

# 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**

## N5341A and N5340A OBSAI Link Level Test

*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

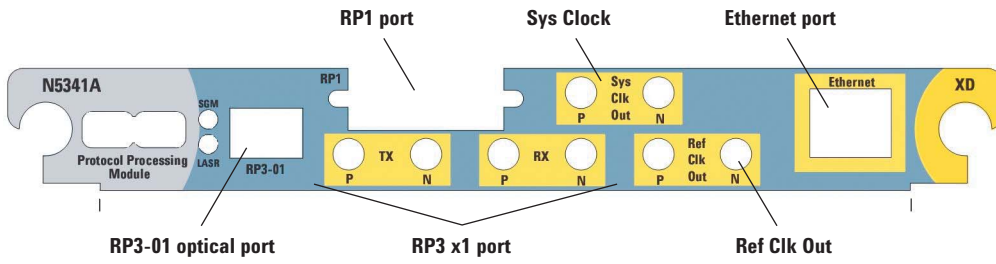
The OBSAI interface test consists of:

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

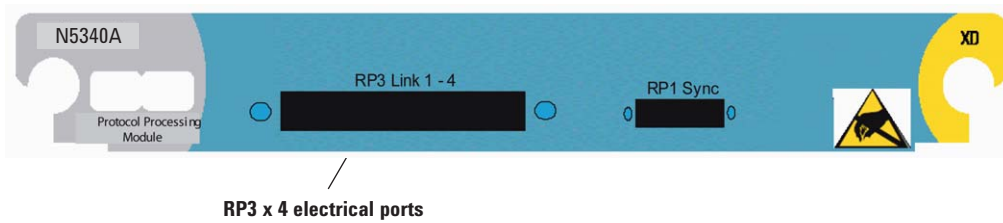


Module	Description	Interfaces				System clock
		RP3	RP3-01	Eth	RP1	
N5341A	RP3-01 input module	1 Ch (1 in/out)	1 Ch (1 optical)	1 in	1 Ch (1 in/out)	In Out
N5340A	RP3 input module	4 Ch (4 in/out)	N/A	N/A	1 Ch (1 in)	N/A

## N5341A Base Station Link Test Module



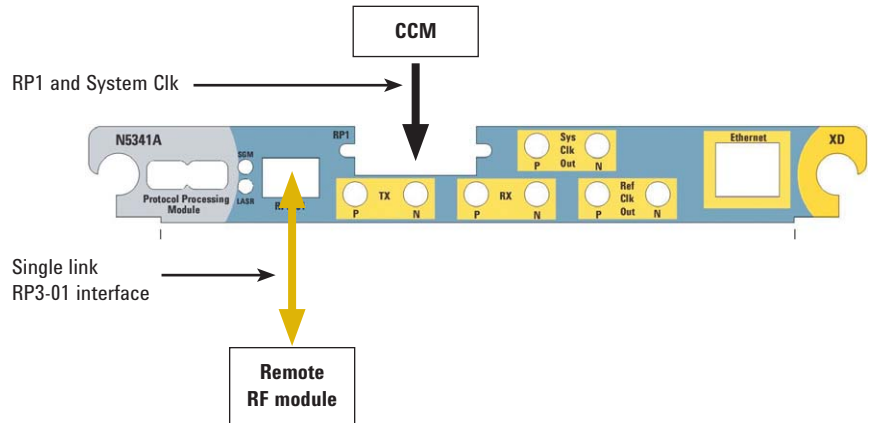
## N5340A Base Station Test Extension Module



# Typical Configurations

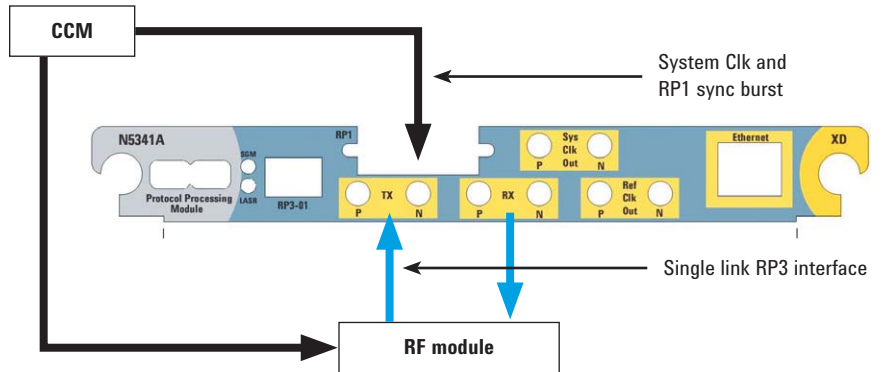
## Remote RF module validation

- 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

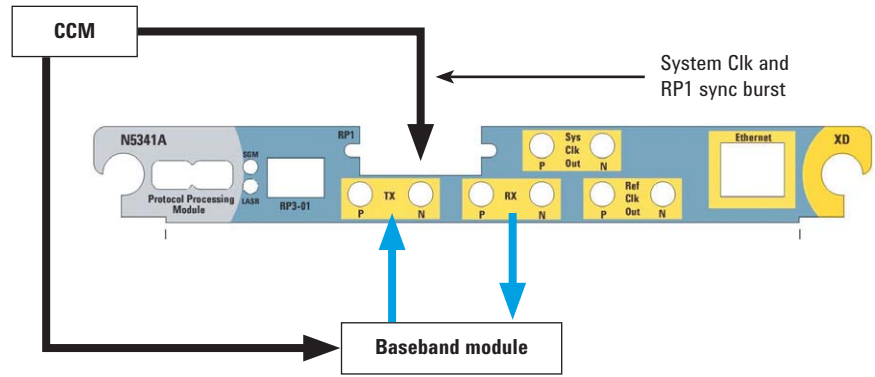
- In this mode, the Agilent N5341A Base Station Link Test Module emulates a baseband module connected to the RF module through the RP3 interface and the RP1 interface.
- If multiple RP3 links are required, the N5340A test extension module will add up to 4 RP3 links to the current configuration.
- The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



# Typical Configurations

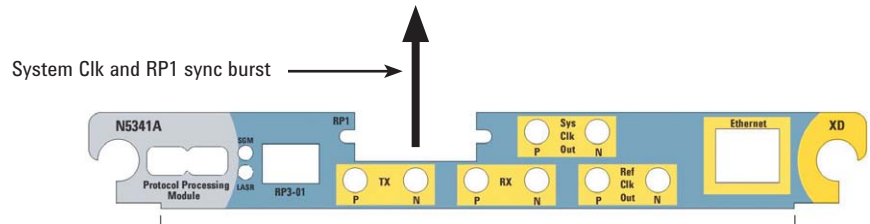
## Baseband module test

- 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

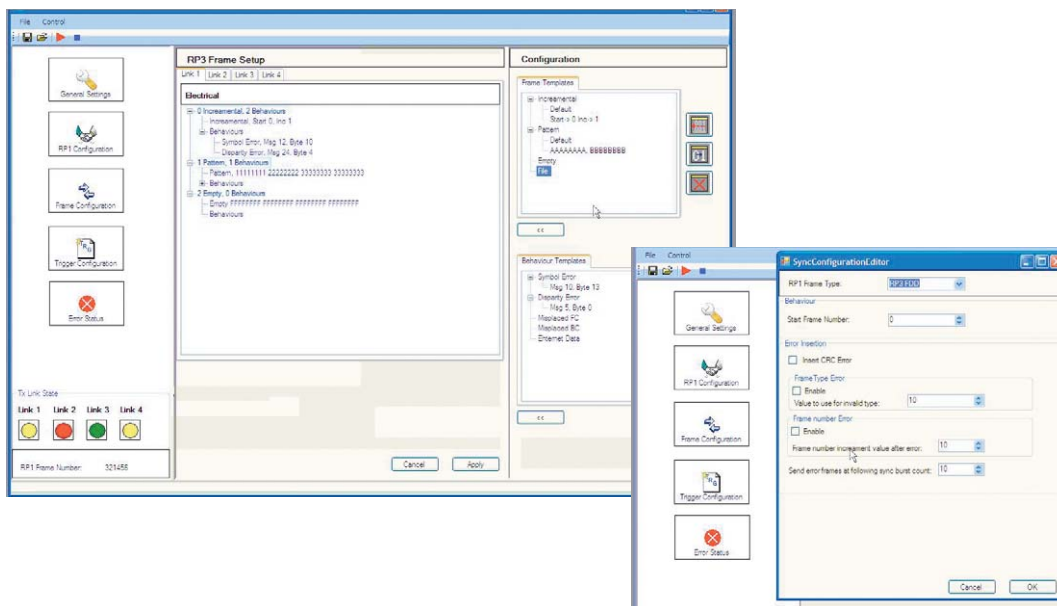
## Validate boundary conditions of your devices and components

## 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**

# Agilent N5341A/N5340A Features and Specifications

RP3 transmitter	Value
Line rate	768/1536/3072 Mbaud $\pm$ 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 $\pm$ 5%

RP3 receiver	Value
Line rate	768/1536/3072 Mbaud $\pm$ 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)

<b>Ethernet characteristics</b>	<b>Value</b>
Connector	RJ45
Speed	10 M/100 M

<b>Performance specifications</b>	<b>Value</b>
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)

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

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

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

<b>Environment</b>	<b>Value</b>
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

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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

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## General characteristics

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

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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)
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# 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
<i>Chassis</i>	
N5540A	2-slot, 2U high chassis
N5541A	4-slot, 2U high chassis
<i>Test cards</i>	
<b>N5341A</b>	<b>Base Station Link Test Module</b>
Option P01	RP3 emulation (required option)
Option E01	Wimax emulation license
Option E02	LTE emulation license
<b>N5340A</b>	<b>Base Station Test Module Extension</b>
Option P01	RP3 emulation (required option)
Option E01	Wimax emulation license
Option E02	LTE emulation license
<b>N5349A</b>	<b>Upgrade Kit for N5340A and N5341A</b>
Option E01	Wimax emulation license
Option E02	LTE emulation license

## Related literature

Publication title	Publication type	Publication number
<i>Agilent 16800 Series Portable Logic Analyzers</i>	Data sheet	5989-5063EN
<i>Agilent 16900 Series Logic Analysis Mainframes</i>	Data sheet	5989-0421EN
<i>Probing Solutions for Agilent Technologies Logic Analyzers</i>	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](http://www.lxistandard.org)  
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