WCDMA HSPA Ue RF Measurements – Course Overview

Product name
WCDMA HSPA Ue RF Measurements

Level
Advanced

Duration
2 days

Max. number of participants
12 persons / session

Learning methods
Lectures, discussion, demonstrations, measurements

Target group
People working with WCDMA User Equipment RF measurements in production, testing, test planning and product design and development.

The course is especially recommended for testing people and designers, with good previous knowledge of high frequency technology and WCDMA Measurements.

The course is recommended as a continuation for Orbis Oy’s WCDMA Ue RF Measurements course.

Expected preliminary knowledge and/or skills
Has participated Orbis’ or KASA Training’s WCDMA RF Measurements training or obtained equivalent competence in WCDMA RF Measurements

Course objectives
After this training course the participant will be able to

- describe the functionality of HSDPA and HSUPA
- can list the main tests and measurements performed for HSDPA and HSUPA
- do HSPA RF measurements in presence of HS-DPCCH and E-DCH channels
- use measurement instrument for testing WCDMA and its HSPA signal
- take into account and avoid errors when measuring

Modules
- WCDMA System operation, Rel99/Rel4 – Review, OPTIONAL
- WCDMA TX RF Measurements, Rel99/Rel4 – Review, OPTIONAL
- HSDPA, High Speed Downlink Packet Access
- HSDPA RF Measurements
- HSUPA, High Speed Uplink Packet Access
- HSUPA RF Measurements
- OPTIONAL: Introduction to HSPA+

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# Course Program, HSPA RF Measurements

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<td>8.30</td>
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| 9.00  | **WCDMA, Principle of system operation R99/R4 – Review (OPTIONAL)**  
  - Functionality  
  - Advantages and weak points  
  - Code domain | 9.00  | HSDPA Measurements continued |
| 10.00 | **WCDMA R99/R4 TX Measurements – Review (OPTIONAL)**  
  - Power Measurements (Maximum and Minimum Output Power, Power Control)  
  - Adjacent Channel Leakage Power Ratio (ACLR or ACP, Adjacent Channel Power)  
  - Occupied Bandwidth (OBW)  
  - Spectrum Emission Mask (SEM)  
  - Modulation Accuracy, EVM (Error Vector Magnitude), Frequency error  
  - Code Domain Power, Peak Code Domain Error (PCDE)  
  - CCDF, Complementary Cumulative Distribution Function | 10.00 | **HSUPA, High Speed Uplink Packet Access**  
  - Principle, advantages and new channels  
  - Gain factors  
  - Data throughput  
  - Analyser settings  
  - Measurement Exercises |
<p>| 11.30 | Lunch | 11.30 | Lunch |</p>
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<td>- Principle, advantages and new code channels</td>
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<td>- Parameters, their explanation and use in RF tests and measurements</td>
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<td>- Challenges for Ue Power Amplifier Design</td>
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<td>12.15</td>
<td>HSUPA Measurements (Acc. to 3GPP Tech. Spec. 34.121)</td>
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<td>- 5.2D UE Relative Code Domain Power Accuracy for HS-DPCCH and E-DCH</td>
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<td>- 5.9B Spectrum Emission Mask with E-DCH</td>
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<td>- 5.10B Adjacent Channel Leakage Power Ratio</td>
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<td>- 10.2.1 Detection of E-DCH HARQ ACK Indicator Channel (E-HICH): Single link performance (10ms and 2ms TTI)</td>
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<td>- 10.3.1 Detection of E-DCH Relative Grant Channel (E-RGCH): Single link performance (10ms and 2ms TTI)</td>
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<td>- 10.4.1 Demodulation of E-DCH Absolute Grant Channel (E-AGCH) Single link performance</td>
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### 13.45 HSDPA Measurements
(Acc. to 3GPP Tech. Spec. 34.121)

**Transmitter**
- 5.2AA Maximum Output Power with HS-DPCCH (R6 and later)
- 5.2C UE Relative Code Domain Power Accuracy (R6 and later)
- 5.7A HS-DPCCH Power Control
- 5.9A Spectrum Emission Mask with HS-DPCCH
- 5.10A Adjacent Channel Leakage Power Ratio (ACLR) with HS-DPCCH
- 5.13.1A Error Vector Magnitude (EVM) with HS-DPCCH
- 5.13.1AA EVM and Phase Discontinuity with HS-DPCCH
- 5.13.2A Relative Code Domain Error with HS-DPCCH

**Receiver**
- 6.3A Maximum Input Level for HS-PDSCH (16QAM)
- 6.4A Adjacent Channel Selectivity, ACS

**Performance**
- 9.3 Reporting of Channel Quality Indicator: 9.3.1 Single Link Performance - AWGN Propagation Conditions

### 13.45 HSUPA Measurements continued

### 15.00 OPTIONAL: Introduction to HSPA+

### 15.45 Summary of the day

### 15.45 Course summary and collection of course feedback and evaluations

### 16.00 Training day ends

### 16.00 Course closure