Product Introduction

Anritsu

MD8480C

W-CDMA Signalling Tester

MD8480C
W-CDMA Signalling Tester
Product Introduction

Ver. 13.0

Anritsu Corporation

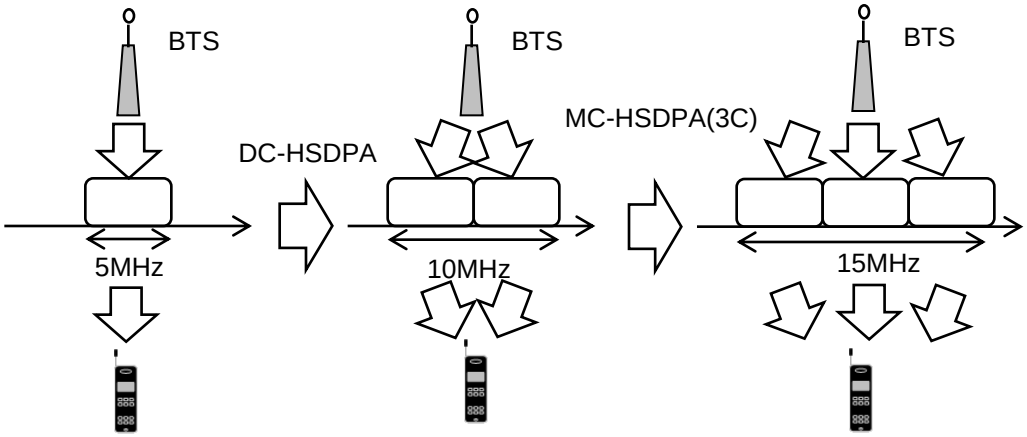
Anritsu envision : ensure

Contents

- New Functionality
- Product Overview
- Applications
- Features
- Functions
- Configurations
- PC Controller
- Roadmap

HSPA Evolution Function Overview (1/6)

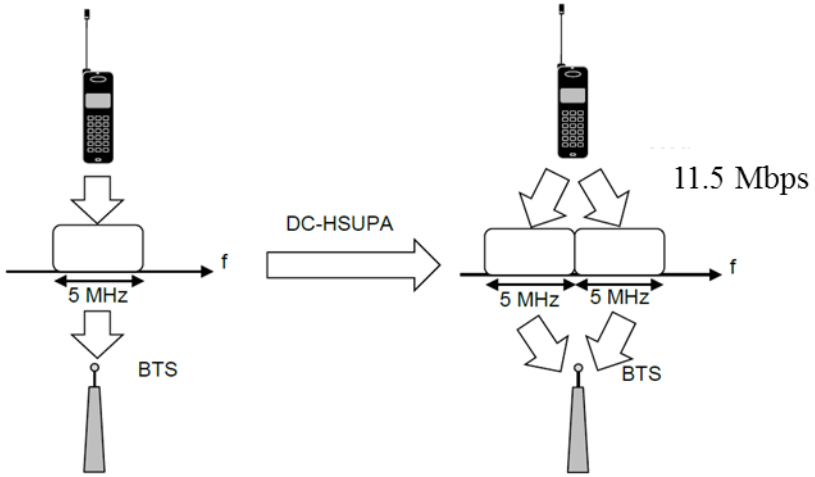
- 3GPP Release 10 Function
  - MC (Multi Carrier) - HSDPA (Release10)
    - MC-HSDPA is a new technology achieving higher packet communications by triple frequency bandwidth(5 MHz x 3) of existing HSDPA. It supports maximum data throughput 41.2 Mbps of 16QAM in DL (L1 supports Category 29 of DL 63.3 Mbps (64QAM)).



MC-HSDPA Operation Concept

HSPA Evolution Function Overview (2/6)

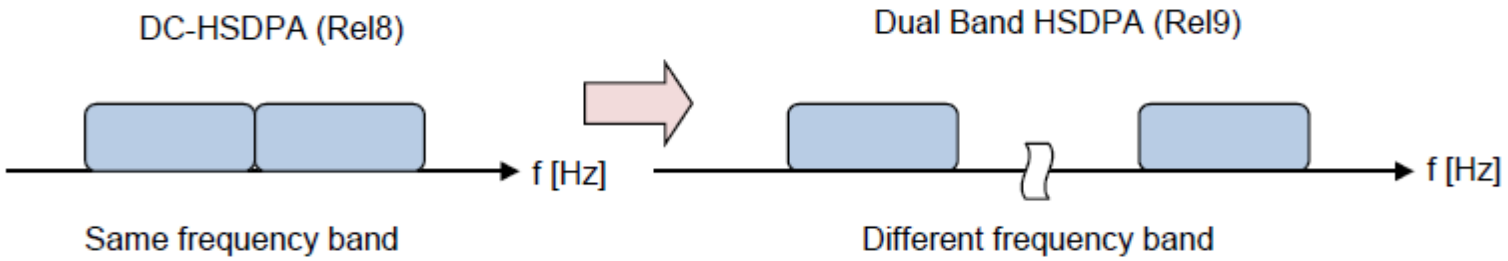
- 3GPP Release 9 Function
  - DC (Dual Cell) - HSUPA (Release9)
    - DC-HSUPA is capable of receiving UL data to be paired DC-HSDPA. It is a new technology achieving higher packet communications by doubled frequency bandwidth (5 MHz x 2) of existing HSUPA channel. It supports maximum data throughput 11.5 Mbps (Category 8) in UL (L1 supports Category 9).



DC-HSUPA Operation Concept

HSPA Evolution Function Overview (3/6)

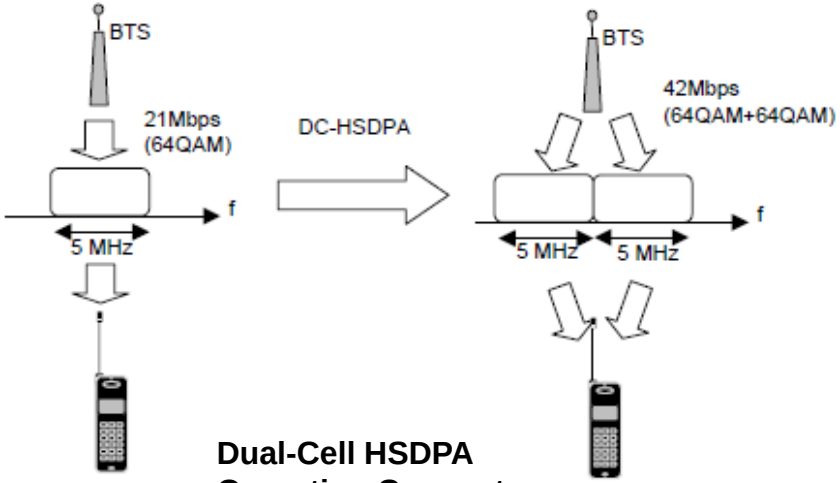
- 3GPP Release 9 Function
  - DB-DC (Different Bands for Dual Cell) HSDPA (Release 9)
    - While the DC-HSDPA function is used for frequencies in the same band, the DB-DC-HSDPA function is useful for telecoms with multiple frequency bands where each carrier is transmitted in a different frequency band, achieving a max. data packet DL speed of 42 Mbps.



Dual-Band HSDPA Concept

HSPA Evolution Function Overview (4/6)

- 3GPP Release 8 Function
  - 64QAM and MIMO
    - Enables maximum 42 Mbps download speed combined with 64QAM and MIMO specified by UE Category 20
  - DC-HSDPA (Dual Cell HSDPA) *1
    - Supports maximum download speed of 42 Mbps with dual cells (carrier) using doubled bandwidth (5 MHz x 2) of HSDPA



Dual-Cell HSDPA Operation Concept

*1 : Supports dual-cell with adjacent carrier.

HSPA Evolution Function Overview (5/6)

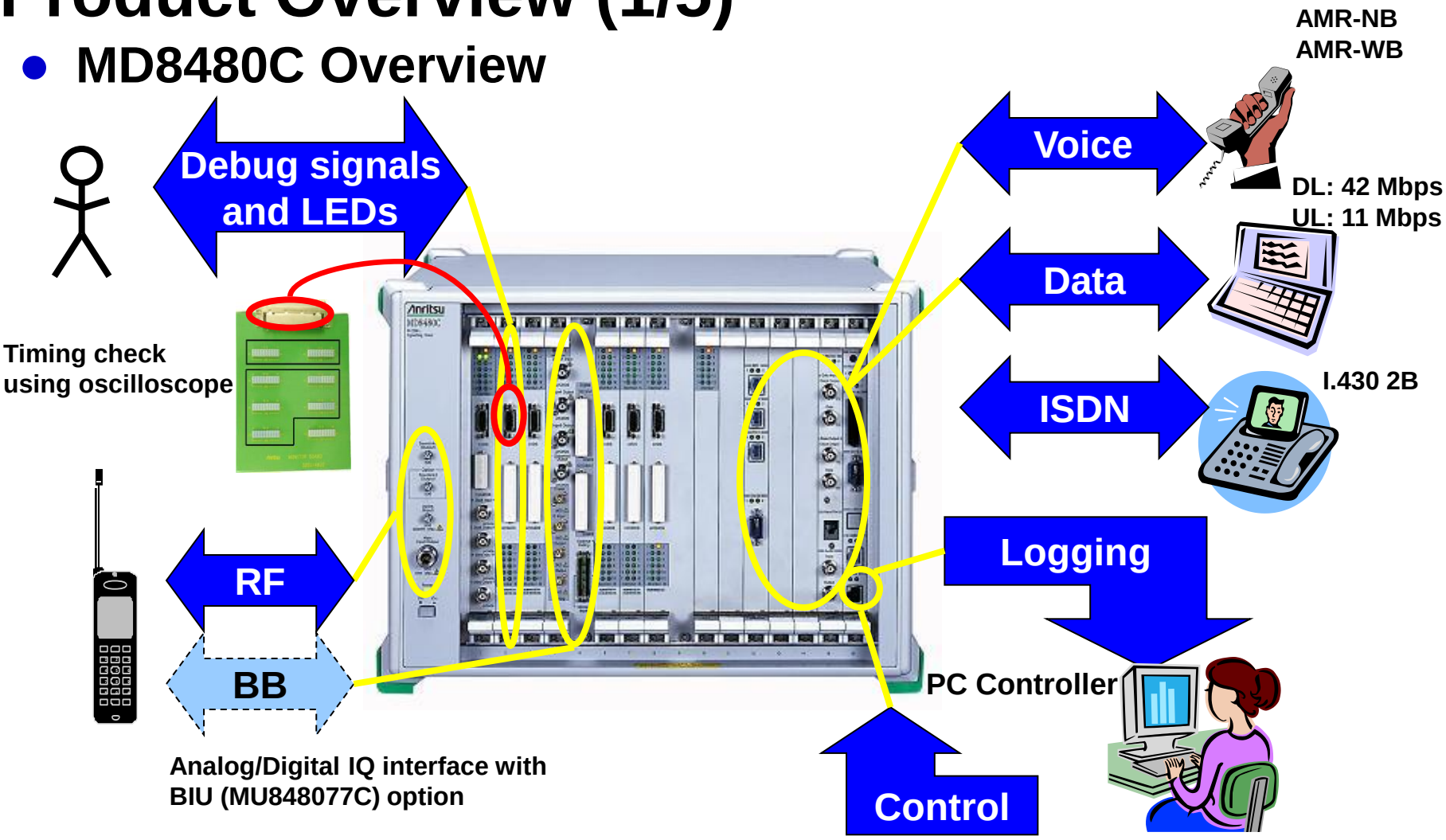
- 3GPP Release 8 Function
  - CS Voice over HSPA
    - Voice communication functionality using DL_HS-DSCH and UL_E-DCH
  - Improved L2 for UL
    - Realizes flexible RLC PDU size to reduce overhead and padding
  - Enhanced UL for CELL_FACH state
    - Enables use of E-DCH channels in non CELL_DCH states, to reduce latency and increase peak data rate
  - HS-DSCH Serving Cell Change Enhancement
    - A function for changing current serving cell to the high quality radio link rapidly

HSPA Evolution Function Overview (6/6)

- HSPA Evolution Function
  - Higher-Order Modulation
    - High-speed data transfer with higher multilevel modulation scheme
      - DL 64QAM &UL 16QAM (4PAM)
  - 2x2 MIMO (Multiple Input Multiple Output)
    - Supports doubled transmission speed by splitting Tx data into two streams and sending each stream simultaneously using multiple antennas
      - Retransmission Control
      - Single and Dual Stream
      - Stream Schedule Function for Testing

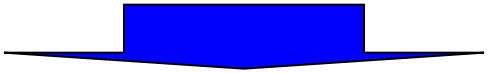
Product Overview (1/5)

- MD8480C Overview



Product Overview (2/5)

- W-CDMA Signalling Tester Concept
  - UE Specifications based on standards (e.g. 3G UE => 3GPP standard)
  - UE Development based on standards
  - Developers simulate BTS connections to verify operation of developed UE
  - Important protocol stack verification and overall UE operation testing



Anritsu offers W-CDMA Signalling Tester simulating call processing of real UMTS/GSM network for mobile terminals.

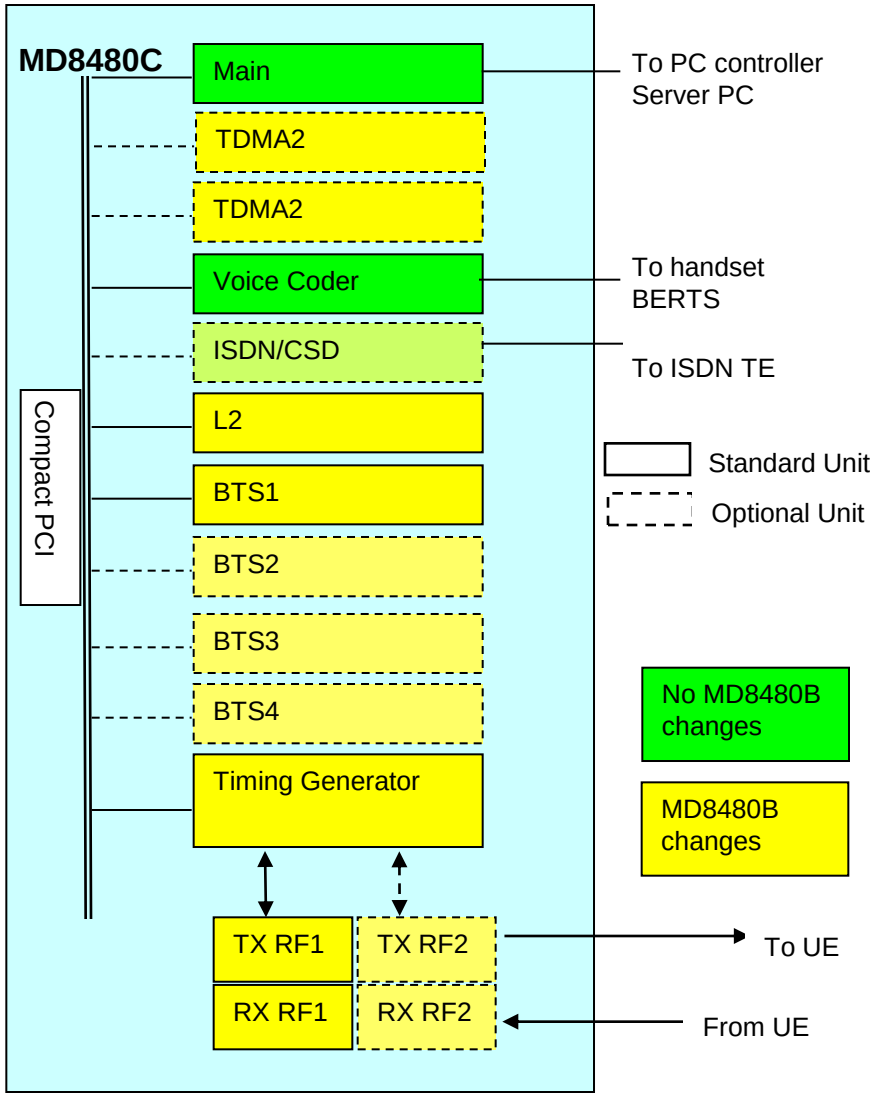
Product Overview (3/5)

- **What is MD8480C?**
  - **The MD8480C is a base station simulator for testing 3.5G W-CDMA/ GSM mobiles with HSPA (including HSPA Evolution) functions**
  - **It has a 3GPP-compliant air interface supporting a full range of application tests, such as chipset and mobile station coding/decoding processing, voice calling, and packet communications as well as MS-to-MS testing (requires two MD8480C units). MD8480C protocol sequence tests include position registration, origination/termination, handover (option), and disconnection from mobile station/network**
  - **Handover tests between W-CDMA/HSPA and GSM/GPRS/EGPRS BTS can be performed by adding optional functions for 2G. The MD8480C is ideal for developing UMTS/GSM mobiles and chipsets**

Product Overview (4/5)

- Block Diagram
  - Basic spec overview (1)

Comm. Speed: DL 42 Mbps*1 max.
UL 11 Mbps*2 max.
Number of BTS: 4 BTS (W) 2 BTS (G) max.
Modulation: QPSK/16QAM/64QAM
Demodulation: BPSK/4PAM
SHO: Soft/Softer handover (4 branches),
Tx diversity (2 branches)
HHO: Inter-frequency HHO
Tx Diversity: STTD, TSTD, Closed Loop Mode 1, 2
Rx Diversity: Supported
Compressed Mode: SF/2, Puncturing, Higher Layer Scheduling
TE Connection:
AMR Speech (for voice)
ISDN (for videophone, etc.)
Server PC (for data)

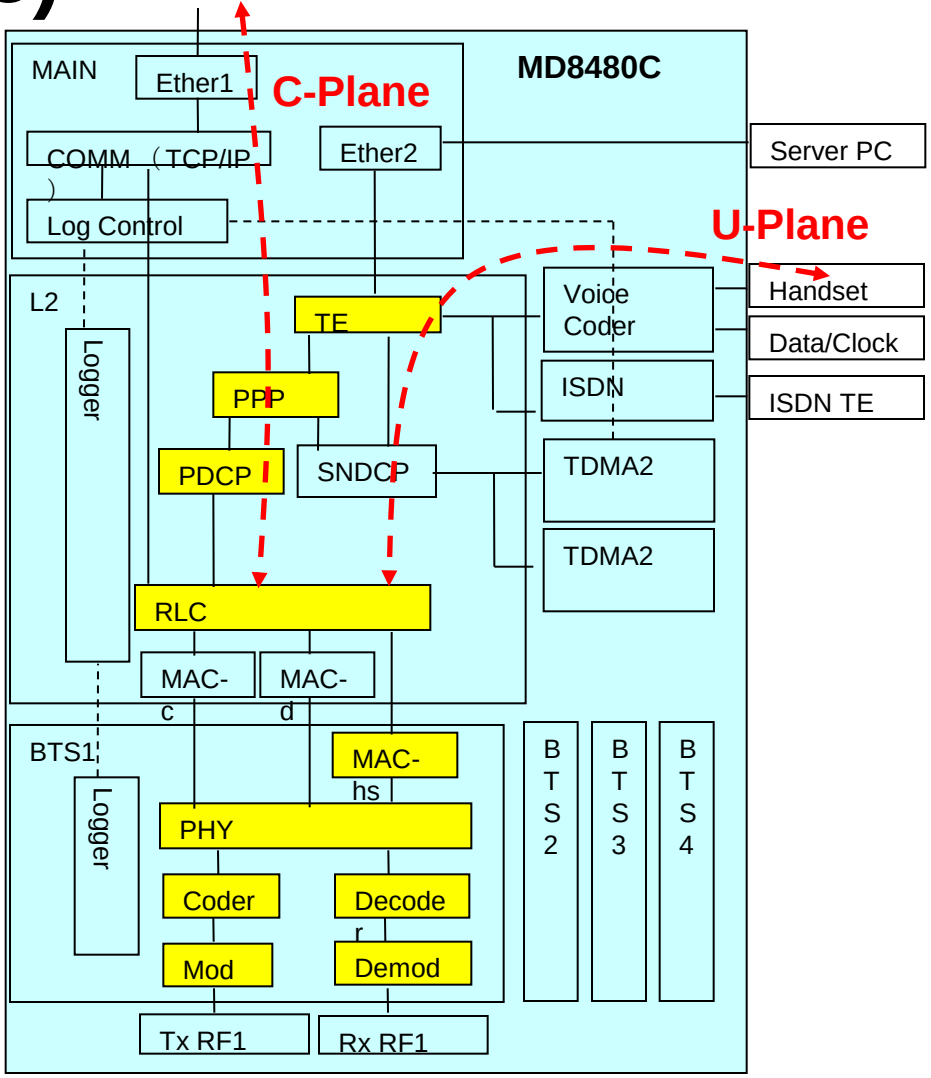


*1: 63 Mbps for L1 testing
*2: 23 Mbps for L1 testing

Product Overview (5/5)

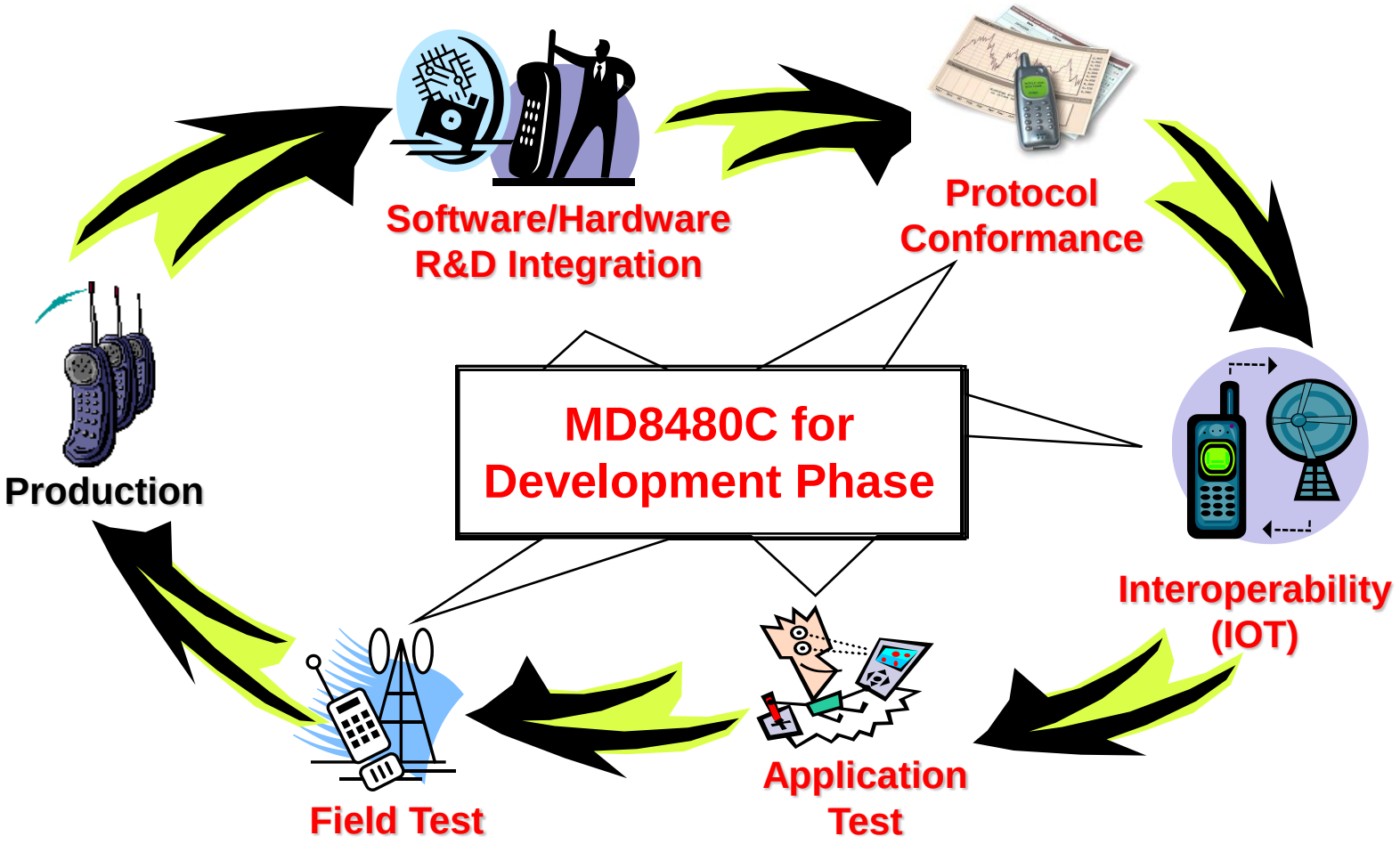
- Block Diagram
  - Basic spec overview (2)

TE: PN, fixed pattern transmission
TE connection
Handset, ISDN, Server PC, etc.
PPP: RFC1661
PDCP: TS25.323 compliant
RLC: TS25.322 compliant
MAC
MAC-c/d:
TS25.321 compliant
MAC-ehs:
TS25.321 compliant
PHY:
AMR Speech
AV64K, UDI, AV32K
Packet (DCH) DL32K, 128K, 384K, UL64K
Packet (HSDPA) ~ 63 Mbps
Packet (HSUPA) ~ 23 Mbps
Multi Call
AMR Speech + Packet (DCH)
AMR Speech + Packet (HSPA), etc.



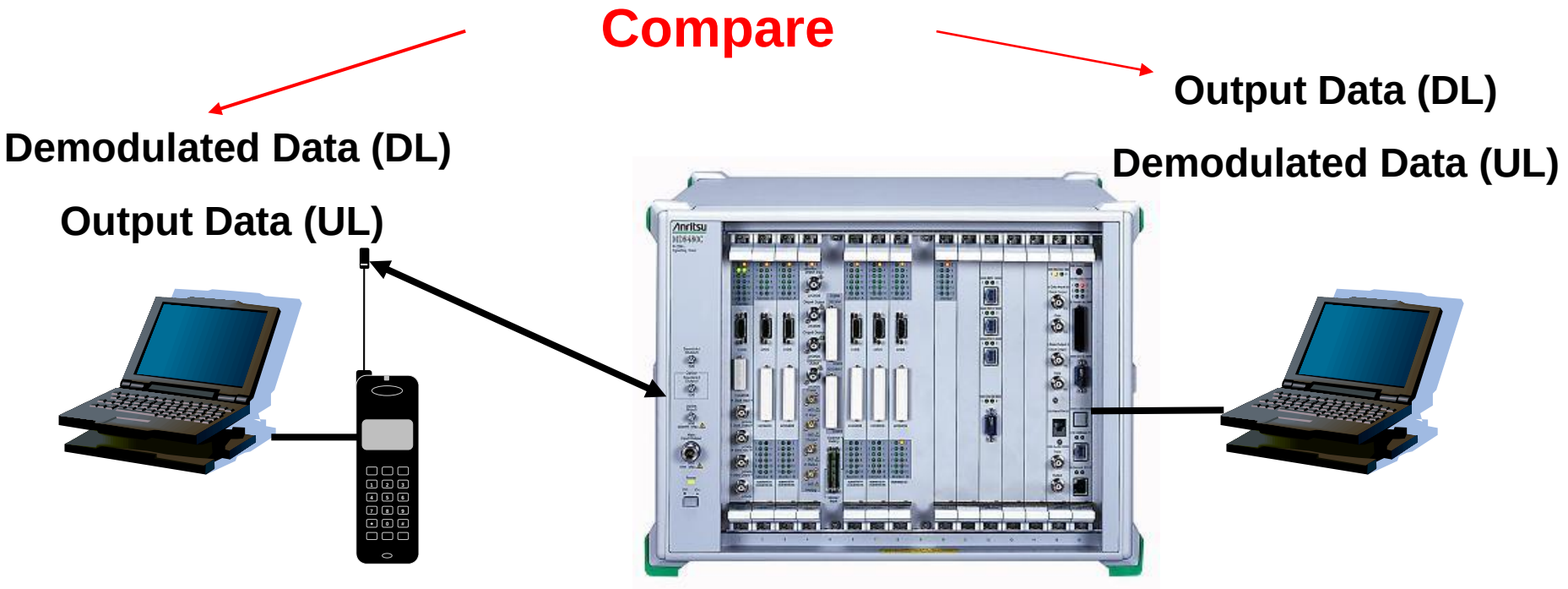
Applications (1/9)

- UE Development Cycle and MD8480C



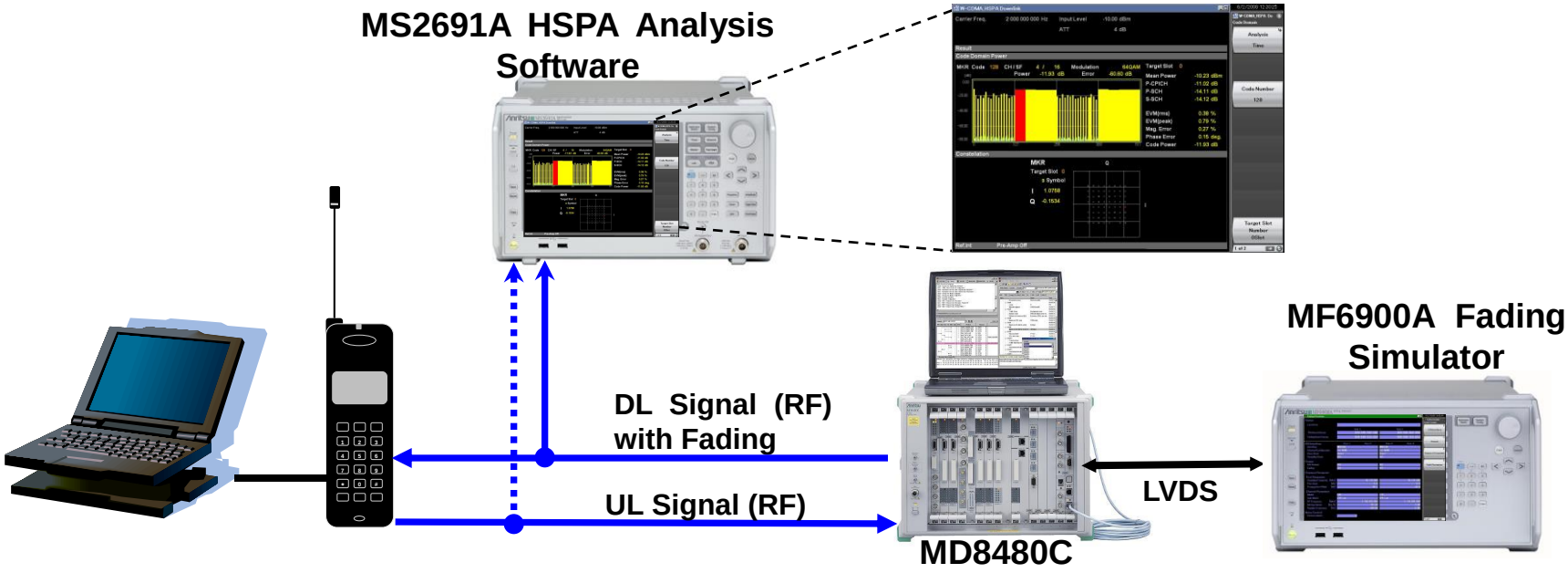
Applications (2/9)

- Coding Decoding Test
  - UE Coding/Decoding functions tested using following setup



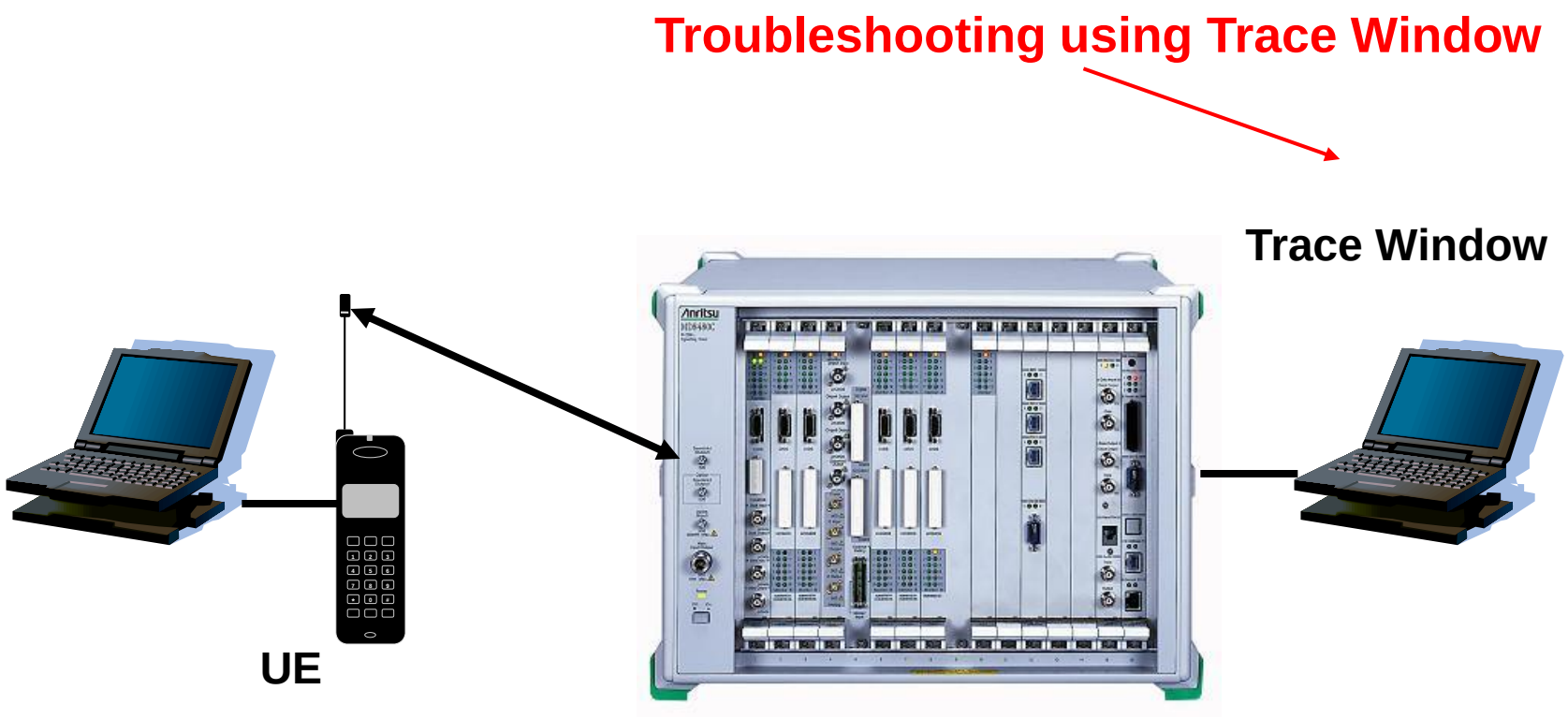
Applications (3/9)

- Coding Decoding Test
  - Can visually check UE operations at dynamic propagation conditions (such as CQI acknowledgement to BTS) combined with MF6900A Fading Simulator.
  - DL and UL constellation and power variation monitored using MS2691A Signal Analyzer



Applications (4/9)

- Protocol Sequence Test
  - UE Call Processing tests performed using following setup.



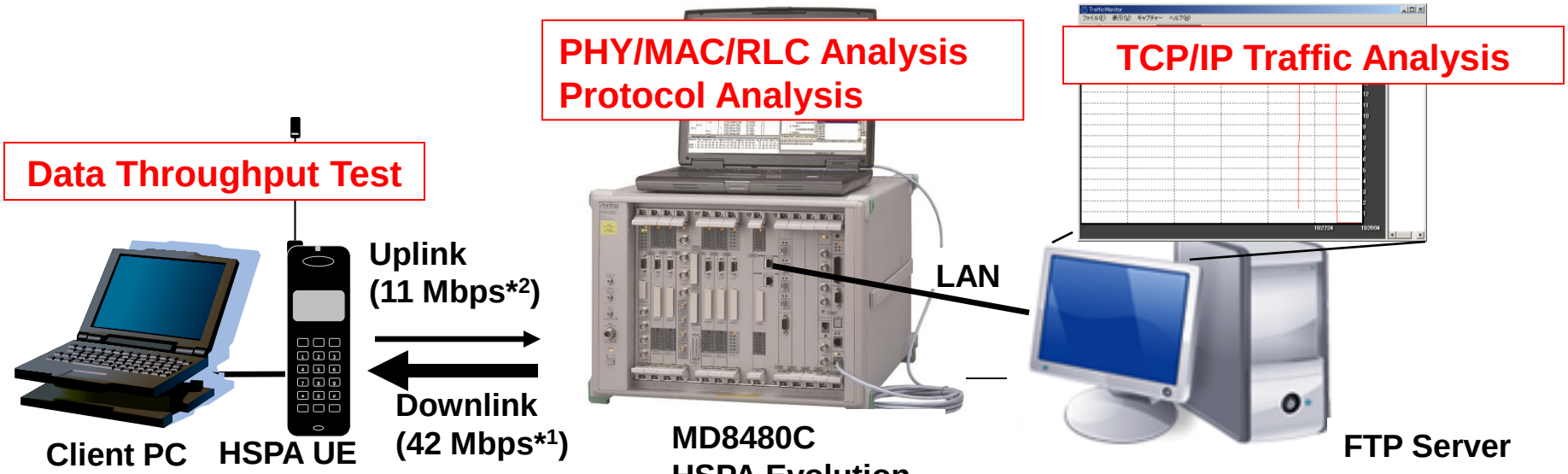
Applications (5/9)

- **Application Tests A**
  - **The MD8480C simulates these various applications.**

- **AMR Voice Test**: A handset is connected to the MD8480C to perform a voice test between MS and MD8480C.
- **User Data Test**: Any data can be inserted into the transmitted DTCH and the demodulated DTCH data is output externally. This is effective for measuring bit error rate.
- **IP Packet Test**: A PC with 10BASE-T I/F is connected to the MD8480C to test the IP protocol data communications.
- **PPP Packet Test**: A PC with RS-232C I/F is connected to the MD8480C to test the PPP protocol data communications.
- **PPP (Built-in Server) Test**: The MD8480C with PPP protocol stack acts as the PPP terminal. The PC connected via 10BASE-T I/F supports high-speed services up to 42 Mbps (HSDPA) and 11 Mbps (HSUPA).
- **ISDN Test (Option)**: A videophone or other ISDN device is connected to the MD8480C to test video and audio communications between the MS and MD8480C.
- **MS-to-MS Test (requires two MD8480C units)**: End-to-end communication tests can be performed between two MS sets by connecting two MD8480C units via 10BASE-T.

Applications (6/9)

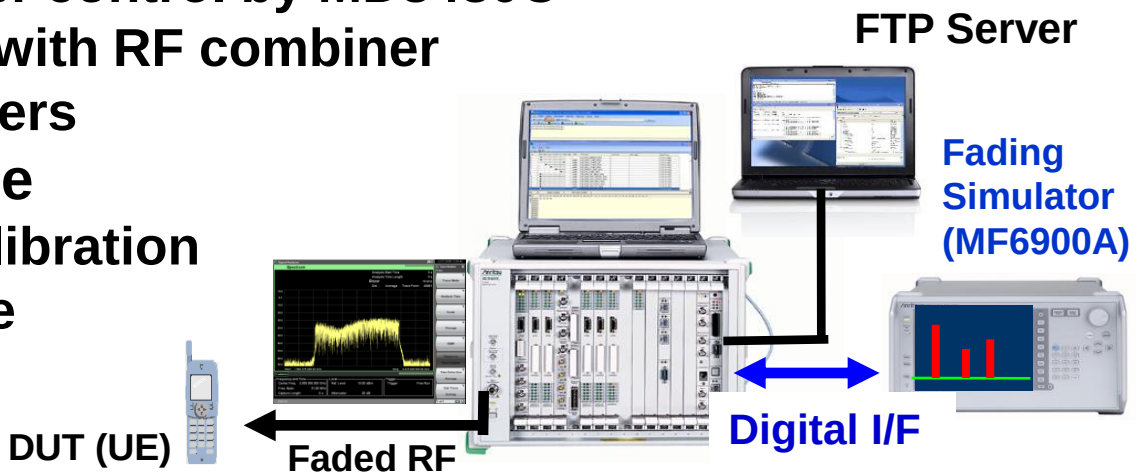
- Application Tests B
  - IP Packet Test Example
    - Throughout tests using external FTP server
    - Layer 1, Layer 2 Trace Log and Throughput Monitor
    - TCP/IP Traffic Analysis using general analysis software



*1: 63 Mbps for L1 testing
*2: 23 Mbps for L1 testing

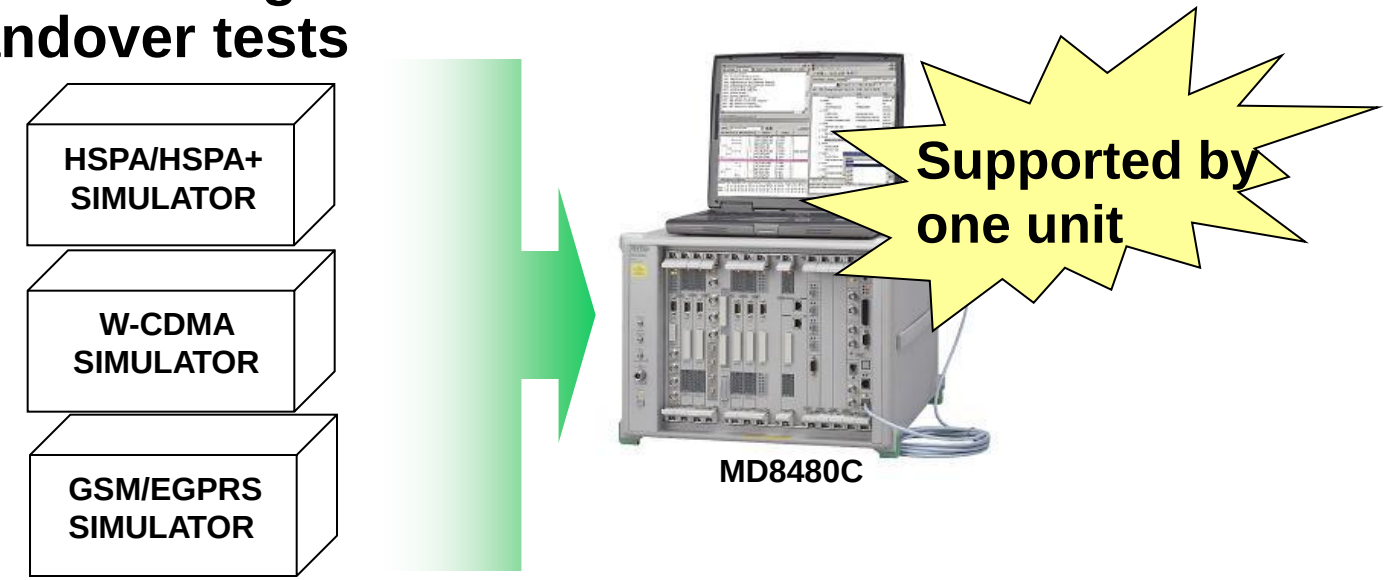
Applications (7/9)

- Fading Performance Test
  - Simple Performance (RF & Throughput) Test Solution
    - Combined with Anritsu MF6900A Digital Fader
  - High Reproducibility
    - Stable fading test using digital baseband interface
  - Easy Operation
    - Standard 3GPP TS25.101, TS34.121-1 fading profiles
    - Easy profile setting from test scenarios
    - Direct RF power control by MD8480C
    - No calibration with RF combiner and power meters
  - Free Maintenance
    - No periodic calibration
    - Low failure rate



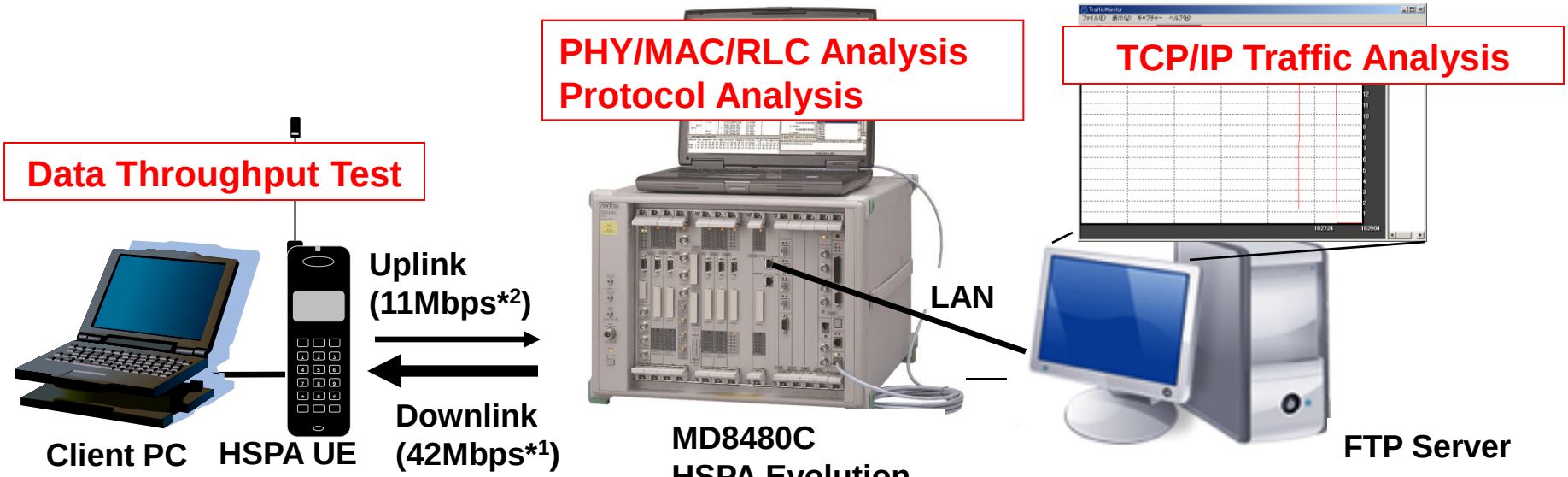
Features (1/5)

- One Unit Supports Latest 2/3/3.5G Mobile Technology including HSPA Evolution
  - Small footprint with expanded functions for testing up to four HSPA/WCDMA base stations including HSPA Evolution
  - One unit supports up to two GSM/GPRS base stations including EGPRS for Inter-RAT and Intra-RAT handover tests



Features (2/5)

- Supports DL 42 Mbps*1 Data Throughput (with MC-HSDPA) Specified by 3GPP Rel-10
  - Throughout tests using external FTP server
  - Layer 1, Layer 2 Trace Log and Throughput Monitor
  - TCP/IP Traffic Analysis using general analysis software



*1: 63 Mbps for L1 testing
*2: 23 Mbps for L1 testing

MD8480C W-CDMA Signalling Tester

Features (3/5)

- **Supports 3GPP Rel-7 and Rel-8 UE Categories**
  - **New hardware supporting DL 64 QAM, and UL 16 QAM modulation schemes as well as 2x2 MIMO**
  - **Supports 64QAM and MIMO (Category 20) , DC-HSDPA (Category 24), DB-DC-HSDPA (Category 24)**
  - **Supports DC-HSDPA with MIMO (Cat. 26*1)**
  - **Supports DC-HSUPA (UL Cat. 8)**
  - **Supports MC-HSDPA (Cat. 29*1)**

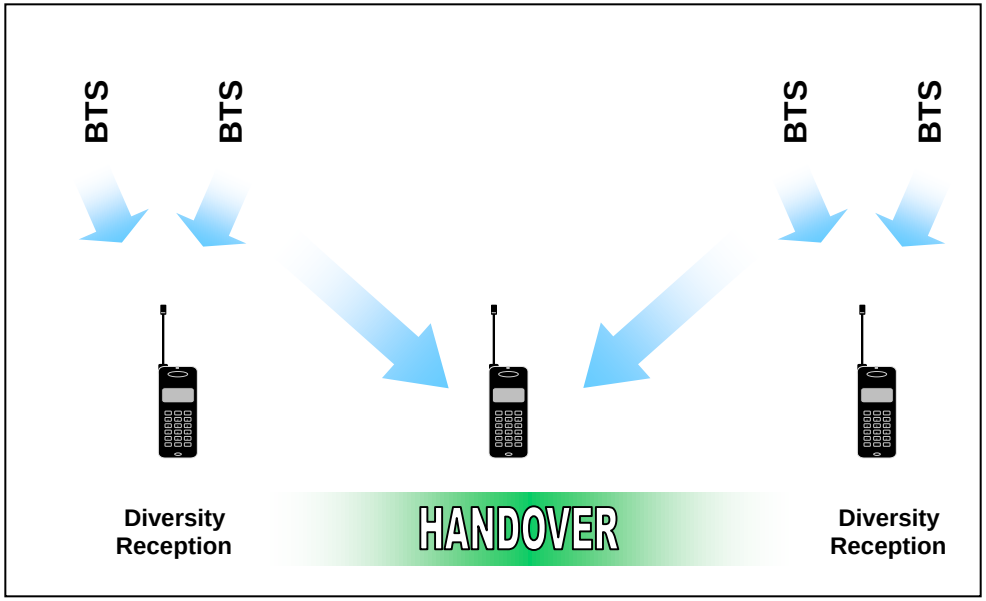
*1 : Limitation Max Throughput

3GPP TS.25.306 V10.10.0 (Release 10) Table 5.1a: FDD HS-DSCH physical layer categories

HS-DSCH category	Maximum number of HS-DSCH codes received	Minimum inter-TTI interval	Maximum number of bits of an HS-DSCH transport block received within an HS-DSCH TTI	Total number of soft channel bits	Total Number of Serving/Secondary serving HS-DSCH	Supported modulations without MIMO operation or aggregated cell operation	Supported modulations with MIMO operation and without aggregated cell operation	Supported modulations without MIMO operation with aggregated cell operation	Supported modulations with MIMO operation and aggregated cell operation	Maximum Throughput [bits/s]
Category 13	15	1	35280	259200	1	QPSK, 16QAM, 64QAM	Not Applicable (MIMO not supported)	Not Applicable (aggregated carriers operation not supported)	Not applicable (simultaneous aggregated carriers and MIMO operation not supported)	17,640,000
Category 14	15	1	42192	259200	1					21,096,000
Category 15	15	1	23370	345600	1	QPSK, 16QAM				11,685,000
Category 16	15	1	27952	345600	1					13,976,000
Category 17	15	1	35280	259200	1	QPSK, 16QAM, 64QAM	–			17,640,000
			23370	345600	1	–	QPSK, 16QAM			23,370,000
Category 18	15	1	42192	259200	1	QPSK, 16QAM, 64QAM	–			21,096,000
			27952	345600	1	–	QPSK, 16QAM			27,952,000
Category 19	15	1	35280	518400	1	QPSK, 16QAM, 64QAM				35,280,000
Category 20	15	1	42192	518400	1					42,192,000
Category 21	15	1	23370	345600	2	–	–	QPSK, 16QAM		23,370,000
Category 22	15	1	27952	345600	2					27,952,000
Category 23	15	1	35280	518400	2			QPSK, 16QAM, 64QAM		35,280,000
Category 24	15	1	42192	518400	2					42,192,000
Category 25	15	1	23370	691200	2	–	–	–	QPSK, 16QAM	46,740,000
Category 26	15	1	27952	691200	2					55,904,000
Category 27	15	1	35280	1036800	2	–	–	–	QPSK, 16QAM, 64QAM	70,560,000
Category 28	15	1	42192	1036800	2					84,384,000
Category 29	15	1	42192	777600	3			QPSK, 16QAM, 64QAM	–	63,288,000

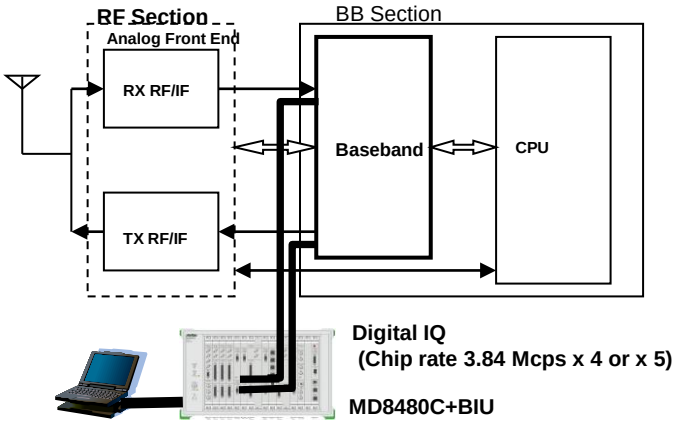
Features (4/5)

- Diversity Support for Four BTS (max.)
  - Built-in support for handover tests between four BTS with diversity reception to simulate handover tests in near-to-real network environment
  - Field verification items can be bench-tested, reducing time in field testing



Features (5/5)

- **Strong Baseband Support**
  - **The optional Baseband Interface Unit (MU848077C) supports stable W-CDMA/HSPA chipset performance and function evaluation tests irrespective of the of RF section performance**
  - **Development of HSPA mobiles requiring performance evaluation in severe mobile environments is supported by configuration of a high-reproducibility coding/decoding test environment**

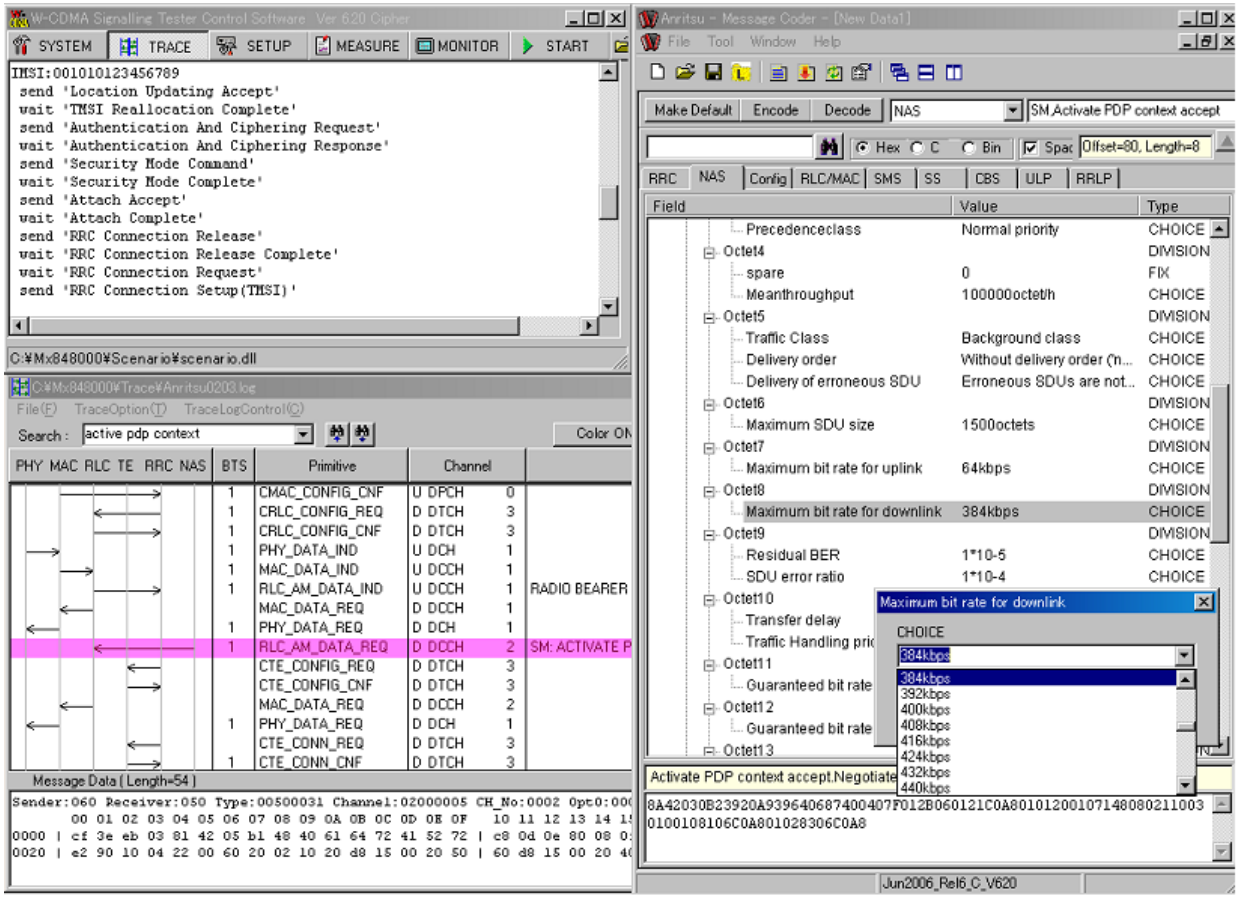


Functions (1/6)

- Main MD8480C Functions
  - 3GPP-compliant BTS simulator
  - Supports W-CDMA including HSPA Evolution and GSM/GPRS/EGPRS
  - Expandable to 4 WCDMA or 2 GSM cells with 2RF
  - Supports Layer 1 and Layer 2
  - Supports editing of Layer-3 protocol sequences controlling Layer 1 and Layer 2 as required
  - Supports monitoring data exchange between MD8480C and UE, and other parameters, such as communication status

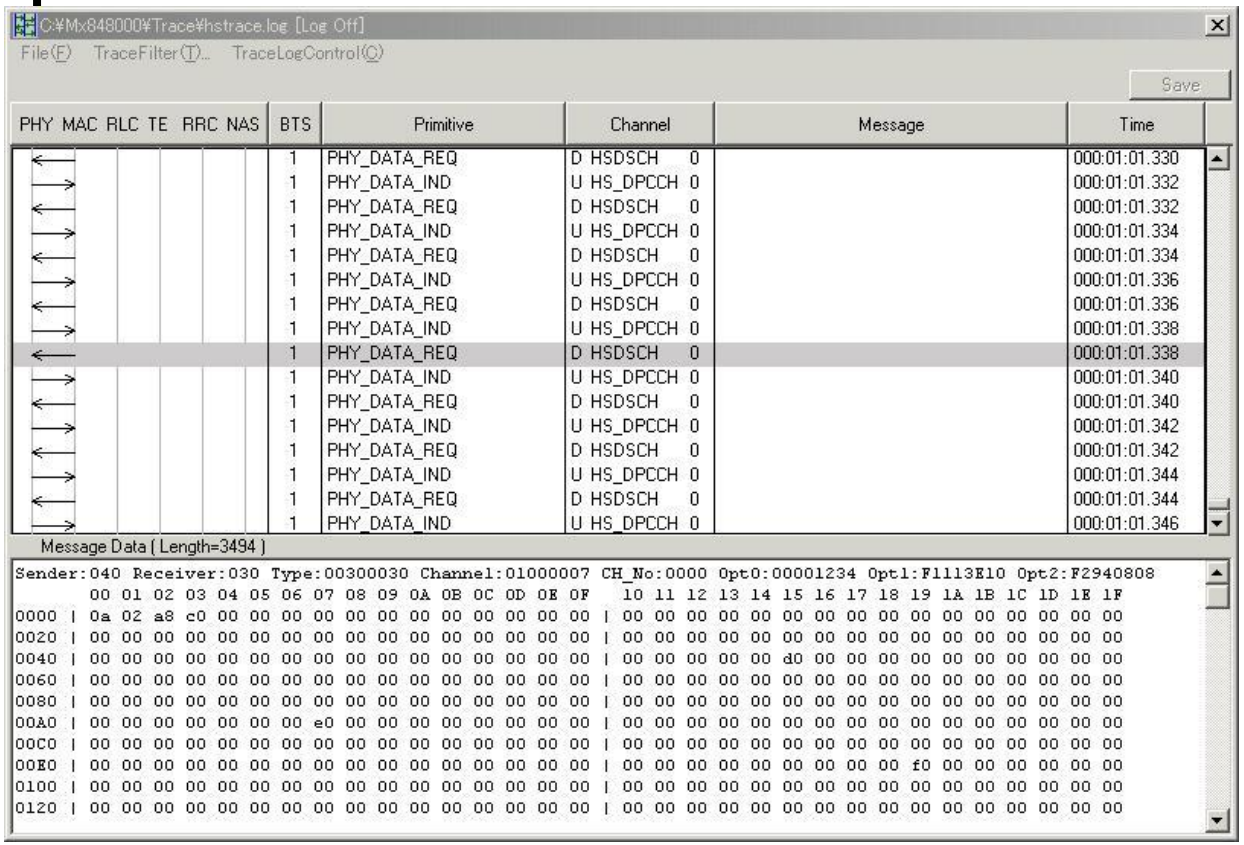
Functions (2/6)

- PC Controller Window
  - Controls and configures MD8480C main frame



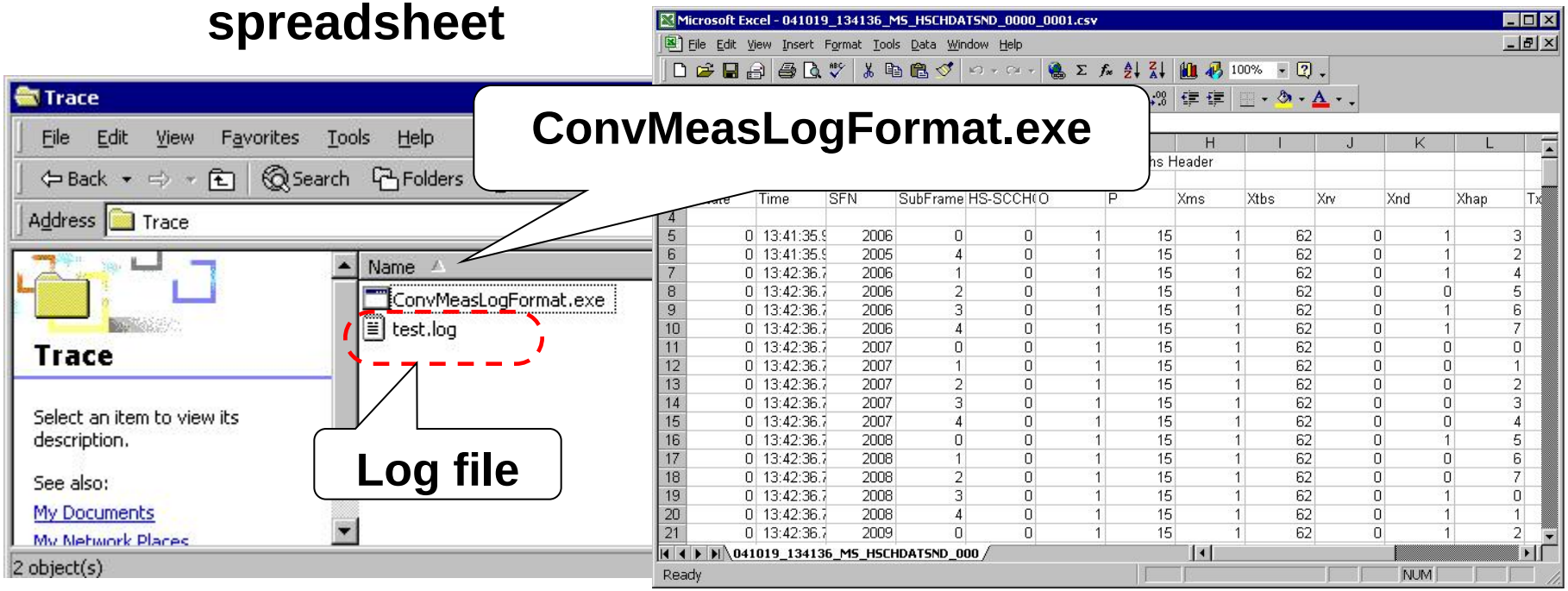
Functions (3/6)

- Trace Functions A
  - Checks message exchange between layers and test sequence



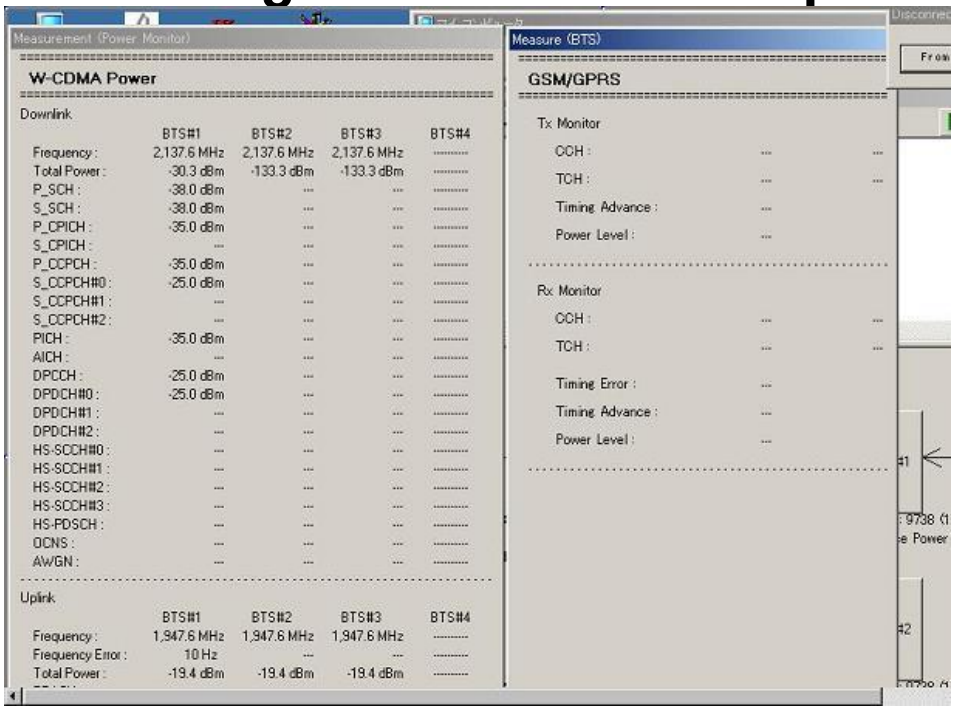
Functions (4/6)

- Trace Functions B
  - Saves and analyzes trace log data up to specified capacity
  - Outputs HS-DSCH parameters generated in CSV format by standard tool and analyzes using spreadsheet



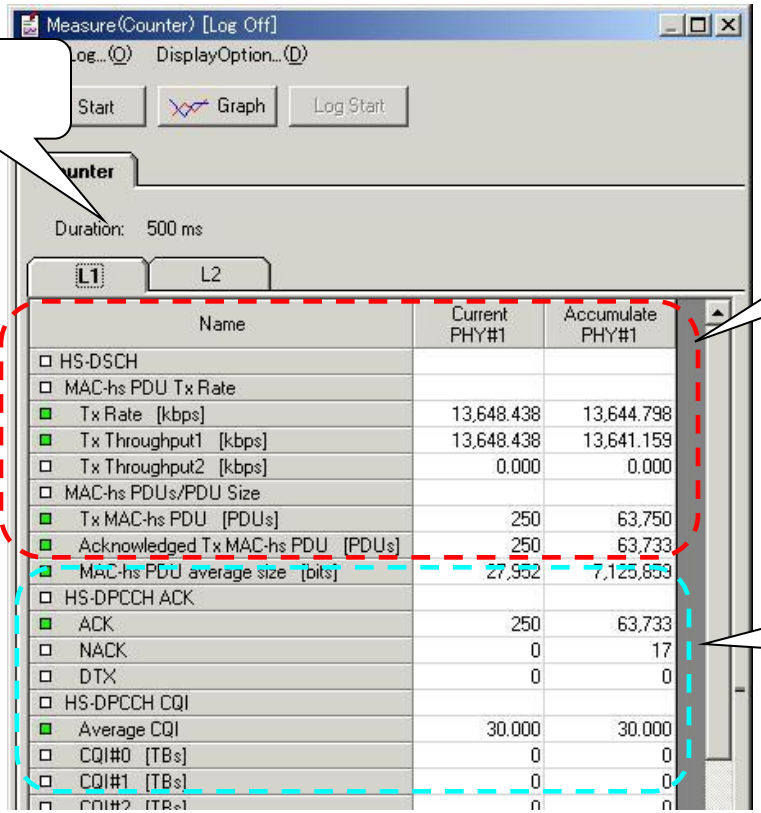
Functions (5/6)

- Monitor Function
  - Monitors frequencies and powers per BTS or channel in real time
  - Saves monitor data to log file and checks frequency and power changes at each test step



Functions (6/6)

- Measure (Counter) Function
  - Analyzes HSDPA parameters in real time
  - Saves result to log file



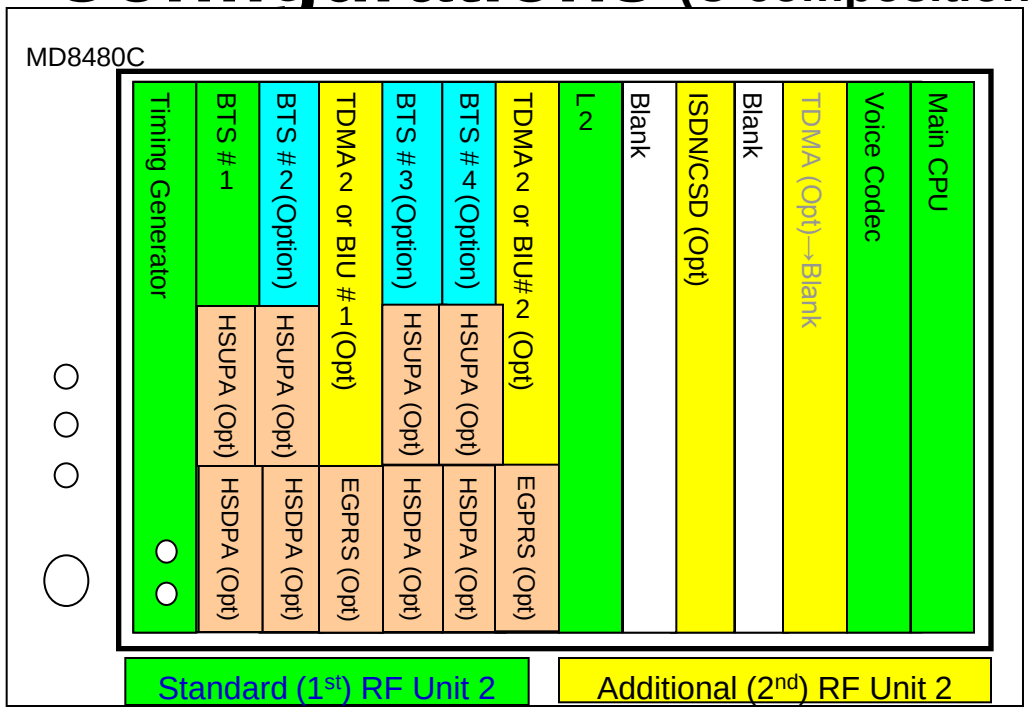
L1

HS-DSCH
MAC-hs PDU Tx Rate
Tx Rate [Kbps]
Tx Throughput 1 [Kbps]
MAC-hs PDUs/PDU Size
Tx MAC-hs PDU
:
:

HS-DPCCH ,
HS-DPCCH ACK
ACK
NACK
DTX
HS-DPCCH CQI
Average CQI
CQI#0 [TBs]
CQI#1 [TBs]
:
:
CQI#30 [TBs]
:
:

MD8480C W-CDMA Signalling Tester

Configurations (C-composition)



Standard Unit

Add. Unit (Option)

Add. BTS Unit (Option)

MD8480C Standard Configuration (W-CDMA 1 BTS included)

-MU848051A: CPU
-MU848056A: Voice codec
-MU848071C: L2
-MU848072C1: BTS Unit
-MU848073C: Timing Generator
-Z1189A: MD8480C 1st RF Unit 2

Additional Units (Option)

-MD8480C-03: Additional RF Unit 2
-MU848060C: TDMA2 (for GSM/GPRS/EGPRS)
-MU848060C-01: EGPRS (R99)
-MU848055C: ISDN/CSD
-MU848077C: Baseband Interface Unit

Additional BTS Units (Option)

-MU848072C1: BTS Unit (for BTS #2-4)
-MU848072C-01: HSDPA (for BTS #1-4)
-MU848072C-02: HSUPA (for BTS #1-4)

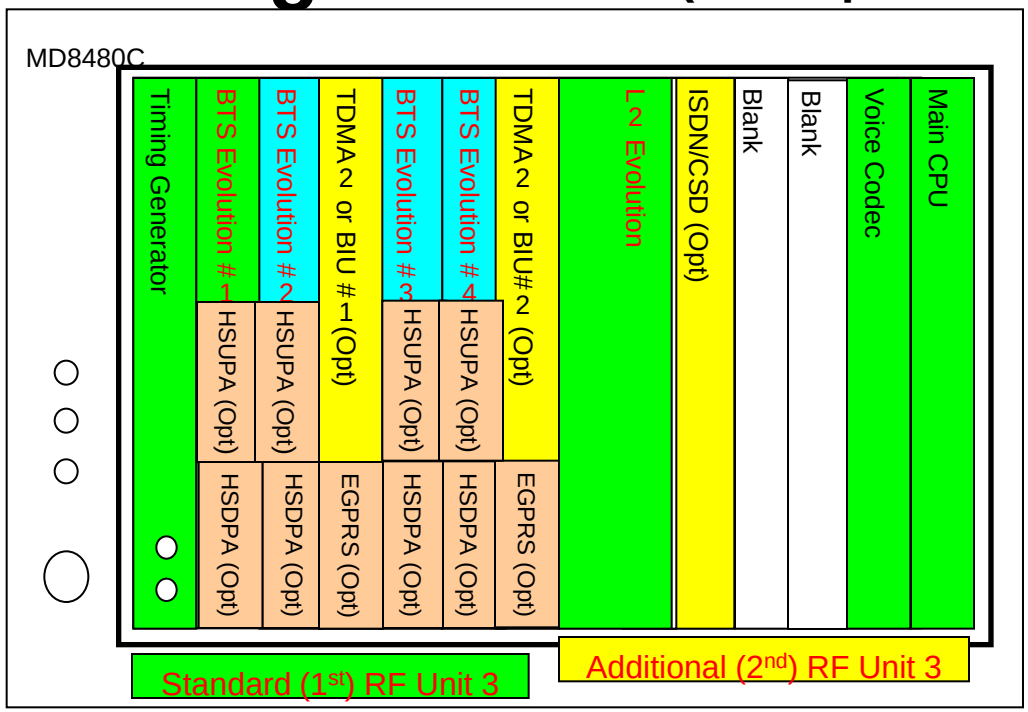
Software Options

-MX848001A-01: Tx Diversity
-MX848001C-11: HSDPA Tx Diversity
-MX848001A-02: Compressed Mode
-MX848001A-03: Router Connection
-MX848001A-04: GSM CSD
-MX848001A-05: GSM Frequency Hopping
-MX848001A-06: W-CDMA CSD
-MX848001A-07: Message Encoder/Decoder
-MX848001C-12: HSPA Evolution
-MX848001C-30: DTM (R99)
-MX848041C: Ciphering (for W-CDMA)
-MX848041C-10: HSDPA Ciphering
-MX848045C: GSM/GPRS Ciphering

March 29, 2013 last day of order entry

MD8480C W-CDMA Signalling Tester

Configurations (E-composition)



MD8480C Standard Configuration (W-CDMA 1 BTS included)

-MU848051A: CPU
-MU848056A: Voice codec
-MU848071E: L2 Evolution
-MU848072E: BTS Evolution
-MU848073C: Timing Generator
-Z1190A: MD8480C 1st RF Unit 3

Additional Units (Option)

-MD8480C-04: Additional RF Unit 3
-MU848060C: TDMA2 (for GSM/GPRS/EGPRS)
-MU848060C-01: EGPRS (R99)
-MU848055C: ISDN/CSD
-MU848077C: Baseband Interface Unit

Additional BTS Units (Option)

-MU848072E: BTS Evolution (for BTS #2-4)
-MU848072C-01: HSDPA (for BTS #1-4)
-MU848072C-02: HSUPA (for BTS #1-4)

Standard Unit

Add. Unit (Option)

Add. BTS Unit (Option)

Software Options

-MX848001A-01: Tx Diversity
-MX848001C-11: HSDPA Tx Diversity
-MX848001A-02: Compressed Mode
-MX848001A-03: Router Connection
-MX848001A-04: GSM CSD
-MX848001A-05: GSM Frequency Hopping
-MX848001A-06: W-CDMA CSD
-MX848001A-07: Message Encoder/Decoder
-MX848001C-30: DTM
-MX848001C-12: HSPA Evolution
-MX848001E-13: Higher Order Modulation
-MX848001E-14: 2x2 MIMO
-MX848001E-15: HSPA Evolution for uplink
-MX848001E-16: DC-HSDPA
-MX848001E-17: 64QAM and MIMO for HSDPA
-MX848001E-18: DB-DC- HSDPA
-MX848001E-20: DC- HSUPA
-MX848001E-21: MC- HSDPA
-MX848041E: Ciphering
-MX848041E-10: HSDPA Ciphering
-MX848045C: GSM/GPRS Ciphering

New!

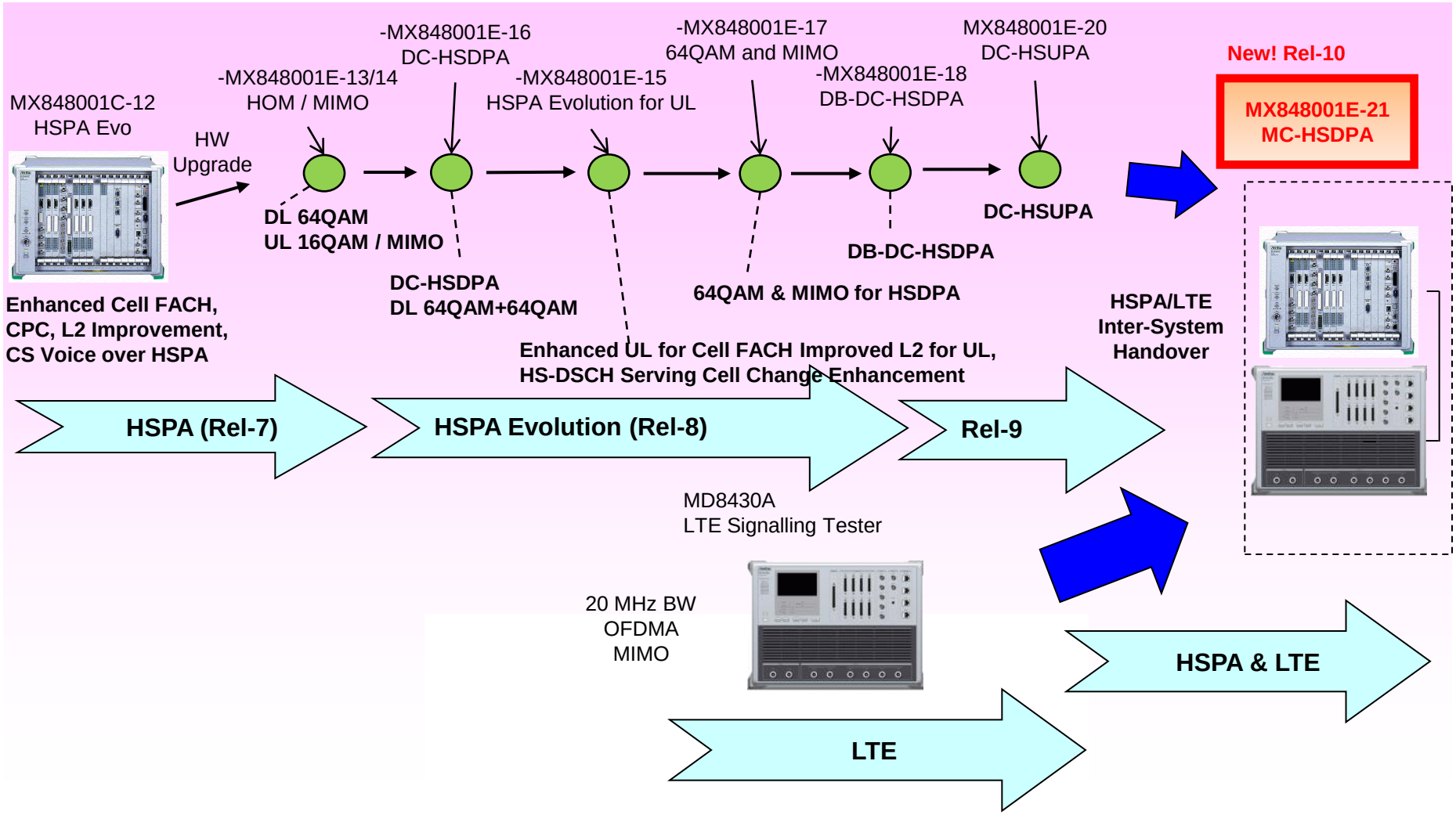
PC Controller

- The MD8480C requires a PC controller with Microsoft Visual C++ or Visual Studio*1.
- Specifications
  - OS: Windows XP (SP2), Windows Vista, Windows 7*2
  - CPU: Pentium 4, ≥1.6 GHz (Core2Duo supported)*3
  - Memory: >512 MB
  - Interface: RS-232C x1, Ethernet (10BASE-T/100BASE-TX)
  - CD-ROM drive
  - Compiler: Microsoft Visual Studio 2005 or Visual Studio 2008, 2010, 2012, 2013 Express Edition

*1: Standard edition. Microsoft Visual Studio are registered trademarks of Microsoft Corporation in the USA and other countries.
*2: Microsoft Windows XP and Vista are registered trademarks of Microsoft Corporation in the USA and other countries.
*3: Pentium and Core2Duo are registered trademarks of Intel Corporation in the USA and other countries.

MD8480C W-CDMA Signalling Tester

Roadmap



Note

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Specifications are subject to change without notice.

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