ADVANTEST®

ADVANTEST CORPORATION

# U3641/61 OPT60

# CDMA Option

# Operation Manual

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# Safety Summary

To ensure thorough understanding of all functions and to ensure efficient use of this instrument, please read the manual carefully before using. Note that Advantest bears absolutely no responsibility for the result of operations caused due to incorrect or inappropriate use of this instrument.

If the equipment is used in a manner not specified by Advantest, the protection provided by the equipment may be impaired.

- **Warning Labels**

  Warning labels are applied to Advantest products in locations where specific dangers exist. Pay careful attention to these labels during handling. Do not remove or tear these labels. If you have any questions regarding warning labels, please ask your nearest Advantest dealer. Our address and phone number are listed at the end of this manual.

  Symbols of those warning labels are shown below together with their meaning.

  **DANGER**: Indicates an imminently hazardous situation which will result in death or serious personal injury.

  **WARNING**: Indicates a potentially hazardous situation which will result in death or serious personal injury.

  **CAUTION**: Indicates a potentially hazardous situation which will result in personal injury or a damage to property including the product.

- **Basic Precautions**

  Please observe the following precautions to prevent fire, burn, electric shock, and personal injury.

  - Use a power cable rated for the voltage in question. Be sure however to use a power cable conforming to safety standards of your nation when using a product overseas.
  - When inserting the plug into the electrical outlet, first turn the power switch OFF and then insert the plug as far as it will go.
  - When removing the plug from the electrical outlet, first turn the power switch OFF and then pull it out by gripping the plug. Do not pull on the power cable itself. Make sure your hands are dry at this time.
  - Before turning on the power, be sure to check that the supply voltage matches the voltage requirements of the instrument.
  - Connect the power cable to a power outlet that is connected to a protected ground terminal. Grounding will be defeated if you use an extension cord which does not include a protected ground terminal.
  - Be sure to use fuses rated for the voltage in question.
  - Do not use this instrument with the case open.
  - Do not place anything on the product and do not apply excessive pressure to the product. Also, do not place flower pots or other containers containing liquid such as chemicals near this

product.

- When the product has ventilation outlets, do not stick or drop metal or easily flammable objects into the ventilation outlets.
- When using the product on a cart, fix it with belts to avoid its drop.
- When connecting the product to peripheral equipment, turn the power off.

- **Caution Symbols Used Within this Manual**

Symbols indicating items requiring caution which are used in this manual are shown below together with their meaning.

**DANGER**: Indicates an item where there is a danger of serious personal injury (death or serious injury).

**WARNING**: Indicates an item relating to personal safety or health.

**CAUTION**: Indicates an item relating to possible damage to the product or instrument or relating to a restriction on operation.

- **Safety Marks on the Product**

The following safety marks can be found on Advantest products.

 : ATTENTION - Refer to manual.

 : Protective ground (earth) terminal.

 : DANGER - High voltage.

 : CAUTION - Risk of electric shock.

- **Replacing Parts with Limited Life**

The following parts used in the instrument are main parts with limited life.
Replace the parts listed below before their expected lifespan has expired to maintain the performance and function of the instrument.
Note that the estimated lifespan for the parts listed below may be shortened by factors such as the environment where the instrument is stored or used, and how often the instrument is used.
The parts inside are not user-replaceable. For a part replacement, please contact the Advantest sales office for servicing.

Each product may use parts with limited life.
For more information, refer to the section in this document where the parts with limited life are described.

Main Parts with Limited Life

| Part name | Life |
|---|---|
| Unit power supply | 5 years |
| Fan motor | 5 years |
| Electrolytic capacitor | 5 years |
| LCD display | 6 years |
| LCD backlight | 2.5 years |
| Floppy disk drive | 5 years |
| Memory backup battery | 5 years |

- **Hard Disk Mounted Products**

The operational warnings are listed below.

- Do not move, shock and vibrate the product while the power is turned on.
  Reading or writing data in the hard disk unit is performed with the memory disk turning at a high speed. It is a very delicate process.

- Store and operate the products under the following environmental conditions.
  An area with no sudden temperature changes.
  An area away from shock or vibrations.
  An area free from moisture, dirt, or dust.
  An area away from magnets or an instrument which generates a magnetic field.

- Make back-ups of important data.
  The data stored in the disk may become damaged if the product is mishandled. The hard disc has a limited life span which depends on the operational conditions. Note that there is no guarantee for any loss of data.

- **Precautions when Disposing of this Instrument**

When disposing of harmful substances, be sure dispose of them properly with abiding by the state-provided law.

Harmful substances: (1) PCB (polycarbon biphenyl)
(2) Mercury
(3) Ni-Cd (nickel cadmium)
(4) Other
Items possessing cyan, organic phosphorous and hexadic chromium and items which may leak cadmium or arsenic (excluding lead in solder).

Example: fluorescent tubes, batteries

# Environmental Conditions

This instrument should be only be used in an area which satisfies the following conditions:

- An area free from corrosive gas
- An area away from direct sunlight
- A dust-free area
- An area free from vibrations
- Altitude of up to 2000 m

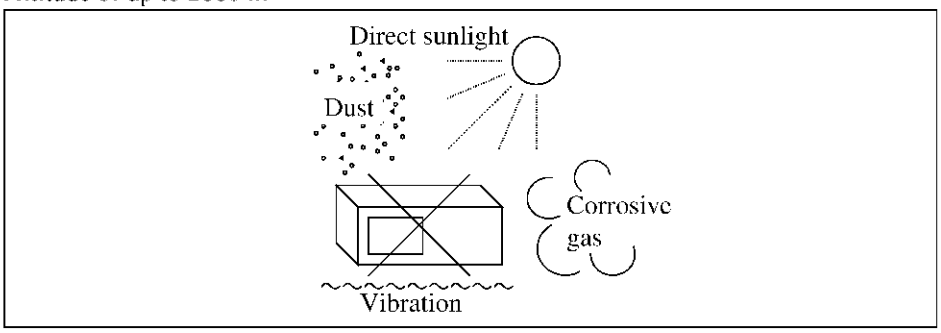



**Figure-1 Environmental Conditions**

- Operating position

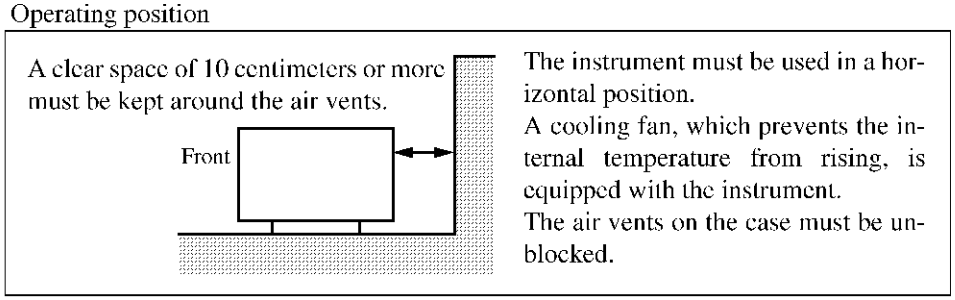



**Figure-2 Operating Position**

- Storage position

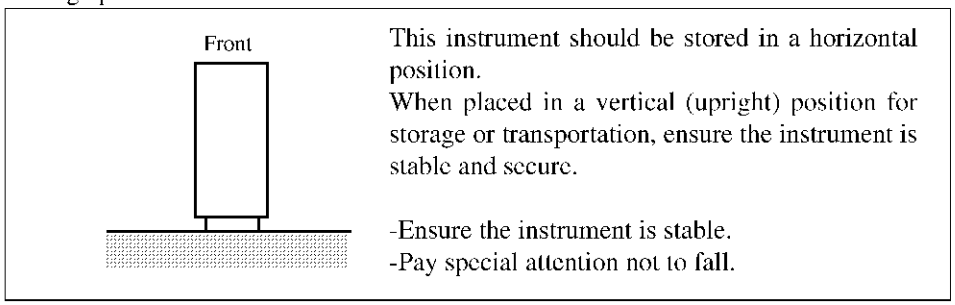



**Figure-3 Storage Position**

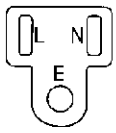
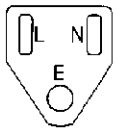
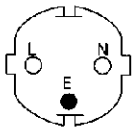
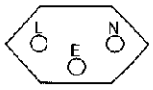
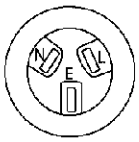
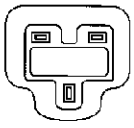
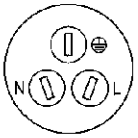
- The classification of the transient over-voltage, which exists typically in the main power supply, and the pollution degree is defined by IEC61010-1 and described below.

  Impulse withstand voltage (over-voltage) category II defined by IEC60364-4-443

  Pollution Degree 2

# Types of Power Cable

Replace any references to the power cable type, according to the following table, with the appropriate power cable type for your country.

| Plug configuration | Standards | Rating, color and length | Model number (Option number) |
|---|---|---|---|
|  | PSE: Japan<br><br>Electrical Appliance and Material Safety Law | 125 V at 7 A<br>Black<br>2 m (6 ft) | Straight: A01402<br><br>Angled: A01412 |
|  | UL: United States of America<br><br>CSA: Canada | 125 V at 7 A<br>Black<br>2 m (6 ft) | Straight: A01403<br>(Option 95)<br>Angled: A01413 |
|  | CEE: Europe<br>DEMKO: Denmark<br>NEMKO: Norway<br>VDE: Germany<br>KEMA: The Netherlands<br>CEBEC: Belgium<br>OVE: Austria<br>FIMKO: Finland<br>SEMKO: Sweden | 250 V at 6 A<br>Gray<br>2 m (6 ft) | Straight: A01404<br>(Option 96)<br>Angled: A01414 |
|  | SEV: Switzerland | 250 V at 6 A<br>Gray<br>2 m (6 ft) | Straight: A01405<br>(Option 97)<br>Angled: A01415 |
|  | SAA: Australia, New Zealand | 250 V at 6 A<br>Gray<br>2 m (6 ft) | Straight: A01406<br>(Option 98)<br>Angled: --------- |
|  | BS: United Kingdom | 250 V at 6 A<br>Black<br>2 m (6 ft) | Straight: A01407<br>(Option 99)<br>Angled: A01417 |
|  | CCC:China | 250 V at 10 A<br>Black<br>2 m (6 ft) | Straight: A114009<br>(Option 94)<br>Angled: A114109 |

# PREFACE

This manual provides information on how to operate the CDMA option (OPT60).

- Organization of this manual
  This manual consists of the following chapters:

| | |
|---|---|
| 1. Overview | A brief introduction to the product. |
| 2. Measurement flowcharts | Shows CDMA measurement procedures using flowcharts. |
| 3. Functional descriptions | Describes the functions of the various CDMA measurements |
| 4. GPIB | Shows GPIB codes and CDMA program examples. |
| 5. Specifications | Shows the specifications of this option. |
| Appendices | |
| Soft menus | Lists the soft menus used with the CDMA. |
| Error Messages | Lists the error messages for the CDMA. |

- Key notations in this manual
  The following styles are used to indicate panel keys and the soft keys in the text of this manual:

  Panel keys: In bold type — Example: **CENTER, CDMA**
  Soft keys: In bold and italic type — Example: ***1 CF STEP AUTO/MNL, 3 ACP***

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# LIST OF ILLUSTRATIONS

# LIST OF TABLES

# 1 OVERVIEW

Transmission characteristic measurements compliant with IS-95/J-STD-008 can easily be taken by installing the CDMA option on the spectrum analyzer U3641/61.

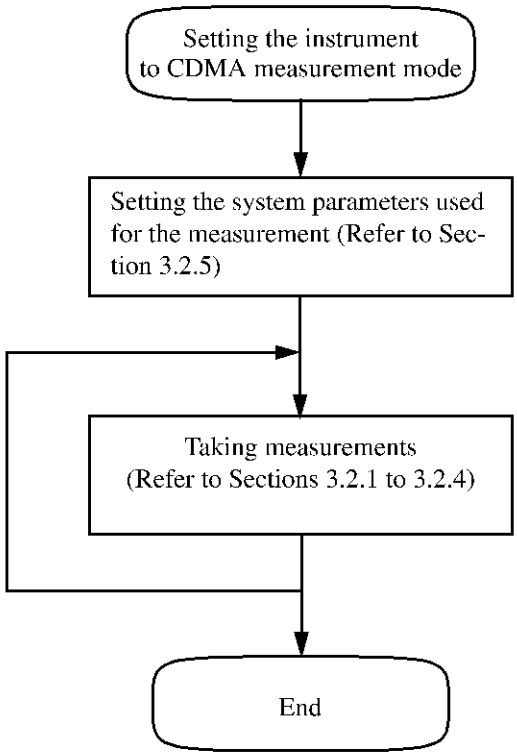
The base or mobile stations controlled by the communication systems (which are covered by this option) and measurement items are as follows.

- Communication systems:
  - US Cellular
  - KOREA Cellular
  - CHINA Cellular
  - JAPAN Cellular
  - US PCS
  - KOREA PCS

- Measurement items:
  - Channel power measurement
  - Occupied bandwidth (OBW) measurement
  - Adjacent channel leakage power (ACP) measurement and the spectrum mask function
  - Spurious emission (In-Band) measurement

# 2 MEASUREMENT FLOWCHART

Measurement flowchart of this option is shown bellow.



# 3 FUNCTIONAL DESCRIPTION

## 3.1 Entering Channels or Center Frequency

When the **CENTER** key is pressed and "***5 UNIT Hz/CH***" is set to "Hz", the Frequency Input mode is activated; when the CENTER key is pressed and "5 UNIT Hz/CH" is activated to "CH", the Channel Input mode is activated.

(1) When the Frequency Input mode is activated:

A center frequency can be activated by one of the following operations:

- Numeric keys and Unit key
- Step keys (the frequency is moved in the step frequency set using "1 CF STEP AUTO/MNL)
- Data knob

(2) When the channel input mode is activated:

A channel can be set by one of the following operations:

- Numeric keys and Unit key
- Step keys
- Data knob

**CENTER**

| | | |
|---|---|---|
| ***1 CF STEP AUTO/MNL*** | AUTO: | Sets the step size to 1/10 of the frequency span. |
| | MNL: | Sets the step size set mode of the center frequency. |
| ***2 FREQ OFS ON/OFF*** | ON: | Allows you to set the offset frequency with a range of -10 GHz to 0 Hz, or 0 Hz to +10 GHz. Any data entered with a value less than the displayed resolution is automatically corrected to a value corresponding to the resolution. currently being displayed<br>"Center frequency (displayed) = Center frequency (set) + Offset frequency" |
| | OFF: | Turns off the offset frequency. |
| ***5 UNIT Hz/CH*** | Hz: | Frequency input mode is activated. |
| | CH: | The channel input mode is activated (see Figure 3-1).<br>For more information on changing communication system types (US cellular, US PCS, etc.), refer to Section 3.2.5, Channel Setting. |

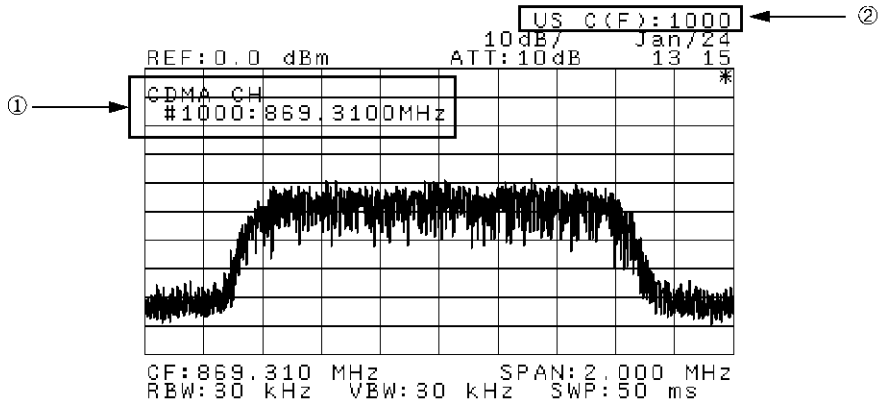



**Figure 3-1 Screen Display Showing the Channel Input Mode**

① A message shown below is displayed when the user channel table is selected and it has no data.

| CDMA CH<br>#?:No Setup |
|---|

② Asterisks (*) are displayed as a channel number when the user channel table has no data.

| US C(F):1000 |
|---|

US C: Channel type

(F): Link(FORWARD, REVERSE)

1000: Channel number

## 3.2 CDMA Measurement

Pressing **CDMA** activates the CDMA measurement mode, displays the soft menu, and lights the LED.

| | |
|---|---|
| **CDMA** | Sets CDMA measurement mode |
| **1 CH. POWER** | Displays the soft menu used with channel power measurements (Refer to Section 3.2.1). |
| **2 OBW** | Displays the soft menu used with OBW measurements (Refer to Section 3.2.2). |
| **3 ACP** | Displays the soft menu used with ACP measurements (Refer to Section 3.2.3). |
| **4 SPRIOUS** | Displays the soft menu used with spurious emission (In Band) measurements (Refer to Section 3.2.4). |
| **5 CDMA OFF** | Terminates CDMA measurement mode. |
| **6 NEXT** | A soft menu used with channel measurements and to enter user channel tables is displayed (Refer to Section 3.2.5 and 3.2.6). |

## 3.2.1 Channel power measurement

Pressing **CDMA** and "*1 CH. POWER*" displays the soft menu and the measuring window both used with channel power measurements.

**CDMA**

***1 CH. POWER***

Sets the channel power measurement mode and displays the measuring window.

Window position: Center frequency
Window width: 1.23MHz
} Factory default

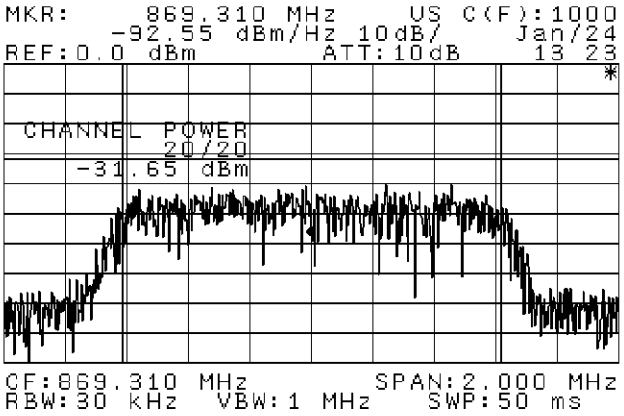



**Figure 3-2 Channel Power Measurement**

***1 MEASURE***

This mode specifies the number of channel power measurements, and starts or interrupts the measurement.

***1 START/STOP***

START: Starts the measurement.

STOP: Interrupts the measurement.

***3 AV. TIMES ON/OFF***

ON: Measures for the specified number of times. Sets values using the data knob, step keys, or numeric keys (together with unit keys).

OFF: Measures each time the specified sweep finishes.

***4 MEASURE 1/CONT***

Choose whether the measurement must be stopped or restarted for the number of times (specified by "*3 AV. TIMES ON/OFF*").

1: Stopped
When stopped, the trace is in VIEW state. If you wish to save the measurement result (BIN type) under these conditions, save it now.

CONT: Re-measurement

| | |
|---|---|
| *6 RETURN* | Retuns to the previous menu. |
| *3 WINDOW ON/OFF* | ON: Displays the measuring window and measures the power within it.<br>OFF: Removes the measuring window and measures the power over the full screen. |
| *4 WINDOW SETUP* | The position and width of the measuring window can be changed. |
| *1 WINDOW DEFAULT* | Sets the position and width of the measuring window to the factory defaults. |
| *3 WINDOW POSITIO*N | Changes the position of the measuring window.<br>Sets the values using the data knob, step keys, or numeric keys (together with unit keys). |
| *4 WINDOW WIDTH* | Changes the width of the measuring window.<br>Sets the values using the data knob, step keys, or numeric keys (together with unit keys). |
| *6 RETURN* | Returns to the previous menu. |
| *5 DSP POSI UP/LOW* | UP: Displays the measurement result in the upper left of the screen.<br>LOW: Displays the measurement result in the lower left of the screen. |
| *6 CII. POWER OFF* | Turns off the channel power measurement mode. |

## 3.2.2 Occupied Bandwidth (OBW) Measurement

Pressing **CDMA** and "***2 OBW***" displays the soft menu used with OBW measurements.

**CDMA**

***2 OBW*** Sets the OBW measurement mode.

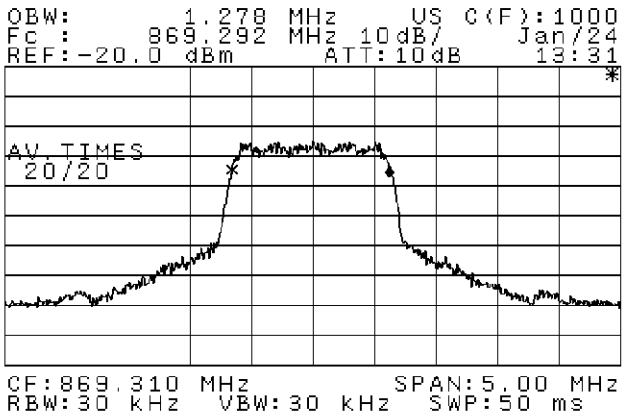



**Figure 3-3 OBW Measurement**

***1 MEASURE*** This mode specifies the number of OBW measurements, selects the trace detector and starts or interrupts the measurement. For more information, refer to Section 2.5.

***1 START/STOP***

START: Starts the measurement.

STOP: Interrupts the measurement.

***3 AV. TIMES ON/OFF***

ON: Measures for the specified number of times. Sets values using the data knob, step keys, or numeric keys (together with unit keys).

OFF: Measures each time the specified sweep finishes.

***4 MEASURE 1/CONT*** Choose whether the measurement must be stopped or restarted for the number of times (specified by "***3 AV. TIMES ON/OFF***").

1: Stopped
When stopped, the trace is in VIEW state. If you wish to save the measurement result(BIN type) under these conditions, save it now.

CONT: Re-measurement

***5 TRC DET SMPL/POS*** Sets the trace detector used with OBW, ACP or SPURIOUS measurement.

SMPL: Select a sample.

POS: Selects a positive part.

When a measurement is taken with "***3 AV.TIMES ON/OFF***" set ON, performs a trace averaging in SMPL, or performs MAX HOLD the specified number of times.

***6 RETURN*** Retuns to the previous menu.

***3 OBW 99.0%*** Sets a ratio of the occupied bandwidth to the total power. The set range is 10.0% to 99.8 %. The factory default is 99.0%.
This value is set using the Data knob, the Step keys or the numeric (together with unit keys).

***6 OBW OFF*** Turns off OBW measurement mode.

### 3.2.3 Adjacent Channel Leakage Power (ACP) Measurement

Pressing **CDMA** and "*3 ACP*" displays the soft menu used with ACP measurements.

**CDMA**

***3 ACP***

Sets the ACP measurement mode.
This mode calculates the power by integrating the area within the measuring window (1.23 MHz) after measuring the specified number of times. A template is drawn using this power as the reference power (Ref.Power).
ACP measurement which is compliant with CDMA standards is taken at each offset frequency after displaying the template. Also, a PASS/FAIL is judged using the spectrum mask. The result is made as satisfactory when the measured trace is within the template area.

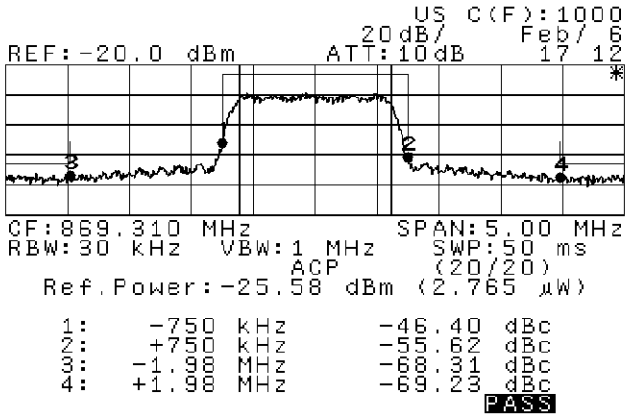



**Figure 3-4 ACP Measurement**

***1 MEASURE***

This mode specifies the number of ACP measurements, selects the trace detector and starts or interrupts the test.

***1 START/STOP***

START: Starts the measurement.

STOP: Interrupts the measurement.

***3 AV. TIMES ON/OFF***

ON: Measures for the specified number of times. Sets values using the data knob, step keys, or numeric keys (together with unit keys).

OFF: Measures each time the specified sweep finishes.

***4 MEASURE 1/CONT*** Choose whether the measurement must be stopped or restarted for the number of times (specified by "***3 AV. TIMES ON/OFF***").

1: Stopped
When stopped, the trace is in VIEW state. If you wish to save the measurement result (BIN type) under these conditions, save it now.

CONT: Re-measurement

***5 TRC DET SMPL/POS*** Sets the trace detector used with OBW, ACP or SPURIOUS measurement.

SMPL: Select a sample.

POS: Selects a positive part.

When a measurement is taken with "***3 AV.TIMES ON/OFF***" set ON, performs a trace averaging in SMPL, or performs MAX HOLD the specified number of times.

***6 RETURN*** Retuns to the previous menu.

***4 F-DOMAIN LMT LINE*** Sets the limit line used with the template.

***1 LMT LINE STD/USER*** STD: Uses CDMA standards.

USER: Uses the template entered by using the ***3 LMT LINE EDIT***.

---

*Note: When using the STD mode, the template is determined by a channel type which is compliant with CDMA standards.*

---

***3 LMT LINE EDIT*** Allows you to enter or edit the user table used for the limit line.
The user table accepts a maximum of 20 entries.
The active cursor can be moved using the step keys and data knob.
You can enter frequency and level using the numeric and unit keys.

***1 INSERT ON/OFF*** ON: Turns on the insertion mode that creates a blank line in the cursor line.

OFF: Turns off the insertion mode.

***2 CURSOR CHANGE*** Switches the inputs (frequency and level).

***3 LINE DELETE*** Removes the cursor line.

*4 TABLE INIT* Used to delete all data which are previously entered.

*1 CONFIRM* Deletes the data.

*6 CANCEL* Cancels the data deletion, and returns to the table editing menu.

*5 COPY STD → USER*
Copies the template used with STD to the user table.

*6 RETURN* Returns to the previous menu.

*4 LMT LINE MEM CARD* Saves or recalls the user table.

*1 LOAD* Recalls the user table saved in the memory card and loads it into the spectrum analyzer.

*3 STORE* Saves the user table to the memory card
When the file name already exists, the following menus are displayed.

*1 CONFIRM* After confirming the message, the data is overwritten.

*6 CANCEL* Cancels the data overwrite.

*4 RENAME* Used to change the file name (8 characters) which is already in use.
Refer to Section 7.11, Label Function in the U3641 or U3661 operation manual.

*1 MARK 1/2/3* Choose a character type from either 1, 2 or 3.

*2 SPACE* Enters a space.

*3 LABEL CLEAR*
Removes all labels currently being displyed.

*6 RETURN* Returns to the previous menu.

*5 CARD DRV A/B* Specifies the active drive in the memory card.

*6 RETURN* Returns to the previous menu.

*6 RETURN* Returns to the previous menu.

*6 ACP OFF* Turns off the ACP measurement mode.

## 3.2.4 Spurious Emission (In Band) Measurement

Pressing **CDMA** and "***4 SPURIOUS***" displays the soft menu used with spurious emission measurements.

**CDMA**

***4 SPRIOUS***

Sets the ACP measurement mode. Table 3-1 lists the frequencies which are set according to the channel and link types.
This mode calculates the power by integrating the area within the measuring window (1.23 MHz) after measuring the specified number of times. A template is drawn using this power as the reference power (Ref. Power).
This mode searches for a peak outside of the measuring window after displaying the template. The detected peak is compared with the template and displayed in the form of relative value (dBc) and PASS/FAIL (PASS is displayed if the peak is inside of the template area). PASS/FAIL is also judged using the normal marker and an arbitrary frequency.

**Table 3-1 In Band Frequency**

| Frequency Range for Spurious Emission Measurement | FORWARD | | REVERSE | |
|---|---|---|---|---|
| | Start Frequency | Stop Frequency | Center Frequency | Frequency Span |
| US Cellular | 868.39MHz | 894.59MHz | Carrier Frequency | 25MHz |
| KOREA Cellular | 868.39MHz | 894.59MHz | Carrier Frequency | 25MHz |
| CHINA Cellular | 916.40MHz | 948.10MHz | Carrier Frequency | 31MHz |
| JAPAN Cellular | 831.40MHz | 870.60MHz | Carrier Frequency | 60MHz |
| US PCS | 1929.38MHz | 1990.56MHz | Carrier Frequency | 60MHz |
| KOREA PCS | 1839.38MHz | 1870.61MHz | Carrier Frequency | 30MHz |
| User channel | Start frequency in the user tabl | Stop frequency in the user table | Carrier Frequency | 60MHz |

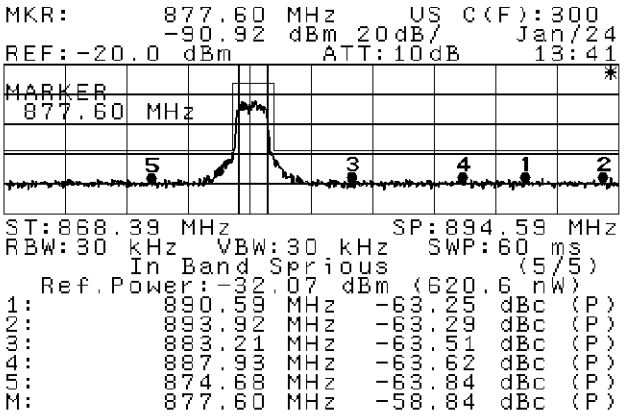



**Figure 3-5 Spurious Emission Measurement**

***1 MEASURE***

This mode specifies the number of spurious emission measurements, selects the trace detector and starts or interrupts the test.

***1 START/STOP***

START: Starts the measurement.

STOP: Interrupts the measurement.

***3 AV. TIMES ON/OFF***

ON: Measures for the specified number of times. Sets values using the data knob, step keys, or numeric keys (together with unit keys).

OFF: Measures each time the specified sweep finishes.

***4 MEASURE 1/CONT***

Choose whether the measurement must be stopped or restarted for the number of times (specified by "3 AV. TIMES ON/OFF").

1: Stopped
When stopped, the trace is in VIEW state. If you wish to save the measurement result (BIN type) under these conditions, save it now.

CONT: Re-measurement

***5 TRC DET SMPL/POS***

Sets the trace detector used with OBW, ACP or SPURIOUS measurement.

SMPL: Select a sample.

POS: Selects a positive part.

When a measurement is taken with "***3 AV.TIMES ON/OFF***" set ON, performs a trace averaging in SMPL, or performs MAX HOLD the specified number of times.

***6 RETURN*** Retuns to the previous menu.

***3 PEAK △ Y div*** Enters the trace amplitude conditions to detect a peak. For more information on the amplitude conditions, refer to paragraph (2) of Section 7.3.2 in the U3641 or U3661 operation manual.

***4 F-DOMAIN LMT LINE*** Sets the limit line used with the template.

***1 LMT LINE STD/USER*** STD: Uses CDMA standards.

USER: Uses the template entered by using the ***3 LMT LINE EDIT***.

---

*Note: When using the STD mode, the template is determined by a channel type which is compliant with CDMA standards.*

---

***3 LMT LINE EDIT*** Allows you to enter or edit the user table used for the limit line.
The user table accepts a maximum of 20 entries.
The active cursor can be moved using the step keys and data knob.
You can enter frequency and level using the numeric and unit keys.

***1 INSERT ON/OFF*** ON: Turns on the insertion mode that creates a blank line in the cursor line.

OFF: Turns off the insertion mode.

***2 CURSOR CHANGE*** Switches the inputs (frequency and level).

***3 LINE DELETE*** Removes the cursor line.

***4 TABLE INIT*** Used to delete all data which are previously entered.

***1 CONFIRM*** Deletes the data.

***6 CANCEL*** Cancels the data deletion, and returns to the table editing menu.

***5 COPY STD → USER***
Copies the template used with STD to the user table.

***6 RETURN*** Returns to the previous menu.

***4 LMT LINE MEM CARD*** Saves or recalls the user table.

***1 LOAD*** Recalls the user table saved in the memory card and loads it into the spectrum analyzer.

***3 STORE*** Saves the user table to the memory card
When the file name already exists, the following menus are displayed.

***1 CONFIRM*** After confirming the message, the data is overwritten.

***6 CANCEL*** Cancels the data overwrite.

***4 RENAME*** Used to change the file name (8 characters) which is already in use.
Refer to Section 7.11, Label Function in the U3641 or U3661 operation manual.

***1 MARK 1/2/3***
Choose a character type from either 1, 2 or 3.

***2 SPACE*** Enters a space.

***3 LABEL CLEAR***
Removes all labels currently being displyed.

***6 RETURN*** Returns to the previous menu.

***5 CARD DRV A/B*** Specifies the active drive in the memory card.

***6 RETURN*** Returns to the previous menu.

***6 RETURN*** Returns to the previous menu.

***6 SPRIOUS OFF*** Turns off the spurious emission measurement mode.

### 3.2.5 Setting Channels (the System Parameters Used with the Measurements)

Pressing **CDMA**, "*6 NEXT*", "*1 CHANNEL SETUP*" displays the screen and soft menu used for setting the channel.

**CDMA**

***6 NEXT***

***1 CHANNEL SETUP***

Sets the channel set mode. Selects the items you wish to change (channel type, link, rate and channel offset and so on) using the data knob.

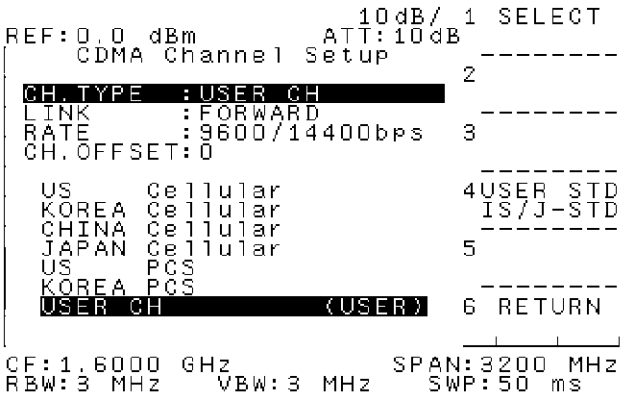



**Figure 3-6 Setting Channels**

***1 SELECT***

Selects the contents displayed in the selection window. For information on these contents, refer to Table 3-2.

---

*Note: The channel offset can be entered using the numeric and unit keys only.*

---

***4 USER STD IS/J-STD***

---

*Note: This menu is displayed only when the user channel is displayed.*

---

IS: User channel uses IS-95 as its standards.

J-STD: User channel uses J-STD-008 as its standards.

***6 RETURN***

Turns off the channel set mode.

**Table 3-2 Setting the Relevant Systems and System Parameters for the Measurements**

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>a. Channel Type</td><td>
<table>
<tr><th>Channel Type</th><th>CDMA Standards</th></tr>
<tr><td>US Cellular</td><td>IS-95</td></tr>
<tr><td>KOREA Cellular</td><td>IS-95</td></tr>
<tr><td>CHINA Cellular</td><td>IS-95</td></tr>
<tr><td>JAPAN Cellular</td><td>IS-95</td></tr>
<tr><td>US PCS</td><td>J-STD-008</td></tr>
<tr><td>KOREA PCS</td><td>J-STD-008</td></tr>
<tr><td>User channel (Note 1)</td><td>Either IS-95 or J-STD-008 can be selected.</td></tr>
</table>
</td></tr>
<tr><td>b. Link (Directions of signal)</td><td>FORWARD: Falling signal (Note 2)<br>REVERSE: Rising signal (Note 3)</td></tr>
<tr><td>c. Rate (Communication rate)</td><td>9600/14400bps<br>4800/7200bps<br>2400/3600bps<br>1200/1800bps</td></tr>
<tr><td>d. Channel offset</td><td>Channel setting = Channel offset + Channel input number<br>(Example)<br>The channel setting is 1010 if you enter 1000 as the channel offset, and 10 as the channel input number using the numeric and unit keys.</td></tr>
</table>

*Note 1: This is the user channel which you can use to enter a maximum of 99 channels and frequencies with the editor.*
*For more details about how to input data, refer to Section 3.2.6, User Channel Table.*

*Note 2: When set to FORWARD, the communication rate does not have to be set, because this does not have any effect.*

*Note 3: Sweep times are changed according to the Rate after setting the measurement mode to either OBW, ACP or SPURIOUS EMISSION with REVERSE already selected. Set "**5 TRC DET SMPL/POS**" to POS when measuring OBW, ACP or SPURIOUS EMISSION using a burst wave obtained from a rate setting other than Full Rate (9600/14400 bps) and the REVERSE link mode.*
*This option, however, does not support channel power measurements for burst signals. Set Rate to Full Rate when measuring signals in the REVERSE Link mode.*

## 3.2.6 Entering Data in the User Channel Table

Pressing **CDMA**, "***6 NEXT***" and "***3 USER CII EDIT***" displays the editor and soft menu both used for inputting data in the user channel table.

**CDMA**

***6 NEXT***

***3 USER CH EDIT***

Allows you to enter or edit the user channel table. The user table can store a maximum of 99 entries.

1. The active cursor is moved using the step keys or data knob.
   You can enter the channel number and frequency using the numeric and unit keys.
2. The start and stop frequencies used for spurious emission measurements (Link: FORWARD) are designated as START F and STOP F, respectively.

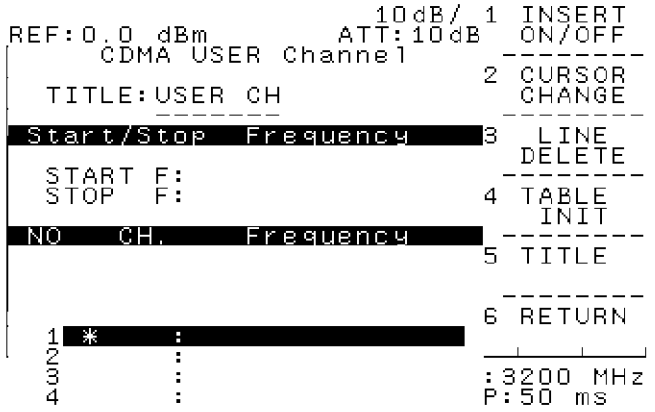



**Figure 3-7 User Channel Table**

***1 INSERT ON/OFF***

ON: Sets the insertion mode that creates a blank line in the cursor line.

OFF: Turns off the insertion mode.

*Note: The insert mode cannot be set to ON when the cursor line is blank.*

***2 CURSOR CHANGE***

Switches the inputs (channel number or frequency).

***3 LINE DELETE***

Removes the cursor line.

***4 TABLE INIT***

Removes all input data.

| | |
|---|---|
| *1 CONFIRM* | Removes the data. |
| *6 CANCEL* | Cancels the data deletion, and returns to the Table Edition menu. |
| *5 TITLE* | Arbitrarily creates a title in the user channel table. The factory default is "USER CH."<br>For more information on how to change the title, Refer to Section 7.11, Label Function in the U3641 or U3661 Operation manual. |
| *1 MARK 1/2/3* | Choose the font type you wish to use from either 1, 2 or 3. |
| *2 SPACE* | Enter a space. |
| *3 LABEL CLEAR* | Removes all labels displayed. |
| *6 RETURN* | Returns to the previous menu. |
| *4 USER CH MEM CARD* | Performs saving to or recalling from the user channel table. |
| *1 LOAD* | Recalls the user channel table saved in the memory card and loads it into the spectrum analyzer. |
| *3 STORE* | Saves the user channel table to the memory card<br>When the file name already exists, the following menus are displayed. |
| *1 CONFIRM* | After confirming the message, the data is overwritten. |
| *6 CANCEL* | Cancels the data overwrite. |
| *4 RENAME* | Used to change the file name (8 characters) which is already in use.<br>Refer to Section 7.11, Label Function in the U3641 or U3661 operation manual. |
| *1 MARK 1/2/3* | Choose a character type from either 1, 2 or 3. |
| *2 SPACE* | Enters a space. |
| *3 LABEL CLEAR* | Removes all labels currently being displyed. |
| *6 RETURN* | Returns to the previous menu. |
| *5 CARD DRV A/B* | Specifies the active drive in the memory card. |

| | |
|---|---|
| ***6 RETURN*** | Returns to the previous menu. |
| ***6 RETURN*** | Returns to the previous menu. |

# 4 GPIB

## 4.1 List of GPIB Codes

Notes on annotations used in this list:

- *1: Numeric data can be entered following the code.

  *2: Enter the frequency and level.

  *3: Enter /filename/. For example, CLMST/A:LMTLINEA/ means that file name LMTLINEA is saved in drive A of the memory card.
- A plus sign (+) in the output format column indicates that more than a single piece of data can be output.
- ON/OFF in the output format column corresponds to an output of 1 or 0, respectively.
- The units in the output column are as follows: Hz for the frequency; second for the time.

**Table 4-1 List of GPIB Codes (1 of 4)**

| FUNCTION | Listener Code | Talker Request | | | Remarks |
|---|---|---|---|---|---|
| | | Code | Output Format | Header | |
| CDMA mode | | CDMA? | ON/OFF | — | |
| ON | CDMA ON | | | | |
| OFF | CDMA OFF | | | | |
| Channel power measurement<br>OBW measurement<br>ACP measurement<br>Spurious emission measurement | | | | | |
| START | CMSSRT | | | | |
| STOP | CMSSTP | | | | |
| Number of averaging | — | CPWTM? | Integer (2 to 999) | — | |
| ON | CPWTM ON*1 | — | — | — | |
| OFF | CPWTM OFF | — | — | — | |
| Measurement mode | | | | | |
| Continuous | CMSCNT | | | | |
| Once | CMSONE | | | | |
| Trace detector | | | | | |
| Sample | CSMP | | | | |
| Positive | CPOS | | | | |
| Channel power | — | CPWCH? | Level | — | |
| ON | CPWCH ON | — | — | — | |
| OFF | CPWCH OFF | — | — | — | |
| Measuring window | | | | | |
| ON | CWDO ON | — | — | — | |
| OFF | CWDO OFF | — | — | — | |
| Position | CWDOLX*1 | — | — | — | |
| Width | CWDODX*1 | — | — | — | |
| Factory default | CWDODFT | — | — | — | |
| Measurement result display position | | | | | |
| Upper | CPDU | — | — | — | |
| Lower | CPDL | — | — | — | |

**Table 4-1 List of GPIB Codes (2 of 4)**

| FUNCTION | Listener Code | Talker Request | | | Remarks |
|---|---|---|---|---|---|
| | | Code | Output Format | Header | |
| OBW | | COBW? | Frequency + Frequency | — | |
| ON | COBW ON | | | | |
| OFF | COBW OFF | | | | |
| OBW % | COBWR*1 | COBWR? | real value | — | |
| ACP | | CACP? | PASS/FAIL+d1+d2<br>+a1+a2+a3+a4<br>1:PASS, 0:FAIL<br>d1: Level (Reference power dBm)<br>d2: Level (Reference power W)<br>a1: Primary level<br>a2: +Primary level<br>a3: –Secondary level<br>a4: +Secondary level | — | |
| ON | CACP ON | | | | |
| OFF | CACP OFF | | | | |
| Spurious emission | | CSPR? | n+d1+d2,<br>(fn+ln+PASS/FAIL) × n<br>n: Number of peaks<br>d1: Level (Reference power dBm)<br>d2: Level (Reference power W)<br>fn: Frequency at the marker<br>ln: Level at the marker<br>1:PASS, 0:FAIL | | The number of peaks is (n+1) when the marker is ON. |
| ON | CSPR ON | | | | |
| OFF | CSPR OFF | | | | |
| Template for ACP& Spurious emission | | | | | |
| Input for the user table | CLMIN*2 | — | — | — | |
| Deletion of the user table | CLMDL | — | — | — | |
| Selection of the template | | | | | |
| STD | CLMSTD | — | — | — | |
| USER | CLMUSR | — | — | — | |
| Memory card | | | | | |
| STORE | CLMST*3 | — | — | — | |
| LOAD | CLMLD*3 | — | — | — | |

**Table 4-1 List of GPIB Codes (3 of 4)**

| FUNCTION | Listner Code | Talker Request | | | Remarks |
|---|---|---|---|---|---|
| | | Code | Output Format | Header | |
| CDMA Channel | CDMACH*1 | CDMACH? | Integer | CCH | |
| Input selection | | CUN? | 0:Frequencyr<br>1:Channel | | |
| Channel Input Mode | CUNFR | — | — | — | |
| Frequency input mode | CUNCH | — | — | — | |
| Selection of the channel table | | CTYPE? | 0:US Cellular<br>1:KOREA Cellular<br>2:CHINA Cellular<br>3:JAPAN Cellular<br>4:US PCS<br>5:KOREA PCS<br>6:User channel | — | |
| US Cellular | | | | | |
| KOREA Cellular | CUS | — | — | — | |
| CHINA Cellular | CKOREA | — | — | — | |
| JAPAN Cellular | CCHINA | — | — | — | |
| US PCS | CJAPAN | — | — | — | |
| KOREA PCS | PUS | — | — | — | |
| User channel | PKOREA | — | — | — | |
| | CUSR | — | — | — | |
| Link | | LINK? | 0:FORWARD<br>1:REVERSE | — | |
| FORWARD | LINK FWD | — | — | — | |
| REVERSE | LINK RVS | — | — | — | |
| Rate | | RATE? | 0:9600/14400<br>1:4800/7200<br>2:2400/1800<br>3:1200/1800 | — | |
| | RATE9600 | — | — | — | |
| | RATE4800 | — | — | — | |
| | RATE2400 | — | — | — | |
| | RATE1200 | — | — | — | |
| Channel offset | CHOFS*1 | CHOFS | Integer | — | |
| CDMA standards for the user channel | | | | | |
| IS-95 | USIS | — | — | — | |
| J-STD-008 | USJSTD | — | — | — | |

**Table 4-1 List of GPIB Codes (4 of 4)**

| FUNCTION | Listener Code | Talker Request | | | Remarks |
|---|---|---|---|---|---|
| | | Code | Output Format | Header | |
| User channel table | | | | | |
| Channel & Frequency Input | CUSIN*1 | — | — | — | |
| Input for start frequency | CUSINST*1 | — | — | — | |
| Input for stop frequency | CUSINSP*1 | — | — | — | |
| Table deletion | CUSDL | — | — | — | |
| Input for the title | CUSTIT*3 | — | — | — | |
| STORE | CUSST*3 | — | — | — | |
| LOAD | CUSLD*3 | — | — | — | |

## 4.2 Service Request (SRQ)

The status of various aspects of the spectrum analyzer can be detected remotely using the GPIB service request function. A controller can read out the status of the spectrum analyzer because an error sets the corresponding bit in the status byte using serial polling.

**Table 4-2 SRQ ON/OFF Specification Codes**

| GPIB Code | Content |
|---|---|
| S0 | Sends SRQ signal (interruption) to the controller. |
| S1 | Does not send SRQ signal (interruption) to the controller. |
| S2 | Clears the status byte. |

**Table 4-3 Status Byte**

| Bit | Value in Decimal | Content |
|---|---|---|
| 0 | 1 | This is set to 1 when UNCAL is generated. |
| 1 | 2 | This is set to 1 when a calibration finishes.. |
| 2 | 4 | This is set to 1 when a sweep finishes. |
| 3 | 8 | This is set to 1 when the averaging (for channel power, OBW, ACP or spurious emission measurement) reaches the set number. |
| 4 | 16 | This is set to 1 when plot output finishes. |
| 5 | 32 | This is set to 1 when a GPIB code error or mode error occurs (SYNTAX ERR). |
| 6 | 64 | This is set to 1 when any bit in bits 0 through 5 or bit 7 is set to 1 after sending a service request (S0). |
| 7 | 128 | |

## 4.3 Sample Programs

The following sample programs use N88-BASIC in PC9801 series.

Example 1: ACP measurement

```
1000 ISET IFC:ISET REN
1010 PRINT @8;"S2"                          ! Clear the status byte.
1020 PRINT @8;"HD0 CACP ON CMSSRT"          ! Start ACP measurement
1030  *LOOP
1040    POLL 8,S
1050 IF (S AND 8)=0 THEN GOTO *LOOP         ! Wait until the measurement finishes.
1060 PRINT @8;"CACP?"                       ! Read out the measurement result.
1070 INPUT @8;PS,DBM,WATT,L1,L2,L3,L4       ! Read out Pass/Fail, the reference power and ACP.
1080 END
```

Example 2: Spurious emission (In Band) measurement

```
1000 ISET IFC:ISET REN
1010 PRINT @8;"S2"                          ! Clear the status byte.
1020 PRINT @8;"HD0 CSPR ON CMSSRT"          ! Start SPURIOUS measurement
1030 *LOOP
1040   ROLL 8,S
1050   IF (S AND 8)=0 THEN GOTO *LOOP       ! Wait until the measurement finishes.
1060 PRINT @8;"CSPR?"                       ! Read out the measurement result.
1070 INPUT @8;N,DBM,WATT                    ! Read out the number of peaks and reference power.
1080 FOR I=1 TO N                           ! Read out the data associated the peaks.
1090 INPUT @8;F,L,PS                        ! Marker frequency or level, PASS/FAIL
1100 NEXT I
1110 END
```

Example 3: Entering user channel table

```
1000 ISET IFC:ISET REN
1010 PRINT @8;"CUSDL"                       ! Initialize the user channel table.
1020 PRINT @8;"CUSTIT /CDMA CH/"            ! Set the title.
1030 PRINT @8;"CUSINST 5MZ"                 ! Set the start frequency in the table.
1040 PRINT @8;"CUSINSP 35MZ"                ! Set the stop frequency in the table.
1050 PRINT @8;"CUSIN"                       ! Input state of the channel and frequency.
1060 PRINT @8;"1ENT 10MZ"                   ! Enter the channel and frequency.
1070 PRINT @8;"2ENT 20MZ"
1080 PRINT @8;"3ENT 30MZ"
1090 PRINT @8;"CUSR"                        ! Change the channel type to USER CH.
1100 PRINT @8;"CDMACH 1ENT"                 ! Set the channel.
1110 END
```

# 5 SPECIFICATIONS

The spectrum analyzer can perform measurements compliant with CDMA standards IS95 and J-STD-008.

(1) Channel Inputs

- US Cellular 1 to 799, 999 to 1023
- KOREAK Cellular 1 to 799, 999 to 1023
- CHINA Cellular 0 to 1000, 1329 to 2047
- JAPAN Cellular 1 to 799, 801 to 1039, 1041 to 1199
- US PCS 0 to 1199
- KOREA PCS 0 to 600
- User channel (99 channels at max.)

(2) Channel Power Measurement

After calibrating, automatically set with the preamplifier OFF: -50 dBm/1.23 MHz to +20 dBm/1.23 MHz within a range of 80 dB from the reference level

- Absolute accuracy: ≤ ± 2.0 dB (15°C to 35°C)
  ≤ ± 2.5 dB (0°C to 50°C)
- Relative accuracy: ≤ ± 0.5 dB (15°C to 35°C)
  ≤ ± 0.8 dB (0°C to 50°C)

(3) Occupied Bandwidth (OBW) Measurement

OBW%: Can be set between 10.0% to 99.8%.

(4) Adjacent Channel Leakage Power (ACP) Measurement

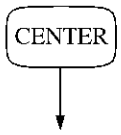
- Template display (the template is drawn after performing the specified number of measurements, and calculating the reference power)
- Either the standard or user template can be selected.
- Spurious mask function (PASS/FAIL)

(5) Spurious Emission (In Band) Measurement (relative value)

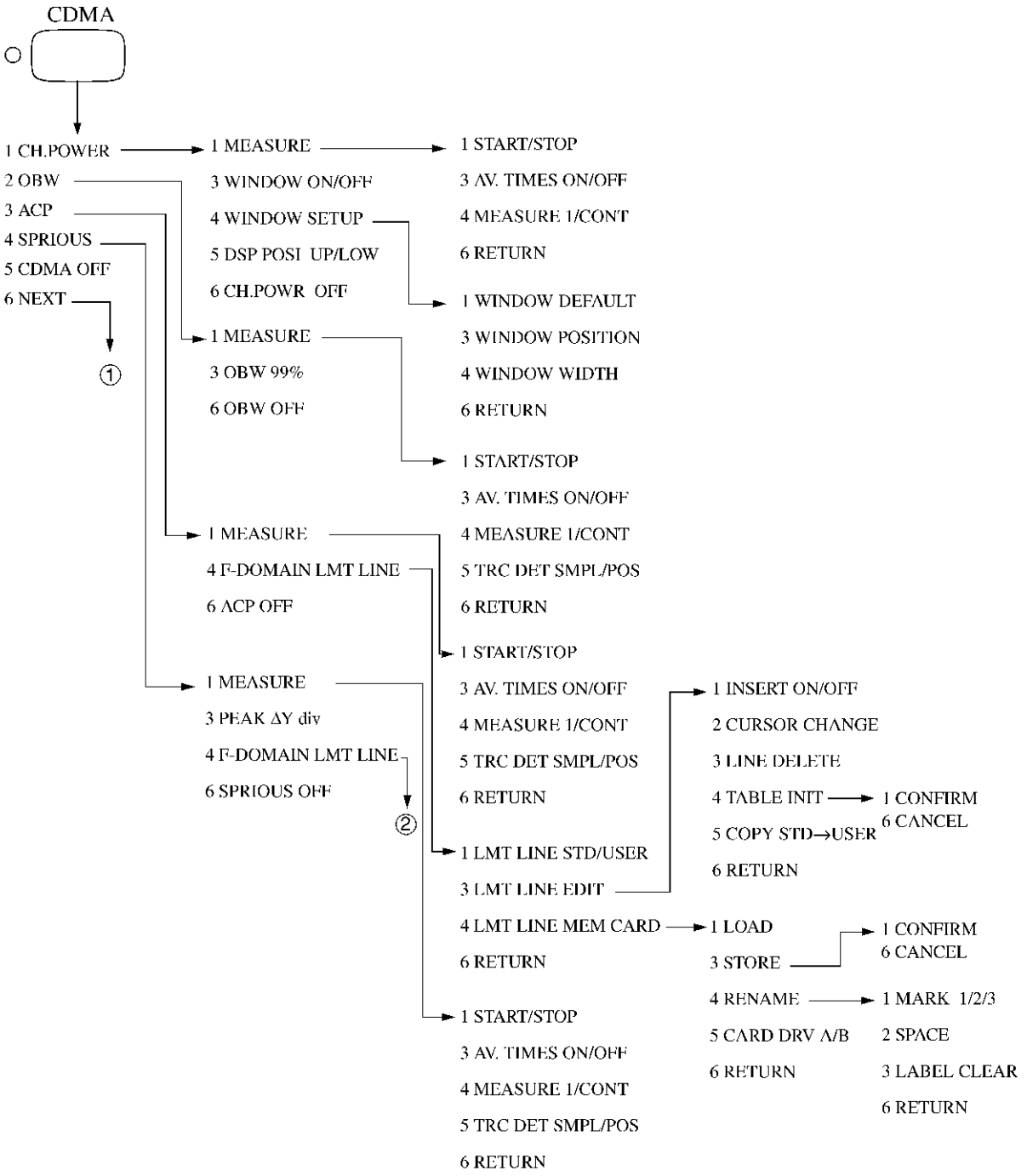
- Template display (the template is drawn after measuring the specified number of times, then calculating the reference power)
- Either the standard or user template can be selected.
- PASS/FAIL function

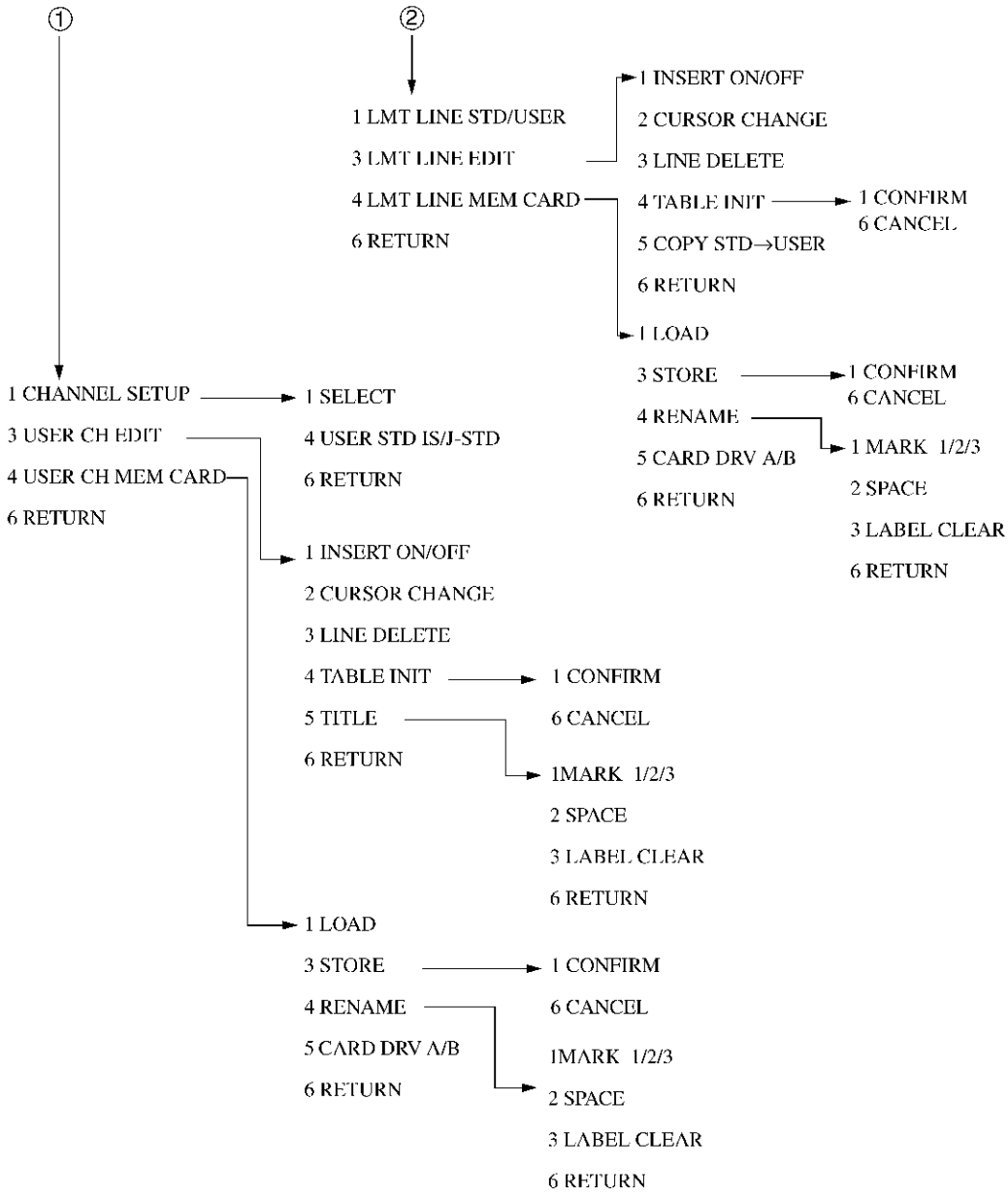
# APPENDIX

## A.1 Soft Menus




1 CF STEP AUTO/MNL
2 FREQ OFS ON/OFF
5 UNIT Hz/CH


CDMA
1 CH.POWER
2 OBW
3 ACP
4 SPRIOUS
5 CDMA OFF
6 NEXT
①
1 MEASURE
3 WINDOW ON/OFF
4 WINDOW SETUP
5 DSP POSI UP/LOW
6 CH.POWR OFF
1 START/STOP
3 AV. TIMES ON/OFF
4 MEASURE 1/CONT
6 RETURN
1 WINDOW DEFAULT
3 WINDOW POSITION
4 WINDOW WIDTH
6 RETURN
1 MEASURE
3 OBW 99%
6 OBW OFF
1 START/STOP
3 AV. TIMES ON/OFF
4 MEASURE 1/CONT
5 TRC DET SMPL/POS
6 RETURN
1 MEASURE
4 F-DOMAIN LMT LINE
6 ACP OFF
1 START/STOP
3 AV. TIMES ON/OFF
4 MEASURE 1/CONT
5 TRC DET SMPL/POS
6 RETURN
1 MEASURE
3 PEAK ΔY div
4 F-DOMAIN LMT LINE
6 SPRIOUS OFF
②
1 LMT LINE STD/USER
3 LMT LINE EDIT
4 LMT LINE MEM CARD
6 RETURN
1 INSERT ON/OFF
2 CURSOR CHANGE
3 LINE DELETE
4 TABLE INIT
5 COPY STD→USER
6 RETURN
1 CONFIRM
6 CANCEL
1 LOAD
3 STORE
4 RENAME
5 CARD DRV A/B
6 RETURN
1 CONFIRM
6 CANCEL
1 MARK 1/2/3
2 SPACE
3 LABEL CLEAR
6 RETURN
1 START/STOP
3 AV. TIMES ON/OFF
4 MEASURE 1/CONT
5 TRC DET SMPL/POS
6 RETURN

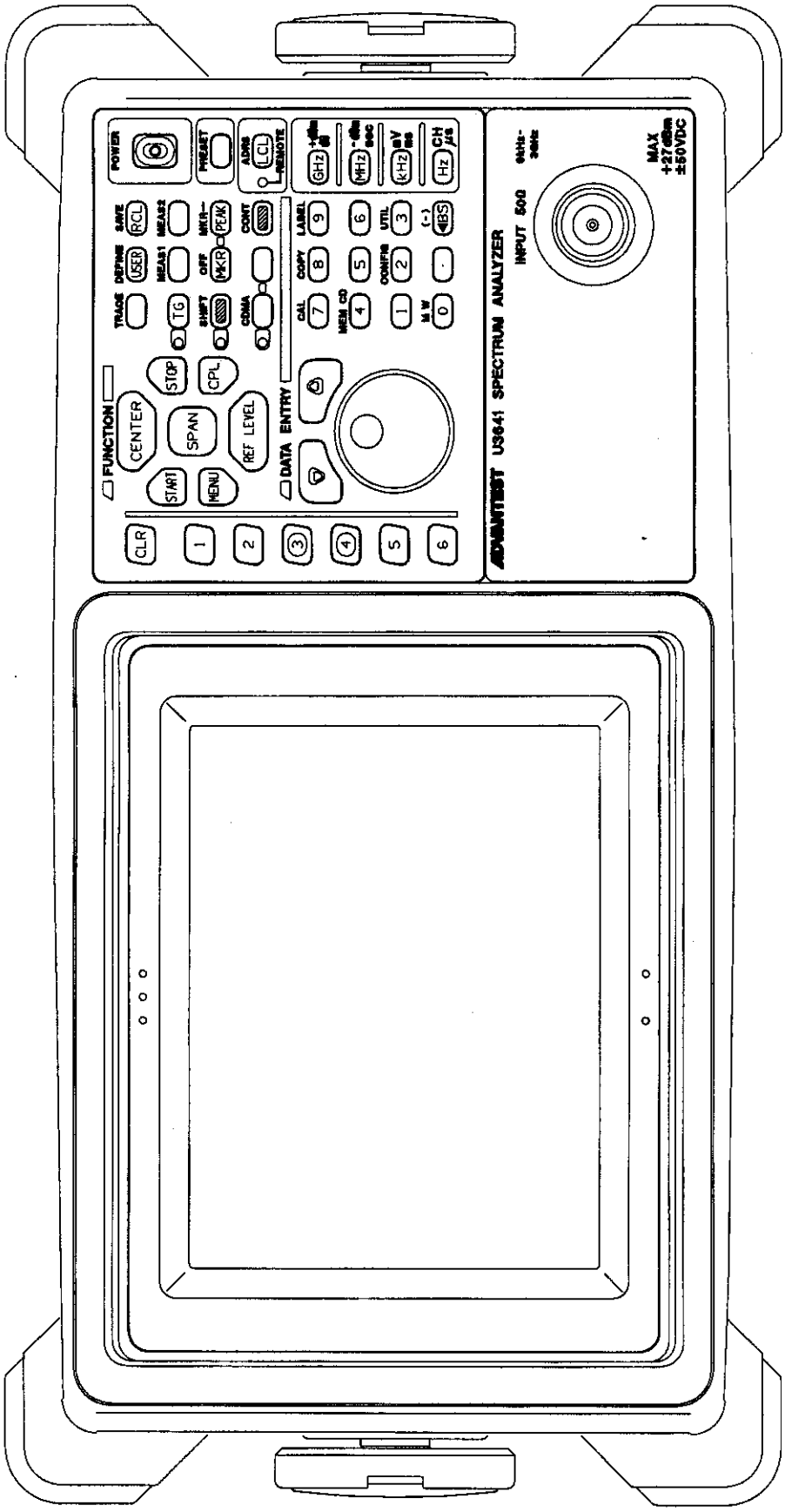

①
②
1 LMT LINE STD/USER
3 LMT LINE EDIT
4 LMT LINE MEM CARD
6 RETURN
1 INSERT ON/OFF
2 CURSOR CHANGE
3 LINE DELETE
4 TABLE INIT
1 CONFIRM
6 CANCEL
5 COPY STD→USER
6 RETURN
1 LOAD
3 STORE
1 CONFIRM
6 CANCEL
4 RENAME
1 MARK 1/2/3
2 SPACE
3 LABEL CLEAR
6 RETURN
5 CARD DRV A/B
6 RETURN
1 CHANNEL SETUP
3 USER CH EDIT
4 USER CH MEM CARD
6 RETURN
1 SELECT
4 USER STD IS/J-STD
6 RETURN
1 INSERT ON/OFF
2 CURSOR CHANGE
3 LINE DELETE
4 TABLE INIT
1 CONFIRM
6 CANCEL
5 TITLE
1MARK 1/2/3
2 SPACE
3 LABEL CLEAR
6 RETURN
6 RETURN
1 LOAD
3 STORE
1 CONFIRM
6 CANCEL
4 RENAME
1MARK 1/2/3
2 SPACE
3 LABEL CLEAR
6 RETURN
5 CARD DRV A/B
6 RETURN

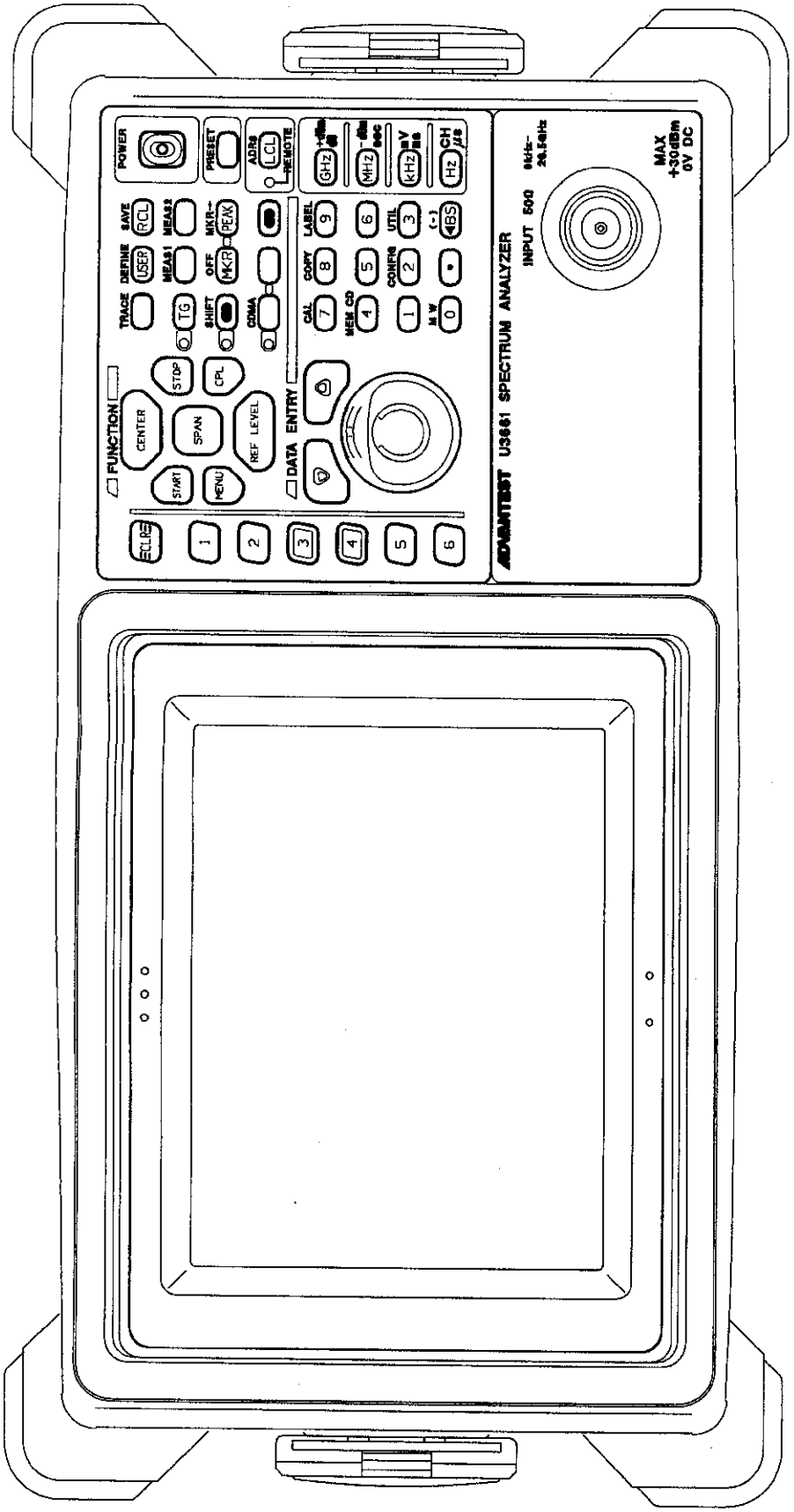
## A.2 Error Messages

| Error Code | Displayed Message | Description |
|---|---|---|
| ERR:229 | NG LIN SCL | CDMA measurement mode cannot be set, because the spectrum analyzer is set to the linear scale. |
| ERR:317 | NG MNL SWP | CDMA measurement mode cannot be set, because the spectrum analyzer is set to the linear scale. |
| ERR:363 | ANT CORR ON | CDMA measurement mode cannot be set, because the spectrum analyzer is set to the antenna correction mode. |
| ERR:755 | CDMA MODE | Disables the marker function, because the spectrum analyzer is in CDMA measurement mode. |
| ERR:756 | CDMA MODE | Disables the trace function, because the spectrum analyzer is in CDMA measurement mode. |
| ERR:758 | CDMA MODE | The linear scale cannot be selected, because the spectrum analyzer is in CDMA measurement mode. |
| ERR:759 | CDMA MODE | The only unit which can be used is dBm, because the spectrum analyzer is in CDMA measurement mode. |
| ERR:760 | CDMA MODE | MANUAL SWEEP cannot be performed, because the spectrum analyzer is in CDMA measurement mode. |
| ERR:761 | CDMA MODE | Antenna correction cannot be turned ON or antenna factor cannot be changed, because the spectrum analyzer is in CDMA measurement mode. |
| ERR:762 | CDMA MODE | Limit line cannot be turned ON, because the spectrum analyzer is in CDMA measurement mode. |
| ERR:763 | CDMA MODE | WIDE RBW cannot be turned ON, because the spectrum analyzer is in CDMA measurement mode. |
| ERR:764 | CDMA MODE | The delay sweep mode cannot be set ON, because the spectrum analyzer is in CDMA measurement mode. |
| ERR:765 | NG LMT LINE | Measurement cannot be started, because there is no data in the user table used with the limit line. |
| ERR:766 | WINDOW LMT | The width of the measuring window is in the minimum size and cannot be made smaller than the actual size. |
| ERR:767 | SPRIOUS MD! | The Frequency Input mode cannot be set, because the spectrum analyzer is in Spurious Emission Measurement mode. |
| ERR:768 | FREQ IINPUT! | The Spurious Emission Measurement mode cannot be set, because the spectrum analyzer is in the Frequency Input mode. |
| ERR:769 | USER TABLE? | The Frequency Input mode cannot be set, because the spectrum analyzer is in Spurious Emission Measurement mode. |

| Error Code | Displayed Message | Description |
|---|---|---|
| ERR:770 | OBW MD! | The marker function cannot be set ON, because the spectrum analyzer is in OBW measurement mode. |
| ERR:771 | MEAS MODE? | CDMA measurement mode (the channel power, OBW and so on) is not selected. |
| ERR:772 | CH.POW MD? | Noise/Hz cannot be set, because channel power measurement mode is not set. |

# EXTERNAL VIEW




POWER
PRESET
ADRS
LCL
REMOTE
GHz
MHz
kHz
Hz
CH
SAVE
RCL
DEFINE
USER
MEAS1
MEAS2
MKR→PEAK
OFF MKR
TRACE
TG
SHIFT
CNMA
LABEL
UTIL
COPY
CONFIG
CAL
MEM CD
M W
BS
FUNCTION
CENTER
SPAN
REF LEVEL
START
MENU
STOP
CPL
DATA ENTRY
ECL DS
INPUT 50Ω
MAX
+30dBm
0V DC
ADVANTEST U3661 SPECTRUM ANALYZER

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2. The warranty period for the Product (the "Warranty Period") will be a period of one year commencing on the delivery date of the Product.

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4. This limited warranty will not apply to defects or damage to the Product or any part or component thereof resulting from any of the following:

   (a) any modifications, maintenance or repairs other than modifications, maintenance or repairs (i) performed by Advantest or (ii) specifically recommended or authorized by Advantest and performed in accordance with Advantest 's instructions;

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   (c) use of the Product under operating conditions or environments different than those specified in the Operation Manual or recommended by Advantest, including, without limitation, (i) instances where the Product has been subjected to physical stress or electrical voltage exceeding the permissible range and (ii) instances where the corrosion of electrical circuits or other deterioration was accelerated by exposure to corrosive gases or dusty environments;

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# CUSTOMER SERVICE DESCRIPTION

In order to maintain safe and trouble-free operation of the Product and to prevent the incurrence of unnecessary costs and expenses, Advantest recommends a regular preventive maintenance program under its maintenance agreement.

Advantest's maintenance agreement provides the Purchaser on-site and off-site maintenance, parts, maintenance machinery, regular inspections, and telephone support and will last a maximum of ten years from the date the delivery of the Product. For specific details of the services provided under the maintenance agreement, please contact the nearest Advantest office listed at the end of this Operation Manual or Advantest 's sales representatives.

Some of the components and parts of this Product have a limited operating life (such as, electrical and mechanical parts, fan motors, unit power supply, etc.). Accordingly, these components and parts will have to be replaced on a periodic basis. If the operating life of a component or part has expired and such component or part has not been replaced, there is a possibility that the Product will not perform properly. Additionally, if the operating life of a component or part has expired and continued use of such component or part damages the Product, the Product may not be repairable. Please contact the nearest Advantest office listed at the end of this Operation Manual or Advantest's sales representatives to determine the operating life of a specific component or part, as the operating life may vary depending on various factors such as operating condition and usage environment.

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