Agilent
OBSAI Protocol Test Solutions
N5341A and N5340A Test Modules for RP3-01, RP3, RP1 and Ethernet

Data Sheet

Accelerate your test development of OBSAI Base Transceiver Station

Simplify your OBSAI test environment by combining stimulus and analysis

Applications

- OBSAI hardware prototype turn-on and debug
- Independent module test within BTS (Base Transceiver Station)
- RP3, RP3-01, RP1 and Ethernet link level test
- Baseband module test
- Radiohead module test
- Robustness test with error injection
- Automated and non-regression test

Key features

- Full link layer test capabilities
- Up to 5 pairs of unidirectional links between the baseband and the RF modules
- Supports 1x, 2x and 4x link speeds
- Emulate link layers of Baseband, RF module, remote RF module and/or CCM
- Fully configurable RP3 and RP3-01 frames for transmission
- Fully configurable RP1 sync burst generation, RP1 reception
- Full Ethernet and control message support
- Allows multiple error insertion
- Real-time comparison with sample frames
- Real-time error and compare counters
- Rich triggering support
- Based on modular, scalable platform

Agilent Technologies

Combine custom stimulus generation and analysis to diagnose and characterize your system faster

The Open Base Station Architecture Initiative (OBSAI) family of specifications includes a reference architecture and interconnect specifications used between modules within a Base Transceiver Station (BTS).

The RP1, RP3 and RP3-01 (respectively Reference Point 1, 2, 3) represent the interfaces between the Baseband block and the local or remote RF blocks.

The adoption of the OBSAI interconnect standards within your next design presents new test challenges during the turn-on debug, and validation phases of the development process.

One of the main challenges is that all modules may not be available or ready during the tests. For example, the RF block needs to be tested without the Baseband block and vice versa.

To ensure that your design operates according to the protocol specification, it is necessary for you to get insight on the DUT's, and be able to trigger on protocol specific patterns or error conditions.

To reproduce system problems or run non-regression tests, you often need to create traffic conditions that may be difficult to reproduce with real devices.

Now you can get the test capabilities you need with the N5341A and N5340A analysis and stimulus solution.

The OBSAI link test solution can accelerate the design/debug/test cycle by reproducing these conditions.

The Agilent Technologies N5341A Base Station Link Test Module and the N5340A Base Station Test Extension Module operate within the modular N2X chassis to provide the link level stimulus and acquisition capabilities required to independently debug and test the link layer of an OBSAI Baseband, RF or remote RF module or component.

Module link emulation and deterministic traffic generation help you test independently the baseband and RF modules.

Error insertion capabilities help test the robustness of your DUT, and analyze how quickly it recovers from link errors and exceptions.

Triggering capabilities help you observe the activity on a bus when a specific event happens, helping you find the root cause of complex problems.

With this versatile architecture, you can use the same platform from the bus design phase to system level test, so you reduce your expenditure on test equipment.

This common, scalable system for device emulation and link analysis protects your financial investment for years to come.

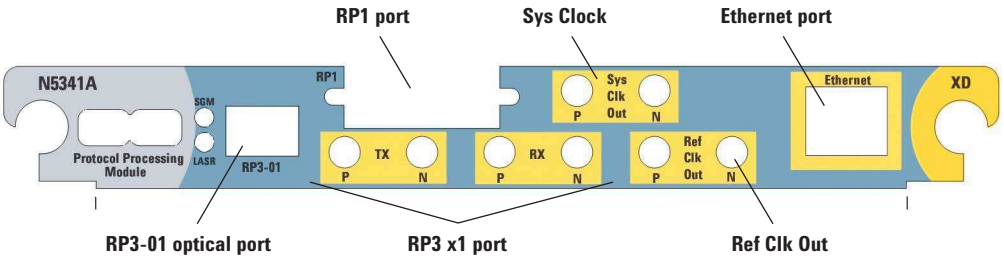
Product Structure

The OBSAI interface test consists of:

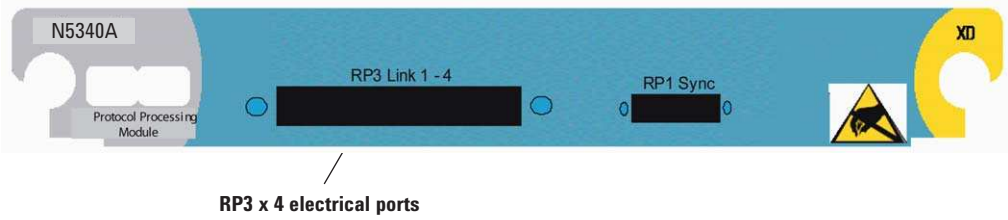
- N5540A N2X 2 slot chassis
- N5341A Base Station Link Test Module
- N5340A Base Station Test Extension Module (optional)
- Windows Based Controller with Host Software

		Interfaces				
Module	**Description**	**RP3**	**RP3-01**	**Eth**	**RP1**	**System clock**
N5341A	RP3-01 input module	1 Ch (1 in/out)	1 Ch (1 optical)	1 in	1 Ch (1 in/out)	In Out
N5340A	RP3 input module	4 Ch (4 in/out)	N/A	N/A	1 Ch (1 in)	N/A

N5341A Base Station Link Test Module



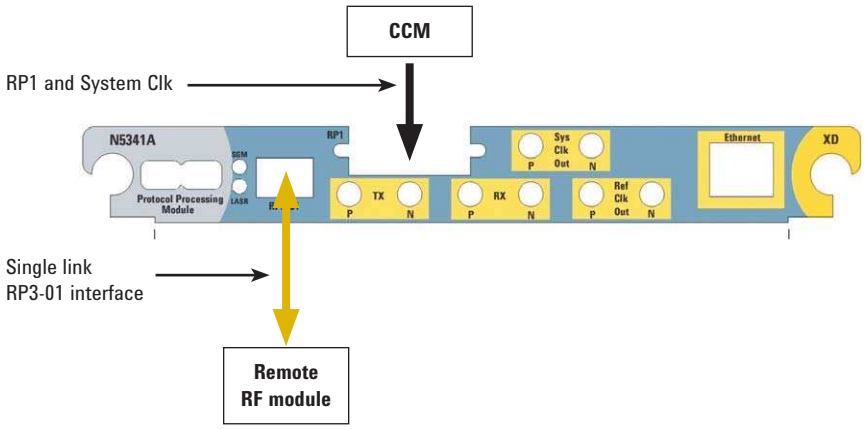
N5340A Base Station Test Extension Module



Typical Configurations

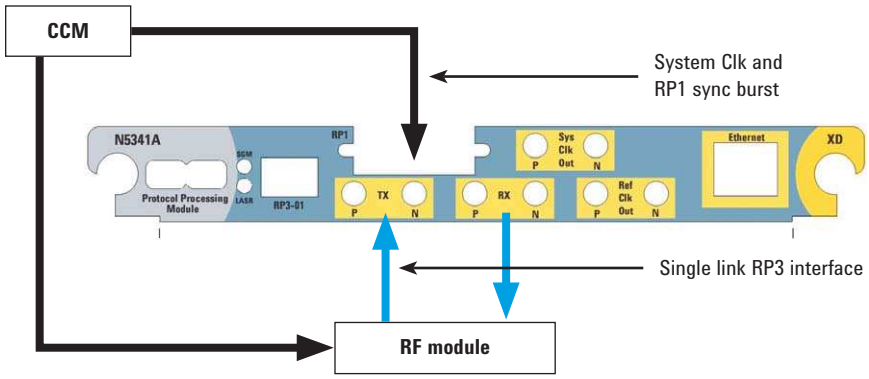
Remote RF module validation

- In this mode, the Agilent N5341A Base Station Link Test Module emulates a baseband module connected to the RF module through the RP3-01 interface and the RP1 interface.
- The Agilent test solution can either use the CCM module of the device under test or emulate it if necessary.



RF module validation

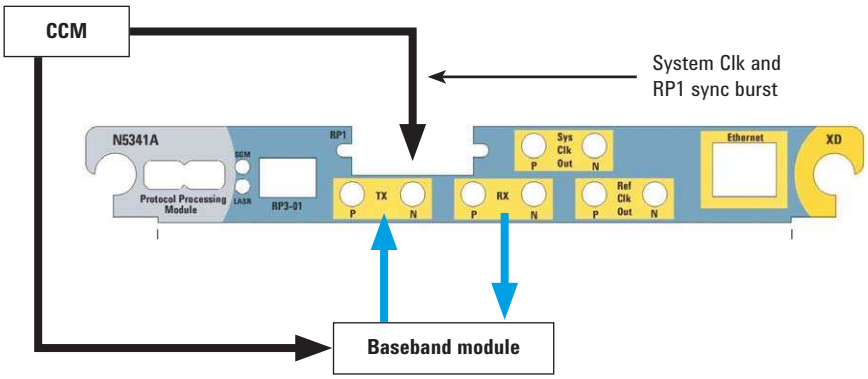
- In this mode, the Agilent N5341A Base Station Link Test Module emulates a baseband module connected to the RF module through the RP3 interface and the RP1 interface.
- If multiple RP3 links are required, the N5340A test extension module will add up to 4 RP3 links to the current configuration.
- The Agilent test solution can either use the CCM module of the device under test or emulate it if necessary.



Typical Configurations

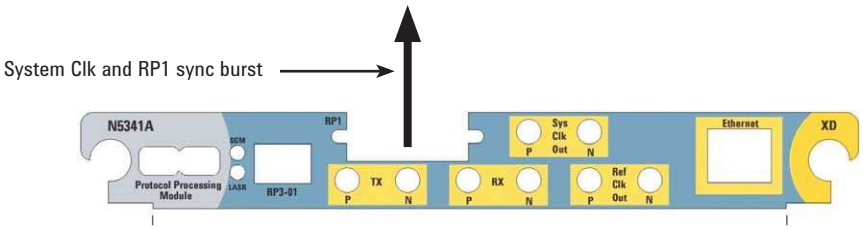
Baseband module test

- In this mode, the Agilent N5341A Base Station Link Test Module emulates an RF module connected to the Baseband module through the RP3 interface and the RP1 interface.



CCM Emulation

- In this mode, the Agilent OBSAI test solution emulates a CCM module



Multiple Traffic Conditions

The N5341A helps you characterize your system's operation under multiple traffic conditions

Increase test coverage with configurable traffic generation

- Configurable traffic can be generated from GUI, or from tcl or custom programs
- Deterministic RP3, RP3-01, Ethernet generation
- Repetitive and Loop events
- Up to five channels support
- Stimulus up to 3 Gbps

Fully test your device's link layer

- Custom frame and link event generation

Error insertion into RP3, RP3-01 and RP1 links

- Validate DUT robustness by inserting errors in traffic

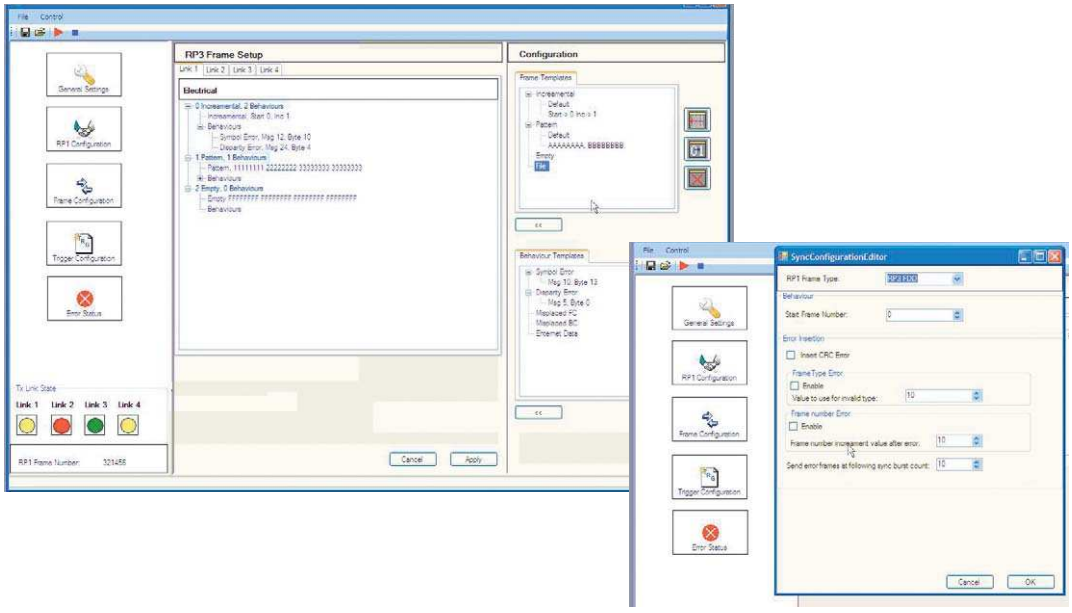
Validate boundary conditions of your devices and components

Hierarchical trace display speeds your debug process

- Avoid constant scrollings with the hierarchical display that maximizes information density on the screen
- Full Decoding capabilities
- Compare frames details and easily count bit-level differences
- Easily retrieve information with embedded markers
- Quickly find problems with automatic error detection

Powerful triggering, easy setup

- Easy trigger setup by using and editing predefined patterns



Easily insert errors in traffic

RP3 transmitter	Value
Line rate	768/1536/3072 Mbaud ± 100 ppm
Unit interval (nominal)	1302 ps / 651 ps / 326 ps
Differential amplitude (max, min)	1600 mV p-p, 400 mV p-p (800 - 1000 mV typical)
Absolute output voltage limits (max, min)	2.3 / –0.4 V
Load	100 Ohms ± 5%

RP3 receiver	Value
Line rate	768/1536/3072 Mbaud ± 100 ppm
Unit interval	1302 ps / 651 ps / 326 ps
Jitter amplitude tolerance	
Minimum deterministic	0.37 UI p-p
Minimum deterministic Plus random	0.55 UI p-p
Minimum total	0.65 UI p-p measured at BER 10^{-12}
Receiver coupling	AC

RP3-01 characteristics	Value
Line rate	768/1536/3072 Mbaud - Industry standard SFP interface

RP1 characteristics	Value		
System clock	In		
Sync burst	In / Out		
Trigger	Out		
Voltage level	LVDS		
Minimum/maximum voltages	–0.2 V, 2.7 V		
Trigger	Out		
System clock	Min	Typical	Max
Frequency (symbol : FCLK)		30.72 Mhz	
Duty cycle (symbol : TDUTY_CYCLE)	40%	50%	60%
PP jitter (symbol : TP-P JITTER)	—	400 ps	600 ps

Agilent N5341A/N5340A Features and Specifications (continued)

Ethernet characteristics	Value
Connector	RJ45
Speed	10 M/100 M

Performance specifications	Value
Maximum bandwidth	3 Gbps on the optical and electrical links
Transmit buffer size	512 Mbytes
Compare buffer size	512 MBytes
Receive buffer size	512 Mbytes (N5341A), 1 Gbyte (N5340A)

Error injection	Value
Symbol error	On any link
Disparity errors	On any link
Misplaced idles (0xfc)	On any link
Misplaced idles (0xbc)	On any link

Trigerring capabilities	Value
Pattern matcher	Four pattern matchers
Errors	Disparity, Symbol, Misplaced idles (0xfc and 0xbc)
RP1 types	Any OR combination of valid type

System requirements
I/O blade for N2X chassis (see related products section for more details)

Environment	Value
Temperature (AT-ETM757)	Operating: 0 °C to +55 °C
Storage	–40 °C to +70 °C
Humidity (AT-ETM758)	Operating: 15 to 95% Operating soak: 90% (24 h)
Safety standards	Installation category: EN ISO/IEC 17025, IEC 61010-1/EN61010-1, II Pollution degree: 2 Environmental rating: Standard

Agilent 2 Slot N2X Chassis Features and Specifications

Environment	
Temperature (AT-ETM757)	Operating: 0 °C to +55 °C
Storage	–40 °C to +70 °C
Humidity (AT-ETM758)	Operating: 15 to 95% Operating soak: 90% (24 h)
Safety standards	Installation category: EN ISO/IEC 17025, IEC 61010-1/EN61010-1, II Pollution degree: 2 Environmental rating: Standard

General characteristics	
Power requirements	100-120 Vac, 200-250 Vac 550 VA maximum 47 to 63 Hz

Physical characteristics	
2-slot chassis	Width: 30 cm (11.81 in) Depth: 49.0 cm (19.29 in) Height: 11 cm (4.33 in) Weight (empty): 5.1 kg (11.2 lbs)

How to configure a system

The recommended configuration consists of a Windows® XP-based system controller (desktop PC or laptop) with one LAN 10/100 network card dedicated to the connection to one chassis containing at least one N5341A Base Station Link Test module.

System controller
The system controller is loaded with the software that provides a graphical interface to drive protocols and applications running on the test cards.

Chassis
The chassis can be a 2-slot N2X chassis or 4-slot N2X chassis.

Test modules
The minimal configuration includes a N5341A Base Station Link Test module.

If more RP3 channels are required for the test, the N5340A Base Station Test module extension will be added in the chassis.

Each test module must be licensed for specific traffic generation, such as LTE or Wimax. The controller software is provided with the test modules.

Agilent product number	Description
Chassis	
N5540A	2-slot, 2U high chassis
N5541A	4-slot, 2U high chassis
Test cards	
N5341A	**Base Station Link Test Module**
Option P01	RP3 emulation (required option)
Option E01	Wimax emulation license
Option E02	LTE emulation license
N5340A	**Base Station Test Module Extension**
Option P01	RP3 emulation (required option)
Option E01	Wimax emulation license
Option E02	LTE emulation license
N5349A	**Upgrade Kit for N5340A and N5341A**
Option E01	Wimax emulation license
Option E02	LTE emulation license

Related literature

Publication title	Publication type	Publication number
Agilent 16800 Series Portable Logic Analyzers	Data sheet	5989-5063EN
Agilent 16900 Series Logic Analysis Mainframes	Data sheet	5989-0421EN
Probing Solutions for Agilent Technologies Logic Analyzers	Catalog	5968-4632E

Product Web site

For the most up-to-date and complete application and product information, please visit our product Web site at:
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LXI

www.lxistandard.org
LXI is the LAN-based successor to GPIB, providing faster, more efficient connectivity. Agilent is a founding member of the LXI consortium.

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Revised: March 27, 2008

Product specifications and descriptions in this document subject to change without notice.

Printed in USA, July 1, 2008
5989-8772EN

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