

MG3681A **Digital Modulation Signal Generator** 250 kHz to 3 GHz



For Evaluating Next Generation Digital Mobile Communications Systems

For Wideband, High-speed Digital Mobile Communications

The MG3681A uses a wideband vector modulator to output the high-accuracy, high-speed vector modulation signals that are required for R&D and manufacturing of digital mobile communications equipment and related devices. It covers, the frequency band of leading mobile communications systems for the frequency range of 250 kHz to 3 GHz.

It uses vector modulator to provide excellent frequency response, distortion and S/N ratio. It can perform accurate receiver sensitivity test and transmitter adjacent channel leakage power test for high-speed modulation communications systems.

Expansion units such as MU368040A CDMA Modulation Unit for modulation signals generation of W-CDMA communication system can be installed on the seven expansion slots in the MG3681A. Various modulation signals can be generated with the expansion units and associated software. The MG3681A also has analog modulation functions such as AM and FM for testing of analog communications systems. In addition, its excellent signal purity and various functions such as memory and frequency sweep are useful as a general-purpose signal generator.

12.00 13.00 14.00 15.00

ООО "Техэнком" Контрольно-измерительные приборы и оборудование www.tehencom.com

- High-resolution Setting of Frequency 0.01 Hz and Output Level 0.01 dB
- 30 MHz Wideband and High-Accuracy Vector Modulation
- Excellent Adjacent Channel Leakage Power Ratio
- Various Expansion Units

6.00 17.00 18.00 19.00 00 20.00 00 21.00 00 15.00 16.00 17.0 12.00 13.00 14.00 15.00 16.00 17.00 18.00 19

24.1

Excellent Analog Basic Performance

Excellent Level Accuracy Signal

The frequency response is excellent by calibrating output level across the entire output RF frequency range. Even low level can be output with high-accuracy due to use of a high-precision, high-reliability step attenuator calibrated.



Output level frequency response



Output level accuracy

Excellent Signal Purity

Digital mobile communications evolve into wideband RF frequency bandwidth, and signal generator requires lownoise signal to faraway frequency offset. A unique synthesizer technology achieves low noise floor characteristics of –145 dBc/Hz (typ. at above 5 MHz offset).



SSB phase noise characteristics

Wideband Vector Modulation

The modulation frequency response of ±3 dB at the modulation frequency from DC to 30 MHz is achievable by the high-speed baseband signal processor and wideband vector modulator, permitting wideband vector modulation supporting high-speed data communications including W-CDMA system. Accurate wideband vector modulation is also available by using the external I/Q signals as well as internal modulation using the optional modulation units installed. In addition, a unique Automatic Level Control (ALC) technology assures stable output level at vector modulation.



Vector modulation frequency response





Flexible System Configuration

Expansion Units for up to Seven Slots

Seven slots for expansion units have 14 bits high-speed waveform data bus each In-phase and Quadrature signals. The excellent expansible platform covers future communication systems by addition of expansion units.

Note: Some expansion units require installation of dedicated software to enable functionality.

Expansion unit	Software
	MX368011A
MU368010A	PDC Software
TDMA Modulation Unit	MX368012A
	GSM Device Test Software
	MX368041B
MU368040A	W-CDMA Software
CDMA Modulation Unit	MX368042A
	IS-95 Device Test Software
	MX368031A
	Device Test Signal Generation Software
	MX368033A
MU368030A	CDMA2000 1xEV-DO Signal
Universal Modulation Unit	Generation Software
	MX368034A
	PDC Packet Software
	MX368035A
	PHS Signal Generation Software
MU368060A	_
AWGN Unit	



Excellent Adjacent Channel Leakage Power Ratio

The adjacent channel leakage power ratio of the digital modulation signal generator is an important factor in distortion testing of device and interference testing of receiver.

The MG3681A achieves an excellent adjacent channel leakage power ratio by an optimized circuit design. The typical adjacent channel leakage power ratio for W-CDMA system is –68 dBc/3.84 MHz and the secondary adjacent channel leakage power ratio is –75 dBc/3.84 MHz.



W-CDMA system adjacent channel leakage power ratio at 16 code multiplex



IS-95 system adjacent channel power ratio at 9 code multiplex

Excellent Operability

In order to realize the good operability is the important element in using signal generators, the operational flow has been analyzed. Parameters can be selected using the cursor keys and changed using either the ten-key pad, rotary knob or step keys. The panel layout has been designed so that related operations can be performed smoothly and an easy-to-understand on-screen Help function facilitates the operation.





PC Card Slot

Set

Cance

dB

GHz/dBm

MHz/mW

kHz/nW

Hz/fW

0

CE

9

6

3

-/+

8

5

2

.

0

A PC card slot simplifies firmware upgrades and data downloads.

<

s/dBµV

ms/V

rad/mV

deg/µV

5

.

Digital

Analog

RPP Reset Off>O< On •

GPIB, RS-232C Interface

Remote control by both GPIB and RS-232C is supported. In addition, high-speed control, such as frequency increase and decrease, can be performed using TTL level signals.



The cursor keys for selecting setting items have been arranged with consideration for good operability to permit efficient setting of many parameters. The setting method and setting range are different for each parameter, and are explained by onscreen Help display.

Modulation, RF Output ON/OFF key

The modulation and RF output can be switched on/off using one-touch keys.

Various Modulation Types

Digital Modulation

In addition to performing internal modulation using I/Q and burst signals generated by the expansion modulation units installed in the MG3681A, external modulation can also be performed using signals generated by an external baseband signal source. The expansion modulation unit operates irrespective of whether modulation is on or off and can be used as I/Q signals source. Moreover, when an optional additional function of I/Q output is installed, the I/Q signals amplitude and DC offset, etc., can be varied.

Freq. 2167.500 000 00 MHz	CDMA(1/2) → Channel 1-3
Level 0.00 dBm Mem.—— Normal	→ Channel 4-8
Baseband : []n] I/Q Mod. : [Int] Pulse Mod. : [Int] System : [W-CDMA] W-CDMA Phase : [1] Simulation Link : Chip Rate : [3.840 000Mcps]	→ Channel 9-12 & Add.
Filter : [RNY0] Roll Off Ratio : [0.22] Filter Mode : [EVM] Pattern Select : [0] Internal Maximum Code Number : [1] Output Level - 0.00dBm Ch. 1 : [On] Power : [-0.0dB] SCH Pr : - Sc : -	Cal
Ch. 2 : [Off] Power : [-40.0dB] SCH Pr : - Sc : - Ch. 3 : [Off] Power : [-40.0dB] SCH Pr : - Sc : - Ch. 4 : [Off] Power : [-40.0dB] Ch. 5 : [Off] Power : [-40.0dB] Ch. 6 : [Off] Power : [-40.0dB] Ch. 7 : [Off] Power : [-40.0dB]	Even Level
Ch. 8 : [Off] Power : [-40.0dB] Ch. 9 : [Off] Power : [-40.0dB] Ch.10 : [Off] Power : [-40.0dB] Ch.11 : [Off] Power : [-40.0dB] Ch.12 : [Off] Power : [-40.0dB] Add Ch : Off Power : [-40.0dB]	* etc.
Data (CH4) Clock/Trig PWR CONT Ref. Clock	1/0 Input

Digital modulation setting screen (when W-CDMA system selected)

Analog Modulation

AM, FM and ϕ M can be performed using an external modulation signal. When an optional AF synthesizer is installed, internal modulation at 0.01 Hz resolution with sine waves and triangular waves, etc., is also possible. The analog setting screen has been designed to provide an image of the modulation signal flow and greatly simplifies setting.





Digital modulation signal flow

Full Function Lineup

High-resolution Output Level Setting of 0.01 dB

The output level can be set with a resolution of 0.01 dB across the entire level range. This is especially useful when wanting to set the level with a fine resolution for device tests, etc., as well as when calibrating the level with a standard such as a reference signal source or power meter, etc.



Output level display

Large Capacity Memory

Basic parameter memory can save up to 512 frequency and output level settings. All parameter memory can save up to 100 all settings including modulation settings. Basic parameter memory has a dedicated memory address display field that can be recalled continuously using the rotary knob or step keys. All parameter memory can be input titles up to 8-character length each, to make it easy to check the memory contents.



Basic parameter memory address display

					Recall
All Parameter	Recall				
Memory No.					
Title : TE No:Title	SI No:Title	No:Title	No:Title	No:Title	
0:TEST	20:	40:	60:	80:	
1:PDC 2:GSM	21: 22:	41: 42:	61: 62:	81: 82:	
2:05⊓ 3:W-CDMA U	23:	42: 43:	62: 63:	82: 83:	*
4:IS-95	24:	44:	64:	84:	* List
5:AWGN	25:	45:	65:	85:	2.00
6:DTSG(0) 7:W-CDMA D	26: 27:	46: 47:	66: 67:	86: 87:	
8 TEST 001	28:	48:	68:	88:	
9:TEST 010	29:	49:	69:	89:	
10:ANRITSU	30:	50:	70:	90:	
11: 12:	31: 32:	51: 52:	71: 72:	91: 92:	
13:	33:	53:	73:	93:	
14:	34:	54:	74:	94:	
15:	35:	55:	75:	95:	
16:	36:	56:	76:	96:	
17: 18:	37: 38:	57: 58:	77: 78:	97: 98:	Return
19:	39:	59:	79:	99:	
Data (CU4)	Clook/Thig			Pof Clook	L/O Input

All parameter memory recall screen

Connector Function Name Display

The type of required auxiliary input signals for modulation varies with the used software. The functions according to the setting conditions are assigned to the auxiliary connectors. The function and name of each connector is displayed on the LCD to simplify the work of connecting other equipment and prevent connection mistakes.







Example of rear panel connector function display

Operation Help Display

The parameters setting range and method are different at each item. The on-screen help for each setting range and method are displayed to simplify parameter operations in the setting window.

Offset Value [] Min:-3.00GHz	Max:3.00GHz
	0.00 Hz	
Knob Step 0123456789	Curson	

Example of help display when setting frequency offset

Specifications

MG3681A Main frame

	Range	250 kHz to 3000 MHz, Resolution: 0.01 Hz			
	Accuracy	Depends on installed reference oscillator, Reference frequency accuracy: ± (5% of FM setting deviation + 5 Hz) for frequency modulation			
Freesenser	Internal reference oscillator	Aging rate: $\pm 1 \times 10^{-6}$ /year, Temperature stability: $\pm 1 \times 10^{-6}$ (0° to 50°C)* ¹			
Frequency	External reference input	10 MHz/13 MHz auto-switching, ±10 ppm, \geq 0.7 V(p-p)/50 Ω (AC coupled), BNC connector (rear panel)			
	Buffer output	10 MHz, TTL level (DC coupled), BNC connector (rear panel)			
	Switching time	≤20 ms (response time from final command to ±500 Hz of set frequency on GPIB at CW, ALC on, except when setting frequency is crossing over 600 MHz and 1010 MHz)			
	Range	-143 to +13 dBm (settable range: -143 to +17 dBm)			
	Unit	dBm, W, dBµV, V (dBµV, V selected terminate/open voltage display)			
	Resolution	0.01 dB (dBm, dBμV units), 3 digits (W, V units)			
	Frequency response	±1 dB (CW, ALC on, 0 dBm)			
		CW, ALC on			
		Frequency <1 CHz			
	Accuracy	Level ≤1 GHz >1 GHz			
	,	\leq +13 dBm, \geq -127 dBm \pm 1 dB \pm 2 dB			
		$<-127 \text{ dBm}$ $\pm 2 \text{ dB}$ $\pm 3 \text{ dB}$			
	Output connector	50 Ω, N-type connector (front panel)			
	Output connector	\leq 50 ms (normal mode), \leq 100 ms (safety mode), \leq 10 ms (continuous mode)			
	Switching time	*Response time from final command to ± 0.5 dB of final level on GPIB at CW, ALC on			
Output level	Special setting mode	Continuous mode: Level continuously adjustable in set value range of ±10 dB (dBm, dBµV units only) For vector modulation by optional digital modulation unit, continuous mode variance depends on modulatior setting Safety mode: Mechanical attenuator decreases level to prevent generation of high-level signal spikes			
	ALC mode	Usage: Continuous wave or pulse modulation wave (burst wave) with RF On time of 10 µs or more ALC time constant: Auto, 500 ns, 2.4 µs, 5 µs, 24 µs, 50 µs, 240 µs, 500 µs selectable At Auto, automatically selected depending on frequency, AM and vector modulation [when digital modulation unit (option) is used] The ALC time constant is automatically selected, depending on the set frequency, regardless of the time constant selected on the front panel ALC off Usage: Pulse modulation wave (burst wave) whose RF on time is less than 10 µs Restrict item: Without AM ALC calibration: Automatic during ALC Calibration operation and at frequency/level setting change			
		Harmonics: <-30 dBc			
		Non harmonic:			
0	Spurious	Frequency 15 kHz to 300 MHz offset >300 MHz offset Fixed frequency spurious			
Signal		≤2500 MHz <-60 dBc <-30 dBc -50 dBc (660, 1320 MHz)			
purity		>2500 MHz <30 dBc -			
		Power line and Fan rotation: <-40 dBc *CW, continuous mode: off, ≤ 0 dBm			
	SSB phase noise	<-118 dBc/Hz (≥10 MHz, ≤1010 MHz), <-112 dBc/Hz (>1010 MHz) *At CW, 20 kHz offset			
	Range	0 to 100% (cannot set internal/external modulation independently), Resolution: 0.1%			
		≤0 dBm, ALC on, in band of ±1.5 dB based on modulation frequency of 1 kHz			
	Modulation frequency response	Frequency Lower limit frequency Upper limit frequency Microsoft Vector modulation and wideband AM off Vector modulation or wideband AM on AM: 30% AM: 80% AM: 30%			
AM		≥0.4 MHz, <2 MHz			
		≥10 MHz (External modulation AC coupled) 10 kHz 10 kHz			
	Internal modulation	requires AF synthesizer (Option 21)			
	External modulation	2 V(p-p) approx., 600 Ω , AC/DC coupled switchable, BNC connector (front panel)			
	Modulation signal polarity	Positive/negative switchable			

Sweep time 1 ms to 600 s (per memory; memory recall time restricts lower limit, resolution: 1 ms) Sweep mode Auto (repetition sweep), single (single sweep) Special display Relative display Frequency, output level (dBm, dBµV units only) Offset display Frequency (offset range: -3 to +3 GHz), output level (offset range: -50 to +50 dB, dBm, dBµV units only) Display Size 7.2 inch, 480 x 640 dots, color D-STN On/off setting Panel display on/off Backup function All items reset at power-on except following: Input data contents, remote condition, contents of GPIB data					
Resolution 10 Hz (10 to 10 Hz (20 to 10 Hz (20 Li 10 00 Hz (20 Li 10 100 Hz (20 H		Range			
Modulation frequency OC to 20 kHz (internal modulation, external modulation frequency of 1 kHz Internal modulation requires AF synthesizer (Option 21) External modulation requires AF synthesizer (Option 21) Modulation signal Positive/megative switchable Positive/megative switchable Positive/megative switchable Modulation signal Positive/megative switchable Positive/megative switchable Positive/megative switchable MM Resolution red. unit. 0.01 red. deg unit. 1 deg Resolution red. unit. 0.01 red. deg unit. 1 deg Resolution Modulation frequency PC to 20 kHz (internal modulation, switzmal modulation frequency of kHz Positive/megative switchable Modulation frequency PC to 20 kHz (internal modulation, requires AF synthesizer (Option 21) External modulation External modulation requires digital modulation unit (option) Positive/megative switchable Modulation frequency PC to 15 MHz (e2 dB bandwidh), DC to 30 MHz (e3 dB bandwidh) Modulation frequency PC to 15 MHz (e2 dB bandwidh), DC to 30 MHz (e3 dB bandwidh) Modulation frequency PC to 15 MHz (e2 dB bandwidh), DC to 30 MHz (e3 dB bandwidh) Modulation frequency PC to 1		Resolution	10 Hz (0 to 10 kHz deviation), 100 Hz (10.1 to 100 kHz deviation), 1 kHz (101 to 1000 kHz deviation),		
Image: Instant and cultation AC coupled) *In band of ±1 dB based on modulation frequency of 1 kHz Internal modulation 2 V(p-p) approx. 600 2.0 AC/DC coupled switchable, BNC connector (front panel) Modulation signal polarity Positive/inegative switchable Positive/inegative switchable Range 0 to 6.28 rad (>10 MHz, <10 to 12.56 rad (>10 MHz) to 16 a.28 rad (>10 MHz, <10 to 12.56 rad (>10 MHz) Unit rad, deg Co 5.28 rad (>10 MHz, <10 to 12.56 rad (>10 MHz) to 2.8 rad (>10 KHz, <10 MHz)		Modulation frequency			
External modulation 2 V(p-p) approx., 600 Q. AC/DC coupled switchable, BNC connector (front panel) Modulation signal polarity Positive/ingative switchable Vinite Range ************************************	FM				
Modulation signal positive/megative switchable Positive/megative switchable Range 0 to 6.28 rad (<10 MHz, <1010 MHz) to 12.56 rad (<1010 MHz)		Internal modulation	requires AF synthesizer (Option 21)		
polarity Polarity Polarity grad Range 0 to 6.2 at 0.4 (2.10 MHz, 2.1010 MHz), 0 to 12.56 rad (>1010 MHz) With rad, deg "Cannot set internal/external modulation independently. Internal modulation rad, unit. 0.01 rad, deg unit. 1 deg Resolution rad, unit. 0.01 rad, deg unit. 1 deg Resolution Polarity Do to 2.2 modulation, external modulation, external modulation frequency of 1 kHz Internal modulation 2 V(p-p) approx, 600 Ω, AC/DC coupled switchable, BNC connector (front panel) Modulation frequency Do to 15 MHz (E 2.4 Bb andwidth), DC to 30 MHz (± 3 dB bandwidth) Polarity Polarity Polarity (E 2.4 Bb andwidth), DC to 30 MHz (± 3 dB bandwidth) Instramal modulation requires digital modulation in (polino) Internal modulation Instramal modulation ≤1 V(p-p), 50 Ω, BNC connector (front panel), sensitivity: 1 V(p-p) = 100% Onvidi raia <100 ns (external modulation)		External modulation	2 V(p-p) approx., 600 Ω, AC/DC coupled switchable, BNC connector (front panel)		
Mange "Cannot set internal/existemal modulation independentity. aM Internal read, deg Internal modulation irad, deg Internal modulation Factorization Internal modulation DC in 20 AHZ (internal modulation, external modulation DC coupled), 20 Hz to 20 kHz (external modulation AC coupled) */In band of ±1 dB based on modulation frequency of 1 kHz Internal modulation 2 V(p-p) approx., 600 Q, AC/DC coupled switchable, BNC connector (front panel) Modulation signal Modulation requires AF2 synthesizer (Option 21) Positive/negative switchable Internal modulation Factorizative adjustive modulation input level: 0.9 V(p-p), 2100 MHz, 50 dBm, modulation frequency of 1 kHz Internal modulation Factorizative adjustive/negative switchable Publice Positive/negative switchable Resoftal imme <100 ns (external modulation)		•			
Resolution rsd unit 0.01 rad, deg unit. 1 deg Mediation frequency response OC to 20 KHz (internal modulation, external modulation DC coupled), 20 Hz to 20 KHz (external modulation response Internal modulation 2 V(p.p.) aprox		Range			
Modulation frequency DC to 20 kHz (internal modulation, external modulation DC coupled). 20 Let to 20 kHz (external modulation AC coupled). "In band of at 4B based on modulation frequency of 1 kHz Internal modulation 2 V(p-p) approx60 0.2, AC/DC coupled switchable, BNC connector (front panel) Modulation frequency DC to 15 MHz (±2 dB bandwidth), DC to 30 MHz (±3 dB bandwidth) Videband Internal modulation 2 V(p-p) approx60 0.2, AC/DC coupled switchable, BNC connector (front panel) Videband Internal modulation 1 KHz 2 K(p-p) approx60 0.2, AC/DC coupled switchable, BNC connector (front panel) Videband requires digital modulation, input level: 0.9 V(p-p), 2100 MHz, ±0 dBm, modulation frequency of 1 kHz Videband requires digital modulation 2 K(p-p) approx. Videband Fibse/fail time <500 ns (external modulation)		Unit			
Amm response AC coupled) *in band of ±1 dB based on modulation frequency of 1 kHz Internal modulation requires AF synthesizer (Option 21) ************************************		Resolution	rad unit: 0.01 rad, deg unit: 1 deg		
External modulation 2 V(p-p) approx., 600 Ω, AC/DC coupled switchable, BNC connector (front panel) Modulation rigner Positive/negative switchable Widebard Modulation requency DC to 15 MHz (±2 dB bandwidth), DC to 30 MHz (±3 dB bandwidth) Midebard Internal modulation requires digital modulation, input level: 0.9 V(p-p), 2100 MHz, ≤0 dBm, modulation frequency of 1 kHz Midebard Fitternal modulation Fitternal modulation Fitternal modulation Pulse On/off ratio > 60 dB On/off ratio > 60 dB RiseFall time <100 ns (external modulation)	ಶM				
Modulation signal polarity Positive/negative switchable Mideband Midulation frequency response DC to 15 MHz (±2 dB bandwidth), DC to 30 MHz (±3 dB bandwidth) *External modulation, input level; 0.9 v(p-p), 2100 MHz, ≤0 dBm, modulation frequency of 1 kHz Midulation frequency response DC to 15 MHz (±2 dB bandwidth), DC to 30 MHz (±3 dB bandwidth) *External modulation, input level; 0.9 v(p-p), 2100 MHz, ≤0 dBm, modulation frequency of 1 kHz Pulse modulation frequency >60 dB Pulse modulation frequency DC to 1 MHz (external modulation) Minimum pulse width <500 ns (external modulation, ALC off) frequency Pulse repetition frequency DC to 1 MHz (external modulation, input level; 0.50 MB connector (front panel) The ternal modulation frequency DC to 1 MHz (external modulation, input level; 0.50 V(rms), ≥100 MHz, ≤0 dBm, 3.84 Msps QPSK modulation requires digital modulation, input level; 0.5 V(rms), ≥100 MHz, ≤0 dBm, 3.84 Msps QPSK modulation requires digital modulation, input level; 0.5 V(rms), ≥100 MHz, ≤0 dBm, 3.84 Msps QPSK modulation requires digital modulation unit (option) External modulation functional modulation functional modulation functional modulation functional modulation functional modulation frequency and waveform of modulation spans bero sombinations below: AM (internal)/SM (internal		Internal modulation	requires AF synthesizer (Option 21)		
polarity C Positive/regulary switchagulary Wideband MM Prostruct/Provided and the polarity DC to 15 MHz (±2 dB bandwidth), DC to 30 MHz (±3 dB bandwidth)) External modulation requires digital modulation, input level: 0.9 V(p-p), ≥100 MHz, ≤0 dBm, modulation frequency of 1 kHz Filternal modulation ≤1 V(p-p), 50 Ω, BNC connector (front panel), sensitivity: 1 V(p-p) = 100% On/off ratio >60 dB Pulse Positive/Filternal modulation, input level; 0.9 V(p-p), ≥100 MHz, ≤0 dBm, modulation Minimum pulse width <500 ns (external modulation, ALC off)		External modulation	2 V(p-p) approx., 600 Ω , AC/DC coupled switchable, BNC connector (front panel)		
Wideband AM response #External modulation, input level: 0.9 V(p-p), ≥100 MHz, ≤0 dBm, modulation frequency of 1 kHz AM External modulation 51 V(p-p), 50 Ω, BNC connector (front panel), sensitivity: 1 V(p-p) = 100% Ch/off ratio >60 dB Simulation Pulse Fisical litime <100 ns (external modulation)		U U	Positive/negative switchable		
AM Internal modulation requires digital modulation unit (option) External modulation ≤1 V(p-p), 50 Ω, BNC connector (front panel), sensitivity: 1 V(p-p) = 100% On/off ratio >60 dB Rise/fail time <100 ns (external modulation)		Modulation frequency			
External modulation ≤1 V(p-p), 50 Ω, BNC connector (front panel), sensitivity: 1 V(p-p) = 100% On/off ratio >60 dB Pulse Resiful time <100 ns (external modulation)					
On/off ratio >60 dB Vector Pulse The View of View o	AM				
Pulse modulation Rise/fall time <100 ns (external modulation)					
Pulse modulation Minimum pulse width Pulse repetition requires digital modulation, ALC off) Pulse repetition requires digital modulation unit (option) DC to 1 MHz (external modulation, ALC off) Internal modulation Treturel soligital modulation unit (option) External modulation TTL ivel, positive logic, 50 0, 2BNC connector (front panel) Modulation frequency response DC to 15 MHz (±2 dB bandwidth), DC to 30 MHz (±3 dB bandwidth) Vector error ≤2.5%(rms) [External modulation, input level: 0.5 V(rms), ≥100 MHz, ≤0 dBm, modulation frequency of 1 kHz Vector error ≤2.5%(rms) [External modulation, input level: 0.5 V(rms), ≥100 MHz, ≤0 dBm, 3.84 Msps QPSK modulation Internal modulation requires digital modulation unit (option) External modulation v(l² + Q²) = 0.5 V(rms), //Q = ±1.5 V(peak), 50 Ω, BNC connector (front panel) Quadrature degree adjustment function Adjustment range: ≥±1 deg I/Q change I, Q signal changeable (RF spectrum invert) Modulation depth and deviation same for combinations below: AM (internal/xEMTmal), AM (internal/xEMTmal) Simultaneous modulation sing losurce same for combinations below: AM (internal/xEMTmal), AM (internal/yM (internal)) Simultaneous modulation mit (option) Frequency and waveform of modulation, vector (internal/vector) Vput Trequires digital modulation unit (option) <td< td=""><td></td><td></td><td></td></td<>					
Pulse repetition frequency DC to 1 MHz (external modulation, ALC off) Internal modulation requires digital modulation unit (option) External modulation TTL level, positive logic, 50 Ω, BNC connector (front panel) Modulation frequency DC to 1 MHz (±2 dB bandwidth), DC to 30 MHz (±3 dB bandwidth), response Vector error ≤2.5%(rms) [External modulation, input level: 0.5 V(rms), ≥100 MHz, ≤0 dBm, 3.84 Msps QPSK modulation Internal modulation requires digital modulation, input level: 0.5 V(rms), ≥100 MHz, ≤0 dBm, 3.84 Msps QPSK modulation Vector error ≤2.5%(rms) [External modulation, input level: 0.5 V(rms), ≥100 MHz, ≤0 dBm, 3.84 Msps QPSK modulation Internal modulation requires digital modulation, input level: 0.5 V(rms), ≥100 MHz, ≤0 dBm, 3.84 Msps QPSK modulation Quadrature degree adjustment function Adjustment range: ≥±1 deg I/Q change I, Q signal changeable (RF spectrum invert) I/Q change I, Q signal changeable (RF spectrum invert) Modulation Modulation signal source same for combinations below: AM (internal/xFM (internal), xFM (internal), xFM (internal) Simultaneous modulation Frequency and waveform of modulation, vector (internal)/Vector (external) modulation Vigginal output requires digital modulation unit (option) Cutput level Q signal ou					
Puise repetition requency DC to 1 MHz (external modulation, ALC off) Internal modulation requires digital modulation unit (option) External modulation TTL level, positive logic, 50 Ω, BNC connector (front panel) Modulation frequency TC to 15 MHz (±2 dB bandwidth), DC to 30 MHz, ±3 dB bandwidth) response *External modulation, input level: 0.5 V(rms), ≥100 MHz, ≤0 dBm, modulation frequency of 1 kHz Vector error ≤2.5%(rms) [External modulation, input level: 0.5 V(rms), ≥100 MHz, ≤0 dBm, 3.84 Msps QPSK modulation Internal modulation requires digital modulation unit (option) External modulation √(l² + Q²) = 0.5 V(rms), I/Q = ±1.5 V(peak), 50 Ω, BNC connector (front panel) Quadrature degree adjustment function Adjustment range: ≥±1 deg Modulation depth and deviation same for combinations below: AM (internal/external), FM (internal/external), aM (internal/external) Simultaneous modulation Frequency and waveform of modulation, vector (internal)/Vector (external) modulation FM/dM (internal/external), FM (internal/external), FM (internal/external) Viggingla Output tevel requires digital modulation unit (option) Viggingla Output tevel requires digital modulation unit (option) Output signal source requires digital modulation unit (option) Output signal source <td>Pulse</td> <td></td> <td><500 ns (external modulation)</td>	Pulse		<500 ns (external modulation)		
External modulation TTL level, positive logic, 50 Ω, BNC connector (front panel) Modulation frequency DC to 15 MHz (±2 dB bandwidth), DC to 30 MHz (±3 dB bandwidth) response *External modulation, input level: 0.5 V(rms), ≥100 MHz, ≤0 dBm, modulation frequency of 1 kHz Vector error ≤2.5%(rms) [External modulation, input level: 0.5 V(rms), ≥100 MHz, ≤0 dBm, as44 Msps QPSK modulation Internal modulation requires digital modulation unit (option) External modulation requires digital modulation unit (option) Quadrature degree adjustment function Adjustment range: ≥±1 deg Modulation depth and deviation same for combinations below: AM (internal/external), FM (internal/external), eM (internal/external), aM (internal/external), aM (internal/external), SM (internal)/aM (intern		frequency			
Modulation frequency response DC to 15 MHz (±2 dB bandwidth), DC to 30 MHz (±3 dB bandwidth) *External modulation, input level: 0.5 V(rms), ≥100 MHz, ≤0 dBm, modulation frequency of 1 kHz Vector modulation Vector error ≤2.5%(rms) [External modulation, input level: 0.5 V(rms), ≥100 MHz, ≤0 dBm, 3.84 Msps QPSK modulation Internal modulation Quadrature degree dijustment function √(l ² + Q ²) = 0.5 V(rms), l/Q = ±1.5 V(peak), 50 Ω, BNC connector (front panel) Quadrature degree dijustment function Adjustment range: ≥±1 deg N/Q change I, Q signal changeable (RF spectrum invert) Modulation depth and deviation same for combinations below: AM (internal/external), FM (internal/external), aM (internal/external), FM (internal/external), FM (internal/sectral), FM (internal/external), FM (internal/external), FM (internal/sectral), FM, (internal/external), FM (internal/sectral), FM (internal/sectral), FM/ (internal/sectral), FFequency and waveform of modulation signal source same for combinations below: AM (internal/FM (internal/sectral), AM (internal/sectral), FM/ (internal/sectral), FM/ (internal/sectral), FM/ (internal/sectral), FM/ (internal/sectral), FM/ (internal/sectral), Simultaneous modulation impossible as below: FM/sM, wideband AM/vector modulation, vector (internal)/Vector (external) modulation AF signal output requires digital modulation unit (option) //Q signal output*2 Output level requires digital modulation unit (option) //Q signal output*2 Seconsector (front panel) Seconsector (front panel)					
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	De el v (· ·		
	васкир тип	CUON	being transferred, RPP operation condition, screen condition, main function selections		

Panel lock	Panel lock Panel lock Disable operation of all keys except front panel power key, panel lock key, local key and contrast k			
function	Knob hold	Disable rotary knob on front panel operation		
	GPIB	Remote control: All functions except power switch, local key, and contrast key Interfaces: SH1, AH1, T5, L4, TE0, SR1, RL1, DP0, PP0, DC1, DT1, C1, E2 Connector: Rear panel		
External interface	RS-232C	Remote control: All functions except power switch, local key, and contrast key Communications method: Async (start-stop), half-duplex Communications control method: X on/off by command Baud rate: 1200, 2400, 4800, 9600, 19200, 38400 bps Data bits; 7 or 8 Parity: Odd, even, none Start bit; 1 Stop bit: 1 or 2 Connector: D-sub 9 pins, rear panel		
	PC card	Memory card (memory backup, screen hard copy) Connector: JEIDA Ver 4/4.1 PCMCIA Rel 2.0, 1 slot (rear panel)		
-	Trigger	Executes item specified by command-input signals (3 bits) from following items: Frequency step-up/step-down, output level step-up/step-down, basic parameter memory recall address up/down, output level on/off Interface: TTL level Connector: D-sub 9-pin, female (rear panel)		
Reverse po	wer protection	≤50 W (≤1 GHz), ≤25 W (>1 GHz), ±50 V (DC)		
Power		AC 100 to 120/200 to 240 V (-15/+10%, 250 V max, automatic selection), 47.5 to 63 Hz, ≤300 VA		
Temperature		Operating: 0° to 50°C, Storage: -20° to +60°C		
Dimensions and mass		426 (W) x 177 (H) x 451 (D) mm, ≤25 kg (excluding option)		
EMC		EN61326: 1997/A2: 2001 (Class A) EN61000-3-2: 2000 (Class A) EN61326: 1997/A2: 2001 (Annex A)		
LVD EN61010-1: 2001 (Pollution Degree 2)		EN61010-1: 2001 (Pollution Degree 2)		

*1: Aging rates down to 5×10^{-10} /day are available as reference crystal oscillator (MG3681A Option 01/02). *2: Possible to expand the function with MG3681A Option 11

Options

Option 01 (Reference crystal oscillator)	Temperature stability: $\pm 3 \times 10^{-8}$ (0° to 50°C)		
Option 02 (Reference crystal oscillator)	Frequency: 10 MHz Aging rate: $\pm 5 \times 10^{-10}$ /day Start-up characteristics: 1 x 10 ⁻⁷ (After 10 min, compared to frequency after 24 h warm-up) Temperature stability: $\pm 5 \times 10^{-9}$ (0 to 50°C)		
Option 11 (Additional function of I/Q output)	 Functions: Adds level, offset setting, and differential output functions to I/Q output Level Range: 80 to 120% of nominal level, Resolution: 0.1% *2 sets of I/I and Q/Q set independently, 50 Ω termination Offset Range: -0.5 to +1.5 V, Resolution: 0.5 mV *4 sets of I, I, Q, Q set independently, 50 Ω termination Quadrature degree variable function Range: ±5 deg, Resolution: 0.5 deg Differential output: I, Q signals (Using front I/Q input connector) Signal source: Depends on installed digital modulation unit (option) Output connector: 50 Ω, BNC connector (front panel) 		
Option 21 (AF synthesizer)	Frequency: 0.01 Hz to 400 kHz, Resolution: 0.01 Hz, Accuracy: same as reference oscillator Waveform: Sine, triangular, square, sawtooth Frequency response: ±1 dB [sine wave, level: 2 V(p-p), offset: 0 V, 600 Ω termination, reference to 1 kHz, 10 Hz to 100 kHz] Harmonics: ≤-50 dB [sine wave, level: 2 V(p-p), offset: 0 V, 600 Ω termination, 1 kHz] Level Range: 0 to 4 V(p-p), Resolution: 1 mV(p-p), Accuracy: ± [8% of set level + 2 mV(p-p)] *600 Ω termination Offset Range: -2 to +2 V, Resolution: 1 mV, Accuracy: ± (8% of set level + 2 mV) *600 Ω termination Output connector: 600 Ω, BNC connector (front panel)		
Option 42 (RF high level output)Functions: 8 dB gain of maximum output level Frequency: 1900 to 2300 MHz Gain: 8 ±1 dB (from –3 dBm, RF high level output off, 2.1 GHz) Gain frequency response: ±1 dB (at +5 dBm, referenced to 2.1 GHz)			

Ordering Information

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

Model/Order No.	Name	Remarks
MG3681A	Main frame Digital Modulation Signal Generator	
B0325 F0014 W1708AE	Standard accessoriesPower cord, 2.6 m:1 pcGPIB connector shield cap:1 pcFuse, 6.3 A:2 pcsMG3681A operation manual:1 copy	
MG3681A-01 MG3681A-02 MG3681A-11 MG3681A-21 MG3681A-42	Options Reference oscillator Reference oscillator Additional function of I/Q output AF synthesizer RF high level output	Aging rate: 5×10^{-9} /day Aging rate: 5×10^{-10} /day Level and DC offset setting, differential output 0.01 Hz to 400 kHz, resolution: 0.01 Hz 8 dB gain
MG3681A-90 MG3681A-91	Maintenance service Extended three years warranty service Extended five years warranty service	
MU368010A MU368030A MU368040A MU368060A	Expansion unit TDMA Modulation Unit*1,*2 Universal Modulation Unit*1,*2 CDMA Modulation Unit*1,*2 AWGN Unit*2	
MX368011A MX368012A MX368031A MX368033A MX368034A MX368035A MX368041B MX368041B-111 MX368042A	Softwares PDC Software ^{*2} GSM Device Test Software ^{*2} Device Test Signal Generation Software ^{*2} CDMA2000 1xEV-DO Signal Generation Software PDC Packet Software PHS Signal Generation Software W-CDMA Software ^{*2} HSDPA Signal Pattern IS-95 Device Test Software ^{*2}	For MU368010A For MU368010A For MU368030A For MU368030A For MU368030A For MU368030A For MU368040A For MU368040A
J0576B J0576D J0127C J0127A J0007 J0008 B0329C B0331C B0332 B0333C	Application parts Coaxial cord (N-P • 5D-2W • N-P), 1 m Coaxial cord (N-P • 5D-2W • N-P), 2 m Coaxial cord (BNC-P • RG-58A/U • BNC-P), 0.5 m Coaxial cord (BNC-P • RG-58A/U • BNC-P), 1 m GPIB connection cable, 1 m GPIB connection cable, 2 m Front cover (1MW4U) Front-panel handle kit Joint plate Rack mount kit	2 pcs/set 4 pcs/set
B0334C MA2512A	Carrying case Band Pass Filter* ²	Hard type, with front cover and casters For W-CDMA, pass band: 1.92 to 2.17 GHz

*1: When using the MU368010A, MU368030A and MU368040A, dedicated software must be installed.

*2: Refer to the data sheets for the expansion units, software and Band pass filter.

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/inritsu

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Catalog No. MG3681A-E-A-1-(9.00) Printed in Japan 2004-1 KL/AKD