



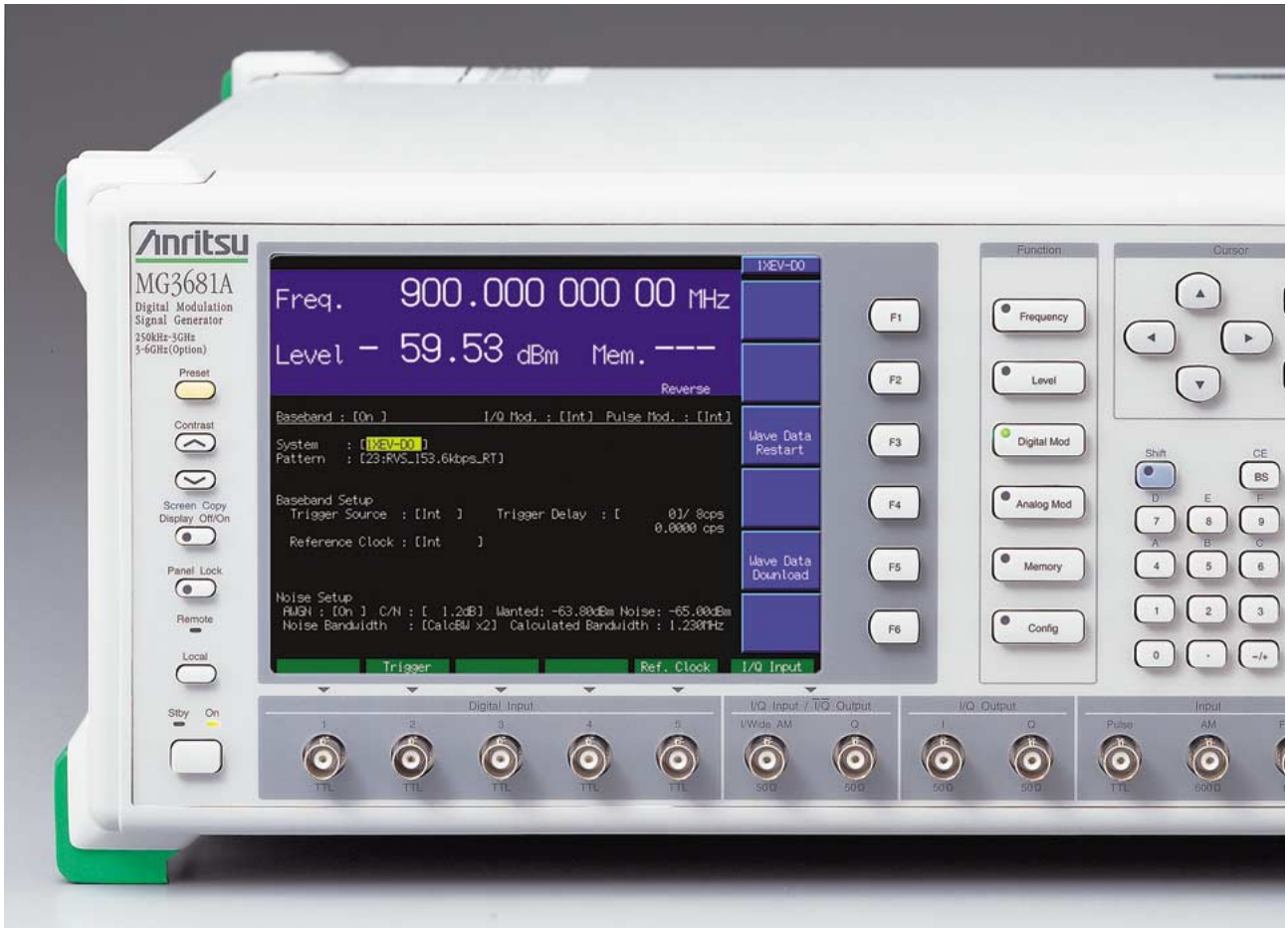
Discover What's Possible™

Anritsu

MX368033A CDMA2000 1xEV-DO Signal Generation Software

MX368133A CDMA2000 1xEV-DO IQproducer™

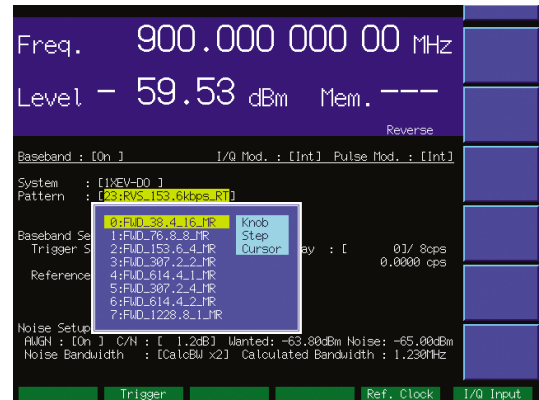
(For MG3681A Digital Modulation Signal Generator)



For evaluation of CDMA2000 1xEV-DO system

Outputs signals for 3GPP2 Standard CDMA2000 1xEV-DO system receiver tests

When the MX368033A CDMA2000 1xEV-DO Signal Generation Software is installed in the MG3681A Digital Modulation Signal Generator with built-in MU368030A Universal Modulation Unit, the platform can output forward/reverse CDMA2000 1xEV-DO modulation signals for C.S0024 standard.

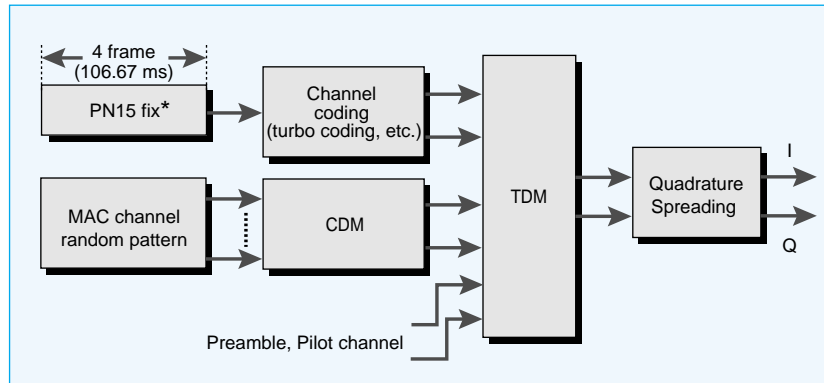


Simple operation and high-speed signal pattern change

Signals for receiver/transmitter tests of CDMA2000 1xEV-DO access network (AN) and access terminal (AT) specified by 3GPP2 can be outputted by selecting signal patterns stored in a large capacity internal memory, without setting complicated parameters. Forward 13 data rate signal patterns (including idle slots) and reverse 5 data rate signal patterns can be changed at high speed.

Forward Signal

Channel configuration

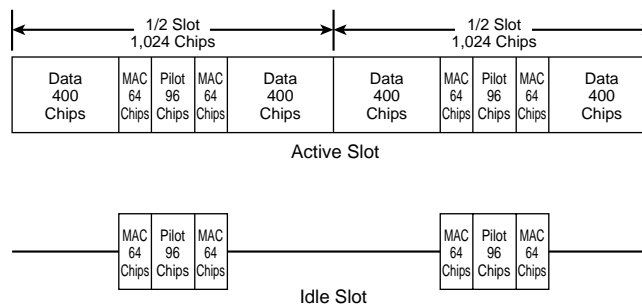


*: PN15 fix: Data length is not integral multiple of PN sequence length, furthermore, PN sequence is discontinuous at the last of data.

Signal pattern

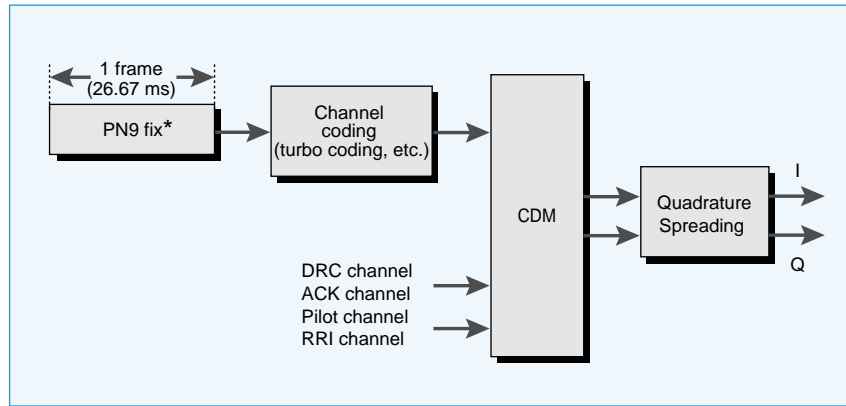
Data Rate (kbps)	Number of Values per Physical Layer Packet				
	Slots	Bits	Code Rate	Modulation Type	TDM Chips (Preamble, Pilot, MAC, Data)
38.4	16	1,024	1/5	QPSK	1,024 3,072 4,096 24,576
76.8	8				512 1,536 2,048 12,288
153.6	4				256 768 1,024 6,144
307.2	2				128 384 512 3,072
614.4	1	2,048	1/3		64 192 256 1,536
307.2	4				128 768 1,024 6,272
614	2				64 384 512 3,136
1,228.8	1				64 192 256 1,536
921.6	2	3,072	1/3	8-PSK	64 384 512 3,136
1,843.2	1			64 192 256 1,536	
1,228.8	2			16-QAM	64 384 512 3,136
2,457.6	1	4,096	1/3	16-QAM	64 192 256 1,536

Slot configuration



Reverse Signal

●Channel configuration



*: PN9 fix: Data length is not integral multiple of PN sequence length, furthermore, PN sequence is discontinuous at the last of data.

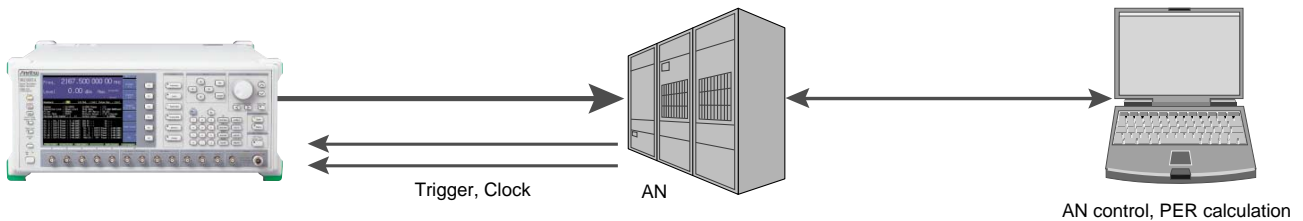
●Signal pattern

Parameter	Data Rate (kbps)				
	9.6	19.2	38.4	76.9	153.6
Reverse Rate Index	1	2	3	4	5
Bits per Physical Layer Packet	256	512	1,024	2,048	4,096
Physical Layer Packet Duration (ms)	26.666...				
Code Rate	1/4	1/4	1/4	1/4	1/2
Code Symbols per Physical Layer Packet	1,024	2,048	4,096	8,192	8,192
Code Symbol Rate (ksps)	38.4	76.8	153.6	307.2	307.2
Interleaved Packet Repeats	8	4	2	1	1
Modulation Symbol Rate (ksps)	307.2				
Modulation Type	BPSK				
PN Chips per Physical Layer Packet Bit	128	64	32	16	8

Access network (AN) receiver test

3GPP2 C.S0032 standard receiver tests (PER: Packet Error Rate) can be performed by selecting a reverse signal pattern required for testing the AN.

Since access terminal simulator protocols are not supported, an external controller must be used to control AN and calculate PER.

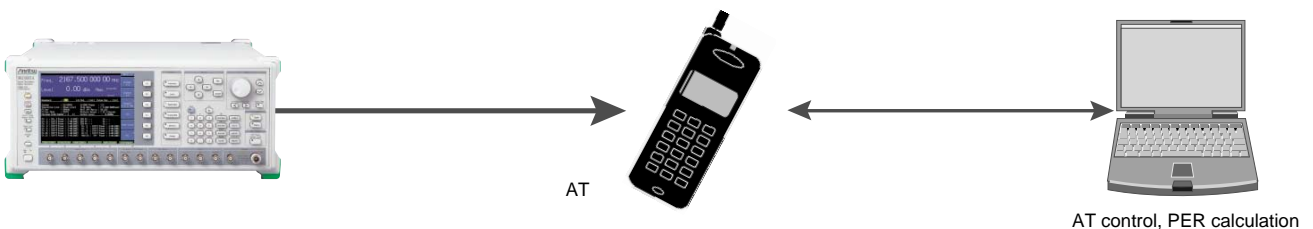


Trigger: Timing for synchronizing the start of frame (frame trigger)

Clock: Clock for synchronizing the chip rate 1.2288 Mcps (8×1.2288 MHz or 10 MHz, 13 MHz)

Access terminal (AT) receiver test

3GPP2 C.S0033 standard receiver tests (PER: Packet Error Rate) can be performed by selecting a forward signal pattern required for testing the AT. Since Access network simulator protocols are not supported, an external controller must be used to control AT and calculate PER.



Editing and Creating Signal Patterns

MX368133A CDMA2000 1xEV-DO IQproducer™ is a Windows application software which upgrades the functioning of MX368033A installed in the MG3681A. It creates the IQ mapping data file for signal patterns, which are generated by MU368030A Universal Modulation Unit incorporated in the MG3681A, and edits the forward multi-carrier signal patterns.

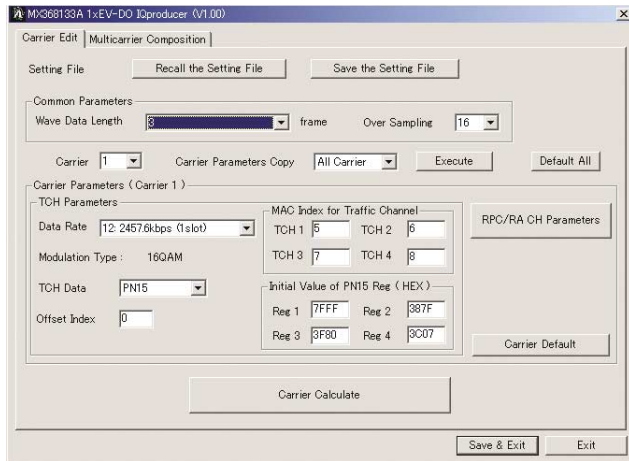
This software supports functions to evaluate various types of power amplifiers and perform a demodulation test.

- **Reference setting file for easy setup**

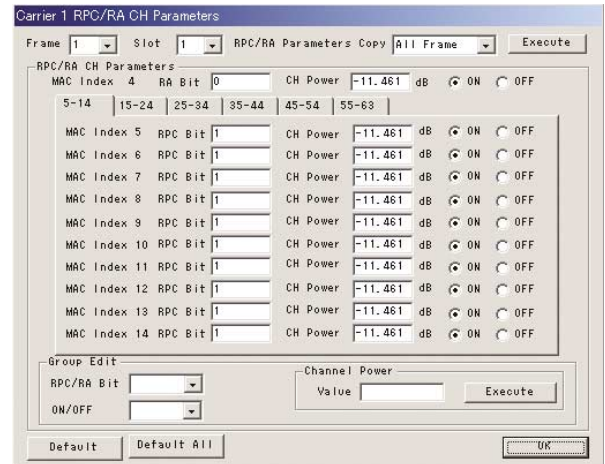
Since the standard reference setting file for MX368033A signal patterns is included, signal patterns can be created easily by merely editing parameters that the customer decides to change.

- **Forward multi-carrier creation**

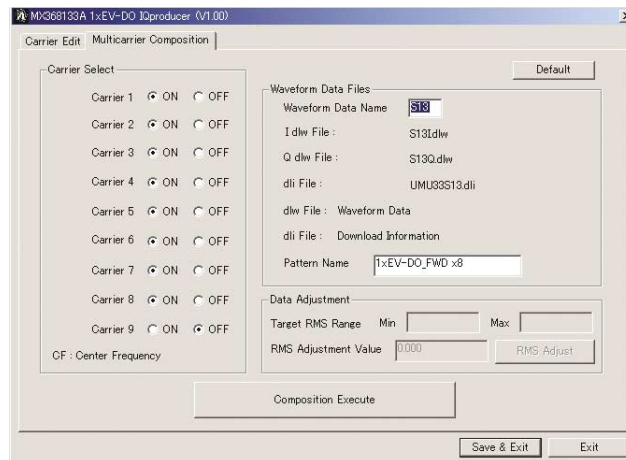
Data rate and MAC channel can be edited for each carrier. Up to 9 carriers can be created at 1.25 MHz offset.



Set of Traffic channel



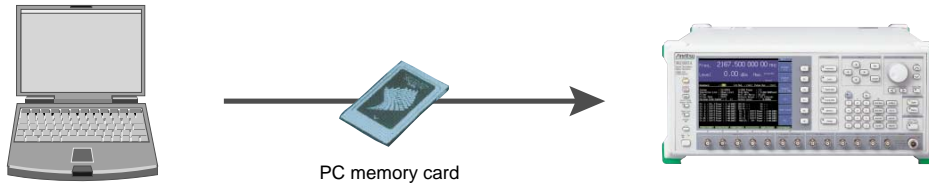
Set of MAC channel



Creation of signal pattern file

- **Signal pattern file download**

A created signal pattern file can be downloaded to the high-capacity internal memory of MU368030A which is built in the MG3681A via a PC memory card.



PC memory card: CompactFlash+PC card adaptor

Options

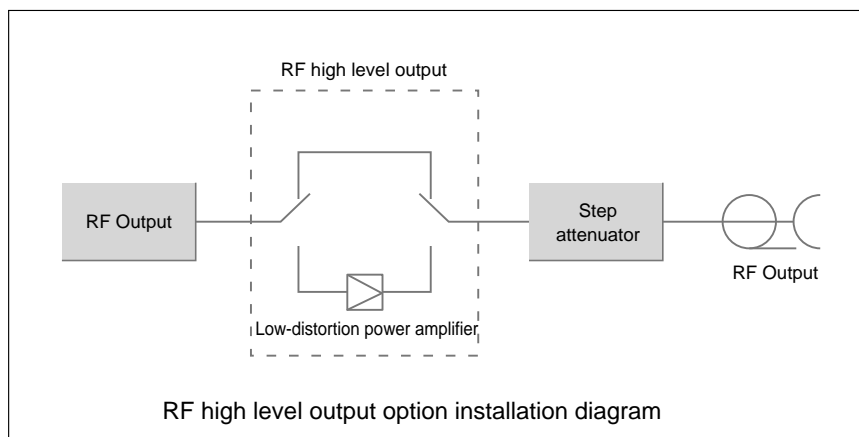
- **AWGN Supports Dynamic Range Test**

When performing the receiver dynamic range test specified by 3GPP2, the 1xEV-DO modulation signal with AWGN is required. When the MU368060A AWGN Unit is installed in the MG3681A, a high-precision AWGN can be output in the 1.5 to 16 MHz bandwidth. Moreover, since one MG3681A can output a signal that is the internally mixed 1xEV-DO modulation signal and the AWGN, it is useful for simple test of the AN receiver dynamic range.

(A MU368040A CDMA modulation unit is required for internal superposition of AWGN)

- **RF Level-up at Modulation**

When the RF high level output (Option 42) is installed in the MG3681A, the RF level can be outputted with 8 dB gain without degrading the spurious close carrier emission within 1.9 to 2.3 GHz. This is very useful for signal source of power amplifier requiring a high input level.



Specifications

MX368033A CDMA2000 1xEV-DO Signal Generation Software

Supported systems		CDMA2000 1xEV-DO : Conforms to specification 3GPP2 C.S0024
Baseband filter		Forward channel : Equalizing FIR filter conforming to 3GGP2 Reverse channel : FIR filter conforming to 3GGP2
Signal Pattern	Common to forward	Channel configuration : Pilot channel, Traffic channel, and MAC channel are time division multiplexed Pilot channel : All 0, Walsh cover= 0 Traffic channel : Payload data PN15 fix(1 packet 4 frame, except idle slot) RPC channel : 13 channel multiplex, MACIndex=5 to17, 0/1 random, Channel gain= -11.42 dB RA channel : MACIndex=4, 0/1 random, channel gain= -12.04 dB
	Forward channel 38.4 kbps (16 slots)	Preamble : 1024 bits Traffic channel : QPSK modulation, Data rate = 38.4 kbps, Time division multiple slot: 16 slots
	Forward channel 76.8 kbps (8 slots)	Preamble : 512 bits Traffic channel : QPSK modulation, Data rate = 76.8 kbps, Time division multiple slot: 8 slots
	Forward channel 153.6 kbps (4 slots)	Preamble : 256 bits Traffic channel : QPSK modulation, Data rate = 153.6 kbps, Time division multiple slot: 4 slots
	Forward channel 307.2 kbps (2 slots)	Preamble : 128 bits Traffic channel : QPSK modulation, Data rate = 307.2 kbps, Time division multiple slot: 2 slots
	Forward channel 614.4 kbps (1 slot)	Preamble : 64 bits Traffic channel : QPSK modulation, Data rate = 614.4 kbps, Time division multiple slot: 1 slot
	Forward channel 307.2 kbps (4 slots)	Preamble : 128 bits Traffic channel : QPSK modulation, Data rate = 307.2 kbps, Time division multiple slot: 4 slots
	Forward channel 614.4 kbps (2 slots)	Preamble : 64 bits Traffic channel : QPSK modulation, Data rate = 614.4 kbps, Time division multiple slot: 2 slots
	Forward channel 1228.8 kbps (1 slot)	Preamble : 64 bits Traffic channel : QPSK modulation, Data rate = 1228.8 kbps, Time division multiple slot: 1 slot
	Forward channel 921.6 kbps (2 slots)	Preamble : 64 bits Traffic channel : 8PSK modulation, Data rate = 921.6 kbps, Time division multiple slot: 2 slots
	Forward channel 1843.2 kbps (1 slot)	Preamble : 64 bits Traffic channel : 8PSK modulation, Data rate = 1843.2 kbps, Time division multiple slot: 1 slot
	Forward channel 1228.8 kbps (2 slots)	Preamble : 64 bits Traffic channel : 16QAM modulation, Data rate = 1228.8 kbps, Time division multiple slot: 2 slots
	Forward channel 2457.6 kbps (1 slot)	Preamble : 64 bits Traffic channel : 16QAM modulation, Data rate = 2457.6 kbps, Time division multiple slot: 1 slot
	Forward idle slot	Traffic channel : None
	Common to reverse (for AT transmitter test)	DRC channel : "0001", DRC cover symbol: "0", Channel gain = 3 dB ACK channel : All 0, Channel gain = 3 dB Long code mask : MI=3FF0000000 (hexadecimal), MQ=3FE0000001 (hexadecimal)
	Reverse 9.6 kbps	Data channel : Data rate = 9.6 kbps, Channel gain = 3.75 dB, Payload data PN9 fix RRI symbol : "001"
	Reverse 19.2 kbps	Data channel : Data rate = 19.2 kbps, Channel gain = 6.75 dB, Payload data PN9 fix RRI symbol : "010"
	Reverse 38.4 kbps	Data channel : Data rate = 38.4 kbps, Channel gain = 9.75 dB, Payload data PN9 fix RRI symbol : "011"
	Reverse 76.8 kbps	Data channel : Data rate = 76.8 kbps, Channel gain = 13.25 dB, Payload data PN9 fix RRI symbol : "100"
	Reverse 153.6 kbps	Data channel : Data rate = 153.6 kbps, Channel gain = 18.50 dB, Payload data PN9 fix RRI symbol : "101"
	Common to reverse _RT (for AN receiver test)	DRC channel : "0001", DRC cover symbol: "0", Channel gain = 3 dB ACK channel : All 0, Channel gain = 0 dB Long code mask : MI=3FF0000000 (hexadecimal), MQ=3FE0000001 (hexadecimal)
	Reverse_RT 9.6 kbps	Data channel : Data rate = 9.6 kbps, Channel gain = 3.75 dB, Payload data PN9 fix RRI symbol : "001"
	Reverse_RT 19.2 kbps	Data channel : Data rate = 19.2 kbps, Channel gain = 6.75 dB, Payload data PN9 fix RRI symbol : "010"
	Reverse_RT 38.4 kbps	Data channel : Data rate = 38.4 kbps, Channel gain = 9.75 dB, Payload data PN9 fix RRI symbol : "011"
	Reverse_RT 76.8 kbps	Data channel : Data rate = 76.8 kbps, Channel gain = 13.25 dB, Payload data PN9 fix RRI symbol : "100"
	Reverse_RT 153.6 kbps	Data channel : Data rate = 153.6 kbps, Channel gain = 18.50 dB, Payload data PN9 fix RRI symbol : "101"

The channel gain is relative to the pilot channel.

RF signal	Frequency range	10 to 3,000 MHz
	Output level	Forward 38.4 to 153.6 kbps -143 to +5 dBm -143 to +13 dBm (Option42 : RF high level output On, 1.9 to 2.3 GHz) Forward 307.2 to 2457.6 kbps, Idle slot -143 to +8 dBm -143 to +13 dBm (Option42 : RF high level output On, 1.9 to 2.3 GHz) Reverse 9.6 to 19.2 kbps -143 to +8 dBm -143 to +13 dBm (Option42 : RF high level output On, 1.9 to 2.3 GHz) Reverse 38.4 to 153.6 kbps -143 to +5 dBm -143 to +13 dBm (Option42 : RF high level output On, 1.9 to 2.3 GHz)
	Level accuracy	compared with CW output level CDMA 2000 1xEV-DO : Within±1.2 dB(≤-3dBm)
	Spurious emission	At 100 to 2300 MHz, The ratio of total power and the electric power within 30 kHz band width at -3dBm Output (Option 42 RF high level output on, 1.9 to 2.3 GHz, +5dBm), PLL mode: Normal ≤-65 dBc (885 kHz to 1.98 MHz offset), ≤-70 dBc (1.98 to 2.5 MHz offset), ≤-77 dBc (2.5 to 5.0 MHz offset), Excluding performance deterioration due to spurious emission of MG3681A main frame.
IQ signal	Output level	101 mV(rms)
	Output level accuracy	Without MG3681A-11 Additional function of I Q output option: ±5 % With MG3681A-11 Additional function of I Q output option: ±10 %
Signal speed	Symbol rate	Depends on signal pattern
	Chip rate	1,2288 Mcps
	Transmit speed accuracy	Depends on reference signal accuracy of MG3681A (except for the case of external synchronization)
Firmware backup space		CPU: 137.3 kByte, FPGA:49.5 kByte

● **MX368133A CDMA2000 1xEV-DO IQproducer™**

Supported systems		CDMA2000 1xEV-DO : Conforms to specification 3GPP2 C.S0024 Generates the signal pattern file for MG3681A Digital Modulation Signal Generator with MU368030A Universal Modulation Unit incorporating MX368033A .
Operating environment	CPU	Pentium II 300 MHz or faster
	Memory size	≥128 MB
	OS	Windows 2000/XP
	Display	800x600 pixels or more
	HDD	Occupation ≤512MB
	Peripheral equipment	It be possible to read CD-R. It be possible to save in CompactFlash(PC card adapter is required for download to MG3681A).

*: MU368030A Universal Modulation Unit of "Hardware ver.A03 Data Ver.2.00" or later is required.
In the case of a former version, since upgrade is required, please ask your Anritsu sales representative.

Ordering Information

Please specify the model, name and quantity when ordering.

Model	Name
MG3681A*1	Main frame Digital Modulation Signal Generator
MG3681A-42	Option RF High Level Output, 1.9 to 2.3 GHz, 8 dB gain
MU368030A*1 MU368040A*1 MU368060A*1	Expansion unit Universal Modulation Unit CDMA Modulation Unit AWGN Unit
MX368033A	Software CDMA2000 1xEV-DO Signal Generation Software*2
W2072AE	Standard accessories MX368033A operation manual: 1 copy
MX368133A	Application Software CDMA2000 1xEV-DO IQproducer*3
W2072AE	Peripheral equipments and parts MX368133A operation manual (booklet)

*1: Refer to each catalogue for MG3681A/MU368030A/MU368040A/MU368060A.

*2: Supplied with CompactFlash (with adapter), CompactFlash™ is a registered trademark of SanDisk Corporation.

*3: Supplied with CD-R, (The operation manual is recorded on the electronic file.)



Specifications are subject to change without notice.

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