SIMT 上海市计量测试技术研究院

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COMOSAR SEPT ISOTROPIC E-FIELD PROBE CALIBRATION REPORT

DATE : 13/02/2007

REFERENCE : SN 12/05 EP42

OBJECT : COMOSAR SEPT ISOTROPIC E-FIELD PROBE

MANUFACTURER : ANTENNESSA

SERIAL NUMBER : SN 12/05 EP42

ORDER :

DATE OF CALIBRATION : 12/02/2007

WARRANTY :

DIRECTOR:

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PRODUCT DESCRIPTION

Frequency Range	100 MHz - 30 GHz
Probe length	330 mm
Length of one dipole	4.5 mm
Maximum external diameter	8 mm
Probe extremity diameter	6.5 mm
Distance between dipoles/probe extremity	< 2.7 mm
Resistance of the three dipole (at the connector)	Dipole 1: R1=1.301 MΩ Dipole 2: R2=1.403 MΩ Dipole 3: R3=1.312 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	CALISAR
Multimeter	Keithley 2000

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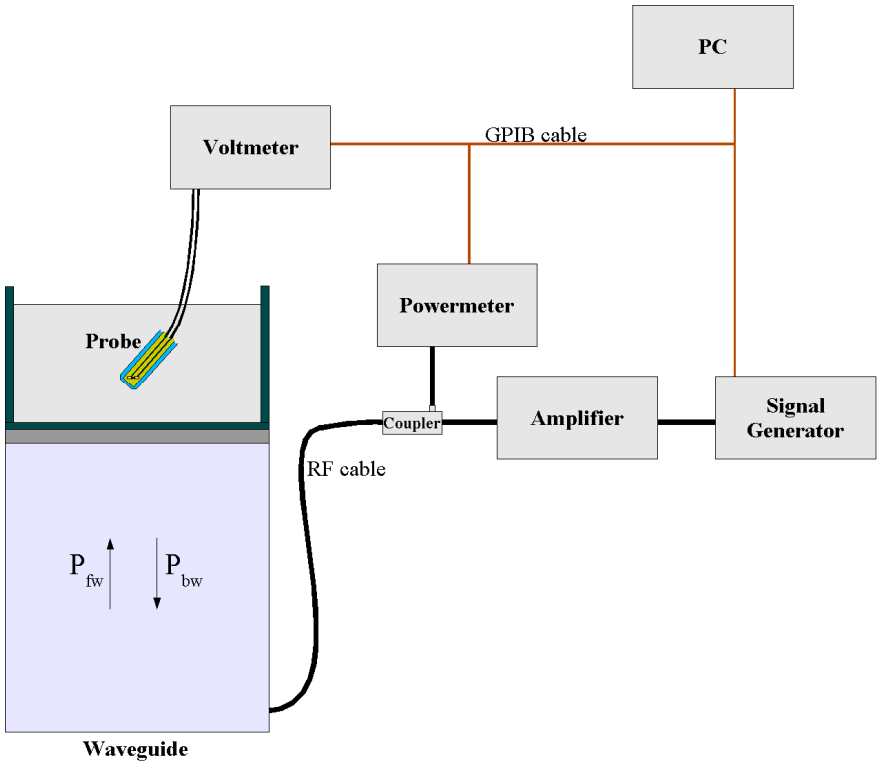
MEASUREMENT PROCEDURE

Probe calibration is realized, in compliance with CENELEC EN 50361 and IEEE 1528 std, with CALISAR, Antennessa proprietary calibration system. The calibration is performed with the EN 50361 annexe technique using reference guide at the five frequencies.



$$SAR = \frac{4\,(P_{fw} - P_{bw})}{ab\delta} \cos^2\left(\pi \frac{y}{a}\right) e^{-(2z/\delta)}$$

Where :

P_{fw} = Forward Power
P_{bw} = Backward Power
a and b = Waveguide dimensions
δ = Skin depth

Keithley configuration:

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

After each calibration, a SAR measurement is performed on a validation dipole and compared with a NPL calibrated probe, to chack it.

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PROBE UNCERTAINTIES

Calibration report of dosimetric Antennessa probe

Uncertainty analysis for the evaluation of reference antenna gain						
ERROR SOURCES	**Description (Section)**	**Uncertainty value (%)**	**Probability Distribution**	**Divisor**	**ci**	**Standard Uncertainty (%)**
Incident Power	B.2.2	0,20%	Rectangular	$\sqrt{3}$	1	0,115%
Reflection coefficients	B.2.2	0,75%	Rectangular	$\sqrt{3}$	1	0,433%
Distance	B.2.2	2,50%	Rectangular	$\sqrt{3}$	1	1,443%
Liquid Permittivity	B.2.2	3,00%	Rectangular	$\sqrt{3}$	1	1,732%
Combined standard uncertainty	B.2.2					2,299%
Expanded uncertainty (confidence interval of 95%)	B.2.2					4,506%

Uncertainty analysis for the technique using reference antennas						
ERROR SOURCES	**Description (Section)**	**Uncertainty value (%)**	**Probability Distribution**	**Divisor**	**ci**	**Standard Uncertainty (%)**
Incident Power	B.2.2	0,20%	Rectangular	$\sqrt{3}$	1	0,200%
Reflection coefficients	B.2.2	0,75%	Rectangular	$\sqrt{3}$	1	0,433%
Antenna Gain	B.2.2	2,50%	Normal	1	1	2,500%
Liquid Permittivity	B.2.2	3,00%	Rectangular	$\sqrt{3}$	0	1,732%
Probe Positioning	B.2.2	2,50%	Rectangular	$\sqrt{3}$	1	1,443%
Combined standard uncertainty	B.2.2					2,926%
Expanded uncertainty (confidence interval of 95%)	B.2.2					5,735%

Uncertainty on measurement system						
ERROR SOURCES	**Description (Section)**	**Uncertainty value (%)**	**Probability Distribution**	**Divisor**	**ci**	**Standard Uncertainty (%)**
Probe Calibration	7.2.1.	5,73%	Normal	1	1	5,735%
Axial Isotropy	7.2.1.	5,00%				
Hemispherical Isotropy	7.2.1.	10,00%				
Total Isotropy	7.2.1.	7,50%	Rectangular	$\sqrt{3}$	1	4,330%
Linearity	7.2.1.	4,60%	Rectangular	$\sqrt{3}$	1	2,656%
Detection Limits	7.2.1.	0,50%	Rectangular	$\sqrt{3}$	1	0,289%
Boundary Effect	7.2.1.	0,50%	Rectangular	$\sqrt{3}$	1	0,289%
Readout Electronics	7.2.1.	0,02%	Normal	1	1	0,020%
Response Time	7.2.1.	0,50%	Normal	1	1	0,500%
Noise	7.2.1.	0,50%	Normal	1	1	0,500%
Integration Time	7.2.1.	0,50%	Normal	1	1	0,500%
Combined standard uncertainty						7,721%
Expanded uncertainty (confidence interval of 95%)						15,132%

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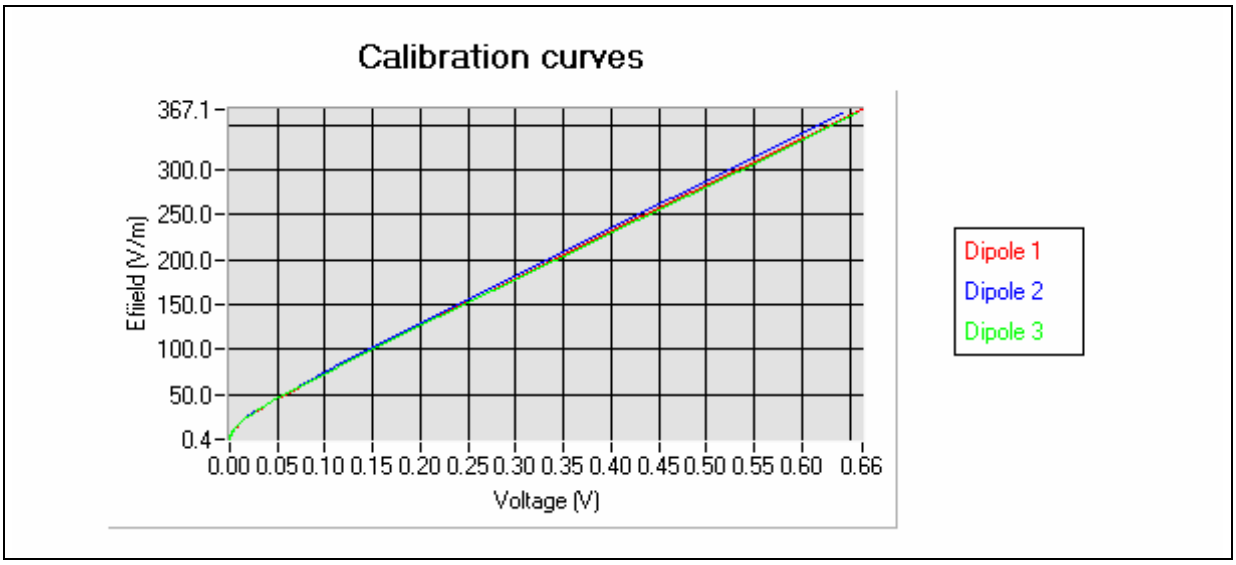
1. Calibration at 835.00 MHz

A. Calibration parameters.

Label	GSM850
Epsilon	43.41
Sigma	0.91 S/m
Temperature	21°C
Cable loss	0.00 dB
Coupler loss	20.50 dB
Waveguide S11	-13.70 dB
Low limit detection	0.73 V/m (0.49 mW/kg)

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 linearisation by curve segment in CW signal.

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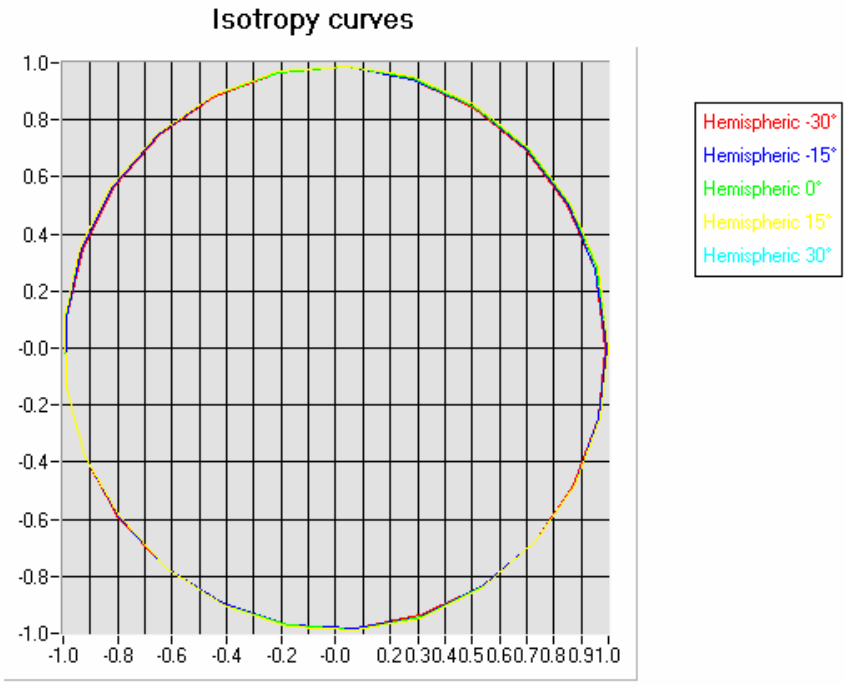
Calibration coefficients for the three dipoles in CW:

v1	e1	v2	e2	v3	e3
0.663662	367.127583	0.643538	363.495807	0.657584	362.615893
0.537478	302.011016	0.511269	294.058594	0.532727	298.546152
0.432809	247.914344	0.411373	241.520088	0.428098	244.767754
0.346250	203.074569	0.333598	200.511997	0.340905	199.839184
0.274978	166.027529	0.268019	165.809876	0.275168	165.845605
0.221203	137.938818	0.213905	137.022519	0.219797	137.067623
0.179687	116.113420	0.170122	113.554364	0.176383	114.342794
0.143941	97.153792	0.138298	96.324751	0.142262	96.311120
0.114454	81.317115	0.109781	80.677757	0.114125	81.250888
0.073256	58.452202	0.070676	58.519536	0.072827	58.452202
0.062379	52.275822	0.060093	52.336041	0.061974	52.275822
0.053008	46.967871	0.051096	46.913828	0.052766	46.913828
0.045230	42.247486	0.043477	42.296154	0.044929	42.247486
0.038553	38.132992	0.036980	38.176919	0.038264	38.176919
0.032683	34.379604	0.031295	34.419209	0.032420	34.419209
0.027541	30.959995	0.026326	30.995659	0.027307	30.959995
0.022915	27.720488	0.021885	27.752421	0.022715	27.752421
0.018758	24.677484	0.017906	24.734371	0.018585	24.734371
0.014998	21.742069	0.014299	21.817294	0.014866	21.792189
0.011179	18.462941	0.010617	18.484210	0.011049	18.484210
0.009084	16.493046	0.008623	16.531066	0.008980	16.531066
0.007404	14.801335	0.007024	14.835454	0.007317	14.818385
0.006051	13.313765	0.005736	13.344455	0.005982	13.344455
0.004960	12.003305	0.004699	12.030976	0.004901	12.030976
0.004055	10.821834	0.003843	10.846781	0.004007	10.846781
0.003299	9.734214	0.003125	9.756653	0.003258	9.756653
0.002654	8.715672	0.002510	8.745827	0.002624	8.735764
0.002109	7.758913	0.001997	7.776799	0.002081	7.776799
0.001634	6.828116	0.001547	6.843856	0.001607	6.843856
0.001136	5.692472	0.001070	5.699030	0.001116	5.699030
0.000904	5.090974	0.000851	5.102710	0.000890	5.096839
0.000726	4.574050	0.000684	4.573791	0.000714	4.579319
0.000584	4.119086	0.000550	4.120519	0.000575	4.124160
0.000472	3.710338	0.000442	3.715163	0.000461	3.712009
0.000380	3.347550	0.000357	3.361938	0.000373	3.359454
0.000304	3.015109	0.000287	3.040387	0.000295	3.012664
0.000235	2.677779	0.000219	2.691486	0.000233	2.705486
0.000185	2.403937	0.000170	2.408948	0.000179	2.406201
0.000135	2.094595	0.000123	2.102564	0.000133	2.118160
0.000097	1.824753	0.000087	1.833584	0.000090	1.807869
0.000075	1.648462	0.000068	1.674290	0.000074	1.677826
0.000056	1.479400	0.000048	1.488307	0.000048	1.441703
0.000041	1.330845	0.000029	1.286963	0.000038	1.339851
0.000031	1.221815	0.000024	1.228506	0.000027	1.218018
0.000021	1.102051	0.000014	1.102329	0.000016	1.082558
0.000012	0.981851	0.000003	0.944259	0.000009	0.986721
0.000006	0.892771	-0.000005	0.804545	0.000002	0.880513
-0.000002	0.757883	-0.000011	0.692350	-0.000005	0.759853

-0.000007	0.651508	-0.000015	0.596469	-0.000010	0.657987
-0.000011	0.560664	-0.000018	0.510253	-0.000014	0.569458
-0.000014	0.478989	-0.000021	0.441075	-0.000017	0.483672
-0.000017	0.408614			-0.000019	0.415655

B. Isotropy.

- Axial isotropy: 0.03 dB
- Hemispherical isotropy: 0.04 dB



C. Linearity

- Linearity: 0.15 dB

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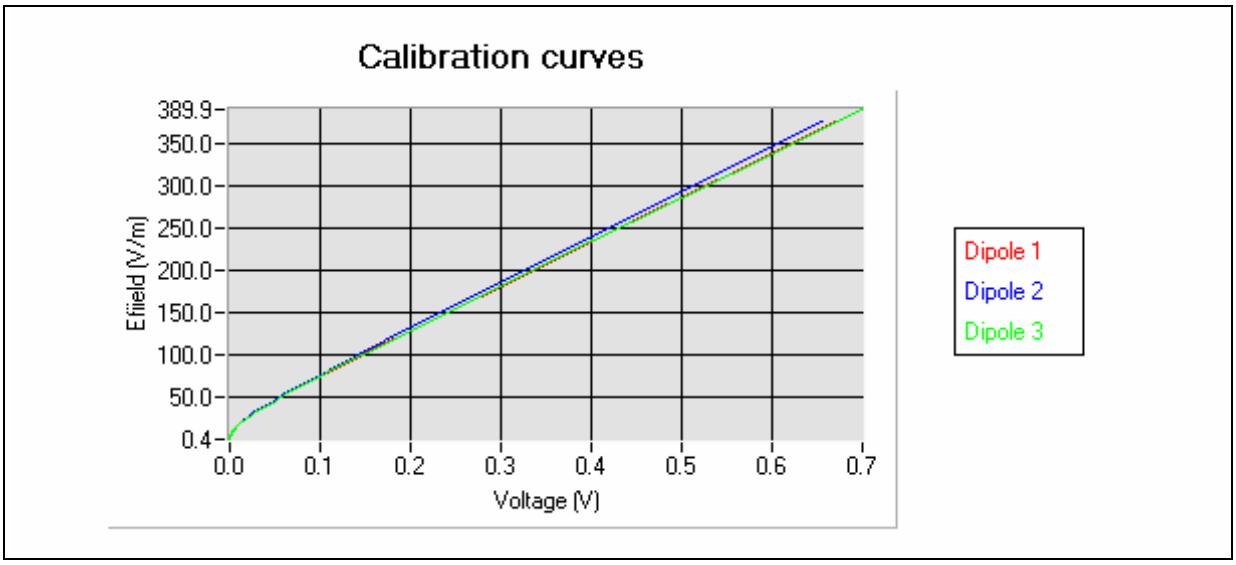
2. Calibration at 897.00 MHz

A. Calibration parameters.

Label	GSM900
Epsilon	49.62
Sigma	0.99 S/m
Temperature	21°C
Cable loss	0.00 dB
Coupler loss	20.30 dB
Waveguide S11	-16.90 dB
Low limit detection	0.74 V/m (0.54 mW/kg)

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 linearisation by curve segment in CW signal.

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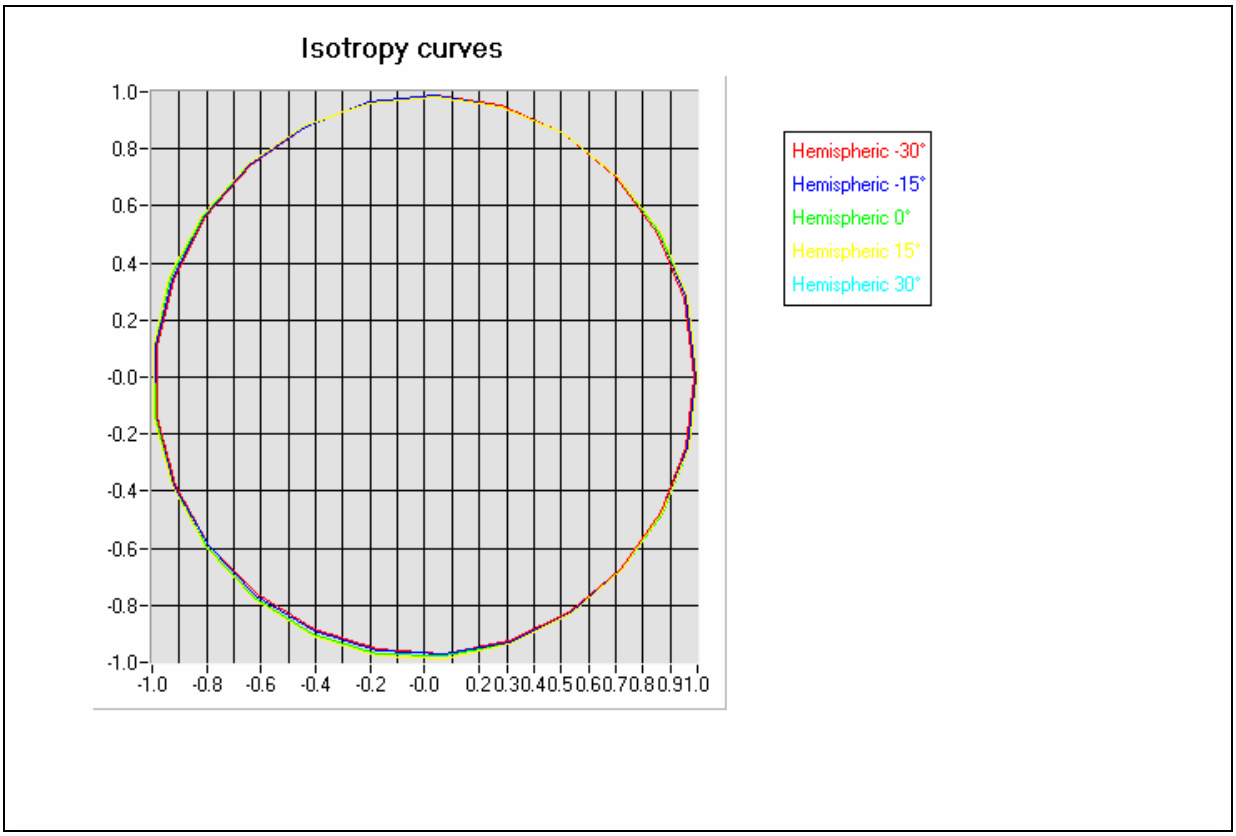
Calibration coefficients for the three dipoles in CW:

v1	e1	v2	e2	v3	e3
0.671835	375.206220	0.654699	375.592541	0.699875	389.894745
0.540865	306.988743	0.520020	303.762641	0.555597	314.790049
0.429512	248.893860	0.416576	248.490689	0.444127	256.670914
0.345754	205.090232	0.335690	205.159118	0.356546	210.901224
0.278548	169.824859	0.269605	169.625481	0.286945	174.408967
0.224252	141.198268	0.214629	139.906014	0.227979	143.344347
0.182245	118.907556	0.171453	116.386155	0.183603	119.808725
0.146813	99.940471	0.137157	97.508576	0.147409	100.438223
0.117907	84.279790	0.109877	82.283514	0.118837	84.961099
0.094115	71.178673	0.088935	70.386940	0.094838	71.748790
0.060782	52.167492	0.058026	52.227586	0.060587	52.167492
0.051515	46.655189	0.049098	46.708934	0.051338	46.708934
0.043689	41.917942	0.041549	41.966230	0.043507	41.966230
0.037027	37.748523	0.035155	37.748523	0.036861	37.748523
0.031383	34.072183	0.029749	34.072183	0.031236	34.072183
0.026463	30.718496	0.025041	30.718496	0.026335	30.753883
0.022194	27.631214	0.020950	27.663044	0.022063	27.663044
0.018370	24.768514	0.017315	24.797046	0.018256	24.797046
0.014966	22.074961	0.014080	22.074961	0.014872	22.100391
0.011906	19.449120	0.011193	19.471525	0.011835	19.471525
0.008828	16.477828	0.008276	16.496809	0.008761	16.496809
0.007149	14.753666	0.006692	14.753666	0.007090	14.753666
0.005812	13.240364	0.005438	13.240364	0.005758	13.240364
0.004742	11.909676	0.004430	11.909676	0.004695	11.923395
0.003880	10.737420	0.003616	10.737420	0.003841	10.749790
0.003163	9.680548	0.002953	9.680548	0.003136	9.691699
0.002564	8.717661	0.002396	8.717661	0.002547	8.717661
0.002062	7.805486	0.001922	7.805486	0.002044	7.814478
0.001638	6.948642	0.001521	6.948642	0.001621	6.956647
0.001266	6.115050	0.001177	6.115050	0.001251	6.122093
0.000877	5.103874	0.000815	5.103874	0.000864	5.103874
0.000697	4.564571	0.000642	4.564571	0.000691	4.569830
0.000562	4.106635	0.000514	4.099233	0.000552	4.107791
0.000448	3.688291	0.000414	3.703408	0.000442	3.698946
0.000361	3.333896	0.000326	3.316227	0.000354	3.335987
0.000288	3.004447	0.000262	3.003453	0.000281	3.001775
0.000228	2.703777	0.000208	2.711633	0.000222	2.701614
0.000174	2.401195	0.000158	2.410126	0.000171	2.412242
0.000135	2.156420	0.000119	2.145740	0.000128	2.138043
0.000096	1.880041	0.000087	1.901548	0.000090	1.862425
0.000068	1.653365	0.000057	1.639920	0.000062	1.629780
0.000047	1.460450	0.000039	1.460620	0.000049	1.509628
0.000033	1.316224	0.000025	1.304232	0.000028	1.292147
0.000025	1.226216	0.000014	1.166743	0.000023	1.234733
0.000012	1.063834	0.000009	1.098574	0.000013	1.111038
0.000008	1.008624	0.000003	1.010720	0.000005	1.001139
0.000000	0.887965	-0.000001	0.947637	0.000000	0.925851
-0.000007	0.763963	-0.000009	0.805896	-0.000008	0.785650

-0.000013	0.650154	-0.000014	0.694849	-0.000014	0.676426
-0.000017	0.557194	-0.000019	0.596813	-0.000018	0.584195
-0.000020	0.475097	-0.000021	0.515891	-0.000021	0.500883
-0.000022	0.410129	-0.000024	0.445502	-0.000023	0.425964

B. Isotropy.

- Axial isotropy: 0.05 dB
- Hemispherical isotropy: 0.06 dB



C. Linearity

- Linearity: 0.13 dB

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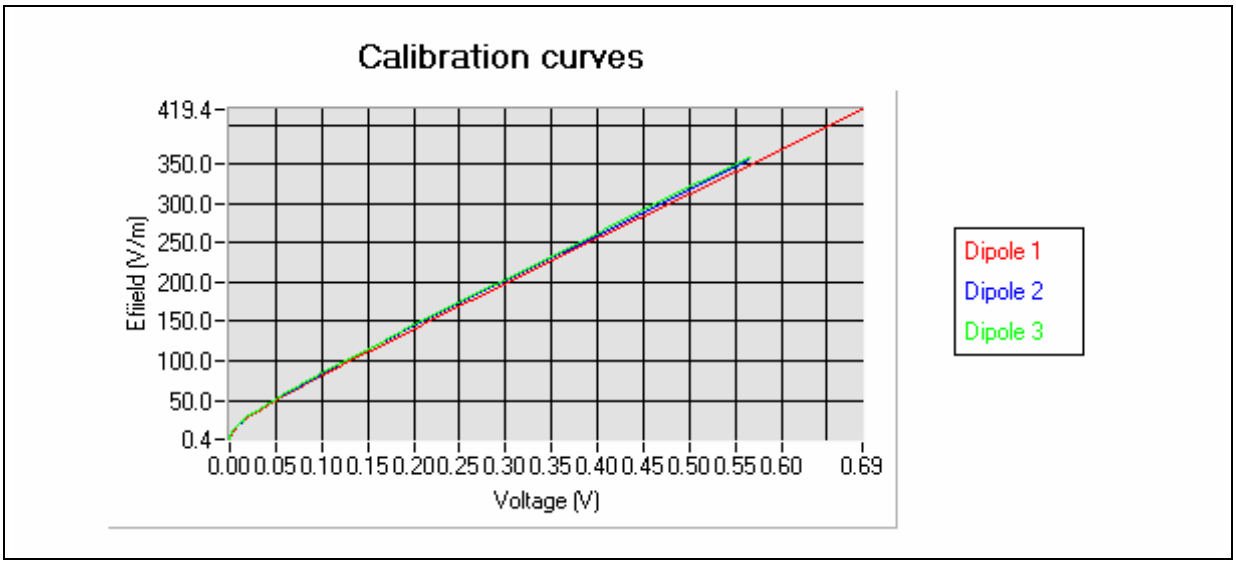
3. Calibration at 1747.00 MHz

A. Calibration parameters.

Label	GSM1800
Epsilon	39.10
Sigma	1.36 S/m
Temperature	21°C
Cable loss	0.00 dB
Coupler loss	20.18 dB
Waveguide S11	-14.16 dB
Low limit detection	0.78 V/m (0.83 mW/kg)

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 linearisation by curve segment in CW signal.

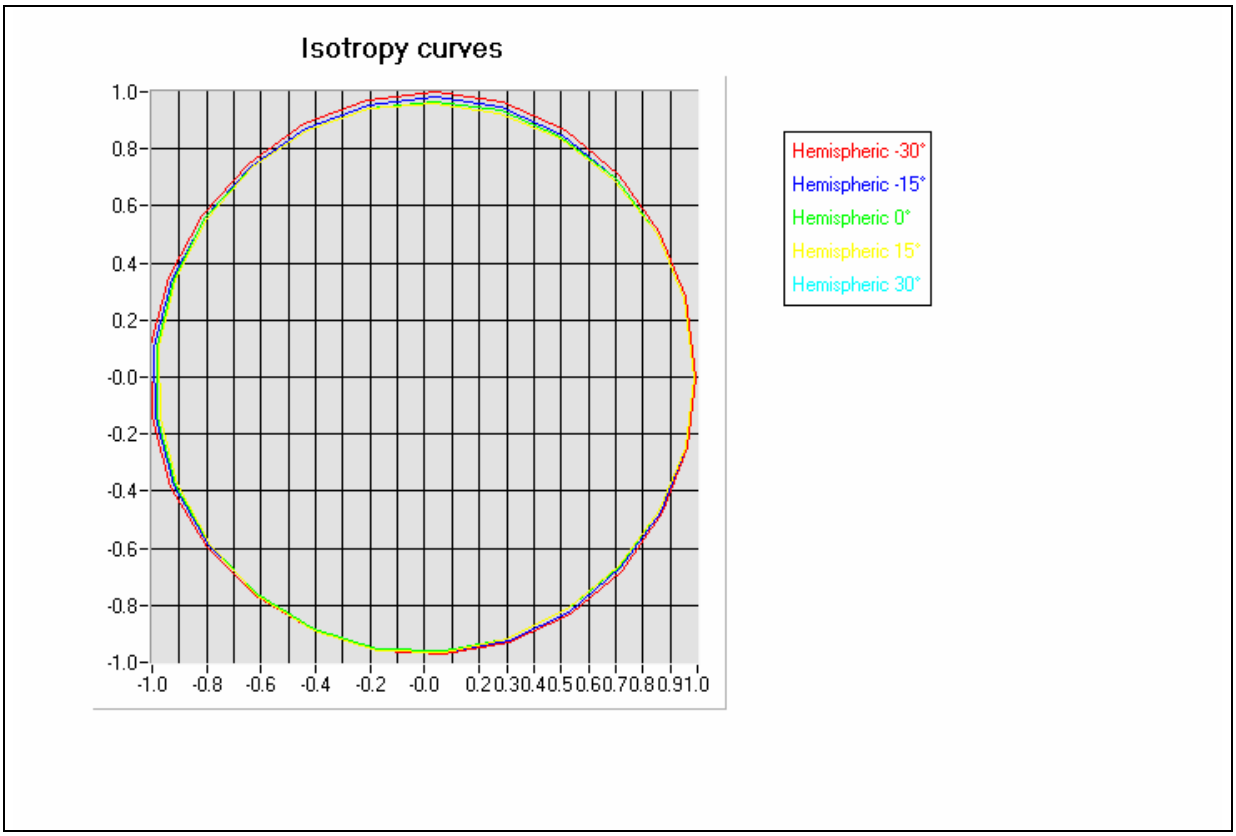
Calibration coefficients for the three dipoles in CW:

v1	e1	v2	e2	v3	e3
0.688348	419.405918	0.564106	355.099362	0.564970	359.252601
0.551388	341.419044	0.456021	292.479813	0.452001	293.015013
0.446381	281.537456	0.362406	238.120286	0.360509	239.250385
0.359326	231.786481	0.290404	196.169725	0.288483	196.787343
0.290888	192.554949	0.234357	163.364301	0.232200	163.454250
0.234582	160.138863	0.185998	134.870238	0.188091	137.170166
0.189920	134.271983	0.148515	112.575643	0.149477	113.958760
0.153211	112.836803	0.118390	94.429140	0.120856	96.549225
0.123456	95.268148	0.077585	69.335455	0.076951	69.096392
0.080389	69.255676	0.066794	62.438918	0.066245	62.223634
0.069306	62.367075	0.057457	56.293127	0.056987	56.163656
0.059706	56.228355	0.049415	50.869254	0.049252	50.986520
0.051460	50.869254	0.040138	44.509772	0.040028	44.561045
0.041888	44.509772	0.032703	39.170162	0.032621	39.170162
0.034202	39.125092	0.026775	34.670122	0.026705	34.710060
0.028032	34.630230	0.021967	30.828711	0.021917	30.864225
0.023033	30.793239	0.018035	27.507769	0.017987	27.539456
0.018930	27.476118	0.014834	24.629487	0.014803	24.686264
0.015592	24.629487	0.012212	22.128673	0.012181	22.154164
0.012842	22.103211	0.010066	19.904688	0.010042	19.950572
0.010592	19.904688	0.008309	17.966165	0.008288	17.986860
0.008746	17.945492	0.006856	16.235115	0.006839	16.253816
0.007221	16.216434	0.005284	14.189117	0.005283	14.205463
0.005579	14.172790	0.004126	12.472553	0.004114	12.486921
0.004356	12.458202	0.003246	11.026949	0.003239	11.039652
0.003419	11.014261	0.002572	9.816471	0.002562	9.827778
0.002717	9.793894	0.002049	8.737064	0.002048	8.759017
0.002160	8.738872	0.001639	7.830422	0.001633	7.851549
0.001728	7.824478	0.001319	7.042158	0.001314	7.046207
0.001390	7.021912	0.001063	6.341386	0.001060	6.336828
0.001122	6.323038	0.000862	5.731435	0.000858	5.726937
0.000903	5.699056	0.000660	5.044687	0.000657	5.047439
0.000696	5.038719	0.000500	4.425733	0.000494	4.420360
0.000517	4.388310	0.000378	3.888125	0.000370	3.875956
0.000397	3.891889	0.000287	3.432731	0.000284	3.448275
0.000301	3.443607	0.000223	3.072285	0.000217	3.074119
0.000229	3.064663	0.000169	2.731409	0.000165	2.748850
0.000175	2.746353	0.000130	2.455970	0.000125	2.469662
0.000129	2.442699	0.000101	2.229203	0.000090	2.196451
0.000097	2.206956	0.000081	2.058307	0.000072	2.041757
0.000069	1.977763	0.000035	1.597301	0.000045	1.784750
0.000049	1.796238	0.000016	1.356998	0.000030	1.624492
0.000029	1.594176	0.000002	1.164414	0.000013	1.421187
0.000012	1.399672	-0.000007	1.006920	0.000000	1.243489
0.000004	1.298095	-0.000014	0.862426	-0.000011	1.062303
-0.000009	1.113486	-0.000020	0.735689	-0.000019	0.915576
-0.000019	0.952835	-0.000024	0.634683	-0.000025	0.792057
-0.000025	0.824833	-0.000027	0.543188	-0.000030	0.676053

-0.000030	0.712861	-0.000029	0.467710	-0.000033	0.575750
-0.000034	0.615441			-0.000036	0.491805
-0.000037	0.529656			-0.000037	0.425814
-0.000039	0.454536				

B. Isotropy.

- Axial isotropy: 0.09 dB
- Hemispherical isotropy: 0.10 dB



C. Linearity

- Linearity: 0.17 dB

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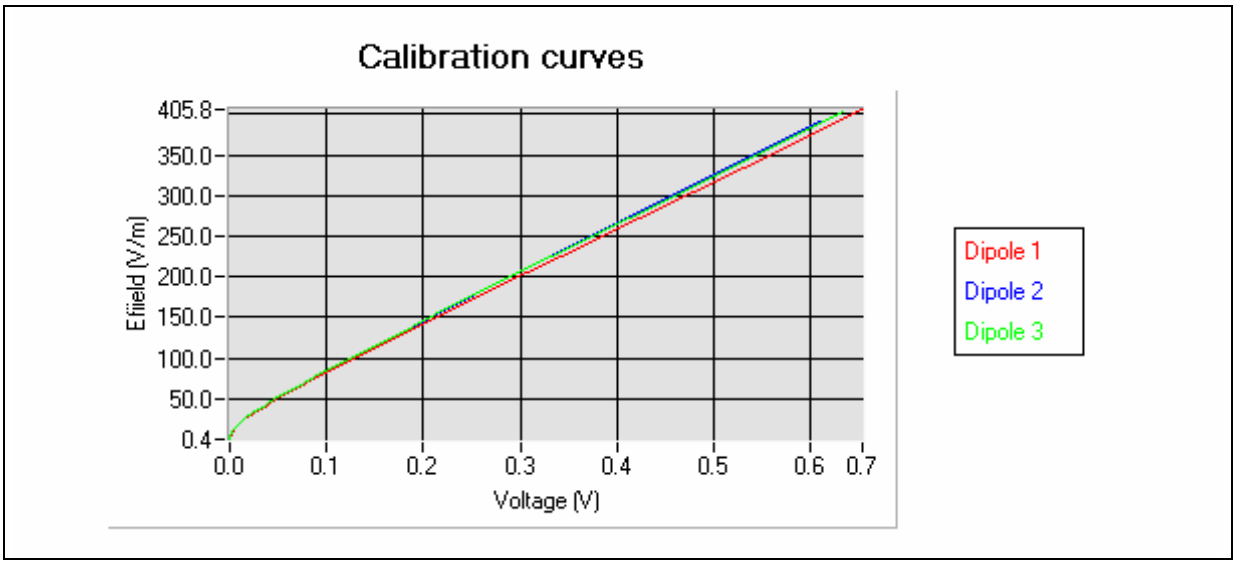
4. Calibration at 1880.00 MHz

A. Calibration parameters.

Label	GSM1900
Epsilon	38.80
Sigma	1.48 S/m
Temperature	21°C
Cable loss	0.00 dB
Coupler loss	20.13 dB
Waveguide S11	-26.40 dB
Low limit detection	0.77 V/m (0.88 mW/kg)

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 linearisation by curve segment in CW signal.

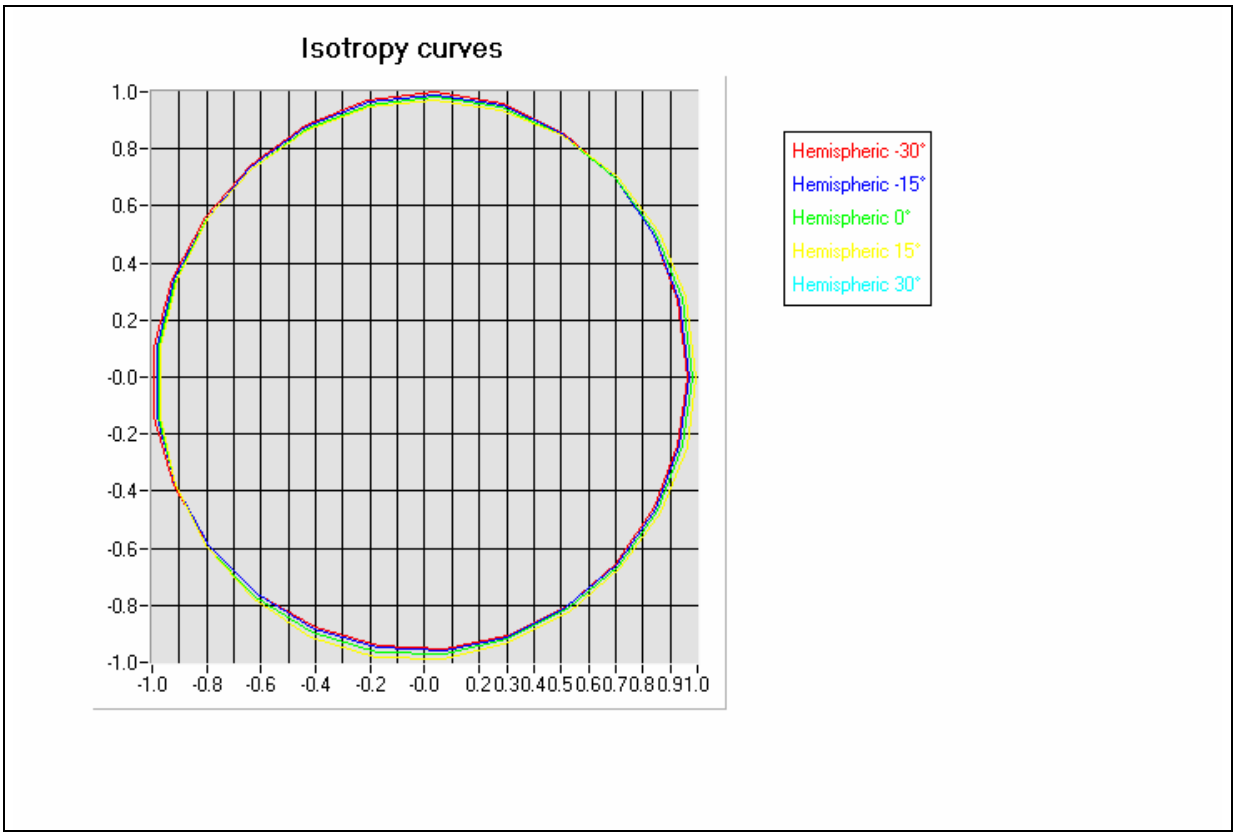
Calibration coefficients for the three dipoles in CW:

v1	e1	v2	e2	v3	e3
0.653000	405.761055	0.609948	390.722289	0.632281	403.346645
0.530634	334.858887	0.485885	316.972874	0.513179	332.677150
0.422069	271.854189	0.392381	261.285177	0.413203	273.257971
0.341928	225.236720	0.314434	214.739150	0.330764	224.141394
0.272250	184.570203	0.253745	178.359997	0.266191	185.531604
0.220360	154.140765	0.204525	148.699172	0.211979	152.952185
0.175596	127.715756	0.165074	124.750737	0.168990	126.926685
0.141697	107.519844	0.134011	105.710264	0.137374	107.602303
0.090795	76.456429	0.087668	76.456429	0.087985	76.632680
0.078828	69.089812	0.075744	68.930910	0.076054	69.089812
0.068140	62.289380	0.065368	62.217708	0.065652	62.289380
0.058855	56.352607	0.056613	56.352607	0.056814	56.482513
0.048110	49.250882	0.046191	49.307616	0.046392	49.364416
0.039439	43.292634	0.037794	43.342505	0.037979	43.392434
0.032462	38.274896	0.031037	38.274896	0.031218	38.363127
0.026773	34.034079	0.025570	34.073286	0.025721	34.112536
0.022082	30.367848	0.021066	30.367848	0.021190	30.437853
0.018249	27.190301	0.017388	27.221623	0.017490	27.252981
0.015080	24.401359	0.014349	24.429468	0.014443	24.485784
0.012472	21.974247	0.011851	21.974247	0.011926	22.024904
0.010324	19.811347	0.009803	19.834169	0.009870	19.857017
0.008561	17.923137	0.008120	17.923137	0.008177	17.964454
0.006630	15.664408	0.006288	15.664408	0.006334	15.700519
0.005177	13.769368	0.004909	13.769368	0.004940	13.801110
0.004073	12.159452	0.003866	12.173460	0.003892	12.201522
0.003232	10.812199	0.003063	10.824654	0.003084	10.849607
0.002575	9.647483	0.002445	9.658596	0.002460	9.669723
0.002063	8.638016	0.001960	8.638016	0.001968	8.657929
0.001659	7.752005	0.001579	7.752005	0.001579	7.769875
0.001337	6.963774	0.001272	6.980941	0.001283	6.997035
0.001085	6.298178	0.001030	6.287114	0.001030	6.296135
0.000815	5.496311	0.000780	5.502921	0.000783	5.523798
0.000616	4.820667	0.000589	4.818553	0.000585	4.816053
0.000469	4.253197	0.000448	4.243100	0.000453	4.279688
0.000356	3.759189	0.000344	3.762672	0.000341	3.765139
0.000273	3.350248	0.000268	3.368533	0.000264	3.366066
0.000211	3.008724	0.000204	2.996686	0.000199	2.987982
0.000154	2.656278	0.000159	2.704794	0.000151	2.674693
0.000117	2.399952	0.000118	2.408241	0.000118	2.436047
0.000085	2.153803	0.000087	2.157118	0.000081	2.137013
0.000064	1.975670	0.000063	1.940509	0.000063	1.975236
0.000042	1.769931	0.000047	1.781532	0.000041	1.757398
0.000022	1.559516	0.000026	1.548295	0.000027	1.603439
0.000004	1.342231	0.000013	1.384356	0.000015	1.458596
-0.000009	1.156931	0.000002	1.228671	-0.000002	1.224416
-0.000019	0.993492	-0.000009	1.050349	-0.000013	1.054044
-0.000026	0.857963	-0.000017	0.893126	-0.000020	0.905710
-0.000032	0.740301	-0.000023	0.773293	-0.000026	0.773887

-0.000036	0.632949	-0.000027	0.666516	-0.000031	0.667135
-0.000039	0.538763	-0.000030	0.574194	-0.000034	0.576466
-0.000041	0.466274	-0.000032	0.492067	-0.000036	0.494325
		-0.000034	0.425268	-0.000038	0.444977

B. Isotropy.

- Axial isotropy: 0.11 dB
- Hemispherical isotropy: 0.12 dB



C. Linearity

- Linearity: 0.18 dB

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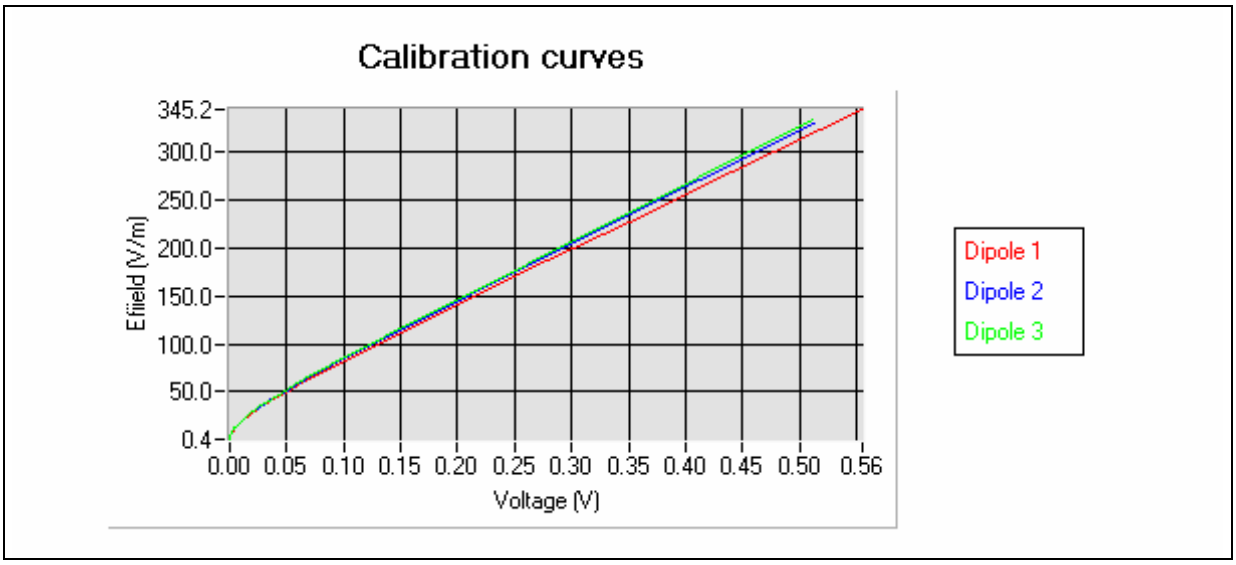
5. Calibration at 1950.00 MHz

A. Calibration parameters.

Label	IMT2000
Epsilon	394.77
Sigma	1.40 S/m
Temperature	21°C
Cable loss	0.00 dB
Coupler loss	20.07 dB
Waveguide S11	-37.80 dB
Low limit detection	0.74 V/m (0.76 mW/kg)

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 linearisation by curve segment in CW signal.

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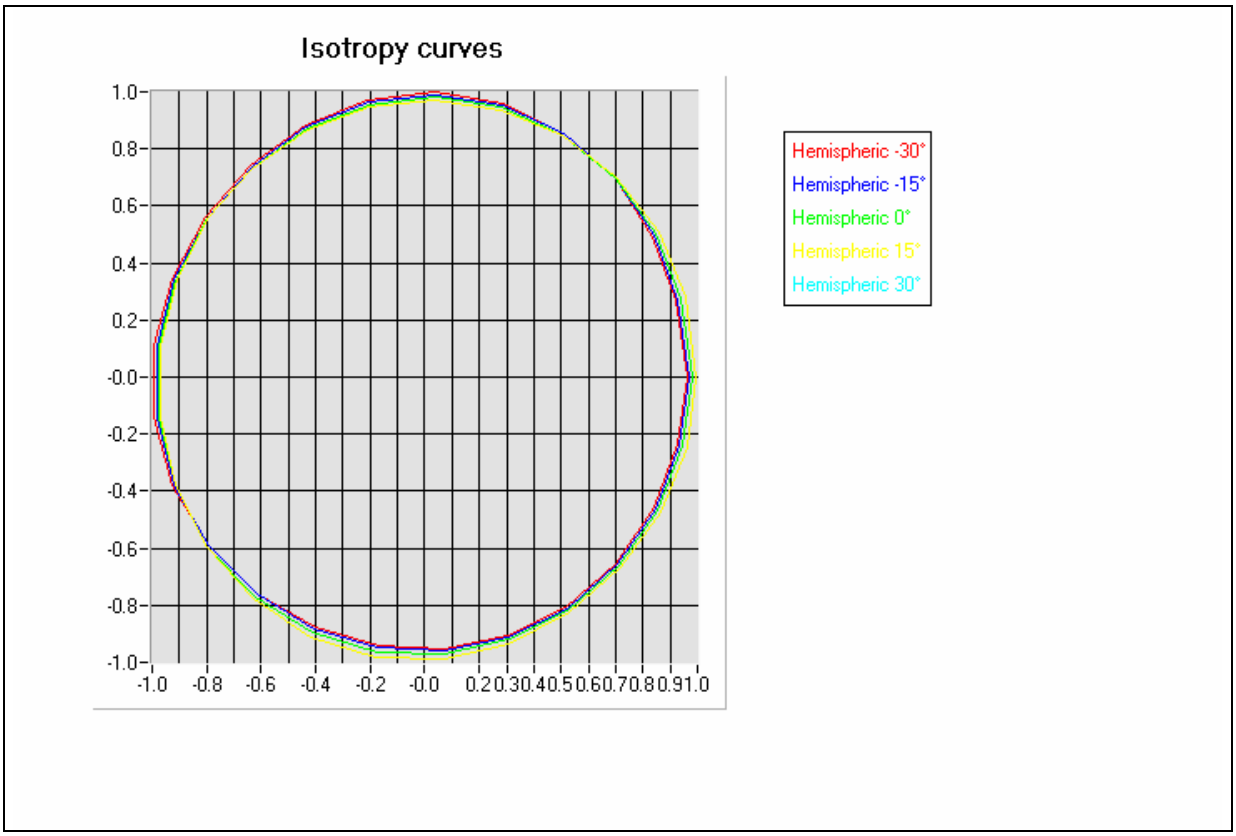
Calibration coefficients for the three dipoles in CW:

v1	e1	v2	e2	v3	e3
0.555139	345.166834	0.512170	329.441264	0.511958	334.215303
0.440932	279.724291	0.412326	270.587925	0.411172	273.898595
0.349987	227.488870	0.327437	220.422183	0.327330	223.594783
0.278939	186.541368	0.263584	182.548758	0.261482	183.940443
0.225976	155.874083	0.212350	152.005901	0.209177	152.276150
0.181594	130.010526	0.170957	127.156617	0.167573	126.905467
0.144607	108.259369	0.138934	107.751324	0.135634	107.238161
0.093235	77.649613	0.089886	77.381884	0.088495	77.560268
0.080708	69.765273	0.077492	69.604817	0.076328	69.684999
0.069731	62.970812	0.066901	62.681488	0.065882	62.898356
0.059833	56.642094	0.057670	56.642094	0.056307	56.511820
0.048961	49.446926	0.047105	49.503887	0.045985	49.390031
0.040146	43.515031	0.038553	43.515031	0.037596	43.364994
0.033056	38.427249	0.031689	38.427249	0.030882	38.383034
0.027263	34.169554	0.026108	34.169554	0.025448	34.090966
0.022486	30.488727	0.021504	30.488727	0.020940	30.418605
0.018577	27.298532	0.017751	27.298532	0.017284	27.235748
0.015347	24.498489	0.014654	24.498489	0.014268	24.442144
0.012692	22.036332	0.012114	22.036332	0.011784	21.985650
0.010515	19.867321	0.010017	19.890207	0.009747	19.821627
0.008896	18.160981	0.008482	18.181901	0.008243	18.119212
0.006891	15.872279	0.006571	15.872279	0.006381	15.817553
0.005381	13.936038	0.005136	13.952091	0.004981	13.903985
0.004235	12.306635	0.004040	12.320811	0.003943	12.278330
0.003362	10.943073	0.003212	10.955679	0.003124	10.917905
0.002684	9.753025	0.002563	9.764259	0.002482	9.730592
0.002152	8.732515	0.002052	8.742574	0.001992	8.712430
0.001736	7.836809	0.001656	7.845837	0.001605	7.818786
0.001401	7.049192	0.001339	7.057312	0.001299	7.032979
0.001146	6.355347	0.001091	6.362668	0.001050	6.340731
0.000869	5.560826	0.000830	5.567232	0.000803	5.548036
0.000663	4.856314	0.000627	4.871237	0.000611	4.857694
0.000511	4.283234	0.000489	4.288061	0.000465	4.264204
0.000395	3.787994	0.000376	3.782374	0.000357	3.765467
0.000304	3.348607	0.000293	3.362843	0.000281	3.370552
0.000245	3.029871	0.000234	3.029499	0.000218	3.004089
0.000189	2.692664	0.000182	2.701820	0.000159	2.614728
0.000149	2.423241	0.000138	2.389711	0.000136	2.446211
0.000117	2.183901	0.000113	2.192673	0.000099	2.147550
0.000092	1.976857	0.000084	1.939188	0.000073	1.909941
0.000068	1.755265	0.000064	1.743022	0.000059	1.768827
0.000049	1.557640	0.000050	1.591384	0.000045	1.615433
0.000032	1.356631	0.000027	1.304542	0.000029	1.419977
0.000019	1.180037	0.000021	1.218661	0.000010	1.145341
0.000012	1.072976	0.000010	1.043004	0.000008	1.112495
0.000003	0.917143	0.000010	1.043004	-0.000001	0.950747
-0.000004	0.778980	0.000002	0.893828	-0.000008	0.812850
-0.000008	0.669434	-0.000004	0.769007	-0.000012	0.698445

-0.000012	0.578479	-0.000008	0.654447	-0.000016	0.604463
-0.000014	0.491571	-0.000011	0.560872	-0.000018	0.514052
-0.000016	0.423663	-0.000014	0.478234	-0.000020	0.443219
		-0.000015	0.412838	-0.000021	0.437570

B. Isotropy.

- Axial isotropy: 0.12 dB
- Hemispherical isotropy: 0.13 dB



C. Linearity

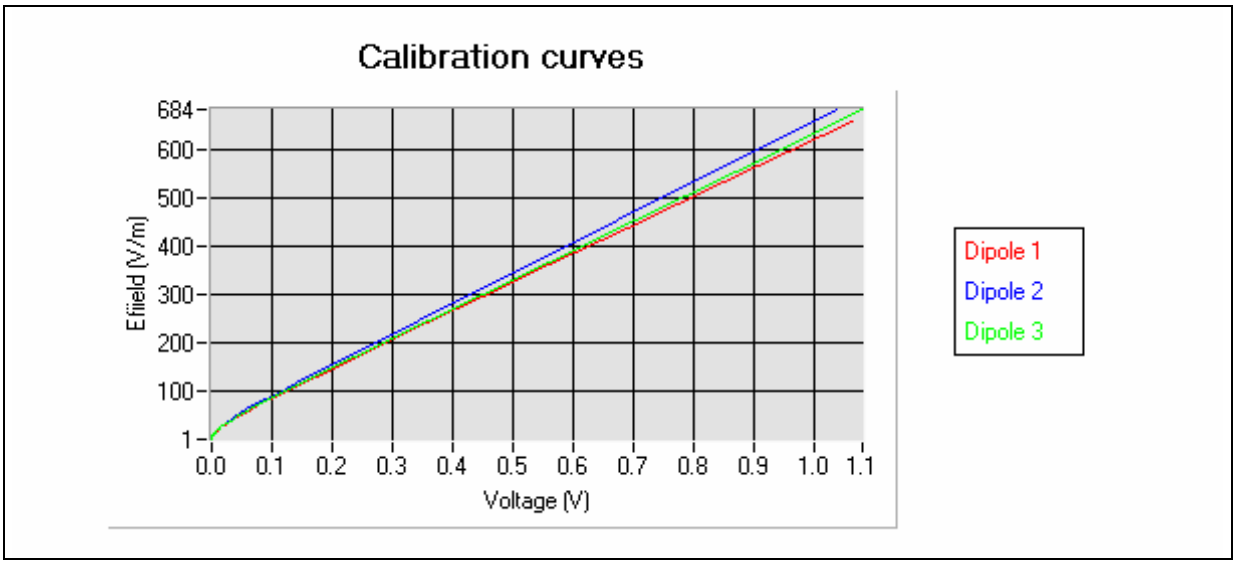
- Linearity: 0.15 dB

6. Calibration at 2450.00 MHz

A. Calibration parameters.

Label	2450
Epsilon	37.79
Sigma	1.85 S/m
Temperature	21°C
Cable loss	0.00 dB
Coupler loss	21.50 dB
Waveguide S11	-14.60 dB
Low limit detection	1.43 V/m (3.76 mW/kg)

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 linearisation by curve segment in CW signal.

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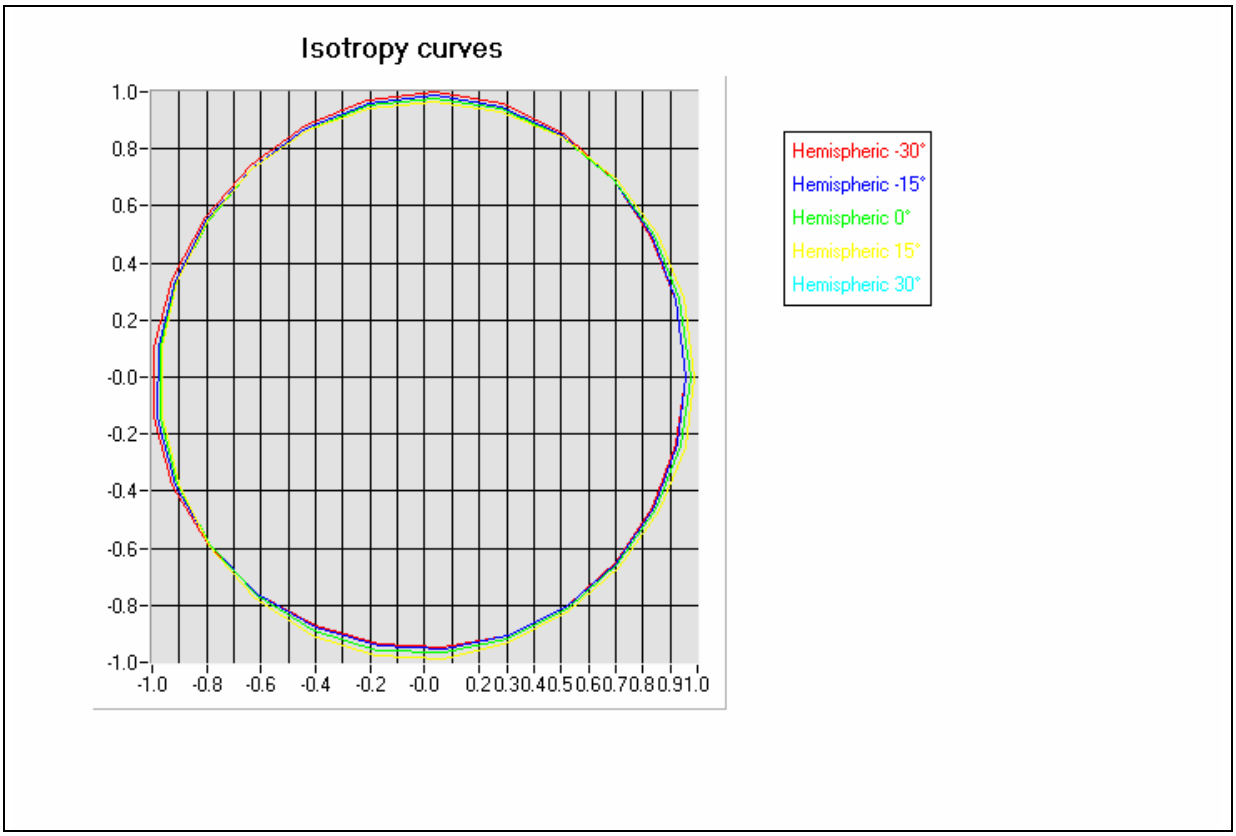
Calibration coefficients for the three dipoles in CW:

v1	e1	v2	e2	v3	e3
1.062034	660.074554	1.038372	684.082307	1.080193	682.034091
0.850803	534.669176	0.833673	555.512935	0.868691	554.426906
0.688643	438.329334	0.672087	453.945068	0.702252	453.940201
0.559622	361.602184	0.536358	368.533961	0.561442	368.841188
0.449307	295.903461	0.426649	299.376395	0.450924	301.947259
0.357955	241.376416	0.342652	246.293312	0.361420	247.653002
0.289366	200.306421	0.272869	202.033034	0.293070	206.061122
0.232520	166.116196	0.217045	166.437162	0.235375	170.799300
0.188390	139.410707	0.173952	138.755762	0.187417	141.299692
0.150687	116.399934	0.138784	115.936343	0.149780	117.940281
0.121311	98.261314	0.112537	98.679634	0.121765	100.349533
0.096336	82.595232	0.089387	83.191349	0.096663	84.341511
0.077550	70.567476	0.071606	71.017645	0.077270	71.711532
0.062476	60.671488	0.057702	61.227885	0.062032	61.526758
0.040876	45.815824	0.036893	45.763106	0.039664	45.815824
0.033265	40.226801	0.029909	40.226801	0.032225	40.226801
0.027138	35.523480	0.024314	35.523480	0.026256	35.523480
0.022222	31.551172	0.019839	31.514867	0.021473	31.551172
0.018206	28.120012	0.016212	28.087656	0.017574	28.087656
0.014951	25.148697	0.013288	25.148697	0.014418	25.148697
0.012313	22.569165	0.010916	22.543197	0.011861	22.543197
0.010132	20.277551	0.008958	20.277551	0.009758	20.277551
0.008349	18.281653	0.007374	18.281653	0.008033	18.281653
0.006154	15.560212	0.005431	15.542307	0.005923	15.560212
0.005445	14.588663	0.004797	14.588663	0.005229	14.588663
0.004229	12.809008	0.003726	12.794269	0.004060	12.794269
0.003309	11.298362	0.002914	11.298362	0.003182	11.298362
0.002619	10.023411	0.002304	10.023411	0.002514	10.023411
0.002084	8.923095	0.001825	8.923095	0.001993	8.923095
0.001667	7.980232	0.001460	7.980232	0.001592	7.980232
0.001339	7.153449	0.001173	7.153449	0.001276	7.153449
0.001080	6.434510	0.000946	6.427107	0.001036	6.427107
0.000869	5.772130	0.000769	5.788914	0.000834	5.786020
0.000637	4.972901	0.000557	4.957423	0.000607	4.970459
0.000555	4.657727	0.000487	4.650341	0.000522	4.628239
0.000418	4.077159	0.000368	4.075537	0.000398	4.077811
0.000316	3.584352	0.000279	3.585916	0.000305	3.610333
0.000250	3.225603	0.000216	3.194283	0.000233	3.201877
0.000194	2.886454	0.000166	2.845351	0.000181	2.870968
0.000143	2.538463	0.000127	2.540123	0.000137	2.557742
0.000111	2.293312	0.000097	2.277670	0.000103	2.286502
0.000084	2.063939	0.000074	2.053865	0.000076	2.045646
0.000062	1.856204	0.000057	1.871321	0.000056	1.847094
0.000035	1.563987	0.000034	1.591359	0.000025	1.487865
0.000023	1.414872	0.000023	1.438329	0.000020	1.421447
0.000006	1.171575	0.000012	1.266949	0.000010	1.278302
-0.000001	1.055214	-0.000001	1.028218	-0.000001	1.099524
-0.000009	0.907760	-0.000008	0.879528	-0.000009	0.942673

-0.000015	0.781848			-0.000016	0.804760

B. Isotropy.

- Axial isotropy: 0.13 dB
- Hemispherical isotropy: 0.14 dB



C. Linearity

- Linearity: 0.17 dB