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SAR Test Report

Report Number: M071033_CERT_MC8781_SAR_GSM_UMTS

Test Sample:	Portable TABLET Computer
Radio Modules:	WWAN MC8781, WLAN & Bluetooth
Model Number:	T2010
Tested For:	Fujitsu Australia Pty Ltd
FCC ID:	N7NMC8781-F
IC:	2417C-MC8781
Date of Issue:	15th February 2008

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1.0 GENERAL INFORMATION

Test Sample:	Portable Tablet Computer
Model Name:	T2010
Radio Modules:	GSM/UMTS WWAN Module MC8781, WLAN KENDRON 4965AGN & Bluetooth EYTF3CS FT
Interface Type:	Mini-PCI Module
Device Category:	Portable Transmitter
Test Device:	Pre-Production Unit
FCC ID:	N7NMC8781-F
IC:	2417C-MC8781
RF exposure Category:	General Population/Uncontrolled
Manufacturer:	Fujitsu Limited

Test Standard/s:

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. Evaluation Procedure for Mobile and Portable Radio Transmitters with respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields.
   RSS-102 Issue 1 (Provisional) September 25, 1999

Statement Of Compliance: The Fujitsu Tablet Computer T2010 GSM/UMTS Module with Wireless LAN model KENDRON 4965AGN and Bluetooth module EYTF3CS FT 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.

*. Refer to compliance statement section 9.

Test Date: 24th to 26th Nov 2007, 31st Jan, 5th and 11th Feb 2008

Tested for: Fujitsu Australia Pty Ltd
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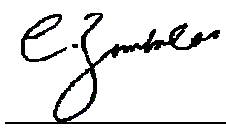
Test Officer:

Kim Long
Test Engineer

Authorised Signature:



Chris Zombolas
Technical Director

SAR TEST REPORT
Portable TABLET Computer
Model: T2010
Report Number: M071033_CERT_MC8781_SAR_GSM_UMTS

2.0 INTRODUCTION

Testing was performed on the Fujitsu Tablet PC, Model: T2010 with SIERRA Mini-PCI Wireless WAN Module Model: MC8781, with INTEL Mini-PCI Wireless LAN Module (KEDRON 4965AGN 802.11a/b/g), Model: KENDRON 4965AGN & TAIYO YUDEN Bluetooth Module, Model: EYTF3CS FT, Bluetooth Transmitter nominal power is less than 5mW. The KEDRON 4965AGN module is an OEM product. It will be referred to as the Equipment Under Test (EUT) throughout this report. The Mini-PCI Wireless WAN (WWAN) was tested in the dedicated host – LIFEBOOK T SERIES, Model T2010.

3.0 SAMPLE TECHNICAL INFORMATION

(Information supplied by the client)

3.1 WWAN Details

Transmitter:	Mini-Card Wireless WAN Module
Model Number:	MC8781
Manufacturer:	Sierra Wireless Incorporated
Modulation Type:	TDMA for GSM/GPRS QPSK and QAM for UMTS
GSM Frequency Bands:	850 / 1900 MHz
UMTS Frequency Bands:	Band II (1900MHz)/Band V (835MHz)
Frequency Ranges:	824.2 – 848.8 MHz and 1850.2 – 1909.8 MHz for GPRS 826.4 – 846.6 MHz and 1852.4 – 1907.6 MHz for UMTS
Antenna Type:	Nissei Electric
Antenna Gain:	Peak gain 2.34 dBi
Output Power:	32 ± 1 dBm in 900 band 29 ± 1 dBm in 1800 band 23 ± 1 dBm in UMTS band

3.2 WLAN Details

Transmitter:	Mini-Card Wireless LAN Module
Wireless Module:	KEDRON 4965 (802.11a/b/g)
Model Number:	KENDRON 4965AGN
Manufacturer:	INTEL
Modulation Type:	Direct Sequence Spread Spectrum (DSSS for 802.11b) Orthogonal Frequency Division Multiplexing (OFDM for 802.11g) Orthogonal Frequency Division Multiplexing (OFDM for 802.11a)
2.4 GHz (802.11b/g):	DBPSK, DQPSK, CCK, 16QAM and 64QAM
5 GHz (802.11a/n):	BPSK, QPSK, 16QAM and 64QAM
Maximum Data Rate:	802.11b = 11Mbps, 802.11g and 802.11a = 54Mbps 802.11n = 300 Mbps
Frequency Ranges:	2.412 –2.462 GHz for 802.11b/g 5.18 - 5.32 GHz, 5500 – 5700 GHz and 5.745 - 5.825 GHz for 802.11a
Number of Channels:	11 channels for 802.11b/g 28 channels for 802.11a
Antenna Types:	Tx: Yokowo Monopole Antenna - Model: CP335166 Location: Top edge of LCD screen
Power Supply:	3.3 VDC from PCI bus

3.3 EUT (Notebook PC) Details

EUT:	LIFEBOOK T SERIES
Model Name:	T2010
Serial Number:	Pre-production Sample
Manufacturer:	FUJITSU LIMITED
CPU Type and Speed:	Core2 Duo U7600 1.20GHz/U7500 1.06GHz
LCD	12.1"WXGA
Wired LAN:	Marvell 88E8055 : 10 Base-T/100 Base-TX/1000Base-T
Modem:	Agere MDC1.5 modem Model: D40
Port Replicator Model:	FPCPR77 / FPCPR79 / FPCPR80
AC Adapter Model:	60W:SEC80N2-16.0(Sanken)
Voltage:	16V
Current Specs:	3.75A
Watts:	60W

3.4 Test Signal, Frequency and Output Power

The EUT was provided by Fujitsu Australia Pty Ltd. It was put into operation using a Rhodes & Schwarz Radio Communication Tester CMU200. The channels utilised in the measurements were the traffic channels shown in the table below. The power level was set to Class 4 for 850 MHz and Class 1 for 1900 MHz GSM bands and class 3 for 850 and 1900 MHz UMTS bands.

Channels and Output power:

Channel and Mode	Frequency MHz	Average Output Power dBm
GPRS Mode		
Channels 128, 190 and 251	824.2, 836.6 and 848.8	33
Channels 512, 661 and 810	1850.2, 1880 and1909.8	30
UMTS Mode		
Channels 4132, 4183 and 4233	826.4, 836.6 and 846.6	24
Channels 9262, 9400 and 9538	1852.4, 1880 and 1907.6	24

3.5 Test sample Accessories

3.5.1 Battery Types

One type of Fujitsu Lithium Ion Battery is used to power the Portable Tablet Computer Wireless WAN Model: MC8781. SAR measurements were performed with the battery as shown below.

Standard Battery

Model	CP343809-01
V/mAh	10.8V / 5800mAh
Cell No.	6

4.0 TEST SIGNAL, FREQUENCY AND OUTPUT POWER

The Portable Tablet Computer Wireless WAN had a total of 423 channels (USA model) within the 824.2 to 848.8 MHz and 1850.2 to 1909.8 MHz GPRS frequency bands and 379 channels within the frequency ranges 826.4 to 846.6 MHz and 1852.4 to 1907.6 MHz. For the SAR measurements the device was operating at full transmit power. The fixed frequency channels used in the testing are shown in the table below.

The Portable Tablet Computer Wireless LAN had a total of 11 channels (USA model) within the 2412 to 2462 MHz frequency band and 17 channels within the frequency range 5180 – 5825 MHz. In The frequency range 2412 MHz to 2462 MHz the device operates in 2 modes, OFDM and DSSS. Within the 5180 – 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 the table below.

The frequency span of the GSM and UMTS 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. 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 results of this measurement are listed in table below.

Table: Frequency and Conducted Power Results GSM

Coding Scheme	GPRS Power Class	RF Channel	Measured Power (dBm)
CS1	10	128	30.39
CS1	10	190	30.42
CS1	10	251	30.67
CS1	11	128	27.38
CS1	11	190	27.38
CS1	11	251	27.58
CS1	12	128	24.47
CS1	12	190	24.40
CS1	12	251	24.62

Coding Scheme	EGPRS Power Class	RF Channel	Measured Power (dBm)
MCS5	10	128	25.32
MCS5	10	190	25.72
MCS5	10	251	25.93
MCS5	11	128	25.15
MCS5	11	190	25.62
MCS5	11	251	25.84
MCS5	12	128	25.12
MCS5	12	190	25.52
MCS5	12	251	25.78

Coding Scheme	GPRS Power Class	RF Channel	Measured Power (dBm)
CS1	10	512	28.55
CS1	10	661	28.42
CS1	10	810	28.44
CS1	11	512	28.40
CS1	11	661	28.30
CS1	11	810	28.36
CS1	12	512	28.32
CS1	12	661	28.23
CS1	12	810	28.16

Coding Scheme	EGPRS Power Class	RF Channel	Measured Power (dBm)
MCS5	10	512	25.61
MCS5	10	661	25.60
MCS5	10	810	25.59
MCS5	11	512	25.53
MCS5	11	661	25.46
MCS5	11	810	25.61
MCS5	12	512	25.54
MCS5	12	661	25.48
MCS5	12	810	25.50

Conducted Power Measurement UMTS 850 MHz

Configuration:
12.2 kbps RMC
Test Loop Mode 1
βc = 8, βd = 15 (3GPP default)
TPC (Transmit Power Control) = All 1s

Channel No.	βc	βd	Result (dBm)
4132	8	15	22.52
4183	8	15	22.39
4233	8	15	22.50

Conducted Power Measurement UMTS + HSDPA 850 MHz

Configuration:
Device HSDPA Category 6 (Downlink 3.6 Mbps and Uplink 384 kbps)
H-Set = 3
QPSK in H-Set (3)
CQI Fidback Cycle = 4ms; CQI Repetition Rate = 2ms
3GPP default HS-DPCCH power offset parameters Δ_{AKN} = 5; Δ_{NAKN} = 5; Δ_{CQI} = 2

Sub Test No.	βc	βd	ΔAKN	ΔNAKN	ΔCQI	Result (dBm)		
						4132	4183	4233
1	2	15	8	8	8	22.60	22.31	22.26
2	12	15	8	8	8	22.06	21.71	21.82
3	15	8	8	8	8	22.10	21.70	21.87
4	15	4	8	8	8	21.58	21.30	21.44
1	2	15	5	5	2	22.62	22.27	22.27
2	12	15	5	5	2	22.20	21.90	22.13
3	15	8	5	5	2	20.91	20.74	20.64
4	15	4	5	5	2	20.17	20.02	19.97

Conducted Power Measurement UMTS 1900 MHz

Configuration:
12.2 kbps RMC
Test Loop Mode 1
βc = 8, βd = 15 (3GPP default)
TPC (Transmit Power Control) = All 1s

Channel No.	βc	βd	Result (dBm)
9262	8	15	24.74
9400	8	15	24.67
9538	8	15	23.75

Conducted Power Measurement UMTS + HSDPA 1900 MHz

Configuration:
Device HSDPA Category 6 (Downlink 3.6 Mbps and Uplink 384 kbps)
H-Set = 3
QPSK in H-Set (3)
CQI Fidback Cycle = 4ms; CQI Repetition Rate = 2ms
3GPP default HS-DPCCH power offset parameters Δ_{AKN} = 5; Δ_{NAKN} = 5; Δ_{CQI} = 2

Sub Test No.	βc	βd	ΔAKN	ΔNAKN	ΔCQI	Result (dBm)		
						9262	9400	9538
1	2	15	8	8	8	24.79	24.72	23.73
2	12	15	8	8	8	25.14	25.17	23.88
3	15	8	8	8	8	25.47	25.43	24.28
4	15	4	8	8	8	25.15	25.06	23.70
1	2	15	5	5	2	24.77	24.66	23.58
2	12	15	5	5	2	25.11	25.03	23.69
3	15	8	5	5	2	24.43	24.36	23.11
4	15	4	5	5	2	24.12	23.92	22.84

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
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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:

AS/NZS 2772.1:	RF and microwave radiation hazard measurement
ACA:	Radio communications (Electromagnetic Radiation - Human Exposure) Standard 2003
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 50361: 2001	Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300MHz – 3GHz)
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 53% to 65%. 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 SN1377 and SN1380 probes was less than 5μV in both air and liquid mediums.

6.0 DESCRIPTION OF SAR MEASUREMENT SYSTEM

Applicable Head Configurations Applicable Body Configurations	: None : Tablet Position : Edge On – Top Position : Edge On – Right Position : Lap 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 system is based on a high precision 6-axis robot (working range greater that 1.1m), which positions the SAR measurement probes with a positional repeatability of better than ±0.02 mm. The DASY4 fully complies with the OET65 C (01-01), IEEE 1528 and EN50361 SAR measurement requirements.

6.2 E-Field Probe Type and Performance

The SAR measurements were conducted with SPEAG dosimetric probes ET3DV6 Serial: 1377 and 1380 designed in the classical triangular configuration and optimised for dosimetric evaluation. The probes have been calibrated and found to be accurate to better than ±0.25 dB. The probe is suitable for measurements close to material discontinuity at the surface of the phantom. The sensors of the probe are directly loaded with Schottky diodes and connected via highly resistive lines (length = 300 mm) to the data acquisition unit.

6.3 Data Acquisition Electronics

The data acquisition electronics (DAE3) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. The input impedance of the DAE3 box is 200 MΩ; the inputs are symmetrical and floating. Common mode rejection is above 80dB.Transmission to the PC-card is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

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

6.4 Validation

6.4.1 Validation Results

The following tables lists the dielectric properties of the tissue simulating liquid measured prior to SAR validation. The results of the validation are listed in columns 4 and 5. The forward power into the reference dipole for SAR validation was adjusted to 250 mW.

Table: Validation Results

1. Validation Date & Frequency	2. ∈r (measured)	3. σ (mho/m) (measured)	4. Measured SAR 1g (mW/g)	5. Measured SAR 10g (mW/g)
24th Nov 07 1800 MHz	38.7	1.38	9.10	4.86
25th Nov 07 900 MHz	42.9	1.01	2.89	1.84
26th Nov 07 900 MHz	42.2	0.99	2.84	1.81
26th Nov 07 1800 MHz	38.6	1.38	9.17	4.90
31st Jan 08 2450 MHz	39.9	1.82	13.8	6.50
5th Feb 08 5800 MHz	36.4	5.43	18.8	5.30
11th Feb 08 5800 MHz	34.3	5.34	18.8	5.30

6.4.2 Deviation from reference validation values

The reference SAR values are derived using a reference dipole and flat section of the SAM phantom suitable for a centre frequency of 900, 1800, 2450 and 5800 MHz. These reference SAR values are obtained from the IEEE Std 1528-2003 and are normalized to 1W.

The SPEAG calibration reference SAR value is the SAR validation result obtained in a specific dielectric liquid using the validation dipole during calibration. The measured one-gram SAR should be within 10% of the expected target reference values shown in table below (2450MHz) below.

Table: Deviation from reference validation values

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)	IEEE Std 1528 reference SAR value 1g (mW/g)	Deviation From IEEE (1g)
24th Nov 07 1800 MHz	9.10	36.4	39.3	-7.38	38.1	-4.46
25th Nov 07 900 MHz	2.89	11.6	10.9	6.06	10.8	7.04
26th Nov 07 900 MHz	2.84	11.4	10.9	4.22	10.8	5.19
26th Nov 07 1800 MHz	9.17	36.7	39.3	-6.66	38.1	-3.73
31st Jan 08 2450 MHz	13.8	55.2	54.0	2.22	52.4	5.34
5th Feb 08 5800 MHz	18.8	75.20	80.8	-6.93	78.2	-3.84
11th Feb 08 5800 MHz	18.8	75.20	80.8	-6.93	78.2	-3.84

NOTE: All reference validation 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 15cm with a tolerance of 0.5cm.

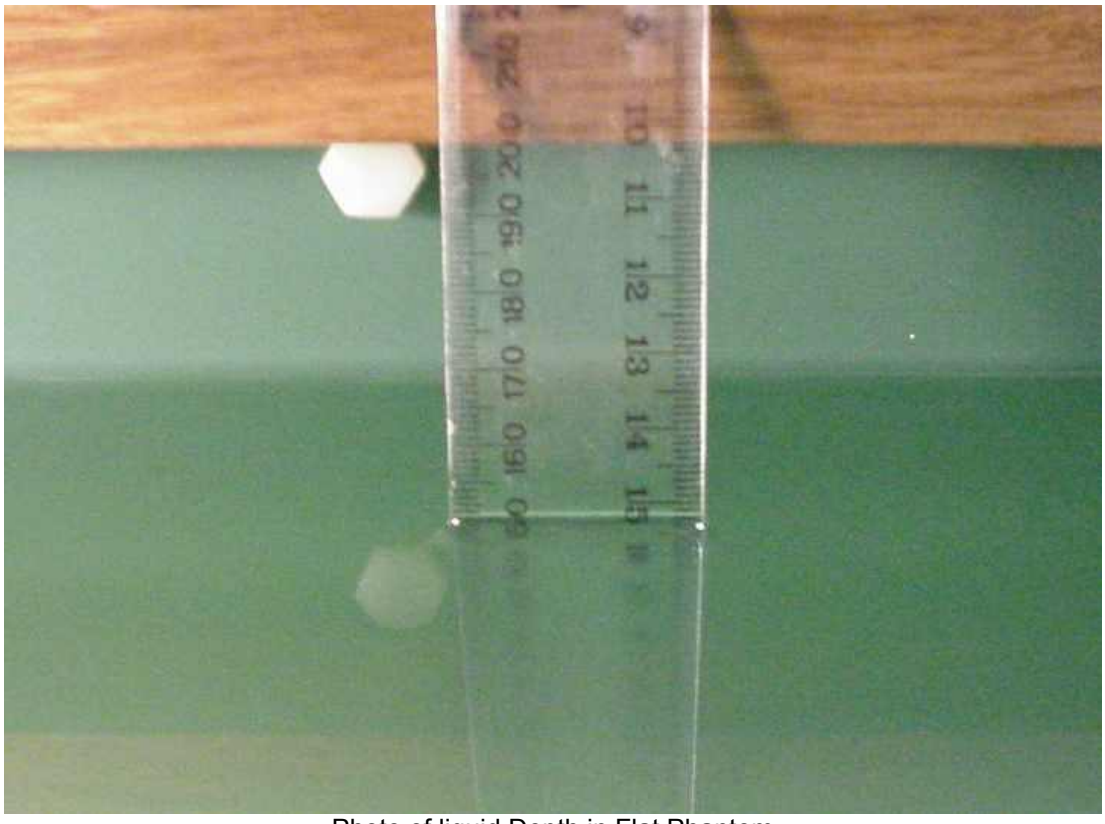


Photo of liquid Depth in Flat Phantom

6.5 Phantom Properties (Size, Shape, Shell Thickness)

The phantom used during the validations was the SAM Phantom model: TP – 1060 and TP - 1260 from SPEAG. It is a phantom with a single thickness of 2 mm and was filled with the required tissue simulating liquid. The SAM phantom support structures were all non-metallic and spaced more than one device width away in transverse directions.

For SAR testing in the body worn positions an AndreT Flat phantom P 10.1 was used. The phantom thickness is 2.0mm+/-0.2 mm and was filled with the required tissue simulating liquid. Below table provides a summary of the measured phantom properties. *Refer to Appendix C Part 4, for details of P 10.1 phantom dielectric properties and loss tangent*.

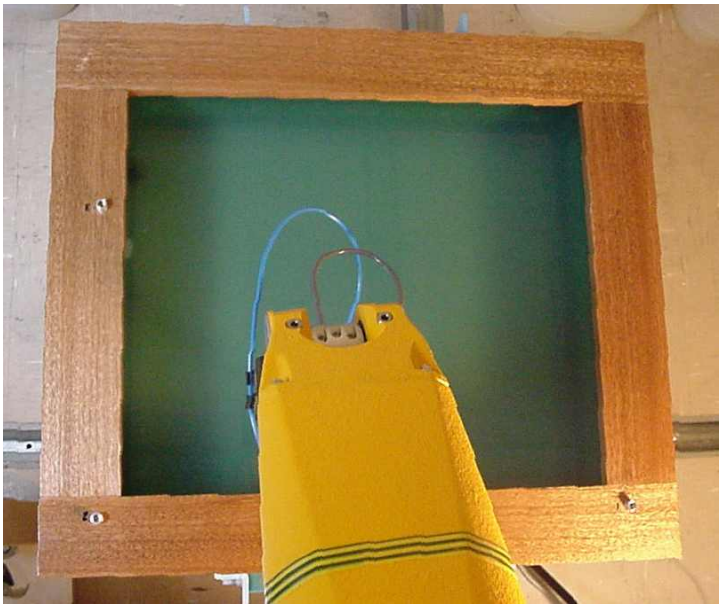
Table: Phantom Properties

Phantom Properties	Required	Measured
Thickness of flat section	2.0mm ± 0.2mm (bottom section)	2.12-2.20mm
Dielectric Constant	<5.0	4.603 @ 300MHz (worst-case frequency)
Loss Tangent	<0.05	0.0379 @ 2500MHz (worst-case frequency)

Depth of Phantom	200mm
Length of Flat Section	620mm
Width of Flat Section	540mm

P 10.1 Flat Phantom

P 10.1 Flat Phantom



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: Measured Brain Simulating Liquid Dielectric Values for Validations

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
900 MHz Brain	42.2 - 42.9	41.5 ±5% (39.4 to 43.6)	0.99 -1.00	0.97 ±5% (0.92 to 1.02)	1000
1800 MHz Brain	38.6 – 38.7	40.0 ±5% (38.0 to 42.0)	1.38	1.40 ±5% (1.33 to 1.47)	1000
2450 MHz Brain	39.9	39.2 ±5% (37.2 to 41.2)	1.82	1.80 ±5% (1.71 to 1.89)	1000
5800 MHz Brain	34.3 - 36.4	35.3 ±5% (33.5 to 37.1)	5.34 - 5.43	5.27 ±5% (5.01 to 5.53)	1000

NOTE: The brain liquid parameters were within the required tolerances of ±5%.

Table: Measured Body Simulating Liquid Dielectric Values at 850MHz

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
825 MHz Body	53.4 - 54.2	55.2 ±5% (52.4 to 58.0)	0.94 - 0.95	0.97 ±5% (0.92 to 1.02)	1000
835 MHz Body	53.1 - 53.9	55.2 ±5% (52.4 to 58.0)	0.96	0.97 ±5% (0.92 to 1.02)	1000
850 MHz Body	53.0 - 53.7	55.2 ±5% (52.4 to 58.0)	0.96 - 0.97	0.97 ±5% (0.92 to 1.02)	1000

Note: The body liquid parameters were within the required tolerances of ±5%.

Table: Measured Body Simulating Liquid Dielectric Values at 1880MHz

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
1850 MHz Body	51.3 – 51.6	53.3 ±5% (50.6 to 56.0)	1.53	1.52 ±5% (1.44 to 1.60)	1000
1880.0 MHz Body	51.2 – 51.6	53.3 ±5% (50.6 to 56.0)	1.54 – 1.56	1.52 ±5% (1.44 to 1.60)	1000
1910 MHz Body	51.1 – 51.4	53.3 ±5% (50.6 to 56.0)	1.56 – 1.57	1.52 ±5% (1.44 to 1.60)	1000

Note: The body liquid parameters were within the required tolerances of ±5%.

Table: Measured Body Simulating Liquid Dielectric Values for WLAN

Frequency Band	∈r (measured range)	∈r (target)	σ (mho/m) (measured range)	σ (target)	ρ kg/m^3
2412 MHz Body	51.9	52.7 ±5% (50.1 to 55.3)	1.94	1.95 ±5% (1.85 to 2.05)	1000
5785 MHz Muscle	47.8	48.2 ±10% (43.38 to 53.02)	6.09	6.0 ±10% (5.4 to 6.60)	1000

Note: The body liquid parameters were within the required tolerances of ±5%.

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: Temperature and Humidity recorded for each day

Date	Ambient Temperature (°C)	Liquid Temperature (°C)	Humidity (%)
24th Nov 2007	22.0	21.7	53.0
25th Nov 2007	21.6	20.8	56.0
26th Nov 2007	21.6	20.9	53.0
31st Jan 2008	21.4	20.9	63.0
5th Jan 2008	22.2	21.5	65.0
11th Jan 2008	21.9	21.5	57.0

6.7 Simulated Tissue Composition Used for SAR Test

The tissue simulating liquids are created prior to the SAR evaluation and often require slight modification each day to obtain the correct dielectric parameters.

Table: Tissue Type: Brain @ 850/900MHz
Volume of Liquid: 30 Litres

Approximate Composition	% By Weight
Distilled Water	41.05
Salt	1.35
Sugar	56.5
HEC	1.0
Bactericide	0.1

Table: Tissue Type: Brain @ 1800/1950MHz MHz
Volume of Liquid: 30 Litres

Approximate Composition	% By Weight
Distilled Water	61.17
Salt	0.31
Bactericide	0.29
Triton X-100	38.23

Table: Tissue Type: Body @ 850/900MHz
Volume of Liquid: 30 Litres

Approximate Composition	% By Weight
Distilled Water	56
Salt	0.76
Sugar	41.76
HEC	1.21
Bactericide	0.27

*Refer "OET Bulletin 65 97/01 P38"

Table: Tissue Type: Body @ 1800/1950MHz MHz
Volume of Liquid: 30 Litres

Approximate Composition	% By Weight
Distilled Water	40.4
Salt	0.5
Sugar	58
HEC	1
Bactericide	0.1

Table: Tissue Type: Brain @ 2450MHz
Volume of Liquid: 30 Litres

Approximate Composition	% By Weight
Distilled Water	62.7
Salt	0.5
Triton X-100	36.8

Table: Tissue Type: Muscle @ 2450MHz
Volume of Liquid: 60 Litres

Approximate Composition	% By Weight
Distilled Water	73.2
Salt	0.04
DGBE	26.7

*Refer "OET Bulletin 65 97/01 P38"

Table: Tissue Type: Muscle @ 5600MHz

Volume of Liquid: 60 Litres

EMCT Liquid

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. Small pieces of foam were then used to press the Tablet flush against 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 3.9 mm from the inner surface of the shell. The area covers the entire dimension of the EUT and the horizontal grid spacing is 15 mm x 15 mm. The actual Area Scan has dimensions of 91mm x 181mm surrounding the test device. Based on this data, the area of the maximum absorption is determined by Spline interpolation. The first “pre-scans” covered an area of 141 mm x 181 mm to ensure that the hotspot was correctly identified.

c) Around this point, a volume of 30 mm x 30 mm x 30 mm is assessed by measuring 7 x 7 x 7 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 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2 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.

7.2 Multi-band Evaluation Procedure

Multi-band evaluations are use in cases where a wireless device co-transmits multiple frequencies at the same time. Such devices may be compliant with the regulatory SAR limit at each frequency while the composite SAR from simultaneous transmission is above the limit. Therefore, multi-band evaluation is use for more accurate SAR measurements.

For Multi-band evaluation separate Volume Scan job was performed for each band to conduct the measurement of volumes with sufficient spatial extend. The resulting measurement jobs were then evaluated and combined using the SEMCAD Postprocessor.

8.0 MEASUREMENT UNCERTAINTY

The uncertainty analysis is based on the template listed in the IEEE Std 1528-2003 for both Handset SAR tests and Validation uncertainty. The measurement uncertainty of a specific device is evaluated independently and the total uncertainty for both evaluations (95% confidence level) must be less than 30%.

Table: Uncertainty Budget for DASY4 V4.7 Build 53 – EUT SAR test

a	b	c	d	e= f(d,k)	f	g	h=cxf/e	i=cxg/e	k
Uncertainty Component	Sec.	Tol. (%)	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i (%)	10g u_i (%)	v_i
Measurement System									
Probe Calibration (k=1) (numerical calibration)	7.2.1	4.8	N	1	1	1	4.8	4.8	∞
Axial Isotropy	7.2.1	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	7.2.1	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	7.2.1	1	R	1.73	1	1	0.6	0.6	∞
Linearity	7.2.1	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	7.2.1	1	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	7.2.1	1	N	1	1	1	1.0	1.0	∞
Response Time	7.2.1	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	7.2.1	2.6	R	1.73	1	1	1.5	1.5	∞
RF Ambient Conditions	7.2.3	0.05	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mechanical Tolerance	7.2.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	7.2.2	2.9	R	1.73	1	1	1.7	1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	7.2.4	1	R	1.73	1	1	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	7.2.2	1.61	N	1	1	1	1.6	1.6	11
Device Holder Uncertainty									
Output Power Variation – SAR Drift Measurement	7.2.3	10	R	1.73	1	1	5.8	5.8	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (shape and thickness tolerances)	7.2.2	4	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity – Deviation from target values	7.2.3	5	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity – Measurement uncertainty	7.2.3	4.3	N	1	0.64	0.43	2.8	1.8	5
Liquid Permittivity – Deviation from target values	7.2.3	5	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity – Measurement uncertainty	7.2.3	4.3	N	1	0.6	0.49	2.6	2.1	5
Combined standard Uncertainty			RSS				10.9	10.5	154
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				21.8	20.92	

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

a	b	c	d	e= f(d,k)	f	g	h=cxf/e	i=cxg/e	k
Uncertainty Component	Sec.	Tol. (%)	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i (%)	10g u_i (%)	v_i
Measurement System									
Probe Calibration (k=1) (numerical calibration)	E.2.1	6.8	N	1	1	1	6.8	6.8	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	2	R	1.73	1	1	1.2	1.2	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	1	N	1	1	1	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1	1	1.5	1.5	∞
RF Ambient Conditions	E.6.1	0.075	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.8	R	1.73	1	1	0.5	0.5	∞
Probe Positioning with respect to Phantom Shell	E.6.3	5.7	R	1.73	1	1	3.3	3.3	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E.5	4	R	1.73	1	1	2.3	2.3	∞
Test Sample Related									
Test Sample Positioning	E.4.2	2.9	N	1	1	1	2.9	2.9	11
Device Holder Uncertainty	E.4.1	3.6	N	1	1	1	3.6	3.6	7
Output Power Variation – SAR Drift Measurement	6.6.2	2.8	R	1.73	1	1	1.6	1.6	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity – Deviation from target values	E.3.2	10	R	1.73	0.64	0.43	3.7	2.5	∞
Liquid Conductivity – Measurement uncertainty	E.3.3	2.5	N	1	0.64	0.43	1.6	1.1	5
Liquid Permittivity – Deviation from target values	E.3.2	10	R	1.73	0.6	0.49	3.5	2.8	∞
Liquid Permittivity – Measurement uncertainty	E.3.3	2.5	N	1	0.6	0.49	1.5	1.2	5
Combined standard Uncertainty			RSS				12.4	11.8	154
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				24.8	23.69	

Estimated total measurement uncertainty for the DASY4 measurement system was ±12.4%. The extended uncertainty (K = 2) was assessed to be ±24.8% based on 95% confidence level. The uncertainty is not added to the measurement result.

Table: Uncertainty Budget for DASY4 V4.7 Build 53 – Validation

a	b	c	D	e= f(d,k)	f	g	h=cxf/e	i=cxg/e	k
Uncertainty Component	Sec.	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 (k=1) (standard calibration)	E.2.1	4.8	N	1	1	1	4.8	4.8	∞
Axial Isotropy	E.2.2	4.7	R	1.73	1	1	2.7	2.7	∞
Hemispherical Isotropy	E.2.2	0	R	1.73	1	1	0.0	0.0	∞
Boundary Effect	E.2.3	1	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	1	N	1	1	1	1.0	1.0	∞
Response Time	E.2.7	0	R	1.73	1	1	0.0	0.0	∞
Integration Time	E.2.8	0	R	1.73	1	1	0.0	0.0	∞
RF Ambient Conditions	E.6.1	0.05	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	E.6.3	2.9	R	1.73	1	1	1.7	1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E.5	1	R	1.73	1	1	0.6	0.6	∞
Test Sample Related				□					
Dipole Axis to Liquid Surface		2	R	1.73	1	1	1.2	1.2	∞
Power Drift		4.7	R	1.73	1	1	2.7	2.7	∞
				□					□
Phantom and Tissue Parameters									
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity – Deviation from target values	E.3.2	5	R	1.73	0.6	0.43	1.7	1.2	∞
Liquid Conductivity – Measurement uncertainty	E.3.3	2.5	N	1.73	0.6	0.43	0.9	0.6	5
Liquid Permittivity – Deviation from target values	E.3.2	5	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity – Measurement uncertainty	E.3.3	2.5	N	1.73	0.6	0.49	0.9	0.7	5
Combined standard Uncertainty			RSS				8.0	7.8	154
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				16.0	15.63	

Estimated total measurement uncertainty for the DASY4 measurement system was ±8.0%. The extended uncertainty (K = 2) was assessed to be ±16.0% based on 95% confidence level. The uncertainty is not added to the Validation measurement result.

Table: Uncertainty Budget for DASY4 Version V4.7 Build 53 – Validation 5GHz

a	b	c	d	e= f(d,k)	f	g	h=cxf/e	i=cxg/e	k
Uncertainty Component	Sec.	Tol. (%)	Prob. Dist.	Div.	C_i (1g)	C_i (10g)	1g u_i (%)	10g u_i (%)	v_i
Measurement System									
Probe Calibration (k=1) (standard calibration)	E.2.1	6.6	N	1	1	1	6.6	6.6	∞
Axial Isotropy	E.2.2	4.7	R	1.73	1	1	2.7	2.7	∞
Hemispherical Isotropy	E.2.2	0	R	1.73	1	1	0.0	0.0	∞
Boundary Effect	E.2.3	2	R	1.73	1	1	1.2	1.2	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	1	N	1	1	1	1.0	1.0	∞
Response Time	E.2.7	0	R	1.73	1	1	0.0	0.0	∞
Integration Time	E.2.8	0	R	1.73	1	1	0.0	0.0	∞
RF Ambient Conditions	E.6.1	0.075	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.8	R	1.73	1	1	0.5	0.5	∞
Probe Positioning with respect to Phantom Shell	E.6.3	5.7	R	1.73	1	1	3.3	3.3	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E.5	4	R	1.73	1	1	2.3	2.3	∞
Test Sample Related									
Dipole Axis to Liquid distance	E.4.2	2	N	1	1	1	2.0	2.0	11
Output Power Variation – SAR Drift Measurement	6.6.2	4.7	R	1.73	1	1	2.7	2.7	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity – Deviation from target values	E.3.2	5	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity – Measurement uncertainty	E.3.3	2.5	N	1	0.64	0.43	1.6	1.1	5
Liquid Permittivity – Deviation from target values	E.3.2	5	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity – Measurement uncertainty	E.3.3	2.5	N	1	0.6	0.49	1.5	1.2	5
Combined standard Uncertainty			RSS				10.3	10.0	154
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				20.5	20.02	

Estimated total measurement uncertainty for the DASY4 measurement system was ±10.3%. The extended uncertainty (K = 2) was assessed to be ±20.5% based on 95% confidence level. The uncertainty is not added to the measurement result.

9.0 EQUIPMENT LIST AND CALIBRATION DETAILS

Table: 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	Yes
Robot Remote Control	SPEAG	CS7MB	RX90B	Not applicable	Yes
SAM Phantom	SPEAG	N/A	1260	Not applicable	Yes
SAM Phantom	SPEAG	N/A	1060	Not applicable	Yes
Flat Phantom	AndreT	10.1	P 10.1	Not Applicable	Yes
Flat Phantom	AndreT	9.1	P 9.1	Not Applicable	Yes
Flat Phantom	SPEAG	PO1A 6mm	1003	Not Applicable	No
Data Acquisition Electronics	SPEAG	DAE3 V1	359	12-July-2007	Yes
Data Acquisition Electronics	SPEAG	DAE3 V1	442	13-Aug-2007	Yes
Probe E-Field - Dummy	SPEAG	DP1	N/A	Not applicable	No
Probe E-Field	SPEAG	ET3DV6	1380	12-Dec-2007	Yes
Probe E-Field	SPEAG	ET3DV6	1377	14-July-2007	Yes
Probe E-Field	SPEAG	ES3DV6	3029	Not Used	No
Probe E-Field	SPEAG	EX3DV4	3563	14-July-2007	No
Antenna Dipole 300 MHz	SPEAG	D300V2	1005	26-Oct-2007	No
Antenna Dipole 450 MHz	SPEAG	D450V2	1009	14-Dec-2008	No
Antenna Dipole 900 MHz	SPEAG	D900V2	047	6-July-2008	Yes
Antenna Dipole 1640 MHz	SPEAG	D1640V2	314	30-June-2008	No
Antenna Dipole 1800 MHz	SPEAG	D1800V2	242	3-July-2008	Yes
Antenna Dipole 1950 MHz	SPEAG	D1950V3	1113	5-March-2009	No
Antenna Dipole 2450 MHz	SPEAG	D2450V2	724	13-Dec-2008	Yes
Antenna Dipole 3500 MHz	SPEAG	D3500V2	1002	1-July-2007	No
Antenna Dipole 5600 MHz	SPEAG	D5GHzV2	1008	27-Oct-2007	Yes
RF Amplifier	EIN	603L	N/A	*In test	No
RF Amplifier	Mini-Circuits	ZHL-42	N/A	*In test	Yes
RF Amplifier	Mini-Circuits	ZVE-8G	N/A	*In test	Yes
Synthesized signal generator	Hewlett Packard	ESG-D3000A	GB37420238	*In test	Yes
RF Power Meter Dual	Hewlett Packard	437B	3125012786	30-May-2007	Yes
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481H	1545A01634	30-May-2007	Yes
RF Power Meter Dual	Gigatronics	8542B	1830125	18-April-2007	Yes
RF Power Sensor	Gigatronics	80301A	1828805	18-April-2007	Yes
RF Power Meter Dual	Hewlett Packard	435A	1733A05847	*In test	Yes
RF Power Sensor	Hewlett Packard	8482A	2349A10114	*In test	Yes
Network Analyser	Hewlett Packard	8714B	GB3510035	31-Aug-2007	No
Network Analyser	Hewlett Packard	8753ES	JP39240130	30-Sept-2007	Yes
Dual Directional Coupler	Hewlett Packard	778D	1144 04700	*In test	No
Dual Directional Coupler	NARDA	3022	75453	*In test	Yes

* 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. Also the spacing between the transmitting antennas and the bottom surface of the convertible Tablet PC was less than 20 cm therefore testing was performed in "Laps On" position additionally.

10.1 Test Positions

10.1.1 "Tablet" Position Definition (0mm spacing)

The device was tested in the 2.00 mm flat section of the AndreT Flat phantom P 10.1 for the "Tablet" position. The Transceiver was placed at the bottom of the phantom and suspended in such way that the back of the device was touching the phantom. This device orientation simulates the PC's normal use – being held on the lap of the user. A spacing of 0mm ensures that the SAR results are conservative and represent a worst-case position.

10.1.2 "Laps On" Position (0mm spacing)

The device was tested with the bottom touching the flat phantom in the notebook (normal use) configuration**.**
For this position, the device was placed at the bottom of the P 10.1 phantom and suspended in such way that the bottom of the device surface was touching the phantom. A spacing of 0mm ensures that the SAR results are conservative and represent a worst-case assessment (with respect to SAR).

10.1.3 "Edge On - Top" Position

The device was tested in the (2.00 mm) flat section of the AndreT phantom for the "Edge On - Top" 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.*

10.1.4 "Edge On - Right" Position

The device was tested in the (2.00 mm) flat section of the AndreT phantom for the "Edge On - Right" 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, as specified in section 4.0 were recorded. The following table represents the matrix used to determine what testing was required. The worst case result was verified with the WLAN transmitting at full power in co-transmission with the WWAN.

Table: Testing configurations

Phantom Configuration	*Device Mode WWAN Band Name	Test Configurations		
		CHANNEL (LOW)	Channel (Middle)	Channel (High)
Tablet	GPRS 850 MHz		x	
	GPRS 1900 MHz		x	
	EGPRS 850 MHz		x	
	EGPRS 1900 MHz		x	
	WCDMA 850 MHz		x	
	WCDMA 1900 MHz		x	
	WCDMA + HSDPA 850 MHz		x	
	WCDMA + HSDPA 1900 MHz		X	
	WLAN + UMTS		x	
	WLAN + GPRS		x	
Edge On	GPRS 850 MHz		x	
	GPRS 1900 MHz		x	
	EGPRS 850 MHz		x	
	EGPRS 1900 MHz		x	
	WCDMA 850 MHz		x	
	WCDMA 1900 MHz		x	
	WCDMA + HSDPA 850 MHz		x	
	WCDMA + HSDPA 1900 MHz		x	
	WLAN + UMTS		x	
	WLAN + GPRS		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.

10.3 FCC RF Exposure Limits for Occupational/ Controlled Exposure

Spatial Peak SAR Limits For:	
Partial-Body:	8.0 mW/g (averaged over any 1g cube of tissue)
Hands, Wrists, Feet and Ankles:	20.0 mW/g (averaged over 10g cube of tissue)

10.4 FCC RF Exposure Limits for Un-controlled/Non–occupational

Spatial Peak SAR Limits For:	
Partial-Body:	1.6 mW/g (averaged over any 1g cube of tissue)
Hands, Wrists, Feet and Ankles:	4.0 mW/g (averaged over 10g cube of tissue)

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 10.1.

11.1.1 SAR Results

There are two modes of operation that include UMTS and GPRS transmission. Refer to section 10.1 for selection of all device test configurations. Table below displays the SAR results.

Table: SAR MEASUREMENT RESULTS – 850MHz GPRS

Test Position	Plot No.	Test Channel	Test Freq (MHz)	Measured 1g SAR Results (mW/g)	Measured Drift (dB)
Tablet	1	190	836.6	Pre-scan Only	-
Edge On Top	2	190	836.6	Pre-scan Only	-
Edge On Right	3	190	836.6	Pre-scan Only	-
Laps On	4	190	836.6	Noise Floor	-
Tablet GPRS Class 10	5	190	836.6	0.33	-0.12
Edge On Top GPRS Class 10	6	190	836.6	0.21	-0.02
Edge On Right EGPRS Class 10	7	251	848.8	0.33	-0.12
Edge On Right GPRS Class 11	8	190	836.6	0.67	-0.06
Edge On Right GPRS Class 12	9	190	836.6	0.47	-0.03
Edge On Right GPRS Class 10	10	128	824.2	0.78	-0.08
	11	190	836.6	0.83	-0.05
	12	251	848.8	0.97	-0.09
Edge On Right GPRS Class 10 WLAN On	13	251	848.8	0.97	-0.09
WLAN (DSSS) Edge On Top Ant A with 850MHz GPRS	14	WLAN: 01 GPRS:190	WLAN: 2412 GPRS:836.6	1.25	-0.05
WLAN (OFDM) Edge On Top Ant A* with 850MHz GPRS	15	WLAN: 157 GPRS:190	WLAN: 5785 GPRS:836.6	0.372	-0.14

NOTE: The measurement uncertainty of 24.8% was not added to the result.
* = with 2dB antenna attenuation

Table: SAR MEASUREMENT RESULTS – 1900MHz GPRS

Test Position	Plot No.	Test Channel	Test Freq (MHz)	Measured 1g SAR Results (mW/g)	Measured Drift (dB)
Tablet	16	661	1880	Pre-scan Only	-
Edge On Top	17	661	1880	Pre-scan Only	-
Edge On Right	18	661	1880	Pre-scan Only	-
Laps On	19	661	1880	Pre-scan Only	-
Tablet GPRS Class 12	20	661	1880	0.25	-0.15
Edge On Top GPRS Class 12	21	661	1880	0.19	-0.36
Edge On Right GPRS Class 10	22	661	1880	0.31	0.03
Edge On Right GPRS Class 11	23	661	1880	0.46	-0.02
Edge On Right GPRS Class 12	24	512	1850.2	0.59	0.35
	25	661	1880	0.63	0.07
	26	810	1909.8	0.87	-0.12
Edge On Right EGPRS Class 12	27	810	1909.8	0.49	-0.04
Edge On Right GPRS Class 10 WLAN On	28	810	1909.8	0.93	-0.07
WLAN (DSSS) Edge On Top Ant A with 1900MHz GPRS	29	WLAN: 01 GPRS:661	WLAN: 2412 GPRS:1800	1.55	-0.39
WLAN (OFDM) Edge On Top Ant A with 1900MHz GPRS #	30	WLAN: 157 GPRS:661	WLAN: 5785 GPRS:1880	1.04	-0.137

NOTE: The measurement uncertainty of 24.8% was not added to the result.
= Multi-band Testing

The highest SAR level recorded for GPRS was 1.55 mW/g as evaluated in a 1g cube of averaging mass. This value was obtained in Edge On Top position with the WLAN DSSS Antenna A On in channel 01 (2412 MHz) and with GPRS Class 10 transmitting in channel 661 (1880 MHz).

Table: SAR MEASUREMENT RESULTS – 850MHz UMTS

Test Position	Plot No.	Test Channel	Test Freq (MHz)	Measured 1g SAR Results (mW/g)	Measured Drift (dB)
Tablet	31	4183	836.6	Pre-scan Only	-
Edge On Top	32	4183	836.6	Pre-scan Only	-
Edge On Right	33	4183	836.6	Pre-scan Only	-
Laps On	34	4183	836.6	Pre-scan Only	-
Tablet	35	4183	836.6	0.19	0.01
Edge On Top	36	4183	836.6	0.15	-0.02
Edge On Right + HSDPA	37	4132	826.4	0.67	0.27
Edge On Right	38	4132	826.4	0.63	-0.03
	39	4183	836.6	0.55	-0.04
	40	4233	846.6	0.65	-0.02
Edge On Right WLAN On	41	4233	846.6	0.66	-0.14
WLAN (DSSS) Edge On Top Ant A with 850MHz UMTS	42	WLAN: 01 UMTS: 4183	WLAN: 2412 UMTS: 836.6	1.54	-0.45
WLAN (OFDM) Edge On Top Ant A with 850MHz UMTS #	43	WLAN: 157 UMTS: 4183	WLAN: 5785 UMTS: 836.6	1.01	0.21

NOTE: The measurement uncertainty of 24.8% was not added to the result.
= Multi-band Testing

Table: SAR MEASUREMENT RESULTS – 1900MHz UMTS

Test Position	Plot No.	Test Channel	Test Freq (MHz)	Measured 1g SAR Results (mW/g)	Measured Drift (dB)
Tablet	44	9400	1880	Noise Floor	-
Edge On Top	45	9400	1880	Pre-scan Only	-
Edge On Right	46	9400	1880	Pre-scan Only	-
Laps On	47	9400	1880	Noise Floor	-
Tablet	48	9400	1880	0.15	0.07
Edge On Top	49	9400	1880	0.12	-0.02
Edge On Right + HSDPA	50	9262	1852.4	0.36	-0.17
	51	9400	1880	0.44	-0.14
	52	9538	1907.6	0.53	0.09
Edge On Right	53	9262	1852.4	0.46	0.27
	54	9400	1880	0.40	-0.24
	55	9538	1907.6	0.53	-0.41
Edge On Right WLAN On	56	9538	1907.6	0.57	-0.22
WLAN (DSSS) Edge On Top Ant A with 1900MHz UMTS	57	WLAN: 01 UMTS: 9400	WLAN: 2412 UMTS: 1880	1.47	0.03
WLAN (OFDM) Edge On Top Ant A with 1900MHz UMTS	58	WLAN: 157 UMTS: 9400	WLAN: 5785 UMTS: 1880	1.22	0.08

NOTE: The measurement uncertainty of 24.8% was not added to the result.

The highest SAR level recorded for UMTS was 1.54 mW/g as evaluated in a 1g cube of averaging mass. This value was obtained in Edge On Top position with WLAN DSSS Antenna A On in channel 157 (5785 MHz) and with UMTS 850MHz transmitting in channel 4183 (836.6 MHz).

12.0 COMPLIANCE STATEMENT

The Fujitsu Tablet PC, Model: T2010 with SIERRA WIRELESS Mini-PCI Wireless WAN Module, Model: MC8781 & WLAN Module, Model: KENDRON 4965AGN was found to comply with the FCC and RSS-102 SAR requirements.

The highest SAR level recorded was 1.55 mW/g for a 1g cube. This value was measured at 1800 MHz (channel 661) in the “Edge On Top” position in 850MHz UMTS mode. The WLAN was ON at Frequency 2412 MHz (channel 01) using Antenna A in DSSS mode. This was below the limit of 1.6 mW/g for uncontrolled exposure.

APPENDIX A1 TEST SAMPLE PHOTOGRAPHS

T2010 Host - Conventional Laptop Configuration

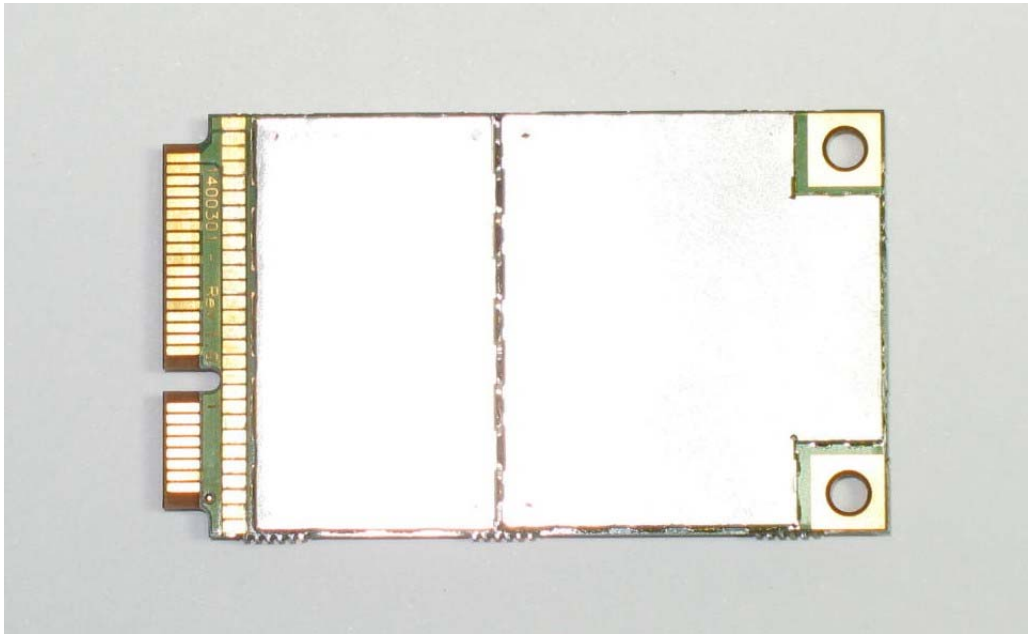
T2010 Host - Tablet Configuration

APPENDIX A2 TEST SAMPLE PHOTOGRAPHS

Model: MC8781 – Wireless WAN Module

Front

Back

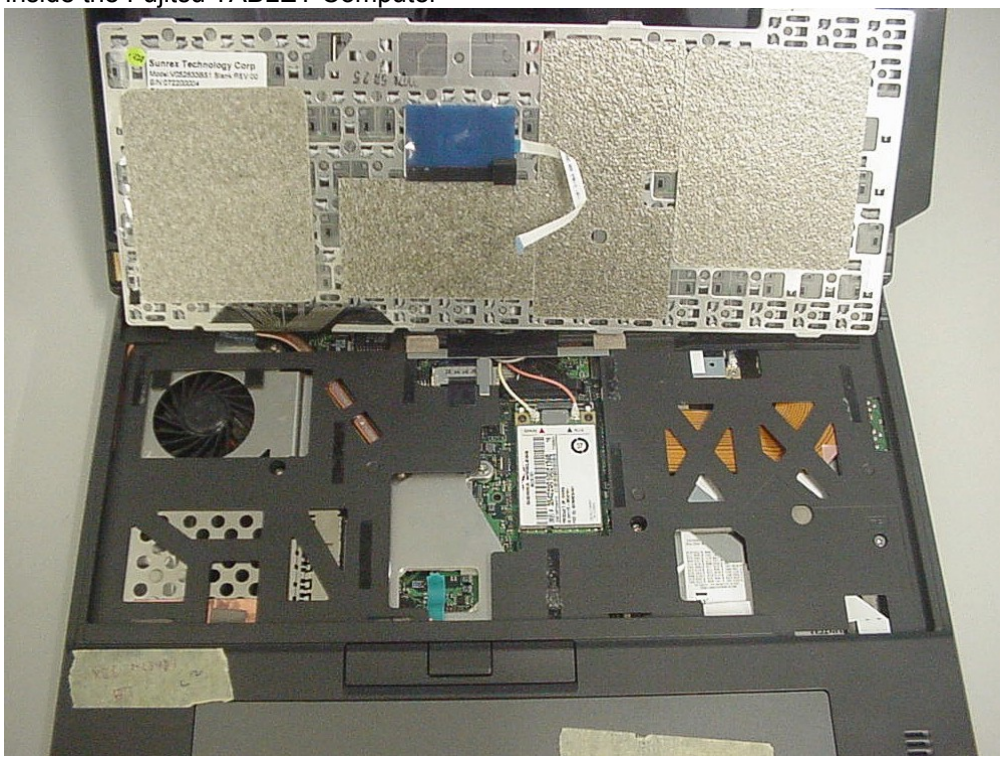


APPENDIX A3 TEST SAMPLE PHOTOGRAPHS

Battery 1

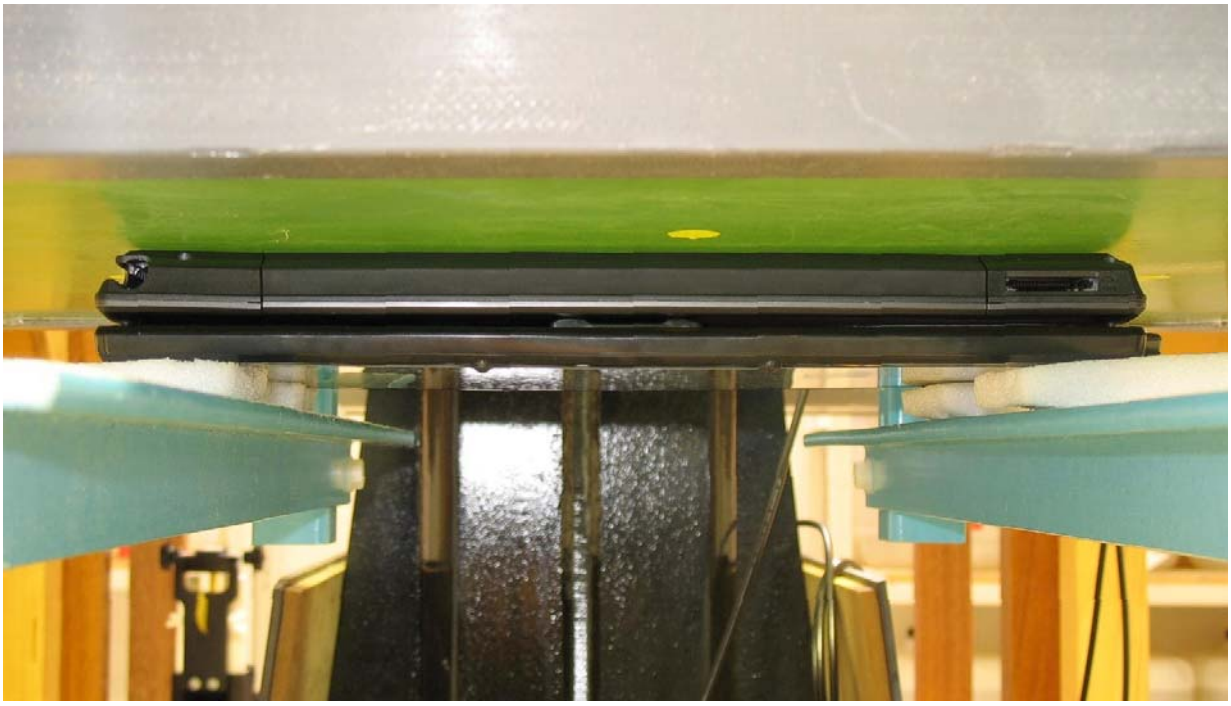
Battery 2

MC8781 inside the Fujitsu TABLET Computer



APPENDIX A4 TEST SETUP PHOTOGRAPHS

Tablet Position

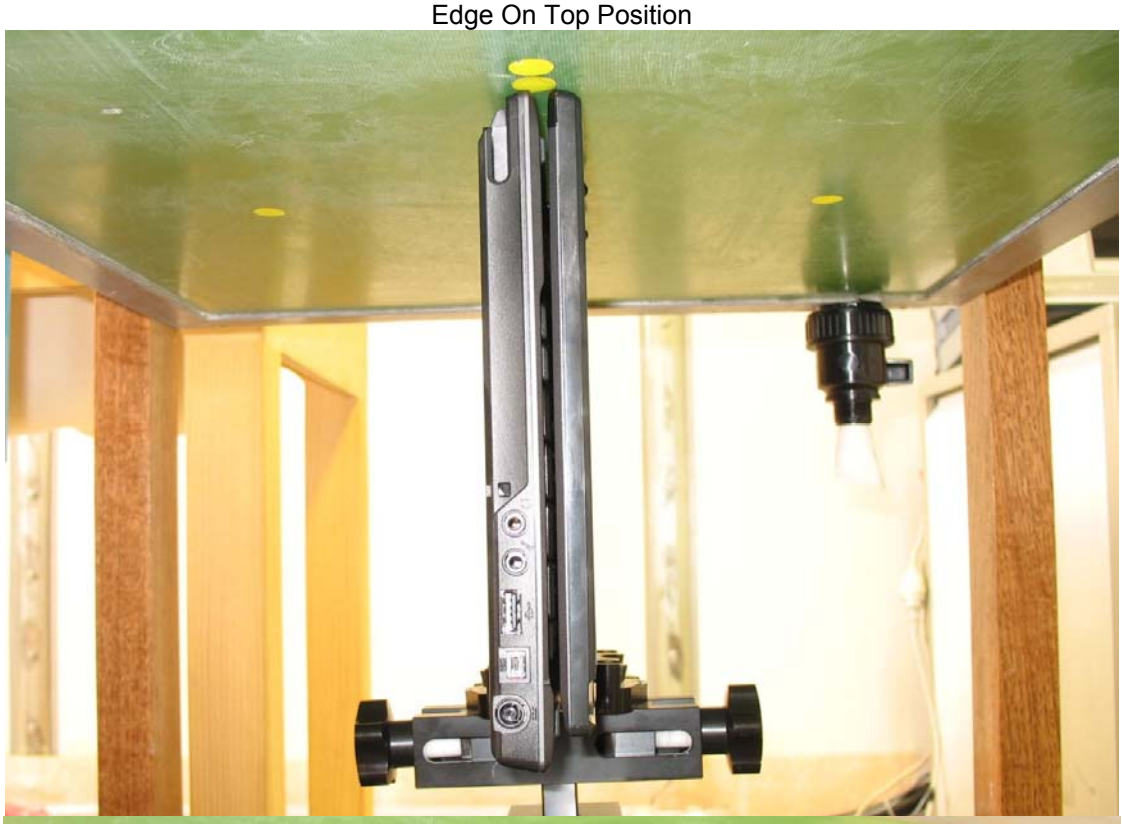


APPENDIX A5 TEST SAMPLE PHOTOGRAPHS

Lap On Position

APPENDIX A6 TEST SAMPLE PHOTOGRAPHS

Edge On Top Position



APPENDIX A7 TEST SAMPLE PHOTOGRAPHS

Edge On Right Position