MX882007C TD-SCDMA Measurement Software

MX882007C-011 TD-SCDMA HSDPA Measurement Software
MX882007C-012 TD-SCDMA HSDPA Evolution Measurement Software
MX882007C-021 TD-SCDMA HSUPA Measurement Software
All-in-one Solution Supporting TD-SCDMA Terminal Development and Manufacturing

The MT8820C Radio Communication Analyzer with MX882007C TD-SCDMA Measurement Software offer powerful support for the R&D and manufacturing phases of 3G TD-SCDMA mobile terminals (1.28 Mcps TDD) now making good market progress mainly in China. Evaluation of the mobile RF characteristics is easy because 3GPP-compliant Tx and Rx measurements of TD-SCDMA mobiles are fully supported and optional support for HSDPA*1 permits throughput tests too. Then, it supports uplink high speed communication for TD-SCDMA HSUPA*2 and can test RF measurement. In addition, built-in functions support voice connections and two-way voice tests as well as audio tests*3 providing easy voice evaluation. Videophone functions*4 are also supported. One-touch settings for 3GPP-compliant testing, and automation of complex tests, such as Closed loop power control (CLPC), Out-of-sync handling make manual operation easy. Moreover, executing selected Tx and Rx test items sequentially using the Test Plan function permits batch testing and evaluation using just one MT8820C without a PC controller. When the optional MX882001C GSM Measurement Software is installed, one unit supports call processing and all the main Tx and Rx characteristics tests for dual TD-SCDMA/ GSM mobile terminals entering service soon. Terminal manufacturing and inspection test times are greatly reduced by running multiple Tx and Rx measurements in parallel, and even greater time savings can be made at handover from TD-SCDMA to GSM systems*5. Downlink signal and fast power measurement at terminal RF adjustment are supported and the built-in GPIB and Ethernet interface simplifies incorporation into automated production lines as well as configuration of automatic maintenance evaluation systems. This full range of powerful and versatile functions for cutting test times makes the MT8820C the perfect solution for developing and manufacturing TD-SCDMA terminals.

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</tr>
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</table>

*1: Require MX882007C-011 TD-SCDMA HSDPA Measurement Software.
*2: Require MX882007C-021 TD-SCDMA HSUPA Measurement Software.
*3: Require MX882007C-001 TD-SCDMA Voice Codec.
*4: Require MX882007C-003 TD-SCDMA Video Phone Test.
*5: Require MX882001C GSM Measurement Software.
*6: Ver. 11.5.0, Only 1.28 Mcps TDD
*7: Support Test1 (12.2 kbps) only
The MX882007C TD-SCDMA Measurement Software supports TD-SCDMA terminals (1.28 Mcps TDD) in the frequency range from 300 MHz to 2.7 GHz (UARFCN: 1500 to 13500) not only are the current band supported, but any new bands within this frequency will be supported easily.

### Frequency Band (currently TS 34.122 Ver. 11.8.0)

<table>
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<th>Operating Band</th>
<th>Uplink/Downlink [MHz]</th>
<th>UARFCN</th>
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<tr>
<td>a</td>
<td>1900 to 1920</td>
<td>9504 to 9596</td>
</tr>
<tr>
<td></td>
<td>2010 to 2025</td>
<td>10054 to 10121</td>
</tr>
<tr>
<td>b</td>
<td>1850 to 1910</td>
<td>9254 to 9546</td>
</tr>
<tr>
<td></td>
<td>1930 to 1990</td>
<td>9654 to 9946</td>
</tr>
<tr>
<td>c</td>
<td>1910 to 1930</td>
<td>9554 to 9646</td>
</tr>
<tr>
<td>d</td>
<td>2570 to 2620</td>
<td>12854 to 13096</td>
</tr>
<tr>
<td>e</td>
<td>2300 to 2400</td>
<td>11504 to 11996</td>
</tr>
<tr>
<td>f</td>
<td>1880 to 1920</td>
<td>9404 to 9596</td>
</tr>
</tbody>
</table>

Voice, Test-loop (RMC 12.2 kbps) Call processing, and all main Tx and Rx test items

#### [Transmitter Measurement]
- Transmit power
- Power template
- Frequency error
- Occupied bandwidth
- Spectrum emission mask
- Adjacent channel leakage power ratio
- Modulation accuracy
- Peak code domain error
- Open loop power control
- Closed loop power control
- Out-of-sync handling of output power

#### [Receiver Measurement]
- Bit error rate (BER)
- Block error rate (BLER)

The both mobile terminal report monitor and spectrum monitor functions are supported.

### Transmitter Measurement

#### Transmit Power

This measures the transmit power TD-SCDMA terminals under max., min. or any arbitrary power conditions. Both Single Code and Multi Code RMC 12.2 kbps connections are supported and can be switched during call processing.

![Transmit Power Measurement](image)

### Power Template

This evaluates the TD-SCDMA terminal burst-waveform off power and rising/falling template Pass/Fail conformance, which can be displayed as a graph too. Using the wide dynamic range function displays the on-to-off burst waveform at maximum output on a single screen.

![Power Template](image)
**Spectrum Emission Mask**

This evaluates the TD-SCDMA terminal spectrum emission mask conformance to check whether or not the spectrum within ±4.0 MHz of the center frequency satisfies the 3GPP standards. Both the worst value and mask margin in each frequency range can be displayed.

**Closed Loop Power Control (CLPC)**

This measurement sends a TPC (power control) bit stream to the TD-SCDMA terminal to monitor and Pass/Fail evaluate the transmit power response on the measurement screen. Automated measurement makes 3GPP-compliant testing easy and the Fail Slot Search function simplifies Fail location as well.

**Modulation Analysis**

This performs TD-SCDMA terminal modulation measurements such as error vector magnitude (EVM), phase error, magnitude error, origin offset, IQ Imbalance and waveform quality (Rho). EVM, phase error, amplitude, and constellation graphs are supported too.
Receiver Measurement

Bit Error Rate (BER)

3GPP-compliant BER Measurement using Test Loop Mode.

One-touch Setting of Tx/Rx Test Item

Settings for 3GPP-compliant main Tx and Rx tests are made by one-touch operation. Evaluation starts when measurement is completed by pressing “Single”, continuously, allowing even novices to perform accurate measurements successfully. In addition, control programs can be created simply and test speed can be faster using relevant GPIB commands.

For example, pressing automatically sets related parameters controlling the mobile terminal maximum output level, and measurement items. After measurement, overall evaluation, Pass and Fail items (displayed in red) can be seen at a glance.

One-touch 3GPP TS 34.122 Settings
Mobile Terminal Report Monitor

This function monitors the power class reported from the TD-SCDMA terminal and the Primary CCPCH level received at the terminal.

Spectrum Monitor

This function monitors the spectrum of the RF signal in the center frequency ±12.5, 2.5, 0.5, 0.125 MHz range. Three markers and the zone/spot mode make it easy to compare peak search levels for adjusting terminal IQ and carrier leak.

Test Plan

This one-touch function runs 3GPP-compliant test items, including call processing, as a batch to display each measurement result and perform Pass/Fail evaluation of the whole test sequence. In addition, easy on-screen test sequence editing supports execution and evaluation using a single MT8820C, eliminating the need for an external PC controller.

RF Adjustment Function

The Downlink RF Signal Generation function for terminal RF adjustment without call processing is supported, and the Multi power Measurement Function for speedy Tx output level adjustment cuts RF adjustment times.

Multi Power Measurement

The Multi Power Measurement provides fast adjustment of transmitter output level of the TD-SCDMA terminal in synchronization with the chipset adjustment function. The MT8820C measures the Tx powers of each power level from the TD-SCDMA terminal in a single sweep.
Higher Productivity
Reducing Test Time for TD-SCDMA/GSM Dual-mode Terminals

Intersystem Handover Control

Both the TD-SCDMA and GSM Tx and Rx characteristics of dual-mode TD-SCDMA/GSM terminals can be measured and voice handover from TD-SCDMA to GSM can be tested using the intersystem handover function, because the MT8820C application software switches quickly while the dual-mode terminal is handing over.

Requires MT8820C-002 + MX882001C.
**MX882007C-001 TD-SCDMA Voice Codec**

**Real-time Voice Encoding/Decoding and Audio Measurement Functions**

The MX882007C-001 TD-SCDMA Voice Codec supports real-time voice encoding and decoding in software, so end-to-end communication with terminals can be tested by installing this option and the MT8820C-011 Audio Board option. In addition, the audio transmitter and receiver can be tested while calling.

**End-to-End Communications Test**

This supports the end-to-end communications test between an Anritsu handset (A0058A/A0013) connected to the RJ11 connector on the MT8820C and a TD-SCDMA terminal. This option supports voice tests by dividing Tx and Rx paths.

**Audio Transmitter Measurement**

The tone signal from the MT8820C AF Output connector is supplied to the microphone of the TD-SCDMA terminal and the audio transmitter characteristics of the TD-SCDMA terminal can be measured using the MT8820C to demodulate the uplink RF signal and measure the level, frequency, and distortion of demodulated tone signal.

**Audio Receiver Measurement**

The tone signal demodulated by the TD-SCDMA terminal is supplied to the MT8820C AF Input connector and the audio receiver characteristics of the TD-SCDMA terminal can be measured by using the MT8820C to measure the level, frequency, and distortion of the tone signal at the AF Input.

* Requires MT8820C-001, MT8820C-007, MT8820C-011, MX882007C, and MX882007C-001.
MX882007C-003 TD-SCDMA Video Phone Test

Videophone Loopback/End-to-End Test

The MX882007C-003 TD-SCDMA Video Phone Test supports end-to-end videophone tests between TD-SCDMA terminals by using the Ethernet port on the rear panel of the MT8820C and video loopback test using one TD-SCDMA terminal. When the ParallelPhone option is installed in the MT8820C, end-to-end videophone tests are supported using one MT8820C.

Videophone Loopback Test

When a videophone is connected, this function loops the video call data received by the MT8820C back to the terminal, supporting videophone test using one TD-SCDMA terminal.

End-to-End Videophone Test

End-to-end videophone tests between two TD-SCDMA terminals are executed via the Ethernet port on the rear panel of the MT8820C. When the Parallelphone option is installed in the MT8820C, end-to-end videophone tests are supported using one MT8820C.

Videophone Loopback Configuration

End-to-end Videophone Test Setup using Two MT8820C units

End-to-end Videophone Test Setup using One MT8820C (when MT8820C configured for Parallelphone measurement)

* Requires MT8820C-001, MT8820C-007, MX882007C, and MX882007C-003.
The MX882007C-011 TD-SCDMA HSDPA Measurement Software supports call processing, throughput measurements, and CQI (Channel Quality Indicator) functions for HSDPA terminals. The related 3GPP standards are listed below.

<table>
<thead>
<tr>
<th>Test</th>
<th>3GPP Test Item</th>
<th>Test Item</th>
</tr>
</thead>
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<td>Transmitter Test</td>
<td>5.2B User Equipment maximum output power with HS-SICH and DPCCH</td>
<td>5.5.2.1B Spectrum emission mask</td>
</tr>
<tr>
<td>Transmitter Test</td>
<td>5.5.2.2B Adjacent Channel Leakage power Ratio (ACLR) with HS-SICH and DPCCH</td>
<td>5.7.1B Error Vector Magnitude with HS-SICH and DPCCH</td>
</tr>
<tr>
<td>Receiver Test</td>
<td>6.3A Maximum Input Level for HS-PDSCH</td>
<td>9.3.1 HS-DSCH throughput for Fixed Reference Channels*</td>
</tr>
<tr>
<td>Performance Tests</td>
<td>9.3.2 HS-DSCH throughput for Variable Reference Channels*</td>
<td>9.3.3 Reporting of HS-DSCH Channel Quality Indicator*</td>
</tr>
<tr>
<td>Performance Tests</td>
<td>9.3.4 HS-SCCH Detection Performance*</td>
<td></td>
</tr>
</tbody>
</table>

1: Ver. 11.5.0
2: Fading not supported

Throughout tests for both Reference Measurement Channel (RMC) signals supporting all HSDPA categories and for maximum data rate (2.8 Mbps) category-15 are supported. The signals for HSDPA throughout measurement are listed in the table below.

<table>
<thead>
<tr>
<th>Parameter (HSDPA Data Rate)</th>
<th>Max. Data Rate</th>
<th>HS-DSCH Category</th>
<th>Modulation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 Mbps UE Class (QPSK)</td>
<td>199.2 kbps</td>
<td>1/2/3</td>
<td>QPSK</td>
<td>RMC</td>
</tr>
<tr>
<td>1.1 Mbps UE Class (QPSK)</td>
<td>199.2 kbps</td>
<td>4/5/6</td>
<td>QPSK</td>
<td>RMC</td>
</tr>
<tr>
<td>1.1 Mbps UE Class (16QAM)</td>
<td>578.6 kbps</td>
<td>4/5/6</td>
<td>16QAM</td>
<td>RMC</td>
</tr>
<tr>
<td>1.6 Mbps UE Class (QPSK)</td>
<td>357.4 kbps</td>
<td>7/8/9</td>
<td>QPSK</td>
<td>RMC</td>
</tr>
<tr>
<td>1.6 Mbps UE Class (16QAM)</td>
<td>634.6 kbps</td>
<td>7/8/9</td>
<td>16QAM</td>
<td>RMC</td>
</tr>
<tr>
<td>2.2 Mbps UE Class (QPSK)</td>
<td>539 kbps</td>
<td>10/11/12</td>
<td>QPSK</td>
<td>RMC</td>
</tr>
<tr>
<td>2.2 Mbps UE Class (16QAM)</td>
<td>782.2 kbps</td>
<td>10/11/12</td>
<td>16QAM</td>
<td>RMC</td>
</tr>
<tr>
<td>2.8 Mbps UE Class (QPSK)</td>
<td>621 kbps</td>
<td>13/14/15</td>
<td>QPSK</td>
<td>RMC</td>
</tr>
<tr>
<td>2.8 Mbps UE Class (16QAM)</td>
<td>1278.6 kbps</td>
<td>13/14/15</td>
<td>16QAM</td>
<td>RMC</td>
</tr>
<tr>
<td>Category 12, Max</td>
<td>2224.8 kbps</td>
<td>12</td>
<td>16QAM</td>
<td>Max. Data Rate</td>
</tr>
<tr>
<td>Category 15, Max</td>
<td>2808.6 kbps</td>
<td>15</td>
<td>16QAM</td>
<td>Max. Data Rate</td>
</tr>
<tr>
<td>Category 15, 4slot</td>
<td>2158.4 kbps</td>
<td>15</td>
<td>16QAM</td>
<td>—</td>
</tr>
<tr>
<td>Category 15, 4slot QPSK</td>
<td>621 kbps</td>
<td>15</td>
<td>QPSK</td>
<td>—</td>
</tr>
<tr>
<td>Category 15, 4slot 16QAM</td>
<td>1278.6 kbps</td>
<td>15</td>
<td>16QAM</td>
<td>—</td>
</tr>
</tbody>
</table>

* Requires MT8820C-001, MT8820C-007, MX882007C, and MX882007C-011.
The MX882007C-012 TD-SCDMA HSDPA Evolution Measurement Software supports call processing, throughput measurements, and CQI functions for HSDPA terminals.

Throughout tests for both Reference Measurement Channel (RMC) signals supporting all HSDPA categories and for maximum data rate (4.2 Mbps) category-24 are supported.

The signals for HSDPA throughput measurement are listed in the table below.

<table>
<thead>
<tr>
<th>Parameter (HSDPA Data Rate)</th>
<th>Max. Data Rate</th>
<th>HS-DSCH Category</th>
<th>Modulation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 16-18 UE (64QAM)</td>
<td>1249.6 kbps</td>
<td>16/17/18</td>
<td>64QAM</td>
<td>RMC</td>
</tr>
<tr>
<td>Category 19-21 UE (64QAM)</td>
<td>1697.6 kbps</td>
<td>19/20/21</td>
<td>64QAM</td>
<td>RMC</td>
</tr>
<tr>
<td>Category 22-24 UE (64QAM)</td>
<td>2046.4 kbps</td>
<td>22/23/24</td>
<td>64QAM</td>
<td>RMC</td>
</tr>
<tr>
<td>Category 18, Max</td>
<td>2526.4 kbps</td>
<td>18</td>
<td>64QAM</td>
<td>Max. Data Rate</td>
</tr>
<tr>
<td>Category 21, Max</td>
<td>3371.2 kbps</td>
<td>21</td>
<td>64QAM</td>
<td>Max. Data Rate</td>
</tr>
<tr>
<td>Category 24, Max</td>
<td>4214.4 kbps</td>
<td>24</td>
<td>64QAM</td>
<td>Max. Data Rate</td>
</tr>
</tbody>
</table>

Recevier Measurement

HSDPA Throughput/CQI Measurement

The HSDPA throughput can be measured by counting the number of ACK blocks from the HSDPA terminal. And statistical analysis can be performed on CQI values reported by the HSDPA terminal.

- Requires MT8820C-001, MT8820C-007, MX882007C, MX882007C-011, and MX882007C-012.
The MX882007C-021 HSUPA Measurement Software supports Tx measurements of HSUPA terminals. It can generate the signals used for testing HSUPA terminals with RMC category 1 to 6 (2.23 Mbps UE Class).

**Transmitter Measurement**

**Modulation Analysis**

This performs TD-SCDMA HSUPA terminal modulation measurements such as error vector magnitude (EVM), magnitude error, phase error, origin offset, and constellation graphs are supported too.

**Performance Measurement**

HSUPA performance measurement is calculated the information about bit rate by detecting E-DCH TB (Transport Block size) Index included E-UCCH sent from the mobile terminal to MT8820C.

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<th>Test</th>
<th>3GPP TS 34.122</th>
<th>Test Item</th>
</tr>
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<td>Transmitter Test</td>
<td>5.2A</td>
<td>User Equipment maximum output power with E-DCH</td>
</tr>
<tr>
<td></td>
<td>5.5.2.1A</td>
<td>Spectrum emission mask</td>
</tr>
<tr>
<td></td>
<td>5.5.2.2A</td>
<td>Adjacent Channel Leakage power Ratio (ACLR) with E-DCH</td>
</tr>
<tr>
<td></td>
<td>5.7.1A</td>
<td>Error Vector Magnitude with E-DCH16QAM</td>
</tr>
<tr>
<td>Performance Tests</td>
<td>11.1</td>
<td>Detection of E-DCH HARQ ACK Indicator Channel (E-HICH)</td>
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<tr>
<td></td>
<td>11.2</td>
<td>Demodulation of E-DCH Absolute Grant Channel (E-AGCH)</td>
</tr>
</tbody>
</table>

*1: Ver. 11.5.0  
*2: Fading not supported

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**HSUPA Parameter**

**HSUPA RF Tx Measurement Signals**

Categories 1 to 6 can be selected as Data Rates including HSUPA RMC signal for Tx measurements of HSUPA terminal.
Specifications

• Typical values are for reference only; specifications are not guaranteed.

• MT8820C-001 W-CDMA Measurement Hardware, MT8820C-007 TD-SCDMA Measurement Hardware, MX882007C TD-SCDMA Measurement Software

| Modulation Analysis | Frequency: 300 MHz to 2.7 GHz  
Carrier frequency accuracy: ± (Setting frequency × Reference oscillator accuracy + 10 Hz)  
Modulation accuracy (residual vector error): ≤2.5% (when Single Code is input) |
|---------------------|-----------------------------|
| RF Power            | Frequency: 300 MHz to 2.7 GHz  
Input level: −70 to +35 dBm (Main)  
Measurement accuracy: ±0.3 dB (typ.), ±0.5 dB (−25 to +35 dBm), ±0.7 dB (−55 to −25 dBm), ±0.9 dB (−70 to −55 dBm)  
Linearity: ±0.2 dB (−40 to 0 dB, ≥−55 dBm), ±0.4 dB (−40 to 0 dB, ≥−65 dBm)  
Measurement object: DPCH, UpPCH |
| Occupied Bandwidth  | Frequency: 300 MHz to 2.7 GHz  
Input level: −10 to +35 dBm (Main) |
| Adjacent Channel Leakage Power Ratio | Frequency: 300 MHz to 2.7 GHz  
Input level: −10 to +35 dBm (Main)  
Ratio measurement points: ±1.6 MHz, ±3.2 MHz  
Measurement range: ±50 dB (±1.6 MHz), ±55 dB (±3.2 MHz) |
| RF Signal Generator | Output frequency: 300 MHz to 2.7 GHz (1 Hz step)  
Channel level (DPCH): −30 to 0 dB [0.1 dB step, relative level for Ior (total level)]  
Channel level accuracy: ±0.2 dB (relative level accuracy for Ior)  
AWGN level: Off, −20 to +5 dB [0.1 dB step, relative level for Ior (total level)]  
AWGN level accuracy: ±0.2 dB (relative level accuracy for Ior) |
| Error Rate Measurement | Functions: Insert PN9 or PN15 pattern in DTCH  
Measurement items: BER, BLER  
Measurement objective: Loopback data imposed on uplink DTCH (BER, BLER) |
| Call Processing | Origination controlling: Registration, Origination, Termination, Network disconnect, Terminal disconnect, Handover (executes each processing conforming to 3GPP standards and performs Pass/Fail evaluation)  
Mobile terminal controlling: Output level, Loopback (executes each mobile terminal control conforming to 3GPP standards) |

• MT8820C-011 Audio Board, MX882007C-001 TD-SCDMA Voice Codec

<table>
<thead>
<tr>
<th>Voice Codec</th>
<th>AMR 12.2 kbps</th>
</tr>
</thead>
</table>
| Codec Level Adjustment | Encoder input gain: −3 to +3 dB, 0.01 dB step  
Handset microphone volume: 0, 1, 2, 3, 4, 5  
Handset speaker volume: 0, 1, 2, 3, 4, 5 |
| AF Output | Frequency range: 30 Hz to 10 kHz, 1 Hz step  
Carrier frequency accuracy: ± (Setting frequency × Reference oscillator accuracy + 0.1 Hz)  
Setting range: 0 to 5 Vpeak (AF Output)  
Setting resolution: 1 mV (≤500 mVpeak), 10 µV (≤50 mVpeak)  
Accuracy: ±0.2 dB (≥10 mVpeak, ≥50 Hz), ±0.3 dB (≥10 mVpeak, ≤50 Hz)  
Waveform distortion: ≤30 kHz band  
≥−60 dB (≥500 mVpeak, ≤5 kHz), ≤−54 dB (≥70 mVpeak)  
Output impedance: ≤1 Ω  
Max. output current: 100 mA |
| AF Input | Frequency range: 50 Hz to 10 kHz  
Input voltage range: 1 mVpeak to 5 Vpeak (AF Input)  
Max. allowable input voltage: 30 Vrms  
Input impedance: 100 kΩ  
Frequency Measurement | Accuracy: ± (Reference oscillator accuracy + 0.5 Hz) |
| Level Measurement | Accuracy: ±0.2 dB (≥10 mVpeak, ≥50 Hz), ±0.4 dB (≥1 mVpeak, >1 kHz) |
| SINAD Measurement | Frequency: 1 kHz  
≥60 dB (≥1000 mVpeak), ≥54 dB (>50 mVpeak), ≥46 dB (≥10 mVpeak) |
| Distortion Rate Measurement | Frequency: 1 kHz  
≤−60 dB (≥1000 mVpeak), ≤−54 dB (>50 mVpeak), ≤−46 dB (≥10 mVpeak) |

• MX882007C-003 TD-SCDMA Video Phone Test

<table>
<thead>
<tr>
<th>Channel Coding</th>
<th>Audio&amp;Visual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Transfer</td>
<td>64 kbps</td>
</tr>
</tbody>
</table>
**MT8820C-001 W-CDMA Measurement Hardware, MT8820C-007 TD-SCDMA Measurement Hardware, MX882007C-011 TD-SCDMA HSDPA Measurement Software**

<table>
<thead>
<tr>
<th>Reference Channel</th>
<th>Transferring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RMC 0.5 Mbps UE Class (QPSK), RMC 1.1 Mbps UE Class (QPSK), RMC 1.1 Mbps UE Class (16QAM), RMC 1.6 Mbps UE Class (QPSK), RMC 1.6 Mbps UE Class (16QAM), RMC 2.2 Mbps UE Class (QPSK), RMC 2.8 Mbps UE Class (QPSK), and RMC 2.8 Mbps UE Class (16QAM)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Throughput Measurement</th>
<th>Functions: Transmit HS-SCCH, HS-PDSCH based on Fixed Reference Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement items:</td>
<td>Throughput</td>
</tr>
<tr>
<td>Measurement object:</td>
<td>ACK and NACK data imposed on uplink HS-SICH</td>
</tr>
</tbody>
</table>

| CQI Measurement | Measurement object: Periodically reported CQI value applied to HS-SICH |

<table>
<thead>
<tr>
<th>Call Processing</th>
<th>Origination controlling: Registration, Call processing for Fixed Reference Channel (executes each processing conforming to 3GPP standards and performs Pass/Fail evaluation)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mobile terminal controlling: Output level (executes each mobile terminal control conforming to 3GPP standards)</td>
</tr>
</tbody>
</table>

**MT8820C-001 W-CDMA Measurement Hardware, MT8820C-007 TD-SCDMA Measurement Hardware, MX882007C-012 TD-SCDMA HSDPA Evolution Measurement Software**

<table>
<thead>
<tr>
<th>Reference Channel</th>
<th>Transferring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RMC Category 16-18 UE (64QAM), RMC Category 19-21 UE (64QAM), RMC Category 22-24 UE (64QAM), RMC Category 18 Max, RMC Category 21 Max, and RMC Category 24 Max</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Throughput Measurement</th>
<th>Function: Transferring HS-SCCH and HS-PDSCH according to fixed reference channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement item:</td>
<td>Throughput</td>
</tr>
<tr>
<td>Measurement object:</td>
<td>ACK and NACK applied to HS-SICH</td>
</tr>
</tbody>
</table>

| CQI Measurement | Measurement object: Periodically reported CQI value applied to HS-SICH |

<table>
<thead>
<tr>
<th>Call Processing</th>
<th>Call control: Location registration, Fixed reference channel (Execution of the operation conforming to the 3GPP standard and pass/fail judgment can be performed.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UE control: Output level (UE control conforming to the 3GPP standard can be performed.)</td>
</tr>
</tbody>
</table>

**MT8820C-001 W-CDMA Measurement Hardware, MT8820C-007 TD-SCDMA Measurement Hardware, MX882007C-021 TD-SCDMA HSUPA Measurement Software**

| Modulation Analysis | Dependent on the performance of MX882007C (when HSUPA RMC Code is input) |

<table>
<thead>
<tr>
<th>Call Processing</th>
<th>Origination controlling: Registration, Call processing for FRC1, FRC2 (executes each processing conforming to 3GPP standards and performs Pass/Fail evaluation)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mobile terminal controlling: Output level (executes each mobile terminal control conforming to 3GPP standards)</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Model/Order No.</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT8820C-001</td>
<td>W-CDMA Measurement Hardware</td>
</tr>
<tr>
<td>MT8820C-002</td>
<td>TDMA Measurement Hardware</td>
</tr>
<tr>
<td>MT8820C-003</td>
<td>CDMA2000 Measurement Hardware</td>
</tr>
<tr>
<td>MT8820C-007</td>
<td>TD-SCDMA Measurement Hardware</td>
</tr>
<tr>
<td>MT8820C-012</td>
<td>Parallel Phone Measurement Hardware</td>
</tr>
<tr>
<td>MT8820C-018</td>
<td>Extended RF 4.3 GHz to 3.8 GHz (requires MT8820C-017, MT8820C-119, or MT8820C-120)</td>
</tr>
<tr>
<td>MT8820C-043</td>
<td>CDMA2000 Time Offset CAL for GPS SG (requires MT8820C-003 and MX882020C2)</td>
</tr>
<tr>
<td>MT8820C-071</td>
<td>CDMA2000 Measurement Hardware Retrofit</td>
</tr>
<tr>
<td>MT8820C-072</td>
<td>TDMA Measurement Hardware Retrofit</td>
</tr>
<tr>
<td>MT8820C-073</td>
<td>CDMA2000 Measurement Hardware Retrofit</td>
</tr>
<tr>
<td>MT8820C-076</td>
<td>TD-SCDMA Measurement Hardware Retrofit</td>
</tr>
<tr>
<td>MT8820C-077</td>
<td>Audio Board</td>
</tr>
<tr>
<td>MT8820C-078</td>
<td>Parallel Phone Measurement Hardware Retrofit</td>
</tr>
<tr>
<td>MT8820C-079</td>
<td>Extended RF Hardware for SPM Retrofit</td>
</tr>
<tr>
<td>MT8820C-130</td>
<td>Extended RF Hardware for PPM Retrofit (requires MT8820C-001)</td>
</tr>
</tbody>
</table>

Software options

- **W-CDMA Measurement Software** (requires MT8820C-001 and MX882050C (2 sets))
- **CDMA2000 Measurement Software** (requires MT8820C-001, MX882000C, and MX882050C)
- **HSUPA High Data Rate** (requires MT8820C-001, MX882000C, MX882000C-011, and MX882050C)
- **HSPA Evolution Measurement Software** (requires MT8820C-001, MX882000C, MX882000C-011, and MX882050C)
- **DC-HSUPA Measurement Software** (requires MT8820C-001, MX882000C, and MX882050C)
- **CDMA2000 Measurement Software** (requires MT8820C-001, MX882000C, MX882000C-011, and MX882050C)
- **HSDPA Measurement Software** (requires MT8820C-001, MX882000C, and MX882050C)
- **EGPRS Measurement Software** (requires MT8820C-001, MX882000C, and MX882050C)
- **EDGE Measurement Software** (requires MT8820C-001, MX882000C, and MX882050C)
- **HSDPA Measurement Software** (requires MT8820C-001, MX882000C, and MX882050C)
- **GSM Measurement Software** (requires MT8820C-001, MX882000C, and MX882050C)
- **GSM High-speed Adjustment** (requires MX882020C1)
- **GSM High-speed Adjustment** (requires MX882000C)
- **GSM High-speed Adjustment** (requires MX882000C-007, and MX882000C)
- **MDMA HSDPA Measurement Software** (requires MT8820C-001, and MT8820C-007)
- **MDMA HSDPA Evolution Measurement Software** (requires MT8820C-001, MT8820C-007, and MX882020C7)
- **DC-HSUPA Measurement Software** (requires MT8820C-001, MT8820C-007, and MX882020C7)

Editions

- **1** (requires MT8820C-001, MT8820C-007, MX882007C, MX882007C-011)
- **2** (requires MT8820C-012, the two same measurement hardware (2 board/set) and one measurement software)
- **3** (requires MT8820C-001, MT8820C-007, and MX882007C)
- **4** (requires MT8820C-012 and MX882012C)
- **5** (requires MX882012C and MX882012C-011)
- **6** (requires MX882012C and MX882012C-011)
- **7** (requires MX882012C and MX882012C-011)
- **8** (requires MX882012C and MX882012C-011)
- **9** (requires MX882012C and MX882012C-011)
- **10** (requires MX882012C and MX882012C-011)
- **11** (requires MX882012C and MX882012C-011)
- **12** (requires MX882012C and MX882012C-011)
- **13** (requires MT8820C-008 (2 sets), MT8820C-012, MX882010C, and MX882012C)
- **14** (requires MT8820C-008 (2 sets), MT8820C-012, MX882010C, and MX882012C)
- **15** (requires MT8820C-008 (2 sets), MT8820C-012, MX882010C, and MX882012C)

Warranty

- **MT8820C-ES210** 2 years Extended Warranty Service
- **MT8820C-ES310** 3 years Extended Warranty Service
- **MT8820C-ES510** 5 years Extended Warranty Service

Application parts

- **P0035B** W-CDMA/GSM Test USIM
- **P0035BT** W-CDMA/GSM Test USIM™
- **P0135A6** Anritsu Test UICC (Micro UICC size)™
- **P0135A7** Anritsu Test UICC GM (Micro UICC size)™
- **P0250A6** Anritsu Test UICC GT (Nano UICC size)
- **P0250A7** Anritsu Test UICC GT (Nano UICC size)
- **P0325A6** Anritsu Test UICC GM (Nano UICC size)
- **P0325A7** Anritsu Test UICC GM (Nano UICC size)
- **P0625A6** Anritsu Test UICC GM (Micro UICC size)
- **P0625A7** Anritsu Test UICC GM (Micro UICC size)
- **A005A** Handset
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Specifications are subject to change without notice.