TCC
Nokia

FINAS
Finnish Accreditation Service
T117 (EN ISO/IEC 17025)

SAR Compliance Test Report

Test report no.:	FCC_RX-113_04	**Date of report:**	2013-11-25
Template version:	19.4	**Number of pages:**	71
Testing laboratory:	TCC Nokia Salo Laboratory P.O.Box 86 Joensuunkatu 7H / Kiila 1B FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 45220 TCC Nokia San Diego Laboratory	**Client:**	Nokia Corporation 16620 West Bernardo Drive SAN DIEGO CA. 92127 USA Tel. +1 858 831 5000 Fax. +1 858 831 6500
Responsible test engineer:	Virpi Tuominen	**Product contact person:**	Jamie Lee
Measurements made by:	N. Koskinen, T. Miettinen, O. Moisio, J. Moussa, M. Laaksonen, A. Viitanen, J. Gomez, A. Belden, R. Ventura, G. Abadilla, J. Tuomela		

Tested device:	RX-113		
FCC ID:	QMNB	**IC:**	-
Supplement reports:	SAR_Photo_RX-113_05		

Testing has been carried out in accordance with:

47CFR §2.1093
Radiofrequency Radiation Exposure Evaluation: Portable Devices
RSS-102
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 - 2003
IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Technique
FCC PUBLISHED RF EXPOSURE KDB PROCEDURES

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

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.

Date and signatures:

For the contents:

Digitally signed by Virpi Tuominen
DN: cn=Virpi Tuominen, o, ou, email=virpi.t.tuominen@nokia.com, c=FI
Date: 2013.11.25 14:03:21 +02'00'

Copyright © 2013 TCC Nokia

CONTENTS

1. SUMMARY OF SAR TEST REPORT 4
1.1 TEST DETAILS 4
1.2 MAXIMUM RESULTS 4
1.2.1 Body Configuration 4
1.2.2 Summary SAR data 6
1.2.3 Maximum Drift 6
1.2.4 Measurement Uncertainty 6
2. DESCRIPTION OF THE DEVICE UNDER TEST 7
2.1 TUNING TARGET WHEN PROXIMITY SENSOR TRIGGERS POWER REDUCTION ON FOR CELLULAR BANDS 11
2.2 DESCRIPTION OF THE ANTENNA 12
3. TEST CONDITIONS 12
3.1 TEMPERATURE AND HUMIDITY 12
3.2 TEST SIGNAL, FREQUENCIES AND OUTPUT POWER 12
4. DESCRIPTION OF THE TEST EQUIPMENT 14
4.1 MEASUREMENT SYSTEM AND COMPONENTS 14
4.1.1 Isotropic E-field Probe Type ES3DV3 16
4.1.2 Isotropic E-field Probe Type EX3DV4 16
4.2 PHANTOMS 17
4.3 TISSUE SIMULANTS 17
4.3.1 Tissue Simulant Recipes 17
4.4 SYSTEM VALIDATION AND SYSTEM CHECKING 18
4.4.1 System validation status 18
4.4.2 System checking 19
4.5 TISSUE SIMULANTS USED IN THE MEASUREMENTS 22
5. DESCRIPTION OF THE TEST PROCEDURE 23
5.1 DEVICE HOLDER 23
5.2 TEST POSITIONS 23
5.2.1 Body Configuration 23
5.2.2 Proximity Sensor Considerations 25
5.3 SCAN PROCEDURES 27
5.4 SAR AVERAGING METHODS 27
6. MEASUREMENT UNCERTAINTY 29
7. RESULTS 31
7.1 THE MEASURED BODY SAR VALUES FOR THE TEST DEVICE ARE TABULATED BELOW: 31

Copyright © 2013 TCC Nokia

APPENDIX A: SYSTEM CHECK SCANS

APPENDIX B: MEASUREMENT SCANS

APPENDIX C: DIELECTRIC PARAMETERS OF THE TISSUE SIMULANTS

APPENDIX D: CONDUCTED AVERAGE POWER MEASUREMENTS FOR WCDMA AND HSUPA

APPENDIX E: RELEVANT PAGES FROM PROBE CALIBRATION REPORTS

APPENDIX F: RELEVANT PAGES FROM DIPOLE VALIDATION REPORTS

APPENDIX G: CONDUCTED POWER MEASUREMENTS FOR SUPPORTED GPRS/EGPRS TRANSMISSION MODES

APPENDIX H: CONDUCTED POWER MEASUREMENTS FOR SUPPORTED WCDMA TRANSMISSION MODES

APPENDIX I: CONDUCTED POWER RESULTS FOR WLAN2450 AND WLAN5000

APPENDIX J: SAR EXCLUSION THRESHOLD CALCULATIONS

APPENDIX K: PROXIMITY SENSOR TEST RESULTS

Copyright © 2013 TCC Nokia

1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2013-09-03 to 2013-10-17
SN, HW and SW numbers of tested device	SN:004402/47/357512/8, HW:0107, SW:ROW_9447_1030_1329_v0.1.12a, DUT: 17640 SN:004402/47/357591/2, HW:0107, SW:ROW_9447_1030_1329_v0.1.12a, DUT: 17637 SN:004402/47/357507/8, HW:0107, SW:ROW_9447_1030_1329_v0.1.12a, DUT: 17638 SN:004402/47/357511/0, HW:0107, SW:ROW_9447_1030_1329_v0.1.12a, DUT: 17639 SN:004402/47/357461/8, HW:0107, SW:ROW_9447_1030_1329_v0.1.12a, DUT: 31339
Batteries used in testing	-
Headsets used in testing	-
Other accessories used in testing	SU-42 Smart cover; DUT: 17809, 17808
State of sample	Prototype unit
Notes	-

1.2 Maximum Results

The maximum measured SAR values for Body configuration are given in section 1.2.1. 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 Body Configuration

Mode	Ch / *f*(MHz)	Conducted power	Separation distance	Measured SAR value (1g avg)	Reported* SAR value (1g avg)	SAR limit (1g avg)	Result	Plot #
2-slot GPRS850	190 / 836.6	27.30 dBm	0 mm	1.15 W/kg	**1.31 W/kg**	1.6 W/kg	PASSED	1
WCDMA850	4132 / 826.4	21.24 dBm	0 mm	1.15 W/kg	**1.18 W/kg**	1.6 W/kg	PASSED	2
4-slot GPRS1900	512 / 1850.2	20.30 dBm	0 mm	1.04 W/kg	**1.18 W/kg**	1.6 W/kg	PASSED	5
WCDMA1900	9262 / 1852.4	17.57 dBm	0 mm	1.26 W/kg	**1.34 W/kg**	1.6 W/kg	PASSED	6
WLAN2450	1 / 2412.0	12.82 dBm	0 mm	0.753 W/kg	**1.11 W/kg**	1.6 W/kg	PASSED	10
WLAN5000	44 / 5220.0	9.82 dBm	0 mm	1.06 W/kg	**1.39 W/kg**	1.6 W/kg	PASSED	16
2-slot GPRS850 +WLAN2450 Main +WLAN2450 AUX	-	-	0 mm	1.15 W/kg	**1.31 W/kg**	1.6 W/kg	PASSED	1**
WCDMA850 +WLAN2450 Main +WLAN2450 AUX	-	-	0 mm	1.15 W/kg	**1.18 W/kg**	1.6 W/kg	PASSED	2**
4-slot GPRS1900 +WLAN2450 Main +WLAN2450 AUX	-	-	0 mm	1.04 W/kg	**1.18 W/kg**	1.6 W/kg	PASSED	5**

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

WCDMA1900 +WLAN2450 Main +WLAN2450 AUX	-	-	0 mm	1.26 W/kg	**1.34 W/kg**	1.6 W/kg	PASSED	6**
2-slot GPRS850 +WLAN5000 Main +WLAN5000 AUX	-	-	0 mm	1.20 W/kg	**1.53 W/kg**	1.6 W/kg	PASSED	18
WCDMA850 +WLAN5000 Main +WLAN5000 AUX	-	-	0 mm	1.16 W/kg	**1.47 W/kg**	1.6 W/kg	PASSED	19
4-slot GPRS1900 +WLAN5000 Main +WLAN5000 AUX	-	-	0 mm	1.06 W/kg	**1.39 W/kg**	1.6 W/kg	PASSED	16**
WCDMA1900 +WLAN5000 Main +WLAN5000 AUX	-	-	0 mm	1.09 W/kg	**1.42 W/kg**	1.6 W/kg	PASSED	20

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

** This is due to fact that individual transmitter and antenna SAR hotspots are not overlapping with each other. Hence the combined plot numbers above table are those of the individual cellular, WLAN2450 or WLAN5000 results, whichever is giving highest individual SAR result.

Copyright © 2013 TCC Nokia

1.2.2 Summary SAR data

	FCC-defined SAR values for the Grants of Equipment Authorization		
	PCE	DTS	NII
Maximum Body SAR values	1.34 W/kg	1.11 W/kg	1.39 W/Kg
{Max + Max} Simultaneous Body SAR value	1.57 W/kg †		
Maximum Simultaneous SAR value **Body SAR: 2-slot GPRS850 + WLAN5000 AUX Antenna**	1.57 W/kg		

Note:

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

† From Section 7.1

{Max + Max} Simultaneous Body SAR quoted here is 1.57W/kg for 2-slot GPRS850 Full power + WLAN5000 AUX Antenna Body Bottom Edge Facing Phantom. This value is highest max+max or max+max+max value not exceeding 1.6W/kg in max+max or max+max+max table.

1.2.3 Maximum Drift

Maximum drift covered by 5% scaling up of the SAR values	Maximum drift during measurements
0.2dB	0.2dB

1.2.4 Measurement Uncertainty

Expanded Uncertainty (k=2) 95%	± 27.8%

Copyright © 2013 TCC Nokia

2. DESCRIPTION OF THE DEVICE UNDER TEST

Device category	Portable
Exposure environment	General population / uncontrolled

Modes of Operation	Bands	Modulation Mode	Duty Cycle	Transmitter Frequency Range (MHz)	Power Tuning Target (dBm)				Upper Limit of Power Tuning Tolerance (dBm)			
					1-slot	2-slot	3-slot	4-slot	1-slot	2-slot	3-slot	4-slot
GPRS	850	GMSK	1/8 to 4/8	824 – 849	32.50	30.00	28.20	27.00	32.85	30.35	28.55	27.35
	1900			1850 – 1910	30.00	27.00	25.20	24.00	30.35	27.35	25.55	24.35
EGPRS	850	8PSK	1/8 to 4/8	824 – 849	27.00	27.00	27.00	26.50	27.35	27.35	27.35	26.85
	1900			1850 – 1910	25.50	24.50	24.50	23.20	25.85	24.85	24.85	23.55
WCDMA	850 (Band 5)		1	826 – 847	23.50				23.85			
WCDMA	1900 (Band 2)		1	1852 – 1908	23.50				23.85			
HSUPA	850 (Band 5)		1	826 – 847	See Appendix D for details							
HSUPA	1900 (Band 2)		1	1852 – 1908	See Appendix D for details							
BT	2450	GFSK	1	2402 – 2480	8.00				9.50			
BT LE	2450	GFSK	1	2402 – 2480	8.00				9.50			
					Ch 1 - 11				Ch 1 - 11			
WLAN b-mode** 20MHz – Main Ant	2450	BPSK QPSK	1	2412 – 2472	13.50				15.00			
WLAN b-mode** 20MHz – AUX Ant	2450	BPSK QPSK	1	2412 – 2472	13.00				14.50			
					Ch 1 - 2	Ch 6	Ch 10 - 11		Ch 1 - 2	Ch 6	Ch 10 - 11	
WLAN g-mode** 20MHz – Main Ant	2450	UP to 64QAM	1	2412 – 2472	10.00	11.50	10.00		11.50	13.00	11.50	
WLAN g-mode** 20MHz – AUX Ant	2450	UP to 64QAM	1	2412 – 2472	10.00	11.50	10.00		11.50	13.00	11.50	
WLAN n-mode** 20MHz – Main Ant	2450	UP to 64QAM	1	2412 – 2462 2412 – 2472	8.50	10.00	8.50		10.00	11.50	10.00	

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

WLAN n-mode** 20MHz – AUX Ant	2450	UP to 64QAM	1	2412 – 2462 2412 – 2472	9.00	10.00	8.50		10.50	11.50	10.00		
					Ch 3 - 9				Ch 3 - 9				
WLAN n-mode** 40MHz – Main Ant	2450	UP to 64QAM	1	2412 – 2472	9.00				10.50				
WLAN n-mode** 40MHz – AUX Ant	2450	UP to 64QAM	1	2412 – 2472	9.00				10.50				
					Ch 36 - 48	Ch 52 - 116	Ch 120 - 140	Ch 149 - 165	Ch 36 - 48	Ch 52 - 116	Ch 120 - 140	Ch 149 - 165	
WLAN a-mode** 20MHz – Main Ant	5000	UP to 64QAM	1	5150 – 5825	7.50	7.50	6.50	7.50	9.00	9.00	8.00	9.00	
WLAN a-mode** 20MHz – AUX Ant	5000	UP to 64QAM	1	5150 – 5825	9.50	8.50	9.50	8.50	11.00	10.00	11.00	10.00	
WLAN n-mode** 20MHz – Main Ant	5000	UP to 64QAM	1	5150 – 5825	7.50	7.50	6.50	7.50	9.00	9.00	8.00	9.00	
WLAN n-mode** 20MHz – AUX Ant	5000	UP to 64QAM	1	5150 – 5825	9.50	8.50	9.50	8.50	11.00	10.00	11.00	10.00	
					Ch 38 - 62	Ch 102 – 118	Ch 122 - 130	Ch 134 - 138	Ch 151 – 163	Ch 38 - 62	Ch 102 – 118	Ch 122 - 130	Ch 134 - 138	Ch 151 – 163
WLAN n-mode** 40MHz Main Ant	5000	UP to 64QAM	1	5180 – 5825	8.00	7.00	6.50	7.00	8.00	9.50	8.50	8.00	8.50	9.50
					Ch 38 – 46	Ch 50 – 118	Ch 122 - 130	Ch 134 - 138	Ch 151 – 163	Ch 38 - 62	Ch 102 – 118	Ch 122 - 130	Ch 134 - 138	Ch 151 – 163
WLAN n-mode** 40MHz AUX Ant	5000	UP to 64QAM	1	5180 – 5825	8.50	8.00	9.00	8.50	8.00	10.00	9.50	10.50	10.00	9.50

**Maximum tuning targets are presented above. See full details in Appendix I.

Copyright © 2013 TCC Nokia

Outside of USA, the transmitter of the device is capable of operating also in GPRS/EGPRS900, GPRS/EGPRS1800, WCDMA900, WCDMA1800, WCDMA2100, LTE845 (band 20), LTE1800 (band 3) and LTE2500 (band 7) bands which are not part of this filing.

This is a WCDMA HSUPA device, but SAR tests for HSUPA mode have not been performed as no HSUPA Sub-test mode has an average power > 0.25dB above the basic WCDMA 12.2kbps RMC mode. Appendix D of this report gives a summary of the measured WCDMA and HSUPA average powers; a detailed report of these WCDMA and HSUPA conducted power tests is submitted separately.

This is a BT Class 1 device; as its upper limit of power tuning tolerance is 9.5dBm (8.91mW), SAR testing was deemed unnecessary since (8.91mW/5mm)*√2.48GHz < 3.0 (KDB447498 D01 General RF Exposure Guidelines v05 Section 4.3.1 Standalone SAR test exclusion considerations). Since WLAN2450 and BT use same frequency and antenna, WLAN2450 power is 4.5dB higher in minimum, and they cannot transmit simultaneously, the 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 and estimations required in KDB 447498 for simultaneous transmission exclusion.

This device uses a single antenna for transmission of all the cellular, AWS and PCS bands; two antennas are used for transmission of WLAN, a main antenna and an auxiliary one; these antennas can be used in MIMO mode. Auxiliary one is also used for transmission of BT. Simultaneous transmission of any singular cellular, AWS and PCS band is possible with either WLAN or BT in Body use.

Simultaneous transmission capabilities in Body use		
	WLAN2450	WLAN5000
GPRS/EGPRS850	✓	✓
WCDMA850	✓	✓
GPRS/EGPRS1900	✓	✓
WCDMA1900	✓	✓

Copyright © 2013 TCC Nokia

This device has Wireless Router "Hotspot" mode capability.

Simultaneous transmission capabilities in Wireless Router use		
	WLAN2450	WLAN5000
GPRS/EGPRS850	✓	–
WCDMA850	✓	–
GPRS/EGPRS1900	✓	–
WCDMA1900	✓	–

Wireless Router SAR is not required to be tested for a tablet since tablet test procedures are more conservative (616217 D04 SAR for laptop and tablets v01r01).

Copyright © 2013 TCC Nokia

2.1 Tuning target when proximity sensor triggers power reduction on for cellular bands

The following table details the tuning target when proximity sensor triggers power reduction on for cellular bands. Both WLANs were tested at full power.

Band	Power reduction	Target tuning power	Upper Limit of Power Tuning Tolerance
GPRS/EGPRS850	3.0 dB 2.5 dB 3.0 dB 4.0 dB 0.0 dB 0.0 dB 2.0 dB 3.5 dB	1-slot GPRS: 29.5 dBm 2-slot GPRS: 27.5 dBm 3-slot GPRS: 25.2 dBm 4-slot GPRS: 23.0 dBm 1-slot EGPRS: 27.0 dBm 2-slot EGPRS: 27.0 dBm 3-slot EGPRS: 25.0 dBm 4-slot EGPRS: 23.0 dBm	1-slot GPRS: 29.85 dBm 2-slot GPRS: 27.85 dBm 3-slot GPRS: 25.55 dBm 4-slot GPRS: 23.35 dBm 1-slot EGPRS: 27.35 dBm 2-slot EGPRS: 27.35 dBm 3-slot EGPRS: 25.35 dBm 4-slot EGPRS: 23.35 dBm
WCDMA850	2.5 dB	21.0 dBm	21.35 dBm
GPRS/EGPRS1900	4.0 dB 5.0 dB 4.0 dB 3.5 dB 0.0 dB 2.5 dB 3.5 dB 3.0 dB	1-slot GPRS: 26.0 dBm 2-slot GPRS: 22.0 dBm 3-slot GPRS: 21.2 dBm 4-slot GPRS: 20.5 dBm 1-slot EGPRS: 25.5 dBm 2-slot EGPRS: 22.0 dBm 3-slot EGPRS: 21.0 dBm 4-slot EGPRS: 20.2 dBm	1-slot GPRS: 26.35 dBm 2-slot GPRS: 22.85 dBm 3-slot GPRS: 21.55 dBm 4-slot GPRS: 20.85 dBm 1-slot EGPRS: 25.85 dBm 2-slot EGPRS: 22.35 dBm 3-slot EGPRS: 21.35 dBm 4-slot EGPRS: 20.55 dBm
WCDMA1900	6.0 dB	17.5 dBm	17.85 dBm

Copyright © 2013 TCC Nokia

2.2 Description of the Antenna

The device has an internal antenna for cellular, AWS, PCS use and 2 separate internal antennas for WLAN use. The cellular antenna is located near the left edge of the device (when looking from the screen side); the main and AUX WLAN antennas are located near the bottom edge.

Picture of antenna dimensions and antenna interdistances can be found from RX-113_Antenna_Description document.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature (°C):	20.5 – 22.5
Ambient humidity (RH %):	35 - 55

3.2 Test Signal, Frequencies and Output Power

The device was put into operation by using a call tester except for testing WLAN2450/WLAN5000 where control software was used. Communication between the device and the call tester was established by air link.

The device output power was set to maximum power level for all tests; a fully charged battery was used for every test sequence.

This device was tested in all the available multi-slot GMSK GPRS modes (this is a multi-slot class 33 device).

The transmission mode of the device in all WCDMA tests was configured to 12.2kbps RMC with all TPC bits set as “1”. All WCDMA testing has been carried out in accordance with FCC KDB 941225: SAR Measurement Procedures for 3G Devices.

In all operating bands the measurements were performed on lowest, middle and highest channels.

The conducted output power of the device was measured by a separate test laboratory on the same units as used for SAR testing. The results are given in Appendices G-I of this report.

Copyright © 2013 TCC Nokia

The standard transmission mode of the device in all WLAN b-mode tests was BPSK 1Mbps. The standard transmission mode of the device in all WLAN a-mode tests was BPSK 6 Mbps. The standard transmission modes used have maximum time-averaged output powers within 0.25dB of the highest time-averaged output power of all the WLAN a, b, g and n modulation modes in this device as illustrated by the tables in Appendix I. All WLAN testing has been carried out in accordance with FCC KDB 248227: SAR Measurement Procedures for 802.11 a/b/g Transmitters. WLAN MIMO Tx exposure was tested using highest available output powers among SISO and MIMO modes to minimize testing. This gives conservative estimate of the WLAN MIMO Tx mode exposure since SISO Tx mode output powers are always equal to or higher than in MIMO mode. Please see Appendix I for details of the WLAN SISO and MIMO mode output powers.

Here is a summary list of the KDB documents used in the reported testing:

KDB 941225 D01 SAR Measurement Procedures for 3G Devices
KDB 248227: SAR Measurement Procedures for 802.11 a/b/g Transmitters
KDB 648474 D04 Handset SAR v01r01
KDB 447498 D01 General RF Exposure Guidance v05r01
KDB 690783 D01 SAR Listings on Grants
KDB 865664 D01 SAR Measurement 100MHz to 6GHz v01r01
616217 D04 SAR for laptop and tablets v01r01
865664 D02 SAR reporting v01r01

Copyright © 2013 TCC Nokia

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
DAE4	793	2013-06	2014-06
DAE4	1355	2013-01	2014-01
DAE4	1301	2013-02	2014-02
E-field Probe ES3DV3	3131	2013-06	2014-06
E-field Probe ES3DV3	3165	2013-01	2014-01
E-field Probe EX3DV4	3817	2013-01	2014-01
Dipole Validation Kit, D835V2	480	2012-12	2014-12
Dipole Validation Kit, D1900V2	5d013	2012-12	2014-12
Dipole Validation Kit, D2450V2	800	2012-09	2014-09
Dipole Validation Kit, D5GHzV2	1042	2012-11	2014-11
Dipole Validation Kit, D5GHzV2	1123	2012-05	2014-05
DASY5 software	Version 52.8	-	-

Copyright © 2013 TCC Nokia

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration date	Calibration expiry
Signal Generator	E4438C	MY42080610	2013-08	2014-08
Signal Generator	SML03	101264	2013-08	2014-08
Signal Generator	N5181B	MY51350034	2013-06	2016-06
Amplifier	5S1G4M3	302338	-	-
Amplifier	ZHL-42-SMA	N072095-5	-	-
Amplifier	ZYE-8G+	N811401219	-	-
Power Meter	NRVS	838624/032	2013-08	2014-08
Power Meter	NRVD	840023/028	2013-08	2014-08
Power Meter	E4419B	GB40202156	2013-07	2015-07
Power Sensor	NRV-Z32	100067	2013-08	2014-08
Power Sensor	NRV-Z32	849745/018	2013-08	2014-08
Power Sensor	E9301A	US39211864	2013-07	2014-07
Call Tester	CMU 200	103293	-	-
Call Tester	CMU 200	104983	-	-
Call Tester	MT8820C	6200883095	-	-
Network Analyzer	ENA E5071C	MY46213166	2013-08	2014-08
Network Analyzer	ENA E5071C	MY46315958	2013-07	2014-07
Dielectric Probe Kit	DAK-3.5	1042	-	-
Dielectric Probe Kit	DAK-3.5	1064	-	-

Copyright © 2013 TCC Nokia

4.1.1 Isotropic E-field Probe Type ES3DV3

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., butyl diglycol)
Calibration	Calibration certificate in Appendix E
Frequency	10 MHz to 4 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in HSL (rotation normal to probe axis)
Dynamic Range	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm Tip length: 20 mm Body diameter: 12 mm Tip diameter: 3.9 mm Distance from probe tip to dipole centers: 2.0 mm
Application	General dosimetry up to 4 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

4.1.2 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 E
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

Copyright © 2013 TCC Nokia

4.2 Phantoms

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

System checking and Body SAR testing was performed using the Triple Flat phantom and ELI Phantom.

The device holder made of low loss expanded polystyrene (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 - 2003 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 flat reference point of the Triple Flat Phantom and ELI Phantom.

4.3.1 Tissue Simulant Recipes

The following recipes were used for Body tissue simulants:

800MHz band

Ingredient	Body (% by weight)
Deionised Water	69.25
Tween 20	30.00
Salt	0.75

1900MHz band

Ingredient	Body (% by weight)
Deionised Water	70.25
Tween 20	29.41
Salt	0.34

Copyright © 2013 TCC Nokia

2450MHz band

Ingredient	Body (% by weight)
Deionised Water	70.20
Tween 20	29.62
Salt	0.18

5000MHz band †

Ingredient	Body (% by weight)
Water	60-80
Oil	-
Emulsifiers, Esters, Inhibitors	20-40
Sodium salt	0-1.5

† Recipe is proprietary to SPEAG. The proportions of the constituents have not been disclosed.

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 Body tissue simulant
835	TCC Salo / SAR-3	V52.8	D835V2 / 480	ES3DV4 / 3165	CW	DAE4 / 1355	2013-05
1900	TCC Salo / SAR-1	V52.8	D1900V2 / 5d013	ES3DV3 / 3131	CW	DAE4 / 793	2013-07
2450	TCC San Diego / SAR-3	V52.8	D2450MHzV2/ 800	EX3DV4 / 3817	CW	DAE4 / 1301	2013-04
5200	TCC San Diego / SAR-3	V52.8	D5GHzV2 / 1042	EX3DV4 / 3817	CW/OFDM	DAE4 / 1301	2013-04
5300	TCC San Diego / SAR-3	V52.8	D5GHzV2 / 1042	EX3DV4 / 3817	CW/OFDM	DAE4 / 1301	2013-04
5500	TCC San Diego / SAR-3	V52.8	D5GHzV2 / 1042	EX3DV4 / 3817	CW/OFDM	DAE4 / 1301	2013-04
5600	TCC San Diego / SAR-3	V52.8	D5GHzV2 / 1042	EX3DV4 / 3817	CW/OFDM	DAE4 / 1301	2013-04
5800	TCC San Diego / SAR-3	V52.8	D5GHzV2 / 1042	EX3DV4 / 3817	CW/OFDM	DAE4 / 1301	2013-04

Copyright © 2013 TCC Nokia

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 (except in the case of the 5000MHz dipole for which 100 mW was supplied), which was placed under the flat section of the Triple Flat Phantom. The system checking results (dielectric parameters and SAR values) are given in the table below.

Copyright © 2013 TCC Nokia

System checking, body tissue simulant

f [MHz]	Description	SAR 1g [W/kg]	Estimated SAR 1g [W/kg]	Estimated SAR 1g Deviation dSAR [%]	Dielectric Parameters εr	Dielectric Parameters σ [S/m]	SAR 1g Deviation from target dSAR [%]	Dielectric Parameters Deviation from target dεr [%]	Dielectric Parameters Deviation from target dσ [%]	Temp [°C]	Plot #
	Tolerances			±3%			±10 %	±5 %	±5 %		
835	IEEE1528 / IEC62209				55.2	0.97					
	Reference result SN:480	2.42	-		54.5	0.99	TCC Salo/SAR-3 ES3DV3 SN:3165 Body 835MHz				
	2013-09-12	2.27	2.28	0.44	53.6	0.98	-6.20	-1.65	-1.01	21.2	-
	2013-09-13	2.24	2.24	0.00	53.5	0.98	-7.44	-1.83	-1.01	21.5	1
	2013-09-25	2.26	2.26	0.00	53.7	0.96	-6.61	-1.47	-3.03	20.9	-
	2013-09-26	2.24	2.26	0.89	53.5	0.97	-7.44	-1.83	-2.02	20.8	-
	2013-10-17	2.25	2.26	0.44	54.6	0.97	-7.02	0.18	-2.02	21.0	-
1900	IEEE1528 / IEC62209				53.3	1.52					
	Reference result SN:5d013	10.3	-		52.2	1.52	TCC Salo/SAR-1 ES3DV3 SN:3131 Body 1900MHz				
	2013-09-11	9.51	9.53	0.21	51.6	1.53	-7.67	-1.15	0.66	20.3	-
	2013-09-12	9.86	9.93	0.71	51.4	1.53	-4.27	-1.53	0.66	20.4	-
	2013-09-26	9.68	9.76	0.83	51.0	1.48	-6.02	-2.30	-2.63	21.9	-
	2013-10-11	9.43	9.40	-0.32	51.4	1.50	-8.45	-1.53	-1.32	21.3	2
2450	IEEE1528 / IEC62209				52.7	1.95					
	Reference result SN:800	13.0	-		51.0	2.01	TCC San Diego /SAR-3 EX3DV4 SN:3817 Body 2450MHz				
	2013-09-09	13.00	13.30	2.31	50.7	1.91	0.00	-0.59	-4.98	21.5	-
	2013-09-24	13.00	13.20	1.54	51.0	1.92	0.00	0.00	-4.48	21.5	-
	2013-09-25	12.90	13.10	1.55	50.9	1.92	-0.77	-0.20	-4.48	21.5	3
5200	FCC Published RF Exposure KDB Procedures				49.0	5.30					
	Reference result SN:1042	7.36	-		46.8	5.35	TCC San Diego/SAR-3 EX3DV4 SN:3817 Body 5200MHz				
	2013-09-03	7.53	6.83	-9.30	47.9	5.47	2.31	2.35	2.24	21.5	4

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

f [MHz]	Description	SAR 1g [W/kg]	Estimated SAR 1g [W/kg]	Estimated SAR 1g Deviation dSAR [%]	Dielectric Parameters εr	Dielectric Parameters σ [S/m]	SAR 1g Deviation from target dSAR [%]	Dielectric Parameters Deviation from target dεr [%]	Dielectric Parameters Deviation from target dσ [%]	Temp [°C]	Plot #
	FCC Published RF Exposure KDB Procedures				48.9	5.42					
	Reference result SN:1123	7.32	-		48.7	5.44	TCC San Diego/SAR-3 EX3DV4 SN:3817 Body 5300MHz				
5200	2013-09-25	6.92	6.39	-7.66	48.3	5.46	-5.98	3.21	2.06	21.5	5
	FCC Published RF Exposure KDB Procedures				48.9	5.42					
	Reference result SN:1042	7.54	-		46.7	5.47	TCC San Diego/SAR-3 EX3DV4 SN:3817 Body 5300MHz				
5300	2013-09-04	7.80	7.17	-8.08	47.5	5.57	3.45	1.71	1.83	21.5	6
	FCC Published RF Exposure KDB Procedures				48.6	5.65					
	Reference result SN:1042	7.94	-		46.3	5.73	TCC San Diego/SAR-3 EX3DV4 SN:3817 Body 5500MHz				
5500	2013-09-04	8.04	7.25	-9.83	47.2	5.83	1.26	1.94	1.75	21.5	7
	FCC Published RF Exposure KDB Procedures				48.6	5.65					
	Reference result SN:1123	7.93	-		48.1	5.83	TCC San Diego/SAR-3 EX3DV4 SN:3817 Body 5500MHz				
5500	2013-09-25	7.35	6.70	-8.84	47.8	5.86	-7.43	3.24	2.27	21.5	8
	FCC Published RF Exposure KDB Procedures				48.5	5.77					
	Reference result SN:1042	8.04	-		46.2	5.86	TCC San Diego/SAR-3 EX3DV4 SN:3817 Body 5600MHz				
5600	2013-09-04	8.15	6.90	-15.34	47.0	5.96	1.37	1.73	1.71	21.5	9
	FCC Published RF Exposure KDB Procedures				48.2	6.00					
	Reference result SN:1042	7.46	-		45.9	6.13	TCC San Diego/SAR-3 EX3DV4 SN:3817 Body 5800MHz				
5800	2013-09-05	7.17	6.53	-8.93	46.7	6.23	-3.89	1.74	1.63	21.5	10

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

Copyright © 2013 TCC Nokia

4.5 Tissue Simulants used in the Measurements

Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Dielectric Parameters Deviation from Standard target		Temp [°C]
		ε_r	σ [S/m]	$d\varepsilon_r$ [%]	dσ [%]	
	Tolerances			±5 %	±5 %	
835	Recommended value	55.2	0.97			
	2013-09-12	53.6	0.98	-2.90	1.03	21.2
	2013-09-13	53.5	0.98	-3.08	1.03	21.5
	2013-09-25	53.7	0.96	-2.72	-1.03	20.9
	2013-09-26	53.5	0.97	-3.08	0.00	20.8
	2013-10-17	54.6	0.97	-1.09	0.00	21.0
836	Recommended value	55.2	0.97			
	2013-09-12	53.6	0.98	-2.90	1.03	21.2
	2013-09-13	53.5	0.98	-3.08	1.03	21.5
	2013-09-25	53.7	0.96	-2.72	-1.03	20.9
	2013-09-26	53.5	0.97	-3.08	0.00	20.8
	2013-10-17	54.6	0.97	-1.09	0.00	21.0
1880	Recommended value	53.3	1.52			
	2013-09-11	51.6	1.51	-3.19	-0.66	20.3
	2013-09-12	51.4	1.51	-3.56	-0.66	20.4
	2013-09-26	51.0	1.47	-4.32	-3.29	21.9
	2013-10-11	51.4	1.48	-3.56	-2.63	21.3
2437	Recommended value	52.7	1.94			
	2013-09-09	50.8	1.90	-3.61	-2.06	21.5
	2013-09-24	51.0	1.90	-3.23	-2.06	21.5
	2013-09-25	51.0	1.90	-3.23	-2.06	21.5
5210	Recommended value	49.0	5.31			
	2013-09-03	47.9	5.48	-2.24	3.20	21.5
	2013-09-25	48.3	5.47	-1.43	3.01	21.5
5290	Recommended value	48.9	5.40			
	2013-09-04	47.5	5.55	-2.86	2.78	21.5
5520	Recommended value	48.6	5.67			
	2013-09-04	47.2	5.85	-2.88	3.17	21.5
	2013-09-25	47.8	5.89	-1.65	3.88	21.5
5620	Recommended value	48.4	5.79			
	2013-09-04	47.0	5.99	-2.89	3.45	21.5
5760	Recommended value	48.3	5.95			
	2013-09-05	46.8	6.18	-3.11	3.87	21.5

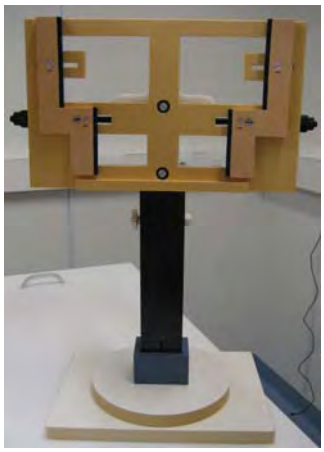
Dielectric parameter data for the band edges is given in Appendix C.

Copyright © 2013 TCC Nokia

5. DESCRIPTION OF THE TEST PROCEDURE

5.1 Device Holder

The device was placed in a device holder (illustrated below) supplied by Nokia.



Device holder supplied by Nokia

5.2 Test Positions

5.2.1 Body Configuration

This tablet device was tested in all bands with its back facing the flat phantom; it was also tested with its edges facing the flat phantom as indicated in table below. Exclusion from testing of edges was based on SAR Exclusion Threshold formula (KDB447498 DR01), please find calculations in Appendix J.

The following table details the edge/antenna combinations tested:

	Left edge	Top edge	Right edge	Bottom edge
Cellular antenna	✓	✓	×	✓
WLAN Main	×	×	×	✓
WLAN AUX	×	×	×	✓

For GPRS1900 bottom edge was excluded from tests according to formula.

Copyright © 2013 TCC Nokia

The tablet device was tested at full power with a separation distance of 22mm from the back surface and a separation distance of 21mm from the Left edge. The separation distance used in all reduced power testing was 0mm. All cellular bands were tested at full power against the top and bottom edge.

This tablet was also tested with SU-42 Smart cover in tablet mode and laptop mode. The highest SAR measured in all cellular bands for each relevant exposure condition was repeated with the SU-42 Smart cover.

In SU-42 tablet mode the device was tested in all cellular bands with its back facing the flat phantom. Exclusion from testing of SU-42 Smart cover edges was based on SAR Exclusion Threshold formula (KDB447498 DR01), please find calculations in Appendix J. In SU-42 tablet mode the Smart cover was tested at full power with a separation distance of 0mm from the back surface and a separation distance of 20mm from the Left edge. The separation distance used in all reduced power testing was 0mm.

The following table details the edge/antenna combinations tested for SU-42 Smart cover tablet mode. WLAN tests were excluded from all tests.

	Left edge	Top edge	Right edge	Bottom edge
Cellular antenna	✓	×	×	×

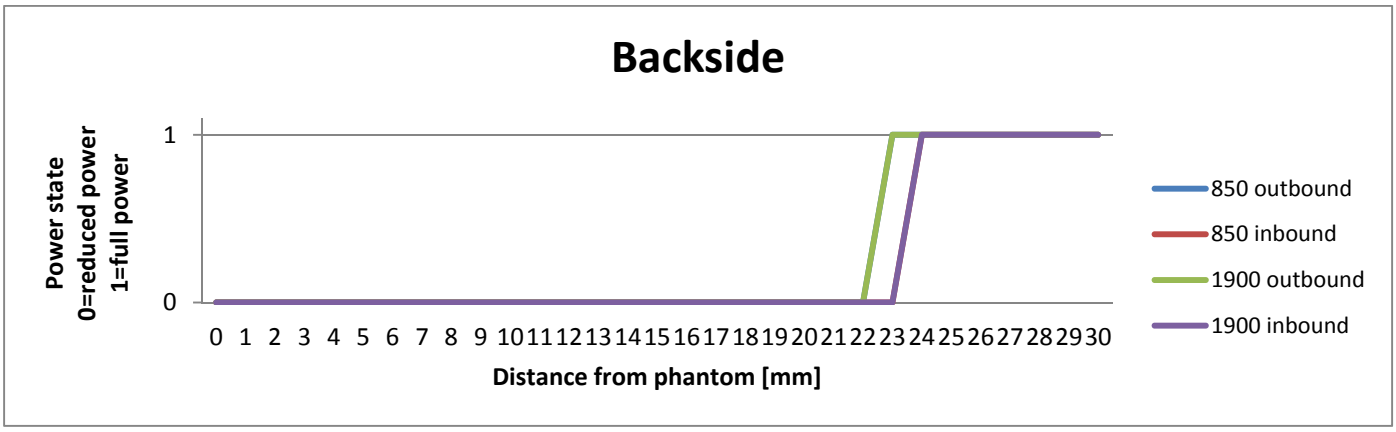
The following table details the edge/antenna combinations tested for SU-42 laptop mode. All cellular and WLAN tests were excluded from all tests except GPRS850 Bottom edge testing.

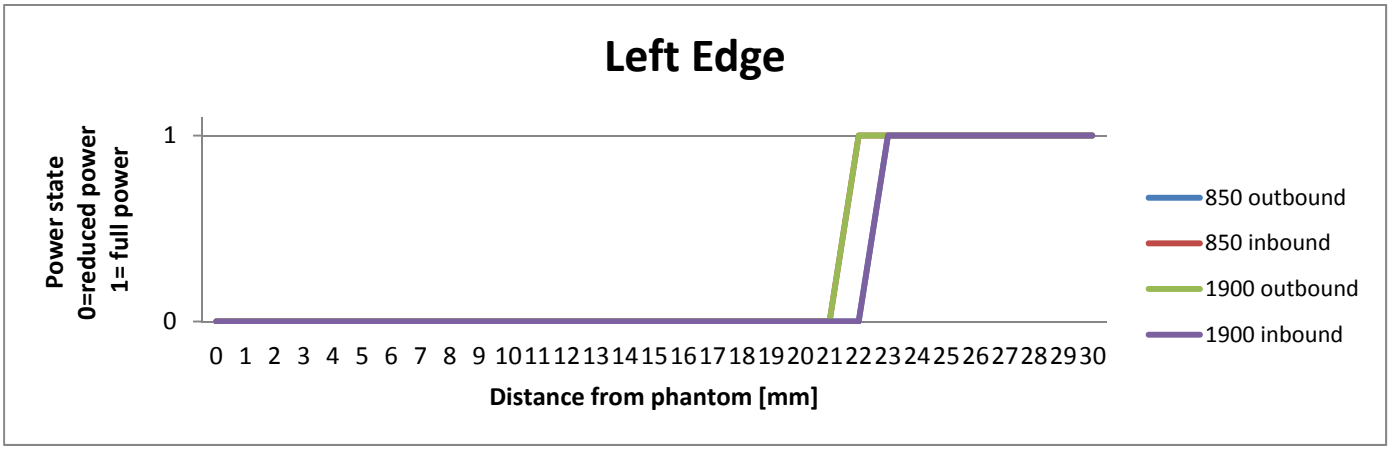
	Left edge	Top edge	Right edge	Bottom edge
Cellular antenna	×	×	×	✓

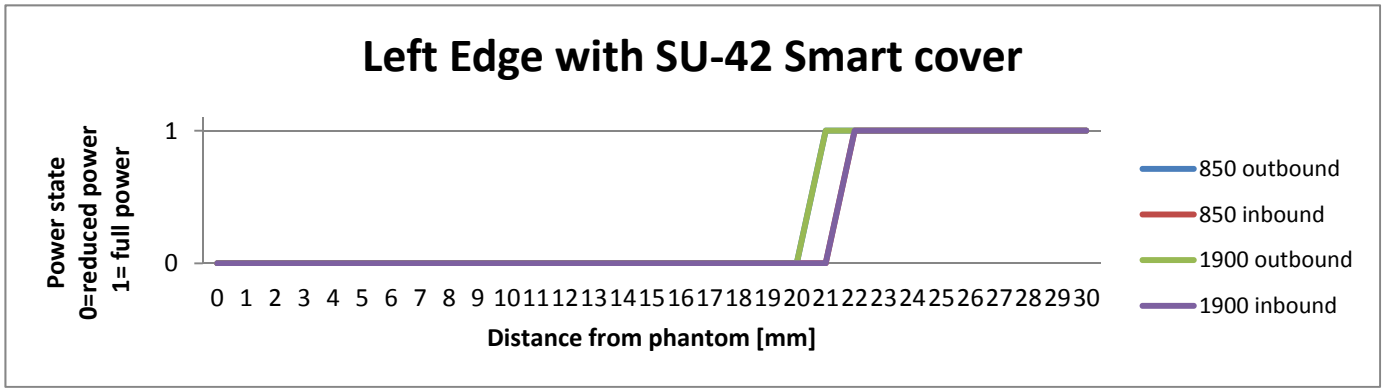
Copyright © 2013 TCC Nokia

5.2.2 Proximity Sensor Considerations

Full power separation distances are based on proximity sensor triggering distances, on back side and left edge, respectively. Following graph depicts the proximity sensor triggering distances for tissue simulating liquids at different frequencies, and when approaching (inbound) and drawn away (outbound) from the phantom:





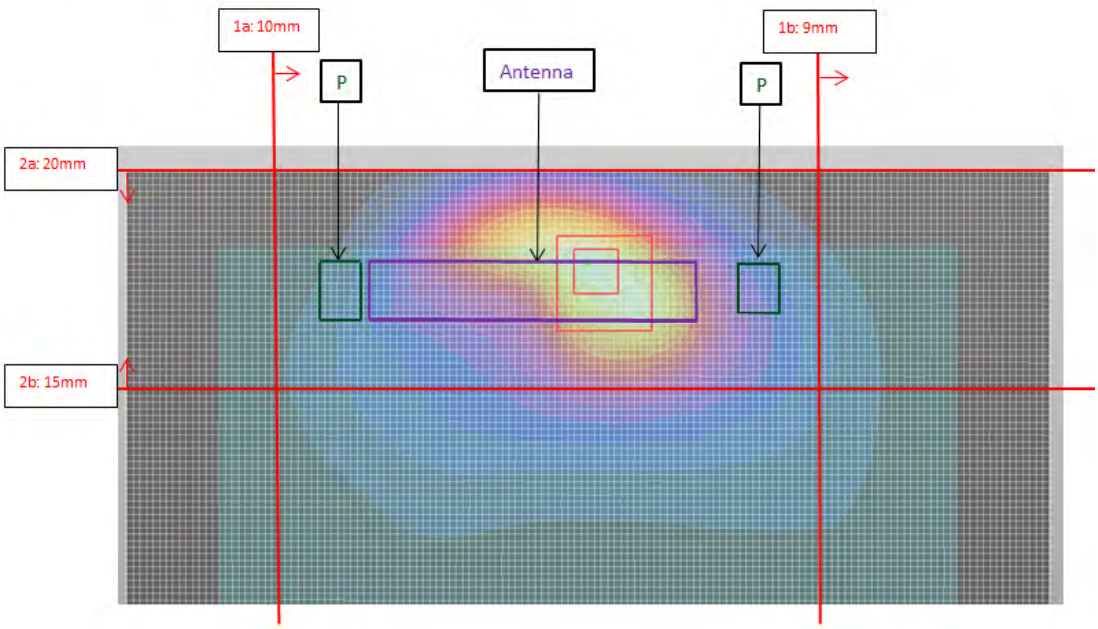


Copyright © 2013 TCC Nokia

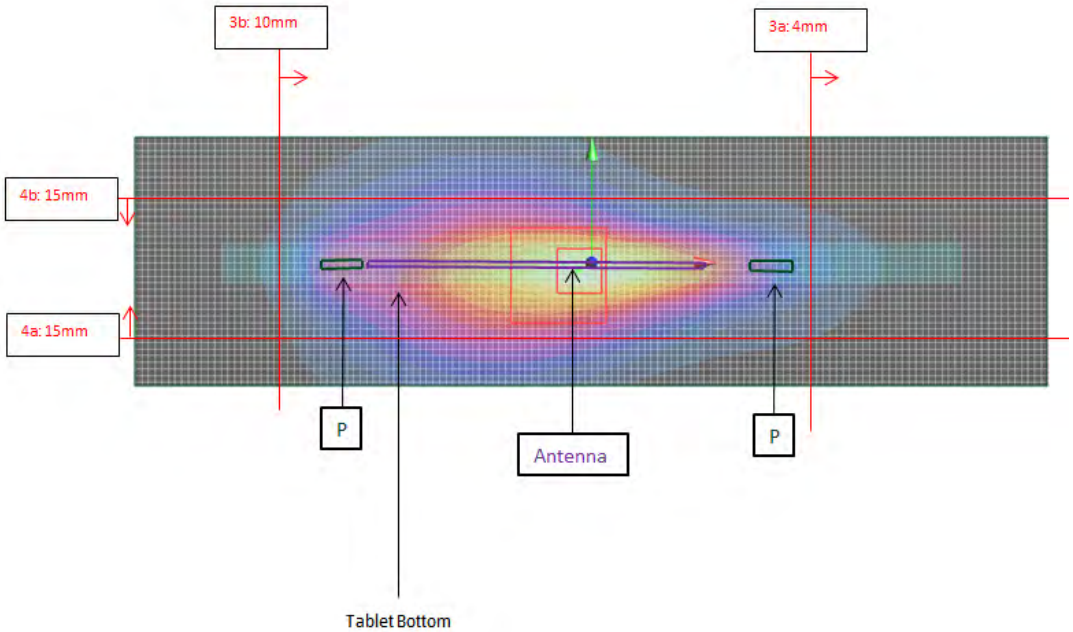
Only 1900 liquid graphs are visible, since triggering distance is exactly the same at both 850 and 1900 liquid. The test distance was chosen as closest distance among these tests, i.e. 22mm from the back surface and 21mm from the left edge (20mm from the left edge for SU-42 Smart cover tablet mode).

Following drawings depict proximity sensor coverage area overlaid on top of SAR distribution in 835MHz. 835Mhz has widest spread of all cellular SAR distributions, giving conservative estimate of the needed proximity sensor coverage area.

As Seen From Tablet Back Side



Copyright © 2013 TCC Nokia



In addition, proximity sensor passes the +-45deg tilt test for left edge at this distance. Full proximity sensor test results are tabulated in Appendix K.

Both WLANs were tested at full power with device touching the phantom. Combining these WLAN results with cellular band results at above mentioned separation distances gives conservative estimate of the combined SAR value.

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 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 Dasy4 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).

Copyright © 2013 TCC Nokia

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.

Copyright © 2013 TCC Nokia

6. MEASUREMENT UNCERTAINTY

Table 6.1 – Measurement uncertainty evaluation

Uncertainty Component	Section in IEEE 1528	Tol. (%)	Prob Dist	Div	c_i	$c_i . u_i$ (%)	v_i
Measurement System							
Probe Calibration	E2.1	±6.55	N	1	1	±6.55	∞
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	±1.0	R	√3	1	±0.6	∞
Linearity	E2.4	±4.7	R	√3	1	±2.7	∞
System Detection Limits	E2.5	±1.0	R	√3	1	±0.6	∞
Readout Electronics	E2.6	±1.0	N	1	1	±1.0	∞
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	±0.4	R	√3	1	±0.2	∞
Probe Positioning with respect to Phantom Shell	E6.3	±2.9	R	√3	1	±1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E5	±3.9	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	±5.0	N	1	1	±5.0	7
Output Power Variation - SAR drift measurement	6.6.3	±5.0	R	√3	1	±2.9	∞
Phantom and Tissue Parameters							
Phantom Uncertainty (shape and thickness tolerances)	E3.1	±4.0	R	√3	1	±2.3	∞
Conductivity Target - tolerance	E3.2	±5.0	R	√3	0.64	±1.8	∞
Conductivity - measurement uncertainty	E3.3	±5.5	N	1	0.64	±3.5	5
Permittivity Target - tolerance	E3.2	±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			**±13.5**	116
Coverage Factor for 95%			**k=2**				
Expanded Uncertainty						**±27.1**	

Copyright © 2013 TCC Nokia

Table 6.2 – Measurement uncertainty evaluation for Fast SAR

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	±6.55	N	1	0		
Axial Isotropy	±4.7	R	√3	0.7	±1.9	∞
Hemispherical Isotropy	±9.6	R	√3	0.7	±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	±2.9	N	1	1	±2.9	145
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 - measurement uncertainty	±2.5	R	√3	0		
Permittivity - measurement uncertainty	±2.5	R	√3	0		
Temperature - Conductivity	±3.4	R	√3	0		
Temperature - Permittivity	±0.4	R	√3	0		
Combined Standard Uncertainty		RSS			±13.9	748
Coverage Factor for 95%		**k=2**				
Expanded Uncertainty					±27.8	

Copyright © 2013 TCC Nokia

7. RESULTS

7.1 The measured Body SAR values for the test device are tabulated below:

850MHz Band Body SAR results – Reduced Power

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation (Estimated SAR - Full SAR) [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		
1-slot GPRS	Tuning Target + Tolerance [dBm]		29.85			Scaling factor*				
	Conducted Slot Average Power [dBm]		29.00	29.00	29.00	0.85	0.85	0.85	dB	
	Time-averaged power [dBm]		19.97	19.97	19.97	1.22	1.22	1.22	Lin	
	Back facing phantom 0mm	Estimated SAR	0.807	0.817	0.781	0.981	0.994	0.950	0.02	-
		Full SAR	-	0.839	-	-	1.02	-		
2-slot GPRS	Tuning Target + Tolerance [dBm]		27.85			Scaling factor*				
	Conducted Slot Average Power [dBm]		27.40	27.30	27.60	0.45	0.55	0.25	dB	
	Time-averaged power [dBm]		21.38	21.28	21.58	1.11	1.14	1.06	Lin	
	Back facing phantom 0mm	Estimated SAR	1.14	1.13	1.12	1.26	1.28	1.19	0.03	1
		Full SAR	1.17	1.15	-	1.30	**1.31**	-		
	Left edge facing phantom 0mm	Estimated SAR	-	0.342	-	-	0.388	-	0.00	-
		Full SAR	-	0.344	-	-	0.390	-		

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

2-slot GPRS SU-42 Tablet mode	Tuning Target + Tolerance [dBm]		27.85			Scaling factor*				
	Conducted Slot Average Power [dBm]		27.40	27.30	27.60	0.45	0.55	0.25	dB	
	Time-averaged power [dBm]		21.38	21.28	21.58	1.11	1.14	1.06	Lin	
	Left edge facing phantom 0mm	Estimated SAR	-	0.274	-	-	0.311	-	-	-
		Full SAR	-	-	-	-	-	-		
3-slot GPRS	Tuning Target + Tolerance [dBm]		25.55			Scaling factor*				
	Conducted Slot Average Power [dBm]		25.20	25.50	25.40	0.35	0.05	0.15	dB	
	Time-averaged power [dBm]		20.94	21.24	21.14	1.08	1.01	1.04	Lin	
	Back facing phantom 0mm	Estimated SAR	1.20	1.29	1.12	1.30	1.31	1.16	0.03	-
		Full SAR	1.17	1.28	-	1.27	1.30	-		
	Repeated SAR: Back facing phantom 0mm	Estimated SAR	-	1.23	-	-	1.24	-	0.02	-
		Full SAR	-	1.25	-	-	1.26	-		
4-slot GPRS	Tuning Target + Tolerance [dBm]		23.35			Scaling factor*				
	Conducted Slot Average Power [dBm]		23.10	23.10	23.00	0.25	0.25	0.35	dB	
	Time-averaged power [dBm]		20.09	20.09	19.99	1.06	1.06	1.08	Lin	
	Back facing phantom 0mm	Estimated SAR	0.978	1.03	0.929	1.04	1.09	1.01	0.01	-
		Full SAR	-	1.02	-	-	1.08	-		

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation (Estimated SAR - Full SAR) [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		
WCDMA	Tuning Target + Tolerance [dBm]		21.35			Scaling factor*				
	Conducted Power [dBm]		21.24	21.21	21.28	0.11	0.14	0.07	dB	
	Time-averaged power [dBm]		21.24	21.21	21.28	1.03	1.03	1.02	Lin	
	Back facing phantom 0mm	Estimated SAR	1.13	1.09	1.07	1.16	1.13	1.09	0.02	2
		Full SAR	1.15	-	-	1.18	-	-		
	Left edge facing phantom 0mm	Estimated SAR	-	0.304	-	-	0.314	-	0.01	-
		Full SAR	-	0.312	-	-	0.322	-		
	Repeated SAR: Back facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-
		Full SAR	1.15	-	-	1.18	-	-		
WCDMA SU-42 Tablet mode	Tuning Target + Tolerance [dBm]		21.35			Scaling factor*				
	Conducted Power [dBm]		21.24	21.21	21.28	0.11	0.14	0.07	dB	
	Time-averaged power [dBm]		21.24	21.21	21.28	1.03	1.03	1.02	Lin	
	Left edge facing phantom 0mm	Estimated SAR	-	0.258	-	-	0.266	-	-	-
		Full SAR	-	-	-	-	-	-		

Copyright © 2013 TCC Nokia

850MHz Band Body SAR results – Full Power

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation (Estimated SAR - Full SAR) [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		
1-slot GPRS	Tuning Target + Tolerance [dBm]		32.85			Scaling factor*				
	Conducted Slot Average Power [dBm]		32.84	32.52	32.77	0.01	0.33	0.08	dB	
	Time-averaged power [dBm]		23.81	23.49	23.74	1.00	1.08	1.02	Lin	
	Back facing phantom 22mm	Estimated SAR	-	0.302	-	-	0.326	-	-	-
		Full SAR	-	-	-	-	-	-		
2-slot GPRS	Tuning Target + Tolerance [dBm]		30.35			Scaling factor*				
	Conducted Slot Average Power [dBm]		30.28	30.14	30.10	0.07	0.21	0.25	dB	
	Time-averaged power [dBm]		24.26	24.12	24.08	1.02	1.05	1.06	Lin	
	Back facing phantom 22mm	Estimated SAR	0.275	0.326	0.342	0.279	0.342	0.362	0.00	3
		Full SAR	-	-	0.344	-	-	**0.364**		
	Top edge facing phantom 0mm	Estimated SAR	-	0.303	-	-	0.318	-	-	-
		Full SAR	-	-	-	-	-	-		
	Bottom facing phantom 0mm	Estimated SAR	-	0.209	-	-	0.219	-	-	-
		Full SAR	-	-	-	-	-	-		
	Left edge facing phantom 21mm	Estimated SAR	-	0.150	-	-	0.157	-	-	-
		Full SAR	-	-	-	-	-	-		

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

2-slot GPRS SU-42 Tablet mode	Tuning Target + Tolerance [dBm]		30.35			Scaling factor*				
	Conducted Slot Average Power [dBm]		30.28	30.14	30.10	0.07	0.21	0.25	dB	
	Time-averaged power [dBm]		24.26	24.12	24.08	1.02	1.05	1.06	Lin	
	Back facing phantom 0mm	Estimated SAR	-	-	0.082	-	-	0.086	-	-
		Full SAR	-	-	-	-	-	-		
	Left edge facing phantom 20mm	Estimated SAR	-	0.048	-	-	0.051	-	-	-
		Full SAR	-	-	-	-	-	-		
2-slot GPRS SU-42 Laptop mode	Tuning Target + Tolerance [dBm]		30.35			Scaling factor*				
	Conducted Slot Average Power [dBm]		30.28	30.14	30.10	0.07	0.21	0.25	dB	
	Time-averaged power [dBm]		24.26	24.12	24.08	1.02	1.05	1.06	Lin	
	Bottom facing phantom 0mm	Estimated SAR	-	0.017	-	-	0.017	-	-	-
		Full SAR	-	-	-	-	-	-		
3-slot GPRS	Tuning Target + Tolerance [dBm]		28.55			Scaling factor*				
	Conducted Slot Average Power [dBm]		28.42	28.31	28.54	0.13	0.24	0.01	dB	
	Time-averaged power [dBm]		24.16	24.05	24.28	1.03	1.06	1.00	Lin	
	Back facing phantom 22mm	Estimated SAR	-	0.313	-	-	0.331	-	-	-
		Full SAR	-	-	-	-	-	-		
		Full SAR	-	-	-	-	-	-		

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

4-slot GPRS	Tuning Target + Tolerance [dBm]		27.35			Scaling factor*				
	Conducted Slot Average Power [dBm]		27.10	27.28	27.17	0.25	0.07	0.18	dB	
	Time-averaged power [dBm]		24.09	24.27	24.16	1.06	1.02	1.04	Lin	
	Back facing phantom 22mm	Estimated SAR	-	0.324	-	-	0.329	-	-	-
		Full SAR	-	-	-	-	-	-		
Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation (Estimated SAR - Full SAR) [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		
WCDMA	Tuning Target + Tolerance [dBm]		23.85			Scaling factor*				
	Conducted Power [dBm]		23.76	23.66	23.60	0.09	0.19	0.25	dB	
	Time-averaged power [dBm]		23.76	23.66	23.60	1.02	1.04	1.06	Lin	
	Back facing phantom 22mm	Estimated SAR	0.326	0.308	0.281	0.333	0.322	0.298	0.00	4
		Full SAR	0.324	-	-	**0.331**	-	-		
	Top edge facing phantom 0mm	Estimated SAR	-	0.152	-	-	0.159	-	-	-
		Full SAR	-	-	-	-	-	-		
	Bottom facing phantom 0mm	Estimated SAR	-	0.166	-	-	0.173	-	-	-
		Full SAR	-	-	-	-	-	-		
	Left edge facing phantom 21mm	Estimated SAR	-	0.115	-	-	0.120	-	-	-
		Full SAR	-	-	-	-	-	-		

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

WCDMA SU-42 Tablet mode	Tuning Target + Tolerance [dBm]		23.85			Scaling factor*				
	Conducted Power [dBm]		23.76	23.66	23.60	0.09	0.19	0.25	dB	
	Time-averaged power [dBm]		23.76	23.66	23.60	1.02	1.04	1.06	Lin	
	Back facing phantom 0mm	Estimated SAR	0.082	-	-	0.083	-	-	-	-
		Full SAR	-	-	-	-	-	-		
	Left edge facing phantom 20mm	Estimated SAR	-	0.029	-	-	0.031	-	-	-
		Full SAR	-	-	-	-	-	-		

Copyright © 2013 TCC Nokia

1900MHz Band Body SAR results – Reduced Power

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation (Estimated SAR - Full SAR) [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		
1-slot GPRS	Tuning Target + Tolerance [dBm]		26.35			Scaling factor*				
	Conducted Slot Average Power [dBm]		26.00	26.20	26.10	0.35	0.15	0.25	dB	
	Time-averaged power [dBm]		16.97	17.17	17.07	1.08	1.04	1.06	Lin	
	Back facing phantom 0mm	Estimated SAR	0.950	0.946	0.881	1.03	0.979	0.933	0.04	-
		Full SAR	0.989	-	-	1.07	-	-		
2-slot GPRS	Tuning Target + Tolerance [dBm]		22.35			Scaling factor*				
	Conducted Slot Average Power [dBm]		22.30	22.30	22.20	0.05	0.05	0.15	dB	
	Time-averaged power [dBm]		16.28	16.28	16.18	1.01	1.01	1.04	Lin	
	Back facing phantom 0mm	Estimated SAR	-	0.724	-	-	0.732	-	-	-
		Full SAR	-	-	-	-	-	-		
3-slot GPRS	Tuning Target + Tolerance [dBm]		21.55			Scaling factor*				
	Conducted Slot Average Power [dBm]		21.20	21.20	21.20	0.35	0.35	0.35	dB	
	Time-averaged power [dBm]		16.94	16.94	16.94	1.08	1.08	1.08	Lin	
	Back facing phantom 0mm	Estimated SAR	0.998	0.960	0.894	1.08	1.04	0.969	0.05	-
		Full SAR	1.05	-	-	1.14	-	-		

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

4-slot GPRS	Tuning Target + Tolerance [dBm]		20.85			Scaling factor*				
	Conducted Slot Average Power [dBm]		20.30	20.30	20.20	0.55	0.55	0.65	dB	
	Time-averaged power [dBm]		17.29	17.29	17.19	1.14	1.14	1.16	Lin	
	Back facing phantom 0mm	Estimated SAR	0.989	0.950	0.891	1.12	1.08	1.04	0.05	5
		Full SAR	1.04	-	-	1.18	-	-		
	Left edge facing phantom 0mm	Estimated SAR	-	0.476	-	-	0.540	-	0.01	-
		Full SAR	-	0.487	-	-	0.553	-		
	Repeated SAR: Back facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-
		Full SAR	1.04	-	-	1.18	-	-		
4-slot GPRS SU-42 Tablet mode	Tuning Target + Tolerance [dBm]		20.85			Scaling factor*				
	Conducted Slot Average Power [dBm]		20.30	20.30	20.20	0.55	0.55	0.65	dB	
	Time-averaged power [dBm]		17.29	17.29	17.19	1.14	1.14	1.16	Lin	
	Left edge facing phantom 0mm	Estimated SAR	-	0.354	-	-	0.402	-	-	-
		Full SAR	-	-	-	-	-	-		

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation (Estimated SAR - Full SAR) [W/kg]	Plot #
			Ch 9262 1852.4 MHz	Ch 9400 1880.0 MHz	Ch 9538 1907.6 MHz	Ch 9262 1852.4 MHz	Ch 9400 1880.0 MHz	Ch 9538 1907.6 MHz		
WCDMA	Tuning Target + Tolerance [dBm]		17.85			Scaling factor*				
	Conducted Power [dBm]		17.57	17.61	17.83	0.28	0.24	0.02	dB	
	Time-averaged power [dBm]		17.57	17.61	17.83	1.07	1.06	1.00	Lin	
	Back facing phantom 0mm	Estimated SAR	1.14	1.07	1.10	1.22	1.13	1.11	0.10	-
		Full SAR	1.24	-	-	1.32	-	-		
	Left edge facing phantom 0mm	Estimated SAR	-	0.599	-	-	0.633	-	0.01	-
		Full SAR	-	0.609	-	-	0.644	-		
	Repeated SAR: Back facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	6
		Full SAR	1.26	-	-	1.34	-	-		
WCDMA SU-42 Tablet mode	Tuning Target + Tolerance [dBm]		17.85			Scaling factor*				
	Conducted Power [dBm]		17.57	17.61	17.83	0.28	0.24	0.02	dB	
	Time-averaged power [dBm]		17.57	17.61	17.83	1.07	1.06	1.00	Lin	
	Left edge facing phantom 0mm	Estimated SAR	-	0.431	-	-	0.455	-	-	-
		Full SAR	-	-	-	-	-	-		

Copyright © 2013 TCC Nokia

1900MHz Band Body SAR results – Full Power

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation (Estimated SAR - Full SAR) [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		
1-slot GPRS	Tuning Target + Tolerance [dBm]		30.35			Scaling factor*				
	Conducted Slot Average Power [dBm]		30.22	30.32	30.24	0.13	0.03	0.11	dB	
	Time-averaged power [dBm]		21.19	21.29	21.21	1.03	1.01	1.03	Lin	
	Back facing phantom 22mm	Estimated SAR	-	0.078	-	-	0.079	-	-	-
		Full SAR	-	-	-	-	-	-		
2-slot GPRS	Tuning Target + Tolerance [dBm]		27.35			Scaling factor*				
	Conducted Slot Average Power [dBm]		27.32	27.29	27.26	0.03	0.06	0.09	dB	
	Time-averaged power [dBm]		21.30	21.27	21.24	1.01	1.01	1.02	Lin	
	Back facing phantom 22mm	Estimated SAR	-	0.094	-	-	0.096	-	-	-
		Full SAR	-	-	-	-	-	-		
3-slot GPRS	Tuning Target + Tolerance [dBm]		25.55			Scaling factor*				
	Conducted Slot Average Power [dBm]		25.43	25.42	25.50	0.12	0.13	0.05	dB	
	Time-averaged power [dBm]		21.17	21.16	21.24	1.03	1.03	1.01	Lin	
	Back facing phantom 22mm	Estimated SAR	-	0.099	-	-	0.102	-	-	-
		Full SAR	-	-	-	-	-	-		

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

4-slot GPRS	Tuning Target + Tolerance [dBm]		24.35			Scaling factor*				
	Conducted Slot Average Power [dBm]		24.18	24.22	24.28	0.17	0.13	0.07	dB	
	Time-averaged power [dBm]		21.17	21.21	21.27	1.04	1.03	1.02	Lin	
	Back facing phantom 22mm	Estimated SAR	-	0.101	-	-	0.104	-	-	-
		Full SAR	-	-	-	-	-	-		
	Top edge facing phantom 0mm	Estimated SAR	0.350	0.310	0.362	0.364	0.319	0.368	0.00	7
		Full SAR	-	-	0.363	-	-	**0.369**		
	Left edge facing phantom 21mm	Estimated SAR	-	0.143	-	-	0.147	-	-	-
		Full SAR	-	-	-	-	-	-		
4-slot GPRS SU-42 Tablet mode	Tuning Target + Tolerance [dBm]		24.35			Scaling factor*				
	Conducted Slot Average Power [dBm]		24.18	24.22	24.28	0.17	0.13	0.07	dB	
	Time-averaged power [dBm]		21.17	21.21	21.27	1.04	1.03	1.02	Lin	
	Back facing phantom 0mm	Estimated SAR	-	0.086	-	-	0.089	-	-	-
		Full SAR	-	-	-	-	-	-		
	Left edge facing phantom 20mm	Estimated SAR	-	0.135	-	-	0.139	-	-	-
		Full SAR	-	-	-	-	-	-		

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation (Estimated SAR - Full SAR) [W/kg]	Plot #
			Ch 9262 1852.4 MHz	Ch 9400 1880.0 MHz	Ch 9538 1907.6 MHz	Ch 9262 1852.4 MHz	Ch 9400 1880.0 MHz	Ch 9538 1907.6 MHz		
WCDMA	Tuning Target + Tolerance [dBm]		23.85			Scaling factor*				
	Conducted Power [dBm]		23.57	23.57	23.62	0.28	0.28	0.23	dB	
	Time-averaged power [dBm]		23.57	23.57	23.62	1.07	1.07	1.05	Lin	
	Back facing phantom 22mm	Estimated SAR	-	0.280	-	-	0.299	-	-	-
		Full SAR	-	-	-	-	-	-		
	Top edge facing phantom 0mm	Estimated SAR	0.695	0.735	0.807	0.741	0.784	0.851	0.07	-
		Full SAR	-	-	0.741	-	-	0.781		
	Bottom edge facing phantom 0mm	Estimated SAR	-	0.063	-	-	0.068	-	-	-
		Full SAR	-	-	-	-	-	-		
	Left edge facing phantom 21mm	Estimated SAR	-	0.313	-	-	0.334	-	0.03	-
		Full SAR	-	0.284	-	-	0.303	-		
	Repeated SAR: Top edge facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	8
		Full SAR	-	-	0.761	-	-	0.802		

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

WCDMA SU-42 Tablet mode	Tuning Target + Tolerance [dBm]		23.85			Scaling factor*				
	Conducted Power [dBm]		23.57	23.57	23.62	0.28	0.28	0.23	dB	
	Time-averaged power [dBm]		23.57	23.57	23.62	1.07	1.07	1.05	Lin	
	Back facing phantom 0mm	Estimated SAR	-	0.165		-	0.176	-	-	-
		Full SAR	-	-	-	-	-	-		
	Left edge facing phantom 20mm	Estimated SAR	-	0.302	-	-	0.322	-	-	-
		Full SAR	-	-	-	-	-	-		

2450MHz Body SAR results – Main Antenna

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation (Estimated SAR - Full SAR) [W/kg]	Plot #
			Ch 1 2412 MHz	Ch 6 2437.0 MHz	Ch 11 2462.0 MHz	Ch 1 2412 MHz	Ch 6 2437.0 MHz	Ch 11 2462.0 MHz		
WLAN b-mode BPSK 1Mbps	Tuning Target + Tolerance [dBm]		15.00			Scaling factor*				
	Conducted Slot Average Power [dBm]		12.53	14.61	13.44	2.47	0.39	1.56	dB	
	Time-averaged power [dBm]		12.53	14.61	13.44	1.77	1.09	1.43	Lin	
	Back facing phantom 0mm	Estimated SAR	0.565	0.973	0.644	0.998	1.06	0.922	0.08	-
		Full SAR	-	0.889	-	-	0.973	-		
	Bottom edge facing phantom 0mm	Estimated SAR	-	0.375	-	-	0.410	-	0.01	-
		Full SAR	-	0.381	-	-	0.417	-		
	Repeated SAR, Back facing phantom	Estimated SAR	-	-	-	-	-	-	-	9
		Full SAR	-	0.899	-	-	**0.983**	-		

Copyright © 2013 TCC Nokia

2450MHz Body SAR results – AUX Antenna

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation (Estimated SAR - Full SAR) [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		
WLAN b-mode BPSK 1Mbps	Tuning Target + Tolerance [dBm]		14.50			Scaling factor*				
	Conducted Slot Average Power [dBm]		12.82	14.25	12.11	1.68	0.25	2.39	dB	
	Time-averaged power [dBm]		12.82	14.25	12.11	1.47	1.06	1.73	Lin	
	Back facing phantom 0mm	Estimated SAR	0.715	0.914	0.567	1.05	0.968	0.983	0.06	10
		Full SAR	0.753	-	-	1.11	-	-		
	Bottom edge facing phantom 0mm	Estimated SAR	-	0.263	-	-	0.279	-	0.01	-
		Full SAR	-	0.275	-	-	0.291	-		
	Repeated SAR: Back facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-
		Full SAR	-	0.935	-	-	0.990	-		

Copyright © 2013 TCC Nokia

5000MHz Body SAR results
5150–5250 MHz and 5250–5350 MHz – Main Antenna

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]				Reported* 1g SAR [W/kg]				Max Deviation (Estimated SAR - Full SAR) [W/kg]	Plot #
			Ch 40 5200.0 MHz	Ch 44 5220.0 MHz	Ch 56 5280.0 MHz	Ch 60 5300.0 MHz	Ch 40 5200.0 MHz	Ch 44 5220.0 MHz	Ch 56 5280.0 MHz	Ch 60 5300.0 MHz		
WLAN a-mode BPSK 6 Mbps	Tuning Target + Tolerance [dBm]		9.00		9.00		Scaling factor*					
	Conducted Power [dBm]		8.36	8.51	8.23	8.44	0.64	0.49	0.77	0.56	dB	
	Time-averaged power [dBm]		8.36	8.51	8.23	8.44	1.16	1.12	1.19	1.14	Lin	
	Back facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-	-	-
		Full SAR	0.240	0.270	0.372	0.355	0.278	0.302	0.444	0.404		
	Bottom edge facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-	-	-
		Full SAR	-	0.396	0.389	-	-	0.443	0.464	-		

Copyright © 2013 TCC Nokia

5000MHz Body SAR results
5150–5250 MHz and 5250–5350 MHz – AUX Antenna

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]				Reported* 1g SAR [W/kg]				Max Deviation (Estimated SAR - Full SAR) [W/kg]	Plot #
			Ch 36 5180.0 MHz	Ch 44 5220.0 MHz	Ch 52 5260.0 MHz	Ch 60 5300.0 MHz	Ch 36 5180.0 MHz	Ch 44 5220.0 MHz	Ch 52 5260.0 MHz	Ch 60 5300.0 MHz		
WLAN a-mode BPSK 6 Mbps	Tuning Target + Tolerance [dBm]		11.00		10.00		Scaling factor*					
	Conducted Power [dBm]		10.14	9.82	8.48	7.77	0.86	1.18	1.52	2.23	dB	
	Time-averaged power [dBm]		10.14	9.82	8.48	7.77	1.22	1.31	1.42	1.67	Lin	
	Back facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-	-	-
		Full SAR	0.416	0.420	0.415	0.319	0.507	0.551	0.589	0.533		
	Bottom edge facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-	-	11
		Full SAR	-	1.03	0.836	-	-	**1.35**	1.19	-		
	Repeated SAR: Bottom edge facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-	-	-
		Full SAR	-	1.02	0.835	-	-	1.34	1.19	-		

Copyright © 2013 TCC Nokia

5000MHz Body SAR results
5470–5725 MHz - Main Antenna

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]				Reported* 1g SAR [W/kg]				Max Deviation (Estimated SAR - Full SAR) [W/kg]	Plot #
			Ch 104 5520.0 MHz	Ch 112 5560.0 MHz	Ch 128 5640.0 MHz	Ch 136 5680.0 MHz	Ch 104 5520.0 MHz	Ch 112 5560.0 MHz	Ch 128 5640.0 MHz	Ch 136 5680.0 MHz		
WLAN a-mode BPSK 6 Mbps	Tuning Target + Tolerance [dBm]		9.00		8.00		Scaling factor*					
	Conducted Power [dBm]		7.95	7.51	7.08	7.41	1.05	1.49	0.92	0.59	dB	
	Time-averaged power [dBm]		7.95	7.51	7.08	7.41	1.27	1.41	1.24	1.15	Lin	
	Back facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-	-	-
		Full SAR	0.353	0.250	0.154	0.208	0.450	0.352	0.190	0.238		
	Bottom edge facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-	-	12
		Full SAR	0.595	-	-	-	**0.758**	-	-	-		

Copyright © 2013 TCC Nokia

5000MHz Body SAR results
5470–5725 MHz - AUX Antenna

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]				Reported* 1g SAR [W/kg]				Max Deviation (Estimated SAR - Full SAR) [W/kg]	Plot #
			Ch 108 5540.0 MHz	Ch 120 5600.0 MHz	Ch 124 5620.0 MHz	Ch 136 5680.0 MHz	Ch 108 5540.0 MHz	Ch 120 5600.0 MHz	Ch 124 5620.0 MHz	Ch 136 5680.0 MHz		
WLAN a-mode BPSK 6 Mbps	Tuning Target + Tolerance [dBm]		10.00	11.00			Scaling factor*					
	Conducted Power [dBm]		9.09	9.82	10.00	9.63	0.91	1.18	1.00	1.37	dB	
	Time-averaged power [dBm]		9.09	9.82	10.00	9.63	1.23	1.31	1.26	1.37	Lin	
	Back facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-	-	-
		Full SAR	0.466	0.507	0.489	0.448	0.575	0.665	0.616	0.614		
	Bottom edge facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-	-	-
		Full SAR	-	0.931	-	-	-	1.22	-	-		
	Repeated SAR: Bottom edge facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-	-	-
		Full SAR	-	0.922	-	-	-	1.21	-	-		

Copyright © 2013 TCC Nokia

5000MHz Body SAR results
5725–5850 MHz – Main Antenna

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation (Estimated SAR - Full SAR) [W/kg]	Plot #
			Ch 153 5765.0 MHz	Ch 161 5805.0 MHz	Ch 165 5825.0 MHz	Ch 153 5765.0 MHz	Ch 161 5805.0 MHz	Ch 165 5825.0 MHz		
WLAN a-mode BPSK 6 Mbps	Tuning Target + Tolerance [dBm]		9.00			Scaling factor*				
	Conducted Power [dBm]		7.49	8.52	8.46	1.51	0.48	0.54	dB	
	Time-averaged power [dBm]		7.49	8.52	8.46	1.42	1.12	1.13	Lin	
	Back facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-
		Full SAR	0.168	0.245	0.291	0.238	0.274	0.330		
	Bottom edge facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-
		Full SAR	-	-	0.424	-	-	0.480		

5000MHz Body SAR results
5725–5850 MHz – AUX Antenna

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation (Estimated SAR - Full SAR) [W/kg]	Plot #
			Ch 149 5745.0 MHz	Ch 157 5785.0 MHz	Ch 161 5805.0 MHz	Ch 149 5745.0 MHz	Ch 157 5785.0 MHz	Ch 161 5805.0 MHz		
WLAN a-mode BPSK 6 Mbps	Tuning Target + Tolerance [dBm]		10.00			Scaling factor*				
	Conducted Power [dBm]		9.13	9.31	9.29	0.87	0.69	0.71	dB	
	Time-averaged power [dBm]		9.13	9.31	9.29	1.22	1.17	1.18	Lin	
	Back facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-
		Full SAR	0.429	0.451	0.430	0.524	0.529	0.506		
	Bottom edge facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-
		Full SAR	-	0.620	-	-	0.727	-		

Copyright © 2013 TCC Nokia

Simultaneous transmissions: Combined Body SAR results – Individual band Max results – Reduced power

Test configuration	*Reported Max. 1g SAR results							
	WLAN 2450 - Main	WLAN 2450 - AUX	WLAN 5000 - Main	WLAN 5000 - AUX	2-slot GPRS 850	WCDMA 850	4-slot GPRS 1900	WCDMA 1900
Back facing phantom	0.983	1.11	0.450	0.665	1.31	1.18	1.18	1.34
Bottom edge facing phantom	0.417	0.291	0.758	1.35	-	-	-	-
Left edge facing phantom	-	-	-	-	0.390	0.322	0.553	0.644

Simultaneous transmissions: Combined Body SAR results – Individual band Max results – Full power

Test configuration	*Reported Max. 1g SAR results							
	WLAN 2450 - Main	WLAN 2450 - AUX	WLAN 5000 - Main	WLAN 5000 - AUX	2-slot GPRS 850	WCDMA 850	4-slot GPRS 1900	WCDMA 1900
Back facing phantom	0.983	1.11	0.450	0.665	0.364	0.331	0.104	0.299
Top facing phantom	-	-	-	-	0.318	0.159	0.369	0.802
Bottom edge facing phantom	0.417	0.291	0.758	1.35	0.219	0.173	-	0.068
Left edge facing phantom	-	-	-	-	0.157	0.120	0.147	0.303

Copyright © 2013 TCC Nokia

Simultaneous transmissions: Combined body SAR results – Max + Max combined results - Reduced power

Test configuration	*Reported Max. 1g SAR results								
	WLAN 2450 Main + WLAN 2450 Aux	2-slot GPRS 850 + WLAN 2450 - Main	WCDMA 850 + WLAN 2450 - Main	4-slot GPRS 1900 + WLAN 2450 - Main	WCDMA 1900 + WLAN 2450 - Main	2-slot GPRS 850 + WLAN 2450 - AUX	WCDMA 850 + WLAN 2450 - AUX	4-slot GPRS 1900 + WLAN 2450 - AUX	WCDMA 1900 + WLAN 2450 - AUX
Back facing phantom	2.09	2.29	2.16	2.16	2.32	2.42	2.29	2.29	2.45
Bottom edge facing phantom	0.708	-	-	-	-	-	-	-	-
Left edge facing phantom	-	-	-	-	-	-	-	-	-
Test configuration	***Reported Max. 1g SAR results**								
	WLAN 5000 Main + WLAN 5000 Aux	2-slot GPRS 850 + WLAN 5000 - Main	WCDMA 850 + WLAN 5000 - Main	4-slot GPRS 1900 + WLAN 5000 - Main	WCDMA 1900 + WLAN 5000 - Main	2-slot GPRS 850 + WLAN 5000 - AUX	WCDMA 850 + WLAN 5000 - AUX	4-slot GPRS 1900 + WLAN 5000 - AUX	WCDMA 1900 + WLAN 5000 - AUX
Back facing phantom	1.12	1.76	1.63	1.63	1.79	1.98	1.85	1.85	2.01
Bottom edge facing phantom	2.11	-	-	-	-	-	-	-	-
Left edge facing phantom	-	-	-	-	-	-	-	-	-

Copyright © 2013 TCC Nokia

Simultaneous transmissions: Combined body SAR results – Max + Max combined results - Full power

Test configuration	*Reported Max. 1g SAR results								
	WLAN 2450 Main + WLAN 2450 Aux	2-slot GPRS 850 + WLAN 2450 - Main	WCDMA 850 + WLAN 2450 - Main	4-slot GPRS 1900 + WLAN 2450 - Main	WCDMA 1900 + WLAN 2450 - Main	2-slot GPRS 850 + WLAN 2450 - AUX	WCDMA 850 + WLAN 2450 - AUX	4-slot GPRS 1900 + WLAN 2450 - AUX	WCDMA 1900 + WLAN 2450 - AUX
Back facing phantom	**2.09**	**1.35**	**1.31**	**1.09**	**1.28**	**1.47**	**1.44**	**1.21**	**1.41**
Top edge facing phantom	-	-	-	-	-	-	-	-	-
Bottom edge facing phantom	0.708	0.636	0.590	-	0.485	0.510	0.464	-	0.359
Left edge facing phantom	-	-	-	-	-	-	-	-	-
Test configuration	*Reported Max. 1g SAR results								
	WLAN 5000 Main + WLAN 5000 Aux	2-slot GPRS 850 + WLAN 5000 - Main	WCDMA 850 + WLAN 5000 - Main	4-slot GPRS 1900 + WLAN 5000 - Main	WCDMA 1900 + WLAN 5000 - Main	2-slot GPRS 850 + WLAN 5000 - AUX	WCDMA 850 + WLAN 5000 - AUX	4-slot GPRS 1900 + WLAN 5000 - AUX	WCDMA 1900 + WLAN 5000 - AUX
Back facing phantom	1.12	0.814	0.781	0.554	0.749	1.03	1.00	0.769	0.964
Top edge facing phantom	-	-	-	-	-	-	-	-	-
Bottom edge facing phantom	**2.11**	**0.977**	**0.931**	-	**0.826**	**1.57**	**1.52**	-	**1.42**
Left edge facing phantom	-	-	-	-	-	-	-	-	-

Copyright © 2013 TCC Nokia

**Simultaneous transmissions: Combined body SAR results –
Max + Max + Max combined results - Reduced power**

Test configuration	*Reported Max. 1g SAR results							
	2-slot GPRS 850 + WLAN 2450 – Main + WLAN 2450 - AUX	WCDMA 850 + WLAN 2450 – Main + WLAN 2450 - AUX	4-slot GPRS 1900 + WLAN 2450 – Main + WLAN 2450 - AUX	WCDMA 1900 + WLAN 2450 – Main + WLAN 2450 - AUX	2-slot GPRS 850 + WLAN 5000 – Main + WLAN 5000 - AUX	WCDMA 850 + WLAN 5000 – Main + WLAN 5000 - AUX	4-slot GPRS 1900 + WLAN 5000 – Main + WLAN 5000 - AUX	WCDMA 1900 + WLAN 5000 – Main + WLAN 5000 - AUX
Back facing phantom	3.40	3.27	3.27	3.43	2.43	2.30	2.30	2.46
Bottom edge facing phantom	-	-	-	-	-	-	-	-
Left edge facing phantom	-	-	-	-	-	-	-	-

Copyright © 2013 TCC Nokia

Simultaneous transmissions: Combined body SAR results – Max + Max + Max combined results – Full power

Test configuration	*Reported Max. 1g SAR results							
	2-slot GPRS 850 + WLAN 2450 – Main + WLAN 2450 - AUX	WCDMA 850 + WLAN 2450 – Main + WLAN 2450 - AUX	4-slot GPRS 1900 + WLAN 2450 – Main + WLAN 2450 - AUX	WCDMA 1900 + WLAN 2450 – Main + WLAN 2450 - AUX	2-slot GPRS 850 + WLAN 5000 – Main + WLAN 5000 - AUX	WCDMA 850 + WLAN 5000 – Main + WLAN 5000 - AUX	4-slot GPRS 1900 + WLAN 5000 – Main + WLAN 5000 - AUX	WCDMA 1900 + WLAN 5000 – Main + WLAN 5000 - AUX
Back facing phantom	**2.46**	**2.42**	**2.20**	**2.39**	1.48	1.45	1.22	1.41
Top facing phantom	-	-	-	-	-	-	-	-
Bottom edge facing phantom	0.927	0.881	-	0.776	**2.33**	**2.28**	-	**2.18**
Left edge facing phantom	-	-	-	-	-	-	-	-

Copyright © 2013 TCC Nokia

Simultaneous Transmission SAR Test Exclusion Procedures for Body Measurements

Simultaneous transmissions SAR test exclusion procedures as described in KDB 447498 D01 v05.

Following table gives antenna pair SAR to peak location separation ratios for the transmitter combinations for which the sum of simultaneously transmitting 1g SAR was above limit (See "Max+Max Combined results" table in previous section).

Antenna Pair SAR to Peak Location Separation Ratio

Back facing phantom	WLAN 2450 Main, reduced power	WLAN 2450 Aux, reduced power	WLAN 2450 Main, reduced power	2-slot GPRS 850, reduced power	WLAN 2450 Main, reduced power	WCDMA 850, reduced power
X [mm]	74.0	73.0	74.0	-3.0	74.0	-3.0
Y [mm]	-53.0	53.1	-53.0	117.0	-53.0	117.0
Z [mm]	-179.5	-179.6	-179.5	-181.4	-179.5	-181.4
DISTANCE [mm]	106.1		186.6		186.6	
MAX + MAX (Reported SAR)	2.09		2.29		2.16	
SAR to peak location separation ratio	0.03		0.02		0.02	
Back facing phantom	**WLAN 2450 Main, reduced power**	**4-slot GPRS 1900 , reduced power**	**WLAN 2450 Main, reduced power**	**WCDMA 1900, reduced power**	**WLAN 2450 Aux, reduced power**	**2-slot GPRS 850, reduced power**
X [mm]	74.0	-3.0	74.0	-3.0	73.0	-3.0
Y [mm]	-53.0	120.0	-53.0	120.0	53.1	117.0
Z [mm]	-179.5	-181.7	-179.5	-181.7	-179.6	-181.4
DISTANCE [mm]	189.4		189.4		99.3	
MAX + MAX (Reported SAR)	2.16		2.32		2.42	
SAR to peak location separation ratio	0.02		0.02		0.04	

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

Back facing phantom	WLAN 2450 Aux, reduced power	WCDMA 850, reduced power	WLAN 2450 Aux, reduced power	4-slot GPRS 1900 , reduced power	WLAN 2450 Aux, reduced power	WCDMA 1900, reduced power
X [mm]	73.0	-3.0	73.0	-3.0	73.0	-3.0
Y [mm]	53.1	117.0	53.1	120.0	53.1	120.0
Z [mm]	-179.6	-181.4	-179.6	-181.7	-179.6	-181.7
DISTANCE [mm]	99.3		101.3		101.3	
MAX + MAX (Reported SAR)	2.29		2.29		2.45	
SAR to peak location separation ratio	0.03		0.03		0.04	
Back facing phantom	**WLAN 5000 Main, reduced power**	**2-slot GPRS 850, reduced power**	**WLAN 5000 Main, reduced power**	**WCDMA 850 , reduced power**	**WLAN 5000 Main, reduced power**	**4-slot GPRS 1900 , reduced power**
X [mm]	80.0	-3.0	80	-3	80	-3
Y [mm]	-51.0	117.0	-51	117	-51	120
Z [mm]	-181.0	-181.4	-181	-181	-181	-182
DISTANCE [mm]	187.4		187.38		190.07	
MAX + MAX (Reported SAR)	1.76		1.63		1.63	
SAR to peak location separation ratio	0.01		0.01		0.01	
Back facing phantom	**WLAN 5000 Main, reduced power**	**WCDMA 1900, reduced power**	**WLAN 5000 Aux, reduced power**	**2-slot GPRS 850, reduced power**	**WLAN 5000 Aux, reduced power**	**WCDMA 850, reduced power**
X [mm]	80.0	-3.0	79.0	-3.0	79.0	-3.0
Y [mm]	-51.0	120.0	52.0	117.0	52.0	117.0
Z [mm]	-181.0	-181.7	-181.0	-181.4	-181.0	-181.4
DISTANCE [mm]	190.1		104.6		104.6	
MAX + MAX (Reported SAR)	1.79		1.98		1.85	
SAR to peak location separation ratio	0.01		0.03		0.02	

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

Back facing phantom	WLAN 5000 Aux, reduced power	4-slot GPRS 1900 , reduced power	WLAN 5000 Aux, reduced power	WCDMA 1900, reduced power		
X [mm]	79.0	-3.0	79.0	-3.0		
Y [mm]	52.0	120.0	52.0	120.0		
Z [mm]	-181.0	-181.7	-181.0	-181.7		
DISTANCE [mm]	106.5		106.5			
MAX + MAX (Reported SAR)	1.85		2.01			
SAR to peak location separation ratio	0.02		0.03			
Bottom Edge facing phantom	**WLAN 5000 Main, reduced power**	**WLAN 5000 Aux, reduced power**				
X [mm]	0.0	0.0				
Y [mm]	-49.0	53.0				
Z [mm]	-182.2	-182.1				
DISTANCE [mm]	102.0					
MAX + MAX (Reported SAR)	2.11					
SAR to peak location separation ratio	0.03					
2-slot GPRS850 + WLAN 2450 – Main + WLAN 2450 - AUX Back facing phantom	**2-slot GPRS 850, reduced power**	**WLAN 2450 Main, reduced power**	**2-slot GPRS 850, reduced power**	**WLAN 2450 Aux, reduced power**	**WLAN 2450 Main, reduced power**	**WLAN 2450 Aux, reduced power**
X [mm]	-3.0	74.0	-3.0	73.0	74.0	73.0
Y [mm]	117.0	-53.0	117.0	53.1	-53.0	53.1
Z [mm]	-181.4	-179.5	-181.4	-179.6	-179.5	-179.6
DISTANCE [mm]	186.6		99.3		106.1	
MAX + MAX (Reported SAR)	2.29		2.420		2.09	
SAR to peak location separation ratio	0.02		0.04		0.03	

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

WCDMA850 + WLAN 2450 – Main + WLAN 2450 - AUX Back facing phantom	WCDMA 850 , reduced power	WLAN 2450 Main, reduced power	WCDMA 850 , reduced power	WLAN 2450 Aux, reduced power	WLAN 2450 Main, reduced power	WLAN 2450 Aux, reduced power
X [mm]	-3.0	74.0	-3.0	73.0	74.0	73.0
Y [mm]	117.0	-53.0	117.0	53.1	-53.0	53.1
Z [mm]	-181.4	-179.5	-181.4	-179.6	-179.5	-179.6
DISTANCE [mm]	186.6		99.3		106.1	
MAX + MAX (Reported SAR)	2.16		2.29		2.09	
SAR to peak location separation ratio	0.02		0.03		0.03	
4-slot GPRS1900 + WLAN 2450 – Main + WLAN 2450 - AUX Back facing phantom	**4-slot GPRS 1900 , reduced power**	**WLAN 2450 Main, reduced power**	**4-slot GPRS 1900 , reduced power**	**WLAN 2450 Aux, reduced power**	**WLAN 2450 Main, reduced power**	**WLAN 2450 Aux, reduced power**
X [mm]	-3.0	74.0	-3.0	73.0	74.0	73.0
Y [mm]	120.0	-53.0	120.0	53.1	-53.0	53.1
Z [mm]	-181.7	-179.5	-181.7	-179.6	-179.5	-179.6
DISTANCE [mm]	189.4		101.3		106.1	
MAX + MAX (Reported SAR)	2.16		2.29		2.09	
SAR to peak location separation ratio	0.02		0.03		0.03	
WCDMA1900 + WLAN 2450 – Main + WLAN 2450 - AUX Back facing phantom	**WCDMA 1900, reduced power**	**WLAN 2450 Main, reduced power**	**WCDMA 1900, reduced power**	**WLAN 2450 Aux, reduced power**	**WLAN 2450 Main, reduced power**	**WLAN 2450 Aux, reduced power**
X [mm]	-3.0	74.0	-3.0	73.0	74.0	73.0
Y [mm]	120.0	-53.0	120.0	53.1	-53.0	53.1
Z [mm]	-181.7	-179.5	-181.7	-179.6	-179.5	-179.6
DISTANCE [mm]	189.4		101.3		106.1	
MAX + MAX (Reported SAR)	2.32		2.45		2.09	
SAR to peak location separation ratio	0.02		0.04		0.03	

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

2-slot GPRS850 + WLAN 5000 – Main + WLAN 5000 - AUX Back facing phantom	2-slot GPRS 850, reduced power	WLAN 5000 Main, reduced power	2-slot GPRS 850, reduced power	WLAN 5000 Aux, reduced power	WLAN 5000 Main, reduced power	WLAN 5000 Aux, reduced power
X [mm]	-3.0	80.0	-3.0	79.0	80.0	79.0
Y [mm]	117.0	-51.0	117.0	52.0	-51.0	52.0
Z [mm]	-181.4	-181.0	-181.4	-181.0	-181.0	-181.0
DISTANCE [mm]	187.4		104.6		103.0	
MAX + MAX (Reported SAR)	1.76		1.98		1.12	
SAR to peak location separation ratio	0.01		0.03		0.01	
WCDMA850 + WLAN 5000 – Main + WLAN 5000 - AUX Back facing phantom	**WCDMA 850, reduced power**	**WLAN 5000 Main, reduced power**	**WCDMA 850, reduced power**	**WLAN 5000 Aux, reduced power**	**WLAN 5000 Main, reduced power**	**WLAN 5000 Aux, reduced power**
X [mm]	-3.0	80.0	-3.0	79.0	80.0	79.0
Y [mm]	117.0	-51.0	117.0	52.0	-51.0	52.0
Z [mm]	-181.4	-181.0	-181.4	-181.0	-181.0	-181.0
DISTANCE [mm]	187.4		104.6		103.0	
MAX + MAX (Reported SAR)	1.63		1.85		1.12	
SAR to peak location separation ratio	0.01		0.02		0.01	
4-slot GPRS1900 + WLAN 5000 – Main + WLAN 5000 - AUX Back facing phantom	**4-slot GPRS 1900 , reduced power**	**WLAN 5000 Main, reduced power**	**4-slot GPRS 1900 , reduced power**	**WLAN 5000 Aux, reduced power**	**WLAN 5000 Main, reduced power**	**WLAN 5000 Aux, reduced power**
X [mm]	-3.0	80.0	-3.0	79.0	80.0	79.0
Y [mm]	120.0	-51.0	120.0	52.0	-51.0	52.0
Z [mm]	-181.7	-181.0	-181.7	-181.0	-181.0	-181.0
DISTANCE [mm]	190.1		106.5		103.0	
MAX + MAX (Reported SAR)	1.63		1.85		1.12	
SAR to peak location separation ratio	0.01		0.02		0.01	

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

WCDMA1900 + WLAN 5000 – Main + WLAN 5000 - AUX Back facing phantom	WCDMA 1900, reduced power	WLAN 5000 Main, reduced power	WCDMA 1900, reduced power	WLAN 5000 Aux, reduced power	WLAN 5000 Main, reduced power	WLAN 5000 Aux, reduced power
X [mm]	-3.0	80.0	-3.0	79.0	80.0	79.0
Y [mm]	120.0	-51.0	120.0	52.0	-51.0	52.0
Z [mm]	-181.7	-181.0	-181.7	-181.0	-181.0	-181.0
DISTANCE [mm]	190.1		106.5		103.0	
MAX + MAX (Reported SAR)	1.79		2.01		1.12	
SAR to peak location separation ratio	0.01		0.03		0.01	
2-slot GPRS850 + WLAN 2450 – Main + WLAN 2450 - AUX Back facing phantom	**2-slot GPRS 850, full power**	**WLAN 2450 Main, full power**	**2-slot GPRS 850, full power**	**WLAN 2450 Aux, full power**	**WLAN 2450 Main, full power**	**WLAN 2450 Aux, full power**
X [mm]	-3.0	74.0	-3.0	73.0	74.0	73.0
Y [mm]	117.0	-53.0	117.0	53.1	-53.0	53.1
Z [mm]	-181.4	-179.5	-181.4	-179.6	-179.5	-179.6
DISTANCE [mm]	186.6		99.3		106.1	
MAX + MAX (Reported SAR)	1.35		1.47		2.09	
SAR to peak location separation ratio	0.01		0.02		0.03	
WCDMA850 + WLAN 2450 – Main + WLAN 2450 - AUX Back facing phantom	**WCDMA 850, full power**	**WLAN 2450 Main, full power**	**WCDMA 850, full power**	**WLAN 2450 Aux, full power**	**WLAN 2450 Main, full power**	**WLAN 2450 Aux, full power**
X [mm]	-3.0	74.0	-3.0	73.0	74.0	73.0
Y [mm]	117.0	-53.0	117.0	53.1	-53.0	53.1
Z [mm]	-181.4	-179.5	-181.4	-179.6	-179.5	-179.6
DISTANCE [mm]	186.6		99.3		106.1	
MAX + MAX (Reported SAR)	1.31		1.44		2.09	
SAR to peak location separation ratio	0.01		0.02		0.03	

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

4-slot GPRS1900 + WLAN 2450 – Main + WLAN 2450 - AUX Back facing phantom	4-slot GPRS 1900 , full power	WLAN 2450 Main, full power	4-slot GPRS 1900 , full power	WLAN 2450 Aux, full power	WLAN 2450 Main, full power	WLAN 2450 Aux, full power
X [mm]	-3.0	74.0	-3.0	73.0	74.0	73.0
Y [mm]	120.0	-53.0	120.0	53.1	-53.0	53.1
Z [mm]	-181.7	-179.5	-181.7	-179.6	-179.5	-179.6
DISTANCE [mm]	189.4		101.3		106.1	
MAX + MAX (Reported SAR)	1.09		1.21		2.09	
SAR to peak location separation ratio	0.01		0.01		0.03	
WCDMA1900 + WLAN 2450 – Main + WLAN 2450 - AUX Back facing phantom	**WCDMA 1900, full power**	**WLAN 2450 Main, full power**	**WCDMA 1900, full power**	**WLAN 2450 Aux, full power**	**WLAN 2450 Main, full power**	**WLAN 2450 Aux, full power**
X [mm]	-3.0	74.0	-3.0	73.0	74.0	73.0
Y [mm]	120.0	-53.0	120.0	53.1	-53.0	53.1
Z [mm]	-181.7	-179.5	-181.7	-179.6	-179.5	-179.6
DISTANCE [mm]	189.4		101.3		106.1	
MAX + MAX (Reported SAR)	1.28		1.41		2.09	
SAR to peak location separation ratio	0.01		0.02		0.03	
2-slot GPRS850 + WLAN 5000 – Main + WLAN 5000 - AUX Bottom Edge facing phantom	**2-slot GPRS850 , full power**	**WLAN 5000 Main, full power**	**2-slot GPRS850, full power**	**WLAN 5000 Aux, full power**	**WLAN 5000 Main, full power**	**WLAN 5000 Aux, full power**
X [mm]	-1.0	0.0	-1.0	0.0	0.0	0.0
Y [mm]	54.0	-49.0	54.0	53.0	-49.0	53.0
Z [mm]	-181.1	-182.2	-181.1	-182.1	-182.2	-182.1
DISTANCE [mm]	103.0		1.7		102.0	
MAX + MAX (Reported SAR)	0.98		1.57		2.11	
SAR to peak location separation ratio	0.01		**1.13**		0.03	

(Table continues)

Copyright © 2013 TCC Nokia

(Table continues)

WCDMA850 + WLAN 5000 – Main + WLAN 5000 - AUX Bottom Edge facing phantom	WCDMA 850, full power	WLAN 5000 Main, full power	WCDMA 850, full power	WLAN 5000 Aux, full power	WLAN 5000 Main, full power	WLAN 5000 Aux, full power
X [mm]	-1.0	0.0	-1.0	0.0	0.0	0.0
Y [mm]	54.0	-49.0	54.0	53.0	-49.0	53.0
Z [mm]	-181.1	-182.2	-181.1	-182.1	-182.2	-182.1
DISTANCE [mm]	103.0		1.7		102.0	
MAX + MAX (Reported SAR)	0.93		1.52		2.11	
SAR to peak location separation ratio	0.01		**1.07**		0.03	
WCDMA1900 + WLAN 5000 – Main + WLAN 5000 - AUX Bottom Edge facing phantom	**WCDMA 1900, full power**	**WLAN 5000 Main, full power**	**WCDMA 1900, full power**	**WLAN 5000 Aux, full power**	**WLAN 5000 Main, full power**	**WLAN 5000 Aux, full power**
X [mm]	0.0	0.0	0.0	0.0	0.0	0.0
Y [mm]	59.0	-49.0	59.0	53.0	-49.0	53.0
Z [mm]	-180.8	-182.2	-180.8	-182.1	-182.2	-182.1
DISTANCE [mm]	108.0		6.1		102.0	
MAX + MAX (Reported SAR)	0.83		1.42		2.11	
SAR to peak location separation ratio	0.01		**0.28**		0.03	

All simultaneous transmitter configurations where all antenna pairs' SPLSR is equal to or below 0.04 are excluded from expanded zoom scan testing.

For all transmitters where SPLSR is >0.04, the following tables give individual and combined expanded zoom scan results.

Copyright © 2013 TCC Nokia

850MHz Band Body SAR Expanded Volume Scan results – Full Power

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation (Estimated SAR - Full SAR) [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		
2-slot GPRS	Tuning Target + Tolerance [dBm]		30.25			Scaling factor*				
	Conducted Slot Average Power [dBm]		30.28	30.14	30.10	0.07	0.21	0.25	dB	
	Time-averaged power [dBm]		24.26	24.12	24.08	1.02	1.05	1.06	Lin	
	Bottom edge facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	13
		Full SAR	-	0.229	-	-	0.240	-		
Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation (Estimated SAR - Full SAR) [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		
WCDMA	Tuning Target + Tolerance [dBm]		23.85			Scaling factor*				
	Conducted Power [dBm]		23.76	23.66	23.60	0.09	0.19	0.25	dB	
	Time-averaged power [dBm]		23.76	23.66	23.60	1.02	1.04	1.06	Lin	
	Bottom edge facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	14
		Full SAR	-	0.200	-	-	0.209	-		

Copyright © 2013 TCC Nokia

WCDMA1900 (Band 2) Body SAR Expanded Volume Scan results – Full Power

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]			Reported* 1g SAR [W/kg]			Max Deviation (Estimated SAR - Full SAR) [W/kg]	Plot #
			Ch 9262 1852.4 MHz	Ch 9400 1880.0 MHz	Ch 9538 1907.6 MHz	Ch 9262 1852.4 MHz	Ch 9400 1880.0 MHz	Ch 9538 1907.6 MHz		
WCDMA	Tuning Target + Tolerance [dBm]		23.85			Scaling factor*				
	Conducted Power [dBm]		23.57	23.57	23.62	0.28	0.28	0.23	dB	
	Time-averaged power [dBm]		23.57	23.57	23.62	1.07	1.07	1.05	Lin	
	Bottom edge facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	15
		Full SAR	-	0.062	-	-	0.066	-		

Copyright © 2013 TCC Nokia

5000MHz Body SAR Expanded Volume Scan results
5150–5250 MHz and 5250–5350 MHz – AUX Antenna

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]				Reported* 1g SAR [W/kg]				Max Deviation (Estimated SAR - Full SAR) [W/kg]	Plot #
			Ch 36 5180.0 MHz	Ch 44 5220.0 MHz	Ch 52 5260.0 MHz	Ch 60 5300.0 MHz	Ch 36 5180.0 MHz	Ch 44 5220.0 MHz	Ch 52 5260.0 MHz	Ch 60 5300.0 MHz		
WLAN a-mode BPSK 6 Mbps	Tuning Target + Tolerance [dBm]		11.00		10.00		Scaling factor*					
	Conducted Power [dBm]		10.14	9.82	8.48	7.77	0.86	1.18	1.52	2.23	dB	
	Time-averaged power [dBm]		10.14	9.82	8.48	7.77	1.22	1.31	1.42	1.67	Lin	
	Bottom edge facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-	-	16
		Full SAR	-	1.06	-	-	-	1.39	-	-		

5000MHz Body SAR Expanded Volume Scan results
5470–5725 MHz - Main Antenna

Mode	Device orientation	SAR measurement	Measured 1g SAR [W/kg]				Reported* 1g SAR [W/kg]				Max Deviation (Estimated SAR - Full SAR) [W/kg]	Plot #
			Ch 104 5520.0 MHz	Ch 112 5560.0 MHz	Ch 128 5640.0 MHz	Ch 136 5680.0 MHz	Ch 104 5520.0 MHz	Ch 112 5560.0 MHz	Ch 128 5640.0 MHz	Ch 136 5680.0 MHz		
WLAN a-mode BPSK 6 Mbps	Tuning Target + Tolerance [dBm]		9.00		8.00		Scaling factor*					
	Conducted Power [dBm]		7.95	7.51	7.08	7.41	1.05	1.49	0.92	0.59	dB	
	Time-averaged power [dBm]		7.95	7.51	7.08	7.41	1.27	1.41	1.24	1.15	Lin	
	Bottom edge facing phantom 0mm	Estimated SAR	-	-	-	-	-	-	-	-	-	17
		Full SAR	0.766	-	-	-	0.976	-	-	-		

Copyright © 2013 TCC Nokia

**Simultaneous transmissions: Combined Body SAR results –
SPEAG Combined Expanded Zoom scans results**

Test configuration	Max. Reported* 1g SAR results			
	2-slot GPRS850 + WLAN 5000 – Main + WLAN 5000 - AUX	WCDMA850 + WLAN 5000 – Main + WLAN 5000 - AUX	WCDMA1900 + WLAN 5000 – Main + WLAN 5000 - AUX	
Bottom edge facing phantom	1.53	1.47	1.42	

Plots # 18- 20

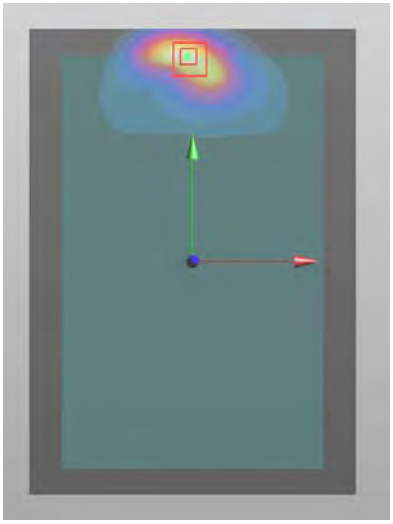
Highest result within individual zoom scan or individual expanded zoom scan results is given in Section 1.2 for each transmitter. Highest result within contributing individual zoom scan, individual expanded zoom scan, Speag combined algorithm or combined expanded zoom scan results are given in Section for each simultaneous transmitter combination.

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

Copyright © 2013 TCC Nokia

The following graphics show enlarged Area Scans and hotspots for the individual cellular, WLAN Main and AUX transmitters.

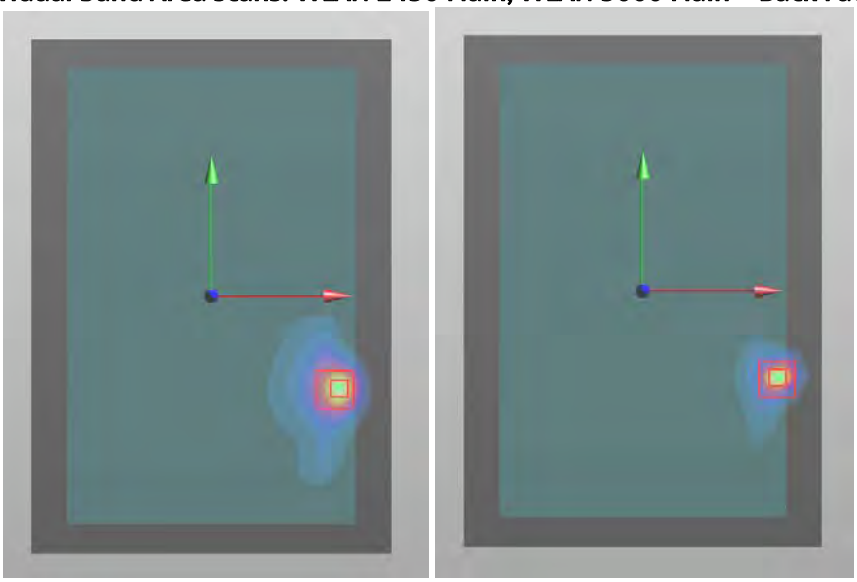
Enlarged Individual band Area scan: 850 – Back Facing Phantom



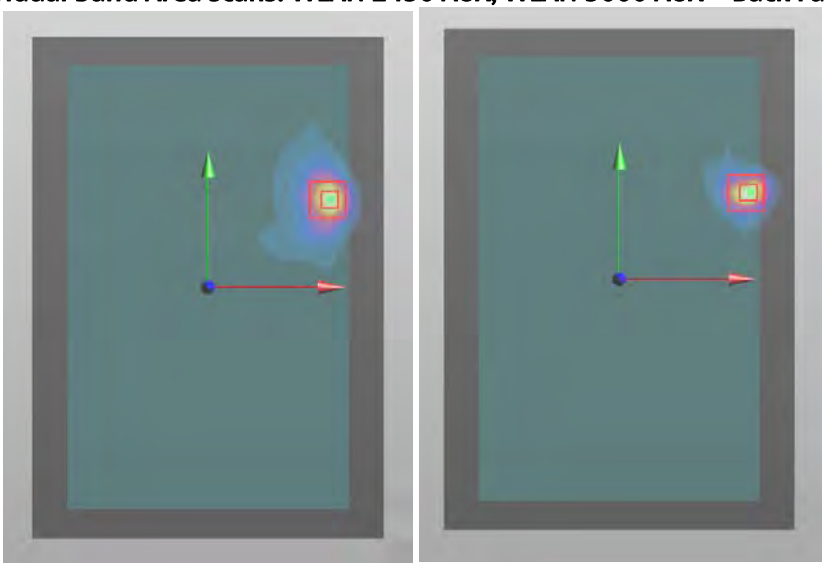
Enlarged Individual band Area scan: 1900 – Back Facing Phantom

Copyright © 2013 TCC Nokia

Enlarged Individual band Area scans: WLAN 2450 Main, WLAN 5000 Main – Back Facing Phantom



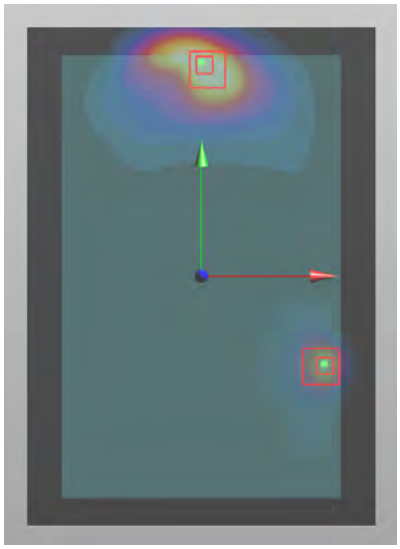
Enlarged Individual band Area scans: WLAN 2450 AUX, WLAN 5000 AUX – Back Facing Phantom



Copyright © 2013 TCC Nokia

850MHz transmitter combined with all WLAN antennas and frequencies. 850MHz has widest spread of all cellular SAR hotspots, giving conservative estimate of the overlapping of the SAR distributions. The graphics show that individual transmitter and antenna SAR hotspots are not overlapping with each other. Hence the combined SAR results presented in Section 1.2.1 are those of the individual cellular, WLAN2450 or WLAN5000 results, whichever is giving highest individual SAR result.

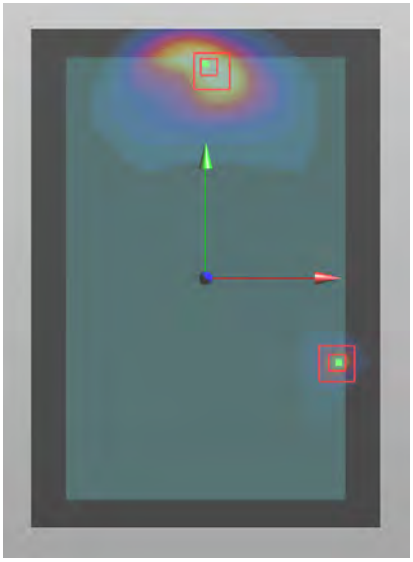
Enlarged Area Scans: Cellular Mode 850 and WLAN2450 Main antenna – Back Facing Phantom



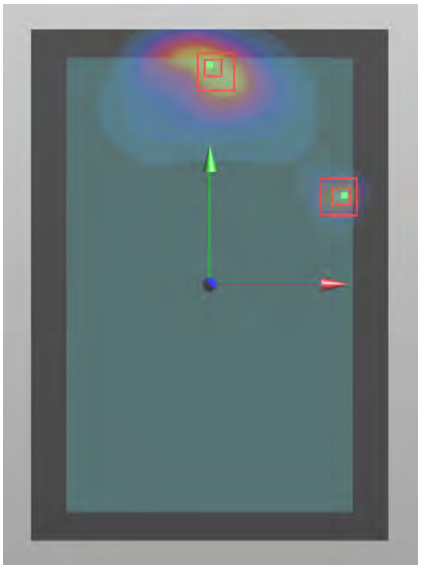
Enlarged Area Scans: Cellular Mode 850 and WLAN2450 Aux antenna – Back Facing Phantom

Copyright © 2013 TCC Nokia

Enlarged Area Scans: Cellular Mode 850 and WLAN5000 Main antenna– Back Facing Phantom



Enlarged Area Scans: Cellular Mode 850 and WLAN5000 Aux antenna– Back Facing Phantom



Copyright © 2013 TCC Nokia

APPENDIX A: SYSTEM CHECKING SCANS

Plot #1

Date/Time: 2013-09-13 07:43:54

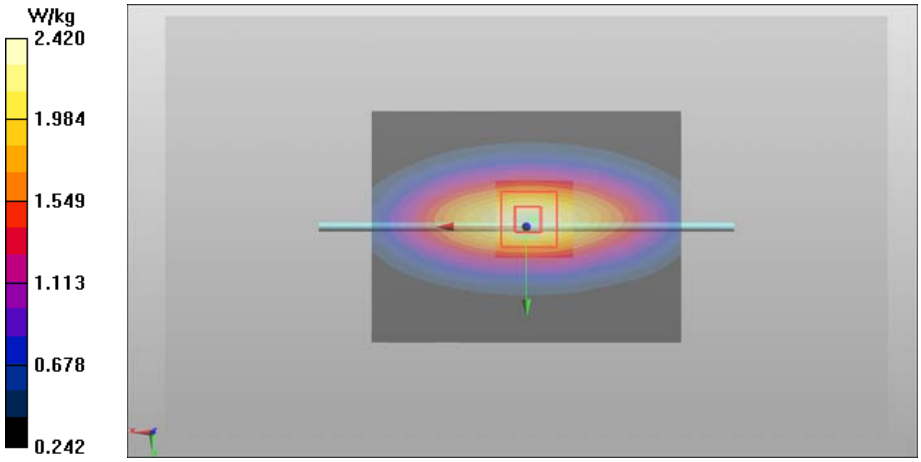
Test Laboratory: TCC Nokia
Type: D835V2; Serial: D835V2 - SN:480

Communication System: CW835
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: BSL835; Medium Notes: t= 21.5 C
Medium parameters used: f = 835 MHz; σ = 0.981 S/m; ε_r = 53.458; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: ES3DV3 - SN3165
- ConvF(6.04, 6.04, 6.04); Calibrated: 2013-01-21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1355; Calibrated: 2013-01-08
- Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (6); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=250mW/Area Scan (81x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 49.743 V/m
Fast SAR: SAR(1 g) = 2.24 W/kg
Fast SAR(10 g) = 1.51 W/kg
Maximum value of SAR (interpolated) = 2.41 W/kg

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 49.743 V/m
Peak SAR (extrapolated) = 3.26 W/kg
SAR(1 g) = 2.24 W/kg
SAR(10 g) = 1.48 W/kg
Power Drift = -0.01 dB
Maximum value of SAR (measured) = 2.42 W/kg



Copyright © 2013 TCC Nokia

Plot #2

Date/Time: 2013-10-11 08:41:14

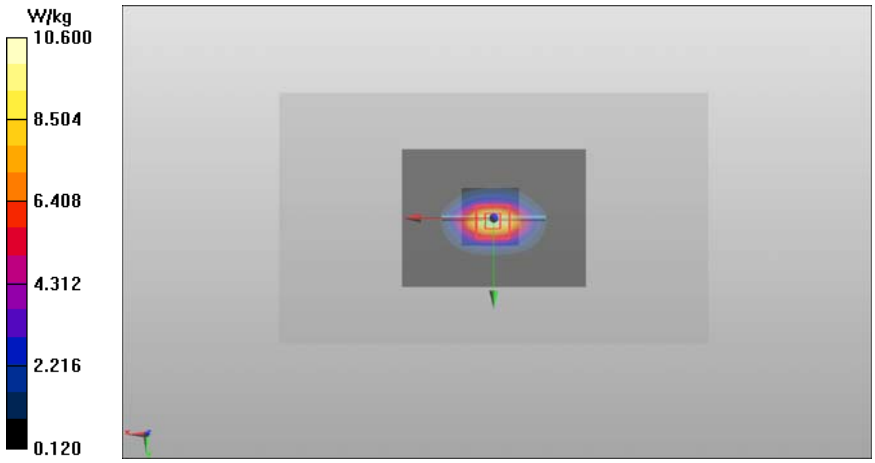
Test Laboratory: TCC Nokia
Type: D1900V2; Serial: D1900V2 - SN:5d013

Communication System: CW1900
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: BSL1900; Medium Notes: t= 21.3 C
Medium parameters used: f = 1900 MHz; σ = 1.499 S/m; ε_r = 51.363; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: ES3DV3 - SN3131
- ConvF(4.62, 4.62, 4.62); Calibrated: 2013-06-18;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2013-06-10
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA;
- Measurement SW: DASY52, Version 52.8 (6); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=250mW/Area Scan (81x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 85.301 V/m
Fast SAR: SAR(1 g) = 9.4 W/kg
Fast SAR(10 g) = 4.83 W/kg
Maximum value of SAR (interpolated) = 10.9 W/kg

d=10mm, Pin=250mW/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 85.301 V/m
Peak SAR (extrapolated) = 15.9 W/kg
SAR(1 g) = 9.43 W/kg
SAR(10 g) = 5.02 W/kg
Power Drift = 0.03 dB
Maximum value of SAR (measured) = 10.6 W/kg



Copyright © 2013 TCC Nokia

Plot #3

Date/Time: 2013-09-25 08:18:54

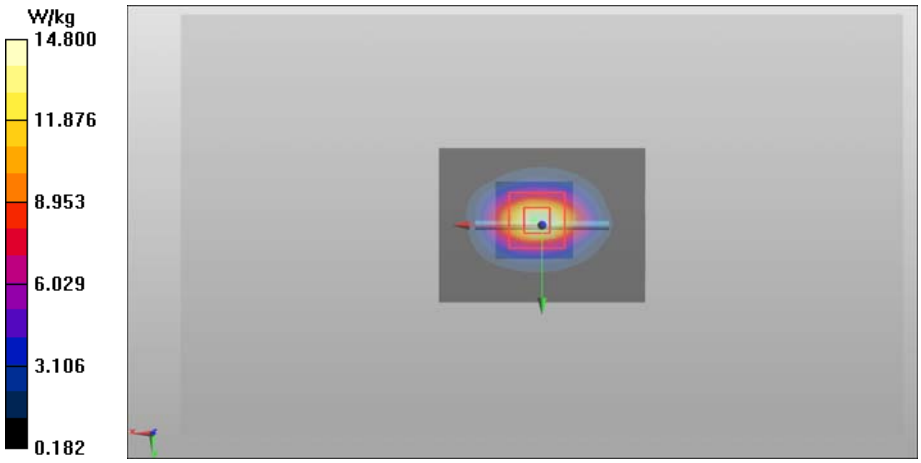
Test Laboratory: TCC Nokia
Type: D2450V2; Serial: D2450V2 - SN:800

Communication System: CW2450
Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: MSL2450; Medium Notes: T=21.5
Medium parameters used: f = 2450 MHz; σ = 1.922 S/m; ε_r = 50.943; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3817
- ConvF(7.13, 7.13, 7.13); Calibrated: 2013-01-23;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 2013/06/28
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=250mW/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 100.9 V/m
Fast SAR: SAR(1 g) = 13.1 W/kg
Fast SAR(10 g) = 6.05 W/kg
Maximum value of SAR (interpolated) = 15.3 W/kg

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 100.9 V/m
Peak SAR (extrapolated) = 24.5 W/kg
SAR(1 g) = 12.9 W/kg
SAR(10 g) = 6.3 W/kg
Power Drift = -0.01 dB
Maximum value of SAR (measured) = 14.8 W/kg



Copyright © 2013 TCC Nokia

Plot #4

Date/Time: 2013-09-03 12:26:20

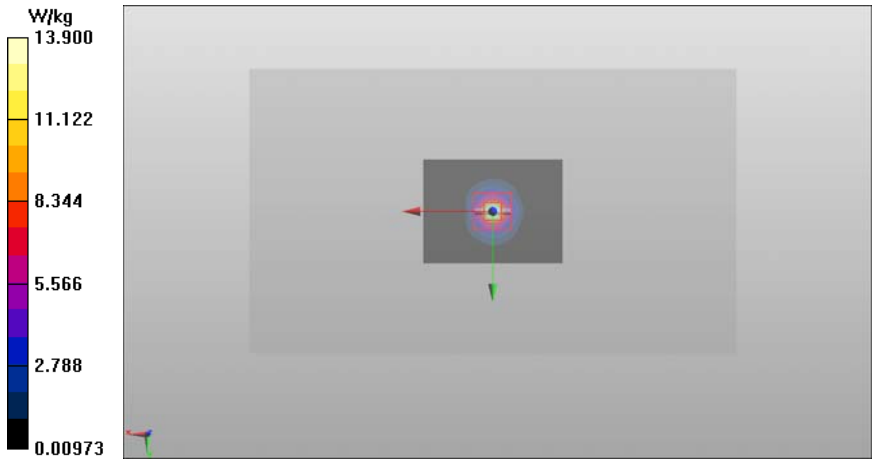
Test Laboratory: Nokia
Type: D5GHzV2; Serial: D5GHzV2 - SN: 1042

Communication System: CW5000-6000
Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: MSL5000; Medium Notes: T=21.5
Medium parameters used: f = 5200 MHz; σ = 5.472 S/m; ε_r = 47.931; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3817
- ConvF(4.54, 4.54, 4.54); Calibrated: 2013-01-23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 2013/06/28
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=100mW/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 57.533 V/m
Fast SAR: SAR(1 g) = 6.83 W/kg
Fast SAR(10 g) = 1.87 W/kg
Maximum value of SAR (interpolated) = 15.2 W/kg

d=10mm, Pin=100mW/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 57.533 V/m
Peak SAR (extrapolated) = 26.3 W/kg
SAR(1 g) = 7.53 W/kg
SAR(10 g) = 2.2 W/kg
Power Drift = -0.07 dB
Maximum value of SAR (measured) = 13.9 W/kg



Copyright © 2013 TCC Nokia

Plot #5

Date/Time: 2013-09-25 15:30:51

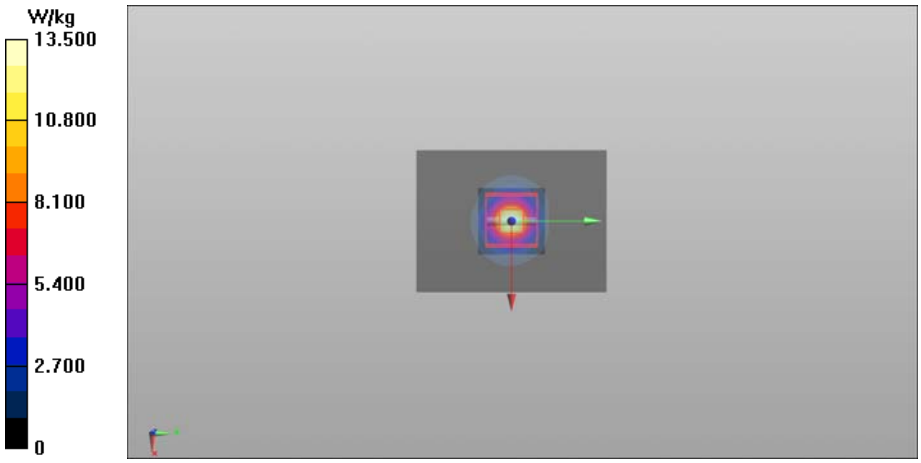
Test Laboratory: TCC Nokia
Type: D5GHzV2; Serial: D5GHzV2 - SN: 1123

Communication System: CW5000-6000
Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: MSL5000; Medium Notes: T=21.5
Medium parameters used: f = 5200 MHz; σ = 5.468 S/m; ε_r = 48.333; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:
- Probe: EX3DV4 - SN3817
- ConvF(4.54, 4.54, 4.54); Calibrated: 2013-01-23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
- Phantom: SAM 2 ELI5; Type: QDOVA002AA; Serial: TP-1160
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.9 (7117)

WLAN a-mode/d=10mm, Pin=100mW 2/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 55.464 V/m
Fast SAR: SAR(1 g) = 6.39 W/kg
Fast SAR(10 g) = 1.76 W/kg
Maximum value of SAR (interpolated) = 14.2 W/kg

WLAN a-mode/d=10mm, Pin=100mW/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 55.464 V/m
Peak SAR (extrapolated) = 27.1 W/kg
SAR(1 g) = 6.92 W/kg
SAR(10 g) = 1.95 W/kg
Power Drift = -0.11 dB
Maximum value of SAR (measured) = 13.5 W/kg



Copyright © 2013 TCC Nokia

Plot #6

Date/Time: 2013-09-04 09:11:18

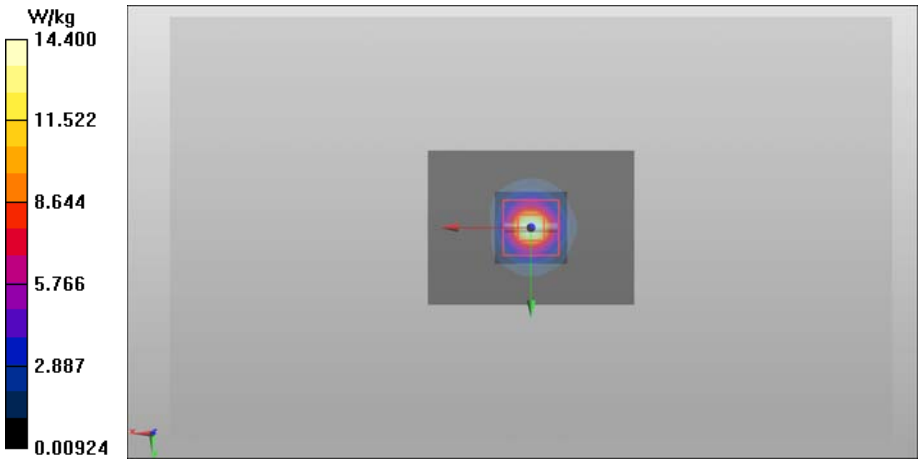
Test Laboratory: TCC Nokia
Type: D5GHzV2; Serial: D5GHzV2 - SN: 1042

Communication System: CW5000-6000
Frequency: 5300 MHz; Duty Cycle: 1:1
Medium: MSL5000; Medium Notes: T=21.5
Medium parameters used: f = 5300 MHz; σ = 5.574 S/m; ε_r = 47.534; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3817
- ConvF(4.34, 4.34, 4.34); Calibrated: 2013-01-23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 2013/06/28
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=100mW/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 58.989 V/m
Fast SAR: SAR(1 g) = 7.17 W/kg
Fast SAR(10 g) = 1.96 W/kg
Maximum value of SAR (interpolated) = 16.0 W/kg

d=10mm, Pin=100mW/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 58.989 V/m
Peak SAR (extrapolated) = 26.9 W/kg
SAR(1 g) = 7.8 W/kg
SAR(10 g) = 2.31 W/kg
Power Drift = 0.08 dB
Maximum value of SAR (measured) = 14.4 W/kg



Copyright © 2013 TCC Nokia

Plot #7

Date/Time: 2013-09-04 16:28:21

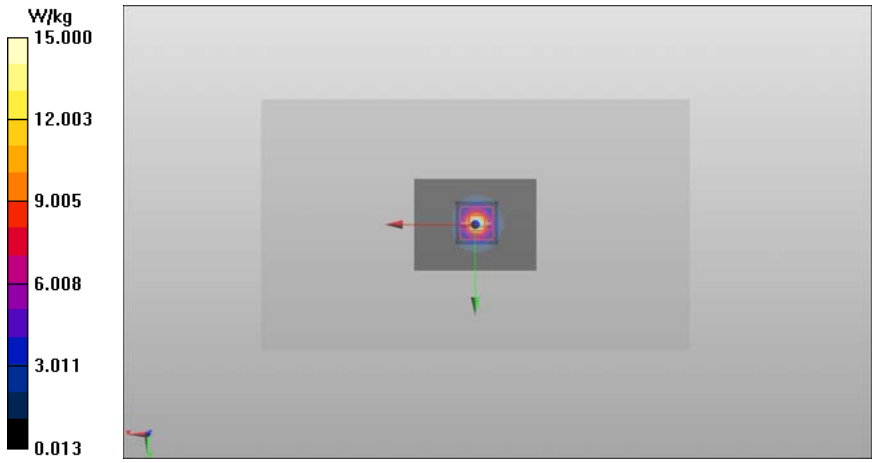
Test Laboratory: Nokia
Type: D5GHzV2; Serial: D5GHzV2 - SN: 1042

Communication System: CW5000-6000
Frequency: 5500 MHz; Duty Cycle: 1:1
Medium: MSL5000; Medium Notes: T=21.5
Medium parameters used: f = 5500 MHz; σ = 5.831 S/m; ε_r = 47.211; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3817
- ConvF(4.07, 4.07, 4.07); Calibrated: 2013-01-23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 2013/06/28
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=100mW/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 58.653 V/m
Fast SAR: SAR(1 g) = 7.25 W/kg
Fast SAR(10 g) = 1.97 W/kg
Maximum value of SAR (interpolated) = 16.5 W/kg

d=10mm, Pin=100mW/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 58.653 V/m
Peak SAR (extrapolated) = 28.8 W/kg
SAR(1 g) = 8.04 W/kg
SAR(10 g) = 2.35 W/kg
Power Drift = -0.04 dB
Maximum value of SAR (measured) = 15.0 W/kg



Copyright © 2013 TCC Nokia

Plot #8

Date/Time: 2013-09-25 14:54:41

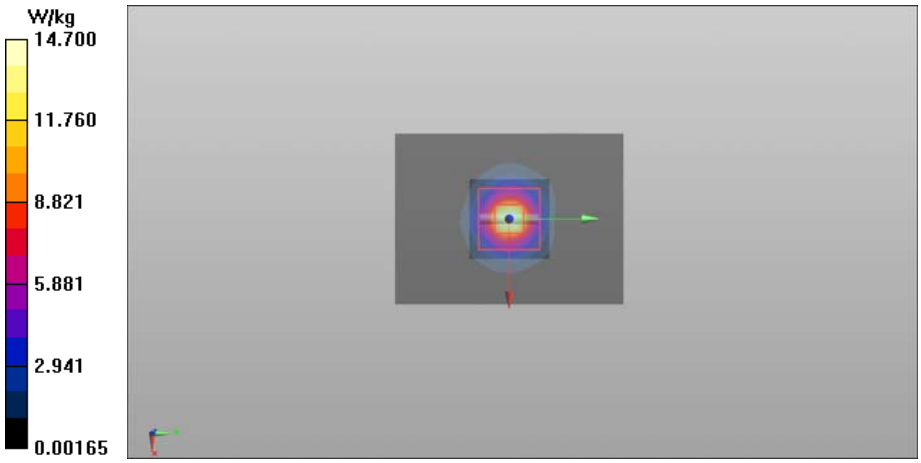
Test Laboratory: TCC Nokia
Type: D5GHzV2; Serial: D5GHzV2 - SN: 1123

Communication System: CW5000-6000
Frequency: 5500 MHz; Duty Cycle: 1:1
Medium: MSL5000; Medium Notes: T=21.5
Medium parameters used: f = 5500 MHz; σ = 5.863 S/m; ε_r = 47.818; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:
- Probe: EX3DV4 - SN3817
- ConvF(4.07, 4.07, 4.07); Calibrated: 2013-01-23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
- Phantom: SAM 2 ELI5; Type: QDOVA002AA; Serial: TP-1160
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.9 (7117)

WLAN a-mode/d=10mm, Pin=100mW/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 55.329 V/m
Fast SAR: SAR(1 g) = 6.7 W/kg
Fast SAR(10 g) = 1.86 W/kg
Maximum value of SAR (interpolated) = 14.8 W/kg

WLAN a-mode/d=10mm, Pin=100mW/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 55.329 V/m
Peak SAR (extrapolated) = 30.2 W/kg
SAR(1 g) = 7.35 W/kg
SAR(10 g) = 2.08 W/kg
Power Drift = -0.10 dB
Maximum value of SAR (measured) = 14.7 W/kg



Copyright © 2013 TCC Nokia

Plot #9

Date/Time: 2013-09-04 16:58:19

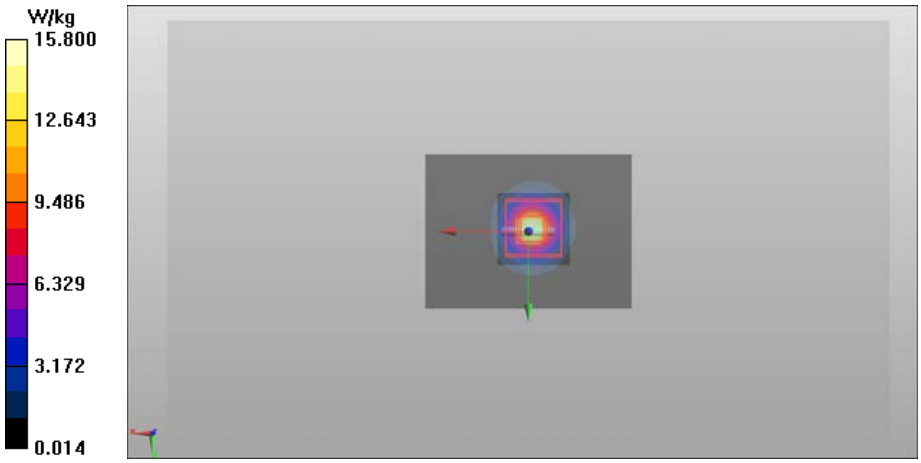
Test Laboratory: TCC Nokia
Type: D5GHzV2; Serial: D5GHzV2 - SN: 1042

Communication System: CW5000-6000
Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: MSL5000; Medium Notes: T=21.5
Medium parameters used: f = 5600 MHz; σ = 5.967 S/m; ε_r = 47.041; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3817
- ConvF(3.79, 3.79, 3.79); Calibrated: 2013-01-23;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 2013/06/28
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=100mW 2/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 57.917 V/m
Fast SAR: SAR(1 g) = 6.9 W/kg
Fast SAR(10 g) = 1.9 W/kg
Maximum value of SAR (interpolated) = 15.7 W/kg

d=10mm, Pin=100mW 2/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 57.917 V/m
Peak SAR (extrapolated) = 29.0 W/kg
SAR(1 g) = 8.15 W/kg
SAR(10 g) = 2.39 W/kg
Power Drift = -0.07 dB
Maximum value of SAR (measured) = 15.8 W/kg



Copyright © 2013 TCC Nokia

Plot #10

Date/Time: 2013-09-05 10:13:09

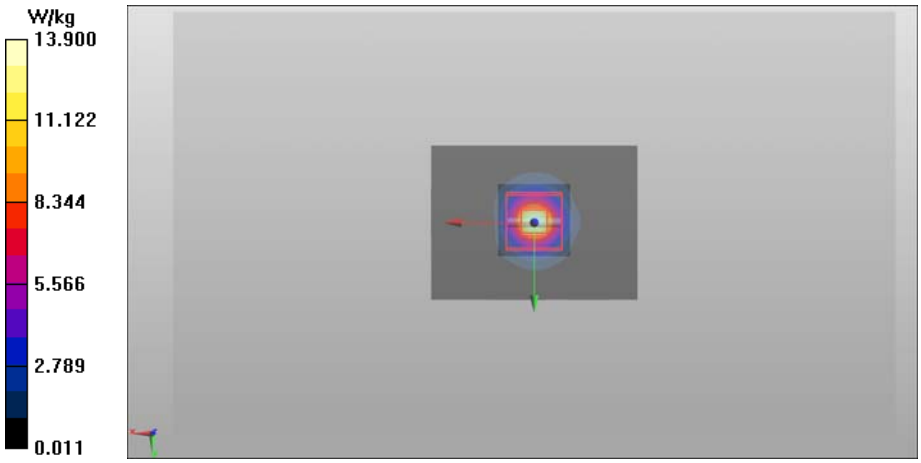
Test Laboratory: TCC Nokia
Type: D5GHzV2; Serial: D5GHzV2 - SN: 1042

Communication System: CW5000-6000
Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: MSL5000; Medium Notes: T=21.5
Medium parameters used: f = 5800 MHz; σ = 6.237 S/m; ε_r = 46.687; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3817
- ConvF(4.25, 4.25, 4.25); Calibrated: 2013-01-23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 2013/06/28
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.9 (7117)

d=10mm, Pin=100mW/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 54.613 V/m
Fast SAR: SAR(1 g) = 6.53 W/kg
Fast SAR(10 g) = 1.79 W/kg
Maximum value of SAR (interpolated) = 14.8 W/kg

d=10mm, Pin=100mW/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 54.613 V/m
Peak SAR (extrapolated) = 26.7 W/kg
SAR(1 g) = 7.17 W/kg
SAR(10 g) = 2.1 W/kg
Power Drift = -0.14 dB
Maximum value of SAR (measured) = 13.9 W/kg



Copyright © 2013 TCC Nokia

APPENDIX B: MEASUREMENT SCANS

Plot #1

Date/Time: 2013-09-12 15:58:55

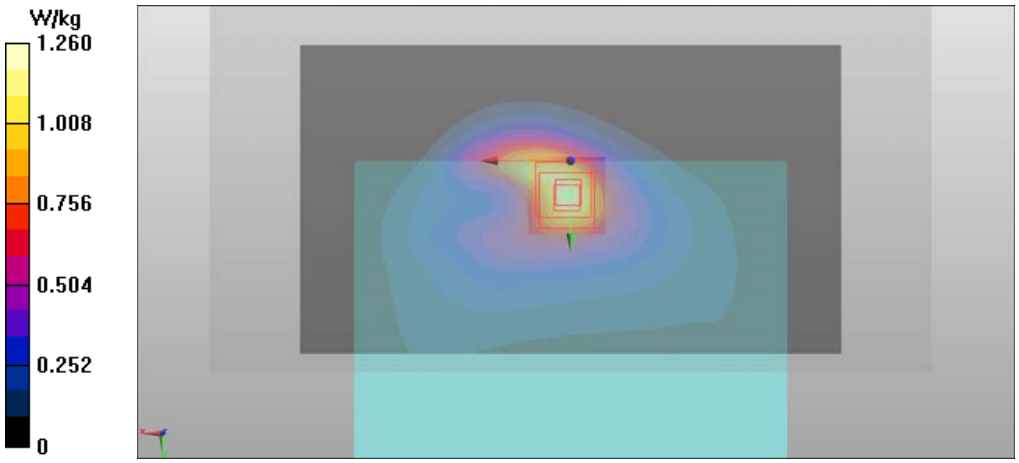
Test Laboratory: TCC Nokia
Type: RX-113; Serial: 004402/47/357511/0

Communication System: 2-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:4.19952
Medium: BSL835; Medium Notes: t= 21.2 C
Medium parameters used: f = 837 MHz; σ = 0.982 S/m; ε_r = 53.571; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: ES3DV3 - SN3165
- ConvF(6.04, 6.04, 6.04); Calibrated: 2013-01-21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1355; Calibrated: 2013-01-08
- Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (6); SEMCAD X Version 14.6.9 (7117)

2-slot GPRS850/Body - Middle - Spacer 0mm - No Accessory - Back Facing Phantom - Reduced Power/Area Scan (141x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 29.790 V/m
Fast SAR: SAR(1 g) = 1.13 W/kg
Fast SAR(10 g) = 0.725 W/kg
Maximum value of SAR (interpolated) = 1.26 W/kg

2-slot GPRS850/Body - Middle - Spacer 0mm - No Accessory - Back Facing Phantom - Reduced Power/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 29.790 V/m
Peak SAR (extrapolated) = 2.05 W/kg
SAR(1 g) = 1.15 W/kg
SAR(10 g) = 0.663 W/kg
Power Drift = 0.01 dB
Maximum value of SAR (measured) = 1.28 W/kg



Copyright © 2013 TCC Nokia

Plot #2

Date/Time: 2013-09-12 05:02:11

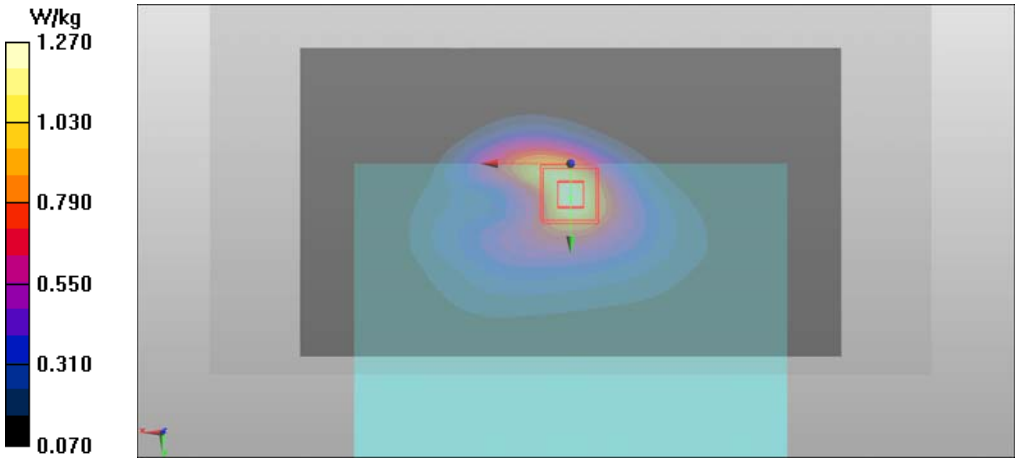
Test Laboratory: TCC Nokia
Type: RX-113; Serial: 004402/47/357511/0

Communication System: WCDMA850 (Band 5)
Frequency: 826.4 MHz; Duty Cycle: 1:1
Medium: BSL835; Medium Notes: t= 21.2 C
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.976 S/m; ε_r = 53.611; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: ES3DV3 - SN3165
- ConvF(6.04, 6.04, 6.04); Calibrated: 2013-01-21;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1355; Calibrated: 2013-01-08
- Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (6); SEMCAD X Version 14.6.9 (7117)

WCDMA850 (Band 5)/Body - Low - Spacer 0mm - No Accessory - Back Facing Phantom - Reduced Power - Repeated/Area Scan (141x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 30.709 V/m
Fast SAR: SAR(1 g) = 1.13 W/kg
Fast SAR(10 g) = 0.722 W/kg
Maximum value of SAR (interpolated) = 1.26 W/kg

WCDMA850 (Band 5)/Body - Low - Spacer 0mm - No Accessory - Back Facing Phantom - Reduced Power - Repeated/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 30.709 V/m
Peak SAR (extrapolated) = 2.04 W/kg
SAR(1 g) = 1.15 W/kg
SAR(10 g) = 0.665 W/kg
Power Drift = 0.00 dB
Maximum value of SAR (measured) = 1.27 W/kg



Copyright © 2013 TCC Nokia

Plot #3

Date/Time: 2013-09-13 13:42:09

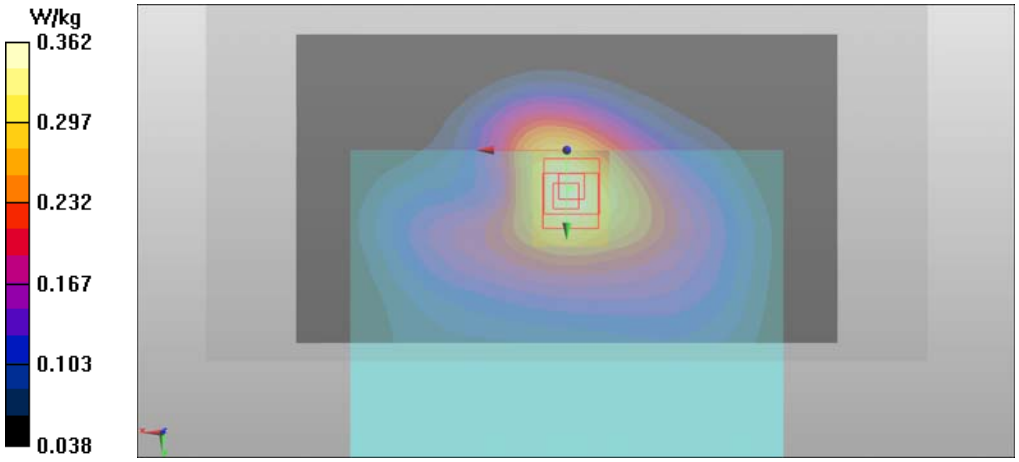
Test Laboratory: TCC Nokia
Type: RX-113; Serial: 004402/47/357507/8

Communication System: 2-slot GPRS850
Frequency: 848.8 MHz; Duty Cycle: 1:4.19952
Medium: BSL835; Medium Notes: t= 21.5 C
Medium parameters used: f = 849 MHz; σ = 0.99 S/m; ε_r = 53.421; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: ES3DV3 - SN3165
- ConvF(6.04, 6.04, 6.04); Calibrated: 2013-01-21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1355; Calibrated: 2013-01-08
- Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (6); SEMCAD X Version 14.6.9 (7117)

2-slot GPRS850/Body - High - Spacer 22mm - No Accessory - Back Facing Phantom - Full Power/Area Scan (141x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 17.946 V/m
Fast SAR: SAR(1 g) = 0.342 W/kg
Fast SAR(10 g) = 0.240 W/kg
Maximum value of SAR (interpolated) = 0.363 W/kg

2-slot GPRS850/Body - High - Spacer 22mm - No Accessory - Back Facing Phantom - Full Power/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 18.154 V/m
Peak SAR (extrapolated) = 0.476 W/kg
SAR(1 g) = 0.344 W/kg
SAR(10 g) = 0.241 W/kg
Power Drift = 0.05 dB
Maximum value of SAR (measured) = 0.362 W/kg



Copyright © 2013 TCC Nokia

Plot #4

Date/Time: 2013-09-13 14:41:48

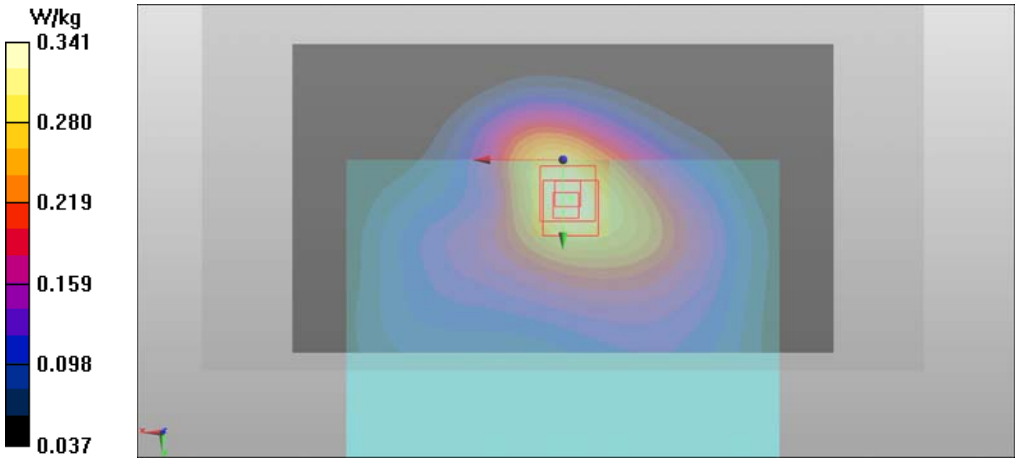
Test Laboratory: TCC Nokia
Type: RX-113; Serial: 004402/47/357507/8

Communication System: WCDMA850 (Band 5)
Frequency: 826.4 MHz; Duty Cycle: 1:1
Medium: BSL835; Medium Notes: t= 21.5 C
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.976 S/m; ε_r = 53.477; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: ES3DV3 - SN3165
- ConvF(6.04, 6.04, 6.04); Calibrated: 2013-01-21;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1355; Calibrated: 2013-01-08
- Phantom: 1. Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (6); SEMCAD X Version 14.6.9 (7117)

WCDMA850 (Band 5)/Body - Low - Spacer 22mm - No Accessory - Back Facing Phantom - Full Power/Area Scan (141x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 17.963 V/m
Fast SAR: SAR(1 g) = 0.326 W/kg
Fast SAR(10 g) = 0.229 W/kg
Maximum value of SAR (interpolated) = 0.347 W/kg

WCDMA850 (Band 5)/Body - Low - Spacer 22mm - No Accessory - Back Facing Phantom - Full Power/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 17.960 V/m
Peak SAR (extrapolated) = 0.446 W/kg
SAR(1 g) = 0.324 W/kg
SAR(10 g) = 0.229 W/kg
Power Drift = -0.04 dB
Maximum value of SAR (measured) = 0.341 W/kg



Copyright © 2013 TCC Nokia

Plot #5

Date/Time: 2013-09-11 19:32:59

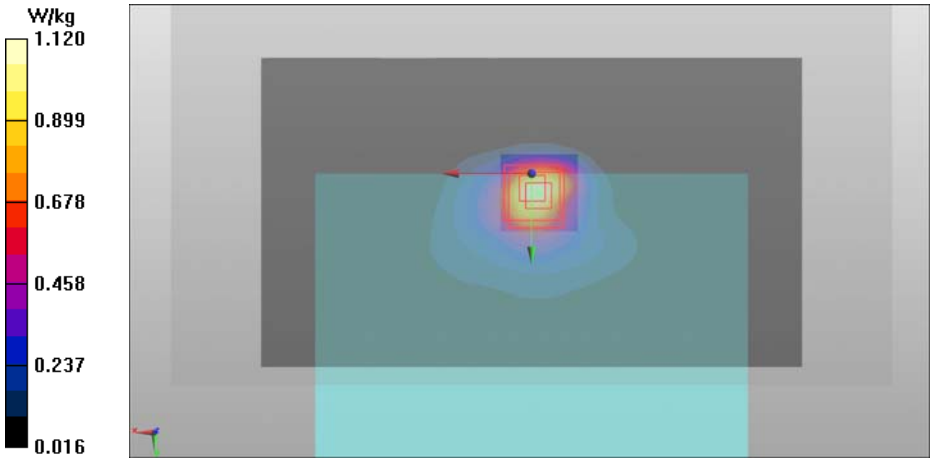
Test Laboratory: TCC Nokia
Type: RX-113; Serial: 004402/47/357591/2

Communication System: 4-slot GPRS1900
Frequency: 1850.2 MHz; Duty Cycle: 1:2.09991
Medium: BSL1900; Medium Notes: t= 20.3 C
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.483 S/m; ε_r = 51.65; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: ES3DV3 - SN3131
- ConvF(4.62, 4.62, 4.62); Calibrated: 2013-06-18;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2013-06-10
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: -
- Measurement SW: DASY52, Version 52.8 (6); SEMCAD X Version 14.6.9 (7117)

4-slot GPRS1900/Body - Low - Spacer 0mm - No Accessory - Back Facing Phantom - Reduced Power/Area Scan (141x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 23.157 V/m
Fast SAR: SAR(1 g) = 0.989 W/kg
Fast SAR(10 g) = 0.525 W/kg
Maximum value of SAR (interpolated) = 1.16 W/kg

4-slot GPRS1900/Body - Low - Spacer 0mm - No Accessory - Back Facing Phantom - Reduced Power/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 23.181 V/m
Peak SAR (extrapolated) = 1.98 W/kg
SAR(1 g) = 1.04 W/kg
SAR(10 g) = 0.520 W/kg
Power Drift = 0.09 dB
Maximum value of SAR (measured) = 1.12 W/kg



Copyright © 2013 TCC Nokia

Plot #6

Date/Time: 2013-09-11 23:34:48

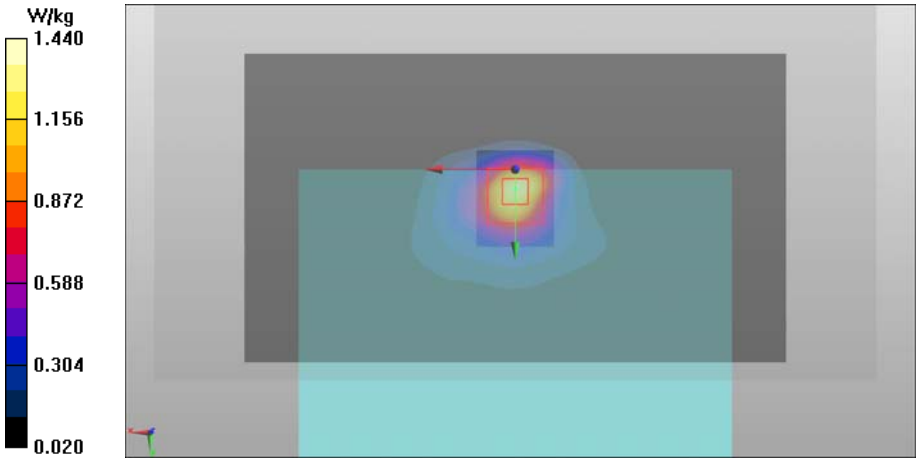
Test Laboratory: TCC Nokia
Type: RX-113; Serial: 004402/47/357591/2

Communication System: WCDMA1900 (Band 2)
Frequency: 1852.4 MHz; Duty Cycle: 1:1
Medium: BSL1900; Medium Notes: t= 20.3 C
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.485 S/m; ε_r = 51.649; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: ES3DV3 - SN3131
- ConvF(4.62, 4.62, 4.62); Calibrated: 2013-06-18;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2013-06-10
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: -
- Measurement SW: DASY52, Version 52.8 (6); SEMCAD X Version 14.6.9 (7117)

WCDMA1900 (Band 2)/Body - Low - Spacer 0mm - No Accessory - Back Facing Phantom - Reduced Power - Repeated/Area Scan (141x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 25.747 V/m
Fast SAR: SAR(1 g) = 1.16 W/kg
Fast SAR(10 g) = 0.613 W/kg
Maximum value of SAR (interpolated) = 1.36 W/kg

WCDMA1900 (Band 2)/Body - Low - Spacer 0mm - No Accessory - Back Facing Phantom - Reduced Power - Repeated/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 25.747 V/m
Peak SAR (extrapolated) = 2.44 W/kg
SAR(1 g) = 1.26 W/kg
SAR(10 g) = 0.626 W/kg
Power Drift = 0.03 dB
Maximum value of SAR (measured) = 1.44 W/kg



Copyright © 2013 TCC Nokia

Plot #7

Date/Time: 2013-09-12 04:55:18

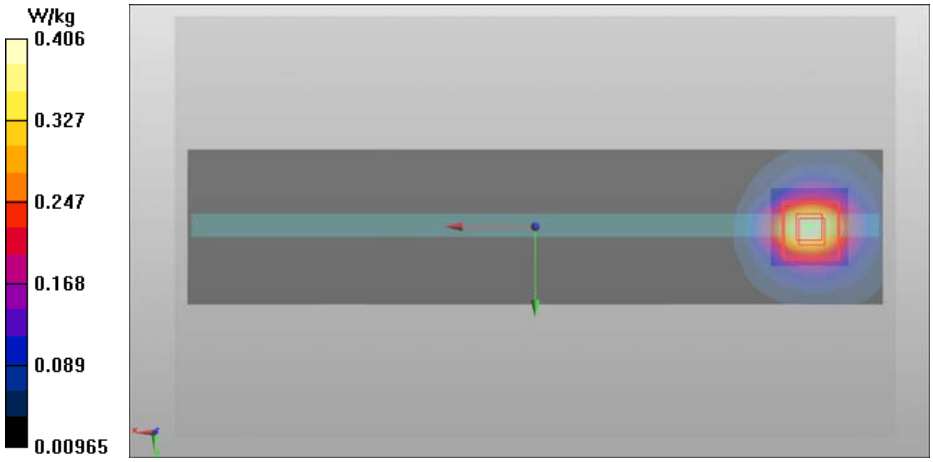
Test Laboratory: TCC Nokia
Type: RX-113; Serial: 004402/47/357512/8

Communication System: 4-slot GPRS1900
Frequency: 1909.8 MHz; Duty Cycle: 1:2.09991
Medium: BSL1900; Medium Notes: t= 20.3 C
Medium parameters used: f = 1910 MHz; σ = 1.546 S/m; ε_r = 51.538; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: ES3DV3 - SN3131
- ConvF(4.62, 4.62, 4.62); Calibrated: 2013-06-18;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2013-06-10
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: -
- Measurement SW: DASY52, Version 52.8 (6); SEMCAD X Version 14.6.9 (7117)

4-slot GPRS1900/Body - High - Spacer 0mm - No Accessory - Top edge Facing Phantom - Full Power/Area Scan (181x41x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 15.949 V/m
Fast SAR: SAR(1 g) = 0.362 W/kg
Fast SAR(10 g) = 0.179 W/kg
Maximum value of SAR (interpolated) = 0.427 W/kg

4-slot GPRS1900/Body - High - Spacer 0mm - No Accessory - Top edge Facing Phantom - Full Power/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 15.953 V/m
Peak SAR (extrapolated) = 0.611 W/kg
SAR(1 g) = 0.363 W/kg
SAR(10 g) = 0.194 W/kg
Power Drift = 0.09 dB
Maximum value of SAR (measured) = 0.406 W/kg



Copyright © 2013 TCC Nokia

Plot #8

Date/Time: 2013-09-12 02:23:19

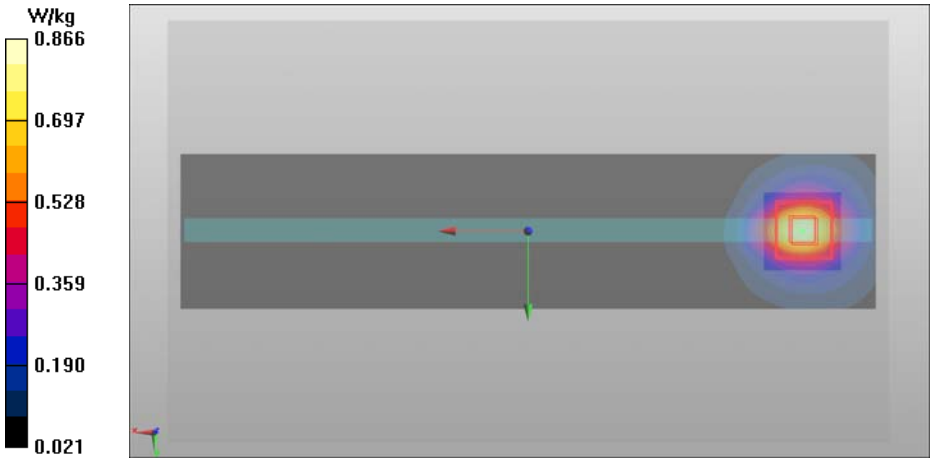
Test Laboratory: TCC Nokia
Type: RX-113; Serial: 004402/47/357512/8

Communication System: WCDMA1900 (Band 2)
Frequency: 1907.6 MHz; Duty Cycle: 1:1
Medium: BSL1900; Medium Notes: t= 20.3 C
Medium parameters used: f = 1908 MHz; σ = 1.544 S/m; ε_r = 51.546; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: ES3DV3 - SN3131
- ConvF(4.62, 4.62, 4.62); Calibrated: 2013-06-18;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2013-06-10
- Phantom: SAM 3 Triple Phantom 5.1C; Type: QD 000 P51 CA; Serial: -
- Measurement SW: DASY52, Version 52.8 (6); SEMCAD X Version 14.6.9 (7117)

WCDMA1900 (Band 2)/Body - High - Spacer 0mm - No Accessory - Top edge Facing Phantom - Full Power - Repeated/Area Scan (181x41x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 24.355 V/m
Fast SAR: SAR(1 g) = 0.745 W/kg
Fast SAR(10 g) = 0.373 W/kg
Maximum value of SAR (interpolated) = 0.871 W/kg

WCDMA1900 (Band 2)/Body - High - Spacer 0mm - No Accessory - Top edge Facing Phantom - Full Power - Repeated/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 24.355 V/m
Peak SAR (extrapolated) = 1.26 W/kg
SAR(1 g) = 0.761 W/kg
SAR(10 g) = 0.407 W/kg
Power Drift = -0.00 dB
Maximum value of SAR (measured) = 0.866 W/kg



Copyright © 2013 TCC Nokia

Plot #9

Date/Time: 2013-09-09 13:10:28

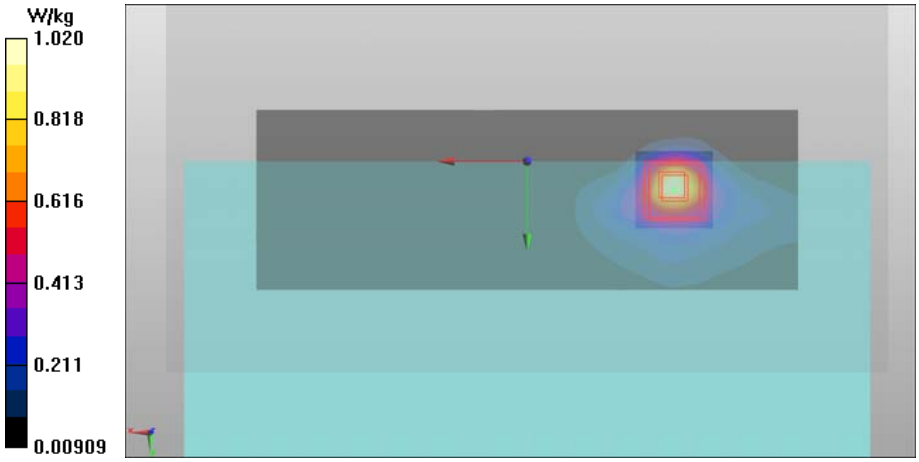
Test Laboratory: TCC Nokia
Type: RX-114; Serial: 004402/47/357461/8

Communication System: WLAN2450 b-mode
Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: MSL2450; Medium Notes: T=21.5
Medium parameters used: f = 2437 MHz; σ = 1.899 S/m; ε_r = 50.759; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3817
- ConvF(7.13, 7.13, 7.13); Calibrated: 2013-01-23;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 2013/06/28
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.9 (7117)

WLAN2450 b-mode/Body - Channel 6 - BPSK 1 Mbps - Spacer 0mm - No Accessory - Back Facing Phantom - Main Antenna - Repeated/Area Scan (211x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = not measured
Fast SAR: SAR(1 g) = 0.866 W/kg
Fast SAR(10 g) = 0.383 W/kg
Maximum value of SAR (interpolated) = 1.06 W/kg

WLAN2450 b-mode/Body - Channel 6 - BPSK 1 Mbps - Spacer 0mm - No Accessory - Back Facing Phantom - Main Antenna - Repeated/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.751 V/m
Peak SAR (extrapolated) = 1.84 W/kg
SAR(1 g) = 0.899 W/kg
SAR(10 g) = 0.417 W/kg
Power Drift = -0.18 dB
Maximum value of SAR (measured) = 1.02 W/kg



Copyright © 2013 TCC Nokia

Plot #10

Date/Time: 2013-09-25 10:51:18

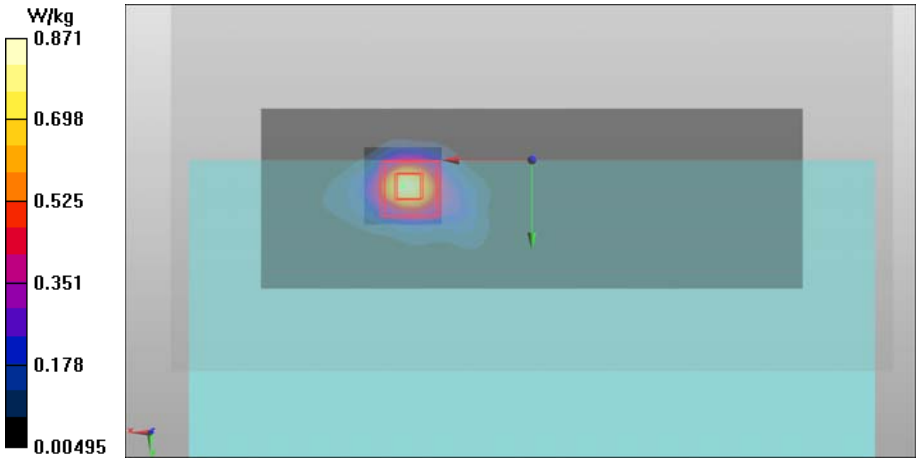
Test Laboratory: TCC Nokia
Type: RX-114; Serial: 004402/47/357461/8

Communication System: WLAN2450 b-mode
Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: MSL2450; Medium Notes: T=21.5
Medium parameters used: f = 2412 MHz; σ = 1.869 S/m; ε_r = 51.03; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3817
- ConvF(7.13, 7.13, 7.13); Calibrated: 2013-01-23;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 2013/06/28
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.9 (7117)

WLAN2450 b-mode/Body - Channel 1 - BPSK 1 Mbps - Spacer 0mm - No Accessory - Back Facing Phantom - Aux Antenna/Area Scan (211x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = not measured
Fast SAR: SAR(1 g) = 0.715 W/kg
Fast SAR(10 g) = 0.313 W/kg
Maximum value of SAR (interpolated) = 0.855 W/kg

WLAN2450 b-mode/Body - Channel 1 - BPSK 1 Mbps - Spacer 0mm - No Accessory - Back Facing Phantom - Aux Antenna/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.762 V/m
Peak SAR (extrapolated) = 1.54 W/kg
SAR(1 g) = 0.753 W/kg
SAR(10 g) = 0.335 W/kg
Power Drift = -0.19 dB
Maximum value of SAR (measured) = 0.871 W/kg



Copyright © 2013 TCC Nokia

Plot #11

Date/Time: 2013-09-04 07:56:04

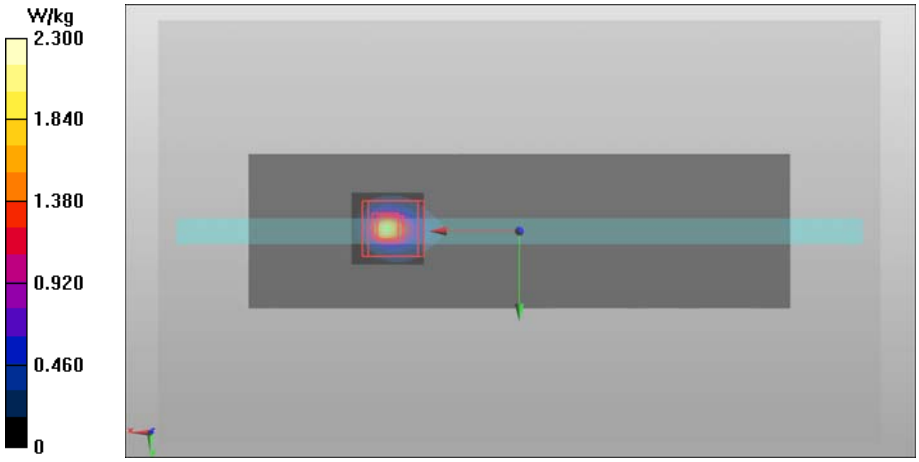
Test Laboratory: Nokia
Type: RX-114; Serial: 004402/47/357461/8

Communication System: WLAN5000 a-mode
Frequency: 5220 MHz; Duty Cycle: 1:1
Medium: MSL5000; Medium Notes: T=21.5
Medium parameters used: f = 5220 MHz; σ = 5.494 S/m; ε_r = 47.91; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3817
- ConvF(4.54, 4.54, 4.54); Calibrated: 2013-01-23;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 2013/06/28
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.9 (7117)

WLAN5000 a-mode/Body - Channel 44 - BPSK 6 Mbps - Spacer 0mm - No Accessory - Bottom Edge Facing Phantom - Aux Antenna/Area Scan (211x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = not measured
Fast SAR: SAR(1 g) = 0.790 W/kg
Fast SAR(10 g) = 0.193 W/kg
Maximum value of SAR (interpolated) = 2.24 W/kg

WLAN5000 a-mode/Body - Channel 44 - BPSK 6 Mbps - Spacer 0mm - No Accessory - Bottom Edge Facing Phantom - Aux Antenna/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 23.222 V/m
Peak SAR (extrapolated) = 4.63 W/kg
SAR(1 g) = 1.03 W/kg
SAR(10 g) = 0.237 W/kg
Power Drift = -0.07 dB
Maximum value of SAR (measured) = 2.30 W/kg



Copyright © 2013 TCC Nokia

Plot #12

Date/Time: 2013-09-04 20:02:06

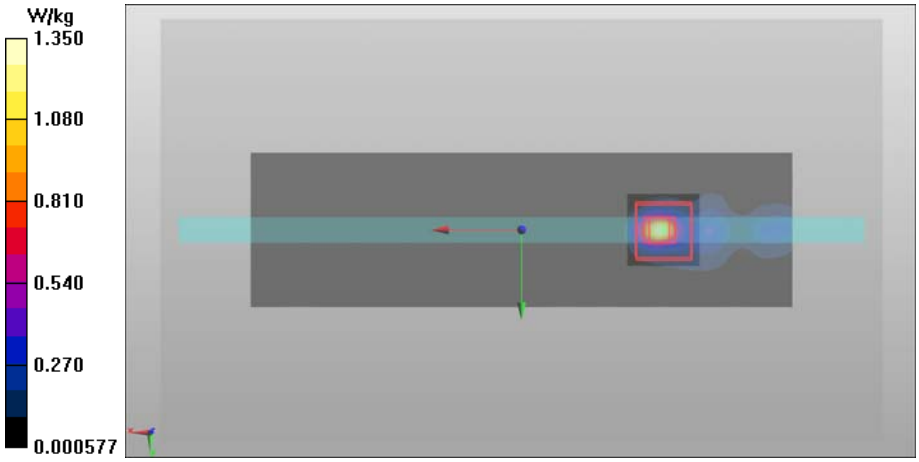
Test Laboratory: Nokia
Type: RX-113; Serial: 004402/47/357461/8

Communication System: WLAN5000 a-mode
Frequency: 5520 MHz; Duty Cycle: 1:1
Medium: MSL5000; Medium Notes: T=21.5
Medium parameters used: f = 5520 MHz; σ = 5.858 S/m; ε_r = 47.18; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:
- Probe: EX3DV4 - SN3817
- ConvF(4.07, 4.07, 4.07); Calibrated: 2013-01-23;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 2013/06/28
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.9 (7117)

WLAN5000 a-mode 2/Body - Channel 104 - BPSK 6 Mbps - Spacer 0mm - No Accessory - Bottom Edge Facing Phantom - Main Antenna/Area Scan (211x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = not measured
Fast SAR: SAR(1 g) = 0.474 W/kg
Fast SAR(10 g) = 0.111 W/kg
Maximum value of SAR (interpolated) = 1.37 W/kg

WLAN5000 a-mode 2/Body - Channel 104 - BPSK 6 Mbps - Spacer 0mm - No Accessory - Bottom Edge Facing Phantom - Main Antenna/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 17.487 V/m
Peak SAR (extrapolated) = 3.31 W/kg
SAR(1 g) = 0.595 W/kg
SAR(10 g) = 0.132 W/kg
Power Drift = -0.09 dB
Maximum value of SAR (measured) = 1.35 W/kg



Copyright © 2013 TCC Nokia

Plot #13

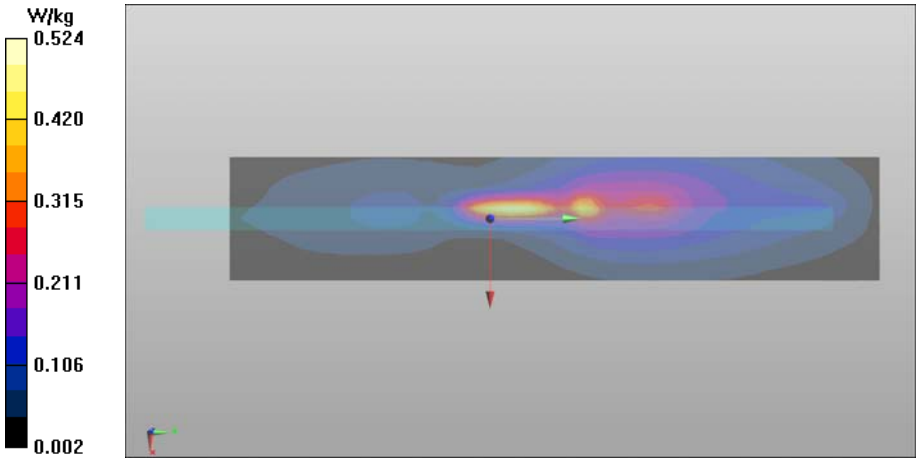
Date/Time: 2013-09-26 07:05:02

Test Laboratory: TCC Nokia
Type: RX-113; Serial: 004402/47/357507/8

Communication System: 2-slot GPRS850
Frequency: 836.6 MHz; Duty Cycle: 1:4.19952
Medium: BSL850; Medium Notes: t= 20,8 C
Medium parameters used: f = 837 MHz; σ = 0.968 S/m; ε_r = 53.509; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:
- Probe: ES3DV3 - SN3165
- ConvF(6.04, 6.04, 6.04); Calibrated: 2013-01-21;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1355; Calibrated: 2013-01-08
- Phantom: #2 ELI Phantom; Type: QDOVA002AA; Serial: -
- Measurement SW: DASY52, Version 52.8 (6); SEMCAD X Version 14.6.9 (7117)

2-slot GPRS850/Body - Middle - Spacer 0mm - No Headset - Bottom Edge Facing Phantom - Full Power/Volume Scan (13x64x12): Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 9.648 V/m
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 0.229 W/kg
SAR(10 g) = 0.123 W/kg
Power Drift = 0.05 dB
Total Absorbed Power = 0.0133 W
Maximum value of SAR (measured) = 0.524 W/kg



Copyright © 2013 TCC Nokia

Plot #14

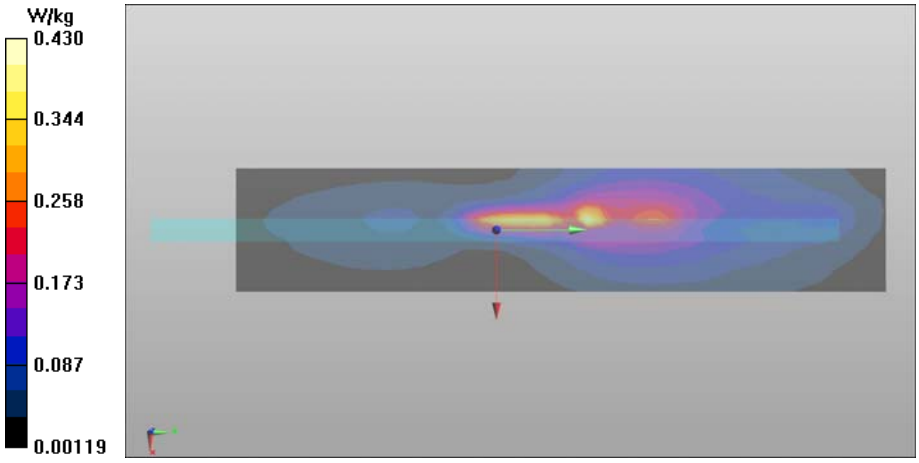
Date/Time: 2013-09-26 13:22:30

Test Laboratory: TCC Nokia
Type: RX-113; Serial: 004402/47/357507/8

Communication System: WCDMA850 (Band 5)
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: BSL850; Medium Notes: t= 20,8 C
Medium parameters used: f = 835 MHz; σ = 0.967 S/m; ε_r = 53.523; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:
- Probe: ES3DV3 - SN3165
- ConvF(6.04, 6.04, 6.04); Calibrated: 2013-01-21;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1355; Calibrated: 2013-01-08
- Phantom: #2 ELI Phantom; Type: QDOVA002AA; Serial: -
- Measurement SW: DASY52, Version 52.8 (6); SEMCAD X Version 14.6.9 (7117)

WCDMA850 (Band 5)/Body - Middle - Spacer 0mm - No Headset - Bottom Edge Facing Phantom - Full Power/Volume Scan (13x64x12): Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 10.173 V/m
Peak SAR (extrapolated) = 0.990 W/kg
SAR(1 g) = 0.200 W/kg
SAR(10 g) = 0.108 W/kg
Power Drift = 0.03 dB
Total Absorbed Power = 0.0110 W
Maximum value of SAR (measured) = 0.430 W/kg



Copyright © 2013 TCC Nokia

Plot #15

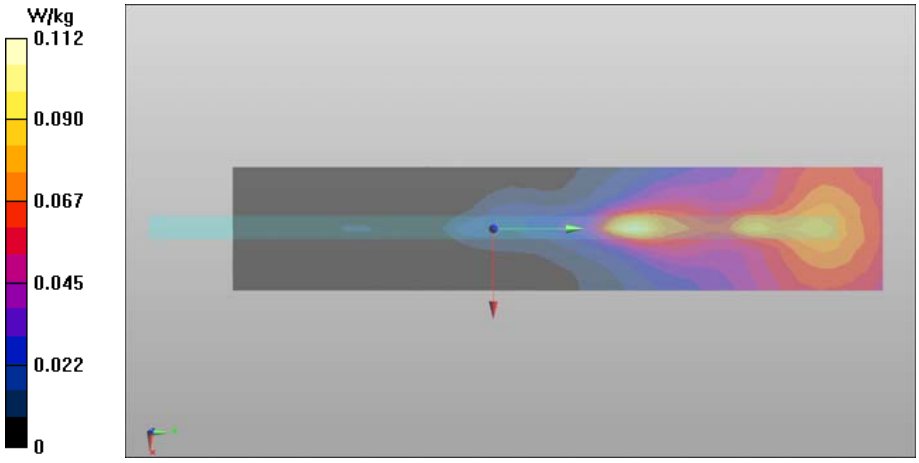
Date/Time: 2013-09-26 06:53:00

Test Laboratory: TCC Nokia
Type: RX-113; Serial: 004402/47/357512/8

Communication System: WCDMA1900 (Band 2)
Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: BSL1900; Medium Notes: t= 21.9 C
Medium parameters used: f = 1880 MHz; σ = 1.471 S/m; ε_r = 51.024; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:
- Probe: ES3DV3 - SN3131
- ConvF(4.62, 4.62, 4.62); Calibrated: 2013-06-18;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn793; Calibrated: 2013-06-10
- Phantom: SAM 2 ELI5; Type: QDOVA002AA; Serial: TP-1160
- Measurement SW: DASY52, Version 52.8 (6); SEMCAD X Version 14.6.9 (7117)

WCDMA1900 (Band 2)/Body - Middle - Spacer 0mm - No Headset - Bottom Edge Facing Phantom - Full Power/Volume Scan (13x64x12): Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.075 V/m
Peak SAR (extrapolated) = 0.250 W/kg
SAR(1 g) = 0.062 W/kg
SAR(10 g) = 0.038 W/kg
Power Drift = 0.05 dB
Total Absorbed Power = 0.00353 W
Maximum value of SAR (measured) = 0.112 W/kg



Copyright © 2013 TCC Nokia

Plot #16

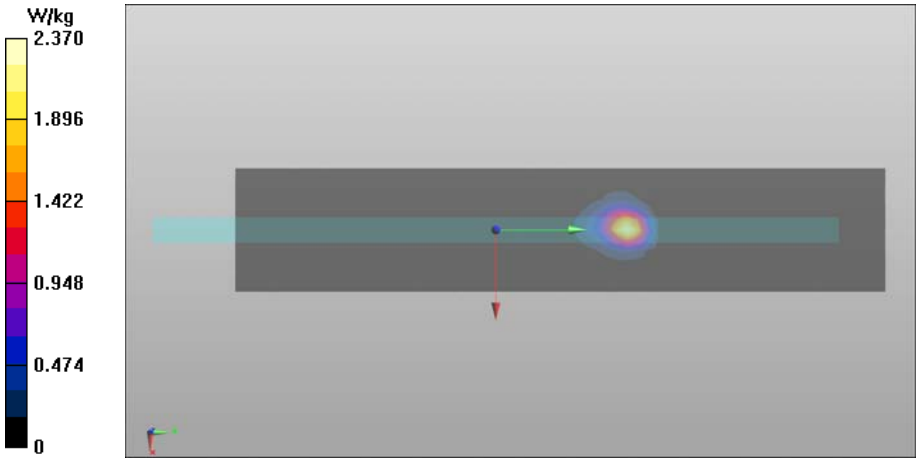
Date/Time: 2013-09-26 11:04:30

Test Laboratory: TCC Nokia
Type: RX-114; Serial: 004402/47/357461/8

Communication System: WLAN5000 a-mode
Frequency: 5220 MHz; Duty Cycle: 1:1
Medium: MSL5000; Medium Notes: T=21.5
Medium parameters used: f = 5220 MHz; σ = 5.498 S/m; ε_r = 48.284; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:
- Probe: EX3DV4 - SN3817
- ConvF(4.54, 4.54, 4.54); Calibrated: 2013-01-23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
- Phantom: SAM 2 ELI5; Type: QDOVA002AA; Serial: TP-1160
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.9 (7117)

WLAN5000 a-mode/Body - Channel 44 - BPSK 6Mbps - Spacer 0mm - No Headset - Bottom Edge Facing Phantom - Aux Antenna/Volume Scan (13x64x12): Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.264 V/m
Peak SAR (extrapolated) = 4.11 W/kg
SAR(1 g) = 1.06 W/kg
SAR(10 g) = 0.254 W/kg
Power Drift = 0.13 dB
Total Absorbed Power = 0.00397 W
Maximum value of SAR (measured) = 2.37 W/kg



Copyright © 2013 TCC Nokia

Plot #17

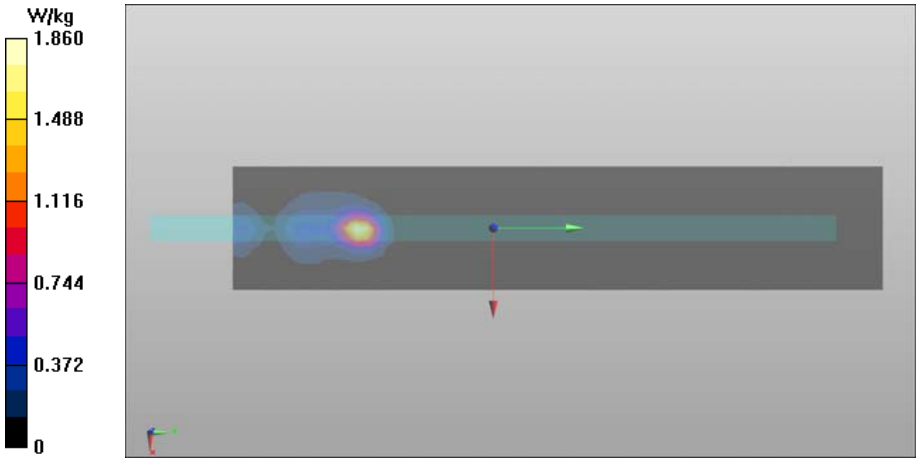
Date/Time: 2013-09-25 16:43:12

Test Laboratory: TCC Nokia
Type: RX-114; Serial: 004402/47/357461/8

Communication System: WLAN5000 a-mode
Frequency: 5520 MHz; Duty Cycle: 1:1
Medium: MSL5000; Medium Notes: T=21.5
Medium parameters used: f = 5520 MHz; σ = 5.898 S/m; ε_r = 47.771; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:
- Probe: EX3DV4 - SN3817
- ConvF(4.07, 4.07, 4.07); Calibrated: 2013-01-23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
- Phantom: SAM 2 ELI5; Type: QDOVA002AA; Serial: TP-1160
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.9 (7117)

WLAN a-mode/Body - Channel 104 - BPSK 6 Mbps - Spacer 0mm - No Headset - Bottom Edge Facing Phantom - Main Antenna/Volume Scan (13x64x12): Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.338 V/m
Peak SAR (extrapolated) = 3.00 W/kg
SAR(1 g) = 0.766 W/kg
SAR(10 g) = 0.174 W/kg
Power Drift = -0.03 dB
Total Absorbed Power = 0.00363 W
Maximum value of SAR (measured) = 1.86 W/kg



Copyright © 2013 TCC Nokia

Plot #18

Date/Time: 2013-09-26 07:05:02

DASY Configuration for 2-slot GPRS850/Body - Middle - Spacer 0mm - No Headset - Bottom Edge Facing Phantom - Full Power/Volume Scan:

Test Laboratory: TCC Nokia

Type: RX-113; Serial: 004402/47/357507/8

Communication System: 2-slot GPRS850; Frequency: 836.6 MHz; Duty Cycle: 1:4.19952; PMF: 2.04927

Medium: BSL850 Medium parameters used: f = 837 MHz; σ = 0.968 S/m; ε_r = 53.509; ρ = 1000 kg/m³

Phantom section: Flat Section

Probe: ES3DV3 - SN3165; ConvF(6.04, 6.04, 6.04); Calibrated: 2013-01-21;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1355; Calibrated: 2013-01-08
Phantom: #2 ELI Phantom; Type: QDOVA002AA; Serial:
Measurement SW: DASY52, Version 52.8 (6)

Date/Time: 2013-09-25 16:43:12

DASY Configuration for WLAN a-mode/Body - Channel 104 - BPSK 6 Mbps - Spacer 0mm - No Headset - Bottom Edge Facing Phantom - Main Antenna/Volume Scan:

Test Laboratory: TCC Nokia

Type: RX-114; Serial: 004402/47/357461/8

Communication System: WLAN5000 a-mode; Frequency: 5520 MHz; Duty Cycle: 1:1; PMF: 1

Medium: MSL5000 Medium parameters used: f = 5520 MHz; σ = 5.898 S/m; ε_r = 47.771; ρ = 1000 kg/m³

Phantom section: Flat Section

Probe: EX3DV4 - SN3817; ConvF(4.07, 4.07, 4.07); Calibrated: 2013-01-23;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
Phantom: SAM 2 ELI5; Type: QDOVA002AA; Serial: TP-1160
Measurement SW: DASY52, Version 52.8 (1)

Date/Time: 2013-09-26 11:04:30

DASY Configuration for WLAN5000 a-mode/Body - Channel 44 - BPSK 6Mbps - Spacer 0mm - No Headset - Bottom Edge Facing Phantom - Aux Antenna/Volume Scan:

Test Laboratory: TCC Nokia

Type: RX-114; Serial: 004402/47/357461/8

Communication System: WLAN5000 a-mode; Frequency: 5220 MHz; Duty Cycle: 1:1; PMF: 1

Medium: MSL5000 Medium parameters used: f = 5220 MHz; σ = 5.498 S/m; ε_r = 48.284; ρ = 1000 kg/m³

Phantom section: Flat Section

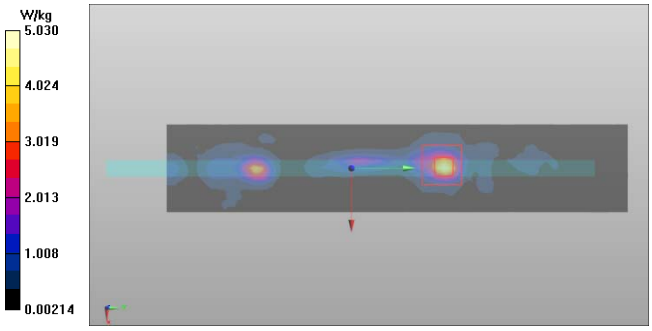
Probe: EX3DV4 - SN3817; ConvF(4.54, 4.54, 4.54); Calibrated: 2013-01-23;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
Phantom: SAM 2 ELI5; Type: QDOVA002AA; Serial: TP-1160
Measurement SW: DASY52, Version 52.8 (1)

Multi Band Result:

SAR(1 g) = 1.53 W/kg; SAR(10 g) = 0.451 W/kg

Maximum value of SAR (interpolated) = 5.03 W/kg

2-slot GPRS850 was scaled with factor 1.05, WLAN5000 a-mode Main Antenna with factor 1.27, WLAN5000 a-mode AUX Antenna with factor 1.31, before combining in SEMCAD SW.



Copyright © 2013 TCC Nokia

Plot #19

Date/Time: 2013-09-26 13:22:30

DASY Configuration for WCDMA850 (Band 5)/Body - Middle - Spacer 0mm - No Headset - Bottom Edge Facing Phantom - Full Power/Volume Scan:

Test Laboratory: TCC Nokia

Type: RX-113; Serial: 004402/47/357507/8

Communication System: WCDMA850 (Band 5); Frequency: 835 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL850 Medium parameters used: f = 835 MHz; σ = 0.967 S/m; ε_r = 53.523; ρ = 1000 kg/m³

Phantom section: Flat Section

Probe: ES3DV3 - SN3165; ConvF(6.04, 6.04, 6.04); Calibrated: 2013-01-21;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1355; Calibrated: 2013-01-08
Phantom: #2 ELI Phantom; Type: QDOVA002AA; Serial: -
Measurement SW: DASY52, Version 52.8 (6)

Date/Time: 2013-09-25 16:43:12

DASY Configuration for WLAN a-mode/Body - Channel 104 - BPSK 6 Mbps - Spacer 0mm - No Headset - Bottom Edge Facing Phantom - Main Antenna/Volume Scan:

Test Laboratory: TCC Nokia

Type: RX-114; Serial: 004402/47/357461/8

Communication System: WLAN5000 a-mode; Frequency: 5520 MHz; Duty Cycle: 1:1; PMF: 1

Medium: MSL5000 Medium parameters used: f = 5520 MHz; σ = 5.898 S/m; ε_r = 47.771; ρ = 1000 kg/m³

Phantom section: Flat Section

Probe: EX3DV4 - SN3817; ConvF(4.07, 4.07, 4.07); Calibrated: 2013-01-23;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
Phantom: SAM 2 ELI5; Type: QDOVA002AA; Serial: TP-1160
Measurement SW: DASY52, Version 52.8 (1)

Date/Time: 2013-09-26 11:04:30

DASY Configuration for WLAN5000 a-mode/Body - Channel 44 - BPSK 6Mbps - Spacer 0mm - No Headset - Bottom Edge Facing Phantom - Aux Antenna/Volume Scan:

Test Laboratory: TCC Nokia

Type: RX-114; Serial: 004402/47/357461/8

Communication System: WLAN5000 a-mode; Frequency: 5220 MHz; Duty Cycle: 1:1; PMF: 1

Medium: MSL5000 Medium parameters used: f = 5220 MHz; σ = 5.498 S/m; ε_r = 48.284; ρ = 1000 kg/m³

Phantom section: Flat Section

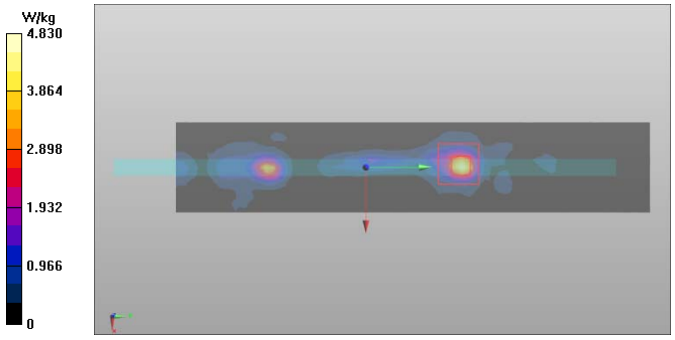
Probe: EX3DV4 - SN3817; ConvF(4.54, 4.54, 4.54); Calibrated: 2013-01-23;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
Phantom: SAM 2 ELI5; Type: QDOVA002AA; Serial: TP-1160
Measurement SW: DASY52, Version 52.8 (1)

Multi Band Result:

SAR(1 g) = 1.47 W/kg; SAR(10 g) = 0.430 W/kg

Maximum value of SAR (interpolated) = 4.83 W/kg

WCDMA850 was scaled with factor 1.04, WLAN5000 a-mode Main Antenna with factor 1.27, WLAN5000 a-mode AUX Antenna with factor 1.31, before combining in SEMCAD SW.



Copyright © 2013 TCC Nokia

Plot #20

Date/Time: 2013-09-26 06:53:00

DASY Configuration for WCDMA1900 (Band 2)/Body - Middle - Spacer 0mm - No Headset - Bottom Edge Facing Phantom - Full Power/Volume Scan:

Test Laboratory: TCC Nokia

Type: RX-113; Serial: 004402/47/357512/8

Communication System: WCDMA1900 (Band 2); Frequency: 1880 MHz; Duty Cycle: 1:1; PMF: 1

Medium: BSL1900 Medium parameters used: f = 1880 MHz; σ = 1.471 S/m; ε_r = 51.024; ρ = 1000 kg/m^3

Phantom section: Flat Section

Probe: ES3DV3 - SN3131; ConvF(4.62, 4.62, 4.62); Calibrated: 2013-06-18;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn793; Calibrated: 2013-06-10
Phantom: SAM 2 ELI5; Type: QDOVA002AA; Serial: TP-1160
Measurement SW: DASY52, Version 52.8 (6)

Date/Time: 2013-09-25 16:43:12

DASY Configuration for WLAN a-mode/Body - Channel 104 - BPSK 6 Mbps - Spacer 0mm - No Headset - Bottom Edge Facing Phantom - Main Antenna/Volume Scan:

Test Laboratory: TCC Nokia

Type: RX-114; Serial: 004402/47/357461/8

Communication System: WLAN5000 a-mode; Frequency: 5520 MHz; Duty Cycle: 1:1; PMF: 1

Medium: MSL5000 Medium parameters used: f = 5520 MHz; σ = 5.898 S/m; ε_r = 47.771; ρ = 1000 kg/m^3

Phantom section: Flat Section

Probe: EX3DV4 - SN3817; ConvF(4.07, 4.07, 4.07); Calibrated: 2013-01-23;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
Phantom: SAM 2 ELI5; Type: QDOVA002AA; Serial: TP-1160
Measurement SW: DASY52, Version 52.8 (1)

Date/Time: 2013-09-26 11:04:30

DASY Configuration for WLAN5000 a-mode/Body - Channel 44 - BPSK 6Mbps - Spacer 0mm - No Headset - Bottom Edge Facing Phantom - Aux Antenna/Volume Scan:

Test Laboratory: TCC Nokia

Type: RX-114; Serial: 004402/47/357461/8

Communication System: WLAN5000 a-mode; Frequency: 5220 MHz; Duty Cycle: 1:1; PMF: 1

Medium: MSL5000 Medium parameters used: f = 5220 MHz; σ = 5.498 S/m; ε_r = 48.284; ρ = 1000 kg/m^3

Phantom section: Flat Section

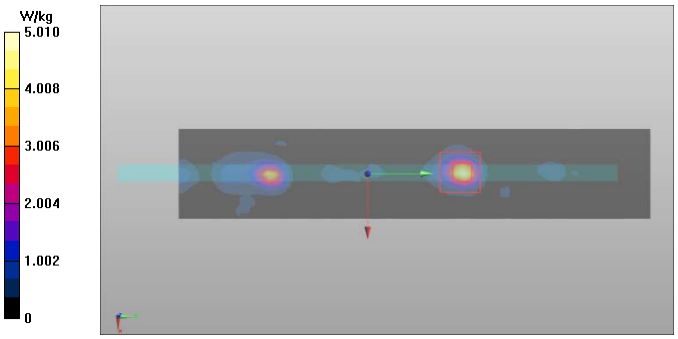
Probe: EX3DV4 - SN3817; ConvF(4.54, 4.54, 4.54); Calibrated: 2013-01-23;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1301; Calibrated: 2013-02-06
Phantom: SAM 2 ELI5; Type: QDOVA002AA; Serial: TP-1160
Measurement SW: DASY52, Version 52.8 (1)

Multi Band Result:

SAR(1 g) = 1.42 W/kg; SAR(10 g) = 0.355 W/kg

Maximum value of SAR (interpolated) = 5.01 W/kg

WCDMA1900 was scaled with factor 1.07, WLAN5000 a-mode Main Antenna with factor 1.27, WLAN5000 a-mode AUX Antenna with factor 1.31, before combining in SEMCAD SW.



Copyright © 2013 TCC Nokia

APPENDIX C: DIELECTRIC PARAMETERS OF THE TISSUE SIMULANTS

Body tissue simulant dielectric parameters used in the measurements:

F (MHz)	Date	Dielectric Parameters					
		Ch 4132 826.4 MHz		Ch 4175 835.0 MHz		Ch 4233 846.6 MHz	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
835	2013-09-12	53.6	0.97	53.6	0.98	53.5	0.99
	2013-09-13	53.5	0.97	53.5	0.98	53.4	0.99
	2013-09-25	53.8	0.95	53.7	0.96	53.6	0.97
	2013-09-26	53.6	0.96	53.5	0.97	53.4	0.97
	2013-10-17	54.6	0.97	54.6	0.97	54.5	0.98
f (MHz)	**Date**	**Dielectric Parameters**					
		Ch 128 824.2 MHz		Ch 190 836.6 MHz		Ch 251 848.8 MHz	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
836	2013-09-12	53.6	0.97	53.6	0.98	53.5	0.99
	2013-09-13	53.5	0.97	53.5	0.98	53.4	0.99
	2013-09-25	53.8	0.95	53.7	0.96	53.6	0.97
	2013-09-26	53.6	0.96	53.5	0.97	53.4	0.97
	2013-10-17	54.6	0.97	54.6	0.97	54.5	0.98
f (MHz)	**Date**	**Dielectric Parameters**					
		Ch 512 1850.2 MHz		Ch 661 1880.0 MHz		Ch 810 1909.8 MHz	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
1880	2013-09-11	51.7	1.48	51.6	1.51	51.5	1.54
	2013-09-12	51.4	1.48	51.4	1.51	51.3	1.54
	2013-10-11	51.5	1.45	51.4	1.48	51.4	1.51
f (MHz)	**Date**	**Dielectric Parameters**					
		Ch 9262 1852.4 MHz		Ch 9400 1880.0 MHz		Ch 9538 1907.6 MHz	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
1880	2013-09-11	51.6	1.48	51.6	1.51	51.5	1.54
	2013-09-12	51.4	1.48	51.4	1.51	51.3	1.54
	2013-09-26	51.1	1.45	51.0	1.47	51.0	1.49
	2013-10-11	51.5	1.45	51.4	1.48	51.4	1.50

(Table Continues)

Copyright © 2013 TCC Nokia

(Table Continues)

f (MHz)	Date	Dielectric Parameters					
		Ch 1 2412.0 MHz		Ch 6 2437.0 MHz		Ch 11 2462.0 MHz	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
2437	2013-09-09	50.8	1.87	50.8	1.90	50.7	1.93
	2013-09-24	51.1	1.87	51.0	1.90	51.0	1.94
	2013-09-25	51.0	1.87	51.0	1.90	50.9	1.94

Body tissue simulant dielectric parameters used in the measurements 5180 – 5825 MHz: Main Antenna

f (MHz)	Date	Dielectric Parameters									
		Ch 40 5200.0 MHz		5210.0 MHz		Ch 44 5220.0 MHz		-		-	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
5210	2013-09-03	47.9	5.47	47.9	5.48	47.9	5.49	-	-	-	-
	2013-09-25	48.3	5.47	48.3	5.48	48.3	5.50				
f (MHz)	Date	Dielectric Parameters									
		Ch 56 5280.0 MHz		5290.0 MHz		Ch 60 5300.0 MHz		-		-	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
5290	2013-09-04	47.6	5.54	47.5	5.56	47.5	5.57	-	-	-	-
f (MHz)	Date	Dielectric Parameters									
		Ch 104 5520.0 MHz		Ch 112 5560.0 MHz		Ch 128 5640.0 MHz		Ch 136 5680.0 MHz		-	
		εr	εr	εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
5520	2013-09-04	47.2	47.1	47.1	5.91	47.0	6.02	46.9	6.08	-	-
	2013-09-25	47.8	47.8	47.8	5.95	47.6	6.07	47.5	6.12	-	-
f (MHz)	Date	Dielectric Parameters									
		5760.0 MHz		Ch 153 5765.0 MHz		Ch 161 5805.0 MHz		Ch 165 5825.0 MHz		-	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
5760	2013-09-05	46.8	6.18	46.8	6.19	46.7	6.23	46.6	6.28	-	-

Copyright © 2013 TCC Nokia

Body tissue simulant dielectric parameters used in the measurements 5180 – 5825 MHz: AUX Antenna

f (MHz)	Date	Dielectric Parameters									
		Ch 36 5180.0 MHz		5210.0 MHz		Ch 44 5220.0 MHz		-		-	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
5210	2013-09-03	48.0	5.44	47.9	5.48	47.9	5.49	-	-	-	-
	2013-09-25	48.4	5.44	48.3	5.48	48.3	5.50				
f (MHz)	Date	Dielectric Parameters									
		Ch 52 5260.0 MHz		5290.0 MHz		Ch 60 5300.0 MHz		-		-	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
5290	2013-09-04	47.6	5.51	47.5	5.56	47.5	5.57	-	-	-	-
f (MHz)	Date	Dielectric Parameters									
		5520.0 MHz		Ch 108 5540.0 MHz		Ch 120 5600.0 MHz		Ch 124 5620.0 MHz		Ch 136 5680.0 MHz	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
5520	2013-09-04	47.2	5.86	47.1	5.89	47.0	5.97	47.0	6.00	46.9	6.08
	2013-09-25	47.8	5.90	47.8	5.93	47.6	6.00	47.6	6.04	47.5	6.12
f (MHz)	Date	Dielectric Parameters									
		Ch 149 5745.0 MHz		5760.0 MHz		Ch 157 5785.0 MHz		Ch 161 5805.0 MHz		-	
		εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]	εr	σ [S/m]
5760	2013-09-05	46.8	6.17	46.8	6.18	46.7	6.22	46.7	6.23	-	-

Copyright © 2013 TCC Nokia

APPENDIX D: CONDUCTED AVERAGE POWER MEASUREMENTS FOR WCDMA AND HSUPA

Test Laboratory: TCC Nokia
Type: RX-113; Serial: 004402/47/357507/8, HW: 0107, SW: ROW_9447_1030_1329_v0.1.12a

D.1. WCDMA850 (Band 5), FULL POWER Test results

Average power

Ch / *f*(MHz)	P [dBm]
4132	23.76
4175	23.66
4233	23.60

D.2. HSUPA850, FULL POWER Test results

Average power

Ch / *f* (MHz)	P [dBm]				
	Subtest mode 1	Subtest mode 2	Subtest mode 3	Subtest mode 4	Subtest mode 5
4132	22.59	21.75	21.54	22.21	22.72
4175	22.63	21.51	21.41	22.13	22.67
4233	22.60	21.32	21.48	22.10	22.65

Note: In HSUPA operation, the output power is reduced relative to the tuning target power for WCDMA. This device runs a single HSUPA power control routine: MPR, and additional 0.5dB reduction to ensure PA linearity. As a result, the MPR for each of the Subtest modes is as follows:

Maximum Power Reduction (MPR)				
Subtest mode 1	Subtest mode 2	Subtest mode 3	Subtest mode 4	Subtest mode 5
0.0dB	2.0dB	1.0dB	2.0dB	0.0dB

Copyright © 2013 TCC Nokia

D.3. WCDMA850 (Band 5), REDUCED POWER Test results

Average power

Ch / *f*(MHz)	P [dBm]
4132	21.24
4175	21.21
4233	21.28

D.4. HSUPA850, REDUCED POWER Test results

Average power

Ch / *f* (MHz)	P [dBm]				
	Subtest mode 1	Subtest mode 2	Subtest mode 3	Subtest mode 4	Subtest mode 5
4132	20.10	19.40	19.00	20.30	20.70
4175	20.70	19.70	19.10	20.30	20.80
4233	20.70	19.70	19.70	20.30	20.90

Note: In HSUPA operation, the output power is reduced relative to the tuning target power for WCDMA. This device runs a single HSUPA power control routine: MPR, and additional 0.5dB reduction to ensure PA linearity. As a result, the MPR for each of the Subtest modes is as follows:

Maximum Power Reduction (MPR)				
Subtest mode 1	Subtest mode 2	Subtest mode 3	Subtest mode 4	Subtest mode 5
0.5dB	1.5dB	1.5dB	0.5dB	0.0dB

Copyright © 2013 TCC Nokia

D.5. WCDMA1900 (Band 2), FULL POWER Test results

Average power

Ch / *f*(MHz)	P [dBm]
9262	23.57
9400	23.57
9538	23.62

D.6. HSUPA1900, FULL POWER Test results

Average power

Ch / *f* (MHz)	P [dBm]				
	Subtest mode 1	Subtest mode 2	Subtest mode 3	Subtest mode 4	Subtest mode 5
9262	22.22	21.29	21.40	22.00	22.51
9400	21.96	21.24	20.94	22.20	22.55
9538	22.63	21.30	21.57	21.83	22.60

Note: In HSUPA operation, the output power is reduced relative to the tuning target power for WCDMA. This device runs a single HSUPA power control routine: MPR, and additional 0.5dB reduction to ensure PA linearity. As a result, the MPR for each of the Subtest modes is as follows:

Maximum Power Reduction (MPR)				
Subtest mode 1	Subtest mode 2	Subtest mode 3	Subtest mode 4	Subtest mode 5
0.0dB	2.0dB	1.0dB	2.0dB	0.0dB

Copyright © 2013 TCC Nokia

D.7. WCDMA1900 (Band 2), REDUCED POWER Test results

Average power

Ch / *f*(MHz)	P [dBm]
9262	17.57
9400	17.61
9538	17.83

D.8. HSUPA1900, REDUCED POWER Test results

Average power

Ch / *f* (MHz)	P [dBm]				
	Subtest mode 1	Subtest mode 2	Subtest mode 3	Subtest mode 4	Subtest mode 5
9262	16.70	15.60	15.40	16.20	16.80
9400	17.20	15.90	15.40	16.70	17.30
9538	17.20	15.90	15.50	16.80	17.30

Note: In HSUPA operation, the output power is reduced relative to the tuning target power for WCDMA. This device runs a single HSUPA power control routine: MPR, and additional 0.5dB reduction to ensure PA linearity. As a result, the MPR for each of the Subtest modes is as follows:

Maximum Power Reduction (MPR)				
Subtest mode 1	Subtest mode 2	Subtest mode 3	Subtest mode 4	Subtest mode 5
0.5dB	1.5dB	2.0dB	1.0dB	0.5dB

Copyright © 2013 TCC Nokia

APPENDIX E: RELEVANT PAGES FROM PROBE CALIBRATION REPORTS

Copyright © 2013 TCC Nokia

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 Nokia Salo TCC

Certificate No: ES3-3131_Jun13

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3131
Calibration procedure(s)	QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4 Calibration procedure for dosimetric E-field probes
Calibration date:	June 18, 2013

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 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	04-Apr-13 (No. 217-01733)	Apr-14
Power sensor E4412A	MY41498087	04-Apr-13 (No. 217-01733)	Apr-14
Reference 3 dB Attenuator	SN: S5054 (3c)	04-Apr-13 (No. 217-01737)	Apr-14
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-13 (No. 217-01735)	Apr-14
Reference 30 dB Attenuator	SN: S5129 (30b)	04-Apr-13 (No. 217-01738)	Apr-14
Reference Probe ES3DV2	SN: 3013	28-Dec-12 (No. ES3-3013_Dec12)	Dec-13
DAE4	SN: 660	31-Jan-13 (No. DAE4-660_Jan13)	Jan-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-15
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

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

Issued: June 18, 2013

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3131

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	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.23	6.23	6.23	0.31	1.83	± 12.0 %
835	41.5	0.90	5.96	5.96	5.96	0.26	1.99	± 12.0 %
1750	40.1	1.37	5.17	5.17	5.17	0.49	1.47	± 12.0 %
1900	40.0	1.40	4.98	4.98	4.98	0.67	1.27	± 12.0 %
2450	39.2	1.80	4.33	4.33	4.33	0.80	1.14	± 12.0 %
2600	39.0	1.96	4.21	4.21	4.21	0.80	1.09	± 12.0 %

[C] Frequency validity 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.
[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.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3131

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	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.10	6.10	6.10	0.30	1.90	± 12.0 %
835	55.2	0.97	6.03	6.03	6.03	0.39	1.68	± 12.0 %
1750	53.4	1.49	4.87	4.87	4.87	0.31	2.53	± 12.0 %
1900	53.3	1.52	4.62	4.62	4.62	0.28	2.70	± 12.0 %
2450	52.7	1.95	4.27	4.27	4.27	0.68	1.20	± 12.0 %
2600	52.5	2.16	4.17	4.17	4.17	0.50	1.10	± 12.0 %

[C] Frequency validity 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.
[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.

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

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

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

Accreditation No.: SCS 108

Client Nokia Salo TCC

Certificate No: ES3-3165_Jan13

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3165
Calibration procedure(s)	QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4 Calibration procedure for dosimetric E-field probes
Calibration date:	January 21, 2013

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 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	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	28-Dec-12 (No. ES3-3013_Dec12)	Dec-13
DAE4	SN: 660	20-Jun-12 (No. DAE4-660_Jun12)	Jun-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

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

Issued: January 21, 2013

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3165

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	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.46	6.46	6.46	0.23	2.34	± 12.0 %
835	41.5	0.90	6.20	6.20	6.20	0.33	1.65	± 12.0 %
1750	40.1	1.37	5.19	5.19	5.19	0.67	1.25	± 12.0 %
1900	40.0	1.40	5.02	5.02	5.02	0.43	1.47	± 12.0 %
2450	39.2	1.80	4.45	4.45	4.45	0.60	1.41	± 12.0 %
2600	39.0	1.96	4.28	4.28	4.28	0.70	1.34	± 12.0 %

[C] Frequency validity 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.
[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.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3165

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	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.10	6.10	6.10	0.31	1.92	± 12.0 %
835	55.2	0.97	6.04	6.04	6.04	0.71	1.22	± 12.0 %
1750	53.4	1.49	4.86	4.86	4.86	0.54	1.49	± 12.0 %
1900	53.3	1.52	4.60	4.60	4.60	0.46	1.72	± 12.0 %
2450	52.7	1.95	4.18	4.18	4.18	0.64	1.17	± 12.0 %
2600	52.5	2.16	3.98	3.98	3.98	0.80	1.00	± 12.0 %

[C] Frequency validity 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.
[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.

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 Nokia SD

Certificate No: EX3-3817_Jan13

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3817
Calibration procedure(s)	QA CAL-01.v8, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v4 Calibration procedure for dosimetric E-field probes
Calibration date:	January 23, 2013

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 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	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	28-Dec-12 (No. ES3-3013_Dec12)	Dec-13
DAE4	SN: 660	20-Jun-12 (No. DAE4-660_Jun12)	Jun-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

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

Issued: January 26, 2013

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3817

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	Depth (mm)	Unct. (k=2)
750	41.9	0.89	9.47	9.47	9.47	0.32	0.90	± 12.0 %
835	41.5	0.90	9.07	9.07	9.07	0.20	1.29	± 12.0 %
1750	40.1	1.37	8.03	8.03	8.03	0.65	0.66	± 12.0 %
1900	40.0	1.40	7.77	7.77	7.77	0.80	0.59	± 12.0 %
2450	39.2	1.80	7.09	7.09	7.09	0.75	0.63	± 12.0 %
5200	36.0	4.66	5.14	5.14	5.14	0.40	1.80	± 13.1 %
5300	35.9	4.76	4.94	4.94	4.94	0.40	1.80	± 13.1 %
5500	35.6	4.96	4.84	4.84	4.84	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.45	4.45	4.45	0.45	1.80	± 13.1 %
5800	35.3	5.27	4.53	4.53	4.53	0.45	1.80	± 13.1 %

[C] Frequency validity 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.
[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.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3817

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	Depth (mm)	Unct. (k=2)
750	55.5	0.96	9.42	9.42	9.42	0.44	0.83	± 12.0 %
835	55.2	0.97	9.25	9.25	9.25	0.27	1.15	± 12.0 %
1750	53.4	1.49	7.80	7.80	7.80	0.48	0.80	± 12.0 %
1900	53.3	1.52	7.46	7.46	7.46	0.31	0.98	± 12.0 %
2450	52.7	1.95	7.13	7.13	7.13	0.80	0.50	± 12.0 %
5200	49.0	5.30	4.54	4.54	4.54	0.50	1.90	± 13.1 %
5300	48.9	5.42	4.34	4.34	4.34	0.50	1.90	± 13.1 %
5500	48.6	5.65	4.07	4.07	4.07	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.79	3.79	3.79	0.55	1.90	± 13.1 %
5800	48.2	6.00	4.25	4.25	4.25	0.50	1.90	± 13.1 %

[C] Frequency validity 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.
[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.

APPENDIX F: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORTS

Copyright © 2013 TCC Nokia

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

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

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

Accreditation No.: SCS 108

Client **Nokia Salo TCC**

Certificate No: D835V2-480_Dec12

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 480
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	December 03, 2012

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	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.3 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

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

Issued: December 3, 2012

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

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.3
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	41.4 ± 6 %	0.92 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	2.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.40 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	**6.16 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.5 ± 6 %	0.99 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	2.42 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.51 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.59 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.27 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.8 Ω - 3.3 jΩ
Return Loss	- 29.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.7 Ω - 4.9 jΩ
Return Loss	- 24.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.391 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	January 28, 2003

DASY5 Validation Report for Head TSL

Date: 03.12.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 480

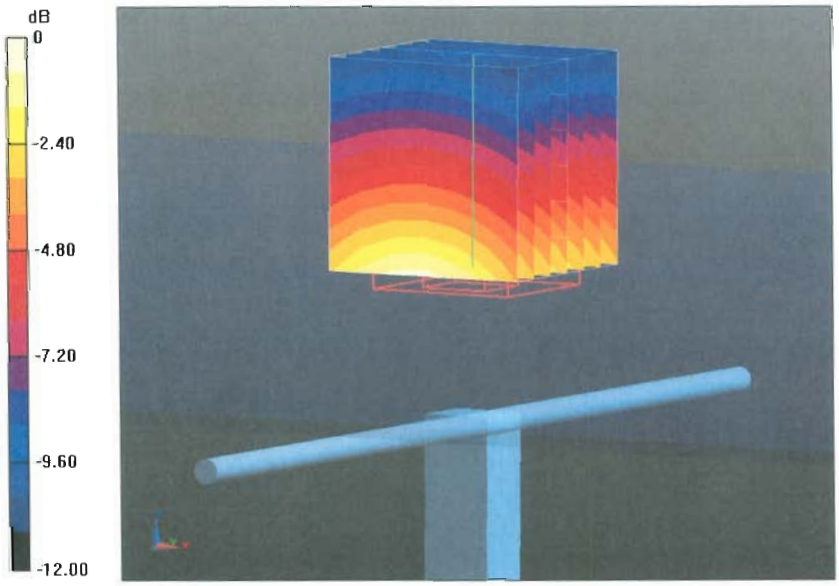
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.92 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

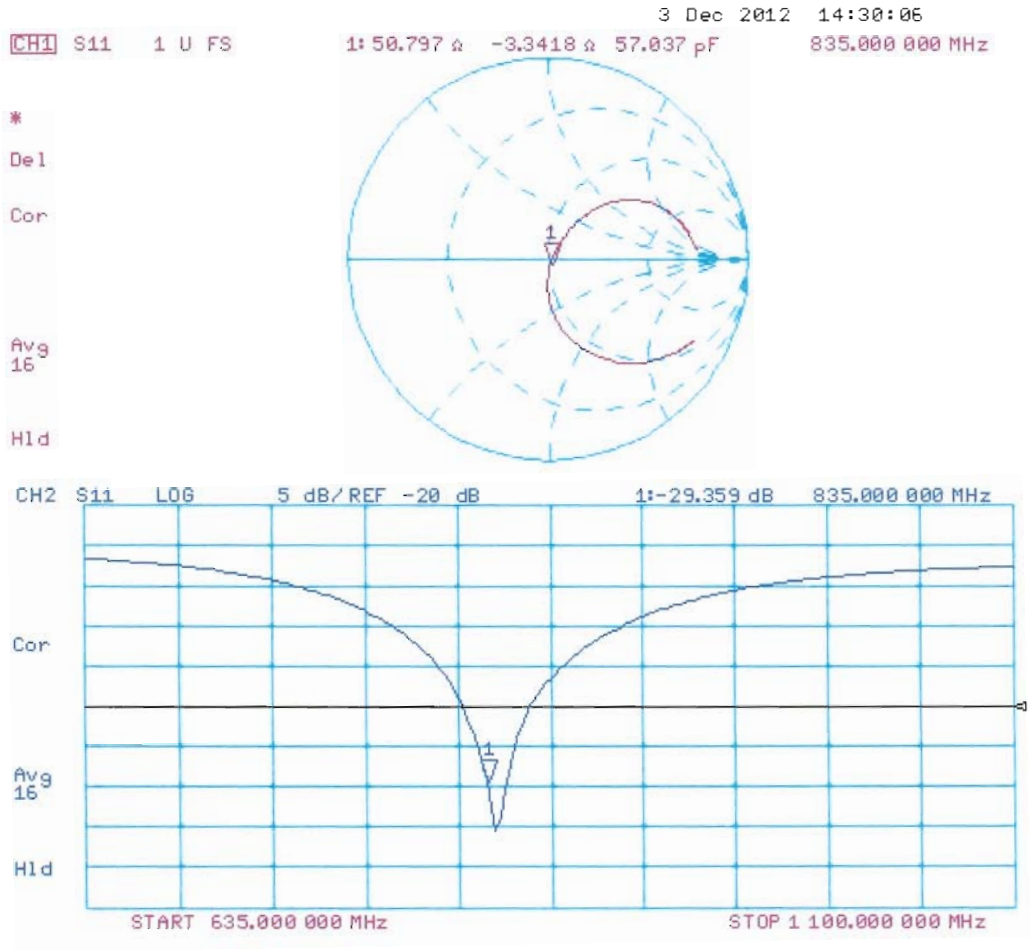
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.814 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.60 W/kg
SAR(1 g) = 2.39 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 Head TSL



DASY5 Validation Report for Body TSL

Date: 03.12.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 480

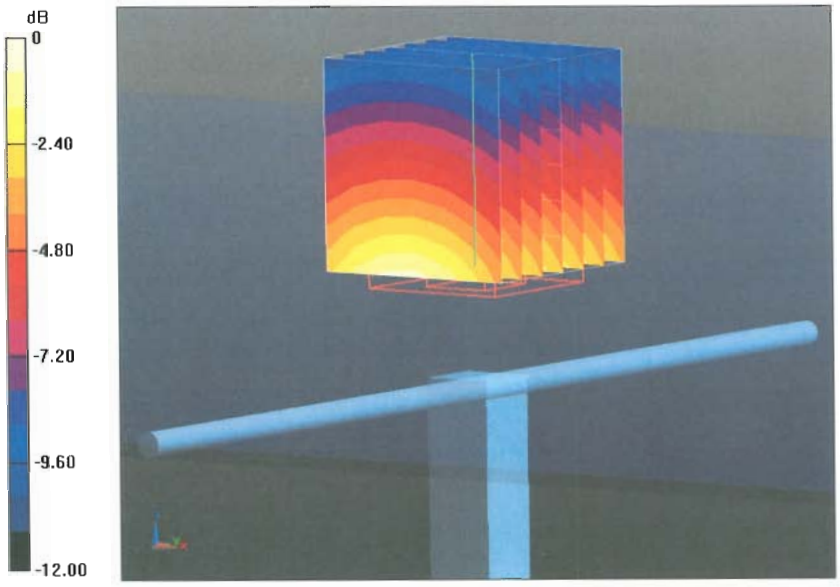
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

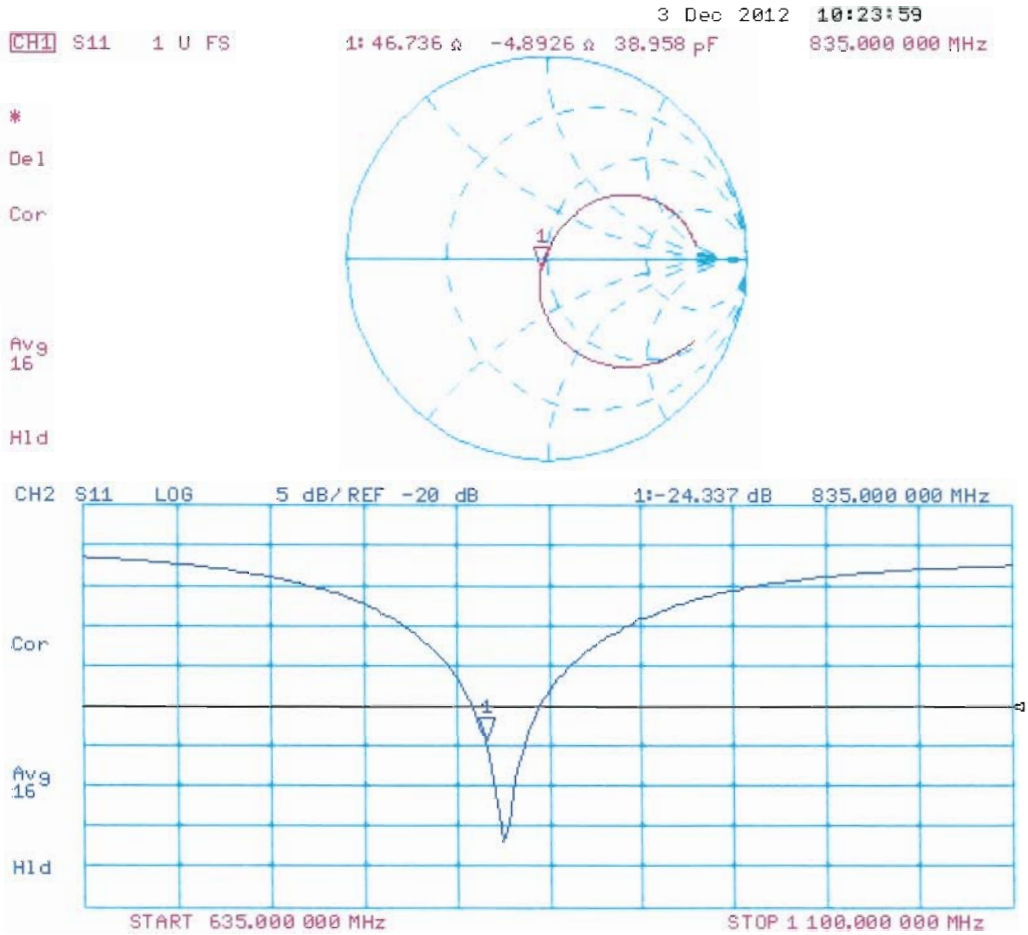
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.301 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.53 W/kg
SAR(1 g) = 2.42 W/kg; SAR(10 g) = 1.59 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



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

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

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

Accreditation No.: SCS 108

Client **Nokia Salo TCC**

Certificate No: D1900V2-5d013_Dec12

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d013
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	December 06, 2012

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	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.3 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

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

Issued: December 6, 2012

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

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.3
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 %	1.38 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	10.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.6 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**21.2 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	52.2 ± 6 %	1.52 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	10.3 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**41.0 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.6 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.3 Ω + 6.2 jΩ
Return Loss	- 23.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.4 Ω + 5.9 jΩ
Return Loss	- 24.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.194 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	April 30, 2002

DASY5 Validation Report for Head TSL

Date: 06.12.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d013

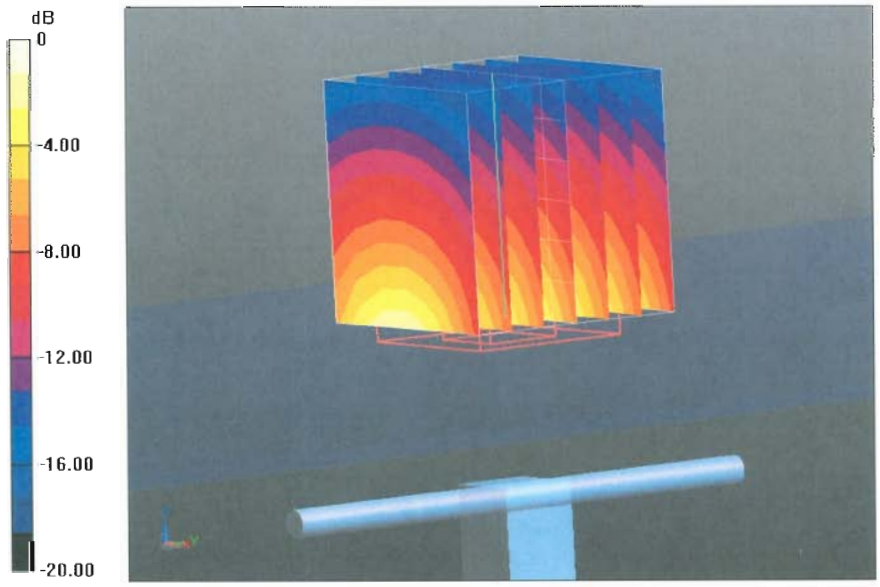
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.38 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

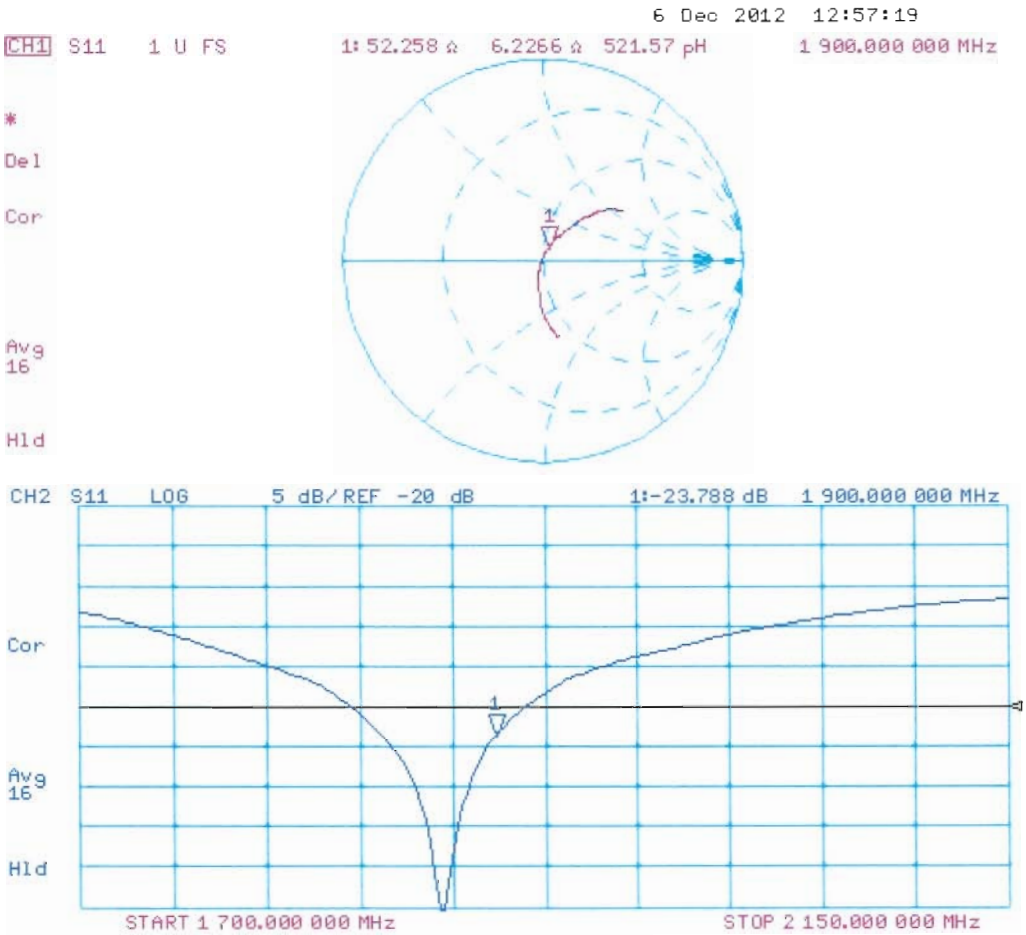
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.748 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 18.0 W/kg
SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.28 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: 06.12.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d013

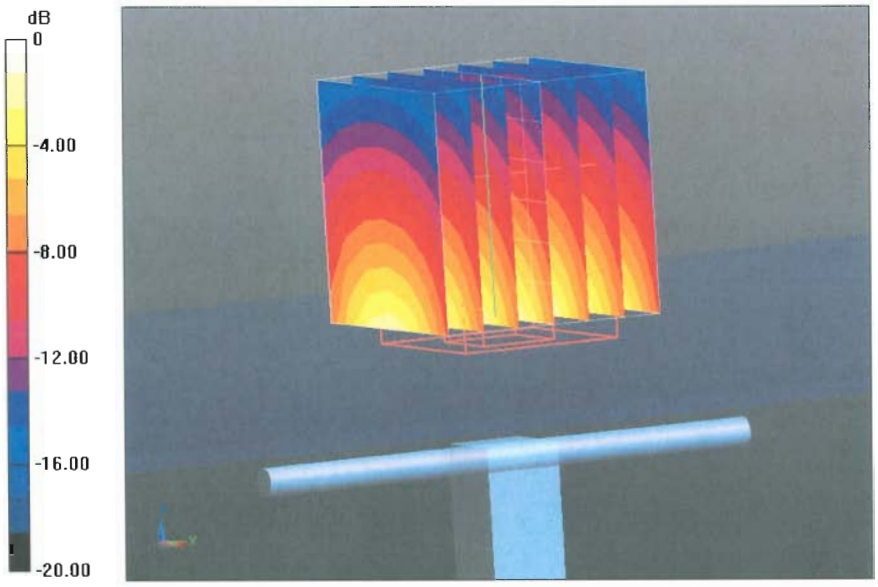
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.52 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

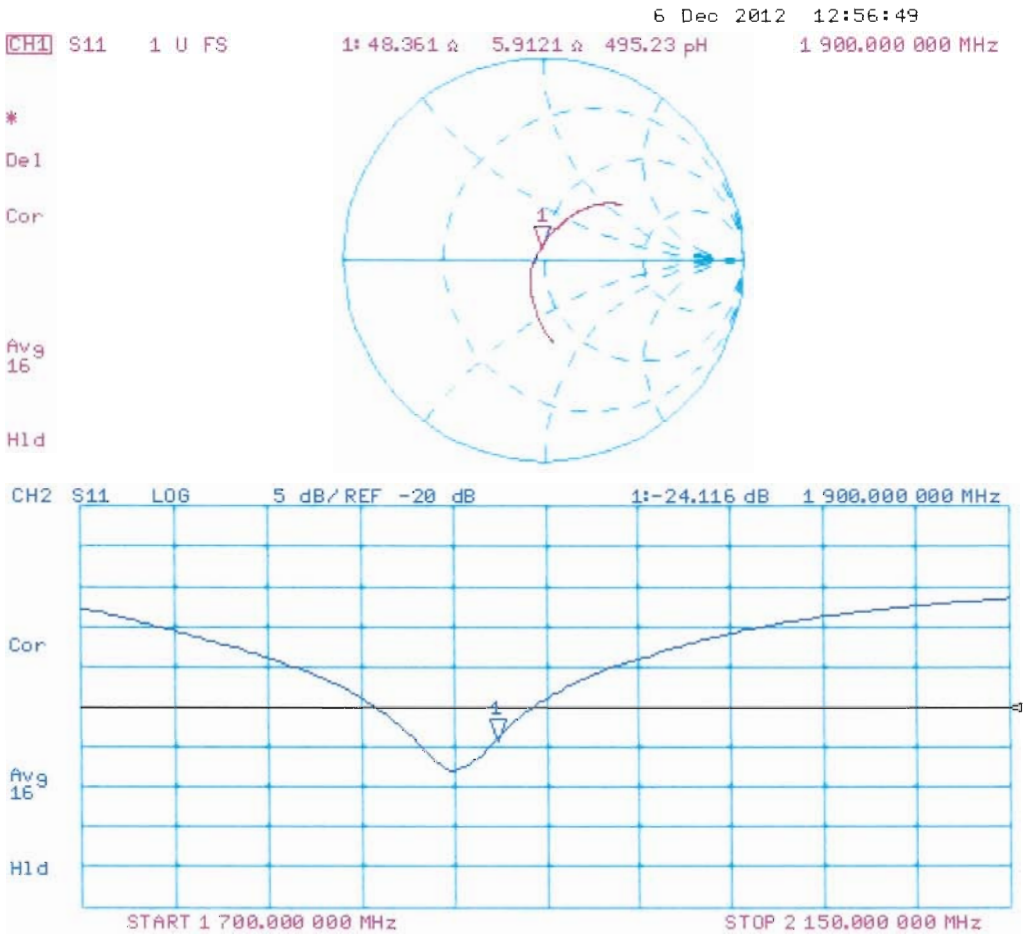
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.039 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 18.0 W/kg
SAR(1 g) = 10.3 W/kg; SAR(10 g) = 5.41 W/kg
Maximum value of SAR (measured) = 12.9 W/kg



0 dB = 12.9 W/kg = 11.11 dBW/kg

Impedance Measurement Plot for Body TSL



7161

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

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

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

Accreditation No.: SCS 108

Client **Nokia SD**

Certificate No: D2450V2-800_Sep12

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 800
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	September 13, 2012

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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: September 13, 2012

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

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.9 ± 6 %	1.84 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	13.4 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**53.2 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.24 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**24.9 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.0 ± 6 %	2.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**50.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.05 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**23.9 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.9 Ω + 2.2 jΩ
Return Loss	- 25.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.4 Ω + 3.7 jΩ
Return Loss	- 28.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.159 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 02, 2006

DASY5 Validation Report for Head TSL

Date: 13.09.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 800

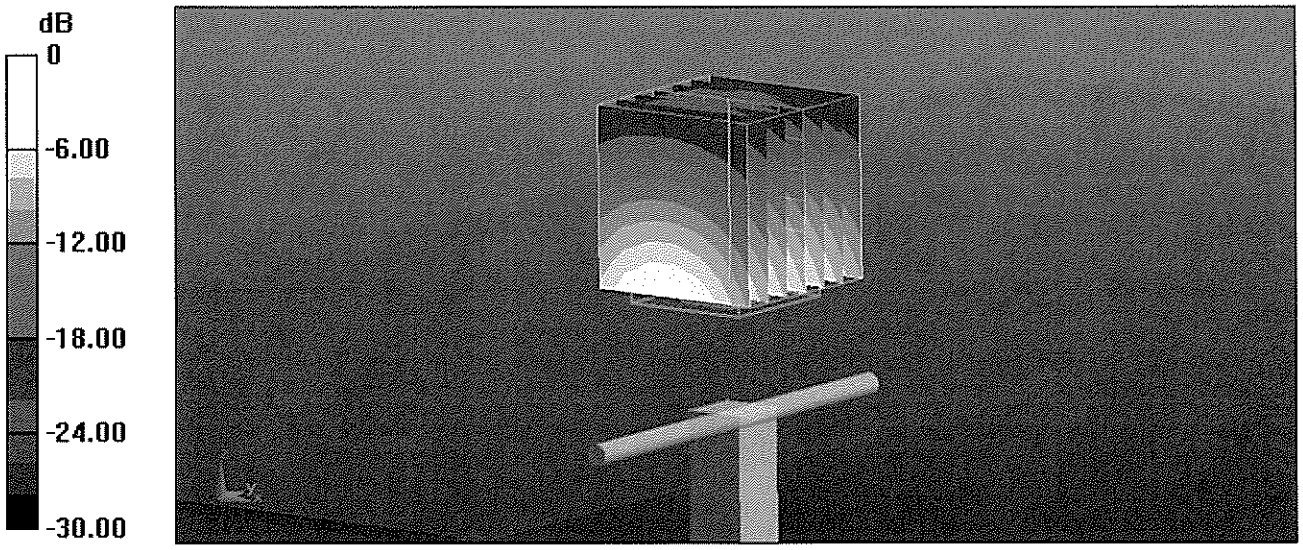
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.84 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

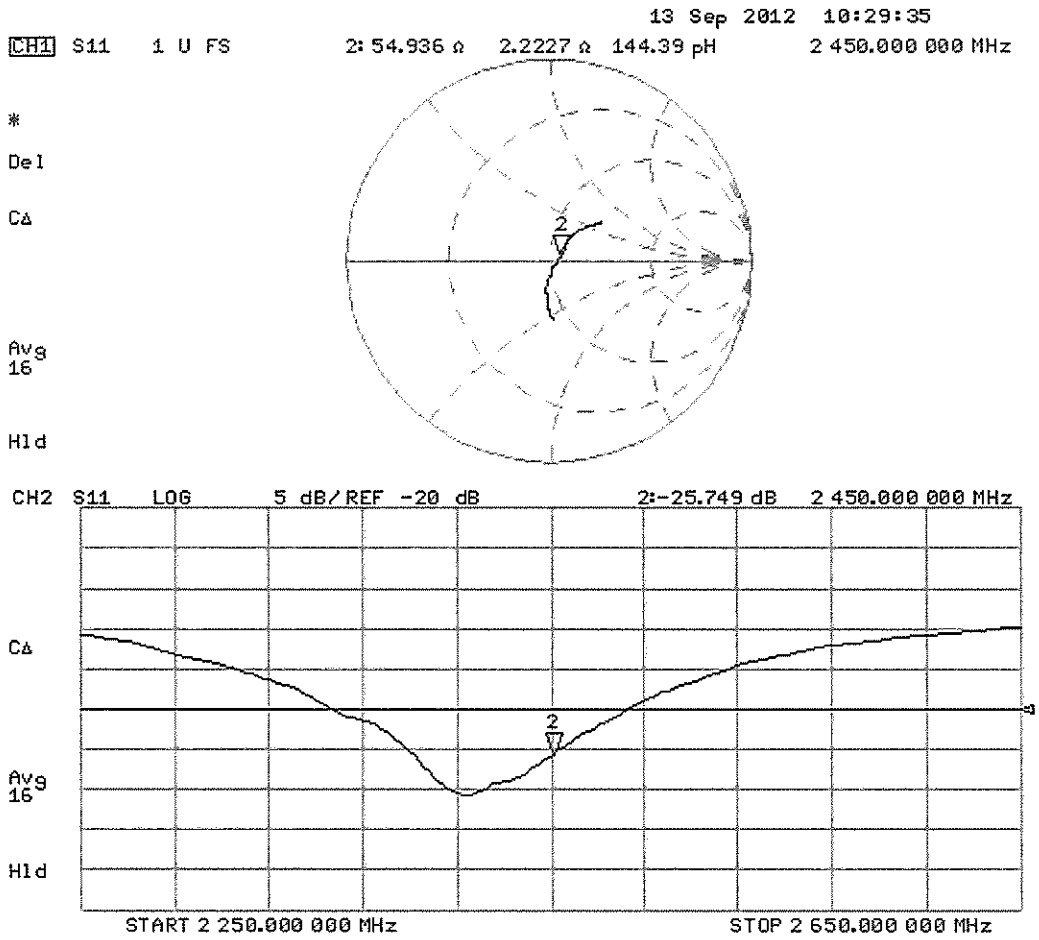
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 100.1 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 27.710 mW/g
SAR(1 g) = 13.4 mW/g; SAR(10 g) = 6.24 mW/g
Maximum value of SAR (measured) = 17.2 W/kg



0 dB = 17.2 W/kg = 24.71 dB W/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 13.09.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 800

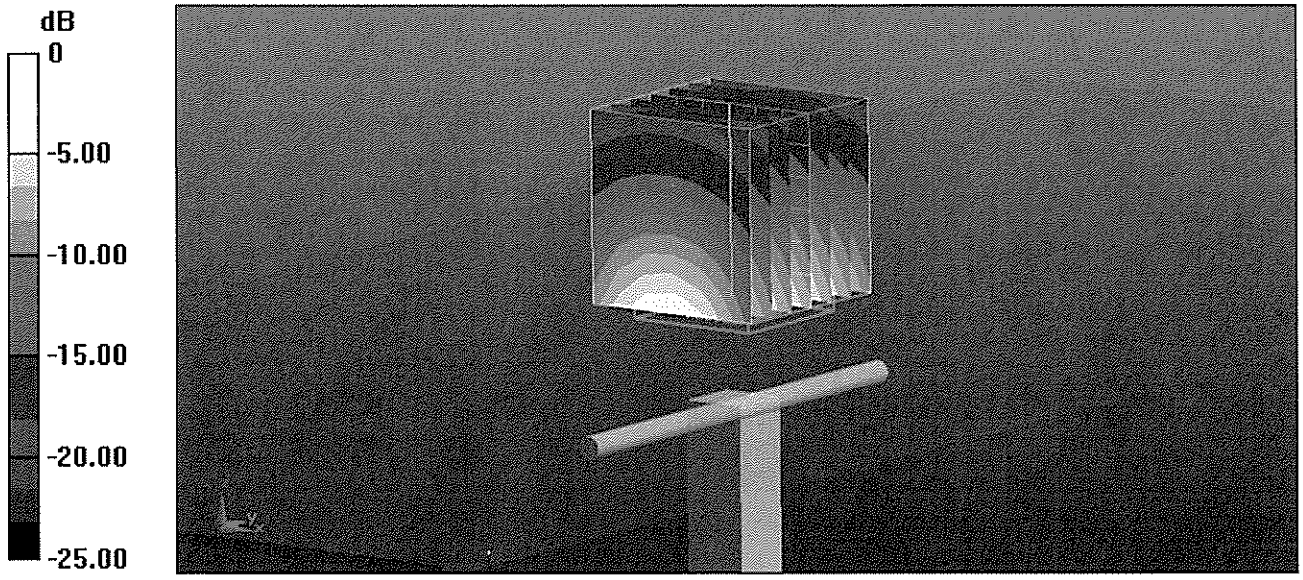
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.01 mho/m; ε_r = 51; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

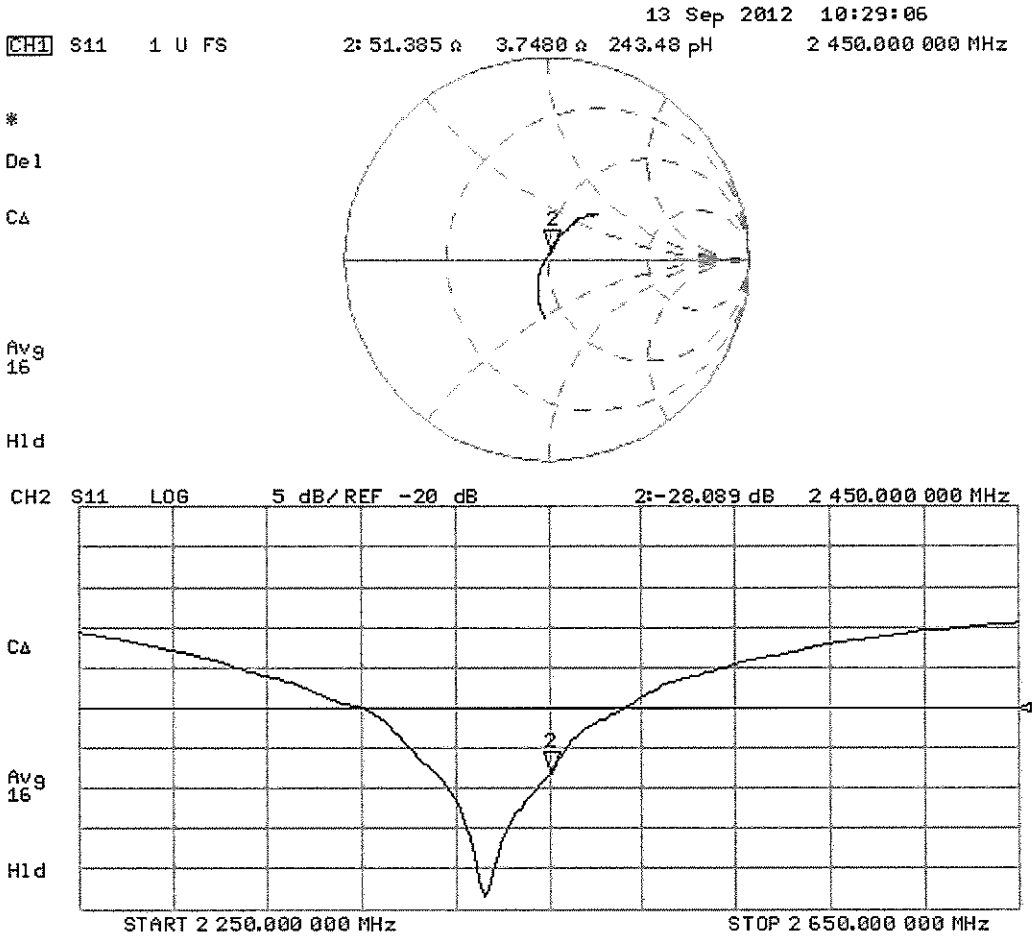
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.223 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.601 mW/g
SAR(1 g) = 13 mW/g; SAR(10 g) = 6.05 mW/g
Maximum value of SAR (measured) = 16.9 W/kg



0 dB = 16.9 W/kg = 24.56 dB W/kg

Impedance Measurement Plot for Body TSL



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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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 108

Client **Nokia SD**

Certificate No: D5GHzV2-1042_Nov12

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN: 1042
Calibration procedure(s)	QA CAL-22.v1 Calibration procedure for dipole validation kits between 3-6 GHz
Calibration date:	November 13, 2012

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	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe EX3DV4	SN: 3503	30-Dec-11 (No. EX3-3503_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

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

Issued: November 13, 2012

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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

b) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

c) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.3
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5300 MHz ± 1 MHz 5500 MHz ± 1 MHz 5600 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.8 ± 6 %	4.53 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.85 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**77.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.25 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.3 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.76 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.7 ± 6 %	4.63 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5300 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.15 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.9 W / kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.34 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.2 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.4 ± 6 %	4.83 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.5 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.2 ± 6 %	4.93 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.32 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**82.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.4 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.0 ± 6 %	5.15 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.82 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**77.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.23 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.1 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.8 ± 6 %	5.35 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.36 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**72.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.06 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.4 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.42 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.7 ± 6 %	5.47 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5300 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.54 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**74.7 W/kg ± 19.9 % (k=2)**

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

Body TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.6	5.65 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.3 ± 6 %	5.73 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.94 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**78.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.20 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.7 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.2 ± 6 %	5.86 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.04 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**79.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.23 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.0 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	45.9 ± 6 %	6.13 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.46 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**73.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.07 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.4 W/kg ± 19.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	47.7 Ω - 10.7 jΩ
Return Loss	- 19.1 dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	50.7 Ω - 7.3 jΩ
Return Loss	- 22.7 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	47.0 Ω - 5.5 jΩ
Return Loss	- 23.9 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	52.5 Ω - 8.1 jΩ
Return Loss	- 21.7 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	54.6 Ω - 2.0 jΩ
Return Loss	- 26.4 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	48.8 Ω - 9.6 jΩ
Return Loss	- 20.2 dB

Antenna Parameters with Body TSL at 5300 MHz

Impedance, transformed to feed point	51.0 Ω - 5.9 jΩ
Return Loss	- 24.5 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	47.6 Ω - 4.4 jΩ
Return Loss	- 25.7 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	53.7 Ω - 7.1 jΩ
Return Loss	- 22.3 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	56.7 Ω - 1.0 jΩ
Return Loss	- 24.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.196 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 30, 2005

DASY5 Validation Report for Head TSL

Date: 13.11.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1042

Communication System: CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 4.53 mho/m; ε_r = 34.8; ρ = 1000 kg/m^3 , Medium parameters used: f = 5300 MHz; σ = 4.63 mho/m; ε_r = 34.7; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 4.83 mho/m; ε_r = 34.4; ρ = 1000 kg/m^3 , Medium parameters used: f = 5600 MHz; σ = 4.93 mho/m; ε_r = 34.2; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 5.15 mho/m; ε_r = 34; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.41, 5.41, 5.41); Calibrated: 30.12.2011, ConvF(5.1, 5.1, 5.1); Calibrated: 30.12.2011, ConvF(4.91, 4.91, 4.91); Calibrated: 30.12.2011, ConvF(4.76, 4.76, 4.76); Calibrated: 30.12.2011, ConvF(4.81, 4.81, 4.81); Calibrated: 30.12.2011;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

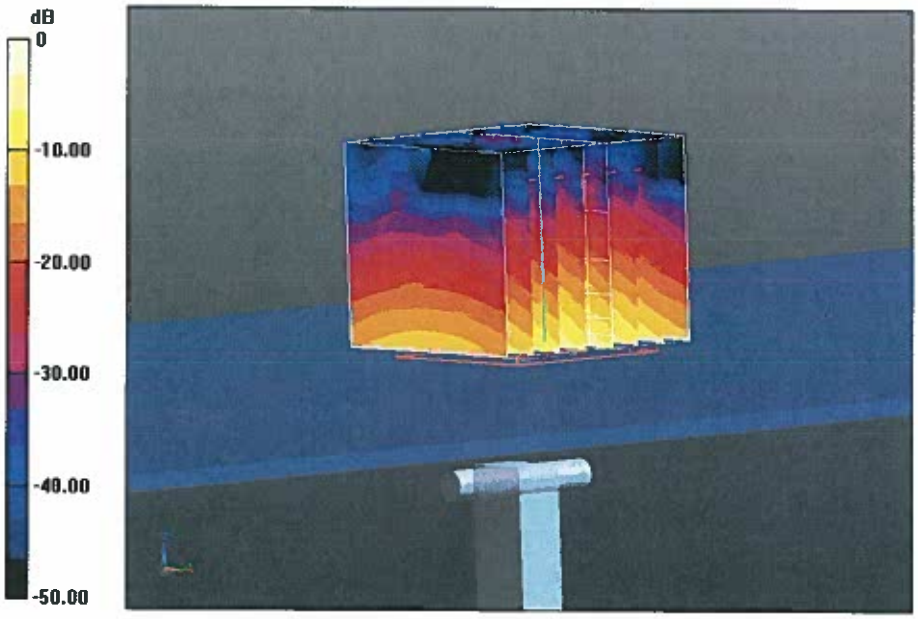
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.770 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 28.5 W/kg
SAR(1 g) = 7.85 W/kg; SAR(10 g) = 2.25 W/kg
Maximum value of SAR (measured) = 18.0 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.429 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 30.4 W/kg
SAR(1 g) = 8.15 W/kg; SAR(10 g) = 2.34 W/kg
Maximum value of SAR (measured) = 18.9 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.178 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 32.8 W/kg
SAR(1 g) = 8.4 W/kg; SAR(10 g) = 2.38 W/kg
Maximum value of SAR (measured) = 19.8 W/kg

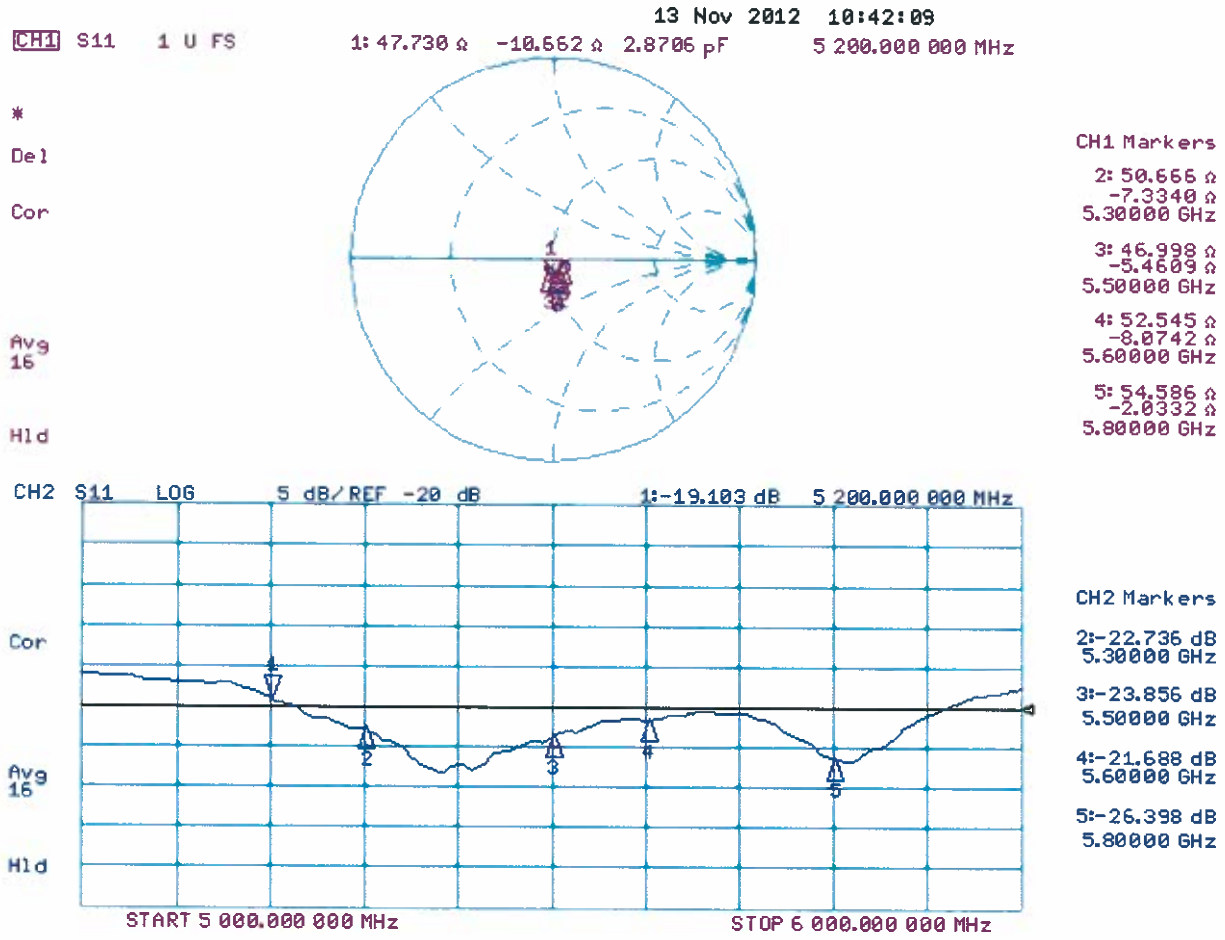
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 62.410 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 32.6 W/kg
SAR(1 g) = 8.32 W/kg; SAR(10 g) = 2.37 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 59.880 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 32.0 W/kg
SAR(1 g) = 7.82 W/kg; SAR(10 g) = 2.23 W/kg
Maximum value of SAR (measured) = 19.0 W/kg



0 dB = 19.0 W/kg = 12.79 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 12.11.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1042

Communication System: CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 5.35 mho/m; ε_r = 46.8; ρ = 1000 kg/m^3 , Medium parameters used: f = 5300 MHz; σ = 5.47 mho/m; ε_r = 46.7; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 5.73 mho/m; ε_r = 46.3; ρ = 1000 kg/m^3 , Medium parameters used: f = 5600 MHz; σ = 5.86 mho/m; ε_r = 46.2; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 6.13 mho/m; ε_r = 45.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.91, 4.91, 4.91); Calibrated: 30.12.2011, ConvF(4.67, 4.67, 4.67); Calibrated: 30.12.2011, ConvF(4.43, 4.43, 4.43); Calibrated: 30.12.2011, ConvF(4.22, 4.22, 4.22); Calibrated: 30.12.2011, ConvF(4.38, 4.38, 4.38); Calibrated: 30.12.2011;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

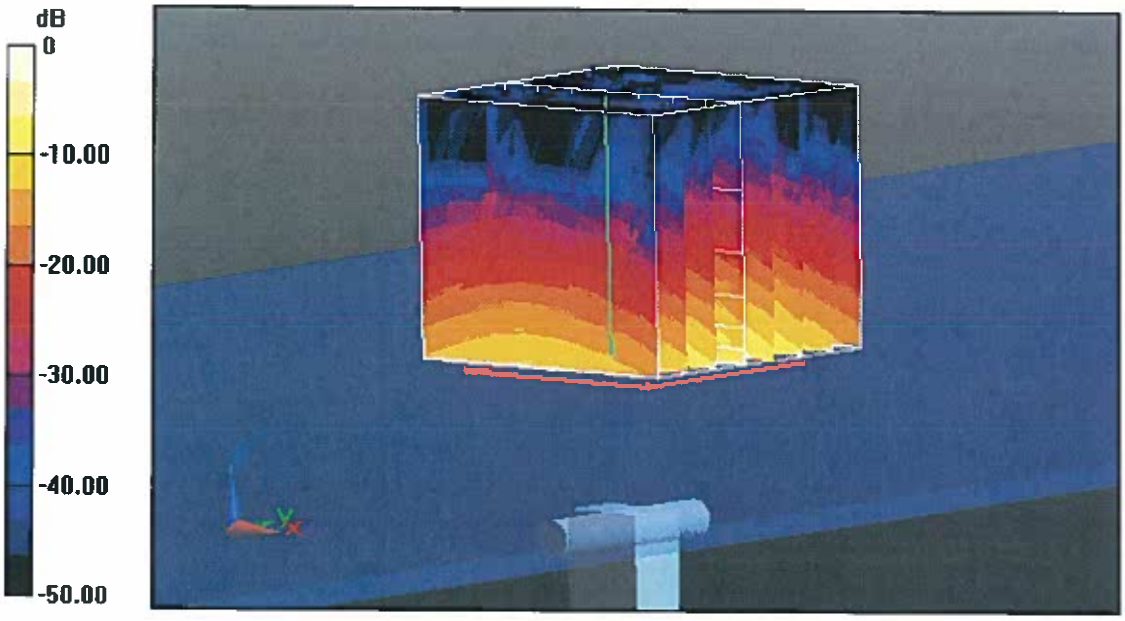
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.598 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 29.3 W/kg
SAR(1 g) = 7.36 W/kg; SAR(10 g) = 2.06 W/kg
Maximum value of SAR (measured) = 17.7 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.989 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 30.7 W/kg
SAR(1 g) = 7.54 W/kg; SAR(10 g) = 2.12 W/kg
Maximum value of SAR (measured) = 18.2 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 59.380 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 34.4 W/kg
SAR(1 g) = 7.94 W/kg; SAR(10 g) = 2.2 W/kg
Maximum value of SAR (measured) = 19.6 W/kg

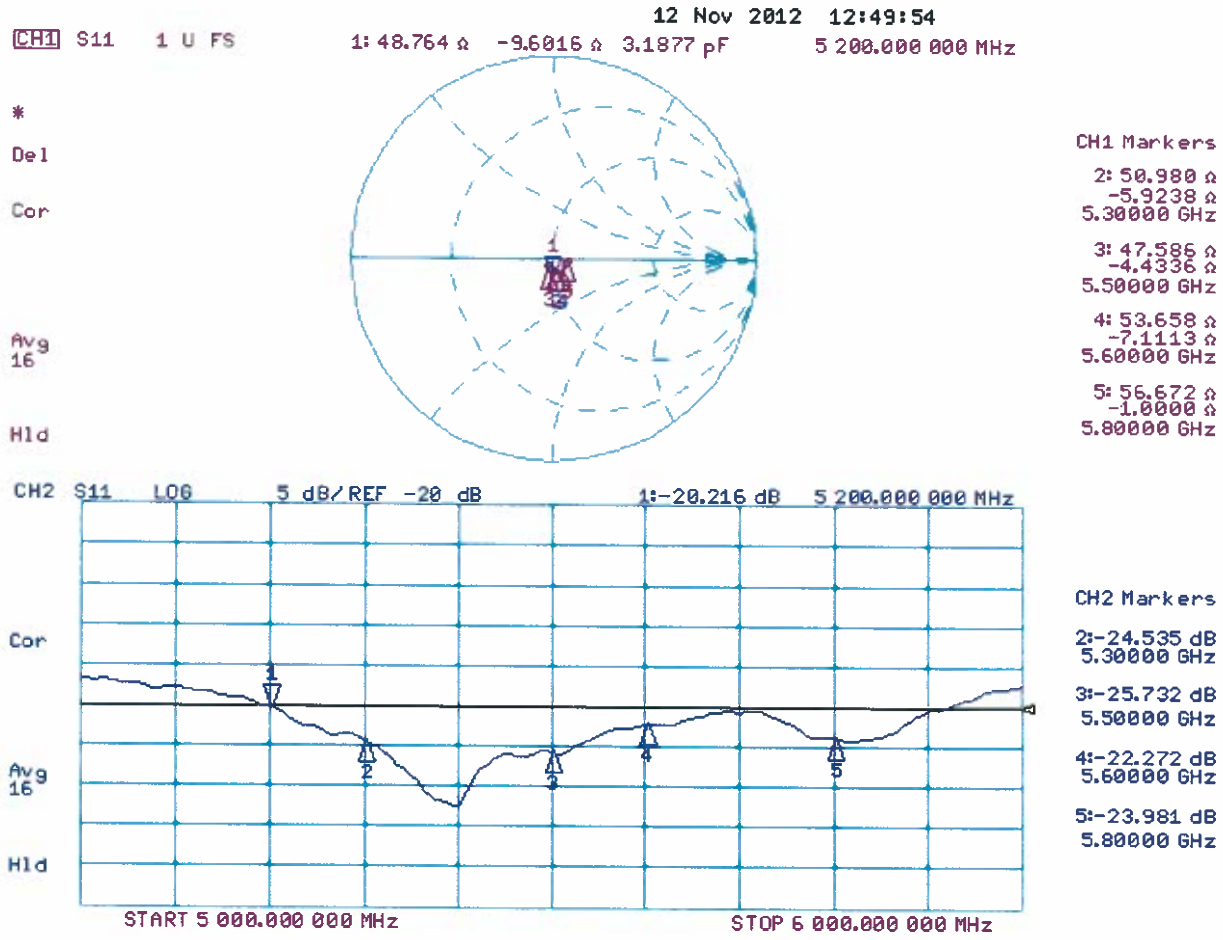
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.795 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 35.9 W/kg
SAR(1 g) = 8.04 W/kg; SAR(10 g) = 2.23 W/kg
Maximum value of SAR (measured) = 20.1 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 55.526 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 35.1 W/kg
SAR(1 g) = 7.46 W/kg; SAR(10 g) = 2.07 W/kg
Maximum value of SAR (measured) = 18.9 W/kg



0 dB = 18.9 W/kg = 12.76 dBW/kg

Impedance Measurement Plot for Body TSL



Property Of
Nokia Mobile Phones
008001

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

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

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

Accreditation No.: SCS 108

Client **Nokia SD**

Certificate No: D5GHzV2-1123_May12

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN: 1123
Calibration procedure(s)	QA CAL-22.v1 Calibration procedure for dipole validation kits between 3-6 GHz
Calibration date:	May 04, 2012

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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe EX3DV4	SN: 3503	30-Dec-11 (No. EX3-3503_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: May 7, 2012

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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

b) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

c) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5500 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.7 ± 6 %	4.59 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.07 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**80.5 mW /g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.31 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**23.0 mW /g ± 19.5 % (k=2)**

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.2 ± 6 %	4.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.59 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**85.6 mW / g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.45 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**24.4 mW / g ± 19.5 % (k=2)**

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.8 ± 6 %	5.19 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.04 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**80.1 mW / g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.29 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**22.8 mW / g ± 19.5 % (k=2)**

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.7 ± 6 %	5.44 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.32 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**73.2 mW / g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.05 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**20.5 mW / g ± 19.5 % (k=2)**

Body TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.6	5.65 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.1 ± 6 %	5.83 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.93 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**79.2 mW / g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.20 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**22.0 mW / g ± 19.5 % (k=2)**

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.6 ± 6 %	6.25 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.25 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**72.4 mW / g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.01 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**20.1 mW / g ± 19.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	51.5 Ω - 7.5 jΩ
Return Loss	- 22.5 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	52.9 Ω - 1.6 jΩ
Return Loss	- 29.8 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	57.0 Ω - 1.4 jΩ
Return Loss	- 23.6 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	51.9 Ω - 6.2 jΩ
Return Loss	- 24.0 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	54.8 Ω - 0.3 jΩ
Return Loss	- 26.7 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	57.7 Ω + 1.0 jΩ
Return Loss	- 22.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.199 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 08, 2011

DASY5 Validation Report for Head TSL

Date: 04.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1123

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 4.59 mho/m; ε_r = 35.7; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 4.89 mho/m; ε_r = 35.2; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 5.19 mho/m; ε_r = 34.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

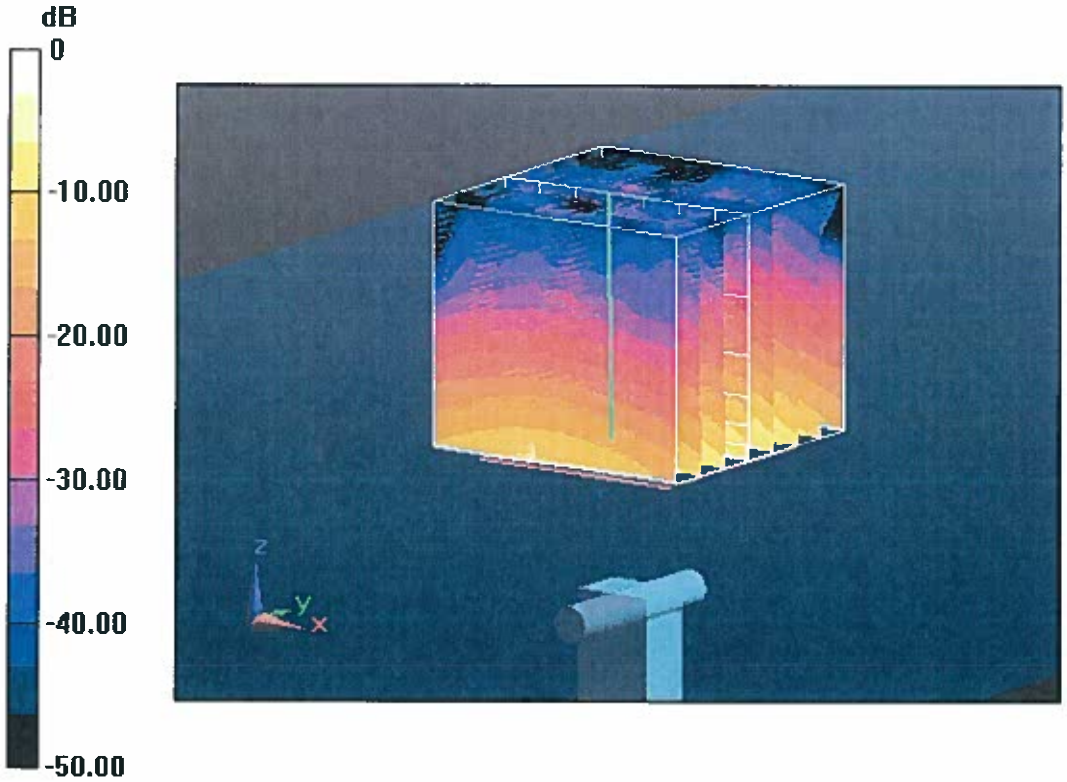
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.41, 5.41, 5.41), ConvF(4.91, 4.91, 4.91), ConvF(4.81, 4.81, 4.81); Calibrated: 30.12.2011
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.566 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 30.0150 mW/g
SAR(1 g) = 8.07 mW/g; SAR(10 g) = 2.31 mW/g
Maximum value of SAR (measured) = 18.509 mW/g

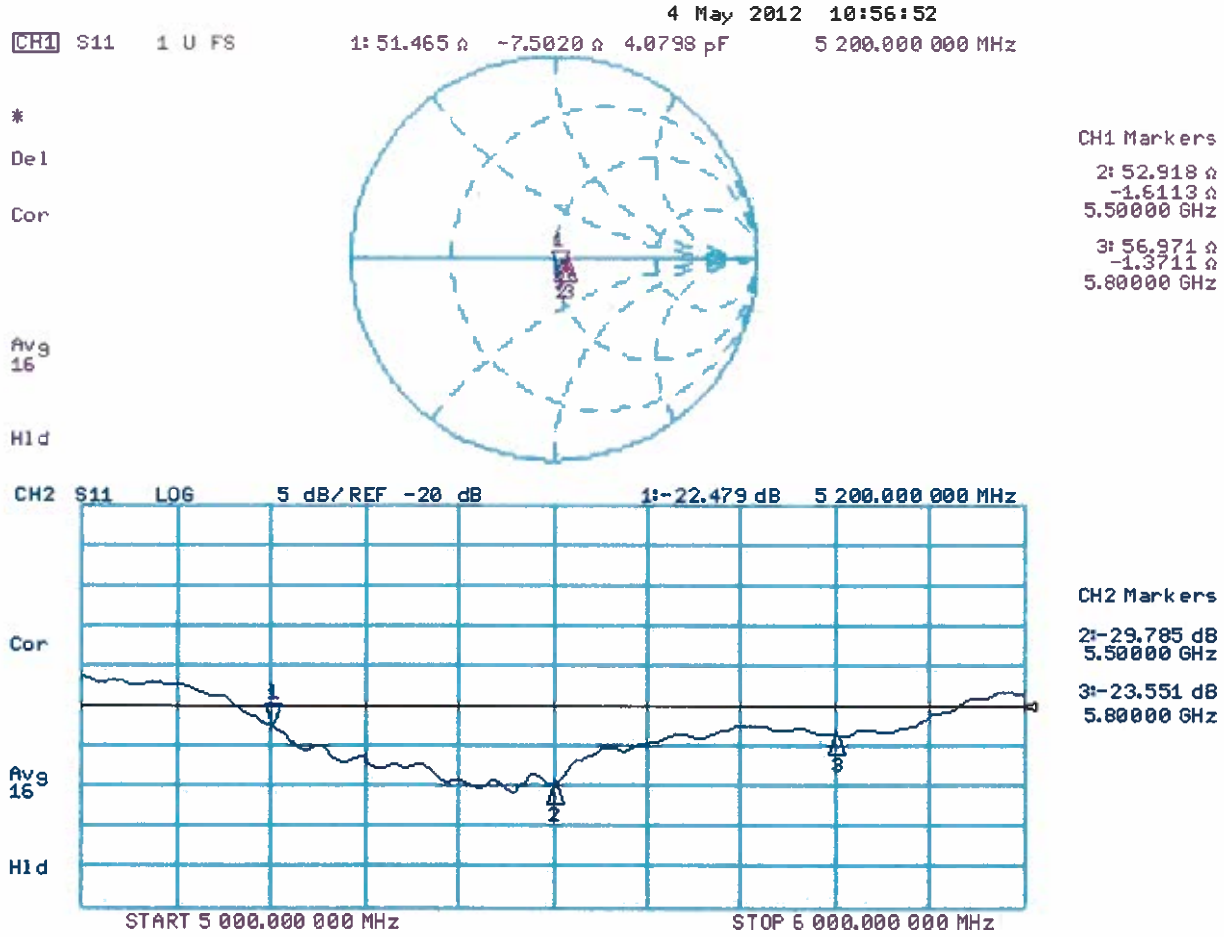
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.375 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 33.9990 mW/g
SAR(1 g) = 8.59 mW/g; SAR(10 g) = 2.45 mW/g
Maximum value of SAR (measured) = 20.086 mW/g

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 61.857 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 33.4580 mW/g
SAR(1 g) = 8.04 mW/g; SAR(10 g) = 2.29 mW/g
Maximum value of SAR (measured) = 19.185 mW/g



0 dB = 19.180mW/g = 25.66 dB mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 04.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1123

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 5.44 mho/m; ε_r = 48.7; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 5.83 mho/m; ε_r = 48.1; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 6.25 mho/m; ε_r = 47.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

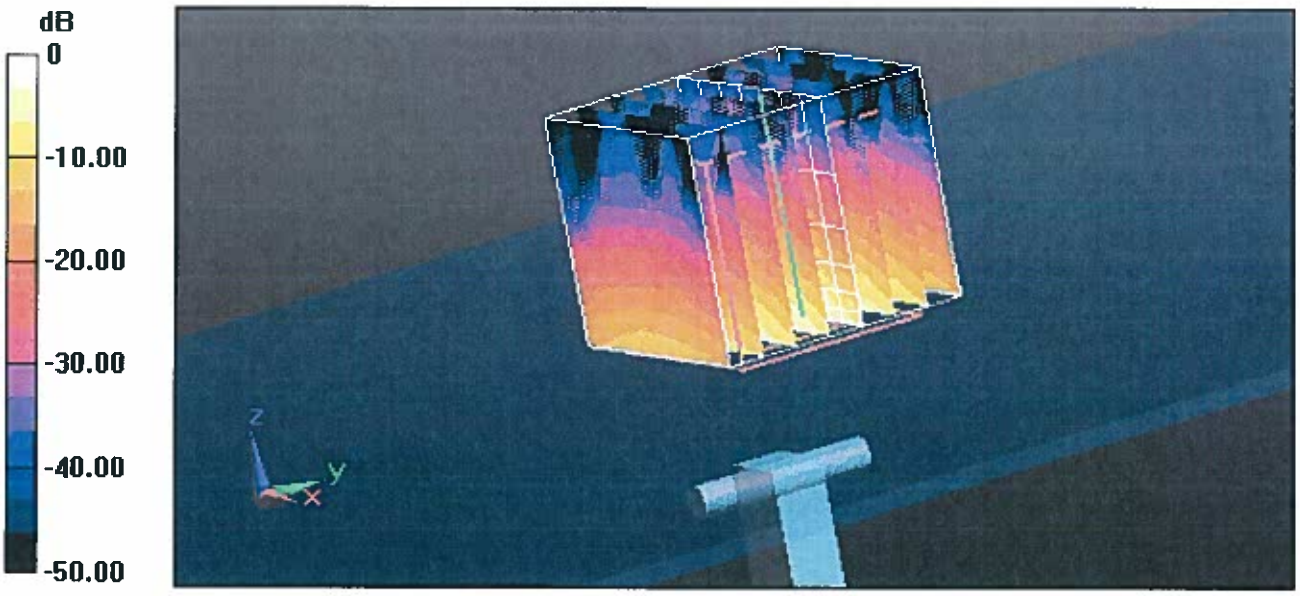
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.91, 4.91, 4.91); Calibrated: 30.12.2011, ConvF(4.43, 4.43, 4.43); Calibrated: 30.12.2011, ConvF(4.38, 4.38, 4.38); Calibrated: 30.12.2011;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 57.889 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 28.896 mW/g
SAR(1 g) = 7.32 mW/g; SAR(10 g) = 2.05 mW/g
Maximum value of SAR (measured) = 17.2 mW/g

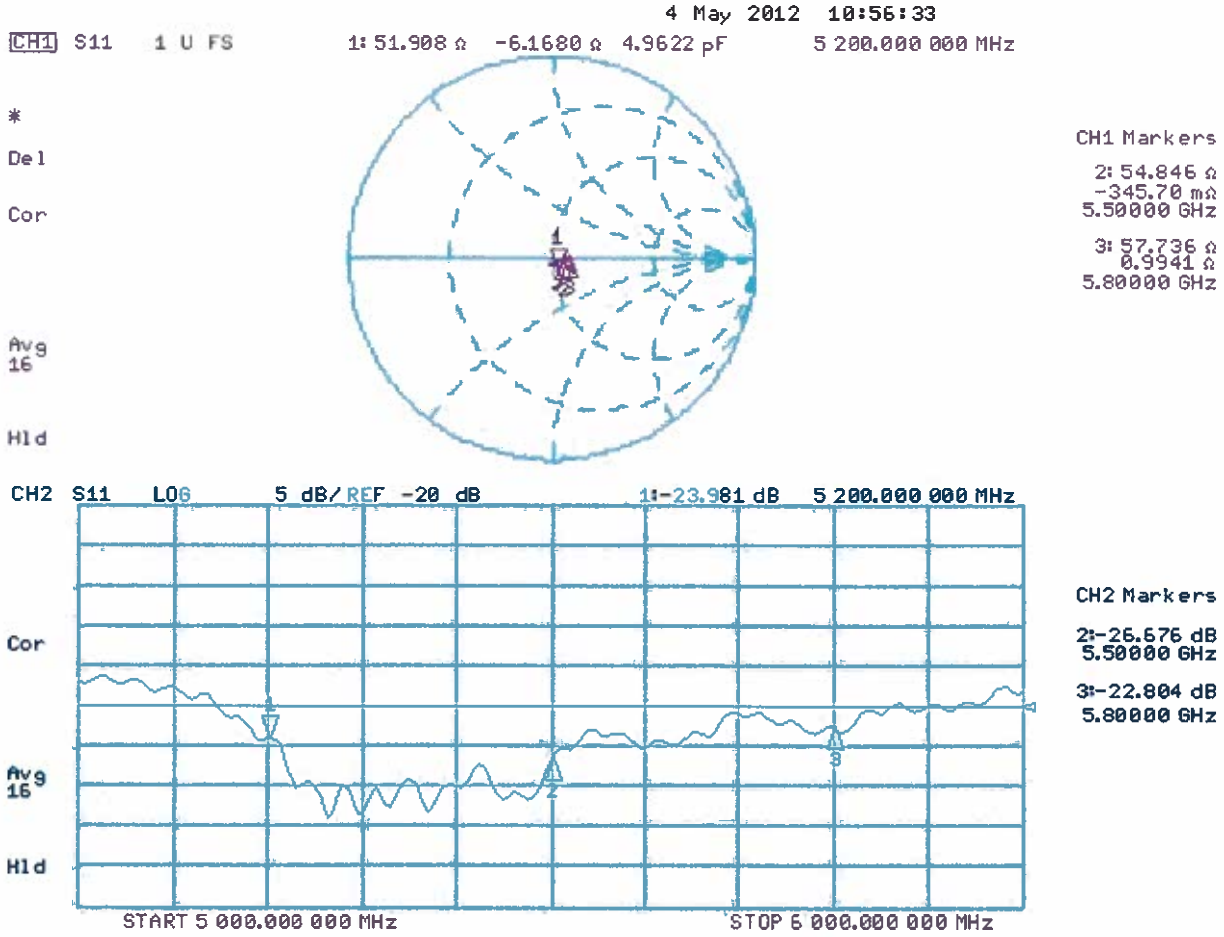
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.366 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 34.150 mW/g
SAR(1 g) = 7.93 mW/g; SAR(10 g) = 2.2 mW/g
Maximum value of SAR (measured) = 19.2 mW/g

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 54.272 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 33.782 mW/g
SAR(1 g) = 7.25 mW/g; SAR(10 g) = 2.01 mW/g
Maximum value of SAR (measured) = 18.0 mW/g



0 dB = 18.410mW/g = 25.30 dB mW/g

Impedance Measurement Plot for Body TSL



Dipole D5GHzV2 – SN: 1123 Antenna Parameters measured: 2013-10-04.

Antenna Parameters with Body TSL at 5200 MHz

	Calibration certificate	1-year measurement
Impedance, transformed to feed point	51.9 Ω - 6.2 jΩ	49.5 Ω - 5.8 jΩ
Return loss	-24.0 dB	-24.7 dB

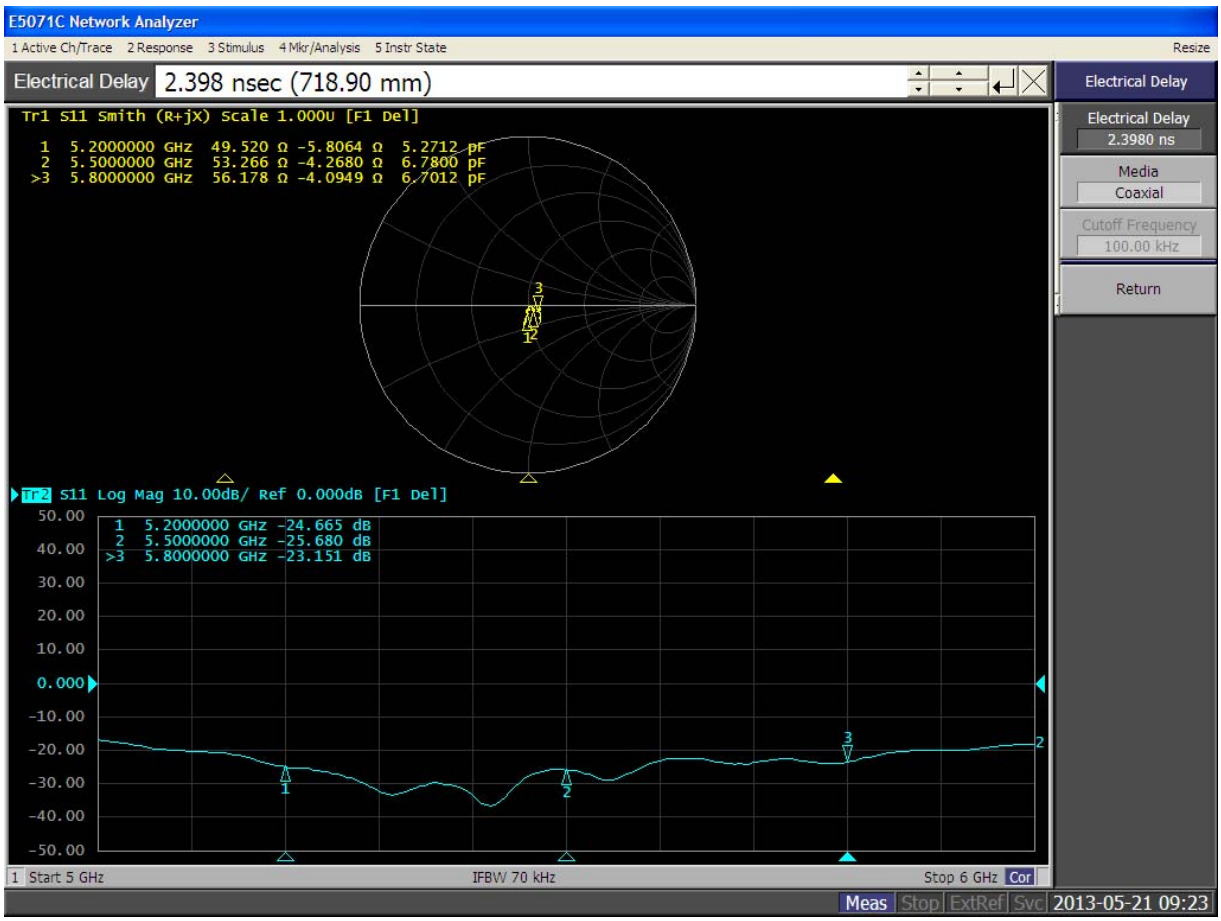
Antenna Parameters with Body TSL at 5500 MHz

	Calibration certificate	1-year measurement
Impedance, transformed to feed point	54.8 Ω - 0.3 jΩ	53.3 Ω - 4.3 jΩ
Return loss	-26.7 dB	-25.7 dB

Antenna Parameters with Body TSL at 5800 MHz

	Calibration certificate	1-year measurement
Impedance, transformed to feed point	57.7 Ω + 1.0 jΩ	56.2 Ω - 4.1 jΩ
Return loss	-22.8 dB	-23.2 dB

Body TSL


E5071C Network Analyzer
1 Active Ch/Trace 2 Response 3 Stimulus 4 Mkr/Analysis 5 Instr State
Resize
Electrical Delay 2.398 nsec (718.90 mm)
Tr1 S11 Smith (R+jX) Scale 1.000U [F1 Del]
1 5.2000000 GHz 49.520 Ω -5.8064 Ω 5.2712 pF
2 5.5000000 GHz 53.266 Ω -4.2680 Ω 6.7800 pF
>3 5.8000000 GHz 56.178 Ω -4.0949 Ω 6.7012 pF
Tr2 S11 Log Mag 10.00dB/ Ref 0.000dB [F1 Del]
1 5.2000000 GHz -24.665 dB
2 5.5000000 GHz -25.680 dB
>3 5.8000000 GHz -23.151 dB
50.00
40.00
30.00
20.00
10.00
0.000
-10.00
-20.00
-30.00
-40.00
-50.00
1 Start 5 GHz
IFBW 70 kHz
Stop 6 GHz
Cor
Electrical Delay
Electrical Delay
2.3980 ns
Media
Coaxial
Cutoff Frequency
100.00 kHz
Return
Meas
Stop
ExtRef
Svc
2013-05-21 09:23

APPENDIX G: CONDUCTED POWER MEASUREMENTS FOR SUPPORTED GSM/GPRS/EGPRS TRANSMISSION MODES

G.1 Power Tuning Targets

FULL POWER

GSM/GPRS/EGPRS 850 Body			
Slot configuration	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz
GPRS 1-slot	32.5	32.5	32.5
GPRS 2-slot	30.0	30.0	30.0
GPRS 3-slot	28.2	28.2	28.2
GPRS 4-slot	27.0	27.0	27.0
EGRPS 1-slot	27.0	27.0	27.0
EGPRS 2-slot	27.0	27.0	27.0
EGPRS 3-slot	27.0	27.0	27.0
EGPRS 4-slot	26.5	26.5	26.5

GSM/GPRS/EGPRS 1900 Body			
Slot configuration	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz
GPRS 1-slot	30.0	30.0	30.0
GPRS 2-slot	27.0	27.0	27.0
GPRS 3-slot	25.2	25.2	25.2
GPRS 4-slot	24.0	24.0	24.0
EGRPS 1-slot	25.5	25.5	25.5
EGPRS 2-slot	24.5	24.5	24.5
EGPRS 3-slot	24.5	24.5	24.5
EGPRS 4-slot	23.2	23.2	23.2

Copyright © 2013 TCC Nokia

REDUCED POWER

GSM/GPRS/EGPRS 850 Body			
Slot configuration	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz
GPRS 1-slot	29.5	29.5	29.5
GPRS 2-slot	27.5	27.5	27.5
GPRS 3-slot	25.2	25.2	25.2
GPRS 4-slot	23.0	23.0	23.0
EGRPS 1-slot	27.0	27.0	27.0
EGPRS 2-slot	27.0	27.0	27.0
EGPRS 3-slot	25.0	25.0	25.0
EGPRS 4-slot	23.0	23.0	23.0

GSM/GPRS/EGPRS 1900 Body			
Slot configuration	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz
GPRS 1-slot	26.0	26.0	26.0
GPRS 2-slot	22.0	22.0	22.0
GPRS 3-slot	21.2	21.2	21.2
GPRS 4-slot	20.5	20.5	20.5
EGRPS 1-slot	25.5	25.5	25.5
EGPRS 2-slot	22.0	22.0	22.0
EGPRS 3-slot	21.0	21.0	21.0
EGPRS 4-slot	20.2	20.2	20.2

Copyright © 2013 TCC Nokia

G.2 Conducted Power from the Samples used in the Testing

Type: RX-113; Serial number: 004402/47/357507/8 used for
- GSM/GPRS/EGPRS850 FULL POWER Body SAR measurements

GSM/GPRS/EGPRS 850 Body			
Slot configuration	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz
GPRS 1-slot	32.84	32.52	32.77
GPRS 2-slot	30.28	30.14	30.10
GPRS 3-slot	28.42	28.31	28.54
GPRS 4-slot	27.10	27.28	27.17
EGRPS 1-slot	27.01	27.00	27.05
EGPRS 2-slot	27.22	27.19	27.14
EGPRS 3-slot	27.15	27.08	27.00
EGPRS 4-slot	26.77	26.67	26.61

Type: RX-113; Serial number: 004402/47/357511/0 used for
- GSM/GPRS/EGPRS850 REDUCED POWER Body SAR measurements

GSM/GPRS/EGPRS 850 Body			
Slot configuration	CH 128 824.2 MHz	CH 190 836.6 MHz	CH 251 848.8 MHz
GPRS 1-slot	29.00	29.00	29.00
GPRS 2-slot	27.40	27.30	27.60
GPRS 3-slot	25.20	25.50	25.40
GPRS 4-slot	23.10	23.10	23.00
EGRPS 1-slot	27.30	27.30	27.30
EGPRS 2-slot	27.20	27.22	27.20
EGPRS 3-slot	24.80	25.00	24.90
EGPRS 4-slot	22.70	22.80	23.00

Copyright © 2013 TCC Nokia

Type: RX-113; Serial number: 004402/47/357512/8 used for

- GSM/GPRS/EGPRS1900 FULL POWER Body SAR measurements

GSM/GPRS/EGPRS 1900 Body			
Slot configuration	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz
GPRS 1-slot	30.22	30.32	30.24
GPRS 2-slot	27.32	27.29	27.26
GPRS 3-slot	25.43	25.42	25.50
GPRS 4-slot	24.18	24.22	24.28
EGRPS 1-slot	25.81	25.75	25.75
EGPRS 2-slot	24.73	24.68	24.65
EGPRS 3-slot	24.85	24.82	24.78
EGPRS 4-slot	23.55	23.47	23.45

Type: RX-113; Serial number: 004402/47/357591/2 used for

- GSM/GPRS/EGPRS1900 REDUCED POWER Body SAR measurements

GSM/GPRS/EGPRS 1900 Body			
Slot configuration	CH 512 1850.2 MHz	CH 661 1880.0 MHz	CH 810 1909.8 MHz
GPRS 1-slot	26.00	26.20	26.10
GPRS 2-slot	22.30	22.30	22.20
GPRS 3-slot	21.20	21.20	21.20
GPRS 4-slot	20.30	20.30	20.20
EGRPS 1-slot	25.70	25.70	25.60
EGPRS 2-slot	22.10	22.10	22.10
EGPRS 3-slot	21.10	21.10	21.00
EGPRS 4-slot	20.10	20.10	20.10

Copyright © 2013 TCC Nokia

APPENDIX H: CONDUCTED POWER MEASUREMENTS FOR SUPPORTED WCDMA TRANSMISSION MODES

H.1 Power Tuning Targets

FULL POWER

WCDMA 850 (Band 5) Body			
Mode	CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz
WCDMA	23.5	23.5	23.5

WCDMA1900 (Band 2) Body			
Mode	CH 9262 1852.4 MHz	CH 9400 1880.0 MHz	CH 9538 1907.6 MHz
WCDMA	23.5	23.5	23.5

REDUCED POWER

WCDMA 850 (Band 5) Body			
Mode	CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz
WCDMA	21.0	21.0	21.0

WCDMA1900 (Band 2) Body			
Mode	CH 9262 1852.4 MHz	CH 9400 1880.0 MHz	CH 9538 1907.6 MHz
WCDMA	17.5	17.5	17.5

Copyright © 2013 TCC Nokia

H.2 Conducted Power from the Samples used in the Testing

Type: RX-113; Serial number: 004402/47/357507/8

- Used for WCDMA850 (Band 5) FULL POWER Body SAR measurements.

WCDMA 850 (Band 5) Body			
Mode	CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz
WCDMA	23.76	23.66	23.60

Type: RX-113; Serial number: 004402/47/357511/0

- Used for WCDMA850 (Band 5) REDUCED POWER Body SAR measurements.

WCDMA 850 (Band 5) Body			
Mode	CH 4132 826.4 MHz	CH 4175 835.0 MHz	CH 4233 846.6 MHz
WCDMA	21.24	21.21	21.28

Copyright © 2013 TCC Nokia

Type: RX-113; Serial number: 004402/47/357512/8

- Used for WCDMA1900 (Band 2) FULL POWER Body SAR measurements.

WCDMA1900 (Band 2) Body			
Mode	CH 9262 1852.4 MHz	CH 9400 1880.0 MHz	CH 9538 1907.6 MHz
WCDMA	23.57	23.57	23.62

Type: RX-113; Serial number: 004402/47/357591/2

- Used for WCDMA1900 (Band 2) REDUCED POWER Body SAR measurements.

WCDMA1900 (Band 2) Body			
Mode	CH 9262 1852.4 MHz	CH 9400 1880.0 MHz	CH 9538 1907.6 MHz
WCDMA	17.57	17.61	17.83

WCDMA and HSUPA Subtest mode conducted powers, measured from a separate, fully representative sample are presented in Appendix D.

Copyright © 2013 TCC Nokia

APPENDIX I: CONDUCTED POWER RESULTS FOR WLAN2450 AND WLAN5000

I.1 Power Tuning Targets Body Measurements - WLAN2450 – Main Antenna

WLAN 2.4 GHz Tuning Targets – 20 MHz channel bandwidth					
Mode	CH 1	-	CH 6	-	CH 11
802.11b BPSK 1 Mbps	13.5	-	13.5	-	13.5
802.11b QPSK 2 Mbps	13.5	-	13.5	-	13.5
802.11b QPSK 5.5 Mbps	13.5	-	13.5	-	13.5
802.11b QPSK 11 Mbps	13.5	-	13.5	-	13.5
802.11g BPSK 6 Mbps	10.0	-	11.5	-	10.0
802.11g BPSK 9 Mbps	10.0	-	11.5	-	10.0
802.11g QPSK 12 Mbps	10.0	-	11.5	-	10.0
802.11g QPSK 18 Mbps	10.0	-	11.5	-	10.0
802.11g 16QAM 24 Mbps	10.0	-	11.5	-	10.0
802.11g 16QAM 36 Mbps	10.0	-	11.5	-	10.0
802.11g 64QAM 48 Mbps	10.0	-	11.5	-	10.0
802.11g 64QAM 54 Mbps	10.0	-	11.5	-	10.0
802.11n BPSK 6.5 / 7.25 Mbps	8.5	-	10.0	-	8.5
802.11n QPSK 13.0 / 14.4 Mbps	6.5	-	8.0	-	6.5
802.11n QPSK 19.5 / 21.7 Mbps	6.5	-	8.0	-	6.5
802.11n 16QAM 26.0 / 28.9 Mbps	8.0	-	9.5	-	8.0
802.11n 16QAM 39.0 / 43.3 Mbps	8.0	-	9.5	-	8.0
802.11n 64QAM 52.0 / 57.8 Mbps	8.0	-	9.5	-	8.0
802.11n 64QAM 58.5 / 65.0 Mbps	8.0	-	9.5	-	8.0
802.11n 64QAM 65.0 / 72.2 Mbps	5.5	-	7.0	-	5.5
802.11n BPSK 13.0 / 14.4 Mbps	8.5	-	10.0	-	8.5
802.11n QPSK 26.0 / 28.9 Mbps	6.5	-	8.0	-	6.5
802.11n QPSK 39.0 / 43.3 Mbps	6.5	-	8.0	-	6.5
802.11n 16QAM 52.0 / 57.8 Mbps	8.0	-	9.5	-	8.0
802.11n 16QAM 78.0 / 86.7 Mbps	8.0	-	9.5	-	8.0
802.11n 64QAM 104.0 / 115.6 Mbps	8.0	-	9.5	-	8.0
802.11n 64QAM 117.0 / 130.0 Mbps	8.0	-	9.5	-	8.0
802.11n 64QAM 130.0 / 144.4 Mbps	5.5	-	7.0	-	5.5

(Tables continues)

Copyright © 2013 TCC Nokia

(Tables continues)

WLAN 2.4 GHz Tuning Targets – 40 MHz channel bandwidth					
Mode	CH 3 (1…5)	CH 4 (2…6)	CH 6 (4…8)	CH 8 (6…10)	CH 9 (7…11)
802.11n QPSK 27.0 / 30.0 Mbps	9.0	-	9.0	-	9.0
802.11n QPSK 40.5 / 45.0 Mbps	7.0	-	7.0	-	7.0
802.11n 16QAM 54.0 / 60.0 Mbps	7.0	-	7.0	-	7.0
802.11n 16QAM 81.0 / 90.0 Mbps	6.5	-	6.5	-	6.5
802.11n 64QAM 108.0 / 120.0 Mbps	6.5	-	6.5	-	6.5
802.11n 64QAM 121.5 / 135.0 Mbps	6.5	-	6.5	-	6.5
802.11n 64QAM 135.0 / 150.0 Mbps	6.5	-	6.5	-	6.5
802.11n BPSK 27.0 / 30.0 Mbps	4.0	-	4.0	-	4.0
802.11n QPSK 54.0 / 60.0 Mbps	9.0	-	9.0	-	9.0
802.11n QPSK 81.0 / 90.0 Mbps	7.0	-	7.0	-	7.0
802.11n 16QAM 108.0 / 120.0 Mbps	7.0	-	7.0	-	7.0
802.11n16QAM 162.0 / 180.0 Mbps	6.5	-	6.5	-	6.5
802.11n 64QAM 216.0 / 240.0 Mbps	6.5	-	6.5	-	6.5
802.11n 64QAM 243.0 / 270.0 Mbps	6.5	-	6.5	-	6.5
802.11n 64QAM 270.0 / 300.0 Mbps	6.5	-	6.5	-	6.5
802.11n QPSK 27.0 / 30.0 Mbps	4.0	-	4.0	-	4.0

Copyright © 2013 TCC Nokia

I.2 Power Tuning Targets Body Measurements - WLAN2450 - AUX Antenna

WLAN 2.4 GHz Tuning Targets – 20 MHz channel bandwidth					
Mode	CH 1	CH 2	CH 6	CH 10	CH 11
802.11b BPSK 1 Mbps	13.0	-	13.0	-	13.0
802.11b QPSK 2 Mbps	13.0	-	13.0	-	13.0
802.11b QPSK 5.5 Mbps	13.0	-	13.0	-	13.0
802.11b QPSK 11 Mbps	13.0	-	13.0	-	13.0
802.11g BPSK 6 Mbps	10.0	-	11.5	-	10.0
802.11g BPSK 9 Mbps	10.0	-	11.5	-	10.0
802.11g QPSK 12 Mbps	10.0	-	11.5	-	10.0
802.11g QPSK 18 Mbps	10.0	-	11.5	-	10.0
802.11g 16QAM 24 Mbps	10.0	-	11.5	-	10.0
802.11g 16QAM 36 Mbps	10.0	-	11.5	-	10.0
802.11g 64QAM 48 Mbps	10.0	-	11.5	-	10.0
802.11g 64QAM 54 Mbps	10.0	-	11.5	-	10.0
802.11n BPSK 6.5 / 7.25 Mbps	9.0	-	10.0	-	8.5
802.11n QPSK 13.0 / 14.4 Mbps	7.5	-	8.0	-	6.5
802.11n QPSK 19.5 / 21.7 Mbps	7.5	-	8.0	-	6.5
802.11n 16QAM 26.0 / 28.9 Mbps	8.0	-	9.5	-	8.0
802.11n 16QAM 39.0 / 43.3 Mbps	8.0	-	9.5	-	8.0
802.11n 64QAM 52.0 / 57.8 Mbps	8.0	-	9.5	-	8.0
802.11n 64QAM 58.5 / 65.0 Mbps	8.0	-	9.5	-	8.0
802.11n 64QAM 65.0 / 72.2 Mbps	6.0	-	7.0	-	5.5
802.11n BPSK 13.0 / 14.4 Mbps	9.0	-	10.0	-	8.5
802.11n QPSK 26.0 / 28.9 Mbps	7.5	-	8.0	-	6.5
802.11n QPSK 39.0 / 43.3 Mbps	7.5	-	8.0	-	6.5
802.11n 16QAM 52.0 / 57.8 Mbps	8.0	-	9.5	-	8.0
802.11n 16QAM 78.0 / 86.7 Mbps	8.0	-	9.5	-	8.0
802.11n 64QAM 104.0 / 115.6 Mbps	8.0	-	9.5	-	8.0
802.11n 64QAM 117.0 / 130.0 Mbps	8.0	-	9.5	-	8.0
802.11n 64QAM 130.0 / 144.4 Mbps	6.0	-	7.0	-	5.5

(Tables continues)

Copyright © 2013 TCC Nokia

(Tables continues)

WLAN 2.4 GHz Tuning Targets – 40 MHz channel bandwidth					
Mode	CH 3 (1…5)	CH 4 (2…6)	CH 6 (4…8)	CH 8 (6…10)	CH 9 (7…11)
802.11n BPSK 13.5 / 15.0 Mbps	9.0	-	9.0	-	9.0
802.11n QPSK 27.0 / 30.0 Mbps	7.0	-	7.0	-	7.0
802.11n QPSK 40.5 / 45.0 Mbps	7.0	-	7.0	-	7.0
802.11n 16QAM 54.0 / 60.0 Mbps	6.5	-	6.5	-	6.5
802.11n 16QAM 81.0 / 90.0 Mbps	6.5	-	6.5	-	6.5
802.11n 64QAM 108.0 / 120.0 Mbps	6.5	-	6.5	-	6.5
802.11n 64QAM 121.5 / 135.0 Mbps	6.5	-	6.5	-	6.5
802.11n 64QAM 135.0 / 150.0 Mbps	4.0	-	4.0	-	4.0
802.11n BPSK 27.0 / 30.0 Mbps	9.0	-	9.0	-	9.0
802.11n QPSK 54.0 / 60.0 Mbps	7.0	-	7.0	-	7.0
802.11n QPSK 81.0 / 90.0 Mbps	7.0	-	7.0	-	7.0
802.11n 16QAM 108.0 / 120.0 Mbps	6.5	-	6.5	-	6.5
802.11n16QAM 162.0 / 180.0 Mbps	6.5	-	6.5	-	6.5
802.11n 64QAM 216.0 / 240.0 Mbps	6.5	-	6.5	-	6.5
802.11n 64QAM 243.0 / 270.0 Mbps	6.5	-	6.5	-	6.5
802.11n 64QAM 270.0 / 300.0 Mbps	4.0	-	4.0	-	4.0

Copyright © 2013 TCC Nokia

I.3 Power Tuning Targets Body Measurements - WLAN5000 - Main Antenna

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 20 MHz Tuning Targets					
			36	40	44	48	52	56
802.11a	BPSK	6	7.5	7.5	7.5	7.5	7.5	7.5
802.11a	BPSK	9	6.5	6.5	6.5	6.5	7.0	7.0
802.11a	QPSK	12	6.5	6.5	6.5	6.5	7.0	7.0
802.11a	QPSK	18	6.5	6.5	6.5	6.5	7.0	7.0
802.11a	16QAM	24	6.5	6.5	6.5	6.5	7.0	7.0
802.11a	16QAM	36	6.5	6.5	6.5	6.5	7.0	7.0
802.11a	64QAM	48	6.0	6.0	6.0	6.0	6.5	6.5
802.11a	64QAM	54	6.0	6.0	6.0	6.0	6.5	6.5
802.11n	BPSK	6.5 / 7.25	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	QPSK	13.0 / 14.4	6.5	6.5	6.5	6.5	7.0	7.0
802.11n	QPSK	19.5 / 21.7	6.5	6.5	6.5	6.5	7.0	7.0
802.11n	16QAM	26.0 / 28.9	6.5	6.5	6.5	6.5	7.0	7.0
802.11n	16QAM	39.0 / 43.3	6.5	6.5	6.5	6.5	7.0	7.0
802.11n	64QAM	52.0 / 57.8	6.5	6.5	6.5	6.5	7.0	7.0
802.11n	64QAM	58.5 / 65.0	6.0	6.0	6.0	6.0	6.5	6.5
802.11n	64QAM	65.0 / 72.2	6.0	6.0	6.0	6.0	6.5	6.5
802.11ac	256QAM	78.0 / 86.7	-	-	-	-	-	-
802.11n	BPSK	13.0 / 14.4	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	QPSK	26.0 / 28.9	6.5	6.5	6.5	6.5	7.0	7.0
802.11n	QPSK	39.0 / 43.3	6.5	6.5	6.5	6.5	7.0	7.0
802.11n	16QAM	52.0 / 57.8	6.5	6.5	6.5	6.5	7.0	7.0
802.11n	16QAM	78.0 / 86.7	6.5	6.5	6.5	6.5	7.0	7.0
802.11n	64QAM	104.0 / 115.6	6.5	6.5	6.5	6.5	7.0	7.0
802.11n	64QAM	117.0 / 130.0	6.0	6.0	6.0	6.0	6.5	6.5
802.11n	64QAM	130.0 / 144.4	6.0	6.0	6.0	6.0	6.5	6.5

Copyright © 2013 TCC Nokia

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 40 MHz Tuning Targets						
			38 (36+40)	42 (40+44)	46 (44+48)	50 (48+52)	54 (52+56)	58 (56+60)	62 (60+64)
802.11n	BPSK	13.5 / 15.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
802.11n	QPSK	27.0 / 30.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
802.11n	QPSK	40.5 / 45.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
802.11n	16QAM	54.0 / 60.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
802.11n	16QAM	81.0 / 90.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
802.11n	64QAM	108.0 / 120.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
802.11n	64QAM	121.5 / 135.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
802.11n	64QAM	135.0 / 150.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5
802.11ac	256QAM	162.0 / 180.0	-	-	-	-	-	-	-
802.11ac	256QAM	180.0 / 200.0	-	-	-	-	-	-	-
802.11n	BPSK	27.0 / 30.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
802.11n	QPSK	54.0 / 60.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
802.11n	QPSK	81.0 / 90.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
802.11n	16QAM	108.0 / 120.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
802.11n	16QAM	162.0 / 180.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
802.11n	64QAM	216.0 / 240.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
802.11n	64QAM	243.0 / 270.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
802.11n	64QAM	270.0 / 300.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5

(Tables continues)

Copyright © 2013 TCC Nokia

(Tables continues)

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 20 MHz Tuning Targets					
			60	64	100	104	108	112
802.11a	BPSK	6	7.5	7.5	7.5	7.5	7.5	7.5
802.11a	BPSK	9	7.0	7.0	6.5	6.5	6.5	6.5
802.11a	QPSK	12	7.0	7.0	6.5	6.5	6.5	6.5
802.11a	QPSK	18	7.0	7.0	6.5	6.5	6.5	6.5
802.11a	16QAM	24	7.0	7.0	6.5	6.5	6.5	6.5
802.11a	16QAM	36	7.0	7.0	6.5	6.5	6.5	6.5
802.11a	64QAM	48	6.5	6.5	6.0	6.0	6.0	6.0
802.11a	64QAM	54	6.5	6.5	6.0	6.0	6.0	6.0
802.11n	BPSK	6.5 / 7.25	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	QPSK	13.0 / 14.4	7.0	7.0	6.5	6.5	6.5	6.5
802.11n	QPSK	19.5 / 21.7	7.0	7.0	6.5	6.5	6.5	6.5
802.11n	16QAM	26.0 / 28.9	7.0	7.0	6.5	6.5	6.5	6.5
802.11n	16QAM	39.0 / 43.3	7.0	7.0	6.5	6.5	6.5	6.5
802.11n	64QAM	52.0 / 57.8	7.0	7.0	6.5	6.5	6.5	6.5
802.11n	64QAM	58.5 / 65.0	6.5	6.5	6.0	6.0	6.0	6.0
802.11n	64QAM	65.0 / 72.2	6.5	6.5	6.0	6.0	6.0	6.0
802.11ac	256QAM	78.0 / 86.7	-	-	-	-	-	-
802.11n	BPSK	13.0 / 14.4	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	QPSK	26.0 / 28.9	7.0	7.0	6.5	6.5	6.5	6.5
802.11n	QPSK	39.0 / 43.3	7.0	7.0	6.5	6.5	6.5	6.5
802.11n	16QAM	52.0 / 57.8	7.0	7.0	6.5	6.5	6.5	6.5
802.11n	16QAM	78.0 / 86.7	7.0	7.0	6.5	6.5	6.5	6.5
802.11n	64QAM	104.0 / 115.6	7.0	7.0	6.5	6.5	6.5	6.5
802.11n	64QAM	117.0 / 130.0	6.5	6.5	6.0	6.0	6.0	6.0
802.11n	64QAM	130.0 / 144.4	6.5	6.5	6.0	6.0	6.0	6.0

Copyright © 2013 TCC Nokia

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 40 MHz Tuning Targets					
			102 (100+104)	106 (104+108)	110 (108+112)	114 (112+116)	118 (116+120)	122 (120+124)
802.11n	BPSK	13.5 / 15.0	7.0	7.0	7.0	7.0	7.0	6.5
802.11n	QPSK	27.0 / 30.0	5.0	5.0	5.0	5.0	5.0	4.5
802.11n	QPSK	40.5 / 45.0	5.0	5.0	5.0	5.0	5.0	4.5
802.11n	16QAM	54.0 / 60.0	4.0	4.0	4.0	4.0	4.0	3.5
802.11n	16QAM	81.0 / 90.0	4.0	4.0	4.0	4.0	4.0	3.5
802.11n	64QAM	108.0 / 120.0	4.0	4.0	4.0	4.0	4.0	3.5
802.11n	64QAM	121.5 / 135.0	2.0	2.0	2.0	2.0	2.0	1.5
802.11n	64QAM	135.0 / 150.0	1.5	1.5	1.5	1.5	1.5	1.0
802.11ac	256QAM	162.0 / 180.0	-	-	-	-	-	-
802.11ac	256QAM	180.0 / 200.0	-	-	-	-	-	-
802.11n	BPSK	27.0 / 30.0	7.0	7.0	7.0	7.0	7.0	6.5
802.11n	QPSK	54.0 / 60.0	5.0	5.0	5.0	5.0	5.0	4.5
802.11n	QPSK	81.0 / 90.0	5.0	5.0	5.0	5.0	5.0	4.5
802.11n	16QAM	108.0 / 120.0	4.0	4.0	4.0	4.0	4.0	3.5
802.11n	16QAM	162.0 / 180.0	4.0	4.0	4.0	4.0	4.0	3.5
802.11n	64QAM	216.0 / 240.0	4.0	4.0	4.0	4.0	4.0	3.5
802.11n	64QAM	243.0 / 270.0	2.0	2.0	2.0	2.0	2.0	1.5
802.11n	64QAM	270.0 / 300.0	1.5	1.5	1.5	1.5	1.5	1.0

(Tables continues)

Copyright © 2013 TCC Nokia

(Tables continues)

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 20 MHz Tuning Targets					
			116	120	124	128	132	136
802.11a	BPSK	6	7.5	6.5	6.5	6.5	6.5	6.5
802.11a	BPSK	9	6.5	6.0	6.0	6.0	6.0	6.0
802.11a	QPSK	12	6.5	6.0	6.0	6.0	6.0	6.0
802.11a	QPSK	18	6.5	6.0	6.0	6.0	6.0	6.0
802.11a	16QAM	24	6.5	6.0	6.0	6.0	6.0	6.0
802.11a	16QAM	36	6.5	6.0	6.0	6.0	6.0	6.0
802.11a	64QAM	48	6.0	5.0	5.0	5.0	5.0	5.0
802.11a	64QAM	54	6.0	5.0	5.0	5.0	5.0	5.0
802.11n	BPSK	6.5 / 7.25	7.5	6.5	6.5	6.5	6.5	6.5
802.11n	QPSK	13.0 / 14.4	6.5	6.0	6.0	6.0	6.0	6.0
802.11n	QPSK	19.5 / 21.7	6.5	6.0	6.0	6.0	6.0	6.0
802.11n	16QAM	26.0 / 28.9	6.5	6.0	6.0	6.0	6.0	6.0
802.11n	16QAM	39.0 / 43.3	6.5	6.0	6.0	6.0	6.0	6.0
802.11n	64QAM	52.0 / 57.8	6.5	6.0	6.0	6.0	6.0	6.0
802.11n	64QAM	58.5 / 65.0	6.0	5.0	5.0	5.0	5.0	5.0
802.11n	64QAM	65.0 / 72.2	6.0	5.0	5.0	5.0	5.0	5.0
802.11ac	256QAM	78.0 / 86.7	-	-	-	-	-	-
802.11n	BPSK	13.0 / 14.4	7.5	6.5	6.5	6.5	6.5	6.5
802.11n	QPSK	26.0 / 28.9	6.5	6.0	6.0	6.0	6.0	6.0
802.11n	QPSK	39.0 / 43.3	6.5	6.0	6.0	6.0	6.0	6.0
802.11n	16QAM	52.0 / 57.8	6.5	6.0	6.0	6.0	6.0	6.0
802.11n	16QAM	78.0 / 86.7	6.5	6.0	6.0	6.0	6.0	6.0
802.11n	64QAM	104.0 / 115.6	6.5	6.0	6.0	6.0	6.0	6.0
802.11n	64QAM	117.0 / 130.0	6.0	5.0	5.0	5.0	5.0	5.0
802.11n	64QAM	130.0 / 144.4	6.0	5.0	5.0	5.0	5.0	5.0

Copyright © 2013 TCC Nokia

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 40 MHz Tuning Targets			
			126 (124+128)	130 (128+132)	134 (132+136)	138 (136+140)
802.11n	BPSK	13.5 / 15.0	6.5	6.5	7.0	7.0
802.11n	QPSK	27.0 / 30.0	4.5	4.5	5.0	5.0
802.11n	QPSK	40.5 / 45.0	4.5	4.5	5.0	5.0
802.11n	16QAM	54.0 / 60.0	3.5	3.5	4.0	4.0
802.11n	16QAM	81.0 / 90.0	3.5	3.5	4.0	4.0
802.11n	64QAM	108.0 / 120.0	3.5	3.5	4.0	4.0
802.11n	64QAM	121.5 / 135.0	1.5	1.5	2.0	2.0
802.11n	64QAM	135.0 / 150.0	1.0	1.0	1.5	1.5
802.11ac	256QAM	162.0 / 180.0	-	-	-	-
802.11ac	256QAM	180.0 / 200.0	-	-	-	-
802.11n	BPSK	27.0 / 30.0	6.5	6.5	7.0	7.0
802.11n	QPSK	54.0 / 60.0	4.5	4.5	5.0	5.0
802.11n	QPSK	81.0 / 90.0	4.5	4.5	5.0	5.0
802.11n	16QAM	108.0 / 120.0	3.5	3.5	4.0	4.0
802.11n	16QAM	162.0 / 180.0	3.5	3.5	4.0	4.0
802.11n	64QAM	216.0 / 240.0	3.5	3.5	4.0	4.0
802.11n	64QAM	243.0 / 270.0	1.5	1.5	2.0	2.0
802.11n	64QAM	270.0 / 300.0	1.0	1.0	1.5	1.5

(Tables continues)

Copyright © 2013 TCC Nokia

(Tables continues)

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 20 MHz Tuning Targets					
			140	149	153	157	161	165
802.11a	BPSK	6	6.5	7.5	7.5	7.5	7.5	7.5
802.11a	BPSK	9	6.0	7.0	7.0	7.0	7.0	7.0
802.11a	QPSK	12	6.0	7.0	7.0	7.0	7.0	7.0
802.11a	QPSK	18	6.0	7.0	7.0	7.0	7.0	7.0
802.11a	16QAM	24	6.0	7.0	7.0	7.0	7.0	7.0
802.11a	16QAM	36	6.0	7.0	7.0	7.0	7.0	7.0
802.11a	64QAM	48	5.0	6.0	6.0	6.0	6.0	6.0
802.11a	64QAM	54	5.0	6.0	6.0	6.0	6.0	6.0
802.11n	BPSK	6.5 / 7.25	6.5	7.5	7.5	7.5	7.5	7.5
802.11n	QPSK	13.0 / 14.4	6.0	7.0	7.0	7.0	7.0	7.0
802.11n	QPSK	19.5 / 21.7	6.0	7.0	7.0	7.0	7.0	7.0
802.11n	16QAM	26.0 / 28.9	6.0	7.0	7.0	7.0	7.0	7.0
802.11n	16QAM	39.0 / 43.3	6.0	7.0	7.0	7.0	7.0	7.0
802.11n	64QAM	52.0 / 57.8	6.0	7.0	7.0	7.0	7.0	7.0
802.11n	64QAM	58.5 / 65.0	5.0	6.0	6.0	6.0	6.0	6.0
802.11n	64QAM	65.0 / 72.2	5.0	6.0	6.0	6.0	6.0	6.0
802.11ac	256QAM	78.0 / 86.7	-	-	-	-	-	-
802.11n	BPSK	13.0 / 14.4	6.5	7.5	7.5	7.5	7.5	7.5
802.11n	QPSK	26.0 / 28.9	6.0	7.0	7.0	7.0	7.0	7.0
802.11n	QPSK	39.0 / 43.3	6.0	7.0	7.0	7.0	7.0	7.0
802.11n	16QAM	52.0 / 57.8	6.0	7.0	7.0	7.0	7.0	7.0
802.11n	16QAM	78.0 / 86.7	6.0	7.0	7.0	7.0	7.0	7.0
802.11n	64QAM	104.0 / 115.6	6.0	7.0	7.0	7.0	7.0	7.0
802.11n	64QAM	117.0 / 130.0	5.0	6.0	6.0	6.0	6.0	6.0
802.11n	64QAM	130.0 / 144.4	5.0	6.0	6.0	6.0	6.0	6.0

Copyright © 2013 TCC Nokia

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 40 MHz Tuning Targets			
			151 (149+153)	155 (153+157)	159 (157+161)	163 (161+165)
802.11n	BPSK	13.5 / 15.0	8.0	8.0	8.0	8.0
802.11n	QPSK	27.0 / 30.0	6.0	6.0	6.0	6.0
802.11n	QPSK	40.5 / 45.0	6.0	6.0	6.0	6.0
802.11n	16QAM	54.0 / 60.0	5.0	5.0	5.0	5.0
802.11n	16QAM	81.0 / 90.0	5.0	5.0	5.0	5.0
802.11n	64QAM	108.0 / 120.0	5.0	5.0	5.0	5.0
802.11n	64QAM	121.5 / 135.0	3.0	3.0	3.0	3.0
802.11n	64QAM	135.0 / 150.0	2.5	2.5	2.5	2.5
802.11ac	256QAM	162.0 / 180.0	-	-	-	-
802.11ac	256QAM	180.0 / 200.0	-	-	-	-
802.11n	BPSK	27.0 / 30.0	8.0	8.0	8.0	8.0
802.11n	QPSK	54.0 / 60.0	6.0	6.0	6.0	6.0
802.11n	QPSK	81.0 / 90.0	6.0	6.0	6.0	6.0
802.11n	16QAM	108.0 / 120.0	5.0	5.0	5.0	5.0
802.11n	16QAM	162.0 / 180.0	5.0	5.0	5.0	5.0
802.11n	64QAM	216.0 / 240.0	5.0	5.0	5.0	5.0
802.11n	64QAM	243.0 / 270.0	3.0	3.0	3.0	3.0
802.11n	64QAM	270.0 / 300.0	2.5	2.5	2.5	2.5

Copyright © 2013 TCC Nokia

I.4 Power Tuning Targets Body Measurements - WLAN5000 - AUX Antenna

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 20 MHz Tuning Targets					
			36	40	44	48	52	56
802.11a	BPSK	6	9.5	9.5	9.5	9.5	8.5	8.5
802.11a	BPSK	9	8.5	8.5	8.5	8.5	7.5	7.5
802.11a	QPSK	12	8.5	8.5	8.5	8.5	7.5	7.5
802.11a	QPSK	18	8.5	8.5	8.5	8.5	7.5	7.5
802.11a	16QAM	24	8.5	8.5	8.5	8.5	7.5	7.5
802.11a	16QAM	36	8.5	8.5	8.5	8.5	7.5	7.5
802.11a	64QAM	48	8.5	8.5	8.5	8.5	7.5	7.5
802.11a	64QAM	54	8.5	8.5	8.5	8.5	7.5	7.5
802.11n	BPSK	6.5 / 7.25	9.5	9.5	9.5	9.5	8.5	8.5
802.11n	QPSK	13.0 / 14.4	8.5	8.5	8.5	8.5	7.5	7.5
802.11n	QPSK	19.5 / 21.7	8.5	8.5	8.5	8.5	7.5	7.5
802.11n	16QAM	26.0 / 28.9	8.5	8.5	8.5	8.5	7.5	7.5
802.11n	16QAM	39.0 / 43.3	8.5	8.5	8.5	8.5	7.5	7.5
802.11n	64QAM	52.0 / 57.8	8.5	8.5	8.5	8.5	7.5	7.5
802.11n	64QAM	58.5 / 65.0	8.5	8.5	8.5	8.5	7.5	7.5
802.11n	64QAM	65.0 / 72.2	8.5	8.5	8.5	8.5	7.5	7.5
802.11ac	256QAM	78.0 / 86.7	-	-	-	-	-	-
802.11n	BPSK	13.0 / 14.4	9.5	9.5	9.5	9.5	8.5	8.5
802.11n	QPSK	26.0 / 28.9	8.5	8.5	8.5	8.5	7.5	7.5
802.11n	QPSK	39.0 / 43.3	8.5	8.5	8.5	8.5	7.5	7.5
802.11n	16QAM	52.0 / 57.8	8.5	8.5	8.5	8.5	7.5	7.5
802.11n	16QAM	78.0 / 86.7	8.5	8.5	8.5	8.5	7.5	7.5
802.11n	64QAM	104.0 / 115.6	8.5	8.5	8.5	8.5	7.5	7.5
802.11n	64QAM	117.0 / 130.0	8.5	8.5	8.5	8.5	7.5	7.5
802.11n	64QAM	130.0 / 144.4	8.5	8.5	8.5	8.5	7.5	7.5

Copyright © 2013 TCC Nokia

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 40 MHz Tuning Targets						
			38 (36+40)	42 (40+44)	46 (44+48)	50 (48+52)	54 (52+56)	58 (56+60)	62 (60+64)
802.11n	BPSK	13.5 / 15.0	8.5	8.5	8.5	8.0	8.0	8.0	8.0
802.11n	QPSK	27.0 / 30.0	6.5	6.5	6.5	6.0	6.0	6.0	6.0
802.11n	QPSK	40.5 / 45.0	6.5	6.5	6.5	6.0	6.0	6.0	6.0
802.11n	16QAM	54.0 / 60.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
802.11n	16QAM	81.0 / 90.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
802.11n	64QAM	108.0 / 120.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
802.11n	64QAM	121.5 / 135.0	4.5	4.5	4.5	4.0	4.0	4.0	4.0
802.11n	64QAM	135.0 / 150.0	3.5	3.5	3.5	3.0	3.0	3.0	3.0
802.11ac	256QAM	162.0 / 180.0	-	-	-	-	-	-	-
802.11ac	256QAM	180.0 / 200.0	-	-	-	-	-	-	-
802.11n	BPSK	27.0 / 30.0	8.5	8.5	8.5	8.0	8.0	8.0	8.0
802.11n	QPSK	54.0 / 60.0	6.5	6.5	6.5	6.0	6.0	6.0	6.0
802.11n	QPSK	81.0 / 90.0	6.5	6.5	6.5	6.0	6.0	6.0	6.0
802.11n	16QAM	108.0 / 120.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
802.11n	16QAM	162.0 / 180.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
802.11n	64QAM	216.0 / 240.0	6.0	6.0	6.0	5.5	5.5	5.5	5.5
802.11n	64QAM	243.0 / 270.0	4.5	4.5	4.5	4.0	4.0	4.0	4.0
802.11n	64QAM	270.0 / 300.0	3.5	3.5	3.5	3.0	3.0	3.0	3.0

(Tables continues)

Copyright © 2013 TCC Nokia

(Tables continues)

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 20 MHz Tuning Targets					
			60	64	100	104	108	112
802.11a	BPSK	6	8.5	8.5	8.5	8.5	8.5	8.5
802.11a	BPSK	9	7.5	7.5	7.5	7.5	7.5	7.5
802.11a	QPSK	12	7.5	7.5	7.5	7.5	7.5	7.5
802.11a	QPSK	18	7.5	7.5	7.5	7.5	7.5	7.5
802.11a	16QAM	24	7.5	7.5	7.5	7.5	7.5	7.5
802.11a	16QAM	36	7.5	7.5	7.5	7.5	7.5	7.5
802.11a	64QAM	48	7.5	7.5	7.5	7.5	7.5	7.5
802.11a	64QAM	54	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	BPSK	6.5 / 7.25	8.5	8.5	8.5	8.5	8.5	8.5
802.11n	QPSK	13.0 / 14.4	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	QPSK	19.5 / 21.7	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	16QAM	26.0 / 28.9	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	16QAM	39.0 / 43.3	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	64QAM	52.0 / 57.8	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	64QAM	58.5 / 65.0	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	64QAM	65.0 / 72.2	7.5	7.5	7.5	7.5	7.5	7.5
802.11ac	256QAM	78.0 / 86.7	-	-	-	-	-	-
802.11n	BPSK	13.0 / 14.4	8.5	8.5	8.5	8.5	8.5	8.5
802.11n	QPSK	26.0 / 28.9	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	QPSK	39.0 / 43.3	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	16QAM	52.0 / 57.8	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	16QAM	78.0 / 86.7	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	64QAM	104.0 / 115.6	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	64QAM	117.0 / 130.0	7.5	7.5	7.5	7.5	7.5	7.5
802.11n	64QAM	130.0 / 144.4	7.5	7.5	7.5	7.5	7.5	7.5

Copyright © 2013 TCC Nokia

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 40 MHz Tuning Targets					
			102 (100+104)	106 (104+108)	110 (108+112)	114 (112+116)	118 (116+120)	122 (120+124)
802.11n	BPSK	13.5 / 15.0	8.0	8.0	8.0	8.0	8.0	9.0
802.11n	QPSK	27.0 / 30.0	6.0	6.0	6.0	6.0	6.0	7.5
802.11n	QPSK	40.5 / 45.0	6.0	6.0	6.0	6.0	6.0	7.5
802.11n	16QAM	54.0 / 60.0	5.5	5.5	5.5	5.5	5.5	6.5
802.11n	16QAM	81.0 / 90.0	5.5	5.5	5.5	5.5	5.5	6.5
802.11n	64QAM	108.0 / 120.0	5.5	5.5	5.5	5.5	5.5	6.5
802.11n	64QAM	121.5 / 135.0	4.0	4.0	4.0	4.0	4.0	4.5
802.11n	64QAM	135.0 / 150.0	3.0	3.0	3.0	3.0	3.0	3.5
802.11ac	256QAM	162.0 / 180.0	-	-	-	-	-	-
802.11ac	256QAM	180.0 / 200.0	-	-	-	-	-	-
802.11n	BPSK	27.0 / 30.0	8.0	8.0	8.0	8.0	8.0	9.0
802.11n	QPSK	54.0 / 60.0	6.0	6.0	6.0	6.0	6.0	7.5
802.11n	QPSK	81.0 / 90.0	6.0	6.0	6.0	6.0	6.0	7.5
802.11n	16QAM	108.0 / 120.0	5.5	5.5	5.5	5.5	5.5	6.5
802.11n	16QAM	162.0 / 180.0	5.5	5.5	5.5	5.5	5.5	6.5
802.11n	64QAM	216.0 / 240.0	5.5	5.5	5.5	5.5	5.5	6.5
802.11n	64QAM	243.0 / 270.0	4.0	4.0	4.0	4.0	4.0	4.5
802.11n	64QAM	270.0 / 300.0	3.0	3.0	3.0	3.0	3.0	3.5

(Tables continues)

Copyright © 2013 TCC Nokia

(Tables continues)

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 20 MHz Tuning Targets					
			116	120	124	128	132	136
802.11a	BPSK	6	8.5	9.5	9.5	9.5	9.5	9.5
802.11a	BPSK	9	7.5	8.5	8.5	8.5	8.5	8.5
802.11a	QPSK	12	7.5	8.5	8.5	8.5	8.5	8.5
802.11a	QPSK	18	7.5	8.5	8.5	8.5	8.5	8.5
802.11a	16QAM	24	7.5	8.5	8.5	8.5	8.5	8.5
802.11a	16QAM	36	7.5	8.5	8.5	8.5	8.5	8.5
802.11a	64QAM	48	7.5	8.5	8.5	8.5	8.5	8.5
802.11a	64QAM	54	7.5	8.5	8.5	8.5	8.5	8.5
802.11n	BPSK	6.5 / 7.25	8.5	9.5	9.5	9.5	9.5	9.5
802.11n	QPSK	13.0 / 14.4	7.5	8.5	8.5	8.5	8.5	8.5
802.11n	QPSK	19.5 / 21.7	7.5	8.5	8.5	8.5	8.5	8.5
802.11n	16QAM	26.0 / 28.9	7.5	8.5	8.5	8.5	8.5	8.5
802.11n	16QAM	39.0 / 43.3	7.5	8.5	8.5	8.5	8.5	8.5
802.11n	64QAM	52.0 / 57.8	7.5	8.5	8.5	8.5	8.5	8.5
802.11n	64QAM	58.5 / 65.0	7.5	8.5	8.5	8.5	8.5	8.5
802.11n	64QAM	65.0 / 72.2	7.5	8.5	8.5	8.5	8.5	8.5
802.11ac	256QAM	78.0 / 86.7	-	-	-	-	-	-
802.11n	BPSK	13.0 / 14.4	8.5	9.5	9.5	9.5	9.5	9.5
802.11n	QPSK	26.0 / 28.9	7.5	8.5	8.5	8.5	8.5	8.5
802.11n	QPSK	39.0 / 43.3	7.5	8.5	8.5	8.5	8.5	8.5
802.11n	16QAM	52.0 / 57.8	7.5	8.5	8.5	8.5	8.5	8.5
802.11n	16QAM	78.0 / 86.7	7.5	8.5	8.5	8.5	8.5	8.5
802.11n	64QAM	104.0 / 115.6	7.5	8.5	8.5	8.5	8.5	8.5
802.11n	64QAM	117.0 / 130.0	7.5	8.5	8.5	8.5	8.5	8.5
802.11n	64QAM	130.0 / 144.4	7.5	8.5	8.5	8.5	8.5	8.5

Copyright © 2013 TCC Nokia

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 40 MHz Tuning Targets			
			126 (124+128)	130 (128+132)	134 (132+136)	138 (136+140)
802.11n	BPSK	13.5 / 15.0	9.0	9.0	8.5	8.5
802.11n	QPSK	27.0 / 30.0	7.5	7.5	6.5	6.5
802.11n	QPSK	40.5 / 45.0	7.5	7.5	6.5	6.5
802.11n	16QAM	54.0 / 60.0	6.5	6.5	6.0	6.0
802.11n	16QAM	81.0 / 90.0	6.5	6.5	6.0	6.0
802.11n	64QAM	108.0 / 120.0	6.5	6.5	6.0	6.0
802.11n	64QAM	121.5 / 135.0	4.5	4.5	4.5	4.5
802.11n	64QAM	135.0 / 150.0	3.5	3.5	3.5	3.5
802.11ac	256QAM	162.0 / 180.0	-	-	-	-
802.11ac	256QAM	180.0 / 200.0	-	-	-	-
802.11n	BPSK	27.0 / 30.0	9.0	9.0	8.5	8.5
802.11n	QPSK	54.0 / 60.0	7.5	7.5	6.5	6.5
802.11n	QPSK	81.0 / 90.0	7.5	7.5	6.5	6.5
802.11n	16QAM	108.0 / 120.0	6.5	6.5	6.0	6.0
802.11n	16QAM	162.0 / 180.0	6.5	6.5	6.0	6.0
802.11n	64QAM	216.0 / 240.0	6.5	6.5	6.0	6.0
802.11n	64QAM	243.0 / 270.0	4.5	4.5	4.5	4.5
802.11n	64QAM	270.0 / 300.0	3.5	3.5	3.5	3.5

(Tables continues)

Copyright © 2013 TCC Nokia

(Tables continues)

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 20 MHz Tuning Targets					
			140	149	153	157	161	165
802.11a	BPSK	6	9.5	8.5	8.5	8.5	8.5	8.5
802.11a	BPSK	9	8.5	7.5	7.5	7.5	7.5	7.5
802.11a	QPSK	12	8.5	7.5	7.5	7.5	7.5	7.5
802.11a	QPSK	18	8.5	7.5	7.5	7.5	7.5	7.5
802.11a	16QAM	24	8.5	7.5	7.5	7.5	7.5	7.5
802.11a	16QAM	36	8.5	7.5	7.5	7.5	7.5	7.5
802.11a	64QAM	48	8.5	7.5	7.5	7.5	7.5	7.5
802.11a	64QAM	54	8.5	7.5	7.5	7.5	7.5	7.5
802.11n	BPSK	6.5 / 7.25	9.5	8.5	8.5	8.5	8.5	8.5
802.11n	QPSK	13.0 / 14.4	8.5	7.5	7.5	7.5	7.5	7.5
802.11n	QPSK	19.5 / 21.7	8.5	7.5	7.5	7.5	7.5	7.5
802.11n	16QAM	26.0 / 28.9	8.5	7.5	7.5	7.5	7.5	7.5
802.11n	16QAM	39.0 / 43.3	8.5	7.5	7.5	7.5	7.5	7.5
802.11n	64QAM	52.0 / 57.8	8.5	7.5	7.5	7.5	7.5	7.5
802.11n	64QAM	58.5 / 65.0	8.5	7.5	7.5	7.5	7.5	7.5
802.11n	64QAM	65.0 / 72.2	8.5	7.5	7.5	7.5	7.5	7.5
802.11ac	256QAM	78.0 / 86.7	-	-	-	-	-	-
802.11n	BPSK	13.0 / 14.4	9.5	8.5	8.5	8.5	8.5	8.5
802.11n	QPSK	26.0 / 28.9	8.5	7.5	7.5	7.5	7.5	7.5
802.11n	QPSK	39.0 / 43.3	8.5	7.5	7.5	7.5	7.5	7.5
802.11n	16QAM	52.0 / 57.8	8.5	7.5	7.5	7.5	7.5	7.5
802.11n	16QAM	78.0 / 86.7	8.5	7.5	7.5	7.5	7.5	7.5
802.11n	64QAM	104.0 / 115.6	8.5	7.5	7.5	7.5	7.5	7.5
802.11n	64QAM	117.0 / 130.0	8.5	7.5	7.5	7.5	7.5	7.5
802.11n	64QAM	130.0 / 144.4	8.5	7.5	7.5	7.5	7.5	7.5

Copyright © 2013 TCC Nokia

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 40 MHz Tuning Targets			
			151 (149+153)	155 (153+157)	159 (157+161)	163 (161+165)
802.11n	BPSK	13.5 / 15.0	8.0	8.0	8.0	8.0
802.11n	QPSK	27.0 / 30.0	6.0	6.0	6.0	6.0
802.11n	QPSK	40.5 / 45.0	6.0	6.0	6.0	6.0
802.11n	16QAM	54.0 / 60.0	5.5	5.5	5.5	5.5
802.11n	16QAM	81.0 / 90.0	5.5	5.5	5.5	5.5
802.11n	64QAM	108.0 / 120.0	5.5	5.5	5.5	5.5
802.11n	64QAM	121.5 / 135.0	4.0	4.0	4.0	4.0
802.11n	64QAM	135.0 / 150.0	3.0	3.0	3.0	3.0
802.11ac	256QAM	162.0 / 180.0	-	-	-	-
802.11ac	256QAM	180.0 / 200.0	-	-	-	-
802.11n	BPSK	27.0 / 30.0	8.0	8.0	8.0	8.0
802.11n	QPSK	54.0 / 60.0	6.0	6.0	6.0	6.0
802.11n	QPSK	81.0 / 90.0	6.0	6.0	6.0	6.0
802.11n	16QAM	108.0 / 120.0	5.5	5.5	5.5	5.5
802.11n	16QAM	162.0 / 180.0	5.5	5.5	5.5	5.5
802.11n	64QAM	216.0 / 240.0	5.5	5.5	5.5	5.5
802.11n	64QAM	243.0 / 270.0	4.0	4.0	4.0	4.0
802.11n	64QAM	270.0 / 300.0	3.0	3.0	3.0	3.0

Copyright © 2013 TCC Nokia

I.5 Conducted Power from the Sample used in the WLAN2450 Main Antenna Testing

Type: RX-113; Serial number: 004402/47/357461/8 used for WLAN2450 Body Main Antenna Testing

WLAN 2.4 GHz Conducted Power Measurements – 20 MHz channel bandwidth					
Mode	CH 1	-	CH 6	-	CH 11
802.11b BPSK 1 Mbps	12.53	-	14.61	-	13.44
802.11b QPSK 2 Mbps	12.65	-	14.68	-	13.46
802.11b QPSK 5.5 Mbps	12.83	-	14.86	-	13.45
802.11b QPSK 11 Mbps	12.77	-	14.81	-	13.43
802.11g BPSK 6 Mbps	9.49	-	11.35	-	10.36
802.11g BPSK 9 Mbps	9.50	-	11.42	-	10.39
802.11g QPSK 12 Mbps	9.58	-	11.38	-	10.41
802.11g QPSK 18 Mbps	9.61	-	11.46	-	10.44
802.11g 16QAM 24 Mbps	10.57	-	12.36	-	11.40
802.11g 16QAM 36 Mbps	10.86	-	12.62	-	11.69
802.11g 64QAM 48 Mbps	10.89	-	12.81	-	11.90
802.11g 64QAM 54 Mbps	10.54	-	12.23	-	11.31
802.11n BPSK 6.5 / 7.25 Mbps	8.30	-	10.15	-	9.17
802.11n QPSK 13.0 / 14.4 Mbps	6.96	-	8.83	-	7.83
802.11n QPSK 19.5 / 21.7 Mbps	7.00	-	8.88	-	7.88
802.11n 16QAM 26.0 / 28.9 Mbps	8.24	-	9.95	-	9.01
802.11n 16QAM 39.0 / 43.3 Mbps	8.23	-	10.09	-	9.07
802.11n 64QAM 52.0 / 57.8 Mbps	8.36	-	10.12	-	9.13
802.11n 64QAM 58.5 / 65.0 Mbps	8.34	-	10.13	-	9.17
802.11n 64QAM 65.0 / 72.2 Mbps	5.57	-	7.42	-	6.45
802.11n BPSK 13.0 / 14.4 Mbps	8.30	-	10.15	-	9.17
802.11n QPSK 26.0 / 28.9 Mbps	6.96	-	8.83	-	7.83
802.11n QPSK 39.0 / 43.3 Mbps	7.00	-	8.88	-	7.88
802.11n 16QAM 52.0 / 57.8 Mbps	8.24	-	9.95	-	9.01
802.11n 16QAM 78.0 / 86.7 Mbps	8.23	-	10.09	-	9.07
802.11n 64QAM 104.0 / 115.6 Mbps	8.36	-	10.12	-	9.13
802.11n 64QAM 117.0 / 130.0 Mbps	8.34	-	10.13	-	9.17
802.11n 64QAM 130.0 / 144.4 Mbps	5.57	-	7.42	-	6.45

(Tables continues)

(Tables continues)

Copyright © 2013 TCC Nokia

WLAN 2.4 GHz Conducted Power Measurements – 40 MHz channel bandwidth					
Mode	CH 3 (1…5)	CH 4 (2…6)	CH 6 (4…8)	CH 8 (6…10)	CH 9 (7…11)
802.11n BPSK 13.5 / 15.0 Mbps	8.22	-	9.24	-	9.17
802.11n QPSK 27.0 / 30.0 Mbps	6.91	-	7.89	-	7.84
802.11n QPSK 40.5 / 45.0 Mbps	6.86	-	7.93	-	7.89
802.11n 16QAM 54.0 / 60.0 Mbps	5.86	-	6.73	-	6.88
802.11n 16QAM 81.0 / 90.0 Mbps	5.89	-	6.87	-	6.93
802.11n 64QAM 108.0 / 120.0 Mbps	6.00	-	6.78	-	7.01
802.11n 64QAM 121.5 / 135.0 Mbps	6.08	-	6.80	-	6.97
802.11n 64QAM 135.0 / 150.0 Mbps	4.07	-	4.96	-	5.13
802.11n BPSK 27.0 / 30.0 Mbps	8.22	-	9.24	-	9.17
802.11n QPSK 54.0 / 60.0 Mbps	6.91	-	7.89	-	7.84
802.11n QPSK 81.0 / 90.0 Mbps	6.86	-	7.93	-	7.89
802.11n 16QAM 108.0 / 120.0 Mbps	5.86	-	6.73	-	6.88
802.11n16QAM 162.0 / 180.0 Mbps	5.89	-	6.87	-	6.93
802.11n 64QAM 216.0 / 240.0 Mbps	6.00	-	6.78	-	7.01
802.11n 64QAM 243.0 / 270.0 Mbps	6.08	-	6.80	-	6.97
802.11n 64QAM 270.0 / 300.0 Mbps	4.07	-	4.96	-	5.13

Copyright © 2013 TCC Nokia

I.6 Conducted Power from the Sample used in the WLAN2450 AUX Antenna Testing

Type: RX-113; Serial number: 004402/47/357461/8 used for WLAN2450 Body AUX Antenna Testing

WLAN 2.4 GHz Conducted Power Measurements – 20 MHz channel bandwidth					
Mode	CH 1	-	CH 6	-	CH 11
802.11b BPSK 1 Mbps	12.82	-	14.25	-	12.11
802.11b QPSK 2 Mbps	13.51	-	14.28	-	12.14
802.11b QPSK 5.5 Mbps	13.66	-	14.43	-	12.23
802.11b QPSK 11 Mbps	13.65	-	14.41	-	12.24
802.11g BPSK 6 Mbps	10.94	-	11.83	-	10.18
802.11g BPSK 9 Mbps	10.95	-	11.90	-	10.22
802.11g QPSK 12 Mbps	11.01	-	11.88	-	10.22
802.11g QPSK 18 Mbps	11.02	-	11.93	-	10.30
802.11g 16QAM 24 Mbps	11.31	-	12.19	-	10.52
802.11g 16QAM 36 Mbps	11.42	-	12.34	-	10.50
802.11g 64QAM 48 Mbps	11.34	-	12.32	-	10.64
802.11g 64QAM 54 Mbps	10.94	-	11.81	-	10.13
802.11n BPSK 6.5 / 7.25 Mbps	9.83	-	10.76	-	9.06
802.11n QPSK 13.0 / 14.4 Mbps	8.49	-	9.33	-	7.65
802.11n QPSK 19.5 / 21.7 Mbps	8.50	-	9.39	-	7.73
802.11n 16QAM 26.0 / 28.9 Mbps	8.93	-	9.76	-	8.13
802.11n 16QAM 39.0 / 43.3 Mbps	8.91	-	9.92	-	8.06
802.11n 64QAM 52.0 / 57.8 Mbps	9.04	-	9.91	-	8.17
802.11n 64QAM 58.5 / 65.0 Mbps	8.96	-	9.95	-	8.19
802.11n 64QAM 65.0 / 72.2 Mbps	7.16	-	8.02	-	6.28
802.11n BPSK 13.0 / 14.4 Mbps	9.83	-	10.76	-	9.06
802.11n QPSK 26.0 / 28.9 Mbps	8.49	-	9.33	-	7.65
802.11n QPSK 39.0 / 43.3 Mbps	8.50	-	9.39	-	7.73
802.11n 16QAM 52.0 / 57.8 Mbps	8.93	-	9.76	-	8.13
802.11n 16QAM 78.0 / 86.7 Mbps	8.91	-	9.92	-	8.06
802.11n 64QAM 104.0 / 115.6 Mbps	9.04	-	9.91	-	8.17
802.11n 64QAM 117.0 / 130.0 Mbps	8.96	-	9.95	-	8.19
802.11n 64QAM 130.0 / 144.4 Mbps	7.16	-	8.02	-	6.28

(Tables continues)

Copyright © 2013 TCC Nokia

(Tables continues)

WLAN 2.4 GHz Conducted Power Measurements – 40 MHz channel bandwidth					
Mode	CH 3 (1…5)	CH 4 (2…6)	CH 6 (4…8)	CH 8 (6…10)	CH 9 (7…11)
802.11n BPSK 13.5 / 15.0 Mbps	9.47	-	9.60	-	9.42
802.11n QPSK 27.0 / 30.0 Mbps	8.07	-	8.25	-	8.10
802.11n QPSK 40.5 / 45.0 Mbps	8.14	-	8.24	-	8.15
802.11n 16QAM 54.0 / 60.0 Mbps	7.23	-	7.22	-	7.33
802.11n 16QAM 81.0 / 90.0 Mbps	7.33	-	7.24	-	7.39
802.11n 64QAM 108.0 / 120.0 Mbps	7.33	-	7.27	-	7.35
802.11n 64QAM 121.5 / 135.0 Mbps	7.31	-	7.35	-	7.46
802.11n 64QAM 135.0 / 150.0 Mbps	5.36	-	5.31	-	5.40
802.11n BPSK 27.0 / 30.0 Mbps	9.47	-	9.60	-	9.42
802.11n QPSK 54.0 / 60.0 Mbps	8.07	-	8.25	-	8.10
802.11n QPSK 81.0 / 90.0 Mbps	8.14	-	8.24	-	8.15
802.11n 16QAM 108.0 / 120.0 Mbps	7.23	-	7.22	-	7.33
802.11n16QAM 162.0 / 180.0 Mbps	7.33	-	7.24	-	7.39
802.11n 64QAM 216.0 / 240.0 Mbps	7.33	-	7.27	-	7.35
802.11n 64QAM 243.0 / 270.0 Mbps	7.31	-	7.35	-	7.46
802.11n 64QAM 270.0 / 300.0 Mbps	5.36	-	5.31	-	5.40

Copyright © 2013 TCC Nokia

I.7 Conducted Power from the Sample used in the WLAN5000 Main Antenna Testing

Type: RX-113; Serial number: 004402/47/357461/8 used for WLAN5000 Body Main Antenna Testing

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 20 MHz channel bandwidth: Measured values					
			36	40	44	48	52	56
802.11a	BPSK	6	8.32	8.36	8.51	7.97	8.05	8.23
802.11a	BPSK	9	7.02	7.27	7.95	7.02	7.14	7.22
802.11a	QPSK	12	6.98	7.29	7.53	7.07	7.17	7.21
802.11a	QPSK	18	7.08	7.42	7.60	7.10	7.29	7.35
802.11a	16QAM	24	7.23	7.96	7.82	7.36	7.48	7.54
802.11a	16QAM	36	7.51	7.77	8.07	7.74	7.96	8.15
802.11a	64QAM	48	6.87	7.25	7.67	6.91	7.24	7.27
802.11a	64QAM	54	6.89	7.03	7.26	7.04	7.11	7.24
802.11n	BPSK	6.5 / 7.25	7.71	8.32	8.50	7.69	7.83	7.86
802.11n	QPSK	13.0 / 14.4	7.28	7.62	7.77	6.86	7.06	7.56
802.11n	QPSK	19.5 / 21.7	6.87	7.64	7.86	6.99	7.09	7.12
802.11n	16QAM	26.0 / 28.9	7.06	7.42	7.70	7.28	7.36	7.60
802.11n	16QAM	39.0 / 43.3	7.23	7.60	7.73	7.42	7.49	7.61
802.11n	64QAM	52.0 / 57.8	7.46	7.83	8.31	7.77	7.88	8.16
802.11n	64QAM	58.5 / 65.0	6.77	7.05	7.69	7.01	7.06	7.20
802.11n	64QAM	65.0 / 72.2	6.95	7.22	7.51	7.00	7.07	7.15
802.11ac	256QAM	78.0 / 86.7	-	-	-	-	-	-
802.11n	BPSK	13.0 / 14.4	7.71	8.32	8.50	7.69	7.83	7.86
802.11n	QPSK	26.0 / 28.9	7.28	7.62	7.77	6.86	7.06	7.56
802.11n	QPSK	39.0 / 43.3	6.87	7.64	7.86	6.99	7.09	7.12
802.11n	16QAM	52.0 / 57.8	7.06	7.42	7.70	7.28	7.36	7.60
802.11n	16QAM	78.0 / 86.7	7.23	7.60	7.73	7.42	7.49	7.61
802.11n	64QAM	104.0 / 115.6	7.46	7.83	8.31	7.77	7.88	8.16
802.11n	64QAM	117.0 / 130.0	6.77	7.05	7.69	7.01	7.06	7.20
802.11n	64QAM	130.0 / 144.4	6.95	7.22	7.51	7.00	7.07	7.15

Copyright © 2013 TCC Nokia

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 40 MHz channel bandwidth: Measured values						
			38 (36+40)	42 (40+44)	46 (44+48)	50 (48+52)	54 (52+56)	58 (56+60)	62 (60+64)
802.11n	BPSK	13.5 / 15.0	7.31	8.00	7.74	7.75	7.91	7.83	8.20
802.11n	QPSK	27.0 / 30.0	5.98	5.80	5.91	5.98	6.13	6.08	6.00
802.11n	QPSK	40.5 / 45.0	5.54	5.86	5.98	6.09	6.25	6.19	6.55
802.11n	16QAM	54.0 / 60.0	4.59	4.92	5.08	5.16	5.38	5.32	5.17
802.11n	16QAM	81.0 / 90.0	4.77	5.03	5.20	5.23	4.96	5.40	5.30
802.11n	64QAM	108.0 / 120.0	4.39	5.14	5.41	5.38	5.67	5.51	5.43
802.11n	64QAM	121.5 / 135.0	2.94	3.30	2.98	3.54	3.69	3.66	3.56
802.11n	64QAM	135.0 / 150.0	1.58	2.37	2.10	2.19	2.34	2.29	2.70
802.11ac	256QAM	351 / 390	-	-	-	-	-	-	-
802.11ac	256QAM	390 / 433.3	-	-	-	-	-	-	-
802.11n	BPSK	27.0 / 30.0	7.31	8.00	7.74	7.75	7.91	7.83	8.20
802.11n	QPSK	54.0 / 60.0	5.98	5.80	5.91	5.98	6.13	6.08	6.00
802.11n	QPSK	81.0 / 90.0	5.54	5.86	5.98	6.09	6.25	6.19	6.55
802.11n	16QAM	108.0 / 120.0	4.59	4.92	5.08	5.16	5.38	5.32	5.17
802.11n	16QAM	162.0 / 180.0	4.77	5.03	5.20	5.23	4.96	5.40	5.30
802.11n	64QAM	216.0 / 240.0	4.39	5.14	5.41	5.38	5.67	5.51	5.43
802.11n	64QAM	243.0 / 270.0	2.94	3.30	2.98	3.54	3.69	3.66	3.56
802.11n	64QAM	270.0 / 300.0	1.58	2.37	2.10	2.19	2.34	2.29	2.70

(Tables continues)

Copyright © 2013 TCC Nokia

(Tables continues)

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 20 MHz channel bandwidth: Measured values					
			60	64	100	104	108	112
802.11a	BPSK	6	8.44	8.16	7.81	7.95	7.87	7.51
802.11a	BPSK	9	7.11	7.03	7.33	7.02	6.93	6.48
802.11a	QPSK	12	7.16	7.12	7.34	7.04	6.98	6.55
802.11a	QPSK	18	7.25	7.21	6.90	7.14	6.61	6.56
802.11a	16QAM	24	7.51	7.47	7.18	7.37	7.30	6.73
802.11a	16QAM	36	7.84	7.79	7.50	7.25	7.14	6.67
802.11a	64QAM	48	6.91	6.97	6.65	6.58	6.37	5.99
802.11a	64QAM	54	7.00	6.87	6.57	6.48	6.52	5.96
802.11n	BPSK	6.5 / 7.25	8.26	8.07	7.76	7.74	7.65	7.34
802.11n	QPSK	13.0 / 14.4	7.40	7.41	6.64	6.90	6.81	6.51
802.11n	QPSK	19.5 / 21.7	7.03	6.97	7.28	6.93	6.85	6.60
802.11n	16QAM	26.0 / 28.9	7.39	7.26	7.59	6.91	7.22	6.46
802.11n	16QAM	39.0 / 43.3	7.52	7.48	7.22	6.93	7.35	6.51
802.11n	64QAM	52.0 / 57.8	7.82	7.82	7.67	7.32	7.29	6.62
802.11n	64QAM	58.5 / 65.0	6.97	6.93	6.70	6.43	6.40	5.99
802.11n	64QAM	65.0 / 72.2	6.96	6.90	6.56	6.50	6.54	6.00
802.11ac	256QAM	78.0 / 86.7	-	-	-	-	-	-
802.11n	BPSK	13.0 / 14.4	8.26	8.07	7.76	7.74	7.65	7.34
802.11n	QPSK	26.0 / 28.9	7.40	7.41	6.64	6.90	6.81	6.51
802.11n	QPSK	39.0 / 43.3	7.03	6.97	7.28	6.93	6.85	6.60
802.11n	16QAM	52.0 / 57.8	7.39	7.26	7.59	6.91	7.22	6.46
802.11n	16QAM	78.0 / 86.7	7.52	7.48	7.22	6.93	7.35	6.51
802.11n	64QAM	104.0 / 115.6	7.82	7.82	7.67	7.32	7.29	6.62
802.11n	64QAM	117.0 / 130.0	6.97	6.93	6.70	6.43	6.40	5.99
802.11n	64QAM	130.0 / 144.4	6.96	6.90	6.56	6.50	6.54	6.00

Copyright © 2013 TCC Nokia

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 40 MHz channel bandwidth: Measured values					
			102 (100+104)	106 (104+108)	110 (108+112)	114 (112+116)	118 (116+120)	122 (120+124)
802.11n	BPSK	13.5 / 15.0	6.95	6.80	6.63	6.99	6.06	6.08
802.11n	QPSK	27.0 / 30.0	5.16	5.00	4.91	5.29	4.27	4.27
802.11n	QPSK	40.5 / 45.0	5.27	5.06	5.00	4.92	4.37	4.34
802.11n	16QAM	54.0 / 60.0	4.29	4.23	4.18	4.08	3.51	3.43
802.11n	16QAM	81.0 / 90.0	4.45	4.30	4.29	4.12	3.59	3.50
802.11n	64QAM	108.0 / 120.0	4.61	4.52	4.44	4.36	3.85	3.86
802.11n	64QAM	121.5 / 135.0	2.75	2.65	2.48	2.49	1.90	1.41
802.11n	64QAM	135.0 / 150.0	1.20	1.03	1.67	1.09	0.98	0.40
802.11ac	256QAM	351 / 390	-	-	-	-	-	-
802.11ac	256QAM	390 / 433.3	-	-	-	-	-	-
802.11n	BPSK	27.0 / 30.0	6.95	6.80	6.63	6.99	6.06	6.08
802.11n	QPSK	54.0 / 60.0	5.16	5.00	4.91	5.29	4.27	4.27
802.11n	QPSK	81.0 / 90.0	5.27	5.06	5.00	4.92	4.37	4.34
802.11n	16QAM	108.0 / 120.0	4.29	4.23	4.18	4.08	3.51	3.43
802.11n	16QAM	162.0 / 180.0	4.45	4.30	4.29	4.12	3.59	3.50
802.11n	64QAM	216.0 / 240.0	4.61	4.52	4.44	4.36	3.85	3.86
802.11n	64QAM	243.0 / 270.0	2.75	2.65	2.48	2.49	1.90	1.41
802.11n	64QAM	270.0 / 300.0	1.20	1.03	1.67	1.09	0.98	0.40

(Tables continues)

Copyright © 2013 TCC Nokia

(Tables continues)

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 20 MHz channel bandwidth: Measured values					
			116	120	124	128	132	136
802.11a	BPSK	6	7.50	6.81	6.76	7.08	7.10	7.41
802.11a	BPSK	9	6.49	5.99	6.01	6.20	6.23	6.60
802.11a	QPSK	12	6.46	5.99	6.05	6.25	6.25	6.66
802.11a	QPSK	18	6.54	6.00	5.96	6.37	6.36	6.72
802.11a	16QAM	24	6.80	6.00	6.13	6.01	6.08	6.78
802.11a	16QAM	36	7.02	6.04	6.06	6.20	6.45	6.54
802.11a	64QAM	48	5.96	5.36	5.39	5.61	5.49	5.92
802.11a	64QAM	54	5.99	5.32	5.72	5.77	5.65	6.04
802.11n	BPSK	6.5 / 7.25	7.11	6.61	6.52	6.91	6.94	7.24
802.11n	QPSK	13.0 / 14.4	6.25	5.95	5.90	6.13	6.09	6.53
802.11n	QPSK	19.5 / 21.7	6.35	5.95	5.99	6.22	6.19	6.08
802.11n	16QAM	26.0 / 28.9	6.23	5.95	6.14	6.37	6.51	6.80
802.11n	16QAM	39.0 / 43.3	6.31	5.93	6.13	6.14	6.06	6.44
802.11n	64QAM	52.0 / 57.8	6.72	6.15	6.09	6.24	6.37	6.63
802.11n	64QAM	58.5 / 65.0	5.81	5.40	5.32	5.58	5.49	5.88
802.11n	64QAM	65.0 / 72.2	5.73	5.54	5.38	5.71	5.61	5.87
802.11ac	256QAM	78.0 / 86.7	-	-	-	-	-	-
802.11n	BPSK	13.0 / 14.4	7.11	6.61	6.52	6.91	6.94	7.24
802.11n	QPSK	26.0 / 28.9	6.25	5.95	5.90	6.13	6.09	6.53
802.11n	QPSK	39.0 / 43.3	6.35	5.95	5.99	6.22	6.19	6.08
802.11n	16QAM	52.0 / 57.8	6.23	5.95	6.14	6.37	6.51	6.80
802.11n	16QAM	78.0 / 86.7	6.31	5.93	6.13	6.14	6.06	6.44
802.11n	64QAM	104.0 / 115.6	6.72	6.15	6.09	6.24	6.37	6.63
802.11n	64QAM	117.0 / 130.0	5.81	5.40	5.32	5.58	5.49	5.88
802.11n	64QAM	130.0 / 144.4	5.73	5.54	5.38	5.71	5.61	5.87

Copyright © 2013 TCC Nokia

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 40 MHz channel bandwidth: Measured values			
			126 (124+128)	130 (128+132)	134 (132+136)	138 (136+140)
802.11n	BPSK	13.5 / 15.0	6.37	6.75	6.77	6.71
802.11n	QPSK	27.0 / 30.0	4.19	4.62	5.10	4.53
802.11n	QPSK	40.5 / 45.0	4.32	4.72	5.21	4.65
802.11n	16QAM	54.0 / 60.0	3.41	3.78	3.80	3.65
802.11n	16QAM	81.0 / 90.0	3.55	3.89	3.92	3.76
802.11n	64QAM	108.0 / 120.0	3.59	4.01	4.04	3.98
802.11n	64QAM	121.5 / 135.0	1.86	1.72	1.65	1.56
802.11n	64QAM	135.0 / 150.0	0.31	0.91	0.75	0.71
802.11ac	256QAM	351 / 390	-	-	-	-
802.11ac	256QAM	390 / 433.3	-	-	-	-
802.11n	BPSK	27.0 / 30.0	6.37	6.75	6.77	6.71
802.11n	QPSK	54.0 / 60.0	4.19	4.62	5.10	4.53
802.11n	QPSK	81.0 / 90.0	4.32	4.72	5.21	4.65
802.11n	16QAM	108.0 / 120.0	3.41	3.78	3.80	3.65
802.11n	16QAM	162.0 / 180.0	3.55	3.89	3.92	3.76
802.11n	64QAM	216.0 / 240.0	3.59	4.01	4.04	3.98
802.11n	64QAM	243.0 / 270.0	1.86	1.72	1.65	1.56
802.11n	64QAM	270.0 / 300.0	0.31	0.91	0.75	0.71

(Tables continues)

Copyright © 2013 TCC Nokia

(Tables continues)

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 20 MHz channel bandwidth: Measured values					
			140	149	153	157	161	165
802.11a	BPSK	6	7.35	6.90	7.49	8.00	8.52	8.46
802.11a	BPSK	9	6.46	6.12	6.55	7.21	7.68	7.71
802.11a	QPSK	12	6.48	6.10	6.61	7.23	8.19	7.68
802.11a	QPSK	18	6.55	5.65	6.63	7.35	7.78	7.36
802.11a	16QAM	24	6.30	5.91	6.87	7.50	7.97	8.00
802.11a	16QAM	36	6.95	6.14	6.48	7.82	7.68	8.06
802.11a	64QAM	48	5.91	5.40	5.98	6.53	7.00	7.06
802.11a	64QAM	54	5.97	5.37	5.93	6.65	7.11	7.50
802.11n	BPSK	6.5 / 7.25	7.21	6.71	7.27	7.81	8.36	8.33
802.11n	QPSK	13.0 / 14.4	6.35	5.96	6.46	7.12	7.56	7.57
802.11n	QPSK	19.5 / 21.7	6.41	6.04	6.49	7.18	7.61	7.65
802.11n	16QAM	26.0 / 28.9	6.21	6.34	6.76	7.39	7.97	7.90
802.11n	16QAM	39.0 / 43.3	6.33	5.90	6.48	7.01	7.56	7.56
802.11n	64QAM	52.0 / 57.8	6.44	6.12	6.58	7.30	8.21	8.13
802.11n	64QAM	58.5 / 65.0	5.82	5.39	5.84	6.48	7.04	7.32
802.11n	64QAM	65.0 / 72.2	5.96	5.23	5.87	6.55	7.18	7.35
802.11ac	256QAM	78.0 / 86.7	-	-	-	-	-	-
802.11n	BPSK	13.0 / 14.4	7.21	6.71	7.27	7.81	8.36	8.33
802.11n	QPSK	26.0 / 28.9	6.35	5.96	6.46	7.12	7.56	7.57
802.11n	QPSK	39.0 / 43.3	6.41	6.04	6.49	7.18	7.61	7.65
802.11n	16QAM	52.0 / 57.8	6.21	6.34	6.76	7.39	7.97	7.90
802.11n	16QAM	78.0 / 86.7	6.33	5.90	6.48	7.01	7.56	7.56
802.11n	64QAM	104.0 / 115.6	6.44	6.12	6.58	7.30	8.21	8.13
802.11n	64QAM	117.0 / 130.0	5.82	5.39	5.84	6.48	7.04	7.32
802.11n	64QAM	130.0 / 144.4	5.96	5.23	5.87	6.55	7.18	7.35

Copyright © 2013 TCC Nokia

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 40 MHz channel bandwidth: Measured values			
			151 (149+153)	155 (153+157)	159 (157+161)	163 (161+165)
802.11n	BPSK	13.5 / 15.0	6.64	7.18	7.81	8.24
802.11n	QPSK	27.0 / 30.0	4.59	5.19	5.76	6.21
802.11n	QPSK	40.5 / 45.0	4.64	5.29	5.88	6.36
802.11n	16QAM	54.0 / 60.0	3.58	4.31	4.82	5.29
802.11n	16QAM	81.0 / 90.0	3.70	4.37	4.90	5.43
802.11n	64QAM	108.0 / 120.0	3.31	4.45	4.92	5.42
802.11n	64QAM	121.5 / 135.0	1.68	2.23	2.72	3.28
802.11n	64QAM	135.0 / 150.0	0.71	1.31	1.92	2.44
802.11ac	256QAM	351 / 390	-	-	-	-
802.11ac	256QAM	390 / 433.3	-	-	-	-
802.11n	BPSK	27.0 / 30.0	6.64	7.18	7.81	8.24
802.11n	QPSK	54.0 / 60.0	4.59	5.19	5.76	6.21
802.11n	QPSK	81.0 / 90.0	4.64	5.29	5.88	6.36
802.11n	16QAM	108.0 / 120.0	3.58	4.31	4.82	5.29
802.11n	16QAM	162.0 / 180.0	3.70	4.37	4.90	5.43
802.11n	64QAM	216.0 / 240.0	3.31	4.45	4.92	5.42
802.11n	64QAM	243.0 / 270.0	1.68	2.23	2.72	3.28
802.11n	64QAM	270.0 / 300.0	0.71	1.31	1.92	2.44

Copyright © 2013 TCC Nokia

I.8 Conducted Power from the Sample used in the WLAN5000 AUX Antenna Testing

Type: RX-113; Serial number: 004402/47/357461/8 used for WLAN5000 Body AUX Antenna Testing

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 20 MHz channel bandwidth: Measured values					
			36	40	44	48	52	56
802.11a	BPSK	6	10.14	9.52	9.82	9.05	8.48	8.33
802.11a	BPSK	9	9.20	8.93	8.65	8.21	7.40	7.33
802.11a	QPSK	12	9.18	8.95	8.69	8.57	7.56	7.45
802.11a	QPSK	18	9.30	9.08	8.65	8.62	7.61	7.49
802.11a	16QAM	24	9.69	9.42	9.10	8.51	7.64	7.68
802.11a	16QAM	36	9.47	9.04	9.38	8.57	7.95	7.69
802.11a	64QAM	48	8.49	8.78	8.45	7.62	7.05	6.79
802.11a	64QAM	54	8.50	8.51	8.47	7.75	6.97	6.82
802.11n	BPSK	6.5 / 7.25	9.72	9.47	9.65	8.59	7.72	8.17
802.11n	QPSK	13.0 / 14.4	8.90	8.75	8.54	7.81	6.92	7.20
802.11n	QPSK	19.5 / 21.7	9.00	9.22	8.57	7.90	7.11	7.25
802.11n	16QAM	26.0 / 28.9	9.49	9.23	8.99	8.33	7.51	7.35
802.11n	16QAM	39.0 / 43.3	9.56	9.35	9.17	8.51	7.65	7.69
802.11n	64QAM	52.0 / 57.8	9.80	9.27	8.83	8.22	7.34	7.65
802.11n	64QAM	58.5 / 65.0	8.73	8.62	8.43	7.79	7.08	6.68
802.11n	64QAM	65.0 / 72.2	8.82	8.66	8.43	7.32	7.07	6.80
802.11ac	256QAM	78.0 / 86.7	-	-	-	-	-	-
802.11n	BPSK	13.0 / 14.4	9.72	9.47	9.65	8.59	7.72	8.17
802.11n	QPSK	26.0 / 28.9	8.90	8.75	8.54	7.81	6.92	7.20
802.11n	QPSK	39.0 / 43.3	9.00	9.22	8.57	7.90	7.11	7.25
802.11n	16QAM	52.0 / 57.8	9.49	9.23	8.99	8.33	7.51	7.35
802.11n	16QAM	78.0 / 86.7	9.56	9.35	9.17	8.51	7.65	7.69
802.11n	64QAM	104.0 / 115.6	9.80	9.27	8.83	8.22	7.34	7.65
802.11n	64QAM	117.0 / 130.0	8.73	8.62	8.43	7.79	7.08	6.68
802.11n	64QAM	130.0 / 144.4	8.82	8.66	8.43	7.32	7.07	6.80

Copyright © 2013 TCC Nokia

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 40 MHz channel bandwidth: Measured values						
			38 (36+40)	42 (40+44)	46 (44+48)	50 (48+52)	54 (52+56)	58 (56+60)	62 (60+64)
802.11n	BPSK	13.5 / 15.0	9.65	9.52	9.03	8.37	7.92	7.32	6.66
802.11n	QPSK	27.0 / 30.0	7.83	7.30	7.31	6.43	6.13	6.08	6.00
802.11n	QPSK	40.5 / 45.0	7.86	6.86	6.98	6.39	6.25	6.19	6.55
802.11n	16QAM	54.0 / 60.0	6.58	6.52	6.58	5.66	5.58	5.32	5.17
802.11n	16QAM	81.0 / 90.0	6.77	6.53	6.40	5.63	5.26	5.40	5.30
802.11n	64QAM	108.0 / 120.0	6.92	6.64	6.91	5.68	5.67	5.51	5.43
802.11n	64QAM	121.5 / 135.0	5.04	4.80	4.58	3.74	3.89	3.66	3.56
802.11n	64QAM	135.0 / 150.0	4.21	4.04	3.58	2.79	2.54	2.29	2.70
802.11ac	256QAM	351 / 390	-	-	-	-	-	-	-
802.11ac	256QAM	390 / 433.3	-	-	-	-	-	-	-
802.11n	BPSK	27.0 / 30.0	9.65	9.52	9.03	8.37	7.92	7.32	6.66
802.11n	QPSK	54.0 / 60.0	7.83	7.30	7.31	6.43	6.13	6.08	6.00
802.11n	QPSK	81.0 / 90.0	7.86	6.86	6.98	6.39	6.25	6.19	6.55
802.11n	16QAM	108.0 / 120.0	6.58	6.52	6.58	5.66	5.58	5.32	5.17
802.11n	16QAM	162.0 / 180.0	6.77	6.53	6.40	5.63	5.26	5.40	5.30
802.11n	64QAM	216.0 / 240.0	6.92	6.64	6.91	5.68	5.67	5.51	5.43
802.11n	64QAM	243.0 / 270.0	5.04	4.80	4.58	3.74	3.89	3.66	3.56
802.11n	64QAM	270.0 / 300.0	4.21	4.04	3.58	2.79	2.54	2.29	2.70

(Tables continues)

Copyright © 2013 TCC Nokia

(Tables continues)

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 20 MHz channel bandwidth: Measured values					
			60	64	100	104	108	112
802.11a	BPSK	6	7.77	6.80	8.69	8.80	9.09	9.33
802.11a	BPSK	9	6.78	5.74	7.77	8.36	8.17	8.43
802.11a	QPSK	12	6.93	5.86	7.77	8.39	8.22	8.44
802.11a	QPSK	18	6.99	5.99	7.90	8.06	8.32	8.53
802.11a	16QAM	24	7.45	6.50	8.31	8.38	8.60	8.90
802.11a	16QAM	36	7.12	6.49	8.48	8.49	8.99	9.01
802.11a	64QAM	48	6.26	5.67	7.68	7.37	8.12	8.10
802.11a	64QAM	54	6.47	5.59	7.74	7.78	7.59	8.08
802.11n	BPSK	6.5 / 7.25	7.54	6.69	8.53	8.64	8.96	9.18
802.11n	QPSK	13.0 / 14.4	6.46	5.67	7.69	7.82	8.07	8.34
802.11n	QPSK	19.5 / 21.7	6.43	5.68	7.76	7.95	8.21	8.41
802.11n	16QAM	26.0 / 28.9	7.00	6.22	8.27	8.23	8.59	8.85
802.11n	16QAM	39.0 / 43.3	7.19	5.93	8.37	8.39	8.78	8.99
802.11n	64QAM	52.0 / 57.8	6.84	6.18	8.53	8.54	8.95	9.00
802.11n	64QAM	58.5 / 65.0	5.86	5.30	7.59	7.76	8.25	7.87
802.11n	64QAM	65.0 / 72.2	5.91	5.34	7.65	7.90	8.17	8.35
802.11ac	256QAM	78.0 / 86.7	-	-	-	-	-	-
802.11n	BPSK	13.0 / 14.4	7.54	6.69	8.53	8.64	8.96	9.18
802.11n	QPSK	26.0 / 28.9	6.46	5.67	7.69	7.82	8.07	8.34
802.11n	QPSK	39.0 / 43.3	6.43	5.68	7.76	7.95	8.21	8.41
802.11n	16QAM	52.0 / 57.8	7.00	6.22	8.27	8.23	8.59	8.85
802.11n	16QAM	78.0 / 86.7	7.19	5.93	8.37	8.39	8.78	8.99
802.11n	64QAM	104.0 / 115.6	6.84	6.18	8.53	8.54	8.95	9.00
802.11n	64QAM	117.0 / 130.0	5.86	5.30	7.59	7.76	8.25	7.87
802.11n	64QAM	130.0 / 144.4	5.91	5.34	7.65	7.90	8.17	8.35

Copyright © 2013 TCC Nokia

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 40 MHz channel bandwidth: Measured values					
			102 (100+104)	106 (104+108)	110 (108+112)	114 (112+116)	118 (116+120)	122 (120+124)
802.11n	BPSK	13.5 / 15.0	8.75	8.95	9.22	9.39	9.63	8.99
802.11n	QPSK	27.0 / 30.0	6.91	7.18	7.39	7.12	7.85	7.53
802.11n	QPSK	40.5 / 45.0	6.95	7.25	7.03	7.74	7.57	7.62
802.11n	16QAM	54.0 / 60.0	6.15	6.40	6.20	6.34	7.04	6.51
802.11n	16QAM	81.0 / 90.0	5.84	6.52	6.24	6.40	6.77	6.54
802.11n	64QAM	108.0 / 120.0	5.90	6.12	6.41	6.64	7.00	6.76
802.11n	64QAM	121.5 / 135.0	4.06	4.39	4.45	4.88	5.04	4.86
802.11n	64QAM	135.0 / 150.0	3.10	3.38	3.65	3.79	4.10	3.85
802.11ac	256QAM	351 / 390	-	-	-	-	-	-
802.11ac	256QAM	390 / 433.3	-	-	-	-	-	-
802.11n	BPSK	27.0 / 30.0	8.75	8.95	9.22	9.39	9.63	8.99
802.11n	QPSK	54.0 / 60.0	6.91	7.18	7.39	7.12	7.85	7.53
802.11n	QPSK	81.0 / 90.0	6.95	7.25	7.03	7.74	7.57	7.62
802.11n	16QAM	108.0 / 120.0	6.15	6.40	6.20	6.34	7.04	6.51
802.11n	16QAM	162.0 / 180.0	5.84	6.52	6.24	6.40	6.77	6.54
802.11n	64QAM	216.0 / 240.0	5.90	6.12	6.41	6.64	7.00	6.76
802.11n	64QAM	243.0 / 270.0	4.06	4.39	4.45	4.88	5.04	4.86
802.11n	64QAM	270.0 / 300.0	3.10	3.38	3.65	3.79	4.10	3.85

(Tables continues)

Copyright © 2013 TCC Nokia

(Tables continues)

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 20 MHz channel bandwidth: Measured values					
			116	120	124	128	132	136
802.11a	BPSK	6	9.57	9.82	10.00	9.99	9.63	9.63
802.11a	BPSK	9	8.68	8.94	9.07	9.14	8.26	8.77
802.11a	QPSK	12	8.74	9.00	9.16	9.16	8.79	8.80
802.11a	QPSK	18	8.77	9.07	9.24	9.27	8.49	8.84
802.11a	16QAM	24	9.01	9.26	9.42	9.52	9.05	8.56
802.11a	16QAM	36	9.53	9.49	9.60	9.91	8.75	8.91
802.11a	64QAM	48	8.66	8.51	9.00	8.61	8.30	8.25
802.11a	64QAM	54	8.97	8.53	8.50	8.72	8.32	8.29
802.11n	BPSK	6.5 / 7.25	9.40	9.64	9.82	9.87	9.04	8.98
802.11n	QPSK	13.0 / 14.4	8.59	8.86	9.00	9.06	8.21	8.17
802.11n	QPSK	19.5 / 21.7	8.70	8.90	9.12	9.17	8.82	8.77
802.11n	16QAM	26.0 / 28.9	9.00	9.34	9.35	9.47	8.62	9.03
802.11n	16QAM	39.0 / 43.3	9.00	9.39	9.56	9.61	8.69	8.68
802.11n	64QAM	52.0 / 57.8	9.01	9.34	9.63	9.75	8.78	8.93
802.11n	64QAM	58.5 / 65.0	8.32	8.53	8.46	8.52	8.18	8.10
802.11n	64QAM	65.0 / 72.2	8.34	8.58	8.59	8.62	8.27	8.18
802.11ac	256QAM	78.0 / 86.7	-	-	-	-	-	-
802.11n	BPSK	13.0 / 14.4	9.40	9.64	9.82	9.87	9.04	8.98
802.11n	QPSK	26.0 / 28.9	8.59	8.86	9.00	9.06	8.21	8.17
802.11n	QPSK	39.0 / 43.3	8.70	8.90	9.12	9.17	8.82	8.77
802.11n	16QAM	52.0 / 57.8	9.00	9.34	9.35	9.47	8.62	9.03
802.11n	16QAM	78.0 / 86.7	9.00	9.39	9.56	9.61	8.69	8.68
802.11n	64QAM	104.0 / 115.6	9.01	9.34	9.63	9.75	8.78	8.93
802.11n	64QAM	117.0 / 130.0	8.32	8.53	8.46	8.52	8.18	8.10
802.11n	64QAM	130.0 / 144.4	8.34	8.58	8.59	8.62	8.27	8.18

Copyright © 2013 TCC Nokia

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 40 MHz channel bandwidth: Measured values			
			126 (124+128)	130 (128+132)	134 (132+136)	138 (136+140)
802.11n	BPSK	13.5 / 15.0	9.54	9.55	9.14	9.10
802.11n	QPSK	27.0 / 30.0	7.57	7.59	7.42	7.32
802.11n	QPSK	40.5 / 45.0	7.70	7.62	7.49	7.43
802.11n	16QAM	54.0 / 60.0	6.48	6.50	6.51	6.54
802.11n	16QAM	81.0 / 90.0	6.65	6.72	6.71	6.61
802.11n	64QAM	108.0 / 120.0	6.87	6.78	6.86	6.76
802.11n	64QAM	121.5 / 135.0	4.94	5.00	4.96	4.95
802.11n	64QAM	135.0 / 150.0	3.91	4.00	4.08	4.03
802.11ac	256QAM	351 / 390	-	-	-	-
802.11ac	256QAM	390 / 433.3	-	-	-	-
802.11n	BPSK	27.0 / 30.0	9.54	9.55	9.14	9.10
802.11n	QPSK	54.0 / 60.0	7.57	7.59	7.42	7.32
802.11n	QPSK	81.0 / 90.0	7.70	7.62	7.49	7.43
802.11n	16QAM	108.0 / 120.0	6.48	6.50	6.51	6.54
802.11n	16QAM	162.0 / 180.0	6.65	6.72	6.71	6.61
802.11n	64QAM	216.0 / 240.0	6.87	6.78	6.86	6.76
802.11n	64QAM	243.0 / 270.0	4.94	5.00	4.96	4.95
802.11n	64QAM	270.0 / 300.0	3.91	4.00	4.08	4.03

(Tables continues)

Copyright © 2013 TCC Nokia

(Tables continues)

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 20 MHz channel bandwidth: Measured values					
			140	149	153	157	161	165
802.11a	BPSK	6	9.47	9.13	8.98	9.31	9.29	8.72
802.11a	BPSK	9	8.62	8.34	8.11	8.43	8.24	7.70
802.11a	QPSK	12	8.62	8.33	8.17	8.44	8.31	7.62
802.11a	QPSK	18	8.28	8.39	8.24	8.49	8.37	7.61
802.11a	16QAM	24	8.53	8.63	8.44	8.72	8.60	7.84
802.11a	16QAM	36	8.88	8.94	8.95	9.14	8.94	8.32
802.11a	64QAM	48	8.12	7.90	7.55	8.43	8.26	7.45
802.11a	64QAM	54	8.09	7.90	7.53	8.73	8.15	7.22
802.11n	BPSK	6.5 / 7.25	9.31	8.94	8.78	9.14	8.91	8.18
802.11n	QPSK	13.0 / 14.4	8.10	8.24	8.02	8.29	8.14	7.40
802.11n	QPSK	19.5 / 21.7	8.18	7.87	8.09	8.37	8.25	7.51
802.11n	16QAM	26.0 / 28.9	8.86	8.51	8.28	8.69	8.49	7.77
802.11n	16QAM	39.0 / 43.3	8.60	8.59	8.47	8.83	8.67	7.89
802.11n	64QAM	52.0 / 57.8	8.93	8.97	8.90	8.67	9.10	8.32
802.11n	64QAM	58.5 / 65.0	7.98	7.88	7.48	7.93	7.96	7.11
802.11n	64QAM	65.0 / 72.2	7.99	7.89	7.85	7.83	8.05	7.14
802.11ac	256QAM	78.0 / 86.7	-	-	-	-	-	-
802.11n	BPSK	13.0 / 14.4	9.31	8.94	8.78	9.14	8.91	8.18
802.11n	QPSK	26.0 / 28.9	8.10	8.24	8.02	8.29	8.14	7.40
802.11n	QPSK	39.0 / 43.3	8.18	7.87	8.09	8.37	8.25	7.51
802.11n	16QAM	52.0 / 57.8	8.86	8.51	8.28	8.69	8.49	7.77
802.11n	16QAM	78.0 / 86.7	8.60	8.59	8.47	8.83	8.67	7.89
802.11n	64QAM	104.0 / 115.6	8.93	8.97	8.90	8.67	9.10	8.32
802.11n	64QAM	117.0 / 130.0	7.98	7.88	7.48	7.93	7.96	7.11
802.11n	64QAM	130.0 / 144.4	7.99	7.89	7.85	7.83	8.05	7.14

Copyright © 2013 TCC Nokia

Standard	Modulation	Data speed [MBPS]	RLAN 5 GHz / 40 MHz channel bandwidth: Measured values			
			151 (149+153)	155 (153+157)	159 (157+161)	163 (161+165)
802.11n	BPSK	13.5 / 15.0	9.10	8.90	8.81	8.46
802.11n	QPSK	27.0 / 30.0	6.85	7.14	7.07	6.81
802.11n	QPSK	40.5 / 45.0	6.97	7.24	6.63	6.86
802.11n	16QAM	54.0 / 60.0	5.88	5.73	5.61	5.45
802.11n	16QAM	81.0 / 90.0	6.04	5.86	5.81	5.56
802.11n	64QAM	108.0 / 120.0	6.16	6.03	5.79	5.73
802.11n	64QAM	121.5 / 135.0	4.38	4.40	4.20	4.11
802.11n	64QAM	135.0 / 150.0	3.45	3.45	3.32	3.10
802.11ac	256QAM	351 / 390	-	-	-	-
802.11ac	256QAM	390 / 433.3	-	-	-	-
802.11n	BPSK	27.0 / 30.0	9.10	8.90	8.81	8.46
802.11n	QPSK	54.0 / 60.0	6.85	7.14	7.07	6.81
802.11n	QPSK	81.0 / 90.0	6.97	7.24	6.63	6.86
802.11n	16QAM	108.0 / 120.0	5.88	5.73	5.61	5.45
802.11n	16QAM	162.0 / 180.0	6.04	5.86	5.81	5.56
802.11n	64QAM	216.0 / 240.0	6.16	6.03	5.79	5.73
802.11n	64QAM	243.0 / 270.0	4.38	4.40	4.20	4.11
802.11n	64QAM	270.0 / 300.0	3.45	3.45	3.32	3.10

Copyright © 2013 TCC Nokia

APPENDIX J: SAR EXCLUSION THRESHOLD CALCULATIONS

Copyright © 2013 TCC Nokia

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

[(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] · [$\sqrt{f_{(GHz)}}$] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,[24] where

- $f_{(GHz)}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation[25]
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum *test separation distance* is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

2) At 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following, and as illustrated in Appendix B:[26]

a) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·($f_{(MHz)}$/150)] mW, at 100 MHz to 1500 MHz

b) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

Multislot worst case:

Band	Radio Mode	Slots	Target	tuning tolerai	mW conv	time-averaged	Max
850	GSM/GPRS	1	32.5	**32.85**	1927.5	240.9	271.6
		2	30	**30.35**	1083.9	271.0	
		3	28.2	**28.55**	716.1	268.6	
		4	27	**27.35**	543.3	271.6	

Band	Radio Mode	Slots	Target	tuning tolerai	mW conv	time-averaged	
1900	GSM/GPRS	1	30	**30.35**	1083.9	135.5	136.1
		2	27	**27.35**	543.3	135.8	
		3	25.2	**25.55**	358.9	134.6	
		4	24	**24.35**	272.3	136.1	

Cellular:

Radio Mode	Band	Target	Upper limit of tuning tolerance (+0.35 dB)	mW conv	time-averaged	Hi Ch Tx freq Ghz	Top Edge to Cellular Main Separation distance mm	Greater than 3 = SAR test Exclusion result	SAR test	Power[mW] <= 3*distance[mm]/ sqrt(f[GHz]) Threshold at 50mm
GSM/GPRS	850	-	-	271.6	271.6	0.8488	33.97	7.4	YES	162.8
	1900	-	-	136.1	136.1	1.9098	33.97	5.5	YES	108.5
WCDMA	B2	23.5	23.85	242.7	242.7	1.9076	33.97	9.9	YES	108.6
	B4	N/A	N/A	N/A	N/A	1.7526	33.97	N/A	N/A	113.3
	B5	23.5	23.85	242.7	242.7	0.8466	33.97	6.6	YES	163.0
LTE	B2	N/A	N/A	N/A	N/A	1.900	33.97	N/A	N/A	108.8
	B4	N/A	N/A	N/A	N/A	1.745	33.97	N/A	N/A	113.6
	B5	N/A	N/A	N/A	N/A	0.844	33.97	N/A	N/A	163.3
	B13	N/A	N/A	N/A	N/A	0.782	33.97	N/A	N/A	169.6
	B17	N/A	N/A	N/A	N/A	0.711	33.97	N/A	N/A	177.9

Radio Mode	Band	Target	Upper limit of tuning tolerance (+0.35 dB)	mW conv	time-averaged	Low Ch Tx freq Mhz	Bottom Edge to Cellular Main Separation distance mm	Threshold at 50mm	Distance -50mm	f (Mhz) / 150	Exclusion threshold [mW]	Tx pwr > Threshold = SAR Power - Threshold	SAR test
GSM/GPRS	850	-	-	271.6	271.6	824.2	58.97	162.8	8.97	5.5	212.1	59.5	YES
	1900	-	-	136.1	136.1	1850.2	58.97	108.5	8.97	-	198.2	-62.1	NO
WCDMA	B2	23.5	23.85	242.7	242.7	1852.4	58.97	108.6	8.97	-	198.3	44.4	YES
	B4	N/A	N/A	N/A	N/A	1712.4	58.97	113.3	8.97	-	203.0	N/A	N/A
	B5	23.5	23.85	242.7	242.7	826.4	58.97	163.0	8.97	5.5	212.4	30.2	YES
LTE	B2	N/A	N/A	N/A	N/A	1860.0	58.97	108.8	8.97	-	198.5	N/A	N/A
	B4	N/A	N/A	N/A	N/A	1720.0	58.97	113.6	8.97	-	203.3	N/A	N/A
	B5	N/A	N/A	N/A	N/A	829.0	58.97	163.3	8.97	5.5	212.8	N/A	N/A
	B13	N/A	N/A	N/A	N/A	782.0	58.97	169.6	8.97	5.2	216.4	N/A	N/A
	B17	N/A	N/A	N/A	N/A	709.0	58.97	177.9	8.97	4.7	220.3	N/A	N/A

Radio Mode	Band	Target	Upper limit of tuning tolerance (+0.35 dB)	mW conv	time-averaged	Low Ch Tx freq Mhz	Right Edge to Cellular Main Separation distance mm	Threshold at 50mm	Distance -50mm	f (Mhz) / 150	Exclusion threshold [mW]	Tx pwr > Threshold = SAR Power - Threshold	SAR test
GSM/GPRS	850	-	-	271.6	271.6	824.2	249.7	162.8	199.7	5.5	1260.1	-988.5	NO
	1900	-	-	136.1	136.1	1850.2	249.7	108.5	199.7	-	2105.5	-1969.4	NO
WCDMA	B2	23.5	23.85	242.7	242.7	1852.4	249.7	108.6	199.7	-	2105.6	-1862.9	NO
	B4	N/A	N/A	N/A	N/A	1712.4	249.7	113.3	199.7	-	2110.3	N/A	N/A
	B5	23.5	23.85	242.7	242.7	826.4	249.7	163.0	199.7	5.5	1263.2	-1020.6	NO
LTE	B2	N/A	N/A	N/A	N/A	1860.0	249.7	108.8	199.7	-	2105.8	N/A	N/A
	B4	N/A	N/A	N/A	N/A	1720.0	249.7	113.6	199.7	-	2110.6	N/A	N/A
	B5	N/A	N/A	N/A	N/A	829.0	249.7	163.3	199.7	5.5	1267.0	N/A	N/A
	B13	N/A	N/A	N/A	N/A	782.0	249.7	169.6	199.7	5.2	1210.7	N/A	N/A
	B17	N/A	N/A	N/A	N/A	709.0	249.7	177.9	199.7	4.7	1121.8	N/A	N/A

WLAN:		WiFi Power Setting					WLAN Main and aux to bottom edge Separation distance mm	Greater than 3 = SAR test Exclusion result	SAR Test	Power[mW] <= 3*distance[mm]/ sqrt(f[GHz]) Threshold at 50mm
	Band	Target	Upper limit of tuning tolerance (+1.5 dB)	mW conv	time-averaged	Hi Ch Tx freq Ghz				
802.11	2.4GHz	13	14.5	28.2	28.2	2.462	5	8.8	YES	95.6
	5GHz	9.5	11	12.6	12.6	5.805	5	6.1	YES	62.3

WLAN		WiFi Power Setting					WLAN Main and Aux to top edge Separation distance mm	Threshold at 50mm	Distance - 50mm	Tx pwr > Threshold = SAR Exclusion threshold [mW]	Power - Threshold	SAR test
	Band	Target	Upper limit of tuning tolerance (+1.5 dB)	mW conv	time-averaged	Low Ch Tx freq Mhz						
802.11	2.4GHz	13	14.5	28.2	28.2	2412	156.2	95.6	106.2	1157.6	-1129.4	NO
	5GHz	9.5	11	12.6	12.6	5200	156.2	62.3	106.2	1124.3	-1111.7	NO

WLAN		WiFi Power Setting					WLAN main to right edge and WLAN Aux to left edge Separation distance mm	Threshold at 50mm	Distance - 50mm	Tx pwr > Threshold = SAR Exclusion threshold [mW]	Power - Threshold	SAR test
	Band	Target	Upper limit of tuning tolerance (+1.5 dB)	mW conv	time-averaged	Low Ch Tx freq Mhz						
802.11	2.4GHz	13	14.5	28.2	28.2	2412	69.9	95.6	19.9	294.6	-266.4	NO
	5GHz	9.5	11	12.6	12.6	5200	69.9	62.3	19.9	261.3	-248.7	NO

WLAN		WiFi Power Setting					WLAN main to left edge and WLAN aux to right edge Separation distance mm	Threshold at 50mm	Distance - 50mm	Tx pwr > Threshold = SAR Exclusion threshold [mW]	Power - Threshold	SAR test
	Band	Target	Upper limit of tuning tolerance (+1.5 dB)	mW conv	time-averaged	Low Ch Tx freq Mhz						
802.11	2.4GHz	13	14.5	28.2	28.2	2412	174.2	95.6	124.2	1337.6	-1309.4	NO
	5GHz	9.5	11	12.6	12.6	5200	174.2	62.3	124.2	1304.3	-1291.7	NO

with SU-42 in tablet mode

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

   [(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] · [$\sqrt{f_{(GHz)}}$] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,[24] where

   - $f_{(GHz)}$ is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation[25]
   - The result is rounded to one decimal place for comparison
   - 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

   The test exclusions are applicable only when the minimum *test separation distance* is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

2) At 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following, and as illustrated in Appendix B:[26]

   a) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·($f_{(MHz)}$/150)] mW, at 100 MHz to 1500 MHz

   b) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

Multislot worst case:

Band	Radio Mode	Slots	Target	tuning tolera	mW conv	time-averaged	Max
850	GSM/GPRS	1	32.5	**32.85**	1927.5	240.9	271.6
		2	30	**30.35**	1083.9	271.0	
		3	28.2	**28.55**	716.1	268.6	
		4	27	**27.35**	543.3	271.6	

Band	Radio Mode	Slots	Target	tuning tolera	mW conv	time-averaged	
1900	GSM/GPRS	1	30	**30.35**	1083.9	135.5	136.1
		2	27	**27.35**	543.3	135.8	
		3	25.2	**25.55**	358.9	134.6	
		4	24	**24.35**	272.3	136.1	

Cellular:

Radio Mode	Band	Target	Upper limit of tuning tolerance (+0.35 dB)	mW conv	time-averaged	Hi Ch Tx freq Ghz	Back facing to Cellular Main Separation distance mm	Greater than 3 = SAR test Exclusion result	SAR test	Power[mW] <= 3*distance[mm]/ sqrt(f[GHz]) Threshold at 50mm
GSM/GPRS	850	-	-	271.6	271.6	0.8488	24.72	10.1	YES	162.8
	1900	-	-	136.1	136.1	1.9098	24.72	7.6	YES	108.5
WCDMA	B2	23.5	23.85	242.7	242.7	1.9076	24.72	13.6	YES	108.6
	B4	N/A	N/A	N/A	N/A	1.7526	24.72	N/A	N/A	113.3
	B5	23.5	23.85	242.7	242.7	0.8466	24.72	9.0	YES	163.0
LTE	B2	N/A	N/A	N/A	N/A	1.900	24.72	N/A	N/A	108.8
	B4	N/A	N/A	N/A	N/A	1.745	24.72	N/A	N/A	113.6
	B5	N/A	N/A	N/A	N/A	0.844	24.72	N/A	N/A	163.3
	B13	N/A	N/A	N/A	N/A	0.782	24.72	N/A	N/A	169.6
	B17	N/A	N/A	N/A	N/A	0.711	24.72	N/A	N/A	177.9

Radio Mode	Band	Target	Upper limit of tuning tolerance (+0.35 dB)	mW conv	time-averaged	Low Ch Tx freq Mhz	Bottom Edge to Cellular Main Separation distance mm	Threshold at 50mm	Distance -50mm	f (Mhz) / 150	Exclusion threshold [mW]	Tx pwr > Threshold = SAR Power - Threshold	SAR test
GSM/GPRS	850	-	-	271.6	271.6	824.2	124.2	162.8	74.2	5.5	570.5	-298.9	NO
	1900	-	-	136.1	136.1	1850.2	124.2	108.5	74.2	-	850.5	-714.4	NO
WCDMA	B2	23.5	23.85	242.7	242.7	1852.4	124.2	108.6	74.2	-	850.6	-607.9	NO
	B4	N/A	N/A	N/A	N/A	1712.4	124.2	113.3	74.2	-	855.3	N/A	N/A
	B5	23.5	23.85	242.7	242.7	826.4	124.2	163.0	74.2	5.5	571.8	-329.2	NO
LTE	B2	N/A	N/A	N/A	N/A	1860.0	124.2	108.8	74.2	-	850.8	N/A	N/A
	B4	N/A	N/A	N/A	N/A	1720.0	124.2	113.6	74.2	-	855.6	N/A	N/A
	B5	N/A	N/A	N/A	N/A	829.0	124.2	163.3	74.2	5.5	573.4	N/A	N/A
	B13	N/A	N/A	N/A	N/A	782.0	124.2	169.6	74.2	5.2	556.5	N/A	N/A
	B17	N/A	N/A	N/A	N/A	709.0	124.2	177.9	74.2	4.7	528.6	N/A	N/A

Radio Mode	Band	Target	Upper limit of tuning tolerance (+0.35 dB)	mW conv	time-averaged	Low Ch Tx freq Mhz	Right Edge to Cellular Main Separation distance mm	Threshold at 50mm	Distance -50mm	f (Mhz) / 150	Exclusion threshold [mW]	Tx pwr > Threshold = SAR Power - Threshold	SAR test
GSM/GPRS	850	-	-	271.6	271.6	824.2	249.7	162.8	199.7	5.5	1260.1	-988.5	NO
	1900	-	-	136.1	136.1	1850.2	249.7	108.5	199.7	-	2105.5	-1969.4	NO
WCDMA	B2	23.5	23.85	242.7	242.7	1852.4	249.7	108.6	199.7	-	2105.6	-1862.9	NO
	B4	N/A	N/A	N/A	N/A	1712.4	249.7	113.3	199.7	-	2110.3	N/A	N/A
	B5	23.5	23.85	242.7	242.7	826.4	249.7	163.0	199.7	5.5	1263.2	-1020.6	NO
LTE	B2	N/A	N/A	N/A	N/A	1860.0	249.7	108.8	199.7	-	2105.8	N/A	N/A
	B4	N/A	N/A	N/A	N/A	1720.0	249.7	113.6	199.7	-	2110.6	N/A	N/A
	B5	N/A	N/A	N/A	N/A	829.0	249.7	163.3	199.7	5.5	1267.0	N/A	N/A
	B13	N/A	N/A	N/A	N/A	782.0	249.7	169.6	199.7	5.2	1210.7	N/A	N/A
	B17	N/A	N/A	N/A	N/A	709.0	249.7	177.9	199.7	4.7	1121.8	N/A	N/A

WLAN:		WiFi Power Setting					WLAN Main and aux to back facing Separation distance mm	Greater than 3 = SAR test Exclusion result	SAR Test	Power[mW] <= 3*distance[mm]/ sqrt(f[GHz]) Threshold at 50mm
	Band	Target	Upper limit of tuning tolerance (+1.5 dB)	mW conv	time-averaged	Hi Ch Tx freq Ghz				
802.11	2.4GHz	13	14.5	28.2	28.2	2.462	15	2.9	NO	95.6
	5GHz	9.5	11	12.6	12.6	5.805	15	2.0	NO	62.3

WLAN:		WiFi Power Setting					WLAN Main and aux to bottom edge Separation distance mm	Greater than 3 = SAR test Exclusion result	SAR Test	Power[mW] <= 3*distance[mm]/ sqrt(f[GHz]) Threshold at 50mm
	Band	Target	Upper limit of tuning tolerance (+1.5 dB)	mW conv	time-averaged	Hi Ch Tx freq Ghz				
802.11	2.4GHz	13	14.5	28.2	28.2	2.462	124.2	0.4	NO	95.6
	5GHz	9.5	11	12.6	12.6	5.805	124.2	0.2	NO	62.3

WLAN		WiFi Power Setting					WLAN Main and Aux to top edge Separation distance mm	Threshold at 50mm	Distance - 50mm	Tx pwr > Threshold = SAR Exclusion threshold [mW]	Power - Threshold	SAR test
	Band	Target	Upper limit of tuning tolerance (+1.5 dB)	mW conv	time-averaged	Low Ch Tx freq Mhz						
802.11	2.4GHz	13	14.5	28.2	28.2	2412	156.2	95.6	106.2	1157.6	-1129.4	NO
	5GHz	9.5	11	12.6	12.6	5200	156.2	62.3	106.2	1124.3	-1111.7	NO

WLAN		WiFi Power Setting					WLAN main to right edge and WLAN Aux to left edge Separation distance mm	Threshold at 50mm	Distance - 50mm	Tx pwr > Threshold = SAR Exclusion threshold [mW]	Power - Threshold	SAR test
	Band	Target	Upper limit of tuning tolerance (+1.5 dB)	mW conv	time-averaged	Low Ch Tx freq Mhz						
802.11	2.4GHz	13	14.5	28.2	28.2	2412	69.9	95.6	19.9	294.6	-266.4	NO
	5GHz	9.5	11	12.6	12.6	5200	69.9	62.3	19.9	261.3	-248.7	NO

WLAN		WiFi Power Setting					WLAN main to left edge and WLAN aux to right edge Separation distance mm	Threshold at 50mm	Distance - 50mm	Tx pwr > Threshold = SAR Exclusion threshold [mW]	Power - Threshold	SAR test
	Band	Target	Upper limit of tuning tolerance (+1.5 dB)	mW conv	time-averaged	Low Ch Tx freq Mhz						
802.11	2.4GHz	13	14.5	28.2	28.2	2412	174.2	95.6	124.2	1337.6	-1309.4	NO
	5GHz	9.5	11	12.6	12.6	5200	174.2	62.3	124.2	1304.3	-1291.7	NO

with SU-42 in laptop mode

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

   [(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] · [$\sqrt{f_{(GHz)}}$] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,[24] where

   - $f_{(GHz)}$ is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation[25]
   - The result is rounded to one decimal place for comparison
   - 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

   The test exclusions are applicable only when the minimum *test separation distance* is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

2) At 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following, and as illustrated in Appendix B:[26]

   a) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·($f_{(MHz)}$/150)] mW, at 100 MHz to 1500 MHz

   b) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

Multislot worst case:

Band	Radio Mode	Slots	Target	tuning tolerar	mW conv	time-averaged	Max
850	GSM/GPRS	1	32.5	**32.85**	1927.5	240.9	271.6
		2	30	**30.35**	1083.9	271.0	
		3	28.2	**28.55**	716.1	268.6	
		4	27	**27.35**	543.3	271.6	

Band	Radio Mode	Slots	Target	tuning tolerar	mW conv	time-averaged	
1900	GSM/GPRS	1	30	**30.35**	1083.9	135.5	136.1
		2	27	**27.35**	543.3	135.8	
		3	25.2	**25.55**	358.9	134.6	
		4	24	**24.35**	272.3	136.1	

Cellular:

Radio Mode	Band	Target	Upper limit of tuning tolerance (+0.35 dB)	mW conv	time-averaged	Low Ch Tx freq Mhz	Bottom Edge to Cellular Main Separation distance mm	Threshold at 50mm	Distance -50mm	f (Mhz) / 150	Exclusion threshold [mW]	Tx pwr > Threshold = SAR Power - Threshold	SAR test
GSM/GPRS	850	-	-	271.6	271.6	824.2	67.76	162.8	17.76	5.5	260.4	11.2	YES
	1900	-	-	136.1	136.1	1850.2	67.76	108.5	17.76	-	286.1	-150.0	NO
WCDMA	B2	23.5	23.85	242.7	242.7	1852.4	67.76	108.6	17.76	-	286.2	-43.5	NO
	B4	N/A	N/A	N/A	N/A	1712.4	67.76	113.3	17.76	-	290.9	N/A	N/A
	B5	23.5	23.85	242.7	242.7	826.4	67.76	163.0	17.76	5.5	260.9	-18.2	NO
LTE	B2	N/A	N/A	N/A	N/A	1860.0	67.76	108.8	17.76	-	286.4	N/A	N/A
	B4	N/A	N/A	N/A	N/A	1720.0	67.76	113.6	17.76	-	291.2	N/A	N/A
	B5	N/A	N/A	N/A	N/A	829.0	67.76	163.3	17.76	5.5	261.4	N/A	N/A
	B13	N/A	N/A	N/A	N/A	782.0	67.76	169.6	17.76	5.2	262.2	N/A	N/A
	B17	N/A	N/A	N/A	N/A	709.0	67.76	177.9	17.76	4.7	261.8	N/A	N/A

WLAN:		WiFi Power Setting				WLAN Main and aux to bottom edge	Greater than 3 = SAR test	
	Band	Target	Upper limit of tuning tolerance (+1.5 dB)	mW conv	time-averaged	Hi Ch Tx freq Ghz	Separation distance mm	Exclusion result	SAR Test
802.11	2.4GHz	13	14.5	28.2	28.2	2.462	16.14	2.7	NO
	5GHz	9.5	11	12.6	12.6	5.805	16.14	1.9	NO

Power[mW] <= 3*distance[mm]/ sqrt(f[GHz])

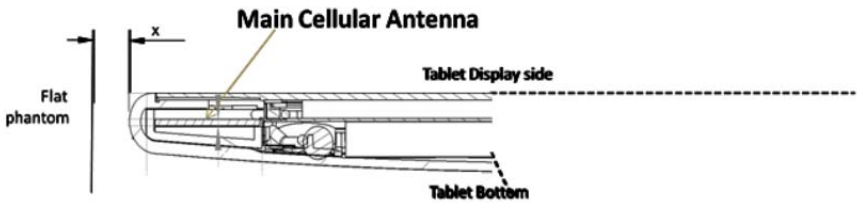
Threshold at 50mm
95.6
62.3

APPENDIX K: PROXIMITY SENSOR TEST RESULTS

Copyright © 2013 TCC Nokia

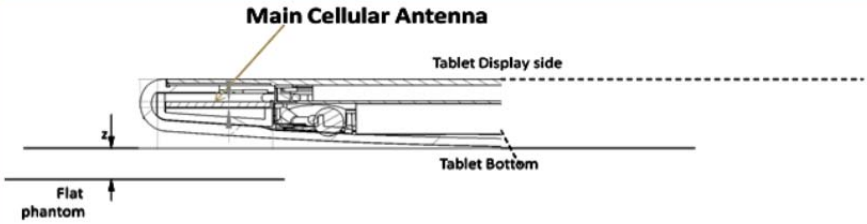
○ P-sensor on × P-Sensor Off

B1.0 P-Sensor Trigger Distance

	Test Condition
1 away from left edge	

X (mm)																									
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	X
26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
X	X	X	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	X
26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
X	X	X	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O

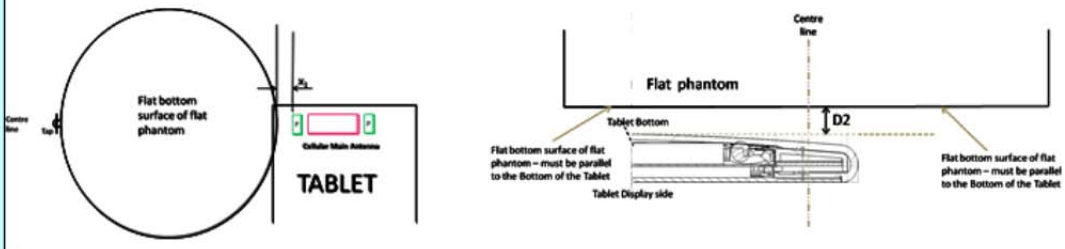
○ P-sensor on × P-Sensor Off

	Test Condition
2 away from back surface	

Z (mm) [D2=Zmin-1]																										
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X
26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
X	X	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X
26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
X	X	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O

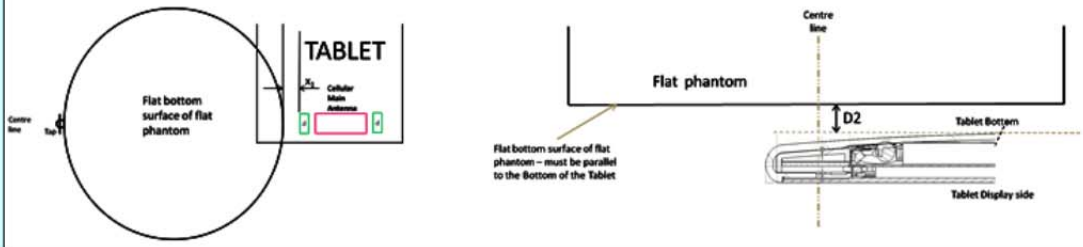
Copyright © 2013 TCC Nokia

○ P-sensor on × P-Sensor Off

	Test Condition
1a	

Frequency (MHz)	X1 (mm)																																															
850	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20							
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X							
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20							
	X	X	X	X	X	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
1900	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20							
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X							
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20							
	X	X	X	X	X	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							

○ P-sensor on × P-Sensor Off

	Test Condition
1b	

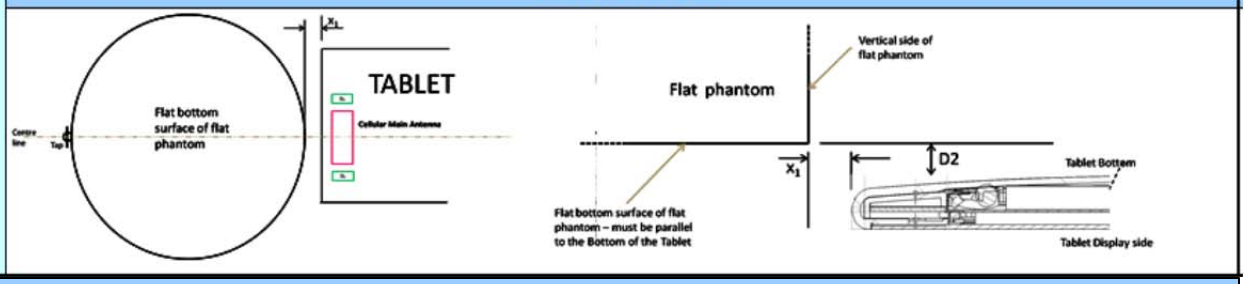
Frequency (MHz)	X1 (mm)																																															
850	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20							
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X	X	X	X	X	X	X	X	X	X							
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20							
	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
1900	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20							
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X	X	X	X	X	X	X	X	X	X							
	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15							
	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							

Copyright © 2013 TCC Nokia

○ P-sensor on × P-Sensor Off

2a

Test Condition

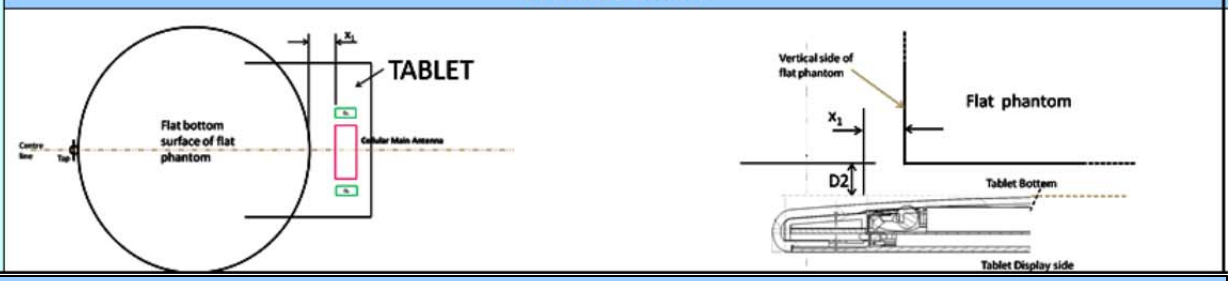


Frequency (MHz)	X1 (mm)																																																			
850	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X	X	X	X	X
	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15
	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1900	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X	X	X	X	X
	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15
	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

○ P-sensor on × P-Sensor Off

2b

Test Condition

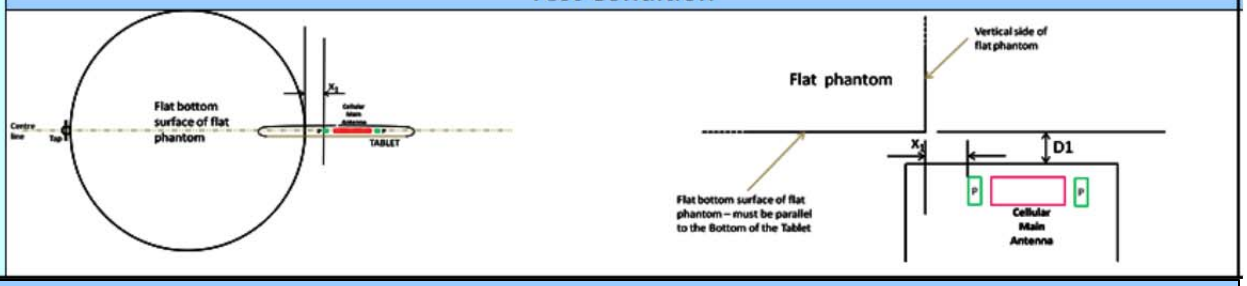


Frequency (MHz)	X1 (mm)																																																			
850	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X	X	X	X	X
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20
	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1900	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X	X	X	X	X
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20
	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Copyright © 2013 TCC Nokia

○ P-sensor on × P-Sensor Off

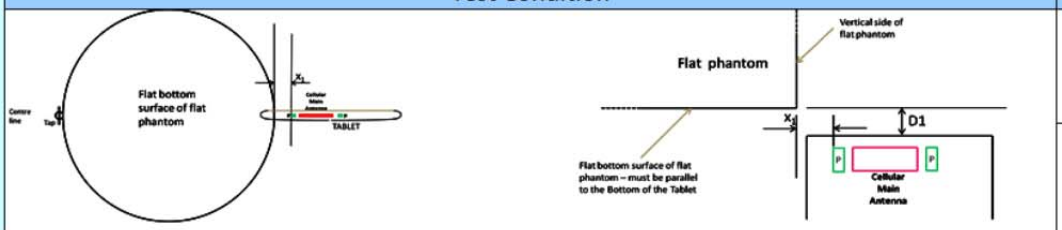
3a	Test Condition



Frequency (MHz)	X1 (mm)																																																	
850	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1900	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

○ P-sensor on × P-Sensor Off

3b	Test Condition	Frequency (MHz)
		850
		1900



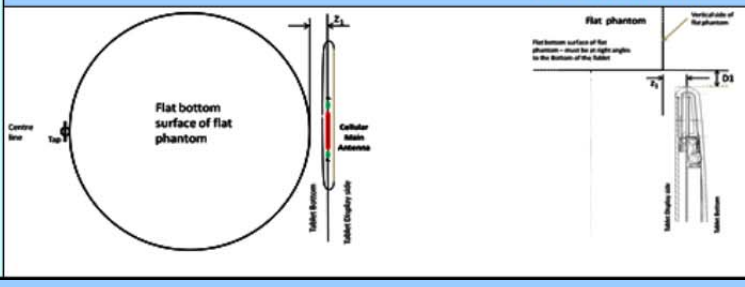
Frequency (MHz)	X1 (mm)																																																	
850	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20
	X	X	X	X	X	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1900	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20
	X	X	X	X	X	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Copyright © 2013 TCC Nokia

○ P-sensor on × P-Sensor Off

4a

Test Condition

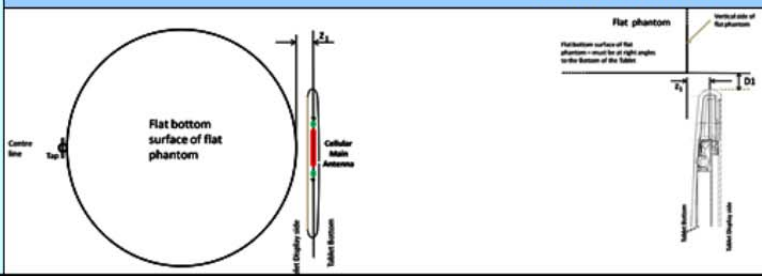


Frequency (MHz)	Z1 (mm)																																																			
850	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20					
	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
1900	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20					
	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					

○ P-sensor on × P-Sensor Off

4b

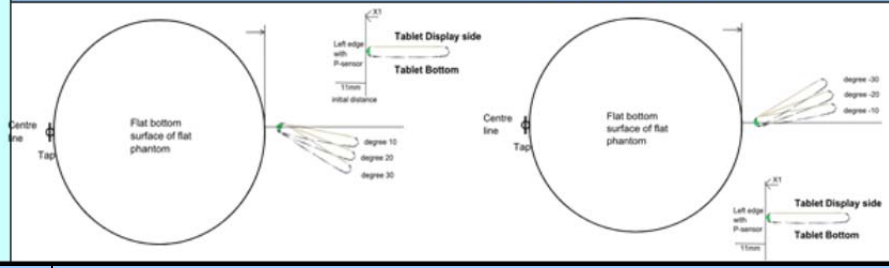
Test Condition



Frequency (MHz)	Z1 (mm)																																																			
850	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20					
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X					
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20					
	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
1900	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20					
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X					
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20					
	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					

Copyright © 2013 TCC Nokia

○ P-sensor on × P-Sensor Off

	Test Condition
5 +/- 45 degree	

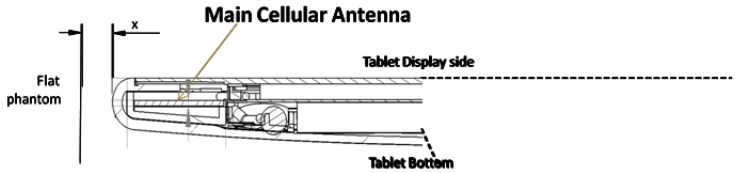
Frequency (MHz)	X (mm) [D1=Xmin-2]																			
		-45	-40	-30	-20	-10	0	10	20	30	40	45								
	18mm	O	O	O	O	O	O	O	O	O	O	O								
	19mm	O	O	O	O	O	O	O	O	O	O	O								
	20mm	O	O	O	O	O	O	O	O	O	O	O								
	21mm	O	O	O	O	O	O	O	O	O	O	O								
	22mm	O	O	O	O	O	O	O	O	O	O	O								
	23mm	X	O	O	O	O	O	O	O	O	O	X								

Copyright © 2013 TCC Nokia

with SU-42 Smart cover

○ P-sensor on × P-Sensor Off

B1.0 P-Sensor Trigger Distance

	Test Condition	Frequency (MHz)
1 away from left edge		850
		1900

Frequency (MHz)	X (mm)																										
850	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	x	x	x	x	x
	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	x	x	x	x	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
1900	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	x	x	x	x	x
	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	x	x	x	x	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o

Copyright © 2013 TCC Nokia