Protocol Test

Racal Instruments Wireless Solutions 6103 AIME
Racal Instruments Wireless Solutions 6103 AIME/CT

2/2.5G Protocol Analysis and Conformance Test Solutions

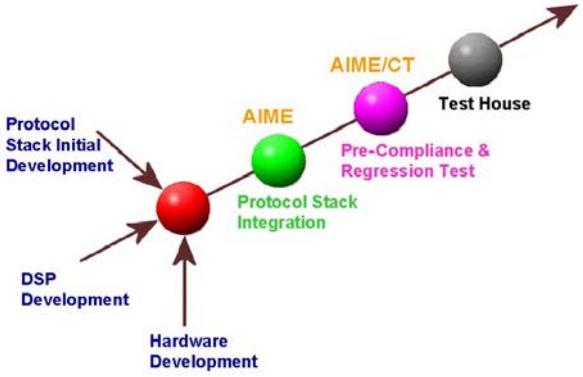
e-LEGACY awards 2007

- GSM, GPRS and EGPRS Protocol Analyzer
- 3GPP Compliant Mobile Conformance Test System
- 3GPP TS51.010 test cases validated by accredited test houses
- Fully automated testing including mobile control
- Fast test case run times
- Quad band capable: 850, 900, 1800 and 1900 MHz
- Modular and flexible design for use in R&D and Conformance applications
- Support for 2G to 3G Intersystem Handover (ISHO) requirements
- Full training and support packages included

Time to market for mobile manufacturers is critical. Sales volumes and profits are far higher for those that bring new products to market fastest. To meet these corporate goals, manufacturers have to reduce the development time for new phones. However, the GSM wireless feature set is constantly evolving and this brings ever-greater complexity to the technical specifications and with it the need for more compliance testing before a new mobile terminal can be launched. The impact of these is to lengthen the development process. To solve this problem, Aeroflex has invested heavily in positioning itself as a leader in protocol R&D and conformance testing and has a proven track record of delivering the most sophisticated solutions ahead of the game. Aeroflex also emphasises the importance of fully testing and debugging its solutions before release so that its customers do not waste time having to do so.

The Racal Instruments Wireless Solutions 6103 AIME and Racal Instruments Wireless Solutions 6103 AIME/CT are Aeroflex's 2/2.5G ProCLAIME family offerings. Using well-proven technology, the platform supports GSM, GPRS and EGPRS in excess of multi-slot class 12 and offers quad RF band coverage within a single test system.

The 6103 AIME is used for initial DSP development and protocol stack R&D and can be upgraded to the 6103 AIME/CT, a fully certified 3GPP Compliant Conformance Test Solution. With GSM, GPRS and EGPRS test cases supplied by setcom wireless products GmbH. Aeroflex 2/2.5G solutions can be easily matched to the development cycle of mobile stations from initial R&D through to market access.



To protect customers' investments in test systems, Aeroflex offers its customers the ability to progressively upgrade from 2/2.5G to Intersystem Handover (ISHO) and 3G testing. In particular, the ability to use the same platform as the basis for ISHO provides customers significant time and cost benefits.

A SINGLE-SOURCED SOLUTION

At the heart of the 6103 AIME and 6103 AIME/CT are one or more 6103G digital radio test sets, designed and used exclusively by Aeroflex. By developing its own hardware and software Aeroflex is able to deliver an optimum design that can be professionally supported without the need to rely on third parties. Total control over the design ensures that as requirements change, the underlying hardware and software can be kept up to date without having to worry about migrating to complete new platforms with the consequent expense of needing to revalidate every test case.

A SCALEABLE AND UPGRADEABLE SOLUTION

Aeroflex understands the importance to its customers of scaleable and upgradeable test systems and the benefits that this brings in terms of spreading expenditure over the development lifecycle and protecting investment made to date. For this reason, the 6103 AIME can be converted quickly and simply to the 6103 AIME/CT with a straightforward software upgrade. So, as users move from R&D to validation, the test equipment can be adapted to meet those changing needs.

PLATFORM AND SOFTWARE ENVIRONMENT

The 6103 AIME and 6103 AIME/CT solutions provide the protocol analysis capability to allow a user to observe the protocol behaviour of a mobile station operating against a simulated 2/2.5G network. The accuracy of the network simulation is achieved within the 6103G digital radio test set and AIME or AIME/CT software by embedding a 3GPP compliant network protocol stack solution at Layers 1 and 2 with a scripted approach for Layers 3 and above. The superior baseband hardware design enables a single test system to support all four major GSM bands: 850, 900, 1800 and 1900 MHz thus reducing the investment needed to cover the major world markets. Scripts and test cases start running within a couple of seconds of pressing the start button as the software does not need to be downloaded into the hardware for every given test case. This dramatically speeds up the time needed to run a given test case or automated sequence of test cases. The baseband design also allows for a fastest implementation of the test case so that test times are reduced.

The 6103 AIME and AIME/CT are designed to address two distinct applications

Research & Development - (6103 AIME)

Conformance Testing - (6103 AIME/CT)

A number of additional software components are available as options to extend the functionality and flexibility of the 6103 AIME and 6103 AIME/CT for these R&D and Conformance Test applications.

AUTOMATION

To save on time and effort, sequences of test cases can be built up as a campaign that are then executed one after another. These campaigns can be a mix of any GPRS and EGPRS test cases licensed on the 6103 AIME/CT. A campaign can be created to run all the test cases desired to validate the implementation of a given feature or be a mix of test cases that are used in a regression test plan. Each test case when executed will produce a separate log and report file.

To fully automate testing, the mobile station under test can be controlled via a serial interface connected to the controlling PC. All the test cases can control the mobile terminal through the serial interface by issuing manufacturer specific calls or AT commands. These calls and commands cover most of the mobile terminal's functionality, such as performing an Attach or PDP context activation without any need for manual intervention.

Automated testing has the benefit of allowing a large number of test cases to be run without an engineer present, for example overnight or over a weekend - making sure that when working against tight timescales, maximum utilization of the test system can be made to reduce or prevent bottlenecks and delays.

MULTI CELL SUPPORT

For more extensive multiple cell emulation able to cover 100% of the GSM, GPRS and EGPRS TS51.010 test cases further 6103G test sets can be added. The flexible system architecture allows system configurations of up to 8 test sets powerful enough to test the most complex network scenarios.

REMOTE CONTROL

The built-in remote control capability provides customers with an extremely effective and flexible way of setting up and controlling complex scenarios from a remote location such as their office or from a site in a different geographical area using the corporate LAN.

RESEARCH & DEVELOPMENT APPLICATIONS

The 6103 AIME system addresses R&D requirements such as integration and interoperability testing. The 6103 AIME is particularly focused on:

- DSP coding scheme development
- State machine debugging
- Protocol stack design
- Feature testing such as EGPRS Attach
- Regression testing

Using a scripting environment based on Visual Basic it is quick and easy to create scripted scenarios from simple looping of traffic frames to aid in DSP development. This allows testing of specific elements of the mobile's state machine, by bringing up the logical and physical channels without protocol exchanges to complex and intensive activities such as PDP context activation or Link Adaptation Control.

A flexible and automated Layer 2 facilitates quick and easy development of complex network scenarios saving on script development and increasing the time available to be spent on core activities such as the actual mobile development.

6103 AIME FEATURES

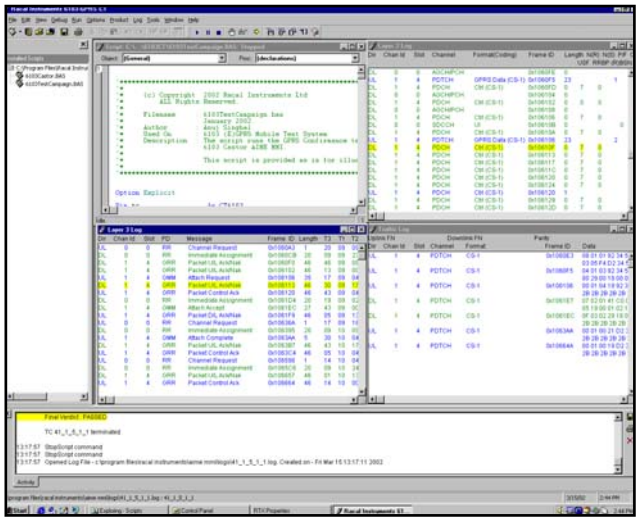
The 6103 AIME software is designed to address applications in R&D and protocol development. The powerful API provides the user a great deal of test flexibility. Examples of testing that can be carried out include:

- Access to each Layer of the protocol structure allowing just Layer 1 test frames to be sent.
- Configuration of RLC/MAC or LAPDm Layer 2 to work in all of the specified modes.
- Ability to define any Layer 3 messages, including invalid messages.

The MMI is designed to be easy to use and provides a number of features designed to support test requirements:

- Real time logging
- Decoding of detailed protocol signaling messages between the mobile and the network as per 04.08
- Filtering capability at Layers 2 and 3 to hide unwanted protocol messages from the MMI displays
- Generation of log files to allow off-line protocol analysis
- Colour coding of information to improve readability
- Ability to synchronize traffic, Layer 2 and Layer 3 frames
- Built-in SAX Basic script environment with colored code types and auto-code complete facility
- COM based API allowing example scripts to be written in any COM based language

A user can configure the 6103 AIME to emulate specific 2/2.5G network configurations and then quickly and easily identify incorrect protocol behaviour within the mobile from detailed information displayed in the Layer 1, 2 and 3 windows.



This is achieved by splitting the 3 lower layers into separate windows able to display the information relative to the characteristic of that layer. For example, with the emphasis on the logical channel and Layer 2 header for the Layer 2 window; or by the Layer 3 message type in the Layer 3 window.

The fourth major window displays the script that is being run. By using different colors for different types of code syntax and variables, script writing is simplified and thereby accelerated.

From pressing the run button, scripts start running in less than two seconds speeding up both script development and the actual testing of a particular mobile. While a script is being executed, the log windows display the information as it is received and sent in real time allowing analysis to take place. The filtering capability allows the user to reduce the amount of protocol shown in any window facilitating fast analysis of the message flow of interest. The filtering does not affect what is stored in the log file so that a user can adjust the filtering after the script has been run and to see the complete message exchange if required or use different filters.

CONFORMANCE TEST APPLICATIONS

The AIME/CT software allows a user to execute validated 3GPP TS51.010 conformance test cases, and accredited test lab approved interoperability system test cases. The 6103 AIME/CT is particularly aimed at the latter stages of the development lifecycle:

- Protocol stack Integration
- Interoperability analysis/problem diagnosis
- Pre-validation confidence testing, to gauge when to go to accreditation labs
- Mobile station validation for accreditation
- Writing customers' own specific protocol conformance test cases to go beyond the minimum level of testing defined in 51.010
- Post-deployment network modeling

TEST CASE PACKAGES

For conformance testing Aeroflex delivers fully compliant ETSI TS51.010 test cases approved by the Global Certification Forum (GCF) and the PCS Type Certification Review Board (PTCRB). setcom wireless products GmbH, based in Munich, Germany is Aeroflex sole supplier of all GSM, GPRS and EGPRS test cases and of the Application Programming Interfaces (S-API). Aeroflex and setcom have been in partnership for 2 years and have enjoyed a rapid delivery to their customers of over 500 validated test cases and were first to market with EGPRS.

Aeroflex supplies validated protocol conformance executable test cases including the source code. The S-API is also exposed to allow the end user to modify the test cases to go beyond the minimum test constraints defined in 3GPP TS51.010. This provides a mechanism for the end user to build up a vast array of variations and manufacturer defined test cases to establish the limits of the mobile stations' performance.

DEVELOPMENT S-API

An intermediate step between the '6103 AIME' and the '6103 AIME/CT with validated 51.010 test cases' is now offered for GSM, GPRS and EGPRS configurations, called the 6103 AIME/CT D-SAPI. The '6103 AIME/CT D-SAPI' is not capable of running the validated 51.010 test cases provided by Aeroflex, however retains the mechanism for the end user to write complex protocol test scenarios using the D-SAPI interface, based on functionality typical of 51.010 tests.

This enables a smoother financial path from a basic R&D configuration through to an approved conformance test system.

It also adds versatility to the 6103 AIME/CT platform meeting non-formal conformance test requirements, at a lower capital investment than a standard conformance test system.

The 6103 AIME/CT D-SAPI comes with a generous selection of example 51.010 test cases demonstrating how to create scripted scenarios free of charge. These examples can also be used as templates to build up a library of specific test cases that are focused to meet the end users implicit requirements, such as being able to support up to 8 different cells.

TEST CASE DEVELOPMENT AND SUBMISSION

Aeroflex invests heavily in the test case development process. The integrity of the test cases is ensured through a rigorous process of testing in house and working with selected leaders in the mobile and protocol development arena. Test cases are chosen for validation based on in-house and partner recommendation. Those test cases are then delivered to accredited test labs for validation. Upon successful validation the test cases are submitted for certification at GCF and PTCRB/PVG.

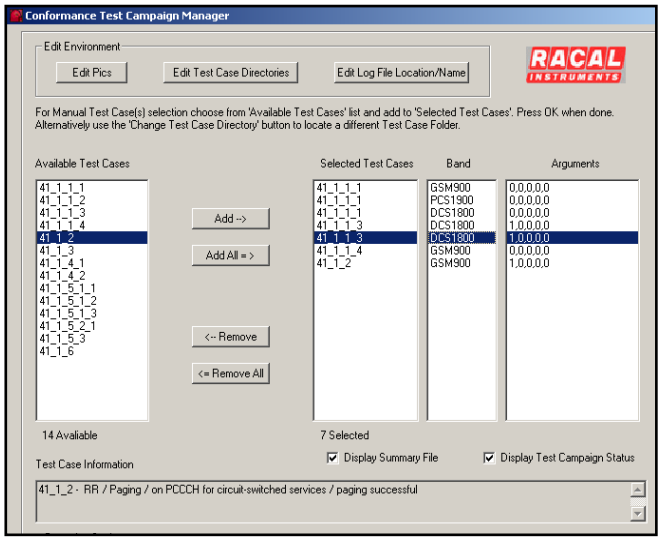
The success of the approach is demonstrated by Aeroflex delivering more test cases in the last year than any other test manufacturer while having the fewest number of de-listed test cases requiring re-validation within both the GCF and PTCRB. Simply put this means designers can spend far more time testing mobiles instead of having to debug test cases. As a result, more time can be spent on core activities with consequently shorter development timescales.

6103 AIME/CT FEATURES

The 6103 AIME/CT is a fully validated test platform listed in the GCF CC and the PTCRB NAPRD documents. With test cases independently validated against a wide selection of mobiles, and listed in the above documents, confidence in the 6103 AIME/CT is assured. To maintain its position at the forefront of 2/2.5G conformance testing and to meet the demands of its customer base, Aeroflex is committed to continuing being first in the roll out of new test cases. Test case rollout is focused by customer demand and the prioritization set out by GCF and PTCRB.

The AIME/CT software allows a user to execute validated 3GPP conformance test cases. In addition to all of the features of the 6103 AIME, the 6103 AIME/CT has the following additional ones:

- Clear display of pertinent information relevant to that test case step by step as per TS51.010
- Ability to create campaigns of test cases
- Ability to Edit PICS and PIXIT files for test cases and/or campaigns
- Separate on-screen windows to show information such as available test cases, system status and generated log files.
- High level summary of the status while the test is being executed listing following the steps listed in TS51.010.
- Dialog boxes that 'pop-up' to prompt the user during test execution when run in manual mode.

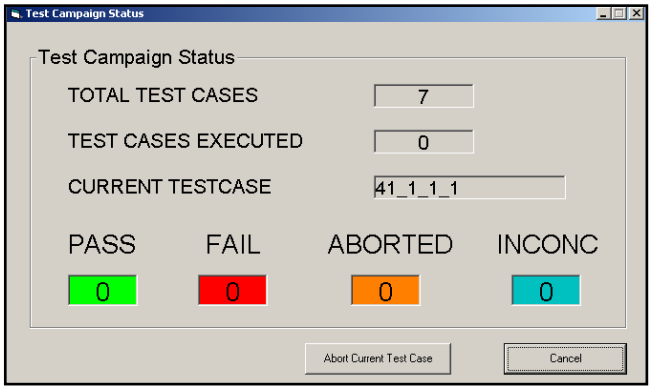


The user selects the appropriate test case or test campaign. The PICS and PIXIT files can be edited for each test case or for a whole campaign - for example to facilitate testing of Release 97 or Release 99 GPRS test case variants or just to change the IMSI to match the test SIM.

FAST AND SIMPLE TO OPERATE

Execution of a test case requires only a single click on the run button or a double click on a test case or campaign from a list. Pop-up prompts then guide the user through the remainder of the process. New test campaigns are easily built by simply clicking on the desired test cases.

On test completion the test case verdict is clearly displayed and a test report file generated. The report file contains summary information of the test conditions and a step by step tracking that matches to the steps of the test case in TS51.010



The log file contains all the protocol flow of the mobile and simulator during a test run. The logs can be saved to a network area for later analysis, or can be e-mailed to a colleague in another department or a test lab for further analysis. This is a powerful way to prove to other members of the project in different geographical regions what interoperability; reliability or conformance failures are being experienced. This data can then be analyzed on their own 6103 AIME and 6103 AIME/CT systems. This allows different regions to carry on working during their day speeding up the time to market.

The MMI can be installed on additional PCs at no extra cost in order to facilitate the analysis of log files allowing the 6103 AIME or 6103 AIME/CT to be used for testing, thereby maximizing the investment and speeding up mobile development.

INTERSYSTEM HANDOVER (ISHO)

To support mobile handover between a GSM/GPRS and a UMTS network, the 6103 AIME/CT can be upgraded to support handover conformance test cases. Aeroflex provides an integrated solution using the 6103 AIME/CT and the Aeroflex 3G solution, the 6401 AIME/CT. The solution leverages the capability of both platforms to deliver all required functionality from the outset.

For further details, please see the ISHO product information.

SUPPORT

Support of the system hardware is an essential element in maximizing efficiency and return on investment of the equipment. Aeroflex offers several comprehensive hardware support packages, which are tailored to typical usage profiles.

The 6103 AIME and 6103 AIME/CT are delivered with a comprehensive worldwide hardware, software and test case support package. Three tiers of support packages are offered to the user: Standard, Silver and Gold. Regardless of the level of support chosen, users have access to a helpdesk facility where any faults or issues can be logged, and are guaranteed to receive a response from Aeroflex within the next working day.

The support also covers issues such as specification tracking and any changes in the 3GPP versions of the standard. To fulfil specific support needs, the user is able to customize any of the support packages.

Further details about support can be found in the support section on the Aeroflex website.

GSM TEST CASE PACKAGES

Below is a list of the available options that can be purchased that execute on the 6103 AIME/CT to validate GSM enabled mobile terminals. For current certification status please refer to the GCF CC Database or the latest version of NAPRD03. The 6103 AIME/CT is listed in the GCF CC Database and in the PTCRB NAPRD03.doc as test platform 11.

All validated test cases are validated to the latest version of 3GPP TS51.010

Please note that the list and number of available test cases is constantly changing due to standards evolution. Please consult your local Aeroflex office for the latest available information.

GSM TEST CASES		
Option	**51.010 TEST CASE SECTION**	
710	11	Verification of support
	19	Channel release after unrecoverable errors
711	20	Cell selection
712	25.2	Test Sequences
713	26.2	Initial tests
	26.5	Handling of unknown, unforeseen, and erroneous protocol data, and of parallel transactions
	26.6	Test of the elementary procedures for radio resource management
714	26.6	Test of the elementary procedures for radio resource management
	26.7	Elementary procedures of mobility management
715	26.8	Tests related to circuit switched call control
	26.9	Structured procedures
	26.10	E-GSM or R-GSM signaling
	26.12	Enhanced Full Rate signaling
716	26.11	Multi-band signaling
717	27	Testing of the SIM/ME interface
718	31.1	Number identification supplementary services
	31.2	Call offering supplementary services
	31.3	Call completion supplementary services
	31.4	Multi-party supplementary services
719	31.6	Charging supplementary services
	31.8	Call restriction supplementary services
	31.9	Handling of undefined (future) GSM supplementary services
	31.10	MMI input for USSD
	31.13	Explicit Call Transfer (ECT)
720	34.2	Short message service point to point
	34.3	Short message service cell broadcast
721	26.6	Test of the elementary procedures for radio resource management
	26.7	Elementary procedures of mobility management
722	26.8	Tests related to circuit switched call control
723	26.14	VGCS and VBS Tests

GPRS TEST CASE PACKAGES

Below is a list of the available options that can be purchased that execute on the 6103 AIME/CT to validate GPRS enabled mobile terminals. For current certification status please refer to the GCF CC Database or the latest version of NAPRD03. The 6103 AIME/CT is listed in the GCF CC Database and in the PTCRB, NAPRD03.doc as test platform 11.

All validated test cases are validated to the latest version of 3GPP TS51.010

Please note that the list and number of available test cases is constantly changing due to standards evolution. Please consult your local RIWS office for the latest available information.

GPRS TEST CASES		
Option		**51.010 TEST CASE SECTION**
611	41.1	RR / Paging
612	41.2	RR procedures on CCCH related to TBF flow establishment
613	41.3	MAC/RLC Release
615	42.1	Test of Medium Access Control (MAC) Procedures on PCCCH in idle mode
618	42.3	Dynamic Allocation in Packet Transfer Mode
619	42.4	Measurement reports and Cell change order procedures
620	42.5	Downlink Transfer
621	43	RLC Test Cases
622	44.2.1	GPRS attach procedure
	44.2.2	GPRS detach procedure
623	44.2.3	Routing area updating procedure
	44.2.4	P-TMSI reallocation
	44.2.7	GMM READY timer handling
624	44.2.5	GPRS authentication and ciphering
	44.2.6	Identification procedure
625	45	Session Management Procedures
626	46.1.2.1	Unacknowledged data transfer
	46.1.2.2	Acknowledged data transfer
627	46.1.2.3	Collision of commands and responses
	46.1.2.4	Unsolicited response frames
	46.1.2.5	FRMR frames
	46.1.2.6	Multiple Connections
	46.1.2.7	XID Negotiation
628	46.2	SNDCP Tests
629	34.4	SMS over GPRS
630	Various	Additions to GPRS at GERAN meeting #13 & 14
631	Various	Additions to GPRS at GERAN meeting #15
632	Various	Network Assisted Test Cases (NACC)
633	Various	NC2 test cases-1
634	41.5	Dual Transfer Mode-1
	42.6	
	44.2	
635	47	Dual Transfer Mode-2
636	20.22	GPRS Cell Selection and Reselection
637	Various	NC2 test cases-2
638	Various	Additions to GPRS at GERAN meeting #20 & 21

EGPRS TEST CASE PACKAGES

Below is a list of the available options that can be purchased that execute on the 6103 AIME/CT to validate EGPRS enabled mobile terminals. For current certification status please refer to the GCF CC Database or the latest version of NAPRD03. The 6103 AIME/CT is listed in the GCF CC Database and in the PTCRB, NAPRD03.doc as test platform 11.

All validated test cases are validated to the latest version of 3GPP TS51.010

Please note that the list and number of available test cases is constantly changing due to standards evolution. Please consult your local RIWS office for the latest available information.

EGPRS TEST CASES		
Option		**51.010 TEST CASE SECTION**
661	51.1	RR / Paging
662	51.2	RR Procedure on CCCH related to TBF Establishment
663	51.3	MAC/RLC Release
665	52.3	Dynamic Allocation in Packet Transfer Mode
666	52.5.5	Downlink Transfer / Re-establishment
	52.6	EGPRS Packet Access for Signalling
667	53	EGPRS Radio Link Control (RLC) Protocol
668	52.1.1	Packet Channel Request
	52.1.2	Packet Uplink/Downlink Assignment
669	Various	Additions to EGPRS at GERAN meeting #13 & 14
670	Various	Additions to EGPRS at GERAN meeting #15
671	Various	Additions to EGPRS at GERAN meeting #20 & 21
672	51.5	EGPRS Dual Transfer Mode
	57.1	Reallocation of CS Resources

A-GPS TEST CASE PACKAGES

Below is a list of the available options that can be purchased that execute on the 6103 AIME/CT to validate A-GPS enabled mobile terminals. For current certification status please refer to the GCF CC Database or the latest version of NAPRD03. The 6103 AIME/CT is listed in the GCF CC Database and in the PTCRB NAPRD03.doc as test platform 11.

All validated test cases are validated to the latest version of 3GPP TS51.010

Please note that the list and number of available test cases is constantly changing due to standards evolution. Please consult your local Aeroflex office for the latest available information.

A-GPS TEST CASES		
Option		**51.010-1 Test Case Section and description**
695	70.7.1.1	LCS Network Induced Emergency Call on an SDCCH / idle, no IMSI for mobiles supporting MS-Based GPS
	70.7.1.2	LCS Network Induced Emergency Call on an SDCCH / idle, no IMSI for mobiles supporting MS-Assisted GPS
	70.7.2.1	Positioning/ RR/ Classmark Interrogation test for mobile supporting MS-Based GPS
	70.7.2.2	Positioning/ RR/ Classmark Interrogation test for mobile supporting MS-Assisted GPS
	70.7.3.1	Network Induced Location Request Emergency Call on an SDCCH for mobiles supporting MS-Based GPS
	70.7.3.2	Network Induced Location Request Emergency Call on an SDCCH for mobiles supporting MS-Assisted GPS
	70.7.4.1	Network Induced Location Request Emergency Call on TCH Radio Channel for Mobiles Supporting MS-Based GPS
	70.7.4.2	Network Induced Location Request Emergency Call on TCH Radio Channel for mobiles supporting MS-Assisted GPS
696	70.8.1	Basic Self Location
	70.8.2	Basic Self Location in Dedicated Mode
	70.8.3	Transfer to 3rd Party
	70.8.4.1	MO-LR Positioning Measurement / Protocol Error
	70.8.4.2.1	Location Error: Requested Method not Supported
	70.8.4.2.2	Location Error: GPS Assistance Data Missing
	70.8.4.3	MO-LR Positioning Measurement / Multiple RRLP Requests with Same Reference Number
	70.8.4.4	MO-LR Positioning Measurement / Multiple RRLP Requests with Different Reference Number
	70.8.4.5	MO-LR Positioning Measurement / RR Management Commands
	70.8.5.1	MO_LR Basic Self Location Request in Idle Mode (Normal Case)
	70.8.5.2	MO_LR Basic Self Location Request in Dedicated Mode (Normal case)
	70.9.1.1	MT-LR Location Notification for Mobiles Supporting MS-Based GPS
	70.9.1.2	MT-LR Location Notification for Mobiles Supporting MS-Assisted GPS
	70.9.2.1	MT-LR Privacy Options/Verification- Location Allowed If No Response for mobiles supporting MS-Based GPS
	70.9.2.2	MT-LR Privacy Options/Verification- Location Allowed If No Response for Mobiles Supporting MS-Assisted GPS
	70.9.3.1	MT-LR Privacy Options/Verification- Location Not Allowed If No Response for Mobiles Supporting MS-Based GPS
	70.9.3.2	MT-LR Privacy Options/Verification- Location Not Allowed If No Response for mobiles supporting MS-Assisted GPS
	70.10.1.1	Network Induced Location Request Emergency Call on an SDCCH for mobiles supporting Conventional GPS
	70.10.2.1	Network Induced Location Request Emergency Call on TCH Radio Channel for Mobiles Supporting Conventional GPS

RADIO FREQUENCY MULTIFUNCTION UNIT (RFMU)

RFMU FEATURES

- Provides interfaces for up to 8 Test Sets to be combined into one RF port
- Provides gain in the synchronization path to ensure reliable synchronization
- Stores calibration data so that the system software can compensate for the RFMU and provide higher accuracy and consistent output level for all 6103G digital radio test sets
- Is controlled through the controlling PC's parrallel port.
- Connects to the AUX RF port of each 6103G, which provides higher output level and sensitivity
- Possible future expansion opportunities to support upto 16 test sets and support for fading simulators

INTRODUCTION

The Racal Instruments Wireless Solutions (RIWS) 6103 AIME/CT is capable of running the vast majority of GPRS and EGPRS test cases as specified in 3GPP TS51.010 with a standard 6103 AIME/CT configuration.

6103 AIME/CT STANDARD CONFIGURATIONS

GPRS Conformance testing = Two 6103G digital radio test sets connected to a controlling PC via GPIB

EGPRS Conformance testing = Three 6103G digital radio test sets connected to a controlling PC via GPIB

The standard 6103 AIME/CT is combined at the RF interface by a passive 3 port combiner. This solution is adequate for two or three test sets. However some of the tests specified in TS51.010 require 3 or more cell emulation, which often require more than three 6103G test sets.

With greater than three 6103G test sets the passive solution is not acceptable, since the passive combiners will worsen signal imbalance between the channels carried on the different test sets. In addition power losses through the combiner components will potentially cause the 6103G test sets not to synchronize.

The RFMU is designed to overcome these problems and represents a significant improvement in performance of for 6103G AIME/CT platform particularly when four or more 6103G test sets are required.

SPECIFICATION

Supports all primary GSM frequency bands, namely 850 MHz, 900 MHz, 1800 MHz and 1900 MHz

Maximum output power on MS port : -42 dBm

Maximum input power on MS port : +36 dBm

External AC supply required : 85-132 V/170-265 V, 47-63 Hz

DIMENSIONS - SAME AS THE 6103G DIGITAL RADIO TEST - 9.3KG

VERSIONS AND ACCESSORIES

ORDERING INFORMATION

ENVIRONMENTAL AND SAFETY

Voltage Range:	85 to 130 V and 180 to 264 V AC
Frequency Range:	47 to 66 Hz
Operating	
Temperature:	10°C to 35°C
Humidity:	Complies with IEC60068
Calibration:	1 year
EMC:	Complies with EN61326-1 :1997+A1 : 1998 , Class A (emissions) , EN61326-1 :1997+A1 : 1998 Table 1 (immunity)
Safety:	Complies with EN61010-1: 1993+A2: 1995

FREQUENCY BAND CONFIGURATIONS

1 = 900 MHz only

2 = 1800 MHz only

3 = 1900 MHz only

6 = 900/1800/1900 MHz - Tri Band

8 = 850 MHz only

9 = 850/900/1800/1900 MHz - Quad Band

Note All 6103G digital radio test sets in a system need to be optioned to support identical RF bands.

GPRS ENABLED 6103 AIME MOBILE PROTOCOL ANALYZER

HARDWARE

1 * 6103G	Digitial Radio Test set
Band Config	See bottom left frequency band configuration chart

CONTROL PC

6103G-93	Controlling PC Workstation

SOFTWARE ENVIRONMENT

6103G-300	GSM AIME Software
6103G-350	GPRS AIME Software

GPRS ENABLED 6103 AIME/CT (D-SAPI)

2 * 6103G	Digital Radio Test set
Band Config	See bottom left frequency band configuration chart

Control PC

6103G-93	Controlling PC Workstation

Software Environment

6103G-300	GSM AIME Software
6103G-350	GPRS AIME Software

Operational Software

6103G-376D	GPRS CT Software
6103G-370D	GPRS CT Software
6103G-609	Example Test Scenarios

EGPRS ENABLED 6103 AIME/CT MOBILE PROTOCOL CONFORMANCE TESTER (3+ CELL SYSTEM)

HARDWARE

3 * 6103G	Digitial Radio Test set
3 * 6103G-15	EDGE functionality enablement
Band Config	See bottom left frequency band configuration chart
1 * 6103G-25	Radio Frequency Multifunction unit (RFMU)

CONTROL PC

6103G-93	Controlling PC Workstation

SOFTWARE ENVIRONMENT

6103G-300	GSM AIME Software
6103G-350	GPRS AIME Software
6103G-351	EGPRS AIME Software

OPERATIONAL SOFTWARE

6103G-376	GSM CT Software (2 cells)
6103G-377	GSM CT Software (3+ cells)
6103G-370	GPRS CT Software (2 cells)
6103G-372	GPRS CT Software (3+ cells)
6103G-371	EGPRS CT Software (2 cells)
6103G-373	EGPRS CT Software (3+ cells)

3GPP TS51.010 CONFORMANCE TEST CASES

6103G- 710- 723	Section 51 - 53 Test cases
6103G- 611- 637	Section 51 - 53 Test cases
6103G- 661- 670	Section 51 - 53 Test cases

Note. Please refer to separate Test Case List above.

ISHO - GSM-UMTS HANDOVER TEST CAPABILITY

Note: Please refer to separate ISHO product information sheet.

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