

MX269013A GSM/EDGE Measurement Software MX269013A-001 EDGE Evolution Measurement Software

MS2690A/MS2691A/MS2692A/MS2830A Signal Analyzer MS2690A/MS2691A/MS2692A/MS2830A Signal Analyzer

MX269013A GSM/EDGE Measurement Software MX269013A-001 EDGE Evolution Measurement Software

Product Introduction





MS269xA

MS2830A

Version 3.00

Anritsu Corporation

Slide 1 MX269013A-E-L-1



GSM/EDGE, **EDGE** Evolution Measurement Software

The MX269013A GSM/EDGE and MX269013A-001 EDGE Evolution Measurement Software packages support measurement of RF Tx characteristics for GSM/EDGE (EGPRS) and EDGE Evolution (EGPRS2) signals. Installing these software in the MS2690A/MS2691A/MS2692A/MS2830A Signal Analyzer supports Modulation Analysis, Output RF Spectrum and Power vs. Time

<complex-block><complex-block>

/inritsu

Discover What's Possible™

measurements.

Slide 2 MX269013A-E-L-1

MX269013A and MX269013A-001 Measurements

The MX269013A GSM/EDGE Measurement Software analyzes GSM/EDGE (EGPRS) signals. The MX269013A-001 EDGE Evolution Measurement Software analyzes EDGE Evolution (EGPRS2) signals.



Discover What's Possible™

Common Functions

- Test Signals: Downlink/Uplink

- Bands: P-GSM, E-GSM, R-GSM, GSM 450, GSM 480, GSM 750, GSM 850, DCS 1800, PCS 1900 *Other frequency signals measured by direct input

- Modulation: GMSK, 8PSK QPSK, 16QAM, 32QAM (= requires MX269013A-001



Setting Parameter (1/2)



> ARFCN

When setting ARFCN, the value matching the Band and RF signal settings is set as the carrier frequency.

- > Carrier Frequency:
 - Measurement range: 400 MHz to 2GHz S

Settable range: 10 MHz to the upper limit of the main unit

Lowest ATT Setting:

The lower limit for the attenuator, which is automatically adjusted according to the Input Level setting, can be changed manually.

Auto Range:

This function adjusts input level according to input signal.

Discover What's Possible™

Slide 5 MX269013A-E-L-1



Setting Parameter (2/2)



d	ulat	io

e

×

\succ	Signal Direction:
	DL: Select this for downlink input signal.
	UL: Select this for uplink input signal.
\succ	Band: Select the frequency band of measurement target.
	P-GSM, E-GSM, R-GSM, GSM450, GSM480, GSM750,
	GSM850, GSM1800, GSM1900
\succ	RF Signal: Select the burst type of the input signal.
	Normal Burst, Continuous
	Higher Symbol Rate Burst,Require MX269013A-001
\succ	Modulation: Select the modulation method of the input signal.
	GMSK, 8PSK,
	QPSK, 16QAM, 32QAMRequire MX269013A-001
\succ	Burst Sync: Select the DUT signal sync detection method.
	Auto, TSC0, TSC1, TSC2, TSC3, TSC4, TSC5, TSC6, TSC7
	Active Slot Threshold:
	Select the slot detection level threshold value from the Input Level.
	Measurement Offset:
	Select the position of the measured target burst slot, on which trigger input
~	point is based (frame header), in slot units.
	Symbol Rotation: Select the symbol rotation phase.
	$\Pi/2$, $\Pi/4$, $3\Pi/8$
~	BIS Type: Select the BIS type for the measurement target.
~	NOTITIAL DTS, MICTO 1/2/3 DTS, PICO DTS PTS Deward evel:
	Soloct the BTS newer level for the measurement target
	Pulse Shaning:
	Select the type of Pulse Shaping filter applied to the DLIT signal
	Narrow Wide
	Power Control Level:
	Select the MS power control levels for the measurement target
	Anciteu
	Slide 6

Slide 6 MX269013A-E-L-1

Measurement Functions

Modulation analysis and Tx power measurement for GSM/EDGE/base station for EDGE Evolution/terminal/device component development performed at high speed and high accuracy

Modulation Analysis

Text Display

- Frequency Error *
- *: Exclude GMSK **: GMSK only

- EVM (rms) *
- EVM (peak) *
- Magnitude Error (rms) *
- Phase Error (rms)
- Phase Error (peak) **
- Origin Offset *
- > 95th percentile *
- Droop *

Graph Display

- Constellation
- EVM vs Symbol *
- Magnitude Error vs Symbol *
- Phase Error vs Symbol

Burst Average Power

Output RF Spectrum

Text Display

- Reference Power
- Modulation Pass/Fail
- > MKR

Graph Display

- Modulation
- Switching
- > Numeric

Power vs Time

Text Display

- Slot Power: Avg/Max/Min
- Slot Status: Active/Inactive
- Judge: Pass/Fail

Graph Display

- Rise and Fail
- Slot
- Frame

Slide 7 MX269013A-E-L-1



Modulation Analysis (1/3)

GSM, EDGE and EDGE Evolution signals can be analyzed.

The frequency and vector error (Avg/Max) are displayed as numerics, while the constellation and vector error vs. symbol are displayed as graphs.



Modulation Analysis Screen

Discover What's Possible™

Slide 8 MX269013A-E-L-1

Modulation Analysis (2/3)

Text Display

The Result window shows the numerical results.

			Frequency Error: Displays frequency error of analyzed signal in Hz and ppm units
Frequency Error Mean Power EVM(rms) EVM(peak) Mag. Error(rms) Phase Error(rms) Origin Offset Time Offset Peak CDE Peak Active CDE Peak Relative CDE	-0. -0.000 -10. 0.0 3.7 0.3 -55.0 -0.1 -60.54 dB 0 -54.08 dB 5 -42.10 dB 4	11 Hz 01 ppm 71 dBm 55 % 74 % 33 % 32 deg. 59 dB 46 chips SF 256 16 16	 EVM (rms)*: Displays input signal EVM as RMS value EVM (peak)*: Displays peak EVM value of input signal Magnitude Error (rms)*: Displays amplitude error between input signal and ideal signal as RMS value Phase Error (rms): Displays phase error between input signal and ideal signal as RMS value Phase Error (peak)**: Displays peak phase error between input signal and ideal signal Origin Offset*: Displays Origin Offset of input signal
			 > 95th percentile*: Displays 95th percentile of input signal > Droop*: Displays the Droop value of the analysis signal in dB and nepers/s.

*: Excluding GMSK

**: GMSK only



Modulation Analysis (3/3)

Vector, amplitude and phase errors can be graphed on the vertical axis to easily find instantaneous symbol-dependent signal degradation.

-10.00 dBr

Frequency Error

EVM(rms)

EVM(peak)

EVM 0.08 %

Mag. Error(rms Phase Error(rms Origin Offse 95th percentile

4 dB

0.31 Hz

0.000 ppr

0.18 %

Input Leve

DL / P-GSM

NB / 320AM

Signal

MKR

3 Symbol

1.1159

-0.2200

EVM vs Symbol

MKR Symbol



Discover What's Possible[™]

Slide 10 MX269013A-E-L-1

Output RF Spectrum (1/4)

Modulation

This function supports measurement of the output RF spectrum modulation specified by 3GPP TS45.005. Pass/fail is evaluated from the limit line.



Output RF Spectrum (Modulation)



Discover What's Possible™

Output RF Spectrum (2/4)

Switching

This function supports measurement of the output RF spectrum switching (rise/fall part) specified by 3GPP TS45.005. Pass/fail is evaluated from the limit line.



Output RF Spectrum (Switching)

Reference mode for switching:

This sets Reference Power for the Switching measurement. **rms:** Sets the power measured at Detection=RMS to the Reference Power. **peak:** Sets the power measured at Detection=Peak to the Reference Power.



Slide 12 MX269013A-E-L-1

Output RF Spectrum (3/4)

Numeric

The modulation and switching output RF spectrum measurement results are listed for simultaneous pass/fail evaluation.



Output RF Spectrum (Numeric)

Reference mode for switching:

This sets Reference Power for the Switching measurement. **rms:** Sets the power measured at Detection=RMS to the Reference Power. **peak:** Sets the power measured at Detection=Peak to the Reference Power.



Discover What's Possible™

Slide 13 MX269013A-E-L-1

Output RF Spectrum (4/4)

Mask Template Editing

This function supports editing of the mask template for the output RF spectrum. Listed setting parameters can be changed easily.

🕥 FSpectrum	Mask	Setting	g (Modul	ation)
là.	GSM			
Trace	Ouput RF Spect	rum Mask Setup		
	Modulation Sw	itching		
	Offset [kHz]	REL Limit [dB]	ABS Limit [dBm]	Fail Logic
	100	0.50 ÷	-36.00 🗧	ABS or REL 🔻
lect Mask	200	-30.00 🗧	-36.00 ÷	ABS or REL 💌
and User	250	-33.00 🗧	-36.00 🗧	ABS or REL 💌
	400	-60.00 🗧	-36.00 ÷	ABS or REL 💌
	600	-70.00 🗧	-65.00 🗧	ABS or REL 💌
sк Setup	800	-70.00 🗧	-65.00 🗧	ABS or REL 💌
	1000	-70.00 🗧	-65.00 🗧	ABS or REL 💌
	1200	-73.00 🗧	-65.00 🗧	ABS or REL 💌
	1400	-73.00 🗧	-65.00 🗧	ABS or REL 💌
	1600	-73.00 🗧	-65.00 🗧	ABS or REL 💌
Offset RBW	1800	-75.00 🗧	-65.00 🗧	ABS or REL 💌
30kHz	3000	-75.00 🗧	-65.00 🗧	ABS or REL 💌
	6000	-75.00 🗧	-65.00 🗧	ABS or REL 💌
			Set	Cancel

ám GSM				×
Ouput RF Spect	rum Mask Setup			
Modulation Sw	ritching			
Offset [kHz]	REL Limit [dB]	ABS Limit [dBm]	Fail Logic	
400 600 1200 1800	-57.00 ± -67.00 ± -74.00 ±	-36.00 ± -36.00 ± -36.00 ±	ABS or REL ABS or REL ABS or REL ABS or REL]]]
		Set	Cancel	

Mask Setting (Switching)

/inritsu

Power vs. Time (1/4)

The slot power results are listed and symbol power vs. time is graphed. Avg, max, and min values are displayed.



Power vs. Time Screen

Discover What's Possible™

Slide 15 MX269013A-E-L-1 **/Inritsu**

Power vs. Time (2/4)

Text Display

The Result window shows the numerical results.

Slot Power							
BW : 300kHz /	5pole	Slot	State	Avg [dBm]	Max [dBm]	Min [dBm]	Judge
		0	Active	-10.43	-10.43	-10.43	Pass
Time Offset	10.94 µs	1	Active	-10.43	-10.43	-10.43	Pass
		2	Active	-10.43	-10.43	-10.43	Pass
		3	Active	-10.43	-10.43	-10.43	Pass
		4	Active	-10.43	-10.43	-10.43	Pass
		5	Active	-10.43	-10.43	-10.43	Pass
		6	Active	-10.43	-10.43	-10.43	Pass
		7	Inactive	-91.78	-91.65	-91.88	****

Slot Power: Avg/Max/Min:

Displays power for 8 consecutive slots from measurement target head slot

Slot Status: Active/Inactive:

Displays Active/Inactive status for 8 consecutive slots from measurement target head slot

 Judge: Pass/Fail: Displays mask evaluation result for Symbol Power at each measurement target slot (8 slots)

Power vs. Time (3/4)

The change in DUT output power over time can be observed using three rising/falling, slot, and frame displays. Pass/fail is evaluated using the template.

Clamber Pred, 1 530 200 000 H2 Implif Level - 1000 dbm Band DL /PCS 1500 ATT 4 dB Signal NB / 320AM Result Average 10 / 10 Signal NB / 320AM Result Average 10 / 10 Signal NB / 320AM Result Average 10 / 10 Siot Power Siste Average 10 / 10 Siste BW : 300kHz / Spole Siste Average 10 / 20 / 10 Siste 6 Inactive 92 / 24 91 / 10 42 / 20 / 10 Errore 6 Inactive 92 / 19 91 / 52 92 / 21 Errore Power vs Time - Rise and Fall MKR Symbol 1300 (48.00 µs) Avg - 11 / 1 / Max -11 / 1 / M -11 / 7 / dbm (dimit30) 000 -000 µs) Avg - 11 / 7 / Max -11 / 7 / dbm I / 000 µs) -000 000 000 µs) Avg - 11 / 7 / Max -11 / 7 / dbm I / 000 µs) I / 000 µs) I / 000 µs)		5/12/2008 14:01:12 GSM						00.10		In such la such				GSM
Band DL/PCS 1900 ATT 4 dB Signal NB / 320AM Result Average 101 10 Slot Power BW : 300kHz / Spole <u>Stat Average 103 Max (dbm) Average 101 10</u> <u>Slot Power</u> <u>BW : 300kHz / Spole</u> <u>Stat Average 103 Max (dbm) Average 101 10</u> <u>Slot Power 2010 922 10 9276 1000 1000 1000 1000 1000 100000 1000000</u>		race Mode						1.00 dB		Input Leve	J HZ	930 200 00		Carrier Freq.
Signal NB / 320AM Result Average 10 / 10 Slot Power Soft State Average 10 / 10 BW : 300kHz / Spole Slot State Average 10 / 10 Slot BW : 300kHz / Spole Slot State Average 10 / 10 Passe 2 Inactive 62.44 947 92.97 Ferrer 2 Inactive 62.44 947 92.97 Ferrer 3 Inactive 62.43 92.17 Ferrer 6 Inactive 62.21 94.152 92.27 Ferrer Power vs Time - Rise and Fall Mix Symbol 13.00 Avg 11.97 / Max 11.97 / Min 11.37 dBm 9000 -0.00								4 dB		ATT	900	DL/PCS		Band
Stot Power Siot Stot Power BW : 300kHz / Spole Siot State Avg (dBm) Min (dBm) Julga Julga Stot Power BW : 300kHz / Spole Siot State Avg (dBm) Min (dBm) Julga <		Rise and Fall									laM	NB / 32		Signal
Slot Power BW : 300kHz / 5pole State Avg (dBm) Max (dBm) Jun (dBm) Judge 1 nactive 42.43 42.19 42.27 1484 1 nactive 42.44 41.194 42.77 1484 1 nactive 42.81 64.77 42.82 11.95 11.97 1 nactive 42.25 64.77 42.25 11.97 <td></td> <th></th> <td>10</td> <td>10 <i>I</i></td> <td>erage</td> <td>A</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Result</td>			10	10 <i>I</i>	erage	A								Result
BW : 300kHz / Spole BW : 300k													r	Slot Powe
UN 1 5000/L 1 5000 10 Attrime 102 (000) Male (000) Unit (Slot	- 11	Judge	[dBm]	Mir	av [dBm]	aml	Aval	State	Slot		7 / 5 nole	BW · 300kH
1 narctive 92/43 92/17 92/97 1 2 narctive 92/43 92/17 92/97 1 1 3 narctive 92/38 92/02 92/71 1 1 4 narctive 40/238 92/02 92/71 1 1 6 narctive 40/218 94/77 92/251 1 1 6 narctive 40/218 94/77 92/251 1 <td>/</td> <th></th> <td></td> <td>Pass</td> <td>-10.73</td> <td>1 Mill</td> <td>[IIIGD] X8 00 0.</td> <td>0.38</td> <td>Avgl</td> <td>Active</td> <td>0</td> <td></td> <td>2700010</td> <td>BW . JOOKH</td>	/			Pass	-10.73	1 Mill	[IIIGD] X8 00 0.	0.38	Avgl	Active	0		2700010	BW . JOOKH
2 inactive 402.44 9196 92761 Image 3 inactive 42.38 52.02 92.57 Image 4 inactive 42.19 6152 92.50 Image 6 inactive 42.28 62.03 92.61 Image 0vervs 1107 Image 42.51 Image Image MKR Symbol 13.00 (48.00 µs) Arg 11.97 IMag 11.97 OBm -023 -023 -023 -023 -023 -023 -023 -033 -033 Image	•		- 11		-92.97		-92.17	2.43		Inactive	1			
3 inactive 492.38 692.02 927.41		Frame		****	-92.75		-91.95	2.44		Inactive	2			
4 Inactive 42:19 41:52 22:20 12:20 6 Inactive 42:23 42:03 42:26 1:20			- 1	****	-92.74		-92.02	2.38		Inactive	3			
5 inactive 42.18 41.77 42.62 1 40.73 42.61 1 40.73 42.61 1				****	-92.59		-91.52	2.19		Inactive	4			
6 Inactive 492.36 492.03 492.61				****	-92.62		-91.77	2.18		Inactive	5			
7 inactive 492.51 492.29 492.77				****	-92.61		-92.03	2.36		Inactive	6			
owerst Time - Rise and Fall Mick Symbol 13.00 (48.00 µs) Avg -11.97 / Max -11.97 / Min -11.97 dBm (den -0.39 -				****	-92.77		-92.29	2.51		Inactive	7			
MKR Symbol 1300 (4800 µs) Avg -1197 / Max -1197 / Min -1197 dBm -203 -203 -203 -203 -203 -203 -203 -203	<u> </u>	_										ind Fall	e - Rise :	ower vs Tim
(den) -133 -133 -133 -133 -133				dBm	-11.97	/ Min	x -11.97	1.97 /	Avg	00 µs)	48	13.00 (ymbol	MKR
														[dBm] -0.38
			- 10		_				-		-17			
						\rightarrow								
-70.9														
-10.38														
	- -			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	\sim							ad	~~~~	
-100.39												v V.		

Rising/Falling



Slot



Frame





Discover What's Possible™

Slide 17 MX269013A-E-L-1

Power vs. Time (4/4)

This function supports editing of the mask template for power vs. time. Listed setting parameters can be changed easily.





Discover What's Possible™

Slide 18 MX269013A-E-L-1

Spurious Emission (Mainframe Function)

The peak frequency and level in each segment and the standard margin are displayed; parts exceeding the limit line are indicated in red. The limit line and measurement method can be set for up to 20 segments.



Spurious Emission Measurement

Discover What's Possible™

Slide 19 MX269013A-E-L-1



Specifications

All 3GPP TS45.005 (Rel. 8) RF Tx tests of GSM/EDGE/EDGE Evolution systems are supported.

3GPI	P TS45.005 Transmitter Characteristics	Software	SPA
4.1	Output Power	Yes	
4.2	Output RF spectrum		
4.2.1	Spectrum due to modulation and wideband noise	Yes	
4.2.2	Spectrum due to switching transients	Yes	
4.3	Spurious emissions	No	Yes
4.4	Radio frequency tolerance	Yes	
4.5	Output level dynamic operation	Yes	
4.6	Modulation accuracy		
4.6.1	GMSK Modulation	Yes	
4.6.2	QPSK, 8-PSK, 16-QAM and 32-QAM modulations		
4.6.2.1	RMS EVM	Yes	
4.6.2.2	2 Origin offset suppression	Yes	
4.6.2.3	B Peak EVM	Yes	
4.6.2.4	95th percentile	Yes	
4.7	Intermodulation attenuation	Yes	

*ATT, filters and amplifiers required as necessary

Discover What's Possible™



<u>/inritsu</u>

United States

Anritsu Company 1155 East Collins Blvd., Suite 100, Richardson, TX 75081, U.S.A. Toll Free: 1-800-267-4878 Phone: +1-972-644-1777 Fax: +1-972-671-1877

Canada

Anritsu Electronics Ltd. 700 Silver Seven Road, Suite 120, Kanata, Ontario K2V 1C3, Canada Phone: +1-613-591-2003 Fax: +1-613-591-1006

• Brazil

Anritsu Eletrônica Ltda. Praça Amadeu Amaral, 27 - 1 Andar 01327-010 - Bela Vista - São Paulo - SP - Brazil Phone: +55-11-3283-2511 Fax: +55-11-3288-6940

Mexico

Anritsu Company, S.A. de C.V. Av. Ejército Nacional No. 579 Piso 9, Col. Granada 11520 México, D.F., México Phone: +52-55-1101-2370 Fax: +52-55-5254-3147

United Kingdom

Anritsu EMEA Ltd. 200 Capability Green, Luton, Bedfordshire, LU1 3LU, U.K. Phone: +44-1582-433200 Fax: +44-1582-731303

France

Anritsu S.A. 12 avenue du Québec, Bâtiment Iris 1- Silic 612, 91140 VILLEBON SUR YVETTE, France Phone: +33-1-60-92-15-50 Fax: +33-1-60-46-10-65

Germany

Anritsu GmbH Nemetschek Haus, Konrad-Zuse-Platz 1 81829 München, Germany Phone: +49-89-442308-0 Fax: +49-89-442308-55

Italy Apritsu Su

Anritsu S.r.I. Via Elio Vittorini 129, 00144 Roma, Italy Phone: +39-6-509-9711 Fax: +39-6-502-2425

Sweden Anritsu AB

Borgarfjordsgatan 13A, 164 40 KISTA, Sweden Phone: +46-8-534-707-00 Fax: +46-8-534-707-30

• Finland Anritsu AB Teknobulevardi 3-5, FI-01530 VANTAA, Finland Phone: +358-20-741-8100 Fax: +358-20-741-8111

Denmark
 Anritsu A/S (Service Assurance)
 Anritsu AB (Test & Measurement)
 Kay Fiskers Plads 9, 2300 Copenhagen S, Denmark
 Phone: +45-7211-2200
 Fax: +45-7211-2210

Russia

Anritsu EMEA Ltd. Representation Office in Russia Tverskaya str. 16/2, bld. 1, 7th floor. Russia. 125009. Moscow

Russia, 125009, Moscow Phone: +7-495-363-1694 Fax: +7-495-935-8962

• United Arab Emirates Anritsu EMEA Ltd.

Dubai Liaison Office P O Box 500413 - Dubai Internet City Al Thuraya Building, Tower 1, Suit 701, 7th Floor Dubai, United Arab Emirates Phone: +971-4-3670352 Fax: +971-4-3688460

Singapore Anritsu Pte. Ltd.

Annisu Pte. Lto. 60 Alexandra Terrace, #02-08, The Comtech (Lobby A) Singapore 118502 Phone: +65-6282-2400 Fax: +65-6282-2533

Specifications are subject to change without notice.

India

Anritsu Pte. Ltd. India Branch Office 2nd & 3rd Floor, #837/1, Binnamangla 1st Stage, Indiranagar, 100ft Road, Bangalore - 560038, India Phone: +91-80-4058-1300 Fax: +91-80-4058-1301

• P.R. China (Shanghai)

Anritsu (China) Co., Ltd. Room 1715, Tower A CITY CENTER of Shanghai, No.100 Zunyi Road, Chang Ning District, Shanghai 200051, P.R. China Phone: +86-21-6237-0898 Fax: +86-21-6237-0899

• P.R. China (Hong Kong)

Anritsu Company Ltd. Unit 1006-7, 10/F., Greenfield Tower, Concordia Plaza, No. 1 Science Museum Road, Tsim Sha Tsui East, Kowloon, Hong Kong, P.R. China Phone: +852-2301-4980 Fax: +852-2301-3545

Japan

Anritsu Corporation 8-5, Tamura-cho, Atsugi-shi, Kanagawa, 243-0016 Japan Phone: +81-46-296-1221 Fax: +81-46-296-1238

Korea

Anritsu Corporation, Ltd.

502, 5FL H-Square N B/D, 681 Sampyeong-dong, Bundang-gu, Seongnam-si, Gyeonggi-do, 463-400 Korea Phone: +82-31-696-7750 Fax: +82-31-696-7751

Australia

Anritsu Pty. Ltd. Unit 21/270 Ferntree Gully Road, Notting Hill, Victoria 3168, Australia Phone: +61-3-9558-8177 Fax: +61-3-9558-8255

• Taiwan

Anritsu Company Inc. 7F, No. 316, Sec. 1, NeiHu Rd., Taipei 114, Taiwan Phone: +886-2-8751-1816 Fax: +886-2-8751-1817

