

# COGEU Workshop DVB-T sensing

10 November 2011



**ROHDE & SCHWARZ**

# DVB-T sensing

## I 1st approach: Cell ID validation

- I Synchronisation to OFDM signal requires about 70 OFDM symbols incl. coarse sync, LMOD4 sync, channel estimation, etc.  
approx. 80 msec (8k)
- I Collecting of TPS bits from 2 complete OFDM frames requires up to 183 OFDM symbols (3 OFDM frames x 68 OFDM symbols per frame -1 symbol),  
approx. 200 msec (8k)
- I Total time to first Cell ID display:  
approx. 300 msec (8k)
- I Secure identification of Cell ID value at **C/N = -6dB... -7dB**

Synchronisation to OFDM signal

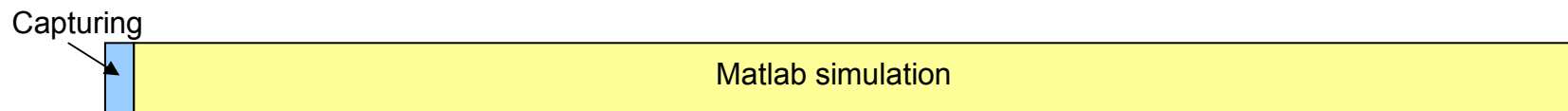


Capturing of 2 OFDM frames



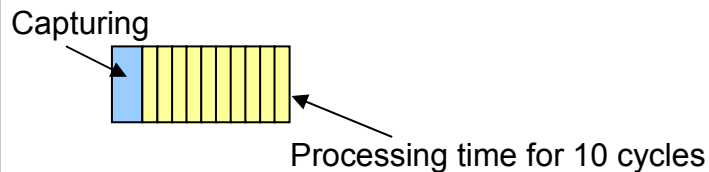
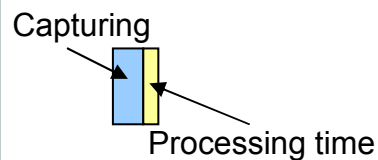
# DVB-T sensing

- I **2nd approach: Matlab simulation with reduced number of time domain samples**
  - I Capturing of 30720 time domain samples i.e. approx. 2 complete OFDM symbols  
approx. 4 msec (8k)
  - I Estimated processing time for coarse sync, etc.  
approx. 800 msec (8k)
  - I Total time to first result for GI and FFT size:  
approx. 810 msec (8k)



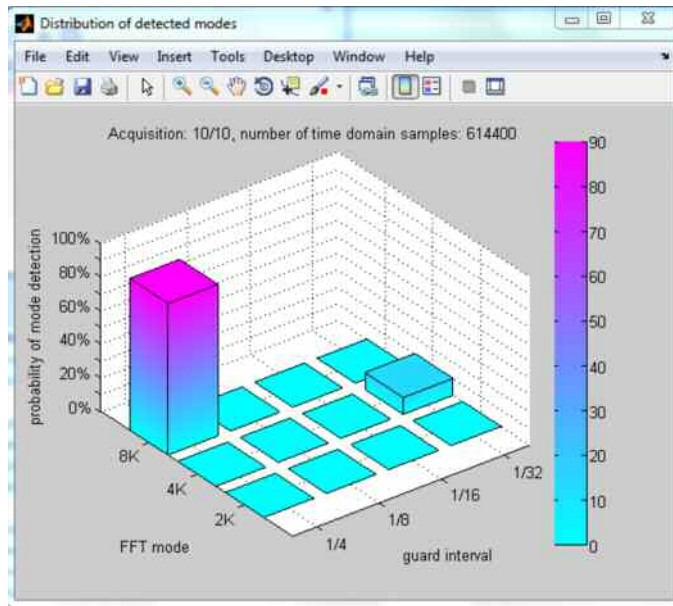
# DVB-T sensing

- I **2nd approach: possible hardware implementation with reduced number of time domain samples (commercially not valid)**
  - I Capturing of 30720 time domain samples i.e. approx. 2 complete OFDM symbols  
approx. 4 msec (8k)
  - I Estimated processing time for coarse sync, etc.  
approx. 2 msec (8k)
  - I Total time to first result for GI and FFT size:  
approx. 6 msec (8k), for 10 cycles approx. 24 msec (8k)

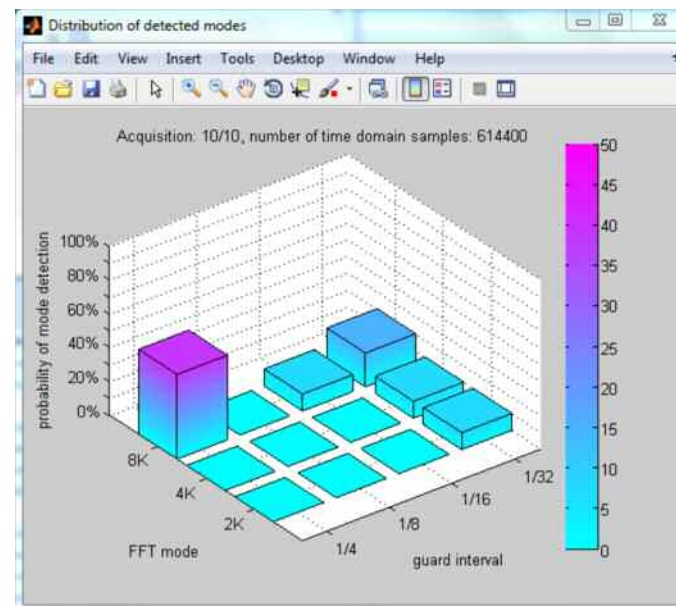


# DVB-T sensing

- I **Examples for results with improved DVB-T sensing algorithm:**
  - I 8k, 16QAM, GI 1/4, -50 dBm, CR 2/3, **C/N = -16dB**, 10x20 cycles



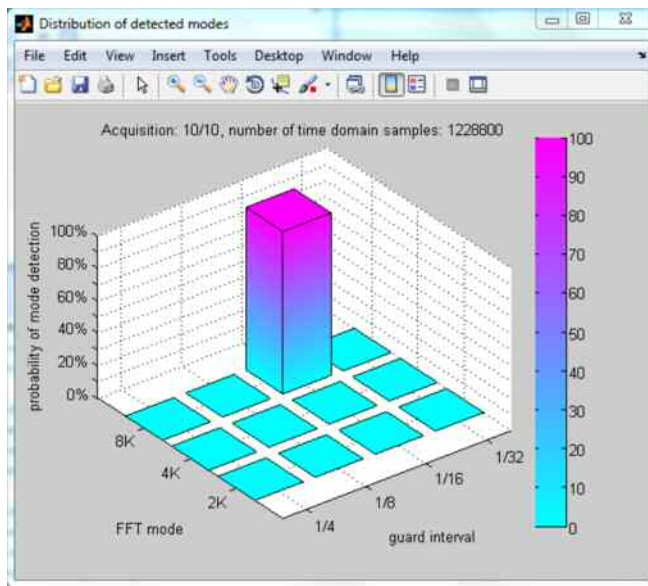
AWGN



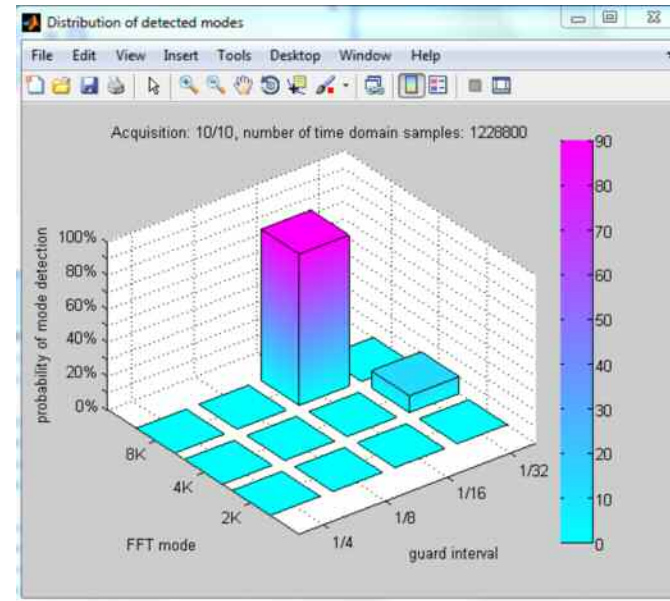
TU6-50

# DVB-T sensing

- I Examples for results with improved DVB-T sensing algorithm:
  - I 8k, 16QAM, GI 1/16, -50 dBm, CR 2/3, **C/N = -17dB**, 10x40 cycles



AWGN

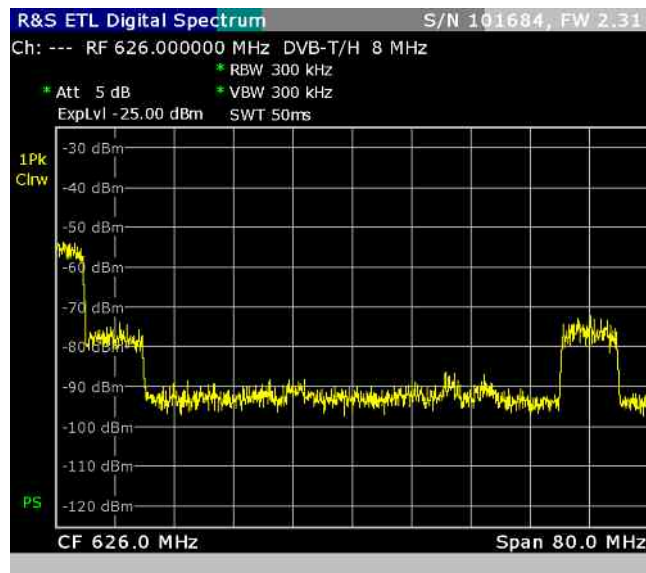


TU6-50

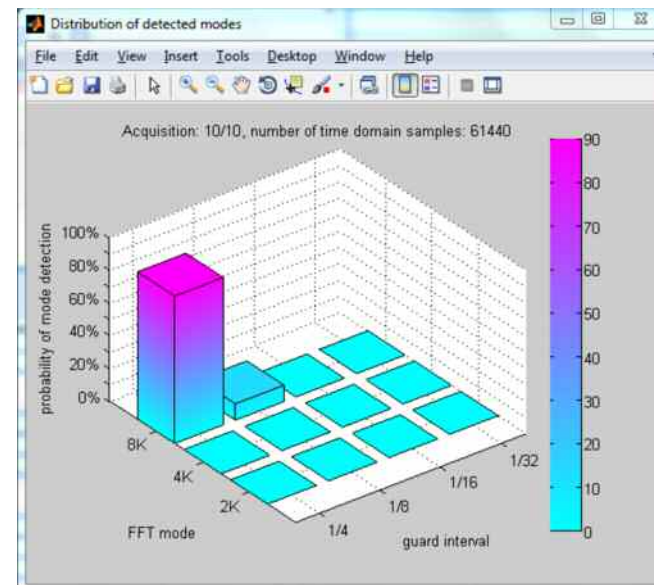
# DVB-T sensing

## I Measurements of antenna signals with improved DVB-T sensing algorithm:

- I Measurements in Munich: 626 MHz, Ch 40
- I 8k, 16QAM, GI 1/4, CR 2/3,



Spectrum

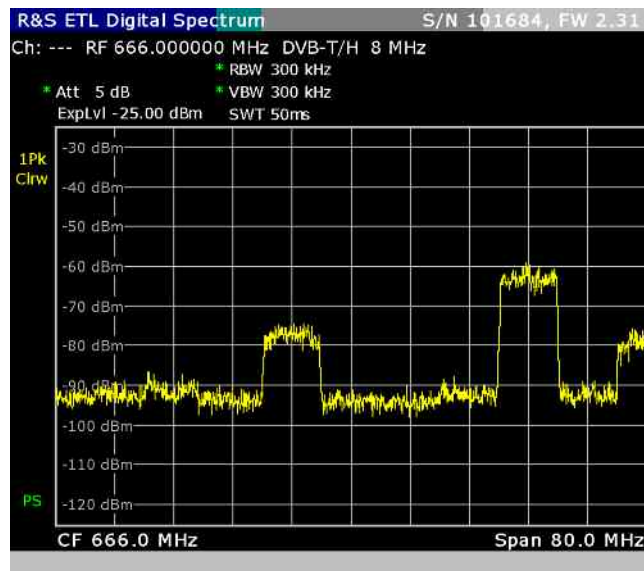


DVB-T mode identification

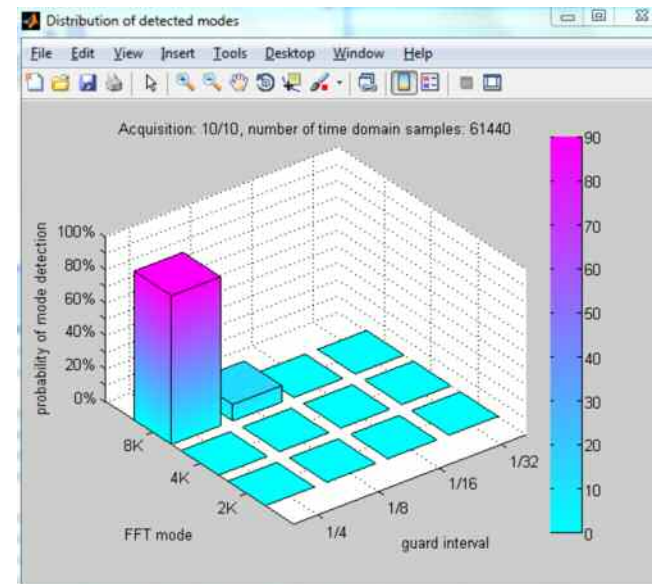
# DVB-T sensing

## I Measurements of antenna signals with improved DVB-T sensing algorithm:

- I Measurements in Munich: 666 MHz, Ch 45
- I 8k, 16QAM, GI 1/4, CR 2/3,



Spectrum



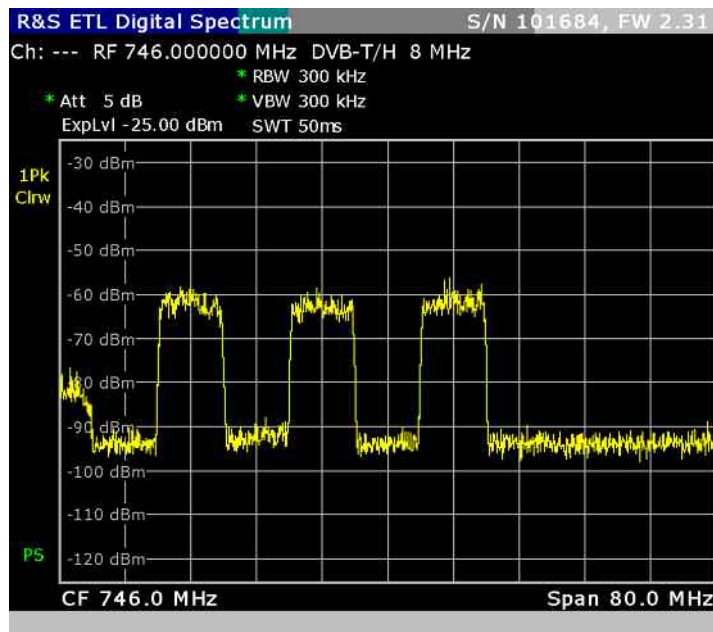
DVB-T mode identification



# DVB-T sensing

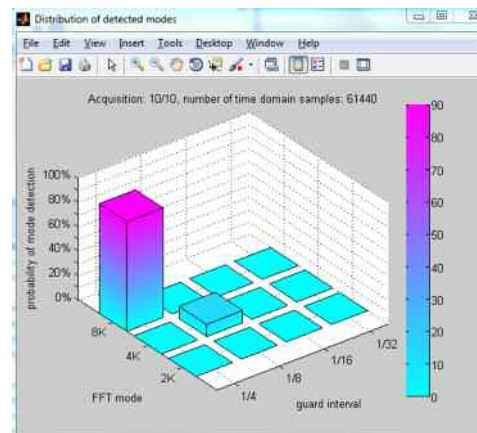
## I Measurements of antenna signals with improved DVB-T sensing algorithm:

- I Measurements in Munich: 746 MHz, Ch 55
- I 8k, 16QAM, GI 1/4, CR 2/3,

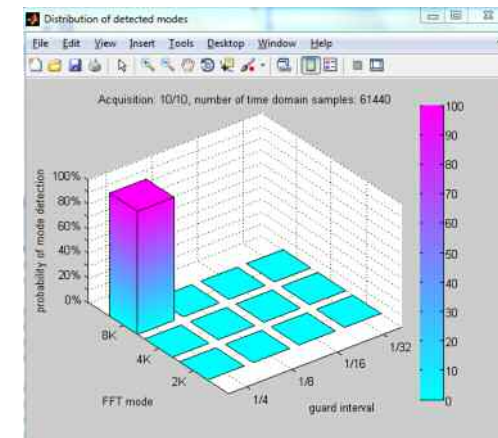


Spectrum

Ch 55  
Nuremberg



Ch 56  
Munich



DVB-T mode identification