Sony Ericsson

Company Internal
REPORT

Prepared (also subject responsible if other)		No.		
BA/SEMC/CVVBAU Robert Carr		*CVVA10:329.*		
Approved	Checked	Date	Rev	Reference
BA/SEMC/CVVBAU Jon Kenny	JK	*100804*	A	File

Report issued by Accredited SAR Laboratory

for

FCC ID: PY7A3880096

IC: 4170B-A3880096

Date of test: 2010-07-23 to 2010-08-02

Laboratory:
Sony Ericsson SAR Test Laboratory
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Jon Kenny

Statement of Compliance

Sony Ericsson Mobile Communications AB declares under its sole responsibility that the product

Sony Ericsson Type AAD-3880096-BV; FCC ID PY7A3880096; IC 4170B-A3880096

to which this declaration relates, is in conformity with the appropriate RF exposure standards recommendations and guidelines. It also declares that the product was tested in accordance with the appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:

(None)

This laboratory is accredited to ISO/IEC 17025 (SWEDAC accreditation no. 1847).

SWEDAC ACKREDITERING 1847 ISO/IEC 17025

Sony Ericsson

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Table of contents

Sony Ericsson

Company Internal
REPORT

Prepared (also subject responsible if other)		No.		
BA/SEMC/CVVBAU Robert Carr		*CVVA10:329.*		
Approved	Checked	Date	Rev	Reference
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1 Introduction

In this test report, compliance of the Sony Ericsson FCC ID: PY7A3880096 (J108a) portable telephone with RF safety guidelines is demonstrated. The applicable RF safety guidelines and the SAR measurement specifications used for the test are described in the SAR Measurement Specifications of Wireless Handsets [1].

2 Customer details

Company Name:	Sony Ericsson Mobile China
Address:	Beijing, 100102 China
Contact Name:	David Zhao

3 Device Under Test

3.1 Antenna Description

Type	Internal antenna	
Location	Bottom of the phone	
Main and BT antennas distance	65 mm	
Dimensions	Max length	14 mm
	Max width	37 mm
Configuration	Monopole	

Sony Ericsson

Company Internal
REPORT

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3.2 Device Description

Device model	AAD-3880096-BV					
Market name	J108a					
Serial number (EUT #)	BX901Y3EVT (#18760) BX901Y3ETC (#18761)					
Mode	GSM 850			GSM 1900		
Crest factor	8.3			8.3		
Multiple access scheme	TDMA			TDMA		
Channel No.	128	190	251	512	661	885
Measured Power Level [dBm] [1] **(#18760)**	33,3	33,4	33,4	30,0	29,8	29,8
Product Maximum power Level [dBm][1]	33,5	33,5	33,5	30,0	30,0	30,0
Data mode	GPRS			GPRS		
Crest factor	4.15 (2Tx)			4.15 (2Tx)		
Measured Power Level [dBm] [1] **(#18761)**	30,4	30,4	30,4	26,8	26,8	26,9
Product Maximum power Level [dBm][1]	30,5	30,5	30,5	27,0	27,0	27,0
Data mode	EDGE			EDGE		
Crest factor	4.15 (2Tx)			4.15 (2Tx)		
Measured Power Level [dBm] [1] **(#18761)**	27,8	27,8	27,8	26,9	26,9	26,9
Product Maximum power Level [dBm][1]	28,0	28,0	28,0	27,0	27,0	27,0
Transmitting frequency range [MHz]	824.0 - 849.0			1850.0 - 1910.0		

Mode	UMTS 2			UMTS 5		
Crest factor	1			1		
Multiple access scheme	WCDMA			WCDMA		
Channel No.	9262	9400	9538	4132	4183	4233
Measured Power Level [dBm] [1] **(#18760)**	22,5	22,4	22,4	23,4	23,4	23,5
Measured Power Level [dBm] [1] **(#18761)**	22,5	22,5	22,5	23,4	23,4	23,4
Product Maximum power Level [dBm][1]	22,5	22,5	22,5	23,5	23,5	23,5
Data Mode	(See section 3.3)			(See section 3.3)		
Transmitting frequency range [MHz]	1852.4 – 1907.6			826.4 – 846.6		

GPRS Multislot class	10
EDGE class	10
GPRS Capability class	B
BT class and conducted power	Class 1 5 mW.
Prototype or production unit	Preproduction
Hardware Version	AP
Software version	R7DA028
Device category	Portable
RF exposure environment	General population / uncontrolled

[1] These values are supplied by the customer

Sony Ericsson

Company Internal
REPORT

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3.3 HSPA Power Characteristics

The conducted power of the device was confirmed in two UMTS circuit switched modes (RMC and Voice) and four HSDPA modes. A CMU-200 was used to establish the call processing and modulation settings and an RF power meter was used for measurement. For all HSDPA measurements, the following settings were applied:

H-SET3 QPSK
CQI feedback=2msec
△ACK= △NACK= △CQI=8

The results (including relevant CMU settings) are presented in the following table:

EUT# 18760					Band 2				Band 5	
				Freq.(MHz)	1852,4	1880,0	1907,6	826,4	836,4	846,6
	βC	βD	ΔHS	max->	22,5	22,5	22,5	23,5	23,5	23,5
CS - RMC	8	15	-		22,2	22,2	22,3	23,0	22,9	23,0
CS - voice	8	15	-		22,0	21,9	22,0	22,8	22,8	22,9
HSDPA - 1	2	15	8		22,1	22,2	22,1	23,0	22,9	23,1
HSDPA - 2	12	15	8		21,7	21,7	21,7	22,7	22,7	22,7
HSDPA - 3	15	8	8		20,1	20,2	20,1	21,0	21,1	21,1
HSDPA - 4	15	4	8		20,1	20,1	20,2	21,0	21,0	21,0

EUT# 18761					Band 2				Band 5	
				Freq.(MHz)	1852,4	1880,0	1907,6	826,4	836,4	846,6
	βC	βD	ΔHS	max->	22,5	22,5	22,5	23,5	23,5	23,5
CS - RMC	8	15	-		22,2	22,2	22,2	23,2	22,9	23,0
CS - voice	8	15	-		22,2	22,1	22,1	22,9	22,8	22,8
HSDPA - 1	2	15	8		22,2	22,2	22,2	23,0	23,0	23,0
HSDPA - 2	12	15	8		21,9	21,9	21,9	22,7	22,6	22,6
HSDPA - 3	15	8	8		20,3	20,3	20,3	21,0	21,0	21,0
HSDPA - 4	15	4	8		20,3	20,3	20,3	21,0	20,9	20,9

The measured 1-gram averaged SAR values of the device against head and body are provided in the test results chapter. For head and body measurement, the unit was measured in the following (CS) voice modes:

RMC=12.2, β_c=8, β_d=15

Sony Ericsson

Company Internal
REPORT

Prepared (also subject responsible if other)		No.		
BA/SEMC/CVVBAU Robert Carr		*CVVA10:329.*		
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In HSUPA mode, additional code channels (E-DPCCH, E-DPDCHn) are added for data transfer in the uplink at higher bit rates.

5 sub-tests are defined by 3GPP TS 34.121 [7] according to the following table:

Sub-test	$ß_c$	$ß_d$	$ß_d$ (SF)	$ß_c/ß_d$	$ß_{hs}$ (1)	$ß_{ec}$	$ß_{ed}$	$ß_{ec}$ (SF)	$ß_{ed}$ (code)	CM (dB)(2)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$ß_{ed1}$:47/15 $ß_{ed2}$:47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15(4)	15/15(4)	64	15/15(4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK}, Δ_{CQI} = 8 <==> A_{hs} = $ß_{hs}/ß_c$ = 30/15 <==> $ß_{hs}$ = 30/15 * $ß_c$
Note 2: CM = 1 for $ß_c/ß_d$ = 12/15, $ß_{hs}/ß_c$ = 24/15. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference
Note 3: For sub-test 1 the $ß_c/ß_d$ ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $ß_c$ = 10/15 and $ß_d$ = 15/15
Note 4: For sub-test 5 the $ß_c/ß_d$ ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $ß_c$ = 14/15 and $ß_d$ = 15/15
Note 5: Testing UE using E-DPDCH Physical Layer category 1 sub-test 3 is not required according to TS 25.306 Table 5.1g
Note 6: $ß_{ed}$ cannot be set directly; it is set by Absolute Grant Value

EUT# 18760		Band 2			Band 5		
	Freq. (MHz)	1852,4	1880,0	1907,6	826,4	836,4	846,6
	max->	22,5	22,5	22,5	23,5	23,5	23,5
HSUPA - Sub-test 1		21,4	21,4	21,3	22,1	22,1	22,1
HSUPA - Sub-test 2		21,9	21,9	22,0	22,8	22,7	22,8
HSUPA - Sub-test 3		20,8	20,7	20,8	21,5	21,4	21,5
HSUPA - Sub-test 4		20,3	20,3	20,3	21,1	21,0	21,1
HSUPA - Sub-test 5		21,3	21,3	21,3	22,0	22,0	22,0

EUT# 18761		Band 2			Band 5		
	Freq. (MHz)	1852,4	1880,0	1907,6	826,4	836,4	846,6
	max->	23,8	23,8	23,8	24,8	24,8	24,8
HSUPA - Sub-test 1		21,5	21,6	21,6	22,1	22,1	22,2
HSUPA - Sub-test 2		22,0	22,1	22,1	22,8	22,7	22,7
HSUPA - Sub-test 3		21,0	21,0	21,0	21,6	21,5	21,5
HSUPA - Sub-test 4		20,3	20,4	20,3	21,2	21,1	21,1
HSUPA - Sub-test 5		21,5	21,5	21,6	22,1	22,0	22,0

NOTE: None of the HSDPA/HSUPA settings leads to conducted power values exceeding the conducted power in RMC mode by more than 0.25 dB.
So no additional SAR measurements are required for those test modes.

NOTE: According to the subtest settings shown in Table above a Maximum Power Reduction (MPR) of up to 2dB can be expected in HSUPA subtest 2 – 4. The WCDMA measurement results may show a lower power reduction depending on the chipset features of the DUT [7].

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Company Internal
REPORT

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4 Test equipment

4.1 Dosimetric system

SAR measurements were made using the DASY4 professional system (software version 4.7, Build 80) with SAM twin phantom, manufactured by Schmid & Partner Engineering AG (SPEAG). The list of calibrated equipment is given below.

Description	Serial Number	Due Date
DASY4 DAE3	448	2010-11
E-field probe ET3DV6	1611	2010-12
DASY4 DAE3	432	2011-05
E-field probe ET3DV6	1583	2010-11
Dipole Validation Kit, D835V2	442	2010-12
Dipole Validation Kit, D1900V2	539	2010-12
Dipole Validation Kit, D1900V2	536	2012-05

4.2 Additional equipment

Description	Inventory Number	Due Date
Signal generator HP SMY02	3.110	2011-04
Directional coupler HP778D	15.233	None
Power meter R&S NRVD	4.073	2011-04
Power sensor R&S NRV-Z5	4.074	2011-04
Power sensor R&S NRV-Z5	4.076	2011-04
Network analyzer Agilent 8719D	2.022	2011-04
Dielectric probe kit HP8507C	14.046	Self Cal
R&S CMU200	20010943	2011-04
Signal generator HP E4433B	1.045	2011-04
Directional coupler HP778D	FB000506	None
Power meter R&S NRVD	FB000511	2011-04
Power sensor R&S NRV-Z5	FB000512	2011-04
Power sensor R&S NRV-Z5	FB000513	2011-04
R&S CMU200	FB000540	2011-04

Sony Ericsson

Company Internal
REPORT

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Approved	Checked	Date	Rev	Reference
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5 Electrical parameters on the tissue simulating liquid

Prior to conducting SAR measurements, the relative permittivity, ε_r, and the conductivity σ, of the tissue simulating liquids were measured with the dielectric probe kit. These values are shown in the table below. The mass density, ρ, entered into the DASY4 software is also given. Recommended limits for permittivity ε_r, conductivity σ and mass density ρ are also shown.

f [MHz]	Tissue type	Measured / Recommended	Dielectric Parameters		Density
			ε_r	σ [S/m]	ρ [g/cm³]
835	Head	Measured 2010-07-27	41.48	0.88	1.00
		Recommended	41.50	0.90	1.00
835	Body	Measured 2010-07-22	52.47	0.96	1.00
		Recommended	55.20	0.97	1.00
1900	Head	Measured 2010-07-30	38.31	1.46	1.00
		Recommended	40.00	1.40	1.00
1900	Body	Measured 2010-07-26	51.07	1.52	1.00
		Recommended	53.30	1.52	1.00
1900	Head	Measured 2010-08-02	38.31	1.46	1.00
		Recommended	40.00	1.40	1.00
1900	Body	Measured 2010-07-26	50.69	1.54	1.00
		Recommended	53.30	1.52	1.00

Sony Ericsson

Company Internal
REPORT

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6 System accuracy verification

A system accuracy verification of the DASY4 was performed using the dipole validation kit listed in section 4.1. The system verification test was conducted on the same day as the measurement of the DUT. The ambient humidity and temperature of test facility were kept between the range 30-70% and 20.0-25.0 °C respectively.
RF noise had been measured in liquid when all RF equipment in lab was switched off. Measured value was 0.0002 mW/g in 1g mass.

f [MHz]	Tissue type	Measured / Reference	SAR [W/kg] 1g	Dielectric Parameters		Density	Liquid T[°C]
				ε_r	σ [S/m]	ρ [g/cm³]	
835	Head	Measured 2010-07-27	10.00	41.48	0.88	1.00	22.0
		Reference	9.34	41.50	0.90	1.00	22.0
835	Body	Measured 2010-07-22	10.24	52.47	0.96	1.00	24.0
		Reference	9.90	55.20	0.97	1.00	22.0
1900	Head	Measured 2010-07-30	39.08	38.31	1.46	1.00	22.7
		Reference	38.60	40.00	1.40	1.00	22.0
1900	Body	Measured 2010-07-26	37.32	51.07	1.52	1.00	24.0
		Reference	40.90	53.30	1.52	1.00	22.0
1900	Head	Measured 2010-08-02	38.56	38.31	1.46	1.00	22.9
		Reference	38.60	40.00	1.40	1.00	22.0
1900	Body	Measured 2010-07-26	37.56	50.69	1.54	1.00	24.0
		Reference	40.90	53.30	1.52	1.00	22.0

Sony Ericsson

Company Internal
REPORT

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7 SAR measurement uncertainty

SAR measurement uncertainty evaluation for Sony Ericsson PY7A3880096 (J108a) phone According to IEEE 1528

Uncertainty Component	Uncer. (%)	Prob Dist.	Div.	C_i	1g mass
Measurement System					
Probe Calibration	±5.9	N	1	1	±5.9
Axial Isotropy	±4.7	R	√3	0.7	±1.9
Spherical Isotropy	±9.6	R	√3	0.7	±3.9
Boundary effect	±1.0	R	√3	1	±0.6
Probe linearity	±4.7	R	√3	1	±2.7
Detection limit	±1.0	R	√3	1	±0.6
Readout electronics	±0.3	N	1	1	±0.3
Response time	±0.8	R	√3	1	±0.5
Integration time	±2.6	R	√3	1	±1.5
RF Ambient Conditions	±3.0	R	√3	1	±1.7
Mech. Constraints of robot	±0.4	R	√3	1	±0.2
Probe positioning	±2.9	R	√3	1	±1.7
Extrap, interpolation and integration	±1.0	R	√3	1	±0.6
Measurement System Uncertainty					*±8.4*
Test Sample Related					
Device positioning	±3.5	N	1	1	±3.5
Device holder uncertainty	±3.5	N	1	1	±3.5
Power drift	±5.0	R	√3	1	±2.9
Test Sample Related Uncertainty					*±5.5*
Phantom and Tissue Parameters					
Phantom uncertainty	±4.0	R	√3	1	±2.3
Liquid conductivity (measured)	±2.5	R	1	0.64	±1.6
Liquid conductivity (target)	±5.0	R	√3	0.64	±1.8
Liquid Permittivity (measured)	±2.5	R	1	0.6	±1.5
Liquid Permittivity (target)	±5.0	R	√3	0.6	±1.7
Phantom and Tissue Parameters Uncertainty					*±4.1*
Combined standard uncertainty					*±10.8*
Extended standard uncertainty (k=2)					***±21.6***

Sony Ericsson

Company Internal
REPORT

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8 Test results

The ambient humidity and temperature of test facility were kept between the range 30-70% and 20.0-25.0 °C respectively. A base station simulator was used to control the device during the SAR measurement. The DUT was supplied with a fully charged battery for each measurement.

For head measurement, the DUT was on the right-hand side and the left-hand side of the phantom, in two phone positions, cheek (touch) and tilt (cheek + 15°). The DUT was tested at the lowest, middle and highest frequencies in the transmission band. The measured 1-gram averaged SAR values of the DUT towards the head are provided in Table 1.

For body measurement the DUT was tested with the back (antenna) and front(display) towards the phantom flat section with 15 mm distance in both speech and data mode. For all modes, the device was tested at the lowest, middle and highest frequencies in the transmission band. For portable hands free (PHF) usage the Sony Ericsson headset HPM-75 was connected to the DUT. The measured 1-gram averaged SAR values of the DUT towards the body are provided in Table 2.

Band	Channel	Measured output power[1] [dBm]	Position	Liquid T [°C]	Measured SAR [W/Kg]	
					Left-hand 1g mass	Right-hand 1g mass
GSM 850	128	33,3	Cheek	22,0	0,34	0,33
	190	33,4	Cheek	22,0	0,46	0,43
			Tilt	22,0	0,26	0,29
	251	33,4	Cheek	22,0	**0,69**	0,58
GSM1900	512	30,0	Cheek	22,7	0,48	0,35
	661	29,8	Cheek	22,7	0,57	0,41
			Tilt	22,7	0,14	0,21
	810	29,8	Cheek	22,7	**0,83**	0,60
UMTS2	9262	22,5	Cheek	22,9	0,94	0,70
	9400	22,4	Cheek	22,9	**1,08**	0,79
			Tilt	22,9	0,25	0,39
	9538	22,4	Cheek	22,9	0,99	0,70
UMTS5	4132	23,4	Cheek	22,0	0,54	0,51
	4183	23,4	Cheek	22,0	0,58	0,57
			Tilt	22,0	0,33	0,37
	4233	23,5	Cheek	22,0	**0,62**	0,57

Table 1: SAR measurement result for Sony Ericsson PY7A3880096 telephone at highest possible output power. Measured towards the head (#18760).

[1] The measured output power values were provided by the customer.

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Band	Channel	Measured output power[1] [dBm]	Position / Mode	Liquid T [°C]	Measured SAR [W/kg] 1g mass
GSM 850	128	30,4	Back / GPRS 2Tx	24,0	0,32
		33,3	Back / Speech	24,0	0,33
	190	30,4	Back / GPRS 2Tx	24,0	0,46
		33,3	Front / Speech	24,0	0,34
		33,3	Back / Speech PHF	24,0	0,29
		33,3	Back / Speech	24,0	0,49
	251	30,4	Back / GPRS 2Tx	24,0	**0,65**
		33,3	Back / Speech	24,0	0,33
		27,8	Back / Edge 2Tx	24,0	0,10
GSM 1900	512	26,8	Back / GPRS 2Tx	24,0	0,15
		29,8	Back / Speech	24,0	0,14
	661	26,8	Back / GPRS 2Tx	24,0	0,19
		30,0	Back / Speech	24,0	0,19
	810	26,9	Back / GPRS 2Tx	24,0	**0,23**
		26,9	Front / GPRS 2Tx	24,0	0,22
		26,9	Back / Edge 2Tx	24,0	0,11
		30,0	Back / Speech PHF	24,0	0,20
		30,0	Back / Speech	24,0	0,22
UMTS2	9262	22,4	Back / Speech	24,0	0,25
	9400	22,5	Back / Speech	24,0	0,28
		22,5	Back / Speech PHF	24,0	**0,29**
		22,5	Front / Speech	24,0	0,26
	9538	22,5	Back / Speech	24,0	0,27
UMTS5	4132	23,4	Back / Speech	24,0	0,48
	4183	23,4	Back / Speech	24,0	0,54
	4233	23,4	Back / Speech	24,0	**0,55**
		23,4	Back / Speech PHF	24,0	0,33
		23,4	Front / Speech	24,0	0,40

Table 2: SAR measurement result for Sony Ericsson PY7A3880096 telephone at highest possible output power. Measured towards the body (#18761).

[1] The measured output power values were provided by the customer.

Sony Ericsson

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[1] R.Plicanic. “SAR Measurement Specification of Wireless Handsets”. Sony Ericsson SAR Test Laboratory internal document GUG/N 03:141

[2] FCC. “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields: Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radio Frequency Emissions.” Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97- 01).

[3] IEEE. “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.” Std 1528-2003. June. 2003.

[4] IEC 62209-1. "Procedure to measure the Specific Absorption Rate (SAR) for hand-held mobile wireless devices in the frequency range of 300 MHz to 3 GHz". February 2005.

[5] FCC KDB648474. "SAR Evaluation Consideration for HANDSETS with Multiple Transmitters and Antenna", April 2008.

[6] FCC KDB248227. "SAR Measurement procedure for 802.11a/b/g Transmitters”, May 2007.

[7] PBA KDB Input Tracking number #703553 regarding function of HSUPA MPR (Maximum Power Reduction) of Qualcomm RF chipset.

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Appendix

8.1 Photographs of the device under test

Front

Sides

Top And Bottom

Back with Battery

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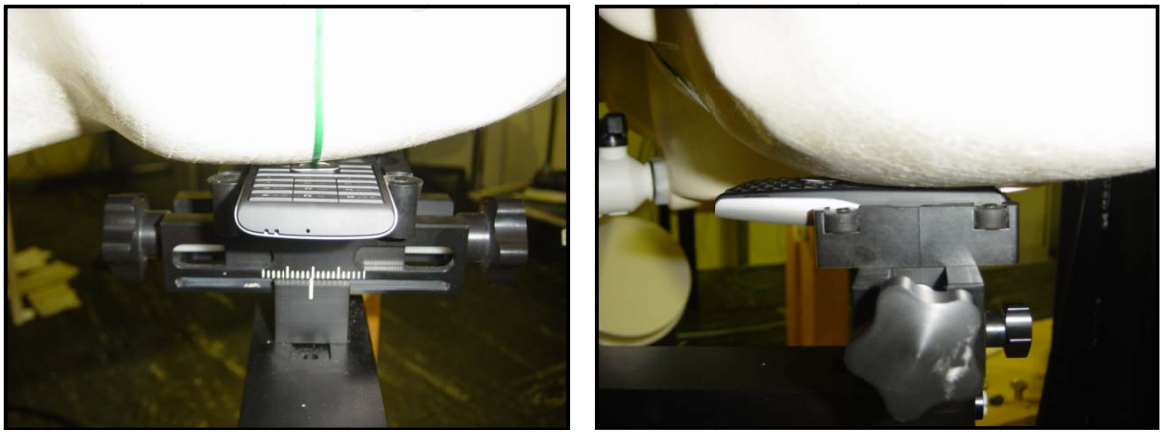
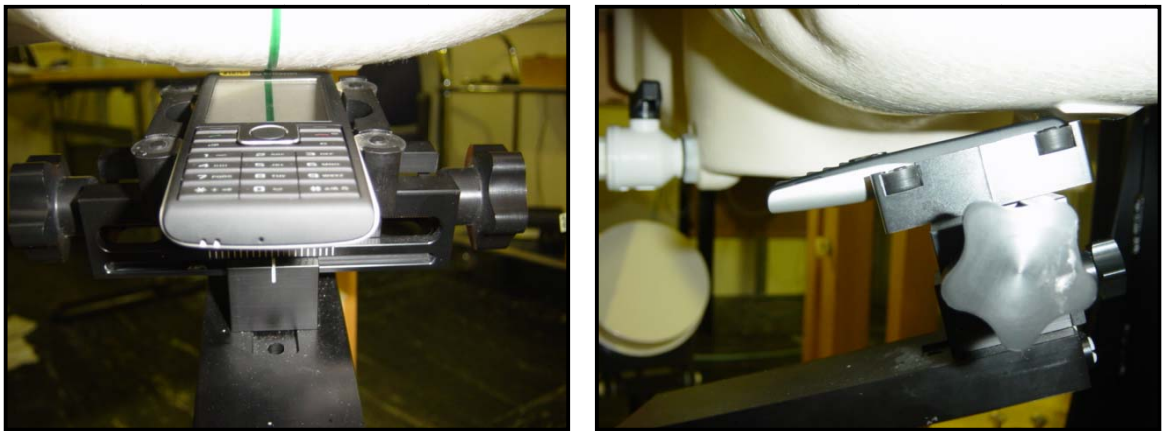
8.2 Device position at SAM Twin Phantom



DUT position towards the head: Cheek (touch) position.



DUT position towards the head: Tilt (touch + 15°) position.

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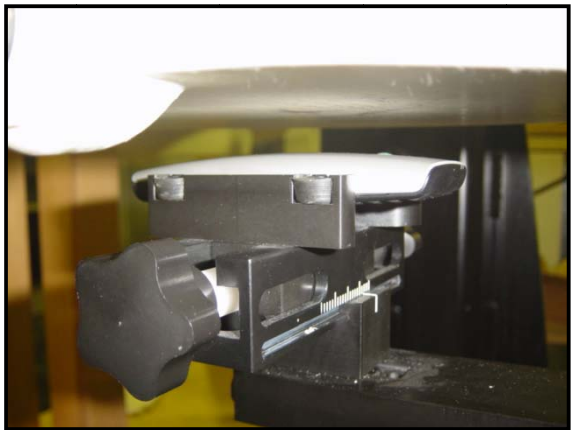

DUT position towards the body, 15 mm distance

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8.3 Attachments

- System validation
- Measurement plots
- Probe calibration
- Dipole calibration