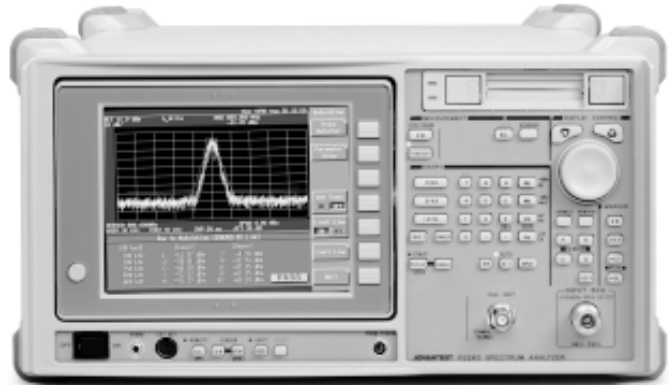


Spectrum Analyzers

Low Cost, High Performance Spectrum Analyzer Enabling Burst Envelope/Burst Spectrum Analysis

R3263

- Measurement Frequency Range: 9 kHz to 3 GHz
- Frequency Stability
Residual FM: 3 Hzp-p Max./0.1 s
Drift: 20 Hz Max. (Span ≤ 5 MHz)
- Frequency Span Accuracy: ± 1% max. (Span ≤ 5 MHz)
- Time Domain Measurement: 50 μs to 2 s/100 ns Resolution
- Resolution Bandwidth: 300 Hz to 3 MHz, 5 MHz (1, 3 Steps)
- GSM/DCS1800/DCS1900 Transmission Characteristics Measurement Function Provided Standard
- GSM Tx Plus (Option 55) Enables GSM/DCS1800/DCS1900 Frequency Error, Phase Error and Bit Synch Tx Power Measurement
- GSM Graphics (Option 77) Enables Detailed Modulated Signal Analysis
- DECT Tx Analysis Option (Options 52, 58)



R3263

Spectrum Analyzer

The R3263 is a 3 GHz spectrum analyzer developed for digital mobile communication equipment. Its basic specifications include a frequency range of 9 kHz to 3 GHz, span accuracy of ± 1% or less, residual FM of 3 Hz_{p-p} (max.)/0.1 s and drift of 20 Hz or less. It comes with CW mode for spectrum analysis and TRANSIENT mode for powerful support of burst wave analysis. It also comes equipped with a burst envelope measurement function for measuring TDMA digital modulated signal ON/OFF characteristics and a burst spectrum measurement function enabling spectrum analysis in the burst ON interval. By adding the GSM Tx Plus Option, measurement of parameters such as GMSK signal frequency and phase errors, and bit synch power can be done at the touch of a button.

■ Measurement Items

- Burst envelope measurement
- Burst spectrum measurement
- Modulation spectrum measurement
- Switching spectrum measurement
- Spurious emission intensity measurement
- Power measurement

GSM Tx Plus (option 55, 58)

- Frequency error measurement
- Phase error measurement
- Tx power measurement
- Power vs time measurement

■ Dual Mode Analysis Function

- CW mode: Spectrum Analyzer
- TRANSIENT mode: GSM/DCS1800/DCS1900 Tx Tester (DECT Tx Tester Option)

■ GSM Standards and Measurement Items

	Standard measurement item		Remarks
4.1	Output Power	*1:2 Δ	Power step not implemented
4.2	Spectrum due to the modulation	Δ	Sweep measurement
4.2	Spectrum due to switching transient	Δ	Sweep measurement
4.3	Spurious emission (relevant transient band)	○	
4.4	Radio frequency tolerance	*1:2 ○	Standard 0.1 ppm or less
4.5	Output level dynamic operation (Template)	○	
4.6	Phase accuracy	*1:2 ○	Standard peak 20° or less, rms 5° or less

*1: Standard is spectrum analyzer mode. Option 55, 58 is required for bit synch power measurement.
*2: Requires GSM Tx Plus (option 55, 58).

■ R3263 Option Table

Model	R3263	R3263+55	R3263+52	R3263+58
GSM/DCS1800/DCS1900 Tx Analysis	○	○	○	○
GSM Tx Plus (option 55, 58)	—	○	—	○
GSM Graphics (option 77)	—	Δ	—	Δ
DECT Tx Analysis (options 52, 58)	—	—	○	○
Program Loader (option 15)	← Can be set for all combinations →			

○ : Tx analysis function
 Δ : Option which can be set
 — : Option which cannot be set
 Option 3263 + 55 GSM Tx Plus (Phase error, Freq. error, Tx power, Power vs time)
 Option 3263 + 52 DECT Addition
 Option 3263 + 58 GSM Tx Plus/DECT Addition

■ Application Software

PR32630300-IC GSM/DCS1800-MS Software
 PR32630310-IC GSM/DCS1800-BS Software
 PR32630500-IC DCS1900-MS Software
 PR32630510-IC DCS1900-BS Software

Requires GSM Tx Plus option (OPT55, 58) and program loader option (OPT. 15)

■ Selection of Digital Radio System

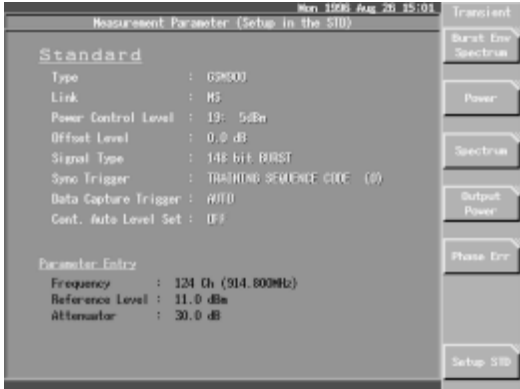
The R3263 can switch easily between the GSM, DCS1800 and DCS1900 communications systems.



< GSM setting screen (with TX Plus Option) >

■ Menu Operation for Selection of Measurement Items

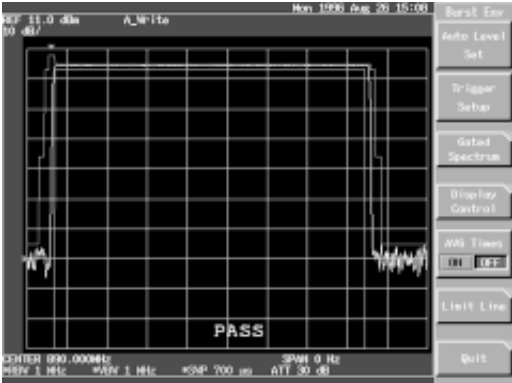
Measurement can be Carried out simply by selecting the desired measurement item.



< TRANSIENT menu screen (with Tx Plus Option) >

■ Burst Envelope Measurement Function

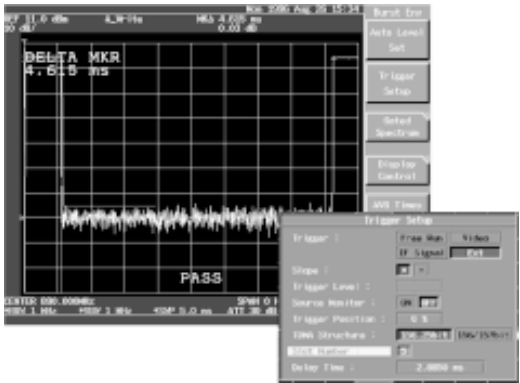
The TDMA format used in many digital mobile communication systems, enables multiple users to talk on the same frequency and has a stringently specified envelope characteristic. The R3263 can measure TDMA parameters at the touch of a button.



< GSM burst envelope measurement >

■ 1 Frame Measurement Function

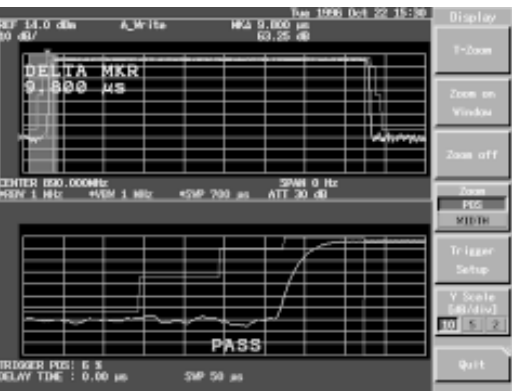
1 frame mode enables slot condition measurement to be done easily, simply by specifying the slot Number.



< Slot number. setting screen >

■ One Touch Zoom Function

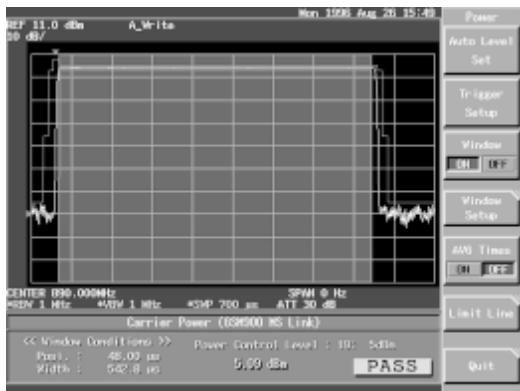
T-Zoom enlarges the rise or fall at the touch of a button.



< T-Zoom measurement >

■ Power Measurement Function

The window width and position required for the measurement are set automatically. PASS/FAIL judgments can also be done simultaneously using a limit line linked to the power value.



< Power measurement screen >

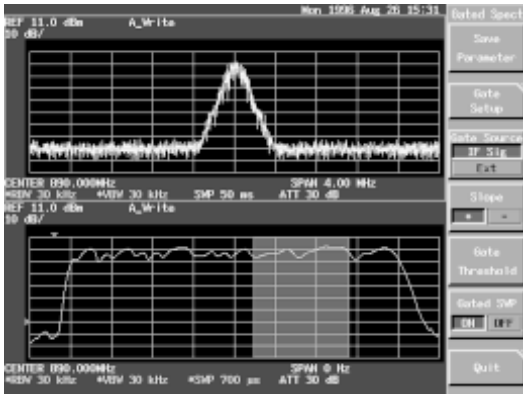
Spectrum Analyzers

Low Cost, High Performance Spectrum Analyzer Enabling Burst Envelope/Burst Spectrum Analysis

R3263

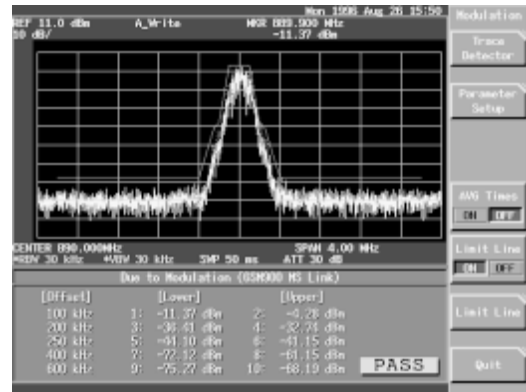
■ Burst Spectrum Measurement Function

Using a gated sweep function, the R3263 can perform spectrum analysis of only the burst ON area. Time domain and frequency domain are each displayed on a separate screen, simplifying measurement range settings and verification.



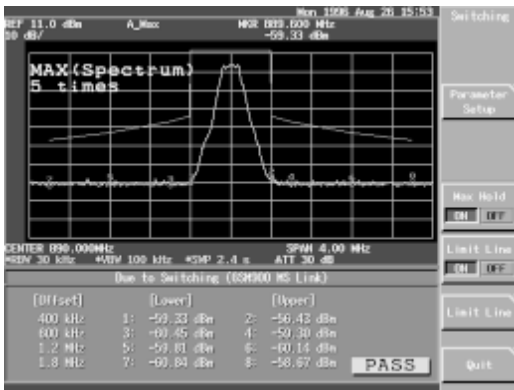
■ Modulation Spectrum Measurement

Measures spectrum of modulated components using a gated sweep. With measured peak values as the reference, performs PASS/FAIL determination using templates.



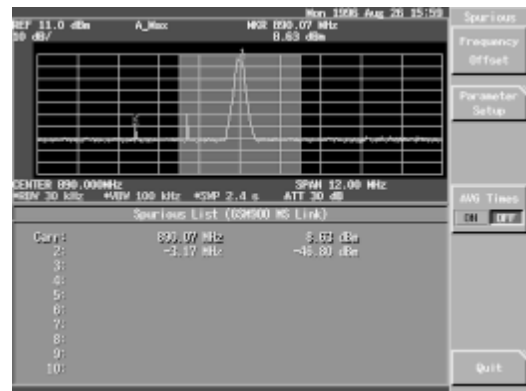
■ Switching Spectrum Measurement

Measures spectrum including burst rise/fall. PASS/FAIL determination is also done using standard templates.



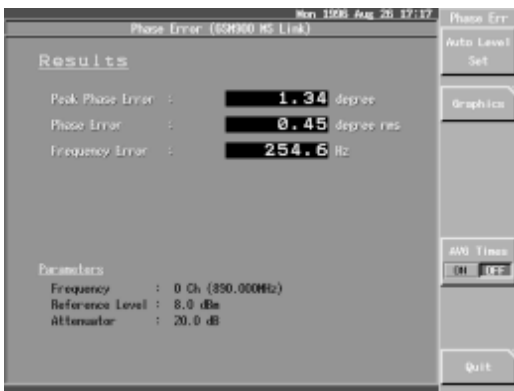
■ Spurious Measurement

Sweeps communication system bands to measure spurious. Three types of measurement can be performed at the touch of a button: ± 1.8 to 6 MHz, > 6 MHz and full span.

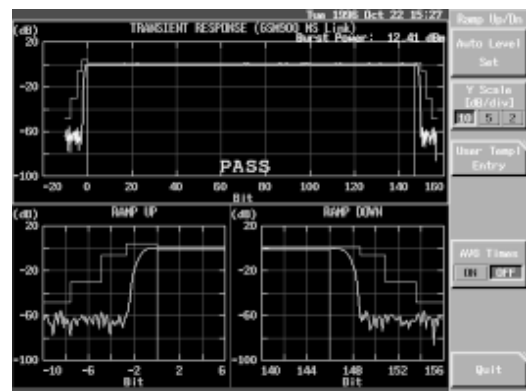


■ GSM Tx Plus Option (Options 55, 58)

With the global boom in GSM, DCS1800 and DCS1900 transmission systems, measurement of frequency error, phase error and bit synch Tx power are increasingly needed. The GSM Tx Plus Option enables simple measurements of these parameters using GMSK modulated signal analysis.



<Frequency error, phase error measurement>



<Power vs time measurement>

■ GSM Graphics (Option 77, Requires Options 55, 58)

• **Outline**

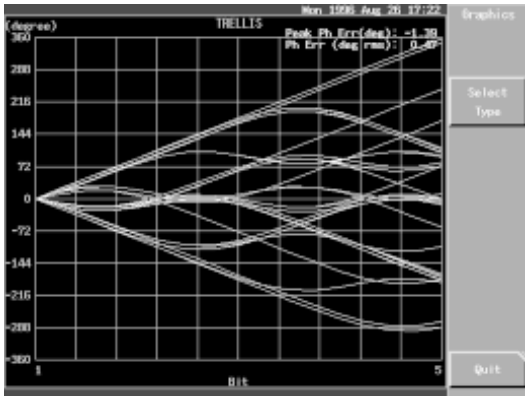
Frequency error/Phase error measurement are required in communication systems of GSM/DCS 1800/DCS1900 respectively. The GSM graphics option (OPT. 77) ensures more detailed modulation signal analysis by graphically displaying these measurement results.

• **Applicable Communications System**

GSM/ DCS1800/DCS1900

• **Analysis Functions**

- Bit-Frequency
- Phase Error
- FFT of Phase Error
- Trellis
- Demodulated Data



< Trellis display >

■ DECT Option (Options 52, 58)

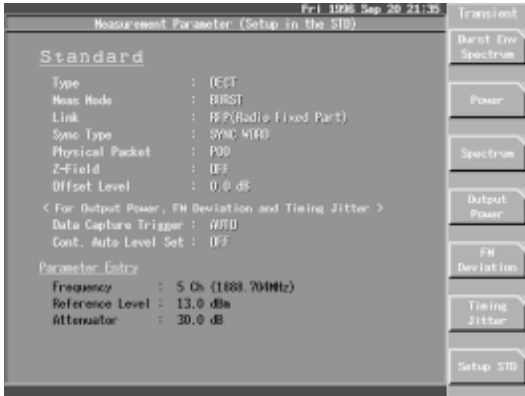
The DECT Option (options 52, 58) enables burst envelope measurement and burst spectrum measurement, conforming to various physical packets at the touch of a button. The GFSK modulation analysis function also enables measurements of Tx power, power vs time and FM deviation.

• **Applicable Communication Systems**

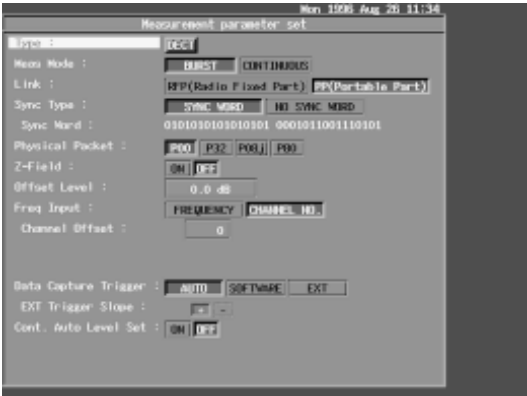
DECT: RFP (Radio Fixed Part), PP (Portable Part)

• **Measurement Items**

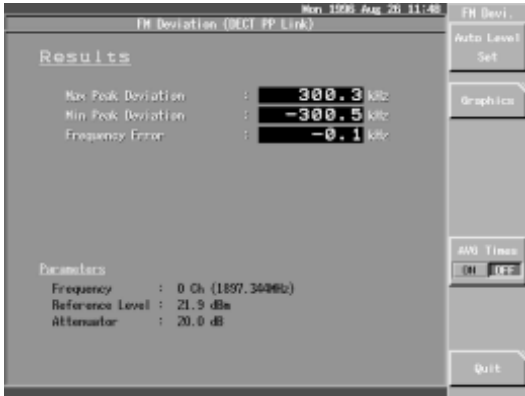
- Burst envelope measurement
- Power measurement
- Power vs time measurement
- FM deviation measurement
- Emission due to modulation measurement
- Emission due to transient measurement
- Spurious emission measurement
- Timing jitter measurement
- Graphics display



< DECT TRANSIENT menu >



< DECT setting screen >



< DECT FM deviation measurement >

Spectrum Analyzers

9 kHz to 3 GHz

R3263

Specifications

Measurement Functions

CW mode: Spectrum measurement

Transient mode: Burst envelope measurement
Burst spectrum measurement

GSM Tx Plus (option 55, 58)

DECT Option (option 52, 58)

Frequency

Frequency range: 9 kHz to 3.0 GHz

Frequency resolution (Display): 1 Hz

Frequency reading accuracy:

(start, stop, center frequency, marker frequency)

$\pm (f \text{ reading} \times f \text{ reference accuracy} + \text{span} \times \text{span accuracy} + 0.15 \times \text{RBW} + 10 \text{ Hz})$

Marker frequency counter:

Resolution 1 Hz to 1 kHz

Accuracy (S/N \geq 25 dB)

$\pm (\text{marker } f \times f \text{ reference accuracy} + 1 \text{ LSD})^*$

Delta counter $\pm (\Delta f \times f \text{ reference accuracy} + 2 \text{ LSD})^*$

* LSD : Least Significant Digit

Frequency reference accuracy: $\pm 2 \times 10^{-8}/\text{day}$
 $\pm 1 \times 10^{-7}/\text{year}$

Frequency stability:

Residual FM $< 3 \text{ Hz}_{\text{p-p}}/0.1 \text{ sec}$ (ZERO span)

Drift (after 1 hour warm up at span \leq 5 MHz)
 $< 20 \text{ Hz} \times (\text{sweep time (minutes)})$

Signal purity:

$< -100 \text{ dBc/Hz}$ (10 kHz offset)

$< -110 \text{ dBc/Hz}$ (100 kHz offset)

Frequency span:

Linear span

Range 2 kHz to 3 GHz, zero span

Accuracy $\pm 4\%$ (span $>$ 5MHz)

$\pm 1\%$ (span \leq 5MHz)

Resolution bandwidth (3 dB):

Range 300 Hz to 3 MHz, 5 MHz (1, 3, 10 sequence)

Accuracy $\pm 20\%$ (RBW 1 kHz to 1 MHz)

$\pm 30\%$ (RBW 300 Hz, 3 MHz, 5 MHz)

Selectivity $< 15:1$ (300 Hz to 5 MHz)

Video bandwidth range: 1 Hz to 3 MHz, 5 MHz (1, 3, 10 sequence)

Frequency sweep:

Sweep time 50 ms to 1000 s (CW mode spectrum measurement)

Accuracy $\pm 5\%$

Sweep trigger Free run, line, single, video, external

Amplitude Range

Measurement range: +30 dBm to average display noise level

Maximum safe input:

Average continuous power (input ATT \geq 10 dB)

+30 dBm (1W)

DC input 0V

Display range: 10 \times 10 div.

Log 10, 5, 2, 1, 0.5 dB/div.

Linear 10% of reference level / div.

Reference level range:

Log -105 to +60 dBm (0.1 dB steps)

Linear 1.25 μ V to 223 V (approx. 1% of full scale steps)

Input attenuator range: 0 to 70 dB (10 dB steps)

Dynamic Range

Average display noise level:

(RBW 1 kHz, input attenuator 0 dB, video bandwidth 1 Hz)

Frequency Range	Average display noise level
10 kHz	-70 dBm
100 kHz	-80 dBm
1 MHz to 3.0 GHz	$-(115 - 1.55 \times f(\text{GHz})) \text{ dBm}$

1 dB gain compression:

-5 dBm $>$ 10 MHz (input mixer level)

Spurious response:

Second order harmonic distortion

$< -70 \text{ dBc}$ 10 MHz to 3.0 GHz -30 dBm (Mixer level)

Third order distortion (12.5 kHz separation, RBW 300 Hz)

$< -75 \text{ dBc}$ 10 MHz to 3.0 GHz -30 dBm (Mixer level)

Image/multiple/outside-band response

$< -70 \text{ dBc}$ 10 MHz to 3 GHz

Residual response (with wide span)

(no input signal, input ATT 0 dB, 50 Ω termination)

$< -100 \text{ dBm}$ 1 MHz to 3.0 GHz

$< -90 \text{ dBm}$ 300 kHz to 3 GHz

Amplitude Accuracy

Frequency response (input ATT 10 dB):

In-band flatness

$\pm 1.5 \text{ dB}$ 9 kHz to 3.0 GHz

$\pm 1.0 \text{ dB}$ 50 MHz to 3.0 GHz

Calibration signal accuracy (30 MHz): -10 dBm $\pm 0.3 \text{ dB}$

If gain error (after auto calibration), RBW 1kHz to 5MHz:

$\pm 0.5 \text{ dB}$ (15 to 35 $^{\circ}$ C) 0 to -50 dBm

$\pm 0.6 \text{ dB}$ (0 to 50 $^{\circ}$ C) 0 to -50 dBm

Scale display accuracy (after auto calibration):

	0 to 50 $^{\circ}$ C	15 to 30 $^{\circ}$ C
Log	$\pm 0.3 \text{ dB} / 1 \text{ dB}$	$\pm 0.2 \text{ dB} / 1 \text{ dB}$
	$\pm 1.2 \text{ dB} / 10 \text{ dB}$	$\pm 1 \text{ dB} / 10 \text{ dB}$
	$\pm 1.5 \text{ dB} / 80 \text{ dB}$	$\pm 1.5 \text{ dB} / 80 \text{ dB}$
Linear	$\pm 30\%$ of reference level (within 8 div)	$\pm 15\%$ of reference level (within 8 div)

Input attenuator switching error

(with 10 dB reference, at 20 to 70 dB):

$\pm 1.1 \text{ dB}/10 \text{ dB}$ steps, 2.0 dB max. 9 kHz to 3.0 GHz

RBW switching error

(RBW: 300 kHz reference, after auto calibration $3 \times \text{RBW} \geq \text{SPAN}$):

$\leq \pm 0.5 \text{ dB}$ (0 to 50 $^{\circ}$ C)

$\leq \pm 0.3 \text{ dB}$ (15 to 35 $^{\circ}$ C)

300 Hz to 3 MHz,

Pulse quantization error

(pulse measurement mode, with PRF $>$ 500/sweep time):

Log 1.2 dB_{p-p} (RBW \leq 1 MHz)

3 dB_{p-p} (RBW = 3 MHz)

Linear 4 % of reference level (RBW \leq 1 MHz)

12 % of reference level (RBW = 3 MHz)

Analog demodulation

Spectrum demodulation:

Modulation type AM and FM

Audio output Built-in speaker, earphone jack, adjustable volume

Demodulation continuation time 100 ms to 1000 s

Transient RF Analysis

Burst envelope measurement:

- Amplitude resolution** 10 bits
- Sweep time** 50 μ s to 2 s/100 ns (resolution)
- Trigger** Free run, single, video, IF detection, external

Delay trigger time 200 ns to 650 ms

Burst spectrum measurement (with Gated sweep):

- Gate position/resolution** 1 μ s to 65 ms/1 μ s
- Gate width/resolution** 2 μ s to 65 ms/1 μ s
- Trigger** Internal IF detection, external

GSM Tx Plus (Option 55, 58):

- Modulation system** GMSK (GSM, DCS1800, DCS 1900)
- Analysis input range** 10 MHz to 3.0 GHz
-30 to +30 dBm

Average power measurement

(after calibration, during automatic setting in GSM, DCS1800 DSC1900 bands)

- Measurement accuracy** ± 0.8 dB

Frequency/phase error measurement

Frequency error	
Range	± 10 kHz
Accuracy	Reference accuracy \times $f_c \pm 5$ Hz
Phase error	
Range	0 to 30° (peak)
Accuracy	$< \pm 1.0^\circ$ (rms) $< \pm 5.0^\circ$ (peak)

f_c : carrier frequency

Input/output

RF input:

- Connector** N type female
- Impedance** 50 Ω (nominal)
- VSWR** (input ATT ≥ 10 dB, at the set frequency)
 $< 1.5:1$ (≤ 3 GHz) (nominal)

Calibration signal output:

- Connector** BNC female, front panel
- Frequency** 30 MHz \times (1 \pm frequency reference accuracy)
- Impedance** 50 Ω (nominal)
- Amplitude** -10 dBm \pm 0.3 dB

10 MHz frequency reference input/output:

- Connector** BNC female, rear panel
- Output impedance** 50 Ω (nominal)
- Output frequency accuracy**
10 MHz \times frequency reference accuracy

- Input/output amplitude range** -5 to +5 dBm

Gate input:

- Connector** BNC female, rear panel
- Impedance** 10 k Ω (nominal), DC coupled
- Sweep stop** While LOW of TTL level
- Sweep** While HIGH of TTL level

I/O:

- GPIB** IEEE-488 bus connector rear panel
- P-I/O** S-SUB 25 pin rear panel
- EXT-KEY** DIN Front panel
- RS232** D-SUB 9 pin rear panel
- Direct Print** Conformed to ESC/P, HP-PCL
- Direct File** Conformed to Windows bit-map file
- Direct Prot** Conformed to HP-GL (waveform data only)

General Specifications

Temperature:

- Operating temperature** 0 to 50°C
- Storage temperature** -20 to 60°C
- Humidity** 85 % RH max.

Power supply (100VAC / 220 VAC automatic switching):

With 100 VAC operation

- Voltage** 100 to 120 V
- Power consumption** 300 VA max.
- Frequency** 50 / 60 Hz

With 220 VAC operation

- Voltage** 220 to 240 V
- Power consumption** 300 VA max.
- Frequency** 50 / 60 Hz

Mass: 17 kg max. (excluding options, front cover, and accessories)

Dimensions: Approx. 177 (H) \times 350 (W) \times 420 (D) mm
(excluding handle, feet, and front cover)

Memory Cards

2 slots, front panel

Connector: JEIDA Ver. 4.2/PCMCIA 2.1

Accessories

- Power cable** A01412
- Input cable** MC-61
- Converter adapter** JUG-201A/U
- Power fuse** 21806.3 (6.3 A)

Option

- Option 15** Program Loader
- Option 52** DECT
- Option 55** GSM Tx Plus
- Option 58** DECT & GSM Tx Plus
- Option 77** GSM Graphics
- Option 85** JIS Rack Mounted Set
- Option 86** EIA Rack Mounted Set



REAR PANEL