| | | | | 39750 | 40620 | 41490 |
|---|---|---|---|---|---|---|
| QPSK | 1 | Low | 23.5 | 22.92 | 23.11 | 22.93 |
| | | Middle | | 23.14 | **23.31** | 23.17 |
| | | High | | 22.99 | 23.07 | 22.98 |
| | 50% | Low | 23 | 22.09 | **22.27** | 21.98 |
| | | Middle | | 22.11 | **22.27** | 22.15 |
| | | High | | 22.22 | 22.16 | 22.16 |
| | 100% | / | 23 | 22.21 | **22.25** | 22.13 |
| 16QAM | 1 | Low | 23 | 22.14 | 22.33 | 22.11 |
| | | Middle | | 22.37 | 22.51 | 22.34 |
| | | High | | 22.22 | 22.27 | 22.10 |
| | 50% | Low | 22 | 21.10 | 21.31 | 21.07 |
| | | Middle | | 21.10 | 21.30 | 21.13 |
| | | High | | 21.19 | 21.19 | 21.16 |
| | 100% | / | 22 | 21.16 | 21.27 | 21.10 |

| **LTE** | | | **LTE B66** | | | |
|---|---|---|---|---|---|---|
| Modulation | RB | RB Offset | Tune up | 1.4MHz | | |
| | | | | 131979 | 132422 | 132665 |
| QPSK | 1 | Low | 22 | 21.27 | 21.58 | 21.20 |
| | | Middle | | 21.32 | 21.58 | 21.46 |
| | | High | | 21.17 | 21.34 | 21.27 |
| | 50% | Low | 22 | 21.39 | 21.41 | 21.34 |
| | | Middle | | 21.47 | 21.48 | 21.36 |
| | | High | | 21.52 | 21.36 | 21.40 |
| | 100% | / | 21 | 20.41 | 20.34 | 20.32 |
| 16QAM | 1 | Low | 21 | 20.23 | 20.18 | 20.36 |
| | | Middle | | 20.36 | 20.26 | 20.04 |
| | | High | | 20.19 | 20.33 | 20.26 |
| | 50% | Low | 21 | 20.07 | 20.12 | 20.19 |
| | | Middle | | 20.13 | 20.21 | 20.34 |
| | | High | | 20.16 | 20.31 | 20.22 |
| | 100% | / | 20 | 19.20 | 19.20 | 19.16 |
| Modulation | RB | RB Offset | Tune up | 3MHz | | |
| | | | | 131987 | 132422 | 132657 |
| QPSK | 1 | Low | 22 | 21.06 | 21.01 | 21.04 |
| | | Middle | | 21.04 | 21.08 | 21.05 |
| | | High | | 21.07 | 21.03 | 20.97 |
| | 50% | Low | 21 | 20.01 | 20.02 | 20.16 |
| | | Middle | | 20.08 | 20.06 | 20.07 |
| | | High | | 20.07 | 20.03 | 20.02 |
| | 100% | / | 21 | 19.98 | 19.97 | 19.98 |
| 16QAM | 1 | Low | 21 | 20.51 | 20.21 | 20.17 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Middle | | 20.22 | 20.64 | 20.24 |
| | | High | | 20.58 | 20.10 | 20.14 |
| | 50% | Low | 20 | 19.12 | 19.32 | 19.13 |
| | | Middle | | 19.16 | 19.16 | 19.15 |
| | | High | | 19.10 | 19.30 | 19.12 |
| | 100% | / | 20 | 19.19 | 19.06 | 19.01 |
| Modulation | RB | RB Offset | Tune up | 5MHz | | |
| | | | | 131997 | 132422 | 132647 |
| QPSK | 1 | Low | 22 | 20.84 | 20.89 | 20.97 |
| | | Middle | | 20.97 | 20.86 | 20.96 |
| | | High | | 20.80 | 20.81 | 20.83 |
| | 50% | Low | 22 | 20.09 | 20.11 | 20.13 |
| | | Middle | | 20.15 | 20.12 | 20.09 |
| | | High | | 20.04 | 20.02 | 20.00 |
| | 100% | / | 21 | 20.01 | 20.03 | 20.01 |
| 16QAM | 1 | Low | 21 | 20.23 | 20.21 | 20.27 |
| | | Middle | | 20.28 | 20.28 | 20.34 |
| | | High | | 20.22 | 20.15 | 20.17 |
| | 50% | Low | 20 | 19.08 | 19.10 | 19.17 |
| | | Middle | | 19.12 | 19.18 | 19.12 |
| | | High | | 19.07 | 19.08 | 19.09 |
| | 100% | / | 20 | 19.16 | 19.14 | 19.18 |
| Modulation | RB | RB Offset | Tune up | 10MHz | | |
| | | | | 132022 | 132422 | 132622 |
| QPSK | 1 | Low | 22 | 20.97 | 20.99 | 20.96 |
| | | Middle | | 21.05 | 21.08 | 21.04 |
| | | High | | 20.98 | 21.01 | 20.99 |
| | 50% | Low | 21 | 20.12 | 20.13 | 20.09 |
| | | Middle | | 20.11 | 20.09 | 20.16 |
| | | High | | 20.09 | 20.11 | 20.12 |
| | 100% | / | 21 | 20.03 | 20.01 | 20.04 |
| 16QAM | 1 | Low | 21 | 20.29 | 20.36 | 20.26 |
| | | Middle | | 20.38 | 20.42 | 20.39 |
| | | High | | 20.34 | 20.29 | 20.22 |
| | 50% | Low | 20 | 19.26 | 19.35 | 19.24 |
| | | Middle | | 19.16 | 19.15 | 19.11 |
| | | High | | 19.15 | 19.17 | 19.12 |
| | 100% | / | 20 | 19.03 | 19.05 | 19.04 |
| Modulation | RB | RB Offset | Tune up | 15MHz | | |
| | | | | 132047 | 132422 | 132597 |
| QPSK | 1 | Low | 22 | 21.07 | 21.04 | 21.05 |
| | | Middle | | 21.01 | 21.03 | 21.06 |
| | | High | | 21.03 | 21.07 | 21.09 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 50% | Low | 21 | 19.18 | 19.16 | 19.22 |
| | | Middle | | 19.07 | 19.07 | 19.05 |
| | | High | | 19.04 | 19.03 | 19.03 |
| | 100% | / | 21 | 19.02 | 19.01 | 19.08 |
| 16QAM | 1 | Low | 21 | 20.78 | 20.81 | 20.74 |
| | | Middle | | 20.80 | 20.83 | 20.76 |
| | | High | | 20.19 | 20.18 | 20.20 |
| | 50% | Low | 20 | 19.07 | 19.11 | 19.10 |
| | | Middle | | 19.10 | 19.12 | 19.13 |
| | | High | | 19.12 | 19.10 | 19.11 |
| | 100% | / | 20 | 19.03 | 19.07 | 19.06 |
| Modulation | RB | RB Offset | Tune up | 20MHz | | |
| | | | | 132072 | 132422 | 132572 |
| QPSK | 1 | Low | 22 | **21.96** | 20.89 | 20.94 |
| | | Middle | | 21.04 | 21.03 | 21.07 |
| | | High | | 21.87 | 20.84 | 20.97 |
| | 50% | Low | 21 | 20.02 | 20.02 | 20.08 |
| | | Middle | | 20.03 | 20.07 | **20.12** |
| | | High | | 20.05 | 19.97 | 19.98 |
| | 100% | / | 21 | 20.00 | 20.05 | **20.07** |
| 16QAM | 1 | Low | 21 | 20.37 | 20.23 | 20.33 |
| | | Middle | | 20.40 | 20.34 | 20.32 |
| | | High | | 20.12 | 20.13 | 20.14 |
| | 50% | Low | 20 | 19.15 | 19.14 | 19.23 |
| | | Middle | | 19.06 | 19.11 | 19.10 |
| | | High | | 19.04 | 19.03 | 19.00 |
| | 100% | / | 20 | 19.07 | 19.05 | 19.04 |

## 13.3. WiFi Measurement result

**Table 13.5: The average conducted power for WiFi**

| **WiFi** | | | **WIFI 2.4G (dBm)** | |
|---|---|---|---|---|
| Mode | BW | Channel | Tune up | Output Power |
| 802.11b | 20M | 1 | 17.5 | 16.76 |
| | | 6 | 18 | **17.21** |
| | | 11 | 17.5 | 16.88 |
| 802.11g | 20M | 1 | 17.5 | 16.51 |
| | | 6 | 17.5 | 16.9 |
| | | 11 | 17.5 | 16.33 |
| 802.11n | 20M | 1 | 16 | 15.48 |

| | | | | |
|---|---|---|---|---|
| | | 6 | 16 | 15.67 |
| | | 11 | 16 | 15.32 |
| | 40M | 3 | 16 | 15.11 |
| | | 6 | 16 | 15.11 |
| | | 9 | 16 | 15.03 |

| WiFi | | | WIFi 5G (dBm) | |
|---|---|---|---|---|
| Mode | BW | Channel | Tune up | Output Power |
| 802.11a Rate 6M | 20M | 36 | 13.5 | 12.68 |
| | | 40 | 13.5 | 12.66 |
| | | 44 | 13.5 | 12.67 |
| | | 48 | 13.5 | 12.58 |
| | | 52 | 13.5 | 13.13 |
| | | 56 | 13.5 | 12.42 |
| | | 60 | 13.5 | 12.43 |
| | | 64 | 13.5 | 12.45 |
| | | 100 | 13.5 | 12.47 |
| | | 104 | 13.5 | 12.55 |
| | | 108 | 13.5 | 12.44 |
| | | 112 | 13.5 | 12.51 |
| | | 116 | 13.5 | 12.48 |
| | | 132 | 13.5 | 12.68 |
| | | 136 | 13.5 | 12.89 |
| | | 140 | 13.5 | 12.34 |
| 802.11n Rate MCS0 | 20M | 36 | 13.5 | 12.88 |
| | | 40 | 13.5 | 12.86 |
| | | 44 | 13.5 | 12.93 |
| | | 48 | 13.5 | 12.88 |
| | | 52 | 13.5 | 12.46 |
| | | 56 | 13.5 | 12.79 |
| | | 60 | 13.5 | 12.66 |
| | | 64 | 13.5 | 12.37 |
| | | 100 | 13.5 | 12.55 |
| | | 104 | 13.5 | 12.49 |
| | | 108 | 13.5 | 12.51 |
| | | 112 | 13.5 | 12.49 |
| | | 116 | 13.5 | 12.77 |

| | | | | |
|---|---|---|---|---|
| | | 132 | 13.5 | 12.49 |
| | | 136 | 13.5 | 12.82 |
| | | 140 | 13.5 | 12.09 |
| | 40M | 38 | 12.5 | 11.47 |
| | | 46 | 12.5 | 11.62 |
| | | 54 | 12.5 | 11.57 |
| | | 62 | 12.5 | 12.03 |
| | | 102 | 12.5 | 11.85 |
| | | 110 | 12.5 | 12.35 |
| | | 134 | 12.5 | 11.85 |
| 802.11ac Rate MCS0 | 20M | 36 | 12.5 | 11.34 |
| | | 40 | 12.5 | 11.31 |
| | | 44 | 12.5 | 11.46 |
| | | 48 | 12.5 | 11.44 |
| | | 52 | 12.5 | 11.45 |
| | | 56 | 12.5 | 11.58 |
| | | 60 | 12.5 | 11.9 |
| | | 64 | 12.5 | 11.33 |
| | | 100 | 12.5 | 11.44 |
| | | 104 | 12.5 | 11.47 |
| | | 108 | 12.5 | 11.87 |
| | | 112 | 12.5 | 11.68 |
| | | 116 | 12.5 | 11.77 |
| | | 132 | 12.5 | 11.66 |
| | | 136 | 12.5 | 11.71 |
| | | 140 | 12.5 | 11.55 |
| | 40M | 38 | 12.5 | 11.55 |
| | | 46 | 12.5 | 11.61 |
| | | 54 | 12.5 | 12.12 |
| | | 62 | 12.5 | 11.59 |
| | | 102 | 12.5 | 12.37 |
| | | 110 | 12.5 | 12.41 |
| | | 134 | 12.5 | 11.93 |
| | 80M | 42 | 12.5 | 11.84 |
| | | 58 | 12.5 | 11.81 |
| | | 106 | 12.5 | 12.44 |
| | | 122 | 12.5 | 12.19 |

### 2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied. SAR is not required for the following 2.4 GHz OFDM conditions.

a) When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.

b) When the highest *reported* SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

**The default power measurement procedures are:**

a) Power must be measured at each transmit antenna port according to the DSSS and OFDM transmission configurations in each standalone and aggregated frequency band.

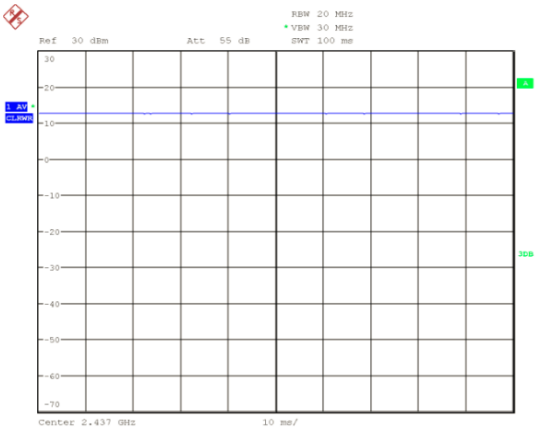
b) Power measurement is required for the transmission mode configuration with the highest maximum output power specified for production units.

1) When the same highest maximum output power specification applies to multiple transmission modes, the largest channel bandwidth configuration with the lowest order modulation and lowest data rate is measured.

2) When the same highest maximum output power is specified for multiple largest channel bandwidth configurations with the same lowest order modulation or lowest order modulation and lowest data rate, power measurement is required for all equivalent 802.11 configurations with the same maximum output power.

c) For each transmission mode configuration, power must be measured for the highest and lowest channels; and at the mid-band channel(s) when there are at least 3 channels. For configurations with multiple mid-band channels, due to an even number of channels, both channels should be measured.

During WiFi SAR testing EUT is configured with the WiFi continuous TX tool, and the transmission duty factor was monitored on the spectrum analyzer with zero-span setting，the duty cycle is 100%.




**Picture 13-1 WiFi 11b duty factor**

# 14. SAR Measurement Result

## 14.1. Standalone SAR Test Result

**Table 14.1: SAR Values for WCDMA Band2**

| Test Position | Cover Type | Mode | Channel | Frequency (MHz) | Measured power (dBm) | Tune-up (dBm) | Power Drift (dB) | Limit of 1gSAR 1.6 W/kg (mW/g) | | | Figure No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Measured SAR1g | Scaling Factor | Report SAR1g | |
| **Body SAR (HotSpot 10mm)** | | | | | | | | | | | |
| Front Side | Standard | RMC12.2k | 9400 | 1880 | 22.4 | 23 | 0.060 | 0.455 | 1.15 | 0.522 | / |
| Back Side | Standard | RMC12.2k | 9400 | 1880 | 22.4 | 23 | 0.030 | 0.692 | 1.15 | **0.795** | **1** |
| Left Side | Standard | RMC12.2k | 9400 | 1880 | 22.4 | 23 | 0.000 | 0.103 | 1.15 | 0.118 | / |
| Right Side | Standard | RMC12.2k | 9400 | 1880 | 22.4 | 23 | 0.020 | 0.061 | 1.15 | 0.069 | / |
| Bottom Side | Standard | RMC12.2k | 9400 | 1880 | 22.4 | 23 | 0.010 | 0.176 | 1.15 | 0.202 | / |

**Table 14.2: SAR Values for WCDMA Band4**

| Test Position | Cover Type | Mode | Channel | Frequency (MHz) | Measured power (dBm) | Tune-up (dBm) | Power Drift (dB) | Limit of 1gSAR 1.6 W/kg (mW/g) | | | Figure No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Measured SAR1g | Scaling Factor | Report SAR1g | |
| **Body SAR (HotSpot 10mm)** | | | | | | | | | | | |
| Front Side | Standard | RMC12.2k | 1413 | 1732.6 | 21.91 | 22 | -0.110 | 0.572 | 1.02 | 0.584 | / |
| Back Side | Standard | RMC12.2k | 1413 | 1732.6 | 21.91 | 22 | 0.030 | 1.050 | 1.02 | 1.072 | / |
| Back Side | Standard | RMC12.2k | 1312 | 1712.4 | 21.89 | 22 | 0.000 | 0.980 | 1.03 | 1.005 | / |
| Back Side | Standard | RMC12.3k | 1513 | 1752.6 | 21.9 | 22 | -0.030 | 1.110 | 1.02 | 1.136 | / |
| Left Side | Standard | RMC12.2k | 1413 | 1732.6 | 21.91 | 22 | 0.120 | 0.119 | 1.02 | 0.121 | / |
| Right Side | Standard | RMC12.2k | 1413 | 1732.6 | 21.91 | 22 | 0.020 | 0.067 | 1.02 | 0.068 | / |
| Bottom Side | Standard | RMC12.2k | 1413 | 1732.6 | 21.91 | 22 | 0.020 | 0.212 | 1.02 | 0.216 | / |
| **Body SAR (HotSpot 10mm) Secondary Supply** | | | | | | | | | | | |
| Back Side | Standard | RMC12.3k | 1513 | 1752.6 | 21.9 | 22 | 0.080 | 1.150 | 1.02 | **1.177** | **2** |
| **Body SAR (HotSpot 10mm)NO esim** | | | | | | | | | | | |
| Back Side | Standard | RMC12.3k | 1513 | 1752.6 | 21.9 | 22 | -0.080 | 0.919 | 1.02 | 0.940 | / |
| **Body SAR (HotSpot 10mm)NO esim Secondary Supply** | | | | | | | | | | | |
| Back Side | Standard | RMC12.3k | 1513 | 1752.6 | 21.9 | 22 | -0.030 | 1.040 | 1.02 | 1.064 | / |
| **Repeated** | | | | | | | | | | | |
| Back Side | Standard | RMC12.2k | 1513 | 1752.6 | 21.9 | 22 | -0.050 | 1.1 | 1.02 | 1.126 | / |

**Table 14.3: SAR Values for WCDMA Band5**

| Test Position | Cover Type | Mode | Channel | Frequency (MHz) | Measured power (dBm) | Tune-up (dBm) | Power Drift (dB) | Limit of 1gSAR 1.6 W/kg (mW/g) | | | Figure No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Measured SAR1g | Scaling Factor | Report SAR1g | |
| **Body SAR (HotSpot 10mm)** | | | | | | | | | | | |
| Front Side | Standard | RMC12.2k | 4183 | 836.6 | 23.1 | 23.5 | 0.030 | 0.457 | 1.10 | 0.501 | / |
| Back Side | Standard | RMC12.2k | 4183 | 836.6 | 23.1 | 23.5 | 0.030 | 0.611 | 1.10 | **0.670** | **3** |
| Left Side | Standard | RMC12.2k | 4183 | 836.6 | 23.1 | 23.5 | 0.010 | 0.266 | 1.10 | 0.292 | / |
| Right Side | Standard | RMC12.2k | 4183 | 836.6 | 23.1 | 23.5 | 0.000 | 0.165 | 1.10 | 0.181 | / |
| Bottom Side | Standard | RMC12.2k | 4183 | 836.6 | 23.1 | 23.5 | 0.110 | 0.083 | 1.10 | 0.091 | / |

## Table 14.4: SAR Values for LTE Band7

| Test Position | Cover Type | Mode | | | | Channel | Frequency (MHz) | Measured power (dBm) | Tune-up (dBm) | Power Drift (dB) | Limit of 1gSAR 1.6 W/kg (mW/g) | | | Figure No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Modulation | BW(MHz) | RB Allocation | RB Offset | | | | | | Measured SAR1g | Scaling Factor | Report SAR1g | |
| Body SAR (HotSpot 10mm) | | | | | | | | | | | | | | |
| Front Side | Standard | QPSK | 20 | 1 | mid | 21350 | 2560 | 22.8 | 23 | 0.060 | 0.092 | 1.05 | 0.096 | / |
| Back Side | Standard | QPSK | 20 | 1 | mid | 21350 | 2560 | 22.8 | 23 | 0.070 | 0.558 | 1.05 | **0.584** | **4** |
| Left Side | Standard | QPSK | 20 | 1 | mid | 21350 | 2560 | 22.8 | 23 | 0.160 | 0.045 | 1.05 | 0.047 | / |
| Right Side | Standard | QPSK | 20 | 1 | mid | 21350 | 2560 | 22.8 | 23 | 0.050 | 0.125 | 1.05 | 0.131 | / |
| Bottom Side | Standard | QPSK | 20 | 1 | mid | 21350 | 2560 | 22.8 | 23 | 0.120 | 0.255 | 1.05 | 0.267 | / |
| Front Side | Standard | QPSK | 20 | 50% | low | 21100 | 2535 | 21.81 | 22.5 | 0.080 | 0.084 | 1.17 | 0.098 | / |
| Back Side | Standard | QPSK | 20 | 50% | low | 21100 | 2535 | 21.81 | 22.5 | 0.140 | 0.448 | 1.17 | 0.525 | / |
| Left Side | Standard | QPSK | 20 | 50% | low | 21100 | 2535 | 21.81 | 22.5 | 0.080 | 0.046 | 1.17 | 0.053 | / |
| Right Side | Standard | QPSK | 20 | 50% | low | 21100 | 2535 | 21.81 | 22.5 | 0.080 | 0.093 | 1.17 | 0.109 | / |
| Bottom Side | Standard | QPSK | 20 | 50% | low | 21100 | 2535 | 21.81 | 22.5 | 0.160 | 0.219 | 1.17 | 0.257 | / |

## Table 14.5: SAR Values for LTE Band12

| Test Position | Cover Type | Mode | | | | Channel | Frequency (MHz) | Measured power (dBm) | Tune-up (dBm) | Power Drift (dB) | Limit of 1gSAR 1.6 W/kg (mW/g) | | | Figure No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Modulation | BW(MHz) | RB Allocation | RB Offset | | | | | | Measured SAR1g | Scaling Factor | Report SAR1g | |
| Body SAR (HotSpot 10mm) | | | | | | | | | | | | | | |
| Front Side | Standard | QPSK | 10 | 1 | mid | 23095 | 707.5 | 23.2 | 23.5 | 0.030 | 0.099 | 1.07 | 0.106 | / |
| Back Side | Standard | QPSK | 10 | 1 | mid | 23095 | 707.5 | 23.2 | 23.5 | 0.160 | 0.168 | 1.07 | **0.180** | **5** |
| Left Side | Standard | QPSK | 10 | 1 | mid | 23095 | 707.5 | 23.2 | 23.5 | 0.060 | 0.066 | 1.07 | 0.070 | / |
| Right Side | Standard | QPSK | 10 | 1 | mid | 23095 | 707.5 | 23.2 | 23.5 | 0.070 | 0.067 | 1.07 | 0.072 | / |
| Bottom Side | Standard | QPSK | 10 | 1 | mid | 23095 | 707.5 | 23.2 | 23.5 | 0.140 | 0.023 | 1.07 | 0.025 | / |
| Front Side | Standard | QPSK | 10 | 50% | high | 23095 | 707.5 | 22.41 | 23 | 0.040 | 0.077 | 1.15 | 0.088 | / |
| Back Side | Standard | QPSK | 10 | 50% | high | 23095 | 707.5 | 22.41 | 23 | 0.020 | 0.133 | 1.15 | 0.152 | / |
| Left Side | Standard | QPSK | 10 | 50% | high | 23095 | 707.5 | 22.41 | 23 | 0.020 | 0.052 | 1.15 | 0.059 | / |
| Right Side | Standard | QPSK | 10 | 50% | high | 23095 | 707.5 | 22.41 | 23 | 0.060 | 0.053 | 1.15 | 0.060 | / |
| Bottom Side | Standard | QPSK | 10 | 50% | high | 23095 | 707.5 | 22.41 | 23 | 0.150 | 0.018 | 1.15 | 0.020 | / |

## Table 14.6: SAR Values for LTE Band13

| Test Position | Cover Type | Mode | | | | Channel | Frequency (MHz) | Measured power (dBm) | Tune-up (dBm) | Power Drift (dB) | Limit of 1gSAR 1.6 W/kg (mW/g) | | | Figure No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Modulation | BW(MHz) | RB Allocation | RB Offset | | | | | | Measured SAR1g | Scaling Factor | Report SAR1g | |
| Body SAR (HotSpot 10mm) | | | | | | | | | | | | | | |
| Front Side | Standard | QPSK | 10 | 1 | mid | 23230 | 782 | 23.01 | 23.5 | 0.000 | 0.550 | 1.12 | 0.616 | / |
| Back Side | Standard | QPSK | 10 | 1 | mid | 23230 | 782 | 23.01 | 23.5 | 0.020 | 0.837 | 1.12 | **0.937** | **6** |
| Left Side | Standard | QPSK | 10 | 1 | mid | 23230 | 782 | 23.01 | 23.5 | 0.060 | 0.537 | 1.12 | 0.601 | / |
| Right Side | Standard | QPSK | 10 | 1 | mid | 23230 | 782 | 23.01 | 23.5 | 0.030 | 0.514 | 1.12 | 0.575 | / |
| Bottom Side | Standard | QPSK | 10 | 1 | mid | 23230 | 782 | 23.01 | 23.5 | 0.060 | 0.079 | 1.12 | 0.088 | / |
| Front Side | Standard | QPSK | 10 | 50% | high | 23230 | 782 | 22.22 | 23 | 0.030 | 0.468 | 1.20 | 0.560 | / |
| Back Side | Standard | QPSK | 10 | 50% | high | 23230 | 782 | 22.22 | 23 | 0.020 | 0.694 | 1.20 | 0.831 | / |
| Left Side | Standard | QPSK | 10 | 50% | high | 23230 | 782 | 22.22 | 23 | 0.050 | 0.448 | 1.20 | 0.536 | / |
| Right Side | Standard | QPSK | 10 | 50% | high | 23230 | 782 | 22.22 | 23 | 0.040 | 0.430 | 1.20 | 0.515 | / |
| Bottom Side | Standard | QPSK | 10 | 50% | high | 23230 | 782 | 22.22 | 23 | 0.060 | 0.067 | 1.20 | 0.080 | / |

## Table 14.7: SAR Values for LTE Band25

| Test Position | Cover Type | Mode | | | | Channel | Frequency (MHz) | Measured power (dBm) | Tune-up (dBm) | Power Drift (dB) | Limit of 1gSAR 1.6 W/kg (mW/g) | | | Figure No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Modulation | BW(MHz) | RB Allocation | RB Offset | | | | | | Measured SAR1g | Scaling Factor | Report SAR1g | |
| Body SAR (HotSpot 10mm) | | | | | | | | | | | | | | |
| Front Side | Standard | QPSK | 20 | 1 | mid | 26365 | 1882.5 | 21.82 | 22 | 0.020 | 0.339 | 1.04 | 0.353 | / |
| Back Side | Standard | QPSK | 20 | 1 | mid | 26365 | 1882.5 | 21.82 | 22 | 0.010 | 0.467 | 1.04 | **0.487** | **7** |
| Left Side | Standard | QPSK | 20 | 1 | mid | 26365 | 1882.5 | 21.82 | 22 | 0.070 | 0.208 | 1.04 | 0.217 | / |
| Right Side | Standard | QPSK | 20 | 1 | mid | 26365 | 1882.5 | 21.82 | 22 | 0.170 | 0.212 | 1.04 | 0.221 | / |
| Bottom Side | Standard | QPSK | 20 | 1 | mid | 26365 | 1882.5 | 21.82 | 22 | 0.070 | 0.186 | 1.04 | 0.194 | / |
| Front Side | Standard | QPSK | 20 | 50% | low | 26365 | 1882.5 | 20.93 | 21.5 | 0.030 | 0.354 | 1.14 | 0.404 | / |
| Back Side | Standard | QPSK | 20 | 50% | low | 26365 | 1882.5 | 20.93 | 21.5 | 0.040 | 0.381 | 1.14 | 0.434 | / |
| Left Side | Standard | QPSK | 20 | 50% | low | 26365 | 1882.5 | 20.93 | 21.5 | 0.150 | 0.168 | 1.14 | 0.192 | / |
| Right Side | Standard | QPSK | 20 | 50% | low | 26365 | 1882.5 | 20.93 | 21.5 | 0.050 | 0.165 | 1.14 | 0.188 | / |
| Bottom Side | Standard | QPSK | 20 | 50% | low | 26365 | 1882.5 | 20.93 | 21.5 | 0.040 | 0.149 | 1.14 | 0.170 | / |

## Table 14.8: SAR Values for LTE Band26

| Test Position | Cover Type | Mode | | | | Channel | Frequency (MHz) | Measured power (dBm) | Tune-up (dBm) | Power Drift (dB) | Limit of 1gSAR 1.6 W/kg (mW/g) | | | Figure No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Modulation | BW(MHz) | RB Allocation | RB Offset | | | | | | Measured SAR1g | Scaling Factor | Report SAR1g | |
| Body SAR (HotSpot 10mm) | | | | | | | | | | | | | | |
| Front Side | Standard | QPSK | 15 | 1 | mid | 26765 | 821.5 | 23.02 | 23.5 | 0.050 | 0.583 | 1.12 | 0.651 | / |
| Back Side | Standard | QPSK | 15 | 1 | mid | 26765 | 821.5 | 23.02 | 23.5 | 0.020 | 0.732 | 1.12 | **0.818** | **8** |
| Left Side | Standard | QPSK | 15 | 1 | mid | 26765 | 821.5 | 23.02 | 23.5 | 0.060 | 0.524 | 1.12 | 0.585 | / |
| Right Side | Standard | QPSK | 15 | 1 | mid | 26765 | 821.5 | 23.02 | 23.5 | 0.040 | 0.451 | 1.12 | 0.504 | / |
| Bottom Side | Standard | QPSK | 15 | 1 | mid | 26765 | 821.5 | 23.02 | 23.5 | 0.190 | 0.087 | 1.12 | 0.098 | / |
| Front Side | Standard | QPSK | 15 | 50% | low | 26865 | 831.5 | 22.18 | 23 | 0.010 | 0.429 | 1.21 | 0.518 | / |
| Back Side | Standard | QPSK | 15 | 50% | low | 26865 | 831.5 | 22.18 | 23 | 0.010 | 0.538 | 1.21 | 0.650 | / |
| Left Side | Standard | QPSK | 15 | 50% | low | 26865 | 831.5 | 22.18 | 23 | 0.050 | 0.384 | 1.21 | 0.464 | / |
| Right Side | Standard | QPSK | 15 | 50% | low | 26865 | 831.5 | 22.18 | 23 | 0.040 | 0.328 | 1.21 | 0.396 | / |
| Bottom Side | Standard | QPSK | 15 | 50% | low | 26865 | 831.5 | 22.18 | 23 | 0.190 | 0.068 | 1.21 | 0.082 | / |
| Back Side | Standard | QPSK | 15 | 1 | mid | 26865 | 831.5 | 23.01 | 23.5 | 0.000 | 0.662 | 1.12 | 0.741 | / |
| Back Side | Standard | QPSK | 15 | 1 | mid | 26965 | 841.5 | 22.97 | 23.5 | 0.000 | 0.603 | 1.13 | 0.681 | / |

## Table 14.9: SAR Values for LTE Band40

| Test Position | Cover Type | Mode | | | | Channel | Frequency (MHz) | Measured power (dBm) | Tune-up (dBm) | Power Drift (dB) | Limit of 1gSAR 1.6 W/kg (mW/g) | | | Figure No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Modulation | BW(MHz) | RB Allocation | RB Offset | | | | | | Measured SAR1g | Scaling Factor | Report SAR1g | |
| Body SAR (HotSpot 10mm) | | | | | | | | | | | | | | |
| Front Side | Standard | QPSK | 20 | 1 | mid | 39550 | 2390 | 23.59 | 24 | 0.030 | 0.078 | 1.10 | 0.086 | / |
| Back Side | Standard | QPSK | 20 | 1 | mid | 39550 | 2390 | 23.59 | 24 | 0.100 | 0.379 | 1.10 | **0.417** | **9** |
| Left Side | Standard | QPSK | 20 | 1 | mid | 39550 | 2390 | 23.59 | 24 | 0.060 | 0.030 | 1.10 | 0.033 | / |
| Right Side | Standard | QPSK | 20 | 1 | mid | 39550 | 2390 | 23.59 | 24 | 0.130 | 0.051 | 1.10 | 0.056 | / |
| Bottom Side | Standard | QPSK | 20 | 1 | mid | 39550 | 2390 | 23.59 | 24 | 0.120 | 0.117 | 1.10 | 0.129 | / |
| Front Side | Standard | QPSK | 20 | 50% | low | 39550 | 2390 | 22.7 | 23 | 0.060 | 0.060 | 1.07 | 0.064 | / |
| Back Side | Standard | QPSK | 20 | 50% | low | 39550 | 2390 | 22.7 | 23 | 0.160 | 0.295 | 1.07 | 0.316 | / |
| Left Side | Standard | QPSK | 20 | 50% | low | 39550 | 2390 | 22.7 | 23 | 0.110 | 0.023 | 1.07 | 0.025 | / |
| Right Side | Standard | QPSK | 20 | 50% | low | 39550 | 2390 | 22.7 | 23 | 0.160 | 0.040 | 1.07 | 0.043 | / |
| Bottom Side | Standard | QPSK | 20 | 50% | low | 39550 | 2390 | 22.7 | 23 | 0.120 | 0.089 | 1.07 | 0.096 | / |

## Table 14.10: SAR Values for LTE Band41

| Test Position | Cover Type | Mode | | | | Channel | Frequency (MHz) | Measured power (dBm) | Tune-up (dBm) | Power Drift (dB) | Limit of 1gSAR 1.6 W/kg (mW/g) | | | Figure No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Modulation | BW(MHz) | RB Allocation | RB Offset | | | | | | Measured SAR1g | Scaling Factor | Report SAR1g | |
| Body SAR (HotSpot 10mm) | | | | | | | | | | | | | | |
| Front Side | Standard | QPSK | 20 | 1 | mid | 40620 | 2593 | 23.31 | 24 | 0.060 | 0.032 | 1.17 | 0.038 | / |
| Back Side | Standard | QPSK | 20 | 1 | mid | 40620 | 2593 | 23.31 | 24 | 0.070 | 0.432 | 1.17 | **0.506** | **10** |
| Left Side | Standard | QPSK | 20 | 1 | mid | 40620 | 2593 | 23.31 | 24 | 0.070 | 0.018 | 1.17 | 0.021 | / |
| Right Side | Standard | QPSK | 20 | 1 | mid | 40620 | 2593 | 23.31 | 24 | 0.060 | 0.066 | 1.17 | 0.077 | / |
| Bottom Side | Standard | QPSK | 20 | 1 | mid | 40620 | 2593 | 23.31 | 24 | 0.080 | 0.190 | 1.17 | 0.223 | / |
| Front Side | Standard | QPSK | 20 | 50% | mid | 40620 | 2593 | 22.27 | 23 | 0.060 | 0.025 | 1.18 | 0.029 | / |
| Back Side | Standard | QPSK | 20 | 50% | mid | 40620 | 2593 | 22.27 | 23 | 0.090 | 0.337 | 1.18 | 0.399 | / |
| Left Side | Standard | QPSK | 20 | 50% | mid | 40620 | 2593 | 22.27 | 23 | 0.040 | 0.015 | 1.18 | 0.018 | / |
| Right Side | Standard | QPSK | 20 | 50% | mid | 40620 | 2593 | 22.27 | 23 | 0.190 | 0.051 | 1.18 | 0.060 | / |
| Bottom Side | Standard | QPSK | 20 | 50% | mid | 40620 | 2593 | 22.27 | 23 | 0.020 | 0.149 | 1.18 | 0.176 | / |

## Table 14.11: SAR Values for LTE Band66

| Test Position | Cover Type | Mode | | | | Channel | Frequency (MHz) | Measured power (dBm) | Tune-up (dBm) | Power Drift (dB) | Limit of 1gSAR 1.6 W/kg (mW/g) | | | Figure No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Modulation | BW(MHz) | RB Allocation | RB Offset | | | | | | Measured SAR1g | Scaling Factor | Report SAR1g | |
| Body SAR (HotSpot 10mm) | | | | | | | | | | | | | | |
| Front Side | Standard | QPSK | 20 | 1 | low | 132072 | 1720 | 21.96 | 22 | 0.120 | 0.391 | 1.01 | 0.395 | / |
| Back Side | Standard | QPSK | 20 | 1 | low | 132072 | 1720 | 21.96 | 22 | 0.060 | 0.799 | 1.01 | 0.806 | / |
| Left Side | Standard | QPSK | 20 | 1 | low | 132072 | 1720 | 21.96 | 22 | 0.190 | 0.146 | 1.01 | 0.147 | / |
| Right Side | Standard | QPSK | 20 | 1 | low | 132072 | 1720 | 21.96 | 22 | 0.070 | 0.235 | 1.01 | 0.237 | / |
| Bottom Side | Standard | QPSK | 20 | 1 | low | 132072 | 1720 | 21.96 | 22 | 0.050 | 0.186 | 1.01 | 0.188 | / |
| Front Side | Standard | QPSK | 20 | 50% | mid | 132572 | 1770 | 20.12 | 21 | 0.080 | 0.322 | 1.22 | 0.394 | / |
| Back Side | Standard | QPSK | 20 | 50% | mid | 132572 | 1770 | 20.12 | 21 | 0.040 | 0.695 | 1.22 | 0.851 | / |
| Left Side | Standard | QPSK | 20 | 50% | mid | 132572 | 1770 | 20.12 | 21 | 0.070 | 0.151 | 1.22 | 0.185 | / |
| Right Side | Standard | QPSK | 20 | 50% | mid | 132572 | 1770 | 20.12 | 21 | 0.160 | 0.199 | 1.22 | 0.244 | / |
| Bottom Side | Standard | QPSK | 20 | 50% | mid | 132572 | 1770 | 20.12 | 21 | 0.010 | 0.142 | 1.22 | 0.174 | / |
| Back Side | Standard | QPSK | 20 | 1 | low | 132422 | 1755 | 20.89 | 22 | 0.020 | 0.883 | 1.29 | 1.140 | / |
| Back Side | Standard | QPSK | 20 | 1 | low | 132572 | 1770 | 20.94 | 22 | 0.030 | 0.894 | 1.28 | **1.141** | **11** |
| Back Side | Standard | QPSK | 20 | 50% | mid | 132072 | 1720 | 20.03 | 21 | -0.030 | 0.750 | 1.25 | 0.938 | / |
| Back Side | Standard | QPSK | 20 | 50% | mid | 132422 | 1755 | 20.07 | 21 | -0.080 | 0.752 | 1.24 | 0.932 | / |
| Repeated | | | | | | | | | | | | | | |
| Back Side | Standard | QPSK | 20 | 1 | low | 132572 | 1770 | 20.94 | 22 | 0.030 | 0.835 | 1.28 | 1.066 | / |

## Table 14.12: SAR Values for WiFi 2.4G

| Test Position | Cover Type | Mode | BW(MHz) | Duty Cycle | Channel | Frequency (MHz) | Measured power (dBm) | Tune-up (dBm) | Power Drift (dB) | Limit of 1gSAR 1.6 W/kg (mW/g) | | | Figure No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Measured SAR1g | Scaling Factor | Report SAR1g | |
| Body SAR (HotSpot 10mm) | | | | | | | | | | | | | |
| Front Side | Standard | 802.11b | 20 | 1:1 | 6 | 2437 | 17.21 | 18 | 0.090 | 0.166 | 1.20 | **0.199** | **12** |
| Back Side | Standard | 802.11b | 20 | 1:1 | 6 | 2437 | 17.21 | 18 | 0.170 | 0.155 | 1.20 | 0.186 | / |
| Left Side | Standard | 802.11b | 20 | 1:1 | 6 | 2437 | 17.21 | 18 | 0.150 | 0.083 | 1.20 | 0.100 | / |
| Right Side | Standard | 802.11b | 20 | 1:1 | 6 | 2437 | 17.21 | 18 | 0.060 | 0.130 | 1.20 | 0.156 | / |
| Top Side | Standard | 802.11b | 20 | 1:1 | 6 | 2437 | 17.21 | 18 | 0.130 | 0.011 | 1.20 | 0.013 | / |

**Table 14.13: SAR Values for WiFi 5G**

| Test Position | Cover Type | Mode | BW(MHz) | Duty Cycle | Channel | Frequency (MHz) | Measured power (dBm) | Tune-up (dBm) | Power Drift (dB) | Limit of 1gSAR 1.6 W/kg (mW/g) | | | Figure No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Measured SAR1g | Scaling Factor | Report SAR1g | |
| Body SAR (HotSpot 10mm) | | | | | | | | | | | | | |
| Front Side | Standard | 802.11a | 20 | 1:1 | 52 | 5260 | 13.13 | 13.5 | 0.000 | 0.009 | 1.09 | 0.010 | / |
| Back Side | Standard | 802.11a | 20 | 1:1 | 52 | 5260 | 13.13 | 13.5 | 0.020 | 0.322 | 1.09 | **0.351** | **13** |
| Left Side | Standard | 802.11a | 20 | 1:1 | 52 | 5260 | 13.13 | 13.5 | -0.080 | 0.015 | 1.09 | 0.016 | / |
| Right Side | Standard | 802.11a | 20 | 1:1 | 52 | 5260 | 13.13 | 13.5 | 0.000 | 0.101 | 1.09 | 0.110 | / |
| Top Side | Standard | 802.11a | 20 | 1:1 | 52 | 5260 | 13.13 | 13.5 | -0.040 | 0.089 | 1.09 | 0.097 | / |
| Front Side | Standard | 802.11a | 20 | 1:1 | 136 | 5680 | 12.89 | 13.5 | 0.000 | 0.019 | 1.15 | 0.022 | / |
| Back Side | Standard | 802.11a | 20 | 1:1 | 136 | 5680 | 12.89 | 13.5 | 0.020 | 0.236 | 1.15 | 0.272 | / |
| Left Side | Standard | 802.11a | 20 | 1:1 | 136 | 5680 | 12.89 | 13.5 | 0.040 | 0.011 | 1.15 | 0.013 | / |
| Right Side | Standard | 802.11a | 20 | 1:1 | 136 | 5680 | 12.89 | 13.5 | 0.070 | 0.073 | 1.15 | 0.084 | / |
| Top Side | Standard | 802.11a | 20 | 1:1 | 136 | 5680 | 12.89 | 13.5 | 0.030 | 0.104 | 1.15 | 0.120 | / |

## 14.2. Simultaneous SAR Evaluation

**Table 14.14 Simultaneous transmission SAR**

| FCC SAR Test | | Cellular | | | | | | | | | | | Max. of Cellular | Non-Cellular Simultanuous Tra | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | W B2 | W B4 | W B5 | L B7 | L B12 | L B13 | L B25 | L B26 | L B66 | L B40 | L B41 | | WiFi2G Core0 | WiFi5G Core0 | Max(Cel.)+ WiFi2G Core0+1 |
| Hotspot (10mm) | Top | | | | | | | | | | | | | 0.013 | 0.120 | 0.013 |
| | Left | 0.118 | 0.121 | 0.292 | 0.053 | 0.070 | 0.601 | 0.217 | 0.585 | 0.185 | 0.033 | 0.019 | 0.601 | 0.100 | 0.016 | 0.701 |
| | Right | 0.069 | 0.068 | 0.181 | 0.131 | 0.072 | 0.575 | 0.221 | 0.504 | 0.244 | 0.056 | 0.069 | 0.575 | 0.156 | 0.110 | 0.731 |
| | Front | 0.522 | 0.584 | 0.501 | 0.098 | 0.106 | 0.616 | 0.404 | 0.651 | 0.395 | 0.086 | 0.034 | 0.651 | 0.199 | 0.022 | 0.850 |
| | Back | 0.795 | 1.177 | 0.670 | 0.584 | 0.180 | 0.937 | 0.487 | 0.818 | 1.141 | 0.417 | 0.451 | 1.177 | 0.186 | 0.351 | 1.363 |
| | Bottom | 0.202 | 0.216 | 0.091 | 0.267 | 0.025 | 0.088 | 0.194 | 0.098 | 0.188 | 0.129 | 0.198 | 0.267 | | | 0.267 |

According to the conducted power measurement result, we can draw the conclusion that: stand-alone SAR for WiFi should be performed. Then, simultaneous transmission SAR for WiFi/BT is considered with measurement results of WCDMA/LTE and WiFi/BT. According to the above table, the sum of reported SAR values for WCDMA/LTE and WiFi<1.6W/kg. So the simultaneous transmission SAR is not required for WiFi/BT transmitter.

## 14.3. SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.
The following procedures are applied to determine if repeated measurements are required.
1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

**Table 14.15: SAR Measurement Variability (1g)**

| Frequency (MHz) | | Configuration | Test Position | Original SAR (W/kg) | First Repeated SAR (W/kg) | The Ratio |
|---|---|---|---|---|---|---|
| Tx | Channel | | | | | |
| 1752.6 | 1513 | WCDMA Band 4 | Back Side | 1.136 | 1.126 | 1.01 |
| 1770 | 132572 | LTE Band 66 | Back Side | 0.894 | 0.835 | 1.07 |

**Note:** According to the KDB 865664 D01 repeated measurement is not required when the original highest measured SAR is < 0.8 W/kg.

# 15. Test Equipment Utilized

**Table 15.1 SAR Test System Equipment List**

| Item | Instrument Name | Type | Serial Number | Manufacturer | Cal. Date | Cal. interval |
|---|---|---|---|---|---|---|
| 1 | Network analyzer | N5242A | MY51221755 | Agilent | 2019-12-11 | 1 year |
| 2 | Power meter | NRVD | 102257 | RS | 2020-5-10 | 1 year |
| 3 | Power sensor | NRV-Z5 | 100241 | | | |
| | | | 100644 | | | |
| 4 | Signal Generator | E4438C | MY49072044 | Agilent | 2020-5-10 | 1 Year |
| 5 | Amplifier | NTWPA-0086010F | 12023024 | rflight | No Calibration Requested | |
| 6 | Coupler | 778D | MY4825551 | Agilent | 2020-5-10 | 1 year |
| 7 | BTS | E5515C | MY50266468 | Agilent | 2019-12-11 | 1 year |
| | | MT8820C | 6201240338 | Anritsu | 2019-12-11 | 1 year |
| 8 | E-field Probe | ES3DV3 | 3252 | SPEAG | 2020-1-3 | 1 year |
| 9 | DAE | SPEAG DAE4 | 1244 | SPEAG | 2019-12-17 | 1 year |
| 10 | Dipole Validation Kit | SPEAG D750V3 | 1144 | SPEAG | 2018-10-26 | 3 year |
| | | SPEAG D835V2 | 4d112 | SPEAG | 2018-10-25 | 3 year |
| | | SPEAG D900V2 | 1d109 | SPEAG | 2018-10-29 | 3 year |
| | | SPEAG D1750V2 | 1044 | SPEAG | 2018-10-31 | 3 year |
| | | SPEAG D1900V2 | 5d232 | SPEAG | 2020-2-12 | 3 year |
| | | SPEAG D2000V2 | 1051 | SPEAG | 2018-10-31 | 3 year |
| | | SPEAG D2300V2 | 1021 | SPEAG | 2018-11-1 | 3 year |
| | | SPEAG D2450V2 | 858 | SPEAG | 2018-10-26 | 3 year |
| | | SPEAG D2600V2 | 1031 | SPEAG | 2018-11-1 | 3 year |
| | | SPEAG D5GHzV2 | 1172 | SPEAG | 2018-3-30 | 3 year |

# 16. Measurement Uncertainty

**Table 16.1 Measurement Uncertainty Evaluation for SAR test**

| Error Description | Uncert. Value | Prob. Dist. | Div. | (Ci) 1g | (Ci) 10g | Std. Unc. (1g) | Std. Unc. (10g) | (Ui) ueff |
|---|---|---|---|---|---|---|---|---|
| Measurement System | | | | | | | | |
| Probe Calibration | 13.3 | N | 2 | 1 | 1 | 6.65 | 6.65 | ∞ |
| Axial Isotropy | 4.7 | R | $\sqrt{3}$ | 0.7 | 0.7 | 1.90 | 1.90 | ∞ |
| Hemispherical Isotropy | 9.6 | R | $\sqrt{3}$ | 0.7 | 0.7 | 3.88 | 3.88 | ∞ |
| Boundary effects | 1 | R | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| Linearity | 4.7 | R | $\sqrt{3}$ | 1 | 1 | 2.70 | 2.70 | ∞ |
| System Detection Limits | 1 | R | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| Readout Electronics | 0.7 | N | 1 | 1 | 1 | 0.70 | 0.70 | ∞ |
| Response Time | 0.8 | R | $\sqrt{3}$ | 1 | 1 | 0.50 | 0.50 | ∞ |
| Integration Time | 2.6 | R | $\sqrt{3}$ | 1 | 1 | 1.50 | 1.50 | ∞ |
| RF Ambient Noise | 3 | R | $\sqrt{3}$ | 1 | 1 | 1.70 | 1.70 | ∞ |
| RF Ambient Re [illegible] | 3 | R | $\sqrt{3}$ | 1 | 1 | 1.70 | 1.70 | ∞ |
| Probe Positioner | 0.4 | R | $\sqrt{3}$ | 1 | 1 | 0.20 | 0.20 | ∞ |
| Probe Positioning | 2.9 | R | $\sqrt{3}$ | 1 | 1 | 1.70 | 1.70 | ∞ |
| Post-processing | 4 | R | $\sqrt{3}$ | 1 | 1 | 2.30 | 2.30 | ∞ |
| Test Sample Related | | | | | | | | |
| Device Holder | 2.42 | N | 1 | 1 | 1 | 2.42 | 2.42 | 71 |
| Test dample Positioning | 3 | N | 1 | 1 | 1 | 3 | 3 | 3 |
| Power Drift | 5 | R | $\sqrt{3}$ | 1 | 1 | 2.9 | 2.9 | ∞ |
| Phantom and Setup | | | | | | | | |
| Phantom Uncertainty | 4 | R | $\sqrt{3}$ | 1 | 1 | 2.3 | 2.3 | ∞ |
| Liquid Conductivity (target) | 5 | R | $\sqrt{3}$ | 0.64 | 0.43 | 2.9 | 2.9 | ∞ |
| Liquid Conductivity (meas.) | 5 | N | 1 | 0.64 | 0.43 | 5 | 5 | ∞ |
| Liquid Permittivity (target) | 5 | R | $\sqrt{3}$ | 0.6 | 0.49 | 2.9 | 2.9 | ∞ |
| Liquid Permittivity (meas.) | 5 | N | 1 | 0.6 | 0.49 | 5 | 5 | ∞ |
| Combined Std. Uncertainty | $U_C^{'} = \sqrt{\sum_{i=1}^{23} Ci^2 Ui^2}$ | | | | | 11.51 | 11.00 | |
| Expanded STD Uncertainty | $U_C = 2U_C^{'}$ | | | | | 23.03 | 22.01 | |

**Table 16.2 Measurement Uncertainty Evaluation for System Validation**

| Error Description | Uncert. Value | Prob. Dist. | Div. | (Ci) 1g | (Ci) 10g | Std. Unc. (1g) | Std. Unc. (10g) | (Ui) ueff |
|---|---|---|---|---|---|---|---|---|
| Measurement System | | | | | | | | |
| Probe Calibration | 12.1 | N | 2 | 1 | 1 | 6.05 | 6.05 | ∞ |
| Axial Isotropy | 4.7 | R | $\sqrt{3}$ | 0.7 | 0.7 | 1.90 | 1.90 | ∞ |
| Hemispherical Isotropy | 9.6 | R | $\sqrt{3}$ | 0.7 | 0.7 | 3.88 | 3.88 | ∞ |
| Boundary effects | 1 | R | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| Linearity | 4.7 | R | $\sqrt{3}$ | 1 | 1 | 2.70 | 2.70 | ∞ |
| System Detection Limits | 1 | R | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| Readout Electronics | 0.7 | N | 1 | 1 | 1 | 0.70 | 0.70 | ∞ |
| Response Time | 0.8 | R | $\sqrt{3}$ | 1 | 1 | 0.50 | 0.50 | ∞ |
| Integration Time | 2.6 | R | $\sqrt{3}$ | 1 | 1 | 1.50 | 1.50 | ∞ |
| RF Ambient Noise | 3 | R | $\sqrt{3}$ | 1 | 1 | 1.70 | 1.70 | ∞ |
| RF Ambient Reflections | 3 | R | $\sqrt{3}$ | 1 | 1 | 1.70 | 1.70 | ∞ |
| Probe Positioner | 0.4 | R | $\sqrt{3}$ | 1 | 1 | 0.20 | 0.20 | ∞ |
| Probe Positioning | 2.9 | R | $\sqrt{3}$ | 1 | 1 | 1.70 | 1.70 | ∞ |
| Post-processing | 4 | R | $\sqrt{3}$ | 1 | 1 | 2.30 | 2.30 | ∞ |
| Test Sample Related | | | | | | | | |
| Validation Dipole Positioning | 2 | N | 1 | 1 | 1 | 2 | 2 | 71 |
| Dipole Input Power | 5 | N | 1 | 1 | 1 | 5 | 5 | 3 |
| Power Drift | 5 | R | $\sqrt{3}$ | 1 | 1 | 2.9 | 2.9 | ∞ |
| Phantom and Setup | | | | | | | | |
| Phantom Uncertainty | 4 | R | $\sqrt{3}$ | 1 | 1 | 2.3 | 2.3 | ∞ |
| Liquid Conductivity (target) | 5 | R | $\sqrt{3}$ | 0.64 | 0.43 | 2.9 | 2.9 | ∞ |
| Liquid Conductivity (meas.) | 5 | N | 1 | 0.64 | 0.43 | 5 | 5 | ∞ |
| Liquid Permittivity (target) | 5 | R | $\sqrt{3}$ | 0.6 | 0.49 | 2.9 | 2.9 | ∞ |
| Liquid Permittivity (meas.) | 5 | N | 1 | 0.6 | 0.49 | 5 | 5 | ∞ |
| Combined Std. Uncertainty | $U_C' = \sqrt{\sum_{i=1}^{23} Ci^2 Ui^2}$ | | | | | 11.79 | 11.30 | |
| Expanded STD Uncertainty | $U_C = 2U_C'$ | | | | | 23.59 | 22.59 | |

***END OF REPORT BODY***

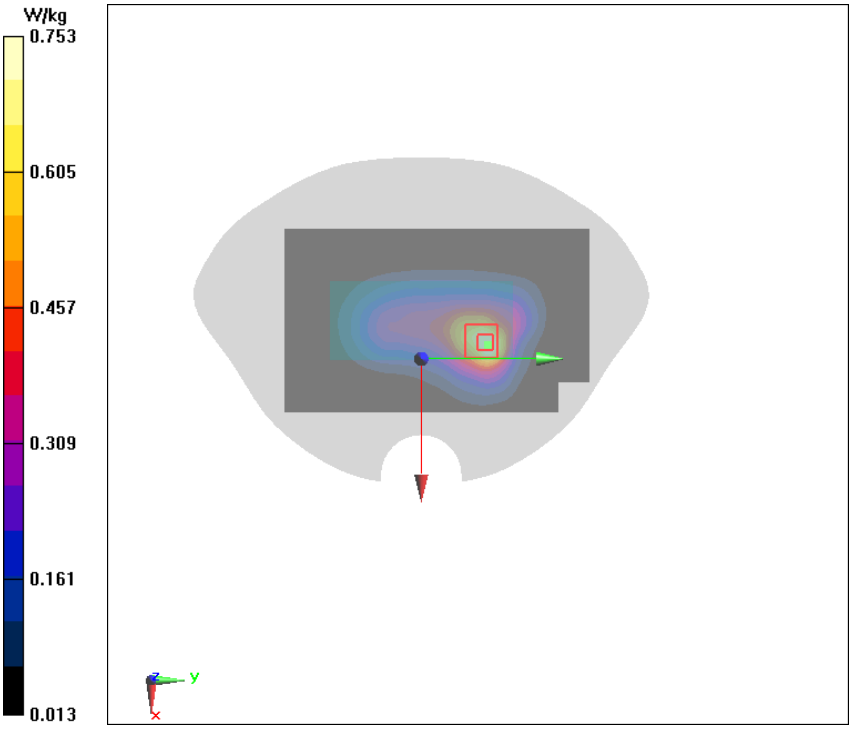
# ANNEX A. Graph Results

## WCDMA B2 Ground Mode

Date/Time: 2020/5/20
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.441 S/m; $\varepsilon_r$ = 38.975; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: WCDMA HSL600-6GHz; Frequency: 1880 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.2, 5.2, 5.2); Calibrated: 1/3/2020

**WCDMA B2 Ground Mode/Area Scan (61x101x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.799 W/kg

**WCDMA B2 Ground Mode/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.55 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.20 W/kg
SAR(1 g) = 0.692 W/kg; SAR(10 g) = 0.397 W/kg
Maximum of SAR (measured) = 0.753 W/kg

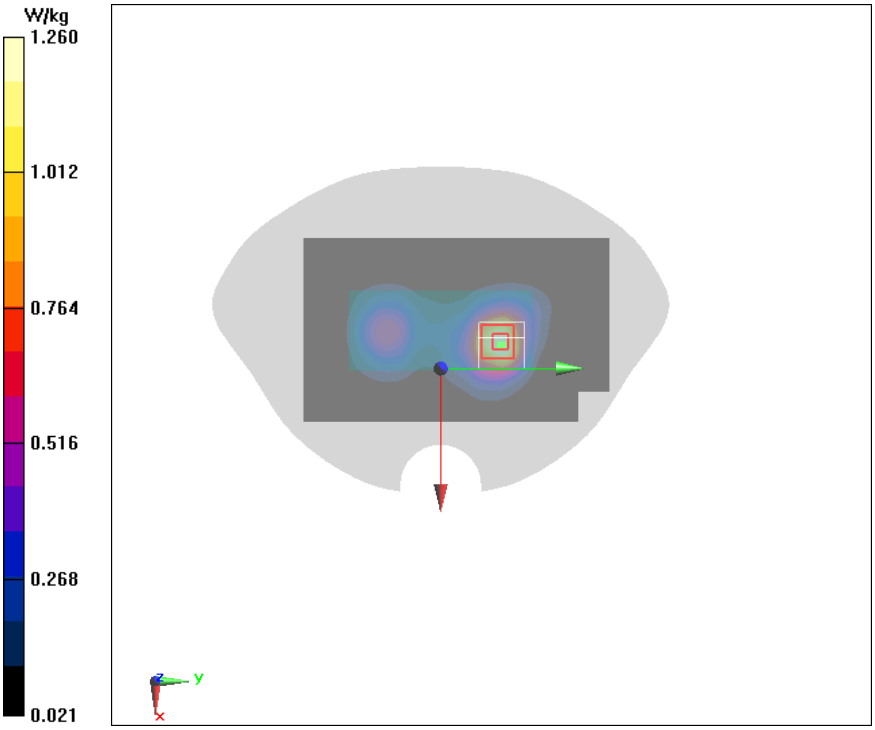


## WCDMA B4 Ground Mode supply

Date/Time: 2020/5/27
Electronics: DAE4 Sn1581
Medium: HSL600-6GHz
Medium parameters used (interpolated): f = 1752.6 MHz; $\sigma$ = 1.367 S/m; $\varepsilon_r$ = 39.17; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: WCDMA HSL600-6GHz; Frequency: 1752.6 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7401ConvF(8.65, 8.65, 8.65); Calibrated: 4/1/2020

**WCDMA B4 Ground Mode supply/Area Scan (61x101x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 1.37 W/kg

**WCDMA B4 Ground Mode supply/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.72 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 1.88 W/kg
SAR(1 g) = 1.15 W/kg; SAR(10 g) = 0.661 W/kg
Maximum value of SAR (measured) = 1.26 W/kg

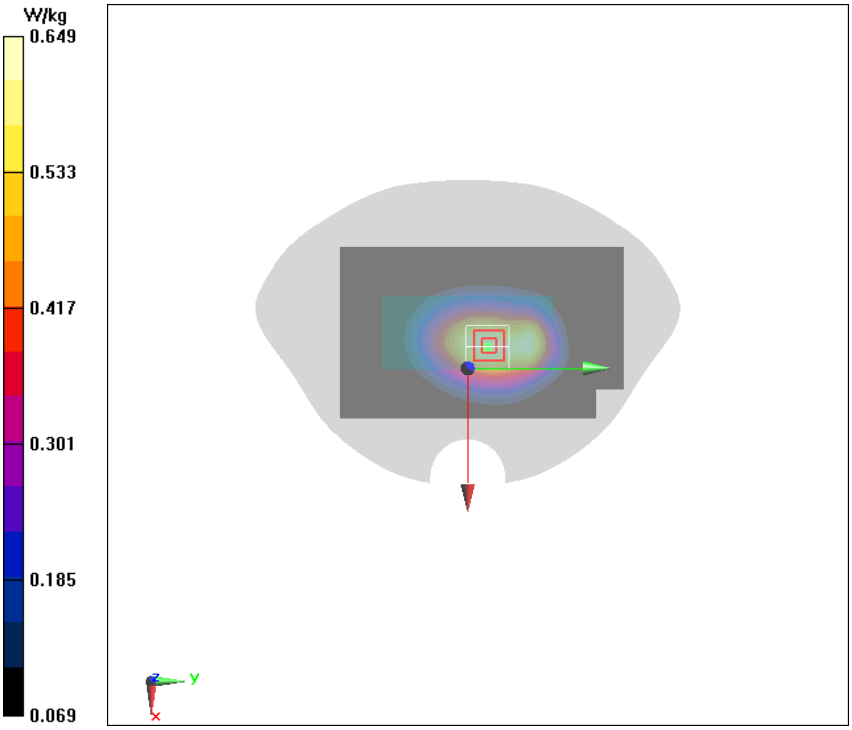


## WCDMA B5 Ground Mode

Date/Time: 2020/5/18
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used (interpolated): f = 836.6 MHz; $\sigma$ = 0.962 S/m; $\varepsilon_r$ = 40.852; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: WCDMA HSL600-6GHz; Frequency: 836.6 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.29, 6.29, 6.29); Calibrated: 1/3/2020

**WCDMA B5 Ground Mode/Area Scan (61x101x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.645 W/kg

**WCDMA B5 Ground Mode/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.27 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.814 W/kg
SAR(1 g) = 0.611 W/kg; SAR(10 g) = 0.434 W/kg
Maximum value of SAR (measured) = 0.649 W/kg

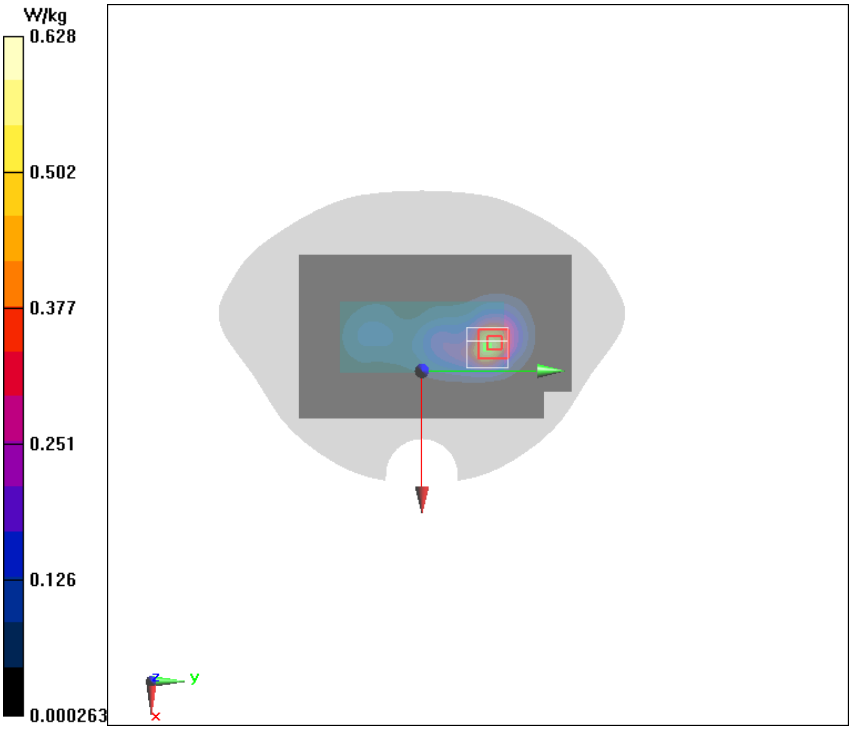


## LTE B7 20M 1RB 50offset Ground Mode High

Date/Time: 2020/5/22
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used: f = 2560 MHz; $\sigma$ = 1.89 S/m; $\varepsilon_r$ = 38.1; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: LTE B7 HSL600-6GHz; Frequency: 2560 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.52, 4.52, 4.52); Calibrated: 1/3/2020

**LTE B7 20M 1RB 50offset Ground Mode High/Area Scan (61x101x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.564 W/kg

**LTE B7 20M 1RB 50offset Ground Mode High/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.232 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.558 W/kg; SAR(10 g) = 0.256 W/kg
Maximum of SAR (measured) = 0.628 W/kg

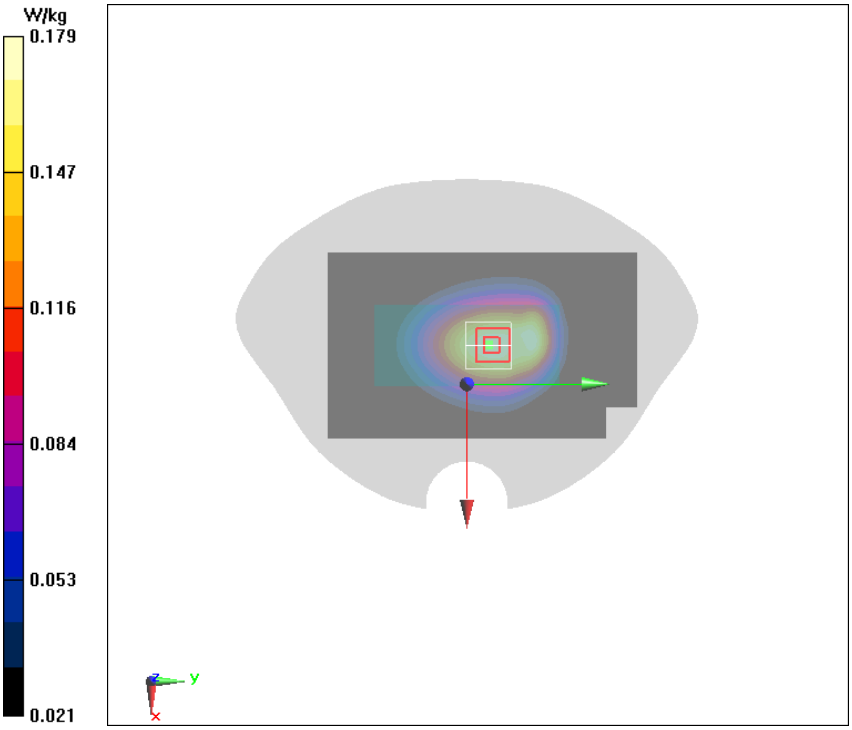


## LTE B12 10M 1RB 25offset Ground Mode High

Date/Time: 2020/5/15
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used (interpolated): f = 707.5 MHz; $\sigma$ = 0.918 S/m; $\varepsilon_r$ = 41.227; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: LTE B12 HSL600-6GHz; Frequency: 707.5 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.46, 6.46, 6.46); Calibrated: 1/3/2020

**LTE B12 10M 1RB 25offset Ground Mode High/Area Scan (61x101x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.181 W/kg

**LTE B12 10M 1RB 25offset Ground Mode High/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.73 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.231 W/kg
SAR(1 g) = 0.168 W/kg; SAR(10 g) = 0.119 W/kg
Maximum value of SAR (measured) = 0.179 W/kg

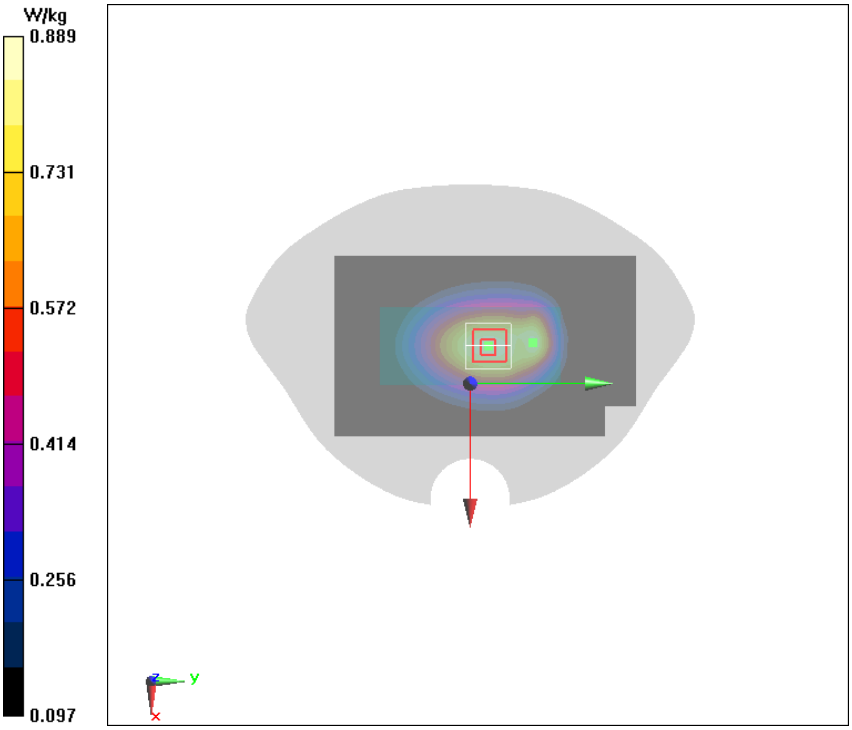


## LTE B13 10M 1RB 25offset Ground Mode High

Date/Time: 2020/5/15
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used (interpolated): f = 782 MHz; $\sigma$ = 0.943 S/m; $\varepsilon_r$ = 41.003; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: LTE B13 HSL600-6GHz; Frequency: 782 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.46, 6.46, 6.46); Calibrated: 1/3/2020

**LTE B13 10M 1RB 25offset Ground Mode High/Area Scan (61x101x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.889 W/kg

**LTE B13 10M 1RB 25offset Ground Mode High/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 30.03 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.837 W/kg; SAR(10 g) = 0.591 W/kg
Maximum value of SAR (measured) = 0.889 W/kg

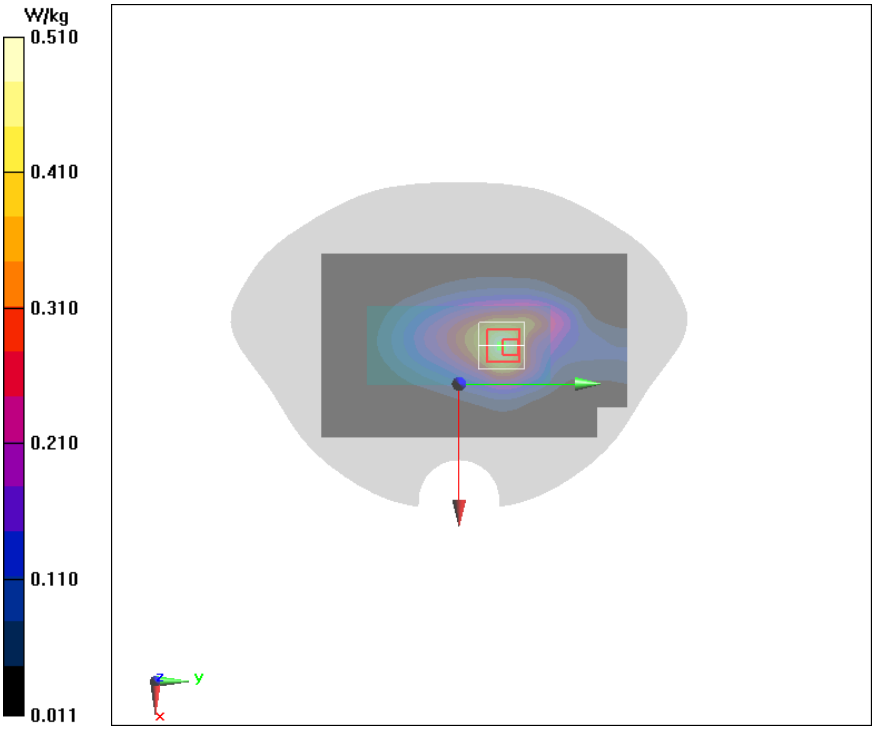


## LTE B25 20M 1RB 50offset Ground Mode High

Date/Time: 2020/5/20
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used (interpolated): f = 1882.5 MHz; $\sigma$ = 1.442 S/m; $\varepsilon_r$ = 38.972; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: LTE B25 HSL600-6GHz; Frequency: 1882.5 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.2, 5.2, 5.2); Calibrated: 1/3/2020

**LTE B25 20M 1RB 50offset Ground Mode High/Area Scan (61x101x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.504 W/kg

**LTE B25 20M 1RB 50offset Ground Mode High/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.36 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.808 W/kg
SAR(1 g) = 0.467 W/kg; SAR(10 g) = 0.277 W/kg
Maximum value of SAR (measured) = 0.510 W/kg

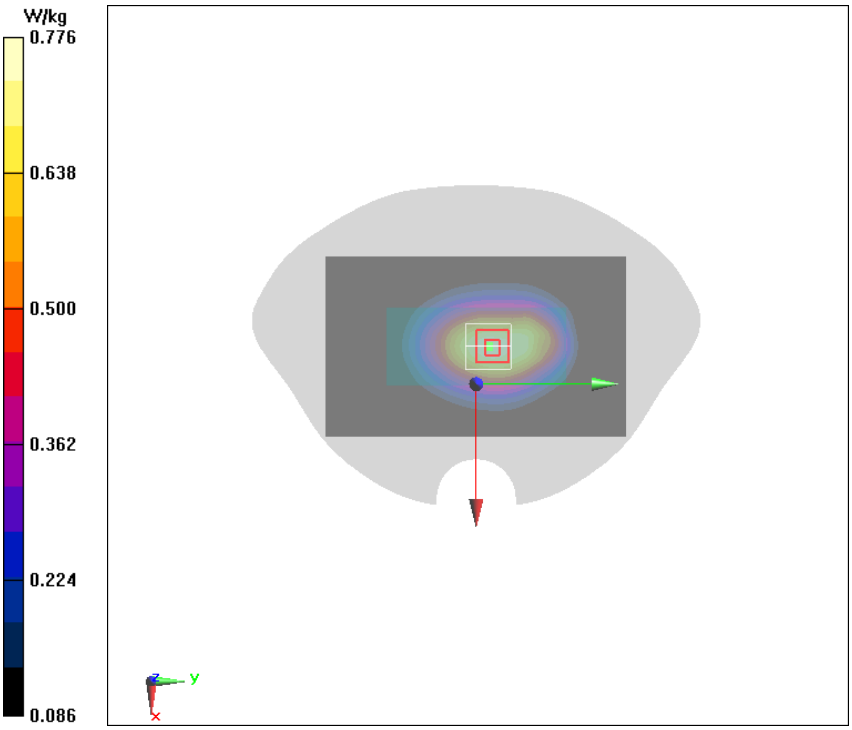


## LTE B26 15M 1RB 38offset Ground Mode Low

Date/Time: 2020/5/18
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used (interpolated): f = 821.5 MHz; $\sigma$ = 0.957 S/m; $\varepsilon_r$ = 40.893; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: LTE B26 HSL600-6GHz; Frequency: 821.5 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.29, 6.29, 6.29); Calibrated: 1/3/2020

**LTE B26 15M 1RB 38offset Ground Mode Low/Area Scan (61x101x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.772 W/kg

**LTE B26 15M 1RB 38offset Ground Mode Low/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.31 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.982 W/kg
SAR(1 g) = 0.732 W/kg; SAR(10 g) = 0.518 W/kg
Maximum value of SAR (measured) = 0.776 W/kg

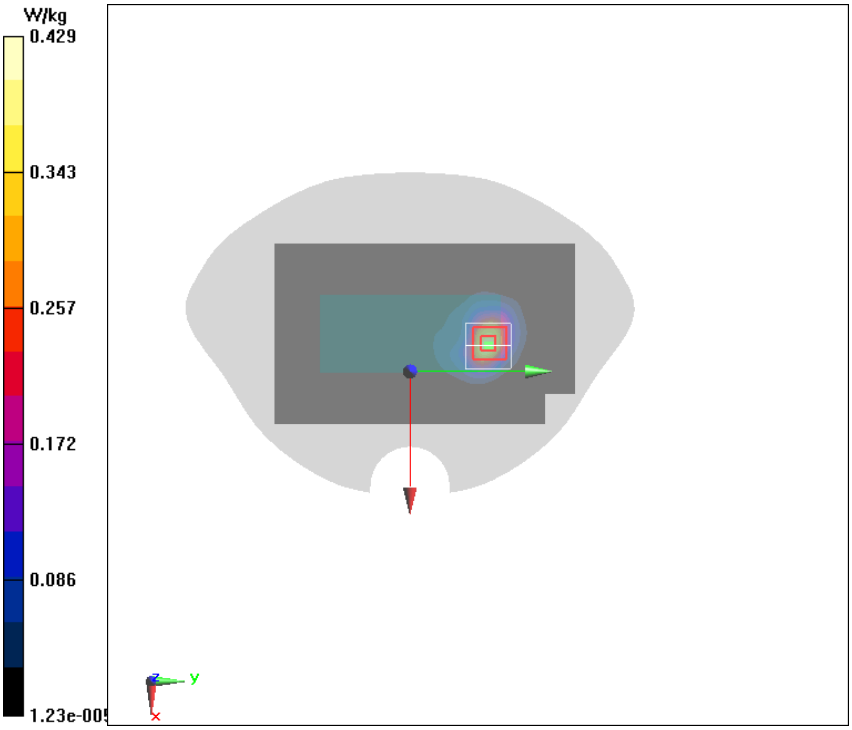


## LTE B40 20M 1RB 50offset Ground Mode High

Date/Time: 2020/5/19
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used (interpolated): f = 2390 MHz; $\sigma$ = 1.764 S/m; $\varepsilon_r$ = 38.366; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: LTE B40 HSL600-6GHz; Frequency: 2390 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.94, 4.94, 4.94); Calibrated: 1/3/2020

**LTE B40 20M 1RB 50offset Ground Mode High/Area Scan (61x101x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.408 W/kg

**LTE B40 20M 1RB 50offset Ground Mode High/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.956 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.781 W/kg
SAR(1 g) = 0.379 W/kg; SAR(10 g) = 0.171 W/kg
Maximum value of SAR (measured) = 0.429 W/kg

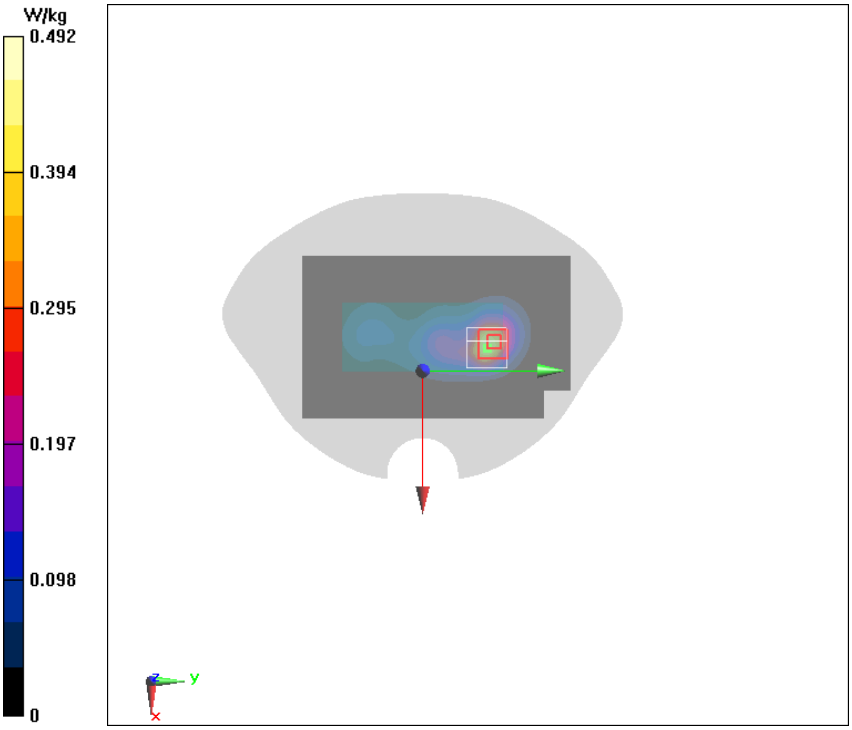


## LTE B41 20M 1RB 50offset Ground Mode Middle

Date/Time: 2020/5/22
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used (interpolated): f = 2593 MHz; $\sigma$ = 1.915 S/m; $\varepsilon_r$ = 38.053; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: LTE B41 HSL600-6GHz; Frequency: 2593 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.52, 4.52, 4.52); Calibrated: 1/3/2020

**LTE B41 20M 1RB 50offset Ground Mode Middle/Area Scan (61x101x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.449 W/kg

**LTE B41 20M 1RB 50offset Ground Mode Middle/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.854 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.925 W/kg
SAR(1 g) = 0.432 W/kg; SAR(10 g) = 0.194 W/kg
Maximum of SAR (measured) = 0.492 W/kg

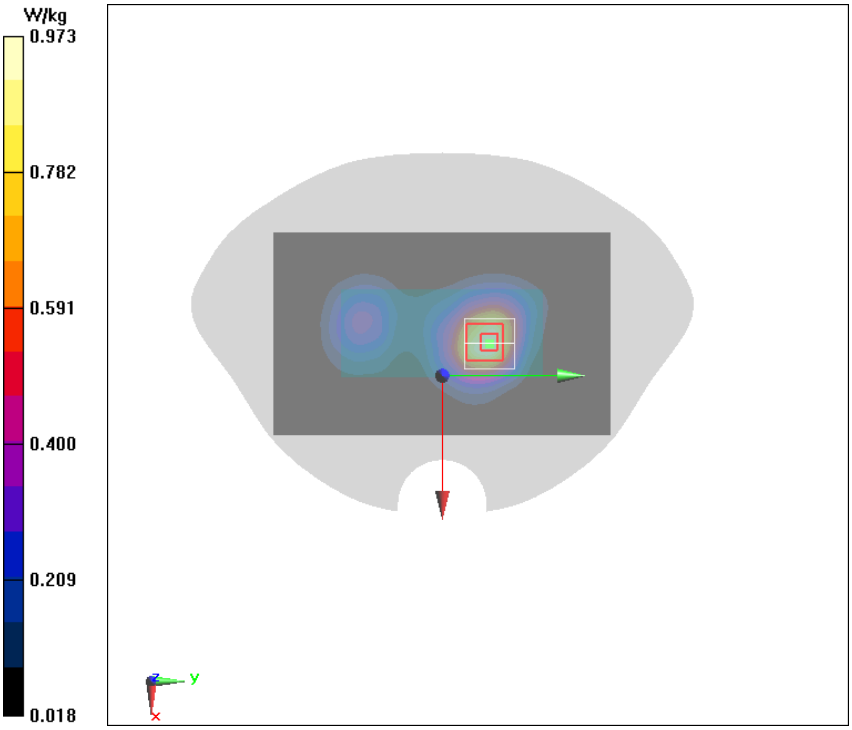


## LTE B66 20M 1RB 0offset Ground Mode High

Date/Time: 2020/5/27
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used (interpolated): f = 1770 MHz; $\sigma$ = 1.377 S/m; $\varepsilon_r$ = 39.152; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: LTE B66 HSL600-6GHz; Frequency: 1770 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.36, 5.36, 5.36); Calibrated: 1/3/2020

**LTE B66 20M 1RB 0offset Ground Mode High/Area Scan (61x101x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 1.02 W/kg

**LTE B66 20M 1RB 0offset Ground Mode High/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.68 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.45 W/kg
SAR(1 g) = 0.894 W/kg; SAR(10 g) = 0.534 W/kg
Maximum value of SAR (measured) = 0.973 W/kg

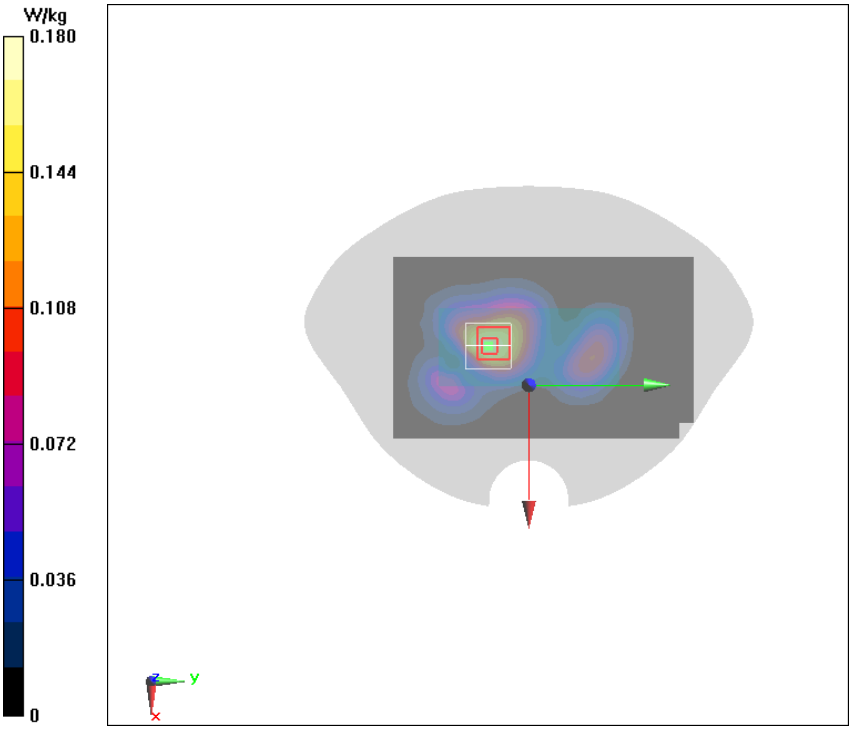


## Wifi 11b Phantom Mode 10mm

Date/Time: 2020/5/21
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used (interpolated): f = 2437 MHz; $\sigma$ = 1.801 S/m; $\varepsilon_r$ = 38.303; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: WLan 2450 HSL600-6GHz; Frequency: 2437 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.75, 4.75, 4.75); Calibrated: 1/3/2020

**Wifi 11b Phantom Mode 10mm/Area Scan (121x201x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.174 W/kg

**Wifi 11b Phantom Mode 10mm/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.910 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.297 W/kg
SAR(1 g) = 0.166 W/kg; SAR(10 g) = 0.094 W/kg
Maximum value of SAR (measured) = 0.180 W/kg

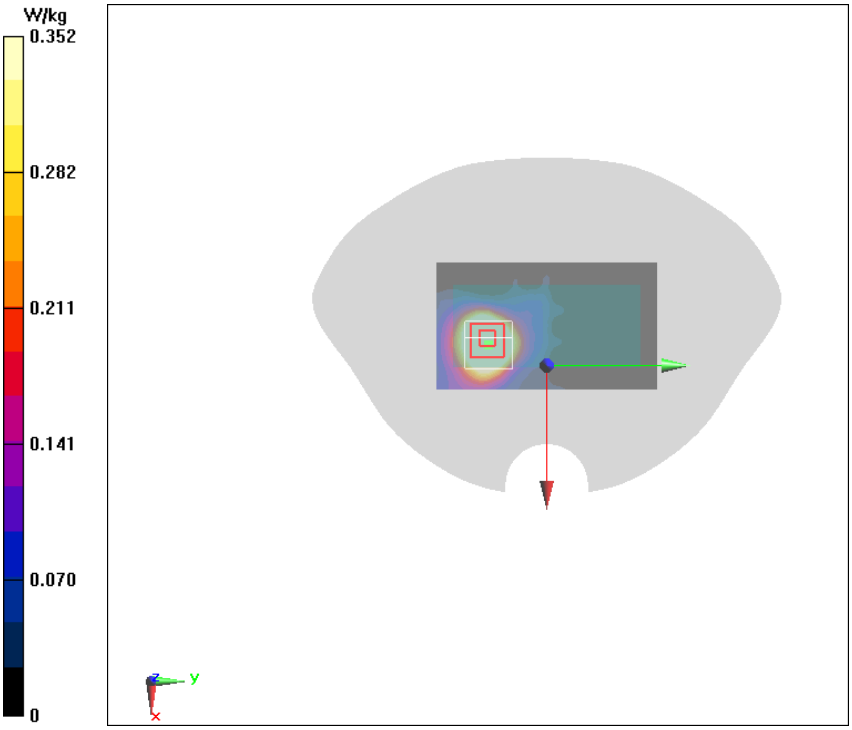


## Wifi 11a U-NII-2A Ground Mode Low

Date/Time: 2020/5/19
Electronics: DAE4 Sn1244
Medium: HSL5GHz
Medium parameters used: f = 5260 MHz; $\sigma$ = 4.654 S/m; $\varepsilon_r$ = 37.068; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: 5G-U-NII-2A HSL5GHz; Frequency: 5260 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7401ConvF(5.74, 5.74, 5.74); Calibrated: 4/1/2020

**Wifi 11a U-NII-2A Ground Mode Low/Area Scan (81x141x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.911 W/kg

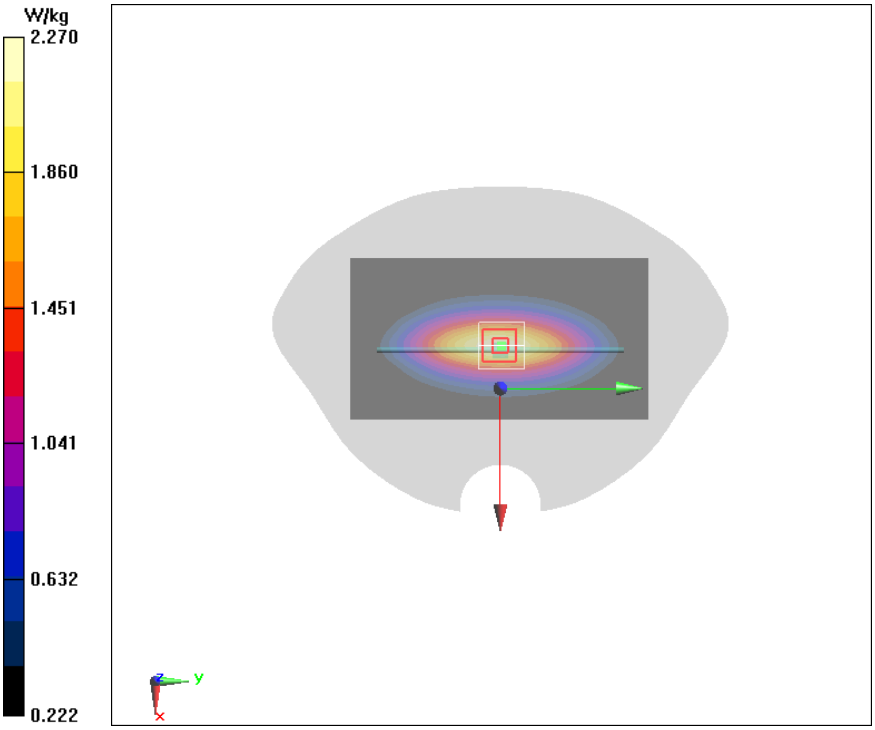
**Wifi 11a U-NII-2A Ground Mode Low/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.137 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.900 W/kg
SAR(1 g) = 0.322 W/kg; SAR(10 g) = 0.130 W/kg
Maximum value of SAR (measured) = 0.352 W/kg



# ANNEX B. System Validation Plot

## Head 750MHz

Date/Time: 2020/5/15
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used (interpolated): f = 750 MHz; $\sigma$ = 0.933 S/m; $\varepsilon_r$ = 41.104; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: CW HSL600-6GHz; Frequency: 750 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.46, 6.46, 6.46); Calibrated: 1/3/2020
**System Validation/Area Scan (71x131x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 2.25 W/kg
**System Validation/Zoom Scan (7x7x7) (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 51.60 V/m; Power Drift = -0.29 dB
Peak SAR (extrapolated) = 3.15 W/kg
SAR(1 g) = 2.11 W/kg; SAR(10 g) = 1.39 W/kg
Maximum value of SAR (measured) = 2.27 W/kg



## Head 835MHz

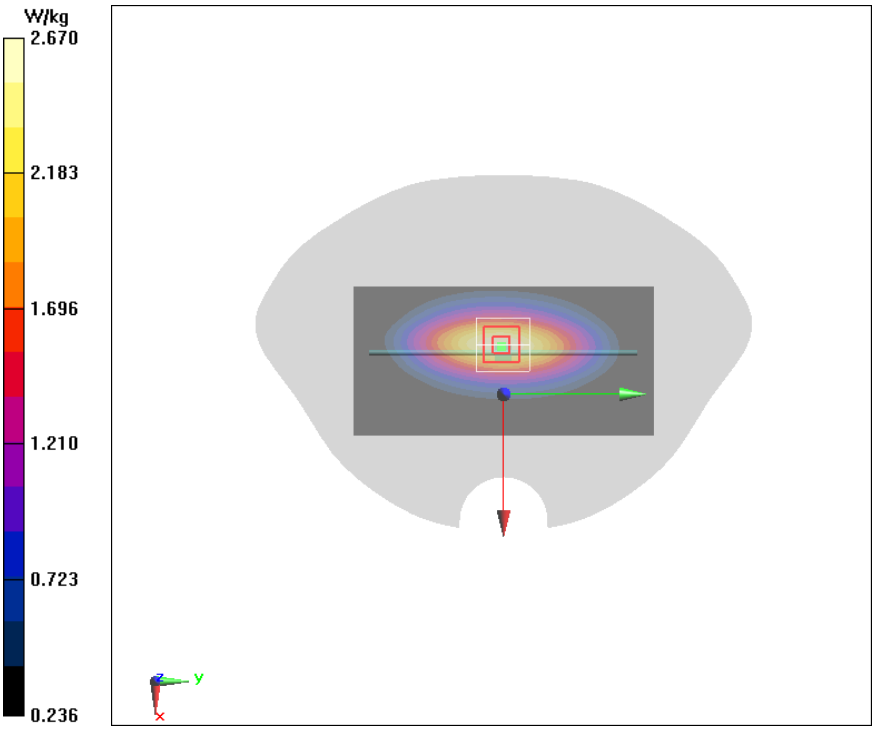
Date/Time: 2020/5/18
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used (interpolated): f = 835 MHz; $\sigma$ = 0.962 S/m; $\varepsilon_r$ = 40.856; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: CW HSL600-6GHz; Frequency: 835 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.29, 6.29, 6.29); Calibrated: 1/3/2020

**System Validation 835MHz/Area Scan (61x121x1):**

Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 2.67 W/kg

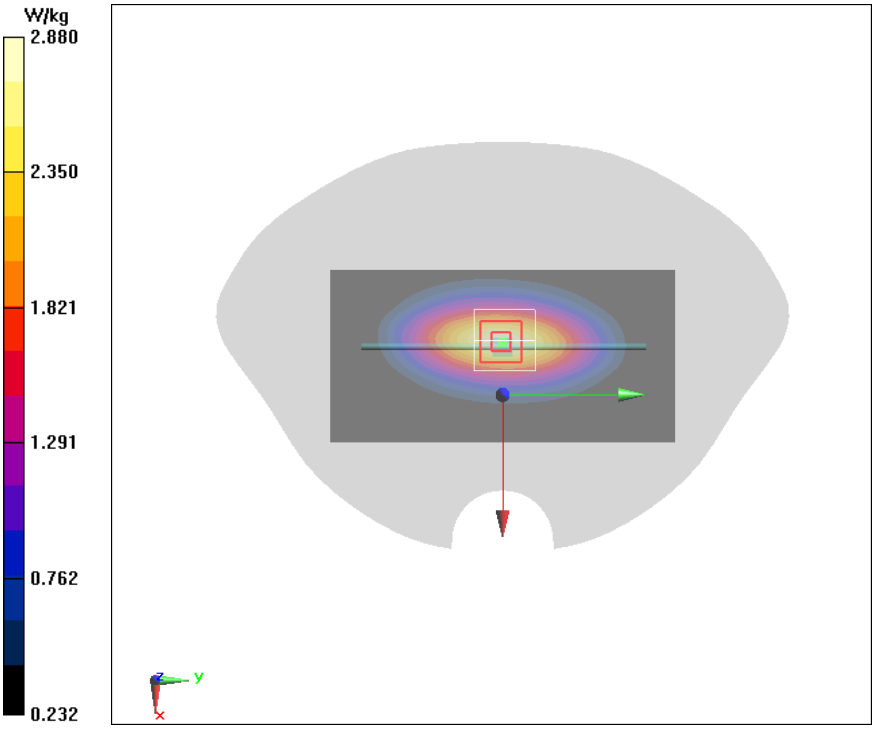
**System Validation 835MHz/Zoom Scan (7x7x7)/Cube 0:**

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.54 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 3.62 W/kg
SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.63 W/kg
Maximum value of SAR (measured) = 2.67 W/kg



## Head 900MHz

Date/Time: 2020/5/18
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used: f = 900 MHz; $\sigma$ = 0.985 S/m; $\varepsilon_r$ = 40.685; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: CW HSL600-6GHz; Frequency: 900 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.27, 6.27, 6.27); Calibrated: 1/3/2020
**System Validation 900MHz/Area Scan (61x121x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 2.87 W/kg
**System Validation 900MHz/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.30 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.95 W/kg
SAR(1 g) = 2.66 W/kg; SAR(10 g) = 1.73 W/kg
Maximum value of SAR (measured) = 2.88 W/kg



## Head 1750MHz

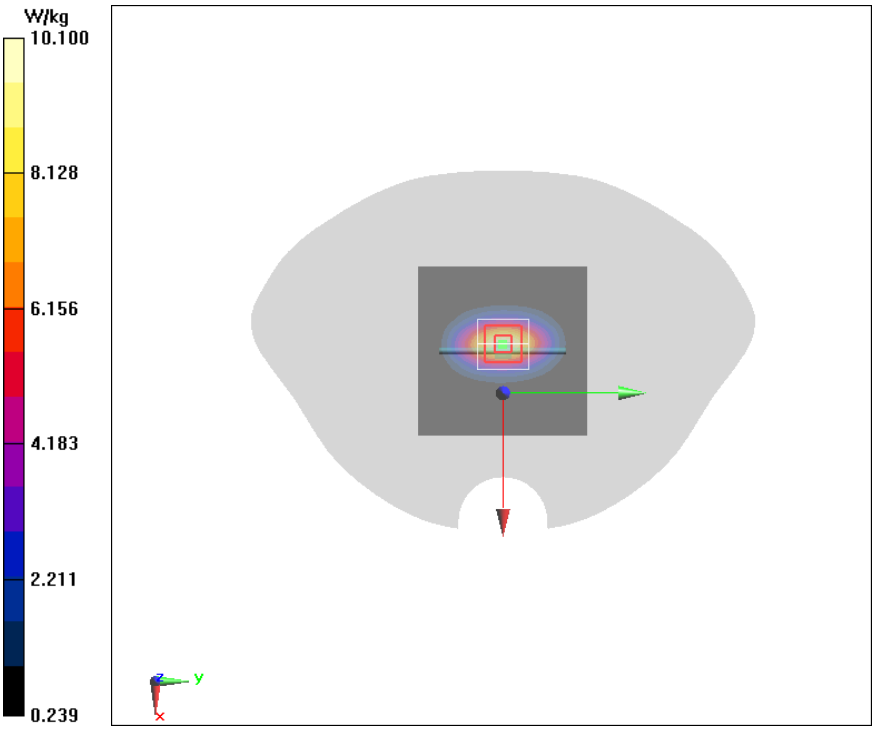
Date/Time: 2020/5/27
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used (interpolated): f = 1750 MHz; $\sigma$ = 1.365 S/m; $\varepsilon_r$ = 39.173; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: CW HSL600-6GHz; Frequency: 1750 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.36, 5.36, 5.36); Calibrated: 1/3/2020

**System Validation 1750MHz /Area Scan (101x101x1):**

Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 10.1 W/kg

**System Validation 1750MHz /Zoom Scan (7x7x7)/Cube 0:**

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 82.02 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 16.3 W/kg
SAR(1 g) = 9.04 W/kg; SAR(10 g) = 4.83 W/kg
Maximum value of SAR (measured) = 10.1 W/kg



## Head 1900MHz

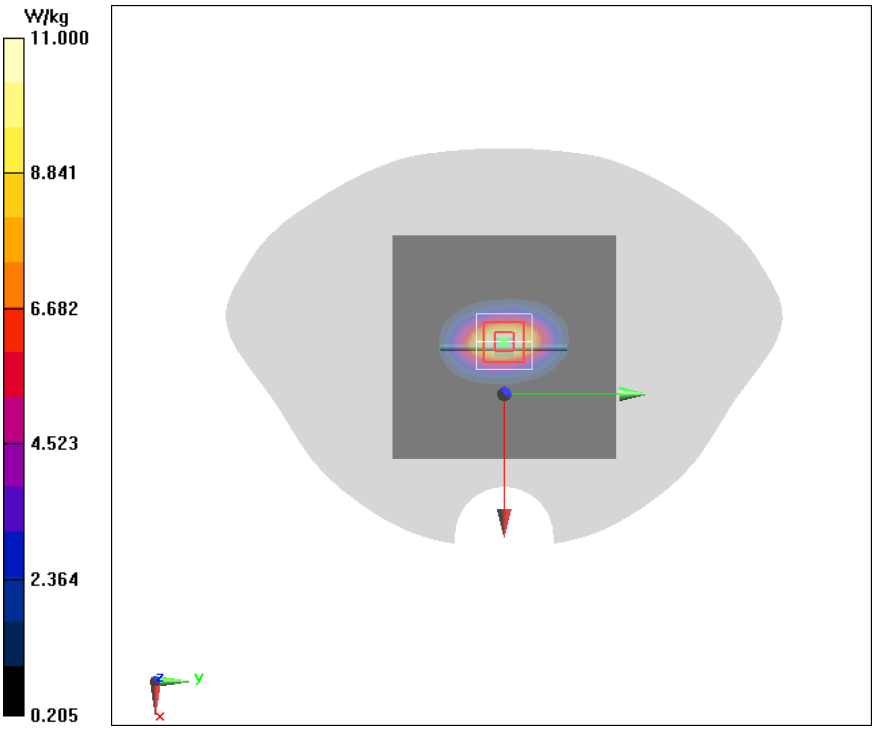
Date/Time: 2020/5/20
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used: f = 1900 MHz; $\sigma$ = 1.452 S/m; $\varepsilon_r$ = 38.947; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: CW HSL600-6GHz; Frequency: 1900 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.2, 5.2, 5.2); Calibrated: 1/3/2020

**System Validation 1900MHz /Area Scan (121x121x1):**

Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 11.9 W/kg

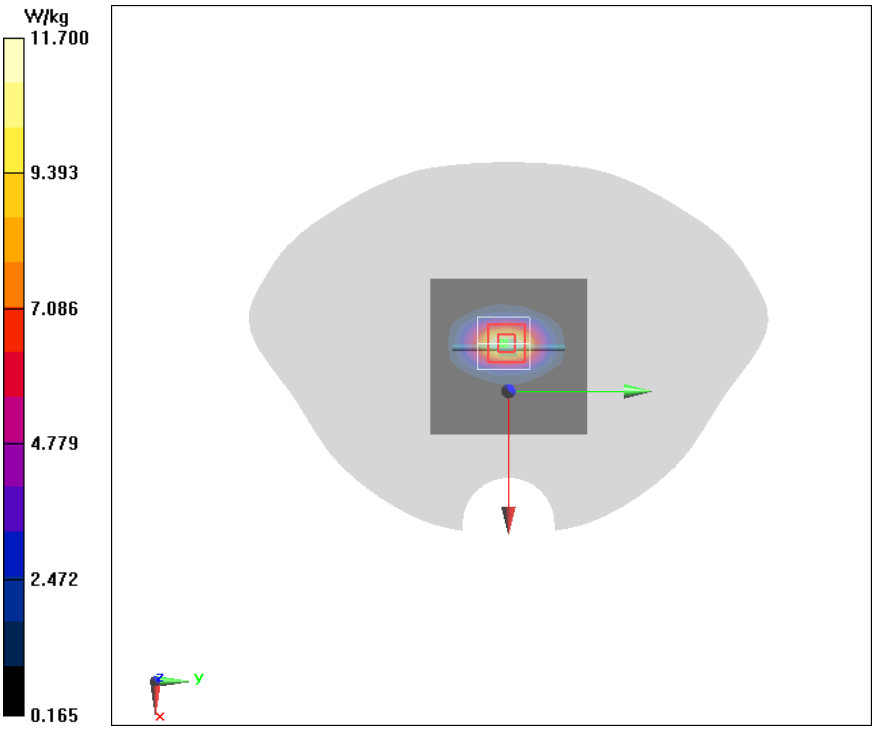
**System Validation 1900MHz /Zoom Scan (7x7x7)/Cube 0:**

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.07 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 18.4 W/kg
SAR(1 g) = 9.8 W/kg; SAR(10 g) = 5.07 W/kg
Maximum value of SAR (measured) = 11.0 W/kg



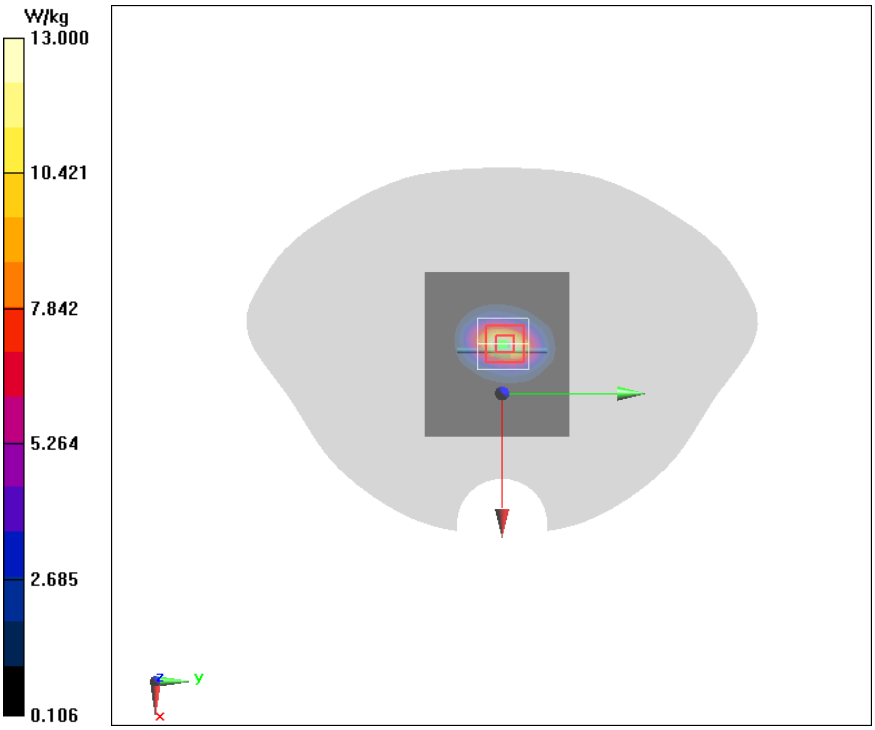
## Head 2000MHz

Date/Time: 2020/5/20
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used: f = 2000 MHz; $\sigma$ = 1.507 S/m; $\varepsilon_r$ = 38.799; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: CW HSL600-6GHz; Frequency: 2000 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.12, 5.12, 5.12); Calibrated: 1/3/2020
**System check Validation/Area Scan (61x61x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 12.3 W/kg
**System check Validation/Zoom Scan (7x7x7) (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.15 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 19.8 W/kg
SAR(1 g) = 10.4 W/kg; SAR(10 g) = 5.3 W/kg
Maximum value of SAR (measured) = 11.7 W/kg



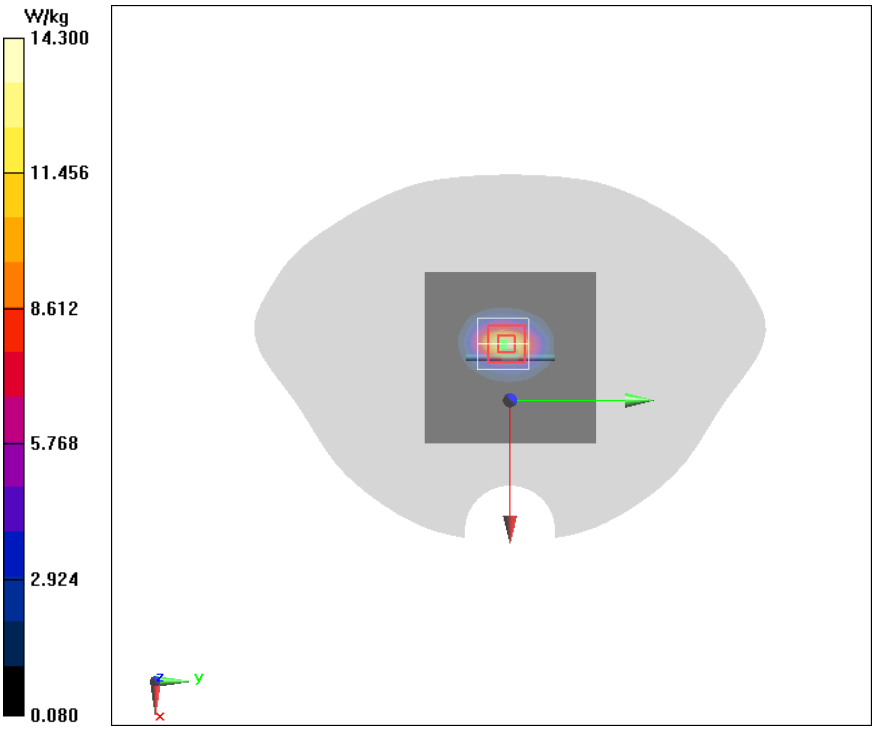
## Head 2300MHz

Date/Time: 2020/5/19
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used: f = 2300 MHz; $\sigma$ = 1.7 S/m; $\varepsilon_r$ = 38.46; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: CW HSL600-6GHz; Frequency: 2300 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.94, 4.94, 4.94); Calibrated: 1/3/2020
**SystemCheck+0.5dbm/Area Scan (81x71x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 13.6 W/kg
**SystemCheck+0.5dbm/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 86.65 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 23.9 W/kg
SAR(1 g) = 11.5 W/kg; SAR(10 g) = 5.49 W/kg
Maximum value of SAR (measured) = 13.0 W/kg



## Head 2450MHz

Date/Time: 2020/5/21
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used (interpolated): f = 2450 MHz; $\sigma$ = 1.81 S/m; $\varepsilon_r$ = 38.281; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: CW HSL600-6GHz; Frequency: 2450 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.75, 4.75, 4.75); Calibrated: 1/3/2020
**SystemCheck+0.3dbm/Area Scan (101x101x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 14.0 W/kg
**SystemCheck+0.3dbm/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 74.07 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 27.0 W/kg
SAR(1 g) = 12.7 W/kg; SAR(10 g) = 5.85 W/kg
Maximum value of SAR (measured) = 14.3 W/kg

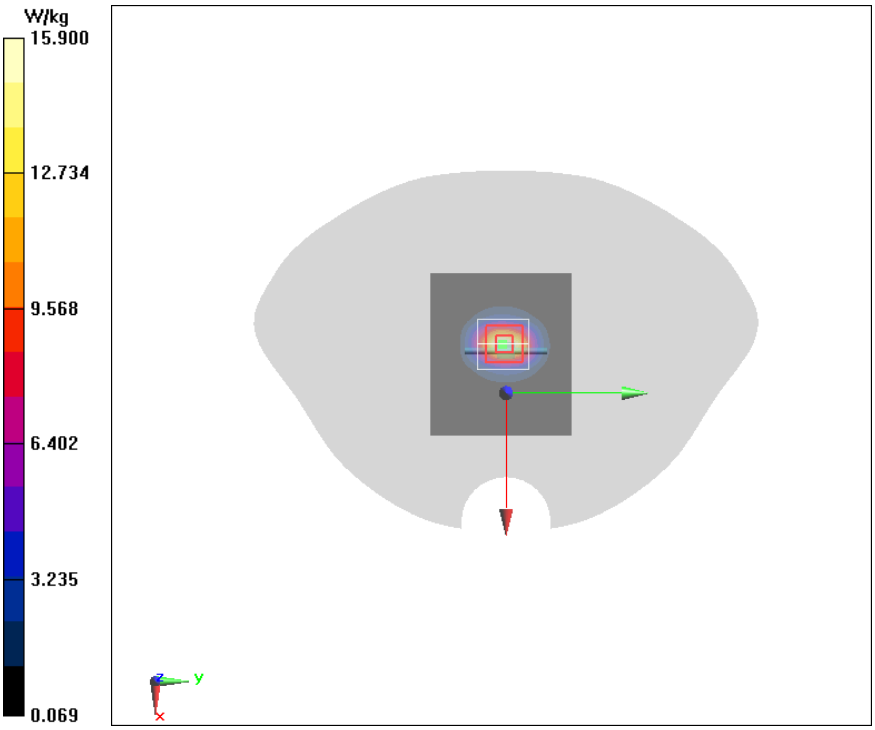


## Head 2600MHz

Date/Time: 2020/5/22
Electronics: DAE4 Sn1244
Medium: HSL600-6GHz
Medium parameters used: f = 2600 MHz; $\sigma$ = 1.92 S/m; $\varepsilon_r$ = 38.041; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: CW HSL600-6GHz; Frequency: 2600 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.52, 4.52, 4.52); Calibrated: 1/3/2020

**System Validation+0.3dbm/Area Scan (81x71x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 17.3 W/kg

**System Validation+0.3dbm/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.33 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 31.0 W/kg
SAR(1 g) = 14 W/kg; SAR(10 g) = 6.25 W/kg
Maximum value of SAR (measured) = 15.9 W/kg

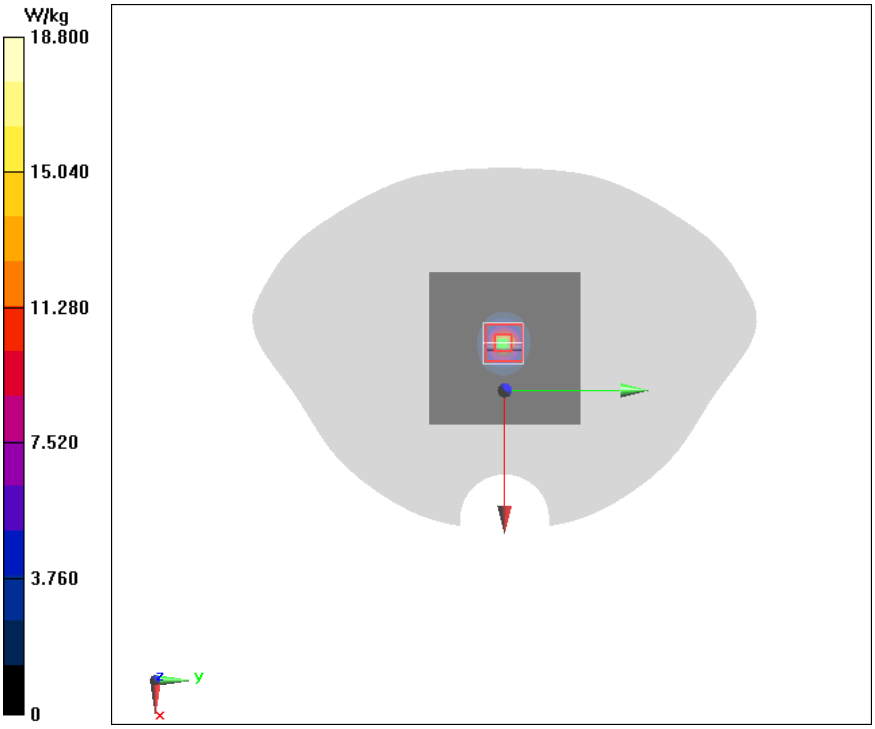


## Head 5300MHz

Date/Time: 2020/5/19
Electronics: DAE4 Sn1244
Medium: HSL5GHz
Medium parameters used: f = 5300 MHz; $\sigma$ = 4.697 S/m; $\varepsilon_r$ = 36.988; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: CW HSL5GHz; Frequency: 5300 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7401ConvF(5.74, 5.74, 5.74); Calibrated: 4/1/2020

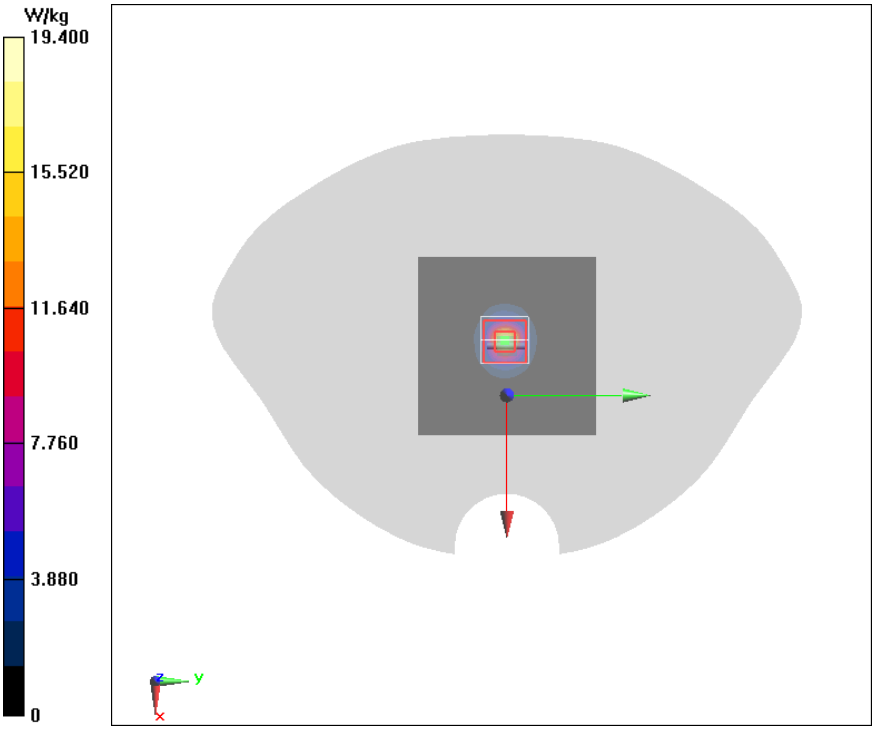
**System Validation 5300MHz/Area Scan (91x91x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 18.1 W/kg

**System Validation 5300MHz/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 64.80 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 29.9 W/kg
SAR(1 g) = 7.33 W/kg; SAR(10 g) = 2.1 W/kg
Maximum of SAR (measured) = 18.8 W/kg



## Head 5600MHz

Date/Time: 2020/5/23
Electronics: DAE4 Sn1244
Medium: HSL5GHz
Medium parameters used: f = 5600 MHz; $\sigma$ = 5.024 S/m; $\varepsilon_r$ = 36.426; $\rho$ = 1000 kg/m$^3$
Ambient Temperature:22.6 ℃ Liquid Temperature:22.6 ℃
Communication System: CW HSL5GHz; Frequency: 5600 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7401ConvF(5.21, 5.21, 5.21); Calibrated: 4/1/2020
**System Validation 5600MHz/Area Scan (91x91x1):**
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 18.8 W/kg
**System Validation 5600MHz/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 64.60 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 32.5 W/kg
SAR(1 g) = 7.39 W/kg; SAR(10 g) = 2.1 W/kg
Maximum of SAR (measured) = 19.4 W/kg



# ANNEX C. Calibration Certification

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校准
CALIBRATION
CNAS L0570

Client : ECIT Certificate No: Z19-60489

## CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | DAE4 - SN: 1244 |
| Calibration Procedure(s) | FF-Z11-002-01<br>Calibration Procedure for the Data Acquisition Electronics (DAEx) |
| Calibration date: | December 17, 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±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Process Calibrator 753 | 1971018 | 24-Jun-19 (CTTL, No.J19X05126) | Jun-20 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Zhao Jing | SAR Test Engineer | |
| Reviewed by: | Lin Hao | SAR Test Engineer | |
| Approved by: | Qi Dianyuan | SAR Project Leader | |

Issued: December 18, 2019

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

Certificate No: Z19-60489 Page 1 of 3

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**Glossary:**

| | |
|---|---|
| DAE | data acquisition electronics |
| Connector angle | information used in DASY system to align probe sensor X to the robot coordinate system. |

**Methods Applied and Interpretation of Parameters:**

- *DC Voltage Measurement*: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The report provide only calibration results for DAE, it does not contain other performance test results.

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## DC Voltage Measurement

A/D - Converter Resolution nominal
High Range: 1LSB = 6.1μV , full range = -100...+300 mV
Low Range: 1LSB = 61nV , full range = -1.....+3mV
DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

| Calibration Factors | X | Y | Z |
|---|---|---|---|
| High Range | 403.859 ± 0.15% (k=2) | 403.595 ± 0.15% (k=2) | 404.513 ± 0.15% (k=2) |
| Low Range | 3.95597 ± 0.7% (k=2) | 3.97332 ± 0.7% (k=2) | 3.98293 ± 0.7% (k=2) |

## Connector Angle

| | |
|---|---|
| **Connector Angle** to be used in DASY system | 23.5° ± 1 ° |

Certificate No: Z19-60489 Page 3 of 3

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Client ECIT Certificate No: Z20-60027

# CALIBRATION CERTIFICAT

| | |
|---|---|
| Object | ES3DV3 - SN : 3252 |
| Calibration Procedure(s) | FF-Z11-004-01<br>Calibration Procedures for Dosimetric E-field Probes |
| Calibration date: | January 03, 2020 |

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power Meter NRP2 | 101919 | 18-Jun-19(CTTL, No.J19X05125) | Jun-20 |
| Power sensor NRP-Z91 | 101547 | 18-Jun-19(CTTL, No.J19X05125) | Jun-20 |
| Power sensor NRP-Z91 | 101548 | 18-Jun-19(CTTL, No.J19X05125) | Jun-20 |
| Reference 10dBAttenuator | 18N50W-10dB | 9-Feb-18(CTTL, No.J18X01133) | Feb-20 |
| Reference 20dBAttenuator | 18N50W-20dB | 9-Feb-18(CTTL, No.J18X01132) | Feb-20 |
| Reference Probe EX3DV4 | SN 7307 | 24-May-19(SPEAG, No.EX3-7307_May19/2) | May-20 |
| DAE4 | SN 1525 | 26-Aug-19(SPEAG, No.DAE4-1525_Aug19) | Aug-20 |

| Secondary Standards | ID # | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| SignalGenerator MG3700A | 6201052605 | 18-Jun-19(CTTL, No.J19X05127) | Jun-20 |
| Network Analyzer E5071C | MY46110673 | 24-Jan-19(CTTL, No.J19X00547) | Jan-20 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Yu Zongying | SAR Test Engineer | |
| Reviewed by: | Lin Hao | SAR Test Engineer | |
| Approved by: | Qi Dianyuan | SAR Project Leader | |

Issued: January 05, 2020

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**Glossary:**

| | |
|---|---|
| TSL | tissue simulating liquid |
| NORMx,y,z | sensitivity in free space |
| ConvF | sensitivity in TSL / NORMx,y,z |
| DCP | diode compression point |
| CF | crest factor (1/duty_cycle) of the RF signal |
| A,B,C,D | modulation dependent linearization parameters |
| Polarization Φ | Φ rotation around probe axis |
| Polarization θ | θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i θ=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:**

a) 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

b) 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

c) 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

d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Methods Applied and Interpretation of Parameters:**

- *NORMx,y,z:* Assessed for E-field polarization θ=0 (f≤900MHz in TEM-cell; f>1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the $E^2$-field uncertainty inside TSL (see below ConvF).
- *NORM(f)x,y,z = NORMx,y,z* 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.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (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.
- *Ax,y,z; Bx,y,z; Cx,y,z;VRx,y,z:*A,B,C 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≤800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z* 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±50MHz to±100MHz.
- *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 *NORMx* (no uncertainty required).

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# Probe ES3DV3

# SN: 3252

Calibrated: January 03, 2020

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: Z20-60027 Page 3 of 11

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# DASY/EASY – Parameters of Probe: ES3DV3 – SN:3252

## Basic Calibration Parameters

| | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|---|---|---|---|
| Norm(μV/(V/m)²)[A] | 1.31 | 1.35 | 1.33 | ±10.0% |
| DCP(mV)[B] | 104.4 | 104.4 | 104.6 | |

## Modulation Calibration Parameters

| UID | Communication System Name | | A dB | B dB√μV | C | D dB | VR mV | Unc[E] (k=2) |
|---|---|---|---|---|---|---|---|---|
| 0 | CW | X | 0.0 | 0.0 | 1.0 | 0.00 | 286.5 | ±2.3% |
| | | Y | 0.0 | 0.0 | 1.0 | | 282.4 | |
| | | Z | 0.0 | 0.0 | 1.0 | | 282.4 | |

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%.

[A] The uncertainties of Norm X, Y, Z do not affect the E²-field uncertainty inside TSL (see Page 5 and Page 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainly is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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# DASY/EASY – Parameters of Probe : ES3DV3 – SN:3252

## Calibration Parameter Determined in Head Tissue Simulating Media

| f [MHz][C] | Relative Permittivity [F] | Conductivity (S/m) [F] | ConvF X | ConvF Y | ConvF Z | Alpha[G] | Depth[G] (mm) | Unct. (k=2) |
|---|---|---|---|---|---|---|---|---|
| 750 | 41.9 | 0.89 | 6.46 | 6.46 | 6.46 | 0.40 | 1.40 | ±12.1% |
| 835 | 41.5 | 0.90 | 6.29 | 6.29 | 6.29 | 0.35 | 1.62 | ±12.1% |
| 900 | 41.5 | 0.97 | 6.27 | 6.27 | 6.27 | 0.38 | 1.57 | ±12.1% |
| 1750 | 40.1 | 1.37 | 5.36 | 5.36 | 5.36 | 0.64 | 1.27 | ±12.1% |
| 1900 | 40.0 | 1.40 | 5.20 | 5.20 | 5.20 | 0.64 | 1.29 | ±12.1% |
| 2000 | 40.0 | 1.40 | 5.12 | 5.12 | 5.12 | 0.64 | 1.31 | ±12.1% |
| 2300 | 39.5 | 1.67 | 4.94 | 4.94 | 4.94 | 0.90 | 1.09 | ±12.1% |
| 2450 | 39.2 | 1.80 | 4.75 | 4.75 | 4.75 | 0.90 | 1.10 | ±12.1% |
| 2600 | 39.0 | 1.96 | 4.52 | 4.52 | 4.52 | 0.90 | 1.10 | ±12.1% |

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of 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. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) 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 (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] 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 the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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# DASY/EASY – Parameters of Probe : ES3DV3 – SN:3252

## Calibration Parameter Determined in Body Tissue Simulating Media

| f [MHz][C] | Relative Permittivity [F] | Conductivity (S/m) [F] | ConvF X | ConvF Y | ConvF Z | Alpha[G] | Depth[G] (mm) | Unct. (k=2) |
|---|---|---|---|---|---|---|---|---|
| 750 | 55.5 | 0.96 | 6.45 | 6.45 | 6.45 | 0.36 | 1.61 | ±12.1% |
| 835 | 55.2 | 0.97 | 6.25 | 6.25 | 6.25 | 0.35 | 1.63 | ±12.1% |
| 900 | 55.0 | 1.05 | 6.23 | 6.23 | 6.23 | 0.46 | 1.47 | ±12.1% |
| 1750 | 53.4 | 1.49 | 5.05 | 5.05 | 5.05 | 0.61 | 1.36 | ±12.1% |
| 1900 | 53.3 | 1.52 | 4.81 | 4.81 | 4.81 | 0.58 | 1.41 | ±12.1% |
| 2000 | 53.3 | 1.52 | 4.86 | 4.86 | 4.86 | 0.65 | 1.35 | ±12.1% |
| 2300 | 52.9 | 1.81 | 4.60 | 4.60 | 4.60 | 0.90 | 1.17 | ±12.1% |
| 2450 | 52.7 | 1.95 | 4.48 | 4.48 | 4.48 | 0.90 | 1.15 | ±12.1% |
| 2600 | 52.5 | 2.16 | 4.27 | 4.27 | 4.27 | 0.90 | 1.15 | ±12.1% |

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of 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. Above 5 GHz frequency validity can be extended to ± 110 MHz.

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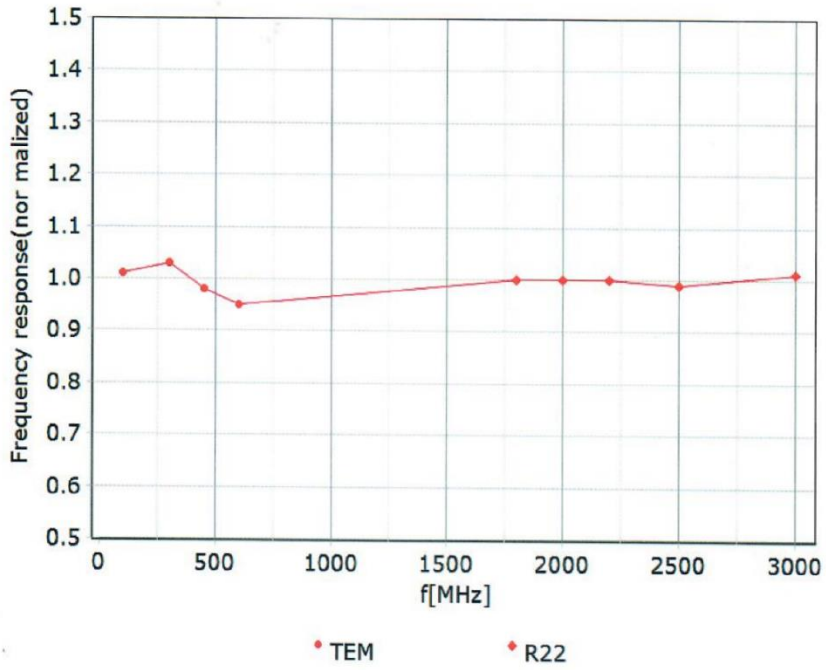
# Frequency Response of E-Field
## (TEM-Cell: ifi110 EXX, Waveguide: R22)




**Uncertainty of Frequency Response of E-field: ±7.4% (k=2)**

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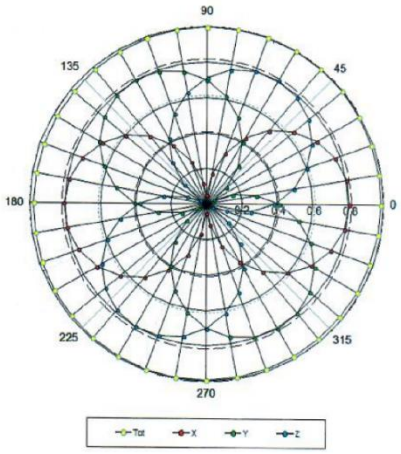
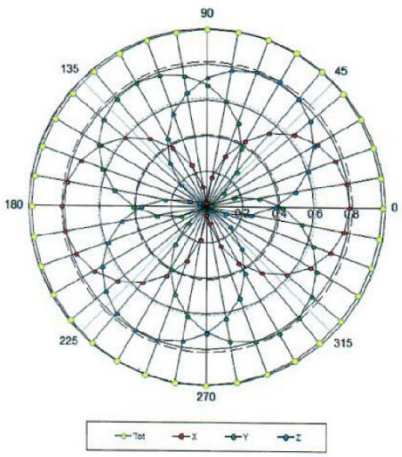
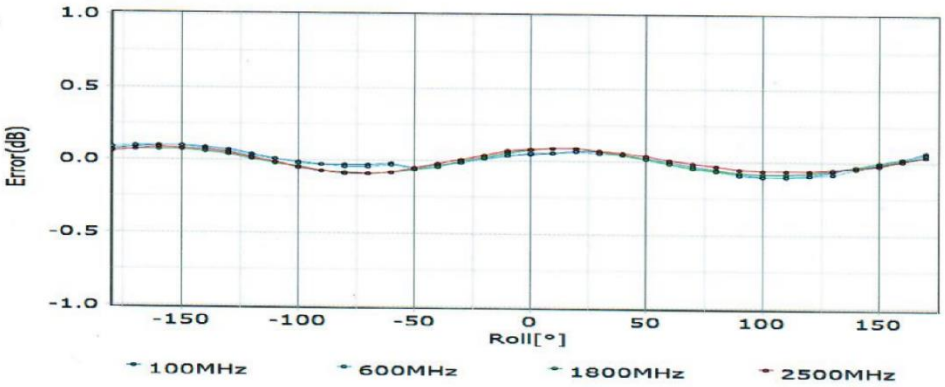
# Receiving Pattern (Φ), θ=0°

## f=600 MHz, TEM




## f=1800 MHz, R22




Uncertainty of Axial Isotropy Assessment: ±1.2% (k=2)

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