SAR Compliance Test Report

Test report no.:	FCC_RM-1127_02	**Date of report:**	2015-10-12
Template version:	19.85	**Number of pages:**	59
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Measurements made by:	Yuan Rui, Wang Weike, He Ying, Marko Laaksonen		
Tested device:	RM-1127, HW1500		
FCC ID:	PYARM-1127	**IC:**	-
Supplement reports:	SAR_Photo_RM-1127_03		

Testing has been carried out in accordance with:

47CFR §2.1093
Radiofrequency Radiation Exposure Evaluation: Portable Devices
FCC published RF exposure KDB procedures
RSS-102, Issue 4
Evaluation Procedure for Mobile and Portable Radio Transmitters with Respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields
IEEE 1528 - 2013
IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Technique

Documentation: The documentation of the testing performed on the tested devices is archived for 15 years at TCC Microsoft.

Test results: **The tested device complies with the requirements in respect of all parameters subject to the test.** The test results and statements relate only to the items tested. The test report shall not be reproduced except in full, without written approval of the laboratory.

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1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2015-07-27 to 2015-09-23
HW and SW numbers of tested device	RM-1127, HW: 1500, SW: 01065.00000.15265.37000
Batteries used in testing	BL-T5A
Headsets used in testing	WH-108
Other accessories used in testing	-
State of sample	Prototype unit
Notes	-

1.2 Maximum Results

The maximum reported SAR values for Head, Body-worn 15 mm and Wireless Router 10 mm configurations are given in section 1.2.1, 1.2.2 and 1.2.3 respectively. The device conforms to the requirements of the standards when the maximum measured SAR value is less than or equal to the limit.

1.2.1 Head Configuration

Mode	Reported* SAR value (1g avg)	SAR limit (1g avg)	Result	Plot #
4-slot GPRS850	**0.76 W/kg**	1.6 W/kg	**PASSED**	**H1**
WCDMA850 (Band 5)	**0.55 W/kg**	1.6 W/kg	**PASSED**	**H2**
4-slot GPRS1900	**0.30 W/kg**	1.6 W/kg	**PASSED**	**H3**
LTE2500 (Band 7)	**0.40 W/kg**	1.6 W/kg	**PASSED**	**H4**
WLAN2450	**0.63 W/kg**	1.6 W/kg	**PASSED**	**H5**
Maximum of SPEAG combined multiband algorithm/combined Volume scan results				
4-slot GPRS850 + WLAN2450	**0.82 W/kg**	1.6 W/kg	**PASSED**	**H6**

1.2.2 Body-worn 15 mm Configuration

Mode	Reported* SAR value (1g avg)	SAR limit (1g avg)	Result	Plot #
4-slot GPRS850	**0.60 W/kg**	1.6 W/kg	**PASSED**	**B1**
WCDMA850 (Band 5)	**0.44 W/kg**	1.6 W/kg	**PASSED**	**B2**
4-slot GPRS1900	**0.24 W/kg**	1.6 W/kg	**PASSED**	**B3**
LTE2500 (Band 7)	**0.33 W/kg**	1.6 W/kg	**PASSED**	**B4**
WLAN2450	**0.17 W/kg**	1.6 W/kg	**PASSED**	**B5**
Maximum of SPEAG combined multiband algorithm/combined Volume scan results				
4-slot GPRS850 + WLAN2450	**0.62 W/kg**	1.6 W/kg	**PASSED**	**B6**

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1.2.3 Wireless Router 10 mm Configuration

Mode	Reported* SAR value (1g avg)	SAR limit (1g avg)	Result	Plot #
4-slot GPRS850	**0.77 W/kg**	1.6 W/kg	**PASSED**	**W1**
WCDMA850 (Band 5)	**0.58 W/kg**	1.6 W/kg	**PASSED**	**W2**
4-slot GPRS1900	**0.51 W/kg**	1.6 W/kg	**PASSED**	**W3**
LTE2500 (Band 7)	**0.67 W/kg**	1.6 W/kg	**PASSED**	**W4**
WLAN2450	**0.36 W/kg**	1.6 W/kg	**PASSED**	**W5**
Maximum of SPEAG combined multiband algorithm/combined Volume scan results				
4-slot GPRS850 + WLAN2450	**0.83 W/kg**	1.6 W/kg	**PASSED**	**W6**

* Reported SAR values are scaled to, or measured at, upper limit of power tuning tolerance.

All bands/communication systems and all surfaces and edges have Wireless Router 10 mm Reported SAR less than or equal to 1.2 W/kg (when scaled to maximum power if WR power reduction applied), therefore there is no need to test Phablet 10g Extremity 0 mm SAR according to KDB 648474 D04 Handset SAR v01r01.

1.2.4 Summary SAR data

Description	**FCC-defined SAR values for the Grants of Equipment Authorization**		
	PCE	**DTS**	**NII**
Maximum Head SAR values	0.76	0.63	-
{Max + Max} Simultaneous Head SAR value	1.38		
Maximum Body-worn 15 mm SAR values	0.60	0.17	-
{Max + Max} Simultaneous Body-worn 15 mm SAR value	0.77		
Maximum Product Specific (Wireless Router 10 mm) SAR values	0.77	0.36	-
{Max + Max} Simultaneous Product Specific (Wireless Router 10 mm) SAR value	1.13		
Maximum Simultaneous SAR value **Head SAR: 4-slot GPRS850 + WLAN2450**	1.38		

Note:

PCE contains the highest results between all cellular modes (cellular, AWS and PCS ands)
DTS contains the highest results between WLAN 2.4 GHz + RLAN 5725-5850 MHz
NII contains the highest results between RLAN 5150-5250, 5250-5350 and 5470-5725 MHz

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1.2.5 Maximum Drift

Maximum drift during measurements	≤ 0.2 dB

1.2.6 Measurement Uncertainty

Expanded Uncertainty (k=2) 95 %	± 29.8 %

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2. DESCRIPTION OF THE DEVICE UNDER TEST

Device category	Portable
Exposure environment	General population / uncontrolled

2.1 Bands and Modes of the DUT

Bands	Modes of Operation	Modulation Mode	Duty Cycle	Channel Bandwidth (MHz)	Transmitter Frequency Range (MHz)	Power Reduction in Wireless Router (Hotspot) Mode (dB)			
850	GSM/GPRS	GMSK	1/8 to 4/8		824 – 849	1-slot	2-slot	3-slot	4-slot
						-	-	-	-
850	EGPRS	GMSK / 8PSK	1/8 to 4/8		824 – 849	-	-	-	-
850 (Band 5)	WCDMA		1		826 – 847	-			
850 (Band 5)	HSUPA		1		826 – 847	-			
850 (Band 5)	DC-HSDPA		1		826 – 847	-			
1900	GSM/GPRS	GMSK	1/8 to 4/8		1850 – 1910	1-slot	2-slot	3-slot	4-slot
						-	-	-	-
1900	EGPRS	GMSK / 8PSK	1/8 to 4/8		1850 – 1910	-	-	-	-
2500 (Band 7)	LTE	QPSK / 16QAM	1	5, 10, 15, 20	2500 - 2570	-			
2450	BT	GFSK	1		2402 - 2480	-			
2450	WLAN b-mode	DSSS	1	20	2412 – 2462	-			
2450	WLAN g-mode	OFDM	1	20	2412 – 2462	-			
2450	WLAN n-mode	OFDM	1	20	2412 – 2462	-			
2450	WLAN n-mode	OFDM	1	40	2412 – 2462	-			

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2.2 DUT Features and Test Requirements

Common features	Testing / Specification / KDB
Bands operating outside USA and Canada	These bands are not part of this filing: GSM/GPRS/EGPRS900 GSM/GPRS/EGPRS1800 WCDMA/HSUPA/DC-HSDPA900 (Band 8) WCDMA/HSUPA/DC-HSDPA2100 (Band 1) LTE850 (Band 20) LTE850 (Band 8) LTE1800 (Band 3) LTE2100 (Band 1)
Number of SIM cards:	1
Ambient temperature:	20.5 – 22.5 °C / Controlled
Ambient humidity (RH %):	35 – 55 % RH / Controlled
Output power and batteries	The device output power was set to maximum power level for all tests. A fully charged battery was used for every test sequence.
Test channels	In all operating bands the measurements were performed on lowest, middle and highest channels, and/or on all required test channels as defined in Published FCC KDB Procedures.
VOIP	This device has Voice-over-IP capability for use at the ear. Therefore SAR for data modes was evaluated against the head profile of the phantom for all communication systems.
Antennas	See the antenna drawing in the report SAR_Photo_RM-1127_02, Section 3. Two antennas are used for transmission of all the cellular bands in diversity-Tx mode. In this mode the antennas can not transmit at the same time. See table below for applicable antennas in each transmission band and mode. A separate single antenna is used for WLAN. All antennas are fully and separately SAR tested for individual transmission. Simultaneous transmissions with WLAN2450 are assessed separately for both cellular antennas. Same RF PA circuitry is used for both antennas and therefore same output power targets and conducted power results apply to both antennas. Control software was used to route the TX power to the chosen antenna during the SAR test sequence.

Band	Tx Antennas	
	Antenna 1	Antenna 2
GSM/GPRS/EGPRS850	✓	✓
WCDMA850 (Band 5)	✓	✓
GSM/GPRS/EGPRS1900	✓	✓
LTE2500 (Band 7)	✓	✓

(Table continues)

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(Table continues)

GSM/GPRS/EGPRS	KDB 941225 D03 SAR Test Reduction Procedures for GSM/GPRS/EDGE
Device Class	A
GSM multi slot class	33
DTM class	DTM class 11. Dual Transfer Mode was not specifically tested as the average power in multi-slot GMSK GPRS mode is always greater than, or equal to, the average power in Dual Transfer Mode in Microsoft devices.
EGPRS	8PSK EGPRS mode was not measured, because maximum averaged output power is lower in 8PSK EGPRS mode than in GPRS mode.
Call tester settings	CMU200 : MS signal was always set to maximum power: Pmax 5 for GSM850 and 0 for GSM1900.
Number of slots used in testing	The number of Tx slots in all GSM/GPRS mode tests was based on tuning target/conducted power data, see Section 3. The number of slots with highest or equal highest time-average power was tested.
WCDMA	**KDB 941225 D01 SAR Measurement Procedures for 3G Devices**
WCDMA	Rel9. Conducted power measurements for WCDMA modes have been carried out in accordance with 3GPP TS34.1083 and GPP TS 34.121-1. See conducted power results in section 3
Call test settings for WCDMA	CMU200: UE uplink signal was configured to 12.2kbps RMC with all TPC bit set to 1.
HSUPA	SAR tests for HSUPA mode have not been performed as no HSUPA Sub-test mode has an average power > 0.25 dB above the basic WCDMA 12.2 kbps RMC mode.
DC-HSDPA	SAR tests for DC-HSDPA mode have not been performed as no DC-HSDPA Sub-test mode has an average power > 0.25 dB above the basic WCDMA 12.2 kbps RMC mode.
LTE	**KDB 941225 D05 SAR for LTE Devices v02r02 DR07-41372**
LTE Category	4
Call tester settings	CMW500: Uplink Power Control was set to 'Max Power'. Additional Spectrum Emission was set to 'NS_01' to disable A-MPR.
LTE MPR	MPR values as stipulated in Table 6.2.3_1 of 3GPP TS 36.101 (presented below) have been incorporated into the device; these MPR values are dependent on the modulation, Channel Bandwidth and Resource Block allocations as shown: Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3 Modulation | Channel bandwidth / Transmission bandwidth (RB) | MPR (dB) 1.4 MHz | 3.0 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz QPSK | > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 1 16 QAM | ≤ 5 | ≤ 4 | ≤ 8 | ≤ 12 | ≤ 16 | ≤ 18 | ≤ 1 16 QAM | > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 2 No additional MPR settings have been incorporated into the design of the device and therefore no A-MPR settings have been active during its testing. Conducted Power Tables in Section 3: "Nominal" column lists measured powers with MPR active. The "A-MPR active" column lists measured powers with MPR and A-MPR active (as defined by 3GPP TS 36.101).

(Table continues)

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(Table continues)

WLAN	**KDB 248227 SAR Measurement Procedures for 802.11 a/b/g Transmitters**
WLAN modes tested	The standard transmission mode of the device in all WLAN tests was b-mode. Additionally in WLAN a/g-mode and n-mode were used for check measurements. In the tables in Section 3 it is shown if other transmission modes are used for check measurements.
WLAN test settings	The device was put into operation by using control software.
BT	**KDB 447498 D01 General RF Exposure Guidance v05**
BT Class	2
BT testing	BT power tuning target upper limit is 3 dBm. WLAN2450 power tuning target upper limit is 18.5 dBm. Since WLAN2450 and BT use same frequency and antenna, WLAN2450 power is 17.0 dB higher, and they cannot transmit simultaneously, the WLAN2450 standalone SAR is conservative estimation of BT SAR. As WLAN2450 SAR result is below limit, also BT SAR can be deemed to comply without further analysis or standalone measurements. Also WLAN2450+cellular bands combined SAR results can be regarded as conservative estimation of BT+cellular combined SARs. As WLAN2450+cellular combined SAR result are below limit, also BT+cellular combined SAR can be deemed to comply without further analysis.
Simultaneous transmission	**KDB 447498 D01 General RF Exposure Guidance v05**
In Head and Body-worn use	Simultaneous transmission of any singular cellular, PCS or AWS with WLAN2450 is possible.
Wireless Router "Hotspot" mode	Yes
In Wireless Router use	Simultaneous transmission of any singular cellular, AWS or PCS band with WLAN2450 is possible. The hotspot mode (Wireless Router mode) may operate concurrently in DTM mode with voice calls. The reported SAR test results are conservative regarding that use case, since output power in hotspot mode is equal to or lower than in normal voice and data modes. See Section 2.1 for hotspot mode power reductions. Also simultaneous transmissions with WLANs are already conservatively assessed for head and body-worn exposure conditions due to VoIP capability.
Power reduction for Wireless Router mode	See the table in Section 2.1.
KDBs used in testing	**KDB 248227 SAR Measurement Procedures for 802.11 a/b/g Transmitters** **KDB 447498 D01 General RF Exposure Guidance v05** **KDB 648474 D04 Handset SAR v01r01** **KDB 690783 D01 SAR Listings on Grants** **KDB 865664 D01 SAR Measurements 100 MHz to 6 GHz v01** **KDB 865664 D02 SAR Reporting v01** **KDB 941225 D01 SAR Measurement Procedures for 3G Devices** **KDB 941225 D03 SAR Test Reduction Procedures for GSM/GPRS/EDGE** **KDB 941225 D05 SAR for LTE Devices v02r02 DR07-41372**

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3. CONDUCTED POWERS

The conducted output power of the device was measured by a separate test laboratory on the same units as used for SAR testing.

Shaded lines in the tables below show which mode/configuration is used in testing.

3.1 GSM/GPRS/EGPRS

3.1.1 GSM850 Head, Body-worn 15 mm and Wireless Router 10 mm, Antenna 1 & Antenna 2

GSM850								
SN: 004402742167814			Conducted power [dBm]			Time-averaged power [dBm]		
Slot configuration	Tuning target [dBm]	Upper limit [dBm]	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz
GSM 1-slot	33.0	33.4	32.9	32.9	32.9	23.9	23.9	23.9
GPRS 2-slot	31.0	31.4	31.2	31.2	31.0	25.2	25.2	25.0
GPRS 3-slot	29.2	29.6	29.4	29.4	29.3	25.1	25.1	25.0
GPRS 4-slot	28.0	28.4	28.3	28.3	28.2	**25.3**	**25.3**	25.2
EGRPS 1-slot	27.0	27.4	26.5	26.7	26.6	17.5	17.7	17.6
EGPRS 2-slot	26.0	26.4	26.3	26.4	26.3	20.3	20.4	20.3
EGPRS 3-slot	24.2	24.6	24.5	24.5	24.5	20.2	20.2	20.2
EGPRS 4-slot	23.0	23.4	23.1	23.1	23.1	20.1	20.1	20.1

3.1.2 GSM1900 Head, Body-worn 15 mm Wireless Router 10 mm, Antenna 1 & Antenna 2

GSM1900								
SN: 004402742168002			Conducted power [dBm]			Time-averaged power [dBm]		
Slot configuration	Tuning target [dBm]	Upper limit [dBm]	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz
GSM 1-slot	30.0	30.4	29.8	30.1	30.3	20.8	21.1	21.3
GPRS 2-slot	28.0	28.4	27.7	28.1	28.3	21.7	22.1	22.3
GPRS 3-slot	26.2	26.6	25.7	25.8	26.4	21.4	21.5	22.1
GPRS 4-slot	25.0	25.4	24.5	25.0	25.3	21.5	22.0	**22.3**
EGRPS 1-slot	25.5	25.9	25.3	25.5	25.9	16.3	16.5	16.9
EGPRS 2-slot	25.5	25.9	25.1	25.2	25.5	19.1	19.2	19.5
EGPRS 3-slot	24.2	24.6	23.8	24.2	24.4	19.5	19.9	20.1
EGPRS 4-slot	23.0	23.4	22.7	23.0	23.3	19.7	20.0	20.3

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3.2 WCDMA

3.2.1 WCDMA850 (Band 5) Head, Body-worn 15 mm and Wireless Router 10 mm, Antenna 1 & Antenna 2

SN: 004402742167814	WCDMA 5				
Mode	Tuning target (dBm)	Upper limit (dBm)	CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz
WCDMA	23.5	23.9	23.6	23.3	23.3
HSUPA Sub-mode 1	22.5	22.9	22.6	22.3	22.4
HSUPA Sub-mode 2	20.5	20.9	21.2	21.0	21.0
HSUPA Sub-mode 3	21.5	21.9	21.6	21.4	20.6
HSUPA Sub-mode 4	20.5	20.9	22.2	22.0	21.9
HSUPA Sub-mode 5	22.5	22.9	22.7	22.5	22.4

3.3 LTE

3.3.1 LTE2500 (Band 7) Head, Body-worn 15 mm and Wireless Router 10 mm ,Antenna 1 & Antenna 2

SN: 004402742167855						Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Tuning target (dBm)	Upper limit (dBm)	Ch20775 / 2502.5 MHz	Ch21100 / 2535 MHz	Ch21425 / 2567.5 MHz	Ch20775 / 2502.5 MHz	Ch21100 / 2535 MHz	Ch21425 / 2567.5 MHz
LTE7 5 MHz	QPSK	1	0	21.5	21.9	21.3	21.1	21.1			
		1	12	21.5	21.9	21.3	21.5	21.1			
		1	24	21.5	21.9	21.3	21.2	21.0			
		12	0	20.5	20.9	20.3	20.3	20.1			
		12	6	20.5	20.9	20.3	20.2	20.1			
		12	13	20.5	20.9	20.3	20.2	20.1			
		25	0	20.5	20.9	20.3	20.2	20.1			
	16QAM	1	0	20.5	20.9	20.7	20.7	20.6			
		1	12	20.5	20.9	20.7	20.7	20.6			
		1	24	20.5	20.9	20.7	20.6	20.5			
		12	0	19.5	19.9	19.2	19.5	19.2			
		12	6	19.5	19.9	19.3	19.4	19.4			
		12	13	19.5	19.9	19.1	19.1	19.1			
		25	0	19.5	19.9	19.2	19.2	19.1			

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SN: 004402742167855						Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Tuning target (dBm)	Upper limit (dBm)	Ch20800 / 2505 MHz	Ch21100 / 2535 MHz	Ch21400 / 2565 MHz	Ch20800 / 2505 MHz	Ch21100 / 2535 MHz	Ch21400 / 2565 MHz
LTE7 10 MHz	QPSK	1	0	21.5	21.9	21.5	21.3	21.1			
		1	24	21.5	21.9	21.5	21.3	21.2			
		1	49	21.5	21.9	21.3	21.3	21.1			
		25	0	20.5	20.9	20.3	20.3	20.2			
		25	12	20.5	20.9	20.3	20.3	20.2			
		25	25	20.5	20.9	20.3	20.3	20.1			
		50	0	20.5	20.9	20.3	20.3	20.2			
	16QAM	1	0	20.5	20.9	20.9	20.7	20.3			
		1	24	20.5	20.9	20.8	20.8	20.6			
		1	49	20.5	20.9	20.4	20.3	20.2			
		25	0	19.5	19.9	19.6	19.5	19.4			
		25	12	19.5	19.9	19.5	19.4	19.4			
		25	25	19.5	19.9	19.4	19.3	19.2			
		50	0	19.5	19.9	19.4	19.3	19.2			

SN: 004402742167855						Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Tuning target (dBm)	Upper limit (dBm)	Ch20825 / 2507.5 MHz	Ch21100 / 2535 MHz	Ch21375 / 2562.5 MHz	Ch20825 / 2507.5 MHz	Ch21100 / 2535 MHz	Ch21375 / 2562.5 MHz
LTE7 15 MHz	QPSK	1	0	21.5	21.9	21.4	21.3	21.3			
		1	36	21.5	21.9	21.4	21.2	21.4			
		1	74	21.5	21.9	21.2	21.3	21.1			
		36	0	20.5	20.9	20.4	20.4	20.2			
		36	18	20.5	20.9	20.3	20.3	20.2			
		36	38	20.5	20.9	20.3	20.3	20.2			
		75	0	20.5	20.9	20.3	20.3	20.2			
	16QAM	1	0	20.5	20.9	20.5	20.4	20.4			
		1	36	20.5	20.9	20.8	20.7	20.8			
		1	74	20.5	20.9	20.8	20.7	20.7			
		36	0	19.5	19.9	19.4	19.4	19.4			
		36	18	19.5	19.9	19.3	19.3	19.3			
		36	38	19.5	19.9	19.4	19.3	19.2			
		75	0	19.5	19.9	19.3	19.3	19.3			

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SN: 004402742167855						Nominal			A-MPR active		
Band / BW	Modulation	RB Allocation	RB Offset	Tuning target (dBm)	Upper limit (dBm)	Ch20850 / 2510 MHz	Ch21100 / 2535 MHz	Ch21350 / 2560 MHz	Ch20850 / 2510 MHz	Ch21100 / 2535 MHz	Ch21350 / 2560 MHz
LTE7 20 MHz	QPSK	1	0	21.5	21.9	21.4	21.3	21.3			
		1	49	21.5	21.9	21.5	21.3	21.3			
		1	99	21.5	21.9	21.2	21.3	21.1			
		50	0	20.5	20.9	20.4	20.4	20.3			
		50	24	20.5	20.9	20.3	20.3	20.3			
		50	50	20.5	20.9	20.3	20.3	20.2			
		100	0	20.5	20.9	20.3	20.4	20.2			
	16QAM	1	0	20.5	20.9	20.6	20.7	20.7			
		1	49	20.5	20.9	20.7	20.5	20.7			
		1	99	20.5	20.9	20.4	20.6	20.1			
		50	0	19.5	19.9	19.4	19.5	19.3			
		50	24	19.5	19.9	19.4	19.4	19.3			
		50	50	19.5	19.9	19.3	19.4	19.1			
		100	0	19.5	19.9	19.5	19.5	19.3			

3.4 BT

BT	Tuning target (dBm)	Upper limit (dBm)
	1.5	3.0

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3.5 WLAN2450

3.5.1 WLAN2450 Head, Body-worn 15 mm and Wireless Router 10 mm

WLAN 2.4 GHz: 20 MHz channel bandwidth											
SN: 004402742167772						Tuning target (dBm)					
Standard	MCS index	Spatial streams	Transmission mode	Modulation	Data rate [MBPS]	CH 1	CH 2	CH 6	CH 7	CH 10	CH 11
802.11b			DSSS	BPSK	1	17.0	17.0	17.0	17.0	17.0	17.0
802.11b			DSSS	QPSK	2	17.0	17.0	17.0	17.0	17.0	17.0
802.11b			DSSS	QPSK	5.5	17.0	17.0	17.0	17.0	17.0	17.0
802.11b			DSSS	QPSK	11	17.0	17.0	17.0	17.0	17.0	17.0
802.11g			OFDM	BPSK	6	14.0	17.0	17.0	17.0	17.0	14.5
802.11g			OFDM	BPSK	9	14.0	17.0	17.0	17.0	17.0	14.5
802.11g			OFDM	QPSK	12	14.0	17.0	17.0	17.0	17.0	14.5
802.11g			OFDM	QPSK	18	14.0	17.0	17.0	17.0	17.0	14.5
802.11g			OFDM	16QAM	24	14.0	17.0	17.0	17.0	17.0	14.5
802.11g			OFDM	16QAM	36	14.0	16.5	16.5	16.5	16.5	14.5
802.11g			OFDM	64QAM	48	14.0	15.5	15.5	15.5	15.5	14.5
802.11g			OFDM	64QAM	54	14.0	15.0	15.0	15.0	15.0	14.5
802.11n	0	1	OFDM	BPSK	6.5 / 7.2	14.0	16.0	16.0	16.0	16.0	14.5
802.11n	1	1	OFDM	QPSK	13.0 / 14.4	14.0	16.0	16.0	16.0	16.0	14.5
802.11n	2	1	OFDM	QPSK	19.5 / 21.7	14.0	16.0	16.0	16.0	16.0	14.5
802.11n	3	1	OFDM	16QAM	26.0 / 28.9	14.0	16.0	16.0	16.0	16.0	14.5
802.11n	4	1	OFDM	16QAM	39.0 / 43.3	14.0	15.0	15.0	15.0	15.0	14.5
802.11n	5	1	OFDM	64QAM	52.0 / 57.8	14.0	14.5	14.5	14.5	14.5	14.5
802.11n	6	1	OFDM	64QAM	58.5 / 65.0	14.0	14.0	14.0	14.0	14.0	14.0
802.11n	7	1	OFDM	64QAM	65.0 / 72.2	13.0	13.0	13.0	13.0	13.0	13.0

WLAN 2.4 GHz: 40 MHz channel bandwidth												
Tuning target (dBm)												
Standard	MCS index	Spatial streams	Transmission mode	Modulation	Data rate [MBPS]	CH 3 (1...5)	CH 4 (2...6)	CH 5 (3...7)	CH 6 (4...8)	CH 7 (5...9)	CH 8 (6...10)	CH 9 (7...11)
802.11n	0	1	OFDM	BPSK	13.5 / 15.0	14.0	15.0	15.0	15.0	15.0	15.0	14.5
802.11n	1	1	OFDM	QPSK	27.0 / 30.0	14.0	15.0	15.0	15.0	15.0	15.0	14.5
802.11n	2	1	OFDM	QPSK	40.5 / 45.0	14.0	15.0	15.0	15.0	15.0	15.0	14.5
802.11n	3	1	OFDM	16QAM	54.0 / 60.0	14.0	15.0	15.0	15.0	15.0	15.0	14.5
802.11n	4	1	OFDM	16QAM	81.0 / 90.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
802.11n	5	1	OFDM	64QAM	108.0 / 120.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5
802.11n	6	1	OFDM	64QAM	121.5 / 135.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
802.11n	7	1	OFDM	64QAM	135.0 / 150.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0

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WLAN 2.4 GHz: 20 MHz channel bandwidth											
SN: 004402742167772						Upper limit of tuning target (dBm)					
Standard	MCS index	Spatial streams	Transmission mode	Modulation	Data rate [MBPS]	CH 1	CH 2	CH 6	CH 7	CH 10	CH 11
802.11b			DSSS	BPSK	1	18.5	18.5	18.5	18.5	18.5	18.5
802.11b			DSSS	QPSK	2	18.5	18.5	18.5	18.5	18.5	18.5
802.11b			DSSS	QPSK	5.5	18.5	18.5	18.5	18.5	18.5	18.5
802.11b			DSSS	QPSK	11	18.5	18.5	18.5	18.5	18.5	18.5
802.11g			OFDM	BPSK	6	15.5	18.5	18.5	18.5	18.5	16.0
802.11g			OFDM	BPSK	9	15.5	18.5	18.5	18.5	18.5	16.0
802.11g			OFDM	QPSK	12	15.5	18.5	18.5	18.5	18.5	16.0
802.11g			OFDM	QPSK	18	15.5	18.5	18.5	18.5	18.5	16.0
802.11g			OFDM	16QAM	24	15.5	18.5	18.5	18.5	18.5	16.0
802.11g			OFDM	16QAM	36	15.5	18.0	18.0	18.0	18.0	16.0
802.11g			OFDM	64QAM	48	15.5	17.0	17.0	17.0	17.0	16.0
802.11g			OFDM	64QAM	54	15.5	16.5	16.5	16.5	16.5	16.0
802.11n	0	1	OFDM	BPSK	6.5 / 7.2	15.5	17.5	17.5	17.5	17.5	16.0
802.11n	1	1	OFDM	QPSK	13.0 / 14.4	15.5	17.5	17.5	17.5	17.5	16.0
802.11n	2	1	OFDM	QPSK	19.5 / 21.7	15.5	17.5	17.5	17.5	17.5	16.0
802.11n	3	1	OFDM	16QAM	26.0 / 28.9	15.5	17.5	17.5	17.5	17.5	16.0
802.11n	4	1	OFDM	16QAM	39.0 / 43.3	15.5	16.5	16.5	16.5	16.5	16.0
802.11n	5	1	OFDM	64QAM	52.0 / 57.8	15.5	16.0	16.0	16.0	16.0	16.0
802.11n	6	1	OFDM	64QAM	58.5 / 65.0	15.5	15.5	15.5	15.5	15.5	15.5
802.11n	7	1	OFDM	64QAM	65.0 / 72.2	14.5	14.5	14.5	14.5	14.5	14.5

WLAN 2.4 GHz: 40 MHz channel bandwidth												
Upper limit of tuning target (dBm)												
Standard	MCS index	Spatial streams	Transmission mode	Modulation	Data rate [MBPS]	CH 3 (1...5)	CH 4 (2...6)	CH 5 (3...7)	CH 6 (4...8)	CH 7 (5...9)	CH 8 (6...10)	CH 9 (7...11)
802.11n	0	1	OFDM	BPSK	13.5 / 15.0	15.5	16.5	16.5	16.5	16.5	16.5	16.0
802.11n	1	1	OFDM	QPSK	27.0 / 30.0	15.5	16.5	16.5	16.5	16.5	16.5	16.0
802.11n	2	1	OFDM	QPSK	40.5 / 45.0	15.5	16.5	16.5	16.5	16.5	16.5	16.0
802.11n	3	1	OFDM	16QAM	54.0 / 60.0	15.5	16.5	16.5	16.5	16.5	16.5	16.0
802.11n	4	1	OFDM	16QAM	81.0 / 90.0	15.5	15.5	15.5	15.5	15.5	15.5	15.5
802.11n	5	1	OFDM	64QAM	108.0 / 120.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
802.11n	6	1	OFDM	64QAM	121.5 / 135.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5
802.11n	7	1	OFDM	64QAM	135.0 / 150.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5

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WLAN 2.4 GHz: 20 MHz channel bandwidth											
SN: 004402742167772						Measured value (dBm)					
Standard	MCS index	Spatial streams	Transmission mode	Modulation	Data rate [MBPS]	CH 1	CH 2	CH 6	CH 7	CH 10	CH 11
802.11b			DSSS	BPSK	1	17.8	17.3	17.2	17.3	18.0	17.6
802.11b			DSSS	QPSK	2	17.8	17.3	17.1	17.3	18.0	17.6
802.11b			DSSS	QPSK	5.5	17.8	17.6	17.1	17.3	18.0	17.6
802.11b			DSSS	QPSK	11	**17.9**	**17.6**	**17.3**	**17.4**	**18.2**	**17.7**
802.11g			OFDM	BPSK	6	14.6	17.2	16.9	17.0	17.5	15.0
802.11g			OFDM	BPSK	9	14.6	17.2	17.2	17.3	17.7	14.9
802.11g			OFDM	QPSK	12	14.6	17.2	17.2	17.3	17.7	14.9
802.11g			OFDM	QPSK	18	14.7	17.3	17.1	17.1	17.6	15.0
802.11g			OFDM	16QAM	24	14.8	17.3	17.0	17.4	17.6	15.0
802.11g			OFDM	16QAM	36	14.9	16.9	16.8	16.9	17.3	15.0
802.11g			OFDM	64QAM	48	14.9	16.0	15.8	15.9	16.7	15.2
802.11g			OFDM	64QAM	54	14.8	15.5	15.4	15.4	16.1	15.2
802.11n	0	1	OFDM	BPSK	6.5 / 7.2	14.7	16.3	16.0	16.4	16.7	15.0
802.11n	1	1	OFDM	QPSK	13.0 / 14.4	14.8	16.3	16.4	16.5	16.9	15.0
802.11n	2	1	OFDM	QPSK	19.5 / 21.7	14.8	16.4	16.1	16.3	16.8	15.1
802.11n	3	1	OFDM	16QAM	26.0 / 28.9	14.8	16.5	16.2	16.5	17.0	15.1
802.11n	4	1	OFDM	16QAM	39.0 / 43.3	14.9	15.6	15.3	15.4	16.1	15.2
802.11n	5	1	OFDM	64QAM	52.0 / 57.8	14.9	15.0	14.9	14.9	15.6	15.2
802.11n	6	1	OFDM	64QAM	58.5 / 65.0	15.0	14.7	14.3	14.4	15.2	15.3
802.11n	7	1	OFDM	64QAM	65.0 / 72.2	14.2	13.7	13.3	13.3	14.3	13.8

WLAN 2.4 GHz: 40 MHz channel bandwidth												
SN:004402742167772						Measured value (dBm)						
Standard	MCS index	Spatial streams	Transmission mode	Modulation	Data rate [MBPS]	CH 3 (1...5)	CH 4 (2...6)	CH 5 (3...7)	CH 6 (4...8)	CH 7 (5...9)	CH 8 (6...10)	CH 9 (7...11)
802.11n	0	1	OFDM	BPSK	13.5 / 15.0	14.5	15.7	15.9	15.3	15.2	15.2	14.1
802.11n	1	1	OFDM	QPSK	27.0 / 30.0	14.7	15.8	16.1	15.4	15.4	15.3	14.2
802.11n	2	1	OFDM	QPSK	40.5 / 45.0	14.8	15.9	16.2	15.5	15.5	15.4	14.3
802.11n	3	1	OFDM	16QAM	54.0 / 60.0	14.7	15.9	16.1	15.5	15.4	15.4	14.3
802.11n	4	1	OFDM	16QAM	81.0 / 90.0	14.8	15.1	15.3	14.6	14.7	14.5	14.8
802.11n	5	1	OFDM	64QAM	108.0 / 120.0	14.4	14.6	14.8	14.2	14.2	14.0	14.2
802.11n	6	1	OFDM	64QAM	121.5 / 135.0	14.0	14.1	14.3	13.7	13.6	13.6	13.8
802.11n	7	1	OFDM	64QAM	135.0 / 150.0	13.0	13.1	13.4	12.7	12.7	12.7	12.8

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4. DESCRIPTION OF THE TEST EQUIPMENT

4.1 Measurement System and Components

The measurements were performed using an automated DASY near-field scanning system manufactured by Schmid & Partner Engineering AG (SPEAG) in Switzerland. The SAR extrapolation algorithm used in all measurements was the 'advanced extrapolation' algorithm.

The following table lists calibration dates of SPEAG components:

Test Equipment	Serial Number	Calibration date	Calibration expiry
DAE 4	860	2014-09	2015-09
DAE 4	1319	2014-09	2015-09
DAE 4	480	2014-09	2015-09
DAE4	538	2015-04	2016-04
E-field Probe EX3DV4	3839	2014-09	2015-09
E-field Probe EX3DV4	3823	2014-09	2015-09
E-field Probe EX3DV4	3574	2014-09	2015-09
E-field Probe EX3DV4	3837	2014-09	2015-09
E-field Probe EX3DV4	3892	2015-04	2016-04
Dipole Validation Kit, D835V2	4d005	2014-03	2016-03
Dipole Validation Kit, D1900V2	509	2014-09	2016-09
Dipole Validation Kit, D2450V2	883	2014-03	2016-03
Dipole Validation Kit, D2600V2	1082	2014-06	2016-06
Dipole Validation Kit, D2600V2	1056	2015-01	2017-01
DASY5 software	Version 52.8	-	-

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Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration date	Calibration expiry
Signal Generator	8648C	3847M00258	2015-04	2016-04
Signal Generator	SME06	829445/008	2015-04	2016-04
Signal Generator	SME03	846923/014	2015-04	2016-04
Signal Generator	SMB100A	105735	2015-04	2016-04
Amplifier	ZHL-42W	QA1252001	-	-
Amplifier	5S1G4M3	302339	-	-
Amplifier	ZHL-4240W	e060204/1	-	-
Amplifier	5S4G11	312661	-	-
Amplifier	ZVE-3W-83+	373701337 / 1005	-	-
Power Meter	NRP	101293	2015-04	2016-04
Power Meter	NRP2	103071	2015-04	2016-04
Power Meter	NRVD	840297/008	2015-04	2016-04
Power Meter	NRP	101465	2015-04	2016-04
Power Sensor	NRP-Z51	100410	2015-04	2016-04
Power Sensor	NRP-Z51	104120	2015-04	2016-04
Power Sensor	NRV-Z51	101135	2015-04	2016-04
Power Sensor	NRP-Z92	100088	2015-04	2016-04
Call Tester	CMU200	835352/008	-	-
Call Tester	CMU200	831593/001	-	-
Call Tester	CMW500	113277	-	-
Call Tester	CMW500	115794	-	-
Call Tester	CMW 500	108406	-	-
RF Network Analyzer	E5071C	MY46104578	2015-04	2016-04
RF Network Analyzer	8753ES	My40002096	2015-04	2016-04
RF Network Analyzer	E5071C	MY46213166	2015-04	2016-04
Dielectric Probe Kit	DAK-3.5	1123	-	-
Dielectric Probe Kit	85070C	2577	-	-
Dielectric Probe Kit	DAK-3.5	1042	-	-

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4.1.1 Isotropic E-field Probe Type EX3DV4

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Calibration certificate in Appendix D
Frequency	10 MHz to >6 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g, Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm Tip length: 10 mm Body diameter: 12 mm Tip diameter: 2.5 mm Distance from probe tip to dipole centers: 1.0 mm
Application	General dosimetry up to 6 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

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4.2 Phantoms

The phantom used for all Head SAR tests i.e. for both system checks and device testing, was the twin-headed "SAM Phantom", manufactured by SPEAG; the SAM phantom conforms to the requirements of IEEE 1528.

The phantom used for all Body SAR tests i.e. for both system checks and device testing, was a flat phantom also manufactured by SPEAG this phantom conform to the requirements of FCC published RF Exposure KDB Procedures.

The SPEAG device holder (see Section 5.1) was used to position the device in all tests whilst a tripod was used to position the validation dipoles against the flat section of phantom.

4.3 Tissue Simulants

Recommended values for the dielectric parameters of the tissue simulants are given in IEEE 1528 and FCC published RF Exposure KDB Procedures. All tests were carried out using simulants whose dielectric parameters were within ± 5% of the recommended values. All tests were carried out within 24 hours of measuring the dielectric parameters.

The depth of the tissue simulant was at least 15.0 cm for all system check and device tests, measured from the ear reference point in the case of the SAM phantom and from the inner surface of the flat phantom.

4.3.1 Tissue Simulant Recipes

The following recipe(s) were used for Head and Body tissue simulant(s):

800 MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	51.50	69.25
Tween 20	47.35	30.00
Salt	1.15	0.75

1900 MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	54.50	70.25
Tween 20	45.23	29.41
Salt	0.27	0.34

2450-2600 MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	56.0	70.20
Tween 20	44.0	29.62
Salt	-	0.18

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4.4 System validation and System checking

4.4.1 System validation status

Probe Calibration Point f / MHz	Test System	DASY SW	Dipole Type / SN	Probe Type / SN	Calibrated signal type(s)	DAE unit Type / SN	Validation done	
							Head tissue simulant	Body tissue simulant
835	TCC Beijing / SAR-1	V52.8	D835V2 / 4d005	EX3DV4 / 3839	CW	DAE4 / 860	2015-03	2015-03
1900	TCC Beijing / SAR-4	V52.8	D1900V2 / 509	EX3DV4 / 3574	CW	DAE4 / 480	2015-03	2015-03
2450	TCC Beijing / SAR-2	V52.8	D2450V2 / 883	ES3DV3 / 3823	CW	DAE4 / 1319	2014-10	2015-10
2600	TCC Beijing / SAR-2	V52.8	D2600V2 / 1082	EX3DV4 / 3837	CW	DAE4 / 1319	2015-01	2015-01
2600	TCC Salo SAR-3	52.8	D2600V2 1056	EX3DV4 3892	CW	DAE4 538	2015-05	2015-05

4.4.2 System checking

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyser. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna. The dipole was placed under the flat section of the twin SAM phantom for head system checking, and under the flat phantom for body system checking. The system checking results (dielectric parameters and SAR values) are given in the table below.

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System checking, head tissue simulant

Dipole freq. [MHz]	Description	SAR 1g [W/kg]	Estimated SAR 1g [W/kg]	Estimated SAR 1g Dev. dSAR [%]	Scaled 1W SAR 1g [W/kg]	Dielectric Parameters		SAR 1g Deviation from target	Dielectric Parameters Deviation from target		Temp [°C]	Plot #
						e_r	s [S/m]	dSAR [%]	de_r [%]	ds [%]		
	Tolerances			±3%				±10 %	±5 %	±5 %		
835	Target result **SN:4d005**	-	-	-	9.32	41.5	0.90	TCC Beijing / SAR1 EX3DV4 - 3839 Head 835 MHz				
	2015-07-27	2.47	2.52	2.02	9.88	41.0	0.89	6.01	-1.20	-1.11	20.8	1
	2015-07-28	2.38	2.40	0.84	9.52	41.3	0.89	2.15	-0.48	-1.11	20.8	-
	2015-08-18	2.41	2.44	1.24	9.64	40.6	0.90	3.43	-2.17	0.00	20.8	-
	Tolerances			±3%				±10 %	±5 %	±5 %		
1900	Target result **SN:509**	-	-	-	40.10	40.0	1.40	TCC Beijing / SAR4 EX3DV4 - 3574 Head 1900 MHz				
	2015-07-31	9.78	9.65	-1.33	39.12	40.5	1.35	-2.44	1.25	-3.57	20.9	-
	2015-08-18	9.76	9.73	-0.31	39.04	39.1	1.37	-2.64	-2.25	-2.14	21.2	2
	Tolerances			±3%				±10 %	±5 %	±5 %		
2450	Target result **SN:883**	-	-	-	53.20	39.2	1.80	TCC Beijing / SAR2 EX3DV4 - 3823 Head 2450 MHz				
	2015-07-29	12.50	12.60	0.80	50.00	40.0	1.86	-6.02	2.04	3.33	20.8	3
	2015-08-10	12.80	13.00	1.56	51.20	38.9	1.86	-3.76	-0.77	3.33	20.7	-
	Tolerances			±3%				±10 %	±5 %	±5 %		
2600	Target result **SN:1056**	-	-	-	56.80	39.0	1.96	TCC Salo / SAR-3 EX3DV4 - SN:3892 Head 2600 MHz				
	2015-09-22	14.60	14.80	1.37	58.40	37.1	1.94	2.82	-4.87	-1.02	22.2	4
	2015-09-23	14.60	14.90	2.05	58.40	37.6	1.96	2.82	-3.59	0.00	22.1	-

* Dielectric parameter reference data taken from IEEE1528/IEC62209

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System checking, body tissue simulant

Dipole freq. [MHz]	Description	SAR 1g [W/kg]	Estimated SAR 1g [W/kg]	Estimated SAR 1g Dev. dSAR [%]	Scaled 1W SAR 1g [W/kg]	Dielectric Parameters		SAR 1g Deviation from target	Dielectric Parameters Deviation from target		Temp [°C]	Plot #
						e_r	s [S/m]	dSAR [%]	de_r [%]	ds [%]		
	Tolerances			±3%				±10 %	±5 %	±5 %		
	Tolerances			±3%				±10 %	±5 %	±5 %		
835	Target result **SN:4d005**	-	-	-	9.31	55.2	0.97	TCC Beijing / SAR1 EX3DV4 - 3839 Body 835 MHz				
	2015-08-04	2.41	2.42	0.41	9.64	53.5	0.94	3.54	-3.08	-3.09	20.9	-
	2015-08-05	2.44	2.43	-0.41	9.76	53.9	0.94	4.83	-2.36	-3.09	20.9	5
	Tolerances			±3%				±10 %	±5 %	±5 %		
1900	Target result **SN:509**	-	-	-	38.70	53.3	1.52	TCC Beijing / SAR4 EX3DV4 - 3574 Body 1900 MHz				
	2015-08-03	9.15	9.28	1.42	36.60	53.1	1.51	-5.43	-0.38	-0.66	20.9	6
	Tolerances			±3%				±10 %	±5 %	±5 %		
2450	Target result **SN:883**	-	-	-	51.00	52.7	1.95	TCC Beijing / SAR2 EX3DV4 - 3823 Body 2450 MHz				
	2015-07-29	13.20	13.40	1.52	52.80	52.2	2.00	3.53	-0.95	2.56	20.9	7
	Tolerances			±3%				±10 %	±5 %	±5 %		
2600	Target result **SN:1082**	-	-	-	56.00	52.5	2.16	TCC Beijing / SAR2 EX3DV4 - 3837 Body 2600 MHz				
	2015-07-30	13.80	14.00	1.45	55.20	51.8	2.22	-1.43	-1.33	2.78	20.8	8
	2015-07-31	14.20	14.40	1.41	56.80	51.6	2.21	1.43	-1.71	2.31	20.8	-
	Tolerances			±3%				±10 %	±5 %	±5 %		
2600	Target result **SN:1056**	-	-	-	55.90	52.5	2.16	TCC Salo / SAR-3 EX3DV4 - SN:3892 Body 2600 MHz				
	2015-09-23	13.40	13.60	1.49	53.60	50.7	2.11	-4.11	-3.43	-2.31	22.2	9

* Dielectric parameter reference data taken from FCC Published RF Exposure KDB Procedures

Plots of the system checking scans are given in Appendix A.

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4.5 Tissue Simulants used in the Measurements

Head tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Dielectric Parameters Deviation from recommended value		Temp [°C]
		e_r	s [S/m]	de_r [%]	ds [%]	
835	Tolerances			±5 %	±5 %	
	Recommended value	41.5	0.90			
	2015-07-27	41.0	0.89	-1.20	-1.11	20.8
	2015-07-28	41.3	0.89	-0.48	-1.11	20.8
836	Tolerances			±5 %	±5 %	
	Recommended value	41.5	0.90			
	2015-07-27	41.0	0.89	-1.20	-1.11	20.8
	2015-07-28	41.3	0.90	-0.48	0.00	20.8
	2015-08-18	40.6	0.90	-2.17	0.00	20.9
1880	Tolerances			±5 %	±5 %	
	Recommended value	40.0	1.40			
	2015-07-31	40.5	1.34	1.25	-4.29	20.9
	2015-08-18	39.1	1.35	-2.25	-3.57	21.2
2437	Tolerances			±5 %	±5 %	
	Recommended value	39.2	1.79			
	2015-07-29	40.1	1.84	2.30	2.79	20.8
	2015-08-10	38.9	1.85	-0.77	3.35	20.7
2535	Tolerances			±5 %	±5 %	
	Recommended value	39.1	1.89			
	2015-09-22	37.3	1.88	-4.60	-0.53	22.2
	2015-09-23	37.9	1.89	-3.07	0.00	22.1

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Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters e_r	Dielectric Parameters s [S/m]	Dielectric Parameters Deviation from recommended value de_r [%]	Dielectric Parameters Deviation from recommended value ds [%]	Temp [°C]
835	Tolerances			±5 %	±5 %	
	Recommended value	55.2	0.97			
	2015-08-05	53.9	0.94	-2.36	-3.09	20.9
836	Tolerances			±5 %	±5 %	
	Recommended value	55.2	0.97			
	2015-08-04	53.4	0.94	-3.26	-3.09	20.9
1880	Tolerances			±5 %	±5 %	
	Recommended value	53.3	1.52			
	2015-08-03	53.2	1.49	-0.19	-1.97	20.9
2437	Tolerances			±5 %	±5 %	
	Recommended value	52.7	1.94			
	2015-07-29	52.2	1.99	-0.95	2.58	20.9
2535	Tolerances			±5 %	±5 %	
	Recommended value	52.6	2.07			
	2015-07-30	52.0	2.14	-1.14	3.38	20.8
	2015-07-31	51.8	2.13	-1.52	2.90	20.8
	2015-09-23	51.0	2.03	-3.04	-1.93	22.2

Dielectric parameter data for the band edges is given in Appendix C.

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5. DESCRIPTION OF THE TEST PROCEDURE

5.1 Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the Dasy system.

Device holder supplied by SPEAG

A spacer (illustrated below) was used to position the device within the SPEAG holder. The spacer positions the device so that the holder has minimal effect on the test results but still holds the device securely. The spacer was removed before the tests.

Spacer

5.2 Test Positions

5.2.1 Against Phantom Head

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.

The positions used in the measurements were according to IEEE 1528 "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

5.2.2 Body-worn 15 mm Configuration

The device was placed in the SPEAG holder using the spacer and placed below the flat phantom. The distance between the device and the phantom was kept at the separation distance indicated in Section 1.2 using a separate flat spacer that was removed before the start of the measurements. The device was oriented with both sides facing the phantom to find the highest results.

Microsoft Body-worn accessories are commonly available for the separation distance used in this testing.

5.2.3 Wireless Router 10 mm Configuration

The device was placed in the SPEAG holder and, in sequence, the back, display and each of the 4 edges was positioned 10 mm away from the flat phantom. The spacer was removed before the start of the measurements.

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5.3 Scan Procedures

First, area scans were used for determination of the field distribution. Next, a zoom scan, a minimum of 5x5x7 points covering a volume of at least 30x30x30mm, was performed around the highest E-field value to determine the averaged SAR value. Drift was determined by measuring the same point at the start of the area scan and again at the end of the zoom scan. Fast SAR is measured according to the KDB 447498 D01 General RF Exposure Guidance v05r01.

5.4 SAR Averaging Methods

The maximum SAR value was averaged over a cube of tissue using interpolation and extrapolation.

The interpolation, extrapolation and maximum search routines within Dasy52 are all based on the modified Quadratic Shepard's method (Robert J. Renka,"Multivariate Interpolation of Large Sets of Scattered Data", University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148).

The interpolation scheme combines a least-square fitted function method with a weighted average method. A trivariate 3-D / bivariate 2-D quadratic function is computed for each measurement point and fitted to neighbouring points by a least-square method. For the zoom scan, inverse distance weighting is incorporated to fit distant points more accurately. The interpolating function is finally calculated as a weighted average of the quadratics.

In the zoom scan, the interpolation function is used to extrapolate the Peak SAR from the deepest measurement points to the inner surface of the phantom.

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6. MEASUREMENT UNCERTAINTY

Table 6.1 – Measurement uncertainty evaluation for 1g Full SAR in 0.3-6G Hz range

Uncertainty Component	Section in IEEE 1528	Tol. (%)	Prob Dist	Div	c_i	$c_i . u_i$ (%)	v_i
Measurement System							
Probe Calibration	E2.1	±6.6	N	1	1	±6.6	∞
Axial Isotropy	E2.2	±4.7	R	√3	$(1-c_p)^{1/2}$	±1.9	∞
Hemispherical Isotropy	E2.2	±9.6	R	√3	$(c_p)^{1/2}$	±3.9	∞
Boundary Effect	E2.3	±2.0	R	√3	1	±1.2	∞
Linearity	E2.4	±4.7	R	√3	1	±2.7	∞
System Detection Limits	E2.5	±1.0	R	√3	1	±0.6	∞
Modulation response	E2.5	±2.4	R	√3	1	±1.4	
Readout Electronics	E2.6	±0.3	N	1	1	±0.3	∞
Response Time	E2.7	±0.8	R	√3	1	±0.5	∞
Integration Time	E2.8	±2.6	R	√3	1	±1.5	∞
RF Ambient Conditions - Noise	E6.1	±3.0	R	√3	1	±1.7	∞
RF Ambient Conditions - Reflections	E6.1	±3.0	R	√3	1	±1.7	∞
Probe Positioner Mechanical Tolerance	E6.2	±0.8	R	√3	1	±0.5	∞
Probe Positioning with respect to Phantom Shell	E6.3	±6.7	R	√3	1	±3.9	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E5	±4.0	R	√3	1	±2.3	∞
Test sample Related							
Test Sample Positioning	E4.2	±6.0	N	1	1	±6.0	11
Device Holder Uncertainty	E4.1	±3.6	N	1	1	±3.6	5
Output Power Variation - SAR drift measurement	E2.9	±5.0	R	√3	1	±2.9	∞
Phantom and Tissue Parameters							
Phantom Uncertainty (shape and thickness tolerances)	E3.1	±6.6	R	√3	1	±3.8	∞
SAR correction	E3.2	±1.9	R	√3	1	±1.1	∞
Conductivity Target - tolerance	E3.4	±5.0	R	√3	0.6	±1.8	∞
Conductivity - measurement uncertainty	E3.3	±5.5	N	1	0.6	±3.5	5
Permittivity Target - tolerance	E3.4	±5.0	R	√3	0.6	±1.7	∞
Permittivity - measurement uncertainty	E3.3	±2.9	N	1	0.6	±1.7	5
Combined Standard Uncertainty			RSS			**±14.0**	198
Coverage Factor for 95%			**k=2**				
Expanded Uncertainty						**±28.2**	

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Table 6.2 – Measurement uncertainty evaluation for 1g Fast SAR in 0.3-6G Hz range

Relative DASY5 Uncertainty Budget for Fast SAR Tests According to IEEE 1528/2011 and IEC 62209-1/2011 (0.3-6 GHz range)						
Uncertainty Component	**Tol. (%)**	**Prob Dist.**	**Div.**	**c_i**	**$c_i . u_i$ (%)**	**v_i**
Measurement System						
Probe Calibration	±6.6	N	1	0		
Axial Isotropy	±4.7	R	√3	$(1\text{-}c_p)^{1/2}$	±1.9	∞
Hemispherical Isotropy	±9.6	R	√3	$(c_p)^{1/2}$	±3.9	∞
Boundary Effect	±2.0	R	√3	1	±1.2	∞
Linearity	±4.7	R	√3	1	±2.7	∞
System Detection Limits	±1.0	R	√3	1	±0.6	∞
Modulation Response	±2.4	R	√3	1	±1.4	∞
Readout Electronics	±0.3	N	1	0		
Response Time	±0.8	R	√3	0		
Integration Time	±2.6	R	√3	1	±1.5	∞
RF Ambient Conditions - Noise	±3.0	R	√3	1	±1.7	∞
RF Ambient Conditions - Reflections	±3.0	R	√3	0		
Probe Positioner Mechanical Tolerance	±0.8	R	√3	1	±0.5	∞
Probe Positioning with respect to Phantom Shell	±6.7	R	√3	1	±3.9	∞
Spatial x-y Resolution	±10.0	R	√3	1	±5.8	∞
Fast SAR z Approximation	±14.0	R	√3	1	±8.1	∞
Test sample Related						
Test Sample Positioning	±6.0	N	1	1	±6.0	12
Device Holder Uncertainty	±3.6	N	1	1	±3.6	5
Output Power Variation - SAR drift measurement	±5.0	R	√3	1	±2.9	∞
Power Scaling	±0	R	√3	0		
Phantom and Setup						
Phantom Uncertainty (shape and thickness tolerances)	±6.6	R	√3	1	±3.8	∞
SAR correction	±1.9	R	√3	0		
Conductivity Target - tolerance	±1.9	R	√3	0		
Conductivity - measurement uncertainty	±5.0	R	√3	0		
Permittivity Target - tolerance	±5.5	N	1	0		
Permittivity - measurement uncertainty	±5.0	R	√3	0		
Combined Standard Uncertainty		RSS			**±14.9**	748
Coverage Factor for 95%		**k=2**				
Expanded Uncertainty					**±29.8**	

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7. RESULTS

7.1 The measured Head SAR values for the test device

7.1.1 GSM/GPRS/EGPRS 850 Head SAR results

Antenna 1

4-slot GPRS850									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz		
Upper limit		**28.4**			**Scaling factor***				
Conducted Power		**28.3**	**28.3**	**28.2**	**0.1**	**0.1**	**0.2**	**dB**	
Time-averaged Power		**25.3**	**25.3**	**25.2**	**1.02**	**1.02**	**1.05**	**Lin**	
Left Cheek	Estimated SAR	-	0.535	-	-	0.547	-	-	-
	Full SAR	-	-	-	-	-	-		
Left Tilt	Estimated SAR	-	0.310	-	-	0.317	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Cheek	Estimated SAR	0.621	0.648	0.652	0.635	0.663	0.683	0.02	-
	Full SAR	-	-	0.668	-	-	0.699		
Right Tilt	Estimated SAR	-	0.318	-	-	0.325	-	-	-
	Full SAR	-	-	-	-	-	-		

2-slot 8PSK EGPRS850									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz		
Upper limit		**26.4**			**Scaling factor***				
Conducted Power		**26.3**	**26.4**	**26.3**	**0.1**	**-**	**0.1**	**dB**	
Time-averaged Power		**20.3**	**20.4**	**20.3**	**1.02**	**1.00**	**1.02**	**Lin**	
Right Cheek	Estimated SAR	-	-	0.213	-	-	0.218	-	-
	Full SAR	-	-	-	-	-	-		

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Antenna 2

4-slot GPRS850									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz		
Upper limit		**28.4**			**Scaling factor***				
Conducted Power		**28.3**	**28.3**	**28.2**	**0.1**	**0.1**	**0.2**	**dB**	
Time-averaged Power		**25.3**	**25.3**	**25.2**	**1.02**	**1.02**	**1.05**	**Lin**	
Left Cheek	Estimated SAR	0.769	0.676	0.579	0.787	0.692	0.606	0.03	**H1**
	Full SAR	0.738	-	-	**0.755**	-	-		
Left Tilt	Estimated SAR	-	0.361	-	-	0.369	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Cheek	Estimated SAR	-	0.540	-	-	0.553	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Tilt	Estimated SAR	-	0.330	-	-	0.338	-	-	-
	Full SAR	-	-	-	-	-	-		

2-slot 8PSK EGPRS850									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz		
Upper limit		**26.4**			**Scaling factor***				
Conducted Power		**26.3**	**26.4**	**26.3**	**0.1**	**-**	**0.1**	**dB**	
Time-averaged Power		**20.3**	**20.4**	**20.3**	**1.02**	**1.00**	**1.02**	**Lin**	
Left Cheek	Estimated SAR	0.250	-	-	0.256	-	-	-	-
	Full SAR	-	-	-	-	-	-		

7.1.2 WCDMA850 (Band 5) Head SAR results

Antenna 1

WCDMA850 (Band 5)									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz	CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz		
Upper limit		**23.9**			**Scaling factor***				
Conducted Power		**23.6**	**23.3**	**23.3**	**0.3**	**0.6**	**0.6**	**dB**	
Time-averaged Power		**23.6**	**23.3**	**23.3**	**1.07**	**1.15**	**1.15**	**Lin**	
Left Cheek	Estimated SAR	-	0.329	-	-	0.378	-	-	-
	Full SAR	-	-	-	-	-	-		
Left Tilt	Estimated SAR	-	0.187	-	-	0.215	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Cheek	Estimated SAR	0.397	0.403	0.422	0.425	0.463	0.485	0.00	-
	Full SAR	-	-	0.424	-	-	0.487		
Right Tilt	Estimated SAR	-	0.204	-	-	0.234	-	-	-
	Full SAR	-	-	-	-	-	-		

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Antenna 2

WCDMA850 (Band 5)										
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz	CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz		
Upper limit		23.9			Scaling factor*				
Conducted Power		23.6	23.3	23.3	0.3	0.6	0.6	dB	
Time-averaged Power		23.6	23.3	23.3	1.07	1.15	1.15	Lin	
Left Cheek	Estimated SAR	0.477	0.458	0.448	0.511	0.526	0.514	0.02	H2
	Full SAR	-	0.477	-	-	**0.548**	-		
Left Tilt	Estimated SAR	-	0.240	-	-	0.276	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Cheek	Estimated SAR	-	0.358	-	-	0.411	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Tilt	Estimated SAR	-	0.213	-	-	0.245	-	-	-
	Full SAR	-	-	-	-	-	-		

7.1.3 GSM/GPRS/EGPRS 1900 Head SAR results

Antenna 1

4-slot GPRS1900									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz		
Upper limit		25.4			Scaling factor*				
Conducted Power		24.5	25.0	25.3	0.9	0.4	0.1	dB	
Time-averaged Power		21.5	22.0	22.3	1.23	1.10	1.02	Lin	
Left Cheek	Estimated SAR	0.122	0.117	0.114	0.150	0.128	0.117	0.01	-
	Full SAR	0.127	-	-	0.156	-	-		
Left Tilt	Estimated SAR	-	0.076	-	-	0.083	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Cheek	Estimated SAR	-	0.083	-	-	0.091	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Tilt	Estimated SAR	-	0.087	-	-	0.095	-	-	-
	Full SAR	-	-	-	-	-	-		

4-slot 8PSK EGPRS1900									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz		
Upper limit		23.4			Scaling factor*				
Conducted Power		22.7	23.0	23.3	0.7	0.4	0.1	dB	
Time-averaged Power		19.7	20.0	20.3	1.17	1.10	1.02	Lin	
Left Cheek	Estimated SAR	0.087	-	-	0.102	-	-	-	-
	Full SAR	-	-	-	-	-	-		

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Antenna 2

4-slot GPRS1900									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz		
Upper limit		**25.4**			**Scaling factor***				
Conducted Power		**24.5**	**25.0**	**25.3**	**0.9**	**0.4**	**0.1**	**dB**	
Time-averaged Power		**21.5**	**22.0**	**22.3**	**1.23**	**1.10**	**1.02**	**Lin**	
Left Cheek	Estimated SAR	0.245	0.202	0.210	0.301	0.221	0.215	0.00	**H3**
	Full SAR	0.246	-	-	**0.303**	-	-		
Left Tilt	Estimated SAR	-	0.114	-	-	0.125	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Cheek	Estimated SAR	-	0.144	-	-	0.158	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Tilt	Estimated SAR	-	0.137	-	-	0.150	-	-	-
	Full SAR	-	-	-	-	-	-		

4-slot 8PSK EGPRS1900									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz		
Upper limit		**23.4**			**Scaling factor***				
Conducted Power		**22.7**	**23.0**	**23.3**	**0.7**	**0.4**	**0.1**	**dB**	
Time-averaged Power		**19.7**	**20.0**	**20.3**	**1.17**	**1.10**	**1.02**	**Lin**	
Left Cheek	Estimated SAR	0.151	-	-	0.177	-	-	-	-
	Full SAR	-	-	-	-	-	-		

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7.1.4 LTE2500 (Band 7) Head SAR results

Antenna 1

LTE2500 (Band 7) - 20MHz - QPSK - 1 RB - Offset 49									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		21.9			Scaling factor*				
Conducted Power		21.5	21.3	21.3	0.4	0.6	0.6	dB	
Time-averaged Power		21.5	21.3	21.3	1.10	1.15	1.15	Lin	
Left Cheek	Estimated SAR	0.184	-	-	0.202	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Left Tilt	Estimated SAR	0.189	-	-	0.207	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Cheek	Estimated SAR	0.358	-	-	0.393	-	-	0.01	H4
	Full SAR	0.365	-	-	**0.400**	-	-		
Right Tilt	Estimated SAR	0.127	-	-	0.139	-	-	-	-
	Full SAR	-	-	-	-	-	-		

LTE2500 (Band 7) - 20MHz - QPSK - 50 RB - Offset 0									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		20.9			Scaling factor*				
Conducted Power		20.4	20.4	20.3	0.5	0.5	0.6	dB	
Time-averaged Power		20.4	20.4	20.3	1.12	1.12	1.15	Lin	
Left Cheek	Estimated SAR	0.126	-	-	0.141	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Left Tilt	Estimated SAR	0.141	-	-	0.158	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Cheek	Estimated SAR	0.286	-	-	0.321	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Tilt	Estimated SAR	0.094	-	-	0.105	-	-	-	-
	Full SAR	-	-	-	-	-	-		

LTE2500 (Band 7) - 20MHz - QPSK - 100 RB - Offset 0									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		20.9			Scaling factor*				
Conducted Power		20.3	20.4	20.2	0.6	0.5	0.7	dB	
Time-averaged Power		20.3	20.4	20.2	1.15	1.12	1.17	Lin	
Right Cheek	Estimated SAR	-	0.279	-	-	0.313	-	-	-
	Full SAR	-	-	-	-	-	-		

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LTE2500 (Band 7) - 20MHz - QPSK - 1 RB - Offset 49									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		21.9			Scaling factor*				
Conducted Power		21.5	21.3	21.3	0.4	0.6	0.6	dB	
Time-averaged Power		21.5	21.3	21.3	1.10	1.15	1.15	Lin	
Left Cheek	Estimated SAR	0.126	-	-	0.138	-	-	0.00	-
	Full SAR	0.128	-	-	0.140	-	-		
Left Tilt	Estimated SAR	0.042	-	-	0.046	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Cheek	Estimated SAR	0.070	-	-	0.077	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Tilt	Estimated SAR	0.046	-	-	0.051	-	-	-	-
	Full SAR	-	-	-	-	-	-		

LTE2500 (Band 7) - 20MHz - QPSK - 50 RB - Offset 0									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		20.9			Scaling factor*				
Conducted Power		20.4	20.4	20.3	0.5	0.5	0.6	dB	
Time-averaged Power		20.4	20.4	20.3	1.12	1.12	1.15	Lin	
Left Cheek	Estimated SAR	0.099	-	-	0.111	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Left Tilt	Estimated SAR	0.032	-	-	0.036	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Cheek	Estimated SAR	0.058	-	-	0.065	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Tilt	Estimated SAR	0.042	-	-	0.047	-	-	-	-
	Full SAR	-	-	-	-	-	-		

LTE2500 (Band 7) - 20MHz - QPSK - 100 RB - Offset 0									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		20.9			Scaling factor*				
Conducted Power		20.3	20.4	20.2	0.6	0.5	0.7	dB	
Time-averaged Power		20.3	20.4	20.2	1.15	1.12	1.17	Lin	
Left Cheek	Estimated SAR	-	0.096	-	-	0.107	-	-	-
	Full SAR	-	-	-	-	-	-		

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7.1.5 WLAN2450 Head SAR results

WLAN2450 b-mode DSSS									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 1 2412.0 MHz	CH 6 2437.0 MHz	CH 11 2462.0 MHz	CH 1 2412.0 MHz	CH 6 2437.0 MHz	CH 11 2462.0 MHz		
Data rate		**11**	**11**	**11**	**Scaling factor***			**Mbps**	
Upper limit		**18.5**	**18.5**	**18.5**					
Conducted Power		**17.9**	**17.3**	**17.7**	**0.6**	**1.2**	**0.8**	**dB**	
Time-averaged Power		**17.9**	**17.3**	**17.7**	**1.15**	**1.33**	**1.19**	**Lin**	
Left Cheek	Estimated SAR	0.515	0.440	0.439	0.594	0.586	0.523	0.03	**H5**
	Full SAR	0.542	-	-	**0.625**	-	-		
Left Tilt	Estimated SAR	-	0.317	-	-	0.422	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Cheek	Estimated SAR	-	0.260	-	-	0.346	-	-	-
	Full SAR	-	-	-	-	-	-		
Right Tilt	Estimated SAR	-	0.240	-	-	0.319	-	-	-
	Full SAR	-	-	-	-	-	-		

Adjusted SAR calculations for the next OFDM test configurations

Adjusted SAR							
Test configuration used	Next test configuration	Device Orientation	Reported 1g SAR for test cfg used [W/kg]	Tuning target for test cfg used [dBm]*	Tuning target for next test cfg [dBm]*	Adjusted 1g SAR [W/kg]	Adjusted SAR > 1.20 [YES/NO]
DSSS b-mode 20 MHz Data rate 11	OFDM g-mode 40MHz Data rate 6	Left Cheek	0.625	17	17	0.625	NO

* Tuning targets are used as [mW] when calculated Adjusted SAR.

Individual Head SAR plots are given in Appendix B.

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Simultaneous transmissions: Combined Head 1g SAR results – WLAN and Individual band Max results - Antenna 1

Test configuration	WLAN 2450	4-slot GPRS850	WCDMA 850 (Band 5)	4-slot GPRS1900	LTE 2500 (Band 7)
Left Cheek	0.625	0.547	0.378	0.156	0.202
Left Tilt	0.422	0.317	0.215	0.083	0.207
Right Cheek	0.346	0.699	0.487	0.091	0.400
Right Tilt	0.319	0.325	0.234	0.095	0.139

Simultaneous transmissions: Combined Head 1g SAR results – WLAN Max + Max combined results - Antenna 1

Test configuration	4-slot GPRS850 + WLAN 2450	WCDMA 850 (Band 5) + WLAN 2450	4-slot GPRS1900 + WLAN 2450	LTE 2500 (Band 7) + WLAN 2450
Left Cheek	**1.172**	**1.003**	**0.781**	**0.827**
Left Tilt	0.739	0.637	0.505	0.629
Right Cheek	1.045	0.833	0.437	0.746
Right Tilt	0.644	0.553	0.414	0.458

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Simultaneous transmissions: Combined Head 1g SAR results – WLAN and Individual band Max results - Antenna 2

Test configuration	WLAN 2450	4-slot GPRS850	WCDMA 850 (Band 5)	4-slot GPRS1900	LTE 2500 (Band 7)
Left Cheek	0.625	0.755	0.548	0.303	0.140
Left Tilt	0.422	0.369	0.276	0.125	0.046
Right Cheek	0.346	0.553	0.411	0.158	0.077
Right Tilt	0.319	0.338	0.245	0.150	0.051

Simultaneous transmissions: Combined Head 1g SAR results – WLAN Max + Max combined results - Antenna 2

Test configuration	4-slot GPRS850 + WLAN 2450	WCDMA 850 (Band 5) + WLAN 2450	4-slot GPRS1900 + WLAN 2450	LTE 2500 (Band 7) + WLAN 2450
Left Cheek	**1.380**	**1.173**	**0.928**	**0.765**
Left Tilt	0.791	0.698	0.547	0.468
Right Cheek	0.899	0.757	0.504	0.423
Right Tilt	0.657	0.564	0.469	0.370

Note: Simultaneous Transmission Procedures as described in KDB648474 are not required for Head configurations for this product.

7.1.6 Combined 1g Head SAR data

The Combined SAR data given in the tables below has been voluntarily calculated and should be ignored for FCC certification.

The following table gives a more accurate assessment of the SAR values for simultaneous transmission. These values have been calculated using the SPEAG Combined Multiband algorithm, which is based on area scans. It a) converts the 2D area scans into 3D volume scans by assuming frequency-dependent decay characteristics for the E-field, b) sums the SAR values for WLAN2450 and the cellular bands point-by-point and c) calculates the combined average SAR values.

The combinations are done for the maximum Head configuration of the each band or band group. Maximum configurations are given in the Max+Max tables in the Section 7.1 of the report. The same scaling factors are used in plotting as for the individual reported SAR value calculations.

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Simultaneous transmissions: Reported* Combined 1g SAR Head results – SPEAG Combined Multiband algorithm results
Antenna 1

Test configuration	4-slot GPRS850 + WLAN 2450	WCDMA 850 (Band 5) + WLAN 2450	4-slot GPRS1900 + WLAN 2450	LTE 2500 (Band 7) + WLAN 2450
Left Cheek	-	-	-	**0.699**
Left Tilt	-	-	-	-
Right Cheek	-	-	-	-
Right Tilt	-	-	-	-

Simultaneous transmissions: Reported* Combined 1g SAR Head results – SPEAG Combined Multiband algorithm results
Antenna 2

Test configuration	4-slot GPRS850 + WLAN 2450	WCDMA 850 (Band 5) + WLAN 2450	4-slot GPRS1900 + WLAN 2450	LTE 2500 (Band 7) + WLAN 2450
Left Cheek	**0.823**	**0.683**	**0.652**	-
Left Tilt	-	-	-	-
Right Cheek	-	-	-	-
Right Tilt	-	-	-	-
Plot no	**H6**	-	-	-

4-slot GPRS850 Antenna 2 + WLAN2450 has the highest Max+Max result of the 850MHz Antenna 1 and Antenna 2 grouped bands: 4-slot GPRS850 and WCDMA850 (Band 5).

Note:
* Reported SAR values are scaled to, or measured at, upper limit of power tuning tolerance.
The highest result within individual zoom scan or individual expanded zoom scan results is given in Section 1.2 for each transmitter. The highest result within contributing individual zoom scan, individual expanded zoom scan, Speag combined algorithm or combined expanded zoom scan results is given in the Section for the simultaneous transmitter combination giving the highest combinated value.

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7.2 The measured Body-worn 15 mm SAR values for the test device

7.2.1 GSM/GPRS/EGPRS 850 Body-worn 15 mm SAR results

Antenna 1

4-slot GPRS850									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz		
Upper limit		**28.4**			**Scaling factor***				
Conducted Power		**28.3**	**28.3**	**28.2**	**0.1**	**0.1**	**0.2**	**dB**	
Time-averaged Power		**25.3**	**25.3**	**25.2**	**1.02**	**1.02**	**1.05**	**Lin**	
Back	Estimated SAR	0.537	0.483	0.431	0.550	0.494	0.451	0.01	-
	Full SAR	0.545	-	-	0.558	-	-		
Display	Estimated SAR	-	0.460	-	-	0.471	-	-	-
	Full SAR	-	-	-	-	-	-		

Antenna 2

4-slot GPRS850									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz		
Upper limit		**28.4**			**Scaling factor***				
Conducted Power		**28.3**	**28.3**	**28.2**	**0.1**	**0.1**	**0.2**	**dB**	
Time-averaged Power		**25.3**	**25.3**	**25.2**	**1.02**	**1.02**	**1.05**	**Lin**	
Back	Estimated SAR	0.561	0.456	0.361	0.574	0.467	0.378	0.02	**B1**
	Full SAR	0.584	-	-	**0.598**	-	-		
Display	Estimated SAR	-	0.438	-	-	0.448	-	-	-
	Full SAR	-	-	-	-	-	-		

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7.2.2 WCDMA850 (Band 5) Body-worn 15 mm SAR results

Antenna 1

WCDMA850 (Band 5)									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz	CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz		
Upper limit		**23.9**			**Scaling factor***				
Conducted Power		**23.6**	**23.3**	**23.3**	**0.3**	**0.6**	**0.6**	**dB**	
Time-averaged Power		**23.6**	**23.3**	**23.3**	**1.07**	**1.15**	**1.15**	**Lin**	
Back	Estimated SAR	0.356	0.321	0.323	0.381	0.369	0.371	0.02	-
	Full SAR	0.376	-	-	0.403	-	-		
Display	Estimated SAR	-	0.312	-	-	0.358	-	-	-
	Full SAR	-	-	-	-	-	-		

Antenna 2

WCDMA850 (Band 5)									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz	CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz		
Upper limit		**23.9**			**Scaling factor***				
Conducted Power		**23.6**	**23.3**	**23.3**	**0.3**	**0.6**	**0.6**	**dB**	
Time-averaged Power		**23.6**	**23.3**	**23.3**	**1.07**	**1.15**	**1.15**	**Lin**	
Back	Estimated SAR	0.402	0.356	0.339	0.431	0.409	0.389	0.01	**B2**
	Full SAR	0.410	-	-	**0.439**	-	-		
Display	Estimated SAR	-	0.345	-	-	0.396	-	-	-
	Full SAR	-	-	-	-	-	-		

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7.2.3 GSM/GPRS/EGPRS 1900 Body-worn 15 mm SAR results

Antenna 1

4-slot GPRS1900									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz		
Upper limit		**25.4**			**Scaling factor***				
Conducted Power		**24.5**	**25.0**	**25.3**	**0.9**	**0.4**	**0.1**	**dB**	
Time-averaged Power		**21.5**	**22.0**	**22.3**	**1.23**	**1.10**	**1.02**	**Lin**	
Back	Estimated SAR	-	0.134	-	-	0.147	-	-	-
	Full SAR	-	-	-	-	-	-		
Display	Estimated SAR	0.154	0.140	0.141	0.189	0.154	0.144	0.01	-
	Full SAR	0.162	-	-	0.199	-	-		

Antenna 2

4-slot GPRS1900									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz		
Upper limit		**25.4**			**Scaling factor***				
Conducted Power		**24.5**	**25.0**	**25.3**	**0.9**	**0.4**	**0.1**	**dB**	
Time-averaged Power		**21.5**	**22.0**	**22.3**	**1.23**	**1.10**	**1.02**	**Lin**	
Back	Estimated SAR	0.181	0.143	0.132	0.223	0.157	0.135	0.02	**B3**
	Full SAR	0.197	-	-	**0.242**	-	-		
Display	Estimated SAR	-	0.138	-	-	0.151	-	-	-
	Full SAR	-	-	-	-	-	-		

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7.2.4 LTE2500 (Band 7) Body-worn 15 mm SAR results

Antenna 1

LTE2500 (Band 7) - 20MHz - QPSK - 1 RB - Offset 49									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		21.9			Scaling factor*				
Conducted Power		21.5	21.3	21.3	0.4	0.6	0.6	dB	
Time-averaged Power		21.5	21.3	21.3	1.10	1.15	1.15	Lin	
Back	Estimated SAR	0.199	-	-	0.218	-	-	0.01	-
	Full SAR	0.190	-	-	0.208	-	-		
Display	Estimated SAR	0.138	-	-	0.151	-	-	-	-
	Full SAR	-	-	-	-	-	-		
LTE2500 (Band 7) - 20MHz - QPSK - 50 RB - Offset 0									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		20.9			Scaling factor*				
Conducted Power		20.4	20.4	20.3	0.5	0.5	0.6	dB	
Time-averaged Power		20.4	20.4	20.3	1.12	1.12	1.15	Lin	
Back	Estimated SAR	0.151	-	-	0.169	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Display	Estimated SAR	0.107	-	-	0.120	-	-	-	-
	Full SAR	-	-	-	-	-	-		
LTE2500 (Band 7) - 20MHz - QPSK - 100 RB - Offset 0									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		20.9			Scaling factor*				
Conducted Power		20.3	20.4	20.2	0.6	0.5	0.7	dB	
Time-averaged Power		20.3	20.4	20.2	1.15	1.12	1.17	Lin	
Back	Estimated SAR	-	0.168	-	-	0.188	-	-	-
	Full SAR	-	-	-	-	-	-		

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Antenna 2

LTE2500 (Band 7) - 20MHz - QPSK - 1 RB - Offset 49									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		21.9			Scaling factor*				
Conducted Power		21.5	21.3	21.3	0.4	0.6	0.6	dB	
Time-averaged Power		21.5	21.3	21.3	1.10	1.15	1.15	Lin	
Back	Estimated SAR	0.290	-	-	0.318	-	-	0.01	B4
	Full SAR	0.300	-	-	**0.329**	-	-		
Display	Estimated SAR	0.254	-	-	0.279	-	-	-	-
	Full SAR	-	-	-	-	-	-		

LTE2500 (Band 7) - 20MHz - QPSK - 50 RB - Offset 0									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		20.9			Scaling factor*				
Conducted Power		20.4	20.4	20.3	0.5	0.5	0.6	dB	
Time-averaged Power		20.4	20.4	20.3	1.12	1.12	1.15	Lin	
Back	Estimated SAR	0.224	-	-	0.251	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Display	Estimated SAR	0.206	-	-	0.231	-	-	-	-
	Full SAR	-	-	-	-	-	-		

LTE2500 (Band 7) - 20MHz - QPSK - 100 RB - Offset 0									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		20.9			Scaling factor*				
Conducted Power		20.3	20.4	20.2	0.6	0.5	0.7	dB	
Time-averaged Power		20.3	20.4	20.2	1.15	1.12	1.17	Lin	
Back	Estimated SAR	-	0.246	-	-	0.276	-	-	-
	Full SAR	-	-	-	-	-	-		

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7.2.5 WLAN2450 Body-worn 15mm SAR results

WLAN2450 b-mode DSSS									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 1 2412.0 MHz	CH 6 2437.0 MHz	CH 11 2462.0 MHz	CH 1 2412.0 MHz	CH 6 2437.0 MHz	CH 11 2462.0 MHz		
Data rate		11	11	11	Scaling factor*			Mbps	
Upper limit		18.5	18.5	18.5					
Conducted Power		17.9	17.3	17.7	0.6	1.2	0.8	dB	
Time-averaged Power		17.9	17.3	17.7	1.15	1.33	1.19	Lin	
Back	Estimated SAR	0.152	0.115	0.115	0.175	0.153	0.137	0.00	B5
	Full SAR	0.150	-	-	**0.173**	-	-		
Display	Estimated SAR	-	0.069	-	-	0.091	-	-	-
	Full SAR	-	-	-	-	-	-		

Adjusted SAR calculations for the next OFDM test configurations

Adjusted SAR							
Test configuration used	Next test configuration	Device Orientation	Reported 1g SAR for test cfg used [W/kg]	Tuning target for test cfg used [dBm]*	Tuning target for next test cfg [dBm]*	Adjusted 1g SAR [W/kg]	Adjusted SAR > 1.20 [YES/NO]
DSSS b-mode 20 MHz Data rate 11	OFDM g-mode 20MHz Data rate 6	Back	0.173	17	17	0.173	NO

* Tuning targets are used as [mW] when calculated Adjusted SAR.

Individual Body-worn 15 mm SAR plots are given Appendix B.

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Simultaneous transmissions: Combined Body-worn 15 mm 1g SAR results – WLAN and Individual band Max results - Antenna 1

Test configuration	WLAN 2450	4-slot GPRS850	WCDMA 850 (Band 5)	4-slot GPRS1900	LTE 2500 (Band 7)
Back	0.173	0.558	0.403	0.147	0.208
Display	0.091	0.471	0.358	0.199	0.151

Simultaneous transmissions: Combined Body-worn 15 mm 1g SAR results – WLAN Max + Max combined results - Antenna 1

4-slot GPRS850 + WLAN 2450	WCDMA 850 (Band 5) + WLAN 2450	4-slot GPRS1900 + WLAN 2450	LTE 2500 (Band 7) + WLAN 2450
0.731	**0.576**	**0.320**	**0.381**
0.562	0.449	0.290	0.242

Simultaneous transmissions: Combined Body-worn 15 mm 1g SAR results – WLAN and Individual band Max results - Antenna 2

Test configuration	WLAN 2450	4-slot GPRS850	WCDMA 850 (Band 5)	4-slot GPRS1900	LTE 2500 (Band 7)
Back	0.173	0.598	0.439	0.242	0.329
Display	0.091	0.448	0.396	0.151	0.279

Simultaneous transmissions: Combined Body-worn 15 mm 1g SAR results – WLAN Max + Max combined results - Antenna 2

Test configuration	4-slot GPRS850 + WLAN 2450	WCDMA 850 (Band 5) + WLAN 2450	4-slot GPRS1900 + WLAN 2450	LTE 2500 (Band 7) + WLAN 2450
Back	**0.771**	**0.612**	**0.415**	**0.502**
Display	0.539	0.487	0.242	0.370

Note: Simultaneous Transmission Procedures as described in KDB648474 are not required for Body-worn 15 mm configurations for this product.

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7.2.6 Combined 1g Body-worn 15 mm SAR data

The Combined SAR data given in the tables below has been voluntarily calculated and should be ignored for FCC certification.

The following table gives a more accurate assessment of the SAR values for simultaneous transmission. These values have been calculated using the SPEAG Combined Multiband algorithm, which is based on area scans. It a) converts the 2D area scans into 3D volume scans by assuming frequency-dependent decay characteristics for the E-field, b) sums the SAR values for WLAN2450 and the cellular bands point-by-point and c) calculates the combined average SAR values.

The combinations are done for the maximum Body configuration of the each band or band group. Maximum configurations are given in the Max+Max tables in the Section 7.2 of the report. The same scaling factors are used in plotting as for the individual reported SAR value calculations.

Simultaneous transmissions: Reported* Combined 1g SAR Body-worn 15 mm results – SPEAG Combined Multiband algorithm results
Antenna 1

Test configuration	4-slot GPRS850 + WLAN 2450	WCDMA 850 (Band 5) + WLAN 2450	4-slot GPRS1900 + WLAN 2450	LTE 2500 (Band 7) + WLAN 2450
Back	-	-	-	-
Display	-	-	-	-

Simultaneous transmissions: Reported* Combined 1g SAR Body-worn 15 mm results – SPEAG Combined Multiband algorithm results
Antenna 2

Test configuration	4-slot GPRS850 + WLAN 2450	WCDMA 850 (Band 5) + WLAN 2450	4-slot GPRS1900 + WLAN 2450	LTE 2500 (Band 7) + WLAN 2450
Back	**0.616**	**0.476**	**0.257**	**0.347**
Display	**-**	**-**	**-**	**-**
Plot no	**B6**	-	-	-

4-slot GPRS850 Antenna 2 + WLAN2450 has the highest Max+Max result of the 850MHz Antenna 1 and Antenna 2 grouped bands: 4-slot GPRS850 and WCDMA850 (Band 5).

Note:
* Reported SAR values are scaled to, or measured at, upper limit of power tuning tolerance.
The highest result within individual zoom scan or individual expanded zoom scan results is given in Section 1.2 for each transmitter. The highest result within contributing individual zoom scan, individual expanded zoom scan, Speag combined algorithm or combined expanded zoom scan results is given in the Section for the simultaneous transmitter combination giving the highest combinated value.

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7.3 The measured Wireless Router 10 mm SAR values for the test device

7.3.1 GSM/GPRS/EGPRS 850 Wireless Router 10 mm SAR results

Antenna 1

4-slot GPRS850									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz		
Upper limit		**28.4**			**Scaling factor***				
Conducted Power		**28.3**	**28.3**	**28.2**	**0.1**	**0.1**	**0.2**	**dB**	
Time-averaged Power		**25.3**	**25.3**	**25.2**	**1.02**	**1.02**	**1.05**	**Lin**	
Back	Estimated SAR	0.693	0.605	0.580	0.709	0.619	0.607	0.01	-
	Full SAR	0.706	-	-	0.722	-	-		
Display	Estimated SAR	-	0.582	-	-	0.596	-	-	-
	Full SAR	-	-	-	-	-	-		
Top	Estimated SAR	-	0.026	-	-	0.026	-	-	-
	Full SAR	-	-	-	-	-	-		
Bottom	Estimated SAR	-	0.604	-	-	0.618	-	-	-
	Full SAR	-	-	-	-	-	-		
Left	Estimated SAR	-	0.266	-	-	0.272	-	-	-
	Full SAR	-	-	-	-	-	-		
Right	Estimated SAR	-	0.572	-	-	0.585	-	-	-
	Full SAR	-	-	-	-	-	-		

Antenna 2

4-slot GPRS850									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz		
Upper limit		**28.4**			**Scaling factor***				
Conducted Power		**28.3**	**28.3**	**28.2**	**0.1**	**0.1**	**0.2**	**dB**	
Time-averaged Power		**25.3**	**25.3**	**25.2**	**1.02**	**1.02**	**1.05**	**Lin**	
Back	Estimated SAR	0.774	0.676	0.608	0.792	0.692	0.637	0.02	**W1**
	Full SAR	0.755	-	-	**0.773**	-	-		
Display	Estimated SAR	-	0.506	-	-	0.518	-	-	-
	Full SAR	-	-	-	-	-	-		
Top	Estimated SAR	-	0.015	-	-	0.016	-	-	-
	Full SAR	-	-	-	-	-	-		
Bottom	Estimated SAR	-	0.510	-	-	0.522	-	-	-
	Full SAR	-	-	-	-	-	-		
Left	Estimated SAR	-	0.505	-	-	0.517	-	-	-
	Full SAR	-	-	-	-	-	-		
Right	Estimated SAR	-	0.199	-	-	0.204	-	-	-
	Full SAR	-	-	-	-	-	-		

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7.3.2 WCDMA850 (Band 5) Wireless Router 10 mm SAR results

Antenna 1

WCDMA850 (Band 5)									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz	CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz		
Upper limit		23.9			Scaling factor*				
Conducted Power		23.6	23.3	23.3	0.3	0.6	0.6	dB	
Time-averaged Power		23.6	23.3	23.3	1.07	1.15	1.15	Lin	
Back	Estimated SAR	0.452	0.412	0.414	0.484	0.473	0.475	0.01	-
	Full SAR	0.465	-	-	0.498	-	-		
Display	Estimated SAR	-	0.383	-	-	0.440	-	-	-
	Full SAR	-	-	-	-	-	-		
Top	Estimated SAR	-	0.019	-	-	0.022	-	-	-
	Full SAR	-	-	-	-	-	-		
Bottom	Estimated SAR	-	0.390	-	-	0.448	-	-	-
	Full SAR	-	-	-	-	-	-		
Left	Estimated SAR	-	0.179	-	-	0.206	-	-	-
	Full SAR	-	-	-	-	-	-		
Right	Estimated SAR	-	0.378	-	-	0.434	-	-	-
	Full SAR	-	-	-	-	-	-		

Antenna 2

WCDMA850 (Band 5)									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz	CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz		
Upper limit		23.9			Scaling factor*				
Conducted Power		23.6	23.3	23.3	0.3	0.6	0.6	dB	
Time-averaged Power		23.6	23.3	23.3	1.07	1.15	1.15	Lin	
Back	Estimated SAR	0.526	0.519	0.511	0.564	0.596	0.587	0.01	**W2**
	Full SAR	-	0.508	-	-	**0.583**	-		
Display	Estimated SAR	-	0.413	-	-	0.474	-	-	-
	Full SAR	-	-	-	-	-	-		
Top	Estimated SAR	-	0.014	-	-	0.016	-	-	-
	Full SAR	-	-	-	-	-	-		
Bottom	Estimated SAR	-	0.348	-	-	0.400	-	-	-
	Full SAR	-	-	-	-	-	-		
Left	Estimated SAR	-	0.382	-	-	0.439	-	-	-
	Full SAR	-	-	-	-	-	-		
Right	Estimated SAR	-	0.159	-	-	0.183	-	-	-
	Full SAR	-	-	-	-	-	-		

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7.3.3 GSM/GPRS/EGPRS 1900 Wireless Router 10 mm SAR results

Antenna 1

4-slot GPRS1900									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz		
Upper limit		25.4			Scaling factor*				
Conducted Power		**24.5**	**25.0**	**25.3**	**0.9**	**0.4**	**0.1**	**dB**	
Time-averaged Power		**21.5**	**22.0**	**22.3**	**1.23**	**1.10**	**1.02**	**Lin**	
Back	Estimated SAR	-	0.280	-	-	0.307	-	-	-
	Full SAR	-	-	-	-	-	-		
Display	Estimated SAR	-	0.288	-	-	0.316	-	-	-
	Full SAR	-	-	-	-	-	-		
Top	Estimated SAR	-	0.008	-	-	0.008	-	-	-
	Full SAR	-	-	-	-	-	-		
Bottom	Estimated SAR	0.387	0.348	0.341	0.476	0.382	0.349	0.02	-
	Full SAR	0.409	-	-	0.503	-	-		
Left	Estimated SAR	-	0.056	-	-	0.061	-	-	-
	Full SAR	-	-	-	-	-	-		
Right	Estimated SAR	-	0.102	-	-	0.112	-	-	-
	Full SAR	-	-	-	-	-	-		

Antenna 2

4-slot GPRS1900									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz		
Upper limit		25.4			Scaling factor*				
Conducted Power		**24.5**	**25.0**	**25.3**	**0.9**	**0.4**	**0.1**	**dB**	
Time-averaged Power		**21.5**	**22.0**	**22.3**	**1.23**	**1.10**	**1.02**	**Lin**	
Back	Estimated SAR	0.370	0.309	0.288	0.455	0.339	0.295	0.04	**W3**
	Full SAR	0.411	-	-	**0.506**	-	-		
Display	Estimated SAR	-	0.236	-	-	0.259	-	-	-
	Full SAR	-	-	-	-	-	-		
Top	Estimated SAR	-	0.011	-	-	0.012	-	-	-
	Full SAR	-	-	-	-	-	-		
Bottom	Estimated SAR	-	0.190	-	-	0.208	-	-	-
	Full SAR	-	-	-	-	-	-		
Left	Estimated SAR	-	0.170	-	-	0.186	-	-	-
	Full SAR	-	-	-	-	-	-		
Right	Estimated SAR	-	0.050	-	-	0.055	-	-	-
	Full SAR	-	-	-	-	-	-		

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7.3.4 LTE2500 (Band 7) Wireless Router 10 mm SAR results

Antenna 1

LTE2500 (Band 7) - 20MHz - QPSK - 1 RB - Offset 49									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		21.9			Scaling factor*				
Conducted Power		21.5	21.3	21.3	0.4	0.6	0.6	dB	
Time-averaged Power		21.5	21.3	21.3	1.10	1.15	1.15	Lin	
Back	Estimated SAR	0.407	-	-	0.446	-	-	0.05	-
	Full SAR	0.457	-	-	0.501	-	-		
Display	Estimated SAR	0.381	-	-	0.418	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Top	Estimated SAR	0.025	-	-	0.028	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Bottom	Estimated SAR	0.382	-	-	0.419	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Left	Estimated SAR	0.026	-	-	0.028	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Right	Estimated SAR	0.215	-	-	0.236	-	-	-	-
	Full SAR	-	-	-	-	-	-		

LTE2500 (Band 7) - 20MHz - QPSK - 50 RB - Offset 0									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		20.9			Scaling factor*				
Conducted Power		20.4	20.4	20.3	0.5	0.5	0.6	dB	
Time-averaged Power		20.4	20.4	20.3	1.12	1.12	1.15	Lin	
Back	Estimated SAR	0.322	-	-	0.361	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Display	Estimated SAR	0.261	-	-	0.293	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Top	Estimated SAR	0.017	-	-	0.019	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Bottom	Estimated SAR	0.304	-	-	0.341	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Left	Estimated SAR	0.021	-	-	0.024	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Right	Estimated SAR	0.161	-	-	0.181	-	-	-	-
	Full SAR	-	-	-	-	-	-		

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LTE2500 (Band 7) - 20MHz - QPSK - 100 RB - Offset 0									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		20.9			Scaling factor*				
Conducted Power		20.3	20.4	20.2	0.6	0.5	0.7	dB	
Time-averaged Power		20.3	20.4	20.2	1.15	1.12	1.17	Lin	
Back	Estimated SAR	-	0.339	-	-	0.380	-	-	-
	Full SAR	-	-	-	-	-	-		

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Antenna 2

LTE2500 (Band 7) - 20MHz - QPSK - 1 RB - Offset 49									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		21.9			Scaling factor*				
Conducted Power		21.5	21.3	21.3	0.4	0.6	0.6	dB	
Time-averaged Power		21.5	21.3	21.3	1.10	1.15	1.15	Lin	
Back	Estimated SAR	0.494	-	-	0.542	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Display	Estimated SAR	0.414	-	-	0.454	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Top	Estimated SAR	0.006	-	-	0.006	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Bottom	Estimated SAR	0.616	-	-	0.675	-	-	0.00	W4
	Full SAR	0.614	-	-	**0.673**	-	-		
Left	Estimated SAR	0.131	-	-	0.144	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Right	Estimated SAR	0.045	-	-	0.049	-	-	-	-
	Full SAR	-	-	-	-	-	-		

LTE2500 (Band 7) - 20MHz - QPSK - 50 RB - Offset 0									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		20.9			Scaling factor*				
Conducted Power		20.4	20.4	20.3	0.5	0.5	0.6	dB	
Time-averaged Power		20.4	20.4	20.3	1.12	1.12	1.15	Lin	
Back	Estimated SAR	0.409	-	-	0.459	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Display	Estimated SAR	0.346	-	-	0.388	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Top	Estimated SAR	0.003	-	-	0.004	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Bottom	Estimated SAR	0.469	-	-	0.526	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Left	Estimated SAR	0.103	-	-	0.116	-	-	-	-
	Full SAR	-	-	-	-	-	-		
Right	Estimated SAR	0.032	-	-	0.035	-	-	-	-
	Full SAR	-	-	-	-	-	-		

LTE2500 (Band 7) - 20MHz - QPSK - 100 RB - Offset 0									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz	CH 20850 2510.0 MHz	CH 21100 2535.0 MHz	CH 21350 2560.0 MHz		
Upper limit		20.9			Scaling factor*				
Conducted Power		20.3	20.4	20.2	0.6	0.5	0.7	dB	
Time-averaged Power		20.3	20.4	20.2	1.15	1.12	1.17	Lin	
Bottom	Estimated SAR	-	0.492	-	-	0.552	-	-	-
	Full SAR	-	-	-	-	-	-		

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7.3.5 WLAN2450 Wireless Router 10 mm SAR results

WLAN2450 b-mode DSSS									
Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation* [W/kg]	Plot #
		CH 1 2412.0 MHz	CH 6 2437.0 MHz	CH 11 2462.0 MHz	CH 1 2412.0 MHz	CH 6 2437.0 MHz	CH 11 2462.0 MHz		
Data rate		11	11	11	Scaling factor*			Mbps	
Upper limit		18.5	18.5	18.5					
Conducted Power		17.9	17.3	17.7	0.6	1.2	0.8	dB	
Time-averaged Power		17.9	17.3	17.7	1.15	1.33	1.19	Lin	
Back	Estimated SAR	0.262	0.264	0.234	0.302	0.351	0.279	0.01	W5
	Full SAR	-	0.269	-	-	**0.358**	-		
Display	Estimated SAR	-	0.114	-	-	0.152	-	-	-
	Full SAR	-	-	-	-	-	-		
Top	Estimated SAR	-	0.077	-	-	0.103	-	-	-
	Full SAR	-	-	-	-	-	-		
Bottom	Estimated SAR	-	0.009	-	-	0.012	-	-	-
	Full SAR	-	-	-	-	-	-		
Left	Estimated SAR	-	0.034	-	-	0.046	-	-	-
	Full SAR	-	-	-	-	-	-		
Right	Estimated SAR	-	0.065	-	-	0.086	-	-	-
	Full SAR	-	-	-	-	-	-		

Adjusted SAR calculations for the next OFDM test configurations

Adjusted SAR							
Test configuration used	Next test configuration	Device Orientation	Reported 1g SAR for test cfg used [W/kg]	Tuning target for test cfg used [dBm]*	Tuning target for next test cfg [dBm]*	Adjusted 1g SAR [W/kg]	Adjusted SAR > 1.20 [YES/NO]
DSSS b-mode 20 MHz Data rate 11	OFDM g-mode 20MHz Data rate 6	Back	0.358	17	17	0.358	NO

* Tuning targets are used as [mW] when calculated Adjusted SAR.

Individual Wireless Router 10 mm SAR plots are given in Appendix B.

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Simultaneous transmissions: Combined Wireless Router 10 mm 1g SAR results – WLAN and Individual band Max results - Antenna 1

Test configuration	WLAN 2450	4-slot GPRS850	WCDMA 850 (Band 5)	4-slot GPRS1900	LTE 2500 (Band 7)
Back	0.358	0.722	0.498	0.307	0.501
Display	0.152	0.596	0.440	0.316	0.418
Top	0.103	0.026	0.022	0.008	0.028
Bottom	0.012	0.618	0.448	0.503	0.419
Left	0.046	0.272	0.206	0.061	0.028
Right	0.086	0.585	0.434	0.112	0.236

Simultaneous transmissions: Combined Wireless Router 10 mm 1g SAR results – WLAN Max + Max combined results - Antenna 1

Test configuration	4-slot GPRS850 + WLAN 2450	WCDMA 850 (Band 5) + WLAN 2450	4-slot GPRS1900 + WLAN 2450	LTE 2500 (Band 7) + WLAN 2450
Back	**1.080**	**0.856**	**0.665**	**0.859**
Display	0.748	0.592	0.468	0.570
Top	0.129	0.125	0.111	0.131
Bottom	0.630	0.460	0.515	0.431
Left	0.318	0.252	0.107	0.074
Right	0.671	0.520	0.198	0.322

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Simultaneous transmissions: Combined Wireless Router 10 mm 1g SAR results – WLAN and Individual band Max results - Antenna 2

Test configuration	WLAN 2450	4-slot GPRS850	WCDMA 850 (Band 5)	4-slot GPRS1900	LTE 2500 (Band 7)
Back	0.358	0.773	0.583	0.506	0.542
Display	0.152	0.518	0.474	0.259	0.454
Top	0.103	0.016	0.016	0.012	0.006
Bottom	0.012	0.522	0.400	0.208	0.673
Left	0.046	0.517	0.439	0.186	0.144
Right	0.086	0.204	0.183	0.055	0.049

Simultaneous transmissions: Combined Wireless Router 10 mm 1g SAR results – WLAN Max + Max combined results - Antenna 2

Test configuration	4-slot GPRS850 + WLAN 2450	WCDMA 850 (Band 5) + WLAN 2450	4-slot GPRS1900 + WLAN 2450	LTE 2500 (Band 7) + WLAN 2450
Back	**1.131**	**0.941**	**0.864**	**0.900**
Display	0.670	0.626	0.411	0.606
Top	0.119	0.119	0.115	0.109
Bottom	0.534	0.412	0.220	0.685
Left	0.563	0.485	0.232	0.190
Right	0.290	0.269	0.141	0.135

Note: Simultaneous Transmission Procedures as described in KDB648474 are not required for Wireless Router 10 mm configurations for this product.

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7.3.6 Combined 1g Wireless Router 10 mm SAR data

The Combined SAR data given in the tables below has been voluntarily calculated and should be ignored for FCC certification.

The following table gives a more accurate assessment of the SAR values for simultaneous transmission. These values have been calculated using the SPEAG Combined Multiband algorithm, which is based on area scans. It a) converts the 2D area scans into 3D volume scans by assuming frequency-dependent decay characteristics for the E-field, b) sums the SAR values for WLAN2450 and the cellular bands point-by-point and c) calculates the combined average SAR values.

The combinations are done for the maximum Wireless Router 10 mm configuration of the each band or band group. Maximum configurations are given in the Max+Max tables in the Section 7.3 of the report. The same scaling factors are used in plotting as for the individual reported SAR value calculations.

Simultaneous transmissions: Reported* Combined 1g SAR Wireless Router 10 mm results – SPEAG Combined Multiband algorithm results

Antenna 1

Test configuration	4-slot GPRS850 + WLAN 2450	WCDMA 850 (Band 5) + WLAN 2450	4-slot GPRS1900 + WLAN 2450	LTE 2500 (Band 7) + WLAN 2450
Back	-	-	-	-
Display	-	-	-	-
Top	-	-	-	-
Bottom	-	-	-	-
Left	-	-	-	-
Right	-	-	-	-

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Simultaneous transmissions: Reported* Combined 1g SAR Wireless Router 10 mm results – SPEAG Combined Multiband algorithm results

Antenna 2

Test configuration	4-slot GPRS850 + WLAN 2450	WCDMA 850 (Band 5) + WLAN 2450	4-slot GPRS1900 + WLAN 2450	LTE 2500 (Band 7) + WLAN 2450
Back	**0.826**	**0.638**	**0.509**	**0.595**
Plot no	**W6**	-	-	-
Display	-	-	-	-
Top	-	-	-	-
Bottom	-	-	-	-
Left	-	-	-	-
Right	-	-	-	-

4-slot GPRS850 Antenna 2 + WLAN2450 has the highest Max+Max result of the 850MHz Antenna 1 and Antenna 2 grouped bands: 4-slot GPRS850 and WCDMA850 (Band 5).

Note:
* Reported SAR values are scaled to, or measured at, upper limit of power tuning tolerance.
The highest result within individual zoom scan or individual expanded zoom scan results is given in Section 1.2 for each transmitter. The highest result within contributing individual zoom scan, individual expanded zoom scan, Speag combined algorithm or combined expanded zoom scan results is given in the Section for the simultaneous transmitter combination giving the highest combinated value.

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APPENDIX A: SYSTEM CHECKING SCANS

Plot 1

Date/Time: 2015-07-27 10:21:07 AM

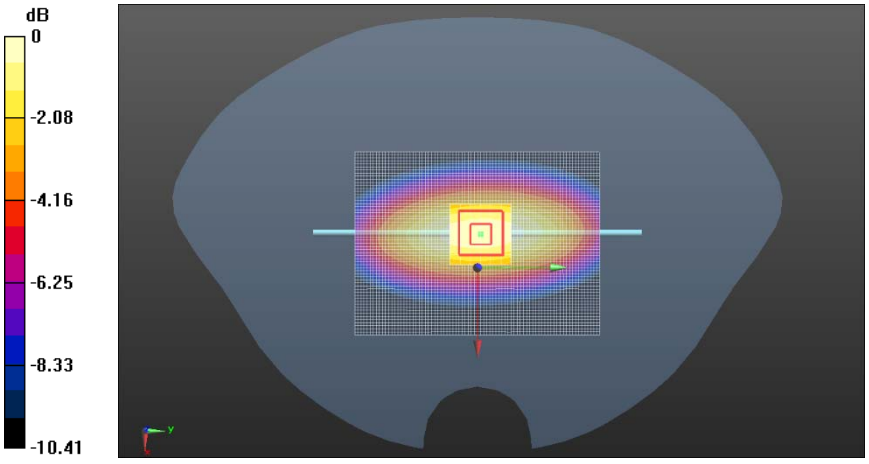
Test Laboratory: TCC Microsoft
Type: D835V2; Serial: 4d005

Communication System: CW
Frequency: **835 MHz**; Duty Cycle: 1:1
Medium: Head 835 SAR1; Medium Notes: Medium Temperature: t=20.8
Medium parameters used: f = 835 MHz; σ = 0.894 S/m; ε_r = 40.984; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:
- Probe: EX3DV4 - SN3839
- ConvF(8.88, 8.88, 8.88); Calibrated: 2014-09-15;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2014-09-09
- Phantom: SAR1 - SAM1; Type: TP - 01097; Serial: Not Specified
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=15mm, Pin=250mW/Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 55.08 V/m
Fast SAR: SAR(1 g) = 2.52 W/kg
Fast SAR(10 g) = 1.7 W/kg
Maximum value of SAR (interpolated) = 2.90 W/kg

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.08 V/m
Peak SAR (extrapolated) = 3.72 W/kg
SAR(1 g) = 2.47 W/kg
SAR(10 g) = 1.62 W/kg
Power Drift = -0.07 dB
Maximum value of SAR (measured) = 2.90 W/kg



0 dB = 2.90 W/kg = 4.62 dBW/kg

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Plot 2

Date/Time: 2015-08-18 1:31:03 PM

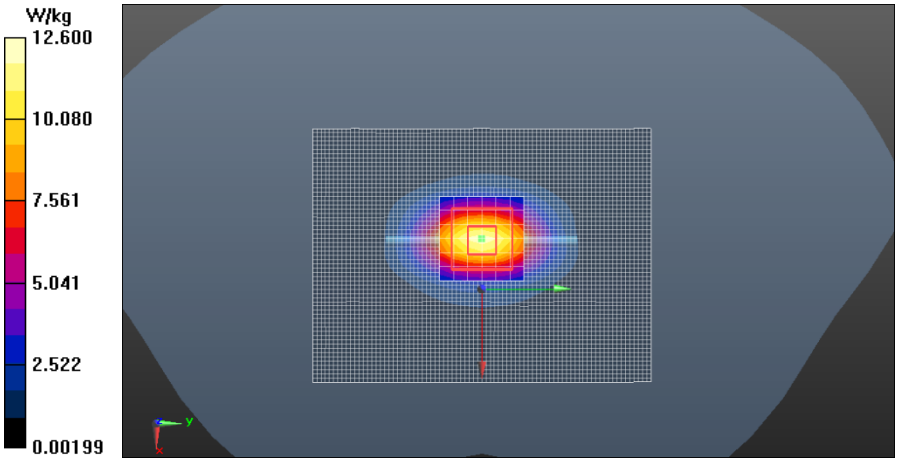
Test Laboratory: TCC Microsoft
Type: D1900V2; Serial: 509

Communication System: CW
Frequency: **1900 MHz**; Duty Cycle: 1:1
Medium: Head 1900 SAR4; Medium Notes: Medium Temperature: t=21.2C
Medium parameters used: f = 1900 MHz; σ = 1.369 S/m; ε_r = 39.08; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:
- Probe: EX3DV4 - SN3574
- ConvF(7.83, 7.83, 7.83); Calibrated: 2014-09-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2014-09-18
- Phantom: SAR4 - SAM1; Type: QD000 P40 CA; Serial: TP - 1274
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 90.81 V/m
Fast SAR: SAR(1 g) = 9.73 W/kg
Fast SAR(10 g) = 5.11 W/kg
Maximum value of SAR (interpolated) = 12.6 W/kg

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.81 V/m
Peak SAR (extrapolated) = 17.8 W/kg
SAR(1 g) = 9.76 W/kg
SAR(10 g) = 5.11 W/kg
Power Drift = -0.01 dB
Maximum value of SAR (measured) = 12.4 W/kg



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Plot 3

Date/Time: 2015-07-29 9:40:35 AM

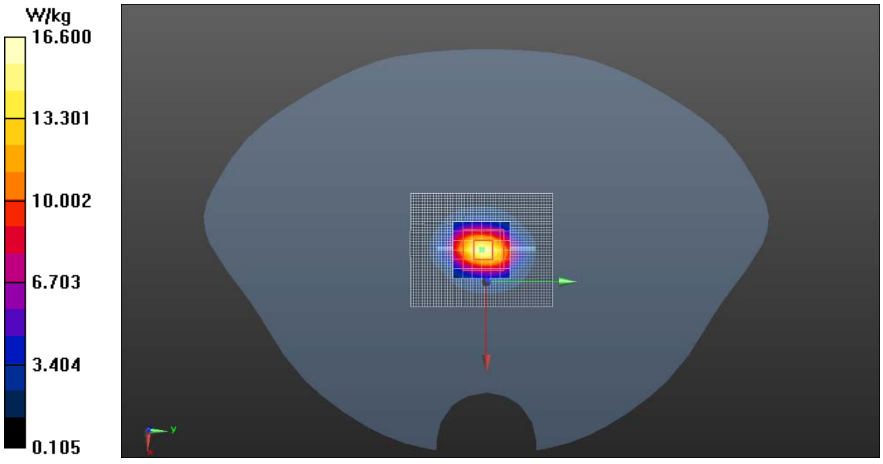
Test Laboratory: TCC Microsoft
Type: D2450V2; Serial: D2450V2 - SN:883

Communication System: CW
Frequency: **2450 MHz**; Duty Cycle: 1:1
Medium: Head 2450 SAR2; Medium Notes: Medium Temperature: t=20.9C
Medium parameters used: f = 2450 MHz; σ = 1.858 S/m; ε_r = 40.038; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:
- Probe: EX3DV4 - SN3823
- ConvF(6.95, 6.95, 6.95); Calibrated: 2014-09-10;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2014-09-09
- Phantom: SAR2 - SAM2; Type: QD 000P40 CD; Serial: TP - 1771
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=15mm, Pin=250mW/Area Scan (41x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 88.00 V/m
Fast SAR: SAR(1 g) = 12.6 W/kg
Fast SAR(10 g) = 5.3 W/kg
Maximum value of SAR (interpolated) = 18.7 W/kg

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.00 V/m
Peak SAR (extrapolated) = 26.0 W/kg
SAR(1 g) = 12.5 W/kg
SAR(10 g) = 5.81 W/kg
Power Drift = -0.04 dB
Maximum value of SAR (measured) = 16.6 W/kg



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Plot 4

Date/Time: 2015-09-22 8:40:21

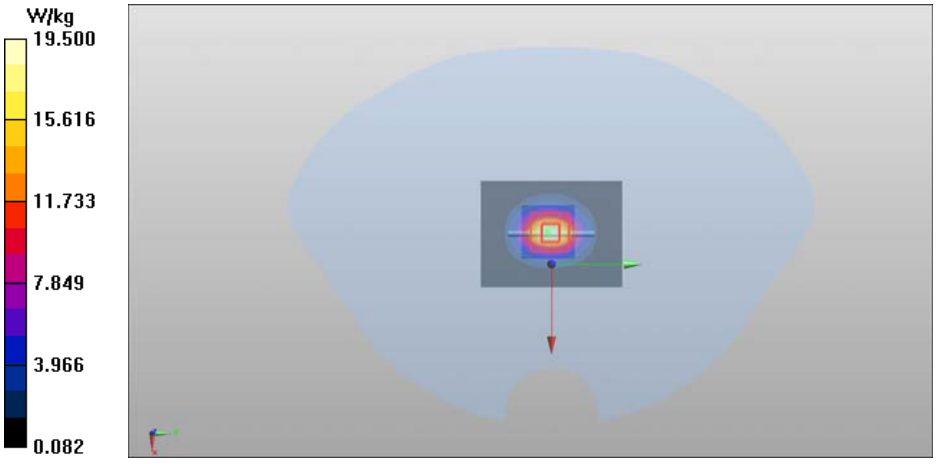
Test Laboratory: TCC Microsoft
Type: D2600V2; Serial: D2600V2 - SN:1056

Communication System: CW
Frequency: **2600 MHz**; Duty Cycle: 1:1
Medium: HSL2600; Medium Notes: t= 22,2 C
Medium parameters used: f = 2600 MHz; σ = 1.947 S/m; ε_r = 37.08; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:
- Probe: EX3DV4 - SN3892
- ConvF(7.13, 7.13, 7.13); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: SAM2; Type: SAM; Serial: TP-1570
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 92.80 V/m
Fast SAR: SAR(1 g) = 14.8 W/kg
Fast SAR(10 g) = 6.62 W/kg
Maximum value of SAR (interpolated) = 19.4 W/kg

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.80 V/m
Peak SAR (extrapolated) = 31.6 W/kg
SAR(1 g) = 14.6 W/kg
SAR(10 g) = 6.49 W/kg
Power Drift = -0.02 dB
Maximum value of SAR (measured) = 19.5 W/kg



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Plot 5

Date/Time: 2015-08-05 10:56:35 AM

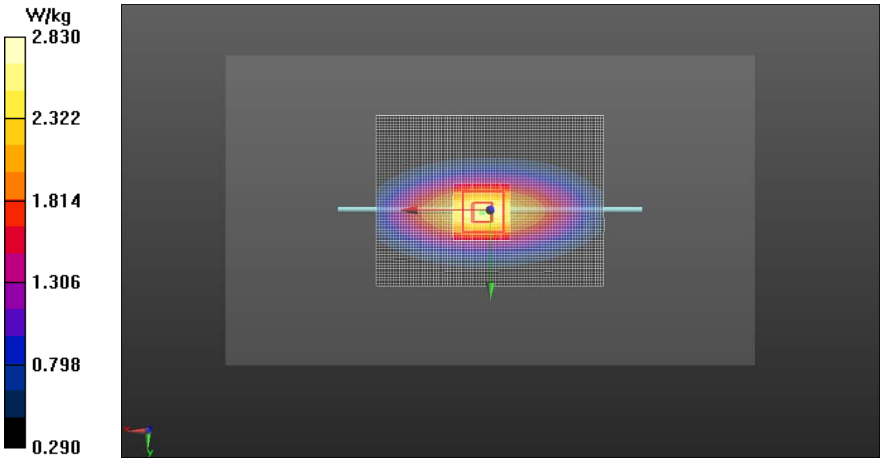
Test Laboratory: TCC Microsoft
Type: D835V2; Serial: 4d005

Communication System: CW
Frequency: **835 MHz**; Duty Cycle: 1:1
Medium: Body 835 SAR1; Medium Notes: Medium Temperature: t=20.9
Medium parameters used: f = 835 MHz; σ = 0.941 S/m; ε_r = 53.872; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3839
- ConvF(8.84, 8.84, 8.84); Calibrated: 2014-09-15;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2014-09-09
- Phantom: SAR1 - TFP; Type: QD 000 P51 CA; Serial: 1125/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=15mm, Pin=250mW/Area Scan (81x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 52.87 V/m
Fast SAR: SAR(1 g) = 2.43 W/kg
Fast SAR(10 g) = 1.65 W/kg
Maximum value of SAR (interpolated) = 2.63 W/kg

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.87 V/m
Peak SAR (extrapolated) = 3.57 W/kg
SAR(1 g) = 2.44 W/kg
SAR(10 g) = 1.62 W/kg
Power Drift = -0.01 dB
Maximum value of SAR (measured) = 2.83 W/kg



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Plot 6

Date/Time: 2015-08-03 9:43:39 AM

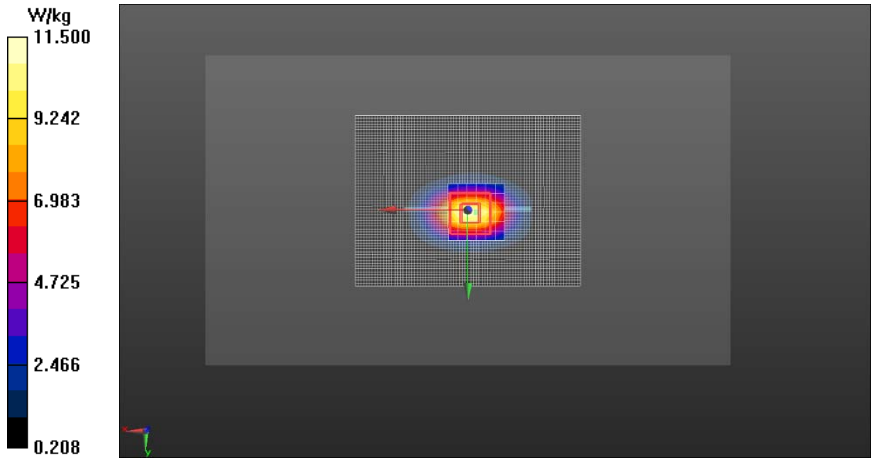
Test Laboratory: TCC Microsoft
Type: D1900V2; Serial: 509

Communication System: CW
Frequency: **1900 MHz**; Duty Cycle: 1:1
Medium: Body 1900 SAR4; Medium Notes: Medium Temperature: t=20.9 C
Medium parameters used: f = 1900 MHz; σ = 1.512 S/m; ε_r = 53.148; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3574
- ConvF(7.41, 7.41, 7.41); Calibrated: 2014-09-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2014-09-18
- Phantom: SAR4 - TFP; Type: QD000 P51 CA; Serial: S/N 1148/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (81x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 82.50 V/m
Fast SAR: SAR(1 g) = 9.28 W/kg
Fast SAR(10 g) = 4.8 W/kg
Maximum value of SAR (interpolated) = 12.2 W/kg

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 82.50 V/m
Peak SAR (extrapolated) = 16.5 W/kg
SAR(1 g) = 9.15 W/kg
SAR(10 g) = 4.82 W/kg
Power Drift = -0.08 dB
Maximum value of SAR (measured) = 11.5 W/kg



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Plot 7

Date/Time: 2015-07-29 3:13:11 PM

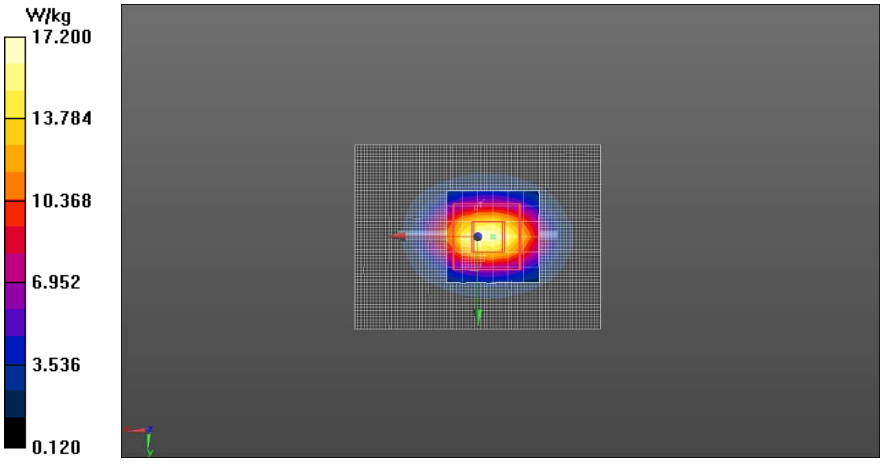
Test Laboratory: TCC Microsoft
Type: D2450V2; Serial: D2450V2 - SN:883

Communication System: CW
Frequency: **2450 MHz**; Duty Cycle: 1:1
Medium: Body 2450 SAR2; Medium Notes: Medium Temperature: t=20.9C
Medium parameters used: f = 2450 MHz; σ = 2.006 S/m; ε_r = 52.203; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3823
- ConvF(6.95, 6.95, 6.95); Calibrated: 2014-09-10;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2014-09-09
- Phantom: SAR2 - TFP ; Type: QD 000 P51 CA; Serial: TP - 1130/2
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (81x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 85.94 V/m
Fast SAR: SAR(1 g) = 13.4 W/kg
Fast SAR(10 g) = 6.08 W/kg
Maximum value of SAR (interpolated) = 18.0 W/kg

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 85.94 V/m
Peak SAR (extrapolated) = 26.8 W/kg
SAR(1 g) = 13.2 W/kg
SAR(10 g) = 6.21 W/kg
Power Drift = -0.01 dB
Maximum value of SAR (measured) = 17.2 W/kg



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Plot 8

Date/Time: 2015-07-30 10:37:13 AM

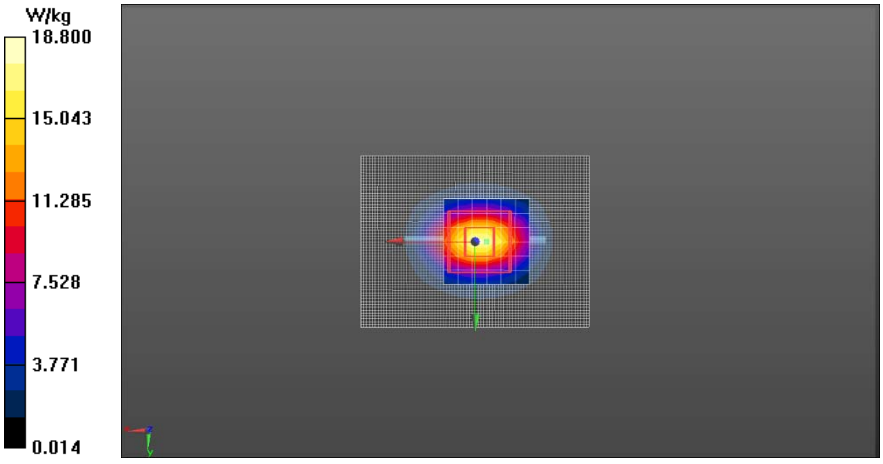
Test Laboratory: TCC Microsoft
Type: D2600V2; Serial: D2600V2 - SN:1082

Communication System: CW
Frequency: **2600 MHz**; Duty Cycle: 1:1
Medium: Body 2600 SAR2; Medium Notes: Medium Temperature: t=20.8C
Medium parameters used: f = 2600 MHz; σ = 2.223 S/m; ε_r = 51.775; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3837
- ConvF(7, 7, 7); Calibrated: 2014-09-10;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2014-09-09
- Phantom: SAR2 - TFP ; Type: QD 000 P51 CA; Serial: TP - 1130/2
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (81x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 84.19 V/m
Fast SAR: SAR(1 g) = 14 W/kg
Fast SAR(10 g) = 6.11 W/kg
Maximum value of SAR (interpolated) = 18.8 W/kg

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 84.19 V/m
Peak SAR (extrapolated) = 29.5 W/kg
SAR(1 g) = 13.8 W/kg
SAR(10 g) = 6.1 W/kg
Power Drift = -0.01 dB
Maximum value of SAR (measured) = 18.2 W/kg



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Plot 9

Date/Time: 2015-09-23 11:15:39

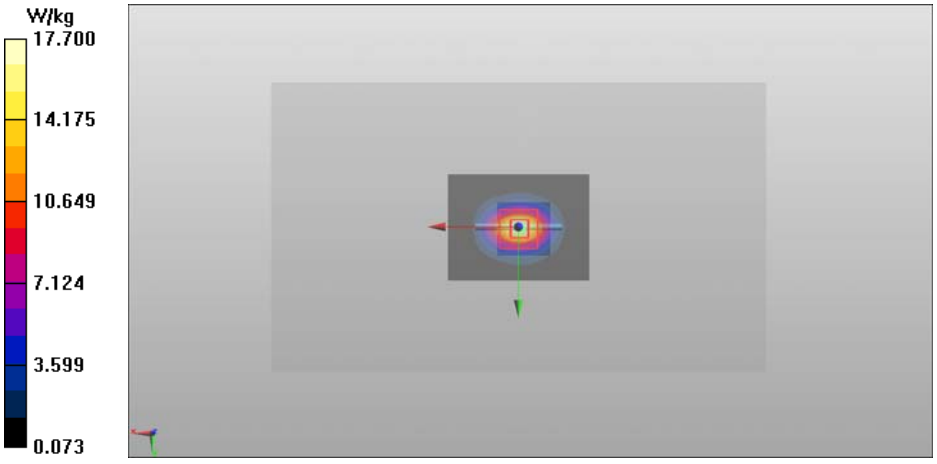
Test Laboratory: TCC Microsoft
Type: D2600V2; Serial: D2600V2 - SN:1056

Communication System: CW
Frequency: **2600 MHz**; Duty Cycle: 1:1
Medium: BSL2600; Medium Notes: t= 22,2 C
Medium parameters used: f = 2600 MHz; σ = 2.109 S/m; ε_r = 50.745; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3892
- ConvF(7.04, 7.04, 7.04); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

d=10mm, Pin=250mW/Area Scan (81x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 85.80 V/m
Fast SAR: SAR(1 g) = 13.6 W/kg
Fast SAR(10 g) = 5.95 W/kg
Maximum value of SAR (interpolated) = 18.1 W/kg

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 85.80 V/m
Peak SAR (extrapolated) = 28.1 W/kg
SAR(1 g) = 13.4 W/kg
SAR(10 g) = 5.97 W/kg
Power Drift = -0.03 dB
Maximum value of SAR (measured) = 17.7 W/kg



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APPENDIX B: MEASUREMENT SCANS
Plot H1

Date/Time: 2015-07-27 4:03:29 PM

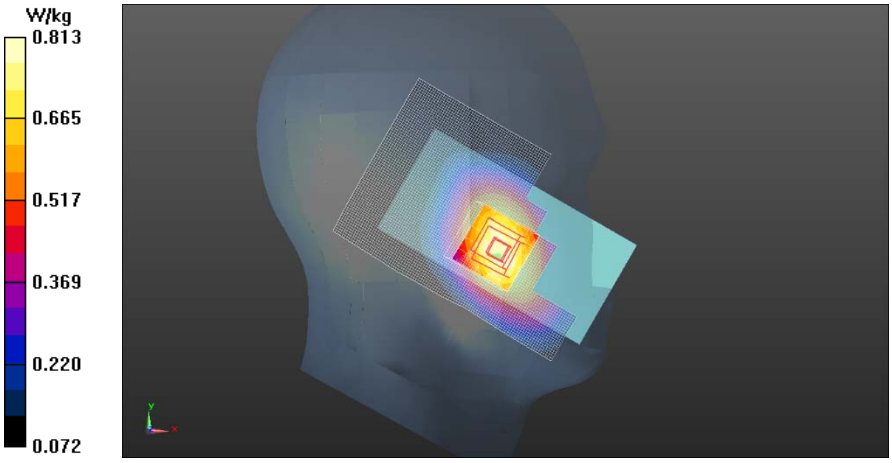
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216781/4

Communication System: 4-slot GPRS850
Frequency: **824.2 MHz**; Duty Cycle: 1:2.09991
Medium: Head 835 SAR1; Medium Notes: Medium Temperature: t=20.8
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.884 S/m; ε_r = 41.127; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY Configuration:
- Probe: EX3DV4 - SN3839
- ConvF(8.88, 8.88, 8.88); Calibrated: 2014-09-15;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2014-09-09
- Phantom: SAR1 - SAM1; Type: TP - 01097; Serial: Not Specified
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

4-slot GPRS 850 (Band 5) - Left/Cheek - CH 128 - Antenna 2/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 28.45 V/m
Fast SAR: SAR(1 g) = 0.769 W/kg
Fast SAR(10 g) = 0.538 W/kg
Maximum value of SAR (interpolated) = 0.877 W/kg

4-slot GPRS 850 (Band 5) - Left/Cheek - CH 128 - Antenna 2/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 28.45 V/m
Peak SAR (extrapolated) = 0.941 W/kg
SAR(1 g) = 0.738 W/kg
SAR(10 g) = 0.566 W/kg
Power Drift = 0.03 dB
Maximum value of SAR (measured) = 0.813 W/kg



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Plot H2

Date/Time: 2015-07-27 2:32:32 PM

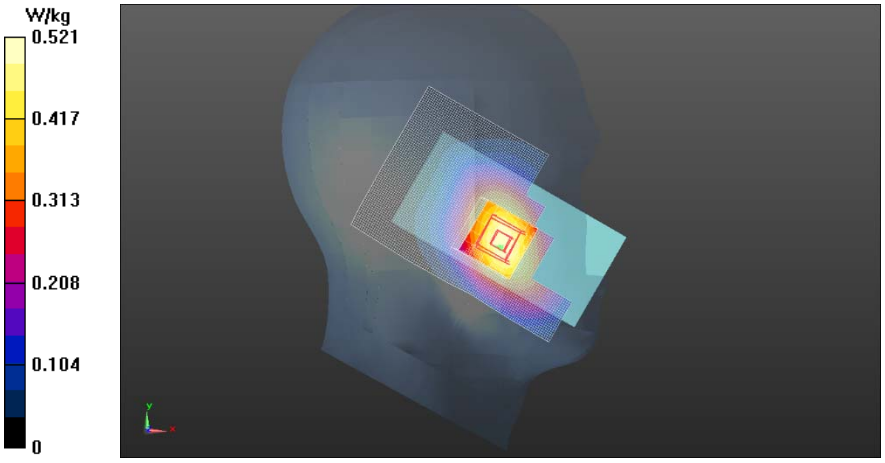
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216781/4

Communication System: WCDMA850 (Band 5)
Frequency: **835 MHz**; Duty Cycle: 1:1
Medium: Head 835 SAR1; Medium Notes: Medium Temperature: t=20.8
Medium parameters used: f = 835 MHz; σ = 0.894 S/m; ε_r = 40.984; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY Configuration:
- Probe: EX3DV4 - SN3839
- ConvF(8.88, 8.88, 8.88); Calibrated: 2014-09-15;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2014-09-09
- Phantom: SAR1 - SAM1; Type: TP - 01097; Serial: Not Specified
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WCDMA 850 (Band 5) - Left/Cheek - CH 4175 - Antenna 2/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 22.58 V/m
Fast SAR: SAR(1 g) = 0.458 W/kg
Fast SAR(10 g) = 0.320 W/kg
Maximum value of SAR (interpolated) = 0.521 W/kg

WCDMA 850 (Band 5) - Left/Cheek - CH 4175 - Antenna 2/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 22.58 V/m
Peak SAR (extrapolated) = 0.608 W/kg
SAR(1 g) = 0.477 W/kg
SAR(10 g) = 0.362 W/kg
Power Drift = -0.01 dB
Maximum value of SAR (measured) = 0.524 W/kg



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Plot H3

Date/Time: 2015-07-31 5:11:39 PM

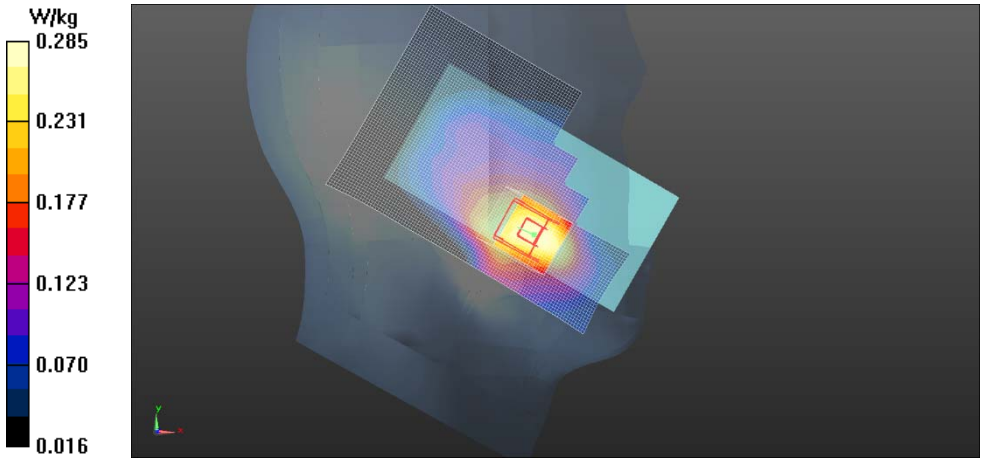
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216800/2

Communication System: 4-slot GPRS1900
Frequency: **1850.2 MHz**; Duty Cycle: 1:2.09991
Medium: Head 1900 SAR4; Medium Notes: Medium Temperature: t=20.9C
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.306 S/m; ε_r = 40.653; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY Configuration:
- Probe: EX3DV4 - SN3574
- ConvF(7.83, 7.83, 7.83); Calibrated: 2014-09-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2014-09-18
- Phantom: SAR4 - SAM1; Type: QD000 P40 CA; Serial: TP - 1274
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

4-slot GPRS 1900 - Left/Cheek - CH 512 - Antenna 2/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 14.55 V/m
Fast SAR: SAR(1 g) = 0.245 W/kg
Fast SAR(10 g) = 0.146 W/kg
Maximum value of SAR (interpolated) = 0.298 W/kg

4-slot GPRS 1900 - Left/Cheek - CH 512 - Antenna 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 14.55 V/m
Peak SAR (extrapolated) = 0.366 W/kg
SAR(1 g) = 0.246 W/kg
SAR(10 g) = 0.161 W/kg
Power Drift = 0.04 dB
Maximum value of SAR (measured) = 0.285 W/kg



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Plot H4

Date/Time: 2015-09-23 10:42:20

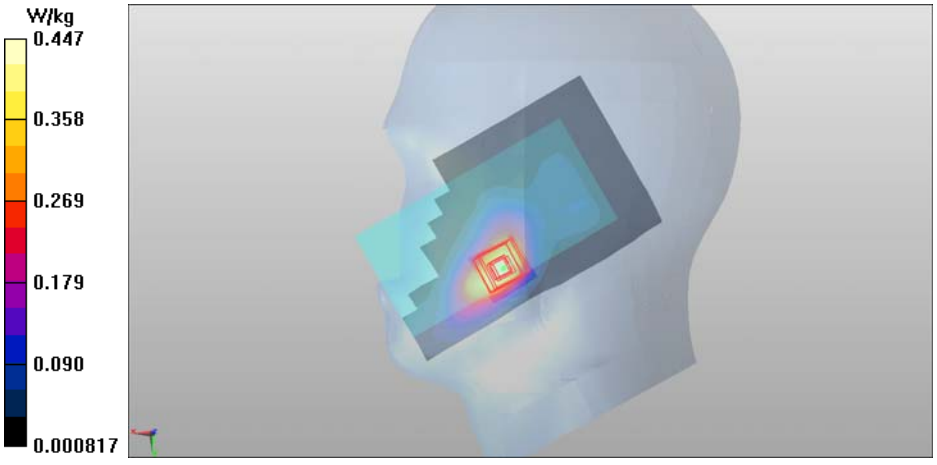
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216785/5

Communication System: LTE2500 (Band 7)
Frequency: **2510 MHz**; Duty Cycle: 1:1
Medium: HSL2600; Medium Notes: t= 22,1 C
Medium parameters used: f = 2510 MHz; σ = 1.864 S/m; ε_r = 37.875; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY Configuration:
- Probe: EX3DV4 - SN3892
- ConvF(7.13, 7.13, 7.13); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: SAM2; Type: SAM; Serial: TP-1570
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE2500 (Band 7) - Right/Cheek - CH 20850 - 20MHz - QPSK - 1 RB - Offset 49 - Antenna 1/Area Scan (101x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 15.07 V/m
Fast SAR: SAR(1 g) = 0.358 W/kg
Fast SAR(10 g) = 0.189 W/kg
Maximum value of SAR (interpolated) = 0.462 W/kg

LTE2500 (Band 7) - Right/Cheek - CH 20850 - 20MHz - QPSK - 1 RB - Offset 49 - Antenna 1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.07 V/m
Peak SAR (extrapolated) = 0.677 W/kg
SAR(1 g) = 0.365 W/kg
SAR(10 g) = 0.195 W/kg
Power Drift = -0.06 dB
Maximum value of SAR (measured) = 0.447 W/kg



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Plot H5

Date/Time: 2015-08-10 12:49:53 PM

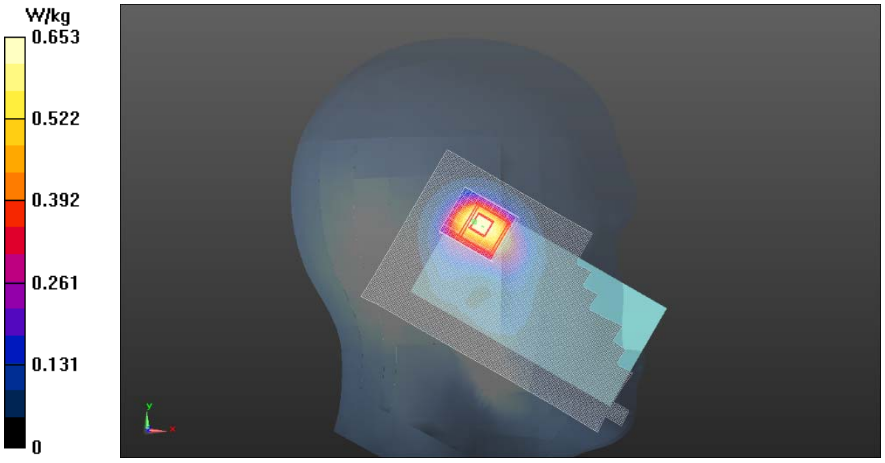
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216777/2

Communication System: WLAN2450
Frequency: **2412 MHz**; Duty Cycle: 1:1
Medium: Head 2450 SAR2; Medium Notes: Medium Temperature: t=20.7C
Medium parameters used: f = 2412 MHz; σ = 1.826 S/m; ε_r = 38.985; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY Configuration:
- Probe: EX3DV4 - SN3823
- ConvF(6.95, 6.95, 6.95); Calibrated: 2014-09-10;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2014-09-09
- Phantom: SAR2 - SAM2; Type: QD 000P40 CD; Serial: TP - 1771
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WLAN2450 b-mode - Left/Cheek - CH 1 - QPSK 11 Mbps/Area Scan (101x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 18.40 V/m
Fast SAR: SAR(1 g) = 0.515 W/kg
Fast SAR(10 g) = 0.258 W/kg
Maximum value of SAR (interpolated) = 0.653 W/kg

WLAN2450 b-mode - Left/Cheek - CH 1 - QPSK 11 Mbps/Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.40 V/m
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.542 W/kg
SAR(10 g) = 0.286 W/kg
Power Drift = 0.04 dB
Maximum value of SAR (measured) = 0.678 W/kg



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Plot H6

Date/Time: 2015-07-27 4:03:29 PM

DASY Configuration for 4-slot GPRS 850 - Left/Cheek - CH 128 - Antenna 2/Area Scan:
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216781/4
Communication System: 4-slot GPRS850; Frequency: 824.2 MHz; Duty Cycle: 1:2.09991; PMF: 1.44911
Medium: Head 835 SAR1 Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.884 S/m; ε_r = 41.127; ρ = 1000 kg/m^3
Phantom section: Left Section

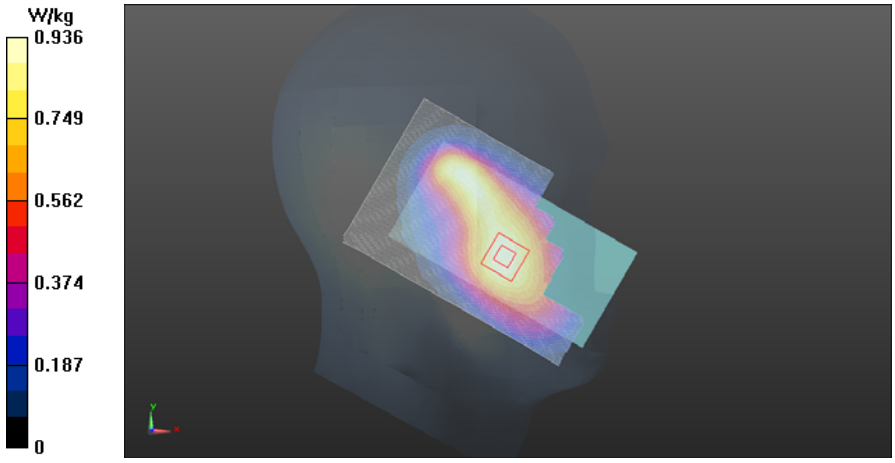
Probe: EX3DV4 - SN3839; ConvF(8.88, 8.88, 8.88); Calibrated: 2014-09-15;
Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))
Electronics: DAE4 Sn860; Calibrated: 2014-09-09
Phantom: SAR1 - SAM1; Type: TP - 01097; Serial: Not Specified
Measurement SW: DASY52, Version 52.8 (8)

Date/Time: 2015-08-10 12:49:53 PM

DASY Configuration for WLAN2450 b-mode - Left/Cheek - CH 1 - QPSK 11 Mbps - Antenna 1/Area Scan:
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216777/2
Communication System: WLAN2450; Frequency: 2412 MHz; Duty Cycle: 1:1; PMF: 1
Medium: Head 2450 SAR2 Medium parameters used: f = 2412 MHz; σ = 1.826 S/m; ε_r = 38.985; ρ = 1000 kg/m^3
Phantom section: Left Section

Probe: EX3DV4 - SN3823; ConvF(6.95, 6.95, 6.95); Calibrated: 2014-09-10;
Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))
Electronics: DAE4 Sn1319; Calibrated: 2014-09-09
Phantom: SAR2 - SAM2; Type: QD 000P40 CD; Serial: TP - 1771
Measurement SW: DASY52, Version 52.8 (8)

Fast SAR of Combined Scans: SAR(1 g) = 0.823 W/kg; SAR(10 g) = 0.570 W/kg
Maximum value of SAR (interpolated) = 0.936 W/kg



Note: 4-slot GPRS850 result was scaled by a factor of 1.02 and WLAN2450 b-mode result was scaled by a factor of 1.15 before combining in SEMCAD SW

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Plot B1

Date/Time: 2015-08-04 3:12:37 PM

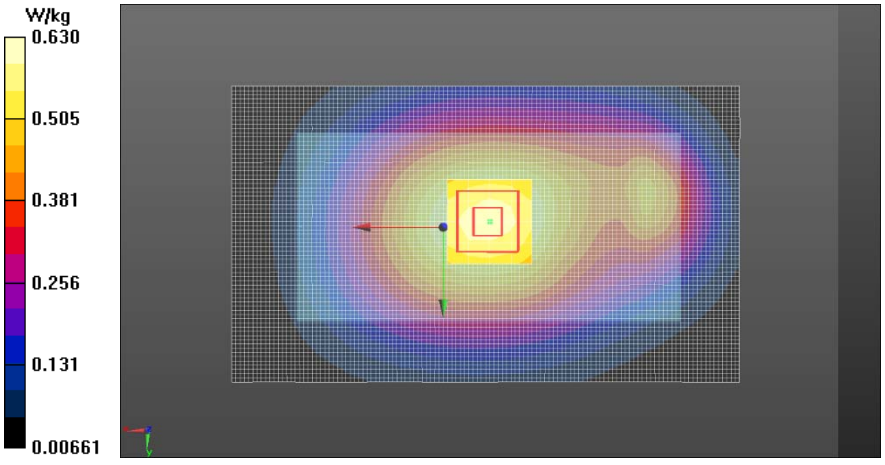
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216781/4

Communication System: 4-slot GPRS850
Frequency: **824.2 MHz**; Duty Cycle: 1:2.09991
Medium: Body 835 SAR1; Medium Notes: Medium Temperature: t=20.9
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.929 S/m; ε_r = 53.56; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3839
- ConvF(8.84, 8.84, 8.84); Calibrated: 2014-09-15;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2014-09-09
- Phantom: SAR1 - TFP; Type: QD 000 P51 CA; Serial: 1125/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

4-slot GPRS 850 (Band 5)/Body - CH 128 - 15 mm - No Headset - Back - Antenna 2/Area Scan (71x121x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 25.34 V/m
Fast SAR: SAR(1 g) = 0.561 W/kg
Fast SAR(10 g) = 0.403 W/kg
Maximum value of SAR (interpolated) = 0.630 W/kg

4-slot GPRS 850 (Band 5)/Body - CH 128 - 15 mm - No Headset - Back - Antenna 2/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 25.34 V/m
Peak SAR (extrapolated) = 0.726 W/kg
SAR(1 g) = 0.584 W/kg
SAR(10 g) = 0.445 W/kg
Power Drift = -0.02 dB
Maximum value of SAR (measured) = 0.614 W/kg



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Plot B2

Date/Time: 2015-08-05 2:59:49 PM

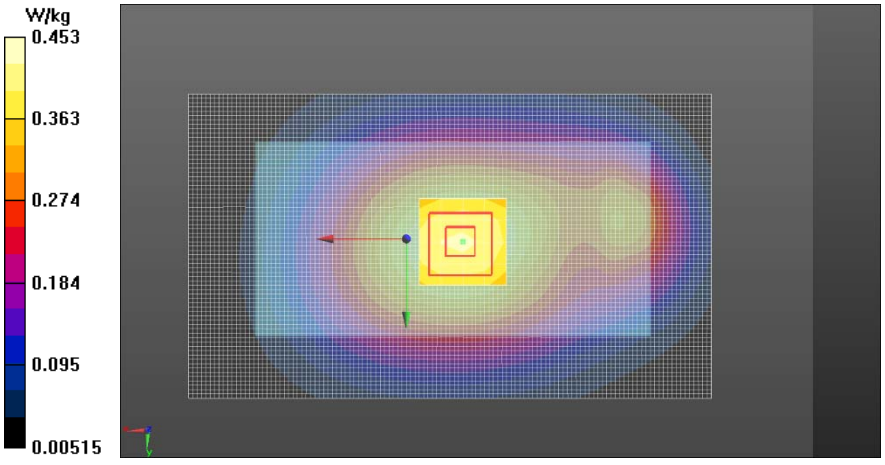
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216781/4

Communication System: WCDMA850 (Band 5)
Frequency: **826.4 MHz**; Duty Cycle: 1:1
Medium: Body 835 SAR1; Medium Notes: Medium Temperature: t=20.9
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.933 S/m; ε_r = 53.956; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3839
- ConvF(8.84, 8.84, 8.84); Calibrated: 2014-09-15;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2014-09-09
- Phantom: SAR1 - TFP; Type: QD 000 P51 CA; Serial: 1125/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WCDMA 850 (Band 5)/Body - CH 4132 - 15 mm - No Headset - Back - Antenna 2/Area Scan (71x121x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 20.65 V/m
Fast SAR: SAR(1 g) = 0.402 W/kg
Fast SAR(10 g) = 0.287 W/kg
Maximum value of SAR (interpolated) = 0.453 W/kg

WCDMA 850 (Band 5)/Body - CH 4132 - 15 mm - No Headset - Back - Antenna 2/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 20.65 V/m
Peak SAR (extrapolated) = 0.513 W/kg
SAR(1 g) = 0.410 W/kg
SAR(10 g) = 0.312 W/kg
Power Drift = 0.08 dB
Maximum value of SAR (measured) = 0.430 W/kg



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Plot B3

Date/Time: 2015-08-03 3:05:14 PM

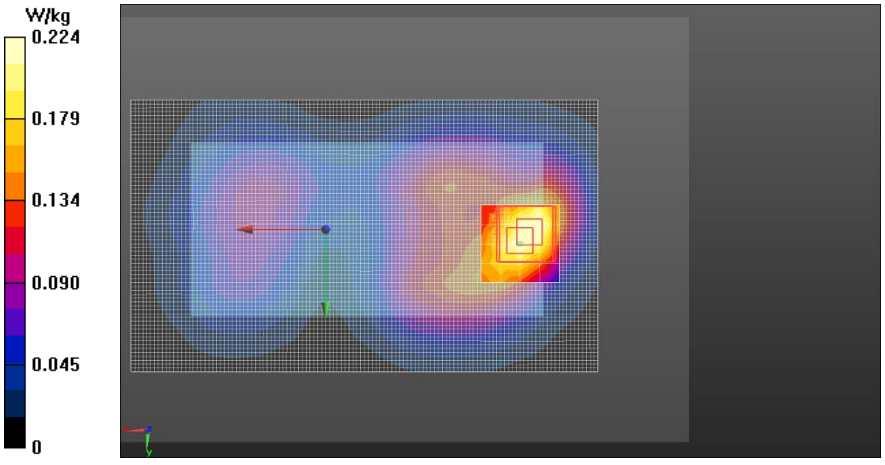
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216800/2

Communication System: 4-slot GPRS1900
Frequency: **1850.2 MHz**; Duty Cycle: 1:2.09991
Medium: Body 1900 SAR4; Medium Notes: Medium Temperature: t=20.9 C
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.465 S/m; ε_r = 53.289; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3574
- ConvF(7.41, 7.41, 7.41); Calibrated: 2014-09-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2014-09-18
- Phantom: SAR4 - TFP; Type: QD000 P51 CA; Serial: S/N 1148/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

4-slot GPRS 1900/Body - CH 512 - 15 mm - No Headset - Back - Antenna 2/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 11.10 V/m
Fast SAR: SAR(1 g) = 0.181 W/kg
Fast SAR(10 g) = 0.107 W/kg
Maximum value of SAR (interpolated) = 0.224 W/kg

4-slot GPRS 1900/Body - CH 512 - 15 mm - No Headset - Back - Antenna 2/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 11.10 V/m
Peak SAR (extrapolated) = 0.332 W/kg
SAR(1 g) = 0.197 W/kg
SAR(10 g) = 0.111 W/kg
Power Drift = -0.01 dB
Maximum value of SAR (measured) = 0.232 W/kg



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Plot B4

Date/Time: 2015-09-23 15:18:32

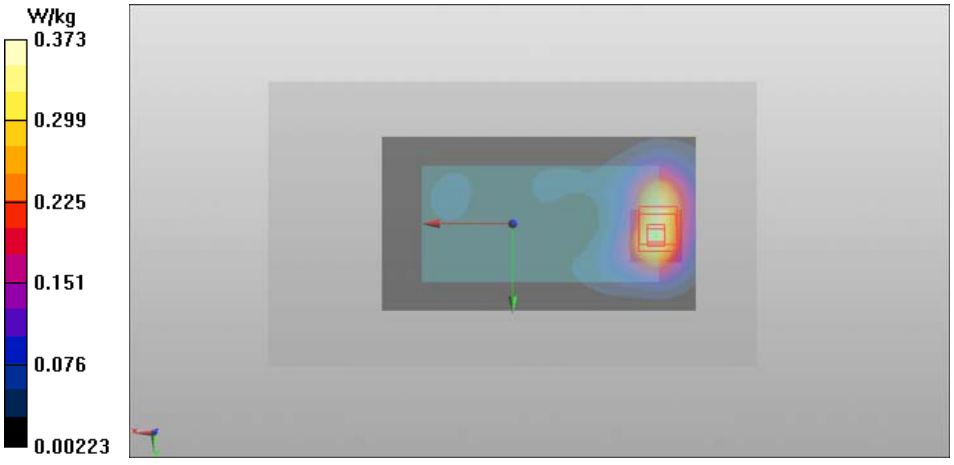
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216785/5

Communication System: LTE2500 (Band 7)
Frequency: **2510 MHz**; Duty Cycle: 1:1
Medium: BSL2600; Medium Notes: t= 22,2 C
Medium parameters used: f = 2510 MHz; σ = 2 S/m; ε_r = 50.979; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3892
- ConvF(7.04, 7.04, 7.04); Calibrated: 2015-04-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn538; Calibrated: 2015-04-20
- Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: TP-1124/3
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE2500 (Band 7)/Body - CH 20850 - 20MHz - QPSK - 1 RB - Offset 49 - 15 mm - No Headset - Back - Antenna 2/Area Scan (101x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 12.90 V/m
Fast SAR: SAR(1 g) = 0.290 W/kg
Fast SAR(10 g) = 0.158 W/kg
Maximum value of SAR (interpolated) = 0.364 W/kg

LTE2500 (Band 7)/Body - CH 20850 - 20MHz - QPSK - 1 RB - Offset 49 - 15 mm - No Headset - Back - Antenna 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.77 V/m
Peak SAR (extrapolated) = 0.540 W/kg
SAR(1 g) = 0.300 W/kg
SAR(10 g) = 0.164 W/kg
Power Drift = -0.06 dB
Maximum value of SAR (measured) = 0.373 W/kg



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Plot B5

Date/Time: 2015-07-29 4:33:49 PM

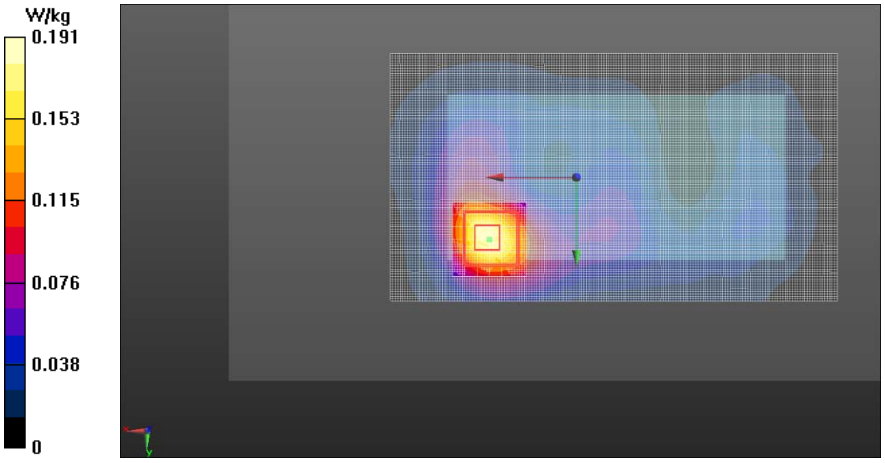
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216777/2

Communication System: WLAN2450
Frequency: **2412 MHz**; Duty Cycle: 1:1
Medium: Body 2450 SAR2; Medium Notes: Medium Temperature: t=20.9C
Medium parameters used: f = 2412 MHz; σ = 1.965 S/m; ε_r = 52.327; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3823
- ConvF(6.95, 6.95, 6.95); Calibrated: 2014-09-10;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2014-09-09
- Phantom: SAR2 - TFP ; Type: QD 000 P51 CA; Serial: TP - 1130/2
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WLAN2450 b-mode/Body - CH 1 - QPSK 11 Mbps - 15 mm - No Headset - Back/Area Scan (101x181x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 5.187 V/m
Fast SAR: SAR(1 g) = 0.152 W/kg
Fast SAR(10 g) = 0.081 W/kg
Maximum value of SAR (interpolated) = 0.191 W/kg

WLAN2450 b-mode/Body - CH 1 - QPSK 11 Mbps - 15 mm - No Headset - Back/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.187 V/m
Peak SAR (extrapolated) = 0.270 W/kg
SAR(1 g) = 0.150 W/kg
SAR(10 g) = 0.081 W/kg
Power Drift = 0.16 dB
Maximum value of SAR (measured) = 0.185 W/kg



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Plot B6

Date/Time: 2015-08-04 3:12:37 PM

DASY Configuration for 4-slot GPRS 850 (Band 5)/Body - CH 128 - 15 mm - No Headset - Back - Antenna 2/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1127, HW:1500; Serial: 004402/74/216781/4

Communication System: 4-slot GPRS850; Frequency: 824.2 MHz; Duty Cycle: 1:2.09991; PMF: 1.44911

Medium: Body 835 SAR1 Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.929 S/m; ε_r = 53.56; ρ = 1000 kg/m^3

Phantom section: Center Section

Probe: EX3DV4 - SN3839; ConvF(8.84, 8.84, 8.84); Calibrated: 2014-09-15;
Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))
Electronics: DAE4 Sn860; Calibrated: 2014-09-09
Phantom: SAR1 - TFP; Type: QD 000 P51 CA; Serial: 1125/1
Measurement SW: DASY52, Version 52.8 (8)

Date/Time: 2015-07-29 4:33:49 PM

DASY Configuration for WLAN2450 b-mode/Body - CH 1 - QPSK 11 Mbps - 15 mm - No Headset - Back - Antenna 1/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1127, HW:1500; Serial: 004402/74/216777/2

Communication System: WLAN2450; Frequency: 2412 MHz; Duty Cycle: 1:1; PMF: 1

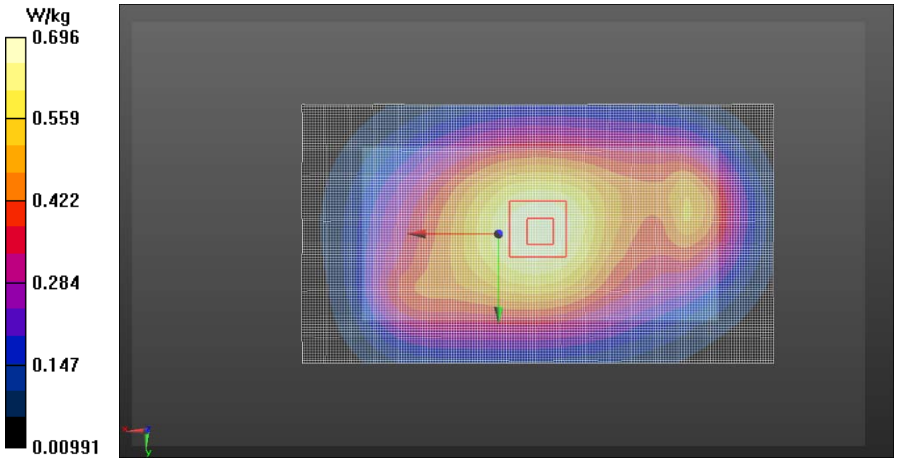
Medium: Body 2450 SAR2 Medium parameters used: f = 2412 MHz; σ = 1.965 S/m; ε_r = 52.327; ρ = 1000 kg/m^3

Phantom section: Center Section

Probe: EX3DV4 - SN3823; ConvF(6.95, 6.95, 6.95); Calibrated: 2014-09-10;
Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))
Electronics: DAE4 Sn1319; Calibrated: 2014-09-09
Phantom: SAR2 - TFP ; Type: QD 000 P51 CA; Serial: TP - 1130/2
Measurement SW: DASY52, Version 52.8 (8)

Fast SAR of Combined Scans: SAR(1 g) = 0.616 W/kg; SAR(10 g) = 0.436 W/kg

Maximum value of SAR (interpolated) = 0.696 W/kg



Note: 4-slot GPRS850 result was scaled by a factor of 1.02 and WLAN2450 b-mode result was scaled by a factor of 1.15 before combining in SEMCAD SW

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Plot W1

Date/Time: 2015-08-04 4:15:21 PM

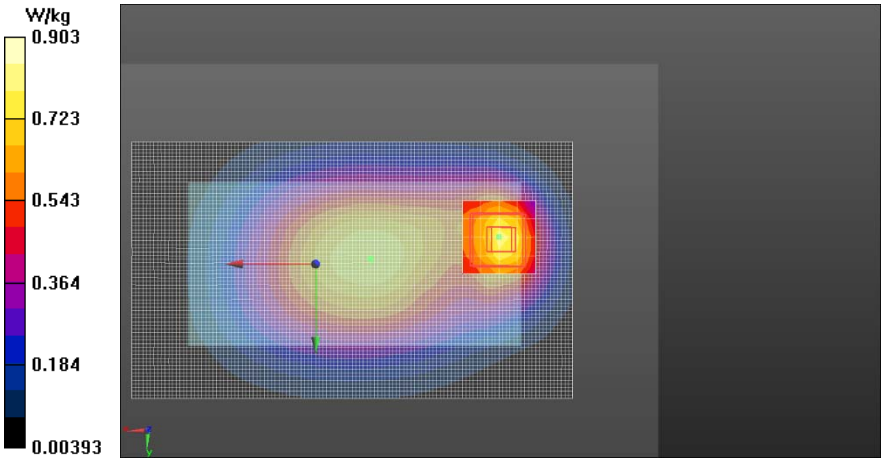
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216781/4

Communication System: 4-slot GPRS850
Frequency: **824.2 MHz**; Duty Cycle: 1:2.09991
Medium: Body 835 SAR1; Medium Notes: Medium Temperature: t=20.9
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.929 S/m; ε_r = 53.56; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3839
- ConvF(8.84, 8.84, 8.84); Calibrated: 2014-09-15;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2014-09-09
- Phantom: SAR1 - TFP; Type: QD 000 P51 CA; Serial: 1125/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

4-slot GPRS 850 (Band 5)/Body - CH 128 - 10 mm - No Headset - Back - Antenna 2/Area Scan (71x121x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 31.25 V/m
Fast SAR: SAR(1 g) = 0.774 W/kg
Fast SAR(10 g) = 0.510 W/kg
Maximum value of SAR (interpolated) = 0.903 W/kg

4-slot GPRS 850 (Band 5)/Body - CH 128 - 10 mm - No Headset - Back - Antenna 2/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 31.25 V/m
Peak SAR (extrapolated) = 1.27 W/kg
SAR(1 g) = 0.755 W/kg
SAR(10 g) = 0.457 W/kg
Power Drift = -0.04 dB
Maximum value of SAR (measured) = 0.818 W/kg



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Plot W2

Date/Time: 2015-08-05 2:35:21 PM

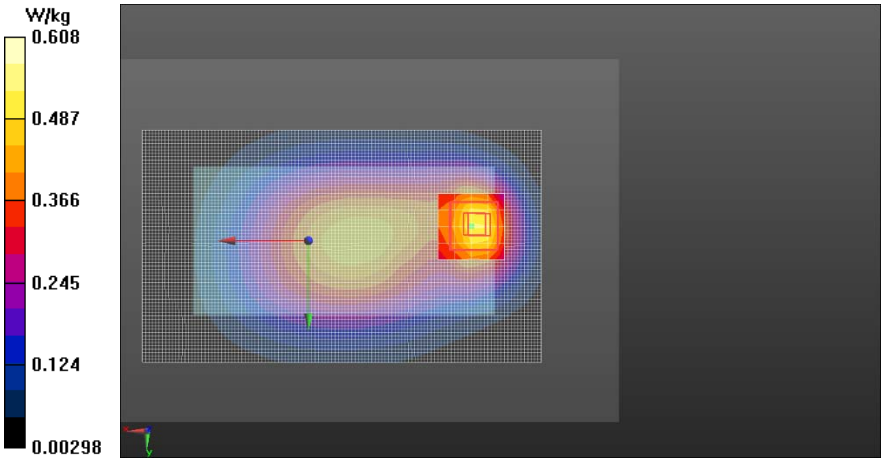
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216781/4

Communication System: WCDMA850 (Band 5)
Frequency: **835 MHz**; Duty Cycle: 1:1
Medium: Body 835 SAR1; Medium Notes: Medium Temperature: t=20.9
Medium parameters used: f = 835 MHz; σ = 0.941 S/m; ε_r = 53.872; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3839
- ConvF(8.84, 8.84, 8.84); Calibrated: 2014-09-15;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn860; Calibrated: 2014-09-09
- Phantom: SAR1 - TFP; Type: QD 000 P51 CA; Serial: 1125/2
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WCDMA 850 (Band 5)/Body - CH 4175 - 10 mm - No Headset - Back - Antenna 2/Area Scan (71x121x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 24.51 V/m
Fast SAR: SAR(1 g) = 0.519 W/kg
Fast SAR(10 g) = 0.339 W/kg
Maximum value of SAR (interpolated) = 0.608 W/kg

WCDMA 850 (Band 5)/Body - CH 4175 - 10 mm - No Headset - Back - Antenna 2/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 24.51 V/m
Peak SAR (extrapolated) = 0.857 W/kg
SAR(1 g) = 0.508 W/kg
SAR(10 g) = 0.305 W/kg
Power Drift = -0.03 dB
Maximum value of SAR (measured) = 0.536 W/kg



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Plot W3

Date/Time: 2015-08-03 3:22:23 PM

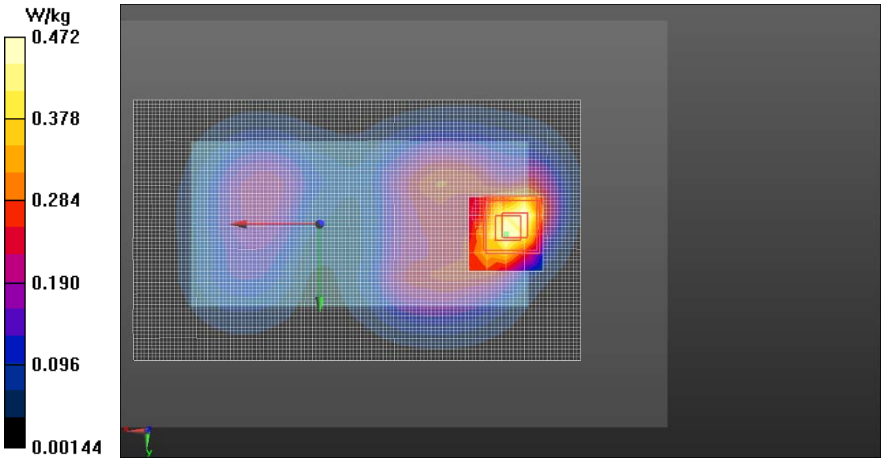
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216800/2

Communication System: 4-slot GPRS1900
Frequency: **1850.2 MHz**; Duty Cycle: 1:2.09991
Medium: Body 1900 SAR4; Medium Notes: Medium Temperature: t=20.9 C
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.465 S/m; ε_r = 53.289; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3574
- ConvF(7.41, 7.41, 7.41); Calibrated: 2014-09-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2014-09-18
- Phantom: SAR4 - TFP; Type: QD000 P51 CA; Serial: S/N 1148/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

4-slot GPRS 1900 (Band x)/Body - CH 512 - 10 mm - No Headset - Back - Antenna 2/Area Scan (71x121x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 14.84 V/m
Fast SAR: SAR(1 g) = 0.370 W/kg
Fast SAR(10 g) = 0.212 W/kg
Maximum value of SAR (interpolated) = 0.472 W/kg

4-slot GPRS 1900 (Band x)/Body - CH 512 - 10 mm - No Headset - Back - Antenna 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 14.84 V/m
Peak SAR (extrapolated) = 0.742 W/kg
SAR(1 g) = 0.411 W/kg
SAR(10 g) = 0.216 W/kg
Power Drift = -0.01 dB
Maximum value of SAR (measured) = 0.495 W/kg



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Plot W4

Date/Time: 2015-07-31 10:11:35 AM

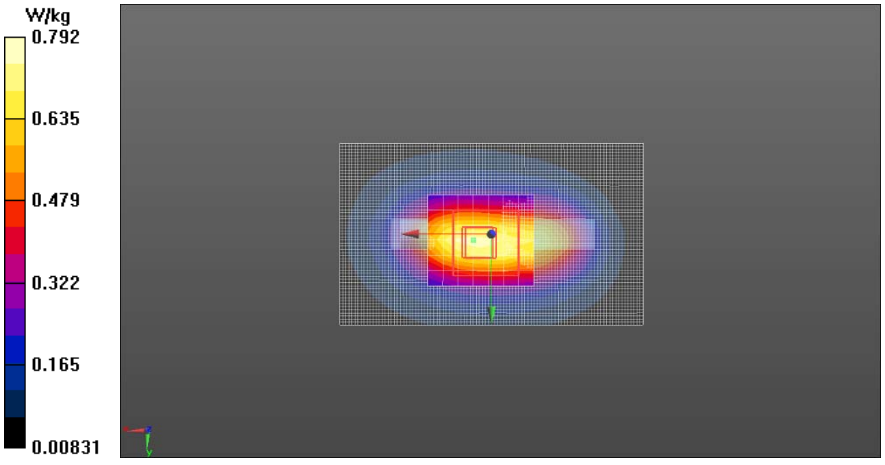
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216785/5

Communication System: LTE2500 (Band 7)
Frequency: **2510 MHz**; Duty Cycle: 1:1
Medium: Body 2600 SAR2; Medium Notes: Medium Temperature: t=20.8C
Medium parameters used: f = 2510 MHz; σ = 2.106 S/m; ε_r = 51.868; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3837
- ConvF(7, 7, 7); Calibrated: 2014-09-10;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2014-09-09
- Phantom: SAR2 - TFP ; Type: QD 000 P51 CA; Serial: TP - 1130/2
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE2500 (Band 7) - Top_Bottom/Body - CH 20850 - 20MHz - QPSK - 1 RB - Offset 49 - 10 mm - No Headset - Bottom - Antenna 2/Area Scan (61x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 18.95 V/m
Fast SAR: SAR(1 g) = 0.616 W/kg
Fast SAR(10 g) = 0.319 W/kg
Maximum value of SAR (interpolated) = 0.792 W/kg

LTE2500 (Band 7) - Top_Bottom/Body - CH 20850 - 20MHz - QPSK - 1 RB - Offset 49 - 10 mm - No Headset - Bottom - Antenna 2/Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.95 V/m
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.614 W/kg
SAR(10 g) = 0.327 W/kg
Power Drift = -0.06 dB
Maximum value of SAR (measured) = 0.770 W/kg



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Plot W5

Date/Time: 2015-07-29 5:19:51 PM

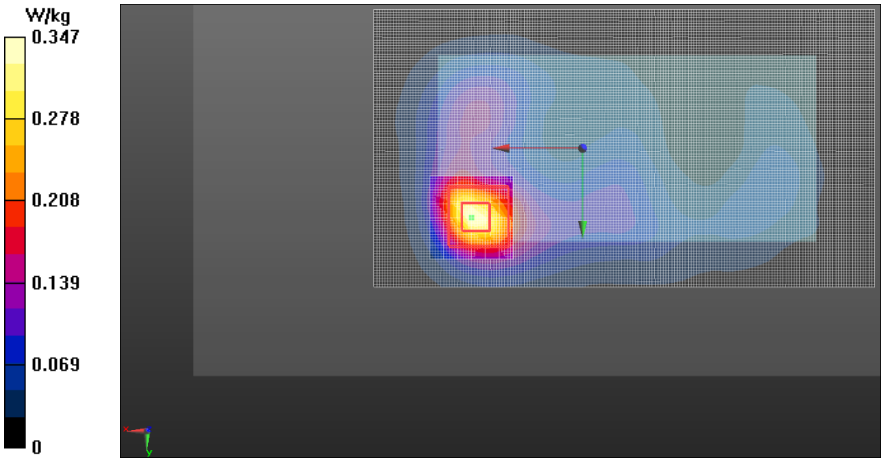
Test Laboratory: TCC Microsoft
Type: RM-1127, HW:1500; Serial: 004402/74/216777/2

Communication System: WLAN2450
Frequency: **2437 MHz**; Duty Cycle: 1:1
Medium: Body 2450 SAR2; Medium Notes: Medium Temperature: t=20.9C
Medium parameters used: f = 2437 MHz; σ = 1.993 S/m; ε_r = 52.243; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3823
- ConvF(6.95, 6.95, 6.95); Calibrated: 2014-09-10;
- Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1319; Calibrated: 2014-09-09
- Phantom: SAR2 - TFP ; Type: QD 000 P51 CA; Serial: TP - 1130/2
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WLAN2450 b-mode/Body - CH 6 - QPSK 11 Mbps - 10 mm - No Headset - Back/Area Scan (101x181x1):
Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 7.012 V/m
Fast SAR: SAR(1 g) = 0.264 W/kg
Fast SAR(10 g) = 0.131 W/kg
Maximum value of SAR (interpolated) = 0.347 W/kg

WLAN2450 b-mode/Body - CH 6 - QPSK 11 Mbps - 10 mm - No Headset - Back/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.012 V/m
Peak SAR (extrapolated) = 0.554 W/kg
SAR(1 g) = 0.269 W/kg
SAR(10 g) = 0.129 W/kg
Power Drift = 0.04 dB
Maximum value of SAR (measured) = 0.350 W/kg



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Plot W6

Date/Time: 2015-08-04 4:15:21 PM

DASY Configuration for 4-slot GPRS 850 (Band 5)/Body - CH 128 - 10 mm - No Headset - Back - Antenna 2/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1127, HW:1500; Serial: 004402/74/216781/4

Communication System: 4-slot GPRS850; Frequency: 824.2 MHz; Duty Cycle: 1:2.09991; PMF: 1.44911

Medium: Body 835 SAR1 Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.929 S/m; ε_r = 53.56; ρ = 1000 kg/m^3

Phantom section: Center Section

Probe: EX3DV4 - SN3839; ConvF(8.84, 8.84, 8.84); Calibrated: 2014-09-15;
Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))
Electronics: DAE4 Sn860; Calibrated: 2014-09-09
Phantom: SAR1 - TFP; Type: QD 000 P51 CA; Serial: 1125/1
Measurement SW: DASY52, Version 52.8 (8)

Date/Time: 2015-07-29 5:19:51 PM

DASY Configuration for WLAN2450 b-mode/Body - CH 6 - QPSK 11 Mbps - 10 mm - No Headset - Back - Antenna 1/Area Scan:

Test Laboratory: TCC Microsoft

Type: RM-1127, HW:1500; Serial: 004402/74/216777/2

Communication System: WLAN2450; Frequency: 2437 MHz; Duty Cycle: 1:1; PMF: 1

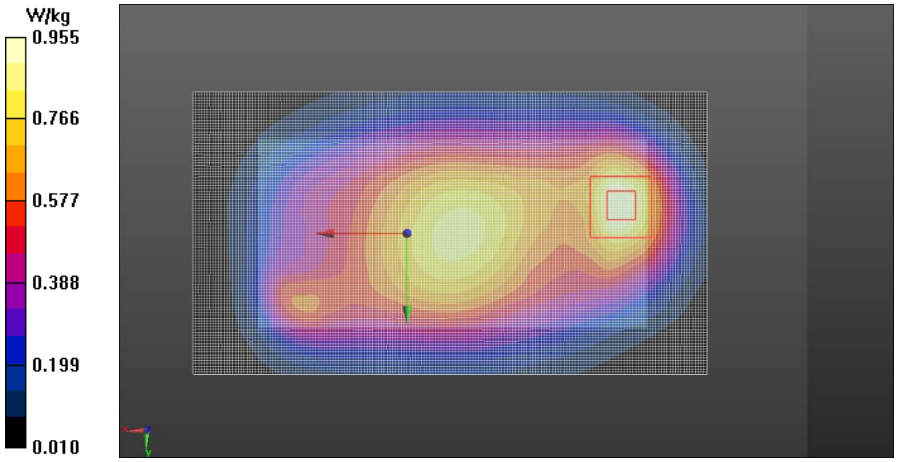
Medium: Body 2450 SAR2 Medium parameters used: f = 2437 MHz; σ = 1.993 S/m; ε_r = 52.243; ρ = 1000 kg/m^3

Phantom section: Center Section

Probe: EX3DV4 - SN3823; ConvF(6.95, 6.95, 6.95); Calibrated: 2014-09-10;
Sensor-Surface: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used))
Electronics: DAE4 Sn1319; Calibrated: 2014-09-09
Phantom: SAR2 - TFP ; Type: QD 000 P51 CA; Serial: TP - 1130/2
Measurement SW: DASY52, Version 52.8 (8)

Fast SAR of Combined Scans: SAR(1 g) = 0.826 W/kg; SAR(10 g) = 0.541 W/kg

Maximum value of SAR (interpolated) = 0.955 W/kg



Note: LTE2500(Band7) result was scaled by a factor of 1.02 and WLAN2450 b-mode result was scaled by a factor of 1.33 before combining in SEMCAD SW

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APPENDIX C: DIELECTRIC PARAMETERS OF THE TISSUE SIMULANTS

Head tissue simulant dielectric parameters used in the measurements:

f (MHz)	GSM850	Dielectric Parameters					
	Date	CH 128 824.2 MHz		CH 190 836.6 MHz		CH 251 848.8 MHz	
		e_r	s [S/m]	e_r	s [S/m]	e_r	s [S/m]
836	2015-07-27	41.1	0.88	41.0	0.89	40.8	0.91
	2015-07-28	41.5	0.88	41.3	0.90	41.2	0.91
	2015-08-18	40.8	0.88	40.6	0.90	40.5	0.91
f (MHz)	WCDMA850 (Band 5)	Dielectric Parameters					
	Date	CH 4132 826.4 MHz		CH 4175 835.0 MHz		CH 4233 846.6 MHz	
		e_r	s [S/m]	e_r	s [S/m]	e_r	s [S/m]
835	2015-07-27	41.1	0.89	41.0	0.89	40.9	0.90
	2015-07-28	41.4	0.89	41.3	0.90	41.2	0.91
f (MHz)	GSM1900	Dielectric Parameters					
	Date	CH 512 1850.2 MHz		CH 661 1880.0 MHz		CH 810 1909.8 MHz	
		e_r	s [S/m]	e_r	s [S/m]	e_r	s [S/m]
1880	2015-07-31	40.7	1.31	40.5	1.34	40.4	1.36
	2015-08-18	39.3	1.32	39.1	1.35	39.1	1.38
f (MHz)	WLAN2450	Dielectric Parameters					
	Date	CH 1 2412.0 MHz		CH 6 2437.0 MHz		CH 11 2462.0 MHz	
		e_r	s [S/m]	e_r	s [S/m]	e_r	s [S/m]
2437	2015-07-29	40.2	1.82	40.1	1.84	40.0	1.87
	2015-08-10	39.0	1.82	38.9	1.85	38.8	1.87
f (MHz)	LTE2500 (Band 7)	Dielectric Parameters					
	Date	CH 20850 2510.0 MHz		CH 21100 2535.0 MHz		CH 21350 2560.0 MHz	
		e_r	s [S/m]	e_r	s [S/m]	e_r	s [S/m]
2535	2015-09-22	37.4	1.85	37.3	1.88	37.3	1.90
	2015-09-23	37.9	1.86	37.9	1.89	37.8	1.91

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Body tissue simulant dielectric parameters used in the measurements:

f (MHz)	GSM850	Dielectric Parameters					
	Date	CH 128 824.2 MHz		CH 190 836.6 MHz		CH 251 848.8 MHz	
		e_r	s [S/m]	e_r	s [S/m]	e_r	s [S/m]
836	2015-08-04	53.6	0.93	53.4	0.94	53.3	0.95
f (MHz)	WCDMA850 (Band 5)	Dielectric Parameters					
	Date	CH 4132 826.4 MHz		CH 4175 835.0 MHz		CH 4233 846.6 MHz	
		e_r	s [S/m]	e_r	s [S/m]	e_r	s [S/m]
835	2015-08-05	54.0	0.93	53.9	0.94	53.8	0.95
f (MHz)	GSM1900	Dielectric Parameters					
	Date	CH 512 1850.2 MHz		CH 661 1880.0 MHz		CH 810 1909.8 MHz	
		e_r	s [S/m]	e_r	s [S/m]	e_r	s [S/m]
1880	2015-08-03	53.3	1.46	53.2	1.49	53.1	1.52
f (MHz)	WLAN2450	Dielectric Parameters					
	Date	CH 1 2412.0 MHz		CH 6 2437.0 MHz		CH 11 2462.0 MHz	
		e_r	s [S/m]	e_r	s [S/m]	e_r	s [S/m]
2437	2015-07-29	52.3	1.96	52.2	1.99	52.2	2.02
f (MHz)	LTE2500 (Band 7)	Dielectric Parameters					
	Date	CH 20850 2510.0 MHz		CH 21100 2535.0 MHz		CH 21350 2560.0 MHz	
		e_r	s [S/m]	e_r	s [S/m]	e_r	s [S/m]
2535	2015-07-30	52.0	2.11	52.0	2.14	51.9	2.17
	2015-07-31	51.9	2.10	51.8	2.13	51.7	2.16
	2015-09-23	51.0	2.00	51.0	2.03	50.9	2.05

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APPENDIX D: RELEVANT PAGES FROM PROBE CALIBRATION REPORTS

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

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

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

Accreditation No.: SCS 108

Client TCC Microsoft Beijing

Certificate No: EX3-3839_Sep14

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3839

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

Calibration date: September 15, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

Issued: September 15, 2014

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3839

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.48	0.44	0.44	± 10.1 %
DCP (mV)[B]	98.7	98.6	100.0	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB$\sqrt{\mu V}$	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	136.4	±3.0 %
		Y	0.0	0.0	1.0		129.1	
		Z	0.0	0.0	1.0		146.1	

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3839

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
835	41.5	0.90	8.88	8.88	8.88	0.39	0.92	± 12.0 %
1750	40.1	1.37	7.62	7.62	7.62	0.76	0.56	± 12.0 %
1900	40.0	1.40	7.39	7.39	7.39	0.67	0.62	± 12.0 %
5200	36.0	4.66	5.06	5.06	5.06	0.35	1.80	± 13.1 %
5300	35.9	4.76	4.82	4.82	4.82	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.58	4.58	4.58	0.35	1.80	± 13.1 %
5600	35.5	5.07	4.47	4.47	4.47	0.35	1.80	± 13.1 %
5800	35.3	5.27	4.52	4.52	4.52	0.40	1.80	± 13.1 %

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

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3839

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
835	55.2	0.97	8.84	8.84	8.84	0.34	0.96	± 12.0 %
1750	53.4	1.49	7.44	7.44	7.44	0.50	0.75	± 12.0 %
1900	53.3	1.52	7.03	7.03	7.03	0.24	1.07	± 12.0 %
5200	49.0	5.30	4.28	4.28	4.28	0.40	1.90	± 13.1 %
5300	48.9	5.42	4.09	4.09	4.09	0.40	1.90	± 13.1 %
5500	48.6	5.65	3.90	3.90	3.90	0.45	1.90	± 13.1 %
5600	48.5	5.77	3.76	3.76	3.76	0.45	1.90	± 13.1 %
5800	48.2	6.00	4.09	4.09	4.09	0.50	1.90	± 13.1 %

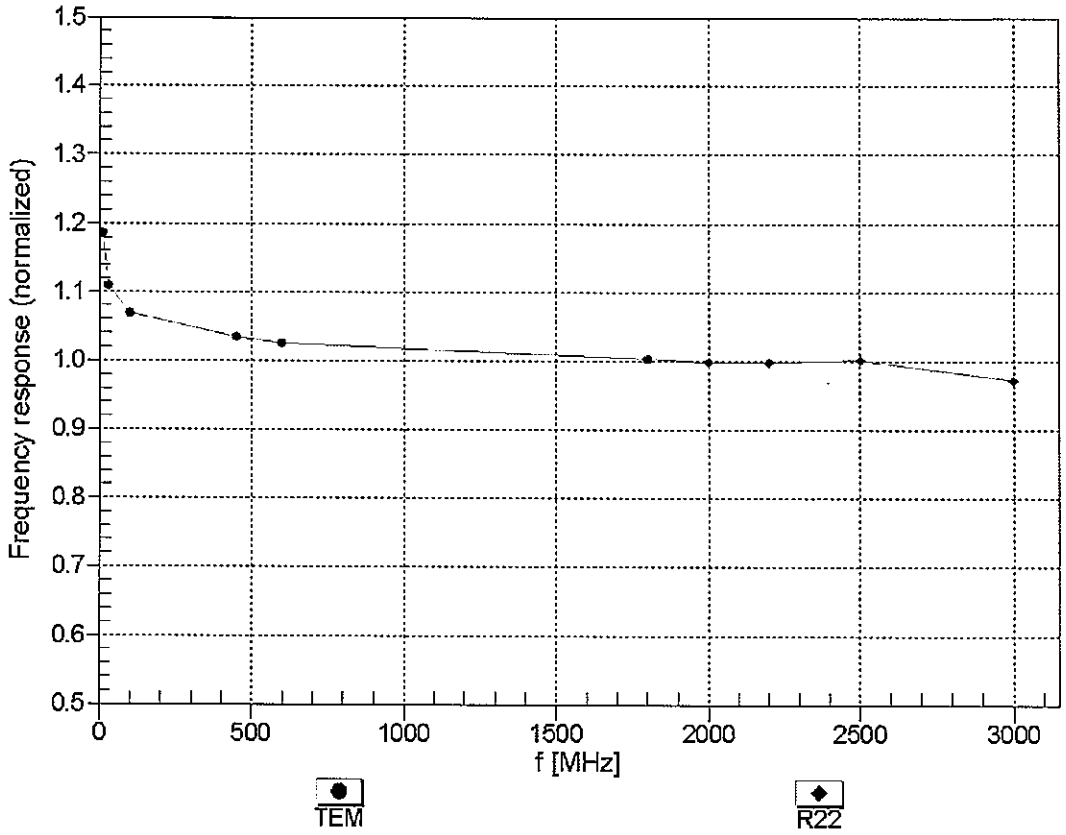
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz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

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

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

Frequency Response of E-Field

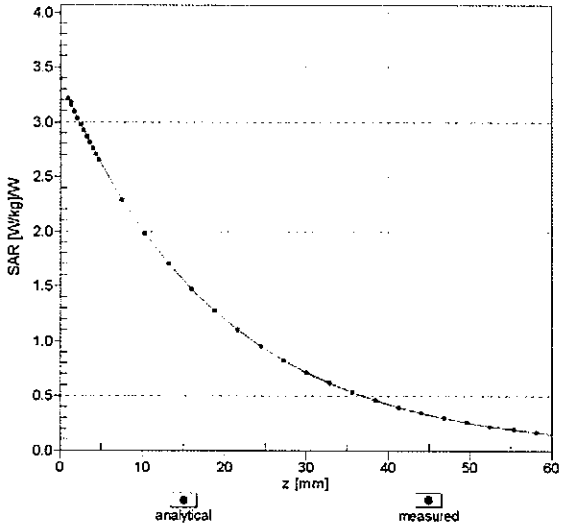
(TEM-Cell:ifi110 EXX, Waveguide: R22)



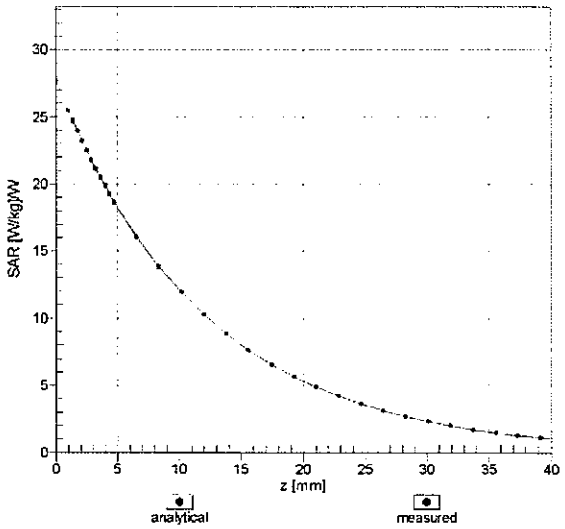
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

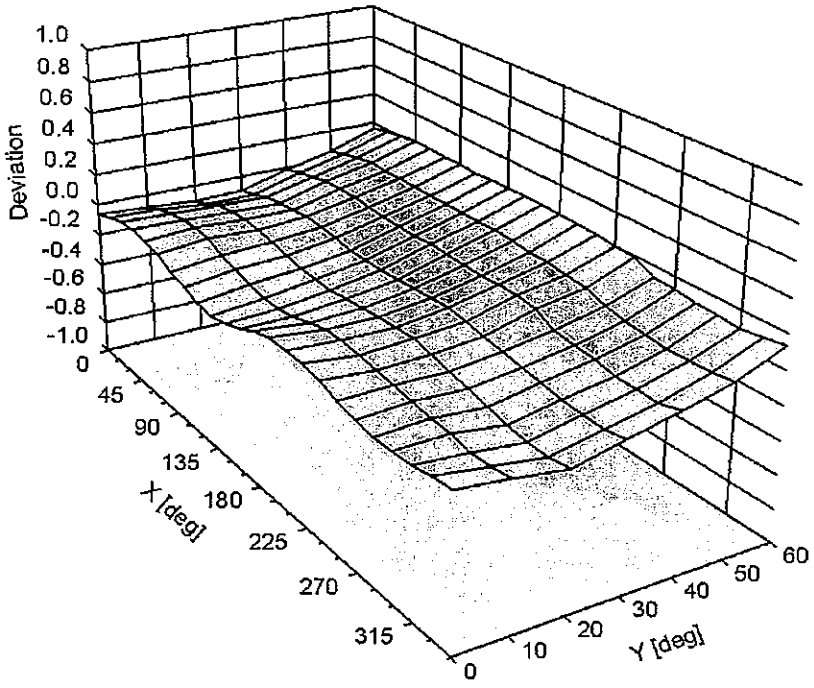


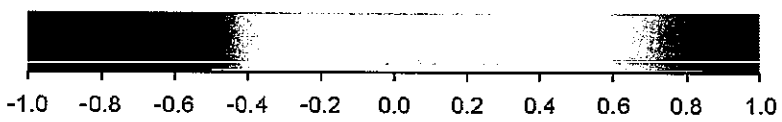
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3839

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	2.6
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

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Swiss Calibration Service

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

Accreditation No.: SCS 108

Client TCC Microsoft Beijing

Certificate No: EX3-3823_Sep14

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3823

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

Calibration date: September 10, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

Issued: September 11, 2014

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3823

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.41	0.36	0.47	± 10.1 %
DCP (mV)[B]	101.2	100.2	98.8	

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	160.0	±3.3 %
		Y	0.0	0.0	1.0		158.6	
		Z	0.0	0.0	1.0		151.9	

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3823

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
835	41.5	0.90	9.08	9.08	9.08	0.28	1.06	± 12.0 %
1750	40.1	1.37	7.87	7.87	7.87	0.41	0.75	± 12.0 %
1900	40.0	1.40	7.63	7.63	7.63	0.31	0.88	± 12.0 %
1950	40.0	1.40	7.46	7.46	7.46	0.47	0.71	± 12.0 %
2300	39.5	1.67	7.32	7.32	7.32	0.38	0.77	± 12.0 %
2450	39.2	1.80	6.95	6.95	6.95	0.41	0.75	± 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: EX3DV4 - SN:3823

Calibration Parameter Determined in Body Tissue Simulating Media

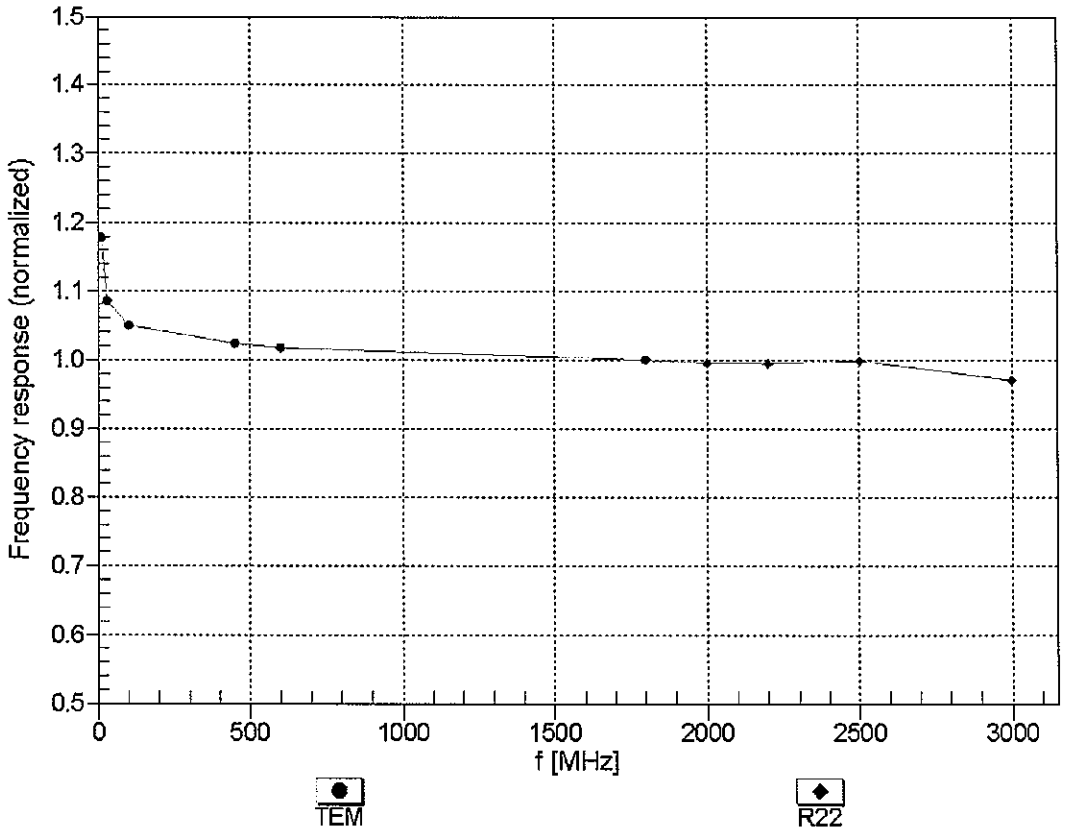
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
835	55.2	0.97	9.05	9.05	9.05	0.24	1.18	± 12.0 %
1750	53.4	1.49	7.54	7.54	7.54	0.43	0.75	± 12.0 %
1900	53.3	1.52	7.28	7.28	7.28	0.69	0.64	± 12.0 %
2450	52.7	1.95	6.95	6.95	6.95	0.80	0.50	± 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.

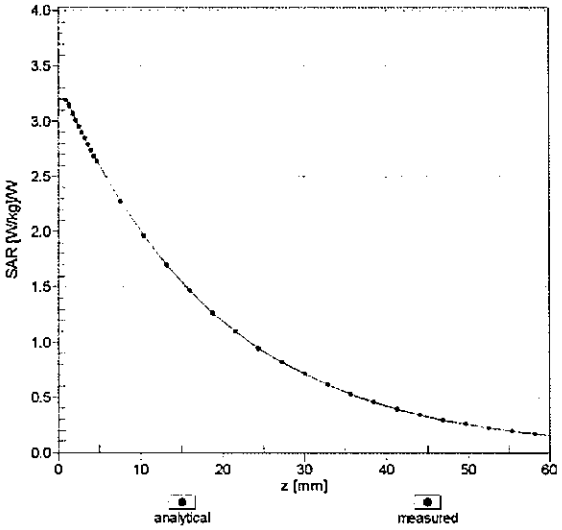
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



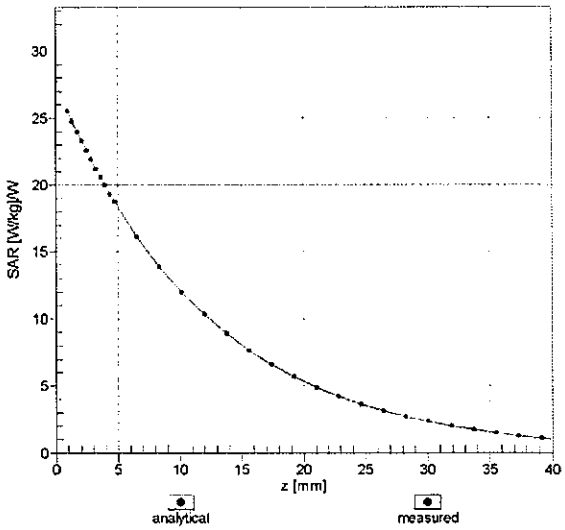
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

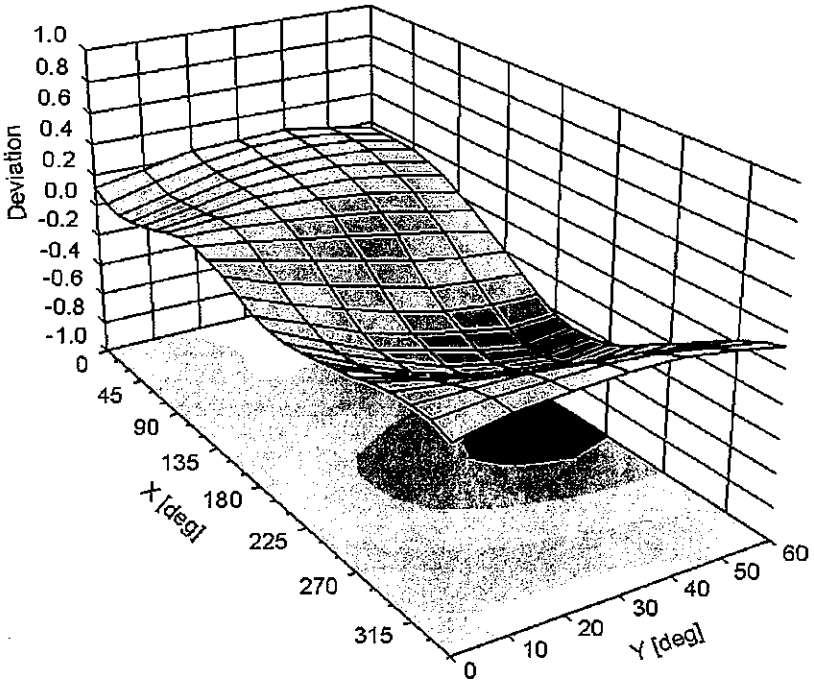


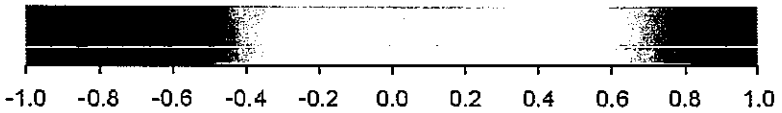
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3823

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-11.7
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

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Accreditation No.: SCS 108

Client TCC Microsoft Beijing

Certificate No: EX3-3574_Sep14

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3574

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

Calibration date: September 24, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

Issued: September 25, 2014

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3574

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.42	0.46	0.53	± 10.1 %
DCP (mV)[B]	99.7	95.2	96.3	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB$\sqrt{\mu V}$	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	131.8	±3.3 %
		Y	0.0	0.0	1.0		129.8	
		Z	0.0	0.0	1.0		137.5	

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3574

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
750	41.9	0.89	10.39	10.39	10.39	0.63	0.69	± 12.0 %
835	41.5	0.90	10.12	10.12	10.12	0.80	0.58	± 12.0 %
1750	40.1	1.37	8.19	8.19	8.19	0.43	0.90	± 12.0 %
1900	40.0	1.40	7.83	7.83	7.83	0.44	0.84	± 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: EX3DV4 - SN:3574

Calibration Parameter Determined in Body Tissue Simulating Media

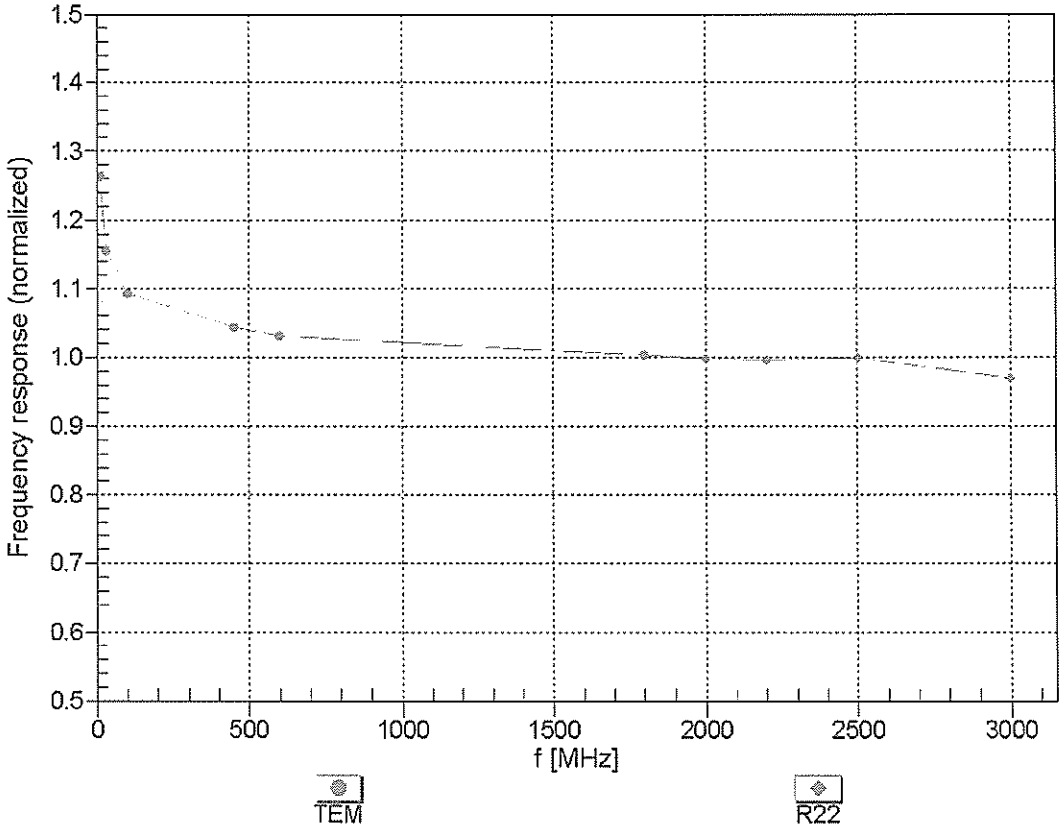
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
750	55.5	0.96	9.68	9.68	9.68	0.27	1.15	± 12.0 %
835	55.2	0.97	9.61	9.61	9.61	0.66	0.68	± 12.0 %
1750	53.4	1.49	7.78	7.78	7.78	0.39	0.85	± 12.0 %
1900	53.3	1.52	7.41	7.41	7.41	0.51	0.72	± 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.

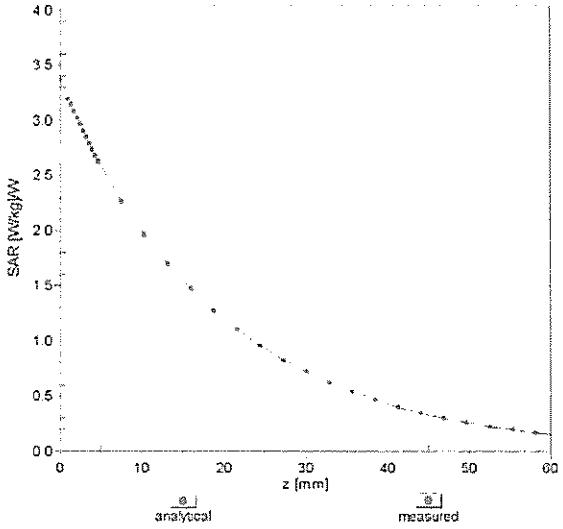
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



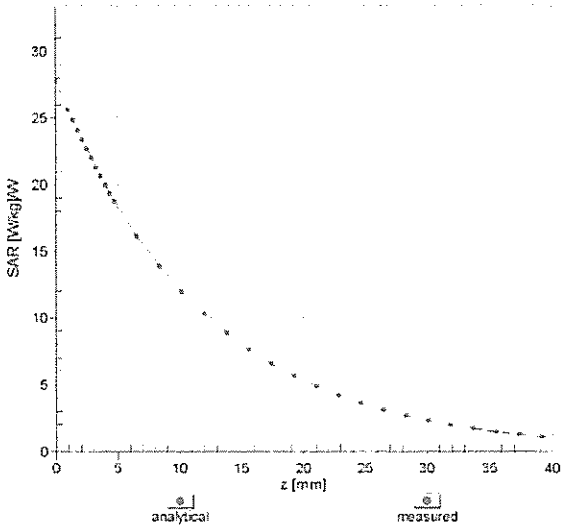
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

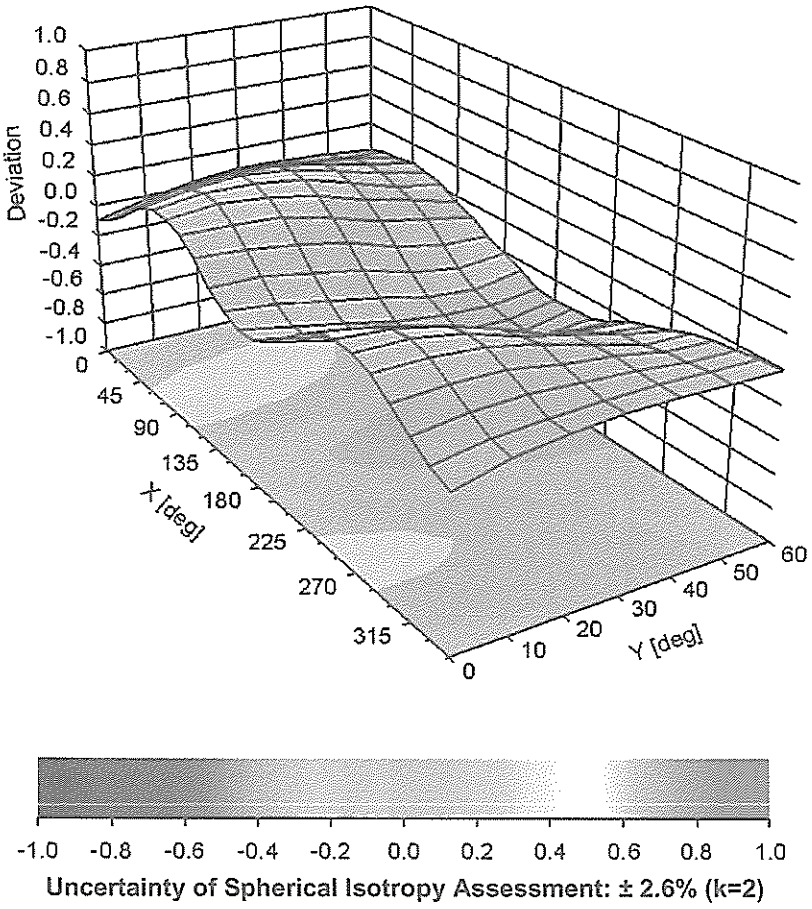


f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3574

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	22.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

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Accreditation No.: SCS 108

Client **TCC Microsoft Beijing**

Certificate No: EX3-3837_Sep14

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3837

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

Calibration date: September 10, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

Issued: September 11, 2014

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3837

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.47	0.47	0.25	± 10.1 %
DCP (mV)[B]	98.4	94.7	93.5	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	134.2	±3.5 %
		Y	0.0	0.0	1.0		132.8	
		Z	0.0	0.0	1.0		136.7	

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3837

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
835	41.5	0.90	9.06	9.06	9.06	0.74	0.61	± 12.0 %
1750	40.1	1.37	7.90	7.90	7.90	0.60	0.64	± 12.0 %
1900	40.0	1.40	7.69	7.69	7.69	0.48	0.71	± 12.0 %
2450	39.2	1.80	7.02	7.02	7.02	0.35	0.85	± 12.0 %
2600	39.0	1.96	6.91	6.91	6.91	0.32	0.92	± 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: EX3DV4 - SN:3837

Calibration Parameter Determined in Body Tissue Simulating Media

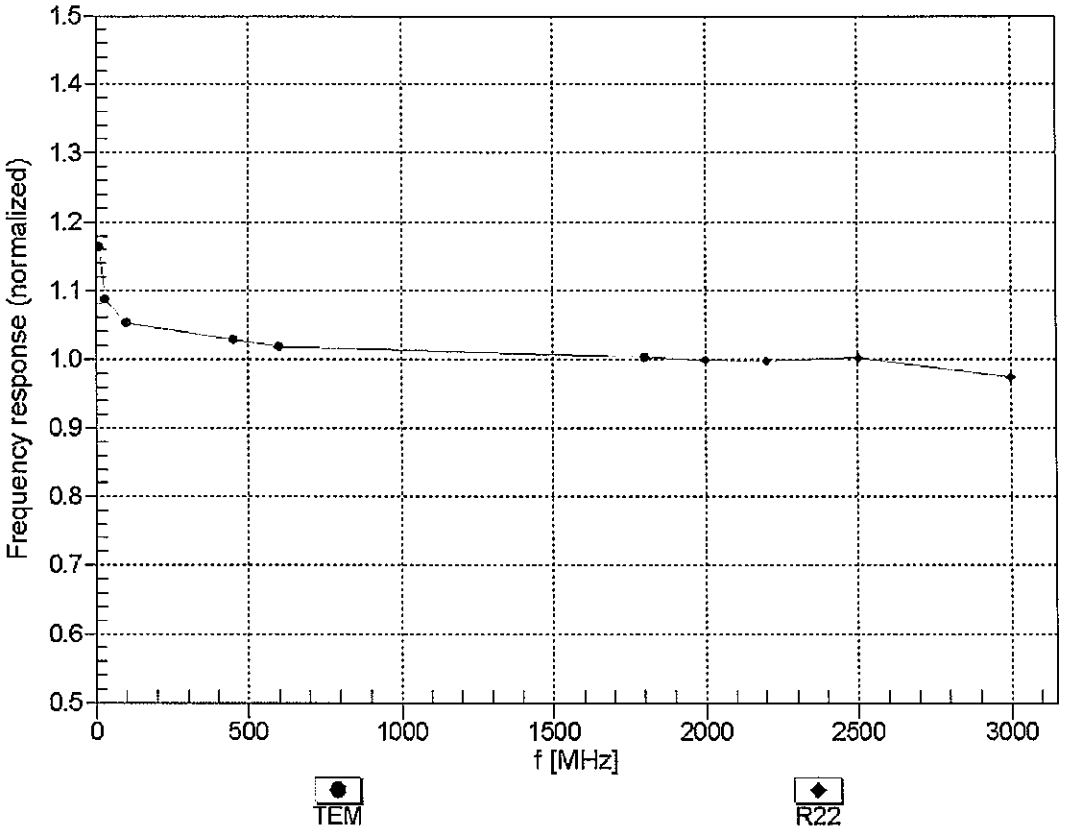
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
835	55.2	0.97	9.10	9.10	9.10	0.80	0.61	± 12.0 %
1750	53.4	1.49	7.62	7.62	7.62	0.52	0.75	± 12.0 %
1900	53.3	1.52	7.32	7.32	7.32	0.70	0.63	± 12.0 %
2450	52.7	1.95	7.15	7.15	7.15	0.80	0.50	± 12.0 %
2600	52.5	2.16	7.00	7.00	7.00	0.80	0.56	± 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.

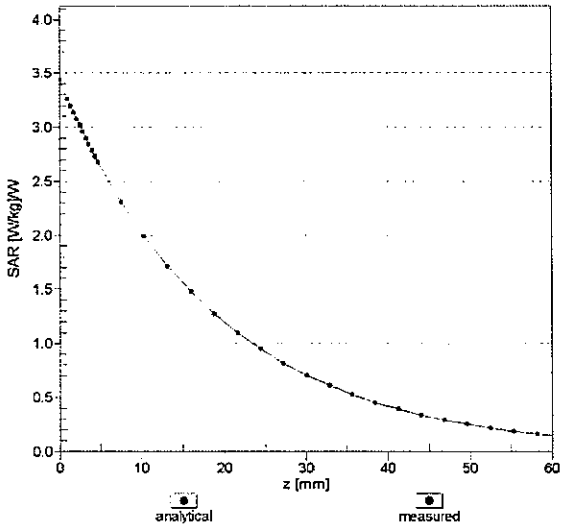
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



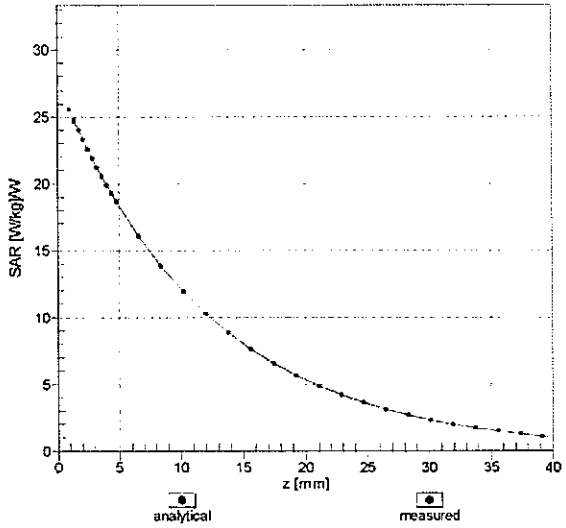
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

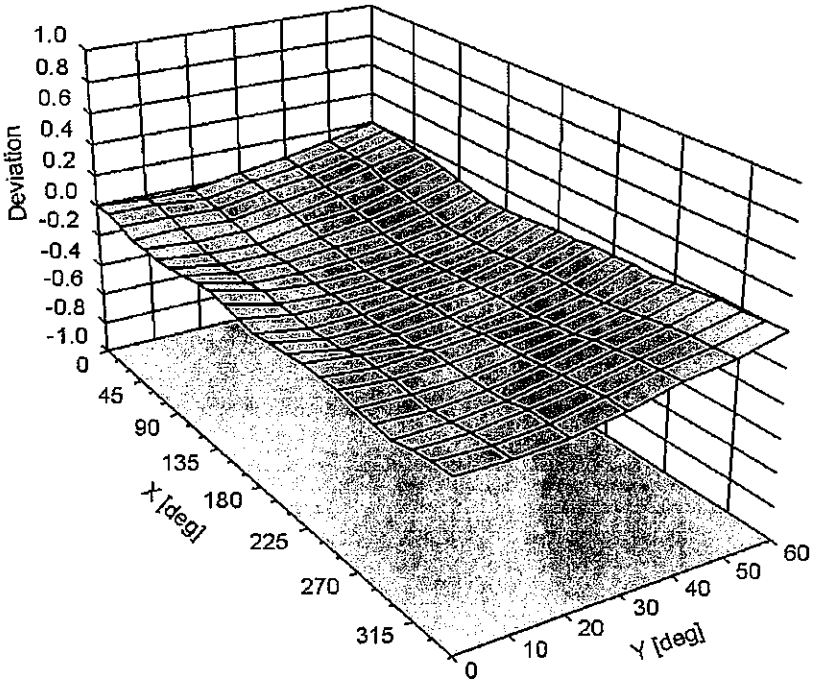


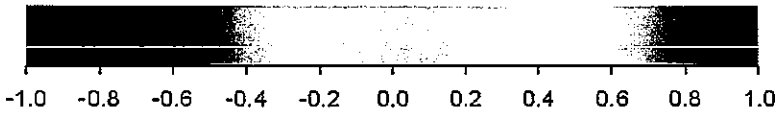
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3837

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-106.5
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Swiss Calibration Service

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

Accreditation No.: SCS 0108

Client **TCC Microsoft**

Certificate No: EX3-3892_Apr15

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3892

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

Calibration date: April 24, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	01-Apr-15 (No. 217-02128)	Mar-16
Power sensor E4412A	MY41498087	01-Apr-15 (No. 217-02128)	Mar-16
Reference 3 dB Attenuator	SN: S5054 (3c)	01-Apr-15 (No. 217-02129)	Mar-16
Reference 20 dB Attenuator	SN: S5277 (20x)	01-Apr-15 (No. 217-02132)	Mar-16
Reference 30 dB Attenuator	SN: S5129 (30b)	01-Apr-15 (No. 217-02133)	Mar-16
Reference Probe ES3DV2	SN: 3013	30-Dec-14 (No. ES3-3013_Dec14)	Dec-15
DAE4	SN: 660	14-Jan-15 (No. DAE4-660_Jan15)	Jan-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Israe Elnaouq	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 27, 2015

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DASY/EASY - Parameters of Probe: EX3DV4 - SN:3892

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
750	41.9	0.89	10.14	10.14	10.14	0.23	1.36	± 12.0 %
835	41.5	0.90	9.65	9.65	9.65	0.21	1.36	± 12.0 %
1750	40.1	1.37	8.13	8.13	8.13	0.35	0.80	± 12.0 %
1900	40.0	1.40	7.92	7.92	7.92	0.35	0.80	± 12.0 %
2300	39.5	1.67	7.47	7.47	7.47	0.21	1.14	± 12.0 %
2450	39.2	1.80	7.24	7.24	7.24	0.24	0.97	± 12.0 %
2600	39.0	1.96	7.13	7.13	7.13	0.35	0.95	± 12.0 %
5200	36.0	4.66	5.07	5.07	5.07	0.35	1.80	± 13.1 %
5300	35.9	4.76	4.84	4.84	4.84	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.78	4.78	4.78	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.60	4.60	4.60	0.40	1.80	± 13.1 %
5800	35.3	5.27	4.52	4.52	4.52	0.40	1.80	± 13.1 %

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

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3892

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
750	55.5	0.96	9.62	9.62	9.62	0.41	0.92	± 12.0 %
835	55.2	0.97	9.55	9.55	9.55	0.36	1.05	± 12.0 %
1750	53.4	1.49	7.90	7.90	7.90	0.29	0.96	± 12.0 %
1900	53.3	1.52	7.68	7.68	7.68	0.41	0.80	± 12.0 %
2300	52.9	1.81	7.44	7.44	7.44	0.37	0.85	± 12.0 %
2450	52.7	1.95	7.32	7.32	7.32	0.35	0.90	± 12.0 %
2600	52.5	2.16	7.04	7.04	7.04	0.35	0.90	± 12.0 %
5200	49.0	5.30	4.54	4.54	4.54	0.40	1.90	± 13.1 %
5300	48.9	5.42	4.33	4.33	4.33	0.40	1.90	± 13.1 %
5500	48.6	5.65	4.01	4.01	4.01	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.93	3.93	3.93	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.05	4.05	4.05	0.50	1.90	± 13.1 %

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

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

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

APPENDIX E: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORTS

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Accreditation No.: SCS 108

Client **Nokia Beijing TCC**

Certificate No: D835V2-4d005_Mar14

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d005
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	March 18, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

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

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

Issued: March 18, 2014

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.5 ± 6 %	0.94 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.32 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.56 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.06 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.0 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.40 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.31 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.56 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.09 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.0 Ω - 2.9 jΩ
Return Loss	- 29.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.3 Ω - 6.5 jΩ
Return Loss	- 22.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.395 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 11, 2003

DASY5 Validation Report for Head TSL

Date: 18.03.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d005

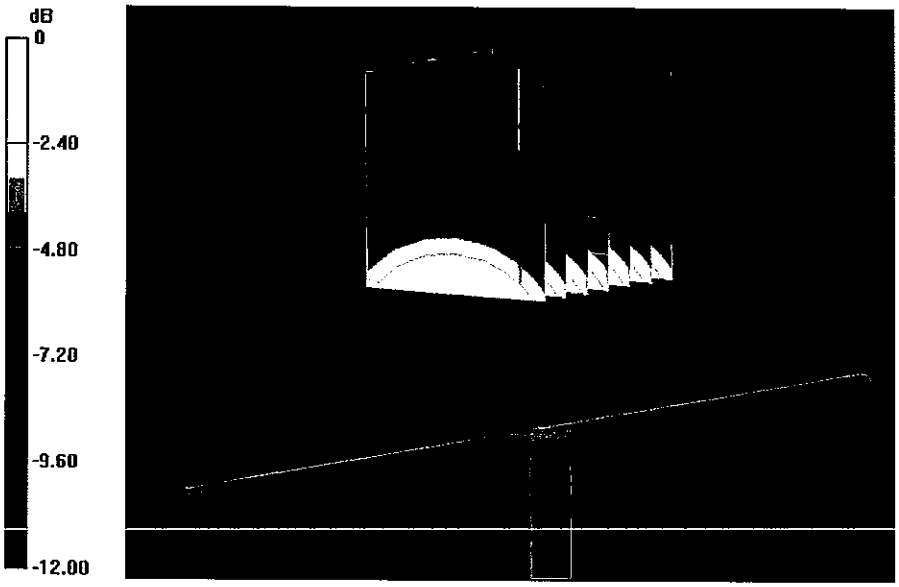
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.94 S/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.22, 6.22, 6.22); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

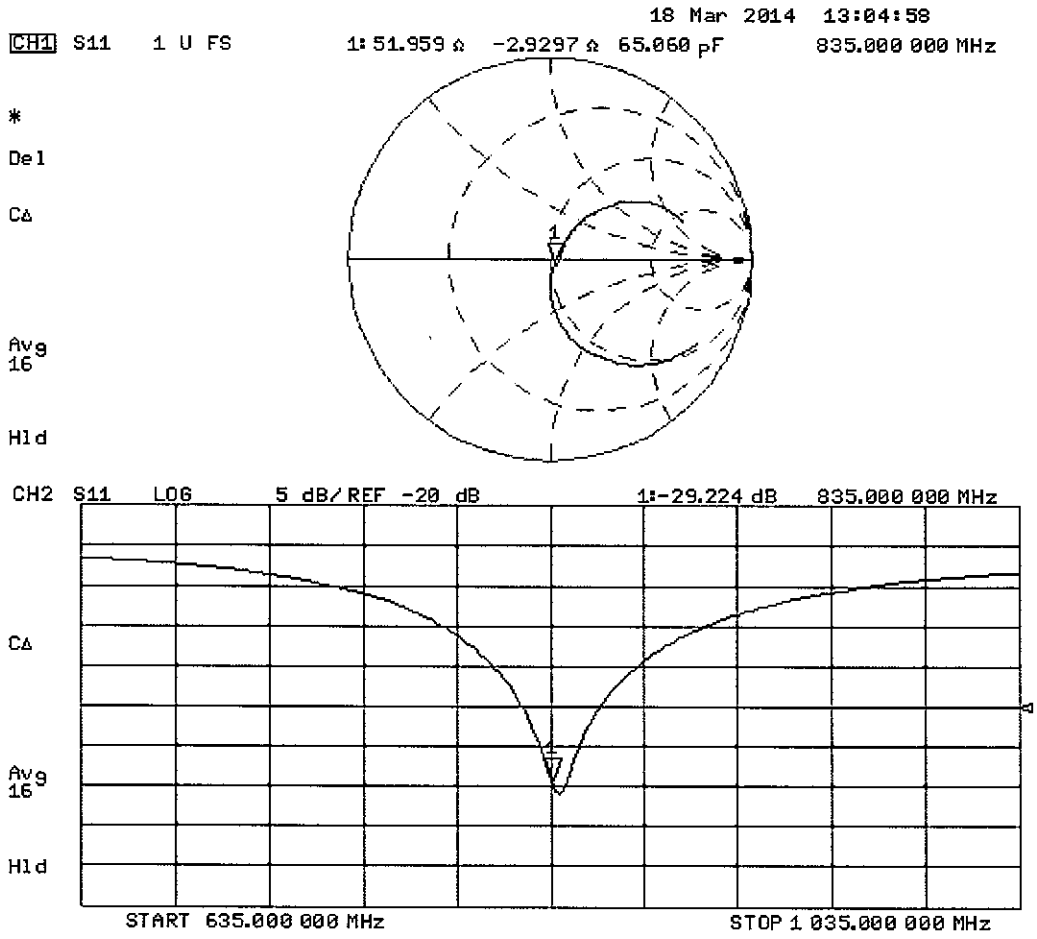
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.167 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 3.67 W/kg
SAR(1 g) = 2.42 W/kg; SAR(10 g) = 1.56 W/kg
Maximum value of SAR (measured) = 2.84 W/kg



0 dB = 2.84 W/kg = 4.53 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 14.03.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d005

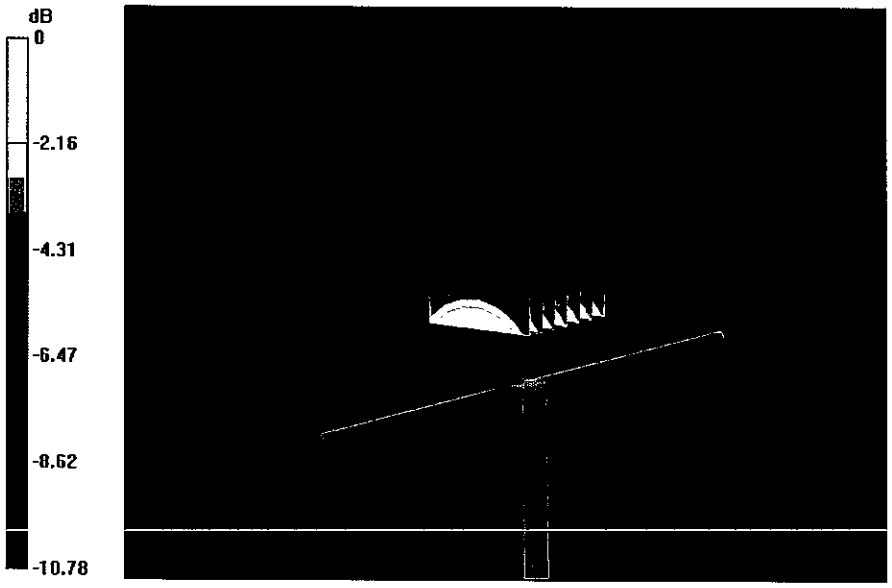
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.01 S/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.09, 6.09, 6.09); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

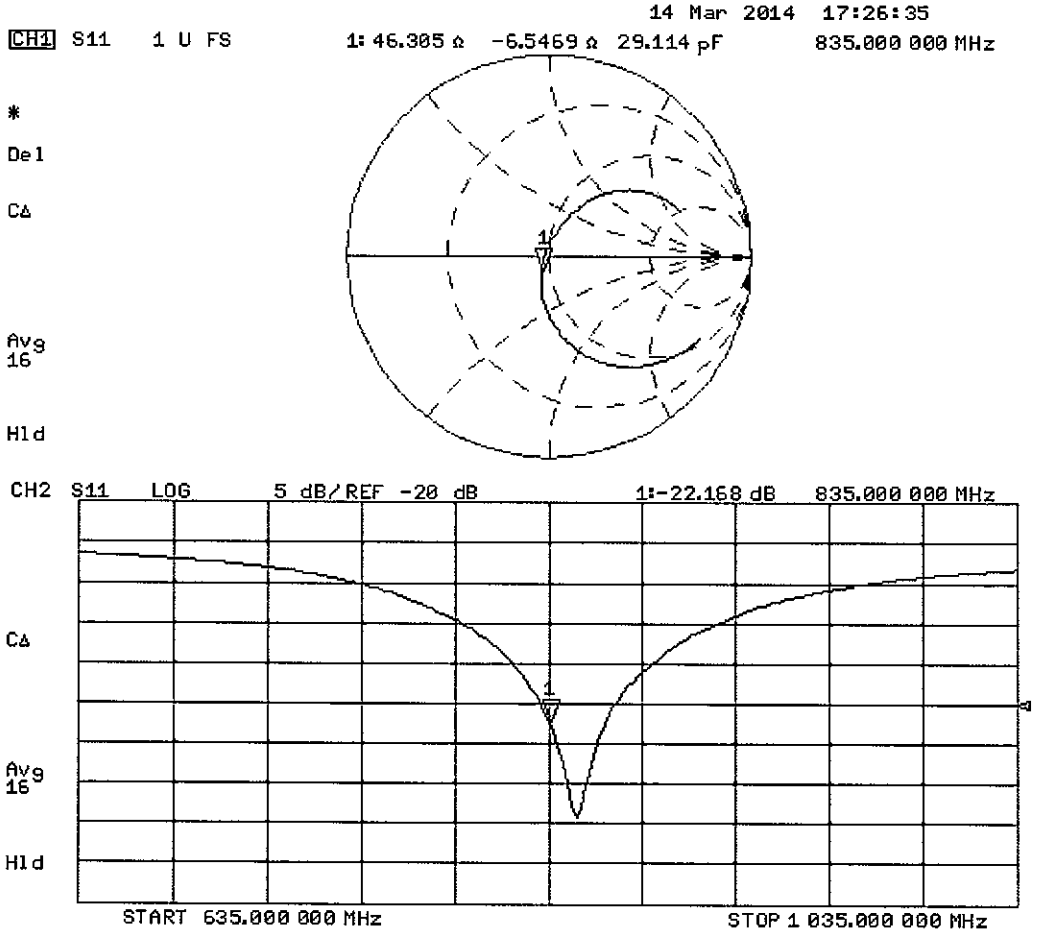
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.814 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 3.56 W/kg
SAR(1 g) = 2.4 W/kg; SAR(10 g) = 1.56 W/kg
Maximum value of SAR (measured) = 2.80 W/kg



0 dB = 2.80 W/kg = 4.47 dBW/kg

Impedance Measurement Plot for Body TSL



Dipole D835V2– SN: 4d005 Antenna Parameters measured: 2015-10-10.

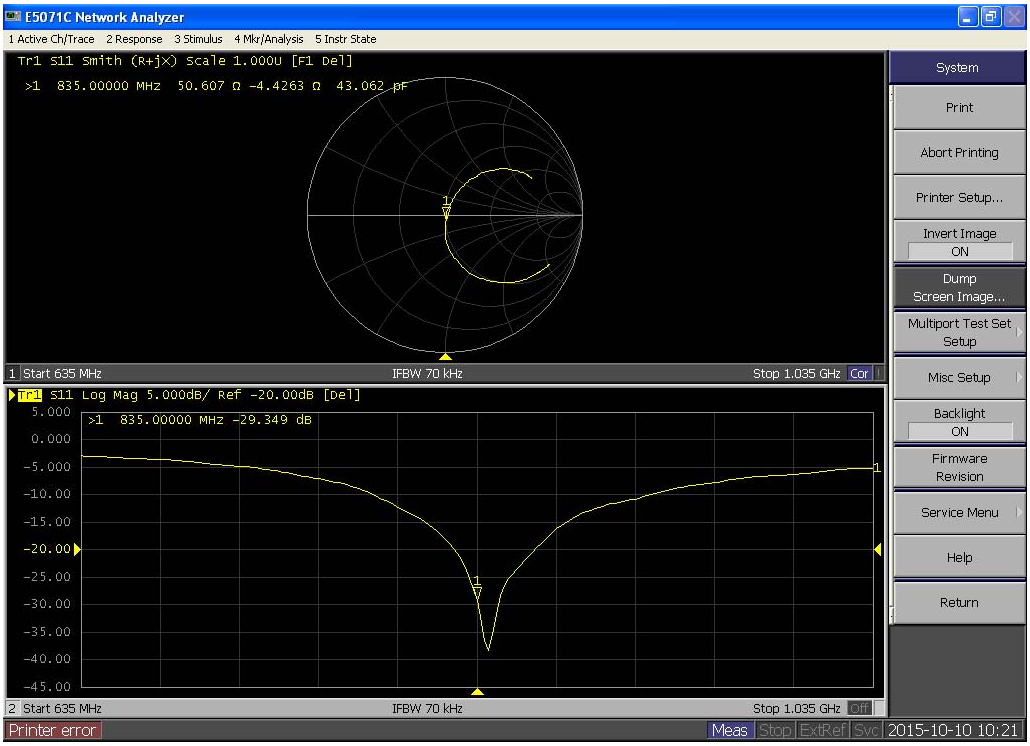
Antenna Parameters with Head TSL

	Calibration certificate	Annual measurement
Impedance, transformed to feed point	52.0 Ω - 2.9 jΩ	50.6 Ω - 4.4 jΩ
Return loss	-29.2 dB	-29.3 dB

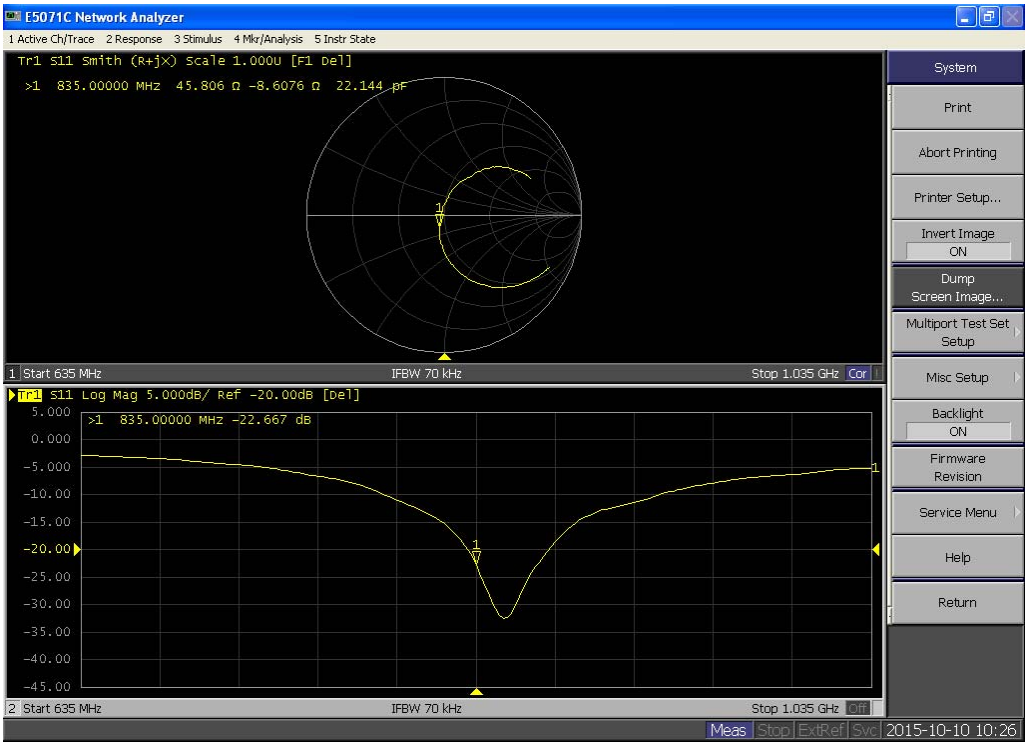
Antenna Parameters with Body TSL

	Calibration certificate	Annual measurement
Impedance, transformed to feed point	46.3 Ω - 6.5 jΩ	45.8 Ω - 8.6 jΩ
Return loss	-22.2 dB	-22.7 dB

Impedance Measurement Plot for Head TSL 835



Impedance Measurement Plot for Body TSL 835



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Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
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S Swiss Calibration Service

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Accreditation No.: SCS 108

Client **TCC Microsoft Beijing**

Certificate No: D1900V2-509_Sep14

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 509
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	September 11, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15

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

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

Issued: September 11, 2014

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.5 ± 6 %	1.37 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.92 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.18 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.9 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	52.6 ± 6 %	1.50 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	9.63 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**38.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.08 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.4 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	46.7 Ω - 5.0 jΩ
Return Loss	- 24.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	43.3 Ω - 4.7 jΩ
Return Loss	- 21.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.192 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	October 20, 1999

DASY5 Validation Report for Head TSL

Date: 11.09.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 509

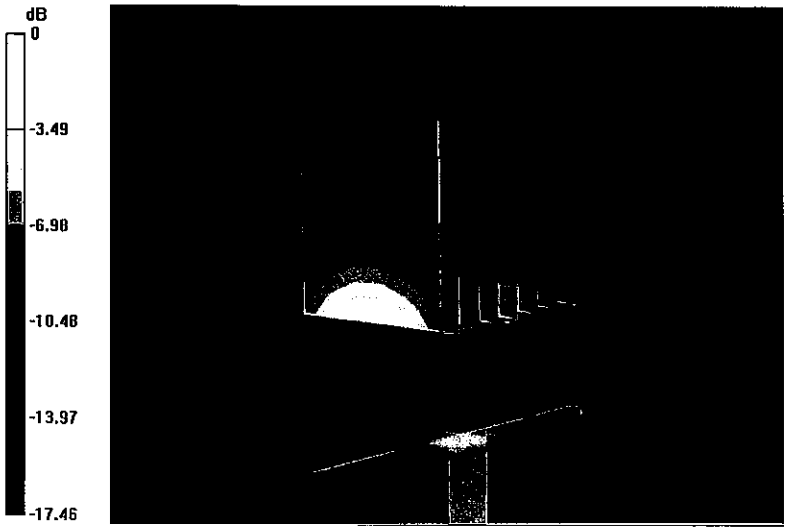
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.37 S/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.06, 5.06, 5.06); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

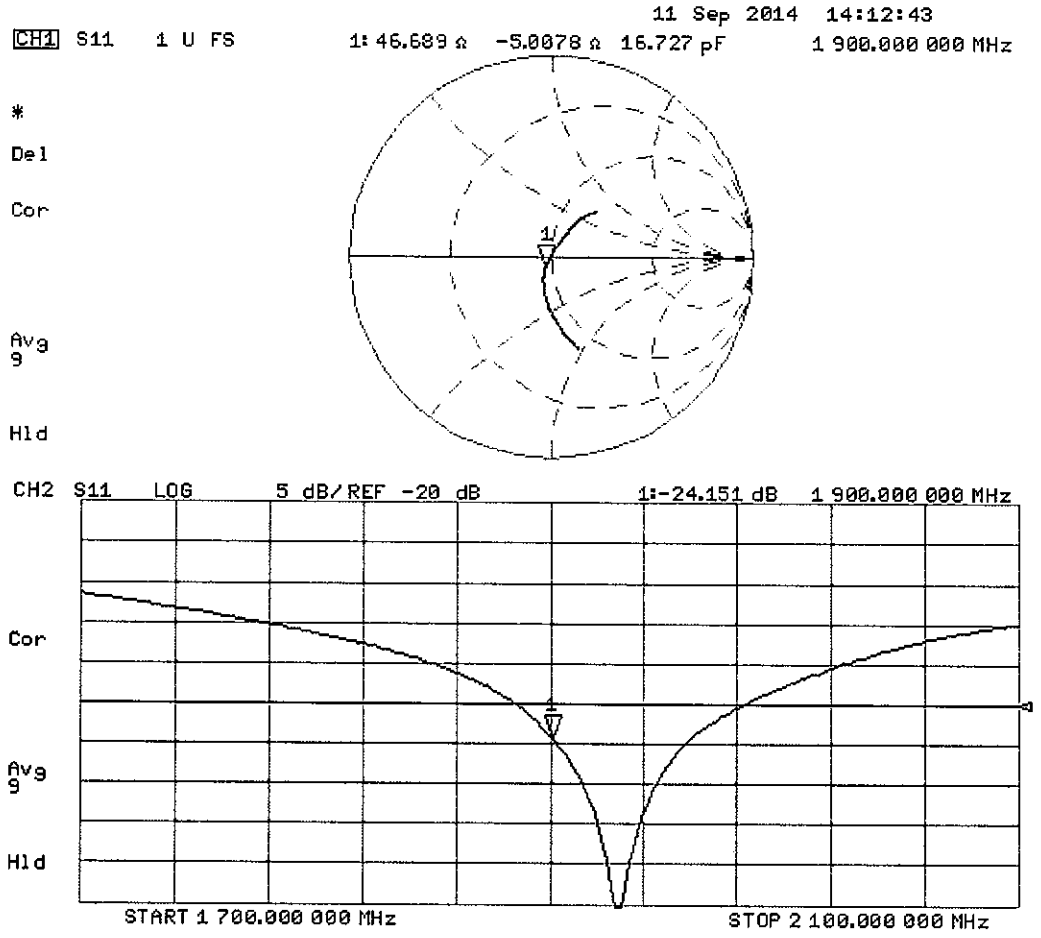
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.12 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 18.2 W/kg
SAR(1 g) = 9.92 W/kg; SAR(10 g) = 5.18 W/kg
Maximum value of SAR (measured) = 12.4 W/kg



0 dB = 12.4 W/kg = 10.93 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 11.09.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 509

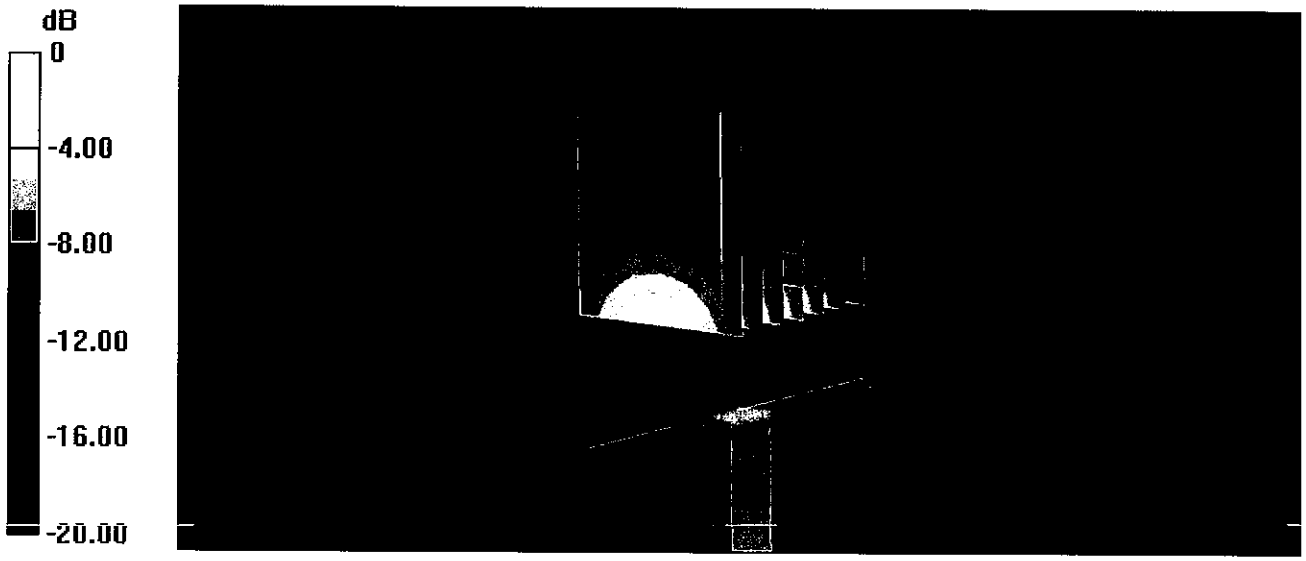
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.5 S/m; ε_r = 52.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.76, 4.76, 4.76); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

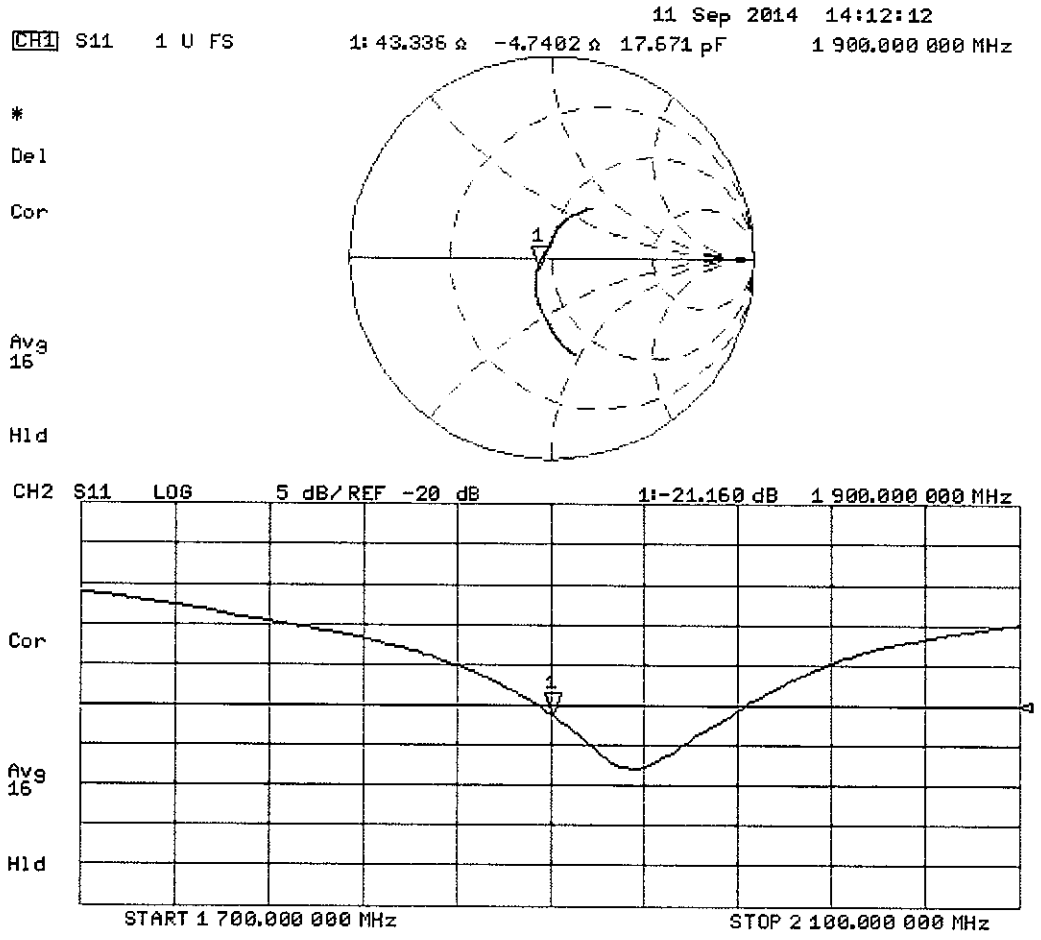
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.78 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 16.8 W/kg
SAR(1 g) = 9.63 W/kg; SAR(10 g) = 5.08 W/kg
Maximum value of SAR (measured) = 12.2 W/kg



0 dB = 12.2 W/kg = 10.86 dBW/kg

Impedance Measurement Plot for Body TSL



Dipole D1900V2– SN: 509 Antenna Parameters measured: 2015-10-10.

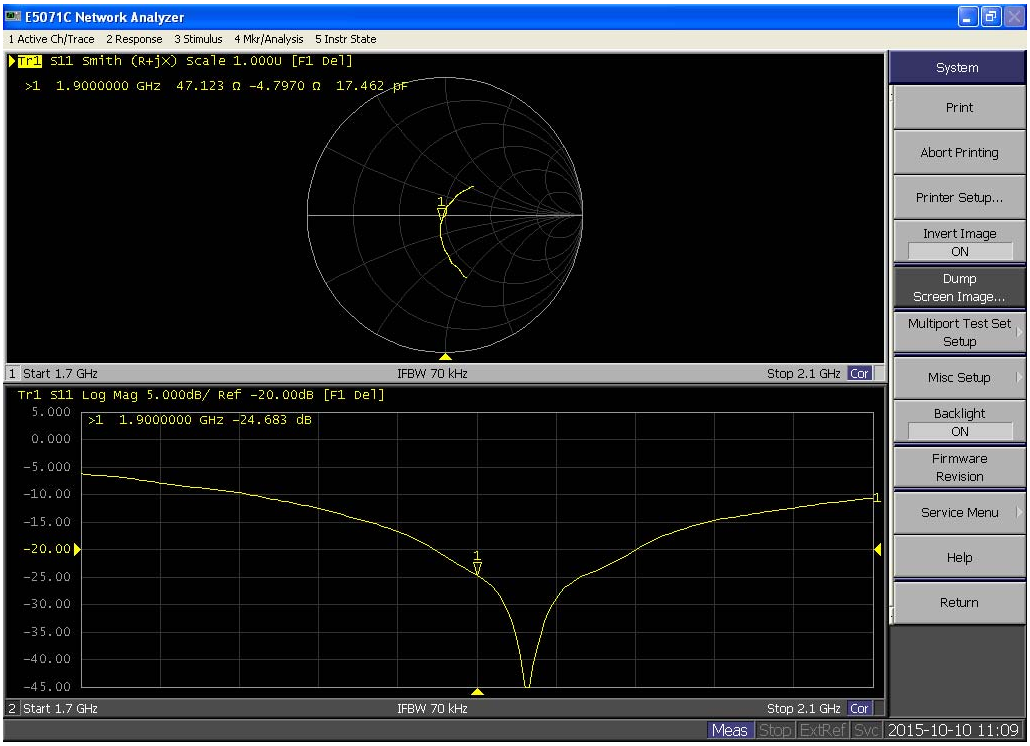
Antenna Parameters with Head TSL

	Calibration certificate	Annual measurement
Impedance, transformed to feed point	46.7 Ω - 5.0 jΩ	47.1 Ω - 4.8 jΩ
Return loss	-24.2 dB	-24.7 dB

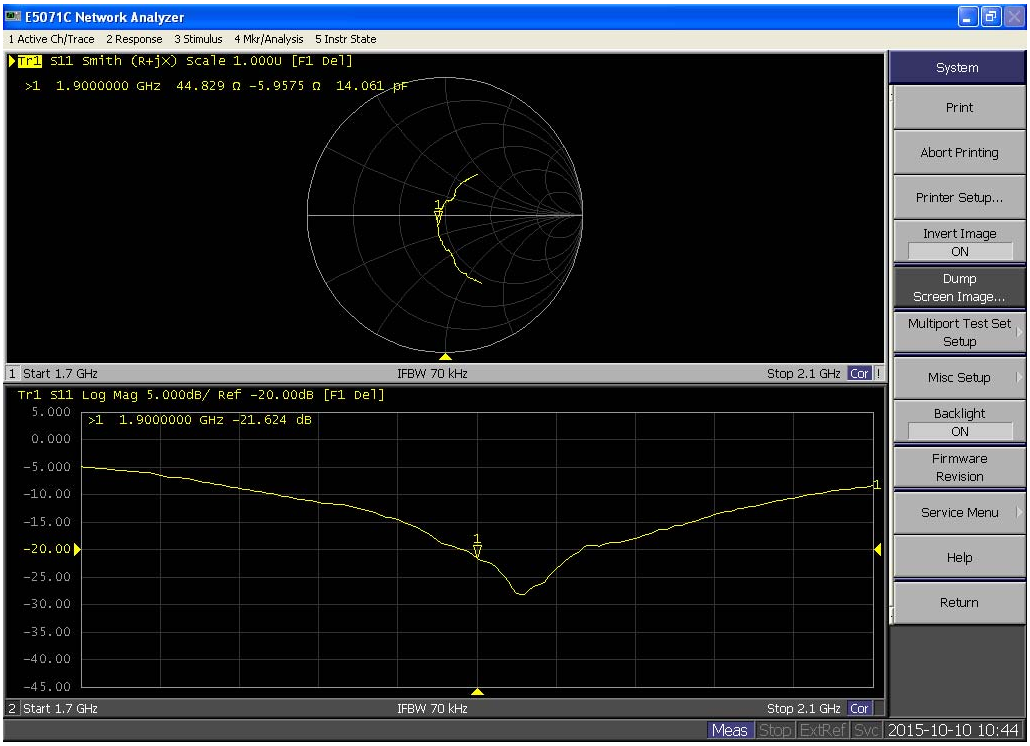
Antenna Parameters with Body TSL

	Calibration certificate	Annual measurement
Impedance, transformed to feed point	43.3 Ω - 4.7 jΩ	44.8 Ω - 6.0 jΩ
Return loss	-21.2 dB	-21.6 dB

Impedance Measurement Plot for Head TSL 1900



Impedance Measurement Plot for Body TSL 1900



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Accreditation No.: SCS 108

Client **Nokia Beijing TCC**

Certificate No: D2450V2-883_Mar14

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 883
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	March 12, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

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

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

Issued: March 12, 2014

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.2 ± 6 %	1.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**53.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.30 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.9 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	50.6 ± 6 %	2.02 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**51.0 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.03 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.7 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.1 Ω - 1.1 jΩ
Return Loss	- 27.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.5 Ω + 1.0 jΩ
Return Loss	- 38.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.167 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 06, 2011

DASY5 Validation Report for Head TSL

Date: 11.03.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 883

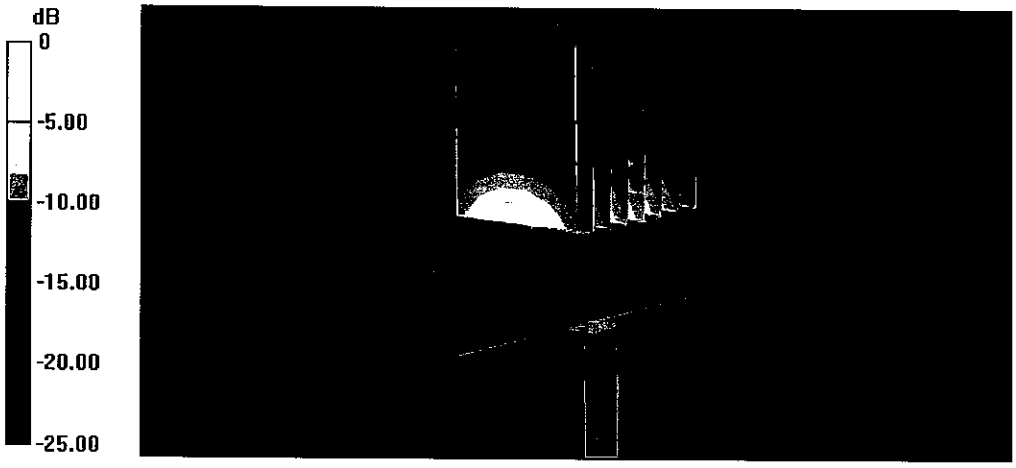
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.86 S/m; ε_r = 38.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

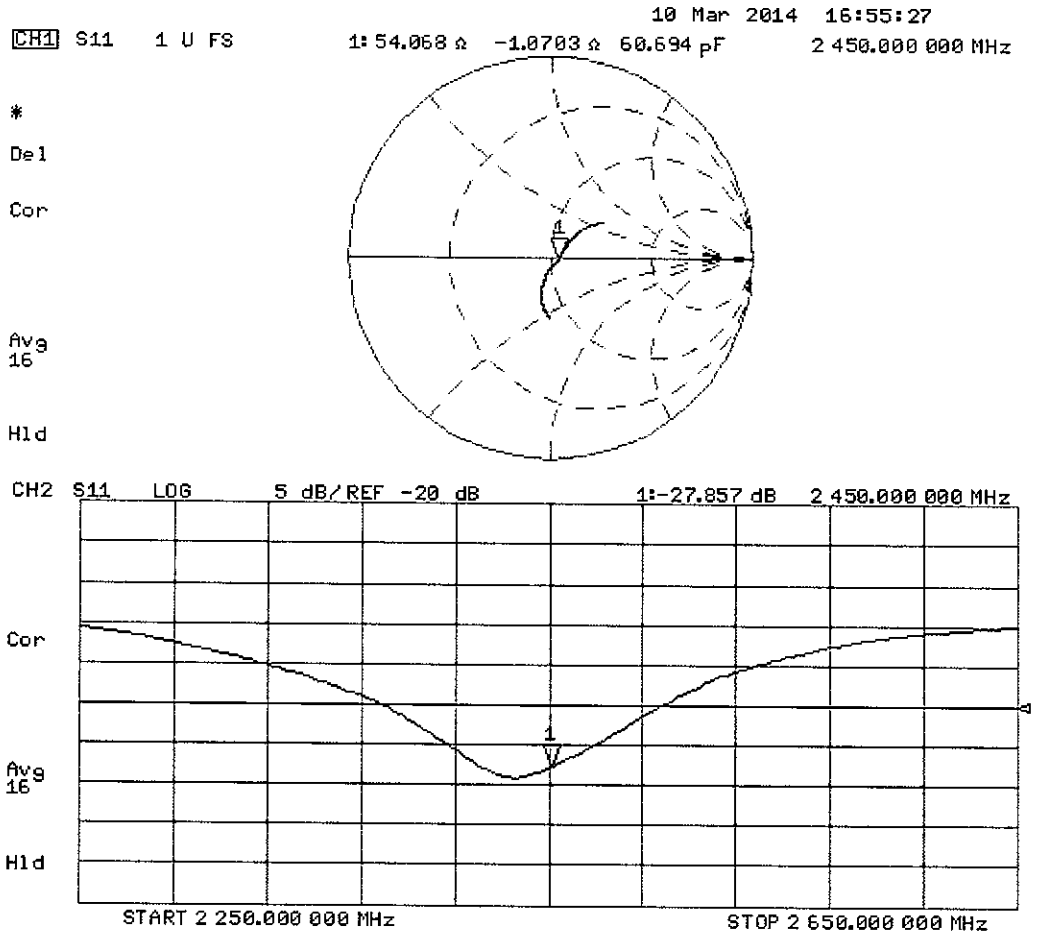
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 100.4 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 28.4 W/kg
SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.3 W/kg
Maximum value of SAR (measured) = 17.4 W/kg



0 dB = 17.4 W/kg = 12.41 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 12.03.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 883

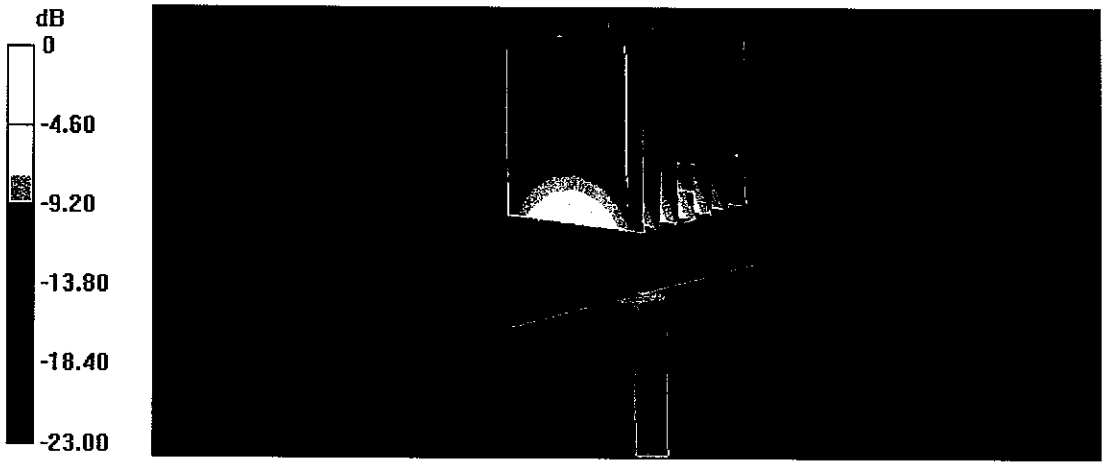
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.02 S/m; ε_r = 50.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.35, 4.35, 4.35); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

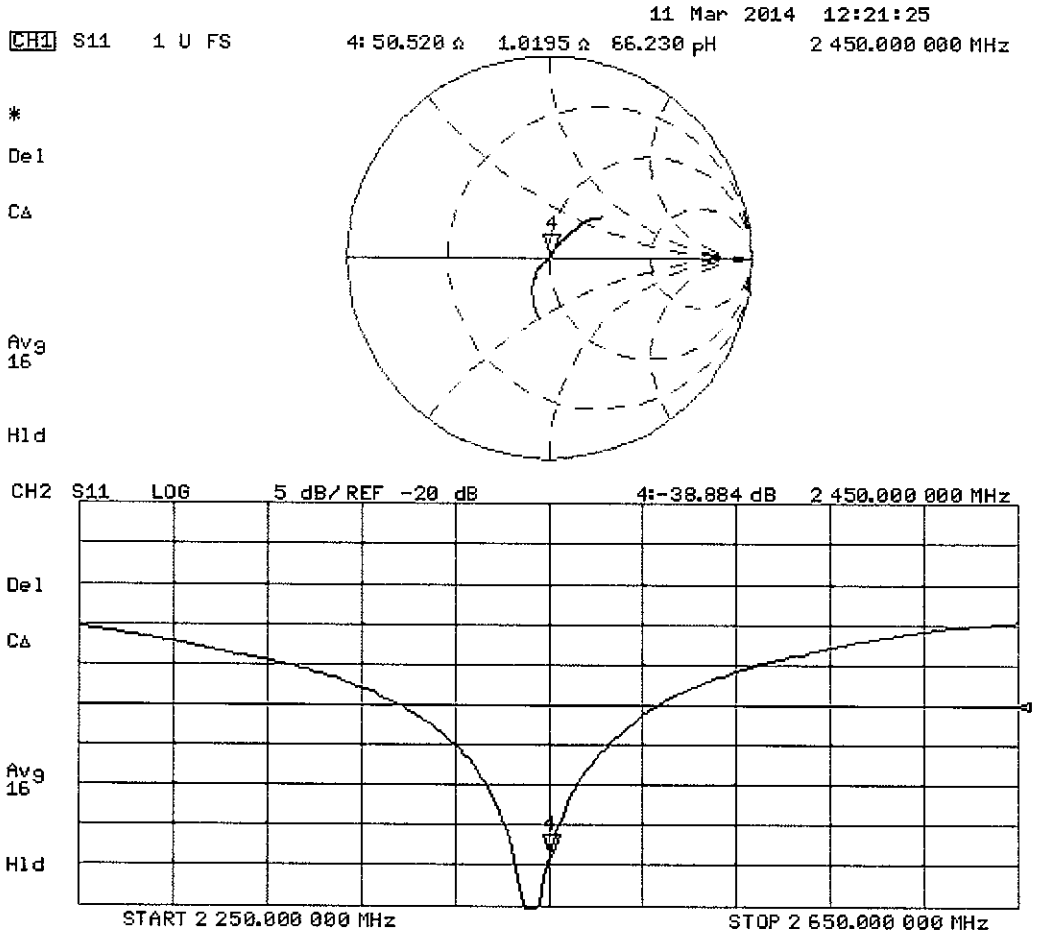
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.054 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 27.6 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.03 W/kg
Maximum value of SAR (measured) = 17.5 W/kg



0 dB = 17.5 W/kg = 12.43 dBW/kg

Impedance Measurement Plot for Body TSL



Dipole D2450V2– SN: 883 Antenna Parameters measured: 2015-10-10.

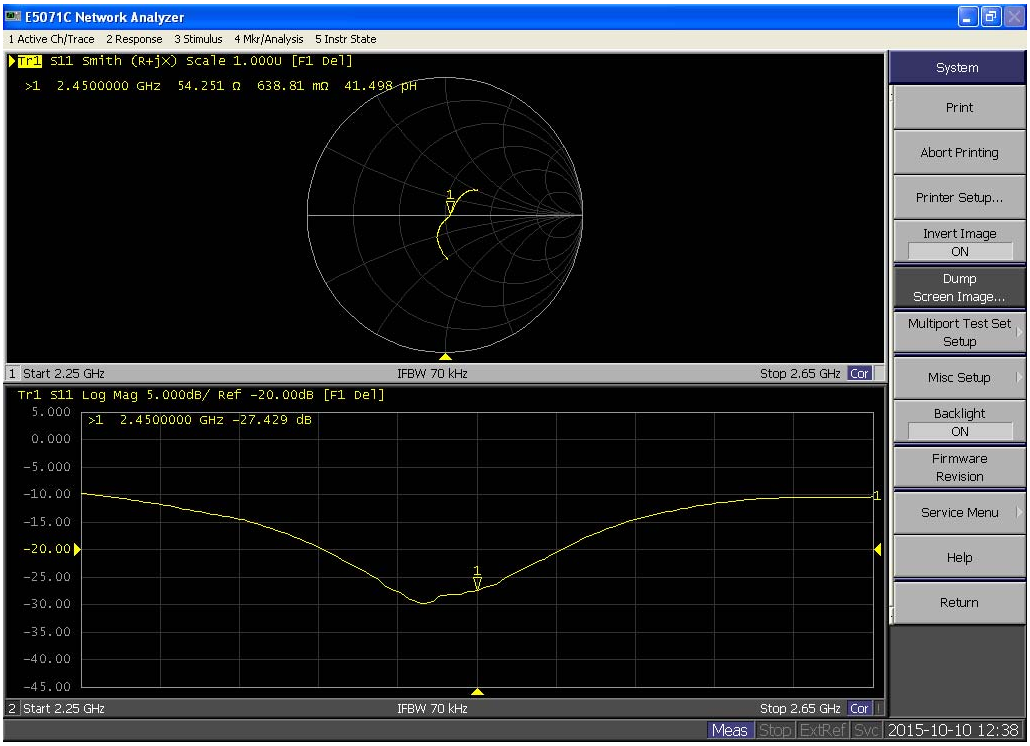
Antenna Parameters with Head TSL

	Calibration certificate	Annual measurement
Impedance, transformed to feed point	54.1 Ω - 1.1 jΩ	54.3 Ω + 0.6 jΩ
Return loss	-27.9 dB	-27.4 dB

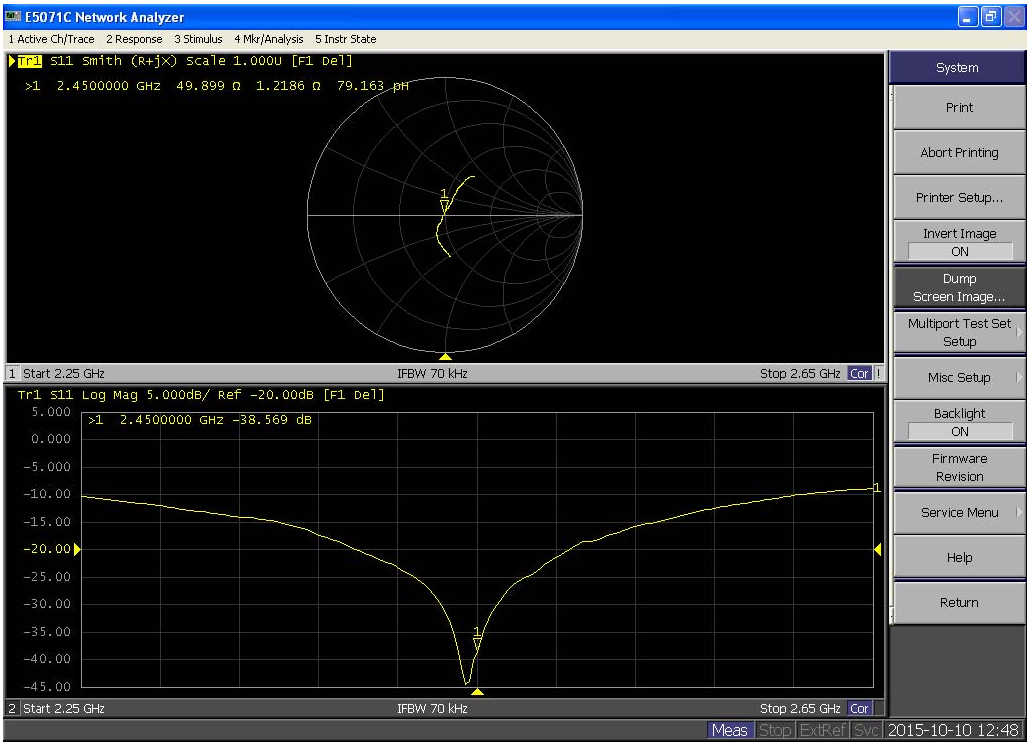
Antenna Parameters with Body TSL

	Calibration certificate	Annual measurement
Impedance, transformed to feed point	50.5 Ω + 1.0 jΩ	49.9 Ω + 1.2 jΩ
Return loss	-38.9 dB	-38.6 dB

Impedance Measurement Plot for Head TSL 2450



Impedance Measurement Plot for Body TSL 2450



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S Swiss Calibration Service

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

Accreditation No.: SCS 108

Client **Nokia Beijing TCC**

Certificate No: D2600V2-1082_Jun14

CALIBRATION CERTIFICATE

Object	D2600V2 - SN: 1082
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	June 06, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	30-Apr-14 (No. DAE4-601_Apr14)	Apr-15

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

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

Issued: June 6, 2014

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	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	38.0 ± 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	14.7 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**57.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.57 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	50.8 ± 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	14.2 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**56.0 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.29 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.9 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.9 Ω - 4.8 jΩ
Return Loss	- 26.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.6 Ω - 3.9 jΩ
Return Loss	- 26.5 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
Manufactured on	March 14, 2014

DASY5 Validation Report for Head TSL

Date: 06.06.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1082

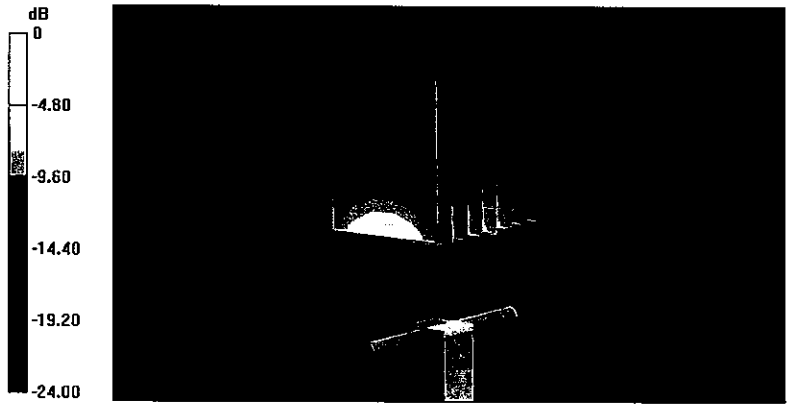
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2 S/m; ε_r = 38; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.46, 4.46, 4.46); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

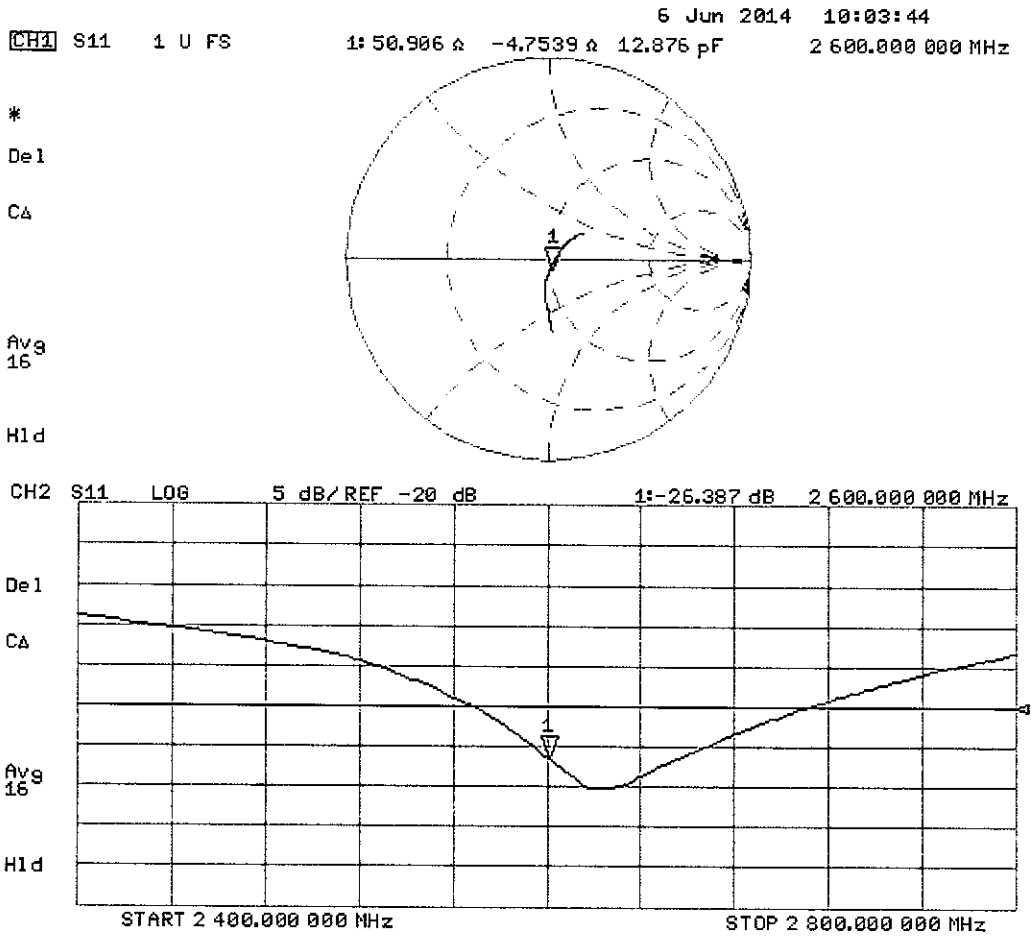
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.4 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 31.1 W/kg
SAR(1 g) = 14.7 W/kg; SAR(10 g) = 6.57 W/kg
Maximum value of SAR (measured) = 19.2 W/kg



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

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 06.06.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1082

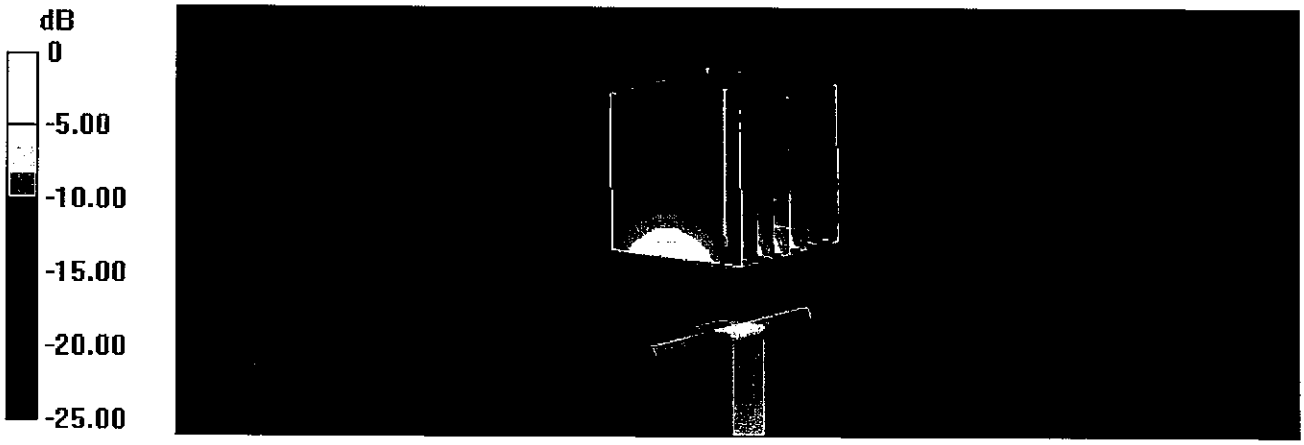
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.19 S/m; ε_r = 50.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.24, 4.24, 4.24); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

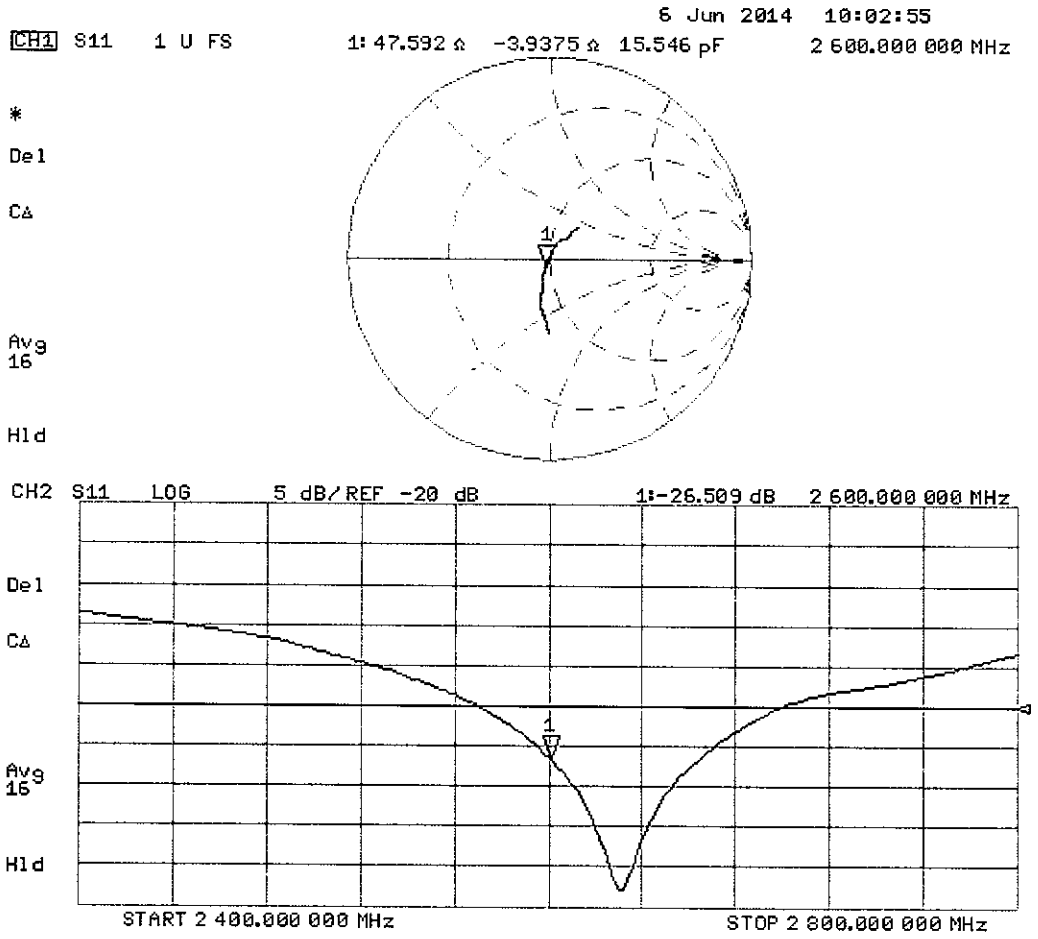
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.05 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 30.5 W/kg
SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.29 W/kg
Maximum value of SAR (measured) = 18.8 W/kg



0 dB = 18.8 W/kg = 12.74 dBW/kg

Impedance Measurement Plot for Body TSL



Dipole D2600V2– SN: 1082 Antenna Parameters measured: 2015-10-10.

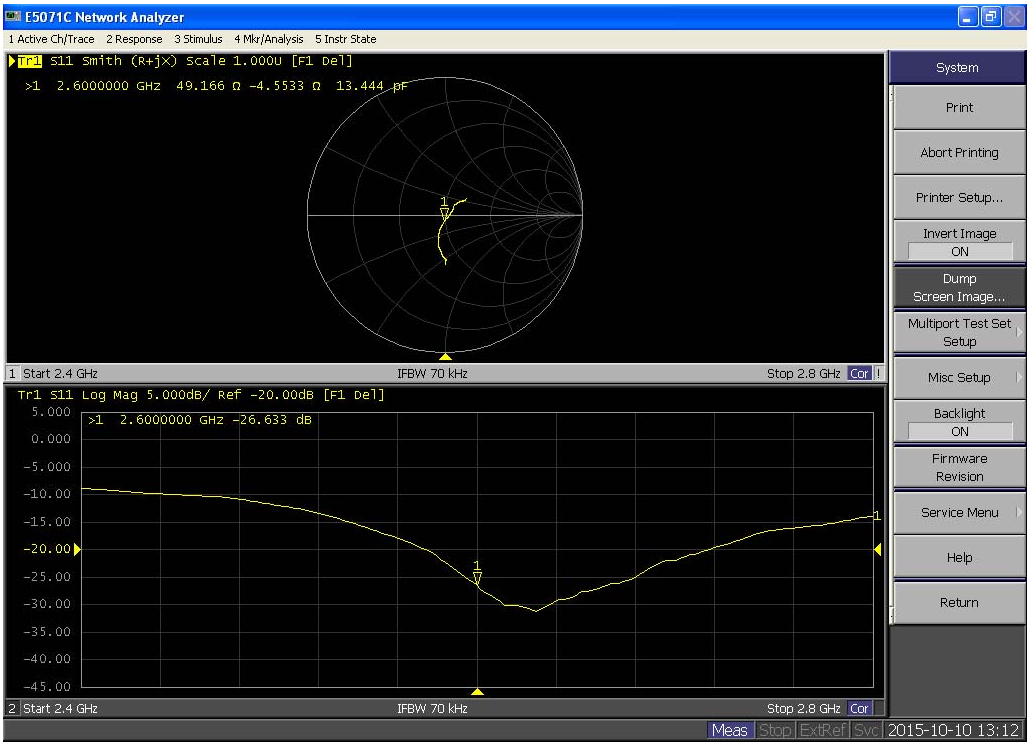
Antenna Parameters with Head TSL

	Calibration certificate	Annual measurement
Impedance, transformed to feed point	50.9 Ω - 4.8 jΩ	49.2 Ω - 4.6 jΩ
Return loss	-26.4 dB	-26.6 dB

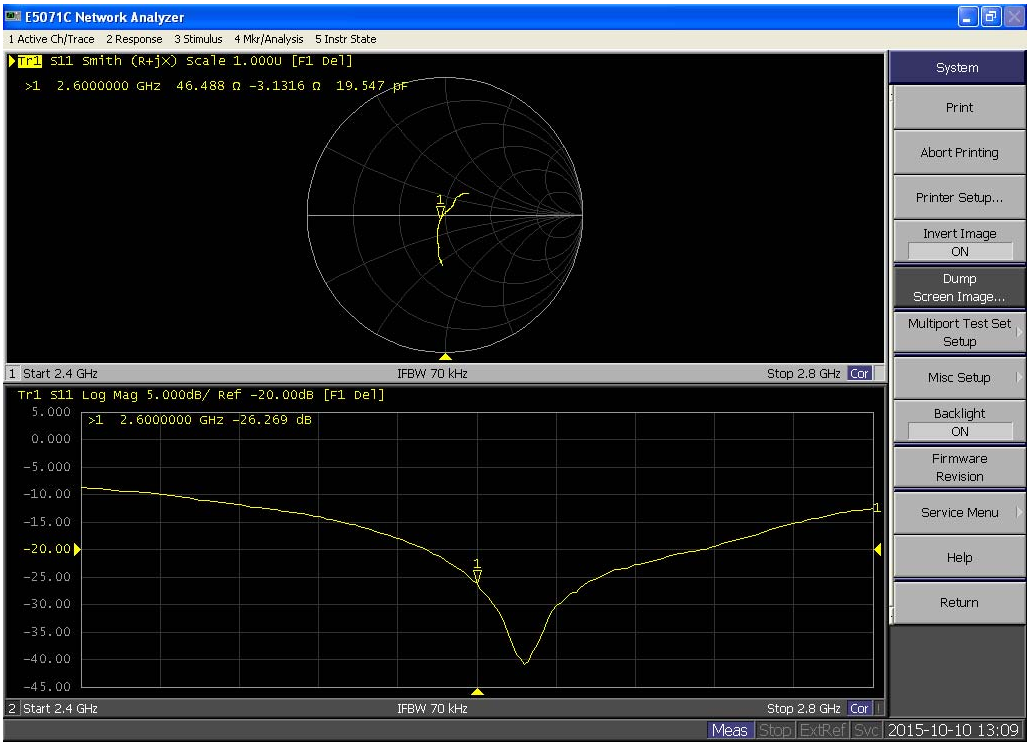
Antenna Parameters with Body TSL

	Calibration certificate	Annual measurement
Impedance, transformed to feed point	47.6 Ω - 3.9 jΩ	46.5Ω - 3.1 jΩ
Return loss	-26.5 dB	-26.3 dB

Impedance Measurement Plot for Head TSL 2600



Impedance Measurement Plot for Body TSL 2600



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
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 **TCC Microsoft**

Certificate No: D2600V2-1056_Jan15

CALIBRATION CERTIFICATE

Object	D2600V2 - SN: 1056
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	January 19, 2015

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 EPM-442A	GB37480704	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Israe Elnaouq	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 19, 2015

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	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	38.8 ± 6 %	2.05 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	14.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**56.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.5 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.1 ± 6 %	2.21 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	14.2 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**55.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.25 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.8 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.4 Ω - 4.2 jΩ
Return Loss	- 27.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.9 Ω - 4.0 jΩ
Return Loss	- 25.6 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
Manufactured on	August 14, 2012

DASY5 Validation Report for Head TSL

Date: 19.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1056

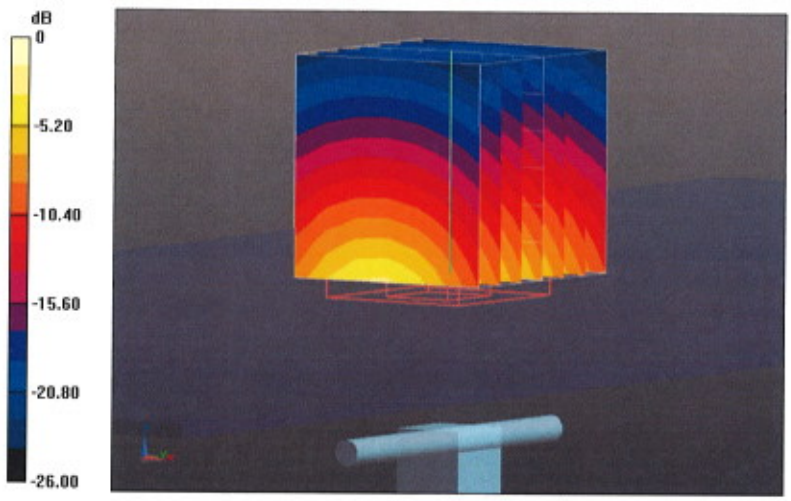
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.05 S/m; ε_r = 38.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.49, 4.49, 4.49); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

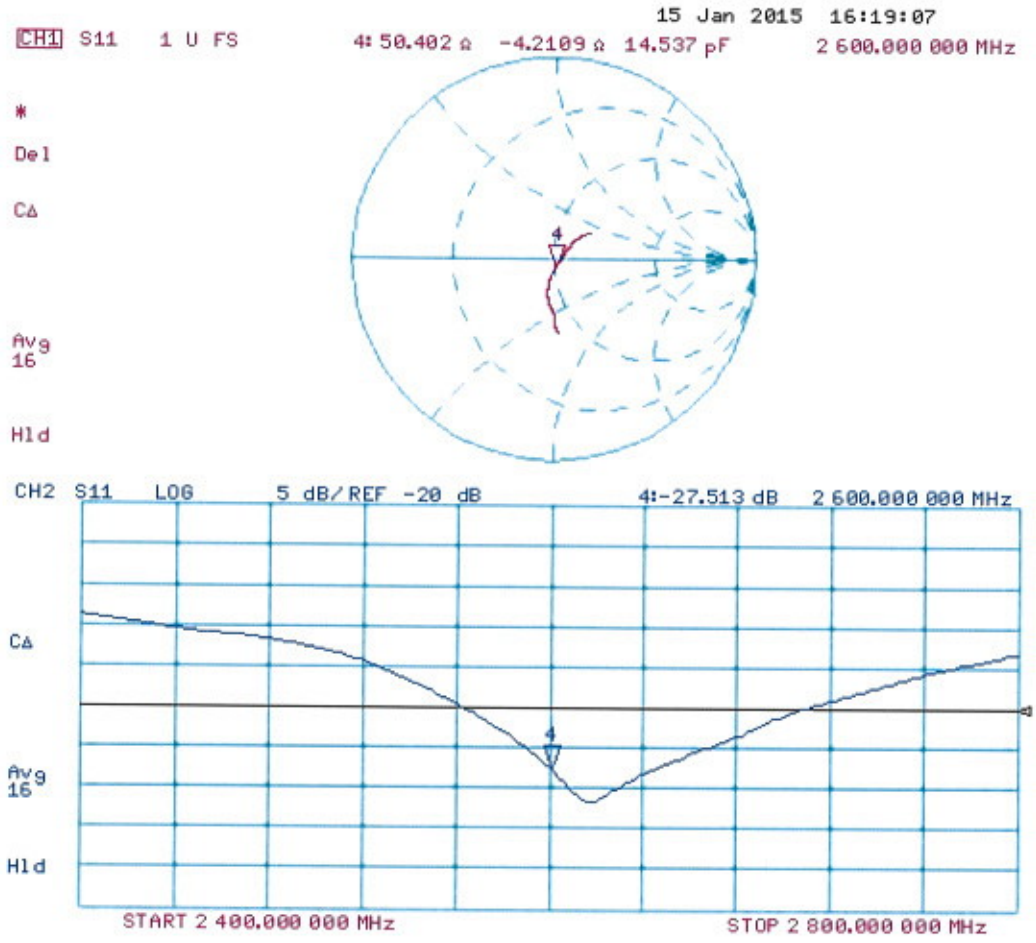
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 101.5 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 30.7 W/kg
SAR(1 g) = 14.5 W/kg; SAR(10 g) = 6.44 W/kg
Maximum value of SAR (measured) = 19.2 W/kg



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

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 15.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1056

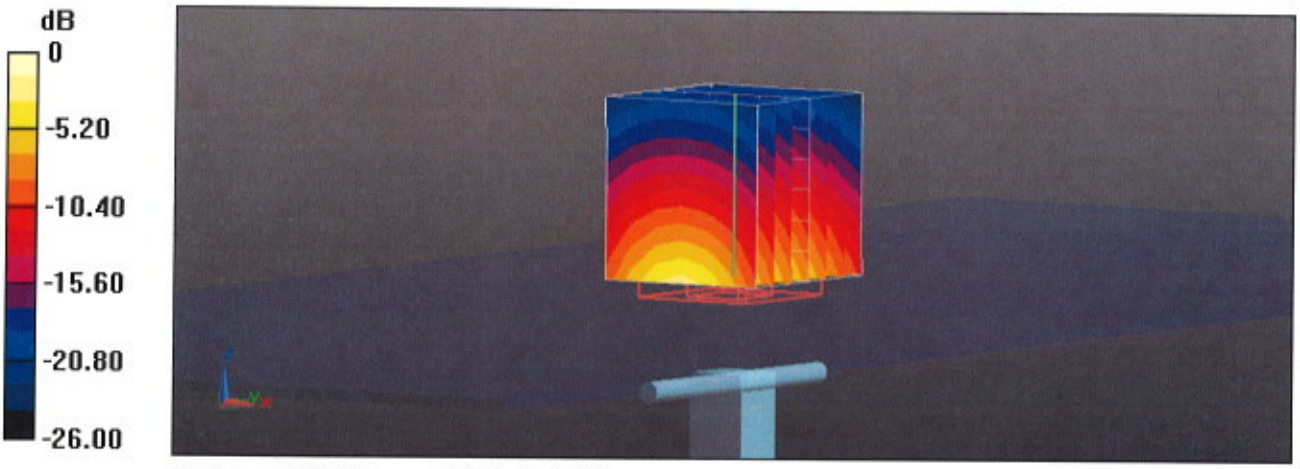
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.21 S/m; ε_r = 51.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.13, 4.13, 4.13); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.02 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 29.8 W/kg
SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.25 W/kg
Maximum value of SAR (measured) = 19.1 W/kg



0 dB = 19.1 W/kg = 12.81 dBW/kg

Impedance Measurement Plot for Body TSL