R2660 iDEN[™] Digital Communications System Analyzer



The R2660 Supports iDEN TDMA Radio Systems

Whether you're testing subscriber units or site equipment, the R2660 offers the unique capability to test iDEN systems under actual TDMA operating conditions in either 6:1 or 3:1 format. Comprehensive diagnostic capabilities are provided to facilitate fault isolation and repair. In addition, the unit also provides dedicated screen displays for convenient observation or printout; innovative use of soft keys and windowing; fast reacting autoranging scales with both analog and digital readouts; and signaling encode and decode functions – all built into a versatile, rugged, and compact test unit designed specifically to meet the tough demands of the field service environment.

In iDEN mode, the R2660 provides the following special measurement features:

- Average power meter
- Frequency error meter
- SQE (Signal Quality Estimate)
- BER (Bit Error Rate)

In addition to offering all the standard system features, the R2660 also includes several high performance features for testing more sophisticated systems.

R2660 Standard System Capabilities

iDEN-Specific Test Capabilities

- Supports both 6:1 and 3:1 TDMA format
- Subscriber unit testing in dynamic call simulation mode including vocoder for live voice testing
- Subscriber unit testing in test mode
- Base site transmitter testing under operating conditions
- Base site receiver BER testing

General Diagnostic Features

- Tracking generator
- Cable fault locator
- High stability oscillator
- Enhanced spectrum analyzer with markers
- · Test memory presets



iDEN Subscriber Unit Testing

Feature

Dynamic Call Simulation Mode

Meter: 341 INELEXI Mode: IDEN MOBILE Mon Freq: 828.80758MHz SRE: +15.7 dB Slats:16 Lul:- 07.2 dBm Gen Freq: 865.80758MHz Lul: 7.87 #9	RF Centrel: DUPLEX Carr. 8:1187 Mon Freq:828.83756MHz Diffset: +45.8888 MHz Forwat: iDEM
Call Seq: 102434645454748-9 Ctatual Research Ctate	Mon: 6 48 RNT Gent -838.840m GTN
Loopback: Disable IME1: 8881 88723186 89 8	Rudio Sum: 0.00 U pk Fixed 1kHz: 0.00 U x
Called Party Number : 5551294 Classmurk Information: Rev: 0 Part: 27 dBm	Synth: 0.68 U x Format Sel: TONE A Free: 60000.0 Hz
Mobile Detected Signal Strengtht- 52 dBm	External: 0.00 V x
AVG INITIAL 6:1 3:1 DIS	stop more

Mon Free: 011.61250MHz SOE: +22.3 48 Salatz:16 Lul:+ 22.3 48 Gen Free: 056.61250MHz Lul: 39.26 uV	Carr. 8:6449 Man Freq:011.61250Hiz Offset: +45.6888 Hiz Farmat: iDEN
Call Seq: 10203-005-6 Status: MS Talker	Hon: 28 48 87 1/0 Gen: -075.040m 87 1/0
1MEI: 0001 00141073 02 0	Rudio Sun: 0.00 V pk Flowd 1kHz: 0.00 V x
Classmark Information: Neu: 0 Pwr: 30 dBm	Synth: 0.08 U x Format Sel: TONE A Free: 00000.0 Hz
	External: 0.60 V x
AVG INITIAL 6:1 3:1 DIS HATTMTA REG INTRCNT INTACHT PATCH	stop pore

Description

Test iDEN mobile and portable radio units under actual signaling conditions by simulating the function of the fixed-end system. The radio accesses the control channel, performs initial registration, and is directed to a traffic channel where parametric measurements and voice tests can be performed. This radio-initiated test uses either the phone interconnect or dispatch call modes. While the call is in process, the unit measures the average power and SQE. It also provides simultaneous display of thermometer call status and decoded radio data.

Radio-compatible vocoder in both the generate and receive modes allows actual voice testing.

Benefits

You can now verify basic functionality without using valuable air time for testing. This feature enables you to test in areas that are beyond the range of an actual system while also providing a more comprehensive measurement of radio performance. This ensures successful operation within the specification limits under all conditions.

You can verify radio performance under actual voice conditions, providing you with absolute confidence in overall radio performance.

Moter:127-015220V Mode:10EM MOBILE Mon Freq: 011.61250MHz SQE: 426.4 40 Slots:16 Lvl:- 26.9 40m Gen Freq: 056.61250MHz Lvl: 39.26 uV	RF Contro Carr. 410 Mon Free: Dffset: Format:	449 811.6 +45.8	DUPLEX 258MH2 88 MH2 IDEN
Display: SPECTRUM ANALYZER Dispersion: 28 kHz/div	Hon: 28 - Gen: -87	E.e.ith	# 1/2 # 1/2
SR:HRXHLD H-k:OFF	Rudio Sur Filmed 1kb	12 0. 121 0.	
Input Lui (dBn) -10	Synth: Format Se Free:	e.	TONE A
-38 miller Marine	External		
AF AC DC INT DISPLAY VOLTS VOLTS DIST	EXT S	INFO	more

The R2660 has the ability to exit the dedicated iDEN test screens to use other standard diagnostic capabilities such as spectrum analyzer, meters, etc., while still maintaining an active call. This feature provides you with the capability to diagnose specific problems to facilitate repair.

Test Mode

Errst 0 Bit Trist SINGLE SIG Free Errt- 731	ts: 11000 BER: its: 16 SQE: Hz Input Lui:	0.0000× +39.5 dB - 6.7 dB+	Carr. Mon Fre Offset Mon:1/	1:0885 +45. 6 Farm	662581912 6888 1912
PREVIOUS	ER MERSUREMEN	att.	Mon: 4	8 48 875.84	NF 1/0
1. 16 0.000 2. 16 0.000 3. 16 0.000 4. 16 0.000 6. 16 0.000 6. 16 0.000 7. 16 0.000 9. 16 0.000	xx +38.5 49 xx +41.7 48 xx +38.4 48 xx +38.4 48 xx +34.7 48 xx +32.3 49 xx +35.8 49 xx +35.1 43 xx +48.1 49	- 731 Hz - 731 Hz - 731 Hz - 731 Hz - 731 Hz - 729 Hz - 729 Hz - 727 Hz - 726 Hz	Rudio : Flood : Synth: Forwat Free: OTHF: Code:10 Extern:	Sum: 1kHz: Sel: 888 2345678 511	e.es U pk e.es U > e.es U > TONE a see.e Hz e.es U > syxemsco e.ss U >
AVG BER	BER TABLE		cléar table	stor	nore

With the subscriber radio in test mode, the R2660 provides the capability to measure the performance of the transmitter. The unit measures the following parameters under TDMA modulating conditions: BER, over selectable time intervals; output power, averaged during selectable measurement intervals; frequency; and SQE. Results can be presented in a real-time display or in a table of the eight most recent readings of BER, frequency and SQE. A dedicated screen exists for average power measurements.

With the subscriber radio in test mode, the R2660 generates a BER pattern to test the sensitivity and demodulator performance.

Test mode allows you to perform quantitative testing of the subscriber unit's transmitter under actual TDMA conditions to aid in the diagnosis of problems and ensure proper system performance.

This feature allows you to perform quantitative testing of the radio's receiver under actual TDMA conditions to aid in the diagnosis of problems and ensure proper system performance of the radio.



iDEN Fixed Site Testing

Feature

Description

Base Site Transmitter Testing

tersting Harrister Moderiden Base	RF Control: MONITOR
leasurement Period: 1.44 S	Carr. #: 0//:+45
	Fres: 866.58888Hiz
Input Luli+ 8.2 JBm	Format: IDEN
	Attenuation: 28 dB
	Mon AF In: AF 1/D
(Keypresses will be recognized	Rudio Sun: 0.88 U pk
Complete, Selection of the step key at any fine during the measurement will terminate Future power measurements.)	Fined 1kHz: 0.68 U x
	Synth: 0.00 U x Forwat Sel: DPL Code: 023
	DTHF: 0.88 U × Code:123456789×8#RECD
	External: 0.88 V x
RVG	start more

The R2660 measures average power level, frequency, and SQE under actual operating conditions. A dedicated screen is provided for average power measurements with a selectable averaging interval. SQE provides a quantitative indication of modulation quality.

Benefits

This feature allows you to monitor performance under traffic conditions without powering down the channel. It can also be done with the transmitter in an off-line test mode.

This feature provides quantitative testing under

actual TDMA conditions to aid in the measurement of receiver sensitivity and demodulator

Base Receiver BER Test

Gen Freq: 811.61258/Hz Lul: 1.77 uV Typ Display: EXTERNAL SCOPE Coupling: DC Trisser: 8010 Tris.kul:568(rel.lul) Gen	he: IN 1/6 i hput Lul:-182.8	DEN
Display: EXTERNAL SCOPE Coupling: DC Dut	put Lul1-102.8	12 -
	AF Dut: AF	1/0
Horiz: 58 us/div Position: (*) Rud	tia Sunt 0.00	V pk
Particult Fis	ad 1kHz: 0.00	
19 m0/ diu Sun For	th: 0.00	
Hek: Off		
	123456789×8 #R	eco^
Post (2) Ext	ternal: 0.68	

With the base receiver in its test mode, the R2660 will generate a carrier modulated with a standard bit pattern in order to perform a receiver bit error rate (BER) test. This can test the receiver's sensitivity as well as its demodulator performance.

Specifications

These specifications are in addition to the standard R2600 series For R2600 series specifications, consult brochure #5474-550

performance.

iDEN TESTS		FREQUENCY ERROR	
FORMATS SUPPORTED iDEN 6:1:	Subscriber dynamic call testing in	Monitoring Test mode: Monitoring Live Base Site Radio:	< ±400 Hz < ±1800 Hz
iDEN 3:1: DJSMR: DMCA:	dispatch and interconnect modes; live site monitoring, test mode Subscriber dynamic call testing in interconnect mode Test mode only Test mode only	SOE MEASUREMENT SPECIFICATIONS Resolution: Range: BER Test Mode:	0.1 dB 0 to 99.9 dBm (BER Specifications are for predefined
DYNAMIC CALL TEST MODE:	 Simulates system to test subscriber radios under actual operating condition Tests control channel access, 	Generator BER Floor Gen Port Range:	data sequence. Percentages are averaged over 960 slots). Gen BER <0.01% for levels -19.9 to -10 dBm Gen BER <0.005% for levels -80 to -20 dBm
	 registration and traffic channel access Tests dispatch in 6:1 mode Tests interconnect calls in either 3:1 or 6:1 mode 	RF I/O Port Range: Generator BER Duty Cycle Selection:	Gen BER <0.005% for levels -130 to -70 dBm Subscriber 1/6 Site 1/6, 4/4, 6/6
	 Vocoder provides live voice testing of both transmitter and receiver Access is provided to diagnostic measurement capabilities during live calling conditions 	MONITOR BER MEASUREMENT SPECIFICATIONS Input Duty Cycle Selections:	(for Predefined Data Sequence) Subscriber 1/6
	Supports user specification of PLMN codes	Slot Number Selections:	4, 16, 80, 960
AVERAGE WATTMETER PERFORMANCE		BER Measurement Floor:	.005%
Range: Accuracy: Period Selection	0.5 W to 125 W _{peak} ±15%	Output Ports:	Baseband I & Q output Slot sync output
Kange: Increment:	90 mS to 4.32 mS 90 S		

Model Nomenclature

DESCRIPTION	PART NUMBER
Communications System Analyzer	
w/iDEN Digital Capability	R2660D
Factory installed options:	
IEEE 488.2	RLN4329A
ACCESSORIES SUPPLIED:	
Microphone	HMN1056D
Power Cord	3080397A62
Telescoping Antenna	TSNB
Signal Generator Termination	
(50 ohm)	5880386B73
Oscilloscope Probe	RTL4011A
BNC to N Adapter	5884300A98
DC Power Connector Kit	RPX4097A
Spare RF Fuses	GG6530277C002
R-2660 Operator's Manual	6880309F16
RF Detector Probe	RLN4748A
BNC RF "T"	0982578B01

DESCRIPTION OPTIONAL ACCESSORIES:

Battery Pack Canvas Case Transit Case Transit Case with Wheels RF Detector (50 Ohm Termination) Programming Reference Manual (RS-232 & IEEE)

PART NUMBER

RPN4000A 1580357B77 A001 A002 5880345B96

6880309E55

Service, maintenance and technical support

For support on your General Dynamics test equipment in the U.S. contact: Motorola Test Equipment Service Center, 2216 Galvin Drive, Elgin, Illinois 60123 1-800-323-6967

Service is also available in many areas other than the U.S. Please contact your local General Dynamics distributor or sales representative for the facility nearest you.

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GENERAL DYNAMICS

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