/Inritsu

ML8740B

Area Scanner

W-CDMA: 2110 to 2170 MHz
GSM: 925 to 960 MHz, 1805 to 1880 MHz

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

The ML8740B Area Scanner is a scanner for performing driving tests for optimizing base station service areas. Because of its excellent hardware performance, it can be used to for accurate area-coverage tests even in severe measurement environments with high interference because it can obtain radio wave carrier characteristics with high reliability.

When used in combination with the ML8740B-001 Two Carrier Measurement Function and MX874002B GSM Measurement Software options, either two W-CDMA base stations on different frequencies or a W-CDMA and GSM base station can be measured simultaneously.

The data collection efficiency for drive testing is greatly improved compared to earlier products.

Furthermore, installing the MX874001B BCH Demodulation Software option permits confirmation of cell traffic data and base station settings, offering support for discovering base stations with insufficient traffic capacity, and preventing configuration errors.

Simultaneous W-CDMA and GSM Measurement

Installing the optional ML8740B-001 Two Carrier Measurement Function and the MX874002B GSM Measurement Software enables simultaneous W-CDMA and GSM measurement. The data collection efficiency for drive testing is greatly improved.

Simultaneous Measurement of Two Carrier Frequencies and Diversity Function

By using the ML8740B-001 Two Carrier Measurement Function option, two carrier frequencies can be measured simultaneously.

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

Received Signal Code Power (RSCP), Received energy per chip divided by the power density in the band (Ec/No), 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 monitoring vehicle to provide fast and accurate area analysis.

High-speed Search with SCH

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

Correlation with GPS Positioning Data

When the 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 mobile terminal. Since the uplink interference power corresponding to the measured CPICH value is displayed in real time, cell traffic data can be checked. And since all SIBs (System Information Blocks) are supported, it is possible to check whether the base station parameters are set as designed.

Specific Distance Measurement Using Car 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 by the pulse count or distance when measuring using the 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.

Example of Use

GSM
Base Station

W-CDMA
Base Station

W-CDMA
Base Station

GSM
Base Station

GPS Satellite

ANT2   ANT1

USB

RS232C   GPS

ML8740B

Mapping Software

Product Configuration

MX874002B

GSM
Measurement
Software

ML8740B

RF Input 1

W-CDMA
Antenna

or

GSM
Antenna

Z0779

RF Input 2
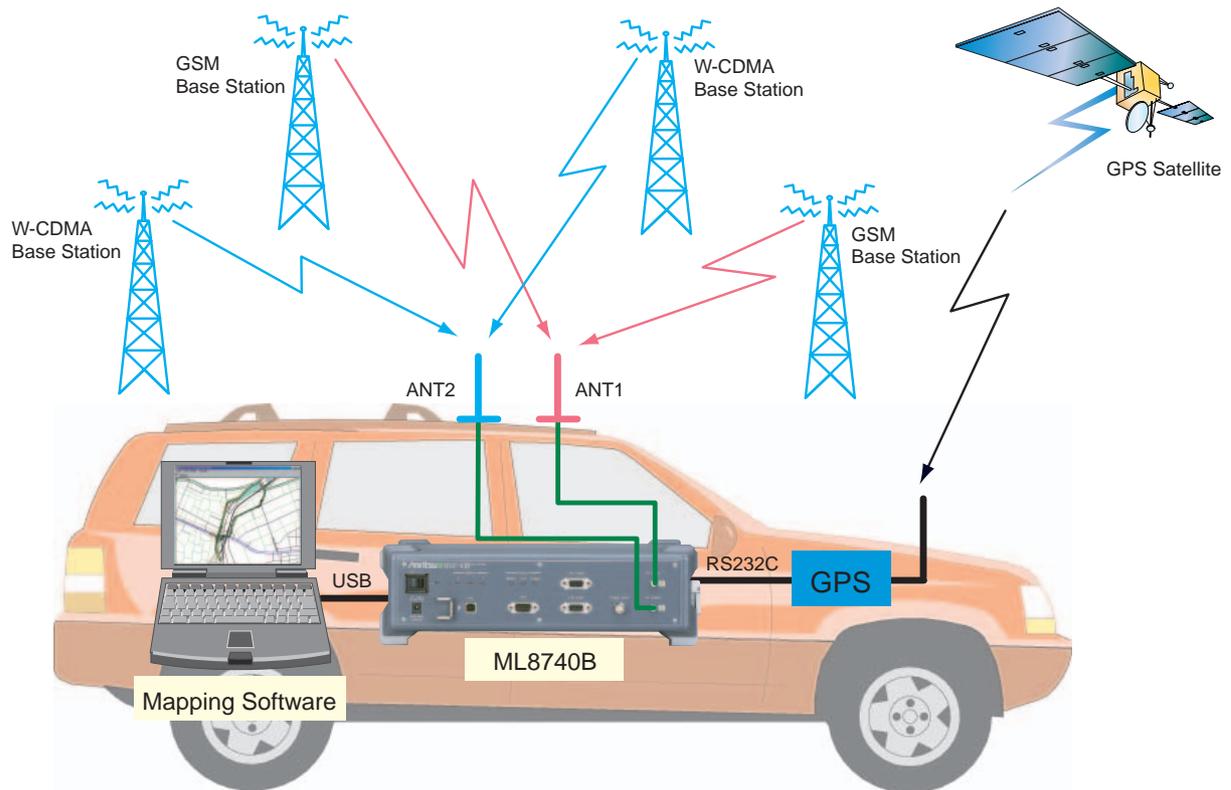
W-CDMA
Antenna
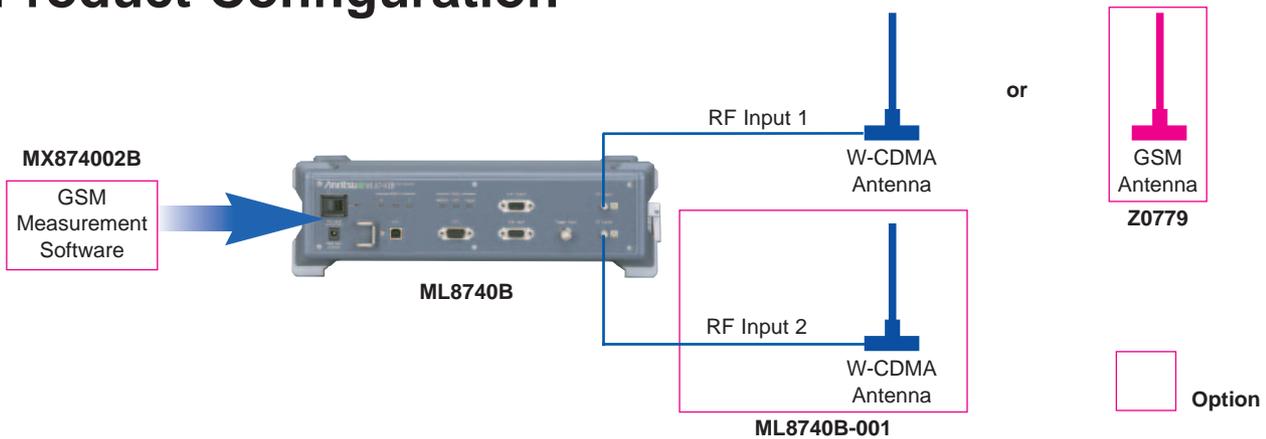
ML8740B-001

Option

Required option list

	ML8740B	ML8740B-001	MX874002B	Z0779
W-CDMA (1 carrier)	Required			
W-CDMA (2 carrier)	Required	Required		
W-CDMA or GSM selectable	Required		Required	Required
W-CDMA and GSM simultaneously	Required	Required	Required	Required

ML8740B   Area Scanner
ML8740B-001 Two Carrier Measurement Option
MX874002B GSM Measurement Software
Z0779   900 MHz/1800 MHz Vehicle Antenna

High Interference Resistance

The ML8740B is ideal for designing optimized area coverage because its high hardware performance enables it to obtain the characteristics of radio-wave carriers with high reliability even in areas with high interference, such as in cities.

The ML8740B has a very wide level measurement range and obtain true levels with almost no error, unlike scanners with an inadequate measurement range, which give average levels that are larger than the true levels.
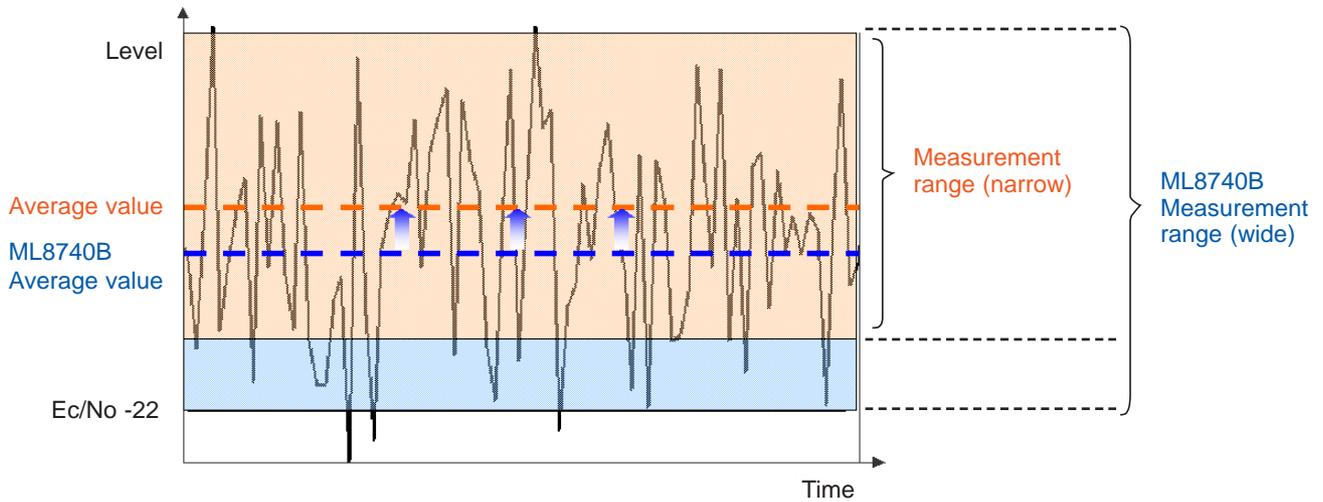
When designing an area using a scanner with an inadequate measurement range, errors occur because the coverage seems wider than the true area coverage, resulting in the likelihood of an incomplete area design with some parts having no coverage.
Today's market requires a scanner like the ML8740B with high-level accuracy supporting exact area design.

4
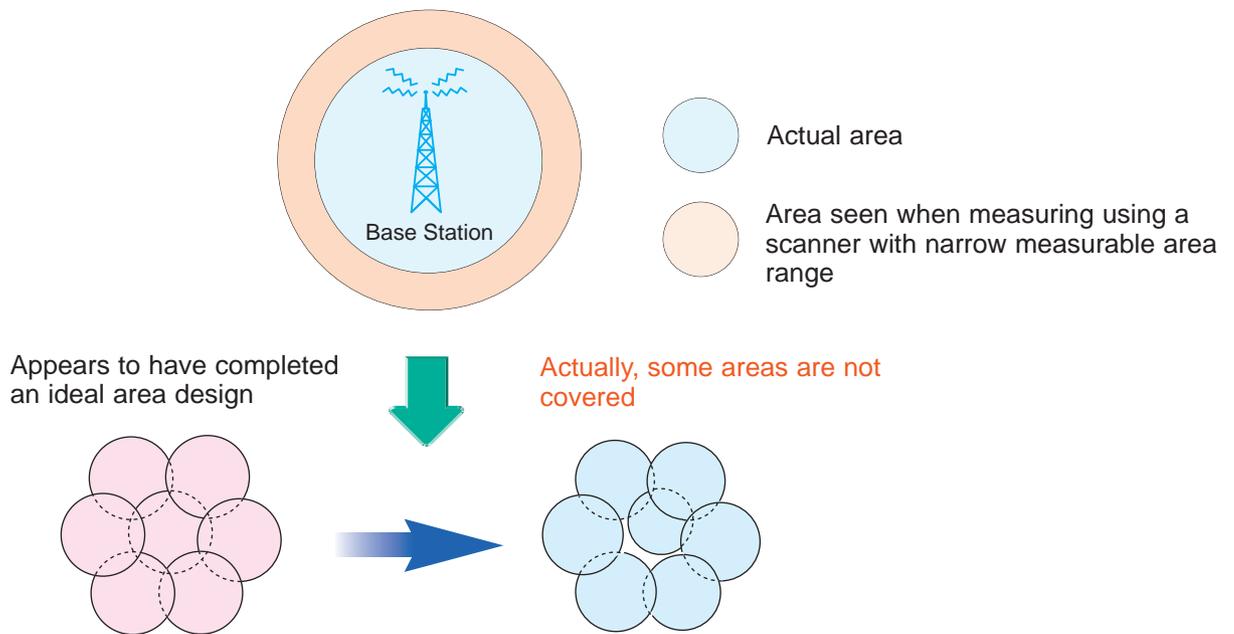
Standard Measurement Functions

Unspecified Base Stations (W-CDMA)

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 mobile terminal or the Primary CPICH (P-CPICH) method, which searches up to 512 types of P-CPIC 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 (W-CDMA)

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.

Delay Profile Output (W-CDMA)

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

Finger Output (W-CDMA)

This function outputs the measurement results for each selected channel path (finger). When the ML8740B-001 option is installed, the RSCP of up to 12 paths can be evaluated simultaneously.

Spectrum Monitor

This function performs in-band spectrum analysis to check for interference waveforms. Either 4, 10, 30, or 60 MHz can be selected.

CW Measurement

Non-modulated signals can be measured with a resolution bandwidth of 15 kHz.
The minimum measurement period is 10 ms. The average and median values are output to a connected PC along with the measurement time and GPS positioning data.

Fixed Distance Measurement Using Car 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.
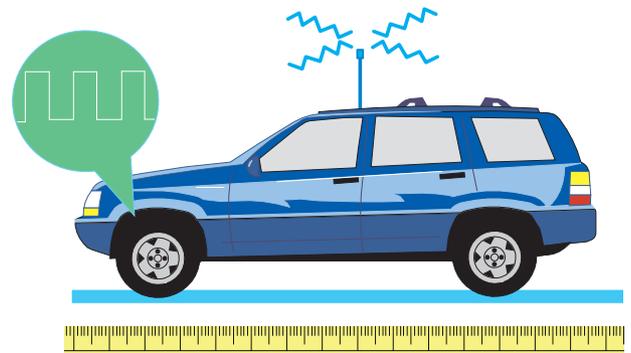
Options

ML8740B-001 Two Carrier Measurement Function

• Two Carrier Measurement Function
This option permits simultaneous measurement of two carrier frequencies for both specified and unspecified base stations. When the MX874002B GSM Measurement Software option is installed, it is possible to perform simultaneous measurement of both W-CDMA and GSM base stations.

• Diversity Function
At specified base station measurement, this function offers CPICH measurement of base stations supporting W-CDMA transmit diversity.
(The ML8740B-001 option and the ML8740B mainframe should be ordered together.)

Application Software

MX874001B BCH Demodulation Software

This software adds a BCH demodulation function for W-CDMA base stations to the ML8740B.
  Information that can be demodulated:
      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.

MX874002B GSM Measurement Software

This option adds GSM measurement functions to the ML8740B. It provides RSSI and C/I measurements as well as BSIC decoding in the GSP900 (E-GSM) and DCS1800 bands.

Image of BCH Demodulation

Broadcast Information

P-CPICH

Broadcast Information in BCH (on P-CCPCH) (SIB1, SIB2, …, SIB18)

+

Uplink Interference Power

Uplink

Uplink

UL Interference in BCH (SIB Type7)

+

Conventional

+

Proposal

+ **MX874001B**

Need no UE

Measurement of Broadcast information and
Uplink interference power is possible by the ML8740B single part.
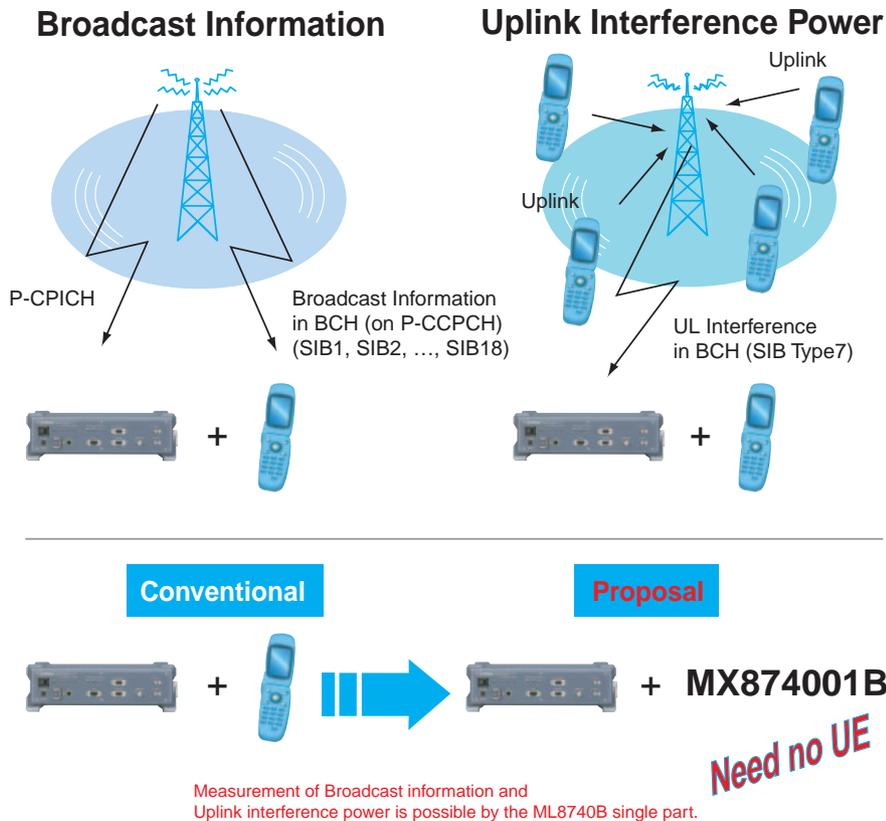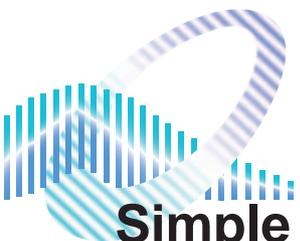
Simple Diagram of Specialized Driving Test
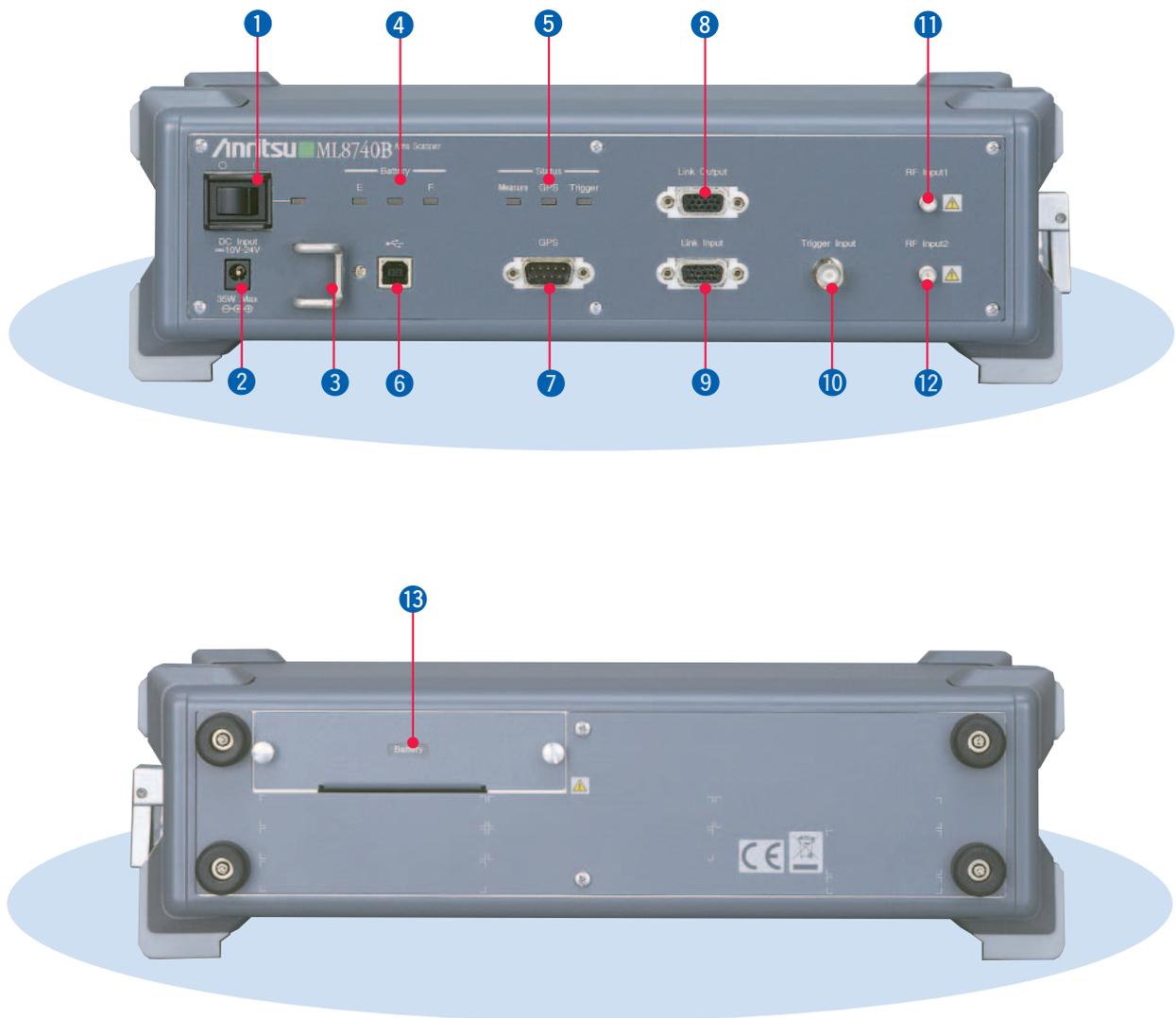
① Power switch
② AC adapter connection switch
③ Cable drop preventing hook
④ Battery status display LED
⑤ Status display LED
⑥ USB connector
⑦ GPS connector

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	RF Input connecter 1:
	  925 to 960 MHz (CW, spectrum monitor and at the time of measuring GSM[*1])
	  1805 to 1880 MHz (CW, spectrum monitor and at the time of measuring GSM[*1])
	  2110 to 2170 MHz (CW, spectrum monitor and at the time of measuring W-CDMA)
	RF Input connecter 2: 2110 to 2200 MHz (at the time of measuring W-CDMA with ML8740B-001 attached.)

Input impedance	50 ohm (SMA type connecter)
Frequency setting resolution	W-CDMA measurement mode: 200 kHz GSM measurement mode[*1]: 200 kHz Spectrum monitor: 1 kHz CW measurement mode: 100 kHz
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) GSM measurement mode[*1]: BCH

Power measurement	Measurement range
	  W-CDMA measurement mode: −117 to −33 dBm (RF Input connecter 1, the end of RF Input connecter 2)
	  GSM measurement mode[*1]: −110 to −40 dBm (the end of RF connecter 1)
	  Spectrum monitor: −123 to −33 dBm (the end of RF connecter 1)
	  CW measurement mode: −117 to −33 dBm (the end of RF connecter 1)
	Resolution: 0.1 dB
	Display units: dBm, dBμ, dBμV/m (CW measurement mode and spectrum monitor mode)
	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)
	GSM measurement accuracy[*1]
	  RSSI: ±1 dB (Typ.) (23°C ±5°C)
	Spectrum monitor
	  Accuracy: ±1 dB (Typ.) (23°C ±5°C)
	  Noise level: −127 dBm (RBW 4 kHz)
	CW measurement accuracy: ±1 dB (Typ.) (23°C ± 5°C)
	Dynamic characteristics: CPICH_RSCP, CPICH_SIR accuracy at 0 to 100 km/h (averaged distance: 50 m)

Measurement items	Specified base station, Unspecified base station, Spectrum monitor, CW measurement

Base station measurement	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)
	GSM measurement items[*1]
	  Receiving/sending power in band with (RSSI, RBW 200 kHz), Carrier versus interference power rate (C/I)
	  Measurement modes: Time variation (internal trigger), distance variation (external trigger)
	Sampling interval
	  W-CDMA measurement: 10 ms/ch
	  GSM measurement[*1]: 20 ms/ch (specified channel measurement only, BSIC decode OFF)
	                50 ms/ch (unspecified channel included measurement, BSIC decode OFF)
	                100 ms/ch (BSIC decode ON)
	Measurement channels: 32 max.
	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)
	  Search method of BTS: CPICH mode, SCH mode
	GSM measurement search time[*1]: 3.3 ms/ch (BSIC decode OFF), 20 ms/ch (BSIC decode ON)
	Data processing method: Average, Median, Max., Min., 10%, 20%, 30%, 40%, 60%, 70%, 80%, 90%
	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.)

Spectrum monitor function	Frequency span: 4, 10, 30, 60 MHz Resolution bandwidth: 4 kHz

*1: This function can work with MX874002B installed.

CW measurement	Frequency setting resolution: 100 kHz, Resolution bandwidth: 15 kHz

Demodulation function	Demodulation channel: BCH
	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
	  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.
	Demodulation processing time: 0,5 s (P-CCPCH 2 frame)
	Demodulation success rate: >50%, 70%(Typ.)
	  (P-CCPCH 2 frame, Ec/No $\geq$–14 dB, Dynamic response 0 to 100 km/h)

Other functions	Master/slave function: Daisy chain connection of multiple ML8740B, parallel measurement
	GPS connection: Supports NMEA-0183 format
	Remote control: Via USB
	Diversity function: Transmit diversity, receive antenna diversity (with ML8740B-001)
	Two carrier measurement function: Two carrier frequencies can be measured
	  simultaneously in the specified base station measurement and the unspecified base station measurement
	  (with ML8740B-001)
	RAKE diversity: Six fingers
	External trigger calibration:
	  Car speed pulse occurrence interval measurement and distance setting of measurement cycle are possible.

Interface	External trigger input: 1.5 Vdc ± (2 to 13 Vp-p), BNC connector Sync output: TTL level, D-Sub 15P connecter PC : USB (Full Speed : 12 Mbps), Type B connecter GPS : RS-232C (38.4 Kbps max.), D-Sub 9P connecter

Environment conditions	Temperature and humidity: 0 to +40˚C/$\leq$90% (operating), –40 to +80˚C/$\leq$90% (storage)
	Vibration: MIL-T-28800E (Class 3)
	EMC
	  EN61326:1997 + A1:1998 + A2:2001 + A3:2003 (Class A, Annex A)
	  EN61000-3-2: 2000 (Class A)
	LVD
	  EN61010-1: 2001 (Pollution Degree 2)

Power	DC : (rating) 10 to 24 V (Power tolerance : 8 to 26.4 V) AC : (rating): 100 to 240 V, 50/60 Hz, 50 VA max (with AC adapter) Power Battery: Z0619 Li-ion Battery Pack (Sell separately) Power consumption: 35 W max. (battery charge), Standard: 15 W, 25 W (with ML8740B-001) Battery continuous operation time: 5 h (typical), 3 h (typical with ML8740B-001)
Dimensions and mass	320 (W) x 88 (H) x 231 (D) mm, $\leq$3.5 kg, $\leq$4 kg (with ML8740B-001)

Ordering Information

Please specify the model/order number, name and quantity when ordering.
The following name of articles is an order name. The actual name may differ name from the product.

Model/Order No.	Name	Remarks
	– Main frame –	
ML8740B	Area Scanner	
	– Standard accessories –	
J1069	AC Adapter : 1 pc	
J1117	DC Power Cable : 1 pc	For cigarette lighter, minus ground vehicle, 3 m
J1316	USB Cable : 1 pc	1 m
Z0516	Antenna : 1 pc (2 pcs)*1	Antenna for 2.1 GHz
Z0797	Antenna Base : 1 pc (2 pcs)*1	With 5 m cable
Z0793B	ML8740B CD-ROM : 1 pc	Operation manual and attached software are installed.
	– Options –	
ML8740B-001	Two Carrier Measurement	Selected when ordering a main frame.
ML8740B-101	Two Carrier Measurement Retrofit	Retrofitted to the already-shipped main frame. (Mainframe need to be taken back.)
	– Application software –	
MX874001B	BCH Demodulation Software	
MX874002B	GSM Measurement Software	Antenna for GSM measurement is required separately.
	– Maintenance service –	
ML8740B-ES310	Extended Three Years Warranty Service	
ML8740B-ES510	Extended Five Years Warranty Service	
	– Application parts –	
W2715AE	ML8740B 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	Two Z0619 batteries can be charged simultaneously.
Z0865A	Antenna Base	With 3.5 m cable
Z0866A	Exchange Antenna Base	Exchange Z0797 for Z0865A in shipping
Z0812A	900/1800 MHz Vehicle Antenna	Used in combination with Z0797
Z0779	900/1800 MHz Vehicle Antenna	Combination of Z0812A and Z0797
Z0778	900/1800 MHz Whip Antenna	For direct connection to main frame
Z0794	Hard Carrying Case	560 (W) x 370 (H) x 220 (D) mm
Z0795	Power Divider	0.7 to 2.5 GHz
J0693D	SMA Cable	0.27 m, for power divider connection (2 cables are required.)
Z0869A	ML8740B Upgrade (for ML8740A)	

*1: Antenna and Antenna mount are provided 2 packs when the option001 (ML8740B-001) is equipped.

(a) Z0516 (For 2.1 GHz)
(b) Z0778 (900/1800 MHz, For direct connection to main frame)
(c) Z0812A (900/1800 MHz, Vehicle antenna)

Z0779 (Combination of Z0812A Antenna and Z0797 Antenna Base)

Note

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