8 Reasons to Migrate from HP/Agilent 856xE/EC Spectrum Analyzers to Agilent X-Series Signal Analyzers (PXA/MXA/EXA)

Building upon a tradition of excellence with leading-edge innovation

- Easier migration with backward compatibilities
- Industry-leading measurement speed
- Superior amplitude accuracy
- Increased sensitivity and dynamic range
- Improved selectivity and accuracy with all-digital IF
- Enhanced usability with modern user interfaces
- Broader offering of measurement applications
- Simpler and more robust data sanitization for security

Agilent Technologies

Table of Contents

Overview

Agilent X-Series

The Agilent X-Series is an evolutionary approach to signal analysis that spans instrumentation, measurements and software. To learn more about the X-Series, visit:

www.agilent.com/find/x-series
www.agilent.com/find/x-series_apps

Since their introduction more than a decade ago, the HP/Agilent 856xE/EC spectrum analyzers have been widely adopted in the industry for a variety of signal analysis applications. Built on this tradition of excellence, Agilent's X-Series signal analyzers (PXA/MXA/EXA) are setting the new industry standards in signal analysis with leading-edge technology innovations. In particular, the mid-performance MXA signal analyzer, has been the leading choice by 856x customers as a replacement analyzer for the 856xE/EC. Additionally, the 856xE/EC customers can also greatly benefit from the future-ready, leading performance PXA for meeting increasingly challenging market demands; or from the economic-class EXA for speeding up signal analysis within tightening budgets.

Move forward in achieving the next level of productivity by migrating from legacy 856xE/EC instruments to the X-Series signal analyzers. The MXA offers significantly higher measurement speed, increased measurement accuracy, enhanced usability, the convenience of remote language backward compatibility, and 2-year recommended calibration cycle all of which will help you gain and keep the competitive edge.

The intent of this document is to help 856xE/EC customers understand how the Agilent X-Series signal analyzers can improve their signal analysis environments. In general, when considering instrument migration, the most important concerns include "Form, Fit, and Function" replacement. "Form" refers to physical dimension compatibility, which is covered on pages 3-4; "Function" relates to the backward programming language compatibility, which is presented on page 3; and "Fit" implies comparability of specifications and applications, which is addressed throughout this document.

Agilent's Instrument Migration and Planning Services (IMPS) program assists you in removing barriers to meeting your test requirements as you transition to Agilent's modern instruments. For more information, please visit **www.agilent.com/find/techrefresh.**

1 Easier Migration with Backward Compatibilities

Remote language compatibility

Remote language compatibility (RLC) becomes particularly critical when considering the MXA/PXA/EXA as a replacement of the 856xE/EC in an automated test environment (ATE). A better RLC offering results in less effort re-programming and a smaller reinvestment for the replacement of the instrument.

The 856xE/EC employed a very instrument-specific command set for remote programming, whereas the MXA/PXA/EXA uses the SCPI commands (standard commands for programming instruments, part of the IEEE-488-2 standard). An RLC application software available for the X-Series signal analyzer (N9061A-2FP) provides a bridge between the legacy 856xE/EC remote programming and the SCPI programming. The X-Series N9061A-2FP RLC application supports the 856xE/EC programming commands that are most frequently used to emulate the behaviors of the 856xE/EC in your remote programming environment. With the N9061A-2FP RLC application, your legacy 856xE/EC remote programs can communicate seamlessly with the X-Series signal analyzers.

Figure 1. Activating the N9061A-2FP measurement application enables the MXA to emulate the 856xE/EC behaviors in a remote programming environment

Physical dimensions and weight comparison

Physical parameters of an instrument, such as dimension or weight, may also become a concern, particularly when the 856xE/EC to be replaced is in a rack-mounted cabinet or in a portable working environment. The following table compares the physical dimension and weight among the 856xEC, the MXA/EXA, and the PXA.

Table 1. Comparisons of dimension and weight among the 856xEC, the MXA/EXA, and the PXA

	856xEC	MXA/EXA	PXA
Dimension (WxHxD)	337 mm x 187 mm x 461 mm	426 mm x 177 mm x 368 mm	426 mm x 177 mm x 556 mm
Dimension with rack[1]	1 full 5-U in 19 inch chassis	1 full 4-U in 19 inch chassis	1 full 4-U in 19 inch chassis
Weight	16.5 kg (36 lb)	16 kg (35 lb)	22 kg (48 lb)

1. Requires an optional rack mount kit.

The following figures show the physical dimensions for the 856xE/EC and the MXA/EXA in portable configuration.

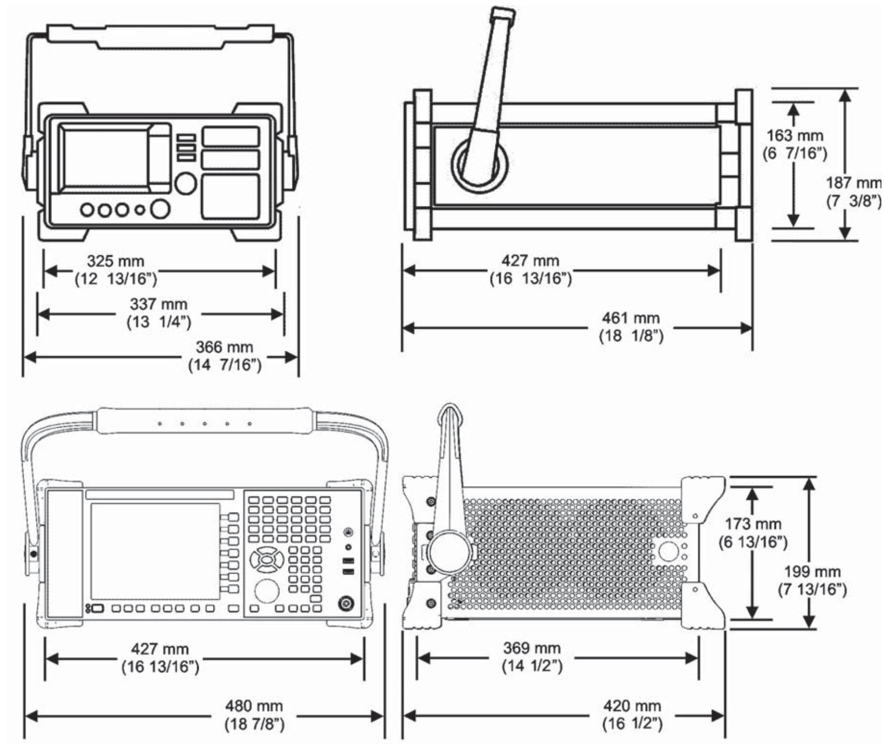

Figure 2. Physical dimensions of 856xE/EC (above) and the MXA /EXA with optional portable configuration (below).

When installed in an instrument chassis, the 856xE/EC requires Option 908 (without handle and fringe) or 909 (with handle and fringe) as the rack mount mechanism. With Option 908 or 909, the 856xE/EC occupies a full 5-rack-unit (5-U) in a 19-inch chassis, which is one rack-unit higher than the MXA/EXA with its own rack mount kit. Therefore, the MXA/EXA can easily fit into the space that used to accommodate the 856xE/EC. The PXA has the same height and width as the MXA/EXA, but is about 187 mm longer in depth to accommodate 7 extra slots for upgrades.

The MXA/EXA weighs slightly less than the 856xE/EC. Order the portable configuration (Option PRC) to add a pivoting handle and protective rubber corners to an MXA/EXA, which makes it more suitable for a portable working environment (Figure 3).

Figure 3. An MXA /EXA with the portable configuration option (Option PRC).

Comparison of RF and microwave frequency coverage

In the RF and microwave range, the X-Series in general has wider frequency coverage than the 856xE/EC (Table 2). The MXA features 20 Hz starting frequency as standard, whereas the 856xE/EC starts at 30 Hz (the 8563E/EC starts at 9 kHz unless an Option 006 is installed). Furthermore, the PXA starts at 3 Hz, and the EXA, 9 kHz. The maximum frequency coverage for the MXA/EXA is 26.5 GHz and 50 GHz for the PXA. The external mixing feature offered by 856xE/EC (as standard) or PXA (optional) with supported external mixers extends frequency coverage beyond 50 GHz.

Table 2. Comparison of RF/microwave frequency coverage.

Model-option	Frequency range
8560E/EC	30 Hz to 2.9 GHz
EXA N9010A-503	9 kHz to 3.6 GHz
MXA N9020A-503	20 Hz to 3.6 GHz
PXA N9030A-503	3 Hz to 3.6 GHz
8561E/EC	30 Hz to 6.5 GHz
EXA N9010A-507	9 kHz to 7.0 GHz
MXA N9020A-508	20 Hz to 8.4 GHz
PXA N9030A-508	3 Hz to 8.4 GHz
8562E/EC	30 Hz to 13.2 GHz
EXA N9010A-513	9 kHz to 13.6 GHz
MXA N9020A-513	20 Hz to 13.6 GHz
PXA N9030A-513	3 Hz to 13.6 GHz
8563E/EC-006	30 Hz to 26.5 GHz
EXA N9010A-526	9 kHz to 26.5 GHz
MXA N9020A-526	20 Hz to 26.5 GHz
PXA N9030A-526	3 Hz to 26.5 GHz
8564E/EC-006	30 Hz to 40 GHz
PXA N9030A-544	3 Hz to 44 GHz
8565E/EC-006	30 Hz to 50 GHz
PXA N9030A-550	3 Hz to 50 GHz

Comparison of hardware options and features

The following table (Table 3) provides a comparison of the hardware options and features in the 856xE/EC and MXA, along with the PXA and EXA. Unlike the 856xE/EC, which offers input attenuation at 10 dB/step, the MXA/PXA includes a 2 dB/step mechanical attenuator standard (Optional for the EXA). Furthermore, an optional electronic attenuator (Option EA3), which steps at 1 dB, is also available for the MXA/PXA/EXA. This enables MXA/PXA/EXA users to optimize the input mixer level to achieve the best possible dynamic range. Additionally, the MXA/PXA offers optional built-in preamplifiers which cover the entire frequency range of the analyzer to achieve the best measurement sensitivity. In contrast, the 856xE/EC does not offer an internal preamplifier.

Table 3. Comparisons of hardware options and features

Option	856x	MXA	PXA	EXA
Input attenuator	Standard mechanical	Standard mechanical	Standard mechanical	Standard mechanical
	70 dB (10 dB/step) - RF/mW	70 dB (2 dB/step)		60 dB (10 dB/step)
				60 dB (2 dB/step) w/ Option FSA
	Electronic attenuator	Electronic attenuator, Option EA3		
	N/A	24 dB (1 dB/step), up to 3.6 GHz		
Preamplifier	Optional - External only	Internal preamp option to the max frequency of analyzer		Internal preamp option to 7 GHz
External mixing	Standard	N/A	Option EXM	N/A
Power Suite	Two standard measurements	Up to 10 standard measurements		
Precision freq ref (Ext ref in range)	Standard	Option PFR	Standard	Option PFR
1 Hz RBW	Standard	Standard	Standard	Standard
Time gating	Standard	Standard	Standard	Standard
ACP DR extension	Option 8563E-E35	Standard	Standard	N/A
Remote connectivity	GPIB - Standard Option B70 - Benchlink SA SW	1,000 base-T LAN -standard		
		GPIB/USB 2.0 -standard; Remote Desktop and Embedded Web Server, standard.		
Security option	Procedure available	Standard removable hard drive, or optional solid state drive		

2

Industry-Leading Measurement Speed

With the increasing pressure to be first-to-market and reduce costs, your legacy test equipment may face tougher measurement speed challenges than ever before. In a world of high-volume manufacturing, every millisecond counts. Replacing your 856xE/EC with the MXA/EXA, or PXA signal analyzer can help you make the productivity gains necessary to stay competitive. The MXA and PXA are equipped with a 2 GHz dual-core CPU as a standard feature (optional for EXA), making the MXA/PXA/EXA stand out as the measurement speed benchmarks among in-class signal and spectrum analyzers. Some key characteristics of measurement speed for the MXA are listed as follows,

- < 1.5 ms marker peak search
- < 20 ms tune, measure, and transfer over GPIB
- < 39 ms measurement/mode switch
- < 14 ms W-CDMA ACLR fast mode measurement speed (σ = 0.2 dB)

More specifically, when compared with the 856xE/EC, the MXA excels significantly in the measurement speed. Figures 4a and 4b compare the sweep time for a 13.2 GHz full span under the same measurement conditions. Under these conditions, the 856xEC took more than 10 times longer than the MXA to complete a single sweep.

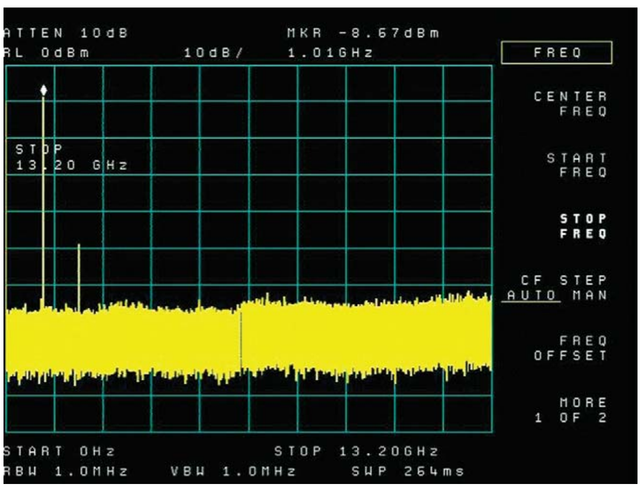

Figure 4a. The 8562 EC takes 260 ms for a full span of 13.2 GHz sweep (RBW=VBW=1 MHz).

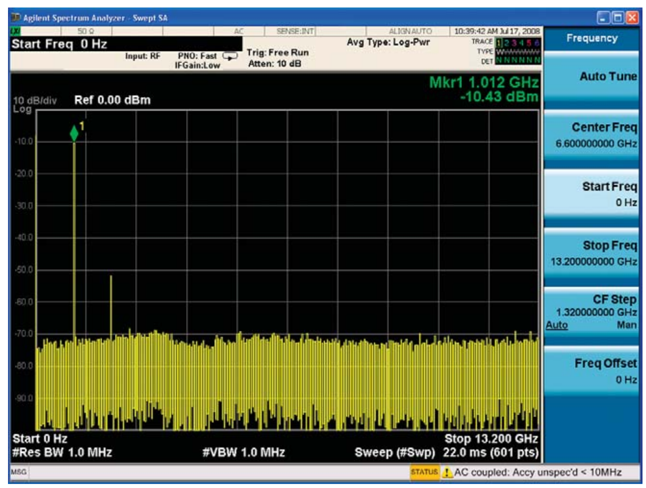

Figure 4b. The MXA only takes 22 ms for a full span of 13.2 GHz sweep (RBW=VBW=1 MHz).

In addition, when the RBW needs to be narrower (for example, in order to gain more sensitivity for small signal detection), the sweep type can be set to "FFT" in the X-Series signal analyzers to shorten the sweep time further. For instance, at 3 kHz of RBW, the 856xEC takes 280 seconds to complete a 1 GHz span, whereas the MXA in the "FFT" mode only takes 8.2 seconds. This drastic savings in sweep time is especially beneficial to the applications, like spur search, which require narrower RBW to detect very low level of signals across a very wide frequency range.

3

Superior Amplitude Accuracy

Improved measurement accuracy translates to enhanced productivity. In manufacturing settings, customers at production lines or rework stations will be able to set more stringent pass/fail criteria using test equipment with higher measurement accuracy. This will diminish "false-positive" test results and yield more products which meet defined specification. In R&D environments, customers will gain more confidence in their designs by using higher accuracy test equipment, thus maximizing productivity.

The MXA/PXA signal analyzer offers significantly better amplitude accuracy compared to the 856xE/EC. The following table (Table 4) compares frequency response specifications that are the primary contributing factor to the instrument's amplitude accuracy.

Table 4. Frequency response in ±dB (relative/typical relative)[1]

Frequency band	8560EC	8561EC	8562EC	8563EC	MXA	RF/μW PXA	8564EC	8565EC	mmW PXA
30 Hz to 2.9 GHz	1.0/0.8	1.0/0.7	1.25/0.8	1.25/0.8	0.6/0.28	0.35/0.16	1.0/0.8	1.0/0.8	0.35/0.15
2.9 to 6.46 GHz		1.5/1.1	1.5/1	1.5/1	1.5/0.48	1.5/0.39	1.7/1.4	1.7/1.4	1.7/0.7
6.46 to 13.2 GHz			2.2/1.5	2.2/1.5	2.0/0.47	2.0/0.45	2.6/2.2	2.6/2.2	2.0/0.54
13.2 to 22 GHz				2.5/1.5	2.0/0.52	2.0/0.62	2.5/2.5	2.5/2.5	2.0/0.72
22 to 26.8 GHz				3.3/2.2	2.5/0.71	2.5/0.82	3.3/2.2	3.3/2.2	2.5/0.71
26.8 to 31.15 GHz							3.1/2.9	3.1/2.9	2.5/0.93
31.15 to 40 GHz							2.6/2.4	3.2/3.0	3.2/1.24
40 to 50 GHz								3.2/3.0	3.2/1.24

1. The MXA/PXA frequency bands are defined differently from the 856x when specifying the frequency responses; refer to the MXA/PXA data sheet for more details

The overall absolute amplitude accuracy at a reference of 50 MHz is ±0.33 dB for the MXA, and ±0.24 dB for the PXA. Furthermore, the typical performance level based on a 2 sigma value (95%) for the absolute amplitude accuracy is ±0.23 across the frequency range between 20 Hz and 3.6 GHz for the MXA and ±0.19 dB for the PXA— this sets the MXA and PXA apart from other signal analyzers. When calculating the overall amplitude accuracy of the 856xE/EC, additional terms, such as IF gain uncertainty and IF alignment uncertainty, will need to be considered for a complete error analysis. These terms of amplitude uncertainty are eliminated in the X-Series by the "all-digital IF." Additionally, the logarithmic amplifier implemented in the 856xE/EC is eliminated from the signal path in the X-Series. This results in superior display linearity and completely removes the uncertainty contributed by the impaired "log fidelity" due to use of the logarithmic amplifier.

4

Increased Sensitivity and Dynamic Range

Increased sensitivity

When measuring very low level signals, such as spurs, the sensitivity of the signal analyzer becomes more critical. The displayed average noise level (DANL) is the indication of the analyzer's sensitivity. The MXA offers excellent DANL performance because of its optional built-in low-noise, high-gain preamplifiers. Further, the Agilent-exclusive noise floor extension (NFE), along with the internal preamplifier, enables the high-performance PXA to offer extraordinary low DANL, allowing user to detect extremely weak signals. The optional preamplifiers cover frequencies up to the maximum frequency of the MXA/PXA.

The comparison table below indicates that the DANL performance of the MXA with preamplifier is over 10 dB better than that of the 856xEC. Without the preamplifier, the MXA's DANL performance is comparable, even slightly better, to that of the 856xEC.

Table 5. DANL performance (RBW= 1 Hz) comparisons among 856x and MXA/PXA, in dBm[1]

Frequency	8560EC	8561EC	8562EC	8563EC	MXA	RF/µW PXA	8564/65EC	mmW PXA
10 MHz	-140	-140	-140	-140	-150 (-161)	-155 (-164)	-140	-155 (-164)
2.9 GHz	-151	-145	-151	-149	-149 (-162)	-162 (-172)	-145	-162 (-172)
6 GHz		-145	-148	-148	-149 (-162)	-158 (-172)	-147	-151 (-165)
13 GHz			-145	-145	-148 (-162)	-157 (-170)	-143	-152 (-165)
17 GHz				-140	-144 (-159)	-152 (-166)	-140	-152 (-165)
20 GHz				-140	-143 (-157)	-145 (-162)	-140	-149 (-163)
26.5 GHz				-139	-136 (-152)	-145 (-162)	-136	-149 (-163)
31 GHz							-139	-144 (-160)
40 GHz							-130	-144 (-160)
50 GHz							-127	-139 (-154)

1. Refer to the 856x and MXA/PXA data sheets for more details; the 856xE/EC instruments do not offer the built-in preamplifier, whereas the MXA/PXA provides preamplifier options. The DANL values in parentheses are for conditions with preamp on. PXA DANL performance specs are "effective DANL" at the middle of corresponding frequency bands. Refer to the PXA specification guide for (N9030-90017) for details.

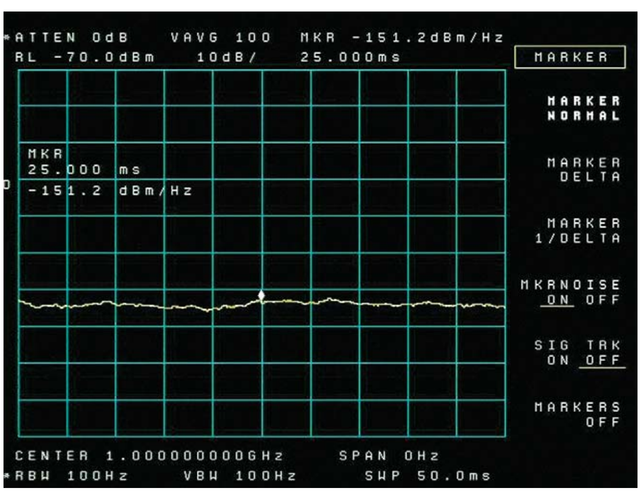

Figure 5a. In a DANL comparison, an 8562EC shows -152.6 dBm DANL normalized to RBW of 1 Hz.

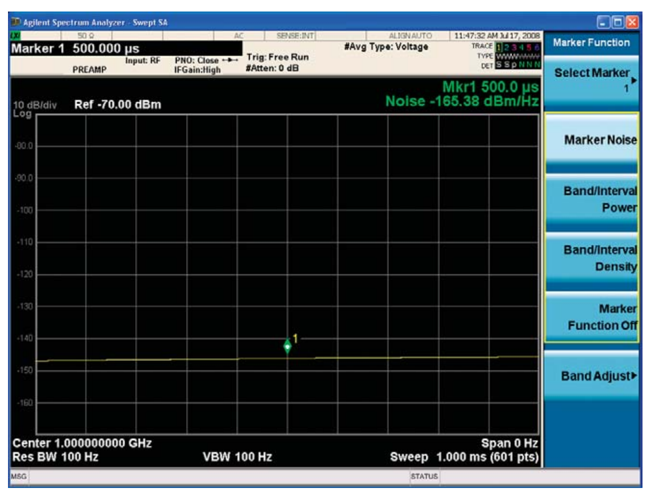

Figure 5b. An MXA shows -165.38 dBm DANL normalized to RBW of 1 Hz, with the preamplifier on.

Superior dynamic range

A signal analyzer's dynamic range determines its ability to measure lower level signals next to higher power signals with negligible distortion. The best dynamic range is achieved with the lowest DANL, combined with the highest third-order intercept point (TOI). A comparison of third-order dynamic range for the 856xE/EC and MXA/PXA analyzers is shown in the following table.

Table 6. Third-order dynamic range comparisons among 856x and MXA/PXA[1]

Frequency	8560EC	8561EC	8562EC	8563EC	MXA	RF/µW PXA	8564/65EC	mmW PXA
10 MHz	108 dB	103 dB	108 dB	107 dB	108 dB	112 dB	104 dB	112 dB
2.9 GHz	108 dB	103 dB	108 dB	107 dB	110 dB	115 dB	108 dB	115 dB
6 GHz		107 dB	108.5 dB	108.5 dB	109.3 dB	108 dB	108 dB	108 dB
13 GHz			101.5 dB	101.5 dB	108.6 dB	109.3 dB	100 dB	108 dB
17 GHz				98 dB	102.6 dB	102.6 dB	98 dB	104 dB
20 GHz				98 dB	102 dB	102 dB	95.5 dB	101 dB
26.5 GHz				95 dB	97.3 dB	98 dB	95.5 dB	99 dB
31 GHz							101 dB (nom.)	101 dB (nom.)
40 GHz							95 dB (nom.)	97 dB (nom.)
50 GHz							93 dB (nom.)	94 dB (nom.)

1. The third-order dynamic range is calculated by 2/3*(TOI-DANL). The PXA values are calculated without NFE being enabled for DANL.

This table reveals that the third-order dynamic range specifications of the MXA are either comparable or superior to that of 856xE/EC, depending upon the frequency range. Additionally, the MXA features a standard 2 dB mechanical step attenuator (and optional 1 dB electronic attenuator), as compared to the 10 dB/step attenuator used in the 856xE/EC, making it much easier to fine-tune the analyzer's mixer level setting to achieve the best usable dynamic range. If your signal analysis task demands frequency coverage above 26.5 GHz, consider the PXA.

5

Improved Selectivity and Accuracy with All-Digital IF

160 choices of RBW settings from 1 Hz to 8 MHz

The set of resolution bandwidth (RBW) filters determines the resolving power of the spectrum/signal analyzer for unequal signals that are close to each other in frequency domain (selectivity). The narrower the RBW setting, the higher the selectivity of a spectrum/signal analyzer. However, choosing a narrower RBW can significantly slow down the measurement speed in an analyzer's swept tuned mode.

Both the 856xE/EC and the X-Series offer resolution bandwidth (RBW) filters as narrow as 1 Hz to achieve the maximum frequency resolution. The 856xE/EC have RBW steps in a 1-3-10 sequence from 1 Hz to 1 MHz, whereas the X-Series has RBW increments at 10% a step from 1 Hz to 3 MHz. There is a total of 160 RBW settings in the X-Series, compared to 14 RBW settings in the 856xE/EC, allowing users to optimize the trade-off between selectivity and measurement speed.

Superb selectivity and RBW accuracy

Unlike the 856xE/EC, in which the digital RBW filters are only in the narrowest bandwidth (1 Hz through 100 Hz) and the remaining RBW filters are analog, the X-Series has all its 160 RBW filters (1 Hz through 8 MHz) digitally implemented. With all-digital processing, the X-Series's IF specifications, including the RBW performance, improved significantly compared to the 856xE/EC (Table 7).

Table 7. RBW performance comparison

	856xE/EC	MXA	PXA
Selectivity (-60 dB/-3 dB)			
RBW ≥ 300 Hz	<15:1	4.1:1 for all RBW settings	
RBW ≤ 100 Hz	<5:1		
Range (-3 dB)	1 Hz to 1 MHz in a 1, 3, 10 sequence, and 2 MHz (3 MHz at -6 dB), 14 choices	1 Hz to 3 MHz (10% steps), 4, 5, 6, 8 MHz, 160 choices	
RBW Accuracy (-3 dB)		nominal	
1 Hz to 300 kHz	±10%	±2%	
1 MHz	±25%	±8%	
2 MHz	+50%, -25%	±20%	

Consistent shape factor at 4.1:1 ratio

All of the RBW settings in the X-Series have an identical shape factor at 4.1:1 ratio (-60 dB/-3 dB). In contrast, the RBW filters beyond 100 Hz used in the 856xE/EC, due to its analog nature, have a shape factor of 15:1 ratio. The smaller the shape factor, the sharper the RBW filter frequency response curves (that is, the narrower skirt at the bottom). The sharper RBW filter shape used in the X-Series effectively separates a small signal that is close to a larger signal in frequency domain (Figures 4a and 4b) without having to select narrower resolution bandwidth and sacrificing measurement speed.

Improved RBW accuracy

Because of the all-digital implementation, every RBW filter used in the X-Series has identical characteristics, ensuring that no additional errors contribute to the overall IF amplitude accuracy. The improvement of the RBW accuracy in the MXA/PXA can be seen in Table 6. Furthermore, the all-digital RBW filtering eliminates the RBW switching uncertainty—one of the contributing error factors in the 856xE/EC.

Improved speed

The digitally implemented RBW filters used in the X-Series, based on the FFT analysis and digital circuitry, have significant speed advantages (2.5 to 4 times faster) over the analog RBW filters in the 856xE/EC, which are LC-crystal-filter-based and take time to charge and discharge. Refer to Figures 6a and 6b to compare the implementation time between the MXA and the 856xEC, as indicated at lower right corner of the screens, under the same conditions.

Figure 6a. Testing a 2.5% depth AM signal with an MXA (RBW=VBW=3 kHz), the AM sideband can be clearly seen (at Marker 1Δ2).

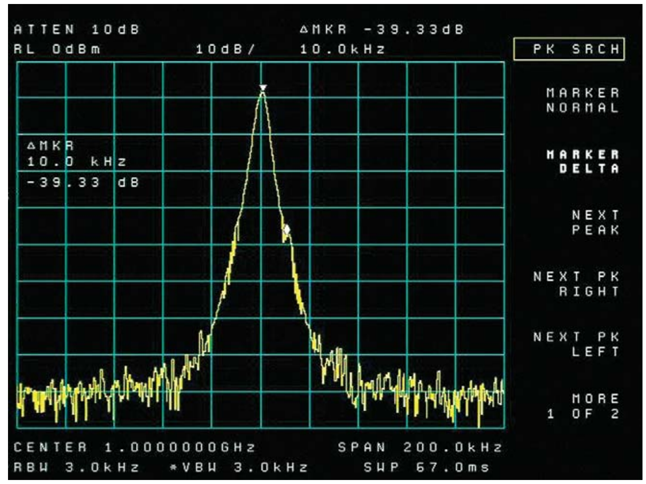

Figure 6b. Testing the same signal as in 7a with an 8562EC (RBW=VBW=3 KHz), the AM sideband is covered by the RBW skirt and cannot be detected.

6

Enhanced Usability with Modern User Interfaces

Open Windows® operating system and embedded online help

The Agilent X-Series signal analyzers are built in the Open Windows operating system (OS) environment. This enables quick and easy file management with Windows Explorer. Also, the Windows environment allows the user to run MATLAB and the industry-leading 89600B vector signal analysis software inside the X-Series analyzer. Additionally, you can troubleshoot and control the X-Series analyzers via Windows Remote Desktop software or with the embedded Web server (LXI-C compliant).

Taking advantage of the Windows OS environments, the X-Series analyzers have a comprehensive context-sensitive help system available. If you have a question when operating the analyzer, you can simply press the "HELP" key on the front panel to get all the information you need—any key, any menu, at any time (Figure 7). By contrast, with an 856xE/EC, you would have to search for the answer to your question in the hard copy user's guides, a much less efficient process.

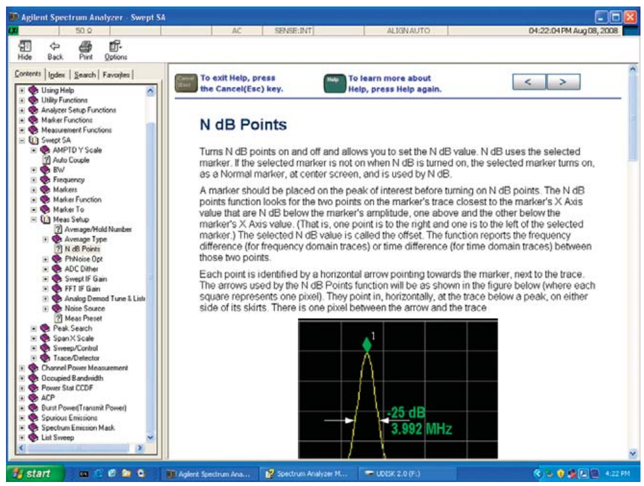

Figure 7. X-Series embedded online help provides a detailed user's guide for the measurement concepts, the definition of front-panel keys, and SCPI commands

Modern connectivity of the X-Series signal analyzers

There are seven USB 2.0 ports installed in an X-Series analyzer (6 type-A, and 1 type-B). A user can connect the analyzer to external peripherals such as a DVD drive, keyboard, mouse, and USB flash drive via the A-type USB ports, or acquire IQ wave-forms and control the analyzer remotely from an external PC over the B-type USB port. Using a USB flash drive, you can save the measurement data and easily transfer it from the analyzer to an external PC.

The LAN connectivity available 1000Base-T as standard for MXA/PXA/EXA, offers an easy and fast analyzer connection to your network environment. The X-Series analyzers are also LXI-compliant, further enabling fast, efficient, and cost-effective creation and reconfiguration of your test system.

Like most signal/spectrum analyzers in their classes, X-Series signal analyzers are also equipped with a GPIB (IEEE-488 bus) ports for the instrument remote control and data transfer. The GPIB port is the only data interface available for the 856xE/EC.

7

Broader Offering of Measurement Applications

In this increasingly competitive world, you must maximize productivity by minimizing equipment setup time and reducing operator errors. The X-Series measurement applications, similar to the measurement utilities in the 856xE/EC, will help you achieve this goal.

While the 856xE/EC only offers a few measurement utilities, such as 85671A phase noise and 85672A spurious response measurement, the X-Series signal analyzers support more than 25 measurement applications—and the number is still growing—that simplify the analyzer setup and meet a variety of measurement needs from traditional measurements like phase noise and noise figure to 2G/3G/3.9 G cellular standards, to the latest communication schemes such as LTE and WiMAX™. The scalability of the X-Series' software protects your investment for the testing needs of today and tomorrow.

In addition, with the industry's leading VSA software (Agilent 89600B) built into the analyzer, the X-Series is capable of supporting deep analysis of over 50 different modulation formats. If the X-Series user prefers the front-panel operations to the mouse-and-keyboard to control the VSA software, the VXA (N9064A) enables the VSA operations via the combination of the hard-/soft-keys on the front-panel of the X-Series. Similarly, the MATLAB software can also be installed into the X-Series, and the user can control the MATLAB functions via either the mouse/keyboard or front-panel keys.

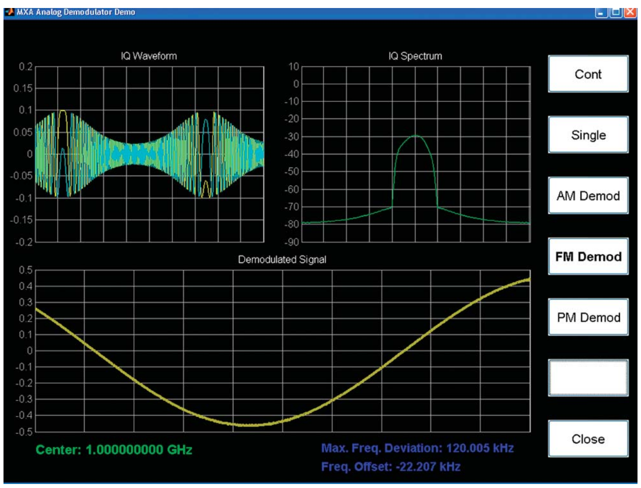

Figure 8. An MXA display for FM modulation analysis using the N6171A MATLAB interactive software.

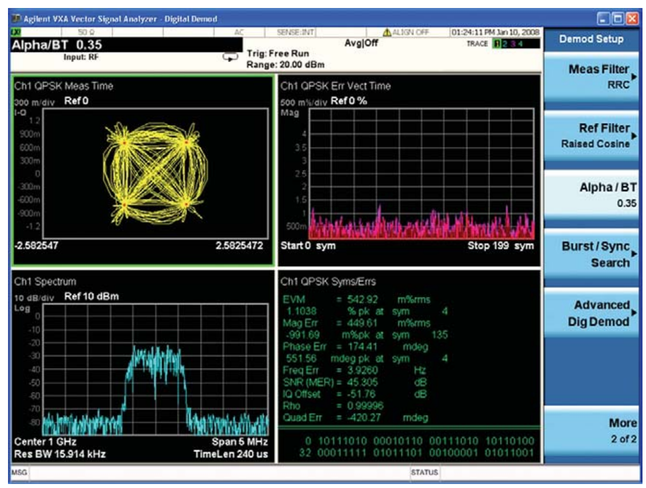

Figure 9. The N9064A VXA vector signal analyzer measurement application enables you to operate the vector signal analyzer via the front panel keys of the MXA.

Even though both the 856xE/EC and X-Series offer phase noise measurement capabilities, the X-Series N9068A phase noise measurement application performs phase noise measurements much faster and provides a more user-friendly interface than the 85671A phase noise utility in the 856xE/EC family.

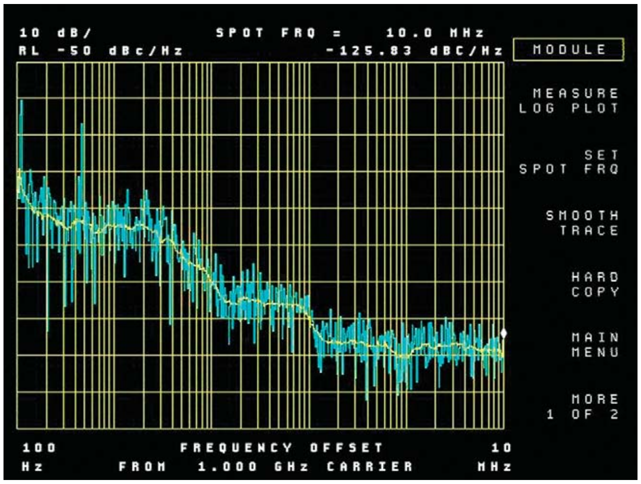

Figure 10a. Phase noise log plot obtained with 85671A phase noise utility installed in an 856xEC.

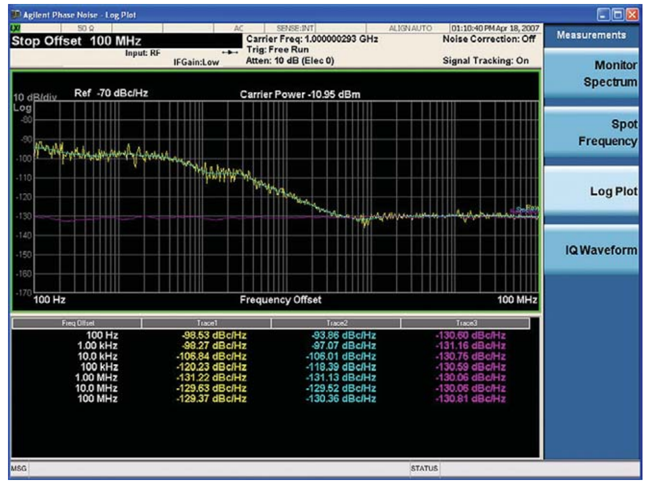

Figure 10b. Phase noise log plot obtained with N9068A phase noise measurement application in an MXA—much faster and easier to use than the 85671A.

The following table lists examples of the measurement applications available on the X-Series to simplify specialized measurements in a variety of applications.

Table 8. Examples of the X-Series measurement applications

Product	Description
N9061A	Remote language compatibility application
N9063A	Analog demodulation measurement application
N9068A	Phase noise measurement application
N9069A	Noise figure measurement application
N9071A	GSM/EDGE measurement application
N9072A	cdma2000® measurement application
N9073A	W-CDMA/HSPA measurement application
N9075A	802.16 OFDMA measurement application
N9076A	1xEV-DO measurement application
N9079A	TD-SCDMA/HSDPA/8PSK measurement application
N9080A	LTE FDD measurement application
N9082A	LTE-TDD measurement application
N6171A	MATLAB software for X-Series
89600B	Vector signal analysis software with the X-Series signal analyzers
N9064A	VXA vector signal analyzer measurement application
N6149A	iDEN/WiDEN/MotoTalk measurement application
N6153A	DVB/T/H measurement application
N6156A	DTMB measurement application
N9051A	Pulse measurement software
N6141A	EMI-precompliance measurement application

8

Simpler and More Robust Data Sanitization for Security

In many cases, particularly in the aerospace and defense industry, instrument security is an imperative requirement. An instrument will not be allowed to leave a secured (or classified) area unless it can be proven that all devices capable of maintaining memory have been thoroughly erased or secured.

The removable solid state drive (SSD) included in the X-Series offers a simple but effective way to meet the most stringent data sanitization requirements. A classified SSD includes non-volatile user sensitive data and needs to be retained in the secured area. Physically removing the classified SSD allows the analyzer to be safely transported to non-secured areas, such as a calibration/repair facility, without fear of leaking sensitive user information. An additional removable SSD (Option SSD) is imaged with the operating system (OS) and instrument software but contains no sensitive user data. When in a non-secured area, the analyzer equipped with this non-classified SSD remains fully functional. Figure 11 depicts how this works.

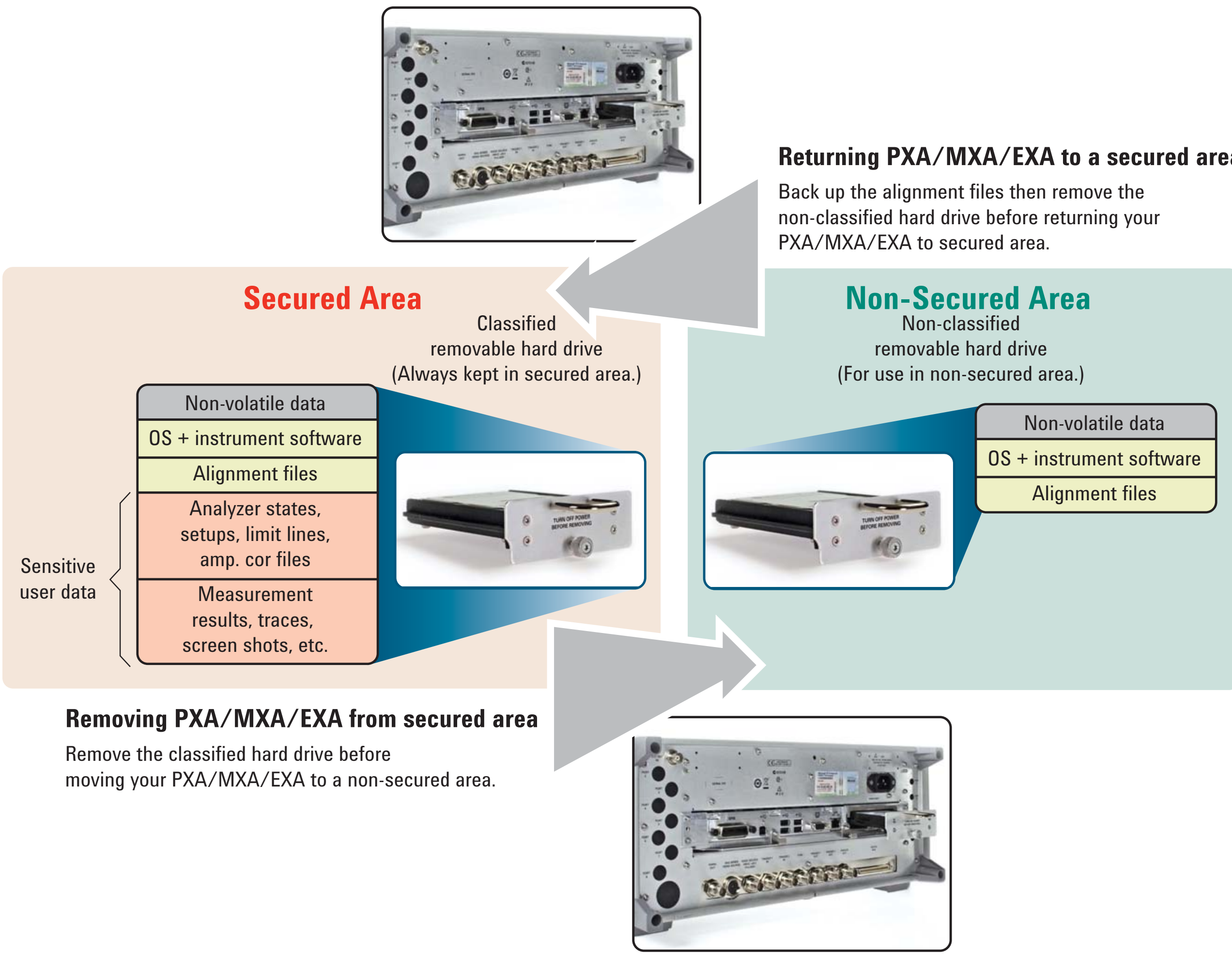

Figure 11. Data sanitization with removable hard drives in the X-Series

On the other hand, the 856xE/EC instrument security procedure involves removal and replacement of the controller board inside the instrument to meet the stringent sanitization standards. This is a more complex procedure, much more time consuming, and costly. Migrate your 856xE/EC to the PXA/MXA/EXA to minimize the cost and your instrument downtime, and maximize the effectiveness of your instrument security!

Appendices: Signal/ Spectrum Analyzer Comparison Tables

Agilent provides a wide range of the signal/spectrum analyzers to best meet customers' requirements for a variety of applications. The following appendices compare the key specifications and one-button power measurement capability among the high-performance spectrum analyzer (PSA), next-generation high-performance signal analyzer (PXA), mid-performance signal/spectrum analyzers (856xEC and MXA), and economy class signal/spectrum analyzers (EXA and ESA). Please refer to the data sheets of each analyzer for detailed specifications.

Appendix 1: Key specification comparisons between the 8563EC and other Agilent 26.5 GHz signal/spectrum analyzers

	8563EC	PSA (E4440A)	PXA (N9030A-526)	MXA (N9020A-526)	EXA (N9010A-526)	ESA (E4407B)
Minimum Frequency	30 Hz[1]	3 Hz	3 Hz	20 Hz	9 kHz	100 Hz[1]
Warm-up time	5 min	30 min	30 min	30 min	30 min	5 min
Phase noise at 1 GHz (10 kHz offset)	–113 dB/Hz	–116 dB/Hz	–129 dB/Hz	–103 dB/Hz	–99 dB/Hz	–98 dB/Hz
Max third-order dynamic range, 1 GHz	107 dB	113 dB	–116.6 dB	110 dB	108 dB	108 dB
Displayed average noise, 1 GHz	–151 dBm	–168 dBm[3]	–172 dBm[2, 3]	–163 dBm[3]	–161 dBm[3]	–153 dBm[3, 4]
Standard attenuator range/step	70 dB/10 dB	70 dB/2 dB	70 dB/2 dB	70 dB/2 dB	60 dB/10 dB	75 dB/5 dB
Overall amplitude accuracy at the low band	±1.9 dB	±0.62 dB	±0.59 dB	±0.78 dB	±1.0 dB	±1.0 dB
Resolution bandwidth	1 Hz to 2 MHz	1 Hz to 8 MHz	1 Hz to 8 MHz	1 Hz to 8 MHz	1 Hz to 8 MHz	1 Hz to 5 MHz

1. Option required for the low frequency extension.
2. With NFE turned on.
3. With optional built-in preamp.
4. Typical performance.

Appendix 2: Availability of one-button power measurement capabilities

	856xE/EC	PSA	PXA	MXA/EXA	ESA
Channel power	Yes	Yes	Yes	Yes	Yes
Occupied bandwidth	Yes	Yes	Yes	Yes	Yes
Multicarrier, multi-offset ACP	Yes[5]	Yes	Yes	Yes	Yes
Multicarrier power	Yes[5]	Yes	Yes	Yes	Yes
CCDF		Yes	Yes	Yes	Yes
Harmonic distortion	Yes[5]	Yes	Yes	Yes[6]	Yes
Burst power		Yes	Yes	Yes	Yes
Intermodulation (TOI)	Yes[5]	Yes	Yes	Yes[6]	Yes
Intermodulation emissions		Yes	Yes	Yes	Yes
Spectrum emission mask		Yes	Yes	Yes	Yes

5. Optional.
6. Requires FW rev. A.03.08 or later, and to upgrade the existing MXA/EXA, ordering Option N9060AK-4FP may be required.

www.agilent.com
www.agilent.com/find/xseries

Agilent Email Updates

www.agilent.com/find/emailupdates
Get the latest information on the products and applications you select.

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.

Agilent Channel Partners

www.agilent.com/find/channelpartners
Get the best of both worlds: Agilent's measurement expertise and product breadth, combined with channel partner convenience.

Web Resources

PXA signal analyzer:
www.agilent.com/find/pxa

MXA signal analyzer:
www.agilent.com/find/mxa

EXA signal analyzer:
www.agilent.com/find/exa

X-Series measurement applications:
www.agilent.com/find/x-series_apps

Agilent Advantage Services

Agilent Advantage Services is committed to your success throughout your equipment's lifetime. To keep you competitive, we continually invest in tools and processes that speed up calibration and repair and reduce your cost of ownership. You can also use Infoline Web Services to manage equipment and services more effectively. By sharing our measurement and service expertise, we help you create the products that change our world.

www.agilent.com/find/advantageservices

Agilent Electronic Measurement Group
DEKRA Certified
ISO 9001:2008
Quality Management System
www.agilent.com/quality

Windows is a registered trademark of Microsoft Corporation.

WiMAX is a U.S. trademark of the WiMAX Forum.

cdma2000 is a U.S. registered certification mark of the Telecommunications Industry Association.

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office. The complete list is available at:
www.agilent.com/find/contactus

Americas	
Canada	(877) 894 4414
Brazil	(11) 4197 3500
Mexico	01800 5064 800
United States	(800) 829 4444

Asia Pacific	
Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 375 8100

Europe & Middle East	
Belgium	32 (0) 2 404 93 40
Denmark	45 70 13 15 15
Finland	358 (0) 10 855 2100
France	0825 010 700*
	*0.125 €/minute
Germany	49 (0) 7031 464 6333
Ireland	1890 924 204
Israel	972-3-9288-504/544
Italy	39 02 92 60 8484
Netherlands	31 (0) 20 547 2111
Spain	34 (91) 631 3300
Sweden	0200-88 22 55
United Kingdom	44 (0) 131 452 0200

For other unlisted countries:
www.agilent.com/find/contactus
Revised: June 8, 2011

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

Published in USA, August 2, 2011
5989-9356EN

Agilent Technologies