國立中央大學通訊工程學系
Department of Communication Engineering

軟體定義無線電實驗室
Software-Defined Radio Laboratory

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研究方向

- ◆正交分頻多工技術
- ◆多天線傳輸技術
- ◆通訊基頻傳收訊號處理
- ◆實務即時無線通訊收發機之軟體定義無線電平台實現
- ◆OFDM Technology
- ◆MIMO Technology
- ◆Communication Baseband Transceiver Signal Processing
- ◆Implementation of Realistic Wireless Communication Transceiver with Software-Defined Radio Platform

近期研究成果

◆實務軟體定義無線電平台研發環境之建構：

A.AD9361射頻前級之訊號介面與其配置。

B.FPGA可程式邏輯閘陣列模組之即時通訊基頻訊號處理設計與實現。

C.軟體定義無線電平台系統控制與訊號傳收之軟體實現。

◆特定規格實務即時無線通訊收發機之軟體定義無線電平台實現:

A. 即時LTE收發機:

1. 正交分頻多工調變器與解調器之FPGA實現。
2. 渦輪通道編碼器與解碼器之FPGA實現。
3. 分頻雙功模式下基地台與多用戶間頻率與時間同步之FPGA實現。
4. 分時雙功模式下基地台與多用戶間頻率與時間同步之FPGA實現。

B. 完整即時DVB-T接收機:

1. 正交分頻多工解調器之FPGA實現。
2. Convolutional/Reed-Solomon通道解碼器之FPGA實現。
3. 接收MPEG-TS資料串流之軟體處理與即時影音接收呈現

◆Construction of Research/Development Environment with Practical Software Define Radio (SDR) Platform:

A.Signal Interface/Configuration of AD9361 RF Frontend.

B.Design and Implementation of Real-Time Communication Baseband Signal Processing with FPGA.

C.Software (MATALB) Implementation of the System Control and Signal Transceiving of the SDR Platform.

◆Implementation of Realistic Specific Real-Time Wireless Communication Transceiver with SDR Platform:

A.Real-Time LTE Transceiver:

1.FPGA Implementation of OFDM Modulator/Demodulator.
2.FPGA Implementation of Turbo Channel Coder/Decoder.
3.FPGA Implementation of Carrier Frequency/Timing Synchronization between Base-Station and Multi-User in FDD Mode.
4.FPGA Implementation of Carrier Frequency/Timing Synchronization between Base-Station and Multi-User in TDD Mode.

B.Complete Real-Time DVB-T Receiver:

1.FPGA Implementation of OFDM Demodulator
2.FPGA Implementation of Convolutional/ Reed-Solomon Channel Decoder
3.Software Processing and Real-Time Audio/Video Presentation of the Received MPEG-TS Data Stream.