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## Appendix C

Phantom Description

|  | Sthmis Panner Engisteriog 40 | S | 0 | e | 2 |
| :---: | :---: | :---: | :---: | :---: | :---: |

Zeoghaustriasten 43，8004 Zuckh，Swizerand Prone＋41 44245.9700 ．Fax +41442450779


## Certificate of Conformity／First Article Inspection

| Bemi | Ovpi Flat Phantom ELI 50 |
| :--- | :--- |
| Type No | QD OVA O02 A |
| Series No | 1108 and higher |
| Manufacturer | Untersee Composites <br> Knebeistrasse 8，CH－8268 Mannenbach，Switzeriand |

Tests
Complete tests were nade on the prosotype units QD OVA 001 A，pre－series units OD OVA 001 B as well as on bome senet units QD OVA DO1 B．Some tests are made on all series units OD OVA DO2 A．

| Test | Requirement | Detaits | Units tested |
| :---: | :---: | :---: | :---: |
| Shape | Internal dimensions，deptr and sagging are compatible with standards | Bomom elliptical $600 \times 400$ mm ，Depth 190 mm ． dimension comipliant with［1］ for $t>375 \mathrm{MHz}$ | Prototypes |
| Matenai thicknass | Bottom： $20 \mathrm{~mm}+1.02 \mathrm{~mm}$ | demension complant with <br> ［3］for $\mathrm{f}>800 \mathrm{MHz}$ | al |
| Material parameters | rel permittivity $2-5$ ， lost tangent $\leq 0.05$ ，at $7 \leq 6$ GHz | rel．permittivity $3,5 * 0,5$ loss tangent 50.05 | Material samples |
| Matenal resistivity | Compatiblity with tissue simulating liquids． | Compatble with SPEAG liquids．＊ | Pnantoms， Material somple |
| Sagging | Sagging of the flat section in tolerance when filled with tiesue simbiating liguid | Whithin tolerance for fring height up to 155 mim | Protorypes． samples |

containing e．DGBE DGMHE or Tirton $x-100$ ．Observe technical note on maserial companti

Standards
［1］OET Buthetin 65，Supplement C，＂Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields＂，Edition 01－01
［2］EEE 1528－2003，＂Recommended Practice for Determining the Paak Spatial－Average Specific Absorption Rate（SAR）in the Human Head from Wreless Communicabons Devices．Measurement Techiniques，December 2003
［31 IEC 62209－1 ed1．0，＂Human exposure to radio frequency Selds from hand－held and body－mounted wireless comminication devices－Human models，instrumentation，and procedures－Part 1 ： Procedure to determine the specific absorption rate（SAR）for hond－held devices used in close proximity to the ear（trequency range of 300 MHz to 3 GHz ），2005－02－18
［4］IEC 62209－2 ed1：0，＂Human exposure to radio frequency Fields from hand－held and body－mounted Wireleos communication devices－Human models，instrumentation，and procedures－Part 2 Procedure to determine the specific absorption rate（SAR）for wreless communicason devices used in close proximity to the human body（frequency range of 30 MHz to 6 GHzI ．2010－03－30

Conformity
Based on the sample tests above，we certify that this item is in complance with the uncertainty requirements of body－worn SAR measurements and system performance checks as specified in［1－4］
and further standards．
Date 25．7．2011
Signature／Stamp
speag



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## System Validation from Original Equipment Supplier



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## Calibration Laboratory of

Schmid \＆Partner
Engineering AG
Zeughausstrasse 43， 8004 Zurich，Switzerland


S Schweizerischer Kalibrierdienst
C Service suisse d＇étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service（SAS）
Accreditation No．：SCS 0108
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates
Glossary：
TSL tissue simulating liquid
ConvF sensitivity in TSL／NORM $x, y, z$
N／A not applicable or not measured

## Calibration is Performed According to the Following Standards：

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

## Additional Documentation：

e）DASY4／5 System Handbook

## Methods Applied and Interpretation of Parameters：

－Measurement Conditions：Further details are available from the Validation Report at the end of the certificate．All figures stated in the certificate are valid at the frequency indicated．
－Antenna Parameters with TSL：The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section，with the arms oriented parallel to the body axis．
－Feed Point Impedance and Return Loss：These parameters are measured with the dipole positioned under the liquid filled phantom．The impedance stated is transformed from the measurement at the SMA connector to the feed point．The Return Loss ensures low reflected power．No uncertainty required．
－Electrical Delay：One－way delay between the SMA connector and the antenna feed point． No uncertainty required．
－SAR measured：SAR measured at the stated antenna input power．
－SAR normalized：SAR as measured，normalized to an input power of 1 W at the antenna connector．
－SAR for nominal TSL parameters：The measured TSL parameters are used to calculate the nominal SAR result．

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

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

| DASY Version | DASY5 | V52．10．2 |
| :--- | :---: | :---: |
| Extrapolation | Advanced Extrapolation |  |
| Phantom | Modular Flat Phantom |  |
| Distance Dipole Center－TSL | 10 mm | with Spacer |
| Zoom Scan Resolution | $\mathrm{dx}, \mathrm{dy}, \mathrm{dz}=5 \mathrm{~mm}$ |  |
| Frequency | $2450 \mathrm{MHz} \pm 1 \mathrm{MHz}$ |  |

## Head TSL parameters

The following parameters and calculations were applied

|  | Temperature | Permittivity | Conductivity |
| :--- | :---: | :---: | :---: |
| Nominal Head TSL parameters | $22.0^{\circ} \mathrm{C}$ | 39.2 | $1.80 \mathrm{mho} / \mathrm{m}$ |
| Measured Head TSL parameters | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $37.8 \pm 6 \%$ | $1.87 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Head TSL temperature change during test | $<0.5^{\circ} \mathrm{C}$ | $\ldots$ | $\ldots--$ |

## SAR result with Head TSL

| SAR averaged over $1 \mathrm{~cm}^{\mathbf{3}}(\mathbf{1} \mathbf{~ g})$ of Head TSL | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 250 mW input power | $13.6 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $\mathbf{5 3 . 0} \mathrm{~W} / \mathrm{kg} \pm 17.0 \%(\mathbf{k}=2)$ |


| SAR averaged over $\mathbf{1 0} \mathbf{c m}^{\mathbf{3}}(\mathbf{1 0} \mathbf{g})$ of Head TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 250 mW input power | $6.28 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $\mathbf{2 4 . 7} \mathbf{W} / \mathbf{k g} \pm \mathbf{1 6 . 5} \%$（k＝2） |

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

## Antenna Parameters with Head TSL

| Impedance，transformed to feed point | $55.8 \Omega+2.9 \mathrm{j} \Omega$ |
| :--- | :---: |
| Return Loss | -24.2 dB |

## General Antenna Parameters and Design

| Electrical Delay（one direction） | 1.149 ns |
| :--- | :--- |

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

## Additional EUT Data

| Manufactured by | SPEAG |
| :--- | :--- |

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## DASY5 Validation Report for Head TSL

Test Laboratory：SPEAG，Zurich，Switzerland

## DUT：Dipole 2450 MHz；Type：D2450V2；Serial：D2450V2－SN：727

Communication System：UID 0 －CW；Frequency： 2450 MHz
Medium parameters used： $\mathrm{f}=2450 \mathrm{MHz} ; \sigma=1.87 \mathrm{~S} / \mathrm{m} ; \varepsilon_{\mathrm{r}}=37.8 ; \rho=1000 \mathrm{~kg} / \mathrm{m}^{3}$
Phantom section：Flat Section
Measurement Standard：DASY5（IEEE／IEC／ANSI C63．19－2011）
DASY52 Configuration：
－Probe：EX3DV4－SN7349；ConvF（7．96，7．96，7．96）＠ 2450 MHz ；Calibrated：31．12．2018
－Sensor－Surface： 1.4 mm （Mechanical Surface Detection）
－Electronics：DAE4 Sn601；Calibrated：04．10．2018
－Phantom：Flat Phantom 5.0 （front）；Type：QD 000 P50 AA；Serial： 1001
－DASY52 52．10．2（1495）；SEMCAD X 14．6．12（7450）

Dipole Calibration for Head Tissue／Pin＝250 mW，d＝10mm／Zoom Scan（7x7x7）／Cube 0：
Measurement grid：$d x=5 \mathrm{~mm}, \mathrm{dy}=5 \mathrm{~mm}, \mathrm{dz}=5 \mathrm{~mm}$
Reference Value $=116.3 \mathrm{~V} / \mathrm{m}$ ；Power Drift $=0.04 \mathrm{~dB}$
Peak SAR（extrapolated）$=26.9 \mathrm{~W} / \mathrm{kg}$
$\operatorname{SAR}(1 \mathrm{~g})=13.6 \mathrm{~W} / \mathrm{kg} ; \operatorname{SAR}(10 \mathrm{~g})=\mathbf{6 . 2 8} \mathrm{W} / \mathrm{kg}$
Maximum value of SAR（measured）$=22.2 \mathrm{~W} / \mathrm{kg}$

$0 \mathrm{~dB}=22.2 \mathrm{~W} / \mathrm{kg}=13.46 \mathrm{dBW} / \mathrm{kg}$

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Impedance Measurement Plot for Head TSL


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## Calibration Laboratory of

 Schmid \＆PartnerEngineering AG
Zeughausstrasse 43， 8004 Zurich，Switzerland


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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates
Glossary：
TSL tissue simulating liquid ConvF sensitivity in TSL／NORM $x, y, z$ N／A not applicable or not measured

S Schweizerischer Kalibrierdienst
C Service suisse d＇ėtalonnage
Servizio svizzero di taratura
Swiss Calibration Service

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

## Additional Documentation：

e）DASY4／5 System Handbook

## Methods Applied and Interpretation of Parameters：

－Measurement Conditions：Further details are available from the Validation Report at the end of the certificate．All figures stated in the certificate are valid at the frequency indicated．
－Antenna Parameters with TSL：The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section，with the arms oriented parallel to the body axis．
－Feed Point Impedance and Return Loss：These parameters are measured with the dipole positioned under the liquid filled phantom．The impedance stated is transformed from the measurement at the SMA connector to the feed point．The Return Loss ensures low reflected power．No uncertainty required．
－Electrical Delay：One－way delay between the SMA connector and the antenna feed point． No uncertainty required．
－SAR measured：SAR measured at the stated antenna input power．
－SAR normalized：SAR as measured，normalized to an input power of 1 W at the antenna connector
－SAR for nominal TSL parameters：The measured TSL parameters are used to calculate the nominal SAR result．
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $\mathrm{k}=2$ ，which for a normal distribution corresponds to a coverage probability of approximately $95 \%$ ．

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## Measurement Conditions

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 | $\mathrm{dx}, \mathrm{dy}=4.0 \mathrm{~mm}, \mathrm{dz}=1.4 \mathrm{~mm}$ | Graded Ratio $=1.4$（Z direction） |
|  | $5200 \mathrm{MHz} \pm 1 \mathrm{MHz}$ |  |
| Frequency | $5300 \mathrm{MHz} \pm 1 \mathrm{MHz}$ |  |
|  | $5600 \mathrm{MHz} \pm 1 \mathrm{MHz}$ |  |

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 | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $36.8 \pm 6 \%$ | $4.49 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Head TSL temperature change during test | $<0.5^{\circ} \mathrm{C}$ | $\ldots$ | $\ldots-$ |

SAR result with Head TSL at 5200 MHz

| SAR averaged over $1 \mathrm{~cm}^{3}(1 \mathrm{~g})$ of Head TSL | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $7.89 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $79.2 \mathrm{~W} / \mathrm{kg} \pm 19.9 \%(\mathrm{k}=2)$ |


| SAR averaged over $10 \mathrm{~cm}^{\mathbf{3}}(\mathbf{1 0} \mathrm{g})$ of Head TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.24 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $22.5 \mathrm{~W} / \mathrm{kg} \pm 19.5 \%(\mathbf{k}=\mathbf{2})$ |

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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 | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $36.6 \pm 6 \%$ | $4.59 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Head TSL temperature change during test | $<0.5^{\circ} \mathrm{C}$ | - | - |

SAR result with Head TSL at 5300 MHz

| SAR averaged over $1 \mathrm{~cm}^{3}(1 \mathrm{~g})$ of Head TSL | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $8.24 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $82.6 \mathrm{~W} / \mathrm{kg} \pm 19.9 \%(\mathbf{k}=\mathbf{2})$ |


| SAR averaged over $10 \mathrm{~cm}^{3}(10 \mathrm{~g})$ of Head TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.34 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $\mathbf{2 3 . 5} \mathrm{~W} / \mathbf{k g} \pm \mathbf{1 9 . 5} \%(\mathbf{k}=\mathbf{2})$ |

Head TSL parameters at 5600 MHz
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 | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $36.2 \pm 6 \%$ | $4.90 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Head TSL temperature change during test | $<0.5{ }^{\circ} \mathrm{C}$ | $\ldots$ | $\ldots$ |

## SAR result with Head TSL at 5600 MHz

| SAR averaged over $1 \mathrm{~cm}^{3}(1 \mathrm{~g})$ of Head TSL | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $8.55 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $85.7 \mathrm{~W} / \mathrm{kg} \pm 19.9 \%(\mathrm{k}=2)$ |


| SAR averaged over $10 \mathrm{~cm}^{3}(10 \mathrm{~g})$ 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 | $\mathbf{2 4 . 4} \mathrm{~W} / \mathrm{kg} \pm \mathbf{1 9 . 5} \%(\mathrm{k}=2)$ |

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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 | $(22.0 \pm 0.2)^{\circ} \mathrm{C}$ | $35.9 \pm 6 \%$ | $5.11 \mathrm{mho} / \mathrm{m} \pm 6 \%$ |
| Head TSL temperature change during test | $<0.5{ }^{\circ} \mathrm{C}$ | $\ldots$ | - |

## SAR result with Head TSL at 5800 MHz

| SAR averaged over $1 \mathrm{~cm}^{3}(1 \mathrm{~g})$ of Head TSL | Condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $8.02 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $\mathbf{8 0 . 4} \mathrm{~W} / \mathrm{kg} \pm 19.9 \%(\mathrm{k}=2)$ |


| SAR averaged over $10 \mathrm{~cm}^{3}(\mathbf{1 0} \mathbf{g})$ of Head TSL | condition |  |
| :--- | :---: | :---: |
| SAR measured | 100 mW input power | $2.26 \mathrm{~W} / \mathrm{kg}$ |
| SAR for nominal Head TSL parameters | normalized to 1 W | $\mathbf{2 2 . 7} \mathrm{~W} / \mathrm{kg} \pm 19.5 \%(\mathrm{k}=\mathbf{2})$ |

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

## Antenna Parameters with Head TSL at 5200 MHz

| Impedance，transformed to feed point | $51.2 \Omega-8.5 j \Omega$ |
| :--- | :---: |
| Return Loss | -21.4 dB |

## Antenna Parameters with Head TSL at 5300 MHz

| Impedance，transformed to feed point | $51.0 \Omega-3.9 \mathrm{j} \Omega$ |
| :--- | :---: |
| Return Loss | -28.0 dB |

Antenna Parameters with Head TSL at 5600 MHz

| Impedance，transformed to feed point | $54.9 \Omega-1.6 j \Omega$ |
| :--- | :---: |
| Return Loss | -26.2 dB |

Antenna Parameters with Head TSL at 5800 MHz

| Impedance，transformed to feed point | $55.8 \Omega+1.3 j \Omega$ |
| :--- | :---: |
| Return Loss | -25.0 dB |

## General Antenna Parameters and Design

| Electrical Delay（one direction） | 1.199 ns |
| :--- | :--- |

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

## Additional EUT Data

| Manufactured by | SPEAG |
| :--- | :--- |

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## DASY5 Validation Report for Head TSL

Date：30，01，2019
Test Laboratory：SPEAG，Zurich，Switzerland

## DUT：Dipole D5GHzV2；Type：D5GHzV2；Serial：D5GHzV2－SN：1023

Communication System：UID 0－CW；Frequency： 5200 MHz ，Frequency： 5300 MHz ，Frequency： 5600
MHz ，Frequency： 5800 MHz
Medium parameters used； $\mathrm{f}=5200 \mathrm{MHz} ; \sigma=4.49 \mathrm{~S} / \mathrm{m} ; \varepsilon_{\mathrm{r}}=36.8 ; \rho=1000 \mathrm{~kg} / \mathrm{m}^{3}$ ，
Medium parameters used： $\mathrm{f}=5300 \mathrm{MHz} ; \sigma=4.59 \mathrm{~S} / \mathrm{m} ; \varepsilon_{r}=36.6 ; p=1000 \mathrm{~kg} / \mathrm{m}^{3}$ ，
Medium parameters used： $\mathrm{f}=5600 \mathrm{MHz} ; \sigma=4.9 \mathrm{~S} / \mathrm{m} ; \varepsilon_{\mathrm{r}}=36.2 ; \rho=1000 \mathrm{~kg} / \mathrm{m}^{3}$ ，
Medium parameters used： $\mathrm{f}=5800 \mathrm{MHz} ; \sigma=5.11 \mathrm{~S} / \mathrm{m} ; \varepsilon_{\mathrm{r}}=35.9 ; \rho=1000 \mathrm{~kg} / \mathrm{m}^{3}$
Phantom section：Flat Section
Measurement Standard：DASY5（IEEE／IEC／ANSI C63．19－2011）
DASY52 Configuration：
－Probe：EX3DV4－SN3503；ConvF（ $5.69,5.69,5.69$ ）＠ $5200 \mathrm{MHz}, \operatorname{ConvF}(5.45,5.45,5.45)$＠ 5300 $\mathrm{MHz}, \operatorname{ConvF}(5,5,5) @ 5600 \mathrm{MHz}$ ，ConvF$(4.96,4.96,4.96) @ 5800 \mathrm{MHz}$ ；Calibrated： 31.12 .2018
－Sensor－Surface： 1.4 mm （Mechanical Surface Detection）
－Electronics：DAE4 Sn601；Calibrated：04．10．2018
－Phantom：Flat Phantom 5.0 （front）；Type：QD 000 P50 AA；Serial： 1001
－DASY52 52．10．2（1495）；SEMCAD X 14．6．12（7450）

Dipole Calibration for Head Tissue／Pin $=100 \mathrm{~mW}$ ，dist $=10 \mathrm{~mm}, \mathrm{f}=5200 \mathrm{MHz} /$ 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 $=75.39 \mathrm{~V} / \mathrm{m}$ ；Power Drift $=0.01 \mathrm{~dB}$
Peak SAR $($ extrapolated $)=28.7 \mathrm{~W} / \mathrm{kg}$
$\operatorname{SAR}(1 \mathrm{~g})=7.89 \mathrm{~W} / \mathrm{kg} ; \operatorname{SAR}(10 \mathrm{~g})=2.24 \mathrm{~W} / \mathrm{kg}$
Maximum value of SAR（measured）$=18.0 \mathrm{~W} / \mathrm{kg}$
Dipole Calibration for Head Tissue／Pin $=100 \mathrm{~mW}$ ，dist $=10 \mathrm{~mm}, \mathrm{f}=5300 \mathrm{MHz} /$ 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 $=76.71 \mathrm{~V} / \mathrm{m}$ ；Power Drift $=0.03 \mathrm{~dB}$
Peak SAR $($ extrapolated $)=29.9 \mathrm{~W} / \mathrm{kg}$
$\operatorname{SAR}(1 \mathrm{~g})=8.24 \mathrm{~W} / \mathrm{kg} ; \operatorname{SAR}(10 \mathrm{~g})=2.34 \mathrm{~W} / \mathrm{kg}$
Maximum value of SAR（measured）$=18.8 \mathrm{~W} / \mathrm{kg}$
Dipole Calibration for Head Tissue／Pin $=100 \mathrm{~mW}$ ，dist $=10 \mathrm{~mm}, \mathrm{f}=5600 \mathrm{MHz} /$ 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 $=76.95 \mathrm{~V} / \mathrm{m}$ ；Power Drift $=0.06 \mathrm{~dB}$
Peak SAR $($ extrapolated $)=32.9 \mathrm{~W} / \mathrm{kg}$
$\operatorname{SAR}(1 \mathrm{~g})=8.55 \mathrm{~W} / \mathrm{kg} ; \operatorname{SAR}(10 \mathrm{~g})=2.43 \mathrm{~W} / \mathrm{kg}$
Maximum value of SAR （measured）$=20.1 \mathrm{~W} / \mathrm{kg}$

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Dipole Calibration for Head Tissue／Pin＝100mW，dist＝10mm， $\mathrm{f}=5800 \mathrm{MHz} /$ 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 $=74.52 \mathrm{~V} / \mathrm{m}$ ；Power Drift $=0.04 \mathrm{~dB}$
Peak SAR $($ extrapolated $)=32.1 \mathrm{~W} / \mathrm{kg}$
$\operatorname{SAR}(1 \mathrm{~g})=8.02 \mathrm{~W} / \mathrm{kg} ; \operatorname{SAR}(10 \mathrm{~g})=2.26 \mathrm{~W} / \mathrm{kg}$
Maximum value of SAR（measured）$=19.1 \mathrm{~W} / \mathrm{kg}$


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Impedance Measurement Plot for Head TSL


## －End of report－

