

ML8741B

Area Scanner

W-CDMA: 869 to 894 MHz, 1805 to 1880 MHz, 2110 to 2170 MHz





For Performing Area Tests and Maintenance of W-CDMA Base Stations

The ML8741B Area Scanner is for performing driving tests to optimize base station service areas. Its excellent hardware performance makes it ideal for accurate area-coverage tests even in severe measurement environments with high interference because it captures carrier characteristics with high reliability. The optional MX874100B 2.1 GHz W-CDMA Software, the MX874103B 1.7GHz W-CDMA Software and the MX874104B 800MHz W-CDMA Software enables W-CDMA measurements in the 2110 to 2170, 1805 to 1880 and the 869 to 894-MHz bands. When used with the Two Carrier Measurement Function, two W-CDMA base stations at different frequencies can be measured simultaneously. The drive testing data collection efficiency is greatly improved over earlier products. Furthermore, installing the MX874001B BCH Demodulation Software option permits confirmation of cell traffic data and base station settings to support discovery of base stations with insufficient traffic capacity and prevent configuration errors.



Simultaneous Measurement of Two Carrier Frequencies and Diversity Function

Two carrier frequencies can be measured simultaneously by using the ML8741B-002 Two Carrier Measurement Function. In addition, the W-CDMA transmission diversity format RSCP of the CPICH can be measured by using the diversity function.



High-speed and High-accuracy Area Analysis

The Received Signal Code Power (RSCP), Received energy per chip divided by the power density in the band (E_c/N_0), and Signal to Interference Ratio (SIR) can be measured at 30-cm intervals (using specified base station and single-channel measurements) while traveling at 100 km/h in a vehicle to provide fast and accurate area analysis.



High-speed Search with SCH

When SCH search is selected in the unspecified base station mode, CPICH can be searched at high speed using the same SCH search method as a UE. As an example, 10 channels are searched in 4 sec on average and then measurement is started.



Correlation with GPS Positioning Data

When a GPS receiver is connected, measurement data is recorded with GPS positioning data (latitude and longitude).



Checking broadcast information by BCH demodulation

For W-CDMA measurement, the W-CDMA base station BCH data can be obtained via the MX874001B BCH Demodulation Software without using the UE. Since the uplink interference power corresponding to the measured CPICH value is displayed in real time, cell traffic data can be checked. And because all SIBs (System Information Blocks) are supported, the base station design parameter settings can be checked too.



Specific Distance Measurement using Speed Pulses

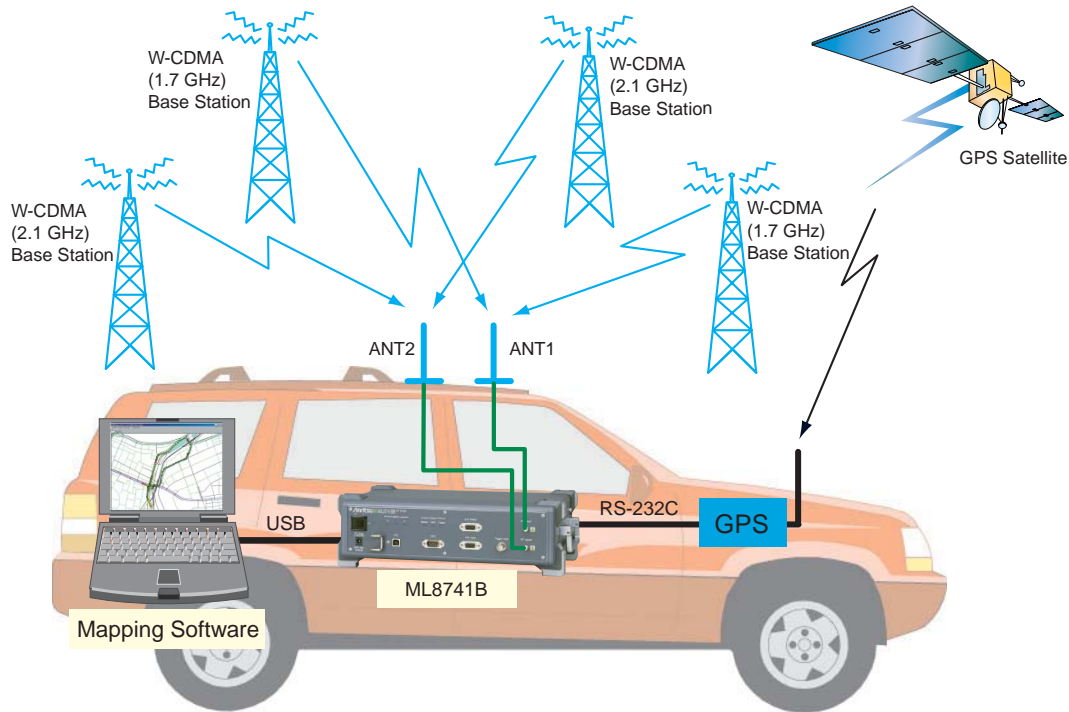
When a car speed pulse is used as an external trigger, measurements can be performed at specific distances. The measurement period can be designated as pulse count or distance when measuring using an external trigger.



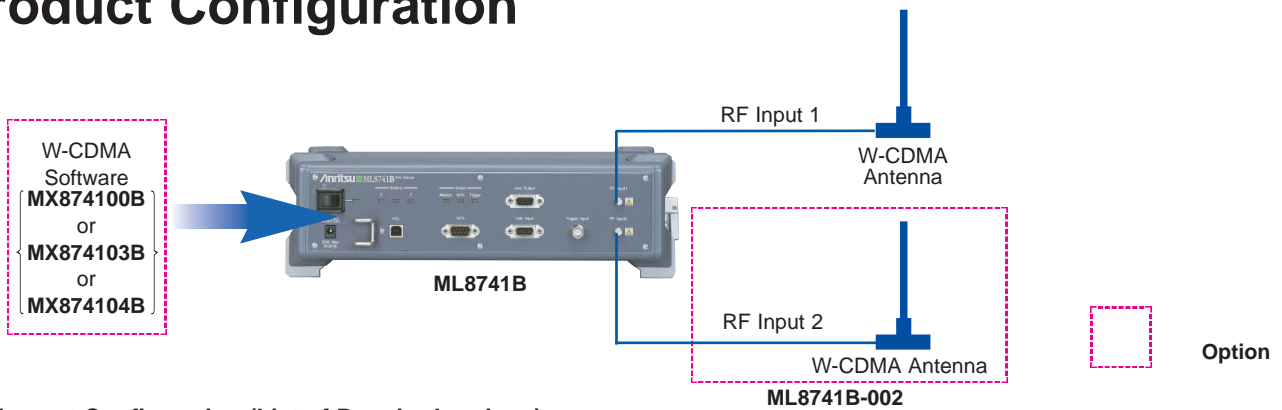
5-hour Battery Operation

In the standard configuration, the lithium-ion battery pack provides 5 hours of operation, and a spare battery pack solves even long-term measurement problems.

Use Example



Product Configuration



Equipment Configuration (List of Required options)

	ML8741B	ML8741B-002	MX874100B	MX874103B	MX874104B
2.1-GHz band (1 carrier)	Required		Required		
1.7-GHz band (1 carrier)	Required			Required	
800-MHz band (1 carrier)	Required				Required
2.1-GHz band (2 carrier)*1	Required	Required	Required		
1.7-GHz band (2 carrier)*1	Required	Required		Required	
800-MHz band (2 carriers)*1	Required	Required			Required
2.1-GHz band + 1.7-GHz band simultaneous measurement	Required	Required	Required	Required	
2.1-GHz band + 800-MHz band simultaneous measurement	Required	Required	Required		Required
1.7-GHz band + 800-MHz band simultaneous measurement	Required	Required		Required	Required

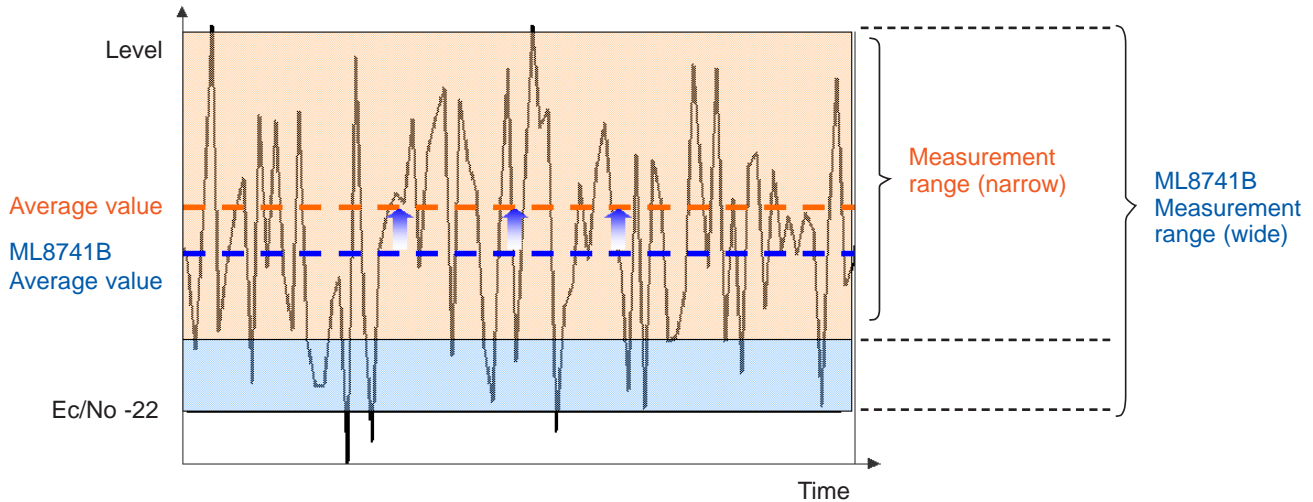
ML8741B Area Scanner
 ML8741B-002 Two Carrier Measurement Option
 MX874100B 2.1 GHz W-CDMA Software (with one antenna for 2.1-GHz band)
 MX874103B 1.7 GHz W-CDMA Software (with one antenna for 1.7-GHz band)
 MX874104B 800 MHz W-CDMA Software (with one antenna for 800-MHz band)

*Each frequency band can be switched and measured when several software applications have been installed.
 *1: Requires second antenna (sold separately)

High Interference Resistance

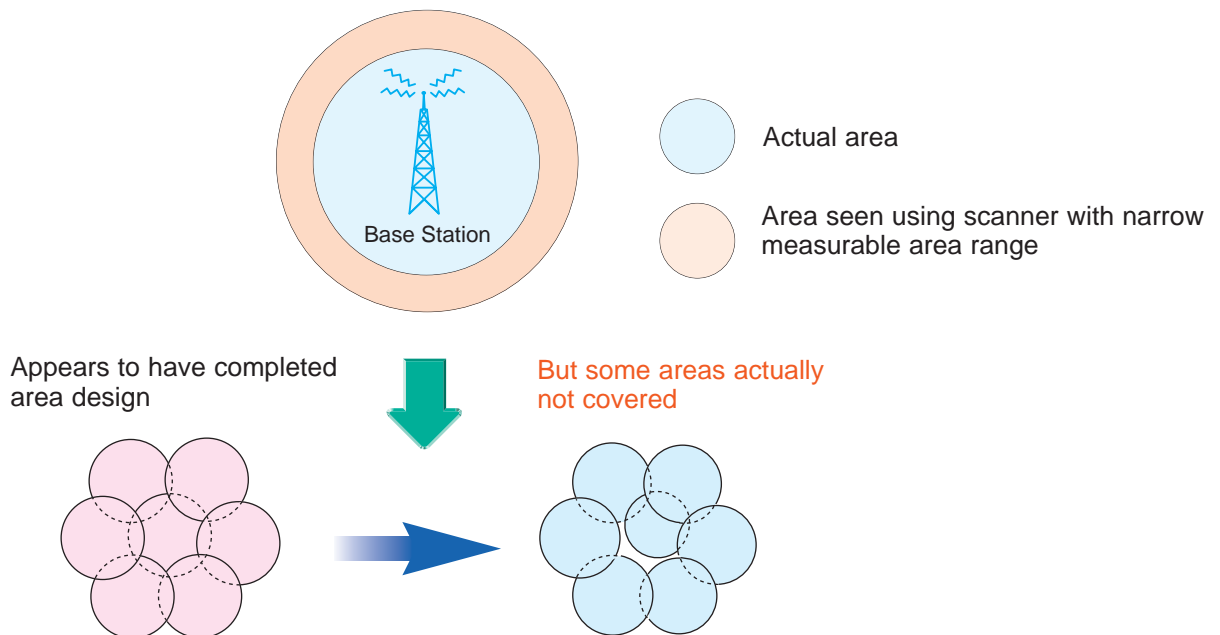
The ML8741B is ideal for designing optimized area coverage because its high hardware performance enables it to capture the characteristics of carriers with high reliability even in areas with high interference, such as cities.

The ML8741B has a very wide level measurement range and obtain true levels with almost no error, unlike scanners with an inadequate measurement range, which provide average levels that are larger than the true levels.



When designing an area using a scanner with an inadequate measurement range, errors occur because the coverage seems wider than the true area coverage, resulting in an incomplete area design with no coverage in some parts.

Today's demanding market requires a scanner like the ML8741B with high-level accuracy supporting exact area design.





Standard Measurement Functions

Unspecified Base Stations

Receiving CPICH channels are searched for and RSCP, Ec/No, and SIR are measured for a maximum of 32 channels.

The search method can be either the same SCH method used by the UE or the Primary CPICH (P-CPICH) method, which searches up to 512 types of P-CPICH in sequence. Moreover, by using the hybrid measurement function for measuring the searched CPICH and preset scrambling code CPICH, known channels can be measured while discovering and measuring other receiving channels.

Specified Base Station

A maximum of 32 P-CPICH and Secondary CPICH (S-CPICH) channels can be specified and RSCP, Ec/No, and SIR can be measured in the same way as unspecified base stations.

Spectrum Monitor

The MX874100B 2.1 GHz W-CDMA, ML874004B 800 MHz W-CDMA, and MX874103B 1.7 GHz W-CDMA Software packages support spectrum analysis in the 2110 to 2170, 1805 to 1880, and 869 to 894-MHz bands, respectively, to check for spurious waveforms. The frequency span can be selected from 4, 10, 30, and 60 MHz.

CW Measurement

Unmodulated signals can be measured with a resolution bandwidth (RBW) of 15 kHz. The minimum measurement period is 10 ms and the average and median values can be output to a PC with a timestamp and GPS data appended. The frequency ranges are 2110 to 2170 MHz, 1805 to 1880 MHz, and 869 to 894 MHz for the MX874100B, MX874103B, and ML874004B packages, respectively.

Delay Profile Output

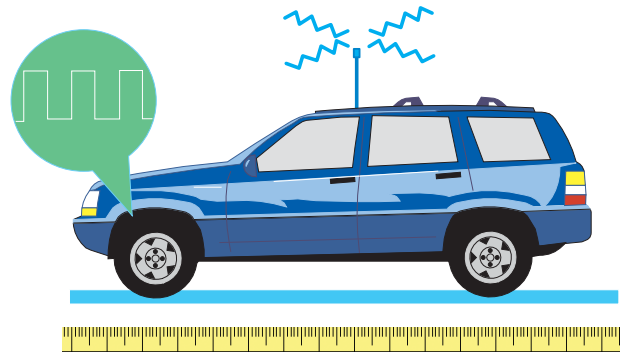
This function measures the delay profile of the selected channel to confirm the multipath delay time and relative level.

Finger Output

This function outputs the measurement results for each selected channel path (finger). When the ML8741B-002 option is installed, the RSCP of up to 12 paths can be evaluated simultaneously.

Fixed Distance Measurement using Speed Pulse

When the speed pulse from an automobile is used as an input trigger, measurement data can be obtained at fixed distance intervals. When the previous speed pulse generation interval is calibrated using the external trigger calibration function, the required distance interval for the measurement cycle can be set directly instead of setting the pulse count.





Options

ML8741B-002 Two Carrier Measurement Function

• Two Carrier Measurement Function

This option permits simultaneous measurement of two carrier frequencies for both specified and unspecified base stations.

• Diversity Function

At specified base station measurement, this function offers CPICH measurement of base stations supporting transmit diversity.

(The ML8741B-002 option and the ML8741B main frame should be ordered together.)



Standard Control Software

MX874091A Standard Control Software

The MX874091A Standard Control Software is application software bundled as standard with the ML8741B. When USB drivers for Windows® 2000/XP and this software are installed in a PC, the W-CDMA base station measurement conditions can be set, measurement can be started and stopped, and the measurement results can be confirmed. In addition, the measurement data can be saved in the same file format as the ML8720B/ML8720C editor.

*: Windows is a registered trademark of Microsoft Corporation in the United States and other countries.



Application Software

MX874001B BCH Demodulation Software

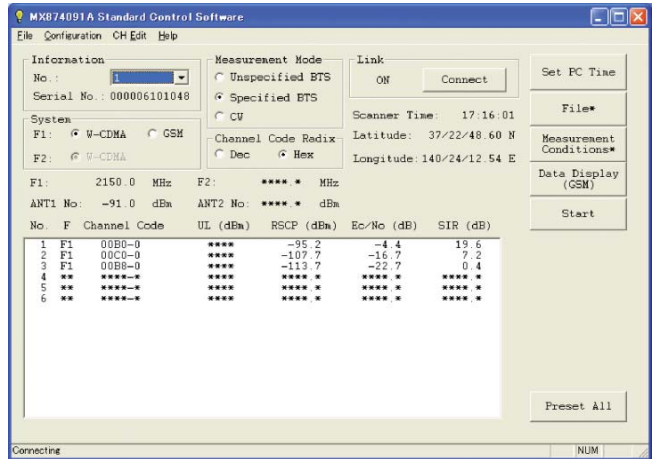
This software adds a BCH demodulation function to the ML8741B.

Demodulated Information

MIB, SB1, SB2, SIB1, SIB2, SIB3, SIB4, SIB5, SIB6, SIB7, SIB8, SIB9, SIB10, SIB11, SIB12, SIB13, SIB13-1, SIB13-2, SIB13-3, SIB13-4, SIB14, SIB15, SIB15-1, SIB15-2, SIB15-3, SIB15-4, SIB15-5, SIB16, SIB17, and SIB18.

During measurement, the above system information is output as a binary file.

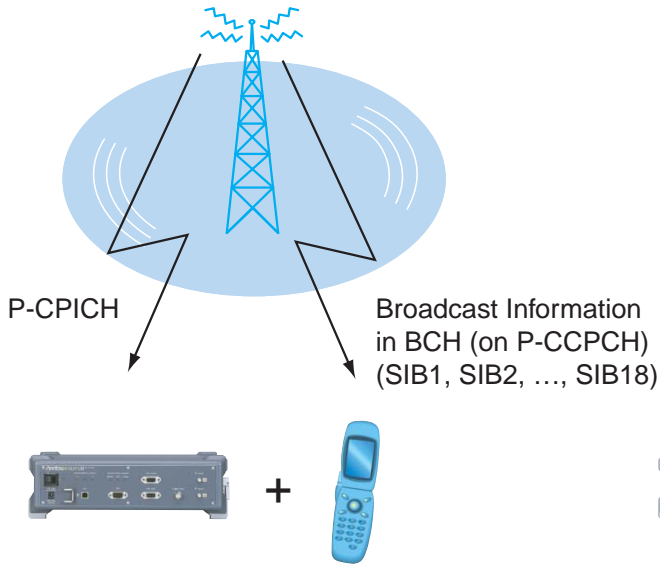
*Any of the MX874100B, MX874103B, or MX874104B software packages must be installed in the main frame to use this application software.



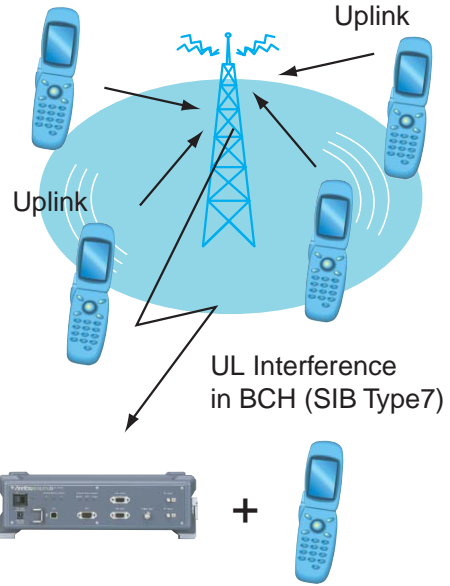


Demodulation Image

Broadcast Information



Uplink Interference Power



Conventional

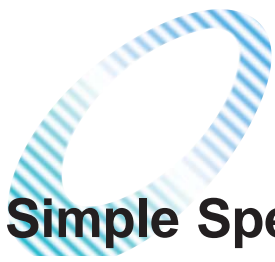


Proposal

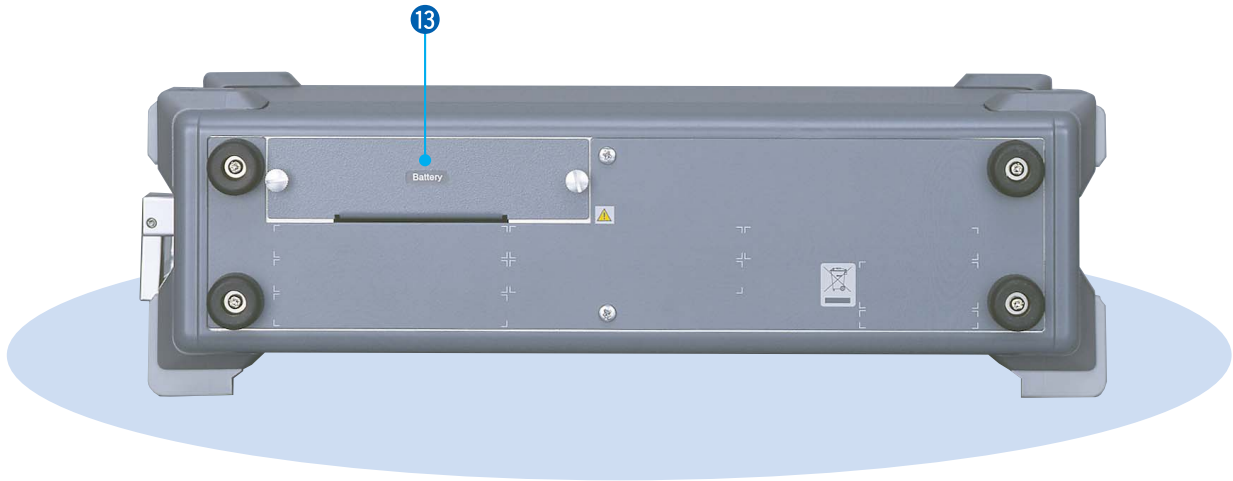
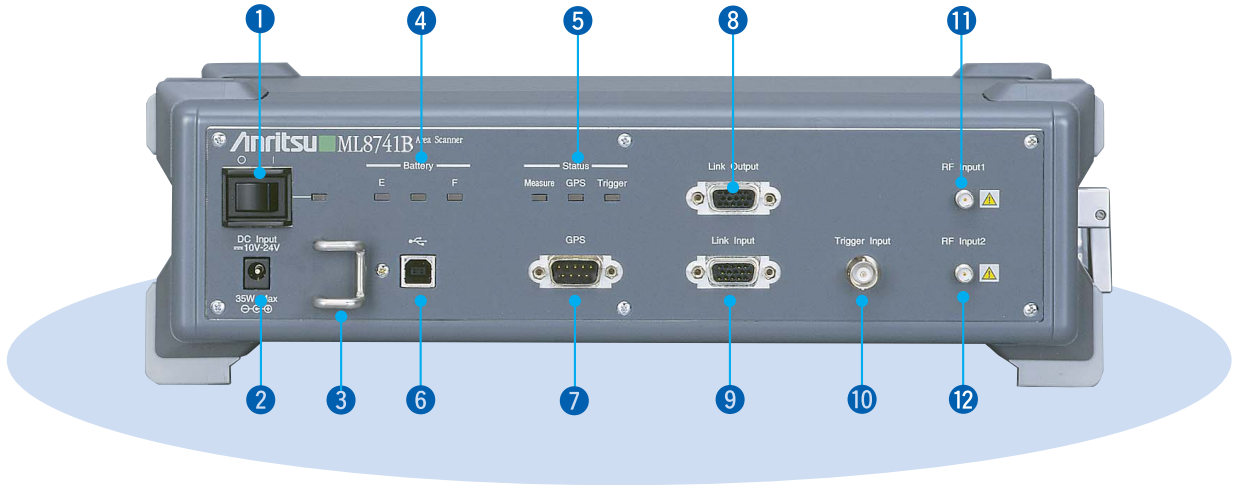


No UE

One ML8741B can measure broadcast information and uplink interference power.



Simple Specialized Driving Test



- ① Power Switch
- ② AC Adapter connector
- ③ Cable Hook
- ④ Battery Status LEDs
- ⑤ Status Display LEDs
- ⑥ USB Connector
- ⑦ GPS Connector
- ⑧ Link Output Connector
- ⑨ Link Input Connector
- ⑩ Trigger Input Connector
- ⑪ RF Input Connector 1: for Antenna Base
- ⑫ RF Input Connector 2: for Antenna Base
- ⑬ Battery Pack Slot



Specifications

Frequency range	<p>RF Input connector 1: 2110 to 2170 MHz^{*1} (CW, spectrum monitor and at the time of measuring W-CDMA) 1805 to 1880 MHz^{*2} (CW, spectrum monitor and at the time of measuring W-CDMA) 869 to 894 MHz^{*3} (CW, spectrum monitor and at the time of measuring W-CDMA)</p> <p>RF Input connector 2: 2110 to 2170 MHz^{*1} (at the time of measuring W-CDMA with ML8741B-002 attached.) 1805 to 1880 MHz^{*2} (at the time of measuring W-CDMA with ML8741B-002 attached.) 869 to 894 MHz^{*3} (at the time of measuring W-CDMA with ML8741B-002 attached.)</p>
Input impedance	50 Ω (SMA connector)
Frequency setting resolution	<p>W-CDMA measurement mode: 100 kHz Spectrum monitor: 1 kHz CW measurement mode: 100 kHz</p>
Reference oscillator	Aging rate: $\pm 1 \times 10^{-6}$ /year
Receive signals	W-CDMA measurement mode: P-CPICH, S-CPICH, P-SCH, S-SCH, P-CCPCH (At the time of BCH demodulation)
Power measurement	<p>Measurement range: W-CDMA measurement mode: -117 to -33 dBm (RF Input connector 1, the end of RF Input connector 2) Spectrum monitor: -123 to -33 dBm (the end of RF connector 1) CW measurement mode: -117 to -33 dBm (the end of RF connector 1)</p> <p>Resolution: 0.1 dB</p> <p>Display units: dBm, dBμ, dBμV/m (CW measurement mode and spectrum monitor mode)</p> <p>W-CDMA measurement accuracy: CPICH_RSCP: ± 1 dB (Typ.) (23°C ± 5°C) CPICH_SIR: ± 2 dB (Typ.) (23°C ± 5°C) SCH_RSCP: ± 2 dB (Typ.) (23°C ± 5°C)</p> <p>Spectrum monitor: Accuracy: ± 1 dB (Typ.) (23°C ± 5°C) Noise level: -127 dBm (RBW 4 kHz)</p> <p>CW measurement accuracy: ± 1 dB (Typ.) (23°C ± 5°C)</p> <p>Dynamic characteristics: CPICH_RSCP, CPICH_SIR accuracy at 0 to 100 km/h (averaged distance: 50 m)</p>
Measurement items	Specified base station, Unspecified base station, Spectrum monitor, CW measurement
Base station measurement	<p>W-CDMA measurement items: Received Signal Code Power (RSCP), Received energy per chip divided by the power density in the band (Ec/No), Signal to Interference Ratio (SIR)</p> <p>Measurement modes: Time variation (internal trigger), Distance variation (external trigger)</p> <p>Sampling interval: W-CDMA measurement: 10 ms/ch</p> <p>Measurement channels: 32 max.</p> <p>W-CDMA measurement sync acquisition time: 600 ms x the number of search channel (CPICH mode), 4 sec on average for Top 10 display (SCH mode)</p> <p>Search method of BTS: CPICH mode, SCH mode</p> <p>Data processing method: Average, Median, Max., Min., 10%, 20%, 30%, 40%, 60%, 70%, 80%, 90%</p> <p>Output data : All channels, Delay profile, Each finger, SCH delay profile (Delay profile and each finger are applied for W-CDMA measurement only. SCH delay profile is applied for W-CDMA and unspecified base station measurement only.)</p>
Spectrum monitor function	<p>Frequency span: 4, 10, 30, 60 MHz Resolution bandwidth: 4 kHz</p>
CW measurement	Frequency setting resolution: 100 kHz, Resolution bandwidth: 15 kHz
Demodulation function	<p>Demodulation channel: BCH</p> <p>Demodulation information: MIB, SB1, SB2, SIB1, SIB2, SIB3, SIB4, SIB5, SIB6, SIB7, SIB8, SIB9, SIB10, SIB11, SIB12, SIB13, SIB13-1, SIB13-2, SIB13-3, SIB13-4, SIB14, SIB15, SIB15-1, SIB15-2, SIB15-3, SIB15-4, SIB15-5, SIB16, SIB17, SIB18</p> <p>When the demodulation function is enabled, MIB, SB1, SB2, and SIB7 are always demodulated, and others can be selected for demodulation as desired. Although the uplink interference power (SIB7) is demodulated periodically, the demodulation period varies depending on the setting and environmental conditions.</p> <p>Demodulation processing time: 0.5 s (P-CCPCH 2 frame)</p> <p>Demodulation success rate: >50%, 70%(Typ.) (P-CCPCH 2 frame, Ec/No ≥ -14 dB, Dynamic response 0 to 100 km/h)</p>

Other functions	<p>Master/slave function: Daisy chain of multiple ML8741B units, parallel measurement</p> <p>GPS Connection: Supports NMEA-0183 format</p> <p>Remote control: Via USB</p> <p>Diversity function: Transmit diversity, Receive antenna diversity (with ML8741B-002)</p> <p>Two Carrier Measurement function: Two carrier frequencies measured simultaneously at specified base station, and unspecified base station measurement (with ML8741B-002)</p> <p>RAKE diversity: Six fingers</p> <p>External trigger calibration: Also speed pulse interval measurement and distance setting of measurement cycle</p>
Interface	<p>External trigger input: 1.5 Vdc ± (2 to 13 Vp-p), BNC connector</p> <p>Sync output: TTL level, D-Sub 15-pin connector</p> <p>PC : USB (Full speed : 12 Mbps), Type B connector</p> <p>GPS : RS-232C (38.4 Kbps max.), D-Sub 9-pin connector</p>
Environment conditions	<p>Temperature and humidity: 0 to +40°C/≤ 90% (operating), -40 to +80°C/≤ 90% (storage)</p> <p>Vibration: MIL-T-28800E (Class 3)</p> <p>EMC*4 EN61326:1997 + A1:1998 + A2:2001 + A3:2003 (Class A, Annex A) EN61000-3-2: 2000 + A2:2005 (Class A)</p> <p>LVD*4 EN61010-1: 2001 (Pollution Degree 2)</p>
Power supply	<p>DC : (rating) 10 to 24 V (tolerance : 8 to 26.4 V)</p> <p>AC : (rating): 100 to 240 V, 50/60 Hz, 50 VA max (with AC adapter)</p> <p>Power Battery: Z0619 Li-ion Battery Pack (Sell separately)</p> <p>Power consumption: 35 W max. (battery charge), Standard: 15 W, 25 W (with ML8741B-002)</p> <p>Battery continuous operation time: 5 h (Typ.), 3 h (Typ., with ML8741B-002)</p>
Dimensions and mass	320 (W) x 88 (H) x 231 (D) mm, ≤3.5 kg, ≤4 kg (with ML8741B-002)

*1: Requires MX874100B installed

*2: Requires MX874103B installed

*3: Requires MX874104B installed

*4: CE specification after February, 2009 is not supported



Ordering Information

Please specify the model/order number, name and quantity when ordering.
 The names listed in the chart below are Order Names. The actual name of the item may differ from the Order Name.

Model/ Order No.	Name	Remarks
ML8741B	– Main frame – Area Scanner	
J1069	– Standard accessories – AC Adapter : 1 pc	
J1117	DC Power Cable : 1 pc	For cigarette lighter, negative-ground vehicle, 3 m
J1316	USB Cable : 1 pc	1 m
Z0793	ML8741B CD-ROM : 1 pc	Operation manual and attached software
ML8741B-002	– Options – Two Carrier Measurement	Selected when ordering main frame
ML8741B-102	Two Carrier Measurement Retrofit	Retrofitted to shipped main flame (factory install required)
MX874101B	– Application software – BCH Demodulation Software	Any of MX874100B, MX874103B, or MX874104B separately required
MX874100B	2.1 GHz W-CDMA Software	Includes one set of Z0516 Antenna and Z0797 Antenna base
MX874103B	1.7 GHz W-CDMA Software	Includes one set of Z0812A Antenna and Z0797 Antenna base
MX874104B	900 MHz W-CDMA Software	Includes one set of Z0812A Antenna and Z0797 Antenna base
ML8741B-ES310	– Maintenance service – Extended Three Years Warranty Service	
ML8741B-ES510	Extended Five Years Warranty Service	
W22705AW	– Application parts – ML8741B Operation Manual	
J0127D	BNC Cable	For connecting external trigger
J1118	DC Power Cable	With arrow-shaped chip, 3 m
J1317	Link Connection Cable	0.7 m
Z0619	Li-ion Battery Pack	
Z0697	Battery Charger	Charges two Z0619 batteries simultaneously
Z0797	Antenna Base	With 5 m cable
Z0865A	Antenna Base	With 3.5 m cable
Z0866A	Exchange Antenna Base	Exchange Z0797 for Z0865A in shipping
Z0516	Antenna	Antenna for 2.1 GHz
Z0812A	900/1800 MHz Vehicle Antenna	Antenna for 800 MHz and 1.7 GHz, Used in combination with Z0797
Z0779	900/1800 MHz Vehicle Antenna	Combination of Z0812A and Z0797
Z0778	900/1800 MHz Whip Antenna	Antenna for 800 MHz and 1.7 GHz, For direct connection to main frame
Z0794	Hard Carrying Case	560 (W) x 370 (H) x 220 (D) mm
Z0910A	Hard Carrying Case	Same dimensions as Z0794; with special compartment for antenna mount and cables
Z0795	Power Divider	Splitter
J0693D	SMA Cable	0.27 m, for power splitter connection (2 cables are required)



- (a) Z0516 (For 2.1 GHz)
- (b) Z0778 (800 MHz and 1.7 GHz, For direct connection to main frame)
- (c) Z0812A (800 MHz and 1.7 GHz, Vehicle antenna)



Z0779 (Combination of Z0812A Antenna and Z0797 Antenna Base)

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