Agilent E6392B GSM (GPRS) Mobile Station Test Set GSM900, DCS1800,PCS1900 Frequency Bands

Product Overview

The best-value solution for servicing GSM900, DCS1800,and PCS1900 mobile-phones — from inspection through module-level repair and after repair calibration

Versatility and performance

- Comprehensive tool sets for measuring dc current, RF spectrum, and more
- Flexibility for performing mobile station (MS) service tasks, from simple auto test for go/no-go inspection to manual test for detailed troubleshooting
- Accurate, reliable troubleshooting
- Adjustment capabilities after repair
- GSM/DCS dual-band handover testing
- Six TCH Channel for automatic testing
- Easy operation and intuitive interface
- Load and store test plans quickly on PCMCIA cards
- Firmware easily upgradable from the web or PCMCIA card
- Essential accessories, including cables and adapters, and shield box
- Point of service test software for flexible testing and database management
- Characterize the performance of GPRS capable mobiles over multi-slot configurations

Agilent Technologies

Designed for today and tomorrow 's mobile-phone repair needs

As a GSM (GPRS) service provider or mobile-phone repair organization, you face the challenge of servicing a rapidly growing industry. Worldwide, the number of GSM (GPRS) mobile-phones in use has increased dramatically — and so has the need for mobile-phone service and repair. To accommodate this need, you may be delegating more repair tasks to remote service centers. A key part of your new repair strategy includes equipping these remote service centers with test sets that are affordable, accurate, flexible, and easy-to-use. Furthermore, with GSM service providers aggressively rolling out GPRS services, now you can meet the potential repair demand for GPRS enabled wireless appliances with E6392B GSM MS test set's GPRS enhancement options (040).

Essential measurement capability

Agilent Technologies provides a solution designed for the changing mobile-phone repair environment. The Agilent E6392B GSM (GPRS) mobile station test set combines just- enough functionality, good performance, and an attractive low price. It lets you check the overall functionality of a mobile-phone — and it provides the essential measurement capability you need to diagnose and repair module-level faults.

The E6392B covers major GSM bands, including GSM900 DCS1800,and PCS1900. It also tests dual-mode and tri-band phones, including dual-band handovers. Six channels are available for automatic fixed-traffic-channel testing, which means that you can make up to five dual-mode handovers in one test.

To test GPRS-enabled mobiles, E6392B provides a base station emulator that enables the essential call-processing functions needed for testing transmitters and receivers.

It also allows multi-slot configurations for characterizing the performance of a GPRS wireless appliance over various operating conditions.

- GPRS measurements for transmitter and receiver testing, including block error ratio (BLER), and multi-slot power versus time (PvT)
- Multi-slot configurations, which allow you to characterize the performance of GPRS mobile over realistic configurations (2x1 for Option 040, downlink x uplink).
- Essential GSM (GPRS)measurements, including power, phase error and frequency error.

E6392B Option 040

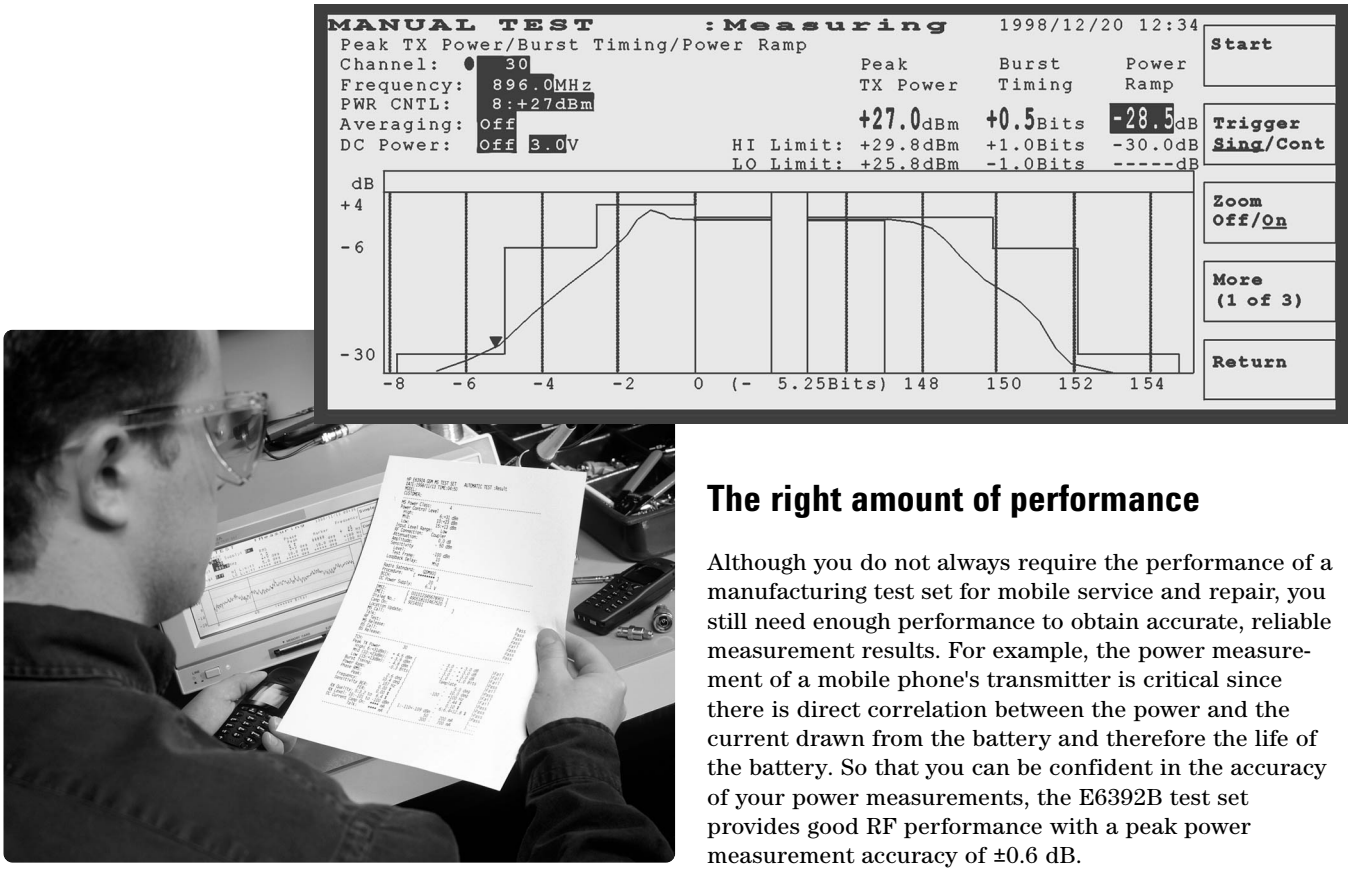
GPRS functionality

frequency band:	GSM900, DCS1800, and PCS1900
coding scheme:	CS-1
multislot configurations:	1x1, 2x1, (downlink x uplink)
control channels:	BCH on timeslot 0 on any ARFCN in any band.

GPRS call processing functionality
- mobile-initiated attach
- packet data transfers on uplink and downlink

GPRS transmitter measurements
- frequency error
- transmit power
- phase error
- power versus time (burst mask comparison)

GPRS receiver measurements
- multislot block error rate (BLER)



The right amount of performance

Although you do not always require the performance of a manufacturing test set for mobile service and repair, you still need enough performance to obtain accurate, reliable measurement results. For example, the power measurement of a mobile phone's transmitter is critical since there is direct correlation between the power and the current drawn from the battery and therefore the life of the battery. So that you can be confident in the accuracy of your power measurements, the E6392B test set provides good RF performance with a peak power measurement accuracy of ±0.6 dB.

Flexible with just-enough functionality

A first-level test set must be affordable. But price isn't the only factor in your decision. Today, your service centers require instruments with more than just "go/no-go" test capability. They need tools with enough functionality and flexibility to make quick inspections of overall mobile-phone performance, to locate mechanical and module faults, and to do module-level repairs.

Automatic and manual testing for greater efficiency

With a growing number of mobile-phones coming into the repair shops every month, you need to perform inspections quickly and thoroughly. The E6392B's automatic GSM (GPRS) measurements speed you through a comprehensive functionality check and provide consistent, repeatable results. If you spot a fault in a phone, the test set's manual measurement tools let you troubleshoot the problem to the mechanical or module level through changeable test parameters and make the necessary module replacements.

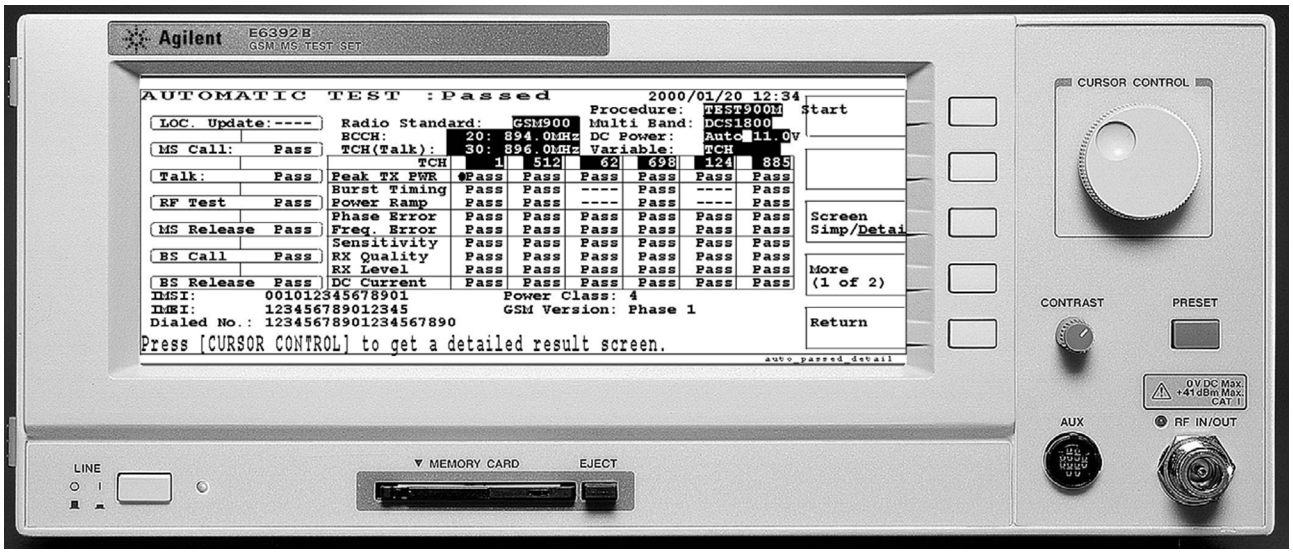
Fault-finding capability and more

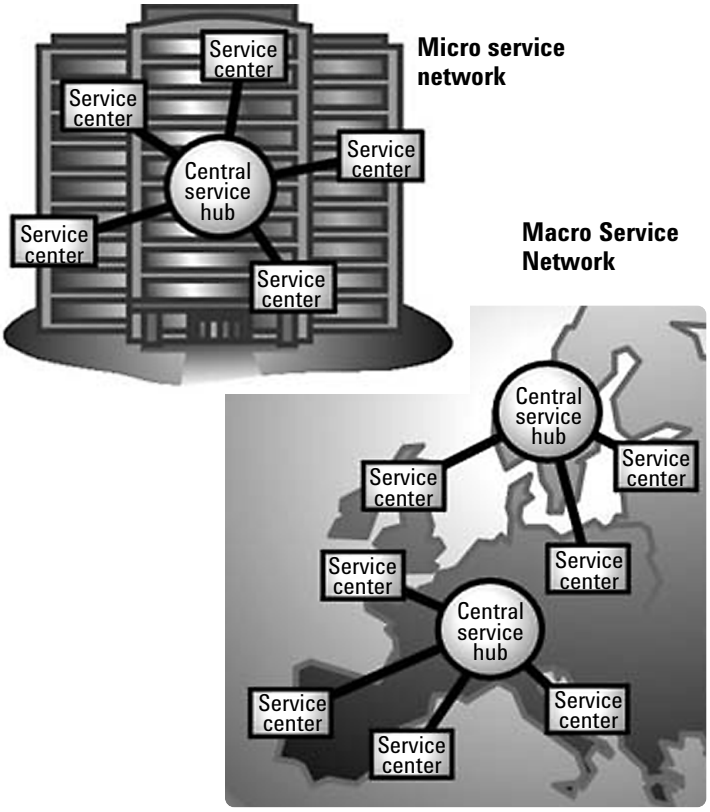
The E6392B includes a complete set of measurement tools for inspection, troubleshooting, repair of faulty modules and adjustment after repair. These tools include a power consumption check (dc current measurement), various transmitter/receiver measurements, and dc power supply. The test set also has an optional spectrum monitor, 0.5 dB-step signal generator, and asynchronous test mode for customers who want more troubleshooting capabilities.

After-repair adjustments

Equipped with an 11 Vdc source, the GSM (GPRS) mobile station test set can perform after-repair adjustments, such as calibration of battery charges, on many popular GSM (GPRS) phones.

You can use the manual async TX power test for transmitter calibration. For receiver calibration, use the signal generator to output a signal from the test set to the mobile phone. For modulation calibration, you can use the spectrum monitor to help measure the gain of the IQ signal.





Micro service network

Macro Service Network

With the hub-and-spoke* approach, use the low-end E6392B for incoming inspection, troubleshooting, and module level repair at remote "spoke" service centers and stations.

Component-level repairs can be made at the central "hub" service centers using the high-end 8960 series test set for manufacturing-quality measurements, troubleshooting, failure analysis, and final checkout.

The foundation of a cost-effective service-repair strategy

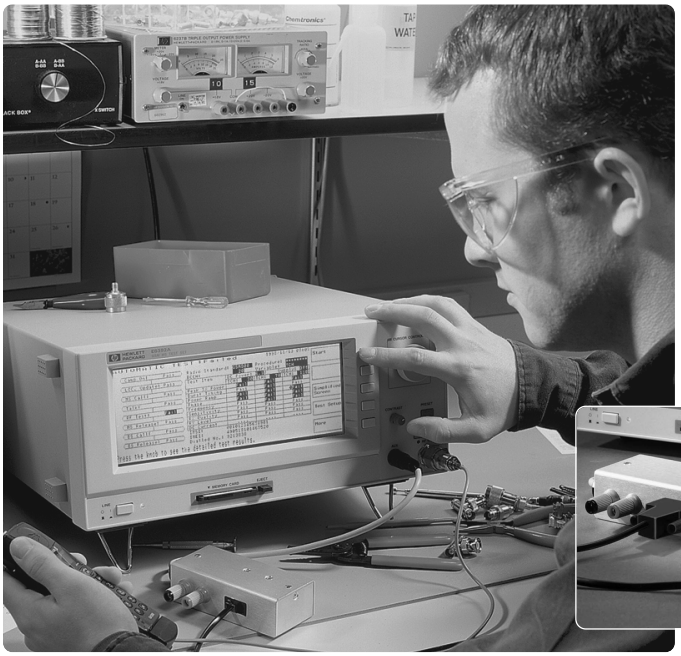
To optimize a distributed repair strategy and facilitate fast turnaround of mobile-phone repairs, you can combine the cost advantages of the E6392B with the factory-level quality of the 8960 series GSM (GPRS) mobile station test set.

Following a hub-and-spoke approach, you can delegate module-level repairs to remote (spoke) service centers, using the low-end E6392B for incoming inspection, troubleshooting, and repair of the mobile-phones. With this test set's economical price, you will want to put one on every test bench!

Component-level repairs can be made at central hub service centers using the low-end test set for incoming inspection, and the high-end 8960 series test set for manufacturing-quality measurements, troubleshooting, failure analysis, and final checkout.

*Spoke service centers and stations = Low-end phone test solution with the E6392B

Hub service centers = High-end board and phone calibration solution with the 8922 series, in conjunction with the E6392B



Useful accessories

When speed and convenience count, it's important to have the right test accessories within easy reach. For example, you'll want the correct RF cable to connect the test set to the mobile-phone's hand set. Agilent offers a growing family of optional accessories for the new GSM (GPRS) test set that includes RF cables, RF and dc power adapters, couplers, GSM test SIMs, and a shield box for testing in open, spectrally noisy environments.

Easy to use, easy to manage

With the E6392B, you will cut the time and costs of training. About 30 minutes is all it takes to learn how to use this test set. An intuitive user interface and PCMCIA memory-card reader help make the test set especially easy to set up and operate. For example, all tests — Automatic, Manual, Signal Generator, and Configuration — are selected from a top screen.

All settings, including configuration settings and cable losses, can be saved to a file. Different test conditions can be stored on a PCMCIA card for easy uploading into the instrument. Measurements can be selected and run by simply rotating a knob and pressing a few keys.

Update firmware via the internet or PCMCIA card

To significantly reduce the time and effort it takes to update the E6392B, Agilent provides firmware updates for the GSM (GPRS) test set on PCMCIA cards and via the Internet. With the PCMCIA card, you simply insert it into the test set and follow the simple instructions. With one card, you can efficiently update all the test sets in your service center. Alternatively, you can get the download software and the latest firmware files from the Internet with your Windows® PC, and update your test set through the RS-232 connection.

Automate testing with point of service test software

With the addition of Option 150, point of service test (PoST) Windows®-based PC software, the E6392B increases its capability to quickly and easily screen customer returned phones by automating test sequences. This practical test solution's mouse-driven, graphical-user interface enables any operator to make fast, accurate measurements regarding the performance of GSM mobile phones. The detailed performance data provided by the PoST software can be saved in PC database and spreadsheet formats, for use in trend-analysis and customer care programs. Technicians can also use PoST software to easily customize test plans to test mobiles according to individual testing needs.

Agilent E6392B GSM MS test set specifications

Specifications describe the test set's warranted performance and are valid over the entire operation and environmental ranges unless otherwise noted. All specifications are valid after a 30-minute warm up period of continuous operation, and within the frequency ranges defined below.

Supplemental characteristics are intended to provide additional information useful in applying the instrument by giving typical, but non-warranted performance parameters. These characteristics are shown in Italics and labeled as "nominal," "typical," or "supplemental."

RF signal generator

Frequency range:
935 MHz to 960 MHz (GSM downlink)
925 MHz to 960 MHz (E-GSM downlink)
1805 MHz to 1880 MHz (DCS1800 downlink)
1930 MHz to 1990 MHz (PCS1900 downlink)

Frequency resolution: 200 kHz, at channel frequency

Frequency accuracy: Same as reference

Output level range: -110 dBm to -50 dBm

Output level accuracy: ±1.0 dB at GSM/E-GSM, ±1.3 dB at DCS1800, ±1.5 dB at PCS1900

Modulation: 0.3 GMSK

Phase error: *<5˚ rms typical*

Peak phase error: *<15˚ peak typical*

RF analyzer

Frequency range:
890 MHz to 915 MHz (GSM uplink)
880 MHz to 915 MHz (E-GSM uplink)
1710 MHz to 1785 MHz (DCS1800 uplink)
1850 MHz to 1910 MHz (PCS1900 uplink)

Transmitter carrier peak power measurement

Range: -20 dBm to +39 dBm (0.3 GMSK at burst/continuous or CW)

Accuracy:
±1.0 dB (±0.6 dB typical at 25 ˚C ±5 ˚C) at ≥0 dBm
±2.0 dB (±1.6 dB typical at 25 ˚C ±5 ˚C) at <0 dBm

Resolution: 0.2 dB

Power ramp measurement

Range: 0 dBm to +39 dBm (0.3 GMSK at burst)

Accuracy:
±0.6 dB typical at 25 ˚C ±5 ˚C at ≥0 dBm
±1.6 dB typical at 25 ˚C ±5 ˚C at <0 dBm

Resolution: 0.2 dB

Dynamic range: *≥40 dB typical*

Phase and frequency error measurement

Input level range: -11 dBm to +39 dBm

Input phase error range: 0 to 20˚ (0.3 GMSK at burst)

Phase error measurement accuracy:
≤1.5˚ rms at phase error ≥2.5˚
≤6.0˚ peak at phase error ≥2.5˚

Frequency error measurement range: ±9 kHz (0.3 GMSK at burst/continuous or CW)

Frequency error measurement accuracy (average of 10 measurements):
±(10 Hz + frequency reference accuracy) at GSM/E-GSM
±(25 Hz + frequency reference accuracy) at DCS1800/PCS1900

DC Power Supply

Range: 3 Vdc to 11 Vdc

Resolution: 0.1 V

Accuracy: 0.1 V at 100 mA load

Maximum current: 1 A, peak 2 A

Ripple noise: *100 mV p-p typical*

DC Current measurement

Range: 3 mA to 1000 mA

Accuracy: ±(3 mA +2% of reading)

Frequency reference

Frequency: 13 MHz

Frequency accuracy: ±[(Time since calibration x aging) + temperature effects + accuracy of calibration]

Aging: ±0.1 ppm/year

Temperature stability: ±0.1 ppm (20 ˚C to 30 ˚C)

Reference input: *13 MHz, 0 to +10 dBm typical, 50 W nominal*

Reference output: *13 MHz, >+3 dBm typical, 50 W nominal*

Serial interface

Interface: EIA RS-232C

Baud rate: 9600

Connector: D-Sub 9-pin male

Printer interface

Interface: Centronics

Connector: D-Sub 25-pin female

Memory Card

Type: PCMCIA (U.S.)

Memory size: SRAM 512 KB

RF Input/Output

Impedance: *50 W nominal*

SWR: ≤1.5:1

Connector: N-type, female

Maximum safe reverse power *(peak): +41 dBm (12.6 W)*

Asynchronous test (Option 002)

In-band spectrum measurement (Option 002)

Frequency range:
890 MHz to 915 MHz (GSM uplink)
880 MHz to 915 MHz (E-GSM uplink)
1710 MHz to 1785 MHz (DCS1800 uplink)
1850 MHz to 1910 MHz (PCS1900 uplink)

Input level range:
-11 dBm to +39 dBm

Frequency span (from channel frequency): 0 Hz to +400 kHz or ±100 kHz

Amplitude accuracy: ±2.0 dB typical

Amplitude resolution: 0.4 dB typical

Dynamic range: *≥40 dB typical at input ≥0 dBm*

RF signal generator (Option 002)

Frequency range:
935 MHz to 960 MHz (GSM downlink)
925 MHz to 960 MHz (E-GSM downlink)
1805 MHz to 1880 MHz (DCS1800 downlink)
1930 MHz to 1990 MHz (PCS1900 downlink)

Frequency resolution: 200 kHz at channel frequency

Step size: 0.5 dB steps

Frequency accuracy: Same as frequency reference

Output level range: –110 dBm to –50 dBm

Output level accuracy: ±1.0 dB at GSM/E-GSM, ±1.3 dB at DCS1800, ±1.5 dB at PCS1900

0.3 GMSK modulation: PN9 (with training sequence), all 0, Off (CW sinewave)

Phase error: *<5˚ rms typical*

Peak phase error: *<15˚ peak typical*

General specifications

Size: 350 mm (W) x 150 mm (H) x 350 mm (D)

Weight: 10 kg

Power voltage: 90 V to 264 V

Power frequency: 47 Hz to 63 Hz

Power consumption: ≤135 VA

Operating temperature: 0 ˚C to +40 ˚C

Storage temperature: -20 ˚C to +60 ˚C

Ordering information

Order number	Description
E6392B	GSM mobile station test set

Option	Description
001	Antenna coupler
002	Add asynchronous test capability
006	DC power adapter
007	Test SIM
008	Test SIM micro
010	Delete 512 KB SRAM memory card
040	GPRS 2 x 1 test capability
150	PoST GSM software
0B1	Add manual set
UK6	Test report
500	RF shield box

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You can also contact one of the following centers and ask for a communication solution representative:

By internet, phone, or fax, get assistance with all your test & measurement needs

Australia
(tel) 1 800 629 485

Austria
(tel) 0 820 87 44 11

Belgium
(tel) (0) 2 404 9340

Brazil
(tel) 11 4197 3600

Canada
(tel) 877 894 4414

China
(tel) 800 810 0189

Denmark
(tel) 70 13 15 15

Finland
(tel) (0) 10 855 2100

France
(tel) (0) 825 010 700

Germany
(tel) (0) 1805 24 6333

Hong Kong
(tel) 800 930 871

India
(tel) 1600 112 929

Ireland
(tel) (0)1 890 924 204

Israel
(tel) 3 6892 500

Italy
(tel) (0)2 9260 8484

Japan
(tel) 0120 421 345

Luxembourg
(tel) (0) 2 404 9340

Malaysia
(tel) 1800 888 848

Mexico
(tel) 55 5081 9469

Netherlands
(tel) (0) 20 547 2111

Philippines
(tel) 1800 1651 0170

Russia
(tel) 095 797 3963

Singapore
(tel) 1800 375 8100

South Korea
(tel) 080 769 0800

Spain
(tel) 91 631 3300

Sweden
(tel) 0200 88 22 55

Switzerland Italian
(tel) 0800 80 5353

Switzerland German
(tel) 0800 80 5353

Switzerland French
(tel) 0800 80 5353

Taiwan
(tel) 0800 047 866

Thailand
(tel) 1800 226 008

United Kingdom
(tel) (0) 7004 666666

USA
(tel) 800 452 4844

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