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EMC-EMF-Safety Approvals

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## SAR Test Report

Report Number: M120829\_FCC\_MC8355\_SAR\_GSM-UMTS

Test Sample: STYLISTIC T series tablet PC  
Radio Modules Under Test: WWAN GOBI 3000 MC8355  
Host PC Model: T732 / TH702  
WWAN FCC ID: N7NMC8355  
WWAN IC: 2417C-MC8355  
Date of Issue: 18<sup>th</sup> September 2012

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## SAR TEST REPORT

**Report Number: M120829\_FCC\_MC8355\_SAR\_GSM-UMTS**

**WWAN FCC ID: N7NMC8355**

**WWAN IC: 2417C-MC8355**

### 1.0 GENERAL INFORMATION

**Table 1**

**Test Sample:** STYLISTIC T series tablet PC with Intel WLAN Modules

**Radio Module Under Test:** MC8355

**Interface Type:** Mini-PCI Module

**Device Category:** Portable Transmitter

**Test Device:** Pre-Production Unit

**Host PC model:** T732 / TH702

**WWAN FCC ID:** N7NMC8355

**WWAN IC:** 2417C-MC8355

**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. Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

RSS-102

3. **EN 62209-2:2010**

Human exposure to radio frequency fields from hand-held and bodymounted wireless communication devices. Human models, instrumentation, and procedures.

**Part 2:** Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)

**Statement Of Compliance:** The Fujitsu TABLET Computer T732 / TH702 with Sierra Wireless

GSM/UMTS Module MC8355 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:** 20<sup>th</sup> August 2012 to 23<sup>rd</sup> August 2012

**Test Officer:**



Peter Jakubiec



Jason Cameron

Emad Mansour

**Authorised Signature:**



Chris Zombolas  
Technical Director



Accreditation No. 5250

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**SAR TEST REPORT**  
**STYLISTIC T series tablet PC**  
**Model: T732 / TH702**  
**Report Number: M120829\_FCC\_MC8355\_SAR\_GSM-UMTS**

## 2.0 INTRODUCTION

Testing was performed on the Fujitsu TABLET PC, Model: T732 / TH702 with SIERRA Mini-PCI Wireless WAN Module (GOBI 3000), Model: MC8355, with INTEL Mini-PCI Wireless LAN Module (INTEL CENTRINO ADVANCED-N 6205 (TAYLOR PEAK) 802.11a/b/g/n), Model: 62205ANHMW & TAIYO YUDEN Bluetooth Module, Model: BCM92070MD\_REF6. Bluetooth Transmitter nominal power is less than 5mW. The GOBI 3000 module is an OEM product. The Mini-PCI Wireless WAN (WWAN) was tested in the dedicated host – STYLISTIC T SERIES , Model T732 / TH702 . The system tested will be referred to as the DUT throughout this report.

## 3.0 TEST SAMPLE TECHNICAL INFORMATION

(Information supplied by the client)

### 3.1 WWAN Details

**Table 2**

|                             |   |
|-----------------------------|---|
| <b>Transmitter:</b>         | WWAN (UMTS/EVDO combo)                        |
| <b>FCC ID:</b>              | N7NMC8355                                     |
| <b>IC:</b>                  | 2417C-MC8355                                  |
| <b>Model Number:</b>        | MC8355  |
| <b>Manufacturer:</b>        | SIERRA WIRELESS INC                           |
| <b>Network Standard:</b>    | GSM Release 6 /                               |
| <b>UMTS bands :</b>         | IMT 2100 / 850 / 1900MHz(Band Class I, II, V) |
| <b>GSM / EDGE bands:</b>    | 850 / 900/ 1800 / 1900 MHz                    |
| <b>Channel spacing:</b>     | 200KHz(GSM), 5MHz(WCDMA)                      |
| <b>Channel raster:</b>      | 200kHz  |
| <b>Antenna type:</b>        | Main: Monopole, AUX: PIFA                     |
| <b>Antenna</b>              | NISSEI ELECTRIC CO. LTD.                      |
| <b>Manufacturer:</b>        |   |
| <b>Antenna Part Number:</b> | Main: CP519214, AUX: CP519215                 |



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### 3.2 Test Signal, Frequency and Output Power

The DUT 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 , 1700 and 1900 MHz UMTS bands.

#### Channels and Output power:

**Table 3**

| Channel and Mode             | Frequency<br>MHz          | Average<br>Output Power<br>dBm |
|------------------------------|---------------------------|--------------------------------|
| <b>GPRS Mode</b>             |                           |                                |
| Channels 128, 190 and 251    | 824.2, 836.6 and 848.8    | 33                             |
| Channels 512, 661 and 810    | 1850.2, 1880 and 1909.8   | 30                             |
| <b>UMTS Mode</b>             |                           |                                |
| 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                             |
| Channels 1312, 1427 and 1513 | 1712.4, 1735.4 and 1752.6 | 24                             |
| <b>CDMA Mode</b>             |                           |                                |
| Channels 1013, 384 and 777   | 824.7, 836.52 and 848.31  | 23                             |
| Channels 25, 600 and 1175    | 1851.25, 1880 and 1908.75 | 23                             |



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### 3.3 DUT (Notebook PC) Details

The intention of this application is to certify **Sierra Wireless Inc. WWAN module** FCC ID: N7NMC8355 and IC: 2417C-MC8355 in a Fujitsu host PC model T732/TH702 with WLAN model Intel 62205ANHMW AND Bluetooth model BCM92070MD\_REF6 (FCC ID: EJE-WL0029 and IC: 337J-WL0029)

SAR testing was conducted on the sample that is equipped with the Bluetooth transmitter with antenna and Intel WLAN modules with antenna.

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 page 32 of this report.

**Table 4**

|                                |  |
|--------------------------------|--|
| <b>Host notebook :</b>         | STYLISTIC T series                               |
| <b>Model Name:</b>             | T732 / TH702                                     |
| <b>Serial Number:</b>          | Pre-production Sample                            |
| <b>Manufacturer:</b>           | FUJITSU LIMITED                                  |
| <br><b>CPU Type and Speed:</b> |  |
| <b>LCD</b>                     | Core i7 2.9GHz                                   |
| <b>Graphics chip</b>           | 12.5"WXGA(1280x800 : LP125WH2                    |
| <b>Wired LAN:</b>              | None   |
| <b>Modem:</b>                  | Intel 82579LM : 10 Base-T/100 Base-TX/1000Base-T |
| <b>Port Replicator Model:</b>  | FPCPR132   |
| <br><b>AC Adapter Model:</b>   |  |
|                                | 80W: ADP-80RB A(Delta), SEE100P2-19.0(Sanken),   |
|                                | PJW1942N(Tamura), PJW1942NA(Tamura)              |
|                                | 100W: A11-100-3A (Chicony)                       |
| <b>Voltage:</b>                | 19 V   |
| <b>Current Specs:</b>          | 4.22A / 5.26A                                    |
| <b>Watts:</b>                  | 80W / 100W                                       |

\*The model numbers shown T732 and TH702 are for the same product. The difference between T732 and TH702 is color and target market.

The T732 is for commercial market.

The TH702 is for consumer market.

### Test sample Accessories

#### 3.3.1 Battery Types

One type of Fujitsu Lithium Ion battery is used to power the DUT.

#### Standard Battery

**Table 5**

|       |               |
|-------|---------------|
| Model | Li-ion        |
| V/mAh | 10.8V/6700mAh |



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## 4.0 TEST SIGNAL, FREQUENCY AND OUTPUT POWER

For the SAR measurements the DUT was operating at full transmit power. The fixed frequency channels used in the testing are shown in Tables below.

The frequency span of the GSM, UMTS and CDMA 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 STYLISTIC T series tablet PC during the SAR measurements. At the beginning of the SAR tests, the conducted power of the GOBI 3000 model MC8355 was measured after temporary modification of antenna connector inside the Host's TX RX compartment. Measurements were performed with a calibrated Power Meter. The results of this measurement are listed in tables below. Burst Average power was used to calculate the Frame Average power (100% Duty Cycle) which determines the worst case Multislot Class.

### Conducted Power Measurement CDMA 2000 1xRTT 850/1900 MHz

Configuration:

Network > System Parameters > System ID = 2004; Network Identity > Network ID Number = 65535

Service cfg > Primary Service Class > Selected Service = Loopback Service; Primary Service Class > Loopback Service > Selected Service Option = Service Option x (x - 2, 9 or 55); Service Option x (x - 2, 9 or 55) > FCH Config > Frames > Frame Rate = Full; Selected Service Option > Service Option 55 > FCH Config > FCH > F-FCH-MO = 0001hex (Fundamental Channel Test Mode 1) or 0002hex (Fundamental Channel Test Mode 2)

Service cfg > Primary Service Class > Selected Service = Test Data Service; Primary Service Class > Test Data Service > Selected Service Option = Service Option 32; Test Data Service Option 32 > FCCH & SCH Config > SCH0 Enable = Off (or On); Test Data Service Option 32 > FCCH & SCH Config > SCH1 Enable = Off (or On); Test Data Service Option 32 > FCCH & SCH Config > SCH0 Config > Data Rate = 9.6 kbps; FCCH & SCH Config > SCH1 Config > Data Rate = 9.6 kbps

BS Signal > RF Settings > RF Power > CDMA Power = -104 dBm/1.23MHz (RF > External attenuation IN/OUT as per cable losses); RF Settings > RF Channel [BC0] = 384; RF Settings > RF Channel [BC1] = 325; BS Signal > RF Settings > RF Power > PICH Level = -7dB; BS Signal > FCH > FCH Level = -7.4 dB  
BS Signal > Power Control > Power Ctrl. Bits = All Up (Service Options 2,9 and 55)  
BS Signal > Power Control > Power Ctrl. Bits = Hold (Service Options 32)

**Table 6**

#### Cellular Band

| Fundamental Channel Test Mode | Supplemental Code Channel Test Mode | Loopback Service Option | Test Data Service Option | SCHn | Result (dBm) |         |         |
|-------------------------------|-------------------------------------|-------------------------|--------------------------|------|--------------|---------|---------|
|                               |                                     |                         |                          |      | Ch. 1013     | Ch. 384 | Ch. 777 |
| 1                             | N/A                                 | SO 2                    | N/A                      | N/A  | 25.10        | 25.13   | 24.88   |
| 1                             | N/A                                 | SO 55                   | N/A                      | N/A  | 25.09        | 25.09   | 24.89   |
| 2                             | N/A                                 | SO 9                    | N/A                      | N/A  | 25.11        | 25.08   | 24.90   |
| 2                             | N/A                                 | SO 55                   | N/A                      | N/A  | 25.08        | 25.07   | 24.87   |
| N/A                           | 3                                   | N/A                     | SO 32                    | OFF  | 25.04        | 25.08   | 24.89   |
| N/A                           | 3                                   | N/A                     | SO 32                    | ON   | 25.09*       | 25.06*  | 24.88*  |

\*SCH1 Enable – rejected by DUT



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**PCS Band**

| Fundamental Channel Test Mode | Supplemental Code Channel Test Mode | Loopback Service Option | Test Data Service Option | SCHn | Result (dBm) |         |         |
|-------------------------------|-------------------------------------|-------------------------|--------------------------|------|--------------|---------|---------|
|                               |                                     |                         |                          |      | Ch. 25       | Ch. 600 | Ch.1175 |
| 1                             | N/A                                 | SO 2                    | N/A                      | N/A  | 23.49        | 22.83   | 23.09   |
| 1                             | N/A                                 | SO 55                   | N/A                      | N/A  | 23.62        | 22.93   | 23.12   |
| 2                             | N/A                                 | SO 9                    | N/A                      | N/A  | 23.60        | 22.95   | 23.15   |
| 2                             | N/A                                 | SO 55                   | N/A                      | N/A  | 23.56        | 23.06   | 23.16   |
| N/A                           | 3                                   | N/A                     | SO 32                    | OFF  | 23.70        | 22.94   | 22.98   |
| N/A                           | 3                                   | N/A                     | SO 32                    | ON   | 23.60        | 22.95   | 22.99   |

**Conducted Power Measurement 1xEvDo Revision 0 850/1900 MHz**

## Configuration:

Network > Network Release = Release 0; Network > System ID = 2004; Access Probes > Initial Adjust (Probe Initial Adjust) = 15 dBm; Probe Increment (Power Step) = 7.5 dB/step; Open Loop Adjust (BC0) = -81 dB (US cellular); Open Loop Adjust (BC1) = -84 dB (N.American PCS)

AN Signal > Sector > Format = Manual; Sector ID = 00800580 00000000 00000000 00000000; RF Settings > RF Power > 1xEv-Do Power = -105.5 dBm/1.23MHz (RF > External attenuation IN/OUT as per cable losses); RF Settings > RF Channel [BC0] = 37; RF Settings > RF Channel [BC1] = 325; Power Control > Power control bits = All Up

Layer > Application Layer > Test Applications > FTAP Cfg > DRC > ACK Ch Fixed Mode = Ack.Always; DRC > Fixed Rate = 4 (307.2 kbps, 2-slots); Test Applications > RTAP Cfg > Data > Min. Rate = 5 (153.6 kbps); Data > Min. Rate = 5 (153.6 kbps)

**Table 7****Cellular Band**

| Release 0 Subtype | Open Loop Adjust (BC0) | Result (dBm) |              |        |
|-------------------|------------------------|--------------|--------------|--------|
|                   |                        | Ch. 1013     | Ch. 384      | Ch.777 |
| 0                 | -81 dB                 | 25.16        | <b>25.26</b> | 24.97  |

**Table 8****PCS Band**

| Release 0 Subtype | Open Loop Adjust (BC0) | Result (dBm) |         |         |
|-------------------|------------------------|--------------|---------|---------|
|                   |                        | Ch. 25       | Ch. 600 | Ch.1175 |
| 0                 | -84 dB                 | <b>23.84</b> | 23.19   | 23.31   |



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## Conducted Power Measurement 1xEvDo Revision A 850/1900 MHz

### Configuration:

Network > Network Release = Release A; Network > System ID = 2004; Access Probes > Initial Adjust (Probe Initial Adjust) = 15 dBm; Probe Increment (Power Step) = 7.5 dB/step; Open Loop Adjust (BC0) = -81 dB (US cellular); Open Loop Adjust (BC1) = -84 dB (N.American PCS)

AN Signal > Sector > Format = Manual; Sector ID = 00800580 00000000 00000000 00000000; RF Settings > RF Power > 1xEv-Do Power = -60 dBm/1.23MHz (RF > External attenuation IN/OUT as per cable losses); RF Settings > RF Channel [BC0] = 37; RF Settings > RF Channel [BC1] = 325; Power Control > Power control bits = All Up

### Subtype 0:

Layer > Protocol View Filter = Release 0 Settings; Layer > Application Layer > Test Applications > FTAP Cfg > DRC > ACK Ch Fixed Mode = Ack.Always; DRC > Fixed Rate = 4 (307.2 kbps, 2-slots); Test Applications > RTAP Cfg > Data > Min. Rate = 5 (153.6 kbps); Data > Max. Rate = 5 (153.6 kbps)

### Subtype 2:

Layer > Protocol View Filter = Release A Settings; Layer > Application Layer > Test Applications > FTAP Cfg > DRC > ACK Ch Fixed Mode = Ack.Always; DRC > Rate = 16 (307.2 kbps, 2-slots); Test Applications > RTAP Cfg > Data > Min. Packet Size = 9 (4096 bits); Data > Max. Packet Size = 9 (4096 bits);

**Table 9**

### Cellular Band

| Release 0 Subtype | Open Loop Adjust (BC0) | Result (dBm) |         |        |
|-------------------|------------------------|--------------|---------|--------|
|                   |                        | Ch. 1013     | Ch. 384 | Ch.777 |
| 0                 | -81 dB                 | N/A*         | N/A*    | N/A*   |
| 2                 | -81 dB                 | 25.12        | 25.17   | 24.90  |

**Table 10**

### PCS Band

| Release 0 Subtype | Open Loop Adjust (BC0) | Result (dBm) |         |         |
|-------------------|------------------------|--------------|---------|---------|
|                   |                        | Ch. 25       | Ch. 600 | Ch.1175 |
| 0                 | -84 dB                 | N/A*         | N/A*    | N/A*    |
| 2                 | -84 dB                 | 23.66        | 23.12   | 23.27   |

\*DUT has no Subtype 0 capabilities



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**Table: Frequency and Conducted Power Results GSM****Table 11**

| Coding Scheme | GPRS Multislot Class | RF Channel | Measured Power Burst Average (dBm) | Calculated Power Frame Average (100% Duty Cycle) (dBm) |
|---------------|----------------------|------------|------------------------------------|--|
| CS1           | 10                   | 128        | 33.21                              | 27.03  |
| CS1           | 10                   | 190        | <b>33.27</b>                       | 27.09  |
| CS1           | 10                   | 251        | 33.23                              | 27.05  |
| CS1           | 11                   | 128        | N/A*                               | N/A*   |
| CS1           | 11                   | 190        | N/A*                               | N/A*   |
| CS1           | 11                   | 251        | N/A*                               | N/A*   |
| CS1           | 12                   | 128        | N/A*                               | N/A*   |
| CS1           | 12                   | 190        | N/A*                               | N/A*   |
| CS1           | 12                   | 251        | N/A*                               | N/A*   |

**Table 12**

| Coding Scheme | EGPRS Multislot Class | RF Channel | Measured Power Burst Average (dBm) | Calculated Power Frame Average (100% Duty Cycle) (dBm) |
|---------------|-----------------------|------------|------------------------------------|--|
| MCS5          | 10                    | 128        | 32.85                              | 26.67  |
| MCS5          | 10                    | 190        | 33.02                              | 26.84  |
| MCS5          | 10                    | 251        | 32.82                              | 26.64  |
| MCS5          | 11                    | 128        | N/A*                               | N/A*   |
| MCS5          | 11                    | 190        | N/A*                               | N/A*   |
| MCS5          | 11                    | 251        | N/A*                               | N/A*   |
| MCS5          | 12                    | 128        | N/A*                               | N/A*   |
| MCS5          | 12                    | 190        | N/A*                               | N/A*   |
| MCS5          | 12                    | 251        | N/A*                               | N/A*   |

\*DUT has no GPRS/EGPRS Multislot Class 11 and 12 capabilities

**Table 13**

| Coding Scheme | GPRS Multislot Class | RF Channel | Measured Power Burst Average (dBm) | Calculated Power Frame Average (100% Duty Cycle) (dBm) |
|---------------|----------------------|------------|------------------------------------|--|
| CS1           | 10                   | 512        | <b>28.55</b>                       | 22.37  |
| CS1           | 10                   | 661        | 28.41                              | 22.23  |
| CS1           | 10                   | 810        | 28.30                              | 22.12  |
| CS1           | 11                   | 512        | N/A*                               | N/A*   |
| CS1           | 11                   | 661        | N/A*                               | N/A*   |
| CS1           | 11                   | 810        | N/A*                               | N/A*   |
| CS1           | 12                   | 512        | N/A*                               | N/A*   |
| CS1           | 12                   | 661        | N/A*                               | N/A*   |
| CS1           | 12                   | 810        | N/A*                               | N/A*   |



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**Table 14**

| Coding Scheme | EGPRS Multislot Class | RF Channel | Measured Power Burst Average (dBm) | Calculated Power Frame Average (100% Duty Cycle) (dBm) |
|---------------|-----------------------|------------|------------------------------------|--|
| MCS5          | 10                    | 512        | 27.89                              | 21.71  |
| MCS5          | 10                    | 661        | 27.99                              | 21.81  |
| MCS5          | 10                    | 810        | 27.75                              | 21.57  |
| MCS5          | 11                    | 512        | N/A*                               | N/A*   |
| MCS5          | 11                    | 661        | N/A*                               | N/A*   |
| MCS5          | 11                    | 810        | N/A*                               | N/A*   |
| MCS5          | 12                    | 512        | N/A*                               | N/A*   |
| MCS5          | 12                    | 661        | N/A*                               | N/A*   |
| MCS5          | 12                    | 810        | N/A*                               | N/A*   |

\*DUT has no GPRS/EGPRS Multislot Class 11 and 12 capabilities

### Conducted Power Measurement UMTS 850 MHz

Configuration:

12.2 kbps RMC

Test Loop Mode 1

$\beta_c = 8$ ,  $\beta_d = 15$  (3GPP default)

TPC (Transmit Power Control) = All 1s

**Table 15**

| Channel No. | $\beta_c$ | $\beta_d$ | Result (dBm) |
|-------------|-----------|-----------|--------------|
| 4132        | 8         | 15        | 25.05        |
| 4183        | 8         | 15        | <b>25.15</b> |
| 4233        | 8         | 15        | 25.08        |

### Conducted Power Measurement UMTS + HSDPA 850 MHz

Configuration:

Device HSDPA Category 6 (Downlink 3.6 Mbps and Uplink 384 kbps)

H-Set = 1

QPSK in H-Set (1)

CQI Feedback Cycle = 4ms; CQI Repetition Rate = 2ms

**Table 16**

| Sub Test No. | $\beta_c$ | $\beta_d$ | $\Delta AKN$ | $\Delta NAKN$ | $\Delta CQI$ | Result (dBm) |       |       | MPR (dB) |
|--------------|-----------|-----------|--------------|---------------|--------------|--------------|-------|-------|----------|
|              |           |           |              |               |              | 4132         | 4183  | 4233  |          |
| 1            | 2         | 15        | 8            | 8             | 8            | 24.49        | 24.62 | 24.62 | 0.0      |
| 2            | 12        | 15        | 8            | 8             | 8            | 24.34        | 24.42 | 24.41 | 0.0      |
| 3            | 15        | 8         | 8            | 8             | 8            | 24.18        | 24.22 | 24.23 | 0.5      |
| 4            | 15        | 4         | 8            | 8             | 8            | 24.08        | 24.16 | 24.17 | 0.5      |



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### Conducted Power Measurement UMTS + HSDPA + HSUPA 850 MHz

#### Configuration:

Device HSUPA Release 6 (5.7 Mbps)

RMC 12.2 kbps + HSPA 34.108 with loop mode 1

HS-DPCCH, E-DPCCH, E-DPDCH Enabled

DPCH Channel Code  $\{\beta_d\}$  (SF) = 64

Power Control – TPC algorithm 2

3GPP default HS-DPCCH power offset parameters  $\Delta AKN = 5$ ;  $\Delta NAKN = 5$ ;  $\Delta CQI = 2$

E-TFCI table index = 0

E-DCH minimum set E-TFCI = 9

PLnon-max = 0.84

Maximum Channelisation Code  $\{\beta_{ed}\}$  (SF) and  $\beta_{ed}$  (codes) – Subtests 1,2,4,5 = SF4; Subtest 3 = 2xSF4

Initial Serving Grant Value = Off

$\Delta$  HARQ = 0

Number of Ref.E-TFCIs – Subtests 1,2,4,5 = 5; Subtest 3 = 2

Set1 Patern Type = Closed Loop

**Table 17**

| Sub Test | $\beta_c$ | $\beta_d$ | $\Delta AKN$ | $\Delta NAKN$ | $\Delta CQI$ | $\Delta E-DPCCH$ | $\beta_{ed}$ (SF) | $\beta_{ed}$ (codes) | AG Index | Result (dBm) |       |       | MPR (dB) |
|----------|-----------|-----------|--------------|---------------|--------------|------------------|-------------------|----------------------|----------|--------------|-------|-------|----------|
|          |           |           |              |               |              |                  |                   |                      |          | 4132         | 4183  | 4233  |          |
| 1        | 10        | 15        | 8            | 8             | 8            | 6                | 4                 | 1                    | 20       | 24.45        | 24.51 | 23.93 | 0.0      |
| 2        | 6         | 15        | 8            | 8             | 8            | 8                | 4                 | 1                    | 12       | 22.81        | 22.82 | 22.61 | 2.0      |
| 3        | 15        | 9         | 8            | 8             | 8            | 8                | 4                 | 2                    | 15       | 23.64        | 23.41 | 23.25 | 1.0      |
| 4        | 2         | 15        | 8            | 8             | 8            | 5                | 4                 | 1                    | 17       | 22.95        | 22.58 | 23.05 | 2.0      |
| 5        | 15        | 15        | 8            | 8             | 8            | 7                | 4                 | 1                    | 21       | 23.85        | 23.86 | 23.80 | 0.0      |

### Conducted Power Measurement UMTS 1700 MHz

#### Configuration:

12.2 kbps RMC

Test Loop Mode 1

$\beta_c = 8$ ,  $\beta_d = 15$  (3GPP default)

TPC (Transmit Power Control) = All 1s

**Table 18**

| Channel No. | $\beta_c$ | $\beta_d$ | Result (dBm) |
|-------------|-----------|-----------|--------------|
| 1312        | 8         | 15        | 22.96        |
| 1427        | 8         | 15        | 23.14        |
| 1513        | 8         | 15        | 23.16        |

### Conducted Power Measurement UMTS + HSDPA 1700 MHz

#### Configuration:

Device HSDPA Category 6 (Downlink 3.6 Mbps and Uplink 384 kbps)

H-Set = 1

QPSK in H-Set (1)

CQI Fidback Cycle = 4ms; CQI Repetition Rate = 2ms

3GPP default HS-DPCCH power offset parameters  $\Delta AKN = 5$ ;  $\Delta NAKN = 5$ ;  $\Delta CQI = 2$

**Table 19**

| Sub Test No. | $\beta_c$ | $\beta_d$ | $\Delta AKN$ | $\Delta NAKN$ | $\Delta CQI$ | Result (dBm) |       |       | MPR (dB) |
|--------------|-----------|-----------|--------------|---------------|--------------|--------------|-------|-------|----------|
|              |           |           |              |               |              | 1312         | 1427  | 1513  |          |
| 1            | 2         | 15        | 8            | 8             | 8            | 22.45        | 22.68 | 22.72 | 0.0      |
| 2            | 12        | 15        | 8            | 8             | 8            | 22.07        | 22.33 | 22.38 | 0.0      |
| 3            | 15        | 8         | 8            | 8             | 8            | 21.99        | 22.17 | 22.28 | 0.5      |
| 4            | 15        | 4         | 8            | 8             | 8            | 21.97        | 22.16 | 22.23 | 0.5      |



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### Conducted Power Measurement UMTS + HSDPA + HSUPA 1700 MHz

Configuration:

Device HSUPA Release 6 (5.7 Mbps)

RMC 12.2 kbps + HSPA 34.108 with loop mode 1

HS-DPCCH, E-DPCCH, E-DPDCH Enabled

DPCH Channel Code  $\{\beta_d\}$  (SF) = 64

Power Control – TPC algorithm 2

3GPP default HS-DPCCH power offset parameters  $\Delta AKN = 5$ ;  $\Delta NAKN = 5$ ;  $\Delta CQI = 2$

E-TFCI table index = 0

E-DCH minimum set E-TFCI = 9

PLnon-max = 0.84

Maximum Channelisation Code  $\{\beta_{ed}\}$  (SF) and  $\beta_{ed}$  (codes) – Subtests 1,2,4,5 = SF4; Subtest 3 = 2xSF4

Initial Serving Grant Value = Off

$\Delta$  HARQ = 0

Number of Ref.E-TFCIs – Subtests 1,2,4,5 = 5; Subtest 3 = 2

Set1 Patern Type = Closed Loop

**Table 20**

| Sub Test | $\beta_c$ | $\beta_d$ | $\Delta AKN$ | $\Delta NAKN$ | $\Delta CQI$ | $\Delta E-DPCCH$ | $\beta_{ed}$ (SF) | $\beta_{ed}$ (codes) | AG Index | Result (dBm) |       |       | MPR (dB) |
|----------|-----------|-----------|--------------|---------------|--------------|------------------|-------------------|----------------------|----------|--------------|-------|-------|----------|
|          |           |           |              |               |              |                  |                   |                      |          | 1312         | 1427  | 1513  |          |
| 1        | 10        | 15        | 8            | 8             | 8            | 6                | 4                 | 1                    | 20       | 21.92        | 22.01 | 22.05 | 0.0      |
| 2        | 6         | 15        | 8            | 8             | 8            | 8                | 4                 | 1                    | 12       | 20.26        | 20.28 | 20.41 | 2.0      |
| 3        | 15        | 9         | 8            | 8             | 8            | 8                | 4                 | 2                    | 15       | 21.27        | 21.13 | 21.26 | 1.0      |
| 4        | 2         | 15        | 8            | 8             | 8            | 5                | 4                 | 1                    | 17       | 20.02        | 20.07 | 20.16 | 2.0      |
| 5        | 15        | 15        | 8            | 8             | 8            | 7                | 4                 | 1                    | 21       | 21.88        | 21.89 | 22.01 | 0.0      |

### Conducted Power Measurement UMTS 1900 MHz

Configuration:

12.2 kbps RMC

Test Loop Mode 1

$\beta_c = 8$ ,  $\beta_d = 15$  (3GPP default)

TPC (Transmit Power Control) = All 1s

**Table 21**

| Channel No. | $\beta_c$ | $\beta_d$ | Result (dBm) |
|-------------|-----------|-----------|--------------|
| 9262        | 8         | 15        | 23.62        |
| 9400        | 8         | 15        | 23.64        |
| 9538        | 8         | 15        | 23.76        |

### Conducted Power Measurement UMTS + HSDPA 1900 MHz

Configuration:

Device HSDPA Category 6 (Downlink 3.6 Mbps and Uplink 384 kbps)

H-Set = 1

QPSK in H-Set (1)

CQI Fidback Cycle = 4ms; CQI Repetition Rate = 2ms

3GPP default HS-DPCCH power offset parameters  $\Delta AKN = 5$ ;  $\Delta NAKN = 5$ ;  $\Delta CQI = 2$

**Table 22**

| Sub Test No. | $\beta_c$ | $\beta_d$ | $\Delta AKN$ | $\Delta NAKN$ | $\Delta CQI$ | Result (dBm) |       |       | MPR (dB) |
|--------------|-----------|-----------|--------------|---------------|--------------|--------------|-------|-------|----------|
|              |           |           |              |               |              | 9262         | 9400  | 9538  |          |
| 1            | 2         | 15        | 8            | 8             | 8            | 23.14        | 23.20 | 23.29 | 0.0      |
| 2            | 12        | 15        | 8            | 8             | 8            | 22.95        | 22.92 | 23.05 | 0.0      |
| 3            | 15        | 8         | 8            | 8             | 8            | 22.78        | 22.72 | 22.83 | 0.5      |
| 4            | 15        | 4         | 8            | 8             | 8            | 22.79        | 22.75 | 22.77 | 0.5      |



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### Conducted Power Measurement UMTS + HSDPA + HSUPA 1900 MHz

#### Configuration:

Device HSUPA Release 6 (5.7 Mbps)

RMC 12.2 kbps + HSPA 34.108 with loop mode 1

HS-DPCCH, E-DPCCH, E-DPDCH Enabled

DPCH Channel Code  $\{\beta_d\}$  (SF) = 64

Power Control – TPC algorithm 2

3GPP default HS-DPCCH power offset parameters  $\Delta_{AKN} = 5$ ;  $\Delta_{NAKN} = 5$ ;  $\Delta_{CQI} = 2$

E-TFCI table index = 0

E-DCH minimum set E-TFCI = 9

PLnon-max = 0.84

Maximum Channelisation Code  $\{\beta_{ed}\}$  (SF) and  $\beta_{ed}$  (codes) – Subtests 1,2,4,5 = SF4; Subtest 3 = 2xSF4

Initial Serving Grant Value = Off

$\Delta$  HARQ = 0

Number of Ref.E-TFCIs – Subtests 1,2,4,5 = 5; Subtest 3 = 2

Set1 Patern Type = Closed Loop

**Table 23**

| Sub Test | $\beta_c$ | $\beta_d$ | $\Delta_{AKN}$ | $\Delta_{NAKN}$ | $\Delta_{CQI}$ | $\Delta_{E-DPCCH}$ | $\beta_{ed}$ (SF) | $\beta_{ed}$ (codes) | AG Index | Result (dBm) |       |       | MPR (dB) |
|----------|-----------|-----------|----------------|-----------------|----------------|--------------------|-------------------|----------------------|----------|--------------|-------|-------|----------|
|          |           |           |                |                 |                |                    |                   |                      |          | 9262         | 9400  | 9538  |          |
| 1        | 10        | 15        | 8              | 8               | 8              | 6                  | 4                 | 1                    | 20       | 22.57        | 22.71 | 22.77 | 0.0      |
| 2        | 6         | 15        | 8              | 8               | 8              | 8                  | 4                 | 1                    | 12       | 20.91        | 20.96 | 20.88 | 2.0      |
| 3        | 15        | 9         | 8              | 8               | 8              | 8                  | 4                 | 2                    | 15       | 21.89        | 22.03 | 21.67 | 1.0      |
| 4        | 2         | 15        | 8              | 8               | 8              | 5                  | 4                 | 1                    | 17       | 21.28        | 21.37 | 21.05 | 2.0      |
| 5        | 15        | 15        | 8              | 8               | 8              | 7                  | 4                 | 1                    | 21       | 22.55        | 22.67 | 22.75 | 0.0      |



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#### 4.1 Battery Status

The DUT 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 DUT, 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 5% 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](mailto:melb@emctech.com.au)  
**website:** [www.emctech.com.au](http://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 24**

|                         |   |
|-------------------------|---|
| <b>AS/NZS 2772.2:</b>   | RF and microwave radiation hazard measurement   |
| <b>ACMA:</b>            | Radio communications (Electromagnetic Radiation - Human Exposure) Standard 2003   |
| <b>FCC:</b>             | Guidelines for Human Exposure to RF Electromagnetic Field OET65C 01/01  |
| <b>EN 50360: 2001</b>   | Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300 MHz – 3 GHz)   |
| <b>EN 62209-1: 2006</b> | Human Exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models instrumentation and procedures.<br><b>Part 1:</b> Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (300 MHz to 3 GHz)                                      |
| <b>EN 62209-2:2010</b>  | Human Exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models instrumentation and procedures<br><b>Part 2:</b> Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz) |
| <b>IEEE 1528: 2003</b>  | 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](http://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  $21 \pm 1^\circ\text{C}$ , the humidity was in the range 36 % to 39 %. 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 DASY5 SAR measurement system using the SN1380 probe was less than  $5\mu\text{V}$  in both air and liquid mediums.



## 6.0 DESCRIPTION OF SAR MEASUREMENT SYSTEM

**Table 25**

|                                |                     |
|--------------------------------|---------------------|
| Applicable Head Configurations | : None              |
| Applicable Body Configurations | : Lap Held Position |
|                                | : Edge On Position  |
|                                | : Bystander         |

### 6.1 Probe Positioning System

The measurements were performed with the state-of-the-art automated near-field scanning system **DASY5 Version 52** from Schmid & Partner Engineering AG (SPEAG). The DASY5 fully complies with the OET65 C (01-01), IEEE 1528 and EN62209-1 and EN62209-2 SAR measurement requirements.

### 6.2 E-Field Probe Type and Performance

The SAR measurements were conducted with SPEAG dosimetric probe ET3DV6 Serial: 1380. Please refer to appendix C for detailed information.

### 6.3 Validation

#### 6.3.1 Validation Results (900 MHz and 1800 MHz and 1950 MHz)

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**

**Table 26**

| 1. Validation Date & Frequency           | 2. $\epsilon_r$ (measured) | 3. $\sigma$ (mho/m) (measured) | 4. Measured SAR 1g (mW/g) | 5. Measured SAR 10g (mW/g) |
|--|----------------------------|--------------------------------|---------------------------|----------------------------|
| 1950 MHz<br>20 <sup>th</sup> August 2012 | 51.9                       | 1.59                           | 9.66                      | 5.00                       |
| 1800 MHz<br>21 <sup>st</sup> August 2012 | 51.2                       | 1.54                           | 9.28                      | 4.98                       |
| 1950 MHz<br>22 <sup>nd</sup> August 2012 | 51.8                       | 1.59                           | 9.91                      | 5.14                       |
| 900 MHz<br>23 <sup>rd</sup> August 2012  | 53.0                       | 1.05                           | 2.81                      | 1.83                       |

#### 6.3.2 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 and 1800 MHz and 1950 MHz. These reference SAR values are obtained from the IEEE Std 1528-2003 and EN 62209-2 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.



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**Table: Deviation from reference validation values @ (900MHz and 1800 MHz and 1950 MHz)****Table 27**

| 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 (%) |
|--|------------------------|------------------------------------|---|---------------------------------------|
| 1950 MHz<br>20 <sup>th</sup> August 2012 | 9.66                   | 38.64                              | 38.8  | -0.41                                 |
| 1800 MHz<br>21 <sup>st</sup> August 2012 | 9.28                   | 37.12                              | 38.7  | -4.08                                 |
| 1950 MHz<br>22 <sup>nd</sup> August 2012 | 9.91                   | 39.64                              | 38.8  | 2.16                                  |
| 900 MHz<br>23 <sup>rd</sup> August 2012  | 2.81                   | 11.24                              | 11.1  | 1.26                                  |

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



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### 6.3.3 Liquid Depth 15cm

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

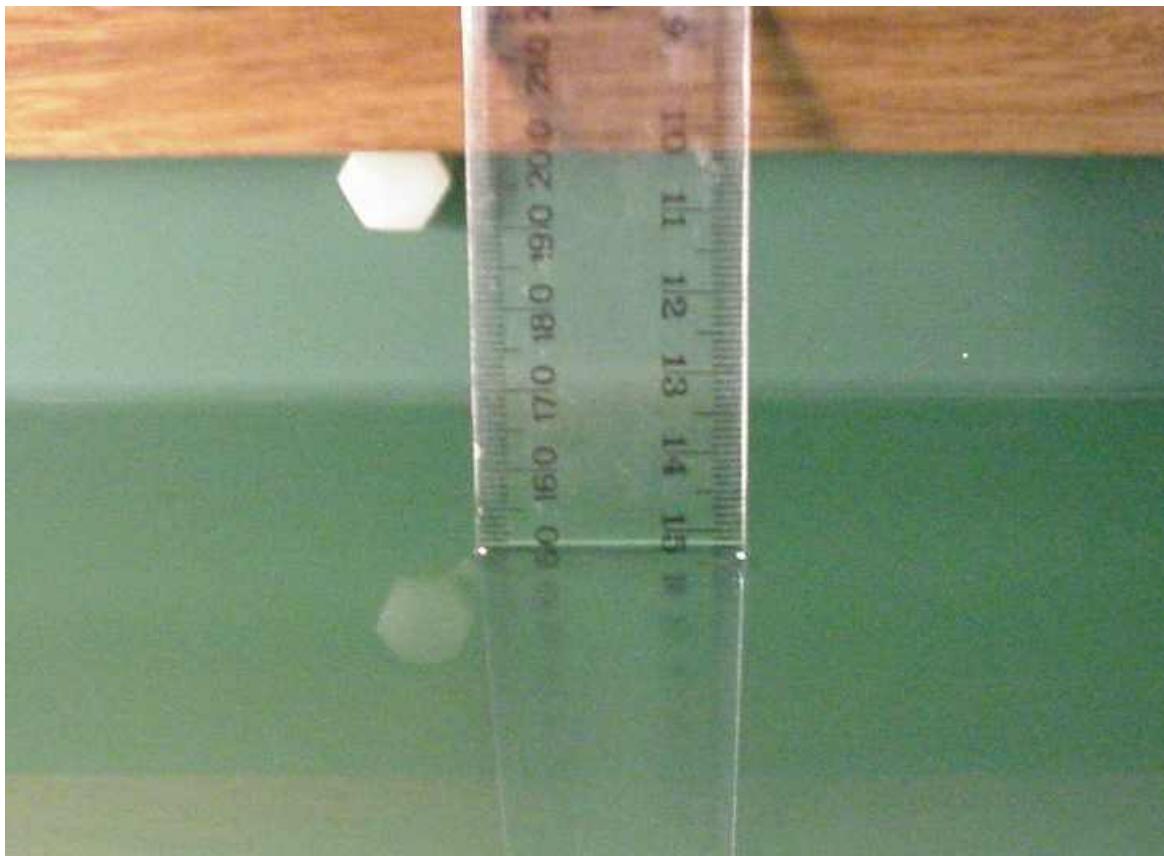


Photo of liquid Depth in Flat Phantom

### 6.4 Phantom Properties

The phantoms used during the testing comply with the OET65 C (01-01), IEEE 1528 and EN62209-1 and EN62209-2 SAR measurement requirements.

| Phantom Properties        | Required                           | Measured                                |
|---------------------------|------------------------------------|---|
| Thickness of flat section | 2.0mm $\pm$ 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) |



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## 6.5 Tissue Material Properties

The dielectric parameters of the human tissue 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 Body Simulating Liquid Dielectric Values at 850MHz**

**Table 28**

| Frequency Band | $\epsilon_r$ (measured range) | $\epsilon_r$ (target)           | $\sigma$ (mho/m) (measured range) | $\sigma$ (target)               | $\rho$ kg/m <sup>3</sup> |
|----------------|-------------------------------|---------------------------------|-----------------------------------|---------------------------------|--------------------------|
| 824.2 MHz Body | 53.7                          | 55.2 $\pm$ 5%<br>(52.4 to 58.0) | 0.97                              | 0.97 $\pm$ 5%<br>(0.92 to 1.02) | 1000                     |
| 836.6 MHz Body | 53.6                          | 55.2 $\pm$ 5%<br>(52.4 to 58.0) | 0.98                              | 0.97 $\pm$ 5%<br>(0.92 to 1.02) | 1000                     |
| 848.6 MHz Body | 53.5                          | 55.2 $\pm$ 5%<br>(52.4 to 58.0) | 0.99                              | 0.97 $\pm$ 5%<br>(0.92 to 1.02) | 1000                     |

**Note:** The body liquid parameters were within the required tolerances of  $\pm$ 5%.

**Table: Measured Body Simulating Liquid Dielectric Values at 1700MHz**

**Table 29**

| Frequency Band  | $\epsilon_r$ (measured range) | $\epsilon_r$ (target)           | $\sigma$ (mho/m) (measured range) | $\sigma$ (target)               | $\rho$ kg/m <sup>3</sup> |
|-----------------|-------------------------------|---------------------------------|-----------------------------------|---------------------------------|--------------------------|
| 1712.4 MHz Body | 51.5                          | 53.3 $\pm$ 5%<br>(50.6 to 56.0) | 1.48                              | 1.49 $\pm$ 5%<br>(1.42 to 1.56) | 1000                     |
| 1735.4 MHz Body | 51.5                          | 53.3 $\pm$ 5%<br>(50.6 to 56.0) | 1.50                              | 1.49 $\pm$ 5%<br>(1.42 to 1.56) | 1000                     |
| 1752.6 MHz Body | 51.4                          | 53.3 $\pm$ 5%<br>(50.6 to 56.0) | 1.51                              | 1.49 $\pm$ 5%<br>(1.42 to 1.56) | 1000                     |

**Note:** The body liquid parameters were within the required tolerances of  $\pm$ 5%.

**Table: Measured Body Simulating Liquid Dielectric Values at 1880MHz**

**Table 30**

| Frequency Band  | $\epsilon_r$ (measured range) | $\epsilon_r$ (target)           | $\sigma$ (mho/m) (measured range) | $\sigma$ (target)               | $\rho$ kg/m <sup>3</sup> |
|-----------------|-------------------------------|---------------------------------|-----------------------------------|---------------------------------|--------------------------|
| 1850 MHz Body   | 52.2                          | 53.3 $\pm$ 5%<br>(50.6 to 56.0) | 1.53                              | 1.52 $\pm$ 5%<br>(1.44 to 1.60) | 1000                     |
| 1880.0 MHz Body | 52.1                          | 53.3 $\pm$ 5%<br>(50.6 to 56.0) | 1.55                              | 1.52 $\pm$ 5%<br>(1.44 to 1.60) | 1000                     |
| 1910 MHz Body   | 52.0                          | 53.3 $\pm$ 5%<br>(50.6 to 56.0) | 1.57                              | 1.52 $\pm$ 5%<br>(1.44 to 1.60) | 1000                     |

**Note:** The body liquid parameters were within the required tolerances of  $\pm$ 5%.





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### 6.5.1 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  $|2|^\circ\text{C}$ .

**Table: Temperature and Humidity recorded for each day**

**Table 31**

| Date                         | Ambient Temperature (°C) | Liquid Temperature (°C) | Humidity (%) |
|------------------------------|--------------------------|-------------------------|--------------|
| 20 <sup>th</sup> August 2012 | 20.5                     | 20.2                    | 39           |
| 21 <sup>st</sup> August 2012 | 20.7                     | 20.5                    | 38           |
| 22 <sup>nd</sup> August 2012 | 20.3                     | 20.1                    | 36           |
| 23 <sup>rd</sup> August 2012 | 20.3                     | 20.1                    | 39           |

### 6.6 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: Body @ 850/900MHz**  
Volume of Liquid: 30 Litres

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

**Table 32**

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

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

\*Refer "OET Bulletin 65 97/01 P38"

### 6.7 Device Holder for Laptops and P 10.1 Phantom

A low loss clamp was used to position the DUT underneath the phantom surface.

Refer to Appendix A for photographs of device positioning



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## 7.0 SAR MEASUREMENT PROCEDURE USING DASY5

The SAR evaluation was performed with the SPEAG DASY5 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 DUT. 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 4 mm from the inner surface of the shell. The area covers the entire dimension of the DUT and the horizontal grid spacing is 15 mm x 15 mm. The actual Area Scan has dimensions of 150 mm x 90 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 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 4 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.



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## 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 33: Uncertainty Budget for DASY5 Version 52 – DUT SAR**

| Error Description                                  | Uncert. Value | Prob. Dist. | Div. | $C_i$<br>(1g) | $C_i$<br>(10g) | $1g u_i$ | $10g u_i$ | $v_i$    |
|--|---------------|-------------|------|---------------|----------------|----------|-----------|----------|
| Measurement System                                 |               |             |      |               |                |          |           |          |
| Probe Calibration                                  | 6             | N           | 1.00 | 1             | 1              | 6.00     | 6.00      | $\infty$ |
| Axial Isotropy                                     | 4.7           | R           | 1.73 | 0.7           | 0.7            | 1.90     | 1.90      | $\infty$ |
| Hemispherical Isotropy                             | 9.6           | R           | 1.73 | 0.7           | 0.7            | 3.88     | 3.88      | $\infty$ |
| Boundary Effects                                   | 1             | R           | 1.73 | 1             | 1              | 0.58     | 0.58      | $\infty$ |
| Linearity  | 4.7           | R           | 1.73 | 1             | 1              | 2.71     | 2.71      | $\infty$ |
| System Detection Limits                            | 1             | R           | 1.73 | 1             | 1              | 0.58     | 0.58      | $\infty$ |
| Readout Electronics                                | 0.3           | N           | 1.00 | 1             | 1              | 0.30     | 0.30      | $\infty$ |
| Response Time                                      | 0.8           | R           | 1.73 | 1             | 1              | 0.46     | 0.46      | $\infty$ |
| Integration Time                                   | 2.6           | R           | 1.73 | 1             | 1              | 1.50     | 1.50      | $\infty$ |
| RF Ambient Noise                                   | 3             | R           | 1.73 | 1             | 1              | 1.73     | 1.73      | $\infty$ |
| RF Ambient Reflections                             | 3             | R           | 1.73 | 1             | 1              | 1.73     | 1.73      | $\infty$ |
| Probe Positioner                                   | 0.4           | R           | 1.73 | 1             | 1              | 0.23     | 0.23      | $\infty$ |
| Probe Positioning                                  | 2.9           | R           | 1.73 | 1             | 1              | 1.67     | 1.67      | $\infty$ |
| Max. SAR Eval.                                     | 1             | R           | 1.73 | 1             | 1              | 0.58     | 0.58      | $\infty$ |
| Post Processing                                    | 2             | R           | 1.73 | 1             | 1              | 1.15     | 1.15      | $\infty$ |
| Test Sample Related                                |               |             |      |               |                |          |           |          |
| Power Scaling                                      | 0             | R           | 1.73 | 1             | 1              | 0.00     | 0.00      | $\infty$ |
| Test Sample Positioning                            | 2.9           | N           | 1.00 | 1             | 1              | 2.90     | 2.90      | 145      |
| Device Holder Uncertainty                          | 3.6           | N           | 1.00 | 1             | 1              | 3.60     | 3.60      | 5        |
| Output Power Variation – SAR Drift Measurement     | 4.71          | R           | 1.73 | 1             | 1              | 2.72     | 2.72      | $\infty$ |
| Phantom and Setup                                  |               |             |      |               |                |          |           |          |
| Phantom Uncertainty                                | 7.5           | R           | 1.73 | 1             | 1              | 4.33     | 4.33      | $\infty$ |
| Liquid Conductivity – Deviation from target values | 5             | R           | 1.73 | 0.64          | 0.43           | 1.85     | 1.24      | $\infty$ |
| Liquid Permittivity – Deviation from target values | 5             | R           | 1.73 | 0.6           | 0.49           | 1.73     | 1.41      | $\infty$ |
| Liquid Conductivity – Measurement uncertainty      | 2.5           | N           | 1.00 | 0.64          | 0.71           | 1.60     | 1.78      | $\infty$ |
| Liquid Permittivity – Measurement uncertainty      | 2.5           | N           | 1.00 | 0.6           | 0.26           | 1.50     | 0.65      | $\infty$ |
| Temp.unc. - Conductivity                           | 1.7           | R           | 1.73 | 0.78          | 0.71           | 0.77     | 0.70      | $\infty$ |
| Temp. unc. - Permittivity                          | 0.3           | R           | 1.73 | 0.23          | 0.26           | 0.04     | 0.05      | $\infty$ |
| Combined standard Uncertainty ( $u_c$ )            |               |             |      |               |                | 11.6     | 11.4      |          |
| Expanded Uncertainty (95% CONFIDENCE LEVEL)        |               |             |      | k= 2          |                | 23.2     | 22.9      |          |

Estimated total measurement uncertainty for the DASY5 measurement system was  $\pm 11.6\%$ . The extended uncertainty ( $K = 2$ ) was assessed to be  $\pm 23.2\%$  based on 95% confidence level. The uncertainty is not added to the measurement result.



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**Table 34: Uncertainty Budget for DASY5 Version 52 – Validation**

| Error Description                                  | Uncert. Value | Prob. Dist. | Div.   | $C_i$ (1g) | $C_i$ (10g) | $1g u_i$ | $10g u_i$ | $v_i$    |
|--|---------------|-------------|--------|------------|-------------|----------|-----------|----------|
| <b>Measurement System</b>                          |               |             |        |            |             |          |           |          |
| Probe Calibration                                  | 6             | N           | 1.00   | 1          | 1           | 6.00     | 6.00      | $\infty$ |
| Axial Isotropy                                     | 4.7           | R           | 1.73   | 1          | 1           | 2.71     | 2.71      | $\infty$ |
| Hemispherical Isotropy                             | 9.6           | R           | 1.73   | 0          | 0           | 0.00     | 0.00      | $\infty$ |
| Boundary Effects                                   | 1             | R           | 1.73   | 1          | 1           | 0.58     | 0.58      | $\infty$ |
| Linearity  | 4.7           | R           | 1.73   | 1          | 1           | 2.71     | 2.71      | $\infty$ |
| System Detection Limits                            | 1             | R           | 1.73   | 1          | 1           | 0.58     | 0.58      | $\infty$ |
| Readout Electronics                                | 0.3           | N           | 1.00   | 1          | 1           | 0.30     | 0.30      | $\infty$ |
| Response Time                                      | 0             | R           | 1.73   | 1          | 1           | 0.00     | 0.00      | $\infty$ |
| Integration Time                                   | 0             | R           | 1.73   | 1          | 1           | 0.00     | 0.00      | $\infty$ |
| RF Ambient Noise                                   | 1             | R           | 1.73   | 1          | 1           | 0.58     | 0.58      | $\infty$ |
| RF Ambient Reflections                             | 1             | R           | 1.73   | 1          | 1           | 0.58     | 0.58      | $\infty$ |
| Probe Positioner                                   | 0.8           | R           | 1.73   | 1          | 1           | 0.46     | 0.46      | $\infty$ |
| Probe Positioning                                  | 6.7           | R           | 1.73   | 1          | 1           | 3.87     | 3.87      | $\infty$ |
| Max. SAR Eval.                                     | 2             | R           | 1.73   | 1          | 1           | 1.15     | 1.15      | $\infty$ |
| Post Processing                                    | 2             | R           | 1.73   | 1          | 1           | 1.15     | 1.15      | $\infty$ |
| <b>Dipole Related</b>                              |               |             |        |            |             |          |           |          |
| Deviation of exp. dipole                           | 5.5           | R           | 1.73   | 1          | 1           | 3.18     | 3.18      | $\infty$ |
| Dipole Axis to Liquid Dist.                        | 2             | R           | 1.73   | 1          | 1           | 1.15     | 1.15      | $\infty$ |
| Input power & SAR drift                            | 5.00          | R           | 1.73   | 1          | 1           | 2.89     | 2.89      | $\infty$ |
| <b>Phantom and Setup</b>                           |               |             |        |            |             |          |           |          |
| Phantom Uncertainty                                | 4             | R           | 1.73   | 1          | 1           | 2.31     | 2.31      | $\infty$ |
| Liquid Conductivity – Deviation from target values | 5             | R           | 1.73   | 0.64       | 0.43        | 1.85     | 1.24      | $\infty$ |
| Liquid Permittivity – Deviation from target values | 5             | R           | 1.73   | 0.6        | 0.49        | 1.73     | 1.41      | $\infty$ |
| Liquid Conductivity – Measurement uncertainty      | 2.5           | N           | 1.00   | 0.78       | 0.71        | 1.95     | 1.78      | $\infty$ |
| Liquid Permittivity – Measurement uncertainty      | 2.5           | N           | 1.00   | 0.26       | 0.26        | 0.65     | 0.65      | $\infty$ |
| Temp.unc. - Conductivity                           | 1.7           | R           | 1.73   | 0.78       | 0.71        | 0.77     | 0.70      | $\infty$ |
| Temp. unc. - Permittivity                          | 0.3           | R           | 1.73   | 0.23       | 0.26        | 0.04     | 0.05      | $\infty$ |
| Combined standard Uncertainty ( $u_c$ )            |               |             |        |            |             | 10.3     | 10.1      |          |
| Expanded Uncertainty (95% CONFIDENCE LEVEL)        |               |             | $k= 2$ |            |             | 20.6     | 20.3      |          |

Estimated total measurement uncertainty for the DASY5 measurement system was  $\pm 10.3\%$ . The extended uncertainty ( $K = 2$ ) was assessed to be  $\pm 20.6\%$  based on 95% confidence level. The uncertainty is not added to the Validation measurement result.



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## 9.0 EQUIPMENT LIST AND CALIBRATION DETAILS

Table 35: SPEAG DASY5 Version 52

| 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           | ELI 4.0      | 1101          | Not Applicable  |                     |
| Data Acquisition Electronics  | SPEAG           | DAE3 V1      | 359           | 21-June-2013    |                     |
| Data Acquisition Electronics  | SPEAG           | DAE3 V1      | 442           | 05-Dec-2012     | ✓                   |
| Probe E-Field - Dummy         | SPEAG           | DP1          | N/A           | Not applicable  |                     |
| Probe E-Field                 | SPEAG           | ET3DV6       | 1380          | 12-Dec-2012     | ✓                   |
| Probe E-Field                 | SPEAG           | ET3DV6       | 1377          | 20-June-2013    |                     |
| Probe E-Field                 | SPEAG           | ES3DV6       | 3029          | Not Used        |                     |
| Probe E-Field                 | SPEAG           | EX3DV4       | 3563          | 21-June-2013    |                     |
| Probe E-Field                 | SPEAG           | EX3DV4       | 3657          | 14-Dec-2012     |                     |
| Antenna Dipole 300 MHz        | SPEAG           | D300V3       | 1012          | 30-Nov-2012     |                     |
| Antenna Dipole 450 MHz        | SPEAG           | D450V3       | 1074          | 30-Nov-2012     |                     |
| Antenna Dipole 750 MHz        | SPEAG           | D750V2       | 1051          | 9-Jan-2014      |                     |
| Antenna Dipole 900 MHz        | SPEAG           | D900V2       | 047           | 22-June-2014    | ✓                   |
| Antenna Dipole 1640 MHz       | SPEAG           | D1640V2      | 314           | 20-June-2014    |                     |
| Antenna Dipole 1800 MHz       | SPEAG           | D1800V2      | 242           | 20-June-2014    | ✓                   |
| Antenna Dipole 1950 MHz       | SPEAG           | D1950V3      | 1113          | 10-Dec-2012     | ✓                   |
| Antenna Dipole 2450 MHz       | SPEAG           | D2450V2      | 724           | 09-Dec-2012     |                     |
| Antenna Dipole 2600 MHz       | SPEAG           | D2600V2      | 1044          | 10-Jan-2014     |                     |
| Antenna Dipole 3500 MHz       | SPEAG           | D3500V2      | 1002          | 13-July-2013    |                     |
| Antenna Dipole 5600 MHz       | SPEAG           | D5GHzV2      | 1008          | 14-Dec-2013     |                     |
| 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                | Hewlett Packard | 437B         | 3125012786    | 30-Aug-2013     |                     |
| RF Power Sensor 0.01 - 18 GHz | Hewlett Packard | 8481H        | 1545A01634    | 03-Sept-2013    |                     |
| RF Power Meter                | Rohde & Schwarz | NRP          | 101415        | 21-Sept-2012    | ✓                   |
| RF Power Sensor               | Rohde & Schwarz | NRP - Z81    | 100174        | 21-Sept-2012    | ✓                   |
| 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     | 27-Sept-2012    |                     |
| Network Analyser              | Hewlett Packard | 8753ES       | JP39240130    | 7-Nov-2012      | ✓                   |
| Dual Directional Coupler      | Hewlett Packard | 778D         | 1144 04700    | *In test        |                     |
| Dual Directional Coupler      | NARDA           | 3022         | 75453         | *In test        | ✓                   |
| Radio Communication Test Set  | Rohde & Schwarz | CMU200       | 101573        | Not Applicable  | ✓                   |
| Radio Communication Test Set  | Anritsu         | MT8820A      | 6200240559    | Not Applicable  |                     |
| Radio Communication Test Set  | Agilent         | PXT E6621A   | MY51100168    | Not Applicable  |                     |

\* Calibrated during the test for the relevant parameters.



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## 10.0 TEST METHODOLOGY

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 "STYLISTIC T SERIES" can be used in either a conventional laptop position (see Appendix A) or a Tablet configuration.

### 10.1.1 "Lap Held" Position Definition (0mm spacing)

The DUT was tested in the 2.00 mm flat section of the AndreT Flat phantom for the "Lap Held" position. The Transceiver was placed at the bottom of the phantom and suspended in such way that the back of the DUT 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 "Edge On" Position

The DUT was tested in the (2.00 mm) flat section of the AndreT Flat 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.*

### 10.1.3 "Bystander" Position (25mm spacing)

The DUT was tested in the 2.00 mm flat section of the AndreT Flat phantom for the "Bystander" position. The Transceiver was placed at the bottom of the phantom and suspended in such way that the back of its LCD screen was parallel to phantom and at 25mm distance. This orientation simulates use of the device in a way that allows occasional RF exposure of the nearby person (Bystander).



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

The DUT 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 941225 are applied for SAR measurements of the host system. SAR measurement for the HSDPA and HSUPA modes were not conducted because SAR results in WWAN bands are lower than 1.2 mW/g (75% of the SAR limit)

**Table: Testing configurations**

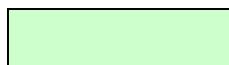
**Table 36**

| Phantom Configuration | Device Mode WWAN Band Name | Test Configurations |                  |                |
|-----------------------|----------------------------|---------------------|------------------|----------------|
|                       |                            | Channel (Low)       | Channel (Middle) | Channel (High) |
| Lap Held              | GPRS 850 MHz               |                     | x                |                |
|                       | GPRS 1900 MHz              | x                   |                  |                |
|                       | WCDMA 850 MHz              |                     | x                |                |
|                       | WCDMA 1750 MHz             |                     |                  | x              |
|                       | WCDMA 1900 MHz             |                     |                  | x              |
|                       | CDMA 850 MHz               |                     | x                |                |
|                       | CDMA 1900 MHz              | x                   |                  |                |
| Edge On               | GPRS 850 MHz               |                     | x                |                |
|                       | GPRS 1900 MHz              | x                   |                  |                |
|                       | WCDMA 850 MHz              |                     | x                |                |
|                       | WCDMA 1750 MHz             |                     |                  | x              |
|                       | WCDMA 1900 MHz             |                     |                  | x              |
|                       | CDMA 850 MHz               |                     | x                |                |
|                       | CDMA 1900 MHz              | x                   |                  |                |
| Bystander             | GPRS 850 MHz               |                     | x                |                |
|                       | GPRS 1900 MHz              | x                   |                  |                |
|                       | WCDMA 850 MHz              |                     | x                |                |
|                       | WCDMA 1750 MHz             |                     |                  | x              |
|                       | WCDMA 1900 MHz             |                     |                  | x              |
|                       | CDMA 850 MHz               |                     | x                |                |
|                       | CDMA 1900 MHz              | x                   |                  |                |

**Legend**



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.



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## 11.0 SAR MEASUREMENT RESULTS

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

### 11.1 SAR Results

There are three modes of operation which include UMTS, GPRS and Ev-Do transmission. Table below displays the SAR results.

**Table: SAR MEASUREMENT RESULTS – 850MHz GPRS**

**Table 37**

| Test Position                      | Plot No. | Test Channel | Test Freq (MHz) | Measured 1g SAR Results (mW/g) | Measured Drift (dB) |
|------------------------------------|----------|--------------|-----------------|--------------------------------|---------------------|
| Bystander 25mm Spacing Antenna In  | -        | 190          | 836             | Noise Floor                    | N/A                 |
| Bystander 25mm Spacing Antenna Out | 1        | 190          | 836             | 0.483                          | -0.11               |
| Lap Held Antenna In                | -        | 190          | 836             | Noise Floor                    | N/A                 |
| Lap Held Antenna Out               | 2        | 190          | 836             | <b>0.719</b>                   | 0.02                |
| Secondary Portrait Antenna In      | 3        | 190          | 836             | 0.011                          | -0.02               |
| Secondary Portrait Antenna Out     | 4        | 190          | 836             | 0.296                          | -0.15               |
| Secondary Landscape Antenna In     | 5        | 128          | 824.2           | 0.355                          | -0.03               |
|                                    | 6        | 190          | 836.6           | 0.431                          | -0.08               |
|                                    | 7        | 251          | 848.6           | 0.358                          | 0.03                |

NOTE: The measurement uncertainty of 23.2% was not added to the result.

The highest SAR level recorded was **0.719** mW/g as evaluated in a 1g cube of averaging mass. This value was obtained in “Lap Held Antenna Out” position in GPRS mode, utilizing channel 190 (836 MHz).



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**Table: SAR MEASUREMENT RESULTS – 1900MHz GPRS****Table 38**

| Test Position                      | Plot No. | Test Channel | Test Freq (MHz) | Measured 1g SAR Results (mW/g) | Measured Drift (dB) |
|------------------------------------|----------|--------------|-----------------|--------------------------------|---------------------|
| Bystander 25mm Spacing Antenna In  | -        | 512          | 1850.2          | Noise Floor                    | N/A                 |
| Bystander 25mm Spacing Antenna Out | 8        | 512          | 1850.2          | 0.149                          | 0.13                |
| Lap Held Antenna In                | -        | 512          | 1850.2          | Noise Floor                    | N/A                 |
| Lap Held Antenna Out               | 9        | 512          | 1850.2          | 0.267                          | 0.09                |
| Secondary Portrait Antenna In      | -        | 512          | 1850.2          | Noise Floor                    | N/A                 |
| Secondary Portrait Antenna Out     | 10       | 512          | 1850.2          | 0.295                          | 0.08                |
| Secondary Landscape Antenna In     | 11       | 512          | 1850.2          | 0.154                          | -0.17               |
|                                    | 12       | 661          | 1880            | <b>0.341</b>                   | 0.07                |
|                                    | 13       | 810          | 1909.8          | 0.281                          | 0.20                |

NOTE: The measurement uncertainty of 23.2% was not added to the result.

The highest SAR level recorded was **0.341** mW/g as evaluated in a 1g cube of averaging mass. This value was obtained in “Secondary Landscape Antenna In” position in GPRS mode, utilizing channel 661 (1880 MHz).

**Table: SAR MEASUREMENT RESULTS – 850MHz UMTS****Table 39**

| Test Position                      | Plot No. | Test Channel | Test Freq (MHz) | Measured 1g SAR Results (mW/g) | Measured Drift (dB) |
|------------------------------------|----------|--------------|-----------------|--------------------------------|---------------------|
| Bystander 25mm Spacing Antenna In  | -        | 4183         | 836.6           | Noise Floor                    | N/A                 |
| Bystander 25mm Spacing Antenna Out | 14       | 4183         | 836.6           | 0.358                          | 0.02                |
| Lap Held Antenna In                | -        | 4183         | 836.6           | Noise Floor                    | N/A                 |
| Lap Held Antenna Out               | 15       | 4132         | 826.4           | <b>0.488</b>                   | -0.08               |
| Secondary Portrait Antenna In      | -        | 4183         | 836.6           | Noise Floor                    | N/A                 |
| Secondary Portrait Antenna Out     | 16       | 4183         | 836.6           | 0.235                          | 0.07                |
| Secondary Landscape Antenna In     | 17       | 4132         | 826.4           | 0.216                          | -0.17               |
|                                    | 18       | 4183         | 836.6           | 0.208                          | -0.05               |
|                                    | 19       | 4233         | 846.6           | 0.283                          | -0.07               |

NOTE: The measurement uncertainty of 23.2% was not added to the result.

The highest SAR level recorded was **0.488** mW/g as evaluated in a 1g cube of averaging mass. This value was obtained in “Lap Held Antenna Out” position in UMTS mode, utilizing channel 4132 (826.4 MHz).



**Table: SAR MEASUREMENT RESULTS – 1750MHz UMTS****Table 40**

| Test Position                      | Plot No. | Test Channel | Test Freq (MHz) | Measured 1g SAR Results (mW/g) | Measured Drift (dB) |
|------------------------------------|----------|--------------|-----------------|--------------------------------|---------------------|
| Bystander 25mm Spacing Antenna In  | -        | 1513         | 1752.6          | Noise Floor                    | N/A                 |
| Bystander 25mm Spacing Antenna Out | 20       | 1513         | 1752.6          | 0.156                          | -0.02               |
| Lap Held Antenna In                | -        | 1513         | 1752.6          | Noise Floor                    | N/A                 |
| Lap Held Antenna Out               | 21       | 1513         | 1752.6          | 0.321                          | 0.03                |
| Secondary Portrait Antenna In      | -        | 1513         | 1752.6          | Noise Floor                    | N/A                 |
| Secondary Portrait Antenna Out     | 22       | 1513         | 1752.6          | <b>0.328</b>                   | -0.09               |
| Secondary Landscape Antenna In     | 23       | 1312         | 1712.4          | 0.107                          | 0.19                |
|                                    | 24       | 1427         | 1735.4          | 0.120                          | -0.02               |
|                                    | 25       | 1513         | 1752.6          | 0.149                          | 0.10                |

NOTE: The measurement uncertainty of 23.2% was not added to the result.

The highest SAR level recorded was **0.328** mW/g as evaluated in a 1g cube of averaging mass. This value was obtained in "Secondary Portrait Antenna Out" position in UMTS mode, utilizing channel 1513 (1752.6 MHz).

**Table: SAR MEASUREMENT RESULTS – 1900MHz UMTS****Table 41**

| Test Position                      | Plot No. | Test Channel | Test Freq (MHz) | Measured 1g SAR Results (mW/g) | Measured Drift (dB) |
|------------------------------------|----------|--------------|-----------------|--------------------------------|---------------------|
| Bystander 25mm Spacing Antenna In  | 26       | 9538         | 1907.6          | 0.007                          | -0.14               |
| Bystander 25mm Spacing Antenna Out | 27       | 9538         | 1907.6          | 0.197                          | -0.11               |
| Lap Held Antenna In                | 28       | 9538         | 1907.6          | 0.011                          | -0.14               |
| Lap Held Antenna Out               | 29       | 9538         | 1907.6          | 0.368                          | -0.12               |
| Secondary Portrait Antenna In      | 30       | 9538         | 1907.6          | 0.014                          | 0.06                |
| Secondary Portrait Antenna Out     | 31       | 9538         | 1907.6          | 0.291                          | 0.00                |
| Secondary Landscape Antenna In     | 32       | 9262         | 1852.4          | 0.256                          | 0.11                |
|                                    | 33       | 9400         | 1880            | 0.371                          | -0.05               |
|                                    | 34       | 9538         | 1907.6          | <b>0.546</b>                   | 0.13                |

NOTE: The measurement uncertainty of 23.2% was not added to the result.

The highest SAR level recorded was **0.546** mW/g as evaluated in a 1g cube of averaging mass. This value was obtained in "Secondary Landscape Antenna In" position in UMTS mode, utilizing channel 9538 (1907.6 MHz).



**Table: SAR MEASUREMENT RESULTS – 850 Ev-Do****Table 42**

| Test Position                      | Plot No. | Test Channel | Test Freq (MHz) | Measured 1g SAR Results (mW/g) | Measured Drift (dB) |
|------------------------------------|----------|--------------|-----------------|--------------------------------|---------------------|
| Bystander 25mm Spacing Antenna In  | -        | 0384         | 836.52          | Noise Floor                    | N/A                 |
| Bystander 25mm Spacing Antenna Out | 35       | 0384         | 836.52          | 0.483                          | 0.08                |
| Lap Held Antenna In                | -        | 0384         | 836.52          | Noise Floor                    | N/A                 |
| Lap Held Antenna Out               | 36       | 0384         | 836.52          | <b>0.521</b>                   | -0.10               |
| Secondary Portrait Antenna In      | -        | 0384         | 836.52          | Noise Floor                    | N/A                 |
| Secondary Portrait Antenna Out     | 37       | 0384         | 836.52          | 0.251                          | 0.10                |
| Secondary Landscape Antenna In     | 38       | 1013         | 824.7           | 0.212                          | -0.15               |
|                                    | 39       | 0384         | 836.52          | 0.217                          | -0.12               |
|                                    | 40       | 0777         | 848.31          | 0.261                          | -0.01               |

NOTE: The measurement uncertainty of 23.2% was not added to the result.

The highest SAR level recorded was **0.521** mW/g as evaluated in a 1g cube of averaging mass. This value was obtained in “Lap Held Antenna Out” position in Ev-Do mode, utilizing channel 0384 (836.52 MHz).

**Table: SAR MEASUREMENT RESULTS – 1900 Ev-Do****Table 43**

| Test Position                      | Plot No. | Test Channel | Test Freq (MHz) | Measured 1g SAR Results (mW/g) | Measured Drift (dB) |
|------------------------------------|----------|--------------|-----------------|--------------------------------|---------------------|
| Bystander 25mm Spacing Antenna In  | -        | 0025         | 1851.25         | Noise Floor                    | N/A                 |
| Bystander 25mm Spacing Antenna Out | 41       | 0025         | 1851.25         | 0.265                          | 0.05                |
| Lap Held Antenna In                | -        | 0025         | 1851.25         | Noise Floor                    | N/A                 |
| Lap Held Antenna Out               | 42       | 0025         | 1851.25         | 0.417                          | 0.06                |
| Secondary Portrait Antenna In      | -        | 0025         | 1851.25         | Noise Floor                    | N/A                 |
| Secondary Portrait Antenna Out     | 43       | 0025         | 1851.25         | 0.414                          | -0.17               |
| Secondary Landscape Antenna In     | 44       | 1175         | 1908.75         | <b>0.449</b>                   | -0.02               |
|                                    | 45       | 0025         | 1851.25         | 0.302                          | -0.02               |
|                                    | 46       | 0600         | 1880            | 0.338                          | -0.10               |

NOTE: The measurement uncertainty of 23.2% was not added to the result.

The highest SAR level recorded was **0.449** mW/g as evaluated in a 1g cube of averaging mass. This value was obtained in “Secondary Landscape Antenna In” position in Ev-Do mode, utilizing channel 1175 (1908.75 MHz).



## 12.0 COMPLIANCE STATEMENT

The Fujitsu TABLET PC, Model: T732 / TH702 with SIERRA WIRELESS Mini-PCI Wireless WAN Module (GOBI 3000), Model: MC8355 was found to comply with the FCC and RSS-102 SAR requirements.

The highest SAR level recorded was **0.719** mW/g for a 1g cube. This value was measured at 836 MHz (channel 190) in the "Lap Held Antenna Out" position in GPRS transmission mode. This was below the limit of 1.6 mW/g for uncontrolled exposure, even taking into account the measurement uncertainty of 23.2 %.



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## 13.0 MULTIBAND EVALUATION CONSIDERATIONS

Fujitsu Tablet PC, Model: T732 / TH702 can be equipped with GOBI3000 WWAN transmitter in addition to WLAN and Bluetooth.

Report numbers M120826\_62205ANHMW\_SAR\_2.4 and M1200826\_62205ANHMW\_SAR\_5.6 relate to SAR testing of a T732 / TH702 sample that includes the INTEL 62205ANHMW WLAN module.

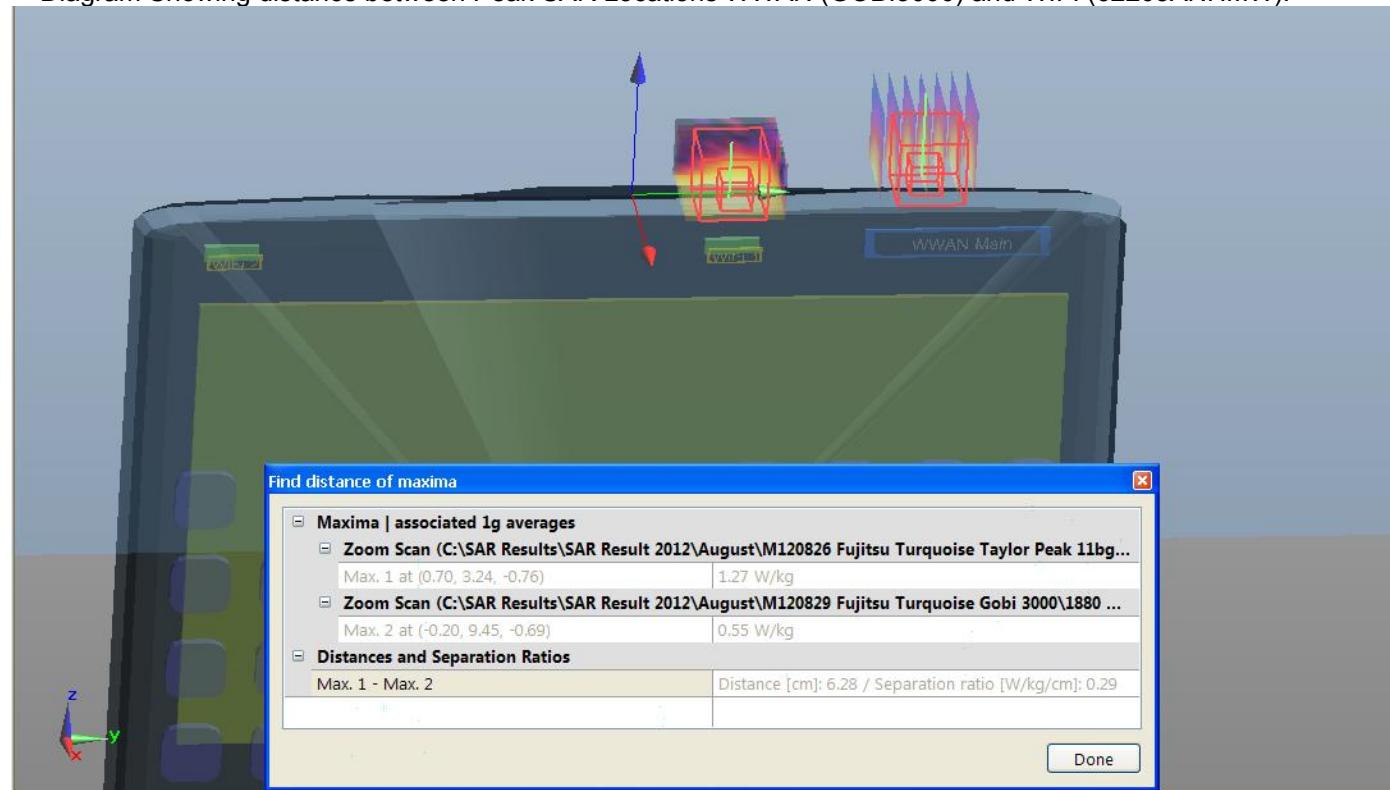
According to the FCC SAR evaluation procedures mentioned in KDB447498, when the sum of SAR results (simultaneously transmitting antennas WLAN and WWAN) is  $> 1.6\text{mW/g}$ , or the ratio of above sum to the distance between peak SAR locations  $> 0.3$ , simultaneous transmission SAR evaluation is required.

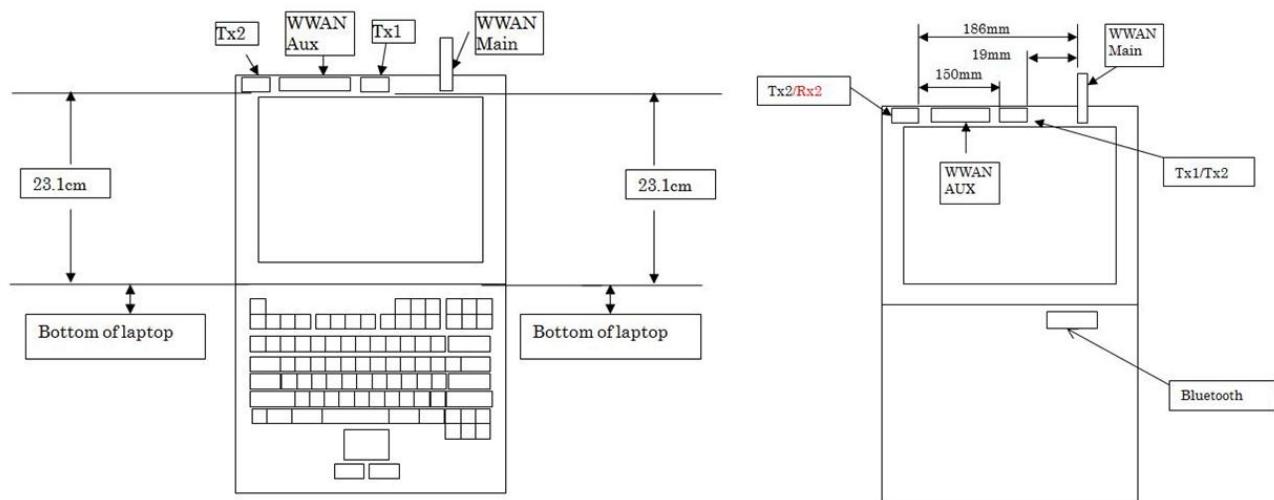
In addition, according to the FCC SAR evaluation procedures mentioned in KDB 616217 stand-alone SAR evaluation is NOT required when the maximum transmitter and antenna output power is less than or equal to  $60/f_{(\text{GHz})} (P_{\text{ref}})$  The Bluetooth module in the DUT operates in the 2.4GHz range. It has a maximum output power less than 5mW which is  $< P_{\text{ref}}$  ( $=60/2.4=25\text{mW}$ ).

The shortest distance between the BT module and any other transmitting antenna was more than 23.1cm. Because  $23.1\text{cm} > 5\text{cm}$ , and  $5\text{mW} < 25\text{mW}$ , the Bluetooth module was not considered for SAR evaluation. This is in accordance with the test reduction methods detailed in KDB 616217 and KDB 447498.

Multiband evaluation was not conducted for UMTS/GSM/CDMA WWAN (GOBI3000) and WLAN (62205ANHMW) because the ratio of the sum of highest SAR results for the WWAN and WLAN (5GHz band Antenna A) to the distance between peak SAR locations of WWAN transmitting antenna and WIFI Antenna A is  $(0.55 + 1.27) \text{mW/g} / 6.28 \text{ cm} = 0.29 < 0.3$ .

Diagram Showing distance between Peak SAR Locations WWAN (GOBI3000) and WIFI (62205ANHMW):



**Diagram Showing distance between Antennas**

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