Contract FP6-IST 508009

ACE

Antenna Centre of Excellence

Instrument: Network of Excellence

Thematic Priority: IST - Information Society Technologies
Mobile and wireless systems beyond 3G

Deliverable A1.2D3
Facility Sharing – Feasibility Study and Test Cases

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PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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Participants: all the members of this work-package

Abstract

The objective of this work-package was to promote the sharing of existing antenna measurement facilities and expertise. The purpose was to increase the effectiveness of existing measurement facilities and also the expertise for this domain:

Three main actions were taken:

- Sharing of antenna measurements facilities (antenna measurements for customers or partners not belonging to their own organization)
- Loan of standard gain antennas (sharing of referenced gain horns of DTU)
- Personnel exchange program (exchange of persons on the frame of antenna measurements activity)

Keyword List

Sharing of antenna measurements facilities, loan of standard gain antennas, personnel exchange program

Document Evolution

Revision	Date	Reason of change
Rev. 1.0	20/12/2005	Final version

Table of contents

1 Acknowledgments

We are most grateful to all the persons who participated at this work-package for their understanding, their patience and their constant help, which provided the necessary motivation to complete this activity. I would address thanks to Olav Breinbjerg for his diligent and professional job as leader of the activity 1.2.

2 Objectives of the work-package

The objective of this work-package is to promote the sharing of existing antenna measurements facilities. It is a support of the antenna activities of the ACE network for the purpose of analysis in development of new antennas, for the purpose of validation of new antenna analysis software, for the purpose of validation of new antenna measurement techniques, etc.
Sharing is not limited to facilities for antenna measurements, sharing of standard gain horns are also included. This collection of standard gain antennas covering the frequency range from 2 to 40 GHz were developed and characterized by the Technical University of Denmark on behalf of the European Space Agency (ESA). These specific antennas are available for purposes of gain calibration.
To develop collaborations between people of the antenna measurement domain, a personnel exchange program was initiated to create co-operations because the techniques to measure antennas and the practices are various. Visits of the facilities can be the first step of this point.

After a presentation of all members and their facilities, the report would be divided in three separate parts for answering at the objectives of this work-package:

- sharing of the antenna measurements ranges,
- loan of standard gain antennas,
- personnel exchange program.

3 Members of this work-package

3.1 List of members

Members of ACE group participating to this work package are listed below:

Company	ACE name	ACE number
Technical University of Denmark	DTU	3
Helsinki University of Technology	HUT	5
France Telecom R&D	FTR&D	8
SATIMO	SATIMO	9
Institut National des Sciences Appliquées de Rennes	IETR	13
University of Calabria	UNICAL	21
Politechnical University of Catalunya	UPC	26

Politechnical University of Madrid	UPM	27
Ericsson Microvaves Systems AB	ERICSSON	30
Saab Ericsson Space AB	SAAB ERICSSON	33
University of Liverpool	LIVUNI	40

Note that members of this work package are very diversified. We have a great number of universities but also private companies large or medium-sized.

3.2 Description of each facility

A general description of the facilities of each member participating at this activity is given in annex 1. Some of them have an important panel for the measurements of antennas. More details are given on the website developed in the frame of WP1.2-1 of this activity.
Techniques to measure antennas are very diversified. We can propose conventional measurements like far field technique, or near field technique and also technique using holography method, multi-probes test range, ...

3.3 External measurements out of ACE

To prove the importance of external antenna measurements, a questionnaire on antenna measurements made by the members of this WP for external companies during year 2004 was realized. Results are presented below:

Company	Number (2004)	Time (2004)
Technical University of Denmark	4	50%
Helsinki University of Technology	1	1%
France Telecom R&D	20	65%
SATIMO		
Institut National des Sciences Appliquées de Rennes	4	2%
University of Calabria	3	15%
Politechnical University of Catalunya	5	33%
Politechnical University of Madrid	40	75%
Ericsson Microvaves Systems AB		
Saab Ericsson Space AB	8	< 5%
University of Liverpool	1	5%

These results show that all the participants are able to do and practice antenna measurements for external companies. We show that, for some of them, universities or private companies, it is a very important part in the use of the facilities in term of number or in term of time to do these external measurements.
All these companies would continue to do external measurements in the future.

4 Sharing of facilities

4.1 Participants

The list of the participants is:

Company	ACE name	ACE number
Technical University of Denmark	DTU	3
Helsinki University of Technology	HUT	5
France Telecom R&D	FTR&D	8
SATIMO	SATIMO	9
Institut National des Sciences et Appliquées de Rennes	IETR	13
University of Calabria	UNICAL	21
Politechnical University of Madrid	UPM	27
Ericsson Microwave Systems AB	ERICSSON	30
Saab Ericsson Space AB	SAAB ERICSSON	33

Descriptions of the facilities participating to this activity are given in chapter 3-1. Techniques for antenna measurements are various and a great frequency band (> 100 GHz) is covered.

4.2 Rules

As all the costs are not taken into account by ACE, we decided for covering costs induced by insurances, maintenances, ... to charge fees. The simplest rule we decided is that the cost was split between the customer and the provider of the antenna measurement. The EB gave the agreement of this internal working method. The “invoice procedure” consists of the following:
1) The facility and the customer agree on the cost of the measurement. In order that this is an eligible ACE cost, it must be an actual cost (salary, rent, depreciation, etc.) and cannot include e.g. investments and profits.
2) The facility and the customer agrees if and how the cost should be shared between them.
3) For the part to be covered by the customer, the facility and the customer enters a written agreement to transfer the amount from the ACE budget of the customer to the ACE budget of the facility.
4) The transfer is approved by the General Board.

4.3 History

4.3.1 First call

When the accessibility to the www-database of the WP1.2-1 was possible (we needed a detailed description of the facilities before to open this service), a call for request (see below) to all the ACE members was announced at the end of September 2004.

CALL FOR REQUESTS

Antenna Measurement Techniques and Facilities Sharing
WP1.2-3: « Facilities sharing »

Objectives

The participating antenna measurement facilities of the WP1.2-3 offer to all members of the ACE Network the possibility to access to their own facilities for antenna measurements under conditions (limited time for this activity, lower costs as a part of the daily cost is taken into account by EU). This could be for the validation of new antennas, for the validation of new antenna analysis softwares, for the validation of new antenna measurement techniques, etc..
It can be a specific cooperation between two partners or between another activity group of ACE.
Many techniques for antenna measurements are proposed.

Participants

The participant members of this activity with their specified plans are listed below:

Company	Weeks
Technical University of Denmark	Oct. 25 - Nov. 5, 2004
Helsinki University of Technology	Agreement
France Telecom R&D	Agreement
SATIMO	Agreement
University of Calabria	Agreement
Polytechnical University of Madrid	Agreement
Saab Ericsson Space AB	Agreement

All useful informations (contact person, technique, frequency range, angles, cost, etc.) are described on the website http://ace.deis.unical.it.

How to proceed

Requests should be directly addressed to the contact person of each members of this WP1.2-3 with a copy to the leader of this WP1.2-3 (chris.sabatier@francetelecom.com). A report with a reference will be edited after each measurement.

For any further information contact: chris.sabatier@francetelecom.com

DTU

HELSINKI UNIVERSITY OF TECHNOLOGY

france telecom R&D

SATIMO

UNIVERSITÀ DELLA CALABRIA
Dipartimento di ELETTRONICA, INFORMATICA E SISTEMISTICA

WAVELAB

SAAB ERICSSON

All the members of this activity presented how they want to proceed in term of weeks opened to this proposal. Only one member choices a specific week for this activity, the others preferred an agreement between the customer and themselves.

4.3.2 Second call

A second call was sent to all the ACE members at the beginning of the year 2005 with two modifications:

- DTU choices an agreement between the customer and itself,
- Politechnical University of Catalunya was a new participant of this activity and was added to the call.

The modified call for request is presented below:

CALL FOR REQUESTS

Antenna Measurement Techniques and Facilities Sharing
WP1.2-3: « Facilities sharing »

Objectives

The participating antenna measurement facilities of the WP1.2-3 offer to all members of the ACE Network the possibility to access to their own facilities for antenna measurements under conditions (limited time for this activity, lower costs as a part of the daily cost is taken into account by EU). This could be for the validation of new antennas, for the validation of new antenna analysis softwares, for the validation of new antenna measurement techniques, etc..
It can be a specific cooperation between two partners or between another activity group of ACE.
Many techniques for antenna measurements are proposed.

Participants

The participant members of this activity with their specified plans are listed below:

Company	Weeks
Technical University of Denmark	Agreement
Helsinki University of Technology	Agreement
France Telecom R&D	Agreement
SATIMO	Agreement
University of Calabria	Agreement
Polytechnical University of Madrid	Agreement
Saab Ericsson Space AB	Agreement
Politechnical University of Catalunya	Agreement

All useful informations (contact person, technique, frequency range, angles, cost, etc.) are described on the website http://ace.deis.unical.it.

How to proceed

Requests should be directly addressed to the contact person of each members of this WP1.2-3 with a copy to the leader of this WP1.2-3 (chris.sabatier@francetelecom.com). A report with a reference will be edited after each measurement.

For any further information contact: chris.sabatier@francetelecom.com

DTU

HELSINKI UNIVERSITY OF TECHNOLOGY

france telecom R&D

SATIMO

UNIVERSITÀ DELLA CALABRIA
Dipartimento di ELETTRONICA, INFORMATICA E SISTEMISTICA

UWAVELAB

SAAB ERICSSON

UNIVERSITAT POLITÈCNICA DE CATALUNYA

4.3.3 Letter to all the Activities and Work-packages' Leaders

A letter to promote this activity presented below was sent during February 2005 to all the leaders of an activity or a work-package:

De : SABATIER Christ RD-RESA-TUR
Envoyé : vendredi 11 février 2005 10:46
À : 'Alexiou Angeliki'; 'Bonnedal Magnus'; 'Caille Gérard'; 'Carlsson Jan'; 'Casali Bruno'; 'Craddock Ian'; 'Di Massa Giuseppe'; 'Foged Lars'; 'Freni Angelo'; 'Gillard Raphaël'; 'Giovacchini Fabio'; 'Guiraud Cécile'; 'Hall Peter'; 'Hervé Legay'; 'Himdi Mohamed'; 'Ingvarson Per'; 'Johansson Joakim'; 'Lampariello Paolo'; 'Lindmark Björn'; 'Maci Stefano'; 'Martinez Marta'; 'Mestre Xavier'; 'Mosig Juan'; 'Navarro Monica'; 'Orefice Mario'; 'Pivnenko Sergey'; 'Pontoppidan Knud'; SABATIER Christ RD-RESA-TUR; 'Sipus Zvonimir'; 'Vandenbosch Guy'; 'Balling Peter'; 'Breinbjerg Olav'

Objet : WP1.2-3
Importance : Haute

Dear Activity and WP Leaders,

With the beginning of the second year for our network and as I am in charge on the WP1.2-3 "Facility Sharing – Feasibility Study and Initial Test Cases", I just want to remember you this activity.

I just want to say that it is not necessary to be a member of this WP to participate. We have at your disposal a great number of techniques to measure antennas or mock-ups that are developed in the theme to which you contribute. All the frequency bandwidths are covered.

As member of the ACE community, you benefit of a very interesting cost as a part of it is already paid by EC. An agreement is always needed between two members.

It is also a very good opportunity to increase your knowledge in this domain and to visit new facility sites.

Details of each facility are on the VCE. The last Call for Requests Poster is attached with this letter.

Do not hesitate to contact me for any questions or comments.

Best regards.

C.SABATIER

<<callwp123-v2.pdf>>

The objective of this letter was to remember that this possibility of antenna measurements is open at all the participants of ACE and to present the activity of this work-package.

4.3.4 Third call

A third call was sent during June 2005 to all the participants of our Network of Excellence. This call was similar to second call. There were no modifications; all the companies are the same as before.

4.4 Results

The results of this facilities sharing campaign are the following:

Facility	Customer	Cost
ERICSSON MICROVAWE SYSTEMS AB	SAAB ERICSSON SPACE	yes
DTU	SATIMO	4,507 k€
SAAB ERICSSON SPACE	SATIMO	mutual sharing
FRANCE TELECOM	U. of NICE CNRS	no
HUT	DARMSTADT TU	no
UPM	UNISI	no
SATIMO	LIVUNI	no
FRANCE TELECOM	SATIMO	mutual sharing
IETR	University of Louvain	no

More details on these measurements are presented at annex 2.
There are four campaigns between Ericsson Microwave Systems AB and Saab Ericsson Space. The relations between these two companies are very important.
One customer (Catholic University of Louvain) is not a member of ACE network but has integrated the ACE community.
Some reports on these antenna measurements are not public; it can be for private purposes between two companies, some characterized antennas are patent pending, ...

4.5 Comments

Although a great number of facilities have similar equipments in term of frequency bandwidth, twelve antennas were measured during these two years, which represents an event every two months. This seems for us a very interesting result in term of number of facility sharing.
There are also antenna measurements with SATIMO, which has a novel technique for the characterization of antennas. All the organizations want to have a comparison between this new technique and the process they use on their facilities.
Just one facility proposes to follow the rules described before for the payment. Many measurements were free. This is generally the case when universities realize antenna measurements. Except mutual sharing cases, there is a cost when the antenna measurements are done by or for private companies.
We show also that this activity interests all the members of this community. Four antenna measurements were for organizations, which are not members of this work-package. One is done for the activity 1.1 of ACE. Another is for a member out of ACE network.

5 Standard Gain Antennas sharing

5.1 Generalities

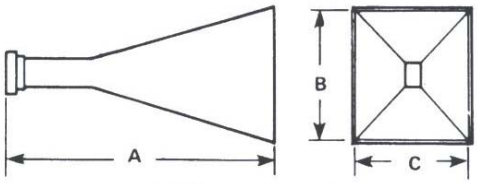
Technical University of Denmark (DTU) operates, on behalf of the European Space Agency (ESA), a Standard Gain Facility - a collection of standard gain horns, covering the frequency range from 2-40GHz, available for purposes of gain calibration to European institutions involved in ESA projects. The horns are calibrated at the DTU-ESA Spherical Near-Field Antenna Test Facility before and after being used in another institution. ESA has permitted the use of the Standard Gain Facility within the ACE.

5.2 List of SGA

The detailed list of SGA is presented below:

Standard Gain Horn collection at the DTU-ESA Facility

Band	Frequency range, GHz	Horn type	Typical gain over band, dBi	Dimensions, mm A×B×C	Horn ID	Status
L	1.7 - 2.6	SA12-1.7	14.4-17.2	367×369×273	BL174 BL175 BL176	In loan until 03.2005
S	2.6 - 3.95	SA12-2.6	17.0-19.6	423×324×240	A6375 A6376	In loan until 03.2005
C	3.95 - 5.85	SA12-3.9	17.3-19.6	308×216×160	BL204 BL205 BL206	In loan until 03.2005
C (J)	5.85 - 8.2	SA12-5.8	21.7-22.8	508×289×214	A6373 A6374 BL494	
X	8.2 - 12.4	SA12-8.2	21.4-22.8	356×194×144	BL151 BL152 BL159	
Ku	12.4 – 18.0	SA12-12	23.5-25.0	356×152×125	BL171 BL172 BL173	
K	18.0 - 26.5	SA12A-18	23.3-25.0	271×102×83	BL495 BL496 BL497	
Ka	26.5 – 40.0	SA12A-26	23.3-25.1	173×69×57	BL498 BL499 BL500	



Model 12 Standard Gain Horn

Each horn was provided with the directivity, gain, and loss values at several frequency points over the band as well as with the accuracy estimates for the directivity and gain.

5.3 Call for requests

Several calls for request were distributed by DTU during 2004-2005 between the ACE participants. An example of the call is given below:

Call for requests

WP 1.2-3: "Facility Sharing"

Objective

The DTU-ESA Spherical Near-Field Antenna Test Facility offers within the WP1.2-3 "Facility Sharing" to all members of the ACE Network the possibility to loan calibrated Standard Gain Horns (SGH) from the DTU-ESA collection. The collection consists of 8 sets for corresponding 8 frequency bands from 1.7 GHz to 40 GHz with 3 similar SGH's in each set (see attached table). One or two SGH's from each set are available for 2-3 months loan. There is no charge for the use of the SGH's except that the requesting side pays return shipment.

How to proceed

Requests for the loan of SGH's with the list of frequencies of interest should be addressed to:

Sergey Pivnenko
Technical University of Denmark
Oersted-DTU, bldg. 348
2800 Kgs. Lyngby, Denmark
Tel.: +45-4525-3860
Fax: +45-4593-1634
E-mail: sp@oersted.dtu.dk

If none of the SGH's were calibrated earlier at the requested frequencies, a calibration will be scheduled and carried out as soon as possible. Therefore, the request should preferrably be forwarded well before the actual need for a SGH.

Note, that a SGH is usually calibrated without coax-to-waveguide transition. Should the requested SGH include the transition, this must be mentioned in the request as well as the type of input connector (N or SMA).

During transportation the contents must be insured according to the stated value of the horns. During use in the measurement facilities the responsibility is on the user and in the case of damage or lost the user should reimburse the cost of the SGH and the cost of its calibration.

5.4 Results

Five companies were interested to have Standard Gain Antennas (eleven antennas). Detailed results of this campaign are presented at annex 3.

5.5 Comments

Very useful and fruitful discussions arose during the ACE meetings on different procedures for gain determination. As a result of these discussions two conference papers were prepared and presented at the conferences:

L. Foged, P. Iversen, L. Duchesne, O. Breinbjerg and S. Pivnenko: Comparative Measurement of Standard Gain Horns. Proceedings of the 28th ESA Antenna Workshop on Space Antenna Systems and Technologies, ESTEC, Noordwijk, The Netherlands, June 2005, pp. 1019-1023.

L. Foged, O. Breinbjerg, S. Pivnenko, G. Di Massa, And C. Sabatier: Antenna Measurement Facility Comparison within the European Antenna Centre of Excellence. 35th European Microwave Conference, Paris, France, October 2005, pp. 789-792.

All the participants were very much satisfied with the service and expressed a common wish of its continuation in future.

6 Personnel Exchange Program

6.1 Objective

The main interest of this activity is to encourage contacts or exchanges between the participants of this work-package in the domain of antenna measurements. The visits can be for multiple reasons (to write a document, to exchange experience in the antenna measurements domain, to participate at a meeting, a course, etc.) and can be associated with an event when it would be possible to limit the cost of the journey. It can be also, organized during a meeting of the Activity 1.2 of ACE. The rule to participate at this activity is an agreement between two persons for fixing the conditions of this exchange.
All participants of this work-package can receive a guest or can be a guest for visiting external facilities. Visits are opened to all but the minimum required level is a Ph-D student.

6.2 Course on Antenna Measurements

After the course on Antenna Measurements in Madrid in June 2005, the letter below for favoring visits was sent to all ACE email database mid July 2005 to encourage students of this course to visit other facilities than UPM:

De : SABATIER Christ RD-RESA-TUR
Envoyé : mardi 19 juillet 2005 09:38
À : ACE

Objet : WP1.2-3
Importance : Haute

Dear All,

Following the ACE-course on Antenna Measurements at UPM in Madrid in June, we inform you that it is possible to visit facilities of each ACE member. This opportunity is open to all ACE members (it is not necessary to be a member of the WP1.2-3 to participate) and even to all Ph-D students.
This would be an excellent complement to all participants of this course. For the others, a visit of a facility can be a good occasion to increase their knowledge in the domain of antenna measurements, to develop new contacts, new relations, ...

Details of each facility are on the VCE. Contact directly the person responsible of each antenna measurement facility. Thanks to inform me of your future visit.

Best regards.

C.SABATIER

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6.3 Visits associated with meetings

Visits of the facilities were also organized during meetings of the activity 1.2. Companies, which welcomed us, are SATIMO in Paris (2005, April 1st - 20 persons) and DTU (2005, September, 23rd – 25 persons). Presentations of the facilities were very detailed and discussions during these visits were very fruitful.
Note also that there was a visit of the facilities of UPM in Madrid for all the students of the school on antenna measurements.

6.4 Results for visits of persons

Results of this action are presented below:

Person	From	To	When
Sergey N. Pivnenko	DTU	SATIMO	February, 6-13, 2005
Manuel Sierra Castañer	UPM	HUT	May, 23-27, 2005
Christian Sabatier	FTR&D	UPM	June, 22-23, 2005
Kenneth Chan	LIVUNI	SATIMO	October, 2005
Fernando Martin-Jimenez	UPM	HUT	May, 23-27, 2005
Ser Tar Chiw	UNIBHAM	HUT	May, 23-27, 2005
Sara Burgos Martínez	UPM	DTU	September-December, 2006

Details on each visit are given at annex 4.

6.5 Comments

The overview of the visits above shows that the possibility to visit antenna measurements ranges seems very interesting. Two poles of interest can be highlighted. One is concerning the discovering of the new technique for antenna measurements proposed by SATIMO. The second is the great

interest in also an original technique proposed by HUT for the measurements of antennas for frequencies greater than 100GHz. Techniques, process, experience, etc. were the subject of discussions during these visits.
Note also that a visit will be planned next year (see the last result). We consider that the obtained results of these exchanges seem very encouraging.

7 Conclusion for this work-package

During all the activity of this work-package, we consider that very good exchanges were obtained. These exchanges are not only technical but also human. Discussions generated by these exchanges and also discussions during meetings of this activity were very appreciated by all the members of this work-package. This is a proof of a very good integration and that all the persons were implicated by these activities. All the members opened their facilities either for the sharing part or for the visits of persons. We can say that this horizontal activity is successful for all the three parts (12 sharing of antenna measurement ranges, 5 loans of standard gain antennas and 6 persons for visiting another facilities, 1 person planned for the next year) of this work-package. This obtained results show us that there is a request in Europe for the antenna measurements activity.
We consider that this work-package which proposed to share facilities, gain standard antennas and also experience in the antenna measurements domain is an important key-point for the success for our Network Of Excellence.

ANNEX 1

Description of the facilities of each member

PARTICIPANTS

COMPANY: Technical University of Denmark
ACE Number: 3
Address:
Ørsted-DTU, Electromagnetic Systems
Technical University of Denmark
Ørsteds Plads, bldg. 348,
DK-2800, Kgs. Lyngby, DENMARK

Contact person: Sergey Pivnenko
Phone: +45-4525-3860
Fax: +45-4593-1634
Email: sp@oersted.dtu.dk

Description of the facility:

- Technique: spherical near-field
- Frequency bandwidth: 0.5-40 GHz
- Size of the facility: 12m x 10m x 8m
- Maximum size for AUT:
  dimensions: 6m in diameter
  mass: 250kg max
- Photos:
- Others, remarks, comments: see web-page www.emi.dtu.dk/research/afg/snf/SNF.html

PARTICIPANTS

COMPANY: HUT Radio Laboratory
ACE Number: 5
Address: P. O. Box 3000, FI-02015 TKK, Finland

Contact person: Juha Mallat
Phone: +358-9-4512247
Fax: +358-9-4512152
Email: juha.mallat@tkk.fi

Description of the facility:

- Technique: Compact range (Hologram CATR)
- Frequency bandwidth: 300 -330 GHz
- Size of the facility: 2 m x 2 m x 2 m
- Maximum size for AUT:
  dimensions: 0.3 m x 0.3 m x 0.3 m
  mass: 9 kg
- Photos: Can be arranged
- Others, remarks, comments: Contact the facility contact person for application specific details

PARTICIPANTS

COMPANY: HUT Radio Laboratory
ACE Number: 5
Address: P. O. Box 3000, FI-02015 TKK, Finland

Contact person: Juha Mallat
Phone: +358-9-4512247
Fax: +358-9-4512152
Email: juha.mallat@tkk.fi

Description of the facility:

- Technique: Near-field range (planar)
- Frequency bandwidth: 1 -700 GHz
- Size of the facility: 2 m x 2 m x 2 m
- Maximum size for AUT:
  dimensions: 1.5 m x 1.5 m x 1.5 m
  mass: 200 kg
- Photos: Can be arranged
- Others, remarks, comments: Contact the facility contact person for application specific details

PARTICIPANTS

COMPANY: HUT Radio Laboratory
ACE Number: 5
Address: P. O. Box 3000, FI-02015 TKK, Finland

Contact person: Juha Mallat
Phone: +358-9-4512247
Fax: +358-9-4512152
Email: juha.mallat@tkk.fi

Description of the facility:

- Technique: PIM (passive intermodulation) near-field scanner
- Frequency bandwidth: 0.925 -0.96 GHz
- Size of the facility: 1 m x 1 m x 1 m
- Maximum size for AUT:
  dimensions: 1 m x 1 m x 1 m
  mass: 100 kg
- Photos: Can be arranged
- Others, remarks, comments: Contact the facility contact person for application specific details

PARTICIPANTS

COMPANY: FRANCE TELECOM Research and Development
ACE Number: 8
Address: 1581 Fort de la Tête de Chien, 06320 La Turbie, FRANCE

Contact person: Christian SABATIER
Phone: + 33 4 92 10 65 26
Fax: + 33 4 92 10 65 19
Email: chris.sabatier@francetelecom.com

Description of the facility:

- Technique: far field
- Frequency bandwidth: 0.4 – 50 GHz
- Size of the facility: L=1450 m
- Maximum size for AUT:
  dimensions: diameter < 3.5 m
  mass: < 800 kg
- Photos:

- Others, remarks, comments: can be transformed in an indoor spherical near field

PARTICIPANTS

COMPANY: FRANCE TELECOM Research and Development
ACE Number: 8
Address: 1581 Fort de la Tête de Chien, 06320 La Turbie, FRANCE

Contact person: Christian SABATIER
Phone: + 33 4 92 10 65 26
Fax: + 33 4 92 10 65 19
Email: chris.sabatier@francetelecom.com

Description of the facility:

- Technique: far field
- Frequency bandwidth: 0.5 – 50 GHz
- Size of the facility: L=1450 m
- Maximum size for AUT:
  dimensions: diameter < 6 m
  mass: < 1000 kg
- Photos:

- Others, remarks, comments: see WP1.2-1 for details

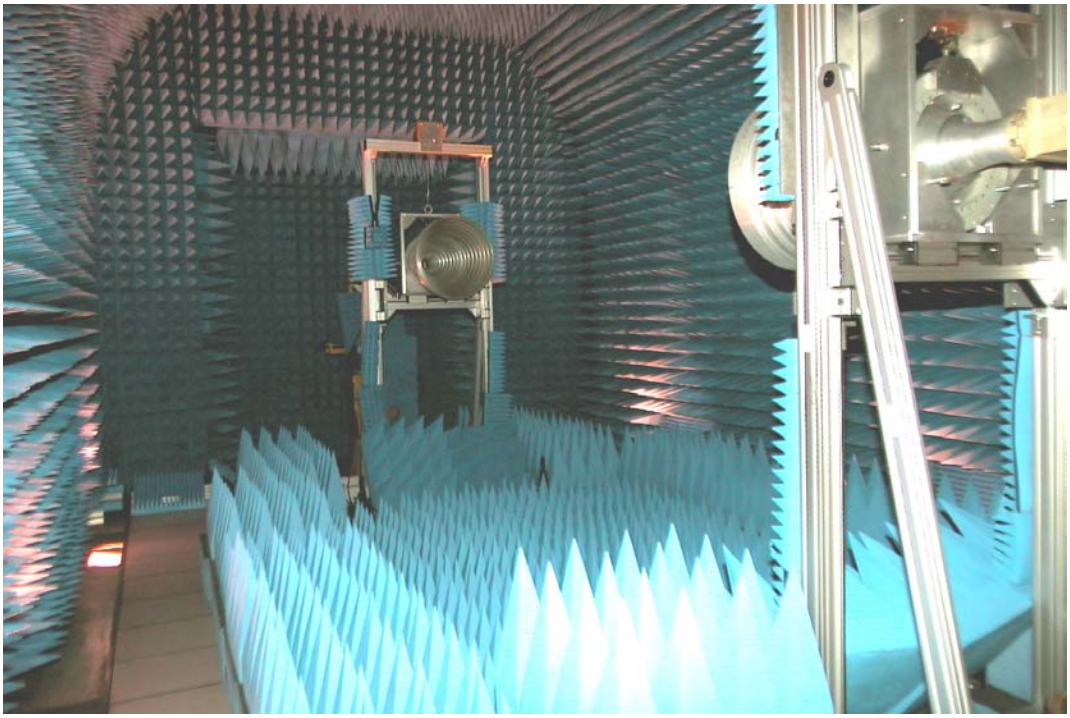
PARTICIPANTS

COMPANY: FRANCE TELECOM Research and Development
ACE Number: 8
Address: 1581 Fort de la Tête de Chien, 06320 La Turbie, FRANCE

Contact person: Christian SABATIER
Phone: + 33 4 92 10 65 26
Fax: + 33 4 92 10 65 19
Email: chris.sabatier@francetelecom.com

Description of the facility:

- Technique: spherical near field
- Frequency bandwidth: 0.4 – 75 GHz
- Size of the facility: 5.35 x 15 x 5 m (width x length x height)
- Maximum size for AUT:
  dimensions: diameter < 1.5 m
  mass: < 200 kg
- Photos:



- Others, remarks, comments: see WP1.2-1 for details

PARTICIPANTS

COMPANY: SATIMO
ACE Number: 9
Address: 22 avenue de la Baltique
91953 Courtaboeuf France

Contact person: Luc DUCHESNE
Phone: +33 1 69 29 81 56
Fax: +33 1 69 29 02 27
Email: lduchesne@satimo.fr

Description of the facility:

- Technique: Spherical Near Field (SG64)
- Frequency bandwidth: 0.4-6Ghz
- Size of the facility: Dimensions measured between tips of absorbers [m] :
  W = 5.2; D = 4.6; H = 3.6
- Maximum size for AUT:
  dimensions: <2 meters
  mass:
- Photos: www.satimo.com
- Others, remarks, comments: Multi probes antenna test range

PARTICIPANTS

COMPANY: SATIMO
ACE Number: 9
Address: 22 avenue de la Baltique
91953 Courtaboeuf France

Contact person: Luc DUCHESNE
Phone: +33 1 69 29 81 56
Fax: +33 1 69 29 02 27
Email: lduchesne@satimo.fr

Description of the facility:

- Technique: Spherical Near Field (SG32)
- Frequency bandwidth: 0.8-6Ghz
- Size of the facility: Dimensions measured between tips of absorbers [m] :
  W = 3.4; D = 3.4; H = 1.9;
- Maximum size for AUT:
  dimensions: <1 meter
  mass:
- Photos: www.satimo.com
- Others, remarks, comments: Multi probes antenna test range

PARTICIPANTS

COMPANY: SATIMO
ACE Number: 9
Address: 22 avenue de la Baltique
91953 Courtaboeuf France

Contact person: Luc DUCHESNE
Phone: +33 1 69 29 81 56
Fax: +33 1 69 29 02 27
Email: lduchesne@satimo.fr

Description of the facility:

- Technique: Spherical Near Field (STARLAB)
- Frequency bandwidth: 0.8-6Ghz
- Size of the facility: Dimensions measured between tips of absorbers [m] :
  W = 1.2; D = 0.9; H = 0.9;
- Maximum size for AUT:
  dimensions: <0.4 meter
  mass:
- Photos: www.satimo.com
- Others, remarks, comments: Multi probes antenna test range

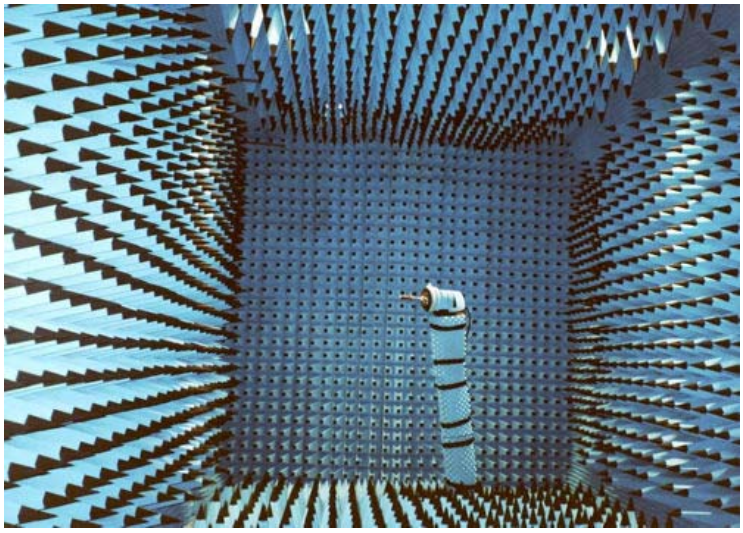
PARTICIPANTS

COMPANY : IETR
ACE Number : 13
Address:avenue du général Leclerc 35042 Rennes cedex France

Contact person: Laurent Le Coq
Phone: (+33)(0)2 23 23 65 26
Fax: (+33)(0)2 23 23 69 63
Email: laurent.le-coq@univ-rennes1.fr

Description of the facility:

- Technique: Indoor Far field
- Frequency bandwidth: 0.8-18GHz
- Size of the facility: 3.2m x 3,2m x 12.7m (tips to tips)
- Maximum size for AUT:
  *dimensions:*1 m diameter
  *mass:*25 kg
- Photos:



- Others, remarks, comments: http://www.ietr.org/eng/gro/plateau5.htm

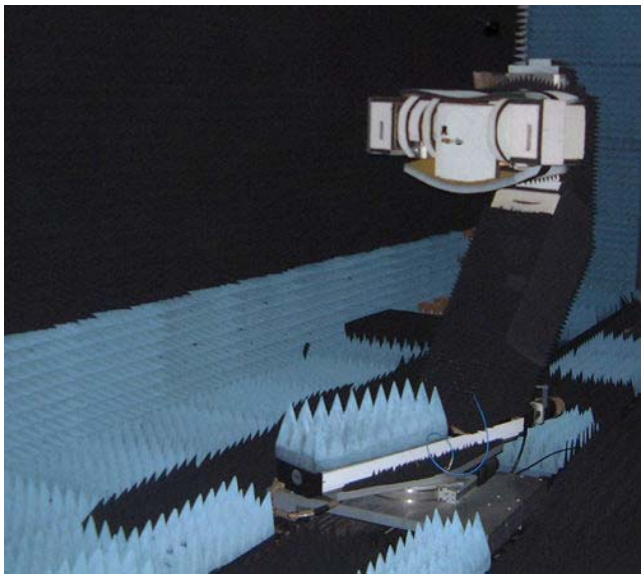
PARTICIPANTS

COMPANY : IETR
ACE Number : 13
Address:avenue du général Leclerc 35042 Rennes cedex France

Contact person: Laurent Le Coq
Phone: (+33)(0)2 23 23 65 26
Fax: (+33)(0)2 23 23 69 63
Email: laurent.le-coq@univ-rennes1.fr

Description of the facility:

- Technique: Indoor Far field
- Frequency bandwidth: 18-110GHz
- Size of the facility: 2,6m x 3,1m x 9,4m (tips to tips)
- Maximum size for AUT:
  dimensions:0.2 m diameter
  *mass:*5 kg
- Photos:



- Others, remarks, comments: http://www.ietr.org/eng/gro/plateau6.htm

PARTICIPANTS

COMPANY : IETR
ACE Number : 13
Address : avenue des buttes de Coësme 35043 Rennes cedex France

Contact person: Philippe Besnier
Phone: (+33)(0)2 23 23 65 26
Fax: (+33)(0)2 23 23 69 63
Email: Philippe.Besnier@insa-rennes.fr

Description of the facility:

- Technique: Near Field – Satimo Stargate 32
- Frequency bandwidth: 0.8-8GHz
- Size of the facility: arch diameter = 1.6 m
- Maximum size for AUT:

  dimensions:

  mass:
- Photos:

- Others, remarks, comments: http://www.ietr.org/eng/gro/plateau4.htm

PARTICIPANTS

COMPANY : IETR
ACE Number : 13
Address : avenue des buttes de Coësme 35043 Rennes cedex France

Contact person: Philippe Besnier
Phone: (+33)(0)2 23 23 65 26
Fax: (+33)(0)2 23 23 69 63
Email: Philippe.Besnier@insa-rennes.fr

Description of the facility:

- Technique: Reverberating chamber
- Frequency bandwidth: > 200 MHz
- Size of the facility: 2,9m x 3,7m x 8,7 m
- Maximum size for AUT:
  dimensions:
  mass:
- Photos:
- Others, remarks, comments: http://www.ietr.org/eng/gro/plateau9.htm

PARTICIPANTS

COMPANY: Università della Calabria
ACE Number: 21
Address: DEIS, Ponte P. Bucci, cubo 42c, Rende (Cs), Italy

Contact person: Luigi Boccia
Phone: +39.0984.49 4743
Fax: +30.0984.49 4761
Email: boccia@deis.unical.it

Description of the facility: Near Field Measurement System

- Technique: planar, cylindrical, spherical surface scanning
- Frequency bandwidth: 2-40 GHz
- Size of the facility: 3 x 3 x 3 m
- Maximum size for AUT:
  *dimensions:*40 cm
  mass: 5 kg
- Photos:
- Others, remarks, comments:

PARTICIPANTS

COMPANY: UPC
ACE Number: 26
Address: Jordi Girona 1-3, 08034 Barcelona. SPAIN

Contact person: Sebastián Blanch
Phone: +34 934016811
Fax: +34 934017232
Email: blanch@tsc.upc.edu

Description of the facility:

- Technique: Spherical Near Field
- Frequency bandwidth: 1 GHz – 40 GHz
- Size of the facility: 5m x 7m x 7m
- Maximum size for AUT:
  dimensions: 2m
  mass: 100 Kg
- Photos:
- Others, remarks, comments:

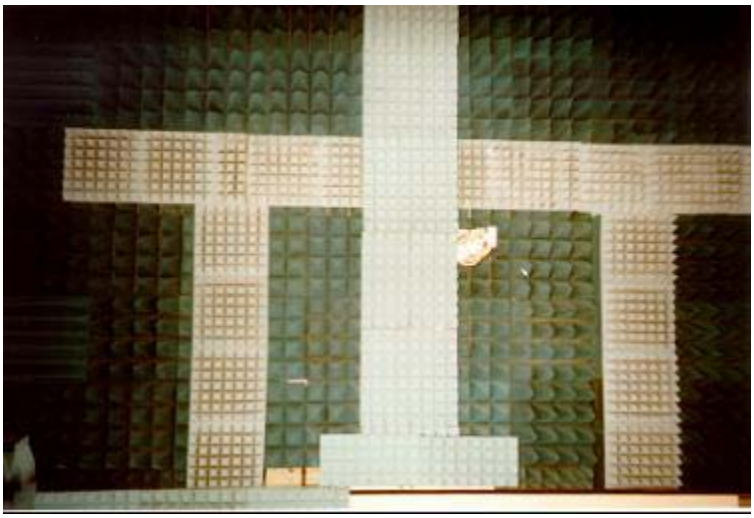
PARTICIPANTS

COMPANY: Universidad Politécnica de Madrid
ACE Number: 27
Address: ETSI Telecomunicación. Ciudad Universitaria. 28040 Madrid. Spain

Contact person: Manuel Sierra Castañer
Phone: +34 91 3367366 ext 4040
Fax: +34 91 5432002
Email: m.sierra. castaner@gr.ssr.upm.es

Description of the facility:

- Technique: Planar and cylindrical near field system
- Frequency bandwidth: 1 – 40 GHz
- Size of the facility: 15.2 x 7.9 x 7.3 m
- Maximum size for AUT:
  dimensions: 4.74 x 4.75 m
  mass: up to 500 Kg
- Photos:



- Others, remarks, comments:

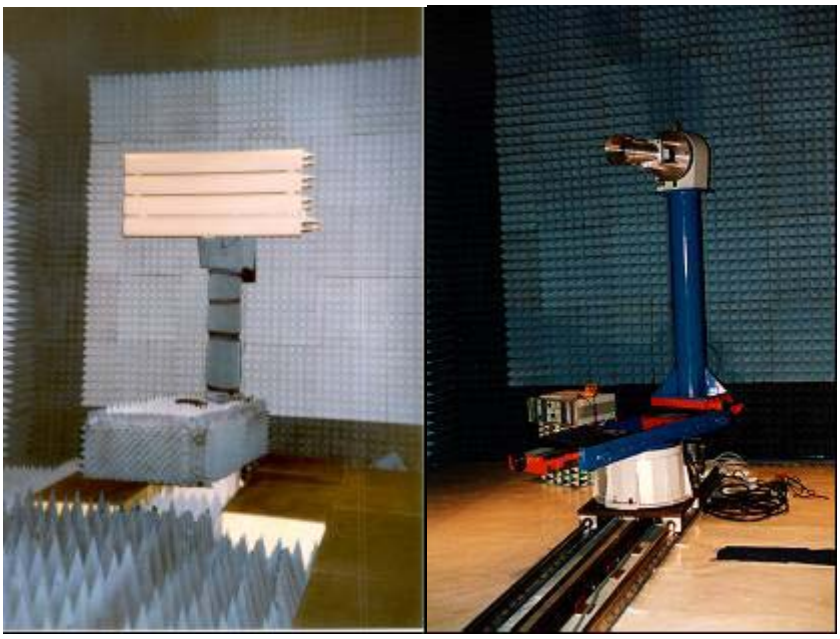
PARTICIPANTS

COMPANY: Universidad Politécnica de Madrid
ACE Number: 27
Address: ETSI Telecomunicación. Ciudad Universitaria. 28040 Madrid. Spain

Contact person: Manuel Sierra Castañer
Phone: +34 91 3367366 ext 4040
Fax: +34 91 5432002
Email: m.sierra. castaner@gr.ssr.upm.es

Description of the facility:

- Technique: Spherical near field system
- Frequency bandwidth: 1.5 - 20 GHz
- Size of the facility: : 7.3 x 4.3 x 4.3 m
- Maximum size for AUT:
  dimensions: diameter < 2 m
  mass: < 50 kg
- Photos:



- Others, remarks, comments:

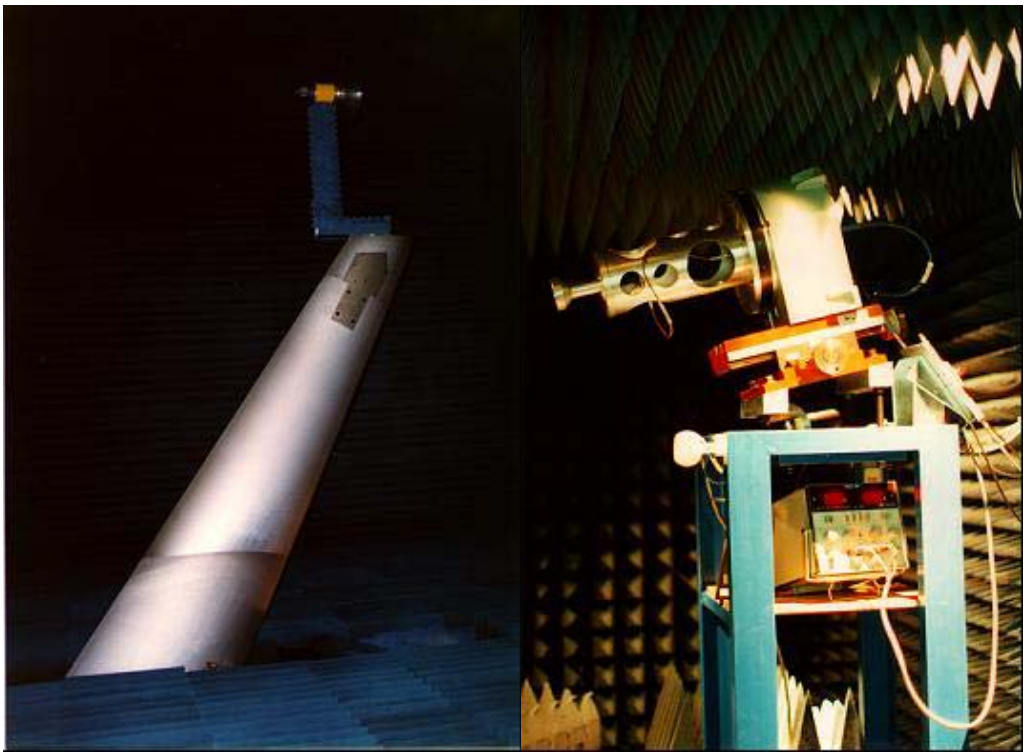
PARTICIPANTS

COMPANY: Universidad Politécnica de Madrid
ACE Number: 27
Address: ETSI Telecomunicación. Ciudad Universitaria. 28040 Madrid. Spain

Contact person: Manuel Sierra Castañer
Phone: +34 91 3367366 ext 4040
Fax: +34 91 5432002
Email: m.sierra. castaner@gr.ssr.upm.es

Description of the facility:

- Technique: gregorian compact range
- Frequency bandwidth: 6 – 200 GHz
- Size of the facility: 15.2 x 7.9 x 7.3 m (main chamber) and 6 x 3 x 2.4 m (sub-reflector chamber)
- Maximum size for AUT:
  dimensions:
  mass:
- Photos:



- Others, remarks, comments:

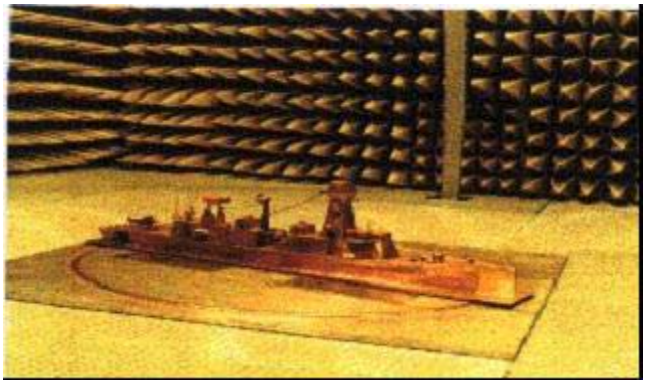
PARTICIPANTS

COMPANY: Universidad Politécnica de Madrid
ACE Number: 27
Address: ETSI Telecomunicación. Ciudad Universitaria. 28040 Madrid. Spain

Contact person: Manuel Sierra Castañer
Phone: +34 91 3367366 ext 4040
Fax: +34 91 5432002
Email: m.sierra. castaner@gr.ssr.upm.es

Description of the facility:

- Technique: arc system
- Frequency bandwidth: over 200 MHz
- Size of the facility: 6.50 x 5.50 x 2.70 m
- Maximum size for AUT:
  dimensions:
  mass:
- Photos:



-
- Others, remarks, comments:

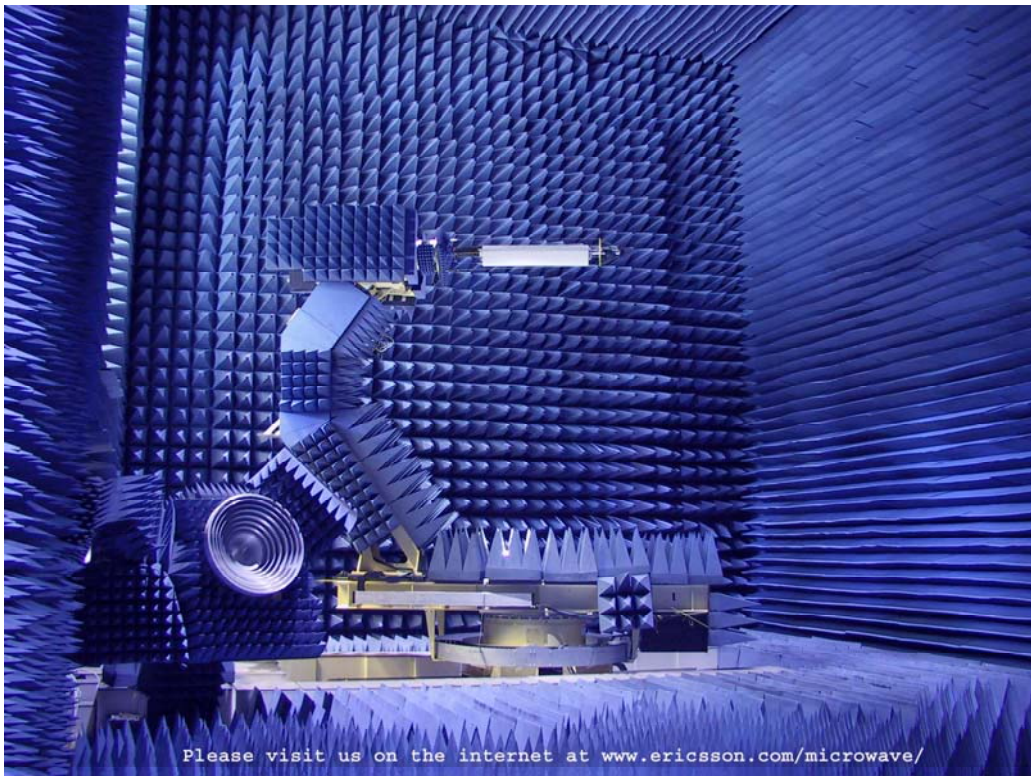
PARTICIPANTS

COMPANY: Ericsson Microwave Systems
ACE Number: 30
Address: Floejelbergsgatan 2A 43184 Moelndal SWEDEN

Contact person: Håkan Eriksson
Phone: +46317472779
Fax:
Email: hakan.mg.eriksson@ericsson.com

Description of the facility:

- Technique: compact range
- Frequency bandwidth: 800MHz – 75 GHz
- Size of the facility: 11 x 11 x 21 m
- Maximum size for AUT:
  dimensions: : 4 x 4 x 3 m
  mass: 700 kg
- Photos:



- Others, remarks, comments:

PARTICIPANTS

COMPANY: The University of Liverpool
ACE Number: 40
Address: Department of Electrical Engineering & Electronics, Brownlow Hill, Liverpool, L69 3GJ, UK

Contact person: Dr Yi Huang
Phone: 44-151-7944521
Fax: 44-151-7944540
Email: Yi.Huang@liv.ac.uk

Description of the facility:

- Technique: Free space measurement
- Frequency bandwidth: 40MHz – 40GHz
- Size of the facility: 7m x 10m
- Maximum size for AUT:
  Dimensions: 1 x 1 x 0,5 m
  Mass: 10 kg
- Photos:
- Others, remarks, comments: We also have a large reverberation chamber 3.6m x 4m x 5.8m for antenna and EMC measurements.

ANNEX 2

Details on each antenna measurement

FACILITY SHARING

PROVIDER OF THE FACILITY

Company: Technical University of Denmark
ACE Number: 4
Address: Ørsted-DTU, Electromagnetic Systems, Technical University of Denmark, Ørsteds Plads, bldg. 348, DK-2800, Kgs. Lyngby, DENMARK
Contact person: S. Pivnenko
Phone: +45-4525-3860
Fax: +45-4593-1634
Email: sp@oersted.dtu.dk

CUSTOMER

Company: SATIMO
ACE Number: 9
Address: 22 avenue de la Baltique, 91953 Courtaboeuf, France
Contact person: L. Foged
Phone: 39 06 50 65 3234
Fax: 39 06 50 60 884
Email: lfoged@satimo.com

MEASUREMENT

Details: Measurement of a dual ridge horn SH 800/S0044
Reference of the report: S. Pivnenko and O. Breinbjerg: EU Antenna Centre of Excellence. WP 1.2-3 Facility Sharing. Measurement of Dual Ridge Horn SH 800/S0044. Technical University of Denmark, Oersted-DTU, EMI, December 2004. (R 718, 64 pp.)
Private:
Cost:
Comments:

FACILITY SHARING

PROVIDER OF THE FACILITY

Company: HUT Radio Laboratory
ACE Number: 5
Address: P.O. Box 3000, FI-02015 TKK, Finland
Contact person: Juha Mallat
Phone: +358-9-4512247
Fax: +358-9-4512152
Email: juha.mallat@tkk.fi

CUSTOMER

Company: Technische Universität Darmstadt
ACE Number: 14
Address: Darmstadt, Germany
Contact person: Cezary Sydlo
Phone:
Fax:
Email: sydlo@hf.tu-darmstadt.de

MEASUREMENT

Details: Measurement of an antenna-detector combination at 300 GHz
Reference of the report: (To follow in due time after completion)
Private:
Cost: -
Comments: The measurement campaign was started with first preparations in 12/2004, initial test measurements in spring 2005, and it is still continuing with further actions expected later in 2005.

FACILITY SHARING

PROVIDER OF THE FACILITY

COMPANY: FRANCE TELECOM Research and Development
ACE Number: 8
Address: 1581 Fort de la Tête de Chien, 06320 La Turbie, FRANCE
Contact person: Christian SABATIER
Phone: + 33 4 92 10 65 26
Fax: + 33 4 92 10 65 19
Email: chris.sabatier@francetelecom.com

CUSTOMER

Company: CNRS-LEAT
ACE Number: 12
Address: Laboratoire d'Electronique, Antennes et Télécommunications, Université de Nice-Sophia Antipolis - CNRS UMR 6071,250 rue Albert Einstein, 06560 Valbonne, FRANCE
Contact person: Jean-Yves Dauvignac
Phone: +33 4 92 94 28 44
Fax: : +33 4 92 94 28 12
Email: jean-yves.dauvignac@unice.fr

MEASUREMENT

Details: measurement of an UWB antenna
Reference of the report: FTR&D/RESA/FACE/05-0089/ES
Private: Yes
Cost: No
Comments: measurements made during a test of a new receiver

FACILITY SHARING

PROVIDER OF THE FACILITY

COMPANY: FRANCE TELECOM Research and Development
ACE Number: 8
Address: 1581 Fort de la Tête de Chien, 06320 La Turbie, FRANCE
Contact person: Christian SABATIER
Phone: + 33 4 92 10 65 26
Fax: + 33 4 92 10 65 19
Email: chris.sabatier@francetelecom.com

CUSTOMER

COMPANY: SATIMO
ACE Number: 9
Address: 22 avenue de la Baltique, 91953 Courtaboeuf, France
Contact person: Luc DUCHESNE
Phone: +33 1 69 29 81 56
Fax: +33 1 69 29 02 27
Email: lduchesne@satimo.fr

MEASUREMENT

Details: 3 antennas
Reference of the report:
Private: Yes
Cost: No
Comments: mutual sharing, planned during 2006

FACILITY SHARING

PROVIDER OF THE FACILITY

COMPANY: SATIMO
ACE Number: 9
Address: 22 avenue de la Baltique, 91953 Courtaboeuf, France
Contact person: Luc DUCHESNE
Phone: +33 1 69 29 81 56
Fax: +33 1 69 29 02 27
Email: lduchesne@satimo.fr

CUSTOMER

Company: LIVUNI
ACE Number: 40
Address: Senate House Liverpool UK
PO Box: 147 L69 3BX
Person: Kenneth Chan
Phone: 0151 794 4493
Fax 0151 794 4540
Email: eechan@liv.ac.uk

MEASUREMENT

Details: measurements performed on a LIVUN antenna in the range 3-5.9Ghz.
Reference of the report: LIVUN Report Tech_Report_ACE1.2_LIVUN.pdf
Private:
Cost: None
Comments: Measurement performed during the ACE meeting 2005/03/31 - 2005/04/01

FACILITY SHARING

PROVIDER OF THE FACILITY

COMPANY: SATIMO
ACE Number: 9
Address: 22 avenue de la Baltique
91953 Courtaboeuf France
Contact person: Luc DUCHESNE
Phone: +33 1 69 29 81 56
Fax: +33 1 69 29 02 27
Email: lduchesne@satimo.fr

CUSTOMER

Company: SAAB ERICSSON
ACE Number: 33
Address: Delsjoemotet 40515 Goteborg Sweden
Person: Jan Zackrisson
Phone: +46 31 735 4004
Fax +46 31 735 4000
Email: jan.zackrisson@space.se

MEASUREMENT

Details: S- Band Conical Helix Antenna 2000-2150 MHz, 2200-2300Mhz
Reference of the report:
Private:
Cost: None
Comments:

FACILITY SHARING

PROVIDER OF THE FACILITY

Company: IETR
ACE Number: 13
Address: IETR (Institut d'Electronique et de Télécommunications de Rennes) UMR CNRS 6164, Université de Rennes1 bât. 11D, Campus de Beaulieu, 35042 Rennes Cedex
Contact person: Laurent Le Coq
Phone: +33223236526
Fax: +33223236969
Email: laurent.le-coq@univ-rennes1.fr

CUSTOMER

Company: Communications and Remote Sensing Lab., Université catholique de Louvain
ACE Number: not ACE member
Address: Place du Levant, 2 ,B-1348 Louvain la Neuve, Belgium
Contact person: Lyazid ABERBOUR
Phone: +3210478067
Fax: +32496482271
Email: aberbour@tele.ucl.ac.be

MEASUREMENT

Details: ISM antenna efficiency and radiation pattern measurements. Contact through ACE short course 'Microwave and millimeter wave antenna design '.
Reference of the report:
Private:
Cost: no
Comments: 3-4 /11/2005

FACILITY SHARING

PROVIDER OF THE FACILITY

Company: Universidad Politécnica de Madrid
ACE Number: 27
Address: ETSI Telecomunicación. Ciudad Universitaria. 28040 Madrid Spain
Person: Manuel Sierra Castañer
Phone: +34 91 3367366 ext 4040
Fax: +34 91 5432002
Email: m.sierra.castaner@gr.ssr.upm.es

CUSTOMER

Company: University of Siena
ACE Number: 23
Address: Department of Information Engineering. University of Siena. Via Roma 56. 53100 Siena (Italy)
Contact person: Alessio Cucini
Phone: +39 0577 46124
Fax: +39 0577 233609
Email: cucini@dii.unisi.it

MEASUREMENT

Details: Measurement of a microstrip linear array antenna
Reference of the report: UPM/LEHA/11/2005
Private:
Cost: Travel expenses
Comments: It was a measurement for the ACE WP1.1-2

FACILITY SHARING

PROVIDER OF THE FACILITY

Company: Ericsson Microwave Systems AB
ACE Number: 30
Address: Floejelbergsgatan 2A 43184 Moelndal SWEDEN
Contact person: Håkan Eriksson
Phone: +46 31 7472779
Fax:
Email: hakan.mg.eriksson@ericsson.com

CUSTOMER

Company: SAAB Ericsson Space AB
ACE Number: 33
Address: Delsjoemotet 40515 Gothenburg Sweden
Contact person: Jan Zackrisson
Phone: +46 31 735 4004
Fax:
Email: jan.zackrisson@space.se

MEASUREMENT

Details: Antenna measurement campaign of SAR-LUPE
Reference of the report: -
Private: -
Cost: Yes
Comments: -

FACILITY SHARING

PROVIDER OF THE FACILITY

Company: Ericsson Microwave Systems AB
ACE Number: 30
Address: Floejelbergsgatan 2A 43184 Moelndal SWEDEN
Contact person: Håkan Eriksson
Phone: +46 31 7472779
Fax:
Email: hakan.mg.eriksson@ericsson.com

CUSTOMER

Company: SAAB Ericsson Space AB
ACE Number: 33
Address: Delsjoemotet 40515 Gothenburg Sweden
Contact person: Jan Zackrisson
Phone: +46 31 735 4004
Fax:
Email: jan.zackrisson@space.se

MEASUREMENT

Details: Antenna measurement campaign of AMC23
Reference of the report: -
Private: -
Cost: Yes
Comments: -

FACILITY SHARING

PROVIDER OF THE FACILITY

Company: Ericsson Microwave Systems AB
ACE Number: 30
Address: Floejelbergsgatan 2A 43184 Moelndal SWEDEN
Contact person: Håkan Eriksson
Phone: +46 31 7472779
Fax:
Email: hakan.mg.eriksson@ericsson.com

CUSTOMER

Company: SAAB Ericsson Space AB
ACE Number: 33
Address: Delsjoemotet 40515 Gothenburg Sweden
Contact person: Jan Zackrisson
Phone: +46 31 735 4004
Fax:
Email: jan.zackrisson@space.se

MEASUREMENT

Details: Antenna measurement campaign of STAR-ONE
Reference of the report: -
Private: -
Cost: Yes
Comments: -

FACILITY SHARING

PROVIDER OF THE FACILITY

Company: Ericsson Microwave Systems AB
ACE Number: 30
Address: Floejelbergsgatan 2A 43184 Moelndal SWEDEN
Contact person: Håkan Eriksson
Phone: +46 31 7472779
Fax:
Email: hakan.mg.eriksson@ericsson.com

CUSTOMER

Company: SAAB Ericsson Space AB
ACE Number: 33
Address: Delsjoemotet 40515 Gothenburg Sweden
Contact person: Jan Zackrisson
Phone: +46 31 735 4004
Fax:
Email: jan.zackrisson@space.se

MEASUREMENT

Details: Qualification of measurement range for space applications
Reference of the report: 1/1597-LPA201186
Private: -
Cost: No
Comments: -

ANNEX 3

Details S G A

Participant Number	Participant name	Loaned horns: band, ID	Term
9	SATIMO - Societe D'applications Technologiques De L'imagerie Micro-Onde	L-band, BL174 S-band, A6375 C-band, BL204	Dec. 2004 – Feb. 2005
45	NCSRD - National Centre for Scientific Research "Demokritos"	L-band, BL174 S-band, A6375 C-band, BL204	Apr. 2005 – June 2005
40	LIVUNI - The University of Liverpool	X-band, BL152	June 2005 – Oct. 2005
21	UNICAL - Universita degli Studi della Calabria	X-band, BL151 Ku-band, BL172 K-band, BL497	June 2005 – Nov. 2005
13	IETR - Institut National des Sciences Appliquees de Rennes	Ku-band, BL171	Sep. 2005 – Dec. 2005

ANNEX 4

Details on personal exchange program

PERSONNEL EXCHANGE PROGRAM

VISITOR

Company: DTU
ACE Number: 3
Address: Oersteds Plads, bldg. 348 Kgs. Lyngby, Denmark
Person: Sergey Pivnenko
Phone: + 45-253800
Fax: + 45-931634
Email: sp@oersted.dtu.dk

RECEIVING PERSON

Company: SATIMO
ACE Number: 9
Address: Via Italo Torsiello 18, 00128 Rome Italy
Person: L. J. Foged
Phone: +39-650653234
Fax: +39-65060884
Email:lfoged@satimo.com

EXCHANGE PROGRAM

Period: one week (2005/01/07-2005/01/11)
Details:
1. Measurements on a DTU antenna performed in STARLAB system.
2. Open discussion on spherical near field measurements.
3. Joint work on “Recommended practices for near field measurements”.

PERSONNEL EXCHANGE PROGRAM

VISITOR

Company: France Telecom
ACE Number: 8
Address: 1581 Fort de la Tête de Chien, 06320 La Turbie, FRANCE.
Person: Christian Sabatier
Phone: + 33 4 92 10 65 26
Fax: + 33 4 92 10 65 19
Email: chris.sabatier@francetelecom.com

RECEIVING PERSON

Company: Universidad Politécnica de Madrid
ACE Number: 27
Address: ETSI Telecomunicación. Ciudad Universitaria. 28040 Madrid Spain
Person: Manuel Sierra Castañer
Phone: +34 91 3367366 ext 4040
Fax: +34 91 5432002
Email: m.sierra.castaner@gr.ssr.upm.es

EXCHANGE PROGRAM

Period: June 23rd 2005
Details: Visit to the facilities and LEHA-UPM antenna measurement laboratory

PERSONNEL EXCHANGE PROGRAM

VISITOR

Company: Universidad Politecnica de Madrid
ACE Number: 27
Address: Madrid, Spain
Person: Manuel Sierra Castaner
Phone: +34 91 3367366 ext 4040
Fax: +34 91 5432002
Email: m.sierra.castaner@gr.ssr.upm.es

RECEIVING PERSON

Company: HUT Radio Laboratory
ACE Number: 5
Address: P.O. Box 3000, FI-02015 TKK, Finland
Person: Antti Räisänen
Phone: +358-9-4512241
Fax: +358-9-4512152
Email: antti.raisanen@tkk.fi

EXCHANGE PROGRAM

Period: 23.-27.5.2005
Details: Accompanied by participation in ACE antenna course at HUT

PERSONNEL EXCHANGE PROGRAM

VISITOR

Company: Universidad Politecnica de Madrid
ACE Number: 27
Address: Madrid, Spain
Person: Fernando Martin-Jimenez
Phone:
Fax:
Email:

RECEIVING PERSON

Company: HUT Radio Laboratory
ACE Number: 5
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EXCHANGE PROGRAM

Period: 23.-27.5.2005
Details: Accompanied by participation in ACE antenna course at HUT

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Period: planned TDB
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EXCHANGE PROGRAM

Period: September-December 2006
Details: Short stage in DTU for a PhD student (to be confirmed)