Protocol Tester R&S CRTU-W

Protocol test solution for 3G user equipment (UE)

- ◆ 2 RF channels / simulation of 2 WCDMA (FDD) cells
- ◆ Platform for 3GPP signalling test cases acc. to TS 34.123
- ◆ Detailed analysis of all protocol layers at U_u interface
- ◆ TTCN toolbox support
- ◆ C/C++ API for test script development
- ◆ Upgradable to GSM/GPRS
- ◆ Upgrading of existing R&S CRTU-G to WCDMA possible
- ◆ Intersystem handover testing

The R&S CRTU-W is the unique signalling and protocol test solution for 3G and multimode terminals. This new member of the R&S CRTU family provides the highest possible level of flexibility from early design and development through to comprehensive conformance and certification testing.

Powerful tools enable the user to define and execute TTCN test cases according to 3GPP test specification TS 34.123, and to visualize the test results. In addition, customer-specific test scenarios can be implemented in TTCN or C++.

The message analyzer tool displays message logs in various formats (sequence, structured and detailed view) including parent/child message linking across protocol layers (incl. ASN.1 decoding).

Two independent RF channels allow the simulation of 2 WCDMA (FDD) cells at the same or at different RF frequencies, which is an indispensable prerequisite for performing WCDMA intrasystem handovers. Moreover, the R&S CRTU-W is prepared for intersystem handover to GSM/GPRS systems, thus setting new standards in testing.

ROHDE & SCHWARZ

R&S CRTU-VT

For starting into 3GPP protocol testing, Rohde & Schwarz has enhanced its R&S CRTU product family. The 3GPP WCDMA Virtual Tester R&S CRTU-VT tests the protocol behaviour of UE above the physical layer using the same powerful tools like the R&S CRTU-W.

Test cases that have been verified/validated for the R&S CRTU-W can be implemented with the R&S CRTU-VT via a TCP/IP link. (A clearly defined interface allows fast linkup of the R&S CRTU-VT.)

R&S CRTU-W Tools

The R&S CRTU-W contains a complete tool chain satisfying all requirements such as test case management, test case modification, test session configuration as well as full analysis of the test results.

Since the tools are implemented in Java, they can be installed on any operating system. For full analysis of the test results and configuration of test sessions, the complete tool chain is also available offline. So the R&S CRTU-W can effectively be used for WCDMA protocol testing.

Project Explorer

The Project Explorer contains full functionality for configuring test sessions. With the aid of the Project Explorer, test cases for a test session can be selected from a test suite. Complete regression tests can be generated by combining test cases from different test suites.

In addition to handling test cases, the Project Explorer can be used to configure the hardware or reference implementations.

The Project Explorer also controls the complete run of the test session.

While a test session is running, the Project Explorer displays online the current status of the complete test session and of the individual test cases. Immediately upon completion of a test case, the final verdict of that test case is displayed.

Message Analyzer

Thanks to the mature architecture of the R&S CRTU-W software, all messages sent via the service access points in line with 3GPP specifications can be stored in a central log file. The decoding function of the Message Analyzer ensures convenient analysis of this information.

Another powerful feature of the Message Analyzer is the message sequence chart.

The Message Analyzer allows all messages to be displayed in a message sequence chart in conformity with official specifications. This function makes it very easy for the user to analyze the logic data flow within a test case.

Test Case Analyzer

The Test Case Analyzer allows analysis of the automatically generated test case result file. This file contains all information about the messages sent or received by the test case, as well as all information about timer and configuration. The TTCN Editor can be started with a hyperlink during the analysis. The corresponding TTCN source code is displayed within the TTCN Editor. Full and in-depth analysis of the test case result file is possible.

TTCN Editor

In addition to the tools developed by Rohde & Schwarz, the TTCN Editor Leonardo from Da Vinci Communications Ltd is available in the R&S CRTU-W tool chain. The TTCN Editor enhances the analysis functions of the

Test Case Analyzer and enables simple modification of existing test cases or generation of new ones. The TTCN Editor comprises an integrated version manager allowing the use and management of different versions of a test suite.

Technical details

RF
- Two independent RF channels
- Simulation of 2 cells on same or different frequency
- RF frequency range: 10 MHz to 2.7 GHz
- 3.84 Mchip/s

DL physical channels
- Up to 16 physical channels in parallel per cell
- CPICH
- P-/S-SCH
- P-CCPCH
- S-CCPCH
- PICH
- AICH
- $n * DPCH + OCNS$ with m channels
- Power level can be set for each physical channel separately

UL physical channels
- PRACH
- DPCCH
- $6 * DPDCH$

Physical layer – transport channels
- DL transport channels
  - BCH, PCH, FACH
  - Up to 8 DCH with 384 kbit/s (single code and multicode) Service multiplexing
- UL transport channels
  - RACH
  - Up to 8 DCH with 384 kbit/s (single code, service multiplexing)

Reference implementations of
  - MAC
  - RLC
  - RRC

AnalyserProject - d:\applic\crtu

File Edit View Project Tools Help

Time	RFN	Chip	Side	Layer	SAP	Serv	Prim	PDU	Auxiliary
15:58:12.634	1429512334	13056	UE	PHY	RACH	Data	Req		NrTrBlk = 0; CFN = 0;
15:58:12.636	1429512334	13824	NW	PHY	RACH	Data	Ind		NrTrBlk = 1; CFN = 140;
15:58:12.636	1429512334	13824	NW	MAC	CCCH	Data	Ind	RLC TrD PDU	
15:58:12.637	1429512334	14208	NW	RLC	TR	TrData	Ind	RRCConnectionRequest	
15:58:12.687	1429512334	33408	NW	RLC	UM	UmData	Req	RRCConnectionSetup_r3	
15:58:12.730	1429512335	11520	NW	MAC	CCCH	Status	Ind		
15:58:12.731	1429512335	11904	NW	MAC	PCCH	Status	Ind		
15:58:12.731	1429512335	11904	NW	PHY	FACH-PCH	Data	Req		NrTrBlk = 0; CFN = 0;
15:58:12.731	1429512335	11904	NW	PHY	FACH-PCH	Data	Req		NrTrBlk = 0; CFN = 0;
15:58:12.733	1429512335	12672	NW	PHY	BCH	Data	Req		NrTrBlk = 1; CFN = 144;
15:58:12.733	1429512335	12672	NW	MAC	PCCH	Data	Req		
15:58:12.734	1429512335	13056	NW	MAC	CCCH	Data	Req		
15:58:12.735	1429512335	13440	UE	MAC	CCCH	Status	Ind		
15:58:12.735	1429512335	13440	UE	MAC	CCCH	Data	Req		
15:58:12.830	1429512336	11520	NW	MAC	CCCH	Status	Ind		
15:58:12.830	1429512336	11520	NW	MAC	PCCH	Status	Ind		
15:58:12.831	1429512336	11904	NW	PHY	FACH-PCH	Data	Req		NrTrBlk = 0; CFN = 0;
15:58:12.831	1429512336	11904	NW	PHY	FACH-PCH	Data	Req		NrTrBlk = 0; CFN = 0;
15:58:12.833	1429512336	12672	NW	MAC	PCCH	Data	Req		
15:58:12.834	1429512336	13056	NW	MAC	CCCH	Data	Req	RLC UMD PDU with 7bits LI	
15:58:12.834	1429512336	13056	UE	PHY	BCH	Data	Ind		NrTrBlk = 0; CFN = 142;

RLC_SDU
- DL_CCCH_Message
  - DL_CCCH_MessageType
    - RRCConnectionSetup_r3
      - r3
        - RRCConnectionSetup_r3_IEs
          - InitialUE_Identity
            - IMSI_GSM_MAP
              - Digit
              - Digit
              - Digit
              - Digit
              - Digit
              - Digit
          - RRC_TransactionIdentifier
      - U_RNTI
        - SRNC_Identity
        - S_RNTI
      - RRC_StateIndicator
      - UTRAN_DRX_CycleLengthCoeffic
      - SRB_InformationSetupList2
        - SRB_InformationSetup
          - RLC_Info
            - UL_RLC_Mode

Byte	Bitstream	Identifier	Decimal	Interpretation
0				
0		RLC Routing information for one or more RBs		
0		Cell/Ue indicator		
32	00000000	Cell/UE Identity indicator	0	
0		Cell/Ue Identity		
33	00000000	Cell Identity	0	
34	00000000	Radio Bearer Selector	0	Select one RB
0		RadioBearerId		
35	00000000	Radio Bearer Identity	0	SRB on TM + CCCH
0		RLC protocol Part		
0		RLC Um Data Req		
36	00000000	Use special LI indicator	0	false
0		RLC SDU		
37	0-------	DL CCCH Message		
37	-011----			
37	----0---			
37	-----0--			
37	------00			
38	00000000			
39	000-----			
39	---0000-			
39	-------1			
40	001-----			
40	---1000-			
40	-------0			

Errors/Warnings Search results Parent/Children

Predecessors of selected message   Succe

Leonardo Editor Pro Version 1.10

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| Defaults: | Def_Init | |
| Comments: | | |

	...	Behaviour Description	Constraint Ref		...
	1	(tcv_Segs := o_SIB_Segmentation(o_S IB_PER_Encoding(sIB3 : p_SIB)))			1.
	2	[tcv_Segs.segCount <>1]		I	2.
	3	[tcv_Segs.segCount =1]			
	4	+ts_Scheduling(p_CellId, systemIn formationBlockType3, 64, 3, p_Timin g, 1)			3.
	5	CMAC?CMAC_SYSINFO_Config_CNF	ca_SysInfoConfigCnf(p_CellId, tsc_RB_ BCCH)		
	6	TM!RLC_TR_DATA_REQ	ca_TR_DataReq(p_CellId, tsc_RB_BCCH, cbs_SIB_Msg (c_SIB_MessageComplete(s ystemInformationBlockType3, tcv_Segs.s eg1)))		4.
	7	(tcv_MIB.sibSb_ReferenceList.[2].sibSb_Type.sysInfoType3 := (tcv_ MIB.sibSb_ReferenceList.[2].sibSb_T ype.sysInfoType3) MOD 4 + 1)			

ETSI MEMBER
...making the right connections.

ROHDE&SCHWARZ