Calibration Laboratory of
Schmid & Partner
Engineering AG
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Accreditation No.: SCS 0108

Client **Sporton**

Certificate No: DAE3-577_Sep18

CALIBRATION CERTIFICATE

Object	DAE3 - SD 000 D03 AA - SN: 577
Calibration procedure(s)	QA CAL-06.v29 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	September 19, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	03-Sep-18 (No:23488)	Sep-19
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	04-Jan-18 (in house check)	In house check: Jan-19
Calibrator Box V2.1	SE UMS 006 AA 1002	04-Jan-18 (in house check)	In house check: Jan-19

	Name	Function	Signature
Calibrated by:	Dominique Steffen	Laboratory Technician	
Approved by:	Sven Kühn	Deputy Manager	i.V.

Issued: September 20, 2018

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

Glossary

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

Methods Applied and Interpretation of Parameters

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

DC Voltage Measurement

A/D - Converter Resolution nominal

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

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

Calibration Factors	X	Y	Z
High Range	403.570 ± 0.02% (k=2)	403.555 ± 0.02% (k=2)	403.860 ± 0.02% (k=2)
Low Range	3.92675 ± 1.50% (k=2)	3.94171 ± 1.50% (k=2)	3.96140 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	190.5 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200038.36	-0.72	-0.00
Channel X	+ Input	20010.00	4.45	0.02
Channel X	- Input	-20002.48	3.65	-0.02
Channel Y	+ Input	200036.35	-3.15	-0.00
Channel Y	+ Input	20005.24	-0.27	-0.00
Channel Y	- Input	-20004.72	1.39	-0.01
Channel Z	+ Input	200037.49	-1.39	-0.00
Channel Z	+ Input	20007.74	2.29	0.01
Channel Z	- Input	-20007.40	-1.18	0.01

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2001.09	-0.01	-0.00
Channel X	+ Input	201.09	0.05	0.02
Channel X	- Input	-198.69	0.26	-0.13
Channel Y	+ Input	2000.84	-0.17	-0.01
Channel Y	+ Input	200.20	-0.73	-0.36
Channel Y	- Input	-200.34	-1.25	0.63
Channel Z	+ Input	2000.71	-0.11	-0.01
Channel Z	+ Input	199.32	-1.41	-0.70
Channel Z	- Input	-200.63	-1.49	0.75

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	-2.17	-4.31
	- 200	6.00	3.83
Channel Y	200	-14.14	-14.03
	- 200	13.56	12.87
Channel Z	200	2.59	2.79
	- 200	-5.24	-5.55

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	-1.77	-2.83
Channel Y	200	8.18	-	0.21
Channel Z	200	4.82	4.96	-

4. AD-Converter Values with inputs shorted

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

	High Range (LSB)	Low Range (LSB)
Channel X	16134	16282
Channel Y	16103	16704
Channel Z	16112	15003

5. Input Offset Measurement

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

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.90	-0.00	1.82	0.37
Channel Y	2.88	1.81	4.92	0.52
Channel Z	-1.31	-2.47	0.13	0.43

6. Input Offset Current

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

7. Input Resistance (Typical values for information)

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

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

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

9. Power Consumption (Typical values for information)

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

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Client : **Sporton** **Certificate No: Z18-60554**

CALIBRATION CERTIFICATE

Object	DAE4 - SN: 316
Calibration Procedure(s)	FF-Z11-002-01 Calibration Procedure for the Data Acquisition Electronics (DAEx)
Calibration date:	January 03, 2019

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(Calibrated by, Certificate No.)	Scheduled Calibration
Process Calibrator 753	1971018	20-Jun-18 (CTTL, No.J18X05034)	June-19

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

Issued: January 05, 2019

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Glossary:

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

Methods Applied and Interpretation of Parameters:

- *DC Voltage Measurement*: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.

- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.

- The report provide only calibration results for DAE, it does not contain other performance test results.

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DC Voltage Measurement

A/D - Converter Resolution nominal

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

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

Calibration Factors	X	Y	Z
High Range	403.874 ± 0.15% (k=2)	402.571 ± 0.15% (k=2)	403.386 ± 0.15% (k=2)
Low Range	3.94038 ± 0.7% (k=2)	3.93848 ± 0.7% (k=2)	3.95800 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	353.5° ± 1 °

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CNAS L0570

Client : **Auden** **Certificate No: Z18-60467**

CALIBRATION CERTIFICATE

Object	DAE3 - SN: 360
Calibration Procedure(s)	FF-Z11-002-01 Calibration Procedure for the Data Acquisition Electronics (DAEx)
Calibration date:	October 29, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Process Calibrator 753	1971018	20-Jun-18 (CTTL, No.J18X05034)	June-19

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

Issued: October 31, 2018

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Glossary:

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

Methods Applied and Interpretation of Parameters:

- *DC Voltage Measurement*: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.

- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.

- The report provide only calibration results for DAE, it does not contain other performance test results.

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DC Voltage Measurement

A/D - Converter Resolution nominal

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

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

Calibration Factors	X	Y	Z
High Range	404.155 ± 0.15% (k=2)	403.990 ± 0.15% (k=2)	404.006 ± 0.15% (k=2)
Low Range	3.93424 ± 0.7% (k=2)	3.93643 ± 0.7% (k=2)	3.97104 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	38° ± 1 °

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Accreditation No.: SCS 0108

Client **Auden**

Certificate No: DAE4-918_Jun18

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BK - SN: 918
Calibration procedure(s)	QA CAL-06.v29 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	June 20, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	31-Aug-17 (No:21092)	Aug-18
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	04-Jan-18 (in house check)	In house check: Jan-19
Calibrator Box V2.1	SE UMS 006 AA 1002	04-Jan-18 (in house check)	In house check: Jan-19

	Name	Function	Signature
Calibrated by:	Eric Hainfeld	Laboratory Technician	
Approved by:	Sven Kühn	Deputy Manager	i.V.

Issued: June 20, 2018

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

Glossary

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

Methods Applied and Interpretation of Parameters

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

DC Voltage Measurement

A/D - Converter Resolution nominal

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

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

Calibration Factors	X	Y	Z
High Range	404.292 ± 0.02% (k=2)	404.471 ± 0.02% (k=2)	404.000 ± 0.02% (k=2)
Low Range	4.01048 ± 1.50% (k=2)	3.99008 ± 1.50% (k=2)	4.00845 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	320.5 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	199995.21	-2.10	-0.00
Channel X	+ Input	20001.90	-0.02	-0.00
Channel X	- Input	-19998.43	2.67	-0.01
Channel Y	+ Input	199997.45	0.04	0.00
Channel Y	+ Input	20000.13	-1.84	-0.01
Channel Y	- Input	-20002.53	-1.31	0.01
Channel Z	+ Input	199998.07	0.90	0.00
Channel Z	+ Input	20000.07	-1.82	-0.01
Channel Z	- Input	-20002.88	-1.51	0.01

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2002.15	0.71	0.04
Channel X	+ Input	201.89	0.17	0.09
Channel X	- Input	-198.28	-0.11	0.06
Channel Y	+ Input	2000.77	-0.64	-0.03
Channel Y	+ Input	201.50	-0.14	-0.07
Channel Y	- Input	-198.61	-0.36	0.18
Channel Z	+ Input	2001.31	-0.10	-0.01
Channel Z	+ Input	200.36	-1.18	-0.59
Channel Z	- Input	-199.37	-1.01	0.51

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	4.32	2.70
	- 200	-2.19	-4.37
Channel Y	200	11.36	11.41
	- 200	-12.35	-12.96
Channel Z	200	-13.98	-14.32
	- 200	13.11	12.07

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	-0.68	-5.41
Channel Y	200	7.71	-	0.61
Channel Z	200	10.01	5.69	-

4. AD-Converter Values with inputs shorted

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

	High Range (LSB)	Low Range (LSB)
Channel X	15930	14966
Channel Y	16009	15983
Channel Z	16005	17407

5. Input Offset Measurement

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

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	-0.01	-2.00	1.96	0.70
Channel Y	1.43	0.40	2.68	0.39
Channel Z	-0.70	-1.89	0.85	0.46

6. Input Offset Current

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

7. Input Resistance (Typical values for information)

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

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

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

9. Power Consumption (Typical values for information)

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

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Accreditation No.: SCS 0108

Client Sporton

Certificate No: DAE4-1399_Nov18

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BM - SN: 1399
Calibration procedure(s)	QA CAL-06.v29 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	November 16, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	03-Sep-18 (No:23488)	Sep-19
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	04-Jan-18 (in house check)	In house check: Jan-19
Calibrator Box V2.1	SE UMS 006 AA 1002	04-Jan-18 (in house check)	In house check: Jan-19

	Name	Function	Signature
Calibrated by:	Adrian Gehring	Laboratory Technician	
Approved by:	Sven Kühn	Deputy Manager	

Issued: November 16, 2018

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

Glossary

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

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
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  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

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

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

Calibration Factors	X	Y	Z
High Range	403.615 ± 0.02% (k=2)	403.876 ± 0.02% (k=2)	403.729 ± 0.02% (k=2)
Low Range	3.98279 ± 1.50% (k=2)	3.99313 ± 1.50% (k=2)	3.98038 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	302.5 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	199995.97	-0.84	-0.00
Channel X	+ Input	20003.53	1.96	0.01
Channel X	- Input	-20000.06	1.70	-0.01
Channel Y	+ Input	199996.26	-0.65	-0.00
Channel Y	+ Input	20000.25	-1.15	-0.01
Channel Y	- Input	-20001.89	0.03	-0.00
Channel Z	+ Input	199995.39	-1.51	-0.00
Channel Z	+ Input	19999.77	-1.56	-0.01
Channel Z	- Input	-20003.54	-1.57	0.01

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2001.10	0.21	0.01
Channel X	+ Input	201.44	0.27	0.13
Channel X	- Input	-198.21	0.48	-0.24
Channel Y	+ Input	2001.07	0.28	0.01
Channel Y	+ Input	200.13	-0.82	-0.41
Channel Y	- Input	-199.82	-0.96	0.49
Channel Z	+ Input	2000.99	0.25	0.01
Channel Z	+ Input	200.17	-0.73	-0.36
Channel Z	- Input	-199.39	-0.48	0.24

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	-5.15	-6.61
	- 200	7.82	6.45
Channel Y	200	-5.89	-6.47
	- 200	4.11	4.20
Channel Z	200	-7.04	-6.67
	- 200	5.06	5.01

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	4.43	-1.37
Channel Y	200	10.10	-	6.50
Channel Z	200	8.99	6.87	-

4. AD-Converter Values with inputs shorted

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

	High Range (LSB)	Low Range (LSB)
Channel X	15819	15315
Channel Y	16117	16356
Channel Z	15883	15504

5. Input Offset Measurement

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

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.62	-0.33	1.64	0.36
Channel Y	0.11	-1.02	1.57	0.46
Channel Z	-0.26	-1.48	1.84	0.52

6. Input Offset Current

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

7. Input Resistance (Typical values for information)

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

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

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

9. Power Consumption (Typical values for information)

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

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Client **Sporton** **Certificate No: Z18-60553**

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3124

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

Calibration date: January 15, 2019

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	20-Jun-18 (CTTL, No.J18X05032)	Jun-19
Power sensor NRP-Z91	101547	20-Jun-18 (CTTL, No.J18X05032)	Jun-19
Power sensor NRP-Z91	101548	20-Jun-18 (CTTL, No.J18X05032)	Jun-19
Reference10dBAttenuator	18N50W-10dB	09-Feb-18(CTTL, No.J18X01133)	Feb-20
Reference20dBAttenuator	18N50W-20dB	09-Feb-18(CTTL, No.J18X01132)	Feb-20
Reference Probe EX3DV4	SN 7514	27-Aug-18(SPEAG,No.EX3-7514_Aug18)	Aug-19
DAE4	SN 1555	20-Aug-18(SPEAG, No.DAE4-1555_Aug18)	Aug -19
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGeneratorMG3700A	6201052605	21-Jun-18 (CTTL, No.J18X05033)	Jun-19
Network Analyzer E5071C	MY46110673	24-Jan-18 (CTTL, No.J18X00561)	Jan -19

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

Issued: January 17, 2019

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

Calibration is Performed According to the Following Standards:

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

b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016

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

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

Methods Applied and Interpretation of Parameters:

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

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Probe ES3DV3

SN: 3124

Calibrated: January 15, 2019

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3124

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)²)[A]	1.25	1.29	1.27	±10.0%
DCP(mV)[B]	105.1	103.6	103.5	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	277.5	±2.2%
		Y	0.0	0.0	1.0		275.5	
		Z	0.0	0.0	1.0		274.2	

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

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

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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3124

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
750	41.9	0.89	6.15	6.15	6.15	0.38	1.48	±12.1%
835	41.5	0.90	5.97	5.97	5.97	0.34	1.55	±12.1%
900	41.5	0.97	6.04	6.04	6.04	0.38	1.54	±12.1%
1750	40.1	1.37	5.18	5.18	5.18	0.66	1.24	±12.1%
1900	40.0	1.40	4.95	4.95	4.95	0.74	1.20	±12.1%
2000	40.0	1.40	4.94	4.94	4.94	0.69	1.24	±12.1%
2450	39.2	1.80	4.49	4.49	4.49	0.90	1.18	±12.1%
2600	39.0	1.96	4.37	4.37	4.37	0.90	1.10	±12.1%

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

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

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

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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3124

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
750	55.5	0.96	6.25	6.25	6.25	0.40	1.40	±12.1%
835	55.2	0.97	6.07	6.07	6.07	0.44	1.56	±12.1%
900	55.0	1.05	6.10	6.10	6.10	0.50	1.46	±12.1%
1750	53.4	1.49	4.90	4.90	4.90	0.66	1.27	±12.1%
1900	53.3	1.52	4.70	4.70	4.70	0.66	1.28	±12.1%
2000	53.3	1.52	4.71	4.71	4.71	0.68	1.27	±12.1%
2450	52.7	1.95	4.31	4.31	4.31	0.71	1.40	±12.1%
2600	52.5	2.16	4.20	4.20	4.20	0.69	1.42	±12.1%

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

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

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

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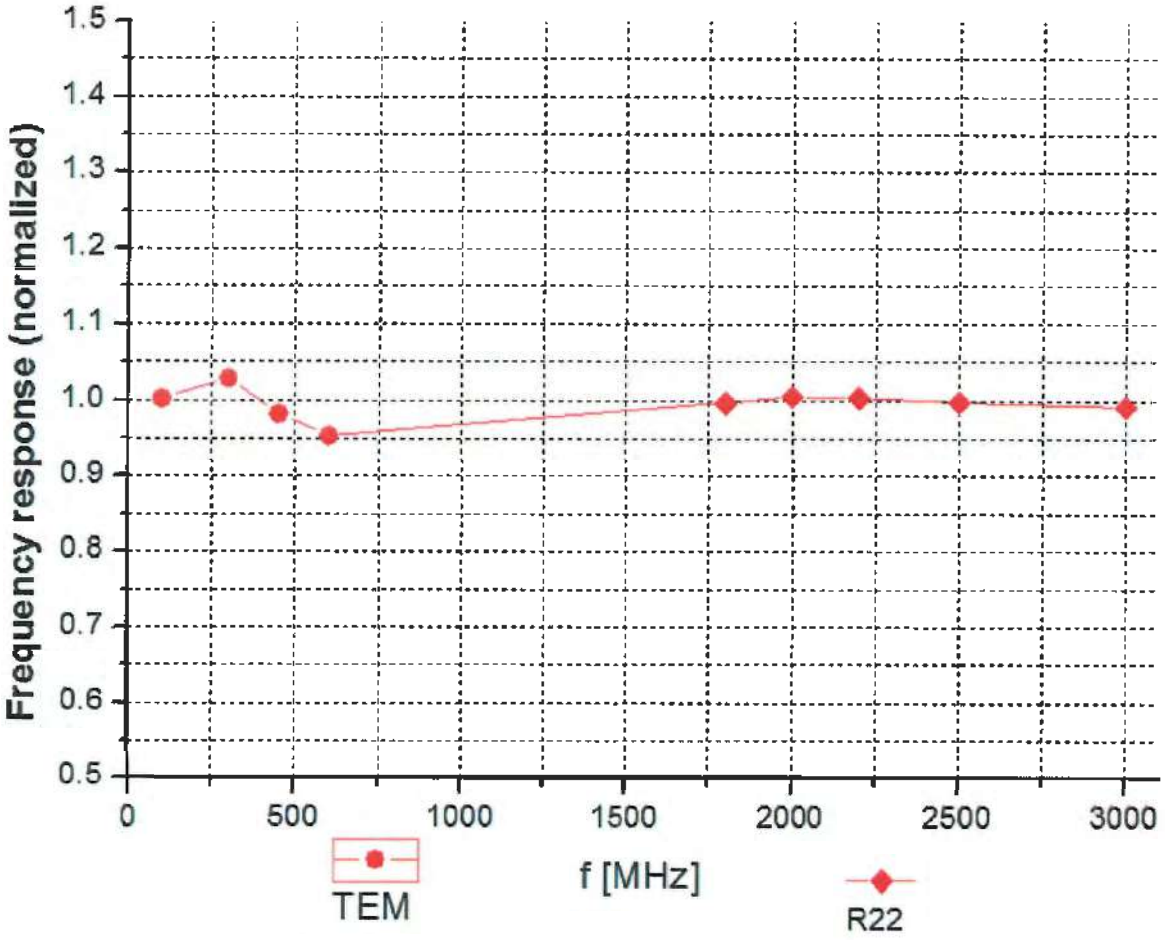
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



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

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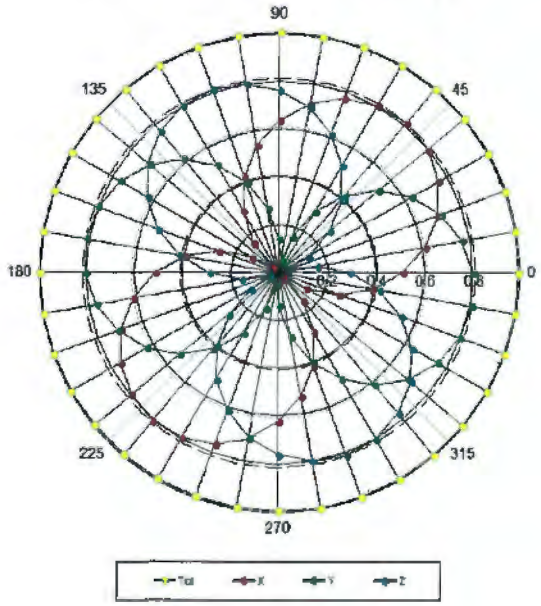
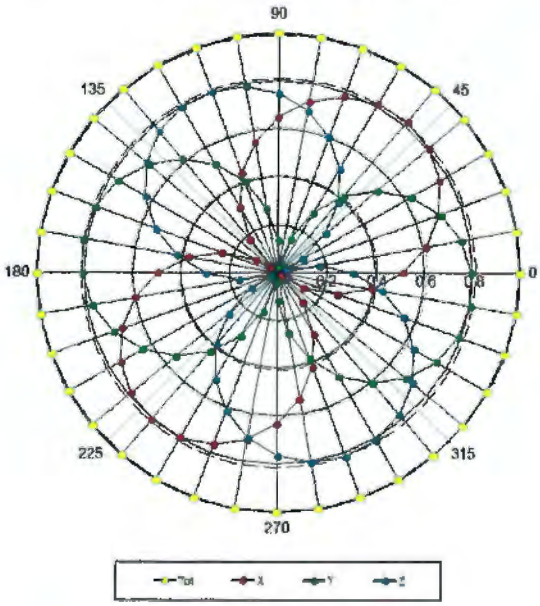
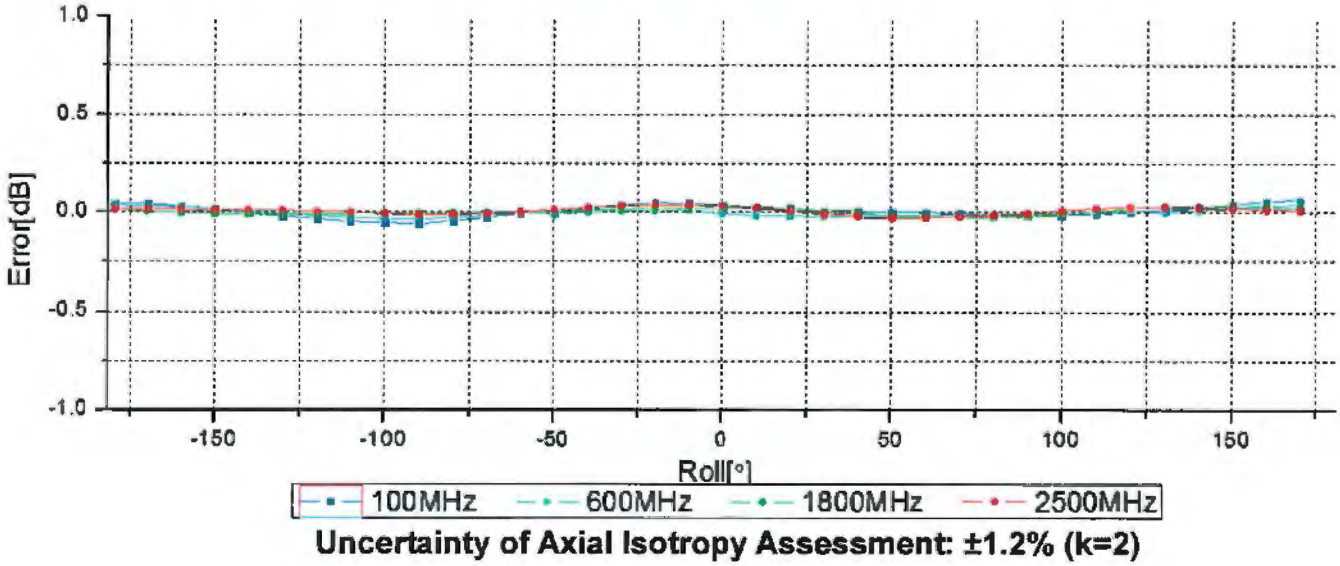
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





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

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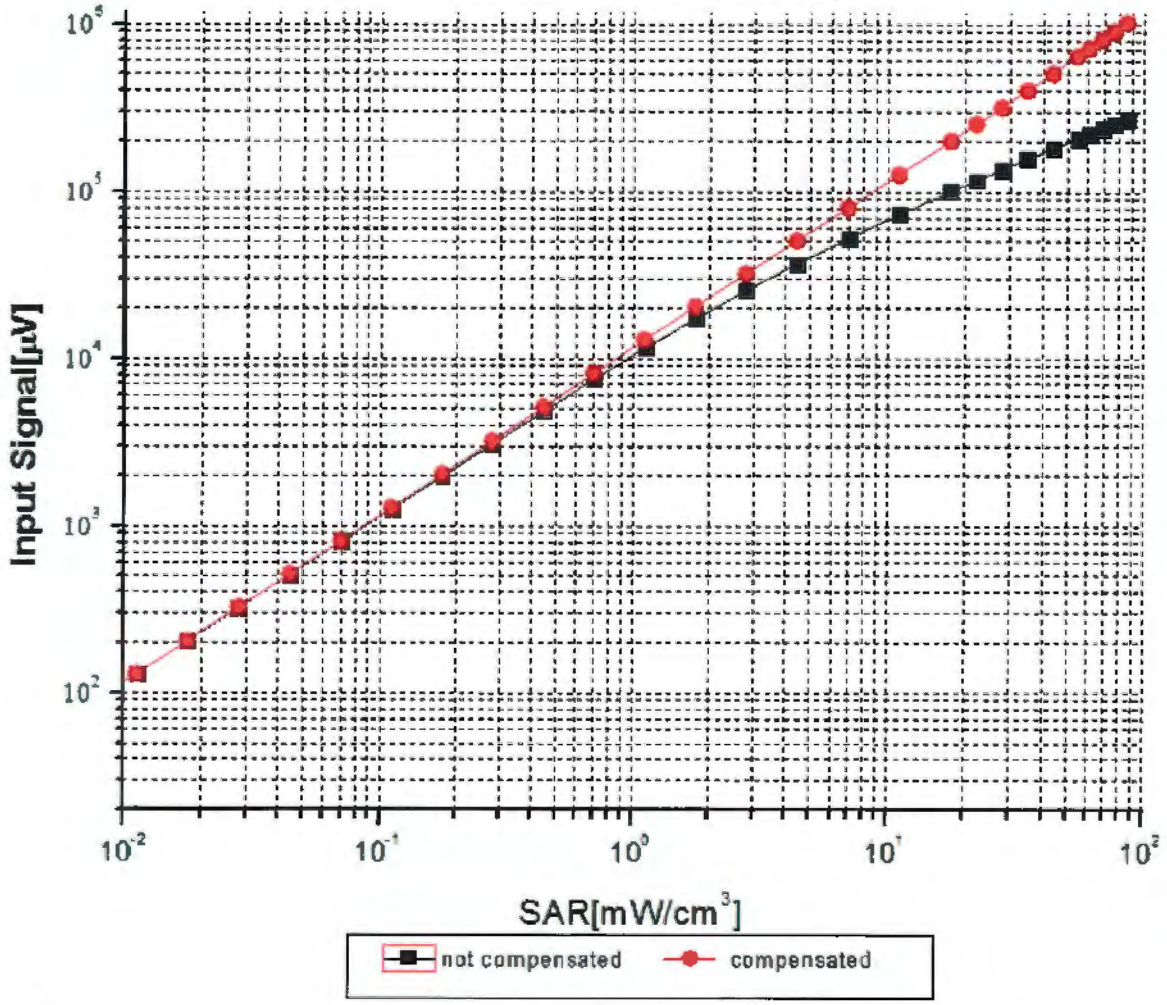
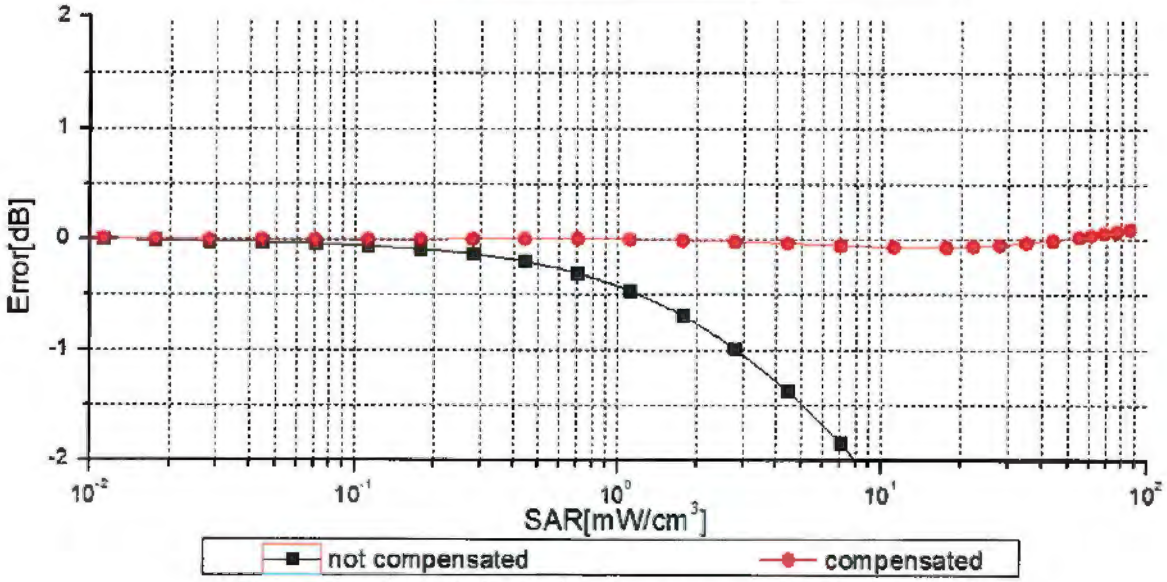
Dynamic Range f(SAR$_{head}$)
(TEM cell, f = 900 MHz)





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

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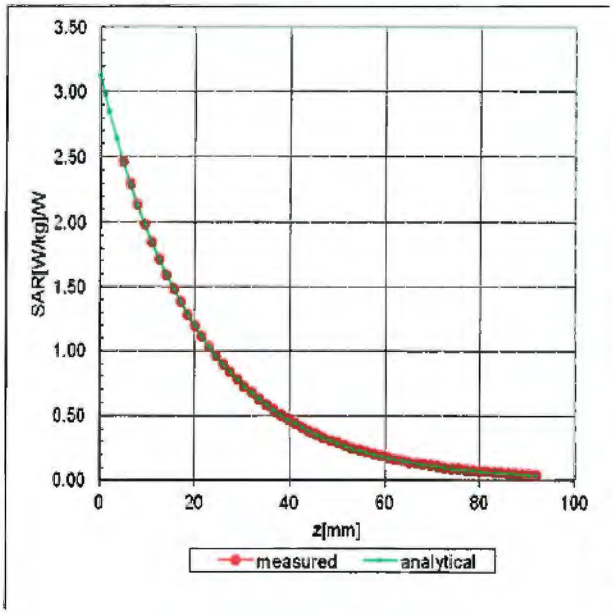
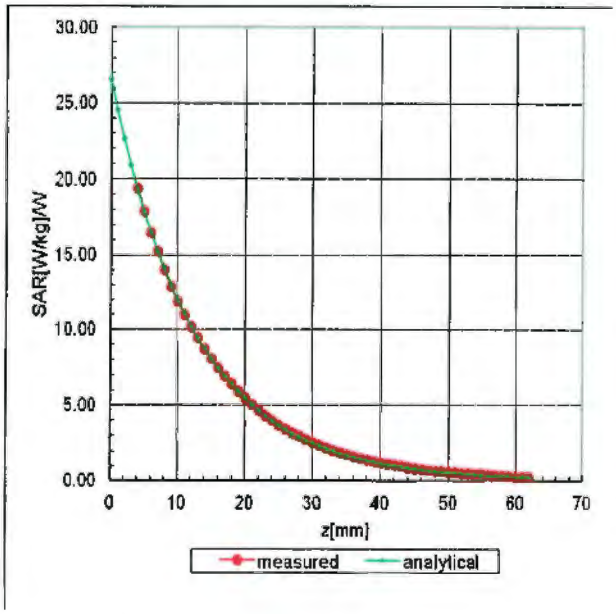
Conversion Factor Assessment

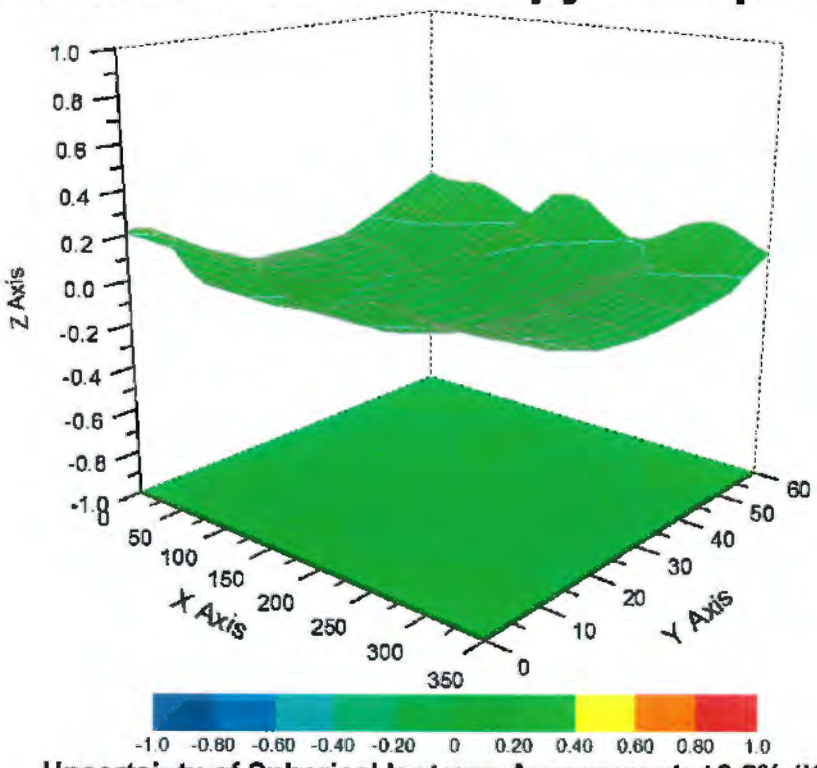
f=750 MHz, WGLS R9(H_convF)



f=1750 MHz, WGLS R22(H_convF)



Deviation from Isotropy in Liquid



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

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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3124

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	127.8
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	10mm
Tip Diameter	4mm
Probe Tip to Sensor X Calibration Point	2mm
Probe Tip to Sensor Y Calibration Point	2mm
Probe Tip to Sensor Z Calibration Point	2mm
Recommended Measurement Distance from Surface	3mm

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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 0108

Client **Sporton**

Certificate No: ES3-3169_May18

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3169

Calibration procedure(s): QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: May 28, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-18 (No. 217-02682)	Apr-19
Reference Probe ES3DV2	SN: 3013	30-Dec-17 (No. ES3-3013_Dec17)	Dec-18
DAE4	SN: 660	21-Dec-17 (No. DAE4-660_Dec17)	Dec-18
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-16)	In house check: Jun-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 29, 2018

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ 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:

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b) IEC 62209-1, ", "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

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- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ 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 *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe ES3DV3

SN:3169

Manufactured: October 8, 2008
Calibrated: May 28, 2018

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

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.15	1.15	1.13	± 10.1 %
DCP (mV)[B]	99.6	99.3	96.1	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	202.3	±3.3 %
		Y	0.0	0.0	1.0		207.5	
		Z	0.0	0.0	1.0		199.0	

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

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

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

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	6.56	6.56	6.56	0.75	1.20	± 12.0 %
835	41.5	0.90	6.39	6.39	6.39	0.80	1.13	± 12.0 %
900	41.5	0.97	6.21	6.21	6.21	0.80	1.13	± 12.0 %
1750	40.1	1.37	5.48	5.48	5.48	0.80	1.14	± 12.0 %
1900	40.0	1.40	5.27	5.27	5.27	0.80	1.14	± 12.0 %
2000	40.0	1.40	5.25	5.25	5.25	0.55	1.34	± 12.0 %
2300	39.5	1.67	4.91	4.91	4.91	0.76	1.18	± 12.0 %
2450	39.2	1.80	4.69	4.69	4.69	0.76	1.25	± 12.0 %
2600	39.0	1.96	4.50	4.50	4.50	0.70	1.30	± 12.0 %

[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: ES3DV3 - SN:3169

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	6.30	6.30	6.30	0.33	1.78	± 12.0 %
835	55.2	0.97	6.19	6.19	6.19	0.63	1.29	± 12.0 %
1750	53.4	1.49	5.06	5.06	5.06	0.62	1.36	± 12.0 %
1900	53.3	1.52	4.80	4.80	4.80	0.37	1.91	± 12.0 %
2300	52.9	1.81	4.50	4.50	4.50	0.78	1.25	± 12.0 %
2450	52.7	1.95	4.40	4.40	4.40	0.80	1.15	± 12.0 %
2600	52.5	2.16	4.27	4.27	4.27	0.80	0.80	± 12.0 %

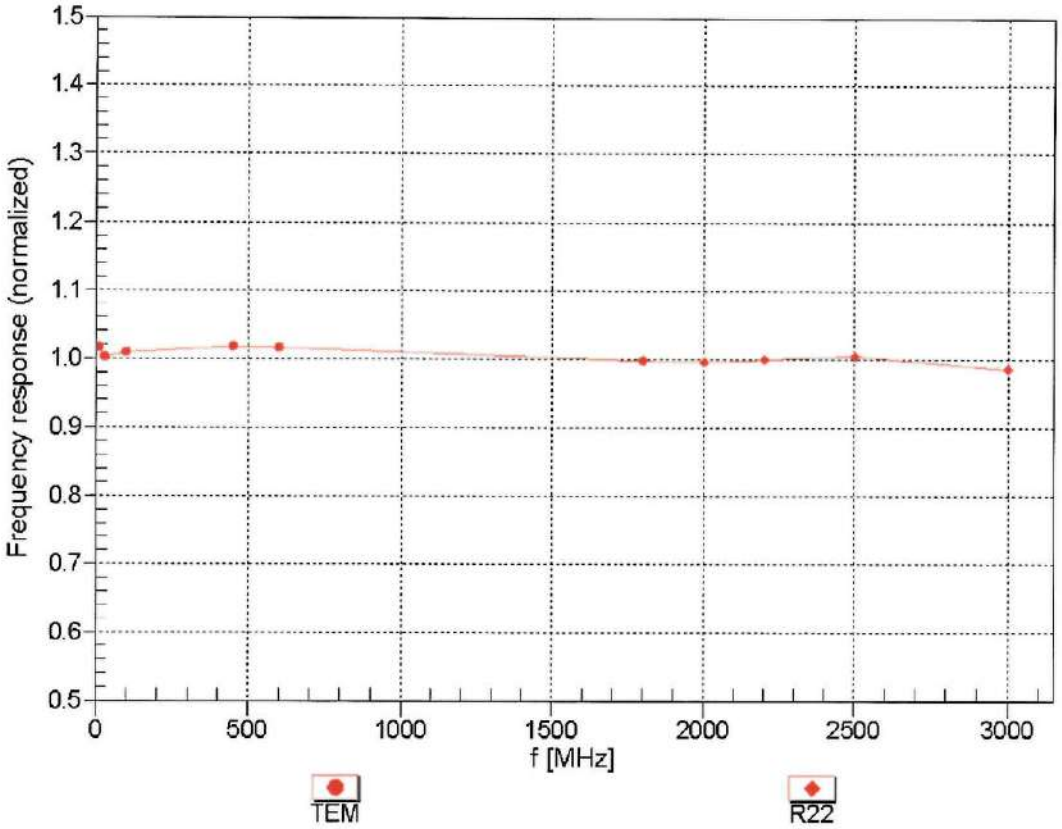
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz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

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

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

Frequency Response of E-Field

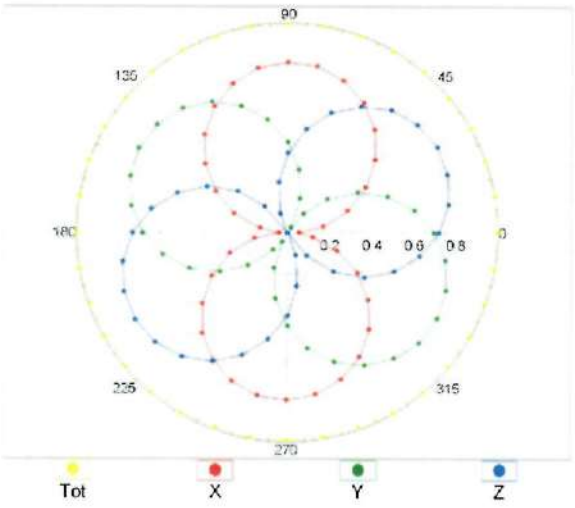
(TEM-Cell:ifi110 EXX, Waveguide: R22)



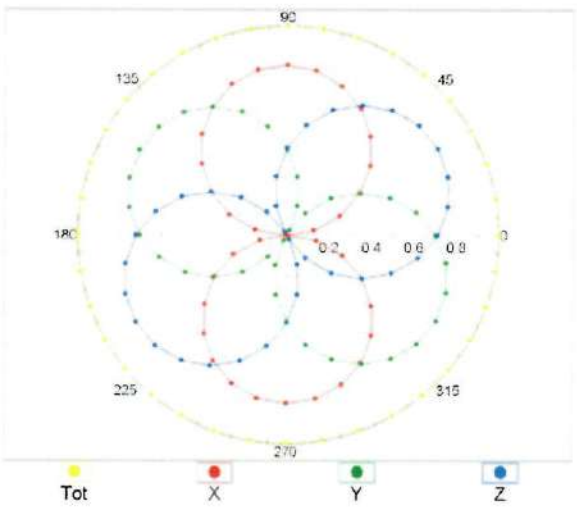
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

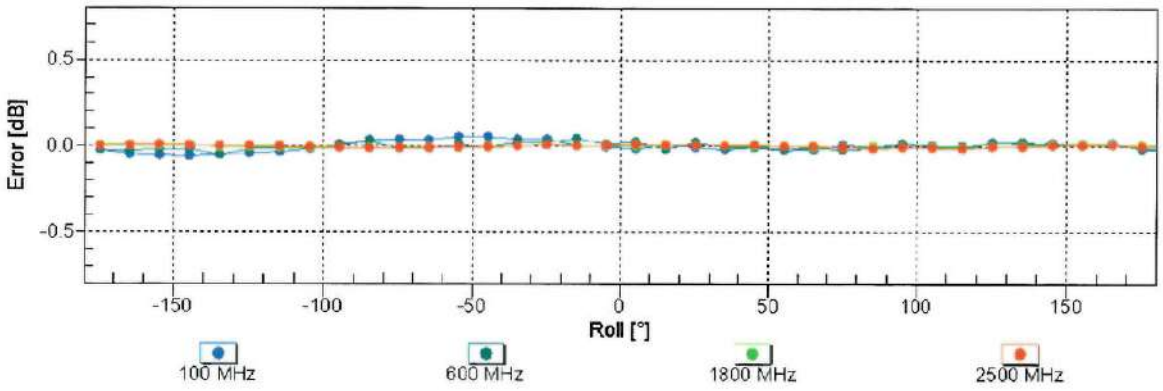
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



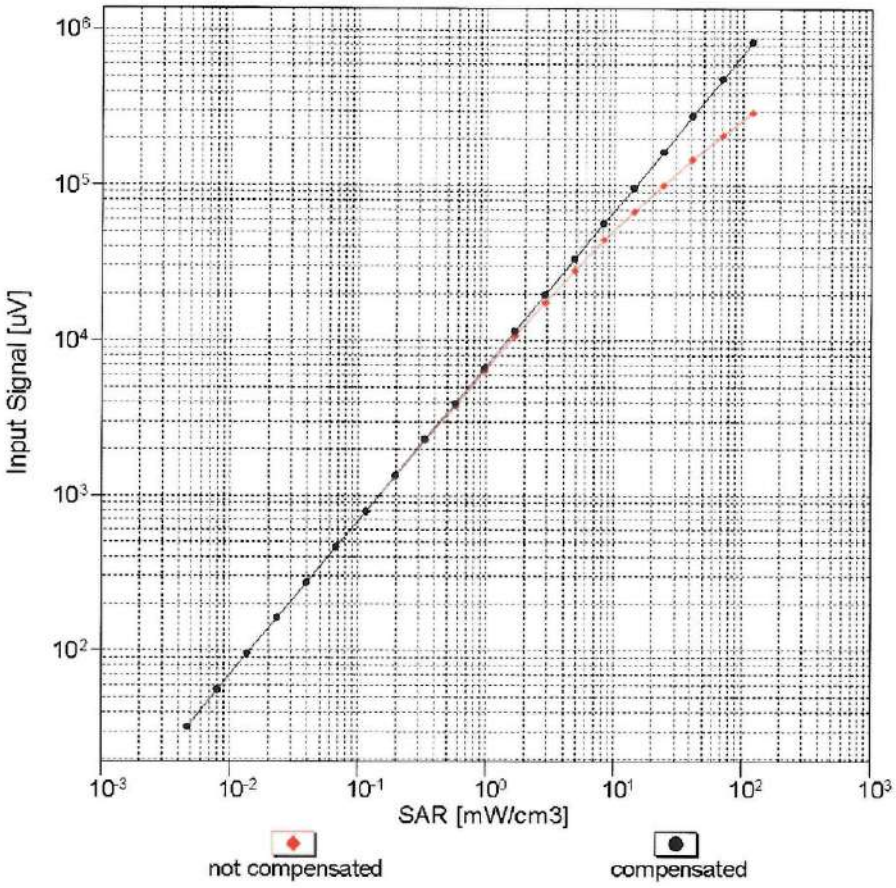
f=1800 MHz,R22

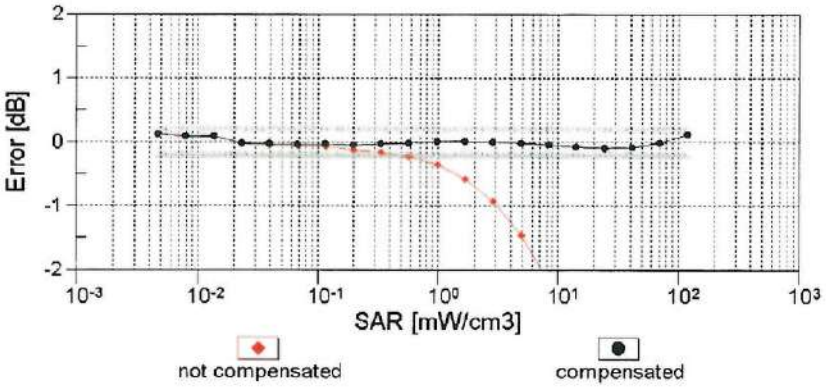




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

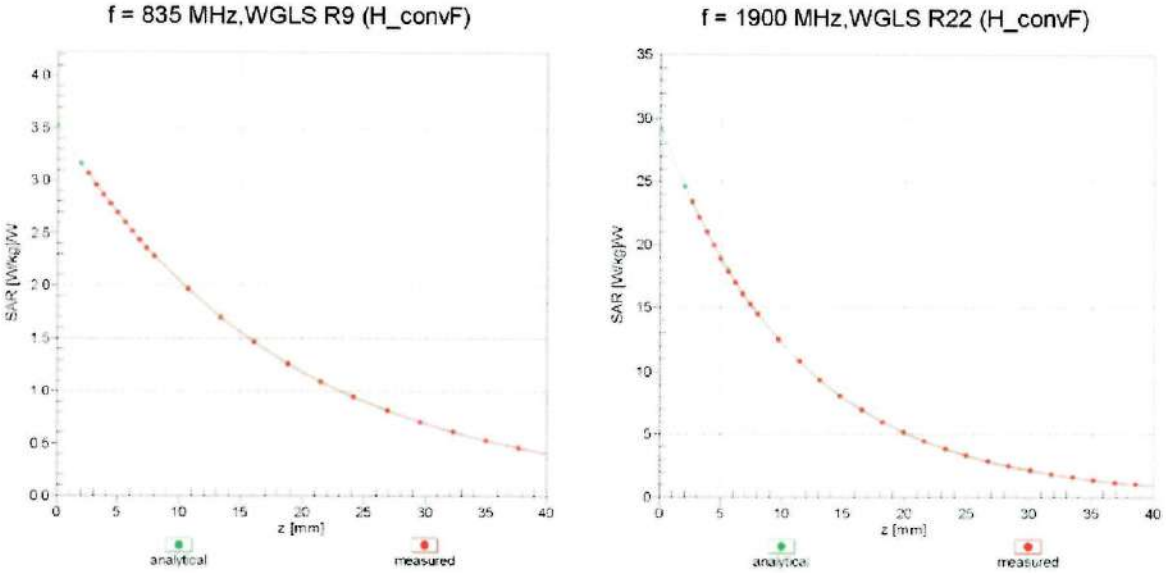
Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)





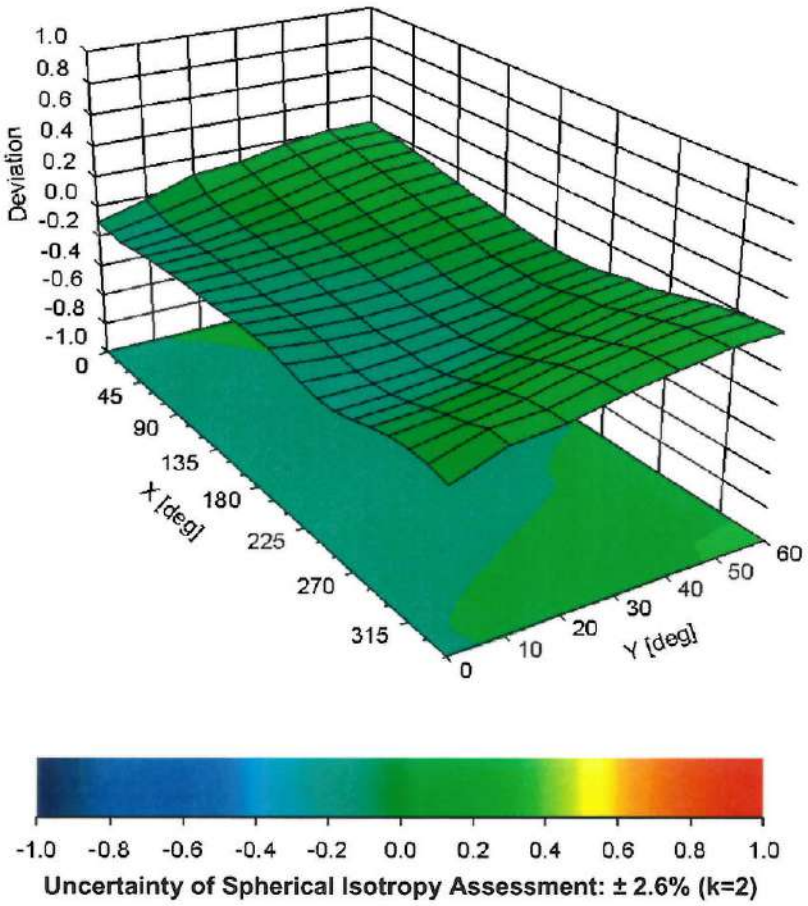
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-24.7
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

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

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

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

Accreditation No.: SCS 0108

Client **Sporton**

Certificate No: ES3-3270_Sep18

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3270
Calibration procedure(s)	QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	September 24, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-18 (No. 217-02682)	Apr-19
Reference Probe ES3DV2	SN: 3013	30-Dec-17 (No. ES3-3013_Dec17)	Dec-18
DAE4	SN: 660	21-Dec-17 (No. DAE4-660_Dec17)	Dec-18
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-17)	In house check: Oct-18

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

Issued: September 29, 2018

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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe ES3DV3

SN:3270

Manufactured: February 25, 2010
Calibrated: September 24, 2018

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

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.08	1.17	1.19	± 10.1 %
DCP (mV)[B]	101.7	104.7	101.9	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	191.7	±3.3 %
		Y	0.0	0.0	1.0		209.4	
		Z	0.0	0.0	1.0		199.9	

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

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

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

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	6.56	6.56	6.56	0.50	1.55	± 12.0 %
835	41.5	0.90	6.39	6.39	6.39	0.43	1.56	± 12.0 %
900	41.5	0.97	6.20	6.20	6.20	0.44	1.54	± 12.0 %
1750	40.1	1.37	5.42	5.42	5.42	0.40	1.75	± 12.0 %
1900	40.0	1.40	5.17	5.17	5.17	0.80	1.16	± 12.0 %
2000	40.0	1.40	5.13	5.13	5.13	0.56	1.46	± 12.0 %
2100	39.8	1.49	5.03	5.03	5.03	0.80	1.23	± 12.0 %
2450	39.2	1.80	4.60	4.60	4.60	0.74	1.30	± 12.0 %
2600	39.0	1.96	4.43	4.43	4.43	0.80	1.31	± 12.0 %

[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: ES3DV3 - SN:3270

Calibration Parameter Determined in Body Tissue Simulating Media

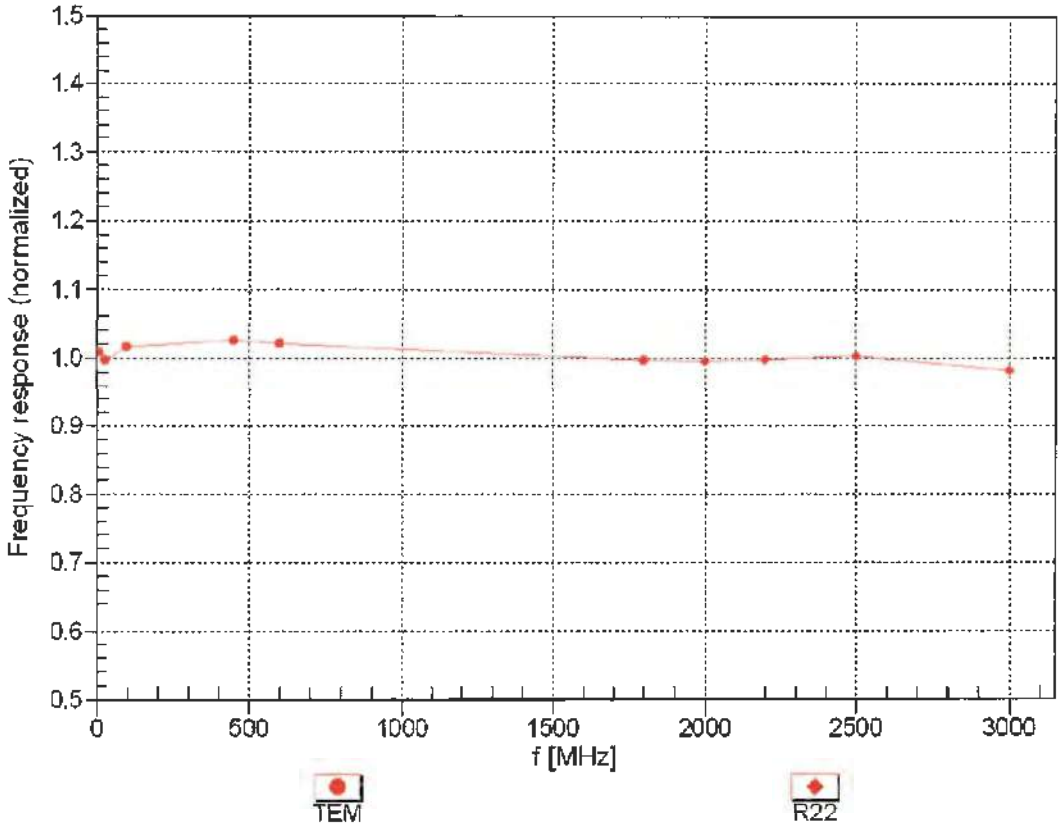
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	6.29	6.29	6.29	0.41	1.65	± 12.0 %
835	55.2	0.97	6.11	6.11	6.11	0.38	1.70	± 12.0 %
1750	53.4	1.49	4.97	4.97	4.97	0.58	1.49	± 12.0 %
1900	53.3	1.52	4.77	4.77	4.77	0.55	1.56	± 12.0 %
2450	52.7	1.95	4.36	4.36	4.36	0.80	1.25	± 12.0 %
2600	52.5	2.16	4.24	4.24	4.24	0.85	1.20	± 12.0 %

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

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

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

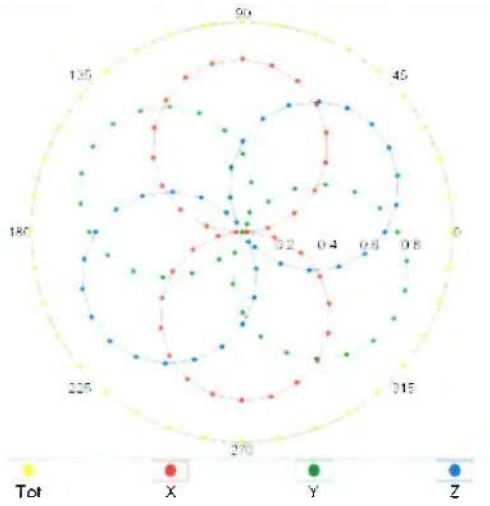
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



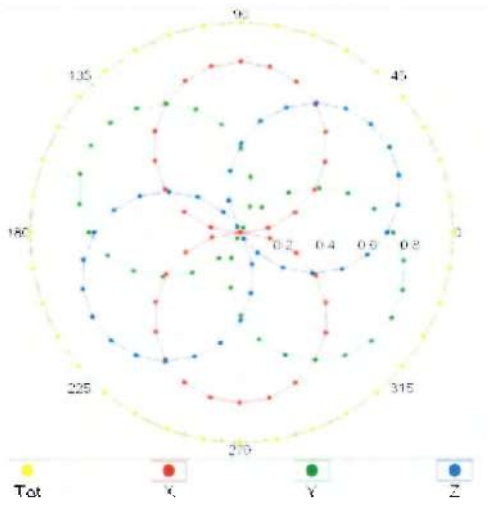
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

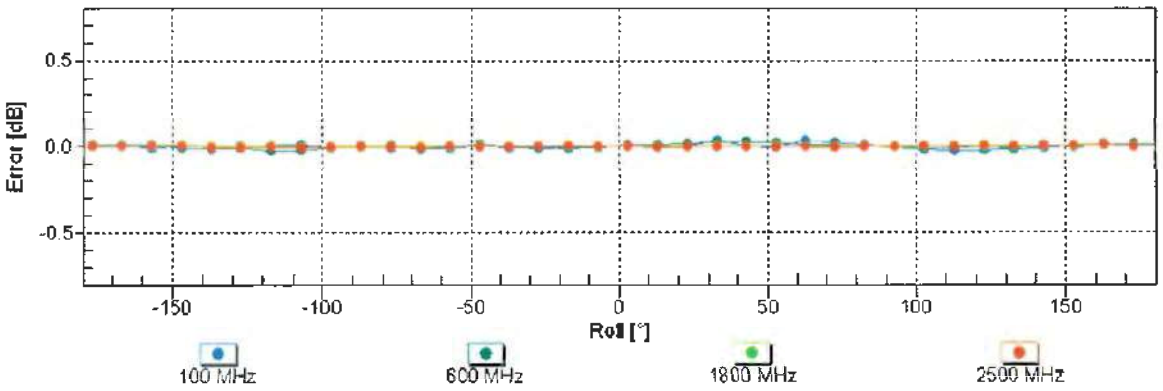
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



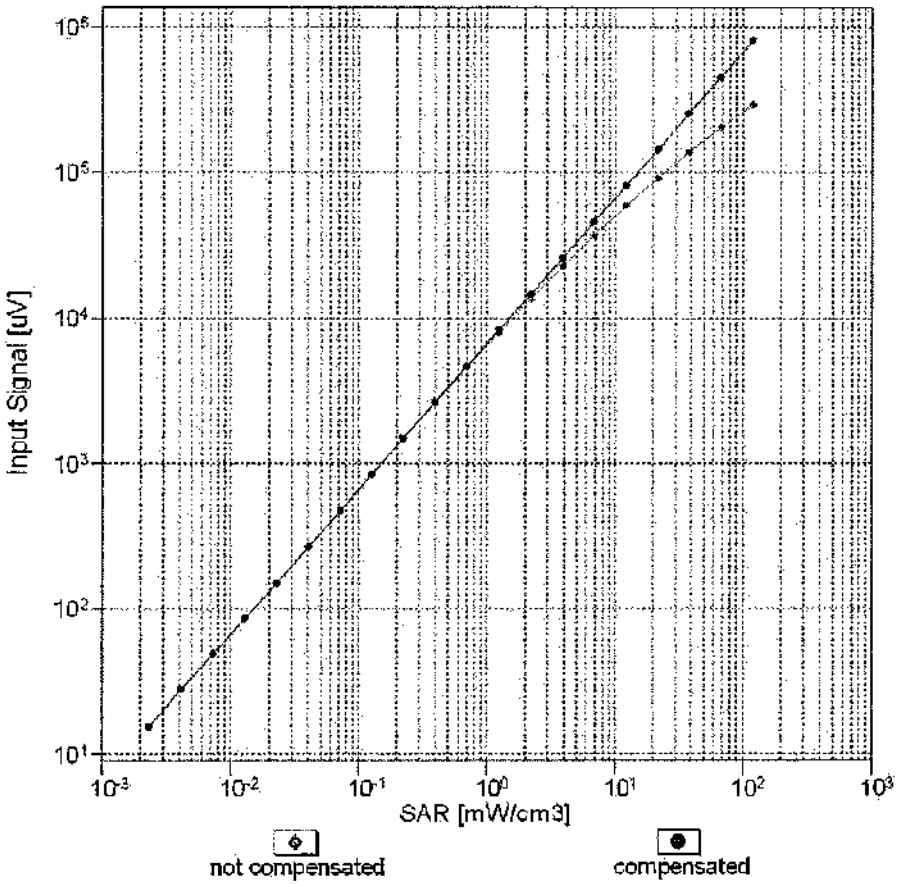
f=1800 MHz,R22

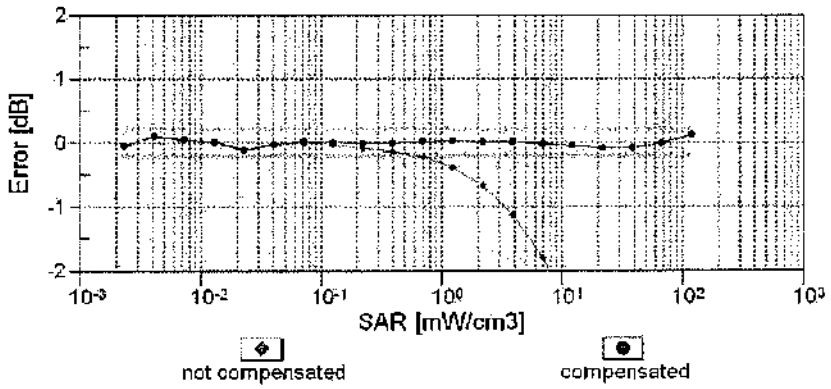




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)

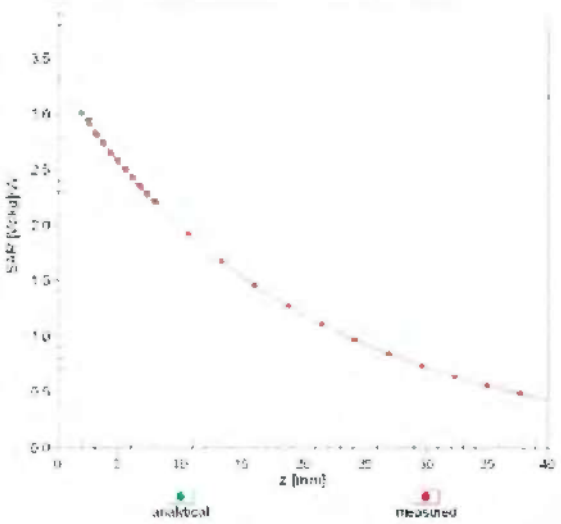




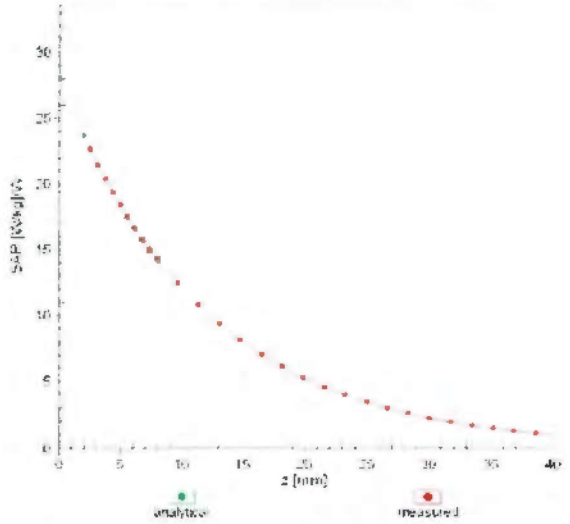
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

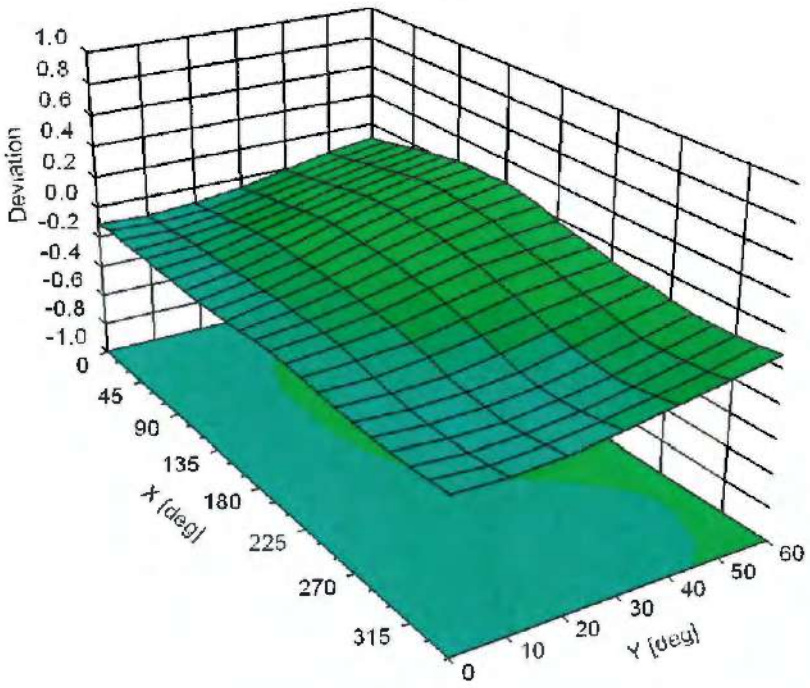


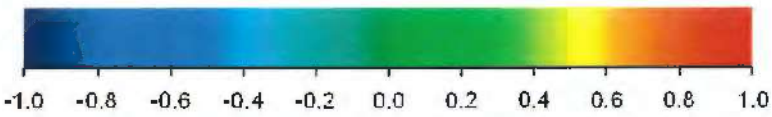
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-17.1
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

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

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Accreditation No.: SCS 0108

Client **Sporton**

Certificate No: EX3-3931_Sep18/2

CALIBRATION CERTIFICATE (Replacement of No: EX3-3931_Sep18)

Object	EX3DV4 - SN:3931
Calibration procedure(s)	QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	September 27, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-18 (No. 217-02682)	Apr-19
Reference Probe ES3DV2	SN: 3013	30-Dec-17 (No. ES3-3013_Dec17)	Dec-18
DAE4	SN: 660	21-Dec-17 (No. DAE4-660_Dec17)	Dec-18
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-17)	In house check: Oct-18

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

Issued: October 25, 2018

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:3931

Manufactured: July 24, 2013
Calibrated: September 27, 2018

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

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.50	0.55	0.49	± 10.1 %
DCP (mV)[B]	100.9	100.9	100.9	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	139.0	±3.0 %
		Y	0.0	0.0	1.0		152.6	
		Z	0.0	0.0	1.0		139.0	

Note: For details on UID parameters see Appendix.

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 $ms.V^{-2}$	T2 $ms.V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
X	38.65	296.1	37.26	12.16	0.622	5.089	0.000	0.379	1.012
Y	57.59	425.2	35.06	26.36	1.062	5.100	1.675	0.401	1.010
Z	50.51	384.9	36.83	20.98	1.058	5.100	0.000	0.641	1.011

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

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

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

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	10.54	10.54	10.54	0.56	0.86	± 12.0 %
835	41.5	0.90	10.07	10.07	10.07	0.49	0.85	± 12.0 %
900	41.5	0.97	9.87	9.87	9.87	0.45	0.84	± 12.0 %
1450	40.5	1.20	8.75	8.75	8.75	0.32	0.80	± 12.0 %
1750	40.1	1.37	8.62	8.62	8.62	0.38	0.80	± 12.0 %
1900	40.0	1.40	8.33	8.33	8.33	0.31	0.80	± 12.0 %
2000	40.0	1.40	8.18	8.18	8.18	0.34	0.84	± 12.0 %
2300	39.5	1.67	7.83	7.83	7.83	0.31	0.89	± 12.0 %
2450	39.2	1.80	7.54	7.54	7.54	0.35	0.81	± 12.0 %
2600	39.0	1.96	7.30	7.30	7.30	0.37	0.85	± 12.0 %
3500	37.9	2.91	7.20	7.20	7.20	0.25	1.20	± 14.0 %
3700	37.7	3.12	7.09	7.09	7.09	0.25	1.20	± 14.0 %
5250	35.9	4.71	5.12	5.12	5.12	0.40	1.80	± 14.0 %
5600	35.5	5.07	4.47	4.47	4.47	0.40	1.80	± 14.0 %
5750	35.4	5.22	4.72	4.72	4.72	0.40	1.80	± 14.0 %

[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 up to 6 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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

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

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	10.17	10.17	10.17	0.50	0.80	± 12.0 %
835	55.2	0.97	9.92	9.92	9.92	0.47	0.80	± 12.0 %
1450	54.0	1.30	8.53	8.53	8.53	0.34	0.80	± 12.0 %
1750	53.4	1.49	8.40	8.40	8.40	0.40	0.84	± 12.0 %
1900	53.3	1.52	8.00	8.00	8.00	0.32	0.97	± 12.0 %
2300	52.9	1.81	7.87	7.87	7.87	0.38	0.88	± 12.0 %
2450	52.7	1.95	7.56	7.56	7.56	0.36	0.87	± 12.0 %
2600	52.5	2.16	7.43	7.43	7.43	0.25	1.05	± 12.0 %
3500	51.3	3.31	7.32	7.32	7.32	0.23	1.20	± 14.0 %
3700	51.0	3.55	6.96	6.96	6.96	0.25	1.20	± 14.0 %
5250	48.9	5.36	4.40	4.40	4.40	0.50	1.90	± 14.0 %
5600	48.5	5.77	3.82	3.82	3.82	0.50	1.90	± 14.0 %
5750	48.3	5.94	4.11	4.11	4.11	0.50	1.90	± 14.0 %

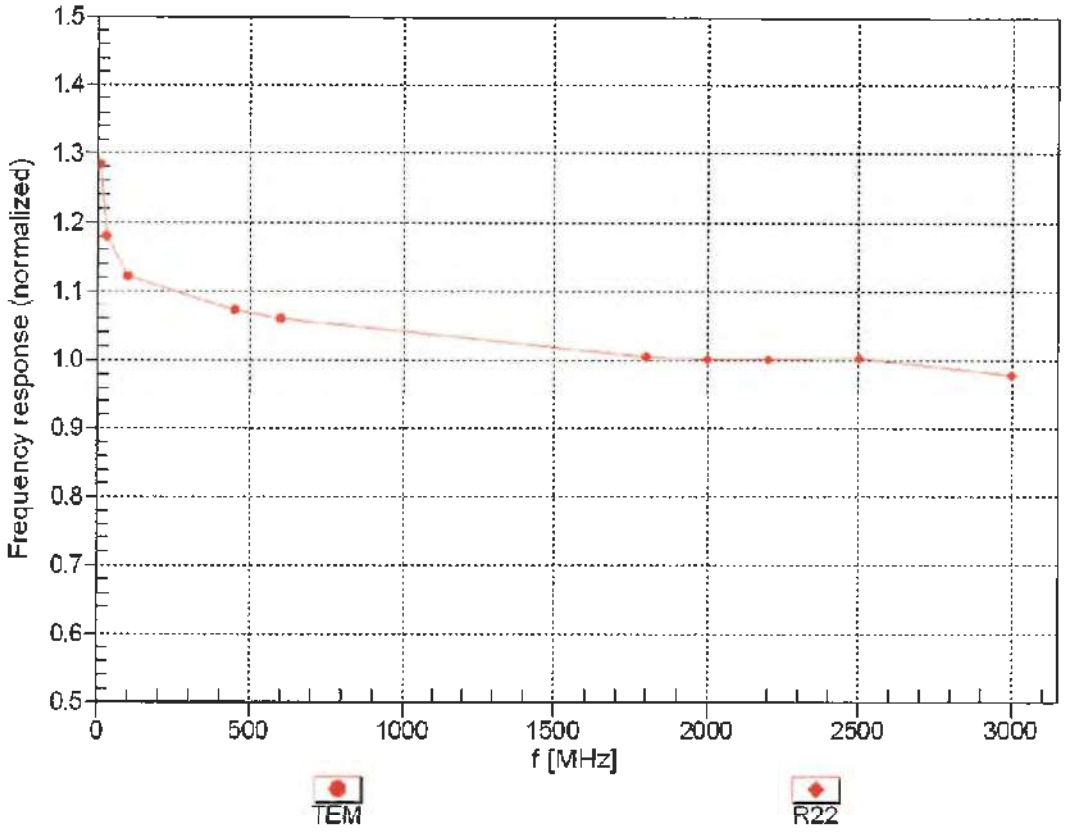
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz 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 up to 6 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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

Frequency Response of E-Field

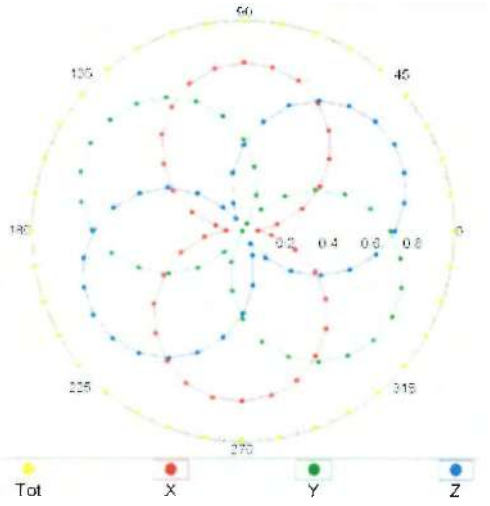
(TEM-Cell:ifi110 EXX, Waveguide: R22)



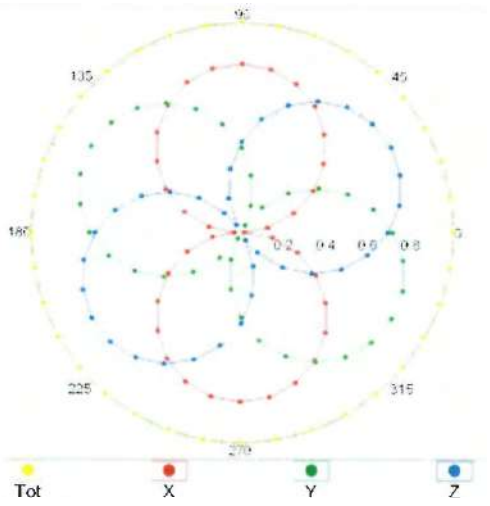
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

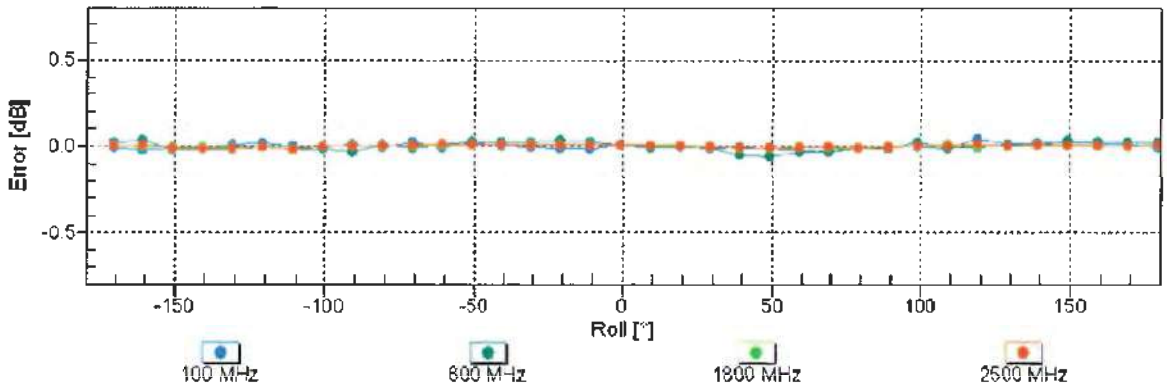
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



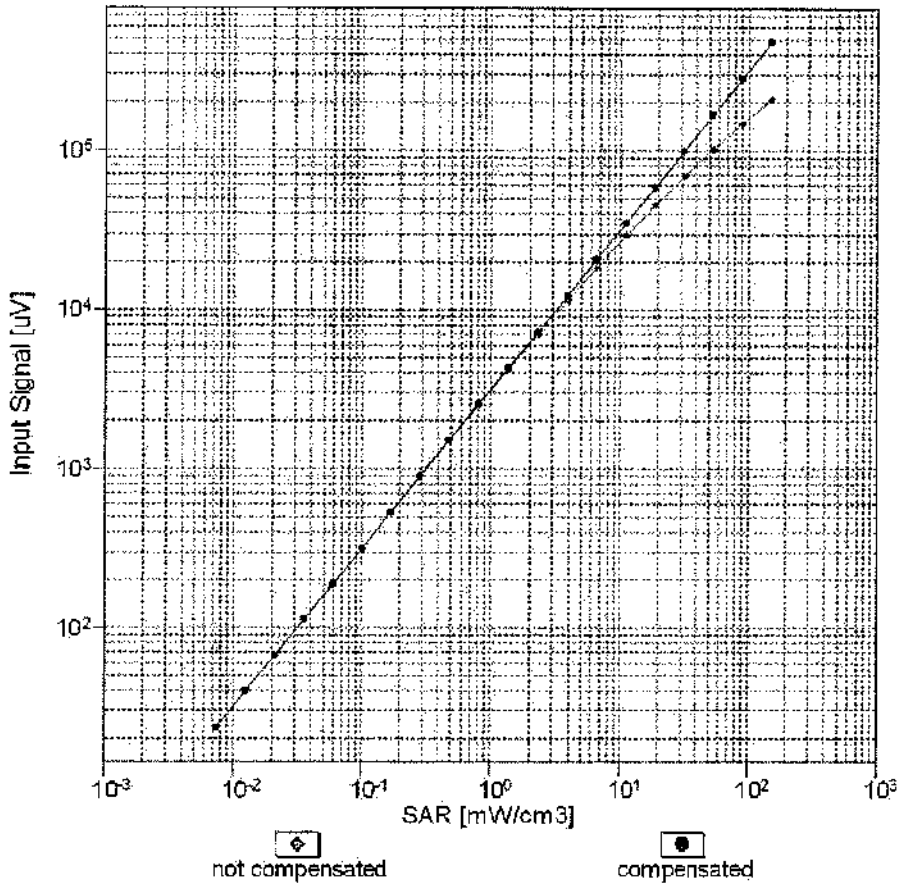
f=1800 MHz,R22

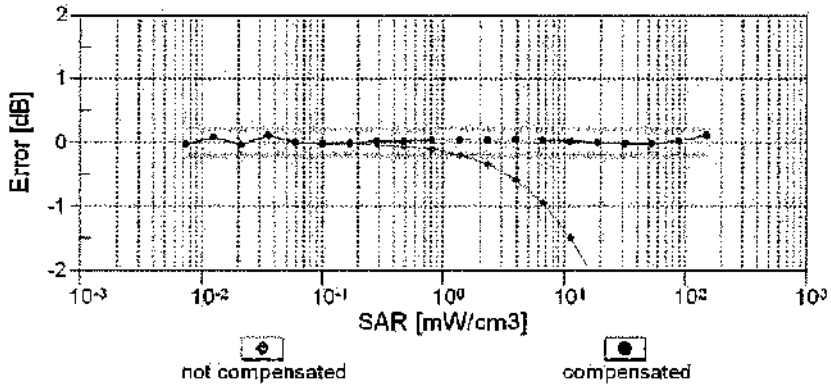




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)

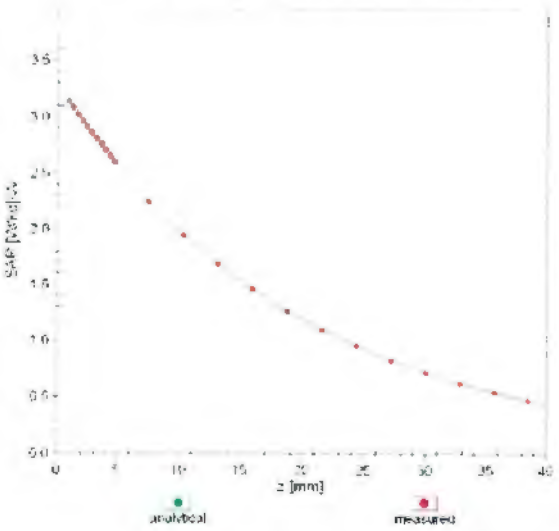




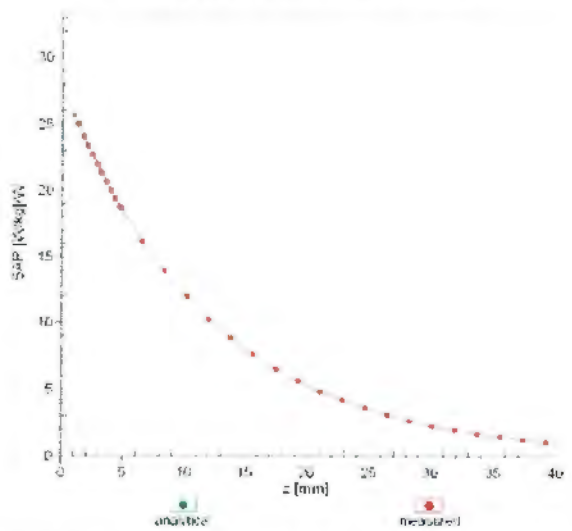
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

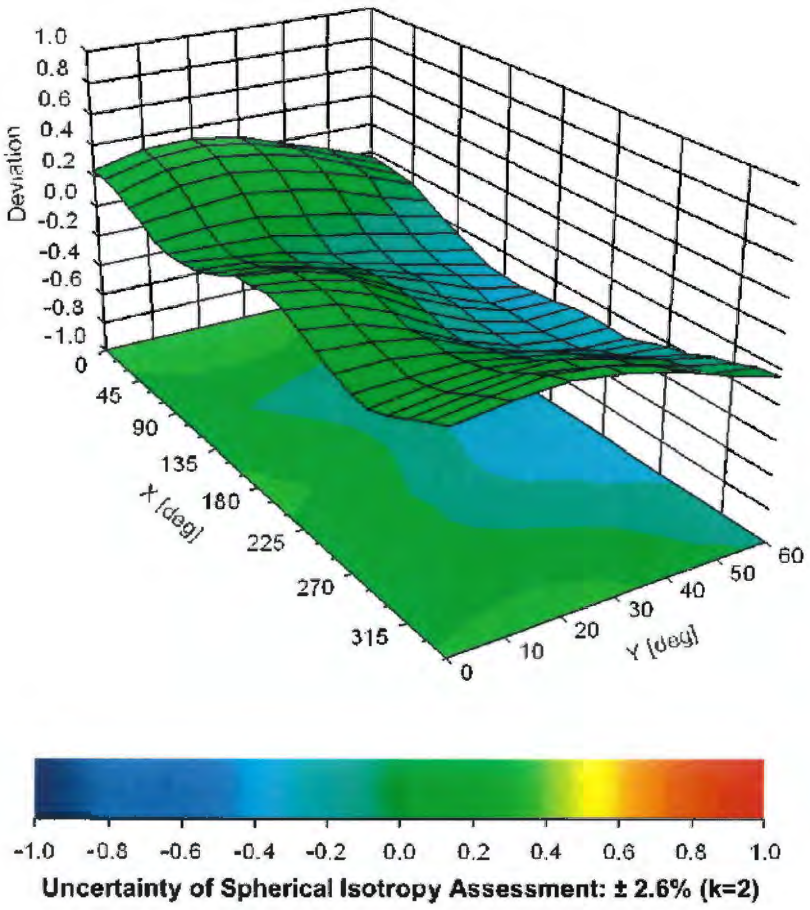


f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	129.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Appendix: Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max Unc[E] (k=2)
0	CW	X	0.00	0.00	1.00	0.00	139.0	± 3.0 %
		Y	0.00	0.00	1.00		152.6	
		Z	0.00	0.00	1.00		139.0	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	2.98	68.78	11.88	10.00	20.0	± 9.6 %
		Y	11.08	83.23	18.45		20.0	
		Z	3.82	70.83	13.35		20.0	
10011-CAB	UMTS-FDD (WCDMA)	X	0.94	67.17	14.82	0.00	150.0	± 9.6 %
		Y	1.26	71.34	17.62		150.0	
		Z	0.88	65.57	13.77		150.0	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	1.12	63.89	15.26	0.41	150.0	± 9.6 %
		Y	1.29	65.84	16.66		150.0	
		Z	1.12	63.61	14.84		150.0	
10013-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	4.76	66.84	17.22	1.46	150.0	± 9.6 %
		Y	5.04	67.03	17.41		150.0	
		Z	4.89	66.66	17.10		150.0	
10021-DAC	GSM-FDD (TDMA, GMSK)	X	100.00	116.20	28.42	9.39	50.0	± 9.6 %
		Y	100.00	117.71	30.18		50.0	
		Z	100.00	117.04	29.42		50.0	
10023-DAC	GPRS-FDD (TDMA, GMSK, TN 0)	X	100.00	115.58	28.19	9.57	50.0	± 9.6 %
		Y	100.00	117.65	30.20		50.0	
		Z	100.00	116.89	29.40		50.0	
10024-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	100.00	116.04	27.20	6.56	60.0	± 9.6 %
		Y	100.00	115.58	26.22		60.0	
		Z	100.00	113.80	25.92		60.0	
10025-DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	X	4.34	71.41	27.04	12.57	50.0	± 9.6 %
		Y	31.37	129.63	49.80		50.0	
		Z	4.85	72.44	26.90		50.0	
10026-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	8.70	92.05	33.25	9.56	60.0	± 9.6 %
		Y	37.55	123.82	42.78		60.0	
		Z	14.17	100.29	35.20		60.0	
10027-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	100.00	117.42	26.97	4.80	80.0	± 9.6 %
		Y	100.00	115.63	27.48		80.0	
		Z	100.00	112.45	25.54		80.0	
10028-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	100.00	119.60	27.12	3.55	100.0	± 9.6 %
		Y	100.00	117.03	27.40		100.0	
		Z	100.00	111.73	24.51		100.0	
10029-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	5.51	81.28	27.79	7.80	80.0	± 9.6 %
		Y	16.20	102.62	34.91		80.0	
		Z	6.72	88.93	29.95		80.0	
10030-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	X	100.00	114.20	25.86	5.30	70.0	± 9.6 %
		Y	100.00	114.49	27.26		70.0	
		Z	100.00	111.66	25.48		70.0	
10031-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	X	100.00	111.64	22.30	1.88	100.0	± 9.6 %
		Y	100.00	120.00	27.22		100.0	
		Z	100.00	105.58	20.52		100.0	

10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	100.00	106.66	19.36	1.17	100.0	± 9.6 %
		Y	100.00	129.09	29.86		100.0	
		Z	100.00	100.41	17.51		100.0	
10033-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	X	100.00	127.15	33.55	5.30	70.0	± 9.6 %
		Y	100.00	127.76	34.93		70.0	
		Z	59.15	117.88	31.76		70.0	
10034-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	X	6.05	85.97	20.30	1.88	100.0	± 9.6 %
		Y	37.67	113.78	30.06		100.0	
		Z	5.46	83.88	20.33		100.0	
10035-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	X	2.54	75.80	16.41	1.17	100.0	± 9.6 %
		Y	9.62	95.00	24.82		100.0	
		Z	2.62	75.26	16.92		100.0	
10036-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	X	100.00	127.67	33.78	5.30	70.0	± 9.6 %
		Y	100.00	128.07	35.08		70.0	
		Z	100.00	126.41	33.87		70.0	
10037-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	X	4.89	83.37	19.46	1.88	100.0	± 9.6 %
		Y	33.54	112.05	29.58		100.0	
		Z	4.98	82.71	19.90		100.0	
10038-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	X	2.63	76.52	16.82	1.17	100.0	± 9.6 %
		Y	10.34	96.47	25.37		100.0	
		Z	2.70	75.90	17.28		100.0	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	1.27	68.24	12.65	0.00	150.0	± 9.6 %
		Y	2.96	79.02	19.36		150.0	
		Z	1.43	68.49	13.67		150.0	
10042-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	X	100.00	111.62	25.49	7.78	50.0	± 9.6 %
		Y	100.00	113.56	27.46		50.0	
		Z	100.00	111.63	26.11		50.0	
10044-CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	X	0.05	121.01	9.03	0.00	150.0	± 9.6 %
		Y	0.00	110.84	2.05		150.0	
		Z	0.11	122.12	11.56		150.0	
10048-CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	X	100.00	113.04	28.58	13.80	25.0	± 9.6 %
		Y	100.00	119.61	32.43		25.0	
		Z	100.00	118.75	31.63		25.0	
10049-CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	X	100.00	114.11	27.88	10.79	40.0	± 9.6 %
		Y	100.00	117.92	30.63		40.0	
		Z	100.00	117.10	29.81		40.0	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	100.00	123.55	33.20	9.03	50.0	± 9.6 %
		Y	83.61	121.90	34.13		50.0	
		Z	34.13	106.38	29.51		50.0	
10058-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	4.31	76.36	24.89	6.55	100.0	± 9.6 %
		Y	10.05	91.97	30.43		100.0	
		Z	6.38	82.59	26.75		100.0	
10059-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	X	1.17	65.20	16.03	0.61	110.0	± 9.6 %
		Y	1.45	68.25	17.88		110.0	
		Z	1.21	65.23	15.72		110.0	
10060-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	X	100.00	139.91	36.29	1.30	110.0	± 9.6 %
		Y	100.00	136.64	35.69		110.0	
		Z	100.00	130.57	32.58		110.0	

10061-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	X	3.96	87.39	25.12	2.04	110.0	± 9.6 %
		Y	46.99	126.16	35.72		110.0	
		Z	6.52	92.09	25.74		110.0	
10062-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	X	4.53	66.72	16.56	0.49	100.0	± 9.6 %
		Y	4.82	66.95	16.78		100.0	
		Z	4.65	66.50	16.42		100.0	
10063-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	X	4.55	66.84	16.68	0.72	100.0	± 9.6 %
		Y	4.85	67.09	16.91		100.0	
		Z	4.68	66.63	16.54		100.0	
10064-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	X	4.81	67.07	16.90	0.86	100.0	± 9.6 %
		Y	5.17	67.39	17.16		100.0	
		Z	4.98	66.94	16.80		100.0	
10065-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	X	4.69	66.98	17.03	1.21	100.0	± 9.6 %
		Y	5.05	67.38	17.31		100.0	
		Z	4.87	66.91	16.95		100.0	
10066-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	X	4.71	67.01	17.21	1.46	100.0	± 9.6 %
		Y	5.09	67.45	17.51		100.0	
		Z	4.90	66.98	17.15		100.0	
10067-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	X	5.02	67.31	17.72	2.04	100.0	± 9.6 %
		Y	5.38	67.54	17.93		100.0	
		Z	5.20	67.17	17.62		100.0	
10068-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	X	5.06	67.27	17.92	2.55	100.0	± 9.6 %
		Y	5.48	67.81	18.26		100.0	
		Z	5.28	67.34	17.91		100.0	
10069-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	X	5.13	67.31	18.12	2.67	100.0	± 9.6 %
		Y	5.55	67.71	18.42		100.0	
		Z	5.36	67.31	18.09		100.0	
10071-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	X	4.86	66.95	17.55	1.99	100.0	± 9.6 %
		Y	5.16	67.19	17.76		100.0	
		Z	5.00	66.81	17.45		100.0	
10072-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	X	4.84	67.27	17.79	2.30	100.0	± 9.6 %
		Y	5.19	67.69	18.07		100.0	
		Z	5.01	67.24	17.72		100.0	
10073-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	X	4.91	67.50	18.17	2.83	100.0	± 9.6 %
		Y	5.28	67.94	18.45		100.0	
		Z	5.10	67.48	18.10		100.0	
10074-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	X	4.92	67.45	18.34	3.30	100.0	± 9.6 %
		Y	5.28	67.91	18.67		100.0	
		Z	5.10	67.44	18.29		100.0	
10075-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	X	4.95	67.53	18.64	3.82	90.0	± 9.6 %
		Y	5.37	68.27	19.11		90.0	
		Z	5.17	67.69	18.69		90.0	
10076-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	X	4.99	67.38	18.81	4.15	90.0	± 9.6 %
		Y	5.36	67.98	19.19		90.0	
		Z	5.18	67.46	18.80		90.0	
10077-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	X	5.02	67.47	18.92	4.30	90.0	± 9.6 %
		Y	5.39	68.05	19.29		90.0	
		Z	5.21	67.53	18.89		90.0	

10081-CAB	CDMA2000 (1xRTT, RC3)	X	0.60	63.29	9.66	0.00	150.0	± 9.6 %
		Y	1.22	71.29	15.97		150.0	
		Z	0.68	63.58	10.65		150.0	
10082-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	X	0.71	60.00	4.51	4.77	80.0	± 9.6 %
		Y	1.31	61.13	6.36		80.0	
		Z	0.98	60.00	5.16		80.0	
10090-DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	100.00	116.12	27.26	6.56	60.0	± 9.6 %
		Y	100.00	115.65	28.27		60.0	
		Z	100.00	113.91	26.98		60.0	
10097-CAB	UMTS-FDD (HSDPA)	X	1.75	67.93	15.43	0.00	150.0	± 9.6 %
		Y	1.98	69.21	16.82		150.0	
		Z	1.68	66.48	14.81		150.0	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	1.72	67.87	15.40	0.00	150.0	± 9.6 %
		Y	1.95	69.21	16.81		150.0	
		Z	1.64	66.42	14.77		150.0	
10099-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	8.77	92.21	33.31	9.56	60.0	± 9.6 %
		Y	37.62	123.82	42.77		60.0	
		Z	14.25	100.38	35.23		60.0	
10100-CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	2.95	69.93	16.56	0.00	150.0	± 9.6 %
		Y	3.51	72.25	17.65		150.0	
		Z	2.95	69.35	16.01		150.0	
10101-CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	3.09	67.24	15.81	0.00	150.0	± 9.6 %
		Y	3.41	68.38	16.46		150.0	
		Z	3.14	66.98	15.52		150.0	
10102-CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	3.20	67.25	15.92	0.00	150.0	± 9.6 %
		Y	3.50	68.25	16.50		150.0	
		Z	3.25	66.99	15.64		150.0	
10103-CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	6.53	77.38	21.49	3.98	65.0	± 9.6 %
		Y	9.35	81.09	22.54		65.0	
		Z	7.56	78.04	21.34		65.0	
10104-CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	6.03	73.85	20.74	3.98	65.0	± 9.6 %
		Y	8.42	77.94	22.21		65.0	
		Z	7.15	75.45	21.13		65.0	
10105-CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	5.88	73.18	20.74	3.98	65.0	± 9.6 %
		Y	8.11	77.21	22.22		65.0	
		Z	6.77	74.33	20.96		65.0	
10108-CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	2.55	69.28	16.40	0.00	150.0	± 9.6 %
		Y	3.06	71.36	17.47		150.0	
		Z	2.58	68.60	15.82		150.0	
10109-CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	2.73	67.18	15.67	0.00	150.0	± 9.6 %
		Y	3.08	68.26	16.44		150.0	
		Z	2.79	66.77	15.38		150.0	
10110-CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	2.04	68.48	15.89	0.00	150.0	± 9.6 %
		Y	2.51	70.47	17.20		150.0	
		Z	2.08	67.62	15.36		150.0	
10111-CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	2.46	68.29	15.90	0.00	150.0	± 9.6 %
		Y	2.81	69.17	16.89		150.0	
		Z	2.49	67.39	15.56		150.0	

10112-CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	2.86	67.23	15.76	0.00	150.0	± 9.6 %
		Y	3.19	68.14	16.44		150.0	
		Z	2.92	66.79	15.47		150.0	
10113-CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	2.61	68.49	16.05	0.00	150.0	± 9.6 %
		Y	2.96	69.17	16.95		150.0	
		Z	2.65	67.58	15.73		150.0	
10114-CAC	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	X	4.97	67.04	16.43	0.00	150.0	± 9.6 %
		Y	5.20	67.34	16.55		150.0	
		Z	5.06	66.93	16.25		150.0	
10115-CAC	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	X	5.23	67.13	16.48	0.00	150.0	± 9.6 %
		Y	5.55	67.61	16.69		150.0	
		Z	5.38	67.13	16.37		150.0	
10116-CAC	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	X	5.06	67.25	16.46	0.00	150.0	± 9.6 %
		Y	5.32	67.60	16.60		150.0	
		Z	5.17	67.15	16.29		150.0	
10117-CAC	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	4.96	66.99	16.42	0.00	150.0	± 9.6 %
		Y	5.20	67.33	16.57		150.0	
		Z	5.03	66.81	16.21		150.0	
10118-CAC	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	X	5.31	67.35	16.60	0.00	150.0	± 9.6 %
		Y	5.62	67.76	16.77		150.0	
		Z	5.46	67.35	16.49		150.0	
10119-CAC	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	X	5.05	67.24	16.46	0.00	150.0	± 9.6 %
		Y	5.29	67.53	16.59		150.0	
		Z	5.14	67.08	16.27		150.0	
10140-CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	3.22	67.26	15.83	0.00	150.0	± 9.6 %
		Y	3.55	68.25	16.42		150.0	
		Z	3.28	66.98	15.56		150.0	
10141-CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	3.35	67.41	16.03	0.00	150.0	± 9.6 %
		Y	3.67	68.27	16.55		150.0	
		Z	3.41	67.11	15.75		150.0	
10142-CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	1.79	68.36	15.22	0.00	150.0	± 9.6 %
		Y	2.31	70.72	17.14		150.0	
		Z	1.84	67.40	14.90		150.0	
10143-CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	2.27	68.69	15.09	0.00	150.0	± 9.6 %
		Y	2.75	70.30	16.96		150.0	
		Z	2.31	67.82	15.12		150.0	
10144-CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	1.97	65.81	13.13	0.00	150.0	± 9.6 %
		Y	2.50	67.92	15.36		150.0	
		Z	2.12	65.74	13.60		150.0	
10145-CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	0.81	61.59	8.37	0.00	150.0	± 9.6 %
		Y	1.71	69.54	14.99		150.0	
		Z	1.08	63.61	10.71		150.0	
10146-CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	1.28	62.94	9.00	0.00	150.0	± 9.6 %
		Y	5.15	78.53	17.94		150.0	
		Z	2.09	67.10	12.37		150.0	
10147-CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	1.43	64.11	9.73	0.00	150.0	± 9.6 %
		Y	8.78	85.92	20.66		150.0	
		Z	2.57	69.71	13.72		150.0	

10149-CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	2.74	67.24	15.73	0.00	150.0	± 9.6 %
		Y	3.09	68.33	16.48		150.0	
		Z	2.80	66.83	15.43		150.0	
10150-CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	2.87	67.29	15.80	0.00	150.0	± 9.6 %
		Y	3.20	68.20	16.48		150.0	
		Z	2.93	66.85	15.51		150.0	
10151-CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	6.97	80.39	22.75	3.98	65.0	± 9.6 %
		Y	10.34	84.28	23.86		65.0	
		Z	8.19	80.94	22.55		65.0	
10152-CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	5.60	74.01	20.43	3.98	65.0	± 9.6 %
		Y	8.12	78.42	22.19		65.0	
		Z	6.73	75.57	20.90		65.0	
10153-CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	6.02	75.20	21.32	3.98	65.0	± 9.6 %
		Y	8.52	79.24	22.88		65.0	
		Z	7.17	76.65	21.72		65.0	
10154-CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	2.08	68.90	16.15	0.00	150.0	± 9.6 %
		Y	2.58	71.01	17.52		150.0	
		Z	2.12	68.04	15.62		150.0	
10155-CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	2.47	68.33	15.92	0.00	150.0	± 9.6 %
		Y	2.81	69.17	16.90		150.0	
		Z	2.49	67.40	15.58		150.0	
10156-CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	1.61	68.09	14.65	0.00	150.0	± 9.6 %
		Y	2.21	71.29	17.26		150.0	
		Z	1.67	67.31	14.59		150.0	
10157-CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	1.77	65.98	12.81	0.00	150.0	± 9.6 %
		Y	2.39	68.95	15.70		150.0	
		Z	1.93	66.07	13.49		150.0	
10158-CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	2.62	68.58	16.11	0.00	150.0	± 9.6 %
		Y	2.97	69.23	17.00		150.0	
		Z	2.65	67.64	15.78		150.0	
10159-CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	1.85	66.34	13.03	0.00	150.0	± 9.6 %
		Y	2.52	69.48	16.02		150.0	
		Z	2.04	66.51	13.78		150.0	
10160-CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	2.61	68.71	16.27	0.00	150.0	± 9.6 %
		Y	2.95	69.76	17.00		150.0	
		Z	2.62	67.86	15.72		150.0	
10161-CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	2.76	67.26	15.69	0.00	150.0	± 9.6 %
		Y	3.10	68.13	16.44		150.0	
		Z	2.82	66.76	15.43		150.0	
10162-CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	2.87	67.48	15.83	0.00	150.0	± 9.6 %
		Y	3.20	68.18	16.50		150.0	
		Z	2.93	66.91	15.55		150.0	
10166-CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	3.30	69.58	19.60	3.01	150.0	± 9.6 %
		Y	4.14	71.67	20.29		150.0	
		Z	3.63	69.62	19.19		150.0	
10167-CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	3.88	72.31	20.00	3.01	150.0	± 9.6 %
		Y	5.71	76.22	21.32		150.0	
		Z	4.48	72.32	19.53		150.0	

10168-CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	4.42	75.29	21.72	3.01	150.0	± 9.6 %
		Y	6.46	78.84	22.71		150.0	
		Z	5.02	74.79	20.98		150.0	
10169-CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	2.60	67.67	18.62	3.01	150.0	± 9.6 %
		Y	3.98	74.14	21.35		150.0	
		Z	3.08	69.29	19.03		150.0	
10170-CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	3.29	73.12	21.22	3.01	150.0	± 9.6 %
		Y	7.50	85.25	25.20		150.0	
		Z	4.29	75.21	21.34		150.0	
10171-AAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	2.72	69.05	18.28	3.01	150.0	± 9.6 %
		Y	5.42	78.29	21.61		150.0	
		Z	3.47	70.74	18.42		150.0	
10172-CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	7.39	92.58	30.37	6.02	65.0	± 9.6 %
		Y	100.00	137.09	41.29		65.0	
		Z	16.12	102.43	32.16		65.0	
10173-CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	18.98	107.95	33.23	6.02	65.0	± 9.6 %
		Y	100.00	128.01	36.62		65.0	
		Z	31.86	109.96	32.40		65.0	
10174-CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	15.84	102.88	31.03	6.02	65.0	± 9.6 %
		Y	100.00	126.00	35.56		65.0	
		Z	22.82	102.43	29.67		65.0	
10175-CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	2.57	67.38	18.56	3.01	150.0	± 9.6 %
		Y	3.91	73.68	21.05		150.0	
		Z	3.03	68.94	18.76		150.0	
10176-CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	3.29	73.15	21.23	3.01	150.0	± 9.6 %
		Y	7.51	85.28	25.21		150.0	
		Z	4.30	75.23	21.36		150.0	
10177-CAI	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	2.59	67.52	18.65	3.01	150.0	± 9.6 %
		Y	3.96	73.90	21.17		150.0	
		Z	3.06	69.11	18.87		150.0	
10178-CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	3.27	72.97	21.13	3.01	150.0	± 9.6 %
		Y	7.34	84.81	25.02		150.0	
		Z	4.24	74.97	21.22		150.0	
10179-CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	2.98	71.02	19.64	3.01	150.0	± 9.6 %
		Y	6.33	81.48	23.22		150.0	
		Z	3.83	72.79	19.72		150.0	
10180-CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	2.72	69.00	18.24	3.01	150.0	± 9.6 %
		Y	5.38	78.14	21.53		150.0	
		Z	3.46	70.65	18.36		150.0	
10181-CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	2.58	67.50	18.64	3.01	150.0	± 9.6 %
		Y	3.95	73.88	21.16		150.0	
		Z	3.06	69.09	18.86		150.0	
10182-CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	3.26	72.94	21.11	3.01	150.0	± 9.6 %
		Y	7.33	84.78	25.00		150.0	
		Z	4.24	74.94	21.20		150.0	
10183-AAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	2.71	68.98	18.23	3.01	150.0	± 9.6 %
		Y	5.37	78.11	21.52		150.0	
		Z	3.46	70.63	18.35		150.0	

10184-CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	2.59	67.54	18.67	3.01	150.0	± 9.6 %
		Y	3.96	73.93	21.19		150.0	
		Z	3.07	69.13	18.88		150.0	
10185-CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	3.28	73.02	21.15	3.01	150.0	± 9.6 %
		Y	7.38	84.89	25.05		150.0	
		Z	4.26	75.02	21.24		150.0	
10186-AAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	2.73	69.04	18.27	3.01	150.0	± 9.6 %
		Y	5.40	78.21	21.56		150.0	
		Z	3.47	70.70	18.39		150.0	
10187-CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	2.60	67.61	18.74	3.01	150.0	± 9.6 %
		Y	3.97	73.99	21.24		150.0	
		Z	3.08	69.19	18.94		150.0	
10188-CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	3.37	73.64	21.54	3.01	150.0	± 9.6 %
		Y	7.82	86.09	25.58		150.0	
		Z	4.41	75.76	21.66		150.0	
10189-AAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	2.78	69.44	18.55	3.01	150.0	± 9.6 %
		Y	5.60	78.92	21.92		150.0	
		Z	3.55	71.14	18.68		150.0	
10193-CAC	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	X	4.36	66.61	16.11	0.00	150.0	± 9.6 %
		Y	4.63	66.80	16.35		150.0	
		Z	4.46	66.30	15.94		150.0	
10194-CAC	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	X	4.51	66.87	16.24	0.00	150.0	± 9.6 %
		Y	4.82	67.16	16.47		150.0	
		Z	4.63	66.63	16.06		150.0	
10195-CAC	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	X	4.55	66.89	16.26	0.00	150.0	± 9.6 %
		Y	4.86	67.18	16.47		150.0	
		Z	4.67	66.66	16.08		150.0	
10196-CAC	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	4.35	66.62	16.11	0.00	150.0	± 9.6 %
		Y	4.64	66.90	16.39		150.0	
		Z	4.46	66.37	15.96		150.0	
10197-CAC	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	X	4.52	66.88	16.25	0.00	150.0	± 9.6 %
		Y	4.84	67.18	16.48		150.0	
		Z	4.65	66.65	16.08		150.0	
10198-CAC	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	X	4.55	66.90	16.27	0.00	150.0	± 9.6 %
		Y	4.87	67.19	16.49		150.0	
		Z	4.68	66.68	16.09		150.0	
10219-CAC	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	X	4.31	66.65	16.07	0.00	150.0	± 9.6 %
		Y	4.59	66.92	16.36		150.0	
		Z	4.41	66.38	15.92		150.0	
10220-CAC	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	X	4.51	66.84	16.24	0.00	150.0	± 9.6 %
		Y	4.83	67.17	16.47		150.0	
		Z	4.64	66.62	16.07		150.0	
10221-CAC	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	X	4.56	66.84	16.26	0.00	150.0	± 9.6 %
		Y	4.87	67.12	16.47		150.0	
		Z	4.68	66.61	16.08		150.0	
10222-CAC	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	X	4.93	66.96	16.40	0.00	150.0	± 9.6 %
		Y	5.18	67.36	16.57		150.0	
		Z	5.01	66.81	16.20		150.0	

10223-CAC	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	X	5.21	67.20	16.54	0.00	150.0	± 9.6 %
		Y	5.51	67.59	16.70		150.0	
		Z	5.32	67.03	16.34		150.0	
10224-CAC	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	X	4.97	67.07	16.38	0.00	150.0	± 9.6 %
		Y	5.22	67.46	16.55		150.0	
		Z	5.05	66.92	16.18		150.0	
10225-CAB	UMTS-FDD (HSPA+)	X	2.63	66.04	14.94	0.00	150.0	± 9.6 %
		Y	2.93	66.64	15.89		150.0	
		Z	2.71	65.59	14.94		150.0	
10226-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	21.37	110.44	34.04	6.02	65.0	± 9.6 %
		Y	100.00	128.23	36.76		65.0	
		Z	35.56	112.16	33.10		65.0	
10227-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	23.91	110.61	33.32	6.02	65.0	± 9.6 %
		Y	100.00	126.07	35.63		65.0	
		Z	30.60	107.66	31.23		65.0	
10228-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	8.42	95.74	31.56	6.02	65.0	± 9.6 %
		Y	100.00	137.63	41.53		65.0	
		Z	21.64	108.86	34.20		65.0	
10229-CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	19.16	108.10	33.27	6.02	65.0	± 9.6 %
		Y	100.00	128.00	36.62		65.0	
		Z	32.08	110.07	32.43		65.0	
10230-CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	20.97	108.03	32.52	6.02	65.0	± 9.6 %
		Y	100.00	125.89	35.52		65.0	
		Z	27.82	105.85	30.65		65.0	
10231-CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	7.96	94.45	31.04	6.02	65.0	± 9.6 %
		Y	100.00	137.44	41.41		65.0	
		Z	20.00	107.14	33.61		65.0	
10232-CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	19.12	108.07	33.27	6.02	65.0	± 9.6 %
		Y	100.00	128.01	36.62		65.0	
		Z	32.05	110.07	32.43		65.0	
10233-CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	20.85	107.95	32.50	6.02	65.0	± 9.6 %
		Y	100.00	125.90	35.52		65.0	
		Z	27.77	105.83	30.64		65.0	
10234-CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	7.66	93.47	30.58	6.02	65.0	± 9.6 %
		Y	100.00	137.13	41.22		65.0	
		Z	18.69	105.56	33.02		65.0	
10235-CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	19.17	108.15	33.29	6.02	65.0	± 9.6 %
		Y	100.00	128.03	36.63		65.0	
		Z	32.15	110.14	32.45		65.0	
10236-CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	21.31	108.30	32.58	6.02	65.0	± 9.6 %
		Y	100.00	125.86	35.50		65.0	
		Z	28.16	106.04	30.69		65.0	
10237-CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	7.97	94.52	31.07	6.02	65.0	± 9.6 %
		Y	100.00	137.47	41.42		65.0	
		Z	20.12	107.30	33.66		65.0	
10238-CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	19.07	108.05	33.26	6.02	65.0	± 9.6 %
		Y	100.00	128.02	36.62		65.0	
		Z	32.02	110.07	32.43		65.0	

10239-CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	20.75	107.88	32.48	6.02	65.0	± 9.6 %
		Y	100.00	125.92	35.53		65.0	
		Z	27.72	105.81	30.64		65.0	
10240-CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	7.95	94.48	31.06	6.02	65.0	± 9.6 %
		Y	100.00	137.48	41.42		65.0	
		Z	20.05	107.23	33.64		65.0	
10241-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	7.80	82.78	26.68	6.98	65.0	± 9.6 %
		Y	13.53	90.40	29.14		65.0	
		Z	9.63	83.70	26.48		65.0	
10242-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	7.45	81.80	26.19	6.98	65.0	± 9.6 %
		Y	12.55	88.73	28.45		65.0	
		Z	8.84	81.84	25.66		65.0	
10243-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	5.96	77.66	25.35	6.98	65.0	± 9.6 %
		Y	9.36	84.34	27.79		65.0	
		Z	7.06	78.51	25.19		65.0	
10244-CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	6.42	78.08	19.07	3.98	65.0	± 9.6 %
		Y	12.74	86.88	23.45		65.0	
		Z	8.49	80.78	20.82		65.0	
10245-CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	5.96	76.65	18.44	3.98	65.0	± 9.6 %
		Y	12.17	85.85	23.04		65.0	
		Z	8.14	79.85	20.41		65.0	
10246-CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	5.90	79.94	19.83	3.98	65.0	± 9.6 %
		Y	14.30	91.96	25.12		65.0	
		Z	8.29	83.47	21.67		65.0	
10247-CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	4.84	74.00	18.20	3.98	65.0	± 9.6 %
		Y	8.22	80.60	21.83		65.0	
		Z	6.24	76.50	19.74		65.0	
10248-CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	4.70	73.03	17.76	3.98	65.0	± 9.6 %
		Y	8.02	79.67	21.45		65.0	
		Z	6.13	75.70	19.40		65.0	
10249-CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	8.24	86.13	23.37	3.98	65.0	± 9.6 %
		Y	15.49	93.89	26.48		65.0	
		Z	9.91	86.86	23.76		65.0	
10250-CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	5.92	77.39	21.72	3.98	65.0	± 9.6 %
		Y	8.91	82.12	23.72		65.0	
		Z	7.18	78.89	22.27		65.0	
10251-CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	5.43	74.51	20.07	3.98	65.0	± 9.6 %
		Y	8.12	79.14	22.25		65.0	
		Z	6.62	76.12	20.79		65.0	
10252-CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	7.77	84.82	24.28	3.98	65.0	± 9.6 %
		Y	12.70	90.01	25.93		65.0	
		Z	9.23	85.17	24.09		65.0	
10253-CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	5.51	73.55	20.15	3.98	65.0	± 9.6 %
		Y	7.82	77.62	21.91		65.0	
		Z	6.55	74.95	20.64		65.0	
10254-CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	5.88	74.60	20.92	3.98	65.0	± 9.6 %
		Y	8.23	78.44	22.55		65.0	
		Z	6.96	75.95	21.38		65.0	

10255-CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	6.57	79.53	22.59	3.98	65.0	± 9.6 %
		Y	9.71	83.47	23.82		65.0	
		Z	7.75	80.18	22.49		65.0	
10256-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	4.02	70.70	14.70	3.98	65.0	± 9.6 %
		Y	11.01	83.82	21.47		65.0	
		Z	6.63	76.44	18.12		65.0	
10257-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	3.74	69.35	13.96	3.98	65.0	± 9.6 %
		Y	10.26	82.33	20.84		65.0	
		Z	6.27	75.22	17.53		65.0	
10258-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	3.49	71.52	15.29	3.98	65.0	± 9.6 %
		Y	11.29	87.42	22.94		65.0	
		Z	5.99	77.85	18.77		65.0	
10259-CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	5.31	75.46	19.56	3.98	65.0	± 9.6 %
		Y	8.46	81.05	22.46		65.0	
		Z	6.61	77.37	20.65		65.0	
10260-CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	5.28	74.99	19.35	3.98	65.0	± 9.6 %
		Y	8.39	80.56	22.29		65.0	
		Z	6.59	76.99	20.50		65.0	
10261-CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	7.44	84.29	23.28	3.98	65.0	± 9.6 %
		Y	13.03	90.84	25.83		65.0	
		Z	8.92	84.96	23.51		65.0	
10262-CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	5.90	77.30	21.66	3.98	65.0	± 9.6 %
		Y	8.89	82.07	23.68		65.0	
		Z	7.16	78.82	22.22		65.0	
10263-CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	5.42	74.48	20.06	3.98	65.0	± 9.6 %
		Y	8.11	79.13	22.25		65.0	
		Z	6.61	76.10	20.78		65.0	
10264-CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	7.66	84.53	24.14	3.98	65.0	± 9.6 %
		Y	12.56	89.77	25.83		65.0	
		Z	9.11	84.92	23.98		65.0	
10265-CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	5.60	74.01	20.43	3.98	65.0	± 9.6 %
		Y	8.12	78.42	22.20		65.0	
		Z	6.72	75.58	20.90		65.0	
10266-CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	6.02	75.18	21.31	3.98	65.0	± 9.6 %
		Y	8.52	79.23	22.87		65.0	
		Z	7.16	76.63	21.71		65.0	
10267-CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	6.95	80.33	22.73	3.98	65.0	± 9.6 %
		Y	10.31	84.22	23.84		65.0	
		Z	8.17	80.88	22.53		65.0	
10268-CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	6.18	73.74	20.78	3.98	65.0	± 9.6 %
		Y	8.44	77.45	22.14		65.0	
		Z	7.27	75.19	21.14		65.0	
10269-CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	6.16	73.30	20.62	3.98	65.0	± 9.6 %
		Y	8.31	76.88	21.98		65.0	
		Z	7.20	74.71	21.00		65.0	
10270-CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	6.49	76.60	21.39	3.98	65.0	± 9.6 %
		Y	8.96	79.83	22.32		65.0	
		Z	7.55	77.42	21.34		65.0	

10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	2.46	66.57	14.94	0.00	150.0	± 9.6 %
		Y	2.69	67.07	15.85		150.0	
		Z	2.47	65.81	14.75		150.0	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	1.50	67.78	15.19	0.00	150.0	± 9.6 %
		Y	1.84	70.29	17.03		150.0	
		Z	1.45	66.52	14.50		150.0	
10277-CAA	PHS (QPSK)	X	2.02	61.18	6.75	9.03	50.0	± 9.6 %
		Y	3.76	65.96	10.93		50.0	
		Z	2.85	63.40	8.98		50.0	
10278-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	X	4.23	70.69	14.32	9.03	50.0	± 9.6 %
		Y	14.51	88.96	23.17		50.0	
		Z	7.21	78.07	18.56		50.0	
10279-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	X	4.34	70.98	14.51	9.03	50.0	± 9.6 %
		Y	14.77	89.16	23.28		50.0	
		Z	7.38	78.33	18.70		50.0	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	0.99	65.21	10.92	0.00	150.0	± 9.6 %
		Y	2.13	73.99	17.11		150.0	
		Z	1.19	66.11	12.27		150.0	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	0.58	63.12	9.55	0.00	150.0	± 9.6 %
		Y	1.18	70.85	15.76		150.0	
		Z	0.66	63.42	10.55		150.0	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	0.77	66.94	11.82	0.00	150.0	± 9.6 %
		Y	2.01	79.93	19.92		150.0	
		Z	0.77	66.04	12.25		150.0	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	1.67	76.19	16.13	0.00	150.0	± 9.6 %
		Y	4.50	92.83	24.85		150.0	
		Z	1.08	70.39	14.77		150.0	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	23.24	99.81	27.92	9.03	50.0	± 9.6 %
		Y	13.10	91.05	26.90		50.0	
		Z	10.99	87.45	24.97		50.0	
10297-AAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	2.56	69.40	16.47	0.00	150.0	± 9.6 %
		Y	3.08	71.48	17.54		150.0	
		Z	2.59	68.70	15.89		150.0	
10298-AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	1.18	65.18	11.74	0.00	150.0	± 9.6 %
		Y	2.03	71.23	16.50		150.0	
		Z	1.38	65.94	12.91		150.0	
10299-AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	2.24	68.99	13.33	0.00	150.0	± 9.6 %
		Y	5.59	79.79	19.27		150.0	
		Z	2.82	70.52	14.91		150.0	
10300-AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	1.47	63.26	9.70	0.00	150.0	± 9.6 %
		Y	3.20	70.81	14.94		150.0	
		Z	2.04	65.42	11.77		150.0	
10301-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	X	4.71	66.14	17.59	4.17	50.0	± 9.6 %
		Y	5.27	66.88	18.30		50.0	
		Z	4.94	65.93	17.56		50.0	
10302-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	X	5.13	66.42	18.12	4.96	50.0	± 9.6 %
		Y	5.73	67.47	19.02		50.0	
		Z	5.42	66.49	18.24		50.0	

10303-AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	X	4.89	66.11	17.95	4.96	50.0	± 9.6 %
		Y	5.53	67.34	18.99		50.0	
		Z	5.19	66.25	18.13		50.0	
10304-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	X	4.70	65.97	17.44	4.17	50.0	± 9.6 %
		Y	5.27	66.94	18.32		50.0	
		Z	4.96	65.96	17.54		50.0	
10305-AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	X	4.66	69.51	19.95	6.02	35.0	± 9.6 %
		Y	5.64	72.39	22.43		35.0	
		Z	5.15	70.50	20.89		35.0	
10306-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	X	4.81	67.88	19.44	6.02	35.0	± 9.6 %
		Y	5.46	68.57	20.34		35.0	
		Z	5.19	68.36	19.99		35.0	
10307-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	X	4.72	68.05	19.40	6.02	35.0	± 9.6 %
		Y	5.54	70.19	21.25		35.0	
		Z	5.15	68.78	20.06		35.0	
10308-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	X	4.72	68.35	19.59	6.02	35.0	± 9.6 %
		Y	5.55	70.54	21.46		35.0	
		Z	5.15	69.09	20.24		35.0	
10309-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	X	4.85	68.01	19.56	6.02	35.0	± 9.6 %
		Y	5.55	68.89	20.52		35.0	
		Z	5.26	68.61	20.15		35.0	
10310-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	X	4.78	68.00	19.45	6.02	35.0	± 9.6 %
		Y	5.43	68.69	20.33		35.0	
		Z	5.16	68.52	20.01		35.0	
10311-AAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	2.92	68.60	16.13	0.00	150.0	± 9.6 %
		Y	3.46	70.68	17.12		150.0	
		Z	2.94	68.03	15.60		150.0	
10313-AAA	iDEN 1:3	X	5.00	78.75	18.58	6.99	70.0	± 9.6 %
		Y	11.04	85.30	20.66		70.0	
		Z	5.44	76.51	17.29		70.0	
10314-AAA	iDEN 1:6	X	11.43	95.03	26.98	10.00	30.0	± 9.6 %
		Y	27.54	104.39	29.21		30.0	
		Z	9.75	88.67	24.34		30.0	
10315-AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	X	1.03	63.74	15.13	0.17	150.0	± 9.6 %
		Y	1.16	65.45	16.47		150.0	
		Z	1.01	63.23	14.58		150.0	
10316-AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	X	4.42	66.67	16.29	0.17	150.0	± 9.6 %
		Y	4.71	66.94	16.54		150.0	
		Z	4.54	66.45	16.14		150.0	
10317-AAC	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	X	4.42	66.67	16.29	0.17	150.0	± 9.6 %
		Y	4.71	66.94	16.54		150.0	
		Z	4.54	66.45	16.14		150.0	
10400-AAD	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	X	4.48	66.89	16.23	0.00	150.0	± 9.6 %
		Y	4.83	67.22	16.46		150.0	
		Z	4.63	66.68	16.05		150.0	
10401-AAD	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	X	5.19	66.92	16.36	0.00	150.0	± 9.6 %
		Y	5.45	67.23	16.51		150.0	
		Z	5.34	66.93	16.27		150.0	

10402-AAD	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	X	5.48	67.29	16.42	0.00	150.0	± 9.6 %
		Y	5.75	67.75	16.60		150.0	
		Z	5.58	67.23	16.27		150.0	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	0.99	65.21	10.92	0.00	115.0	± 9.6 %
		Y	2.13	73.99	17.11		115.0	
		Z	1.19	66.11	12.27		115.0	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	0.99	65.21	10.92	0.00	115.0	± 9.6 %
		Y	2.13	73.99	17.11		115.0	
		Z	1.19	66.11	12.27		115.0	
10406-AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	X	100.00	128.83	32.89	0.00	100.0	± 9.6 %
		Y	100.00	120.74	30.47		100.0	
		Z	49.71	114.12	29.38		100.0	
10410-AAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9, Subframe Conf=4)	X	100.00	134.34	35.50	3.23	80.0	± 9.6 %
		Y	100.00	121.15	30.74		80.0	
		Z	100.00	123.18	31.28		80.0	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	0.95	62.86	14.48	0.00	150.0	± 9.6 %
		Y	1.03	63.95	15.58		150.0	
		Z	0.91	62.11	13.82		150.0	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	4.36	66.62	16.19	0.00	150.0	± 9.6 %
		Y	4.63	66.84	16.40		150.0	
		Z	4.46	66.34	16.00		150.0	
10417-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	4.36	66.62	16.19	0.00	150.0	± 9.6 %
		Y	4.63	66.84	16.40		150.0	
		Z	4.46	66.34	16.00		150.0	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preambule)	X	4.36	66.81	16.23	0.00	150.0	± 9.6 %
		Y	4.62	67.00	16.42		150.0	
		Z	4.45	66.49	16.01		150.0	
10419-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preambule)	X	4.37	66.75	16.22	0.00	150.0	± 9.6 %
		Y	4.64	66.95	16.42		150.0	
		Z	4.47	66.45	16.02		150.0	
10422-AAB	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	X	4.48	66.73	16.23	0.00	150.0	± 9.6 %
		Y	4.77	66.94	16.43		150.0	
		Z	4.59	66.46	16.04		150.0	
10423-AAB	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	X	4.62	67.00	16.33	0.00	150.0	± 9.6 %
		Y	4.96	67.30	16.56		150.0	
		Z	4.76	66.78	16.16		150.0	
10424-AAB	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	X	4.54	66.95	16.31	0.00	150.0	± 9.6 %
		Y	4.87	67.25	16.53		150.0	
		Z	4.68	66.73	16.13		150.0	
10425-AAB	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	X	5.18	67.21	16.52	0.00	150.0	± 9.6 %
		Y	5.43	67.49	16.63		150.0	
		Z	5.29	67.10	16.35		150.0	
10426-AAB	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	X	5.20	67.32	16.57	0.00	150.0	± 9.6 %
		Y	5.44	67.51	16.63		150.0	
		Z	5.29	67.12	16.35		150.0	

10427-AAB	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	X	5.17	67.12	16.47	0.00	150.0	± 9.6 %
		Y	5.46	67.52	16.64		150.0	
		Z	5.30	67.09	16.34		150.0	
10430-AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	X	4.21	71.93	18.35	0.00	150.0	± 9.6 %
		Y	4.40	70.86	18.47		150.0	
		Z	4.18	70.48	17.97		150.0	
10431-AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	X	3.99	67.19	16.07	0.00	150.0	± 9.6 %
		Y	4.37	67.47	16.51		150.0	
		Z	4.14	66.84	15.96		150.0	
10432-AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	X	4.31	67.04	16.23	0.00	150.0	± 9.6 %
		Y	4.65	67.32	16.51		150.0	
		Z	4.44	66.75	16.06		150.0	
10433-AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	X	4.56	66.98	16.32	0.00	150.0	± 9.6 %
		Y	4.89	67.30	16.55		150.0	
		Z	4.69	66.76	16.15		150.0	
10434-AAA	W-CDMA (BS Test Model 1, 64 DPCH)	X	4.32	72.81	18.16	0.00	150.0	± 9.6 %
		Y	4.53	71.77	18.54		150.0	
		Z	4.27	71.26	17.89		150.0	
10435-AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	134.05	35.36	3.23	80.0	± 9.6 %
		Y	100.00	120.96	30.65		80.0	
		Z	100.00	122.98	31.18		80.0	
10447-AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.23	67.00	14.98	0.00	150.0	± 9.6 %
		Y	3.70	67.68	16.09		150.0	
		Z	3.41	66.70	15.18		150.0	
10448-AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%)	X	3.85	66.98	15.94	0.00	150.0	± 9.6 %
		Y	4.19	67.26	16.37		150.0	
		Z	3.97	66.61	15.81		150.0	
10449-AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Clipng 44%)	X	4.14	66.86	16.13	0.00	150.0	± 9.6 %
		Y	4.45	67.16	16.42		150.0	
		Z	4.25	66.57	15.95		150.0	
10450-AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.35	66.76	16.18	0.00	150.0	± 9.6 %
		Y	4.63	67.07	16.42		150.0	
		Z	4.45	66.51	15.99		150.0	
10451-AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	X	3.04	66.82	14.28	0.00	150.0	± 9.6 %
		Y	3.64	68.03	15.87		150.0	
		Z	3.29	66.80	14.75		150.0	
10456-AAB	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	X	6.14	67.90	16.76	0.00	150.0	± 9.6 %
		Y	6.28	68.08	16.78		150.0	
		Z	6.15	67.66	16.51		150.0	
10457-AAA	UMTS-FDD (DC-HSDPA)	X	3.69	65.32	15.90	0.00	150.0	± 9.6 %
		Y	3.83	65.47	16.14		150.0	
		Z	3.71	64.98	15.71		150.0	
10458-AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	X	3.78	71.20	16.92	0.00	150.0	± 9.6 %
		Y	4.14	70.94	18.01		150.0	
		Z	3.87	70.33	17.18		150.0	
10459-AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	X	4.93	69.13	18.11	0.00	150.0	± 9.6 %
		Y	5.19	68.06	18.23		150.0	
		Z	5.06	68.26	18.10		150.0	

10460-AAA	UMTS-FDD (WCDMA, AMR)	X	0.83	68.30	15.79	0.00	150.0	± 9.6 %
		Y	1.14	73.12	19.01		150.0	
		Z	0.74	65.97	14.32		150.0	
10461-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	141.36	38.72	3.29	80.0	± 9.6 %
		Y	100.00	127.85	33.84		80.0	
		Z	100.00	127.95	33.52		80.0	
10462-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	113.71	25.89	3.23	80.0	± 9.6 %
		Y	100.00	109.72	25.28		80.0	
		Z	100.00	109.03	24.71		80.0	
10463-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	106.98	22.83	3.23	80.0	± 9.6 %
		Y	100.00	106.12	23.58		80.0	
		Z	23.17	90.72	19.54		80.0	
10464-AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	138.83	37.33	3.23	80.0	± 9.6 %
		Y	100.00	125.79	32.72		80.0	
		Z	100.00	125.52	32.23		80.0	
10465-AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	112.64	25.41	3.23	80.0	± 9.6 %
		Y	100.00	109.11	24.98		80.0	
		Z	100.00	108.36	24.39		80.0	
10466-AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	106.07	22.43	3.23	80.0	± 9.6 %
		Y	100.00	105.55	23.31		80.0	
		Z	8.34	80.33	16.62		80.0	
10467-AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	139.29	37.53	3.23	80.0	± 9.6 %
		Y	100.00	126.04	32.63		80.0	
		Z	100.00	125.81	32.36		80.0	
10468-AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	113.03	25.58	3.23	80.0	± 9.6 %
		Y	100.00	109.29	25.07		80.0	
		Z	100.00	108.57	24.48		80.0	
10469-AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	106.13	22.45	3.23	80.0	± 9.6 %
		Y	100.00	105.56	23.31		80.0	
		Z	8.57	80.62	16.71		80.0	
10470-AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	139.37	37.56	3.23	80.0	± 9.6 %
		Y	100.00	126.08	32.84		80.0	
		Z	100.00	125.84	32.37		80.0	
10471-AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	112.94	25.53	3.23	80.0	± 9.6 %
		Y	100.00	109.24	25.03		80.0	
		Z	100.00	108.50	24.45		80.0	
10472-AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	106.01	22.39	3.23	80.0	± 9.6 %
		Y	100.00	105.50	23.28		80.0	
		Z	8.43	80.43	16.63		80.0	
10473-AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	139.33	37.54	3.23	80.0	± 9.6 %
		Y	100.00	126.05	32.83		80.0	
		Z	100.00	125.80	32.35		80.0	
10474-AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	112.95	25.53	3.23	80.0	± 9.6 %
		Y	100.00	109.25	25.04		80.0	
		Z	100.00	108.51	24.45		80.0	
10475-AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	106.03	22.40	3.23	80.0	± 9.6 %
		Y	100.00	105.51	23.28		80.0	
		Z	8.27	80.26	16.58		80.0	

10477-AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	112.61	25.38	3.23	80.0	± 9.6 %
		Y	100.00	109.06	24.95		80.0	
		Z	100.00	108.31	24.35		80.0	
10478-AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	105.92	22.34	3.23	80.0	± 9.6 %
		Y	100.00	105.45	23.26		80.0	
		Z	8.03	79.94	16.48		80.0	
10479-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	130.93	35.65	3.23	80.0	± 9.6 %
		Y	60.57	118.93	33.06		80.0	
		Z	29.16	106.82	29.42		80.0	
10480-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	117.62	29.35	3.23	80.0	± 9.6 %
		Y	100.00	117.06	30.32		80.0	
		Z	26.27	97.79	24.92		80.0	
10481-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	114.76	27.95	3.23	80.0	± 9.6 %
		Y	70.77	110.70	28.37		80.0	
		Z	17.72	91.40	22.72		80.0	
10482-AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.13	73.40	16.60	2.23	80.0	± 9.6 %
		Y	9.37	87.65	23.06		80.0	
		Z	3.95	75.11	17.91		80.0	
10483-AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	13.19	88.16	21.18	2.23	80.0	± 9.6 %
		Y	19.24	94.27	24.80		80.0	
		Z	9.47	83.70	20.63		80.0	
10484-AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	8.46	82.36	19.39	2.23	80.0	± 9.6 %
		Y	15.52	90.85	23.84		80.0	
		Z	8.01	81.18	20.00		80.0	
10485-AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.00	77.42	19.59	2.23	80.0	± 9.6 %
		Y	8.12	86.07	23.37		80.0	
		Z	4.33	76.67	19.48		80.0	
10486-AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.12	70.03	15.84	2.23	80.0	± 9.6 %
		Y	5.35	76.22	19.51		80.0	
		Z	3.70	71.02	16.81		80.0	
10487-AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.05	69.35	15.52	2.23	80.0	± 9.6 %
		Y	5.20	75.42	19.20		80.0	
		Z	3.67	70.52	16.59		80.0	
10488-AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.77	74.77	19.74	2.23	80.0	± 9.6 %
		Y	6.61	81.26	22.22		80.0	
		Z	4.34	74.97	19.56		80.0	
10489-AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.48	70.19	17.70	2.23	80.0	± 9.6 %
		Y	4.85	73.54	19.43		80.0	
		Z	3.88	70.37	17.78		80.0	
10490-AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.54	69.92	17.57	2.23	80.0	± 9.6 %
		Y	4.87	73.02	19.24		80.0	
		Z	3.96	70.12	17.70		80.0	
10491-AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.80	72.22	18.92	2.23	80.0	± 9.6 %
		Y	5.84	77.06	20.75		80.0	
		Z	4.36	72.73	18.82		80.0	
10492-AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.72	68.92	17.58	2.23	80.0	± 9.6 %
		Y	4.92	71.73	18.92		80.0	
		Z	4.16	69.33	17.66		80.0	

10493-AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.77	68.74	17.49	2.23	80.0	± 9.6 %
		Y	4.96	71.43	18.81		80.0	
		Z	4.22	69.16	17.60		80.0	
10494-AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.18	73.92	19.49	2.23	80.0	± 9.6 %
		Y	6.95	79.96	21.62		80.0	
		Z	4.84	74.54	19.36		80.0	
10495-AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.75	69.23	17.80	2.23	80.0	± 9.6 %
		Y	5.05	72.43	19.20		80.0	
		Z	4.21	69.80	17.87		80.0	
10496-AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.82	68.92	17.69	2.23	80.0	± 9.6 %
		Y	5.05	71.84	18.99		80.0	
		Z	4.27	69.45	17.77		80.0	
10497-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.52	64.18	11.26	2.23	80.0	± 9.6 %
		Y	7.69	84.10	21.07		80.0	
		Z	2.64	69.56	14.73		80.0	
10498-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.23	60.00	7.91	2.23	80.0	± 9.6 %
		Y	3.94	71.70	15.61		80.0	
		Z	1.87	62.84	10.67		80.0	
10499-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.24	60.00	7.75	2.23	80.0	± 9.6 %
		Y	3.71	70.58	15.03		80.0	
		Z	1.81	62.24	10.23		80.0	
10500-AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.81	75.98	19.54	2.23	80.0	± 9.6 %
		Y	6.92	82.90	22.53		80.0	
		Z	4.21	75.48	19.35		80.0	
10501-AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.35	70.49	16.72	2.23	80.0	± 9.6 %
		Y	5.07	74.88	19.37		80.0	
		Z	3.79	70.79	17.20		80.0	
10502-AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.37	70.18	16.50	2.23	80.0	± 9.6 %
		Y	5.07	74.49	19.17		80.0	
		Z	3.84	70.57	17.05		80.0	
10503-AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.71	74.51	19.62	2.23	80.0	± 9.6 %
		Y	6.50	80.97	22.10		80.0	
		Z	4.27	74.72	19.44		80.0	
10504-AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.45	70.07	17.62	2.23	80.0	± 9.6 %
		Y	4.82	73.43	19.38		80.0	
		Z	3.86	70.26	17.72		80.0	
10505-AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.52	69.80	17.51	2.23	80.0	± 9.6 %
		Y	4.84	72.92	19.19		80.0	
		Z	3.93	70.01	17.63		80.0	
10506-AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.14	73.74	19.40	2.23	80.0	± 9.6 %
		Y	6.87	79.75	21.53		80.0	
		Z	4.79	74.36	19.28		80.0	
10507-AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.74	69.16	17.76	2.23	80.0	± 9.6 %
		Y	5.03	72.36	19.16		80.0	
		Z	4.19	69.73	17.83		80.0	

10508-AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.80	68.84	17.64	2.23	80.0	± 9.6 %
		Y	5.03	71.76	18.95		80.0	
		Z	4.26	69.37	17.72		80.0	
10509-AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.37	71.90	18.66	2.23	80.0	± 9.6 %
		Y	6.40	76.35	20.25		80.0	
		Z	4.95	72.52	18.58		80.0	
10510-AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.17	68.57	17.64	2.23	80.0	± 9.6 %
		Y	5.39	71.46	18.83		80.0	
		Z	4.65	69.26	17.74		80.0	
10511-AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.23	68.32	17.56	2.23	80.0	± 9.6 %
		Y	5.38	70.99	18.68		80.0	
		Z	4.69	68.96	17.66		80.0	
10512-AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.63	73.62	19.22	2.23	80.0	± 9.6 %
		Y	7.45	79.52	21.26		80.0	
		Z	5.32	74.42	19.16		80.0	
10513-AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.07	68.81	17.76	2.23	80.0	± 9.6 %
		Y	5.37	72.10	19.08		80.0	
		Z	4.56	69.62	17.88		80.0	
10514-AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.09	68.37	17.61	2.23	80.0	± 9.6 %
		Y	5.28	71.36	18.84		80.0	
		Z	4.55	69.13	17.73		80.0	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	0.91	63.04	14.53	0.00	150.0	± 9.6 %
		Y	1.00	64.25	15.72		150.0	
		Z	0.87	62.24	13.83		150.0	
10516-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	X	0.58	71.35	17.16	0.00	150.0	± 9.6 %
		Y	1.16	84.12	23.91		150.0	
		Z	0.44	67.03	14.33		150.0	
10517-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)	X	0.76	64.94	15.08	0.00	150.0	± 9.6 %
		Y	0.90	67.48	17.10		150.0	
		Z	0.71	63.66	14.02		150.0	
10518-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	X	4.35	66.71	16.17	0.00	150.0	± 9.6 %
		Y	4.63	66.92	16.39		150.0	
		Z	4.45	66.41	15.98		150.0	
10519-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	X	4.51	66.89	16.27	0.00	150.0	± 9.6 %
		Y	4.84	67.19	16.51		150.0	
		Z	4.64	66.66	16.11		150.0	
10520-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)	X	4.36	66.83	16.18	0.00	150.0	± 9.6 %
		Y	4.69	67.18	16.45		150.0	
		Z	4.49	66.61	16.02		150.0	
10521-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	X	4.29	66.80	16.16	0.00	150.0	± 9.6 %
		Y	4.62	67.20	16.45		150.0	
		Z	4.42	66.60	16.00		150.0	
10522-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	X	4.35	66.94	16.27	0.00	150.0	± 9.6 %
		Y	4.67	67.20	16.49		150.0	
		Z	4.48	66.69	16.08		150.0	

10523-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	X	4.27	66.89	16.16	0.00	150.0	± 9.6 %
		Y	4.55	67.10	16.35		150.0	
		Z	4.36	66.54	15.92		150.0	
10524-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)	X	4.30	66.88	16.25	0.00	150.0	± 9.6 %
		Y	4.62	67.15	16.47		150.0	
		Z	4.43	66.61	16.05		150.0	
10525-AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	X	4.32	65.97	15.86	0.00	150.0	± 9.6 %
		Y	4.59	66.19	16.06		150.0	
		Z	4.41	65.65	15.64		150.0	
10526-AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	X	4.45	66.27	15.98	0.00	150.0	± 9.6 %
		Y	4.78	66.59	16.21		150.0	
		Z	4.58	66.01	15.79		150.0	
10527-AAB	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)	X	4.38	66.23	15.92	0.00	150.0	± 9.6 %
		Y	4.70	66.57	16.17		150.0	
		Z	4.50	65.97	15.73		150.0	
10528-AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)	X	4.40	66.25	15.95	0.00	150.0	± 9.6 %
		Y	4.72	66.59	16.20		150.0	
		Z	4.51	65.99	15.76		150.0	
10529-AAB	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)	X	4.40	66.25	15.95	0.00	150.0	± 9.6 %
		Y	4.72	66.59	16.20		150.0	
		Z	4.51	65.99	15.76		150.0	
10531-AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)	X	4.37	66.28	15.94	0.00	150.0	± 9.6 %
		Y	4.73	66.73	16.23		150.0	
		Z	4.51	66.09	15.77		150.0	
10532-AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)	X	4.24	66.14	15.87	0.00	150.0	± 9.6 %
		Y	4.58	66.60	16.18		150.0	
		Z	4.37	65.93	15.70		150.0	
10533-AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)	X	4.40	66.32	15.96	0.00	150.0	± 9.6 %
		Y	4.73	66.62	16.18		150.0	
		Z	4.52	66.03	15.75		150.0	
10534-AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	X	4.96	66.28	16.03	0.00	150.0	± 9.6 %
		Y	5.23	66.67	16.21		150.0	
		Z	5.05	66.14	15.85		150.0	
10535-AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	X	5.01	66.43	16.11	0.00	150.0	± 9.6 %
		Y	5.29	66.81	16.27		150.0	
		Z	5.12	66.31	15.93		150.0	
10536-AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	X	4.90	66.42	16.08	0.00	150.0	± 9.6 %
		Y	5.17	66.82	16.26		150.0	
		Z	4.99	66.25	15.88		150.0	
10537-AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)	X	4.96	66.40	16.07	0.00	150.0	± 9.6 %
		Y	5.23	66.77	16.23		150.0	
		Z	5.05	66.23	15.87		150.0	
10538-AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	X	5.03	66.38	16.10	0.00	150.0	± 9.6 %
		Y	5.33	66.82	16.29		150.0	
		Z	5.14	66.26	15.93		150.0	
10540-AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	X	4.95	66.34	16.10	0.00	150.0	± 9.6 %
		Y	5.24	66.79	16.29		150.0	
		Z	5.07	66.27	15.95		150.0	

10541-AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	X	4.93	66.23	16.03	0.00	150.0	± 9.6 %
		Y	5.22	66.69	16.24		150.0	
		Z	5.04	66.14	15.87		150.0	
10542-AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	X	5.09	66.34	16.10	0.00	150.0	± 9.6 %
		Y	5.37	66.73	16.27		150.0	
		Z	5.20	66.21	15.93		150.0	
10543-AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	X	5.16	66.40	16.16	0.00	150.0	± 9.6 %
		Y	5.45	66.74	16.29		150.0	
		Z	5.28	66.26	15.97		150.0	
10544-AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	X	5.30	66.35	16.02	0.00	150.0	± 9.6 %
		Y	5.51	66.78	16.19		150.0	
		Z	5.36	66.26	15.85		150.0	
10545-AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	X	5.49	66.84	16.22	0.00	150.0	± 9.6 %
		Y	5.71	67.15	16.32		150.0	
		Z	5.56	66.68	16.01		150.0	
10546-AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	X	5.34	66.49	16.06	0.00	150.0	± 9.6 %
		Y	5.60	67.04	16.28		150.0	
		Z	5.43	66.47	15.93		150.0	
10547-AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	X	5.42	66.60	16.11	0.00	150.0	± 9.6 %
		Y	5.69	67.11	16.30		150.0	
		Z	5.50	66.51	15.94		150.0	
10548-AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	X	5.61	67.37	16.47	0.00	150.0	± 9.6 %
		Y	5.91	67.95	16.70		150.0	
		Z	5.77	67.49	16.39		150.0	
10550-AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	X	5.40	66.69	16.17	0.00	150.0	± 9.6 %
		Y	5.62	67.00	16.27		150.0	
		Z	5.46	66.49	15.94		150.0	
10551-AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	X	5.34	66.48	16.03	0.00	150.0	± 9.6 %
		Y	5.63	67.07	16.27		150.0	
		Z	5.46	66.53	15.92		150.0	
10552-AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	X	5.31	66.45	16.01	0.00	150.0	± 9.6 %
		Y	5.54	66.86	16.18		150.0	
		Z	5.38	66.32	15.83		150.0	
10553-AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	X	5.36	66.42	16.03	0.00	150.0	± 9.6 %
		Y	5.63	66.91	16.23		150.0	
		Z	5.46	66.37	15.88		150.0	
10554-AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	X	5.72	66.70	16.11	0.00	150.0	± 9.6 %
		Y	5.91	67.13	16.27		150.0	
		Z	5.77	66.63	15.95		150.0	
10555-AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	X	5.83	66.97	16.22	0.00	150.0	± 9.6 %
		Y	6.05	67.44	16.39		150.0	
		Z	5.90	66.93	16.08		150.0	
10556-AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	X	5.87	67.07	16.27	0.00	150.0	± 9.6 %
		Y	6.06	67.47	16.40		150.0	
		Z	5.92	66.98	16.10		150.0	
10557-AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	X	5.81	66.91	16.21	0.00	150.0	± 9.6 %
		Y	6.04	67.42	16.40		150.0	
		Z	5.89	66.89	16.07		150.0	

10558-AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	X	5.84	67.01	16.27	0.00	150.0	± 9.6 %
		Y	6.10	67.59	16.50		150.0	
		Z	5.94	67.05	16.17		150.0	
10560-AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	X	5.85	66.91	16.26	0.00	150.0	± 9.6 %
		Y	6.10	67.45	16.47		150.0	
		Z	5.93	66.90	16.13		150.0	
10561-AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	X	5.78	66.91	16.29	0.00	150.0	± 9.6 %
		Y	6.01	67.40	16.48		150.0	
		Z	5.85	66.87	16.15		150.0	
10562-AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	X	5.84	67.10	16.39	0.00	150.0	± 9.6 %
		Y	6.15	67.82	16.69		150.0	
		Z	5.98	67.26	16.35		150.0	
10563-AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 99pc duty cycle)	X	5.94	67.06	16.33	0.00	150.0	± 9.6 %
		Y	6.46	68.30	16.88		150.0	
		Z	6.23	67.62	16.48		150.0	
10564-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	X	4.67	66.76	16.32	0.46	150.0	± 9.6 %
		Y	4.96	67.01	16.55		150.0	
		Z	4.79	66.52	16.16		150.0	
10565-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)	X	4.88	67.18	16.64	0.46	150.0	± 9.6 %
		Y	5.21	67.47	16.86		150.0	
		Z	5.02	66.99	16.49		150.0	
10566-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle)	X	4.71	67.00	16.45	0.46	150.0	± 9.6 %
		Y	5.04	67.35	16.70		150.0	
		Z	4.85	66.82	16.30		150.0	
10567-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle)	X	4.75	67.42	16.83	0.46	150.0	± 9.6 %
		Y	5.07	67.74	17.04		150.0	
		Z	4.88	67.23	16.66		150.0	
10568-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)	X	4.61	66.75	16.20	0.46	150.0	± 9.6 %
		Y	4.95	67.10	16.47		150.0	
		Z	4.76	66.59	16.06		150.0	
10569-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)	X	4.73	67.64	16.97	0.46	150.0	± 9.6 %
		Y	5.02	67.79	17.07		150.0	
		Z	4.84	67.32	16.73		150.0	
10570-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)	X	4.74	67.41	16.85	0.46	150.0	± 9.6 %
		Y	5.06	67.63	17.01		150.0	
		Z	4.87	67.16	16.66		150.0	
10571-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	X	1.11	64.38	15.53	0.46	130.0	± 9.6 %
		Y	1.32	66.85	17.17		130.0	
		Z	1.13	64.23	15.15		130.0	
10572-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	X	1.12	65.00	15.92	0.46	130.0	± 9.6 %
		Y	1.36	67.67	17.63		130.0	
		Z	1.14	64.81	15.50		130.0	
10573-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	X	2.73	91.60	24.98	0.46	130.0	± 9.6 %
		Y	100.00	150.60	40.49		130.0	
		Z	2.09	84.11	21.34		130.0	
10574-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	X	1.25	71.44	19.20	0.46	130.0	± 9.6 %
		Y	1.86	77.60	22.21		130.0	
		Z	1.27	70.66	18.31		130.0	

10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	4.47	66.58	16.39	0.46	130.0	± 9.6 %
		Y	4.76	66.85	16.64		130.0	
		Z	4.59	66.37	16.25		130.0	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	4.50	66.78	16.48	0.46	130.0	± 9.6 %
		Y	4.78	67.01	16.70		130.0	
		Z	4.61	66.54	16.32		130.0	
10577-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	X	4.67	67.03	16.63	0.46	130.0	± 9.6 %
		Y	5.01	67.32	16.87		130.0	
		Z	4.82	66.84	16.49		130.0	
10578-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	X	4.57	67.19	16.75	0.46	130.0	± 9.6 %
		Y	4.91	67.50	16.98		130.0	
		Z	4.72	67.00	16.60		130.0	
10579-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	X	4.32	66.36	15.98	0.46	130.0	± 9.6 %
		Y	4.68	66.86	16.34		130.0	
		Z	4.48	66.26	15.88		130.0	
10580-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	X	4.37	66.43	16.01	0.46	130.0	± 9.6 %
		Y	4.72	66.85	16.35		130.0	
		Z	4.53	66.30	15.91		130.0	
10581-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	X	4.48	67.27	16.72	0.46	130.0	± 9.6 %
		Y	4.81	67.59	16.94		130.0	
		Z	4.62	67.04	16.54		130.0	
10582-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	X	4.25	66.11	15.75	0.46	130.0	± 9.6 %
		Y	4.63	66.61	16.14		130.0	
		Z	4.42	66.02	15.67		130.0	
10583-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	X	4.47	66.58	16.39	0.46	130.0	± 9.6 %
		Y	4.76	66.85	16.64		130.0	
		Z	4.59	66.37	16.25		130.0	
10584-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	X	4.50	66.78	16.48	0.46	130.0	± 9.6 %
		Y	4.78	67.01	16.70		130.0	
		Z	4.61	66.54	16.32		130.0	
10585-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	X	4.67	67.03	16.63	0.46	130.0	± 9.6 %
		Y	5.01	67.32	16.87		130.0	
		Z	4.82	66.84	16.49		130.0	
10586-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	X	4.57	67.19	16.75	0.46	130.0	± 9.6 %
		Y	4.91	67.50	16.98		130.0	
		Z	4.72	67.00	16.60		130.0	
10587-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	X	4.32	66.36	15.98	0.46	130.0	± 9.6 %
		Y	4.68	66.86	16.34		130.0	
		Z	4.48	66.26	15.88		130.0	
10588-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	X	4.37	66.43	16.01	0.46	130.0	± 9.6 %
		Y	4.72	66.85	16.35		130.0	
		Z	4.53	66.30	15.91		130.0	
10589-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	X	4.48	67.27	16.72	0.46	130.0	± 9.6 %
		Y	4.81	67.59	16.94		130.0	
		Z	4.62	67.04	16.54		130.0	
10590-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	X	4.25	66.11	15.75	0.46	130.0	± 9.6 %
		Y	4.63	66.61	16.14		130.0	
		Z	4.42	66.02	15.67		130.0	

10591-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	X	4.62	66.66	16.52	0.46	130.0	± 9.6 %
		Y	4.91	66.89	16.72		130.0	
		Z	4.74	66.44	16.36		130.0	
10592-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	X	4.75	66.97	16.64	0.46	130.0	± 9.6 %
		Y	5.08	67.24	16.84		130.0	
		Z	4.89	66.78	16.50		130.0	
10593-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle)	X	4.67	66.84	16.50	0.46	130.0	± 9.6 %
		Y	5.00	67.18	16.75		130.0	
		Z	4.82	66.69	16.37		130.0	
10594-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)	X	4.72	67.03	16.67	0.46	130.0	± 9.6 %
		Y	5.06	67.33	16.89		130.0	
		Z	4.87	66.86	16.53		130.0	
10595-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)	X	4.69	67.00	16.58	0.46	130.0	± 9.6 %
		Y	5.03	67.30	16.80		130.0	
		Z	4.84	66.81	16.43		130.0	
10596-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)	X	4.62	66.97	16.57	0.46	130.0	± 9.6 %
		Y	4.97	67.31	16.81		130.0	
		Z	4.77	66.80	16.42		130.0	
10597-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle)	X	4.57	66.84	16.42	0.46	130.0	± 9.6 %
		Y	4.92	67.24	16.71		130.0	
		Z	4.72	66.70	16.30		130.0	
10598-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle)	X	4.56	67.09	16.70	0.46	130.0	± 9.6 %
		Y	4.90	67.49	16.97		130.0	
		Z	4.71	66.95	16.57		130.0	
10599-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	X	5.32	67.17	16.77	0.46	130.0	± 9.6 %
		Y	5.56	67.43	16.88		130.0	
		Z	5.41	67.01	16.59		130.0	
10600-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	X	5.44	67.61	16.97	0.46	130.0	± 9.6 %
		Y	5.71	67.87	17.07		130.0	
		Z	5.55	67.45	16.78		130.0	
10601-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	X	5.33	67.33	16.84	0.46	130.0	± 9.6 %
		Y	5.60	67.61	16.95		130.0	
		Z	5.44	67.19	16.66		130.0	
10602-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	X	5.46	67.50	16.84	0.46	130.0	± 9.6 %
		Y	5.68	67.58	16.86		130.0	
		Z	5.53	67.20	16.59		130.0	
10603-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)	X	5.54	67.83	17.15	0.46	130.0	± 9.6 %
		Y	5.78	67.93	17.16		130.0	
		Z	5.61	67.52	16.88		130.0	
10604-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)	X	5.41	67.45	16.94	0.46	130.0	± 9.6 %
		Y	5.56	67.37	16.88		130.0	
		Z	5.42	66.97	16.60		130.0	
10605-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)	X	5.43	67.47	16.95	0.46	130.0	± 9.6 %
		Y	5.66	67.65	17.02		130.0	
		Z	5.53	67.32	16.77		130.0	
10606-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)	X	5.19	66.82	16.47	0.46	130.0	± 9.6 %
		Y	5.45	67.18	16.65		130.0	
		Z	5.28	66.65	16.29		130.0	

10607-AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	X	4.47	66.01	16.16	0.46	130.0	± 9.6 %
		Y	4.75	66.22	16.35		130.0	
		Z	4.57	65.74	15.97		130.0	
10608-AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	X	4.62	66.36	16.31	0.46	130.0	± 9.6 %
		Y	4.96	66.65	16.52		130.0	
		Z	4.76	66.14	16.14		130.0	
10609-AAB	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle)	X	4.52	66.19	16.13	0.46	130.0	± 9.6 %
		Y	4.84	66.53	16.38		130.0	
		Z	4.65	65.98	15.97		130.0	
10610-AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	X	4.57	66.37	16.31	0.46	130.0	± 9.6 %
		Y	4.90	66.69	16.54		130.0	
		Z	4.70	66.15	16.14		130.0	
10611-AAB	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	X	4.48	66.16	16.15	0.46	130.0	± 9.6 %
		Y	4.82	66.51	16.40		130.0	
		Z	4.62	65.95	15.99		130.0	
10612-AAB	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)	X	4.47	66.30	16.19	0.46	130.0	± 9.6 %
		Y	4.83	66.68	16.45		130.0	
		Z	4.63	66.10	16.02		130.0	
10613-AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)	X	4.47	66.11	16.03	0.46	130.0	± 9.6 %
		Y	4.84	66.59	16.34		130.0	
		Z	4.63	65.98	15.91		130.0	
10614-AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	X	4.44	66.35	16.30	0.46	130.0	± 9.6 %
		Y	4.78	66.77	16.57		130.0	
		Z	4.57	66.18	16.15		130.0	
10615-AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	X	4.47	65.98	15.91	0.46	130.0	± 9.6 %
		Y	4.82	66.34	16.18		130.0	
		Z	4.62	65.77	15.75		130.0	
10616-AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	X	5.12	66.35	16.35	0.46	130.0	± 9.6 %
		Y	5.39	66.72	16.51		130.0	
		Z	5.23	66.24	16.19		130.0	
10617-AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	X	5.18	66.54	16.42	0.46	130.0	± 9.6 %
		Y	5.44	66.83	16.53		130.0	
		Z	5.30	66.42	16.25		130.0	
10618-AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	X	5.08	66.59	16.46	0.46	130.0	± 9.6 %
		Y	5.34	66.91	16.59		130.0	
		Z	5.18	66.42	16.26		130.0	
10619-AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	X	5.10	66.38	16.28	0.46	130.0	± 9.6 %
		Y	5.37	66.73	16.44		130.0	
		Z	5.20	66.24	16.11		130.0	
10620-AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	X	5.17	66.39	16.34	0.46	130.0	± 9.6 %
		Y	5.47	66.81	16.53		130.0	
		Z	5.29	66.28	16.18		130.0	
10621-AAB	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	X	5.18	66.51	16.52	0.46	130.0	± 9.6 %
		Y	5.45	66.88	16.68		130.0	
		Z	5.29	66.41	16.37		130.0	
10622-AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	X	5.17	66.62	16.57	0.46	130.0	± 9.6 %
		Y	5.45	66.99	16.72		130.0	
		Z	5.30	66.58	16.44		130.0	

10623-AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)	X	5.05	66.12	16.18	0.46	130.0	± 9.6 %
		Y	5.34	66.59	16.41		130.0	
		Z	5.18	66.09	16.07		130.0	
10624-AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)	X	5.25	66.39	16.39	0.46	130.0	± 9.6 %
		Y	5.53	66.75	16.54		130.0	
		Z	5.37	66.30	16.24		130.0	
10625-AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)	X	5.38	66.67	16.59	0.46	130.0	± 9.6 %
		Y	5.90	67.70	17.07		130.0	
		Z	5.75	67.32	16.80		130.0	
10626-AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	X	5.45	66.38	16.30	0.46	130.0	± 9.6 %
		Y	5.65	66.76	16.45		130.0	
		Z	5.52	66.31	16.15		130.0	
10627-AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	X	5.70	67.06	16.61	0.46	130.0	± 9.6 %
		Y	5.89	67.26	16.65		130.0	
		Z	5.76	66.88	16.40		130.0	
10628-AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	X	5.45	66.37	16.19	0.46	130.0	± 9.6 %
		Y	5.71	66.92	16.42		130.0	
		Z	5.56	66.40	16.09		130.0	
10629-AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)	X	5.55	66.55	16.28	0.46	130.0	± 9.6 %
		Y	5.80	66.98	16.44		130.0	
		Z	5.64	66.49	16.13		130.0	
10630-AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)	X	5.86	67.71	16.86	0.46	130.0	± 9.6 %
		Y	6.24	68.48	17.19		130.0	
		Z	6.10	68.05	16.90		130.0	
10631-AAB	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)	X	5.79	67.61	17.01	0.46	130.0	± 9.6 %
		Y	6.17	68.34	17.30		130.0	
		Z	5.98	67.80	16.98		130.0	
10632-AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)	X	5.69	67.21	16.83	0.46	130.0	± 9.6 %
		Y	5.87	67.35	16.83		130.0	
		Z	5.73	66.95	16.57		130.0	
10633-AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)	X	5.50	66.55	16.32	0.46	130.0	± 9.6 %
		Y	5.79	67.12	16.54		130.0	
		Z	5.62	66.56	16.20		130.0	
10634-AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)	X	5.50	66.62	16.41	0.46	130.0	± 9.6 %
		Y	5.78	67.13	16.61		130.0	
		Z	5.60	66.59	16.28		130.0	
10635-AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)	X	5.36	65.87	15.76	0.46	130.0	± 9.6 %
		Y	5.66	66.49	16.04		130.0	
		Z	5.48	65.92	15.67		130.0	
10636-AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)	X	5.88	66.74	16.39	0.46	130.0	± 9.6 %
		Y	6.06	67.13	16.53		130.0	
		Z	5.93	66.68	16.24		130.0	
10637-AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)	X	6.02	67.10	16.56	0.46	130.0	± 9.6 %
		Y	6.22	67.49	16.69		130.0	
		Z	6.09	67.07	16.42		130.0	
10638-AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)	X	6.03	67.11	16.54	0.46	130.0	± 9.6 %
		Y	6.22	67.47	16.65		130.0	
		Z	6.09	67.04	16.38		130.0	

10639-AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)	X	5.99	67.00	16.52	0.46	130.0	± 9.6 %
		Y	6.22	67.48	16.70		130.0	
		Z	6.07	67.00	16.40		130.0	
10640-AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	X	5.96	66.94	16.43	0.46	130.0	± 9.6 %
		Y	6.23	67.53	16.67		130.0	
		Z	6.08	67.01	16.35		130.0	
10641-AAC	IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	X	6.06	67.00	16.49	0.46	130.0	± 9.6 %
		Y	6.24	67.32	16.58		130.0	
		Z	6.12	66.90	16.32		130.0	
10642-AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	X	6.07	67.18	16.75	0.46	130.0	± 9.6 %
		Y	6.31	67.64	16.91		130.0	
		Z	6.16	67.17	16.62		130.0	
10643-AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	X	5.92	66.89	16.49	0.46	130.0	± 9.6 %
		Y	6.14	67.31	16.65		130.0	
		Z	5.99	66.84	16.35		130.0	
10644-AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	X	5.99	67.10	16.62	0.46	130.0	± 9.6 %
		Y	6.33	67.92	16.98		130.0	
		Z	6.16	67.36	16.63		130.0	
10645-AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	X	6.18	67.33	16.70	0.46	130.0	± 9.6 %
		Y	6.71	68.57	17.24		130.0	
		Z	6.55	68.09	16.95		130.0	
10646-AAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	X	14.14	107.69	38.12	9.30	60.0	± 9.6 %
		Y	100.00	144.94	46.77		60.0	
		Z	30.85	119.35	40.08		60.0	
10647-AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	X	12.04	104.46	37.24	9.30	60.0	± 9.6 %
		Y	100.00	146.11	47.28		60.0	
		Z	27.80	117.78	39.79		60.0	
10648-AAA	CDMA2000 (1x Advanced)	X	0.47	61.13	7.86	0.00	150.0	± 9.6 %
		Y	0.88	66.67	13.23		150.0	
		Z	0.57	61.81	9.11		150.0	
10652-AAD	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.52	67.37	16.66	2.23	80.0	± 9.6 %
		Y	4.30	69.06	17.80		80.0	
		Z	3.79	67.33	16.72		80.0	
10653-AAD	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	X	4.01	66.39	16.78	2.23	80.0	± 9.6 %
		Y	4.70	67.95	17.65		80.0	
		Z	4.29	66.62	16.85		80.0	
10654-AAD	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	X	4.01	65.96	16.79	2.23	80.0	± 9.6 %
		Y	4.63	67.55	17.61		80.0	
		Z	4.26	66.27	16.85		80.0	
10655-AAE	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.08	65.87	16.81	2.23	80.0	± 9.6 %
		Y	4.69	67.57	17.65		80.0	
		Z	4.32	66.26	16.89		80.0	
10658-AAA	Pulse Waveform (200Hz, 10%)	X	100.00	112.61	27.04	10.00	50.0	± 9.6 %
		Y	100.00	116.07	29.63		50.0	
		Z	100.00	115.00	28.71		50.0	
10659-AAA	Pulse Waveform (200Hz, 20%)	X	100.00	111.16	25.24	6.99	60.0	± 9.6 %
		Y	100.00	113.33	27.35		60.0	
		Z	100.00	111.29	25.96		60.0	

10660-AAA	Pulse Waveform (200Hz, 40%)	X	100.00	110.59	23.58	3.98	80.0	± 9.6 %
		Y	100.00	112.96	25.87		80.0	
		Z	100.00	108.11	23.21		80.0	
10661-AAA	Pulse Waveform (200Hz, 60%)	X	100.00	108.86	21.59	2.22	100.0	± 9.6 %
		Y	100.00	116.28	26.03		100.0	
		Z	100.00	104.99	20.64		100.0	
10662-AAA	Pulse Waveform (200Hz, 80%)	X	100.00	91.27	13.16	0.97	120.0	± 9.6 %
		Y	100.00	127.90	28.93		120.0	
		Z	18.81	83.38	12.18		120.0	
10670-AAA	Bluetooth Low Energy	X	100.00	115.25	24.54	2.19	100.0	± 9.6 %
		Y	100.00	116.78	26.61		100.0	
		Z	100.00	108.14	22.30		100.0	

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

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Accreditation No.: SCS 0108

Client **Auden**

Certificate No: EX3-7515_Oct18

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:7515

Calibration procedure(s): QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: October 3, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-18 (No. 217-02682)	Apr-19
Reference Probe ES3DV2	SN: 3013	30-Dec-17 (No. ES3-3013_Dec17)	Dec-18
DAE4	SN: 660	21-Dec-17 (No. DAE4-660_Dec17)	Dec-18
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 3, 2018

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:7515

Manufactured: March 28, 2018
Calibrated: October 3, 2018

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7515

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.42	0.50	0.46	± 10.1 %
DCP (mV)[B]	97.1	97.7	95.7	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	169.5	±2.2 %
		Y	0.0	0.0	1.0		156.2	
		Z	0.0	0.0	1.0		176.6	

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7515

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	10.11	10.11	10.11	0.54	0.80	± 12.0 %
835	41.5	0.90	9.75	9.75	9.75	0.41	0.88	± 12.0 %
900	41.5	0.97	9.68	9.68	9.68	0.55	0.85	± 12.0 %
1750	40.1	1.37	8.65	8.65	8.65	0.34	0.88	± 12.0 %
1900	40.0	1.40	8.33	8.33	8.33	0.25	0.90	± 12.0 %
2000	40.0	1.40	8.28	8.28	8.28	0.29	0.88	± 12.0 %
2300	39.5	1.67	7.86	7.86	7.86	0.35	0.87	± 12.0 %
2450	39.2	1.80	7.42	7.42	7.42	0.36	0.88	± 12.0 %
2600	39.0	1.96	7.37	7.37	7.37	0.33	0.97	± 12.0 %
5250	35.9	4.71	5.45	5.45	5.45	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.83	4.83	4.83	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.95	4.95	4.95	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:7515

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	10.15	10.15	10.15	0.46	0.84	± 12.0 %
835	55.2	0.97	9.99	9.99	9.99	0.38	1.01	± 12.0 %
900	55.0	1.05	9.69	9.69	9.69	0.52	0.80	± 12.0 %
1750	53.4	1.49	8.20	8.20	8.20	0.36	0.93	± 12.0 %
1900	53.3	1.52	7.93	7.93	7.93	0.31	0.96	± 12.0 %
2000	53.3	1.52	7.89	7.89	7.89	0.38	0.87	± 12.0 %
2300	52.9	1.81	7.75	7.75	7.75	0.36	0.90	± 12.0 %
2450	52.7	1.95	7.53	7.53	7.53	0.36	0.94	± 12.0 %
2600	52.5	2.16	7.48	7.48	7.48	0.28	0.97	± 12.0 %
5250	48.9	5.36	4.96	4.96	4.96	0.50	1.90	± 13.1 %
5600	48.5	5.77	4.39	4.39	4.39	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.42	4.42	4.42	0.50	1.90	± 13.1 %

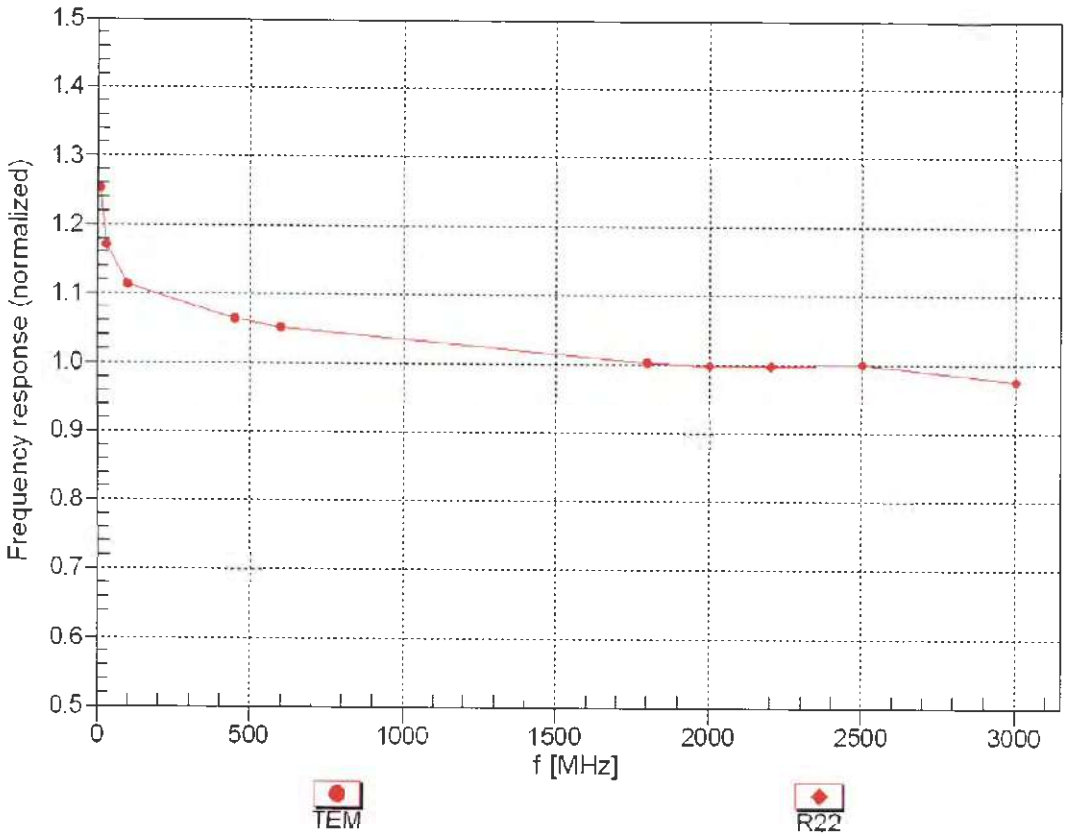
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz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

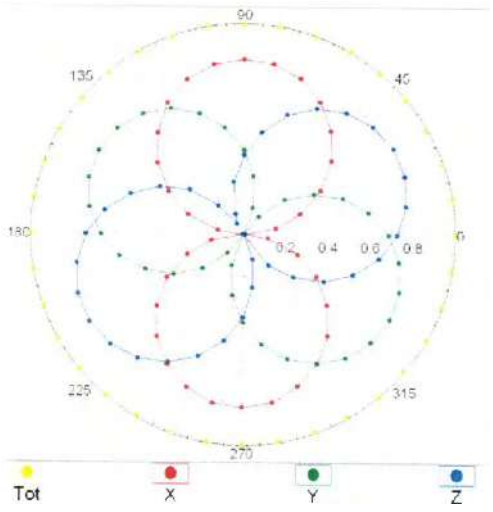
(TEM-Cell:ifi110 EXX, Waveguide: R22)



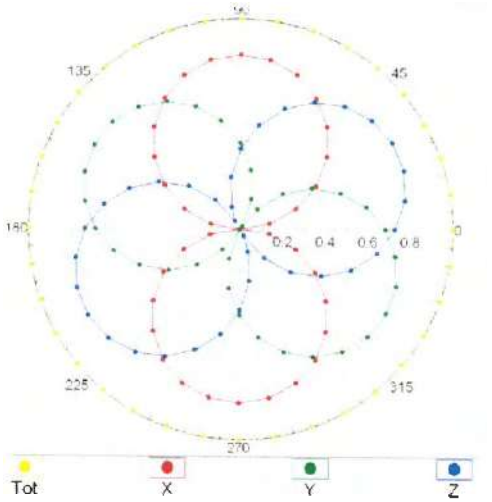
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

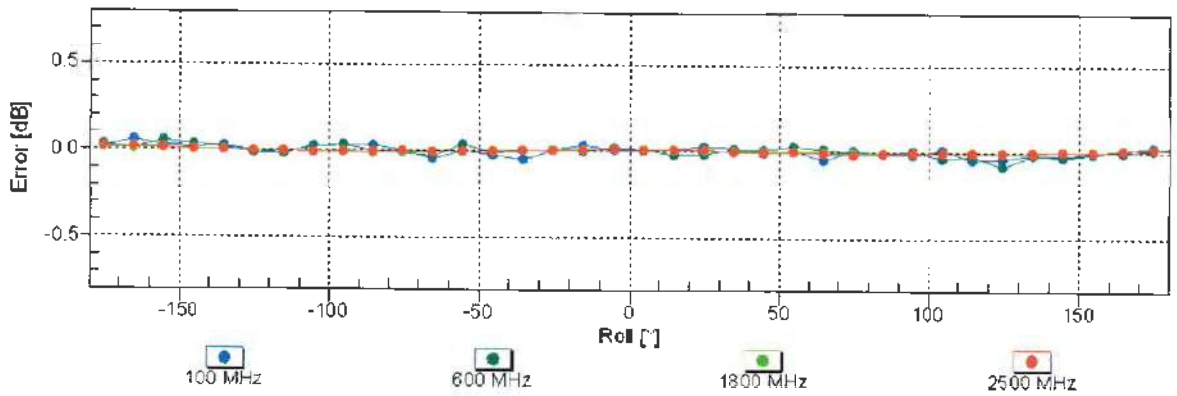
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



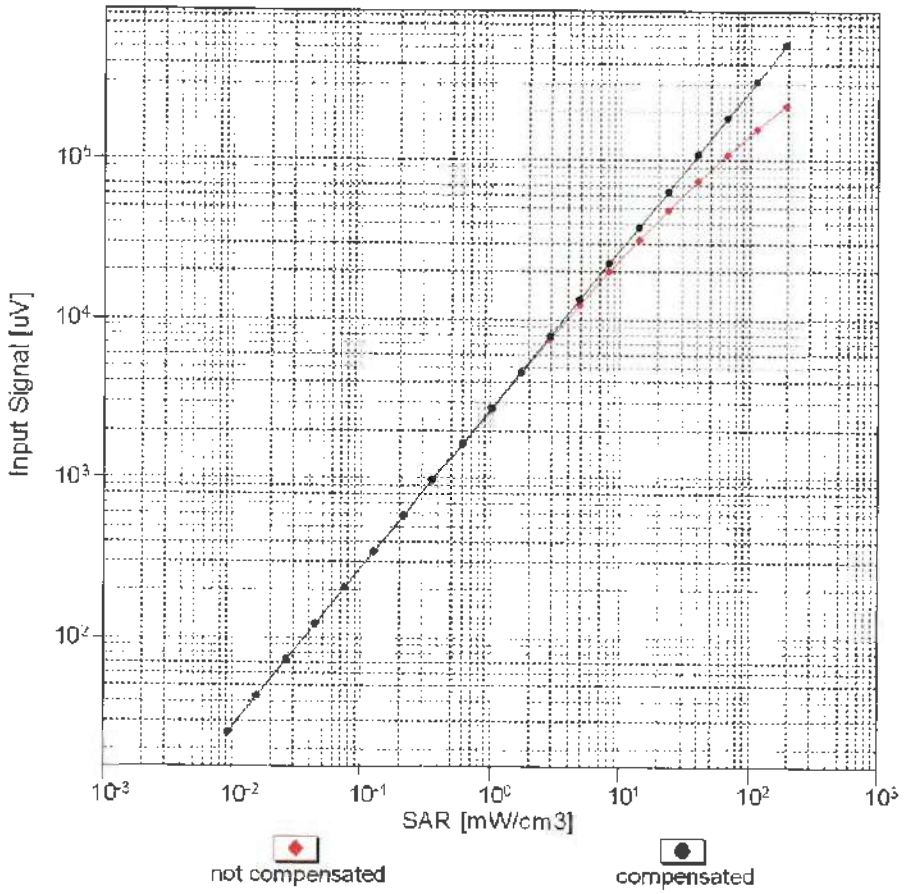
f=1800 MHz,R22

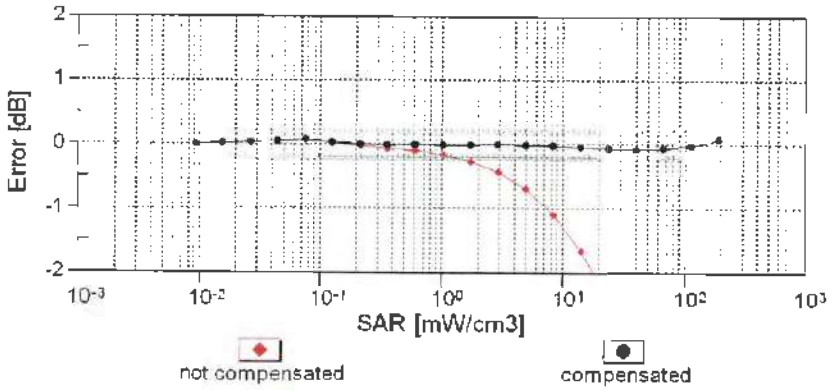




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)

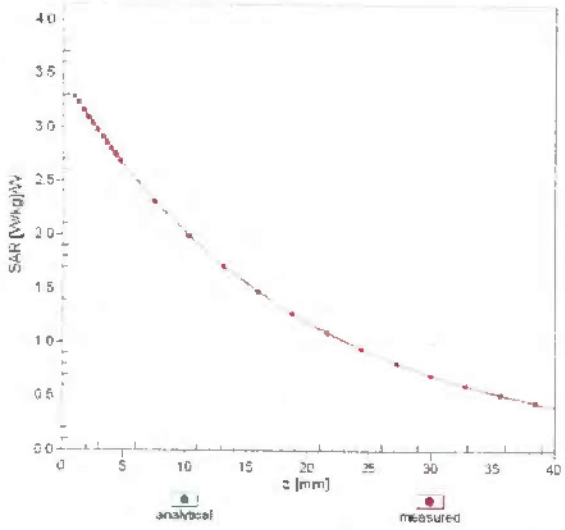




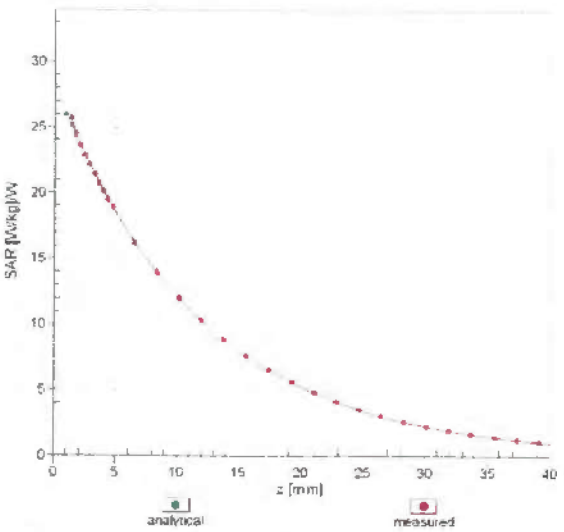
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

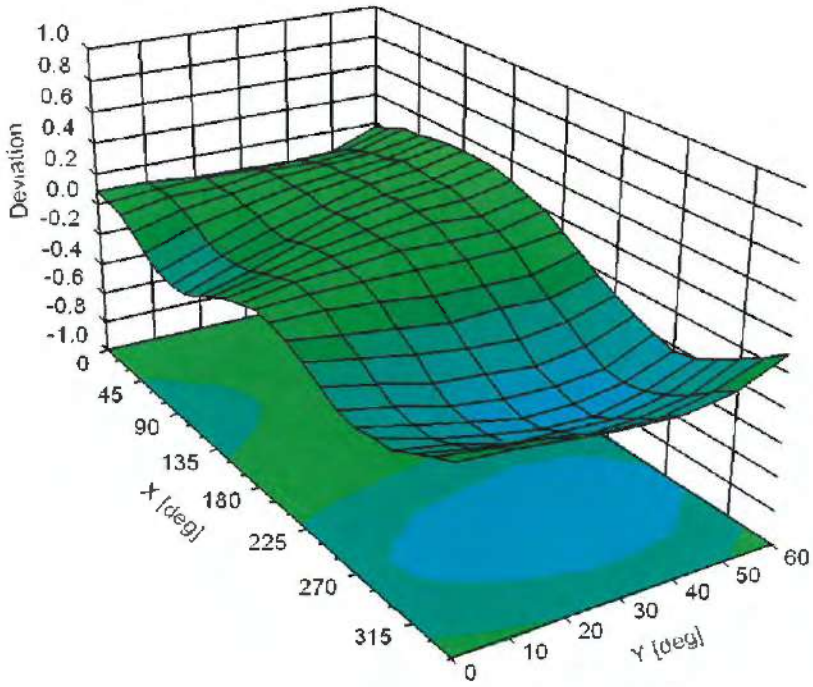


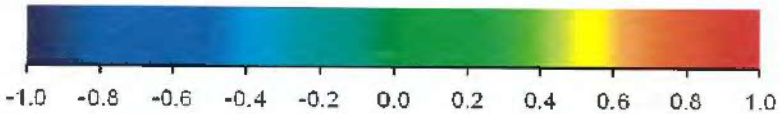
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7515

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-5.4
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