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## DASY/EASY – Parameters of Probe: EX3DV4 – SN:7515

### Basic Calibration Parameters

|                                                          | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|----------------------------------------------------------|----------|----------|----------|-----------|
| Norm( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup> | 0.44     | 0.49     | 0.47     | ±10.0%    |
| DCP(mV) <sup>B</sup>                                     | 98.0     | 98.8     | 100.2    |           |

### Modulation Calibration Parameters

| UID | Communication System Name |   | A dB | B dB $\sqrt{\mu\text{V}}$ | C   | D dB | VR mV | Unc <sup>E</sup> (k=2) |
|-----|---------------------------|---|------|---------------------------|-----|------|-------|------------------------|
| 0   | CW                        | X | 0.0  | 0.0                       | 1.0 | 0.00 | 146.7 | ±4.8%                  |
|     |                           | Y | 0.0  | 0.0                       | 1.0 |      | 161.1 |                        |
|     |                           | Z | 0.0  | 0.0                       | 1.0 |      | 154.1 |                        |

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

<sup>A</sup> The uncertainties of Norm X, Y, Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Page 4).

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

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





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### Calibration Parameter Determined in Head Tissue Simulating Media

| f [MHz] <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity (S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha <sup>G</sup> | Depth <sup>G</sup> (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|--------------------|-------------------------|-------------|
| 750                  | 41.9                               | 0.89                            | 10.02   | 10.02   | 10.02   | 0.08               | 1.72                    | ±12.1%      |
| 835                  | 41.5                               | 0.90                            | 9.65    | 9.65    | 9.65    | 0.16               | 1.25                    | ±12.1%      |
| 900                  | 41.5                               | 0.97                            | 9.61    | 9.61    | 9.61    | 0.20               | 1.18                    | ±12.1%      |
| 1750                 | 40.1                               | 1.37                            | 8.40    | 8.40    | 8.40    | 0.47               | 0.79                    | ±12.1%      |
| 1900                 | 40.0                               | 1.40                            | 8.16    | 8.16    | 8.16    | 0.30               | 0.95                    | ±12.1%      |
| 2000                 | 40.0                               | 1.40                            | 8.23    | 8.23    | 8.23    | 0.19               | 1.29                    | ±12.1%      |
| 2300                 | 39.5                               | 1.67                            | 7.71    | 7.71    | 7.71    | 0.60               | 0.70                    | ±12.1%      |
| 2450                 | 39.2                               | 1.80                            | 7.44    | 7.44    | 7.44    | 0.54               | 0.78                    | ±12.1%      |
| 2600                 | 39.0                               | 1.96                            | 7.31    | 7.31    | 7.31    | 0.60               | 0.74                    | ±12.1%      |
| 3300                 | 38.2                               | 2.71                            | 7.10    | 7.10    | 7.10    | 0.43               | 0.92                    | ±13.3%      |
| 3500                 | 37.9                               | 2.91                            | 6.87    | 6.87    | 6.87    | 0.42               | 1.00                    | ±13.3%      |
| 3700                 | 37.7                               | 3.12                            | 6.55    | 6.55    | 6.55    | 0.43               | 1.00                    | ±13.3%      |
| 3900                 | 37.5                               | 3.32                            | 6.47    | 6.47    | 6.47    | 0.40               | 1.25                    | ±13.3%      |
| 4100                 | 37.2                               | 3.53                            | 6.53    | 6.53    | 6.53    | 0.40               | 1.15                    | ±13.3%      |
| 4200                 | 37.1                               | 3.63                            | 6.44    | 6.44    | 6.44    | 0.40               | 1.25                    | ±13.3%      |
| 4400                 | 36.9                               | 3.84                            | 6.34    | 6.34    | 6.34    | 0.40               | 1.25                    | ±13.3%      |
| 4600                 | 36.7                               | 4.04                            | 6.25    | 6.25    | 6.25    | 0.50               | 1.17                    | ±13.3%      |
| 4800                 | 36.4                               | 4.25                            | 6.22    | 6.22    | 6.22    | 0.45               | 1.20                    | ±13.3%      |
| 4950                 | 36.3                               | 4.40                            | 5.97    | 5.97    | 5.97    | 0.50               | 1.20                    | ±13.3%      |
| 5250                 | 35.9                               | 4.71                            | 5.46    | 5.46    | 5.46    | 0.45               | 1.25                    | ±13.3%      |
| 5600                 | 35.5                               | 5.07                            | 4.89    | 4.89    | 4.89    | 0.55               | 1.20                    | ±13.3%      |
| 5750                 | 35.4                               | 5.22                            | 4.96    | 4.96    | 4.96    | 0.55               | 1.25                    | ±13.3%      |

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

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

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

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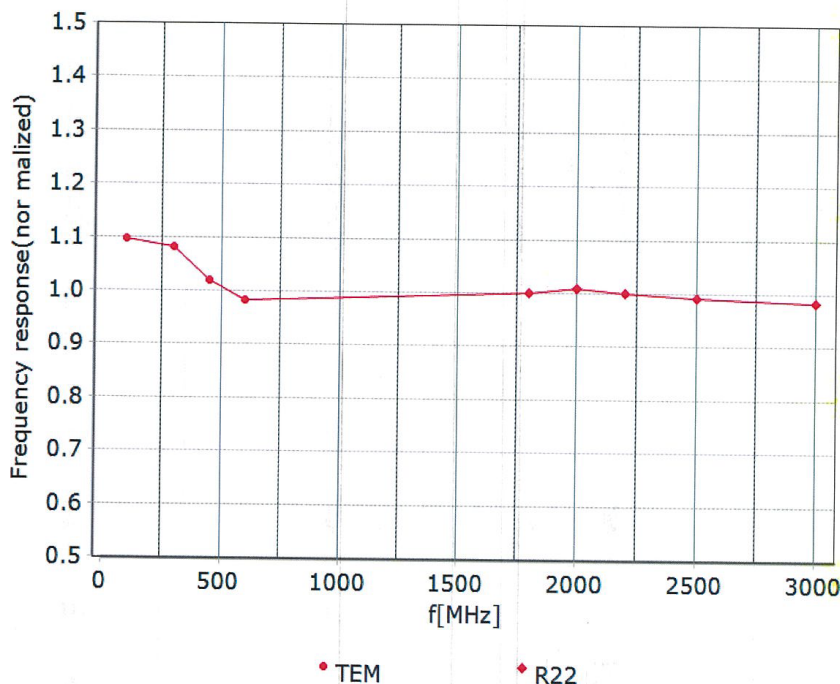
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### Frequency Response of E-Field (TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field:  $\pm 7.4\%$  ( $k=2$ )



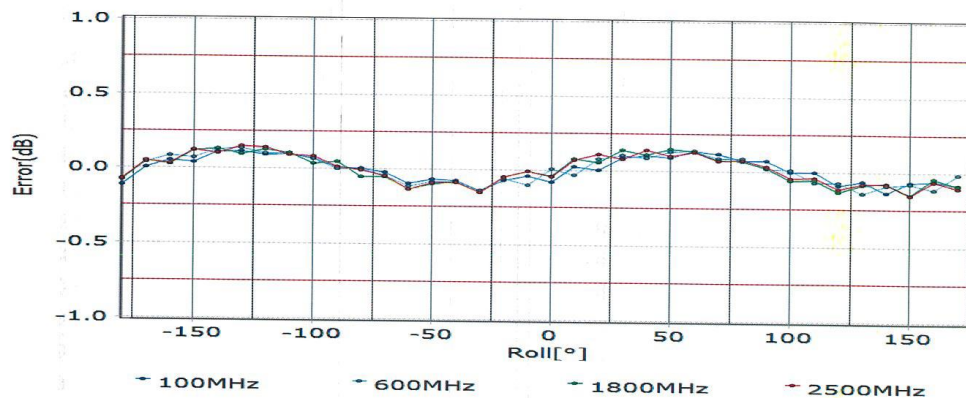
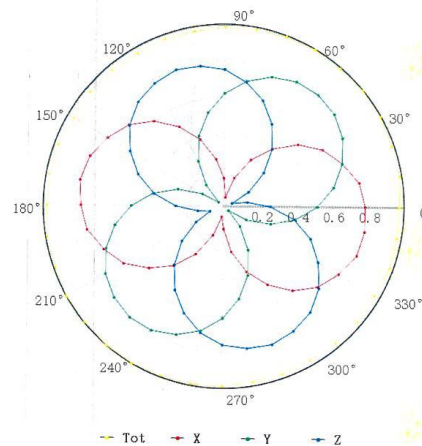
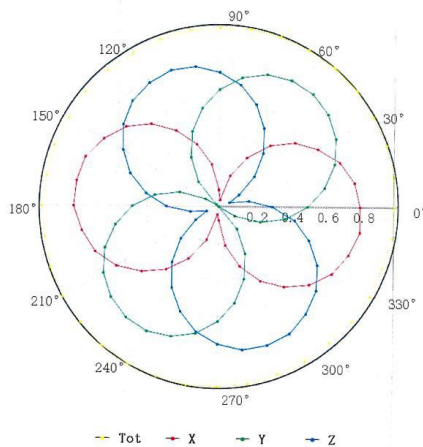


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### Receiving Pattern ( $\Phi$ ), $\theta=0^\circ$

**f=600 MHz, TEM**

**f=1800 MHz, R22**



Uncertainty of Axial Isotropy Assessment:  $\pm 1.2\%$  ( $k=2$ )

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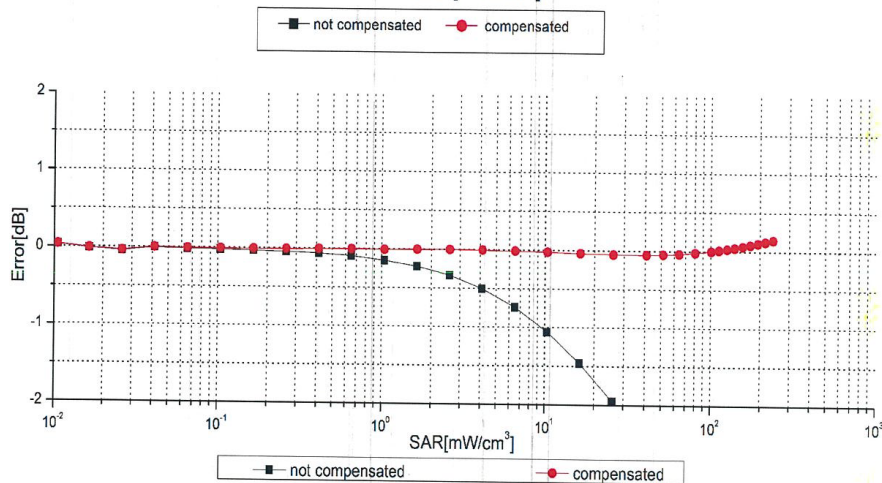
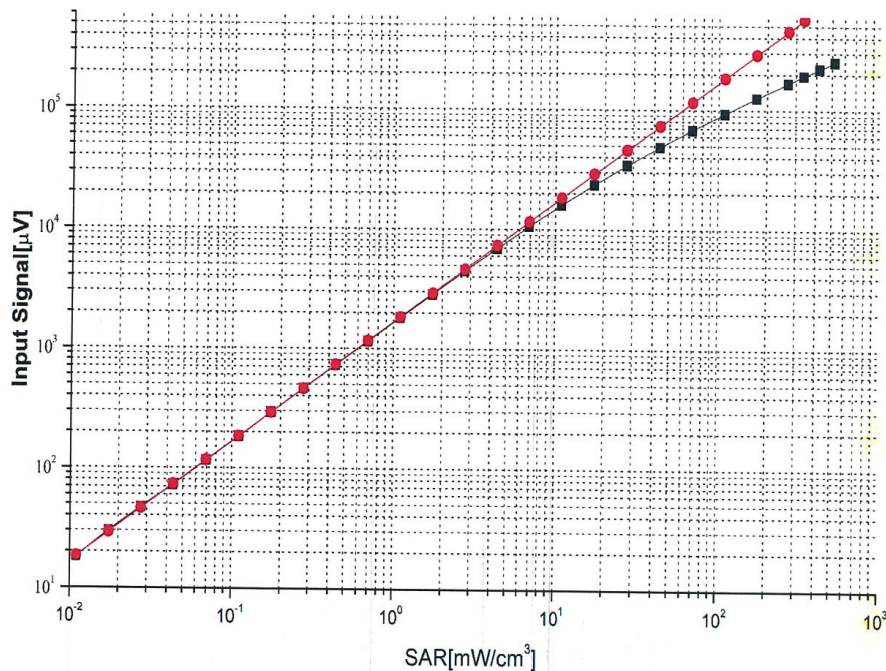
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### Dynamic Range f(SAR<sub>head</sub>) (TEM cell, f = 900 MHz)



Uncertainty of Linearity Assessment:  $\pm 0.9\%$  ( $k=2$ )

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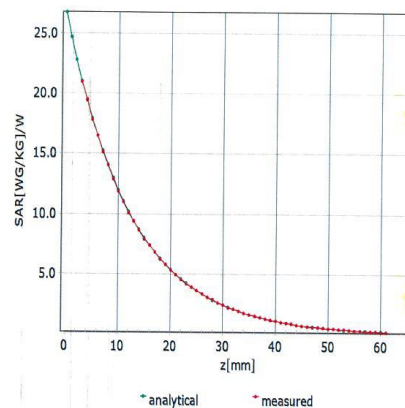
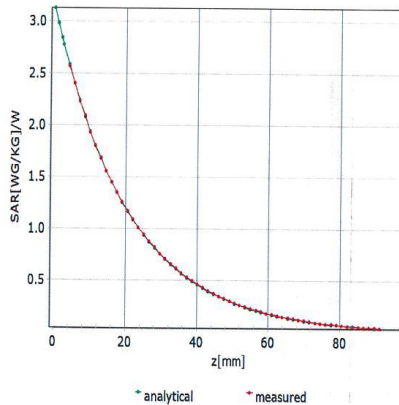


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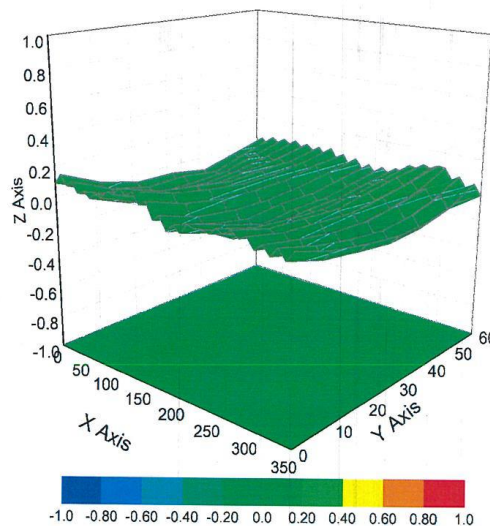
### Conversion Factor Assessment

f=750 MHz,WGLS R9(H\_convF)

f=1750 MHz,WGLS R22(H\_convF)



### Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment:  $\pm 3.2\%$  ( $k=2$ )

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## DASY/EASY – Parameters of Probe: EX3DV4 – SN:7515

### Other Probe Parameters

|                                               |            |
|-----------------------------------------------|------------|
| Sensor Arrangement                            | Triangular |
| Connector Angle (°)                           | 175.7      |
| Mechanical Surface Detection Mode             | enabled    |
| Optical Surface Detection Mode                | disable    |
| Probe Overall Length                          | 337mm      |
| Probe Body Diameter                           | 10mm       |
| Tip Length                                    | 9mm        |
| Tip Diameter                                  | 2.5mm      |
| Probe Tip to Sensor X Calibration Point       | 1mm        |
| Probe Tip to Sensor Y Calibration Point       | 1mm        |
| Probe Tip to Sensor Z Calibration Point       | 1mm        |
| Recommended Measurement Distance from Surface | 1.4mm      |

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## 4. Impedance and return loss

| Dipole D2450V2 SN 817 |                 |            |                        |                |
|-----------------------|-----------------|------------|------------------------|----------------|
| Head Liquid           |                 |            |                        |                |
| Date of Measurement   | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2019/6/10             | -28.5           | /          | 52.3                   | /              |
| 2020/6/9              | -29.3           | 2.81%      | 54.3                   | 2.0 $\Omega$   |
| 2021/6/8              | -29.2           | 2.46%      | 54                     | 1.7 $\Omega$   |
| Body Liquid           |                 |            |                        |                |
| Date of Measurement   | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
| 2019/6/10             | -26.6           | /          | 48.7                   | /              |
| 2020/6/9              | -27.5           | 3.38%      | 49.6                   | 0.9 $\Omega$   |
| 2021/6/8              | -27.3           | 2.63%      | 49.5                   | 0.8 $\Omega$   |



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