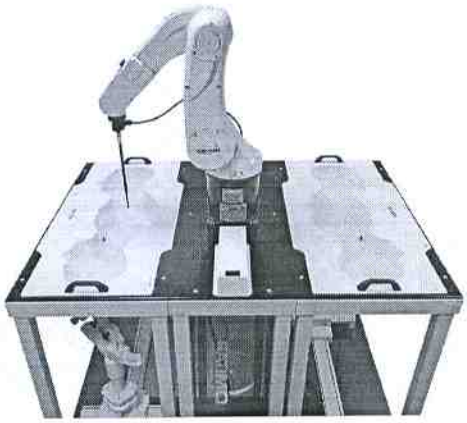
SITE ACCEPTANCE TEST REPORT
SAR SYSTEM

Document N°: SAR-280-1-08-SATB-A
Subject: Test of conformity of the equipment.

Specification of the equipment:

Type: SAR
Name: Specific Absorption Rate system



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Issue	Date	Modifications/Pages changed
A	2008/10/06	Initial release

1. INTRODUCTION

1.1. Scope of Operation

This document describes the various tests used during the acceptance trials of the SAR Test System as proposed in § 8.3 – System Validation from IEEE standard 1528 (2003) "recommended practice for determining the peak spatial average specific absorption rate (SAR) in the human head from wireless communication devices: measurement techniques" and HAC Test System as proposed in in § 4.1 – Validation Procedure from ANSI C63.19 (2007) "American National Standard Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids"

The Acceptance Test Procedure includes the initial calibration performed by SATIMO, the System Validation performed in MORLAB in Shenzhen.

1.2. Test Procedure

The Initial calibration is done at SATIMO without the customer.

The Acceptance test procedure performed in MORLAB in Shenzhen is to demonstrate the safety and the functional operation of the SAR&HAC Test System. The tests are divided into System check and System Validation.

1.3. System Validation

For SAR, the System Validation procedure evaluates the system against reference SAR values and the performance of the probe, readout electronics, and software. The test setup utilizes the flat part of a Semi Anthropomorphic Mannequin (SAM) phantom and a reference dipole. Thus, the System Validation process doesn't include uncertainty due to handset positioning variability.

For HAC, the System Validation procedure evaluates the system against reference E-field and H-field values and the performance of the probe, readout electronics, and software. The test setup utilizes the broadband reference dipole. Thus, the System Validation process doesn't include uncertainty due to handset positioning variability.

System Validation has to be performed with a probe preliminary calibrated.

1.4. System Check

System check includes mechanical inspection, electrical safety tests, functional tests (hardware), operational tests (hardware and software) and system tests (hardware and software) on a mobile phone.

This mobile phone delivered by MORLAB has to be compliance to the used frequency bands.

2. DOCUMENTATION

2.1. Reference Documents

- PJF_213_01_08b_SATH A.xls

2.2. Abbreviations

ATP	acceptance test procedure
EUT	equipment under test
FAT	final acceptance test
GPIB	general purpose interface bus
HAC	Hearing Aids Compatibility
IEEE	Institute of Electrical and Electronic Engineers
IPL	Input Power Level
SAM	Specific Anthropomorphic Mannequin
SAR	Specific Absorption Rate

3. LISTED OF MANDATORY EQUIPMENT REQUIRED

System validation has to be performed with the input power measurement test setup described in §8.2.4-IEEE 1528-page 65.

AMP	Amplifier 435 MHz-2450 MHz – 1 Watt – MORLAB
CBL1	Coaxial câble 1– SATIMO
CBL2	Coaxial câble 2– MORLAB
RAD	Radiocommunication tester – MORLAB
CPL	Coaxial Directional Coupler – MORLAB
PMR	Power meter - MORLAB
SIM	SIM card – MORLAB
GEN	Signal generator - MORLAB

Mandatory Instruments necessary to performed acceptance tests are provided by MORLAB except CBL1.

4. DELIVERED ITEMS

Pos	Type / Item Description	Supplier	Serial No.	Qty	DELIVERED (y/n)
1	PROBE E SAR E FIELD PROBE	SATIMO	SN 37/08 EP80	1	
2	DIPOLE 435 435 MHz REFERENCE DIPOLE	SATIMO	SN 36/08 DIPB98	1	
3	DIPOLE 835 835 MHz REFERENCE DIPOLE	SATIMO	SN 36/08 DIPC99	1	
4	DIPOLE 900 900 MHz REFERENCE DIPOLE	SATIMO	SN 36/08 DIPD100	1	
5	DIPOLE 1800 1800 MHz REFERENCE DIPOLE	SATIMO	SN 36/08 DIPF101	1	
7	DIPOLE 2000 1800 MHz REFERENCE DIPOLE	SATIMO	SN 36/08 DIPI102	1	
8	DIPOLE 2450 2450 MHz REFERENCE DIPOLE	SATIMO	SN 36/08 DIPJ103	1	
9	POSITIONING DEVICE MOBILE PHONE POSITIONING DEVICE	SATIMO	SN 36/08 MSH56	1	
10	DUMMY PROBE	SATIMO	SN 36/08 DP31	1	
11	SAM PHANTOM	SATIMO	SN 36/08 SAM62	1	
12	TABLE 1 SAM PHANTOM TABLE	SATIMO	SN 36/08 TABP44	1	
13	TABLE 2 KUKA ROBOT TABLE	SATIMO	SN 36/08 TABR29	1	
14	KR5 6 AXIS ROBOT	KUKA		1	
15	KRC2 ROBOT CONTROL CABINET	KUKA		1	
16	MILLIVOLTMETER KEITHLEY 2000	KEITHLEY		1	
17	SCAN CARD 10 CHANELS SCANCARD	KEITHLEY		1	
18	PCI-GPIB CARD	SATIMO		1	
19	AXIS DEVICE PROBE/ ROBOT POSITIONING DEVICE	SATIMO	SN 36/08 SUPR31	1	
20	SHIELDED CABLE PROBE / KEITHLEY SHIELDED CABLE	SATIMO		1	
21	PHANTOM & TABLE SCREW NILON SCREW	SATIMO		-	
22	CABLE GPIB KEITHLEY TO PC GPIB LINK	SATIMO		1	
23	CABLE TCP/IP ROBOT CABINET TO PC LINK	SATIMO		1	
24	RG214U SIGNAL GENERATOR / DIPOLE CABLE	SATIMO		1	
25	COM ANTENNA 800-2500 COM TESTER ANTENNA	SATIMO	SN 36/08 ANTA24	1	
26	OPENSAR SAR MEASUREMENT SOFTWARE	SATIMO		1	

27	EPS LIQUID CALIBRATION SOFTWARE	SATIMO		1	
28	OCP LIQUID CALIBRATION KIT	SATIMO	SN 42/07 OCP26	1	
30	LIQUID 900 HEAD TISSU LIQUID 835-900 MHz	SATIMO	SN 36/08 HLD123	25 l	
31	LIQUID 1800 HEAD TISSU LIQUID 1800 MHz	SATIMO	SN 36/08 HLF124	25 l	
31	LIQUID 1900 HEAD TISSU LIQUID 1900 MHz	SATIMO	SN 36/08 HLG125	25 l	
31	LIQUID 2450 HEAD TISSU LIQUID 2450 MHz	SATIMO	SN 36/08 HLJ126	25 l	
41	Video Positioning System	SATIMO	SN 36/08 VPS18	1	
42	Reference Tools for VPS	SATIMO	SN 36/08 RT12	1	
40	PROBE E HAC E FIELD PROBE	SATIMO	SN 41/08 EPH17	1	
41	PROBE H HAC H FIELD PROBE	SATIMO	SN 41/08 HPH18	1	
42	PROBE T-Coil HAC E FIELD PROBE	SATIMO	SN 39/08 TCP11	1	
43	Broadband Dipole 800-950 HAC DIPOLE	SATIMO	SN 36/08 DHA16	1	
44	Broadband Dipole 1700-2000 HAC DIPOLE	SATIMO	SN 36/08 DHB16	1	
44	Broadband Dipole 2400-2500 HAC DIPOLE	SATIMO	SN 36/08 DHC11	1	
45	AUDIO DAQ	SATIMO		1	
46	HAC Positioning System	SATIMO	SN 36/08 SUPH16	1	
	Helmholtz Coil	SATIMO	SN 36/08 HC06		
47	BNC Cable	SATIMO		1	

5. INITIAL TEST ON SYSTEM

5.1. Preliminary Test

The preliminary tests of SAR&HAC Test System are confined to power on tests, delivery and assembly inspections. These tests are performed by SATIMO after assembly of the SAR&HAC Test System. Morlab is present.

The SAR&HAC Test System must be fully fitted with all the measuring instruments and equipment as defined in the list of mandatory and delivered equipments.

5.1.1. List of Equipment delivered

Cf § 4 - Delivered Items

5.1.2. Mechanical Inspection

The SAR&HAC test system is to be visually checked for good workmanship in the following points:

- Manufacturing:
  Shipment condition, Mechanical condition of equipment

  Compliance: YES ☑ NOT ☐

  If not, items : .....
  .....
  .....
  .....

- Assembly:

  Compliance: YES ☑ NOT ☐

  If not, items : .....
  .....
  .....
  .....

5.1.3. Power on test

POWER ON				
Acceptance		VALIDATION	EQUIPMENT	ACTION
Y [✓]	N [ ]		PC from Morlab	PC on
Y [✓]	N [ ]			
Y [✓]	N [ ]	OpenSAR Software		Run OpenSAR software
Y [✓]	N [ ]	OpenHAC Software		Close OpenSAR software Run OpenHAC software
Y [✓]	N [ ]	Robot	Material	Power On

5.2. Functional Tests

The functional tests of SAR&HAC Test System are confined to make reference points and path inspections on SAM phantom. These tests are performed by SATIMO after assembly of the SAR&HAC Test System. HONHER is present.

The SAR Test System must be fully fitted with all the measuring instruments and equipment as defined in the list of mandatory and delivered equipments. Tests have to be made with dummy probe.

MECHANICAL VALIDATION (Using Dummy probe)				
Acceptance		**VALIDATION**	**EQUIPMENT**	**ACTION**
Y [✓]	N [ ]	Probe holder	Robot	Connect dummy probe
Y [✓]	N [ ]	OpenSAR software	OpenSAR	Take manual reference point
Y [✓]	N [ ]	Right head surface path & automatic return to ref point		OpenSAR
Y [✓]	N [ ]	Left head surface path & automatic return to ref point		
Y [✓]	N [ ]	Flat phantom surface path & automatic return to ref point		
Y [✓]	N [ ]	OpenHAC software	OpenHAC	Take manual reference point
Y [✓]	N [ ]	Surface path 50*50 mm		OpenHAC
Y [✓]	N [ ]	Flat phantom surface path & Emergency stop	Robot	Manual Emergency stop

6. SYSTEM VALIDATION

6.1. Introduction to System validation

The System Validation is divided into 3 main sections: calibration, environmental and system validation.

The Calibration refers to some of the delivered equipment, namely:

- E-Field Probe 1
- Dipole 435
- Dipole 835
- Dipole 900
- Dipole 1800
- Dipole 2000
- Dipole 2450
- Positioning device
- SAM Phantom
- Communication antenna
- Open Coaxial Probe
- Liquid HL900
- Liquid HL1800
- Liquid HL1900
- Liquid HL2450
- E-Field Probe 2
- H-Field Probe
- T-Coil Probe
- Broadband Dipole 800-950
- Broadband Dipole 1700-2000
- Broadband Dipole 2000-2600

- SAR measurement uncertainties
- HAC measurement uncertainties

The sections covering calibration of the system demonstrates the techniques used in the SATIMO factory and cover measurements results.

The System Validation procedure for SAR evaluates the system against reference SAR values and the performance of the probe, readout electronics, and software. The test setup utilizes the flat part of a Specific Anthropomorphic Model (SAM) phantom and a reference dipole.

The System Validation procedure for HAC evaluates the system against reference E and H values and the performance of the probe, readout electronics, and software. The test setup utilizes a broadband reference dipole.

6.2. Calibration

6.2.1. E-FIELD PROBE 1	Compliance : YES ☑ NOT ☐
6.2.2. DIPOLE 435	Compliance : YES ☑ NOT ☐
6.2.3. DIPOLE 835	Compliance : YES ☑ NOT ☐
6.2.4. DIPOLE 900	Compliance : YES ☑ NOT ☐
6.2.5. DIPOLE 1800	Compliance : YES ☑ NOT ☐
6.2.6. DIPOLE 2000	Compliance : YES ☑ NOT ☐
6.2.7. DIPOLE 2450	Compliance : YES ☑ NOT ☐
6.2.8. MOBILE PHONE HOLDER	Compliance : YES ☑ NOT ☐
6.2.9. SAM PHANTOM	Compliance : YES ☑ NOT ☐
6.2.10. COMMUNICATION ANTENNA	Compliance : YES ☑ NOT ☐
6.2.11. OPEN COAXIAL PROBE	Compliance : YES ☑ NOT ☐
6.2.12. HEAD LIQUID 900	Compliance : YES ☑ NOT ☐
6.2.13. HEAD LIQUID 1800	Compliance : YES ☑ NOT ☐

6.2.14. HEAD LIQUID 1900	Compliance : YES ☑ NOT ☐
6.2.15. HEAD LIQUID 2450	Compliance : YES ☑ NOT ☐
6.2.16. E-FIELD PROBE 2	Compliance : YES ☑ NOT ☐
6.2.17. H-FIELD PROBE	Compliance : YES ☑ NOT ☐
6.2.18. T-COIL PROBE	Compliance : YES ☑ NOT ☐
6.2.19. BROADBAND DIPOLE 800-950	Compliance : YES ☑ NOT ☐
6.2.20. BROADBAND DIPOLE 1700-2000	Compliance : YES ☑ NOT ☐
6.2.21. BROADBAND DIPOLE 2000-2600	Compliance : YES ☑ NOT ☐
6.2.22. SAR SYSTEM VALIDATION UNCERTAINTIES	Compliance : YES ☑ NOT ☐
6.2.23. SAR MEASUREMENT UNCERTAINTIES	Compliance : YES ☑ NOT ☐
6.2.24. HAC MEASUREMENT UNCERTAINTIES	Compliance : YES ☑ NOT ☐

6.3. SAR System Validation

6.3.1. SAR Noise measurement

In compliance to the IEEE 1528 standard -§ 6.1.1, the Systems Validation has to be performed in a noise free environment. The first step of System Validation is therefore to perform a noise measurement. The result of noise measurement (if the SAR local noise is > 0.012 W/Kg) has a direct influence on the validity of CW System Validation measurements done below 0.5 W/Kg.

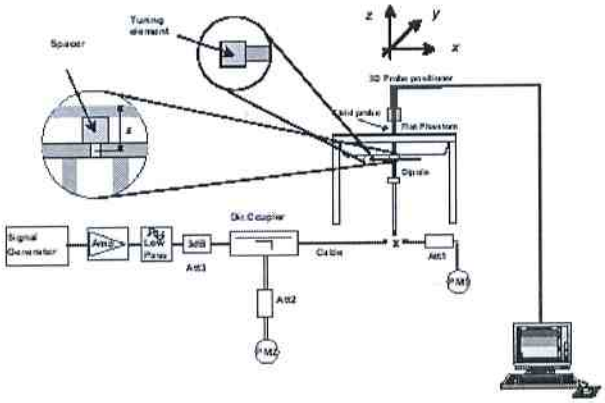
This test is performed in System Validation configuration with Signal Generator and Amplifier powered off.

Environmental Conditions

SAR Local < 12 mW/Kg ☑ SAR Local > 12 mW/Kg ☐

6.3.2. SAR System Validation Setup

System validation has to be performed with the below input power measurement test setup described in §8.2.4-IEEE 1528-page 65.



System Validation is used for verifying the accuracy of the probe and readout electronics, and performance of the software.

6.3.3. SAR System Validation Uncertainty

Differences between System Validation values and references values should be less than the tolerance specified for the SAR measurement system by SATIMO. Considering that the device positioning and head phantom shape errors are not considered, uncertainties for System Validation become:

SAR	Full Expended Uncertainty (95% Confidence interval)	Test Sample related uncertainty	SYSTEM VALIDATION UNCERTAINTY
1g (W/Kg)	18.93 %	6,50 %	**15.86 %**
10g (W/Kg)	18.67 %		**15.54 %**

6.3.4.SAR evaluation

A complete 1g or 10g average SAR measurement is performed. The 1g and 10g averaged SAR is measured at frequencies 900 and 1800 MHz. The results are normalized to 1W forward input power and compared with the reference SAR value below.

Frequency (MHz)	1g SAR (W/Kg)		10g SAR (W/Kg)	
	REF	SV	REF	SV
450	4.6	4,59	3.06	3.06
835	9.5	9,51	6.2	6.19
900	10.8	10.79	6.9	6.91
1800	38.1	38,09	19.8	19.8
2000	41.1	41.1	21.1	21,08
2450	52.4	52,38	24.0	24,02

SAR EVALUATION @ 450				
Acceptance		**VALIDATION**	**EQUIPMENT**	**ACTION**
Y [✓]	N [ ]		Phantom	Fill up 450 MHz liquid
Y [✓]	N [ ]	Probe holder	Robot	Connect E-field probe
Y [✓]	N [ ]	OpenSAR software	OpenSAR	Take ref. point
Y [✓]	N [ ]	Validation Dipole 450	Device holder	Position dipole at 9.8 mm
Y [✓]	N [ ]		RF Cable 1	Connect dipole
Y [✓]	N [ ]		RF Cable 1	Connect coupler
Y [✓]	N [ ]		Coupler	Connect to amplifier
Y [✓]	N [ ]		Coupler	Connect to Power meter
Y [✓]	N [ ]		RF Cable 2	Signal generator to amplifier
Y [✓]	N [ ]	Signal generator & Amplifier	OpenSAR	Power level to 1 W
Y [✓]	N [ ]			Frequency to 450 MHz
Y [✓]	N [ ]	Flat phantom path		Path & SAR measurement
Y [✓]	N [ ]	1g SAR		94.6W/Kg +/- 10.0 %
Y [✓]	N [ ]	10g SAR		3.06 W/Kg +/- 10.0 %

SAR EVALUATION @ 835				
Acceptance		VALIDATION	EQUIPMENT	ACTION
Y [✓]	N [ ]		Phantom	Fill up 900 MHz liquid
Y [✓]	N [ ]	Probe holder	Robot	Connect E-field probe
Y [✓]	N [ ]	OpenSAR software	OpenSAR	Take ref. point
Y [✓]	N [ ]	Validation Dipole 835	Device holder	Position dipole at 11.2 mm
Y [✓]	N [ ]		RF Cable 1	Connect dipole
Y [✓]	N [ ]		RF Cable 1	Connect coupler
Y [✓]	N [ ]		Coupler	Connect to amplifier
Y [✓]	N [ ]		Coupler	Connect to Power meter
Y [✓]	N [ ]		RF Cable 2	Signal generator to amplifier
Y [✓]	N [ ]	Signal generator & Amplifier	OpenSAR	Power level to 1 W
Y [✓]	N [ ]			Frequency to 835 MHz
Y [✓]	N [ ]	Flat phantom path		Path & SAR measurement
Y [✓]	N [ ]	1g SAR		9.5 W/Kg +/- 10.0 %
Y [✓]	N [ ]	10g SAR		6.2 W/Kg +/- 10.0 %

SAR EVALUATION @ 900				
Acceptance		VALIDATION	EQUIPMENT	ACTION
Y [✓]	N [ ]		Phantom	Fill up 900 MHz liquid
Y [✓]	N [ ]	Probe holder	Robot	Connect E-field probe
Y [✓]	N [ ]	OpenSAR software	OpenSAR	Take ref. point
Y [✓]	N [ ]	Validation Dipole 900	Device holder	Position dipole at 11.2 mm
Y [✓]	N [ ]		RF Cable 1	Connect dipole
Y [✓]	N [ ]		RF Cable 1	Connect coupler
Y [✓]	N [ ]		Coupler	Connect to amplifier
Y [✓]	N [ ]		Coupler	Connect to Power meter
Y [✓]	N [ ]		RF Cable 2	Signal generator to amplifier
Y [✓]	N [ ]	Signal generator & Amplifier	OpenSAR	Power level to 1 W
Y [✓]	N [ ]			Frequency to 900 MHz
Y [✓]	N [ ]	Flat phantom path		Path & SAR measurement
Y [✓]	N [ ]	1g SAR		10.8 W/Kg +/- 10.0 %
Y [✓]	N [ ]	10g SAR		6.9 W/Kg +/- 10.0 %

SAR EVALUATION @ 1800				
Acceptance		VALIDATION	EQUIPMENT	ACTION
Y [✓]	N [ ]		Phantom	Fill up 1800 MHz liquid
Y [✓]	N [ ]	Probe holder	Robot	Connect E-field probe
Y [✓]	N [ ]	OpenSAR software	OpenSAR	Take ref. point
Y [✓]	N [ ]	Validation Dipole 1800	Device holder	Position dipole at 6.2 mm
Y [✓]	N [ ]		RF Cable 1	Connect dipole
Y [✓]	N [ ]		RF Cable 1	Connect coupler
Y [✓]	N [ ]		Coupler	Connect to amplifier
Y [✓]	N [ ]		Coupler	Connect to Power meter
Y [✓]	N [ ]		RF Cable 2	Signal generator to amplifier
Y [✓]	N [ ]	Signal generator & Amplifier	OpenSAR	Power level to 1 W
Y [✓]	N [ ]			Frequency to 1800 MHz
Y [✓]	N [ ]	Flat phantom path		Path & SAR measurement
Y [✓]	N [ ]	1g SAR		38.1 W/Kg +/- 10.0 %
Y [✓]	N [ ]	10g SAR		19.8 W/Kg +/- 10.0 %

SAR EVALUATION @ 2000				
Acceptance		VALIDATION	EQUIPMENT	ACTION
Y [✓]	N [ ]		Phantom	Fill up 2000 MHz liquid
Y [✓]	N [ ]	Probe holder	Robot	Connect E-field probe
Y [✓]	N [ ]	OpenSAR software	OpenSAR	Take ref. point
Y [✓]	N [ ]	Validation Dipole 2000	Device holder	Position dipole at 6.2 mm
Y [✓]	N [ ]		RF Cable 1	Connect dipole
Y [✓]	N [ ]		RF Cable 1	Connect coupler
Y [✓]	N [ ]		Coupler	Connect to amplifier
Y [✓]	N [ ]		Coupler	Connect to Power meter
Y [✓]	N [ ]		RF Cable 2	Signal generator to amplifier
Y [✓]	N [ ]	Signal generator & Amplifier	OpenSAR	Power level to 1 W
Y [✓]	N [ ]			Frequency to 2000 MHz
Y [✓]	N [ ]	Flat phantom path		Path & SAR measurement
Y [✓]	N [ ]	1g SAR		41.1 W/Kg +/- 10.0 %
Y [✓]	N [ ]	10g SAR		21.1 W/Kg +/- 10.0 %

SAR EVALUATION @ 2450				
Acceptance		VALIDATION	EQUIPMENT	ACTION
Y [✓]	N [ ]		Phantom	Fill up 2450 MHz liquid
Y [✓]	N [ ]	Probe holder	Robot	Connect E-field probe
Y [✓]	N [ ]	OpenSAR software	OpenSAR	Take ref. point
Y [✓]	N [ ]	Validation Dipole 2450	Device holder	Position dipole at 6.2 mm
Y [✓]	N [ ]		RF Cable 1	Connect dipole
Y [✓]	N [ ]		RF Cable 1	Connect coupler
Y [✓]	N [ ]		Coupler	Connect to amplifier
Y [✓]	N [ ]		Coupler	Connect to Power meter
Y [✓]	N [ ]		RF Cable 2	Signal generator to amplifier
Y [✓]	N [ ]	Signal generator & Amplifier	OpenSAR	Power level to 1 W
Y [✓]	N [ ]			Frequency to 2450 MHz
Y [✓]	N [ ]	Flat phantom path		Path & SAR measurement
Y [✓]	N [ ]	1g SAR		52.4 W/Kg +/- 10.0 %
Y [✓]	N [ ]	10g SAR		24.0 W/Kg +/- 10.0 %

6.4. HAC System Validation

6.4.1. HAC System Validation Setup

System validation has to be performed by following the procedure described in §4.3.2-ANSI C63.19-page 17.

System Validation is used for verifying the accuracy of the probe and readout electronics, and performance of the software.

6.4.2. HAC evaluation

A complete scan along the length of the broadband dipole is performed. The maximum values of E-Field and H-field is measured at frequencies 900 and 1800 MHz. The results are normalized to 1W forward input power and compared with the reference E-Field and H-Field value below.

Frequency (MHz)	E-Field (V/m)		H-Field (A/m)	
	REF	SV	REF	SV
900	205	205	0.448	0.447
1800	165	165	0.452	0.452
2450	142	141	0.105	0.106

E-Field EVALUATION @ 900				
Acceptance		**VALIDATION**	**EQUIPMENT**	**ACTION**
Y [✓]	N [ ]	Probe holder	Robot	Connect E-field probe
Y [✓]	N [ ]	HAC software	OpenHAC	Take manual ref. point
Y [✓]	N [ ]	Broadband Dipole 800-950	Device holder	Position dipole
Y [✓]	N [ ]		RF Cable 1	Connect dipole
Y [✓]	N [ ]		RF Cable 1	Connect coupler
Y [✓]	N [ ]		Coupler	Connect to amplifier
Y [✓]	N [ ]		Coupler	Connect to Power meter
Y [✓]	N [ ]		RF Cable 2	Signal generator to amplifier
Y [✓]	N [ ]	Signal generator & Amplifier	OpenHAC	Power level to 20 dBm
Y [✓]	N [ ]			Frequency to 900 MHz
Y [✓]	N [ ]	Probe path		RF measurement
Y [✓]	N [ ]	E-Field value		Record Maximum E-field@900 MHz

E-Field EVALUATION @ 1800				
Acceptance		**VALIDATION**	**EQUIPMENT**	**ACTION**
Y [✓]	N [ ]	Probe holder	Robot	Connect E-field probe
Y [✓]	N [ ]	HAC software	OpenHAC	Take manual ref. point
Y [✓]	N [ ]	Broadband Dipole 1700-2000	Device holder	Position dipole
Y [✓]	N [ ]		RF Cable 1	Connect dipole
Y [✓]	N [ ]		RF Cable 1	Connect coupler
Y [✓]	N [ ]		Coupler	Connect to amplifier
Y [✓]	N [ ]		Coupler	Connect to Power meter
Y [✓]	N [ ]		RF Cable 2	Signal generator to amplifier
Y [✓]	N [ ]	Signal generator & Amplifier	OpenHAC	Power level to 20 dBm
Y [✓]	N [ ]			Frequency to 1800 MHz
Y [✓]	N [ ]	Probe path		RF measurement
Y [✓]	N [ ]	E-Field value		Record Maximum E-field@1800 MHz

E-Field EVALUATION @ 2450				
Acceptance		**VALIDATION**	**EQUIPMENT**	**ACTION**
Y [✓]	N [ ]	Probe holder	Robot	Connect E-field probe
Y [✓]	N [ ]	HAC software	OpenHAC	Take manual ref. point
Y [✓]	N [ ]	Broadband Dipole 2000-2600	Device holder	Position dipole
Y [✓]	N [ ]		RF Cable 1	Connect dipole
Y [✓]	N [ ]		RF Cable 1	Connect coupler
Y [✓]	N [ ]		Coupler	Connect to amplifier
Y [✓]	N [ ]		Coupler	Connect to Power meter
Y [✓]	N [ ]		RF Cable 2	Signal generator to amplifier
Y [✓]	N [ ]	Signal generator & Amplifier	OpenHAC	Power level to 20 dBm
Y [✓]	N [ ]			Frequency to 2450 MHz
Y [✓]	N [ ]	Probe path		RF measurement
Y [✓]	N [ ]	E-Field value		Record Maximum E-field@2450 MHz

H-Field EVALUATION @ 900				
Acceptance		**VALIDATION**	**EQUIPMENT**	**ACTION**
Y [✓]	N [ ]	Probe holder	Robot	Connect E-field probe
Y [✓]	N [ ]	HAC software	OpenHAC	Take manual ref. point
Y [✓]	N [ ]	Broadband Dipole 800-950	Device holder	Position dipole
Y [✓]	N [ ]		RF Cable 1	Connect dipole
Y [✓]	N [ ]		RF Cable 1	Connect coupler
Y [✓]	N [ ]		Coupler	Connect to amplifier
Y [✓]	N [ ]		Coupler	Connect to Power meter
Y [✓]	N [ ]		RF Cable 2	Signal generator to amplifier
Y [✓]	N [ ]	Signal generator & Amplifier	OpenHAC	Power level to 20 dBm
Y [✓]	N [ ]			Frequency to 900 MHz
Y [✓]	N [ ]	Probe path		RF measurement
Y [✓]	N [ ]	H-Field value		Record Maximum H-field@900 MHz

H-Field EVALUATION @ 1800				
Acceptance		**VALIDATION**	**EQUIPMENT**	**ACTION**
Y [✓]	N [ ]	Probe holder	Robot	Connect E-field probe
Y [✓]	N [ ]	HAC software	OpenHAC	Take manual ref. point
Y [✓]	N [ ]	Broadband Dipole 1700-2000	Device holder	Position dipole
Y [✓]	N [ ]		RF Cable 1	Connect dipole
Y [✓]	N [ ]		RF Cable 1	Connect coupler
Y [✓]	N [ ]		Coupler	Connect to amplifier
Y [✓]	N [ ]		Coupler	Connect to Power meter
Y [✓]	N [ ]		RF Cable 2	Signal generator to amplifier
Y [✓]	N [ ]	Signal generator & Amplifier	OpenHAC	Power level to 20 dBm
Y [✓]	N [ ]			Frequency to 1800 MHz
Y [✓]	N [ ]	Probe path		RF measurement
Y [✓]	N [ ]	H-Field value		Record Maximum H-field@1800 MHz

H-Field EVALUATION @ 2450				
Acceptance		**VALIDATION**	**EQUIPMENT**	**ACTION**
Y [✓]	N [ ]	Probe holder	Robot	Connect E-field probe
Y [✓]	N [ ]	HAC software	OpenHAC	Take manual ref. point
Y [✓]	N [ ]	Broadband Dipole 2000-2600	Device holder	Position dipole
Y [✓]	N [ ]		RF Cable 1	Connect dipole
Y [✓]	N [ ]		RF Cable 1	Connect coupler
Y [✓]	N [ ]		Coupler	Connect to amplifier
Y [✓]	N [ ]		Coupler	Connect to Power meter
Y [✓]	N [ ]		RF Cable 2	Signal generator to amplifier
Y [✓]	N [ ]	Signal generator & Amplifier	OpenHAC	Power level to 20 dBm
Y [✓]	N [ ]			Frequency to 2450 MHz
Y [✓]	N [ ]	Probe path		RF measurement
Y [✓]	N [ ]	H-Field value		Record Maximum H-field@2450 MHz

7. SAR SYSTEM CHECK

7.1. Introduction

The System Check Test of SAR Test System will be carried out at the MORLAB site. The purpose of the tests is to finalize the full compliance of the SAR test system with the specification as defined in the offer.

System check includes functional tests (hardware), operational tests (hardware and software) and system tests (hardware and software) on a mobile phone. This mobile phone delivered by MORLAB has to be compliance to tested frequency bands

7.2. Remote Mobile Phone Emulation

This test has to demonstrate the accuracy of OPENSAR software for piloting remotely the GSM TEST SET.

A SIM card is place on the mobile phone and the software emulates the local network.

Compliance: YES ☑ NOT ☐

The mobile phone is remotely control and OPENSAR emulate frequency hoping.

Compliance: YES ☑ NOT ☐

7.3. SAR measurement on Mobile Phone @ 900 MHz

MOBILE MEASUREMENT @ 900				
Acceptance		**VALIDATION**	**EQUIPMENT**	**ACTION**
Y [✓]	N [ ]		Mobile	Integrate SIM card
Y [✓]	N [ ]	Network emulator	OpenSAR	Set GSM900 band
Y [✓]	N [ ]		Mobile	Take the call
Y [✓]	N [ ]	Mobile holder		Position mobile
Y [✓]	N [ ]	Right ear phantom path	OpenSAR	Adaptative path
Y [✓]	N [ ]	OpenSAR		Report generation

7.4. SAR measurement on Mobile Phone @ 1800 MHz

MOBILE MEASUREMENT @ 1800				
Acceptance		VALIDATION	EQUIPMENT	ACTION
Y [✓]	N [ ]		Mobile	Integrate SIM card
Y [✓]	N [ ]	Network emulator	OpenSAR	Set GSM1800 band
Y [✓]	N [ ]		Mobile	Take the call
Y [✓]	N [ ]	Mobile holder		Position mobile
Y [✓]	N [ ]	Right ear phantom path	OpenSAR	Adaptative path
Y [✓]	N [ ]	OpenSAR		Report generation

8. HAC SYSTEM CHECK

8.1. Introduction

The System Check Test of HAC Test System will be carried out at the HONHER site. The purpose of the tests is to finalize the full compliance of the HAC test system with the specification as defined in the offer.

System check includes functional tests (hardware), operational tests (hardware and software) and system tests (hardware and software) on a mobile phone. This mobile phone delivered by HONHER has to be compliance to 900/1800 MHz frequency bands

8.2. Remote Mobile Phone Emulation

This test has to demonstrate the accuracy of HAC software for piloting remotely the GSM TEST SET.

A SIM card is place on the mobile phone and the software emulates the local network.

Compliance: YES ☑ NOT ☐

The mobile phone is remotely control and OPENSAR emulate frequency hoping.

Compliance: YES ☑ NOT ☐

8.3. E-Field measurement

MOBILE MEASUREMENT @ 900				
Acceptance		VALIDATION	EQUIPMENT	ACTION
Y [✓]	N [ ]		Mobile	Integrate SIM card
Y [✓]	N [ ]	Network emulator	HAC	Set GSM900 band
Y [✓]	N [ ]		Mobile	Take the call
Y [✓]	N [ ]	Mobile holder		Position mobile
Y [✓]	N [ ]	50*50 mm grid	HAC	2D scan
Y [✓]	N [ ]	HAC		Report generation

MOBILE MEASUREMENT @ 1800				
Acceptance		VALIDATION	EQUIPMENT	ACTION
Y [✓]	N [ ]		Mobile	Integrate SIM card
Y [✓]	N [ ]	Network emulator	HAC	Set GSM1800 band
Y [✓]	N [ ]		Mobile	Take the call
Y [✓]	N [ ]	Mobile holder		Position mobile
Y [✓]	N [ ]	50*50 mm grid	HAC	Adaptative path
Y [✓]	N [ ]	OpenSAR		Report generation

8.4. H-Field measurement

MOBILE MEASUREMENT @ 900				
Acceptance		VALIDATION	EQUIPMENT	ACTION
Y [✓]	N [ ]		Mobile	Integrate SIM card
Y [✓]	N [ ]	Network emulator	OpenHAC	Set GSM900 band
Y [✓]	N [ ]		Mobile	Take the call
Y [✓]	N [ ]	Mobile holder		Position mobile
Y [✓]	N [ ]	50*50 mm grid	OpenHAC	2D scan
Y [✓]	N [ ]	HAC		Report generation

MOBILE MEASUREMENT @ 1800				
Acceptance		VALIDATION	EQUIPMENT	ACTION
Y [✓]	N [ ]		Mobile	Integrate SIM card
Y [✓]	N [ ]	Network emulator	HAC	Set GSM1800 band
Y [✓]	N [ ]		Mobile	Take the call
Y [✓]	N [ ]	Mobile holder		Position mobile
Y [✓]	N [ ]	50*50 mm grid	OpenHAC	Adaptative path
Y [✓]	N [ ]	OpenSAR		Report generation

8.5. T-Coil measurement

MOBILE MEASUREMENT @ 900				
Acceptance		VALIDATION	EQUIPMENT	ACTION
Y [✓]	N [ ]		Mobile	Integrate SIM card
Y [✓]	N [ ]	Network emulator	OpenHAC	Set GSM900 band
Y [✓]	N [ ]		Mobile	Take the call
Y [✓]	N [ ]	Mobile holder		Position mobile
Y [✓]	N [ ]	50*50 mm grid	OpenHAC	2D scan
Y [✓]	N [ ]	HAC		Report generation

MOBILE MEASUREMENT @ 1800				
Acceptance		VALIDATION	EQUIPMENT	ACTION
Y [✓]	N [ ]		Mobile	Integrate SIM card
Y [✓]	N [ ]	Network emulator	OpenHAC	Set GSM1800 band
Y [✓]	N [ ]		Mobile	Take the call
Y [✓]	N [ ]	Mobile holder		Position mobile
Y [✓]	N [ ]	50*50 mm grid	OpenHAC	Adaptative path
Y [✓]	N [ ]	OpenSAR		Report generation

INITIAL TEST ON SYSTEM

We hereby certify the correct functioning of the SAR test system.

The initial test of the test system is regarded as being (please mark):

☐ Accepted without open points

☐ Accepted with the following open points:

Date

2008.11.14

FOR SATIMO:

FOR MORLAB:

SYSTEM VALIDATION

We hereby certify the correct functioning of the SAR test system.

The initial test of the test system is regarded as being (please mark):

☐ Accepted without open points

☐ Accepted with the following open points:

Date

2008.11.14

FOR SATIMO:

FOR MORLAB:

SYSTEM CHECK

We hereby certify the correct functioning of the SAR test system.

The initial test of the test system is regarded as being (please mark):

☐ Accepted without open points

☐ Accepted with the following open points:

Date

08.11.19

FOR SATIMO:

FOR MORLAB: