

## SAR Data Summary –LTE Band 26 – EM7565

### MEASUREMENT RESULTS

| Gap      | Plot  | Position/<br>Antenna | Frequency |       | BW/ Modulation | RB<br>Size | RB<br>Offset | MPR<br>Target | End Power | Measured<br>SAR (W/kg) | Reported<br>SAR (W/kg) |
|----------|-------|----------------------|-----------|-------|----------------|------------|--------------|---------------|-----------|------------------------|------------------------|
|          |       |                      | MHz       | Ch.   |                |            |              |               | (dBm)     |                        |                        |
| 10<br>mm | ----- | Top/T1               | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.397                  | 0.42                   |
|          | ----- | Top/T1               | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.317                  | 0.36                   |
|          | ----- | Top/T2               | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.110                  | 0.12                   |
|          | ----- | Top/T2               | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.113                  | 0.13                   |
|          | ----- | Top/T3               | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.125                  | 0.13                   |
|          | ----- | Top/T3               | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.101                  | 0.12                   |
|          | ----- | Top/T4               | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.245                  | 0.26                   |
|          | ----- | Top/T4               | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.202                  | 0.23                   |
|          | ----- | Bottom/B1            | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.136                  | 0.14                   |
|          | ----- | Bottom/B1            | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.107                  | 0.12                   |
|          | ----- | Bottom/B2            | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.109                  | 0.11                   |
|          | ----- | Bottom/B2            | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.0878                 | 0.10                   |
|          | ----- | Bottom/B3            | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.0738                 | 0.08                   |
|          | ----- | Bottom/B3            | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.0587                 | 0.07                   |
|          | ----- | Bottom/B4            | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.125                  | 0.13                   |
|          | ----- | Bottom/B4            | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.100                  | 0.11                   |
|          | ----- | Left/T1              | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.209                  | 0.22                   |
|          | ----- | Left/T1              | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.167                  | 0.19                   |
|          | ----- | Right/T2             | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.328                  | 0.34                   |
|          | ----- | Right/T2             | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.263                  | 0.30                   |
|          | ----- | Left/T3              | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.231                  | 0.24                   |
|          | ----- | Left/T3              | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.186                  | 0.21                   |
|          | ----- | Right/T4             | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.253                  | 0.26                   |
|          | ----- | Right/T4             | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.202                  | 0.23                   |
|          | ----- | Left/B1              | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.207                  | 0.22                   |
|          | ----- | Left/B1              | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.160                  | 0.18                   |
|          | ----- | Right/B2             | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.408                  | 0.43                   |
|          | ----- | Right/B2             | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.332                  | 0.38                   |
|          | ----- | Left/B3              | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.337                  | 0.35                   |
|          | ----- | Left/B3              | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.273                  | 0.31                   |
|          | ----- | Right/B4             | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.193                  | 0.20                   |
|          | ----- | Right/B4             | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.156                  | 0.18                   |
|          | ----- | Back/T1              | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.386                  | 0.40                   |
|          | ----- | Back/T1              | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.313                  | 0.36                   |
|          | ----- | Back/T2              | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.253                  | 0.26                   |
|          | ----- | Back/T2              | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.201                  | 0.23                   |
|          | ----- | Front/T3             | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.154                  | 0.16                   |
|          | ----- | Front/T3             | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.125                  | 0.14                   |
|          | 5     | Front/T4             | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.459                  | 0.48                   |
|          | ----- | Front/T4             | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.369                  | 0.42                   |
|          | ----- | Back/B1              | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.353                  | 0.37                   |
|          | ----- | Back/B1              | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.283                  | 0.32                   |
|          | ----- | Back/B2              | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.194                  | 0.20                   |
|          | ----- | Back/B2              | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.156                  | 0.18                   |
|          | ----- | Front/B3             | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.164                  | 0.17                   |
|          | ----- | Front/B3             | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.147                  | 0.17                   |
|          | ----- | Front/B4             | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.8      | 0.347                  | 0.36                   |
|          | ----- | Front/B4             | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.4      | 0.280                  | 0.32                   |

Body  
1.6 W/kg (mW/g)  
averaged over 1 gram

- SAR Measurement  
Phantom Configuration  
SAR Configuration
- Test Signal Call Mode
- Test Configuration
- Tissue Depth is at least 15.0 cm

- ☐ Left Head  
☐ Head  
☐ Test Code  
☐ With Belt Clip

- ☒ Eli4  
☒ Body  
☒ Base Station Simulator  
☐ Without Belt Clip ☒ N/A

- ☐ Right Head



Jay M. Moulton  
Vice President

## SAR Data Summary –LTE Band 26 – EM7511

### MEASUREMENT RESULTS

| Gap                                                           | Plot  | Position/<br>Antenna | Frequency |       | BW/ Modulation | RB<br>Size | RB<br>Offset | MPR<br>Target | End Power | Measured<br>SAR (W/kg) | Reported<br>SAR (W/kg) |
|---------------------------------------------------------------|-------|----------------------|-----------|-------|----------------|------------|--------------|---------------|-----------|------------------------|------------------------|
|                                                               |       |                      | MHz       | Ch.   |                |            |              |               | (dBm)     |                        |                        |
| 10<br>mm                                                      | ----- | Bottom/B1            | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.4      | 0.0811                 | 0.09                   |
|                                                               | ----- | Bottom/B1            | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.6      | 0.0636                 | 0.07                   |
|                                                               | ----- | Bottom/B2            | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.4      | 0.0759                 | 0.09                   |
|                                                               | ----- | Bottom/B2            | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.6      | 0.0595                 | 0.07                   |
|                                                               | ----- | Left/B1              | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.4      | 0.307                  | 0.35                   |
|                                                               | ----- | Left/B1              | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.6      | 0.234                  | 0.26                   |
|                                                               | ----- | Right/B2             | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.4      | 0.327                  | 0.38                   |
|                                                               | ----- | Right/B2             | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.6      | 0.258                  | 0.28                   |
|                                                               | ----- | Back/B1              | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.4      | 0.360                  | 0.41                   |
|                                                               | ----- | Back/B1              | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.6      | 0.290                  | 0.32                   |
|                                                               | ----- | Back/B2              | 831.5     | 26865 | 15 MHz/QPSK    | 1          | 37           | 0             | 23.4      | 0.455                  | 0.52                   |
|                                                               | ----- | Back/B2              | 831.5     | 26865 | 15 MHz/QPSK    | 37         | 18           | 1             | 22.6      | 0.360                  | 0.39                   |
| <b>Body</b><br><b>1.6 W/kg (mW/g)</b><br>averaged over 1 gram |       |                      |           |       |                |            |              |               |           |                        |                        |

- SAR Measurement Phantom Configuration
- Test Signal Call Mode
- Test Configuration
- Tissue Depth is at least 15.0 cm

☐ Left Head  
☐ Head  
☐ Test Code  
☐ With Belt Clip

☒ Eli4  
☒ Body  
☒ Base Station Simulator  
☐ Without Belt Clip ☒ N/A

☐ Right Head



Jay M. Moulton  
Vice President

# SAR Data Summary – 1750 MHz Body – UMTS Band 4 – EM7565

## MEASUREMENT RESULTS

| Gap      | Plot  | Frequency |      | Modulation | Position/<br>Antenna | End<br>Power<br>(dBm)                           | RMC       | Test Set Up | Measured<br>SAR<br>(W/kg) | Reported<br>SAR<br>(W/kg) |
|----------|-------|-----------|------|------------|----------------------|-------------------------------------------------|-----------|-------------|---------------------------|---------------------------|
|          |       | MHz       | Ch.  |            |                      |                                                 |           |             |                           |                           |
| 10<br>mm | ----- | 1732.6    | 1413 | WCDMA      | Top/T1               | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.462                     | 0.49                      |
|          | ----- | 1732.6    | 1413 |            | Top/T2               | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.139                     | 0.15                      |
|          | ----- | 1732.6    | 1413 |            | Top/T3               | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.256                     | 0.27                      |
|          | ----- | 1732.6    | 1413 |            | Top/T4               | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.226                     | 0.24                      |
|          | ----- | 1732.6    | 1413 |            | Bottom/B1            | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.322                     | 0.34                      |
|          | ----- | 1732.6    | 1413 |            | Bottom/B2            | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.155                     | 0.16                      |
|          | ----- | 1732.6    | 1413 |            | Bottom/B3            | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.151                     | 0.16                      |
|          | ----- | 1732.6    | 1413 |            | Bottom/B4            | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.129                     | 0.14                      |
|          | ----- | 1732.6    | 1413 |            | Left/T1              | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.262                     | 0.28                      |
|          | ----- | 1732.6    | 1413 |            | Right/T2             | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.467                     | 0.49                      |
|          | ----- | 1732.6    | 1413 |            | Left/T3              | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.610                     | 0.64                      |
|          | ----- | 1732.6    | 1413 |            | Right/T4             | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.436                     | 0.46                      |
|          | ----- | 1732.6    | 1413 |            | Left/B1              | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.149                     | 0.16                      |
|          | ----- | 1732.6    | 1413 |            | Right/B2             | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.266                     | 0.28                      |
|          | ----- | 1732.6    | 1413 |            | Left/B3              | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.135                     | 0.14                      |
|          | ----- | 1732.6    | 1413 |            | Right/B4             | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.131                     | 0.14                      |
|          | ----- | 1732.6    | 1413 |            | Back/T1              | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.785                     | 0.83                      |
|          | ----- | 1712.4    | 1312 |            | Back/T2              | 23.73                                           | 12.2 kbps | Test Loop 1 | 0.905                     | 0.96                      |
|          | ----- | 1732.6    | 1413 |            |                      | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.927                     | 0.98                      |
|          | ----- | 1752.6    | 1513 |            |                      | 23.62                                           | 12.2 kbps | Test Loop 1 | 0.859                     | 0.94                      |
|          | ----- | 1732.6    | 1413 |            | Front/T3             | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.613                     | 0.64                      |
|          | ----- | 1732.6    | 1413 |            | Front/T4             | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.596                     | 0.63                      |
|          | ----- | 1732.6    | 1413 |            | Back/B1              | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.425                     | 0.45                      |
|          | ----- | 1712.4    | 1312 |            | Back/B2              | 23.73                                           | 12.2 kbps | Test Loop 1 | 0.811                     | 0.85                      |
|          | ----- | 1732.6    | 1413 |            |                      | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.857                     | 0.90                      |
|          | ----- | 1752.6    | 1513 |            |                      | 23.62                                           | 12.2 kbps | Test Loop 1 | 0.767                     | 0.81                      |
|          | ----- | 1732.6    | 1413 |            | Front/B3             | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.127                     | 0.13                      |
|          | ----- | 1732.6    | 1413 |            | Front/B4             | 23.78                                           | 12.2 kbps | Test Loop 1 | 0.254                     | 0.27                      |
|          |       |           |      |            |                      | Body<br>1.6 W/kg (mW/g)<br>averaged over 1 gram |           |             |                           |                           |

### 1. SAR Measurement

Phantom Configuration

SAR Configuration

### 2. Test Signal Call Mode

### 3. Test Configuration

### 4. Tissue Depth is at least 15.0 cm

☐ Left Head

☐ Head

☐ Test Code

☐ With Belt Clip

☒ Eli4

☒ Body

☒ Base Station Simulator

☐ Without Belt Clip ☒ N/A

☐ Right Head



Jay M. Moulton  
Vice President

## SAR Data Summary – 1750 MHz Body – UMTS Band 4 – EM7511

### MEASUREMENT RESULTS

| Gap      | Plot  | Frequency |      | Modulation | Position/<br>Antenna | End<br>Power | RMC                                             | Test Set Up | Measured<br>SAR<br>(W/kg) | Reported<br>SAR<br>(W/kg) |
|----------|-------|-----------|------|------------|----------------------|--------------|-------------------------------------------------|-------------|---------------------------|---------------------------|
|          |       | MHz       | Ch.  |            |                      | (dBm)        |                                                 |             |                           |                           |
| 10<br>mm | ----- | 1732.6    | 1413 | WCDMA      | Bottom/B1            | 23.99        | 12.2 kbps                                       | Test Loop 1 | 0.377                     | 0.38                      |
|          | ----- | 1732.6    | 1413 |            | Bottom/B2            | 23.99        | 12.2 kbps                                       | Test Loop 1 | 0.326                     | 0.33                      |
|          | ----- | 1732.6    | 1413 |            | Left/B1              | 23.99        | 12.2 kbps                                       | Test Loop 1 | 0.397                     | 0.40                      |
|          | ----- | 1732.6    | 1413 |            | Right/B2             | 23.99        | 12.2 kbps                                       | Test Loop 1 | 0.447                     | 0.45                      |
|          | ----- | 1732.6    | 1413 |            | Back/B1              | 23.99        | 12.2 kbps                                       | Test Loop 1 | 0.760                     | 0.76                      |
|          | 6     | 1712.4    | 1312 |            | Back/B2              | 23.76        | 12.2 kbps                                       | Test Loop 1 | 0.965                     | 1.02                      |
|          | ----- | 1732.6    | 1413 |            |                      | 23.99        | 12.2 kbps                                       | Test Loop 1 | 0.901                     | 0.90                      |
|          | ----- | 1752.6    | 1513 |            |                      | 23.73        | 12.2 kbps                                       | Test Loop 1 | 0.920                     | 0.98                      |
|          | ----- | 1712.4    | 1312 |            | Repeat               | 23.76        | 12.2 kbps                                       | Test Loop 1 | 0.945                     | 1.00                      |
|          |       |           |      |            |                      |              | Body<br>1.6 W/kg (mW/g)<br>averaged over 1 gram |             |                           |                           |

- SAR Measurement
 

Phantom Configuration
 

☐ Left Head
 ☒ Eli4
 ☐ Right Head

 SAR Configuration
 

☐ Head
 ☒ Body
- Test Signal Call Mode
 

☐ Test Code
 ☒ Base Station Simulator
- Test Configuration
 

☐ With Belt Clip
 ☐ Without Belt Clip
 ☒ N/A
- Tissue Depth is at least 15.0 cm



Jay M. Moulton  
Vice President

# SAR Data Summary –LTE Band 66 – EM7565

## MEASUREMENT RESULTS

| Gap                                                                        | Plot  | Position/<br>Antenna | Frequency |        | BW/ Modulation | RB<br>Size | RB<br>Offset | MPR<br>Target | End Power | Measured<br>SAR (W/kg) | Reported<br>SAR (W/kg) |
|----------------------------------------------------------------------------|-------|----------------------|-----------|--------|----------------|------------|--------------|---------------|-----------|------------------------|------------------------|
|                                                                            |       |                      | MHz       | Ch.    |                |            |              |               | (dBm)     |                        |                        |
| 10<br>mm                                                                   | ----- | Top/T1               | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.464                  | 0.49                   |
|                                                                            | ----- | Top/T1               | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.369                  | 0.43                   |
|                                                                            | ----- | Top/T2               | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.145                  | 0.15                   |
|                                                                            | ----- | Top/T2               | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.116                  | 0.14                   |
|                                                                            | ----- | Top/T3               | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.209                  | 0.22                   |
|                                                                            | ----- | Top/T3               | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.170                  | 0.20                   |
|                                                                            | ----- | Top/T4               | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.160                  | 0.17                   |
|                                                                            | ----- | Top/T4               | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.130                  | 0.15                   |
|                                                                            | ----- | Bottom/B1            | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.288                  | 0.30                   |
|                                                                            | ----- | Bottom/B1            | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.230                  | 0.27                   |
|                                                                            | ----- | Bottom/B2            | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.129                  | 0.14                   |
|                                                                            | ----- | Bottom/B2            | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.104                  | 0.12                   |
|                                                                            | ----- | Bottom/B3            | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.115                  | 0.12                   |
|                                                                            | ----- | Bottom/B3            | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.0975                 | 0.11                   |
|                                                                            | ----- | Bottom/B4            | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.124                  | 0.13                   |
|                                                                            | ----- | Bottom/B4            | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.0985                 | 0.12                   |
|                                                                            | ----- | Left/T1              | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.327                  | 0.34                   |
|                                                                            | ----- | Left/T1              | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.262                  | 0.31                   |
|                                                                            | ----- | Right/T2             | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.310                  | 0.32                   |
|                                                                            | ----- | Right/T2             | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.255                  | 0.30                   |
|                                                                            | ----- | Left/T3              | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.292                  | 0.31                   |
|                                                                            | ----- | Left/T3              | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.234                  | 0.27                   |
|                                                                            | ----- | Right/T4             | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.254                  | 0.27                   |
|                                                                            | ----- | Right/T4             | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.206                  | 0.24                   |
|                                                                            | ----- | Left/B1              | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.140                  | 0.15                   |
|                                                                            | ----- | Left/B1              | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.114                  | 0.13                   |
|                                                                            | ----- | Right/B2             | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.227                  | 0.24                   |
|                                                                            | ----- | Right/B2             | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.185                  | 0.22                   |
|                                                                            | ----- | Left/B3              | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.155                  | 0.16                   |
|                                                                            | ----- | Left/B3              | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.129                  | 0.15                   |
|                                                                            | ----- | Right/B4             | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.125                  | 0.13                   |
|                                                                            | ----- | Right/B4             | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.102                  | 0.12                   |
|                                                                            | ----- | Back/T1              | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.723                  | 0.76                   |
|                                                                            | ----- | Back/T1              | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.589                  | 0.69                   |
|                                                                            | 7     | Back/T2              | 1720.0    | 132072 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.9      | 0.932                  | 0.95                   |
|                                                                            | ----- |                      | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.901                  | 0.94                   |
|                                                                            | ----- |                      | 1770.0    | 132571 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.4      | 0.877                  | 1.01                   |
|                                                                            | ----- | Back/T2              | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.734                  | 0.86                   |
|                                                                            | ----- | Back/T2              | 1745.0    | 132322 | 20 MHz/QPSK    | 100        | 0            | 1             | 22.4      | 0.685                  | 0.79                   |
|                                                                            | ----- | Front/T3             | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.512                  | 0.54                   |
|                                                                            | ----- | Front/T3             | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.430                  | 0.51                   |
|                                                                            | ----- | Front/T4             | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.480                  | 0.50                   |
|                                                                            | ----- | Front/T4             | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.387                  | 0.45                   |
|                                                                            | ----- | Back/B1              | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.359                  | 0.38                   |
|                                                                            | ----- | Back/B1              | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.293                  | 0.34                   |
|                                                                            | ----- | Back/B2              | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.681                  | 0.71                   |
|                                                                            | ----- | Back/B2              | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.554                  | 0.65                   |
|                                                                            | ----- | Front/B3             | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.422                  | 0.44                   |
|                                                                            | ----- | Front/B3             | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.343                  | 0.40                   |
|                                                                            | ----- | Front/B4             | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.280                  | 0.29                   |
|                                                                            | ----- | Front/B4             | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.3      | 0.219                  | 0.26                   |
|                                                                            | ----- | Repeat               | 1720.0    | 132072 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.9      | 0.911                  | 0.93                   |
| <div>Body</div> <div>1.6 W/kg (mW/g)</div> <div>averaged over 1 gram</div> |       |                      |           |        |                |            |              |               |           |                        |                        |

- SAR Measurement Phantom Configuration
- Test Signal Call Mode
- Test Configuration
- Tissue Depth is at least 15.0 cm

☐ Left Head  
☐ Head  
☐ Test Code  
☐ With Belt Clip

☒ Eli4  
☒ Body  
☒ Base Station Simulator  
☐ Without Belt Clip ☒ N/A

☐ Right Head



Jay M. Moulton  
Vice President

## SAR Data Summary –LTE Band 66 – EM7511

### MEASUREMENT RESULTS

| Gap      | Plot  | Position/<br>Antenna | Frequency |        | BW/ Modulation | RB<br>Size | RB<br>Offset | MPR<br>Target | End Power | Measured<br>SAR (W/kg) | Reported<br>SAR (W/kg) |
|----------|-------|----------------------|-----------|--------|----------------|------------|--------------|---------------|-----------|------------------------|------------------------|
|          |       |                      | MHz       | Ch.    |                |            |              |               | (dBm)     |                        |                        |
| 10<br>mm | ----- | Bottom/B1            | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.4      | 0.348                  | 0.40                   |
|          | ----- | Bottom/B1            | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.8      | 0.279                  | 0.29                   |
|          | ----- | Bottom/B2            | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.4      | 0.285                  | 0.33                   |
|          | ----- | Bottom/B2            | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.8      | 0.232                  | 0.24                   |
|          | ----- | Left/B1              | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.4      | 0.348                  | 0.40                   |
|          | ----- | Left/B1              | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.8      | 0.256                  | 0.27                   |
|          | ----- | Right/B2             | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.4      | 0.341                  | 0.39                   |
|          | ----- | Right/B2             | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.8      | 0.272                  | 0.29                   |
|          | ----- | Back/B1              | 1720.0    | 132072 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.4      | 0.867                  | 1.00                   |
|          | ----- |                      | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.4      | 0.887                  | 1.02                   |
|          | ----- |                      | 1770.0    | 132571 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.7      | 0.874                  | 0.94                   |
|          | ----- | Back/B1              | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.8      | 0.719                  | 0.75                   |
|          | ----- | Back/B1              | 1745.0    | 132322 | 20 MHz/QPSK    | 100        | 0            | 1             | 22.7      | 0.682                  | 0.73                   |
|          | ----- | Back/B2              | 1745.0    | 132322 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.4      | 0.778                  | 0.89                   |
|          | ----- | Back/B2              | 1745.0    | 132322 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.8      | 0.630                  | 0.66                   |

**Body**  
**1.6 W/kg (mW/g)**  
 averaged over 1 gram

- SAR Measurement  
Phantom Configuration  
SAR Configuration
- Test Signal Call Mode
- Test Configuration
- Tissue Depth is at least 15.0 cm

- ☐ Left Head  
☐ Head  
☐ Test Code  
☐ With Belt Clip

- ☒ Eli4  
☒ Body  
☒ Base Station Simulator  
☐ Without Belt Clip ☒ N/A

- ☐ Right Head



Jay M. Moulton  
 Vice President

# SAR Data Summary – 1900 MHz Body – UMTS Band 2 – EM7565

## MEASUREMENT RESULTS

| Gap      | Plot  | Frequency |      | Modulation | Position/<br>Antenna | End<br>Power<br>(dBm) | RMC       | Test Set Up | Measured<br>SAR<br>(W/kg) | Reported<br>SAR<br>(W/kg) |
|----------|-------|-----------|------|------------|----------------------|-----------------------|-----------|-------------|---------------------------|---------------------------|
|          |       | MHz       | Ch.  |            |                      |                       |           |             |                           |                           |
| 10<br>mm | ----- | 1880.0    | 9400 | WCDMA      | Top/T1               | 23.91                 | 12.2 kbps | Test Loop 1 | 0.585                     | 0.60                      |
|          | ----- | 1880.0    | 9400 |            | Top/T2               | 23.91                 | 12.2 kbps | Test Loop 1 | 0.154                     | 0.16                      |
|          | ----- | 1880.0    | 9400 |            | Top/T3               | 23.91                 | 12.2 kbps | Test Loop 1 | 0.216                     | 0.22                      |
|          | ----- | 1880.0    | 9400 |            | Top/T4               | 23.91                 | 12.2 kbps | Test Loop 1 | 0.148                     | 0.15                      |
|          | ----- | 1880.0    | 9400 |            | Bottom/B1            | 23.91                 | 12.2 kbps | Test Loop 1 | 0.412                     | 0.42                      |
|          | ----- | 1880.0    | 9400 |            | Bottom/B2            | 23.91                 | 12.2 kbps | Test Loop 1 | 0.108                     | 0.11                      |
|          | ----- | 1880.0    | 9400 |            | Bottom/B3            | 23.91                 | 12.2 kbps | Test Loop 1 | 0.254                     | 0.26                      |
|          | ----- | 1880.0    | 9400 |            | Bottom/B4            | 23.91                 | 12.2 kbps | Test Loop 1 | 0.158                     | 0.16                      |
|          | ----- | 1880.0    | 9400 |            | Left/T1              | 23.91                 | 12.2 kbps | Test Loop 1 | 0.325                     | 0.33                      |
|          | ----- | 1880.0    | 9400 |            | Right/T2             | 23.91                 | 12.2 kbps | Test Loop 1 | 0.478                     | 0.49                      |
|          | ----- | 1880.0    | 9400 |            | Left/T3              | 23.91                 | 12.2 kbps | Test Loop 1 | 0.312                     | 0.32                      |
|          | ----- | 1880.0    | 9400 |            | Right/T4             | 23.91                 | 12.2 kbps | Test Loop 1 | 0.261                     | 0.27                      |
|          | ----- | 1880.0    | 9400 |            | Left/B1              | 23.91                 | 12.2 kbps | Test Loop 1 | 0.151                     | 0.15                      |
|          | ----- | 1880.0    | 9400 |            | Right/B2             | 23.91                 | 12.2 kbps | Test Loop 1 | 0.188                     | 0.19                      |
|          | ----- | 1880.0    | 9400 |            | Left/B3              | 23.91                 | 12.2 kbps | Test Loop 1 | 0.255                     | 0.26                      |
|          | ----- | 1880.0    | 9400 |            | Right/B4             | 23.91                 | 12.2 kbps | Test Loop 1 | 0.198                     | 0.20                      |
|          | ----- | 1880.0    | 9400 |            | Back/T1              | 23.91                 | 12.2 kbps | Test Loop 1 | 0.707                     | 0.72                      |
|          | 8     | 1852.4    | 9262 |            | Back/T2              | 23.76                 | 12.2 kbps | Test Loop 1 | 1.02                      | 1.08                      |
|          | ----- | 1880.0    | 9400 |            |                      | 23.91                 | 12.2 kbps | Test Loop 1 | 0.991                     | 1.01                      |
|          | ----- | 1907.6    | 9538 |            |                      | 23.80                 | 12.2 kbps | Test Loop 1 | 0.897                     | 0.94                      |
|          | ----- | 1880.0    | 9400 |            | Front/T3             | 23.91                 | 12.2 kbps | Test Loop 1 | 0.659                     | 0.67                      |
|          | ----- | 1880.0    | 9400 |            | Front/T4             | 23.91                 | 12.2 kbps | Test Loop 1 | 0.586                     | 0.60                      |
|          | ----- | 1880.0    | 9400 |            | Back/B1              | 23.91                 | 12.2 kbps | Test Loop 1 | 0.352                     | 0.36                      |
|          | ----- | 1880.0    | 9400 |            | Back/B2              | 23.91                 | 12.2 kbps | Test Loop 1 | 0.710                     | 0.73                      |
|          | ----- | 1880.0    | 9400 |            | Front/B3             | 23.91                 | 12.2 kbps | Test Loop 1 | 0.224                     | 0.23                      |
|          | ----- | 1880.0    | 9400 |            | Front/B4             | 23.91                 | 12.2 kbps | Test Loop 1 | 0.363                     | 0.37                      |
|          | ----- | 1852.4    | 9262 |            | Repeat               | 23.76                 | 12.2 kbps | Test Loop 1 | 1.00                      | 1.06                      |

**Body**  
**1.6 W/kg (mW/g)**  
averaged over 1 gram

- SAR Measurement  
Phantom Configuration ☐ Left Head ☒ Eli4 ☐ Right Head  
SAR Configuration ☐ Head ☒ Body
- Test Signal Call Mode ☐ Test Code ☒ Base Station Simulator
- Test Configuration ☐ With Belt Clip ☐ Without Belt Clip ☒ N/A
- Tissue Depth is at least 15.0 cm



Jay M. Moulton  
Vice President



## SAR Data Summary – 1900 MHz Body – UMTS Band 2 – EM7511

### MEASUREMENT RESULTS

| Gap      | Plot  | Frequency |      | Modulation | Position/<br>Antenna | End<br>Power                                    | RMC       | Test Set Up | Measured<br>SAR<br>(W/kg) | Reported<br>SAR<br>(W/kg) |
|----------|-------|-----------|------|------------|----------------------|-------------------------------------------------|-----------|-------------|---------------------------|---------------------------|
|          |       | MHz       | Ch.  |            |                      | (dBm)                                           |           |             |                           |                           |
| 10<br>mm | ----- | 1880.0    | 9400 | WCDMA      | Bottom/B1            | 23.89                                           | 12.2 kbps | Test Loop 1 | 0.292                     | 0.30                      |
|          | ----- | 1880.0    | 9400 |            | Bottom/B2            | 23.89                                           | 12.2 kbps | Test Loop 1 | 0.447                     | 0.46                      |
|          | ----- | 1880.0    | 9400 |            | Left/B1              | 23.89                                           | 12.2 kbps | Test Loop 1 | 0.281                     | 0.29                      |
|          | ----- | 1880.0    | 9400 |            | Right/B2             | 23.89                                           | 12.2 kbps | Test Loop 1 | 0.510                     | 0.52                      |
|          | ----- | 1880.0    | 9400 |            | Back/B1              | 23.89                                           | 12.2 kbps | Test Loop 1 | 0.701                     | 0.72                      |
|          | ----- | 1852.4    | 9262 |            | Back/B2              | 23.80                                           | 12.2 kbps | Test Loop 1 | 0.841                     | 0.88                      |
|          | ----- | 1880.0    | 9400 |            |                      | 23.89                                           | 12.2 kbps | Test Loop 1 | 0.911                     | 0.93                      |
|          | ----- | 1907.6    | 9538 |            |                      | 23.84                                           | 12.2 kbps | Test Loop 1 | 0.835                     | 0.87                      |
|          |       |           |      |            |                      |                                                 |           |             |                           |                           |
|          |       |           |      |            |                      | Body<br>1.6 W/kg (mW/g)<br>averaged over 1 gram |           |             |                           |                           |

#### 1. SAR Measurement

Phantom Configuration

☐ Left Head

☒ Eli4

☐ Right Head

SAR Configuration

☐ Head

☒ Body

#### 2. Test Signal Call Mode

☐ Test Code

☒ Base Station Simulator

#### 3. Test Configuration

☐ With Belt Clip

☐ Without Belt Clip ☒ N/A

#### 4. Tissue Depth is at least 15.0 cm



Jay M. Moulton  
Vice President



# SAR Data Summary –LTE Band 2 – EM7565

## MEASUREMENT RESULTS

| Gap      | Plot  | Position/<br>Antenna | Frequency |       | BW/ Modulation | RB<br>Size | RB<br>Offset | MPR<br>Target | End Power | Measured<br>SAR (W/kg) | Reported<br>SAR (W/kg) |
|----------|-------|----------------------|-----------|-------|----------------|------------|--------------|---------------|-----------|------------------------|------------------------|
|          |       |                      | MHz       | Ch.   |                |            |              |               | (dBm)     |                        |                        |
| 10<br>mm | ----- | Top/T1               | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.518                  | 0.54                   |
|          | ----- | Top/T1               | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.421                  | 0.45                   |
|          | ----- | Top/T2               | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.202                  | 0.21                   |
|          | ----- | Top/T2               | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.159                  | 0.17                   |
|          | ----- | Top/T3               | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.218                  | 0.23                   |
|          | ----- | Top/T3               | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.175                  | 0.19                   |
|          | ----- | Top/T4               | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.198                  | 0.21                   |
|          | ----- | Top/T4               | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.159                  | 0.17                   |
|          | ----- | Bottom/B1            | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.327                  | 0.34                   |
|          | ----- | Bottom/B1            | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.261                  | 0.28                   |
|          | ----- | Bottom/B2            | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.133                  | 0.14                   |
|          | ----- | Bottom/B2            | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.102                  | 0.11                   |
|          | ----- | Bottom/B3            | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.187                  | 0.20                   |
|          | ----- | Bottom/B3            | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.151                  | 0.16                   |
|          | ----- | Bottom/B4            | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.155                  | 0.16                   |
|          | ----- | Bottom/B4            | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.122                  | 0.13                   |
|          | ----- | Left/T1              | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.325                  | 0.34                   |
|          | ----- | Left/T1              | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.266                  | 0.29                   |
|          | ----- | Right/T2             | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.361                  | 0.38                   |
|          | ----- | Right/T2             | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.288                  | 0.31                   |
|          | ----- | Left/T3              | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.198                  | 0.21                   |
|          | ----- | Left/T3              | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.162                  | 0.17                   |
|          | ----- | Right/T4             | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.262                  | 0.27                   |
|          | ----- | Right/T4             | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.208                  | 0.22                   |
|          | ----- | Left/B1              | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.126                  | 0.13                   |
|          | ----- | Left/B1              | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.0994                 | 0.11                   |
|          | ----- | Right/B2             | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.158                  | 0.17                   |
|          | ----- | Right/B2             | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.130                  | 0.14                   |
|          | ----- | Left/B3              | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.204                  | 0.21                   |
|          | ----- | Left/B3              | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.164                  | 0.18                   |
|          | ----- | Right/B4             | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.138                  | 0.15                   |
|          | ----- | Right/B4             | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.108                  | 0.12                   |
|          | ----- | Back/T1              | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.725                  | 0.76                   |
|          | ----- | Back/T1              | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.587                  | 0.63                   |
|          | ----- | Back/T2              | 1860.0    | 18700 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.6      | 1.02                   | 1.12                   |
|          | ----- |                      | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 1.01                   | 1.06                   |
|          | 9     | Back/T2              | 1900.0    | 19100 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.7      | 1.04                   | 1.11                   |
|          | ----- |                      | 1860.0    | 18700 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.4      | 0.827                  | 0.95                   |
|          | ----- |                      | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.818                  | 0.88                   |
|          | ----- |                      | 1900.0    | 19100 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.843                  | 0.90                   |
|          | ----- | Back/T2              | 1880.0    | 18900 | 20 MHz/QPSK    | 100        | 0            | 1             | 22.4      | 0.779                  | 0.89                   |
|          | ----- | Front/T3             | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.404                  | 0.42                   |
|          | ----- | Front/T3             | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.331                  | 0.35                   |
|          | ----- | Front/T4             | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.512                  | 0.54                   |
|          | ----- | Front/T4             | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.419                  | 0.45                   |
|          | ----- | Back/B1              | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.323                  | 0.34                   |
|          | ----- | Back/B1              | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.261                  | 0.28                   |
|          | ----- | Back/B2              | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.548                  | 0.57                   |
|          | ----- | Back/B2              | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.446                  | 0.48                   |
|          | ----- | Front/B3             | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.518                  | 0.54                   |
|          | ----- | Front/B3             | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.421                  | 0.45                   |
|          | ----- | Front/B4             | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.8      | 0.323                  | 0.34                   |
|          | ----- | Front/B4             | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.7      | 0.258                  | 0.28                   |
|          | ----- | Repeat               | 1900.0    | 19100 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.7      | 1.02                   | 1.09                   |

Body  
1.6 W/kg (mW/g)  
averaged over 1 gram

- SAR Measurement Phantom Configuration
- Test Signal Call Mode
- Test Configuration
- Tissue Depth is at least 15.0 cm

☐ Left Head  
☐ Head  
☐ Test Code  
☐ With Belt Clip

☒ Eli4  
☒ Body  
☒ Base Station Simulator  
☐ Without Belt Clip

☐ Right Head  
☒ N/A

Jay M. Moulton  
Vice President

## SAR Data Summary –LTE Band 2 – EM7511

### MEASUREMENT RESULTS

| Gap                                                           | Plot  | Position/<br>Antenna | Frequency |       | BW/ Modulation | RB<br>Size | RB<br>Offset | MPR<br>Target | End Power | Measured<br>SAR (W/kg) | Reported<br>SAR (W/kg) |
|---------------------------------------------------------------|-------|----------------------|-----------|-------|----------------|------------|--------------|---------------|-----------|------------------------|------------------------|
|                                                               |       |                      | MHz       | Ch.   |                |            |              |               | (dBm)     |                        |                        |
| 10<br>mm                                                      | ----- | Bottom/B1            | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.4      | 0.296                  | 0.34                   |
|                                                               | ----- | Bottom/B1            | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.9      | 0.241                  | 0.25                   |
|                                                               | ----- | Bottom/B2            | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.4      | 0.412                  | 0.47                   |
|                                                               | ----- | Bottom/B2            | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.9      | 0.329                  | 0.34                   |
|                                                               | ----- | Left/B1              | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.4      | 0.198                  | 0.23                   |
|                                                               | ----- | Left/B1              | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.9      | 0.159                  | 0.16                   |
|                                                               | ----- | Right/B2             | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.4      | 0.354                  | 0.41                   |
|                                                               | ----- | Right/B2             | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.9      | 0.285                  | 0.29                   |
|                                                               | ----- | Back/B1              | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.4      | 0.654                  | 0.75                   |
|                                                               | ----- | Back/B1              | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.9      | 0.521                  | 0.53                   |
|                                                               | ----- | Back/B2              | 1880.0    | 18900 | 20 MHz/QPSK    | 1          | 49           | 0             | 23.4      | 0.682                  | 0.78                   |
|                                                               | ----- | Back/B2              | 1880.0    | 18900 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.9      | 0.549                  | 0.56                   |
| <b>Body</b><br><b>1.6 W/kg (mW/g)</b><br>averaged over 1 gram |       |                      |           |       |                |            |              |               |           |                        |                        |

- SAR Measurement Phantom Configuration
- Test Signal Call Mode
- Test Configuration
- Tissue Depth is at least 15.0 cm

☐ Left Head  
☐ Head  
☐ Test Code  
☐ With Belt Clip

☒ Eli4  
☒ Body  
☒ Base Station Simulator  
☐ Without Belt Clip

☐ Right Head  
☒ N/A



Jay M. Moulton  
 Vice President

# SAR Data Summary –LTE Band 7

## MEASUREMENT RESULTS

| Gap      | Plot  | Position/<br>Antenna | Frequency |       | BW/ Modulation | RB Size | RB<br>Offset | MPR Target | End Power<br>(dBm) | Measured SAR<br>(W/kg) | Reported SAR<br>(W/kg) |
|----------|-------|----------------------|-----------|-------|----------------|---------|--------------|------------|--------------------|------------------------|------------------------|
|          |       |                      | MHz       | Ch.   |                |         |              |            |                    |                        |                        |
| 10<br>mm | ----- | Top/T1               | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.571                  | 0.57                   |
|          | ----- | Top/T1               | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.564                  | 0.58                   |
|          | ----- | Top/T2               | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.486                  | 0.49                   |
|          | ----- | Top/T2               | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.386                  | 0.40                   |
|          | ----- | Top/T3               | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.656                  | 0.66                   |
|          | ----- | Top/T3               | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.533                  | 0.55                   |
|          | ----- | Top/T4               | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.617                  | 0.62                   |
|          | ----- | Top/T4               | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.491                  | 0.50                   |
|          | ----- | Bottom/B1            | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.609                  | 0.61                   |
|          | ----- | Bottom/B1            | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.495                  | 0.51                   |
|          | ----- | Bottom/B2            | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.403                  | 0.40                   |
|          | ----- | Bottom/B2            | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.328                  | 0.34                   |
|          | ----- | Bottom/B3            | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.540                  | 0.54                   |
|          | ----- | Bottom/B3            | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.434                  | 0.44                   |
|          | ----- | Bottom/B4            | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.372                  | 0.37                   |
|          | ----- | Bottom/B4            | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.299                  | 0.31                   |
|          | ----- | Left/T1              | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.135                  | 0.14                   |
|          | ----- | Left/T1              | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.107                  | 0.11                   |
|          | ----- | Right/T2             | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.130                  | 0.13                   |
|          | ----- | Right/T2             | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.105                  | 0.11                   |
|          | ----- | Left/T3              | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.164                  | 0.16                   |
|          | ----- | Left/T3              | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.130                  | 0.13                   |
|          | ----- | Right/T4             | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.159                  | 0.16                   |
|          | ----- | Right/T4             | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.128                  | 0.13                   |
|          | ----- | Left/B1              | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.163                  | 0.16                   |
|          | ----- | Left/B1              | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.134                  | 0.14                   |
|          | ----- | Right/B2             | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.162                  | 0.16                   |
|          | ----- | Right/B2             | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.132                  | 0.14                   |
|          | ----- | Left/B3              | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.184                  | 0.18                   |
|          | ----- | Left/B3              | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.145                  | 0.15                   |
|          | ----- | Right/B4             | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.169                  | 0.17                   |
|          | ----- | Right/B4             | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.135                  | 0.14                   |
|          | ----- | Back/T1              | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.627                  | 0.63                   |
|          | ----- | Back/T1              | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.508                  | 0.52                   |
|          | ----- | Back/T2              | 2510      | 20850 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 1.09                   | 1.09                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 1.13                   | 1.13                   |
|          | ----- | Back/T2              | 2560      | 21350 | 20 MHz/QPSK    | 1       | 49           | 0          | 22.5               | 0.952                  | 1.07                   |
|          | ----- |                      | 2510      | 20850 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.7               | 0.885                  | 0.95                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.905                  | 0.93                   |
|          | ----- |                      | 2560      | 21350 | 20 MHz/QPSK    | 50      | 24           | 1          | 22.0               | 0.871                  | 0.87                   |
|          | ----- | Back/T2              | 2535      | 21100 | 20 MHz/QPSK    | 100     | 0            | 1          | 21.5               | 0.803                  | 0.90                   |
|          | ----- | Front/T3             | 2510      | 20850 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.827                  | 0.83                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.860                  | 0.86                   |
|          | ----- |                      | 2560      | 21350 | 20 MHz/QPSK    | 1       | 49           | 0          | 22.5               | 0.803                  | 0.90                   |
|          | ----- | Front/T3             | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.700                  | 0.72                   |
|          | ----- | Front/T3             | 2535      | 21100 | 20 MHz/QPSK    | 100     | 0            | 1          | 21.5               | 0.659                  | 0.74                   |
|          | ----- | Front/T4             | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.653                  | 0.65                   |
|          | ----- | Front/T4             | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.526                  | 0.54                   |
|          | ----- | Back/B1              | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.460                  | 0.46                   |
|          | ----- | Back/B1              | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.370                  | 0.38                   |
|          | ----- | Back/B2              | 2510      | 20850 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 1.07                   | 1.07                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 1.09                   | 1.09                   |
|          | ----- |                      | 2560      | 21350 | 20 MHz/QPSK    | 1       | 49           | 0          | 22.5               | 0.941                  | 1.06                   |
|          | ----- |                      | 2510      | 20850 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.7               | 0.958                  | 1.03                   |
|          | ----- | Back/B2              | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 1.02                   | 1.04                   |
|          | ----- |                      | 2560      | 21350 | 20 MHz/QPSK    | 50      | 24           | 1          | 22.0               | 0.917                  | 0.92                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 100     | 0            | 1          | 21.5               | 0.869                  | 0.98                   |
|          | ----- | Front/B3             | 2510      | 20850 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.994                  | 0.99                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 1.01                   | 1.01                   |
|          | ----- |                      | 2560      | 21350 | 20 MHz/QPSK    | 1       | 49           | 0          | 22.5               | 0.94                   | 1.05                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.738                  | 0.76                   |
|          | ----- | Front/B3             | 2535      | 21100 | 20 MHz/QPSK    | 100     | 0            | 1          | 21.5               | 0.675                  | 0.76                   |
|          | ----- | Front/B4             | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 0.643                  | 0.64                   |
|          | ----- | Front/B4             | 2535      | 21100 | 20 MHz/QPSK    | 50      | 24           | 1          | 21.9               | 0.553                  | 0.57                   |
|          | ----- | Repeat               | 2535      | 21100 | 20 MHz/QPSK    | 1       | 49           | 0          | 23.0               | 1.11                   | 1.11                   |

Body  
1.6 W/kg (mW/g)  
averaged over 1 gram

- SAR Measurement Phantom Configuration
- Test Signal Call Mode
- Test Configuration
- Tissue Depth is at least 15.0 cm

☐ Left Head  
☐ Head  
☐ Test Code  
☐ With Belt Clip

☒ Eli4  
☒ Base Station Simulator  
☐ Without Belt Clip

☐ Right Head  
☒ Body  
☒ N/A



Jay M. Moulton  
Vice President

# SAR Data Summary –LTE Band 7 – EM7511

## MEASUREMENT RESULTS

| Gap      | Plot  | Position/<br>Antenna | Frequency |       | BW/ Modulation | RB<br>Size | RB<br>Offset | MPR<br>Target | End Power | Measured<br>SAR (W/kg) | Reported<br>SAR (W/kg) |
|----------|-------|----------------------|-----------|-------|----------------|------------|--------------|---------------|-----------|------------------------|------------------------|
|          |       |                      | MHz       | Ch.   |                |            |              |               | (dBm)     |                        |                        |
| 10<br>mm | ----- | Bottom/B1            | 2510      | 20850 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.8      | 1.04                   | 1.09                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.5      | 0.865                  | 0.97                   |
|          | ----- |                      | 2560      | 21350 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.8      | 1.01                   | 1.06                   |
|          | ----- | Bottom/B1            | 2510      | 20850 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.933                  | 0.96                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.998                  | 1.02                   |
|          | ----- |                      | 2560      | 21350 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.0      | 0.911                  | 0.91                   |
|          | ----- | Bottom/B1            | 2535      | 21100 | 20 MHz/QPSK    | 100        | 0            | 1             | 21.6      | 0.897                  | 0.98                   |
|          | ----- |                      | 2510      | 20850 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.8      | 1.07                   | 1.12                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.5      | 0.921                  | 1.03                   |
|          | ----- | Bottom/B2            | 2560      | 21350 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.8      | 0.961                  | 1.08                   |
|          | ----- |                      | 2510      | 20850 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.964                  | 0.99                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.874                  | 0.89                   |
|          | ----- | Bottom/B2            | 2560      | 21350 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.0      | 0.940                  | 0.94                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 100        | 0            | 1             | 21.6      | 0.823                  | 0.90                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.5      | 0.290                  | 0.33                   |
|          | ----- | Left/B1              | 2535      | 21100 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.235                  | 0.24                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.5      | 0.269                  | 0.30                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.222                  | 0.23                   |
|          | ----- | Right/B2             | 2510      | 20850 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.8      | 0.864                  | 0.91                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.5      | 0.900                  | 1.01                   |
|          | ----- |                      | 2560      | 21350 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.8      | 0.803                  | 0.84                   |
|          | ----- | Back/B1              | 2535      | 21100 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.726                  | 0.74                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 100        | 0            | 1             | 21.6      | 0.684                  | 0.75                   |
|          | ----- |                      | 2510      | 20850 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.8      | 0.967                  | 0.80                   |
|          | ----- | Back/B2              | 2535      | 21100 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.5      | 1.01                   | 0.90                   |
|          | ----- |                      | 2560      | 21350 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.8      | 1.01                   | 1.06                   |
|          | ----- |                      | 2510      | 20850 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.809                  | 1.04                   |
|          | ----- | Back/B2              | 2535      | 21100 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.846                  | 1.09                   |
|          | ----- |                      | 2560      | 21350 | 20 MHz/QPSK    | 50         | 24           | 1             | 22.0      | 0.842                  | 0.84                   |
|          | ----- |                      | 2535      | 21100 | 20 MHz/QPSK    | 100        | 0            | 1             | 21.6      | 0.765                  | 0.84                   |

**Body**  
1.6 W/kg (mW/g)  
averaged over 1 gram

- SAR Measurement Phantom Configuration
- Test Signal Call Mode
- Test Configuration
- Tissue Depth is at least 15.0 cm

- ☐ Left Head  
☐ Head  
☐ Test Code  
☐ With Belt Clip

- ☒ Eli4  
☒ Body  
☒ Base Station Simulator  
☐ Without Belt Clip

☐ Right Head

☒ N/A



Jay M. Moulton  
Vice President

# SAR Data Summary –LTE Band 41 – EM7565

## MEASUREMENT RESULTS

| Gap      | Plot  | Position/<br>Antenna | Frequency |       | BW/ Modulation | RB<br>Size | RB<br>Offset | MPR<br>Target | End Power | Measured<br>SAR (W/kg) | Reported<br>SAR (W/kg) |
|----------|-------|----------------------|-----------|-------|----------------|------------|--------------|---------------|-----------|------------------------|------------------------|
|          |       |                      | MHz       | Ch.   |                |            |              |               | (dBm)     |                        |                        |
| 10<br>mm | ----- | Top/T1               | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.326                  | 0.35                   |
|          | ----- | Top/T1               | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.268                  | 0.29                   |
|          | ----- | Top/T2               | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.185                  | 0.20                   |
|          | ----- | Top/T2               | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.151                  | 0.17                   |
|          | ----- | Top/T3               | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.254                  | 0.27                   |
|          | ----- | Top/T3               | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.203                  | 0.22                   |
|          | ----- | Top/T4               | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.256                  | 0.27                   |
|          | ----- | Top/T4               | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.206                  | 0.23                   |
|          | ----- | Bottom/B1            | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.301                  | 0.32                   |
|          | ----- | Bottom/B1            | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.245                  | 0.27                   |
|          | ----- | Bottom/B2            | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.249                  | 0.27                   |
|          | ----- | Bottom/B2            | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.202                  | 0.22                   |
|          | ----- | Bottom/B3            | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.192                  | 0.21                   |
|          | ----- | Bottom/B3            | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.157                  | 0.17                   |
|          | ----- | Bottom/B4            | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.204                  | 0.22                   |
|          | ----- | Bottom/B4            | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.164                  | 0.18                   |
|          | ----- | Left/T1              | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.0624                 | 0.07                   |
|          | ----- | Left/T1              | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.0417                 | 0.05                   |
|          | ----- | Right/T2             | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.0519                 | 0.06                   |
|          | ----- | Right/T2             | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.0414                 | 0.05                   |
|          | ----- | Left/T3              | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.0390                 | 0.04                   |
|          | ----- | Left/T3              | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.0306                 | 0.03                   |
|          | ----- | Right/T4             | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.0632                 | 0.07                   |
|          | ----- | Right/T4             | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.0548                 | 0.06                   |
|          | ----- | Left/B1              | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.0877                 | 0.09                   |
|          | ----- | Left/B1              | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.0720                 | 0.08                   |
|          | ----- | Right/B2             | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.0762                 | 0.08                   |
|          | ----- | Right/B2             | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.0621                 | 0.07                   |
|          | ----- | Left/B3              | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.0698                 | 0.08                   |
|          | ----- | Left/B3              | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.0567                 | 0.06                   |
|          | ----- | Right/B4             | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.0786                 | 0.08                   |
|          | ----- | Right/B4             | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.0657                 | 0.07                   |
|          | ----- | Back/T1              | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.253                  | 0.27                   |
|          | ----- | Back/T1              | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.206                  | 0.23                   |
|          | ----- | Back/T2              | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.390                  | 0.42                   |
|          | ----- | Back/T2              | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.304                  | 0.33                   |
|          | ----- | Front/T3             | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.229                  | 0.25                   |
|          | ----- | Front/T3             | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.186                  | 0.20                   |
|          | ----- | Front/T4             | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.247                  | 0.26                   |
|          | ----- | Front/T4             | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.200                  | 0.22                   |
|          | ----- | Back/B1              | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.278                  | 0.30                   |
|          | ----- | Back/B1              | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.225                  | 0.25                   |
|          | ----- | Back/B2              | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.483                  | 0.52                   |
|          | ----- | Back/B2              | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.373                  | 0.41                   |
|          | ----- | Front/B3             | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.376                  | 0.40                   |
|          | ----- | Front/B3             | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.304                  | 0.33                   |
|          | ----- | Front/B4             | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.7      | 0.285                  | 0.31                   |
|          | ----- | Front/B4             | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.6      | 0.246                  | 0.27                   |

Body  
1.6 W/kg (mW/g)  
averaged over 1 gram

- SAR Measurement  
Phantom Configuration  
SAR Configuration
- Test Signal Call Mode
- Test Configuration
- Tissue Depth is at least 15.0 cm

- ☐ Left Head  
☐ Head  
☐ Test Code  
☐ With Belt Clip

- ☒ Eli4  
☒ Body  
☒ Base Station Simulator  
☐ Without Belt Clip ☒ N/A

- ☐ Right Head



Jay M. Moulton  
Vice President

## SAR Data Summary –LTE Band 41 – EM7511

### MEASUREMENT RESULTS

| Gap      | Plot  | Position/<br>Antenna | Frequency |       | BW/ Modulation | RB<br>Size | RB<br>Offset | MPR<br>Target | End Power | Measured<br>SAR (W/kg) | Reported<br>SAR (W/kg) |
|----------|-------|----------------------|-----------|-------|----------------|------------|--------------|---------------|-----------|------------------------|------------------------|
|          |       |                      | MHz       | Ch.   |                |            |              |               | (dBm)     |                        |                        |
| 10<br>mm | ----- | Bottom/B1            | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.419                  | 0.46                   |
|          | ----- | Bottom/B1            | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.4      | 0.405                  | 0.47                   |
|          | 11    | Bottom/B2            | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.550                  | 0.60                   |
|          | ----- | Bottom/B2            | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.4      | 0.437                  | 0.50                   |
|          | ----- | Left/B1              | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.114                  | 0.13                   |
|          | ----- | Left/B1              | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.4      | 0.093                  | 0.11                   |
|          | ----- | Right/B2             | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.112                  | 0.12                   |
|          | ----- | Right/B2             | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.4      | 0.089                  | 0.10                   |
|          | ----- | Back/B1              | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.292                  | 0.32                   |
|          | ----- | Back/B1              | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.4      | 0.239                  | 0.27                   |
|          | ----- | Back/B2              | 2593      | 40620 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.420                  | 0.46                   |
|          | ----- | Back/B2              | 2593      | 40620 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.4      | 0.341                  | 0.39                   |

Body  
1.6 W/kg (mW/g)  
averaged over 1 gram

- SAR Measurement Phantom Configuration
- Test Signal Call Mode
- Test Configuration
- Tissue Depth is at least 15.0 cm

- ☐ Left Head  
☐ Head  
☐ Test Code  
☐ With Belt Clip

- ☒ Eli4  
☒ Body  
☒ Base Station Simulator  
☐ Without Belt Clip ☒ N/A

- ☐ Right Head



Jay M. Moulton  
Vice President

# SAR Data Summary –LTE Band 48 – EM7565

## MEASUREMENT RESULTS

| Gap      | Plot  | Position/<br>Antenna | Frequency |       | BW/ Modulation | RB<br>Size | RB<br>Offset | MPR<br>Target | End Power | Measured<br>SAR (W/kg) | Reported<br>SAR (W/kg) |
|----------|-------|----------------------|-----------|-------|----------------|------------|--------------|---------------|-----------|------------------------|------------------------|
|          |       |                      | MHz       | Ch.   |                |            |              |               | (dBm)     |                        |                        |
| 10<br>mm | ----- | Top/T1               | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.187                  | 0.21                   |
|          | ----- | Top/T1               | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0998                 | 0.10                   |
|          | ----- | Top/T2               | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.0855                 | 0.09                   |
|          | ----- | Top/T2               | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0368                 | 0.04                   |
|          | ----- | Top/T3               | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.108                  | 0.12                   |
|          | ----- | Top/T3               | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0516                 | 0.05                   |
|          | ----- | Top/T4               | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.200                  | 0.22                   |
|          | ----- | Top/T4               | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.103                  | 0.11                   |
|          | ----- | Bottom/B1            | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.128                  | 0.14                   |
|          | ----- | Bottom/B1            | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0643                 | 0.07                   |
|          | ----- | Bottom/B2            | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.0691                 | 0.08                   |
|          | ----- | Bottom/B2            | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0329                 | 0.03                   |
|          | ----- | Bottom/B3            | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.0523                 | 0.06                   |
|          | ----- | Bottom/B3            | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0119                 | 0.01                   |
|          | ----- | Bottom/B4            | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.157                  | 0.17                   |
|          | ----- | Bottom/B4            | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0819                 | 0.08                   |
|          | ----- | Left/T1              | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.198                  | 0.22                   |
|          | ----- | Left/T1              | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0474                 | 0.05                   |
|          | ----- | Right/T2             | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.204                  | 0.22                   |
|          | ----- | Right/T2             | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.107                  | 0.11                   |
|          | ----- | Left/T3              | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.199                  | 0.22                   |
|          | ----- | Left/T3              | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.102                  | 0.10                   |
|          | ----- | Right/T4             | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.177                  | 0.19                   |
|          | ----- | Right/T4             | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0908                 | 0.09                   |
|          | ----- | Left/B1              | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.186                  | 0.20                   |
|          | ----- | Left/B1              | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0991                 | 0.10                   |
|          | ----- | Right/B2             | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.197                  | 0.22                   |
|          | ----- | Right/B2             | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.101                  | 0.10                   |
|          | ----- | Left/B3              | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.206                  | 0.23                   |
|          | ----- | Left/B3              | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.107                  | 0.11                   |
|          | ----- | Right/B4             | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.179                  | 0.20                   |
|          | ----- | Right/B4             | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0902                 | 0.09                   |
|          | ----- | Back/T1              | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.179                  | 0.20                   |
|          | ----- | Back/T1              | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0884                 | 0.09                   |
|          | ----- | Back/T2              | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.140                  | 0.15                   |
|          | ----- | Back/T2              | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0697                 | 0.07                   |
|          | ----- | Front/T3             | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.149                  | 0.16                   |
|          | ----- | Front/T3             | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0753                 | 0.08                   |
|          | ----- | Front/T4             | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.169                  | 0.19                   |
|          | ----- | Front/T4             | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0852                 | 0.09                   |
|          | ----- | Back/B1              | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.104                  | 0.11                   |
|          | ----- | Back/B1              | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0567                 | 0.06                   |
|          | 12    | Back/B2              | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.211                  | 0.23                   |
|          | ----- | Back/B2              | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.108                  | 0.11                   |
|          | ----- | Front/B3             | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.177                  | 0.19                   |
|          | ----- | Front/B3             | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.0925                 | 0.09                   |
|          | ----- | Front/B4             | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.6      | 0.138                  | 0.15                   |
|          | ----- | Front/B4             | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.9      | 0.062                  | 0.06                   |

Body  
1.6 W/kg (mW/g)  
averaged over 1 gram

- SAR Measurement Phantom Configuration SAR Configuration
- Test Signal Call Mode
- Test Configuration
- Tissue Depth is at least 15.0 cm

☐ Left Head  
☐ Head  
☐ Test Code  
☐ With Belt Clip

☒ Eli4  
☒ Body  
☒ Base Station Simulator  
☐ Without Belt Clip ☒ N/A

☐ Right Head



Jay M. Moulton  
Vice President



## SAR Data Summary –LTE Band 48 – EM7511

### MEASUREMENT RESULTS

| Gap                                                           | Plot  | Position/<br>Antenna | Frequency |       | BW/ Modulation | RB<br>Size | RB<br>Offset | MPR<br>Target | End Power | Measured<br>SAR (W/kg) | Reported<br>SAR (W/kg) |
|---------------------------------------------------------------|-------|----------------------|-----------|-------|----------------|------------|--------------|---------------|-----------|------------------------|------------------------|
|                                                               |       |                      | MHz       | Ch.   |                |            |              |               | (dBm)     |                        |                        |
| 10<br>mm                                                      | ----- | Bottom/B1            | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.4      | 0.103                  | 0.12                   |
|                                                               | ----- | Bottom/B1            | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.8      | 0.0572                 | 0.06                   |
|                                                               | ----- | Bottom/B2            | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.4      | 0.0572                 | 0.07                   |
|                                                               | ----- | Bottom/B2            | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.8      | 0.0297                 | 0.03                   |
|                                                               | ----- | Left/B1              | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.4      | 0.171                  | 0.20                   |
|                                                               | ----- | Left/B1              | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.8      | 0.0877                 | 0.09                   |
|                                                               | ----- | Right/B2             | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.4      | 0.148                  | 0.17                   |
|                                                               | ----- | Right/B2             | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.8      | 0.0962                 | 0.10                   |
|                                                               | ----- | Back/B1              | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.4      | 0.0903                 | 0.10                   |
|                                                               | ----- | Back/B1              | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.8      | 0.0481                 | 0.05                   |
|                                                               | ----- | Back/B2              | 3625      | 55990 | 20 MHz/QPSK    | 1          | 49           | 0             | 22.4      | 0.189                  | 0.22                   |
|                                                               | ----- | Back/B2              | 3625      | 55990 | 20 MHz/QPSK    | 50         | 24           | 1             | 21.8      | 0.0967                 | 0.10                   |
| <b>Body</b><br><b>1.6 W/kg (mW/g)</b><br>averaged over 1 gram |       |                      |           |       |                |            |              |               |           |                        |                        |

- SAR Measurement Phantom Configuration
- Test Signal Call Mode
- Test Configuration
- Tissue Depth is at least 15.0 cm

☐ Left Head  
☐ Head  
☐ Test Code  
☐ With Belt Clip

☒ Eli4  
☒ Body  
☒ Base Station Simulator  
☐ Without Belt Clip ☒ N/A

☐ Right Head



Jay M. Moulton  
 Vice President

## SAR Data Summary – 2450 MHz Body 802.11b

### MEASUREMENT RESULTS

| Plot  | Gap  | Position | Frequency |     | Modulation | Antenna | End Power | Measured SAR (W/kg) | Reported SAR (W/kg) |
|-------|------|----------|-----------|-----|------------|---------|-----------|---------------------|---------------------|
|       |      |          | MHz       | Ch. |            |         | (dBm)     |                     |                     |
| 13    | 0 mm | Bottom   | 2437      | 6   | DSSS       | Tx0     | 20.00     | 0.737               | 0.83                |
| ----- |      |          | 2462      | 11  | DSSS       |         | 20.00     | 0.687               | 0.77                |
| ----- |      | Top      | 2437      | 6   | DSSS       | Tx1     | 20.00     | 0.293               | 0.33                |

**Body**  
**1.6 W/kg (mW/g)**  
averaged over 1 gram

- Battery is fully charged for all tests.  
Power Measured ☒ Conducted ☐ ERP ☐ EIRP
- SAR Measurement  
Phantom Configuration ☐ Left Head ☒ Eli4 ☐ Right Head  
SAR Configuration ☐ Head ☒ Body
- Test Signal Call Mode ☒ Test Code ☐ Base Station Simulator
- Test Configuration ☐ With Belt Clip ☐ Without Belt Clip ☒ N/A
- Tissue Depth is at least 15.0 cm

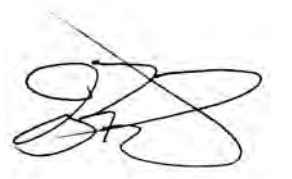


Jay M. Moulton  
Vice President

# SAR Data Summary – 5250 MHz Body 802.11a

| MEASUREMENT RESULTS |      |          |           |     |                                                 |         |           |                     |                     |
|---------------------|------|----------|-----------|-----|-------------------------------------------------|---------|-----------|---------------------|---------------------|
| Plot                | Gap  | Position | Frequency |     | Modulation                                      | Antenna | End Power | Measured SAR (W/kg) | Reported SAR (W/kg) |
|                     |      |          | MHz       | Ch. |                                                 |         | (dBm)     |                     |                     |
| 14                  | 0 mm | Bottom   | 5300      | 60  | OFDM                                            | Tx0     | 18.00     | 0.00422             | 0.01                |
| -----               |      | Top      | 5300      | 60  | OFDM                                            | Tx1     | 18.00     | 0.00315             | 0.01                |
|                     |      |          |           |     | Body<br>1.6 W/kg (mW/g)<br>averaged over 1 gram |         |           |                     |                     |

- Battery is fully charged for all tests.  
Power Measured ☒ Conducted ☐ ERP ☐ EIRP
- SAR Measurement  
Phantom Configuration ☐ Left Head ☒ Eli4 ☐ Right Head  
SAR Configuration ☐ Head ☒ Body
- Test Signal Call Mode ☒ Test Code ☐ Base Station Simulator
- Test Configuration ☐ With Belt Clip ☐ Without Belt Clip ☒ N/A
- Tissue Depth is at least 15.0 cm



Jay M. Moulton  
Vice President

## SAR Data Summary – 5600 MHz Body 802.11a

### MEASUREMENT RESULTS

| Plot | Gap  | Position | Frequency |     | Modulation | Antenna | End Power | Measured SAR (W/kg) | Reported SAR (W/kg) |
|------|------|----------|-----------|-----|------------|---------|-----------|---------------------|---------------------|
|      |      |          | MHz       | Ch. |            |         | (dBm)     |                     |                     |
| 15   | 0 mm | Bottom   | 5620      | 124 | OFDM       | Tx0     | 18.00     | 0.0031              | 0.01                |
| ---- |      | Top      | 5620      | 124 | OFDM       | Tx1     | 18.00     | 0.0023              | 0.01                |

**Body**  
**1.6 W/kg (mW/g)**  
averaged over 1 gram

- Battery is fully charged for all tests.  
Power Measured ☒ Conducted ☐ ERP ☐ EIRP
- SAR Measurement  
Phantom Configuration ☐ Left Head ☒ Eli4 ☐ Right Head  
SAR Configuration ☐ Head ☒ Body
- Test Signal Call Mode ☒ Test Code ☐ Base Station Simulator
- Test Configuration ☐ With Belt Clip ☐ Without Belt Clip ☒ N/A
- Tissue Depth is at least 15.0 cm



Jay M. Moulton  
Vice President

# SAR Data Summary – 5800 MHz Body 802.11a

| MEASUREMENT RESULTS |      |          |           |     |                                                                            |         |           |                     |                     |
|---------------------|------|----------|-----------|-----|----------------------------------------------------------------------------|---------|-----------|---------------------|---------------------|
| Plot                | Gap  | Position | Frequency |     | Modulation                                                                 | Antenna | End Power | Measured SAR (W/kg) | Reported SAR (W/kg) |
|                     |      |          | MHz       | Ch. |                                                                            |         | (dBm)     |                     |                     |
| 16                  | 0 mm | Bottom   | 5785      | 157 | OFDM                                                                       | Tx0     | 18.00     | 0.00271             | 0.01                |
| -----               |      | Top      | 5785      | 157 | OFDM                                                                       | Tx1     | 18.00     | 0.00136             | 0.01                |
|                     |      |          |           |     | <div>Body</div> <div>1.6 W/kg (mW/g)</div> <div>averaged over 1 gram</div> |         |           |                     |                     |

- Battery is fully charged for all tests.  
Power Measured ☒ Conducted ☐ ERP ☐ EIRP
- SAR Measurement  
Phantom Configuration ☐ Left Head ☒ Eli4 ☐ Right Head  
SAR Configuration ☐ Head ☒ Body
- Test Signal Call Mode ☒ Test Code ☐ Base Station Simulator
- Test Configuration ☐ With Belt Clip ☐ Without Belt Clip ☒ N/A
- Tissue Depth is at least 15.0 cm



Jay M. Moulton  
Vice President

## SAR Data Summary – Simultaneous Evaluation

The cellular antennas can transmit simultaneously with each other and with the WiFi antennas. The highest SAR value measured for each side/antenna was used to determine the simultaneous for each side. All values listed in red are estimated values based on the formula in KDB447498 D01 v06 section 4.3.2 b) on page 14. Using the highest reported SAR to calculate the simultaneous Tx using sum of two pairs each side (per KDB447498 D01 v06 section 4.3.2 c), the highlighted pairs produce the worst case simultaneous which is above the limit of 1.6 W/kg. If the pair that is evaluated meets the simultaneous SPLSR limit all other pairs will also meet the requirement. Therefore, only the highlighted pairs were evaluated. The highest value is 0.04 which meets the requirements of KDB 447498 D01 v06 section 4.3.2 c) on page 15. The calculation is shown below.

| Side   | T1   | T2   | T3   | T4   | B1   | B2   | B3   | B4   | WiFi |
|--------|------|------|------|------|------|------|------|------|------|
| Top    | 0.60 | 0.49 | 0.66 | 0.62 | 0.40 | 0.40 | 0.40 | 0.40 | 0.33 |
| Bottom | 0.40 | 0.40 | 0.40 | 0.40 | 1.09 | 1.12 | 0.54 | 0.37 | 0.83 |
| Left   | 0.34 | 0.40 | 0.66 | 0.40 | 0.42 | 0.40 | 0.44 | 0.40 | 0.40 |
| Right  | 0.40 | 0.51 | 0.40 | 0.46 | 0.40 | 0.55 | 0.40 | 0.27 | 0.40 |
| Back   | 0.83 | 1.13 | 0.40 | 0.40 | 1.02 | 1.09 | 0.40 | 0.40 | 0.40 |
| Front  | 0.40 | 0.40 | 0.90 | 0.65 | 0.40 | 0.40 | 1.05 | 0.64 | 0.40 |

### MEASUREMENT RESULTS –

| Position | Antenna | Maxima |         |       | Antenna | Maxima |        |       | SAR <sub>1</sub> | SAR <sub>2</sub> | SAR Total |
|----------|---------|--------|---------|-------|---------|--------|--------|-------|------------------|------------------|-----------|
|          |         | X      | Y       | Z     |         | X      | Y      | Z     |                  |                  |           |
| Bottom1  | B1      | -25.00 | 46.00   | -0.91 | B2      | -20.00 | -56.00 | -0.68 | 1.09             | 1.12             | 2.21      |
| Back1    | T1      | 39.43  | 71.40   | -2.19 | T2      | -40.99 | 102.00 | -2.04 | 0.83             | 1.13             | 1.96      |
| Back2    | B1      | -43.50 | -90.50  | -0.29 | B2      | 48.00  | -98.00 | -1.70 | 1.02             | 1.09             | 2.11      |
| Front    | B3      | 43.94  | -102.99 | -2.28 | B4      | -44.07 | -97.97 | -2.02 | 1.05             | 0.64             | 1.69      |
| Bottom   | WiFi    | -5.00  | 5.00    | -3.57 | B2      | -20.00 | -56.00 | -0.68 | 0.83             | 1.12             | 1.95      |

Body  
1.6 W/kg (mW/g)  
averaged over 1 gram

Bottom1 – 102.12 mm SPLSR=0.03  
Back1 – 86.05 mm SPLSR=0.03  
Back2 – 91.82 mm SPLSR=0.03  
Front – 88.15 mm SPLSR=0.02  
Bottom2 – 62.88 mm SPLSR=0.04

Simultaneous Separation Ratio Calculation

$$(SAR_1 + SAR_2)^{1.5}/R_i \leq 0.04 \text{ rounded to two digits}$$

Simultaneous Separation Ratio Calculation

$$(SAR_1 + SAR_2)^{1.5}/R_i \leq 0.04 \text{ rounded to two digits}$$

$$(1.09 + 1.12)^{1.5}/102.12 = 0.03, \text{ for the Bottom1}$$

$$(0.83 + 1.13)^{1.5}/86.05 = 0.03, \text{ for the Back1}$$

$$(1.02 + 1.09)^{1.5}/91.82 = 0.03, \text{ for the Back2}$$

$$(1.05 + 0.64)^{1.5}/88.15 = 0.02, \text{ for the Front}$$

$$(0.83 + 1.12)^{1.5}/62.88 = 0.04, \text{ for the Bottom2}$$

## 12. Test Equipment List

**Table 12.1 Equipment Specifications**

| Type                                          | Calibration Due Date | Calibration Done Date | Serial Number    |
|-----------------------------------------------|----------------------|-----------------------|------------------|
| Staubli Robot TX60L                           | N/A                  | N/A                   | F07/55M6A1/A/01  |
| Measurement Controller CS8c                   | N/A                  | N/A                   | 1012             |
| ELI4 & ELI5 Flat Phantom                      | N/A                  | N/A                   | 1065, 2037, 1251 |
| Device Holder                                 | N/A                  | N/A                   | N/A              |
| Data Acquisition Electronics 4                | 08/14/2020           | 08/14/2019            | 759              |
| Data Acquisition Electronics 4                | 01/10/2020           | 01/10/2019            | 1321             |
| Data Acquisition Electronics 4                | 04/16/2020           | 04/16/2019            | 1416             |
| SPEAG E-Field Probe EX3DV4                    | 04/24/2020           | 04/24/2019            | 3662             |
| SPEAG E-Field Probe EX3DV4                    | 08/20/2020           | 08/20/2019            | 3693             |
| SPEAG E-Field Probe EX3DV4                    | 06/03/2020           | 06/03/2019            | 7531             |
| Speag Validation Dipole D750V3                | 07/13/2020           | 07/13/2018            | 1016             |
| Speag Validation Dipole D835V2                | 07/13/2020           | 07/13/2018            | 4d089            |
| Speag Validation Dipole D1750V2               | 07/20/2020           | 07/20/2018            | 1018             |
| Speag Validation Dipole D1900V2               | 07/13/2020           | 07/13/2018            | 5d116            |
| Speag Validation Dipole D2450V2               | 07/12/2020           | 07/12/2018            | 829              |
| Speag Validation Dipole D2550V2               | 07/12/2020           | 07/12/2018            | 1003             |
| Speag Validation Dipole D3500V2               | 04/13/2020           | 04/13/2018            | 1061             |
| Speag Validation Dipole D3700V2               | 04/13/2020           | 04/13/2018            | 1024             |
| Speag Validation Dipole D5GHzV2               | 07/19/2020           | 07/19/2018            | 1085             |
| Agilent N1911A Power Meter                    | 04/27/2020           | 04/27/2019            | GB45100254       |
| Agilent N1922A Power Sensor                   | 04/27/2020           | 04/27/2019            | MY45240464       |
| Advantest R3261A Spectrum Analyzer            | 03/25/2020           | 03/25/2019            | 31720068         |
| Agilent (HP) 8350B Signal Generator           | 03/20/2020           | 03/20/2019            | 2749A10226       |
| Agilent (HP) 83525A RF Plug-In                | 03/20/2020           | 03/20/2019            | 2647A01172       |
| Agilent (HP) 8753C Vector Network Analyzer    | 03/20/2020           | 03/20/2019            | 3135A01724       |
| Agilent (HP) 85047A S-Parameter Test Set      | 03/20/2020           | 03/20/2019            | 2904A00595       |
| Agilent (HP) 8960 Base Station Sim.           | 03/19/2020           | 03/19/2019            | MY48360364       |
| Anritsu MT8820C                               | 01/26/2020           | 01/26/2019            | 6201176199       |
| Agilent 778D Dual Directional Coupler         | N/A                  | N/A                   | MY48220184       |
| MiniCircuits BW-N20W5+ Fixed 20 dB Attenuator | N/A                  | N/A                   | N/A              |
| MiniCircuits SPL-10.7+ Low Pass Filter        | N/A                  | N/A                   | R8979513746      |
| Apriel Dielectric Probe Assembly              | N/A                  | N/A                   | 0011             |
| Head Equivalent Matter (750 MHz)              | N/A                  | N/A                   | N/A              |
| Head Equivalent Matter (835 MHz)              | N/A                  | N/A                   | N/A              |
| Head Equivalent Matter (1750 MHz)             | N/A                  | N/A                   | N/A              |
| Head Equivalent Matter (1900 MHz)             | N/A                  | N/A                   | N/A              |
| Head Equivalent Matter (2450 MHz)             | N/A                  | N/A                   | N/A              |
| Head Equivalent Matter (2550 MHz)             | N/A                  | N/A                   | N/A              |
| Head Equivalent Matter (3-6 GHz)              | N/A                  | N/A                   | N/A              |



### 13. Conclusion

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC/IC. These measurements are taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The tested device complies with the requirements in respect to all parameters subject to the test. The test results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body is a very complex phenomena that depends on the mass, shape, and size of the body; the orientation of the body with respect to the field vectors; and, the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because innumerable factors may interact to determine the specific biological outcome of an exposure to electromagnetic fields, any protection guide shall consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

## 14. References

- [1] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radio Frequency Radiation, August 1996
- [2] ANSI/IEEE C95.1 – 1992, American National Standard Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300kHz to 100GHz, New York: IEEE, 1992.
- [3] ANSI/IEEE C95.3 – 2002, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave, New York: IEEE, 2002.
- [4] International Electrotechnical Commission, IEC 62209-2 (Edition 1.0), Human Exposure to radio frequency fields from hand-held and body mounted wireless communication devices – Human models, instrumentation, and procedures – Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz), March 2010.
- [5] IEEE Standard 1528 – 2013, IEEE Recommended Practice for Determining the Peak-Spatial Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communication Devices: Measurement Techniques, June 2013.
- [6] Industry Canada, RSS – 102 Issue 5, Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands), March 2015.
- [7] Health Canada, Safety Code 6, Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3kHz to 300 GHz, 2009.

## Appendix A – System Validation Plots and Data

\*\*\*\*\*

Test Result for UIM Dielectric Parameter

Mon 07/Oct/2019

Freq Frequency(GHz)

FCC\_eH Limits for Head Epsilon

FCC\_sH Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

| Freq   | FCC_eH | FCC_sH | Test_e | Test_s |
|--------|--------|--------|--------|--------|
| 0.7000 | 42.20  | 0.89   | 41.76  | 0.86   |
| 0.7040 | 42.18  | 0.89   | 41.732 | 0.864* |
| 0.7075 | 42.163 | 0.89   | 41.708 | 0.868* |
| 0.7100 | 42.15  | 0.89   | 41.69  | 0.87   |
| 0.7110 | 42.10  | 0.89   | 41.685 | 0.871* |
| 0.7200 | 42.10  | 0.89   | 41.64  | 0.88   |
| 0.7300 | 42.05  | 0.89   | 41.57  | 0.89   |
| 0.7400 | 41.99  | 0.89   | 41.51  | 0.89   |
| 0.7500 | 41.94  | 0.89   | 41.46  | 0.90   |
| 0.7600 | 41.89  | 0.89   | 41.40  | 0.91   |
| 0.7700 | 41.84  | 0.89   | 41.34  | 0.92   |
| 0.7800 | 41.79  | 0.90   | 41.28  | 0.92   |
| 0.7820 | 41.778 | 0.90   | 41.268 | 0.922* |
| 0.7900 | 41.73  | 0.90   | 41.22  | 0.93   |

\* value interpolated

\*\*\*\*\*

Test Result for UIM Dielectric Parameter

Wed 16/Oct/2019

Freq Frequency(GHz)

FCC\_eH Limits for Head Epsilon

FCC\_sH Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

| Freq   | FCC_eH | FCC_sH | Test_e | Test_s |
|--------|--------|--------|--------|--------|
| 0.7000 | 42.20  | 0.89   | 41.49  | 0.85   |
| 0.7040 | 42.18  | 0.89   | 41.462 | 0.854* |
| 0.7075 | 42.163 | 0.89   | 41.438 | 0.858* |
| 0.7100 | 42.15  | 0.89   | 41.42  | 0.86   |
| 0.7110 | 42.145 | 0.89   | 41.415 | 0.861* |
| 0.7200 | 42.10  | 0.89   | 41.37  | 0.87   |
| 0.7300 | 42.05  | 0.89   | 41.30  | 0.88   |
| 0.7400 | 41.99  | 0.89   | 41.24  | 0.88   |
| 0.7500 | 41.94  | 0.89   | 41.19  | 0.89   |
| 0.7600 | 41.89  | 0.89   | 41.13  | 0.90   |
| 0.7700 | 41.84  | 0.89   | 41.07  | 0.91   |
| 0.7800 | 41.79  | 0.90   | 41.01  | 0.91   |
| 0.7820 | 41.778 | 0.90   | 40.998 | 0.912* |
| 0.7900 | 41.73  | 0.90   | 40.95  | 0.92   |
| 0.7930 | 41.715 | 0.90   | 40.938 | 0.92*  |
| 0.8000 | 41.68  | 0.90   | 40.91  | 0.92   |

\* value interpolated

\*\*\*\*\*

# Test Result for UIM Dielectric Parameter

Thu 10/Oct/2019

Freq Frequency(GHz)

eH Limits for Head Epsilon

sH Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

| Freq   | eH     | sH    | Test_e | Test_s |
|--------|--------|-------|--------|--------|
| 0.8000 | 41.68  | 0.90  | 41.52  | 0.89   |
| 0.8100 | 41.63  | 0.90  | 41.47  | 0.90   |
| 0.8190 | 41.585 | 0.90  | 41.416 | 0.909* |
| 0.8200 | 41.58  | 0.90  | 41.41  | 0.91   |
| 0.8264 | 41.548 | 0.90  | 41.442 | 0.91*  |
| 0.8300 | 41.53  | 0.90  | 41.46  | 0.91   |
| 0.8315 | 41.526 | 0.902 | 41.456 | 0.912* |
| 0.8350 | 41.515 | 0.905 | 41.445 | 0.915* |
| 0.8366 | 41.51  | 0.907 | 41.44  | 0.917* |
| 0.8400 | 41.50  | 0.91  | 41.43  | 0.92   |
| 0.8440 | 41.50  | 0.914 | 41.422 | 0.924* |
| 0.8466 | 41.50  | 0.917 | 41.417 | 0.927* |
| 0.8500 | 41.50  | 0.92  | 41.41  | 0.93   |
| 0.8600 | 41.50  | 0.93  | 41.39  | 0.94   |
| 0.8700 | 41.50  | 0.94  | 41.38  | 0.95   |

\* value interpolated

\*\*\*\*\*

# Test Result for UIM Dielectric Parameter

Thu 17/Oct/2019

Freq Frequency(GHz)

eH Limits for Head Epsilon

sH Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

| Freq   | eH     | sH    | Test_e | Test_s |
|--------|--------|-------|--------|--------|
| 0.8000 | 41.68  | 0.90  | 41.20  | 0.90   |
| 0.8100 | 41.63  | 0.90  | 41.15  | 0.91   |
| 0.8190 | 41.585 | 0.90  | 41.096 | 0.919* |
| 0.8200 | 41.58  | 0.90  | 41.09  | 0.92   |
| 0.8264 | 41.548 | 0.90  | 41.122 | 0.92*  |
| 0.8300 | 41.53  | 0.90  | 41.14  | 0.92   |
| 0.8315 | 41.526 | 0.902 | 41.136 | 0.922* |
| 0.8350 | 41.515 | 0.905 | 41.125 | 0.925* |
| 0.8366 | 41.51  | 0.907 | 41.12  | 0.927* |
| 0.8400 | 41.50  | 0.91  | 41.11  | 0.93   |
| 0.8440 | 41.50  | 0.914 | 41.102 | 0.934* |
| 0.8466 | 41.50  | 0.917 | 41.097 | 0.937* |
| 0.8500 | 41.50  | 0.92  | 41.09  | 0.94   |
| 0.8600 | 41.50  | 0.93  | 41.07  | 0.95   |
| 0.8700 | 41.50  | 0.94  | 41.06  | 0.96   |

\* value interpolated

\*\*\*\*\*

# Test Result for UIM Dielectric Parameter

Tue 15/Oct/2019

Freq Frequency(GHz)

eH Limits for Head Epsilon

sH Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

| Freq   | eH     | sH    | Test_e | Test_s |
|--------|--------|-------|--------|--------|
| 1.7000 | 40.16  | 1.34  | 40.03  | 1.35   |
| 1.7100 | 40.14  | 1.35  | 40.01  | 1.36   |
| 1.7124 | 40.138 | 1.35  | 40.005 | 1.362* |
| 1.7200 | 40.13  | 1.35  | 39.99  | 1.37   |
| 1.7300 | 40.11  | 1.36  | 39.97  | 1.37   |
| 1.7326 | 40.105 | 1.363 | 39.965 | 1.373* |
| 1.7400 | 40.09  | 1.37  | 39.95  | 1.38   |
| 1.7450 | 40.085 | 1.37  | 39.94  | 1.385* |
| 1.7500 | 40.08  | 1.37  | 39.93  | 1.39   |
| 1.7526 | 40.075 | 1.373 | 39.925 | 1.393* |
| 1.7600 | 40.06  | 1.38  | 39.91  | 1.40   |
| 1.7700 | 40.05  | 1.38  | 39.89  | 1.41   |
| 1.7800 | 40.03  | 1.39  | 39.87  | 1.41   |
| 1.7900 | 40.02  | 1.39  | 39.85  | 1.42   |

\* value interpolated

\*\*\*\*\*

# Test Result for UIM Dielectric Parameter

Sat 19/Oct/2019

Freq Frequency(GHz)

eH Limits for Head Epsilon

sH Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

| Freq   | eH     | sH    | Test_e | Test_s |
|--------|--------|-------|--------|--------|
| 1.7000 | 40.16  | 1.34  | 39.71  | 1.38   |
| 1.7100 | 40.14  | 1.35  | 39.69  | 1.39   |
| 1.7124 | 40.138 | 1.35  | 39.685 | 1.392* |
| 1.7200 | 40.13  | 1.35  | 39.67  | 1.40   |
| 1.7300 | 40.11  | 1.36  | 39.65  | 1.40   |
| 1.7326 | 40.105 | 1.363 | 39.645 | 1.403* |
| 1.7400 | 40.09  | 1.37  | 39.63  | 1.41   |
| 1.7450 | 40.085 | 1.37  | 39.62  | 1.415* |
| 1.7500 | 40.08  | 1.37  | 39.61  | 1.42   |
| 1.7526 | 40.075 | 1.373 | 39.605 | 1.423* |
| 1.7600 | 40.06  | 1.38  | 39.59  | 1.43   |
| 1.7700 | 40.05  | 1.38  | 39.57  | 1.44   |
| 1.7800 | 40.03  | 1.39  | 39.55  | 1.44   |
| 1.7900 | 40.02  | 1.39  | 39.53  | 1.45   |

\* value interpolated

\*\*\*\*\*

# Test Result for UIM Dielectric Parameter

Sat 19/Oct/2019

Freq Frequency(GHz)

FCC\_eH Limits for Head Epsilon

FCC\_sH Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

| Freq   | FCC_eH | FCC_sH | Test_e | Test_s |
|--------|--------|--------|--------|--------|
| 1.8500 | 40.00  | 1.40   | 40.43  | 1.38   |
| 1.8524 | 40.00  | 1.40   | 40.425 | 1.382* |
| 1.8600 | 40.00  | 1.40   | 40.41  | 1.39   |
| 1.8700 | 40.00  | 1.40   | 40.39  | 1.40   |
| 1.8800 | 40.00  | 1.40   | 40.38  | 1.41   |
| 1.8900 | 40.00  | 1.40   | 40.37  | 1.41   |
| 1.9000 | 40.00  | 1.40   | 40.37  | 1.43   |
| 1.9076 | 40.00  | 1.40   | 40.355 | 1.438* |
| 1.9100 | 40.00  | 1.40   | 40.35  | 1.44   |

\*value interpolated

\*\*\*\*\*

# Test Result for UIM Dielectric Parameter

Mon 21/Oct/2019

Freq Frequency(GHz)

eH Limits for Head Epsilon

sH Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

| Freq   | eH    | sH   | Test_e | Test_s |
|--------|-------|------|--------|--------|
| 1.8500 | 40.00 | 1.40 | 39.97  | 1.37   |
| 1.8524 | 40.00 | 1.40 | 39.965 | 1.372* |
| 1.8600 | 40.00 | 1.40 | 39.95  | 1.38   |
| 1.8700 | 40.00 | 1.40 | 39.93  | 1.38   |
| 1.8800 | 40.00 | 1.40 | 39.91  | 1.39   |
| 1.8900 | 40.00 | 1.40 | 39.89  | 1.39   |
| 1.9000 | 40.00 | 1.40 | 39.87  | 1.39   |
| 1.9076 | 40.00 | 1.40 | 39.855 | 1.398* |
| 1.9100 | 40.00 | 1.40 | 39.85  | 1.40   |

\* value interpolated

\*\*\*\*\*

# Test Result for UIM Dielectric Parameter

Wed 23/Oct/2019

Freq Frequency(GHz)

FCC\_eH Limits for Head Epsilon

FCC\_sH Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

| Freq   | FCC_eH | FCC_sH | Test_e | Test_s |
|--------|--------|--------|--------|--------|
| 2.4900 | 39.15  | 1.84   | 39.09  | 1.86   |
| 2.5000 | 39.14  | 1.85   | 39.07  | 1.87   |
| 2.5060 | 39.128 | 1.862  | 39.052 | 1.876* |
| 2.5100 | 39.12  | 1.87   | 39.04  | 1.88   |
| 2.5200 | 39.11  | 1.88   | 39.02  | 1.90   |
| 2.5300 | 39.10  | 1.89   | 39.00  | 1.91   |
| 2.5350 | 39.095 | 1.895  | 38.985 | 1.915* |
| 2.5400 | 39.09  | 1.90   | 38.97  | 1.92   |
| 2.5500 | 39.07  | 1.91   | 38.95  | 1.94   |
| 2.5600 | 39.06  | 1.92   | 38.93  | 1.95   |
| 2.5700 | 39.05  | 1.93   | 38.90  | 1.96   |
| 2.5800 | 39.03  | 1.94   | 38.88  | 1.98   |
| 2.5900 | 39.02  | 1.95   | 38.85  | 1.99   |
| 2.5930 | 39.017 | 1.953  | 38.853 | 1.99*  |
| 2.6000 | 39.01  | 1.96   | 38.86  | 1.99   |
| 2.6100 | 39.00  | 1.97   | 38.84  | 2.00   |
| 2.6200 | 38.98  | 1.99   | 38.83  | 2.01   |
| 2.6300 | 38.97  | 2.00   | 38.81  | 2.02   |
| 2.6400 | 38.96  | 2.01   | 38.79  | 2.03   |
| 2.6500 | 38.95  | 2.02   | 38.77  | 2.04   |
| 2.6600 | 38.93  | 2.03   | 38.76  | 2.05   |
| 2.6700 | 38.92  | 2.04   | 38.74  | 2.06   |
| 2.6800 | 38.91  | 2.05   | 38.72  | 2.07   |
| 2.6900 | 38.89  | 2.06   | 38.70  | 2.08   |
| 2.7000 | 38.88  | 2.07   | 38.69  | 2.09   |

\* value interpolated

\*\*\*\*\*

# Test Result for UIM Dielectric Parameter

Wed 23/Oct/2019

Freq Frequency(GHz)

FCC\_eH Limits for Head Epsilon

FCC\_sH Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

| Freq   | FCC_eH | FCC_sH | Test_e | Test_s |
|--------|--------|--------|--------|--------|
| 2.4900 | 39.15  | 1.84   | 39.02  | 1.84   |
| 2.5000 | 39.14  | 1.85   | 39.01  | 1.85   |
| 2.5060 | 39.128 | 1.862  | 39.004 | 1.862* |
| 2.5100 | 39.12  | 1.87   | 39.00  | 1.87   |
| 2.5200 | 39.11  | 1.88   | 38.98  | 1.89   |
| 2.5300 | 39.10  | 1.89   | 38.97  | 1.90   |
| 2.5350 | 39.095 | 1.895  | 38.965 | 1.905* |
| 2.5400 | 39.09  | 1.90   | 38.96  | 1.91   |
| 2.5500 | 39.07  | 1.91   | 38.94  | 1.92   |
| 2.5600 | 39.06  | 1.92   | 38.93  | 1.93   |
| 2.5700 | 39.05  | 1.93   | 38.92  | 1.94   |
| 2.5800 | 39.03  | 1.94   | 38.90  | 1.95   |
| 2.5900 | 39.02  | 1.95   | 38.89  | 1.96   |
| 2.5930 | 39.017 | 1.953  | 38.887 | 1.963* |
| 2.6000 | 39.01  | 1.96   | 38.88  | 1.97   |
| 2.6100 | 39.00  | 1.97   | 38.86  | 1.98   |
| 2.6200 | 38.98  | 1.99   | 38.84  | 1.99   |
| 2.6300 | 38.97  | 2.00   | 38.82  | 2.00   |
| 2.6400 | 38.96  | 2.01   | 38.80  | 2.01   |
| 2.6500 | 38.95  | 2.02   | 38.78  | 2.02   |
| 2.6600 | 38.93  | 2.03   | 38.75  | 2.03   |
| 2.6700 | 38.92  | 2.04   | 38.73  | 2.04   |
| 2.6800 | 38.91  | 2.05   | 38.71  | 2.05   |
| 2.6900 | 38.89  | 2.06   | 38.68  | 2.06   |
| 2.7000 | 38.88  | 2.07   | 38.66  | 2.07   |

\* value interpolated



\*\*\*\*\*

Test Result for UIM Dielectric Parameter

Fri 25/Oct/2019

Freq Frequency(GHz)

FCC\_eH Limits for Head Epsilon

FCC\_sH Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

| Freq   | FCC_eH | FCC_sH | Test_e | Test_s |
|--------|--------|--------|--------|--------|
| 3.5000 | 37.93  | 2.91   | 37.41  | 2.92   |
| 3.5100 | 37.92  | 2.92   | 37.40  | 2.93   |
| 3.5200 | 37.91  | 2.93   | 37.39  | 2.94   |
| 3.5300 | 37.89  | 2.94   | 37.37  | 2.95   |
| 3.5400 | 37.88  | 2.95   | 37.35  | 2.96   |
| 3.5500 | 37.87  | 2.96   | 37.34  | 2.97   |
| 3.5600 | 37.86  | 2.97   | 37.33  | 2.98   |
| 3.5700 | 37.85  | 2.98   | 37.31  | 2.99   |
| 3.5800 | 37.84  | 2.99   | 37.29  | 3.00   |
| 3.5900 | 37.83  | 3.00   | 37.28  | 3.01   |
| 3.6000 | 37.81  | 3.02   | 37.26  | 3.02   |
| 3.6100 | 37.80  | 3.03   | 37.24  | 3.03   |
| 3.6200 | 37.79  | 3.04   | 37.23  | 3.04   |
| 3.6250 | 37.785 | 3.045  | 37.225 | 3.045* |
| 3.6300 | 37.78  | 3.05   | 37.22  | 3.05   |
| 3.6400 | 37.77  | 3.06   | 37.20  | 3.06   |
| 3.6500 | 37.76  | 3.07   | 37.19  | 3.07   |
| 3.6600 | 37.74  | 3.08   | 37.18  | 3.08   |
| 3.6700 | 37.73  | 3.09   | 37.16  | 3.09   |
| 3.6800 | 37.72  | 3.10   | 37.15  | 3.10   |
| 3.6900 | 37.71  | 3.11   | 37.14  | 3.11   |
| 3.7000 | 37.70  | 3.13   | 37.12  | 3.12   |
| 3.7100 | 37.69  | 3.14   | 37.11  | 3.13   |

\* value interpolated

\*\*\*\*\*

# Test Result for UIM Dielectric Parameter

Mon 28/Oct/2019

Freq Frequency(GHz)

FCC\_eH Limits for Head Epsilon

FCC\_sH Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

| Freq   | FCC_eH | FCC_sH | Test_e | Test_s |
|--------|--------|--------|--------|--------|
| 3.5000 | 37.93  | 2.91   | 37.59  | 2.93   |
| 3.5100 | 37.92  | 2.92   | 37.58  | 2.94   |
| 3.5200 | 37.91  | 2.93   | 37.57  | 2.95   |
| 3.5300 | 37.89  | 2.94   | 37.55  | 2.96   |
| 3.5400 | 37.88  | 2.95   | 37.53  | 2.97   |
| 3.5500 | 37.87  | 2.96   | 37.52  | 2.98   |
| 3.5600 | 37.86  | 2.97   | 37.51  | 2.99   |
| 3.5700 | 37.85  | 2.98   | 37.49  | 3.00   |
| 3.5800 | 37.84  | 2.99   | 37.47  | 3.01   |
| 3.5900 | 37.83  | 3.00   | 37.46  | 3.02   |
| 3.6000 | 37.81  | 3.02   | 37.44  | 3.03   |
| 3.6100 | 37.80  | 3.03   | 37.42  | 3.04   |
| 3.6200 | 37.79  | 3.04   | 37.41  | 3.05   |
| 3.6250 | 37.785 | 3.045  | 37.405 | 3.055* |
| 3.6300 | 37.78  | 3.05   | 37.40  | 3.06   |
| 3.6400 | 37.77  | 3.06   | 37.38  | 3.07   |
| 3.6500 | 37.76  | 3.07   | 37.37  | 3.08   |
| 3.6600 | 37.74  | 3.08   | 37.36  | 3.09   |
| 3.6700 | 37.73  | 3.09   | 37.34  | 3.10   |
| 3.6800 | 37.72  | 3.10   | 37.33  | 3.11   |
| 3.6900 | 37.71  | 3.11   | 37.32  | 3.12   |
| 3.7000 | 37.70  | 3.13   | 37.30  | 3.13   |
| 3.7100 | 37.69  | 3.14   | 37.29  | 3.14   |

\* value interpolated

\*\*\*\*\*

# Test Result for UIM Dielectric Parameter

Fri 25/Oct/2019

Freq Frequency(GHz)

FCC\_eH Limits for Head Epsilon

FCC\_sH Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

| Freq   | FCC_eH | FCC_sH | Test_e | Test_s |
|--------|--------|--------|--------|--------|
| 2.4100 | 39.26  | 1.76   | 39.06  | 1.79   |
| 2.4120 | 39.258 | 1.762  | 39.056 | 1.792* |
| 2.4200 | 39.25  | 1.77   | 39.04  | 1.80   |
| 2.4300 | 39.24  | 1.78   | 39.02  | 1.81   |
| 2.4370 | 39.226 | 1.787  | 39.013 | 1.824* |
| 2.4400 | 39.22  | 1.79   | 39.01  | 1.83   |
| 2.4420 | 39.216 | 1.792  | 39.00  | 1.832* |
| 2.4500 | 39.20  | 1.80   | 38.96  | 1.84   |
| 2.4600 | 39.19  | 1.81   | 38.96  | 1.85   |
| 2.4620 | 39.186 | 1.812  | 38.956 | 1.852* |
| 2.4700 | 39.17  | 1.82   | 38.94  | 1.86   |
| 2.4720 | 39.168 | 1.822  | 38.936 | 1.866* |
| 2.4800 | 39.16  | 1.83   | 38.92  | 1.89   |

\* value interpolated

\*\*\*\*\*

# Test Result for UIM Dielectric Parameter

Fri 25/Oct/2019

Freq Frequency(GHz)

FCC\_eH Limits for Head Epsilon

FCC\_sH Limits for Head Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

| Freq   | FCC_eH | FCC_sH | Test_e | Test_s |
|--------|--------|--------|--------|--------|
| 5.1000 | 36.10  | 4.55   | 36.12  | 4.64   |
| 5.1200 | 36.08  | 4.57   | 36.10  | 4.66   |
| 5.1400 | 36.05  | 4.59   | 36.07  | 4.68   |
| 5.1600 | 36.03  | 4.61   | 36.05  | 4.71   |
| 5.1800 | 36.01  | 4.63   | 36.03  | 4.73   |
| 5.2000 | 35.99  | 4.65   | 36.00  | 4.75   |
| 5.2200 | 35.96  | 4.68   | 35.98  | 4.77   |
| 5.2400 | 35.94  | 4.70   | 35.96  | 4.79   |
| 5.2500 | 35.93  | 4.71   | 35.945 | 4.805* |
| 5.2600 | 35.92  | 4.72   | 35.93  | 4.82   |
| 5.2800 | 35.89  | 4.74   | 35.90  | 4.84   |
| 5.3000 | 35.87  | 4.76   | 35.87  | 4.86   |
| 5.3200 | 35.85  | 4.78   | 35.85  | 4.88   |
| 5.3400 | 35.83  | 4.80   | 35.83  | 4.91   |
| 5.3600 | 35.80  | 4.82   | 35.81  | 4.93   |
| 5.3800 | 35.78  | 4.84   | 35.78  | 4.95   |
| 5.4000 | 35.76  | 4.86   | 35.76  | 4.97   |
| 5.4200 | 35.73  | 4.88   | 35.74  | 5.00   |
| 5.4400 | 35.71  | 4.90   | 35.73  | 5.02   |
| 5.4600 | 35.69  | 4.92   | 35.70  | 5.04   |
| 5.4800 | 35.67  | 4.94   | 35.67  | 5.06   |
| 5.5000 | 35.64  | 4.96   | 35.64  | 5.08   |
| 5.5200 | 35.62  | 4.98   | 35.62  | 5.10   |
| 5.5400 | 35.60  | 5.00   | 35.60  | 5.12   |
| 5.5600 | 35.57  | 5.02   | 35.58  | 5.15   |
| 5.5800 | 35.55  | 5.04   | 35.55  | 5.17   |
| 5.6000 | 35.53  | 5.07   | 35.53  | 5.19   |
| 5.6200 | 35.51  | 5.09   | 35.50  | 5.21   |
| 5.6400 | 35.48  | 5.11   | 35.48  | 5.24   |
| 5.6600 | 35.46  | 5.13   | 35.46  | 5.26   |
| 5.6800 | 35.44  | 5.15   | 35.44  | 5.28   |
| 5.7000 | 35.41  | 5.17   | 35.41  | 5.30   |
| 5.7200 | 35.39  | 5.19   | 35.39  | 5.33   |
| 5.7400 | 35.37  | 5.21   | 35.37  | 5.35   |
| 5.7450 | 35.365 | 5.215  | 35.365 | 5.355* |
| 5.7500 | 35.36  | 5.22   | 35.36  | 5.36*  |
| 5.7600 | 35.35  | 5.23   | 35.35  | 5.37   |
| 5.7800 | 35.32  | 5.25   | 35.33  | 5.39   |
| 5.7850 | 35.315 | 5.255  | 35.32  | 5.395* |
| 5.8000 | 35.30  | 5.27   | 35.29  | 5.41   |
| 5.8200 | 35.28  | 5.29   | 35.27  | 5.44   |
| 5.8250 | 35.273 | 5.295  | 35.265 | 5.445* |
| 5.8400 | 35.25  | 5.31   | 35.25  | 5.46   |
| 5.8600 | 35.23  | 5.33   | 35.23  | 5.48   |

\* value interpolated

# RF Exposure Lab

## Plot 1

**DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN 1016**

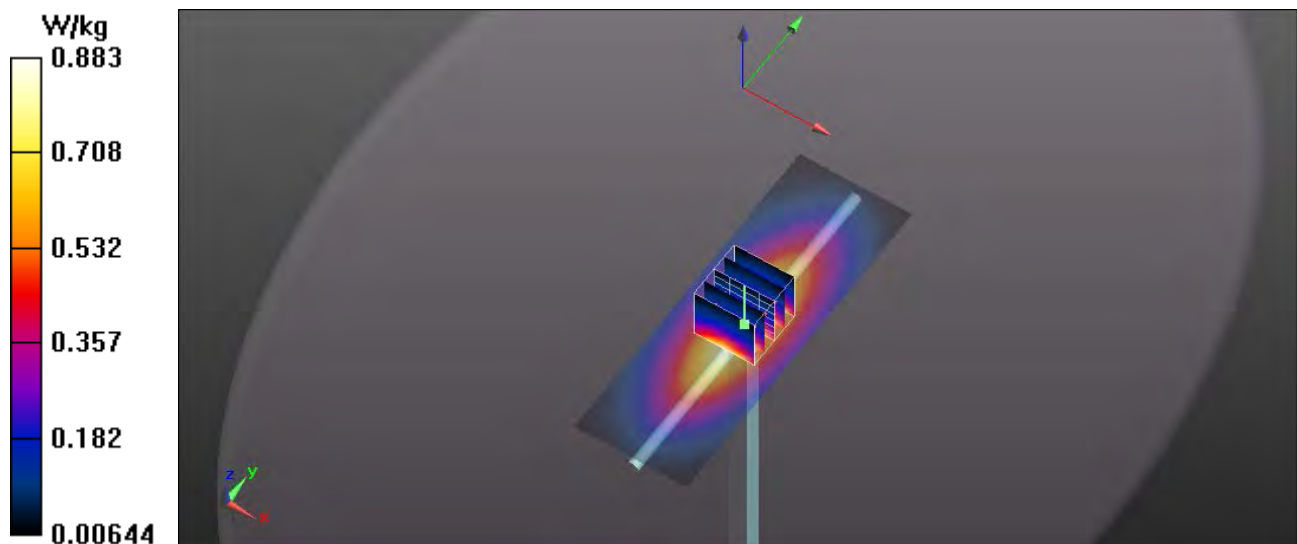
Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1  
Medium: HSL750; Medium parameters used (interpolated):  $f = 750$  MHz;  $\sigma = 0.9$  S/m;  $\epsilon_r = 41.46$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

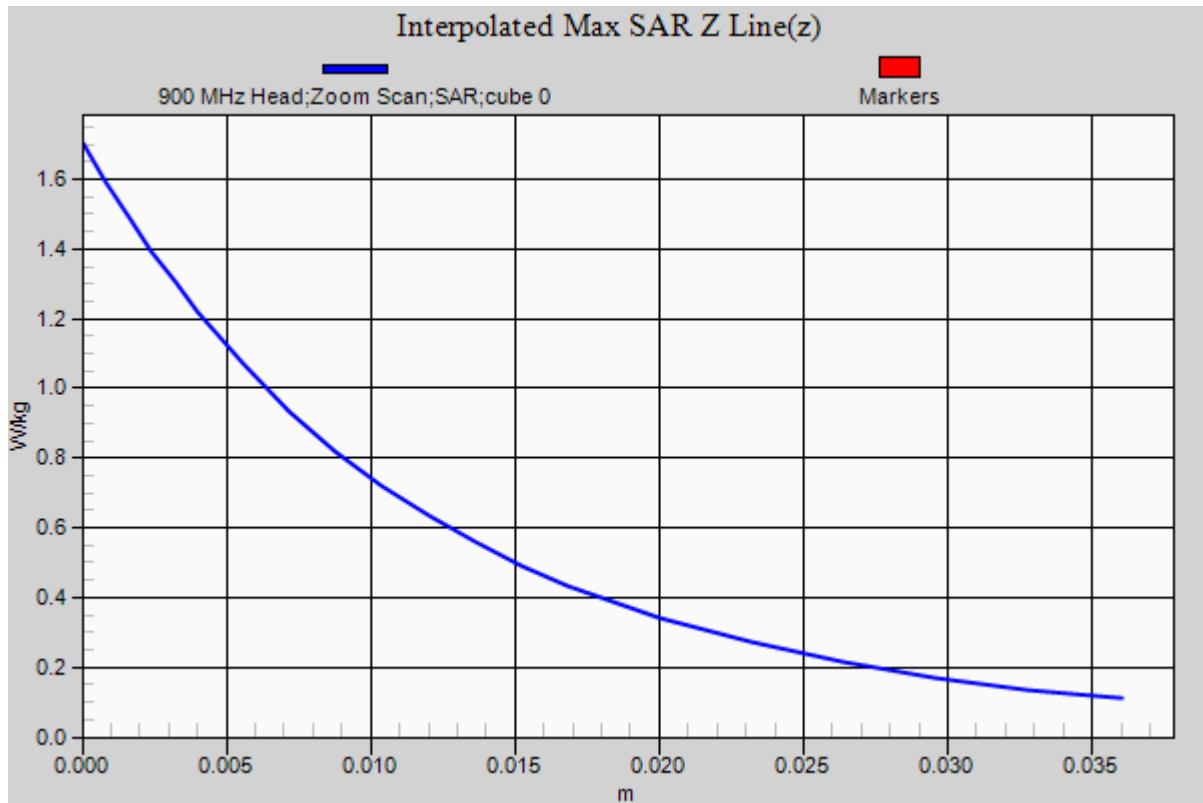
Test Date: Date: 10/7/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 - SN3662; ConvF(9.57, 9.57, 9.57); Calibrated: 4/24/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1416; Calibrated: 4/16/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 2037  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**750 MHz Head/Verification/Area Scan (41x121x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm  
Maximum value of SAR (interpolated) = 0.883 W/kg

**750 MHz Head/Verification /Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 31.949 V/m; Power Drift = -0.03 dB  
Peak SAR (extrapolated) = 1.691 mW/g  
 $P_{in} = 100$  mW  
**SAR(1 g) = 0.828 mW/g; SAR(10 g) = 0.532 mW/g**  
Maximum value of SAR (measured) = 0.888 W/kg





# RF Exposure Lab

## Plot 2

**DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN 1016**

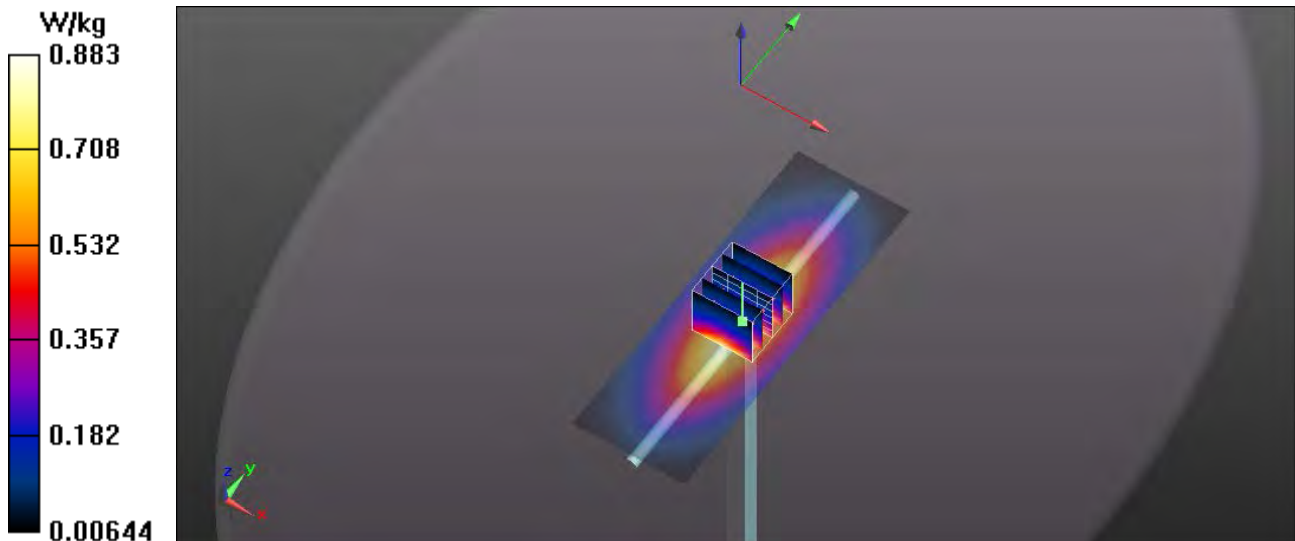
Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1  
Medium: HSL750; Medium parameters used (interpolated):  $f = 750$  MHz;  $\sigma = 0.89$  S/m;  $\epsilon_r = 41.19$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

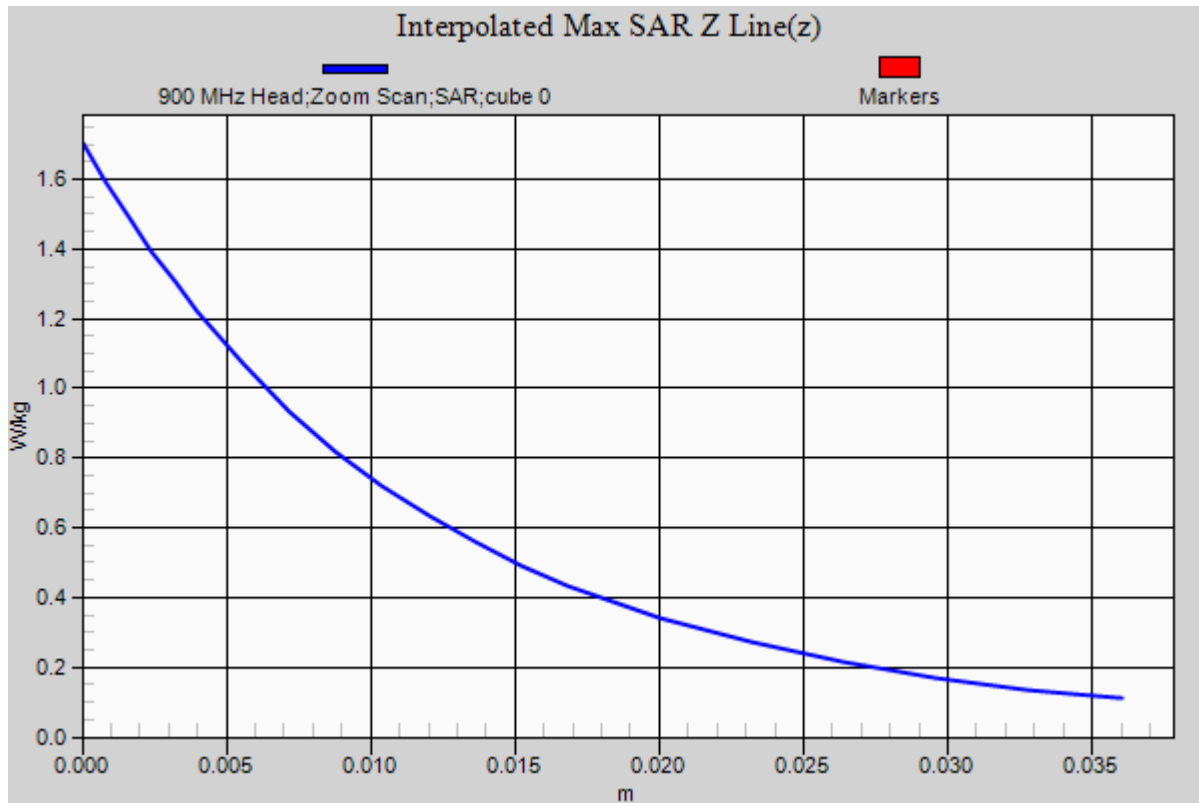
Test Date: Date: 10/16/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 - SN3693; ConvF(9.52, 9.52, 9.52); Calibrated: 8/20/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1321; Calibrated: 1/10/2019  
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**750 MHz Head/Verification/Area Scan (41x121x1):** Interpolated grid:  $dx=1.500$  mm,  $dy=1.500$  mm  
Maximum value of SAR (interpolated) = 0.883 W/kg

**750 MHz Head/Verification /Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm  
Reference Value = 31.949 V/m; Power Drift = -0.03 dB  
Peak SAR (extrapolated) = 1.691 mW/g  
 $P_{in} = 100$  mW  
**SAR(1 g) = 0.826 mW/g; SAR(10 g) = 0.530 mW/g**  
Maximum value of SAR (measured) = 0.888 W/kg





# RF Exposure Lab

## Plot 3

**DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:4d089**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1  
Medium: HSL835; Medium parameters used (interpolated):  $f = 835 \text{ MHz}$ ;  $\sigma = 0.915 \text{ S/m}$ ;  $\epsilon_r = 41.445$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

Test Date: Date: 10/10/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 - SN3662; ConvF(9.12, 9.12, 9.12); Calibrated: 4/24/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1416; Calibrated: 4/16/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 2037  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**835 MHz/Verification/Area Scan (5x11x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.19 W/kg

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

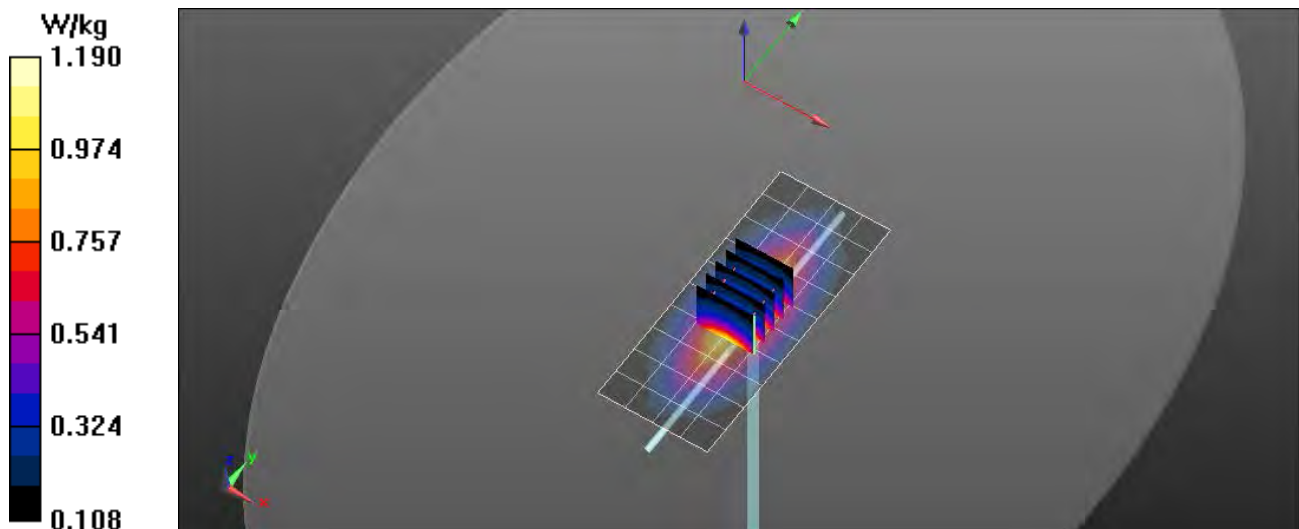
Reference Value = 31.568 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.43 W/kg

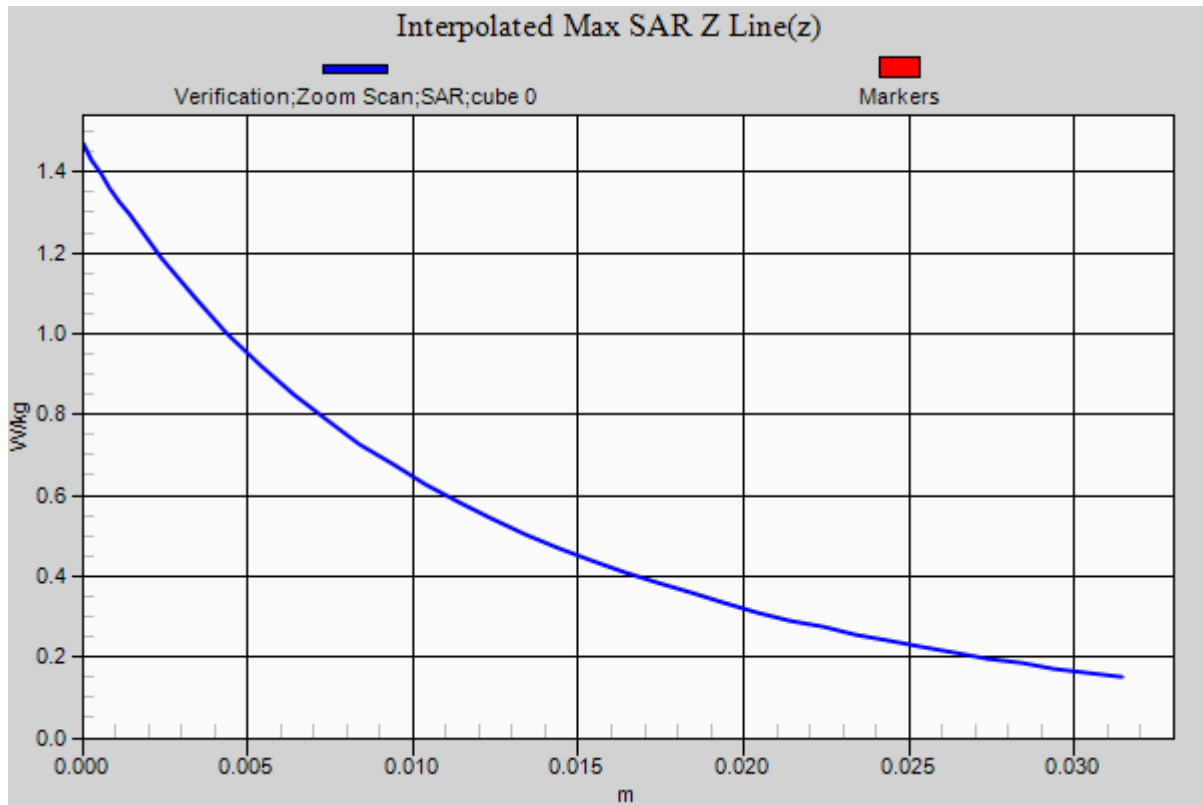
**SAR(1 g) = 0.941 W/kg; SAR(10 g) = 0.612 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.2 W/kg







# RF Exposure Lab

## Plot 4

**DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:4d089**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1  
Medium: HSL835; Medium parameters used (interpolated):  $f = 835$  MHz;  $\sigma = 0.925$  S/m;  $\epsilon_r = 41.125$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Test Date: Date: 10/17/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 - SN3693; ConvF(9.14, 9.14, 9.14); Calibrated: 8/20/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1321; Calibrated: 1/10/2019  
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**835 MHz/Verification/Area Scan (5x11x1):** Measurement grid: dx=15mm, dy=15mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.19 W/kg

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

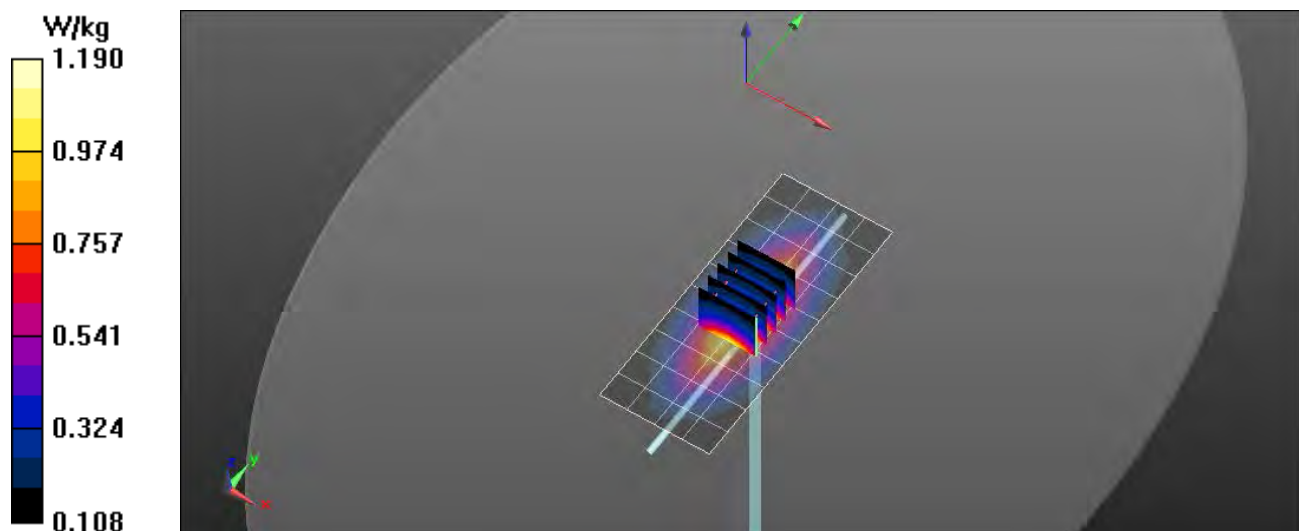
Reference Value = 31.568 V/m; Power Drift = -0.02 dB

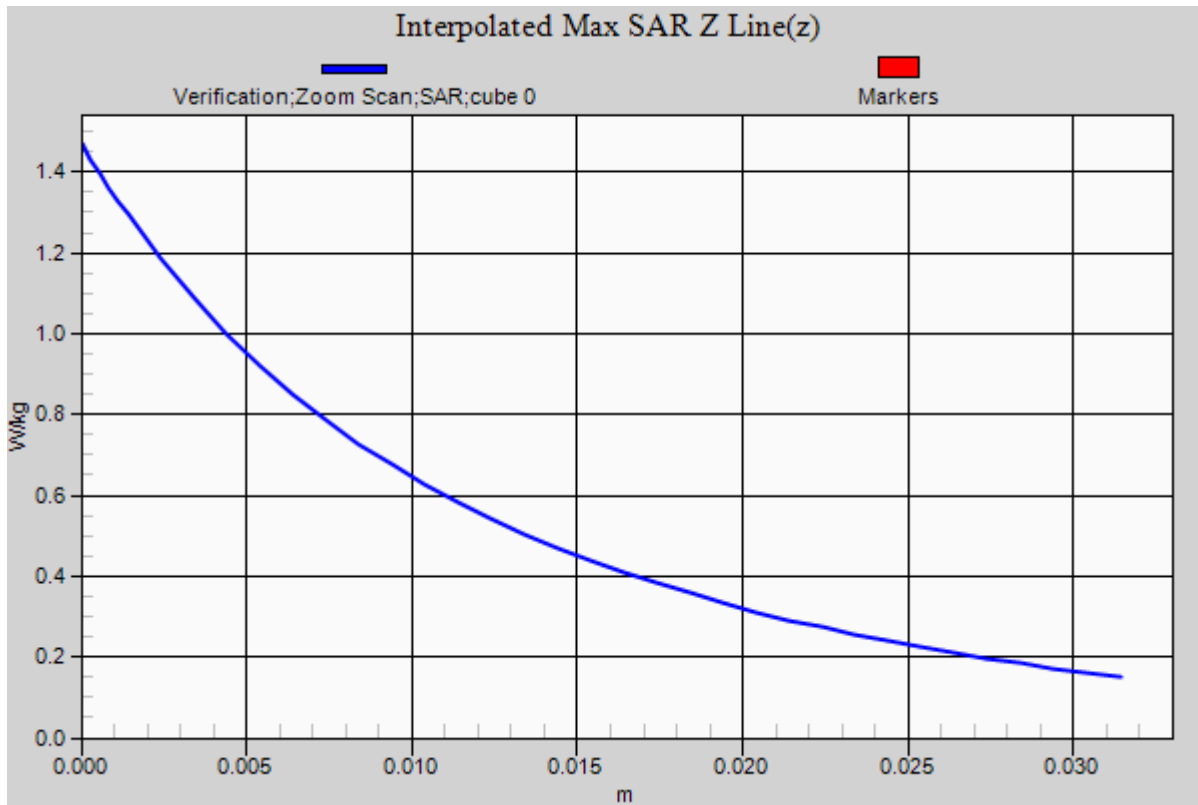
Peak SAR (extrapolated) = 1.43 W/kg

**SAR(1 g) = 0.943 W/kg; SAR(10 g) = 0.611 W/kg**

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.2 W/kg





# RF Exposure Lab

## Plot 5

**DUT: Dipole 1750 MHz D1750V2; Type: D1750V2; Serial: D1750V2 - SN:1018**

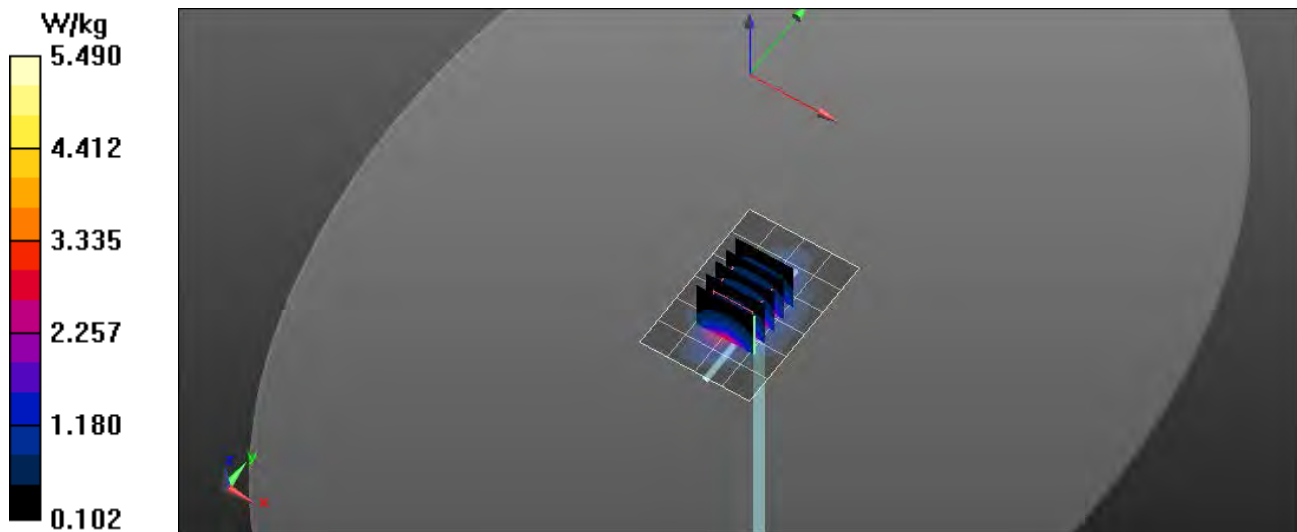
Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1  
Medium: HSL1750; Medium parameters used:  $f = 1750$  MHz;  $\sigma = 1.39$  S/m;  $\epsilon_r = 39.93$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

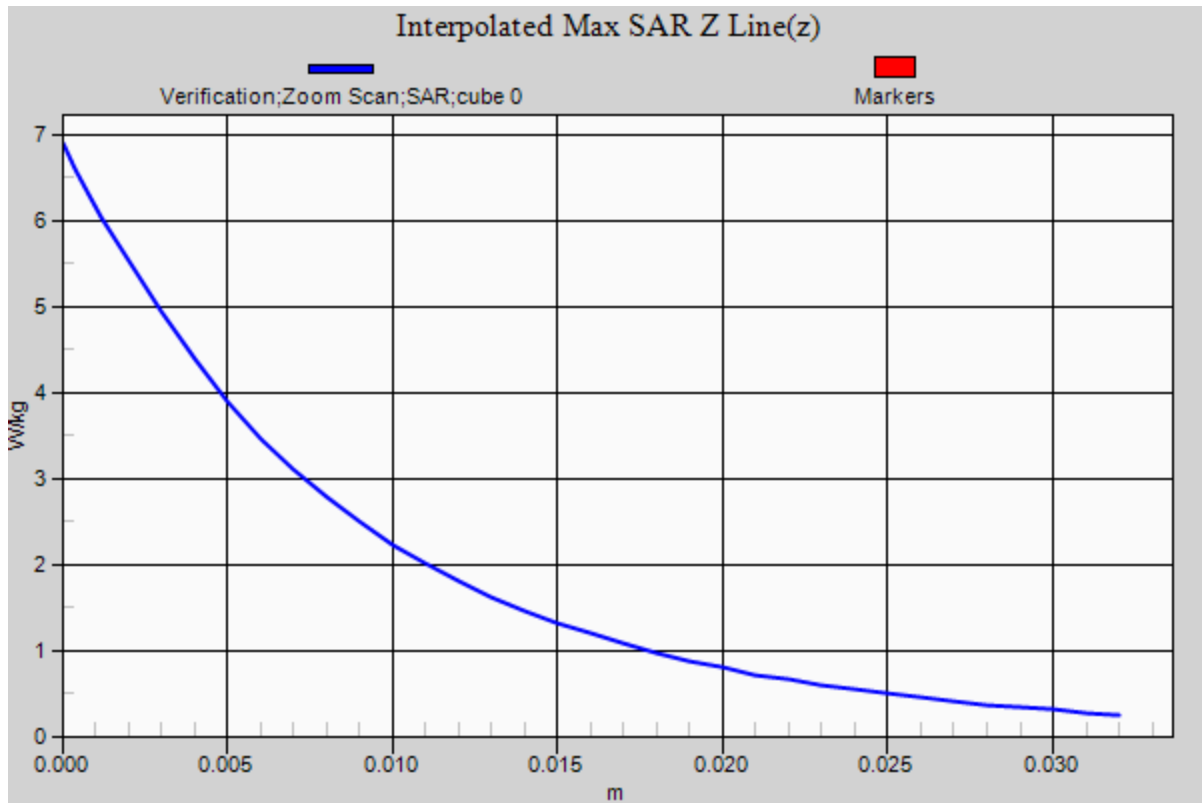
Test Date: Date: 10/15/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 - SN3662; ConvF(8.23, 8.23, 8.23); Calibrated: 4/24/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1416; Calibrated: 4/16/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 2037  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**1750 MHz/Verification/Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 5.33 W/kg

**1750 MHz/Verification/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 31.227 V/m; Power Drift = -0.01 dB  
Peak SAR (extrapolated) = 6.89 W/kg  
**SAR(1 g) = 3.71 W/kg; SAR(10 g) = 1.91 W/kg**  
Maximum value of SAR (measured) = 5.49 W/kg





# RF Exposure Lab

## Plot 6

**DUT: Dipole 1750 MHz D1750V2; Type: D1750V2; Serial: D1750V2 - SN:1018**

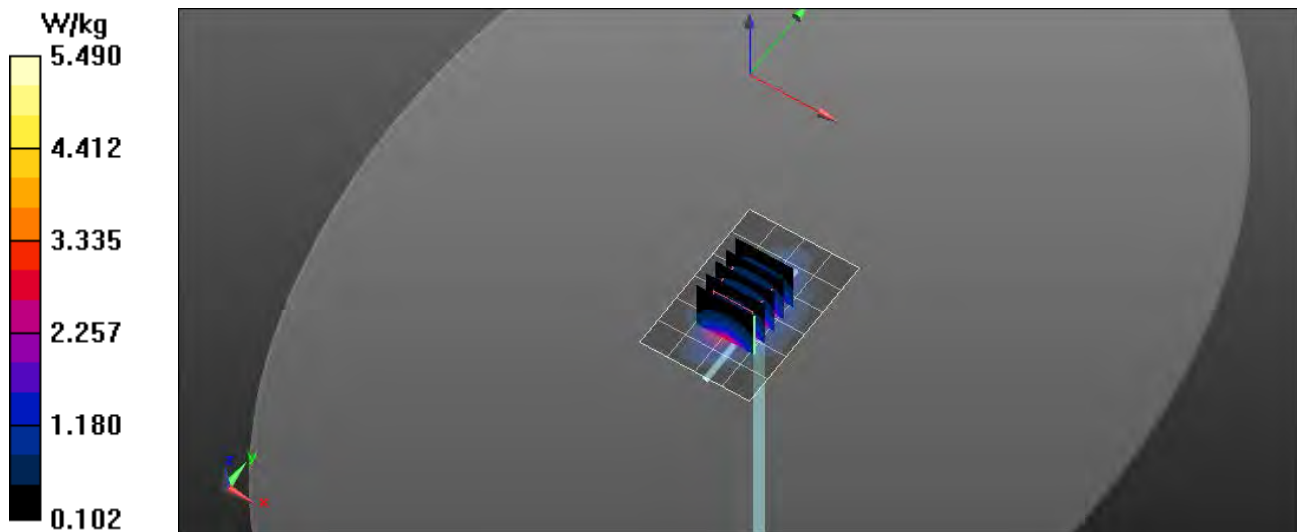
Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1  
Medium: HSL1750; Medium parameters used:  $f = 1750$  MHz;  $\sigma = 1.42$  S/m;  $\epsilon_r = 39.61$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

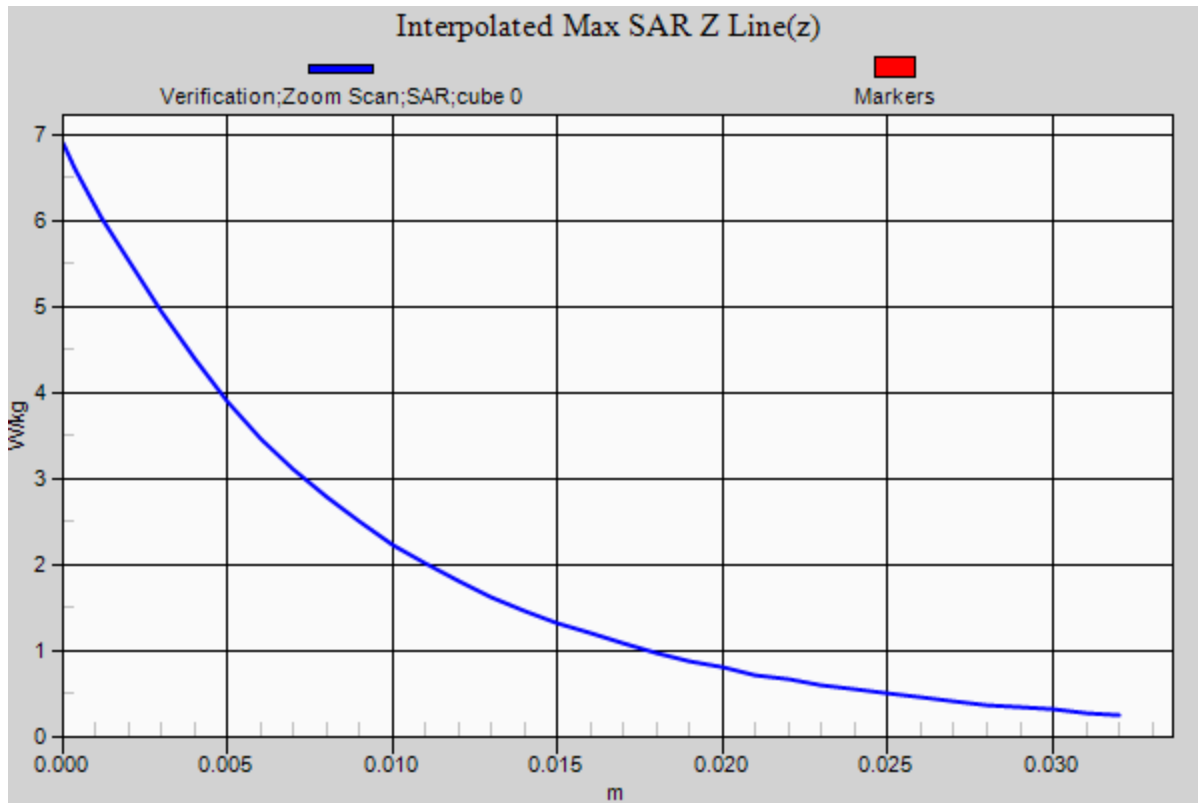
Test Date: Date: 10/19/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 - SN3693; ConvF(7.97, 7.97, 7.97); Calibrated: 8/20/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1321; Calibrated: 1/10/2019  
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**1750 MHz/Verification/Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 5.33 W/kg

**1750 MHz/Verification/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 31.227 V/m; Power Drift = -0.01 dB  
Peak SAR (extrapolated) = 6.89 W/kg  
**SAR(1 g) = 3.69 W/kg; SAR(10 g) = 1.92 W/kg**  
Maximum value of SAR (measured) = 5.49 W/kg





# RF Exposure Lab

## Plot 7

**DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:5d116**

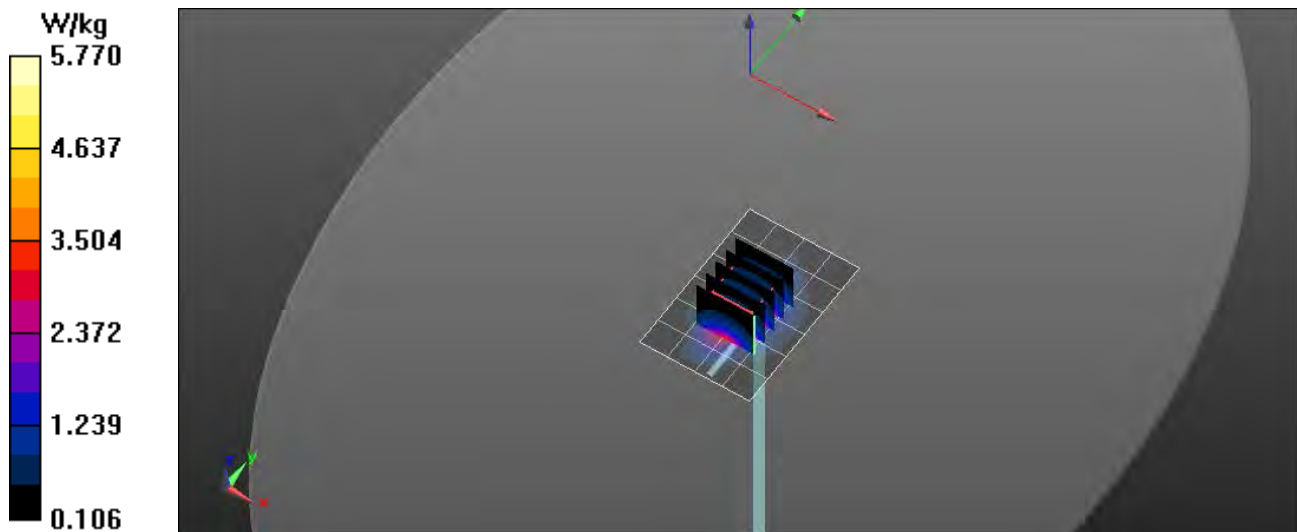
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1  
Medium: HSL1900; Medium parameters used:  $f = 1900 \text{ MHz}$ ;  $\sigma = 1.43 \text{ S/m}$ ;  $\epsilon_r = 40.37$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

Test Date: Date: 10/19/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 - SN3662; ConvF(7.9, 7.9, 7.9); Calibrated: 4/24/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1416; Calibrated: 4/16/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 2037  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

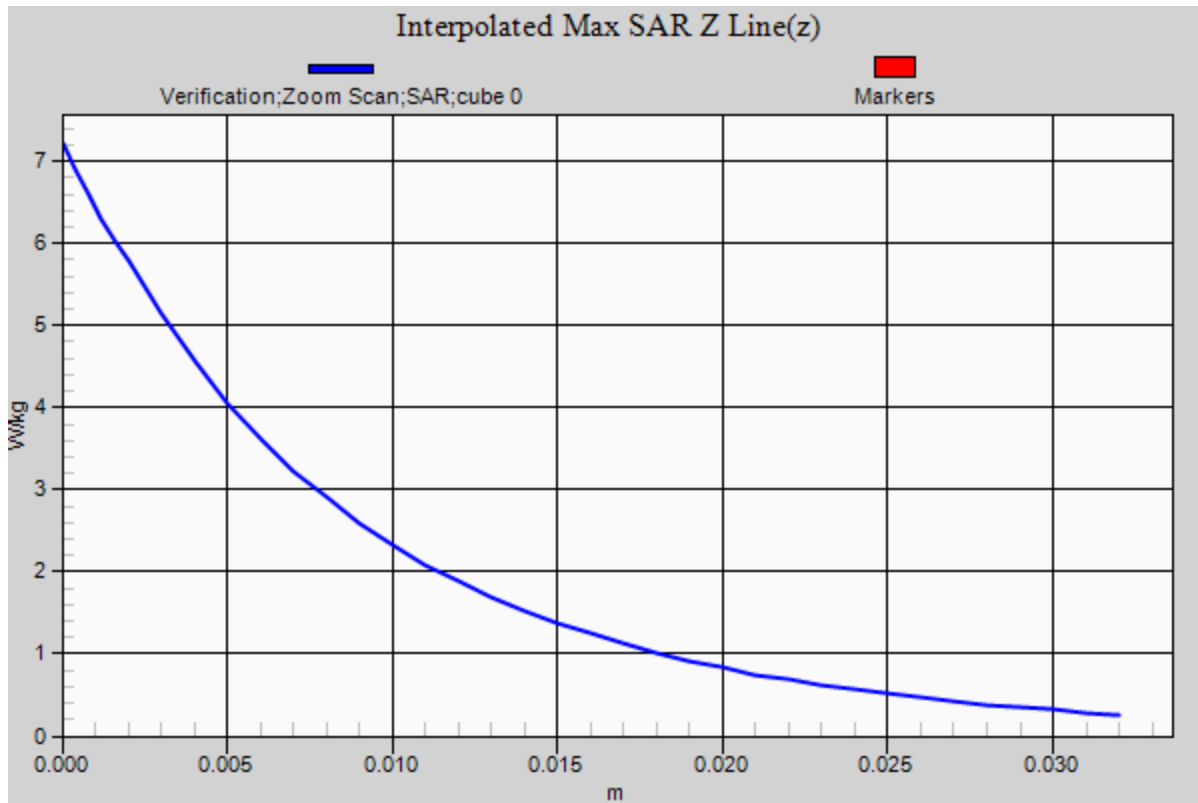
### Procedure Notes:

**1900 MHz/Verification/Area Scan (5x7x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$   
Maximum value of SAR (measured) = 5.52 W/kg

**1900 MHz/Verification/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$   
Reference Value = 32.186 V/m; Power Drift = -0.03 dB  
Peak SAR (extrapolated) = 7.25 W/kg  
**SAR(1 g) = 4.12 W/kg; SAR(10 g) = 2.15 W/kg**  
Maximum value of SAR (measured) = 5.79 W/kg







# RF Exposure Lab

## Plot 8

**DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:5d116**

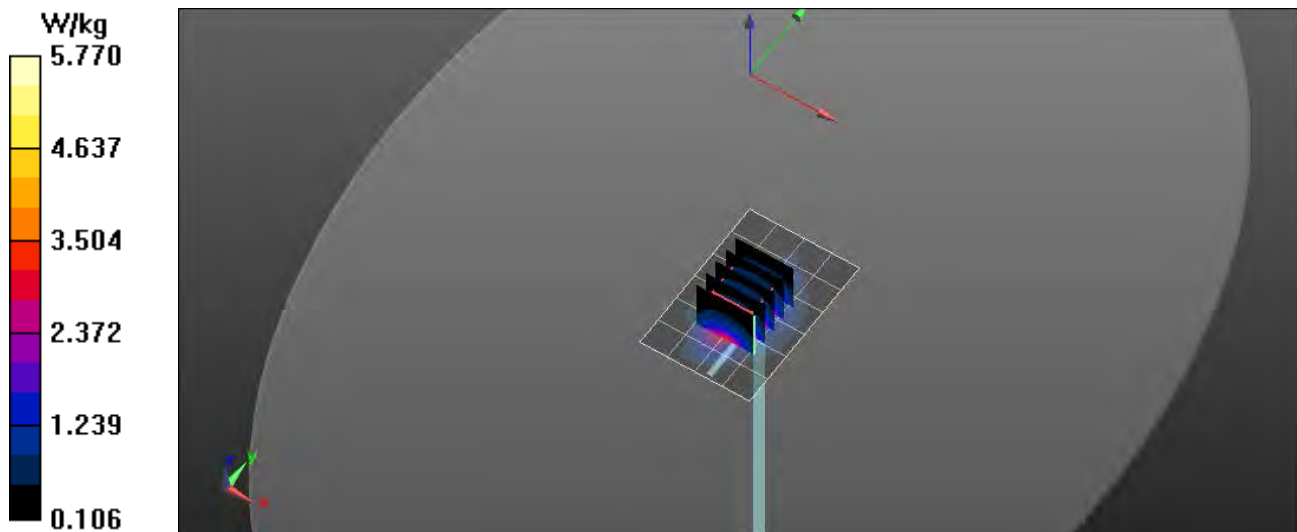
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1  
Medium: HSL1900; Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.39$  S/m;  $\epsilon_r = 39.87$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

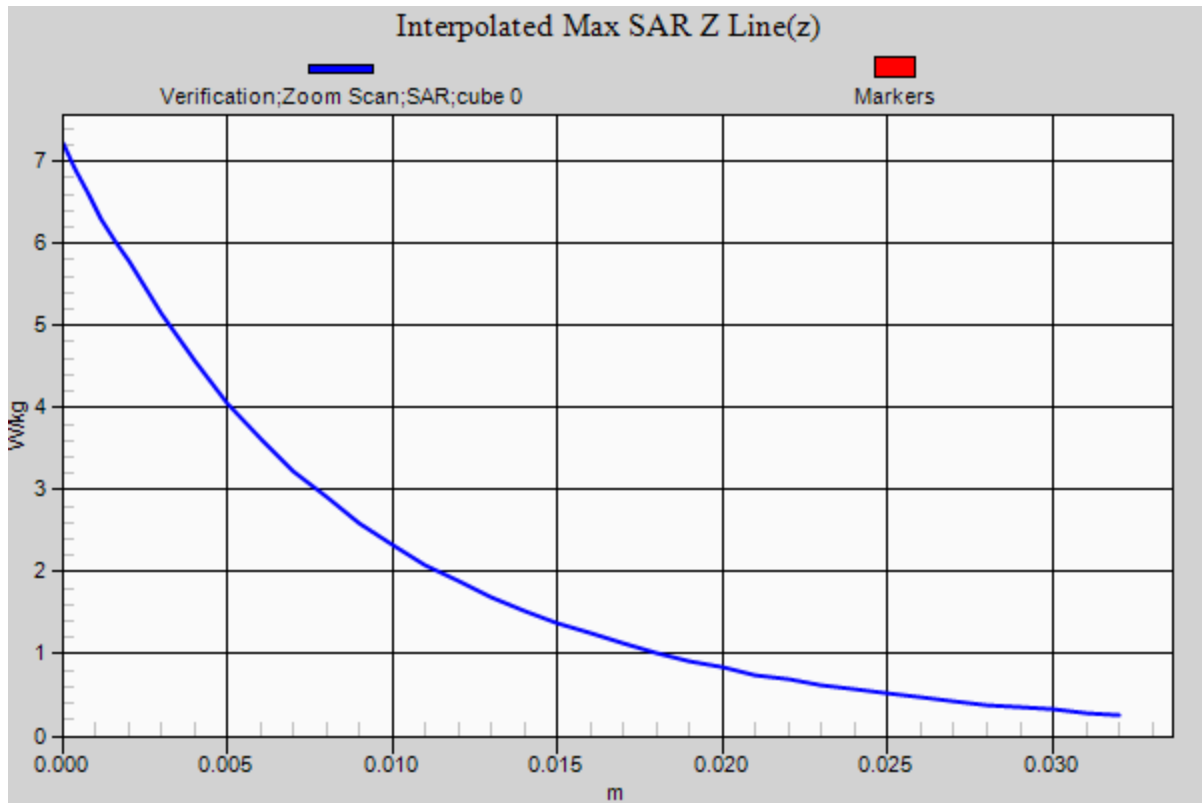
Test Date: Date: 10/21/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 - SN3693; ConvF(7.53, 7.53, 7.53); Calibrated: 8/20/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1321; Calibrated: 1/10/2019  
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**1900 MHz/Verification/Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 5.52 W/kg

**1900 MHz/Verification/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 32.186 V/m; Power Drift = -0.03 dB  
Peak SAR (extrapolated) = 7.25 W/kg  
**SAR(1 g) = 4.11 W/kg; SAR(10 g) = 2.14 W/kg**  
Maximum value of SAR (measured) = 5.79 W/kg





# RF Exposure Lab

## Plot 9

**DUT: Dipole 2550 MHz D2550V2; Type: D2550V2; Serial: D2550V2 - SN:1003**

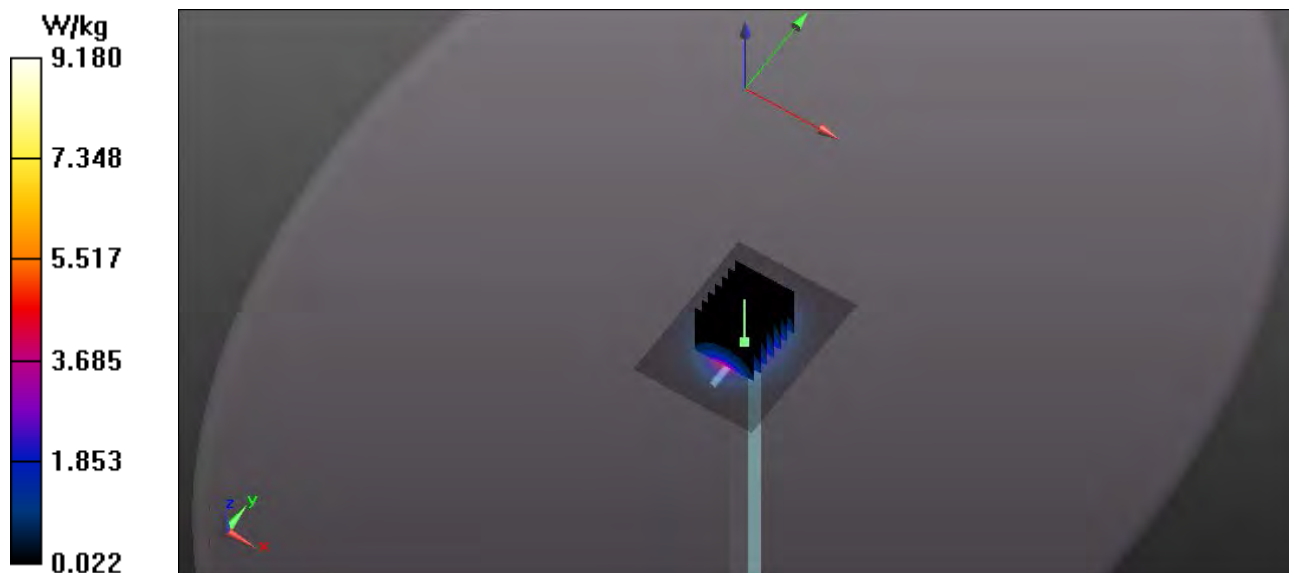
Communication System: CW; Frequency: 2550 MHz; Duty Cycle: 1:1  
Medium: HSL2550; Medium parameters used:  $f = 2550$  MHz;  $\sigma = 1.94$  S/m;  $\epsilon_r = 38.95$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

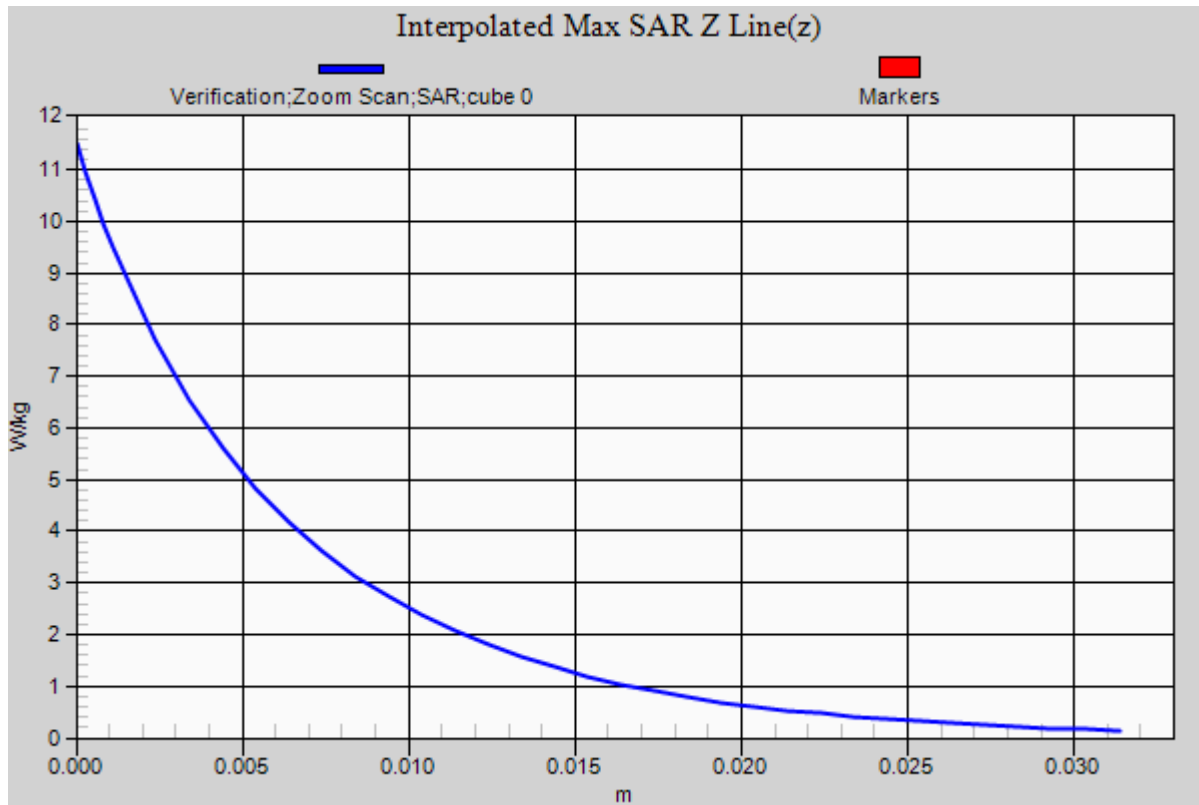
Test Date: Date: 10/23/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 - SN3662; ConvF(7.21, 7.21, 7.21); Calibrated: 4/24/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1416; Calibrated: 4/16/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 2037  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**2550 MHz Body/Verification/Area Scan (61x81x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm  
Maximum value of SAR (interpolated) = 9.18 W/kg

**2550 MHz Body/Verification/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 54.541 V/m; Power Drift = -0.02 dB  
Peak SAR (extrapolated) = 11.5 W/kg  
**SAR(1 g) = 5.71 W/kg; SAR(10 g) = 2.56 W/kg**  
Maximum value of SAR (measured) = 8.98 W/kg





# RF Exposure Lab

## Plot 10

**DUT: Dipole 2550 MHz D2550V2; Type: D2550V2; Serial: D2550V2 - SN: 1003**

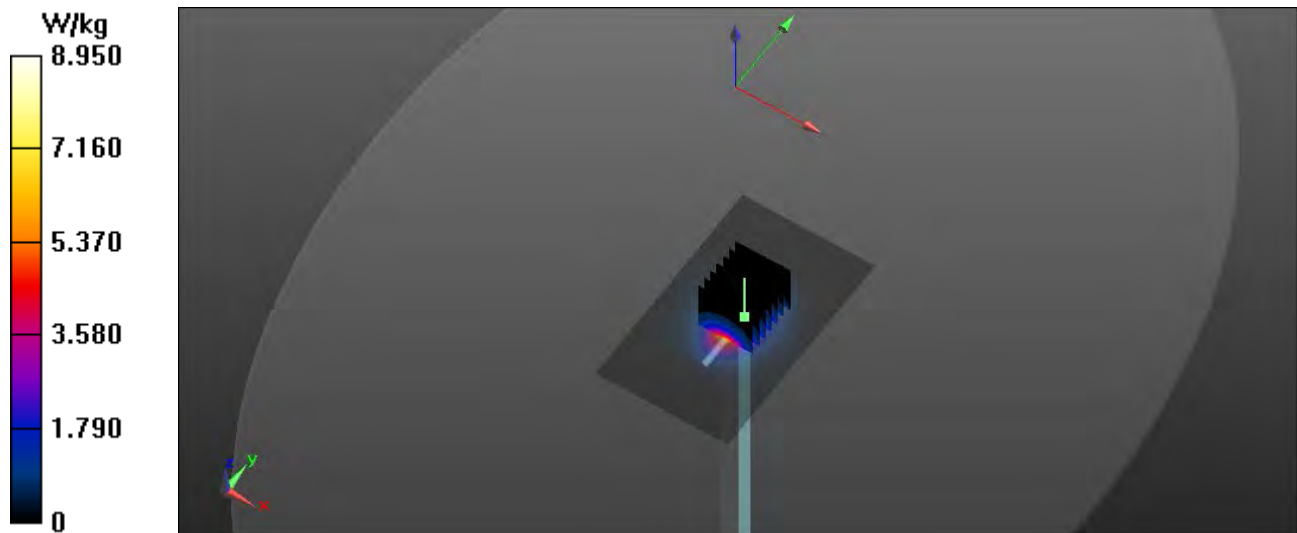
Communication System: CW; Frequency: 2550 MHz; Duty Cycle: 1:1  
Medium: HSL2550; Medium parameters used:  $f = 2550$  MHz;  $\sigma = 1.92$  S/m;  $\epsilon_r = 38.94$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

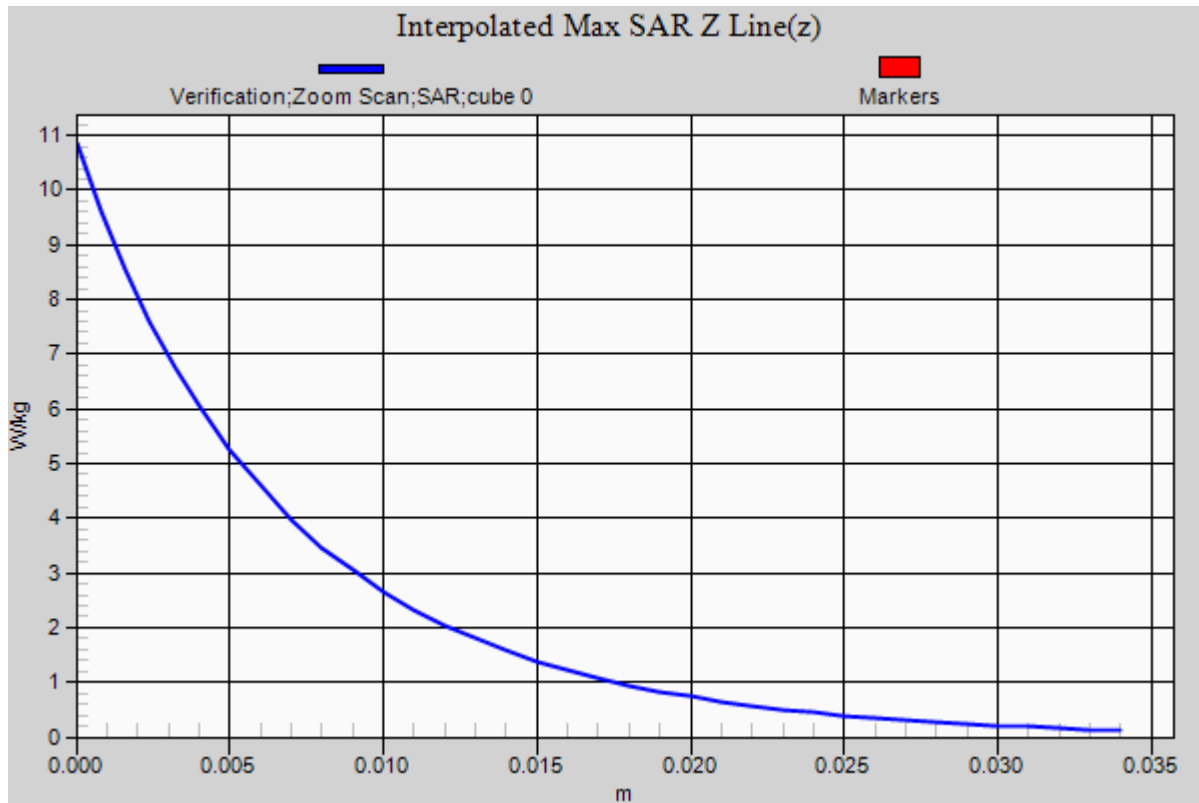
Test Date: Date: 10/23/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 - SN3693; ConvF(6.73, 6.73, 6.73); Calibrated: 8/20/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1321; Calibrated: 1/10/2019  
Phantom: ELI v4.0; Type: QDOVA001AA; Serial: 1065  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**2550 MHz Head/Verification/Area Scan (61x101x1):** Interpolated grid:  $dx=1.200$  mm,  $dy=1.200$  mm  
Maximum value of SAR (interpolated) = 8.87 W/kg

**2550 MHz Head/Verification/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm  
Reference Value = 54.368 V/m; Power Drift = -0.02 dB  
Peak SAR (extrapolated) = 10.95 W/kg  
 $P_{in} = 100$  mW  
**SAR(1 g) = 5.64 W/kg; SAR(10 g) = 2.58 W/kg**  
Maximum value of SAR (measured) = 8.95 W/kg





# RF Exposure Lab

## Plot 11

**DUT: Dipole D3500V2; Type: D3500V2; Serial: D3500V2 - SN: 1061**

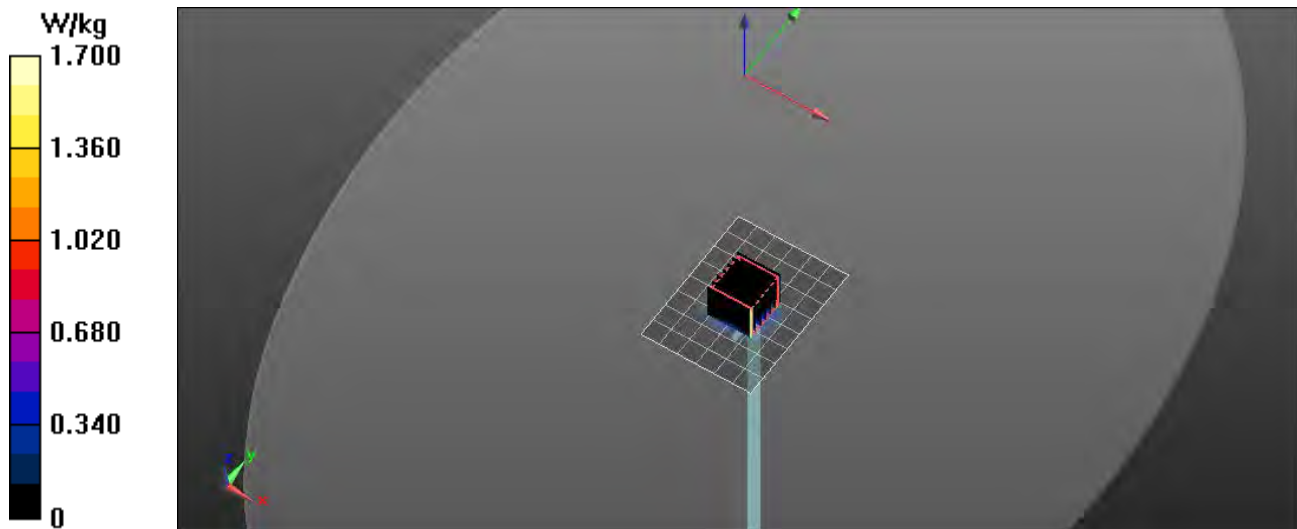
Communication System: CW; Frequency: 3500 MHz; Duty Cycle: 1:1  
Medium: HSL 3-6 GHz; Medium parameters used:  $f = 3500$  MHz;  $\sigma = 2.93$  S/m;  $\epsilon_r = 37.59$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Test Date: Date: 10/28/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 - SN3662; ConvF(7.07, 7.07, 7.07); Calibrated: 4/24/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1416; Calibrated: 4/16/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 2037  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

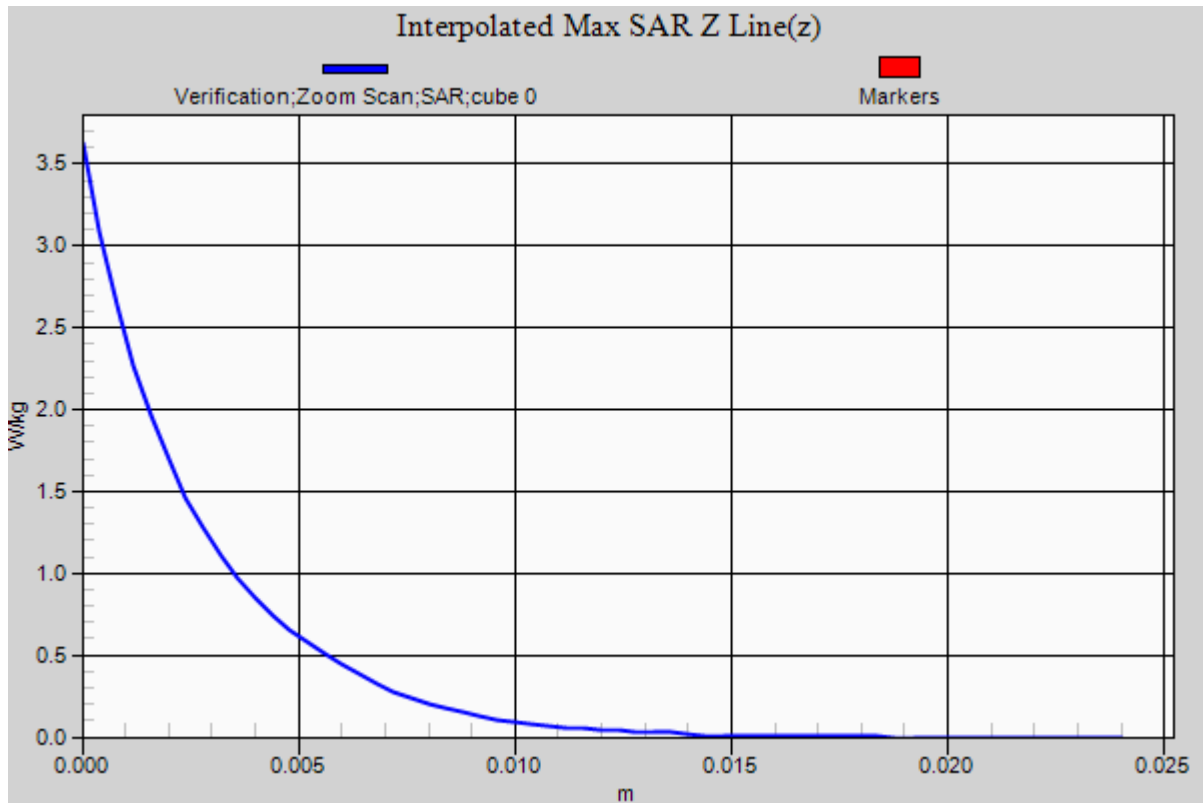
### Procedure Notes:

**3500 MHz Head/Verification/Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 1.68 W/kg

**3500 MHz Head/Verification/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=4mm  
Reference Value = 11.892 V/m; Power Drift = -0.01 dB  
Peak SAR (extrapolated) = 3.63 W/kg  
 $P_{in} = 10$  mW  
**SAR(1 g) = 0.695 W/kg; SAR(10 g) = 0.265 W/kg**  
Maximum value of SAR (measured) = 1.70 W/kg







# RF Exposure Lab

## Plot 12

**DUT: Dipole D3700V2; Type: D3700V2; Serial: D3700V2 - SN:1024**

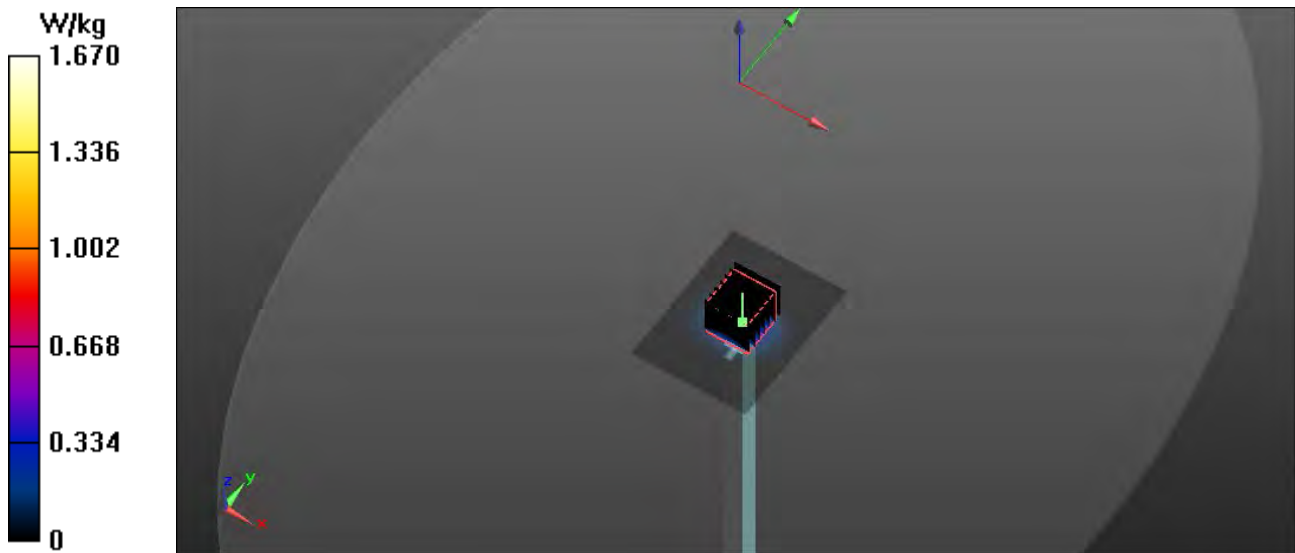
Communication System: CW; Frequency: 3700 MHz; Duty Cycle: 1:1  
Medium: HSL 3-6 GHz; Medium parameters used:  $f = 3700$  MHz;  $\sigma = 3.13$  S/m;  $\epsilon_r = 37.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

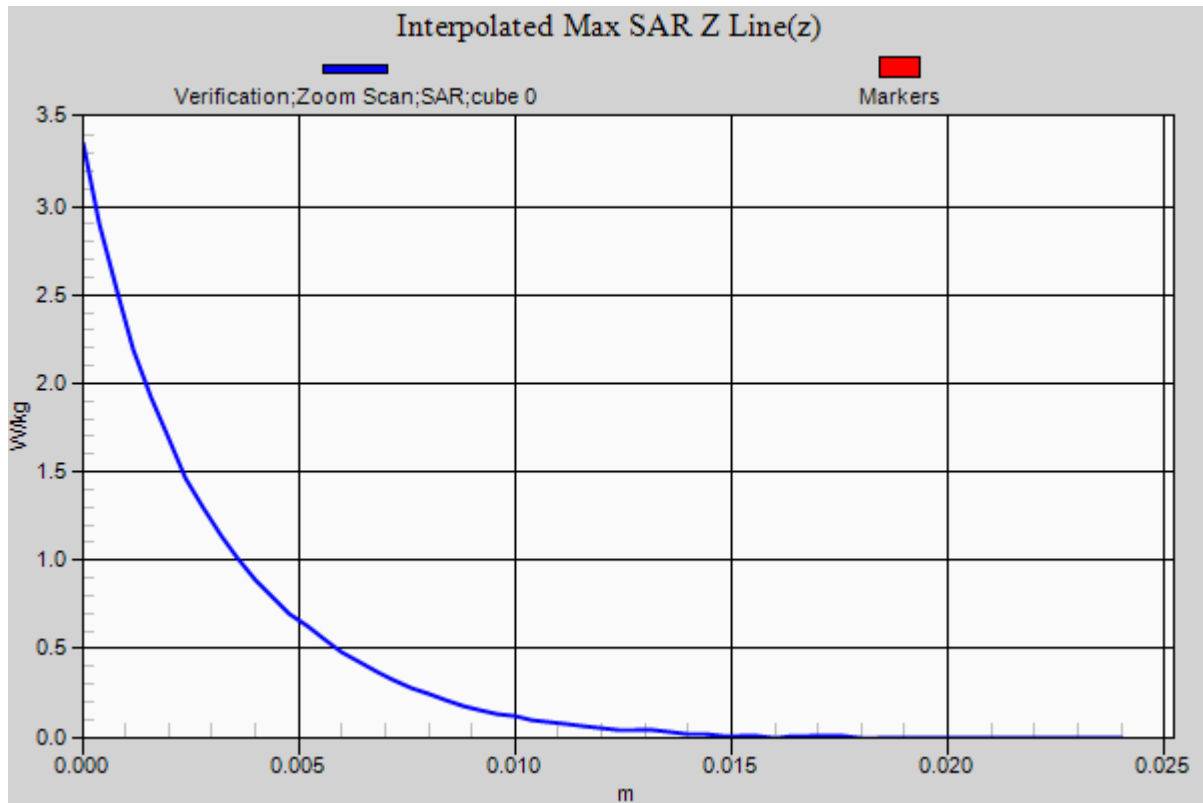
Test Date: Date: 10/28/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 - SN3662; ConvF(6.92, 6.92, 6.92); Calibrated: 4/24/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1416; Calibrated: 4/16/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 2037  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**3700 MHz Head/Verification/Area Scan (61x81x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm  
Maximum value of SAR (interpolated) = 1.68 W/kg

**3700 MHz Head/Verification/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm  
Reference Value = 55.852 V/m; Power Drift = -0.01 dB  
Peak SAR (extrapolated) = 3.37 W/kg  
**SAR(1 g) = 0.712 W/kg; SAR(10 g) = 0.258 W/kg**  
Maximum value of SAR (measured) = 1.71 W/kg





# RF Exposure Lab

## Plot 13

**DUT: Dipole D3500V2; Type: D3500V2; Serial: D3500V2 - SN:1061**

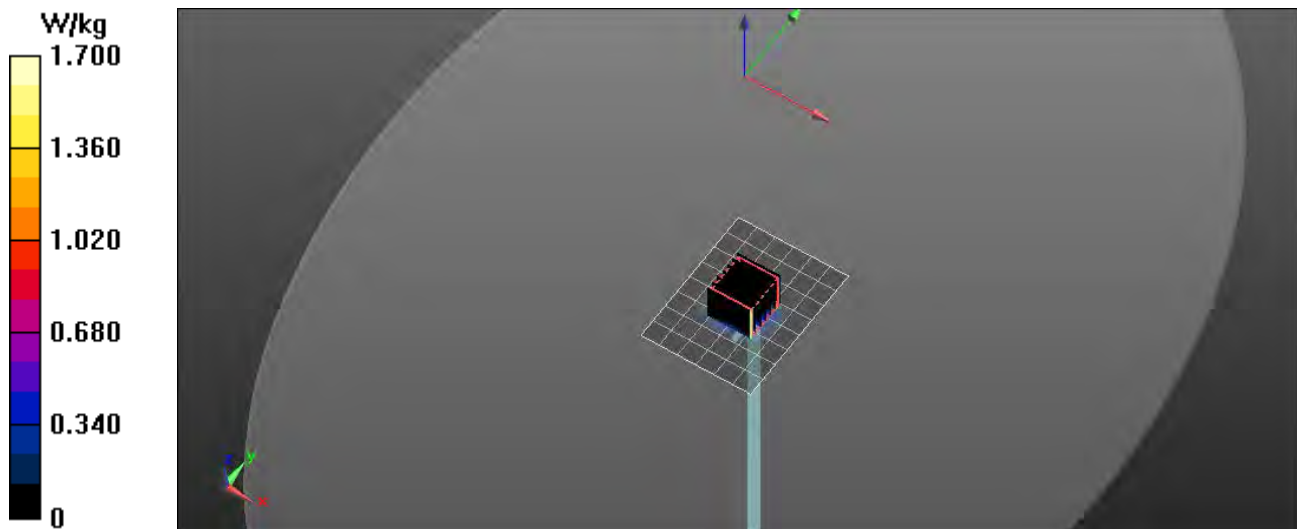
Communication System: CW; Frequency: 3500 MHz; Duty Cycle: 1:1  
Medium: HSL 3-6 GHz; Medium parameters used:  $f = 3500$  MHz;  $\sigma = 2.92$  S/m;  $\epsilon_r = 37.41$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

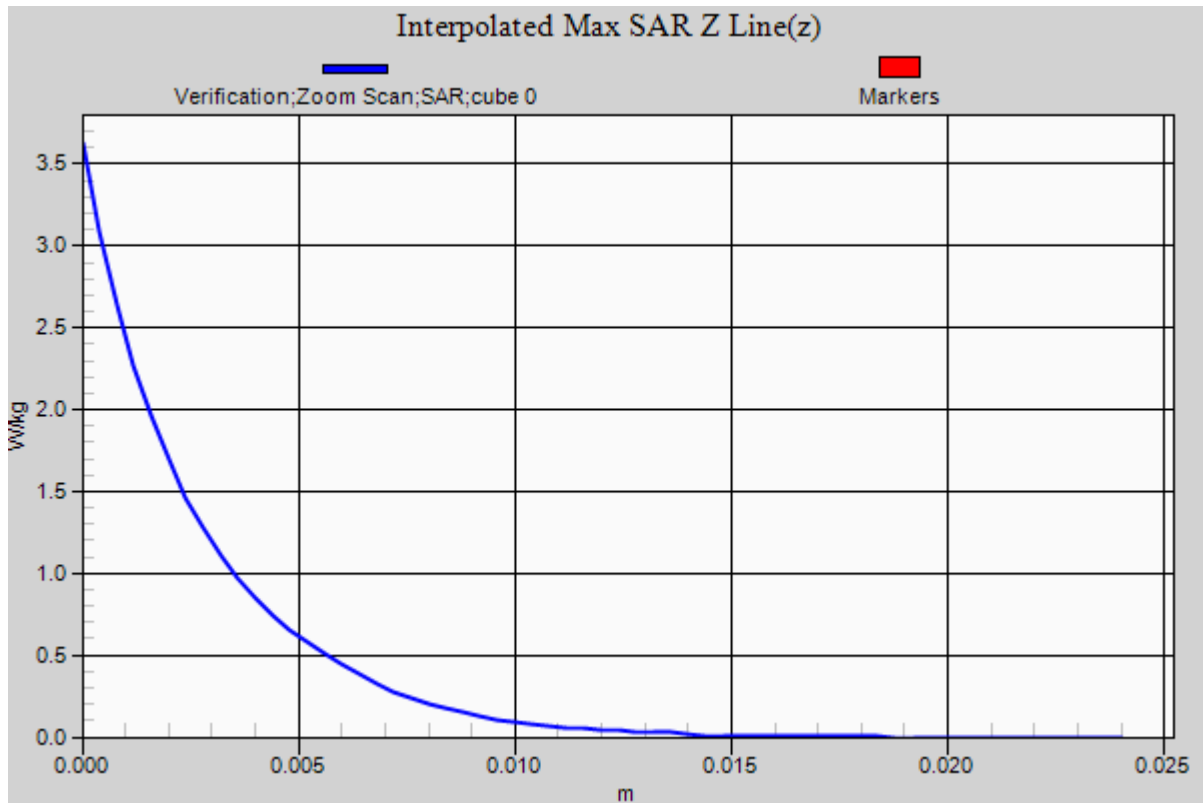
Test Date: Date: 10/25/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 - SN3693; ConvF(6.58, 6.58, 6.58); Calibrated: 8/20/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1321; Calibrated: 1/10/2019  
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**3500 MHz Body/Verification/Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 1.64 W/kg

**3500 MHz Body/Verification/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=4mm  
Reference Value = 55.892 V/m; Power Drift = 0.01 dB  
Peak SAR (extrapolated) = 3.63 W/kg  
**SAR(1 g) = 0.655 W/kg; SAR(10 g) = 0.245 W/kg**  
Maximum value of SAR (measured) = 1.70 W/kg





# RF Exposure Lab

## Plot 14

**DUT: Dipole D3700V2; Type: D3700V2; Serial: D3700V2 - SN:1024**

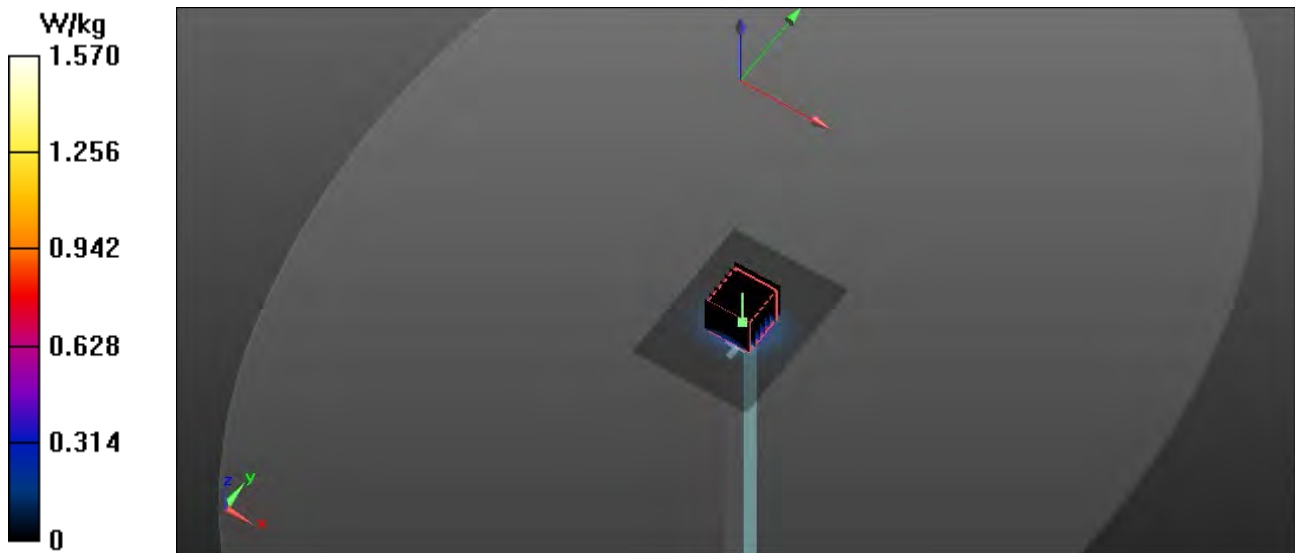
Communication System: CW; Frequency: 3700 MHz; Duty Cycle: 1:1  
Medium: HSL 3-6 GHz; Medium parameters used:  $f = 3700$  MHz;  $\sigma = 3.12$  S/m;  $\epsilon_r = 37.12$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

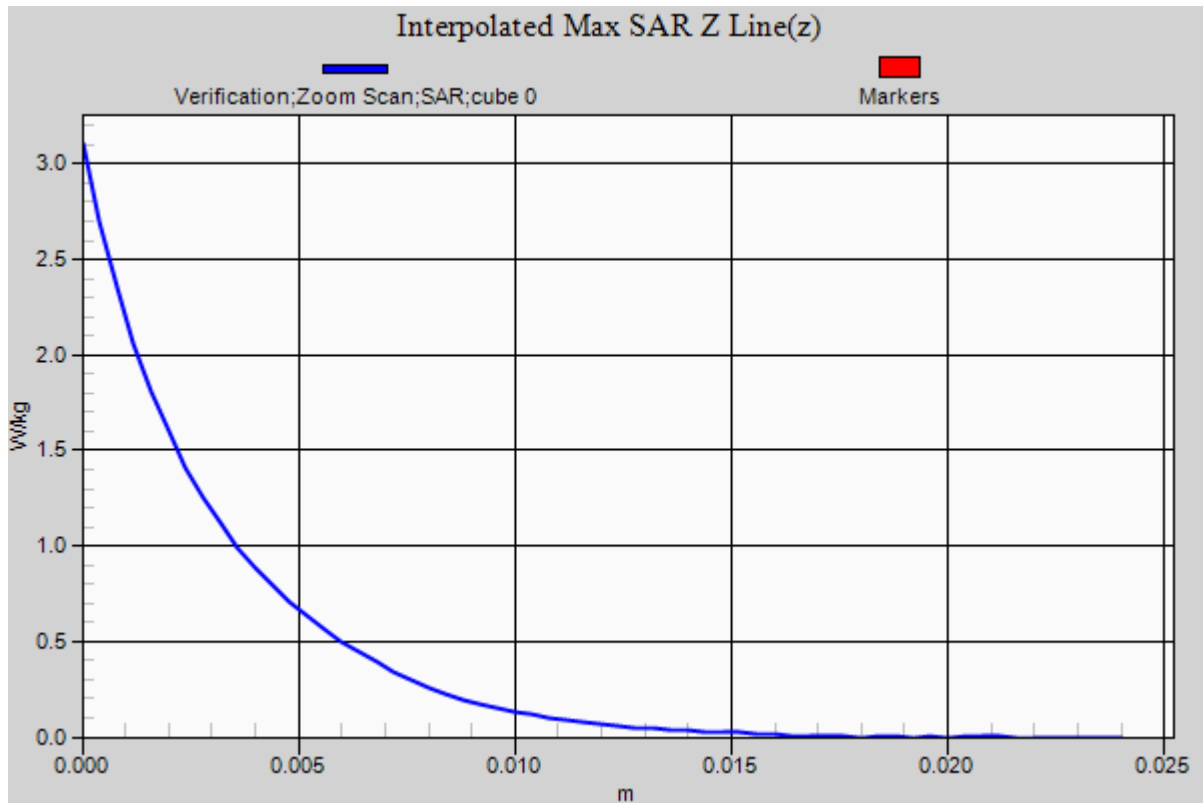
Test Date: Date: 10/25/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 - SN3693; ConvF(6.34, 6.34, 6.34); Calibrated: 8/20/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1321; Calibrated: 1/10/2019  
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**3700 MHz Body/Verification/Area Scan (61x81x1):** Interpolated grid:  $dx=1.000$  mm,  $dy=1.000$  mm  
Maximum value of SAR (interpolated) = 1.55 W/kg

**3700 MHz Body/Verification/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=4$ mm,  $dy=4$ mm,  $dz=4$ mm  
Reference Value = 55.759 V/m; Power Drift = -0.04 dB  
Peak SAR (extrapolated) = 3.09 W/kg  
**SAR(1 g) = 0.719 W/kg; SAR(10 g) = 0.241 W/kg**  
Maximum value of SAR (measured) = 1.58 W/kg





# RF Exposure Lab

## Plot 15

**DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:829**

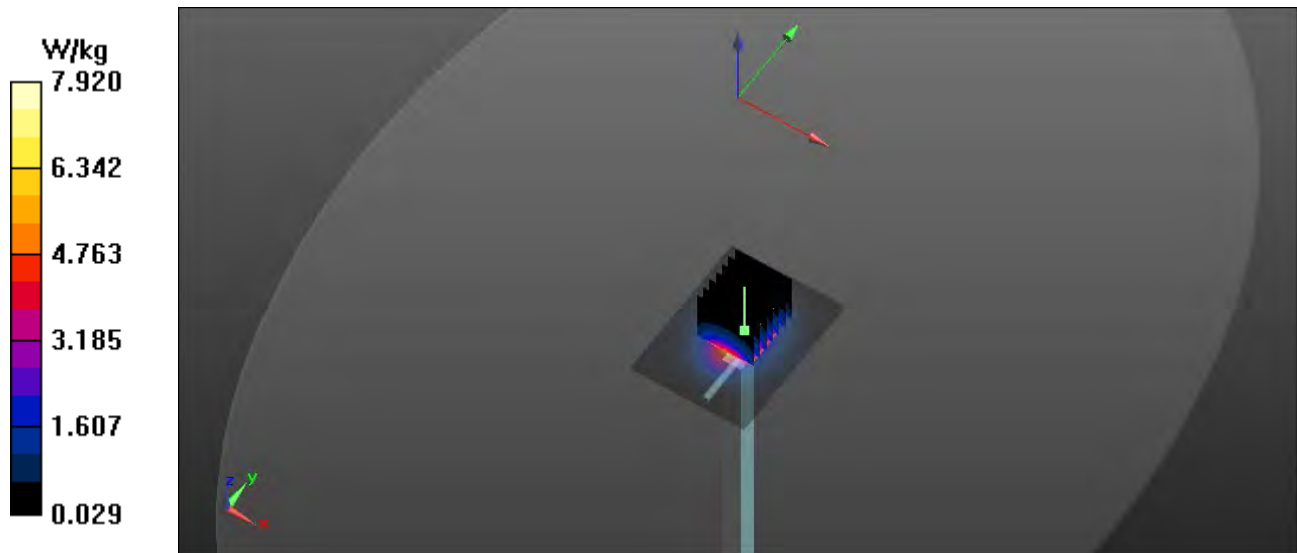
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1  
Medium: HSL2450; Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.84$  S/m;  $\epsilon_r = 38.96$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Test Date: Date: 10/25/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 – SN7531; ConvF(7.58, 7.58, 7.58); Calibrated: 6/3/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn759; Calibrated: 8/14/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

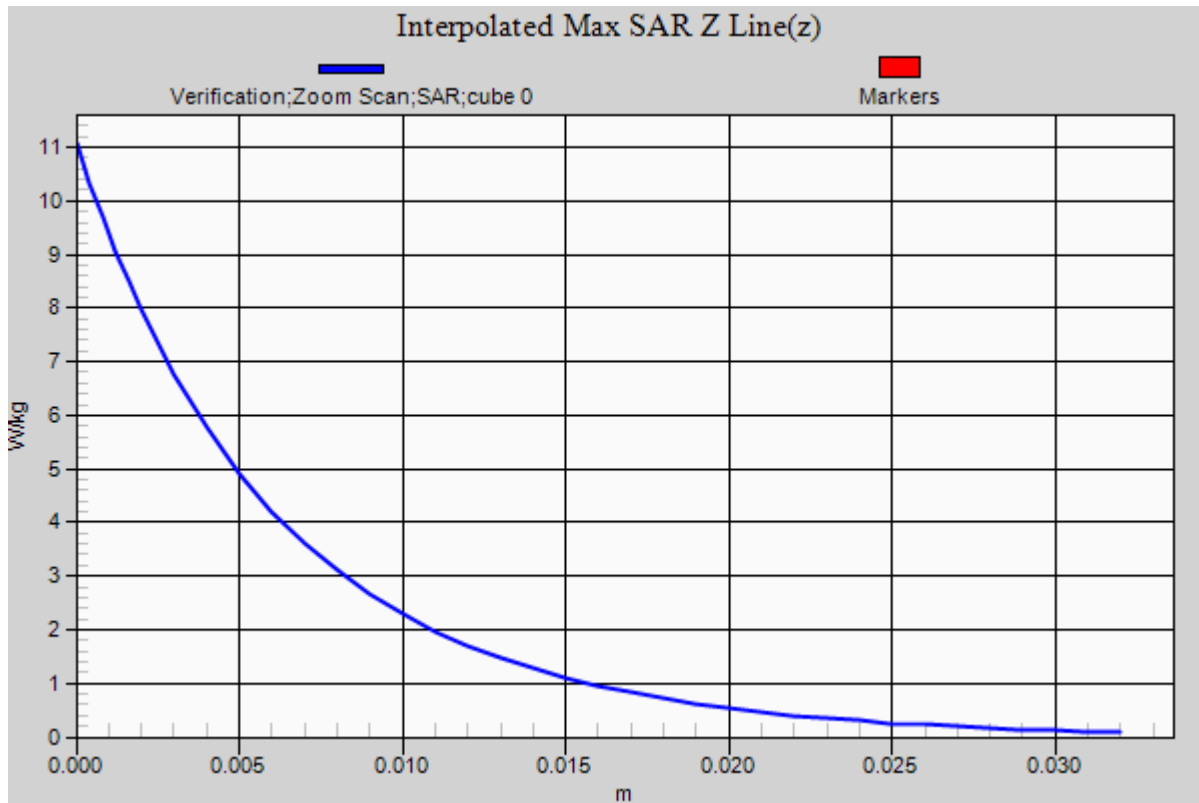
### Procedure Notes:

**2450 MHz Head/Verification/Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 7.93 W/kg

**2450 MHz Head/Verification/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 58.792 V/m; Power Drift = -0.01 dB  
Peak SAR (extrapolated) = 11.15 W/kg  
**SAR(1 g) = 5.29 W/kg; SAR(10 g) = 2.48 W/kg**  
Maximum value of SAR (measured) = 8.39 W/kg







# RF Exposure Lab

## Plot 16

**DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1085**

Communication System: CW; Frequency: 5250 MHz; Duty Cycle: 1:1  
Medium: HSL3-6GHz; Medium parameters used (interpolated):  $f = 5250$  MHz;  $\sigma = 4.805$  S/m;  $\epsilon_r = 35.945$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Test Date: Date: 10/25/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 – SN7531; ConvF(5.24, 5.24, 5.24); Calibrated: 6/3/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn759; Calibrated: 8/14/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**5250 MHz Head/Verification/Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.5 W/kg

**5250 MHz Head/Verification/Zoom Scan (8x8x15)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

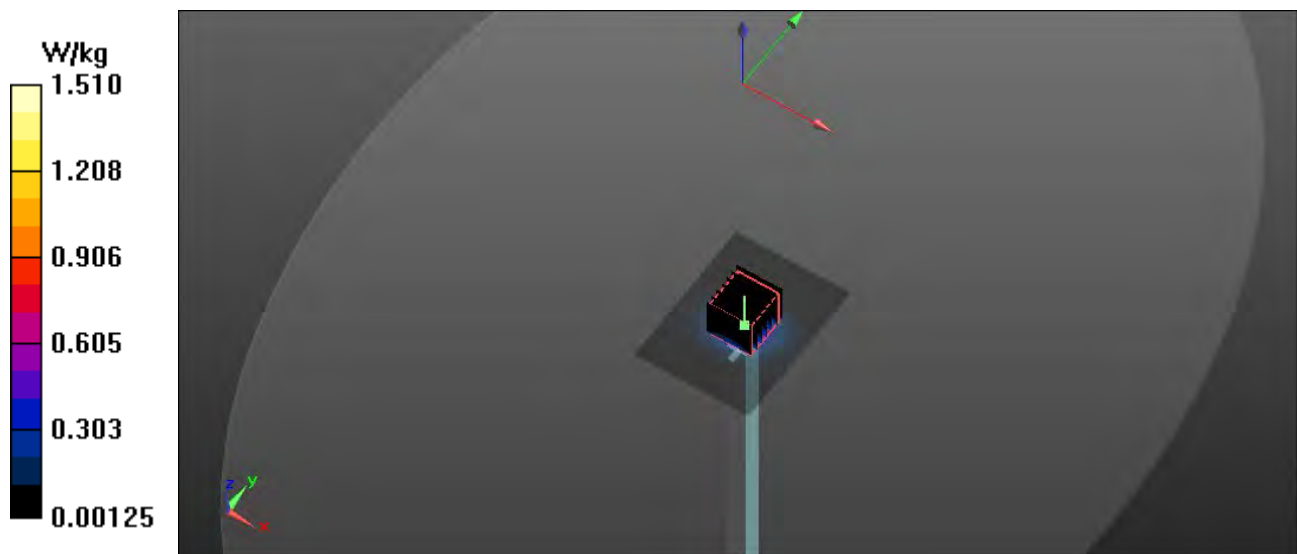
Reference Value = 58.697 V/m; Power Drift = -0.02 dB

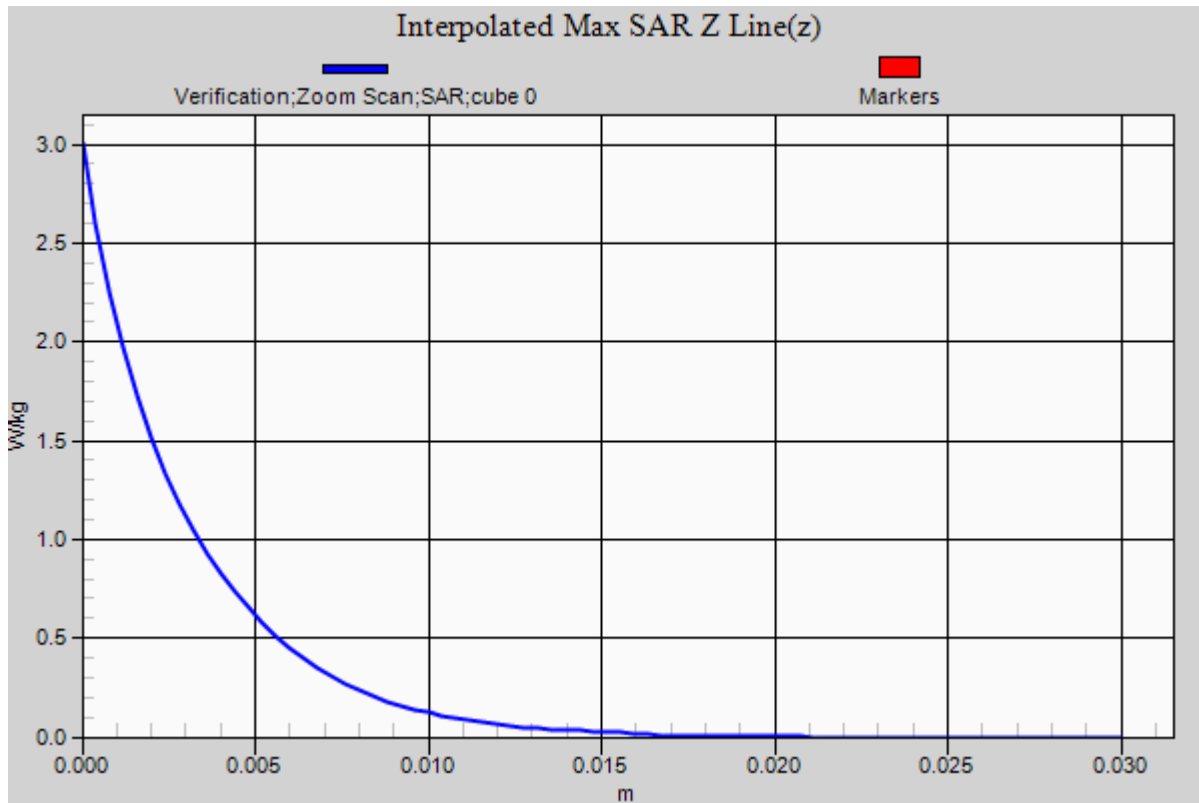
Peak SAR (extrapolated) = 3.06 W/kg

**SAR(1 g) = 0.841 W/kg; SAR(10 g) = 0.242 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.96 W/kg





# RF Exposure Lab

## Plot 17

**DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1085**

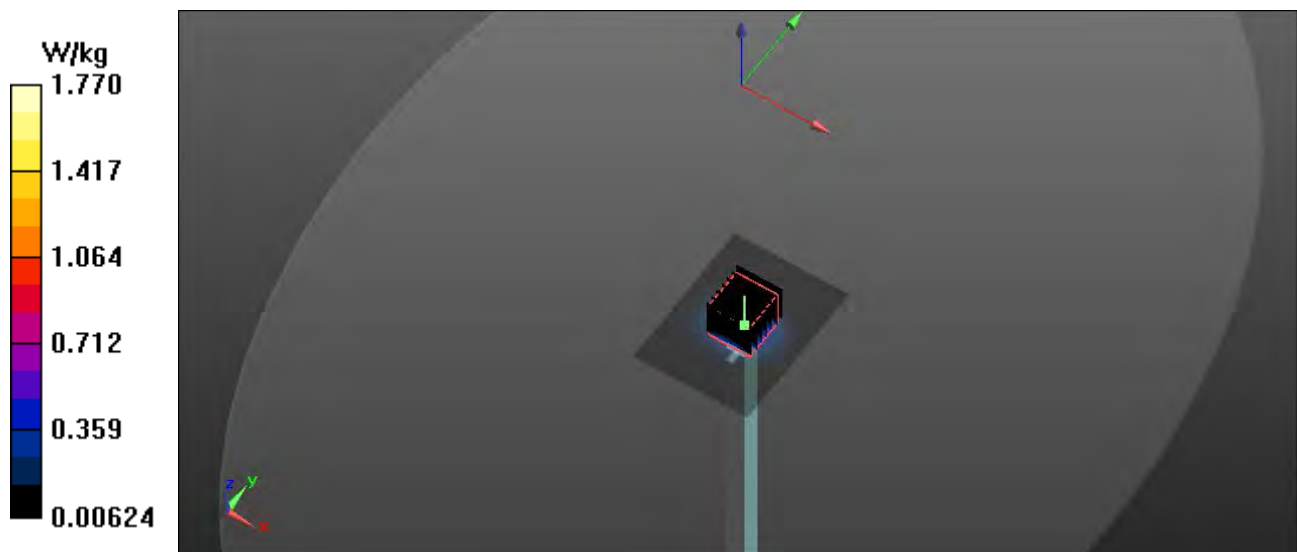
Communication System: CW; Frequency: 5600 MHz; Duty Cycle: 1:1  
Medium: HSL3-6GHz; Medium parameters used:  $f = 5600$  MHz;  $\sigma = 5.19$  S/m;  $\epsilon_r = 35.53$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

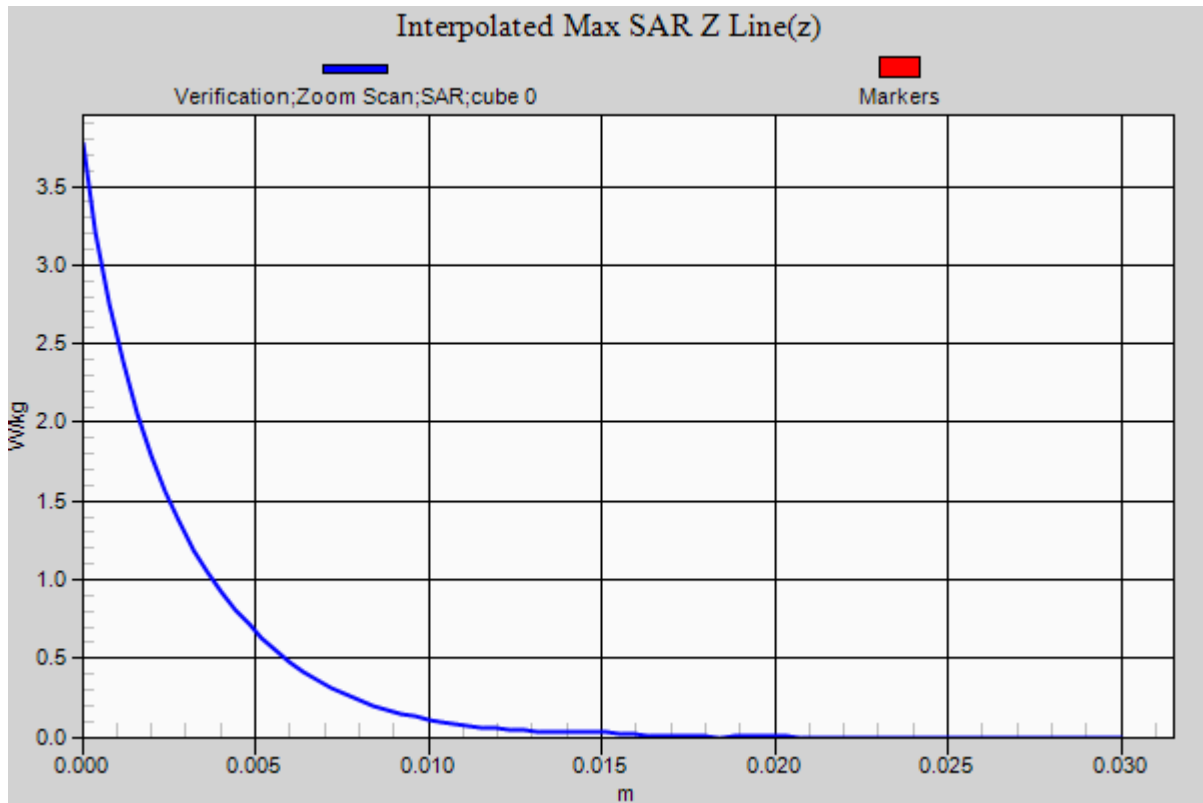
Test Date: Date: 10/25/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 – SN7531; ConvF(4.69, 4.69, 4.69); Calibrated: 6/3/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn759; Calibrated: 8/14/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**5600 MHz Head/Verification/Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 1.75 W/kg

**5600 MHz Head/Verification/Zoom Scan (8x8x15)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm  
Reference Value = 13.798 V/m; Power Drift = -0.01 dB  
Peak SAR (extrapolated) = 3.79 W/kg  
**SAR(1 g) = 0.853 W/kg; SAR(10 g) = 0.243 W/kg**  
Maximum value of SAR (measured) = 2.03 W/kg





# RF Exposure Lab

## Plot 18

**DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1085**

Communication System: CW; Frequency: 5750 MHz; Duty Cycle: 1:1  
Medium: HSL3-6GHz; Medium parameters used (interpolated):  $f = 5750$  MHz;  $\sigma = 5.36$  S/m;  $\epsilon_r = 35.36$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Test Date: Date: 10/25/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C  
Probe: EX3DV4 – SN7531; ConvF(4.78, 4.78, 4.78); Calibrated: 6/3/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn759; Calibrated: 8/14/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**5750 MHz Head/Verification/Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.67 W/kg

**5750 MHz Head/Verification/Zoom Scan (8x8x15)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

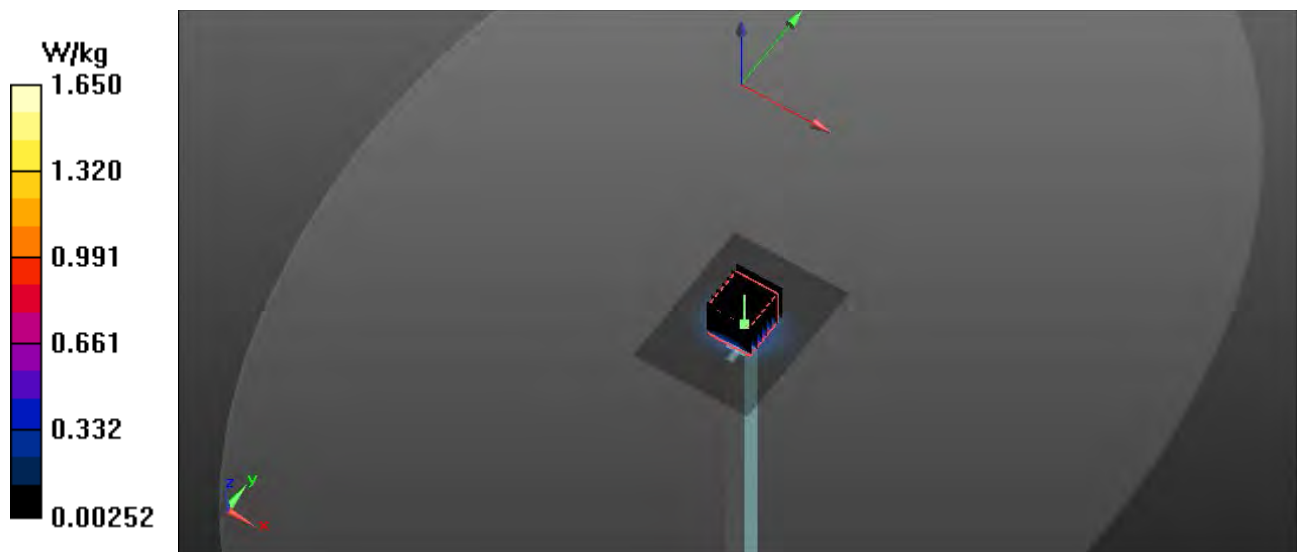
Reference Value = 12.942 V/m; Power Drift = -0.02 dB

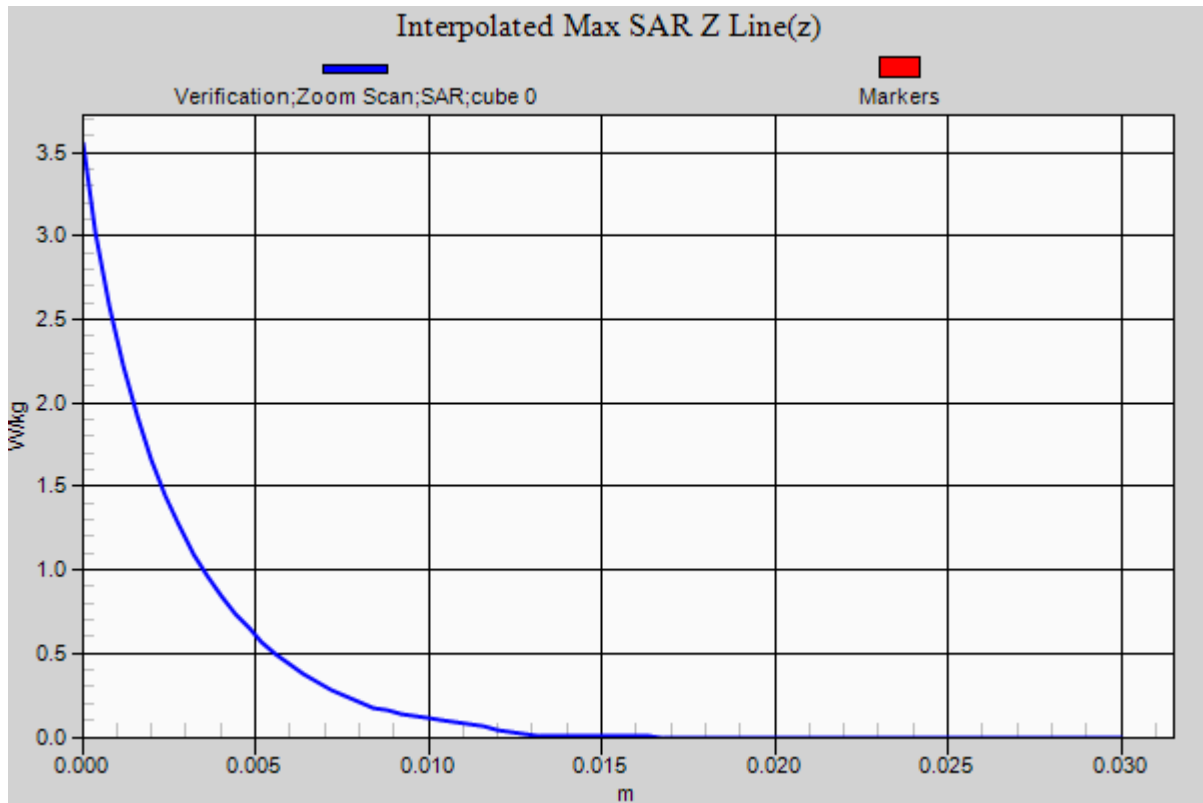
Peak SAR (extrapolated) = 3.59 W/kg

**SAR(1 g) = 0.823 W/kg; SAR(10 g) = 0.241 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.86 W/kg





## Appendix B – SAR Test Data Plots



# RF Exposure Lab

## Plot 1

**DUT: EG 2xx; Type: Wireless TV Video Case; Serial: Eng 1**

Communication System: LTE (SC-FDMA, 1 RB, 10 MHz, QPSK); Frequency: 782 MHz; Duty Cycle: 1:1  
Medium: HSL750; Medium parameters used (interpolated):  $f = 782 \text{ MHz}$ ;  $\sigma = 0.922 \text{ S/m}$ ;  $\epsilon_r = 41.268$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

Test Date: Date: 10/07/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN3662; ConvF(9.57, 9.57, 9.57); Calibrated: 4/24/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1416; Calibrated: 4/16/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 2037  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**750 MHz B13 LTE Short Edge/Ant T3 Left Mid 1 RB 24 Offset/Area Scan (7x5x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.723 W/kg

**750 MHz B13 LTE Short Edge/Ant T3 Left Mid 1 RB 24 Offset/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

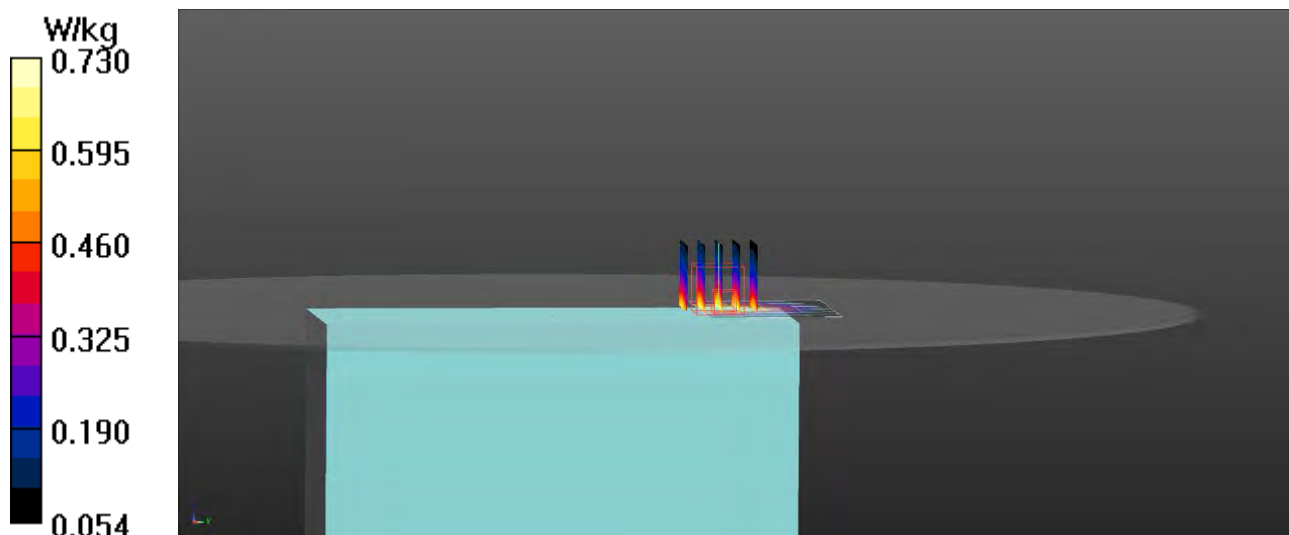
Reference Value = 11.92 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.846 W/kg

**SAR(1 g) = 0.606 W/kg; SAR(10 g) = 0.423 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.730 W/kg



# RF Exposure Lab

## Plot 2

**DUT: EG 2xx; Type: Wireless TV Video Case; Serial: Eng 1**

Communication System: LTE (SC-FDMA, 1 RB, 10 MHz, QPSK); Frequency: 707.5 MHz; Duty Cycle: 1:1  
Medium: HSL750; Medium parameters used (interpolated):  $f = 707.5$  MHz;  $\sigma = 0.858$  S/m;  $\epsilon_r = 41.438$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Test Date: Date: 10/16/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN3693; ConvF(9.52, 9.52, 9.52); Calibrated: 8/20/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1321; Calibrated: 1/10/2019  
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**750 MHz B12 LTE Long Edge/Ant B2 Back Mid 1 RB 24 Offset/Area Scan (7x5x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.418 W/kg

**750 MHz B12 LTE Long Edge/Ant B2 Back Mid 1 RB 24 Offset/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

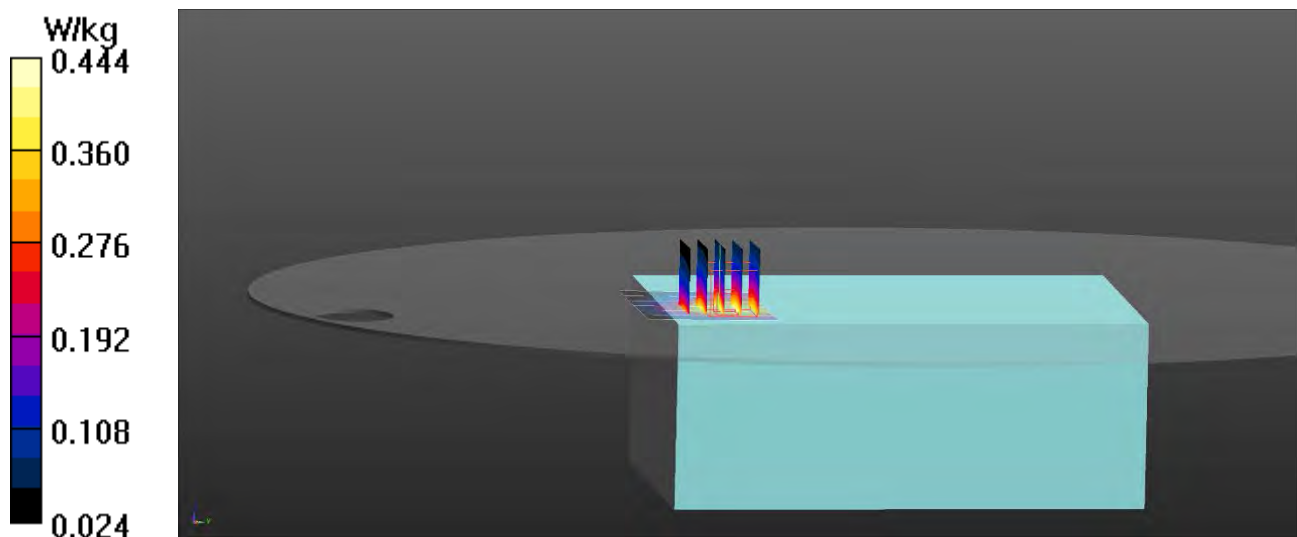
Reference Value = 7.782 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.516 W/kg

**SAR(1 g) = 0.363 W/kg; SAR(10 g) = 0.249 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.444 W/kg



# RF Exposure Lab

## Plot 3

**DUT: EG 2xx; Type: Wireless TV Video Case; Serial: Eng 1**

Communication System: LTE (SC-FDMA, 1 RB, 10 MHz, QPSK); Frequency: 793 MHz; Duty Cycle: 1:1  
Medium: HSL750; Medium parameters used (interpolated):  $f = 793 \text{ MHz}$ ;  $\sigma = 0.92 \text{ S/m}$ ;  $\epsilon_r = 40.938$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

Test Date: Date: 10/17/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN3693; ConvF(9.52, 9.52, 9.52); Calibrated: 8/20/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1321; Calibrated: 1/10/2019  
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**750 MHz B14 LTE Short Edge/Ant B2 Left Mid 1 RB 49 Offset/Area Scan (7x5x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.556 W/kg

**750 MHz B14 LTE Short Edge/Ant B2 Left Mid 1 RB 49 Offset/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

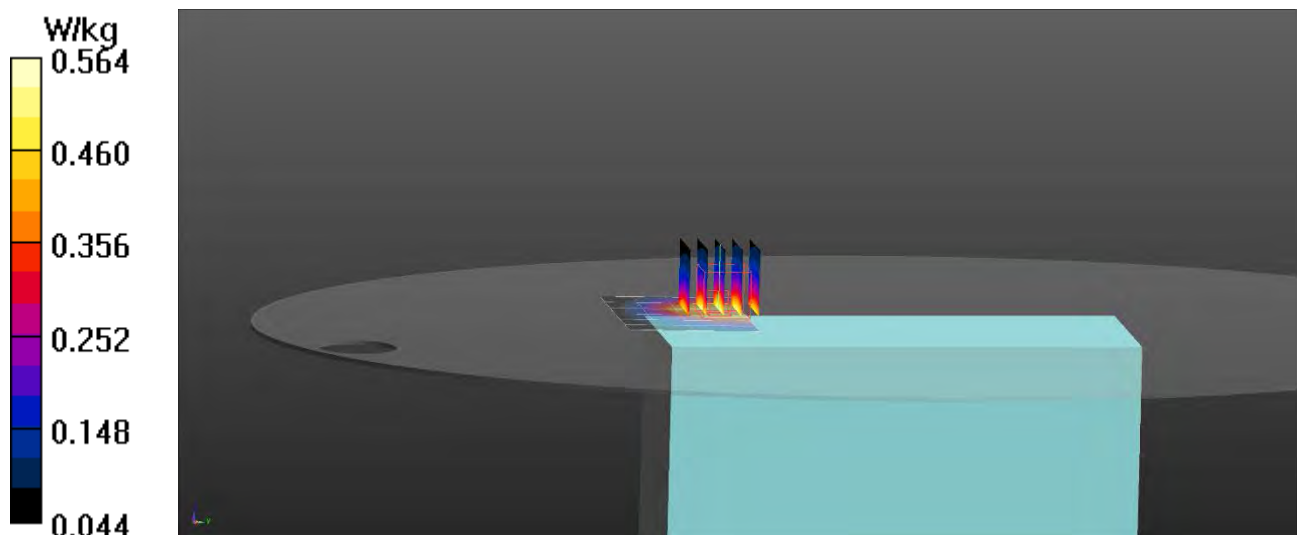
Reference Value = 10.76 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.646 W/kg

**SAR(1 g) = 0.464 W/kg; SAR(10 g) = 0.325 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.564 W/kg



# RF Exposure Lab

## Plot 4

**DUT: EG 2xx; Type: Wireless TV Video Case; Serial: Eng 1**

Communication System: UMTS (WCDMA); Frequency: 836.6 MHz; Duty Cycle: 1:1  
Medium: HSL835; Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 0.927$  S/m;  $\epsilon_r = 41.12$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Test Date: Date: 10/17/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN3693; ConvF(9.14, 9.14, 9.14); Calibrated: 8/20/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1321; Calibrated: 1/10/2019  
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**850 MHz B5 WCDMA Long Edge/Ant B2 Back Mid/Area Scan (7x5x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.580 W/kg

**850 MHz B5 WCDMA Long Edge/Ant B2 Back Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

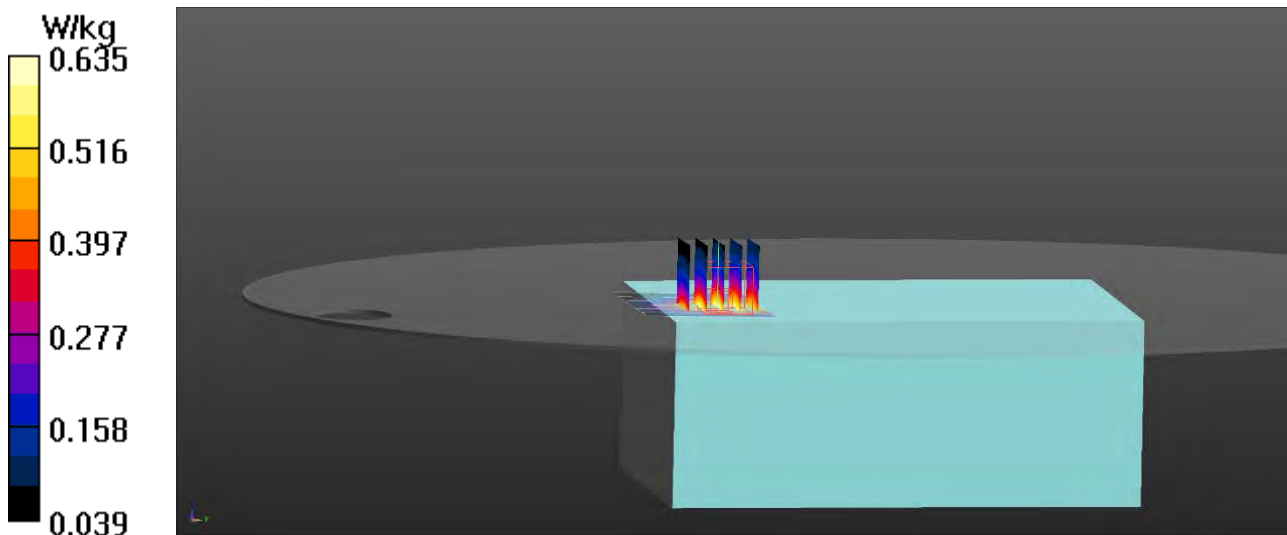
Reference Value = 9.634 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.721 W/kg

**SAR(1 g) = 0.518 W/kg; SAR(10 g) = 0.354 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.635 W/kg



# RF Exposure Lab

## Plot 5

**DUT: EG 2xx; Type: Wireless TV Video Case; Serial: Eng 1**

Communication System: LTE (SC-FDMA, 1 RB, 10 MHz, QPSK); Frequency: 831.5 MHz; Duty Cycle: 1:1  
Medium: HSL835; Medium parameters used (interpolated):  $f = 831.5$  MHz;  $\sigma = 0.912$  S/m;  $\epsilon_r = 41.456$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Test Date: Date: 10/10/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN3662; ConvF(9.12, 9.12, 9.12); Calibrated: 4/24/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1416; Calibrated: 4/16/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 2037  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**850 MHz B26 LTE Long Edge/Ant T4 Front Mid 1 RB 24 Offset/Area Scan (7x5x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.523 W/kg

**850 MHz B26 LTE Long Edge/Ant T4 Front Mid 1 RB 24 Offset/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

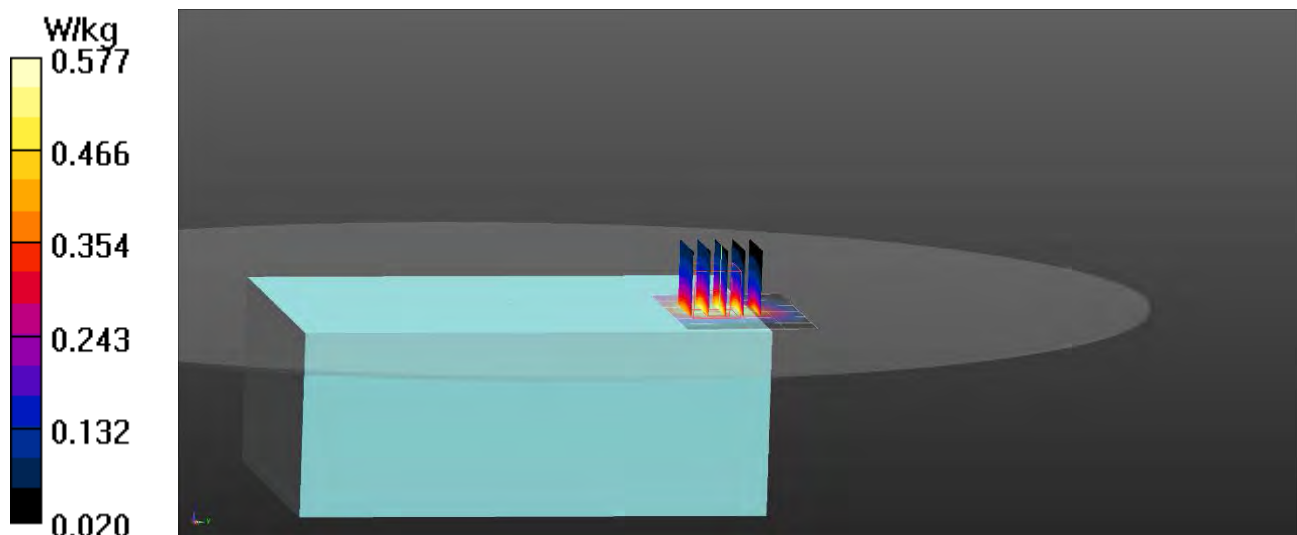
Reference Value = 9.610 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.676 W/kg

**SAR(1 g) = 0.459 W/kg; SAR(10 g) = 0.302 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.577 W/kg



# RF Exposure Lab

## Plot 6

**DUT: EG 2xx; Type: Wireless TV Video Case; Serial: Eng 1**

Communication System: UMTS (WCDMA); Frequency: 1712.4 MHz; Duty Cycle: 1:1  
Medium: HSL1750; Medium parameters used (interpolated):  $f = 1712.4$  MHz;  $\sigma = 1.392$  S/m;  $\epsilon_r = 39.685$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Test Date: Date: 10/19/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN3693; ConvF(7.97, 7.97, 7.97); Calibrated: 8/20/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1321; Calibrated: 1/10/2019  
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**1750 MHz B4 WCDMA Long Edge/Ant B2 Back Low/Area Scan (7x5x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.26 W/kg

**1750 MHz B4 WCDMA Long Edge/Ant B2 Back Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

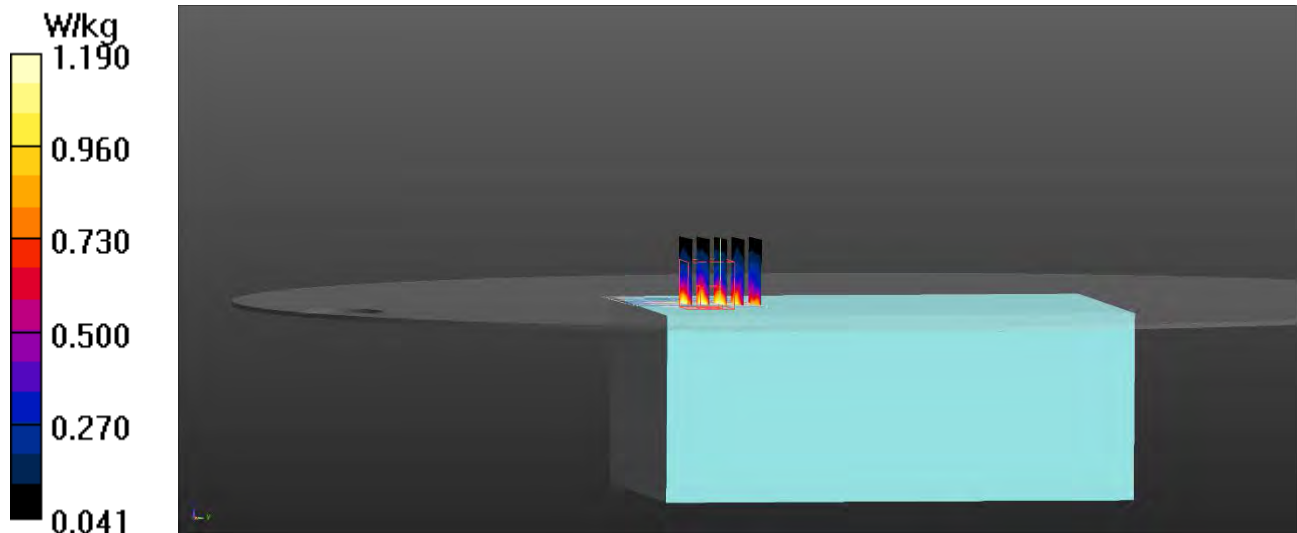
Reference Value = 10.07 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.49 W/kg

**SAR(1 g) = 0.965 W/kg; SAR(10 g) = 0.590 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.19 W/kg



# RF Exposure Lab

## Plot 7

**DUT: EG 2xx; Type: Wireless TV Video Case; Serial: Eng 1**

Communication System: LTE (SC-FDMA, 1 RB, 20 MHz, QPSK); Frequency: 1720 MHz; Duty Cycle: 1:1  
Medium: HSL1750; Medium parameters used:  $f = 1720$  MHz;  $\sigma = 1.37$  S/m;  $\epsilon_r = 39.99$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

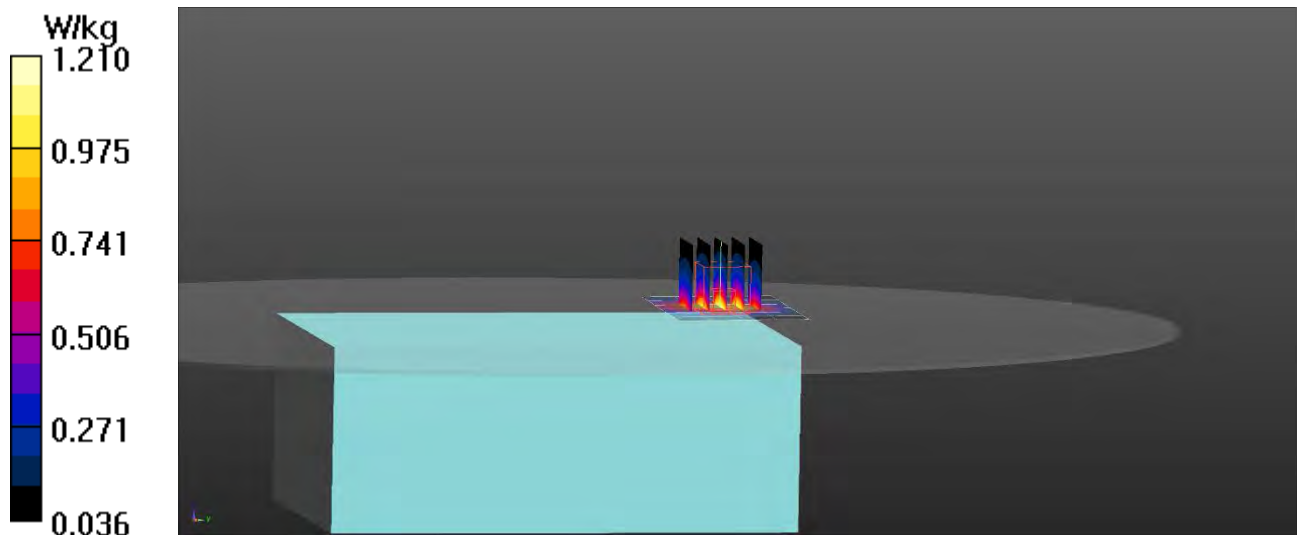
Test Date: Date: 10/15/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN3662; ConvF(8.23, 8.23, 8.23); Calibrated: 4/24/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1416; Calibrated: 4/16/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 2037  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**1750 MHz B66 LTE Long Edge/Ant T2 Back Low 1 RB 24 Offset/Area Scan (7x5x1):** Measurement grid:  
dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 1.17 W/kg

**1750 MHz B66 LTE Long Edge/Ant T2 Back Low 1 RB 24 Offset/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  
dx=8mm, dy=8mm, dz=5mm  
Reference Value = 4.889 V/m; Power Drift = 0.03 dB  
Peak SAR (extrapolated) = 1.45 W/kg  
**SAR(1 g) = 0.932 W/kg; SAR(10 g) = 0.561 W/kg**  
Maximum value of SAR (measured) = 1.21 W/kg



# RF Exposure Lab

## Plot 8

**DUT: EG 2xx; Type: Wireless TV Video Case; Serial: Eng 1**

Communication System: UMTS (WCDMA); Frequency: 1852.4 MHz; Duty Cycle: 1:1  
Medium: HSL1900; Medium parameters used (interpolated):  $f = 1852.4$  MHz;  $\sigma = 1.382$  S/m;  $\epsilon_r = 40.425$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Test Date: Date: 10/19/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN3662; ConvF(7.9, 7.9, 7.9); Calibrated: 4/24/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1416; Calibrated: 4/16/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 2037  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**1900 MHz B2 WCDMA Long Edge/Ant T2 Back Low/Area Scan (7x5x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.21 W/kg

**1900 MHz B2 WCDMA Long Edge/Ant T2 Back Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

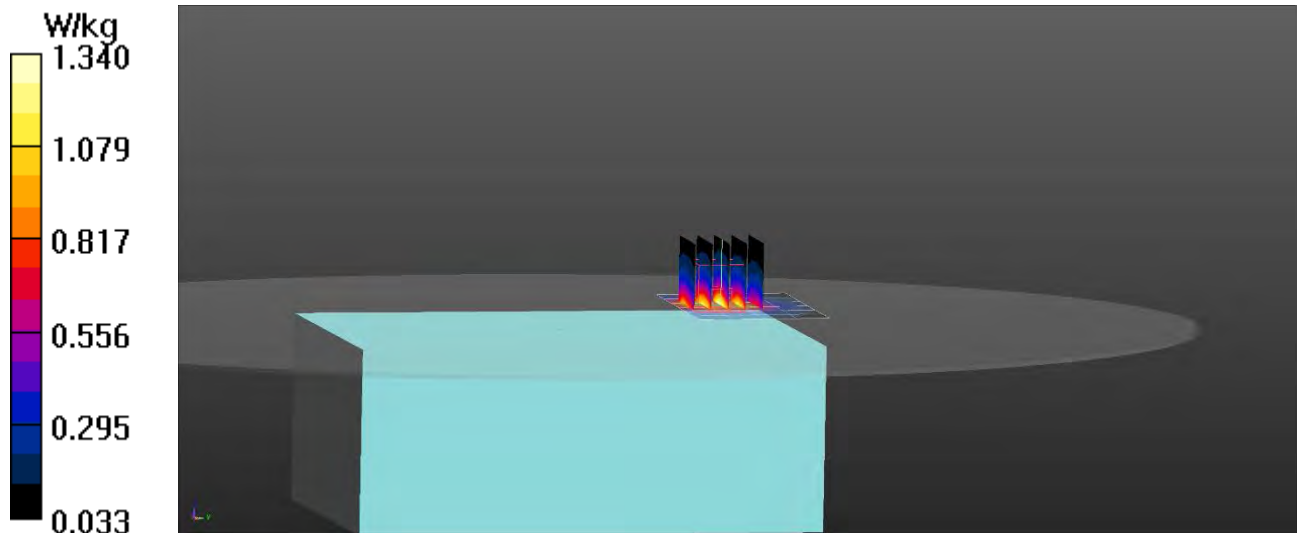
Reference Value = 9.740 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.60 W/kg

**SAR(1 g) = 1.02 W/kg; SAR(10 g) = 0.603 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.34 W/kg





# RF Exposure Lab

## Plot 9

**DUT: EG 2xx; Type: Wireless TV Video Case; Serial: Eng 1**

Communication System: LTE (SC-FDMA, 1 RB, 20 MHz, QPSK); Frequency: 1900 MHz; Duty Cycle: 1:1  
Medium: HSL1900; Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.43$  S/m;  $\epsilon_r = 40.37$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Test Date: Date: 10/19/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN3662; ConvF(7.9, 7.9, 7.9); Calibrated: 4/24/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1416; Calibrated: 4/16/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 2037  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**1900 MHz B2 LTE Long Edge/Ant T2 Back High 1 RB 24 Offset/Area Scan (7x5x1):** Measurement grid:

$dx=15$ mm,  $dy=15$ mm

Maximum value of SAR (measured) = 1.37 W/kg

**1900 MHz B2 LTE Long Edge/Ant T2 Back High 1 RB 24 Offset/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:

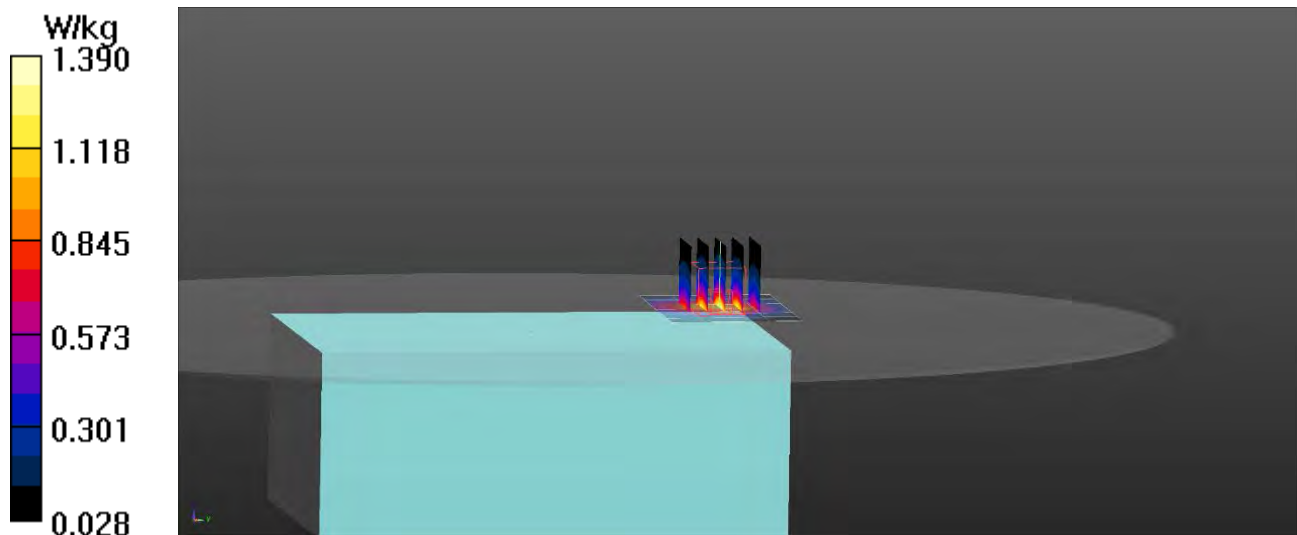
$dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 4.427 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.72 W/kg

**SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.603 W/kg**

Maximum value of SAR (measured) = 1.39 W/kg



# RF Exposure Lab

## Plot 10

**DUT: EG 2xx; Type: Wireless TV Video Case; Serial: Eng 1**

Communication System: LTE (SC-FDMA, 1 RB, 20 MHz, QPSK); Frequency: 2535 MHz; Duty Cycle: 1:1  
Medium: HSL2550; Medium parameters used (interpolated):  $f = 2535$  MHz;  $\sigma = 1.915$  S/m;  $\epsilon_r = 38.985$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Test Date: Date: 10/23/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN3662; ConvF(7.21, 7.21, 7.21); Calibrated: 4/24/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1416; Calibrated: 4/16/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 2037  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**2550 MHz B7 LTE Long Edge/Ant T2 Back Mid 1 RB 49 Offset/Area Scan (10x7x1):** Measurement grid:  
dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.56 W/kg

**2550 MHz B7 LTE Long Edge/Ant T2 Back Mid 1 RB 49 Offset/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:

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

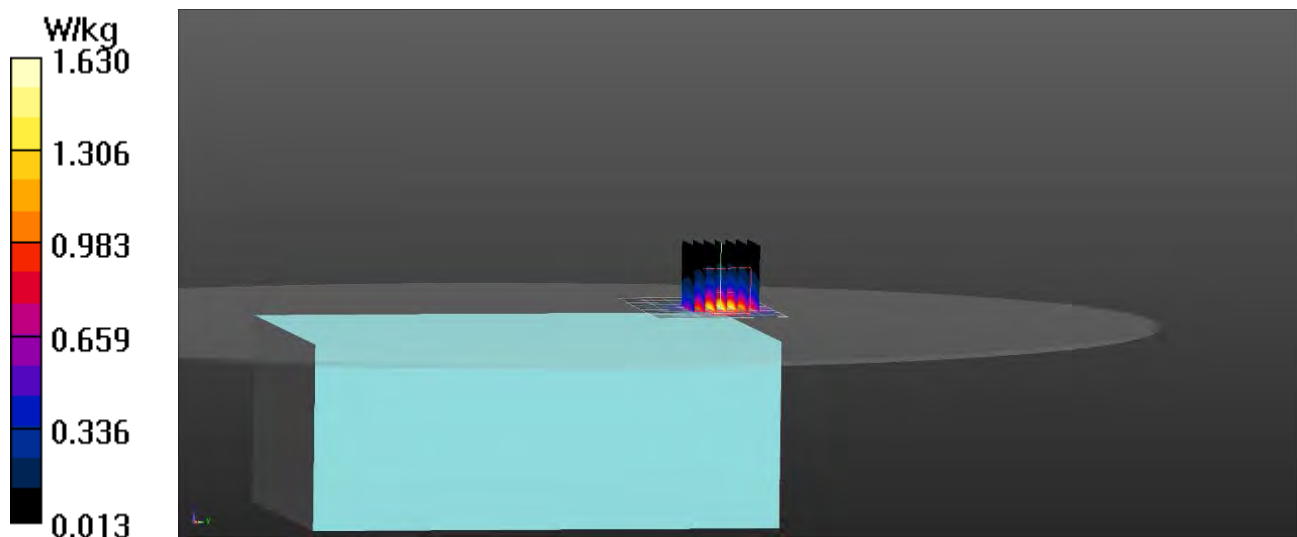
Reference Value = 2.058 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 2.13 W/kg

**SAR(1 g) = 1.13 W/kg; SAR(10 g) = 0.588 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.63 W/kg



# RF Exposure Lab

## Plot 11

**DUT: EG 2xx; Type: Wireless TV Video Case; Serial: Eng 1**

Communication System: LTE (SC-FDMA, 1 RB, 20 MHz, QPSK); Frequency: 2593 MHz; Duty Cycle: 1:1  
Medium: HSL2550; Medium parameters used (interpolated):  $f = 2593$  MHz;  $\sigma = 1.963$  S/m;  $\epsilon_r = 38.887$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Test Date: Date: 10/24/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN3693; ConvF(6.73, 6.73, 6.73); Calibrated: 8/20/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1321; Calibrated: 1/10/2019  
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**2550 MHz B41 LTE End/Ant B2 Bottom Mid 1 RB 49 Offset/Area Scan (7x10x1):** Measurement grid: dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.815 W/kg

**2550 MHz B41 LTE End/Ant B2 Bottom Mid 1 RB 49 Offset/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:

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

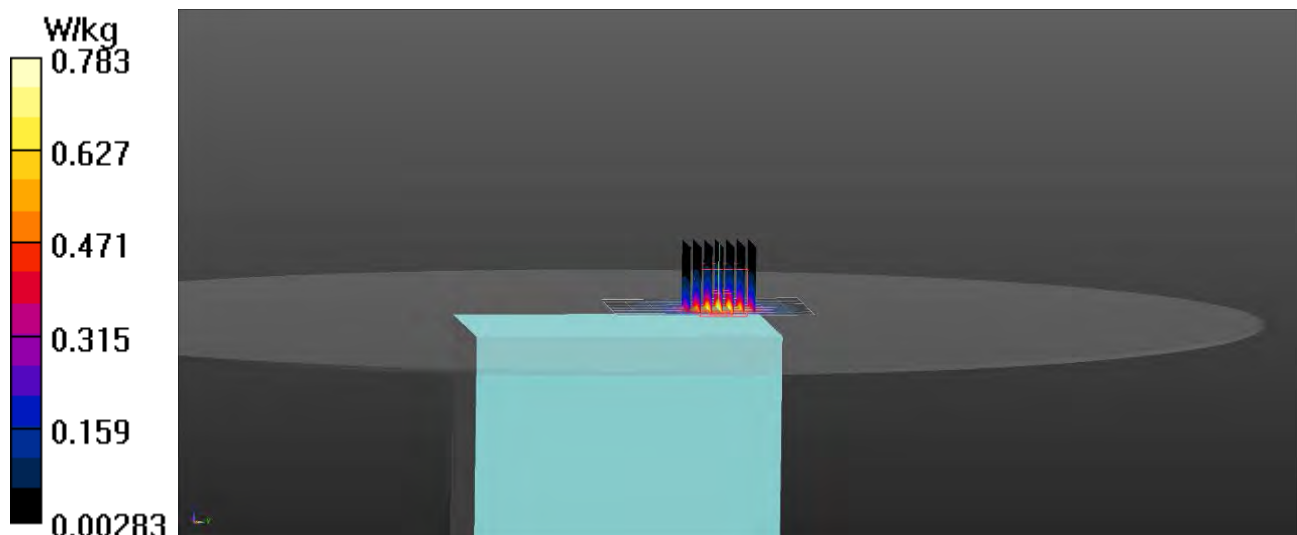
Reference Value = 10.09 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.00 W/kg

**SAR(1 g) = 0.550 W/kg; SAR(10 g) = 0.285 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.783 W/kg



# RF Exposure Lab

## Plot 12

**DUT: EG 2xx; Type: Wireless TV Video Case; Serial: Eng 1**

Communication System: LTE (SC-FDMA, 1 RB, 20 MHz, QPSK); Frequency: 3625 MHz; Duty Cycle: 1:1  
Medium: HSL3-6GHz; Medium parameters used (interpolated):  $f = 3625$  MHz;  $\sigma = 3.055$  S/m;  $\epsilon_r = 37.405$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Test Date: Date: 10/28/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN3662; ConvF(6.92, 6.92, 6.92); Calibrated: 4/24/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1416; Calibrated: 4/16/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 2037  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**3600 MHz B48 LTE Long Edge/Ant B2 Back Mid 1 RB 49 Offset/Area Scan (10x7x1):** Measurement grid:  
dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.314 W/kg

**3600 MHz B48 LTE Long Edge/Ant B2 Back Mid 1 RB 49 Offset/Zoom Scan (8x8x8)/Cube 0:** Measurement grid:

dx=4mm, dy=4mm, dz=4mm

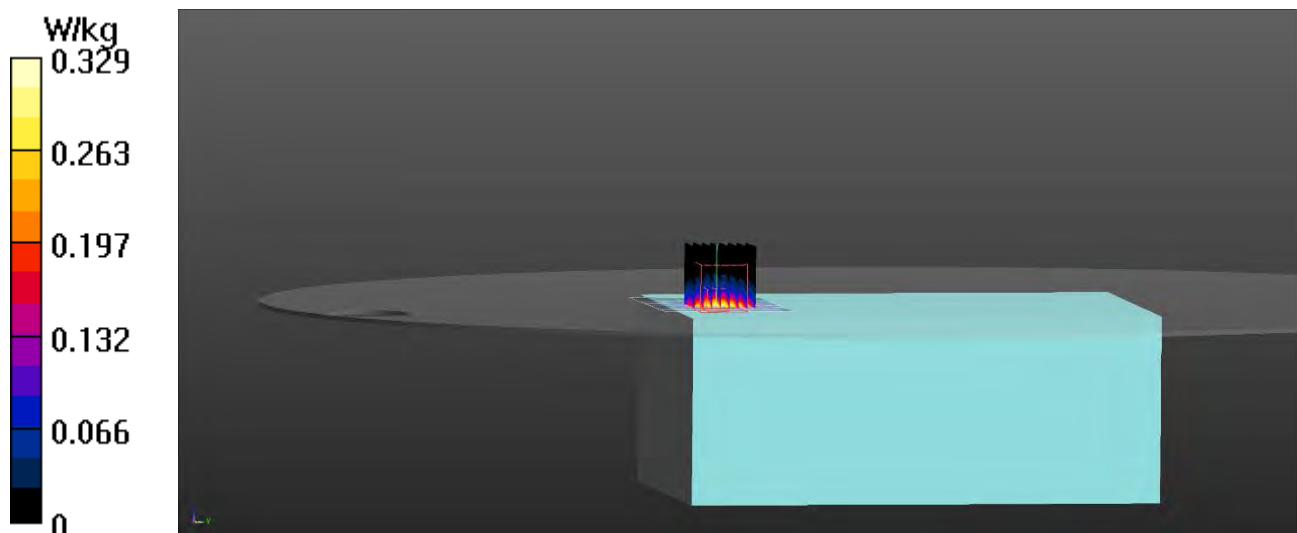
Reference Value = 0 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.480 W/kg

**SAR(1 g) = 0.211 W/kg; SAR(10 g) = 0.093 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.329 W/kg



# RF Exposure Lab

## Plot 13

**DUT: EG 2xx; Type: Wireless TV Video Case; Serial: Eng 1**

Communication System: WiFi 802.11b (DSSS, 1 Mbps); Frequency: 2437 MHz; Duty Cycle: 1:1  
Medium: HSL2450; Medium parameters used (interpolated):  $f = 2437$  MHz;  $\sigma = 1.824$  S/m;  $\epsilon_r = 39.013$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Test Date: Date: 10/25/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(7.58, 7.58, 7.58); Calibrated: 6/3/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn759; Calibrated: 8/14/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**2450 MHz/Bottom Tx0 Mid/Area Scan (9x7x1):** Measurement grid: dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.904 W/kg

**2450 MHz/Bottom Tx0 Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

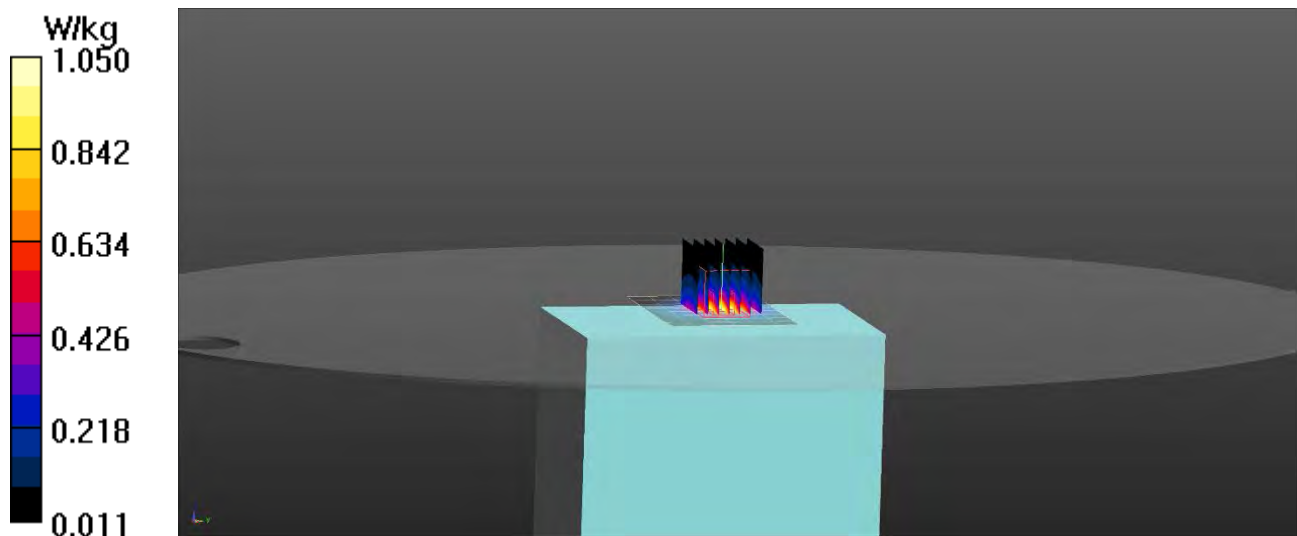
Reference Value = 19.38 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.36 W/kg

**SAR(1 g) = 0.737 W/kg; SAR(10 g) = 0.381 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.05 W/kg



# RF Exposure Lab

## Plot 14

**DUT: EG 2xx; Type: Wireless TV Video Case; Serial: Eng 1**

Communication System: WiFi 802.11a (OFDM, 6 Mbps); Frequency: 5300 MHz; Duty Cycle: 1:1  
Medium: HSL3-6GHz; Medium parameters used:  $f = 5300$  MHz;  $\sigma = 4.86$  S/m;  $\epsilon_r = 35.87$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

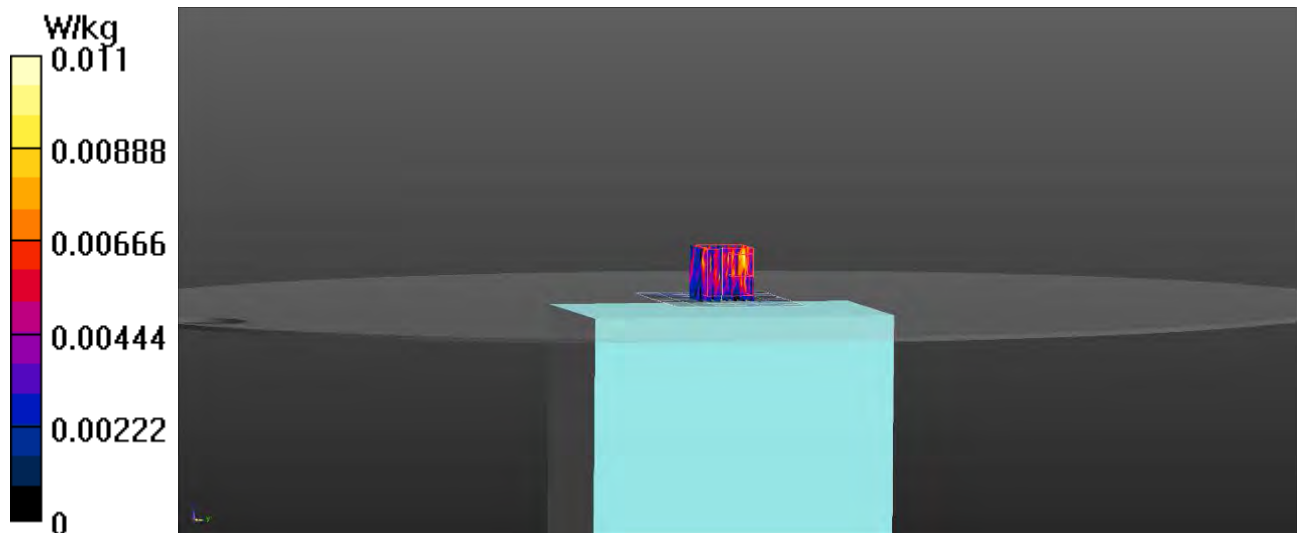
Test Date: Date: 10/25/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(5.24, 5.24, 5.24); Calibrated: 6/3/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn759; Calibrated: 8/14/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**5200 MHz/Bottom Tx0 60/Area Scan (9x7x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 0.00347 W/kg

**5200 MHz/Bottom Tx0 60/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm  
Reference Value = 0.2380 V/m; Power Drift = 0.02 dB  
Peak SAR (extrapolated) = 0.0100 W/kg  
**SAR(1 g) = 0.00422 W/kg; SAR(10 g) = 0.00158 W/kg**  
Maximum value of SAR (measured) = 0.0111 W/kg



# RF Exposure Lab

## Plot 15

**DUT: EG 2xx; Type: Wireless TV Video Case; Serial: Eng 1**

Communication System: WiFi 802.11a (OFDM, 6 Mbps); Frequency: 5620 MHz; Duty Cycle: 1:1  
Medium: HSL3-6GHz; Medium parameters used:  $f = 5620$  MHz;  $\sigma = 5.21$  S/m;  $\epsilon_r = 35.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

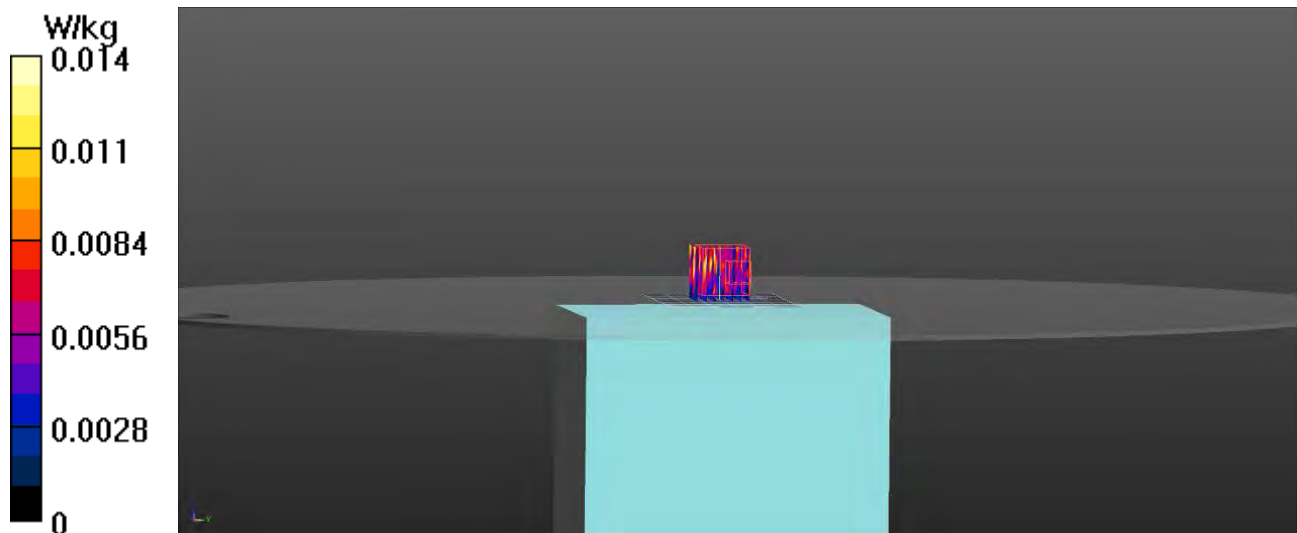
Test Date: Date: 10/25/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(4.69, 4.69, 4.69); Calibrated: 6/3/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn759; Calibrated: 8/14/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**5600 MHz/Bottom Tx0 124/Area Scan (9x7x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 0.00551 W/kg

**5600 MHz/Bottom Tx0 124/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm  
Reference Value = 1.103 V/m; Power Drift = 0.03 dB  
Peak SAR (extrapolated) = 0.0290 W/kg  
**SAR(1 g) = 0.0031 W/kg; SAR(10 g) = 0.00144 W/kg**  
Maximum value of SAR (measured) = 0.0140 W/kg



# RF Exposure Lab

## Plot 16

**DUT: EG 2xx; Type: Wireless TV Video Case; Serial: Eng 1**

Communication System: WiFi 802.11a (OFDM, 6 Mbps); Frequency: 5785 MHz; Duty Cycle: 1:1  
Medium: HSL3-6GHz; Medium parameters used (interpolated):  $f = 5785$  MHz;  $\sigma = 5.395$  S/m;  $\epsilon_r = 35.32$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Test Date: Date: 10/25/2019; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(4.78, 4.78, 4.78); Calibrated: 6/3/2019;  
Sensor-Surface: 2mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn759; Calibrated: 8/14/2019  
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251  
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

### Procedure Notes:

**5800 MHz/Bottom Tx0 157/Area Scan (9x7x1):** Measurement grid: dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.00472 W/kg

**5800 MHz/Bottom Tx0 157/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

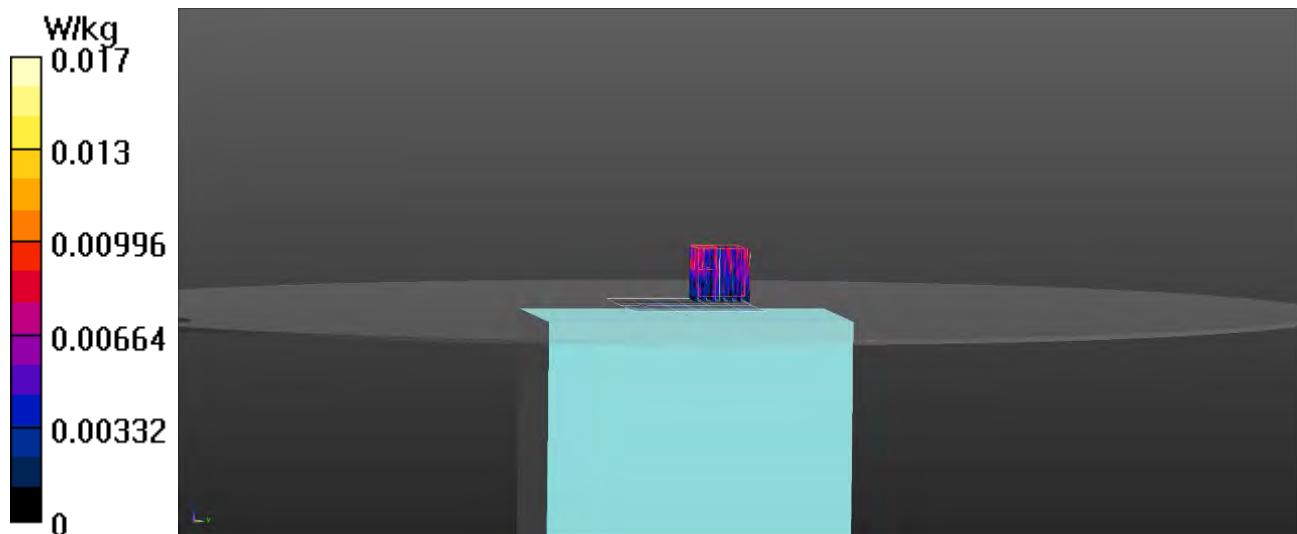
Reference Value = 0 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.0250 W/kg

**SAR(1 g) = 0.00271 W/kg; SAR(10 g) = 0.000815 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.0166 W/kg





## Appendix C – SAR Test Setup Photos



**Test Configuration Top/Bottom 10 mm Gap**



**Test Configuration Right/Left 10 mm Gap**



**Test Configuration Front/Back 10 mm Gap**



**Front of Device**



**Back of Device**





**Left Side of Device**



**Right Side of Device**



**Top of Device in Carrying Case Opened**





**Bottom of Device in Carrying Case Opened**



**Front of Device in Carrying Case Opened**



**Front of Device in Carrying Case Closed**

## Appendix D – Probe Calibration Data Sheets



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Client **RF Exposure Lab**

Certificate No: **EX3-3662\_Apr19**

## CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3662**

Calibration procedure(s) **QA CAL-01.v9, QA CAL-14.v5, QA CAL-23.v5, QA CAL-25.v7**  
**Calibration procedure for dosimetric E-field probes**

Calibration date: **April 24, 2019**

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 NRP            | SN: 104778       | 03-Apr-19 (No. 217-02892/02893)   | Apr-20                 |
| Power sensor NRP-Z91       | SN: 103244       | 03-Apr-19 (No. 217-02892)         | Apr-20                 |
| Power sensor NRP-Z91       | SN: 103245       | 03-Apr-19 (No. 217-02893)         | Apr-20                 |
| Reference 20 dB Attenuator | SN: S5277 (20x)  | 04-Apr-19 (No. 217-02894)         | Apr-20                 |
| DAE4                       | SN: 660          | 19-Dec-18 (No. DAE4-660_Dec18)    | Dec-19                 |
| Reference Probe ES3DV2     | SN: 3013         | 31-Dec-18 (No. ES3-3013_Dec18)    | Dec-19                 |
| Secondary Standards        | ID               | Check Date (in house)             | Scheduled Check        |
| Power meter E4419B         | SN: GB41293874   | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| Power sensor E4412A        | SN: MY41498087   | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| Power sensor E4412A        | SN: 000110210    | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| RF generator HP 8648C      | SN: US3642U01700 | 04-Aug-99 (in house check Jun-18) | In house check: Jun-20 |
| Network Analyzer E8358A    | SN: US41080477   | 31-Mar-14 (in house check Oct-18) | In house check: Oct-19 |

Calibrated by: **Claudio Leubler** **Laboratory Technician**

Signature

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

Issued: April 25, 2019

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

## 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, D               | modulation dependent linearization parameters                                                                                                           |
| Polarization $\phi$      | $\phi$ 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 |
| Connector Angle          | information used in DASY system to align probe sensor X to the robot coordinate system                                                                  |

## Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

## 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  $E^2$ -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>; D<sub>x,y,z</sub>; VR<sub>x,y,z</sub>**: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- 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.
- Connector Angle**: The angle is assessed using the information gained by determining the NORM<sub>x</sub> (no uncertainty required).



# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3662

## Basic Calibration Parameters

|                                                           | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|-----------------------------------------------------------|----------|----------|----------|-----------|
| Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup> | 0.43     | 0.45     | 0.50     | ± 10.1 %  |
| DCP (mV) <sup>B</sup>                                     | 100.7    | 100.3    | 97.0     |           |

## Calibration Results for Modulation Response

| UID | Communication System Name |   | A<br>dB | B<br>dB/ $\mu\text{V}$ | C   | D<br>dB | VR<br>mV | Max<br>dev. | Unc <sup>E</sup><br>(k=2) |
|-----|---------------------------|---|---------|------------------------|-----|---------|----------|-------------|---------------------------|
| 0   | CW                        | X | 0.0     | 0.0                    | 1.0 | 0.00    | 157.7    | ±1.9 %      | ± 4.7 %                   |
|     |                           | Y | 0.0     | 0.0                    | 1.0 |         | 152.9    |             |                           |
|     |                           | Y | 0.0     | 0.0                    | 1.0 |         | 153.2    |             |                           |

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 Norm X,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.

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3662

### Other Probe Parameters

|                                               |            |
|-----------------------------------------------|------------|
| Sensor Arrangement                            | Triangular |
| Connector Angle (°)                           | -22.4      |
| 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 | 1.4 mm     |



## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3662

### 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 <sup>G</sup> | Depth <sup>G</sup> (mm) | Unc (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|--------------------|-------------------------|-----------|
| 750                  | 41.9                               | 0.89                            | 9.57    | 9.57    | 9.57    | 0.49               | 0.80                    | ± 12.0 %  |
| 900                  | 41.5                               | 0.97                            | 9.12    | 9.12    | 9.12    | 0.51               | 0.80                    | ± 12.0 %  |
| 1750                 | 40.1                               | 1.37                            | 8.23    | 8.23    | 8.23    | 0.38               | 0.85                    | ± 12.0 %  |
| 1900                 | 40.0                               | 1.40                            | 7.90    | 7.90    | 7.90    | 0.37               | 0.85                    | ± 12.0 %  |
| 2300                 | 39.5                               | 1.67                            | 7.50    | 7.50    | 7.50    | 0.39               | 0.85                    | ± 12.0 %  |
| 2450                 | 39.2                               | 1.80                            | 7.33    | 7.33    | 7.33    | 0.41               | 0.84                    | ± 12.0 %  |
| 2600                 | 39.0                               | 1.96                            | 7.21    | 7.21    | 7.21    | 0.42               | 0.85                    | ± 12.0 %  |
| 3500                 | 37.9                               | 2.91                            | 7.07    | 7.07    | 7.07    | 0.30               | 1.20                    | ± 13.1 %  |
| 3700                 | 37.7                               | 3.12                            | 6.92    | 6.92    | 6.92    | 0.35               | 1.25                    | ± 13.1 %  |
| 5250                 | 35.9                               | 4.71                            | 5.05    | 5.05    | 5.05    | 0.40               | 1.80                    | ± 13.1 %  |
| 5600                 | 35.5                               | 5.07                            | 4.81    | 4.81    | 4.81    | 0.40               | 1.80                    | ± 13.1 %  |
| 5750                 | 35.4                               | 5.22                            | 4.90    | 4.90    | 4.90    | 0.40               | 1.80                    | ± 13.1 %  |

<sup>C</sup> Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

<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.

<sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3662

### 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 <sup>G</sup> | Depth <sup>G</sup> (mm) | Unc (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|--------------------|-------------------------|-----------|
| 750                  | 55.5                               | 0.96                            | 9.55    | 9.55    | 9.55    | 0.47               | 0.80                    | ± 12.0 %  |
| 900                  | 55.0                               | 1.05                            | 9.34    | 9.34    | 9.34    | 0.45               | 0.80                    | ± 12.0 %  |
| 1750                 | 53.4                               | 1.49                            | 7.95    | 7.95    | 7.95    | 0.40               | 0.85                    | ± 12.0 %  |
| 1900                 | 53.3                               | 1.52                            | 7.69    | 7.69    | 7.69    | 0.43               | 0.84                    | ± 12.0 %  |
| 2300                 | 52.9                               | 1.81                            | 7.43    | 7.43    | 7.43    | 0.40               | 0.86                    | ± 12.0 %  |
| 2450                 | 52.7                               | 1.95                            | 7.36    | 7.36    | 7.36    | 0.40               | 0.85                    | ± 12.0 %  |
| 2600                 | 52.5                               | 2.16                            | 7.12    | 7.12    | 7.12    | 0.22               | 0.97                    | ± 12.0 %  |
| 3500                 | 51.3                               | 3.31                            | 6.83    | 6.83    | 6.83    | 0.30               | 1.25                    | ± 13.1 %  |
| 3700                 | 51.0                               | 3.55                            | 6.52    | 6.52    | 6.52    | 0.35               | 1.25                    | ± 13.1 %  |
| 5250                 | 48.9                               | 5.36                            | 4.30    | 4.30    | 4.30    | 0.50               | 1.90                    | ± 13.1 %  |
| 5600                 | 48.5                               | 5.77                            | 3.87    | 3.87    | 3.87    | 0.50               | 1.90                    | ± 13.1 %  |
| 5750                 | 48.3                               | 5.94                            | 4.07    | 4.07    | 4.07    | 0.50               | 1.90                    | ± 13.1 %  |

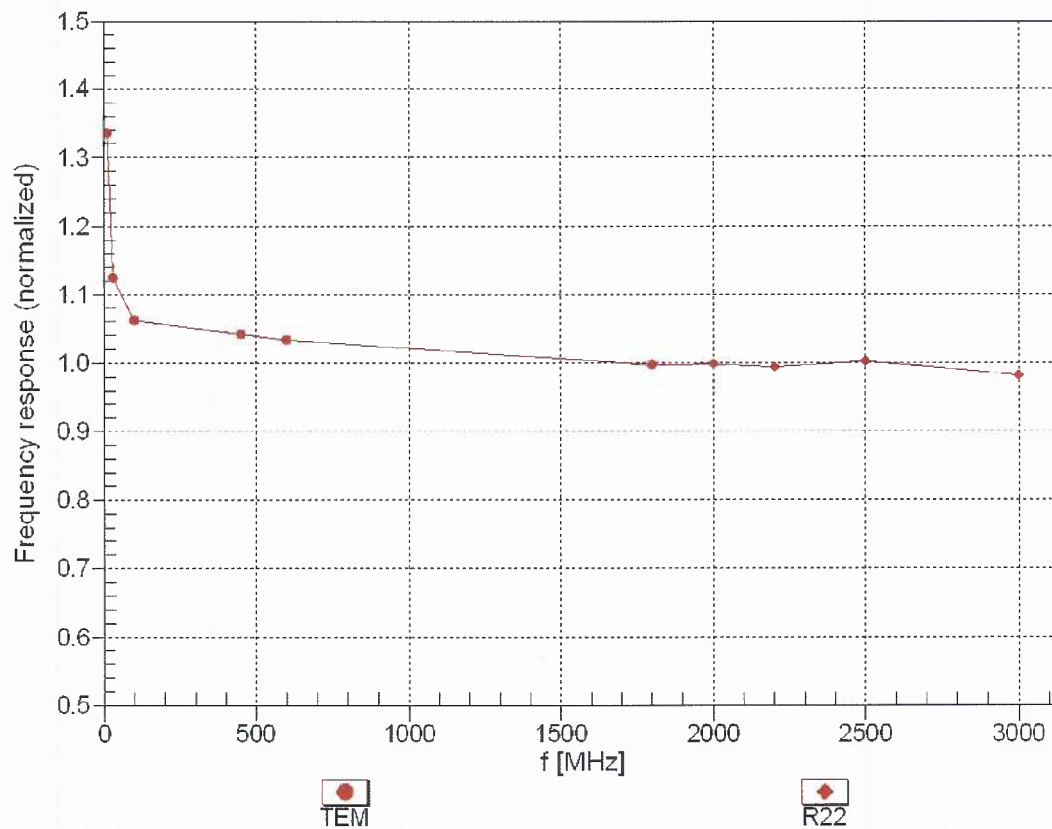
<sup>C</sup> Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

<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.

<sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

## Frequency Response of E-Field

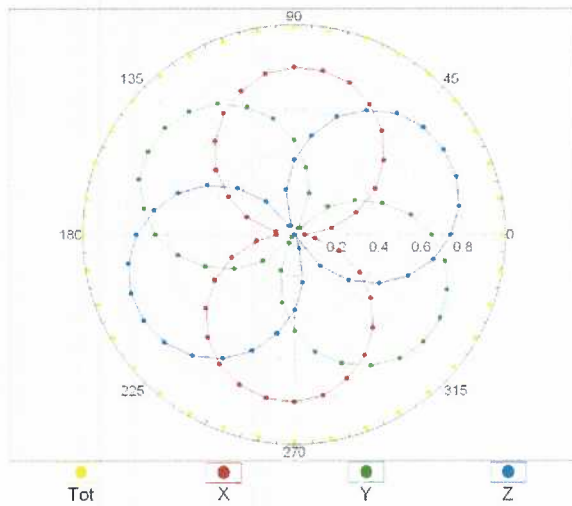
(TEM-Cell:ifi110 EXX, Waveguide: R22)



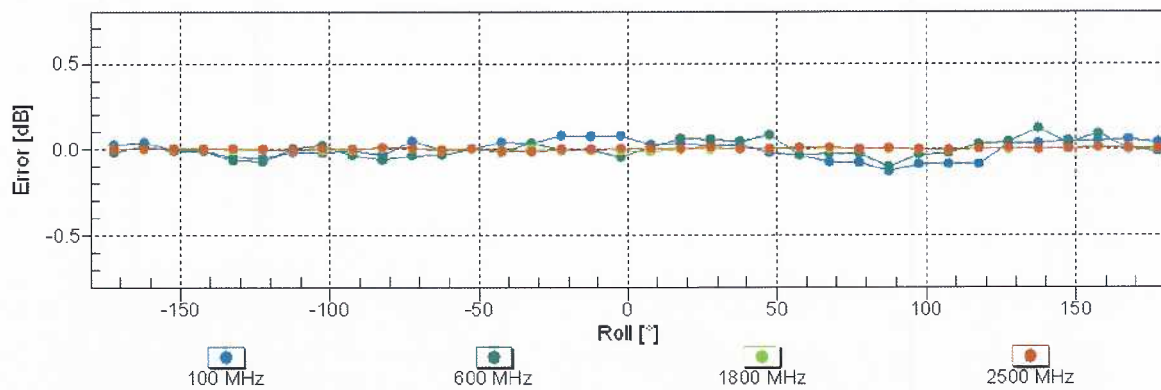
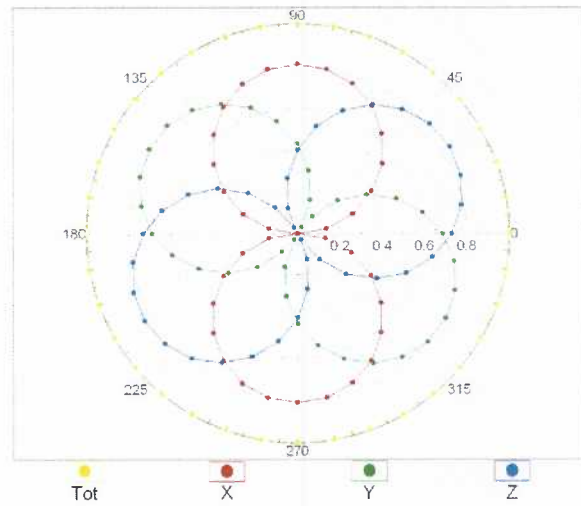
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

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

f=600 MHz,TEM

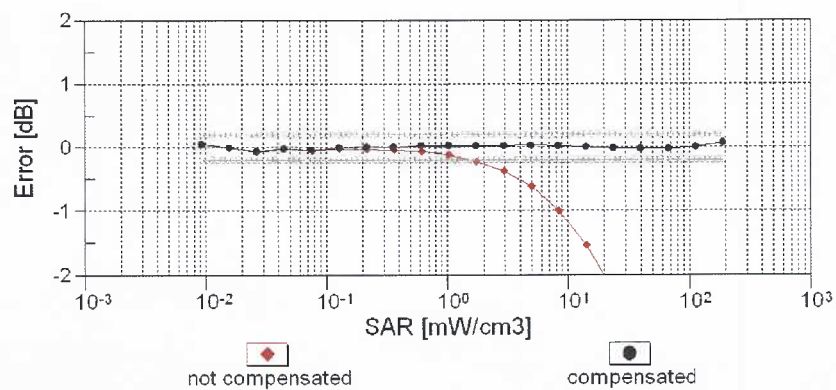
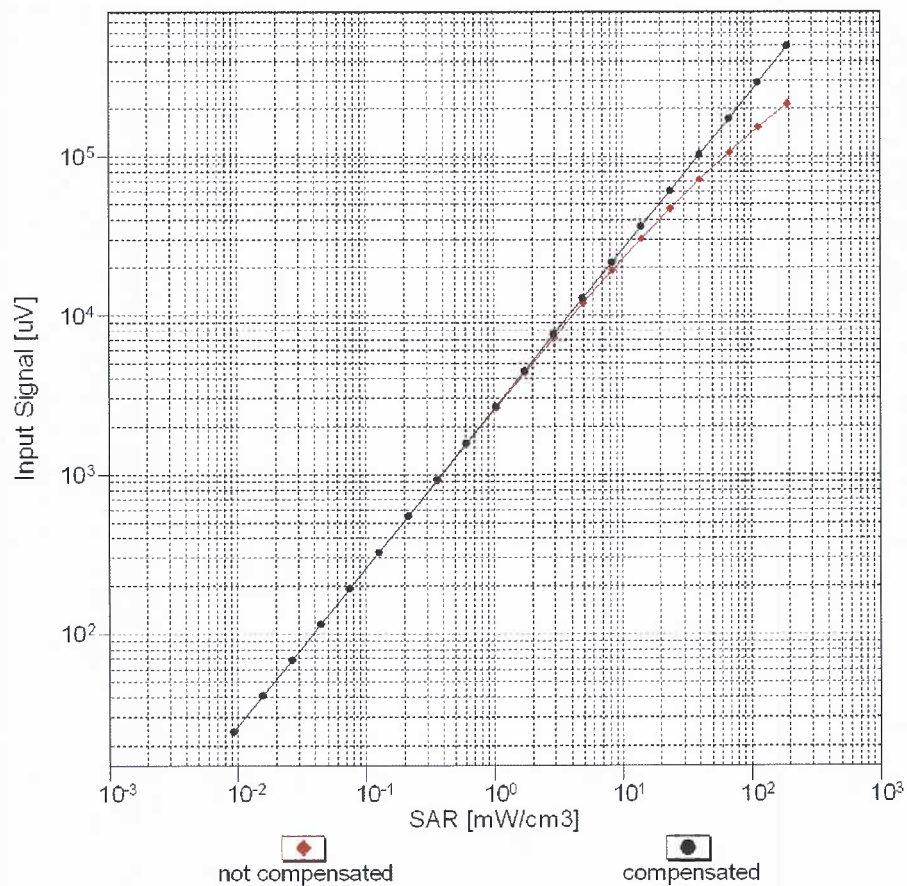


f=1800 MHz,R22



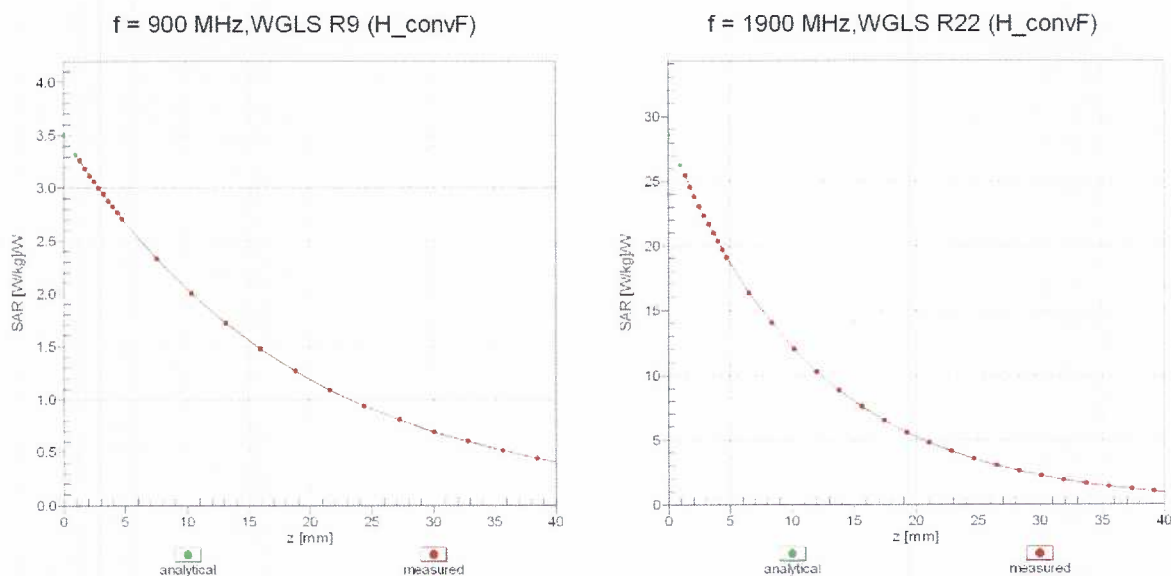
Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

## Dynamic Range $f(\text{SAR}_{\text{head}})$ (TEM cell , $f_{\text{eval}} = 1900 \text{ MHz}$ )



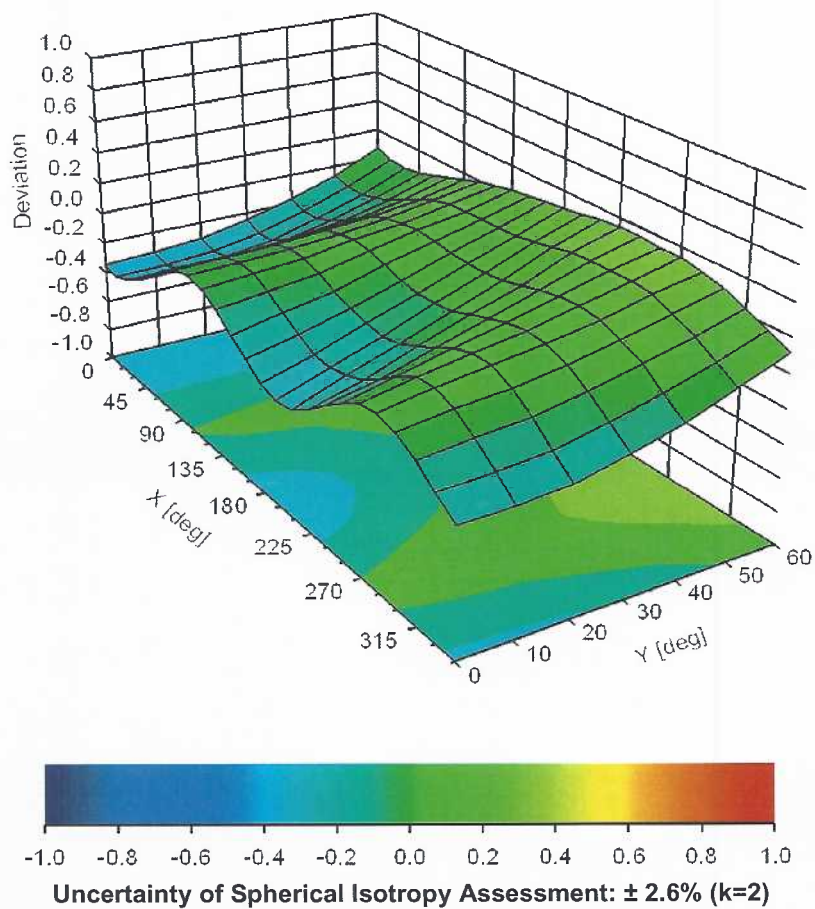
Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

## Conversion Factor Assessment



## Deviation from Isotropy in Liquid

Error ( $\phi, \theta$ ),  $f = 900 \text{ MHz}$





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 0108

Client **RF Exposure Lab**

Certificate No: **EX3-3693\_Aug19**

## CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3693**

Calibration procedure(s) **QA CAL-01.v9, QA CAL-14.v5, QA CAL-23.v5, QA CAL-25.v7**  
**Calibration procedure for dosimetric E-field probes**

Calibration date: **August 20, 2019**

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 NRP            | SN: 104778       | 03-Apr-19 (No. 217-02892/02893)   | Apr-20                 |
| Power sensor NRP-Z91       | SN: 103244       | 03-Apr-19 (No. 217-02892)         | Apr-20                 |
| Power sensor NRP-Z91       | SN: 103245       | 03-Apr-19 (No. 217-02893)         | Apr-20                 |
| Reference 20 dB Attenuator | SN: S5277 (20x)  | 04-Apr-19 (No. 217-02894)         | Apr-20                 |
| DAE4                       | SN: 660          | 19-Dec-18 (No. DAE4-660_Dec18)    | Dec-19                 |
| Reference Probe ES3DV2     | SN: 3013         | 31-Dec-18 (No. ES3-3013_Dec18)    | Dec-19                 |
|                            |                  |                                   |                        |
| Secondary Standards        | ID               | Check Date (in house)             | Scheduled Check        |
| Power meter E4419B         | SN: GB41293874   | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| Power sensor E4412A        | SN: MY41498087   | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| Power sensor E4412A        | SN: 000110210    | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| RF generator HP 8648C      | SN: US3642U01700 | 04-Aug-99 (in house check Jun-18) | In house check: Jun-20 |
| Network Analyzer E8358A    | SN: US41080477   | 31-Mar-14 (in house check Oct-18) | In house check: Oct-19 |

|                |                               |                                          |                                                                                                    |
|----------------|-------------------------------|------------------------------------------|----------------------------------------------------------------------------------------------------|
| Calibrated by: | Name<br><b>Jeton Kastrati</b> | Function<br><b>Laboratory Technician</b> | Signature<br> |
| Approved by:   | Name<br><b>Katja Pokovic</b>  | Function<br><b>Technical Manager</b>     | Signature<br> |

Issued: August 20, 2019

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

### 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, D               | modulation dependent linearization parameters                                                                                                           |
| Polarization $\phi$      | $\phi$ 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 |
| Connector Angle          | information used in DASY system to align probe sensor X to the robot coordinate system                                                                  |

### Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

### 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  $E^2$ -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>; D<sub>x,y,z</sub>; VR<sub>x,y,z</sub>**: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- 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.
- Connector Angle**: The angle is assessed using the information gained by determining the NORM<sub>x</sub> (no uncertainty required).



## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3693

### Basic Calibration Parameters

|                                                           | Sensor X | Sensor Y | Sensor Z | Unc (k=2)     |
|-----------------------------------------------------------|----------|----------|----------|---------------|
| Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup> | 0.39     | 0.30     | 0.36     | $\pm 10.1 \%$ |
| DCP (mV) <sup>B</sup>                                     | 96.6     | 98.6     | 109.7    |               |

### Calibration Results for Modulation Response

| UID | Communication System Name |   | A<br>dB | B<br>dB $\sqrt{\mu\text{V}}$ | C   | D<br>dB | VR<br>mV | Max<br>dev.  | Unc <sup>E</sup><br>(k=2) |
|-----|---------------------------|---|---------|------------------------------|-----|---------|----------|--------------|---------------------------|
| 0   | CW                        | X | 0.0     | 0.0                          | 1.0 | 0.00    | 134.4    | $\pm 2.7 \%$ | $\pm 4.7 \%$              |
|     |                           | Y | 0.0     | 0.0                          | 1.0 |         | 132.0    |              |                           |
|     |                           | Z | 0.0     | 0.0                          | 1.0 |         | 135.0    |              |                           |

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 Norm X,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Page 5).

<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.

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3693

### Other Probe Parameters

|                                               |            |
|-----------------------------------------------|------------|
| Sensor Arrangement                            | Triangular |
| Connector Angle (°)                           | 105.9      |
| 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 | 1.4 mm     |

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3693

### Calibration Parameter Determined in Head Tissue Simulating Media

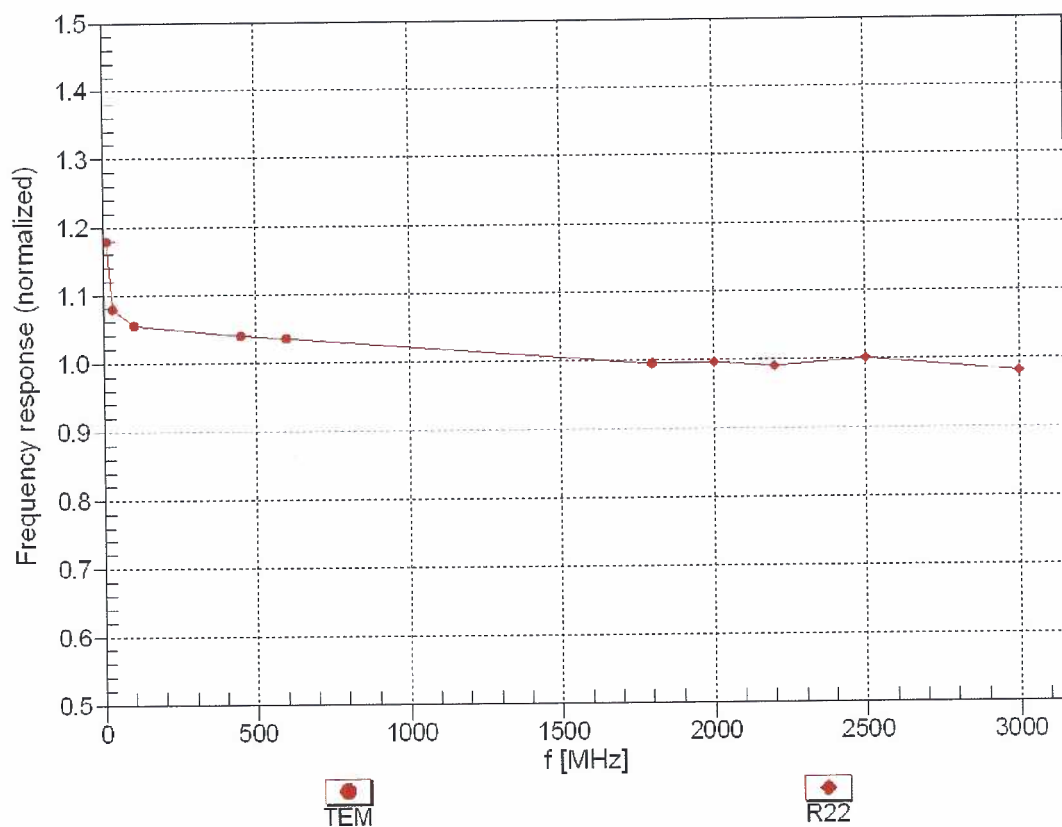
| f (MHz) <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity (S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha <sup>G</sup> | Depth <sup>G</sup> (mm) | Unc (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|--------------------|-------------------------|-----------|
| 750                  | 41.9                               | 0.89                            | 9.52    | 9.52    | 9.52    | 0.47               | 0.80                    | ± 12.0 %  |
| 900                  | 41.5                               | 0.97                            | 9.14    | 9.14    | 9.14    | 0.28               | 1.27                    | ± 12.0 %  |
| 1750                 | 40.1                               | 1.37                            | 7.97    | 7.97    | 7.97    | 0.20               | 0.80                    | ± 12.0 %  |
| 1900                 | 40.0                               | 1.40                            | 7.53    | 7.53    | 7.53    | 0.31               | 0.85                    | ± 12.0 %  |
| 2300                 | 39.5                               | 1.67                            | 7.24    | 7.24    | 7.24    | 0.21               | 1.32                    | ± 12.0 %  |
| 2450                 | 39.2                               | 1.80                            | 6.87    | 6.87    | 6.87    | 0.24               | 1.28                    | ± 12.0 %  |
| 2600                 | 39.0                               | 1.96                            | 6.73    | 6.73    | 6.73    | 0.35               | 1.20                    | ± 12.0 %  |
| 3500                 | 37.9                               | 2.91                            | 6.58    | 6.58    | 6.58    | 0.30               | 1.30                    | ± 13.1 %  |
| 3700                 | 37.7                               | 3.12                            | 6.34    | 6.34    | 6.34    | 0.30               | 1.30                    | ± 13.1 %  |
| 5250                 | 35.9                               | 4.71                            | 4.95    | 4.95    | 4.95    | 0.40               | 1.80                    | ± 13.1 %  |
| 5600                 | 35.5                               | 5.07                            | 4.60    | 4.60    | 4.60    | 0.40               | 1.80                    | ± 13.1 %  |
| 5750                 | 35.4                               | 5.22                            | 4.61    | 4.61    | 4.61    | 0.40               | 1.80                    | ± 13.1 %  |

<sup>C</sup> Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

<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.

<sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

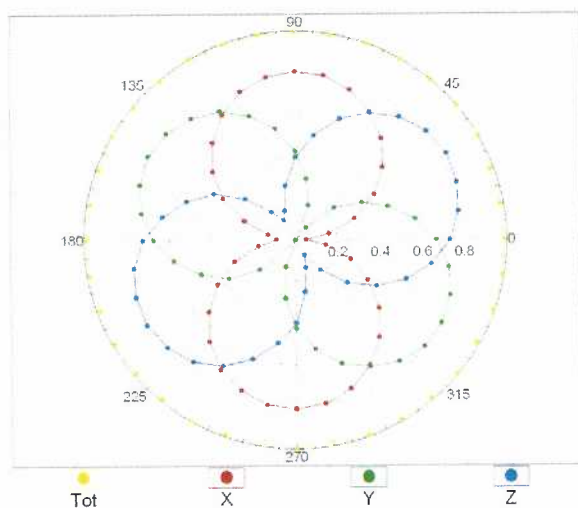
## Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



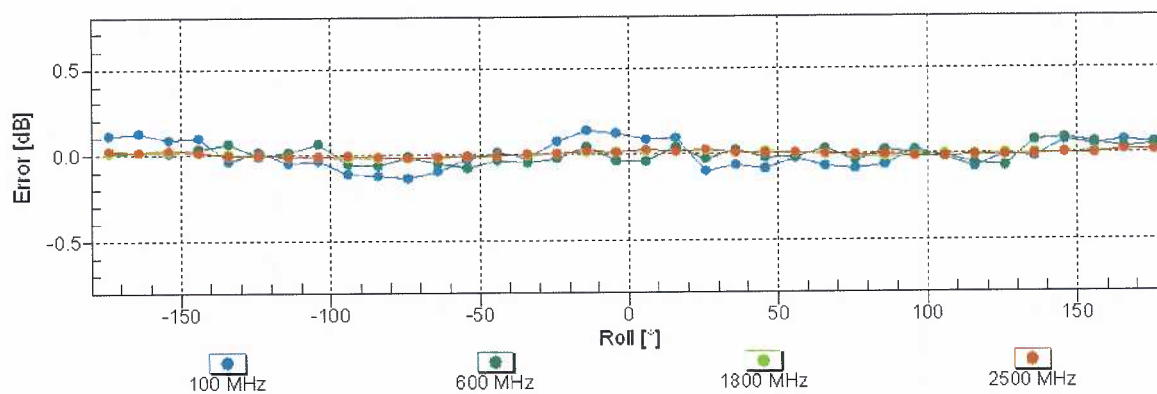
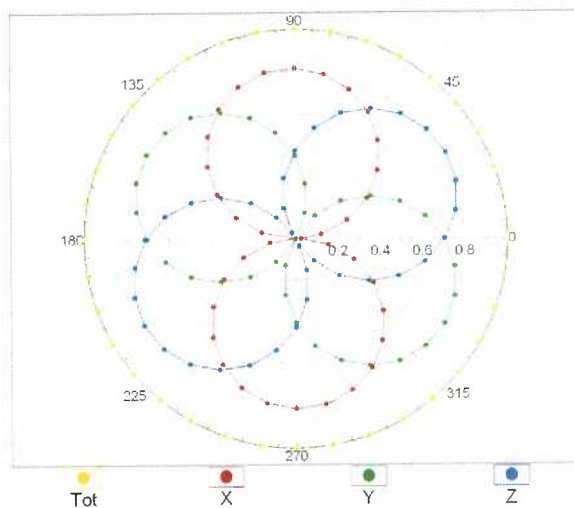
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

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

f=600 MHz, TEM

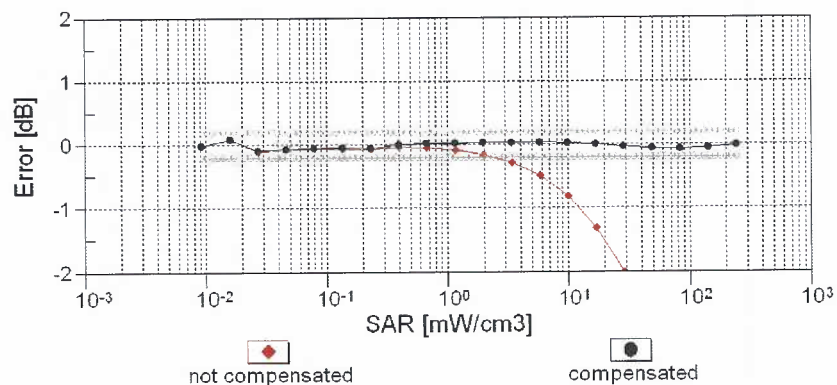
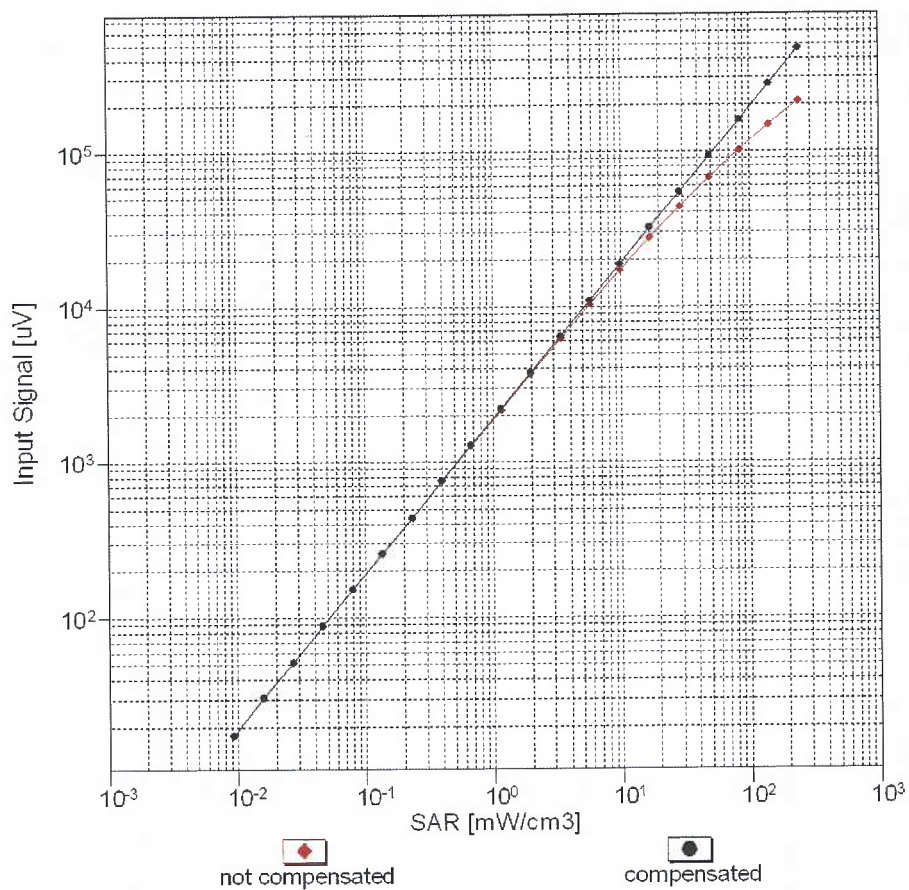


f=1800 MHz, R22



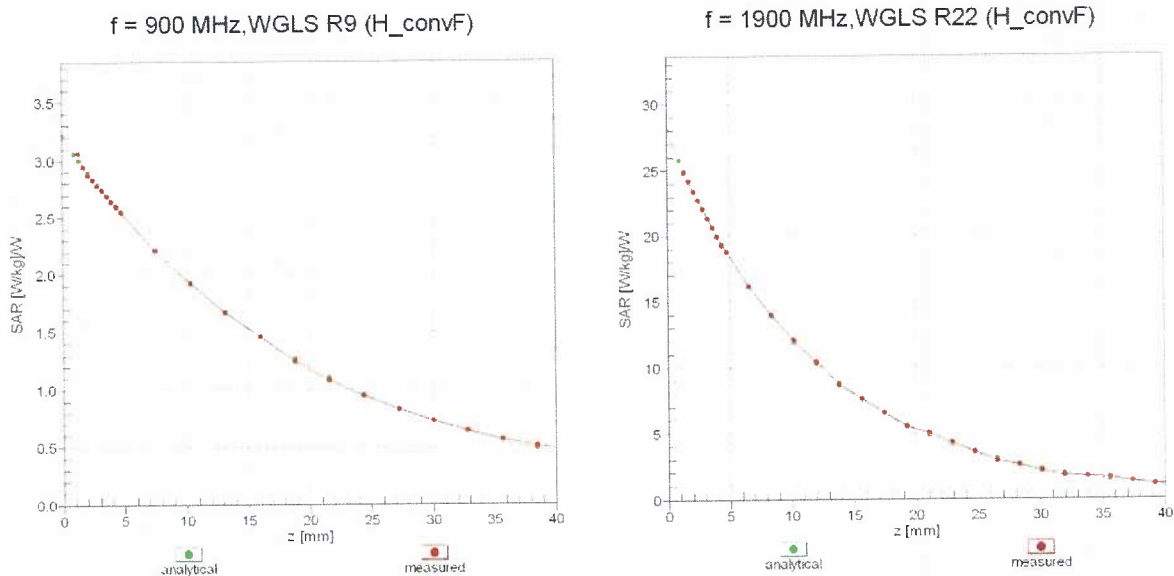
Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

## Dynamic Range $f(\text{SAR}_{\text{head}})$ (TEM cell , $f_{\text{eval}} = 1900 \text{ MHz}$ )



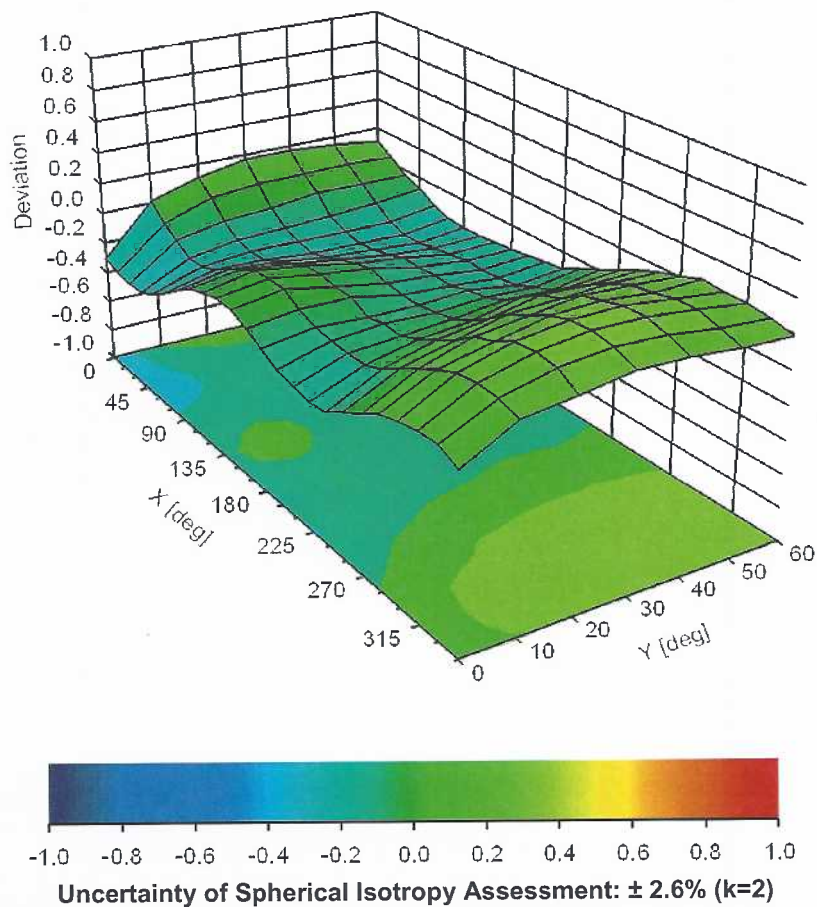
Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

## Conversion Factor Assessment



## Deviation from Isotropy in Liquid

Error ( $\phi, \theta$ ),  $f = 900 \text{ MHz}$





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 0108**

Client **RF Exposure Lab**

Certificate No: **EX3-7531\_Jun19**

## CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:7531**

Calibration procedure(s) **QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v5, QA CAL-23.v5,  
QA CAL-25.v7  
Calibration procedure for dosimetric E-field probes**

Calibration date: **June 3, 2019**

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 NRP            | SN: 104778       | 03-Apr-19 (No. 217-02892/02893)   | Apr-20                 |
| Power sensor NRP-Z91       | SN: 103244       | 03-Apr-19 (No. 217-02892)         | Apr-20                 |
| Power sensor NRP-Z91       | SN: 103245       | 03-Apr-19 (No. 217-02893)         | Apr-20                 |
| Reference 20 dB Attenuator | SN: S5277 (20x)  | 04-Apr-19 (No. 217-02894)         | Apr-20                 |
| DAE4                       | SN: 660          | 19-Dec-18 (No. DAE4-660_Dec18)    | Dec-19                 |
| Reference Probe ES3DV2     | SN: 3013         | 31-Dec-18 (No. ES3-3013_Dec18)    | Dec-19                 |
| Secondary Standards        | ID               | Check Date (in house)             | Scheduled Check        |
| Power meter E4419B         | SN: GB41293874   | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| Power sensor E4412A        | SN: MY41498087   | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| Power sensor E4412A        | SN: 000110210    | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| RF generator HP 8648C      | SN: US3642U01700 | 04-Aug-99 (in house check Jun-18) | In house check: Jun-20 |
| Network Analyzer E8358A    | SN: US41080477   | 31-Mar-14 (in house check Oct-18) | In house check: Oct-19 |

|                |                               |                                          |                                                                                                    |
|----------------|-------------------------------|------------------------------------------|----------------------------------------------------------------------------------------------------|
| Calibrated by: | Name<br><b>Jeton Kastrati</b> | Function<br><b>Laboratory Technician</b> | Signature<br> |
| Approved by:   | Name<br><b>Katja Pokovic</b>  | Function<br><b>Technical Manager</b>     | Signature<br> |

Issued: June 3, 2019

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





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 0108**

### 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, D               | modulation dependent linearization parameters                                                                                                           |
| Polarization $\phi$      | $\phi$ 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 |
| Connector Angle          | information used in DASY system to align probe sensor X to the robot coordinate system                                                                  |

### Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

### 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>; D<sub>x,y,z</sub>; VR<sub>x,y,z</sub>**: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- 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.
- Connector Angle**: The angle is assessed using the information gained by determining the NORM<sub>x</sub> (no uncertainty required).

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:7531

### Basic Calibration Parameters

|                                                           | Sensor X | Sensor Y | Sensor Z | Unc (k=2)     |
|-----------------------------------------------------------|----------|----------|----------|---------------|
| Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup> | 0.39     | 0.47     | 0.39     | $\pm 10.1 \%$ |
| DCP (mV) <sup>B</sup>                                     | 97.9     | 95.2     | 100.9    |               |

### Calibration Results for Modulation Response

| UID | Communication System Name |   | A<br>dB | B<br>dB $\sqrt{\mu\text{V}}$ | C   | D<br>dB | VR<br>mV | Max<br>dev.  | Unc <sup>E</sup><br>(k=2) |
|-----|---------------------------|---|---------|------------------------------|-----|---------|----------|--------------|---------------------------|
| 0   | CW                        | X | 0.0     | 0.0                          | 1.0 | 0.00    | 139.8    | $\pm 3.5 \%$ | $\pm 4.7 \%$              |
|     |                           | Y | 0.0     | 0.0                          | 1.0 |         | 132.9    |              |                           |
|     |                           | Y | 0.0     | 0.0                          | 1.0 |         | 137.4    |              |                           |

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 Norm X,Y,Z do not affect the  $E^2$ -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.

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:7531

### Other Probe Parameters

|                                               |            |
|-----------------------------------------------|------------|
| Sensor Arrangement                            | Triangular |
| Connector Angle (°)                           | 6.4        |
| 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 | 1.4 mm     |

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:7531

### 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 <sup>G</sup> | Depth <sup>G</sup> (mm) | Unc (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|--------------------|-------------------------|-----------|
| 150                  | 52.3                               | 0.76                            | 13.01   | 13.01   | 13.01   | 0.00               | 1.00                    | ± 13.3 %  |
| 220                  | 49.0                               | 0.81                            | 12.68   | 12.68   | 12.68   | 0.00               | 1.00                    | ± 13.3 %  |
| 300                  | 45.3                               | 0.87                            | 12.23   | 12.23   | 12.23   | 0.06               | 1.30                    | ± 13.3 %  |
| 450                  | 43.5                               | 0.87                            | 11.43   | 11.43   | 11.43   | 0.13               | 1.30                    | ± 13.3 %  |
| 600                  | 42.7                               | 0.88                            | 10.58   | 10.58   | 10.58   | 0.03               | 1.30                    | ± 13.3 %  |
| 1450                 | 40.5                               | 1.20                            | 8.85    | 8.85    | 8.85    | 0.38               | 0.80                    | ± 12.0 %  |
| 1640                 | 40.2                               | 1.31                            | 8.71    | 8.71    | 8.71    | 0.28               | 0.91                    | ± 12.0 %  |
| 2450                 | 39.2                               | 1.80                            | 7.58    | 7.58    | 7.58    | 0.28               | 0.96                    | ± 12.0 %  |
| 5250                 | 35.9                               | 4.71                            | 5.24    | 5.24    | 5.24    | 0.40               | 1.80                    | ± 13.1 %  |
| 5600                 | 35.5                               | 5.07                            | 4.69    | 4.69    | 4.69    | 0.40               | 1.80                    | ± 13.1 %  |
| 5750                 | 35.4                               | 5.22                            | 4.78    | 4.78    | 4.78    | 0.40               | 1.80                    | ± 13.1 %  |

<sup>C</sup> Frequency validity above 300 MHz 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. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

<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.

<sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:7531

### 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 <sup>G</sup> | Depth <sup>G</sup> (mm) | Unc (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|--------------------|-------------------------|-----------|
| 150                  | 61.9                               | 0.80                            | 12.57   | 12.57   | 12.57   | 0.00               | 1.00                    | ± 13.3 %  |
| 220                  | 60.2                               | 0.86                            | 12.08   | 12.08   | 12.08   | 0.00               | 1.00                    | ± 13.3 %  |
| 300                  | 58.2                               | 0.92                            | 11.64   | 11.64   | 11.64   | 0.03               | 1.20                    | ± 13.3 %  |
| 450                  | 56.7                               | 0.94                            | 11.18   | 11.18   | 11.18   | 0.09               | 1.20                    | ± 13.3 %  |
| 600                  | 56.1                               | 0.95                            | 10.55   | 10.55   | 10.55   | 0.08               | 1.20                    | ± 13.3 %  |
| 1640                 | 53.7                               | 1.42                            | 8.53    | 8.53    | 8.53    | 0.26               | 0.99                    | ± 12.0 %  |
| 2450                 | 52.7                               | 1.95                            | 7.62    | 7.62    | 7.62    | 0.28               | 0.95                    | ± 12.0 %  |
| 5250                 | 48.9                               | 5.36                            | 4.52    | 4.52    | 4.52    | 0.50               | 1.90                    | ± 13.1 %  |
| 5600                 | 48.5                               | 5.77                            | 4.01    | 4.01    | 4.01    | 0.50               | 1.90                    | ± 13.1 %  |
| 5750                 | 48.3                               | 5.94                            | 4.08    | 4.08    | 4.08    | 0.50               | 1.90                    | ± 13.1 %  |

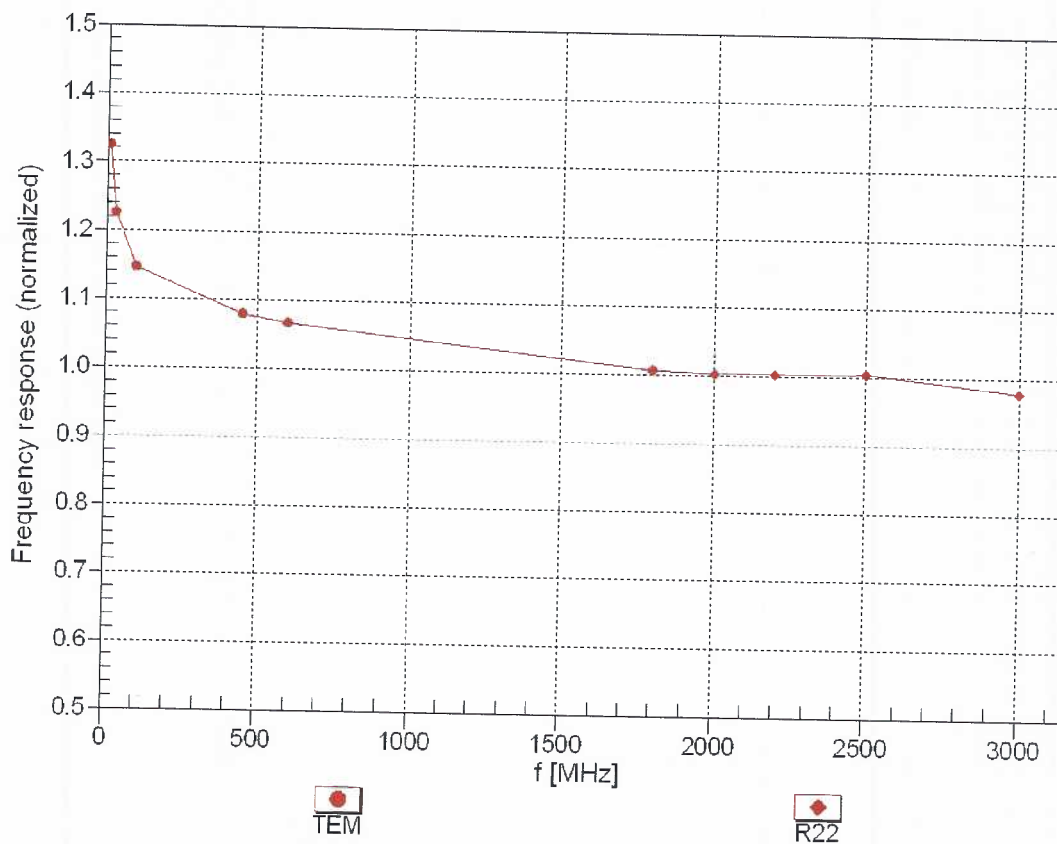
<sup>C</sup> Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

<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.

<sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

## Frequency Response of E-Field

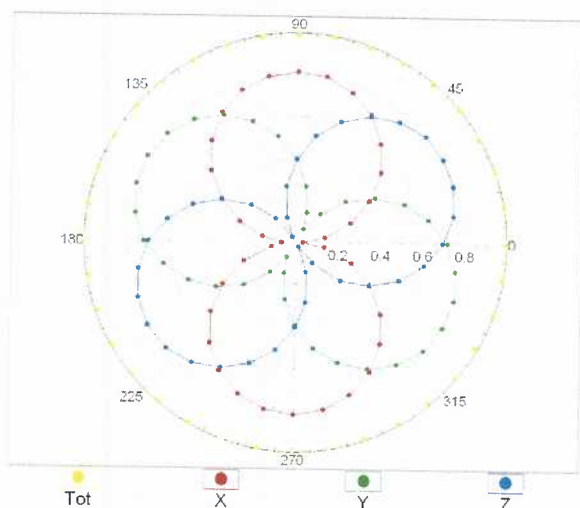
(TEM-Cell:ifi110 EXX, Waveguide: R22)



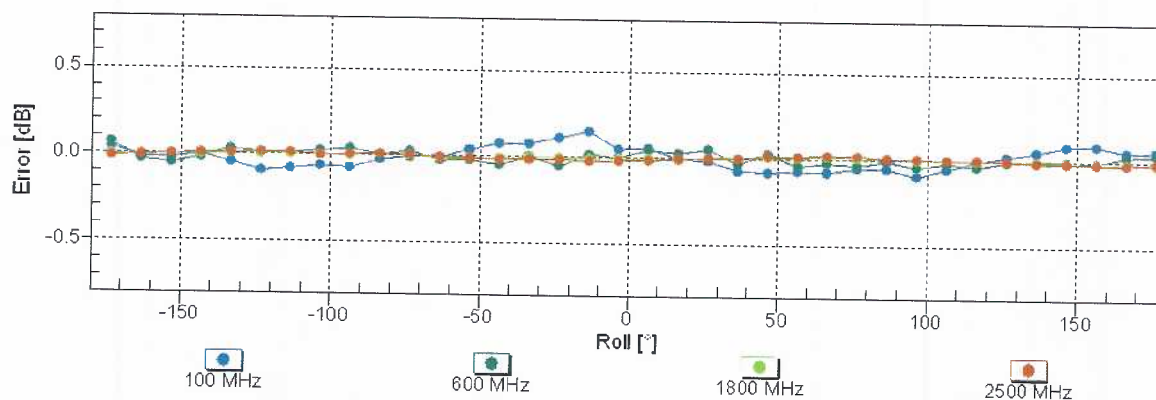
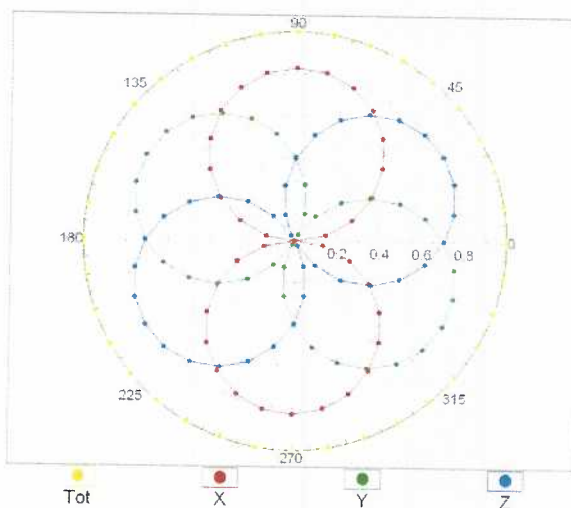
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

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

f=600 MHz, TEM

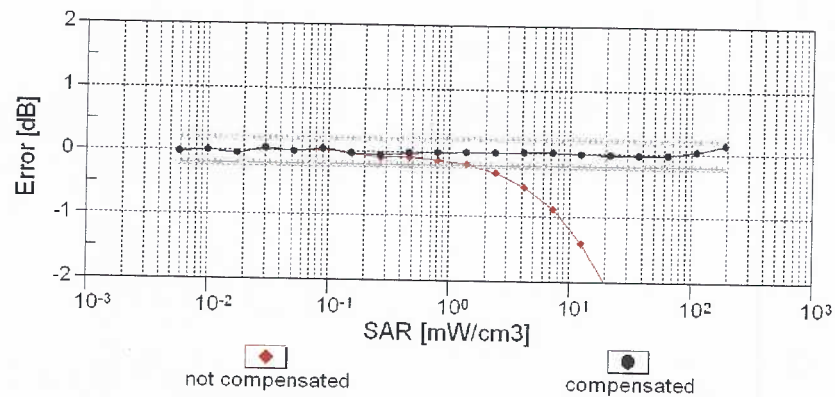
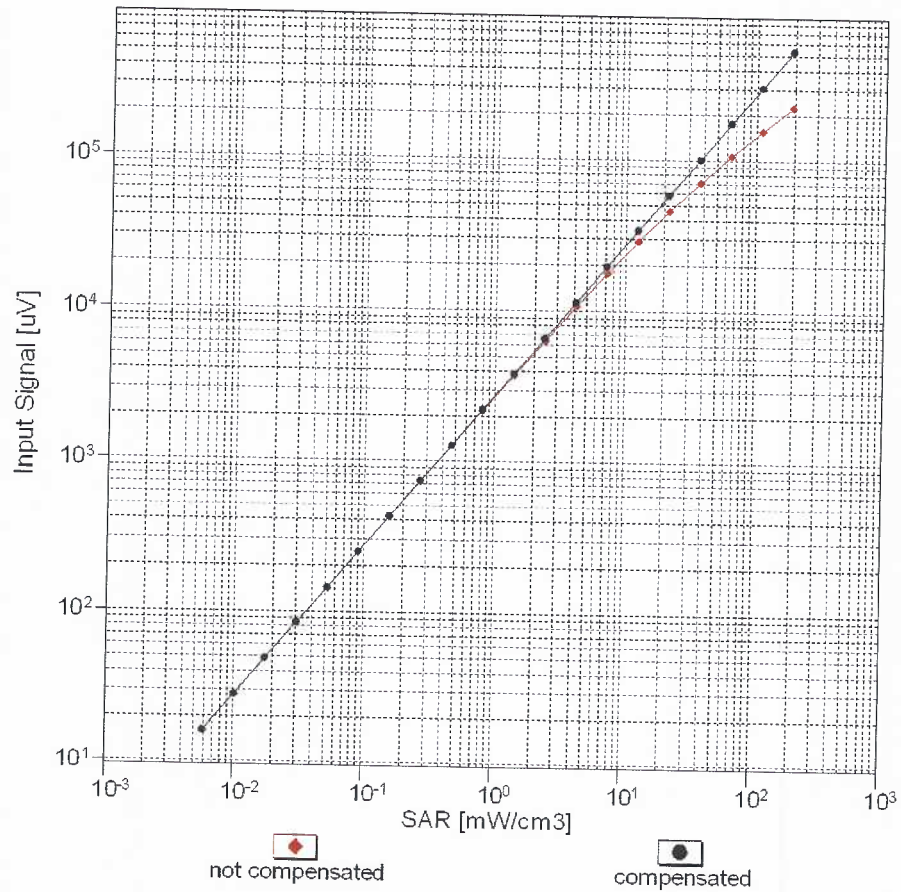


f=1800 MHz, R22



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

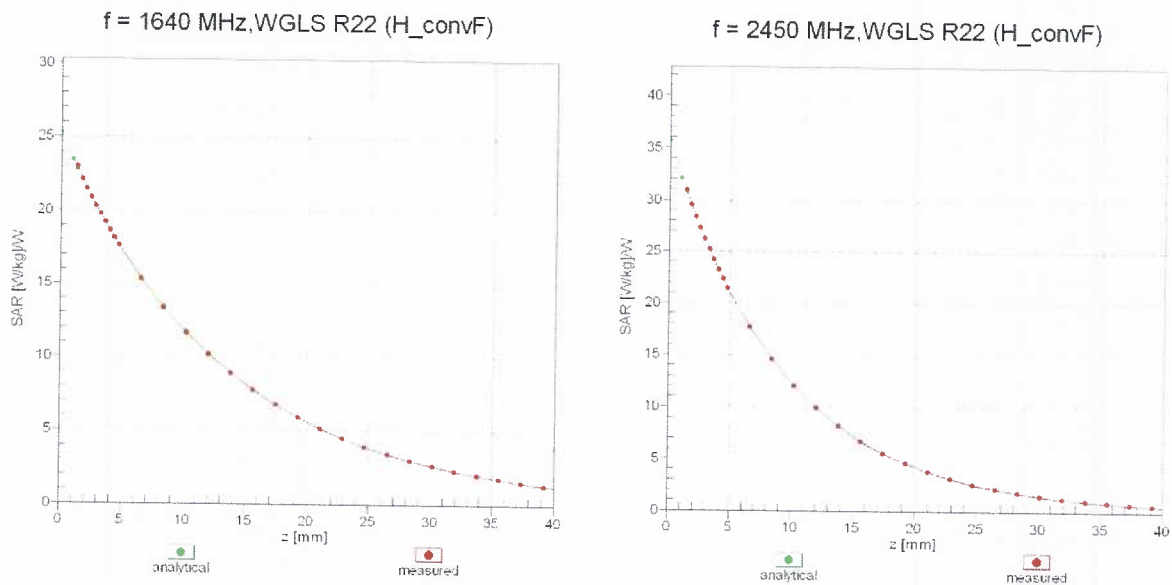
# Dynamic Range $f(\text{SAR}_{\text{head}})$ (TEM cell , $f_{\text{eval}} = 1900 \text{ MHz}$ )



Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

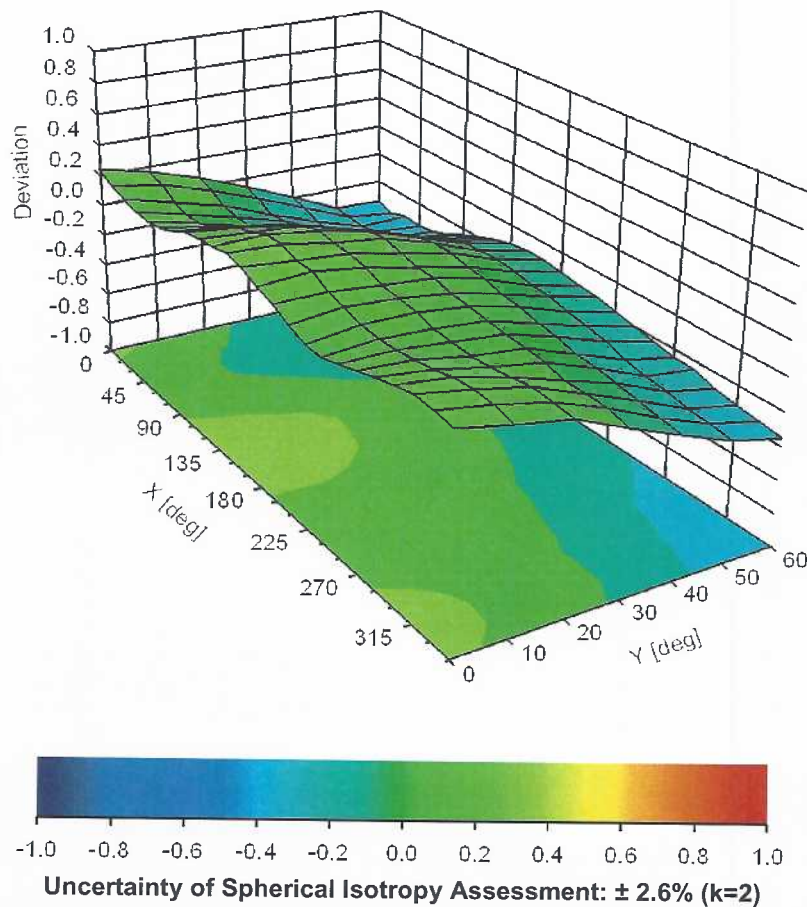


## Conversion Factor Assessment



## Deviation from Isotropy in Liquid

Error ( $\phi$ ,  $\theta$ ),  $f = 900 \text{ MHz}$



## Appendix E – Dipole Calibration Data Sheets



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Client **RF Exposure Lab**

Certificate No: **D750V3-1016\_Jul18**

## CALIBRATION CERTIFICATE

Object **D750V3 - SN:1016**

Calibration procedure(s) **QA CAL-05.v10**  
**Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **July 13, 2018**

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 NRP                 | SN: 104778         | 04-Apr-18 (No. 217-02672/02673)   | Apr-19                 |
| Power sensor NRP-Z91            | SN: 103244         | 04-Apr-18 (No. 217-02672)         | Apr-19                 |
| Power sensor NRP-Z91            | SN: 103245         | 04-Apr-18 (No. 217-02673)         | Apr-19                 |
| Reference 20 dB Attenuator      | SN: 5058 (20k)     | 04-Apr-18 (No. 217-02682)         | Apr-19                 |
| Type-N mismatch combination     | SN: 5047.2 / 06327 | 04-Apr-18 (No. 217-02683)         | Apr-19                 |
| Reference Probe EX3DV4          | SN: 7349           | 30-Dec-17 (No. EX3-7349_Dec17)    | Dec-18                 |
| DAE4                            | SN: 601            | 26-Oct-17 (No. DAE4-601_Oct17)    | Oct-18                 |
| Secondary Standards             | ID #               | Check Date (in house)             | Scheduled Check        |
| Power meter EPM-442A            | SN: GB37480704     | 07-Oct-15 (in house check Oct-16) | In house check: Oct-18 |
| Power sensor HP 8481A           | SN: US37292783     | 07-Oct-15 (in house check Oct-16) | In house check: Oct-18 |
| Power sensor HP 8481A           | SN: MY41092317     | 07-Oct-15 (in house check Oct-16) | In house check: Oct-18 |
| RF generator R&S SMT-06         | SN: 100972         | 15-Jun-15 (in house check Oct-16) | In house check: Oct-18 |
| Network Analyzer Agilent E8358A | SN: US41080477     | 31-Mar-14 (in house check Oct-17) | In house check: Oct-18 |

Calibrated by: **Manu Seitz** Name **Manu Seitz** Function **Laboratory Technician**

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

Signature

Issued: July 16, 2018

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



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 0108**

### 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 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

### 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.

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%.

## Measurement Conditions

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

|                                     |                        |             |
|-------------------------------------|------------------------|-------------|
| <b>DASY Version</b>                 | DASY5                  | V52.10.1    |
| <b>Extrapolation</b>                | Advanced Extrapolation |             |
| <b>Phantom</b>                      | Modular Flat Phantom   |             |
| <b>Distance Dipole Center - TSL</b> | 15 mm                  | with Spacer |
| <b>Zoom Scan Resolution</b>         | dx, dy, dz = 5 mm      |             |
| <b>Frequency</b>                    | 750 MHz $\pm$ 1 MHz    |             |

## Head TSL parameters

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Head TSL parameters</b>             | 22.0 °C             | 41.9           | 0.89 mho/m           |
| <b>Measured Head TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 40.9 $\pm$ 6 % | 0.89 mho/m $\pm$ 6 % |
| <b>Head TSL temperature change during test</b> | < 0.5 °C            | ----           | ----                 |

## SAR result with Head TSL

|                                                             |                    |                                                |
|-------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b> | Condition          |                                                |
| SAR measured                                                | 250 mW input power | 2.07 W/kg                                      |
| SAR for nominal Head TSL parameters                         | normalized to 1W   | <b>8.23 W/kg <math>\pm</math> 17.0 % (k=2)</b> |

|                                                               |                    |                                                |
|---------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b> | condition          |                                                |
| SAR measured                                                  | 250 mW input power | 1.35 W/kg                                      |
| SAR for nominal Head TSL parameters                           | normalized to 1W   | <b>5.38 W/kg <math>\pm</math> 16.5 % (k=2)</b> |

## Body TSL parameters

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Body TSL parameters</b>             | 22.0 °C             | 55.5           | 0.96 mho/m           |
| <b>Measured Body TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 55.3 $\pm$ 6 % | 0.96 mho/m $\pm$ 6 % |
| <b>Body TSL temperature change during test</b> | < 0.5 °C            | ----           | ----                 |

## SAR result with Body TSL

|                                                             |                    |                                                |
|-------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Body TSL</b> | Condition          |                                                |
| SAR measured                                                | 250 mW input power | 2.14 W/kg                                      |
| SAR for nominal Body TSL parameters                         | normalized to 1W   | <b>8.55 W/kg <math>\pm</math> 17.0 % (k=2)</b> |

|                                                               |                    |                                                |
|---------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Body TSL</b> | condition          |                                                |
| SAR measured                                                  | 250 mW input power | 1.41 W/kg                                      |
| SAR for nominal Body TSL parameters                           | normalized to 1W   | <b>5.64 W/kg <math>\pm</math> 16.5 % (k=2)</b> |

## Appendix (Additional assessments outside the scope of SCS 0108)

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 53.4 $\Omega$ + 0.0 j $\Omega$ |
| Return Loss                          | - 29.6 dB                      |

### Antenna Parameters with Body TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 48.8 $\Omega$ - 2.6 j $\Omega$ |
| Return Loss                          | - 30.7 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.038 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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 | March 22, 2010 |

#### Extended Calibration

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss ( $\leq -20$  dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 865664 D01 v01r04.

| D750V3 SN: 1016 - Head |                  |            |                             |                |                                   |                |
|------------------------|------------------|------------|-----------------------------|----------------|-----------------------------------|----------------|
| Date of Measurement    | Return Loss (dB) | $\Delta\%$ | Impedance Real ( $\Omega$ ) | $\Delta\Omega$ | Impedance Imaginary (j $\Omega$ ) | $\Delta\Omega$ |
| 7/13/2018              | -29.6            |            | 53.4                        |                | 0.0                               |                |
| 7/13/2019              | -28.2            | -4.7       | 54.9                        | 1.5            | -0.2                              | -0.2           |
|                        |                  |            |                             |                |                                   |                |
| D750V3 SN: 1016 - Body |                  |            |                             |                |                                   |                |
| Date of Measurement    | Return Loss (dB) | $\Delta\%$ | Impedance Real ( $\Omega$ ) | $\Delta\Omega$ | Impedance Imaginary (j $\Omega$ ) | $\Delta\Omega$ |
| 7/13/2018              | -30.7            |            | 48.8                        |                | -2.6                              |                |
| 7/13/2019              | -29.8            | -2.9       | 49.2                        | 0.4            | -2.7                              | -0.1           |
|                        |                  |            |                             |                |                                   |                |

## DASY5 Validation Report for Head TSL

Date: 13.07.2018

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1016**

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used:  $f = 750 \text{ MHz}$ ;  $\sigma = 0.89 \text{ S/m}$ ;  $\epsilon_r = 40.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.22, 10.22, 10.22) @ 750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

### Dipole Calibration for Head Tissue/Pin=250 mW, $d=15\text{mm}$ /Zoom Scan (7x7x7)/Cube 0:

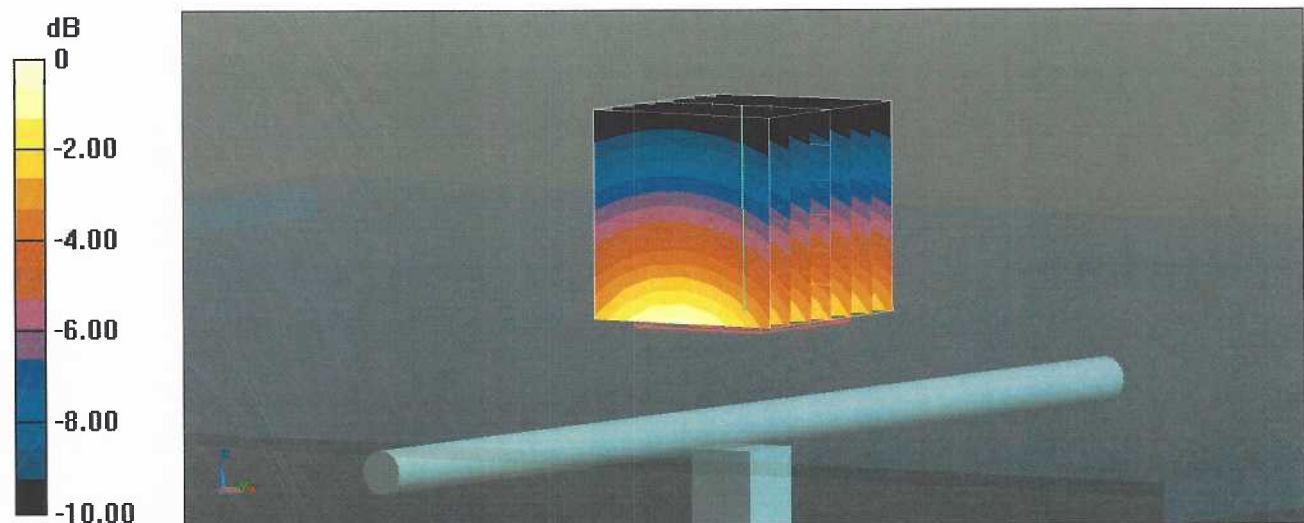
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 59.03 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 3.10 W/kg

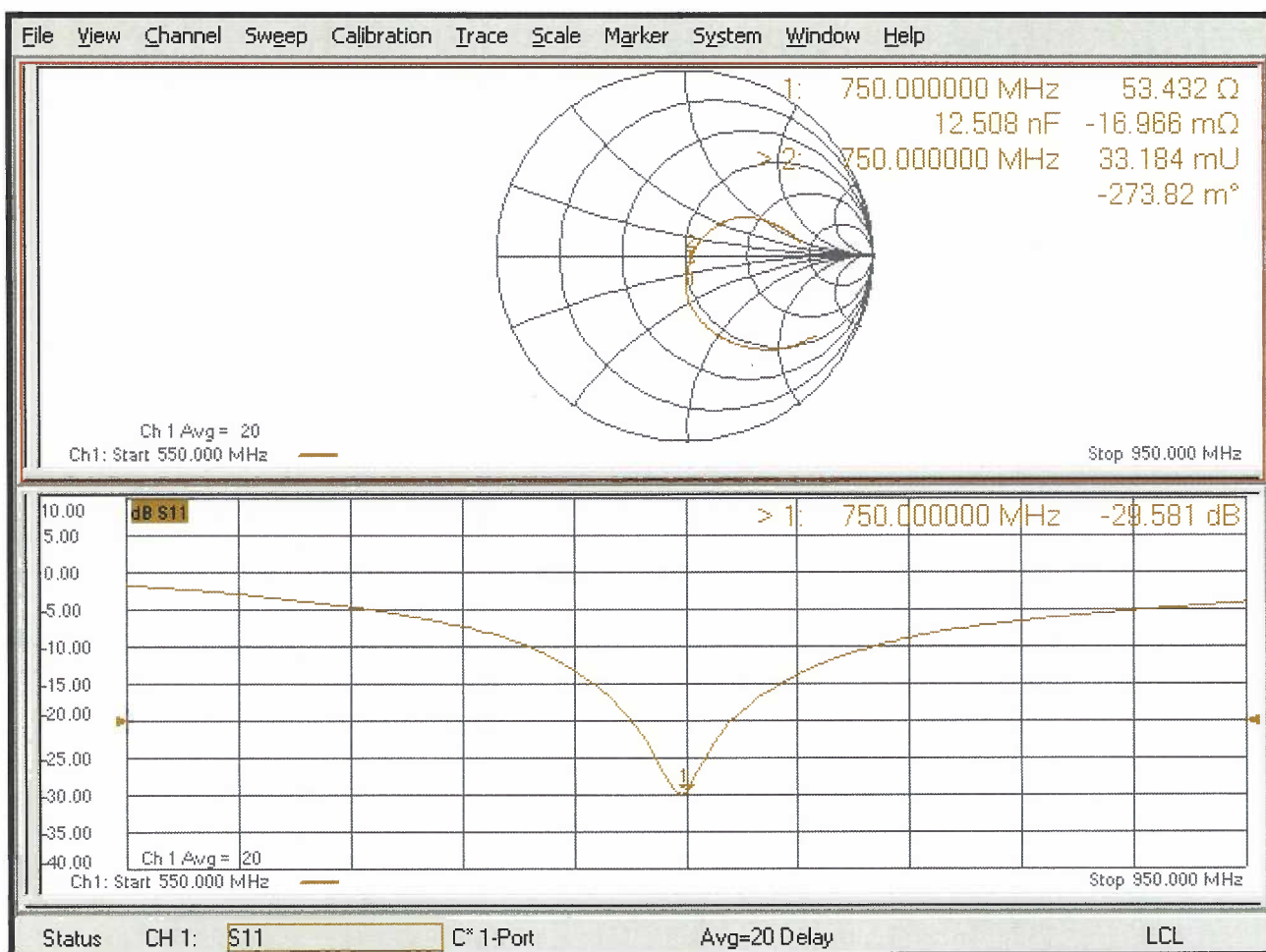
**SAR(1 g) = 2.07 W/kg; SAR(10 g) = 1.35 W/kg**

Maximum value of SAR (measured) = 2.76 W/kg



0 dB = 2.76 W/kg = 4.41 dBW/kg

## Impedance Measurement Plot for Head TSL





## DASY5 Validation Report for Body TSL

Date: 13.07.2018

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1016**

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used:  $f = 750 \text{ MHz}$ ;  $\sigma = 0.96 \text{ S/m}$ ;  $\epsilon_r = 55.3$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.19, 10.19, 10.19) @ 750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

**Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:**

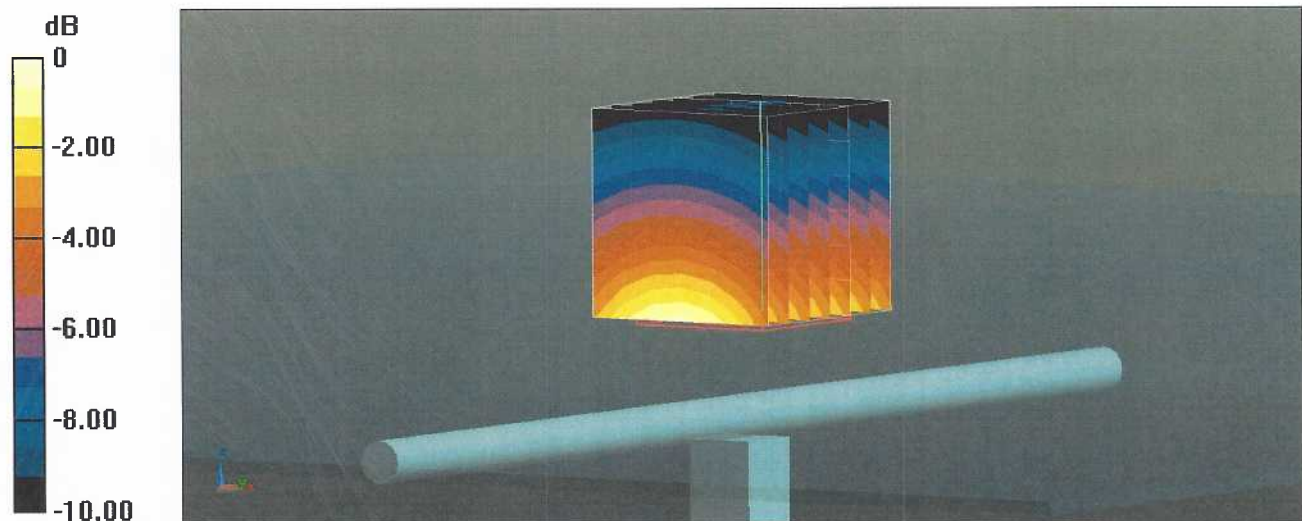
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 57.68 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 3.18 W/kg

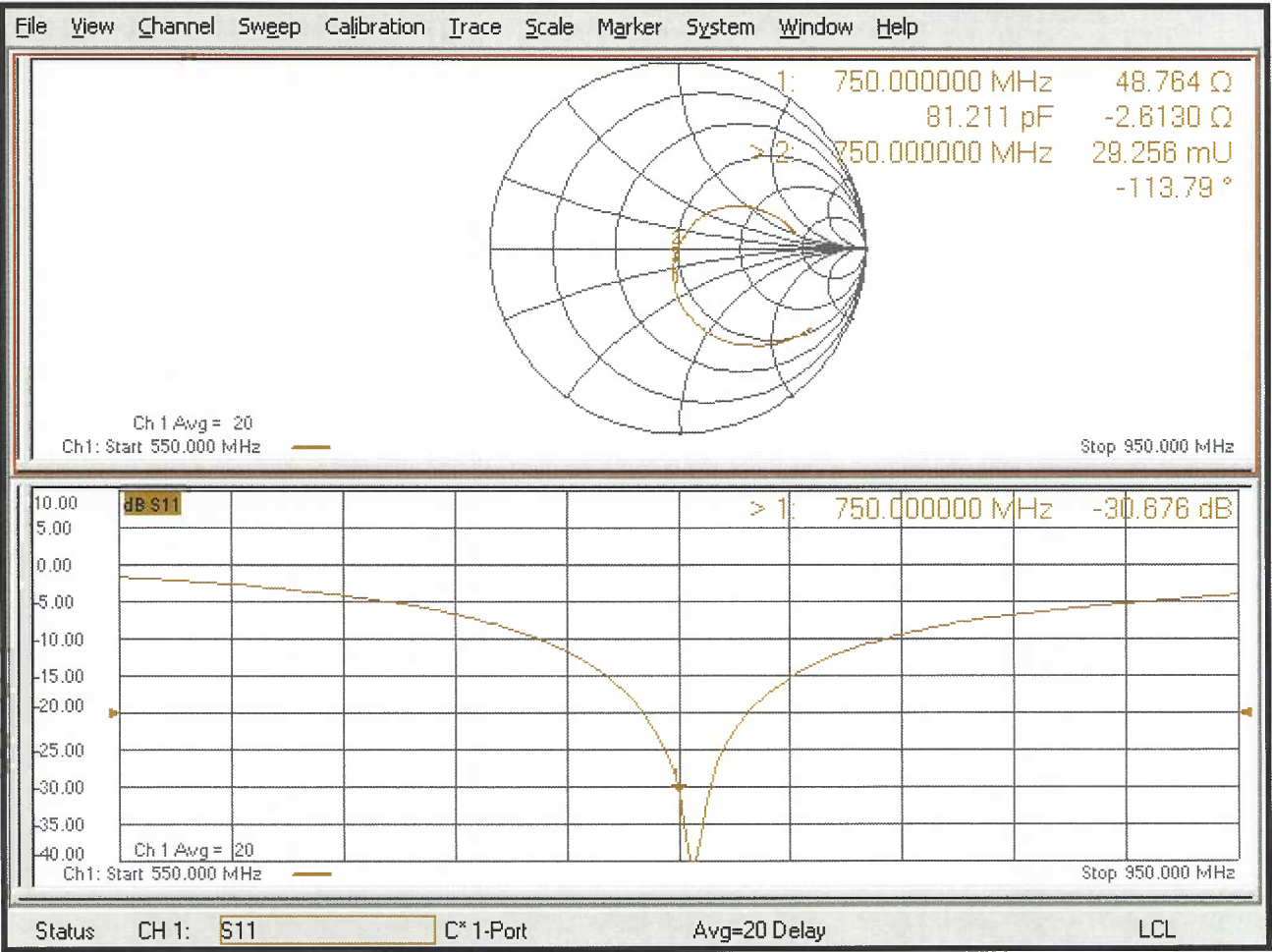
**SAR(1 g) = 2.14 W/kg; SAR(10 g) = 1.41 W/kg**

Maximum value of SAR (measured) = 2.84 W/kg



0 dB = 2.84 W/kg = 4.53 dBW/kg

Impedance Measurement Plot for Body TSL





Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Client **RF Exposure Lab**

Certificate No: **D835V2-4d089\_Jul18**

## CALIBRATION CERTIFICATE

Object **D835V2 - SN:4d089**

Calibration procedure(s) **QA CAL-05.v10**  
**Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **July 13, 2018**

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 NRP             | SN: 104778         | 04-Apr-18 (No. 217-02672/02673) | Apr-19                |
| Power sensor NRP-Z91        | SN: 103244         | 04-Apr-18 (No. 217-02672)       | Apr-19                |
| Power sensor NRP-Z91        | SN: 103245         | 04-Apr-18 (No. 217-02673)       | Apr-19                |
| Reference 20 dB Attenuator  | SN: 5058 (20k)     | 04-Apr-18 (No. 217-02682)       | Apr-19                |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 04-Apr-18 (No. 217-02683)       | Apr-19                |
| Reference Probe EX3DV4      | SN: 7349           | 30-Dec-17 (No. EX3-7349_Dec17)  | Dec-18                |
| DAE4                        | SN: 601            | 26-Oct-17 (No. DAE4-601_Oct17)  | Oct-18                |

| Secondary Standards             | ID #           | Check Date (in house)             | Scheduled Check        |
|---------------------------------|----------------|-----------------------------------|------------------------|
| Power meter EPM-442A            | SN: GB37480704 | 07-Oct-15 (in house check Oct-16) | In house check: Oct-18 |
| Power sensor HP 8481A           | SN: US37292783 | 07-Oct-15 (in house check Oct-16) | In house check: Oct-18 |
| Power sensor HP 8481A           | SN: MY41092317 | 07-Oct-15 (in house check Oct-16) | In house check: Oct-18 |
| RF generator R&S SMT-06         | SN: 100972     | 15-Jun-15 (in house check Oct-16) | In house check: Oct-18 |
| Network Analyzer Agilent E8358A | SN: US41080477 | 31-Mar-14 (in house check Oct-17) | In house check: Oct-18 |

Calibrated by: **Manu Seitz** **Laboratory Technician**

Signature

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

Issued: July 17, 2018

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



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 0108**

**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 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**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.

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%.

## Measurement Conditions

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

|                                     |                        |             |
|-------------------------------------|------------------------|-------------|
| <b>DASY Version</b>                 | DASY5                  | V52.10.1    |
| <b>Extrapolation</b>                | Advanced Extrapolation |             |
| <b>Phantom</b>                      | Modular Flat Phantom   |             |
| <b>Distance Dipole Center - TSL</b> | 15 mm                  | with Spacer |
| <b>Zoom Scan Resolution</b>         | dx, dy, dz = 5 mm      |             |
| <b>Frequency</b>                    | 835 MHz $\pm$ 1 MHz    |             |

## Head TSL parameters

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Head TSL parameters</b>             | 22.0 °C             | 41.5           | 0.90 mho/m           |
| <b>Measured Head TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 40.7 $\pm$ 6 % | 0.92 mho/m $\pm$ 6 % |
| <b>Head TSL temperature change during test</b> | < 0.5 °C            | ----           | ----                 |

## SAR result with Head TSL

|                                                             |                    |                                                |
|-------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b> | Condition          |                                                |
| SAR measured                                                | 250 mW input power | 2.41 W/kg                                      |
| SAR for nominal Head TSL parameters                         | normalized to 1W   | <b>9.44 W/kg <math>\pm</math> 17.0 % (k=2)</b> |

|                                                               |                    |                                                |
|---------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b> | condition          |                                                |
| SAR measured                                                  | 250 mW input power | 1.55 W/kg                                      |
| SAR for nominal Head TSL parameters                           | normalized to 1W   | <b>6.10 W/kg <math>\pm</math> 16.5 % (k=2)</b> |

## Body TSL parameters

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Body TSL parameters</b>             | 22.0 °C             | 55.2           | 0.97 mho/m           |
| <b>Measured Body TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 55.2 $\pm$ 6 % | 0.99 mho/m $\pm$ 6 % |
| <b>Body TSL temperature change during test</b> | < 0.5 °C            | ----           | ----                 |

## SAR result with Body TSL

|                                                             |                    |                                                |
|-------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Body TSL</b> | Condition          |                                                |
| SAR measured                                                | 250 mW input power | 2.43 W/kg                                      |
| SAR for nominal Body TSL parameters                         | normalized to 1W   | <b>9.57 W/kg <math>\pm</math> 17.0 % (k=2)</b> |

|                                                               |                    |                                                |
|---------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Body TSL</b> | condition          |                                                |
| SAR measured                                                  | 250 mW input power | 1.58 W/kg                                      |
| SAR for nominal Body TSL parameters                           | normalized to 1W   | <b>6.24 W/kg <math>\pm</math> 16.5 % (k=2)</b> |

## Appendix (Additional assessments outside the scope of SCS 0108)

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 51.6 $\Omega$ - 3.3 j $\Omega$ |
| Return Loss                          | - 28.9 dB                      |

### Antenna Parameters with Body TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 47.3 $\Omega$ - 5.3 j $\Omega$ |
| Return Loss                          | - 24.3 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.391 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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 | October 17, 2008 |

#### Extended Calibration

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (<-20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 865664 D01 v01r04.

| D835V2 SN: 4d089 - Head |                  |            |                             |                |                                   |                |
|-------------------------|------------------|------------|-----------------------------|----------------|-----------------------------------|----------------|
| Date of Measurement     | Return Loss (dB) | $\Delta\%$ | Impedance Real ( $\Omega$ ) | $\Delta\Omega$ | Impedance Imaginary (j $\Omega$ ) | $\Delta\Omega$ |
| 7/13/2018               | -28.9            |            | 51.6                        |                | -3.3                              |                |
| 7/13/2019               | -30.2            | 4.5        | 52.5                        | 0.9            | -2.9                              | 0.4            |
|                         |                  |            |                             |                |                                   |                |
| D835V2 SN: 4d089 - Body |                  |            |                             |                |                                   |                |
| Date of Measurement     | Return Loss (dB) | $\Delta\%$ | Impedance Real ( $\Omega$ ) | $\Delta\Omega$ | Impedance Imaginary (j $\Omega$ ) | $\Delta\Omega$ |
| 7/13/2018               | -24.3            |            | 47.3                        |                | -5.3                              |                |
| 7/13/2019               | -25.6            | 5.3        | 48.3                        | 1.0            | -5.2                              | 0.1            |
|                         |                  |            |                             |                |                                   |                |

## DASY5 Validation Report for Head TSL

Date: 13.07.2018

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d089**

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.92 \text{ S/m}$ ;  $\epsilon_r = 40.7$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.9, 9.9, 9.9) @ 835 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

### Dipole Calibration for Head Tissue/Pin=250 mW, $d=15\text{mm}$ /Zoom Scan (7x7x7)/Cube 0:

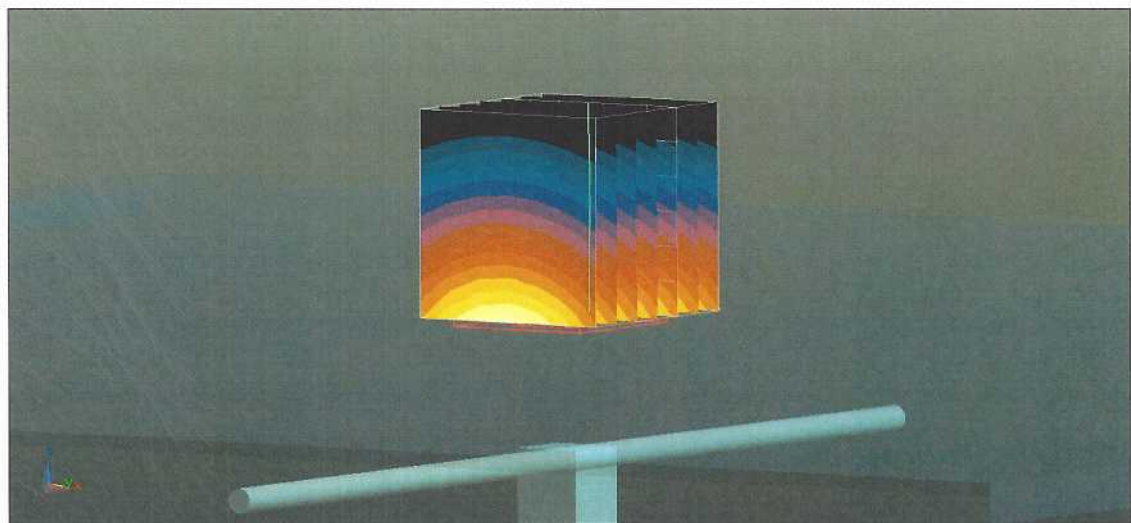
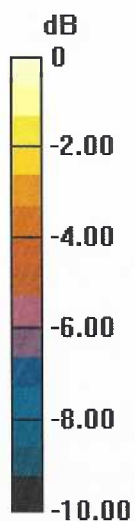
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 62.80 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 3.70 W/kg

**SAR(1 g) = 2.41 W/kg; SAR(10 g) = 1.55 W/kg**

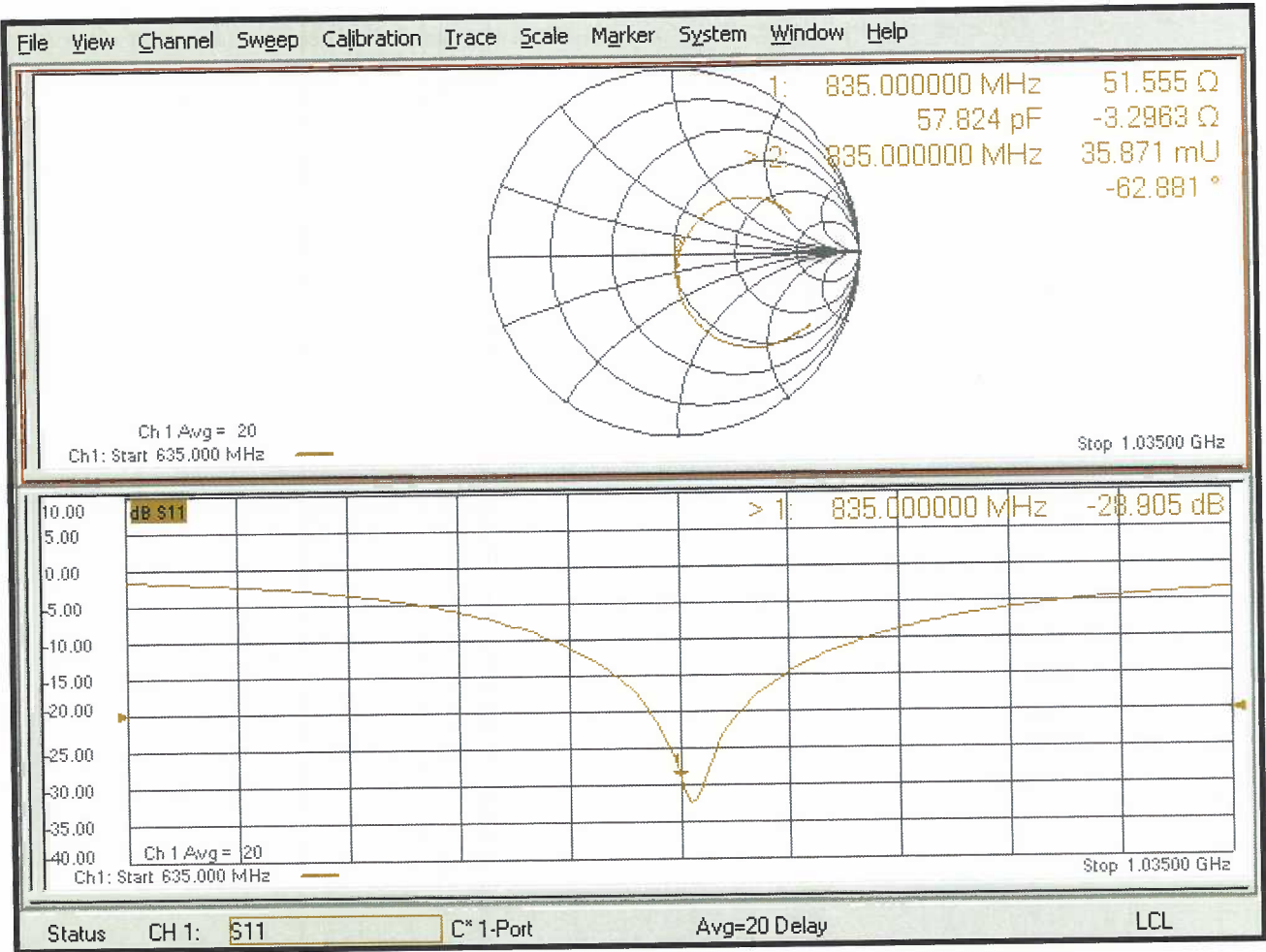
Maximum value of SAR (measured) = 3.26 W/kg



0 dB = 3.26 W/kg = 5.13 dBW/kg



Impedance Measurement Plot for Head TSL





## DASY5 Validation Report for Body TSL

Date: 13.07.2018

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d089**

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.99 \text{ S/m}$ ;  $\epsilon_r = 55.2$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.05, 10.05, 10.05) @ 835 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

### Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

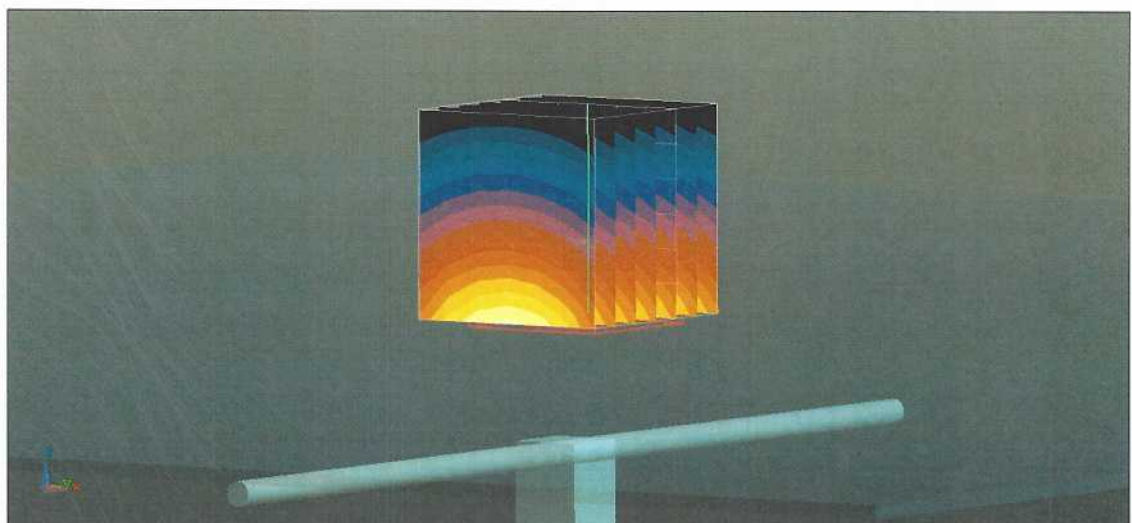
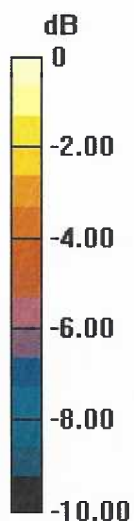
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 60.59 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 3.60 W/kg

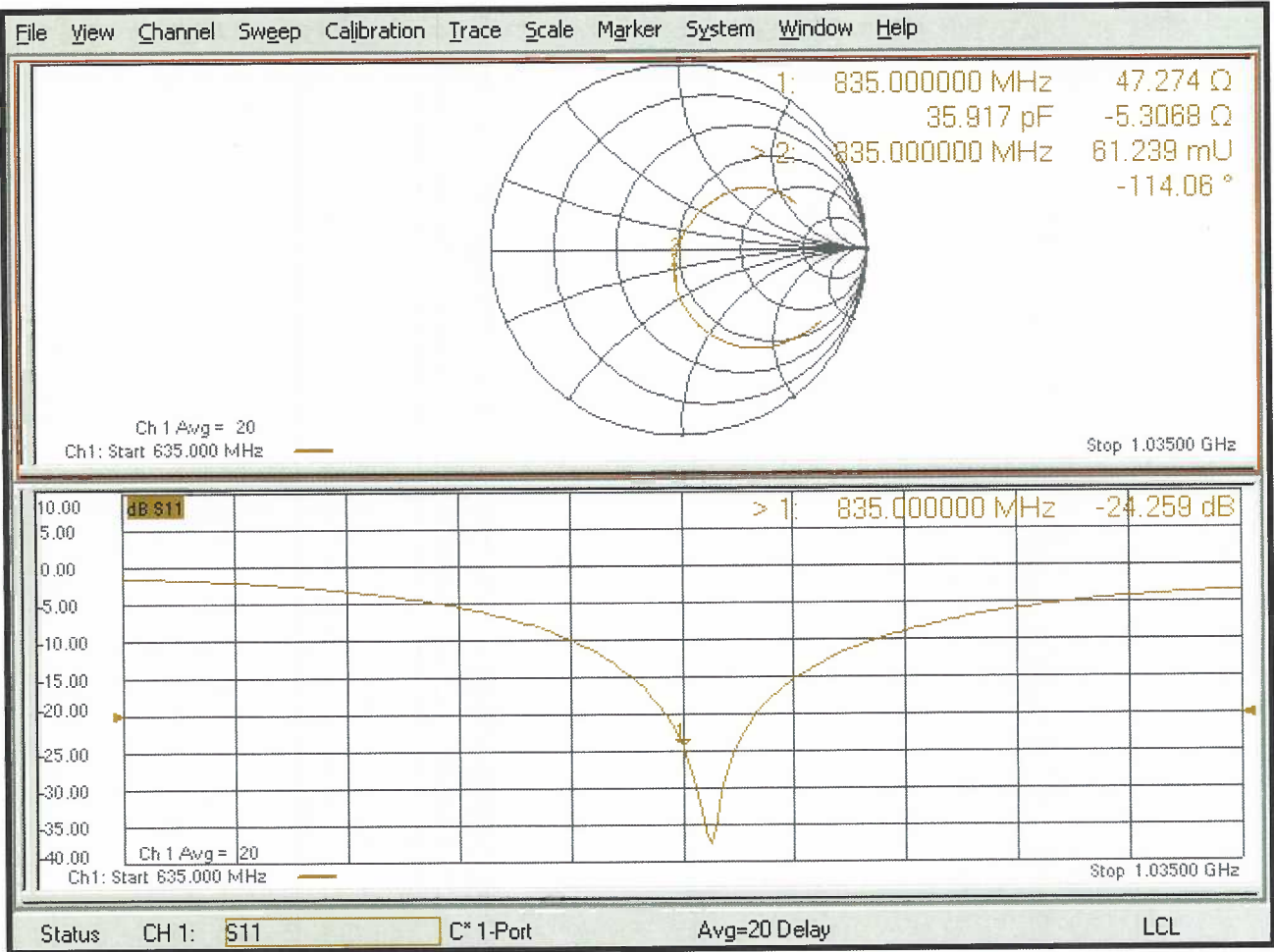
**SAR(1 g) = 2.43 W/kg; SAR(10 g) = 1.58 W/kg**

Maximum value of SAR (measured) = 3.22 W/kg



0 dB = 3.22 W/kg = 5.08 dBW/kg

Impedance Measurement Plot for Body TSL





Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Client **RF Exposure Lab**

Certificate No: **D1750V2-1018\_Jul18**

## CALIBRATION CERTIFICATE

Object **D1750V2 - SN:1018**

Calibration procedure(s) **QA CAL-05.v10**  
**Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **July 20, 2018**

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 NRP                 | SN: 104778         | 04-Apr-18 (No. 217-02672/02673)   | Apr-19                 |
| Power sensor NRP-Z91            | SN: 103244         | 04-Apr-18 (No. 217-02672)         | Apr-19                 |
| Power sensor NRP-Z91            | SN: 103245         | 04-Apr-18 (No. 217-02673)         | Apr-19                 |
| Reference 20 dB Attenuator      | SN: 5058 (20k)     | 04-Apr-18 (No. 217-02682)         | Apr-19                 |
| Type-N mismatch combination     | SN: 5047.2 / 06327 | 04-Apr-18 (No. 217-02683)         | Apr-19                 |
| Reference Probe EX3DV4          | SN: 7349           | 30-Dec-17 (No. EX3-7349_Dec17)    | Dec-18                 |
| DAE4                            | SN: 601            | 26-Oct-17 (No. DAE4-601_Oct17)    | Oct-18                 |
| Secondary Standards             | ID #               | Check Date (in house)             | Scheduled Check        |
| Power meter EPM-442A            | SN: GB37480704     | 07-Oct-15 (in house check Oct-16) | In house check: Oct-18 |
| Power sensor HP 8481A           | SN: US37292783     | 07-Oct-15 (in house check Oct-16) | In house check: Oct-18 |
| Power sensor HP 8481A           | SN: MY41092317     | 07-Oct-15 (in house check Oct-16) | In house check: Oct-18 |
| RF generator R&S SMT-06         | SN: 100972         | 15-Jun-15 (in house check Oct-16) | In house check: Oct-18 |
| Network Analyzer Agilent E8358A | SN: US41080477     | 31-Mar-14 (in house check Oct-17) | In house check: Oct-18 |

Calibrated by: **Manu Seitz** Name **Laboratory Technician** Function

Approved by: **Katja Pokovic** Technical Manager

Signature

Issued: July 20, 2018

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



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 0108**

**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 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**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.

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%.

## Measurement Conditions

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

|                                     |                        |             |
|-------------------------------------|------------------------|-------------|
| <b>DASY Version</b>                 | DASY5                  | V52.10.1    |
| <b>Extrapolation</b>                | Advanced Extrapolation |             |
| <b>Phantom</b>                      | Modular Flat Phantom   |             |
| <b>Distance Dipole Center - TSL</b> | 10 mm                  | with Spacer |
| <b>Zoom Scan Resolution</b>         | dx, dy, dz = 5 mm      |             |
| <b>Frequency</b>                    | 1750 MHz $\pm$ 1 MHz   |             |

## Head TSL parameters

The following parameters and calculations were applied.

|                                                | <b>Temperature</b>  | <b>Permittivity</b> | <b>Conductivity</b>  |
|------------------------------------------------|---------------------|---------------------|----------------------|
| <b>Nominal Head TSL parameters</b>             | 22.0 °C             | 40.1                | 1.37 mho/m           |
| <b>Measured Head TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 39.0 $\pm$ 6 %      | 1.34 mho/m $\pm$ 6 % |
| <b>Head TSL temperature change during test</b> | < 0.5 °C            | ----                | ----                 |

## SAR result with Head TSL

|                                                             |                    |                                                |
|-------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b> | Condition          |                                                |
| SAR measured                                                | 250 mW input power | 8.95 W/kg                                      |
| SAR for nominal Head TSL parameters                         | normalized to 1W   | <b>36.1 W/kg <math>\pm</math> 17.0 % (k=2)</b> |

|                                                               |                    |                                                |
|---------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b> | condition          |                                                |
| SAR measured                                                  | 250 mW input power | 4.73 W/kg                                      |
| SAR for nominal Head TSL parameters                           | normalized to 1W   | <b>19.0 W/kg <math>\pm</math> 16.5 % (k=2)</b> |

## Body TSL parameters

The following parameters and calculations were applied.

|                                                | <b>Temperature</b>  | <b>Permittivity</b> | <b>Conductivity</b>  |
|------------------------------------------------|---------------------|---------------------|----------------------|
| <b>Nominal Body TSL parameters</b>             | 22.0 °C             | 53.4                | 1.49 mho/m           |
| <b>Measured Body TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 53.7 $\pm$ 6 %      | 1.46 mho/m $\pm$ 6 % |
| <b>Body TSL temperature change during test</b> | < 0.5 °C            | ----                | ----                 |

## SAR result with Body TSL

|                                                             |                    |                                                |
|-------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Body TSL</b> | Condition          |                                                |
| SAR measured                                                | 250 mW input power | 9.00 W/kg                                      |
| SAR for nominal Body TSL parameters                         | normalized to 1W   | <b>36.5 W/kg <math>\pm</math> 17.0 % (k=2)</b> |

|                                                               |                    |                                                |
|---------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Body TSL</b> | condition          |                                                |
| SAR measured                                                  | 250 mW input power | 4.80 W/kg                                      |
| SAR for nominal Body TSL parameters                           | normalized to 1W   | <b>19.4 W/kg <math>\pm</math> 16.5 % (k=2)</b> |

## Appendix (Additional assessments outside the scope of SCS 0108)

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 49.4 $\Omega$ - 1.3 j $\Omega$ |
| Return Loss                          | - 36.8 dB                      |

### Antenna Parameters with Body TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 45.2 $\Omega$ - 0.1 j $\Omega$ |
| Return Loss                          | - 25.9 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.221 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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 | February 11, 2009 |

#### Extended Calibration

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (<-20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 865664 D01 v01r04.

| D1750V2 SN: 1018 - Head |                  |            |                             |                |                                   |                |
|-------------------------|------------------|------------|-----------------------------|----------------|-----------------------------------|----------------|
| Date of Measurement     | Return Loss (dB) | $\Delta\%$ | Impedance Real ( $\Omega$ ) | $\Delta\Omega$ | Impedance Imaginary (j $\Omega$ ) | $\Delta\Omega$ |
| 7/20/2018               | -36.8            |            | 49.4                        |                | -1.3                              |                |
| 7/13/2019               | -37.2            | 1.1        | 48.9                        | -0.5           | -1.6                              | -0.3           |
|                         |                  |            |                             |                |                                   |                |
| D1750V2 SN: 1018 - Body |                  |            |                             |                |                                   |                |
| Date of Measurement     | Return Loss (dB) | $\Delta\%$ | Impedance Real ( $\Omega$ ) | $\Delta\Omega$ | Impedance Imaginary (j $\Omega$ ) | $\Delta\Omega$ |
| 7/20/2018               | -25.9            |            | 45.2                        |                | -0.1                              |                |
| 7/13/2019               | -26.5            | 2.3        | 45.8                        | 0.6            | -0.2                              | -0.1           |
|                         |                  |            |                             |                |                                   |                |

## DASY5 Validation Report for Head TSL

Date: 20.07.2018

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1018**

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used:  $f = 1750$  MHz;  $\sigma = 1.34$  S/m;  $\epsilon_r = 39$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.5, 8.5, 8.5) @ 1750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

### Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

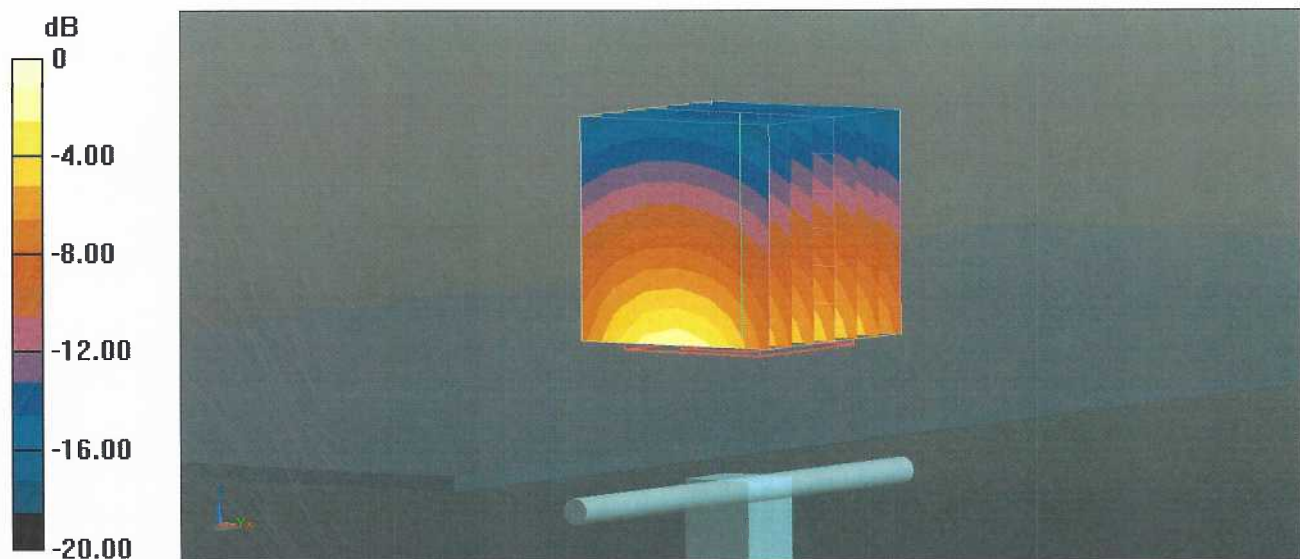
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 106.7 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 16.4 W/kg

**SAR(1 g) = 8.95 W/kg; SAR(10 g) = 4.73 W/kg**

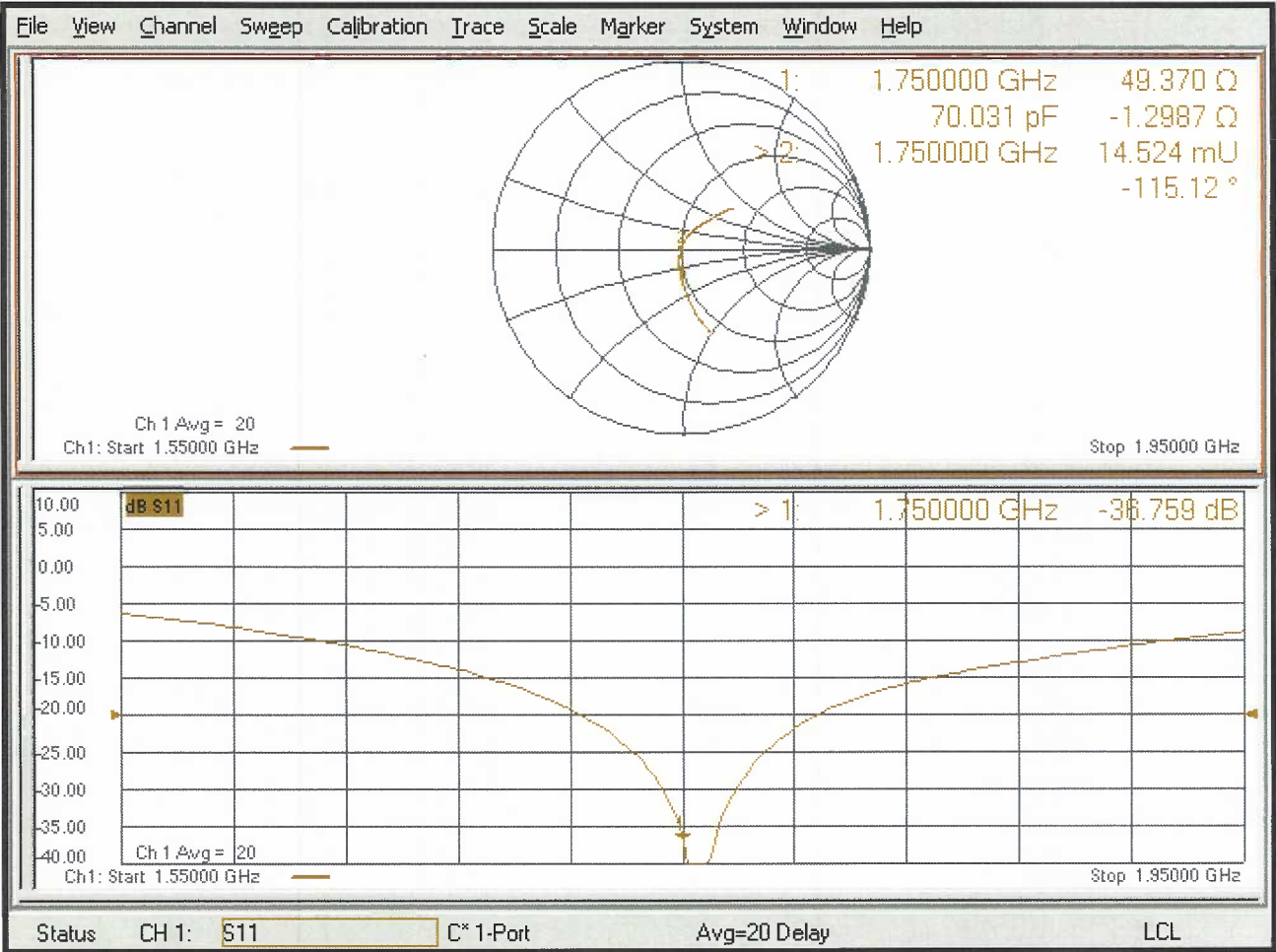
Maximum value of SAR (measured) = 13.9 W/kg



0 dB = 13.9 W/kg = 11.43 dBW/kg



Impedance Measurement Plot for Head TSL





## DASY5 Validation Report for Body TSL

Date: 20.07.2018

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1018**

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used:  $f = 1750$  MHz;  $\sigma = 1.46$  S/m;  $\epsilon_r = 53.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.35, 8.35, 8.35) @ 1750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

**Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

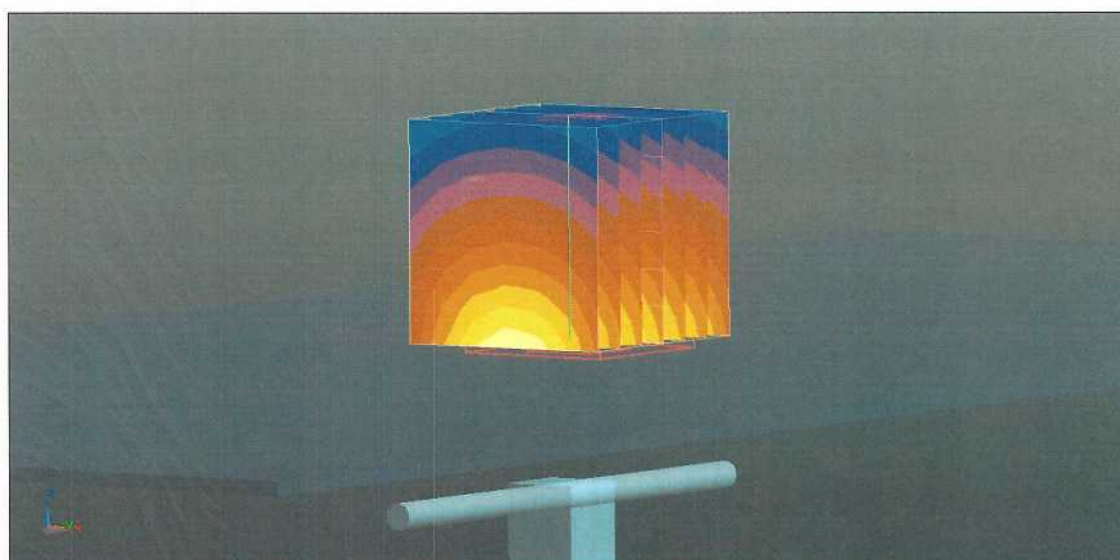
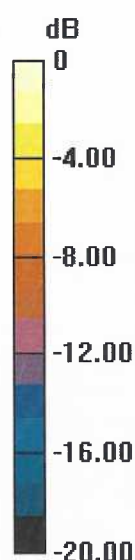
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 101.9 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 15.8 W/kg

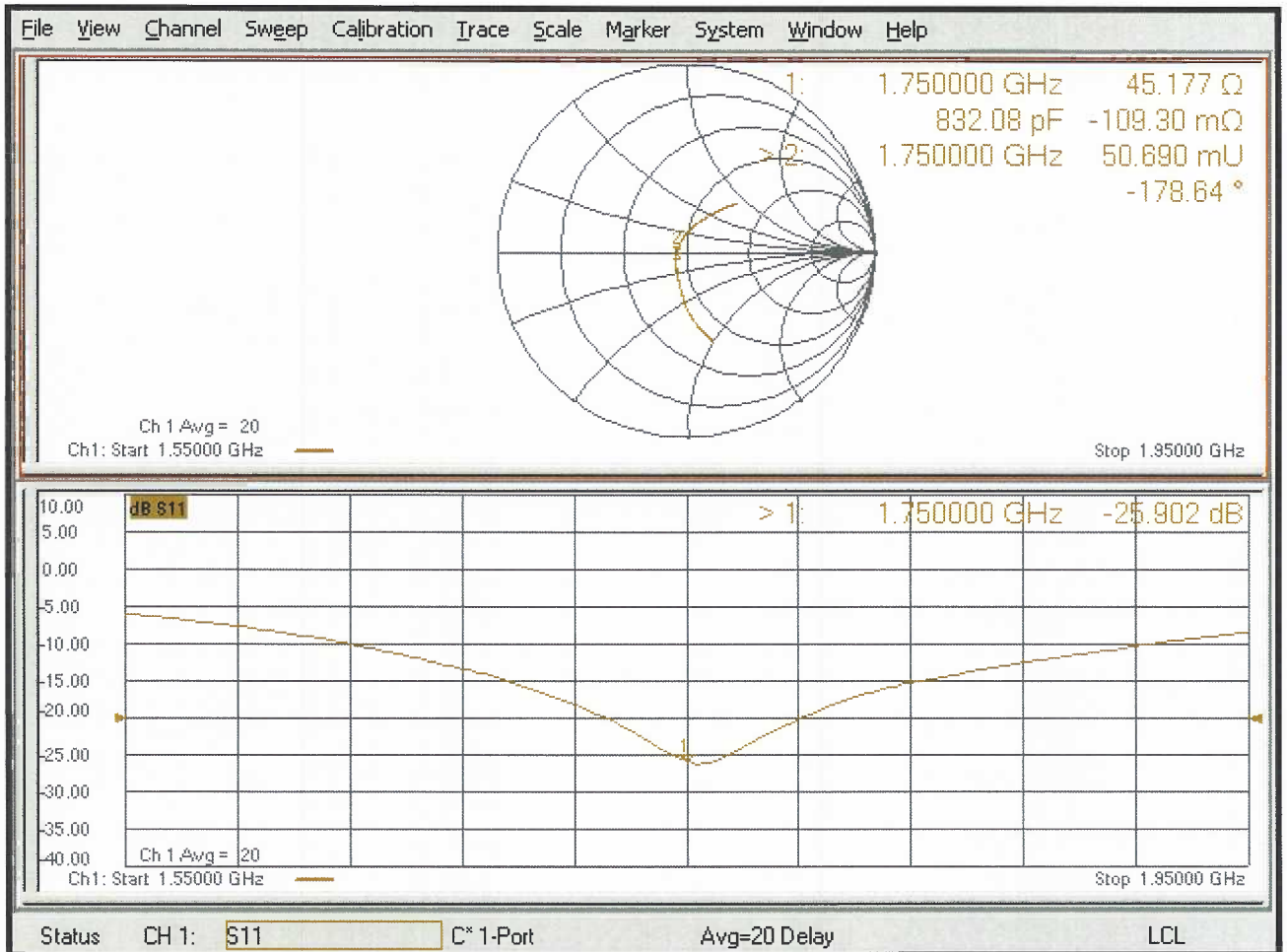
**SAR(1 g) = 9 W/kg; SAR(10 g) = 4.8 W/kg**

Maximum value of SAR (measured) = 13.4 W/kg



0 dB = 13.4 W/kg = 11.27 dBW/kg

## Impedance Measurement Plot for Body TSL





Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Client **RF Exposure Lab**

Certificate No: **D1900V2-5d116\_Jul18**

## CALIBRATION CERTIFICATE

Object **D1900V2 - SN:5d116**

Calibration procedure(s) **QA CAL-05.v10**  
**Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **July 13, 2018**

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 NRP                 | SN: 104778         | 04-Apr-18 (No. 217-02672/02673)   | Apr-19                 |
| Power sensor NRP-Z91            | SN: 103244         | 04-Apr-18 (No. 217-02672)         | Apr-19                 |
| Power sensor NRP-Z91            | SN: 103245         | 04-Apr-18 (No. 217-02673)         | Apr-19                 |
| Reference 20 dB Attenuator      | SN: 5058 (20k)     | 04-Apr-18 (No. 217-02682)         | Apr-19                 |
| Type-N mismatch combination     | SN: 5047.2 / 06327 | 04-Apr-18 (No. 217-02683)         | Apr-19                 |
| Reference Probe EX3DV4          | SN: 7349           | 30-Dec-17 (No. EX3-7349_Dec17)    | Dec-18                 |
| DAE4                            | SN: 601            | 26-Oct-17 (No. DAE4-601_Oct17)    | Oct-18                 |
| Secondary Standards             | ID #               | Check Date (in house)             | Scheduled Check        |
| Power meter EPM-442A            | SN: GB37480704     | 07-Oct-15 (in house check Oct-16) | In house check: Oct-18 |
| Power sensor HP 8481A           | SN: US37292783     | 07-Oct-15 (in house check Oct-16) | In house check: Oct-18 |
| Power sensor HP 8481A           | SN: MY41092317     | 07-Oct-15 (in house check Oct-16) | In house check: Oct-18 |
| RF generator R&S SMT-06         | SN: 100972         | 15-Jun-15 (in house check Oct-16) | In house check: Oct-18 |
| Network Analyzer Agilent E8358A | SN: US41080477     | 31-Mar-14 (in house check Oct-17) | In house check: Oct-18 |

Calibrated by: **Manu Seitz** **Manu Seitz** **Manu Seitz**  
Name Function Laboratory Technician

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

Issued: July 16, 2018

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



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 0108**

### 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 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

### 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.

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%.

## Measurement Conditions

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

|                                     |                        |             |
|-------------------------------------|------------------------|-------------|
| <b>DASY Version</b>                 | DASY5                  | V52.10.1    |
| <b>Extrapolation</b>                | Advanced Extrapolation |             |
| <b>Phantom</b>                      | Modular Flat Phantom   |             |
| <b>Distance Dipole Center - TSL</b> | 10 mm                  | with Spacer |
| <b>Zoom Scan Resolution</b>         | dx, dy, dz = 5 mm      |             |
| <b>Frequency</b>                    | 1900 MHz $\pm$ 1 MHz   |             |

## Head TSL parameters

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Head TSL parameters</b>             | 22.0 °C             | 40.0           | 1.40 mho/m           |
| <b>Measured Head TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 39.9 $\pm$ 6 % | 1.34 mho/m $\pm$ 6 % |
| <b>Head TSL temperature change during test</b> | < 0.5 °C            | ----           | ----                 |

## SAR result with Head TSL

|                                                             |                    |                                                |
|-------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b> | Condition          |                                                |
| SAR measured                                                | 250 mW input power | 9.90 W/kg                                      |
| SAR for nominal Head TSL parameters                         | normalized to 1W   | <b>40.6 W/kg <math>\pm</math> 17.0 % (k=2)</b> |

|                                                               |                    |                                                |
|---------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b> | condition          |                                                |
| SAR measured                                                  | 250 mW input power | 5.27 W/kg                                      |
| SAR for nominal Head TSL parameters                           | normalized to 1W   | <b>21.4 W/kg <math>\pm</math> 16.5 % (k=2)</b> |

## Body TSL parameters

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Body TSL parameters</b>             | 22.0 °C             | 53.3           | 1.52 mho/m           |
| <b>Measured Body TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 54.3 $\pm$ 6 % | 1.46 mho/m $\pm$ 6 % |
| <b>Body TSL temperature change during test</b> | < 0.5 °C            | ----           | ----                 |

## SAR result with Body TSL

|                                                             |                    |                                                |
|-------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Body TSL</b> | Condition          |                                                |
| SAR measured                                                | 250 mW input power | 9.70 W/kg                                      |
| SAR for nominal Body TSL parameters                         | normalized to 1W   | <b>39.9 W/kg <math>\pm</math> 17.0 % (k=2)</b> |

|                                                               |                    |                                                |
|---------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Body TSL</b> | condition          |                                                |
| SAR measured                                                  | 250 mW input power | 5.23 W/kg                                      |
| SAR for nominal Body TSL parameters                           | normalized to 1W   | <b>21.3 W/kg <math>\pm</math> 16.5 % (k=2)</b> |

## Appendix (Additional assessments outside the scope of SCS 0108)

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 54.5 $\Omega$ + 5.0 j $\Omega$ |
| Return Loss                          | - 23.9 dB                      |

### Antenna Parameters with Body TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 50.2 $\Omega$ + 8.3 j $\Omega$ |
| Return Loss                          | - 21.7 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.202 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. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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 | August 21, 2009 |

#### Extended Calibration

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (<-20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 865664 D01 v01r04.

| D1900V2 SN: 5d116 - Head |                  |            |                             |                |                                   |                |
|--------------------------|------------------|------------|-----------------------------|----------------|-----------------------------------|----------------|
| Date of Measurement      | Return Loss (dB) | $\Delta\%$ | Impedance Real ( $\Omega$ ) | $\Delta\Omega$ | Impedance Imaginary (j $\Omega$ ) | $\Delta\Omega$ |
| 7/13/2018                | -23.9            |            | 54.5                        |                | 5.0                               |                |
| 7/13/2019                | -24.2            | 1.3        | 54.6                        | 0.1            | 5.2                               | 0.2            |
|                          |                  |            |                             |                |                                   |                |
| D1900V2 SN: 5d116 - Body |                  |            |                             |                |                                   |                |
| Date of Measurement      | Return Loss (dB) | $\Delta\%$ | Impedance Real ( $\Omega$ ) | $\Delta\Omega$ | Impedance Imaginary (j $\Omega$ ) | $\Delta\Omega$ |
| 7/13/2018                | -21.7            |            | 50.2                        |                | 8.3                               |                |
| 7/13/2019                | -22.3            | 2.8        | 49.6                        | -0.6           | 8.1                               | -0.2           |
|                          |                  |            |                             |                |                                   |                |