CDMA2000 Protocol Testing and Analysis

▶ K1205/K1297-G20

▶ Features & Benefits

K1205
– Easy to Use with Graphical User Interface
– Field Monitoring
– Portable and Rugged
– 16+ Physical Links (E1/T1, etc.) and 64+ Time Slots
– Large Number of Supported Protocols
– Advanced Troubleshooting Applications

K1297-G20
– Hardware, Software and User Interface Based on the K1205
– Graphical User Interface is Compatible with K1205
– Offers All Monitoring and Analysis Features of the K1205, Plus Simulation and Emulation
– Hardware Items, Including All Application Processing Boards, Are Interchangeable Between K1297-G20 and K1205

▶ Applications

K1205
– Creation of Network Statistics and Call Detail Records
– Call Tracing and Troubleshooting

K1297-G20
– Replacing Real Equipment in a Network for Testing Purposes
– System Verification and End-to-end Testing
– Voice Channel Verification

K1205

The K1205 is specifically designed for field monitoring applications and provides users with many advanced monitoring features for analysis and troubleshooting.

For example, a click on the "Zoom" button, as shown in Figure 1, will extract all messages that belong to one particular call, even from a large recording. This saves time and is as easy as it could be.
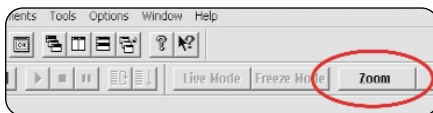

▶ **Figure 1.** *Click on the Zoom button to extract all messages.*

A sophisticated filter configuration dialogue, as shown in Figure 2, enables the user to select messages according to a certain criteria (e.g. containing a certain IMSI, etc.).
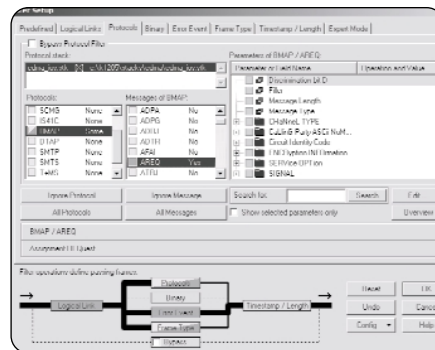
▶ **Figure 2.** *Filter dialogue allows user to select messages according to certain criteria.*

Decoding down to bit-level for all parameters is essential for troubleshooting and problem analysis, as shown in Figure 3.
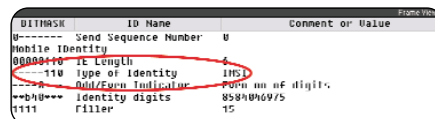
▶ **Figure 3.** *All parameters can be decoded down to the bit-level.*

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K1297-G20

The K1297-G20 features protocol monitoring, simulation, and emulation. The instrument's hardware, software, and user interface are based on the K1205, which makes it easy for previous K1205 users to adapt to the G20.

Capabilities in the K1297-G20 allow applications that are particularly valuable for Network Installation and Commissioning in the field.

### Network Element Emulations for Replacing of Real Equipment

Network Element Emulations on the K1297-G20 are designed to allow network elements (such as MSC, HL, etc.) to be replaced by the Emulation for testing purposes.

All parameters – for example, phone numbers, IMSIs, and more – are configured through menus. Once activated, the Network Element Emulation will automatically respond to incoming messages and/or initiate calls and procedures. Outgoing calls or procedures can be initiated interactively with a mouse click, or with the help of a simple script interface by defining specific call scenarios, as shown in Figure 4.

MBS/MSC Tools for Detail Level Testing and Troubleshooting

The MBS (Message Building System) and MSC (Message Sequence Chart Tool) allow users to graphically design and modify Test Cases.

Users have full control over message flow and message content. Virtually any equipment behavior (correct or faulty) can be simulated with the MBS/MSC tools, making it particularly useful for detail level testing or troubleshooting.
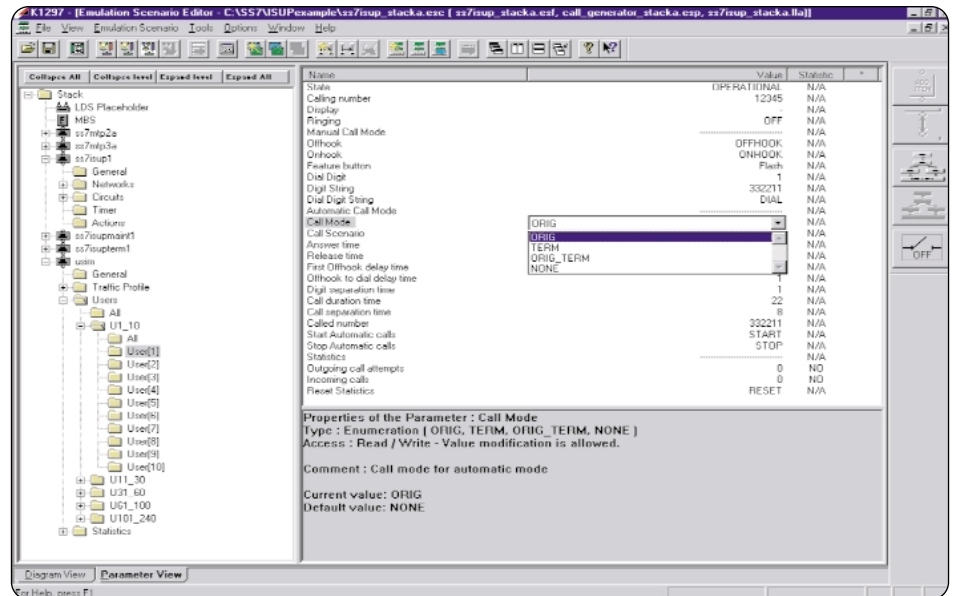
▶ *Figure 4. Configuration dialog for a Network Element Emulation.*
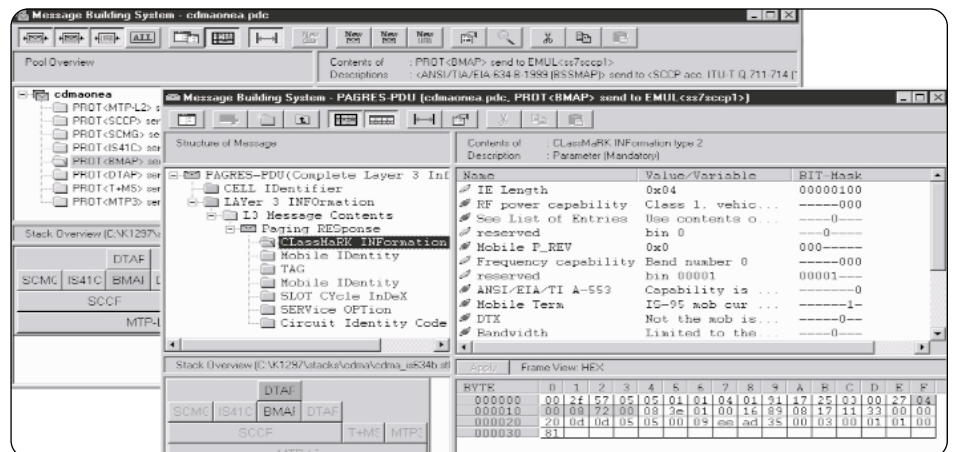
▶ *Figure 5. Message Building System (MBS) and Message Sequence Chart Tool (MSC) displays.*

The MBS is used to create messages and edit their parameters. Variables can be used to handle parameters dynamically. Figure 5 illustrates how the MBS and MSC tools are used. Messages are built by selecting the Message Type and Parameters (IEs) from menus.

As shown in Figure 6, the MSC is used to define the message flow of a test case. The messages (indicated by arrows in the chart) are defined within the MBS.
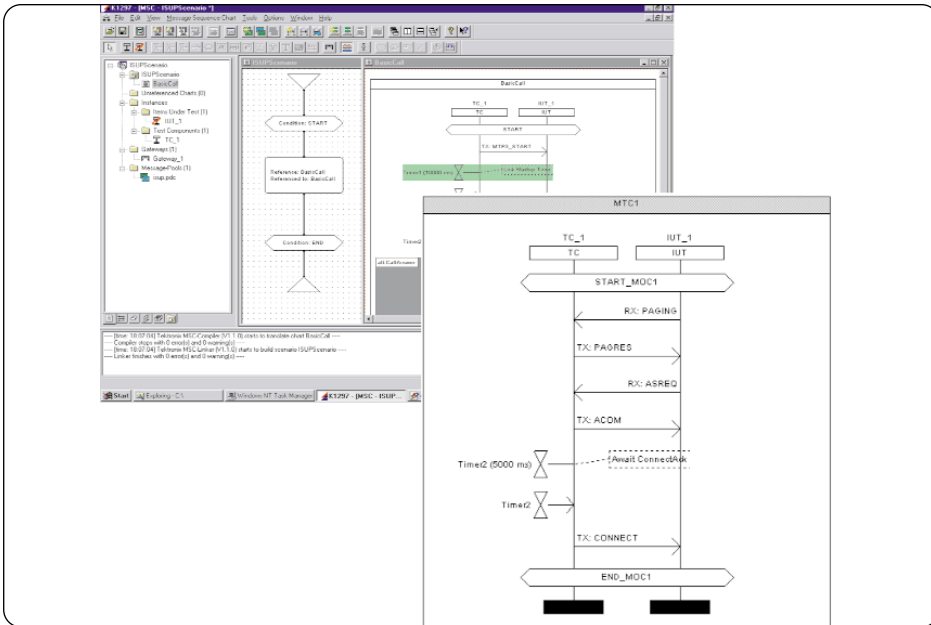
▶ *Figure 6. Message Sequence Chart Tool displays.*
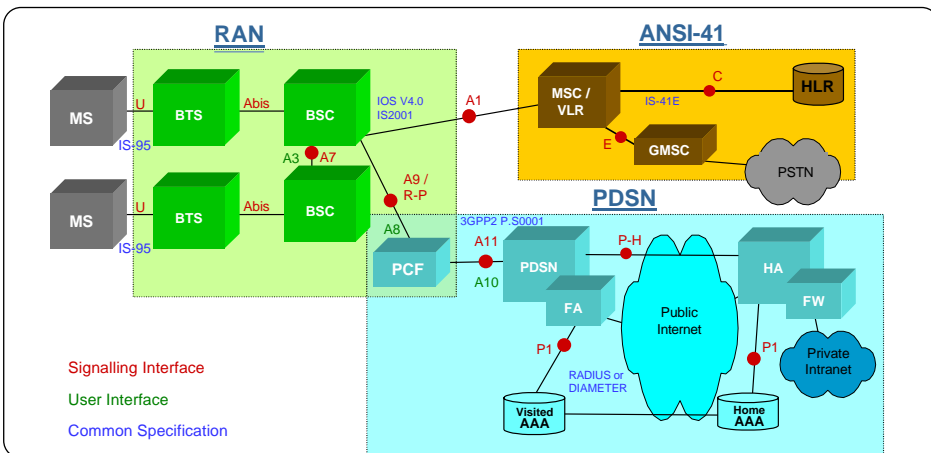
CDMA2000 System Architecture

Figure 7 illustrates the CDMA2000 system architecture.

A1 Interface

The A1 interface is the Interface between the BSS (Base Station Subsystem) and MSC (Mobile Switching Center) for the circuit-switched side of the CDMA2000 network, as shown in Figure 8.

A1 Interface Test Capabilities

▶ Monitoring with advanced Filtering and Analysis applications

▶ Simulation with Message Building System (MBS) and Message Sequence Chart Tool – test case development and detail level testing

▶ Voice Channel Verification feature

▶ BSS and MSC Network Element Emulation for system level testing, supporting 240 subscribers

▶ *Figure 7. CDMA2000 architecture diagram.*
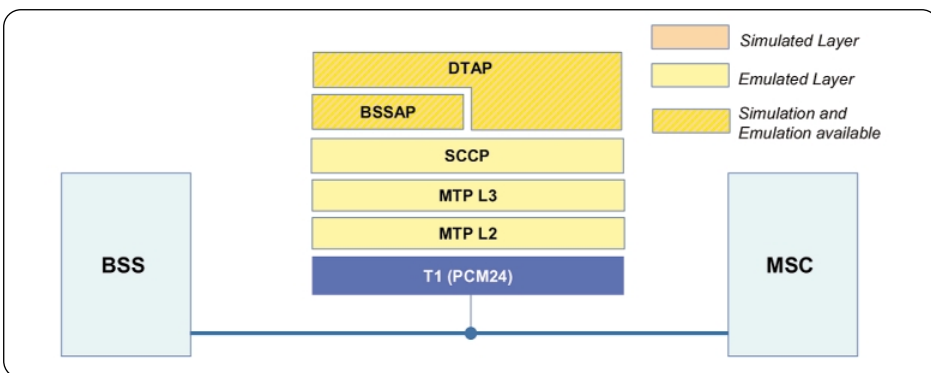
▶ *Figure 8. A1 Interface testing diagram.*

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Features of MBS/MSC Test Suite for A1 Interface

A suite of predefined Test Cases is based on the MBS/MSC tool. These Test Cases are particularly useful for troubleshooting or detail-level testing since any equipment behavior can be simulated.

A Voice Path Verification feature ensures that B-channels are switched correctly.

The user may modify or add Test Cases as needed (message content as well as message sequence), using the MBS and MSC tools. The time needed for recompiling and reloading a test case is very short (<1 min).

► Features of K1297-G20 Network Element Emulation for A1 Interface

Network Element Emulation for A1 Interface

Emulated Equipment	BSS, MSC
Supported Procedures	Location Registration
	Mobile Originated Call (MOC)
	Mobile Terminated Call (MTC)
	Call Clearing (MO and MT)
Number of Subscribers	240

MBS/MSC Test Suite for A1 Interface

|	
The following procedures are covered in the predefined test suite for testing the BSS and MSC side:	Location Registration
	Mobile Originated Call (MOC)
	Mobile Terminated Call (MTC)
	Call Clearing (MO and MT)
	Call Waiting
	Message Waiting Indication (MS Idle and in Traffic)
	SMS (MS Idle and in Traffic)
	Voice Path Verification
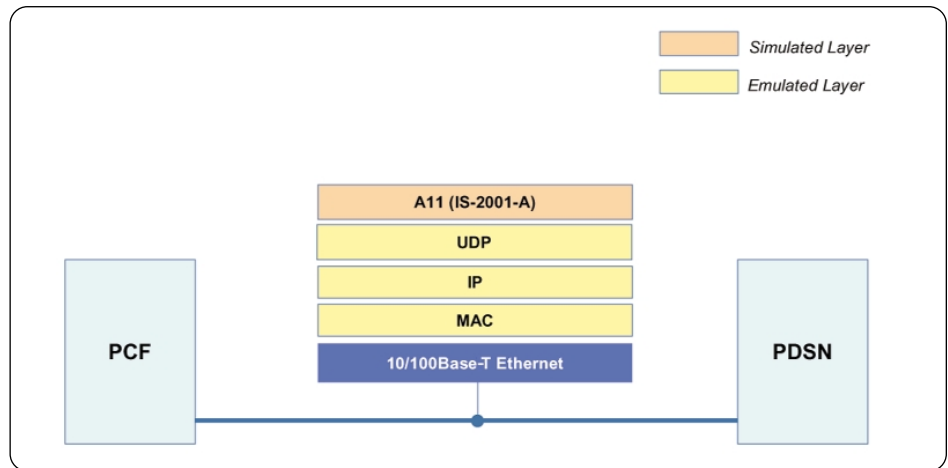
► *Figure 9. A11 Interface testing diagram (Open R-P Control Plane).*
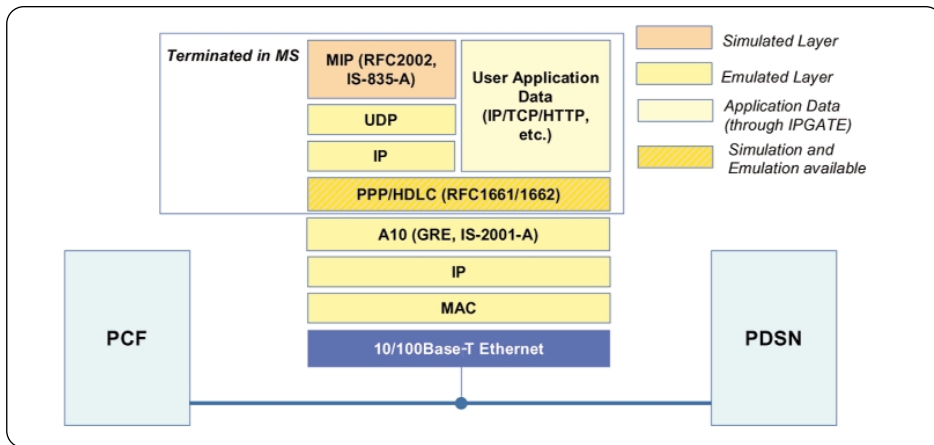
▶ **Figure 10.** A10 Interface testing diagram (Open R-P Data Plane).
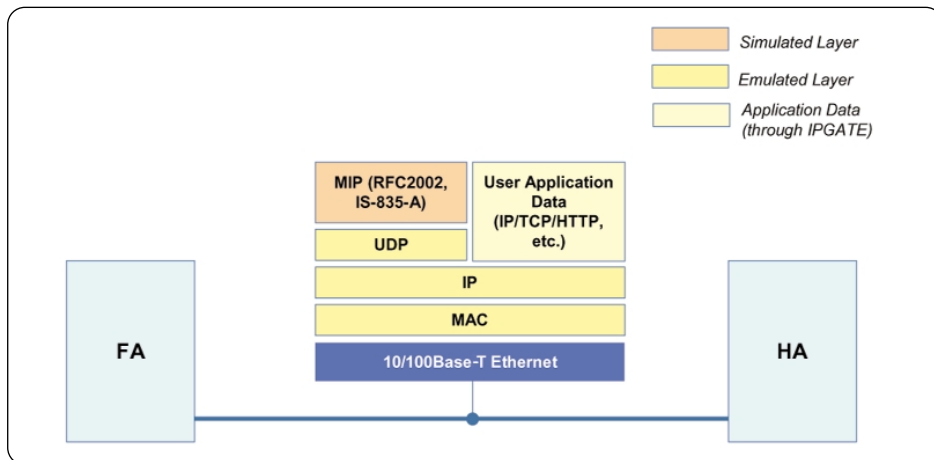
▶ **Figure 11.** P-H Interface testing diagram (Mobile IP).
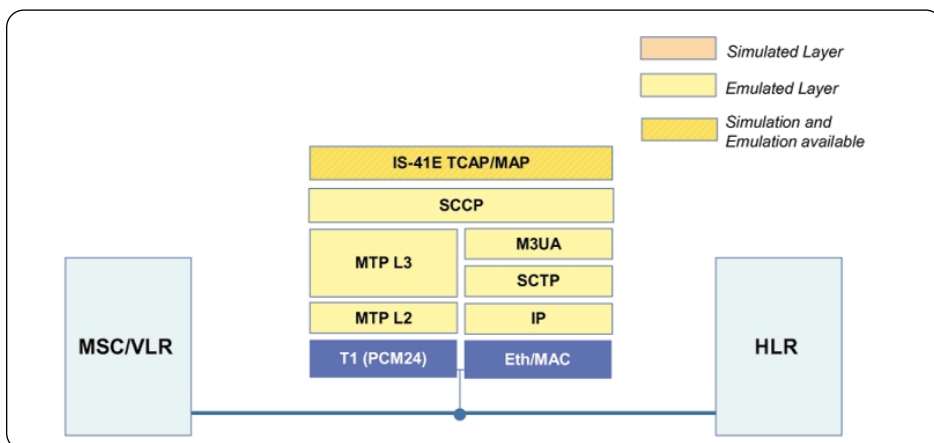
▶ **Figure 12.** IS-41 Interface testing diagram.

A10/A11 and P-H Interface

See Figures 9, 10, and 11.

A10/A11 and P-H (Mobile IP) Interface Test Tools

▶ Monitoring with advanced Filtering and Analysis applications

▶ Simulation with Message Building System (MBS) and Message Sequence Chart Tool – test case development and detail level testing

▶ IP Gateway Emulation for feeding IP application data (web browsing) into the A10 protocol stack

▶ IP Packet Generator/Comparator

IS-41 Interface

See Figure 12.

IS-41 Test Tools

▶ Monitoring with advanced Filtering and Analysis applications

▶ Simulation with Message Building System (MBS) and Message Sequence Chart Tool – test case development and detail level testing

▶ Support of WIN and Prepaid Services Protocols (IS-771, IS-826)

▶ HLR Network Element Emulation for system level testing

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▶ **Ordering Information**

▶ K12xx SW Configuration for A1 Interface Testing

	K1205 Monitoring	K1297-G20 Monitoring, Simulation and Emulation
SS7 Transport SW Package	7PK1205-6TN11	7PK1221-7TN11
SCCP Transport SW Package	7PK1205-6TC11	7PK1221-7TC11
CDMA SW Package	7PK1205-6MC11	7PK1221-7MC11
SMS SW Package	7PK1205-6MS11	7PK1221-7MS11
Handset (for voice channel verification)	–	7KK1200-5HS11
Network Element Emulation SW	–	7KK1223-8MC11

▶ K12xx SW Configuration for A8/A9, A10/A11 and P-H Interfaces

	K1205 Monitoring	K1297-G20 Monitoring, Simulation and Emulation
Data Transport SW Package	7PK1205-6TP11	7PK1221-7TP11
CDMA2000 SW Package	7PK1205-6DR11	7PK1221-7DR11
PPP SW Package	7PK1205-6PP11	7PK1221-7PP11
IP Application Protocol SW Package	7PK1205-6JJ11	7PK1221-6JJ11
IP Gateway Emulation/Packet Gen/Comp.	–	7KK1226-9GA11

▶ K12xx SW Configuration for IS-41 Interfaces

	K1205 Monitoring	K1297-G20 Monitoring, Simulation and Emulation
SS7 Based Stack		
SS7 Transport SW Package	7PK1205-6TN11	7PK1221-7TN11
IPS7 Stack		
Data Transport SW Package	7PK1205-6TP11	7PK1221-7TP11
IPS7 SW Package	7PK1205-6JS11	7PK1221-7JS11
SCCP Transport SW Package	7PK1205-6TC11	7PK1221-7TC11
CDMA SW Package	7PK1205-6MC11	7PK1221-7MC11
SMS SW Package	7PK1205-6MS11	7PK1221-7MS11

▶ cdmaOne and CDMA2OOO Products and Standards Summary

	Monitoring	Simulation (MBS/MSC)	Network Element Emulation
A1 Interface			
IS-634B	Released[1] 7PK1221-6MC11	Released[1] 7PK1221-7MC11	Released[1] 7KK1223-8MC11
IOS-2.4	Released 7PK1221-6MC11	Released 7PK1221-7MC11	
IOS-3.1	Released 7PK1221-6MC11	Released 7PK1221-7MC11	Released 7KK1223-8MC11
IOS-4.0	Released 7PK1221-6MC11	Released 7PK1221-7MC11	
IOS-4.1	Available (Beta)[2] 7PK1221-6MC11	Available (Beta)[2] 7PK1221-7MC11	
SMS			
IS-637	Released 7PK1221-6MS11	Released 7PK1221-7MS11	
MAP/IN			
IS-41C/D	Released 7PK1221-6MC11	Released 7PK1221-7MC11	
IS-41E	Available (Beta) 7PK1221-6MC11	Available (Beta) 7PK1221-7MC11	
IS-771 (Prepaid Services)	Released 7PK1221-6MC11	Released 7PK1221-7MC11	
IS-826 (Wireless IN)	Released 7PK1221-6MC11	Released 7PK1221-7MC11	
IPS7			
SCTP/M3UA (RFC2960/M3UA Draft V6)	Released 7PK1221-6JS11	Released 7PK1221-7JS11	Released 7PK1221-7JS11
Other CDMA2OOO Interfaces			
A9/A11 (Signaling BSC/PCF-PDSN) (105-4.0, 4.1, 4.2)	Available (Beta) 7PK1221-6DR11	Available (Beta) 7PK1221-7DR11	
A8/A10 (Data Plane BSC/PCF-PDSN) (105-4.0, 4.1, 4.2)	Available (Beta 7PK1221-6DR11	Available (Beta) 7PK1221-7DR11	
A3/A7 (BSC-BSC Signaling Plane)	Available (Beta) 7PK1221-6DR11	Available (Beta) 7PK1221-7DR11	
P-H (PDSN/FA-HA)	Available (Beta) 7PK1221-6JJ11	Available (Beta)	
P1 (FA/HA-AAA)	Available (Beta) 7PK1221-6JJ11	Available (Beta)	

[1] Released: Delivered on product CD.

[2] Available (Beta): Can be delivered upon request as Beta version (engineering release).

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For the most up-to-date product information
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