TECHNICAL NOTE

ML8720B

W-CDMA Area Tester

ANRITSU CORPORATION

ML8720B-03/23/43 Technical note

1. Overview

The ML8720B-03/23/43 has the following functions

- **Two Carrier Measurement function**

    Two carrier frequencies can be measured simultaneously in the specified base station measurement and the unspecified base station measurement.

- **Diversity function (Same function as ML8720B-01)**

    The signal from the base station that supports transmit diversity can be measured per transmit antenna in the specified base station measurement.

    (The combined value of transmit diversity signal is outputted in the unspecified base station measurement.)

The number of channels to be measured is 32 at max. for two carrier frequencies.

Simultaneous measurement of multiple carrier frequencies enhances the measurement efficiency.

Also, carrier frequencies of others can be simultaneously measured for comparison.

- ML8720B-03: Selected when ordering a mainframe.
- ML8720B-23: Retrofitted to the already-shipped mainframe.
    (Mainframes need to be taken back.)
- ML8720B-43: Upgrade of ML8720B-01 to ML8720B-03. (Mainframes need to be taken back.)

The outline of operation is that, as shown in Fig.1 below, a standard DSP Module and options ML8720B-03/-23/-43 receive separate carriers (F1, F2) and perform measurement.
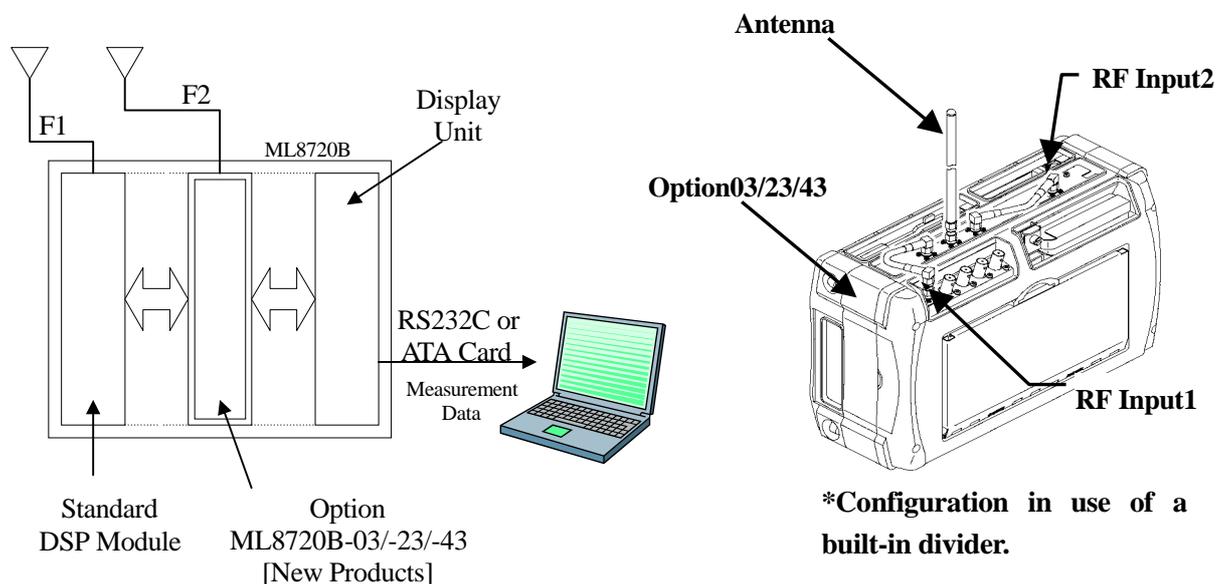

Fig.1 Equipment configuration

(Note)
(1) Two antennas are directly connected to the respective RF-Input or either antenna is linked to the Input connector of a built-in divider before measurement. The divider's loss needs to be corrected when the divider is used. Also, min. reception sensitivity deteriorates by the divider's loss (Typ.4dB).
(2) ML8720B-03 (or -23/-43) cannot be used simultaneously with the conventional diversity option ML8720B-01, however, performs functionally the same diversity measurement as ML8720B-01.

2. Change of functions
2.1 Specification

Mounting of the ML8720B-03 (or -23/-43) option does not change measurement performance.
Additional functions are as follows.

- Setting of two carrier frequencies (F1, F2) in the measurement frequency: 2110.0 ~ 2200.0 MHz (in increments of 200kHz).

- The number of measured channels: max. 32
> In case of the specified base station measurement:
>> F1 or F2 is specified for measurement of each channel (max. 32 channels).
> In case of the unspecified base station measurement:
>> [The number of measured channels] is specified in a range of 1~32. F1 side and F2 side perform SCH search simultaneously and measure the channels, starting from the detected code, for the number specified in [The number of measured channels]. P-CPICH direct search function is not available for the case of two-carrier measurement.

- Measurement time:
> 10ms per channel. Measurement cycle for data processing can be set in a range of 0.01~500s (Same as existing ML8720B).

- Data processing method:
> [Average] and [Mean] values are calculated (user-specified calculation) per channel (Same as existing ML8720B).

2.2 Operation outline (Measurement parameter setting)

(1) Diversity setting
> Sets the usage of Option 03 or 23/43.

>> Receive ....Performs the receive diversity measurement. [Specified&Unspecified]
>>> The signal from the base station that supports transmit diversity cannot be measured in the specified base station measurement.

>> Transmit ....Performs the transmit diversity measurement. [Specified only]

>> Two carriers ....Performs the measurement of two carriers. [Specified&Unspecified] <= **Newly added**
>>> When the base **station of a transmit diversity is** measured, ANT-1 and ANT-2 cannot be measured individually in the specified base station measurement.

>> None...................Performs the measurement of one carrier only. [Specified&Unspecified]
>>> The signal from the base station that supports transmit diversity cannot be measured in the specified base station measurement.

(2) Carrier frequency setting
> Sets the first frequency (F1) and the second frequency (F2). When the usage except [Two carriers] is selected in (1), the codes specified in F1 are measured.

(3) Measurement channel setting (The specified base station measurement)
> Sets the code of measured channels (scrambling code), the transmit diversity ON/OFF and F1 or F2, the carrier frequency for measurement.

(4) The number of measured channels (The unspecified base station measurement)
> Specifies the number in a range of 1 ~ 32 similarly to existing ML8720B. When [Two carriers] is selected in (1), search method is always [SCH search].

(5) Screen display for two-carrier measurement.

All	:Displays the code under measurement and which carrier was used for measurement, F1 or F2.
Delay profile	:Same as above (ANT-1 / ANT-2 can not be switched.)
Finger	:Same as above (Displays ANT-1 side only.)
Time variation	:Same as above
SCH delay profile	:F1 / F2 can be switched.

3. File output

The result data of two-carrier measurement are saved in separate files per carrier.

3.1 Measurement data file name

File name format

◇◇◇◇◇. x x x	:A data file and a comment file (*.CMT) of one carrier measurement
◇◇◇◇◇_ F1. x x x	:A F1 data file of two carrier measurement
◇◇◇◇◇_ F2. x x x	:A F2 data file of two carrier measurement

◇◇◇◇◇: User-specified data file name
x x x : Extension by measurement data (*.DAT, *.FIG, *.SCH, *.CMT)

File names become as follows when automatic increment of file names is specified in two-carrier measurement.

◇◇◇◇◇◇_001_F1. x x x
◇◇◇◇◇◇_001_F2. x x x
◇◇◇◇◇◇_002_F1. x x x
◇◇◇◇◇◇_002_F2. x x x
◇◇◇◇◇◇_003_F1. x x x
◇◇◇◇◇◇_003_F2. x x x

Three-digit number before "_F1" and "_F2" increases per measurement.

Note
The number of characters used for a file name is limited to 24 or less. When automatic increment of file names is specified in two-carrier measurement, the number of characters is limited to 17 or less.

3.2 File format

Also in two-carrier measurement, the format of data saved in files is the same as existing ML8720B.
Data files of F1 and F2 are synchronized and measurement data with the same time stamp are saved in the same line number.

3.3 Other files

Measurement parameter files are different from those of existing ML8720B as the measurement parameter of two-carrier is added.
However, measurement parameter files created by the equipment without ML8720B-03 (or -23/-43) options can be read (not vise versa). In this case, measurement frequency is reflected to F1 and F1 is specified for measuring all channels in the specified base station measurement.

4. Remote command

Basically, remote commands of existing ML8720B are all available although they are partly restricted. Two-carrier measurement is supported by additional commands or extended command arguments.

The following is changes in remote commands in case ML8720B-03 (or -23/-43) is added.

(1) Option information
- Command: *OPT?
- Response: n1, n2
- n1: The number of Fingers in a standard DSP module
- n2: The number of Fingers in an optional DSP module

  Sets "0" for standard configuration, and "6" for the case ML8720B-01 and ML8720B-03 are equipped.
- Command: OPT2? .... **[Additional command]**
- Response: OPT2 03

  Responds with "OPT2 03" for the case ML8720B-03 is equipped, and <u>undefined command errors for other cases.</u>

(2) Carrier frequency setting
- Command: CF f1

  Sets "f1", the carrier frequency of F1.
- Command: CF2 f1,f2 .... **[Additional command]**

  Sets "f2", the carrier frequency of F2.

  Frequency setting method is the same as CF commands.

(3) Delay profile ANT display switching
- Command: ANTNO n

  Not function while two-carrier measurement is performed.

(4) Diversity
- Command: UDIV n

  Sets the diversity function of the unspecified base station measurement.

  0 : None

  1 : Receive antenna diversity

  3 : Two carrier measurement .... **[Added]**
- Command: SDIV n

  Sets the diversity function of the specified base station measurement.

  0 : None

  1 : Receive antenna diversity

  2 : Transmit diversity

  3 : Two carrier measurement .... **[Added]**

(5) Measurement channel setting
- Command: UMCH $n,s_1,n_1,s_2,n_2,\ldots$

  Sets the channels to be measured fixedly in the unspecified base station measurement.

  The channel codes specified by this command are all measured in F1.
- Command: UMCH2 $n,n_{11},s_1,n_{12},n_{21},s_2,n_{22},$ --- $n_{i1},s_i,n_{i2},$--- n_{321},s_{32},n_{322} .... **[Additional command]**

  Sets the channels to be measured fixedly in the unspecified base station measurement.

  n : The number of codes to be specified in a range of 0 ~ 32 (0 means "clear".)

  n_{i1} :　0: Measures in F1, 1: Measures in F2.

  s_i : Specified code (format is the same as UMCH, refer to the operation manual.)

  n_{i2} : Measurement ON/OFF　0: Measurement OFF, 1: Measurement ON

- Command: MCH n,s_1,n_{11},n_{12},s_2,n_{21},n_{22}, --- n_{i1},s_i,n_{i2},--- n_{321},s_{32},n_{322}

        Sets the channels to be measured in the specified base station measurement.

        The channel codes specified by this command are all measured in F1.

- Command: MCH2 n,n_{11},$s_1$$n_{12}$,$n_{13}$,$n_{21}$,$s_2$,$n_{22}$,$n_{23}$, --- n_{i1},s_i,n_{i2}, n_{i3},--- n_{321},s_{32},n_{322},n_{323} .... **[Additional command]**

        Sets the channels to be measured fixedly in the specified base station measurement.

            n : The number of codes to be specified in a range of 1 ~ 32

            n_{i1} :   0: Measures in F1, 1: Measures in F2

            s_i : Specified code (format is the same as MCH, refer to the operation manual.)

            n_{i2} :   0: Transmit diversity OFF, 1: Transmit diversity ON

            n_{i3} : Measurement ON/OFF   0: Measurement OFF, 1: Measurement ON

(6) The unspecified base station measurement data request

The following commands are also acceptable in two-carrier measurement. However, carrier frequencies are not distinguishable.

        UOLC, UOLU, UOLY, UOLA, UOLFL, UOLD

By contrast, the additional commands below have the data item to indicate which carrier was used for measurement, F1 or F2 (0: F1, 1:F2), in CSV format just after channel codes.

        UOLC2, UOLU2, UOLY2, UOLA2, UOLFL2, UOLD2 .... **[Additional command]**

(7) Measurement channel selection

- Command: USCH s
- Command: SSCH s

        Specifies the channel to request delay profile and Finger data. F1 and F2 are not distinguishable. The code in F1 is selected if the same code is measured in both carriers.

- Command: USCH2 n,s .... **[Additional command]**
- Command: SSCH2 n,s .... **[Additional command]**

        Sets the channel to request delay profile and Finger data by specifying carriers.

            n : Carrier frequency 0:F1, 1:F2

            s : Specified code

(8) SCH delay profile measurement result request

- Command: UOLS

        Requests the P-SCH delay profile data on F1 side.

- Command: UOLS2 .... **[Additional command]**

        Requests the P-SCH delay profile data on F2 side.

(9) The unspecified base station measurement data request

The following commands are also acceptable in two-carrier measurement. However, carrier frequencies are not distinguishable.

        SOLC, SOLU, SOLY, SOLA, SOLFL, SOLD

By contrast, the additional commands below have the data item to indicate which carrier was used for measurement, F1 or F2 (0: F1, 1:F2), in CSV format just after channel codes.

        SOLC2, SOLU2, SOLY2, SOLA2, SOLFL2, SOLD2 .... **[Additional command]**

5. Other cautions

When ML8720B-03 (or -23/-43) is mounted, similarly to the case the diversity option ML8720B-01 is mounted, battery operation time becomes shorter than the case of standard configuration (approx. two hours).

~ Ends ~

Anritsu

Specifications are subject to change without notice.

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