Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 0108

Client **Auden**

Certificate No: D750V3-1078_Jun16

CALIBRATION CERTIFICATE

Object	D750V3 - SN:1078
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	June 22, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	Leif Klysner
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 27, 2016

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Accreditation No.: **SCS 0108**

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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
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 k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.3 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.18 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.39 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.6 ± 6 %	0.98 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.20 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.63 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.44 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.67 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.5 Ω - 0.7 jΩ
Return Loss	- 27.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.9 Ω - 2.9 jΩ
Return Loss	- 30.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.034 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	SPEAG
Manufactured on	November 15, 2012

DASY5 Validation Report for Head TSL

Date: 22.06.2016

Test Laboratory: SPEAG, Zurich, Switzerland

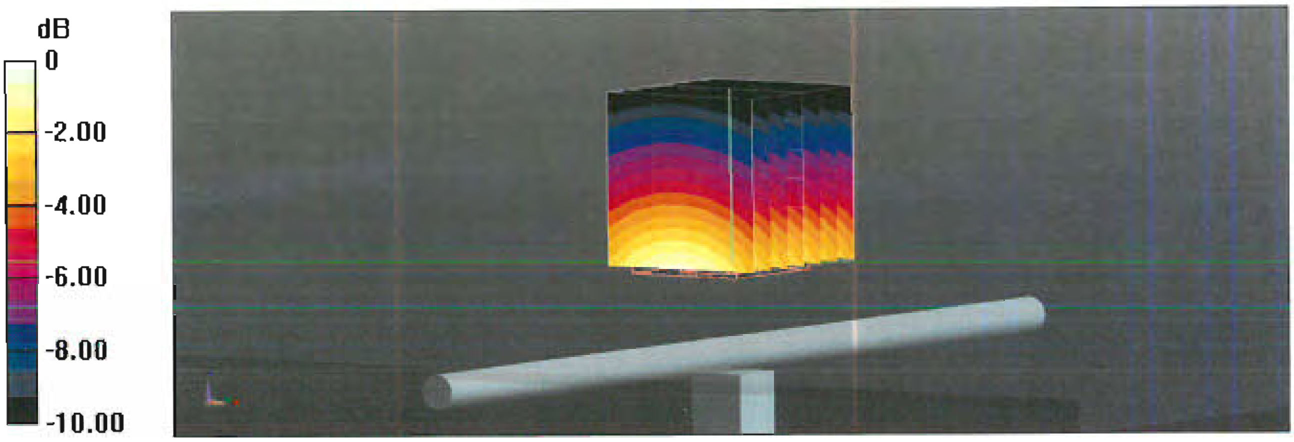
DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1078

Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.9 S/m; ε_r = 41.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

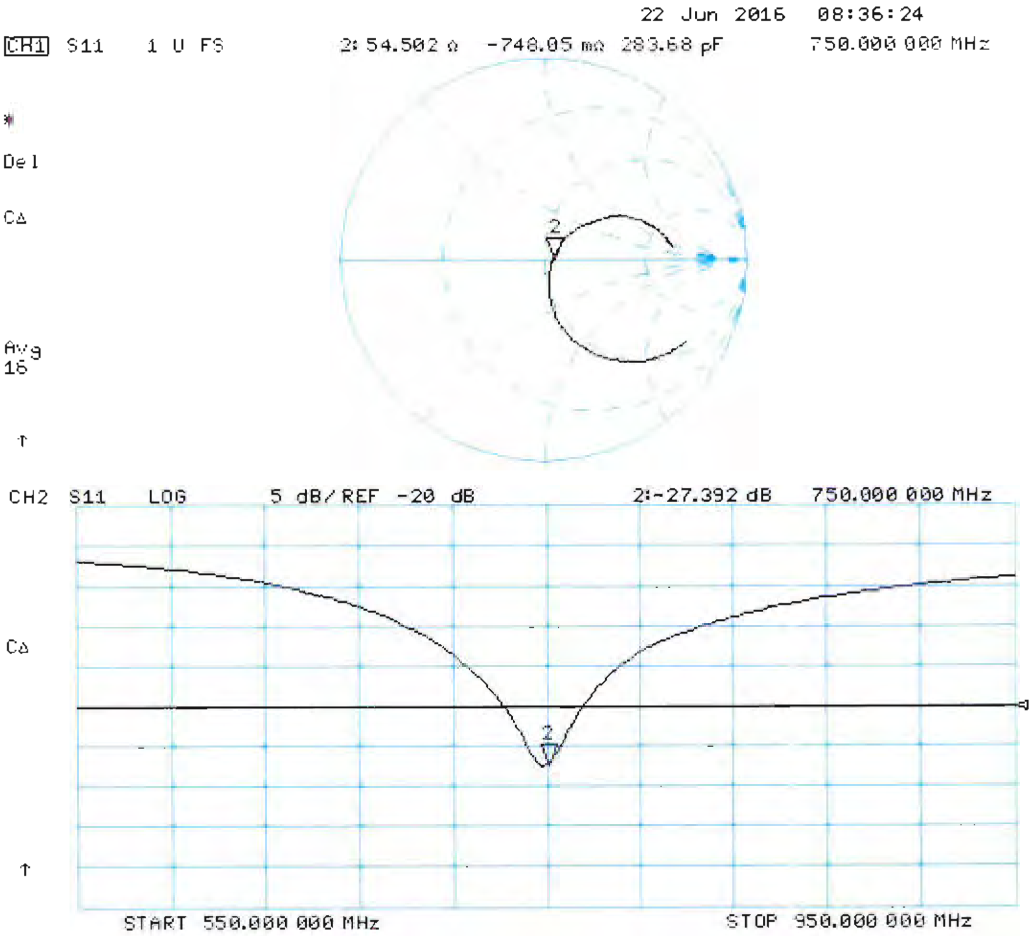
- Probe: EX3DV4 - SN7349; ConvF(10.17, 10.17, 10.17); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.85 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.07 W/kg
SAR(1 g) = 2.07 W/kg; SAR(10 g) = 1.36 W/kg
Maximum value of SAR (measured) = 2.73 W/kg



0 dB = 2.73 W/kg = 4.36 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 22.06.2016

Test Laboratory: SPEAG, Zurich, Switzerland

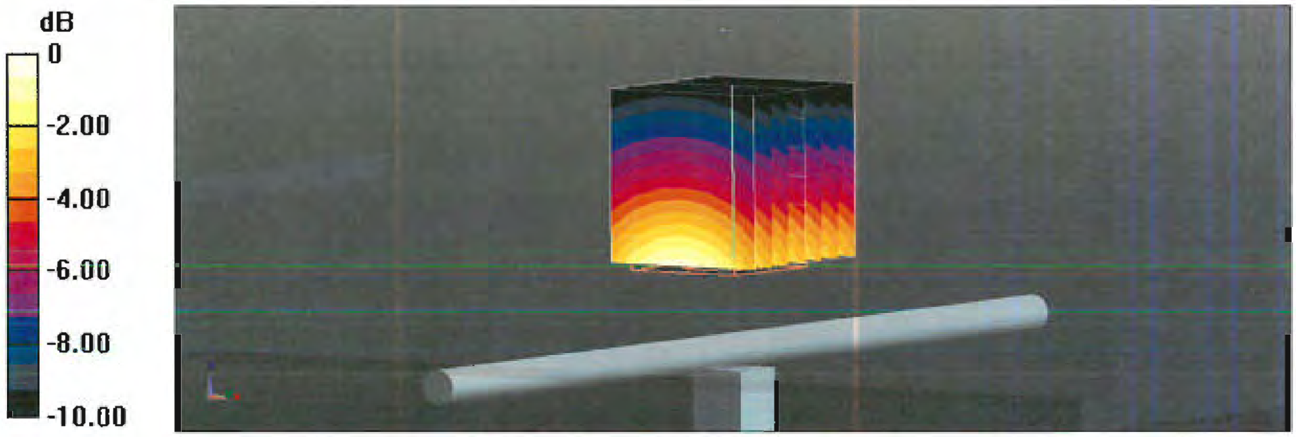
DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1078

Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.98 S/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

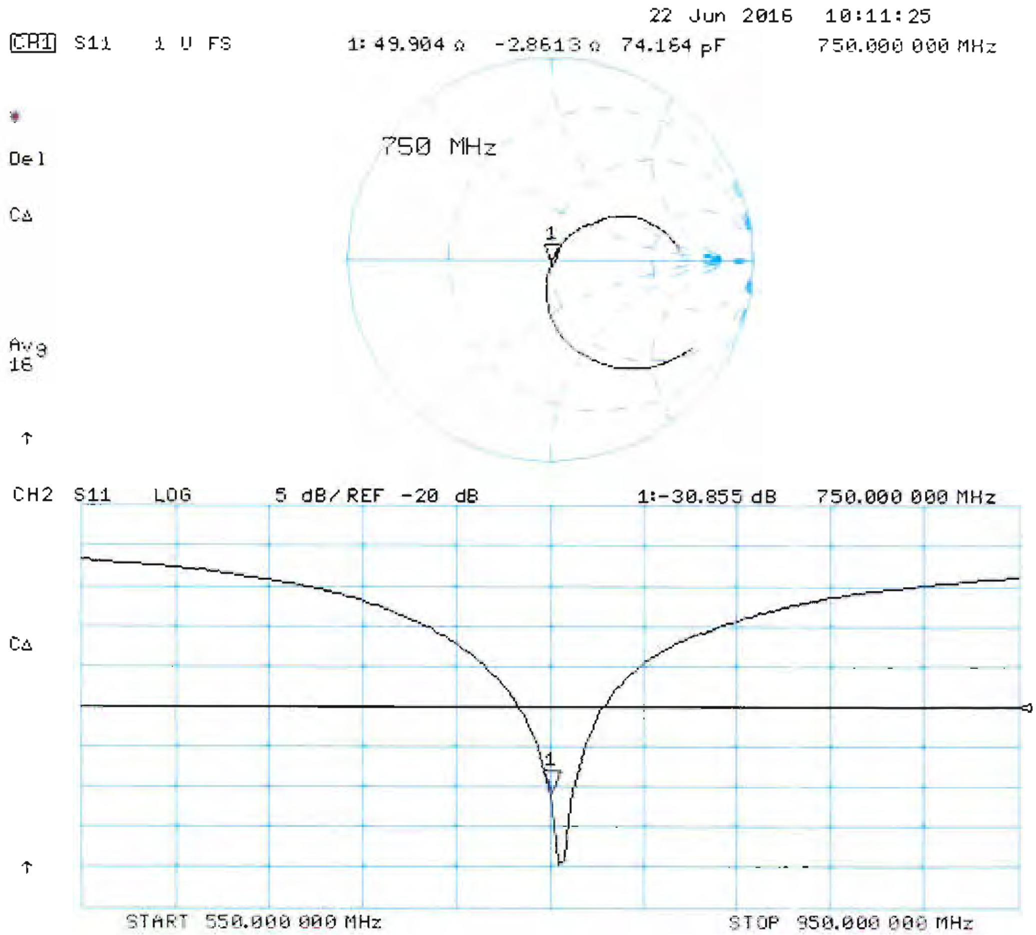
- Probe: EX3DV4 - SN7349; ConvF(9.99, 9.99, 9.99); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.86 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.26 W/kg
SAR(1 g) = 2.2 W/kg; SAR(10 g) = 1.44 W/kg
Maximum value of SAR (measured) = 2.91 W/kg



0 dB = 2.91 W/kg = 4.64 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client **Sporton-TW (Auden)**

Certificate No: D835V2-499_Mar17

CALIBRATION CERTIFICATE

Object	D835V2 - SN:499
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	March 21, 2017

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	31-Dec-16 (No. EX3-7349_Dec16)	Dec-17
DAE4	SN: 601	04-Jan-17 (No. DAE4-601_Jan17)	Jan-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	Leif Klysner
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 23, 2017

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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
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 k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.7 ± 6 %	0.94 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.45 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.45 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.58 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.14 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.4 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.50 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.67 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.63 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.35 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.0 Ω - 4.9 jΩ
Return Loss	- 25.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.5 Ω - 7.0 jΩ
Return Loss	- 22.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.390 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	SPEAG
Manufactured on	July 10, 2003

DASY5 Validation Report for Head TSL

Date: 21.03.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:499

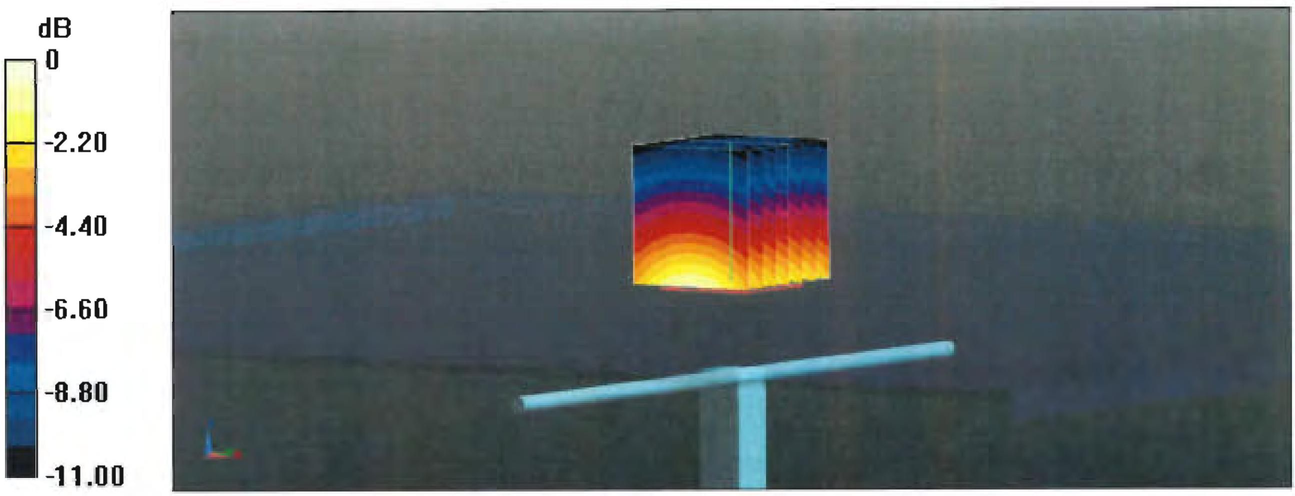
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.94 S/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.72, 9.72, 9.72); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.01.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

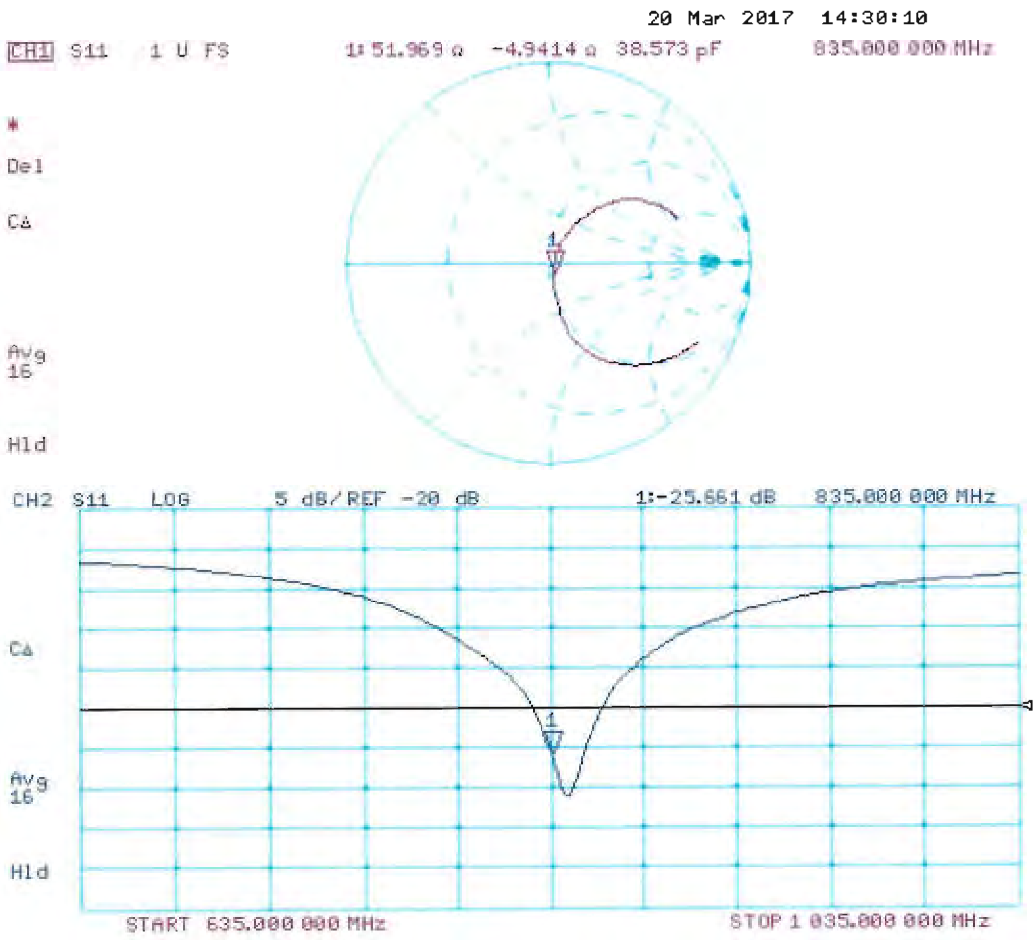
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 63.11 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.69 W/kg
SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.58 W/kg
Maximum value of SAR (measured) = 3.29 W/kg



0 dB = 3.29 W/kg = 5.17 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 20.03.2017

Test Laboratory: SPEAG, Zurich, Switzerland

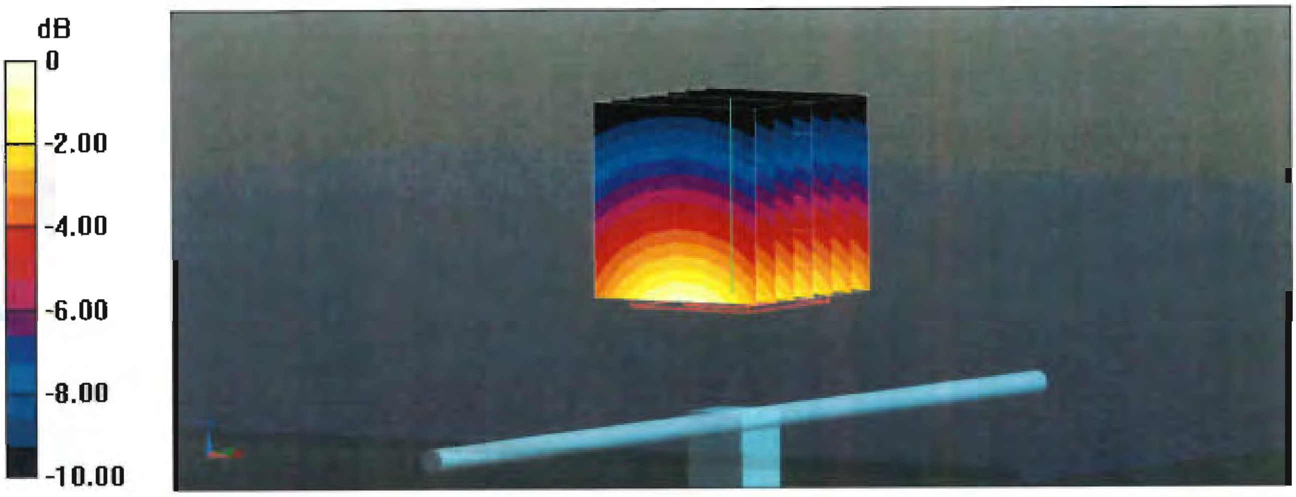
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:499

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.01 S/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

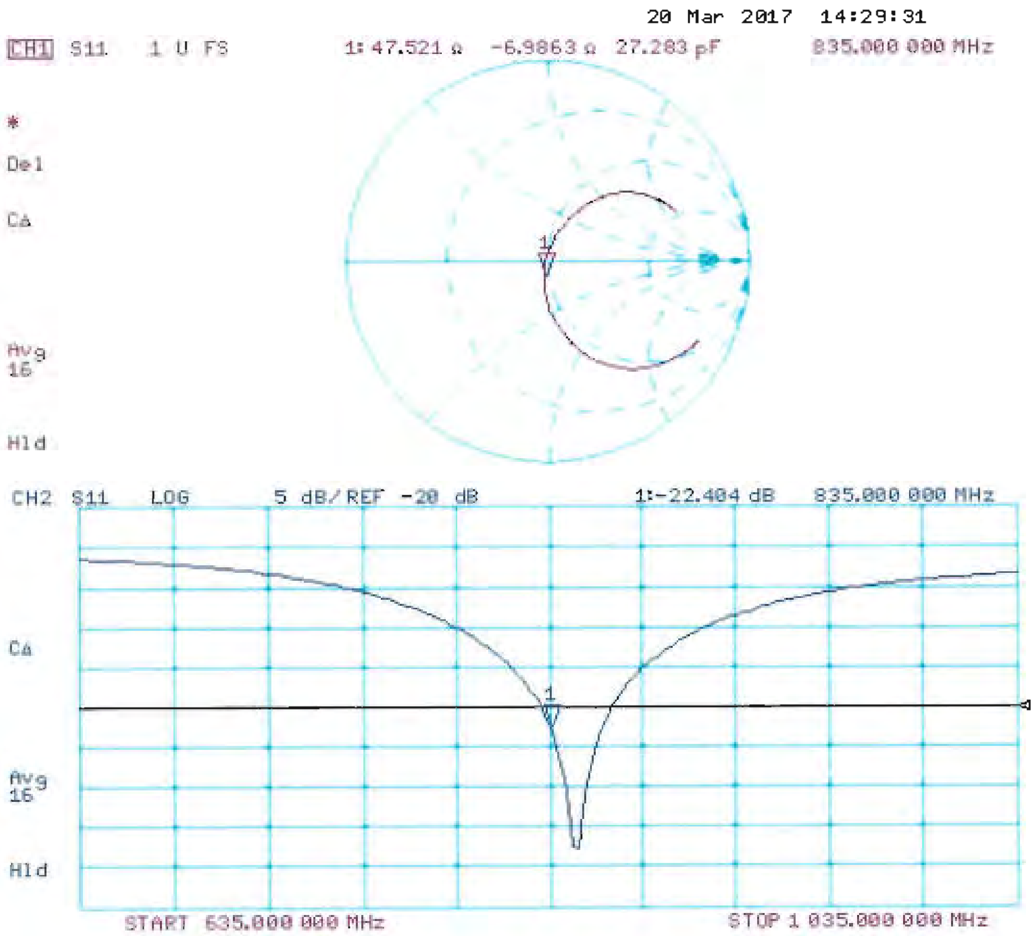
- Probe: EX3DV4 - SN7349; ConvF(9.73, 9.73, 9.73); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.01.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 61.02 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 3.74 W/kg
SAR(1 g) = 2.5 W/kg; SAR(10 g) = 1.63 W/kg
Maximum value of SAR (measured) = 3.32 W/kg



0 dB = 3.32 W/kg = 5.21 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client **Sporton-TW (Auden)**

Certificate No: D1750V2-1068_Nov16

CALIBRATION CERTIFICATE

Object	D1750V2 - SN:1068
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	November 16, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 17, 2016

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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
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 k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.1 ± 6 %	1.37 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.20 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**36.6 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.88 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.5 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.7 ± 6 %	1.49 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.04 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**36.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.85 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**19.4 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.4 Ω + 3.9 jΩ
Return Loss	- 27.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.1 Ω + 2.7 jΩ
Return Loss	- 27.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.221 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	SPEAG
Manufactured on	June 15, 2010

DASY5 Validation Report for Head TSL

Date: 16.11.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1068

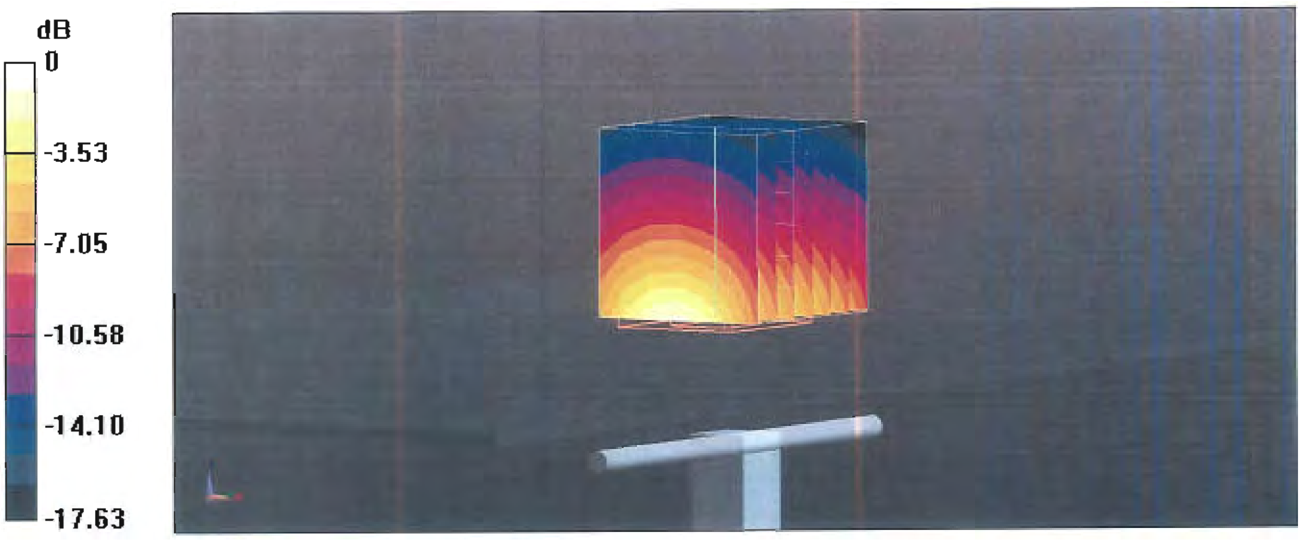
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.37 S/m; ε_r = 39.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.46, 8.46, 8.46); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

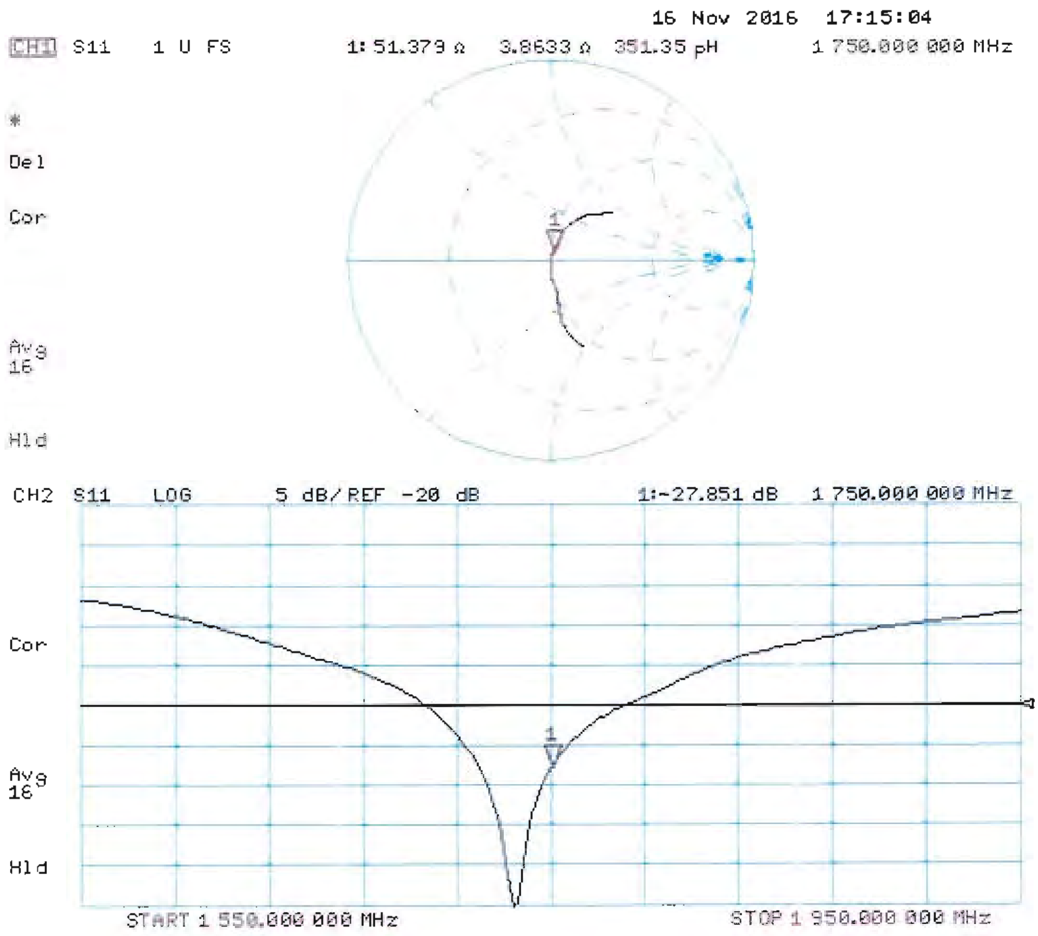
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 103.4 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 16.8 W/kg
SAR(1 g) = 9.2 W/kg; SAR(10 g) = 4.88 W/kg
Maximum value of SAR (measured) = 14.0 W/kg



0 dB = 14.0 W/kg = 11.46 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 16.11.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1068

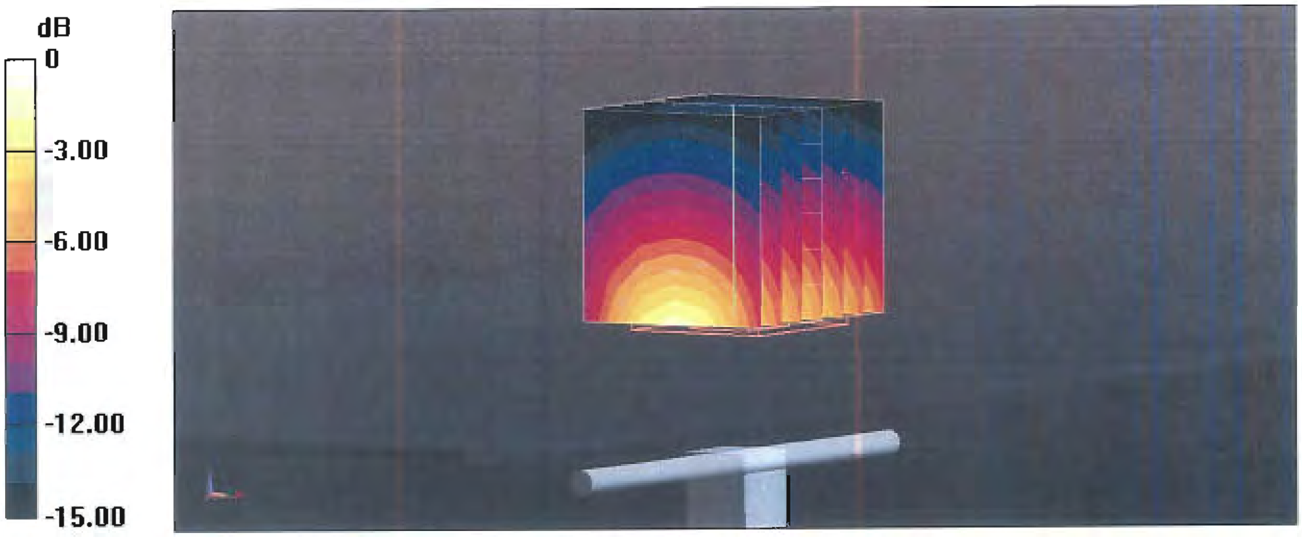
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.49 S/m; ε_r = 53.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.25, 8.25, 8.25); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

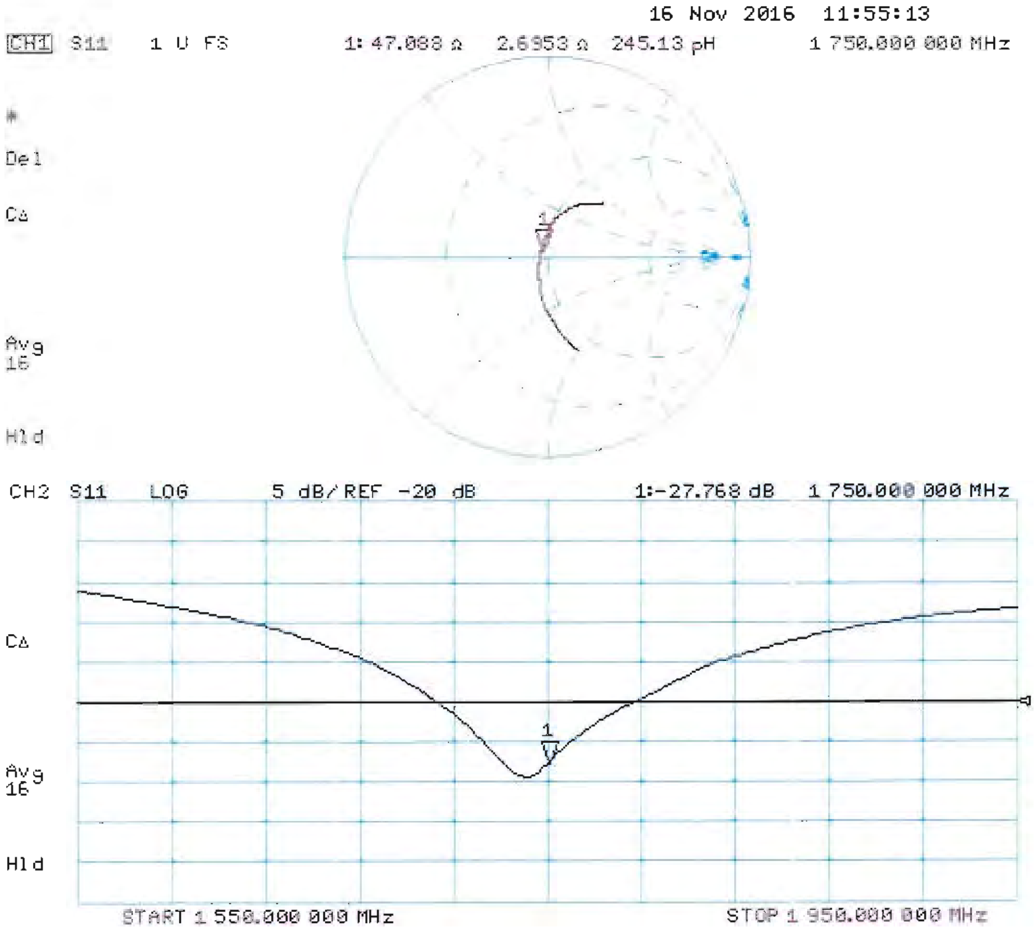
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.57 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 15.8 W/kg
SAR(1 g) = 9.04 W/kg; SAR(10 g) = 4.85 W/kg
Maximum value of SAR (measured) = 13.5 W/kg



0 dB = 13.5 W/kg = 11.30 dBW/kg

Impedance Measurement Plot for Body TSL



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CNAS L0570

Client **Sporton_TW** **Certificate No: Z16-97128**

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d210
Calibration Procedure(s)	FD-Z11-2-003-01 Calibration Procedures for dipole validation kits
Calibration date:	August 25, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Power sensor NRP-Z91	101547	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Reference Probe EX3DV4	SN 3617	26-Aug-15(SPEAG,No.EX3-3617_Aug15)	Aug-16
DAE4	SN 777	26-Aug-15(SPEAG,No.DAE4-777_Aug15)	Aug-16
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	01-Feb-16 (CTTL, No.J16X00893)	Jan-17
Network Analyzer E5071C	MY46110673	26-Jan-16 (CTTL, No.J16X00894)	Jan-17

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: Agust 27, 2016

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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,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, "Procedure to measure the Specific Absorption Rate (SAR) For hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005

c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010

d) KDB865664, 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 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	DASY52	52.8.8.1258
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.4 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.91 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**39.9 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.20 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.9 mW /g ± 20.4 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.9 ± 6 %	1.51 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**40.3 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.32 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**21.4 mW /g ± 20.4 % (k=2)**

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.8Ω+ 4.37jΩ
Return Loss	- 26.7dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.1Ω+ 3.94jΩ
Return Loss	- 25.9dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.311 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	SPEAG

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DASY5 Validation Report for Head TSL Date: 08.25.2016

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d210

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.379 S/m; εr = 39.42; ρ = 1000 kg/m3

Phantom section: Center Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(8.07, 8.07, 8.07); Calibrated: 8/26/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn777; Calibrated: 8/26/2015
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

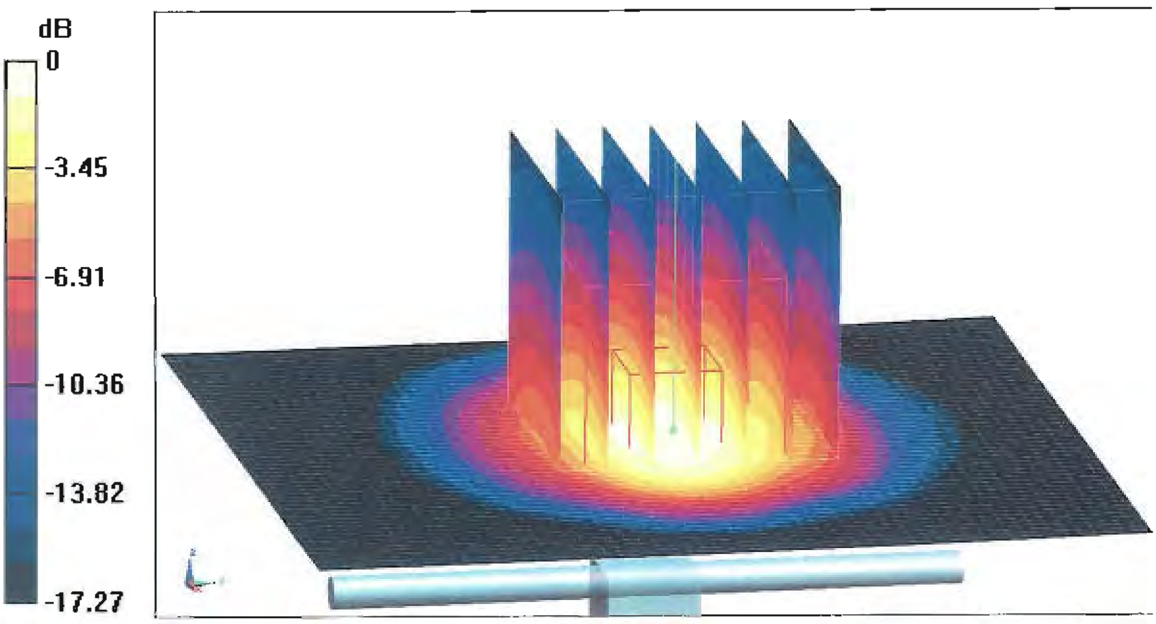
System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 101.2V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 18.3W/kg

SAR(1 g) = 9.91 W/kg; SAR(10 g) = 5.2 W/kg

Maximum value of SAR (measured) = 14.2 W/kg



0 dB = 14.2 W/kg = 11.52 dBW/kg

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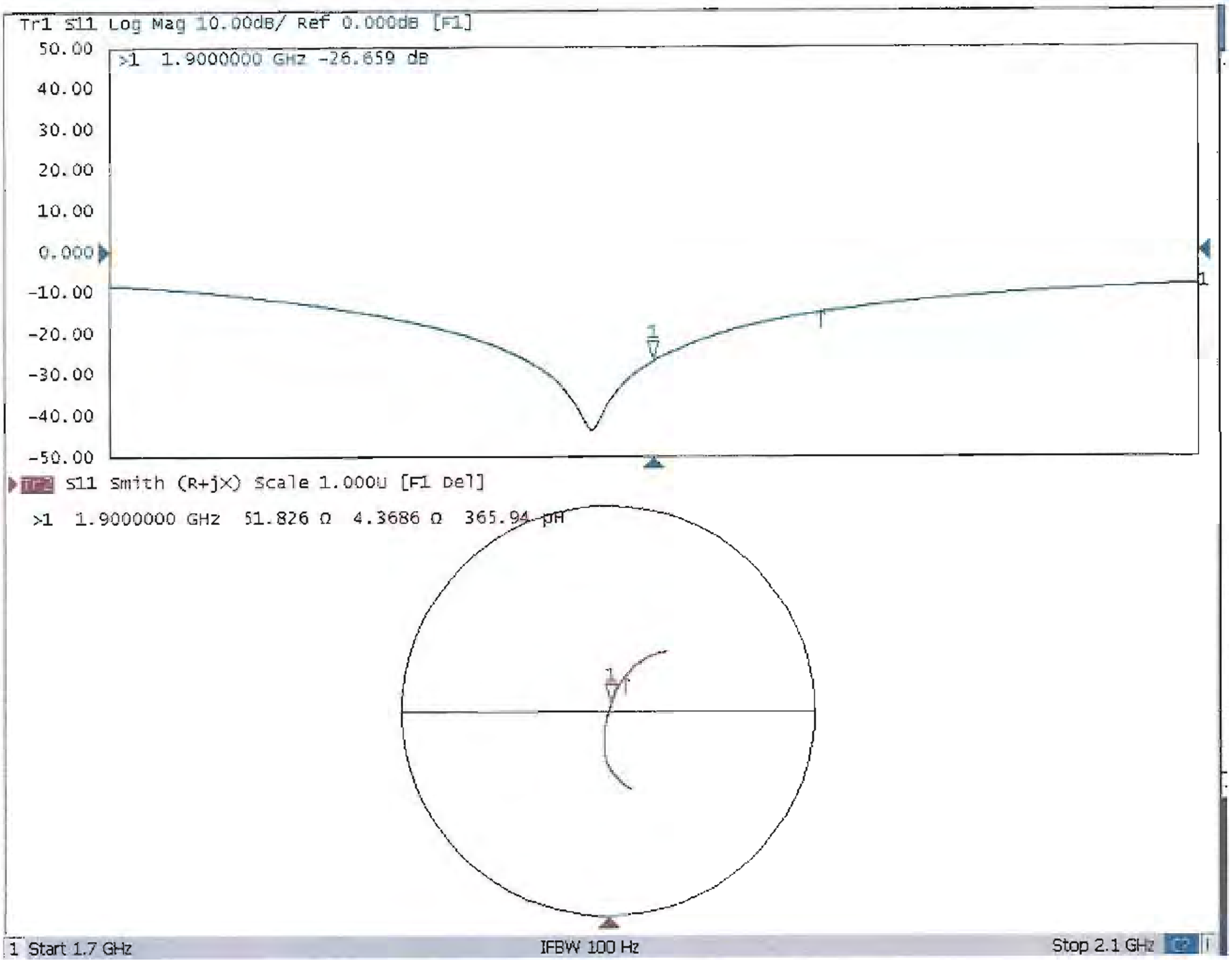
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL Date: 08.25.2016

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d210

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.508 S/m; ε_r = 53.92; ρ = 1000 kg/m^3

Phantom section: Left Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(7.74, 7.74, 7.74); Calibrated: 8/26/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn777; Calibrated: 8/26/2015
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

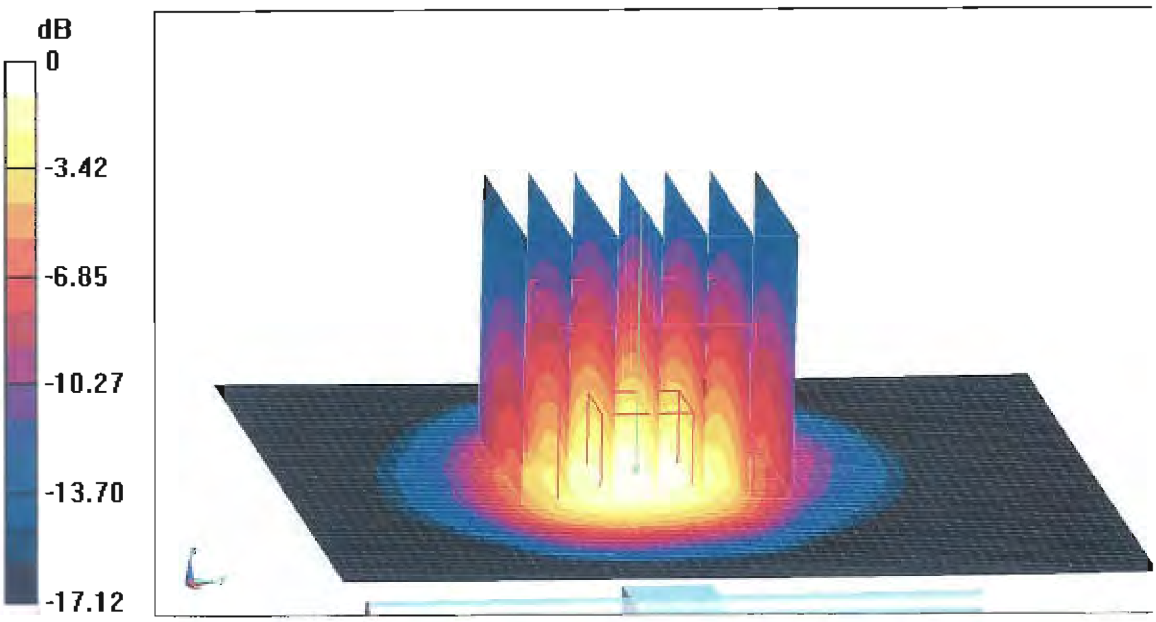
System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.92 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 17.8 W/kg

SAR(1 g) = 10 W/kg; SAR(10 g) = 5.32 W/kg

Maximum value of SAR (measured) = 14.1 W/kg



0 dB = 14.1 W/kg = 11.49 dBW/kg

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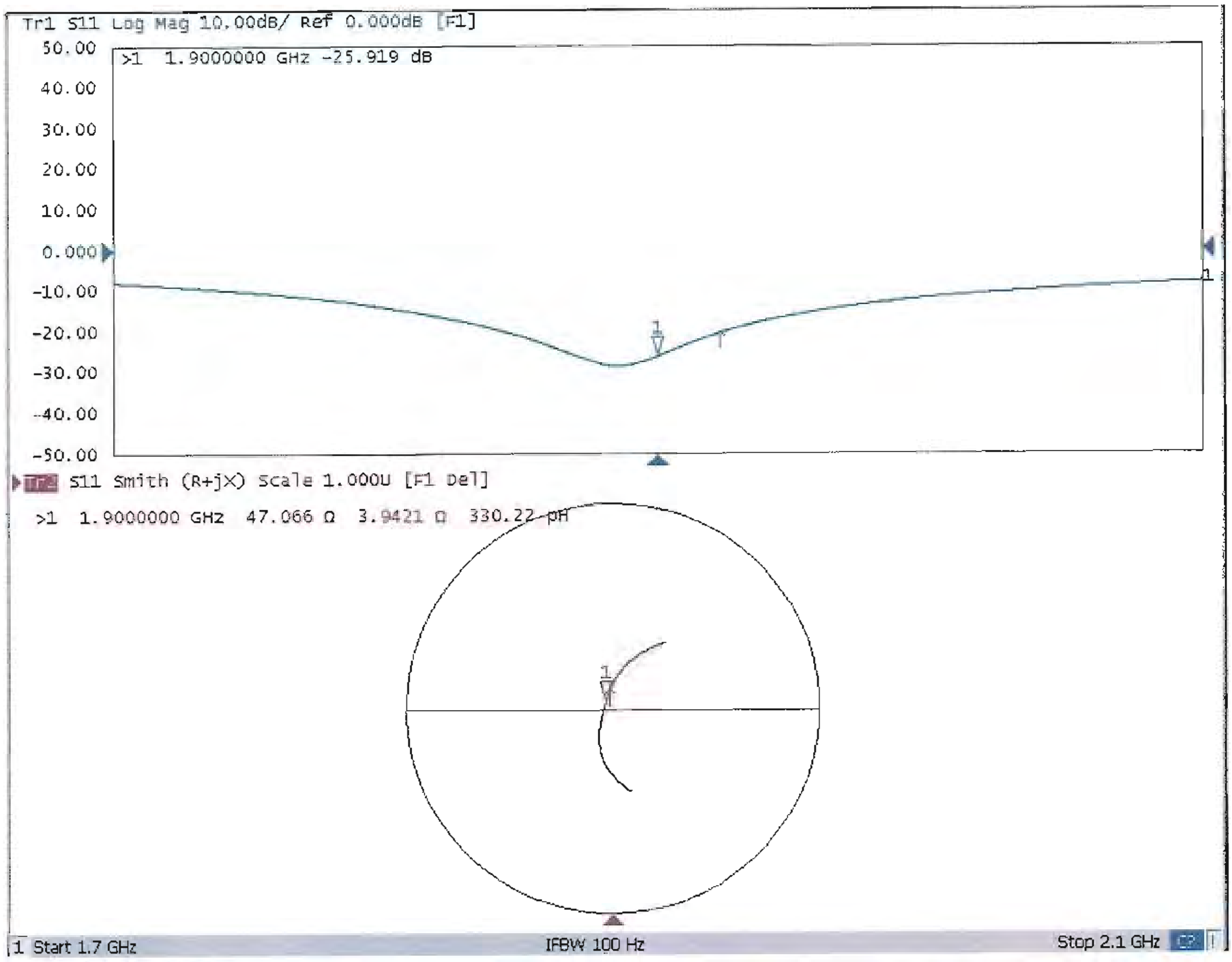
Impedance Measurement Plot for Body TSL



Calibration Laboratory of
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Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **Sporton (Auden)**

Certificate No: D2300V2-1006_Jan17

CALIBRATION CERTIFICATE

Object	D2300V2 - SN:1006
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	January 25, 2017

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	31-Dec-16 (No. EX3-7349_Dec16)	Dec-17
DAE4	SN: 601	04-Jan-17 (No. DAE4-601_Jan17)	Jan-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Johannes Kurikka	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 25, 2017

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S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
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 k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2300 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.5	1.67 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.5 ± 6 %	1.72 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	12.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**49.0 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.95 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.5 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.9	1.81 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.1 ± 6 %	1.85 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**47.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.81 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.1 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.7 Ω - 4.1 jΩ
Return Loss	- 27.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.6 Ω - 2.9 jΩ
Return Loss	- 25.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.167 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	SPEAG
Manufactured on	December 23, 2006

DASY5 Validation Report for Head TSL

Date: 25.01.2017

Test Laboratory: SPEAG, Zurich, Switzerland

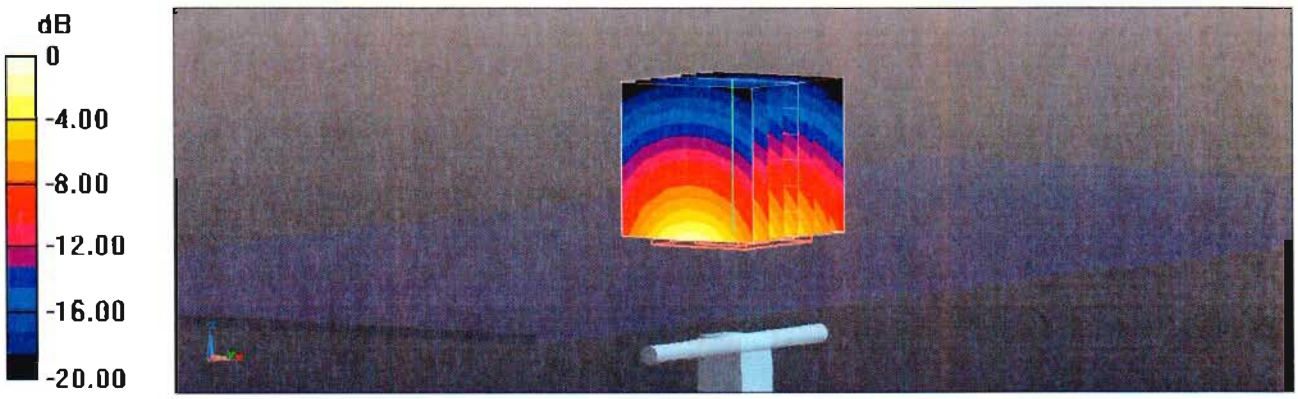
DUT: Dipole 2300 MHz; Type: D2300V2; Serial: D2300V2 - SN:1006

Communication System: UID 0 - CW; Frequency: 2300 MHz
Medium parameters used: f = 2300 MHz; σ = 1.72 S/m; ε_r = 38.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

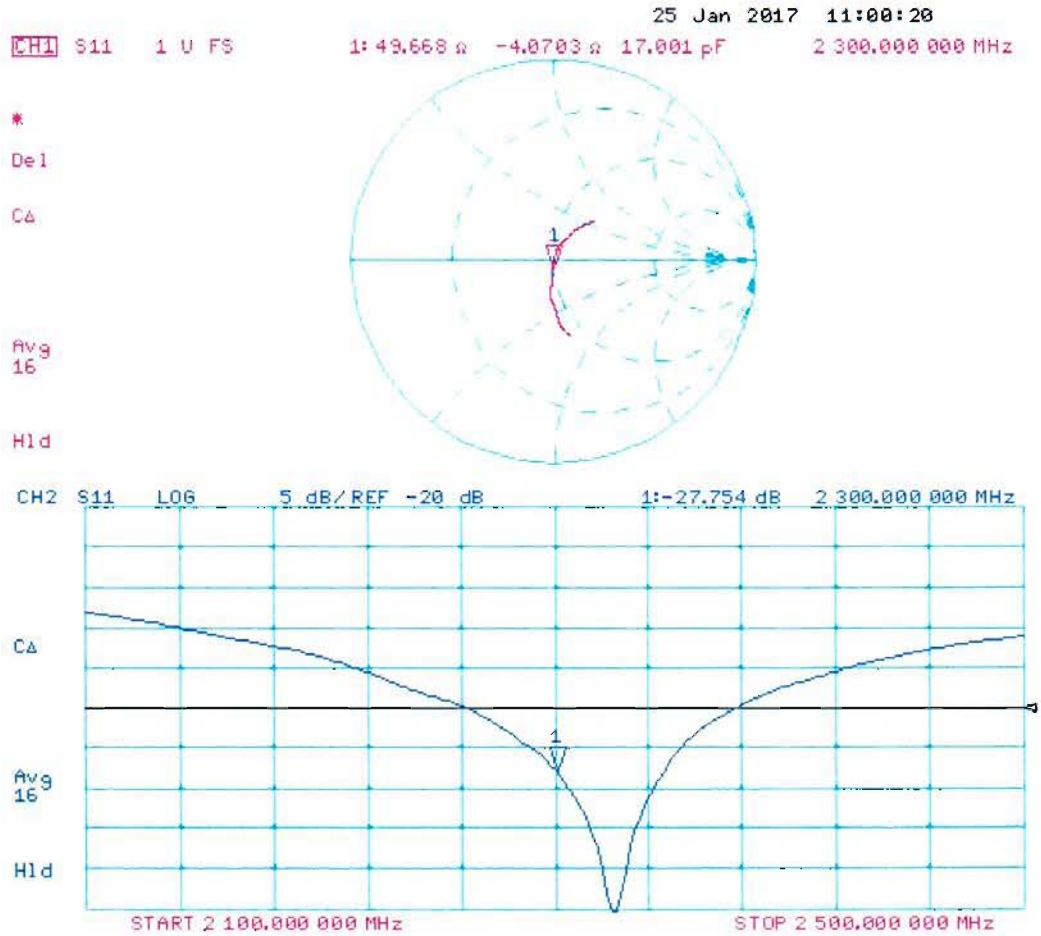
- Probe: EX3DV4 - SN7349; ConvF(7.99, 7.99, 7.99); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.01.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 113.5 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 25.3 W/kg
SAR(1 g) = 12.5 W/kg; SAR(10 g) = 5.95 W/kg
Maximum value of SAR (measured) = 20.3 W/kg



0 dB = 20.3 W/kg = 13.07 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 18.01.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: D2300V2 - SN:1006

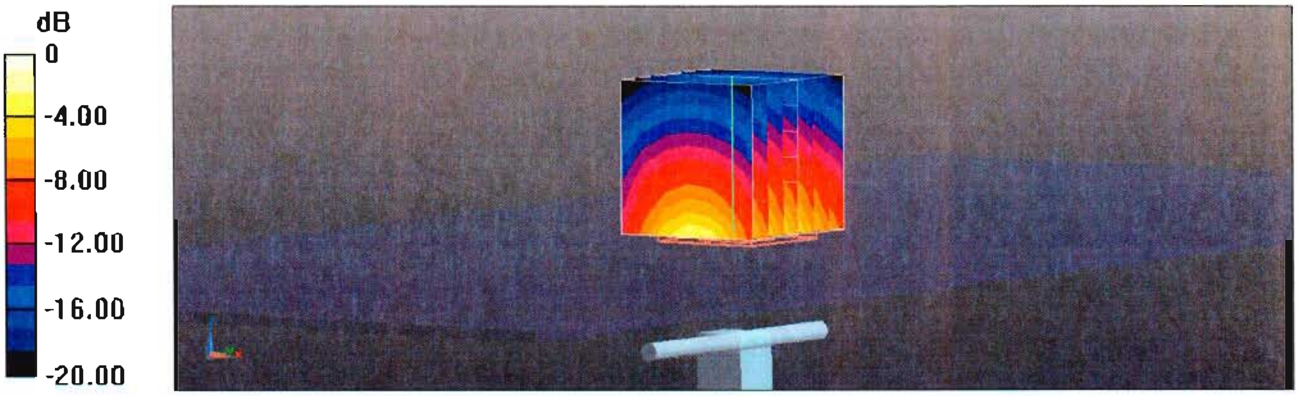
Communication System: UID 0 - CW; Frequency: 2300 MHz
Medium parameters used: f = 2300 MHz; σ = 1.85 S/m; ε_r = 53.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.79, 7.79, 7.79); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.01.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

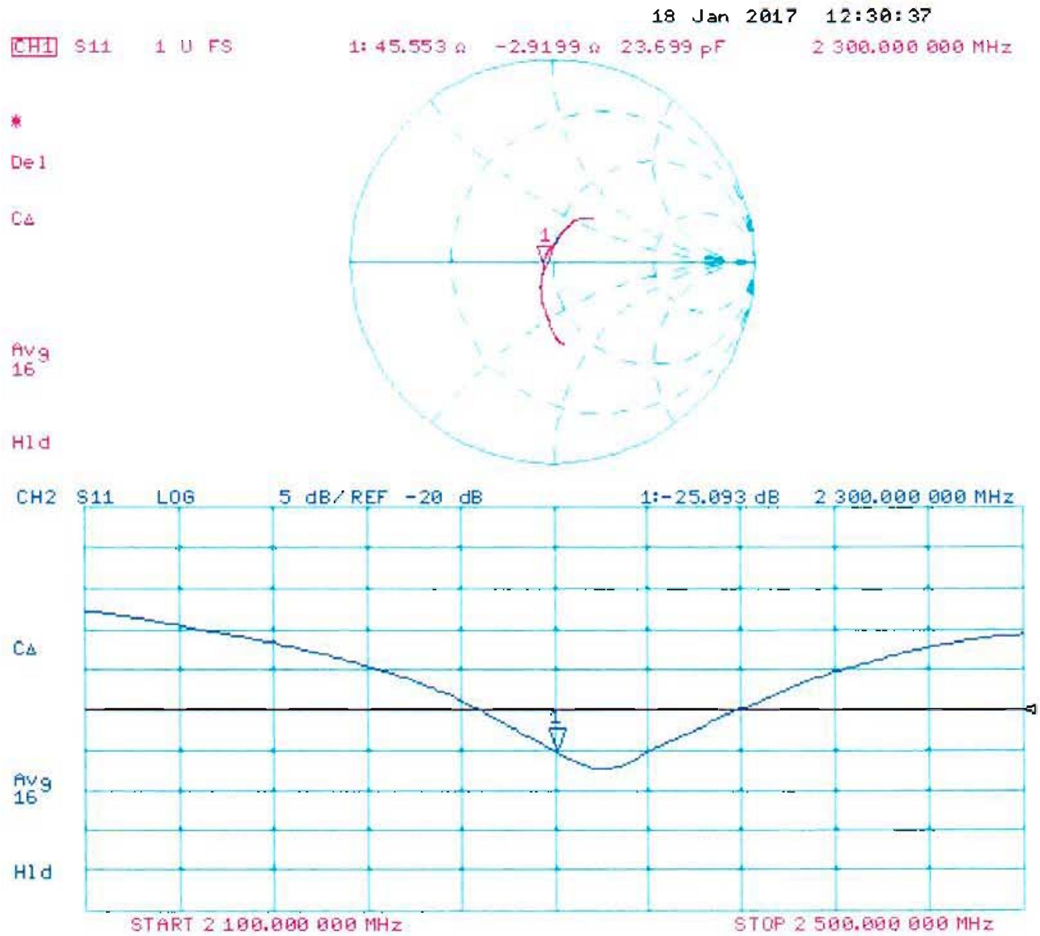
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 106.6 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 23.9 W/kg
SAR(1 g) = 12.1 W/kg; SAR(10 g) = 5.81 W/kg
Maximum value of SAR (measured) = 19.5 W/kg



0 dB = 19.5 W/kg = 12.90 dBW/kg

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client Sporton-TW (Auden)

Certificate No: D2450V2-926_Jul16

CALIBRATION CERTIFICATE

Object	D2450V2 - SN:926
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	July 25, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 26, 2016

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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
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 k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.0 ± 6 %	1.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**52.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.22 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.5 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.8 ± 6 %	2.03 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**51.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.07 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.0 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.3 Ω + 3.7 jΩ
Return Loss	- 25.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.3 Ω + 5.0 jΩ
Return Loss	- 26.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.155 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	SPEAG
Manufactured on	September 26, 2013

DASY5 Validation Report for Head TSL

Date: 25.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

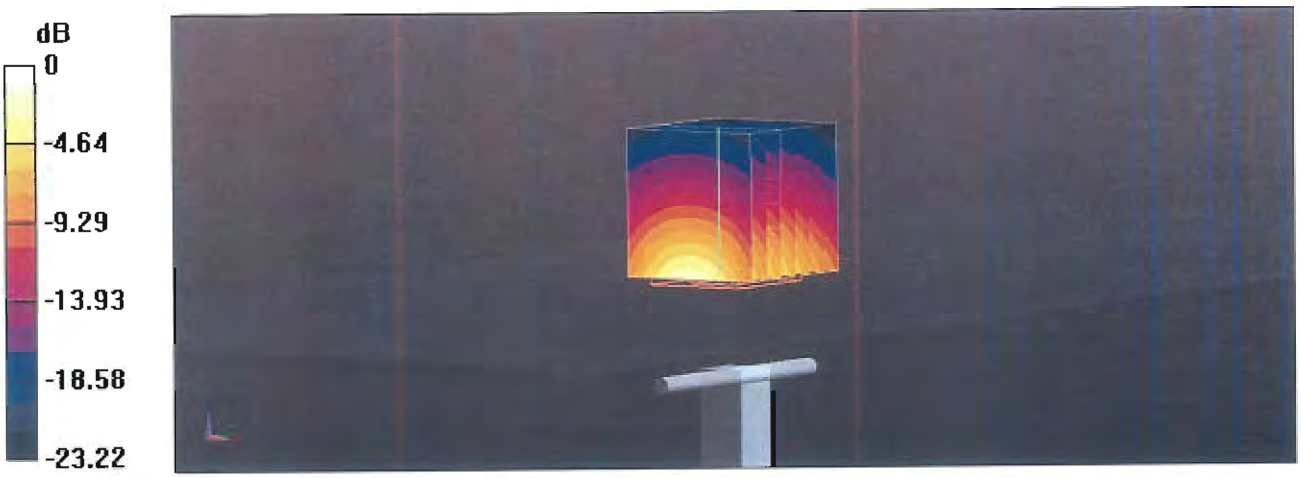
DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:926

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.86 S/m; ε_r = 38; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

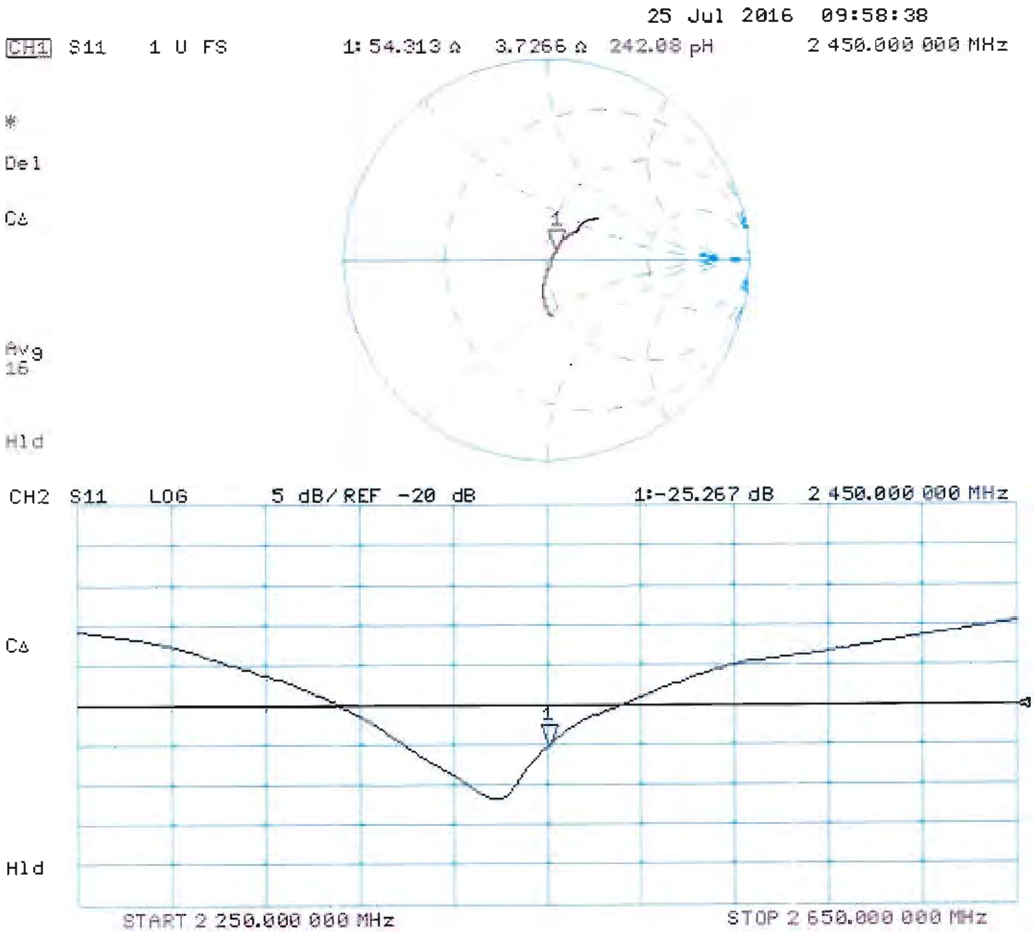
- Probe: EX3DV4 - SN7349; ConvF(7.72, 7.72, 7.72); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 114.2 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 27.6 W/kg
SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.22 W/kg
Maximum value of SAR (measured) = 22.3 W/kg



0 dB = 22.3 W/kg = 13.48 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 25.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:926

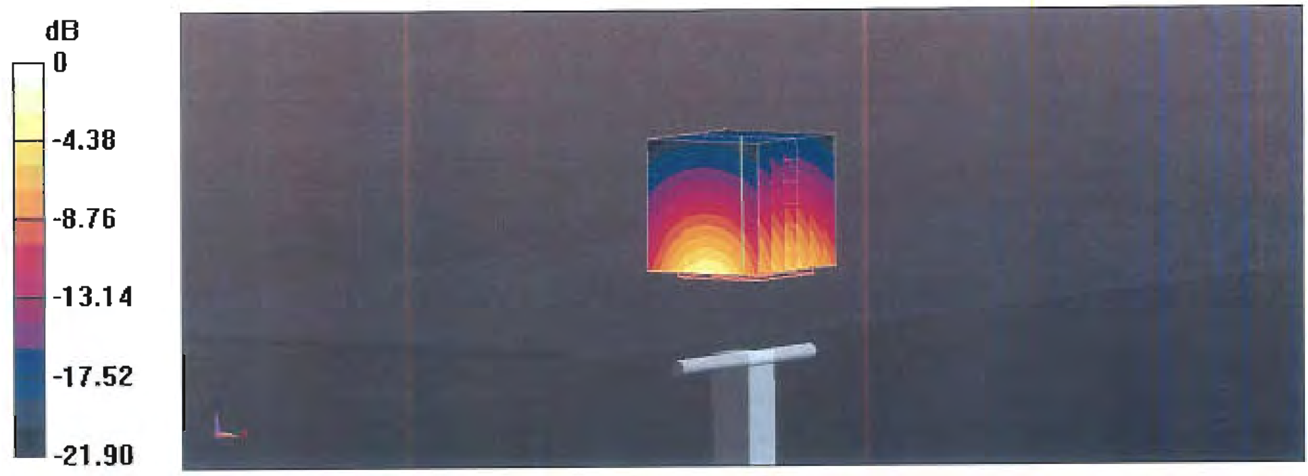
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.03 S/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.79, 7.79, 7.79); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

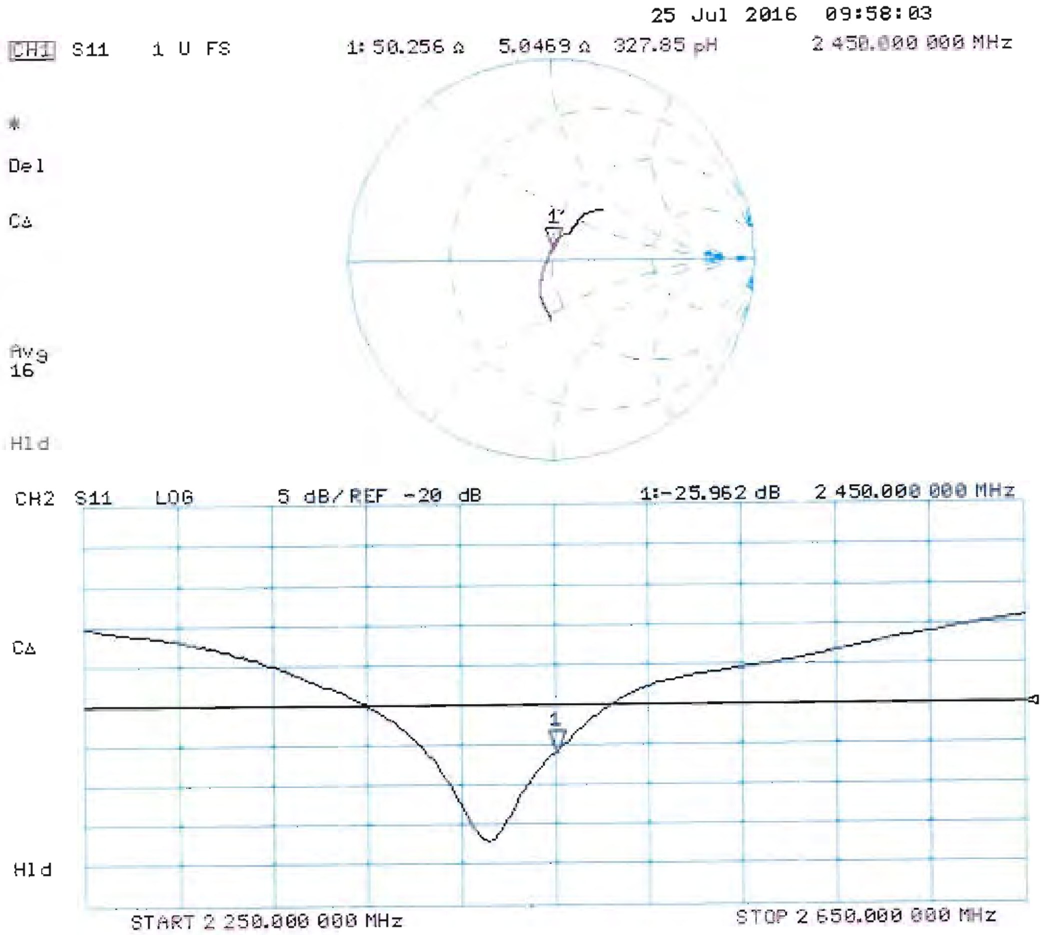
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 107.2 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 26.3 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.07 W/kg
Maximum value of SAR (measured) = 21.4 W/kg



0 dB = 21.4 W/kg = 13.30 dBW/kg

Impedance Measurement Plot for Body TSL



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CALIBRATION
CNAS L0570

Client **Sporton_TW** **Certificate No: Z16-97132**

CALIBRATION CERTIFICATE

Object D2600V2 - SN: 1008

Calibration Procedure(s) FD-Z11-2-003-01
Calibration Procedures for dipole validation kits

Calibration date: August 30, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	01-Jul-15 (CTTL, No.J15X04256)	Jun-16
Power sensor NRP-Z91	101547	01-Jul-15 (CTTL, No.J15X04256)	Jun-16
Reference Probe EX3DV4	SN 3801	29-Jun-16(SPEAG,No.EX3-3801_Jun16)	Jun-17
DAE4	SN 777	22-Aug-16(CTTL-SPEAG,No.Z16-97138)	Aug-17
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	01-Feb-16 (CTTL, No.J16X00893)	Jan-17
Network Analyzer E5071C	MY46110673	26-Jan-16 (CTTL, No.J16X00894)	Jan-17

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: September 1, 2016

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E-mail: cttl@chinattl.com Http://www.chinattl.cn

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,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, "Procedure to measure the Specific Absorption Rate (SAR) For hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005
c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
d) KDB865664, 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 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	DASY52	52.8.8.1258
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.4 ± 6 %	1.97 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**56.8 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.40 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**25.6 mW /g ± 20.4 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.2 ± 6 %	2.18 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.9 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**55.2 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	6.28 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**25.0 mW /g ± 20.4 % (k=2)**

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.3Ω- 1.82jΩ
Return Loss	- 31.8dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.8Ω- 1.91jΩ
Return Loss	- 26.4dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.046 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	SPEAG

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E-mail: cttl@chinattl.com Http://www.chinattl.cn

DASY5 Validation Report for Head TSL Date: 08.30.2016

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1008

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2600 MHz; σ = 1.974 S/m; εr = 39.43; ρ = 1000 kg/m3

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(6.64, 6.64, 6.64); Calibrated: 6/29/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn777; Calibrated: 8/22/2016
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

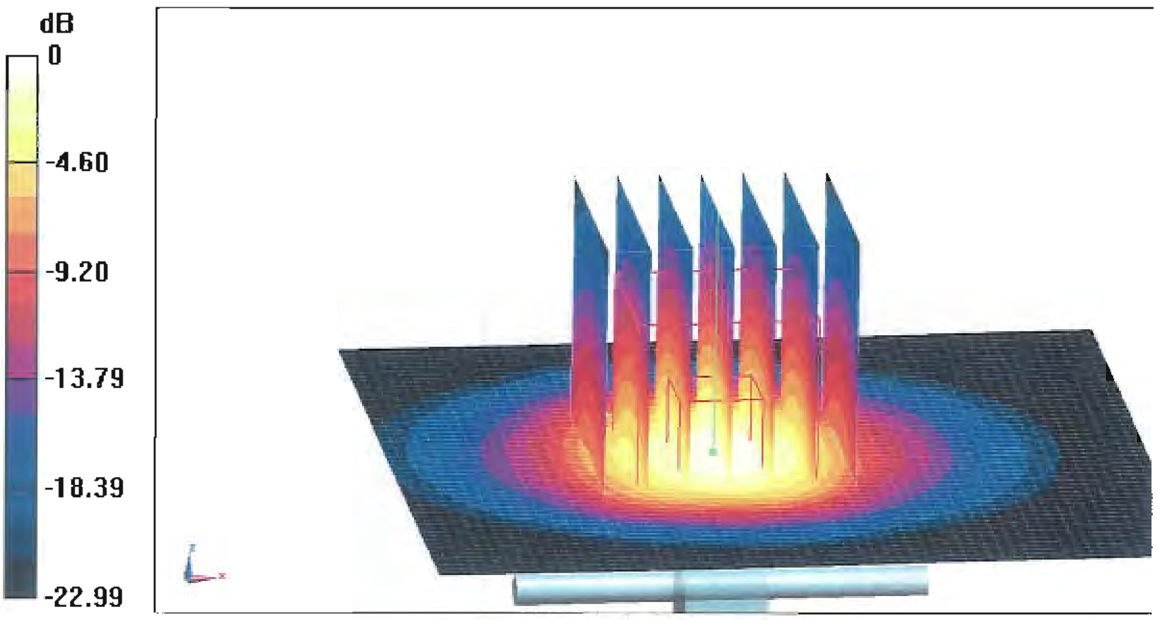
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 107.4 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 30.0 W/kg

SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.4 W/kg

Maximum value of SAR (measured) = 22.1 W/kg



0 dB = 22.1 W/kg = 13.44 dBW/kg

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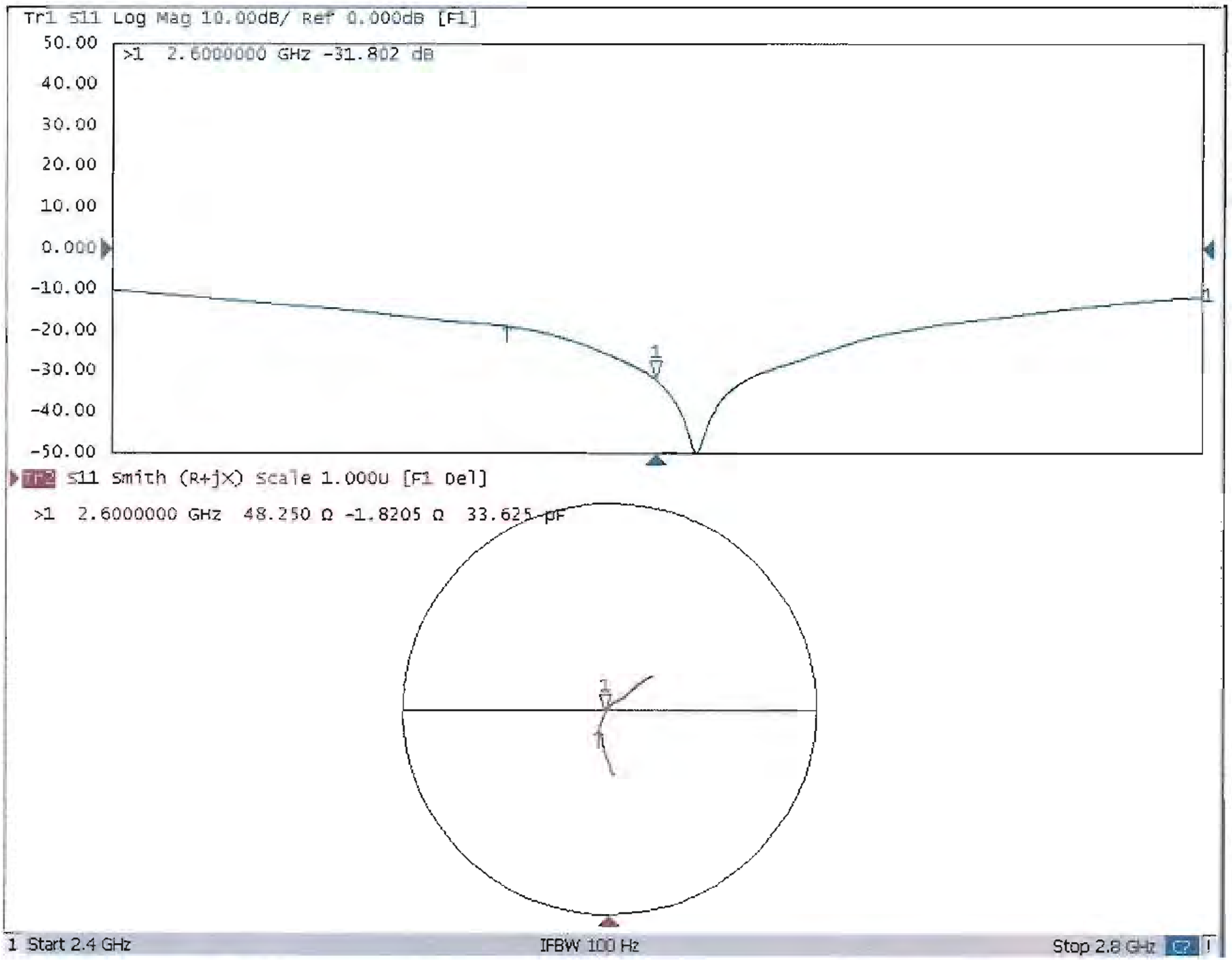
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL Date: 08.30.2016

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1008

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2600 MHz; σ = 2.184 S/m; ε_r = 52.15; ρ = 1000 kg/m^3

Phantom section: Left Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(6.7, 6.7,6.7); Calibrated: 6/29/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn777; Calibrated: 8/22/2016
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

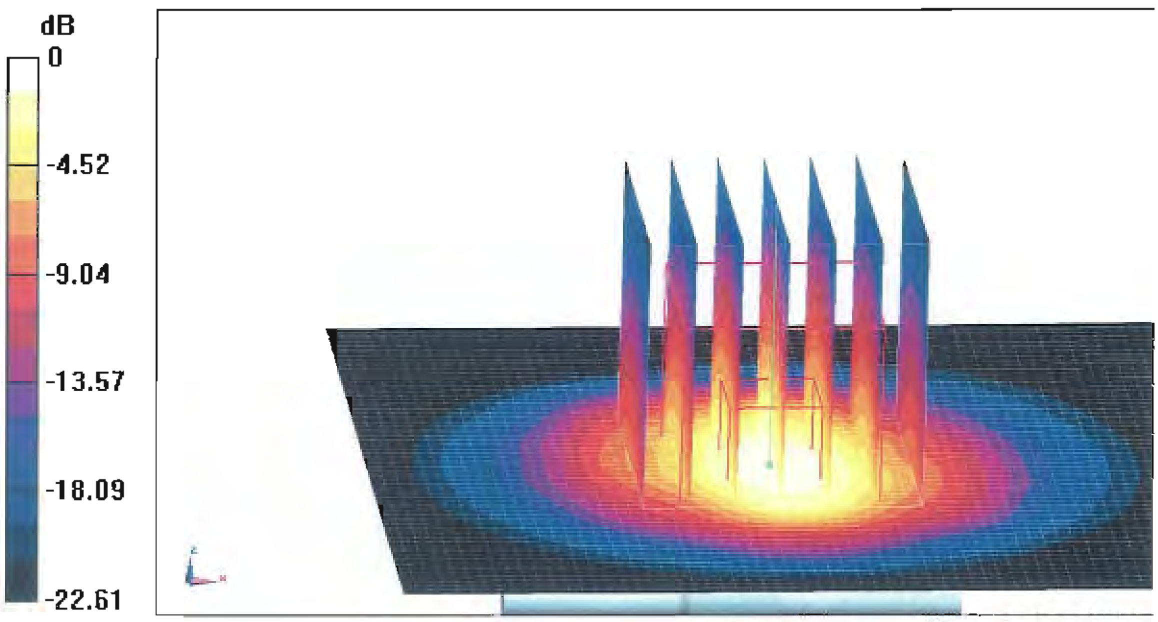
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.70 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 28.8 W/kg

SAR(1 g) = 13.9 W/kg; SAR(10 g) = 6.28 W/kg

Maximum value of SAR (measured) = 21.3 W/kg



0 dB = 21.3 W/kg = 13.28 dBW/kg

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
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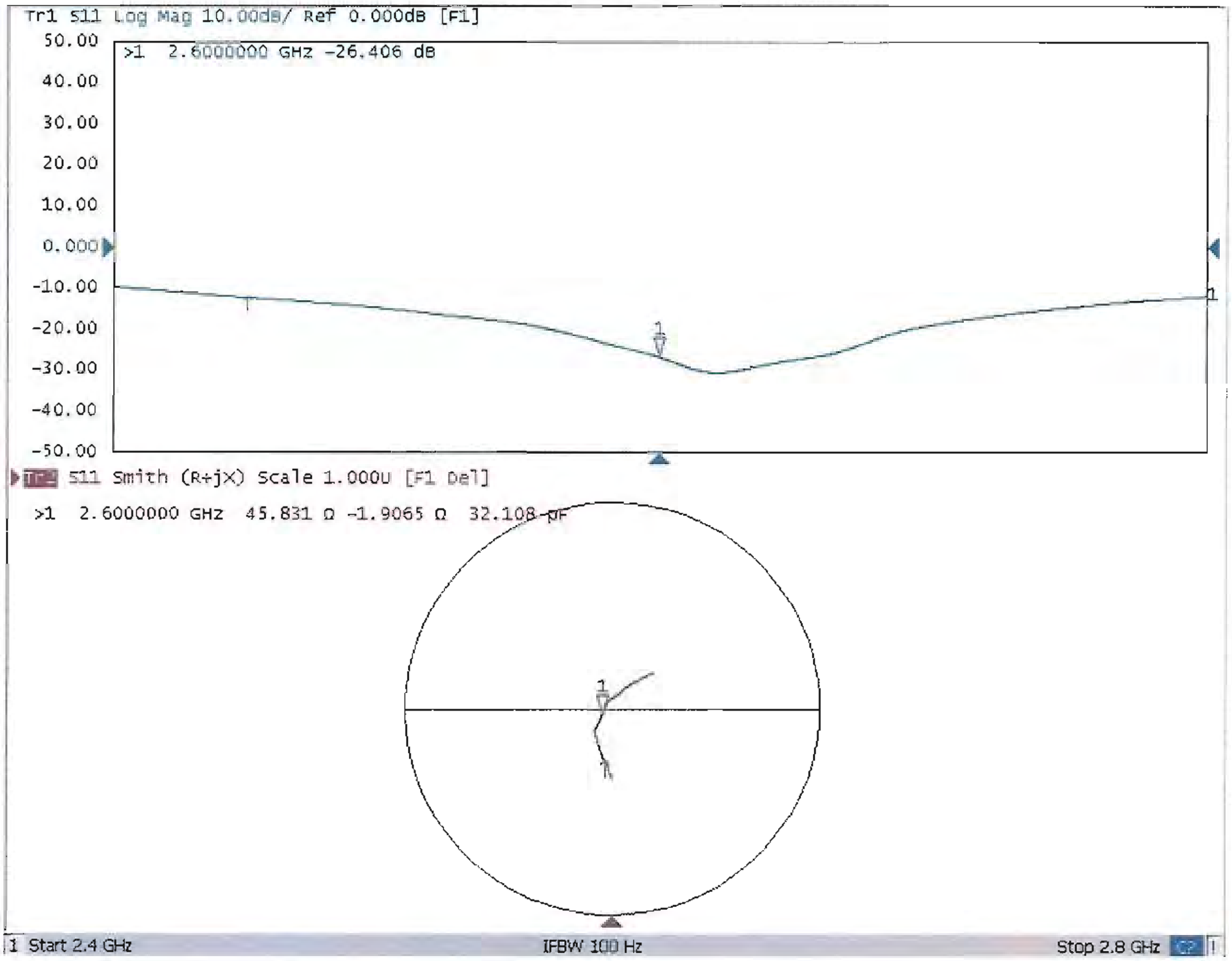
E-mail: cttl@chinattl.com Http://www.chinattl.cn

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
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Accreditation No.: SCS 0108

Client Sporton-TW (Auden)

Certificate No: D5GHzV2-1006_Sep16

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN:1006
Calibration procedure(s)	QA CAL-22.v2 Calibration procedure for dipole validation kits between 3-6 GHz
Calibration date:	September 27, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 3503	30-Jun-16 (No. EX3-3503_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 27, 2016

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Accreditation No.: SCS 0108

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 62209-2, "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
c) KDB 865664, “SAR Measurement Requirements for 100 MHz to 6 GHz”

Additional Documentation:

d) 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 k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.5 ± 6 %	4.59 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.13 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.6 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.32 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.9 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.0 ± 6 %	4.93 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.8 W / kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.7 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	33.8 ± 6 %	5.08 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.14 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.30 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.7 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.36 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.4 ± 6 %	5.52 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5250 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.59 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**75.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.13 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.2 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.8 ± 6 %	6.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.90 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**78.6 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.22 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.0 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.3	5.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.5 ± 6 %	6.21 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5750 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.50 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**74.6 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.10 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.8 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	55.6 Ω - 6.5 jΩ
Return Loss	- 21.8 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	57.5 Ω - 4.7 jΩ
Return Loss	- 21.7 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	59.2 Ω + 5.8 jΩ
Return Loss	- 20.1 dB

Antenna Parameters with Body TSL at 5250 MHz

Impedance, transformed to feed point	55.5 Ω - 3.4 jΩ
Return Loss	- 24.2 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	59.3 Ω - 1.9 jΩ
Return Loss	- 21.2 dB

Antenna Parameters with Body TSL at 5750 MHz

Impedance, transformed to feed point	58.8 Ω + 8.9 jΩ
Return Loss	- 18.8 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	SPEAG
Manufactured on	August 28, 2003

DASY5 Validation Report for Head TSL

Date: 27.09.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1006

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; σ = 4.59 S/m; ε_r = 34.5; ρ = 1000 kg/m^3
Medium parameters used: f = 5600 MHz; σ = 4.93 S/m; ε_r = 34.0; ρ = 1000 kg/m^3
Medium parameters used: f = 5750 MHz; σ = 5.08 S/m; ε_r = 33.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

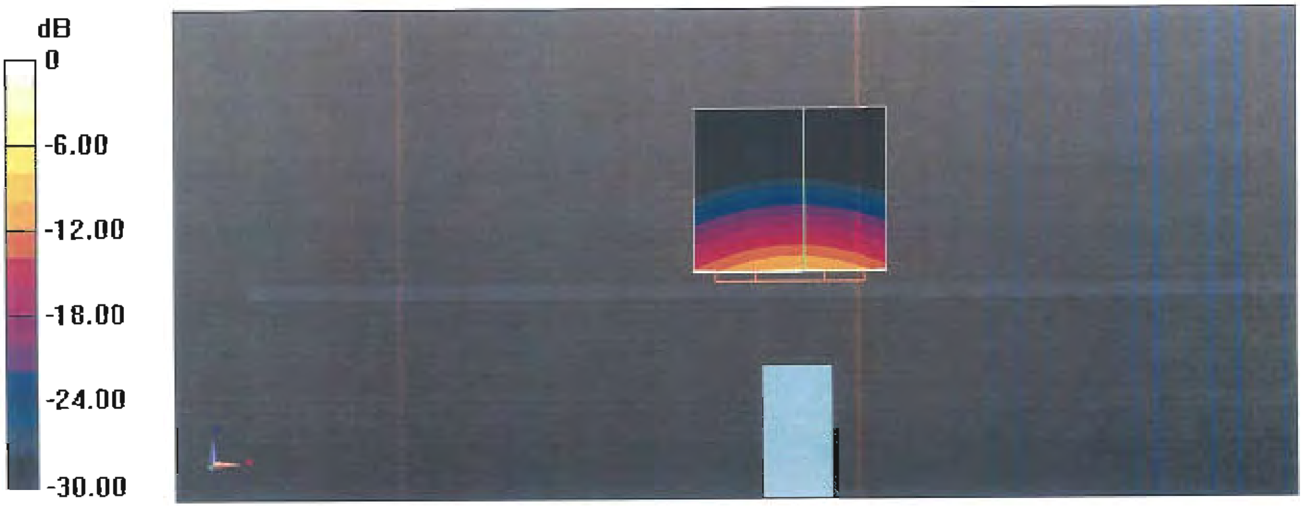
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.42, 5.42, 5.42); Calibrated: 30.06.2016, ConvF(4.89, 4.89, 4.89); Calibrated: 30.06.2016, ConvF(4.85, 4.85, 4.85); Calibrated: 30.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.67 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 29.4 W/kg
SAR(1 g) = 8.13 W/kg; SAR(10 g) = 2.32 W/kg
Maximum value of SAR (measured) = 18.2 W/kg

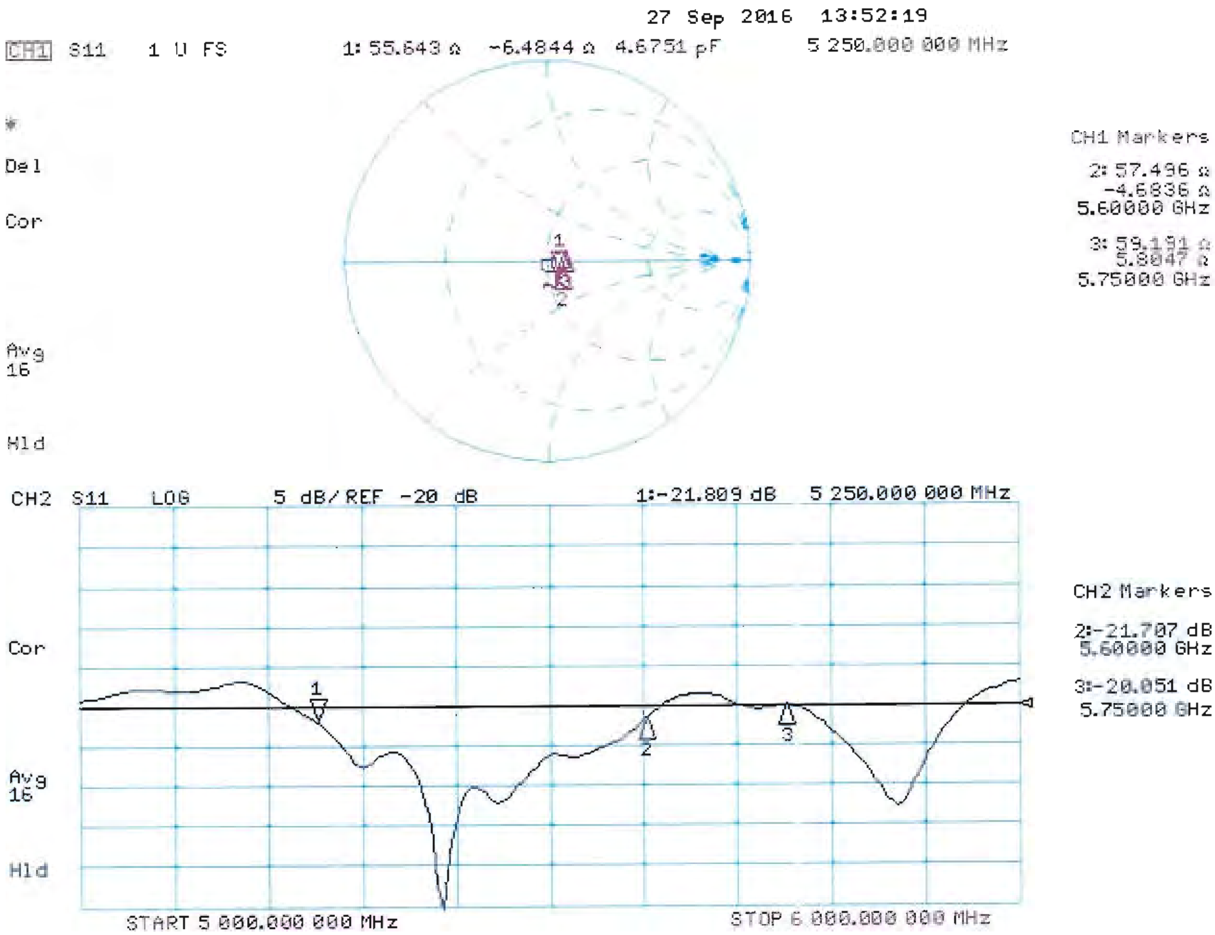
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.60 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 33.1 W/kg
SAR(1 g) = 8.47 W/kg; SAR(10 g) = 2.4 W/kg
Maximum value of SAR (measured) = 19.7 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 70.56 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 33.0 W/kg
SAR(1 g) = 8.14 W/kg; SAR(10 g) = 2.3 W/kg
Maximum value of SAR (measured) = 19.2 W/kg



0 dB = 19.2 W/kg = 12.83 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 26.09.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1006

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; σ = 5.52 S/m; ε_r = 47.4; ρ = 1000 kg/m^3
Medium parameters used: f = 5600 MHz; σ = 6.00 S/m; ε_r = 46.8; ρ = 1000 kg/m^3
Medium parameters used: f = 5750 MHz; σ = 6.21 S/m; ε_r = 46.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

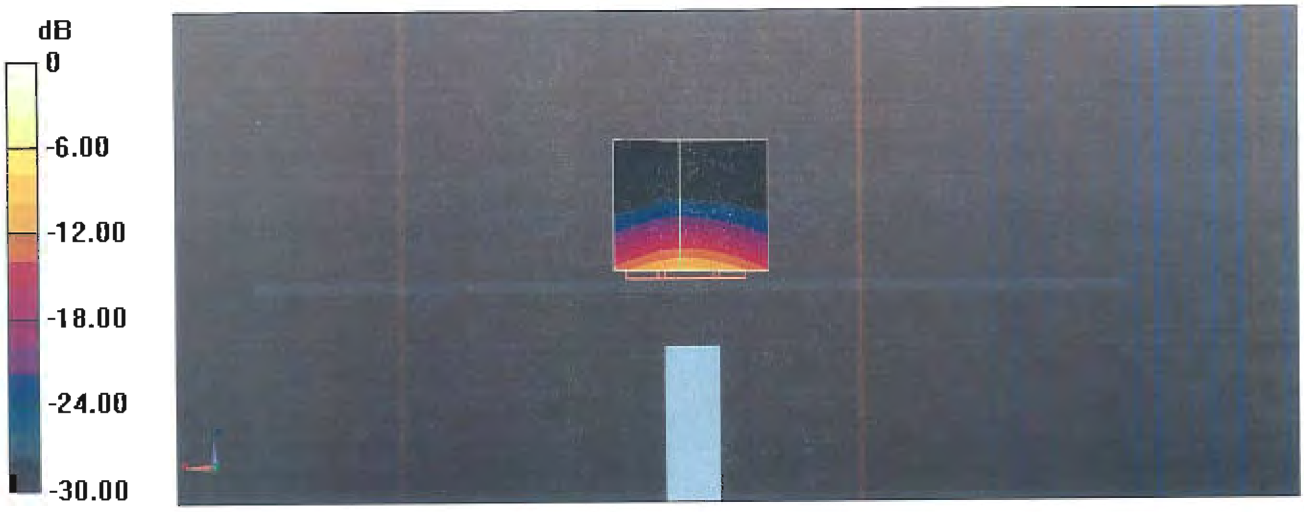
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.85, 4.85, 4.85); Calibrated: 30.06.2016, ConvF(4.35, 4.35, 4.35); Calibrated: 30.06.2016, ConvF(4.3, 4.3, 4.3); Calibrated: 30.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 66.79 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 28.8 W/kg
SAR(1 g) = 7.59 W/kg; SAR(10 g) = 2.13 W/kg
Maximum value of SAR (measured) = 17.9 W/kg

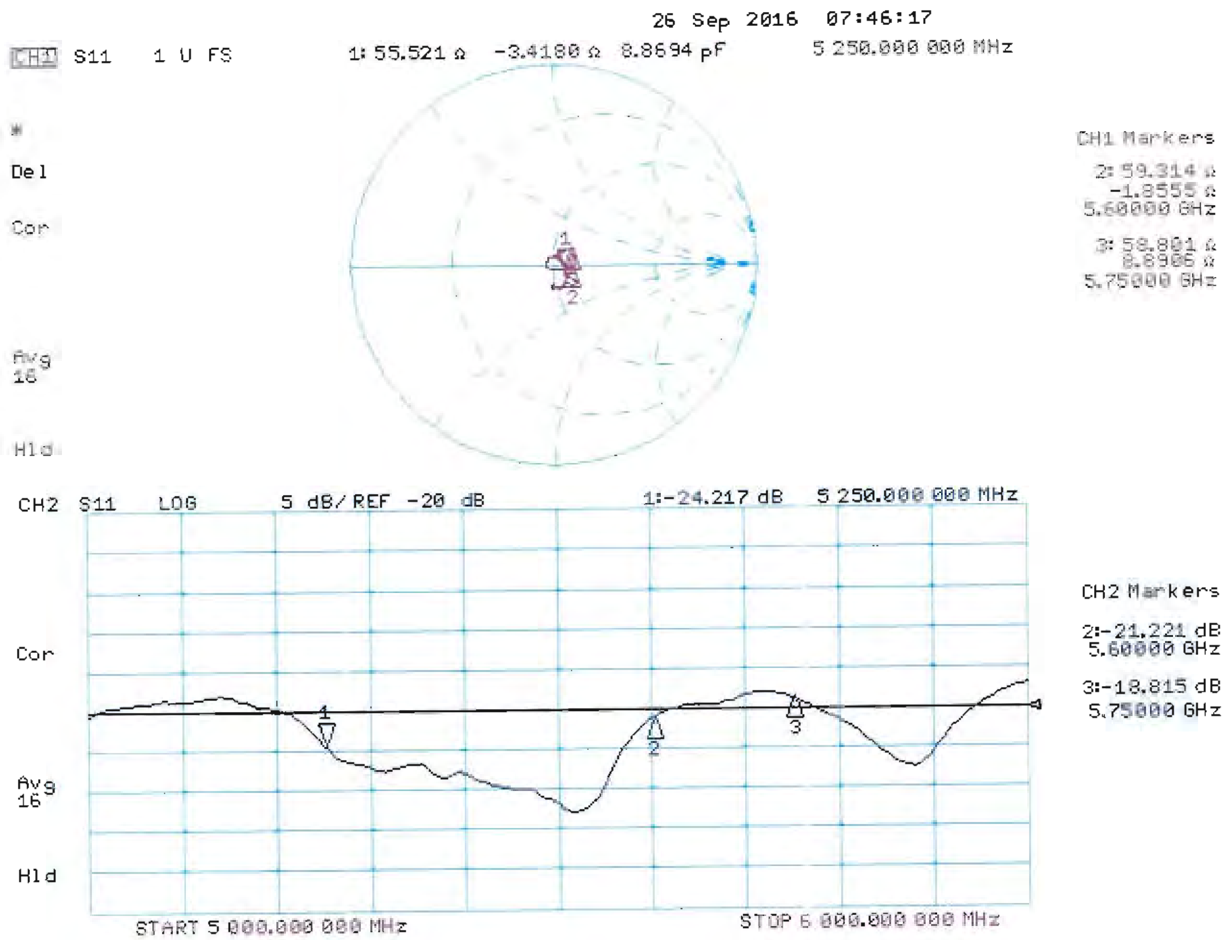
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 67.00 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 32.5 W/kg
SAR(1 g) = 7.9 W/kg; SAR(10 g) = 2.22 W/kg
Maximum value of SAR (measured) = 19.0 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.64 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 32.2 W/kg
SAR(1 g) = 7.5 W/kg; SAR(10 g) = 2.1 W/kg
Maximum value of SAR (measured) = 18.5 W/kg



0 dB = 18.5 W/kg = 12.67 dBW/kg

Impedance Measurement Plot for Body TSL



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Swiss Calibration Service

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **Auden**

Certificate No: **DAE4-916_Dec16**

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BK - SN: 916
Calibration procedure(s)	QA CAL-06.v29 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	December 15, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	09-Sep-16 (No:19065)	Sep-17
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	05-Jan-16 (in house check)	In house check: Jan-17
Calibrator Box V2.1	SE UMS 006 AA 1002	05-Jan-16 (in house check)	In house check: Jan-17

	Name	Function	Signature
Calibrated by:	Adrian Gehring	Technician	A. Gehring
Approved by:	Fin Bomholt	Deputy Technical Manager	i.V.

Issued: December 15, 2016

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

Glossary

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

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.......+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	403.882 ± 0.02% (k=2)	403.668 ± 0.02% (k=2)	403.797 ± 0.02% (k=2)
Low Range	3.97364 ± 1.50% (k=2)	3.98713 ± 1.50% (k=2)	3.98098 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	238.0 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200031.81	-1.22	-0.00
Channel X	+ Input	20007.13	2.51	0.01
Channel X	- Input	-20002.69	2.85	-0.01
Channel Y	+ Input	200029.98	-2.72	-0.00
Channel Y	+ Input	20006.28	1.71	0.01
Channel Y	- Input	-20005.88	-0.17	0.00
Channel Z	+ Input	200030.72	-2.46	-0.00
Channel Z	+ Input	20004.72	0.25	0.00
Channel Z	- Input	-20007.38	-1.48	0.01

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2000.95	0.20	0.01
Channel X	+ Input	200.73	-0.09	-0.05
Channel X	- Input	-199.18	-0.10	0.05
Channel Y	+ Input	2000.61	-0.06	-0.00
Channel Y	+ Input	200.03	-0.76	-0.38
Channel Y	- Input	-200.51	-1.26	0.63
Channel Z	+ Input	2001.22	0.58	0.03
Channel Z	+ Input	199.16	-1.53	-0.76
Channel Z	- Input	-200.72	-1.37	0.69

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	3.76	2.39
	- 200	-1.64	-3.85
Channel Y	200	-16.60	-16.77
	- 200	15.75	15.23
Channel Z	200	-23.25	-22.87
	- 200	20.50	20.71

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	-0.82	-3.02
Channel Y	200	5.35	-	0.36
Channel Z	200	8.41	2.98	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15873	13890
Channel Y	16099	15731
Channel Z	15951	14368

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.27	-0.60	1.03	0.34
Channel Y	0.15	-0.84	0.90	0.36
Channel Z	-0.38	-1.92	0.87	0.46

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	–0.01	-8	-9

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Accreditation No.: SCS 0108

Client Sporton - TW (Auden)

Certificate No: DAE3-577_Sep16

CALIBRATION CERTIFICATE

Object	DAE3 - SD 000 D03 AA - SN: 577
Calibration procedure(s)	QA CAL-06.v29 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	September 28, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	09-Sep-16 (No:19065)	Sep-17
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	05-Jan-16 (in house check)	In house check: Jan-17
Calibrator Box V2.1	SE UMS 006 AA 1002	05-Jan-16 (in house check)	In house check: Jan-17

	Name	Function	Signature
Calibrated by:	Eric Hainfeld	Technician	
Approved by:	Fin Bomholt	Deputy Technical Manager	i.V.

Issued: September 28, 2016

Glossary

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

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.......+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	**X**	**Y**	**Z**
High Range	403.533 ± 0.02% (k=2)	403.512 ± 0.02% (k=2)	403.819 ± 0.02% (k=2)
Low Range	3.92648 ± 1.50% (k=2)	3.94206 ± 1.50% (k=2)	3.96074 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	190.0 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200038.14	2.56	0.00
Channel X	+ Input	20010.51	5.45	0.03
Channel X	- Input	-20002.01	3.17	-0.02
Channel Y	+ Input	200032.33	-3.18	-0.00
Channel Y	+ Input	20006.38	1.35	0.01
Channel Y	- Input	-20004.73	0.65	-0.00
Channel Z	+ Input	200031.49	-4.11	-0.00
Channel Z	+ Input	20005.92	0.98	0.00
Channel Z	- Input	-20007.03	-1.64	0.01

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2001.00	-0.10	-0.01
Channel X	+ Input	201.47	0.40	0.20
Channel X	- Input	-198.57	0.28	-0.14
Channel Y	+ Input	2001.38	0.31	0.02
Channel Y	+ Input	200.40	-0.54	-0.27
Channel Y	- Input	-199.63	-0.73	0.37
Channel Z	+ Input	2000.35	-0.56	-0.03
Channel Z	+ Input	199.97	-0.93	-0.46
Channel Z	- Input	-200.50	-1.56	0.79

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	-2.76	-4.30
	- 200	6.04	3.73
Channel Y	200	-14.29	-14.35
	- 200	12.74	12.77
Channel Z	200	3.10	2.81
	- 200	-5.90	-5.65

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	-1.07	-3.44
Channel Y	200	8.43	-	0.12
Channel Z	200	5.44	4.83	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	16132	16062
Channel Y	16099	16321
Channel Z	16116	15372

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.37	-1.07	1.49	0.43
Channel Y	1.21	-0.41	3.21	0.59
Channel Z	-1.38	-2.63	-0.30	0.45

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	–0.01	-8	-9

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Accreditation No.: SCS 0108

Client **Sony Mobile CN (Vitec)**

Certificate No: DAE4-853_Jul16

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BM - SN: 853
Calibration procedure(s)	QA CAL-06.v29 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	July 11, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	09-Sep-15 (No:17153)	Sep-16
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	05-Jan-16 (in house check)	In house check: Jan-17
Calibrator Box V2.1	SE UMS 006 AA 1002	05-Jan-16 (in house check)	In house check: Jan-17

	Name	Function	Signature
Calibrated by:	Dominique Steffen	Technician	
Approved by:	Fin Bomholt	Deputy Technical Manager	i.V.

Issued: July 11, 2016

Glossary

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

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
    - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
    - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
    - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
    - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
    - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
    - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
    - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
    - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
    - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range:	1LSB =	6.1μV ,	full range =	-100...+300 mV
Low Range:	1LSB =	61nV ,	full range =	-1.......+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	402.596 ± 0.02% (k=2)	403.253 ± 0.02% (k=2)	403.418 ± 0.02% (k=2)
Low Range	3.95372 ± 1.50% (k=2)	3.96515 ± 1.50% (k=2)	3.96696 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	268.5 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200035.92	2.04	0.00
Channel X	+ Input	20005.49	0.78	0.00
Channel X	- Input	-20003.97	1.10	-0.01
Channel Y	+ Input	200030.33	-3.67	-0.00
Channel Y	+ Input	20005.22	0.65	0.00
Channel Y	- Input	-20005.01	0.15	-0.00
Channel Z	+ Input	200032.22	-1.65	-0.00
Channel Z	+ Input	20003.78	-0.75	-0.00
Channel Z	- Input	-20006.53	-1.31	0.01

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2001.21	0.14	0.01
Channel X	+ Input	201.79	0.66	0.33
Channel X	- Input	-198.36	0.47	-0.24
Channel Y	+ Input	2000.60	-0.39	-0.02
Channel Y	+ Input	200.58	-0.42	-0.21
Channel Y	- Input	-199.60	-0.62	0.31
Channel Z	+ Input	2000.85	-0.14	-0.01
Channel Z	+ Input	199.94	-1.03	-0.51
Channel Z	- Input	-199.96	-0.94	0.47

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	-6.09	-8.11
	- 200	10.53	8.41
Channel Y	200	4.95	4.11
	- 200	-5.53	-5.79
Channel Z	200	0.72	0.75
	- 200	-3.16	-3.24

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	0.66	-3.22
Channel Y	200	7.41	-	1.96
Channel Z	200	10.10	4.84	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	16255	17664
Channel Y	16086	16244
Channel Z	16250	17243

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.45	-0.48	1.43	0.40
Channel Y	0.41	-0.76	1.55	0.38
Channel Z	-0.88	-2.21	0.03	0.41

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	–0.01	-8	-9

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Client **Sporton_TW** **Certificate No: Z16-97123**

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3270

Calibration Procedure(s) FD-Z11-2-004-01
Calibration Procedures for Dosimetric E-field Probes

Calibration date: August 26, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Power sensor NRP-Z91	101547	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Power sensor NRP-Z91	101548	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Reference10dBAttenuator	18N50W-10dB	13-Mar-16(CTTL,No.J16X01547)	Mar-18
Reference20dBAttenuator	18N50W-20dB	13-Mar-16(CTTL, No.J16X01548)	Mar-18
Reference Probe EX3DV4	SN 7307	19-Feb-16(SPEAG,No.EX3-7307_Feb16)	Feb-17
DAE4	SN 1331	21-Jan-16(SPEAG, No.DAE4-1331_Jan16)	Jan -17
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGeneratorMG3700A	6201052605	27-Jun-16 (CTTL, No.J16X04776)	Jun-17
Network Analyzer E5071C	MY46110673	26-Jan-16 (CTTL, No.J16X00894)	Jan -17

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: August 27, 2016

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Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A,B,C,D	modulation dependent linearization parameters
Polarization Φ	Φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i θ=0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005

c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010

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

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization θ=0 (f≤900MHz in TEM-cell; f>1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below ConvF).
- *NORM(f)x,y,z = NORMx,y,z* frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
- *Ax,y,z; Bx,y,z; Cx,y,z;VRx,y,z:*A,B,C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f≤800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from±50MHz to±100MHz.
- *Spherical isotropy (3D deviation from isotropy):* in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset:* The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle:* The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

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Probe ES3DV3

SN: 3270

Calibrated: August 26, 2016

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3270

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)^2)[A]	1.09	1.22	1.19	±10.8%
DCP(mV)[B]	100.9	103.3	101.0	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	274.7	±2.7%
		Y	0.0	0.0	1.0		295.4	
		Z	0.0	0.0	1.0		288.4	

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

[A] The uncertainties of Norm X, Y, Z do not affect the E^2-field uncertainty inside TSL (see Page 5 and Page 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainly is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3270

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
750	41.9	0.89	6.19	6.19	6.19	0.50	1.35	±12%
835	41.5	0.90	6.03	6.03	6.03	0.42	1.47	±12%
900	41.5	0.97	6.09	6.09	6.09	0.37	1.61	±12%
1750	40.1	1.37	5.21	5.21	5.21	0.52	1.53	±12%
1900	40.0	1.40	5.08	5.08	5.08	0.55	1.50	±12%
2000	40.0	1.40	4.98	4.98	4.98	0.57	1.47	±12%
2100	39.8	1.49	5.02	5.02	5.02	0.68	1.41	±12%
2450	39.2	1.80	4.51	4.51	4.51	0.73	1.30	±12%
2600	39.0	1.96	4.37	4.37	4.37	0.90	1.13	±12%

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

[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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

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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3270

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
750	55.5	0.96	6.09	6.09	6.09	0.50	1.35	±12%
835	55.2	0.97	6.01	6.01	6.01	0.42	1.60	±12%
1750	53.4	1.49	4.95	4.95	4.95	0.50	1.66	±12%
1900	53.3	1.52	4.70	4.70	4.70	0.53	1.64	±12%
2450	52.7	1.95	4.28	4.28	4.28	0.90	1.20	±12%
2600	52.5	2.16	4.12	4.12	4.12	0.90	1.18	±12%

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

[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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

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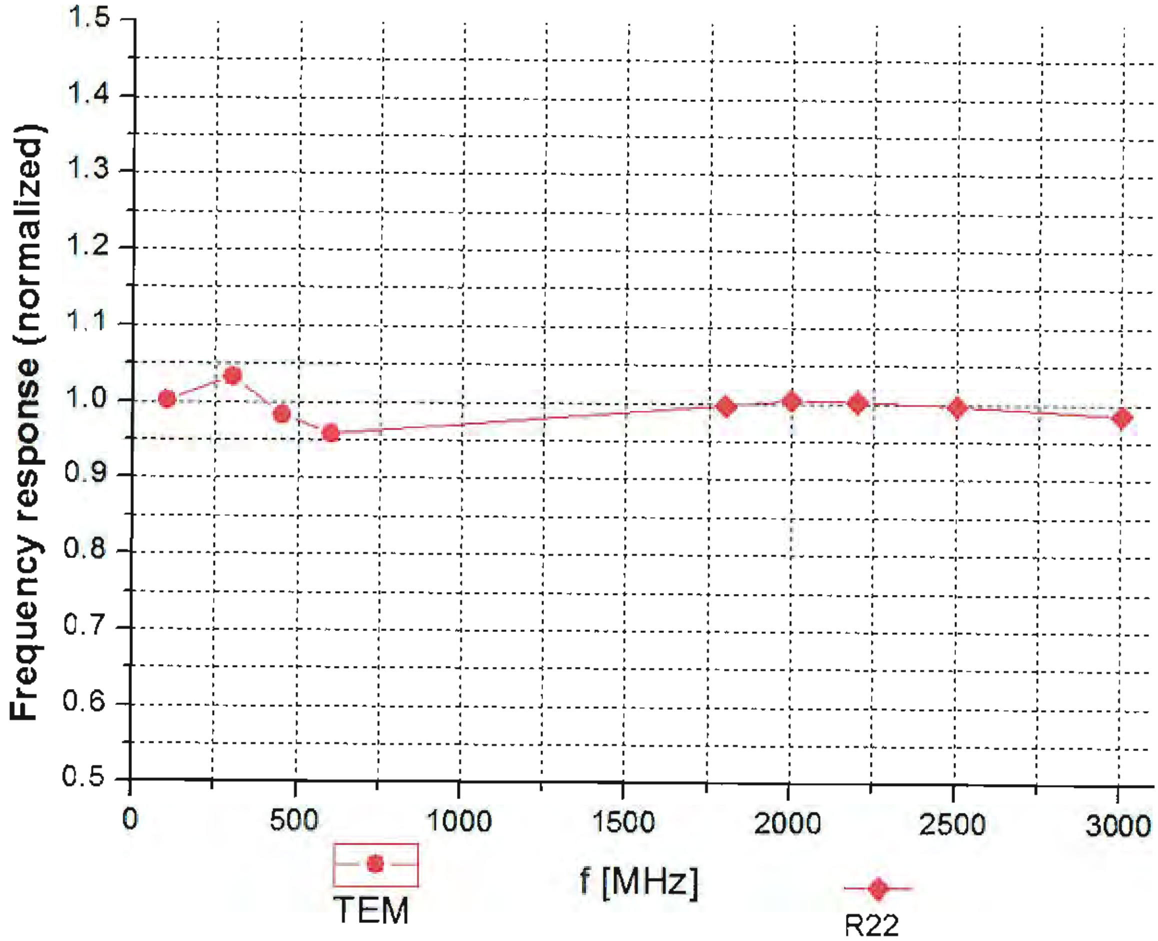
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ±7.5% (k=2)

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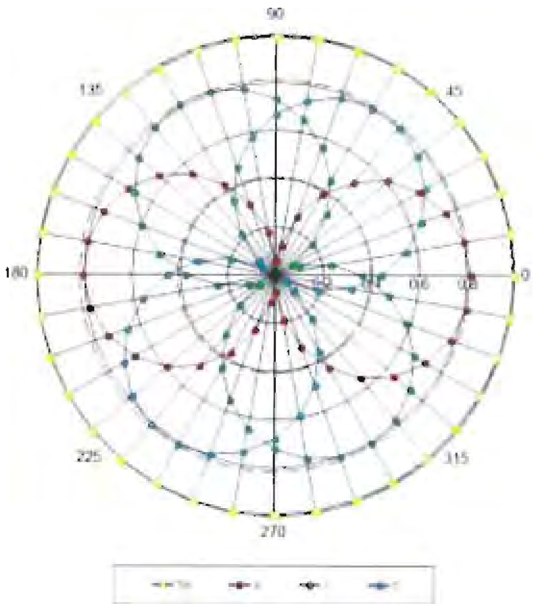
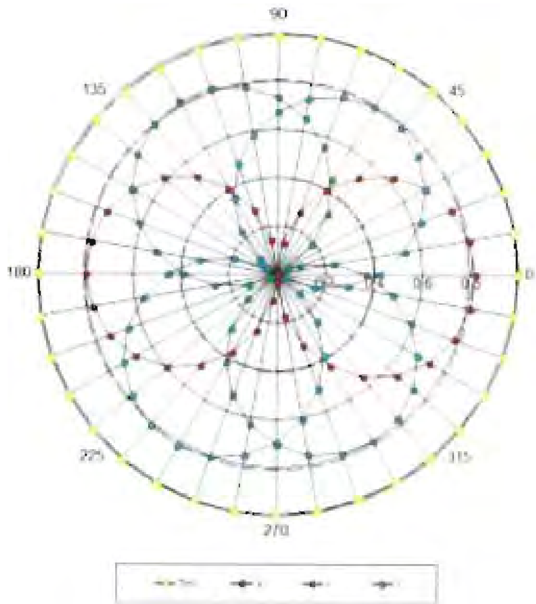
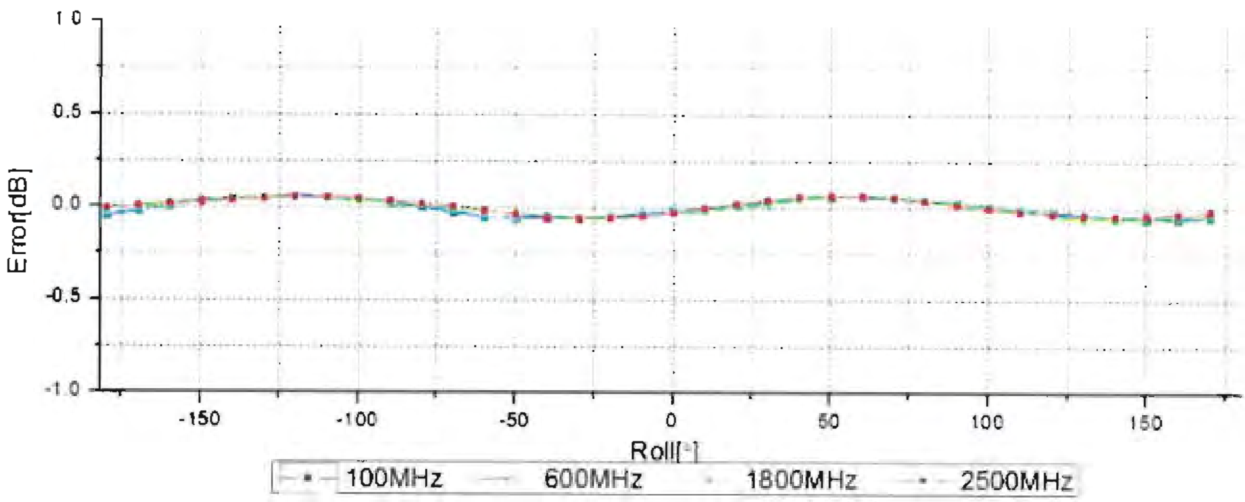
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





Uncertainty of Axial Isotropy Assessment: ±0.9% (k=2)

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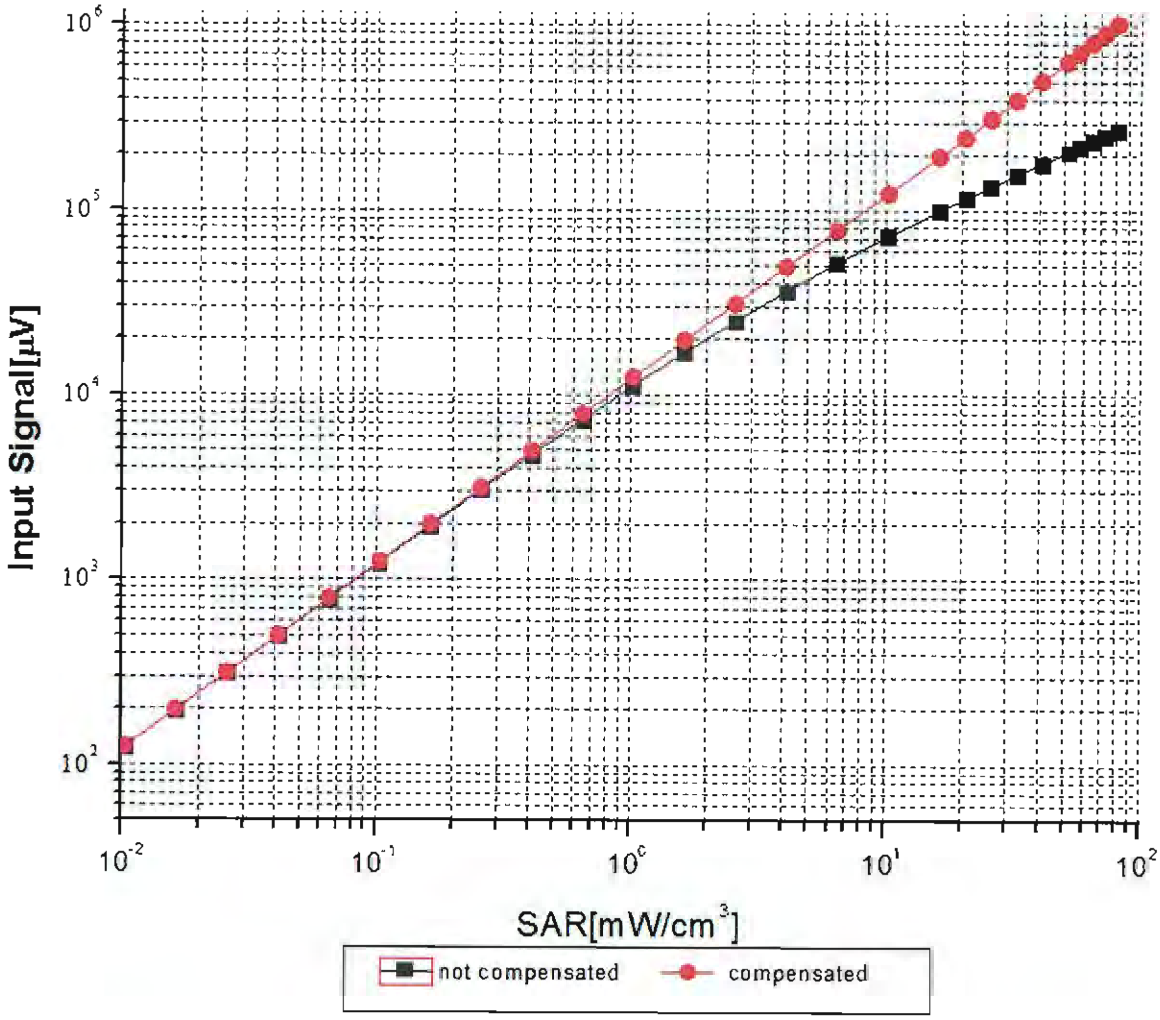
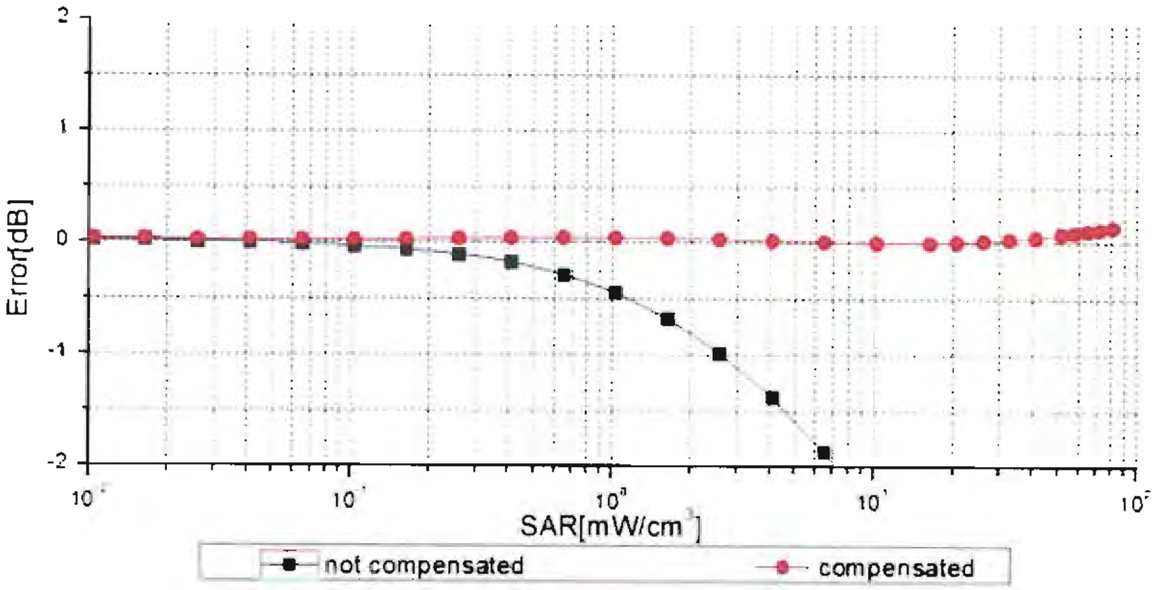
Dynamic Range f(SAR$_{head}$)
(TEM cell, f = 900 MHz)





Uncertainty of Linearity Assessment: ±0.9% (k=2)

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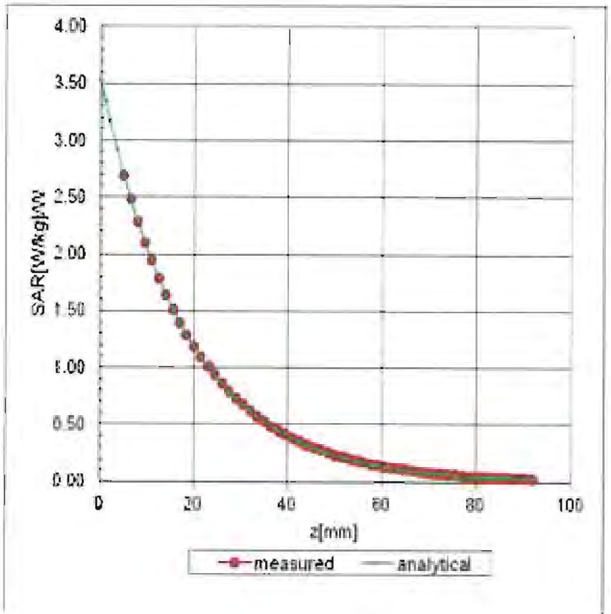
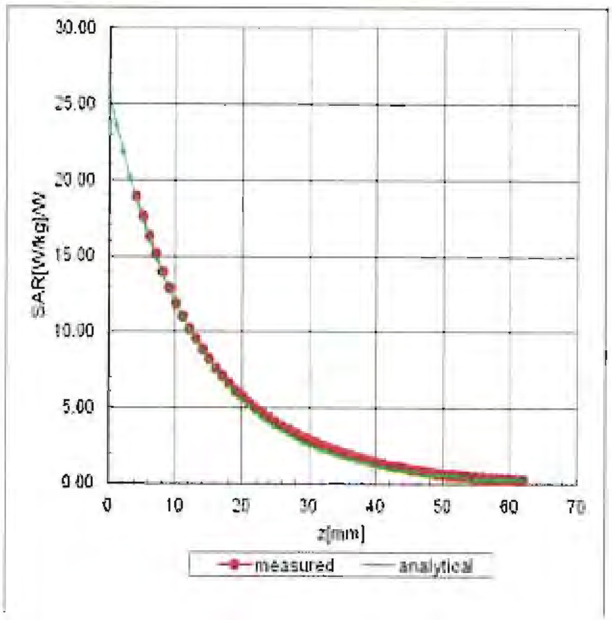
Conversion Factor Assessment

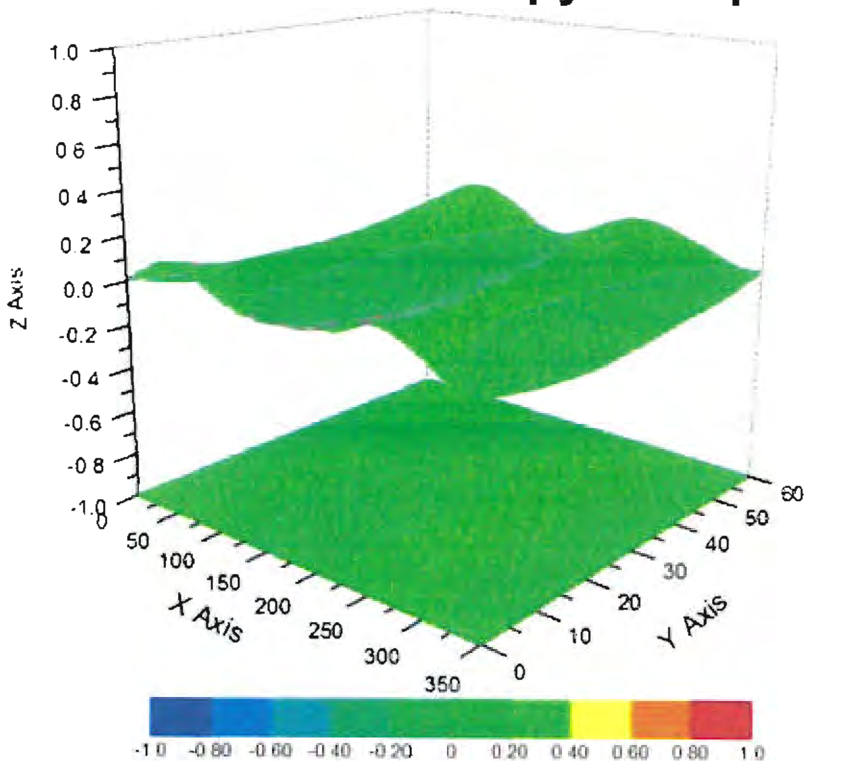
f=900 MHz, WGLS R9(H_convF)



f=1750 MHz, WGLS R22(H_convF)



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±2.8% (K=2)

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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3270

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	168.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	10mm
Tip Diameter	4mm
Probe Tip to Sensor X Calibration Point	2mm
Probe Tip to Sensor Y Calibration Point	2mm
Probe Tip to Sensor Z Calibration Point	2mm
Recommended Measurement Distance from Surface	3mm

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Accreditation No.: **SCS 0108**

Client Sporton-TW (Auden)

Certificate No: **EX3-3931_Oct16**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3931
Calibration procedure(s)	QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	October 3, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: S5277 (20x)	05-Apr-16 (No. 217-02293)	Apr-17
Reference Probe ES3DV2	SN: 3013	31-Dec-15 (No. ES3-3013_Dec15)	Dec-16
DAE4	SN: 660	23-Dec-15 (No. DAE4-660_Dec15)	Dec-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-16)	In house check: Jun-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	MWeber
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 4, 2016

Calibration Laboratory of
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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe EX3DV4

SN:3931

Manufactured: July 24, 2013
Repaired: September 27, 2016
Calibrated: October 3, 2016

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3931

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.50	0.56	0.47	± 10.1 %
DCP (mV)[B]	99.3	102.3	99.2	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	165.2	±2.2 %
		Y	0.0	0.0	1.0		169.6	
		Z	0.0	0.0	1.0		158.4	

Note: For details on UID parameters see Appendix.

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 $ms.V^{-2}$	T2 $ms.V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
X	39.73	299.4	36.38	13.81	1.099	5.004	0.119	0.351	1.005
Y	59.82	447.7	35.85	21.83	1.546	5.045	0.719	0.472	1.007
Z	54.23	405.8	35.74	19.34	1.491	5.007	0.433	0.514	1.005

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

[A] The uncertainties of Norm X,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3931

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	10.68	10.68	10.68	0.47	0.86	± 12.0 %
835	41.5	0.90	10.35	10.35	10.35	0.43	0.80	± 12.0 %
900	41.5	0.97	10.09	10.09	10.09	0.44	0.86	± 12.0 %
1450	40.5	1.20	8.73	8.73	8.73	0.45	0.80	± 12.0 %
1750	40.1	1.37	8.68	8.68	8.68	0.37	0.80	± 12.0 %
1900	40.0	1.40	8.42	8.42	8.42	0.34	0.80	± 12.0 %
2000	40.0	1.40	8.43	8.43	8.43	0.37	0.80	± 12.0 %
2300	39.5	1.67	7.94	7.94	7.94	0.28	0.86	± 12.0 %
2450	39.2	1.80	7.60	7.60	7.60	0.36	0.84	± 12.0 %
2600	39.0	1.96	7.37	7.37	7.37	0.31	0.97	± 12.0 %
5250	35.9	4.71	5.38	5.38	5.38	0.35	1.80	± 13.1 %
5600	35.5	5.07	4.68	4.68	4.68	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.84	4.84	4.84	0.40	1.80	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

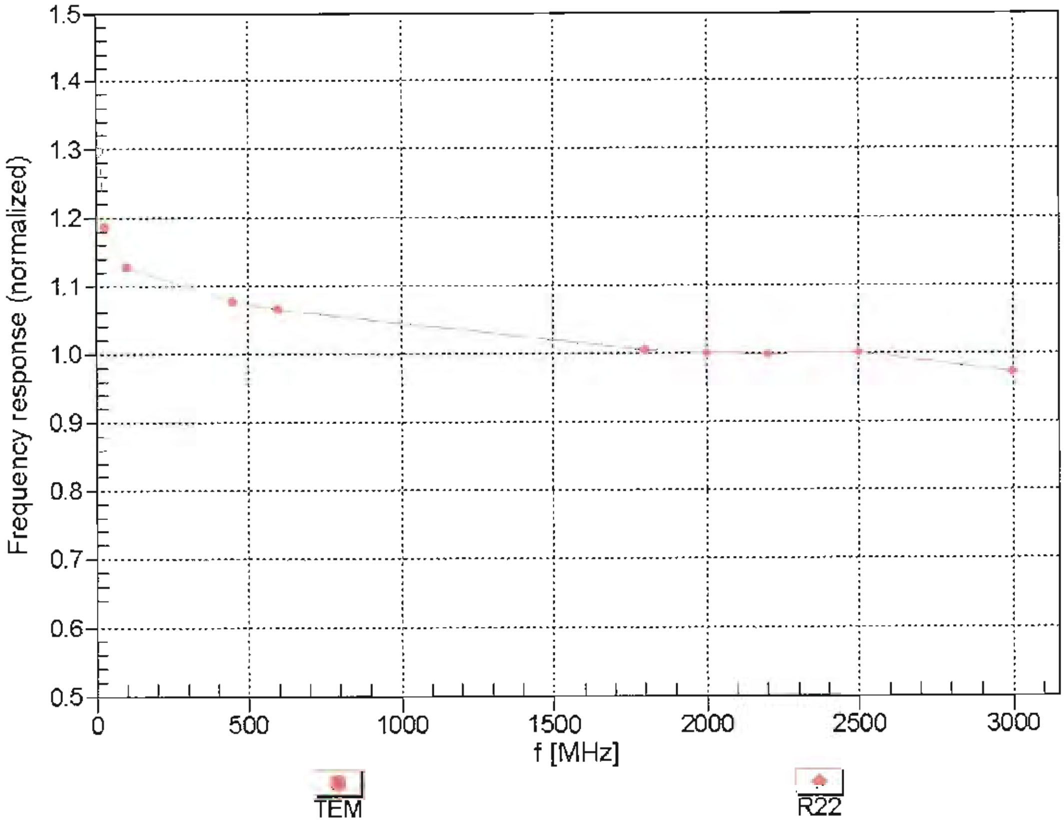
DASY/EASY - Parameters of Probe: EX3DV4 - SN:3931

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	10.37	10.37	10.37	0.38	0.97	± 12.0 %
835	55.2	0.97	10.14	10.14	10.14	0.36	0.99	± 12.0 %
1450	54.0	1.30	8.53	8.53	8.53	0.31	0.80	± 12.0 %
1750	53.4	1.49	8.45	8.45	8.45	0.37	0.80	± 12.0 %
1900	53.3	1.52	8.14	8.14	8.14	0.33	0.90	± 12.0 %
2300	52.9	1.81	7.96	7.96	7.96	0.39	0.80	± 12.0 %
2450	52.7	1.95	7.73	7.73	7.73	0.38	0.85	± 12.0 %
2600	52.5	2.16	7.46	7.46	7.46	0.25	0.95	± 12.0 %
5250	48.9	5.36	4.57	4.57	4.57	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.71	3.71	3.71	0.60	1.90	± 13.1 %
5750	48.3	5.94	4.01	4.01	4.01	0.60	1.90	± 13.1 %

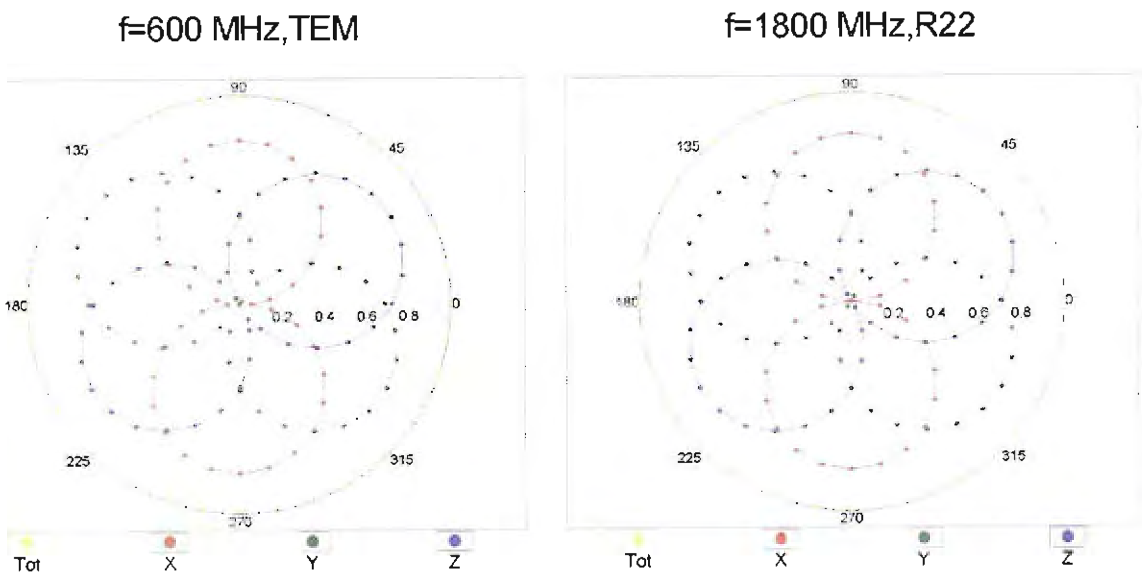
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

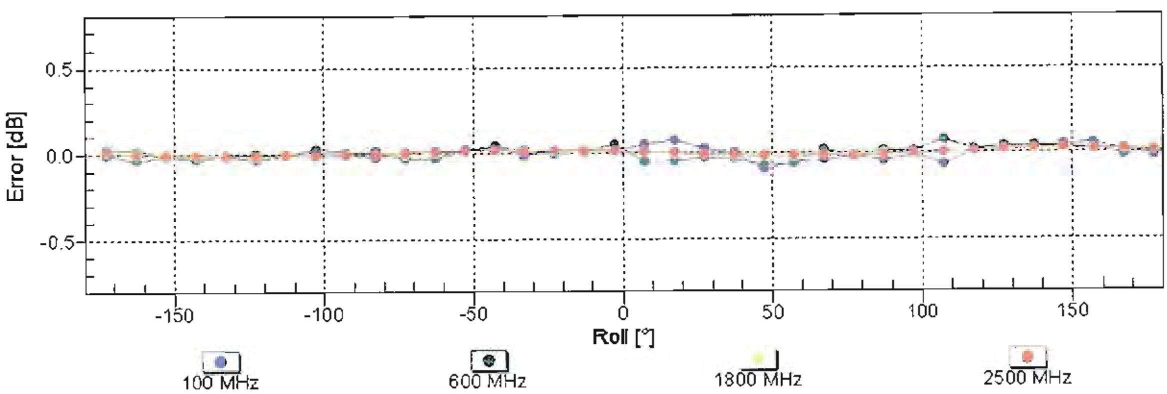
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), $\vartheta = 0°$

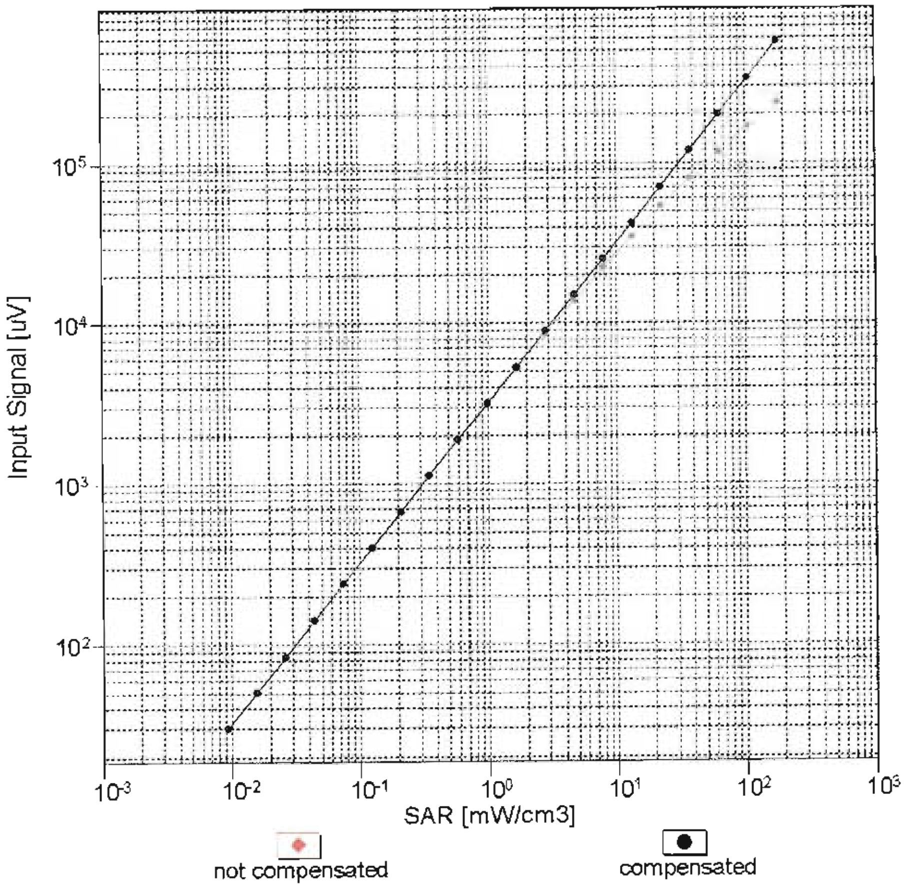


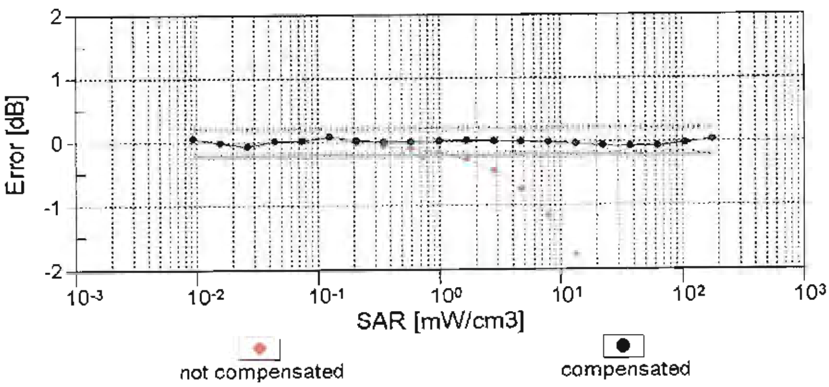


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR$_{head}$)

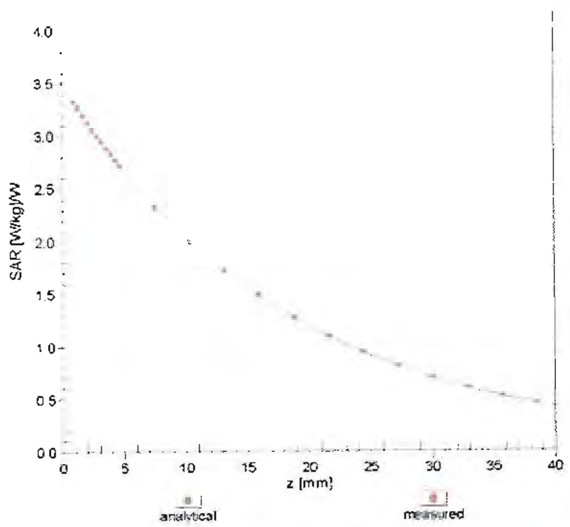
(TEM cell , f_{eval}= 1900 MHz)

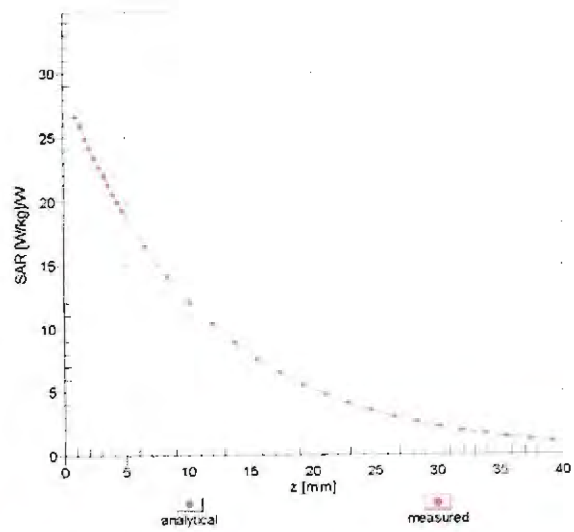




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

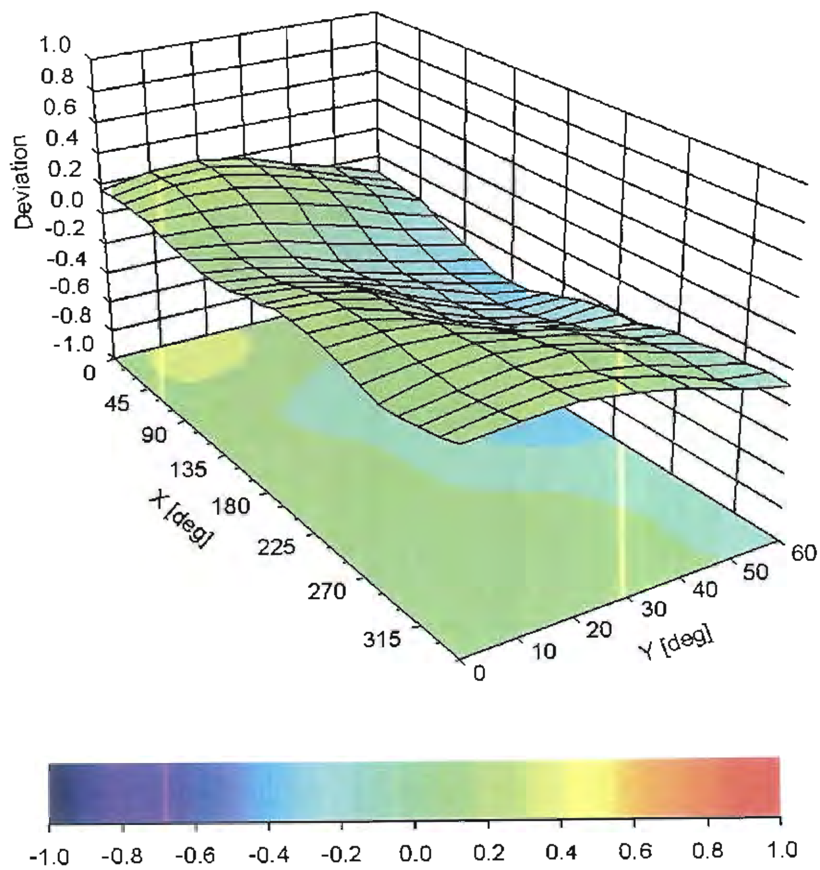
Conversion Factor Assessment





Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3931

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	127.3
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Appendix: Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max Unc[E] (k=2)
0	CW	X	0.00	0.00	1.00	0.00	165.2	± 2.2 %
		Y	0.00	0.00	1.00		169.6	
		Z	0.00	0.00	1.00		158.4	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	3.48	69.31	12.63	10.00	20.0	± 9.6 %
		Y	5.87	75.87	16.27		20.0	
		Z	4.02	70.66	13.78		20.0	
10011-CAB	UMTS-FDD (WCDMA)	X	1.30	72.39	18.20	0.00	150.0	± 9.6 %
		Y	1.19	69.63	16.77		150.0	
		Z	1.01	66.38	14.76		150.0	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	1.24	65.29	16.42	0.41	150.0	± 9.6 %
		Y	1.26	64.91	16.05		150.0	
		Z	1.20	63.67	14.96		150.0	
10013-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	4.82	66.95	17.27	1.46	150.0	± 9.6 %
		Y	5.04	66.77	17.23		150.0	
		Z	4.95	66.50	16.90		150.0	
10021-DAB	GSM-FDD (TDMA, GMSK)	X	100.00	114.09	27.93	9.39	50.0	± 9.6 %
		Y	100.00	118.26	30.54		50.0	
		Z	25.45	96.76	24.27		50.0	
10023-DAB	GPRS-FDD (TDMA, GMSK, TN 0)	X	83.93	111.52	27.32	9.57	50.0	± 9.6 %
		Y	99.99	118.26	30.60		50.0	
		Z	19.40	92.86	23.18		50.0	
10024-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	100.00	112.26	25.94	6.56	60.0	± 9.6 %
		Y	100.00	115.42	28.11		60.0	
		Z	100.00	112.41	26.50		60.0	
10025-DAB	EDGE-FDD (TDMA, 8PSK, TN 0)	X	5.67	76.70	28.63	12.57	50.0	± 9.6 %
		Y	15.06	105.00	40.92		50.0	
		Z	5.92	75.84	27.63		50.0	
10026-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	9.71	91.87	32.18	9.56	60.0	± 9.6 %
		Y	18.06	104.69	36.55		60.0	
		Z	11.21	92.21	31.55		60.0	
10027-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	100.00	112.68	25.31	4.80	80.0	± 9.6 %
		Y	100.00	114.88	27.06		80.0	
		Z	100.00	111.26	25.19		80.0	
10028-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	100.00	114.77	25.52	3.55	100.0	± 9.6 %
		Y	100.00	115.72	26.71		100.0	
		Z	100.00	111.32	24.54		100.0	
10029-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	6.19	82.03	27.36	7.80	80.0	± 9.6 %
		Y	10.55	92.05	31.00		80.0	
		Z	7.53	83.82	27.35		80.0	
10030-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	X	100.00	110.56	24.66	5.30	70.0	± 9.6 %
		Y	100.00	113.96	26.95		70.0	
		Z	100.00	110.53	25.16		70.0	
10031-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	X	100.00	116.75	24.95	1.88	100.0	± 9.6 %
		Y	100.00	117.62	26.11		100.0	
		Z	100.00	110.75	23.01		100.0	

10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	100.00	131.18	29.75	1.17	100.0	± 9.6 %
		Y	100.00	125.29	28.26		100.0	
		Z	100.00	114.95	23.87		100.0	
10033-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	X	10.93	90.53	23.32	5.30	70.0	± 9.6 %
		Y	20.55	101.44	27.99		70.0	
		Z	7.67	84.45	21.88		70.0	
10034-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	X	5.70	84.58	20.06	1.88	100.0	± 9.6 %
		Y	5.85	85.75	22.03		100.0	
		Z	2.95	74.86	17.34		100.0	
10035-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	X	3.92	81.20	18.80	1.17	100.0	± 9.6 %
		Y	3.48	79.72	19.80		100.0	
		Z	2.10	71.76	15.97		100.0	
10036-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	X	15.13	95.54	24.90	5.30	70.0	± 9.6 %
		Y	28.86	107.18	29.66		70.0	
		Z	9.07	87.21	22.88		70.0	
10037-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	X	4.82	82.50	19.36	1.88	100.0	± 9.6 %
		Y	5.58	85.13	21.78		100.0	
		Z	2.82	74.36	17.11		100.0	
10038-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	X	4.08	82.09	19.24	1.17	100.0	± 9.6 %
		Y	3.57	80.38	20.14		100.0	
		Z	2.12	72.10	16.20		100.0	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	5.80	88.31	21.06	0.00	150.0	± 9.6 %
		Y	2.44	75.65	18.16		150.0	
		Z	1.80	71.10	15.73		150.0	
10042-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	X	100.00	110.27	25.32	7.78	50.0	± 9.6 %
		Y	100.00	114.03	27.70		50.0	
		Z	32.06	97.64	22.93		50.0	
10044-CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	X	0.00	105.67	0.52	0.00	150.0	± 9.6 %
		Y	0.00	101.10	0.34		150.0	
		Z	0.00	94.56	3.16		150.0	
10048-CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	X	11.94	82.95	20.71	13.80	25.0	± 9.6 %
		Y	15.06	89.64	24.59		25.0	
		Z	9.78	81.31	21.11		25.0	
10049-CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	X	15.54	88.48	21.39	10.79	40.0	± 9.6 %
		Y	23.79	97.14	25.51		40.0	
		Z	11.46	84.91	21.03		40.0	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	13.32	89.14	23.36	9.03	50.0	± 9.6 %
		Y	16.34	93.59	26.16		50.0	
		Z	10.18	84.57	22.45		50.0	
10058-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	4.78	77.20	24.69	6.55	100.0	± 9.6 %
		Y	7.46	84.92	27.60		100.0	
		Z	5.76	78.94	24.73		100.0	
10059-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	X	1.30	66.67	17.10	0.61	110.0	± 9.6 %
		Y	1.37	66.65	16.91		110.0	
		Z	1.27	64.87	15.53		110.0	
10060-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	X	100.00	139.37	36.42	1.30	110.0	± 9.6 %
		Y	100.00	134.75	34.85		110.0	
		Z	5.80	90.90	23.07		110.0	

10061-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	X	4.16	86.26	24.31	2.04	110.0	± 9.6 %
		Y	6.78	92.08	26.03		110.0	
		Z	3.18	78.55	20.67		110.0	
10062-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	X	4.62	66.99	16.77	0.49	100.0	± 9.6 %
		Y	4.83	66.75	16.66		100.0	
		Z	4.75	66.51	16.38		100.0	
10063-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	X	4.64	67.08	16.86	0.72	100.0	± 9.6 %
		Y	4.86	66.87	16.78		100.0	
		Z	4.77	66.60	16.47		100.0	
10064-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	X	4.89	67.27	17.04	0.86	100.0	± 9.6 %
		Y	5.19	67.18	17.02		100.0	
		Z	5.08	66.89	16.71		100.0	
10065-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	X	4.77	67.14	17.11	1.21	100.0	± 9.6 %
		Y	5.06	67.12	17.13		100.0	
		Z	4.94	66.80	16.79		100.0	
10066-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	X	4.78	67.15	17.25	1.46	100.0	± 9.6 %
		Y	5.09	67.18	17.31		100.0	
		Z	4.97	66.83	16.94		100.0	
10067-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	X	5.07	67.35	17.68	2.04	100.0	± 9.6 %
		Y	5.38	67.26	17.72		100.0	
		Z	5.26	66.92	17.34		100.0	
10068-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	X	5.11	67.30	17.84	2.55	100.0	± 9.6 %
		Y	5.48	67.51	18.02		100.0	
		Z	5.34	67.10	17.60		100.0	
10069-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	X	5.18	67.33	18.03	2.67	100.0	± 9.6 %
		Y	5.55	67.43	18.19		100.0	
		Z	5.42	67.05	17.77		100.0	
10071-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	X	4.92	67.02	17.54	1.99	100.0	± 9.6 %
		Y	5.15	66.91	17.55		100.0	
		Z	5.05	66.61	17.20		100.0	
10072-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	X	4.89	67.32	17.73	2.30	100.0	± 9.6 %
		Y	5.18	67.36	17.81		100.0	
		Z	5.06	66.97	17.41		100.0	
10073-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	X	4.97	67.51	18.05	2.83	100.0	± 9.6 %
		Y	5.26	67.57	18.16		100.0	
		Z	5.13	67.15	17.71		100.0	
10074-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	X	4.97	67.45	18.19	3.30	100.0	± 9.6 %
		Y	5.25	67.52	18.35		100.0	
		Z	5.12	67.08	17.88		100.0	
10075-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	X	5.01	67.53	18.46	3.82	90.0	± 9.6 %
		Y	5.35	67.85	18.77		90.0	
		Z	5.20	67.32	18.23		90.0	
10076-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	X	5.05	67.39	18.61	4.15	90.0	± 9.6 %
		Y	5.33	67.57	18.84		90.0	
		Z	5.20	67.09	18.32		90.0	
10077-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	X	5.08	67.49	18.72	4.30	90.0	± 9.6 %
		Y	5.35	67.63	18.93		90.0	
		Z	5.23	67.15	18.41		90.0	

10081-CAB	CDMA2000 (1xRTT, RC3)	X	1.31	72.98	15.39	0.00	150.0	± 9.6 %
		Y	1.11	69.20	15.13		150.0	
		Z	0.87	65.58	12.79		150.0	
10082-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	X	0.85	60.00	5.02	4.77	80.0	± 9.6 %
		Y	1.21	60.81	6.24		80.0	
		Z	1.05	60.00	5.50		80.0	
10090-DAB	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	100.00	112.28	25.96	6.56	60.0	± 9.6 %
		Y	100.00	115.46	28.15		60.0	
		Z	100.00	112.45	26.54		60.0	
10097-CAB	UMTS-FDD (HSDPA)	X	2.10	70.95	17.43	0.00	150.0	± 9.6 %
		Y	1.95	68.39	16.42		150.0	
		Z	1.81	67.01	15.42		150.0	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	2.06	70.93	17.43	0.00	150.0	± 9.6 %
		Y	1.91	68.38	16.41		150.0	
		Z	1.77	66.95	15.38		150.0	
10099-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	9.76	91.94	32.20	9.56	60.0	± 9.6 %
		Y	18.08	104.66	36.54		60.0	
		Z	11.25	92.22	31.54		60.0	
10100-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	3.35	72.13	17.90	0.00	150.0	± 9.6 %
		Y	3.43	71.55	17.33		150.0	
		Z	3.14	69.99	16.48		150.0	
10101-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	3.28	68.30	16.59	0.00	150.0	± 9.6 %
		Y	3.42	68.10	16.32		150.0	
		Z	3.28	67.37	15.82		150.0	
10102-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	3.39	68.25	16.67	0.00	150.0	± 9.6 %
		Y	3.51	67.99	16.38		150.0	
		Z	3.39	67.35	15.92		150.0	
10103-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	6.41	75.89	20.51	3.98	65.0	± 9.6 %
		Y	7.77	77.49	21.00		65.0	
		Z	6.54	74.47	19.52		65.0	
10104-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	6.38	73.95	20.45	3.98	65.0	± 9.6 %
		Y	7.62	75.73	21.18		65.0	
		Z	6.97	74.03	20.17		65.0	
10105-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	5.88	72.23	19.98	3.98	65.0	± 9.6 %
		Y	7.31	74.91	21.13		65.0	
		Z	6.85	73.64	20.32		65.0	
10108-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	2.91	71.53	17.82	0.00	150.0	± 9.6 %
		Y	3.02	70.68	17.15		150.0	
		Z	2.76	69.18	16.29		150.0	
10109-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	2.95	68.44	16.61	0.00	150.0	± 9.6 %
		Y	3.08	67.93	16.28		150.0	
		Z	2.95	67.17	15.72		150.0	
10110-CAC	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	2.39	71.08	17.59	0.00	150.0	± 9.6 %
		Y	2.47	69.75	16.86		150.0	
		Z	2.25	68.18	15.88		150.0	
10111-CAC	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	2.79	70.36	17.30	0.00	150.0	± 9.6 %
		Y	2.80	68.64	16.65		150.0	
		Z	2.65	67.83	16.01		150.0	

10112-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	3.07	68.42	16.64	0.00	150.0	± 9.6 %
		Y	3.20	67.83	16.29		150.0	
		Z	3.07	67.16	15.79		150.0	
10113-CAC	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	2.94	70.45	17.39	0.00	150.0	± 9.6 %
		Y	2.95	68.67	16.72		150.0	
		Z	2.81	67.97	16.15		150.0	
10114-CAB	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	X	5.09	67.47	16.77	0.00	150.0	± 9.6 %
		Y	5.23	67.24	16.53		150.0	
		Z	5.18	67.08	16.35		150.0	
10115-CAB	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	X	5.34	67.51	16.78	0.00	150.0	± 9.6 %
		Y	5.60	67.53	16.67		150.0	
		Z	5.52	67.36	16.50		150.0	
10116-CAB	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	X	5.18	67.67	16.79	0.00	150.0	± 9.6 %
		Y	5.36	67.51	16.58		150.0	
		Z	5.29	67.32	16.39		150.0	
10117-CAB	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	5.07	67.38	16.74	0.00	150.0	± 9.6 %
		Y	5.24	67.25	16.55		150.0	
		Z	5.16	67.03	16.34		150.0	
10118-CAB	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	X	5.42	67.71	16.89	0.00	150.0	± 9.6 %
		Y	5.67	67.69	16.76		150.0	
		Z	5.59	67.53	16.59		150.0	
10119-CAB	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	X	5.17	67.64	16.79	0.00	150.0	± 9.6 %
		Y	5.33	67.45	16.57		150.0	
		Z	5.26	67.25	16.37		150.0	
10140-CAB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	3.41	68.25	16.57	0.00	150.0	± 9.6 %
		Y	3.56	67.99	16.30		150.0	
		Z	3.43	67.35	15.84		150.0	
10141-CAB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	3.54	68.37	16.75	0.00	150.0	± 9.6 %
		Y	3.68	68.01	16.43		150.0	
		Z	3.56	67.45	16.01		150.0	
10142-CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	2.25	71.96	17.48	0.00	150.0	± 9.6 %
		Y	2.26	69.83	16.74		150.0	
		Z	2.02	68.09	15.61		150.0	
10143-CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	2.82	72.22	17.26	0.00	150.0	± 9.6 %
		Y	2.71	69.55	16.65		150.0	
		Z	2.52	68.51	15.83		150.0	
10144-CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	2.29	68.06	14.75	0.00	150.0	± 9.6 %
		Y	2.50	67.47	15.19		150.0	
		Z	2.32	66.44	14.34		150.0	
10145-CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	1.16	65.56	11.35	0.00	150.0	± 9.6 %
		Y	1.65	68.53	14.65		150.0	
		Z	1.36	65.83	12.76		150.0	
10146-CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	1.35	63.40	9.39	0.00	150.0	± 9.6 %
		Y	3.12	72.00	15.52		150.0	
		Z	2.16	67.04	12.61		150.0	
10147-CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	1.53	64.72	10.19	0.00	150.0	± 9.6 %
		Y	4.03	75.63	17.18		150.0	
		Z	2.54	69.13	13.74		150.0	

10149-CAB	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	2.96	68.52	16.66	0.00	150.0	± 9.6 %
		Y	3.09	67.99	16.32		150.0	
		Z	2.96	67.23	15.77		150.0	
10150-CAB	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	3.08	68.50	16.69	0.00	150.0	± 9.6 %
		Y	3.21	67.88	16.33		150.0	
		Z	3.08	67.21	15.83		150.0	
10151-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	7.03	79.10	21.82	3.98	65.0	± 9.6 %
		Y	8.21	79.75	22.00		65.0	
		Z	7.10	77.15	20.67		65.0	
10152-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	5.92	73.94	20.06	3.98	65.0	± 9.6 %
		Y	7.21	75.88	21.03		65.0	
		Z	6.48	73.87	19.84		65.0	
10153-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	6.35	75.11	20.94	3.98	65.0	± 9.6 %
		Y	7.55	76.62	21.69		65.0	
		Z	6.87	74.79	20.60		65.0	
10154-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	2.46	71.67	17.92	0.00	150.0	± 9.6 %
		Y	2.54	70.24	17.15		150.0	
		Z	2.30	68.63	16.17		150.0	
10155-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	2.79	70.40	17.33	0.00	150.0	± 9.6 %
		Y	2.80	68.64	16.65		150.0	
		Z	2.66	67.83	16.02		150.0	
10156-CAC	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	2.17	72.73	17.45	0.00	150.0	± 9.6 %
		Y	2.14	70.24	16.79		150.0	
		Z	1.88	68.21	15.48		150.0	
10157-CAC	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	2.21	69.24	14.98	0.00	150.0	± 9.6 %
		Y	2.36	68.31	15.46		150.0	
		Z	2.15	66.99	14.43		150.0	
10158-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	2.95	70.56	17.46	0.00	150.0	± 9.6 %
		Y	2.95	68.72	16.76		150.0	
		Z	2.82	68.03	16.20		150.0	
10159-CAC	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	2.36	69.87	15.32	0.00	150.0	± 9.6 %
		Y	2.49	68.78	15.76		150.0	
		Z	2.27	67.50	14.75		150.0	
10160-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	2.90	70.47	17.47	0.00	150.0	± 9.6 %
		Y	2.94	69.28	16.77		150.0	
		Z	2.76	68.21	16.07		150.0	
10161-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	2.98	68.55	16.64	0.00	150.0	± 9.6 %
		Y	3.10	67.79	16.29		150.0	
		Z	2.98	67.13	15.77		150.0	
10162-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	3.10	68.74	16.76	0.00	150.0	± 9.6 %
		Y	3.21	67.84	16.35		150.0	
		Z	3.09	67.25	15.86		150.0	
10166-CAC	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	3.31	69.42	19.40	3.01	150.0	± 9.6 %
		Y	3.85	69.94	19.41		150.0	
		Z	3.63	68.92	18.65		150.0	
10167-CAC	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	3.89	72.11	19.78	3.01	150.0	± 9.6 %
		Y	4.89	73.20	20.04		150.0	
		Z	4.45	71.60	19.05		150.0	

10168-CAC	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	4.43	75.02	21.48	3.01	150.0	± 9.6 %
		Y	5.37	75.20	21.21		150.0	
		Z	4.92	73.76	20.36		150.0	
10169-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	2.61	67.65	18.68	3.01	150.0	± 9.6 %
		Y	3.41	71.01	19.90		150.0	
		Z	3.09	68.90	18.61		150.0	
10170-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	3.32	73.16	21.10	3.01	150.0	± 9.6 %
		Y	5.09	78.14	22.55		150.0	
		Z	4.27	74.69	20.88		150.0	
10171-AAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	2.74	69.02	18.13	3.01	150.0	± 9.6 %
		Y	4.10	73.53	19.72		150.0	
		Z	3.48	70.44	18.07		150.0	
10172-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	5.53	83.56	25.72	6.02	65.0	± 9.6 %
		Y	21.34	105.31	32.41		65.0	
		Z	7.30	84.26	24.94		65.0	
10173-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	10.58	92.60	26.95	6.02	65.0	± 9.6 %
		Y	29.30	105.74	30.57		65.0	
		Z	12.37	90.08	25.23		65.0	
10174-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	7.41	85.53	24.05	6.02	65.0	± 9.6 %
		Y	21.20	98.69	27.99		65.0	
		Z	10.53	86.42	23.55		65.0	
10175-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	2.58	67.36	18.42	3.01	150.0	± 9.6 %
		Y	3.37	70.66	19.64		150.0	
		Z	3.05	68.56	18.35		150.0	
10176-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	3.33	73.19	21.11	3.01	150.0	± 9.6 %
		Y	5.10	78.16	22.56		150.0	
		Z	4.27	74.71	20.89		150.0	
10177-CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	2.60	67.50	18.51	3.01	150.0	± 9.6 %
		Y	3.40	70.83	19.75		150.0	
		Z	3.07	68.74	18.46		150.0	
10178-CAC	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	3.30	73.00	21.00	3.01	150.0	± 9.6 %
		Y	5.02	77.85	22.40		150.0	
		Z	4.22	74.44	20.74		150.0	
10179-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	3.00	71.00	19.50	3.01	150.0	± 9.6 %
		Y	4.55	75.67	20.98		150.0	
		Z	3.82	72.37	19.31		150.0	
10180-CAC	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	2.73	68.97	18.09	3.01	150.0	± 9.6 %
		Y	4.08	73.43	19.65		150.0	
		Z	3.47	70.35	18.01		150.0	
10181-CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	2.59	67.48	18.51	3.01	150.0	± 9.6 %
		Y	3.39	70.81	19.74		150.0	
		Z	3.07	68.71	18.45		150.0	
10182-CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	3.30	72.98	20.99	3.01	150.0	± 9.6 %
		Y	5.01	77.82	22.39		150.0	
		Z	4.21	74.41	20.73		150.0	
10183-AAA	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	2.73	68.94	18.08	3.01	150.0	± 9.6 %
		Y	4.07	73.40	19.64		150.0	
		Z	3.46	70.33	18.00		150.0	

10184-CAC	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	2.60	67.52	18.53	3.01	150.0	± 9.6 %
		Y	3.40	70.86	19.76		150.0	
		Z	3.08	68.76	18.47		150.0	
10185-CAC	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	3.31	73.05	21.03	3.01	150.0	± 9.6 %
		Y	5.04	77.90	22.43		150.0	
		Z	4.23	74.49	20.77		150.0	
10186-AAC	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	2.74	69.01	18.12	3.01	150.0	± 9.6 %
		Y	4.10	73.47	19.68		150.0	
		Z	3.48	70.39	18.03		150.0	
10187-CAC	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	2.61	67.58	18.60	3.01	150.0	± 9.6 %
		Y	3.41	70.90	19.81		150.0	
		Z	3.09	68.80	18.52		150.0	
10188-CAC	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	3.41	73.70	21.42	3.01	150.0	± 9.6 %
		Y	5.24	78.69	22.84		150.0	
		Z	4.38	75.22	21.18		150.0	
10189-AAC	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	2.80	69.41	18.40	3.01	150.0	± 9.6 %
		Y	4.20	73.97	19.98		150.0	
		Z	3.56	70.83	18.32		150.0	
10193-CAB	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	X	4.49	67.07	16.51	0.00	150.0	± 9.6 %
		Y	4.67	66.69	16.32		150.0	
		Z	4.59	66.49	16.09		150.0	
10194-CAB	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	X	4.64	67.34	16.63	0.00	150.0	± 9.6 %
		Y	4.86	67.05	16.43		150.0	
		Z	4.77	66.83	16.21		150.0	
10195-CAB	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	X	4.68	67.36	16.65	0.00	150.0	± 9.6 %
		Y	4.90	67.06	16.44		150.0	
		Z	4.82	66.86	16.22		150.0	
10196-CAB	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	4.48	67.10	16.51	0.00	150.0	± 9.6 %
		Y	4.68	66.78	16.36		150.0	
		Z	4.60	66.57	16.12		150.0	
10197-CAB	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	X	4.66	67.35	16.64	0.00	150.0	± 9.6 %
		Y	4.88	67.07	16.45		150.0	
		Z	4.79	66.86	16.22		150.0	
10198-CAB	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	X	4.68	67.37	16.65	0.00	150.0	± 9.6 %
		Y	4.91	67.08	16.45		150.0	
		Z	4.82	66.87	16.23		150.0	
10219-CAB	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	X	4.44	67.14	16.49	0.00	150.0	± 9.6 %
		Y	4.63	66.80	16.32		150.0	
		Z	4.55	66.58	16.08		150.0	
10220-CAB	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	X	4.65	67.31	16.63	0.00	150.0	± 9.6 %
		Y	4.87	67.06	16.44		150.0	
		Z	4.79	66.83	16.21		150.0	
10221-CAB	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	X	4.69	67.30	16.64	0.00	150.0	± 9.6 %
		Y	4.91	67.01	16.44		150.0	
		Z	4.83	66.81	16.22		150.0	
10222-CAB	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	X	5.04	67.37	16.73	0.00	150.0	± 9.6 %
		Y	5.22	67.27	16.55		150.0	
		Z	5.14	67.04	16.34		150.0	

10223-CAB	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	X	5.33	67.57	16.84	0.00	150.0	± 9.6 %
		Y	5.58	67.57	16.72		150.0	
		Z	5.46	67.24	16.46		150.0	
10224-CAB	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	X	5.08	67.48	16.71	0.00	150.0	± 9.6 %
		Y	5.27	67.38	16.53		150.0	
		Z	5.19	67.14	16.31		150.0	
10225-CAB	UMTS-FDD (HSPA+)	X	2.82	67.14	15.84	0.00	150.0	± 9.6 %
		Y	2.95	66.38	15.78		150.0	
		Z	2.86	65.91	15.30		150.0	
10226-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	11.41	94.07	27.52	6.02	65.0	± 9.6 %
		Y	31.67	107.27	31.09		65.0	
		Z	13.11	91.16	25.67		65.0	
10227-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	11.04	92.14	26.24	6.02	65.0	± 9.6 %
		Y	24.12	100.92	28.72		65.0	
		Z	11.71	88.12	24.16		65.0	
10228-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	7.63	90.07	28.10	6.02	65.0	± 9.6 %
		Y	23.55	107.62	33.18		65.0	
		Z	10.51	91.21	27.39		65.0	
10229-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	10.66	92.71	26.99	6.02	65.0	± 9.6 %
		Y	29.42	105.79	30.60		65.0	
		Z	12.45	90.17	25.27		65.0	
10230-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	10.25	90.80	25.74	6.02	65.0	± 9.6 %
		Y	22.68	99.76	28.30		65.0	
		Z	11.15	87.26	23.80		65.0	
10231-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	7.27	89.04	27.66	6.02	65.0	± 9.6 %
		Y	22.20	106.36	32.73		65.0	
		Z	10.05	90.30	27.01		65.0	
10232-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	10.64	92.69	26.99	6.02	65.0	± 9.6 %
		Y	29.42	105.80	30.60		65.0	
		Z	12.43	90.15	25.26		65.0	
10233-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	10.23	90.76	25.73	6.02	65.0	± 9.6 %
		Y	22.67	99.78	28.30		65.0	
		Z	11.14	87.24	23.80		65.0	
10234-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	6.99	88.15	27.23	6.02	65.0	± 9.6 %
		Y	20.93	105.02	32.23		65.0	
		Z	9.64	89.40	26.60		65.0	
10235-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	10.65	92.73	27.00	6.02	65.0	± 9.6 %
		Y	29.50	105.86	30.62		65.0	
		Z	12.44	90.18	25.27		65.0	
10236-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	10.34	90.92	25.77	6.02	65.0	± 9.6 %
		Y	22.93	99.94	28.35		65.0	
		Z	11.22	87.34	23.83		65.0	
10237-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	7.28	89.10	27.69	6.02	65.0	± 9.6 %
		Y	22.38	106.55	32.79		65.0	
		Z	10.07	90.36	27.03		65.0	
10238-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	10.61	92.67	26.98	6.02	65.0	± 9.6 %
		Y	29.40	105.80	30.59		65.0	
		Z	12.41	90.13	25.25		65.0	

10239-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	10.19	90.73	25.72	6.02	65.0	± 9.6 %
		Y	22.65	99.78	28.31		65.0	
		Z	11.11	87.22	23.79		65.0	
10240-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	7.26	89.06	27.67	6.02	65.0	± 9.6 %
		Y	22.30	106.48	32.77		65.0	
		Z	10.04	90.32	27.01		65.0	
10241-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	7.75	81.08	25.21	6.98	65.0	± 9.6 %
		Y	10.21	83.82	26.43		65.0	
		Z	8.73	80.32	24.52		65.0	
10242-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	6.80	78.38	24.02	6.98	65.0	± 9.6 %
		Y	9.63	82.52	25.83		65.0	
		Z	8.38	79.47	24.10		65.0	
10243-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	5.61	75.06	23.46	6.98	65.0	± 9.6 %
		Y	7.74	79.46	25.50		65.0	
		Z	6.88	76.70	23.79		65.0	
10244-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	4.85	72.20	16.09	3.98	65.0	± 9.6 %
		Y	8.02	78.99	20.43		65.0	
		Z	6.19	74.48	17.94		65.0	
10245-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	4.70	71.53	15.74	3.98	65.0	± 9.6 %
		Y	7.89	78.48	20.19		65.0	
		Z	6.13	74.10	17.74		65.0	
10246-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	5.22	76.54	18.28	3.98	65.0	± 9.6 %
		Y	8.14	82.43	21.79		65.0	
		Z	5.87	76.86	19.08		65.0	
10247-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	4.92	73.01	17.55	3.98	65.0	± 9.6 %
		Y	6.62	76.59	20.16		65.0	
		Z	5.63	73.71	18.45		65.0	
10248-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	4.84	72.32	17.23	3.98	65.0	± 9.6 %
		Y	6.62	76.08	19.95		65.0	
		Z	5.66	73.31	18.26		65.0	
10249-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	7.10	81.85	21.45	3.98	65.0	± 9.6 %
		Y	9.09	84.35	23.13		65.0	
		Z	6.82	79.25	20.73		65.0	
10250-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	6.14	76.72	21.07	3.98	65.0	± 9.6 %
		Y	7.40	78.29	22.09		65.0	
		Z	6.54	75.95	20.75		65.0	
10251-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	5.70	74.17	19.61	3.98	65.0	± 9.6 %
		Y	7.04	76.19	20.94		65.0	
		Z	6.27	74.04	19.64		65.0	
10252-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	7.47	82.32	22.88	3.98	65.0	± 9.6 %
		Y	8.82	83.02	23.29		65.0	
		Z	7.18	79.27	21.49		65.0	
10253-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	5.82	73.49	19.80	3.98	65.0	± 9.6 %
		Y	6.99	75.20	20.79		65.0	
		Z	6.34	73.34	19.64		65.0	
10254-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	6.20	74.53	20.56	3.98	65.0	± 9.6 %
		Y	7.35	75.96	21.41		65.0	
		Z	6.71	74.22	20.33		65.0	

10255-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	6.71	78.47	21.74	3.98	65.0	± 9.6 %
		Y	7.84	79.18	22.03		65.0	
		Z	6.83	76.67	20.70		65.0	
10256-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	3.47	67.38	12.72	3.98	65.0	± 9.6 %
		Y	6.90	76.38	18.57		65.0	
		Z	5.11	71.48	15.77		65.0	
10257-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	3.38	66.76	12.32	3.98	65.0	± 9.6 %
		Y	6.74	75.67	18.20		65.0	
		Z	5.05	70.99	15.48		65.0	
10258-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	3.49	70.18	14.59	3.98	65.0	± 9.6 %
		Y	6.78	79.22	19.98		65.0	
		Z	4.80	73.56	17.06		65.0	
10259-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	5.42	74.50	18.87	3.98	65.0	± 9.6 %
		Y	6.93	77.16	20.83		65.0	
		Z	5.98	74.51	19.26		65.0	
10260-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	5.41	74.15	18.72	3.98	65.0	± 9.6 %
		Y	6.95	76.90	20.74		65.0	
		Z	6.03	74.34	19.21		65.0	
10261-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	6.87	81.15	21.70	3.98	65.0	± 9.6 %
		Y	8.53	83.00	22.95		65.0	
		Z	6.70	78.62	20.83		65.0	
10262-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	6.12	76.64	21.02	3.98	65.0	± 9.6 %
		Y	7.39	78.26	22.06		65.0	
		Z	6.53	75.90	20.71		65.0	
10263-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	5.69	74.15	19.60	3.98	65.0	± 9.6 %
		Y	7.03	76.18	20.94		65.0	
		Z	6.26	74.03	19.63		65.0	
10264-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	7.38	82.08	22.77	3.98	65.0	± 9.6 %
		Y	8.75	82.86	23.22		65.0	
		Z	7.12	79.11	21.41		65.0	
10265-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	5.92	73.94	20.06	3.98	65.0	± 9.6 %
		Y	7.20	75.88	21.03		65.0	
		Z	6.48	73.87	19.85		65.0	
10266-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	6.35	75.09	20.93	3.98	65.0	± 9.6 %
		Y	7.55	76.61	21.68		65.0	
		Z	6.86	74.78	20.59		65.0	
10267-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	7.01	79.05	21.80	3.98	65.0	± 9.6 %
		Y	8.19	79.71	21.98		65.0	
		Z	7.09	77.11	20.65		65.0	
10268-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	6.54	73.87	20.51	3.98	65.0	± 9.6 %
		Y	7.70	75.41	21.18		65.0	
		Z	7.12	73.89	20.25		65.0	
10269-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	6.52	73.47	20.39	3.98	65.0	± 9.6 %
		Y	7.63	74.96	21.06		65.0	
		Z	7.08	73.52	20.16		65.0	
10270-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	6.72	76.10	20.81	3.98	65.0	± 9.6 %
		Y	7.77	76.91	21.02		65.0	
		Z	7.04	75.13	20.02		65.0	

10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	2.68	67.93	16.00	0.00	150.0	± 9.6 %
		Y	2.70	66.71	15.69		150.0	
		Z	2.60	66.12	15.13		150.0	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	1.86	71.35	17.51	0.00	150.0	± 9.6 %
		Y	1.79	69.27	16.54		150.0	
		Z	1.60	67.20	15.22		150.0	
10277-CAA	PHS (QPSK)	X	2.51	62.07	7.69	9.03	50.0	± 9.6 %
		Y	3.60	65.47	10.92		50.0	
		Z	3.21	64.00	9.69		50.0	
10278-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	X	4.14	68.90	13.57	9.03	50.0	± 9.6 %
		Y	8.03	79.56	19.93		50.0	
		Z	5.72	73.56	16.82		50.0	
10279-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	X	4.23	69.12	13.72	9.03	50.0	± 9.6 %
		Y	8.23	79.82	20.06		50.0	
		Z	5.85	73.80	16.95		50.0	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	2.16	75.12	16.21	0.00	150.0	± 9.6 %
		Y	1.91	71.91	16.34		150.0	
		Z	1.49	68.32	14.21		150.0	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	1.24	72.30	15.09	0.00	150.0	± 9.6 %
		Y	1.08	68.86	14.96		150.0	
		Z	0.85	65.38	12.66		150.0	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	13.33	104.67	25.79	0.00	150.0	± 9.6 %
		Y	1.50	74.81	18.02		150.0	
		Z	1.03	68.79	14.75		150.0	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	100.00	135.60	33.89	0.00	150.0	± 9.6 %
		Y	2.41	82.36	21.43		150.0	
		Z	1.44	73.75	17.42		150.0	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	11.05	85.41	22.93	9.03	50.0	± 9.6 %
		Y	8.87	82.92	23.80		50.0	
		Z	7.57	79.23	21.65		50.0	
10297-AAA	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	2.93	71.67	17.91	0.00	150.0	± 9.6 %
		Y	3.03	70.79	17.22		150.0	
		Z	2.77	69.28	16.35		150.0	
10298-AAB	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	1.80	70.98	15.29	0.00	150.0	± 9.6 %
		Y	1.94	70.01	16.02		150.0	
		Z	1.64	67.53	14.38		150.0	
10299-AAB	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	2.25	68.93	13.39	0.00	150.0	± 9.6 %
		Y	3.57	73.44	16.90		150.0	
		Z	2.68	69.23	14.47		150.0	
10300-AAB	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	1.52	63.47	9.92	0.00	150.0	± 9.6 %
		Y	2.60	68.00	13.77		150.0	
		Z	2.12	65.38	11.93		150.0	
10301-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	X	4.73	66.14	17.79	4.17	50.0	± 9.6 %
		Y	5.14	66.14	17.98		50.0	
		Z	4.87	65.30	17.38		50.0	
10302-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	X	5.19	66.64	18.43	4.96	50.0	± 9.6 %
		Y	5.69	67.11	18.91		50.0	
		Z	5.42	66.20	18.24		50.0	

10303-AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	X	4.96	66.34	18.27	4.96	50.0	± 9.6 %
		Y	5.48	66.96	18.88		50.0	
		Z	5.20	65.95	18.14		50.0	
10304-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	X	4.76	66.23	17.80	4.17	50.0	± 9.6 %
		Y	5.21	66.54	18.19		50.0	
		Z	4.96	65.68	17.56		50.0	
10305-AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	X	4.83	70.07	20.50	6.02	35.0	± 9.6 %
		Y	5.51	71.60	22.16		35.0	
		Z	4.98	69.23	20.55		35.0	
10306-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	X	4.91	68.09	19.77	6.02	35.0	± 9.6 %
		Y	5.42	68.18	20.25		35.0	
		Z	5.11	67.47	19.73		35.0	
10307-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	X	4.83	68.37	19.78	6.02	35.0	± 9.6 %
		Y	5.47	69.61	21.06		35.0	
		Z	5.07	67.89	19.81		35.0	
10308-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	X	4.84	68.69	19.98	6.02	35.0	± 9.6 %
		Y	5.46	69.92	21.24		35.0	
		Z	5.05	68.12	19.96		35.0	
10309-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	X	4.94	68.23	19.88	6.02	35.0	± 9.6 %
		Y	5.52	68.51	20.43		35.0	
		Z	5.19	67.72	19.88		35.0	
10310-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	X	4.88	68.25	19.79	6.02	35.0	± 9.6 %
		Y	5.44	69.18	20.91		35.0	
		Z	5.08	67.61	19.74		35.0	
10311-AAA	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	3.31	70.70	17.41	0.00	150.0	± 9.6 %
		Y	3.40	70.05	16.83		150.0	
		Z	3.13	68.65	16.04		150.0	
10313-AAA	iDEN 1:3	X	4.31	74.90	16.96	6.99	70.0	± 9.6 %
		Y	5.76	76.90	17.84		70.0	
		Z	4.08	72.13	15.67		70.0	
10314-AAA	iDEN 1:6	X	7.33	84.94	23.33	10.00	30.0	± 9.6 %
		Y	7.31	83.11	22.80		30.0	
		Z	4.98	76.71	20.14		30.0	
10315-AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	X	1.15	65.39	16.53	0.17	150.0	± 9.6 %
		Y	1.15	64.64	15.92		150.0	
		Z	1.10	63.46	14.86		150.0	
10316-AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	X	4.52	67.01	16.57	0.17	150.0	± 9.6 %
		Y	4.73	66.76	16.44		150.0	
		Z	4.65	66.51	16.17		150.0	
10317-AAB	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	X	4.52	67.01	16.57	0.17	150.0	± 9.6 %
		Y	4.73	66.76	16.44		150.0	
		Z	4.65	66.51	16.17		150.0	
10400-AAC	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	X	4.62	67.36	16.62	0.00	150.0	± 9.6 %
		Y	4.87	67.12	16.43		150.0	
		Z	4.77	66.88	16.19		150.0	
10401-AAC	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	X	5.32	67.33	16.68	0.00	150.0	± 9.6 %
		Y	5.49	67.16	16.50		150.0	
		Z	5.43	67.01	16.32		150.0	

10402-AAC	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	X	5.60	67.66	16.72	0.00	150.0	± 9.6 %
		Y	5.79	67.68	16.60		150.0	
		Z	5.72	67.47	16.40		150.0	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	2.16	75.12	16.21	0.00	115.0	± 9.6 %
		Y	1.91	71.91	16.34		115.0	
		Z	1.49	68.32	14.21		115.0	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	2.16	75.12	16.21	0.00	115.0	± 9.6 %
		Y	1.91	71.91	16.34		115.0	
		Z	1.49	68.32	14.21		115.0	
10406-AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	X	100.00	127.59	32.37	0.00	100.0	± 9.6 %
		Y	100.00	123.98	31.83		100.0	
		Z	14.26	95.15	24.05		100.0	
10410-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	124.06	30.89	3.23	80.0	± 9.6 %
		Y	100.00	119.95	30.07		80.0	
		Z	11.66	89.63	21.52		80.0	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	1.06	64.51	16.01	0.00	150.0	± 9.6 %
		Y	1.04	63.51	15.25		150.0	
		Z	1.01	62.60	14.33		150.0	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	4.49	67.08	16.58	0.00	150.0	± 9.6 %
		Y	4.67	66.72	16.37		150.0	
		Z	4.59	66.53	16.14		150.0	
10417-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	4.49	67.08	16.58	0.00	150.0	± 9.6 %
		Y	4.67	66.72	16.37		150.0	
		Z	4.59	66.53	16.14		150.0	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preambule)	X	4.49	67.30	16.63	0.00	150.0	± 9.6 %
		Y	4.65	66.87	16.37		150.0	
		Z	4.58	66.67	16.15		150.0	
10419-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preambule)	X	4.50	67.22	16.62	0.00	150.0	± 9.6 %
		Y	4.68	66.82	16.38		150.0	
		Z	4.60	66.63	16.16		150.0	
10422-AAA	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	X	4.61	67.18	16.61	0.00	150.0	± 9.6 %
		Y	4.80	66.83	16.39		150.0	
		Z	4.73	66.64	16.18		150.0	
10423-AAA	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	X	4.75	67.46	16.71	0.00	150.0	± 9.6 %
		Y	5.00	67.20	16.53		150.0	
		Z	4.91	66.98	16.30		150.0	
10424-AAA	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	X	4.68	67.42	16.69	0.00	150.0	± 9.6 %
		Y	4.91	67.14	16.49		150.0	
		Z	4.82	66.93	16.27		150.0	
10425-AAA	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	X	5.29	67.59	16.82	0.00	150.0	± 9.6 %
		Y	5.47	67.41	16.61		150.0	
		Z	5.41	67.25	16.44		150.0	
10426-AAA	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	X	5.31	67.68	16.86	0.00	150.0	± 9.6 %
		Y	5.48	67.44	16.63		150.0	
		Z	5.41	67.26	16.44		150.0	

10427-AAA	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	X	5.29	67.52	16.78	0.00	150.0	± 9.6 %
		Y	5.50	67.46	16.63		150.0	
		Z	5.43	67.26	16.43		150.0	
10430-AAA	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	X	4.63	73.67	19.48	0.00	150.0	± 9.6 %
		Y	4.38	70.39	18.28		150.0	
		Z	4.34	70.59	18.21		150.0	
10431-AAA	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	X	4.15	67.84	16.60	0.00	150.0	± 9.6 %
		Y	4.40	67.31	16.45		150.0	
		Z	4.29	67.04	16.16		150.0	
10432-AAA	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	X	4.45	67.57	16.66	0.00	150.0	± 9.6 %
		Y	4.69	67.19	16.47		150.0	
		Z	4.59	66.95	16.22		150.0	
10433-AAA	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	X	4.70	67.46	16.71	0.00	150.0	± 9.6 %
		Y	4.93	67.18	16.52		150.0	
		Z	4.84	66.96	16.29		150.0	
10434-AAA	W-CDMA (BS Test Model 1, 64 DPCH)	X	4.94	75.22	19.61	0.00	150.0	± 9.6 %
		Y	4.49	71.19	18.31		150.0	
		Z	4.45	71.43	18.22		150.0	
10435-AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	123.75	30.75	3.23	80.0	± 9.6 %
		Y	100.00	119.75	29.98		80.0	
		Z	11.13	88.92	21.27		80.0	
10447-AAA	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.46	68.09	15.85	0.00	150.0	± 9.6 %
		Y	3.73	67.44	16.02		150.0	
		Z	3.59	67.02	15.56		150.0	
10448-AAA	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%)	X	4.01	67.64	16.48	0.00	150.0	± 9.6 %
		Y	4.23	67.09	16.31		150.0	
		Z	4.12	66.82	16.01		150.0	
10449-AAA	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%)	X	4.28	67.42	16.58	0.00	150.0	± 9.6 %
		Y	4.48	67.02	16.38		150.0	
		Z	4.39	66.78	16.12		150.0	
10450-AAA	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.48	67.25	16.58	0.00	150.0	± 9.6 %
		Y	4.66	66.95	16.38		150.0	
		Z	4.58	66.72	16.14		150.0	
10451-AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	X	3.33	68.18	15.32	0.00	150.0	± 9.6 %
		Y	3.67	67.76	15.79		150.0	
		Z	3.50	67.23	15.24		150.0	
10456-AAA	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	X	6.23	68.21	17.00	0.00	150.0	± 9.6 %
		Y	6.33	68.03	16.78		150.0	
		Z	6.26	67.85	16.61		150.0	
10457-AAA	UMTS-FDD (DC-HSDPA)	X	3.79	65.76	16.30	0.00	150.0	± 9.6 %
		Y	3.86	65.36	16.10		150.0	
		Z	3.82	65.17	15.85		150.0	
10458-AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	X	3.05	67.01	14.29	0.00	150.0	± 9.6 %
		Y	3.48	67.05	15.31		150.0	
		Z	3.32	66.56	14.71		150.0	
10459-AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	X	4.19	65.60	15.56	0.00	150.0	± 9.6 %
		Y	4.63	65.36	16.07		150.0	
		Z	4.50	65.15	15.72		150.0	

10460-AAA	UMTS-FDD (WCDMA, AMR)	X	1.27	75.41	20.14	0.00	150.0	± 9.6 %
		Y	1.05	70.71	17.81		150.0	
		Z	0.86	66.76	15.37		150.0	
10461-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	127.84	32.72	3.29	80.0	± 9.6 %
		Y	100.00	123.27	31.69		80.0	
		Z	6.47	83.77	20.46		80.0	
10462-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.26	63.91	10.22	3.23	80.0	± 9.6 %
		Y	14.90	86.82	19.02		80.0	
		Z	1.81	64.45	10.77		80.0	
10463-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.85	60.00	7.76	3.23	80.0	± 9.6 %
		Y	4.74	73.69	14.47		80.0	
		Z	1.46	62.00	9.21		80.0	
10464-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	124.65	31.09	3.23	80.0	± 9.6 %
		Y	100.00	121.04	30.50		80.0	
		Z	5.02	79.91	18.70		80.0	
10465-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.13	62.86	9.67	3.23	80.0	± 9.6 %
		Y	9.25	81.62	17.45		80.0	
		Z	1.69	63.74	10.38		80.0	
10466-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.85	60.00	7.71	3.23	80.0	± 9.6 %
		Y	3.78	71.31	13.57		80.0	
		Z	1.40	61.59	8.96		80.0	
10467-AAA	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	125.03	31.26	3.23	80.0	± 9.6 %
		Y	100.00	121.26	30.60		80.0	
		Z	5.32	80.71	18.99		80.0	
10468-AAA	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.17	63.15	9.83	3.23	80.0	± 9.6 %
		Y	10.30	82.81	17.81		80.0	
		Z	1.71	63.90	10.47		80.0	
10469-AAA	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.85	60.00	7.71	3.23	80.0	± 9.6 %
		Y	3.80	71.39	13.60		80.0	
		Z	1.40	61.60	8.96		80.0	
10470-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	125.05	31.26	3.23	80.0	± 9.6 %
		Y	100.00	121.29	30.60		80.0	
		Z	5.31	80.70	18.98		80.0	
10471-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.16	63.09	9.79	3.23	80.0	± 9.6 %
		Y	10.21	82.69	17.77		80.0	
		Z	1.70	63.86	10.44		80.0	
10472-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.85	60.00	7.70	3.23	80.0	± 9.6 %
		Y	3.77	71.31	13.56		80.0	
		Z	1.40	61.57	8.94		80.0	
10473-AAA	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	125.02	31.24	3.23	80.0	± 9.6 %
		Y	100.00	121.25	30.59		80.0	
		Z	5.30	80.66	18.96		80.0	
10474-AAA	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.15	63.05	9.77	3.23	80.0	± 9.6 %
		Y	10.08	82.57	17.73		80.0	
		Z	1.70	63.84	10.43		80.0	
10475-AAA	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.85	60.00	7.70	3.23	80.0	± 9.6 %
		Y	3.75	71.25	13.54		80.0	
		Z	1.39	61.55	8.93		80.0	

10477-AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.12	62.81	9.63	3.23	80.0	± 9.6 %
		Y	9.29	81.66	17.43		80.0	
		Z	1.68	63.69	10.35		80.0	
10478-AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.85	60.00	7.69	3.23	80.0	± 9.6 %
		Y	3.71	71.13	13.49		80.0	
		Z	1.39	61.52	8.91		80.0	
10479-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	16.34	98.15	26.22	3.23	80.0	± 9.6 %
		Y	8.05	85.58	23.31		80.0	
		Z	4.44	75.80	19.08		80.0	
10480-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	8.15	82.28	19.17	3.23	80.0	± 9.6 %
		Y	9.14	82.89	20.82		80.0	
		Z	4.48	72.61	16.42		80.0	
10481-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.98	75.50	16.46	3.23	80.0	± 9.6 %
		Y	7.94	80.29	19.62		80.0	
		Z	4.00	70.70	15.36		80.0	
10482-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.11	72.47	16.27	2.23	80.0	± 9.6 %
		Y	4.49	76.30	19.03		80.0	
		Z	2.84	69.51	15.71		80.0	
10483-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.23	69.48	14.33	2.23	80.0	± 9.6 %
		Y	6.12	77.20	19.06		80.0	
		Z	3.70	69.78	15.41		80.0	
10484-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	2.99	68.30	13.84	2.23	80.0	± 9.6 %
		Y	5.80	76.19	18.70		80.0	
		Z	3.62	69.26	15.20		80.0	
10485-AAA	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.90	76.03	18.96	2.23	80.0	± 9.6 %
		Y	4.65	76.77	19.89		80.0	
		Z	3.19	70.88	17.04		80.0	
10486-AAA	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.22	69.78	15.73	2.23	80.0	± 9.6 %
		Y	4.07	71.59	17.54		80.0	
		Z	3.24	68.15	15.55		80.0	
10487-AAA	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.17	69.19	15.46	2.23	80.0	± 9.6 %
		Y	4.05	71.16	17.36		80.0	
		Z	3.26	67.91	15.45		80.0	
10488-AAA	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.89	74.31	19.36	2.23	80.0	± 9.6 %
		Y	4.74	75.31	19.78		80.0	
		Z	3.62	70.94	17.62		80.0	
10489-AAA	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.61	70.11	17.53	2.23	80.0	± 9.6 %
		Y	4.17	70.61	18.05		80.0	
		Z	3.61	68.29	16.66		80.0	
10490-AAA	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.68	69.86	17.43	2.23	80.0	± 9.6 %
		Y	4.25	70.34	17.96		80.0	
		Z	3.72	68.19	16.64		80.0	
10491-AAA	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.96	72.11	18.69	2.23	80.0	± 9.6 %
		Y	4.74	73.16	19.02		80.0	
		Z	3.92	70.03	17.39		80.0	
10492-AAA	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.88	69.01	17.48	2.23	80.0	± 9.6 %
		Y	4.46	69.66	17.87		80.0	
		Z	4.00	67.90	16.78		80.0	

10493-AAA	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.93	68.84	17.41	2.23	80.0	± 9.6 %
		Y	4.52	69.48	17.82		80.0	
		Z	4.08	67.81	16.77		80.0	
10494-AAA	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.32	73.69	19.20	2.23	80.0	± 9.6 %
		Y	5.29	75.06	19.58		80.0	
		Z	4.18	71.25	17.73		80.0	
10495-AAA	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.92	69.34	17.70	2.23	80.0	± 9.6 %
		Y	4.53	70.19	18.09		80.0	
		Z	4.04	68.27	16.95		80.0	
10496-AAA	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.98	69.05	17.60	2.23	80.0	± 9.6 %
		Y	4.58	69.81	17.97		80.0	
		Z	4.12	68.07	16.91		80.0	
10497-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.72	64.88	11.75	2.23	80.0	± 9.6 %
		Y	3.58	73.16	17.12		80.0	
		Z	2.20	66.42	13.58		80.0	
10498-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.30	60.00	8.13	2.23	80.0	± 9.6 %
		Y	2.81	67.13	13.70		80.0	
		Z	1.98	62.85	11.00		80.0	
10499-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.32	60.00	7.98	2.23	80.0	± 9.6 %
		Y	2.75	66.54	13.31		80.0	
		Z	1.95	62.46	10.68		80.0	
10500-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.82	75.04	19.03	2.23	80.0	± 9.6 %
		Y	4.55	75.62	19.66		80.0	
		Z	3.32	70.66	17.20		80.0	
10501-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.45	70.22	16.55	2.23	80.0	± 9.6 %
		Y	4.10	71.10	17.69		80.0	
		Z	3.41	68.23	15.99		80.0	
10502-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.48	69.95	16.36	2.23	80.0	± 9.6 %
		Y	4.15	70.89	17.57		80.0	
		Z	3.47	68.14	15.91		80.0	
10503-AAA	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.83	74.06	19.24	2.23	80.0	± 9.6 %
		Y	4.68	75.11	19.69		80.0	
		Z	3.58	70.77	17.54		80.0	
10504-AAA	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.59	69.99	17.46	2.23	80.0	± 9.6 %
		Y	4.16	70.53	18.00		80.0	
		Z	3.60	68.21	16.61		80.0	
10505-AAA	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.66	69.75	17.36	2.23	80.0	± 9.6 %
		Y	4.23	70.25	17.91		80.0	
		Z	3.70	68.11	16.59		80.0	
10506-AAA	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.28	73.52	19.12	2.23	80.0	± 9.6 %
		Y	5.24	74.92	19.51		80.0	
		Z	4.15	71.12	17.66		80.0	
10507-AAA	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.90	69.27	17.66	2.23	80.0	± 9.6 %
		Y	4.51	70.14	18.06		80.0	
		Z	4.02	68.21	16.91		80.0	

10508-AAA	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.97	68.96	17.55	2.23	80.0	± 9.6 %
		Y	4.57	69.75	17.93		80.0	
		Z	4.11	68.00	16.87		80.0	
10509-AAA	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.54	71.87	18.48	2.23	80.0	± 9.6 %
		Y	5.35	73.05	18.77		80.0	
		Z	4.54	70.32	17.38		80.0	
10510-AAA	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.34	68.76	17.59	2.23	80.0	± 9.6 %
		Y	4.97	69.73	17.95		80.0	
		Z	4.53	68.16	17.00		80.0	
10511-AAA	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.39	68.51	17.51	2.23	80.0	± 9.6 %
		Y	5.00	69.40	17.85		80.0	
		Z	4.59	67.95	16.96		80.0	
10512-AAA	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.78	73.48	18.98	2.23	80.0	± 9.6 %
		Y	5.80	75.09	19.41		80.0	
		Z	4.67	71.54	17.71		80.0	
10513-AAA	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.24	69.00	17.69	2.23	80.0	± 9.6 %
		Y	4.89	70.17	18.11		80.0	
		Z	4.41	68.40	17.07		80.0	
10514-AAA	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.26	68.58	17.56	2.23	80.0	± 9.6 %
		Y	4.87	69.63	17.95		80.0	
		Z	4.44	68.04	16.99		80.0	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	1.03	64.84	16.18	0.00	150.0	± 9.6 %
		Y	1.01	63.76	15.35		150.0	
		Z	0.97	62.74	14.37		150.0	
10516-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	X	1.37	87.37	25.57	0.00	150.0	± 9.6 %
		Y	0.82	76.24	20.55		150.0	
		Z	0.54	67.46	15.73		150.0	
10517-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)	X	0.93	68.34	17.75	0.00	150.0	± 9.6 %
		Y	0.89	66.40	16.42		150.0	
		Z	0.81	64.28	14.78		150.0	
10518-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	X	4.48	67.19	16.57	0.00	150.0	± 9.6 %
		Y	4.66	66.80	16.35		150.0	
		Z	4.59	66.60	16.12		150.0	
10519-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	X	4.64	67.36	16.66	0.00	150.0	± 9.6 %
		Y	4.88	67.08	16.48		150.0	
		Z	4.79	66.86	16.25		150.0	
10520-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)	X	4.50	67.33	16.59	0.00	150.0	± 9.6 %
		Y	4.73	67.07	16.42		150.0	
		Z	4.64	66.83	16.17		150.0	
10521-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	X	4.43	67.32	16.58	0.00	150.0	± 9.6 %
		Y	4.66	67.08	16.41		150.0	
		Z	4.57	66.82	16.16		150.0	
10522-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	X	4.49	67.45	16.68	0.00	150.0	± 9.6 %
		Y	4.71	67.07	16.44		150.0	
		Z	4.62	66.87	16.22		150.0	

10523-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	X	4.40	67.41	16.59	0.00	150.0	± 9.6 %
		Y	4.58	66.97	16.31		150.0	
		Z	4.50	66.74	16.07		150.0	
10524-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)	X	4.44	67.39	16.66	0.00	150.0	± 9.6 %
		Y	4.66	67.02	16.43		150.0	
		Z	4.57	66.80	16.19		150.0	
10525-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	X	4.46	66.48	16.28	0.00	150.0	± 9.6 %
		Y	4.62	66.06	16.02		150.0	
		Z	4.54	65.85	15.79		150.0	
10526-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	X	4.60	66.79	16.40	0.00	150.0	± 9.6 %
		Y	4.82	66.46	16.16		150.0	
		Z	4.72	66.22	15.93		150.0	
10527-AAA	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)	X	4.53	66.77	16.35	0.00	150.0	± 9.6 %
		Y	4.74	66.44	16.12		150.0	
		Z	4.64	66.19	15.88		150.0	
10528-AAA	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)	X	4.54	66.78	16.38	0.00	150.0	± 9.6 %
		Y	4.75	66.46	16.15		150.0	
		Z	4.66	66.21	15.91		150.0	
10529-AAA	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)	X	4.54	66.78	16.38	0.00	150.0	± 9.6 %
		Y	4.75	66.46	16.15		150.0	
		Z	4.66	66.21	15.91		150.0	
10531-AAA	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)	X	4.52	66.84	16.38	0.00	150.0	± 9.6 %
		Y	4.76	66.60	16.18		150.0	
		Z	4.66	66.32	15.93		150.0	
10532-AAA	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)	X	4.39	66.72	16.32	0.00	150.0	± 9.6 %
		Y	4.61	66.47	16.13		150.0	
		Z	4.51	66.18	15.86		150.0	
10533-AAA	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)	X	4.55	66.87	16.39	0.00	150.0	± 9.6 %
		Y	4.77	66.48	16.13		150.0	
		Z	4.67	66.24	15.89		150.0	
10534-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	X	5.09	66.73	16.38	0.00	150.0	± 9.6 %
		Y	5.26	66.58	16.18		150.0	
		Z	5.19	66.36	15.98		150.0	
10535-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	X	5.14	66.89	16.46	0.00	150.0	± 9.6 %
		Y	5.33	66.72	16.24		150.0	
		Z	5.25	66.50	16.04		150.0	
10536-AAA	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	X	5.03	66.89	16.44	0.00	150.0	± 9.6 %
		Y	5.20	66.71	16.22		150.0	
		Z	5.12	66.47	16.01		150.0	
10537-AAA	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)	X	5.08	66.84	16.42	0.00	150.0	± 9.6 %
		Y	5.27	66.68	16.21		150.0	
		Z	5.18	66.44	16.00		150.0	
10538-AAA	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	X	5.15	66.81	16.44	0.00	150.0	± 9.6 %
		Y	5.37	66.74	16.28		150.0	
		Z	5.28	66.49	16.06		150.0	
10540-AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	X	5.09	66.80	16.45	0.00	150.0	± 9.6 %
		Y	5.28	66.69	16.27		150.0	
		Z	5.20	66.47	16.06		150.0	

10541-AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	X	5.06	66.68	16.38	0.00	150.0	± 9.6 %
		Y	5.26	66.60	16.22		150.0	
		Z	5.18	66.36	16.00		150.0	
10542-AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	X	5.22	66.77	16.43	0.00	150.0	± 9.6 %
		Y	5.41	66.64	16.25		150.0	
		Z	5.33	66.43	16.05		150.0	
10543-AAA	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	X	5.28	66.79	16.47	0.00	150.0	± 9.6 %
		Y	5.50	66.65	16.27		150.0	
		Z	5.41	66.46	16.08		150.0	
10544-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	X	5.42	66.77	16.34	0.00	150.0	± 9.6 %
		Y	5.55	66.69	16.17		150.0	
		Z	5.48	66.48	15.98		150.0	
10545-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	X	5.61	67.23	16.53	0.00	150.0	± 9.6 %
		Y	5.75	67.07	16.30		150.0	
		Z	5.67	66.87	16.11		150.0	
10546-AAA	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	X	5.46	66.92	16.38	0.00	150.0	± 9.6 %
		Y	5.64	66.96	16.27		150.0	
		Z	5.56	66.72	16.06		150.0	
10547-AAA	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	X	5.54	67.00	16.42	0.00	150.0	± 9.6 %
		Y	5.73	67.04	16.29		150.0	
		Z	5.64	66.77	16.07		150.0	
10548-AAA	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	X	5.73	67.79	16.78	0.00	150.0	± 9.6 %
		Y	5.99	67.96	16.73		150.0	
		Z	5.87	67.64	16.48		150.0	
10550-AAA	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	X	5.52	67.07	16.47	0.00	150.0	± 9.6 %
		Y	5.66	66.92	16.25		150.0	
		Z	5.58	66.70	16.06		150.0	
10551-AAA	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	X	5.47	66.93	16.36	0.00	150.0	± 9.6 %
		Y	5.67	66.99	16.25		150.0	
		Z	5.59	66.76	16.05		150.0	
10552-AAA	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	X	5.43	66.87	16.34	0.00	150.0	± 9.6 %
		Y	5.58	66.77	16.15		150.0	
		Z	5.50	66.55	15.96		150.0	
10553-AAA	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	X	5.49	66.84	16.35	0.00	150.0	± 9.6 %
		Y	5.67	66.82	16.21		150.0	
		Z	5.59	66.61	16.01		150.0	
10554-AAA	IEEE 1602.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	X	5.84	67.09	16.40	0.00	150.0	± 9.6 %
		Y	5.94	67.05	16.25		150.0	
		Z	5.88	66.85	16.07		150.0	
10555-AAA	IEEE 1602.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	X	5.95	67.36	16.52	0.00	150.0	± 9.6 %
		Y	6.09	67.37	16.39		150.0	
		Z	6.01	67.14	16.19		150.0	
10556-AAA	IEEE 1602.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	X	5.98	67.45	16.56	0.00	150.0	± 9.6 %
		Y	6.10	67.39	16.39		150.0	
		Z	6.03	67.18	16.21		150.0	
10557-AAA	IEEE 1602.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	X	5.93	67.31	16.50	0.00	150.0	± 9.6 %
		Y	6.09	67.35	16.39		150.0	
		Z	6.01	67.12	16.19		150.0	

10558-AAA	IEEE 1602.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	X	5.96	67.43	16.58	0.00	150.0	± 9.6 %
		Y	6.14	67.53	16.50		150.0	
		Z	6.06	67.28	16.29		150.0	
10560-AAA	IEEE 1602.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	X	5.96	67.30	16.55	0.00	150.0	± 9.6 %
		Y	6.14	67.38	16.46		150.0	
		Z	6.06	67.14	16.26		150.0	
10561-AAA	IEEE 1602.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	X	5.90	67.30	16.59	0.00	150.0	± 9.6 %
		Y	6.05	67.33	16.47		150.0	
		Z	5.97	67.09	16.27		150.0	
10562-AAA	IEEE 1602.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	X	5.97	67.52	16.70	0.00	150.0	± 9.6 %
		Y	6.20	67.78	16.70		150.0	
		Z	6.10	67.49	16.47		150.0	
10563-AAA	IEEE 1602.11ac WiFi (160MHz, MCS9, 99pc duty cycle)	X	6.05	67.43	16.61	0.00	150.0	± 9.6 %
		Y	6.51	68.26	16.88		150.0	
		Z	6.42	68.01	16.67		150.0	
10564-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	X	4.79	67.15	16.65	0.46	150.0	± 9.6 %
		Y	4.99	66.89	16.50		150.0	
		Z	4.91	66.68	16.27		150.0	
10565-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)	X	5.00	67.58	16.97	0.46	150.0	± 9.6 %
		Y	5.25	67.37	16.83		150.0	
		Z	5.16	67.16	16.61		150.0	
10566-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle)	X	4.83	67.41	16.78	0.46	150.0	± 9.6 %
		Y	5.08	67.24	16.66		150.0	
		Z	4.99	67.00	16.41		150.0	
10567-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle)	X	4.88	67.87	17.20	0.46	150.0	± 9.6 %
		Y	5.11	67.62	16.99		150.0	
		Z	5.02	67.41	16.78		150.0	
10568-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)	X	4.73	67.14	16.52	0.46	150.0	± 9.6 %
		Y	4.99	66.97	16.41		150.0	
		Z	4.89	66.73	16.15		150.0	
10569-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)	X	4.86	68.08	17.32	0.46	150.0	± 9.6 %
		Y	5.05	67.63	17.01		150.0	
		Z	4.97	67.46	16.82		150.0	
10570-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)	X	4.87	67.85	17.21	0.46	150.0	± 9.6 %
		Y	5.09	67.48	16.95		150.0	
		Z	5.01	67.31	16.75		150.0	
10571-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	X	1.23	65.85	16.68	0.46	130.0	± 9.6 %
		Y	1.28	65.62	16.38		130.0	
		Z	1.20	64.12	15.14		130.0	
10572-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	X	1.26	66.61	17.14	0.46	130.0	± 9.6 %
		Y	1.30	66.27	16.76		130.0	
		Z	1.21	64.64	15.46		130.0	
10573-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	X	15.61	122.59	34.86	0.46	130.0	± 9.6 %
		Y	7.32	105.62	29.57		130.0	
		Z	1.41	77.28	19.61		130.0	
10574-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	X	1.59	75.46	21.51	0.46	130.0	± 9.6 %
		Y	1.56	73.46	20.23		130.0	
		Z	1.30	69.51	17.90		130.0	

10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	4.57	66.90	16.65	0.46	130.0	± 9.6 %
		Y	4.78	66.67	16.55		130.0	
		Z	4.70	66.43	16.27		130.0	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	4.60	67.11	16.74	0.46	130.0	± 9.6 %
		Y	4.81	66.83	16.61		130.0	
		Z	4.72	66.59	16.34		130.0	
10577-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	X	4.78	67.36	16.89	0.46	130.0	± 9.6 %
		Y	5.04	67.16	16.78		130.0	
		Z	4.94	66.91	16.52		130.0	
10578-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	X	4.68	67.55	17.03	0.46	130.0	± 9.6 %
		Y	4.93	67.32	16.88		130.0	
		Z	4.83	67.07	16.62		130.0	
10579-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	X	4.43	66.68	16.24	0.46	130.0	± 9.6 %
		Y	4.71	66.69	16.25		130.0	
		Z	4.59	66.34	15.91		130.0	
10580-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	X	4.47	66.74	16.26	0.46	130.0	± 9.6 %
		Y	4.75	66.68	16.26		130.0	
		Z	4.64	66.35	15.93		130.0	
10581-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	X	4.59	67.62	16.99	0.46	130.0	± 9.6 %
		Y	4.83	67.38	16.83		130.0	
		Z	4.73	67.09	16.54		130.0	
10582-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	X	4.35	66.42	16.00	0.46	130.0	± 9.6 %
		Y	4.66	66.46	16.06		130.0	
		Z	4.54	66.09	15.70		130.0	
10583-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	X	4.57	66.90	16.65	0.46	130.0	± 9.6 %
		Y	4.78	66.67	16.55		130.0	
		Z	4.70	66.43	16.27		130.0	
10584-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	X	4.60	67.11	16.74	0.46	130.0	± 9.6 %
		Y	4.81	66.83	16.61		130.0	
		Z	4.72	66.59	16.34		130.0	
10585-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	X	4.78	67.36	16.89	0.46	130.0	± 9.6 %
		Y	5.04	67.16	16.78		130.0	
		Z	4.94	66.91	16.52		130.0	
10586-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	X	4.68	67.55	17.03	0.46	130.0	± 9.6 %
		Y	4.93	67.32	16.88		130.0	
		Z	4.83	67.07	16.62		130.0	
10587-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	X	4.43	66.68	16.24	0.46	130.0	± 9.6 %
		Y	4.71	66.69	16.25		130.0	
		Z	4.59	66.34	15.91		130.0	
10588-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	X	4.47	66.74	16.26	0.46	130.0	± 9.6 %
		Y	4.75	66.68	16.26		130.0	
		Z	4.64	66.35	15.93		130.0	
10589-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	X	4.59	67.62	16.99	0.46	130.0	± 9.6 %
		Y	4.83	67.38	16.83		130.0	
		Z	4.73	67.09	16.54		130.0	
10590-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	X	4.35	66.42	16.00	0.46	130.0	± 9.6 %
		Y	4.66	66.46	16.06		130.0	
		Z	4.54	66.09	15.70		130.0	

10591-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	X	4.72	66.97	16.76	0.46	130.0	± 9.6 %
		Y	4.93	66.73	16.63		130.0	
		Z	4.85	66.51	16.38		130.0	
10592-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	X	4.85	67.28	16.89	0.46	130.0	± 9.6 %
		Y	5.10	67.07	16.76		130.0	
		Z	5.01	66.85	16.51		130.0	
10593-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle)	X	4.77	67.16	16.75	0.46	130.0	± 9.6 %
		Y	5.03	67.02	16.67		130.0	
		Z	4.93	66.76	16.39		130.0	
10594-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)	X	4.83	67.35	16.92	0.46	130.0	± 9.6 %
		Y	5.08	67.17	16.80		130.0	
		Z	4.99	66.92	16.54		130.0	
10595-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)	X	4.79	67.31	16.82	0.46	130.0	± 9.6 %
		Y	5.06	67.14	16.71		130.0	
		Z	4.95	66.87	16.44		130.0	
10596-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)	X	4.73	67.29	16.82	0.46	130.0	± 9.6 %
		Y	4.99	67.14	16.71		130.0	
		Z	4.89	66.86	16.43		130.0	
10597-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle)	X	4.68	67.16	16.68	0.46	130.0	± 9.6 %
		Y	4.95	67.07	16.62		130.0	
		Z	4.84	66.78	16.32		130.0	
10598-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle)	X	4.67	67.44	16.97	0.46	130.0	± 9.6 %
		Y	4.93	67.31	16.88		130.0	
		Z	4.82	67.03	16.60		130.0	
10599-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	X	5.39	67.39	16.95	0.46	130.0	± 9.6 %
		Y	5.60	67.32	16.82		130.0	
		Z	5.51	67.07	16.58		130.0	
10600-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	X	5.51	67.80	17.12	0.46	130.0	± 9.6 %
		Y	5.77	67.81	17.04		130.0	
		Z	5.65	67.49	16.76		130.0	
10601-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	X	5.41	67.56	17.02	0.46	130.0	± 9.6 %
		Y	5.64	67.51	16.91		130.0	
		Z	5.54	67.24	16.65		130.0	
10602-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	X	5.54	67.73	17.02	0.46	130.0	± 9.6 %
		Y	5.72	67.51	16.82		130.0	
		Z	5.62	67.22	16.56		130.0	
10603-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)	X	5.62	68.07	17.33	0.46	130.0	± 9.6 %
		Y	5.82	67.83	17.11		130.0	
		Z	5.72	67.58	16.87		130.0	
10604-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)	X	5.49	67.68	17.12	0.46	130.0	± 9.6 %
		Y	5.60	67.27	16.82		130.0	
		Z	5.51	67.03	16.58		130.0	
10605-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)	X	5.51	67.70	17.12	0.46	130.0	± 9.6 %
		Y	5.70	67.55	16.96		130.0	
		Z	5.61	67.31	16.72		130.0	
10606-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)	X	5.26	67.01	16.63	0.46	130.0	± 9.6 %
		Y	5.49	67.08	16.60		130.0	
		Z	5.39	66.79	16.33		130.0	

10607-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	X	4.58	66.35	16.43	0.46	130.0	± 9.6 %
		Y	4.76	66.03	16.25		130.0	
		Z	4.68	65.79	15.98		130.0	
10608-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	X	4.73	66.71	16.58	0.46	130.0	± 9.6 %
		Y	4.98	66.46	16.42		130.0	
		Z	4.87	66.20	16.15		130.0	
10609-AAA	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle)	X	4.62	66.54	16.40	0.46	130.0	± 9.6 %
		Y	4.87	66.34	16.28		130.0	
		Z	4.76	66.05	15.99		130.0	
10610-AAA	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	X	4.68	66.72	16.58	0.46	130.0	± 9.6 %
		Y	4.92	66.49	16.43		130.0	
		Z	4.81	66.21	16.15		130.0	
10611-AAA	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	X	4.59	66.51	16.42	0.46	130.0	± 9.6 %
		Y	4.84	66.32	16.29		130.0	
		Z	4.73	66.02	16.00		130.0	
10612-AAA	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)	X	4.59	66.66	16.46	0.46	130.0	± 9.6 %
		Y	4.85	66.48	16.33		130.0	
		Z	4.74	66.16	16.03		130.0	
10613-AAA	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)	X	4.58	66.47	16.30	0.46	130.0	± 9.6 %
		Y	4.87	66.40	16.24		130.0	
		Z	4.75	66.06	15.92		130.0	
10614-AAA	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	X	4.55	66.74	16.59	0.46	130.0	± 9.6 %
		Y	4.80	66.57	16.46		130.0	
		Z	4.69	66.26	16.16		130.0	
10615-AAA	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	X	4.58	66.31	16.16	0.46	130.0	± 9.6 %
		Y	4.84	66.15	16.08		130.0	
		Z	4.73	65.83	15.77		130.0	
10616-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	X	5.21	66.65	16.56	0.46	130.0	± 9.6 %
		Y	5.41	66.58	16.44		130.0	
		Z	5.33	66.33	16.20		130.0	
10617-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	X	5.28	66.84	16.63	0.46	130.0	± 9.6 %
		Y	5.47	66.68	16.45		130.0	
		Z	5.38	66.45	16.22		130.0	
10618-AAA	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	X	5.18	66.90	16.68	0.46	130.0	± 9.6 %
		Y	5.37	66.76	16.51		130.0	
		Z	5.28	66.49	16.27		130.0	
10619-AAA	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	X	5.18	66.65	16.49	0.46	130.0	± 9.6 %
		Y	5.39	66.59	16.37		130.0	
		Z	5.30	66.32	16.11		130.0	
10620-AAA	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	X	5.26	66.66	16.54	0.46	130.0	± 9.6 %
		Y	5.51	66.68	16.46		130.0	
		Z	5.40	66.39	16.19		130.0	
10621-AAA	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	X	5.27	66.82	16.75	0.46	130.0	± 9.6 %
		Y	5.48	66.74	16.60		130.0	
		Z	5.39	66.50	16.37		130.0	
10622-AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	X	5.27	66.93	16.80	0.46	130.0	± 9.6 %
		Y	5.48	66.86	16.65		130.0	
		Z	5.39	66.62	16.42		130.0	

10623-AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)	X	5.14	66.42	16.40	0.46	130.0	± 9.6 %
		Y	5.37	66.46	16.34		130.0	
		Z	5.27	66.17	16.07		130.0	
10624-AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)	X	5.34	66.68	16.59	0.46	130.0	± 9.6 %
		Y	5.56	66.62	16.48		130.0	
		Z	5.47	66.37	16.24		130.0	
10625-AAA	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)	X	5.51	67.05	16.84	0.46	130.0	± 9.6 %
		Y	5.94	67.60	17.02		130.0	
		Z	5.85	67.36	16.78		130.0	
10626-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	X	5.53	66.66	16.50	0.46	130.0	± 9.6 %
		Y	5.68	66.62	16.38		130.0	
		Z	5.60	66.40	16.16		130.0	
10627-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	X	5.78	67.30	16.79	0.46	130.0	± 9.6 %
		Y	5.92	67.14	16.59		130.0	
		Z	5.84	66.92	16.37		130.0	
10628-AAA	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	X	5.53	66.65	16.39	0.46	130.0	± 9.6 %
		Y	5.74	66.79	16.36		130.0	
		Z	5.65	66.51	16.11		130.0	
10629-AAA	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)	X	5.63	66.79	16.45	0.46	130.0	± 9.6 %
		Y	5.82	66.85	16.38		130.0	
		Z	5.74	66.60	16.14		130.0	
10630-AAA	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)	X	5.95	67.97	17.05	0.46	130.0	± 9.6 %
		Y	6.32	68.49	17.20		130.0	
		Z	6.17	68.05	16.86		130.0	
10631-AAA	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)	X	5.89	67.93	17.23	0.46	130.0	± 9.6 %
		Y	6.21	68.27	17.26		130.0	
		Z	6.09	67.93	17.00		130.0	
10632-AAA	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)	X	5.77	67.44	17.00	0.46	130.0	± 9.6 %
		Y	5.90	67.22	16.76		130.0	
		Z	5.82	67.00	16.55		130.0	
10633-AAA	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)	X	5.60	66.87	16.54	0.46	130.0	± 9.6 %
		Y	5.83	67.02	16.49		130.0	
		Z	5.72	66.69	16.23		130.0	
10634-AAA	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)	X	5.59	66.92	16.62	0.46	130.0	± 9.6 %
		Y	5.81	67.01	16.55		130.0	
		Z	5.71	66.73	16.31		130.0	
10635-AAA	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)	X	5.44	66.12	15.93	0.46	130.0	± 9.6 %
		Y	5.70	66.39	15.99		130.0	
		Z	5.59	66.05	15.69		130.0	
10636-AAA	IEEE 1602.11ac WiFi (160MHz, MCS0, 90pc duty cycle)	X	5.96	67.00	16.57	0.46	130.0	± 9.6 %
		Y	6.08	67.01	16.47		130.0	
		Z	6.01	66.78	16.25		130.0	
10637-AAA	IEEE 1602.11ac WiFi (160MHz, MCS1, 90pc duty cycle)	X	6.10	67.36	16.74	0.46	130.0	± 9.6 %
		Y	6.25	67.39	16.63		130.0	
		Z	6.17	67.14	16.41		130.0	
10638-AAA	IEEE 1602.11ac WiFi (160MHz, MCS2, 90pc duty cycle)	X	6.11	67.36	16.71	0.46	130.0	± 9.6 %
		Y	6.25	67.36	16.60		130.0	
		Z	6.17	67.12	16.38		130.0	

10639-AAA	IEEE 1602.11ac WiFi (160MHz, MCS3, 90pc duty cycle)	X	6.07	67.26	16.71	0.46	130.0	± 9.6 %
		Y	6.25	67.37	16.65		130.0	
		Z	6.16	67.11	16.42		130.0	
10640-AAA	IEEE 1602.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	X	6.05	67.22	16.62	0.46	130.0	± 9.6 %
		Y	6.27	67.44	16.63		130.0	
		Z	6.17	67.12	16.37		130.0	
10641-AAA	IEEE 1602.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	X	6.13	67.23	16.65	0.46	130.0	± 9.6 %
		Y	6.27	67.20	16.53		130.0	
		Z	6.19	66.96	16.31		130.0	
10642-AAA	IEEE 1602.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	X	6.16	67.45	16.94	0.46	130.0	± 9.6 %
		Y	6.34	67.53	16.85		130.0	
		Z	6.25	67.29	16.64		130.0	
10643-AAA	IEEE 1602.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	X	6.00	67.14	16.67	0.46	130.0	± 9.6 %
		Y	6.17	67.21	16.60		130.0	
		Z	6.08	66.93	16.36		130.0	
10644-AAA	IEEE 1602.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	X	6.08	67.39	16.82	0.46	130.0	± 9.6 %
		Y	6.38	67.85	16.95		130.0	
		Z	6.26	67.49	16.66		130.0	
10645-AAA	IEEE 1602.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	X	6.23	67.50	16.83	0.46	130.0	± 9.6 %
		Y	6.74	68.44	17.18		130.0	
		Z	6.68	68.29	17.00		130.0	
10646-AAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	X	13.71	101.95	34.43	9.30	60.0	± 9.6 %
		Y	31.42	116.20	38.46		60.0	
		Z	15.59	99.47	32.52		60.0	
10647-AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	X	12.18	100.02	33.95	9.30	60.0	± 9.6 %
		Y	30.06	116.00	38.55		60.0	
		Z	14.66	98.82	32.42		60.0	
10648-AAA	CDMA2000 (1x Advanced)	X	0.74	65.73	11.50	0.00	150.0	± 9.6 %
		Y	0.86	65.73	12.88		150.0	
		Z	0.73	63.45	11.13		150.0	

[E] 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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Client **sporton** **Certificate No: Z17-97056**

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3169
Calibration Procedure(s)	FF-Z11-004-01 Calibration Procedures for Dosimetric E-field Probes
Calibration date:	May 11, 2017

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Power sensor NRP-Z91	101547	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Power sensor NRP-Z91	101548	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Reference10dBAttenuator	18N50W-10dB	13-Mar-16(CTTL,No.J16X01547)	Mar-18
Reference20dBAttenuator	18N50W-20dB	13-Mar-16(CTTL, No.J16X01548)	Mar-18
Reference Probe EX3DV4	SN 7433	26-Sep-16(SPEAG,No.EX3-7433_Sep16)	Sep-17
DAE4	SN 549	13-Dec-16(SPEAG, No.DAE4-549_Dec16)	Dec -17
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGeneratorMG3700A	6201052605	27-Jun-16 (CTTL, No.J16X04776)	Jun-17
Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan -18

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

Issued: May 12, 2017

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Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A,B,C,D	modulation dependent linearization parameters
Polarization Φ	Φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i θ=0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005

c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010

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

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization θ=0 (f≤900MHz in TEM-cell; f>1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below ConvF).
- *NORM(f)x,y,z = NORMx,y,z* frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
- *Ax,y,z; Bx,y,z; Cx,y,z;VRx,y,z:*A,B,C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f≤800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from±50MHz to±100MHz.
- *Spherical isotropy (3D deviation from isotropy):* in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset:* The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle:* The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

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Probe ES3DV3

SN: 3169

Calibrated: May 11, 2017

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3169

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)^2)[A]	1.16	1.17	1.17	±10.0%
DCP(mV)[B]	102.3	98.9	96.6	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	283.5	±2.6%
		Y	0.0	0.0	1.0		283.4	
		Z	0.0	0.0	1.0		278.5	

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

[A] The uncertainties of Norm X, Y, Z do not affect the E^2-field uncertainty inside TSL (see Page 5 and Page 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainly is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3169

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
750	41.9	0.89	6.07	6.07	6.07	0.50	1.20	±12.1%
835	41.5	0.90	5.99	5.99	5.99	0.32	1.63	±12.1%
1750	40.1	1.37	5.33	5.33	5.33	0.45	1.51	±12.1%
1900	40.0	1.40	5.03	5.03	5.03	0.46	1.51	±12.1%
2450	39.2	1.80	4.50	4.50	4.50	0.90	1.10	±12.1%
2600	39.0	1.96	4.47	4.47	4.47	0.90	1.05	±12.1%

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

[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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

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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3169

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
750	55.5	0.96	6.31	6.31	6.31	0.50	1.30	±12.1%
835	55.2	0.97	6.05	6.05	6.05	0.37	1.65	±12.1%
1750	53.4	1.49	4.95	4.95	4.95	0.43	1.62	±12.1%
1900	53.3	1.52	4.72	4.72	4.72	0.61	1.32	±12.1%
2450	52.7	1.95	4.28	4.28	4.28	0.52	1.72	±12.1%
2600	52.5	2.16	4.17	4.17	4.17	0.55	1.60	±12.1%

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

[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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

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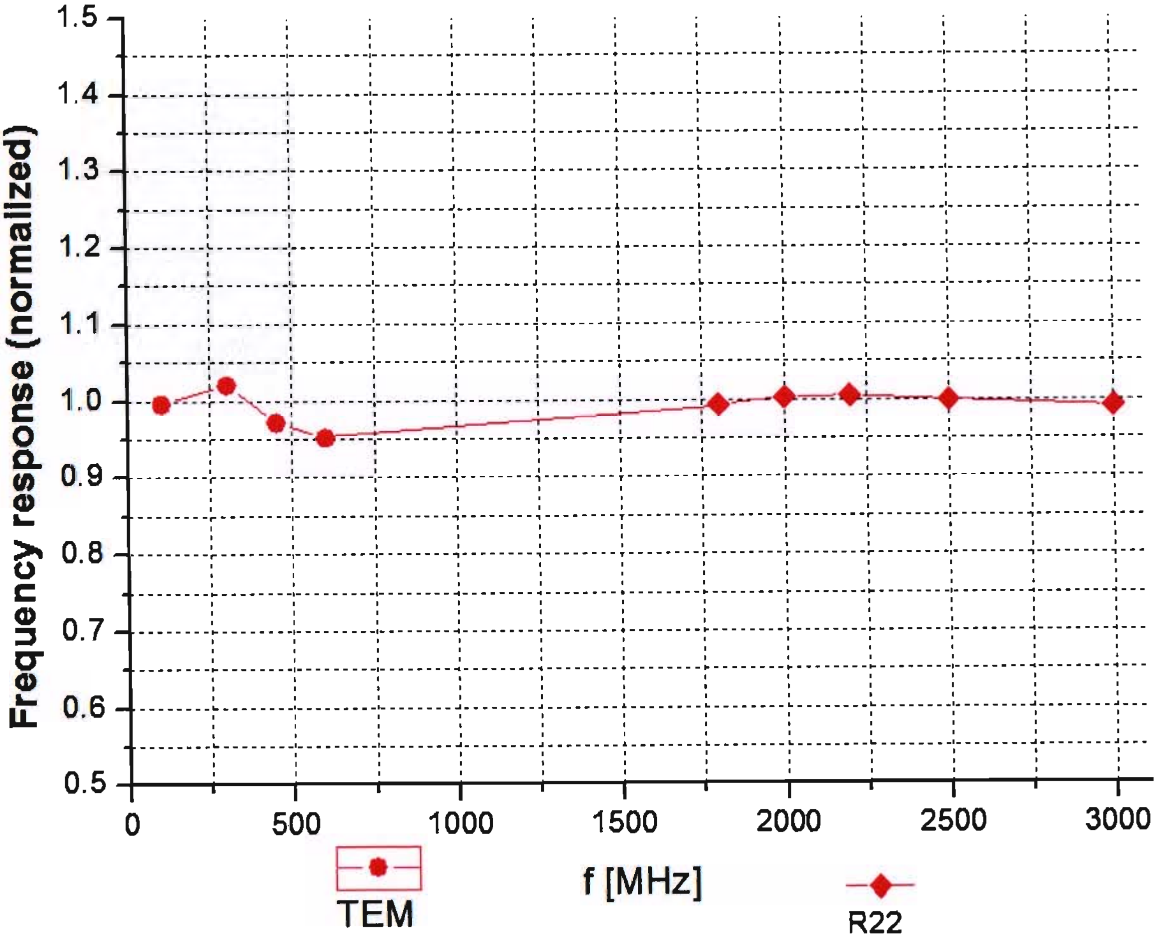
Frequency Response of E-Field

(TEM-Cell: ifi110 EXX, Waveguide: R22)



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

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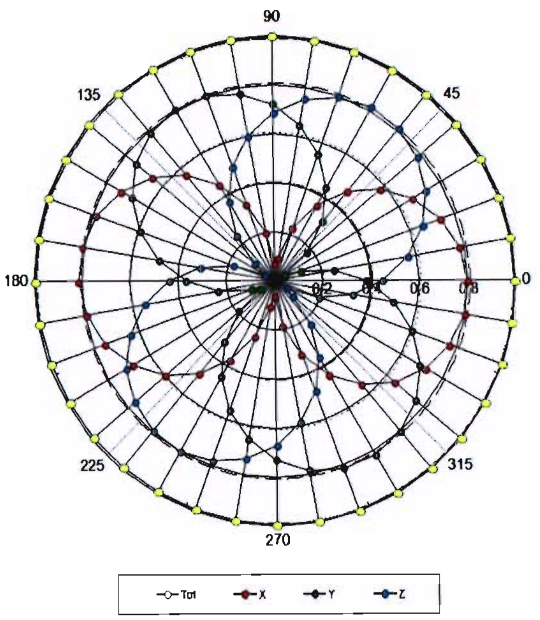
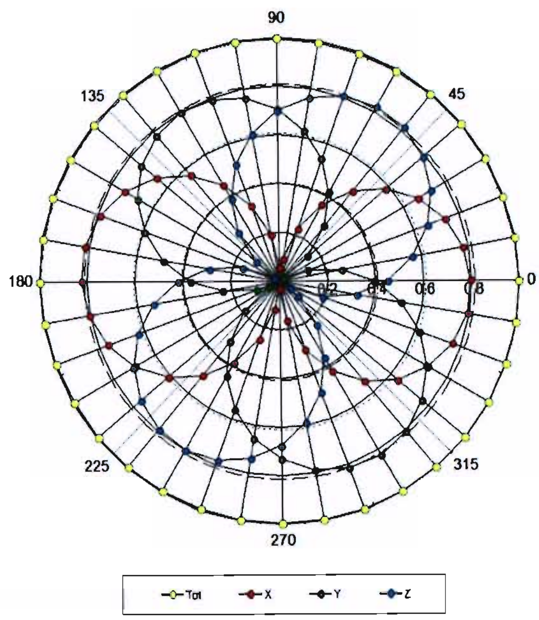
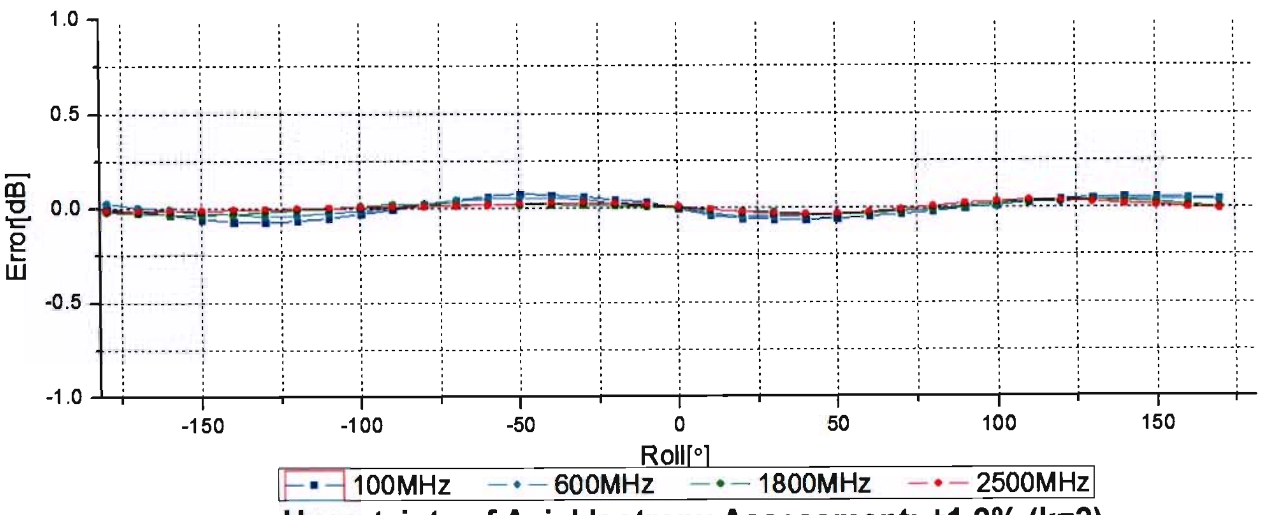
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





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

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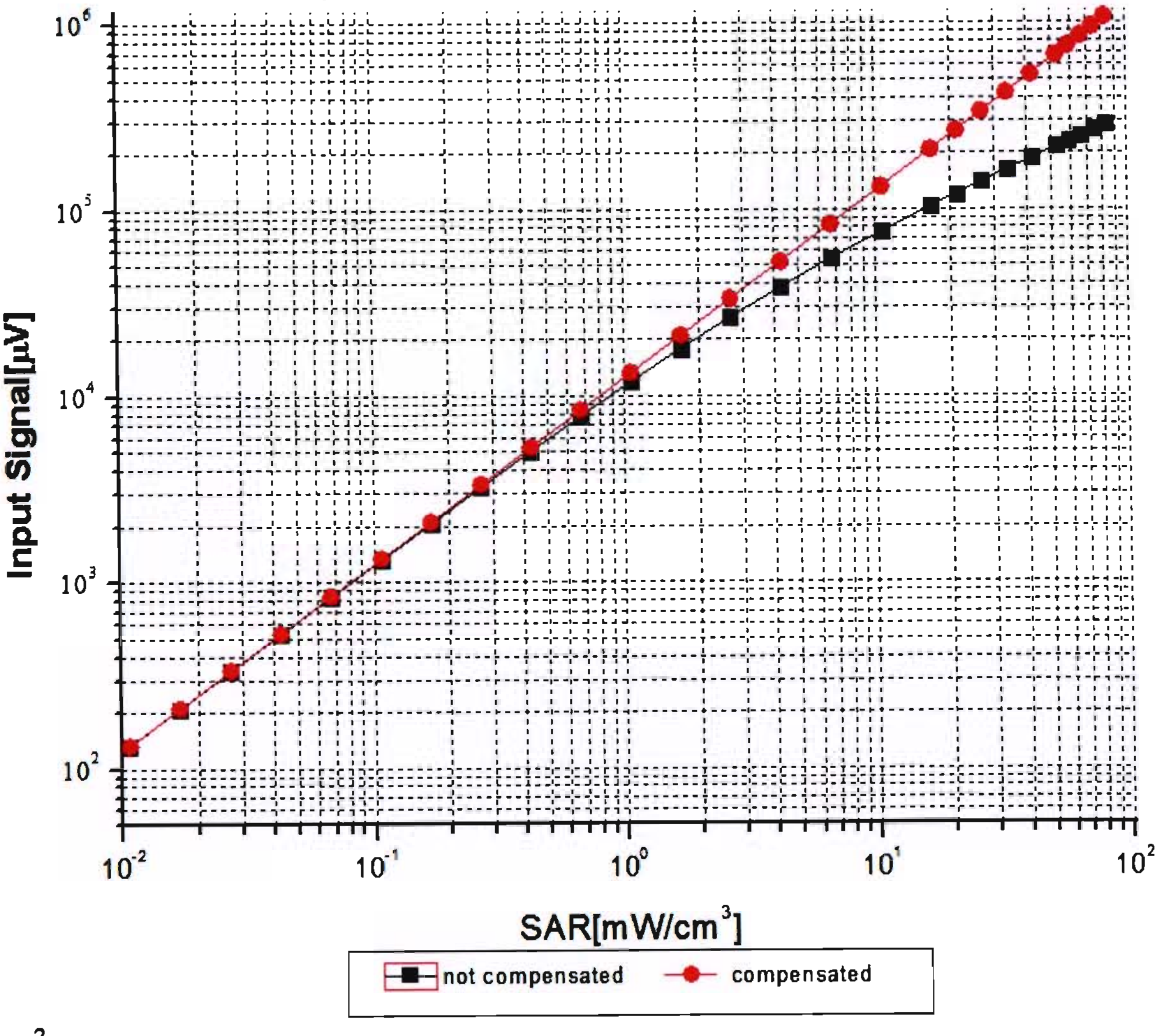
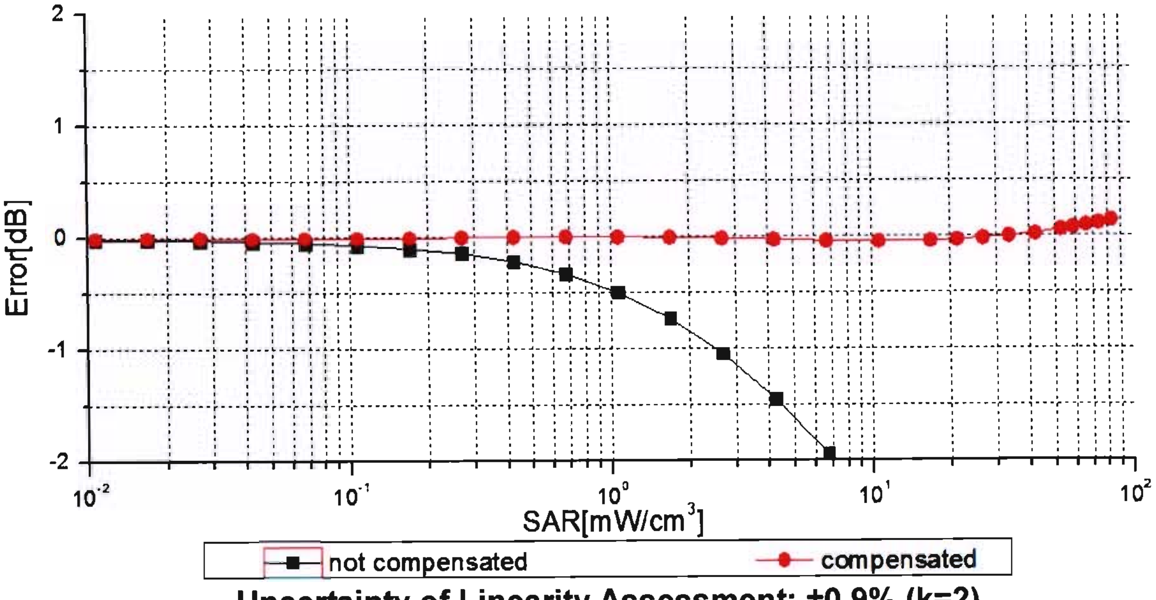
Dynamic Range f(SAR_{head})
(TEM cell, f = 900 MHz)





Uncertainty of Linearity Assessment: ±0.9% (k=2)

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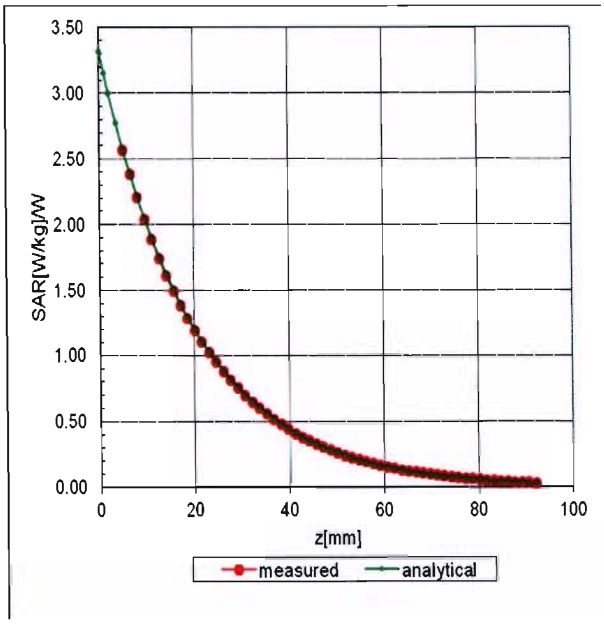
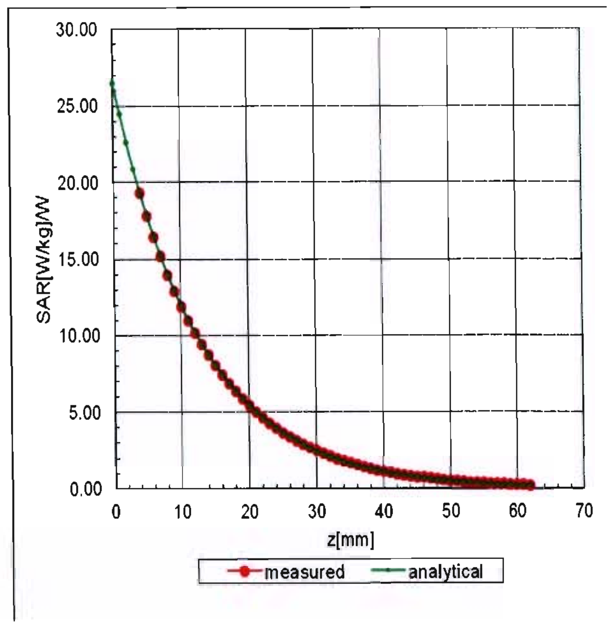
Conversion Factor Assessment

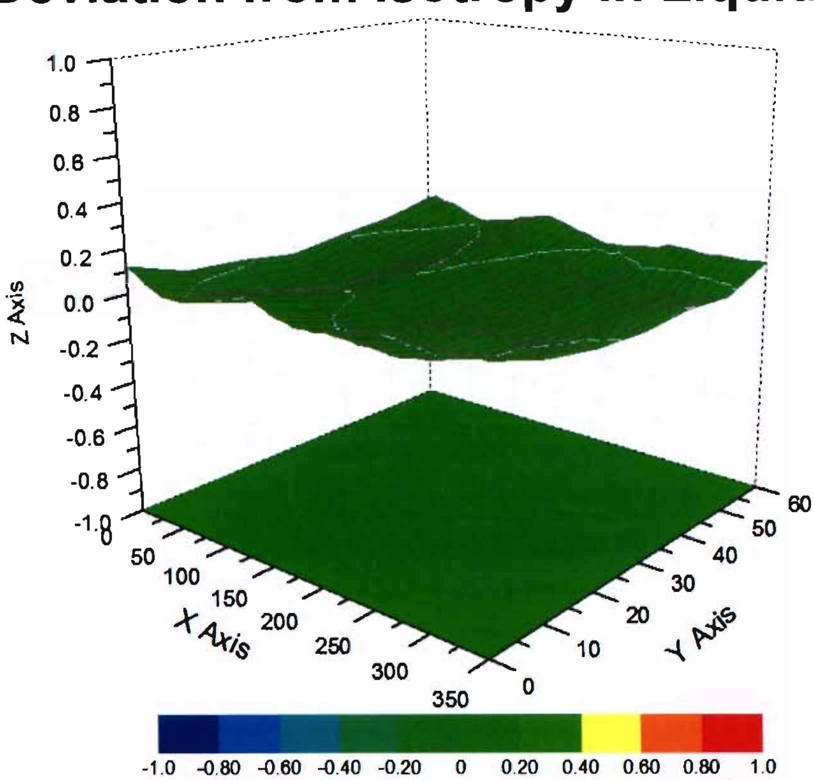
f=835 MHz, WGLS R9(H_convF)



f=1750 MHz, WGLS R22(H_convF)



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±3.2% (K=2)

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Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	154.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	10mm
Tip Diameter	4mm
Probe Tip to Sensor X Calibration Point	2mm
Probe Tip to Sensor Y Calibration Point	2mm
Probe Tip to Sensor Z Calibration Point	2mm
Recommended Measurement Distance from Surface	3mm