COMOHAC E-FIELD PROBE CALIBRATION REPORT

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Project Description: HAC TEST BENCH

Prepared For (End User): Shenzhen Morlab Communication Technology

COMOHAC E-FIELD PROBE CALIBRATION REPORT

DATE: 14/11/2009

REFERENCE: SN 41/08 EPH17

OBJECT: COMOHAC E-FIELD PROBE

MANUFACTURER: SATIMO

SERIAL NUMBER: SN 41/08 EPH17

CUSTOMER: Shenzhen Morlab Communication Technology

CONTRACT: PF2130108b_SAR_Morlab

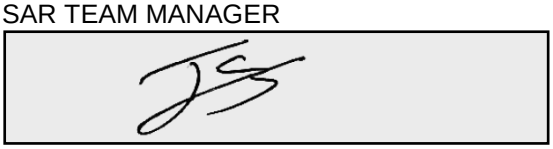
DATE OF CALIBRATION: 24/09/2009

WARRANTY:

Date

2009/10/05

SAR TEAM MANAGER



SATIMO Bretagne
Technopôle Brest Iroise
Zone du Vernis
225 rue Pierre Rivoalon
29200 BREST

PRODUCT DESCRIPTION

Frequency Range	100 MHz - 3 GHz
Probe length	330 mm
Length of one dipole	3.3 mm
Maximum external diameter	8 mm
Probe extremity diameter	6 mm
Distance between dipoles/probe extremity	3 mm
Resistance of the three dipole (at the connector)	Dipole 1: R1=2.1807 MΩ Dipole 2: R2=2.0612 MΩ Dipole 3: R3=2.1892 MΩ
Connector (HIROSE series SR30)	6 wire male (Hirose SR30series)

The probe could be checked by measuring the resistance of the three dipoles.

CALIBRATION TEST EQUIPMENT

TYPE	IDENTIFICATION
Calibration bench	SATIMO AIR CALIBRATION SOFTWARE
Multimeter	Keithley 2000

MEASUREMENT PROCEDURE

Probe calibration is realized by using the waveguide method. The probe was inserted in a waveguide loading by a 50 load. By controlling the input power in the waveguide, we are able to create a know E-Field value in the waveguide. ,

Keithley configuration:

Rate = Medium; Filter =ON; RDGS=10; FILTER TYPE =MOVING AVERAGE; RANGE AUTO

PROBE UNCERTAINTIES

Calibration report of dosimetric SATIMO probe

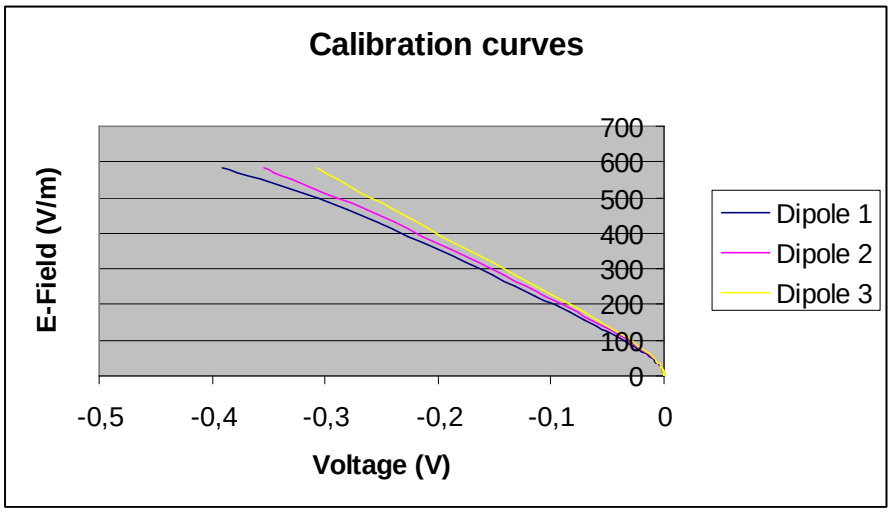
Uncertainty on calibration system

ERROR SOURCES	Uncertainty value (%)	Probability Distribution	Divisor	ci	Standard Uncertainty (%)
Incident or forward power	3,00%	Rectangular	$\sqrt{3}$	1	1,732%
Reflected power	3,00%	Rectangular	$\sqrt{3}$	1	1,732%
Field homogeneity	3,00%	Rectangular	$\sqrt{3}$	1	1,732%
Field probe positioning	5,00%	Rectangular	$\sqrt{3}$	1	2,887%
Field probe linearity	3,00%	Rectangular	$\sqrt{3}$	1	1,732%
Combined standard uncertainty					4,509%
Expanded uncertainty (confidence interval of 95%)					8,838%

A. Calibration parameters 800-2450 MHz.

Temperature	21℃
Cable loss	0.00 dB
Coupler loss	20.30 dB
Low limit detection	1.91 V/m

Calibration curves ei=f(V) (i=1,2,3) allow to obtain E-field value using the formula:
E=(e1*e1+e2*e2+e3*e3)pow(1/2)



The following tables represent the calibration curves linearization by curve segment in CW signal.

Calibration coefficients for the three dipoles in CW:

v1	e1	v2	e2	v3	e3
-0,391059	583,917909	-0,354339	583,917909	-0,306717	583,917909
-0,378181	571,371919	-0,346227	571,371919	-0,300527	571,371919
-0,357013	551,074564	-0,330481	551,074564	-0,289309	551,074564
-0,331842	526,648093	-0,310342	526,648093	-0,275382	526,648093
-0,30612	498,442358	-0,288505	498,442358	-0,259231	498,442358
-0,279772	465,543452	-0,263918	465,543452	-0,239942	465,543452
-0,253089	428,936208	-0,237544	428,936208	-0,218233	428,936208
-0,226841	392,389511	-0,213691	392,389511	-0,196671	392,389511
-0,200327	353,811786	-0,188228	353,811786	-0,173755	353,811786
-0,175179	316,614131	-0,163997	316,614131	-0,151754	316,614131
-0,152236	282,250491	-0,141951	282,250491	-0,131536	282,250491
-0,131655	251,273729	-0,122246	251,273729	-0,113368	251,273729
-0,114288	225,321775	-0,106239	225,321775	-0,098262	225,321775
-0,098166	200,556749	-0,09081	200,556749	-0,084047	200,556749
-0,083761	178,106966	-0,076961	178,106966	-0,071298	178,106966
-0,071086	158,100238	-0,064944	158,100238	-0,060184	158,100238
-0,059706	139,817731	-0,054276	139,817731	-0,050265	139,817731
-0,050587	125,051541	-0,045935	125,051541	-0,042367	125,051541
-0,042039	110,684861	-0,037963	110,684861	-0,035009	110,684861
-0,034878	98,193414	-0,031308	98,193414	-0,028847	98,193414
-0,028753	86,981497	-0,025682	86,981497	-0,023631	86,981497
-0,023561	77,117391	-0,020891	77,117391	-0,019237	77,117391
-0,019292	68,625926	-0,01709	68,625926	-0,015679	68,625926
-0,01569	60,891251	-0,013801	60,891251	-0,012687	60,891251
-0,012702	54,088086	-0,011137	54,088086	-0,01022	54,088086
-0,010229	47,945649	-0,008932	47,945649	-0,008192	47,945649
-0,008235	42,632657	-0,007168	42,632657	-0,006573	42,632657
-0,00665	38,021403	-0,005791	38,021403	-0,005295	38,021403
-0,005333	33,81729	-0,004629	33,81729	-0,004243	33,81729
-0,004257	30,037008	-0,003689	30,037008	-0,003378	30,037008
-0,003404	26,719225	-0,00295	26,719225	-0,002696	26,719225
-0,002717	23,778972	-0,002353	23,778972	-0,002165	23,778972
-0,002177	21,206988	-0,001894	21,206988	-0,001727	21,206988
-0,001752	18,888081	-0,001512	18,888081	-0,001387	18,888081
-0,001393	16,823167	-0,001207	16,823167	-0,001108	16,823167
-0,001118	14,986399	-0,000967	14,986399	-0,000886	14,986399
-0,00089	13,328016	-0,000771	13,328016	-0,000717	13,328016
-0,000718	11,923626	-0,000629	11,923626	-0,000574	11,923626
-0,00059	10,624355	-0,0005	10,624355	-0,000465	10,624355
-0,000466	9,444142	-0,000408	9,444142	-0,000374	9,444142
-0,000379	8,395302	-0,000328	8,395302	-0,000303	8,395302
-0,000306	7,482718	-0,000283	7,482718	-0,000257	7,482718
-0,000264	6,700794	-0,000198	6,700794	-0,000202	6,700794

-0,000217	5,96914	-0,000184	5,96914	-0,000169	5,96914
-0,000168	5,31289	-0,000156	5,31289	-0,000145	5,31289
-0,000145	4,736317	-0,000127	4,736317	-0,000119	4,736317
-0,00012	4,209201	-0,000106	4,209201	-9,90E-05	4,209201
-0,000103	3,790967	-9,10E-05	3,790967	-7,30E-05	3,379958
-8,80E-05	3,379958	-7,20E-05	3,005176	-5,70E-05	2,383219
-6,60E-05	2,678018	-5,40E-05	2,383219	-5,20E-05	2,122917
-6,20E-05	2,383219	-5,00E-05	2,122917	-4,90E-05	1,89355
-5,60E-05	2,122917	-3,50E-05	1,061153	-4,80E-05	1,685858
-5,40E-05	1,89355			-4,00E-05	1,061153
-4,40E-05	1,189676				

B. Isotropy.

- Axial isotropy: 0.05 dB

C. Linearity.

- Linearity: 0.11 dB