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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Microsoft**

Certificate No: **D2450V2-916_Jul14**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 916**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **July 16, 2014**

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 $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	30-Apr-14 (No. DAE4-601_Apr14)	Apr-15
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

Calibrated by: **Name** **Function** **Signature**
Michael Weber **Laboratory Technician**

Approved by: **Katja Pokovic** **Technical Manager**

Issued: July 16, 2014

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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:

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

Additional Documentation:

- 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 $\pm$ 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 $\pm$ 0.2) °C	37.8 $\pm$ 6 %	1.85 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.3 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	52.1 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.1 W/kg $\pm$ 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 $\pm$ 0.2) °C	50.6 $\pm$ 6 %	2.03 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.3 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	51.7 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.11 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	24.0 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$53.9 \Omega + 1.6 j\Omega$
Return Loss	- 27.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$51.2 \Omega + 3.7 j\Omega$
Return Loss	- 28.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.153 ns
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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 19, 2012

DASY5 Validation Report for Head TSL

Date: 07.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 916

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.85$ S/m; $\epsilon_r = 37.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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

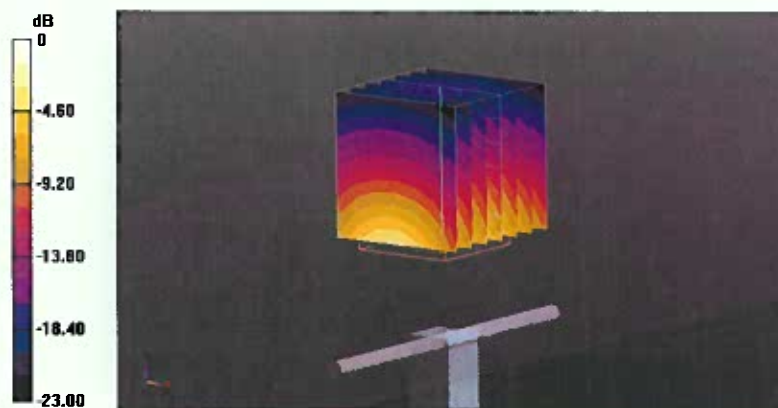
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 99.97 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 27.6 W/kg

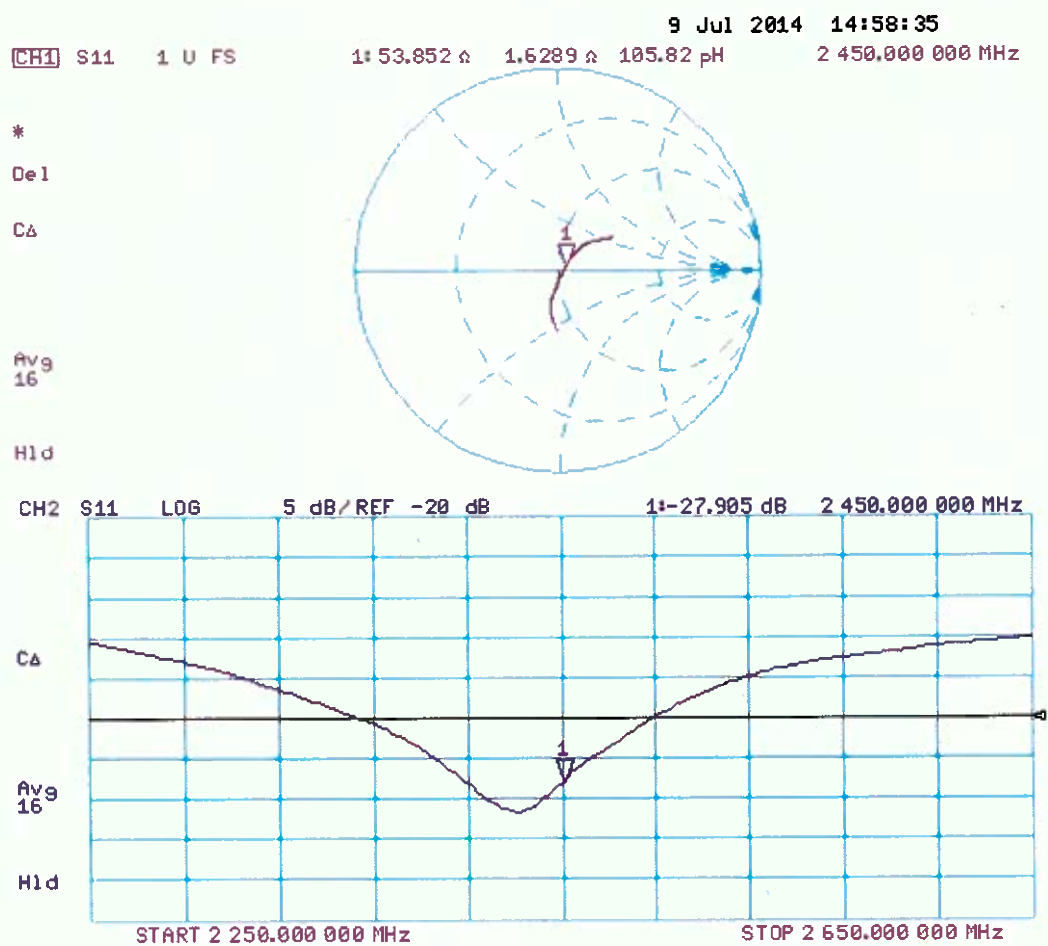
SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.11 W/kg

Maximum value of SAR (measured) = 17.2 W/kg



0 dB = 17.2 W/kg = 12.36 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 16.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 916

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 2.03 \text{ S/m}$; $\epsilon_r = 50.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.35, 4.35, 4.35); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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

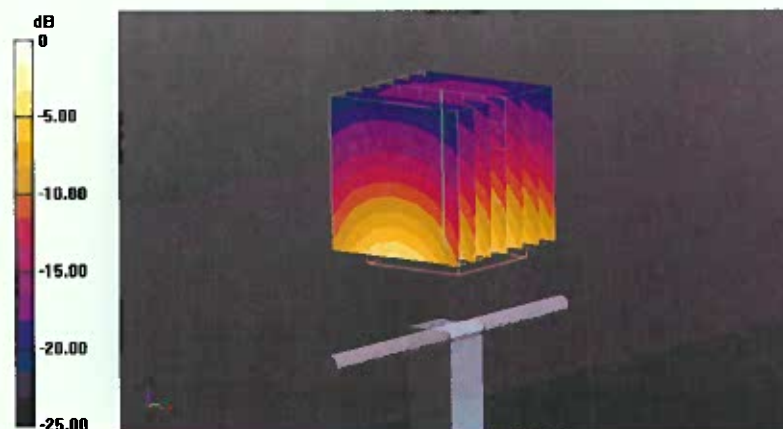
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 95.95 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 27.9 W/kg

SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.11 W/kg

Maximum value of SAR (measured) = 17.6 W/kg

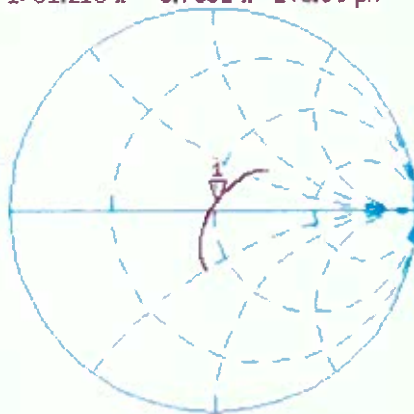


0 dB = 17.6 W/kg = 12.46 dBW/kg

Impedance Measurement Plot for Body TSL

16 Jul 2014 11:24:48
CH1 S11 1 U FS 1: 51.215 Ω 3.7051 Ω 240.69 μH 2 450.000 000 MHz

*
De1
CA



Avg
16

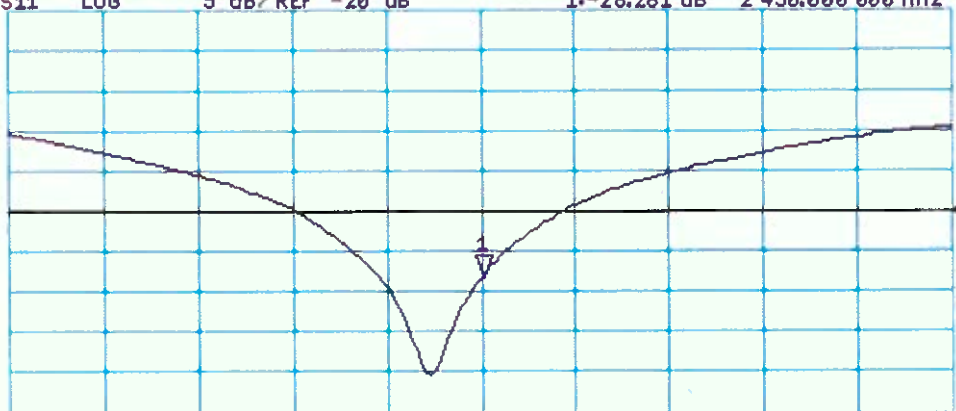
H1d

CH2 S11 LOG 5 dB/REF -20 dB 1: -28.281 dB 2 450.000 000 MHz

CA

Avg
16

H1d



START 2 250.000 000 MHz

STOP 2 650.000 000 MHz



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Client **Microsoft**

Certificate No: **D5GHzV2-1158_Jul14**

CALIBRATION CERTIFICATE

Object **D5GHzV2 - SN: 1158**

Calibration procedure(s) **QA CAL-22.v2
Calibration procedure for dipole validation kits between 3-6 GHz**

Calibration date: **July 15, 2014**

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 $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe EX3DV4	SN: 3503	30-Dec-13 (No. EX3-3503_Dec13)	Dec-14
DAE4	SN: 601	30-Apr-14 (No. DAE4-601_Apr14)	Apr-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

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

Issued: July 16, 2014

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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:

- IEC 62209-2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures"; Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"
- 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

Additional Documentation:

- 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	5200 MHz $\pm$ 1 MHz 5600 MHz $\pm$ 1 MHz 5800 MHz $\pm$ 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	34.6 $\pm$ 6 %	4.46 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.05 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	79.8 W/kg $\pm$ 19.9 % (k=2)

SAR averaged over 10 cm³ (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 $\pm$ 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 $\pm$ 0.2) °C	34.0 $\pm$ 6 %	4.84 mho/m $\pm$ 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	8.54 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	84.5 W / kg $\pm$ 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.0 W/kg $\pm$ 19.5 % (k=2)

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	33.8 ± 6 %	5.04 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.05 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	79.6 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.29 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.6 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.7 ± 6 %	5.38 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.71 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	76.7 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.16 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.5 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	47.1 ± 6 %	5.91 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.35 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	83.1 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.32 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	23.0 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.7 ± 6 %	6.18 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.67 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	76.3 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.12 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.0 W/kg ± 19.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS108)

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	50.5 Ω - 8.6 j Ω
Return Loss	- 21.4 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	55.1 Ω - 2.7 j Ω
Return Loss	- 25.2 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	53.3 Ω - 3.8 j Ω
Return Loss	- 26.2 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	49.7 Ω - 6.4 j Ω
Return Loss	- 23.9 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	55.4 Ω - 1.0 j Ω
Return Loss	- 25.7 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	54.9 Ω - 1.9 j Ω
Return Loss	- 26.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.205 ns
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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 06, 2013

DASY5 Validation Report for Head TSL

Date: 15.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1158

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz
Medium parameters used: $f = 5200$ MHz; $\sigma = 4.46$ S/m; $\epsilon_r = 34.6$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5600$ MHz; $\sigma = 4.84$ S/m; $\epsilon_r = 34$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5800$ MHz; $\sigma = 5.04$ S/m; $\epsilon_r = 33.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.52, 5.52, 5.52); Calibrated: 30.12.2013, ConvF(4.86, 4.86, 4.86); Calibrated: 30.12.2013, ConvF(4.91, 4.91, 4.91); Calibrated: 30.12.2013;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 66.12 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 29.3 W/kg

SAR(1 g) = 8.05 W/kg; SAR(10 g) = 2.3 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 = 65.52 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 33.8 W/kg

SAR(1 g) = 8.54 W/kg; SAR(10 g) = 2.43 W/kg

Maximum value of SAR (measured) = 20.0 W/kg

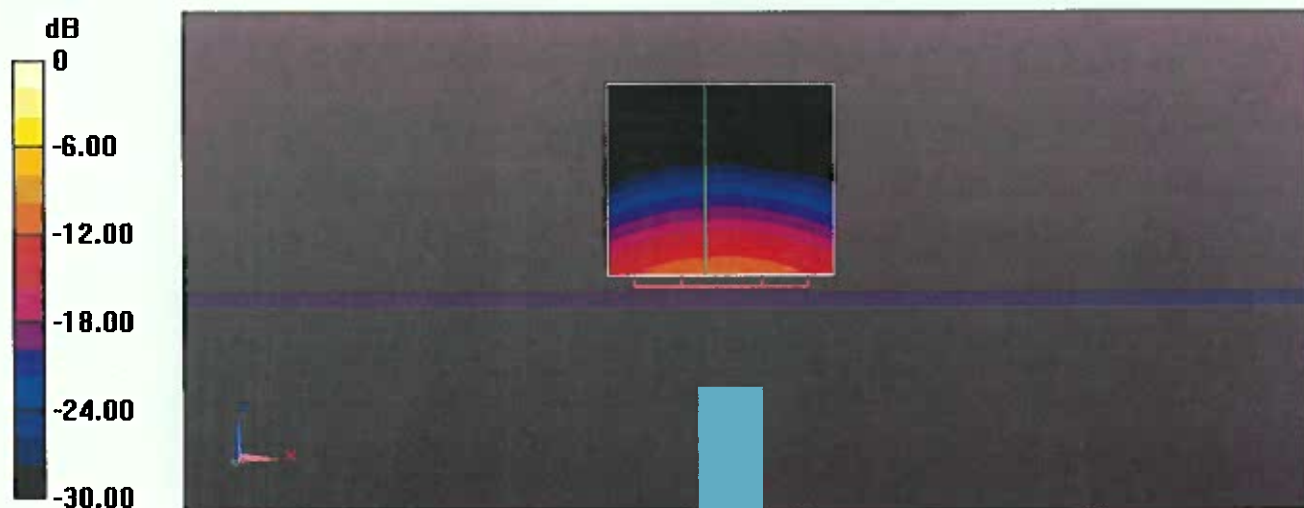
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 62.97 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 33.2 W/kg

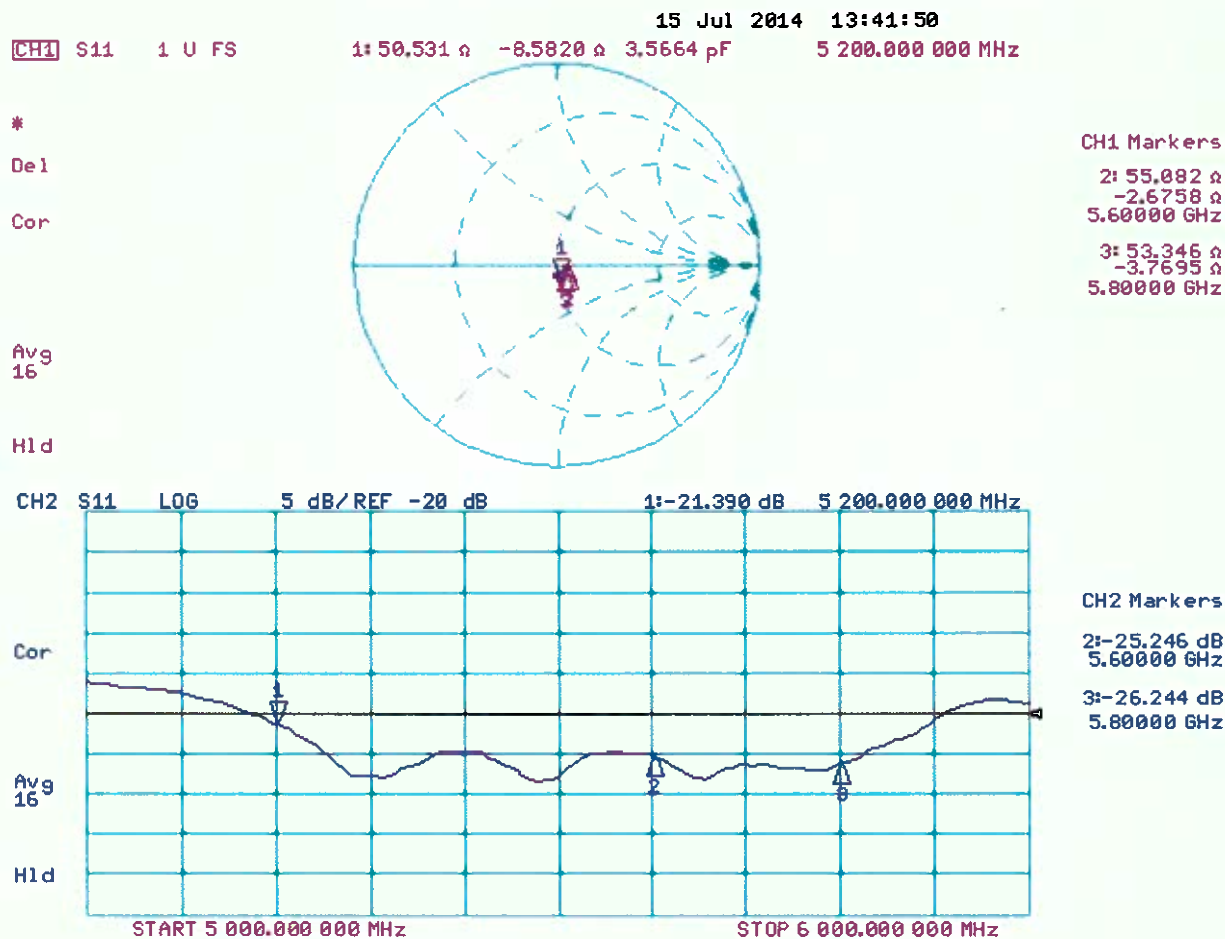
SAR(1 g) = 8.05 W/kg; SAR(10 g) = 2.29 W/kg

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: 14.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1158

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz
Medium parameters used: $f = 5200$ MHz; $\sigma = 5.38$ S/m; $\epsilon_r = 47.7$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5600$ MHz; $\sigma = 5.91$ S/m; $\epsilon_r = 47.1$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5800$ MHz; $\sigma = 6.18$ S/m; $\epsilon_r = 46.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2013, ConvF(4.3, 4.3, 4.3); Calibrated: 30.12.2013, ConvF(4.47, 4.47, 4.47); Calibrated: 30.12.2013;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 59.14 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 30.4 W/kg

SAR(1 g) = 7.71 W/kg; SAR(10 g) = 2.16 W/kg

Maximum value of SAR (measured) = 18.5 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 = 59.30 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 36.8 W/kg

SAR(1 g) = 8.35 W/kg; SAR(10 g) = 2.32 W/kg

Maximum value of SAR (measured) = 20.7 W/kg

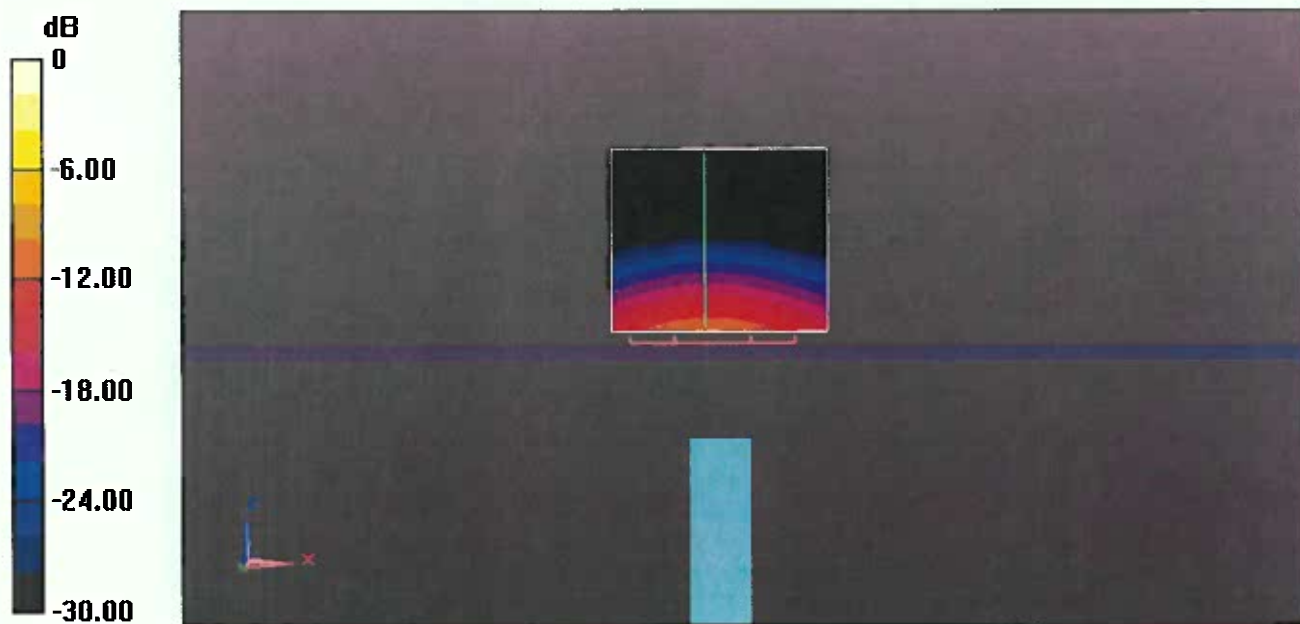
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 55.64 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 35.7 W/kg

SAR(1 g) = 7.67 W/kg; SAR(10 g) = 2.12 W/kg

Maximum value of SAR (measured) = 19.5 W/kg



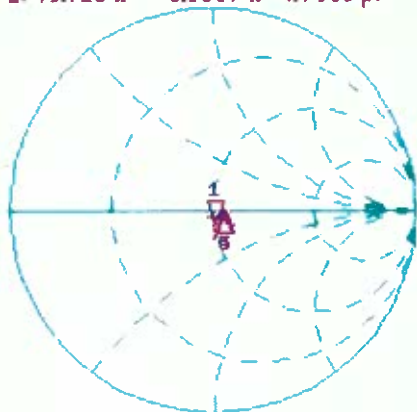
0 dB = 19.5 W/kg = 12.90 dBW/kg

Impedance Measurement Plot for Body TSL

14 Jul 2014 13:21:02

CH1 S11 1 U FS 1: 49.723 Ω -6.3887 Ω 4.7908 pF 5 200.000 000 MHz

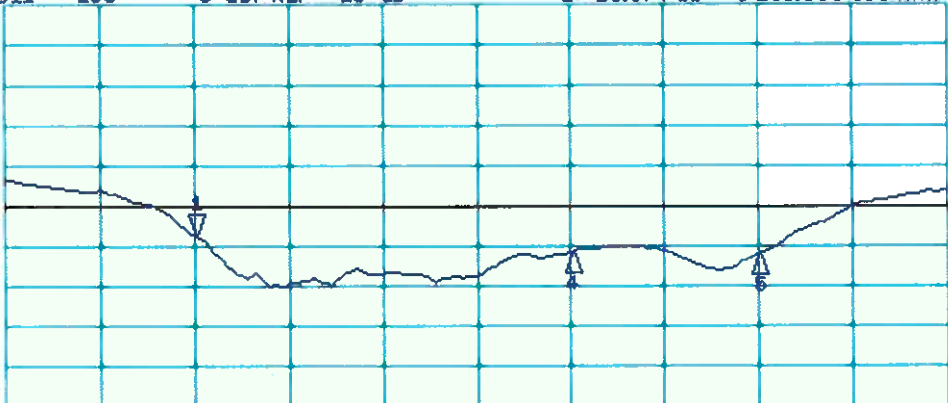
*
De1
CA
Avg
16
H1d



CH1 Markers
4: 55.389 Ω
-1.0195 Ω
5.60000 GHz
5: 54.879 Ω
-1.8887 Ω
5.80000 GHz

CH2 S11 LOG 5 dB/REF -20 dB 1:-23.874 dB 5 200.000 000 MHz

CA
Avg
16
H1d



CH2 Markers
4:-25.673 dB
5.60000 GHz
5:-26.035 dB
5.80000 GHz

START 5 000.000 000 MHz STOP 6 000.000 000 MHz

Dipole D5GHzV2-1159 Calibration Extension

The dipole D5GHzV2-1159 was used under an extended calibration by way of the rules of **FCC KDB 865664 D01 v01r03 Section 3.2.2**, which say:

However, instead of the typical annual calibration recommended by measurement standards, longer calibration intervals of up to three years may be considered when it is demonstrated that the SAR target, impedance and return loss of a dipole have remain stable according to the following requirements.

- 1) The test laboratory must ensure that the required supporting information and documentation are included in the SAR report to qualify for the three-year extended calibration interval; otherwise, the IEEE Std 1528-2003 recommended annual calibration applies.
- 2) Immediate re-calibration is required for the following conditions.
 - a) After a dipole is damaged and properly repaired to meet required specifications.
 - b) When the measured SAR deviates from the calibrated SAR value by more than 10% due to changes in physical, mechanical, electrical or other relevant dipole conditions; i.e., the error is not introduced by incorrect measurement procedures or other issues relating to the SAR measurement system.
 - c) When the most recent return-loss result, measured at least annually, deviates by more than 20% from the previous measurement (**i.e. value in dB X 0.2**) or not meeting the required 20 dB minimum return-loss requirement.²⁴
 - d) When the most recent measurement of the real or imaginary parts of the impedance, measured at least annually, deviates by more than 5 Ω from the previous measurement.

The required most recent return loss and impedance measurements of the dipole are compared to those of the calibration report below (See following Aug 13 Calibration Certificate). This dipole was only used for 5300 MHz and 5500 MHz system verifications, so only the parameters of those frequencies are listed.

Dipole D5GHzV2-1159 Return Loss and Impedance Measurements – Body TSL

Freq. (MHZ)	Return Loss (dB)			Impedance Real Part (Ω)			Impedance Imaginary Part (j Ω)		
	Cal. Cert.	Meas. 2/10/15	% Diff. of dB values	Cal. Cert.	Meas. 2/10/15	Diff. in (Ω)	Cal. Cert.	Meas. 2/10/15	Diff. in (j Ω)
5300	-21.8	-22.27	2.16	46.8	45.63	1.17	-7.2	-4.94	2.26
5500	-31.1	-29.32	-5.72	52.9	48.04	4.86	-0.1	2.45	2.55

Measurements were made with the dipole at a spacing of 10mm from a flat phantom filled with 5 GHz muscle-tissue simulating liquid. (MBBL 3500-5800). Most recent measurements were made 2-10-2015. Cal. Cert. measurements are from Certificate No: D5GHzV2-1158_Aug13

Dipole D5GHzV2-1159 Return Loss and Impedance Measurements – Head TSL

Freq. (MHZ)	Return Loss (dB)			Impedance Real Part (Ω)			Impedance Imaginary Part (Ω)		
	Cal. Cert.	Meas. 2/10/15	% Diff. of dB values	Cal. Cert.	Meas. 2/10/15	Diff. in (Ω)	Cal. Cert.	Meas. 2/10/15	Diff. in (Ω)
5300	-21	-21.9	4.29	46.9	44.96	1.94	-8.1	-6.53	1.57
5500	-31.1	-29.47	-5.24	52.7	48.92	3.78	-0.9	1.88	2.78

Measurements were made with the dipole at a spacing of 10mm from a flat phantom filled with 5 GHz head-tissue simulating liquid. (HBBL 3500-5800). Most recent measurements were made 2-10-2015. Cal. Cert. measurements are from Certificate No: D5GHzV2-1158_Aug13



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 108**

Client **Microsoft (TDK)**

Certificate No: **D5GHzV2-1159_Aug13**

CALIBRATION CERTIFICATE

Object **D5GHzV2 - SN: 1159**

Calibration procedure(s) **QA CAL-22.v2**
Calibration procedure for dipole validation kits between 3-6 GHz

Calibration date: **August 06, 2013**

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 $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe EX3DV4	SN: 3503	28-Dec-12 (No. EX3-3503_Dec12)	Dec-13
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

Calibrated by: **Claudio Leubler** **Laboratory Technician**

Signature

Approved by: **Katja Pokovic** **Technical Manager**

Issued: August 6, 2013

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



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

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) IEC 62209-2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures"; Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters", March 2010
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- c) 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	V52.8.7
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	5200 MHz $\pm$ 1 MHz 5300 MHz $\pm$ 1 MHz 5500 MHz $\pm$ 1 MHz 5600 MHz $\pm$ 1 MHz 5800 MHz $\pm$ 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	35.2 $\pm$ 6 %	4.46 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.00 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	79.5 W/kg $\pm$ 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.29 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.7 W/kg $\pm$ 19.5 % (k=2)

Head TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.76 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.1 ± 6 %	4.55 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5300 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	82.3 W / kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.5 W/kg ± 19.5 % (k=2)

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.8 ± 6 %	4.74 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.51 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	84.5 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.1 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	34.7 ± 6 %	4.85 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	8.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	83.6 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.8 W/kg ± 19.5 % (k=2)

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.4 ± 6 %	5.05 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.98 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	79.2 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.27 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.5 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.9 ± 6 %	5.40 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.33 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	73.3 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.05 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.5 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.42 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.7 ± 6 %	5.53 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5300 MHz

SAR averaged over 1 cm³ (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	75.0 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (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	21.0 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.6	5.65 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.4 ± 6 %	5.79 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.81 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	78.1 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.17 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.7 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	48.2 ± 6 %	5.93 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.99 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	79.9 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.21 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	22.1 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.9 ± 6 %	6.21 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.40 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	74.0 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.05 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.5 W/kg ± 19.5 % (k=2)

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	46.7 Ω - 7.1 j Ω
Return Loss	- 21.9 dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	46.9 Ω - 8.1 j Ω
Return Loss	- 21.0 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	52.7 Ω - 0.9 j Ω
Return Loss	- 31.1 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	50.6 Ω - 1.0 j Ω
Return Loss	- 39.0 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	55.7 Ω - 5.2 j Ω
Return Loss	- 22.8 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	46.6 Ω - 5.6 j Ω
Return Loss	- 23.4 dB

Antenna Parameters with Body TSL at 5300 MHz

Impedance, transformed to feed point	46.8 Ω - 7.2 j Ω
Return Loss	- 21.8 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	52.9 Ω - 0.1 j Ω
Return Loss	- 31.1 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	$50.8 \Omega + 0.7 j\Omega$
Return Loss	- 39.2 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	$56.3 \Omega - 3.7 j\Omega$
Return Loss	- 23.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.202 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 06, 2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1159

Communication System: UID 0 - CW ; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz

Medium parameters used: $f = 5200 \text{ MHz}$; $\sigma = 4.46 \text{ S/m}$; $\epsilon_r = 35.2$; $\rho = 1000 \text{ kg/m}^3$,Medium parameters used: $f = 5300 \text{ MHz}$; $\sigma = 4.55 \text{ S/m}$; $\epsilon_r = 35.1$; $\rho = 1000 \text{ kg/m}^3$,Medium parameters used: $f = 5500 \text{ MHz}$; $\sigma = 4.74 \text{ S/m}$; $\epsilon_r = 34.8$; $\rho = 1000 \text{ kg/m}^3$,Medium parameters used: $f = 5600 \text{ MHz}$; $\sigma = 4.85 \text{ S/m}$; $\epsilon_r = 34.7$; $\rho = 1000 \text{ kg/m}^3$,Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 5.05 \text{ S/m}$; $\epsilon_r = 34.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.41, 5.41, 5.41); Calibrated: 28.12.2012, ConvF(5.1, 5.1, 5.1); Calibrated: 28.12.2012, ConvF(4.91, 4.91, 4.91); Calibrated: 28.12.2012, ConvF(4.76, 4.76, 4.76); Calibrated: 28.12.2012, ConvF(4.81, 4.81, 4.81); Calibrated: 28.12.2012;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 64.332 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 29.2 W/kg

SAR(1 g) = 8 W/kg; SAR(10 g) = 2.29 W/kg

Maximum value of SAR (measured) = 18.2 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 64.496 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 30.8 W/kg

SAR(1 g) = 8.28 W/kg; SAR(10 g) = 2.37 W/kg

Maximum value of SAR (measured) = 18.9 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 64.390 V/m; Power Drift = 0.08 dB

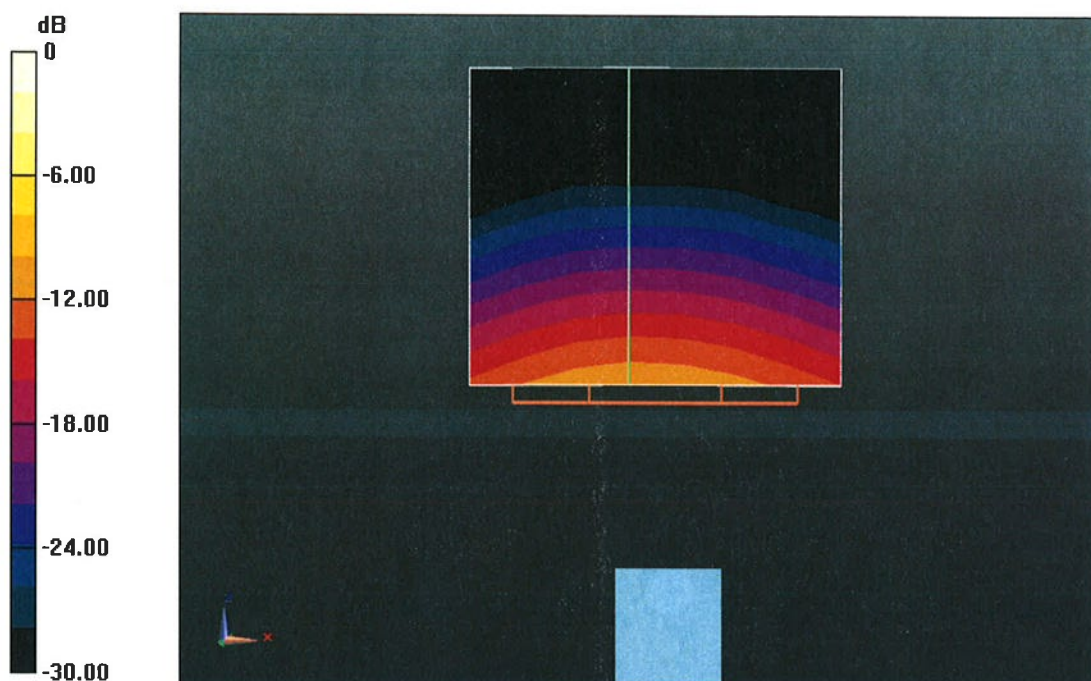
Peak SAR (extrapolated) = 33.1 W/kg

SAR(1 g) = 8.51 W/kg; SAR(10 g) = 2.43 W/kg

Maximum value of SAR (measured) = 19.8 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 = 64.023 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 32.8 W/kg
SAR(1 g) = 8.42 W/kg; SAR(10 g) = 2.4 W/kg
Maximum value of SAR (measured) = 19.6 W/kg

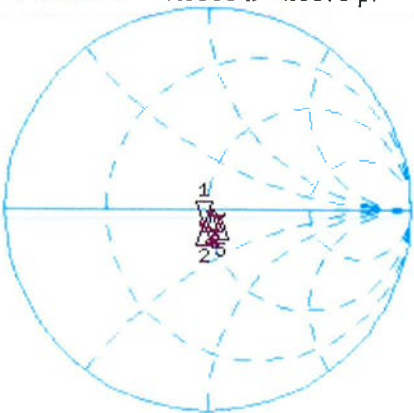
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 61.148 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 32.7 W/kg
SAR(1 g) = 7.98 W/kg; SAR(10 g) = 2.27 W/kg
Maximum value of SAR (measured) = 19.1 W/kg



Impedance Measurement Plot for Head TSL

5 Aug 2013 12:09:44
CH1 S11 1 U FS 1: 46.682 Ω -7.0566 Ω 4.3373 pF 5 200.000 000 MHz

*
De1
Cor



CH1 Markers
2: 46.936 Ω
-8.0938 Ω
5.30000 GHz
3: 52.707 Ω
-927.73 m Ω
5.50000 GHz
4: 50.596 Ω
-958.98 m Ω
5.60000 GHz
5: 55.676 Ω
-5.1875 Ω
5.80000 GHz

Avg
16
H1d

CH2 S11 LOG 5 dB/REF -20 dB 1: -21.887 dB 5 200.000 000 MHz

Cor
Avg
16
H1d



CH2 Markers
2: -21.016 dB
5.30000 GHz
3: -31.098 dB
5.50000 GHz
4: -38.995 dB
5.60000 GHz
5: -22.771 dB
5.80000 GHz

START 5 000.000 000 MHz STOP 5 800.000 000 MHz

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1159

Communication System: UID 0 - CW ; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz

Medium parameters used: $f = 5200 \text{ MHz}$; $\sigma = 5.4 \text{ S/m}$; $\epsilon_r = 48.9$; $\rho = 1000 \text{ kg/m}^3$,Medium parameters used: $f = 5300 \text{ MHz}$; $\sigma = 5.53 \text{ S/m}$; $\epsilon_r = 48.7$; $\rho = 1000 \text{ kg/m}^3$,Medium parameters used: $f = 5500 \text{ MHz}$; $\sigma = 5.79 \text{ S/m}$; $\epsilon_r = 48.4$; $\rho = 1000 \text{ kg/m}^3$,Medium parameters used: $f = 5600 \text{ MHz}$; $\sigma = 5.93 \text{ S/m}$; $\epsilon_r = 48.2$; $\rho = 1000 \text{ kg/m}^3$,Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 6.21 \text{ S/m}$; $\epsilon_r = 47.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.91, 4.91, 4.91); Calibrated: 28.12.2012, ConvF(4.67, 4.67, 4.67); Calibrated: 28.12.2012, ConvF(4.43, 4.43, 4.43); Calibrated: 28.12.2012, ConvF(4.22, 4.22, 4.22); Calibrated: 28.12.2012, ConvF(4.38, 4.38, 4.38); Calibrated: 28.12.2012;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 57.936 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 28.5 W/kg

SAR(1 g) = 7.33 W/kg; SAR(10 g) = 2.05 W/kg

Maximum value of SAR (measured) = 17.1 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 58.193 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 30.0 W/kg

SAR(1 g) = 7.5 W/kg; SAR(10 g) = 2.1 W/kg

Maximum value of SAR (measured) = 17.7 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 57.981 V/m; Power Drift = 0.02 dB

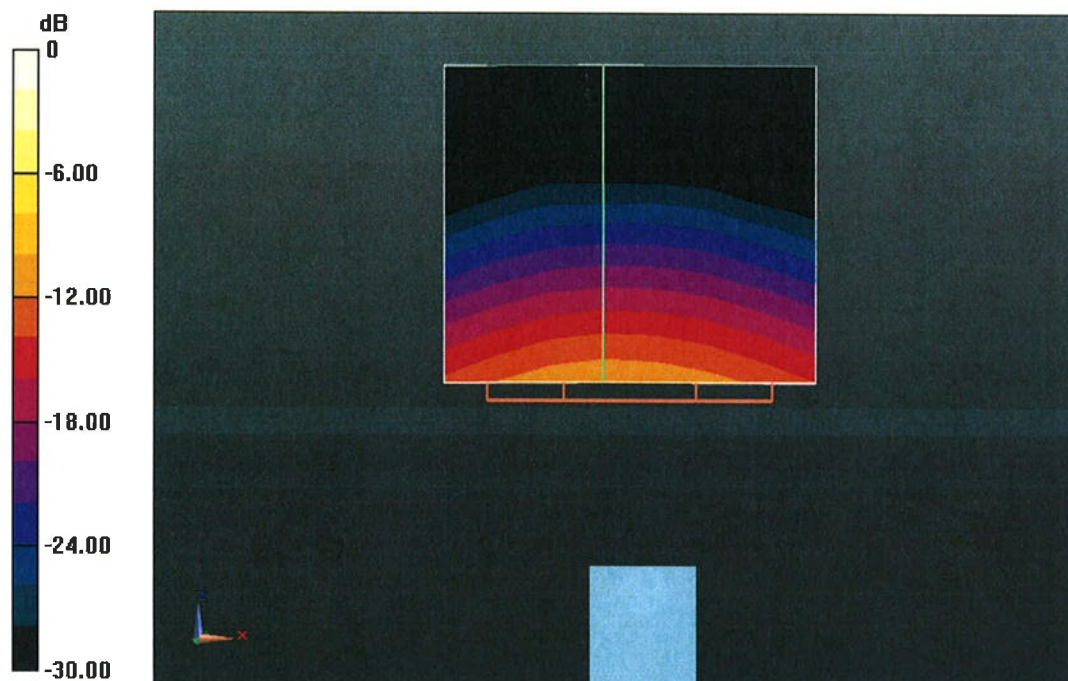
Peak SAR (extrapolated) = 33.4 W/kg

SAR(1 g) = 7.81 W/kg; SAR(10 g) = 2.17 W/kg

Maximum value of SAR (measured) = 19.0 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 = 57.897 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 34.9 W/kg
SAR(1 g) = 7.99 W/kg; SAR(10 g) = 2.21 W/kg
Maximum value of SAR (measured) = 19.5 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 54.838 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 34.1 W/kg
SAR(1 g) = 7.4 W/kg; SAR(10 g) = 2.05 W/kg
Maximum value of SAR (measured) = 18.3 W/kg

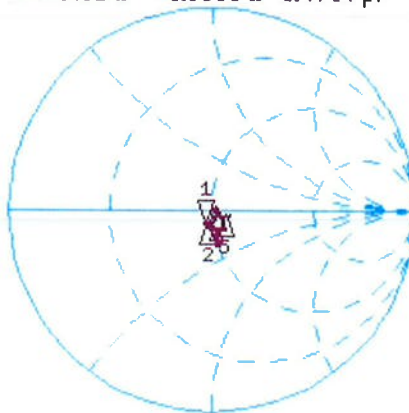


0 dB = 18.3 W/kg = 12.62 dBW/kg

Impedance Measurement Plot for Body TSL

5 Aug 2013 12:09:13
CH1 S11 1 U FS 1: 46.592 Ω -5.5898 Ω 5.4754 pF 5 200.000 000 MHz

*
Del
Cor



CH1 Markers
2: 46.803 Ω
-7.1680 Ω
5.30000 GHz
3: 52.863 Ω
-52.734 m Ω
5.50000 GHz
4: 50.840 Ω
0.7207 Ω
5.60000 GHz
5: 56.254 Ω
-3.6660 Ω
5.80000 GHz

Avg
16

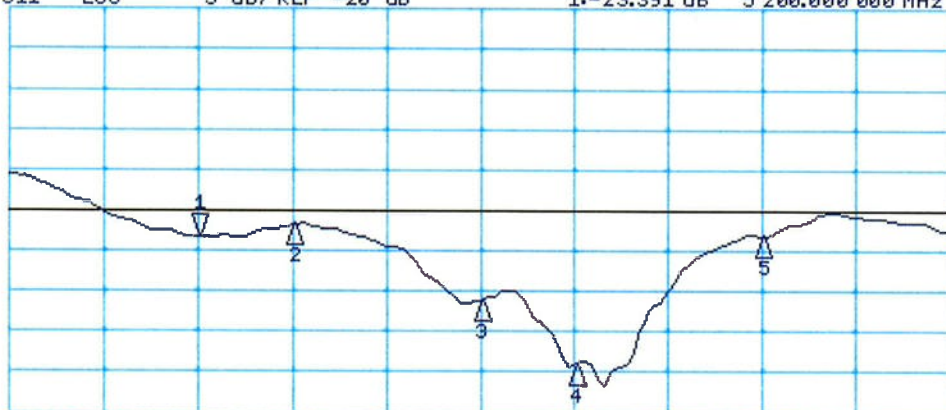
H1d

CH2 S11 LOG 5 dB/REF -20 dB 1: -23.391 dB 5 200.000 000 MHz

Cor

Avg
16

H1d



CH2 Markers
2: -21.845 dB
5.30000 GHz
3: -31.103 dB
5.50000 GHz
4: -39.168 dB
5.60000 GHz
5: -23.325 dB
5.80000 GHz

START 5 000.000 000 MHz

STOP 5 800.000 000 MHz



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA
 Multilateral Agreement for the recognition of calibration certificates

Client **Microsoft**

Certificate No: **EX3-3939_Jul14**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3939**

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: **July 17, 2014**

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 $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	03-Apr-14 (No. 217-01911)	Apr-15
Power sensor E4412A	MY41498087	03-Apr-14 (No. 217-01911)	Apr-15
Reference 3 dB Attenuator	SN: S5054 (3c)	03-Apr-14 (No. 217-01915)	Apr-15
Reference 20 dB Attenuator	SN: S5277 (20x)	03-Apr-14 (No. 217-01919)	Apr-15
Reference 30 dB Attenuator	SN: S5129 (30b)	03-Apr-14 (No. 217-01920)	Apr-15
Reference Probe ES3DV2	SN: 3013	30-Dec-13 (No. ES3-3013_Dec13)	Dec-14
DAE4	SN: 660	13-Dec-13 (No. DAE4-660_Dec13)	Dec-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

Calibrated by:	Name	Function	Signature
	Israe El-Naouq	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	
			Issued: July 19, 2014
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			



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Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,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., $\vartheta = 0$ 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:

- 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
- 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

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,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.
- DCP_{x,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
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; D_{x,y,z}; VR_{x,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 $f \leq 800$ 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 NORM_{x,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 NORM_x (no uncertainty required).

Probe EX3DV4

SN:3939

Manufactured: May 2, 2013
Calibrated: July 17, 2014

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3939

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.41	0.38	0.41	$\pm 10.1 \%$
DCP (mV) ^B	102.7	105.8	100.5	

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 $\text{ms} \cdot \text{V}^{-2}$	T2 $\text{ms} \cdot \text{V}^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
X	41.63	302.7	34.15	16.86	0.918	4.958	0.908	0.342	0.998
Y	50.01	372.2	34.8	16.32	0.586	5.043	0.796	0.307	1.003
Z	49.89	371.4	34.95	17.26	0.796	5.026	1.654	0.211	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 NormX,Y,Z do not affect the E^2 -field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter: uncertainty not required.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3939

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	9.40	9.40	9.40	0.80	0.50	± 12.0 %
835	41.5	0.90	9.20	9.20	9.20	0.45	0.77	± 12.0 %
900	41.5	0.97	8.99	8.99	8.99	0.33	0.94	± 12.0 %
1750	40.1	1.37	8.32	8.32	8.32	0.47	0.81	± 12.0 %
1900	40.0	1.40	7.86	7.86	7.86	0.42	0.82	± 12.0 %
2000	40.0	1.40	7.74	7.74	7.74	0.78	0.59	± 12.0 %
2300	39.5	1.67	7.34	7.34	7.34	0.48	0.72	± 12.0 %
2450	39.2	1.80	6.86	6.86	6.86	0.31	0.93	± 12.0 %
2600	39.0	1.96	6.74	6.74	6.74	0.51	0.73	± 12.0 %
3500	37.9	2.91	7.22	7.22	7.22	1.00	0.52	± 13.1 %
5200	36.0	4.66	5.21	5.21	5.21	0.30	1.80	± 13.1 %
5300	35.9	4.76	5.03	5.03	5.03	0.30	1.80	± 13.1 %
5500	35.6	4.96	4.75	4.75	4.75	0.35	1.80	± 13.1 %
5600	35.5	5.07	4.48	4.48	4.48	0.40	1.80	± 13.1 %
5800	35.3	5.27	4.56	4.56	4.56	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:3939

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	9.15	9.15	9.15	0.80	0.50	± 12.0 %
835	55.2	0.97	9.31	9.31	9.31	0.67	0.69	± 12.0 %
900	55.0	1.05	9.12	9.12	9.12	0.76	0.65	± 12.0 %
1750	53.4	1.49	7.65	7.65	7.65	0.61	0.71	± 12.0 %
1900	53.3	1.52	7.45	7.45	7.45	0.29	1.05	± 12.0 %
2000	53.3	1.52	7.51	7.51	7.51	0.40	0.87	± 12.0 %
2300	52.9	1.81	7.17	7.17	7.17	0.30	1.04	± 12.0 %
2450	52.7	1.95	6.90	6.90	6.90	0.65	0.68	± 12.0 %
2600	52.5	2.16	6.75	6.75	6.75	0.65	0.66	± 12.0 %
3500	51.3	3.31	6.65	6.65	6.65	0.75	0.74	± 13.1 %
5200	49.0	5.30	4.38	4.38	4.38	0.40	1.90	± 13.1 %
5300	48.9	5.42	4.11	4.11	4.11	0.40	1.90	± 13.1 %
5500	48.6	5.65	3.99	3.99	3.99	0.45	1.90	± 13.1 %
5600	48.5	5.77	3.72	3.72	3.72	0.50	1.90	± 13.1 %
5800	48.2	6.00	3.93	3.93	3.93	0.50	1.90	± 13.1 %

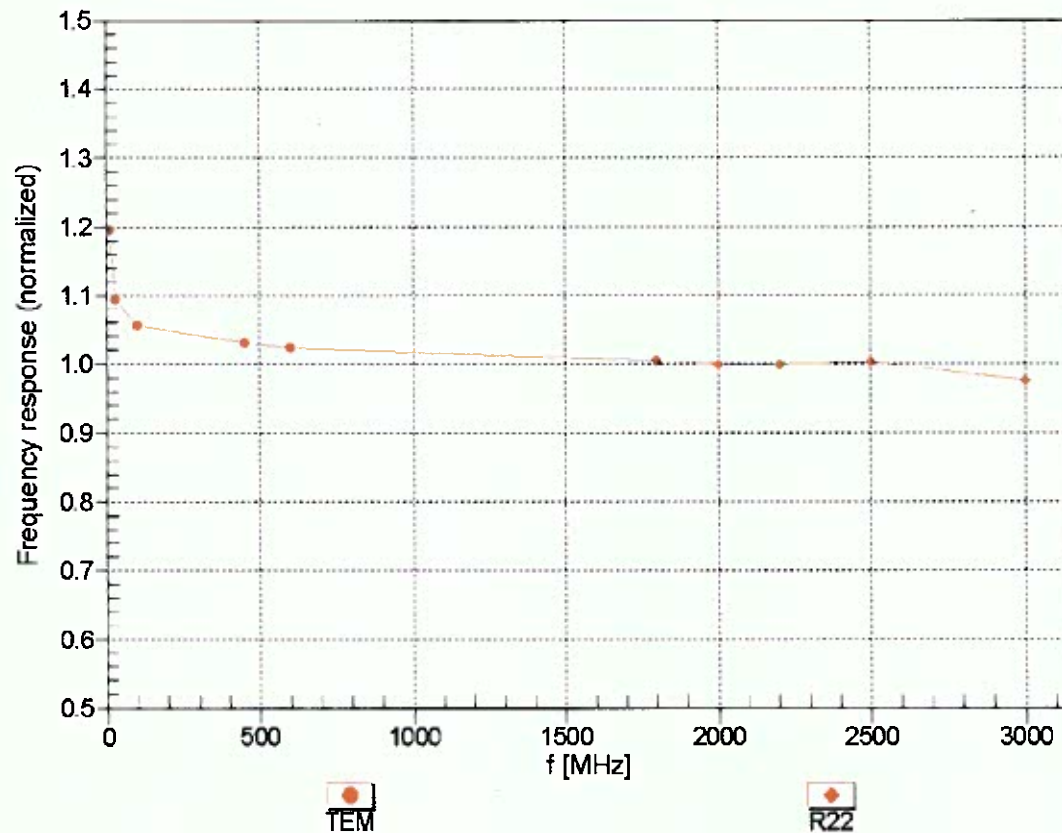
^C Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 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

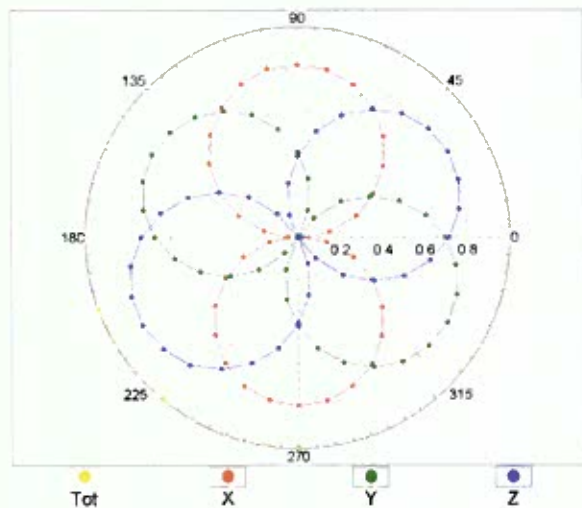
(TEM-Cell: ifi110 EXX, Waveguide: R22)



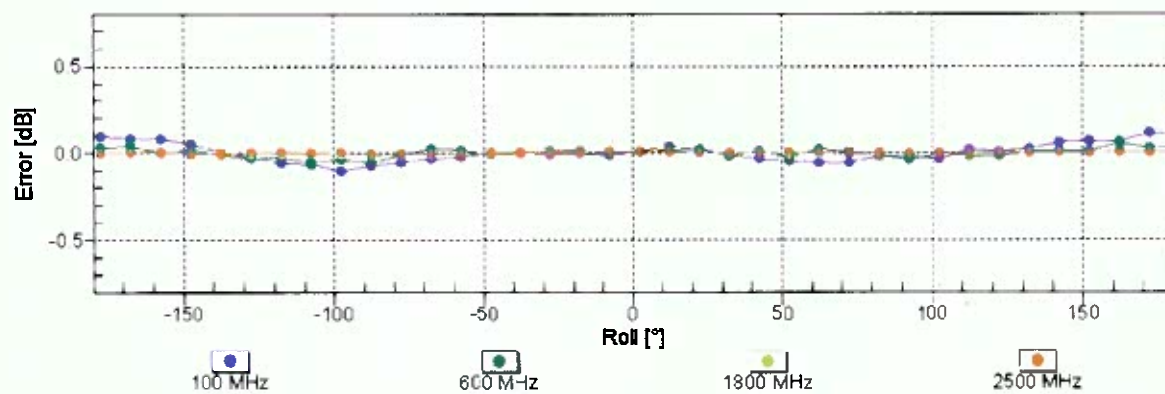
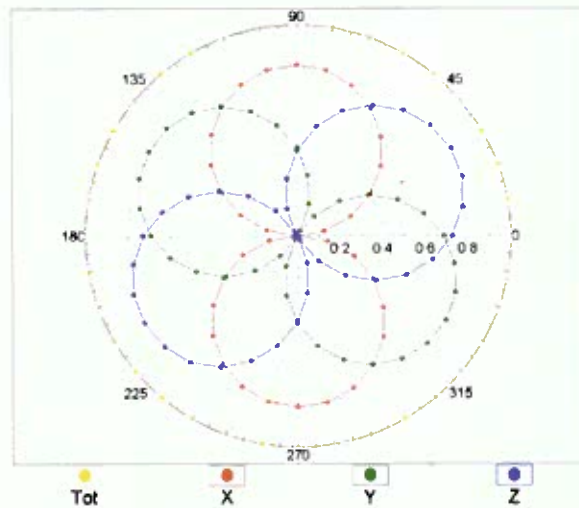
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

Receiving Pattern (ϕ), $\vartheta = 0^\circ$

f=600 MHz,TEM

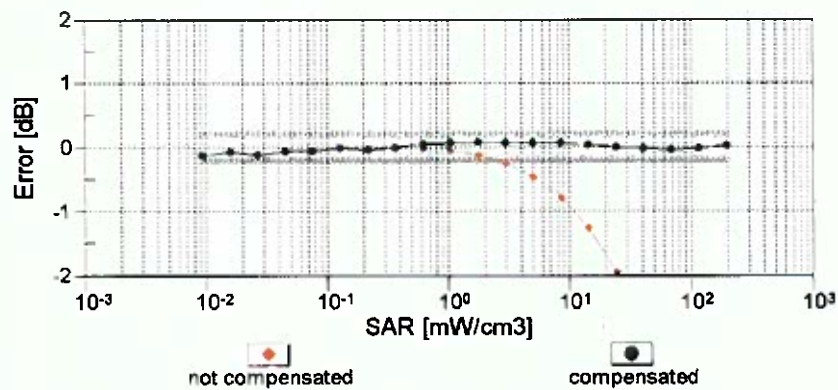
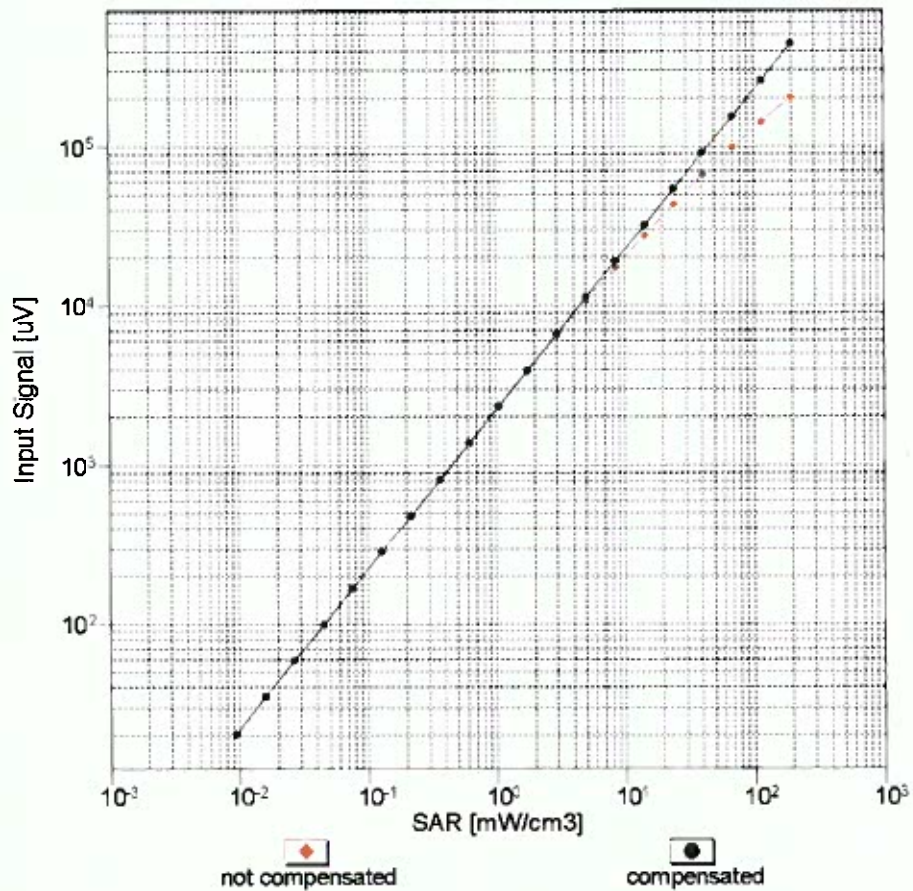


f=1800 MHz,R22



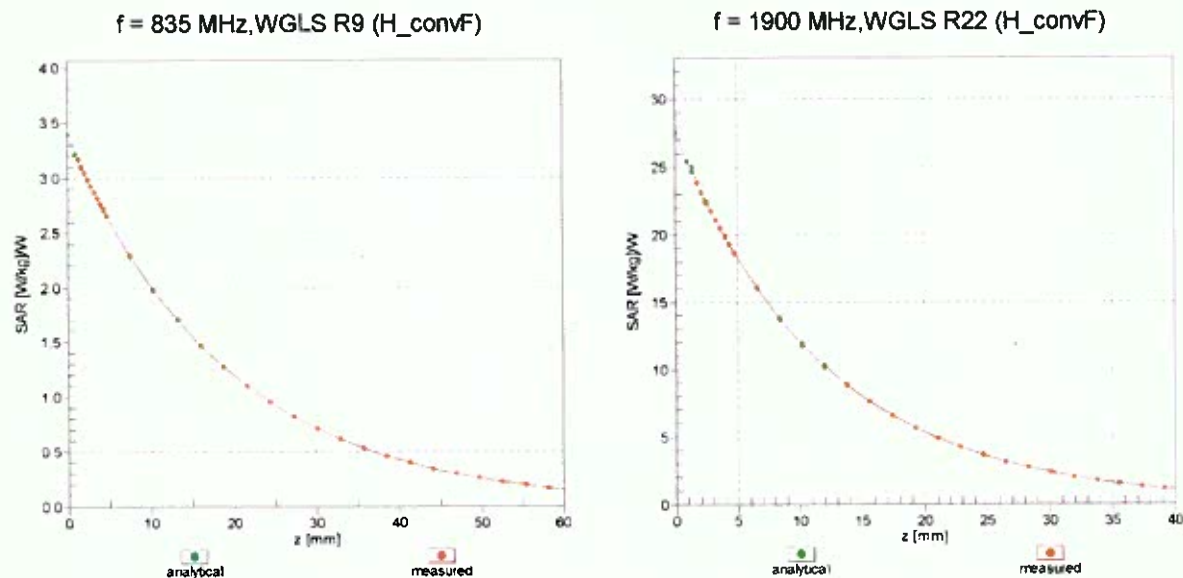
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range $f(\text{SAR}_{\text{head}})$ (TEM cell, $f_{\text{eval}} = 1900 \text{ MHz}$)



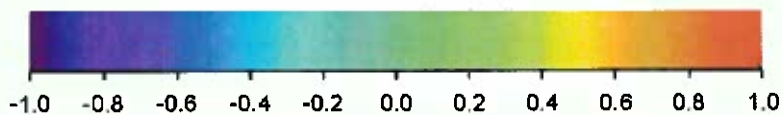
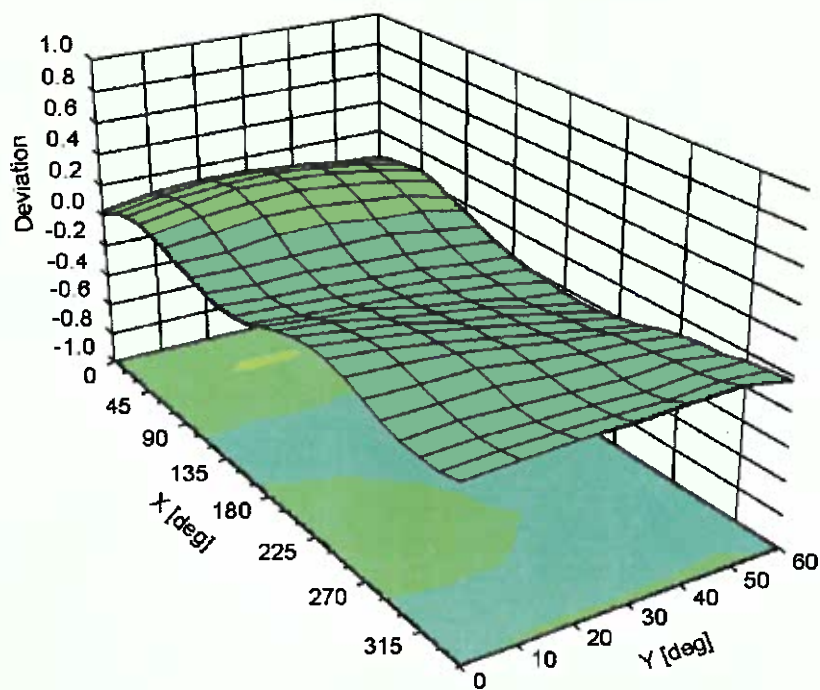
Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), $f = 900 \text{ MHz}$



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ ($k=2$)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3939**Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle (°)	-37.6
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
(Additional assessments outside the scope of SCS108)

UID	Communication System Name		A dB	B dB μ V	C	D dB	VR mV	Max Unc ^E (k=2)
0	CW	X	0.00	0.00	1.00	0.00	145.5	$\pm 3.5 \%$
		Y	0.00	0.00	1.00		137.6	
		Z	0.00	0.00	1.00		147.9	
10010- CAA	SAR Validation (Square, 100ms, 10ms)	X	4.19	76.93	18.57	10.00	20.0	$\pm 9.6 \%$
		Y	2.76	69.37	12.90		20.0	
		Z	3.16	72.54	16.20		20.0	
10011- CAB	UMTS-FDD (WCDMA)	X	1.28	69.28	17.17	0.00	150.0	$\pm 9.6 \%$
		Y	0.68	61.04	9.81		150.0	
		Z	0.86	61.95	11.36		150.0	
10012- CAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	1.37	64.76	16.02	0.41	150.0	$\pm 9.6 \%$
		Y	0.98	60.76	11.75		150.0	
		Z	1.15	61.35	12.65		150.0	
10013- CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	4.94	66.85	17.08	1.46	150.0	$\pm 9.6 \%$
		Y	4.68	65.70	15.98		150.0	
		Z	4.87	65.92	16.25		150.0	
10021- DAB	GSM-FDD (TDMA, GMSK)	X	100.00	117.49	29.59	9.39	50.0	$\pm 9.6 \%$
		Y	5.67	74.67	14.76		50.0	
		Z	100.00	115.86	28.69		50.0	
10023- DAB	GPRS-FDD (TDMA, GMSK, TN 0)	X	100.00	117.70	29.76	9.57	50.0	$\pm 9.6 \%$
		Y	5.89	75.08	14.99		50.0	
		Z	100.00	116.14	28.88		50.0	
10024- DAB	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	100.00	117.25	28.48	6.56	60.0	$\pm 9.6 \%$
		Y	3.80	71.73	12.59		60.0	
		Z	100.00	113.64	26.68		60.0	
10025- DAB	EDGE-FDD (TDMA, 8PSK, TN 0)	X	4.64	70.06	25.58	12.57	50.0	$\pm 9.6 \%$
		Y	7.18	85.19	32.91		50.0	
		Z	4.62	70.20	25.64		50.0	
10026- DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	8.07	86.30	29.88	9.56	60.0	$\pm 9.6 \%$
		Y	10.19	92.02	31.36		60.0	
		Z	7.90	85.20	29.13		60.0	
10027- DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	100.00	119.30	28.68	4.80	80.0	$\pm 9.6 \%$
		Y	2.36	68.52	10.62		80.0	
		Z	100.00	112.74	25.57		80.0	
10028- DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	100.00	123.70	30.00	3.55	100.0	$\pm 9.6 \%$
		Y	1.36	65.36	8.73		100.0	
		Z	63.06	107.90	23.91		100.0	
10029- DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	5.75	79.09	25.93	7.80	80.0	$\pm 9.6 \%$
		Y	6.27	81.33	26.08		80.0	
		Z	5.60	77.87	24.99		80.0	
10030- CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	X	100.00	115.17	27.06	5.30	70.0	$\pm 9.6 \%$
		Y	2.22	67.10	10.16		70.0	
		Z	21.10	93.79	20.92		70.0	
10031- CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	X	100.00	129.83	31.37	1.88	100.0	$\pm 9.6 \%$
		Y	0.41	60.00	4.79		100.0	
		Z	1.69	72.48	13.03		100.0	

10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	100.00	144.78	36.84	1.17	100.0	± 9.6 %
		Y	0.27	60.00	3.86		100.0	
		Z	0.73	67.81	11.23		100.0	
10033-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	X	6.59	83.31	21.52	5.30	70.0	± 9.6 %
		Y	3.99	74.83	17.06		70.0	
		Z	4.26	76.27	18.79		70.0	
10034-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	X	3.45	77.84	18.67	1.88	100.0	± 9.6 %
		Y	1.42	65.04	11.45		100.0	
		Z	1.71	66.80	13.38		100.0	
10035-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	X	2.70	75.95	17.95	1.17	100.0	± 9.6 %
		Y	1.10	63.31	10.31		100.0	
		Z	1.35	64.91	12.22		100.0	
10036-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	X	7.75	86.03	22.52	5.30	70.0	± 9.6 %
		Y	4.41	76.32	17.69		70.0	
		Z	4.64	77.76	19.43		70.0	
10037-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	X	3.18	76.78	18.25	1.88	100.0	± 9.6 %
		Y	1.38	64.87	11.33		100.0	
		Z	1.67	66.57	13.25		100.0	
10038-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	X	2.69	76.15	18.14	1.17	100.0	± 9.6 %
		Y	1.09	63.39	10.43		100.0	
		Z	1.34	64.96	12.32		100.0	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	3.53	82.20	20.60	0.00	150.0	± 9.6 %
		Y	0.92	62.12	9.46		150.0	
		Z	1.17	63.82	11.41		150.0	
10042-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	X	100.00	115.10	27.74	7.78	50.0	± 9.6 %
		Y	2.83	67.79	10.96		50.0	
		Z	49.94	103.75	24.22		50.0	
10044-CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	X	0.14	60.00	18.01	0.00	150.0	± 9.6 %
		Y	0.00	75.53	19.28		150.0	
		Z	0.05	60.00	8.39		150.0	
10048-CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	X	36.29	101.84	27.02	13.80	25.0	± 9.6 %
		Y	4.87	70.52	14.66		25.0	
		Z	26.74	97.33	25.56		25.0	
10049-CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	X	57.11	108.96	27.77	10.79	40.0	± 9.6 %
		Y	4.89	72.05	14.03		40.0	
		Z	26.80	97.72	24.44		40.0	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	12.05	88.74	23.79	9.03	50.0	± 9.6 %
		Y	8.11	80.93	19.81		50.0	
		Z	9.49	85.02	22.58		50.0	
10058-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	4.66	75.33	23.67	6.55	100.0	± 9.6 %
		Y	4.72	75.95	23.07		100.0	
		Z	4.50	73.89	22.51		100.0	
10059-CAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	X	1.42	65.69	16.44	0.61	110.0	± 9.6 %
		Y	1.00	61.39	12.05		110.0	
		Z	1.17	61.94	12.96		110.0	
10060-CAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	X	4.09	88.78	24.18	1.30	110.0	± 9.6 %
		Y	1.00	66.18	11.64		110.0	
		Z	1.21	67.63	13.96		110.0	

10061-CAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	X	2.62	76.08	20.45	2.04	110.0	± 9.6 %
		Y	1.60	68.01	14.75		110.0	
		Z	1.75	68.10	15.72		110.0	
10062-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	X	4.77	67.00	16.68	0.49	100.0	± 9.6 %
		Y	4.46	65.56	15.34		100.0	
		Z	4.65	65.84	15.66		100.0	
10063-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	X	4.78	67.04	16.74	0.72	100.0	± 9.6 %
		Y	4.47	65.65	15.43		100.0	
		Z	4.67	65.92	15.75		100.0	
10064-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	X	5.04	67.24	16.91	0.86	100.0	± 9.6 %
		Y	4.77	65.99	15.72		100.0	
		Z	4.97	66.24	16.02		100.0	
10065-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	X	4.90	67.08	16.95	1.21	100.0	± 9.6 %
		Y	4.65	65.88	15.80		100.0	
		Z	4.84	66.12	16.09		100.0	
10066-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	X	4.91	67.04	17.06	1.46	100.0	± 9.6 %
		Y	4.67	65.93	15.98		100.0	
		Z	4.86	66.15	16.25		100.0	
10067-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	X	5.19	67.19	17.44	2.04	100.0	± 9.6 %
		Y	4.97	66.16	16.48		100.0	
		Z	5.16	66.34	16.72		100.0	
10068-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	X	5.22	67.13	17.58	2.55	100.0	± 9.6 %
		Y	5.04	66.30	16.74		100.0	
		Z	5.22	66.46	16.97		100.0	
10069-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	X	5.30	67.12	17.74	2.67	100.0	± 9.6 %
		Y	5.12	66.31	16.95		100.0	
		Z	5.31	66.46	17.16		100.0	
10071-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	X	5.03	66.87	17.31	1.99	100.0	± 9.6 %
		Y	4.78	65.83	16.31		100.0	
		Z	4.97	66.03	16.57		100.0	
10072-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	X	5.00	67.12	17.48	2.30	100.0	± 9.6 %
		Y	4.76	66.12	16.49		100.0	
		Z	4.95	66.30	16.74		100.0	
10073-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	X	5.05	67.24	17.74	2.83	100.0	± 9.6 %
		Y	4.83	66.30	16.83		100.0	
		Z	5.01	66.45	17.06		100.0	
10074-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	X	5.05	67.15	17.87	3.30	100.0	± 9.6 %
		Y	4.82	66.24	17.00		100.0	
		Z	5.00	66.38	17.23		100.0	
10075-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	X	5.09	67.21	18.12	3.82	90.0	± 9.6 %
		Y	4.87	66.42	17.34		90.0	
		Z	5.05	66.53	17.55		90.0	
10076-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	X	5.11	67.05	18.24	4.15	90.0	± 9.6 %
		Y	4.88	66.24	17.48		90.0	
		Z	5.07	66.35	17.68		90.0	
10077-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	X	5.14	67.12	18.34	4.30	90.0	± 9.6 %
		Y	4.91	66.31	17.58		90.0	
		Z	5.09	66.41	17.77		90.0	

10081-CAB	CDMA2000 (1xRTT, RC3)	X	1.34	71.93	16.59	0.00	150.0	± 9.6 %
		Y	0.52	60.00	7.49		150.0	
		Z	0.71	61.36	9.65		150.0	
10082-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	X	0.99	60.53	6.07	4.77	80.0	± 9.6 %
		Y	0.83	60.00	4.27		80.0	
		Z	0.85	59.33	4.92		80.0	
10090-DAB	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	100.00	117.15	28.45	6.56	60.0	± 9.6 %
		Y	3.86	71.87	12.66		60.0	
		Z	100.00	113.64	26.70		60.0	
10097-CAB	UMTS-FDD (HSDPA)	X	2.14	69.69	17.13	0.00	150.0	± 9.6 %
		Y	1.38	62.80	11.80		150.0	
		Z	1.59	63.64	12.85		150.0	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	2.10	69.63	17.11	0.00	150.0	± 9.6 %
		Y	1.35	62.72	11.72		150.0	
		Z	1.56	63.56	12.79		150.0	
10099-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	8.11	86.37	29.90	9.56	60.0	± 9.6 %
		Y	10.26	92.13	31.40		60.0	
		Z	7.94	85.28	29.16		60.0	
10100-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	3.40	71.55	17.74	0.00	150.0	± 9.6 %
		Y	2.41	65.64	13.36		150.0	
		Z	2.66	66.42	14.23		150.0	
10101-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	3.43	68.24	16.57	0.00	150.0	± 9.6 %
		Y	2.84	64.98	13.75		150.0	
		Z	3.06	65.49	14.35		150.0	
10102-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	3.53	68.22	16.65	0.00	150.0	± 9.6 %
		Y	2.96	65.08	13.94		150.0	
		Z	3.17	65.57	14.51		150.0	
10103-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	6.33	74.75	19.86	3.98	65.0	± 9.6 %
		Y	5.23	71.43	17.71		65.0	
		Z	5.76	72.49	18.53		65.0	
10104-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	6.60	73.67	20.10	3.98	65.0	± 9.6 %
		Y	6.00	72.04	18.87		65.0	
		Z	6.25	72.19	19.18		65.0	
10105-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	6.05	71.87	19.60	3.98	65.0	± 9.6 %
		Y	5.50	70.37	18.45		65.0	
		Z	5.85	70.84	18.87		65.0	
10108-CAB	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	2.97	70.77	17.58	0.00	150.0	± 9.6 %
		Y	2.12	64.92	13.10		150.0	
		Z	2.35	65.68	13.98		150.0	
10109-CAB	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	3.09	68.27	16.57	0.00	150.0	± 9.6 %
		Y	2.50	64.52	13.43		150.0	
		Z	2.71	65.08	14.09		150.0	
10110-CAB	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	2.45	70.02	17.28	0.00	150.0	± 9.6 %
		Y	1.70	63.87	12.46		150.0	
		Z	1.92	64.65	13.42		150.0	
10111-CAB	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	2.90	69.84	17.25	0.00	150.0	± 9.6 %
		Y	2.14	64.34	13.13		150.0	
		Z	2.36	65.06	13.94		150.0	

10112-CAB	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	3.22	68.28	16.62	0.00	150.0	± 9.6 %
		Y	2.63	64.66	13.60		150.0	
		Z	2.85	65.20	14.23		150.0	
10113-CAB	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	3.05	69.97	17.34	0.00	150.0	± 9.6 %
		Y	2.29	64.63	13.38		150.0	
		Z	2.51	65.32	14.16		150.0	
10114-CAA	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	X	5.25	67.62	16.76	0.00	150.0	± 9.6 %
		Y	4.87	66.09	15.29		150.0	
		Z	5.08	66.41	15.64		150.0	
10115-CAA	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	X	5.51	67.66	16.78	0.00	150.0	± 9.6 %
		Y	5.19	66.35	15.45		150.0	
		Z	5.39	66.65	15.79		150.0	
10116-CAA	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	X	5.34	67.79	16.78	0.00	150.0	± 9.6 %
		Y	4.96	66.28	15.31		150.0	
		Z	5.17	66.59	15.67		150.0	
10117-CAA	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	5.23	67.51	16.72	0.00	150.0	± 9.6 %
		Y	4.85	66.01	15.27		150.0	
		Z	5.06	66.32	15.61		150.0	
10118-CAA	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	X	5.58	67.82	16.86	0.00	150.0	± 9.6 %
		Y	5.25	66.50	15.54		150.0	
		Z	5.46	66.81	15.87		150.0	
10119-CAA	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	X	5.32	67.75	16.77	0.00	150.0	± 9.6 %
		Y	4.94	66.22	15.30		150.0	
		Z	5.15	66.54	15.65		150.0	
10140-CAB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	3.56	68.23	16.57	0.00	150.0	± 9.6 %
		Y	2.99	65.11	13.88		150.0	
		Z	3.21	65.60	14.46		150.0	
10141-CAB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	3.69	68.35	16.73	0.00	150.0	± 9.6 %
		Y	3.12	65.29	14.11		150.0	
		Z	3.34	65.76	14.66		150.0	
10142-CAB	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	2.28	70.64	17.25	0.00	150.0	± 9.6 %
		Y	1.47	63.32	11.79		150.0	
		Z	1.69	64.22	12.90		150.0	
10143-CAB	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	2.91	71.65	17.44	0.00	150.0	± 9.6 %
		Y	1.89	64.06	12.33		150.0	
		Z	2.13	65.00	13.35		150.0	
10144-CAB	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	2.49	68.28	15.31	0.00	150.0	± 9.6 %
		Y	1.84	63.16	11.47		150.0	
		Z	2.06	63.98	12.42		150.0	
10145-CAB	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	1.75	69.88	14.70	0.00	150.0	± 9.6 %
		Y	0.88	60.78	8.33		150.0	
		Z	1.11	62.16	10.05		150.0	
10146-CAB	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	1.70	64.54	10.43	0.00	150.0	± 9.6 %
		Y	1.31	61.49	8.22		150.0	
		Z	1.73	63.70	10.16		150.0	
10147-CAB	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	1.90	65.87	11.21	0.00	150.0	± 9.6 %
		Y	1.37	61.88	8.55		150.0	
		Z	1.85	64.45	10.67		150.0	

10149-CAB	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	3.10	68.34	16.63	0.00	150.0	± 9.6 %
		Y	2.51	64.56	13.46		150.0	
		Z	2.72	65.12	14.12		150.0	
10150-CAB	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	3.23	68.34	16.67	0.00	150.0	± 9.6 %
		Y	2.64	64.69	13.63		150.0	
		Z	2.85	65.23	14.26		150.0	
10151-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	6.84	77.49	21.01	3.98	65.0	± 9.6 %
		Y	5.67	73.98	18.79		65.0	
		Z	5.93	74.25	19.30		65.0	
10152-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	6.09	73.46	19.68	3.98	65.0	± 9.6 %
		Y	5.46	71.61	18.37		65.0	
		Z	5.71	71.78	18.71		65.0	
10153-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	6.52	74.58	20.52	3.98	65.0	± 9.6 %
		Y	5.82	72.56	19.16		65.0	
		Z	6.07	72.69	19.47		65.0	
10154-CAB	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	2.51	70.55	17.59	0.00	150.0	± 9.6 %
		Y	1.72	64.05	12.61		150.0	
		Z	1.94	64.85	13.58		150.0	
10155-CAB	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	2.90	69.86	17.26	0.00	150.0	± 9.6 %
		Y	2.14	64.35	13.14		150.0	
		Z	2.36	65.06	13.95		150.0	
10156-CAB	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	2.18	71.27	17.33	0.00	150.0	± 9.6 %
		Y	1.31	62.93	11.29		150.0	
		Z	1.53	63.93	12.52		150.0	
10157-CAB	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	2.43	69.61	15.76	0.00	150.0	± 9.6 %
		Y	1.61	62.94	11.04		150.0	
		Z	1.85	63.93	12.17		150.0	
10158-CAB	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	3.06	70.06	17.40	0.00	150.0	± 9.6 %
		Y	2.29	64.66	13.41		150.0	
		Z	2.52	65.35	14.19		150.0	
10159-CAB	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	2.59	70.32	16.13	0.00	150.0	± 9.6 %
		Y	1.68	63.19	11.25		150.0	
		Z	1.92	64.22	12.38		150.0	
10160-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	2.95	69.69	17.20	0.00	150.0	± 9.6 %
		Y	2.22	64.69	13.26		150.0	
		Z	2.44	65.35	14.04		150.0	
10161-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	3.13	68.37	16.63	0.00	150.0	± 9.6 %
		Y	2.53	64.54	13.49		150.0	
		Z	2.75	65.10	14.15		150.0	
10162-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	3.24	68.54	16.74	0.00	150.0	± 9.6 %
		Y	2.64	64.72	13.65		150.0	
		Z	2.85	65.27	14.29		150.0	
10166-CAB	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	3.47	68.66	18.52	3.01	150.0	± 9.6 %
		Y	3.11	66.48	16.52		150.0	
		Z	3.44	67.44	17.40		150.0	
10167-CAB	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	4.17	71.43	18.98	3.01	150.0	± 9.6 %
		Y	3.61	68.38	16.62		150.0	
		Z	4.13	70.04	17.82		150.0	

10168-	CAB	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	4.67	73.95	20.47	3.01	150.0	± 9.6 %
			Y	3.91	69.98	17.68		150.0	
			Z	4.52	71.93	19.01		150.0	
10169-	CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	2.91	67.83	18.12	3.01	150.0	± 9.6 %
			Y	2.49	65.64	15.96		150.0	
			Z	2.87	67.09	17.13		150.0	
10170-	CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	3.88	73.50	20.47	3.01	150.0	± 9.6 %
			Y	3.06	69.38	17.39		150.0	
			Z	3.79	72.27	19.19		150.0	
10171-	AAA	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	3.19	69.41	17.67	3.01	150.0	± 9.6 %
			Y	2.61	66.46	15.11		150.0	
			Z	3.16	68.66	16.65		150.0	
10172-	CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	4.62	77.15	22.22	6.02	65.0	± 9.6 %
			Y	4.62	77.57	21.72		65.0	
			Z	5.32	79.35	23.02		65.0	
10173-	CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	7.72	83.71	22.99	6.02	65.0	± 9.6 %
			Y	6.84	81.29	21.26		65.0	
			Z	8.95	85.80	23.64		65.0	
10174-	CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	5.41	77.48	20.33	6.02	65.0	± 9.6 %
			Y	4.46	74.25	18.23		65.0	
			Z	6.61	80.25	21.28		65.0	
10175-	CAB	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	2.87	67.53	17.87	3.01	150.0	± 9.6 %
			Y	2.46	65.42	15.76		150.0	
			Z	2.84	66.83	16.91		150.0	
10176-	CAB	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	3.88	73.52	20.48	3.01	150.0	± 9.6 %
			Y	3.07	69.39	17.40		150.0	
			Z	3.80	72.29	19.20		150.0	
10177-	CAC	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	2.89	67.68	17.96	3.01	150.0	± 9.6 %
			Y	2.48	65.53	15.84		150.0	
			Z	2.86	66.96	17.00		150.0	
10178-	CAB	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	3.85	73.32	20.37	3.01	150.0	± 9.6 %
			Y	3.04	69.24	17.30		150.0	
			Z	3.76	72.08	19.08		150.0	
10179-	CAB	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	3.49	71.28	18.92	3.01	150.0	± 9.6 %
			Y	2.80	67.73	16.07		150.0	
			Z	3.43	70.25	17.74		150.0	
10180-	CAB	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	3.18	69.35	17.62	3.01	150.0	± 9.6 %
			Y	2.61	66.41	15.07		150.0	
			Z	3.15	68.60	16.60		150.0	
10181-	CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	2.89	67.66	17.96	3.01	150.0	± 9.6 %
			Y	2.48	65.52	15.83		150.0	
			Z	2.85	66.95	16.99		150.0	
10182-	CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	3.84	73.29	20.36	3.01	150.0	± 9.6 %
			Y	3.04	69.22	17.29		150.0	
			Z	3.75	72.06	19.06		150.0	
10183-	AAA	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	3.17	69.33	17.61	3.01	150.0	± 9.6 %
			Y	2.60	66.40	15.06		150.0	
			Z	3.14	68.58	16.59		150.0	

10184-CAB	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	2.90	67.70	17.98	3.01	150.0	± 9.6 %
		Y	2.49	65.55	15.85		150.0	
		Z	2.86	66.99	17.01		150.0	
10185-CAB	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	3.86	73.37	20.40	3.01	150.0	± 9.6 %
		Y	3.05	69.27	17.33		150.0	
		Z	3.77	72.13	19.10		150.0	
10186-AAA	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	3.19	69.38	17.65	3.01	150.0	± 9.6 %
		Y	2.61	66.45	15.09		150.0	
		Z	3.16	68.63	16.62		150.0	
10187-CAB	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	2.91	67.75	18.04	3.01	150.0	± 9.6 %
		Y	2.49	65.59	15.91		150.0	
		Z	2.87	67.03	17.07		150.0	
10188-CAB	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	3.98	74.02	20.78	3.01	150.0	± 9.6 %
		Y	3.13	69.75	17.64		150.0	
		Z	3.89	72.74	19.47		150.0	
10189-AAA	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	3.25	69.78	17.91	3.01	150.0	± 9.6 %
		Y	2.66	66.73	15.31		150.0	
		Z	3.22	68.99	16.87		150.0	
10193-CAA	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	X	4.66	67.18	16.52	0.00	150.0	± 9.6 %
		Y	4.29	65.42	14.92		150.0	
		Z	4.49	65.75	15.29		150.0	
10194-CAA	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	X	4.82	67.45	16.63	0.00	150.0	± 9.6 %
		Y	4.45	65.73	15.05		150.0	
		Z	4.65	66.06	15.41		150.0	
10195-CAA	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	X	4.86	67.48	16.65	0.00	150.0	± 9.6 %
		Y	4.49	65.77	15.07		150.0	
		Z	4.70	66.10	15.43		150.0	
10196-CAA	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	4.66	67.21	16.52	0.00	150.0	± 9.6 %
		Y	4.29	65.47	14.93		150.0	
		Z	4.49	65.80	15.30		150.0	
10197-CAA	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	X	4.83	67.46	16.64	0.00	150.0	± 9.6 %
		Y	4.46	65.76	15.06		150.0	
		Z	4.67	66.08	15.42		150.0	
10198-CAA	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	X	4.86	67.49	16.66	0.00	150.0	± 9.6 %
		Y	4.50	65.79	15.08		150.0	
		Z	4.70	66.11	15.44		150.0	
10219-CAA	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	X	4.61	67.25	16.50	0.00	150.0	± 9.6 %
		Y	4.23	65.45	14.87		150.0	
		Z	4.43	65.78	15.24		150.0	
10220-CAA	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	X	4.82	67.43	16.63	0.00	150.0	± 9.6 %
		Y	4.46	65.74	15.05		150.0	
		Z	4.66	66.06	15.42		150.0	
10221-CAA	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	X	4.87	67.41	16.64	0.00	150.0	± 9.6 %
		Y	4.51	65.74	15.08		150.0	
		Z	4.71	66.06	15.44		150.0	
10222-CAA	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	X	5.20	67.51	16.71	0.00	150.0	± 9.6 %
		Y	4.83	66.01	15.26		150.0	
		Z	5.03	66.32	15.60		150.0	

10223-CAA	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	X	5.49	67.70	16.82	0.00	150.0	± 9.6 %
		Y	5.13	66.25	15.42		150.0	
		Z	5.34	66.55	15.76		150.0	
10224-CAA	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	X	5.24	67.63	16.71	0.00	150.0	± 9.6 %
		Y	4.87	66.11	15.23		150.0	
		Z	5.07	66.42	15.58		150.0	
10225-CAB	UMTS-FDD (HSPA+)	X	2.99	67.11	15.96	0.00	150.0	± 9.6 %
		Y	2.49	63.82	13.26		150.0	
		Z	2.70	64.34	13.86		150.0	
10226-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	8.11	84.61	23.39	6.02	65.0	± 9.6 %
		Y	7.18	82.14	21.65		65.0	
		Z	9.45	86.80	24.06		65.0	
10227-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	7.83	83.13	22.34	6.02	65.0	± 9.6 %
		Y	6.61	79.82	20.27		65.0	
		Z	8.96	84.85	22.87		65.0	
10228-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	6.09	82.37	24.25	6.02	65.0	± 9.6 %
		Y	5.91	81.90	23.34		65.0	
		Z	6.37	82.71	24.31		65.0	
10229-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	7.77	83.80	23.03	6.02	65.0	± 9.6 %
		Y	6.89	81.39	21.30		65.0	
		Z	9.02	85.91	23.68		65.0	
10230-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	7.48	82.34	22.00	6.02	65.0	± 9.6 %
		Y	6.34	79.14	19.95		65.0	
		Z	8.54	84.02	22.51		65.0	
10231-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	5.89	81.69	23.92	6.02	65.0	± 9.6 %
		Y	5.70	81.23	23.02		65.0	
		Z	6.17	82.05	23.99		65.0	
10232-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	7.76	83.78	23.02	6.02	65.0	± 9.6 %
		Y	6.88	81.37	21.30		65.0	
		Z	9.00	85.89	23.67		65.0	
10233-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	7.47	82.32	21.99	6.02	65.0	± 9.6 %
		Y	6.33	79.12	19.95		65.0	
		Z	8.52	84.00	22.50		65.0	
10234-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	5.72	81.06	23.58	6.02	65.0	± 9.6 %
		Y	5.52	80.55	22.66		65.0	
		Z	5.99	81.43	23.65		65.0	
10235-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	7.76	83.79	23.03	6.02	65.0	± 9.6 %
		Y	6.87	81.37	21.30		65.0	
		Z	9.00	85.90	23.68		65.0	
10236-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	7.52	82.40	22.02	6.02	65.0	± 9.6 %
		Y	6.37	79.20	19.97		65.0	
		Z	8.58	84.09	22.53		65.0	
10237-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	5.89	81.70	23.93	6.02	65.0	± 9.6 %
		Y	5.70	81.25	23.02		65.0	
		Z	6.16	82.07	23.99		65.0	
10238-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	7.74	83.76	23.01	6.02	65.0	± 9.6 %
		Y	6.86	81.34	21.28		65.0	
		Z	8.98	85.86	23.66		65.0	

10239-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	7.44	82.28	21.98	6.02	65.0	± 9.6 %
		Y	6.31	79.09	19.93		65.0	
		Z	8.49	83.96	22.49		65.0	
10240-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	5.87	81.67	23.91	6.02	65.0	± 9.6 %
		Y	5.69	81.21	23.01		65.0	
		Z	6.15	82.03	23.98		65.0	
10241-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	7.04	77.93	23.43	6.98	65.0	± 9.6 %
		Y	6.51	76.27	22.49		65.0	
		Z	6.94	76.95	23.13		65.0	
10242-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	6.06	74.96	22.11	6.98	65.0	± 9.6 %
		Y	5.59	73.23	21.09		65.0	
		Z	6.26	74.88	22.18		65.0	
10243-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	5.51	73.07	21.97	6.98	65.0	± 9.6 %
		Y	5.73	74.18	22.28		65.0	
		Z	5.70	73.18	22.10		65.0	
10244-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	4.78	70.86	15.40	3.98	65.0	± 9.6 %
		Y	4.33	69.76	14.94		65.0	
		Z	5.15	71.99	16.51		65.0	
10245-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	4.72	70.45	15.17	3.98	65.0	± 9.6 %
		Y	4.32	69.53	14.79		65.0	
		Z	5.12	71.69	16.33		65.0	
10246-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	5.25	75.90	18.38	3.98	65.0	± 9.6 %
		Y	3.81	70.99	15.71		65.0	
		Z	4.30	72.34	16.94		65.0	
10247-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	5.16	72.97	17.73	3.98	65.0	± 9.6 %
		Y	4.31	70.20	16.15		65.0	
		Z	4.69	70.98	16.96		65.0	
10248-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	5.12	72.41	17.46	3.98	65.0	± 9.6 %
		Y	4.39	70.02	16.08		65.0	
		Z	4.75	70.74	16.84		65.0	
10249-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	6.38	79.12	20.58	3.98	65.0	± 9.6 %
		Y	4.63	73.70	17.68		65.0	
		Z	4.99	74.42	18.55		65.0	
10250-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	6.19	75.75	20.58	3.98	65.0	± 9.6 %
		Y	5.27	72.94	18.89		65.0	
		Z	5.54	73.15	19.31		65.0	
10251-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	5.85	73.63	19.32	3.98	65.0	± 9.6 %
		Y	5.17	71.51	17.97		65.0	
		Z	5.44	71.77	18.39		65.0	
10252-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	6.83	79.49	21.71	3.98	65.0	± 9.6 %
		Y	5.35	75.00	19.12		65.0	
		Z	5.58	75.17	19.64		65.0	
10253-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	6.00	73.06	19.47	3.98	65.0	± 9.6 %
		Y	5.37	71.19	18.20		65.0	
		Z	5.63	71.38	18.54		65.0	
10254-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	6.38	74.05	20.20	3.98	65.0	± 9.6 %
		Y	5.70	72.07	18.91		65.0	
		Z	5.96	72.23	19.23		65.0	

10255-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	6.57	76.92	20.95	3.98	65.0	± 9.6 %
		Y	5.49	73.63	18.88		65.0	
		Z	5.74	73.82	19.32		65.0	
10256-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	3.74	67.44	12.81	3.98	65.0	± 9.6 %
		Y	3.48	66.93	12.66		65.0	
		Z	4.23	69.22	14.36		65.0	
10257-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	3.69	67.00	12.51	3.98	65.0	± 9.6 %
		Y	3.49	66.66	12.47		65.0	
		Z	4.21	68.84	14.11		65.0	
10258-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	4.02	71.55	15.68	3.98	65.0	± 9.6 %
		Y	3.09	68.06	13.65		65.0	
		Z	3.62	69.79	15.14		65.0	
10259-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	5.56	74.02	18.76	3.98	65.0	± 9.6 %
		Y	4.68	71.21	17.14		65.0	
		Z	5.02	71.77	17.79		65.0	
10260-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	5.58	73.77	18.66	3.98	65.0	± 9.6 %
		Y	4.76	71.15	17.14		65.0	
		Z	5.09	71.69	17.77		65.0	
10261-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	6.29	78.55	20.76	3.98	65.0	± 9.6 %
		Y	4.78	73.79	18.12		65.0	
		Z	5.08	74.25	18.82		65.0	
10262-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	6.17	75.68	20.53	3.98	65.0	± 9.6 %
		Y	5.26	72.90	18.85		65.0	
		Z	5.53	73.11	19.27		65.0	
10263-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	5.84	73.61	19.31	3.98	65.0	± 9.6 %
		Y	5.16	71.49	17.96		65.0	
		Z	5.43	71.75	18.39		65.0	
10264-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	6.77	79.30	21.61	3.98	65.0	± 9.6 %
		Y	5.31	74.86	19.04		65.0	
		Z	5.55	75.04	19.57		65.0	
10265-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	6.09	73.46	19.68	3.98	65.0	± 9.6 %
		Y	5.46	71.61	18.37		65.0	
		Z	5.71	71.78	18.72		65.0	
10266-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	6.51	74.56	20.51	3.98	65.0	± 9.6 %
		Y	5.82	72.55	19.15		65.0	
		Z	6.07	72.68	19.47		65.0	
10267-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	6.83	77.45	20.99	3.98	65.0	± 9.6 %
		Y	5.66	73.95	18.78		65.0	
		Z	5.93	74.22	19.29		65.0	
10268-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	6.77	73.64	20.20	3.98	65.0	± 9.6 %
		Y	6.18	72.03	19.01		65.0	
		Z	6.44	72.19	19.31		65.0	
10269-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	6.77	73.30	20.10	3.98	65.0	± 9.6 %
		Y	6.18	71.75	18.96		65.0	
		Z	6.45	71.92	19.25		65.0	
10270-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	6.82	75.40	20.32	3.98	65.0	± 9.6 %
		Y	5.92	72.79	18.53		65.0	
		Z	6.21	73.10	18.99		65.0	

10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	2.81	67.70	16.05	0.00	150.0	± 9.6 %
		Y	2.23	63.69	12.84		150.0	
		Z	2.44	64.27	13.54		150.0	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	1.88	69.73	17.07	0.00	150.0	± 9.6 %
		Y	1.16	62.43	11.20		150.0	
		Z	1.36	63.33	12.40		150.0	
10277-CAA	PHS (QPSK)	X	2.61	62.77	8.38	9.03	50.0	± 9.6 %
		Y	2.25	61.38	6.94		50.0	
		Z	2.63	62.97	8.65		50.0	
10278-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	X	4.70	71.38	15.25	9.03	50.0	± 9.6 %
		Y	3.93	68.83	13.36		50.0	
		Z	4.99	72.83	16.26		50.0	
10279-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	X	4.78	71.57	15.37	9.03	50.0	± 9.6 %
		Y	4.05	69.12	13.55		50.0	
		Z	5.10	73.05	16.39		50.0	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	2.25	75.22	17.65	0.00	150.0	± 9.6 %
		Y	0.86	61.52	8.91		150.0	
		Z	1.09	63.04	10.78		150.0	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	1.30	71.53	16.40	0.00	150.0	± 9.6 %
		Y	0.52	60.00	7.47		150.0	
		Z	0.71	61.30	9.60		150.0	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	2.31	81.52	20.95	0.00	150.0	± 9.6 %
		Y	0.52	60.36	7.90		150.0	
		Z	0.72	61.98	10.27		150.0	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	6.74	99.12	27.19	0.00	150.0	± 9.6 %
		Y	0.57	61.02	8.66		150.0	
		Z	0.79	62.85	11.09		150.0	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	8.34	81.73	22.23	9.03	50.0	± 9.6 %
		Y	6.23	76.73	19.76		50.0	
		Z	6.45	77.64	21.00		50.0	
10297-AAA	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	2.99	70.89	17.66	0.00	150.0	± 9.6 %
		Y	2.12	64.97	13.14		150.0	
		Z	2.36	65.73	14.02		150.0	
10298-AAA	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	2.02	71.48	16.46	0.00	150.0	± 9.6 %
		Y	1.07	61.94	9.85		150.0	
		Z	1.30	63.17	11.36		150.0	
10299-AAA	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	2.27	67.51	12.91	0.00	150.0	± 9.6 %
		Y	1.64	63.04	9.94		150.0	
		Z	2.12	65.38	11.83		150.0	
10300-AAA	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	1.79	63.99	10.46	0.00	150.0	± 9.6 %
		Y	1.50	61.76	8.70		150.0	
		Z	1.87	63.45	10.26		150.0	
10301-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	X	4.68	65.29	17.42	4.17	50.0	± 9.6 %
		Y	4.48	64.08	16.18		50.0	
		Z	4.72	64.54	16.63		50.0	
10302-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	X	5.18	66.01	18.18	4.96	50.0	± 9.6 %
		Y	5.01	64.98	17.07		50.0	
		Z	5.17	65.03	17.28		50.0	

10303-AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	X	4.94	65.65	18.01	4.96	50.0	± 9.6 %
		Y	4.78	64.64	16.90		50.0	
		Z	4.94	64.69	17.11		50.0	
10304-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	X	4.77	65.65	17.58	4.17	50.0	± 9.6 %
		Y	4.56	64.37	16.29		50.0	
		Z	4.72	64.47	16.55		50.0	
10305-AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	X	4.42	67.25	19.34	6.02	35.0	± 9.6 %
		Y	4.22	66.18	18.32		35.0	
		Z	4.37	66.02	18.45		35.0	
10306-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	X	4.71	66.29	18.96	6.02	35.0	± 9.6 %
		Y	4.55	65.43	18.05		35.0	
		Z	4.71	65.37	18.21		35.0	
10307-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	X	4.61	66.44	18.94	6.02	35.0	± 9.6 %
		Y	4.45	65.57	17.99		35.0	
		Z	4.61	65.51	18.16		35.0	
10308-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	X	4.59	66.63	19.08	6.02	35.0	± 9.6 %
		Y	4.42	65.72	18.10		35.0	
		Z	4.58	65.64	18.25		35.0	
10309-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	X	4.75	66.41	19.06	6.02	35.0	± 9.6 %
		Y	4.61	65.64	18.19		35.0	
		Z	4.77	65.56	18.33		35.0	
10310-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	X	4.67	66.37	18.96	6.02	35.0	± 9.6 %
		Y	4.50	65.47	18.01		35.0	
		Z	4.66	65.41	18.17		35.0	
10311-AAA	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	3.38	70.24	17.27	0.00	150.0	± 9.6 %
		Y	2.41	64.49	13.03		150.0	
		Z	2.65	65.25	13.84		150.0	
10313-AAA	iDEN 1:3	X	100.00	131.05	35.95	6.99	70.0	± 9.6 %
		Y	5.19	78.16	17.79		70.0	
		Z	8.90	88.38	23.09		70.0	
10314-AAA	iDEN 1:6	X	38.99	120.46	35.66	10.00	30.0	± 9.6 %
		Y	3.20	73.05	17.67		30.0	
		Z	4.18	78.61	21.76		30.0	
10315-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	X	1.29	64.88	16.14	0.17	150.0	± 9.6 %
		Y	0.89	60.43	11.43		150.0	
		Z	1.06	61.08	12.41		150.0	
10316-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	X	4.68	67.04	16.50	0.17	150.0	± 9.6 %
		Y	4.35	65.49	15.06		150.0	
		Z	4.54	65.79	15.40		150.0	
10317-AAA	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	X	4.68	67.04	16.50	0.17	150.0	± 9.6 %
		Y	4.35	65.49	15.06		150.0	
		Z	4.54	65.79	15.40		150.0	
10400-AAA	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	X	4.79	67.46	16.60	0.00	150.0	± 9.6 %
		Y	4.44	65.77	15.03		150.0	
		Z	4.64	66.08	15.39		150.0	
10401-AAA	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	X	5.46	67.40	16.62	0.00	150.0	± 9.6 %
		Y	5.14	66.13	15.35		150.0	
		Z	5.34	66.43	15.67		150.0	

10402-AAA	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	X	5.76	67.86	16.73	0.00	150.0	± 9.6 %
		Y	5.40	66.52	15.41		150.0	
		Z	5.60	66.83	15.74		150.0	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	2.25	75.22	17.65	0.00	115.0	± 9.6 %
		Y	0.86	61.52	8.91		115.0	
		Z	1.09	63.04	10.78		115.0	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	2.25	75.22	17.65	0.00	115.0	± 9.6 %
		Y	0.86	61.52	8.91		115.0	
		Z	1.09	63.04	10.78		115.0	
10406-AAA	CDMA2000, RC3, SO32, SCH0, Full Rate	X	6.74	99.12	27.19	0.00	150.0	± 9.6 %
		Y	0.57	61.02	8.66		150.0	
		Z	0.79	62.85	11.09		150.0	
10410-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	0.72	60.00	4.12	2.23	80.0	± 9.6 %
		Y	46.36	64.55	3.25		80.0	
		Z	0.78	60.00	4.15		80.0	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	1.21	64.25	15.79	0.00	150.0	± 9.6 %
		Y	0.83	60.00	11.07		150.0	
		Z	1.00	60.59	12.02		150.0	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	4.66	67.19	16.58	0.00	150.0	± 9.6 %
		Y	4.29	65.46	14.98		150.0	
		Z	4.49	65.78	15.34		150.0	
10417-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	4.66	67.19	16.58	0.00	150.0	± 9.6 %
		Y	4.29	65.46	14.98		150.0	
		Z	4.49	65.78	15.34		150.0	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preamble)	X	4.66	67.38	16.63	0.00	150.0	± 9.6 %
		Y	4.27	65.56	14.96		150.0	
		Z	4.47	65.89	15.33		150.0	
10419-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preamble)	X	4.67	67.32	16.61	0.00	150.0	± 9.6 %
		Y	4.29	65.54	14.98		150.0	
		Z	4.49	65.86	15.35		150.0	

^g Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Client **Microsoft**

Certificate No: **EX3-3940_Jul14**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3940**

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

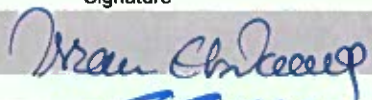
Calibration date: **July 17, 2014**

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 E4419B	GB41293874	03-Apr-14 (No. 217-01911)	Apr-15
Power sensor E4412A	MY41498087	03-Apr-14 (No. 217-01911)	Apr-15
Reference 3 dB Attenuator	SN: S5054 (3c)	03-Apr-14 (No. 217-01915)	Apr-15
Reference 20 dB Attenuator	SN: S5277 (20x)	03-Apr-14 (No. 217-01919)	Apr-15
Reference 30 dB Attenuator	SN: S5129 (30b)	03-Apr-14 (No. 217-01920)	Apr-15
Reference Probe ES3DV2	SN: 3013	30-Dec-13 (No. ES3-3013_Dec13)	Dec-14
DAE4	SN: 660	13-Dec-13 (No. DAE4-660_Dec13)	Dec-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

Calibrated by:	Name Israe El-Naouq	Function Laboratory Technician	Signature 
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 19, 2014

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



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Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,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., $\vartheta = 0$ 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:

- 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
- 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

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,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.
- DCP_{x,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
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; D_{x,y,z}; VR_{x,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 $f \leq 800$ 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 NORM_{x,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 NORM_x (no uncertainty required).

Probe EX3DV4

SN:3940

Manufactured: May 2, 2013
Calibrated: July 17, 2014

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3940

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.41	0.38	0.41	$\pm 10.1 \%$
DCP (mV) ^B	103.8	104.5	102.4	

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 $\text{ms} \cdot \text{V}^{-2}$	T2 $\text{ms} \cdot \text{V}^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
X	54.98	401.6	34.73	18.6	0.75	5.011	1.302	0.192	1.005
Y	43.05	316.2	34.94	13.6	0.757	5.003	1.111	0.266	1.004
Z	43.27	318	34.93	16.21	0.589	5.042	1.241	0.169	1.008

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 NormX,Y,Z do not affect the E^2 -field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter; uncertainty not required.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3940

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	9.55	9.55	9.55	0.60	0.72	± 12.0 %
835	41.5	0.90	9.17	9.17	9.17	0.36	0.99	± 12.0 %
900	41.5	0.97	8.90	8.90	8.90	0.25	1.32	± 12.0 %
1750	40.1	1.37	7.94	7.94	7.94	0.63	0.63	± 12.0 %
1900	40.0	1.40	7.67	7.67	7.67	0.77	0.61	± 12.0 %
2000	40.0	1.40	7.76	7.76	7.76	0.66	0.61	± 12.0 %
2300	39.5	1.67	7.39	7.39	7.39	0.44	0.75	± 12.0 %
2450	39.2	1.80	7.00	7.00	7.00	0.43	0.73	± 12.0 %
2600	39.0	1.96	7.01	7.01	7.01	0.57	0.67	± 12.0 %
3500	37.9	2.91	7.00	7.00	7.00	0.40	0.96	± 13.1 %
5200	36.0	4.66	5.10	5.10	5.10	0.35	1.80	± 13.1 %
5300	35.9	4.76	4.91	4.91	4.91	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.65	4.65	4.65	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.54	4.54	4.54	0.40	1.80	± 13.1 %
5800	35.3	5.27	4.56	4.56	4.56	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:3940

Calibration Parameter Determined in Body Tissue Simulating Media

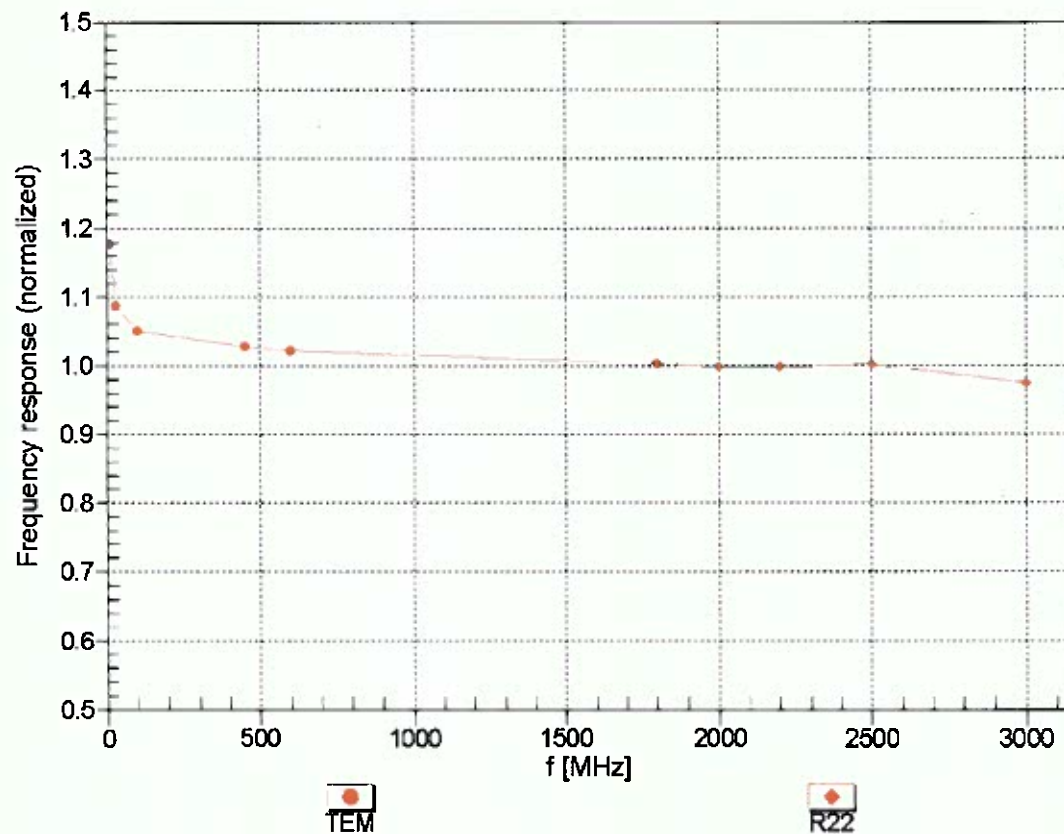
f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unct. (k=2)
750	55.5	0.96	9.18	9.18	9.18	0.23	1.40	± 12.0 %
835	55.2	0.97	9.22	9.22	9.22	0.24	1.43	± 12.0 %
900	55.0	1.05	9.04	9.04	9.04	0.36	1.04	± 12.0 %
1750	53.4	1.49	7.51	7.51	7.51	0.67	0.69	± 12.0 %
1900	53.3	1.52	7.14	7.14	7.14	0.66	0.70	± 12.0 %
2000	53.3	1.52	7.53	7.53	7.53	0.36	0.89	± 12.0 %
2300	52.9	1.81	6.97	6.97	6.97	0.72	0.63	± 12.0 %
2450	52.7	1.95	7.05	7.05	7.05	0.80	0.50	± 12.0 %
2600	52.5	2.16	6.97	6.97	6.97	0.80	0.50	± 12.0 %
3500	51.3	3.31	6.47	6.47	6.47	0.67	0.78	± 13.1 %
5200	49.0	5.30	4.31	4.31	4.31	0.40	1.90	± 13.1 %
5300	48.9	5.42	4.20	4.20	4.20	0.40	1.90	± 13.1 %
5500	48.6	5.65	3.79	3.79	3.79	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.77	3.77	3.77	0.50	1.90	± 13.1 %
5800	48.2	6.00	3.93	3.93	3.93	0.50	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.

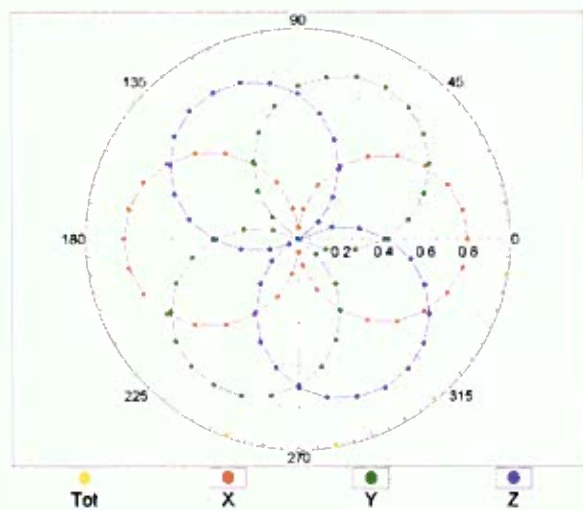
Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



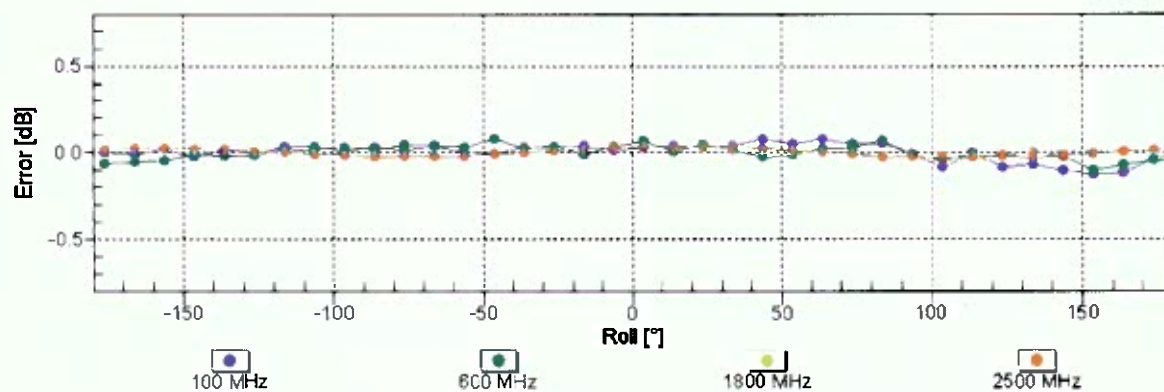
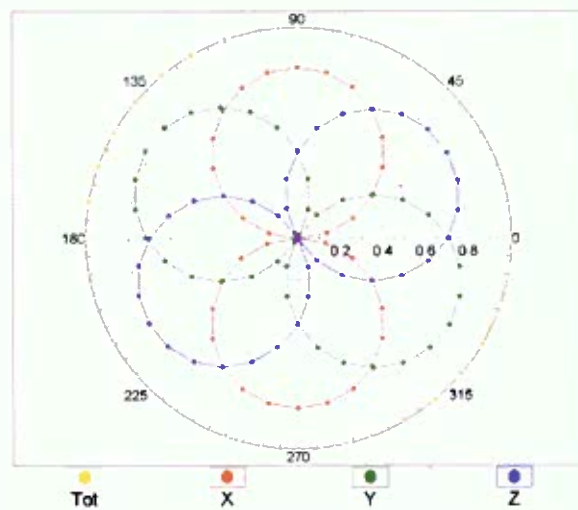
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

Receiving Pattern (ϕ), $\vartheta = 0^\circ$

f=600 MHz,TEM

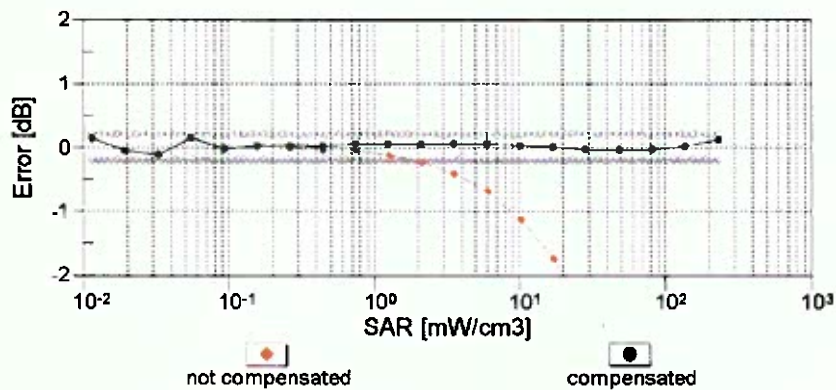
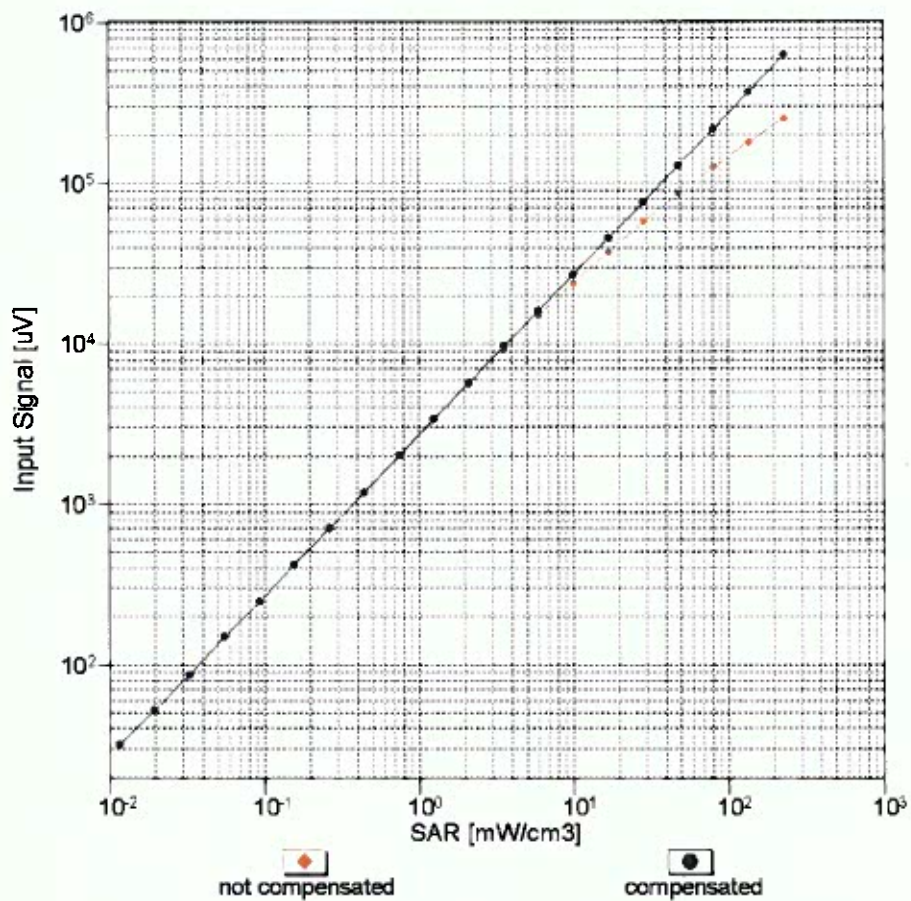


f=1800 MHz,R22



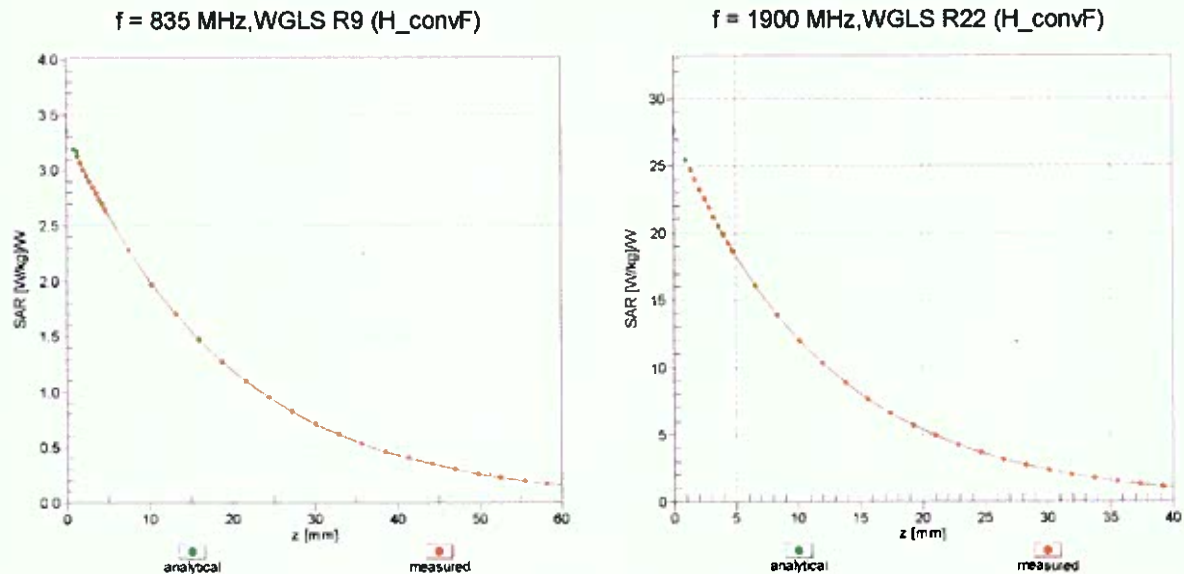
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range $f(\text{SAR}_{\text{head}})$ (TEM cell, $f_{\text{eval}} = 1900 \text{ MHz}$)



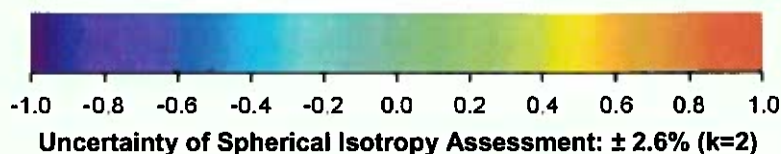
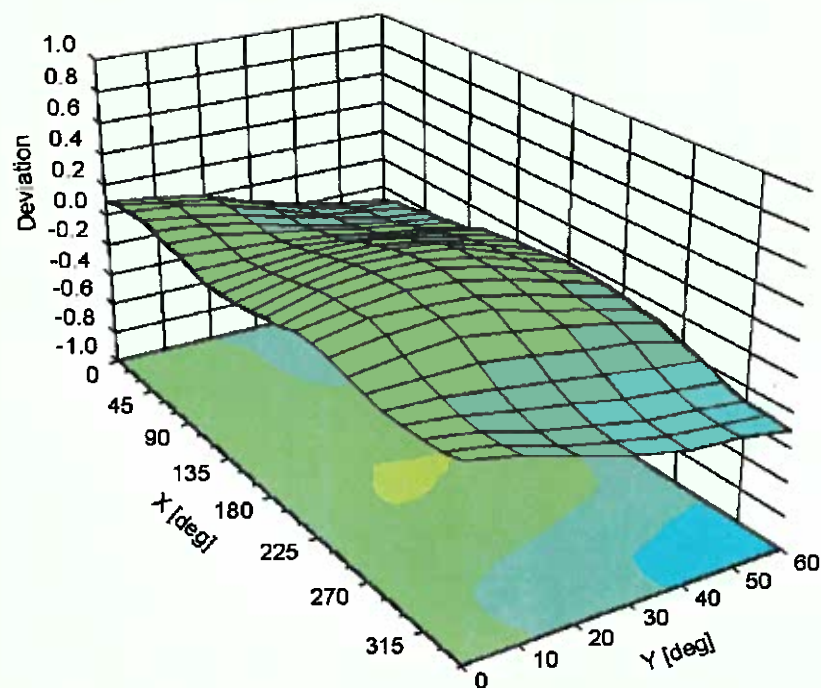
Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), $f = 900 \text{ MHz}$



10402-AAA	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	X	5.97	68.39	17.21	0.00	150.0	± 9.6 %
		Y	5.75	68.10	16.99		150.0	
		Z	5.79	68.03	16.96		150.0	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	10.90	101.16	27.85	0.00	115.0	± 9.6 %
		Y	17.67	105.75	27.20		115.0	
		Z	5.24	88.40	22.62		115.0	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	10.90	101.16	27.85	0.00	115.0	± 9.6 %
		Y	17.67	105.75	27.20		115.0	
		Z	5.24	88.40	22.62		115.0	
10406-AAA	CDMA2000, RC3, SO32, SCH0, Full Rate	X	100.00	153.54	43.12	0.00	150.0	± 9.6 %
		Y	100.00	147.69	39.68		150.0	
		Z	100.00	146.26	39.42		150.0	
10410-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	0.81	60.00	4.64	2.23	80.0	± 9.6 %
		Y	7.03	67.08	5.70		80.0	
		Z	2.08	65.20	6.36		80.0	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	1.30	67.03	18.31	0.00	150.0	± 9.6 %
		Y	1.21	66.43	17.58		150.0	
		Z	1.23	65.51	16.96		150.0	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	4.86	67.64	17.13	0.00	150.0	± 9.6 %
		Y	4.65	67.56	16.94		150.0	
		Z	4.69	67.42	16.86		150.0	
10417-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	4.86	67.64	17.13	0.00	150.0	± 9.6 %
		Y	4.65	67.56	16.94		150.0	
		Z	4.69	67.42	16.86		150.0	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preamble)	X	4.85	67.83	17.17	0.00	150.0	± 9.6 %
		Y	4.65	67.78	17.00		150.0	
		Z	4.69	67.63	16.92		150.0	
10419-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preamble)	X	4.87	67.76	17.16	0.00	150.0	± 9.6 %
		Y	4.67	67.70	16.98		150.0	
		Z	4.70	67.56	16.90		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.

10303-AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	X	5.24	66.21	18.72	4.96	50.0	± 9.6 %
		Y	4.97	66.07	18.32		50.0	
		Z	5.11	66.37	18.52		50.0	
10304-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	X	5.05	66.16	18.26	4.17	50.0	± 9.6 %
		Y	4.80	66.11	17.93		50.0	
		Z	4.93	66.33	18.06		50.0	
10305-AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	X	4.64	67.79	20.41	6.02	35.0	± 9.6 %
		Y	4.49	68.18	19.94		35.0	
		Z	4.63	68.59	20.27		35.0	
10306-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	X	4.95	66.72	19.81	6.02	35.0	± 9.6 %
		Y	4.75	66.94	19.43		35.0	
		Z	4.89	67.32	19.72		35.0	
10307-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	X	4.87	67.02	19.87	6.02	35.0	± 9.6 %
		Y	4.66	67.15	19.43		35.0	
		Z	4.79	67.51	19.72		35.0	
10308-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	X	4.84	67.19	20.00	6.02	35.0	± 9.6 %
		Y	4.65	67.38	19.59		35.0	
		Z	4.78	67.76	19.89		35.0	
10309-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	X	5.02	66.99	19.97	6.02	35.0	± 9.6 %
		Y	4.79	67.09	19.54		35.0	
		Z	4.93	67.49	19.85		35.0	
10310-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	X	4.90	66.81	19.80	6.02	35.0	± 9.6 %
		Y	4.71	67.05	19.43		35.0	
		Z	4.84	67.41	19.72		35.0	
10311-AAA	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	4.35	74.73	19.58	0.00	150.0	± 9.6 %
		Y	3.86	73.25	18.79		150.0	
		Z	3.69	72.07	18.29		150.0	
10313-AAA	iDEN 1:3	X	100.00	131.54	36.13	6.99	70.0	± 9.6 %
		Y	100.00	133.90	36.86		70.0	
		Z	100.00	137.49	38.84		70.0	
10314-AAA	iDEN 1:6	X	100.00	139.43	40.49	10.00	30.0	± 9.6 %
		Y	100.00	139.69	40.30		30.0	
		Z	100.00	145.75	43.37		30.0	
10315-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	X	1.41	68.08	18.88	0.17	150.0	± 9.6 %
		Y	1.30	67.33	18.09		150.0	
		Z	1.32	66.42	17.52		150.0	
10316-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	X	4.89	67.55	17.12	0.17	150.0	± 9.6 %
		Y	4.68	67.44	16.90		150.0	
		Z	4.73	67.39	16.90		150.0	
10317-AAA	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	X	4.89	67.55	17.12	0.17	150.0	± 9.6 %
		Y	4.68	67.44	16.90		150.0	
		Z	4.73	67.39	16.90		150.0	
10400-AAA	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	X	5.05	68.00	17.17	0.00	150.0	± 9.6 %
		Y	4.80	67.84	16.96		150.0	
		Z	4.84	67.73	16.90		150.0	
10401-AAA	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	X	5.66	67.87	17.10	0.00	150.0	± 9.6 %
		Y	5.47	67.73	16.94		150.0	
		Z	5.51	67.68	16.92		150.0	

10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	3.08	69.28	17.52	0.00	150.0	± 9.6 %
		Y	2.93	69.22	17.03		150.0	
		Z	2.92	68.68	16.79		150.0	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	2.71	76.98	21.10	0.00	150.0	± 9.6 %
		Y	2.39	75.43	19.91		150.0	
		Z	2.19	73.15	18.97		150.0	
10277-CAA	PHS (QPSK)	X	2.91	64.32	9.69	9.03	50.0	± 9.6 %
		Y	2.35	62.02	7.64		50.0	
		Z	2.57	63.40	8.77		50.0	
10278-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	X	12.96	88.77	23.01	9.03	50.0	± 9.6 %
		Y	5.15	73.22	15.88		50.0	
		Z	9.72	83.81	20.71		50.0	
10279-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	X	13.10	88.84	23.07	9.03	50.0	± 9.6 %
		Y	5.28	73.48	16.04		50.0	
		Z	9.78	83.85	20.78		50.0	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	10.90	101.16	27.85	0.00	150.0	± 9.6 %
		Y	17.67	105.75	27.20		150.0	
		Z	5.24	88.40	22.62		150.0	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	7.22	101.47	28.63	0.00	150.0	± 9.6 %
		Y	9.25	102.26	26.71		150.0	
		Z	2.90	84.87	21.90		150.0	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	100.00	150.30	41.51	0.00	150.0	± 9.6 %
		Y	100.00	143.00	37.47		150.0	
		Z	29.49	123.47	33.45		150.0	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	100.00	153.54	43.12	0.00	150.0	± 9.6 %
		Y	100.00	147.69	39.68		150.0	
		Z	100.00	146.26	39.42		150.0	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	10.16	87.92	25.99	9.03	50.0	± 9.6 %
		Y	11.58	88.38	24.76		50.0	
		Z	16.21	96.35	28.33		50.0	
10297-AAA	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	3.90	75.71	20.19	0.00	150.0	± 9.6 %
		Y	3.44	74.31	19.39		150.0	
		Z	3.28	72.97	18.82		150.0	
10298-AAA	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	4.15	83.51	22.60	0.00	150.0	± 9.6 %
		Y	3.82	82.31	20.84		150.0	
		Z	2.83	77.29	19.18		150.0	
10299-AAA	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	8.54	87.73	22.62	0.00	150.0	± 9.6 %
		Y	4.69	78.05	17.67		150.0	
		Z	7.37	84.94	20.67		150.0	
10300-AAA	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	3.55	73.27	16.44	0.00	150.0	± 9.6 %
		Y	2.13	66.75	12.12		150.0	
		Z	2.63	69.60	13.94		150.0	
10301-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	X	5.04	66.09	18.23	4.17	50.0	± 9.6 %
		Y	4.71	65.74	17.76		50.0	
		Z	4.94	66.39	18.12		50.0	
10302-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	X	5.48	66.53	18.83	4.96	50.0	± 9.6 %
		Y	5.21	66.42	18.49		50.0	
		Z	5.35	66.71	18.67		50.0	

10255-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	8.37	81.83	23.53	3.98	65.0	± 9.6 %
		Y	7.13	79.89	22.59		65.0	
		Z	7.88	81.76	23.64		65.0	
10256-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	7.77	79.52	19.77	3.98	65.0	± 9.6 %
		Y	4.34	70.69	14.76		65.0	
		Z	6.54	77.11	18.13		65.0	
10257-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	7.33	78.21	19.17	3.98	65.0	± 9.6 %
		Y	4.15	69.74	14.23		65.0	
		Z	5.96	75.38	17.32		65.0	
10258-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	9.41	86.14	22.83	3.98	65.0	± 9.6 %
		Y	5.01	76.16	17.86		65.0	
		Z	7.12	81.78	20.56		65.0	
10259-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	7.31	79.48	22.10	3.98	65.0	± 9.6 %
		Y	6.02	76.76	20.33		65.0	
		Z	6.71	78.69	21.46		65.0	
10260-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	7.27	79.02	21.92	3.98	65.0	± 9.6 %
		Y	5.98	76.30	20.13		65.0	
		Z	6.64	78.14	21.23		65.0	
10261-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	10.47	88.50	25.44	3.98	65.0	± 9.6 %
		Y	8.20	84.90	23.62		65.0	
		Z	9.76	88.23	25.24		65.0	
10262-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	7.64	80.20	23.23	3.98	65.0	± 9.6 %
		Y	6.54	78.20	22.04		65.0	
		Z	7.08	79.61	22.91		65.0	
10263-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	7.06	77.41	21.77	3.98	65.0	± 9.6 %
		Y	5.98	75.26	20.43		65.0	
		Z	6.51	76.80	21.38		65.0	
10264-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	10.27	87.57	25.47	3.98	65.0	± 9.6 %
		Y	8.33	84.75	24.16		65.0	
		Z	9.57	87.46	25.52		65.0	
10265-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	7.12	76.72	21.72	3.98	65.0	± 9.6 %
		Y	6.10	74.66	20.60		65.0	
		Z	6.58	76.02	21.46		65.0	
10266-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	7.52	77.60	22.43	3.98	65.0	± 9.6 %
		Y	6.56	75.87	21.49		65.0	
		Z	7.00	77.06	22.24		65.0	
10267-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	8.98	82.87	23.68	3.98	65.0	± 9.6 %
		Y	7.57	80.74	22.72		65.0	
		Z	8.41	82.74	23.81		65.0	
10268-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	7.59	76.06	21.75	3.98	65.0	± 9.6 %
		Y	6.69	74.42	20.91		65.0	
		Z	7.10	75.49	21.60		65.0	
10269-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	7.50	75.50	21.58	3.98	65.0	± 9.6 %
		Y	6.65	73.96	20.75		65.0	
		Z	7.04	74.98	21.43		65.0	
10270-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	8.07	78.79	22.19	3.98	65.0	± 9.6 %
		Y	7.05	77.19	21.45		65.0	
		Z	7.61	78.58	22.28		65.0	

10239-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	89.92	127.58	36.29	6.02	65.0	± 9.6 %
		Y	22.47	103.96	29.76		65.0	
		Z	79.26	130.40	38.03		65.0	
10240-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	24.75	112.68	35.47	6.02	65.0	± 9.6 %
		Y	9.60	94.60	29.66		65.0	
		Z	13.50	103.55	33.70		65.0	
10241-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	8.59	82.45	26.32	6.98	65.0	± 9.6 %
		Y	7.50	80.76	25.27		65.0	
		Z	8.27	83.36	26.96		65.0	
10242-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	7.71	80.09	25.27	6.98	65.0	± 9.6 %
		Y	7.07	79.51	24.67		65.0	
		Z	7.42	80.97	25.90		65.0	
10243-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	6.59	77.16	24.77	6.98	65.0	± 9.6 %
		Y	6.14	76.75	24.25		65.0	
		Z	6.28	77.48	25.16		65.0	
10244-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	9.35	82.95	22.02	3.98	65.0	± 9.6 %
		Y	6.23	76.32	18.28		65.0	
		Z	9.03	82.82	21.45		65.0	
10245-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	9.00	82.04	21.62	3.98	65.0	± 9.6 %
		Y	5.96	75.38	17.85		65.0	
		Z	8.42	81.41	20.86		65.0	
10246-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	11.76	90.47	25.03	3.98	65.0	± 9.6 %
		Y	7.61	83.30	21.54		65.0	
		Z	10.31	88.67	23.95		65.0	
10247-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	7.12	79.22	21.53	3.98	65.0	± 9.6 %
		Y	5.64	75.78	19.30		65.0	
		Z	6.44	78.06	20.62		65.0	
10248-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	6.95	78.23	21.11	3.98	65.0	± 9.6 %
		Y	5.47	74.77	18.85		65.0	
		Z	6.21	76.92	20.11		65.0	
10249-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	12.41	91.77	26.21	3.98	65.0	± 9.6 %
		Y	9.31	87.25	23.99		65.0	
		Z	11.63	91.49	25.92		65.0	
10250-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	7.65	80.25	23.28	3.98	65.0	± 9.6 %
		Y	6.56	78.29	22.10		65.0	
		Z	7.09	79.68	22.96		65.0	
10251-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	7.07	77.43	21.78	3.98	65.0	± 9.6 %
		Y	5.99	75.29	20.44		65.0	
		Z	6.53	76.83	21.39		65.0	
10252-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	10.39	87.81	25.57	3.98	65.0	± 9.6 %
		Y	8.45	85.05	24.29		65.0	
		Z	9.70	87.73	25.64		65.0	
10253-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	6.90	75.97	21.42	3.98	65.0	± 9.6 %
		Y	5.98	74.14	20.33		65.0	
		Z	6.44	75.46	21.18		65.0	
10254-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	7.28	76.84	22.09	3.98	65.0	± 9.6 %
		Y	6.39	75.25	21.13		65.0	
		Z	6.83	76.42	21.89		65.0	

10061-CAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	X	10.69	104.98	31.76	2.04	110.0	± 9.6 %
		Y	5.45	92.69	27.41		110.0	
		Z	5.41	92.48	27.87		110.0	
10062-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	X	4.97	67.46	17.28	0.49	100.0	± 9.6 %
		Y	4.77	67.38	17.08		100.0	
		Z	4.83	67.35	17.10		100.0	
10063-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	X	4.98	67.54	17.37	0.72	100.0	± 9.6 %
		Y	4.78	67.45	17.16		100.0	
		Z	4.84	67.45	17.20		100.0	
10064-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	X	5.29	67.77	17.55	0.86	100.0	± 9.6 %
		Y	5.04	67.63	17.32		100.0	
		Z	5.11	67.64	17.38		100.0	
10065-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	X	5.15	67.66	17.63	1.21	100.0	± 9.6 %
		Y	4.91	67.49	17.39		100.0	
		Z	4.98	67.53	17.48		100.0	
10066-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	X	5.16	67.64	17.77	1.46	100.0	± 9.6 %
		Y	4.91	67.46	17.52		100.0	
		Z	5.00	67.53	17.63		100.0	
10067-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	X	5.42	67.60	18.06	2.04	100.0	± 9.6 %
		Y	5.19	67.55	17.87		100.0	
		Z	5.28	67.67	18.03		100.0	
10068-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	X	5.48	67.73	18.31	2.55	100.0	± 9.6 %
		Y	5.22	67.49	18.02		100.0	
		Z	5.32	67.65	18.23		100.0	
10069-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	X	5.55	67.62	18.43	2.67	100.0	± 9.6 %
		Y	5.29	67.48	18.19		100.0	
		Z	5.39	67.64	18.39		100.0	
10071-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	X	5.21	67.28	17.93	1.99	100.0	± 9.6 %
		Y	5.02	67.23	17.74		100.0	
		Z	5.10	67.33	17.88		100.0	
10072-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	X	5.21	67.67	18.17	2.30	100.0	± 9.6 %
		Y	4.99	67.54	17.94		100.0	
		Z	5.08	67.66	18.12		100.0	
10073-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	X	5.26	67.78	18.45	2.83	100.0	± 9.6 %
		Y	5.05	67.66	18.22		100.0	
		Z	5.15	67.82	18.44		100.0	
10074-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	X	5.22	67.62	18.58	3.30	100.0	± 9.6 %
		Y	5.03	67.53	18.34		100.0	
		Z	5.13	67.71	18.59		100.0	
10075-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	X	5.27	67.79	18.91	3.82	90.0	± 9.6 %
		Y	5.06	67.60	18.60		90.0	
		Z	5.17	67.80	18.88		90.0	
10076-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	X	5.25	67.47	18.94	4.15	90.0	± 9.6 %
		Y	5.08	67.38	18.70		90.0	
		Z	5.18	67.59	18.99		90.0	
10077-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	X	5.27	67.51	19.03	4.30	90.0	± 9.6 %
		Y	5.10	67.45	18.79		90.0	
		Z	5.21	67.66	19.10		90.0	

10223-CAA	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	X	5.71	68.19	17.29	0.00	150.0	± 9.6 %
		Y	5.49	68.00	17.12		150.0	
		Z	5.53	67.91	17.07		150.0	
10224-CAA	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	X	5.45	68.18	17.22	0.00	150.0	± 9.6 %
		Y	5.24	67.94	17.01		150.0	
		Z	5.28	67.84	16.96		150.0	
10225-CAB	UMTS-FDD (HSPA+)	X	3.25	68.36	17.27	0.00	150.0	± 9.6 %
		Y	3.06	68.25	16.77		150.0	
		Z	3.06	67.81	16.55		150.0	
10226-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	100.00	132.35	38.26	6.02	65.0	± 9.6 %
		Y	27.26	109.39	32.08		65.0	
		Z	92.22	136.29	40.35		65.0	
10227-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	100.00	129.63	36.86	6.02	65.0	± 9.6 %
		Y	25.91	106.52	30.56		65.0	
		Z	98.38	134.53	39.09		65.0	
10228-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	26.87	114.46	36.05	6.02	65.0	± 9.6 %
		Y	10.26	95.98	30.20		65.0	
		Z	14.43	105.01	34.23		65.0	
10229-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	100.00	132.07	38.09	6.02	65.0	± 9.6 %
		Y	23.94	106.84	31.26		65.0	
		Z	76.57	132.41	39.31		65.0	
10230-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	90.23	127.60	36.29	6.02	65.0	± 9.6 %
		Y	22.67	104.08	29.79		65.0	
		Z	80.25	130.57	38.06		65.0	
10231-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	24.67	112.57	35.43	6.02	65.0	± 9.6 %
		Y	9.62	94.59	29.66		65.0	
		Z	13.51	103.50	33.68		65.0	
10232-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	100.00	132.08	38.09	6.02	65.0	± 9.6 %
		Y	23.88	106.80	31.26		65.0	
		Z	76.42	132.39	39.31		65.0	
10233-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	90.12	127.59	36.29	6.02	65.0	± 9.6 %
		Y	22.57	104.02	29.78		65.0	
		Z	79.75	130.48	38.04		65.0	
10234-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	22.89	110.81	34.80	6.02	65.0	± 9.6 %
		Y	9.13	93.38	29.13		65.0	
		Z	12.85	102.26	33.17		65.0	
10235-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	100.00	132.10	38.10	6.02	65.0	± 9.6 %
		Y	23.93	106.86	31.27		65.0	
		Z	76.84	132.52	39.34		65.0	
10236-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	92.77	128.05	36.39	6.02	65.0	± 9.6 %
		Y	22.94	104.26	29.84		65.0	
		Z	82.50	131.04	38.17		65.0	
10237-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	24.86	112.77	35.49	6.02	65.0	± 9.6 %
		Y	9.63	94.64	29.68		65.0	
		Z	13.55	103.60	33.71		65.0	
10238-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	100.00	132.09	38.09	6.02	65.0	± 9.6 %
		Y	23.81	106.77	31.25		65.0	
		Z	76.28	132.37	39.31		65.0	

10184-CAB	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	3.41	71.96	20.90	3.01	150.0	± 9.6 %
		Y	3.07	70.24	19.82		150.0	
		Z	3.06	70.13	20.10		150.0	
10185-CAB	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	5.73	82.69	25.15	3.01	150.0	± 9.6 %
		Y	4.85	79.68	23.71		150.0	
		Z	4.57	78.94	23.82		150.0	
10186-AAA	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	4.30	76.23	21.53	3.01	150.0	± 9.6 %
		Y	3.59	73.10	19.86		150.0	
		Z	3.61	73.64	20.56		150.0	
10187-CAB	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	3.42	71.99	20.95	3.01	150.0	± 9.6 %
		Y	3.08	70.30	19.89		150.0	
		Z	3.07	70.19	20.16		150.0	
10188-CAB	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	6.06	83.92	25.74	3.01	150.0	± 9.6 %
		Y	5.12	80.86	24.29		150.0	
		Z	4.76	79.83	24.28		150.0	
10189-AAA	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	4.45	76.95	21.93	3.01	150.0	± 9.6 %
		Y	3.71	73.74	20.24		150.0	
		Z	3.71	74.20	20.89		150.0	
10193-CAA	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	X	4.85	67.60	17.08	0.00	150.0	± 9.6 %
		Y	4.65	67.54	16.87		150.0	
		Z	4.69	67.40	16.80		150.0	
10194-CAA	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	X	5.05	67.95	17.19	0.00	150.0	± 9.6 %
		Y	4.82	67.82	16.99		150.0	
		Z	4.85	67.69	16.91		150.0	
10195-CAA	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	X	5.09	67.96	17.19	0.00	150.0	± 9.6 %
		Y	4.86	67.84	17.00		150.0	
		Z	4.89	67.71	16.93		150.0	
10196-CAA	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	4.87	67.70	17.11	0.00	150.0	± 9.6 %
		Y	4.65	67.59	16.89		150.0	
		Z	4.69	67.45	16.81		150.0	
10197-CAA	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	X	5.06	67.97	17.20	0.00	150.0	± 9.6 %
		Y	4.83	67.84	17.00		150.0	
		Z	4.87	67.70	16.92		150.0	
10198-CAA	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	X	5.09	67.98	17.20	0.00	150.0	± 9.6 %
		Y	4.86	67.85	17.01		150.0	
		Z	4.89	67.72	16.94		150.0	
10219-CAA	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	X	4.82	67.74	17.10	0.00	150.0	± 9.6 %
		Y	4.61	67.64	16.87		150.0	
		Z	4.64	67.49	16.79		150.0	
10220-CAA	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	X	5.06	67.95	17.19	0.00	150.0	± 9.6 %
		Y	4.82	67.80	16.98		150.0	
		Z	4.86	67.66	16.91		150.0	
10221-CAA	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	X	5.09	67.89	17.17	0.00	150.0	± 9.6 %
		Y	4.86	67.77	16.98		150.0	
		Z	4.90	67.64	16.91		150.0	
10222-CAA	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	X	5.40	68.06	17.23	0.00	150.0	± 9.6 %
		Y	5.19	67.81	17.02		150.0	
		Z	5.23	67.71	16.96		150.0	

10168-CAB	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	5.89	78.41	23.10	3.01	150.0	± 9.6 %
		Y	5.62	78.74	23.01		150.0	
		Z	5.46	78.28	23.12		150.0	
10169-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	3.42	72.12	21.05	3.01	150.0	± 9.6 %
		Y	3.08	70.43	20.00		150.0	
		Z	3.07	70.27	20.25		150.0	
10170-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	5.82	83.06	25.32	3.01	150.0	± 9.6 %
		Y	4.90	79.96	23.84		150.0	
		Z	4.60	79.13	23.92		150.0	
10171-AAA	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	4.30	76.32	21.59	3.01	150.0	± 9.6 %
		Y	3.59	73.16	19.90		150.0	
		Z	3.61	73.68	20.59		150.0	
10172-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	19.13	107.23	33.86	6.02	65.0	± 9.6 %
		Y	8.80	92.59	28.97		65.0	
		Z	9.57	96.17	31.35		65.0	
10173-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	100.00	132.08	38.09	6.02	65.0	± 9.6 %
		Y	23.64	106.64	31.20		65.0	
		Z	75.58	132.18	39.25		65.0	
10174-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	54.16	118.95	34.22	6.02	65.0	± 9.6 %
		Y	11.84	93.49	26.77		65.0	
		Z	37.07	116.80	34.70		65.0	
10175-CAB	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	3.36	71.70	20.75	3.01	150.0	± 9.6 %
		Y	3.03	70.00	19.68		150.0	
		Z	3.03	69.93	19.98		150.0	
10176-CAB	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	5.83	83.10	25.34	3.01	150.0	± 9.6 %
		Y	4.91	80.00	23.86		150.0	
		Z	4.61	79.16	23.93		150.0	
10177-CAC	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	3.40	71.92	20.88	3.01	150.0	± 9.6 %
		Y	3.06	70.21	19.81		150.0	
		Z	3.06	70.10	20.08		150.0	
10178-CAB	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	5.70	82.61	25.12	3.01	150.0	± 9.6 %
		Y	4.83	79.60	23.67		150.0	
		Z	4.55	78.88	23.79		150.0	
10179-CAB	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	5.00	79.54	23.32	3.01	150.0	± 9.6 %
		Y	4.16	76.29	21.69		150.0	
		Z	4.08	76.36	22.16		150.0	
10180-CAB	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	4.28	76.16	21.50	3.01	150.0	± 9.6 %
		Y	3.58	73.04	19.83		150.0	
		Z	3.60	73.59	20.53		150.0	
10181-CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	3.40	71.90	20.87	3.01	150.0	± 9.6 %
		Y	3.05	70.18	19.79		150.0	
		Z	3.05	70.08	20.07		150.0	
10182-CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	5.69	82.57	25.10	3.01	150.0	± 9.6 %
		Y	4.82	79.57	23.66		150.0	
		Z	4.55	78.85	23.77		150.0	
10183-AAA	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	4.27	76.13	21.49	3.01	150.0	± 9.6 %
		Y	3.57	73.01	19.82		150.0	
		Z	3.59	73.56	20.52		150.0	

10149-CAB	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	3.50	70.51	18.12	0.00	150.0	± 9.6 %
		Y	3.24	69.91	17.61		150.0	
		Z	3.22	69.32	17.32		150.0	
10150-CAB	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	3.60	70.23	18.03	0.00	150.0	± 9.6 %
		Y	3.35	69.79	17.58		150.0	
		Z	3.33	69.22	17.31		150.0	
10151-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	9.01	82.93	23.70	3.98	65.0	± 9.6 %
		Y	7.59	80.81	22.75		65.0	
		Z	8.43	82.80	23.84		65.0	
10152-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	7.13	76.72	21.71	3.98	65.0	± 9.6 %
		Y	6.10	74.65	20.59		65.0	
		Z	6.58	76.02	21.45		65.0	
10153-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	7.52	77.62	22.44	3.98	65.0	± 9.6 %
		Y	6.56	75.89	21.50		65.0	
		Z	7.01	77.07	22.25		65.0	
10154-CAB	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	3.38	75.86	20.54	0.00	150.0	± 9.6 %
		Y	3.00	74.82	19.76		150.0	
		Z	2.80	73.00	18.98		150.0	
10155-CAB	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	3.38	72.46	19.12	0.00	150.0	± 9.6 %
		Y	3.21	72.61	18.78		150.0	
		Z	3.08	71.28	18.17		150.0	
10156-CAB	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	3.38	78.89	21.52	0.00	150.0	± 9.6 %
		Y	3.10	78.51	20.62		150.0	
		Z	2.66	75.23	19.37		150.0	
10157-CAB	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	3.29	74.41	18.97	0.00	150.0	± 9.6 %
		Y	2.97	73.65	17.70		150.0	
		Z	2.79	72.18	17.18		150.0	
10158-CAB	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	3.52	72.34	19.10	0.00	150.0	± 9.6 %
		Y	3.37	72.68	18.85		150.0	
		Z	3.23	71.35	18.24		150.0	
10159-CAB	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	3.53	75.28	19.40	0.00	150.0	± 9.6 %
		Y	3.26	74.85	18.26		150.0	
		Z	2.98	72.96	17.57		150.0	
10160-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	3.52	72.88	19.14	0.00	150.0	± 9.6 %
		Y	3.24	72.26	18.61		150.0	
		Z	3.16	71.30	18.18		150.0	
10161-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	3.51	70.28	18.06	0.00	150.0	± 9.6 %
		Y	3.27	69.92	17.61		150.0	
		Z	3.24	69.30	17.31		150.0	
10162-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	3.61	70.26	18.07	0.00	150.0	± 9.6 %
		Y	3.38	70.04	17.69		150.0	
		Z	3.35	69.43	17.39		150.0	
10166-CAB	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	3.96	71.18	20.44	3.01	150.0	± 9.6 %
		Y	3.69	70.93	20.12		150.0	
		Z	3.74	70.90	20.36		150.0	
10167-CAB	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	5.16	75.47	21.51	3.01	150.0	± 9.6 %
		Y	4.72	74.89	20.97		150.0	
		Z	4.75	75.09	21.39		150.0	

10112-CAB	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	3.59	70.16	17.98	0.00	150.0	± 9.6 %
		Y	3.34	69.70	17.52		150.0	
		Z	3.32	69.16	17.26		150.0	
10113-CAB	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	3.51	72.25	19.05	0.00	150.0	± 9.6 %
		Y	3.35	72.54	18.78		150.0	
		Z	3.22	71.25	18.18		150.0	
10114-CAA	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	X	5.43	68.08	17.23	0.00	150.0	± 9.6 %
		Y	5.25	67.95	17.08		150.0	
		Z	5.29	67.85	17.02		150.0	
10115-CAA	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	X	5.77	68.28	17.31	0.00	150.0	± 9.6 %
		Y	5.50	67.94	17.07		150.0	
		Z	5.54	67.86	17.02		150.0	
10116-CAA	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	X	5.55	68.33	17.28	0.00	150.0	± 9.6 %
		Y	5.34	68.13	17.10		150.0	
		Z	5.38	68.03	17.04		150.0	
10117-CAA	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	5.42	68.03	17.22	0.00	150.0	± 9.6 %
		Y	5.21	67.80	17.02		150.0	
		Z	5.25	67.70	16.97		150.0	
10118-CAA	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	X	5.84	68.44	17.39	0.00	150.0	± 9.6 %
		Y	5.58	68.13	17.17		150.0	
		Z	5.62	68.05	17.12		150.0	
10119-CAA	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	X	5.52	68.26	17.26	0.00	150.0	± 9.6 %
		Y	5.32	68.08	17.08		150.0	
		Z	5.36	67.98	17.03		150.0	
10140-CAB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	3.92	69.98	17.78	0.00	150.0	± 9.6 %
		Y	3.66	69.36	17.31		150.0	
		Z	3.66	68.97	17.12		150.0	
10141-CAB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	4.03	69.91	17.85	0.00	150.0	± 9.6 %
		Y	3.78	69.43	17.46		150.0	
		Z	3.78	69.03	17.25		150.0	
10142-CAB	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	3.22	76.63	20.67	0.00	150.0	± 9.6 %
		Y	2.91	76.02	19.85		150.0	
		Z	2.65	73.76	18.94		150.0	
10143-CAB	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	3.67	75.49	20.04	0.00	150.0	± 9.6 %
		Y	3.66	76.42	19.70		150.0	
		Z	3.27	73.96	18.72		150.0	
10144-CAB	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	3.11	71.61	17.80	0.00	150.0	± 9.6 %
		Y	2.77	70.76	16.64		150.0	
		Z	2.72	70.02	16.38		150.0	
10145-CAB	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	5.20	87.32	23.14	0.00	150.0	± 9.6 %
		Y	3.56	80.46	18.80		150.0	
		Z	2.69	76.43	17.67		150.0	
10146-CAB	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	12.35	92.27	23.04	0.00	150.0	± 9.6 %
		Y	2.59	70.21	13.32		150.0	
		Z	5.77	80.54	17.86		150.0	
10147-CAB	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	74.12	117.95	30.02	0.00	150.0	± 9.6 %
		Y	5.18	78.45	16.63		150.0	
		Z	37.21	103.94	24.78		150.0	

10081-CAB	CDMA2000 (1xRTT, RC3)	X	8.14	103.44	29.22	0.00	150.0	± 9.6 %
		Y	11.54	105.53	27.61		150.0	
		Z	3.12	85.96	22.29		150.0	
10082-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	X	1.04	61.06	6.31	4.77	80.0	± 9.6 %
		Y	0.80	60.00	5.13		80.0	
		Z	0.98	61.22	6.44		80.0	
10090-DAB	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	100.00	121.19	30.29	6.56	60.0	± 9.6 %
		Y	100.00	117.57	28.26		60.0	
		Z	100.00	126.34	32.54		60.0	
10097-CAB	UMTS-FDD (HSDPA)	X	2.67	74.30	20.09	0.00	150.0	± 9.6 %
		Y	2.55	74.17	19.47		150.0	
		Z	2.38	72.21	18.62		150.0	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	2.63	74.38	20.14	0.00	150.0	± 9.6 %
		Y	2.51	74.19	19.48		150.0	
		Z	2.34	72.21	18.63		150.0	
10099-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	13.82	101.27	36.26	9.56	60.0	± 9.6 %
		Y	8.86	90.41	31.98		60.0	
		Z	10.82	96.82	35.28		60.0	
10100-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	4.45	76.51	20.24	0.00	150.0	± 9.6 %
		Y	3.91	74.76	19.33		150.0	
		Z	3.74	73.57	18.85		150.0	
10101-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	3.80	70.22	17.89	0.00	150.0	± 9.6 %
		Y	3.53	69.48	17.37		150.0	
		Z	3.53	69.07	17.18		150.0	
10102-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	3.88	69.99	17.87	0.00	150.0	± 9.6 %
		Y	3.63	69.37	17.41		150.0	
		Z	3.63	68.96	17.21		150.0	
10103-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	8.21	79.75	22.34	3.98	65.0	± 9.6 %
		Y	7.15	78.09	21.60		65.0	
		Z	7.58	79.16	22.32		65.0	
10104-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	7.52	76.46	21.81	3.98	65.0	± 9.6 %
		Y	6.55	74.58	20.87		65.0	
		Z	6.98	75.74	21.62		65.0	
10105-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	7.01	74.99	21.47	3.98	65.0	± 9.6 %
		Y	6.34	73.82	20.84		65.0	
		Z	6.50	74.17	21.22		65.0	
10108-CAB	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	3.87	75.54	20.10	0.00	150.0	± 9.6 %
		Y	3.41	74.12	19.29		150.0	
		Z	3.26	72.83	18.74		150.0	
10109-CAB	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	3.49	70.42	18.07	0.00	150.0	± 9.6 %
		Y	3.23	69.81	17.54		150.0	
		Z	3.21	69.25	17.27		150.0	
10110-CAB	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	3.23	74.98	20.09	0.00	150.0	± 9.6 %
		Y	2.86	73.90	19.28		150.0	
		Z	2.72	72.40	18.64		150.0	
10111-CAB	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	3.38	72.47	19.12	0.00	150.0	± 9.6 %
		Y	3.21	72.60	18.77		150.0	
		Z	3.07	71.26	18.15		150.0	

Appendix: Modulation Calibration Parameters
(Additional assessments outside the scope of SCS108)

UID	Communication System Name		A dB	B dB μ V	C	D dB	VR mV	Max Unc ^E (k=2)
0	CW	X	0.00	0.00	1.00	0.00	171.3	$\pm 3.8 \%$
		Y	0.00	0.00	1.00		163.7	
		Z	0.00	0.00	1.00		160.9	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	11.46	93.32	24.33	10.00	20.0	$\pm 9.6 \%$
		Y	6.01	82.08	19.74		20.0	
		Z	24.33	107.00	28.78		20.0	
10011-CAB	UMTS-FDD (WCDMA)	X	2.38	82.50	23.96	0.00	150.0	$\pm 9.6 \%$
		Y	1.91	78.99	21.87		150.0	
		Z	1.62	74.77	20.15		150.0	
10012-CAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	1.49	67.79	18.62	0.41	150.0	$\pm 9.6 \%$
		Y	1.37	66.90	17.78		150.0	
		Z	1.41	66.29	17.41		150.0	
10013-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	5.12	67.25	17.68	1.46	150.0	$\pm 9.6 \%$
		Y	4.93	67.21	17.50		150.0	
		Z	5.01	67.27	17.60		150.0	
10021-DAB	GSM-FDD (TDMA, GMSK)	X	100.00	119.78	30.59	9.39	50.0	$\pm 9.6 \%$
		Y	100.00	116.08	28.64		50.0	
		Z	100.00	123.03	32.03		50.0	
10023-DAB	GPRS-FDD (TDMA, GMSK, TN 0)	X	100.00	119.94	30.72	9.57	50.0	$\pm 9.6 \%$
		Y	100.00	116.22	28.77		50.0	
		Z	100.00	123.08	32.12		50.0	
10024-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	100.00	121.28	30.32	6.56	60.0	$\pm 9.6 \%$
		Y	100.00	117.63	28.27		60.0	
		Z	100.00	126.45	32.57		60.0	
10025-DAB	EDGE-FDD (TDMA, 8PSK, TN 0)	X	9.00	93.05	37.73	12.57	50.0	$\pm 9.6 \%$
		Y	4.50	70.54	26.26		50.0	
		Z	7.88	89.67	36.76		50.0	
10026-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	13.72	101.14	36.22	9.56	60.0	$\pm 9.6 \%$
		Y	8.80	90.30	31.95		60.0	
		Z	10.73	96.65	35.23		60.0	
10027-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	100.00	125.51	31.48	4.80	80.0	$\pm 9.6 \%$
		Y	100.00	121.75	29.31		80.0	
		Z	100.00	132.04	34.27		80.0	
10028-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	100.00	133.08	34.12	3.55	100.0	$\pm 9.6 \%$
		Y	100.00	129.54	31.97		100.0	
		Z	100.00	140.52	37.23		100.0	
10029-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	8.19	88.56	30.50	7.80	80.0	$\pm 9.6 \%$
		Y	5.92	81.57	27.51		80.0	
		Z	6.60	84.53	29.34		80.0	
10030-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	X	100.00	120.51	29.51	5.30	70.0	$\pm 9.6 \%$
		Y	100.00	115.91	26.99		70.0	
		Z	100.00	125.24	31.51		70.0	
10031-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	X	100.00	150.02	39.82	1.88	100.0	$\pm 9.6 \%$
		Y	100.00	141.77	35.51		100.0	
		Z	100.00	152.95	40.89		100.0	

10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	100.00	180.36	51.24	1.17	100.0	± 9.6 %
		Y	100.00	174.36	47.54		100.0	
		Z	100.00	176.42	49.48		100.0	
10033-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	X	100.00	132.82	37.01	5.30	70.0	± 9.6 %
		Y	38.58	113.21	30.74		70.0	
		Z	100.00	132.66	36.72		70.0	
10034-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	X	52.11	124.92	34.35	1.88	100.0	± 9.6 %
		Y	45.77	117.72	30.64		100.0	
		Z	48.90	121.07	32.38		100.0	
10035-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	X	21.58	112.43	31.31	1.17	100.0	± 9.6 %
		Y	25.22	110.59	28.86		100.0	
		Z	17.10	106.13	28.46		100.0	
10036-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	X	100.00	133.26	37.22	5.30	70.0	± 9.6 %
		Y	91.62	127.23	34.22		70.0	
		Z	100.00	133.16	36.95		70.0	
10037-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	X	41.93	121.45	33.49	1.88	100.0	± 9.6 %
		Y	28.55	110.95	28.98		100.0	
		Z	33.37	115.32	30.97		100.0	
10038-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	X	22.45	113.66	31.79	1.17	100.0	± 9.6 %
		Y	27.24	112.41	29.51		100.0	
		Z	16.86	106.50	28.73		100.0	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	38.78	122.76	33.90	0.00	150.0	± 9.6 %
		Y	100.00	132.60	34.08		150.0	
		Z	15.63	105.44	27.98		150.0	
10042-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	X	100.00	117.80	28.94	7.78	50.0	± 9.6 %
		Y	100.00	113.53	26.67		50.0	
		Z	100.00	121.26	30.44		50.0	
10044-CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	X	0.10	60.00	31.59	0.00	150.0	± 9.6 %
		Y	0.06	60.00	39.25		150.0	
		Z	0.10	60.00	24.44		150.0	
10048-CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	X	100.00	119.35	31.79	13.80	25.0	± 9.6 %
		Y	100.00	113.50	29.04		25.0	
		Z	100.00	120.73	32.41		25.0	
10049-CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	X	100.00	118.72	30.45	10.79	40.0	± 9.6 %
		Y	100.00	114.66	28.39		40.0	
		Z	100.00	120.60	31.27		40.0	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	100.00	127.52	35.73	9.03	50.0	± 9.6 %
		Y	35.34	106.73	29.13		50.0	
		Z	100.00	128.19	35.86		50.0	
10058-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	6.09	82.30	27.32	6.55	100.0	± 9.6 %
		Y	4.70	77.25	25.06		100.0	
		Z	5.08	78.97	26.25		100.0	
10059-CAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	X	1.61	69.72	19.57	0.61	110.0	± 9.6 %
		Y	1.45	68.46	18.55		110.0	
		Z	1.49	67.83	18.25		110.0	
10060-CAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	X	100.00	151.04	42.27	1.30	110.0	± 9.6 %
		Y	100.00	148.25	40.54		110.0	
		Z	100.00	150.26	41.85		110.0	

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3940**Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle (°)	-136.3
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