

# SAR TEST REPORT

|                                        |                                                                   |
|----------------------------------------|-------------------------------------------------------------------|
| <b>Equipment Under Test</b>            | Tablet (Pad) Computer                                             |
| <b>Model</b>                           | ThinkPad Tablet                                                   |
| <b>Canadian Model number</b>           | TP00028AE                                                         |
| <b>Company Name</b>                    | Compal Electronics, Inc.                                          |
| <b>Company Address</b>                 | No.581,Ruiguang.,Neihu District, Taipei City 11492, Taiwan(R.O.C) |
| <b>FCC KDB inquiry tracking number</b> | 271063                                                            |
| <b>Date of Receipt</b>                 | 2011.07.23                                                        |
| <b>Date of Test(s)</b>                 | 2011.07.24~2011.08.04;2011.09.02                                  |
| <b>Date of Issue</b>                   | 2011.11.02                                                        |

Standards:

**FCC OET 65 supplement C,  
IEEE /ANSI C95.1 , C95.3, IEEE 1528,  
RSS-102**

In the configuration tested, the EUT complied with the standards specified above.

## Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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Tested by : Ricky Huang  
Asst. Supervisor

Date : 2011.11.02

Approved by : Nick Hsu  
Supervisor

Date : 2011.11.02

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### Revision Version

| Report Number | Revision | Date       | Memo                             |
|---------------|----------|------------|----------------------------------|
| ES/2011/70014 | 00       | 2011/08/09 | Initial creation of test report. |
| ES/2011/70014 | 01       | 2011/08/24 | 1 <sup>st</sup> modification     |
| ES/2011/70014 | 02       | 2011/09/06 | 2 <sup>nd</sup> modification     |
| ES/2011/70014 | 03       | 2011/09/07 | 3 <sup>rd</sup> modification     |
| ES/2011/70014 | 04       | 2011/10/04 | 4 <sup>th</sup> modification     |
| ES/2011/70014 | 05       | 2011/10/25 | 5 <sup>th</sup> modification     |
| ES/2011/70014 | 06       | 2011/11/02 | 6 <sup>th</sup> modification     |

**This test report contains a reference to the previous version test report that it replaces.**

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## 1. General Information

### 1.1 Testing Laboratory

|                                                        |                                                           |
|--------------------------------------------------------|-----------------------------------------------------------|
| SGS Taiwan Ltd. Electronics & Communication Laboratory |                                                           |
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| Taipei county, Taiwan, R.O.C.                          |                                                           |
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### 1.2 Details of Applicant

|                |                                                                   |
|----------------|-------------------------------------------------------------------|
| Name           | Compal Electronics, Inc.                                          |
| Address        | No.581,Ruiguang.,Neihu District, Taipei City 11492, Taiwan(R.O.C) |
| Contact Person | Evelyn_Yang                                                       |

### 1.3 Description of EUT

|                       |                       |
|-----------------------|-----------------------|
| EUT Name              | Tablet (Pad) Computer |
| Model No. of Modular  | F5521gw               |
| Model                 | ThinkPad Tablet       |
| Canadian Model number | TP28000AE             |
| Brand Name            | Lenovo                |
| Marketing Name        | Tablet Computer       |
| FCC ID                | GKR-TP00028AE         |
| IC ID                 | 2533B-TP00028AE       |
| IMEI code             | 004401700676220       |

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|                             |                                                                                                                                                                                                                                                                                                                                                                    |                    |                 |               |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------|---------------|
| Definition                  | Production unit                                                                                                                                                                                                                                                                                                                                                    |                    |                 |               |
| Mode of Operation           | GSM\GPRS\EGPRS\ WCDMA\HSDPA\HSUPA                                                                                                                                                                                                                                                                                                                                  |                    |                 |               |
| Duty Cycle                  | GPRS                                                                                                                                                                                                                                                                                                                                                               | EGPRS              | WCDMA           |               |
|                             | 1/4 (2 multi-slot)                                                                                                                                                                                                                                                                                                                                                 | 1/4 (2 multi-slot) | 1               |               |
|                             | DTM multi class B<br>(GPRS Mobile station(MS) class B)                                                                                                                                                                                                                                                                                                             |                    |                 |               |
| TX Frequency range (MHz)    | GPRS 850                                                                                                                                                                                                                                                                                                                                                           | GPRS1900           | WCDMA Band II   | WCDMA Band V  |
|                             | 824.2-848.8                                                                                                                                                                                                                                                                                                                                                        | 1850.20-1909.80    | 1852.40-1907.60 | 826.40-846.60 |
| Channel Number (ARFCN)      | GPRS 850                                                                                                                                                                                                                                                                                                                                                           | GPRS1900           | WCDMA Band II   | WCDMA Band V  |
|                             | 128-251                                                                                                                                                                                                                                                                                                                                                            | 512-810            | 9262-9538       | 4132-4233     |
| Max. SAR Measured (1g) mW/g | GPRS 850                                                                                                                                                                                                                                                                                                                                                           |                    |                 |               |
|                             | 0.926                                                                                                                                                                                                                                                                                                                                                              |                    |                 |               |
|                             | At GPRS 850_ CH128_ Lap-held mode_(2 multi-slot) (proximity sensor is activated)_ test distance is 0mm)                                                                                                                                                                                                                                                            |                    |                 |               |
|                             | GPRS 1900                                                                                                                                                                                                                                                                                                                                                          |                    |                 |               |
|                             | 0.978                                                                                                                                                                                                                                                                                                                                                              |                    |                 |               |
|                             | At GPRS 1900_ CH810_ Front side mode_(2 multi-slot) (proximity sensor is not activated)_ test distance is 10mm)                                                                                                                                                                                                                                                    |                    |                 |               |
|                             | WCDMA Band II                                                                                                                                                                                                                                                                                                                                                      |                    |                 |               |
|                             | 1.38                                                                                                                                                                                                                                                                                                                                                               |                    |                 |               |
|                             | At WCDMA Band II_ CH9400_ Lap-held mode (proximity sensor is activated)_ test distance is 0mm)                                                                                                                                                                                                                                                                     |                    |                 |               |
|                             | WCDMA Band V                                                                                                                                                                                                                                                                                                                                                       |                    |                 |               |
|                             | 1.02                                                                                                                                                                                                                                                                                                                                                               |                    |                 |               |
|                             | At WCDMA Band V_ CH4182_ Lap-held mode (proximity sensor is activated)_ test distance is 0mm)                                                                                                                                                                                                                                                                      |                    |                 |               |
| Declaration                 | Second solution(change wahyu antenna)                                                                                                                                                                                                                                                                                                                              |                    |                 |               |
|                             | In addition to the Original sample shown in these test results, model ThinkPad Tablet / TP28000AE also has an option for a wahyu antenna; SAR values were checked on these options using the spot check method. We found results were same or lower than Original for GPRS850/GPRS1900/ WCDMA Band II/ WCDMA Band V, but still within 20% of highest measured SAR. |                    |                 |               |

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|               |                                                                                                                                                                                                          |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Antenna Type: | <p>Fixed Integrated antenna</p> <p>PIFA type</p> <p>(Main) → ACON P/M: DC33000W300</p> <p>(Aux) → ACON P/M: DC33000W310</p> <p>(Main) → WahYu P/N: DC33000XZ00</p> <p>(Aux) → WahYu P/N: DC33000XZ10</p> |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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### Maximum GSM Power

|      |                       | Burst Average Power |                          |                          |                          |                          |
|------|-----------------------|---------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|      |                       |                     | GPRS/EDGE (GMSK)         |                          | EDGE (8PSK)              |                          |
| Band | Frequency Range (MHz) | Channel             | GPRS (dBm) 1 uplink Slot | GPRS (dBm) 2 uplink Slot | EDGE (dBm) 1 uplink Slot | EDGE (dBm) 2 uplink Slot |
| 850  | 824.2 - 848.8         | 128                 | 32.6                     | 29.48                    | 26.6                     | 26.6                     |
|      |                       | 189                 | 32.3                     | 29.59                    | 26.68                    | 26.68                    |
|      |                       | 251                 | 32.35                    | 29.7                     | 26.81                    | 26.81                    |
| 1900 | 1850.2 - 1909.8       | 512                 | 29.9                     | 28.4                     | 26.02                    | 25.47                    |
|      |                       | 661                 | 29.4                     | 28.35                    | 25.8                     | 25.51                    |
|      |                       | 810                 | 29.55                    | 28.5                     | 26.01                    | 25.64                    |

|      |                       | Calculated Source-Based Time Average Power |                          |                          |                          |                          |
|------|-----------------------|--------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|      |                       |                                            | GPRS/EDGE (GMSK)         |                          | EDGE (8PSK)              |                          |
| Band | Frequency Range (MHz) | Channel                                    | GPRS (dBm) 1 uplink Slot | GPRS (dBm) 2 uplink Slot | EDGE (dBm) 1 uplink Slot | EDGE (dBm) 2 uplink Slot |
| 850  | 824.2 - 848.8         | 128                                        | 23.57                    | <b>23.46</b>             | 17.57                    | 20.58                    |
|      |                       | 189                                        | 23.27                    | <b>23.57</b>             | 17.65                    | 20.66                    |
|      |                       | 251                                        | 23.32                    | <b>23.68</b>             | 17.78                    | 20.79                    |
| 1900 | 1850.2 - 1909.8       | 512                                        | 20.87                    | <b>22.38</b>             | 16.99                    | 19.45                    |
|      |                       | 661                                        | 20.37                    | <b>22.33</b>             | 16.77                    | 19.49                    |
|      |                       | 810                                        | 20.52                    | <b>22.48</b>             | 16.98                    | 19.62                    |

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### GPRS/EDGE Powers with Reduction

|      |                       | Burst Average Power |                             |                             |                             |                             |
|------|-----------------------|---------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|      |                       |                     | GPRS/EDGE (GMSK)            |                             | EDGE (8PSK)                 |                             |
| Band | Frequency Range (MHz) | Channel             | GPRS (dBm)<br>1 uplink Slot | GPRS (dBm)<br>2 uplink Slot | EDGE (dBm)<br>1 uplink Slot | EDGE (dBm)<br>2 uplink Slot |
| 850  | 824.2 - 848.8         | 128                 | 28.41                       | 25.52                       | 24.64                       | 24.65                       |
|      |                       | 189                 | 28.45                       | 25.65                       | 24.74                       | 24.74                       |
|      |                       | 251                 | 28.16                       | 25.84                       | 24.88                       | 24.89                       |
| 1900 | 1850.2 - 1909.8       | 512                 | 25.35                       | 22.65                       | 23.46                       | 22.49                       |
|      |                       | 661                 | 25.34                       | 22.61                       | 23.53                       | 22.53                       |
|      |                       | 810                 | 25.42                       | 22.65                       | 23.65                       | 22.65                       |

|      |                       | Calculated Source-Based Time Average Power |                             |                             |                             |                             |
|------|-----------------------|--------------------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|      |                       |                                            | GPRS/EDGE (GMSK)            |                             | EDGE (8PSK)                 |                             |
| Band | Frequency Range (MHz) | Channel                                    | GPRS (dBm) 1<br>uplink Slot | GPRS (dBm) 2<br>uplink Slot | EDGE (dBm) 1<br>uplink Slot | EDGE (dBm) 2<br>uplink Slot |
| 850  | 824.2 - 848.8         | 128                                        | 19.38                       | <b>19.50</b>                | 15.61                       | 18.63                       |
|      |                       | 189                                        | 19.42                       | <b>19.63</b>                | 15.71                       | 18.72                       |
|      |                       | 251                                        | 19.13                       | <b>19.82</b>                | 15.85                       | 18.87                       |
| 1900 | 1850.2 - 1909.8       | 512                                        | 16.32                       | <b>16.63</b>                | 14.43                       | 16.47                       |
|      |                       | 661                                        | 16.31                       | <b>16.59</b>                | 14.50                       | 16.51                       |
|      |                       | 810                                        | 16.39                       | <b>16.63</b>                | 14.62                       | 16.58                       |

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**Slot Factor**

| Frame Average Factor (Source Based Time Average Factor) |                                      |
|---------------------------------------------------------|--------------------------------------|
| 1Tx (1 slot of uplink Transmission)                     | 2Tx (2 slots of uplink Transmission) |
| -9.03                                                   | -6.02                                |

Note1: Source-Based Average power has been determined by the addition with the measured burst-average power. The GPRS/EDGE mode with GSMK modulation scheme as boldize in red as table of data above are chosen to perform SAR testing in accordance with KDB 941225 D-03 in which highest output power in sourced-based time average mode shall be used to perform the corresponding SAR test.

Note2: The given device is pure Data-Only device at which GSM function is disabled, and since CS and PS are not co-existed while operation, DTM is not applicable to this given DUT of the application.

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### WCDMA Band II / Band V( Not Power back-off)

| Freq. Band    | Frequency | CH   | R99 Avg. Power | HSDPA mode Avg. Power |       |       |       | HSUPA mode Avg. Power |       |       |       |       |
|---------------|-----------|------|----------------|-----------------------|-------|-------|-------|-----------------------|-------|-------|-------|-------|
|               | (MHz)     |      | (dBm)          | SUB-1                 | SUB-2 | SUB-3 | SUB-4 | SUB-1                 | SUB-2 | SUB-3 | SUB-4 | SUB-5 |
| WCDMA Band II | 1852.4    | 9262 | 22.7           | 22.87                 | 22.58 | 22.39 | 22.46 | 22.62                 | 20.67 | 21.68 | 20.8  | 22.51 |
|               | 1880.0    | 9400 | 22.73          | 22.62                 | 22.59 | 22.17 | 22.18 | 22.71                 | 20.78 | 21.73 | 20.83 | 22.57 |
|               | 1907.6    | 9538 | 22.78          | 22.64                 | 22.63 | 22.11 | 22.23 | 22.72                 | 20.76 | 21.8  | 20.8  | 22.63 |
| Freq. Band    | Frequency | CH   | Avg. Power     | HSDPA mode Avg. Power |       |       |       | HSUPA mode Avg. Power |       |       |       |       |
|               | (MHz)     |      | (dBm)          | SUB-1                 | SUB-2 | SUB-3 | SUB-4 | SUB-1                 | SUB-2 | SUB-3 | SUB-4 | SUB-5 |
| WCDMA Band V  | 826.4     | 4132 | 23.8           | 22.62                 | 20.67 | 21.68 | 20.8  | 23.76                 | 21.82 | 22.8  | 21.87 | 23.62 |
|               | 836.4     | 4182 | 23.75          | 22.71                 | 20.78 | 21.73 | 20.83 | 23.66                 | 21.74 | 22.72 | 21.8  | 23.49 |
|               | 846.6     | 4233 | 23.95          | 22.72                 | 20.76 | 21.8  | 20.8  | 23.87                 | 21.91 | 22.95 | 21.99 | 23.76 |

### WCDMA Band II / Band V(Power back-off)

| Freq. Band    | Frequency | CH   | R99 Avg. Power | HSDPA mode Avg. Power |       |       |       | HSUPA mode Avg. Power |       |       |       |       |
|---------------|-----------|------|----------------|-----------------------|-------|-------|-------|-----------------------|-------|-------|-------|-------|
|               | (MHz)     |      | (dBm)          | SUB-1                 | SUB-2 | SUB-3 | SUB-4 | SUB-1                 | SUB-2 | SUB-3 | SUB-4 | SUB-5 |
| WCDMA Band II | 1852.4    | 9262 | 21.08          | 21.25                 | 20.96 | 20.77 | 20.84 | 21                    | 19.05 | 20.06 | 19.18 | 20.89 |
|               | 1880.0    | 9400 | 21.20          | 21.09                 | 21.06 | 20.64 | 20.65 | 21.18                 | 19.25 | 20.2  | 19.3  | 21.04 |
|               | 1907.6    | 9538 | 21.10          | 20.96                 | 20.95 | 20.43 | 20.55 | 21.04                 | 19.08 | 20.12 | 19.12 | 20.95 |
| Freq. Band    | Frequency | CH   | Avg. Power     | HSDPA mode Avg. Power |       |       |       | HSUPA mode Avg. Power |       |       |       |       |
|               | (MHz)     |      | (dBm)          | SUB-1                 | SUB-2 | SUB-3 | SUB-4 | SUB-1                 | SUB-2 | SUB-3 | SUB-4 | SUB-5 |
| WCDMA Band V  | 826.4     | 4132 | 17.91          | 17.7                  | 17.84 | 17.24 | 17.29 | 17.87                 | 15.93 | 16.91 | 15.98 | 17.73 |
|               | 836.4     | 4182 | 17.84          | 17.7                  | 17.73 | 17.22 | 17.26 | 17.77                 | 15.85 | 16.83 | 15.91 | 17.6  |
|               | 846.6     | 4233 | 17.66          | 17.78                 | 17.53 | 17.29 | 17.35 | 17.58                 | 15.62 | 16.66 | 15.7  | 17.47 |

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### The Deficit of Power

| Band | Frequency Range (MHz) | Channel | GPRS/EDGE<br>(GMSK) |               | EDGE<br>(8PSK) |               |
|------|-----------------------|---------|---------------------|---------------|----------------|---------------|
|      |                       |         | GPRS<br>(dBm)       | GPRS<br>(dBm) | EDGE<br>(dBm)  | EDGE<br>(dBm) |
|      |                       |         | 1uplink             | 2uplink       | 1uplink        | 2uplink       |
|      |                       |         | Slot                | Slot          | Slot           | Slot          |
| 850  | 824.2 - 848.8         | 128     | <b>4.19</b>         | 3.96          | <b>1.96</b>    | 1.95          |
|      |                       | 190     | 3.85                | 3.94          | 1.94           | 1.94          |
|      |                       | 250     | <b>4.19</b>         | 3.86          | 1.93           | 1.92          |
|      |                       | 512     | 4.55                | 5.75          | 2.56           | 2.98          |
| 1900 | 1850.2 - 1909.8       | 661     | 4.06                | 5.74          | 2.27           | 2.98          |
|      |                       | 810     | 4.13                | <b>5.85</b>   | 2.36           | <b>2.99</b>   |

| Band         | Freq.  | R99 Avg.<br>Power | HSDPA mode / Avg. Power |       |       |       | HSUPA mode / Avg. Power |       |       |       |       |
|--------------|--------|-------------------|-------------------------|-------|-------|-------|-------------------------|-------|-------|-------|-------|
|              |        |                   | Sub-1                   | Sub-2 | Sub-3 | Sub-4 | Sub-1                   | Sub-2 | Sub-3 | Sub-4 | Sub-5 |
| WCDMA<br>BII | 1852.4 | 1.62              | 1.62                    | 1.62  | 1.62  | 1.62  | 1.62                    | 1.62  | 1.62  | 1.62  | 1.62  |
|              | 1880   | 1.53              | 1.53                    | 1.53  | 1.53  | 1.53  | 1.53                    | 1.53  | 1.53  | 1.53  | 1.53  |
|              | 1907.6 | <b>1.68</b>       | <b>1.68</b>             | 1.68  | 1.68  | 1.68  | <b>1.68</b>             | 1.68  | 1.68  | 1.68  | 1.68  |
| WCDMA<br>BV  | 826.4  | 5.89              | 4.92                    | 2.83  | 4.44  | 3.51  | 5.89                    | 5.89  | 5.89  | 5.89  | 5.89  |
|              | 836.4  | 5.91              | <b>5.01</b>             | 3.05  | 4.51  | 3.57  | 5.89                    | 5.89  | 5.89  | 5.89  | 5.89  |
|              | 846.6  | <b>6.29</b>       | 4.94                    | 3.23  | 4.51  | 3.45  | <b>6.29</b>             | 6.29  | 6.19  | 6.29  | 6.29  |

Note: The table as presented above records the result of power difference in burst mode between full power when sensor is de-activated and power reduction when sensor is activated. The data as boldlize in red highlights the largest difference at each transmission mode.

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## 1.4 Test Environment

Ambient Temperature:  $22 \pm 2^{\circ}\text{C}$

Tissue Simulating Liquid:  $22 \pm 2^{\circ}\text{C}$

## 1.5 Operation description

### Device description :

INDIGO support GPRS/EGPRS/WCDMA/HSDPA/HSUPA, technology. The conducted power of EGPRS850, EGPRS1900 will not reduced even proximity sensor actives.

The others are shown as below:

**Ericsson F5521gw**

| Mode(s) of operation                 | GPRS/<br>EGPRS 850<br>MSC 1-4<br>(GMSK) | EGPRS<br>850 MSC<br>5-9<br>(8-PSK)      | GPRS/<br>EGPRS<br>1900 MSC<br>1-4<br>(GMSK) | EGPRS<br>1900 MSC<br>5-9<br>(8-PSK)     |
|--------------------------------------|-----------------------------------------|-----------------------------------------|---------------------------------------------|-----------------------------------------|
| Max. output power<br>setting         | <b><math>31.27 \pm 1</math><br/>dBm</b> | <b><math>25.81 \pm 1</math><br/>dBm</b> | <b><math>28.22 \pm 1</math><br/>dBm</b>     | <b><math>24.64 \pm 1</math><br/>dBm</b> |
| Reduced Max. output<br>power setting | <b><math>29.66 \pm 1</math><br/>dBm</b> | <b>N/A</b>                              | <b><math>26.52 \pm 1</math><br/>dBm</b>     | <b>N/A</b>                              |
| Transmitting frequency<br>range(s)   | <b>824 – 849 MHz</b>                    |                                         | <b>1850 – 1910 MHz</b>                      |                                         |

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| Mode(s) of operation              | WCDMA B2        | WCDMA B5      |
|-----------------------------------|-----------------|---------------|
| Max. output power setting         | 21.96± 1dBm     | 23.14± 1dBm   |
| Reduced Max. output power setting | 16.91± 1dBm     | 20.2± 1dBm    |
| Transmitting frequency range(s)   | 1850 – 1910 MHz | 824 – 849 MHz |

Due to proximity sensing antennas in INDIGO are placed next to GPRS/WCDMA main antenna and detect distance are limited by sensing antennas. That's why Primary landscape, secondary landscape and primary portrait mode of conduct power reduction will not active during SAR measurements due to out of detect range. But, proximity sensor itself is "always available" independent of display orientation.

In real case, when end user operates in landscape mode for example. Proximity sensor will be triggered while human's hand approaches GPRS/WCDMA main antenna and vice versa. Moreover, proximity sensor's functionality will not be impacted even A/C adapter is plugged. More detail information about proximity sensor will be described in next section.

### Proximity Sensor description :

There exists a capacitance between any reference points relative to ground, as long as electrical isolation exists between them. If this reference point is a sensing plate (or sense antenna), it helps to think of it as a capacitor. The positive plate of the capacitor is the sensing plate, and the negative plate is formed by the surrounding area.

For example, a human hand will increase the sense plate capacitance as it approaches the sense plate. Touching the plate will increase the capacitance significantly.

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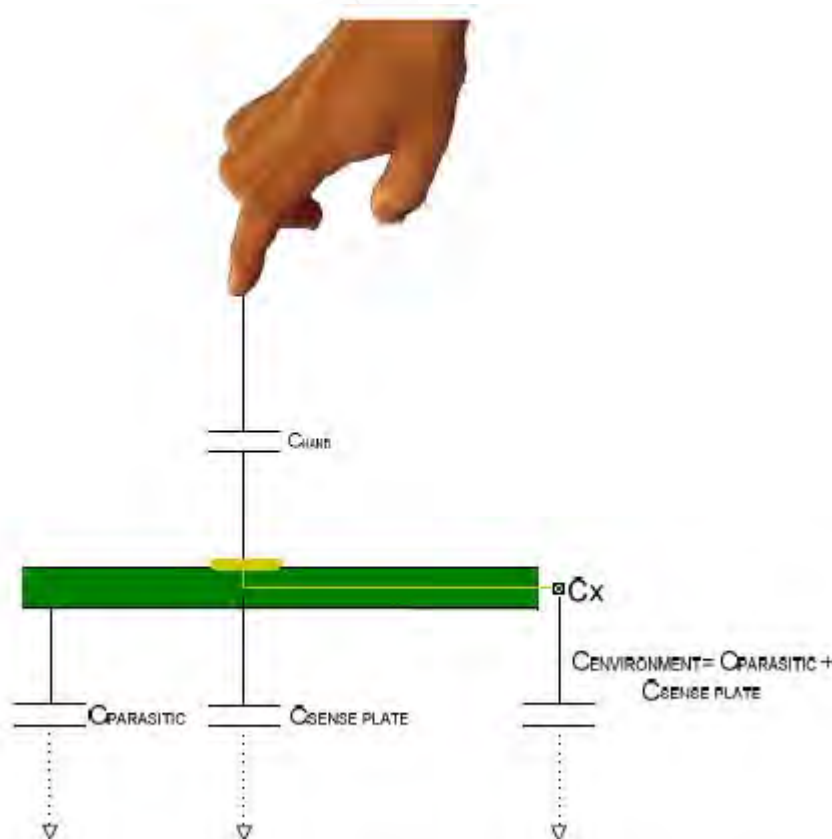


Figure 1.1 Illustration of environmental capacitance

The sense plate (or sense antenna) can be any electrically conductive object. This includes glass or perspex plates with a conductive surface, or the base of a metal desk lamp. In this project, we use two sensing plates (or sense antennas) in INDIGO. One is at the right side of GSM/WCDMA main antenna and the other is at the left side of GSM/WCDMA main antenna. The sense plate is connected to the CX Pin of all modules. The capacitance of the CX plate is referred to as CX.

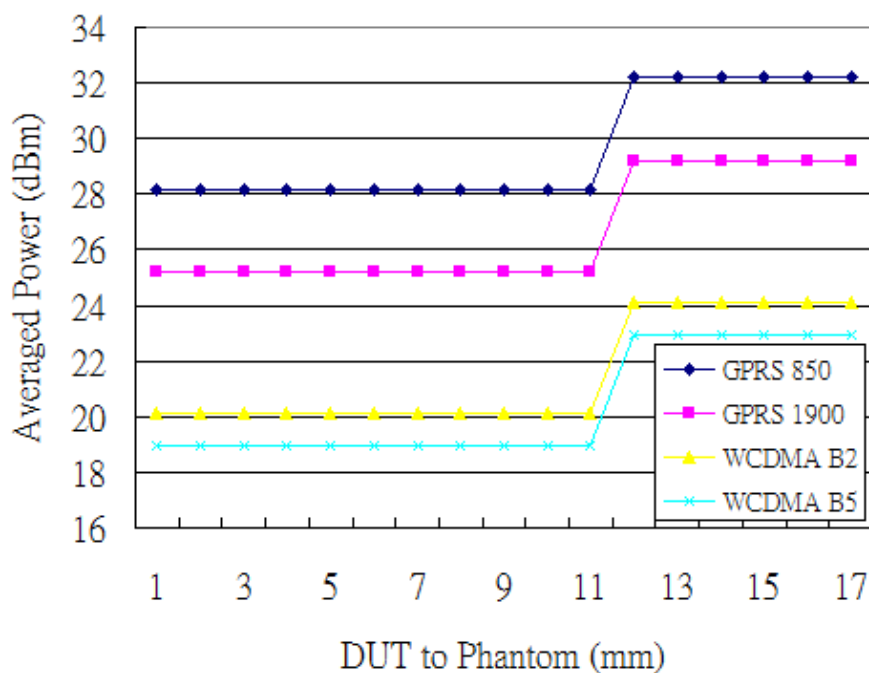
The following graphs are proximity sensor activation vs. output power of each module. Briefly speaking, the detect distance of INDIGO from phantom body to Bottom side is 11mm at least and the detect distance from phantom body to INDIGO edge side is 10mm at least. And we will test bottom/edge SAR when  $d=11\text{mm}$  at bottom side &  $d=10\text{mm}$  at edge side. Consider 45 degree tilt usage with respect to proximity sensor at screen side, the detect distance of INDIGO from phantom body to Device Under Test is 10mm at least also.

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**Proximity Sensor Activation (Ericsson F5521gw)**  
**Max. Output Power vs. Distance from the body phantom**

Power back-off (Bottom SAR)

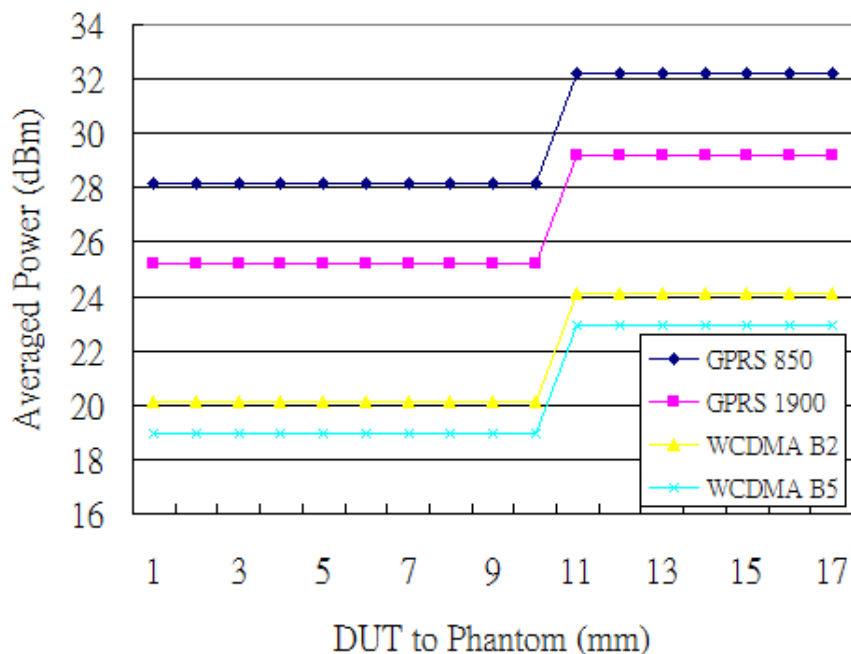


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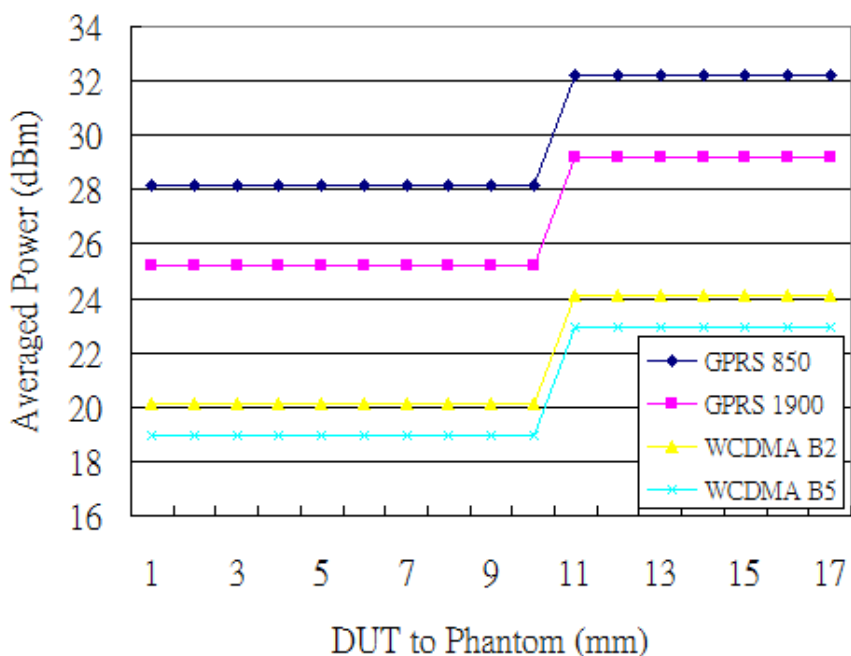
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## Power back-off (Edge SAR)



## Power back-off (tilt 45 degrees at screen side)

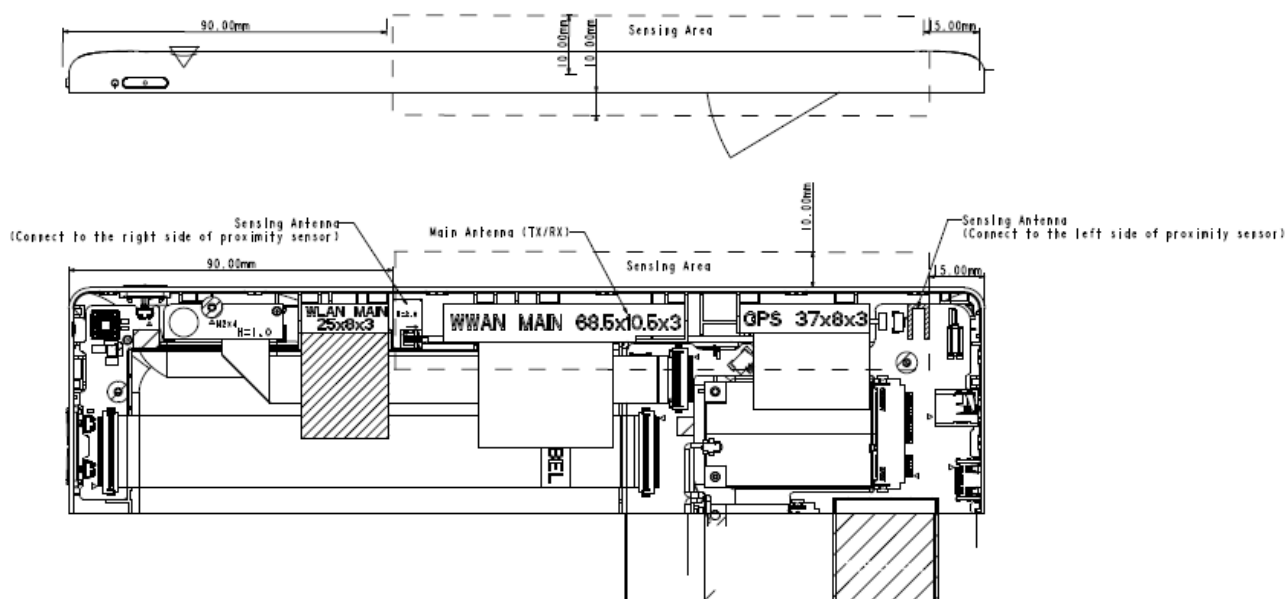


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Figure C is the proximity sensor and power limit activation flow chart in INDIGO. One is placed at the right side of GSM/WCDMA main antenna and the other is at the left side of GSM/WCDMA main antenna. While human body approach the sensing antenna of proximity sensor near the right side of GSM/WCDMA main antenna, right proximity sensor will info. Nvidia T20 then reduces power by AT command.



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While human body approach the sensing antenna of proximity sensor near the left side of GSM/WCDMA main antenna, left proximity sensor will info. Nvidia T20 then reduces power by AT command also. Both right and left proximity sensors use the same GPIO pin of Nvidia T20, this means power reduction will be triggered either one of the proximity sensor works.

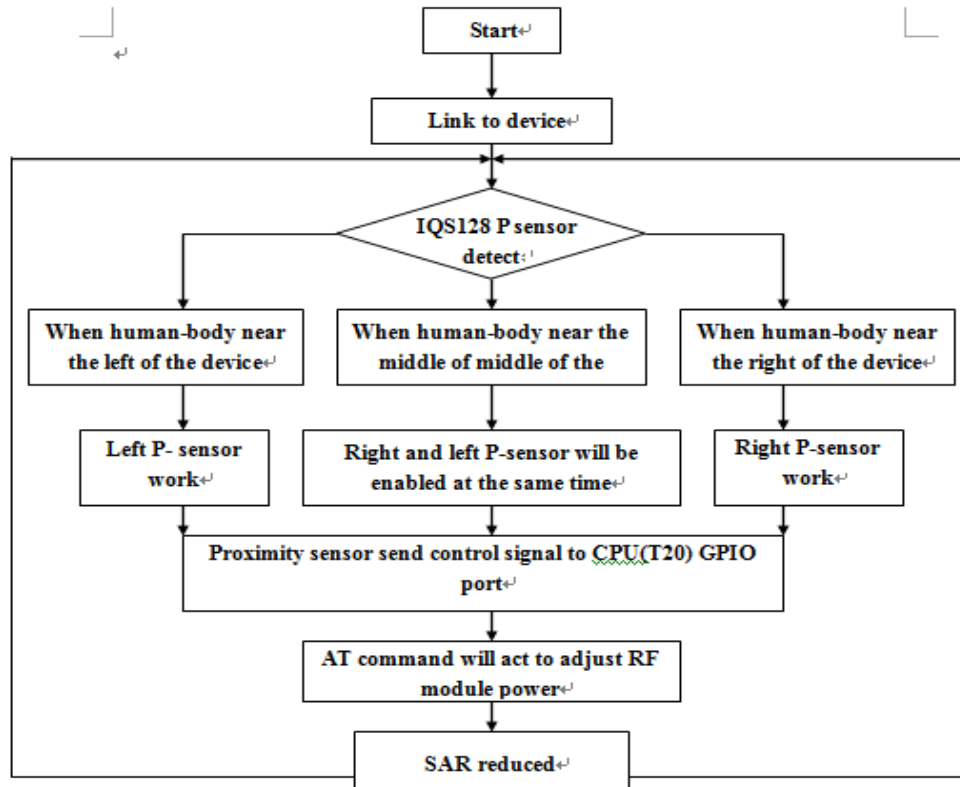


Figure C Control flow chart of human body sensing

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### Proposed SAR test plan

The EUT WWAN is controlled by using a Radio Communication Tester, and the communication between the EUT and the tester is established by air link. Measurements are performed respectively on the lowest, middle and highest channels of the operating band(s). The EUT is set to maximum power level during all tests, and at the beginning of each test the battery is fully charged.

Since the overall device diagonal size is larger than 200mm, according to KDB447498 , Lab should test this device in highest power with 3 configurations below (highlighted with bold)

**Configuration 1: Lap-held mode.** (back side of device is parallel to human body, proximity sensor is activated)

Configuration 2: Primary Portrait mode. (Not tested, since distance of WWAN antenna to edge is 85.22mm , which is larger than 5cm )

Configuration 3: Secondary Portrait mode. (Not tested, since distance of WWAN antenna to edge is 106.68mm , which is larger than 5cm)

Configuration 4: Primary Landscape mode. (Not tested, since distance of WWAN antenna to edge is 166.4 mm , which is larger than 5cm)

**Configuration 5: Secondary Landscape mode.** (proximity sensor is activated)

**Configuration 6: Front side mode.** (proximity sensor is not activated)

Full power test: (Test distance is 10 mm)

**Configuration 7: Lap-held mode.** (back side of device is parallel to human body, proximity sensor is not activated)

**Configuration 8: Secondary Landscape mode.** (proximity sensor is not activated)

#. If the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is  $\leq 100$  MHz, testing for the other channels is not required.

#. When the maximum transmitter and antenna output power are  $\leq 60/f(\text{GHz})$  (mW) SAR evaluation is not required for FCC or TCB approval.

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- #. Per KDB941225 FCC 3G procedures, HSDPA and HSUPA have been omitted since the maximum transmit power results are NOT 1/4dB larger than the WCDMA R99 test result.
- #. Per KDB941225 D03 procedures, EGPRS/EDGE have been omitted since the maximum transmit power results are less than the GPRS test results.
- #. The highest 1-g SAR for WLAN is 0.459 W/kg\_ Lap-held mode (Refer to SGS Report No.EN/2011/60009) and the highest 1-g SAR for WWAN is 1.38 W/kg\_ Lap-held mode. The sum of 1-g for simultaneous transmitting WLAN and WWAN antenna pair is  $0.459 + 1.38 = 1.839 \text{ W/kg} > 1.6 \text{ W/kg}$  which higher than the limit 1.6W/kg.

| TX<br>configuration      | $\Sigma$ of SAR                                                            | Note            |
|--------------------------|----------------------------------------------------------------------------|-----------------|
|                          | Lap-held Mode                                                              |                 |
| GPRS850 + WLAN802.11 b   | $0.616 \text{ W/kg} + 0.459 \text{ W/kg} = \underline{1.075 \text{ W/kg}}$ | Full Power      |
| GPRS 1900 + WLAN802.11 b | $0.453 \text{ W/kg} + 0.459 \text{ W/kg} = \underline{0.912 \text{ W/kg}}$ | Full Power      |
| WCDMA BII + WLAN802.11 b | $0.574 \text{ W/kg} + 0.459 \text{ W/kg} = \underline{1.033 \text{ W/kg}}$ | Full Power      |
| WCDMA BV + WLAN802.11 b  | $0.462 \text{ W/kg} + 0.459 \text{ W/kg} = \underline{0.921 \text{ W/kg}}$ | Full Power      |
| GPRS850 + WLAN802.11 b   | $0.926 \text{ W/kg} + 0.459 \text{ W/kg} = \underline{1.385 \text{ W/kg}}$ | Power Reduction |
| GPRS1900 + WLAN802.11 b  | $0.789 \text{ W/kg} + 0.459 \text{ W/kg} = \underline{1.248 \text{ W/kg}}$ | Power Reduction |
| WCDMA BII + WLAN802.11 b | $1.38 \text{ W/kg} + 0.459 \text{ W/kg} = \underline{1.839 \text{ W/kg}}$  | Power Reduction |
| WCDMA BV + WLAN802.11 b  | $1.02 \text{ W/kg} + 0.459 \text{ W/kg} = \underline{1.479 \text{ W/kg}}$  | Power Reduction |

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#.By the way, the hotspot peak to peak distance for WWAN and WLAN is **6.1561 cm**, we have made my calculations per the DASY and SEMCAD document:

TN\_110201\_DASY\_Calculate\_Hotspot\_Distance.

| % Value of SAR |               | X       | Y       | Z      |      |
|----------------|---------------|---------|---------|--------|------|
| % mW/g         |               | m       | m       | m      |      |
| 1.38           |               | 0.00603 | -0.0006 | -0.207 | WWAN |
| 0.459          |               | -0.0332 | -0.048  | -0.205 | WLAN |
|                |               |         |         |        |      |
| m              | cm            |         |         |        |      |
| 0.061561       | <b>6.1561</b> |         |         |        |      |

#. We calculate the peak location separation ratio of simultaneous transmitting antenna pair, the value is **0.298**  $((1.38+0.459)/6.1561=0.298)$ , which less than 0.3.  
According to **KDB648474**, simultaneous SAR evaluation is not required.

## The brief of SAR result

### GPRS 850 SAR Result

| Measurement Results |     |           |                       |                   |                      |         |                     |                     |          |
|---------------------|-----|-----------|-----------------------|-------------------|----------------------|---------|---------------------|---------------------|----------|
| Frequency           |     | Mode      | Conducted Power (dBm) | Power Drift (dBm) | Power Reduction (dB) | Spacing | Number of GPRS Slot | Test Config.        | SAR (1g) |
| MHz                 | Ch. |           |                       |                   |                      |         |                     |                     | (W/kg)   |
| 824.20              | 128 | GPRS 850  | 19.50                 | 0.002             | 3.96                 | 0mm     | 2 slot              | Lap-held            | 0.926    |
| 836.40              | 189 | GPRS 850  | 19.63                 | 0.007             | 3.94                 | 0mm     | 2 slot              | Lap-held            | 0.828    |
| 848.80              | 251 | GPRS 850  | 19.82                 | 0.1               | 3.86                 | 0mm     | 2 slot              | Lap-held            | 0.696    |
| 836.40              | 189 | GPRS 8500 | 19.63                 | -0.041            | 3.94                 | 0mm     | 2 slot              | Secondary landscape | 0.297    |
| 836.40              | 189 | GPRS 850  | 23.57                 | -0.052            | 0                    | 10mm    | 2 slot              | Front side          | 0.315    |
| 836.40              | 189 | GPRS 850  | 23.57                 | 0.19              | 0                    | 10mm    | 2 slot              | Lap-held            | 0.616    |
| 836.40              | 189 | GPRS 850  | 23.57                 | -0.15             | 0                    | 10mm    | 2 slot              | Secondary landscape | 0.303    |

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### GPRS1900 SAR Result

| Measurement Results |     |           |                       |                   |                      |         |                     |                     |          |
|---------------------|-----|-----------|-----------------------|-------------------|----------------------|---------|---------------------|---------------------|----------|
| Frequency           |     | Mode      | Conducted Power (dBm) | Power Drift (dBm) | Power Reduction (dB) | Spacing | Number of GPRS Slot | Test Config.        | SAR (1g) |
| MHz                 | Ch. |           |                       |                   |                      |         |                     |                     | (W/kg)   |
| 1880                | 661 | GPRS 1900 | 16.59                 | -0.133            | 5.74                 | 0mm     | 2 slot              | Lap-held            | 0.789    |
| 1880                | 661 | GPRS 1900 | 16.59                 | -0.01             | 5.74                 | 0mm     | 2 slot              | Secondary landscape | 0.669    |
| 1850.2              | 512 | GPRS 1900 | 22.38                 | -0.032            | 5.75                 | 10mm    | 2 slot              | Front side          | 0.740    |
| 1880                | 661 | GPRS 1900 | 22.33                 | -0.049            | 5.74                 | 10mm    | 2 slot              | Front side          | 0.897    |
| 1909.8              | 810 | GPRS 1900 | 22.48                 | -0.116            | 5.85                 | 10mm    | 2 slot              | Front side          | 0.978    |
| 1880                | 661 | GPRS 1900 | 22.33                 | -0.02             | 0                    | 10mm    | 2 slit              | Lap-held            | 0.435    |
| 1880                | 661 | GPRS 1900 | 22.33                 | 0.05              | 0                    | 10mm    | 2 slit              | Secondary landscape | 0.797    |

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### WCDMA Band II SAR Result

| Measurement Results |      |      |                       |                   |                      |         |                     |                     |          |
|---------------------|------|------|-----------------------|-------------------|----------------------|---------|---------------------|---------------------|----------|
| Frequency           |      | Mode | Conducted Power (dBm) | Power Drift (dBm) | Power Reduction (dB) | Spacing | Number of GPRS Slot | Test Config.        | SAR (1g) |
| MHz                 | Ch.  |      |                       |                   |                      |         |                     |                     | (W/kg)   |
| 1852.4              | 9262 | R99  | 21.08                 | -0.001            | 1.62                 | 0mm     | NA                  | Lap-held            | 1.25     |
| 1880                | 9400 | R99  | 21.20                 | 0.029             | 1.53                 | 0mm     | NA                  | Lap-held            | 1.38     |
| 1907.6              | 9538 | R99  | 21.10                 | 0.013             | 1.68                 | 0mm     | NA                  | Lap-held            | 1.37     |
| 1852.4              | 9262 | R99  | 21.08                 | 0.033             | 1.62                 | 0mm     | NA                  | Secondary landscape | 1.14     |
| 1880                | 9400 | R99  | 21.20                 | -0.1              | 1.53                 | 0mm     | NA                  | Secondary landscape | 1.14     |
| 1907.6              | 9538 | R99  | 21.10                 | -0.128            | 1.68                 | 0mm     | NA                  | Secondary landscape | 1.11     |
| 1852.4              | 9262 | R99  | 22.7                  | -0.090            | 0                    | 10mm    | NA                  | Front side          | 0.944    |
| 1880                | 9400 | R99  | 22.73                 | -0.043            | 0                    | 10mm    | NA                  | Front side          | 0.968    |
| 1907.6              | 9538 | R99  | 22.78                 | 0                 | 0                    | 10mm    | NA                  | Front side          | 1.00     |
| 1880                | 9400 | R99  | 22.73                 | -0.14             | 0                    | 10mm    | NA                  | Lap-held            | 0.574    |
| 1852.4              | 9262 | R99  | 22.7                  | -0.08             | 0                    | 10mm    | NA                  | Secondary landscape | 1.07     |
| 1880                | 9400 | R99  | 22.73                 | -0.09             | 0                    | 10mm    | NA                  | Secondary landscape | 0.989    |
| 1907.6              | 9538 | R99  | 22.78                 | -0.10             | 0                    | 10mm    | NA                  | Secondary landscape | 0.891    |

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### WCDMA Band V SAR Result

| Measurement Results |      |      |                       |                   |                      |         |                     |                     |          |
|---------------------|------|------|-----------------------|-------------------|----------------------|---------|---------------------|---------------------|----------|
| Frequency           |      | Mode | Conducted Power (dBm) | Power Drift (dBm) | Power Reduction (dB) | Spacing | Number of GPRS Slot | Test Config.        | SAR (1g) |
| MHz                 | Ch.  |      |                       |                   |                      |         |                     |                     | (W/kg)   |
| 826.4               | 4132 | R99  | 17.91                 | -0.071            | 5.89                 | 0mm     | NA                  | Lap-held            | 1.01     |
| 836.4               | 4182 | R99  | 17.84                 | -0.098            | 5.91                 | 0mm     | NA                  | Lap-held            | 1.02     |
| 846.60              | 4233 | R99  | 17.66                 | 0.050             | 6.29                 | 0mm     | NA                  | Lap-held            | 0.980    |
| 836.4               | 4182 | R99  | 17.84                 | -0.028            | 0                    | 0mm     | NA                  | Secondary landscape | 0.420    |
| 836.4               | 4182 | R99  | 23.75                 | 0.034             | 0                    | 0mm     | NA                  | Front side          | 0.331    |
| 836.4               | 4182 | R99  | 22.75                 | -0.02             | 0                    | 10mm    | NA                  | Lap-held            | 0.462    |
| 836.4               | 4182 | R99  | 22.75                 | -0.19             | 0                    | 10mm    | NA                  | Front side          | 0.311    |

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## 1.6 The SAR Measurement System

A photograph of the SAR measurement System is given in Fig. a. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system ( SPEAG DASY 4 /Dasy 5professional system ). A Model EX3DV4 field probe is used to determine the internal electric fields. The SAR can be obtained from the equation  $SAR = \sigma (|E_i|^2) / \rho$  where  $\sigma$  and  $\rho$  are the conductivity and mass density of the tissue-simulant.

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

- A standard high precision 6-axis robot (Staubli RX family) with controller, teach pendant and software. An arm extension is for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc.

The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

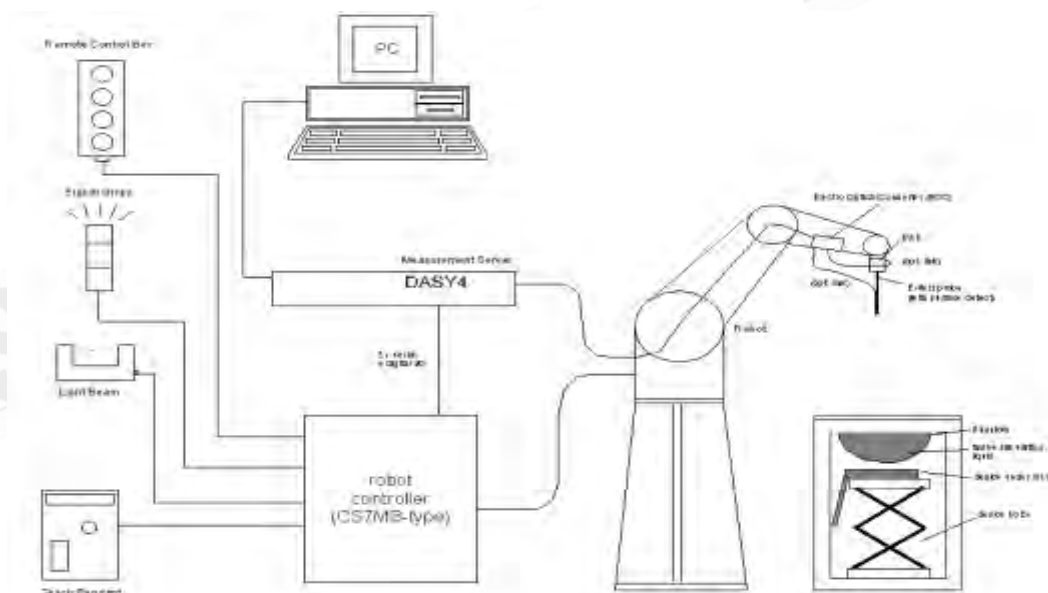


Fig.a The block diagram of SAR system

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- The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
  - A computer operating Windows 2000 or Windows XP.
  - DASY4/Dasy5 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
  - The SAM twin phantom enabling testing left-hand and right-hand usage.
  - The device holder for handheld mobile phones.
  - Tissue simulating liquid mixed according to the given recipes.
  - Validation dipole kits allowing to validate the proper functioning of the system.

## 1.7 System Components

### EX3DV4 E-Field Probe

|               |                                                                                                                                                             |                                                                                       |  |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--|
| Construction  | Symmetrical design with triangular core<br>Built-in shielding against static charges<br>PEEK enclosure material (resistant to organic solvents, e.g., DGBE) |  |  |
| Calibration   | Basic Broad Band Calibration in air<br>Conversion Factors (CF) for HSL835/1900 MHz<br>Additional CF for other liquids and frequencies upon request          |                                                                                       |  |
| Frequency     | 10 MHz to > 6 GHz, Linearity: $\pm 0.2$ dB (30 MHz to 6 GHz)                                                                                                |                                                                                       |  |
| Directivity   | $\pm 0.3$ dB in HSL (rotation around probe axis)<br>$\pm 0.5$ dB in tissue material (rotation normal to probe axis)                                         |                                                                                       |  |
| Dynamic Range | 10 $\mu$ W/g to > 100 mW/g<br>Linearity: $\pm 0.2$ dB (noise: typically < 1 $\mu$ W/g)                                                                      |                                                                                       |  |

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|             |                                                                                                                                                                                                            |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimensions  | Overall length: 330 mm (Tip: 20 mm)<br>Tip diameter: 2.5 mm (Body: 12 mm)<br>Typical distance from probe tip to dipole centers: 1 mm                                                                       |
| Application | High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%. |

## SAM PHANTOM V4.0C

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                      |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Construction    | <p>The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-200X, CENELEC 50361 and IEC 62209.</p> <p>It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points with the robot.</p> |                                                                                      |
| Shell Thickness | 2 ± 0.2 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| Filling Volume  | Approx. 25 liters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                      |
| Dimensions      | Height: 251 mm;<br>Length: 1000 mm;<br>Width: 500 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                      |

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## DEVICE HOLDER

|              |                                                                                                                                                                                         |                                                                                    |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Construction | The device holder (Supporter) for Notebook is made by POM (polyoxymethylene resin) , which is non-metal and non-conductive. The height can be adjusted to fit varies kind of notebooks. |  |
|              |                                                                                                                                                                                         | Device Holder                                                                      |

## 1.8 SAR System Verification

The microwave circuit arrangement for system verification is sketched in Fig. b. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 5% from the target SAR values. These tests were done at 835/1900 MHz. The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed in the table 1 (SAR values are normalized to 1W forward power delivered to the dipole). During the tests, the ambient temperature of the laboratory was in the range 22.1°C, the relative humidity was in the range 62% and the liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

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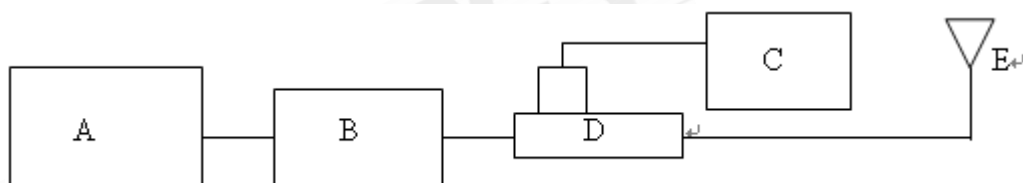


Fig.b The block diagram of system verification

- A. Agilent Model 8648D Signal Generator
- B. Mini circuits Model ZHL-42 Amplifier
- C. Agilent Model U2001B Power sensor
- D. Agilent Model 778D Dual directional coupling
- E. Reference dipole antenna



Photograph of the dipole Antenna

| Validation Kit       | Frequency Hz       | Target SAR (1g)<br>(Pin=250mW) | Measured SAR (1g) | Measured Date |
|----------------------|--------------------|--------------------------------|-------------------|---------------|
| D835V2<br>S/N:4d063  | 850 MHz<br>(Body)  | 2.43mW/g                       | 2.4mW/g           | 2011-07-24    |
| D1900V2<br>S/N:5d027 | 1900 MHz<br>(Body) | 9.93mW/g                       | 9.94 mW/g         | 2011-07-25    |
| D835V2<br>S/N:4d063  | 850 MHz<br>(Body)  | 2.43mW/g                       | 2.42mW/g          | 2011-08-04    |
| D1900V2<br>S/N:5d027 | 1900 MHz<br>(Body) | 9.93mW/g                       | 9.99 mW/g         | 2011-08-04    |
| D835V2<br>S/N:4d063  | 850 MHz<br>(Body)  | 2.43mW/g                       | 2.45mW/g          | 2011-09-02    |
| D1900V2<br>S/N:5d027 | 1900 MHz<br>(Body) | 9.93mW/g                       | 9.7mW/g           | 2011-09-02    |

Table 2. Results of system validation

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## 1.9 Tissue Simulant Fluid for the Frequency Band

The dielectric properties for this body-simulant fluid were measured by using the Agilent Model 85070D Dielectric Probe (rates frequency band 200 MHz to 20 GHz) in conjunction with HP 8753D Network Analyzer (30 KHz-6000 MHz ).

All dielectric parameters of tissue simulates were measured within 24 hours of SAR measurements. The depth of the tissue simulant in the flat section of the phantom was 15cm±5mm during all tests. (Fig .2)

| Frequency<br>(MHz) | Tissue type | Measurement date/<br>Limits | Dielectric Parameters |                |                                      |
|--------------------|-------------|-----------------------------|-----------------------|----------------|--------------------------------------|
|                    |             |                             | $\rho$                | $\sigma$ (S/m) | Simulated Tissue<br>Temperature(° C) |
| 850                | Body        | Measured, 2011.07.24        | 55.3                  | 1.02           | 21.7                                 |
|                    |             | Recommended Limits          | 51.21-56.60           | 0.95-1.05      | 20-24                                |
| 1900               | Body        | Measured, 2011.07.25        | 51.5                  | 1.59           | 21.7                                 |
|                    |             | Recommended Limits          | 48.55-53.66           | 1.44-1.6       | 20-24                                |
| 850                | Body        | Measured, 2011.08.04        | 55.4                  | 1.02           | 21.7                                 |
|                    |             | Recommended Limits          | 51.21-56.60           | 0.95-1.05      | 20-24                                |
| 1900               | Body        | Measured, 2011.08.04        | 51.4                  | 1.58           | 21.7                                 |
|                    |             | Recommended Limits          | 48.55-53.66           | 1.44-1.6       | 20-24                                |
| 850                | Body        | Measured, 2011.09.02        | 53.847                | 1.01           | 21.7                                 |
|                    |             | Recommended Limits          | 51.21-56.60           | 0.95-1.05      | 20-24                                |
| 1900               | Body        | Measured, 2011.09.02        | 51.545                | 1.523          | 21.7                                 |
|                    |             | Recommended Limits          | 48.55-53.66           | 1.44-1.6       | 20-24                                |

Table 3. Dielectric Parameters of Tissue Simulant Fluid

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The composition of the body tissue simulating liquid is:

| Ingredient    | 850MHz<br>(Body) | 1900MHz<br>(Body) |
|---------------|------------------|-------------------|
| DGMBE         | X                | 300.67g           |
| Water         | 631.68 g         | 716.56 g          |
| Salt          | 11.72 g          | 4.0 g             |
| Preventol D-7 | 1.2 g            | X                 |
| Cellulose     | X                | X                 |
| Sugar         | 600 g            | X                 |
| Total amount  | 1 L (1.0kg)      | 1 L (1.0kg)       |

Table 3. Recipes for tissue simulating liquid

## 1.10 EVALUATION PROCEDURES

The entire evaluation of the spatial peak values is performed within the Post-processing engine (SEMCAD). The system always gives the maximum values for the 1 g and 10 g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. The extraction of the measured data (grid and values) from the Zoom Scan.
2. The calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. The generation of a high-resolution mesh within the measured volume
4. The interpolation of all measured values from the measurement grid to the high-resolution grid
5. The extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. The calculation of the averaged SAR within masses of 1g and 10g.

The probe is calibrated at the center of the dipole sensors that is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated. The angle between the probe axis and the surface normal line is less than 30 degree.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extreme of the SAR distribution. The uncertainty on the locations of the extreme is less than 1/20 of the grid size. Only local maximum within -2 dB of the global maximum are searched and passed for the Cube Scan measurement. In the Cube Scan, the

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interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5mm.

The maximum search is automatically performed after each area scan measurement. It is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with relatively large grid spacing. After the area scanning measurement, the probe is automatically moved to a position at the interpolated maximum. The following scan can directly use this position for reference, e.g., for a finer resolution grid or the cube evaluations. The 1g and 10g peak evaluations are only available for the predefined cube 7x7x7 scans. The routines are verified and optimized for the grid dimensions used in these cube measurements.

The measured volume of 30x30x30mm contains about 30g of tissue.

The first procedure is an extrapolation (incl. Boundary correction) to get the points between the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume. In the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is moved around until the highest averaged SAR is found. If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.

### 1.11 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate ("SAR") in Section 4.2 of "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," ANSI/IEEE C95.1-1992, Copyright 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in "Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields," NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814.

SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and

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shall apply for portable devices transmitting in the frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

- (1) Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube).
- (2) Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.
- (3) Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure. Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.(Table .4)

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| Human Exposure                                      | Uncontrolled Environment<br>General Population | Controlled Environment<br>Occupational |
|-----------------------------------------------------|------------------------------------------------|----------------------------------------|
| <b>Spatial Peak SAR</b><br>(Brain)                  | 1.60 m W/g                                     | 8.00 m W/g                             |
| <b>Spatial Average SAR</b><br>(Whole Body)          | 0.08 m W/g                                     | 0.40 m W/g                             |
| <b>Spatial Peak SAR</b><br>(Hands/Feet/Ankle/Wrist) | 4.00 m W/g                                     | 20.00 m W/g                            |

Table .4 RF exposure limits

Notes:

1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
2. Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.

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## 2. Summary of Results

### Acon antenna

### GPRS 850\_(2 multi-slot\_2UP\_1Dn)

| Lap-held mode: (proximity sensor is activated)_0 mm            |         |        |                                  |                      |                   |                     |
|----------------------------------------------------------------|---------|--------|----------------------------------|----------------------|-------------------|---------------------|
| Frequency                                                      | Channel | MHz    | Conducted Output Power (Average) | Measured(W/kg)<br>1g | Amb.<br>Temp[ °C] | Liquid<br>Temp[ °C] |
| 850MHz                                                         | 128     | 824.20 | 19.50dBm                         | 0.926                | 22.1              | 21.7                |
|                                                                | 189     | 836.40 | 19.63dBm                         | 0.828                | 22.1              | 21.7                |
|                                                                | 251     | 848.80 | 19.82dBm                         | 0.696                | 22.1              | 21.7                |
| Secondary landscape mode: (proximity sensor is activated)_0 mm |         |        |                                  |                      |                   |                     |
| Frequency                                                      | Channel | MHz    | Conducted Output Power (Average) | Measured(W/kg)<br>1g | Amb.<br>Temp[ °C] | Liquid<br>Temp[ °C] |
| 850MHz                                                         | 189     | 836.40 | 19.63dBm                         | 0.297                | 22.1              | 21.7                |
| Front side mode: (proximity sensor is not activated)_10 mm     |         |        |                                  |                      |                   |                     |
| Frequency                                                      | Channel | MHz    | Conducted Output Power (Average) | Measured(W/kg)<br>1g | Amb.<br>Temp[ °C] | Liquid<br>Temp[ °C] |
| 850MHz                                                         | 189     | 836.40 | 23.57dBm                         | 0.315                | 22.1              | 21.7                |

#. Using KDB941225 D03 to exclude SAR test requirements for EDGE modes due to the source-based time-averaged output power for edge mode is lower than that in the GPRS mode.

#. According to KDB447498 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is  $\leq 100$  MHz, testing for the other channels is not required.

#.GPRS 850 class10 for 2 multi-slot : the maximum number of uplink is 2 and the maximum number of downlink is 1.

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**GPRS 850\_(2 multi-slot\_2UP\_1Dn)\_Full power test**

| <b>Lap-held mode: (proximity sensor is not activated)_10 mm</b>            |         |        |                                  |                      |                    |                      |
|----------------------------------------------------------------------------|---------|--------|----------------------------------|----------------------|--------------------|----------------------|
| Frequency                                                                  | Channel | MHz    | Conducted Output Power (Average) | Measured(W/kg)<br>1g | Amb.<br>Temp[ ° C] | Liquid<br>Temp[ ° C] |
| 850MHz                                                                     | 189     | 836.40 | 23.57dBm                         | 0.616                | 22.1               | 21.7                 |
| <b>Secondary landscape mode: (proximity sensor is not activated)_10 mm</b> |         |        |                                  |                      |                    |                      |
| Frequency                                                                  | Channel | MHz    | Conducted Output Power (Average) | Measured(W/kg)<br>1g | Amb.<br>Temp[ ° C] | Liquid<br>Temp[ ° C] |
| 850MHz                                                                     | 189     | 836.40 | 23.57dBm                         | 0.303                | 22.1               | 21.7                 |

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**GPRS 1900(2 multi-slot\_2UP\_1Dn)**

| <b>Lap-held mode: (proximity sensor is activated) _0mm</b>            |         |         |                                  |                      |                 |                   |
|-----------------------------------------------------------------------|---------|---------|----------------------------------|----------------------|-----------------|-------------------|
| Frequency                                                             | Channel | MHz     | Conducted Output Power (Average) | Measured(W/kg)<br>1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 1900MHz                                                               | 661     | 1880.00 | 16.59dBm                         | 0.789                | 22.1            | 21.7              |
| <b>Secondary landscape mode: (proximity sensor is activated) _0mm</b> |         |         |                                  |                      |                 |                   |
| Frequency                                                             | Channel | MHz     | Conducted Output Power (Average) | Measured(W/kg)<br>1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 1900MHz                                                               | 661     | 1880.00 | 16.59dBm                         | 0.669                | 22.1            | 21.7              |
| <b>Front side mode: (proximity sensor is not activated) _10mm</b>     |         |         |                                  |                      |                 |                   |
| Frequency                                                             | Channel | MHz     | Conducted Output Power (Average) | Measured(W/kg)<br>1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 1900MHz                                                               | 512     | 1850.20 | 22.38dBm                         | 0.740                | 22.1            | 21.7              |
|                                                                       | 661     | 1880.00 | 22.33dBm                         | 0.897                | 22.1            | 21.7              |
|                                                                       | 810     | 1909.80 | 22.48dBm                         | 0.978                | 22.1            | 21.7              |

#. Using KDB941225 D03 to exclude SAR test requirements for EDGE modes due to the source-based time-averaged output power for edge mode is lower than that in the GPRS mode.

#. According to KDB447498 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is  $\leq 100$  MHz, testing for the other channels is not required.

#.GPRS 1900 class10 for 2 multi-slot : the maximum number of uplink is 2 and the maximum number of downlink is 1.

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**GPRS 1900(2 multi-slot\_2UP\_1Dn) \_Full power test**

| <b>Lap-held mode: (proximity sensor is not activated) _10mm</b>            |         |         |                                     |                      |                    |                      |
|----------------------------------------------------------------------------|---------|---------|-------------------------------------|----------------------|--------------------|----------------------|
| Frequency                                                                  | Channel | MHz     | Conducted Output<br>Power (Average) | Measured(W/kg)<br>1g | Amb.<br>Temp[ ° C] | Liquid<br>Temp[ ° C] |
| 1900MHz                                                                    | 661     | 1880.00 | 22.33dBm                            | 0.453                | 22.1               | 21.7                 |
| <b>Secondary landscape mode: (proximity sensor is not activated) _10mm</b> |         |         |                                     |                      |                    |                      |
| Frequency                                                                  | Channel | MHz     | Conducted Output<br>Power (Average) | Measured(W/kg)<br>1g | Amb.<br>Temp[ ° C] | Liquid<br>Temp[ ° C] |
| 1900MHz                                                                    | 661     | 1880.00 | 22.33dBm                            | 0.797                | 22.1               | 21.7                 |

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## WCDMA Band II

| Lap-held mode: (proximity sensor is activated) _0mm            |         |         |                                  |                   |                 |                   |
|----------------------------------------------------------------|---------|---------|----------------------------------|-------------------|-----------------|-------------------|
| Frequency                                                      | Channel | MHz     | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 1900MHz                                                        | 9262    | 1852.40 | 21.08dBm                         | 1.25              | 22.1            | 21.7              |
|                                                                | 9400    | 1880.00 | 21.20dBm                         | 1.38              | 22.1            | 21.7              |
|                                                                | 9538    | 1907.60 | 21.10dBm                         | 1.37              | 22.1            | 21.7              |
| Secondary landscape mode: (proximity sensor is activated) _0mm |         |         |                                  |                   |                 |                   |
| Frequency                                                      | Channel | MHz     | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 1900MHz                                                        | 9262    | 1852.40 | 21.08dBm                         | 1.14              | 22.1            | 21.7              |
|                                                                | 9400    | 1880.00 | 21.20dBm                         | 1.14              | 22.1            | 21.7              |
|                                                                | 9538    | 1907.60 | 21.10dBm                         | 1.11              | 22.1            | 21.7              |
| Front side mode: (proximity sensor is not activated) _10mm     |         |         |                                  |                   |                 |                   |
| Frequency                                                      | Channel | MHz     | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 1900MHz                                                        | 9262    | 1852.40 | 22.7dBm                          | 0.944             | 22.1            | 21.7              |
|                                                                | 9400    | 1880.00 | 22.73dBm                         | 0.968             | 22.1            | 21.7              |
|                                                                | 9538    | 1907.60 | 22.78dBm                         | 1.00              | 22.1            | 21.7              |

#. Using KDB941225 D01 to exclude SAR test requirements for HSPA modes due to the maximum average output power of HSPA active is less than 1/4 dB higher than that measured without HSPA using 12.2kbps RMC

#. According to KDB447498 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is  $\leq 100$  MHz, testing for the other channels is not required.

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## WCDMA Band II\_ Full power test

| Lap-held mode: (proximity sensor is not activated) _10mm            |         |         |                                  |                      |                    |                      |
|---------------------------------------------------------------------|---------|---------|----------------------------------|----------------------|--------------------|----------------------|
| Frequency                                                           | Channel | MHz     | Conducted Output Power (Average) | Measured(W/kg)<br>1g | Amb.<br>Temp[ ° C] | Liquid<br>Temp[ ° C] |
| 1900MHz                                                             | 9400    | 1880.00 | 22.73dBm                         | 0.574                | 22.1               | 21.7                 |
| Secondary landscape mode: (proximity sensor is not activated) _10mm |         |         |                                  |                      |                    |                      |
| Frequency                                                           | Channel | MHz     | Conducted Output Power (Average) | Measured(W/kg)<br>1g | Amb.<br>Temp[ ° C] | Liquid<br>Temp[ ° C] |
| 1900MHz                                                             | 9262    | 1852.40 | 22.7dBm                          | 1.07                 | 22.1               | 21.7                 |
|                                                                     | 9400    | 1880.00 | 22.73dBm                         | 0.989                | 22.1               | 21.7                 |
|                                                                     | 9538    | 1907.60 | 22.78dBm                         | 0.891                | 22.1               | 21.7                 |

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## WCDMA Band V

| Lap-held mode: (proximity sensor is activated) _0mm             |         |        |                                  |                   |                 |                   |
|-----------------------------------------------------------------|---------|--------|----------------------------------|-------------------|-----------------|-------------------|
| Frequency                                                       | Channel | MHz    | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 850MHz                                                          | 4132    | 826.40 | 17.91dBm                         | 1.01              | 22.1            | 21.7              |
|                                                                 | 4182    | 836.40 | 17.84dBm                         | 1.02              | 22.1            | 21.7              |
|                                                                 | 4233    | 846.60 | 17.66dBm                         | 0.980             | 22.1            | 21.7              |
| Secondary landscape mode: (proximity sensor is activated) _0 mm |         |        |                                  |                   |                 |                   |
| Frequency                                                       | Channel | MHz    | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 850MHz                                                          | 4182    | 836.40 | 17.84dBm                         | 0.420             | 22.1            | 21.7              |
| Front side mode: (proximity sensor is not activated) _10mm      |         |        |                                  |                   |                 |                   |
| Frequency                                                       | Channel | MHz    | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 850MHz                                                          | 4182    | 836.40 | 23.75dBm                         | 0.331             | 22.1            | 21.7              |

#. Using KDB941225 D01 to exclude SAR test requirements for HSPA modes due to the maximum average output power of HSPA active is less than 1/4 dB higher than that measured without HSPA using 12.2kbps RMC

#. According to KDB447498 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is  $\leq 100$  MHz, testing for the other channels is not required.

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## WCDMA Band V\_Full power test

| Lap-held mode: (proximity sensor is Not activated) _10mm             |         |        |                                  |                      |                    |                      |
|----------------------------------------------------------------------|---------|--------|----------------------------------|----------------------|--------------------|----------------------|
| Frequency                                                            | Channel | MHz    | Conducted Output Power (Average) | Measured(W/kg)<br>1g | Amb.<br>Temp[ ° C] | Liquid<br>Temp[ ° C] |
| 850MHz                                                               | 4182    | 836.40 | 23.75dBm                         | 0.462                | 22.1               | 21.7                 |
| Secondary landscape mode: (proximity sensor is NOT activated) _10 mm |         |        |                                  |                      |                    |                      |
| Frequency                                                            | Channel | MHz    | Conducted Output Power (Average) | Measured(W/kg)<br>1g | Amb.<br>Temp[ ° C] | Liquid<br>Temp[ ° C] |
| 850MHz                                                               | 4182    | 836.40 | 23.75dBm                         | 0.311                | 22.1               | 21.7                 |

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## Wahyu antenna

| Lap-held mode: (proximity sensor is activated)_0 mm        |         |         |                                  |                      |                    |                      |
|------------------------------------------------------------|---------|---------|----------------------------------|----------------------|--------------------|----------------------|
| Frequency                                                  | Channel | MHz     | Conducted Output Power (Average) | Measured(W/kg)<br>1g | Amb.<br>Temp[ ° C] | Liquid<br>Temp[ ° C] |
| 850MHz                                                     | 128     | 824.20  | 19.50dBm                         | 0.576                | 22.1               | 21.7                 |
| Front side mode: (proximity sensor is not activated) _10mm |         |         |                                  |                      |                    |                      |
| Frequency                                                  | Channel | MHz     | Conducted Output Power (Average) | Measured(W/kg)<br>1g | Amb.<br>Temp[ ° C] | Liquid<br>Temp[ ° C] |
| 1900MHz                                                    | 810     | 1909.80 | 16.63dBm                         | 0.258                | 22.1               | 21.7                 |
| Lap-held mode: (proximity sensor is activated) _0mm        |         |         |                                  |                      |                    |                      |
| Frequency                                                  | Channel | MHz     | Conducted Output Power (Average) | Measured(W/kg)<br>1g | Amb.<br>Temp[ ° C] | Liquid<br>Temp[ ° C] |
| 1900MHz                                                    | 9400    | 1880.00 | 21.20dBm                         | 0.893                | 22.1               | 21.7                 |
| Lap-held mode: (proximity sensor is activated) _0mm        |         |         |                                  |                      |                    |                      |
| Frequency                                                  | Channel | MHz     | Conducted Output Power (Average) | Measured(W/kg)<br>1g | Amb.<br>Temp[ ° C] | Liquid<br>Temp[ ° C] |
| 850MHz                                                     | 4182    | 836.40  | 17.84dBm                         | 0.587                | 22.1               | 21.7                 |

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### 3. Instruments List

| Manufacturer                    | Device                                | Type                       | Serial number | Date of last calibration   |
|---------------------------------|---------------------------------------|----------------------------|---------------|----------------------------|
| Schmid & Partner Engineering AG | Dosimetric E-Field Probe              | EX3DV4                     | 3770          | Apr.19.2011                |
| Schmid & Partner Engineering AG | 850/1900 MHz System Validation Dipole | D835V2                     | 4d063         | May.25.2010                |
|                                 |                                       | D1900V2                    | 5d027         | Apr.19.2011                |
| Schmid & Partner Engineering AG | Data acquisition Electronics          | DAE4                       | 547<br>856    | Aug.18.2010<br>May.18.2011 |
| Schmid & Partner Engineering AG | Software                              | DASY 4<br>V4.7<br>Build 80 | N/A           | Calibration not required   |
| Schmid & Partner Engineering AG | Phantom                               | SAM                        | N/A           | Calibration not required   |
| HP                              | Network Analyzer                      | 8753D                      | 3410A05547    | Mar.16.2011                |
| HP                              | Dielectric Probe Kit                  | 85070D                     | US01440168    | Calibration not required   |
| Agilent                         | Dual-directional coupler              | 778D                       | 50313         | Aug.25.2010                |
|                                 |                                       |                            |               | Aug.19.2011                |
| Agilent                         | RF Signal Generator                   | 8648D                      | 3847M00432    | Jun.01.2011                |
| Agilent                         | Power Sensor                          | U2001B                     | MY48100169    | Apr.28.2011                |
| R&S                             | Radio Communication Test              | CMU200                     | 113505        | May.31.2011                |

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## 4. Measurements

Date: 2011/7/24

### Lap-held \_GPRS850\_CH128\_Acon antenna

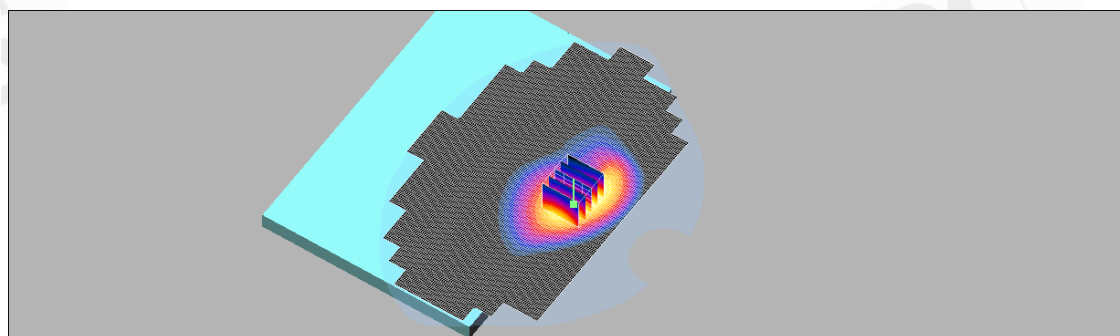
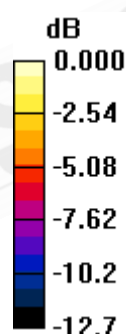
Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:4

Medium: Muscle 900 MHz Medium parameters used (interpolated):  $f = 824.2 \text{ MHz}$ ;  $\sigma = 1 \text{ mho/m}$ ;  $\epsilon_r = 55.4$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$ Maximum value of SAR (interpolated) =  $1.00 \text{ mW/g}$ **body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$ Reference Value =  $19.5 \text{ V/m}$ ; Power Drift =  $0.002 \text{ dB}$ Peak SAR (extrapolated) =  $1.63 \text{ W/kg}$ **SAR(1 g) =  $0.926 \text{ mW/g}$ ; SAR(10 g) =  $0.538 \text{ mW/g}$** Maximum value of SAR (measured) =  $0.998 \text{ mW/g}$ 0 dB =  $0.998 \text{ mW/g}$ 

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Date: 2011/7/24

## Lap-held \_GPRS850\_CH189\_Acon antenna

Communication System: GSM 850; Frequency: 836.4 MHz; Duty Cycle: 1:4

Medium: Muscle 900 MHz Medium parameters used:  $f = 837 \text{ MHz}$ ;  $\sigma = 1.02 \text{ mho/m}$ ;  $\epsilon_r = 55.3$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) =  $0.891 \text{ mW/g}$

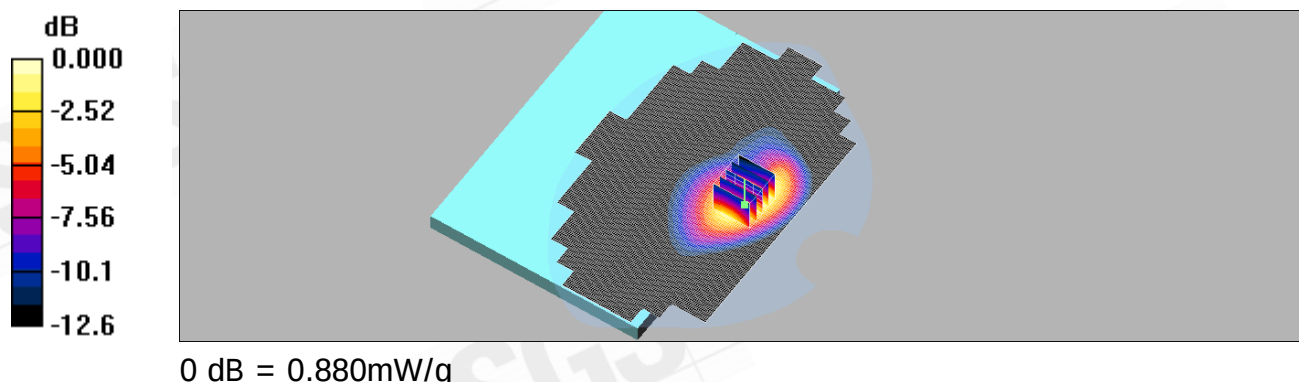
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $18.0 \text{ V/m}$ ; Power Drift =  $0.007 \text{ dB}$

Peak SAR (extrapolated) =  $1.48 \text{ W/kg}$

**SAR(1 g) =  $0.828 \text{ mW/g}$ ; SAR(10 g) =  $0.479 \text{ mW/g}$**

Maximum value of SAR (measured) =  $0.880 \text{ mW/g}$



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Date: 2011/7/24

## Lap-held \_GPRS850\_CH251\_Acon antenna

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:4

Medium: Muscle 900 MHz Medium parameters used:  $f = 849 \text{ MHz}$ ;  $\sigma = 1.03 \text{ mho/m}$ ;  $\epsilon_r = 55.2$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) =  $0.758 \text{ mW/g}$

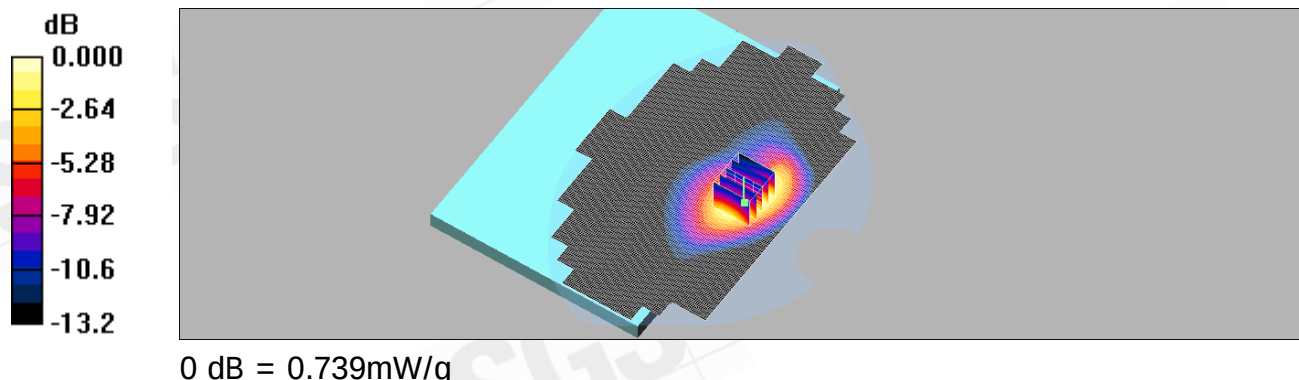
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $16.2 \text{ V/m}$ ; Power Drift =  $-0.100 \text{ dB}$

Peak SAR (extrapolated) =  $1.25 \text{ W/kg}$

**SAR(1 g) =  $0.696 \text{ mW/g}$ ; SAR(10 g) =  $0.403 \text{ mW/g}$**

Maximum value of SAR (measured) =  $0.739 \text{ mW/g}$



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Date: 2011/7/24

**Secondary Landscape\_GPRS850\_CH189\_Acon antenna**

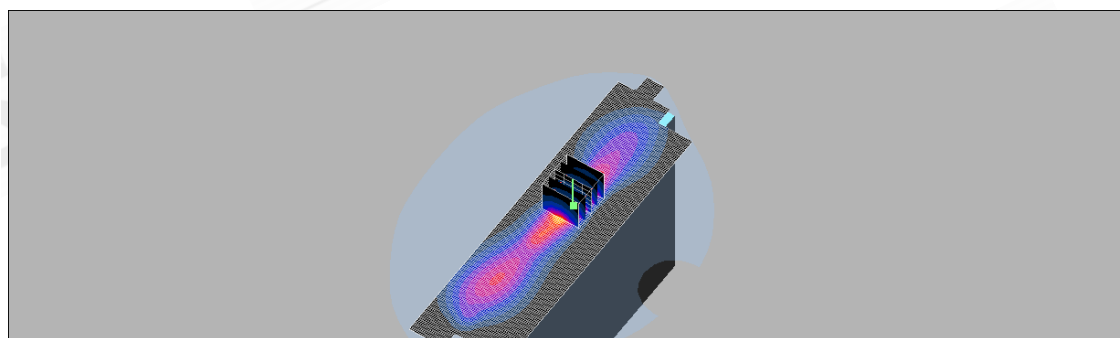
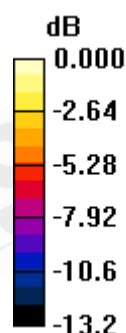
Communication System: GSM 850; Frequency: 836.4 MHz; Duty Cycle: 1:4

Medium: Muscle 900 MHz Medium parameters used:  $f = 837 \text{ MHz}$ ;  $\sigma = 1.02 \text{ mho/m}$ ;  $\epsilon_r = 55.3$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (51x191x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$ Maximum value of SAR (interpolated) =  $0.344 \text{ mW/g}$ **body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$ Reference Value =  $14.9 \text{ V/m}$ ; Power Drift =  $-0.041 \text{ dB}$ Peak SAR (extrapolated) =  $0.565 \text{ W/kg}$ **SAR(1 g) =  $0.297 \text{ mW/g}$ ; SAR(10 g) =  $0.156 \text{ mW/g}$** Maximum value of SAR (measured) =  $0.342 \text{ mW/g}$ 0 dB =  $0.342 \text{ mW/g}$ 

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Date: 2011/7/24

## Front side \_GPRS850\_CH189\_Acon antenna

Communication System: GSM 850; Frequency: 836.4 MHz; Duty Cycle: 1:4

Medium: Muscle 900 MHz Medium parameters used:  $f = 837 \text{ MHz}$ ;  $\sigma = 1.02 \text{ mho/m}$ ;  $\epsilon_r = 55.3$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) =  $0.345 \text{ mW/g}$

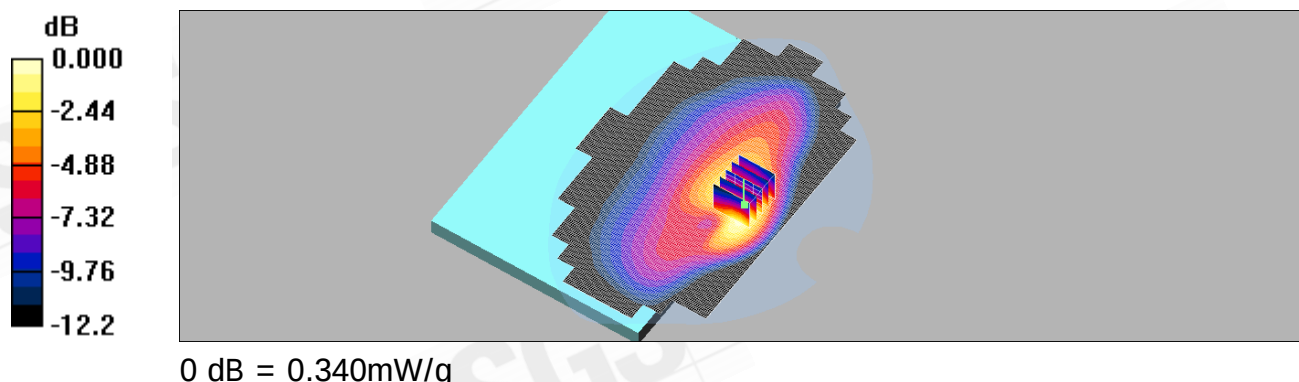
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $14.3 \text{ V/m}$ ; Power Drift =  $-0.052 \text{ dB}$

Peak SAR (extrapolated) =  $0.491 \text{ W/kg}$

**SAR(1 g) =  $0.315 \text{ mW/g}$ ; SAR(10 g) =  $0.200 \text{ mW/g}$**

Maximum value of SAR (measured) =  $0.340 \text{ mW/g}$



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Date: 9/02/2011

## Lap-held GPRS 850 CH189\_Acon antenna\_ Full power

Communication System: GPRS(Class 10); Frequency: 836.4 MHz

Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 1.012$  mho/m;  $\epsilon_r = 53.831$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 4/19/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/18/2011
- Phantom: SAM1; Type: SAM
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

**Configuration/Body/Area Scan (111x181x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.668 mW/g

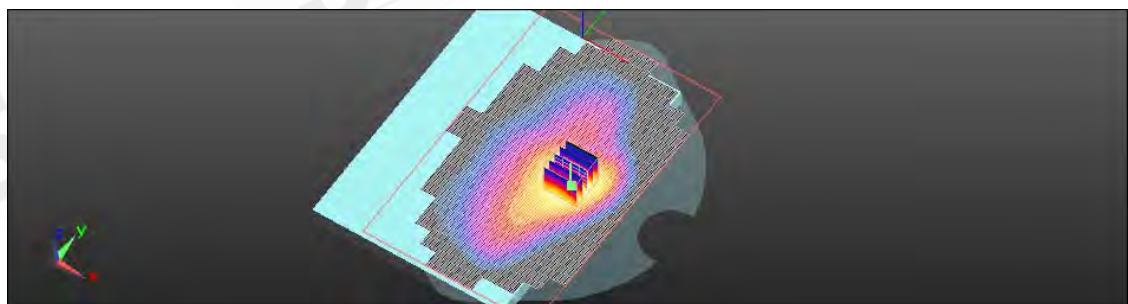
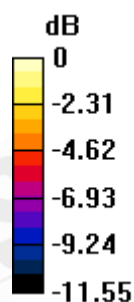
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 24.427 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 0.942 W/kg

**SAR(1 g) = 0.616 mW/g; SAR(10 g) = 0.398 mW/g**

Maximum value of SAR (measured) = 0.662 mW/g



0 dB = 0.660mW/g

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Date: 9/02/2011

## Secondary Landscape GPRS 850 CH189\_Acon antenna\_ Full power

Communication System: GPRS(Class 10); Frequency: 836.4 MHz

Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 1.012$  mho/m;  $\epsilon_r = 53.831$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 4/19/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/18/2011
- Phantom: SAM1; Type: SAM
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

**Configuration/Body/Area Scan (51x191x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.320 mW/g

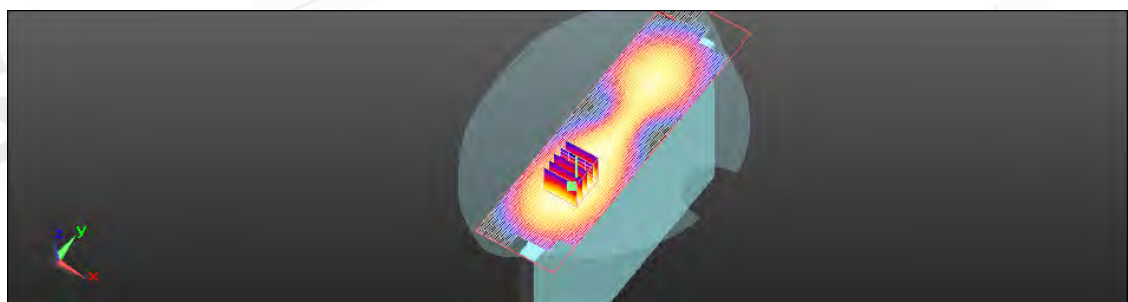
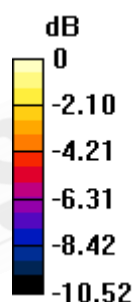
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.369 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 0.398 W/kg

**SAR(1 g) = 0.303 mW/g; SAR(10 g) = 0.221 mW/g**

Maximum value of SAR (measured) = 0.321 mW/g



0 dB = 0.320mW/g

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## Lap-held \_GPRS1900\_CH661\_Acon antenna

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:4

Medium: M1800 & 1900 Medium parameters used:  $f = 1880 \text{ MHz}$ ;  $\sigma = 1.56 \text{ mho/m}$ ;  $\epsilon_r = 51.6$ ;  
 $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) =  $0.918 \text{ mW/g}$

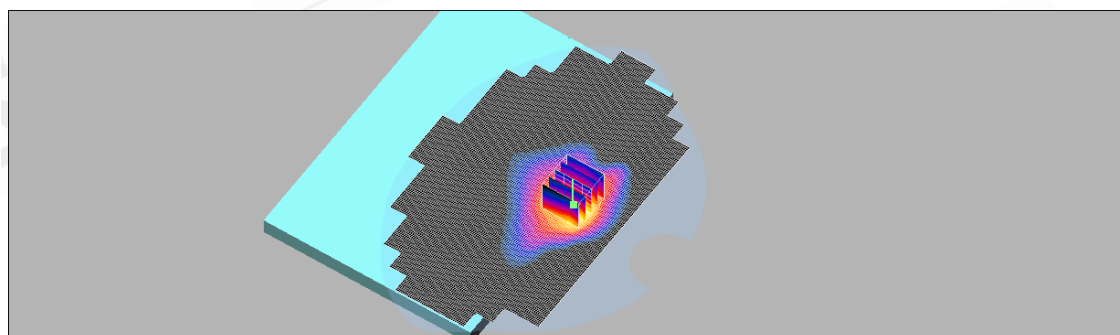
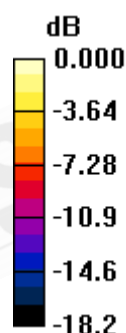
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  
 $dz=5\text{mm}$

Reference Value =  $13.4 \text{ V/m}$ ; Power Drift =  $-0.133 \text{ dB}$

Peak SAR (extrapolated) =  $1.53 \text{ W/kg}$

**SAR(1 g) =  $0.789 \text{ mW/g}$ ; SAR(10 g) =  $0.395 \text{ mW/g}$**

Maximum value of SAR (measured) =  $0.899 \text{ mW/g}$



0 dB =  $0.899 \text{ mW/g}$

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Date: 2011/7/25

**Secondary Landscape\_GPRS1900\_CH661\_Acon antenna**

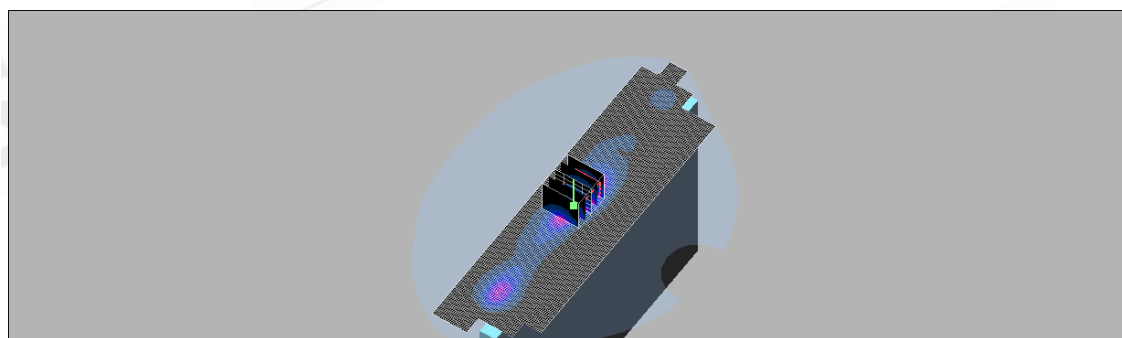
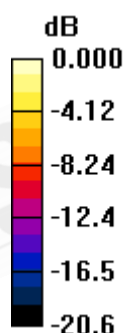
Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:4

Medium: M1800 & 1900 Medium parameters used:  $f = 1880 \text{ MHz}$ ;  $\sigma = 1.56 \text{ mho/m}$ ;  $\epsilon_r = 51.6$ ;  
 $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (51x191x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$ Maximum value of SAR (interpolated) =  $0.792 \text{ mW/g}$ **body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  
 $dz=5\text{mm}$ Reference Value =  $21.4 \text{ V/m}$ ; Power Drift =  $-0.01 \text{ dB}$ Peak SAR (extrapolated) =  $1.30 \text{ W/kg}$ **SAR(1 g) =  $0.669 \text{ mW/g}$ ; SAR(10 g) =  $0.315 \text{ mW/g}$** Maximum value of SAR (measured) =  $0.762 \text{ mW/g}$ 0 dB =  $0.762 \text{ mW/g}$ 

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Date: 2011/7/25

## Front side \_GPRS1900\_CH512\_Acon antenna

Communication System: GSM1900; Frequency: 1850.2 MHz; Duty Cycle: 1:4  
Medium: M1800 & 1900 Medium parameters used (interpolated):  $f = 1850.2 \text{ MHz}$ ;  $\sigma = 1.53 \text{ mho/m}$ ;  $\epsilon_r = 51.7$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) =  $0.866 \text{ mW/g}$

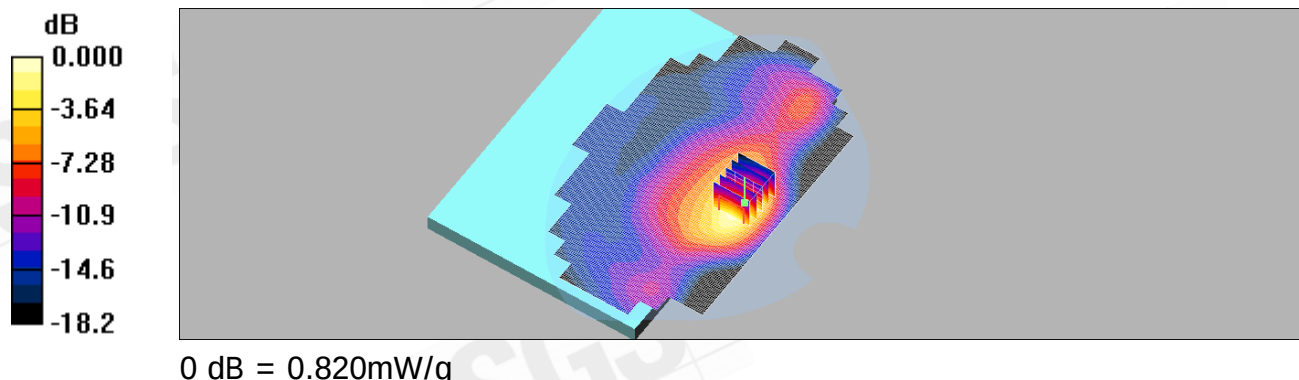
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $12.3 \text{ V/m}$ ; Power Drift =  $-0.032 \text{ dB}$

Peak SAR (extrapolated) =  $1.28 \text{ W/kg}$

**SAR(1 g) =  $0.740 \text{ mW/g}$ ; SAR(10 g) =  $0.411 \text{ mW/g}$**

Maximum value of SAR (measured) =  $0.820 \text{ mW/g}$



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## Front side \_GPRS1900\_CH661\_Acon antenna

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:4

Medium: M1800 & 1900 Medium parameters used:  $f = 1880 \text{ MHz}$ ;  $\sigma = 1.56 \text{ mho/m}$ ;  $\epsilon_r = 51.6$ ;  
 $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 1.05 mW/g

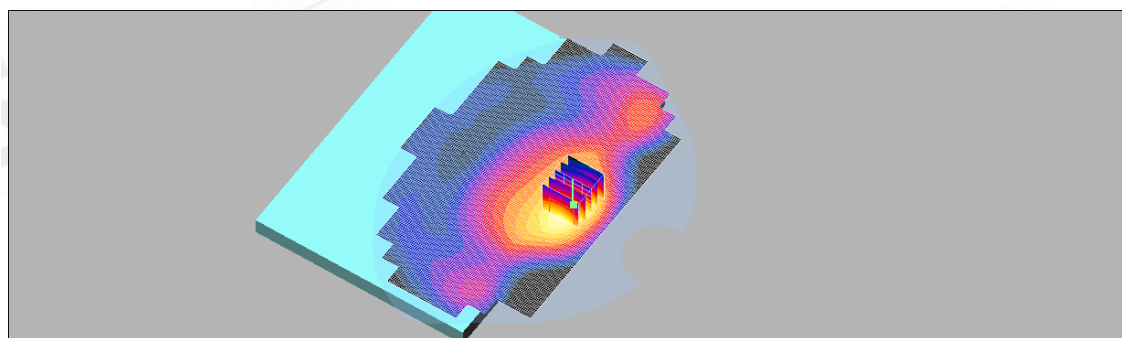
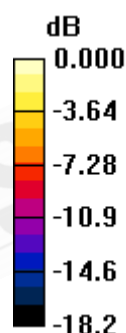
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  
 $dz=5\text{mm}$

Reference Value = 12.8 V/m; Power Drift = -0.049 dB

Peak SAR (extrapolated) = 1.59 W/kg

**SAR(1 g) = 0.897 mW/g; SAR(10 g) = 0.495 mW/g**

Maximum value of SAR (measured) = 0.962 mW/g



0 dB = 0.962mW/g

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Date: 2011/7/25

## Front side \_GPRS1900\_CH810\_Acon antenna

Communication System: GSM1900; Frequency: 1909.8 MHz; Duty Cycle: 1:4  
Medium: M1800 & 1900 Medium parameters used:  $f = 1910 \text{ MHz}$ ;  $\sigma = 1.59 \text{ mho/m}$ ;  $\epsilon_r = 51.5$ ;  
 $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) = 1.14 mW/g

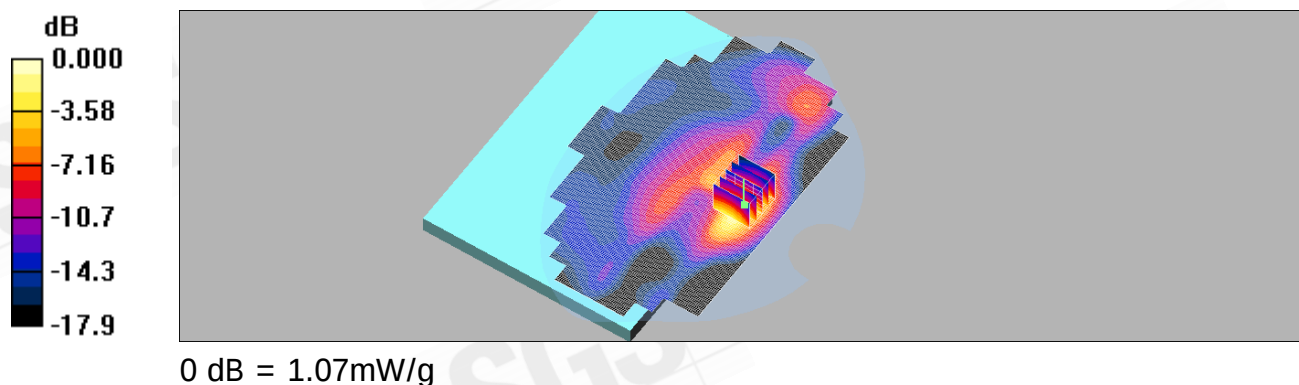
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  
 $dz=5\text{mm}$

Reference Value = 13.5 V/m; Power Drift = -0.116 dB

Peak SAR (extrapolated) = 1.70 W/kg

**SAR(1 g) = 0.978 mW/g; SAR(10 g) = 0.540 mW/g**

Maximum value of SAR (measured) = 1.07 mW/g



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Date: 9/02/2011

## Lap-held GPRS 1900 CH661\_Acon antenna\_ Full power

Communication System: GPRS(Class 10); Frequency: 1880 MHz

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.499$  mho/m;  $\epsilon_r = 51.606$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 4/19/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/18/2011
- Phantom: SAM2; Type: SAM
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

**Configuration/Body/Area Scan (111x181x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.518 mW/g

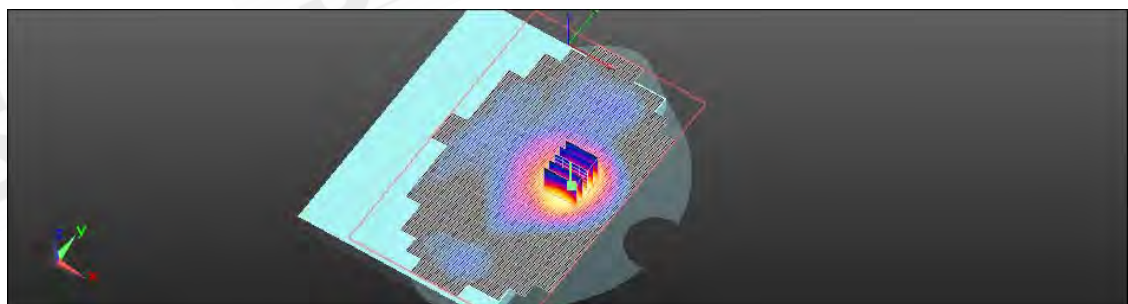
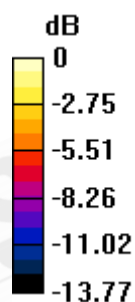
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.678 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.732 W/kg

**SAR(1 g) = 0.453 mW/g; SAR(10 g) = 0.268 mW/g**

Maximum value of SAR (measured) = 0.490 mW/g



0 dB = 0.490mW/g

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Date: 9/02/2011

## Secondary Landscape GPRS 1900 CH661\_Acon antenna\_ Full power

Communication System: GPRS(Class 10); Frequency: 1880 MHz

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.499$  mho/m;  $\epsilon_r = 51.606$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 4/19/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/18/2011
- Phantom: SAM2; Type: SAM
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

**Configuration/Body/Area Scan (51x191x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.903 mW/g

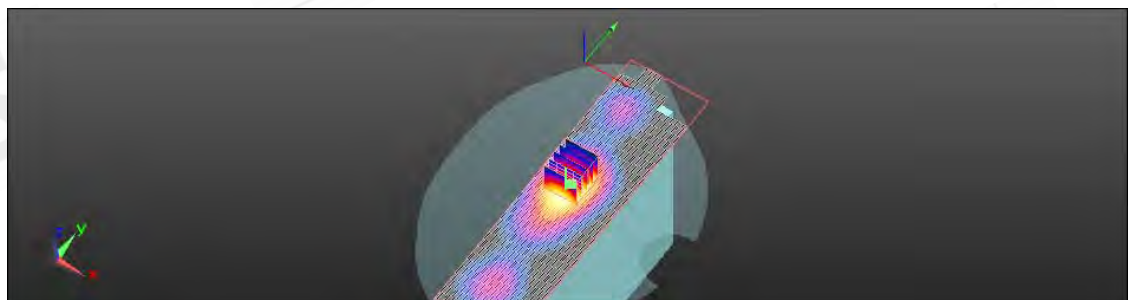
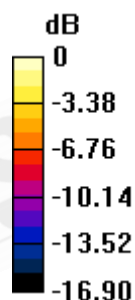
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.628 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 1.319 W/kg

**SAR(1 g) = 0.797 mW/g; SAR(10 g) = 0.446 mW/g**

Maximum value of SAR (measured) = 0.858 mW/g



0 dB = 0.860mW/g

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## Lap-held \_WCDMA Band II\_CH9262\_Acon antenna

Communication System: WCDMA Band II; Frequency: 1852.4 MHz; Duty Cycle: 1:1  
Medium: M1800 & 1900 Medium parameters used (interpolated):  $f = 1852.4 \text{ MHz}$ ;  $\sigma = 1.54 \text{ mho/m}$ ;  $\epsilon_r = 51.7$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) = 1.44 mW/g

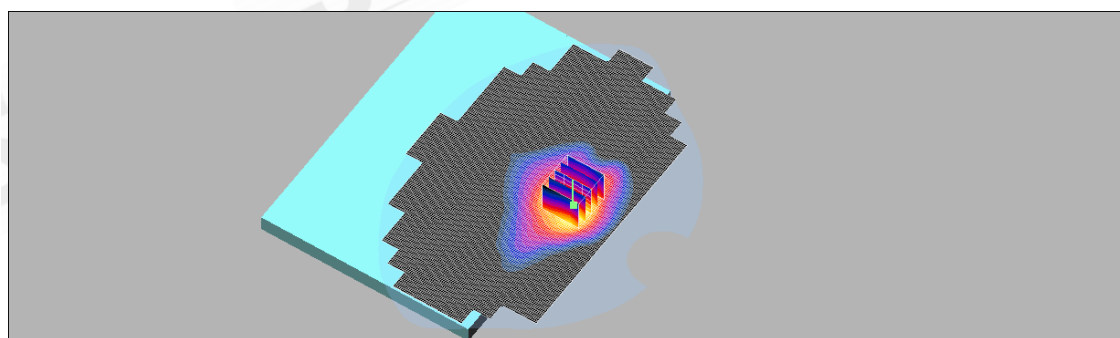
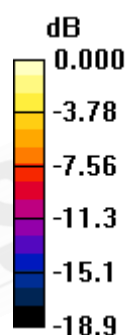
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 15.5 V/m; Power Drift = -0.001 dB

Peak SAR (extrapolated) = 2.43 W/kg

**SAR(1 g) = 1.25 mW/g; SAR(10 g) = 0.628 mW/g**

Maximum value of SAR (measured) = 1.40 mW/g



0 dB = 1.40mW/g

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Date: 2011/7/25

## Lap-held \_WCDMA Band II\_CH9400\_Acon antenna

Communication System: WCDMA Band II; Frequency: 1880 MHz; Duty Cycle: 1:1  
Medium: M1800 & 1900 Medium parameters used:  $f = 1880 \text{ MHz}$ ;  $\sigma = 1.56 \text{ mho/m}$ ;  $\epsilon_r = 51.6$ ;  
 $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) =  $1.55 \text{ mW/g}$

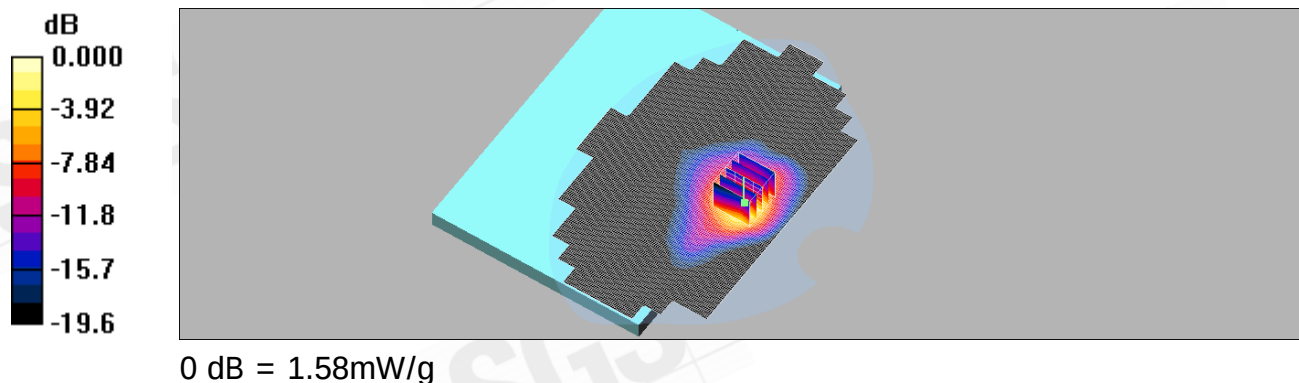
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  
 $dz=5\text{mm}$

Reference Value =  $14.4 \text{ V/m}$ ; Power Drift =  $0.029 \text{ dB}$

Peak SAR (extrapolated) =  $2.75 \text{ W/kg}$

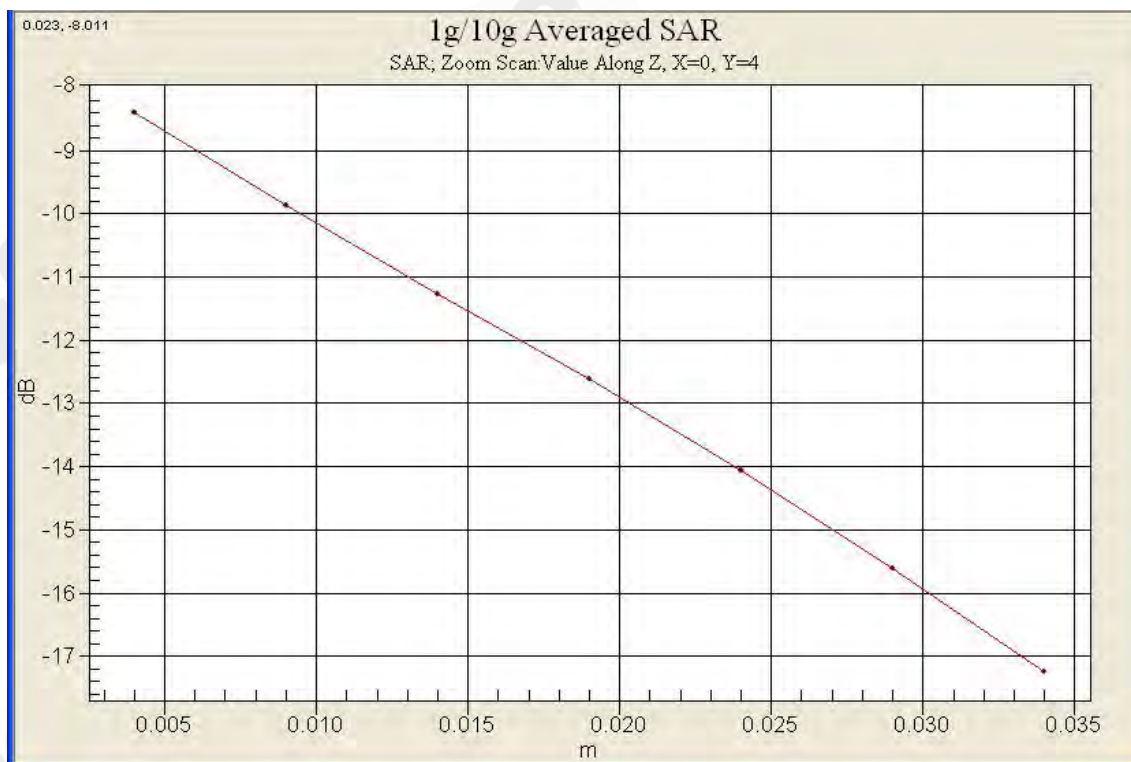
**SAR(1 g) =  $1.38 \text{ mW/g}$ ; SAR(10 g) =  $0.684 \text{ mW/g}$**

Maximum value of SAR (measured) =  $1.58 \text{ mW/g}$



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## Lap-held \_WCDMA Band II\_CH9538\_Acon antenna

Communication System: WCDMA Band II; Frequency: 1907.6 MHz; Duty Cycle: 1:1  
Medium: M1800 & 1900 Medium parameters used:  $f = 1908$  MHz;  $\sigma = 1.59$  mho/m;  $\epsilon_r = 51.5$ ;  
 $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 1.51 mW/g

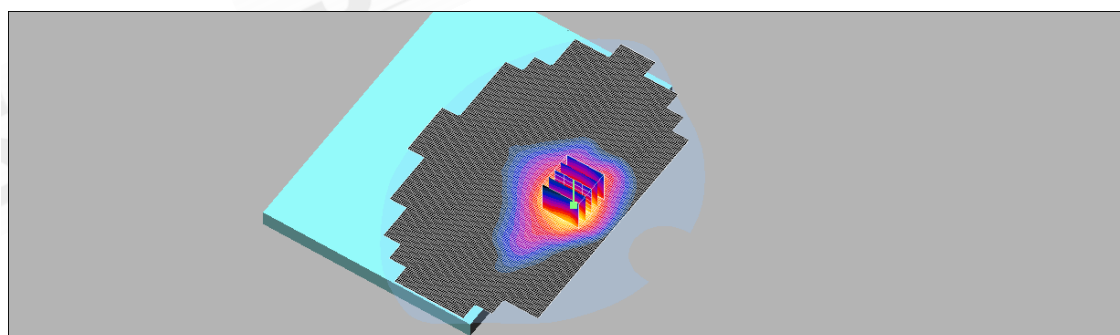
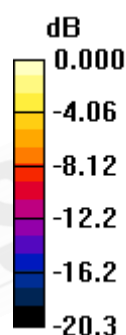
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.0 V/m; Power Drift = 0.013 dB

Peak SAR (extrapolated) = 2.76 W/kg

**SAR(1 g) = 1.37 mW/g; SAR(10 g) = 0.668 mW/g**

Maximum value of SAR (measured) = 1.56 mW/g



0 dB = 1.56mW/g

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Date: 2011/7/25

## Secondary Landscape\_WCDMA Band II\_CH9262\_Acon antenna

Communication System: WCDMA Band II; Frequency: 1852.4 MHz; Duty Cycle: 1:1  
Medium: M1800 & 1900 Medium parameters used (interpolated):  $f = 1852.4 \text{ MHz}$ ;  $\sigma = 1.54 \text{ mho/m}$ ;  $\epsilon_r = 51.7$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (51x191x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) =  $1.41 \text{ mW/g}$

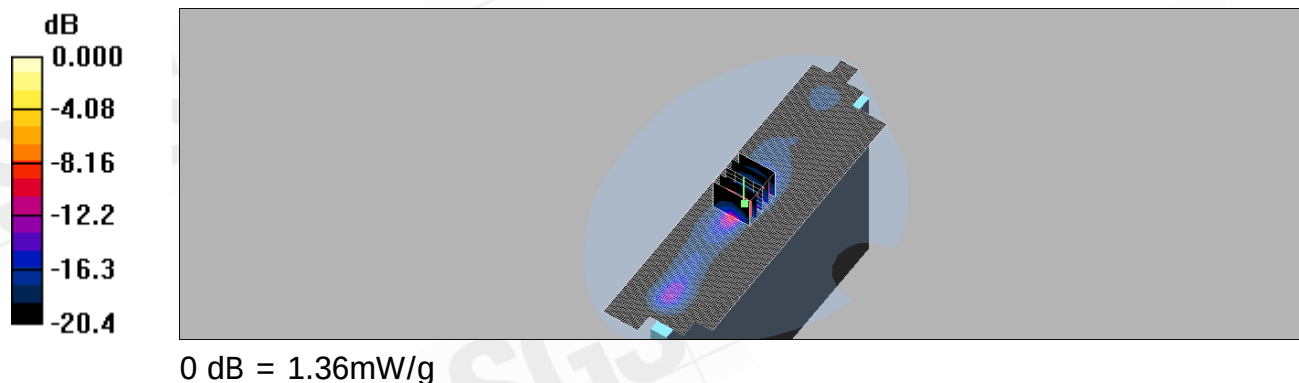
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $25.4 \text{ V/m}$ ; Power Drift =  $0.033 \text{ dB}$

Peak SAR (extrapolated) =  $2.22 \text{ W/kg}$

**SAR(1 g) =  $1.14 \text{ mW/g}$ ; SAR(10 g) =  $0.539 \text{ mW/g}$**

Maximum value of SAR (measured) =  $1.36 \text{ mW/g}$



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Date: 2011/7/25

## Secondary Landscape\_WCDMA Band II\_CH9400\_Acon antenna

Communication System: WCDMA Band II; Frequency: 1880 MHz; Duty Cycle: 1:1  
Medium: M1800 & 1900 Medium parameters used:  $f = 1880 \text{ MHz}$ ;  $\sigma = 1.56 \text{ mho/m}$ ;  $\epsilon_r = 51.6$ ;  
 $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (51x191x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) =  $1.41 \text{ mW/g}$

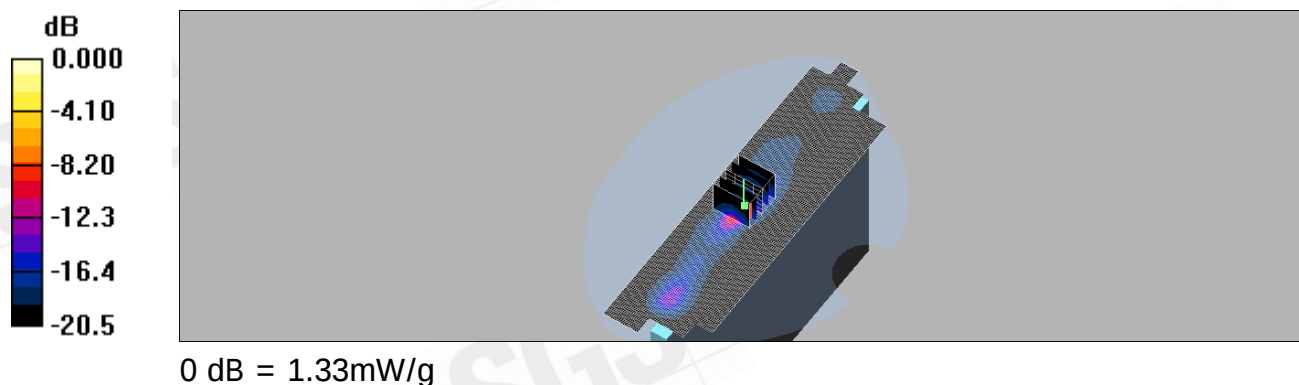
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  
 $dz=5\text{mm}$

Reference Value =  $26.3 \text{ V/m}$ ; Power Drift =  $-0.100 \text{ dB}$

Peak SAR (extrapolated) =  $2.25 \text{ W/kg}$

**SAR(1 g) =  $1.14 \text{ mW/g}$ ; SAR(10 g) =  $0.536 \text{ mW/g}$**

Maximum value of SAR (measured) =  $1.33 \text{ mW/g}$



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Date: 2011/7/25

**Secondary Landscape\_WCDMA Band II\_CH9538\_Acon antenna**

Communication System: WCDMA Band II; Frequency: 1907.6 MHz; Duty Cycle: 1:1  
Medium: M1800 & 1900 Medium parameters used:  $f = 1908$  MHz;  $\sigma = 1.59$  mho/m;  $\epsilon_r = 51.5$ ;  
 $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

**DASY4 Configuration:**

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (51x191x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 1.36 mW/g

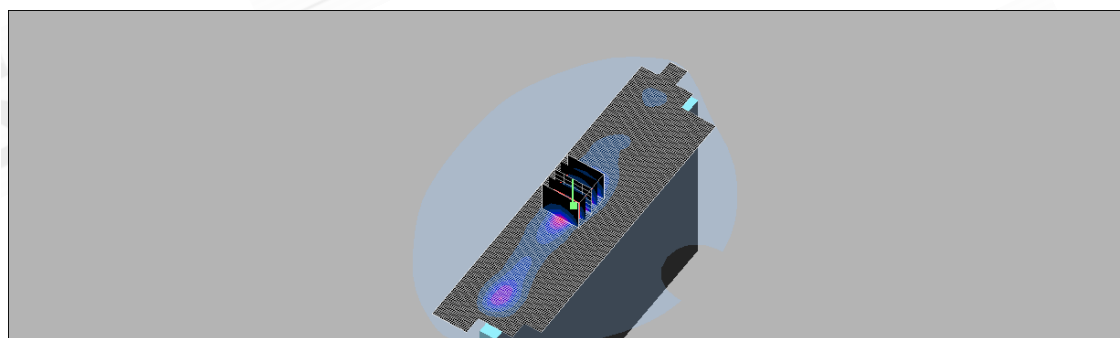
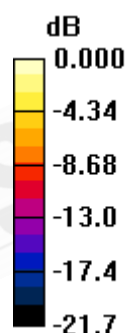
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 24.8 V/m; Power Drift = -0.128 dB

Peak SAR (extrapolated) = 2.16 W/kg

**SAR(1 g) = 1.11 mW/g; SAR(10 g) = 0.518 mW/g**

Maximum value of SAR (measured) = 1.33 mW/g



0 dB = 1.33mW/g

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## Front side\_WCDMA Band II\_CH9262\_Acon antenna

Communication System: WCDMA Band II; Frequency: 1852.4 MHz; Duty Cycle: 1:1  
Medium: M1800 & 1900 Medium parameters used (interpolated):  $f = 1852.4 \text{ MHz}$ ;  $\sigma = 1.54 \text{ mho/m}$ ;  $\epsilon_r = 51.7$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) = 1.02 mW/g

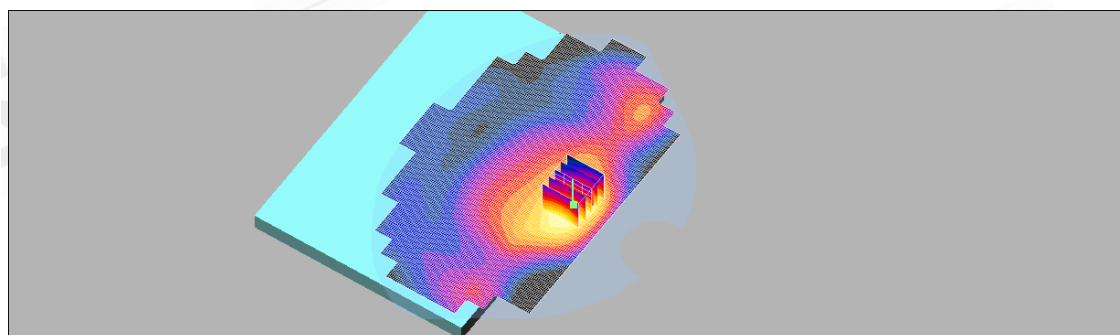
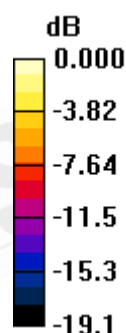
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 12.2 V/m; Power Drift = -0.090 dB

Peak SAR (extrapolated) = 1.63 W/kg

**SAR(1 g) = 0.944 mW/g; SAR(10 g) = 0.522 mW/g**

Maximum value of SAR (measured) = 1.03 mW/g



0 dB = 1.03mW/g

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## Front side\_WCDMA Band II\_CH9400\_Acon antenna

Communication System: WCDMA Band II; Frequency: 1880 MHz; Duty Cycle: 1:1  
Medium: M1800 & 1900 Medium parameters used:  $f = 1880 \text{ MHz}$ ;  $\sigma = 1.56 \text{ mho/m}$ ;  $\epsilon_r = 51.6$ ;  
 $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) =  $1.12 \text{ mW/g}$

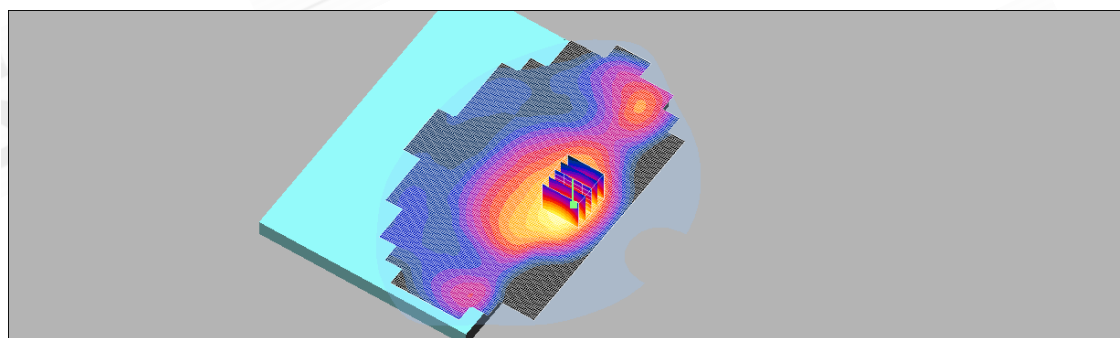
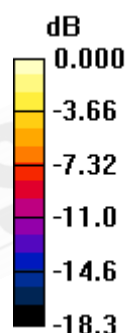
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  
 $dz=5\text{mm}$

Reference Value =  $15.5 \text{ V/m}$ ; Power Drift =  $-0.043 \text{ dB}$

Peak SAR (extrapolated) =  $1.70 \text{ W/kg}$

**SAR(1 g) =  $0.968 \text{ mW/g}$ ; SAR(10 g) =  $0.531 \text{ mW/g}$**

Maximum value of SAR (measured) =  $1.08 \text{ mW/g}$



0 dB =  $1.08 \text{ mW/g}$

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Date: 2011/7/25

## Front side\_WCDMA Band II\_CH9538\_Acon antenna

Communication System: WCDMA Band II; Frequency: 1907.6 MHz; Duty Cycle: 1:1  
Medium: M1800 & 1900 Medium parameters used:  $f = 1908 \text{ MHz}$ ;  $\sigma = 1.59 \text{ mho/m}$ ;  $\epsilon_r = 51.5$ ;  
 $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) = 1.06 mW/g

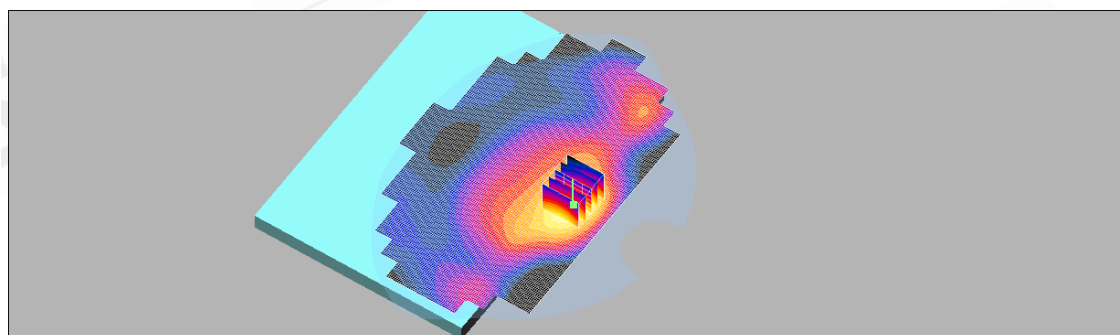
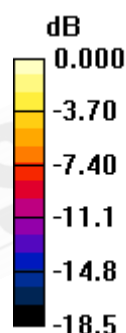
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  
 $dz=5\text{mm}$

Reference Value = 12.1 V/m; Power Drift = 0.000 dB

Peak SAR (extrapolated) = 1.79 W/kg

**SAR(1 g) = 1 mW/g; SAR(10 g) = 0.544 mW/g**

Maximum value of SAR (measured) = 1.12 mW/g



0 dB = 1.12mW/g

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Date: 9/02/2011

## Lap-held WCDMA BAND II CH9400\_Acon antenna\_ Full power

Communication System: WCDMA; Frequency: 1880 MHz

Medium parameters used:  $f = 1880 \text{ MHz}$ ;  $\sigma = 1.499 \text{ mho/m}$ ;  $\epsilon_r = 51.606$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 4/19/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/18/2011
- Phantom: SAM2; Type: SAM
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

**Configuration/Body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) =  $0.655 \text{ mW/g}$

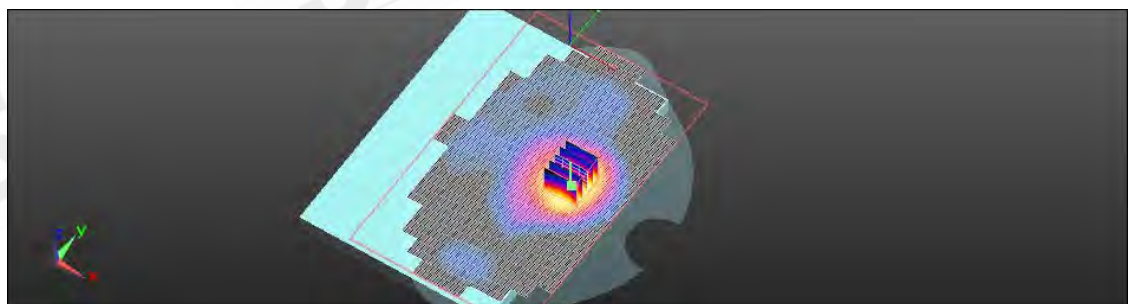
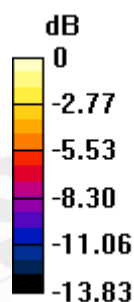
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $15.569 \text{ V/m}$ ; Power Drift =  $-0.14 \text{ dB}$

Peak SAR (extrapolated) =  $0.931 \text{ W/kg}$

**SAR(1 g) =  $0.574 \text{ mW/g}$ ; SAR(10 g) =  $0.338 \text{ mW/g}$**

Maximum value of SAR (measured) =  $0.623 \text{ mW/g}$



0 dB =  $0.620\text{mW/g}$

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Date: 9/02/2011

## Secondary Landscape WCDMA BAND II CH9262\_

### Acon antenna\_ Full power

Communication System: WCDMA; Frequency: 1852.4 MHz

Medium parameters used:  $f = 1852.4$  MHz;  $\sigma = 1.468$  mho/m;  $\epsilon_r = 51.665$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 4/19/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/18/2011
- Phantom: SAM2; Type: SAM
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

**Configuration/Body/Area Scan (51x191x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.215 mW/g

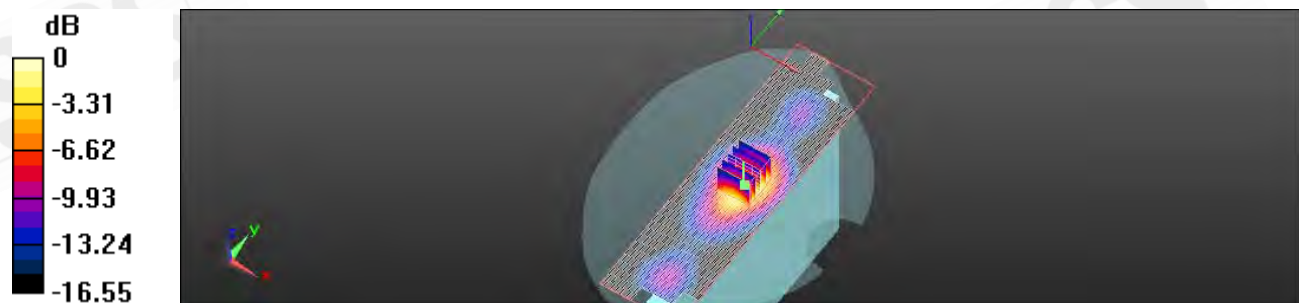
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.890 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 1.792 W/kg

**SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.596 mW/g**

Maximum value of SAR (measured) = 1.160 mW/g



0 dB = 1.160mW/g

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Date: 9/02/2011

## Secondary Landscape WCDMA BAND II CH9400\_

### Acon antenna\_ Full power

Communication System: WCDMA; Frequency: 1880 MHz

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.499$  mho/m;  $\epsilon_r = 51.606$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 4/19/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/18/2011
- Phantom: SAM2; Type: SAM
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

**Configuration/Body/Area Scan (51x191x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.117 mW/g

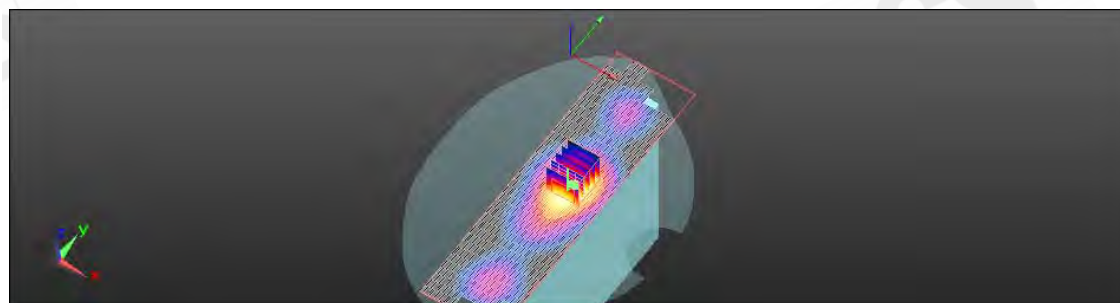
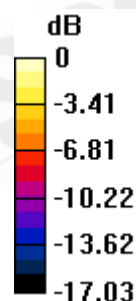
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.975 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 1.663 W/kg

**SAR(1 g) = 0.989 mW/g; SAR(10 g) = 0.552 mW/g**

Maximum value of SAR (measured) = 1.070 mW/g



0 dB = 1.070mW/g

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Date: 9/02/2011

**Secondary Landscape WCDMA BAND II CH9538\_****Acon antenna\_ Full power**

Communication System: WCDMA; Frequency: 1907.6 MHz

Medium parameters used:  $f = 1908$  MHz;  $\sigma = 1.533$  mho/m;  $\epsilon_r = 51.518$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 4/19/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/18/2011
- Phantom: SAM2; Type: SAM
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

**Configuration/Body/Area Scan (51x191x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.002 mW/g

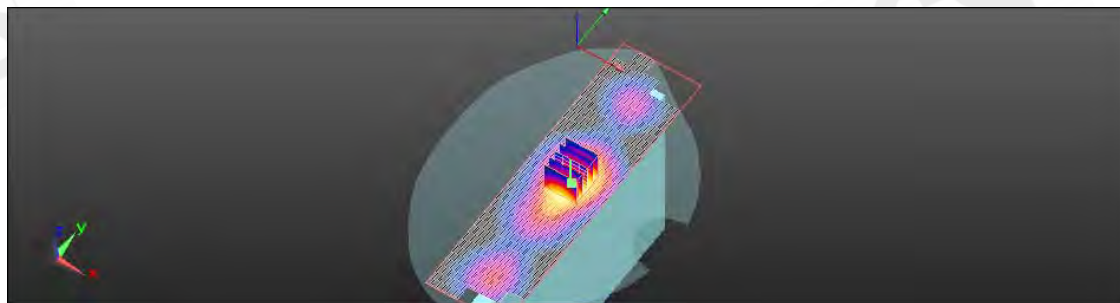
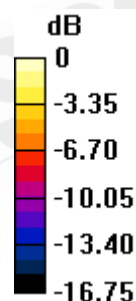
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.046 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 1.513 W/kg

**SAR(1 g) = 0.891 mW/g; SAR(10 g) = 0.495 mW/g**

Maximum value of SAR (measured) = 0.968 mW/g



0 dB = 0.970mW/g

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## Lap-held \_WCDMA Band V\_CH4132\_Acon antenna

Communication System: WCDMA Band V; Frequency: 826.4 MHz; Duty Cycle: 1:1  
Medium: Muscle 900 MHz Medium parameters used (interpolated):  $f = 826.4 \text{ MHz}$ ;  $\sigma = 1.01 \text{ mho/m}$ ;  $\epsilon_r = 55.4$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) = 1.10 mW/g

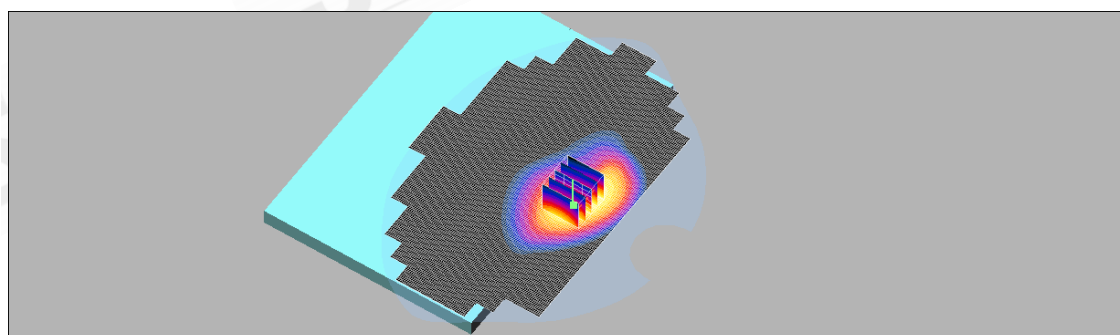
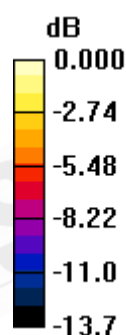
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 17.9 V/m; Power Drift = -0.071 dB

Peak SAR (extrapolated) = 1.83 W/kg

**SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.578 mW/g**

Maximum value of SAR (measured) = 1.09 mW/g



0 dB = 1.09mW/g

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## Lap-held \_WCDMA Band V\_CH4182\_Acon antenna

Communication System: WCDMA Band V; Frequency: 836.4 MHz; Duty Cycle: 1:1  
Medium: Muscle 900 MHz Medium parameters used:  $f = 837 \text{ MHz}$ ;  $\sigma = 1.02 \text{ mho/m}$ ;  $\epsilon_r = 55.3$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) =  $1.11 \text{ mW/g}$

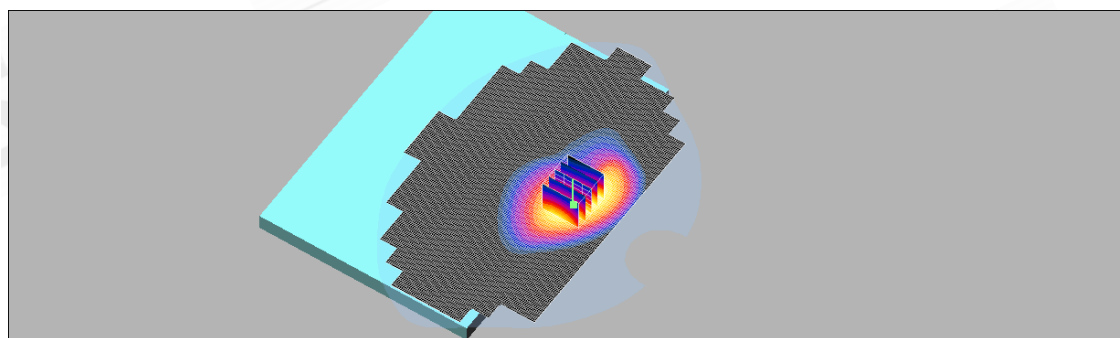
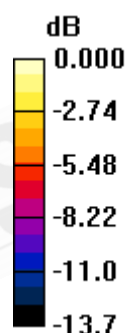
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $19.2 \text{ V/m}$ ; Power Drift =  $-0.098 \text{ dB}$

Peak SAR (extrapolated) =  $1.85 \text{ W/kg}$

**SAR(1 g) =  $1.02 \text{ mW/g}$ ; SAR(10 g) =  $0.584 \text{ mW/g}$**

Maximum value of SAR (measured) =  $1.09 \text{ mW/g}$



0 dB =  $1.09 \text{ mW/g}$

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## Lap-held \_WCDMA Band V\_CH4233\_Acon antenna

Communication System: WCDMA Band V; Frequency: 846.6 MHz; Duty Cycle: 1:1

Medium: Muscle 900 MHz Medium parameters used:  $f = 847 \text{ MHz}$ ;  $\sigma = 1.03 \text{ mho/m}$ ;  $\epsilon_r = 55.2$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) =  $1.08 \text{ mW/g}$

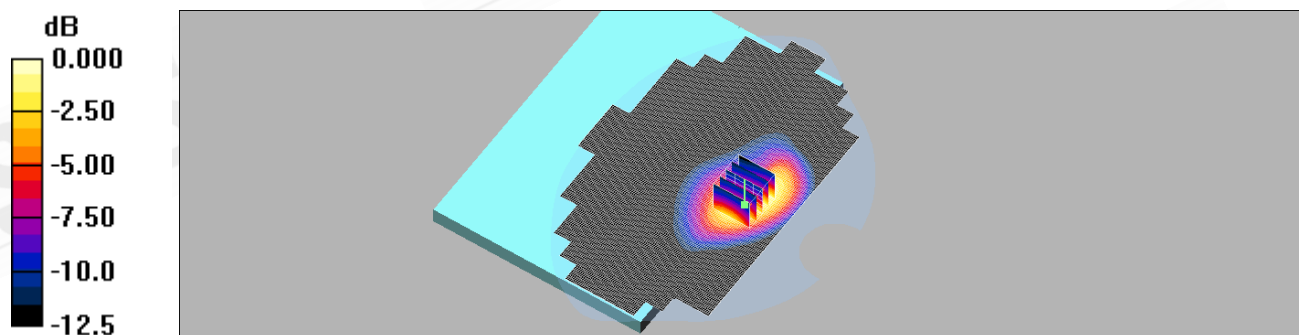
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $17.0 \text{ V/m}$ ; Power Drift =  $0.050 \text{ dB}$

Peak SAR (extrapolated) =  $1.78 \text{ W/kg}$

**SAR(1 g) =  $0.980 \text{ mW/g}$ ; SAR(10 g) =  $0.567 \text{ mW/g}$**

Maximum value of SAR (measured) =  $1.06 \text{ mW/g}$



0 dB =  $1.06 \text{ mW/g}$

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## Secondary Landscape\_WCDMA Band V\_CH4182\_Acon antenna

Communication System: WCDMA Band V; Frequency: 836.4 MHz; Duty Cycle: 1:1  
Medium: Muscle 900 MHz Medium parameters used:  $f = 837 \text{ MHz}$ ;  $\sigma = 1.02 \text{ mho/m}$ ;  $\epsilon_r = 55.3$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (51x191x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) =  $0.495 \text{ mW/g}$

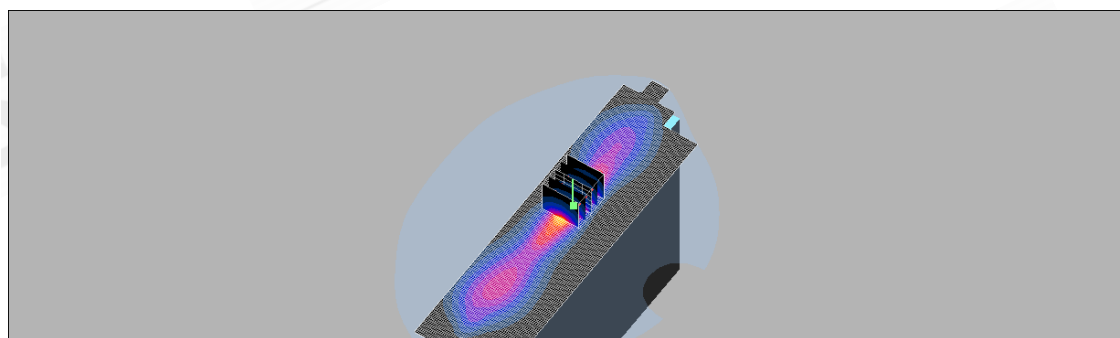
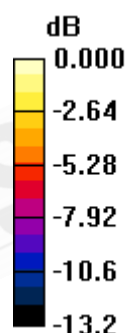
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $17.1 \text{ V/m}$ ; Power Drift =  $-0.028 \text{ dB}$

Peak SAR (extrapolated) =  $0.805 \text{ W/kg}$

**SAR(1 g) =  $0.420 \text{ mW/g}$ ; SAR(10 g) =  $0.220 \text{ mW/g}$**

Maximum value of SAR (measured) =  $0.486 \text{ mW/g}$



0 dB =  $0.486 \text{ mW/g}$

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Date: 2011/7/24

## Front side \_WCDMA Band V\_CH4182\_Acon antenna

Communication System: WCDMA Band V; Frequency: 836.4 MHz; Duty Cycle: 1:1  
Medium: Muscle 900 MHz Medium parameters used:  $f = 837 \text{ MHz}$ ;  $\sigma = 1.02 \text{ mho/m}$ ;  $\epsilon_r = 55.3$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) =  $0.367 \text{ mW/g}$

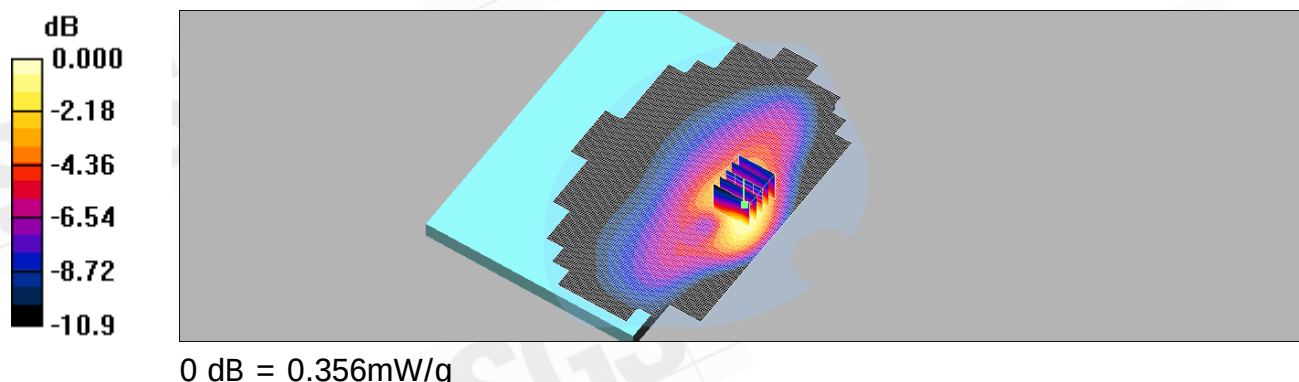
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $13.0 \text{ V/m}$ ; Power Drift =  $0.034 \text{ dB}$

Peak SAR (extrapolated) =  $0.515 \text{ W/kg}$

**SAR(1 g) =  $0.331 \text{ mW/g}$ ; SAR(10 g) =  $0.212 \text{ mW/g}$**

Maximum value of SAR (measured) =  $0.356 \text{ mW/g}$



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## Lap-held WCDMA Band V CH4182\_Acon antenna\_Full power

Communication System: WCDMA; Frequency: 836.4 MHz

Medium parameters used:  $f = 836.4$  MHz;  $\sigma = 1.012$  mho/m;  $\epsilon_r = 53.831$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 4/19/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/18/2011
- Phantom: SAM1; Type: SAM
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

**Configuration/Body/Area Scan (111x181x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.506 mW/g

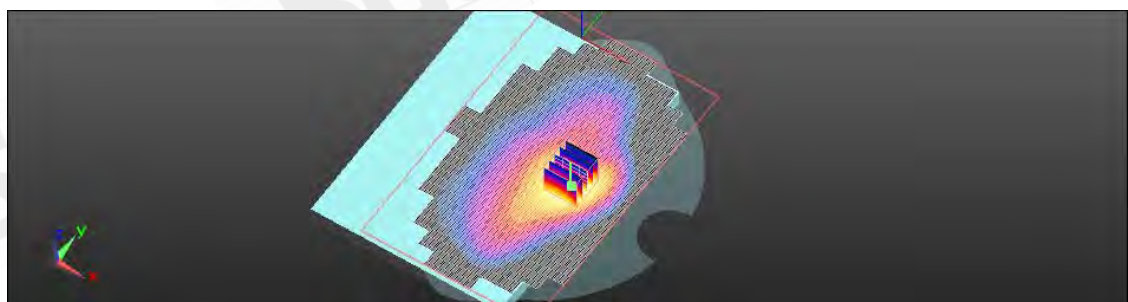
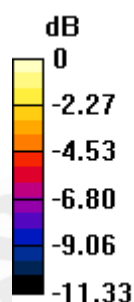
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.472 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.703 W/kg

**SAR(1 g) = 0.462 mW/g; SAR(10 g) = 0.299 mW/g**

Maximum value of SAR (measured) = 0.496 mW/g



0 dB = 0.500mW/g

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Date: 9/02/2011

**Secondary Landscape WCDMA Band V CH4182\_Acon antenna\_ Full power**

Communication System: WCDMA; Frequency: 836.4 MHz

Medium parameters used:  $f = 836.4 \text{ MHz}$ ;  $\sigma = 1.012 \text{ mho/m}$ ;  $\epsilon_r = 53.831$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 4/19/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/18/2011
- Phantom: SAM1; Type: SAM
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

**Configuration/Body/Area Scan (51x191x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$ 

Maximum value of SAR (interpolated) = 0.341 mW/g

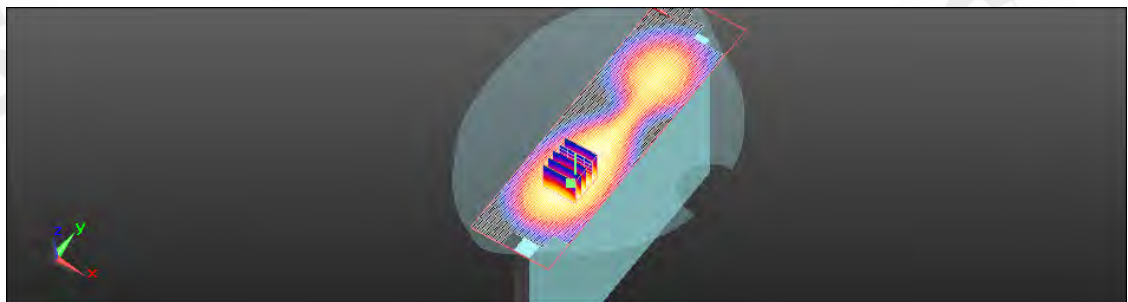
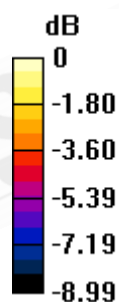
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$ 

Reference Value = 14.569 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 0.472 W/kg

**SAR(1 g) = 0.311 mW/g; SAR(10 g) = 0.211 mW/g**

Maximum value of SAR (measured) = 0.323 mW/g



0 dB = 0.330mW/g

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## Lap-held \_GPRS850\_CH128\_Wahyu antenna

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:4

Medium: Muscle 900 MHz Medium parameters used (interpolated):  $f = 824.2 \text{ MHz}$ ;  $\sigma = 1.01 \text{ mho/m}$ ;  $\epsilon_r = 55.5$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) =  $0.650 \text{ mW/g}$

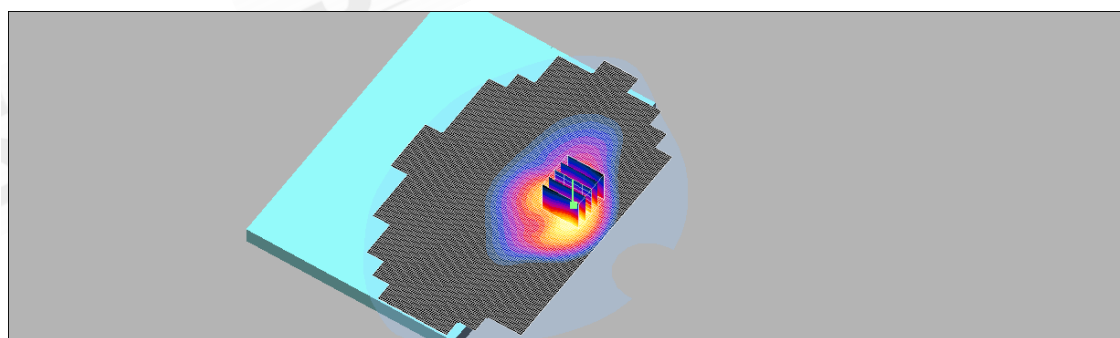
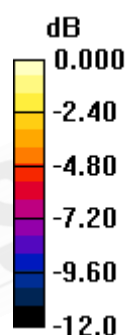
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $15.4 \text{ V/m}$ ; Power Drift =  $-0.014 \text{ dB}$

Peak SAR (extrapolated) =  $0.978 \text{ W/kg}$

**SAR(1 g) =  $0.576 \text{ mW/g}$ ; SAR(10 g) =  $0.344 \text{ mW/g}$**

Maximum value of SAR (measured) =  $0.622 \text{ mW/g}$



0 dB =  $0.622 \text{ mW/g}$

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## Front side \_GPRS1900\_CH810\_Wahyu antenna

Communication System: GSM1900; Frequency: 1909.8 MHz; Duty Cycle: 1:4

Medium: M1800 & 1900 Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.59$  mho/m;  $\epsilon_r = 51.4$ ;  
 $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.291 mW/g

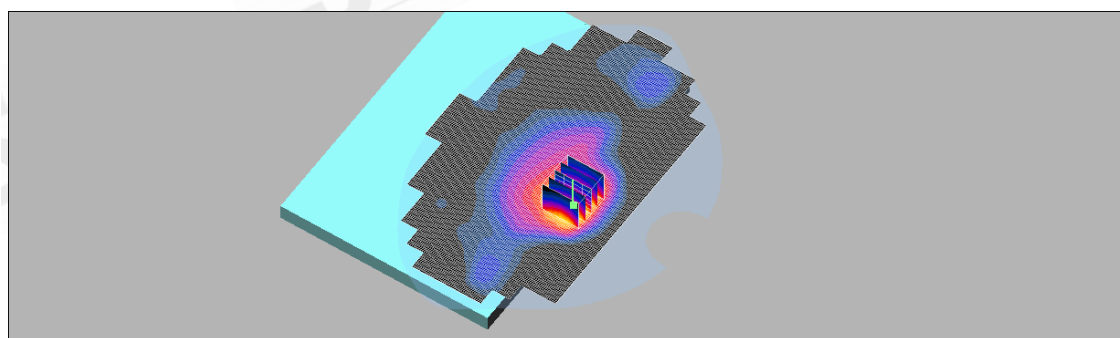
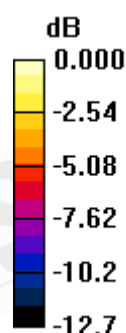
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.19 V/m; Power Drift = -0.091 dB

Peak SAR (extrapolated) = 0.449 W/kg

**SAR(1 g) = 0.258 mW/g; SAR(10 g) = 0.143 mW/g**

Maximum value of SAR (measured) = 0.286 mW/g



0 dB = 0.286mW/g

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## Lap-held \_WCDMA Band II\_CH9400\_Wahyu antenna

Communication System: WCDMA Band II; Frequency: 1880 MHz; Duty Cycle: 1:1  
Medium: M1800 & 1900 Medium parameters used:  $f = 1880 \text{ MHz}$ ;  $\sigma = 1.57 \text{ mho/m}$ ;  $\epsilon_r = 51.5$ ;  
 $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) = 1.07 mW/g

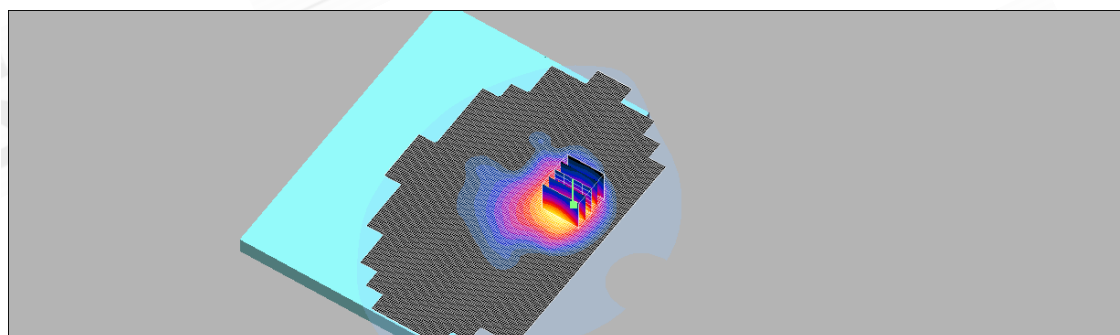
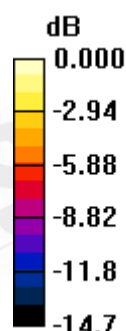
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  
 $dz=5\text{mm}$

Reference Value = 11.5 V/m; Power Drift = 0.058 dB

Peak SAR (extrapolated) = 1.67 W/kg

**SAR(1 g) = 0.893 mW/g; SAR(10 g) = 0.474 mW/g**

Maximum value of SAR (measured) = 0.991 mW/g



0 dB = 0.991mW/g

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Date: 2011/8/4

**Lap-held \_WCDMA Band V\_CH4182\_Wahyu antenna**

Communication System: WCDMA Band V; Frequency: 836.4 MHz; Duty Cycle: 1:1  
Medium: Muscle 900 MHz Medium parameters used:  $f = 837 \text{ MHz}$ ;  $\sigma = 1.02 \text{ mho/m}$ ;  $\epsilon_r = 55.4$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

**DASY4 Configuration:**

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**body/Area Scan (111x181x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (interpolated) =  $0.667 \text{ mW/g}$

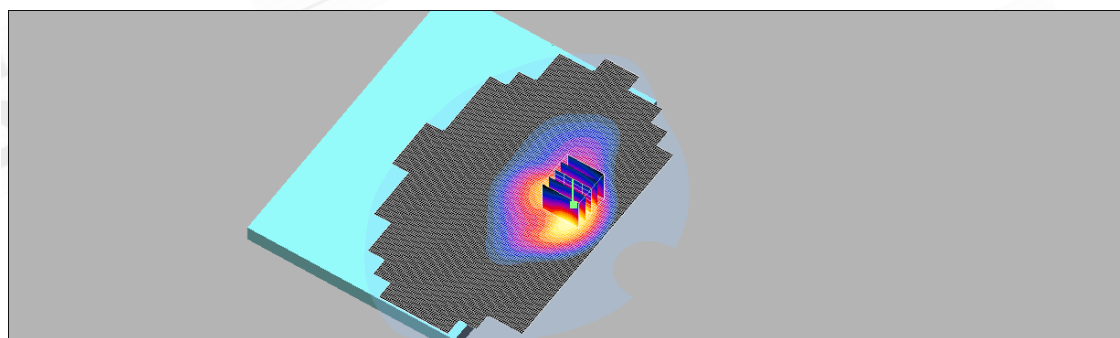
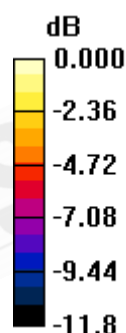
**body/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $14.8 \text{ V/m}$ ; Power Drift =  $-0.016 \text{ dB}$

Peak SAR (extrapolated) =  $0.996 \text{ W/kg}$

**SAR(1 g) =  $0.587 \text{ mW/g}$ ; SAR(10 g) =  $0.351 \text{ mW/g}$**

Maximum value of SAR (measured) =  $0.634 \text{ mW/g}$



0 dB =  $0.634 \text{ mW/g}$

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## 5. SAR System Performance Verification

Date: 2011/7/24

### DUT: Dipole 835 MHz;

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Muscle 900 MHz Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 1.02 \text{ mho/m}$ ;  $\epsilon_r = 55.3$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Pin=250mW/Area Scan (61x61x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$ 

Maximum value of SAR (interpolated) = 2.61 mW/g

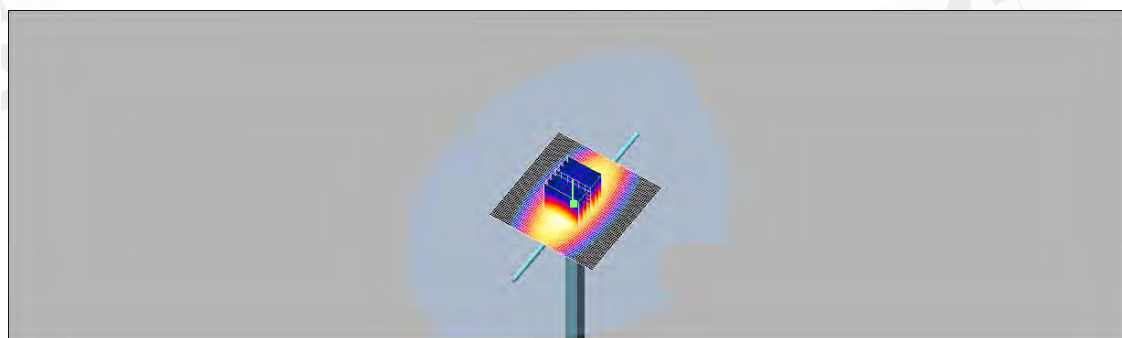
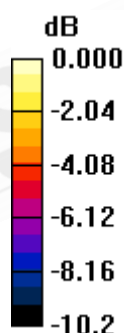
**Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$ 

Reference Value = 50.5 V/m; Power Drift = -0.033 dB

Peak SAR (extrapolated) = 3.54 W/kg

**SAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.58 mW/g**

Maximum value of SAR (measured) = 2.58 mW/g



0 dB = 2.58mW/g

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Date: 2011/7/25

## DUT: Dipole 1900 MHz;

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: M1800 & 1900 Medium parameters used:  $f = 1900 \text{ MHz}$ ;  $\sigma = 1.59 \text{ mho/m}$ ;  $\epsilon_r = 51.5$ ;  
 $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

## DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Pin=250mW/Area Scan (51x61x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 13.0 mW/g

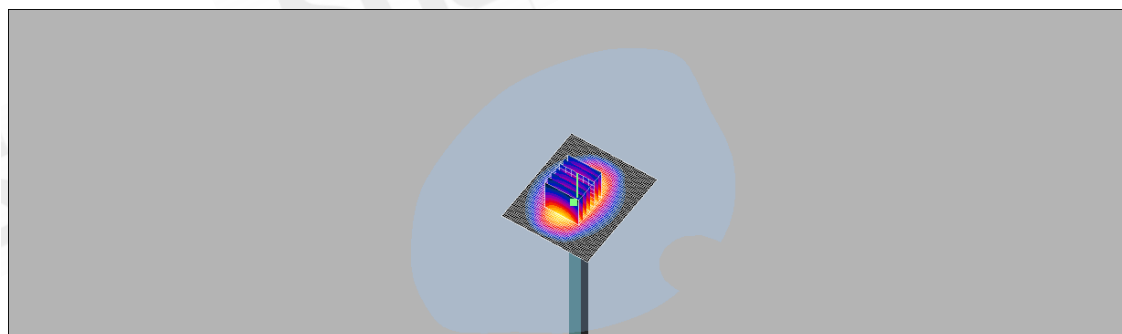
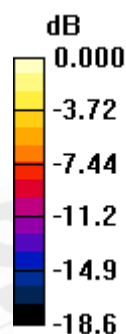
**Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  
 $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 83.9 V/m; Power Drift = -0.026 dB

Peak SAR (extrapolated) = 18.7 W/kg

**SAR(1 g) = 9.94 mW/g; SAR(10 g) = 5.09 mW/g**

Maximum value of SAR (measured) = 11.3 mW/g



0 dB = 11.3mW/g

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## DUT: Dipole 835 MHz;

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Muscle 900 MHz Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 1.02 \text{ mho/m}$ ;  $\epsilon_r = 55.4$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

### DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Pin=250mW/Area Scan (61x61x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 2.63 mW/g

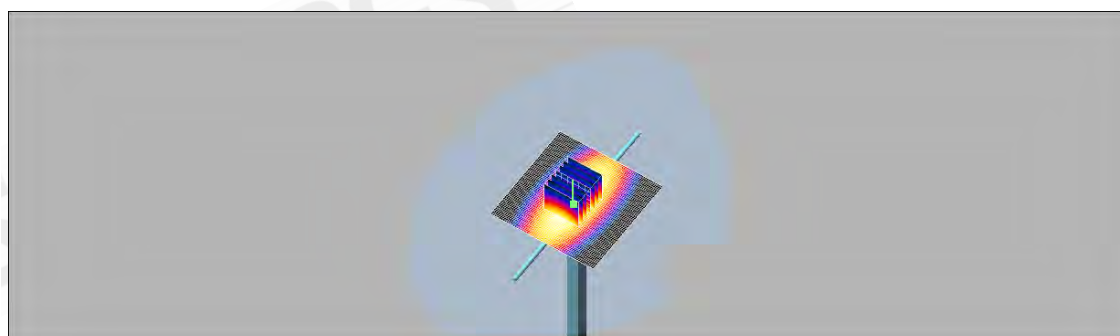
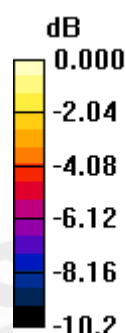
**Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 50.9 V/m; Power Drift = -0.043 dB

Peak SAR (extrapolated) = 3.58 W/kg

**SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.59 mW/g**

Maximum value of SAR (measured) = 2.61 mW/g



0 dB = 2.61mW/g

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Date: 2011/8/4

## DUT: Dipole 1900 MHz;

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: M1800 & 1900 Medium parameters used:  $f = 1900 \text{ MHz}$ ;  $\sigma = 1.58 \text{ mho/m}$ ;  $\epsilon_r = 51.4$ ;  
 $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

## DASY4 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 2011/4/19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Pin=250mW/Area Scan (51x61x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 13.1 mW/g

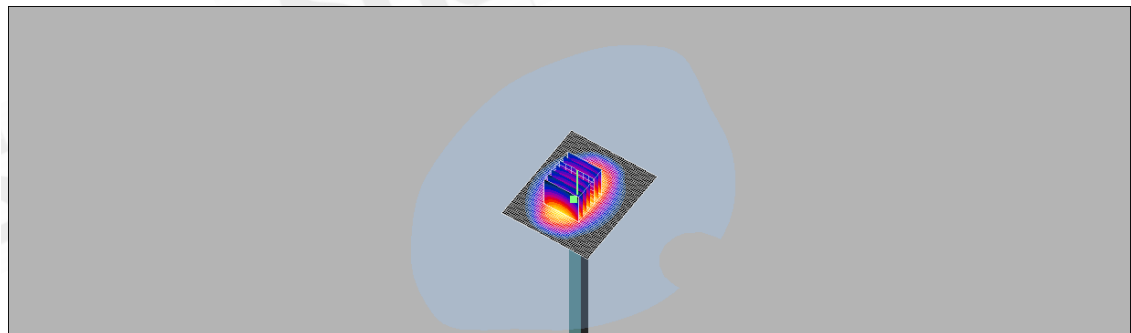
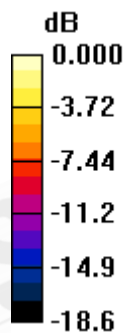
**Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  
 $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 83.3 V/m; Power Drift = -0.016 dB

Peak SAR (extrapolated) = 18.7 W/kg

**SAR(1 g) = 9.99 mW/g; SAR(10 g) = 5.14 mW/g**

Maximum value of SAR (measured) = 11.3 mW/g



0 dB = 11.3mW/g

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Date: 5/23/2011

## DUT: Dipole 835 MHz;

Communication System: CW; Frequency: 835 MHz

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 1.01 \text{ mho/m}$ ;  $\epsilon_r = 53.847$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 4/19/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/18/2011
- Phantom: SAM2; Type: SAM
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

## Configuration /d=15mm, Pin=250mW, dist=4mm: Measurement grid:

$dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 2.656 mW/g

## Configuration /d=15mm, Pin=250mW, dist=4mm: Measurement grid:

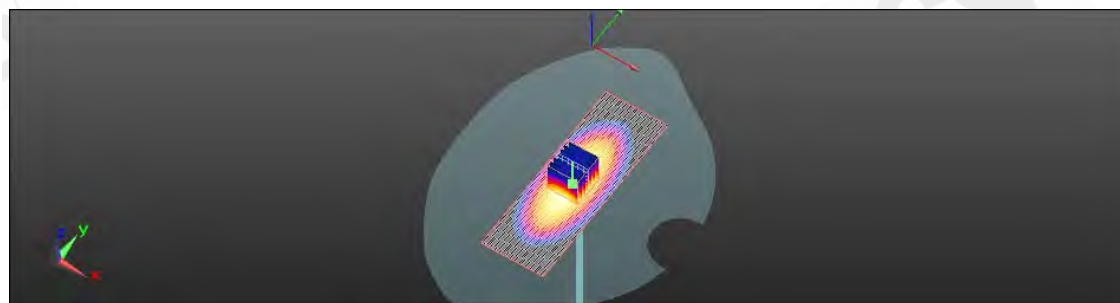
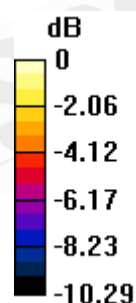
$dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 51.852 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 3.632 W/kg

## SAR(1 g) = 2.45 mW/g; SAR(10 g) = 1.6 mW/g

Maximum value of SAR (measured) = 2.647 mW/g



0 dB = 2.650mW/g

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Date: 5/23/2011

## DUT: Dipole 1900 MHz;

Communication System: CW; Frequency: 1900 MHz

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.523$  mho/m;  $\epsilon_r = 51.545$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 4/19/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/18/2011
- Phantom: SAM2; Type: SAM
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

### Configuration / d=10mm, Pin=250mW, dist=4mm: Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.810 mW/g

### Configuration / d=10mm, Pin=250mW, dist=4mm: Measurement grid:

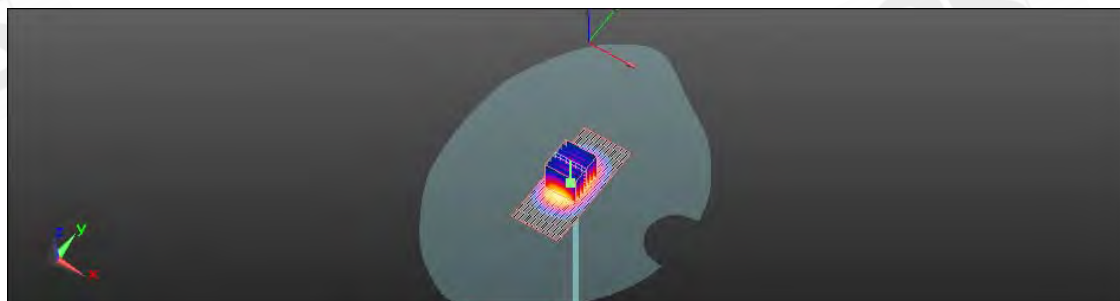
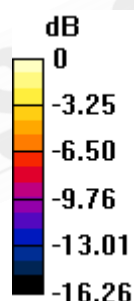
dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.845 V/m; Power Drift = 0.0024 dB

Peak SAR (extrapolated) = 16.549 W/kg

### SAR(1 g) = 9.6 mW/g; SAR(10 g) = 5.12 mW/g

Maximum value of SAR (measured) = 10.924 mW/g



0 dB = 10.920mW/g

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**DUT: Dipole 835 MHz;**

Date: 9/02/2011

Communication System: CW; Frequency: 835 MHz

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 1.01 \text{ mho/m}$ ;  $\epsilon_r = 53.847$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(9.3, 9.3, 9.3); Calibrated: 4/19/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/18/2011
- Phantom: SAM1; Type: SAM
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

**Configuration /d=15mm, Pin=250mW, dist=4mm:** Measurement grid:

$dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 2.656 mW/g

**Configuration /d=15mm, Pin=250mW, dist=4mm:** Measurement grid:

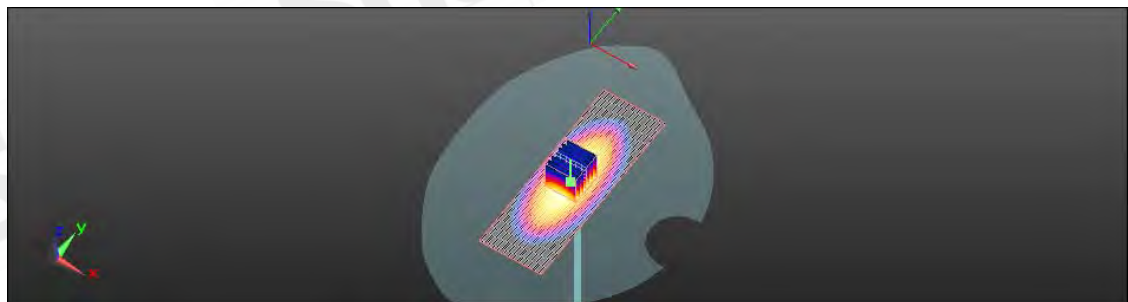
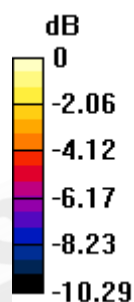
$dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 51.852 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 3.632 W/kg

**SAR(1 g) = 2.45 mW/g; SAR(10 g) = 1.6 mW/g**

Maximum value of SAR (measured) = 2.647 mW/g



0 dB = 2.650mW/g

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## DUT: Dipole 1900 MHz;

Date: 9/02/2011

Communication System: CW; Frequency: 1900 MHz

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.523$  mho/m;  $\epsilon_r = 51.545$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3770; ConvF(7.51, 7.51, 7.51); Calibrated: 4/19/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/18/2011
- Phantom: SAM2; Type: SAM
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

**Configuration / d=10mm, Pin=250mW, dist=4mm:** Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.810 mW/g

**Configuration / d=10mm, Pin=250mW, dist=4mm:** Measurement grid:

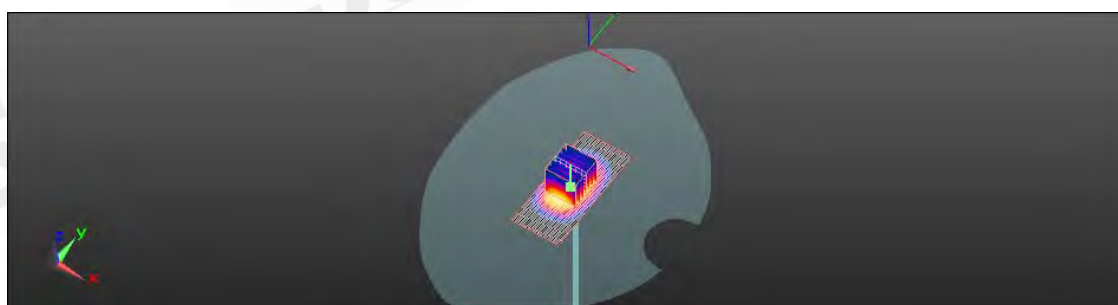
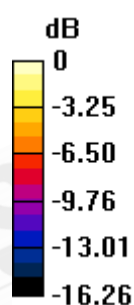
dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.845 V/m; Power Drift = 0.0024 dB

Peak SAR (extrapolated) = 16.549 W/kg

**SAR(1 g) = 9.7 mW/g; SAR(10 g) = 5.12 mW/g**

Maximum value of SAR (measured) = 10.924 mW/g



0 dB = 10.920mW/g

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client **SGS-TW**

Certificate No: **DAE4-547\_Aug10**

### CALIBRATION CERTIFICATE

Object **DAE4 - SD 000 D04 BJ - SN: 547**

Calibration procedure(s) **QA CAL-06.v22  
Calibration procedure for the data acquisition electronics (DAE)**

Calibration date: **August 18, 2010**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards             | ID #               | Cal Date (Certificate No.) | Scheduled Calibration  |
|-------------------------------|--------------------|----------------------------|------------------------|
| Keithley Multimeter Type 2001 | SN: 0810278        | 1-Oct-09 (No: 9055)        | Oct-10                 |
| Secondary Standards           | ID #               | Check Date (in house)      | Scheduled Check        |
| Calibrator Box V1.1           | SE UMS 006 AB 1004 | 07-Jun-10 (in house check) | In house check: Jun-11 |

|                | Name              | Function     | Signature |
|----------------|-------------------|--------------|-----------|
| Calibrated by: | Dominique Steffen | Technician   |           |
| Approved by:   | Fin Bornholt      | R&D Director |           |

Issued: August 18, 2010

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Certificate No: DAE4-547\_Aug10

Page 1 of 5

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Accreditation No.: **SCS 108**

Client **SGS-TW (Auden)**

Certificate No: **DAE4-856\_May11**

## CALIBRATION CERTIFICATE

Object **DAE4 - SD 000 D04 BJ - SN: 856**

Calibration procedure(s) **QA CAL-06.v23**  
**Calibration procedure for the data acquisition electronics (DAE)**

Calibration date: **May 18, 2011**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature  $(22 \pm 3)^{\circ}\text{C}$  and humidity  $< 70\%$ .

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards              | ID #               | Cal Date (Certificate No.) | Scheduled Calibration  |
|--------------------------------|--------------------|----------------------------|------------------------|
| Kelithley Multimeter Type 2001 | SN: 0810278        | 28-Sep-10 (No:10376)       | Sep-11                 |
| Secondary Standards            | ID #               | Check Date (in house)      | Scheduled Check        |
| Calibrator Box V1.1            | SE UMS 006 AB 1004 | 07-Jun-10 (in house check) | In house check: Jun-11 |

Calibrated by: 

|                   |            |           |
|-------------------|------------|-----------|
| Name              | Function   | Signature |
| Dominique Steffen | Technician |           |

Approved by: 

|             |              |
|-------------|--------------|
| Fin Bomholt | R&D Director |
|-------------|--------------|

Issued: May 18, 2011

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Certificate No: DAE4-856\_May11

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Client **SGS-TW (Auden)**

Certificate No: **EX3-3770\_Apr11**

## CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3770**

Calibration procedure(s) **QA CAL-01.v7, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v3  
Calibration procedure for dosimetric E-field probes**

Calibration date: **April 19, 2011**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature  $(22 \pm 3)^{\circ}\text{C}$  and humidity  $< 70\%$ .

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards          | ID              | Cal Date (Certificate No.)        | Scheduled Calibration  |
|----------------------------|-----------------|-----------------------------------|------------------------|
| Power meter E4419B         | GB41293874      | 31-Mar-11 (No. 217-01372)         | Apr-12                 |
| Power sensor E4412A        | MY41495277      | 31-Mar-11 (No. 217-01372)         | Apr-12                 |
| Power sensor E4412A        | MY41498087      | 31-Mar-11 (No. 217-01372)         | Apr-12                 |
| Reference 3 dB Attenuator  | SN: S5054 (3c)  | 29-Mar-11 (No. 217-01369)         | Apr-12                 |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 29-Mar-11 (No. 217-01367)         | Apr-12                 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 29-Mar-11 (No. 217-01370)         | Apr-12                 |
| Reference Probe ES3DV2     | SN: 3013        | 29-Dec-10 (No. ES3-3013_Dec10)    | Dec-11                 |
| DAE4                       | SN: 654         | 23-Apr-10 (No. DAE4-654_Apr10)    | Apr-11                 |
| Secondary Standards        | ID              | Check Date (in house)             | Scheduled Check        |
| RF generator HP 8648C      | US3642U01700    | 4-Aug-99 (in house check Oct-09)  | In house check: Oct-11 |
| Network Analyzer HP 8753E  | US37390585      | 18-Oct-01 (in house check Oct-10) | In house check: Oct-11 |

|                                                                                                                 | Name          | Function          | Signature              |
|-----------------------------------------------------------------------------------------------------------------|---------------|-------------------|------------------------|
| Calibrated by:                                                                                                  | Katja Pokovic | Technical Manager |                        |
| Approved by:                                                                                                    | Fin Bornholt  | R&D Director      |                        |
|                                                                                                                 |               |                   | Issued: April 19, 2011 |
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## Glossary:

|                          |                                                                                                                                                         |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| TSL                      | tissue simulating liquid                                                                                                                                |
| NORM <sub>x,y,z</sub>    | sensitivity in free space                                                                                                                               |
| ConvF                    | sensitivity in TSL / NORM <sub>x,y,z</sub>                                                                                                              |
| DCP                      | diode compression point                                                                                                                                 |
| CF                       | crest factor (1/duty_cycle) of the RF signal                                                                                                            |
| A, B, C                  | modulation dependent linearization parameters                                                                                                           |
| Polarization $\varphi$   | $\varphi$ rotation around probe axis                                                                                                                    |
| Polarization $\vartheta$ | $\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center),<br>i.e., $\vartheta = 0$ is normal to probe axis |

## Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

## Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not affect the E<sup>2</sup>-field uncertainty inside TSL (see below ConvF).
- NORM(f)<sub>x,y,z</sub>** = NORM<sub>x,y,z</sub> \* frequency\_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP<sub>x,y,z</sub>**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A<sub>x,y,z</sub>; B<sub>x,y,z</sub>; C<sub>x,y,z</sub>** are numerical linearization parameters in dB assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media.
- VR**: VR is the validity range of the calibration related to the average diode voltage or DAE voltage in mV.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f > 800$  MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM<sub>x,y,z</sub> \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50$  MHz to  $\pm 100$  MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

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EX3DV4 – SN:3770

April 19, 2011

## Probe EX3DV4

SN:3770

Manufactured: July 6, 2010  
Calibrated: April 19, 2011Calibrated for DASY/EASY Systems  
(Note: non-compatible with DASY2 system!)

Certificate No: EX3-3770\_Apr11

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EX3DV4- SN:3770

April 19, 2011

**DASY/EASY - Parameters of Probe: EX3DV4 - SN:3770****Basic Calibration Parameters**

|                                                    | Sensor X | Sensor Y | Sensor Z | Unc (k=2)     |
|----------------------------------------------------|----------|----------|----------|---------------|
| Norm ( $\mu\text{V}/(\text{V/m})^2$ ) <sup>A</sup> | 0.32     | 0.62     | 0.40     | $\pm 10.1 \%$ |
| DCP (mV) <sup>B</sup>                              | 106.6    | 98.3     | 102.8    |               |

**Modulation Calibration Parameters**

| UID   | Communication System Name | PAR  |   | A<br>dB | B<br>dB | C<br>dB | VR<br>mV | Unc <sup>E</sup><br>(k=2) |
|-------|---------------------------|------|---|---------|---------|---------|----------|---------------------------|
| 10000 | CW                        | 0.00 | X | 0.00    | 0.00    | 1.00    | 120.8    | $\pm 2.7 \%$              |
|       |                           |      | Y | 0.00    | 0.00    | 1.00    | 134.3    |                           |
|       |                           |      | Z | 0.00    | 0.00    | 1.00    | 133.5    |                           |

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

<sup>A</sup> The uncertainties of NormX,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Pages 5 and 6)

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

<sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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EX3DV4- SN:3770

April 19, 2011

**DASY/EASY - Parameters of Probe: EX3DV4 - SN:3770****Calibration Parameter Determined in Head Tissue Simulating Media**

| f (MHz) <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity (S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 750                  | 41.9                               | 0.89                            | 9.58    | 9.58    | 9.58    | 0.80  | 0.70       | ± 12.0 %    |
| 835                  | 41.5                               | 0.90                            | 9.25    | 9.25    | 9.25    | 0.80  | 0.67       | ± 12.0 %    |
| 900                  | 41.5                               | 0.97                            | 9.06    | 9.06    | 9.06    | 0.76  | 0.71       | ± 12.0 %    |
| 1750                 | 40.1                               | 1.37                            | 7.97    | 7.97    | 7.97    | 0.80  | 0.61       | ± 12.0 %    |
| 1900                 | 40.0                               | 1.40                            | 7.78    | 7.78    | 7.78    | 0.71  | 0.62       | ± 12.0 %    |
| 2000                 | 40.0                               | 1.40                            | 7.79    | 7.79    | 7.79    | 0.75  | 0.58       | ± 12.0 %    |
| 2450                 | 39.2                               | 1.80                            | 6.99    | 6.99    | 6.99    | 0.80  | 0.56       | ± 12.0 %    |
| 2600                 | 39.0                               | 1.96                            | 6.95    | 6.95    | 6.95    | 0.66  | 0.62       | ± 12.0 %    |

<sup>C</sup> Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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EX3DV4- SN:3770

April 19, 2011

**DASY/EASY - Parameters of Probe: EX3DV4- SN:3770****Calibration Parameter Determined in Body Tissue Simulating Media**

| f (MHz) <sup>c</sup> | Relative Permittivity <sup>f</sup> | Conductivity (S/m) <sup>f</sup> | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 750                  | 55.5                               | 0.96                            | 9.42    | 9.42    | 9.42    | 0.73  | 0.72       | ± 12.0 %    |
| 835                  | 55.2                               | 0.97                            | 9.30    | 9.30    | 9.30    | 0.72  | 0.72       | ± 12.0 %    |
| 900                  | 55.0                               | 1.05                            | 9.12    | 9.12    | 9.12    | 0.73  | 0.75       | ± 12.0 %    |
| 1750                 | 53.4                               | 1.49                            | 7.84    | 7.84    | 7.84    | 0.80  | 0.68       | ± 12.0 %    |
| 1900                 | 53.3                               | 1.52                            | 7.51    | 7.51    | 7.51    | 0.80  | 0.62       | ± 12.0 %    |
| 2000                 | 53.3                               | 1.52                            | 7.44    | 7.44    | 7.44    | 0.80  | 0.66       | ± 12.0 %    |
| 2450                 | 52.7                               | 1.95                            | 6.96    | 6.96    | 6.96    | 0.80  | 0.50       | ± 12.0 %    |
| 2600                 | 52.5                               | 2.16                            | 6.78    | 6.78    | 6.78    | 0.80  | 0.50       | ± 12.0 %    |
| 5200                 | 49.0                               | 5.30                            | 4.42    | 4.42    | 4.42    | 0.50  | 1.90       | ± 13.1 %    |
| 5300                 | 48.9                               | 5.42                            | 4.12    | 4.12    | 4.12    | 0.52  | 1.90       | ± 13.1 %    |
| 5600                 | 48.5                               | 5.77                            | 3.54    | 3.54    | 3.54    | 0.60  | 1.90       | ± 13.1 %    |
| 5800                 | 48.2                               | 6.00                            | 3.80    | 3.80    | 3.80    | 0.60  | 1.90       | ± 13.1 %    |

<sup>c</sup> Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>f</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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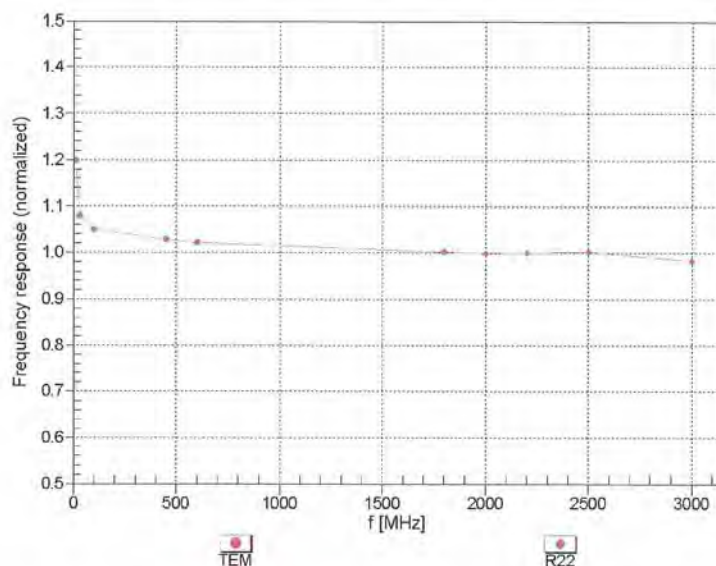
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EX3DV4- SN:3770

April 19, 2011

## Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

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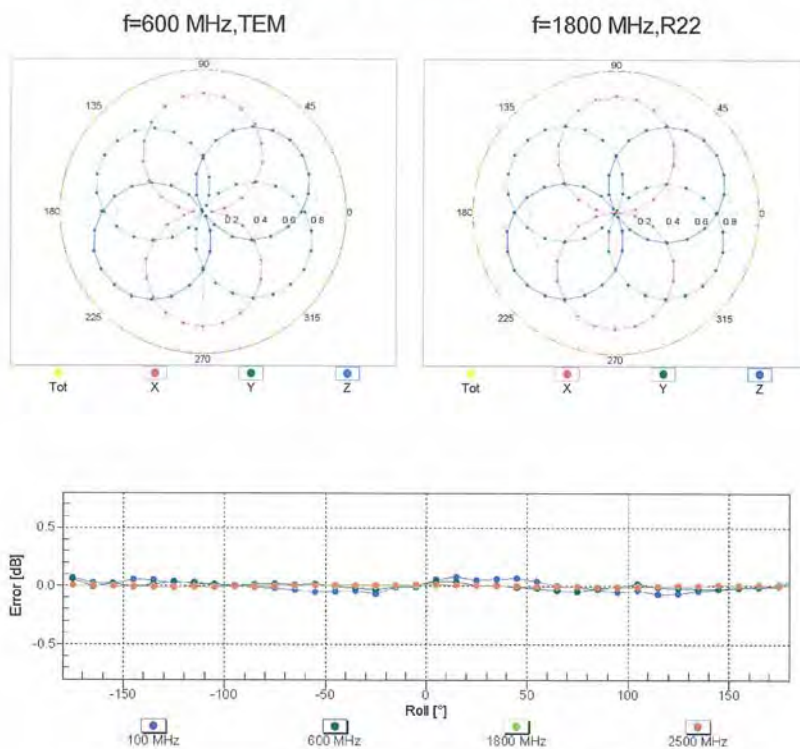
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April 19, 2011

## Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$



Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

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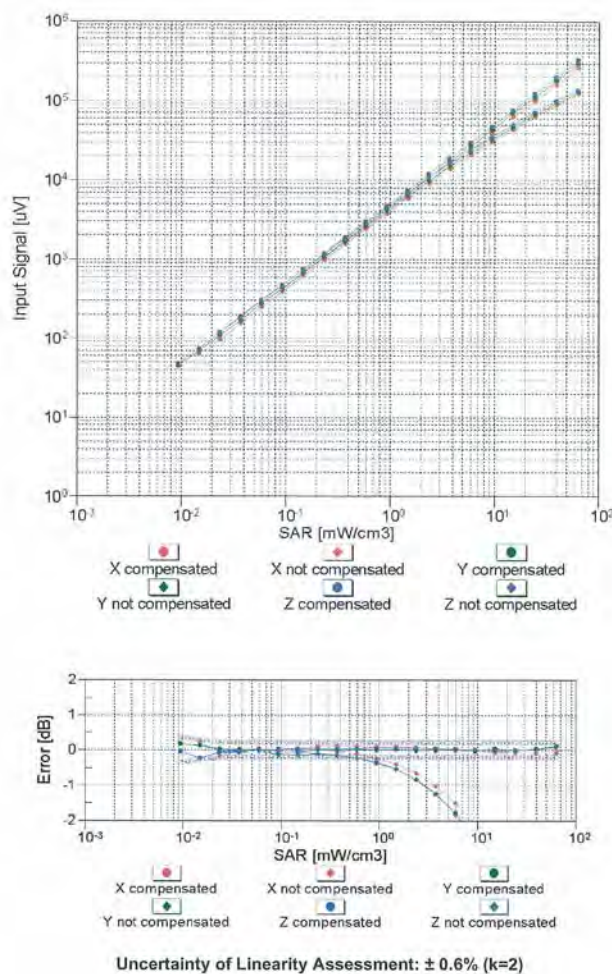
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EX3DV4- SN:3770

April 19, 2011

## Dynamic Range f(SAR<sub>head</sub>) (TEM cell , f = 900 MHz)



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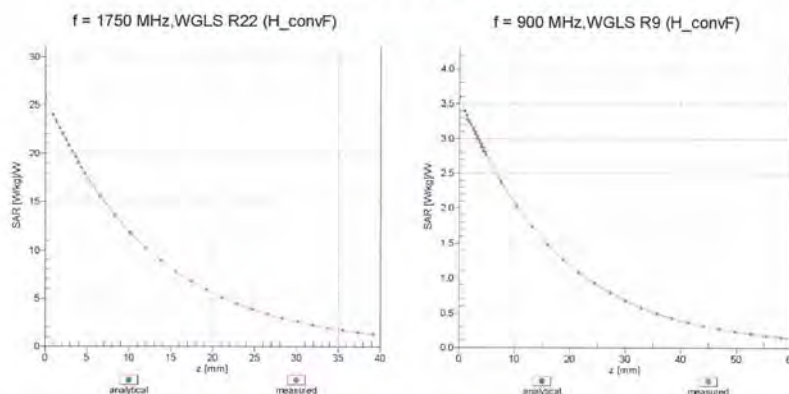
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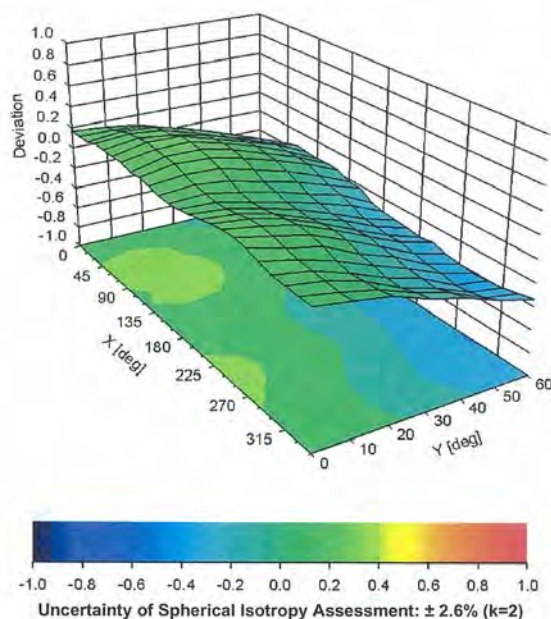
EX3DV4- SN:3770

April 19, 2011

## Conversion Factor Assessment



## Deviation from Isotropy in Liquid Error ( $\phi, \theta$ ), $f = 900 \text{ MHz}$



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EX3DV4- SN:3770

April 19, 2011

**DASY/EASY - Parameters of Probe: EX3DV4 - SN:3770****Other Probe Parameters**

|                                               |                |
|-----------------------------------------------|----------------|
| Sensor Arrangement                            | Triangular     |
| Connector Angle (°)                           | Not applicable |
| Mechanical Surface Detection Mode             | enabled        |
| Optical Surface Detection Mode                | disabled       |
| Probe Overall Length                          | 337 mm         |
| Probe Body Diameter                           | 10 mm          |
| Tip Length                                    | 9 mm           |
| Tip Diameter                                  | 2.5 mm         |
| Probe Tip to Sensor X Calibration Point       | 1 mm           |
| Probe Tip to Sensor Y Calibration Point       | 1 mm           |
| Probe Tip to Sensor Z Calibration Point       | 1 mm           |
| Recommended Measurement Distance from Surface | 2 mm           |

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## 7. Uncertainty Budget

| Measurement Uncertainty evaluation template for DUT SAR test |                                |                             |            |               |                |                         |                         |                         |
|--------------------------------------------------------------|--------------------------------|-----------------------------|------------|---------------|----------------|-------------------------|-------------------------|-------------------------|
| IEEE 1528                                                    |                                |                             |            |               |                |                         |                         |                         |
| A                                                            | c                              | D                           | e          | f             | g              | $h=c * f / e$           | $i=c * g / e$           | k                       |
| Source of Uncertainty                                        | Tolerance/<br>Uncertainty<br>% | Probability<br>Distribution | Div        | $c_i$<br>(1g) | $c_i$<br>(10g) | Standard<br>uncertainty | Standard<br>uncertainty | $v_i$ , or<br>$V_{eff}$ |
| Measurement system                                           |                                |                             |            |               |                |                         |                         |                         |
| Probe calibration<br>(Frequency below<br>2GHz)               | 6%(12.0/2)                     | N                           | 1          | 1             | 1              | 6%                      | 6%                      | $\infty$                |
| <i>Isotropy, Axial</i>                                       | 4.7%                           | R                           | $\sqrt{3}$ | 1             | 1              | 2.7%                    | 2.7%                    | $\infty$                |
| <i>Isotropy,<br/>Hemispherical</i>                           | 9.6%                           | R                           | $\sqrt{3}$ | 1             | 1              | 5.5%                    | 5.5%                    | $\infty$                |
| Boundary Effect                                              | 1.0%                           | R                           | $\sqrt{3}$ | 1             | 1              | 0.6%                    | 0.6%                    | $\infty$                |
| Linearity                                                    | 4.7%                           | R                           | $\sqrt{3}$ | 1             | 1              | 2.7%                    | 2.7%                    | $\infty$                |
| Detection Limits                                             | 1.0%                           | R                           | $\sqrt{3}$ | 1             | 1              | 0.6%                    | 0.6%                    | $\infty$                |
| Readout<br>Electronics                                       | 0.3%                           | N                           | 1          | 1             | 1              | 0.3%                    | 0.3%                    | $\infty$                |
| Response time                                                | 0.8%                           | R                           | $\sqrt{3}$ | 1             | 1              | 0.5%                    | 0.5%                    | $\infty$                |
| Integration Time                                             | 2.6%                           | R                           | $\sqrt{3}$ | 1             | 1              | 1.5%                    | 1.5%                    | $\infty$                |
| <i>Measurement drift</i>                                     | 1.8%                           | R                           | $\sqrt{3}$ | 1             | 1              | 1.0%                    | 1.0%                    | $\infty$                |

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|                                                 |      |   |            |      |      |      |      |          |
|-------------------------------------------------|------|---|------------|------|------|------|------|----------|
| <i>(class A evaluation)</i>                     |      |   | 3          |      |      |      |      |          |
| RF ambient condition - noise                    | 3.0% | R | $\sqrt{3}$ | 1    | 1    | 1.7% | 1.7% | $\infty$ |
| RF ambient conditions -reflections              | 3.0% | R | $\sqrt{3}$ | 1    | 1    | 1.7% | 1.7% | $\infty$ |
| Probe positioner Mechanical restrictions        | 0.4% | R | $\sqrt{3}$ | 1    | 1    | 0.2% | 0.2% | $\infty$ |
| Probe Positioning with respect to phantom shell | 2.9% | R | $\sqrt{3}$ | 1    | 1    | 1.7% | 1.7% | $\infty$ |
| Post-processing                                 | 1.0% | R | $\sqrt{3}$ | 1    | 1    | 0.6% | 0.6% | $\infty$ |
| Max SAR Eval                                    | 1.0% | R | $\sqrt{3}$ | 1    | 1    | 0.6% | 0.6% | $\infty$ |
|                                                 |      |   |            |      |      |      |      |          |
| <b>Test Sample related</b>                      |      |   |            |      |      |      |      |          |
| Test sample positioning                         | 2.9% | N | 1          | 1    | 1    | 2.9% | 2.9% | M-1      |
| Device Holder Uncertainty                       | 3.6% | N | 1          | 1    | 1    | 3.6% | 3.6% | M-1      |
| Drift of output power                           | 5.0% | R | $\sqrt{3}$ | 1    | 1    | 2.9% | 2.9% | $\infty$ |
|                                                 |      |   |            |      |      |      |      |          |
| <b>Phantom and Setup</b>                        |      |   |            |      |      |      |      |          |
| Phantom Uncertainty                             | 4.0% | R | $\sqrt{3}$ | 1    | 1    | 2.3% | 2.3% | $\infty$ |
| Liquid conductivity(meas.) Max at 1900 band     | 4.6% | N | 1          | 0.64 | 0.43 | 2.9% | 2.0% | M        |

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|                                                         |      |     |   |     |      |       |       |   |
|---------------------------------------------------------|------|-----|---|-----|------|-------|-------|---|
| Liquid<br>permutivity(meas.)<br>Max at 835 band         | 2.2% | N   | 1 | 0.6 | 0.49 | 1.3%  | 1.1%  | M |
|                                                         |      |     |   |     |      |       |       |   |
| Combined standard<br>uncertainty                        |      | RSS |   |     |      | 11.8% | 11.6% |   |
| Expant uncertainty<br>(95% confidence<br>interval), K=2 |      |     |   |     |      | 23.6% | 23.2% |   |

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## 8. Phantom Description

Schmid &amp; Partner Engineering AG

s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland  
Phone +41 1 245 9700, Fax +41 1 245 9779  
info@speag.com, http://www.speag.com

### Certificate of Conformity / First Article Inspection

|              |                                                              |
|--------------|--------------------------------------------------------------|
| Item         | SAM Twin Phantom V4.0                                        |
| Type No      | QD 000 P40 C                                                 |
| Series No    | TP-1150 and higher                                           |
| Manufacturer | SPEAG<br>Zeughausstrasse 43<br>CH-8004 Zurich<br>Switzerland |

#### Tests

The series production process used allows the limitation to test of first articles.  
Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series items (called samples) or are tested at each item.

| Test                        | Requirement                                                                                                                                                                                      | Details                                                                  | Units tested                                |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------|
| Dimensions                  | Compliant with the geometry according to the CAD model                                                                                                                                           | IT/IS CAD File (*)                                                       | First article, Samples                      |
| Material thickness of shell | Compliant with the requirements according to the standards                                                                                                                                       | 2mm +/- 0.2mm in flat and specific areas of head section                 | First article, Samples, TP-1314 ff.         |
| Material thickness at ERP   | Compliant with the requirements according to the standards                                                                                                                                       | 8mm +/- 0.2mm at ERP                                                     | First article, All items                    |
| Material parameters         | Dielectric parameters for required frequencies                                                                                                                                                   | 300 MHz – 6 GHz:<br>Relative permittivity < 5,<br>Loss tangent < 0.05    | Material samples                            |
| Material resistivity        | The material has been tested to be compatible with the liquids defined in the standards if handled and cleaned according to the instructions. Observe technical Note for material compatibility. | DEGMBE based simulating liquids                                          | Pre-series, First article, Material samples |
| Sagging                     | Compliant with the requirements according to the standards. Sagging of the flat section when filled with tissue simulating liquid                                                                | < 1% typical < 0.6% if filled with 155mm of HSL900 and without DUT below | Prototypes, Sample testing                  |

#### Standards

- [1] CENELEC EN 50361
- [2] IEEE Std 1528-2003
- [3] IEC 62209 Part I
- [4] FCC OET Bulletin 65, Supplement C, Edition 01-01

(\*) The IT/IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of the other documents.

#### Conformity

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standards [1] to [4].

Date 07.07.2005

s p e a g

Signature / Stamp

Schmid & Partner Engineering AG  
Zeughausstrasse 43, 8004 Zurich, Switzerland  
Phone +41 1 245 9700, Fax +41 1 245 9779  
info@speag.com, http://www.speag.com

Doc No. 581 - QD 000 P40 C - 3

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## 9. System Validation from Original equipment supplier

Calibration Laboratory of  
Schmid & Partner  
Engineering AG  
Zeughausstrasse 43, 8004 Zurich, Switzerland



S Schweizerischer Kalibrierdienst  
C Service suisse d'étalonnage  
S Servizio svizzero di taratura  
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)  
The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: D835V2-4d063\_May11

**CALIBRATION CERTIFICATE**

Object D835V2 - SN: 4d063

Calibration procedure(s) QA CAL-05.v8  
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: May 25, 2011

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature ( $22 \pm 3$ )°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards           | ID #               | Cal Date (Certificate No.)        | Scheduled Calibration  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| Power meter EPM-442A        | GB37480704         | 06-Oct-10 (No. 217-01266)         | Oct-11                 |
| Power sensor HP 8481A       | US37292783         | 06-Oct-10 (No. 217-01266)         | Oct-11                 |
| Reference 20 dB Attenuator  | SN: S5086 (20b)    | 29-Mar-11 (No. 217-01367)         | Apr-12                 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 29-Mar-11 (No. 217-01371)         | Apr-12                 |
| Reference Probe ES3DV3      | SN: 3205           | 29-Apr-11 (No. ES3-3205_Apr11)    | Apr-12                 |
| DAE4                        | SN: 601            | 10-Jun-10 (No. DAE4-601_Jun10)    | Jun-11                 |
| Secondary Standards         | ID #               | Check Date (in house)             | Scheduled Check        |
| Power sensor HP 8481A       | MY41092317         | 18-Oct-02 (in house check Oct-09) | In house check: Oct-11 |
| RF generator R&S SMT-06     | 100005             | 4-Aug-99 (in house check Oct-09)  | In house check: Oct-11 |
| Network Analyzer HP 8753E   | US37390585 S4206   | 18-Oct-01 (in house check Oct-10) | In house check: Oct-11 |

|                |                         |                                   |               |
|----------------|-------------------------|-----------------------------------|---------------|
| Calibrated by: | Name<br>Claudio Leubler | Function<br>Laboratory Technician | Signature<br> |
| Approved by:   | Name<br>Katja Pokovic   | Function<br>Technical Manager     | Signature<br> |

Issued: May 25, 2011

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D835V2-4d063\_May11

Page 1 of 8

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**Calibration Laboratory of**  
Schmid & Partner  
Engineering AG  
Zeughausstrasse 43, 8004 Zurich, Switzerland



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)  
The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

## Glossary:

|       |                                 |
|-------|---------------------------------|
| TSL   | tissue simulating liquid        |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A   | not applicable or not measured  |

## Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

## Additional Documentation:

- DASY4/5 System Handbook

## Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

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**Measurement Conditions**

DASY system configuration, as far as not given on page 1.

|                              |                        |             |
|------------------------------|------------------------|-------------|
| DASY Version                 | DASY5                  | V52.6.2     |
| Extrapolation                | Advanced Extrapolation |             |
| Phantom                      | Modular Flat Phantom   |             |
| Distance Dipole Center - TSL | 15 mm                  | with Spacer |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm      |             |
| Frequency                    | 835 MHz $\pm$ 1 MHz    |             |

**Head TSL parameters**

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| Nominal Head TSL parameters             | 22.0 °C             | 41.5           | 0.90 mho/m           |
| Measured Head TSL parameters            | (22.0 $\pm$ 0.2) °C | 40.4 $\pm$ 6 % | 0.88 mho/m $\pm$ 6 % |
| Head TSL temperature change during test | < 0.5 °C            | -----          | -----                |

**SAR result with Head TSL**

|                                                       |                    |                                |
|-------------------------------------------------------|--------------------|--------------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                                |
| SAR measured                                          | 250 mW input power | 2.31 mW / g                    |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 9.34 mW / g $\pm$ 17.0 % (k=2) |

|                                                         |                    |                                |
|---------------------------------------------------------|--------------------|--------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                                |
| SAR measured                                            | 250 mW input power | 1.52 mW / g                    |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 6.13 mW / g $\pm$ 16.5 % (k=2) |

**Body TSL parameters**

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| Nominal Body TSL parameters             | 22.0 °C             | 55.2           | 0.97 mho/m           |
| Measured Body TSL parameters            | (22.0 $\pm$ 0.2) °C | 53.9 $\pm$ 6 % | 1.00 mho/m $\pm$ 6 % |
| Body TSL temperature change during test | < 0.5 °C            | -----          | -----                |

**SAR result with Body TSL**

|                                                       |                    |                                |
|-------------------------------------------------------|--------------------|--------------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                                |
| SAR measured                                          | 250 mW input power | 2.43 mW / g                    |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 9.45 mW / g $\pm$ 17.0 % (k=2) |

|                                                         |                    |                                |
|---------------------------------------------------------|--------------------|--------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                                |
| SAR measured                                            | 250 mW input power | 1.60 mW / g                    |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 6.27 mW / g $\pm$ 16.5 % (k=2) |

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## Appendix

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 53.4 $\Omega$ - 1.5 j $\Omega$ |
| Return Loss                          | - 28.9 dB                      |

### Antenna Parameters with Body TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 48.7 $\Omega$ - 4.1 j $\Omega$ |
| Return Loss                          | - 27.3 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.426 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### Additional EUT Data

|                 |                   |
|-----------------|-------------------|
| Manufactured by | SPEAG             |
| Manufactured on | November 27, 2006 |

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## DASY5 Validation Report for Head TSL

Date: 25.05.2011

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d063**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL900

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.88 \text{ mho/m}$ ;  $\epsilon_r = 40.4$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

### Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Cube 0:

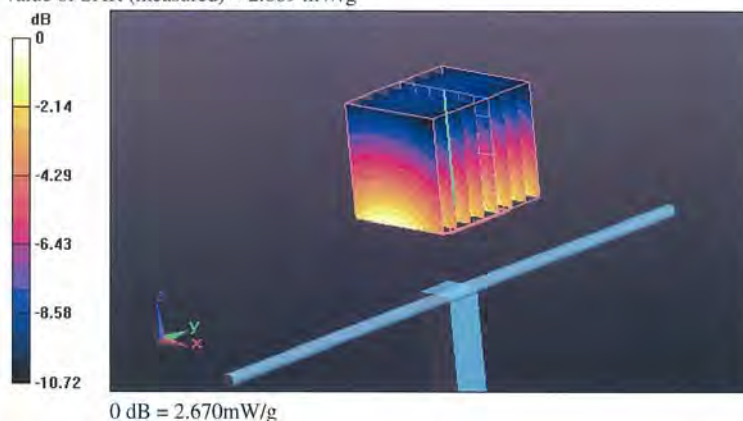
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 56.554 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 3.427 W/kg

**SAR(1 g) = 2.31 mW/g; SAR(10 g) = 1.52 mW/g**

Maximum value of SAR (measured) = 2.669 mW/g



Certificate No: D835V2-4d063\_May11

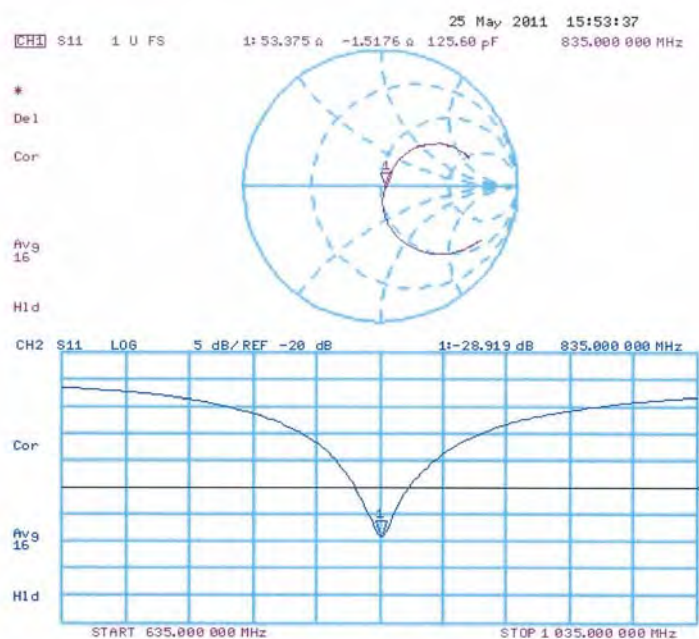
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## Impedance Measurement Plot for Head TSL



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## DASY5 Validation Report for Body TSL

Date: 25.05.2011

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d063**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: MSL900

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 1 \text{ mho/m}$ ;  $\epsilon_r = 53.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

### DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

### Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Cube 0:

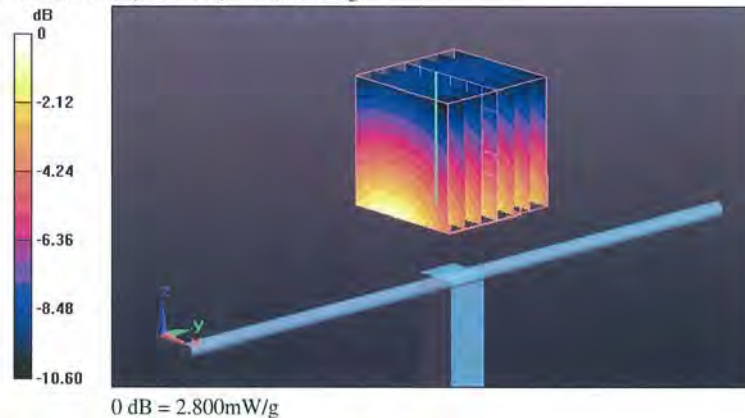
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 54.297 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 3.530 W/kg

**SAR(1 g) = 2.43 mW/g; SAR(10 g) = 1.6 mW/g**

Maximum value of SAR (measured) = 2.804 mW/g

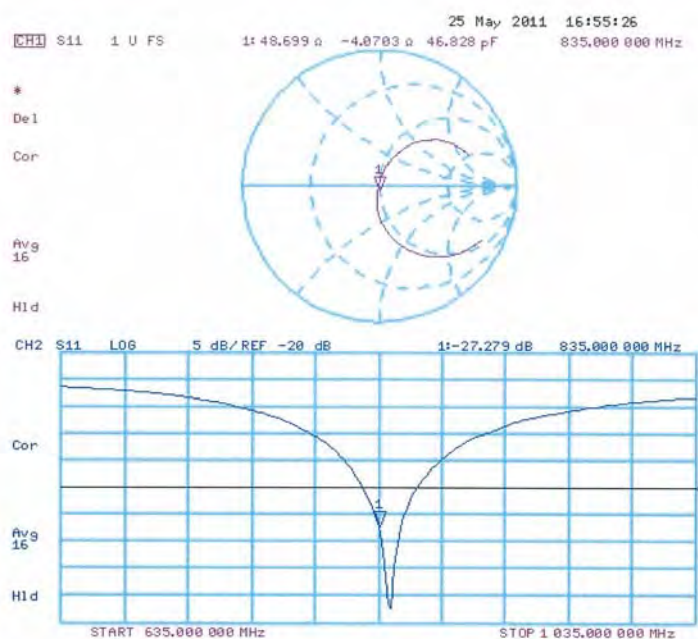


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## Impedance Measurement Plot for Body TSL



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**Calibration Laboratory of**  
Schmid & Partner  
Engineering AG  
Zeughausstrasse 43, 8004 Zurich, Switzerland



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client **SGS TW (Auden)**

Certificate No: D1900V2-5d027\_Apr11

## CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d027**

Calibration procedure(s) **QA CAL-05.v8  
Calibration procedure for dipole validation kits**

Calibration date: **April 19, 2011**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards           | ID #               | Cal Date (Certificate No.)     | Scheduled Calibration |
|-----------------------------|--------------------|--------------------------------|-----------------------|
| Power meter EPM-442A        | GB37480704         | 06-Oct-10 (No. 217-01266)      | Oct-11                |
| Power sensor HP 8481A       | US37292783         | 06-Oct-10 (No. 217-01266)      | Oct-11                |
| Reference 20 dB Attenuator  | SN: 5086 (20g)     | 29-Mar-11 (No. 217-01368)      | Apr-12                |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 29-Mar-11 (No. 217-01371)      | Apr-12                |
| Reference Probe ES3DV3      | SN: 3205           | 30-Apr-10 (No. ES3-3205_Apr10) | Apr-11                |
| DAE4                        | SN: 601            | 10-Jun-10 (No. DAE4-601_Jun10) | Jun-11                |

| Secondary Standards       | ID #             | Check Date (in house)             | Scheduled Check        |
|---------------------------|------------------|-----------------------------------|------------------------|
| Power sensor HP 8481A     | MY41092317       | 18-Oct-02 (in house check Oct-09) | In house check: Oct-11 |
| RF generator R&S SMT-06   | 100005           | 4-Aug-99 (in house check Oct-09)  | In house check: Oct-11 |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (in house check Oct-10) | In house check: Oct-11 |

Calibrated by: **Name** Claudio Leubler **Function** Laboratory Technician **Signature**

Approved by: **Name** Katja Pokovic **Technical Manager**

Issued: April 19, 2011

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Certificate No: D1900V2-5d027\_Apr11

Page 1 of 9

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Accreditation No.: SCS 108

## Glossary:

|       |                                 |
|-------|---------------------------------|
| TSL   | tissue simulating liquid        |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A   | not applicable or not measured  |

## Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

## Additional Documentation:

- DASY4/5 System Handbook

## Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

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**Measurement Conditions**

DASY system configuration, as far as not given on page 1.

|                              |                           |             |
|------------------------------|---------------------------|-------------|
| DASY Version                 | DASY5                     | V52.6.2     |
| Extrapolation                | Advanced Extrapolation    |             |
| Phantom                      | Modular Flat Phantom V5.0 |             |
| Distance Dipole Center - TSL | 10 mm                     | with Spacer |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm         |             |
| Frequency                    | 1900 MHz $\pm$ 1 MHz      |             |

**Head TSL parameters**

The following parameters and calculations were applied.

|                                  | Temperature         | Permittivity   | Conductivity         |
|----------------------------------|---------------------|----------------|----------------------|
| Nominal Head TSL parameters      | 22.0 °C             | 40.0           | 1.40 mho/m           |
| Measured Head TSL parameters     | (22.0 $\pm$ 0.2) °C | 38.9 $\pm$ 6 % | 1.41 mho/m $\pm$ 6 % |
| Head TSL temperature during test | (21.0 $\pm$ 0.2) °C | ----           | ----                 |

**SAR result with Head TSL**

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                                |
|-------------------------------------------------------|--------------------|--------------------------------|
| SAR measured                                          | 250 mW input power | 10.1 mW / g                    |
| SAR normalized                                        | normalized to 1W   | 40.4 mW / g                    |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 40.1 mW / g $\pm$ 17.0 % (k=2) |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                                |
|---------------------------------------------------------|--------------------|--------------------------------|
| SAR measured                                            | 250 mW input power | 5.26 mW / g                    |
| SAR normalized                                          | normalized to 1W   | 21.0 mW / g                    |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 20.9 mW / g $\pm$ 16.5 % (k=2) |

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**Body TSL parameters**

The following parameters and calculations were applied.

|                                  | Temperature     | Permittivity | Conductivity     |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters      | 22.0 °C         | 53.3         | 1.52 mho/m       |
| Measured Body TSL parameters     | (22.0 ± 0.2) °C | 51.1 ± 6 %   | 1.52 mho/m ± 6 % |
| Body TSL temperature during test | (21.8 ± 0.2) °C | ----         | ----             |

**SAR result with Body TSL**

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                            |
|-------------------------------------------------------|--------------------|----------------------------|
| SAR measured                                          | 250 mW input power | 9.93 mW / g                |
| SAR normalized                                        | normalized to 1W   | 39.7 mW / g                |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 39.4 mW / g ± 17.0 % (k=2) |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                            |
|---------------------------------------------------------|--------------------|----------------------------|
| SAR measured                                            | 250 mW input power | 5.18 mW / g                |
| SAR normalized                                          | normalized to 1W   | 20.7 mW / g                |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 20.6 mW / g ± 16.5 % (k=2) |

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## Appendix

### Antenna Parameters with Head TSL

|                                      |                             |
|--------------------------------------|-----------------------------|
| Impedance, transformed to feed point | $51.8 \Omega + 6.4 j\Omega$ |
| Return Loss                          | -23.7 dB                    |

### Antenna Parameters with Body TSL

|                                      |                             |
|--------------------------------------|-----------------------------|
| Impedance, transformed to feed point | $48.1 \Omega + 6.6 j\Omega$ |
| Return Loss                          | -23.1 dB                    |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.194 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### Additional EUT Data

|                 |                   |
|-----------------|-------------------|
| Manufactured by | SPEAG             |
| Manufactured on | December 17, 2002 |

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## DASY5 Validation Report for Head TSL

Date/Time: 18.04.2011 15:27:22

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d027**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL U12 BB

Medium parameters used:  $f = 1900 \text{ MHz}$ ;  $\sigma = 1.41 \text{ mho/m}$ ;  $\epsilon_r = 39$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.09, 5.09, 5.09); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2829)

### Pin=250 mW, Cube 0:

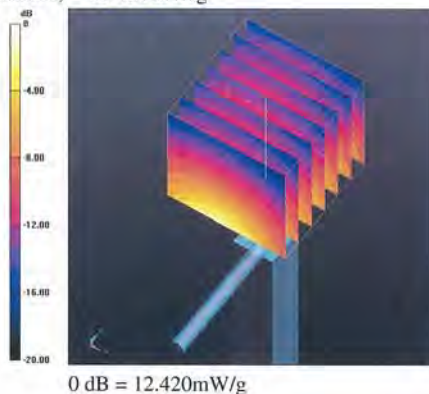
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 97.235 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 18.650 W/kg

**SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.26 mW/g**

Maximum value of SAR (measured) = 12.424 mW/g

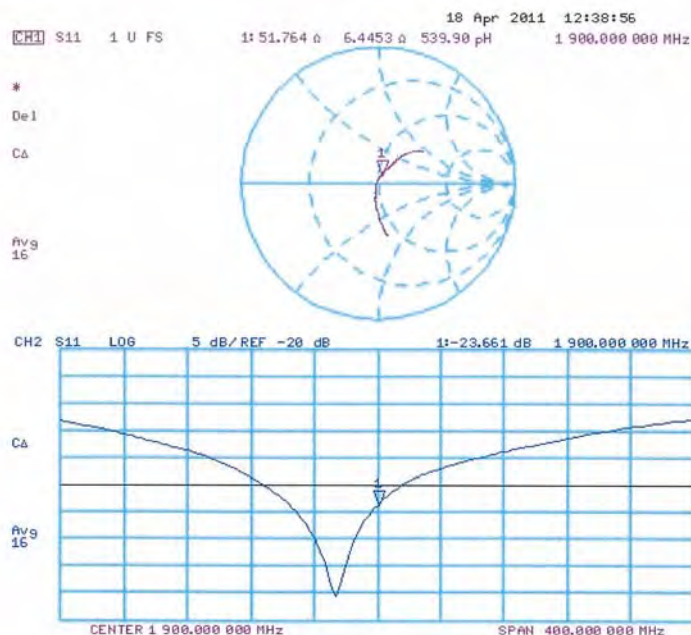


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## Impedance Measurement Plot for Head TSL



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## DASY5 Validation Report for Body TSL

Date/Time: 19.04.2011 12:53:51

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d027**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: MSL U12 BB

Medium parameters used:  $f = 1900 \text{ MHz}$ ;  $\sigma = 1.52 \text{ mho/m}$ ;  $\epsilon_r = 51.1$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

### DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.59, 4.59, 4.59); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2829)

### Pin=250 mW, Cube 0:

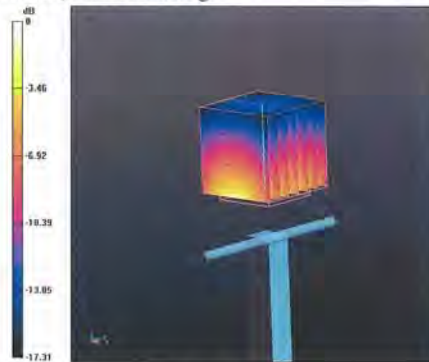
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 96.170 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 17.156 W/kg

**SAR(1 g) = 9.93 mW/g; SAR(10 g) = 5.18 mW/g**

Maximum value of SAR (measured) = 12.615 mW/g



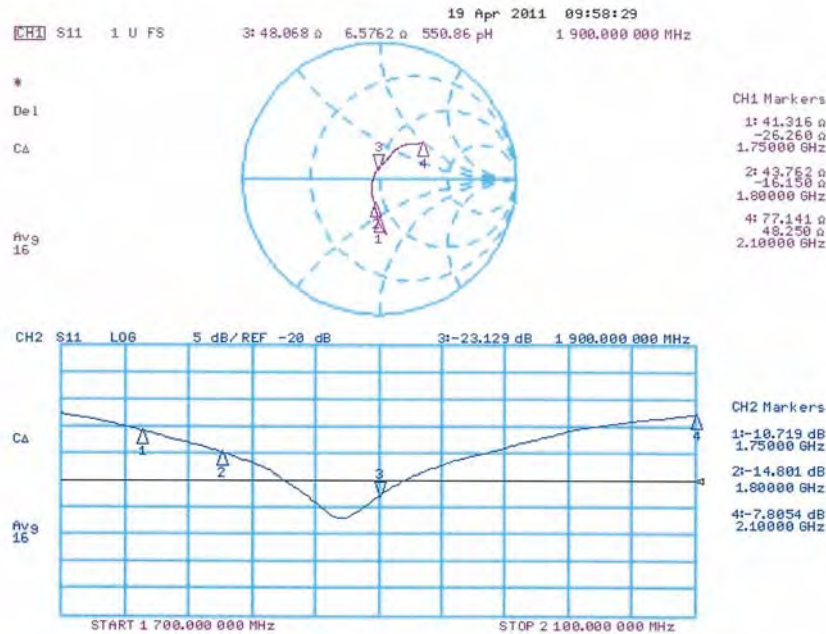
0 dB = 12.610mW/g

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## Impedance Measurement Plot for Body TSL



**End of 1<sup>st</sup> part of report**

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