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

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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D2450V2-797_Sep17

CALIBRATION CERTIFICATE

Object	D2450V2 - SN:797
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	September 11, 2017

SC ✓ 10/03/2017

Extended PM ✓ 9/20/2018

Extended PM ✓ 10/4/2019

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 (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	31-May-17 (No. EX3-7349_May17)	May-18
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18

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

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

Issued: September 11, 2017

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Accreditation No.: **SCS 0108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.8 ± 6 %	1.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**52.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.8 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.9 ± 6 %	2.04 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**51.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.2 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.8 Ω + 7.4 jΩ
Return Loss	- 21.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.7 Ω + 9.1 jΩ
Return Loss	- 20.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.152 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	January 24, 2006

DASY5 Validation Report for Head TSL

Date: 11.09.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 797

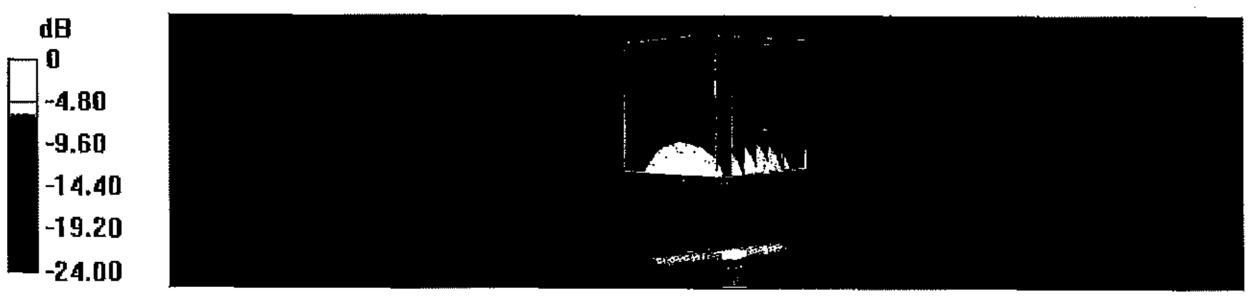
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.86 S/m; ε_r = 37.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.12, 8.12, 8.12); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

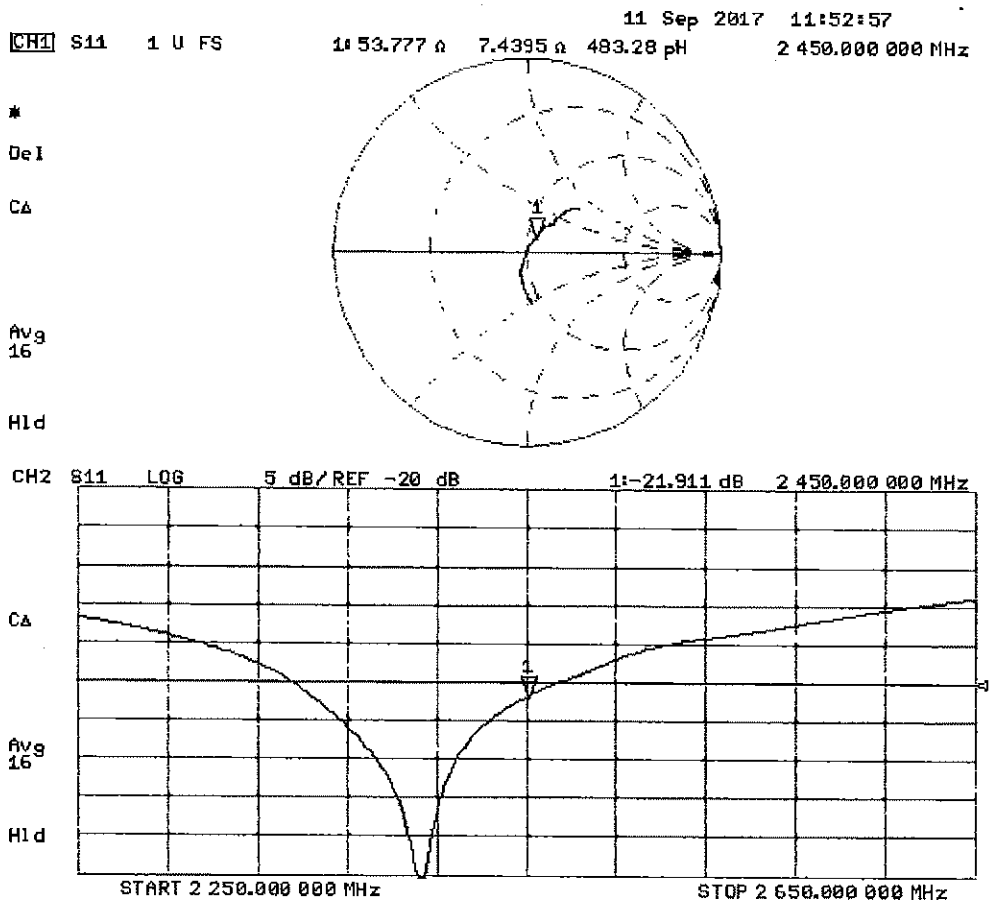
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 113.5 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 26.9 W/kg
SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.28 W/kg
Maximum value of SAR (measured) = 21.6 W/kg



0 dB = 21.6 W/kg = 13.34 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 11.09.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 797

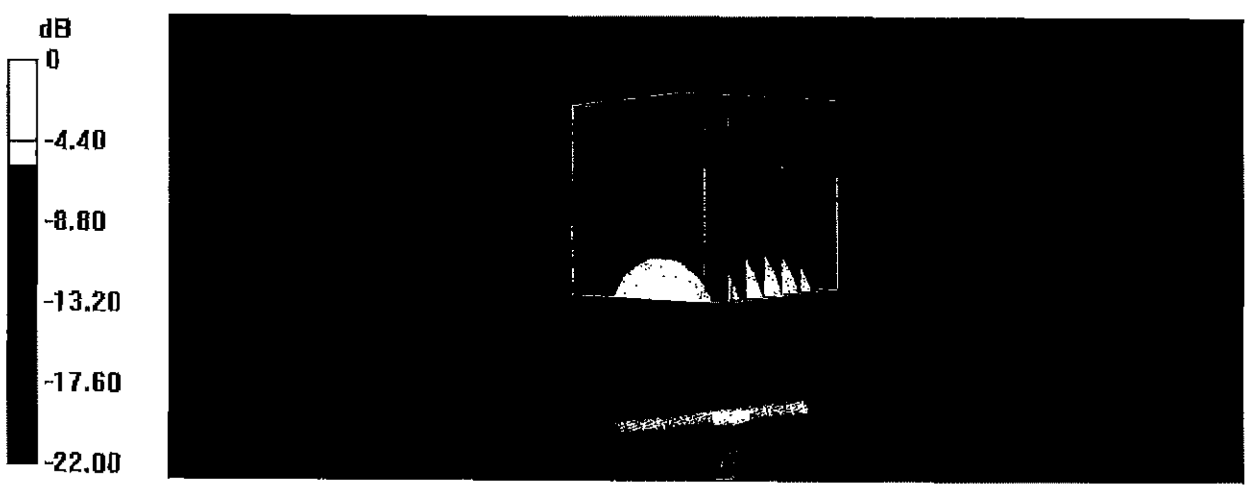
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.04 S/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.1, 8.1, 8.1); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

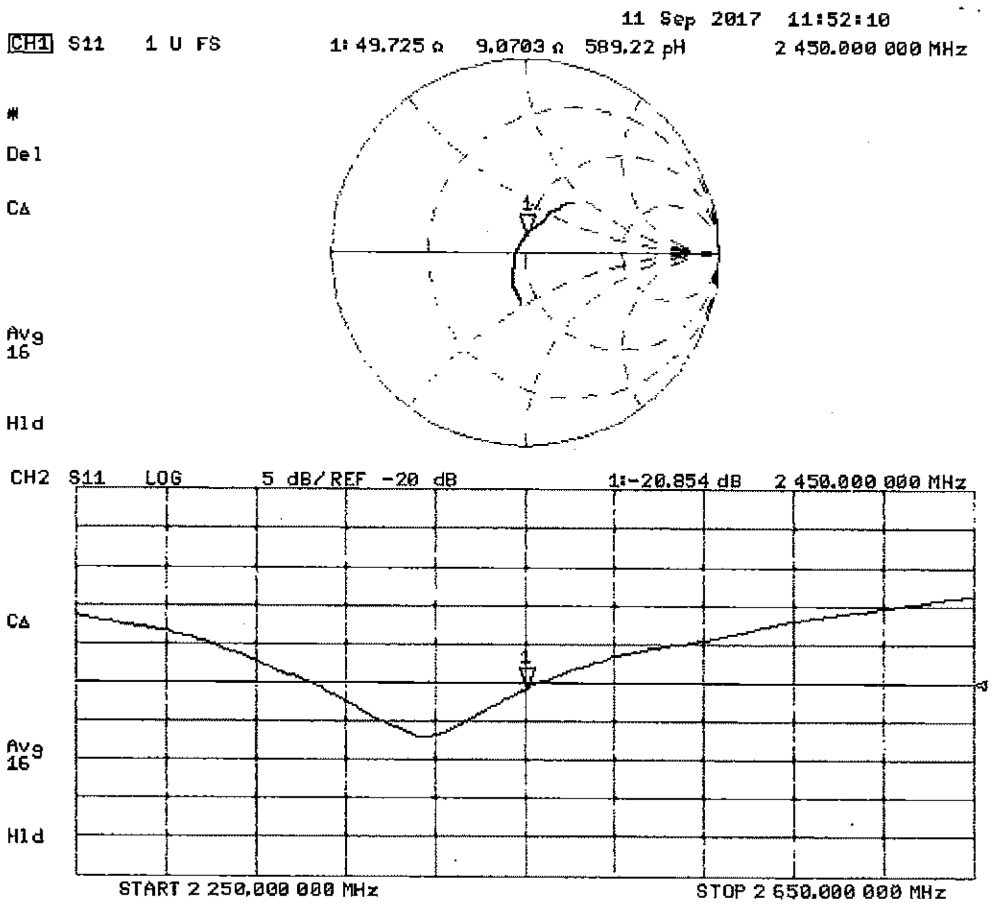
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 105.4 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 25.6 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.14 W/kg
Maximum value of SAR (measured) = 20.3 W/kg



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

Impedance Measurement Plot for Body TSL



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Certification of Calibration

Object D2450V2 – SN: 797

Calibration procedure(s) Procedure for Calibration Extension for SAR Dipoles.

Extended Calibration date: September 11, 2018

Description: SAR Validation Dipole at 2450 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Biennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330156
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
Agilent	8753ES	S-Parameter Vector Network Analyzer	8/30/2018	Annual	8/30/2019	MY40003841
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/15/2018	Annual	5/15/2019	1070
SPEAG	EX3DV4	SAR Probe	7/20/2018	Annual	7/20/2019	7410
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/11/2018	Annual	7/11/2019	1322
SPEAG	ES3DV3	SAR Probe	3/13/2018	Annual	3/13/2019	3319
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/7/2018	Annual	3/7/2019	1368
Anritsu	MA2411B	Pulse Power Sensor	3/2/2018	Annual	3/2/2019	1207364
Anritsu	MA2411B	Pulse Power Sensor	3/2/2018	Annual	3/2/2019	1339018
Anritsu	ML2495A	Power Meter	10/22/2017	Annual	10/22/2018	1328004
Agilent	N5182A	MXG Vector Signal Generator	4/18/2018	Annual	4/18/2019	MY47420800
Seekonk	NC-100	Torque Wrench	7/11/2018	Annual	7/11/2019	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path.

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Team Lead Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	KOK

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

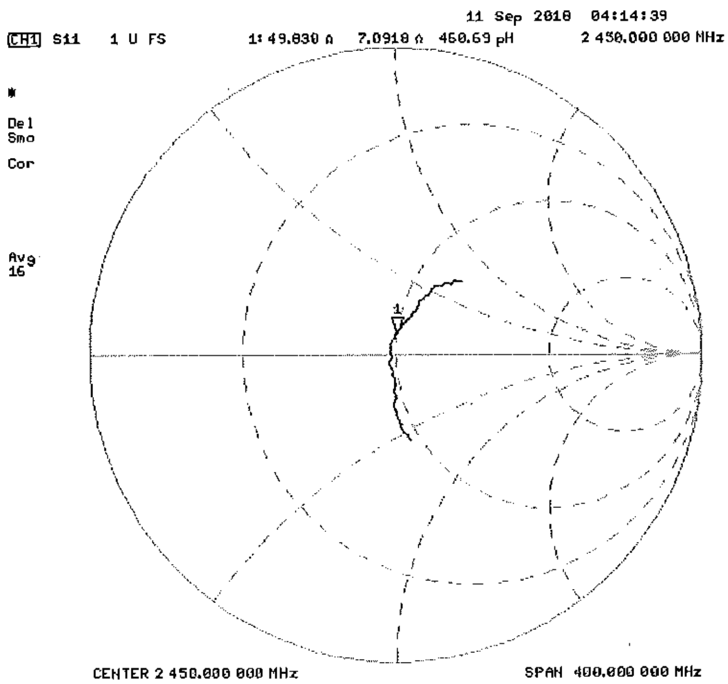
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

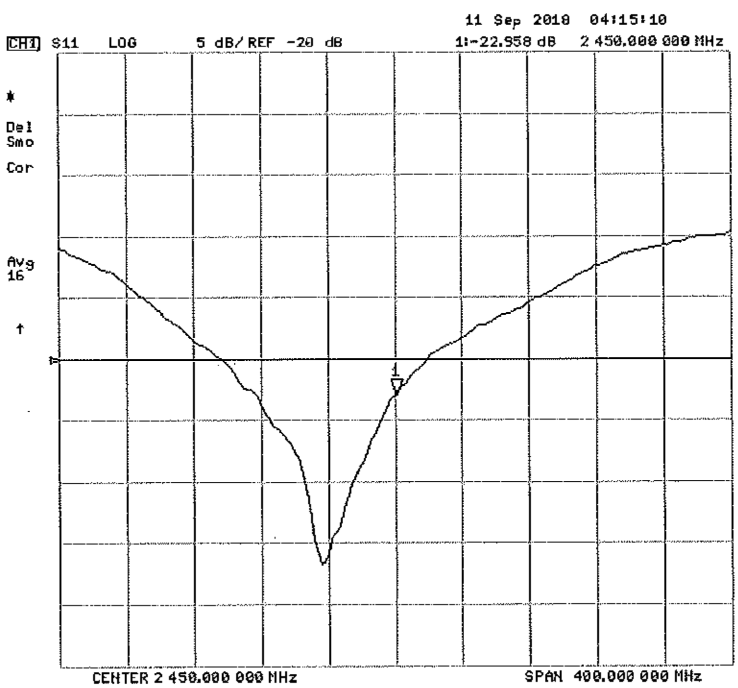
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
9/11/2017	9/11/2018	1.152	5.27	5.52	4.74%	2.48	2.54	2.42%	53.8	49.8	4	7.4	7.1	0.3	-21.9	-23	-4.80%	PASS

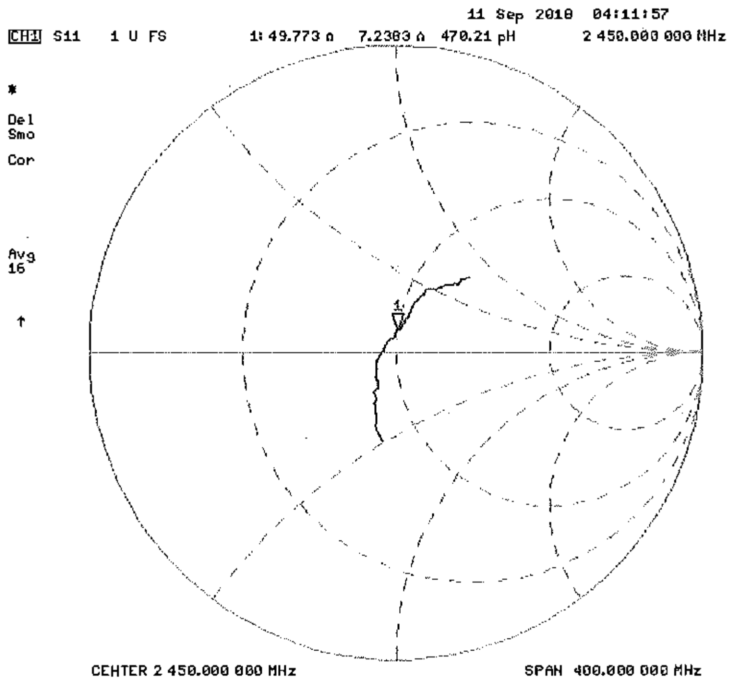
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
9/11/2017	9/11/2018	1.152	5.11	5.17	1.17%	2.42	2.37	-2.07%	49.7	49.8	0.1	9.1	7.2	1.9	-20.9	-22.6	-8.20%	PASS

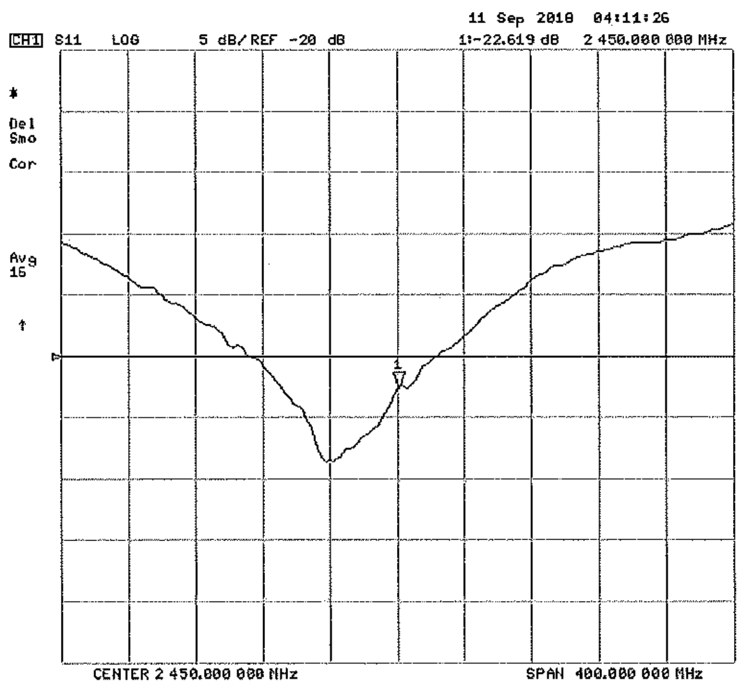
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





Certification of Calibration

Object	D2450V2 – SN: 797
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	September 9, 2019
Description:	SAR Validation Dipole at 2450 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	10/2/2018	Annual	10/2/2019	US39170118
Agilent	N5182A	MXG Vector Signal Generator	6/27/2019	Annual	6/27/2020	US46240505
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1207470
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1339007
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/28/2018	Biennial	2/28/2020	170330160
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	7/2/2019	Annual	7/2/2020	MY53401181
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	NC-100	Torque Wrench	5/23/2018	Biennial	5/23/2020	N/A
SPEAG	EX3DV4	SAR Probe	2/19/2019	Annual	2/19/2020	7417
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/13/2019	Annual	2/13/2020	665
SPEAG	EX3DV4	SAR Probe	7/15/2019	Annual	7/15/2020	7547
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/11/2019	Annual	7/11/2020	1323
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/11/2018	Annual	9/11/2019	1091

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path.

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Team Lead Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	KOK

DIPOLE CALIBRATION EXTENSION

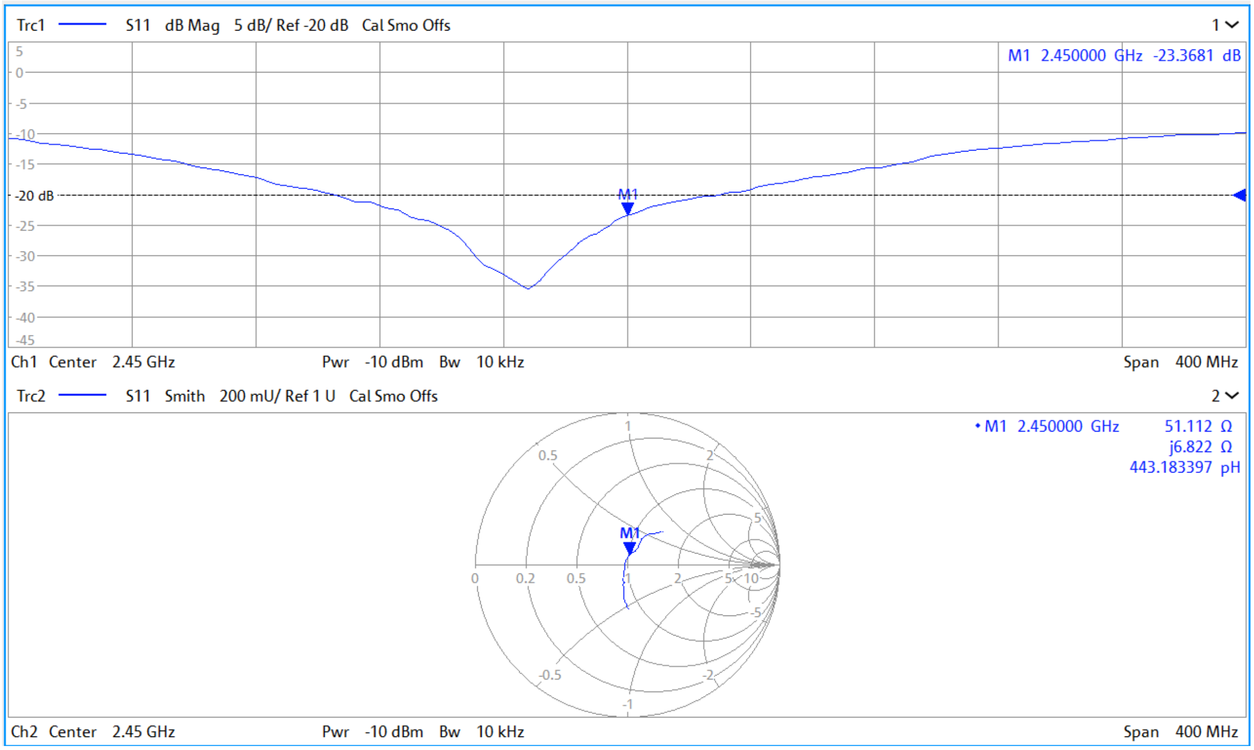
Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

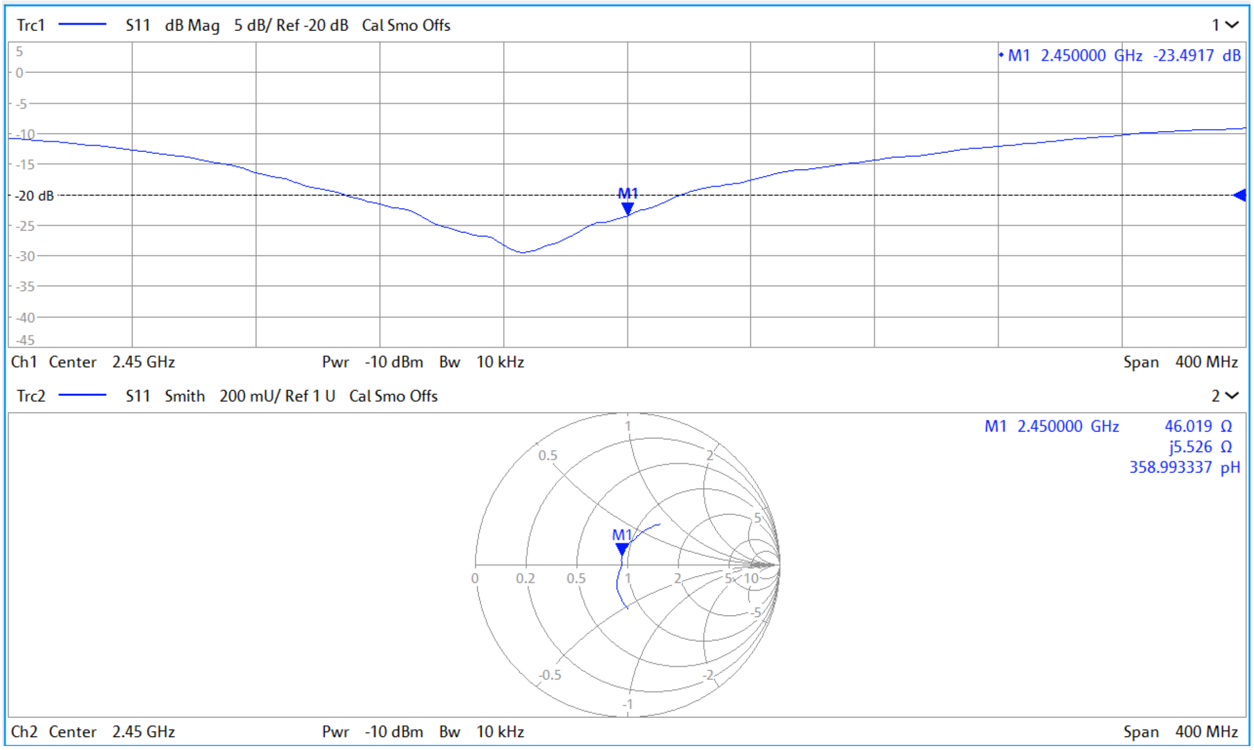
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
9/11/2017	9/9/2019	1.152	5.27	5.19	-1.52%	2.48	2.41	-2.82%	53.8	51.1	2.7	7.4	6.8	0.6	-21.9	-23.4	-6.70%	PASS
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
9/11/2017	9/9/2019	1.152	5.11	5.17	1.17%	2.42	2.38	-1.65%	49.7	46	3.7	9.1	5.5	3.6	-20.9	-23.5	-12.40%	PASS

Impedance & Return-Loss Measurement Plot for Head TSL



Impedance & Return-Loss Measurement Plot for Body TSL



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S **Schweizerischer Kalibrierdienst**
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S **Servizio svizzero di taratura**
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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 **PC Test**

Certificate No: D1900V2-5d149_Oct18

CALIBRATION CERTIFICATE

Object: D1900V2 - SN:5d149

Calibration procedure(s): QA CAL-05.v10
Calibration procedure for dipole validation kits above 700 MHz

BNV
10-30-2018

Calibration date: October 23, 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: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

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

Issued: October 23, 2018

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.3 ± 6 %	1.40 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.80 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**39.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.5 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.9 ± 6 %	1.47 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.68 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**39.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.11 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.7 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.9 Ω + 6.3 jΩ
Return Loss	- 23.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.5 Ω + 8.2 jΩ
Return Loss	- 21.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.193 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 11, 2011

DASY5 Validation Report for Head TSL

Date: 23.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d149

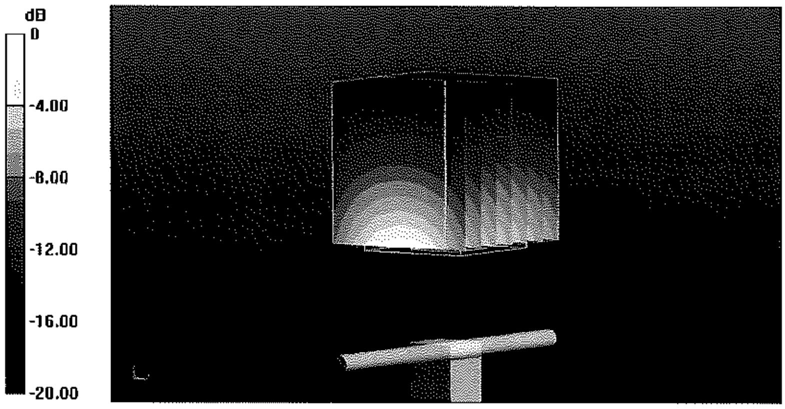
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.4 S/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.18, 8.18, 8.18) @ 1900 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

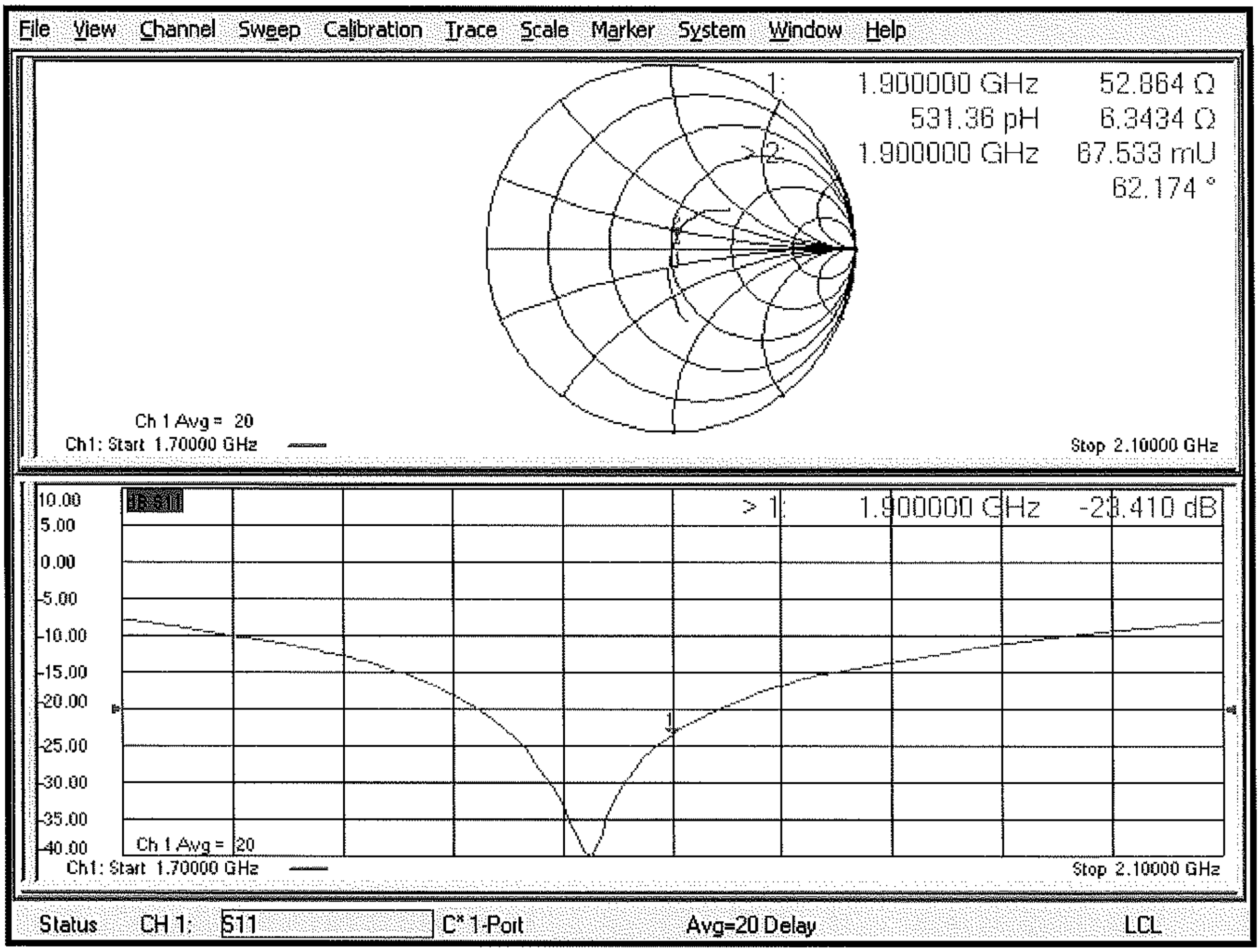
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 110.0 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 18.5 W/kg
SAR(1 g) = 9.8 W/kg; SAR(10 g) = 5.11 W/kg
Maximum value of SAR (measured) = 15.4 W/kg



0 dB = 15.4 W/kg = 11.88 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 23.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d149

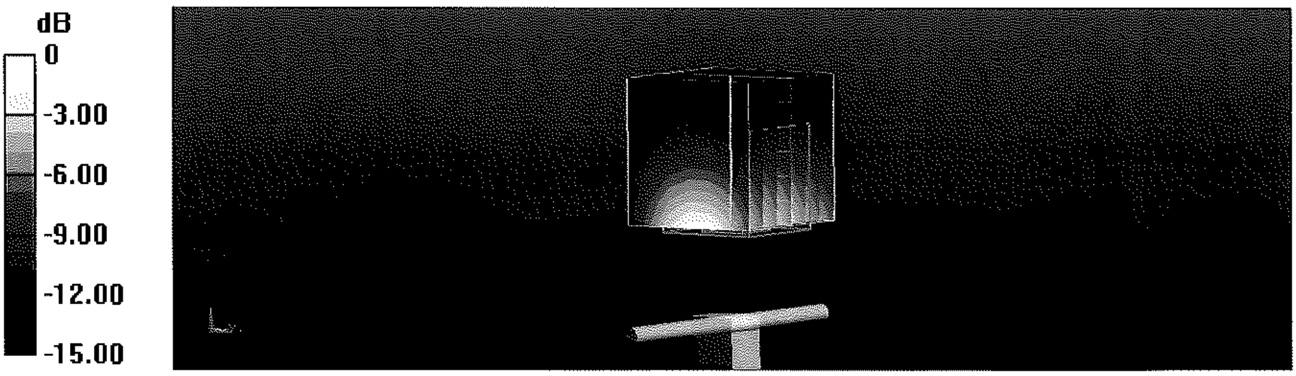
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.47 S/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.15, 8.15, 8.15) @ 1900 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

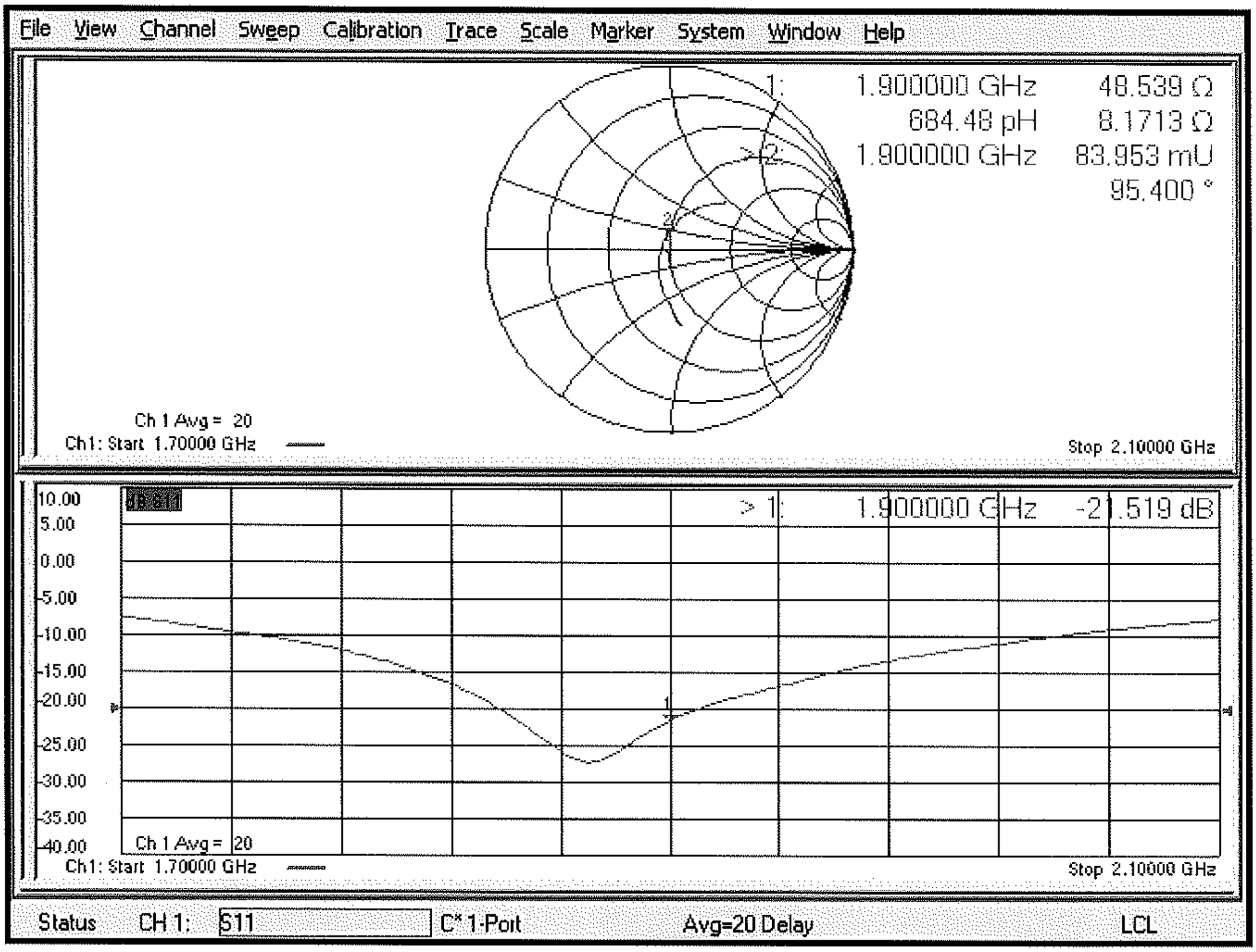
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 103.1 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 17.5 W/kg
SAR(1 g) = 9.68 W/kg; SAR(10 g) = 5.11 W/kg
Maximum value of SAR (measured) = 14.2 W/kg



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

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D2450V2-719_Aug19

CALIBRATION CERTIFICATE

Object	D2450V2 - SN:719
Calibration procedure(s)	QA CAL-05.v11 Calibration Procedure for SAR Validation Sources between 0.7-3 GHz
Calibration date:	August 14, 2019

BNV
08/30/2019

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 (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 7349	29-May-19 (No. EX3-7349_May19)	May-20
DAE4	SN: 601	30-Apr-19 (No. DAE4-601_Apr19)	Apr-20

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

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

Issued: August 15, 2019

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

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.8 ± 6 %	1.83 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**53.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.25 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.7 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	50.8 ± 6 %	2.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**50.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.09 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.0 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.6 Ω + 5.6 jΩ
Return Loss	- 23.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.0 Ω + 8.4 jΩ
Return Loss	- 21.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.150 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 14.08.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:719

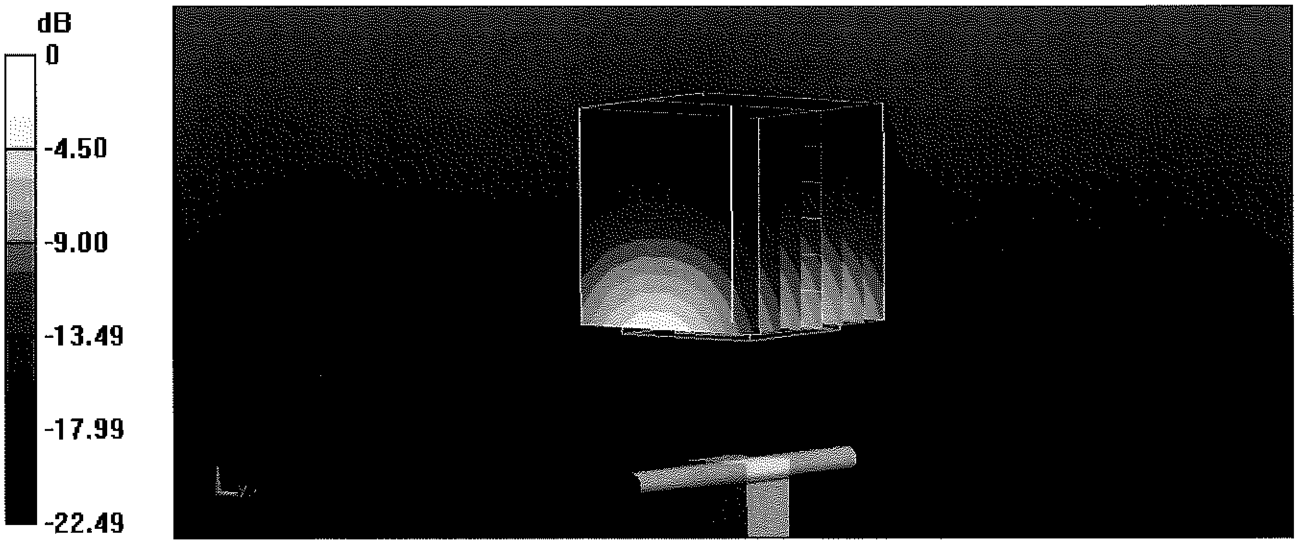
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.83 S/m; ε_r = 37.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.9, 7.9, 7.9) @ 2450 MHz; Calibrated: 29.05.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

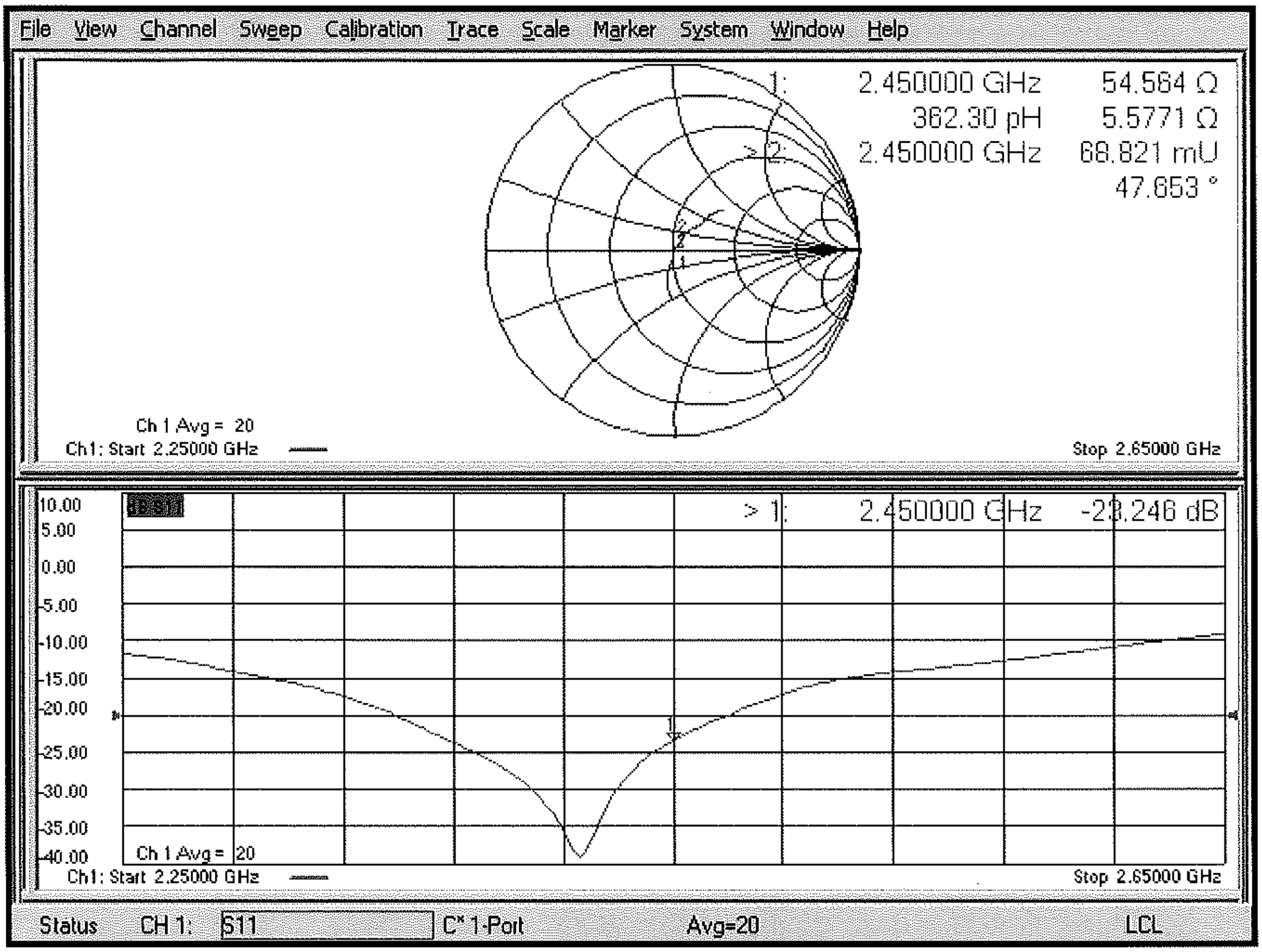
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 117.1 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 26.6 W/kg
SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.25 W/kg
Maximum value of SAR (measured) = 21.8 W/kg



0 dB = 21.8 W/kg = 13.38 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 14.08.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:719

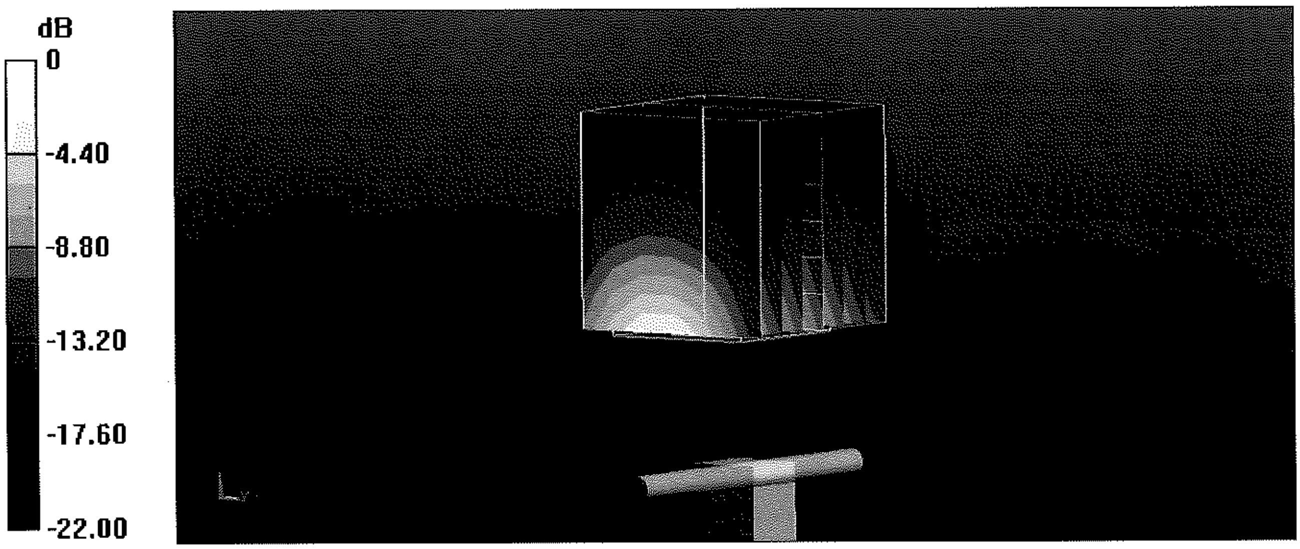
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.01 S/m; ε_r = 50.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.94, 7.94, 7.94) @ 2450 MHz; Calibrated: 29.05.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

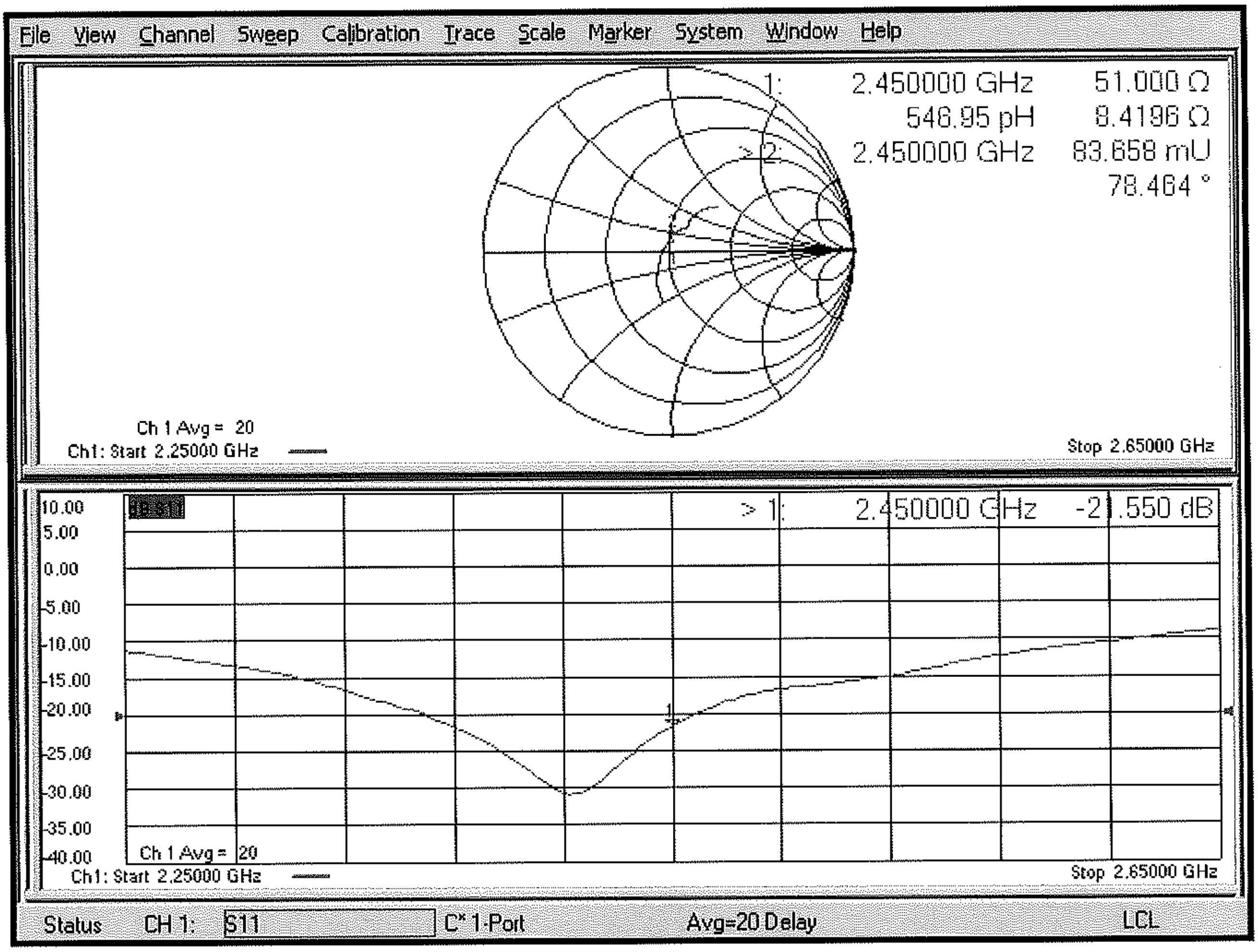
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 105.2 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 25.6 W/kg
SAR(1 g) = 13 W/kg; SAR(10 g) = 6.09 W/kg
Maximum value of SAR (measured) = 20.0 W/kg



0 dB = 20.0 W/kg = 13.01 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **D2600V2-1064_Jun19**

CALIBRATION CERTIFICATE

Object: D2600V2 - SN:1064

Calibration procedure(s): QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

BNV 07/31/2019

Calibration date: June 14, 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 (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 7349	29-May-19 (No. EX3-7349_May19)	May-20
DAE4	SN: 601	30-Apr-19 (No. DAE4-601_Apr19)	Apr-20

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

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

Issued: June 20, 2019

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.3 ± 6 %	2.03 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.9 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**58.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.59 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**26.0 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	50.5 ± 6 %	2.22 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	14.2 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**55.6 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.33 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**25.0 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.8 Ω - 6.9 jΩ
Return Loss	- 23.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.6 Ω - 4.4 jΩ
Return Loss	- 24.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.151 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 14.06.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1064

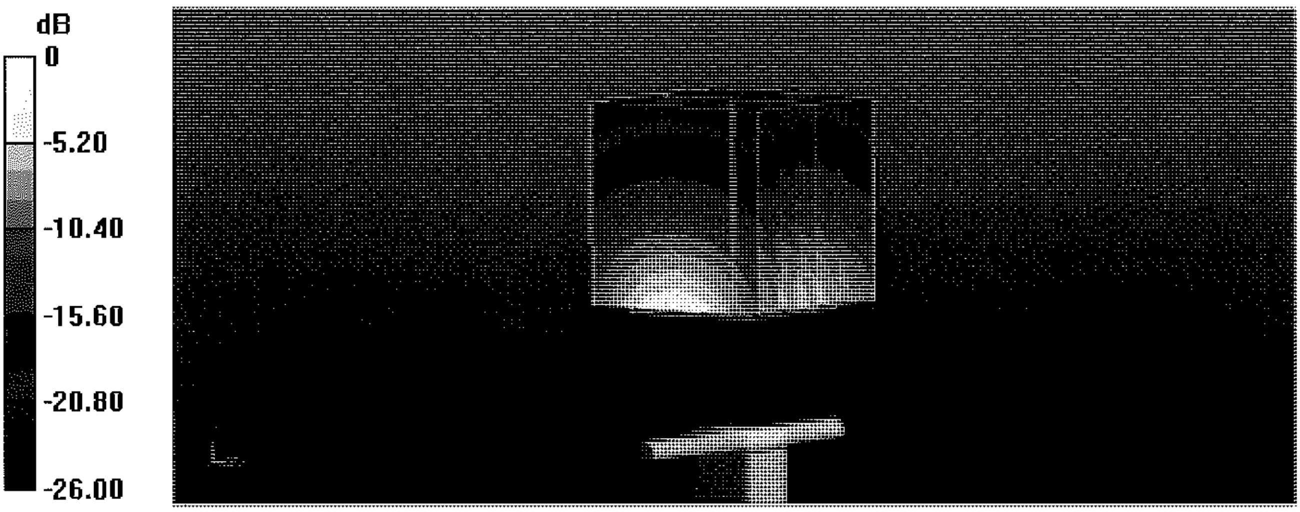
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.03 S/m; ε_r = 37.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.69, 7.69, 7.69) @ 2600 MHz; Calibrated: 29.05.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

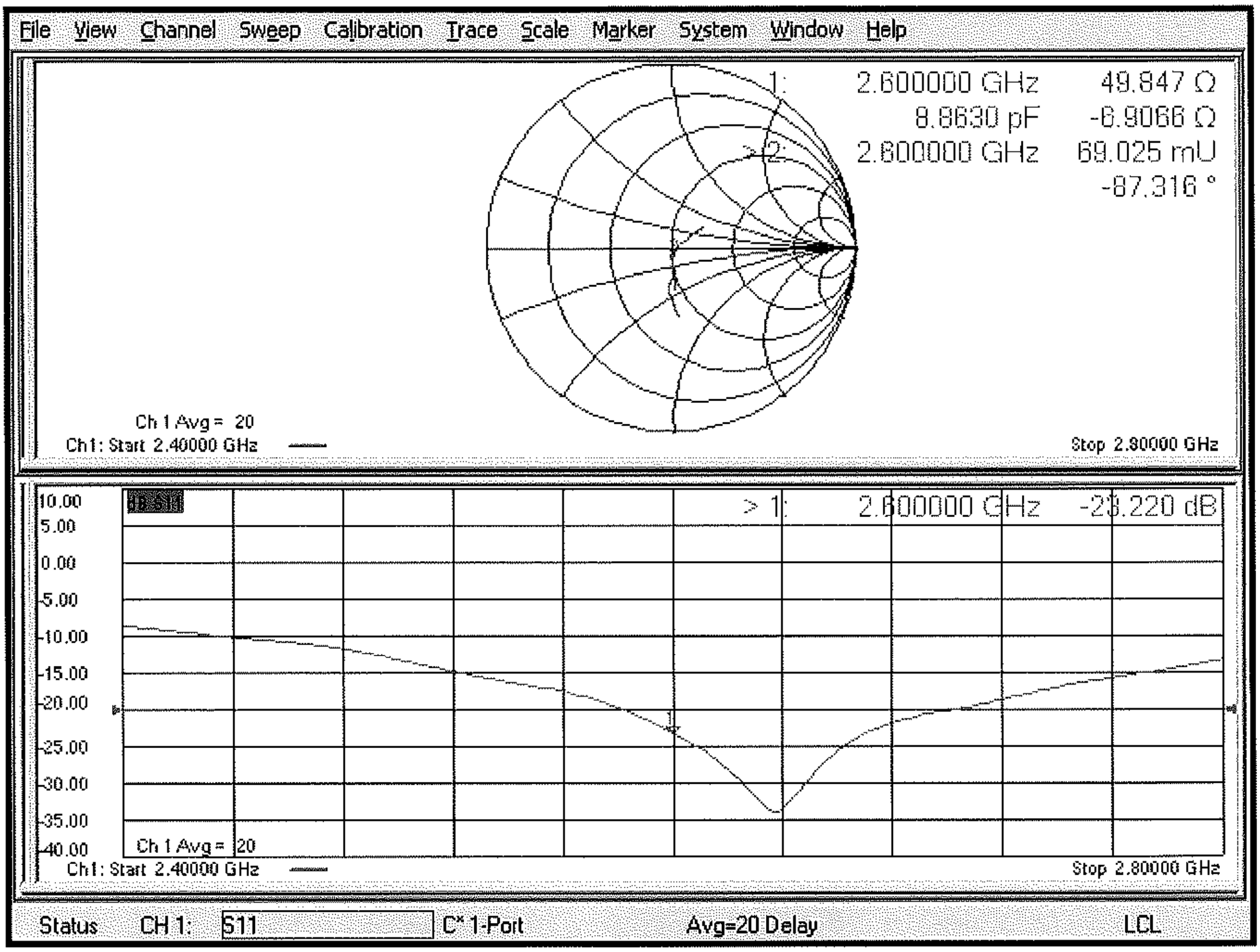
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 120.9 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 30.2 W/kg
SAR(1 g) = 14.9 W/kg; SAR(10 g) = 6.59 W/kg
Maximum value of SAR (measured) = 25.1 W/kg



0 dB = 25.1 W/kg = 14.00 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 14.06.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1064

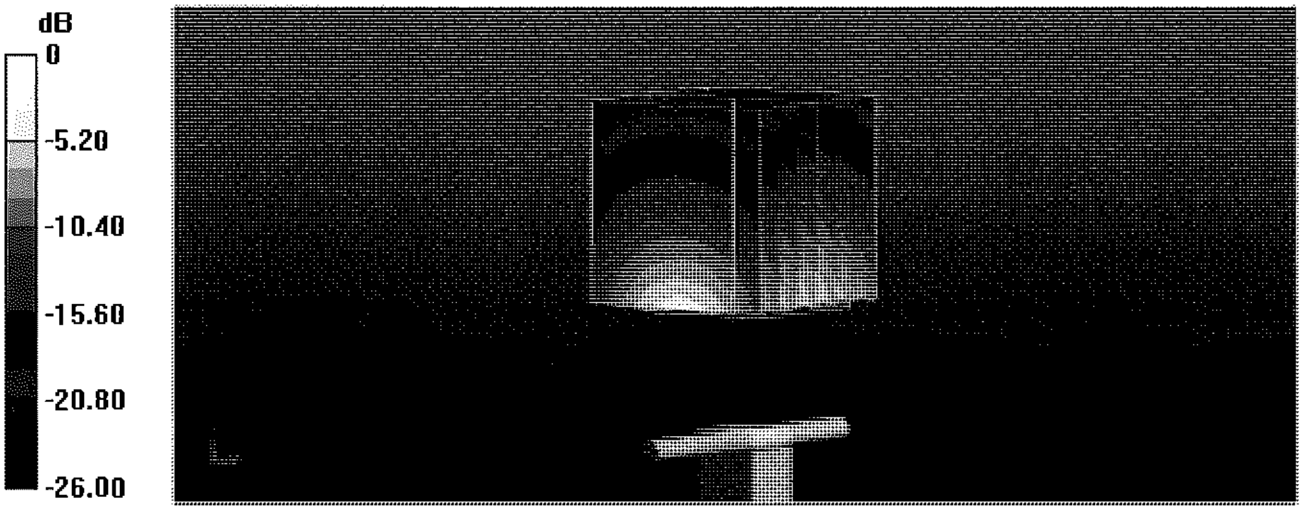
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.22 S/m; ε_r = 50.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.8, 7.8, 7.8) @ 2600 MHz; Calibrated: 29.05.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

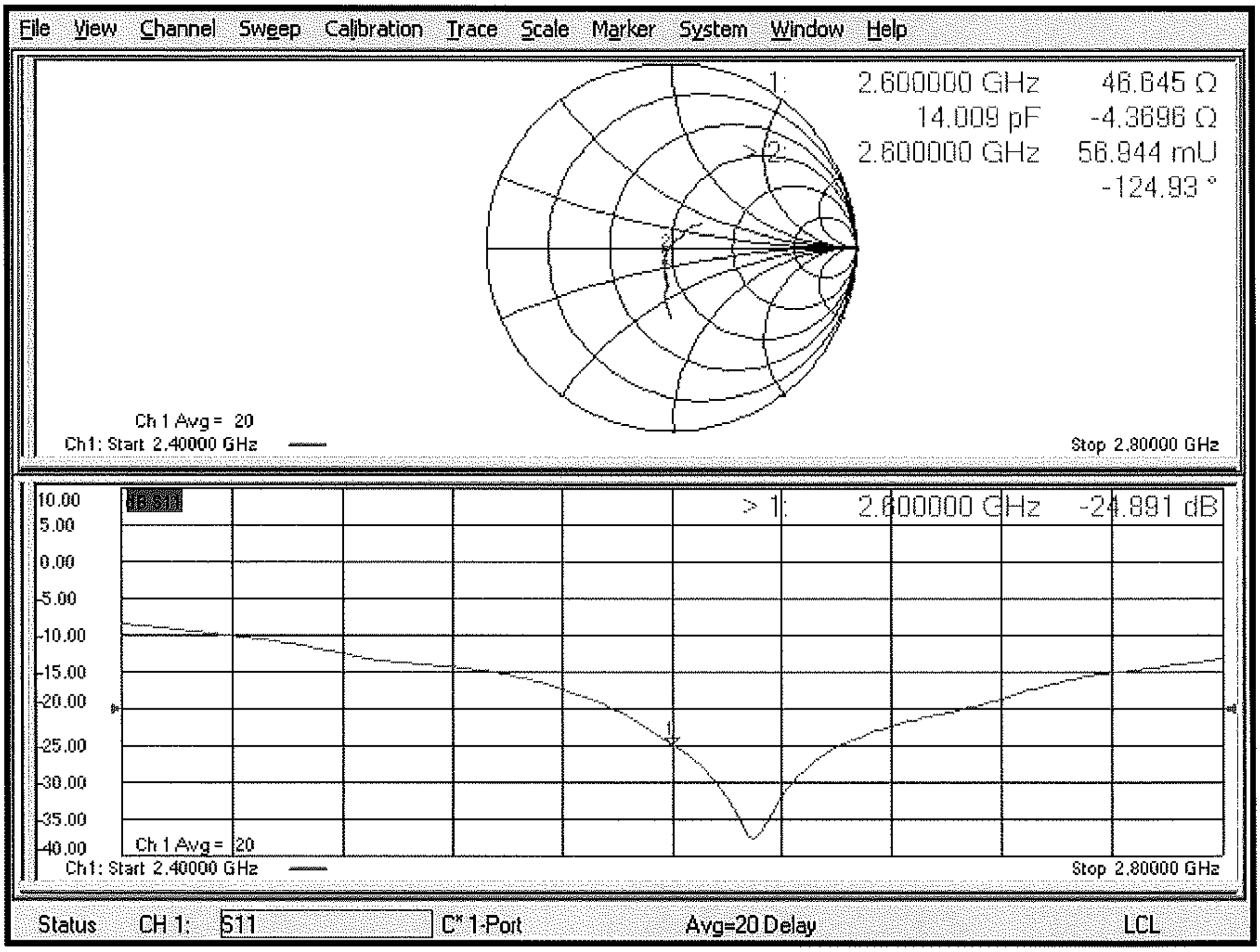
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 110.6 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 28.9 W/kg
SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.33 W/kg
Maximum value of SAR (measured) = 23.6 W/kg



0 dB = 23.6 W/kg = 13.73 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client PC Test

Certificate No: D2600V2-1126_Aug19

CALIBRATION CERTIFICATE

Object	D2600V2 - SN:1126
Calibration procedure(s)	QA CAL-05.v11 Calibration Procedure for SAR Validation Sources between 0.7-3 GHz
Calibration date:	August 14, 2019

BN ✓
08/30/2019

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 (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 7349	29-May-19 (No. EX3-7349_May19)	May-20
DAE4	SN: 601	30-Apr-19 (No. DAE4-601_Apr19)	Apr-20

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

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

Issued: August 15, 2019

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.3 ± 6 %	2.00 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**56.5 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.3 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	50.4 ± 6 %	2.19 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.8 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**54.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.3 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.3 Ω - 7.2 jΩ
Return Loss	- 22.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.3 Ω - 5.5 jΩ
Return Loss	- 22.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.155 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 14.08.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1126

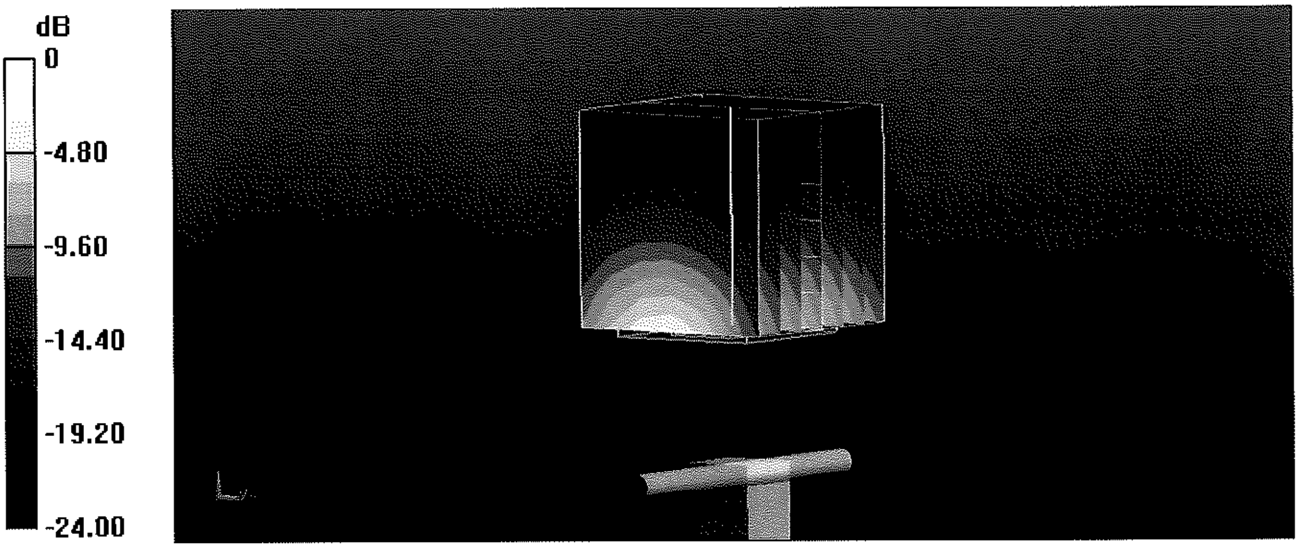
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2 S/m; ε_r = 37.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.69, 7.69, 7.69) @ 2600 MHz; Calibrated: 29.05.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

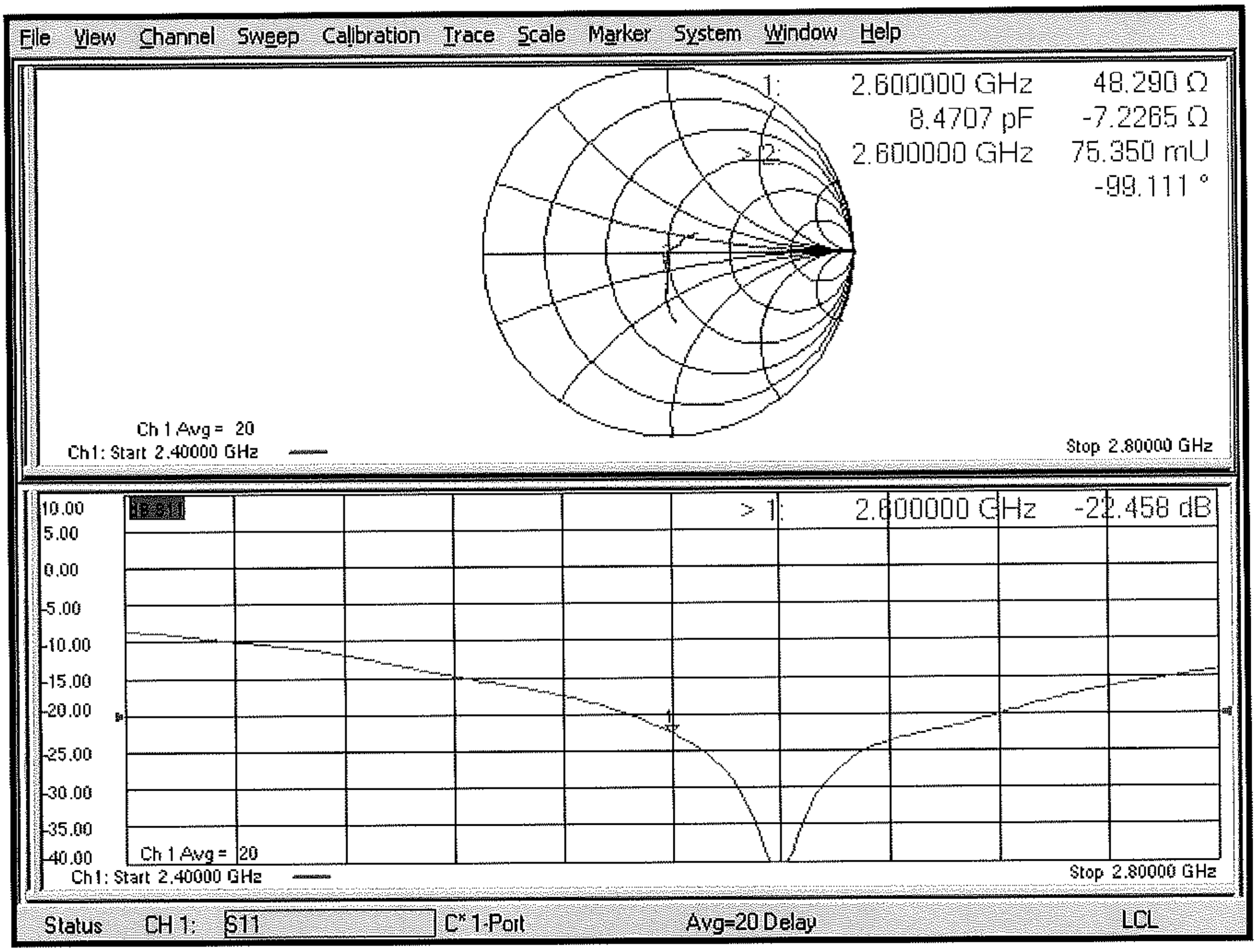
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 118.5 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 29.0 W/kg
SAR(1 g) = 14.4 W/kg; SAR(10 g) = 6.41 W/kg
Maximum value of SAR (measured) = 23.8 W/kg



0 dB = 23.8 W/kg = 13.77 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 14.08.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1126

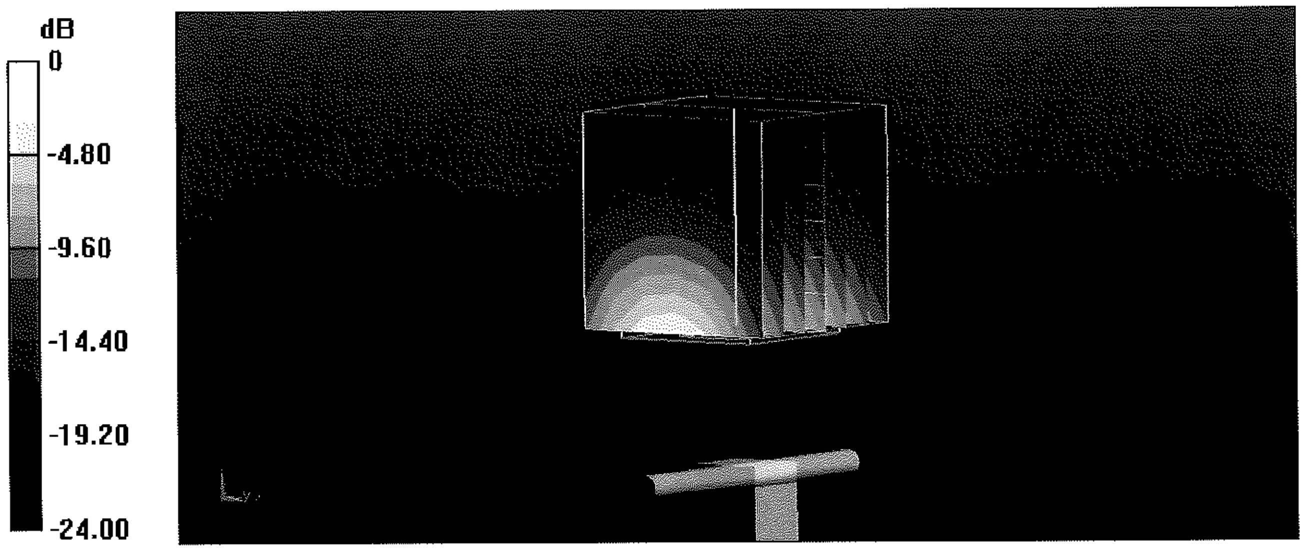
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.19 S/m; ε_r = 50.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.8, 7.8, 7.8) @ 2600 MHz; Calibrated: 29.05.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

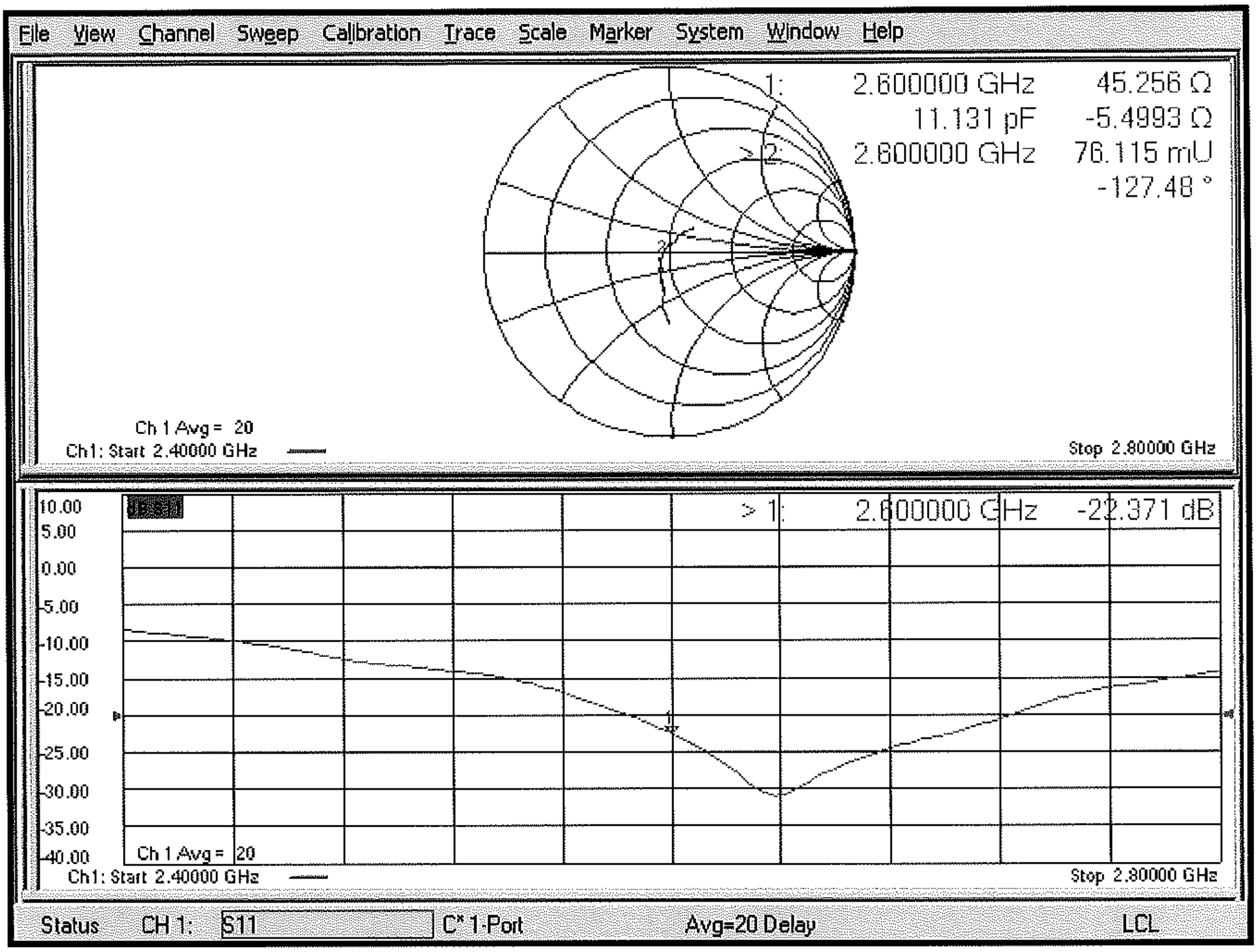
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 109.3 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 28.2 W/kg
SAR(1 g) = 13.8 W/kg; SAR(10 g) = 6.14 W/kg
Maximum value of SAR (measured) = 22.9 W/kg



0 dB = 22.9 W/kg = 13.60 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D2450V2-981_Aug18

CALIBRATION CERTIFICATE

Object: D2450V2 - SN:981

Calibration procedure(s): QA CAL-05.v10
Calibration procedure for dipole validation kits above 700 MHz

BN ✓
09-06/2018

Calibration date: August 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
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: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-17)	In house check: Oct-18

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

Issued: August 23, 2018

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Accreditation No.: **SCS 0108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5.0 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.7 ± 6 %	1.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**52.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.20 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.4 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.8 ± 6 %	2.02 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**50.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.11 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.2 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.0 Ω + 2.3 jΩ
Return Loss	- 25.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.2 Ω + 4.7 jΩ
Return Loss	- 26.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.162 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 30, 2014

Appendix (Additional assessments outside the scope of SCS 0108)

Measurement Conditions

DASY system configuration, as far as not given on page 1 and 3.

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L

SAR result with SAM Head (Top)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**54.0 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.2 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**54.0 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.3 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Neck)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	12.9 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**51.2 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.4 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Ear)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	8.74 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**34.7 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**17.5 W/kg ± 16.9 % (k=2)**

Date: 13.08.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:981

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.86 S/m; ε_r = 37.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

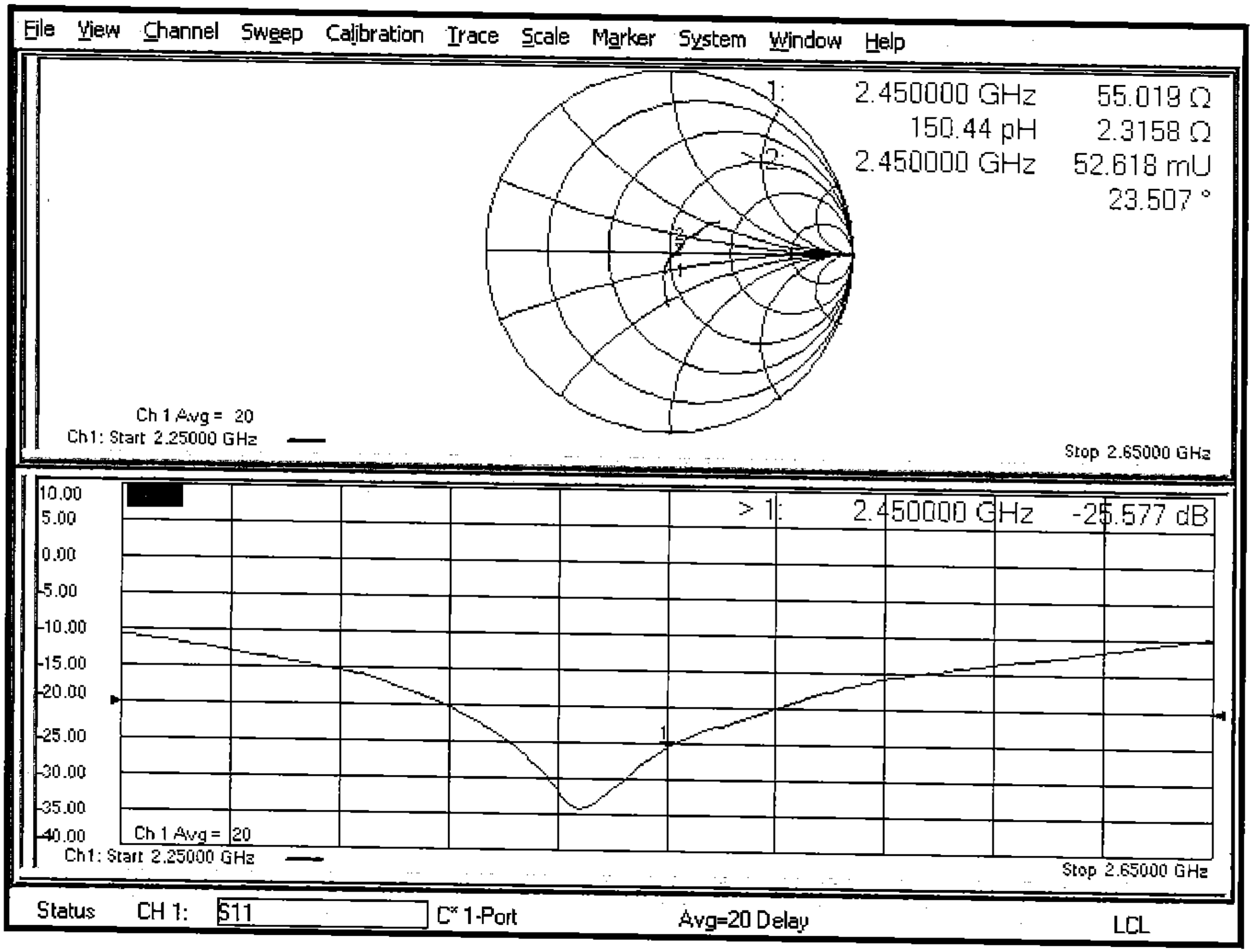
DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.88, 7.88, 7.88) @ 2450 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 116.6 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 26.7 W/kg
SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.2 W/kg
Maximum value of SAR (measured) = 22.1 W/kg

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

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 13.08.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:981

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.02 S/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

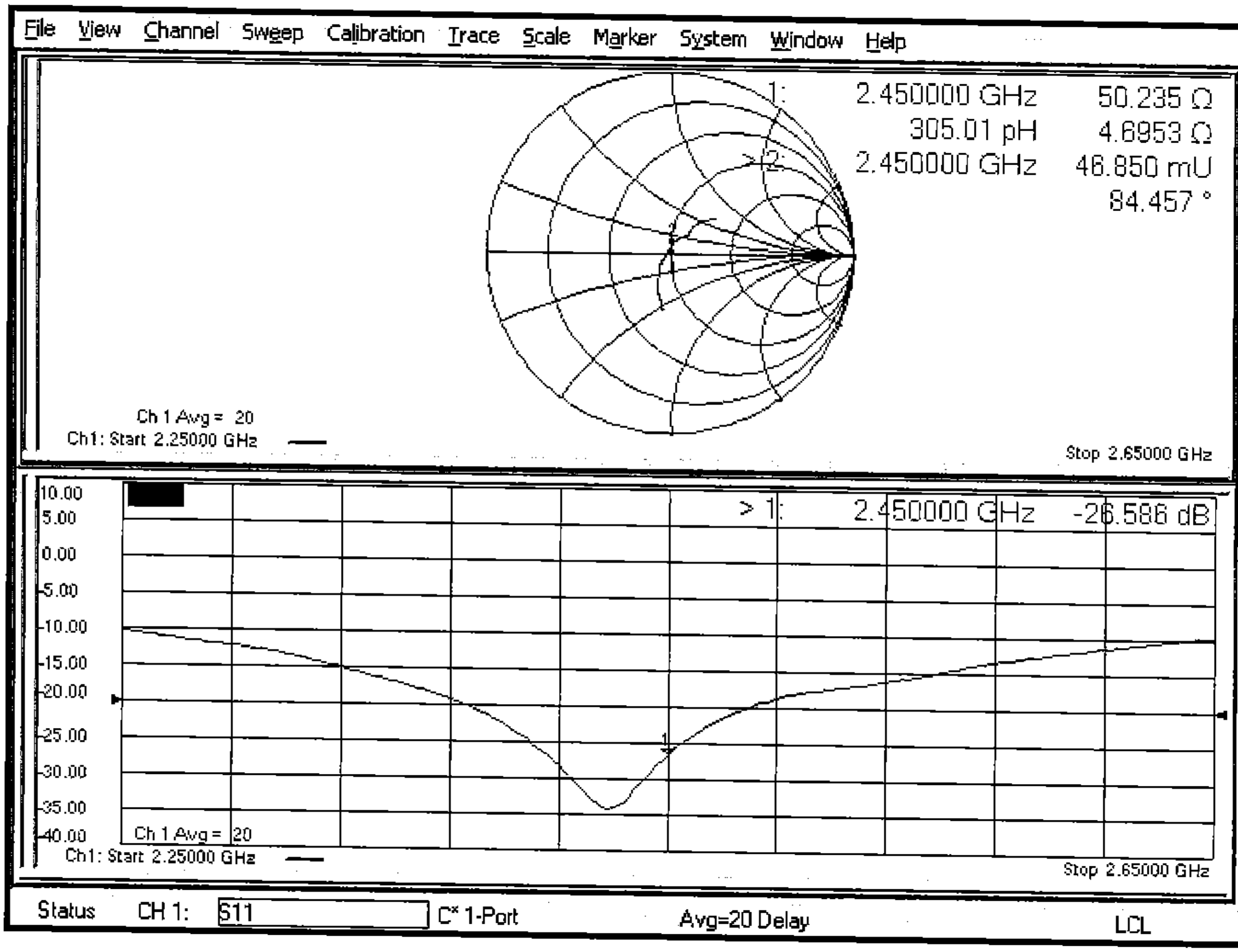
DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.01, 8.01, 8.01) @ 2450 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 107.0 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 25.3 W/kg
SAR(1 g) = 13 W/kg; SAR(10 g) = 6.11 W/kg
Maximum value of SAR (measured) = 20.7 W/kg

0 dB = 20.7 W/kg = 13.16 dBW/kg

Impedance Measurement Plot for Body TSL



DASY5 Validation Report for SAM Head

Date: 16.08.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:981

Communication System: UID 0 - CW ; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.85 S/m; ε_r = 40.2; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

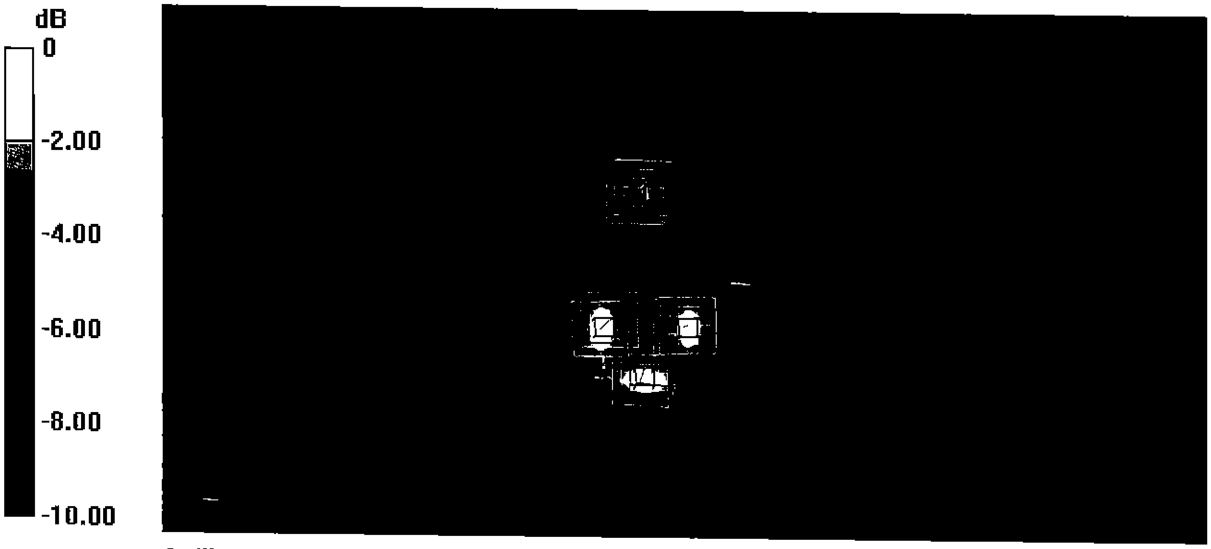
- Probe: EX3DV4 - SN7349; ConvF(7.88, 7.88, 7.88) @ 2450 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: SAM Head
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

SAM Head Top/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 116.2 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 26.4 W/kg
SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.33 W/kg
Maximum value of SAR (measured) = 22.0 W/kg

SAM Head Mouth/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 116.9 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.3 W/kg
SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.35 W/kg
Maximum value of SAR (measured) = 21.7 W/kg

SAM Head Neck/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 112.0 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 24.1 W/kg
SAR(1 g) = 12.9 W/kg; SAR(10 g) = 6.11 W/kg
Maximum value of SAR (measured) = 20.5 W/kg

SAM Head Ear/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.03 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 15.8 W/kg
SAR(1 g) = 8.74 W/kg; SAR(10 g) = 4.4 W/kg
Maximum value of SAR (measured) = 13.5 W/kg



0 dB = 22.0 W/kg = 13.42 dBW/kg

Calibration Laboratory of
Schmid & Partner
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S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

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

Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: ES3-3288_Dec18

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3288
Calibration procedure(s)	QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	December 11, 2018

SLV ✓
12/20/2018

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
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-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Manu Seitz	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: December 13, 2018

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:3288

Manufactured: July 6, 2010
Calibrated: December 11, 2018

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3288

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (μV/(V/m)^2)[A]	1.13	1.09	1.09	± 10.1 %
DCP (mV)[B]	103.7	106.0	104.2	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	191.1	±3.0 %
		Y	0.0	0.0	1.0		196.5	
		Z	0.0	0.0	1.0		194.8	

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	42.42	304.2	35.17	23.59	0.843	5.100	1.279	0.215	1.009
Y	45.72	323.4	34.48	25.10	1.269	5.100	1.663	0.175	1.011
Z	44.40	317.9	35.06	25.34	1.194	5.100	1.225	0.273	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: ES3DV3 - SN:3288

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	6.75	6.75	6.75	0.80	1.17	± 12.0 %
835	41.5	0.90	6.48	6.48	6.48	0.64	1.34	± 12.0 %
1750	40.1	1.37	5.52	5.52	5.52	0.43	1.66	± 12.0 %
1900	40.0	1.40	5.30	5.30	5.30	0.74	1.23	± 12.0 %
2300	39.5	1.67	4.94	4.94	4.94	0.55	1.47	± 12.0 %
2450	39.2	1.80	4.63	4.63	4.63	0.68	1.37	± 12.0 %
2600	39.0	1.96	4.47	4.47	4.47	0.80	1.27	± 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.

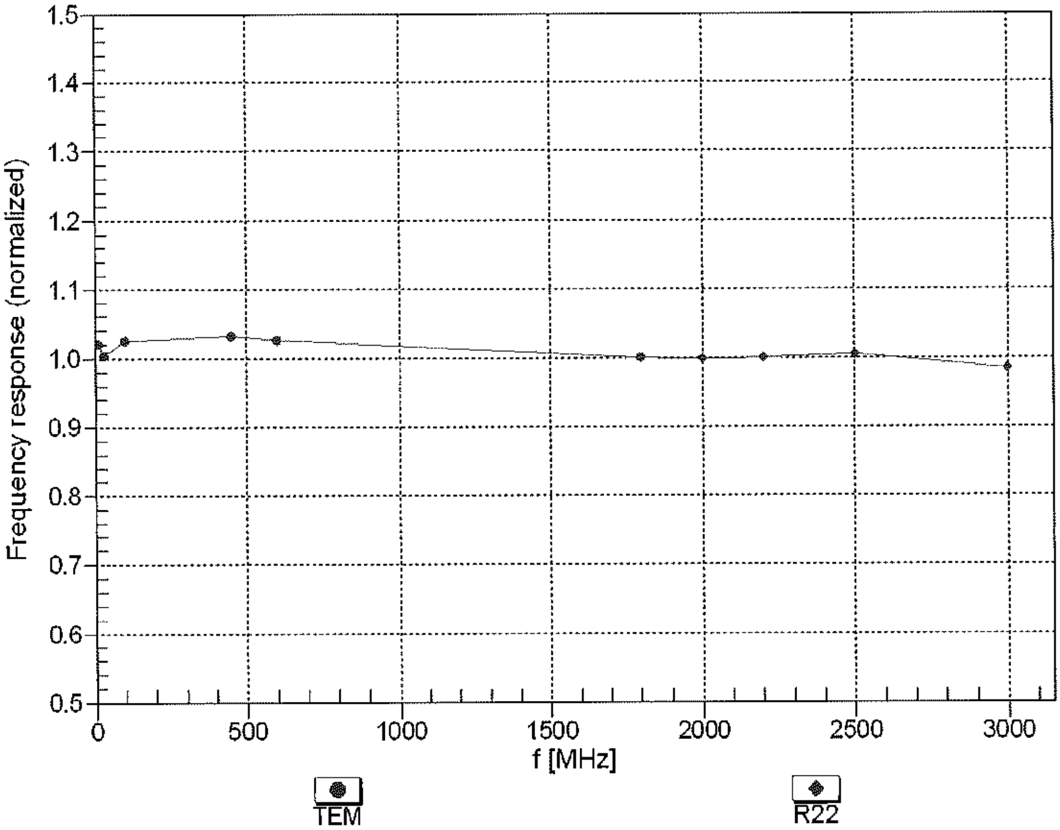
DASY/EASY - Parameters of Probe: ES3DV3 - SN:3288

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	6.38	6.38	6.38	0.60	1.40	± 12.0 %
835	55.2	0.97	6.21	6.21	6.21	0.60	1.40	± 12.0 %
1750	53.4	1.49	5.09	5.09	5.09	0.45	1.67	± 12.0 %
1900	53.3	1.52	4.89	4.89	4.89	0.56	1.55	± 12.0 %
2300	52.9	1.81	4.57	4.57	4.57	0.71	1.32	± 12.0 %
2450	52.7	1.95	4.50	4.50	4.50	0.70	1.30	± 12.0 %
2600	52.5	2.16	4.38	4.38	4.38	0.80	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.

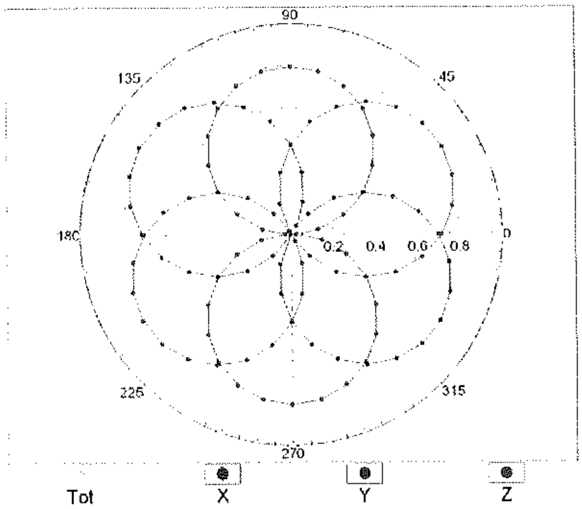
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



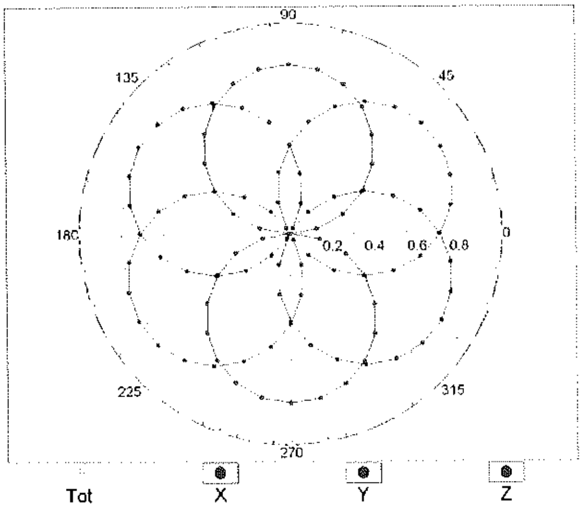
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

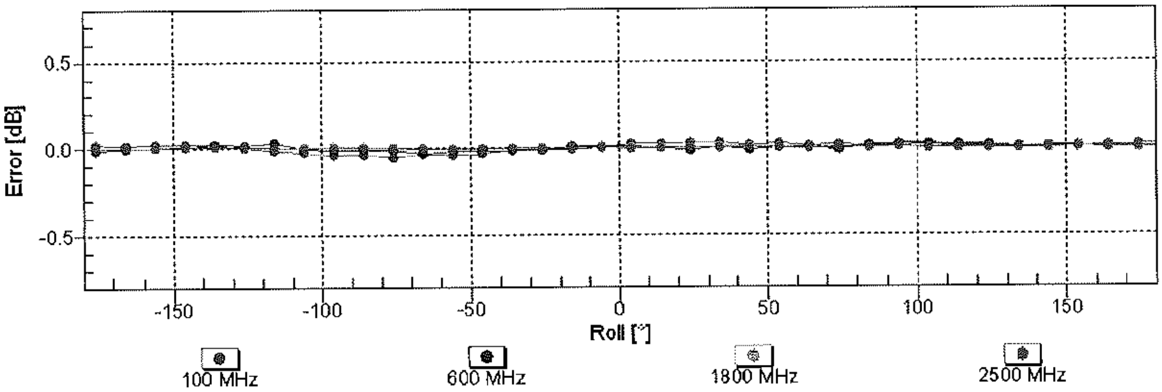
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



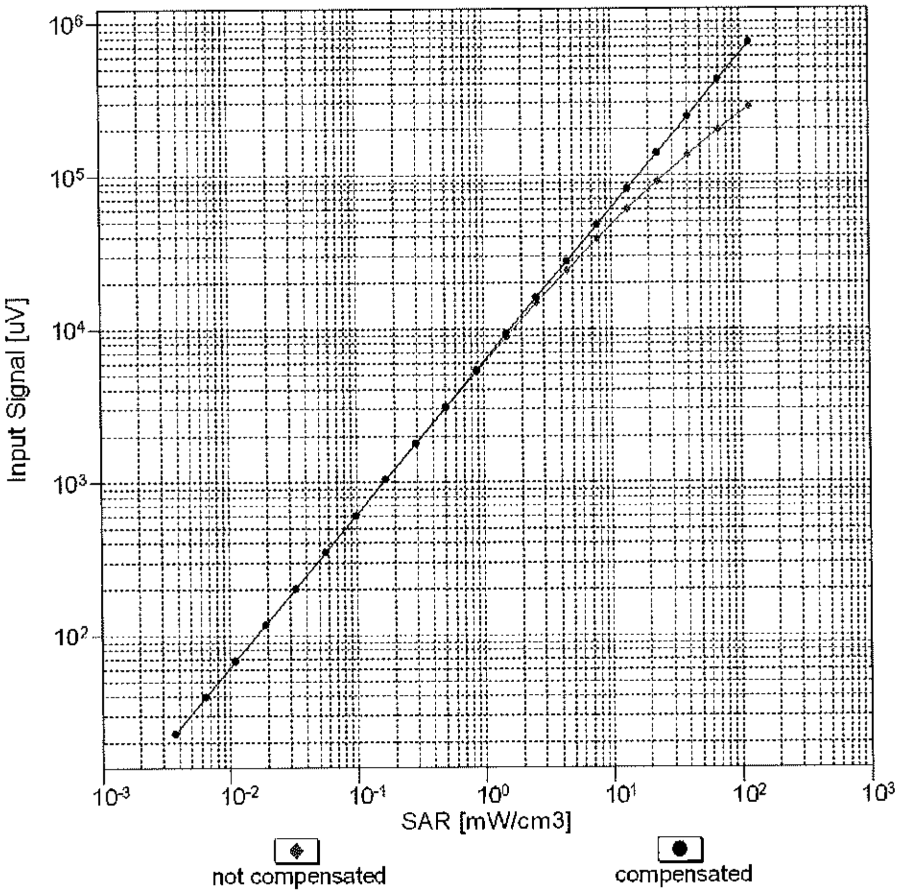
f=1800 MHz,R22

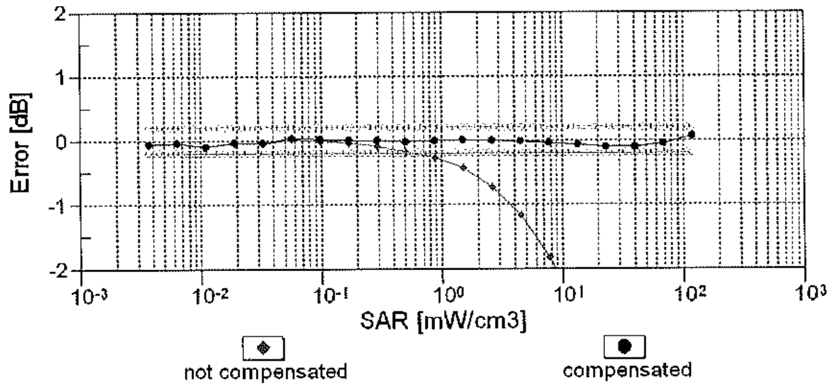




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

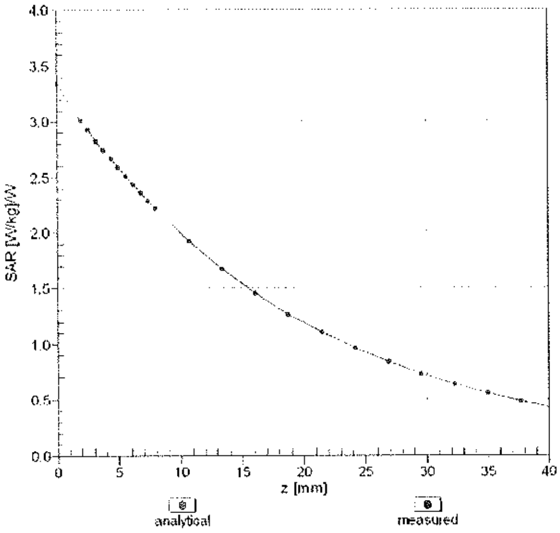




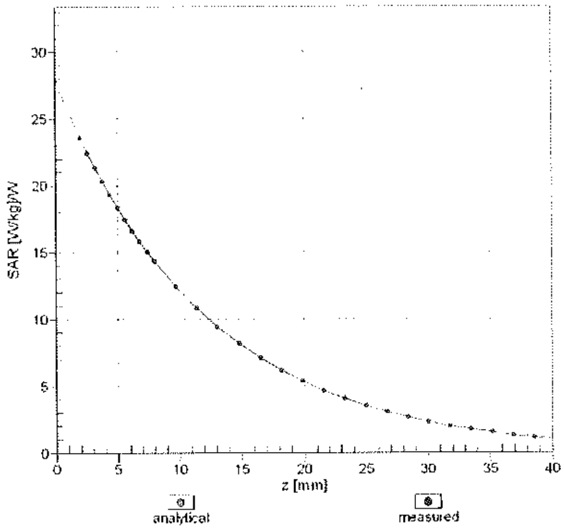
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

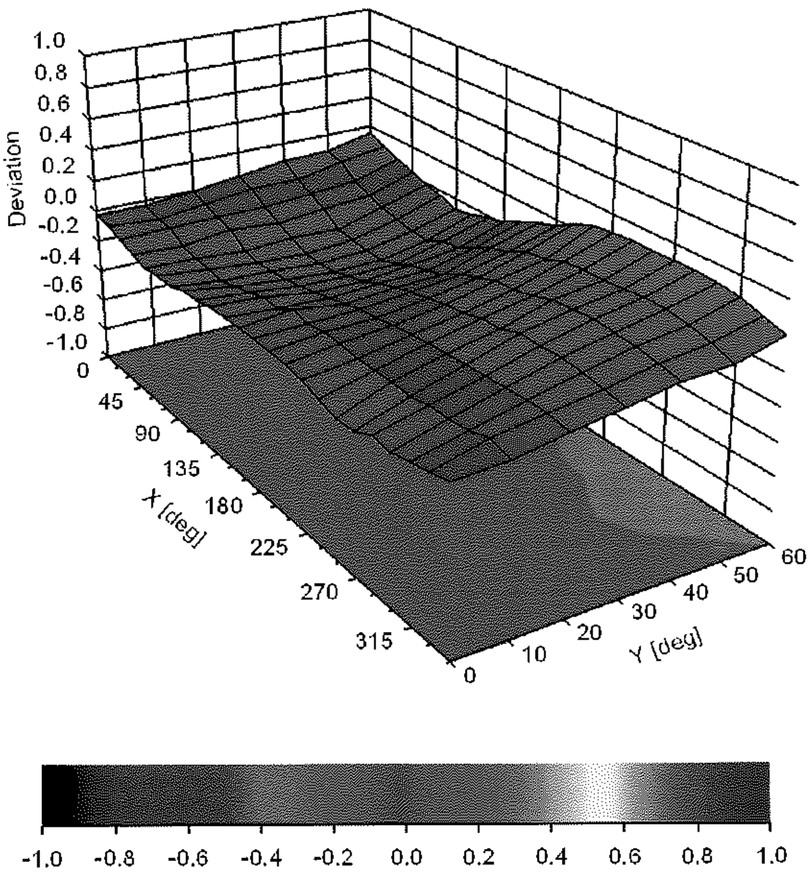


f = 1900 MHz,WGLS R22 (H_convF)



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:3288

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	94.1
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

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	191.1	± 3.0 %
		Y	0.00	0.00	1.00		196.5	
		Z	0.00	0.00	1.00		194.8	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	6.24	76.67	15.81	10.00	25.0	± 9.6 %
		Y	9.09	81.21	18.14		25.0	
		Z	6.22	76.01	15.93		25.0	
10011-CAB	UMTS-FDD (WCDMA)	X	0.85	64.24	12.79	0.00	150.0	± 9.6 %
		Y	0.99	66.97	14.74		150.0	
		Z	0.84	64.26	12.74		150.0	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	1.17	63.37	14.30	0.41	150.0	± 9.6 %
		Y	1.24	64.74	15.45		150.0	
		Z	1.16	63.48	14.32		150.0	
10013-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	4.87	66.95	17.04	1.46	150.0	± 9.6 %
		Y	4.96	67.25	17.32		150.0	
		Z	4.89	66.97	17.05		150.0	
10021-DAC	GSM-FDD (TDMA, GMSK)	X	100.00	117.46	29.69	9.39	50.0	± 9.6 %
		Y	100.00	118.87	30.88		50.0	
		Z	100.00	117.65	30.17		50.0	
10023-DAC	GPRS-FDD (TDMA, GMSK, TN 0)	X	100.00	117.25	29.63	9.57	50.0	± 9.6 %
		Y	100.00	118.78	30.89		50.0	
		Z	100.00	117.55	30.17		50.0	
10024-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	100.00	114.32	27.30	6.56	60.0	± 9.6 %
		Y	100.00	115.92	28.46		60.0	
		Z	100.00	114.14	27.52		60.0	
10025-DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	X	14.49	106.35	41.86	12.57	50.0	± 9.6 %
		Y	35.14	132.48	50.59		50.0	
		Z	17.38	109.14	42.18		50.0	
10026-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	18.23	106.85	37.52	9.56	60.0	± 9.6 %
		Y	31.69	119.75	41.58		60.0	
		Z	19.94	107.22	37.22		60.0	
10027-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	100.00	113.24	26.09	4.80	80.0	± 9.6 %
		Y	100.00	115.16	27.33		80.0	
		Z	100.00	112.68	26.08		80.0	
10028-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	100.00	113.00	25.31	3.55	100.0	± 9.6 %
		Y	100.00	115.51	26.77		100.0	
		Z	100.00	112.04	25.10		100.0	
10029-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	9.83	91.59	30.93	7.80	80.0	± 9.6 %
		Y	14.24	99.61	33.83		80.0	
		Z	11.04	93.01	31.13		80.0	
10030-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	X	100.00	112.24	25.90	5.30	70.0	± 9.6 %
		Y	100.00	114.24	27.20		70.0	
		Z	100.00	112.05	26.08		70.0	
10031-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	X	100.00	109.56	22.52	1.88	100.0	± 9.6 %
		Y	100.00	114.84	25.05		100.0	
		Z	100.00	108.38	22.17		100.0	

10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	100.00	109.17	21.47	1.17	100.0	± 9.6 %
		Y	100.00	117.68	25.23		100.0	
		Z	100.00	107.06	20.70		100.0	
10033-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	X	31.59	105.89	28.05	5.30	70.0	± 9.6 %
		Y	45.55	111.97	30.13		70.0	
		Z	23.03	100.25	26.50		70.0	
10034-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	X	3.87	77.59	17.36	1.88	100.0	± 9.6 %
		Y	7.94	87.73	21.39		100.0	
		Z	4.00	77.59	17.40		100.0	
10035-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	X	2.17	71.58	14.70	1.17	100.0	± 9.6 %
		Y	3.80	79.25	18.25		100.0	
		Z	2.27	71.81	14.83		100.0	
10036-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	X	52.58	113.84	30.16	5.30	70.0	± 9.6 %
		Y	75.42	120.08	32.21		70.0	
		Z	33.31	106.06	28.16		70.0	
10037-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	X	3.59	76.73	17.02	1.88	100.0	± 9.6 %
		Y	7.22	86.52	20.98		100.0	
		Z	3.75	76.83	17.09		100.0	
10038-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	X	2.19	71.91	14.93	1.17	100.0	± 9.6 %
		Y	3.90	79.88	18.59		100.0	
		Z	2.30	72.18	15.07		100.0	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	1.10	65.55	11.57	0.00	150.0	± 9.6 %
		Y	1.54	69.93	14.28		150.0	
		Z	1.13	65.72	11.73		150.0	
10042-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	X	100.00	112.53	26.64	7.78	50.0	± 9.6 %
		Y	100.00	114.28	27.90		50.0	
		Z	100.00	112.67	27.03		50.0	
10044-CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	X	0.00	107.70	4.22	0.00	150.0	± 9.6 %
		Y	0.00	100.41	3.59		150.0	
		Z	0.00	120.42	8.19		150.0	
10048-CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	X	100.00	119.69	31.98	13.80	25.0	± 9.6 %
		Y	48.39	109.13	30.30		25.0	
		Z	58.19	111.18	30.43		25.0	
10049-CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	X	100.00	117.41	29.98	10.79	40.0	± 9.6 %
		Y	79.06	115.65	30.55		40.0	
		Z	72.30	113.22	29.54		40.0	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	41.93	108.97	29.91	9.03	50.0	± 9.6 %
		Y	29.97	103.37	28.82		50.0	
		Z	23.56	98.69	27.10		50.0	
10058-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	6.89	83.98	27.22	6.55	100.0	± 9.6 %
		Y	9.07	89.65	29.47		100.0	
		Z	7.67	85.42	27.53		100.0	
10059-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	X	1.25	64.83	15.08	0.61	110.0	± 9.6 %
		Y	1.37	66.69	16.45		110.0	
		Z	1.27	65.07	15.14		110.0	
10060-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	X	10.79	98.50	24.82	1.30	110.0	± 9.6 %
		Y	100.00	131.43	33.37		110.0	
		Z	12.52	99.27	24.73		110.0	

10061-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	X	4.84	85.60	23.20	2.04	110.0	± 9.6 %
		Y	10.62	98.65	27.68		110.0	
		Z	5.56	86.94	23.43		110.0	
10062-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	X	4.60	66.69	16.30	0.49	100.0	± 9.6 %
		Y	4.69	67.02	16.59		100.0	
		Z	4.62	66.69	16.30		100.0	
10063-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	X	4.63	66.83	16.43	0.72	100.0	± 9.6 %
		Y	4.72	67.16	16.72		100.0	
		Z	4.65	66.84	16.43		100.0	
10064-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	X	4.91	67.11	16.69	0.86	100.0	± 9.6 %
		Y	5.01	67.44	16.97		100.0	
		Z	4.93	67.13	16.69		100.0	
10065-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	X	4.81	67.08	16.84	1.21	100.0	± 9.6 %
		Y	4.91	67.44	17.13		100.0	
		Z	4.84	67.12	16.85		100.0	
10066-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	X	4.84	67.17	17.05	1.46	100.0	± 9.6 %
		Y	4.96	67.54	17.35		100.0	
		Z	4.88	67.22	17.07		100.0	
10067-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	X	5.16	67.50	17.60	2.04	100.0	± 9.6 %
		Y	5.28	67.83	17.88		100.0	
		Z	5.21	67.54	17.60		100.0	
10068-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	X	5.23	67.59	17.86	2.55	100.0	± 9.6 %
		Y	5.36	67.99	18.17		100.0	
		Z	5.29	67.68	17.89		100.0	
10069-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	X	5.32	67.64	18.07	2.67	100.0	± 9.6 %
		Y	5.45	68.03	18.39		100.0	
		Z	5.37	67.72	18.10		100.0	
10071-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	X	4.99	67.13	17.42	1.99	100.0	± 9.6 %
		Y	5.09	67.46	17.70		100.0	
		Z	5.02	67.17	17.43		100.0	
10072-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	X	4.99	67.53	17.69	2.30	100.0	± 9.6 %
		Y	5.11	67.92	17.99		100.0	
		Z	5.04	67.60	17.71		100.0	
10073-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	X	5.10	67.83	18.10	2.83	100.0	± 9.6 %
		Y	5.23	68.26	18.42		100.0	
		Z	5.15	67.94	18.13		100.0	
10074-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	X	5.12	67.86	18.32	3.30	100.0	± 9.6 %
		Y	5.26	68.31	18.66		100.0	
		Z	5.18	67.98	18.36		100.0	
10075-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	X	5.19	68.08	18.71	3.82	90.0	± 9.6 %
		Y	5.35	68.62	19.08		90.0	
		Z	5.28	68.27	18.77		90.0	
10076-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	X	5.23	67.97	18.89	4.15	90.0	± 9.6 %
		Y	5.39	68.49	19.26		90.0	
		Z	5.31	68.15	18.95		90.0	
10077-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	X	5.27	68.07	19.00	4.30	90.0	± 9.6 %
		Y	5.43	68.60	19.38		90.0	
		Z	5.35	68.26	19.07		90.0	

10081-CAB	CDMA2000 (1xRTT, RC3)	X	0.61	62.32	9.35	0.00	150.0	± 9.6 %
		Y	0.74	64.78	11.38		150.0	
		Z	0.61	62.34	9.39		150.0	
10082-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	X	1.14	60.55	5.66	4.77	80.0	± 9.6 %
		Y	1.45	61.81	6.79		80.0	
		Z	1.33	61.07	6.17		80.0	
10090-DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	100.00	114.39	27.35	6.56	60.0	± 9.6 %
		Y	100.00	115.99	28.52		60.0	
		Z	100.00	114.23	27.58		60.0	
10097-CAB	UMTS-FDD (HSDPA)	X	1.62	65.79	14.04	0.00	150.0	± 9.6 %
		Y	1.78	67.49	15.30		150.0	
		Z	1.61	65.76	14.04		150.0	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	1.58	65.72	14.00	0.00	150.0	± 9.6 %
		Y	1.74	67.44	15.28		150.0	
		Z	1.58	65.69	13.99		150.0	
10099-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	18.34	106.95	37.55	9.56	60.0	± 9.6 %
		Y	31.67	119.68	41.55		60.0	
		Z	19.99	107.23	37.22		60.0	
10100-CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	2.78	68.40	15.45	0.00	150.0	± 9.6 %
		Y	3.04	70.07	16.43		150.0	
		Z	2.79	68.47	15.43		150.0	
10101-CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	3.06	66.64	15.18	0.00	150.0	± 9.6 %
		Y	3.19	67.51	15.78		150.0	
		Z	3.06	66.68	15.17		150.0	
10102-CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	3.17	66.68	15.31	0.00	150.0	± 9.6 %
		Y	3.29	67.48	15.87		150.0	
		Z	3.17	66.71	15.30		150.0	
10103-CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	8.02	79.01	21.59	3.98	65.0	± 9.6 %
		Y	8.44	79.45	21.80		65.0	
		Z	8.25	78.96	21.46		65.0	
10104-CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	7.51	76.34	21.32	3.98	65.0	± 9.6 %
		Y	8.14	77.48	21.87		65.0	
		Z	7.76	76.48	21.29		65.0	
10105-CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	7.39	76.00	21.50	3.98	65.0	± 9.6 %
		Y	7.49	75.83	21.47		65.0	
		Z	7.70	76.31	21.54		65.0	
10108-CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	2.41	67.68	15.23	0.00	150.0	± 9.6 %
		Y	2.65	69.34	16.25		150.0	
		Z	2.43	67.74	15.22		150.0	
10109-CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	2.69	66.38	14.94	0.00	150.0	± 9.6 %
		Y	2.84	67.34	15.64		150.0	
		Z	2.70	66.40	14.95		150.0	
10110-CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	1.93	66.68	14.63	0.00	150.0	± 9.6 %
		Y	2.14	68.47	15.82		150.0	
		Z	1.94	66.73	14.64		150.0	
10111-CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	2.36	66.79	14.88	0.00	150.0	± 9.6 %
		Y	2.53	68.00	15.78		150.0	
		Z	2.36	66.79	14.90		150.0	

10112-CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	2.82	66.47	15.05	0.00	150.0	± 9.6 %
		Y	2.96	67.34	15.71		150.0	
		Z	2.83	66.48	15.05		150.0	
10113-CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	2.51	67.02	15.07	0.00	150.0	± 9.6 %
		Y	2.68	68.15	15.92		150.0	
		Z	2.52	67.03	15.09		150.0	
10114-CAC	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	X	5.02	67.05	16.17	0.00	150.0	± 9.6 %
		Y	5.10	67.38	16.42		150.0	
		Z	5.03	67.06	16.15		150.0	
10115-CAC	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	X	5.28	67.15	16.23	0.00	150.0	± 9.6 %
		Y	5.37	67.48	16.48		150.0	
		Z	5.30	67.17	16.22		150.0	
10116-CAC	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	X	5.11	67.23	16.18	0.00	150.0	± 9.6 %
		Y	5.19	67.55	16.44		150.0	
		Z	5.11	67.23	16.17		150.0	
10117-CAC	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	4.99	66.92	16.12	0.00	150.0	± 9.6 %
		Y	5.06	67.22	16.36		150.0	
		Z	4.99	66.90	16.09		150.0	
10118-CAC	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	X	5.37	67.37	16.35	0.00	150.0	± 9.6 %
		Y	5.46	67.70	16.60		150.0	
		Z	5.38	67.38	16.34		150.0	
10119-CAC	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	X	5.09	67.20	16.18	0.00	150.0	± 9.6 %
		Y	5.17	67.51	16.43		150.0	
		Z	5.10	67.20	16.16		150.0	
10140-CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	3.19	66.70	15.23	0.00	150.0	± 9.6 %
		Y	3.33	67.50	15.80		150.0	
		Z	3.20	66.72	15.22		150.0	
10141-CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	3.32	66.85	15.43	0.00	150.0	± 9.6 %
		Y	3.45	67.60	15.96		150.0	
		Z	3.33	66.87	15.42		150.0	
10142-CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	1.67	66.25	13.92	0.00	150.0	± 9.6 %
		Y	1.90	68.32	15.35		150.0	
		Z	1.69	66.31	13.96		150.0	
10143-CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	2.11	66.79	14.05	0.00	150.0	± 9.6 %
		Y	2.35	68.49	15.29		150.0	
		Z	2.13	66.84	14.13		150.0	
10144-CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	1.96	65.04	12.67	0.00	150.0	± 9.6 %
		Y	2.15	66.40	13.78		150.0	
		Z	1.98	65.11	12.78		150.0	
10145-CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	0.91	62.04	8.96	0.00	150.0	± 9.6 %
		Y	1.08	64.00	10.69		150.0	
		Z	0.93	62.23	9.21		150.0	
10146-CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	1.46	63.31	9.13	0.00	150.0	± 9.6 %
		Y	2.12	67.43	11.83		150.0	
		Z	1.64	64.44	10.03		150.0	
10147-CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	1.58	64.11	9.66	0.00	150.0	± 9.6 %
		Y	2.61	69.87	13.06		150.0	
		Z	1.82	65.59	10.73		150.0	

10149-CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	2.70	66.43	14.99	0.00	150.0	± 9.6 %
		Y	2.85	67.39	15.69		150.0	
		Z	2.71	66.46	14.99		150.0	
10150-CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	2.83	66.51	15.09	0.00	150.0	± 9.6 %
		Y	2.97	67.39	15.74		150.0	
		Z	2.84	66.53	15.09		150.0	
10151-CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	8.63	81.75	22.67	3.98	65.0	± 9.6 %
		Y	9.56	83.05	23.22		65.0	
		Z	8.80	81.43	22.44		65.0	
10152-CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	7.08	76.45	21.00	3.98	65.0	± 9.6 %
		Y	7.78	77.80	21.67		65.0	
		Z	7.34	76.60	20.99		65.0	
10153-CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	7.56	77.60	21.84	3.98	65.0	± 9.6 %
		Y	8.22	78.75	22.41		65.0	
		Z	7.82	77.69	21.80		65.0	
10154-CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	1.96	66.95	14.82	0.00	150.0	± 9.6 %
		Y	2.18	68.80	16.04		150.0	
		Z	1.97	67.02	14.84		150.0	
10155-CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	2.36	66.81	14.90	0.00	150.0	± 9.6 %
		Y	2.53	68.02	15.80		150.0	
		Z	2.37	66.81	14.92		150.0	
10156-CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	1.49	65.86	13.36	0.00	150.0	± 9.6 %
		Y	1.73	68.22	15.00		150.0	
		Z	1.50	65.96	13.45		150.0	
10157-CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	1.74	65.04	12.33	0.00	150.0	± 9.6 %
		Y	1.97	66.76	13.67		150.0	
		Z	1.77	65.14	12.46		150.0	
10158-CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	2.51	67.08	15.11	0.00	150.0	± 9.6 %
		Y	2.69	68.21	15.97		150.0	
		Z	2.52	67.08	15.13		150.0	
10159-CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	1.82	65.33	12.53	0.00	150.0	± 9.6 %
		Y	2.06	67.13	13.90		150.0	
		Z	1.85	65.45	12.68		150.0	
10160-CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	2.50	67.33	15.24	0.00	150.0	± 9.6 %
		Y	2.69	68.61	16.11		150.0	
		Z	2.51	67.34	15.23		150.0	
10161-CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	2.72	66.41	14.96	0.00	150.0	± 9.6 %
		Y	2.86	67.32	15.65		150.0	
		Z	2.73	66.43	14.97		150.0	
10162-CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	2.83	66.62	15.11	0.00	150.0	± 9.6 %
		Y	2.97	67.49	15.77		150.0	
		Z	2.84	66.62	15.11		150.0	
10166-CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	3.44	69.49	18.93	3.01	150.0	± 9.6 %
		Y	3.74	71.12	19.94		150.0	
		Z	3.54	69.89	19.15		150.0	
10167-CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	4.25	72.83	19.54	3.01	150.0	± 9.6 %
		Y	4.98	75.61	20.98		150.0	
		Z	4.46	73.36	19.80		150.0	

10168-CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	4.80	75.44	21.03	3.01	150.0	± 9.6 %
		Y	5.66	78.37	22.46		150.0	
		Z	5.04	76.01	21.30		150.0	
10169-CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	2.83	68.75	18.61	3.01	150.0	± 9.6 %
		Y	3.21	71.38	20.14		150.0	
		Z	2.97	69.43	18.96		150.0	
10170-CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	3.99	75.54	21.31	3.01	150.0	± 9.6 %
		Y	5.30	81.05	23.77		150.0	
		Z	4.32	76.64	21.77		150.0	
10171-AAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	3.21	70.99	18.32	3.01	150.0	± 9.6 %
		Y	4.07	75.35	20.48		150.0	
		Z	3.43	71.82	18.71		150.0	
10172-CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	22.60	110.62	34.58	6.02	65.0	± 9.6 %
		Y	48.93	125.83	38.92		65.0	
		Z	16.45	103.03	32.18		65.0	
10173-CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	72.94	125.95	36.27	6.02	65.0	± 9.6 %
		Y	100.00	130.47	37.35		65.0	
		Z	80.34	126.17	36.18		65.0	
10174-CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	46.54	116.03	33.12	6.02	65.0	± 9.6 %
		Y	100.00	128.69	36.37		65.0	
		Z	52.96	116.84	33.20		65.0	
10175-CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	2.80	68.45	18.36	3.01	150.0	± 9.6 %
		Y	3.17	71.05	19.89		150.0	
		Z	2.93	69.12	18.71		150.0	
10176-CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	4.00	75.57	21.32	3.01	150.0	± 9.6 %
		Y	5.31	81.08	23.78		150.0	
		Z	4.32	76.67	21.79		150.0	
10177-CAI	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	2.82	68.59	18.45	3.01	150.0	± 9.6 %
		Y	3.20	71.20	19.98		150.0	
		Z	2.95	69.26	18.80		150.0	
10178-CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	3.96	75.36	21.21	3.01	150.0	± 9.6 %
		Y	5.25	80.81	23.65		150.0	
		Z	4.28	76.44	21.67		150.0	
10179-CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	3.55	73.11	19.66	3.01	150.0	± 9.6 %
		Y	4.63	78.06	21.98		150.0	
		Z	3.83	74.06	20.09		150.0	
10180-CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	3.20	70.94	18.28	3.01	150.0	± 9.6 %
		Y	4.05	75.27	20.43		150.0	
		Z	3.42	71.76	18.67		150.0	
10181-CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	2.82	68.57	18.44	3.01	150.0	± 9.6 %
		Y	3.19	71.19	19.97		150.0	
		Z	2.95	69.25	18.79		150.0	
10182-CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	3.95	75.33	21.20	3.01	150.0	± 9.6 %
		Y	5.24	80.78	23.64		150.0	
		Z	4.27	76.41	21.66		150.0	
10183-AAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	3.19	70.91	18.27	3.01	150.0	± 9.6 %
		Y	4.04	75.24	20.41		150.0	
		Z	3.42	71.73	18.65		150.0	

10184-CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	2.83	68.62	18.46	3.01	150.0	± 9.6 %
		Y	3.20	71.23	19.99		150.0	
		Z	2.96	69.29	18.81		150.0	
10185-CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	3.97	75.41	21.24	3.01	150.0	± 9.6 %
		Y	5.27	80.87	23.68		150.0	
		Z	4.29	76.50	21.70		150.0	
10186-AAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	3.21	70.98	18.31	3.01	150.0	± 9.6 %
		Y	4.07	75.33	20.45		150.0	
		Z	3.43	71.80	18.69		150.0	
10187-CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	2.84	68.68	18.53	3.01	150.0	± 9.6 %
		Y	3.22	71.30	20.06		150.0	
		Z	2.97	69.35	18.88		150.0	
10188-CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	4.11	76.12	21.64	3.01	150.0	± 9.6 %
		Y	5.49	81.77	24.13		150.0	
		Z	4.45	77.25	22.11		150.0	
10189-AAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	3.28	71.42	18.59	3.01	150.0	± 9.6 %
		Y	4.19	75.89	20.78		150.0	
		Z	3.52	72.27	18.99		150.0	
10193-CAC	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	X	4.40	66.45	15.78	0.00	150.0	± 9.6 %
		Y	4.48	66.78	16.08		150.0	
		Z	4.40	66.42	15.77		150.0	
10194-CAC	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	X	4.55	66.73	15.92	0.00	150.0	± 9.6 %
		Y	4.65	67.08	16.22		150.0	
		Z	4.57	66.72	15.91		150.0	
10195-CAC	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	X	4.59	66.77	15.94	0.00	150.0	± 9.6 %
		Y	4.69	67.11	16.23		150.0	
		Z	4.61	66.75	15.93		150.0	
10196-CAC	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	4.39	66.48	15.78	0.00	150.0	± 9.6 %
		Y	4.48	66.83	16.10		150.0	
		Z	4.40	66.46	15.78		150.0	
10197-CAC	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	X	4.57	66.75	15.93	0.00	150.0	± 9.6 %
		Y	4.66	67.10	16.23		150.0	
		Z	4.58	66.74	15.92		150.0	
10198-CAC	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	X	4.59	66.78	15.95	0.00	150.0	± 9.6 %
		Y	4.69	67.13	16.25		150.0	
		Z	4.61	66.77	15.94		150.0	
10219-CAC	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	X	4.34	66.48	15.74	0.00	150.0	± 9.6 %
		Y	4.43	66.84	16.06		150.0	
		Z	4.35	66.47	15.73		150.0	
10220-CAC	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	X	4.56	66.71	15.92	0.00	150.0	± 9.6 %
		Y	4.65	67.07	16.22		150.0	
		Z	4.57	66.71	15.91		150.0	
10221-CAC	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	X	4.61	66.72	15.94	0.00	150.0	± 9.6 %
		Y	4.70	67.06	16.23		150.0	
		Z	4.62	66.71	15.93		150.0	
10222-CAC	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	X	4.96	66.91	16.10	0.00	150.0	± 9.6 %
		Y	5.03	67.23	16.35		150.0	
		Z	4.97	66.90	16.08		150.0	

10223-CAC	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	X	5.26	67.19	16.27	0.00	150.0	± 9.6 %
		Y	5.35	67.49	16.51		150.0	
		Z	5.28	67.21	16.27		150.0	
10224-CAC	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	X	5.00	67.01	16.08	0.00	150.0	± 9.6 %
		Y	5.08	67.33	16.33		150.0	
		Z	5.01	67.01	16.06		150.0	
10225-CAB	UMTS-FDD (HSPA+)	X	2.63	65.42	14.42	0.00	150.0	± 9.6 %
		Y	2.75	66.16	15.09		150.0	
		Z	2.64	65.42	14.46		150.0	
10226-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	87.54	129.49	37.24	6.02	65.0	± 9.6 %
		Y	100.00	130.69	37.49		65.0	
		Z	95.28	129.48	37.08		65.0	
10227-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	70.84	123.19	34.95	6.02	65.0	± 9.6 %
		Y	100.00	128.18	36.17		65.0	
		Z	72.30	122.22	34.60		65.0	
10228-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	23.91	111.94	35.01	6.02	65.0	± 9.6 %
		Y	100.00	140.30	42.50		65.0	
		Z	32.77	116.73	36.13		65.0	
10229-CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	73.51	126.08	36.31	6.02	65.0	± 9.6 %
		Y	100.00	130.46	37.35		65.0	
		Z	80.80	126.27	36.21		65.0	
10230-CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	60.26	120.23	34.13	6.02	65.0	± 9.6 %
		Y	100.00	128.03	36.07		65.0	
		Z	62.58	119.56	33.86		65.0	
10231-CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	21.94	110.07	34.40	6.02	65.0	± 9.6 %
		Y	96.90	139.48	42.23		65.0	
		Z	29.83	114.70	35.49		65.0	
10232-CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	73.48	126.08	36.32	6.02	65.0	± 9.6 %
		Y	100.00	130.47	37.36		65.0	
		Z	80.83	126.29	36.22		65.0	
10233-CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	60.09	120.20	34.13	6.02	65.0	± 9.6 %
		Y	100.00	128.05	36.08		65.0	
		Z	62.48	119.55	33.86		65.0	
10234-CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	20.42	108.40	33.79	6.02	65.0	± 9.6 %
		Y	85.29	136.53	41.39		65.0	
		Z	27.51	112.84	34.85		65.0	
10235-CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	74.06	126.24	36.36	6.02	65.0	± 9.6 %
		Y	100.00	130.49	37.36		65.0	
		Z	81.47	126.44	36.26		65.0	
10236-CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	61.46	120.53	34.20	6.02	65.0	± 9.6 %
		Y	100.00	127.99	36.05		65.0	
		Z	63.70	119.84	33.93		65.0	
10237-CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	22.09	110.25	34.45	6.02	65.0	± 9.6 %
		Y	99.25	140.00	42.36		65.0	
		Z	30.12	114.93	35.55		65.0	
10238-CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	73.45	126.09	36.32	6.02	65.0	± 9.6 %
		Y	100.00	130.48	37.36		65.0	
		Z	80.85	126.30	36.22		65.0	

10239-CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	59.93	120.17	34.12	6.02	65.0	± 9.6 %
		Y	100.00	128.07	36.08		65.0	
		Z	62.38	119.54	33.86		65.0	
10240-CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	22.01	110.18	34.43	6.02	65.0	± 9.6 %
		Y	98.83	139.93	42.34		65.0	
		Z	30.00	114.86	35.53		65.0	
10241-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	11.17	88.32	28.11	6.98	65.0	± 9.6 %
		Y	14.12	92.90	29.93		65.0	
		Z	11.94	88.91	28.24		65.0	
10242-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	10.58	87.20	27.63	6.98	65.0	± 9.6 %
		Y	11.64	88.74	28.35		65.0	
		Z	11.55	88.22	27.92		65.0	
10243-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	8.01	82.52	26.78	6.98	65.0	± 9.6 %
		Y	8.59	83.63	27.39		65.0	
		Z	8.75	83.76	27.20		65.0	
10244-CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	7.49	77.98	18.72	3.98	65.0	± 9.6 %
		Y	9.57	81.63	20.57		65.0	
		Z	8.24	79.09	19.36		65.0	
10245-CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	7.15	77.05	18.30	3.98	65.0	± 9.6 %
		Y	9.11	80.61	20.14		65.0	
		Z	7.89	78.19	18.96		65.0	
10246-CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	7.31	80.59	19.91	3.98	65.0	± 9.6 %
		Y	9.28	84.03	21.54		65.0	
		Z	7.54	80.49	19.93		65.0	
10247-CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	6.19	75.83	18.78	3.98	65.0	± 9.6 %
		Y	7.08	77.67	19.84		65.0	
		Z	6.46	76.00	18.90		65.0	
10248-CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	6.07	75.10	18.47	3.98	65.0	± 9.6 %
		Y	6.95	76.95	19.55		65.0	
		Z	6.36	75.34	18.62		65.0	
10249-CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	9.60	85.58	22.75	3.98	65.0	± 9.6 %
		Y	11.62	88.40	24.00		65.0	
		Z	9.64	84.99	22.52		65.0	
10250-CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	7.52	79.44	22.06	3.98	65.0	± 9.6 %
		Y	8.31	80.79	22.74		65.0	
		Z	7.79	79.47	22.02		65.0	
10251-CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	6.92	76.78	20.63	3.98	65.0	± 9.6 %
		Y	7.69	78.24	21.42		65.0	
		Z	7.19	76.91	20.66		65.0	
10252-CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	9.67	85.65	23.94	3.98	65.0	± 9.6 %
		Y	11.12	87.60	24.76		65.0	
		Z	9.78	85.11	23.65		65.0	
10253-CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	6.93	75.93	20.74	3.98	65.0	± 9.6 %
		Y	7.59	77.20	21.41		65.0	
		Z	7.18	76.07	20.74		65.0	
10254-CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	7.36	76.96	21.48	3.98	65.0	± 9.6 %
		Y	8.00	78.09	22.07		65.0	
		Z	7.62	77.07	21.46		65.0	

10255-CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	8.26	81.20	22.65	3.98	65.0	± 9.6 %
		Y	9.16	82.56	23.25		65.0	
		Z	8.45	80.97	22.45		65.0	
10256-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	5.31	72.46	15.37	3.98	65.0	± 9.6 %
		Y	7.14	76.50	17.57		65.0	
		Z	6.06	73.94	16.26		65.0	
10257-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	5.06	71.46	14.84	3.98	65.0	± 9.6 %
		Y	6.72	75.28	16.99		65.0	
		Z	5.76	72.92	15.73		65.0	
10258-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	4.98	74.24	16.51	3.98	65.0	± 9.6 %
		Y	6.52	77.88	18.42		65.0	
		Z	5.35	74.75	16.84		65.0	
10259-CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	6.73	77.24	19.99	3.98	65.0	± 9.6 %
		Y	7.58	78.86	20.90		65.0	
		Z	6.99	77.33	20.04		65.0	
10260-CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	6.69	76.84	19.83	3.98	65.0	± 9.6 %
		Y	7.52	78.42	20.73		65.0	
		Z	6.96	76.96	19.90		65.0	
10261-CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	9.07	84.65	22.90	3.98	65.0	± 9.6 %
		Y	10.71	87.04	23.97		65.0	
		Z	9.18	84.16	22.68		65.0	
10262-CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	7.50	79.37	22.01	3.98	65.0	± 9.6 %
		Y	8.30	80.73	22.69		65.0	
		Z	7.77	79.40	21.97		65.0	
10263-CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	6.91	76.76	20.63	3.98	65.0	± 9.6 %
		Y	7.68	78.22	21.41		65.0	
		Z	7.18	76.89	20.65		65.0	
10264-CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	9.55	85.40	23.83	3.98	65.0	± 9.6 %
		Y	11.00	87.37	24.66		65.0	
		Z	9.67	84.88	23.54		65.0	
10265-CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	7.08	76.46	21.01	3.98	65.0	± 9.6 %
		Y	7.78	77.80	21.68		65.0	
		Z	7.34	76.60	20.99		65.0	
10266-CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	7.56	77.59	21.83	3.98	65.0	± 9.6 %
		Y	8.22	78.74	22.40		65.0	
		Z	7.81	77.68	21.79		65.0	
10267-CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	8.61	81.70	22.65	3.98	65.0	± 9.6 %
		Y	9.54	83.00	23.20		65.0	
		Z	8.78	81.39	22.42		65.0	
10268-CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	7.64	76.16	21.36	3.98	65.0	± 9.6 %
		Y	8.22	77.19	21.86		65.0	
		Z	7.88	76.29	21.33		65.0	
10269-CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	7.58	75.72	21.23	3.98	65.0	± 9.6 %
		Y	8.14	76.72	21.73		65.0	
		Z	7.82	75.87	21.21		65.0	
10270-CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	7.95	78.32	21.55	3.98	65.0	± 9.6 %
		Y	8.58	79.24	21.95		65.0	
		Z	8.14	78.21	21.40		65.0	

10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	2.42	65.66	14.26	0.00	150.0	± 9.6 %
		Y	2.54	66.55	15.02		150.0	
		Z	2.42	65.63	14.28		150.0	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	1.38	65.51	13.67	0.00	150.0	± 9.6 %
		Y	1.55	67.64	15.15		150.0	
		Z	1.37	65.53	13.65		150.0	
10277-CAA	PHS (QPSK)	X	3.00	63.81	8.90	9.03	50.0	± 9.6 %
		Y	3.74	65.65	10.52		50.0	
		Z	3.50	64.83	9.85		50.0	
10278-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	X	6.31	75.25	16.86	9.03	50.0	± 9.6 %
		Y	7.73	77.90	18.55		50.0	
		Z	6.71	75.50	17.26		50.0	
10279-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	X	6.44	75.48	17.00	9.03	50.0	± 9.6 %
		Y	7.87	78.12	18.68		50.0	
		Z	6.83	75.71	17.39		50.0	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	0.97	64.09	10.56	0.00	150.0	± 9.6 %
		Y	1.25	67.20	12.74		150.0	
		Z	1.00	64.23	10.70		150.0	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	0.60	62.22	9.27	0.00	150.0	± 9.6 %
		Y	0.73	64.60	11.26		150.0	
		Z	0.60	62.23	9.31		150.0	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	0.65	63.74	10.44	0.00	150.0	± 9.6 %
		Y	0.90	68.02	13.35		150.0	
		Z	0.65	63.74	10.46		150.0	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	0.79	65.96	12.01	0.00	150.0	± 9.6 %
		Y	1.33	73.30	16.16		150.0	
		Z	0.79	65.97	12.05		150.0	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	16.78	93.84	26.47	9.03	50.0	± 9.6 %
		Y	14.66	91.28	26.06		50.0	
		Z	13.94	89.83	25.22		50.0	
10297-AAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	2.42	67.75	15.29	0.00	150.0	± 9.6 %
		Y	2.66	69.43	16.31		150.0	
		Z	2.43	67.82	15.27		150.0	
10298-AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	1.17	64.16	11.29	0.00	150.0	± 9.6 %
		Y	1.41	66.65	13.15		150.0	
		Z	1.20	64.34	11.47		150.0	
10299-AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	2.07	66.78	12.02	0.00	150.0	± 9.6 %
		Y	3.21	72.39	15.13		150.0	
		Z	2.34	68.19	12.96		150.0	
10300-AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	1.65	63.55	9.70	0.00	150.0	± 9.6 %
		Y	2.09	66.20	11.60		150.0	
		Z	1.79	64.31	10.35		150.0	
10301-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	X	4.96	66.63	17.66	4.17	80.0	± 9.6 %
		Y	5.40	68.26	18.68		80.0	
		Z	5.12	67.10	17.89		80.0	
10302-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	X	5.40	67.04	18.27	4.96	80.0	± 9.6 %
		Y	5.77	68.38	19.15		80.0	
		Z	5.54	67.38	18.44		80.0	

10303-AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	X	5.19	66.81	18.14	4.96	80.0	± 9.6 %
		Y	5.57	68.27	19.10		80.0	
		Z	5.33	67.21	18.34		80.0	
10304-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	X	4.95	66.49	17.52	4.17	80.0	± 9.6 %
		Y	5.28	67.74	18.36		80.0	
		Z	5.07	66.79	17.68		80.0	
10305-AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	X	5.33	71.69	20.97	6.02	50.0	± 9.6 %
		Y	6.67	76.67	23.65		50.0	
		Z	5.94	73.75	21.94		50.0	
10306-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	X	5.25	69.25	20.07	6.02	50.0	± 9.6 %
		Y	5.72	70.35	20.68		50.0	
		Z	5.58	70.41	20.67		50.0	
10307-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	X	5.21	69.62	20.11	6.02	50.0	± 9.6 %
		Y	5.70	70.74	20.71		50.0	
		Z	5.59	70.95	20.78		50.0	
10308-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	X	5.23	70.00	20.32	6.02	50.0	± 9.6 %
		Y	5.75	71.18	20.94		50.0	
		Z	5.64	71.43	21.03		50.0	
10309-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	X	5.30	69.44	20.21	6.02	50.0	± 9.6 %
		Y	5.79	70.61	20.85		50.0	
		Z	5.65	70.64	20.82		50.0	
10310-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	X	5.23	69.44	20.10	6.02	50.0	± 9.6 %
		Y	5.71	70.52	20.69		50.0	
		Z	5.59	70.66	20.72		50.0	
10311-AAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	2.76	67.15	15.05	0.00	150.0	± 9.6 %
		Y	3.01	68.71	15.98		150.0	
		Z	2.77	67.21	15.04		150.0	
10313-AAA	iDEN 1:3	X	6.69	78.91	18.28	6.99	70.0	± 9.6 %
		Y	8.21	81.16	19.29		70.0	
		Z	6.41	77.39	17.66		70.0	
10314-AAA	iDEN 1:6	X	10.80	90.27	25.03	10.00	30.0	± 9.6 %
		Y	13.17	92.20	25.68		30.0	
		Z	9.96	87.29	23.81		30.0	
10315-AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	X	1.05	62.92	13.97	0.17	150.0	± 9.6 %
		Y	1.11	64.25	15.15		150.0	
		Z	1.04	62.98	13.97		150.0	
10316-AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	X	4.48	66.60	16.01	0.17	150.0	± 9.6 %
		Y	4.57	66.95	16.31		150.0	
		Z	4.49	66.60	16.00		150.0	
10317-AAC	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	X	4.48	66.60	16.01	0.17	150.0	± 9.6 %
		Y	4.57	66.95	16.31		150.0	
		Z	4.49	66.60	16.00		150.0	
10400-AAD	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	X	4.53	66.77	15.91	0.00	150.0	± 9.6 %
		Y	4.64	67.15	16.22		150.0	
		Z	4.55	66.77	15.90		150.0	
10401-AAD	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	X	5.30	67.15	16.23	0.00	150.0	± 9.6 %
		Y	5.37	67.42	16.46		150.0	
		Z	5.31	67.15	16.21		150.0	

10402-AAD	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	X	5.52	67.30	16.17	0.00	150.0	± 9.6 %
		Y	5.60	67.61	16.40		150.0	
		Z	5.53	67.31	16.16		150.0	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	0.97	64.09	10.56	0.00	115.0	± 9.6 %
		Y	1.25	67.20	12.74		115.0	
		Z	1.00	64.23	10.70		115.0	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	0.97	64.09	10.56	0.00	115.0	± 9.6 %
		Y	1.25	67.20	12.74		115.0	
		Z	1.00	64.23	10.70		115.0	
10406-AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	X	100.00	116.01	27.29	0.00	100.0	± 9.6 %
		Y	100.00	117.87	28.36		100.0	
		Z	100.00	117.33	28.06		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	121.05	29.92	3.23	80.0	± 9.6 %
		Y	100.00	121.81	30.57		80.0	
		Z	100.00	120.53	29.90		80.0	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	0.95	61.88	13.25	0.00	150.0	± 9.6 %
		Y	0.99	62.95	14.33		150.0	
		Z	0.93	61.85	13.22		150.0	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	4.40	66.48	15.86	0.00	150.0	± 9.6 %
		Y	4.48	66.82	16.16		150.0	
		Z	4.41	66.46	15.85		150.0	
10417-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	4.40	66.48	15.86	0.00	150.0	± 9.6 %
		Y	4.48	66.82	16.16		150.0	
		Z	4.41	66.46	15.85		150.0	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preambule)	X	4.39	66.63	15.88	0.00	150.0	± 9.6 %
		Y	4.48	66.98	16.18		150.0	
		Z	4.39	66.61	15.86		150.0	
10419-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preambule)	X	4.41	66.58	15.88	0.00	150.0	± 9.6 %
		Y	4.50	66.93	16.18		150.0	
		Z	4.42	66.56	15.87		150.0	
10422-AAB	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	X	4.52	66.60	15.91	0.00	150.0	± 9.6 %
		Y	4.61	66.93	16.20		150.0	
		Z	4.53	66.58	15.90		150.0	
10423-AAB	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	X	4.67	66.88	16.01	0.00	150.0	± 9.6 %
		Y	4.77	67.23	16.31		150.0	
		Z	4.68	66.87	16.00		150.0	
10424-AAB	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	X	4.59	66.82	15.98	0.00	150.0	± 9.6 %
		Y	4.69	67.18	16.28		150.0	
		Z	4.60	66.81	15.97		150.0	
10425-AAB	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	X	5.22	67.18	16.24	0.00	150.0	± 9.6 %
		Y	5.30	67.49	16.48		150.0	
		Z	5.23	67.17	16.22		150.0	
10426-AAB	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	X	5.25	67.29	16.29	0.00	150.0	± 9.6 %
		Y	5.32	67.56	16.52		150.0	
		Z	5.25	67.28	16.27		150.0	

10427-AAB	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	X	5.24	67.18	16.24	0.00	150.0	± 9.6 %
		Y	5.32	67.50	16.49		150.0	
		Z	5.25	67.20	16.23		150.0	
10430-AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	X	3.95	70.04	17.27	0.00	150.0	± 9.6 %
		Y	4.09	70.48	17.72		150.0	
		Z	3.97	69.98	17.29		150.0	
10431-AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	X	4.02	66.87	15.69	0.00	150.0	± 9.6 %
		Y	4.14	67.34	16.10		150.0	
		Z	4.04	66.86	15.70		150.0	
10432-AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	X	4.35	66.83	15.87	0.00	150.0	± 9.6 %
		Y	4.45	67.22	16.21		150.0	
		Z	4.36	66.82	15.87		150.0	
10433-AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	X	4.61	66.85	16.00	0.00	150.0	± 9.6 %
		Y	4.70	67.21	16.30		150.0	
		Z	4.62	66.84	15.99		150.0	
10434-AAA	W-CDMA (BS Test Model 1, 64 DPCH)	X	3.96	70.56	17.00	0.00	150.0	± 9.6 %
		Y	4.15	71.19	17.59		150.0	
		Z	3.98	70.52	17.06		150.0	
10435-AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	120.82	29.81	3.23	80.0	± 9.6 %
		Y	100.00	121.59	30.47		80.0	
		Z	100.00	120.31	29.80		80.0	
10447-AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.24	66.49	14.60	0.00	150.0	± 9.6 %
		Y	3.41	67.22	15.27		150.0	
		Z	3.27	66.51	14.67		150.0	
10448-AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%)	X	3.87	66.65	15.54	0.00	150.0	± 9.6 %
		Y	3.99	67.12	15.96		150.0	
		Z	3.89	66.63	15.55		150.0	
10449-AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%)	X	4.17	66.64	15.75	0.00	150.0	± 9.6 %
		Y	4.27	67.04	16.10		150.0	
		Z	4.18	66.62	15.75		150.0	
10450-AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.38	66.60	15.84	0.00	150.0	± 9.6 %
		Y	4.47	66.97	16.15		150.0	
		Z	4.39	66.59	15.82		150.0	
10451-AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	X	3.07	66.37	13.99	0.00	150.0	± 9.6 %
		Y	3.28	67.28	14.79		150.0	
		Z	3.11	66.44	14.10		150.0	
10456-AAB	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	X	6.16	67.89	16.51	0.00	150.0	± 9.6 %
		Y	6.19	68.07	16.66		150.0	
		Z	6.14	67.84	16.46		150.0	
10457-AAA	UMTS-FDD (DC-HSDPA)	X	3.71	65.16	15.55	0.00	150.0	± 9.6 %
		Y	3.76	65.47	15.86		150.0	
		Z	3.71	65.13	15.54		150.0	
10458-AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	X	3.56	69.52	16.11	0.00	150.0	± 9.6 %
		Y	3.80	70.49	16.94		150.0	
		Z	3.60	69.58	16.25		150.0	
10459-AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	X	4.82	68.13	17.51	0.00	150.0	± 9.6 %
		Y	4.87	68.06	17.69		150.0	
		Z	4.86	68.12	17.58		150.0	

10460-AAA	UMTS-FDD (WCDMA, AMR)	X	0.72	64.25	13.06	0.00	150.0	± 9.6 %
		Y	0.85	67.52	15.41		150.0	
		Z	0.70	64.27	13.01		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	126.16	32.32	3.29	80.0	± 9.6 %
		Y	100.00	128.30	33.57		80.0	
		Z	100.00	125.51	32.24		80.0	
10462-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.29	76.66	15.10	3.23	80.0	± 9.6 %
		Y	100.00	107.26	23.61		80.0	
		Z	19.76	89.48	19.03		80.0	
10463-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.77	65.52	10.51	3.23	80.0	± 9.6 %
		Y	62.77	98.74	20.70		80.0	
		Z	3.01	69.97	12.51		80.0	
10464-AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	123.40	30.88	3.23	80.0	± 9.6 %
		Y	100.00	125.93	32.30		80.0	
		Z	100.00	122.95	30.89		80.0	
10465-AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.53	72.68	13.71	3.23	80.0	± 9.6 %
		Y	100.00	106.62	23.31		80.0	
		Z	8.88	81.40	16.74		80.0	
10466-AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.58	64.43	10.00	3.23	80.0	± 9.6 %
		Y	17.28	86.47	17.66		80.0	
		Z	2.45	67.96	11.70		80.0	
10467-AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	123.70	31.01	3.23	80.0	± 9.6 %
		Y	100.00	126.21	32.43		80.0	
		Z	100.00	123.23	31.02		80.0	
10468-AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.92	73.71	14.09	3.23	80.0	± 9.6 %
		Y	100.00	106.83	23.40		80.0	
		Z	10.75	83.35	17.32		80.0	
10469-AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.58	64.46	10.01	3.23	80.0	± 9.6 %
		Y	18.16	86.94	17.78		80.0	
		Z	2.46	68.02	11.72		80.0	
10470-AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	123.72	31.01	3.23	80.0	± 9.6 %
		Y	100.00	126.24	32.43		80.0	
		Z	100.00	123.25	31.02		80.0	
10471-AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.86	73.56	14.02	3.23	80.0	± 9.6 %
		Y	100.00	106.76	23.37		80.0	
		Z	10.54	83.13	17.24		80.0	
10472-AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.57	64.40	9.97	3.23	80.0	± 9.6 %
		Y	17.74	86.68	17.69		80.0	
		Z	2.44	67.93	11.67		80.0	
10473-AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	123.69	31.00	3.23	80.0	± 9.6 %
		Y	100.00	126.21	32.42		80.0	
		Z	100.00	123.22	31.00		80.0	
10474-AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.82	73.48	13.99	3.23	80.0	± 9.6 %
		Y	100.00	106.76	23.36		80.0	
		Z	10.37	82.98	17.20		80.0	
10475-AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.56	64.37	9.96	3.23	80.0	± 9.6 %
		Y	17.32	86.47	17.64		80.0	
		Z	2.42	67.89	11.66		80.0	

10477-AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.53	72.67	13.69	3.23	80.0	± 9.6 %
		Y	100.00	106.55	23.26		80.0	
		Z	8.97	81.48	16.74		80.0	
10478-AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.56	64.31	9.93	3.23	80.0	± 9.6 %
		Y	16.59	86.04	17.51		80.0	
		Z	2.40	67.79	11.61		80.0	
10479-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	17.18	97.84	26.15	3.23	80.0	± 9.6 %
		Y	67.82	119.39	32.25		80.0	
		Z	23.68	102.24	27.47		80.0	
10480-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	13.44	87.88	21.01	3.23	80.0	± 9.6 %
		Y	73.56	110.56	27.54		80.0	
		Z	18.97	92.14	22.47		80.0	
10481-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	8.48	81.26	18.55	3.23	80.0	± 9.6 %
		Y	35.81	99.73	24.39		80.0	
		Z	11.84	85.18	20.01		80.0	
10482-AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.92	70.56	15.40	2.23	80.0	± 9.6 %
		Y	4.78	77.09	18.38		80.0	
		Z	3.15	71.16	15.69		80.0	
10483-AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.51	73.02	15.95	2.23	80.0	± 9.6 %
		Y	9.30	82.76	20.00		80.0	
		Z	5.86	76.22	17.39		80.0	
10484-AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.12	71.69	15.43	2.23	80.0	± 9.6 %
		Y	7.87	80.35	19.20		80.0	
		Z	5.24	74.59	16.79		80.0	
10485-AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.63	73.64	17.76	2.23	80.0	± 9.6 %
		Y	5.34	79.18	20.20		80.0	
		Z	3.86	74.09	17.92		80.0	
10486-AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.28	69.11	15.32	2.23	80.0	± 9.6 %
		Y	4.18	72.40	17.08		80.0	
		Z	3.45	69.50	15.54		80.0	
10487-AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.26	68.70	15.13	2.23	80.0	± 9.6 %
		Y	4.11	71.80	16.83		80.0	
		Z	3.43	69.09	15.36		80.0	
10488-AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.97	73.40	18.62	2.23	80.0	± 9.6 %
		Y	5.12	77.21	20.31		80.0	
		Z	4.20	73.83	18.71		80.0	
10489-AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.77	69.90	17.16	2.23	80.0	± 9.6 %
		Y	4.35	71.94	18.26		80.0	
		Z	3.92	70.17	17.26		80.0	
10490-AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.86	69.73	17.11	2.23	80.0	± 9.6 %
		Y	4.41	71.64	18.15		80.0	
		Z	4.01	70.00	17.20		80.0	
10491-AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.15	71.88	18.23	2.23	80.0	± 9.6 %
		Y	4.95	74.53	19.47		80.0	
		Z	4.34	72.24	18.30		80.0	
10492-AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.11	69.22	17.29	2.23	80.0	± 9.6 %
		Y	4.57	70.76	18.13		80.0	
		Z	4.26	69.48	17.37		80.0	

10493-AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.17	69.09	17.25	2.23	80.0	± 9.6 %
		Y	4.62	70.56	18.06		80.0	
		Z	4.32	69.34	17.33		80.0	
10494-AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.47	73.20	18.63	2.23	80.0	± 9.6 %
		Y	5.50	76.30	20.00		80.0	
		Z	4.69	73.58	18.69		80.0	
10495-AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.15	69.55	17.49	2.23	80.0	± 9.6 %
		Y	4.64	71.19	18.35		80.0	
		Z	4.30	69.84	17.56		80.0	
10496-AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.22	69.31	17.43	2.23	80.0	± 9.6 %
		Y	4.68	70.81	18.23		80.0	
		Z	4.37	69.57	17.50		80.0	
10497-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.90	65.16	11.93	2.23	80.0	± 9.6 %
		Y	3.10	70.87	14.94		80.0	
		Z	2.09	65.87	12.38		80.0	
10498-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.49	60.55	8.58	2.23	80.0	± 9.6 %
		Y	1.97	63.21	10.49		80.0	
		Z	1.63	61.16	9.08		80.0	
10499-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.44	60.12	8.21	2.23	80.0	± 9.6 %
		Y	1.88	62.52	10.01		80.0	
		Z	1.59	60.72	8.71		80.0	
10500-AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.73	73.39	18.06	2.23	80.0	± 9.6 %
		Y	5.11	77.97	20.12		80.0	
		Z	3.96	73.80	18.18		80.0	
10501-AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.53	69.63	16.11	2.23	80.0	± 9.6 %
		Y	4.28	72.30	17.56		80.0	
		Z	3.69	69.93	16.27		80.0	
10502-AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.56	69.43	15.97	2.23	80.0	± 9.6 %
		Y	4.30	72.01	17.39		80.0	
		Z	3.73	69.73	16.13		80.0	
10503-AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.91	73.20	18.52	2.23	80.0	± 9.6 %
		Y	5.05	76.99	20.21		80.0	
		Z	4.14	73.63	18.61		80.0	
10504-AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.75	69.80	17.10	2.23	80.0	± 9.6 %
		Y	4.33	71.84	18.20		80.0	
		Z	3.90	70.07	17.20		80.0	
10505-AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.83	69.64	17.05	2.23	80.0	± 9.6 %
		Y	4.39	71.55	18.10		80.0	
		Z	3.98	69.90	17.15		80.0	
10506-AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.43	73.06	18.56	2.23	80.0	± 9.6 %
		Y	5.45	76.14	19.92		80.0	
		Z	4.65	73.43	18.62		80.0	
10507-AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.13	69.49	17.45	2.23	80.0	± 9.6 %
		Y	4.62	71.13	18.31		80.0	
		Z	4.28	69.77	17.53		80.0	

10508-AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.21	69.24	17.39	2.23	80.0	± 9.6 %
		Y	4.66	70.74	18.19		80.0	
		Z	4.35	69.50	17.45		80.0	
10509-AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.74	71.77	18.10	2.23	80.0	± 9.6 %
		Y	5.47	73.93	19.10		80.0	
		Z	4.92	72.05	18.14		80.0	
10510-AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.61	69.17	17.49	2.23	80.0	± 9.6 %
		Y	5.04	70.50	18.18		80.0	
		Z	4.76	69.43	17.55		80.0	
10511-AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.67	68.95	17.44	2.23	80.0	± 9.6 %
		Y	5.07	70.18	18.09		80.0	
		Z	4.81	69.20	17.49		80.0	
10512-AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.93	73.11	18.49	2.23	80.0	± 9.6 %
		Y	5.92	75.87	19.69		80.0	
		Z	5.14	73.45	18.53		80.0	
10513-AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.50	69.40	17.57	2.23	80.0	± 9.6 %
		Y	4.96	70.86	18.32		80.0	
		Z	4.65	69.68	17.64		80.0	
10514-AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.53	69.02	17.47	2.23	80.0	± 9.6 %
		Y	4.94	70.35	18.17		80.0	
		Z	4.67	69.29	17.53		80.0	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	0.91	61.95	13.22	0.00	150.0	± 9.6 %
		Y	0.95	63.11	14.37		150.0	
		Z	0.89	61.92	13.19		150.0	
10516-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	X	0.43	63.99	12.55	0.00	150.0	± 9.6 %
		Y	0.56	69.22	16.17		150.0	
		Z	0.41	64.06	12.42		150.0	
10517-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)	X	0.73	62.78	13.11	0.00	150.0	± 9.6 %
		Y	0.79	64.79	14.83		150.0	
		Z	0.71	62.78	13.06		150.0	
10518-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	X	4.39	66.55	15.83	0.00	150.0	± 9.6 %
		Y	4.48	66.89	16.14		150.0	
		Z	4.40	66.53	15.82		150.0	
10519-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	X	4.55	66.76	15.95	0.00	150.0	± 9.6 %
		Y	4.65	67.11	16.25		150.0	
		Z	4.57	66.75	15.94		150.0	
10520-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)	X	4.40	66.68	15.85	0.00	150.0	± 9.6 %
		Y	4.50	67.06	16.16		150.0	
		Z	4.42	66.67	15.84		150.0	
10521-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	X	4.34	66.65	15.82	0.00	150.0	± 9.6 %
		Y	4.44	67.04	16.15		150.0	
		Z	4.35	66.64	15.81		150.0	
10522-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	X	4.40	66.78	15.93	0.00	150.0	± 9.6 %
		Y	4.50	67.17	16.25		150.0	
		Z	4.41	66.77	15.92		150.0	

10523-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	X	4.29	66.67	15.78	0.00	150.0	± 9.6 %
		Y	4.39	67.04	16.10		150.0	
		Z	4.30	66.64	15.76		150.0	
10524-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)	X	4.34	66.70	15.89	0.00	150.0	± 9.6 %
		Y	4.44	67.08	16.21		150.0	
		Z	4.35	66.69	15.88		150.0	
10525-AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	X	4.35	65.77	15.50	0.00	150.0	± 9.6 %
		Y	4.44	66.13	15.81		150.0	
		Z	4.35	65.74	15.48		150.0	
10526-AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	X	4.49	66.08	15.63	0.00	150.0	± 9.6 %
		Y	4.59	66.48	15.95		150.0	
		Z	4.50	66.07	15.61		150.0	
10527-AAB	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)	X	4.41	66.03	15.55	0.00	150.0	± 9.6 %
		Y	4.52	66.43	15.88		150.0	
		Z	4.42	66.02	15.54		150.0	
10528-AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)	X	4.43	66.05	15.59	0.00	150.0	± 9.6 %
		Y	4.53	66.45	15.92		150.0	
		Z	4.44	66.04	15.58		150.0	
10529-AAB	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)	X	4.43	66.05	15.59	0.00	150.0	± 9.6 %
		Y	4.53	66.45	15.92		150.0	
		Z	4.44	66.04	15.58		150.0	
10531-AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)	X	4.40	66.10	15.58	0.00	150.0	± 9.6 %
		Y	4.51	66.53	15.92		150.0	
		Z	4.42	66.10	15.57		150.0	
10532-AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)	X	4.27	65.94	15.50	0.00	150.0	± 9.6 %
		Y	4.38	66.38	15.85		150.0	
		Z	4.28	65.94	15.49		150.0	
10533-AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)	X	4.43	66.11	15.58	0.00	150.0	± 9.6 %
		Y	4.54	66.51	15.91		150.0	
		Z	4.44	66.09	15.57		150.0	
10534-AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	X	4.99	66.22	15.73	0.00	150.0	± 9.6 %
		Y	5.08	66.55	15.99		150.0	
		Z	5.00	66.21	15.71		150.0	
10535-AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	X	5.05	66.39	15.82	0.00	150.0	± 9.6 %
		Y	5.14	66.74	16.08		150.0	
		Z	5.06	66.40	15.80		150.0	
10536-AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	X	4.93	66.33	15.76	0.00	150.0	± 9.6 %
		Y	5.01	66.69	16.03		150.0	
		Z	4.93	66.33	15.74		150.0	
10537-AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)	X	4.98	66.30	15.75	0.00	150.0	± 9.6 %
		Y	5.07	66.65	16.02		150.0	
		Z	4.99	66.30	15.74		150.0	
10538-AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	X	5.06	66.32	15.80	0.00	150.0	± 9.6 %
		Y	5.15	66.66	16.07		150.0	
		Z	5.07	66.32	15.79		150.0	
10540-AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	X	4.99	66.30	15.81	0.00	150.0	± 9.6 %
		Y	5.09	66.67	16.09		150.0	
		Z	5.00	66.31	15.80		150.0	

10541-AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	X	4.97	66.19	15.74	0.00	150.0	± 9.6 %
		Y	5.06	66.55	16.01		150.0	
		Z	4.98	66.20	15.73		150.0	
10542-AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	X	5.13	66.30	15.82	0.00	150.0	± 9.6 %
		Y	5.22	66.63	16.07		150.0	
		Z	5.14	66.30	15.80		150.0	
10543-AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	X	5.20	66.33	15.86	0.00	150.0	± 9.6 %
		Y	5.29	66.66	16.11		150.0	
		Z	5.21	66.33	15.84		150.0	
10544-AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	X	5.33	66.35	15.76	0.00	150.0	± 9.6 %
		Y	5.40	66.67	16.00		150.0	
		Z	5.33	66.35	15.74		150.0	
10545-AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	X	5.52	66.80	15.94	0.00	150.0	± 9.6 %
		Y	5.59	67.10	16.17		150.0	
		Z	5.52	66.79	15.92		150.0	
10546-AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	X	5.37	66.50	15.80	0.00	150.0	± 9.6 %
		Y	5.45	66.85	16.05		150.0	
		Z	5.38	66.51	15.79		150.0	
10547-AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	X	5.45	66.58	15.84	0.00	150.0	± 9.6 %
		Y	5.52	66.90	16.07		150.0	
		Z	5.45	66.58	15.82		150.0	
10548-AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	X	5.66	67.41	16.23	0.00	150.0	± 9.6 %
		Y	5.76	67.80	16.50		150.0	
		Z	5.67	67.45	16.23		150.0	
10550-AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	X	5.42	66.63	15.88	0.00	150.0	± 9.6 %
		Y	5.49	66.91	16.10		150.0	
		Z	5.42	66.61	15.85		150.0	
10551-AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	X	5.40	66.55	15.80	0.00	150.0	± 9.6 %
		Y	5.49	66.92	16.06		150.0	
		Z	5.41	66.58	15.80		150.0	
10552-AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	X	5.33	66.42	15.74	0.00	150.0	± 9.6 %
		Y	5.41	66.74	15.97		150.0	
		Z	5.33	66.41	15.72		150.0	
10553-AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	X	5.40	66.42	15.77	0.00	150.0	± 9.6 %
		Y	5.48	66.76	16.01		150.0	
		Z	5.41	66.43	15.76		150.0	
10554-AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	X	5.75	66.73	15.87	0.00	150.0	± 9.6 %
		Y	5.81	67.03	16.09		150.0	
		Z	5.75	66.74	15.85		150.0	
10555-AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	X	5.86	67.02	15.99	0.00	150.0	± 9.6 %
		Y	5.93	67.33	16.22		150.0	
		Z	5.87	67.03	15.98		150.0	
10556-AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	X	5.89	67.08	16.02	0.00	150.0	± 9.6 %
		Y	5.96	67.39	16.24		150.0	
		Z	5.89	67.08	16.00		150.0	
10557-AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	X	5.84	66.95	15.97	0.00	150.0	± 9.6 %
		Y	5.92	67.27	16.20		150.0	
		Z	5.85	66.96	15.96		150.0	

10558-AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	X	5.88	67.09	16.06	0.00	150.0	± 9.6 %
		Y	5.96	67.43	16.30		150.0	
		Z	5.89	67.11	16.05		150.0	
10560-AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	X	5.88	66.96	16.03	0.00	150.0	± 9.6 %
		Y	5.96	67.28	16.26		150.0	
		Z	5.88	66.97	16.02		150.0	
10561-AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	X	5.82	66.95	16.06	0.00	150.0	± 9.6 %
		Y	5.89	67.26	16.29		150.0	
		Z	5.82	66.96	16.05		150.0	
10562-AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	X	5.90	67.20	16.19	0.00	150.0	± 9.6 %
		Y	5.99	67.59	16.45		150.0	
		Z	5.91	67.25	16.19		150.0	
10563-AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 99pc duty cycle)	X	5.99	67.15	16.13	0.00	150.0	± 9.6 %
		Y	6.11	67.60	16.42		150.0	
		Z	6.02	67.22	16.14		150.0	
10564-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	X	4.73	66.69	16.05	0.46	150.0	± 9.6 %
		Y	4.81	67.02	16.34		150.0	
		Z	4.74	66.67	16.04		150.0	
10565-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)	X	4.93	67.10	16.36	0.46	150.0	± 9.6 %
		Y	5.03	67.43	16.64		150.0	
		Z	4.95	67.09	16.35		150.0	
10566-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle)	X	4.77	66.92	16.16	0.46	150.0	± 9.6 %
		Y	4.86	67.28	16.46		150.0	
		Z	4.78	66.92	16.16		150.0	
10567-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle)	X	4.79	67.28	16.50	0.46	150.0	± 9.6 %
		Y	4.89	67.62	16.78		150.0	
		Z	4.81	67.28	16.49		150.0	
10568-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)	X	4.69	66.74	15.95	0.46	150.0	± 9.6 %
		Y	4.79	67.12	16.27		150.0	
		Z	4.70	66.74	15.95		150.0	
10569-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)	X	4.77	67.43	16.60	0.46	150.0	± 9.6 %
		Y	4.86	67.75	16.86		150.0	
		Z	4.78	67.42	16.58		150.0	
10570-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)	X	4.79	67.27	16.52	0.46	150.0	± 9.6 %
		Y	4.88	67.60	16.79		150.0	
		Z	4.80	67.26	16.50		150.0	
10571-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	X	1.17	63.92	14.55	0.46	130.0	± 9.6 %
		Y	1.26	65.53	15.82		130.0	
		Z	1.18	64.09	14.59		130.0	
10572-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	X	1.18	64.38	14.83	0.46	130.0	± 9.6 %
		Y	1.28	66.13	16.18		130.0	
		Z	1.19	64.56	14.88		130.0	
10573-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	X	1.16	73.40	17.12	0.46	130.0	± 9.6 %
		Y	3.60	91.72	24.40		130.0	
		Z	1.24	74.20	17.22		130.0	
10574-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	X	1.20	68.26	16.69	0.46	130.0	± 9.6 %
		Y	1.46	72.14	19.02		130.0	
		Z	1.23	68.66	16.80		130.0	

10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	4.54	66.55	16.13	0.46	130.0	± 9.6 %
		Y	4.63	66.89	16.43		130.0	
		Z	4.55	66.55	16.13		130.0	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	4.56	66.71	16.20	0.46	130.0	± 9.6 %
		Y	4.65	67.05	16.49		130.0	
		Z	4.57	66.71	16.19		130.0	
10577-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	X	4.74	66.97	16.36	0.46	130.0	± 9.6 %
		Y	4.84	67.31	16.65		130.0	
		Z	4.76	66.97	16.35		130.0	
10578-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	X	4.64	67.09	16.44	0.46	130.0	± 9.6 %
		Y	4.74	67.44	16.73		130.0	
		Z	4.66	67.10	16.44		130.0	
10579-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	X	4.41	66.39	15.75	0.46	130.0	± 9.6 %
		Y	4.51	66.80	16.10		130.0	
		Z	4.43	66.40	15.76		130.0	
10580-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	X	4.45	66.46	15.79	0.46	130.0	± 9.6 %
		Y	4.56	66.87	16.14		130.0	
		Z	4.47	66.47	15.79		130.0	
10581-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	X	4.54	67.14	16.39	0.46	130.0	± 9.6 %
		Y	4.64	67.51	16.69		130.0	
		Z	4.56	67.14	16.38		130.0	
10582-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	X	4.35	66.17	15.55	0.46	130.0	± 9.6 %
		Y	4.46	66.59	15.91		130.0	
		Z	4.37	66.18	15.55		130.0	
10583-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	X	4.54	66.55	16.13	0.46	130.0	± 9.6 %
		Y	4.63	66.89	16.43		130.0	
		Z	4.55	66.55	16.13		130.0	
10584-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	X	4.56	66.71	16.20	0.46	130.0	± 9.6 %
		Y	4.65	67.05	16.49		130.0	
		Z	4.57	66.71	16.19		130.0	
10585-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	X	4.74	66.97	16.36	0.46	130.0	± 9.6 %
		Y	4.84	67.31	16.65		130.0	
		Z	4.76	66.97	16.35		130.0	
10586-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	X	4.64	67.09	16.44	0.46	130.0	± 9.6 %
		Y	4.74	67.44	16.73		130.0	
		Z	4.66	67.10	16.44		130.0	
10587-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	X	4.41	66.39	15.75	0.46	130.0	± 9.6 %
		Y	4.51	66.80	16.10		130.0	
		Z	4.43	66.40	15.76		130.0	
10588-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	X	4.45	66.46	15.79	0.46	130.0	± 9.6 %
		Y	4.56	66.87	16.14		130.0	
		Z	4.47	66.47	15.79		130.0	
10589-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	X	4.54	67.14	16.39	0.46	130.0	± 9.6 %
		Y	4.64	67.51	16.69		130.0	
		Z	4.56	67.14	16.38		130.0	
10590-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	X	4.35	66.17	15.55	0.46	130.0	± 9.6 %
		Y	4.46	66.59	15.91		130.0	
		Z	4.37	66.18	15.55		130.0	

10591-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	X	4.69	66.63	16.25	0.46	130.0	± 9.6 %
		Y	4.77	66.94	16.53		130.0	
		Z	4.70	66.62	16.24		130.0	
10592-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	X	4.82	66.93	16.38	0.46	130.0	± 9.6 %
		Y	4.92	67.26	16.65		130.0	
		Z	4.84	66.94	16.37		130.0	
10593-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle)	X	4.74	66.82	16.24	0.46	130.0	± 9.6 %
		Y	4.84	67.17	16.54		130.0	
		Z	4.76	66.83	16.24		130.0	
10594-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)	X	4.80	66.99	16.40	0.46	130.0	± 9.6 %
		Y	4.89	67.32	16.69		130.0	
		Z	4.81	67.00	16.40		130.0	
10595-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)	X	4.76	66.96	16.31	0.46	130.0	± 9.6 %
		Y	4.86	67.29	16.59		130.0	
		Z	4.78	66.96	16.30		130.0	
10596-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)	X	4.70	66.94	16.30	0.46	130.0	± 9.6 %
		Y	4.80	67.30	16.60		130.0	
		Z	4.72	66.94	16.30		130.0	
10597-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle)	X	4.65	66.82	16.16	0.46	130.0	± 9.6 %
		Y	4.75	67.19	16.47		130.0	
		Z	4.67	66.83	16.16		130.0	
10598-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle)	X	4.63	67.02	16.41	0.46	130.0	± 9.6 %
		Y	4.73	67.38	16.71		130.0	
		Z	4.65	67.03	16.41		130.0	
10599-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	X	5.37	67.18	16.53	0.46	130.0	± 9.6 %
		Y	5.44	67.44	16.74		130.0	
		Z	5.38	67.17	16.51		130.0	
10600-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	X	5.50	67.63	16.73	0.46	130.0	± 9.6 %
		Y	5.58	67.89	16.95		130.0	
		Z	5.51	67.62	16.70		130.0	
10601-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	X	5.39	67.35	16.60	0.46	130.0	± 9.6 %
		Y	5.46	67.62	16.83		130.0	
		Z	5.40	67.34	16.58		130.0	
10602-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	X	5.52	67.50	16.61	0.46	130.0	± 9.6 %
		Y	5.58	67.73	16.81		130.0	
		Z	5.52	67.47	16.57		130.0	
10603-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)	X	5.58	67.75	16.86	0.46	130.0	± 9.6 %
		Y	5.64	67.97	17.05		130.0	
		Z	5.58	67.72	16.82		130.0	
10604-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)	X	5.46	67.44	16.69	0.46	130.0	± 9.6 %
		Y	5.49	67.56	16.83		130.0	
		Z	5.44	67.35	16.62		130.0	
10605-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)	X	5.50	67.54	16.74	0.46	130.0	± 9.6 %
		Y	5.57	67.81	16.96		130.0	
		Z	5.51	67.54	16.72		130.0	
10606-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)	X	5.23	66.82	16.23	0.46	130.0	± 9.6 %
		Y	5.30	67.08	16.45		130.0	
		Z	5.23	66.79	16.20		130.0	

10607-AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	X	4.52	65.90	15.85	0.46	130.0	± 9.6 %
		Y	4.61	66.24	16.14		130.0	
		Z	4.53	65.89	15.84		130.0	
10608-AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	X	4.68	66.25	16.00	0.46	130.0	± 9.6 %
		Y	4.78	66.62	16.30		130.0	
		Z	4.69	66.26	16.00		130.0	
10609-AAB	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle)	X	4.57	66.09	15.83	0.46	130.0	± 9.6 %
		Y	4.68	66.48	16.14		130.0	
		Z	4.59	66.09	15.82		130.0	
10610-AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	X	4.62	66.25	15.99	0.46	130.0	± 9.6 %
		Y	4.72	66.62	16.30		130.0	
		Z	4.64	66.25	15.99		130.0	
10611-AAB	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	X	4.54	66.06	15.84	0.46	130.0	± 9.6 %
		Y	4.64	66.44	16.15		130.0	
		Z	4.55	66.06	15.83		130.0	
10612-AAB	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)	X	4.53	66.19	15.88	0.46	130.0	± 9.6 %
		Y	4.65	66.61	16.21		130.0	
		Z	4.56	66.20	15.87		130.0	
10613-AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)	X	4.53	66.06	15.75	0.46	130.0	± 9.6 %
		Y	4.65	66.48	16.09		130.0	
		Z	4.56	66.07	15.75		130.0	
10614-AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	X	4.49	66.22	15.97	0.46	130.0	± 9.6 %
		Y	4.59	66.63	16.29		130.0	
		Z	4.50	66.23	15.97		130.0	
10615-AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	X	4.53	65.91	15.63	0.46	130.0	± 9.6 %
		Y	4.65	66.31	15.96		130.0	
		Z	4.55	65.91	15.62		130.0	
10616-AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	X	5.17	66.35	16.09	0.46	130.0	± 9.6 %
		Y	5.25	66.67	16.33		130.0	
		Z	5.18	66.35	16.08		130.0	
10617-AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	X	5.24	66.56	16.17	0.46	130.0	± 9.6 %
		Y	5.33	66.88	16.42		130.0	
		Z	5.25	66.57	16.16		130.0	
10618-AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	X	5.13	66.56	16.18	0.46	130.0	± 9.6 %
		Y	5.21	66.87	16.42		130.0	
		Z	5.14	66.55	16.16		130.0	
10619-AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	X	5.14	66.35	16.02	0.46	130.0	± 9.6 %
		Y	5.22	66.67	16.27		130.0	
		Z	5.15	66.35	16.00		130.0	
10620-AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	X	5.22	66.39	16.09	0.46	130.0	± 9.6 %
		Y	5.31	66.71	16.33		130.0	
		Z	5.24	66.39	16.07		130.0	
10621-AAB	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	X	5.23	66.51	16.27	0.46	130.0	± 9.6 %
		Y	5.31	66.82	16.50		130.0	
		Z	5.24	66.52	16.25		130.0	
10622-AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	X	5.25	66.68	16.34	0.46	130.0	± 9.6 %
		Y	5.32	66.98	16.57		130.0	
		Z	5.25	66.68	16.33		130.0	

10623-AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)	X	5.12	66.18	15.96	0.46	130.0	± 9.6 %
		Y	5.21	66.54	16.23		130.0	
		Z	5.13	66.21	15.96		130.0	
10624-AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)	X	5.31	66.42	16.15	0.46	130.0	± 9.6 %
		Y	5.39	66.73	16.39		130.0	
		Z	5.32	66.42	16.14		130.0	
10625-AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)	X	5.54	67.00	16.50	0.46	130.0	± 9.6 %
		Y	5.70	67.55	16.86		130.0	
		Z	5.60	67.16	16.56		130.0	
10626-AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	X	5.49	66.43	16.07	0.46	130.0	± 9.6 %
		Y	5.56	66.73	16.30		130.0	
		Z	5.49	66.44	16.06		130.0	
10627-AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	X	5.74	67.06	16.36	0.46	130.0	± 9.6 %
		Y	5.80	67.32	16.56		130.0	
		Z	5.74	67.05	16.33		130.0	
10628-AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	X	5.50	66.46	15.99	0.46	130.0	± 9.6 %
		Y	5.58	66.80	16.24		130.0	
		Z	5.51	66.49	15.98		130.0	
10629-AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)	X	5.59	66.58	16.04	0.46	130.0	± 9.6 %
		Y	5.66	66.87	16.26		130.0	
		Z	5.59	66.58	16.03		130.0	
10630-AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)	X	5.95	67.87	16.70	0.46	130.0	± 9.6 %
		Y	6.07	68.30	16.99		130.0	
		Z	5.99	67.96	16.72		130.0	
10631-AAB	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)	X	5.85	67.66	16.77	0.46	130.0	± 9.6 %
		Y	5.95	68.03	17.02		130.0	
		Z	5.87	67.71	16.78		130.0	
10632-AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)	X	5.71	67.13	16.53	0.46	130.0	± 9.6 %
		Y	5.76	67.35	16.70		130.0	
		Z	5.71	67.11	16.50		130.0	
10633-AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)	X	5.57	66.65	16.12	0.46	130.0	± 9.6 %
		Y	5.64	66.95	16.34		130.0	
		Z	5.57	66.65	16.10		130.0	
10634-AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)	X	5.54	66.65	16.17	0.46	130.0	± 9.6 %
		Y	5.62	66.97	16.40		130.0	
		Z	5.55	66.67	16.16		130.0	
10635-AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)	X	5.43	66.00	15.59	0.46	130.0	± 9.6 %
		Y	5.51	66.37	15.86		130.0	
		Z	5.44	66.03	15.58		130.0	
10636-AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)	X	5.92	66.82	16.19	0.46	130.0	± 9.6 %
		Y	5.98	67.08	16.38		130.0	
		Z	5.92	66.82	16.16		130.0	
10637-AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)	X	6.07	67.20	16.36	0.46	130.0	± 9.6 %
		Y	6.13	67.48	16.57		130.0	
		Z	6.07	67.21	16.35		130.0	
10638-AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)	X	6.07	67.17	16.32	0.46	130.0	± 9.6 %
		Y	6.13	67.45	16.53		130.0	
		Z	6.07	67.17	16.30		130.0	

10639-AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)	X	6.03	67.08	16.32	0.46	130.0	± 9.6 %
		Y	6.10	67.37	16.53		130.0	
		Z	6.03	67.09	16.31		130.0	
10640-AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	X	6.03	67.08	16.27	0.46	130.0	± 9.6 %
		Y	6.10	67.40	16.49		130.0	
		Z	6.04	67.10	16.26		130.0	
10641-AAC	IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	X	6.11	67.09	16.29	0.46	130.0	± 9.6 %
		Y	6.16	67.35	16.49		130.0	
		Z	6.10	67.08	16.27		130.0	
10642-AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	X	6.12	67.25	16.54	0.46	130.0	± 9.6 %
		Y	6.18	67.52	16.73		130.0	
		Z	6.12	67.26	16.52		130.0	
10643-AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	X	5.97	66.99	16.30	0.46	130.0	± 9.6 %
		Y	6.04	67.27	16.51		130.0	
		Z	5.97	66.99	16.28		130.0	
10644-AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	X	6.07	67.28	16.47	0.46	130.0	± 9.6 %
		Y	6.17	67.67	16.73		130.0	
		Z	6.09	67.34	16.48		130.0	
10645-AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	X	6.22	67.39	16.49	0.46	130.0	± 9.6 %
		Y	6.35	67.86	16.79		130.0	
		Z	6.25	67.47	16.51		130.0	
10646-AAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	X	46.26	130.91	43.60	9.30	60.0	± 9.6 %
		Y	100.00	147.58	47.83		60.0	
		Z	58.34	134.03	44.02		60.0	
10647-AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	X	38.17	127.34	42.82	9.30	60.0	± 9.6 %
		Y	100.00	148.89	48.39		60.0	
		Z	50.85	131.86	43.65		60.0	
10648-AAA	CDMA2000 (1x Advanced)	X	0.53	61.12	8.14	0.00	150.0	± 9.6 %
		Y	0.61	62.66	9.68		150.0	
		Z	0.53	61.13	8.17		150.0	
10652-AAD	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.78	67.42	16.36	2.23	80.0	± 9.6 %
		Y	4.10	68.60	17.11		80.0	
		Z	3.87	67.58	16.44		80.0	
10653-AAD	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	X	4.33	66.88	16.68	2.23	80.0	± 9.6 %
		Y	4.58	67.74	17.23		80.0	
		Z	4.41	67.04	16.74		80.0	
10654-AAD	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	X	4.32	66.55	16.73	2.23	80.0	± 9.6 %
		Y	4.55	67.37	17.24		80.0	
		Z	4.40	66.72	16.78		80.0	
10655-AAE	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.39	66.51	16.77	2.23	80.0	± 9.6 %
		Y	4.61	67.34	17.28		80.0	
		Z	4.47	66.69	16.83		80.0	
10658-AAA	Pulse Waveform (200Hz, 10%)	X	100.00	115.33	28.90	10.00	50.0	± 9.6 %
		Y	46.45	105.93	27.47		50.0	
		Z	36.14	101.41	25.87		50.0	
10659-AAA	Pulse Waveform (200Hz, 20%)	X	100.00	111.86	26.34	6.99	60.0	± 9.6 %
		Y	100.00	113.84	27.67		60.0	
		Z	100.00	112.19	26.79		60.0	

10660-AAA	Pulse Waveform (200Hz, 40%)	X	100.00	109.38	23.97	3.98	80.0	± 9.6 %
		Y	100.00	112.06	25.50		80.0	
		Z	100.00	109.17	24.09		80.0	
10661-AAA	Pulse Waveform (200Hz, 60%)	X	100.00	108.23	22.30	2.22	100.0	± 9.6 %
		Y	100.00	112.70	24.51		100.0	
		Z	100.00	107.44	22.12		100.0	
10662-AAA	Pulse Waveform (200Hz, 80%)	X	100.00	104.63	19.32	0.97	120.0	± 9.6 %
		Y	100.00	114.33	23.49		120.0	
		Z	100.00	102.50	18.52		120.0	
10670-AAA	Bluetooth Low Energy	X	100.00	110.10	23.42	2.19	100.0	± 9.6 %
		Y	100.00	113.74	25.27		100.0	
		Z	100.00	109.20	23.18		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.

APPENDIX D: SAR TISSUE SPECIFICATIONS

Measurement Procedure for Tissue verification:

1) The network analyzer and probe system was configured and calibrated.
2) The probe was immersed in the tissue. The tissue was placed in a nonmetallic container. Trapped air bubbles beneath the flange were minimized by placing the probe at a slight angle.
3) The complex admittance with respect to the probe aperture was measured
4) The complex relative permittivity ε' can be calculated from the below equation (Pournaropoulos and Misra):

$$Y = \frac{j2\omega\varepsilon_r\varepsilon_0}{[\ln(b/a)]^2}\int_a^b\int_a^b\int_0^\pi \cos\phi' \frac{\exp\left[-j\omega r(\mu_0\varepsilon_r'\varepsilon_0)^{1/2}\right]}{r} d\phi' d\rho' d\rho$$

where Y is the admittance of the probe in contact with the sample, the primed and unprimed coordinates refer to source and observation points, respectively, $r^2 = \rho^2 + \rho'^2 - 2\rho\rho'\cos\phi'$, ω is the angular frequency, and $j = \sqrt{-1}$.

3 Composition / Information on ingredients

3.2 Mixtures
Description: Aqueous solution with surfactants and inhibitors
Declarable, or hazardous components:

CAS: 107-21-1 EINECS: 203-473-3 Reg.nr.: 01-2119456816-28-0000	**Ethanediol** STOT RE 2, H373; Acute Tox. 4, H302	>1.0-4.9%
CAS: 68608-26-4 EINECS: 271-781-5 Reg.nr.: 01-2119527859-22-0000	**Sodium petroleum sulfonate** Eye Irrit. 2, H319	< 2.9%
CAS: 107-41-5 EINECS: 203-489-0 Reg.nr.: 01-2119539582-35-0000	**Hexylene Glycol / 2-Methyl-pentane-2,4-diol** Skin Irrit. 2, H315; Eye Irrit. 2, H319	< 2.9%
CAS: 68920-66-1 NLP: 500-236-9 Reg.nr.: 01-2119489407-26-0000	**Alkoxylated alcohol, > C_{16}** Aquatic Chronic 2, H411; Skin Irrit. 2, H315; Eye Irrit. 2, H319	< 2.0%

Figure D-1
Composition of the Tissue Equivalent Matter

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s p e a g

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Measurement Certificate / Material Test

Item Name	**Head Tissue Simulating Liquid (HBBL600-10000V6)**
Product No.	SL AAH U16 BC (Batch: 181031-2)
Manufacturer	SPEAG

Measurement Method

TSL dielectric parameters measured using calibrated DAK probe.

Target Parameters

Target parameters as defined in the IEEE 1528 and IEC 62209 compliance standards.

Test Condition

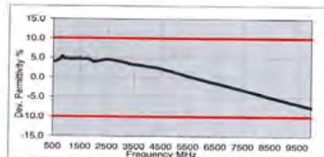
Ambient Condition	22°C ; 30% humidity
TSL Temperature	22°C
Test Date	31-Oct-18
Operator	CL

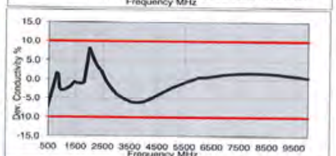
Additional Information

TSL Density
TSL Heat-capacity

Results

	Measured			Target		Diff.to Target [%]	
f (MHz)	e'	e"	sigma	eps	sigma	Δ-eps	Δ-sigma
800	43.8	20.5	0.91	41.7	0.90	5.1	1.4
825	43.8	20.1	0.92	41.6	0.91	5.3	1.5
835	43.8	19.9	0.93	41.5	0.91	5.4	2.0
850	43.7	19.7	0.93	41.5	0.92	5.3	1.5
900	43.5	18.9	0.95	41.5	0.97	4.8	-2.1
1400	42.5	15.0	1.17	40.6	1.18	4.7	-0.8
1450	42.5	14.8	1.19	40.5	1.20	4.9	-0.8
1600	42.2	14.3	1.27	40.3	1.28	4.7	-1.1
1625	42.2	14.2	1.29	40.3	1.30	4.8	-0.7
1640	42.2	14.2	1.30	40.3	1.31	4.8	-0.5
1650	42.1	14.2	1.30	40.2	1.31	4.6	-1.0
1700	42.1	14.0	1.33	40.2	1.34	4.8	-0.9
1750	42.0	13.9	1.36	40.1	1.37	4.8	-0.8
1800	41.9	13.9	1.39	40.0	1.40	4.7	-0.7
1810	41.9	13.8	1.40	40.0	1.40	4.7	0.0
1825	41.9	13.8	1.41	40.0	1.40	4.7	0.7
1850	41.8	13.8	1.42	40.0	1.40	4.5	1.4
1900	41.8	13.7	1.45	40.0	1.40	4.5	3.6
1950	41.7	13.7	1.48	40.0	1.40	4.3	5.7
2000	41.6	13.6	1.51	40.0	1.40	4.0	7.9
2050	41.6	13.6	1.55	39.9	1.44	4.2	7.3
2100	41.5	13.5	1.58	39.8	1.49	4.2	6.1
2150	41.4	13.5	1.62	39.7	1.53	4.2	5.7
2200	41.4	13.5	1.65	39.6	1.58	4.4	4.6
2250	41.3	13.5	1.69	39.6	1.62	4.4	4.2
2300	41.2	13.5	1.72	39.5	1.67	4.4	3.2
2350	41.1	13.5	1.76	39.4	1.71	4.4	2.9
2400	41.1	13.5	1.80	39.3	1.76	4.6	2.5
2450	41.0	13.5	1.84	39.2	1.80	4.6	2.2
2500	40.9	13.5	1.88	39.1	1.85	4.5	1.4
2550	40.8	13.5	1.92	39.1	1.91	4.4	0.6
2600	40.8	13.6	1.96	39.0	1.96	4.6	-0.2
3500	39.2	14.1	2.74	37.9	2.91	3.3	-5.8
3700	38.9	14.2	2.93	37.7	3.12	3.1	-6.1
5200	36.3	15.8	4.57	36.0	4.66	0.9	-1.7
5250	36.2	15.9	4.63	35.9	4.71	0.8	-1.6
5300	36.1	15.9	4.69	35.9	4.76	0.7	-1.4
5500	35.8	16.1	4.92	35.6	4.96	0.3	-0.9
5600	35.6	16.2	5.04	35.5	5.07	0.1	-0.6
5700	35.4	16.2	5.15	35.4	5.17	0.0	-0.3
5800	35.2	16.3	5.27	35.3	5.27	-0.2	0.0
6000	34.9	16.5	5.50	35.1	5.48	-0.6	0.5
6500	34.0	16.9	6.12	34.5	6.07	-1.4	0.9
7000	33.1	17.3	6.74	33.9	6.65	-2.3	1.3
7500	32.2	17.6	7.36	33.3	7.24	-3.2	1.6
8000	31.4	17.9	7.97	32.7	7.84	-4.1	1.7
8500	30.5	18.2	8.59	32.1	8.45	-5.0	1.6
9000	29.7	18.4	9.20	31.5	9.08	-5.9	1.3
9500	28.9	18.5	9.80	31.0	9.71	-6.8	0.9
10000	28.1	18.7	10.40	30.4	10.36	-7.6	0.4





TSL Dielectric Parameters

Figure D-2
750 – 5800 MHz Head Tissue Equivalent Matter

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Measurement Certificate / Material Test

Item Name	**Body Tissue Simulating Liquid (MBBL600-6000V6)**
Product No.	SL AAM U16 BC (Batch: 181029-1)
Manufacturer	SPEAG

Measurement Method

TSL dielectric parameters measured using calibrated DAK probe.

Target Parameters

Target parameters as defined in the KDB 865664 compliance standard.

Test Condition

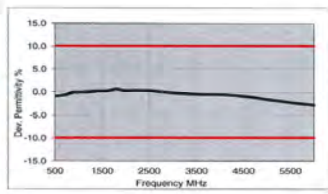
Ambient Condition	22°C ; 30% humidity
TSL Temperature	22°C
Test Date	30-Oct-18
Operator	CL

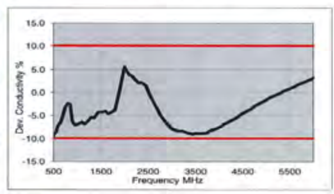
Additional Information

TSL Density
TSL Heat-capacity

Results

	Measured			Target		Diff.to Target [%]	
f [MHz]	e'	e''	sigma	eps	sigma	Δ-eps	Δ-sigma
800	55.1	21.3	0.95	55.3	0.97	-0.4	-2.1
825	55.1	20.8	0.96	55.2	0.98	-0.3	-2.0
835	55.1	20.6	0.96	55.1	0.99	0.0	-2.5
850	55.1	20.4	0.96	55.2	0.99	-0.1	-3.0
900	55.0	19.7	0.98	55.0	1.05	0.0	-6.7
1400	54.2	15.6	1.22	54.1	1.28	0.2	-4.7
1450	54.1	15.4	1.24	54.0	1.30	0.2	-4.6
1500	54.1	15.3	1.27	53.9	1.33	0.3	-4.5
1550	54.0	15.1	1.30	53.9	1.36	0.2	-4.4
1600	53.9	15.0	1.33	53.8	1.39	0.2	-4.3
1625	53.9	14.9	1.35	53.8	1.41	0.3	-4.3
1640	53.9	14.9	1.36	53.7	1.42	0.3	-4.2
1650	53.8	14.9	1.36	53.7	1.43	0.2	-4.9
1700	53.8	14.8	1.40	53.6	1.46	0.4	-4.1
1750	53.7	14.7	1.43	53.4	1.49	0.5	-4.0
1800	53.7	14.6	1.46	53.3	1.52	0.8	-3.9
1810	53.7	14.6	1.47	53.3	1.52	0.8	-3.3
1825	53.7	14.6	1.48	53.3	1.52	0.8	-2.6
1850	53.6	14.5	1.50	53.3	1.52	0.6	-1.3
1900	53.5	14.5	1.53	53.3	1.52	0.4	0.7
1950	53.5	14.5	1.57	53.3	1.52	0.4	3.3
2000	53.4	14.4	1.60	53.3	1.52	0.2	5.3
2050	53.4	14.4	1.64	53.2	1.57	0.3	4.5
2100	53.3	14.4	1.68	53.2	1.62	0.2	3.7
2150	53.3	14.4	1.72	53.1	1.66	0.4	3.6
2200	53.2	14.4	1.76	53.0	1.71	0.3	2.9
2250	53.1	14.4	1.81	53.0	1.76	0.2	2.8
2300	53.1	14.4	1.85	52.9	1.81	0.4	2.2
2350	53.0	14.5	1.89	52.8	1.85	0.3	2.2
2400	52.9	14.5	1.94	52.8	1.90	0.2	2.1
2450	52.9	14.5	1.98	52.7	1.95	0.4	1.5
2500	52.8	14.6	2.03	52.6	2.02	0.3	0.5
2550	52.7	14.6	2.07	52.6	2.09	0.2	-1.0
2600	52.6	14.7	2.12	52.5	2.16	0.2	-1.9
3500	51.1	15.5	3.02	51.3	3.31	-0.4	-8.8
3700	50.8	15.7	3.24	51.1	3.55	-0.5	-8.8
5200	48.1	18.2	5.27	49.0	5.30	-1.8	-0.6
5250	48.0	18.3	5.34	49.0	5.36	-1.9	-0.4
5300	47.9	18.4	5.41	48.9	5.42	-2.0	-0.2
5500	47.5	18.6	5.70	48.6	5.65	-2.2	0.8
5600	47.3	18.8	5.84	48.5	5.77	-2.3	1.3
5700	47.1	18.9	5.99	48.3	5.88	-2.5	1.8
5800	47.0	19.0	6.14	48.2	6.00	-2.6	2.3





TSL Dielectric Parameters 1

Figure D-3
750 – 5800 MHz Body Tissue Equivalent Matter

APPENDIX E: SAR SYSTEM VALIDATION

Per FCC KDB Publication 865664 D02v01r02, SAR system validation status should be documented to confirm measurement accuracy. The SAR systems (including SAR probes, system components and software versions) used for this device were validated against its performance specifications prior to the SAR measurements. Reference dipoles were used with the required tissue- equivalent media for system validation, according to the procedures outlined in FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013. Since SAR probe calibrations are frequency dependent, each probe calibration point was validated at a frequency within the valid frequency range of the probe calibration point, using the system that normally operates with the probe for routine SAR measurements and according to the required tissue-equivalent media.

A tabulated summary of the system validation status including the validation date(s), measurement frequencies, SAR probes and tissue dielectric parameters has been included.

Table E-1
SAR System Validation Summary – 1g

SAR SYSTEM #	FREQ. [MHz]	DATE	PROBE SN	PROBE CAL. POINT		COND.	PERM.	CW VALIDATION			MOD. VALIDATION		
						(σ)	(εr)	SENSITIVITY	PROBE LINEARITY	PROBE ISOTROPY	MOD. TYPE	DUTY FACTOR	PAR
O	750	8/27/2019	7538	750	Head	0.885	41.82	PASS	PASS	PASS	N/A	N/A	N/A
O	835	8/7/2019	7538	835	Head	0.926	42.299	PASS	PASS	PASS	GMSK	PASS	N/A
H	835	6/6/2019	7406	835	Head	0.93	43.8	PASS	PASS	PASS	GMSK	PASS	N/A
O	1750	8/7/2019	7538	1750	Head	1.37	40.428	PASS	PASS	PASS	N/A	N/A	N/A
O	1900	8/29/2019	7538	1900	Head	1.43	39.112	PASS	PASS	PASS	GMSK	PASS	N/A
E	2450	9/5/2019	7417	2450	Head	1.855	39.542	PASS	PASS	PASS	OFDM/TDD	PASS	PASS
L	2450	9/5/2019	7410	2450	Head	1.85	39.32	PASS	PASS	PASS	OFDM/TDD	PASS	PASS
L	2600	9/5/2019	7410	2600	Head	1.98	39.106	PASS	PASS	PASS	TDD	PASS	N/A
H	5250	6/10/2019	7406	5250	Head	4.59	36.819	PASS	PASS	PASS	OFDM	N/A	PASS
H	5600	6/10/2019	7406	5600	Head	4.978	34.167	PASS	PASS	PASS	OFDM	N/A	PASS
H	5750	6/10/2019	7406	5750	Head	5.15	33.901	PASS	PASS	PASS	OFDM	N/A	PASS
I	750	5/16/2019	7357	750	Body	0.937	56.547	PASS	PASS	PASS	N/A	N/A	N/A
H	835	7/11/2019	7406	835	Body	0.978	54.026	PASS	PASS	PASS	GMSK	PASS	N/A
G	1750	7/11/2019	7409	1750	Body	1.445	53.92	PASS	PASS	PASS	N/A	N/A	N/A
J	1900	2/8/2019	7488	1900	Body	1.571	52.538	PASS	PASS	PASS	GMSK	PASS	N/A
G	1900	8/15/2019	7409	1900	Body	1.585	50.851	PASS	PASS	PASS	GMSK	PASS	N/A
P	2450	9/6/2019	3288	2450	Body	1.948	51.831	PASS	PASS	PASS	OFDM/TDD	PASS	PASS
K	2450	3/6/2019	7417	2450	Body	2.039	50.67	PASS	PASS	PASS	OFDM/TDD	PASS	PASS
K	2450	9/6/2019	7547	2450	Body	1.996	51.898	PASS	PASS	PASS	OFDM/TDD	PASS	PASS
K	2600	9/5/2019	7547	2600	Body	2.716	52.04	PASS	PASS	PASS	TDD	PASS	N/A
L	5250	7/31/2019	7410	5250	Body	5.165	47.068	PASS	PASS	PASS	OFDM	N/A	PASS
L	5600	7/31/2019	7410	5600	Body	5.629	46.485	PASS	PASS	PASS	OFDM	N/A	PASS
L	5750	7/31/2019	7410	5750	Body	5.842	46.222	PASS	PASS	PASS	OFDM	N/A	PASS

Table E-2
SAR System Validation Summary – 10g

SAR SYSTEM #	FREQ. [MHz]	DATE	PROBE SN	PROBE CAL. POINT		COND.	PERM.	CW VALIDATION			MOD. VALIDATION		
						(σ)	(εr)	SENSITIVITY	PROBE LINEARITY	PROBE ISOTROPY	MOD. TYPE	DUTY FACTOR	PAR
G	1750	7/11/2019	7409	1750	Body	1.445	53.92	PASS	PASS	PASS	N/A	N/A	N/A
G	1900	8/15/2019	7409	1900	Body	1.585	50.851	PASS	PASS	PASS	GMSK	PASS	N/A
K	2450	9/6/2019	7547	2450	Body	1.996	51.898	PASS	PASS	PASS	OFDM/TDD	PASS	PASS
K	2600	9/5/2019	7547	2600	Body	2.716	52.04	PASS	PASS	PASS	TDD	PASS	N/A
L	5250	7/31/2019	7410	5250	Body	5.165	47.068	PASS	PASS	PASS	OFDM	N/A	PASS
L	5600	7/31/2019	7410	5600	Body	5.629	46.485	PASS	PASS	PASS	OFDM	N/A	PASS
L	5750	7/31/2019	7410	5750	Body	5.842	46.222	PASS	PASS	PASS	OFDM	N/A	PASS

NOTE: While the probes have been calibrated for both CW and modulated signals, all measurements were performed using communication systems calibrated for CW signals only. Modulations in the table above represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664 D01v01r04 for scenarios when CW probe calibrations are used with other signal types. SAR systems were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5 dB), such as OFDM according to FCC KDB Publication 865664 D01v01r04.

APPENDIX G POWER REDUCTION VERIFICATION

Per the May 2017 TCBC Workshop Notes, demonstration of proper functioning of the power reduction mechanisms is required to support the corresponding SAR configurations. The verification process was divided into two parts: (1) evaluation of output power levels for individual or multiple triggering mechanisms and (2) evaluation of the triggering distances for proximity-based sensors.

G.1 Power Verification Procedure

The power verification was performed according to the following procedure:

1. A base station simulator was used to establish a conducted RF connection and the output power was monitored. The power measurements were confirmed to be within expected tolerances for all states before and after a power reduction mechanism was triggered.

2. Step 1 was repeated for all relevant modes and frequency bands for the mechanism being investigated.

3. Steps 1 and 2 were repeated for all individual power reduction mechanisms and combinations thereof. For the combination cases, one mechanism was switched to a 'triggered' state at a time; powers were confirmed to be within tolerances after each additional mechanism was activated.

G.2 Distance Verification Procedure

The distance verification procedure was performed according to the following procedure:

1. A base station simulator was used to establish an RF connection and to monitor the power levels. The device being tested was placed below the relevant section of the phantom with the relevant side or edge of the device facing toward the phantom.

2. The device was moved toward and away from the phantom to determine the distance at which the mechanism triggers and the output power is reduced, per KDB Publication 616217 D04v01r02 and FCC Guidance. Each applicable test position was evaluated. The distances were confirmed to be the same or larger (more conservative) than the minimum distances provided by the manufacturer.

3. Steps 1 and 2 were repeated for low, mid, and high bands, as appropriate (see note below Table G-2 for more details).

4. Steps 1 through 3 were repeated for all distance-based power reduction mechanisms.

G.3 Main Antenna Verification Summary

Table G-1
Power Measurement Verification for Main Antenna

Mechanism(s)			Mode/Band	Conducted Power (dBm)			
1st	2nd	3rd		Un-triggered (Max)	Mechanism #1 (Reduced)	Mechanism #2 (Reduced)	Mechanism #3 (Reduced)
Hotspot On			GSM1900	28.73	27.81		
Grip			GSM1900	28.80	26.54		
Hotspot On	Grip		GSM1900	28.75	27.76	26.48	
Grip	Hotspot On		GSM1900	28.76	26.48	26.51	
Hotspot On			UMTS 1900	23.14	22.09		
Grip			UMTS 1900	23.12	21.10		
Hotspot On	Grip		UMTS 1900	23.12	22.10	21.11	
Grip	Hotspot On		UMTS 1900	23.11	21.12	21.09	
Hotspot On			LTE FDD Band 4	24.07	21.28		
Grip			LTE FDD Band 4	24.05	20.30		
Hotspot On	Grip		LTE FDD Band 4	24.08	21.26	20.29	
Grip	Hotspot On		LTE FDD Band 4	24.06	20.32	20.31	
Hotspot On			LTE FDD Band 66	24.22	21.56		
Grip			LTE FDD Band 66	24.28	20.55		
Hotspot On	Grip		LTE FDD Band 66	24.32	21.52	20.52	
Grip	Hotspot On		LTE FDD Band 66	24.29	20.54	20.56	
Hotspot On			LTE FDD Band 2	24.30	22.52		
Grip			LTE FDD Band 2	24.36	22.50		
Hotspot On	Grip		LTE FDD Band 2	24.27	22.56	22.51	
Grip	Hotspot On		LTE FDD Band 2	24.28	22.57	22.53	
Hotspot On			LTE FDD Band 7	22.35	19.59		
Grip			LTE FDD Band 7	22.32	19.58		
Held-to-Ear			LTE FDD Band 7	22.55	20.38		
Hotspot On	Grip		LTE FDD Band 7	22.34	19.59	19.57	
Grip	Hotspot On		LTE FDD Band 7	22.35	19.58	19.57	
Held-to-Ear	Grip		LTE FDD Band 7	22.43	20.18	20.20	
Grip	Held-to-Ear		LTE FDD Band 7	22.50	19.62	20.25	
Hotspot On	Held-to-Ear		LTE FDD Band 7	22.37	19.47	20.26	
Held-to-Ear	Hotspot On		LTE FDD Band 7	22.47	20.23	20.21	
Hotspot On	Held-to-Ear	Grip	LTE FDD Band 7	22.36	19.45	20.30	20.23
Hotspot On	Grip	Held-to-Ear	LTE FDD Band 7	22.44	19.46	19.54	20.20
Held-to-Ear	Hotspot On	Grip	LTE FDD Band 7	22.55	20.23	20.20	20.21
Held-to-Ear	Grip	Hotspot On	LTE FDD Band 7	22.46	20.25	20.25	20.23
Grip	Hotspot On	Held-to-Ear	LTE FDD Band 7	22.42	19.60	19.42	20.25
Grip	Held-to-Ear	Hotspot On	LTE FDD Band 7	22.36	19.54	20.26	20.23

Table G-2
Distance Measurement Verification for Main Antenna

Mechanism(s)	Test Condition	Band	Distance Measurements (mm)		Minimum Distance per Manufacturer (mm)
			Moving Toward	Moving Away	
Grip	Phablet - Back Side	Mid	17	22	8
Grip	Phablet - Back Side	High	11	12	8
Grip	Phablet - Bottom Edge	Mid	7	10	5

*Note: Mid band refers to: GSM 1900, UMTS B2, LTE B2/4/66; High band refers to LTE B7

G.4 WIFI Verification Summary

Table G-3
Power Measurement Verification WIFI

Mechanism(s)	Mode/Band	Conducted Power (dBm)	
1st		Un-triggered (Max)	Mechanism #1 (Reduced)
Held-to-Ear	802.11b	18.93	13.97
Held-to-Ear	802.11g	17.06	13.14
Held-to-Ear	802.11n (2.4GHz)	17.06	13.21
Held-to-Ear	802.11a	16.81	9.91
Held-to-Ear	802.11n (5GHz, 20MHz BW)	17.19	9.21
Held-to-Ear	802.11ac (20MHz BW)	16.46	8.35
Held-to-Ear	802.11n (5GHz, 40MHz BW)	16.19	9.09
Held-to-Ear	802.11ac (40MHz BW)	16.21	9.23
Held-to-Ear	802.11ac (80MHz BW)	14.72	9.91

APPENDIX H: DOWNLINK LTE CA RF CONDUCTED POWERS

1.1 LTE Downlink Only Carrier Aggregation Test Reduction Methodology

SAR test exclusion for LTE downlink Carrier Aggregation is determined by power measurements according to the number of component carriers (CCs) supported by the product implementation. Per April 2018 TCBC Workshop Notes, the following test reduction methodology was applied to determine the combinations required for conducted power measurements.

LTE DLCA Test Reduction Methodology:

- The supported combinations were arranged by the number of component carriers in columns.
- Any limitations on the PCC or SCC for each combination were identified alongside the combination (e.g. CA_2A-2A-4A-12A, but B12 can only be configured as a SCC).
- Power measurements were performed for "supersets" (LTE CA combinations with multiple components carriers) and any "subsets" (LTE CA combinations with fewer component carriers) that were not completely covered by the supersets.
- Only subsets that have the exact same components as a superset were excluded for measurement.
- When there were certain restrictions on component carriers that existed in the superset that were not applied for the subset, the subset configuration was additionally evaluated.
- Both inter-band and intra-band downlink carrier aggregation scenarios were considered.

Table 1 – Example of Exclusion Table for SISO Configurations

Index	2CC	Supported Channel Bandwidth [MHz]		Restriction	Completely Covered by Measurement Superset
		CC1	CC2		
2CC #1	CA_2C	5, 10, 15, 20	5, 10, 15, 20		3CC #4
2CC #2	CA_2A-5A	5, 10, 15, 20	5, 10		4CC #1
2CC #3	CA_2A-12A	5, 10, 15, 20	5, 10		3CC #3
2CC #4	CA_2A-13A	5, 10, 15, 20	10		3CC #9
2CC #5	CA_2A-17A	5, 10	5, 10		No
2CC #6	CA_2A-30A	5, 10, 15, 20	5, 10		3CC #14
2CC #8	CA_2A-66A (2)	5, 10, 15, 20	5, 10, 15, 20		5CC #1
2CC #9	CA_2A-71A	5, 10, 15, 20	5, 10, 15, 20		3CC #10
2CC #10	CA_4A-4A	5, 10, 15, 20	5, 10, 15, 20		3CC #6
2CC #11	CA_4A-5A (1)	5, 10, 15, 20	5, 10		4CC #1
2CC #12	CA_4A-12A (4)	5, 10, 15, 20	5, 10		3CC #8
2CC #13	CA_4A-13A	5, 10, 15, 20	10		3CC #9
2CC #14	CA_4A-17A	5, 10	5, 10	B17 SCC Only	No
2CC #15	CA_5B	5, 10	5, 10		5CC #1
2CC #16	CA_5A-25A	5, 10	5, 10, 15, 20		No
2CC #17	CA_7C	15, 20	15, 20		No
2CC #18	CA_7A-7A (1)	5, 10, 15, 20	5, 10, 15, 20		No
2CC #19	CA_7A-12A	5, 10, 15, 20	5, 10		3CC #12
2CC #20	CA_12B	5	5, 10		3CC #13
2CC #21	CA_12A-25A	5, 10	5, 10, 15, 20		No
2CC #22	CA_12A-30A	5, 10	5, 10		3CC #14
2CC #23	CA_41A-41A (1)	5, 10, 15, 20	5, 10, 15, 20		No

Index	3CC	Supported Channel Bandwidth [MHz]			Restriction	Completely Covered by Measurement Superset
		CC1	CC2	CC3		
3CC #1	CA_2A-2A-4A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		4CC #1
3CC #2	CA_2A-2A-5A	5, 10, 15, 20	5, 10, 15, 20	5, 10		4CC #1
3CC #3	CA_2A-2A-12A	5, 10, 15, 20	5, 10, 15, 20	5, 10		No
3CC #4	CA_2C-66A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #5	CA_2A-2A-71A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #6	CA_2A-4A-4A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #7	CA_2A-4A-5A	5, 10, 15, 20	5, 10, 15, 20	5, 10		4CC #1
3CC #8	CA_2A-4A-12A	5, 10, 15, 20	5, 10, 15, 20	5, 10		No
3CC #9	CA_2A-4A-13A	5, 10, 15, 20	5, 10, 15, 20	10		No
3CC #10	CA_2A-4A-71A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #11	CA_2A-5B	5, 10, 15, 20	5, 10	5, 10		4CC #5
3CC #12	CA_2A-7A-12A	5, 10, 15, 20	5, 10, 15, 20	5, 10		No
3CC #13	CA_2A-12B	5, 10, 15, 20	5	5, 10		No
3CC #14	CA_2A-12A-30A	5, 10, 15, 20	5, 10	5, 10		No
3CC #15	CA_4A-4A-5A	5, 10, 15, 20	5, 10, 15, 20	5, 10		No
3CC #16	CA_5B-30A	5, 10	5, 10	5, 10		5CC #1
3CC #17	CA_5B-66A	5, 10	5, 10	5, 10, 15, 20		5CC #1
3CC #18	CA_5A-30A-66A	5, 10	5, 10	5, 10, 15, 20		4CC #9
3CC #19	CA_12A-66C	5, 10	5, 10, 15, 20	5, 10, 15, 20		No
3CC #20	CA_30A-66A-66A	5, 10	5, 10, 15, 20	5, 10, 15, 20		4CC #9
3CC #21	CA_41D	10, 15, 20	10, 15, 20	10, 15, 20		No
3CC #22	CA_41A-41C	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #23	CA_66D	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No
3CC #24	CA_66A-66C	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20		No

Index	4CC	Supported Channel Bandwidth [MHz]				Restriction	Completely Covered by Measurement Superset
		CC1	CC2	CC3	CC4		
4CC #1	CA_2A-2A-4A-5A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20	5, 10		No
4CC #2	CA_2A-2A-4A-12A	5, 10, 15, 20	5, 10, 15, 20	5, 10, 15, 20	5, 10	B12 SCC Only	No
4CC #3	CA_2A-2A-5A-30A	5, 10, 15, 20	5, 10, 15, 20	5, 10	5, 10		No
4CC #4	CA_2A-2A-5A-66A	5, 10, 15, 20	5, 10, 15, 20	5, 10	5, 10, 15, 20		No
4CC #5	CA_2A-5B-30A	5, 10, 15, 20	5, 10	5, 10	5, 10		5CC #1
4CC #6	CA_2A-5B-66A	5, 10, 15, 20	5, 10	5, 10	5, 10, 15, 20		5CC #1
4CC #7	CA_5B-30A-66A	5, 10	5, 10	5, 10	5, 10		5CC #1
4CC #8	CA_5B-66A-66A	5, 10	5, 10	5, 10, 15, 20	5, 10, 15, 20		5CC #2
4CC #9	CA_5A-30A-66A-66A	5, 10	5, 10	5, 10, 15, 20	5, 10, 15, 20		No
4CC #10	CA_41E	15, 20	15, 20	15, 20	20		No

Index	5CC	Supported Channel Bandwidth [MHz]					Restriction	Completely Covered by Measurement Superset
		CC1	CC2	CC3	CC4	CC5		
5CC #1	CA_2A-5B-30A-66A	5, 10, 15, 20	5, 10	5, 10	5, 10	5, 10, 15, 20		No
5CC #2	CA_2A-5B-66A-66A	5, 10, 15, 20	5, 10	5, 10	5, 10, 15, 20	5, 10, 15, 20		No

1.2 LTE Downlink Only Carrier Aggregation Test Selection and Setup

SAR test exclusion for LTE downlink Carrier Aggregation is determined by power measurements according to the number component carriers (CCs) supported by the product implementation. For those configurations required by April 2018 TCBC Workshop Notes, conducted power measurements with LTE Carrier Aggregation (CA) (downlink only) active are made in accordance to KDB Publication 941225 D05Av01r02. The RRC connection is only handled by one cell, the primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds secondary component carrier(s) (SCC) on the downlink only. All uplink communications and acknowledgements remain identical to specifications when downlink carrier aggregation is inactive on the PCC. Additional conducted output powers are measured with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.

Per FCC KDB Publication 941225 D05Av01r02, no SAR measurements are required for carrier aggregation configurations when the maximum average output power with downlink only carrier aggregation active is not more than 0.25 dB higher than the average output power with downlink only carrier aggregation inactive. All bands required for SAR testing per FCC KDB procedures were considered. Based on the measured maximum powers below, no additional SAR tests were required for DLCA SAR configurations.

General PCC and SCC configuration selection procedure

- PCC uplink channel, channel bandwidth, modulation and RB configurations were selected based on section C)3)b)ii) of KDB 941225 D05 V01r02. The downlink PCC channel was paired with the selected PCC uplink channel according to normal configurations without carrier aggregation.
- To maximize aggregated bandwidth, highest channel bandwidth available for that CA combination was selected for SCC. For inter-band CA, the SCC downlink channels were selected near the middle of their transmission bands. For contiguous intra-band CA, the downlink channel spacing between the component carriers was set to multiple of 300 kHz less than the nominal channel spacing defined in section 5.4.1A of 3GPP TS 36.521. For non-contiguous intra-band CA, the downlink channel spacing between the component carriers was set to be larger than the nominal channel spacing and provided maximum separation between the component carriers.
- All selected PCC and SCC(s) remained fully within the uplink/downlink transmission band of the respective component carrier.

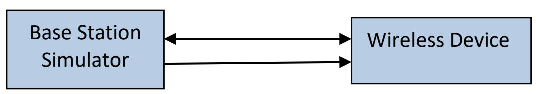


Figure 1
DL CA Power Measurement Setup

1.3 Downlink Carrier Aggregation RF Conducted Powers

1.3.1 LTE Band 13 as PCC

Table 1
Maximum Output Powers

	PCC									SCC 1				SCC 2				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-2A-13A	LTE B13	10	23230	782	QPSK	1	25	5230	751	LTE B2	20	900	1960	LTE B2	20	700	1940	24.46	24.47
CA_2A-4A-13A	LTE B13	10	23230	782	QPSK	1	25	5230	751	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	24.50	24.47
CA_2A-13A-66A	LTE B13	10	23230	782	QPSK	1	25	5230	751	LTE B2	20	900	1960	LTE B66	20	66786	2145	24.48	24.47
CA_4A-4A-13A	LTE B13	10	23230	782	QPSK	1	25	5230	751	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	24.46	24.47
CA_13A-66A-66A	LTE B13	10	23230	782	QPSK	1	25	5230	751	LTE B66	20	66786	2145	LTE B66	20	67236	2190	24.47	24.47
CA_13A-66B	LTE B13	10	23230	782	QPSK	1	25	5230	751	LTE B66	15	66786	2145	LTE B66	5	66879	2154.3	24.53	24.47
CA_13A-66C	LTE B13	10	23230	782	QPSK	1	25	5230	751	LTE B66	20	66786	2145	LTE B66	20	66984	2164.8	24.51	24.47

1.3.2 LTE Band 5 as PCC

Table 2
Maximum Output Powers

	PCC									SCC 1				SCC 2				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_5A-5A (1)	LTE B5	3	20415	825.5	QPSK	1	0	2415	870.5	LTE B5	5	2625	891.5	-	-	-	-	24.75	24.76
CA_2A-2A-5A	LTE B5	5	20425	826.5	QPSK	1	0	2425	871.5	LTE B2	20	900	1960	LTE B2	20	700	1940	24.71	24.68
CA_2A-4A-5A	LTE B5	5	20425	826.5	QPSK	1	0	2425	871.5	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	24.72	24.68
CA_2A-5B	LTE B5	5	20425	826.5	QPSK	1	0	2425	871.5	LTE B5	10	2497	878.7	LTE B2	20	900	1960	24.68	24.68
CA_2A-5A-66A	LTE B5	5	20425	826.5	QPSK	1	0	2425	871.5	LTE B2	20	900	1960	LTE B66	20	66786	2145	24.72	24.68
CA_4A-4A-5A	LTE B5	5	20425	826.5	QPSK	1	0	2425	871.5	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	24.75	24.68
CA_4A-5B	LTE B5	5	20425	826.5	QPSK	1	0	2425	871.5	LTE B5	10	2497	878.7	LTE B4	20	2175	2132.5	24.71	24.68
CA_5A-5A-66A	LTE B5	5	20425	826.5	QPSK	1	0	2425	871.5	LTE B5	10	2600	889	LTE B66	20	66786	2145	24.70	24.68
CA_5A-66A-66A	LTE B5	5	20425	826.5	QPSK	1	0	2425	871.5	LTE B66	20	66786	2145	LTE B66	20	67236	2190	24.68	24.68
CA_5A-66B	LTE B5	5	20425	826.5	QPSK	1	0	2425	871.5	LTE B66	15	66786	2145	LTE B66	5	66879	2154.3	24.70	24.68
CA_5A-66C	LTE B5	5	20425	826.5	QPSK	1	0	2425	871.5	LTE B66	20	66786	2145	LTE B66	20	66984	2164.8	24.74	24.68
CA_5B-66A	LTE B5	5	20425	826.5	QPSK	1	0	2425	871.5	LTE B5	10	2497	878.7	LTE B66	20	66786	2145	24.74	24.68

1.3.3 LTE Band 66 as PCC

Table 3
Maximum Output Powers

	PCC									SCC 1				SCC 2				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-66A	LTE B66	15	132597	1772.5	QPSK	1	74	67061	2172.5	LTE B2	20	900	1960	-	-	-	-	24.21	24.19
CA_2A-2A-66A	LTE B66	15	132597	1772.5	QPSK	1	74	67061	2172.5	LTE B2	20	900	1960	LTE B2	20	700	1940	24.20	24.19
CA_2A-5A-66A	LTE B66	15	132597	1772.5	QPSK	1	74	67061	2172.5	LTE B2	20	900	1960	LTE B5	10	2525	881.5	24.24	24.19
CA_2A-13A-66A	LTE B66	15	132597	1772.5	QPSK	1	74	67061	2172.5	LTE B2	20	900	1960	LTE B13	10	5230	751	24.22	24.19
CA_2A-66A-66A	LTE B66	15	132597	1772.5	QPSK	1	74	67061	2172.5	LTE B66	20	66536	2120	LTE B2	20	900	1960	24.21	24.19
CA_2A-66B	LTE B66	15	132597	1772.5	QPSK	1	74	67061	2172.5	LTE B66	5	66968	2163.2	LTE B2	20	900	1960	24.23	24.19
CA_2A-66C	LTE B66	15	132597	1772.5	QPSK	1	74	67061	2172.5	LTE B66	20	66890	2155.4	LTE B2	20	900	1960	24.22	24.19
CA_5A-5A-66A	LTE B66	15	132597	1772.5	QPSK	1	74	67061	2172.5	LTE B5	10	2525	881.5	LTE B5	5	2425	871.5	24.20	24.19
CA_5A-66A-66A	LTE B66	15	132597	1772.5	QPSK	1	74	67061	2172.5	LTE B66	20	66536	2120	LTE B5	10	2525	881.5	24.23	24.19
CA_5A-66B	LTE B66	15	132597	1772.5	QPSK	1	74	67061	2172.5	LTE B66	5	66968	2163.2	LTE B5	10	2525	881.5	24.22	24.19
CA_5A-66C	LTE B66	15	132597	1772.5	QPSK	1	74	67061	2172.5	LTE B66	20	66890	2155.4	LTE B5	10	2525	881.5	24.20	24.19
CA_5B-66A	LTE B66	15	132597	1772.5	QPSK	1	74	67061	2172.5	LTE B5	10	2525	881.5	LTE B5	5	2453	874.3	24.21	24.19
CA_13A-66A-66A	LTE B66	15	132597	1772.5	QPSK	1	74	67061	2172.5	LTE B66	20	66536	2120	LTE B13	10	5230	751	24.20	24.19
CA_13A-66B	LTE B66	15	132597	1772.5	QPSK	1	74	67061	2172.5	LTE B66	5	66968	2163.2	LTE B13	10	5230	751	24.21	24.19
CA_13A-66C	LTE B66	15	132597	1772.5	QPSK	1	74	67061	2172.5	LTE B66	20	66890	2155.4	LTE B13	10	5230	751	24.19	24.19

1.3.4 LTE Band 2 as PCC

Table 4
Maximum Output Powers

	PCC									SCC 1				SCC 2				Power	
Combination	PCC Band	PCC BW [MHz]	PCC (UL) Ch.	PCC (UL) Freq. [MHz]	Mod.	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	SCC Band	SCC BW [MHz]	SCC (DL) Channel	SCC (DL) Freq. [MHz]	LTE Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-4A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B4	20	2175	2132.5	-	-	-	-	24.18	24.18
CA_2A-66A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B66	20	66786	2145	-	-	-	-	24.20	24.18
CA_2A-2A-4A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B2	20	700	1940	LTE B4	20	2175	2132.5	24.17	24.18
CA_2A-2A-5A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B2	20	700	1940	LTE B5	10	2525	881.5	24.18	24.18
CA_2A-2A-13A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B2	20	700	1940	LTE B13	10	5230	751	24.19	24.18
CA_2A-2A-66A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B2	20	700	1940	LTE B66	20	66786	2145	24.18	24.18
CA_2A-4A-4A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	24.16	24.18
CA_2A-4A-5A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B4	20	2175	2132.5	LTE B5	10	2525	881.5	24.18	24.18
CA_2A-4A-13A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B4	20	2175	2132.5	LTE B13	10	5230	751	24.16	24.18
CA_2A-5B	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B5	10	2525	881.5	LTE B5	5	2453	874.3	24.19	24.18
CA_2A-5A-66A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B5	10	2525	881.5	LTE B66	20	66786	2145	24.16	24.18
CA_2A-13A-66A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B13	10	5230	751	LTE B66	20	66786	2145	24.17	24.18
CA_2A-66A-66A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B66	20	66786	2145	LTE B66	20	67236	2190	24.18	24.18
CA_2A-66B	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B66	15	66786	2145	LTE B66	5	66879	2154.3	24.20	24.18
CA_2A-66C	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B66	20	66786	2145	LTE B66	20	66984	2164.8	24.18	24.18