

| MEASUREMENT RESULTS                                                                                       |           |     |            |         |                             |                       |                  |                                                   |                      |                  |            |               |                |                      |
|-----------------------------------------------------------------------------------------------------------|-----------|-----|------------|---------|-----------------------------|-----------------------|------------------|---------------------------------------------------|----------------------|------------------|------------|---------------|----------------|----------------------|
| Plot No.                                                                                                  | Frequency |     | Mode/ Band | Service | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Spacing [Side]                                    | Device Serial Number | Data Rate [Mbps] | Duty Cycle | 1g SAR [W/kg] | Scaling Factor | 1g Scaled SAR [W/kg] |
|                                                                                                           | MHz       | Ch  |            |         |                             |                       |                  |                                                   |                      |                  |            |               |                |                      |
|                                                                                                           | 5180      | 36  | 802.11a    | OFDM    | 13.9                        | 13.25                 | 0.00             | 10mm [Front]                                      | FCC#1                | 6                | 1:1        | 0.000         | 1.161          | 0.000                |
| 21                                                                                                        | 5180      | 36  | 802.11a    | OFDM    | 13.9                        | 13.25                 | 0.00             | 10mm [Rear]                                       | FCC#1                | 6                | 1:1        | 0.0511        | 1.161          | <b>0.0594</b>        |
|                                                                                                           | 5210      | 42  | 802.11ac   | OFDM    | 13.9                        | 12.13                 | 0.00             | 10mm [Rear]                                       | FCC#1                | 29.3             | 1:1        | 0.0376        | 1.505          | 0.0566               |
|                                                                                                           | 5260      | 52  | 802.11a    | OFDM    | 15.9                        | 14.97                 | 0.00             | 10mm [Front]                                      | FCC#1                | 6                | 1:1        | 0.000         | 1.239          | 0.000                |
| 22                                                                                                        | 5260      | 52  | 802.11a    | OFDM    | 15.9                        | 14.97                 | 0.00             | 10mm [Rear]                                       | FCC#1                | 6                | 1:1        | 0.102         | 1.239          | <b>0.126</b>         |
|                                                                                                           | 5290      | 58  | 802.11ac   | OFDM    | 13.9                        | 12.09                 | 0.00             | 10mm [Rear]                                       | FCC#1                | 29.3             | 1:1        | 0.0460        | 1.518          | 0.0698               |
|                                                                                                           | 5580      | 116 | 802.11a    | OFDM    | 15.9                        | 15.39                 | 0.00             | 10mm [Front]                                      | FCC#1                | 6                | 1:1        | 0             | 1.125          | 0.000                |
| 23                                                                                                        | 5580      | 116 | 802.11a    | OFDM    | 15.9                        | 15.39                 | 0.00             | 10mm [Rear]                                       | FCC#1                | 6                | 1:1        | 0.187         | 1.125          | <b>0.210</b>         |
|                                                                                                           | 5530      | 106 | 802.11ac   | OFDM    | 13.9                        | 12.24                 | 0.00             | 10mm [Rear]                                       | FCC#1                | 29.3             | 1:1        | 0.0687        | 1.467          | 0.101                |
| ANSI / IEEE C95.1-2005- SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure |           |     |            |         |                             |                       |                  | Head<br>1.6 W/kg(mW/g)<br>averaged over<br>1 gram |                      |                  |            |               |                |                      |

Table 12.11 NII Body-Worn SAR

| MEASUREMENT RESULTS                                                                                       |           |     |            |         |                             |                       |                  |                                                   |                      |                  |            |               |                |                      |
|-----------------------------------------------------------------------------------------------------------|-----------|-----|------------|---------|-----------------------------|-----------------------|------------------|---------------------------------------------------|----------------------|------------------|------------|---------------|----------------|----------------------|
| Plot No.                                                                                                  | Frequency |     | Mode/ Band | Service | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Spacing [Side]                                    | Device Serial Number | Data Rate [Mbps] | Duty Cycle | 1g SAR [W/kg] | Scaling Factor | 1g Scaled SAR [W/kg] |
|                                                                                                           | MHz       | Ch  |            |         |                             |                       |                  |                                                   |                      |                  |            |               |                |                      |
|                                                                                                           | 5200      | 40  | 802.11n    | OFDM    | 13.9                        | 13.46                 | 0.00             | 10mm [Front]                                      | FCC#1                | 6.5              | 1:1        | 0.00501       | 1.107          | 0.00554              |
|                                                                                                           | 5200      | 40  | 802.11n    | OFDM    | 13.9                        | 13.46                 | 0.00             | 10mm [Rear]                                       | FCC#1                | 6.5              | 1:1        | 0.0509        | 1.107          | 0.0563               |
| 24                                                                                                        | 5210      | 42  | 802.11ac   | OFDM    | 13.9                        | 12.13                 | 0.00             | 10mm [Rear]                                       | FCC#1                | 29.3             | 1:1        | 0.0376        | 1.505          | <b>0.0566</b>        |
|                                                                                                           | 5260      | 52  | 802.11n    | OFDM    | 15.9                        | 15.03                 | 0.00             | 10mm [Front]                                      | FCC#1                | 6.5              | 1:1        | 0.00273       | 1.222          | 0.00334              |
| 25                                                                                                        | 5260      | 52  | 802.11n    | OFDM    | 15.9                        | 15.03                 | 0.00             | 10mm [Rear]                                       | FCC#1                | 6.5              | 1:1        | 0.104         | 1.222          | <b>0.127</b>         |
|                                                                                                           | 5290      | 58  | 802.11ac   | OFDM    | 13.9                        | 12.09                 | 0.00             | 10mm [Rear]                                       | FCC#1                | 29.3             | 1:1        | 0.0460        | 1.518          | 0.0698               |
|                                                                                                           | 5500      | 100 | 802.11n    | OFDM    | 15.9                        | 15.26                 | 0.00             | 10mm [Front]                                      | FCC#1                | 6.5              | 1:1        | 0.00425       | 1.159          | 0.00492              |
| 26                                                                                                        | 5500      | 100 | 802.11n    | OFDM    | 15.9                        | 15.26                 | 0.00             | 10mm [Rear]                                       | FCC#1                | 6.5              | 1:1        | 0.147         | 1.159          | <b>0.170</b>         |
|                                                                                                           | 5530      | 106 | 802.11ac   | OFDM    | 13.9                        | 12.24                 | 0.00             | 10mm [Rear]                                       | FCC#1                | 29.3             | 1:1        | 0.0687        | 1.467          | 0.101                |
| ANSI / IEEE C95.1-2005- SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure |           |     |            |         |                             |                       |                  | Head<br>1.6 W/kg(mW/g)<br>averaged over<br>1 gram |                      |                  |            |               |                |                      |

Table 12.12 NII Body-Worn SAR

### 12.3 Standalone Wireless router SAR Results

| MEASUREMENT RESULTS                                                                                       |           |     |               |         |                                      |                             |                        |                                                   |                            |                       |               |                     |                   |                               |
|-----------------------------------------------------------------------------------------------------------|-----------|-----|---------------|---------|--------------------------------------|-----------------------------|------------------------|---------------------------------------------------|----------------------------|-----------------------|---------------|---------------------|-------------------|-------------------------------|
| Plot No.                                                                                                  | Frequency |     | Mode/<br>Band | Service | Maximum<br>Allowed<br>Power<br>[dBm] | Conducted<br>Power<br>[dBm] | Drift<br>Power<br>[dB] | Spacing<br>[Side]                                 | Device<br>Serial<br>Number | # of<br>Time<br>slots | Dyty<br>Cycle | 1g<br>SAR<br>[W/kg] | Scaling<br>Factor | 1g<br>Scaled<br>SAR<br>[W/kg] |
|                                                                                                           | MHz       | Ch  |               |         |                                      |                             |                        |                                                   |                            |                       |               |                     |                   |                               |
|                                                                                                           | 836.6     | 190 | GSM850        | GPRS    | 32.5                                 | 32.42                       | 0.11                   | 10mm<br>[Bottom]                                  | FCC#1                      | 2                     | 1:4.2         | 0.101               | 1.019             | 0.103                         |
|                                                                                                           | 836.6     | 190 | GSM850        | GPRS    | 32.5                                 | 32.42                       | -0.19                  | 10mm<br>[Front]                                   | FCC#1                      | 2                     | 1:4.2         | 0.604               | 1.019             | 0.615                         |
|                                                                                                           | 836.6     | 190 | GSM850        | GPRS    | 33.0                                 | 32.91                       | -0.10                  | 10mm<br>[Rear]                                    | FCC#1                      | 1                     | 1:8.3         | 0.452               | 1.021             | 0.461                         |
|                                                                                                           | 824.2     | 128 | GSM850        | GPRS    | 32.5                                 | 32.50                       | 0.10                   | 10mm<br>[Rear]                                    | FCC#1                      | 2                     | 1:4.2         | 0.837               | 1.000             | 0.837                         |
|                                                                                                           | 836.6     | 190 | GSM850        | GPRS    | 32.5                                 | 32.42                       | -0.19                  | 10mm<br>[Rear]                                    | FCC#1                      | 2                     | 1:4.2         | 0.859               | 1.019             | 0.875                         |
|                                                                                                           | 848.8     | 251 | GSM850        | GPRS    | 32.5                                 | 32.36                       | -0.02                  | 10mm<br>[Rear]                                    | FCC#1                      | 2                     | 1:4.2         | 0.681               | 1.033             | 0.703                         |
|                                                                                                           | 824.2     | 128 | GSM850        | GPRS    | 30.0                                 | 29.98                       | -0.03                  | 10mm<br>[Rear]                                    | FCC#1                      | 3                     | 1:2.8         | 0.968               | 1.005             | 0.972                         |
|                                                                                                           | 836.6     | 190 | GSM850        | GPRS    | 30.0                                 | 29.97                       | -0.17                  | 10mm<br>[Rear]                                    | FCC#1                      | 3                     | 1:2.8         | 0.916               | 1.007             | 0.922                         |
|                                                                                                           | 848.8     | 251 | GSM850        | GPRS    | 30.0                                 | 30.00                       | -0.17                  | 10mm<br>[Rear]                                    | FCC#1                      | 3                     | 1:2.8         | 0.700               | 1.000             | 0.700                         |
|                                                                                                           | 824.2     | 128 | GSM850        | GPRS    | 29.5                                 | 28.85                       | 0.09                   | 10mm<br>[Rear]                                    | FCC#1                      | 4                     | 1:2.1         | 1.27                | 1.161             | 1.475                         |
|                                                                                                           | 836.6     | 190 | GSM850        | GPRS    | 29.5                                 | 28.88                       | 0.04                   | 10mm<br>[Rear]                                    | FCC#1                      | 4                     | 1:2.1         | 1.17                | 1.153             | 1.350                         |
|                                                                                                           | 848.8     | 251 | GSM850        | GPRS    | 29.5                                 | 29.15                       | -0.13                  | 10mm<br>[Rear]                                    | FCC#1                      | 4                     | 1:2.1         | 0.917               | 1.084             | 0.994                         |
|                                                                                                           | 836.6     | 190 | GSM850        | GPRS    | 32.5                                 | 32.42                       | 0.17                   | 10mm<br>[Right]                                   | FCC#1                      | 2                     | 1:4.2         | 0.462               | 1.019             | 0.471                         |
|                                                                                                           | 836.6     | 190 | GSM850        | GPRS    | 32.5                                 | 32.42                       | -0.03                  | 10mm<br>[Left]                                    | FCC#1                      | 2                     | 1:4.2         | 0.528               | 1.019             | 0.538                         |
|                                                                                                           | 836.6     | 190 | GSM850        | GPRS    | 32.5                                 | 32.42                       | -0.07                  | 10mm<br>[Rear]                                    | FCC#2                      | 2                     | 1:4.2         | 0.812               | 1.019             | 0.827                         |
| 27                                                                                                        | 824.2     | 128 | GSM850        | GPRS    | 29.5                                 | 28.85                       | 0.19                   | 10mm<br>[Rear]                                    | FCC#1                      | 4                     | 1:2.1         | 1.33                | 1.161             | 1.545                         |
| ANSI / IEEE C95.1-2005- SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure |           |     |               |         |                                      |                             |                        | Head<br>1.6 W/kg(mW/g)<br>averaged over<br>1 gram |                            |                       |               |                     |                   |                               |

**Table 12.13 GSM850 GPRS Hotspot SAR**

Note: Yellow entries represent measurements with connected earphone cable. / Blue entries represent repeatability measurements.

| MEASUREMENT RESULTS                                                                                       |           |     |               |         |                                      |                             |                        |                                                   |                            |                       |               |                     |                   |                               |
|-----------------------------------------------------------------------------------------------------------|-----------|-----|---------------|---------|--------------------------------------|-----------------------------|------------------------|---------------------------------------------------|----------------------------|-----------------------|---------------|---------------------|-------------------|-------------------------------|
| Plot No.                                                                                                  | Frequency |     | Mode/<br>Band | Service | Maximum<br>Allowed<br>Power<br>[dBm] | Conducted<br>Power<br>[dBm] | Drift<br>Power<br>[dB] | Spacing<br>[Side]                                 | Device<br>Serial<br>Number | # of<br>Time<br>slots | Dyty<br>Cycle | 1g<br>SAR<br>[W/kg] | Scaling<br>Factor | 1g<br>Scaled<br>SAR<br>[W/kg] |
|                                                                                                           | MHz       | Ch  |               |         |                                      |                             |                        |                                                   |                            |                       |               |                     |                   |                               |
|                                                                                                           | 1880.0    | 661 | PCS1900       | GPRS    | 30.0                                 | 29.62                       | -0.08                  | 10mm<br>[Bottom]                                  | FCC#1                      | 2                     | 1:4.2         | 0.584               | 1.091             | 0.637                         |
|                                                                                                           | 1880.0    | 661 | PCS1900       | GPRS    | 30.0                                 | 29.62                       | 0.01                   | 10mm<br>[Front]                                   | FCC#1                      | 2                     | 1:4.2         | 0.248               | 1.091             | 0.271                         |
|                                                                                                           | 1880.0    | 661 | PCS1900       | GPRS    | 30.0                                 | 29.65                       | 0.20                   | 10mm<br>[Rear]                                    | FCC#1                      | 1                     | 1:8.3         | 0.331               | 1.084             | 0.359                         |
|                                                                                                           | 1880.0    | 661 | PCS1900       | GPRS    | 30.0                                 | 29.62                       | 0.01                   | 10mm<br>[Rear]                                    | FCC#1                      | 2                     | 1:4.2         | 0.662               | 1.091             | 0.723                         |
|                                                                                                           | 1850.2    | 512 | PCS1900       | GPRS    | 28.0                                 | 27.57                       | -0.02                  | 10mm<br>[Rear]                                    | FCC#1                      | 3                     | 1:2.8         | 0.830               | 1.104             | 0.916                         |
|                                                                                                           | 1880.0    | 661 | PCS1900       | GPRS    | 28.0                                 | 27.54                       | 0.00                   | 10mm<br>[Rear]                                    | FCC#1                      | 3                     | 1:2.8         | 0.842               | 1.112             | 0.936                         |
|                                                                                                           | 1909.8    | 810 | PCS1900       | GPRS    | 28.0                                 | 27.63                       | 0.10                   | 10mm<br>[Rear]                                    | FCC#1                      | 3                     | 1:2.8         | 0.878               | 1.089             | 0.956                         |
|                                                                                                           | 1850.2    | 512 | PCS1900       | GPRS    | 27.0                                 | 26.47                       | 0.08                   | 10mm<br>[Rear]                                    | FCC#1                      | 4                     | 1:2.1         | 0.881               | 1.130             | 0.995                         |
| 28                                                                                                        | 1880.0    | 661 | PCS1900       | GPRS    | 27.0                                 | 26.38                       | 0.05                   | 10mm<br>[Rear]                                    | FCC#1                      | 4                     | 1:2.1         | 0.866               | 1.153             | 0.999                         |
|                                                                                                           | 1909.8    | 810 | PCS1900       | GPRS    | 27.0                                 | 26.54                       | 0.12                   | 10mm<br>[Rear]                                    | FCC#1                      | 4                     | 1:2.1         | 0.858               | 1.112             | 0.954                         |
|                                                                                                           | 1880.0    | 661 | PCS1900       | GPRS    | 30.0                                 | 29.62                       | 0.03                   | 10mm<br>[Right]                                   | FCC#1                      | 2                     | 1:4.2         | 0.191               | 1.091             | 0.208                         |
|                                                                                                           | 1880.0    | 661 | PCS1900       | GPRS    | 30.0                                 | 29.62                       | 0.19                   | 10mm<br>[Left]                                    | FCC#1                      | 2                     | 1:4.2         | 0.0377              | 1.091             | 0.0411                        |
|                                                                                                           | 1880.0    | 661 | PCS1900       | GPRS    | 30.0                                 | 29.62                       | -0.12                  | 10mm<br>[Rear]                                    | FCC#1                      | 2                     | 1:4.2         | 0.673               | 1.091             | 0.735                         |
|                                                                                                           | 1880.0    | 661 | PCS1900       | GPRS    | 27.0                                 | 26.38                       | 0.06                   | 10mm<br>[Rear]                                    | FCC#1                      | 4                     | 1:2.1         | 0.863               | 1.153             | 0.995                         |
| ANSI / IEEE C95.1-2005– SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure |           |     |               |         |                                      |                             |                        | Head<br>1.6 W/kg(mW/g)<br>averaged over<br>1 gram |                            |                       |               |                     |                   |                               |

Table 12.14 PCS1900 GPRS Hotspot SAR

Note: Yellow entries represent measurements with connected earphone cable. / Blue entries represent repeatability measurements.

| MEASUREMENT RESULTS                                                                                       |           |      |            |         |                             |                       |                  |                                                   |                      |                 |            |               |                |                      |
|-----------------------------------------------------------------------------------------------------------|-----------|------|------------|---------|-----------------------------|-----------------------|------------------|---------------------------------------------------|----------------------|-----------------|------------|---------------|----------------|----------------------|
| Plot No.                                                                                                  | Frequency |      | Mode/ Band | Service | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Spacing [Side]                                    | Device Serial Number | # of Time slots | Dyty Cycle | 1g SAR [W/kg] | Scaling Factor | 1g Scaled SAR [W/kg] |
|                                                                                                           | MHz       | Ch   |            |         |                             |                       |                  |                                                   |                      |                 |            |               |                |                      |
|                                                                                                           | 836.6     | 4183 | WCDMA850   | RMC     | 23.5                        | 23.03                 | 0.04             | 10mm [Bottom]                                     | FCC#2                | N/A             | 1:1        | 0.0575        | 1.114          | 0.0641               |
|                                                                                                           | 836.6     | 4183 | WCDMA850   | RMC     | 23.5                        | 23.03                 | -0.19            | 10mm [Front]                                      | FCC#2                | N/A             | 1:1        | 0.291         | 1.114          | 0.324                |
| 18                                                                                                        | 836.6     | 4183 | WCDMA850   | RMC     | 23.5                        | 23.03                 | 0.12             | 10mm [Rear]                                       | FCC#2                | N/A             | 1:1        | 0.425         | 1.114          | 0.474                |
|                                                                                                           | 836.6     | 4183 | WCDMA850   | RMC     | 23.5                        | 23.03                 | 0.03             | 10mm [Right]                                      | FCC#2                | N/A             | 1:1        | 0.220         | 1.114          | 0.245                |
|                                                                                                           | 836.6     | 4183 | WCDMA850   | RMC     | 23.5                        | 23.03                 | 0.02             | 10mm [Left]                                       | FCC#2                | N/A             | 1:1        | 0.250         | 1.114          | 0.279                |
|                                                                                                           | 836.6     | 4183 | WCDMA850   | RMC     | 23.5                        | 23.03                 | 0.01             | 10mm [Rear]                                       | FCC#2                | N/A             | 1:1        | 0.392         | 1.114          | 0.437                |
|                                                                                                           | 1880.0    | 9400 | WCDMA1900  | RMC     | 23.5                        | 22.98                 | -0.04            | 10mm [Bottom]                                     | FCC#1                | N/A             | 1:1        | 0.464         | 1.127          | 0.523                |
|                                                                                                           | 1880.0    | 9400 | WCDMA1900  | RMC     | 23.5                        | 22.98                 | 0.16             | 10mm [Front]                                      | FCC#1                | N/A             | 1:1        | 0.236         | 1.127          | 0.266                |
|                                                                                                           | 1852.4    | 9262 | WCDMA1900  | RMC     | 23.5                        | 23.18                 | -0.10            | 10mm [Rear]                                       | FCC#1                | N/A             | 1:1        | 0.180         | 1.076          | 0.194                |
| 19                                                                                                        | 1880.0    | 9400 | WCDMA1900  | RMC     | 23.5                        | 22.98                 | 0.05             | 10mm [Rear]                                       | FCC#1                | N/A             | 1:1        | 0.618         | 1.127          | 0.697                |
|                                                                                                           | 1907.6    | 9538 | WCDMA1900  | RMC     | 23.5                        | 23.42                 | -0.02            | 10mm [Rear]                                       | FCC#1                | N/A             | 1:1        | 0.268         | 1.019          | 0.273                |
|                                                                                                           | 1880.0    | 9400 | WCDMA1900  | RMC     | 23.5                        | 22.98                 | -0.04            | 10mm [Right]                                      | FCC#1                | N/A             | 1:1        | 0.148         | 1.127          | 0.167                |
|                                                                                                           | 1880.0    | 9400 | WCDMA1900  | RMC     | 23.5                        | 22.98                 | 0.10             | 10mm [Left]                                       | FCC#1                | N/A             | 1:1        | 0.0294        | 1.127          | 0.0331               |
| 29                                                                                                        | 1880.0    | 9400 | WCDMA1900  | RMC     | 23.5                        | 22.98                 | 0.01             | 10mm [Rear]                                       | FCC#1                | N/A             | 1:1        | 0.672         | 1.127          | 0.757                |
| ANSI / IEEE C95.1-2005- SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure |           |      |            |         |                             |                       |                  | Head<br>1.6 W/kg(mW/g)<br>averaged over<br>1 gram |                      |                 |            |               |                |                      |

Table 12.15 WCDMA Hotspot SAR

Note: Yellow entries represent measurements with connected earphone cable..



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| MEASUREMENT RESULTS                                                                                       |           |    |            |         |                             |                       |                  |                                                   |                      |                  |            |               |                |                      |
|-----------------------------------------------------------------------------------------------------------|-----------|----|------------|---------|-----------------------------|-----------------------|------------------|---------------------------------------------------|----------------------|------------------|------------|---------------|----------------|----------------------|
| Plot No.                                                                                                  | Frequency |    | Mode/ Band | Service | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Spacing [Side]                                    | Device Serial Number | Data Rate [Mbps] | Duty Cycle | 1g SAR [W/kg] | Scaling Factor | 1g Scaled SAR [W/kg] |
|                                                                                                           | MHz       | Ch |            |         |                             |                       |                  |                                                   |                      |                  |            |               |                |                      |
|                                                                                                           | 2462      | 11 | 802.11b    | DSSS    | 16.9                        | 15.90                 | -0.11            | 10mm [Top]                                        | FCC#1                | 1                | 1:1        | 0.136         | 1.259          | 0.171                |
|                                                                                                           | 2462      | 11 | 802.11b    | DSSS    | 16.9                        | 15.90                 | -0.19            | 10mm [Front]                                      | FCC#1                | 1                | 1:1        | 0.0416        | 1.259          | 0.0524               |
| 20                                                                                                        | 2462      | 11 | 802.11b    | DSSS    | 16.9                        | 15.90                 | -0.02            | 10mm [Rear]                                       | FCC#1                | 1                | 1:1        | 0.215         | 1.259          | <b>0.271</b>         |
|                                                                                                           | 2462      | 11 | 802.11b    | DSSS    | 16.9                        | 15.90                 | 0.11             | 10mm [Right]                                      | FCC#1                | 1                | 1:1        | 0.0265        | 1.259          | 0.0334               |
| ANSI / IEEE C95.1-2005- SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure |           |    |            |         |                             |                       |                  | Head<br>1.6 W/kg(mW/g)<br>averaged over<br>1 gram |                      |                  |            |               |                |                      |

Table 12.16 WLAN Hotspot SAR

## 12.4 SAR Test Notes

### General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2003, FCC/OET Bulletin 65, Supplement C [June 2001] and FCC KDB Publication 447498 D01v05r02.
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery was used for all SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v05r02.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB Publication 648474 D04v01r01, SAR was evaluated without a headset connected to the device. Since the standalone reported SAR was  $\leq 1.2$  W/kg, no additional SAR evaluations using a headset cable were required.
8. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v01r01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.7 for more details).
9. Per FCC KDB 865664 D01v01r01, variability SAR tests were performed when the measured SAR results for a frequency band were greater than 0.8 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 14 for variability analysis.

### GSM Notes:

1. This device supports GSM VOIP in the head and body-worn configurations, therefore GPRS was additionally evaluated for head and body-worn compliance.
2. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
3. Per FCC KDB Publication 447498 D01v05r02, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is  $\leq 0.8$  W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is  $> \frac{1}{2}$  dB, instead of the middle channel, the highest output power channel was used.

### WCDMA Notes:

1. WCDMA mode was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v02r02.
2. Body SAR for HSPA is not required for handsets with HSDPA capabilities when the maximum average output power of each RF channel with HSPA active is less than 0.25 dB higher than that measured without HSPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is  $\leq 75\%$  of the SAR limit.
3. Per FCC KDB Publication 447498 D01v05r02, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is  $\leq 0.8$  W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is  $> \frac{1}{2}$  dB, instead of the middle channel, the highest output power channel was used.

**WLAN Notes:**

1. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012 FCC/TCB Meeting Notes for 2.4 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11b. Other IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
2. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012 FCC/TCB Meeting Notes for 5 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11a. Other IEEE 802.11 modes (including 802.11n 20 MHz and 40 MHz bandwidths) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
3. Per April 2013 TCB Workshop notes, full SAR tests for all IEEE 802.11ac configurations were not required because the average output power was not more than 0.25 dB higher than IEEE 802.11a mode. IEEE 802.11ac was evaluated for the highest IEEE 802.11a position in each 5 GHz band and exposure condition.
4. When Hotspot is enabled, all 5 GHz bands are disabled. Therefore no 5 GHz WIFI Wireless Router SAR Data was required.
5. 5 GHz WIFI Direct GO is not supported in the 5 GHz band for this device. WIFI Direct GO is supported in the 2.4 GHz band only. The manufacturer expects 2.4 GHz WIFI Direct GO may be used in a similar manner to wireless router usage. Therefore, 2.4 GHz WIFI Direct GO was evaluated for SAR similarly to wireless router SAR procedures in FCC KDB Publication 941225.
6. WIFI transmission was verified using a spectrum analyzer.
7. Since the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the reported 1g averaged SAR is <0.8 W/kg, SAR testing on other default channels was not required.

## 13. FCC Multi-TX and Antenna SAR Considerations

### 13.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v05r02 are applicable to handsets with built-in unlicensed transmitters such as 802.11a/b/g/n/ac and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

### 13.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v05r02 IV.C.1.iii, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is  $\leq 1.6$  W/kg. When standalone SAR is not required to be measured, per FCC KDB 447498 D01v05r02 4.3.2 2), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\text{Max. Tune up Power}_{(\text{mW})}}{\text{Min. Test Separation Distance}_{(\text{mm})}} \times \frac{\sqrt{f_{(\text{GHz})}}}{7.5}$$

Table 13.1 Estimated SAR

| Mode      | Frequency | Maximum Allowed Power |      | Separation Distance (Body) | Estimated SAR (Body) |
|-----------|-----------|-----------------------|------|----------------------------|----------------------|
|           | MHz       | [dBm]                 | [mW] | [mm]                       | [W/kg]               |
| Bluetooth | 2480      | 6.9                   | 4.89 | 10                         | 0.103                |

Note : Held-to ear configurations are not applicable to Bluetooth operations and therefore were not considered for simultaneous transmission. Per KDB Publication 447498 D01v05r02, the maximum power of the channel was rounded to the nearest mW before calculation.

### 13.3 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v05r02, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the DUT are shown in Figure 13.1 and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.



Figure 13.1 Simultaneous Transmission Paths

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v05r02 3) procedures.

### 13.4 Simultaneous Transmission SAR Analysis

KDB 447498 D01 General RF Exposure Guidance v05, introduces a new formula for calculating the SAR to Peak Location Ratio (SPLSR) between pairs of simultaneously transmitting antennas:

$$SPLSR = (SAR_1 + SAR_2)^{1.5} / Ri$$

Where:

**SAR1** is the highest measured or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

**SAR2** is the highest measured or estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

**Ri** is the separation distance between the pair of simultaneous transmitting antennas. When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of

$$[(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2]$$

A new threshold of 0.04 is also introduced in the draft KDB. Thus, in order for a pair of simultaneous transmitting antennas with the sum of 1-g SAR > 1.6 W/kg to qualify for exemption from Simultaneous Transmission SAR measurements, it has to satisfy the condition of:

$$(SAR_1 + SAR_2)^{1.5} / Ri < 0.04$$

**Table 13.2 Simultaneous Transmission Scenarios**

| Ref. | Simultaneous Transmit Configurations | Head            | Body-Worn Accessory | Hot Spot                       | Note |
|------|--------------------------------------|-----------------|---------------------|--------------------------------|------|
|      |                                      | IEEE1528 Supp C | Supplement C        | FCC KDB 941225 D06 Edges/sides |      |
| 1    | GSM850 Voice + 2.4GHz WIFI           | Yes             | Yes                 | N/A                            |      |
| 2    | PCS1900 Voice + 2.4GHz WIFI          | Yes             | Yes                 | N/A                            |      |
| 3    | WCDMA850 Voice + 2.4GHz WIFI         | Yes             | Yes                 | Yes                            |      |
| 4    | WCDMA1900 Voice + 2.4GHz WIFI        | Yes             | Yes                 | Yes                            |      |
| 5    | GSM850 Voice + 5GHz WIFI             | Yes             | Yes                 | N/A                            |      |
| 6    | PCS1900 Voice + 5GHz WIFI            | Yes             | Yes                 | N/A                            |      |
| 7    | WCDMA850 Voice + 5GHz WIFI           | Yes             | Yes                 | N/A                            |      |
| 8    | WCDMA1900 Voice + 5GHz WIFI          | Yes             | Yes                 | N/A                            |      |
| 9    | GSM850 GPRS + 2.4GHz WIFI            | Yes             | Yes                 | Yes                            |      |
| 10   | GPRS1900 GPRS + 2.4GHz WIFI          | Yes             | Yes                 | Yes                            |      |
| 11   | GSM850 GPRS + 5GHz WIFI              | Yes             | Yes                 | N/A                            |      |
| 12   | GPRS1900 GPRS + 5GHz WIFI            | Yes             | Yes                 | N/A                            |      |
| 13   | GSM850 Voice + Bluetooth             | N/A             | Yes                 | N/A                            |      |
| 14   | PCS1900 Voice + Bluetooth            | N/A             | Yes                 | N/A                            |      |
| 15   | WCDMA850 + Bluetooth                 | N/A             | Yes                 | N/A                            |      |
| 16   | WCDMA1900 + Bluetooth                | N/A             | Yes                 | N/A                            |      |

**Notes:**

1. 2.4 GHz WIFI is supported Hotspot and WIFI-Direct.
2. 5 GHz WIFI is not supported Hotspot and not supported WIFI-Direct.
3. WCDMA, GPRS is supported Hotspot.
4. Bluetooth and WIFI cannot transmit simultaneously since they share the same chip.
5. GSM and WCDMA cannot transmit simultaneously since they share the same chip.
6. VoIP is supported in WCDMA, GSM.

Per the manufacturer, WIFI Direct is expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Simultaneous transmission scenarios involving WIFI Direct are specified above.

### 13.5 Head SAR Simultaneous Transmission Analysis

| Simult TX | Configuration | GSM850 SAR [W/kg] | 2.4G W-LAN (802.11b) SAR [W/kg] | $\Sigma$ SAR [W/kg] | SPLSR [Yes/No] |
|-----------|---------------|-------------------|---------------------------------|---------------------|----------------|
| Head SAR  | Right Touch   | 0.286             | 0.105                           | 0.391               | No             |
|           | Left Touch    | 0.231             | 0.144                           | 0.375               | No             |
|           | Right Tilt    | 0.238             | 0.153                           | 0.392               | No             |
|           | Left Tilt     | 0.236             | 0.170                           | 0.406               | No             |

| Simult TX | Configuration | PCS1900 SAR [W/kg] | 2.4G W-LAN (802.11b) SAR [W/kg] | $\Sigma$ SAR [W/kg] | SPLSR [Yes/No] |
|-----------|---------------|--------------------|---------------------------------|---------------------|----------------|
| Head SAR  | Right Touch   | 0.238              | 0.105                           | 0.344               | No             |
|           | Left Touch    | 0.160              | 0.144                           | 0.305               | No             |
|           | Right Tilt    | 0.0467             | 0.153                           | 0.200               | No             |
|           | Left Tilt     | 0.0460             | 0.170                           | 0.216               | No             |

**Table 13.3 Simultaneous Transmission Scenario with 2.4 GHz W-LAN (Held to Ear)**

| Simult TX | Configuration | GPRS 850 SAR [W/kg] | 2.4G W-LAN (802.11b) SAR [W/kg] | $\Sigma$ SAR [W/kg] | SPLSR [Yes/No] |
|-----------|---------------|---------------------|---------------------------------|---------------------|----------------|
| Head SAR  | Right Touch   | 0.714               | 0.105                           | <b>0.819</b>        | No             |
|           | Left Touch    | 0.464               | 0.144                           | 0.609               | No             |
|           | Right Tilt    | 0.449               | 0.153                           | 0.603               | No             |
|           | Left Tilt     | 0.445               | 0.170                           | 0.615               | No             |

| Simult TX | Configuration | GPRS 1900 SAR [W/kg] | 2.4G W-LAN (802.11b) SAR [W/kg] | $\Sigma$ SAR [W/kg] | SPLSR [Yes/No] |
|-----------|---------------|----------------------|---------------------------------|---------------------|----------------|
| Head SAR  | Right Touch   | 0.576                | 0.105                           | 0.681               | No             |
|           | Left Touch    | 0.391                | 0.144                           | 0.535               | No             |
|           | Right Tilt    | 0.106                | 0.153                           | 0.260               | No             |
|           | Left Tilt     | 0.105                | 0.170                           | 0.274               | No             |

**Table 13.4 Simultaneous Transmission Scenario with 2.4 GHz W-LAN (Held to Ear)**

| Simult TX | Configuration | WCDMA 850 SAR [W/kg] | 2.4G W-LAN (802.11b) SAR [W/kg] | $\Sigma$ SAR [W/kg] | SPLSR [Yes/No] |
|-----------|---------------|----------------------|---------------------------------|---------------------|----------------|
| Head SAR  | Right Touch   | 0.250                | 0.105                           | 0.355               | No             |
|           | Left Touch    | 0.210                | 0.144                           | 0.354               | No             |
|           | Right Tilt    | 0.146                | 0.153                           | 0.299               | No             |
|           | Left Tilt     | 0.163                | 0.170                           | 0.333               | No             |

| Simult TX | Configuration | WCDMA 1900 SAR [W/kg] | 2.4G W-LAN (802.11b) SAR [W/kg] | $\Sigma$ SAR [W/kg] | SPLSR [Yes/No] |
|-----------|---------------|-----------------------|---------------------------------|---------------------|----------------|
| Head SAR  | Right Touch   | 0.367                 | 0.105                           | 0.473               | No             |
|           | Left Touch    | 0.248                 | 0.144                           | 0.393               | No             |
|           | Right Tilt    | 0.0667                | 0.153                           | 0.220               | No             |
|           | Left Tilt     | 0.0704                | 0.170                           | 0.240               | No             |

**Table 13.5 Simultaneous Transmission Scenario with 2.4 GHz W-LAN (Held to Ear)**

| Simult<br>TX | Configuration | GSM850<br>SAR<br>[W/kg] | 5.2G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.286                   | 0.0238                                   | 0.309                  | No                |
|              | Left Touch    | 0.231                   | 0.0220                                   | 0.253                  | No                |
|              | Right Tilt    | 0.238                   | 0.0218                                   | 0.260                  | No                |
|              | Left Tilt     | 0.236                   | 0.0207                                   | 0.257                  | No                |

| Simult<br>TX | Configuration | PCS1900<br>SAR<br>[W/kg] | 5.2G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|--------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.238                    | 0.0238                                   | 0.262                  | No                |
|              | Left Touch    | 0.160                    | 0.0220                                   | 0.182                  | No                |
|              | Right Tilt    | 0.0467                   | 0.0218                                   | 0.0686                 | No                |
|              | Left Tilt     | 0.0460                   | 0.0207                                   | 0.0666                 | No                |

Table 13.6 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | GPRS<br>850<br>SAR<br>[W/kg] | 5.2G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.714                        | 0.0238                                   | 0.738                  | No                |
|              | Left Touch    | 0.464                        | 0.0220                                   | 0.486                  | No                |
|              | Right Tilt    | 0.449                        | 0.0218                                   | 0.471                  | No                |
|              | Left Tilt     | 0.445                        | 0.0207                                   | 0.466                  | No                |

| Simult<br>TX | Configuration | GPRS<br>1900<br>SAR<br>[W/kg] | 5.2G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.576                         | 0.0238                                   | 0.599                  | No                |
|              | Left Touch    | 0.391                         | 0.0220                                   | 0.413                  | No                |
|              | Right Tilt    | 0.106                         | 0.0218                                   | 0.128                  | No                |
|              | Left Tilt     | 0.105                         | 0.0207                                   | 0.125                  | No                |

Table 13.7 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | WCDMA<br>850<br>SAR<br>[W/kg] | 5.2G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.250                         | 0.0238                                   | 0.274                  | No                |
|              | Left Touch    | 0.210                         | 0.0220                                   | 0.232                  | No                |
|              | Right Tilt    | 0.146                         | 0.0218                                   | 0.168                  | No                |
|              | Left Tilt     | 0.163                         | 0.0207                                   | 0.184                  | No                |

| Simult<br>TX | Configuration | WCDMA<br>1900<br>SAR<br>[W/kg] | 5.2G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|--------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.367                          | 0.0238                                   | 0.391                  | No                |
|              | Left Touch    | 0.248                          | 0.0220                                   | 0.270                  | No                |
|              | Right Tilt    | 0.0667                         | 0.0218                                   | 0.0885                 | No                |
|              | Left Tilt     | 0.0704                         | 0.0207                                   | 0.0910                 | No                |

Table 13.8 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | GSM<br>850<br>SAR<br>[W/kg] | 5.3G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-----------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.286                       | 0.0326                                   | 0.318                  | No                |
|              | Left Touch    | 0.231                       | 0.0300                                   | 0.261                  | No                |
|              | Right Tilt    | 0.238                       | 0.0346                                   | 0.273                  | No                |
|              | Left Tilt     | 0.236                       | 0.0275                                   | 0.264                  | No                |

| Simult<br>TX | Configuration | PCS<br>1900<br>SAR<br>[W/kg] | 5.3G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.238                        | 0.0326                                   | 0.271                  | No                |
|              | Left Touch    | 0.160                        | 0.0300                                   | 0.190                  | No                |
|              | Right Tilt    | 0.0467                       | 0.0346                                   | 0.0813                 | No                |
|              | Left Tilt     | 0.0460                       | 0.0275                                   | 0.0735                 | No                |

Table 13.9 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | GPRS<br>850<br>SAR<br>[W/kg] | 5.3G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.714                        | 0.0326                                   | 0.747                  | No                |
|              | Left Touch    | 0.464                        | 0.0300                                   | 0.494                  | No                |
|              | Right Tilt    | 0.449                        | 0.0346                                   | 0.484                  | No                |
|              | Left Tilt     | 0.445                        | 0.0275                                   | 0.473                  | No                |

| Simult<br>TX | Configuration | GPRS<br>1900<br>SAR<br>[W/kg] | 5.2G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.576                         | 0.0326                                   | 0.608                  | No                |
|              | Left Touch    | 0.391                         | 0.0300                                   | 0.421                  | No                |
|              | Right Tilt    | 0.106                         | 0.0346                                   | 0.141                  | No                |
|              | Left Tilt     | 0.105                         | 0.0275                                   | 0.132                  | No                |

Table 13.10 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | WCDMA<br>850<br>SAR<br>[W/kg] | 5.3G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.250                         | 0.0326                                   | 0.283                  | No                |
|              | Left Touch    | 0.210                         | 0.0300                                   | 0.240                  | No                |
|              | Right Tilt    | 0.146                         | 0.0346                                   | 0.180                  | No                |
|              | Left Tilt     | 0.163                         | 0.0275                                   | 0.191                  | No                |

| Simult<br>TX | Configuration | WCDMA<br>1900<br>SAR<br>[W/kg] | 5.3G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|--------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.367                          | 0.0326                                   | 0.400                  | No                |
|              | Left Touch    | 0.248                          | 0.0300                                   | 0.278                  | No                |
|              | Right Tilt    | 0.0667                         | 0.0346                                   | 0.101                  | No                |
|              | Left Tilt     | 0.0704                         | 0.0275                                   | 0.098                  | No                |

Table 13.11 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | GSM850<br>SAR<br>[W/kg] | 5.5G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.286                   | 0.0390                                   | 0.325                  | No                |
|              | Left Touch    | 0.231                   | 0.0310                                   | 0.262                  | No                |
|              | Right Tilt    | 0.238                   | 0.0489                                   | 0.287                  | No                |
|              | Left Tilt     | 0.236                   | 0.0412                                   | 0.277                  | No                |

| Simult<br>TX | Configuration | PCS1900<br>SAR<br>[W/kg] | 5.5G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|--------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.238                    | 0.0390                                   | 0.277                  | No                |
|              | Left Touch    | 0.160                    | 0.0310                                   | 0.191                  | No                |
|              | Right Tilt    | 0.0467                   | 0.0489                                   | 0.0956                 | No                |
|              | Left Tilt     | 0.0460                   | 0.0412                                   | 0.0871                 | No                |

Table 13.12 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | GPRS<br>850<br>SAR<br>[W/kg] | 5.5G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.714                        | 0.0390                                   | 0.753                  | No                |
|              | Left Touch    | 0.464                        | 0.0310                                   | 0.496                  | No                |
|              | Right Tilt    | 0.449                        | 0.0489                                   | 0.498                  | No                |
|              | Left Tilt     | 0.445                        | 0.0412                                   | 0.486                  | No                |

| Simult<br>TX | Configuration | GPRS<br>1900<br>SAR<br>[W/kg] | 5.5G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.576                         | 0.0390                                   | 0.615                  | No                |
|              | Left Touch    | 0.391                         | 0.0310                                   | 0.422                  | No                |
|              | Right Tilt    | 0.106                         | 0.0489                                   | 0.155                  | No                |
|              | Left Tilt     | 0.105                         | 0.0412                                   | 0.146                  | No                |

Table 13.13 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | WCDMA<br>850<br>SAR<br>[W/kg] | 5.5G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.250                         | 0.0390                                   | 0.289                  | No                |
|              | Left Touch    | 0.210                         | 0.0310                                   | 0.241                  | No                |
|              | Right Tilt    | 0.146                         | 0.0489                                   | 0.195                  | No                |
|              | Left Tilt     | 0.163                         | 0.0412                                   | 0.204                  | No                |

| Simult<br>TX | Configuration | WCDMA<br>1900<br>SAR<br>[W/kg] | 5.5G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|--------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.367                          | 0.0390                                   | 0.406                  | No                |
|              | Left Touch    | 0.248                          | 0.0310                                   | 0.280                  | No                |
|              | Right Tilt    | 0.0667                         | 0.0489                                   | 0.116                  | No                |
|              | Left Tilt     | 0.0704                         | 0.0412                                   | 0.112                  | No                |

Table 13.14 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | GSM850<br>SAR<br>[W/kg] | 5.2G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.286                   | 0.0217                                   | 0.307                  | No                |
|              | Left Touch    | 0.231                   | 0.0185                                   | 0.250                  | No                |
|              | Right Tilt    | 0.238                   | 0.0202                                   | 0.258                  | No                |
|              | Left Tilt     | 0.236                   | 0.0189                                   | 0.255                  | No                |

| Simult<br>TX | Configuration | PCS1900<br>SAR<br>[W/kg] | 5.2G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|--------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.238                    | 0.0217                                   | 0.260                  | No                |
|              | Left Touch    | 0.160                    | 0.0185                                   | 0.179                  | No                |
|              | Right Tilt    | 0.0467                   | 0.0202                                   | 0.0669                 | No                |
|              | Left Tilt     | 0.0460                   | 0.0189                                   | 0.0649                 | No                |

Table 13.15 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | GPRS<br>850<br>SAR<br>[W/kg] | 5.2G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.714                        | 0.0217                                   | 0.736                  | No                |
|              | Left Touch    | 0.464                        | 0.0185                                   | 0.483                  | No                |
|              | Right Tilt    | 0.449                        | 0.0202                                   | 0.469                  | No                |
|              | Left Tilt     | 0.445                        | 0.0189                                   | 0.464                  | No                |

| Simult<br>TX | Configuration | GPRS<br>1900<br>SAR<br>[W/kg] | 5.2G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.576                         | 0.0217                                   | 0.597                  | No                |
|              | Left Touch    | 0.391                         | 0.0185                                   | 0.410                  | No                |
|              | Right Tilt    | 0.106                         | 0.0202                                   | 0.127                  | No                |
|              | Left Tilt     | 0.105                         | 0.0189                                   | 0.123                  | No                |

Table 13.16 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | WCDMA<br>850<br>SAR<br>[W/kg] | 5.2G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.250                         | 0.0217                                   | 0.272                  | No                |
|              | Left Touch    | 0.210                         | 0.0185                                   | 0.229                  | No                |
|              | Right Tilt    | 0.146                         | 0.0202                                   | 0.166                  | No                |
|              | Left Tilt     | 0.163                         | 0.0189                                   | 0.182                  | No                |

| Simult<br>TX | Configuration | WCDMA<br>1900<br>SAR<br>[W/kg] | 5.2G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|--------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.367                          | 0.0217                                   | 0.389                  | No                |
|              | Left Touch    | 0.248                          | 0.0185                                   | 0.267                  | No                |
|              | Right Tilt    | 0.0667                         | 0.0202                                   | 0.0868                 | No                |
|              | Left Tilt     | 0.0704                         | 0.0189                                   | 0.0893                 | No                |

Table 13.17 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | GSM<br>850<br>SAR<br>[W/kg] | 5.3G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-----------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.286                       | 0.0411                                   | 0.327                  | No                |
|              | Left Touch    | 0.231                       | 0.0339                                   | 0.265                  | No                |
|              | Right Tilt    | 0.238                       | 0.0378                                   | 0.276                  | No                |
|              | Left Tilt     | 0.236                       | 0.0284                                   | 0.265                  | No                |

| Simult<br>TX | Configuration | PCS<br>1900<br>SAR<br>[W/kg] | 5.3G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.238                        | 0.0411                                   | 0.280                  | No                |
|              | Left Touch    | 0.160                        | 0.0339                                   | 0.194                  | No                |
|              | Right Tilt    | 0.0467                       | 0.0378                                   | 0.0845                 | No                |
|              | Left Tilt     | 0.0460                       | 0.0284                                   | 0.0743                 | No                |

Table 13.18 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | GPRS<br>850<br>SAR<br>[W/kg] | 5.3G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.714                        | 0.0411                                   | 0.755                  | No                |
|              | Left Touch    | 0.464                        | 0.0339                                   | 0.498                  | No                |
|              | Right Tilt    | 0.449                        | 0.0378                                   | 0.487                  | No                |
|              | Left Tilt     | 0.445                        | 0.0284                                   | 0.473                  | No                |

| Simult<br>TX | Configuration | GPRS<br>1900<br>SAR<br>[W/kg] | 5.3G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.576                         | 0.0411                                   | 0.617                  | No                |
|              | Left Touch    | 0.391                         | 0.0339                                   | 0.425                  | No                |
|              | Right Tilt    | 0.106                         | 0.0378                                   | 0.144                  | No                |
|              | Left Tilt     | 0.105                         | 0.0284                                   | 0.133                  | No                |

Table 13.19 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | WCDMA<br>850<br>SAR<br>[W/kg] | 5.3G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.250                         | 0.0411                                   | 0.291                  | No                |
|              | Left Touch    | 0.210                         | 0.0339                                   | 0.244                  | No                |
|              | Right Tilt    | 0.146                         | 0.0378                                   | 0.184                  | No                |
|              | Left Tilt     | 0.163                         | 0.0284                                   | 0.192                  | No                |

| Simult<br>TX | Configuration | WCDMA<br>1900<br>SAR<br>[W/kg] | 5.3G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|--------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.367                          | 0.0411                                   | 0.408                  | No                |
|              | Left Touch    | 0.248                          | 0.0339                                   | 0.282                  | No                |
|              | Right Tilt    | 0.0667                         | 0.0378                                   | 0.104                  | No                |
|              | Left Tilt     | 0.0704                         | 0.0284                                   | 0.099                  | No                |

Table 13.20 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | GSM850<br>SAR<br>[W/kg] | 5.5G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.286                   | 0.0274                                   | 0.313                  | No                |
|              | Left Touch    | 0.231                   | 0.0260                                   | 0.257                  | No                |
|              | Right Tilt    | 0.238                   | 0.0384                                   | 0.277                  | No                |
|              | Left Tilt     | 0.236                   | 0.0317                                   | 0.268                  | No                |

| Simult<br>TX | Configuration | PCS1900<br>SAR<br>[W/kg] | 5.5G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|--------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.238                    | 0.0274                                   | 0.266                  | No                |
|              | Left Touch    | 0.160                    | 0.0260                                   | 0.186                  | No                |
|              | Right Tilt    | 0.0467                   | 0.0384                                   | 0.0851                 | No                |
|              | Left Tilt     | 0.0460                   | 0.0317                                   | 0.0776                 | No                |

Table 13.21 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | GPRS<br>850<br>SAR<br>[W/kg] | 5.5G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.714                        | 0.0274                                   | 0.741                  | No                |
|              | Left Touch    | 0.464                        | 0.0260                                   | 0.490                  | No                |
|              | Right Tilt    | 0.449                        | 0.0384                                   | 0.488                  | No                |
|              | Left Tilt     | 0.445                        | 0.0317                                   | 0.477                  | No                |

| Simult<br>TX | Configuration | GPRS<br>1900<br>SAR<br>[W/kg] | 5.5G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.576                         | 0.0274                                   | 0.603                  | No                |
|              | Left Touch    | 0.391                         | 0.0260                                   | 0.417                  | No                |
|              | Right Tilt    | 0.106                         | 0.0384                                   | 0.145                  | No                |
|              | Left Tilt     | 0.105                         | 0.0317                                   | 0.136                  | No                |

Table 13.22 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

| Simult<br>TX | Configuration | WCDMA<br>850<br>SAR<br>[W/kg] | 5.5G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|-------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.250                         | 0.0274                                   | 0.277                  | No                |
|              | Left Touch    | 0.210                         | 0.0260                                   | 0.236                  | No                |
|              | Right Tilt    | 0.146                         | 0.0384                                   | 0.184                  | No                |
|              | Left Tilt     | 0.163                         | 0.0317                                   | 0.195                  | No                |

| Simult<br>TX | Configuration | WCDMA<br>1900<br>SAR<br>[W/kg] | 5.5G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|--------------|---------------|--------------------------------|------------------------------------------|------------------------|-------------------|
| Head<br>SAR  | Right Touch   | 0.367                          | 0.0274                                   | 0.394                  | No                |
|              | Left Touch    | 0.248                          | 0.0260                                   | 0.274                  | No                |
|              | Right Tilt    | 0.0667                         | 0.0384                                   | 0.105                  | No                |
|              | Left Tilt     | 0.0704                         | 0.0317                                   | 0.102                  | No                |

Table 13.23 Simultaneous Transmission Scenario with 5 GHz W-LAN (Held to Ear)

### 13.6 Body-Worn Simultaneous Transmission Analysis

| Configuration | Mode       | 2G/3G<br>SAR<br>[W/kg] | 2.4G W-LAN<br>(802.11b)<br>SAR<br>[W/kg] | ΣSAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|---------------|------------|------------------------|------------------------------------------|----------------|-------------------|
| Front Side    | GSM 850    | 0.390                  | 0.0524                                   | 0.442          | No                |
| Rear Side     | GSM 850    | 0.569                  | 0.271                                    | 0.840          | No                |
| Front Side    | GPRS 850   | 0.615                  | 0.0524                                   | 0.668          | No                |
| Rear Side     | GPRS 850   | 1.545                  | 0.271                                    | 1.816          | Yes               |
| Front Side    | PCS 1900   | 0.166                  | 0.0524                                   | 0.218          | No                |
| Rear Side     | PCS 1900   | 0.503                  | 0.271                                    | 0.774          | No                |
| Front Side    | GPRS 1900  | 0.287                  | 0.0524                                   | 0.340          | No                |
| Rear Side     | GPRS 1900  | 0.999                  | 0.271                                    | <b>1.270</b>   | No                |
| Front Side    | WCDMA 850  | 0.324                  | 0.0524                                   | 0.377          | No                |
| Rear Side     | WCDMA 850  | 0.474                  | 0.271                                    | 0.744          | No                |
| Front Side    | WCDMA 1900 | 0.266                  | 0.0524                                   | 0.318          | No                |
| Rear Side     | WCDMA 1900 | 0.697                  | 0.271                                    | 0.967          | No                |

**Table 13.24 Simultaneous Transmission Scenario with 2.4 GHz W-LAN (Body-Worn at 10 mm)**

| Configuration | Mode       | 2G/3G<br>SAR<br>[W/kg] | 5.2G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | ΣSAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|---------------|------------|------------------------|------------------------------------------|----------------|-------------------|
| Front Side    | GSM 850    | 0.390                  | 0.000                                    | 0.390          | No                |
| Rear Side     | GSM 850    | 0.569                  | 0.0594                                   | 0.629          | No                |
| Front Side    | GPRS 850   | 0.615                  | 0.000                                    | 0.615          | No                |
| Rear Side     | GPRS 850   | 1.545                  | 0.0594                                   | 1.604          | Yes               |
| Front Side    | PCS 1900   | 0.166                  | 0.000                                    | 0.166          | No                |
| Rear Side     | PCS 1900   | 0.503                  | 0.0594                                   | 0.562          | No                |
| Front Side    | GPRS 1900  | 0.287                  | 0.000                                    | 0.287          | No                |
| Rear Side     | GPRS 1900  | 0.999                  | 0.0594                                   | 1.058          | No                |
| Front Side    | WCDMA 850  | 0.324                  | 0.000                                    | 0.324          | No                |
| Rear Side     | WCDMA 850  | 0.474                  | 0.0594                                   | 0.533          | No                |
| Front Side    | WCDMA 1900 | 0.266                  | 0.000                                    | 0.266          | No                |
| Rear Side     | WCDMA 1900 | 0.697                  | 0.0594                                   | 0.756          | No                |

**Table 13.25 Simultaneous Transmission Scenario with 5 GHz W-LAN (Body-Worn at 10 mm)**

| Configuration | Mode       | 2G/3G<br>SAR<br>[W/kg] | 5.3G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|---------------|------------|------------------------|------------------------------------------|------------------------|-------------------|
| Front Side    | GSM 850    | 0.390                  | 0.000                                    | 0.390                  | No                |
| Rear Side     | GSM 850    | 0.569                  | 0.126                                    | 0.696                  | No                |
| Front Side    | GPRS 850   | 0.615                  | 0.000                                    | 0.615                  | No                |
| Rear Side     | GPRS 850   | 1.545                  | 0.126                                    | 1.671                  | Yes               |
| Front Side    | PCS 1900   | 0.166                  | 0.000                                    | 0.166                  | No                |
| Rear Side     | PCS 1900   | 0.503                  | 0.126                                    | 0.629                  | No                |
| Front Side    | GPRS 1900  | 0.287                  | 0.000                                    | 0.287                  | No                |
| Rear Side     | GPRS 1900  | 0.999                  | 0.126                                    | 1.125                  | No                |
| Front Side    | WCDMA 850  | 0.324                  | 0.000                                    | 0.324                  | No                |
| Rear Side     | WCDMA 850  | 0.474                  | 0.126                                    | 0.600                  | No                |
| Front Side    | WCDMA 1900 | 0.266                  | 0.000                                    | 0.266                  | No                |
| Rear Side     | WCDMA 1900 | 0.697                  | 0.126                                    | 0.823                  | No                |

Table 13.26 Simultaneous Transmission Scenario with 5 GHz W-LAN (Body-Worn at 10 mm)

| Configuration | Mode       | 2G/3G<br>SAR<br>[W/kg] | 5.5G W-LAN<br>(802.11a)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|---------------|------------|------------------------|------------------------------------------|------------------------|-------------------|
| Front Side    | GSM 850    | 0.390                  | 0.000                                    | 0.390                  | No                |
| Rear Side     | GSM 850    | 0.569                  | 0.210                                    | 0.780                  | No                |
| Front Side    | GPRS 850   | 0.615                  | 0.000                                    | 0.615                  | No                |
| Rear Side     | GPRS 850   | 1.545                  | 0.210                                    | 1.755                  | Yes               |
| Front Side    | PCS 1900   | 0.166                  | 0.000                                    | 0.166                  | No                |
| Rear Side     | PCS 1900   | 0.503                  | 0.210                                    | 0.713                  | No                |
| Front Side    | GPRS 1900  | 0.287                  | 0.000                                    | 0.287                  | No                |
| Rear Side     | GPRS 1900  | 0.999                  | 0.210                                    | 1.209                  | No                |
| Front Side    | WCDMA 850  | 0.324                  | 0.000                                    | 0.324                  | No                |
| Rear Side     | WCDMA 850  | 0.474                  | 0.210                                    | 0.684                  | No                |
| Front Side    | WCDMA 1900 | 0.266                  | 0.000                                    | 0.266                  | No                |
| Rear Side     | WCDMA 1900 | 0.697                  | 0.210                                    | 0.907                  | No                |

Table 13.27 Simultaneous Transmission Scenario with 5 GHz W-LAN (Body-Worn at 10 mm)

| Configuration | Mode       | 2G/3G<br>SAR<br>[W/kg] | 5.2G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|---------------|------------|------------------------|------------------------------------------|------------------------|-------------------|
| Front Side    | GSM 850    | 0.390                  | 0.00554                                  | 0.395                  | No                |
| Rear Side     | GSM 850    | 0.569                  | 0.0563                                   | 0.626                  | No                |
| Front Side    | GPRS 850   | 0.615                  | 0.00554                                  | 0.621                  | No                |
| Rear Side     | GPRS 850   | 1.545                  | 0.0563                                   | 1.601                  | Yes               |
| Front Side    | PCS 1900   | 0.166                  | 0.00554                                  | 0.172                  | No                |
| Rear Side     | PCS 1900   | 0.503                  | 0.0563                                   | 0.559                  | No                |
| Front Side    | GPRS 1900  | 0.287                  | 0.00554                                  | 0.293                  | No                |
| Rear Side     | GPRS 1900  | 0.999                  | 0.0563                                   | 1.055                  | No                |
| Front Side    | WCDMA 850  | 0.324                  | 0.00554                                  | 0.330                  | No                |
| Rear Side     | WCDMA 850  | 0.474                  | 0.0563                                   | 0.530                  | No                |
| Front Side    | WCDMA 1900 | 0.266                  | 0.00554                                  | 0.272                  | No                |
| Rear Side     | WCDMA 1900 | 0.697                  | 0.0563                                   | 0.753                  | No                |

Table 13.28 Simultaneous Transmission Scenario with 5 GHz W-LAN (Body-Worn at 10 mm)

| Configuration | Mode       | 2G/3G<br>SAR<br>[W/kg] | 5.3G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|---------------|------------|------------------------|------------------------------------------|------------------------|-------------------|
| Front Side    | GSM 850    | 0.390                  | 0.00334                                  | 0.393                  | No                |
| Rear Side     | GSM 850    | 0.569                  | 0.127                                    | 0.696                  | No                |
| Front Side    | GPRS 850   | 0.615                  | 0.00334                                  | 0.619                  | No                |
| Rear Side     | GPRS 850   | 1.545                  | 0.127                                    | 1.672                  | Yes               |
| Front Side    | PCS 1900   | 0.166                  | 0.00334                                  | 0.169                  | No                |
| Rear Side     | PCS 1900   | 0.503                  | 0.127                                    | 0.630                  | No                |
| Front Side    | GPRS 1900  | 0.287                  | 0.00334                                  | 0.291                  | No                |
| Rear Side     | GPRS 1900  | 0.999                  | 0.127                                    | 1.126                  | No                |
| Front Side    | WCDMA 850  | 0.324                  | 0.00334                                  | 0.328                  | No                |
| Rear Side     | WCDMA 850  | 0.474                  | 0.127                                    | 0.601                  | No                |
| Front Side    | WCDMA 1900 | 0.266                  | 0.00334                                  | 0.269                  | No                |
| Rear Side     | WCDMA 1900 | 0.697                  | 0.127                                    | 0.824                  | No                |

Table 13.29 Simultaneous Transmission Scenario with 5 GHz W-LAN (Body-Worn at 10 mm)

| Configuration | Mode       | 2G/3G<br>SAR<br>[W/kg] | 5.5G W-LAN<br>(802.11n)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|---------------|------------|------------------------|------------------------------------------|------------------------|-------------------|
| Front Side    | GSM 850    | 0.390                  | 0.00492                                  | 0.395                  | No                |
| Rear Side     | GSM 850    | 0.569                  | 0.170                                    | 0.740                  | No                |
| Front Side    | GPRS 850   | 0.615                  | 0.00492                                  | 0.620                  | No                |
| Rear Side     | GPRS 850   | 1.545                  | 0.170                                    | 1.715                  | Yes               |
| Front Side    | PCS 1900   | 0.166                  | 0.00492                                  | 0.171                  | No                |
| Rear Side     | PCS 1900   | 0.503                  | 0.170                                    | 0.673                  | No                |
| Front Side    | GPRS 1900  | 0.287                  | 0.00492                                  | 0.292                  | No                |
| Rear Side     | GPRS 1900  | 0.999                  | 0.170                                    | 1.169                  | No                |
| Front Side    | WCDMA 850  | 0.324                  | 0.00492                                  | 0.329                  | No                |
| Rear Side     | WCDMA 850  | 0.474                  | 0.170                                    | 0.644                  | No                |
| Front Side    | WCDMA 1900 | 0.266                  | 0.00492                                  | 0.271                  | No                |
| Rear Side     | WCDMA 1900 | 0.697                  | 0.170                                    | 0.867                  | No                |

Table 13.30 Simultaneous Transmission Scenario with 5 GHz W-LAN (Body-Worn at 10 mm)

| Configuration | Mode       | 2G/3G<br>SAR<br>[W/kg] | Bluetooth<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|---------------|------------|------------------------|----------------------------|------------------------|-------------------|
| Front Side    | GSM 850    | 0.390                  | 0.105                      | 0.495                  | No                |
| Rear Side     | GSM 850    | 0.569                  | 0.105                      | 0.674                  | No                |
| Front Side    | GPRS 850   | 0.615                  | 0.105                      | 0.720                  | No                |
| Rear Side     | GPRS 850   | 1.545                  | 0.105                      | 1.650                  | Yes               |
| Front Side    | PCS 1900   | 0.166                  | 0.105                      | 0.271                  | No                |
| Rear Side     | PCS 1900   | 0.503                  | 0.105                      | 0.608                  | No                |
| Front Side    | GPRS 1900  | 0.287                  | 0.105                      | 0.392                  | No                |
| Rear Side     | GPRS 1900  | 0.999                  | 0.105                      | 1.104                  | No                |
| Front Side    | WCDMA 850  | 0.324                  | 0.105                      | 0.429                  | No                |
| Rear Side     | WCDMA 850  | 0.474                  | 0.105                      | 0.579                  | No                |
| Front Side    | WCDMA 1900 | 0.266                  | 0.105                      | 0.371                  | No                |
| Rear Side     | WCDMA 1900 | 0.697                  | 0.105                      | 0.802                  | No                |

Table 13.31 Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 10 mm)

Note: Bluetooth SAR was not required to be measured per FCC KDB 447498. Estimated SAR results were used in the above table to determine simultaneous transmission SAR test exclusion.

### 13.7 Hotspot SAR Simultaneous Transmission Analysis

Per FCC KDB Publication 941225 D06v01r01, the device edges with antennas more than 2.5 cm from edge are not required to be evaluated for SAR ("-").

| Simult TX | Configuration | GPRS<br>850<br>SAR<br>[W/kg] | 2.4G W-LAN<br>(802.11b)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|-----------|---------------|------------------------------|------------------------------------------|------------------------|-------------------|
| Body SAR  | Top           | -                            | 0.171                                    | 0.171                  | No                |
|           | Bottom        | 0.103                        | -                                        | 0.103                  | No                |
|           | Front         | 0.615                        | 0.0524                                   | 0.668                  | No                |
|           | Rear          | 1.545                        | 0.271                                    | 1.815                  | Yes               |
|           | Right         | 0.471                        | 0.0334                                   | 0.504                  | No                |
|           | Left          | 0.538                        | -                                        | 0.538                  | No                |

| Simult TX | Configuration | GPRS<br>1900<br>SAR<br>[W/kg] | 2.4G W-LAN<br>(802.11b)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|-----------|---------------|-------------------------------|------------------------------------------|------------------------|-------------------|
| Body SAR  | Top           | -                             | 0.171                                    | 0.171                  | No                |
|           | Bottom        | 0.637                         | -                                        | 0.637                  | No                |
|           | Front         | 0.271                         | 0.0524                                   | 0.323                  | No                |
|           | Rear          | 0.999                         | 0.271                                    | <b>1.270</b>           | No                |
|           | Right         | 0.208                         | 0.0334                                   | 0.242                  | No                |
|           | Left          | 0.0411                        | -                                        | 0.0411                 | No                |

**Table 13.32 Simultaneous Transmission Scenario (Hotspot at 10 mm)**

| Simult TX | Configuration | WCDMA<br>850<br>SAR<br>[W/kg] | 2.4G W-LAN<br>(802.11b)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|-----------|---------------|-------------------------------|------------------------------------------|------------------------|-------------------|
| Body SAR  | Top           | -                             | 0.171                                    | 0.171                  | No                |
|           | Bottom        | 0.0641                        | -                                        | 0.0641                 | No                |
|           | Front         | 0.324                         | 0.0524                                   | 0.377                  | No                |
|           | Rear          | 0.474                         | 0.271                                    | 0.744                  | No                |
|           | Right         | 0.245                         | 0.0334                                   | 0.279                  | No                |
|           | Left          | 0.279                         | -                                        | 0.279                  | No                |

| Simult TX | Configuration | WCDMA<br>1900<br>SAR<br>[W/kg] | 2.4G W-LAN<br>(802.11b)<br>SAR<br>[W/kg] | $\Sigma$ SAR<br>[W/kg] | SPLSR<br>[Yes/No] |
|-----------|---------------|--------------------------------|------------------------------------------|------------------------|-------------------|
| Body SAR  | Top           | -                              | 0.171                                    | 0.171                  | No                |
|           | Bottom        | 0.523                          | -                                        | 0.523                  | No                |
|           | Front         | 0.266                          | 0.0524                                   | 0.318                  | No                |
|           | Rear          | 0.697                          | 0.271                                    | 0.967                  | No                |
|           | Right         | 0.167                          | 0.0334                                   | 0.200                  | No                |
|           | Left          | 0.0331                         | -                                        | 0.0331                 | No                |

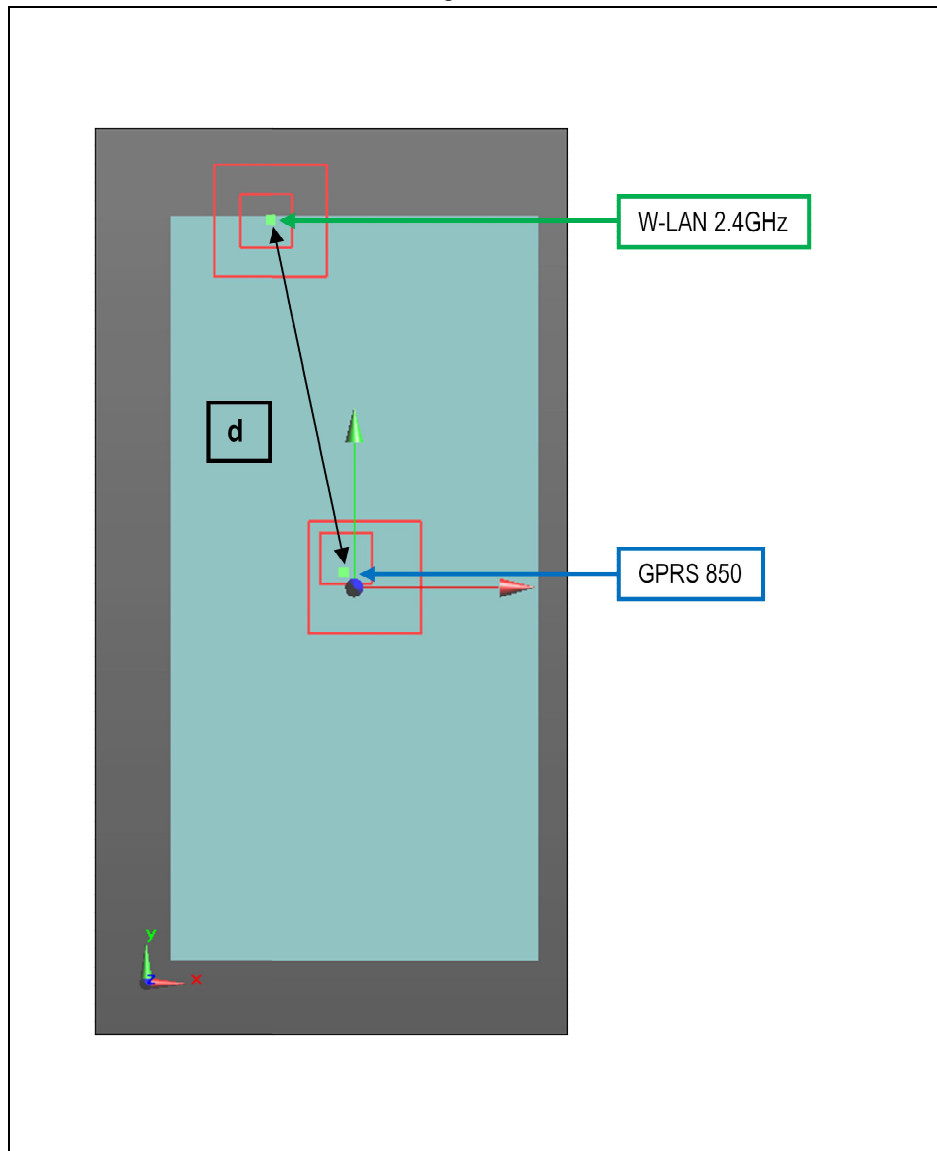
**Table 13.33 Simultaneous Transmission Scenario (Hotspot at 10 mm)**

### 13.8 SAR to Peak Location Separation Ratio (SPLSR)

| Test Position | Worst-case combination |              |               |               |               |                |               |               | $\Sigma$ SAR [W/kg] | Calculated distance [mm] | SPLSR [ $\leq 0.04$ ] | Volume Scan [Yes/No] | Figure |
|---------------|------------------------|--------------|---------------|---------------|---------------|----------------|---------------|---------------|---------------------|--------------------------|-----------------------|----------------------|--------|
|               | GPRS 850               | W-LAN 2.4GHz | W-LAN W52 11a | W-LAN W53 11a | W-LAN W56 11a | W-LAN W52 11ac | W-LAN W53 11n | W-LAN W56 11n |                     |                          |                       |                      |        |
| Rear          | 1.545                  | 0.271        | -             | -             | -             | -              | -             | -             | 1.816               | 68.5                     | 0.036                 | No                   | 13-1   |
| Rear          | 1.545                  | -            | 0.0594        | -             | -             | -              | -             | -             | 1.604               | 67.0                     | 0.030                 | No                   | 13-2   |
| Rear          | 1.545                  | -            | -             | 0.126         | -             | -              | -             | -             | 1.671               | 67.0                     | 0.032                 | No                   | 13-3   |
| Rear          | 1.545                  | -            | -             | -             | 0.21          | -              | -             | -             | 1.755               | 67.0                     | 0.035                 | No                   | 13-4   |
| Rear          | 1.545                  | -            | -             | -             | -             | 0.0566         | -             | -             | 1.602               | 69.1                     | 0.029                 | No                   | 13-5   |
| Rear          | 1.545                  | -            | -             | -             | -             | -              | 0.127         | -             | 1.672               | 63.3                     | 0.034                 | No                   | 13-6   |
| Rear          | 1.545                  | -            | -             | -             | -             | -              | -             | 0.17          | 1.715               | 65.1                     | 0.034                 | No                   | 13-7   |

**Table 13.34 SAR to Peak Location Separation Ratio (SPLSR)**

Figure 13-1



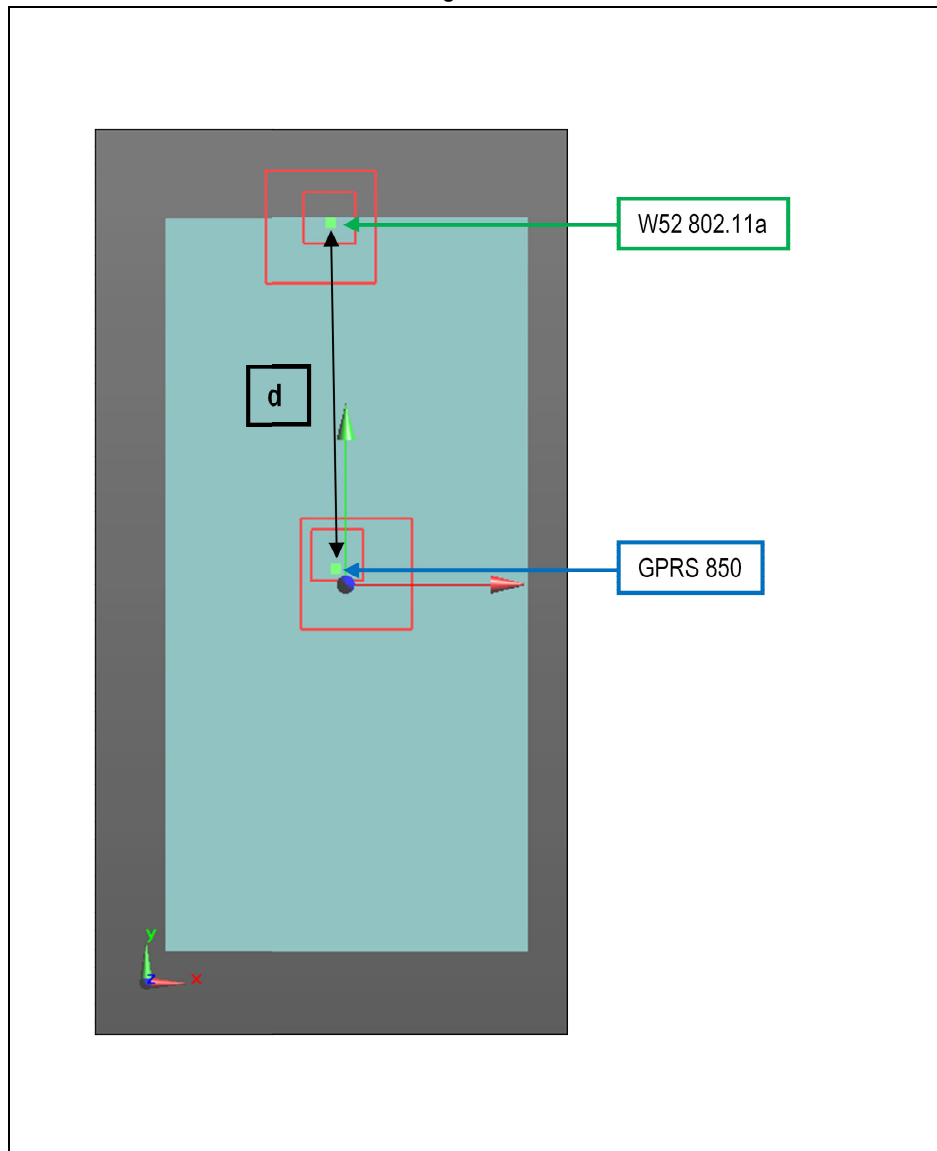
| Mode         | Peak SAR | X      | Y      | Z      |
|--------------|----------|--------|--------|--------|
|              | [mW/g]   | m      | m      | m      |
| GPRS 850     | 1.66     | -0.002 | -0.002 | -0.183 |
| W-LAN 2.4GHz | 0.327    | -0.016 | 0.07   | -0.183 |

|                            |      |
|----------------------------|------|
| d: Calculated distance(mm) | 68.5 |
|----------------------------|------|

The Peak Location Separation Distance is computed by using the formula below:

$$\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$$

Figure 13-2



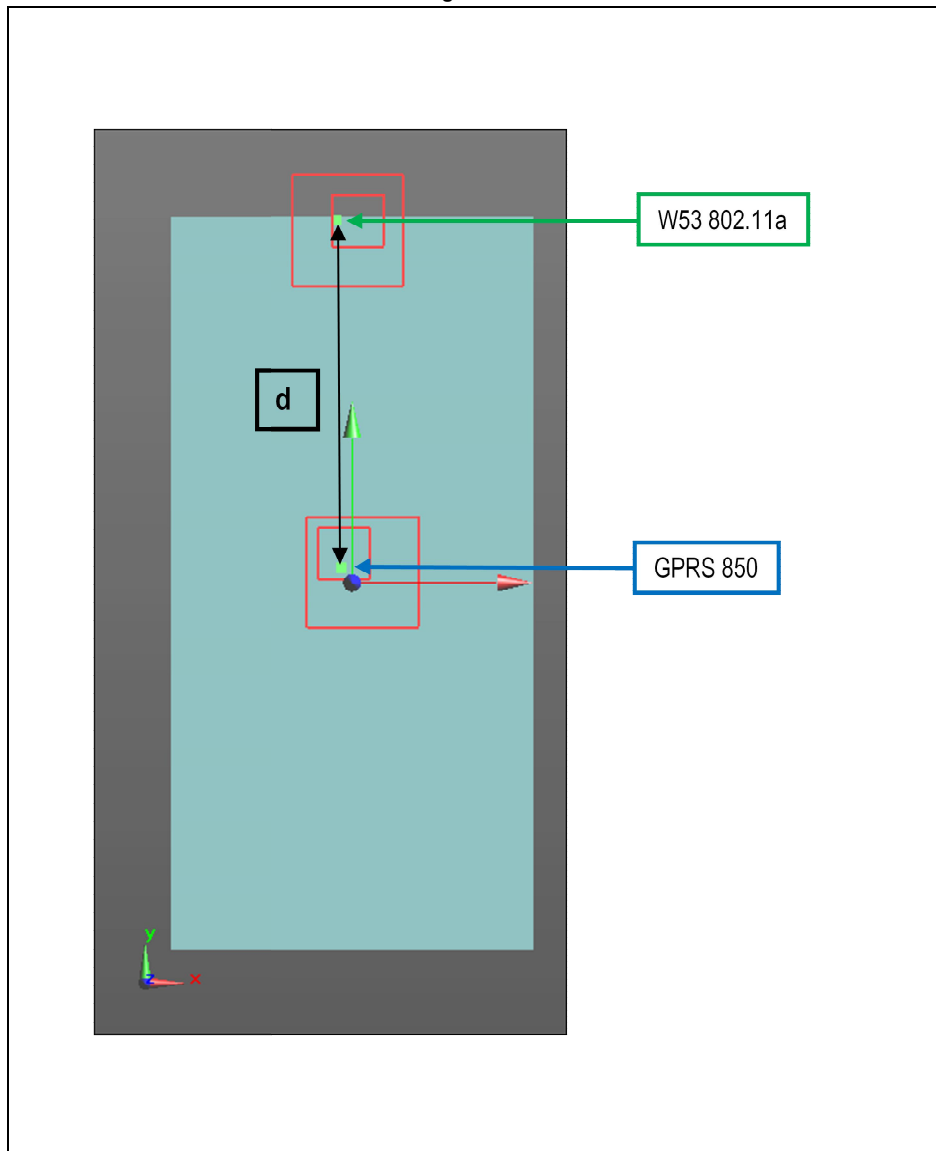
| Mode              | Peak SAR | X      | Y      | Z      |
|-------------------|----------|--------|--------|--------|
|                   | [mW/g]   | m      | m      | m      |
| GPRS 850          | 1.66     | -0.002 | -0.002 | -0.183 |
| W-LAN W52 802.11a | 0.119    | -0.004 | 0.07   | -0.182 |

|                            |      |
|----------------------------|------|
| d: Calculated distance(mm) | 67.0 |
|----------------------------|------|

The Peak Location Separation Distance is computed by using the formula below:

$$\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$$

Figure 13-3



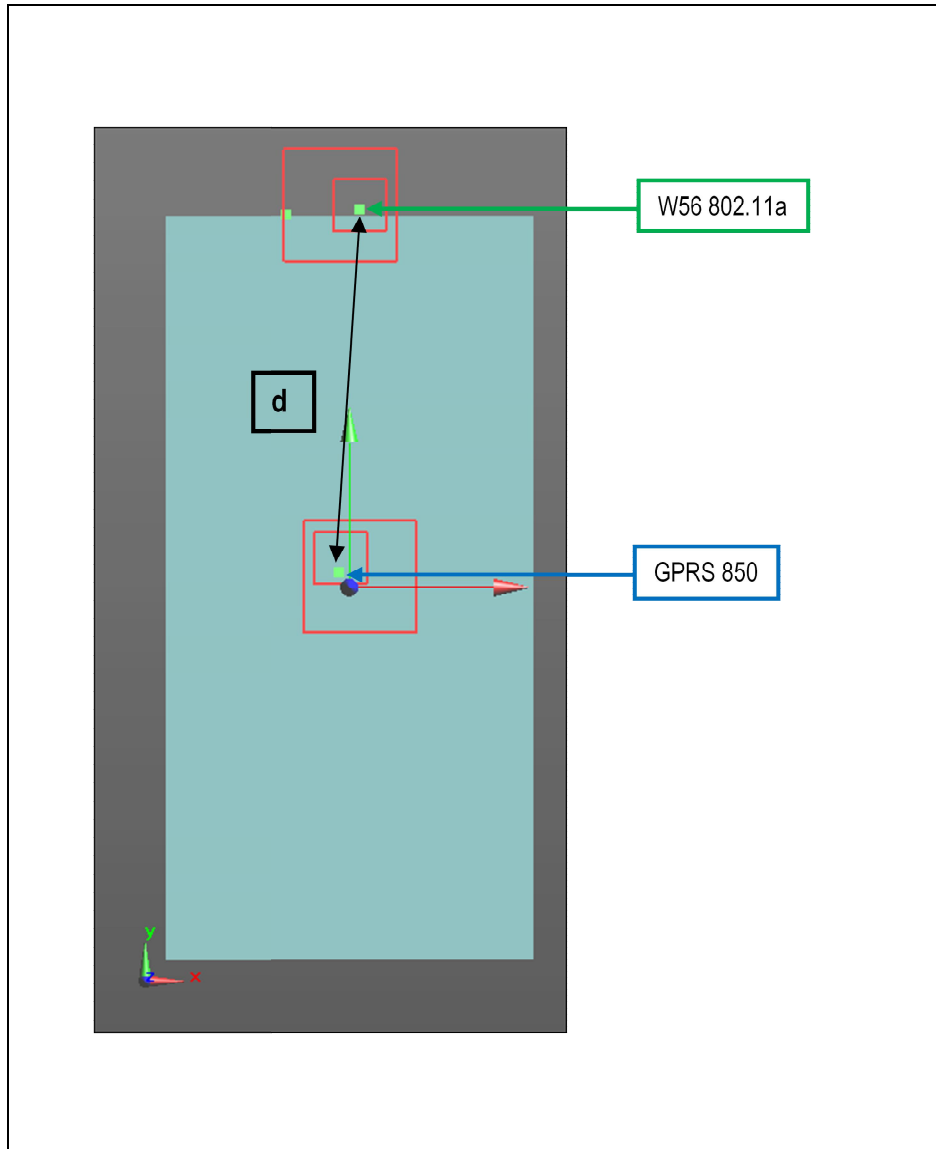
| Mode              | Peak SAR | X      | Y      | Z      |
|-------------------|----------|--------|--------|--------|
|                   | [mW/g]   | m      | m      | m      |
| GPRS 850          | 1.66     | -0.002 | -0.002 | -0.183 |
| W-LAN W53 802.11a | 0.217    | 0.002  | 0.069  | -0.182 |

|                            |      |
|----------------------------|------|
| d: Calculated distance(mm) | 67.0 |
|----------------------------|------|

The Peak Location Separation Distance is computed by using the formula below:

$$\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$$

Figure 13-4



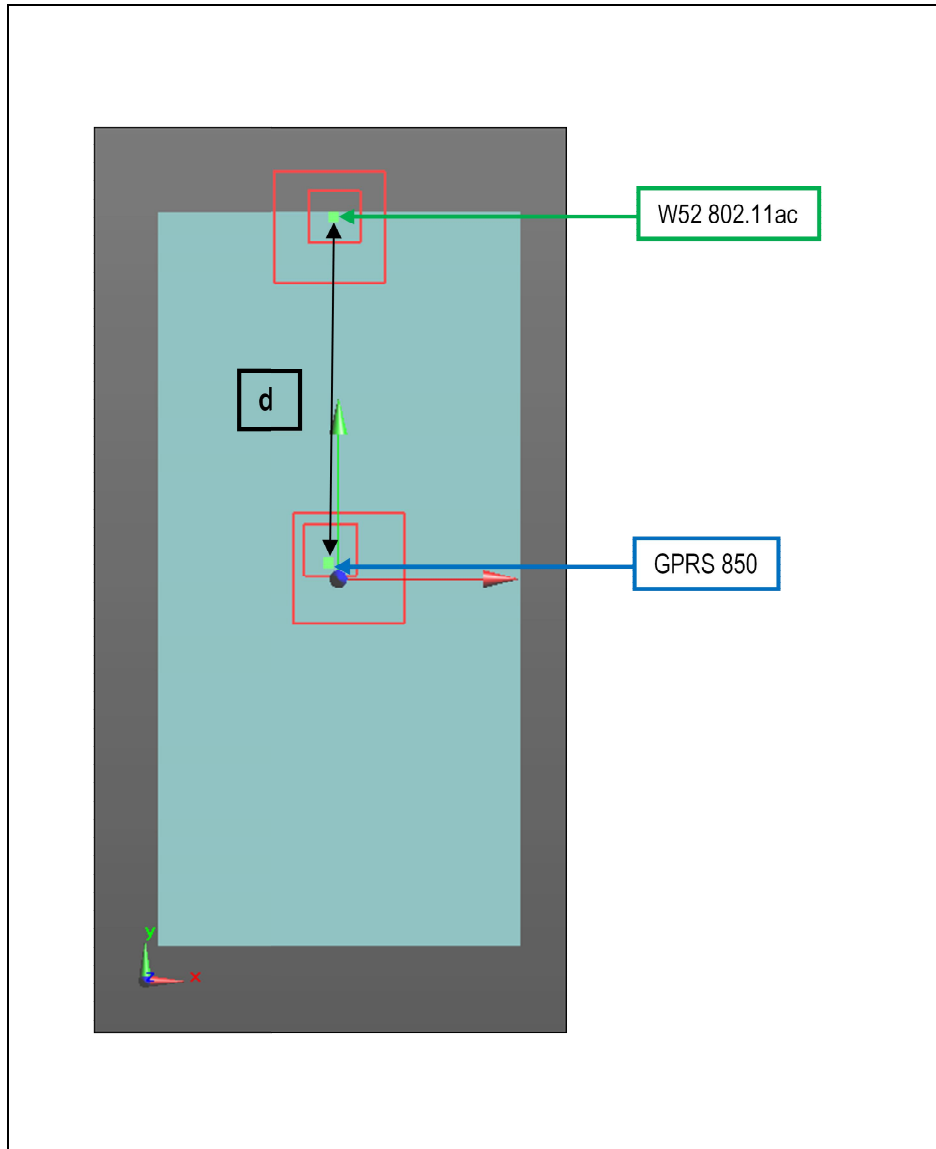
| Mode              | Peak SAR | X      | Y      | Z      |
|-------------------|----------|--------|--------|--------|
|                   | [mW/g]   | m      | m      | m      |
| GPRS 850          | 1.66     | -0.002 | -0.002 | -0.183 |
| W-LAN W56 802.11a | 0.385    | 0.003  | 0.071  | -0.182 |

|                            |      |
|----------------------------|------|
| d: Calculated distance(mm) | 67.0 |
|----------------------------|------|

The Peak Location Separation Distance is computed by using the formula below:

$$\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$$

Figure 13-5



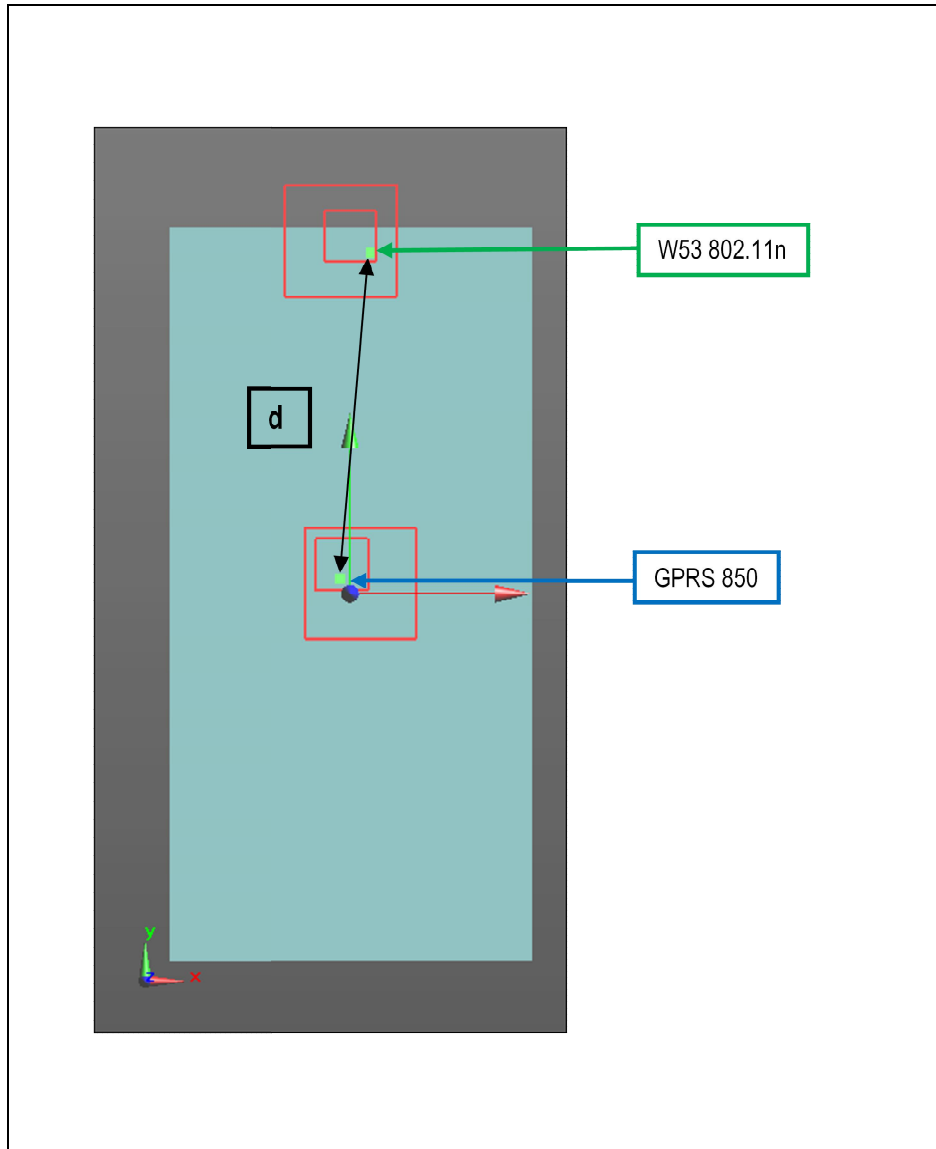
| Mode               | Peak SAR | X      | Y      | Z      |
|--------------------|----------|--------|--------|--------|
|                    | [mW/g]   | m      | m      | m      |
| GPRS 850           | 1.66     | -0.002 | -0.002 | -0.183 |
| W-LAN W52 802.11ac | 0.0867   | -0.003 | 0.069  | -0.182 |

|                            |      |
|----------------------------|------|
| d: Calculated distance(mm) | 69.1 |
|----------------------------|------|

The Peak Location Separation Distance is computed by using the formula below:

$$\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$$

Figure 13-6



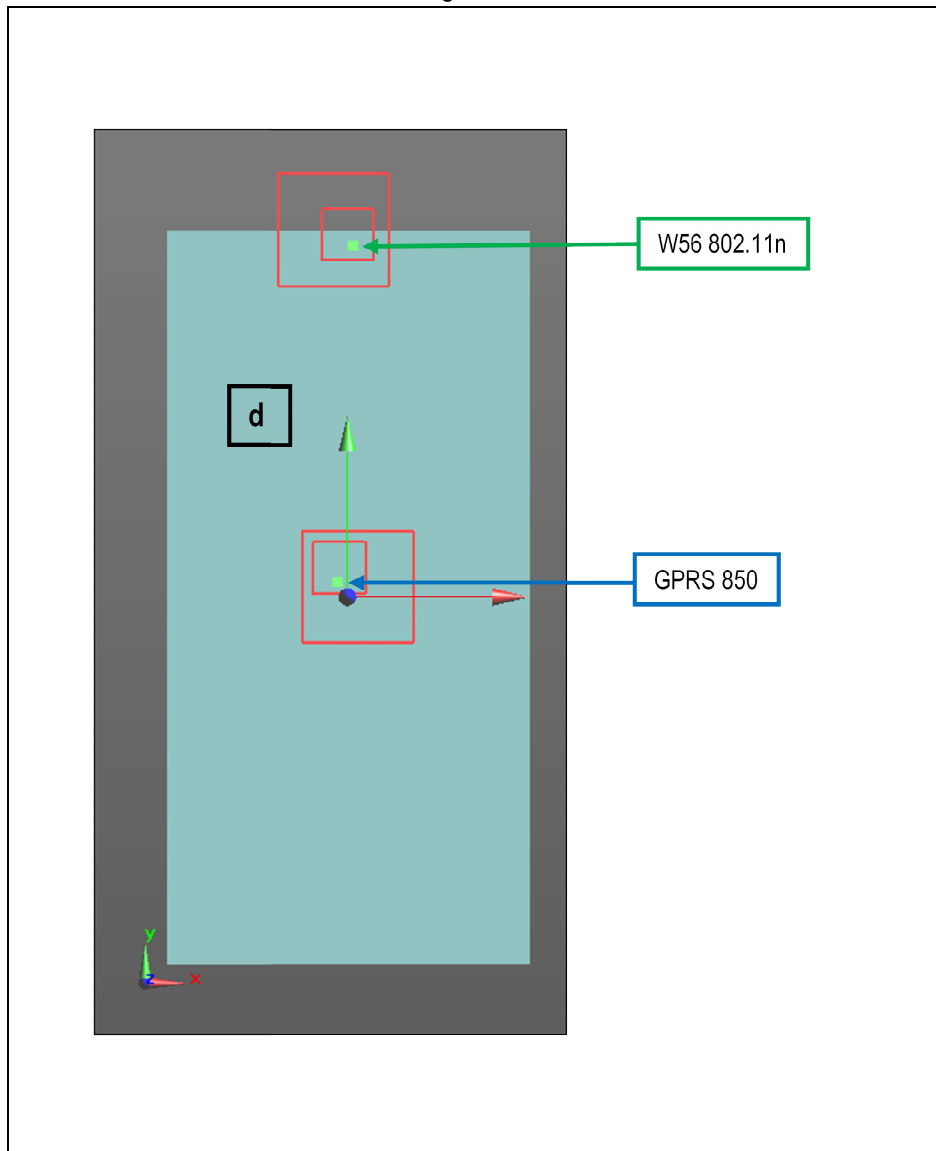
| Mode              | Peak SAR | X      | Y      | Z      |
|-------------------|----------|--------|--------|--------|
|                   | [mW/g]   | m      | m      | m      |
| GPRS 850          | 1.66     | -0.002 | -0.002 | -0.183 |
| W-LAN W53 802.11n | 0.212    | 0.001  | 0.07   | -0.182 |

|                            |      |
|----------------------------|------|
| d: Calculated distance(mm) | 63.3 |
|----------------------------|------|

The Peak Location Separation Distance is computed by using the formula below:

$$\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$$

Figure 13-7



| Mode              | Peak SAR | X      | Y      | Z      |
|-------------------|----------|--------|--------|--------|
|                   | [mW/g]   | m      | m      | m      |
| GPRS 850          | 1.66     | -0.002 | -0.002 | -0.183 |
| W-LAN W56 802.11n | 0.304    | 0.002  | 0.071  | -0.182 |

|                            |      |
|----------------------------|------|
| d: Calculated distance(mm) | 65.1 |
|----------------------------|------|

The Peak Location Separation Distance is computed by using the formula below:

$$\text{SQRT}((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)$$

### 13.9 Simultaneous Transmission Conclusion

Simultaneous transmission SAR measurement (Volume Scan) is not required because the either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

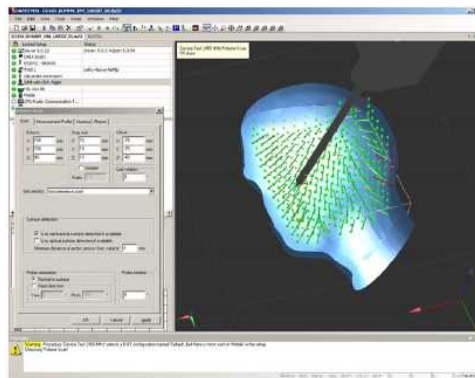
### **Description of Volume Scan:**

In order to determine the EM field distribution in a three-dimensional spatial extension, volume scans are required. In free space, these assessments can help to gain more information on the performance of the DUT (e.g., to determine the degree of symmetry of the field radiated from a horn antenna).

For dosimetric application, it is necessary to assess the peak spatial SAR value averaged over a volume. For this purpose, fine resolution volume scans need to be performed at the peak SAR location(s) determined during the Area Scan. In DASY5 software these scans are called Zoom Scan jobs. The default Zoom Scan measures  $7 \times 7 \times 7$  points with a step size of 5 mm. Faster evaluations can be achieved with a reduced number of measurement points. For example, a Zoom Scan with a grid step size in x- and y-directions of 7.5 mm ( $5 \times 5 \times 7$  cube configuration) reduces the measurement time to almost half with only 1-2% difference in SAR reading compared to the fine-resolution  $7 \times 7 \times 7$  scan.

For SAR evaluations with larger spatial extensions (e.g., within a complete phantom head section) a Volume Scan job should be used.

The Volume Scan job is compatible with DASY5 SAR, PRO and NEO system levels. Volume Scans are used to assess peak SAR and averaged SAR measurement in largely extended 3-dimensional volumes within any phantom. This measurement does not need any previous area scan. The grid can be anchored to a user specific point or to the current probe location. With an Administrator access mode, the grid can be optionally graded in Z-direction, whereby the smallest grid step and the grading ratio can be defined. Chosen grading ratio is automatically adjusted so that the desired extent in Z-direction is fully covered.



Under the Report page, the quantity to be evaluated for an instant report may be selected.

## **SAR Assessment:**

### **Alternative 1**

- Evaluation Method
  - Maximum summed SAR Value
- Description
  - Easiest and most conservative method to determine the upper limit of multi-band SAR
- Example
  - F1's SAR Value is 0.9
  - F2's SAR Value is 1.3
  - Multi-band SAR Value is  $0.9 + 1.3 = 2.2$

### **Alternative 2**

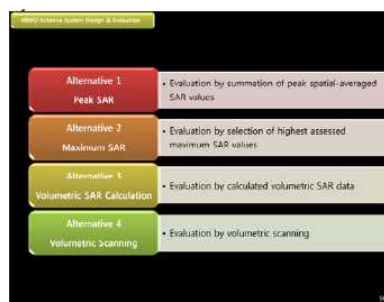
- Evaluation Method
  - Selection of highest assessed maximum SAR Value
- Description
  - Accurate estimate of the multi-band SAR
- Example
  - F1's SAR Value is 0.9
  - F2's SAR Value is 1.3
  - Multi-band SAR Value is 1.3

### **Alternative 3**

- Evaluation Method
  - Combining existing Area and Zoom Scan results by Post-Processor
- Description
  - Rapid way of obtaining the multi-band SAR. It is always applicable.
- Example
  - F1's SAR Value is 0.9
  - F2's SAR Value is 1.3
  - Combining results by Post-Processor

### **Alternative 4**

- Evaluation Method
  - Combining existing Area and Zoom Scan results by Post-Processor
- Description
  - The most accurate way of assessing the multi-band SAR and always
- Example
  - F1's SAR Value is 0.9
  - F2's SAR Value is 1.3
  - Combining results by Post-Processor



## 14. SAR Measurement Variability

### 14.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01r01, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.

These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:

1. When the original highest measured SAR is  $\geq 0.80$  W/kg, the measurement was repeated once.
2. A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was  $> 1.20$  or when the original or repeated measurement was  $\geq 1.45$  W/kg ( $\sim 10\%$  from the 1-g SAR limit).
3. A third repeated measurement was performed only if the original, first or second repeated measurement was  $\geq 1.5$  W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$ .
4. Repeated measurements are not required when the original highest measured SAR is  $< 0.80$  W/kg.

Table 14.1 Body SAR Measurement Variability Results

| Frequency                                                                                                  |     | Mode    | Service | # of Time Slots | Spacing [Side] | Measured SAR(1g) | 1st Repeated SAR(1g)                           | Ratio | 2nd Repeated SAR(1g) | Ratio | 3rd Repeated SAR(1g) | Ratio |
|------------------------------------------------------------------------------------------------------------|-----|---------|---------|-----------------|----------------|------------------|------------------------------------------------|-------|----------------------|-------|----------------------|-------|
| MHz                                                                                                        | Ch  |         |         |                 |                | [W/kg]           | [W/kg]                                         |       | [W/kg]               |       | [W/kg]               |       |
| 824.2                                                                                                      | 128 | GSM850  | GPRS    | 4               | 10 mm [Rear]   | 1.475            | 1.545                                          | 0.95  | N/A                  | N/A   | N/A                  | N/A   |
| 1880.0                                                                                                     | 661 | PCS1900 | GPRS    | 4               | 10 mm [Rear]   | 0.999            | 0.995                                          | 1.00  | N/A                  | N/A   | N/A                  | N/A   |
| ANSI / IEEE C95.1-2005 - SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General population Exposure |     |         |         |                 |                |                  | Body<br>1.6 W/kg(mW/g)<br>averaged over 1 gram |       |                      |       |                      |       |

### 14.2 Measurement Uncertainty

The measured SAR was  $< 1.5$  W/kg for all frequency bands. Therefore, per KDB Publication 865664D01v01r01, the standard measurement uncertainty analysis per IEEE 1528-2003 was not required.

## 15. IEEE P1528 - Measurement uncertainties

Expanded uncertainties stated are calculated with a coverage Factor  $k=2$ .

Please note that these results are not taken into account when determining compliance or non-compliance with test result.

### 835MHz Head

| Error Description                                     | Uncertainty Value<br>$\pm \%$ | Probability distribution | Divisor    | $c_i$<br>(1g) | Standard uncertainty<br>$\pm \%, (1g)$ | $v_i$<br>or<br>$v_{eff}$ |
|-------------------------------------------------------|-------------------------------|--------------------------|------------|---------------|----------------------------------------|--------------------------|
| <b>Measurement System</b>                             |                               |                          |            |               |                                        |                          |
| Probe Calibration                                     | $\pm 6.0$                     | N                        | 1          | 1             | $\pm 6.0$                              | $\infty$                 |
| Axial Isotropy                                        | $\pm 4.7$                     | R                        | $\sqrt{3}$ | 0.7           | $\pm 1.9$                              | $\infty$                 |
| Hemispherical Isotropy                                | $\pm 9.6$                     | R                        | $\sqrt{3}$ | 0.7           | $\pm 3.9$                              | $\infty$                 |
| Boundary Effect                                       | $\pm 1.0$                     | R                        | $\sqrt{3}$ | 1             | $\pm 0.6$                              | $\infty$                 |
| Linearity                                             | $\pm 4.7$                     | R                        | $\sqrt{3}$ | 1             | $\pm 2.7$                              | $\infty$                 |
| System Detection Limits                               | $\pm 1.0$                     | R                        | $\sqrt{3}$ | 1             | $\pm 0.6$                              | $\infty$                 |
| Readout Electronics                                   | $\pm 0.3$                     | N                        | 1          | 1             | $\pm 0.3$                              | $\infty$                 |
| Response Time                                         | $\pm 0.8$                     | R                        | $\sqrt{3}$ | 1             | $\pm 0.5$                              | $\infty$                 |
| Integration Time                                      | $\pm 2.6$                     | R                        | $\sqrt{3}$ | 1             | $\pm 1.5$                              | $\infty$                 |
| RF Ambient Noise                                      | $\pm 3.0$                     | R                        | $\sqrt{3}$ | 1             | $\pm 1.7$                              | $\infty$                 |
| RF Ambient Reflections                                | $\pm 3.0$                     | R                        | $\sqrt{3}$ | 1             | $\pm 1.7$                              | $\infty$                 |
| Probe Positioner                                      | $\pm 0.4$                     | R                        | $\sqrt{3}$ | 1             | $\pm 0.2$                              | $\infty$                 |
| Probe Positioning                                     | $\pm 2.9$                     | R                        | $\sqrt{3}$ | 1             | $\pm 1.7$                              | $\infty$                 |
| Max. SAR Eval.                                        | $\pm 1.0$                     | R                        | $\sqrt{3}$ | 1             | $\pm 0.6$                              | $\infty$                 |
| <b>Test sample related</b>                            |                               |                          |            |               |                                        |                          |
| Device Positioning                                    | $\pm 2.9$                     | N                        | 1          | 1             | $\pm 2.9$                              | 145                      |
| Device Holder                                         | $\pm 3.6$                     | N                        | 1          | 1             | $\pm 3.6$                              | 5                        |
| Power Drift                                           | $\pm 5.0$                     | R                        | $\sqrt{3}$ | 1             | $\pm 2.9$                              | $\infty$                 |
| <b>Phantom and set-up</b>                             |                               |                          |            |               |                                        |                          |
| Phantom Uncertainty                                   | $\pm 4.0$                     | R                        | $\sqrt{3}$ | 1             | $\pm 2.3$                              | $\infty$                 |
| Liquid conductivity (target)                          | $\pm 5.0$                     | R                        | $\sqrt{3}$ | 0.64          | $\pm 1.8$                              | $\infty$                 |
| Liquid conductivity (meas.)                           | $\pm 1.2$                     | R                        | 1          | 0.64          | $\pm 0.8$                              | $\infty$                 |
| Liquid permittivity (target)                          | $\pm 5.0$                     | R                        | $\sqrt{3}$ | 0.6           | $\pm 1.7$                              | $\infty$                 |
| Liquid permittivity (meas.)                           | $\pm 1.1$                     | R                        | 1          | 0.6           | $\pm 0.7$                              | $\infty$                 |
| Combined Std. Uncertainty                             |                               |                          |            |               | $\pm 10.6$                             | 387                      |
| <b>Expanded uncertainty (95% confidence interval)</b> |                               |                          |            |               | $\pm 21.2$                             |                          |

**835MHz Body**

| Error Description                                         | Uncertainty Value<br>± % | Probability distribution | Divisor    | ci<br>(1g) | Standard uncertainty<br>±%,(1g) | vi<br>or<br>veff |
|-----------------------------------------------------------|--------------------------|--------------------------|------------|------------|---------------------------------|------------------|
| <b>Measurement System</b>                                 |                          |                          |            |            |                                 |                  |
| Probe Calibration                                         | ± 6.0                    | N                        | 1          | 1          | ± 6.0                           | ∞                |
| Axial Isotropy                                            | ± 4.7                    | R                        | $\sqrt{3}$ | 0.7        | ± 1.9                           | ∞                |
| Hemispherical Isotropy                                    | ± 9.6                    | R                        | $\sqrt{3}$ | 0.7        | ± 3.9                           | ∞                |
| Boundary Effect                                           | ± 1.0                    | R                        | $\sqrt{3}$ | 1          | ± 0.6                           | ∞                |
| Linearity                                                 | ± 4.7                    | R                        | $\sqrt{3}$ | 1          | ± 2.7                           | ∞                |
| System Detection Limits                                   | ± 1.0                    | R                        | $\sqrt{3}$ | 1          | ± 0.6                           | ∞                |
| Readout Electronics                                       | ± 0.3                    | N                        | 1          | 1          | ± 0.3                           | ∞                |
| Response Time                                             | ± 0.8                    | R                        | $\sqrt{3}$ | 1          | ± 0.5                           | ∞                |
| Integration Time                                          | ± 2.6                    | R                        | $\sqrt{3}$ | 1          | ± 1.5                           | ∞                |
| RF Ambient Noise                                          | ± 3.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.7                           | ∞                |
| RF Ambient Reflections                                    | ± 3.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.7                           | ∞                |
| Probe Positioner                                          | ± 0.4                    | R                        | $\sqrt{3}$ | 1          | ± 0.2                           | ∞                |
| Probe Positioning                                         | ± 2.9                    | R                        | $\sqrt{3}$ | 1          | ± 1.7                           | ∞                |
| Max. SAR Eval.                                            | ± 1.0                    | R                        | $\sqrt{3}$ | 1          | ± 0.6                           | ∞                |
| <b>Test sample related</b>                                |                          |                          |            |            |                                 |                  |
| Device Positioning                                        | ± 2.9                    | N                        | 1          | 1          | ± 2.9                           | 145              |
| Device Holder                                             | ± 3.6                    | N                        | 1          | 1          | ± 3.6                           | 5                |
| Power Drift                                               | ± 5.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.9                           | ∞                |
| <b>Phantom and set-up</b>                                 |                          |                          |            |            |                                 |                  |
| Phantom Uncertainty                                       | ± 4.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.3                           | ∞                |
| Liquid conductivity (target)                              | ± 5.0                    | R                        | $\sqrt{3}$ | 0.64       | ± 1.8                           | ∞                |
| Liquid conductivity (meas.)                               | ± 4.6                    | R                        | 1          | 0.64       | ± 2.9                           | ∞                |
| Liquid permittivity (target)                              | ± 5.0                    | R                        | $\sqrt{3}$ | 0.6        | ± 1.7                           | ∞                |
| Liquid permittivity (meas.)                               | ± 1.7                    | R                        | 1          | 0.6        | ± 1.0                           | ∞                |
| Combined Std. Uncertainty                                 |                          |                          |            |            | ± 13.0                          | 387              |
| <b>Expanded uncertainty<br/>(95% confidence interval)</b> |                          |                          |            |            | <b>± 26.0</b>                   |                  |

**1900MHz Head**

| Error Description                                         | Uncertainty Value<br>$\pm \%$ | Probability distribution | Divisor    | ci<br>(1g) | Standard uncertainty<br>$\pm \%, (1g)$ | vi<br>or<br>veff |
|-----------------------------------------------------------|-------------------------------|--------------------------|------------|------------|----------------------------------------|------------------|
| <b>Measurement System</b>                                 |                               |                          |            |            |                                        |                  |
| Probe Calibration                                         | $\pm 6.0$                     | N                        | 1          | 1          | $\pm 6.0$                              | $\infty$         |
| Axial Isotropy                                            | $\pm 4.7$                     | R                        | $\sqrt{3}$ | 0.7        | $\pm 1.9$                              | $\infty$         |
| Hemispherical Isotropy                                    | $\pm 9.6$                     | R                        | $\sqrt{3}$ | 0.7        | $\pm 3.9$                              | $\infty$         |
| Boundary Effect                                           | $\pm 1.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.6$                              | $\infty$         |
| Linearity                                                 | $\pm 4.7$                     | R                        | $\sqrt{3}$ | 1          | $\pm 2.7$                              | $\infty$         |
| System Detection Limits                                   | $\pm 1.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.6$                              | $\infty$         |
| Readout Electronics                                       | $\pm 0.3$                     | N                        | 1          | 1          | $\pm 0.3$                              | $\infty$         |
| Response Time                                             | $\pm 0.8$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.5$                              | $\infty$         |
| Integration Time                                          | $\pm 2.6$                     | R                        | $\sqrt{3}$ | 1          | $\pm 1.5$                              | $\infty$         |
| RF Ambient Noise                                          | $\pm 3.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 1.7$                              | $\infty$         |
| RF Ambient Reflections                                    | $\pm 3.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 1.7$                              | $\infty$         |
| Probe Positioner                                          | $\pm 0.4$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.2$                              | $\infty$         |
| Probe Positioning                                         | $\pm 2.9$                     | R                        | $\sqrt{3}$ | 1          | $\pm 1.7$                              | $\infty$         |
| Max. SAR Eval.                                            | $\pm 1.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.6$                              | $\infty$         |
| <b>Test sample related</b>                                |                               |                          |            |            |                                        |                  |
| Device Positioning                                        | $\pm 2.9$                     | N                        | 1          | 1          | $\pm 2.9$                              | 145              |
| Device Holder                                             | $\pm 3.6$                     | N                        | 1          | 1          | $\pm 3.6$                              | 5                |
| Power Drift                                               | $\pm 5.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 2.9$                              | $\infty$         |
| <b>Phantom and set-up</b>                                 |                               |                          |            |            |                                        |                  |
| Phantom Uncertainty                                       | $\pm 4.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 2.3$                              | $\infty$         |
| Liquid conductivity (target)                              | $\pm 5.0$                     | R                        | $\sqrt{3}$ | 0.64       | $\pm 1.8$                              | $\infty$         |
| Liquid conductivity (meas.)                               | $\pm 3.9$                     | R                        | 1          | 0.64       | $\pm 2.5$                              | $\infty$         |
| Liquid permittivity (target)                              | $\pm 5.0$                     | R                        | $\sqrt{3}$ | 0.6        | $\pm 1.7$                              | $\infty$         |
| Liquid permittivity (meas.)                               | $\pm 0.7$                     | R                        | 1          | 0.6        | $\pm 0.4$                              | $\infty$         |
| Combined Std. Uncertainty                                 |                               |                          |            |            | $\pm 12.0$                             | 387              |
| <b>Expanded uncertainty<br/>(95% confidence interval)</b> |                               |                          |            |            | <b><math>\pm 24.0</math></b>           |                  |

**1900MHz Body**

| Error Description                                         | Uncertainty Value<br>$\pm \%$ | Probability distribution | Divisor    | ci<br>(1g) | Standard uncertainty<br>$\pm \%, (1g)$ | vi<br>or<br>veff |
|-----------------------------------------------------------|-------------------------------|--------------------------|------------|------------|----------------------------------------|------------------|
| <b>Measurement System</b>                                 |                               |                          |            |            |                                        |                  |
| Probe Calibration                                         | $\pm 6.0$                     | N                        | 1          | 1          | $\pm 6.0$                              | $\infty$         |
| Axial Isotropy                                            | $\pm 4.7$                     | R                        | $\sqrt{3}$ | 0.7        | $\pm 1.9$                              | $\infty$         |
| Hemispherical Isotropy                                    | $\pm 9.6$                     | R                        | $\sqrt{3}$ | 0.7        | $\pm 3.9$                              | $\infty$         |
| Boundary Effect                                           | $\pm 1.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.6$                              | $\infty$         |
| Linearity                                                 | $\pm 4.7$                     | R                        | $\sqrt{3}$ | 1          | $\pm 2.7$                              | $\infty$         |
| System Detection Limits                                   | $\pm 1.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.6$                              | $\infty$         |
| Readout Electronics                                       | $\pm 0.3$                     | N                        | 1          | 1          | $\pm 0.3$                              | $\infty$         |
| Response Time                                             | $\pm 0.8$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.5$                              | $\infty$         |
| Integration Time                                          | $\pm 2.6$                     | R                        | $\sqrt{3}$ | 1          | $\pm 1.5$                              | $\infty$         |
| RF Ambient Noise                                          | $\pm 3.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 1.7$                              | $\infty$         |
| RF Ambient Reflections                                    | $\pm 3.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 1.7$                              | $\infty$         |
| Probe Positioner                                          | $\pm 0.4$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.2$                              | $\infty$         |
| Probe Positioning                                         | $\pm 2.9$                     | R                        | $\sqrt{3}$ | 1          | $\pm 1.7$                              | $\infty$         |
| Max. SAR Eval.                                            | $\pm 1.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.6$                              | $\infty$         |
| <b>Test sample related</b>                                |                               |                          |            |            |                                        |                  |
| Device Positioning                                        | $\pm 2.9$                     | N                        | 1          | 1          | $\pm 2.9$                              | 145              |
| Device Holder                                             | $\pm 3.6$                     | N                        | 1          | 1          | $\pm 3.6$                              | 5                |
| Power Drift                                               | $\pm 5.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 2.9$                              | $\infty$         |
| <b>Phantom and set-up</b>                                 |                               |                          |            |            |                                        |                  |
| Phantom Uncertainty                                       | $\pm 4.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 2.3$                              | $\infty$         |
| Liquid conductivity (target)                              | $\pm 5.0$                     | R                        | $\sqrt{3}$ | 0.64       | $\pm 1.8$                              | $\infty$         |
| Liquid conductivity (meas.)                               | $\pm 3.0$                     | R                        | 1          | 0.64       | $\pm 1.9$                              | $\infty$         |
| Liquid permittivity (target)                              | $\pm 5.0$                     | R                        | $\sqrt{3}$ | 0.6        | $\pm 1.7$                              | $\infty$         |
| Liquid permittivity (meas.)                               | $\pm 3.9$                     | R                        | 1          | 0.6        | $\pm 2.3$                              | $\infty$         |
| Combined Std. Uncertainty                                 |                               |                          |            |            | $\pm 13.3$                             | 387              |
| <b>Expanded uncertainty<br/>(95% confidence interval)</b> |                               |                          |            |            | <b><math>\pm 26.6</math></b>           |                  |

**2450MHz Head**

| Error Description                                         | Uncertainty Value<br>$\pm \%$ | Probability distribution | Divisor    | ci<br>(1g) | Standard uncertainty<br>$\pm \%, (1g)$ | vi<br>or<br>veff |
|-----------------------------------------------------------|-------------------------------|--------------------------|------------|------------|----------------------------------------|------------------|
| <b>Measurement System</b>                                 |                               |                          |            |            |                                        |                  |
| Probe Calibration                                         | $\pm 6.0$                     | N                        | 1          | 1          | $\pm 6.0$                              | $\infty$         |
| Axial Isotropy                                            | $\pm 4.7$                     | R                        | $\sqrt{3}$ | 0.7        | $\pm 1.9$                              | $\infty$         |
| Hemispherical Isotropy                                    | $\pm 9.6$                     | R                        | $\sqrt{3}$ | 0.7        | $\pm 3.9$                              | $\infty$         |
| Boundary Effect                                           | $\pm 1.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.6$                              | $\infty$         |
| Linearity                                                 | $\pm 4.7$                     | R                        | $\sqrt{3}$ | 1          | $\pm 2.7$                              | $\infty$         |
| System Detection Limits                                   | $\pm 1.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.6$                              | $\infty$         |
| Readout Electronics                                       | $\pm 0.3$                     | N                        | 1          | 1          | $\pm 0.3$                              | $\infty$         |
| Response Time                                             | $\pm 0.8$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.5$                              | $\infty$         |
| Integration Time                                          | $\pm 2.6$                     | R                        | $\sqrt{3}$ | 1          | $\pm 1.5$                              | $\infty$         |
| RF Ambient Noise                                          | $\pm 3.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 1.7$                              | $\infty$         |
| RF Ambient Reflections                                    | $\pm 3.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 1.7$                              | $\infty$         |
| Probe Positioner                                          | $\pm 0.4$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.2$                              | $\infty$         |
| Probe Positioning                                         | $\pm 2.9$                     | R                        | $\sqrt{3}$ | 1          | $\pm 1.7$                              | $\infty$         |
| Max. SAR Eval.                                            | $\pm 1.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.6$                              | $\infty$         |
| <b>Test sample related</b>                                |                               |                          |            |            |                                        |                  |
| Device Positioning                                        | $\pm 2.9$                     | N                        | 1          | 1          | $\pm 2.9$                              | 145              |
| Device Holder                                             | $\pm 3.6$                     | N                        | 1          | 1          | $\pm 3.6$                              | 5                |
| Power Drift                                               | $\pm 5.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 2.9$                              | $\infty$         |
| <b>Phantom and set-up</b>                                 |                               |                          |            |            |                                        |                  |
| Phantom Uncertainty                                       | $\pm 4.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 2.3$                              | $\infty$         |
| Liquid conductivity (target)                              | $\pm 5.0$                     | R                        | $\sqrt{3}$ | 0.64       | $\pm 1.8$                              | $\infty$         |
| Liquid conductivity (meas.)                               | $\pm 4.7$                     | R                        | 1          | 0.64       | $\pm 3.0$                              | $\infty$         |
| Liquid permittivity (target)                              | $\pm 5.0$                     | R                        | $\sqrt{3}$ | 0.6        | $\pm 1.7$                              | $\infty$         |
| Liquid permittivity (meas.)                               | $\pm 2.9$                     | R                        | 1          | 0.6        | $\pm 1.7$                              | $\infty$         |
| Combined Std. Uncertainty                                 |                               |                          |            |            | $\pm 13.8$                             | 387              |
| <b>Expanded uncertainty<br/>(95% confidence interval)</b> |                               |                          |            |            | <b><math>\pm 27.6</math></b>           |                  |

**2450MHz Body**

| Error Description                                         | Uncertainty Value<br>$\pm \%$ | Probability distribution | Divisor    | ci<br>(1g) | Standard uncertainty<br>$\pm \%, (1g)$ | vi<br>or<br>veff |
|-----------------------------------------------------------|-------------------------------|--------------------------|------------|------------|----------------------------------------|------------------|
| <b>Measurement System</b>                                 |                               |                          |            |            |                                        |                  |
| Probe Calibration                                         | $\pm 6.0$                     | N                        | 1          | 1          | $\pm 6.0$                              | $\infty$         |
| Axial Isotropy                                            | $\pm 4.7$                     | R                        | $\sqrt{3}$ | 0.7        | $\pm 1.9$                              | $\infty$         |
| Hemispherical Isotropy                                    | $\pm 9.6$                     | R                        | $\sqrt{3}$ | 0.7        | $\pm 3.9$                              | $\infty$         |
| Boundary Effect                                           | $\pm 1.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.6$                              | $\infty$         |
| Linearity                                                 | $\pm 4.7$                     | R                        | $\sqrt{3}$ | 1          | $\pm 2.7$                              | $\infty$         |
| System Detection Limits                                   | $\pm 1.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.6$                              | $\infty$         |
| Readout Electronics                                       | $\pm 0.3$                     | N                        | 1          | 1          | $\pm 0.3$                              | $\infty$         |
| Response Time                                             | $\pm 0.8$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.5$                              | $\infty$         |
| Integration Time                                          | $\pm 2.6$                     | R                        | $\sqrt{3}$ | 1          | $\pm 1.5$                              | $\infty$         |
| RF Ambient Noise                                          | $\pm 3.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 1.7$                              | $\infty$         |
| RF Ambient Reflections                                    | $\pm 3.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 1.7$                              | $\infty$         |
| Probe Positioner                                          | $\pm 0.4$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.2$                              | $\infty$         |
| Probe Positioning                                         | $\pm 2.9$                     | R                        | $\sqrt{3}$ | 1          | $\pm 1.7$                              | $\infty$         |
| Max. SAR Eval.                                            | $\pm 1.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 0.6$                              | $\infty$         |
| <b>Test sample related</b>                                |                               |                          |            |            |                                        |                  |
| Device Positioning                                        | $\pm 2.9$                     | N                        | 1          | 1          | $\pm 2.9$                              | 145              |
| Device Holder                                             | $\pm 3.6$                     | N                        | 1          | 1          | $\pm 3.6$                              | 5                |
| Power Drift                                               | $\pm 5.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 2.9$                              | $\infty$         |
| <b>Phantom and set-up</b>                                 |                               |                          |            |            |                                        |                  |
| Phantom Uncertainty                                       | $\pm 4.0$                     | R                        | $\sqrt{3}$ | 1          | $\pm 2.3$                              | $\infty$         |
| Liquid conductivity (target)                              | $\pm 5.0$                     | R                        | $\sqrt{3}$ | 0.64       | $\pm 1.8$                              | $\infty$         |
| Liquid conductivity (meas.)                               | $\pm 0.7$                     | R                        | 1          | 0.64       | $\pm 0.4$                              | $\infty$         |
| Liquid permittivity (target)                              | $\pm 5.0$                     | R                        | $\sqrt{3}$ | 0.6        | $\pm 1.7$                              | $\infty$         |
| Liquid permittivity (meas.)                               | $\pm 0.4$                     | R                        | 1          | 0.6        | $\pm 0.2$                              | $\infty$         |
| Combined Std. Uncertainty                                 |                               |                          |            |            | $\pm 9.7$                              | 387              |
| <b>Expanded uncertainty<br/>(95% confidence interval)</b> |                               |                          |            |            | <b><math>\pm 19.4</math></b>           |                  |

**5200MHz Head**

| Error Description                                         | Uncertainty Value<br>± % | Probability distribution | Divisor    | ci<br>(1g) | Standard uncertainty<br>±%,(1g) | vi<br>or<br>veff |
|-----------------------------------------------------------|--------------------------|--------------------------|------------|------------|---------------------------------|------------------|
| <b>Measurement System</b>                                 |                          |                          |            |            |                                 |                  |
| Probe Calibration                                         | ± 6.55                   | N                        | 1          | 1          | ± 6.55                          | ∞                |
| Axial Isotropy                                            | ± 4.7                    | R                        | $\sqrt{3}$ | 0.7        | ± 1.9                           | ∞                |
| Hemispherical Isotropy                                    | ± 9.6                    | R                        | $\sqrt{3}$ | 0.7        | ± 3.9                           | ∞                |
| Boundary Effect                                           | ± 2.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.2                           | ∞                |
| Linearity                                                 | ± 4.7                    | R                        | $\sqrt{3}$ | 1          | ± 2.7                           | ∞                |
| System Detection Limits                                   | ± 1.0                    | R                        | $\sqrt{3}$ | 1          | ± 0.6                           | ∞                |
| Readout Electronics                                       | ± 0.3                    | N                        | 1          | 1          | ± 0.3                           | ∞                |
| Response Time                                             | ± 0.8                    | R                        | $\sqrt{3}$ | 1          | ± 0.5                           | ∞                |
| Integration Time                                          | ± 2.6                    | R                        | $\sqrt{3}$ | 1          | ± 1.5                           | ∞                |
| RF Ambient Noise                                          | ± 3.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.7                           | ∞                |
| RF Ambient Reflections                                    | ± 3.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.7                           | ∞                |
| Probe Positioner                                          | ± 0.8                    | R                        | $\sqrt{3}$ | 1          | ± 0.5                           | ∞                |
| Probe Positioning                                         | ± 6.7                    | R                        | $\sqrt{3}$ | 1          | ± 3.9                           | ∞                |
| Max. SAR Eval.                                            | ± 4.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.3                           | ∞                |
| <b>Test sample related</b>                                |                          |                          |            |            |                                 |                  |
| Device Positioning                                        | ± 2.9                    | N                        | 1          | 1          | ± 2.9                           | 145              |
| Device Holder                                             | ± 3.6                    | N                        | 1          | 1          | ± 3.6                           | 5                |
| Power Drift                                               | ± 5.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.9                           | ∞                |
| <b>Phantom and set-up</b>                                 |                          |                          |            |            |                                 |                  |
| Phantom Uncertainty                                       | ± 4.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.3                           | ∞                |
| Liquid conductivity (target)                              | ± 5.0                    | R                        | $\sqrt{3}$ | 0.64       | ± 1.8                           | ∞                |
| Liquid conductivity (meas.)                               | ± 2.8                    | R                        | 1          | 0.64       | ± 1.8                           | ∞                |
| Liquid permittivity (target)                              | ± 5.0                    | R                        | $\sqrt{3}$ | 0.6        | ± 1.7                           | ∞                |
| Liquid permittivity (meas.)                               | ± 3.0                    | R                        | 1          | 0.6        | ± 1.8                           | ∞                |
| Combined Std. Uncertainty                                 |                          |                          |            |            | ± 13.8                          | 330              |
| <b>Expanded uncertainty<br/>(95% confidence interval)</b> |                          |                          |            |            | <b>± 27.6</b>                   |                  |

**5200MHz Body**

| Error Description                                         | Uncertainty Value<br>± % | Probability distribution | Divisor    | ci<br>(1g) | Standard uncertainty<br>±%,(1g) | vi<br>or<br>veff |
|-----------------------------------------------------------|--------------------------|--------------------------|------------|------------|---------------------------------|------------------|
| <b>Measurement System</b>                                 |                          |                          |            |            |                                 |                  |
| Probe Calibration                                         | ± 6.55                   | N                        | 1          | 1          | ± 6.55                          | ∞                |
| Axial Isotropy                                            | ± 4.7                    | R                        | $\sqrt{3}$ | 0.7        | ± 1.9                           | ∞                |
| Hemispherical Isotropy                                    | ± 9.6                    | R                        | $\sqrt{3}$ | 0.7        | ± 3.9                           | ∞                |
| Boundary Effect                                           | ± 2.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.2                           | ∞                |
| Linearity                                                 | ± 4.7                    | R                        | $\sqrt{3}$ | 1          | ± 2.7                           | ∞                |
| System Detection Limits                                   | ± 1.0                    | R                        | $\sqrt{3}$ | 1          | ± 0.6                           | ∞                |
| Readout Electronics                                       | ± 0.3                    | N                        | 1          | 1          | ± 0.3                           | ∞                |
| Response Time                                             | ± 0.8                    | R                        | $\sqrt{3}$ | 1          | ± 0.5                           | ∞                |
| Integration Time                                          | ± 2.6                    | R                        | $\sqrt{3}$ | 1          | ± 1.5                           | ∞                |
| RF Ambient Noise                                          | ± 3.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.7                           | ∞                |
| RF Ambient Reflections                                    | ± 3.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.7                           | ∞                |
| Probe Positioner                                          | ± 0.8                    | R                        | $\sqrt{3}$ | 1          | ± 0.5                           | ∞                |
| Probe Positioning                                         | ± 6.7                    | R                        | $\sqrt{3}$ | 1          | ± 3.9                           | ∞                |
| Max. SAR Eval.                                            | ± 4.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.3                           | ∞                |
| <b>Test sample related</b>                                |                          |                          |            |            |                                 |                  |
| Device Positioning                                        | ± 2.9                    | N                        | 1          | 1          | ± 2.9                           | 145              |
| Device Holder                                             | ± 3.6                    | N                        | 1          | 1          | ± 3.6                           | 5                |
| Power Drift                                               | ± 5.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.9                           | ∞                |
| <b>Phantom and set-up</b>                                 |                          |                          |            |            |                                 |                  |
| Phantom Uncertainty                                       | ± 4.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.3                           | ∞                |
| Liquid conductivity<br>(target)                           | ± 5.0                    | R                        | $\sqrt{3}$ | 0.64       | ± 1.8                           | ∞                |
| Liquid conductivity<br>(meas.)                            | ± 3.7                    | R                        | 1          | 0.64       | ± 2.4                           | ∞                |
| Liquid permittivity<br>(target)                           | ± 5.0                    | R                        | $\sqrt{3}$ | 0.6        | ± 1.7                           | ∞                |
| Liquid permittivity<br>(meas.)                            | ± 3.9                    | R                        | 1          | 0.6        | ± 2.3                           | ∞                |
| Combined Std. Uncertainty                                 |                          |                          |            |            | ± 14.9                          | 330              |
| <b>Expanded uncertainty<br/>(95% confidence interval)</b> |                          |                          |            |            | <b>± 29.8</b>                   |                  |

**5300MHz Head**

| Error Description                                         | Uncertainty Value<br>± % | Probability distribution | Divisor    | ci<br>(1g) | Standard uncertainty<br>±%,(1g) | vi<br>or<br>veff |
|-----------------------------------------------------------|--------------------------|--------------------------|------------|------------|---------------------------------|------------------|
| <b>Measurement System</b>                                 |                          |                          |            |            |                                 |                  |
| Probe Calibration                                         | ± 6.55                   | N                        | 1          | 1          | ± 6.55                          | ∞                |
| Axial Isotropy                                            | ± 4.7                    | R                        | $\sqrt{3}$ | 0.7        | ± 1.9                           | ∞                |
| Hemispherical Isotropy                                    | ± 9.6                    | R                        | $\sqrt{3}$ | 0.7        | ± 3.9                           | ∞                |
| Boundary Effect                                           | ± 2.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.2                           | ∞                |
| Linearity                                                 | ± 4.7                    | R                        | $\sqrt{3}$ | 1          | ± 2.7                           | ∞                |
| System Detection Limits                                   | ± 1.0                    | R                        | $\sqrt{3}$ | 1          | ± 0.6                           | ∞                |
| Readout Electronics                                       | ± 0.3                    | N                        | 1          | 1          | ± 0.3                           | ∞                |
| Response Time                                             | ± 0.8                    | R                        | $\sqrt{3}$ | 1          | ± 0.5                           | ∞                |
| Integration Time                                          | ± 2.6                    | R                        | $\sqrt{3}$ | 1          | ± 1.5                           | ∞                |
| RF Ambient Noise                                          | ± 3.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.7                           | ∞                |
| RF Ambient Reflections                                    | ± 3.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.7                           | ∞                |
| Probe Positioner                                          | ± 0.8                    | R                        | $\sqrt{3}$ | 1          | ± 0.5                           | ∞                |
| Probe Positioning                                         | ± 6.7                    | R                        | $\sqrt{3}$ | 1          | ± 3.9                           | ∞                |
| Max. SAR Eval.                                            | ± 4.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.3                           | ∞                |
| <b>Test sample related</b>                                |                          |                          |            |            |                                 |                  |
| Device Positioning                                        | ± 2.9                    | N                        | 1          | 1          | ± 2.9                           | 145              |
| Device Holder                                             | ± 3.6                    | N                        | 1          | 1          | ± 3.6                           | 5                |
| Power Drift                                               | ± 5.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.9                           | ∞                |
| <b>Phantom and set-up</b>                                 |                          |                          |            |            |                                 |                  |
| Phantom Uncertainty                                       | ± 4.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.3                           | ∞                |
| Liquid conductivity (target)                              | ± 5.0                    | R                        | $\sqrt{3}$ | 0.64       | ± 1.8                           | ∞                |
| Liquid conductivity (meas.)                               | ± 2.9                    | R                        | 1          | 0.64       | ± 1.9                           | ∞                |
| Liquid permittivity (target)                              | ± 5.0                    | R                        | $\sqrt{3}$ | 0.6        | ± 1.7                           | ∞                |
| Liquid permittivity (meas.)                               | ± 3.3                    | R                        | 1          | 0.6        | ± 2.0                           | ∞                |
| Combined Std. Uncertainty                                 |                          |                          |            |            | ± 14.1                          | 330              |
| <b>Expanded uncertainty<br/>(95% confidence interval)</b> |                          |                          |            |            | <b>± 28.2</b>                   |                  |

**5300MHz Body**

| Error Description                                         | Uncertainty Value<br>± % | Probability distribution | Divisor    | ci<br>(1g) | Standard uncertainty<br>±%,(1g) | vi<br>or<br>veff |
|-----------------------------------------------------------|--------------------------|--------------------------|------------|------------|---------------------------------|------------------|
| <b>Measurement System</b>                                 |                          |                          |            |            |                                 |                  |
| Probe Calibration                                         | ± 6.55                   | N                        | 1          | 1          | ± 6.55                          | ∞                |
| Axial Isotropy                                            | ± 4.7                    | R                        | $\sqrt{3}$ | 0.7        | ± 1.9                           | ∞                |
| Hemispherical Isotropy                                    | ± 9.6                    | R                        | $\sqrt{3}$ | 0.7        | ± 3.9                           | ∞                |
| Boundary Effect                                           | ± 2.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.2                           | ∞                |
| Linearity                                                 | ± 4.7                    | R                        | $\sqrt{3}$ | 1          | ± 2.7                           | ∞                |
| System Detection Limits                                   | ± 1.0                    | R                        | $\sqrt{3}$ | 1          | ± 0.6                           | ∞                |
| Readout Electronics                                       | ± 0.3                    | N                        | 1          | 1          | ± 0.3                           | ∞                |
| Response Time                                             | ± 0.8                    | R                        | $\sqrt{3}$ | 1          | ± 0.5                           | ∞                |
| Integration Time                                          | ± 2.6                    | R                        | $\sqrt{3}$ | 1          | ± 1.5                           | ∞                |
| RF Ambient Noise                                          | ± 3.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.7                           | ∞                |
| RF Ambient Reflections                                    | ± 3.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.7                           | ∞                |
| Probe Positioner                                          | ± 0.8                    | R                        | $\sqrt{3}$ | 1          | ± 0.5                           | ∞                |
| Probe Positioning                                         | ± 6.7                    | R                        | $\sqrt{3}$ | 1          | ± 3.9                           | ∞                |
| Max. SAR Eval.                                            | ± 4.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.3                           | ∞                |
| <b>Test sample related</b>                                |                          |                          |            |            |                                 |                  |
| Device Positioning                                        | ± 2.9                    | N                        | 1          | 1          | ± 2.9                           | 145              |
| Device Holder                                             | ± 3.6                    | N                        | 1          | 1          | ± 3.6                           | 5                |
| Power Drift                                               | ± 5.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.9                           | ∞                |
| <b>Phantom and set-up</b>                                 |                          |                          |            |            |                                 |                  |
| Phantom Uncertainty                                       | ± 4.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.3                           | ∞                |
| Liquid conductivity<br>(target)                           | ± 5.0                    | R                        | $\sqrt{3}$ | 0.64       | ± 1.8                           | ∞                |
| Liquid conductivity<br>(meas.)                            | ± 3.4                    | R                        | 1          | 0.64       | ± 2.2                           | ∞                |
| Liquid permittivity<br>(target)                           | ± 5.0                    | R                        | $\sqrt{3}$ | 0.6        | ± 1.7                           | ∞                |
| Liquid permittivity<br>(meas.)                            | ± 4.4                    | R                        | 1          | 0.6        | ± 2.6                           | ∞                |
| Combined Std. Uncertainty                                 |                          |                          |            |            | ± 14.8                          | 330              |
| <b>Expanded uncertainty<br/>(95% confidence interval)</b> |                          |                          |            |            | <b>± 25.6</b>                   |                  |

**5500MHz Head**

| Error Description                                         | Uncertainty Value<br>± % | Probability distribution | Divisor    | ci<br>(1g) | Standard uncertainty<br>±%,(1g) | vi<br>or<br>veff |
|-----------------------------------------------------------|--------------------------|--------------------------|------------|------------|---------------------------------|------------------|
| <b>Measurement System</b>                                 |                          |                          |            |            |                                 |                  |
| Probe Calibration                                         | ± 6.55                   | N                        | 1          | 1          | ± 6.55                          | ∞                |
| Axial Isotropy                                            | ± 4.7                    | R                        | $\sqrt{3}$ | 0.7        | ± 1.9                           | ∞                |
| Hemispherical Isotropy                                    | ± 9.6                    | R                        | $\sqrt{3}$ | 0.7        | ± 3.9                           | ∞                |
| Boundary Effect                                           | ± 2.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.2                           | ∞                |
| Linearity                                                 | ± 4.7                    | R                        | $\sqrt{3}$ | 1          | ± 2.7                           | ∞                |
| System Detection Limits                                   | ± 1.0                    | R                        | $\sqrt{3}$ | 1          | ± 0.6                           | ∞                |
| Readout Electronics                                       | ± 0.3                    | N                        | 1          | 1          | ± 0.3                           | ∞                |
| Response Time                                             | ± 0.8                    | R                        | $\sqrt{3}$ | 1          | ± 0.5                           | ∞                |
| Integration Time                                          | ± 2.6                    | R                        | $\sqrt{3}$ | 1          | ± 1.5                           | ∞                |
| RF Ambient Noise                                          | ± 3.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.7                           | ∞                |
| RF Ambient Reflections                                    | ± 3.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.7                           | ∞                |
| Probe Positioner                                          | ± 0.8                    | R                        | $\sqrt{3}$ | 1          | ± 0.5                           | ∞                |
| Probe Positioning                                         | ± 6.7                    | R                        | $\sqrt{3}$ | 1          | ± 3.9                           | ∞                |
| Max. SAR Eval.                                            | ± 4.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.3                           | ∞                |
| <b>Test sample related</b>                                |                          |                          |            |            |                                 |                  |
| Device Positioning                                        | ± 2.9                    | N                        | 1          | 1          | ± 2.9                           | 145              |
| Device Holder                                             | ± 3.6                    | N                        | 1          | 1          | ± 3.6                           | 5                |
| Power Drift                                               | ± 5.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.9                           | ∞                |
| <b>Phantom and set-up</b>                                 |                          |                          |            |            |                                 |                  |
| Phantom Uncertainty                                       | ± 4.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.3                           | ∞                |
| Liquid conductivity (target)                              | ± 5.0                    | R                        | $\sqrt{3}$ | 0.64       | ± 1.8                           | ∞                |
| Liquid conductivity (meas.)                               | ± 2.8                    | R                        | 1          | 0.64       | ± 1.8                           | ∞                |
| Liquid permittivity (target)                              | ± 5.0                    | R                        | $\sqrt{3}$ | 0.6        | ± 1.7                           | ∞                |
| Liquid permittivity (meas.)                               | ± 3.1                    | R                        | 1          | 0.6        | ± 1.9                           | ∞                |
| Combined Std. Uncertainty                                 |                          |                          |            |            | ± 13.9                          | 330              |
| <b>Expanded uncertainty<br/>(95% confidence interval)</b> |                          |                          |            |            | <b>± 27.8</b>                   |                  |

**5500MHz Body**

| Error Description                                         | Uncertainty Value<br>± % | Probability distribution | Divisor    | ci<br>(1g) | Standard uncertainty<br>±%,(1g) | vi<br>or<br>veff |
|-----------------------------------------------------------|--------------------------|--------------------------|------------|------------|---------------------------------|------------------|
| <b>Measurement System</b>                                 |                          |                          |            |            |                                 |                  |
| Probe Calibration                                         | ± 6.55                   | N                        | 1          | 1          | ± 6.55                          | ∞                |
| Axial Isotropy                                            | ± 4.7                    | R                        | $\sqrt{3}$ | 0.7        | ± 1.9                           | ∞                |
| Hemispherical Isotropy                                    | ± 9.6                    | R                        | $\sqrt{3}$ | 0.7        | ± 3.9                           | ∞                |
| Boundary Effect                                           | ± 2.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.2                           | ∞                |
| Linearity                                                 | ± 4.7                    | R                        | $\sqrt{3}$ | 1          | ± 2.7                           | ∞                |
| System Detection Limits                                   | ± 1.0                    | R                        | $\sqrt{3}$ | 1          | ± 0.6                           | ∞                |
| Readout Electronics                                       | ± 0.3                    | N                        | 1          | 1          | ± 0.3                           | ∞                |
| Response Time                                             | ± 0.8                    | R                        | $\sqrt{3}$ | 1          | ± 0.5                           | ∞                |
| Integration Time                                          | ± 2.6                    | R                        | $\sqrt{3}$ | 1          | ± 1.5                           | ∞                |
| RF Ambient Noise                                          | ± 3.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.7                           | ∞                |
| RF Ambient Reflections                                    | ± 3.0                    | R                        | $\sqrt{3}$ | 1          | ± 1.7                           | ∞                |
| Probe Positioner                                          | ± 0.8                    | R                        | $\sqrt{3}$ | 1          | ± 0.5                           | ∞                |
| Probe Positioning                                         | ± 6.7                    | R                        | $\sqrt{3}$ | 1          | ± 3.9                           | ∞                |
| Max. SAR Eval.                                            | ± 4.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.3                           | ∞                |
| <b>Test sample related</b>                                |                          |                          |            |            |                                 |                  |
| Device Positioning                                        | ± 2.9                    | N                        | 1          | 1          | ± 2.9                           | 145              |
| Device Holder                                             | ± 3.6                    | N                        | 1          | 1          | ± 3.6                           | 5                |
| Power Drift                                               | ± 5.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.9                           | ∞                |
| <b>Phantom and set-up</b>                                 |                          |                          |            |            |                                 |                  |
| Phantom Uncertainty                                       | ± 4.0                    | R                        | $\sqrt{3}$ | 1          | ± 2.3                           | ∞                |
| Liquid conductivity<br>(target)                           | ± 5.0                    | R                        | $\sqrt{3}$ | 0.64       | ± 1.8                           | ∞                |
| Liquid conductivity<br>(meas.)                            | ± 3.8                    | R                        | 1          | 0.64       | ± 2.4                           | ∞                |
| Liquid permittivity<br>(target)                           | ± 5.0                    | R                        | $\sqrt{3}$ | 0.6        | ± 1.7                           | ∞                |
| Liquid permittivity<br>(meas.)                            | ± 4.2                    | R                        | 1          | 0.6        | ± 2.5                           | ∞                |
| Combined Std. Uncertainty                                 |                          |                          |            |            | ± 14.9                          | 330              |
| <b>Expanded uncertainty<br/>(95% confidence interval)</b> |                          |                          |            |            | <b>± 29.8</b>                   |                  |

## 16. Conclusion

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### Measurement Conclusion

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC. These measurements are taken to simulate the RF effects exposure under the 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 are very complex phenomena that depend 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 impossible biological effect 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.

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