## Measurement Conditions

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

| DASY Version | DASY5 | V52.10.2 |
| :--- | :---: | :---: |
| Extrapolation | Advanced Extrapolation |  |
| Phantom | Modular Flat Phantom V5.0 |  |
| Distance Dipole Center - TSL | 10 mm | with Spacer |
| Zoom Scan Resolution | dx, dy $=4.0 \mathrm{~mm}, \mathrm{dz}=1.4 \mathrm{~mm}$ | Graded Ratio $=1.4$ (Z direction) |
|  | $5200 \mathrm{MHz} \pm 1 \mathrm{MHz}$ |  |
|  | $5250 \mathrm{MHz} \pm 1 \mathrm{MHz}$ |  |
| Frequency | $5300 \mathrm{MHz} \pm 1 \mathrm{MHz}$ |  |
|  | $5500 \mathrm{MHz} \pm 1 \mathrm{MHz}$ |  |
|  | $5600 \mathrm{MHz} \pm 1 \mathrm{MHz}$ |  |
|  | $5750 \mathrm{MHz} \pm 1 \mathrm{MHz}$ |  |

Head TSL parameters at 5200 MHz
The following parameters and calculations were applied.

|  | Temperature | Permittivity | Conductivity |
| :--- | :---: | :---: | :---: |
| Nominal Head TSL parameters | $22.0^{\circ} \mathrm{C}$ | 36.0 | $4.66 \mathrm{mho} / \mathrm{m}$ |
| Measured Head TSL parameters | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $35.5 \pm 6 \%$ | $4.46 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Head TSL temperature change during test | $<0.5^{\circ} \mathrm{C}$ | ---- | ---- |

## SAR result with Head TSL at 5200 MHz

| SAR averaged over $\mathbf{1} \mathbf{c m}^{\mathbf{3}} \mathbf{( 1 \mathbf { g } ) \text { of Head TSL }}$ | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $8.06 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $\mathbf{8 0 . 3} \mathbf{W} / \mathbf{k g} \pm 19.9 \%(\mathbf{k}=\mathbf{2})$ |


| SAR averaged over $10 \mathrm{~cm}^{\mathbf{3}}(\mathbf{1 0 ~ g})$ of Head TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.32 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $\mathbf{2 3 . 0} \mathrm{~W} / \mathbf{k g} \pm \mathbf{1 9 . 5} \%(\mathbf{k}=\mathbf{2})$ |

Head TSL parameters at 5250 MHz
The following parameters and calculations were applied.

|  | Temperature | Permittivity | Conductivity |
| :--- | :---: | :---: | :---: |
| Nominal Head TSL parameters | $22.0^{\circ} \mathrm{C}$ | 35.9 | $4.71 \mathrm{mho} / \mathrm{m}$ |
| Measured Head TSL parameters | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $35.5 \pm 6 \%$ | $4.51 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Head TSL temperature change during test | $<0.5^{\circ} \mathrm{C}$ | ---- | ---- |

## SAR result with Head TSL at 5250 MHz

| SAR averaged over $\mathbf{1} \mathrm{cm}^{\mathbf{3}} \mathbf{( 1 \mathrm { g } )}$ of Head TSL | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $8.07 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $80.4 \mathrm{~W} / \mathrm{kg} \pm 19.9 \%(\mathrm{k}=2)$ |


| SAR averaged over $\left.10 \mathrm{~cm}^{\mathbf{3}} \mathbf{( 1 0 ~ g}\right)$ of Head TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.33 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $\mathbf{2 3 . 2} \mathbf{W} / \mathbf{k g} \pm 19.5 \%(\mathbf{k}=\mathbf{2})$ |

Head TSL parameters at 5300 MHz
The following parameters and calculations were applied.

|  | Temperature | Permittivity | Conductivity |
| :--- | :---: | :---: | :---: |
| Nominal Head TSL parameters | $22.0^{\circ} \mathrm{C}$ | 35.9 | $4.76 \mathrm{mho} / \mathrm{m}$ |
| Measured Head TSL parameters | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $35.4 \pm 6 \%$ | $4.56 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Head TSL temperature change during test | $<0.5^{\circ} \mathrm{C}$ | ---- | ---- |

## SAR result with Head TSL at 5300 MHz

| SAR averaged over $\mathbf{1} \mathbf{c m}^{\mathbf{3}} \mathbf{( 1 \mathbf { g } )}$ of Head TSL | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $8.23 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $\mathbf{8 2 . 0} \mathbf{W} / \mathbf{k g} \pm 19.9 \%(\mathbf{k}=\mathbf{2})$ |


| SAR averaged over $\left.\mathbf{1 0} \mathbf{c m}^{\mathbf{3}} \mathbf{( 1 0} \mathbf{~ g}\right)$ of Head TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.37 \mathrm{~W} / \mathbf{k g}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $\mathbf{2 3 . 5} \mathbf{W} / \mathbf{k g} \pm \mathbf{1 9 . 5} \%(\mathbf{k}=\mathbf{2})$ |

Head TSL parameters at 5500 MHz
The following parameters and calculations were applied.
The following parameters and calculations were applied.

|  | Temperature | Permittivity | Conductivity |
| :--- | :---: | :---: | :---: |
| Nominal Head TSL parameters | $22.0^{\circ} \mathrm{C}$ | 35.6 | $4.96 \mathrm{mho} / \mathrm{m}$ |
| Measured Head TSL parameters | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $35.1 \pm 6 \%$ | $4.76 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Head TSL temperature change during test | $<0.5^{\circ} \mathrm{C}$ | ---- | ---- |

## SAR result with Head TSL at 5500 MHz

| SAR averaged over $1 \mathrm{~cm}^{\mathbf{3}} \mathbf{( 1 \mathrm { g } ) \text { of Head TSL }}$ | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $8.51 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $84.7 \mathrm{~W} / \mathrm{kg} \pm 19.9 \%(\mathrm{k}=2)$ |


| SAR averaged over $\left.10 \mathrm{~cm}^{3} \mathbf{( 1 0 ~ g}\right)$ of Head TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.43 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $\mathbf{2 4 . 2} \mathbf{W} / \mathbf{k g} \pm 19.5 \%(\mathbf{k}=\mathbf{2})$ |

Head TSL parameters at 5600 MHz
The following parameters and calculations were applied.
The following parameters and calculations were applied.

|  | Temperature | Permittivity | Conductivity |
| :--- | :---: | :---: | :---: |
| Nominal Head TSL parameters | $22.0^{\circ} \mathrm{C}$ | 35.5 | $5.07 \mathrm{mho} / \mathrm{m}$ |
| Measured Head TSL parameters | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $35.0 \pm 6 \%$ | $4.86 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Head TSL temperature change during test | $<0.5^{\circ} \mathrm{C}$ | ---- | ---- |

## SAR result with Head TSL at 5600 MHz

| SAR averaged over $\mathbf{1} \mathbf{c m}^{\mathbf{3}} \mathbf{( 1 \mathbf { g } ) \text { of Head TSL }}$ | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $8.49 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $\mathbf{8 4 . 5} \mathbf{W} / \mathbf{k g} \pm \mathbf{1 9 . 9 \% ( \mathbf { k } = \mathbf { 2 } )}$ |


| SAR averaged over $\mathbf{1 0} \mathbf{c m}^{\mathbf{3}} \mathbf{( 1 0 \mathbf { g } ) \text { of Head TSL }}$ | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.43 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $\mathbf{2 4 . 1} \mathrm{~W} / \mathrm{kg} \pm 19.5 \%(\mathbf{k}=\mathbf{2})$ |

Head TSL parameters at 5750 MHz
The following parameters and calculations were applied.

|  | Temperature | Permittivity | Conductivity |
| :--- | :---: | :---: | :---: |
| Nominal Head TSL parameters | $22.0^{\circ} \mathrm{C}$ | 35.4 | $5.22 \mathrm{mho} / \mathrm{m}$ |
| Measured Head TSL parameters | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $34.8 \pm 6 \%$ | $5.02 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Head TSL temperature change during test | $<0.5^{\circ} \mathrm{C}$ | ---- | ---- |

## SAR result with Head TSL at 5750 MHz

| SAR averaged over $\mathbf{1} \mathrm{cm}^{\mathbf{3}} \mathbf{( 1 \mathrm { g } ) \text { of Head TSL }}$ | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $8.08 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $80.4 \mathrm{~W} / \mathrm{kg} \pm 19.9 \%(\mathrm{k}=\mathbf{2})$ |


| SAR averaged over $\left.10 \mathrm{~cm}^{\mathbf{3}} \mathbf{( 1 0 ~ g}\right)$ of Head TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.31 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $23.0 \mathrm{~W} / \mathrm{kg} \pm 19.5 \%(\mathbf{k}=\mathbf{2})$ |

## Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

|  | Temperature | Permittivity | Conductivity |
| :--- | :---: | :---: | :---: |
| Nominal Head TSL parameters | $22.0^{\circ} \mathrm{C}$ | 35.3 | $5.27 \mathrm{mho} / \mathrm{m}$ |
| Measured Head TSL parameters | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $34.7 \pm 6 \%$ | $5.07 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Head TSL temperature change during test | $<0.5^{\circ} \mathrm{C}$ | ---- | ---- |

## SAR result with Head TSL at 5800 MHz

| SAR averaged over $\mathbf{1} \mathbf{c m}^{\mathbf{3}} \mathbf{( 1 \mathbf { g } ) \text { of Head TSL }}$ | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $8.14 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $\mathbf{8 0 . 9} \mathbf{W} / \mathbf{k g} \pm 19.9 \%(\mathbf{k}=\mathbf{2})$ |


| SAR averaged over $\mathbf{1 0} \mathrm{cm}^{\mathbf{3}} \mathbf{( 1 0 ~ \mathbf { g } )}$ of Head TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.30 \mathrm{~W} / \mathbf{k g}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $\mathbf{2 2 . 9} \mathbf{W} / \mathbf{k g} \pm \mathbf{1 9 . 5} \%(\mathbf{k}=\mathbf{2})$ |

Body TSL parameters at 5200 MHz
The following parameters and calculations were applied.
The following parameters and calculations were applied.

|  | Temperature | Permittivity | Conductivity |
| :--- | :---: | :---: | :---: |
| Nominal Body TSL parameters | $22.0^{\circ} \mathrm{C}$ | 49.0 | $5.30 \mathrm{mho} / \mathrm{m}$ |
| Measured Body TSL parameters | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $47.3 \pm 6 \%$ | $5.43 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Body TSL temperature change during test | $<0.5{ }^{\circ} \mathrm{C}$ | ---- | ---- |

## SAR result with Body TSL at 5200 MHz

| SAR averaged over $1 \mathrm{~cm}^{\mathbf{3}} \mathbf{( 1 \mathrm { g } ) \text { of Body TSL }}$ | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $7.41 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Body TSL parameters | normalized to 1 W | $\mathbf{7 3 . 6} \mathbf{W} / \mathrm{kg} \pm 19.9 \%(\mathbf{k}=2)$ |


| SAR averaged over $\mathbf{1 0} \mathbf{c m}^{\mathbf{3}} \mathbf{( 1 0 ~ \mathbf { g } )}$ of Body TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.08 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Body TSL parameters | normalized to 1 W | $\mathbf{2 0 . 6} \mathbf{W} / \mathbf{k g} \pm \mathbf{1 9 . 5} \%(\mathbf{k}=\mathbf{2})$ |

Body TSL parameters at 5250 MHz
The following parameters and calculations were applied.
The folowing parameters and calculations were applied.

|  | Temperature | Permittivity | Conductivity |
| :--- | :---: | :---: | :---: |
| Nominal Body TSL parameters | $22.0^{\circ} \mathrm{C}$ | 48.9 | $5.36 \mathrm{mho} / \mathrm{m}$ |
| Measured Body TSL parameters | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $47.2 \pm 6 \%$ | $5.49 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Body TSL temperature change during test | $<0.5^{\circ} \mathrm{C}$ | ---- | ---- |

## SAR result with Body TSL at 5250 MHz

| SAR averaged over $\mathbf{1} \mathbf{c m}^{\mathbf{3}} \mathbf{( 1 \mathbf { g } )}$ of Body TSL | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $7.67 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Body TSL parameters | normalized to 1 W | $\mathbf{7 6 . 2} \mathbf{W} / \mathrm{kg} \pm 19.9 \%(\mathbf{k}=\mathbf{2})$ |


| SAR averaged over $\left.\mathbf{1 0} \mathbf{c m}^{\mathbf{3}} \mathbf{( 1 0 ~} \mathbf{g}\right)$ of Body TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.15 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Body TSL parameters | normalized to 1 W | $\mathbf{2 1 . 3} \mathrm{~W} / \mathbf{k g} \pm 19.5 \%(\mathbf{k}=\mathbf{2})$ |

Body TSL parameters at 5300 MHz
The following parameters and calculations were applied.

|  | Temperature | Permittivity | Conductivity |
| :--- | :---: | :---: | :---: |
| Nominal Body TSL parameters | $22.0^{\circ} \mathrm{C}$ | 48.9 | $5.42 \mathrm{mho} / \mathrm{m}$ |
| Measured Body TSL parameters | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $47.1 \pm 6 \%$ | $5.56 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Body TSL temperature change during test | $<0.5^{\circ} \mathrm{C}$ | ---- | ---- |

## SAR result with Body TSL at 5300 MHz

| SAR averaged over $1 \mathrm{~cm}^{\mathbf{3}} \mathbf{( 1 \mathrm { g } ) \text { of Body TSL }}$ | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $7.52 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Body TSL parameters | normalized to 1 W | $\mathbf{7 4 . 7} \mathrm{~W} / \mathrm{kg} \pm 19.9 \%(\mathbf{k}=2)$ |


| SAR averaged over $\mathbf{1 0} \mathbf{c m}^{\mathbf{3}} \mathbf{( 1 0 ~ \mathbf { g } )}$ of Body TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.13 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Body TSL parameters | normalized to 1 W | $\mathbf{2 1 . 1} \mathbf{W} / \mathbf{k g} \pm 19.5 \%(\mathbf{k}=\mathbf{2})$ |

## Body TSL parameters at 5500 MHz

The following parameters and calculations were applied.
The folowing parameters and calculations were applied.

|  | Temperature | Permittivity | Conductivity |
| :--- | :---: | :---: | :---: |
| Nominal Body TSL parameters | $22.0^{\circ} \mathrm{C}$ | 48.6 | $5.65 \mathrm{mho} / \mathrm{m}$ |
| Measured Body TSL parameters | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $46.7 \pm 6 \%$ | $5.83 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Body TSL temperature change during test | $<0.5^{\circ} \mathrm{C}$ | ---- | ---- |

## SAR result with Body TSL at 5500 MHz

| SAR averaged over $\mathbf{1} \mathbf{c m}^{\mathbf{3}} \mathbf{( 1 \mathbf { g } )}$ of Body TSL | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $8.00 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Body TSL parameters | normalized to 1 W | $\mathbf{7 9 . 5} \mathrm{~W} / \mathrm{kg} \pm 19.9 \%(\mathbf{k}=\mathbf{2})$ |


| SAR averaged over $\left.\mathbf{1 0} \mathbf{c m}^{\mathbf{3}} \mathbf{( 1 0 ~ g}\right)$ of Body TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.23 \mathrm{~W} / \mathbf{k g}$ |
| SAR for nominal Body TSL parameters | normalized to $\mathbf{1 W}$ | $\mathbf{2 2 . 1} \mathbf{W} / \mathbf{k g} \pm \mathbf{1 9 . 5} \%(\mathbf{k}=\mathbf{2})$ |

## Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

|  | Temperature | Permittivity | Conductivity |
| :--- | :---: | :---: | :---: |
| Nominal Body TSL parameters | $22.0^{\circ} \mathrm{C}$ | 48.5 | $5.77 \mathrm{mho} / \mathrm{m}$ |
| Measured Body TSL parameters | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $46.6 \pm 6 \%$ | $5.97 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Body TSL temperature change during test | $<0.5^{\circ} \mathrm{C}$ | ---- | ---- |

## SAR result with Body TSL at 5600 MHz

| SAR averaged over $\mathbf{1} \mathrm{cm}^{\mathbf{3}} \mathbf{( 1 \mathbf { g } ) \text { of Body TSL }}$ | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $7.87 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Body TSL parameters | normalized to 1 W | $\mathbf{7 8 . 2} \mathbf{W} / \mathrm{kg} \pm 19.9 \%(\mathbf{k}=\mathbf{2})$ |


| SAR averaged over $\left.10 \mathrm{~cm}^{\mathbf{3}} \mathbf{( 1 0 ~ g}\right)$ of Body TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.22 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Body TSL parameters | normalized to 1 W | $\mathbf{2 2 . 0} \mathbf{W} / \mathbf{k g} \pm 19.5 \%(\mathbf{k}=\mathbf{2})$ |

Body TSL parameters at 5750 MHz
The following parameters and calculations were applied.

|  | Temperature | Permittivity | Conductivity |
| :--- | :---: | :---: | :---: |
| Nominal Body TSL parameters | $22.0^{\circ} \mathrm{C}$ | 48.3 | $5.94 \mathrm{mho} / \mathrm{m}$ |
| Measured Body TSL parameters | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $46.3 \pm 6 \%$ | $6.17 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Body TSL temperature change during test | $<0.5^{\circ} \mathrm{C}$ | ---- | ---- |

SAR result with Body TSL at 5750 MHz

| SAR averaged over $\mathbf{1} \mathbf{c m}^{\mathbf{3}} \mathbf{( 1 \mathbf { g } ) \text { of Body TSL }}$ | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $7.79 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Body TSL parameters | normalized to 1 W | $\mathbf{7 7 . 4} \mathrm{~W} / \mathrm{kg} \pm 19.9 \%(\mathbf{k}=\mathbf{2})$ |


| SAR averaged over $\mathbf{1 0} \mathbf{c m}^{\mathbf{3}} \mathbf{( 1 0 ~ \mathbf { g } )}$ of Body TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.18 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Body TSL parameters | normalized to 1 W | $\mathbf{2 1 . 5} \mathbf{W} / \mathbf{k g} \pm \mathbf{1 9 . 5} \%(\mathbf{k}=\mathbf{2})$ |

## Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.
The following parameters and calculations were applied.

|  | Temperature | Permittivity | Conductivity |
| :--- | :---: | :---: | :---: |
| Nominal Body TSL parameters | $22.0^{\circ} \mathrm{C}$ | 48.2 | $6.00 \mathrm{mho} / \mathrm{m}$ |
| Measured Body TSL parameters | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $46.2 \pm 6 \%$ | $6.24 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Body TSL temperature change during test | $<0.5^{\circ} \mathrm{C}$ | ---- | ---- |

## SAR result with Body TSL at 5800 MHz

| SAR averaged over $\mathbf{1} \mathbf{c m}^{\mathbf{3}} \mathbf{( 1 \mathbf { g } )}$ of Body TSL | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $7.51 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Body TSL parameters | normalized to 1 W | $\mathbf{7 4 . 6} \mathrm{~W} / \mathrm{kg} \pm 19.9 \%(\mathbf{k}=\mathbf{2})$ |


| SAR averaged over $10 \mathrm{~cm}^{\mathbf{3}}(\mathbf{1 0} \mathbf{~ g})$ of Body TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.09 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Body TSL parameters | normalized to 1 W | $\mathbf{2 0 . 7} \mathbf{W} / \mathbf{k g} \pm \mathbf{1 9 . 5} \%(\mathbf{k}=\mathbf{2})$ |

Appendix (Additional assessments outside the scope of SCS 0108)

## Antenna Parameters with Head TSL at 5200 MHz

| Impedance, transformed to feed point | $48.7 \Omega-5.5 \mathrm{j} \Omega$ |
| :--- | :---: |
| Return Loss | -24.9 dB |

Antenna Parameters with Head TSL at 5250 MHz

| Impedance, transformed to feed point | $48.6 \Omega-4.0 \mathrm{j} \Omega$ |
| :--- | :---: |
| Return Loss | -27.5 dB |

## Antenna Parameters with Head TSL at 5300 MHz

| Impedance, transformed to feed point | $47.7 \Omega-3.3 \mathrm{j} \Omega$ |
| :--- | :---: |
| Return Loss | -27.7 dB |

Antenna Parameters with Head TSL at 5500 MHz

| Impedance, transformed to feed point | $50.9 \Omega-3.9 \mathrm{j} \Omega$ |
| :--- | :---: |
| Return Loss | -28.2 dB |

Antenna Parameters with Head TSL at 5600 MHz

| Impedance, transformed to feed point | $54.2 \Omega+0.3 \mathrm{j} \Omega$ |
| :--- | :---: |
| Return Loss | -27.9 dB |

Antenna Parameters with Head TSL at 5750 MHz

| Impedance, transformed to feed point | $51.7 \Omega-0.8 \mathrm{j} \Omega$ |
| :--- | :---: |
| Return Loss | -34.7 dB |

Antenna Parameters with Head TSL at 5800 MHz

| Impedance, transformed to feed point | $52.1 \Omega-2.4 \mathrm{j} \Omega$ |
| :--- | :---: |
| Return Loss | -30.1 dB |

## Antenna Parameters with Body TSL at 5200 MHz

| Impedance, transformed to feed point | $48.9 \Omega-5.6 \mathrm{j} \Omega$ |
| :--- | :---: |
| Return Loss | -24.8 dB |

Antenna Parameters with Body TSL at 5250 MHz

| Impedance, transformed to feed point | $48.0 \Omega-2.2 \mathrm{j} \Omega$ |
| :--- | :---: |
| Return Loss | -30.4 dB |

Antenna Parameters with Body TSL at 5300 MHz

| Impedance, transformed to feed point | $48.3 \Omega-3.0 \mathrm{j} \Omega$ |
| :--- | :---: |
| Return Loss | -29.1 dB |

Antenna Parameters with Body TSL at 5500 MHz

| Impedance, transformed to feed point | $50.2 \Omega-2.2 \mathrm{j} \Omega$ |
| :--- | :---: |
| Return Loss | -33.1 dB |

Antenna Parameters with Body TSL at 5600 MHz

| Impedance, transformed to feed point | $55.5 \Omega+1.0 \mathrm{j} \Omega$ |
| :--- | :---: |
| Return Loss | -25.5 dB |

Antenna Parameters with Body TSL at 5750 MHz

| Impedance, transformed to feed point | $52.3 \Omega+0.8 \mathrm{j} \Omega$ |
| :--- | :---: |
| Return Loss | -32.3 dB |

Antenna Parameters with Body TSL at 5800 MHz

| Impedance, transformed to feed point | $52.9 \Omega-1.8 \mathrm{j} \Omega$ |
| :--- | :---: |
| Return Loss | -29.5 dB |

## General Antenna Parameters and Design

| Electrical Delay (one direction) | 1.201 ns |
| :--- | :--- |

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.
The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

## Additional EUT Data

Manufactured by $\quad$ SPEAG

## DASY5 Validation Report for Head TSL

Date: 22.07.2019
Test Laboratory: SPEAG, Zurich, Switzerland

## DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1060

Communication System: UID 0 - CW; Frequency: 5200 MHz , Frequency: 5250 MHz , Frequency: 5300 MHz, Frequency: 5500 MHz , Frequency: 5600 MHz , Frequency: 5750 MHz , Frequency: 5800 MHz Medium parameters used: $\mathrm{f}=5200 \mathrm{MHz} ; \sigma=4.46 \mathrm{~S} / \mathrm{m} ; \varepsilon_{\mathrm{r}}=35.5 ; \rho=1000 \mathrm{~kg} / \mathrm{m}^{3}$, Medium parameters used: $\mathrm{f}=5250 \mathrm{MHz} ; \sigma=4.51 \mathrm{~S} / \mathrm{m} ; \varepsilon_{\mathrm{r}}=35.5 ; \rho=1000 \mathrm{~kg} / \mathrm{m}^{3}$, Medium parameters used: $\mathrm{f}=5300 \mathrm{MHz} ; \sigma=4.56 \mathrm{~S} / \mathrm{m} ; \varepsilon_{\mathrm{r}}=35.4 ; \rho=1000 \mathrm{~kg} / \mathrm{m}^{3}$, Medium parameters used: $\mathrm{f}=5500 \mathrm{MHz} ; \sigma=4.76 \mathrm{~S} / \mathrm{m} ; \varepsilon_{\mathrm{r}}=35.1 ; \rho=1000 \mathrm{~kg} / \mathrm{m}^{3}$, Medium parameters used: $\mathrm{f}=5600 \mathrm{MHz} ; \sigma=4.86 \mathrm{~S} / \mathrm{m} ; \varepsilon_{\mathrm{r}}=35 ; \rho=1000 \mathrm{~kg} / \mathrm{m}^{3}$, Medium parameters used: $\mathrm{f}=5750 \mathrm{MHz} ; \sigma=5.02 \mathrm{~S} / \mathrm{m} ; \varepsilon_{\mathrm{r}}=34.8 ; \rho=1000 \mathrm{~kg} / \mathrm{m}^{3}$, Medium parameters used: $\mathrm{f}=5800 \mathrm{MHz} ; \sigma=5.07 \mathrm{~S} / \mathrm{m} ; \varepsilon_{\mathrm{r}}=34.7 ; \rho=1000 \mathrm{~kg} / \mathrm{m}^{3}$ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.64, 5.64, 5.64) @ 5200 MHz , ConvF(5.4, 5.4, 5.4) @ 5250 $\mathrm{MHz}, \operatorname{ConvF}(5.39,5.39,5.39) @ 5300 \mathrm{MHz}$, ConvF(5.1, 5.1, 5.1) @ 5500 MHz , ConvF(4.95, 4.95, $4.95) @ 5600 \mathrm{MHz}, \operatorname{ConvF}(4.98,4.98,4.98) @ 5750 \mathrm{MHz}, \operatorname{ConvF}(4.96,4.96,4.96) @ 5800 \mathrm{MHz}$; Calibrated: 25.03.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

Dipole Calibration for Head Tissue/Pin $=100 \mathrm{~mW}$, dist $=10 \mathrm{~mm}, \mathrm{f}=5200 \mathrm{MHz} / \mathrm{Zoom}$ Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: $d x=4 \mathrm{~mm}, d y=4 \mathrm{~mm}, d z=1.4 \mathrm{~mm}$
Reference Value $=74.16 \mathrm{~V} / \mathrm{m}$; Power Drift $=0.09 \mathrm{~dB}$
Peak SAR $($ extrapolated $)=28.1 \mathrm{~W} / \mathrm{kg}$
$\operatorname{SAR}(1 \mathrm{~g})=8.06 \mathrm{~W} / \mathrm{kg} ; \operatorname{SAR}(10 \mathrm{~g})=2.32 \mathrm{~W} / \mathrm{kg}$
Maximum value of SAR (measured) $=17.8 \mathrm{~W} / \mathrm{kg}$
Dipole Calibration for Head Tissue/Pin $=100 \mathrm{~mW}$, dist $=10 \mathrm{~mm}, \mathrm{f}=5250 \mathrm{MHz} / \mathrm{Zoom}$ Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: $d x=4 \mathrm{~mm}, d y=4 m m, d z=1.4 \mathrm{~mm}$
Reference Value $=74.71$ V/m; Power Drift $=0.07 \mathrm{~dB}$
Peak SAR $($ extrapolated $)=27.3 \mathrm{~W} / \mathrm{kg}$
$\operatorname{SAR}(1 \mathrm{~g})=8.07 \mathrm{~W} / \mathrm{kg} ; \operatorname{SAR}(10 \mathrm{~g})=\mathbf{2 . 3 3} \mathbf{W} / \mathrm{kg}$
Maximum value of SAR (measured) $=17.8 \mathrm{~W} / \mathrm{kg}$

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, $f=5300 \mathrm{MHz} / \mathrm{Zoom}$ Scan, dist $=1.4 \mathrm{~mm}(8 x 8 x 7) /$ Cube 0: Measurement grid: $d x=4 \mathrm{~mm}, d y=4 \mathrm{~mm}, \mathrm{dz}=1.4 \mathrm{~mm}$
Reference Value $=75.07 \mathrm{~V} / \mathrm{m}$; Power Drift $=0.08 \mathrm{~dB}$
Peak SAR $($ extrapolated $)=28.8 \mathrm{~W} / \mathrm{kg}$
$\operatorname{SAR}(1 \mathrm{~g})=8.23 \mathrm{~W} / \mathrm{kg} ; \operatorname{SAR}(10 \mathrm{~g})=2.37 \mathrm{~W} / \mathrm{kg}$
Maximum value of SAR (measured) $=18.5 \mathrm{~W} / \mathrm{kg}$
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, $\mathrm{f}=5500 \mathrm{MHz} /$ Zoom Scan, dist $=1.4 \mathrm{~mm}(8 \times 8 \times 7) /$ Cube 0: Measurement grid: $d x=4 \mathrm{~mm}, d y=4 \mathrm{~mm}, \mathrm{dz}=1.4 \mathrm{~mm}$
Reference Value $=74.21 \mathrm{~V} / \mathrm{m}$; Power Drift $=0.7 \mathrm{~dB}$
Peak SAR (extrapolated) $=32.1 \mathrm{~W} / \mathrm{kg}$
$\operatorname{SAR}(1 \mathrm{~g})=8.51 \mathrm{~W} / \mathrm{kg} ; \operatorname{SAR}(10 \mathrm{~g})=2.43 \mathrm{~W} / \mathrm{kg}$
Maximum value of SAR (measured) $=19.6 \mathrm{~W} / \mathrm{kg}$
Dipole Calibration for Head Tissue/Pin $=100 \mathrm{~mW}$, dist $=10 \mathrm{~mm}, \mathrm{f}=5600 \mathrm{MHz} / \mathrm{Zoom}$ Scan, dist $=1.4 \mathrm{~mm}(8 \times 8 x 7) /$ Cube 0: Measurement grid: $\mathrm{dx}=4 \mathrm{~mm}, \mathrm{dy}=4 \mathrm{~mm}, \mathrm{dz}=1.4 \mathrm{~mm}$
Reference Value $=75.03 \mathrm{~V} / \mathrm{m}$; Power Drift $=0.06 \mathrm{~dB}$
Peak SAR $($ extrapolated $)=31.0 \mathrm{~W} / \mathrm{kg}$
$\operatorname{SAR}(1 \mathrm{~g})=8.49 \mathrm{~W} / \mathrm{kg} ; \operatorname{SAR}(10 \mathrm{~g})=2.43 \mathrm{~W} / \mathrm{kg}$
Maximum value of SAR (measured) $=19.4 \mathrm{~W} / \mathrm{kg}$
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, $f=5750 \mathrm{MHz} / \mathrm{Zoom}$ Scan, dist $=1.4 \mathrm{~mm}(8 \times 8 \times 7) /$ Cube 0 : Measurement grid: $\mathrm{dx}=4 \mathrm{~mm}, \mathrm{dy}=4 \mathrm{~mm}, \mathrm{dz}=1.4 \mathrm{~mm}$
Reference Value $=71.89 \mathrm{~V} / \mathrm{m}$; Power Drift $=0.09 \mathrm{~dB}$
Peak SAR (extrapolated) $=31.1 \mathrm{~W} / \mathrm{kg}$
$\operatorname{SAR}(1 \mathrm{~g})=8.08 \mathrm{~W} / \mathrm{kg} ; \operatorname{SAR}(10 \mathrm{~g})=2.31 \mathrm{~W} / \mathrm{kg}$
Maximum value of SAR (measured) $=18.8 \mathrm{~W} / \mathrm{kg}$
Dipole Calibration for Head Tissue/Pin $=100 \mathrm{~mW}$, dist $=10 \mathrm{~mm}, \mathrm{f}=5800 \mathrm{MHz} / \mathrm{Zoom}$ Scan, dist $=1.4 \mathrm{~mm}(8 \times 8 \times 7) /$ Cube 0: Measurement grid: $\mathrm{dx}=4 \mathrm{~mm}, \mathrm{dy}=4 \mathrm{~mm}, \mathrm{dz}=1.4 \mathrm{~mm}$
Reference Value $=72.69 \mathrm{~V} / \mathrm{m}$; Power Drift $=0.09 \mathrm{~dB}$
Peak SAR (extrapolated) $=31.8 \mathrm{~W} / \mathrm{kg}$
$\operatorname{SAR}(1 \mathrm{~g})=8.14 \mathrm{~W} / \mathrm{kg} ; \operatorname{SAR}(10 \mathrm{~g})=2.30 \mathrm{~W} / \mathrm{kg}$
Maximum value of SAR (measured) $=19.0 \mathrm{~W} / \mathrm{kg}$

