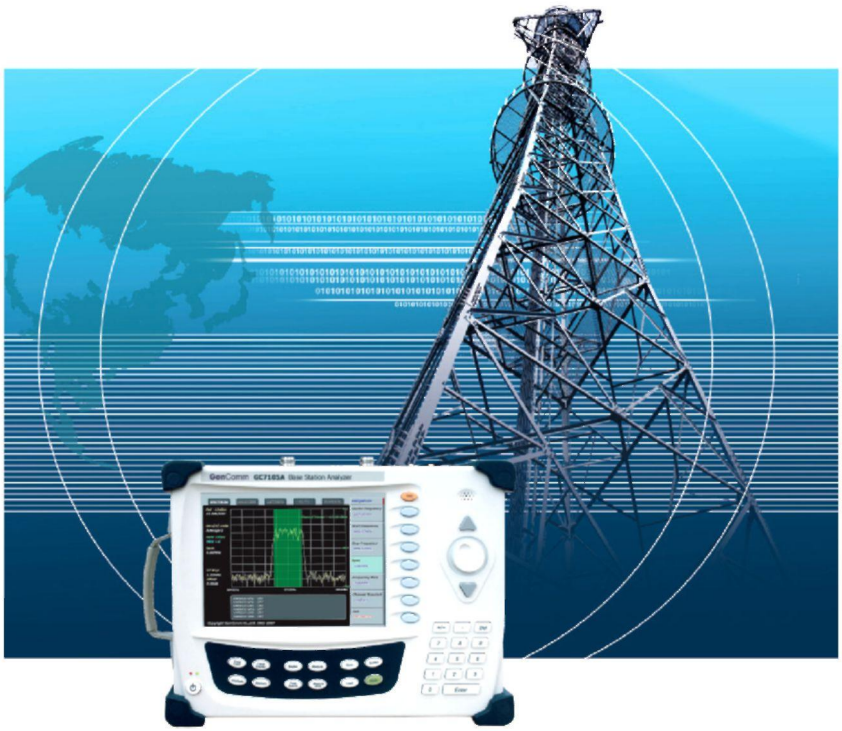
JDSU

COMMUNICATIONS TEST & MEASUREMENT SOLUTIONS

GC7105A
Base Station Analyzer



Key Features

- Spectrum Analyzer
- Transmission Analyzer
- Antenna & Cable Analyzer
- Power Measurement
- E1/T1 Analyzer
- Over the Air Measurements
- Auto-measurement function for quick and easy configuration and measurement

Introduction

The GC7105A is a Base Station Analyzer for installation and maintenance of modern wireless communication systems. It combines the functionality of spectrum analysis, cable and antenna analysis, power meter, and modulation analysis, including:

- CDMA2000/EVDO
- GSM/GPRS/EDGE
- WCDMA/HSDPA

The GC7105A has been designed with a wide bandwidth analysis capability, ensuring the compatibility with future wideband technologies such as Fixed WiMAX and Mobile WiMAX.

The GC7105A is the perfect field testing solution that combines portability, due to its lightweight design and battery extended operation, performance, with its multifunction capability and ease of use with its high resolution display.

In addition, the GC7105A provides an Auto-Measurement test capability which dramatically increases user's productivity.

The GC7105 is the optimal solution for installation and maintenance of wireless communications systems.

GenComm

Features

Multi-function Integration

The Base Station Analyzer has integrated all the necessary functions to test and measure modern wireless communication systems. Its combined functionality includes spectrum analysis, cable and antenna analysis, power meter, channel scanner, E1/T1 analysis and modulation analysis for CDMA2000/EVDO, GSM/GPRS/EDGE and WCDMA/HSDPA.

Easy-to-use User Interface

A common interface through its multiple functions provides the same menu structure that is easy to learn and use. It allows a quick configuration sets for complicated radio systems, making single button actions to change the instrument configuration.

Auto-Measurement and Error Logging

The Auto-Measurement function is used to test mobile systems and store the results to either internal or external memory under specified measurement conditions and schedules. This function is particularly important for effective tracking, monitoring and isolating intermittent problems.

Compact and Lightweight Design

The Base Station Analyzer is compact and portable for users to perform outdoor maintenance jobs. The built-in high capacity Li-Ion battery allows jobs at remote sites without being restricted by power sources.

Easy to upgrade

The GC7105A comes with software activated options, allowing easy upgrades, and enabling users to have new options available at their site. This benefit provides the convenience of configuring the Base Station Analyzer for today's needs and an easy upgrade path for future requirements.

The GC7105A automatically verifies the latest firmware version and performs remote download & upgrade if necessary when it is connected to the network. The user can also easily perform firmware upgrades using a USB memory.

The Complete Solution for BTS maintenance

Spectrum Analyzer

Frequency Range: 100 kHz ~ 3 GHz

TX Analyzer

CDMA2000 1X EV-DO
WCDMA/HSDPA
GSM/GPRS/EDGE

Antenna/Cable Analyzer

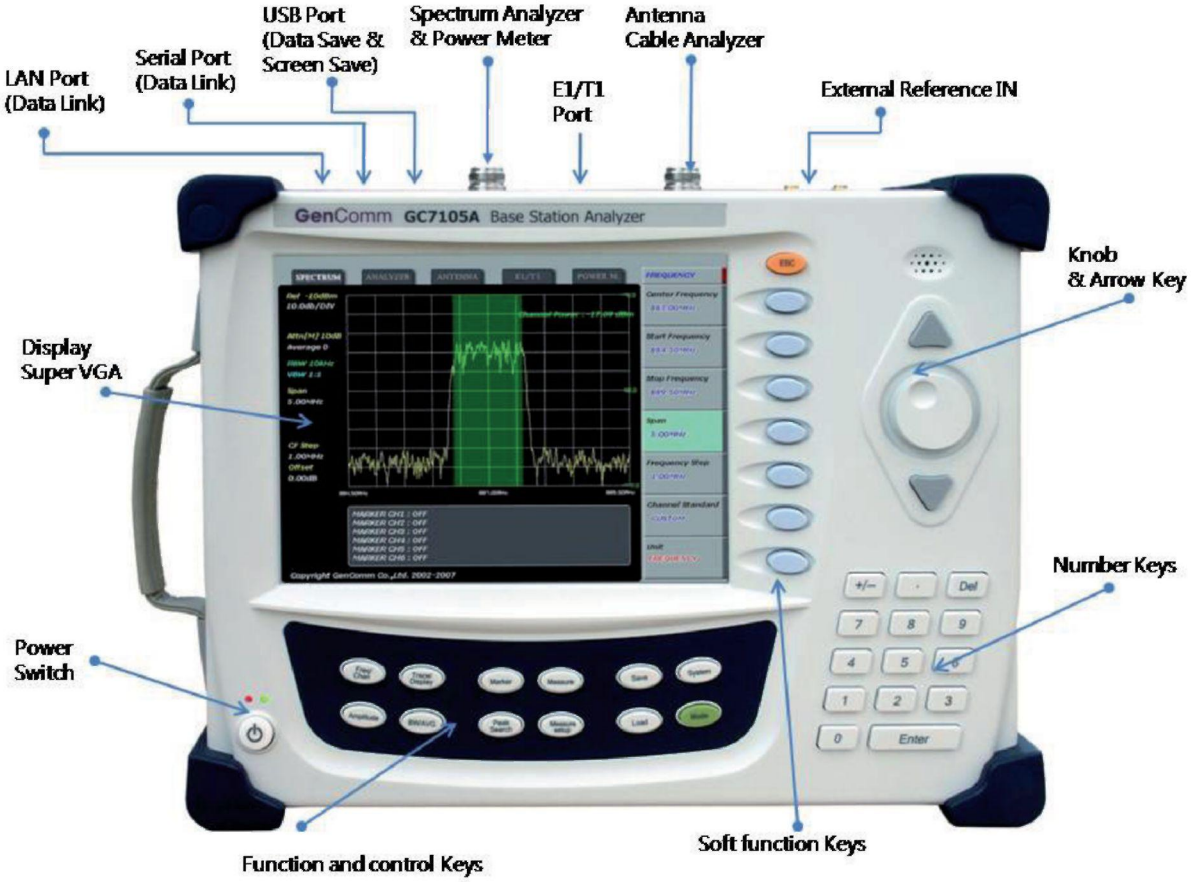
- Cable Loss
- DTF
- VSWR (In Service, Out of Service)

RF Power Meter

Internal and External Power Sensors.

E1/T1 Analyzer

Transmission and Receiving



Main Functions

Spectrum Analyzer

The Base Station Analyzer has a general purposed spectrum analyzer which is the most flexible test tool for RF analysis. Beyond this basic spectrum analysis functionality, a built in RF measurement application provides a one button RF power measurements including:

- Channel Power
- Adjacent Channel Power
- Spectrum Emission Mask
- Occupied Bandwidth

Transmission Analyzer

The modulation measurement suite of the Base Station Analyzer provides not only RF parametric analysis but also modulation parametric analysis of modern wireless communication systems. Built-in wireless standard test procedures allow users to test each of the following items with a single button action.

- CDMA2000 / EVDO Analyzer
  - CDMA Channel Power / Multichannel Power
  - CDMA Adjacent Channel Power
  - CDMA Spectrum Emission Mask
  - CDMA Code Domain Power
  - Frequency Error Time Offset
  - Wave Quality
  - PN Search
- WCDMA/HSDPA Analyzer
  - WCDMA Channel Power
  - Multi-channel Power
  - Adjacent Channel Leakage Power Ration (ACLPR)
  - WCDMA Spurious Emission Mask
  - WCDMA Occupied Bandwidth
  - WCDMA Code Domain Error Vector Magnitude (EVM)
  - Peak Coded Domain Error (PCDE)
  - Auto Scramble Search
- GSM/GPRS/EDGE* Analyzer
  - RMS Phase Error
  - Peak Phase Error
  - Burst Power
  - Frequency Error
  - TSC Code
  - IQ Origin Offset
  - Occupied BW

Over the Air Measurements*

The Base Station Analyzer provides over the air measurements for a quick performance characterization of the base station. This function is especially useful in testing cell sites which are not easily accessible.

Channel Scanner

The Base Station Analyzer has the function of measuring multiple transmitted signals. The Channel Scanner can measure up to 20 channels in GSM, CDMA, or WCDMA networks.

Using existing format-based or custom parameters, the user can easily verify improper multi-channel power levels.

Antenna/Cable Analyzer*

The Base Station Analyzer has the function of an antenna and cable analyzer that measures cable loss, distance to fault (DTF) and voltage standing wave ratio (VSWR). The antenna and cable analysis functionality can characterize active and passive devices such as cables, filters, amplifiers, antennas and multiplexers.

In a one port measurement, users can measure feed-line cable loss, DTF location, and Antenna VSWR. And with a two ports measurements users can measures gain, insertion loss and isolation.

In addition, the Base Station Analyzer can perform non-intrusive VSWR measurements without disrupting service, maximizing airtime and minimizing subscriber's complaints**.

** Non-intrusive VSWR measurements require a bidirectional coupler at the BTS.

Power Meter

The Base Station Analyzer can perform two power testing methodologies:

- Internal, for standard power measurements without the assistance of external power sensors.
- External, for high accuracy power measurements with the assistance of external power sensors.

The internal power meter with no additional power sensors uses the spectrum analyzer functionality. It is a simple test methodology with reasonable accuracy. On the other hand, external power sensors perform power measurements more accurately.

- Power displays in either dBm or Watts.
- Upper/limit can be set during pass/fail measurements.

E1/T1 Analyzer*

The Base Station Analyzer provides a testing solution for E1/T1 transmission lines. Various test modes are available for the user, including:

- Mode: Term, Monitor, Bridge, Loop
- Frame: PCM30, PCM31, Unframed
- Code: AMI, HDB3, B8ZS
- TX Pattern: 1-8, 1-16, ALL0, ALL1, 0101, 2E20
- E1/T1 Pulse Mask
- Alarm, Error Count and Logging

Auto-Measure*

Base Station Systems may present irregular malfunctions which are difficult to isolate. In such cases, the Base Station Analyzer monitors the cell site for a long period of time in order to capture enough measurement data to detect the exact symptoms and isolate the problem.

The Auto-Measure function provides an easily set up for testing, including the programming of measurement schedules such as starting time, duration; intervals and measurement parameters.

Based on the user defined conditions, the Base Station Analyzer performs the tests and automatically stores the results.

*Availability information upon request.

Specifications

Standard	
Frequency Accuracy	± 0.05 ppm Internal
Frequency Aging	± 0.5 ppm/year
Display	8.4"TFT LCD 800 x 600 mode
Frequency and time reference	
Even Second	TTL
10 MHz, 13 MHz,15 MHz	-10 ~ +10 dBm

Spectrum Analyzer	
Input Frequency Range	100 kHz ~ 3 GHz
Maximum Input Level	+30 dBm (1W)
Amplitude Accuracy	± 1.0 dB
Bandwidth Resolution	100 Hz ~ 1 MHz
Dynamic Range	>85 dB
Input Attenuation	0 ~ 55 dB (Step 5 dB)
SSB phase noise	≤ -90 dBc/Hz 30 kHz offset
DANL	<-140 dBm @100Hz RBW, with preamp on
Measurement Range	DANL ~ +30 dBm
Port 1 VSWR	<1.5

CDMA2000 TX Analyzer	
Frequency Error	± 10 Hz + Ref Freq/time accuracy
Waveform quality (p)	± 0.005 for 0.9 < p < 1
Pilot Time Alignment (tau)	± 1 µs
Code Domain Power	± 0.5 dB (Rel.) ± 1.5 dB (Abs.)
Pilot Power	± 1.5 dB (Abs.)
Channel power	± 1 dB

EVDO TX Analyzer	
Frequency Error	± 10Hz+Ref Freq/time accuracy
Waveform quality (p)	± 0.005 for 0.9 < p < 1
Pilot Time Alignment (tau)	± 1 µs
Code Domain Power	± 0.5 dB (Rel.) ± 1.5 dB (Abs.)
Pilot Power	± 1.5 dB (Abs.)

WCDMA/HSDPA TX Analyzer	
EVM Accuracy	± 2.5% (Range: 2%~20%)
Residual EVM	± 2.5% typical
Code Domain Power	± 0.5 dB for code channel power > -25 dBm, TM1, 2, 3
CPICH (dBm) Accuracy	± 1.5 dBm Max
Channel Power	± 0.7 dB typical
Occupied Bandwidth	± 100 kHz
Residual ACLR	< -58 dB @ 5 MHz < -60 dB @ 10 MHz
ACLR Accuracy	± 0.7 dB
Frequency Error	± 10 Hz + Ref Freq/ time accuracy
Scrambling Code	Auto Detection

GSM/GPRS/EDGE TX Analyzer	
Input Dynamic Range	> -40 dBm
GSMK Modulation Quality RMS Phase	± 0.5 deg
Residual Error (GSMK)	0.5 deg
8PSK Modulation Quality EVM	± 1.0%
Residual Error (8PSK)	2.0%
Burst Power	± 1.0 dB
Frequency Error	± 10 Hz + Ref Freq/time accuracy

Power Meter	
Frequency Range	100 kHz ~ 3 GHz
Display Range	± 100 dBm (User settable)
Measurement Range	-70 ~ +30 dBm
Offset Range	0 ~ 60 dB
Accuracy	± 0.7 dB
Maximum Power	1 W

Channel Scanner	
Frequency Range	100 kHz ~ 3 GHz
Frequency Accuracy	± 10 Hz + Ref Freq/time accuracy
Measurement Range	-110 ~ 20 dBm

Cable / Antenna Analyzer	
Frequency Range	40 MHz ~ 3 GHz
Frequency Resolution	100 kHz
Data Point	126,251,501,1001
Cable Loss	
Dynamic Range	0 ~ 30 dB
Resolution	0.01 dB
VSWR	
VSWR Range	1 ~65
Return Loss Range	0 ~ 60 dB
DTF	
Distance	1250m (4125ft)
Horizontal Range	0 to (# of data point -1) x resolution
Resolution	Distance/450 (m/ft) or 1.5x108xVPx Δ xZF
V_p: cable's relative propagation velocity Δ: Stop Freq. – Start Freq. ZF (Zoom Factor) = Setup Dist./Max Dist.	
VSWR Range	1 ~ 65
Return Loss Range	0 ~ 60 dB

T1 Analyzer	
Error Detect Code	BPV, Frame, CRC
Alarm Detection	Red Alarm, Yellow Alarm, AIS Alarm
Receive Level	+6 ~ -36 dB DSX
Electrical Interface	
Connectors Rx, Tx	RJ48C(100 Ω)
Output	0 dB, -7.5 dB, And -15 dB
Line Code	AMI, B8ZS
Impedance	100 or 1000 Ω (Bridge)
Input	
Term / Bridge / Monitor / Loop	0 ~ -20 dB
Transmitter and Receiver	
Framing	D4, ESF
Channel Formats	Full T1
Test Pattern	1-8, 1-16, ALL1, ALL0, 0101, 3E-24, QRSS, 2E-23, 2E-15, 2E-23 inverse, 2E-15 inverse
Additional Functions	
Reference Clock	Received or Internal
Event Log Capability	Internal memory or External USB
Error Insertion	1E-5, 1E-6, 1E-7

Specifications

Error Rate Count	CRC, Frame, Code, Calculated BER
Pulse Mask Checking	
E1 Analyzer	
Error Detect Code	BPV, FAS,CRC-4
Alarm Detect	FAS RAI, MFAS RAI, AIS
Receive Level	+6 ~ -36 dB DSX
Input	
Term / Bridge / Monitor	0 ~ -20 dB
Electrical Interface	
Connectors Rx, Tx	RJ48C (120 Ω)
Output	0 dB, -6dB (ITU-T Rec.G.703)
Line Code	AMI, HDB3
Impedance	Term, Monitor: 120 Ω Bridge > 1,000 Ω
Transmitter and Receiver	
Framing	Unframed,PCM-30 PCM-30 with CRC PCM-31, PCM-31 with CRC
Channel Formats	Full E1/T1
Test Pattern	1-8, 1-16, ALL1, ALL0, 0101, 20ITU
Additional Functions	
Reference Clock	Received or Internal
Event Log Capability	Internal Memory or External USB
Error Insertion	1, 1E-5, 1E-6, and 1E-7
Error Rate Count	CRC, Frame, Code, Calculated BER
Pulse mask checking	
External reference clock	
10,13,15 MHz External Reference	
Input Power	-10 ~ +10 dBm
Connector Type	SMA
Even Second	
Connector Type	SMA
Input level	TTL Compatible

Environmental Condition	
Operating Temperature	-5 ~ +50 °C 23 ~ 122°F
Storage Temperature	-20 ~ +70 °C -4 ~ +158°F
Calibration Cycle	1 year
Dimension	
Weight	5.0 kg (11 lbs) (Include battery)
Size (W x H x D)	315 x 245 x 95 mm 12.4" x 9.6" x 3.7"
General	
Interface Ports	
Serial	1 Port
USB 1.1	1 Port
10 Mbps LAN	1 Port
GPS Antenna (SMA)	1 Port
Built-in Speaker	
Battery (Internal Lithium Ion)	
Nominal Voltage	11.1 V
Nominal Capacity	7200 mA
Minimum Charge Voltage	12.6 V
Battery operation at full charge	1.5 Hours
Power Supply	
AC Input	100~240 V 2.5A, 50~60 Hz

Product specifications and description subject to change without notice.

Ordering Information

GC7105A	Base Station Analyzer incl. Spectrum Analyzer with RF Applications

Standard Accessories

User's Manual
RF Cable (50 cm)
128 MByte USB memory
Li-Ion Battery
Power Cable
DC Car Adapter
Soft carrying case

Optional Accessories

GC7105A004	GPS Receiver incl. Antenna
GC7105A005	E1/T1 Analyzer
GC7105A006	Channel Scanner
GC7105A007	Cable and Antenna Analyzer
GC7105A008	Interference Analyzer
GC7105A010	cdmaOne/cdma2000 Over the Air (OTA)
GC7105A011	WCDMA Over The Air (OTA)
GC7105A020	cdmaOne/cdma2000 Analyzer
GC7105A021	EVDO Analyzer
GC7105A030	WCDMA Analyzer
GC7105A031	HSDPA Analyzer
GC7105A040	GSM/GPRS Analyzer
GC7105A041	EDGE Analyzer
GC72450509	Open-Short-Lead for Calibration