**Product Brochure** 



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For MT8820C Radio Communication Analyzer

# MX882001C GSM Measurement Software MX882001C-011

/Inritsu MT8820C

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EGPRS Measurement Software



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# for GSM/GPRS

# Advanced High-speed Measurement Method and Batch Measurement Supporting the Manufacture of GSM/GPRS Terminals

The MX882001C GSM Measurement Software supports measurement of transmitters and receivers of digital mobile terminals conforming to GSM/GPRS/EGPRS\*-the world's most widely used digital mobile standard.

When the MX 882001 C GSM Measurement Software and MX 882000 C W-CDMA Measurement Software are installed in the MT 8820 C main frame, the Tx and Rx characteristics of dual-mode W-CDMA/GSM terminals, which are becoming very popular worldwide, can be evaluated using a single MT 8820 C unit.

Anritsu's advanced DSP (Digital Signal Processing) and parallel-measurement technologies greatly reduce test times on automated production lines as well as when testing mobile terminals. Any combination of test parameters can be set, facilitating speedy batch measurement, and the number of measurements for each measurement item can be set independently.

At GSM measurement, selected measurement items can be batch-processed by one-touch operation, supporting easy, fast Pass/Fail evaluation of major test items including frequency error, modulation accuracy, transmit power, output RF spectrum, and BER.

At GPRS measurement, frequency error, modulation accuracy and transmit power are measured using a Test Mode A connection, while BLER with selected multislot class and coding scheme is measured using either a Test Mode B or BLER connection.

The built-in GPIB and Ethernet interface enables the MT8820C to be integrated into automated test systems for after-sales maintenance, as well as into automated production lines.

\*: Require MX882001C-011 for EGPRS measurement

# GSM Measurement

	Transmit Power
	Power vs. Time (template mask)
Transmitter Tests	Frequency Error
	Phase Error (rms, peak)
	Output RF Spectrum
Receiver Tests	FER, BER and CRC error rates for TCH/FS,
Receiver resis	TCH/HS, TCH/EFS, TCH/AFS and TCH/AHS
	Location registration, Terminal call origination,
	Network call origination, Communication, Handover,
Call Processing	Terminal disconnect, Network disconnect
	Mobile Terminal Report Monitor
	(Reception level, Reception quality, etc)

### GPRS Measurement

	Transmit Power
	Power vs. Time (template mask)
Transmitter Tests	Frequency Error
	Phase Error (rms, peak)
	Output RF Spectrum
Receiver Tests	BLER
	Test Mode A, B, BLER connection, Communication,
Call Processing	Disconnection
	Mobile Terminal Report Monitor
	(Multislot Class, etc)

# MX882001C GSM Measurement Software

# GSM

# **Transmitter Measurement**

# **Transmit Power**

When two or more measurements are made, the maximum, average, and minimum results are displayed, supporting evaluation of the GSM terminal transmit power.

This functionality is also supported for other measurements.



### Power vs. Time

Power at six measuring points for each burst rise/fall edge can be measured, with measuring time set in increments of 0.1  $\mu s$  resolution.



### **Burst Waveform Display**

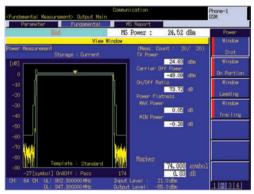
Burst waveforms can be displayed graphically, and a magnified display of the entire time slot and burst-on interval, as well as the rising and falling edges, supports easy evaluation of whether the burst waveform is within the limits of the power time template.



Rising Edge



Falling Edge



Entire Time Slot



### **Modulation Analysis**

The frequency, frequency error (in kHz and ppm), phase error, and peak phase error can be measured simultaneously.

The amplitude error of the burst-on interval can be measured too.



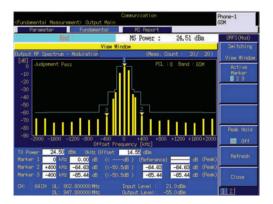
### **Output RF Spectrum**

The spectrum can be measured at a total of 25 frequency points within the range of  $\pm 2$  MHz of the carrier frequency.

"Modulation" is the spectrum resulting from the modulated signal around the center of the burst signal, while "Switching" is the spectrum resulting from the rising and falling edges of the burst signal.

In addition to using advanced DSP technology, parallel measurement supports faster display of the output RF spectrum.



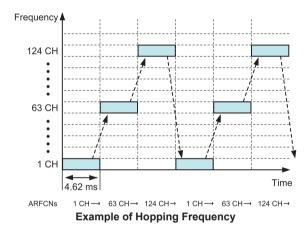


# **GSM Frequency Hopping Function**

The frequency hopping is a function that changes the channel (ARFCN) used for communication between the base station (BS) and mobile station (MS) by each 4.62 ms frame. Frequency hopping is operated by the Measure Channel and Frequency set value of 'hopping frequency table-ARFCNs'.\*

Frequency Hopp Hopping Freq		Table						
Band ARFCNs	P-GSM	601	104	000	000	0.00	0.00	0.00
HIPUNS	Dff	Dff	124 0ff	Off	Off	Off	Off	Dff
	Off	Off	Off	Off	Off	Off	Off	Off
	Off	Off	Off	Off	Off	Off	Off	Off
	Off	Off	Off	Off	Off	Off	Off	Off





\*: Please refer MX882001C Operation manual for setting condition of the channel list.

# **Receiver Measurement**

### **Error Rate Test**

The uplink RF signal, which is looped back from GSM terminal, is demodulated by controlling the GSM terminal in the loopback condition to measure the frame error, bit error, and CRC error rates. The error rate for TCH/FS, TCH/HS, TCH/EFS, TCH/AFS and TCH/AHS can be measured. The FAST BER mode is also available.

Transmitter measurements can be run in parallel with error-rate measurements as well.

Eunda	amental Me	asurement	> Output		nunication			P	ione-1 M
	Parameter		Fundament		MS Repor	t		~	522
1	and the second second	End		1000	MS Power	: 2	4.65 dBm		Fundamental
kHz	Avg.	Мак	Min	Avg.	Мак	Min	l as		
0	23.12	24.44	21.44	23.12	24.44	21.44			Powerh
100	16.49	17.15	15.38	16.60	17.29	15.76			Measurement
200	-10.15	-8.35	-12.34	-10.57	-9.15	-12.07			Power
250	-17.19	-16.70	-18.22	-16.92	-16.34	-17.59			VS
400	-41.63	-38.76	-44.20	-32.26	-31.64	~32.98			Time
600	-45.85	-42.10	-48.10	-45.18	~43.01	-46.82			
800	-47.09	-44,45	-49.41	-47.78	-46.22	-50,48			Template
1000	-45.14	-42.43	-48.22	-46.61	-43.96	-49.11			
200	-49.78	-47.93	-52.30	-50.11	-46.86	-51.69			ALCONDUCT STOLEN
400	-49.65	-46.84	-51.79	-50.27	-47.01	-53.06			Modulation
1600	-50.67	-48.09	-52.36	-51.50	-47.69	-53.78			Analysis
1800	-51.58	-49.10	-54.46	-51.79	-49.17	-53.81			1
2000	-51.52	-47.38	-55.46	-52.82	-51.38	-55.31			ORFS
									Modulation.
Sit Er	mon Rate	End	14.14						
		F	atio	Event A	lece i ved	Sample			ORFS
			0.003	0	500/	500			Switching
CIBO	RBER)		0.003	0	660000/	68000			Bit
	RBER)		0.008	0	39000/	39000			Error
	/ 30	RXQUAL	0						Rate
									1 2

# **Call Processing**

# **Connection Test**

Various connection tests, such as registration, call origination from terminal and network, terminal disconnect, and network disconnect, can be tested using the call processing functionality.

Moreover, simple voice communication can be tested during a call using voice loopback.



# **Mobile Terminal Report Monitor**

The GSM terminal status can be displayed as a periodic report sent by the GSM terminal to the MT8820C.

The downlink RF signal level at the GSM receiver can be checked with the Rx level reported from the GSM terminal.

<fundamental mea<="" th=""><th>surement&gt;</th><th>Output Mai</th><th>Communication</th><th></th><th></th><th></th><th>Phone-1 GSM</th></fundamental>	surement>	Output Mai	Communication				Phone-1 GSM
Pananeter		indamental	MS Report	t			
Service of the servic	End		MS Power	:	24.62	dBa	MS Report
MS Report MS Power Class IMSI IMEI NH Phone No	0010111234 355523000	441790 44444					A MS G Report
MS Power Level Timing Advance		Actual	1 : 1 2 : 4 4 : 5 6 : 5				
							12

# GPRS

# **Measurement Function**

The MX882001C GSM Measurement Software supports GPRS measurement and terminals supporting both GSM and GPRS can be tested much faster because the software switches quickly between GSM and GPRS measurements.

(Fundamental Measurement) Output Ma	Idle		Phone-1 GSM
Paraneter Fundamental	MS Report		
End	MS Power :	-49.10 dBm	Panameter
Connon Parameter Item List Standard Operating Mode GPRS System Combination GSN \$1800			Common
Call Processing CARS Dynamic ARFCN Mapping ECFRS	Connection Type	ist Mode A	T A Call G Processing
Frequency Setting Mode CCH Channel & Frequency 1 C			TTX
Band (P, E, R-GSM)			A Measurement
TOH Channel & Frequency 64 0			6 Parameter
			A Measurement
Level			
MS Power Level 1st Slot 8 2nd Slot 8 3nd Slot	445 Stat 12		A Fundamental
MS_TXPHR_MAX_CDH 0			G Measurement
Input Level Control Manual Reference TOH 1st			
Input Level 21.0 dBm			I
Output Level -55.0 dBn	On Level	Continuous Off	
External Loss Off			
Band 1 Main DL 0.00 dB		d 3 .00 dB 1	112131

# **Multislot Class and Coding Scheme**

Various combinations of uplink/downlink slots can be selected for GPRS terminals with class 1 to 11.



All CS-1 to CS-4 coding schemes are supported.





# **Connection Type**

Test Mode A, Test Mode B, and BLER connections are supported. In Test Mode A for transmitter measurements, the GPRS terminal generates pseudorandom data during uplink on PDTCH. At BLER measurement, the GPRS terminal calculates block errors in received data at downlink and reports the result to the MT8820C at uplink. The MT8820C calculates the block error rate using the report from the GPRS terminal.



# **Transmitter Measurement**

The transmitter measurements listed below can be made with the Test Mode A connection as in GSM measurement.

- Power vs. Time (template mask)
- Frequency error
- Phase error (rms, peak)
- Output RF spectrum

# **Receiver Measurement**

The block error rate can be measured using the block error reported from the GPRS terminal with the BLER connection.

Fundamental Measureme	nt> Output Mai	Transfer n		Phone-1 GSM
Pananeten	Fundamental	MS Report		
End		MS Power :	23.67 dBm	Fundamenta
TX Power	24.77	24.80 24.68	dBn	A Power
Carrier Off Power	-43.91			G Measuremen
On/Off Ratio	68.68			
Power Flatness Max Po	wer 0.06	0.07 0.05		T Block
Power Flatness Min Po	wer -0.27	-0.26 -0.28		G Rate
Time Alignment	-0.18			
Block Error Rate - 1st Slot - 2nd Slot - 3nd Slot - 4th Slot	0.00 x 0.00 x 0.00 x			
Common Parameter Item Iperating Mode System Combination Call Processing	GPRS GSM/DCS1800		ER I	
whamic ARFON Mapping				
		hannel Direct		1 2

# **Call Processing**

- The following functions can be tested using call processing.
- Location registration
- Connection
- Communication
- Disconnection

After connection, GPRS terminal generates uplink slot, enabling Transmission measurement and BLER measurement.

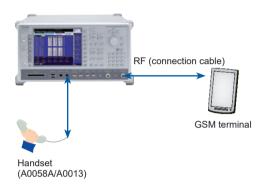
# MX882001C-001 GSM Voice Codec

# **Real-time Voice Encoding/Decoding and Audio Measurement Functions**

The optional MX882001C-001 GSM Voice Codec supports real-time voice encoding and decoding in software, so end-to-end communication with terminals can be tested by installing this option and the MT8820C-011 Audio Board option. In addition, the audio transmitter and receiver can be tested while calling.

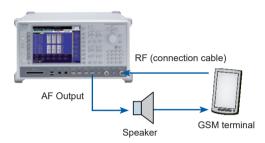
# **End-to-End Communications Test**

Connection of an Anritsu handset (A0058A/A0013) to the MT8820C RJ11 connector enables end-to-end communications testing between the MT8820C and a GSM terminal. This option supports voice tests by dividing Tx and Rx paths.



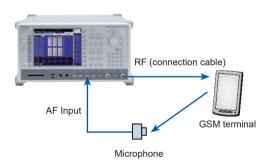
# **Audio Transmitter Measurement**

The tone signal from the MT8820C AF Output connector is supplied to the microphone of the GSM terminal and the audio transmitter characteristics of the GSM terminal can be measured using the MT8820C to demodulate the uplink RF signal and to measure the level, frequency, and distortion of demodulated tone signal.



# **Audio Receiver Measurement**

The tone signal demodulated by the GSM terminal is supplied to the MT8820C AF Input connector and the audio receiver characteristics of the GSM terminal can be measured by using the MT8820C to measure the level, frequency, and distortion of the tone signal at the AF Input.



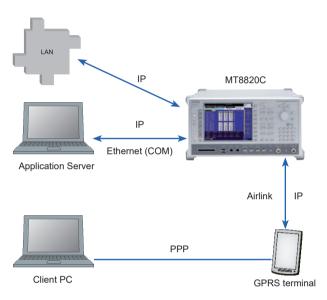
# MX882001C-002 GSM External Packet Data

Verification Test Function for GPRS Packet Communication Data Transfer

The MX882001C-002 GSM External Packet Data option supports data transfer to/from external equipment via the Ethernet port on the back panel of the MT8820C.

The MX882001C-002 can test end-to-end data transfer both in the local environment, such as the connection between the application server connected to the MT8820C and GPRS terminal, as well as in an almost-real environment, such as the connection between equipment connected to a LAN and GPRS terminal.

# **External Packet Test**



Sample MT8820C Connection

# for **EGPRS**

# Advanced High-speed Measurement Method and Batch Measurement Supporting the Manufacture of EGPRS Terminals

The MX882001C-011 EGPRS Measurement Software supports Tx and Rx measurements of terminals supporting the enhanced GPRS system or EGPRS. It supports both the MCS-1 to MCS-4 coding schemes using GMSK modulation as well as the MCS-5 to MCS-9 coding schemes using 8PSK modulation. And installing the MX882001C-011 EGPRS Measurement Software supports EGPRS as the Operating Mode.

At EGPRS measurement, frequency error, modulation accuracy, and transmit power are measured using a Test Mode A connection, while BLER with selected multislot class and modulation and coding scheme is measured using a BLER connection; both transmitter and receiver are tested by loopback at the physical layer using an SRB loopback (Switched Radio Block loopback) connection.

# Cardinantial Mesoryment Output Main Prometal Breaketter Fundamental MS Report -43, 98 dBa Persenter Stopp MS Report -43, 98 dBa Persenter Persenter Stopp MS Report -43, 98 dBa Persenter Persenter Steps State State -43, 98 dBa Persenter Steps State State -43, 98 dBa Persenter Steps State State -43, 98 dBa Persenter State State State -43, 98 dBa Persenter Consol State State State -43, 98 dBa Persenter Consol State State State State Persenter Persenter Contract Persenter State State State State Persenter Cold Darrel & Freeward Freeward Persenter Persenter Persenter Cold Darrel & Persenter State State State Persenter

### • EGPRS Measurement

	Transmit Power
	Power vs. Time (template mask)
Transmitter Tests	Frequency Error
Transmiller Tests	Phase Error (rms, peak) (GMSK)
	Modulation Accuracy (8PSK)
	Output RF Spectrum
Receiver Tests	BLER, BER
	Test Mode A, BLER, SRB Loopback,
Call Processing	Communication, Disconnection
	Mobile Terminal Report Monitor
	(Multislot Class, etc)

# MX882001C-011 EGPRS Measurement Software

# **Transmitter Measurement**

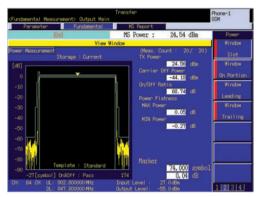
# Transmit Power

When two or more measurements are made, the maximum, average, and minimum results are displayed, supporting evaluation of the transmit power distribution of the EGPRS terminal. This functionality is also supported for other measurements.

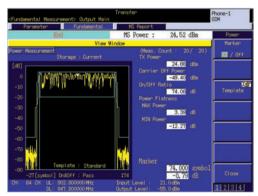
### Power vs. Time

The power can be measured with 0.1  $\mu s$  resolution at five measurement points within the rising and falling edges of the burst signal.

Burst waveforms can be displayed graphically, and a magnified display of the entire time slot and burst-on interval as well as the rising and falling edges supports easy evaluation of whether the burst waveform is within the limits of the power time template.



Entire Time Slot of GMSK Modulation



Entire Time Slot of 8PSK Modulation

# **Modulation Analysis**

The frequency, frequency error (in kHz and ppm), phase error, and peak phase error of GMSK modulated signals can be measured simultaneously. The EVM, peak EVM, 95th percentile EVM and origin offset of 8PSK modulated signals can also be measured.



# **Output RF Spectrum**

The spectrum can be measured at a total of 25 frequency points within the range of  $\pm 2$  MHz of the carrier frequency. "Modulation" is the spectrum resulting from the modulated signal around the center of the burst signal, while "Switching" is the spectrum resulting from the rising and falling edges of the burst signal.

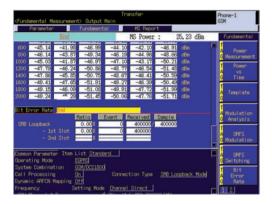
In addition to using advanced DSP technology, parallel measurement supports faster display of the output RF spectrum.

< Fundamental	Measurement	o Output		nsfer				Phone-1 GSM
Paranet		Fundament		MS Repor	٠t			
1	End		100	MS Power	: 2	3.67	dBn	Fundamental
Output RF Sp	ectrum - Moc	dulation	View	(Meas.	Count :	20/	20)	T
Judgement								A Power
	Lower			Upper				C Measurement
kHz Avg.	Мак	Min	Avg.	Мак	Min			T Power-
0 16.4	8 19.27	13.45	16.48	19.27	13.45			A VS G Time
100 -7.7	2 -3.47	-12.02	-8.21	-4.44	-12.07			<u>c</u> 1100
200 -35.6	2 ~31.02	-38,45	-36.55	-31.66	-39.84			I management
250 -38.5		-42.20	-40.33	-37.03	-44.51			A Modulation C Analysis
400 -60.1	3 -55.82	-64.61	-62.51	-56.44	-65.50			C Henallysis
600 -62.7	9 -55.43	-67.91	-68.61	-64.17	-72.94			I and a second
800 -66.0		-70.30	-70.98	-68.32	-73.61			A ORFS
1000 -67.2		-73.33	-71.96	-67.09	-75.30			e noduración
1200 -72.7		-77.64	-73.94	-70.64	-77.38			
1400 -75.6		-79.58	-75.24	-71.81	-80.03			A ORFS Switching
1600 -75.3		-77.92	-76.20	-71.87	-80.28			-
1800 -70.0		-73.86	-70.51	~66.58	-73.73			T USF
2000 -70.2	9 -66.99	-72.91	-71.19	-67.97	-74.09			A Block G Error Rate
								a creat nate
Output RF Sp		itching 🔣	EW.	(Meas.				
Judgement	Pass							
1000	Lower			Upper				1101
kHz Avg.	Мак	Min	Avg.	Maox.	Min			12

# **Receiver Measurement**

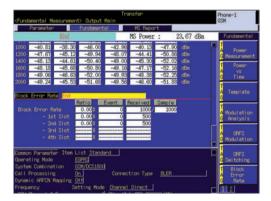
# Bit Error Rate (BER)

At SRB loopback, the bit error rate can be measured using the MT8820C-demodulated uplink RF signal looped back from the EGPRS terminal. The error rate can be measured in parallel with transmitter measurements.



# **Block Error Rate (BLER)**

At BLER connection, the EGPRS terminal calculates block errors in received data at downlink and reports the result to the MT8820C at uplink. The MT8820C calculates the block error rate using the report from the EGPRS terminal.



# **Call Processing**

# **Connection Test**

The following functions can be tested using call processing.

- Location registration
- Connection
- Communication
- Disconnection

After connection, EGPRS terminal generates uplink slot, enabling transmission measurement and BLER measurement.

# **Mobile Terminal Report Monitor**

The EGPRS terminal status can be displayed as a periodic report sent by the EGPRS terminal to the MT8820C for checking information such as Multislot Class and BEP (Bit Error Probability).



# MX882001C-041 GSM High-speed Adjustment

Reduced RF Adjustment Times, Linked with Chipset Adjustment Function

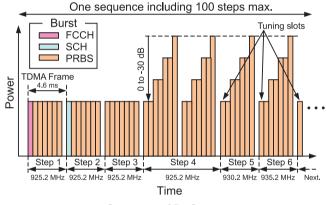
Installing the MX882001C-041 GSM High-speed Adjustment cuts the RF adjustment time, running in synchronization with the chipset adjustment function on GSM terminal. And it runs IQ Capturing Measurement.

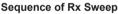
The measurement runs Fundamental Measurement screen. The measurement can't run Fundamental Measurement, and IQ Capturing Measurement, or High-Speed Adjustment Measurement when the measurement is effective.

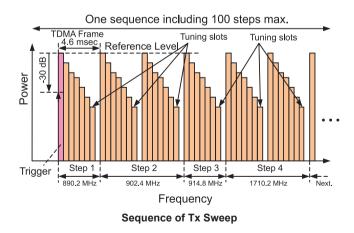
The measurement runs with Remote Control only.

# **High-speed Adjustment Measurement**

GSM High-speed Adjustment Measurement function adjusts both Tx and Rx. This function consists of Rx Sweep used for Rx adjustment and Tx Sweep used for Tx adjustment.

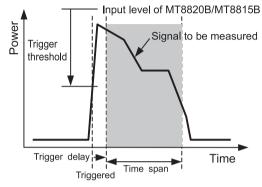






# **IQ Capturing Measurement**

IQ Capturing Measurement converts from Tx signal to Band-limited Base band signal and output sampling IQ binary data.



**IQ Capturing Measurement** 

# **Specifications**

\* Typical values are for reference only; specifications are not guaranteed.

# • MT8820C-002 TDMA Measurement Hardware, MX882001C GSM Measurement Software

	Frequency: 300 MHz to 2.7 GHz
	Input level: -30 to +40 dBm (Average power of burst signal, Main)
	Measurement items: Normal burst, RACH
Frequency/Modulation	Carrier frequency accuracy:
measurement	± (Setting frequency × Reference oscillator accuracy +10 Hz) (When measuring Normal Burst)
	± (Setting frequency × Reference oscillator accuracy +20 Hz) (When measuring RACH)
	Residual phase error: ≤0.5° rms, 2° peak
	Frequency: 300 MHz to 2.7 GHz
	Input level: –30 to +40 dBm (Average power of burst signal, Main)
	Measurement items: Normal burst, RACH
Amplitude measurement	Measurement accuracy: ±0.3 dB (typ.), ±0.5 dB (-20 to +40 dBm), ±0.7 dB (-30 to -20 dBm) *After calibration, 10° to 40°C
	Linearity: ±0.2 dB (–40 to 0 dB, ≥–30 dBm)
	Carrier-off power: ≥65 dB (Input level ≥–10 dBm), ≥45 dB (–30 dBm ≤ Input level < –10 dBm)
	Burst waveform display: Rise, Fall, Time slot, Burst-on
	Frequency: 300 MHz to 2.7 GHz
	Input level: –10 to +40 dBm (Average power of burst signal, Main)
Output RF spectrum	Measurement item: Normal burst
measurement	Measurement range in modulation area: ≤–55 dB (≤250 kHz offset), ≤–66 dB (≥400 kHz offset)
measurement	*Average of 10 measurements
	Measurement range in transient area: ≤–57 dB (≥400 kHz offset)
	Measurement points: ±100, ±200, ±250, ±400, ±600, ±800, ±1000, ±1200, ±1400, ±1600, ±1800, ±2000 kHz
	Output frequency: 300 MHz to 2.7 GHz (1 Hz step)
	Phase error: ≤1° rms, ≤4° peak
RF signal generator	Output patterns: CCH, TCH, CCH + TCH
	TCH Data: PN9, PN15, ALL 0, ALL 1, Fixed pattern (PAT0 to PAT9)
	USF: 0 to 7 (at GPRS)
	Functions: frame, bit and CRC error measurement
	Measurement object: Loopback data imposed on uplink TCH
Error rate measurement	Serial data input from rear panel call processing I/O port
	Number of blocks received from terminal imposed on uplink TCH for GPRS
	Number of USF blocks received from terminal for GPRS
	Call controlling:
	GSM
	Location registration, Terminal call origination, Network call origination, Network disconnect, Terminal disconnect
	GPRS
Call processing	Connection, Disconnection, Data transfer
	Terminal controlling: GSM
	Output level, Time slot, Timing advance, Loopback on/off GPRS
	Test Mode A, Test Mode B, BLER
Channel coding	FS, EFS, HS0, HS1, AFS, AHS0, AHS1
Coding scheme	CS-1, CS-2, CS-3, CS-4
V	GSN450, GSM480, GSM710, GSM750, T-GSM810, GSM850, P-GSM, E-GSM, R-GSM, DCS1800, PCS1900
Frequency bands	G31V1430, G31V1400, G31V1710, G31V1700, 1-G31V1610, G31V1630, P-G31V1, E-G31V1, R-G31V1, DC31000, PC31900

# MT8820C-011 Audio Board, MX882001C-001 GSM Voice Codec

Voice codec	GSM EFR, GSM AMR			
	Encoder input gain: –3 to +3 dB, 0.01 dB step			
Codec level adjustment	Handset microphone volume: 0, 1, 2, 3, 4, 5			
	Handset speaker volume: 0, 1, 2, 3, 4, 5			
	Frequency range: 30 Hz to 10 kHz, 1 Hz step			
	Frequency accuracy: ± (Setting frequency × Reference oscillator accuracy +0.1 Hz)			
	Setting range: 0 to 5 Vpeak (AF Output)			
	Setting resolution: 1 mV (≤5 Vpeak), 100 μV (≤500 mVpeak), 10 μV (≤50 mVpeak)			
AF output	Accuracy: ±0.2 dB (≥10 mVpeak, ≥50 Hz), ±0.3 dB (≥10 mVpeak, <50 Hz)			
	Waveform distortion: In ≤30 kHz band,			
	≤–60 dB (≥500 mVpeak, ≤5 kHz), ≤–54 dB (≥70 mVpeak)			
	Output impedance: ≤1 Ω			
	Max. output current: 100 mA			
	Frequency range: 50 Hz to 10 kHz			
AF input	Input voltage range: 1 mVpeak to 5 Vpeak (AF Input)			
Ai input	Max. allowable input voltage: 30 Vrms			
	Input impedance: 100 kΩ			
Frequency measurement	Accuracy: ± (Reference oscillator accuracy +0.5 Hz)			
Level measurement	Accuracy: ±0.2 dB (≥10 mVpeak, ≥50 Hz), ±0.4 dB (≥1 mVpeak, ≥1 kHz)			
SINAD measurement	At frequency 1 kHz in ≤30 kHz band,			
SINAD measurement	≥60 dB (≥1000 mVpeak), ≥54 dB (>50 mVpeak), ≥46 dB (≥10 mVpeak)			
Distortion rate measurement	At frequency 1 kHz in ≤30 kHz band,			
Distortion rate measurement	≤–60 dB (≥1000 mVpeak), ≤–54 dB (>50 mVpeak), ≤–46 dB (≥10 mVpeak)			

# • MT8820C-002 TDMA Measurement Hardware, MX882001C-011 EGPRS Measurement Software

Frequency/Modulation measurement	Frequency: 300 MHz to 2.7 GHz Input level: -30 to +40 dBm (Average power of burst signal, Main) Measurement items: Normal burst (GMSK, 8PSK), RACH Carrier frequency accuracy: ± (Setting frequency × Reference oscillator accuracy +10 Hz) (When measuring Normal Burst) ± (Setting frequency × Reference oscillator accuracy +20 Hz) (When measuring RACH) Residual phase error (GMSK): ≤0.5° rms, 2° peak Residual EVM (8PSK): ≤1.5% rms Waveform display: Phase error vs. Bit number, Amplitude error vs. Bit number, EVM vs. Bit number
Amplitude measurement	Frequency: 300 MHz to 2.7 GHz Input level: –30 to +40 dBm (Average power of burst signal, Main) Measurement items: Normal burst (GMSK, 8PSK), RACH Measurement accuracy: ±0.3 dB (typ.), ±0.5 dB (–20 to +40 dBm), ±0.7 dB (–30 to –20 dBm) *After calibration, 10° to 40°C Linearity: ±0.2 dB (–40 to 0 dB, ≥–30 dBm) Carrier-off power: ≥65 dB (Input level ≥–10 dBm), ≥45 dB (–30 dBm ≤ Input level < –10 dBm) Burst waveform display: Rise, Fall, Time slot, Burst-on
Output RF spectrum measurement	Frequency: 300 MHz to 2.7 GHz Input level: -10 to +40 dBm (Average power of burst signal, Main) Measurement item: Normal burst (GMSK, 8PSK) Measurement range in modulation area: ≤-55 dB (≤250 kHz offset), ≤-66 dB (≥400 kHz offset) *Average of 10 measurements Measurement range in transient area: ≤-57 dB (≥400 kHz offset) Measurement points: ±100, ±200, ±250, ±400, ±600, ±800, ±1000, ±1200, ±1400, ±1600, ±1800, ±2000 kHz
RF signal generator	Output frequency: 300 MHz to 2.7 GHz (1 Hz step) Phase error: ≤1° rms, ≤4° peak Modulation accuracy (8PSK): ≤3% rms Output patterns: OCH, TCH, OCH + TCH TCH Data: PN9, PN15, ALL 0, ALL 1, Fixed pattern (PAT0 to PAT9)
Error rate measurement	Functions: bit and CRC error measurement Measurement object: Loopback date imposed on uplink TCH (GMSK, 8PSK) Number of blocks received from terminal imposed on uplink TCH for EGPRS Number of USF blocks received from terminal for EGPRS
Call processing	Call controlling: Location registration, Connection, Termination, Data transfer via EGPRS Terminal controlling: Output level, Time slot, Timing advance, Test Mode A, BLER, SRB loopback
Coding scheme	MCS1 to MCS4 (GMSK), MCS5 to MCS9 (8PSK)
Puncturing scheme	P1, P2, P3
Frequency bands	GSM450, GSM480, GSM710, GSM750, T-GSM810, GSM850, P-GSM, E-GSM, R-GSM, DCS1800, PCS1900

# **Ordering Information**

Please specify the model/order number, name and quantity when ordering. The names listed in the chart below are Order Names. The actual name of the item may differ from the Order Name

lodel/Order No.	Name	Model/Order No.	Name
MT8820C	Main frame Radio Communication Analyzer	MX882007C-021	TD-SCDMA HSUPA Measurement Software <sup>*2</sup> (requires MT8820C-001, MT8820C-007, MX882007C, MX882007C-01
	Standard accessories	MX882010C	Parallel Phone Measurement Software*5
	Power Cord: 1 pc		[requires MT8820C-012, the two same measurement hardwar
	CF Card: 1 pc	10/0000100	(2 board/set) and one measurement software]
	PC Card Adapter (For CF card): 1 pc	MX882012C	LTE FDD Measurement Software <sup>*2</sup> (requires MT8820C-008)
W3320AE	MT8820C Operation Manual (CD-ROM): 1 pc	MX882012C-006	LTE FDD IP Data Transfer <sup>*2</sup> (requires MX882012C)
	Options	MX882012C-011	LTE FDD 2×2 MIMO DL <sup>*2, *6</sup> (requires MT8820C-012 and MX882012
MT8820C-017	Extended RF Hardware*1	MX882012C-016	LTE FDD CS Fallback to W-CDMA/GSM* <sup>7</sup> (requires MX882012C) LTE-Advanced FDD DL CA Measurement Software <sup>*2, *8</sup>
MT8820C-001	W-CDMA Measurement Hardware	MX882012C-021	(requires MT8820C-008 (2 sets), MT8820C-012, MX882010C, a
MT8820C-002	TDMA Measurement Hardware		MX882012C)
MT8820C-007	TD-SCDMA Measurement Hardware	MX882012C-026	LTE-Advanced FDD DL CA IP Data Transfer <sup>*9</sup>
MT8820C-008	LTE Measurement Hardware	101/0020120-020	(requires MT8820C-008 (2 sets), MT8820C-012, MX882010C
MT8820C-011	Audio Board		MX882012C, MX882012C-006, MX882012C-021)
MT8820C-012	Parallel Phone Measurement Hardware	MX882012C-031	LTE-Advanced FDD DL CA 3CCs Measurement Software*2.*
MT8820C-018	Extended RF 3.4 GHz to 3.8 GHz		(requires MT8820C 2 sets.
	(requires MT8820C-017, MT8820C-119, or MT8820C-120)		One is required MT8820C-008 (2 sets), MT8820C-012,
MT8820C-101	W-CDMA Measurement Hardware Retrofit		MX882010C, MX882012C and MX882012C-021.
MT8820C-102	TDMA Measurement Hardware Retrofit		The other is required MT8820C-008, MX882012C.)
MT8820C-107	TD-SCDMA Measurement Hardware Retrofit	MX882013C	LTE TDD Measurement Software <sup>*2</sup> (requires MT8820C-008)
MT8820C-108	LTE Measurement Hardware Retrofit	MX882013C-006	LTE TDD IP Data Transfer <sup>*2</sup> (requires MX882013C)
MT8820C-111	Audio Board Retrofit	MX882013C-011	LTE TDD 2×2 MIMO DL*2,*6 (requires MT8820C-012 and MX882013
MT8820C-112	Parallel Phone Measurement Hardware Retrofit	MX882013C-016	LTE TDD CS Fallback to W-CDMA/GSM*11 (requires MX882013)
MT8820C-119	Extended RF Hardware for SPM Retrofit	MX882013C-018	LTE TDD CS Fallback to TD-SCDMA/GSM*11 (requires MX882013
MT8820C-120	Extended RF Hardware for PPM Retrofit	MX882013C-021	LTE-Advanced TDD DL CA Measurement Software*2, *8
MT8820C-177	TD-SCDMA Measurement Retrofit (requires MT8820C-001)		(requires MT8820C-008 (2 sets), MT8820C-012, MX882010C, a
	Software options		MX882013C)
MX882000C	W-CDMA Measurement Software	MX882013C-026	LTE-Advanced TDD DL CA IP Data Transfer*9
	(requires MT8820C-001 and MX88205xC)		(requires MT8820C-008 (2 sets), MT8820C-012, MX882010C,
MX882000C-001	W-CDMA Voice Codec (requires MT8820C-011 and MX882000C)		MX882013C, MX882013C-006, MX882013C-021)
MX882000C-011 MX882000C-013 MX882000C-021	HSDPA Measurement Software	MX882013C-031	LTE-Advanced TDD DL CA 3CCs Measurement Software <sup>*2, *10</sup>
	(requires MT8820C-001, MX882000C, and MX882050C)		(requires MT8820C 2 sets.
	HSDPA High Data Rate (requires MT8820C-001,		One is required MT8820C-008 (2 sets), MT8820C-012,
	MX882000C, MX882000C-011, and MX882050C)		MX882010C, MX882013C, MX882013C-021.
	HSUPA Measurement Software (requires MT8820C-001,	11/10000000	The other is required MT8820C-008, MX882013C.)
	MX882000C, MX882000C-011, and MX882050C)	MX882032C	CDMA2000 Measurement Software Lite*2
MX882000C-031	HSPA Evolution Measurement Software*2	MX882036C	1xEV-DO Measurement Software Lite*2
	(requires MT8820C-001, MX882000C, MX882000C-011,	MX882036C-011	1xEV-DO Rev. A Measurement Software*2
	MX882000C-021, and MX882050C)	MX882042C MX882043C	LTE FDD Measurement Software Lite <sup>*2</sup> LTE TDD Measurement Software Lite <sup>*2</sup>
MX882000C-032	DC-HSDPA Measurement Software <sup>*2, *3</sup>	MX882050C	W-CDMA Call Processing Software <sup>2, *12</sup> (requires MX882000
	(requires MT8820C-001 (2 sets), MT8820C-012, MX882000C,	MX882050C-002	W-CDMA Call Processing Software (requires MX882050C) W-CDMA External Packet Data*2 (requires MX882050C)
	MX882000C-011, MX882000C-021, MX882000C-031,	MX882050C-002	W-CDMA Video Phone Test*2 (requires MX882050C)
	MX882010C, and MX882050C)	MX882050C-007	W-CDMA Band XII, XIII, XIV, XIX, XX, XXI <sup>*2, *13</sup> (requires MX882050
MX882000C-033	DC-HSUPA Measurement Software*2, *4	MX882050C-008	W-CDMA Band XI, <sup>2</sup> 2 (requires MX882050C)
	(requires MT8820C-001 (2 sets), MT8820C-012, MX882000C,	MX882050C-009	W-CDMA Band IX*2 (requires MX882050C)
	MX882000C-011, MX882000C-021, MX882000C-031,	MX882050C-011	HSDPA External Packet Data*2 (requires MX882000C-011)
	MX882000C-032, MX882010C, MX882050C)	MX882051C	W-CDMA Call Processing Software*2 (requires MX882000C)
MX882000C-034	4C-HSDPA Measurement Software* <sup>2, *4</sup>	MX882051C-002	W-CDMA External Packet Data <sup>*2</sup> (requires MX882051C)
	(requires MT8820C-001 (2 sets), MT8820C-012, MX882000C,	MX882051C-003	W-CDMA Video Phone Test* <sup>2</sup> (requires MX882051C)
	MX882000C-011, MX882000C-021, MX882000C-031,	MX882070C	W-CDMA Ciphering Software <sup>*2</sup> (requires MX882050C)
MV0000040	MX882000C-032, MX882010C, MX882050C)	MX882071C	W-CDMA Ciphering Software <sup>*2</sup> (requires MX882051C)
MX882001C	GSM Measurement Software (requires MT8820C-002)		Warranty
MX882001C-001	GSM Voice Codec (requires MT8820C-011 and MX882001C)	MT8820C-ES210	2 years Extended Warranty Service
MX882001C-002	GSM External Packet Data (requires MX882001C)	MT8820C-ES310	3 years Extended Warranty Service
MX882001C-011	EGPRS Measurement Software (requires MX882001C)	MT8820C-ES510	5 years Extended Warranty Service
MX882001C-041 MX882005C	GSM High-speed Adjustment (requires MX882001C) PHS Measurement Software (requires MT8820C-002)		
MX882005C-011	Advanced PHS Measurement Software (requires M188200-002)	DOO25D	Application parts W-CDMA/GSM Test USIM
MX882007C	TD-SCDMA Measurement Software	P0035B	W-CDMA/GSM Test USIM W-CDMA/GSM Test USIM <sup>*14</sup>
0020070	(requires MT8820C-001 and MT8820C-007)	P0035B7 P0135A6	Anritsu Test UICC GA (Nano UICC size) <sup>*15</sup>
MX882007C-001	TD-SCDMA Voice Codec (requires MT8820C-011 and MX882007C)	P0135A6	Anritsu Test UICC GA (Micro UICC size)*15
MX882007C-003	TD-SCDMA Video Phone Test (requires MX882007C)	P0250A6	Anritsu Test UICC GT (Nano UICC size) <sup>*15</sup>
MX882007C-011	TD-SCDMA Video Filone Test (requires intoo2007C)	P0250A7	Anritsu Test UICC GT (Mano UICC size) <sup>*15</sup>
	(requires MT8820C-001, MT8820C-007, and MX882007C)	P0260A6	Anritsu Test UICC GM (Nano UICC size)*15
MX882007C-012	TD-SCDMA HSDPA Evolution Measurement Software <sup>*2</sup>	P0260A7	Anritsu Test UICC GM (Nano UICC size) <sup>*15</sup>
	(requires MT8820C-001, MT8820C-007, MX882007C, MX882007C-011)	P0135B6	Anritsu Test UICC GA (Nano UICC size) <sup>*15</sup>
		P0135B7	Anritsu Test UICC GA (Mario UICC size) <sup>*15</sup>
		P0250B6	Anritsu Test UICC GT (Nano UICC size)*15
		P0250B7	Anritsu Test UICC GT (Micro UICC size)* <sup>15</sup>
		P0260B6	Anritsu Test UICC GM (Nano UICC size)*15
		P0260B7	Anritsu Test UICC GM (Micro UICC size)*15
		A0058A	Handset

Model/Order No.	Name
J1195A	PP2S Output Cable
J1249	CDMA2000 Cable
J1267	[D-Sub (15 pin, P-type) · D-Sub (15 pin, P-type), used in combination with J1267 (sold separately)]* <sup>16</sup> CDMA2000 Cross Cable [D-Sub (9 pin, P-type) · D-Sub (9 pin, P-type), reverse cable
	used in combination with J1249 (sold separately)]
J1606A	Cable <sup>*16</sup>
J0576B	Coaxial Cord, 1 m (N-P · 5D-2W · N-P)
J0576D	Coaxial Cord, 2 m (N-P · 5D-2W · N-P)
J0127A	Coaxial Cord, 1 m (BNC-P · RG58A/U · BNC-P)
J0127C	Coaxial Cord, 0.5 m (BNC-P · RG58A/U · BNC-P)
J0007	GPIB Cable, 1 m
J0008	GPIB Cable, 2 m
MN8110B	I/O Adapter (for call processing I/O)
B0332	Joint Plate (4 pcs/set)
B0643A	Rack Mount Kit (MT8820C)
B0499	Carrying Case (Hard type) (with protective cover and casters)
B0499B	Carrying Case (Hard type) (with protective cover, without casters)

\*1: MT8820C-017 has been a standard option that MT8820C are shipped with until July 2012 (Simultaneous order is required MT8820C and MT8820C-017).

\*2: For terminal connectivity, contact your Anritsu sales representative.

\*3: MX882000C-032 is required a Parallelphone measurement configuration of W-CDMA HSPA Evolution.

For use MT8820C 2 units, contact your Anritsu sales representative. \*4: MX882000C-033 (034) is required W-CDMA DC-HSDPA configuration.

- \*5: The following measurement hardware supports the Parallelphone measurement option: MT8820C-001, MT8820C-002, MT8820C-007, MT8820C-008. All the measurement hardware can be installed simultaneously.
- \*6: MX882012C-011 is required MT8820C-012.

- \*7: The MX882012C-016 LTE FDD CS Fallback to W-CDMA/GSM requires a separate MT8820C with the W-CDMA/GSM configuration. Contact your Anritsu sales representative for the CS Fallback function test configuration.
- \*8: MX882012C (12C)-021 is required a Parallelphone measurement configuration of LTE FDD (TDD).

For Use MT8820C 2 units, contact your Anritsu sales representative.

- \*9: MX882012C (13C)-026 function test is required external server PCs (2 sets). LTE Advanced FDD (TDD) DL CA IP Data Transfer (2CCs, 2Layer) is required MT8820C LTE 2\*2 MIMO DL configuration (2 sets) and external server PCs (2 sets).
- \*10: One is required LTE FDD (TDD) ParallelPhone Configuration. The other is required LTE FDD Single Phone Configuration. For use MT8820C 3 units, contact your Anritsu sales representative. A synchronized cable is required too.
- \*11: The MX882013C-016 (018) LTE TDD CS Fallback to W-CDMA/GSM (TD-SCDMA/GSM) requires a separate MT8820C with the W-CDMA/GSM (TD-SCDMA/GSM) configuration. Contact your Anritsu sales representative for the CS Fallback function test configuration.
- \*12: These options preinstall the integrity protection function.
- \*13: MX882050C-007 supports W-CDMA Band 12, 13, 14, 19, 20, 21.
  \*14: The P0035B7 MicroSIM is a cut-down P0035B W-CDMA/GSM Test USIM. The P0035B7 Test USIM is a microSIM. It CANNOT be used in a normal size USIM card slot. A commercial SIM adapter CANNOT be used with the P0035B7. If used, it may jam and break in the terminal.
- \*15: Refer to the P0135Ax/P0250Ax/P0260Ax leaflet for details.
- \*16: J1267 (J1606A) cable can use for LTE-Advanced DLCA synchronized cable. Contact your Anritsu sales representative for details.
- Parallelphone<sup>™</sup> is a registered trademark of Anritsu Corporation.
- CF<sup>®</sup> card is a registered trademark of SanDisk Corporation in the United States and is licensed to CFA (Compact Flash Association).





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