



Presentation for UK Visiting Delegation

The Institute Of Wireless Communication Technology

[HTTP://iwct.sjtu.edu.cn](http://iwct.sjtu.edu.cn)

Episode 2009





① **About IWCT**

② **People**

③ **Research, Development and Projects**

④ **Industrial Partners and Trends**

⑤ **Students and funs**





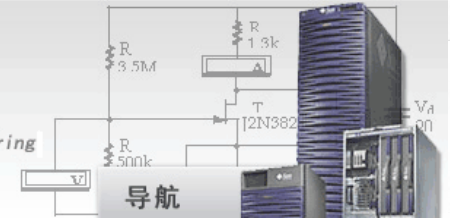
上海交通大学
Shanghai Jiao Tong University

电子信息与电气工程学院

SJT University



上海交通大学电子工程系
Shanghai Jiao Tong University Electronic Engineering



School of Electronics, Information and Electrical Engineering

Department of Electronics Engineering

Institute of Wireless Communication Technology

The Institute of Wireless Communication Technology (IWCT) was founded at Shanghai Jiao Tong university in 2001. Faculty affiliated with the institute are mainly drawn from the **Wireless communications** and relative research topics.





Location

Old Campus

27.435km

According to self-dev wireless
GPS/Compass receiver



New Campus

SJTU.EE.IWCT ©
2009



上海交通大学



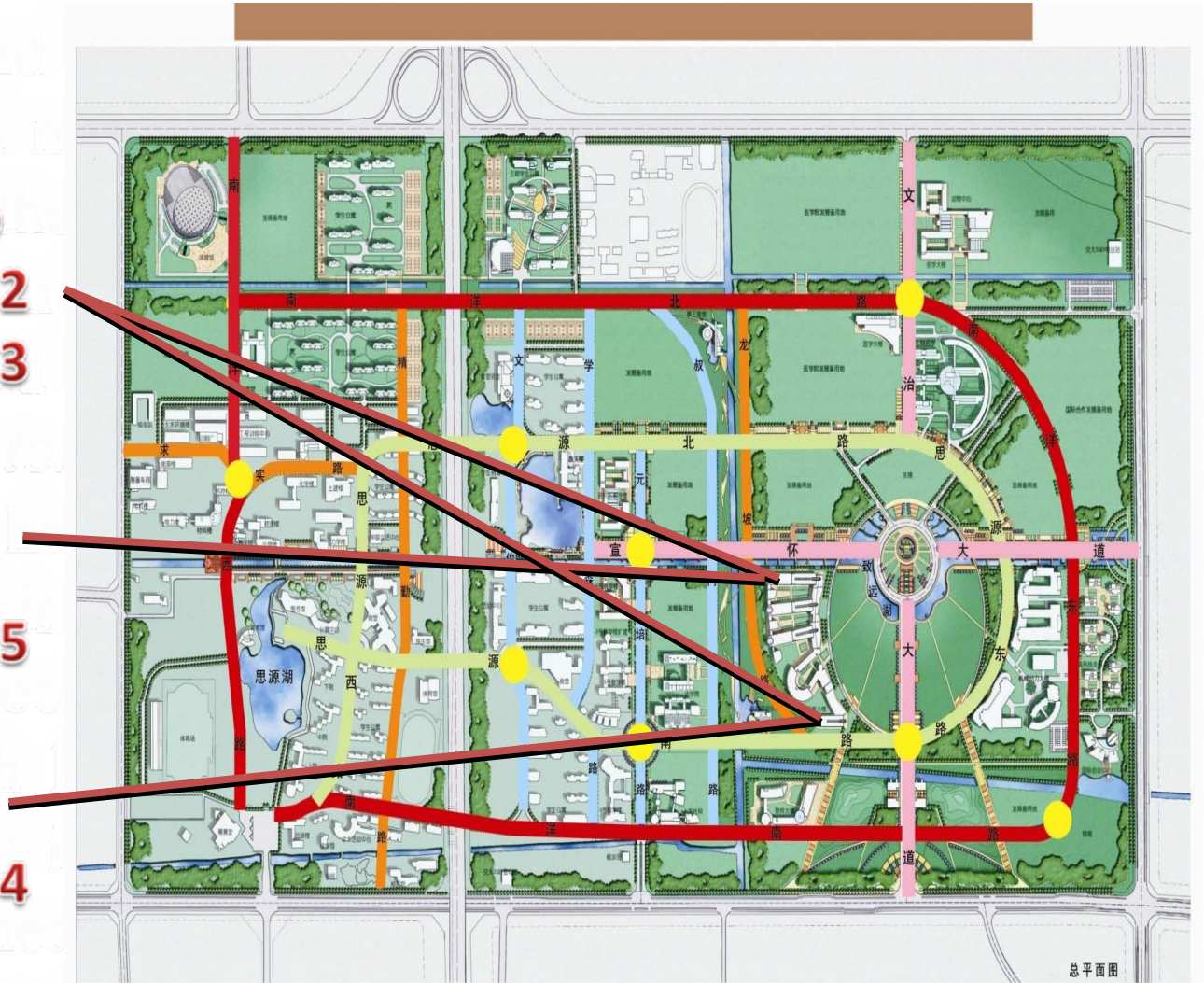


Location

Theoretical Group
SEIEE Building1 Flr.2
SEIEE Building5 Flr.3

Development
Group A
SEIEE Building1 Flr.5

Development
Group B
SEIEE Building5 Flr.4



上海交通大学闵行校区二期控制性详细规划
DEVELOPMENT CONTROL PLAN FOR MINHANG CAMPUS OF SJTU



Papers and Contributions

Papers: more than 150*, half of them were appeared on top IEEE trans. and conferences including MobiCom, ICC, Globecom etc.

Patents: more than 50* applied, and 8 authorized in 08'.

Proposals: more than 6* prepared for ITU

Documents: 2 prepared for IEEE802.15

** In the past three years*



Projects and Dev Environment

Projects:

Approx. 70% are sponsored by NSF, 863, 973, and KSS (key special subjects), 30% from industry.

Dev Environment: products and donations from Agilent, Tektronix, Spirent, Anritsu, Sun, HP, etc, ***gross value exceeds 1.7 million USD.***



Awards

S

- 1 National Advancement in Technology Awards 08'
- 1 Shanghai Advancement in Technology Awards 06'
- 4 Awards in relative professional fields
- Awards for elite scholarship (Prof. Tao and Wang)





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Students

- 15 Ph.D candidates in Lab
- 60 Master candidates with 20- graduated annually



Faculty

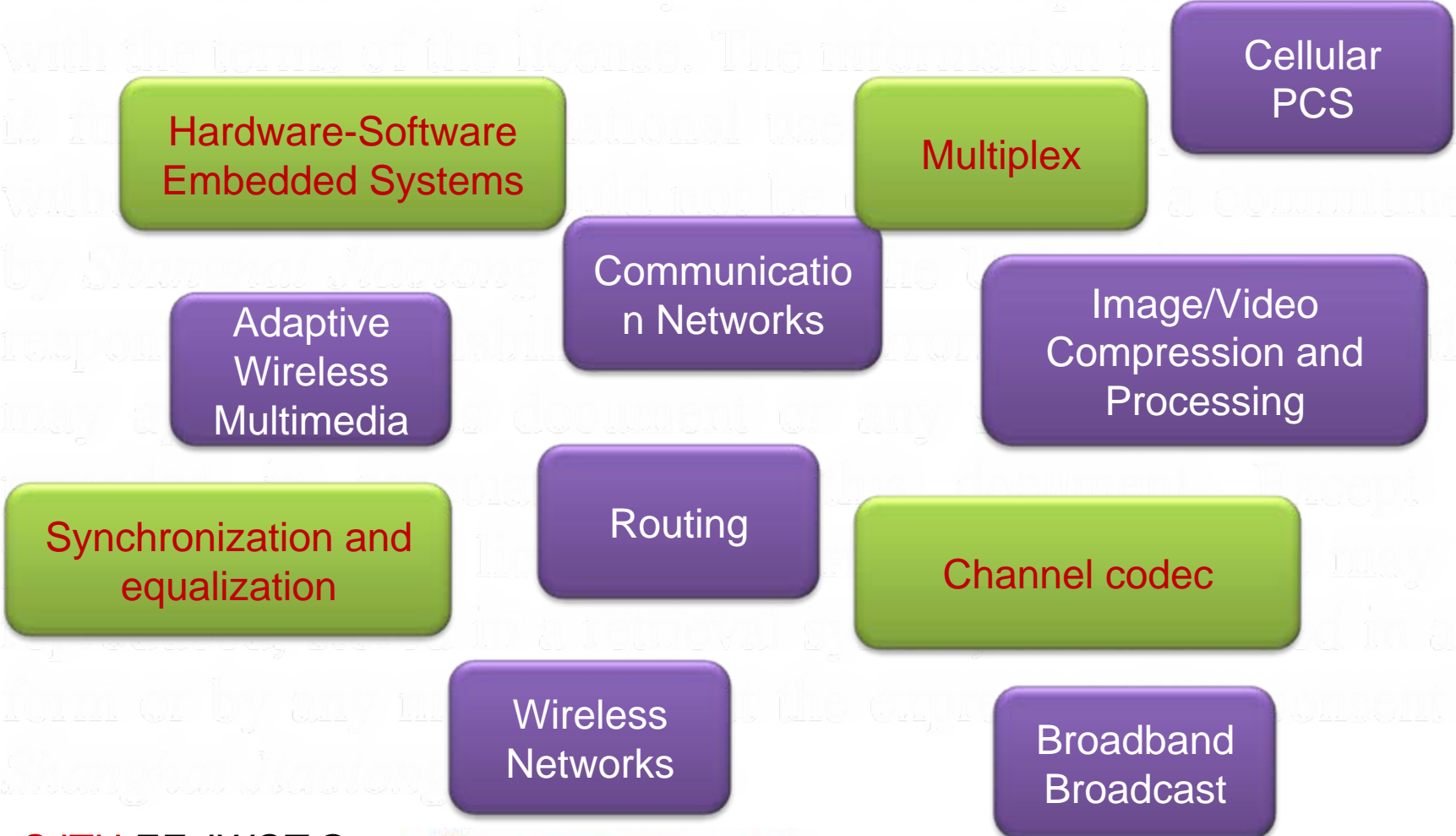


- 4 Ph.D Advisor (Communication and Information System)
- 4 Master Advisor (Communication and Information System)
- 6 Ph.D-hold Lecturers
- 2-4 standing postdoctoral positions
- more than 10 Guest professors /researchers





Corresponding Research Areas





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Research Experience

1, Digital cellular communications

2, Digital Broadcast System

*3, Industry-ready Prototype Data Access
Wireless Network*

*4, Considerations & solutions for special
and hot wireless scenario*

primary

secondary

Research Experience

1

Digital mobile cellular communications

IS-95 and GSM systems (1990s)

CDMA and digital modulation and coding (1995s)

Chinese 3G (C3G)---WCDMA /w Turbo Coding (1998-2001)

China B3G/4G FDD mode 20Mbps trial system (2001-2003)

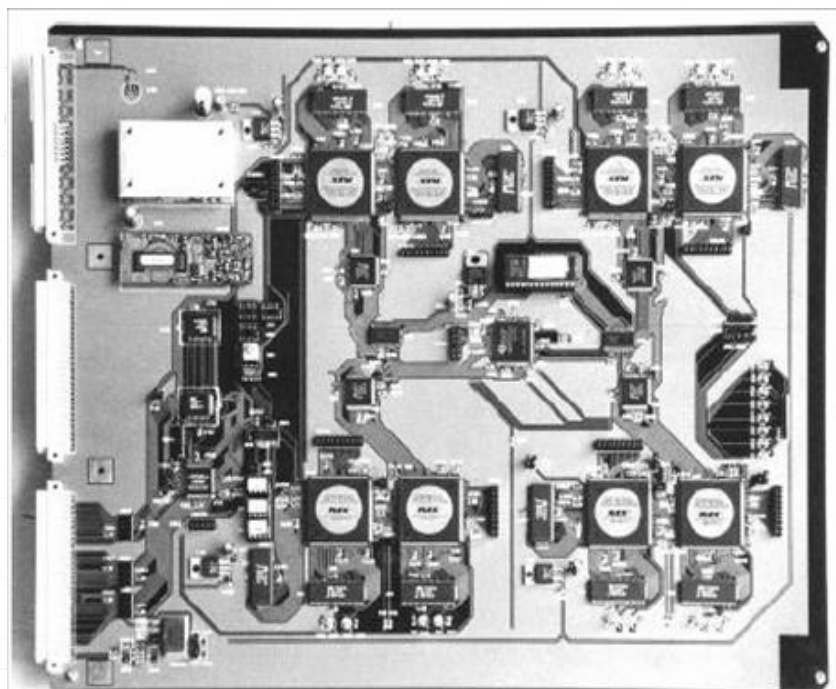
China B3G/4G TDD mode 100Mbps trial system (2003-2006)

IMT-Advanced research and evaluation (2006-now)

Research Experience

1

- **Advanced Channel Coding Research & Development (1999~2001)**



4 CDU Channel Card for Base Station



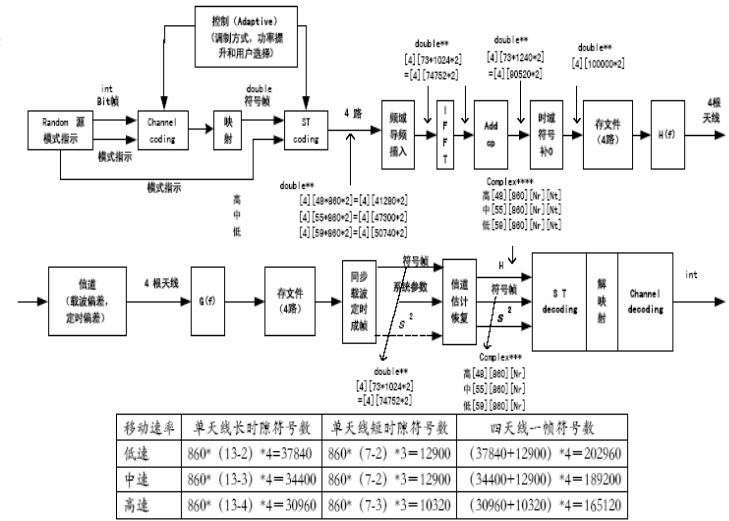
Single FPGA CDU Module for MT

**Channel Decoding Unit (CDU)
Design and Implementation for
The 3rd Generation System of
China (C3G) ---- the WCDMA
Trial System.**

Research Experience

1

Simulation platform for B3G transmission system (TDD downlink)



					MMAC	MMR	MBR1	MBT	MMT	MBR2	MBR3				
					MAC处理/接口	多天线接收	基带接收1	基带发送	多天线发送	基带接收2	基带接收3				
13	11	9	7	5	3	1	2	4	6	8	10	12	14		

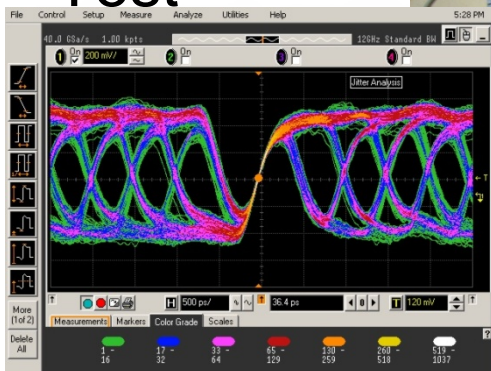
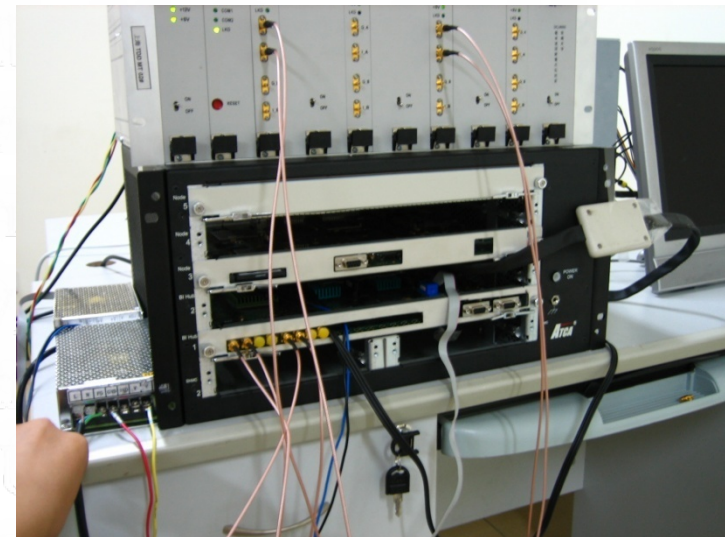
					AMT1	AMR1	AMR2	AMR3	ASW	ABT	AMT2	AMT3	ABR1	ABR2	ABR3	AMAC
					多天线发送	多天线接收	多天线接收	多天线接收	交换/时序	基带发送	多天线发送	多天线发送	基带接收	基带接收	基带接收	MAC处理/接口
13	11	9	7	5	3	1	2	4	6	8	10	12	14			



Research Experience

1

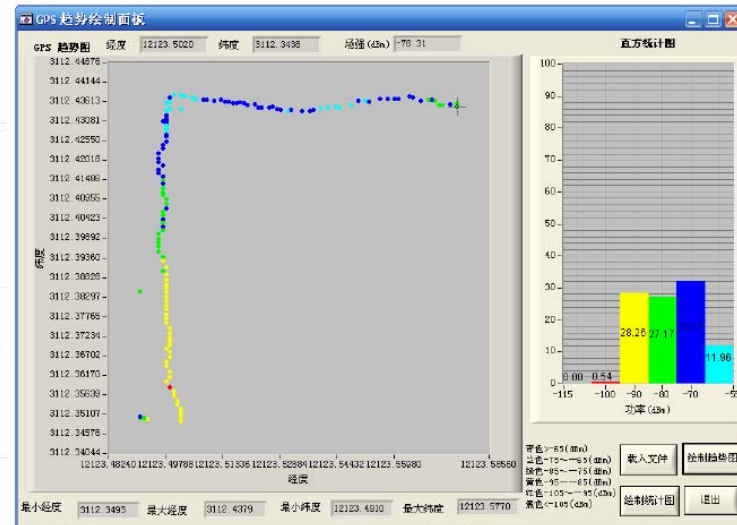
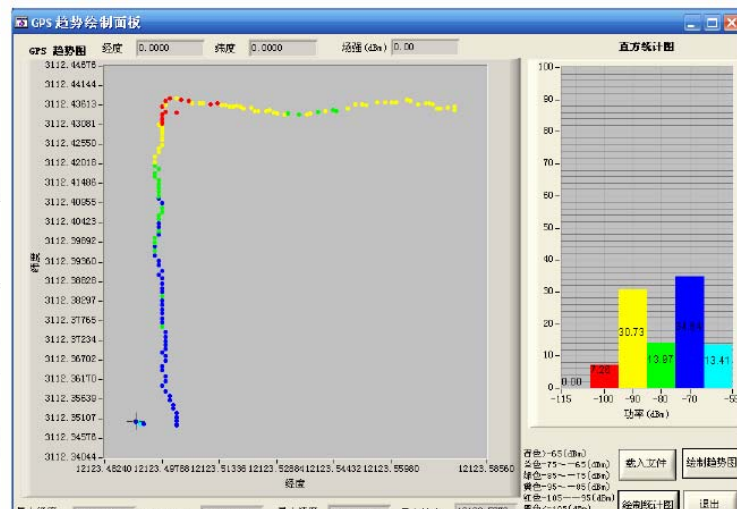
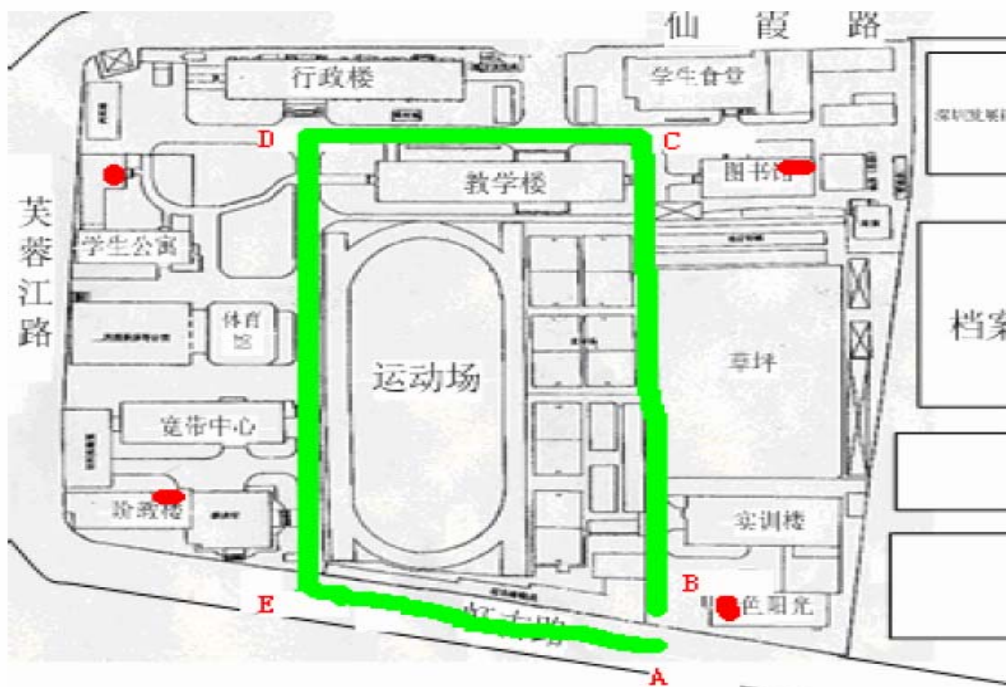
Indoor Test



Research Experience

1

Outdoor Test

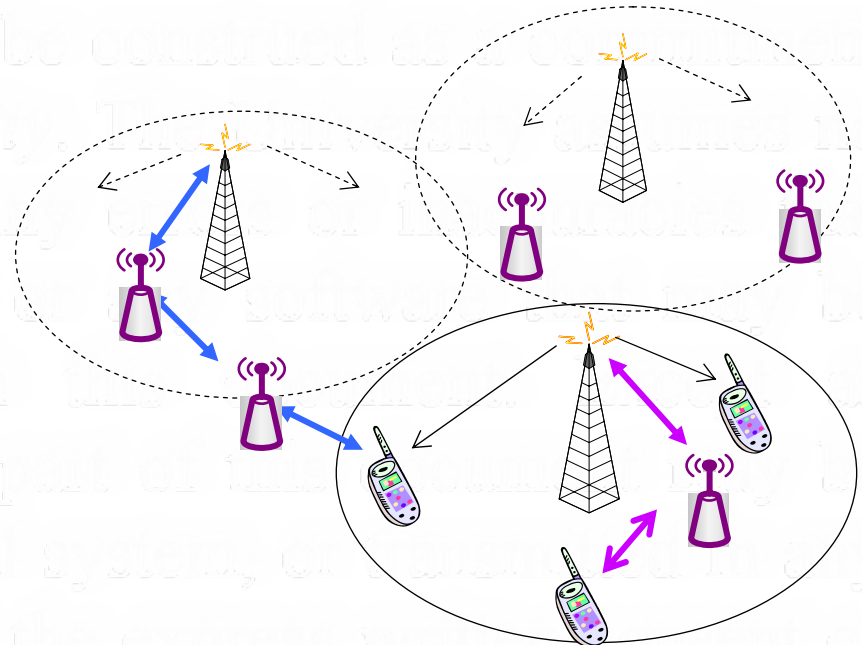


Research Experience

1

OFDMA-Based Multihop relay Network

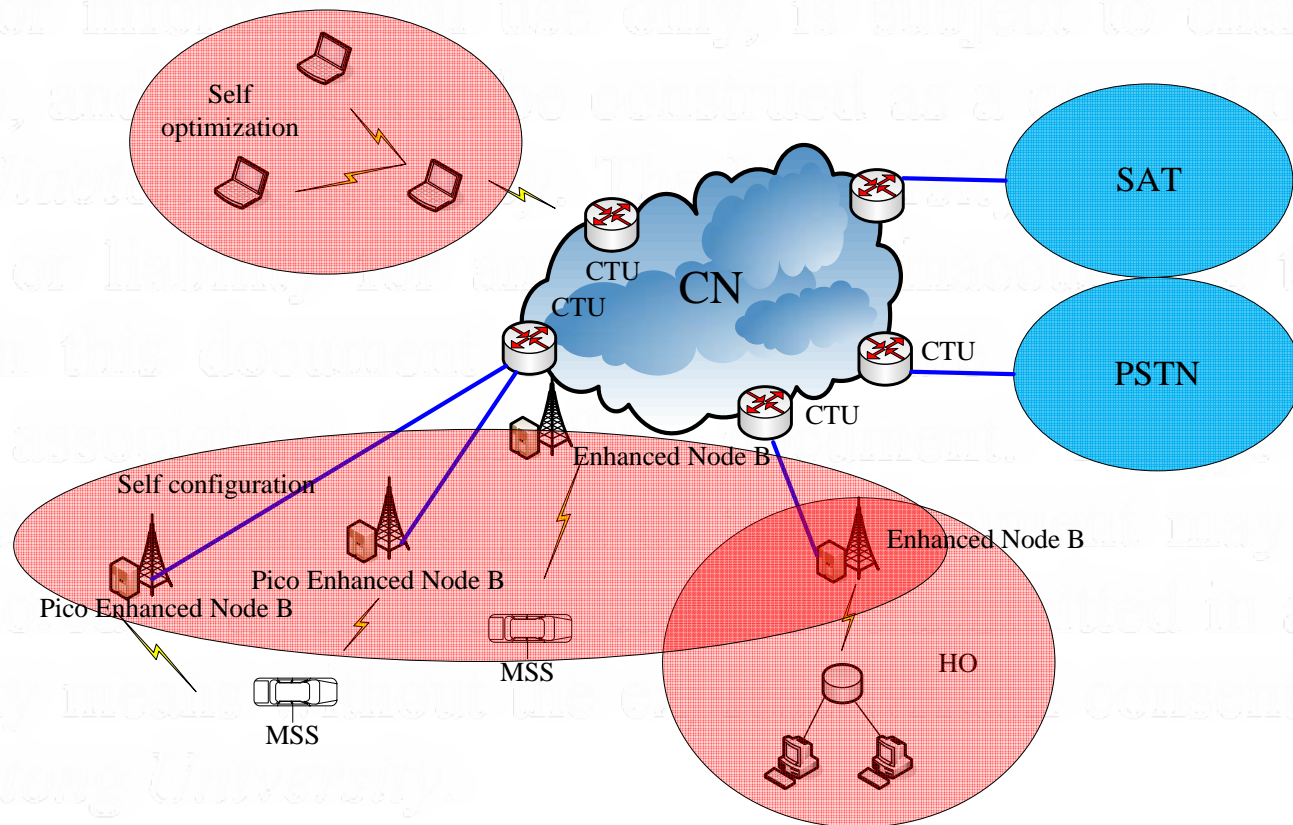
- ❖ Relay selection for limited backbone resources environment ;
(Partial channel information DL cooperative transmission)
(BS decoding UL cooperative receiving)
- ❖ Opportunistic subscriber scheduling
- ❖ Time pre-compensation synchronization
- ❖ Power allocation on sub-carrier



Research Experience

1

Self optimization and configuration Network for LTE-Advanced



Research Experience

1

Several Joint Research Directions for TD-LTE and IMT-Advanced

- ❖ **TD-LTE terminal baseband ASIC (Datang)**
- ❖ **TD-LTE data-card (Datang)**
- ❖ **TD-LTE BS module (Xinwei SCDMA)**
- ❖ **IMT-A Multiple Access Technology (SHR CWC)**
- ❖ **IMT-A Cooperative Transmission (SHRC WC)**

Research Experience

2

Digital Broadcast System

Digital TV Terrestrial Broadcasting ADTB-T (Chinese standard) (1998-2006)

DVB-T (1998-2006)

Handset Mobile TV: DVB-H and CMMB (2005-2007)

China Compass Navigation System (2008-now)

Research Experience

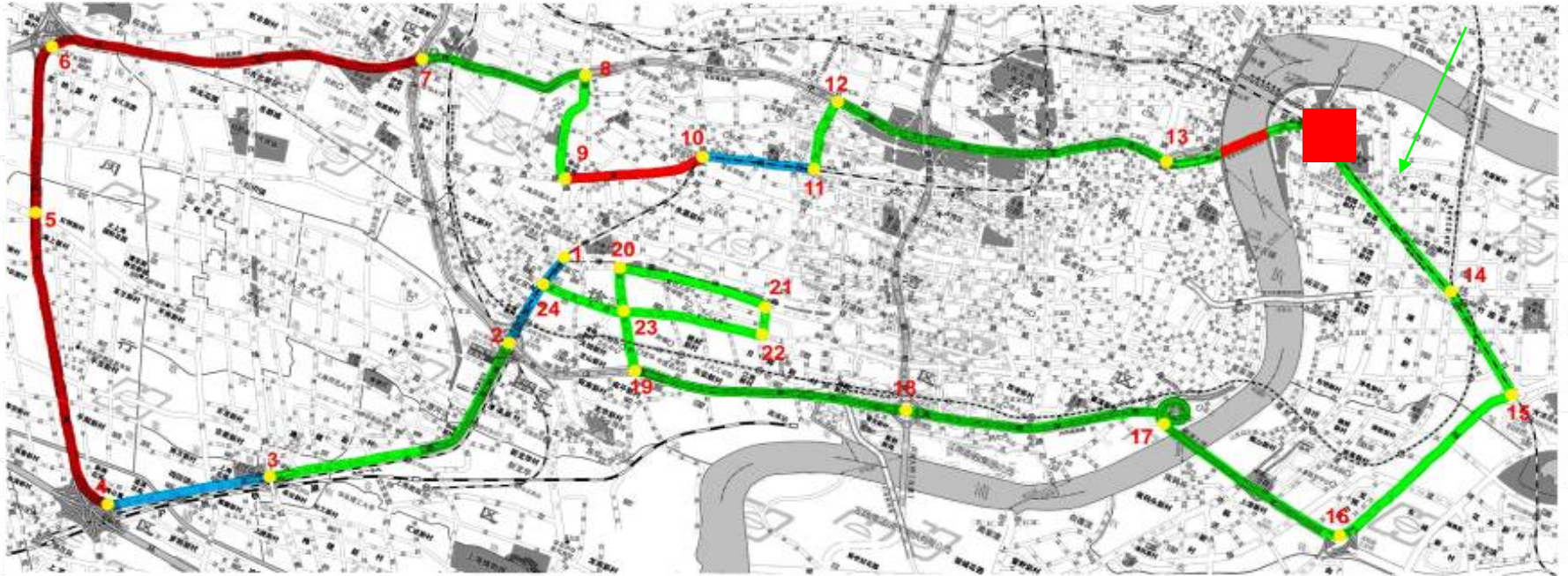
2

Advanced Digital Television Broadcasting for Terrestrial (ADTB-T) (1998~2006)



Research Experience

2



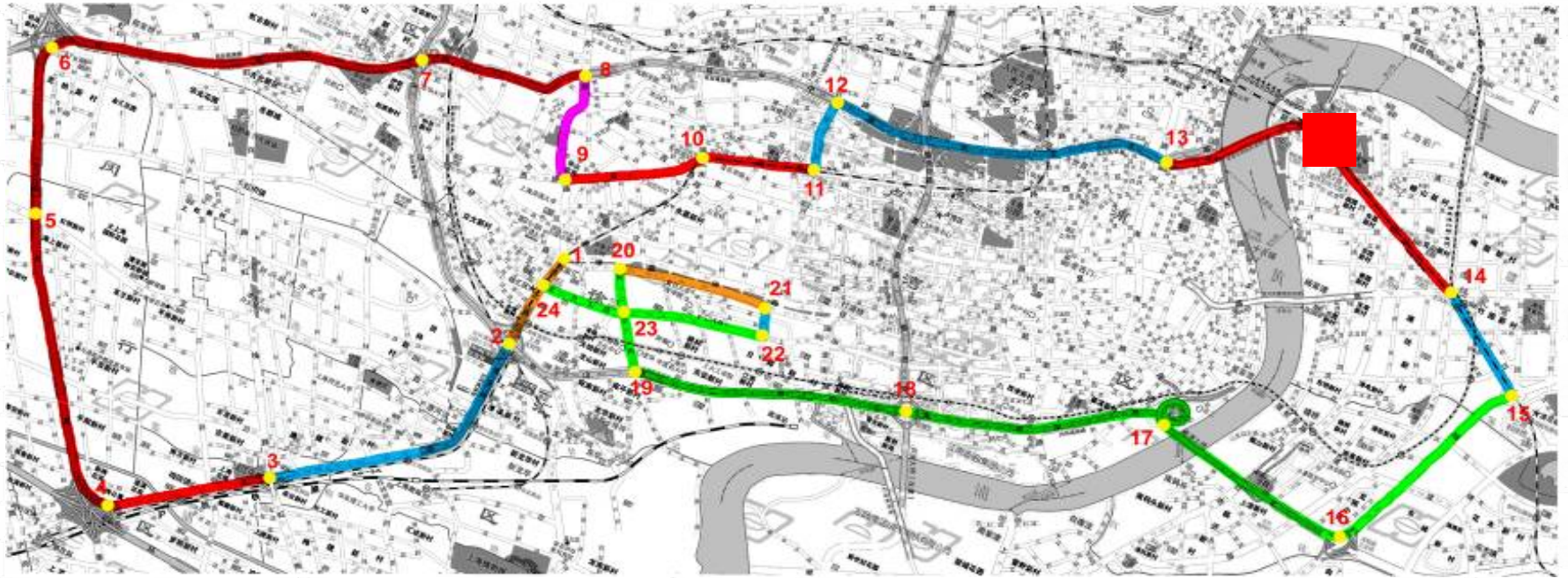
ADTB-T 83.62%

- Green : 100%
- Blue : >95%
- Yellow : >90%
- Purple : >85%
- Red : <85%



Research Experience

2



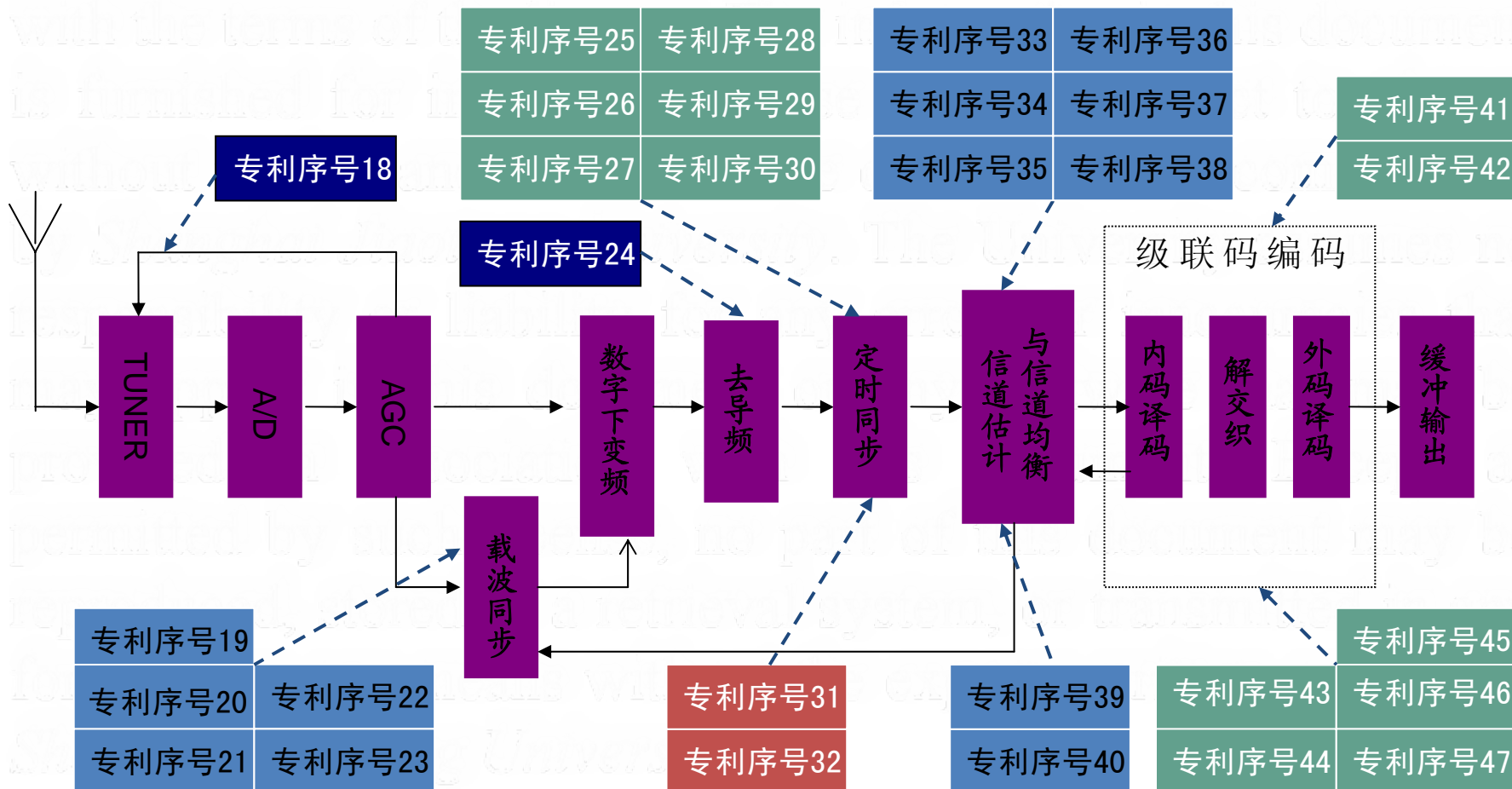
DVB-T 63.73%

- Green : 100%
- Blue : >95%
- Yellow : >90%
- Purple : >85%
- Red : <85%



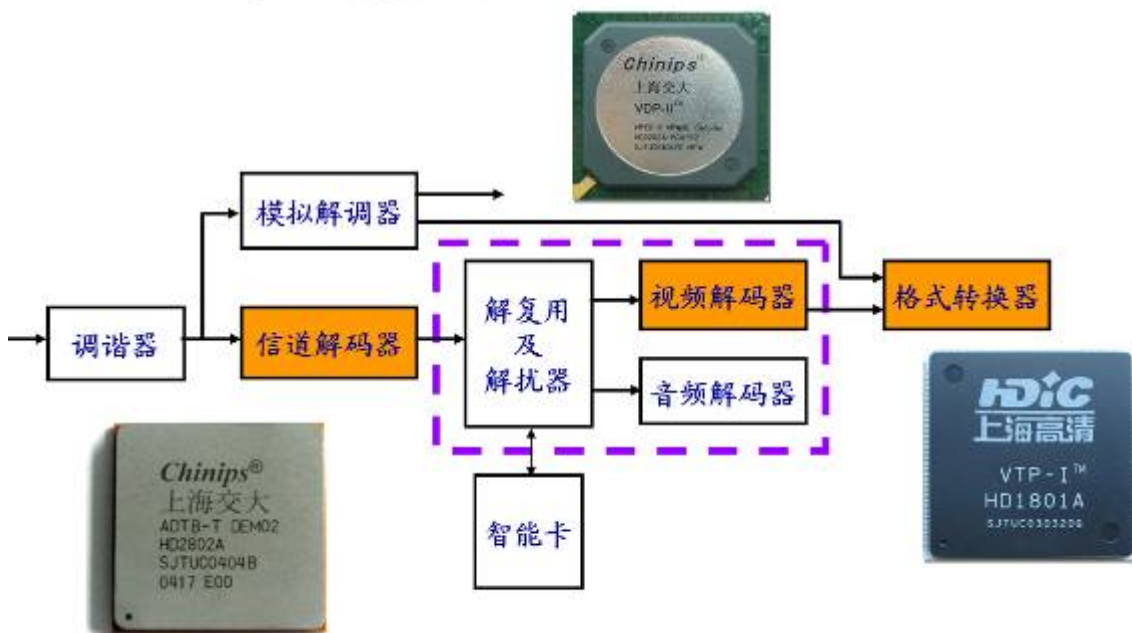
Research Experience

2



Research Experience

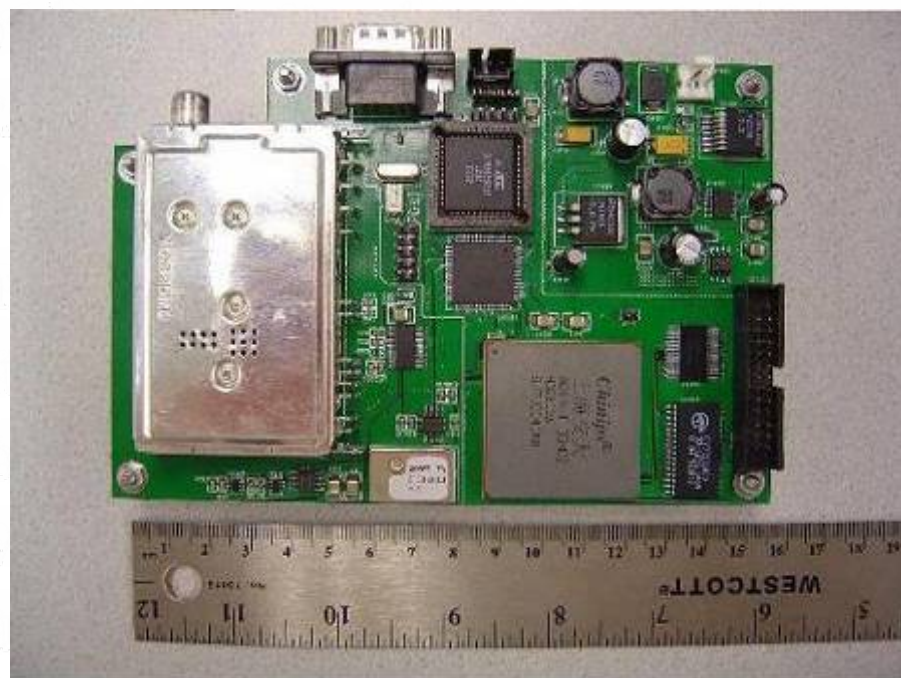
2



Research Experience

2

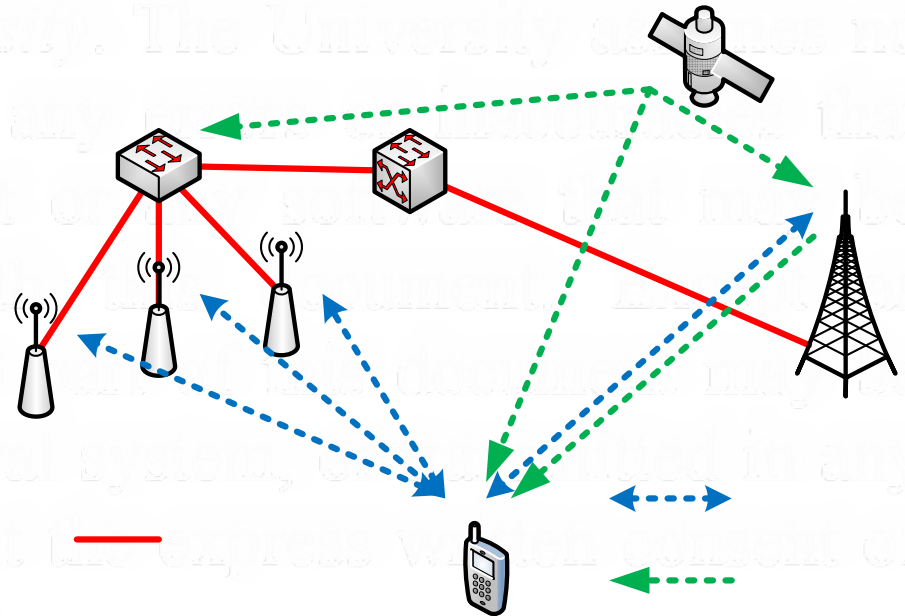
subsequent research on DVB-H and CMMB in China



Research Experience

2

Research direction changes to Compass/GPS broadcast System



Research Experience

3

Industry-ready Prototype Data Access Wireless Network

IEEE 802.15 Bluetooth (2001-2002)

IEEE 802.11 WiFi (2002-2003)

IEEE 802.16d/e WiMax (2003-2006)

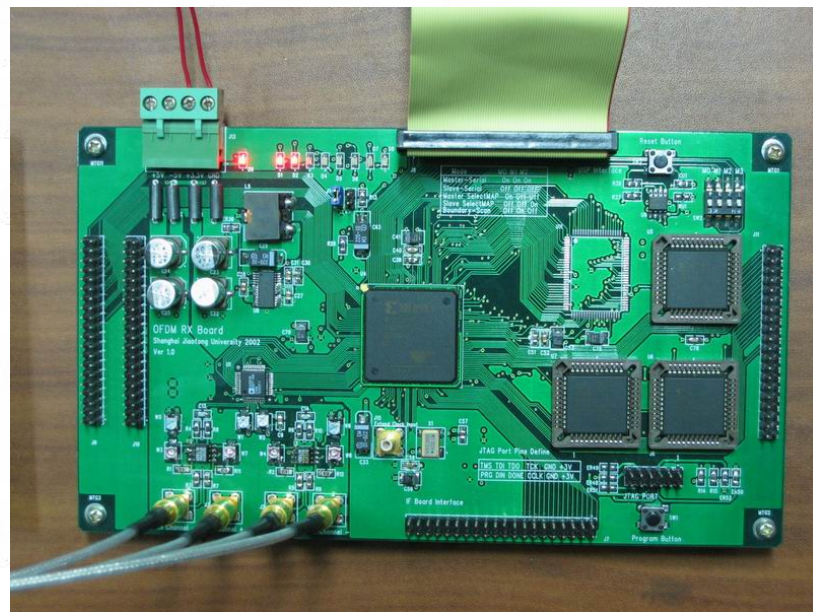
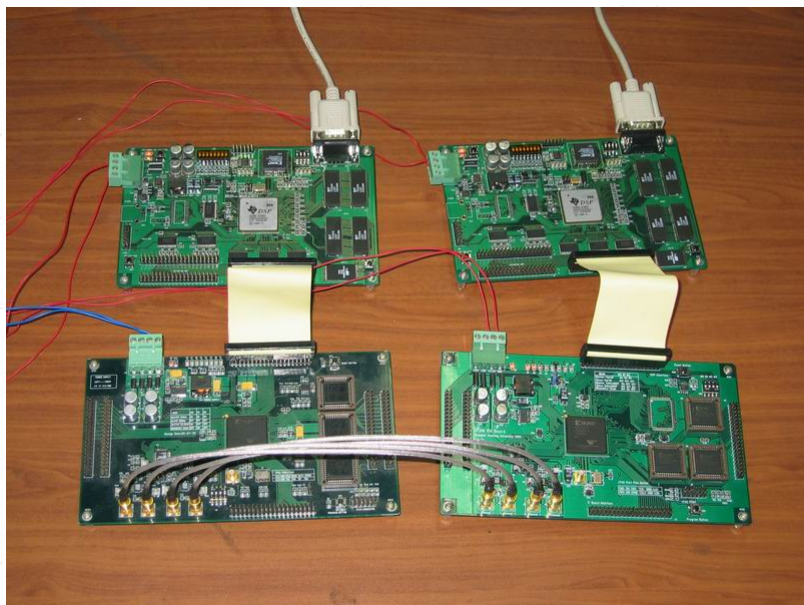
Wireless multihop Network (2002-)

Wireless Video Transmission for special scenarios (2003-)

Research Experience

3

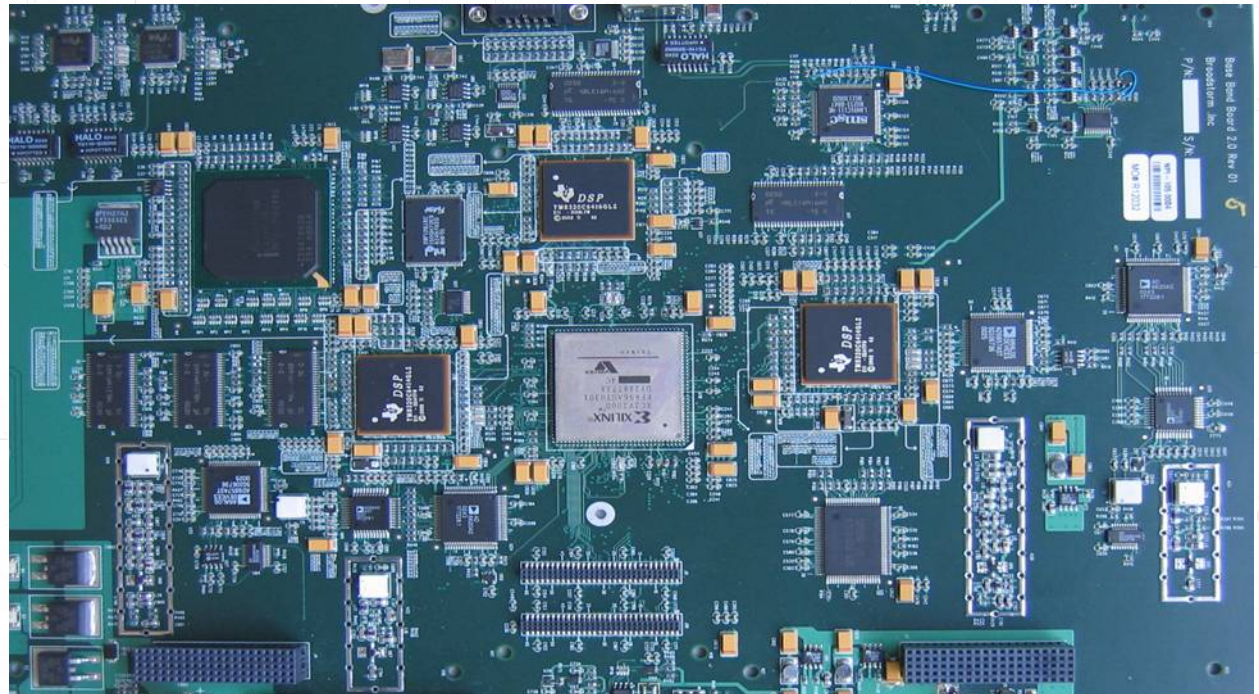
Baseband processing unit for IEEE802.11a (WiFi)



Research Experience

3

A joint project between SJTU and Adaptix Ltd. , which aimed to fast entering WiMAX market around the world in the near future.



Key processing modules designed for IEEE802.16d OFDM system have been verified upon hardware platform.

Research Experience

3

A industry-ready hardware transceivers supporting 3-hop video transmission

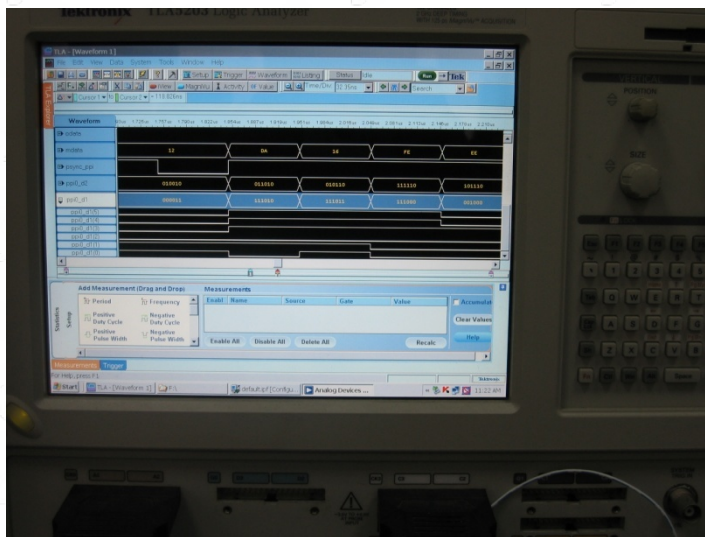
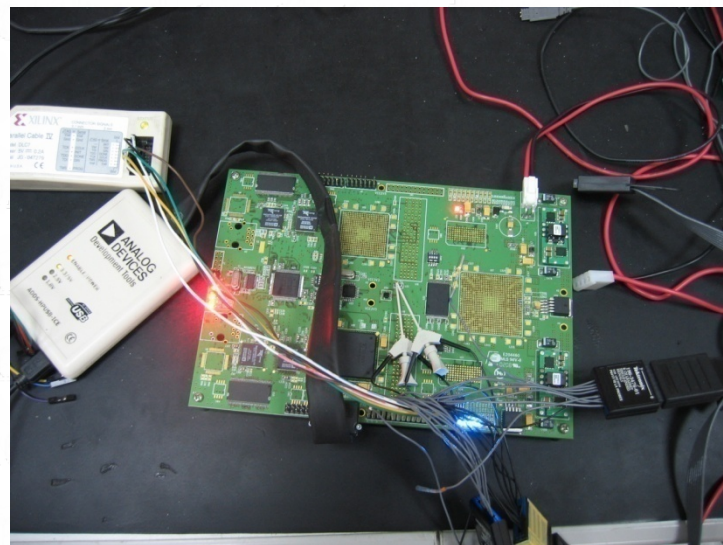
- Fast synch. for NLOS scenario
- SmartAGC for dynamic range
- TDD mode networking



Research Experience

3

Unified SDR and CR prototype
hard-ware platform



Research Experience

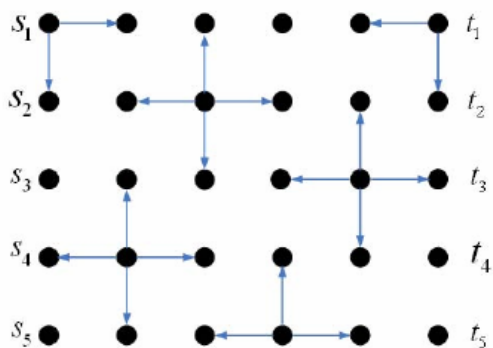
4

Considerations & solutions for special and hot wireless scenario

Improve Throughput of TCP-Vegas

A Game Approach for Multi-Channel Allocation

Network Coding



MobiCom08'

GlobeCom08'

Fig. 3. Transmit Assignment of Perfect Schedule at TS 1

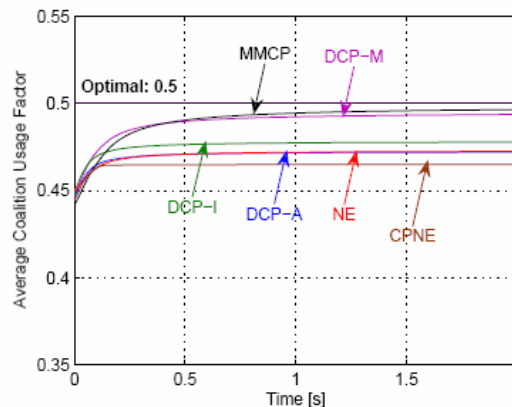


Figure 10: Average coalition usage factor vs. time using $W = 15$, $|C| = 8$, $k = 4$, $|U| = 5$ and $co_x = \{u_1, u_2\}$.

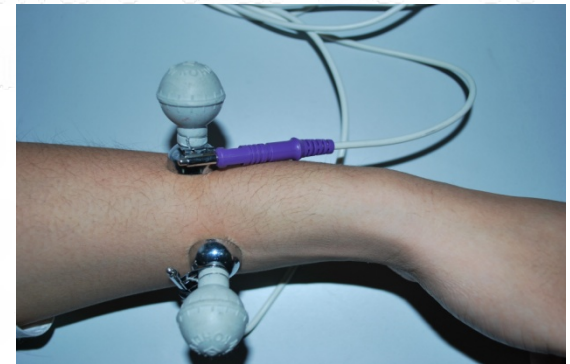
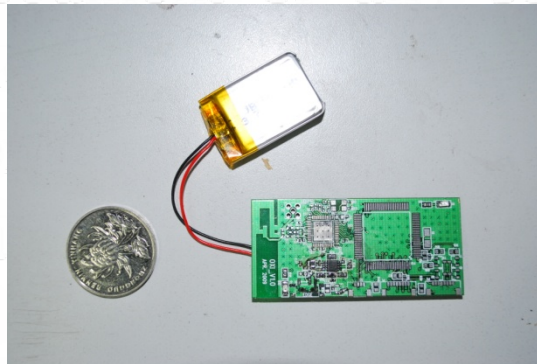
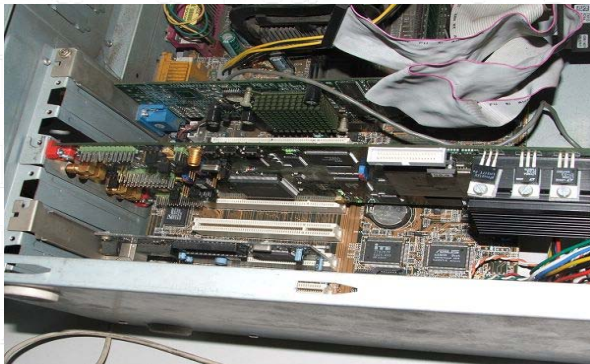
Research Experience

4

Considerations & solutions for special and hot wireless scenario

High-end channel codec implementation

IEEE 802.15 MBAN





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Industrial Partners and Trends



To be expected in coming episode:

• *Top Conference and Trans. paper*

• *Industry-oriented proposals*

• *Demo and prototype design for latest and new wireless technology*

• *Small-volume-production-ready prototype hardware platform*



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A Warmly Welcome to Guests from UK!

