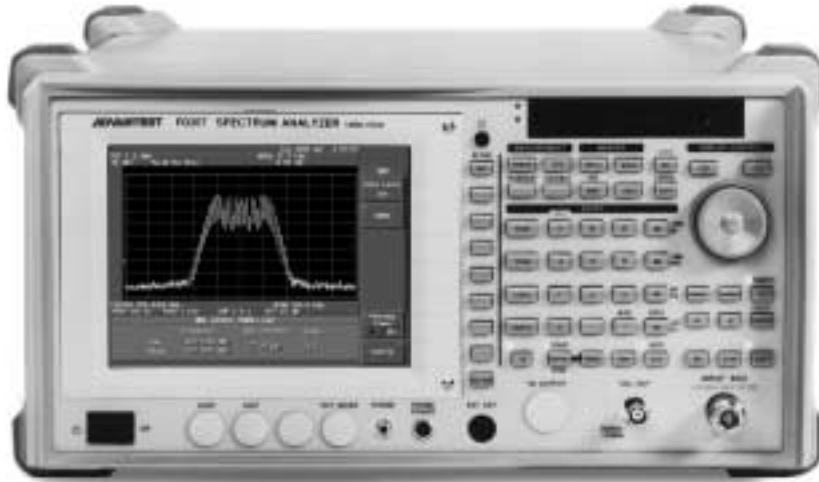


For AMPS/JTACS/NTACS Transmission Test



Spectrum Analyzer R3267/3273

■ Overview

The AMPS/JTACS/NTACS analysis software option (OPT.73) makes R3267/3273 possible to measure the AMPS/JTACS/NTACS transmission test items.

This option contributes to both base station/mobile station with a single unit. In addition, modulation signal analysis such as FM Deviation and ACP, OBW, Power (standard items) measurement are possible. (Operation of OPT.73 require Digital Modulation Analysis Option (OPT.01).)

■ Target systems

AMPS/JTACS/NTACS - UPLINK/DOWNLINK

■ Features

- Dual mode analysis
 - Spectrum analyzer mode
 - (R3267 100Hz to 8GHz)
 - (R3273 100Hz to 26.5GHz)
 - AMPS/JTACS/NTACS Tx tester mode
- Standard items measurement such as ACP, OBW and FM Deviation.
- Automatic setting of AMPS/JTACS/NTACS parameters
- Simple operation with conversational key menu.
- PASS/FAIL judgement function is provided

■ Measurement items

- Power
- OBW
- ACP
- Carrier Frequency Error
- FM Deviation
- Spurious Emission
- Fund. Freq. and Level of FM Demodulated Signal
- Distortion and Harmonics of FM Demodulated Signal

Display Example

STD parameter setup menu

Tue 2000 Apr 4 15:16

STD Measurement Parameter Set

Type	AMPS	JTACS	NTACS
Link	UPLINK	DOWNLINK	
Offset Level	0.0 dB		
Frequency Input	FREQUENCY	CHANNEL	
Cont Auto Level Set	ON	OFF	

1 DC CAL

6 Channel Setting

7 STD Setup

Channel setup menu

Tue 2000 Apr 4 16:20

Channel Setting

Table 1 : ENABLE DISABLE

1 MHz 799

Uplink : 30.00 kHz *(N+ 0) * 825.00000 MHz

Downlink : 30.00 kHz *(N+ 0) * 870.00000 MHz

Table 2 : ENABLE DISABLE

990 MHz 1023

Uplink : 30.00 kHz *(N+ -1023) * 825.00000 MHz

Downlink : 30.00 kHz *(N+ -1023) * 870.00000 MHz

Table 3 : ENABLE DISABLE

MHz

Uplink : * (N+) *

Downlink : * (N+) *

Channel

1 Copy from STD

<AMPS>

Tx Tester Mode menu

Tue 2000 Apr 4 15:16

Measurement Parameter (Setup in the STD)

Standard

Type	AMPS
Link	DOWNLINK
Offset Level	0.0 dB
Frequency Input	CHANNEL
Cont Auto Level Set	OFF

Parameter Entry

Frequency	870.030000 MHz
Reference Level	-0.9 dBm
Attenuator	10.0 dB
10MHz Ref.	INT

1 Transient

2 T-Domain

3 F-Domain

4 Modulation

7 STD

Channel setup menu

Tue 2000 Apr 4 16:19

Channel Setting

Table 1 : ENABLE DISABLE

1 MHz 799

Uplink : 12.50 kHz *(N+ 0) * 915.00000 MHz

Downlink : 12.50 kHz *(N+ 0) * 860.00000 MHz

Table 2 : ENABLE DISABLE

801 MHz 1039

Uplink : 12.50 kHz *(N+ -800) * 915.00000 MHz

Downlink : 12.50 kHz *(N+ -800) * 860.00000 MHz

Table 3 : ENABLE DISABLE

MHz

Uplink : * (N+) *

Downlink : * (N+) *

Channel

1 Copy from STD

<JTACS>

F-Domain Power

Tue 2000 Apr 4 16:28

Power

1 Auto Level Set

2 Gate Setup

3 Window Setup

5 Y Scale [dB/div] 10 | 5 | 2

6 Average Times ON | OFF

7 Config

REF 40.9 dBm

10 dB/ *A_Write Smp1

LOF

CENTER 860.0125 MHz SPAN 100.0 kHz

*RBW 1 kHz *VBW 30 kHz SMP 200 ms ATT 15 dB

Power (JTACS: DOWN Link)

<< Window Conditions >> Power Judge

Posi : 860.012500 MHz 3.957 W PASS

Width: 32.0 kHz

Tx Power

Tue 2000 Apr 4 16:29

Tx Power

Results

Tx Power : 35.97 dBm

: 3.96 W

(Offset : 40.0 dB)

Parameter Entry

Frequency	860.012500 MHz
Reference Level	46.9 dBm
Attenuator	20.0 dB
10MHz Ref.	INT

1 Tx Power

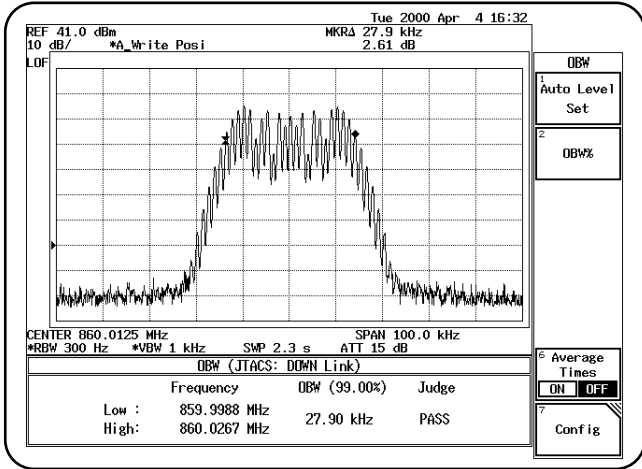
2 Auto Level Set

5 Parameter Setup

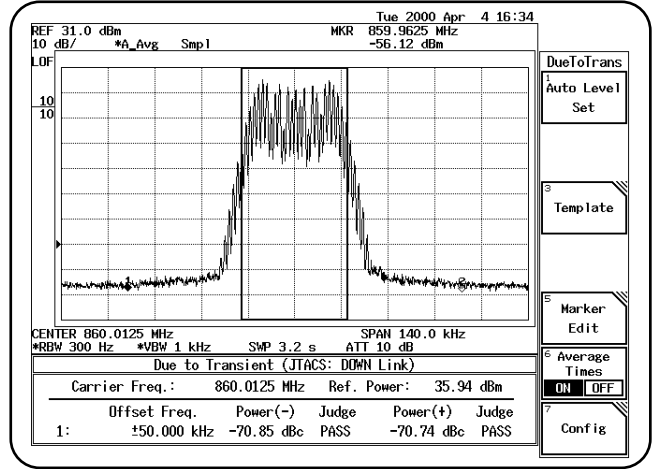
6 Average Times ON | OFF

• AMPS/JTACS/NTACS Analysis Software Option (OPT.73)

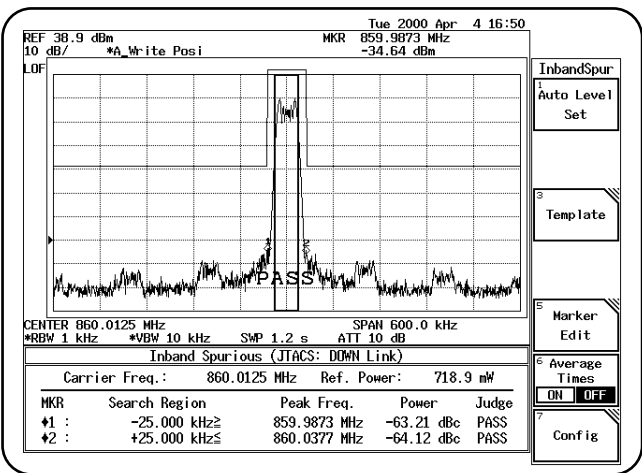
■ OBW



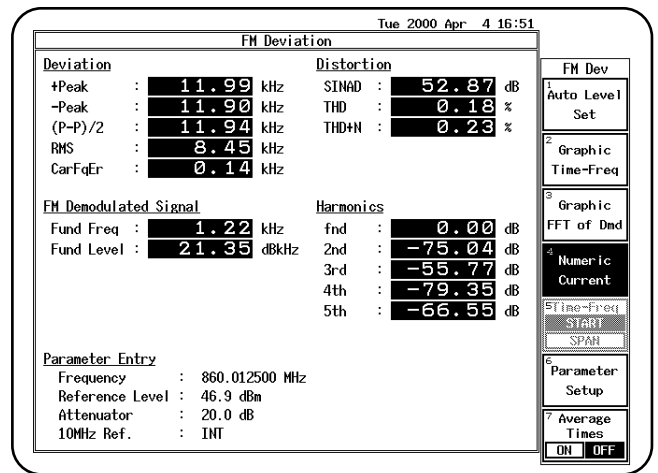
■ ACP



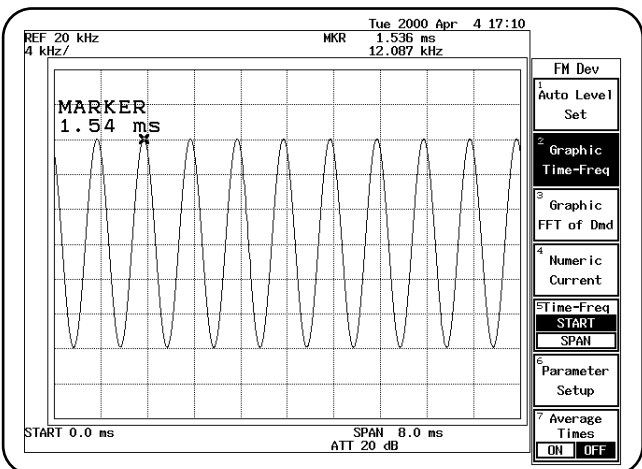
■ In-Band Spurious



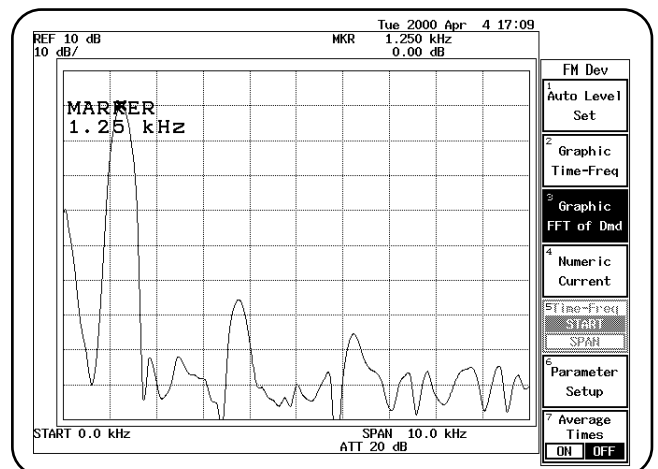
■ FM Deviation



■ Graphic (Time-Freq.)

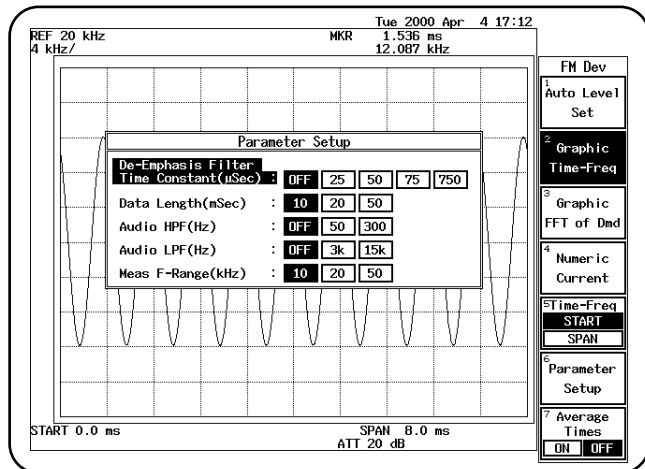


■ Graphic (FFT of Dmd.)

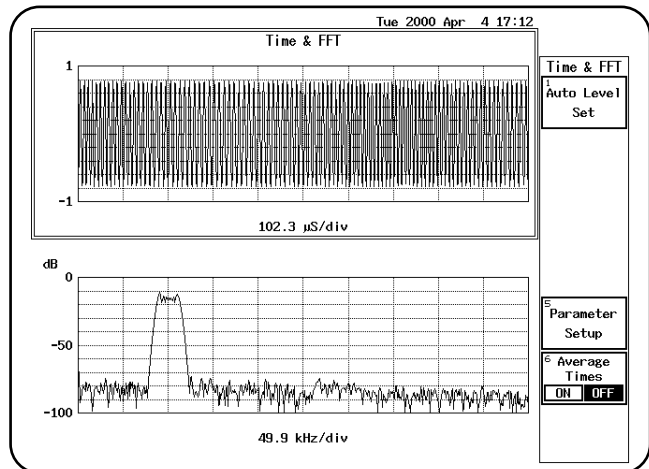


AMPS/JTACS/NTACS Analysis Software Option (OPT.73)

FM Deviation Parameter Setup



Time & FFT



Specifications

Items	Specifications
Measurement range	Up to 50kHz
FM deviation measurement accuracy	±5% or less
Measurement frequency range	10kHz/20kHz/50kHz
De-Emphasis Filter time constant	OFF/25/50/75/750μsec
Audio measurement	Measure THD, SINAD, THD+N and Harmonics using FFT of the FM demodulated signal.
Audio L.P.F	OFF/3kHz/15kHz
Audio H.P.F	OFF/50Hz/300Hz

Technical Information

About the Measurement Result

Results are calculated from the following formula.

+Peak: Maximum frequency of the FM demodulated signal.

-Peak: Minimum frequency of the FM demodulated signal.

(P-P)/2: Mean value of absolute values of +Peak and -Peak.

RMS: Root Mean Square of the FM demodulated signal.

CarFqEr: Carrier frequency error.

$$\text{CarFqEr} = \frac{1}{N} \sum_{i=0}^{N-1} \text{fm}[i]$$

fm[i]: FM demodulated signal

SINAD: Signal Noise And Distortion

$$\text{SINAD}[\text{dB}] = 20 \log \left[\frac{S+N+D}{N+D} \right]$$

THD: Total Harmonic Distortion (Distortion Ratio)

$$\text{THD}(\%) = D/S \times 100$$

THD+N: Total Harmonic Distortion and Noise

$$\text{THD+N}(\%) = (D+N)/S \times 100$$

S = RMS of the fundamental wave element

D = RMS of the harmonic element

N = RMS of the noise element

Harmonics: Displays up to the fifth harmonic level of the FM demodulated signal. The level of the fundamental wave is normalized to 0 dB.

About De-Emphasis Filter Time Constant

The Time constant and its main usage followings.

Time constant	3dB point (Hz)	Main usage
25	6366	FM broadcast (using Dolby-B reduction)
50	3183	FM broadcast (JIS)
75	2122	FM broadcast (FCC old standard), satellite broadcast
750	212.2	MIRS

Technology Support on the Leading Edge

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ADVANTEST CORPORATION

Shinjuku-NS Building, 4-1, Nishi-Shinjuku 2-chome, Shinjuku-ku, Tokyo 163-0880, Japan
Phone: +81-3-3342-7500 Facsimile: +81-3-5381-7661 Telex: 232-4914 ADVAN J

Advantest (Singapore) Pte. Ltd. : 438A Alexandra Road #08-03/06 Alexandra Technopark Singapore 119967 Phone: +65-274-3100

Tektronix Inc :

(North America)

Phone: +1-800-426-2200

Rohde & Schwarz Engineering and Sales GmbH :

(Europe)

Phone: +49-89-4129-13711

Homepage <http://www.advantest.co.jp>

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