Antenna technologies

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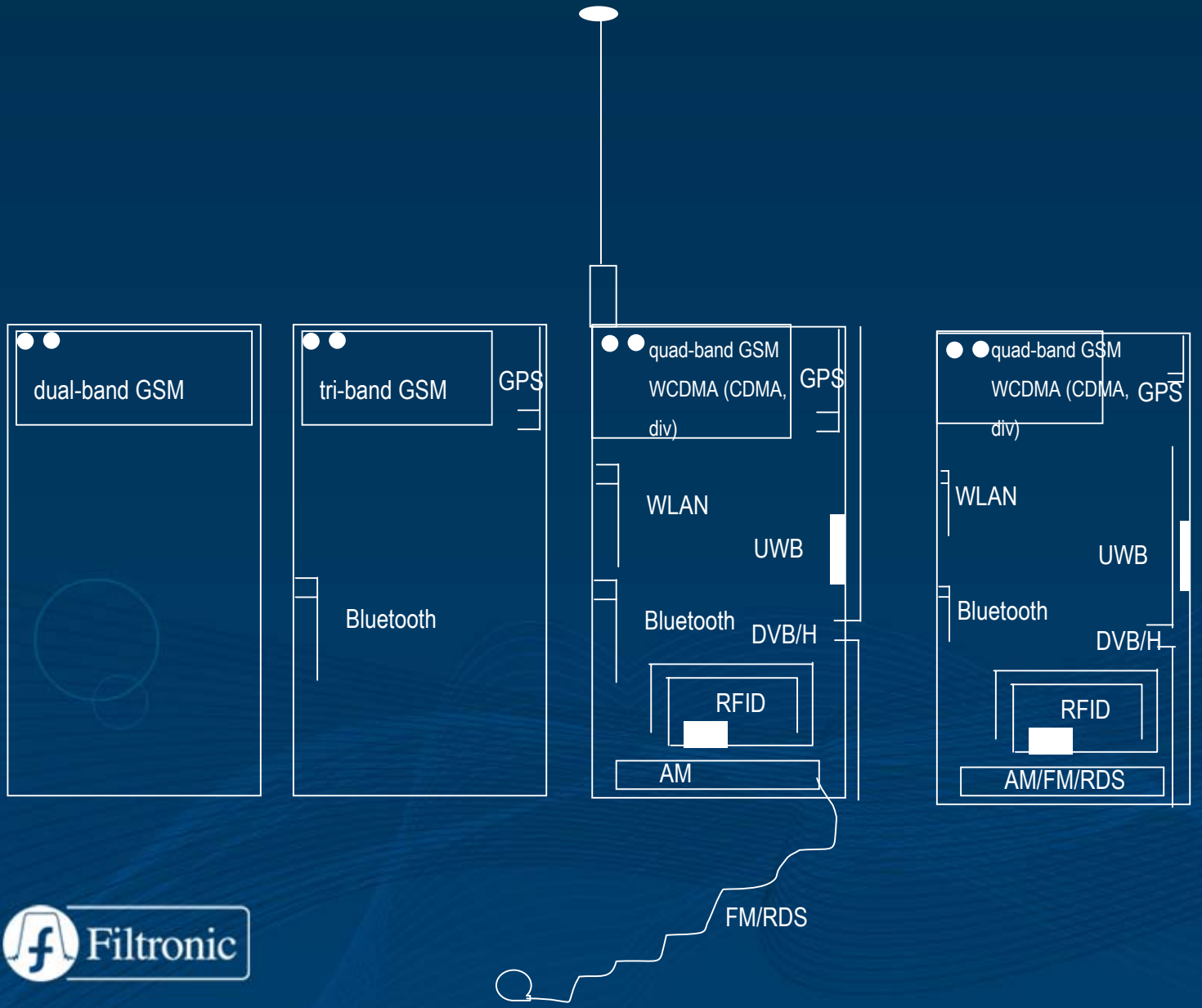
Antenna technologies

- Current status → trends
- Outlook to different antenna solutions, examples
- Summary, challenges for the future

Current status → trends



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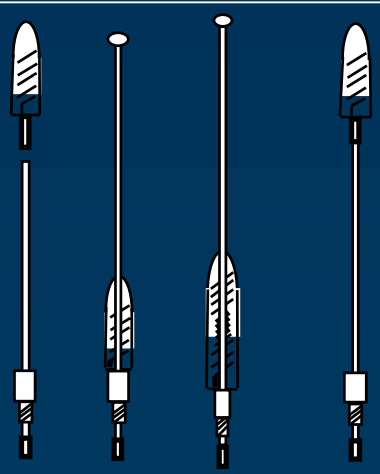
Roadmap

WHIP

RETRACTABLE

TELESCOPIC STRUCTURES



SMALLER DIAMETER, DIMENSIONS AND MORE FUNCTIONALITY, LIKE SWIVEL/HINGE STRUCTURES OR AUTOMATIC MECHANICAL MOVEMENTS. MAGNETOSTRICTIVE METALS COULD BRING NEW FEATURES TO THESE TRADITIONAL STRUCTURES.
GOOD RF PROPERTIES CAN BE USED IN NEW SYSTEMS LIKE UWB.

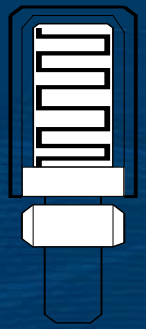
HELICAL

PWB

FLEX PWB (MEANDER LINE)

BALANCED

SWISS ROLL



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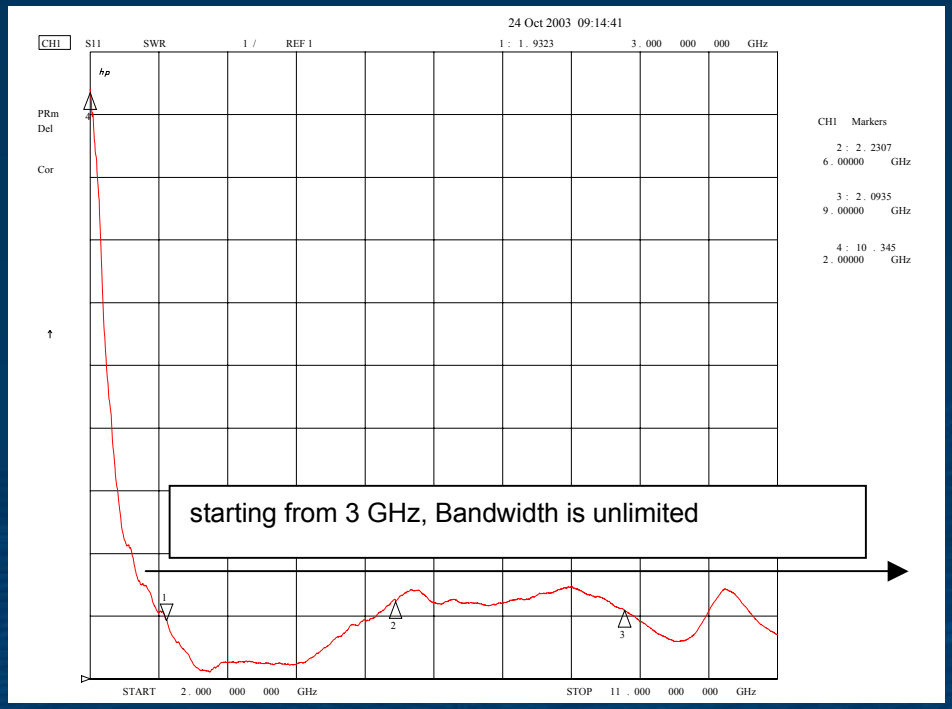
UWB ANTENNA

SIMPLE THICK MONOPOLE OR A ELLIPTICAL DISK

SWR

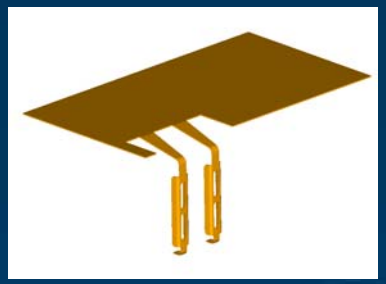


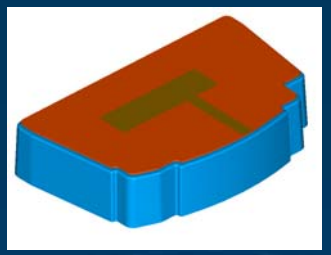
Roadmap

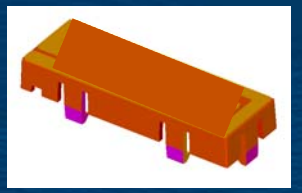
(P)IFA LOOP | SHEET METAL | MID TECHNIQUES | FLEX/FOIL | FLEXIBLE TECHNIQUES | INKS

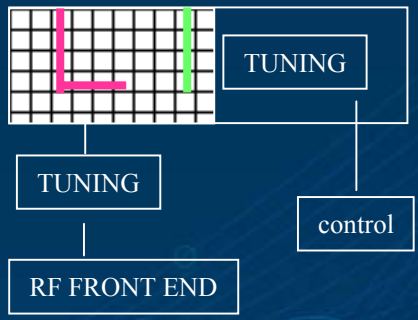
INSERT MOULDED PART | IML/IMD

FETs | MEMS









EXISTING ANTENNA TYPES ARE SUITABLE FOR A NUMBER OF SWITCHING SCHEMES. BAND-, MODE, CHANNEL SWITCHING. DIRECT, INDIRECT AND ELEMENT LEVEL SWITCHING

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MODE switching

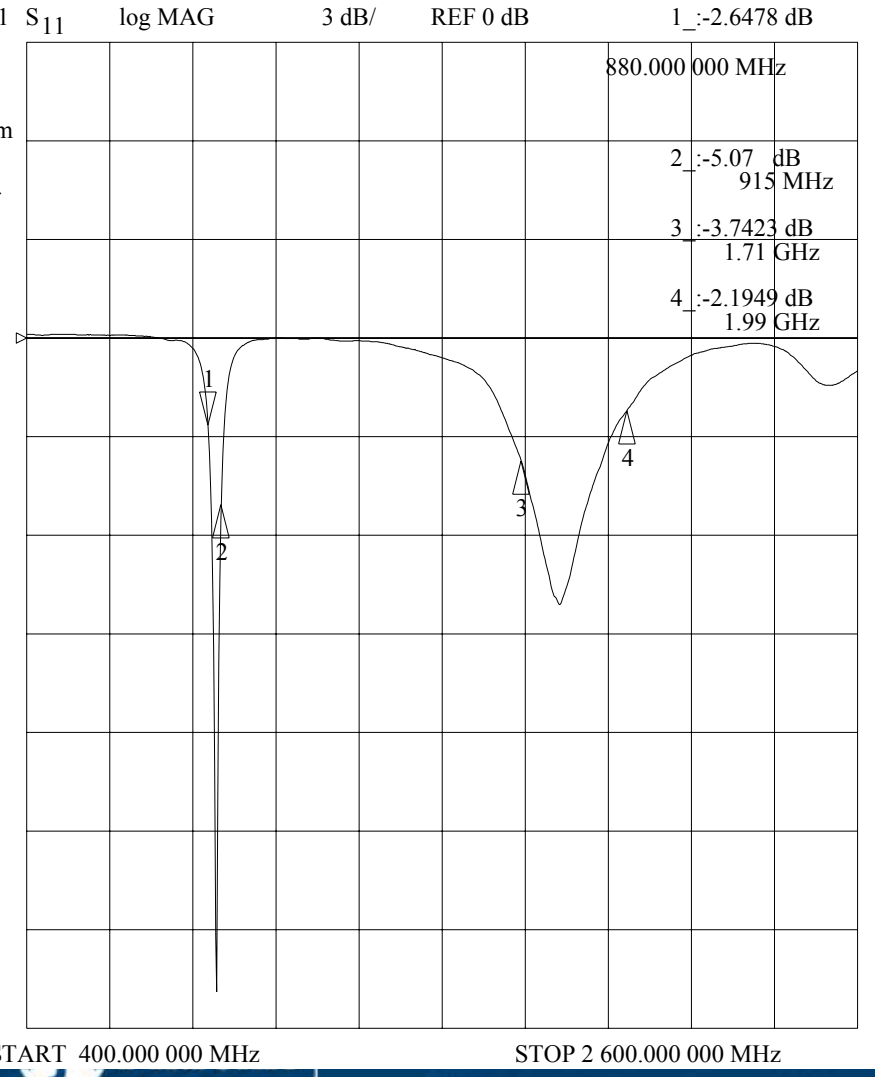
Antenna type: PIFA

Antenna size:30mm x 13mm x 5mm = 1.95cc

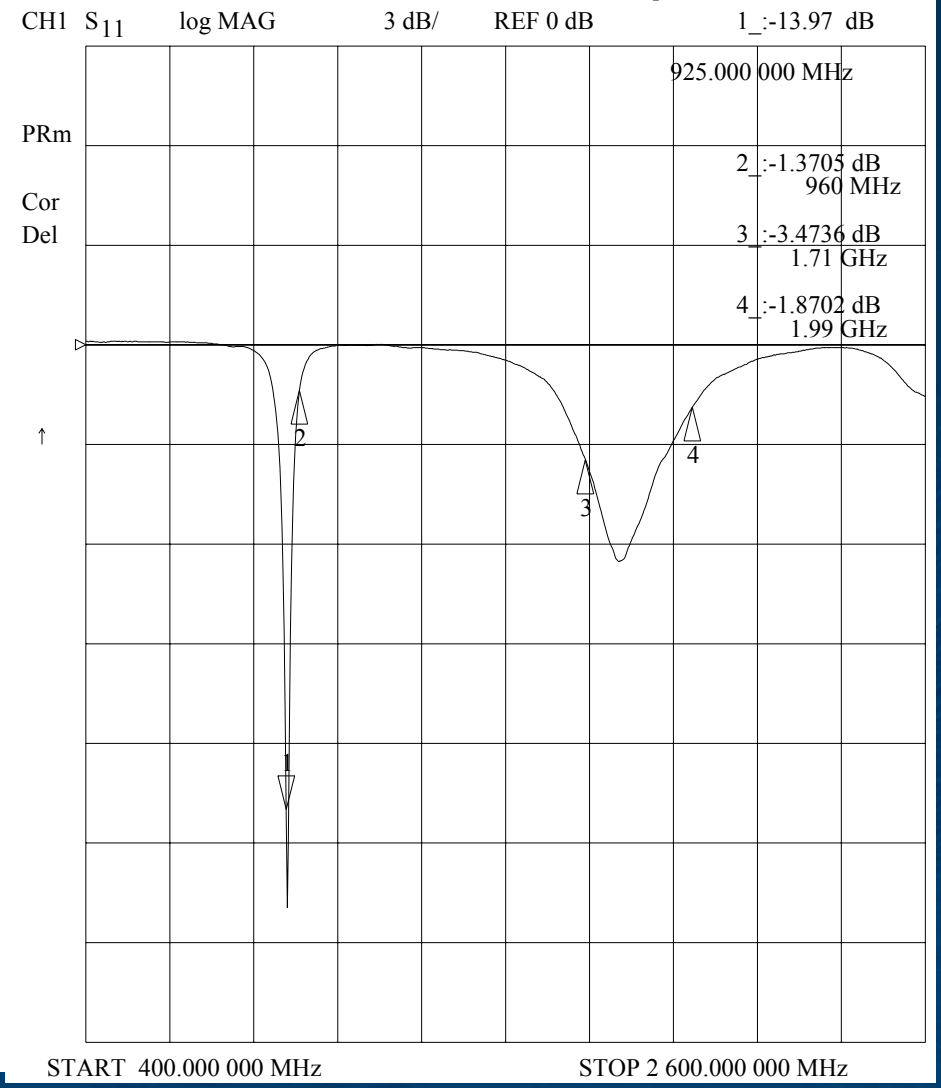
Ground plane size: 100mm x 40mm

Matching

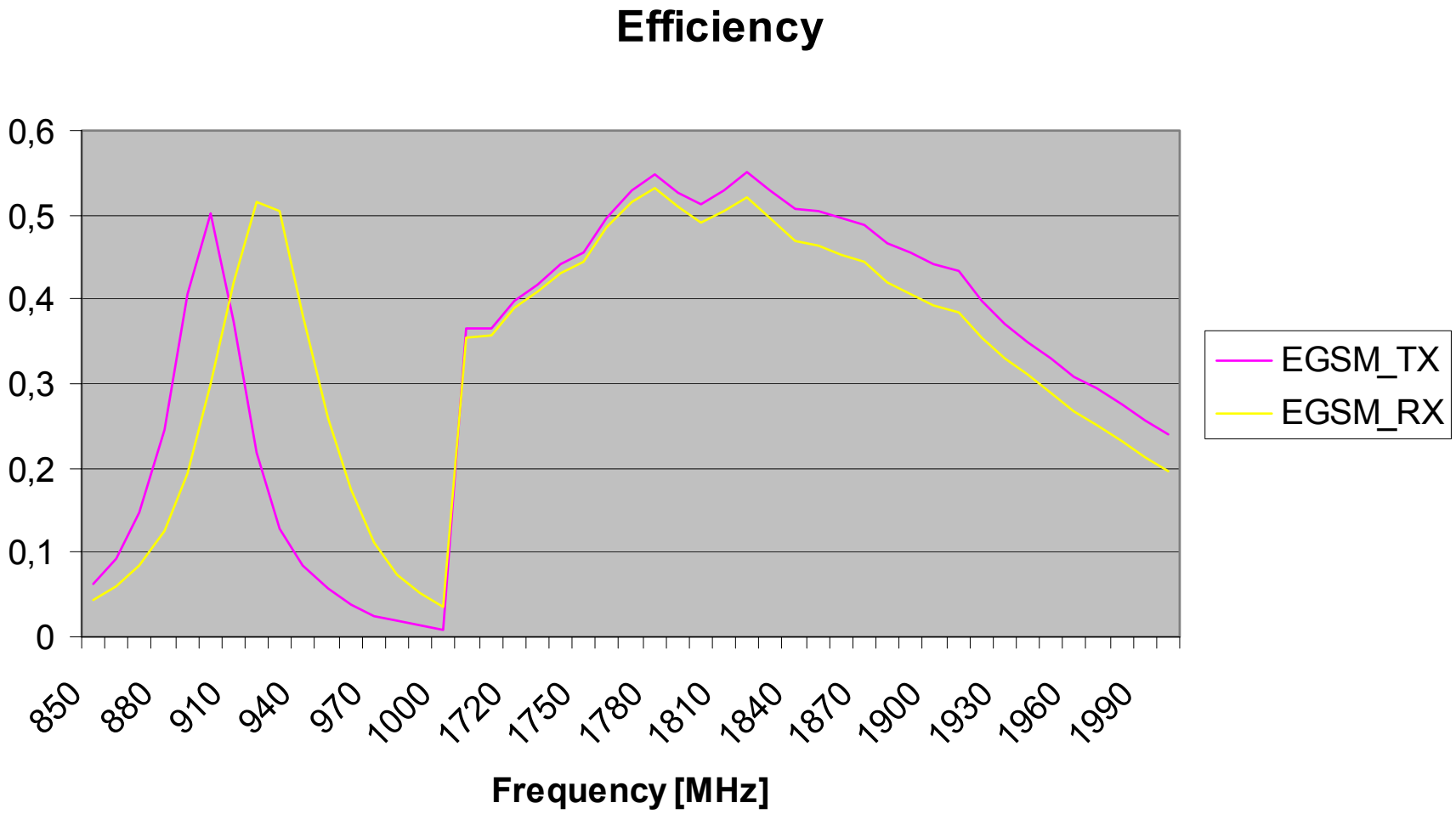
EGSM TX



EGSM RX



Realized (total) efficiency



Quad-band switchable antenna

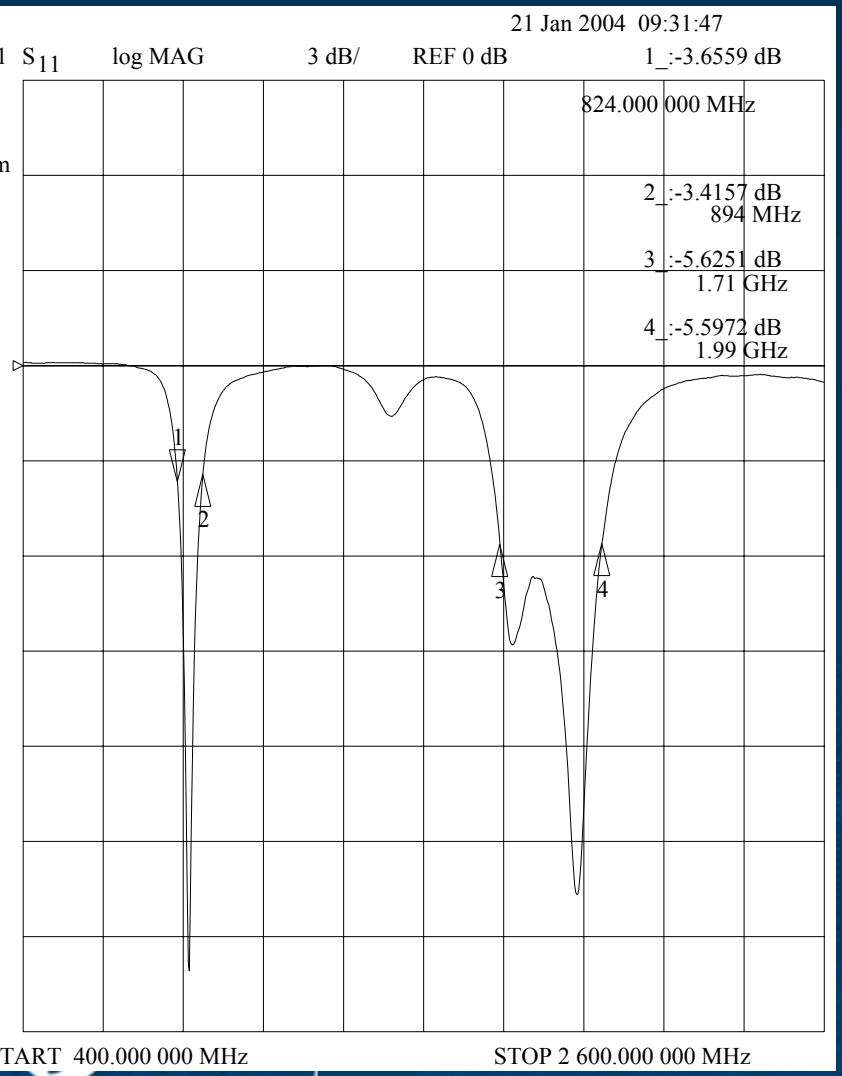
Antenna type: PIFA

Antenna size:40mm x 17mm x 6mm

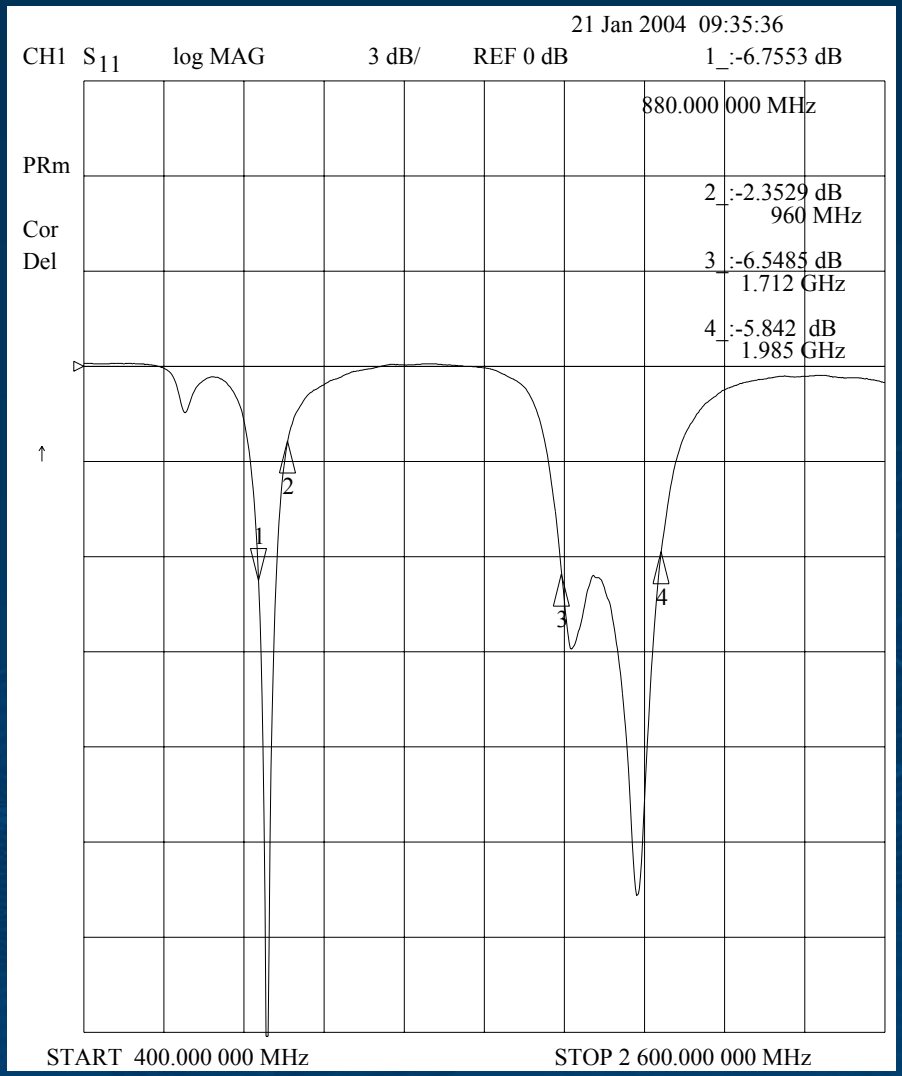
Ground plane size: 100mm x 40mm

Matching

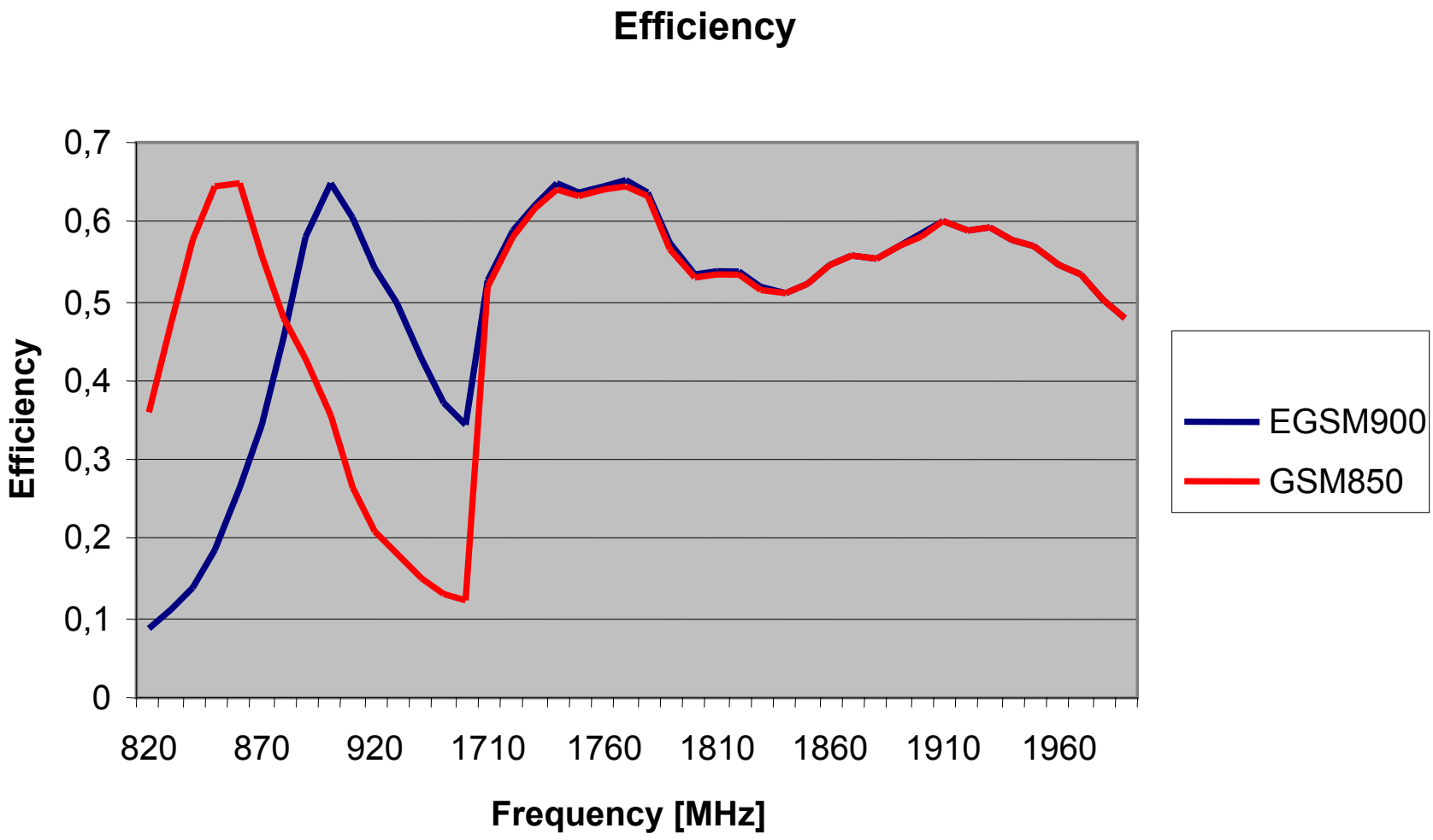
GSM850



EGSM900

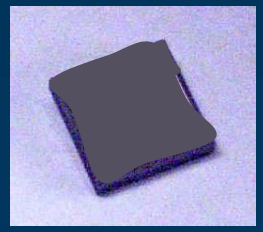


Realized (total) efficiency



Roadmap

CERAMIC (PATCH) | LOOP | HYBRID | DRA



FERRITES

CLEARLY NEW TYPES OF MATERIALS ARE NEEDED IN THE FUTURE ANTENNA SOLUTIONS AND ADVANCES IN PLATING, PRINTING CERAMIC, FERRITE ETC. MATERIAL TECHONOGIES ARE NEEDED BEFORE THEY CAN BE REALISED EFFECTIVELY.
NEW MATERIALS MAY EVEN OPEN UP COMPLETELY NEW ANTENNA TYPES THAT HAVE NOT TRADITIONALLY BEEN USED IN PORTABLE DEVICES?

COMPLETELY NEW ANTENNA TYPES LIKE SLOT ANTENNAS?

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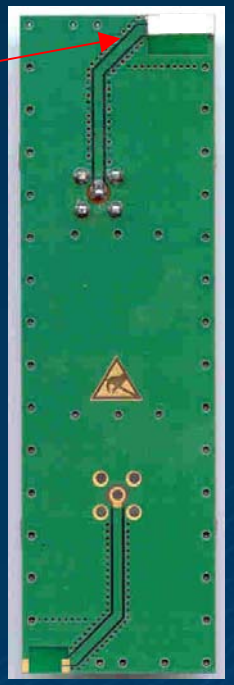
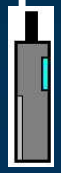
Ceramic BT/GPS- chip antennas

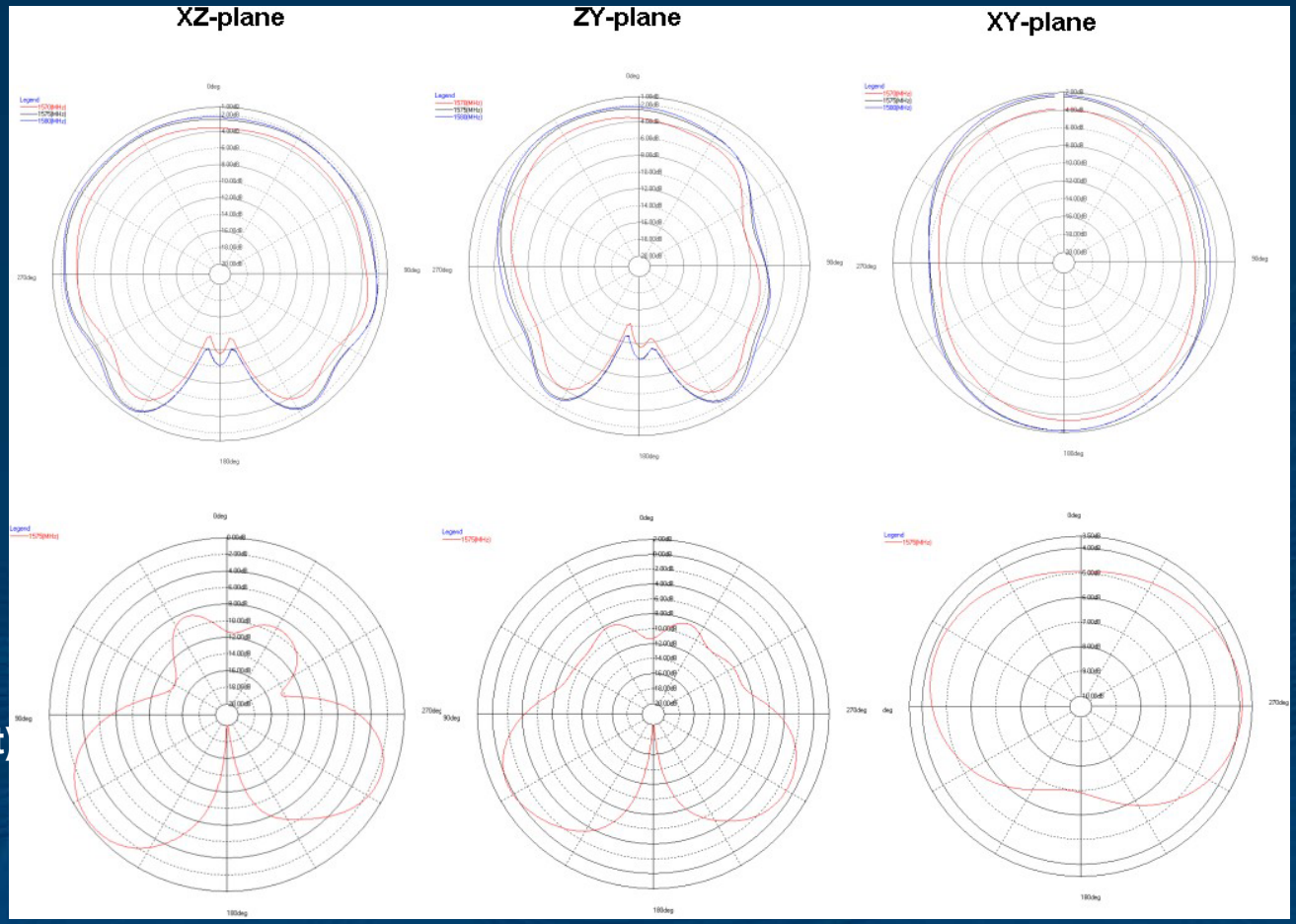


AS AN EXAMPLE LET'S LOOK AT SOME
MAIN DIFFERENCES WHEN COMPARING A NORMAL IFA
TO A CERAMIC LOADED ANTENNA

Ceramic BT/GPS- chip antennas



Ceramic antenna



IFA-antenna
(same size, plastic support)

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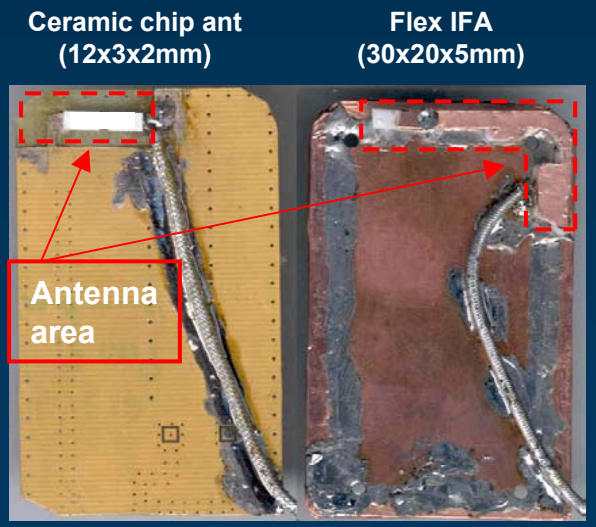
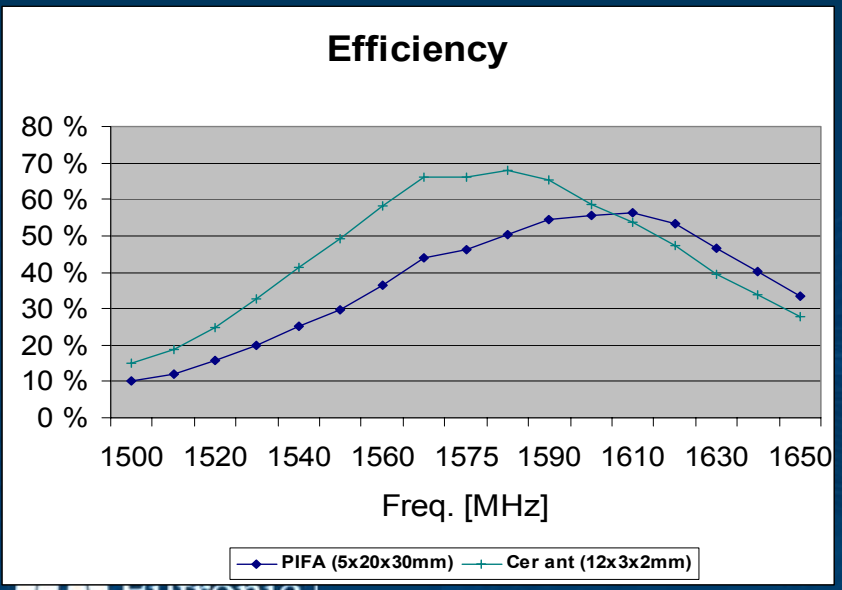
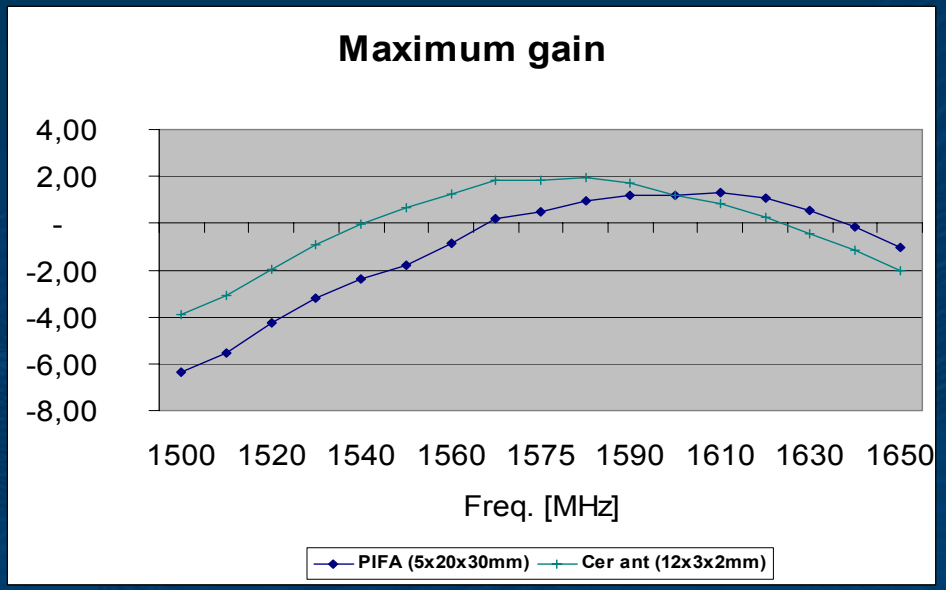
Ceramic BT/GPS- chip antennas

good radiation performance in compact size





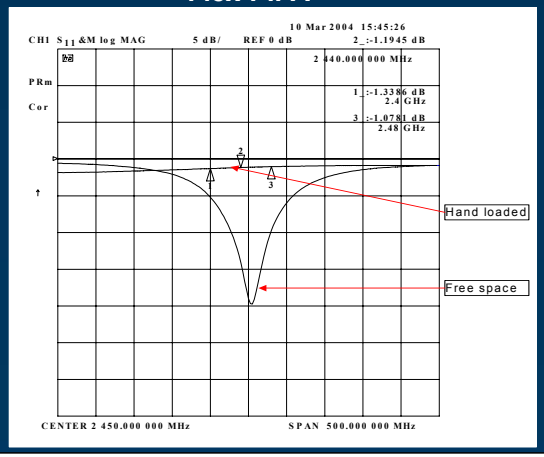


Ceramic BT/GPS- chip antennas

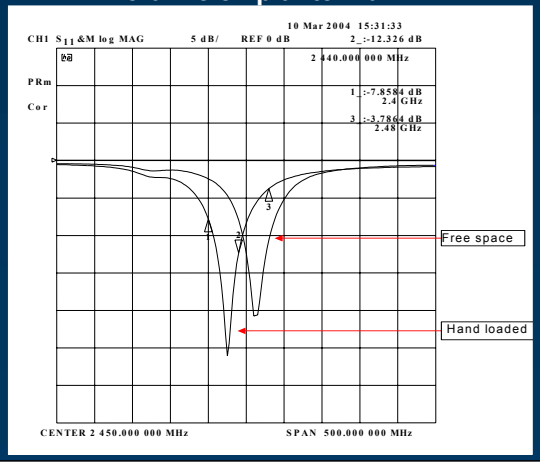
immunity for loading objects

Return loss / S11

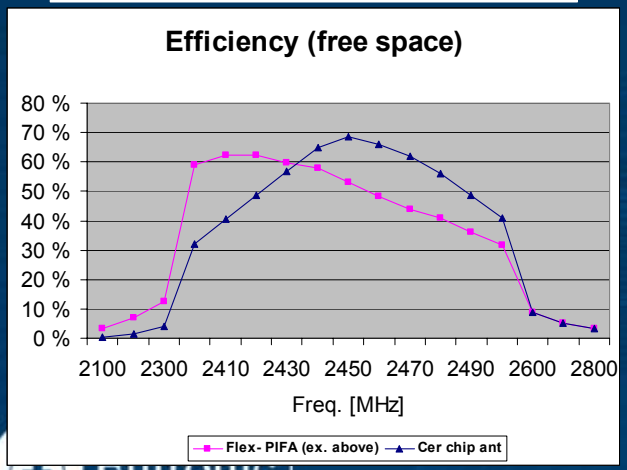
Flex-PIFA

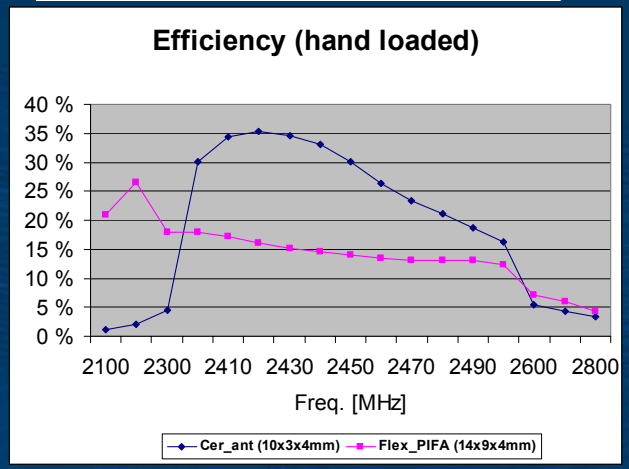


Ceramic chip antenna



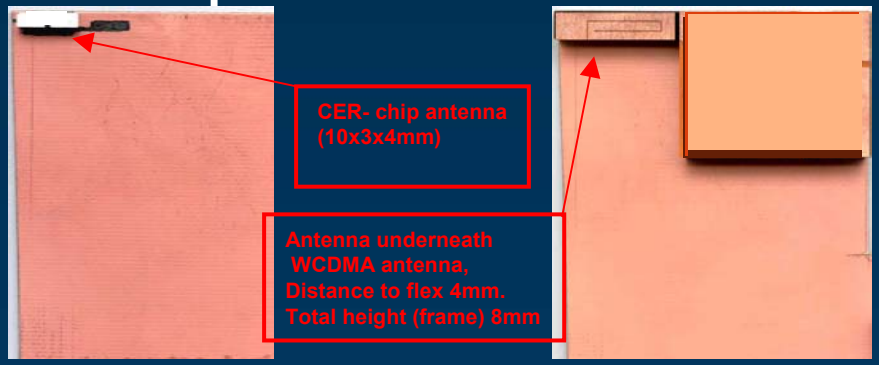
Antenna underneath cover, against the tissue of the hand



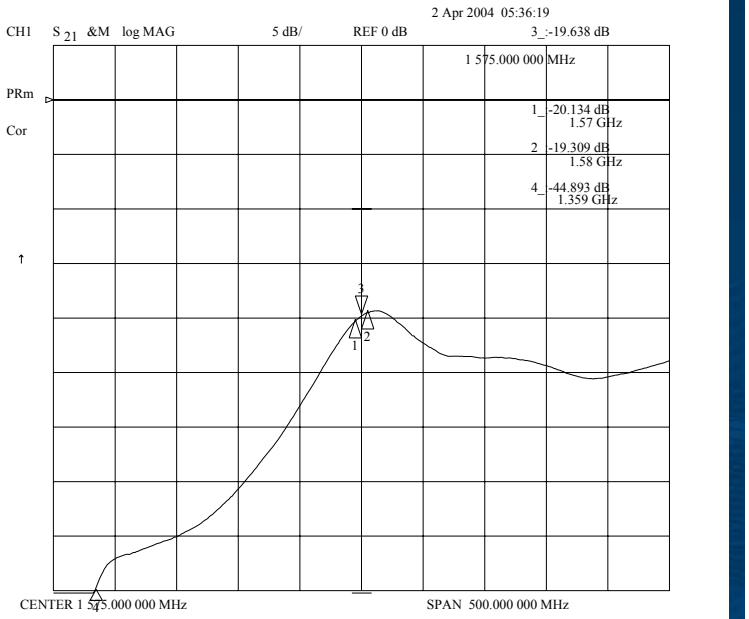


Ceramic BT/GPS- chip antennas

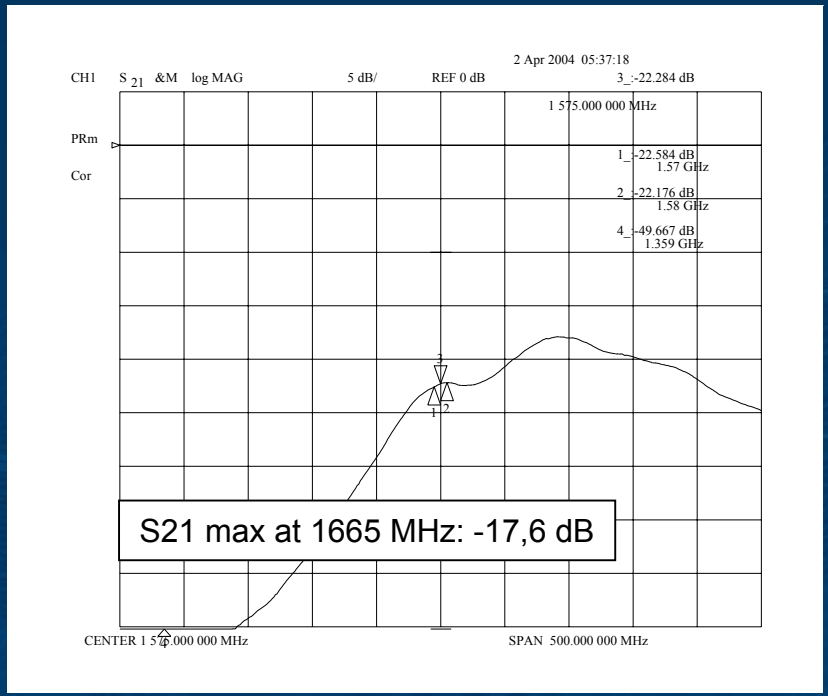
High isolation between other antennas)



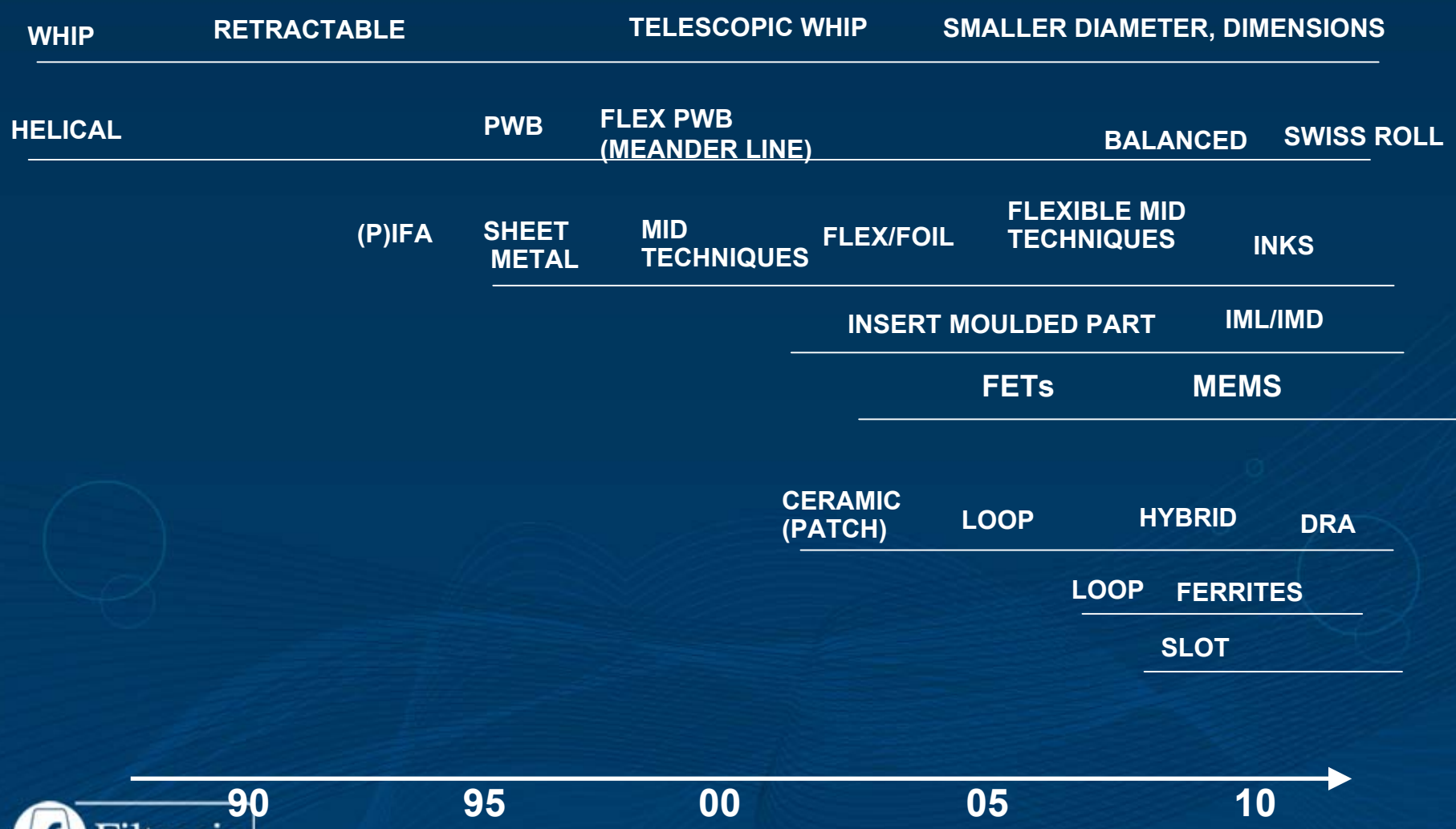
S21: isolation to WCDMA antenna



S21: isolation to GSM antenna



SUMMARY


WHIP
RETRACTABLE
TELESCOPIC WHIP
SMALLER DIAMETER, DIMENSIONS
HELICAL
PWB
FLEX PWB
(MEANDER LINE)
BALANCED
SWISS ROLL
(P)IFA
SHEET METAL
MID TECHNIQUES
FLEX/FOIL
FLEXIBLE MID TECHNIQUES
INKS
INSERT MOULDED PART
IML/IMD
FETs
MEMS
CERAMIC (PATCH)
LOOP
HYBRID
DRA
LOOP
FERRITES
SLOT
90
95
00
05
10

SUMMARY

- Low cost, small size, flexible design are must, lifetimes getting shorter. Antenna markets growing because of non cellular systems
- Environmental and health issues (SAR) important (design & validation)
- Adaptive (arrays) / tuneable (software) / smart antennas coming available
- Lots of data downloading on terminal => reception quality important (diversity, MIMO)
- New Antenna technologies & materials coming
  - Advanced ceramic/ferrite materials
  - Semiconductors (FE integration, also audio and other functionality)
  - New methods to enable effective 3D designs
- Antenna may also integrate into front-ends or part of mechanics

material & process know-how

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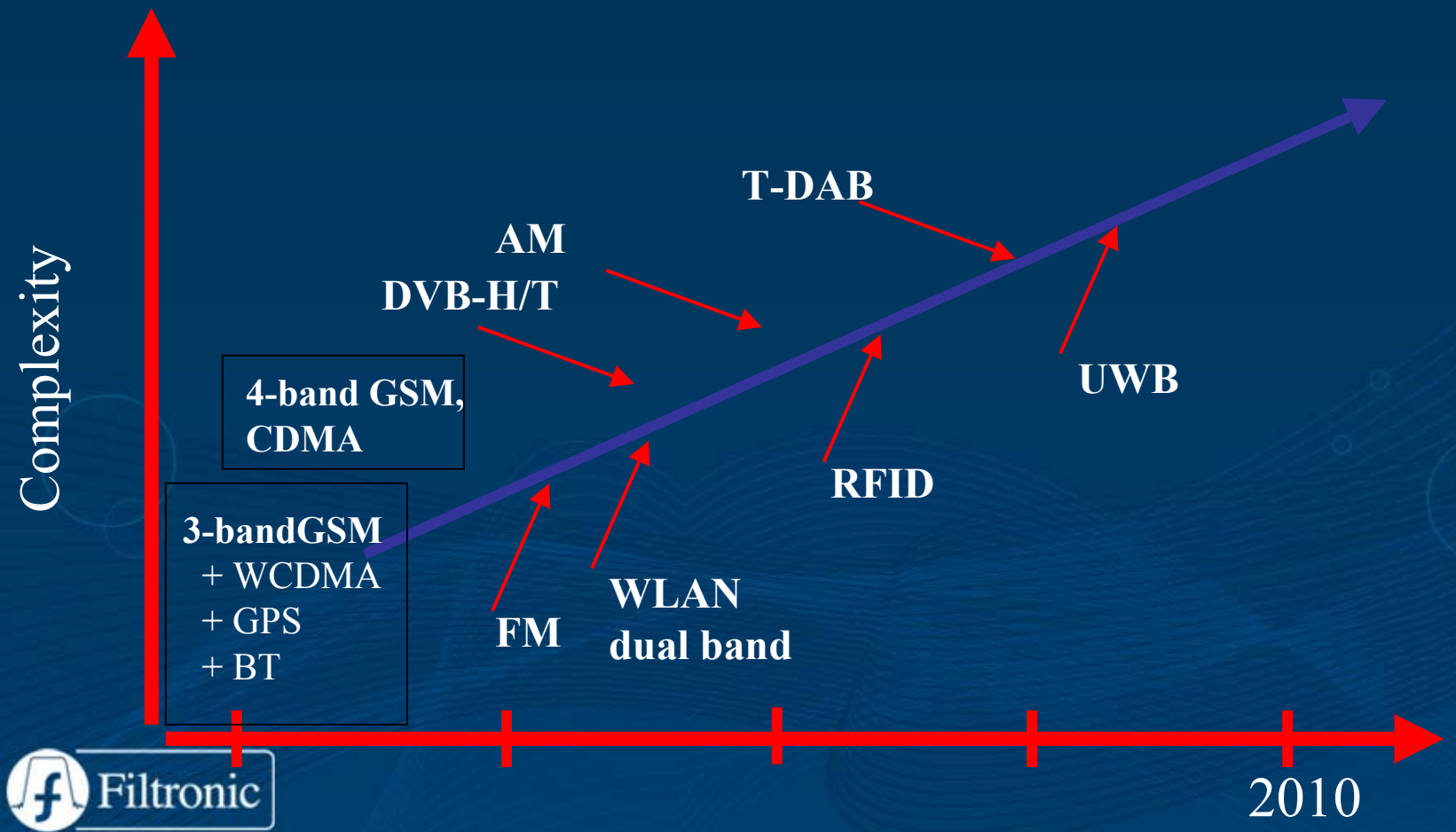
SUMMARY

- COMPLEXITY IS INCREASING
- INTERACTION, ISOLATION



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THANK YOU

射 频 和 天 线 设 计 培 训 课 程 推 荐

易迪拓培训(www.edatop.com)由数名来自于研发第一线的资深工程师发起成立，致力并专注于微波、射频、天线设计研发人才的培养；我们于 2006 年整合合并微波 EDA 网(www.mweda.com)，现已发展成为国内最大的微波射频和天线设计人才培养基地，成功推出多套微波射频以及天线设计经典培训课程和 ADS、HFSS 等专业软件使用培训课程，广受客户好评；并先后与人民邮电出版社、电子工业出版社合作出版了多本专业图书，帮助数万名工程师提升了专业技术能力。客户遍布中兴通讯、研通高频、埃威航电、国人通信等多家国内知名公司，以及台湾工业技术研究院、永业科技、全一电子等多家台湾地区企业。

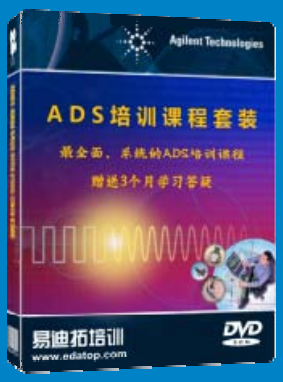
易迪拓培训课程列表：http://www.edatop.com/peixun/rfe/129.html

射频工程师养成培训课程套装

该套装精选了射频专业基础培训课程、射频仿真设计培训课程和射频电路测量培训课程三个类别共 30 门视频培训课程和 3 本图书教材；旨在引领学员全面学习一个射频工程师需要熟悉、理解和掌握的专业知识和研发设计能力。通过套装的学习，能够让学员完全达到和胜任一个合格的射频工程师的要求…

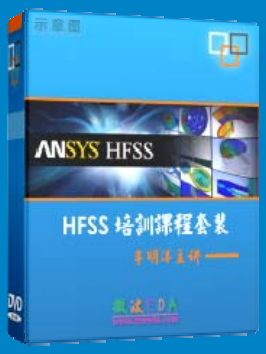
课程网址：http://www.edatop.com/peixun/rfe/110.html

ADS 学习培训课程套装



该套装是迄今国内最全面、最权威的 ADS 培训教程，共包含 10 门 ADS 学习培训课程。课程是由具有多年 ADS 使用经验的微波射频与通信系统设计领域资深专家讲解，并多结合设计实例，由浅入深、详细而又全面地讲解了 ADS 在微波射频电路设计、通信系统设计和电磁仿真设计方面的内容。能让您在最短的时间内学会使用 ADS，迅速提升个人技术能力，把 ADS 真正应用到实际研发工作中去，成为 ADS 设计专家...

课程网址： http://www.edatop.com/peixun/ads/13.html



HFSS 学习培训课程套装

该套课程套装包含了本站全部 HFSS 培训课程，是迄今国内最全面、最专业的 HFSS 培训教程套装，可以帮助您从零开始，全面深入学习 HFSS 的各项功能和在多个方面的工程应用。购买套装，更可超值赠送 3 个月免费学习答疑，随时解答您学习过程中遇到的棘手问题，让您的 HFSS 学习更加轻松顺畅…

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CST 学习培训课程套装

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课程网址：http://www.edatop.com/peixun/cst/24.html

HFSS 天线设计培训课程套装

套装包含 6 门视频课程和 1 本图书，课程从基础讲起，内容由浅入深，理论介绍和实际操作讲解相结合，全面系统的讲解了 HFSS 天线设计的全过程。是国内最全面、最专业的 HFSS 天线设计课程，可以帮助您快速学习掌握如何使用 HFSS 设计天线，让天线设计不再难…

课程网址：http://www.edatop.com/peixun/hfss/122.html

13.56MHz NFC/RFID 线圈天线设计培训课程套装

套装包含 4 门视频培训课程，培训将 13.56MHz 线圈天线设计原理和仿真设计实践相结合，全面系统地讲解了 13.56MHz 线圈天线的工作原理、设计方法、设计考量以及使用 HFSS 和 CST 仿真分析线圈天线的具体操作，同时还介绍了 13.56MHz 线圈天线匹配电路的设计和调试。通过该套课程的学习，可以帮助您快速学习掌握 13.56MHz 线圈天线及其匹配电路的原理、设计和调试…

详情浏览：http://www.edatop.com/peixun/antenna/116.html

我们的课程优势：

※ 成立于 2004 年，10 多年丰富的行业经验，

※ 一直致力并专注于微波射频和天线设计工程师的培养，更了解该行业对人才的要求

※ 经验丰富的一线资深工程师讲授，结合实际工程案例，直观、实用、易学

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