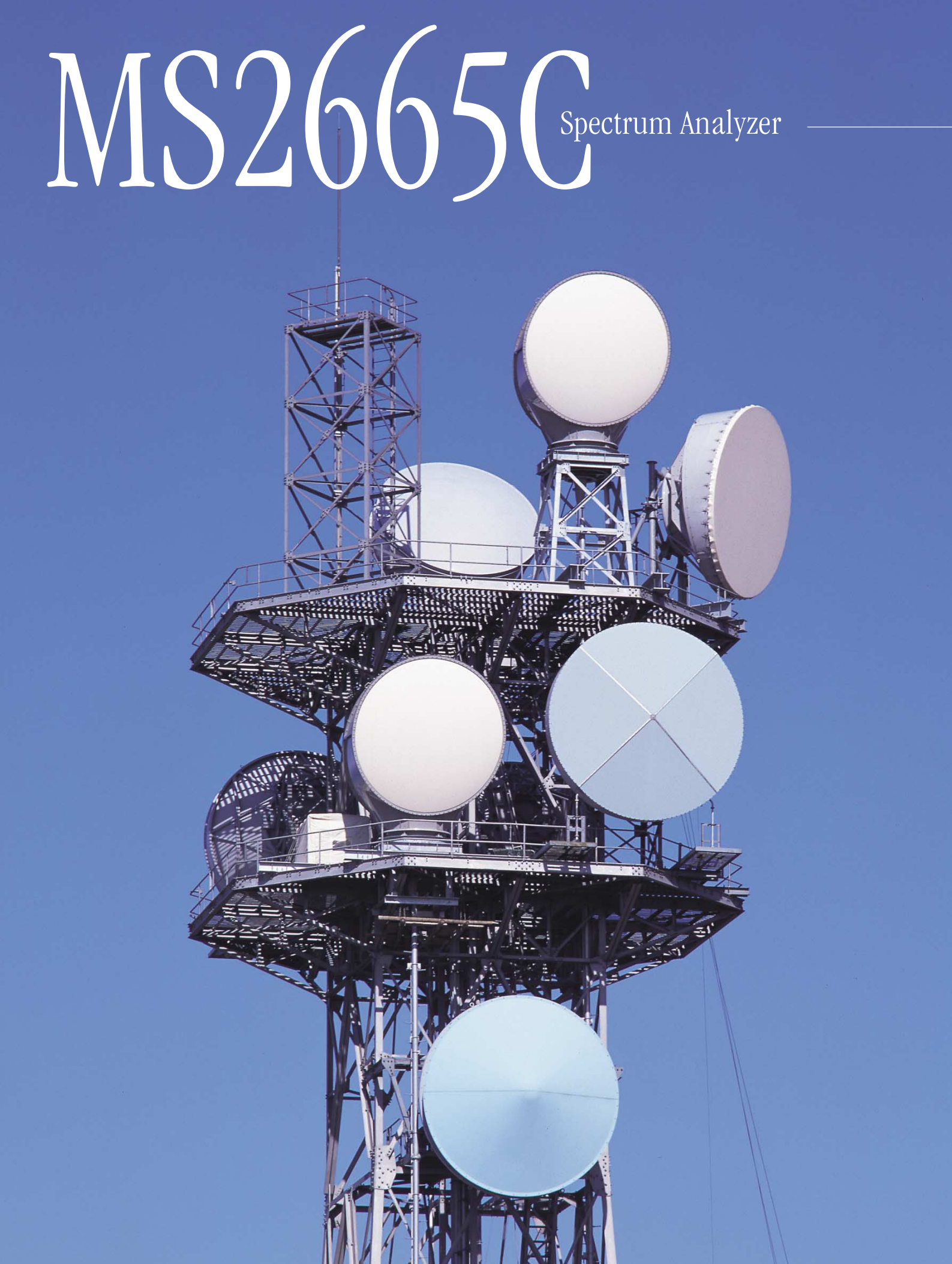
MS2665C

Spectrum Analyzer

9 kHz to 21.2 GHz

For Various Applications

MS2665C Spectrum Analyzer



Portable at Only 13 kg

The MS2665C covers a frequency range of 9 kHz to 21.2 GHz. MS2665C is a compact, lightweight and low price spectrum analyzer. The MS2665C has superior basic performance such as high C/N ratio, low distortion, and high frequency/level accuracies and is easy to operate. The large selection of options are provided to handle a wide range of applications at reasonable cost.

■ Compact and lightweight (13 kg in standard configuration)

- ●Half weight of previous Anritsu spectrum analyzers
- ●Easy portability for installation and maintenance

■ High C/N and superior distortion characteristics

- ●Radio testing from RF to microwave bands

■ Easy-to-use, simple operation

- ●Built-in “Measure” function for evaluation of radio equipment (frequency counter, C/N, channel power, adjacent channel power, occupied frequency bandwidth, burst average power and template pass/fail function)
- ●User-defined function
- ●Zone marker/zone sweep
- ●Two-screen display
- ●FM demodulation waveform display
- ●Memory card interface (for saving/recalling trace data and set up parameter and for saving screen image in bitmap format)

■ Options support wide range of applications

- ●High stability crystal oscillator
- ●Narrow resolution bandwidth (30 Hz to 300 Hz)
- ●High-speed time domain sweep
- ●Trigger/gate circuit
- ●AM/FM demodulator (sound monitor)
- ●Centronics interface (cannot be installed with GPIB simultaneously)

■ Easy to set up automatic measurements

- ●Controller function built-in (PTA)
- ●Built-in RS-232C and GPIB (standard)

MS2665C

Spectrum Analyzer

9 kHz to 21.2 GHz

Compact, Lightweight, and Powerful

Small and weighing only 13 kg

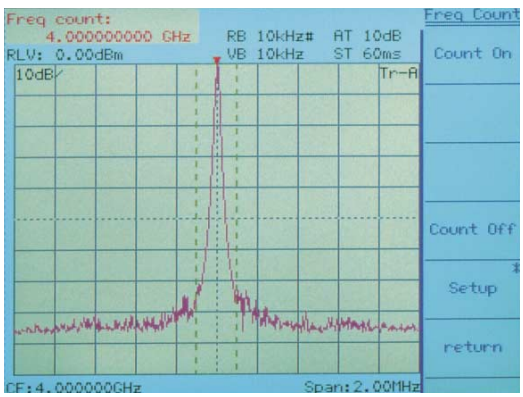
The MS2665C is compact and lightweight, measuring 320 (W) × 177 (H) × 351 (D) mm and weighing only 13 kg. In addition to benchtop use, this can be carried easily for field use, making it the ideal choice for manufacturing and maintenance of radio equipment.

Synthesized local oscillator

The synthesized local oscillator design permits stable measurements without disturbance due to frequency drift of the spectrum analyzer itself. The level stabilizes in 30 minutes after power-on, making this unit especially suitable for on-site maintenance and adjustment where work must be completed quickly.

Counter with 1 Hz resolution

A full complement of frequency counter functions are provided. Resolution is as high as ±1 Hz even at full span, and high-speed frequency measurements can be performed. The high sensitivity compared with ordinary counters makes it easy to select one signal from many and to determine its frequency.



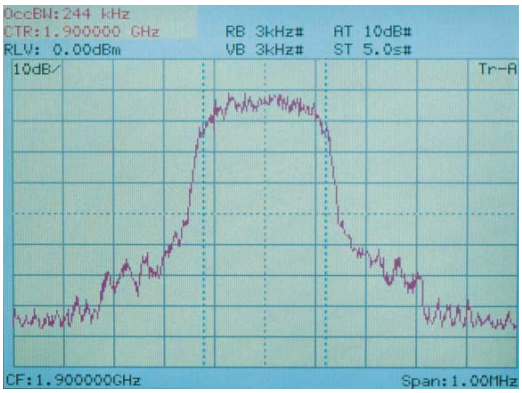
Frequency measurement (1 Hz resolution)

100 dB display dynamic range

For measurements requiring a wide dynamic range such as adjacent channel power measurements, MS2665C can display nearly 90 dB on a single screen.

Highly-accurate measurement

Auto-calibration ensures a high level accuracy. A span accuracy of 2.5% and 501 sampling points ensure accurate occupied frequency bandwidth and adjacent channel power measurements.



Occupied bandwidth measurement

Excellent cost vs. performance

The superior basic performance, including noise sideband, average noise level, and spurious response, provides excellent cost vs. performance.

Noise sideband	≤ –95 dBc/Hz + 20 log (n) ∗1MHz to 21.2 GHz, 10 kHz offset, n: harmonic order of mixer
Average noise level	≤ –115 dBm (1 MHz to 1 GHz, band 0) ≤ –115 dBm + 1.5f [GHz] dB (1.0 to 3.1 GHz, band 0) ≤ –110 dBm (2.92 to 8.1 GHz, band 1) ≤ –102 dBm (8.0 to 15.3 GHz, band 2) ≤ –98 dBm (15.2 to 21.2 GHz, band 3) ∗RBW: 1 kHz, VBW: 1 Hz, RF ATT: 0 dB
Spurious response	2nd harmonic distortion: ≤ –60 dBc (10 to 200 MHz, band 0, mixer input: –30 dBm) ≤ –70 dBc (0.2 to 1.55 GHz, band 0, mixer input: –30 dBm) ≤ –100 dBc or noise level (1.46 to 10.6 GHz, band 1/2/3, mixer input: –10 dBm) Two signal 3rd intermodulation distortion: ≤ –70 dBc (10 to 100 MHz), ≤ –80 dBc (0.1 to 8.1 GHz), ≤ –75 dBc or noise level (8.1 to 21.2 GHz) ∗Frequency difference of two signals: ≥50 kHz, mixer input: –30 dBm

Convenient, Easy-to-Use Functions

Simple operation

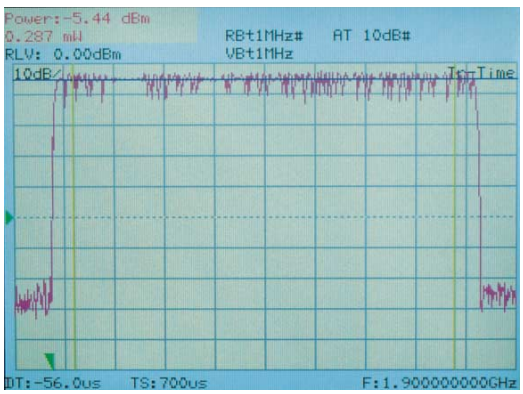
Users require ease of operation in a wide variety of contexts. The front panel, key layout, and soft key menu were simplified for ease-of-use. Also, “page-learning” and “user-defined” functions have been added to minimize the steps required for a given procedure.

Bright color screen

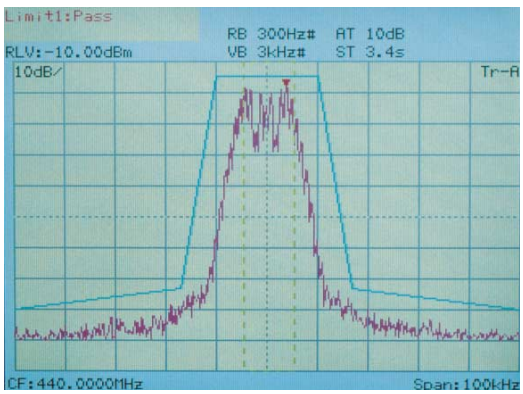
A 14 cm bright color TFT-LCD is used to custom configure the display scales, measured waveform data, settings and other parameters. Each color can be changed independently. When the soft key display is turned off, the scale area enlarges to 80 (H) x 110 (W) mm for easy viewing.

Radio equipment evaluation functions (“measure” functions)

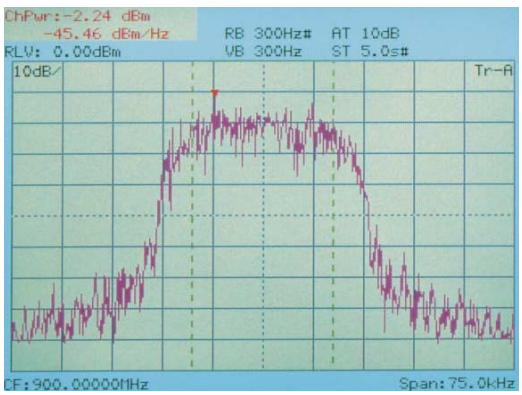
A full range of functions including measurement of power levels, frequencies, adjacent channel power, and mask and time template measurements are provided for performance evaluation of radio equipment. Key operation is simple and high-speed calculations make the measurement fast and efficient.



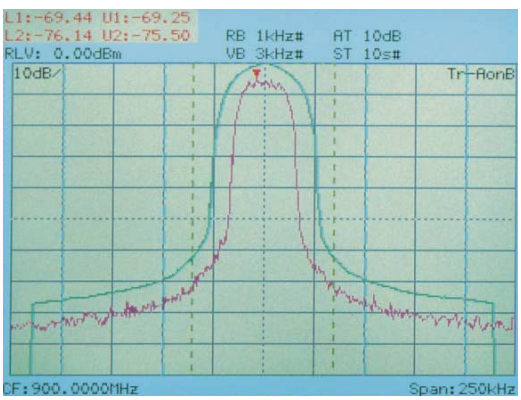
Burst average power measurement



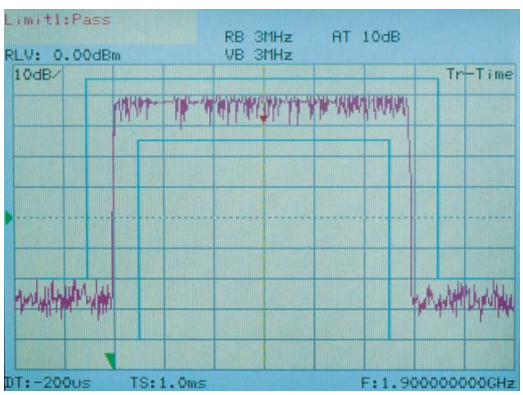
Mask measurement



Channel power measurement



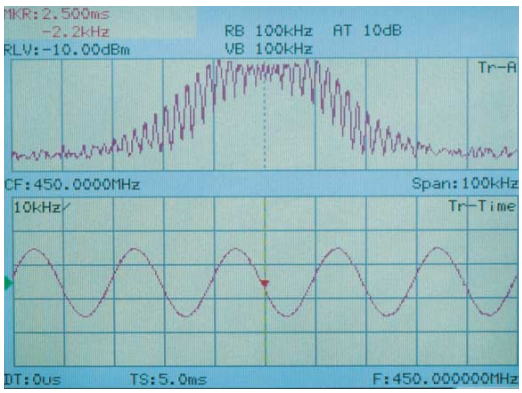
Adjacent channel power measurement



Time template measurement

FM-demodulated waveform display function

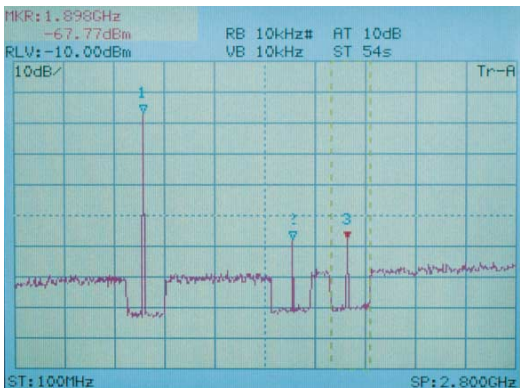
This function displays FM-demodulated waveforms with an accuracy of 5% over the range ±10 kHz to ±1 MHz. When used with high-speed time domain sweep (Option 04) and trigger/gate circuit (Option 06), frequency deviation of the modulated signal, as well as frequency switching times of radio equipment and VCOs, can be measured.



Spectrum and FM-demodulation waveform

Zone sweep and multi-zone sweep functions

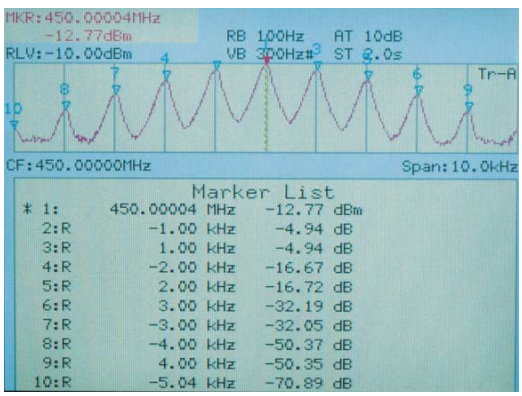
Sweeps can be limited to zones defined by zone markers which results in reduced sweep time. This zone sweep function can be combined with “measure” functions such as “noise measure” which can directly readout the total noise power within the zone to reduce measurement time greatly. The multi-zone sweep function enables up to ten zones to be swept.



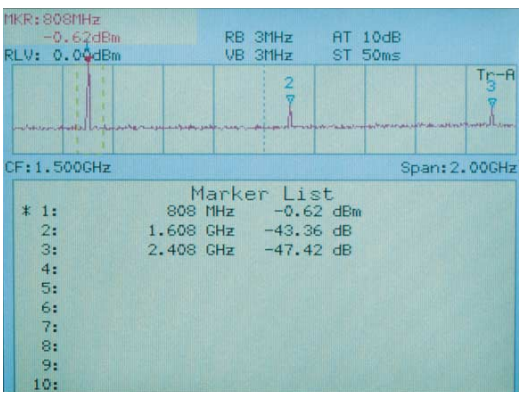
Multi-zone sweep

Zone markers and multimarkers

Zone markers can be set automatically at the peak signal within a given marker range, enabling quick measurement. By using the multimarker function, automatic measurements can be performed at up to ten markers with the results displayed in a table. With the multimarker function, up to 10 harmonics of the carrier can be measured, as well as the 10 highest spurious levels within the frequency span. Also, up to 10 markers can be manually set for automatic frequency and amplitude measurements.



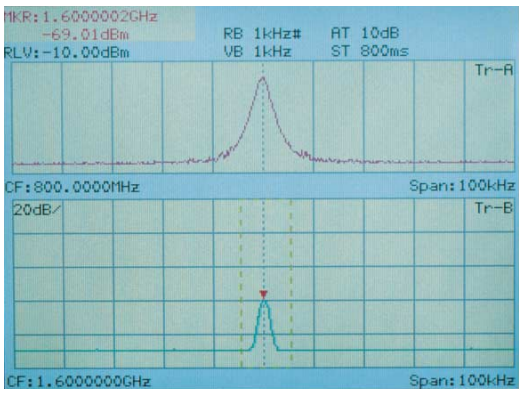
Multimarker (highest 10 points)



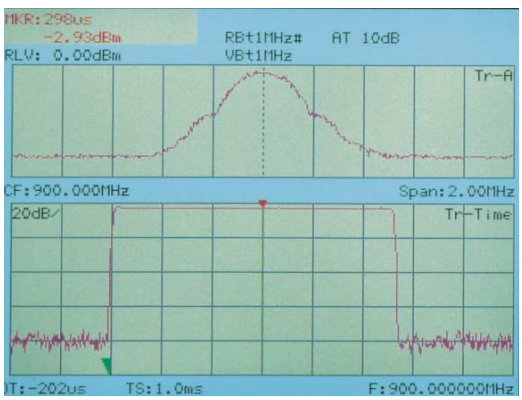
Multimarker (harmonics measurement)

Multi-screen display

The Trace A and Trace B waveforms are superimposed on the same screen, and two spectra with different frequencies are displayed simultaneously. In addition, it is possible to simultaneously display spectrum and time domain screens for the same signal. The multi-screen display permits efficient signal level adjustment and harmonic distortion measurement, too. Furthermore, in addition to being able to display amplitude in the time domain, it is also possible to display the FM demodulation waveform.



Two traces with different frequencies



Spectrum and time domain measurement

User-defined functions

Measurement programs downloaded to the spectrum analyzers from a personal computer or memory card can be executed by defining menu keys. The measurement program is executed simply by pressing the predefined key, with no further operation. Other panel and function keys can also be predefined in the same way.

User-defined menu

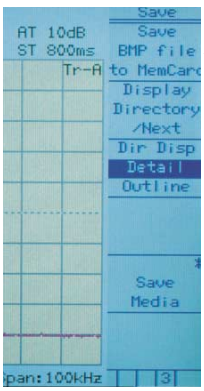
Measurement programs definition (downloaded from personal computer)

Panel and function keys definition

Screen image bitmap saved to memory card

Instead of printing a hard copy of the screen, it is also possible to save the screen image to a memory card in bitmap format. Editing the saved bitmap data using a PC, makes report writing easy.

When the mode to save the screen image in bitmap format to the memory card is selected as a copy method at the hard copy function, just one press of the copy key saves the screen image as a bitmap format to the memory card. And the file number of each saved file is incremented automatically.



The screen image data can also be saved to the memory card using the save function. In this case, the file number of the saved file can be specified.

Versatile Options

The enhanced performance and digital functions of recent radio equipment necessitate measuring equipment with even more sophisticated functions and performance. Versatile options are available to meet such needs.

To boost basic performance

Reference crystal oscillator (Option 01)

Adding the optional reference oscillator with a stability of 2 x10^{-8}/day and 1 x 10^{-7}/year, increases the accuracy of frequency measurements even further.

Narrow resolution bandwidth (Option 02)

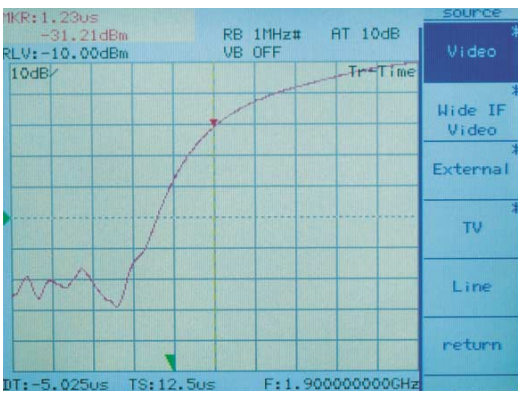
Adding the option for a resolution bandwidth of 30 Hz, 100 Hz and 300 Hz greatly improves frequency resolution.

For testing digital mobile communication equipment

High-speed time domain sweep (Option 04)

Testing of TDMA-type radio equipment requires time domain (zero-span) measurements of antenna power, transient response characteristics of burst transmissions, transmission timing, and other characteristics. The high-speed time domain sweep option boosts a sweep time to 12.5 µs and resolution to 0.025 µs.

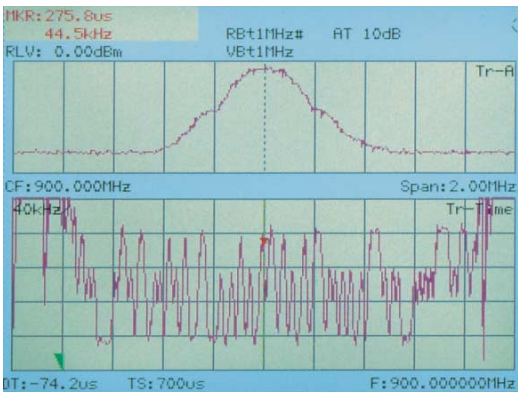
∗This option must be used with the trigger/gate circuit (Option 06).



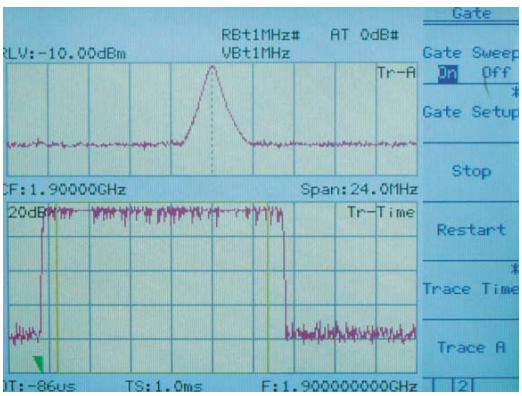
High-speed time-domain measurement (TS=12.5 µs)

Trigger/gate circuit (Option 06)

The trigger function provides stable measurements of burst signals in the time domain. External, video, wide IF video, or line trigger can be selected. PASS/FAIL measurements are easily made on TDMA radio burst signals using limit lines created in the template function. Pre-trigger and post-trigger delays can be used. Burst signals can also be measured in the frequency domain using the gate sweep function. A wide IF video trigger function is used, eliminating the need for an external trigger source that was previously required.

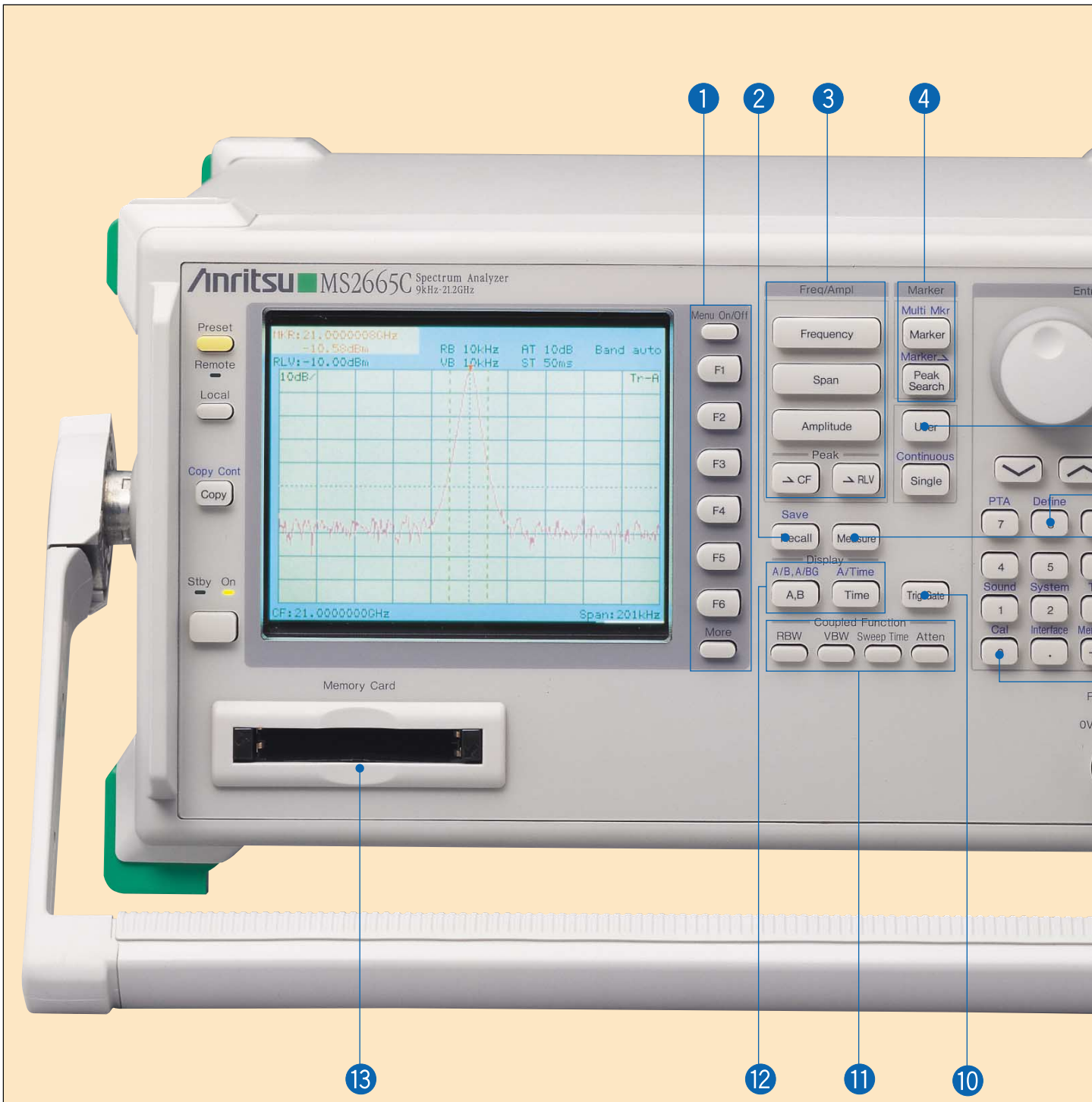


Wide IF video trigger function



Wide IF video trigger and gate functions

Easy-to-Use Key Layout



q **Function keys F1 to F6**
Select on-screen menu items
Menu on/off keys turn menus on and off, and [more] key turns menu pages.

w **Save/recall**
Saves and recalls measurement settings and measured waveforms
Data can be saved either to internal memory or to a memory card. (In internal memory, up to 12 data sets can be saved.)

e **Main Functions**
Set frequency, span, amplitude and other parameters

r **Markers**
Normal markers, multimarkers (maximum 10 numbers), zone markers and zone sweeping are provided.

t **Entry keys**
Input numeric values, units, and alphabetic characters

y **User keys**
Register any panel and menu key functions, as well as application software functions to user keys.

u **User define key**
Define functions of user-defined keys
Up to 3-pages can be predefined.

i **Measure key**
Executes various operations based on waveform data
High-speed measurements and computations are performed without the need for an external computer.

o **Calibration**
The built-in high-precision calibration signal source provides accurate measurements.

! **Trigger/gate**
The trigger can be set in the time domain mode.

! **Coupled-function keys**
Set parameters other than those set using main function keys
Normally set “Auto” for optimum values

! **Display**
Can be switched between frequency and time domains, and has two-screen display modes

! **Memory card slots**
Support memory cards up to 2 Mbytes
Two type-1 memory cards conforming to PCMCIA ver. 2.0 standards can be used simultaneously.

! **RF connector**
For input of signals at levels up to +30 dBm (maximum DC input: ±0 V)

Configuring Automated Measurement System

RS-232C interface (standard)

The RS-232C interface can be used to output hard copy data to a printer or plotter and for remote control of the analyzer. A notebook computer can be used for automated control and data collection in the field. In addition, a modem can be used for easy remote operation.

GPIB interface (standard)

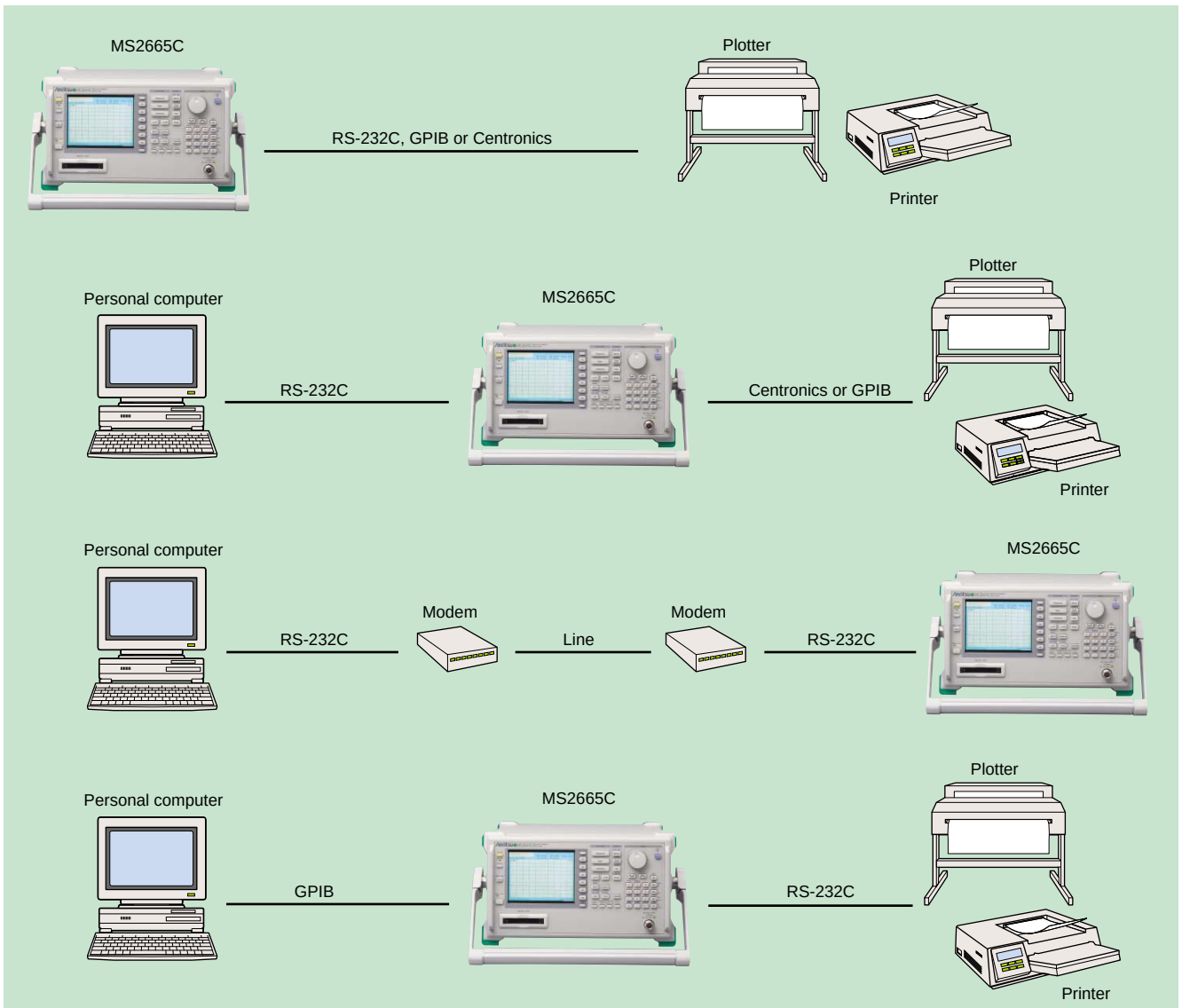
In addition to remote control, the GPIB interface can also be used to output data to a printer/plotter. (GPIB and Option 10 can not be installed simultaneously.)

Centronics interface (Option 10)

The Centronics interface is used to output data to a printer. (GPIB and Option 10 can not be installed simultaneously.)

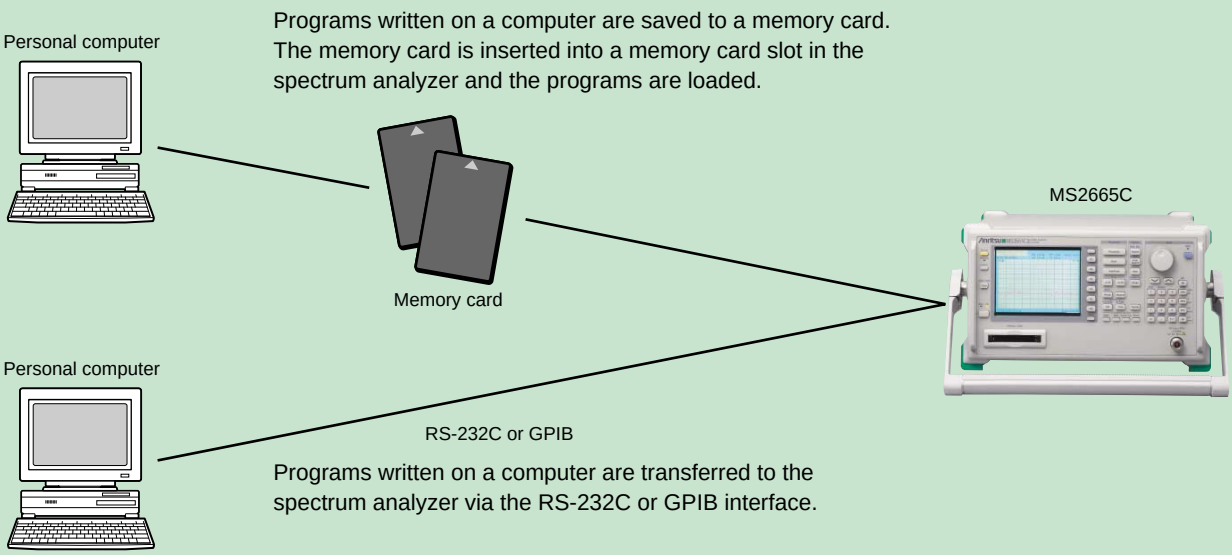
Memory card interface (standard)

Memory cards are used to save and recall measurement settings and waveform data, as well as to upload and download PTA programs. Cards up to 2 Mbytes are supported (PCMCIA ver. 2.0, type-I, 2-slots)



Automated measurement without external controller

The built-in microcomputer (PTA) functions which utilize the spectrum analyzer as a controller, make an external controller unnecessary. An automated measurement system including control of other instruments is easily configured. The two methods for loading programs are shown below.



Specifications

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Except where noted otherwise, specified values were obtained after warming up the equipment for 30 minutes at a constant ambient temperature and then performing calibration. The typical values are given for reference, and are not guaranteed.

Frequency	Frequency range	9 kHz to 21.2 GHz
	Frequency band	Band 0: 0 to 3.2 GHz (n: 1), Band 1–: 2.92 to 6.5 GHz (n: 1), Band 1+: 6.4 to 8.1 GHz (n: 1), Band 2+: 8.0 to 15.3 GHz (n: 2), Band 3+: 15.2 to 21.2 GHz (n: 3) ∗n: harmonic order of the mixer
	Pre-selector range	2.92 to 21.2 GHz (band 1–, 1+, 2+, 3+)
	Frequency setting resolution	Frequency domain: (1 x n) Hz, Zero span: (100 x n) Hz ∗n: harmonic order of the mixer
	Frequency display accuracy	± (display frequency x reference frequency accuracy + span x span accuracy + 100 Hz x n) ∗Span: ≥10 kHz x n (n: harmonic order of the mixer, after calibration)
	Marker frequency display accuracy	Normal marker: Same as display frequency accuracy, Delta marker: Same as frequency span accuracy
	Frequency counter	Resolution: 1 Hz, 10 Hz, 100 Hz, 1 kHz Accuracy: Display frequency x reference frequency accuracy ± 1 LSD (at S/N: ≥20 dB)
	Frequency span	Setting range: 0 Hz, 1 kHz to 21.3 GHz Accuracy: ± 2.5% (span: ≥10 kHz x n), ± 5% (span: <10 kHz x n, Option 02 installed)
	Resolution bandwidth (RBW) (3 dB bandwidth)	Setting range: 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz (manually settable, or automatically settable according to frequency span) ∗Option 02: 30 Hz, 100 Hz, and 300 Hz are added. Measurements of noise, C/N, adjacent channel power and channel power by measure function are executed with the calculated equivalent noise bandwidth of the RBW. Bandwidth accuracy: ± 20% (1 kHz to 1 MHz), ± 30% (3 MHz) Selectivity (60 dB : 3 dB): ≤15:1
	Video bandwidth (VBW)	1 Hz to 3 MHz (1-3 sequence), OFF ∗Manually settable, or automatically settable according to RBW
	Signal purity and stability	Noise sidebands: ≤–95 dBc/Hz + 20 log n (1 MHz to 21.2 GHz, 10 kHz offset) ∗n: harmonic order of the mixer Residual FM: ≤20 Hzp-p/0.1 s (1 GHz, span: 0 Hz) Frequency drift: ≤200 x n Hz/min (span: ≤10 kHz x n, sweep time: ≤100 s) ∗After 1-hour warm-up at constant ambient temperature; n: harmonic order of the mixer
	Reference oscillator	Frequency: 10 MHz Aging rate: 2 x 10^{-6}/year (typical); Option 01: 1 x 10^{-7}/year, 2 x 10^{-8}/day Temperature characteristics: 1 x 10^{-5} (typical, 0° to 50°C); Option 01: ± 5 x 10^{-8} (0° to 50°C, referenced to frequency at 25°C)
Amplitude	Level measurement	Measurement range: Average noise level to +30 dBm Maximum input level: +30 dBm (CW average power, RF ATT: ≥10 dB), ± 0 Vdc Average noise level: ≤–115 dBm (1 MHz to 1 GHz, band 0), ≤–115 dBm + 1.5f [GHz] dB (1 to 3.1 GHz, band 0), ≤–110 dBm (2.92 to 8.1 GHz, band 1), ≤–102 dBm (8.0 to 15.3 GHz, band 2), ≤–98 dBm (15.2 to 21.2 GHz, band 3) ∗RBW: 1 kHz, VBW: 1 Hz, RF ATT: 0 dB Residual response: ≤–90 dBm (RF ATT: 0 dB, input: 50 Ω terminated, 1 MHz to 8.1 GHz)
	Reference level	Setting range Log scale: –100 to +30 dBm, Linear scale: 224 µV to 7.07 V Unit Log scale: dBm, dB µV, dBmV, V, dB µVemf, W Linear scale: V Reference level accuracy: ± 0.4 dB (–49.9 to 0 dBm), ± 0.75 dB (–69.9 to -50 dBm, 0.1 to +30 dBm), ± 1.5 dB (–80 to –70 dBm) ∗After calibration, at 100 MHz, span: 1 MHz (when RF ATT, RBW, VBW, and sweep time set to AUTO) RBW switching uncertainty: ± 0.3 dB (1 kHz to 1 MHz), ± 0.4 dB (3 MHz) ∗After calibration, referenced to RBW: 3 kHz Input attenuator (RF ATT) Setting range: 0 to 70 dB (10 dB steps) ∗Manual settable, or automatically settable according to reference level Switching uncertainty: ± 0.3 dB (0 to 50 dB), ± 1.0 dB (0 to 70 dB) ∗After calibration, frequency: 100 MHz, referenced to RF ATT: 10 dB
	Frequency response	Relative: ± 1.5 dB (9 to 100 kHz, band 0), ± 1.0 dB (100 kHz to 3.2 GHz, band 0), ± 1.5 dB (2.92 to 8.1 GHz, band 1), ± 3.0 dB (8 to 15.3 GHz, band 2), ± 4.0 dB (15.2 to 21.2 GHz, band 3) ∗After pre-selector tuning at band 1, 2 and 3, referenced to midpoint between highest and lowest frequency deviation in each band Absolute: ± 5.0 dB (9 kHz to 21.2 GHz, RF ATT: 10 dB, referenced to 100 MHz) ∗After pre-selector tuning at band 1, 2 and 3, referenced to midpoint between highest and lowest frequency deviation in each band
	Waveform display	Scale (10 div) Log scale: 10, 5, 2, 1 dB/div Linear scale: 10, 5, 2, 1%/div Linearity (after calibration) Log scale: ± 0.4 dB (0 to –20 dB), ± 1.0 dB (0 to –70 dB), ± 1.5 dB (0 to –85 dB), ± 2.5 dB (0 to –90 dB) Linear scale: ± 4% (compared to reference level) Marker level resolution Log scale: 0.01 dB, Linear scale: 0.02% of reference level

Amplitude	Spurious response	2nd harmonic distortion: ≤–60 dBc (10 to 200 MHz, band 0, mixer input: –30 dBm), ≤–70 dBc (0.2 to 1.55 GHz, band 0, mixer input: –30 dBm), ≤–100 dBc or noise level (1.46 to 10.6 GHz, band 1/2/3, mixer input: –10 dBm) Two signal 3rd order intermodulation distortion: ≤–70 dBc (10 to 100 MHz), ≤–80 dBc (0.1 to 8.1 GHz), –75 dBc or noise level (8.1 to 21.2 GHz) ∗Frequency difference of two signals: ≥50 kHz, mixer input: –30 dBm Image response: ≤–65 dBc (≤18 GHz), ≤–60 dBc (>18 GHz) Multiple response: ≤–60 dBc
	1 dB gain compression	≥–5 dBm (≥100 MHz, at mixer input)
Sweep	Sweep time	Setting range : 20 ms to 1000 s (manually settable, or automatically settable according to span, RBW, and VBW) Accuracy: ± 15% (20 ms to 100 s), ± 25% (110 to 1000 s), ± 1% (time domain sweep: digital zero span mode)
	Sweep mode	Continuous, single
	Time domain sweep mode	Analog zero span, digital zero span
	Zone sweep	Sweeps only in frequency range indicated by zone marker
	Tracking sweep	Sweeps while tracing peak points within zone marker (zone sweep also possible)
Functions	Number of data points	501
	Detection mode	NORMAL: Simultaneously displays max. and min. points between sample points POS PEAK: Displays max. point between sample points NEG PEAK: Displays min. point between sample points SAMPLE: Displays momentary value at sample points Detection mode switching uncertainty: ± 0.5 dB (at reference level)
	Display	Color TFT-LCD, Size: 14 cm, Number of colors: 17 (RGB, each 64-scale settable), Intensity adjustment: 5 steps settable
	Display functions	Trace A: Displays frequency spectrum Trace B: Displays frequency spectrum Trace Time: Displays time domain waveform at center frequency Trace A/B: Displays Trace A and Trace B simultaneously. Simultaneous sweep of same frequency, alternate sweep of independent frequencies Trace A/BG: Displays frequency region to be observed (background) and object band (foreground) selected from background with zone marker simultaneously Trace A/Time: Displays frequency spectrum, and time domain waveform at center frequency simultaneously Trace move/calculation: A → B, B → A, A ↔ B, A + B → A, A – B → A, A – B + DL → A
	Storage functions	NORMAL, VIEW, MAX HOLD, MIN HOLD, AVERAGE, CUMULATIVE, OVER WRITE
	FM demodulation waveform display function	Demodulation range: 2, 5, 10, 20, 50, 100, 200 kHz/div Marker display Accuracy: ± 5% of full scale (referenced to center frequency, DC-coupled. RBW: 3 MHz, VBW: 1 Hz, CW) Demodulation frequency response: DC (50 Hz at AC-coupled) to 100 kHz (range: ≤20 kHz/div, VBW: off, at 3 dB bandwidth) DC (50 Hz at AC-coupled) to 500 kHz (range: ≥50 kHz/div, VBW: off, at 3 dB bandwidth) ∗RBW: ≥1 kHz to 3 MHz usable
	Input connector	N-J, 50 Ω
	Auxiliary signal input and output	IF OUTPUT: 10.69 MHz, BNC connector VIDEO OUTPUT (Y): 0 to 0.5 V ± 0.1 V (typical, from lower edge to upper edge at 10 dB/div) 0 to 0.4 V ± 0.1 V (typical, from lower edge to upper edge at 10%/div) BNC connector ∗75 Ω terminated at 100 MHz input COMPOSITE OUTPUT: For NTSC, 1 Vp-p (75 Ω terminated), BNC connector EXT REF INPUT: 10 MHz ± 10 Hz, ≥0 dBm (50 Ω terminated), BNC connector
	Signal search	AUTO TUNE, PEAK → CF, PEAK → REF, SCROLL
	Zone marker	NORMAL, DELTA
	Marker →	MARKER → CF, MARKER → REF, MARKER → CF STEP SIZE, Δ MARKER → SPAN, ZONE → SPAN
	Peak search	PEAK, NEXT PEAK, NEXT RIGHT PEAK, NEXT LEFT PEAK, MIN DIP, NEXT DIP
	Multimarker	Number of markers: 10 max. (HIGHEST 10, HARMONICS, MANUAL SET)
	Measure	Noise power (dBm/Hz, dBm/ch), C/N (dBc/Hz, dBc/ch), occupied bandwidth (power N% method, X-dB down method), adjacent channel power (REF: total power/reference level/in-band level method, channel designate display: 2 channels x 2 graphic display), average power of burst signal (average power in designated time range of time domain waveform), channel power (dBm, dBm/Hz), template comparison (upper/lower limits x each 2, time domain), MASK (upper/lower x each 2, frequency domain)
	Save/recall	Save and recall setting conditions and waveform data to internal memory (max. 12) or memory card
	Hard copy	Printer (HP dotmatrix, EPSON dotmatrix compatible models): Display data can be hard-copied via RS-232C, GPIB and Centronics (Option 10) interface. Plotter (HP-GL, GP-GL compatible models): Display data can be output via RS-232C, and GPIB interface.
	PTA	Language: PTL (interpreter based on BASIC) Programming: Using external computer Program memory: Memory card, upload/download to/from external computer Programming capacity: 192 KB Data processing: Directly accesses measurement data according to system variables, system subroutines, and system functions
	RS-232C	Outputs data to printer and plotter. Control from external computer (excluding power switch)

Functions	GPIB	Meets IEEE488.2. Controlled by external computer (excluding power switch). Or controls external equipment with PTA Interface function: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C1, C2, C3, C4, C28
	Correction	Automatic correction of insertion loss of MA1621A Impedance Transformer Correction accuracy (RF ATT: ≥10 dB): ± 2.5 dB (9 to 100 kHz), ± 1.5 dB (100 kHz to 2 GHz), ± 2.0 dB (2 to 3 GHz) ∗Typical value
	Memory card interface	Functions: Saving/recalling measurement parameters/waveform data, uploading/downloading PTA programs; Applicable cards: SRAM, EPROM, Flash EPROM (Only SRAM writable; Card capacity: 2 MB max.) Connector: Meets the PCMCIA Rel. 2.0; 2 slots
Others	EMC	EN61326: 1997/A1: 1998 (Class A) EN61000-3-2: 1995/A2: 1998 (Class A) EN61326: 1997/A1: 1998 (Annex A)
	LVD	EN61010-1: 1993/A2: 1995 (Installation Category II, Pollution Degree 2)
	Vibration	Meets the MIL-STD-810D
	Power (operating range)	85 to 132/170 to 250 Vac (automatic voltage switching), 47.5 to 63 Hz, 380 to 420 Hz (85 to 132 V only), ≤330 VA
	Dimensions and mass	320 (W) x 177 (H) x 351 (D) mm, ≤13 kg (without option)
	Ambient temperature	0° to +50℃ (operate), –40° to +75℃ (storage)

Option 01: Reference crystal oscillator

Frequency	10 MHz
Aging rate	≤1 x 10^{-7}/year, ≤2 x 10^{-8}/day (after power on, with reference to frequency after 24 h)
Temperature characteristics	± 5 x 10^{-8} (0° to 50°C, with reference to 25°C)
Buffer output	10 MHz, >2 Vp-p (200 Ω termination), BNC connector

Option 02: Narrow resolution bandwidth

Resolution bandwidth (3 dB)	30 Hz, 100 Hz, 300 Hz
Resolution bandwidth switching uncertainty	± 0.4 dB (RBW 3 kHz referenced)
Resolution bandwidth accuracy	± 20% (100, 300 Hz)
Selectivity (60 dB:3 dB)	≤15:1 (RBW: 100, 300 Hz), ≤20:1 (RBW: 30 Hz)

Option 04: High-speed time domain sweep

Sweep time	12.5 µs, 25 µs, 50 µs, 100 to 900 µs (one most significant digit settable), 1.0 to 19 ms (two upper significant digits settable)
Accuracy	± 1%
Marker level resolution	Log scale: 0.1 dB, Linear scale: 0.2% (relative to reference level)

Option 06: Trigger/gate circuit

Trigger switch	FREERUN, TRIGGERED
Trigger source	EXT Trigger level: ± 10 V (resolution: 0.1 V), TTL level Trigger slope: Rise, fall Connector: BNC VIDEO Log scale: –100 to 0 dB (resolution: 1 dB) Trigger slope: Rise, fall WIDE IF VIDEO Trigger level: High, middle, or low selectable Bandwidth: ≥20 MHz Trigger slope: Rise, fall LINE Frequency: 47.5 to 63 Hz (line lock)
Trigger delay	Pre-trigger (displays waveform from previous max. 1 screen at trigger occurrence point) Range: –time span to 0 s Resolution: time span/500 Post trigger (displays waveform from after max. 65.5 ms at trigger occurrence point) Range: 0 to 65.5 ms Resolution: 1 µs
Gate sweep	In frequency domain, displays spectrum of input signal in specified gate interval Gate delay: 0 to 65.5 ms (from trigger point, resolution: 1 µs) Gate width: 2 µs to 65.5 ms (from gate delay, resolution: 1 µs)

Option 07: AM/FM demodulator

Voice output	With internal loudspeaker and earphone connector (ø 3.5 jack), adjustable volume

Option 10: Centronics interface*1

Function	Outputs data to printer (Centronics standard)
Connector	D-sub 25-pin (jack)

*1: GPIB interface can not be installed simultaneously.

Option 15: Sweep signal output

Sweep output (X)	0 to 10 V ± 1 V (≥100 kΩ termination, from left side to right side of display scale), BNC connector
Sweep status output (Z)	TTL level (low level with sweeping), BNC connector

Ordering Information

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Please specify model/order number, name and quantity when ordering.

Model/order No.	Name	Remarks
	Main frame	
MS2665C	Spectrum Analyzer	
	Standard accessories	
	Power cord, 2.6 m: 1 pc	
F0013	Fuse, 5 A: 2 pcs	
W1335AE	MS2665C/MS2667C operation manual: 1 copy	
B0329G	Front cover	3/4MW4U
	Options	
MS2665C-01	Reference crystal oscillator	Stability: ≤2 x 10^{-8}/day
MS2665C-02	Narrow resolution bandwidth	30, 100, 300 Hz
MS2665C-04	High-speed time domain sweep	1.25 µs/div
MS2665C-06	Trigger/gate circuit	Pre-trigger and post trigger available
MS2665C-07	AM/FM demodulator	Outputs to loudspeaker or earphone connector
MS2665C-10	Centronics interface	GPIB interface can not be installed simultaneously.
MS2665C-15	Sweep signal output	X, Z
	Application parts	
J0561	Coaxial cord (N-P-5W•5D-2W•N-P-5W), 1 m	
J0104A	Coaxial cord (BNC-P•RG-55/U•N-P) , 1 m	
CSCJ-256K-SM	256 KB memory card	Meets PCMCIA Rel. 2.0
CSCJ-512K-SM	512 KB memory card	Meets PCMCIA Rel. 2.0
CSCJ-001M-SM	1024 KB memory card	Meets PCMCIA Rel. 2.0
CSCJ-002M-SM	2048 KB memory card	Meets PCMCIA Rel. 2.0
B0395A	Rack mount kit (IEC)	
B0395B	Rack mount kit (JIS)	
B0391A	Carrying case (hard type)	With casters
B0391B	Carrying case (hard type)	Without casters
MP612A	RF Fuse Holder	DC to 1000 MHz, 50 Ω (N-type)
MP613A	Fuse Element	For MP612A
J0805	DC block (Model 7003)	10 kHz to 18 GHz, ± 50 V, N-type, Weinschel product
MA2507A	DC Block Adaptor	50 Ω, 9 kHz to 3 GHz, ± 50 V, N-type
MA8601A	DC Block Adaptor	50 Ω, 30 kHz to 2 GHz, ± 50 V, N-type
MA8601J	DC Block Adaptor	75 Ω, 10 kHz to 2.2 GHz, ± 50 V, NC-type
MA1621A	50Ω → 75Ω Impedance Transformer	75 Ω, 9 kHz to 3 GHz, ± 100 V, NC-type
MP614B	50Ω↔ 75Ω Impedance Transformer	50 to 1200 MHz (transformer type), NC-type
J0007	GPIB cable, 1 m	408JE-101
J0008	GPIB cable, 2 m	408JE-102
J0742A	RS-232C cable, 1 m	For PC-98 Personal Computer and VP-600, D-sub 25 pins (straight)
J0743A	RS-232C cable, 1 m	For PC/AT compatible, D-sub 9-pins (cross)
J0064A	7 GHz band coaxial/waveguide adaptor	5.8 to 8.6 GHz, N-J•BRJ-7
J0064C	10 GHz band coaxial/waveguide adaptor	8.2 to 12.4 GHz, N-J•BRJ-10
J0004	Coaxial adaptor (N-P•SMA-J)	
DGM010-02000EE	Coaxial cord, 2 m	N-type connector, general use
DGM024-02000EE	Coaxial cord, 2 m	N-type connector, low-loss type

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Specifications are subject to change without notice.

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