

8100 Mobile Device Test System

Data Throughput - LTE

User Manual

Spirent

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This manual applies to Data Throughput-LTE Test Packs Version 1.5 or higher.

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1. Introduction

1.1. Overview

This document provides information on the LTE Data Throughput Test Packs. You will become familiar with the Test Pack Suites, Test Cases, and setting up LTE testing scenarios in the *Test Manager* environment by following the step-by-step procedures and test reference documentation.

1.2. Intended Audience

This manual is intended for those who have a working knowledge of wireless communication equipment, and are familiar with the automated testing of mobile devices. It is assumed that the audience is familiar with the *Test Manager* GUI environment. Those who are unfamiliar with the Test Manager should refer to the *Test Manager User Manual* before proceeding further.

1.3. Before You Get Started

Before getting started with this guide, install all software and power up the test system. The controller PC is shipped with the *Test Manager Test Executive* software and *LTE - Data Throughput* Test Packs installed.

1.4. Security Information

The LTE – Data Throughput Test Packs are shipped with the appropriate dongle and software/hardware security passwords configured.

To verify the security information:

 Open Test Manager and select Help>About. The About Test Manager window displays, as shown in Figure 1-1.



Figure 1-1: About Test Manager Window

- 2. Select the **Passwords** tab.
- 3. Under **Installed Features**, confirm the LTE Data Throughput Test Packs are installed, as shown in Figure 1-2.

About Test Manager		x
SPIRENT.	Test Manager (Version 2.1.0 Build 254) Copyright © 2008 - 2009 Spirent Communications Inc. Test Folders Building Blocks Platforms Passwords Installed Features: □ Installed Features □ Installed	
	Add New Password: Password: Add Import [6C3D3AB9 OK Export	

Figure 1-2: About Test Manager Window – Installed Features

Password authentication is a pre-requisite to running any tests supported by these Test Packs. This password is tied to security information provided by the USB hard-lock dongle that comes with the module installation.

For an SVLTE test, confirm the *SVLTE – Data Throughput Test Pack* is installed, as shown in Figure 1-3.

About Test Manager	
	Test Manager (Version 2.2.0 Build 267) Copyright © 2008 - 2009 Spirent Communications Inc.
SPIRENT.	Test Folders Building Blocks Platforms Passwords Installed Features: Password: QCCDTCHIHEEWCY04G0LK TP-DATA-SVLTE-TP1 (MDTTM-DA Update Password Delete Password ASA/Trial Expiration Date: December 2014
	Feature Version: Import Feature Version: Import Add Import Import

Figure 1-3: About Test Manager Window – SVLTE

If Advanced Channel Models is enabled using SR5500M, confirm the *Data Throughput Test Pack 2* is installed, as shown in Figure 1-4.

About Test Manager	×
Test Manager (Version 2.4.0 Build 298) Copyright © 2008 - 2011 Spirent Communication Test Folders Building Blocks Platforms P Installed Features TP-DATA-RET-LTE-TP1 (MDTTM- TP-DATA-SVLTE-TP1 (MDTTM- TP-DATA-LTE-TP1 (MDTTM-DA TP-DATA-LTE-TP1 (MDTTM-DA	Passwords Password: CQZRDZ5BR3UGB0ZWVZHP Delete Password ASA/Trial Expiration Date: June 2014 Feature Version: 1.0
Add New Password: Password:	Hard Lock Serial ID: Add Import 6C3D3AB9

Figure 1-4: About Test Manager Window – Test Pack 2

NOTE: To use the SR5500 for the Advanced Channel Models test, the following minimum options must be purchased:

- AWGN
- Complex Correlation
- MIMO
- GCM

For the Variable Reference Channel feature, confirm the Data Throughput Test Pack 3 is installed and authorized with the corresponding password, as shown in Figure 1-5.

	Test Manager (Version 2.7.0 Build 331) Copyright © 2008 - 2011 Spirent Communicat	ions Inc.	
	Test Folders Building Blocks Platforms	Passwords	
*	Installed Features:		
SPIRENT	talled Features TP-DATA-LTE-TP1 (MDTTM-DATA-LTE-	Password:	
	TP-DATA-LTE-TP2 (MDTTM-DATA-LTE- TP-DATA-LTE-TP3 (MDTTM-TP-DATA-L TD-DATA-SVLTE-TP1 (MDTTM-DATA-S	ASA/Trial Expiration Date:	Delete Password
	x >	Feature Version:	
	Add New Password: Password:	Add Import	Hard Lock Serial ID
	<u> </u>		OK Export.

Figure 1-5: About Test Manager Window – Test Pack 3

If you have any questions or concerns, contact Spirent Technical Support at support.spirent.com, or by phone at 1-800-SPIRENT.

1.5. Accessing Documentation

There are two ways to access this document from the Controller PC:

- 1. Windows Explorer
- 2. Test Manager

1.5.1. Accessing Documentation from Windows Explorer

Access this Manual offline by navigating to C:\Program Files\Spirent Communications\Test Manager\Modules\Data Throughput - LTE\User Manual.pdf" using Windows Explorer, as shown in Figure 1-6.

😂 Data Throughput - LTE					
File Edit View Favorites Tools Help File Edit View Favorites Tools Help Address C:\Program Files\Spirent Communications\Test Manager Size Type Date Modified Folders X Name Size Type Date Modified Image: Common Image: Common Image: Common File File Folders 10/8/2010 2:35 PM Image: Common Image: Common Image: Common Image: Common File File Folder 10/8/2010 2:35 PM Image: Common Image: Common Image: Common Image: Common File Folder 10/8/2010 2:35 PM Image: Common Image: Common Image: Common Image: Common File Folder 10/8/2010 2:35 PM Image: Common Image: Common Image: Common File Folder 10/8/2010 2:35 PM Image: Common Image: Common Image: Common File Folder 10/8/2010 2:35 PM Image: Common Image: Common Image: Common File Fi					
🚱 Back 👻 🕥 - 🏂 🔎 Se	S Back + S + 1 - Search Folders				
Address 🛅 C:\Program Files\Spirent C	ommunications\Test Manager\Modules\Data Thro	ughput - LTE		💌 🄁 Go	
Folders ×	Name 🔺	Size	Туре	Date Modified	
🕂 🧰 Common	Cayout Files		File Folder	10/8/2010 2:35 PM	
	🗀 lib		File Folder	10/8/2010 2:35 PM	
	Cicense Agreement		File Folder	10/8/2010 2:35 PM	
E C Data Throughout - LTE	Configuration Files		File Folder	9/14/2010 2:43 AM	
Lavout Files	CREPORT Templates		File Folder	10/8/2010 2:35 PM	
	🛅 Test Case Parameter Schema Files		File Folder	10/9/2010 4:21 PM	
	🛅 Utility		File Folder	10/8/2010 2:35 PM	
E Configurati	🛛 🚾 Application Layer Data Transfer Stress.seq	30 KB	TestStand Sequenc	10/3/2010 9:52 PM	
Report Templates	🗖 Control Plane Timing.seq	53 KB	TestStand Sequenc	10/3/2010 9:52 PM	
Tect Cace Paramete	🚾 Data Throughput.seq	36 KB	TestStand Sequenc	10/3/2010 9:52 PM	
	🚾 FTP Data Transfer.seq	30 KB	TestStand Sequenc	10/3/2010 9:52 PM	
	🔮 Module.xml	8 KB	XML Document	10/3/2010 9:51 PM	
Back Search Folders Image: C:\Program Files\Spirent Communications\Test Manager\Modules\Data Throughput - LTE Date Modified Folders Size Type Date Modified Date Modified Folders Image: C:\Program Files\Spirent Communications\Test Manager\Modules\Data Throughput - LTE Image: C:\Program Files\Spirent Communications\Test Manager\Modules\Data Transfer Stress.seq File Folder 10/8/2010 2:35 PM Image: Dista Throughput - LTE Image: C:\Program Files\Spirent Communication Files File Folder 10/8/2010 2:35 PM Image: Dista Throughput - LTE Image: C:\Program Files\Spirent Computer Files File Folder 10/8/2010 2:35 PM Image: Dista Throughput - LTE Report Templates File Folder 10/8/2010 2:35 PM File Folder 10/8/2010 2:35 PM Image: Dista Throughput - LTE Report Templates File Folder 10/8/2010 2:35 PM File Folder 10/8/2010 2:35 PM Image: Dista Throughput - LTE Report Templates File Folder 10/8/2010 2:35 PM File Folder 10/8/2010 2:35 PM File Folder					
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Image: Modules File Folder 9/14/2010 2:43 AM Image: Modules Image: Modules File Folder 10/8/2010 2:35 PM Image: Modules Image: Modules File Folder 10/8/2010 2:35 PM Image: Modules Image: Modules File Folder 10/8/2010 2:35 PM Image: Modules Image: Modules File Folder 10/8/2010 2:35 PM Image: Modules Image: Modules File Folder 10/8/2010 2:35 PM Image: Modules Image: Modules File Folder 10/8/2010 9:52 PM Image: Modules Image: Modules Image: Modules 10/3/2010 9:52 PM Image: Modules Image: Modules Image: Modules 10/3/2010 9:52 PM Image: Modules Image: Modules Image: Modules 10/3/2010 9:52 PM Image: Modules Image: Modules Image: Modules 10/3/2010 9:52 PM Image: Modules Image: Modules Image: Modules 10/3/2010 9:52 PM Image: Modules Image: Modules Image: Modules 10/3/2010 9:52 PM Image: Modules Image: Modules Image: Modules 10/3/2010 9:52 PM Image: Modules Image: Modules Image: Modules					
Spirept YML Editor	🛛 🚾 User Plane Latency.seq	41 KB	TestStand Sequenc	10/3/2010 9:52 PM	
	🔁 User Manual.pdf	0 KB	Adobe Acrobat Doc	10/12/2010 1:40 PM	

Figure 1-6: Accessing the Manual from Windows Explorer

1.5.2. Accessing Documentation from Test Manager

Access this Manual from the Test Manager menu by selecting: Help>Modules>Data Throughput - LTE>User Manual.pdf, as shown in Figure 1-7.

ſ	Help	2		
		Test Manager	•	👻 归 SessionsFile1.ses
		Test Folders	•	Data Throughput - LTE 🔸 🔁 User Manual
1		Platforms	•	
		Report Engines		
		About		

Figure 1-7: Accessing the Manual from Test Manager

2. Data Throughput – LTE Description

2.1. Overview

This chapter provides a high-level overview of the key software and hardware components necessary to configure and use the Data Throughput – LTE Test Packs.

2.2. Description

The Data Throughput - LTE Module is an integrated software component that allows you to perform interactive and automated testing of mobility scenarios on a UE device. Support is provided for:

- LTE Bands: 1, 2, 3, 4, 5, 7, 10, 12, 13, 14, 17, 20, 24, 25, and 26.
- LTE Bandwidth: 1.4, 3, 5, 10, 15, and 20.

NOTE: 1.4M, 3M, 15M and 20MHz bandwidths and Band Classes 1, 2, 3, 5, 12, 20, 24, 25, and 26 have not been fully validated.

The Data Throughput - LTE module test cases run with the Test Manager software. This provides an easy way to automate test sessions with analysis and reporting capabilities.

3. Using the Data Throughput – LTE Test Packs

3.1. Overview

This chapter gives information on using Data Throughput – LTE from *Test Manager*. This includes the following steps:

- 1. Configuring the Platform Parameters
- 2. Configuring the UE Parameters
- 3. Configuring the Session Parameters
- 4. Selecting the Parameter Files for Session Execution
- 5. Locating the Test Cases
- 6. Creating a Custom Test Suite
- 7. Configuring Test Case parameters
- 8. Running a Test Suite
- 9. Setting up a New UE with the Data Client

3.2. Configuring the Platform Parameters

3.2.1. Supported Platforms

The Data Throughput – LTE Test Packs support the following platforms:

• 8100-B Series

3.2.2. 8100-B Series Platform Parameters

The parameters for the 8100-B Series platform configure the technologies present in the system, as shown in Figure 3-1. Set the *SR3452 Enabled* parameter to **True** to support CDMA/EV-DO. Set the *SR3420 Enabled* parameter to **True** to support WCDMA/GSM. Set the *E2010S Enabled* parameter to **True** to support LTE.

NOTE: The platform parameters will be correctly configured when the system is delivered. It should not be necessary to modify them.

	Pla	atformFile1.plm	▼ ×		
/	Ξ	1 - Available Instruments			
0		E2010S NE Enabled	True		
-A1		E2010S CE Enabled	False		
10		SR8078 Enabled	False		
0	1	SR3452 #1 Enabled	False		
6		SR3452 #2 Enabled	False		
Ľ.		SR3462 Enabled	False		
Š		SR3420 Enabled	False		
2		SR5500 #1 Enabled	False		
ğ		SR5500 #2 Enabled	False		
8	Ξ	2 - Network Configuration			
		Network Configuration	1 - eNodeB		
<u> </u>	Ξ	3 - Core Network			
ġ	Ŧ	PDN Gateway			
ы С	Ξ	4 - E2010S Broadband W	ireless Test Set		
ŇQ		E2010S IP Address	192.168.0.180		
Ч Ч		Duplex Mode	True		
gler	Ξ	9 - Calibration			
Ă		Calibration Data File Path	C:\Users\Public\Documents\Spirent Communications\Developm		
_		Calibration Wizard	Click here to execute		
Ŧ	Ε	2010S NE Enabled			
	S	pecifies if E2010S Network Emu	ilator is enabled		
-					
•					

Figure 3-1: 8100-B Series Platform Parameters

For SVLTE, set the parameters as shown in Figure 3-2. To support SVLTE, set the SR8078 and SR3452 #1 to **True** if the configuration is 1eNodeB and 1BSC.

	Pla	atformFile1.plm*	▼ ×			
	⊡	1 - Available Instruments				
6		E2010S NE Enabled	True			
-Å1		E2010S CE Enabled	False			
8		SR8078 Enabled	True			
00		SR3452 #1 Enabled	True			
7.		SR3452 #2 Enabled	False			
Ē		SR3462 Enabled	False			
٩ N		SR3420 Enabled	False			
2		SR5500 #1 Enabled	False			
ğ		SR5500 #2 Enabled	False			
8		2 - Network Configuration				
$(\neg$		Network Configuration	1 - eNodeB, 1 - BSC			
승	Ξ	3 - Core Network				
ġ	Ŧ	PDN Gateway				
Ъ.		4 - E2010S Broadband W	ireless Test Set			
No.		E2010S IP Address	192.168.0.180			
臣		Duplex Mode	False			
<u>e</u>		5 - SR8078 Test Configuration Unit				
4		SR8078 IP Address	192.168.0.207			
7		LTE Mode	Dedicated Mode			
يد		CDMA Diversity Enabled	False			
lien		6 - SR3452 CDMA Netwo	k Emulator			
0		SR3452 #1 IP Address	192.168.0.6			
Dat		SR3452 #2 IP Address	192.168.0.26			
ţ		Duplex Mode	True			
pire		9 - Calibration				
U.		Calibration Data File Path	C:\Users\Public\Documents\Spirent Communications\Developm			
		Calibration Wizard	Click here to execute			
	E.	20105 NE Enabled	later in smalled			
	5	DECINES IF EZUTUS INERWORK EMU	iator is enabled			
-						

Figure 3-2 :8100-B Series Platform Parameters for SVLTE

For Advanced/Dynamic Channel Models using SR5500M, set the E2010S CE Enabled and SR5500 #1 Enabled to **True**, as shown in Figure 3-3.

	Pla	tformFile1.plm	▼ ×
	Ξ	1 - Available Instruments	
0		E2010S NE Enabled	True
-Ā		E2010S CE Enabled	True
8		SR8078 Enabled	True
0		SR3452 #1 Enabled	False
7.		SR3452 #2 Enabled	False
Ĕ		SR3462 Enabled	False
Š		SR3420 Enabled	False
2		SR5500 #1 Enabled	True
ğ		SR5500 #2 Enabled	False
8		2 - Network Configuration	
		Network Configuration	1 - eNodeB
승	Ξ	3 - Core Network	
ġ	Ŧ	PDN Gateway	
ы С	Ξ	4 - E2010S Broadband W	ireless Test Set
Š.		E2010S IP Address	192.168.0.180
臣		Duplex Mode	True
glei		5 - SR8078 Test Configur	ation Unit
₹		SR8078 IP Address	192.168.0.207
٢		LTE Mode	Dedicated Mode
يد		CDMA Diversity Enabled	False
liei		8 - SR5500 Wireless Char	nnel Emulator
e e		SR5500 #1 IP Address	192.168.0.7
Dat I		SR5500 #2 IP Address	192.168.0.11
ţ	Ξ	9 - Calibration	
bị,		Calibration Data File Path	C:\Users\Public\Documents\Spirent Communications\Developm
0		Calibration Wizard	Click here to execute
	E.	zurus ne enabled popifies if E2010S Network Emi	lator is enabled
	3	Decilies II E20103 Metwork EIIIt	
-			

Figure 3-3: 8100-B Series Platform Parameters for Advanced/Dynamic Channel Models

NOTE: If SR5500M Enabled is set to **True**, test cases can be run with Advanced/Dynamic Channel Models enabled or disabled without having to change any cables.

If SR5500M is set to **False**, Advanced/Dynamic Channel Model test cases are not supported.

3.3. Configuring the UE Parameters

The level of automation and reliability of the system is heavily dependent on the ability of the system to control the UE. UE parameters are configured to facilitate these activities.

3.3.1. UE Interface Parameters

The UE interface parameters specify how the UE is controlled during test case execution. The options for the *UE Control Method* are:

- Manual: The system prompts the operator to perform actions on the UE.
- AT: The system issues the specified AT commands to control the UE.
- **Custom**: (Advanced) Allows custom UE control. If **Custom** is selected, the UE Control Sequence File parameter specifies the Control Sequence file used by the system.

The ability of the system to return the UE to a known state before execution of a test case is important. If the UE supports a reliable reset command, set the *Reset for Ensure Idle* parameter to **True**.

	UEFile1.u	9		→ ×
/	🗆 Misc			
ß	UE Co	ntrol Method	AT	-
ilitie	UE Re	set Method	AT	
de de				
С М				
Щ				
-	, 			
e l				
fac				
iter				
L L				
5	UE Con	trol Method		
	Specifie:	s how to control the	UE under test.	
_				
•				

Figure 3-4: UE Parameters Window – UE Interface Parameters

NOTE: In cases where the UE Control Method is set to anything other than Manual, the Manual method will be attempted as a fallback if a command fails or is not provided.

3.3.2. UE Manual Interface Parameters

If the UE Control Method parameter under the UE Interface tab is set to "Manual", if a command fails, or is not provided by the selected UE Control Method, the parameters of the UE Manual Interface are used. In this case, a window displays prompting you to perform the necessary action on the UE.

- Timeout Parameters: Specifies how long the system waits before automatically selecting the defined Timeout Button. The timeout value is selected from a dropdown box providing a range from "Disabled" to "Indefinite." A value of "Disabled" indicates no user prompt will be displayed and testing will proceed as if the UE control was completed successfully. A value of "Indefinite" indicates the function will wait indefinitely. Note that even if Manual control is not selected, it may be used in case of failure. If the timeout value is set to "Indefinite", the system will wait indefinitely, which may not be desirable.
- **Timeout Button Parameters**: If a timeout other than "Disabled" or "Indefinite" is specified, these parameters specify if the OK or Cancel button is selected when the timeout expires.

	UEFile1.ue • ×					
🗆 1 - Timeout						
ω		Connect	Disabled			
ß		Disconnect	Disabled			
<u>S</u>		Ensure Idle	Disabled			
ert		Originate Voice Call	15 seconds 🗾 💌			
I _I S		Answer Voice Call	15 seconds			
Ļ		End Voice Call	Disabled			
(₊		Reset	15 seconds			
ien.		Clear MRU Table	Disabled			
Ū		Write MRU Table	Disabled			
ate		Enable IMS Client	15 seconds			
뉟		Disable IMS Client	15 seconds			
Dire		Send SMS	Disabled			
ମ		Attach To Internet PDN	15 seconds			
╘		Detach From Internet PDN	Disabled			
ω		Attach To IMS PDN	Disabled			
fa		Detach From IMS PDN	Disabled			
l fe	Ξ	2 - Timeout Button				
		Originate Voice Call	ОК			
≷		Answer Voice Call	ОК			
5		Reset	ОК			
<u> </u>		Enable IMS Client	ОК			
		Disable IMS Client	ОК			
		Attach To Internet PDN	OK			
	C)riginato Voico Call				
₹		Inginate voice can Inacifies how long the system weits hefe	re automatically calecting the			
-	Ы	efined Timeout Button	ine datematically selecting the			
•	ľ	onned finleout button.				

Figure 3-5: UE Parameters Window – UE Manual Interface Parameters

Configuring these parameters correctly can be effective in allowing some level of automation; even if AT commands are not available or supported for the UE under Test.

For example, if the UE can be configured to auto-answer an incoming call, you can set the timeout for *Answer Voice Call*. This allows the UE time to auto-answer the call, and the **Timeout Button** for *Answer Voice Call* can be set to **OK**. This configuration allows the device to reliably answer network-initiated voice calls.

3.3.3. UE AT Interface Parameters

If the UE reliably supports AT commands, AT control can be very useful. The UE is connected to the Data Client PC for AT control after the manufacturer's driver software is installed.

The following parameters are provided:

- **Client IP Address:** Set this parameter to the IP address of the Data Client PC. NOTE: The default address 192.168.0.61 should not be changed.
- Primary COM Port Settings/Secondary COM Port Settings: These parameters configure the standard serial port parameters. Two COM ports can be used for different commands. For example, if two UE are used to test SVLTE, one COM port for LTE UE and another for 1xRTT UE.

NOTE: The Data Throughput– LTE; Test Packs only make use of the Primary COM Port. The Data Throughput – SVLTE; Test Packs make use of two COM Ports.

- **Port** Set this parameter to the port on the Data Client PC assigned to the modem when the UE is connected.
- Bits Per Second Configure the baud rate.
- **Data Bits** Configure the number of data bits.
- **Parity** Configure the parity.
- Stop Bits Configure the stop bits.
- Flow Control Configure the flow control.
- Enable DTR Enables Data Terminal Ready Signaling.
- Enable RTS Enables Request To Send Signaling.
- **New Line** Specifies the new line terminator to use.
- **Commands** Configure the available AT command strings.
- **Test AT Commands** Use this wizard to test AT commands to check if the UE responds correctly and reliably before testing.

	UEFile1.ue × ×				
		1 - UE AT Interface			
~		Client IP Address	192.168.0.61		
đ	Ξ	Primary COM Port Settings			
ത		Port	COM7		
Ver		Bits Per Second	19200		
P0		Data Bits	8		
at I		Parity	None		
٩ <u>i</u>		Stop Bits	1		
⊲		Flow Control	None		
\succ		Enable DTR	False		
8		Enable RTS	False		
Ê		New Line	\r\n		
g	Ð	Secondary COM Port Settings	1		
er 1		Secondary COM Port Settings[1]			
Ĕ		Port[1]	COM76		
5		Bits Per Second[1]	19200		
τĿ		Data Bits[1]	8		
<u>lei</u>		Parity[1]	None		
U U U		Stop Bits[1]	1		
Dat		Flow Control[1]	None		
ť		Enable DTR[1]	False		
ire		Enable RTS[1]	False		
ന്		New Line[1]	\r\n		
<u> </u>	Ξ	Commands	8		
		🗆 Commands[1]			
		Port Tvpe[1]	Primary Port		
₹	F	rimary COM Port Settings			
*	F	rimary COM Port Settings to be use by t	ne Client PC to connect to the UE.		
-					

Figure 3-6: UE Parameters Window — UE AT Interface Port Parameters

	UEFile1.ue • X					
	Ξ	1 - UE AT Interface				
[_		Client IP Address	192.168.0.61			
g	Ð	Primary COM Port Settings				
ທີ	Ð	Secondary COM Port Settings	1			
je	Ξ	Commands	8			
ð.		□ Commands[1]				
ut I		Port Type[1]	Primary Port			
gi e		Name[1]	Reset			
∢		AT String[1]	AT%LCRST			
5		□ Commands[2]				
ģ		Port Type[2]	Primary Port			
ĕ		Name[2]	AttachToInternetPDN			
j.		AT String[2]	AT%LCATT=0,0,1			
ert		🗆 Commands[3]				
I _I s		Port Type[3]	Primary Port			
Ļ		Name[3]	DisableIMSClient			
L .		AT String[3]	AT%LCIMSSETCFG=0,0			
iei		🗆 Commands[4]				
		Port Type[4]	Primary Port			
ate		Name[4]	DetachFromInternetPDN			
뉟		AT String[4]	AT%LCATT=1,1,1			
je l		🗆 Commands[5]				
ស		Port Type[5]	Primary Port			
4		Name[5]	EnableIMSClient			
8		AT String[5]	AT%LCIMSSETCFG=0,1			
fa		🗆 Commands[6]				
ter		Port Type[6]	Secondary Port - 1			
E		Name[6]	OriginateVoiceCall			
Ā		AT String[6]	AT+CDV10000			
≝		🗆 Commands[7]				
\succ		Port Type[7]	Secondary Port - 1			
ŝ		Name[7]	AnswerVoiceCall			
ii:		AT String[7]	ATA			
문		🗆 Commands[8]				
Ū		Port Type[8]	Secondary Port - 1			
빙		Name[8]	EndVoiceCall			
		AT String[8]	ATHO			
		Test AT Commands	Click here to test the AT commands			
_	0	Commands				
	T	The list of AT Commands supported by the	e UE.			
•						

Figure 3-7: Parameters Window – UE AT Interface AT Command Parameters

NOTE: There is great variability in the AT commands supported by UE vendors and how reliably they work. Experimentation may be necessary to determine the best settings.

	SuiteFile1.sui* EMM Connection M	anagement Scenarios.sui	uicc.ue	• x
	1 - UE AT Interface			
ί.	Client IP Address		192.168.0.61	
	🗄 Primary COM Port Settings			
-S	E Secondary COM Port Settings		1	
wer	E Commands		5	-
t Po	Test AT Commands		Click here to test the AT comma	nds
len l				
Ă		Test AT Commands		
99				
n Los		Commands: Reset		✓
ertio		Ports: COM7		~
IIS		AT String: AT%LCB	ST	
lient		Test		
ţ		Response:		
t Da		Waiting for UE to reset.		
iren		Checking for availability	of COM Port: COM7	
3	j	Successibility confinenced	Dack to the OE	
٢.				
ace	1	1		
erf	1			
Ē				
P1				
3	;			
		1		
	Tota AT Comments			
₹	Test AT Lommands			
-				
-	·			

Figure 3-8: UE Parameters Window – Test UE AT Commands

3.3.4. Spirent Data Client Parameters

The *Spirent Data Client Parameters* tab, shown in Figure 3-9, allows you to configure some UE parameters relative to the Spirent Data Client.

	VEFile1.ue						
\wedge	Ξ	1 - General					
~		Connection Mode	Network Interface Card				
d		Connection Verification Type	Ping				
ഗ		MTU Size	1500				
ver	Ξ	2 - Network Interface Card					
PO		Interface Identification Method	Device Interface Name				
art		Device Interface Name	LGE F1 USB NDIS				
di b	Ξ	5 - Shell Commands					
ચ		Pre Registration					
		Command String	C:\UE Automation\LG_UE_Restart.exe				
S		Timeout	60				
2	Ξ	Pre Call					
tion		Command String	C:\UE Automation\LG_CM_LaunchAndConnectexe				
Sert		Timeout	60				
Ĩ		Post Call					
_		Command String	C:\UE Automation\LG_CM_DisconnectAndClose.exe				
		Timeout	60				
	Ξ	6 - FTP Options					
		FTP Mode	Active				
₹	C	connection Mode					
*	Specifies how the UE sets up the data connection.						

← Valid values: Dial-up Networking (Modem), Network Interface Card (NIC), Internet Connectio...

Figure 3-9: UE Parameters Window --- Spirent Data Client

The following parameters are provided:

- **Connection Mode**: Specifies how the UE sets up the data connection. There are currently four modes supported: Dial-up Networking, Network Interface Card, Internet Connection Sharing, and Wi-Fi.
- **Connection Verification Type**: Specifies how to verify the establishment of the connection when the connection mode is Network Interface Card, Internet Connection Sharing, and Wi-Fi.
- **MTU Size**: Specifies the MTU Size of the UE under test in bytes.
- Interface Identification Method: Specifies the method the Spirent Data Client uses to identify the UE Network Interface on the Client Laptop.
- **Device Interface Name:** Specifies the device interface name in the route table. This name can be obtained by typing "route print" in the Command Prompt on the Client Laptop when the UE is connected.

NOTE: The Device Interface Name has to be exactly the same as indicated on the client laptop, including any spaces.

- Shell Commands: Specifies certain shell commands if an AT command is not used. These shell commands can be executed on the Client Laptop before registration, before setting up data call and after ending a data call. If the shell command is empty, nothing will be executed.
- **FTP Options**: Specifies how the Spirent Data Client initiates the FTP data connection.

3.3.5. UE Capability Parameters

UE Capability parameters configure the security and authentication settings for the UE as shown in Figure 3-10. These parameters also include configuring the PDN number and properties, as shown in Figure 3-11.

The following parameters are provided for security and authentication settings:

- AS Security: AS Security settings
- NAS Security: NAS Security settings
- NAS Authentication: NAS Authentication settings
- HSS Settings: HSS Settings

	UE	File1.ue	• X			
	🗉 1 - Common					
ιų		RX Diversity	Disabled			
lier		Registration Procedure	Automatic			
U U U		Registration Domain	Any			
Dat	Ξ	2 - Measurement Capability				
ť	Ξ	Measurement Capability FDD	1			
Dire		Measurement Capability FDD[1]				
ம்		Radio Frequency Band FDD[1]	1			
7		Compressed Mode Radio Frequency Band[1]	1			
ø		Requires DL Compressed Mode[1]	True			
l fa		Requires UL Compressed Mode[1]	True			
E	Ð	Measurement Capability GSM	1			
Ē	Ξ	3 - GSM/GPRS				
A E		Network Detach Enabled	True			
2	Ð	4 - LTE				
7	Ξ	Security Information				
es.		🗉 AS Security				
H		AS Security Enabled	True			
a de		AS Ciphering Algorithm	Null			
l a		AS Integrity Algorithm	Snow3G			
Ē		NAS Security				
Ļ		NAS Security Enabled	True			
a l		NAS Ciphering Algorithm	Null			
fa		NAS Integrity Algorithm	Snow3G			
let		NAS Authentication				
		NAS Authentication Enabled	True			
		NAS Authentication Algorithm	MileNage			
	1	HSS Settings				
e		Authentication Management Field	0x8000			
rfa		Operator Variant	0x5F1D289C5D354D0A140C2548F5F3E3BA			
t a		RAND	0xAA55AA55AA55AA55AA55AA55AA55AA55AA50			
all		Secret Key	0x465B5CE8B199B49FAA5F0A2EE238A6BC			
anu		Sequence Number	0x00000000020			
Ž	Ξ	5 - CDMA				
5	E	eHRPD				
<u> </u>	E	1X/HRPD				
	Ľ	6 - Packet Data				
Ŧ	4	- LTE				
-						

Figure 3-10: UE Parameters Window – Security and Authentication Parameters

The following parameters are provided for configuring PDN number and PDN properties:

- **PDNs:** Parameters for supported PDNs.
- **PDN** [N]: Specifies valid PDN settings.
- IP Address Type: Specifies the type of IP address the UE will request. Valid Values: IPv4, IPv6, IPv4v6.
- **APN**: Specifies the Access Point Name (APN) the UE will communicate with.
- Services: Parameters for mapping services to PDNs.
- Service [N]: Parameters for mapping the service to the PDN.
- **Service**: Specifies the service. Valid Values: Administrative, Application, IMS, and Internet.
- **PDN**: Specifies the PDN that carries this service.

	UEFile1.ue*				
	Θ	1 - Common			
S S		RX Diversity	Disabled		
Ľ I		Registration Procedure	Automatic		
<u> </u>		Registration Domain	Any		
i ti		2 - Measurement Capability			
Ľ,	Ð	Measurement Capability FDD	1		
5	Ð	Measurement Capability GSM	1		
يد ا		3 - GSM/GPRS			
e.		Network Detach Enabled	True		
		4 - LTE			
g	Ð	Security Information			
뉟		5 - CDMA			
j.	Ð	eHRPD			
5	Ð	1X/HRPD			
\succ	Θ	6 - Packet Data			
8		PDSN IP Mode	Simple IP Only		
L P		PDNs	1		
E E		PDN[1]			
ΙĘ		IP Address Type	IPv4		
ι Ψ		APN	spirent.com		
Ľ	'⊡	Services	1		
6		Service[1]			
E:		Service	Internet		
ļ,		PDN	1		

Figure 3-11: UE Parameters Window – UE Capability Parameters for PDN

NOTE: There is great variability in the AT commands supported by UE vendors and how reliably they work. Experimentation may be necessary to determine the best settings.

3.4. Configuring the Session Parameters

3.4.1. Session Control Parameters

Session Parameters control the execution of the session as shown in Figure 3-12.

- **Rerunning Test Cases:** These parameters control the automatic rerunning of test cases that end with a final result of "Incomplete" or "Failed".
- **Rerunning Test Case Iterations:** These parameters control the behavior of iteration-based test cases.

NOTE: Because Data Throughput – LTE test packs are not iteration-based; these parameters are not used.

• **Reset UE between Test Cases:** Resetting the UE between test cases can improve system performance and stability in some cases.

NOTE: The Data Throughput – LTE test packs automatically reset the UE at various points during the test; it is not necessary to set this parameter to "True".

/	Se	ssionFile1.ses*		▼ ×
/		1 - Error Handlin	g	
ō		Rerunning Test Cas	es	
Contr		Rerun Incomplete	e Test Cases	True
		Rerun Failed Tes	st Cases	False
5		Test Case Rerun	i Count	1
15		Test Case Duration	ion Limit	300
ശ്	Ð	Rerunning Test Cas	e Iterations	
	Ξ	2 - Session Beha	avior Between Te	est Cases
		Reset UE between	Test Cases	False
•		- Error Handling		

Figure 3-12: Session Parameters

3.4.2. eAirAccess Parameters

eAirAccess parameters control the execution of eAA, as shown in Figure 3-13.

• LTE L1/L2 Logging Enabled: This parameter enables or disables logging of eAirAccess L1/L2 messages.

\mathbb{Z}	SessionsFile1.ses			•	×
	🗉 1 - Loqqinq O	ptions			
es.	LTE L1/L2 Logg	ing Enabled	False		
Ac					
eAii					
					_
₹	LTE L1/L2 Logg	ing Enabled			
•	Enables or disable	s logging of e	AirAccess L1/L2 debug messages		
•					

Figure 3-13: eAirAccess parameters

3.5. Selecting the Parameter Files for Session Execution

As indicated in the *Test Manager User Manual*, you cannot run a suite successfully unless it undergoes validation using the specified Platform, Session and UE Parameter files.

In the *Execute Session* window, select the **Session File**, the **UE File**, and the **Platform File**. After the Platform File is selected, select the **Platform** as shown in Figure 3-14.

Execute Session	Đ
Tester Name:	Tester 1
UE Manufacturer: UE Model:	Model X
Results Folder Selection:	C:\Program Files\Sp\SessionsFile1.ses C:\Program Files\Spirent C\UEFile1.ue C:\Program Files\Spirent PlatformFile1.plm 8100-B Series
Perform Validation Verify the settings are correct for a test case.	each Test Connectivity Test the instrument connections for each test case.
* Indicates Required Field	<u> </u>

Figure 3-14: Selecting Parameter Files for Data Throughput – LTE Module

3.6. Locating the Test Suites and Test Cases

3.6.1. Locating Pre-defined Module Test Suites

- 1. In the Test Manager, select the **Suite Files** tab in the File Cabinet and open the **Suite Files** folder tree.
- 2. Open the LTE Data Throughput folder tree.
 - All of the pre-defined Suites available for Data Throughput Testing display, as shown in Figure 3-15.



Figure 3-15: Locating Data Throughput - LTE Module Pre-defined Suites

3.6.2. Locating Module Test Cases

- 1. In the Test Manager, select the **Test Folders** tab in from the file Cabinet.
- 2. Open the Test Folders folder.
- Open the LTE>Data Throughput subfolder. This folder contains the Data Throughput – LTE Test Cases, as shown in Figure 3-16.



Figure 3-16: Data Throughput – LTE Test Cases

3.7. Creating a Custom Test Suite

To set up a custom Data Throughput – LTE test, you must create a Test Suite.

To create a Test Suite:

1. In the Test Manager Menu, select File>New>Suite File, as shown in Figure 3-17.

File	Edit	View	Execute	Rep	ort	Help	
	New			•	۴	Suite File	
Ē 💕	Open			•	2	UE File	
	Close					Session File	
	Close All				<u>8</u>	Platform File	
	UE File S Session F Platform Results F Options.	election File Sele File Sele Path Sel	 ction ection		ughpu ughp ihrou irougi ig y	ut uut ghput Stress hput	
	Save Save As.		Ctrl+9	5			
1	Save All	(Itrl+Shift+S	5			
Ч	Exit		Alt+F4	ł			
					2		

Figure 3-17: Creating a New Suite

2. You can also use the toolbar shortcuts available to create a new file, as shown in Figure 3-18.



Figure 3-18: Creating a Suite File using the Toolbar Shortcut

- 3. A new *Test Suite* window opens with a default file name. This window allows you to sequence and arrange the tests.
- 4. To add a test from the Data Throughput LTE test packs, drag the desired test from the **Module Files** tab of the File Cabinet on the left and move it over to your **Suite File** on the right, as shown in Figure 3-19 and Figure 3-20.

🗰 Test Manager	
File Edit View Execute Report Help	
🗋 🕶 🚰 🛃 🎒 🐰 🖻 🏙 🕨 🗉 🔳 - 🚊 UEFile1.u	ie 🔹 灯 SessionsFile1.ses
File Cabinet 7 ×	SuitesFile1.sui
E Jest Folders	Type Test Folder/Suite Test Class Description
🖉 🗇 🚰 LIE	
월 FTP Transfer Throughput	
の UDP Transfer Throughput	 Dragging a Test Case
Application Layer I nroughput Stress	
Control Plane Timing	
ビー In Rein Control Co	
· ·	

Figure 3-19: Transferring a Test Case into a Suite



Figure 3-20: Successfully Transferred Test Case

- 5. Configure the parameters for each Test Case based on your testing needs. Refer to Section 3.6 and Chapter 4 for additional information on configuring Test Case Parameters.
- 6. When you have completed adding and sequencing the test cases, save the **Suite** file. The custom suite file displays in the file cabinet, as shown in Figure 3-21.

TM	M Test Manager										
Fi	e Edit	View	Execute	R	.eport	Help					
- 🗋	📂 🛃 🕻	101	K B B		- 11 1	🕞 👔 UEFile 1	.ue			🔹 約 SessionsFile 1. ses	• @ •
File	Cabinet		4 ×		SuiteFi	le1.sui					▼ ×
	🖃 🚞 Suite	es		ŀ	Type	Test Folder/S	Test Class	Descript	Т	est Case Parameters	
ัธ	🗆 🖻 🦈 S	uiteFile1				Data Throug	LIDP Transfe	Transm	E	1 - General	
륟		i) Transr	nit diver			Data miloag.		. manoni		Description	Transmit diversity with low SNR - IPv6
:픹					_				E	2 - Network Configuration	
ത്					_					Configuration File Path	C:\Program Files\Spirent Communications\Test
									Œ	PDN Gateway	
E.S.									Œ	eNodeB 1	
믕									Œ	CDMA 1xRTT	
ц.									E	3 - Channel Conditions	
Ŭ,										Advanced/Dynamic Models	No
					_					Fade Model	None
Ω					_					Noise Enabled	True
Ë										Noc(dBm/15KHz)	-98
불										SNR	-3
Ses										Final RSTP (dBm/15kHz)	-98
_									E	4 - Test Options	
										Number of Transfers	5
					_					Transfer Direction	Download
										Transfer Duration	60
									Œ	Voice Call Options	
									E	5 - Test Criteria	
										Minimum Downlink Throughput	0.06
									1	Transfer Check Criteria	All
									1	Require Data Integrity	False
										Early Termination Enabled	False
				-	_				E	6 - Logging Options	
										CQI Stats Enabled	Disabled
									E	7 - Advanced Options	
										Downlink Socket Buffer Size	524288
-	•		Þ	•				Þ		I - General	

Figure 3-21: Customized Suite Saved to the File Cabinet

3.8. Configuring Test Case Parameters

- 1. In Test Manager, select the desired **Test Suite** from the **Parameters** tab in the File Cabinet.
- 2. In the *Suite Editor*, select the Test Case, as shown in Figure 3-22.

				→ ×	
Test Class	Descript	Т	est Case Parameters	4	
UDP Transfe	Transmi		1 - General		
			Description	Transmit diversity with low SNR - IPv6	
			2 - Network Configuration	, i i i i i i i i i i i i i i i i i i i	
			Configuration File Path	C:\Program Files\Spirent Communications\Test	
		Ð	PDN Gateway		
		Ð	eNodeB 1		
		Ð	CDMA 1xRTT		
			3 - Channel Conditions		
			Advanced/Dynamic Models	No	
			Fade Model	None	
			Noise Enabled	True	
			Noc(dBm/15KHz)	-98	
			SNR	-3	
			Final RSTP (dBm/15kHz)	-98	
			4 - Test Options		
			Number of Transfers	5	
			Transfer Direction	Download	
			Transfer Duration	60	
1		Ð	Voice Call Options		
		Ð	5 - Test Criteria		
			Minimum Downlink Throughput	0.06	
			Transfer Check Criteria	All	
			Require Data Integrity	False	
			Early Termination Enabled	False	
1		Ξ	6 - Logging Options		
			CQI Stats Enabled	Disabled	
			7 - Advanced Options		
			Downlink Socket Buffer Size	524288	
			Pescription Procifies a chort description of the	tost caso	
			alid Values: Any description	e lest case.	
		N N	and valdes. Any description.		

Figure 3-22: Configuring Test Case Parameters

- 3. Select the appropriate defining parameters for the test. For more information on setting parameters, refer to Chapter 4.
- 4. Save changes to the Suite File.

3.9. Running a Test Suite

After creating the custom test suite and configuring the test case parameters (refer to Section 3.6 on page 25 for details), or selecting a pre-defined test suite, you must ensure the suite passes validation.

As discussed in the *Test Manager User Manual*, the key requirements to run a userdefined suite are a valid Session, UE, and Platform file.

To run the test suite:

1. In the Test Manager, open the desired test suite from the **Suite Files** tab of the File cabinet, as shown in Figure 3-23.

TM	M Test Manager												
F	File Edit View Execute Report Help												
	• 😂 • 🛃 🎒 🖄 🐁 🐘 🕨 = + 👔 UEFile1.ue												
File	ile Cabinet + × LTE Data Throughput.sui • ×								×				
/	و 📫	Suites			Ту	pe	Test Folder/	Test Class		Description		TestCase Pa	џ
les		📁 LTE Data T	hroug	I	•	2	Data Thro	UDP Transfer	Throughput	Test 1 - Transmit di			
Ε		Test 2-1	Trans			2	Data Thro	UDP Transfer	Throughput	Test 2 - Transmit di			
Suit		wi Test 3-1	Trans			2	Data Thro	UDP Transfer	Throughput	Test 3 - Transmit di			
\succ		- 🛃 Test 4 - 1	Trans			2	Data Thro	UDP Transfer	Throughput	Test 4 - Transmit di			
ers		🛃 Test 5 - 1	Trans			2	Data Thro	UDP Transfer	Throughput	Test 5 - Transmit di			
Pe		- 🛃 Test 6 - 1	Trans			2	Data Thro	UDP Transfer	Throughput	Test 6 - Transmit di			
stF		⊨ Mest/-I	Open I			2	Data Thro	UDP Transfer	Throughput	Test 7 - Open loop			
μ		🖬 Test 9-1	Close			2	Data Thro	UDP Transfer	Throughput	Test 8 - Open loop			
		a Test 10 -	Clos			2	Data Thro	UDP Transfer	Throughput	Test 9 - Closed Ioo			
iles		🚽 🛃 Test 11 -	Clos			2	Data Thro	UDP Transfer	Throughput	Test 10 - Closed Io			
벽		- 🛃 Test 12 -	Clos			2	Data Thro	UDP Transfer	Throughput	Test 11 - Closed Io			
Sest		- 🛃 Test 13 -	Clos			2	Data Thro	UDP Transfer	Throughput	Test 12 - Closed Io			
-		Est 14-	Clos			2	Data Thro	UDP Transfer	Throughput	Test 13 - Closed Io			
		Test 16-	- Clos			2	Data Thro	UDP Transfer	Throughput	Test 14 - Closed Io			
		- 🛃 Test 17 -	Clos			2	Data Thro	UDP Transfer	Throughput	Test 15 - Closed Io			
		🚽 Test 18 -	Clos			2	Data Thro	UDP Transfer	Throughput	Test 16 - Closed Io			
		- 🛃 Test 19-	Clos 🔽			2	Data Thro	UDP Transfer	Throughput	Test 17 - Closed Io			
•	┛		►			2	Data Thro	UDP Transfer	Throughput	Test 18 - Closed Io	▼		

Figure 3-23: Loading a Data Throughput – LTE Test Suite

NOTE: Each Test Case in a pre-defined Suite has test case parameters configured to support the test definition. You do not have to alter them unless you are writing your own test suite. For more information on configuring test case parameters, refer to Section 3.6 on and Chapter 4: Test Reference.

- In the Test Manager menu, select Execute>Start Session>Run All Test Cases to start executing the entire Test Suite.
 You also have the option of executing only the currently selected test case.
 The Execute Session window displays.
- 3. Select the appropriate parameter files and platform. For more information on selecting these files, refer to section 4.
- 4. If desired, specify the **Tester Name**, **UE Manufacturer**, and **UE Model**. These fields display on all reports you create based on the results of this session.

NOTE: The Results folder and Platform File selections are already set, it is not necessary to make changes to these fields.

 Click OK to begin validation. If successful, the test session begins, as shown in Figure 3-24.

TM	Test Manager									
E	jie <u>E</u> dit <u>V</u> iew E <u>x</u> ecul	te <u>R</u> eport	Help							
	• 😂 • 🛃 🦪 🕘 X	h (b. ▶ •	📕 🔳 👻 🚊 ATT-Sierra A	C313-AT Co	mmads V3-5 🔹	SessionFile1.ses	- I 🕢	-		1
File	ie Cabinet 4 × 1 TE fiels Throughout out 2011 11 01 1550 (Active)									
6	⊡- <u>i</u> Suites	Dashboard	×	Summary	ummary					
8	🗄 🍑 LIE Data Inr	Indicator	dicator Values		Description	Test Case	Test Folder	Status	Progress	C _
ite		Test Status	Percentage	▶ 1	Test 1 · Trans	UDP Transfer Throu	Data Throughput - LTE	Executing	0 of 5 (0%)	
ß		Fail	0 of 24 (0%)	Test #	Description	Test Case	Test Folder	Status		
(Pass	0 of 24 (0%)	2	Test 2 · Trans	UDP Transfer Throu	Data Throughput - LTE	PreValidation		
ders		Pending	24 of 24 (100%)	3	Test 3 · Trans	UDP Transfer Throu	Data Throughput - LTE	PreValidation		
E		Other	0 of 24 (0%)	4	Test 4 · Trans	UDP Transfer Throu	Data Throughput - LTE	PreValidation		
Test		Elapsed Time	HH:MM:SS	5	Test 5 · Trans	UDP Transfer Throu	Data Throughput - LTE	PreValidation		-
5		Session	00:01:38	11		1				Þ
Files		Throughput Cha	at - 800×	LTE CQI	Chart 💌					т×
Result		Throughput	[Mbps] 1 1 20 1 1 10 1 1 0 0 1 0 0 0 0 0 0 0 0 0					은 후 또 CQI (Median: -1)	Code Word 1 Window Size [ms]: 1000 View by Timestamp 0.00 0.00	
		Events	•							Ξ×
		Туре	PC Timestamp	Description	1					-
		U Inform	117172011 3:59:38 PM	Connecting	to Instruments					
		🕸 Debug	11/1/2011 4:00:42 PM	Status upd	ated for Test Casi	<udp td="" throughpu<="" transfer=""><td>ut> Status = Executing</td><td></td><td></td><td> h</td></udp>	ut> Status = Executing			h
		1nform	11/1/2011 4:00:42 PM	Started <u< td=""><td>DP Transfer Thro</td><td>ighput></td><td></td><td></td><td></td><td>_</td></u<>	DP Transfer Thro	ighput>				_
		1nform	11/1/2011 4:00:47 PM	Ensuring In	struments is idle					
		1nform	11/1/2011 4:00:47 PM	Connecting	to Spirent Data (lient				
		1 Inform	11/1/2011 4:00:50 PM	Ensuring S	pirent Data Client	sidle				
•		🕸 Debug	11/1/2011 4:01:02 PM	Set IP Typ	e: IPv6					-
	0 of 24 Test Cases Executed Result File: 2011 11 01 1559 Originating Suite File: LTE Data Throughput.sui Execution In Progress									

Figure 3-24: Test Session in Progress

3.10. Setting Up a New UE with the Data Client

To introduce or setup a new UE (or swap between more than one) connected to the Data Client PC, you need to configure the system to establish data throughput connectivity from the Controller PC, as well as the Application server. While both the Data Client and the Application Server are connected by the Ethernet cable, the data transfer throughput must occur via the Network Emulator interface.

To run a test with a new UE:

1. On the Data Client laptop, install the manufacturer software/drivers for the new UE. The UE software should support an installation configurable as a tethered modem.

NOTE: The Data Client laptop has a modem dial-up connection named **TestDrive Data Connection** configured for use with your UE. This is part of the installation and cannot be changed.

- The Data Client laptop is pre-configured to support Client Dial-up connections for the tethered modem-configured UE under Test.
 Use the **TestDrive Data Connection** Dial-up networking setting on the laptop to set up the UE.
- 3. On the Data Client laptop, select **Control Panel>Network Connections**, right-click *TestDrive Data Connection* and select **Properties**, as shown in Figure 3-25.

Solutions	Network Connections						
File Edit View Favorites Tools	File Edit View Favorites Tools Advanced Help 🦉						
🕞 Back 🔹 💮 🖌 🏂 🔎 Sear	🕒 Back 🔹 🕥 🖌 🏂 Search 🌮 Folders 🛄 •						
Address 🔕 Network Connections					💌 🔁 Go		
	Name	Туре	S	Status	Device Name		
Network Tasks 🌼	Dial-up						
Create a new	b TestDrive Data Connection	Connect	C	Disconne	Motorola USB Modem		
Set up a home or small office network	LAN or High-Speed Inte	Status					
Change Windows Firewall settings	🔔 1394 Connection 2	Set as Default Connection pee	d Inter D	Disabled	1394 Net Adapter #3		
Start this connection	Local Area Connection	Create Copy pee	d Inter C	Connected Disabled	Broadcom NetXtreme 57 Dell Wireless 1490 Dual B		
Rename this connection	1 WIEless Network Connec	Create Shortcut	d 11001 0	Jabbieu	Del Wilcless 1450 Dobro.		
Delete this connection		Delete					
Change settings of this connection	-	Rename					
		Properties					
Other Places							
🚱 Control Panel							
My Network Places							
My Documents							
My Computer							
Details 🌣							
TestDrive Data Connection							
Disconnected	 				Þ		

Figure 3-25: Data Client Network Connections

🍉 TestDrive Da	ta Conne	ection Pro	perties		?×
General Options	Security	Networkin	g Advan	ced	
Connect using:					
Modem -	Standard	Modem (CON	410)		Ŷ
Moder	Soyote Ind	dustries Limit	ed R99 HSDPA N	Modem (CO	1
PoloatUE				>	
Selectur	I the same	numbers	Co	oficure	
being used				ingure	
PASIeHoliber	1000				6320
Area code:	Phone	number:			
	99#	10		Alternate	s
dial up #	n oder	·			
					~
Use dialing	rules			Dialing Ru	es
Show icon in	notification	area when	connected		
		ſ	ОК		ancel
			511		

Figure 3-26: TestDrive Data Connections Properties Window – Selecting Current UE

- 4. Under the *General* tab, shown in Figure 3-26, select the correct **UE under Test** in the *Connect Using* list.
- 5. Refer to the UE specifications and enter the correct dial-in number. By default, the Data Client laptop is set to a dial-in Number of ***99#**. Note that ***99#** is one of two AT Command GPRS specifications for a request to use the Packet Domain service. The other common dial-in number is ***98#**.
- 6. Your new UE is now configured for testing.

4. Test Reference

4.1. Overview

This chapter describes the Data Throughput – LTE Module test cases in greater detail, including the algorithms implemented during test execution.

The information is grouped into the following subsections:

- 1. Test Suite Execution
- 2. Data Throughput LTE Test Cases
- 3. Description of Data Throughput LTE Module Test Parameters

4.2. Test Suite Execution

This section describes the sequence of operations performed during the execution of a Test Suite from the Test Manager.



Figure 4-1: Test Suite Execution Flowchart

4.3. Data Throughput – LTE Test Cases

This section describes the test cases that facilitate the Testing functionality of the Data Throughput – LTE Test Packs.

- 1. FTP Transfer Throughput Test
- 2. UDP Transfer Throughput Test
- 3. Application Layer Throughput Stress Test
- 4. Control Plane Timing Test
- 5. User Plane Latency Test
- 6. UDP Power Sweep Test

4.3.1. FTP Transfer Throughput – Test

4.3.1.1 Description

This test case is designed to evaluate LTE Data Throughput performance of the UE during a LTE data call. Once the initial conditions are configured, the system waits to detect the initial network attach. Following the network attach, different parameters are configured such as RF impairments (AWGN, Fade Profile, MIMO), using configurable Resource Block Allocations.

If SVLTE is enabled, this test case is designed to evaluate LTE Data Throughput performance of the UE during a LTE Data Call and a 1xRTT Voice Call. The parameters "CDMA 1xRTT Enabled" and "Call Enabled" should be set to **True** to support SVLTE. After configuring the initial conditions, the system waits to detect the initial network attach. Following the network attach, different parameters can be configured; such as RF impairments (AWGN, Fade Profile, MIMO), using configurable Resource Block Allocations.

If Advanced/Dynamic Models is enabled, this test case evaluates LTE Data Throughput with integration of SR5500M to enable advanced channel emulation. You can select the **.wce** file where all Fading and Noise parameters are set.

NOTE: If you use a Windows XP laptop and Application Server with a Windows 2003 server, the maximum throughput in IPv6 will be lower than expected. This is because Microsoft does not support TCP window scaling for IPv6 on those platforms.

4.3.1.2 Required Test Equipment

This test requires the following equipment:

- LTE Network Emulators: Depending on the technologies specified in the configured scenarios.
- **CDMA 1xRTT Network Emulators:** Depending on the parameters specified in the configured scenarios.
- **SR8078 TCU**: Depending on the parameters specified in the configured scenarios.
- **SR5500M**: Depending on the parameters specified in the configured scenarios.

4.3.1.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General	Description
Network Configuration	 Configuration File Path PDN Gateway PDN PDN IP Address Type Default Barer QCI Enable Dedicated Bearers eNodeB 1 Operating Band Downlink Channel Number Downlink Bandwidth MCC MNC RLC Mode MAC Downlink Reference Channel Scheduling Module RB Allocation Allocated RBS Modulation TBSize Uplink Reference Channel Scheduling Module RB Allocation Allocated RBS Modulation TBSize Uplink Reference Channel Scheduling Module RB Allocation TBSize Outloated RBS Modulation TBSize Physical PSTP

Test Parameters	
	 Transmission Mode
	 CFI
	 UE Specific Search Space Aggregation
	 EPRE Ratios
	Synchronization Signals
	o PSS RA
	o PSS RB
	o SSS RA
	o SSS RB
	Control Channels
	o PBCH RA
	 PBCH RB
	 PCFICH RA
	 PCFICH RB
	o PDCCH RA
	 PDCCH RB
	o PHICH RA
	O PHICH RB
	Shared Channels
	o PDSCH RA
	O PDSCH RB
	CQI Parameters
	 CQI Reporting Type
	 Periodic CQI - ConfigIndex
	 CQI Reporting Channel
	 CQI Feedback Type
	 CQI Reporting Mode
	 Default Imcs for CW1
	 Default Imcs for CW2
	 CQI Mapping Type
	 CQI Mapping File Path
	CDMA 1xRTT
	 CDMA 1xRTT Enabled
	o SID
	• Band Class
	 Channel Number
	A Radio Configuration
	o Sonico Options
	o Power Control
	KF Power Level
Channel Conditions	Advanced/Dynamic Models
	SK5500 Configuration File
	rade Middel MIMO Correlation
	MINU Correlation
	• MIMU Correlation Matrix Alpha
	 MIMO Correlation Matrix Beta

Test Parameters	
	 Noise Enabled Noc SNR Final PSTP(dBm/15kHz)
Test Options	 Number of Transfers Transfer Direction FTP Optimization Enabled Max Transfer Duration Download File Name Upload File Name Voice Call Options Call Enabled Call Direction Call Duration Delay Between Calls
Test Criteria	 Advanced Criteria Enabled Cat 1 Required Downlink Throughput Cat 2 Required Downlink Throughput Cat 3 Required Downlink Throughput Cat 4 Required Downlink Throughput Cat 5 Required Downlink Throughput Cat 1 Required Uplink Throughput Cat 2 Required Uplink Throughput Cat 3 Required Uplink Throughput Cat 3 Required Uplink Throughput Cat 4 Required Uplink Throughput Cat 5 Required Uplink Throughput Minimum Downlink Throughput Minimum Uplink Throughput Transfer Check Criteria Require Data Integrity Early Termination Enabled
Logging Options	CQI Stats EnabledRLC Layer Stats Enabled
Advanced Options	Downlink Socket Buffer SizeUplink Socket Buffer Size

4.3.1.4 Test Results

The following results are generated for this test:

• Pass/Fail

4.3.1.5 Pass / Fail Criteria

Testing Scenario	Test Result
The test completes performing average throughput exceeding the Minimum Downlink (Uplink) Throughput. If SVLTE is enabled, the voice calls all succeed or fail once.	Pass
The test completes performing average throughput not meeting the Minimum Downlink (Uplink) Throughput. If SVLTE is enabled, the voice call failed twice can also cause the case to have a "Fail" result.	Fail
The test cannot complete due to UE/Network Failures or an unknown failure.	Incomplete (Other)

4.3.2. UDP Transfer Throughput – Test

4.3.2.1 Description

This test case is designed to evaluate UE's LTE data throughput performance during a LTE data call. Once the initial conditions are configured, the system waits to detect the initial network attach. Following the network attach, different parameters are configured such as RF impairments (AWGN, Fade Profile, MIMO), using configurable Resource Block Allocations.

If SVLTE is enabled, this test case is designed to evaluate LTE Data Throughput performance of the UE during a LTE Data Call and a 1xRTT Voice Call. The parameters "CDMA 1xRTT Enabled" and "Call Enabled" should be set to **True** to support SVLTE. After configuring the initial conditions, the system waits to detect the initial network attach. Following the network attach, different parameters can be configured; such as RF impairments (AWGN, Fade Profile, MIMO), using configurable Resource Block Allocations.

If Advanced/Dynamic Models is enabled, this test case evaluates LTE Data Throughput with integration of SR5500M to enable advanced channel emulation. You can select the .wce file where the Fading and Noise parameters are set.

4.3.2.2 Required Test Equipment

This test requires the following equipment:

- LTE Network Emulators: Depending on the technologies specified in the configured scenarios.
- **CDMA 1xRTT Network Emulator**: Depending on the parameters specified in the configured scenarios.
- **SR8078 TCU**: Depending on the parameters specified in the configured scenarios.
- **SR5500M**: Depending on the parameters specified in the configured scenarios.

4.3.2.3 Test Parameters

The following test parameters are supported for this test.

Test Paramet	ers
General	Description
Network	Configuration File Path
Configurati	PDN Gateway
on	o PDNs
	• PDN
	IP Address Type
	Default Barer QCI
	Enable Dedicated Bearers
	eNodeB 1
	 Operating Band
	 Downlink Channel Number
	 Downlink Bandwidth
	o MCC
	o MNC
	o RLC
	• Mode
	Downlink Reference Channel
	Scheduling Module
	RB Allocation
	Allocated RBs
	Modulation
	TBSize
	 Uplink Reference Channel
	Scheduling Module
	RB Allocation
	Allocated RBS Modulation
	TBSize
	o Physical
	■ RSTP
	 Transmission Mode
	 CFI
	 UE Specific Search Space Aggregation
	 EPRE Ratios
	Synchronization Signals
	o PSS RA
	o PSS RB
	Control Channels
	o PBCH RA
	o PBCH RB
	o PCFICH RA

Test Paramete	ers
	o PCFICH RB
	o PDCCH RA
	o PDCCH RB
	o PHICH RA
	o PHICH RB
	Shared Channels
	o PDSCH RA
	o PDSCH RB
	CQI Parameters
	 CQI Reporting Type
	 Periodic CQI - ConfigIndex
	 CQI Reproting Channel
	 CQI Feedback Type
	 CQI Reporting Mode
	 Default Imcs for CW1
	 Default Imcs for CW2
	 CQI Mapping Type
	 CQI Mapping File Path
	CDMA 1xRTT
	CDMA 1xRTT Enabled
	• SID
	• NID
	Band Class
	Channel Number
	Radio Configuration
	Service Ontions
	Power Control
Channel	Advanced / Dynamic Models
Conditions	SR5500 Configuration File
contaitions	Fade Model
	MIMO Correlation
	MIMO Correlation Matrix Alpha
	MIMO Correlation Matrix Reta
	Noise Enabled
	Nor
	• SNR
	• Final RSTP(dBm/15kHz)
Tost	Number of Transfers
Options	Transfer Direction
	Transfer Duration
	Blaster Rate
	Downlink Blaster Rate
	Uplink Blaster Rate
	Voice Call Options

Test Paramet	ers		
		o Call Enabled	
		o Call Direction	
		o Call Duration	
		o Delay Between Calls	
Test	•	Advanced Criteria Enabled	
Criteria		 Cat 1 Required Downlink Throughput 	
		 Cat 2 Required Downlink Throughput 	
		 Cat 3 Required Downlink Throughput 	
		 Cat 4 Required Downlink Throughput 	
		 Cat 5 Required Downlink Throughput 	
		 Cat 1 Required Uplink Throughput 	
		 Cat 2 Required Uplink Throughput 	
		 Cat 3 Required Uplink Throughput 	
		 Cat 4 Required Uplink Throughput 	
		 Cat 5 Required Uplink Throughput 	
	•	Minimum Downlink Throughput	
	•	Minimum Uplink Throughput	
	•	Transfer Check Criteria	
	•	Require Data Integrity	
	•	Early Termination Enabled	
Logging	•	CQI Stats Enabled	
Options	•	RLC Layer Stats Enabled	
Advanced	•	Downlink Socket Buffer Size	
Options	•	Uplink Socket Buffer Size	
	•	IPv4 UDP Packet Size	
	•	IPv6 UDP Packet Size	

4.3.2.4 Test Results

The following results are generated for this test:

• Pass/Fail

4.3.2.5 Pass / Fail Criteria

Testing Scenario	Test Result
The test completes performing average throughput exceeding the Minimum Downlink (Uplink) Throughput. If SVLTE is enabled, the voice calls all succeed or fail once.	Pass
The test completes performing average throughput not meeting the Minimum Downlink (Uplink) Throughput. If SVLTE is enabled, the voice call failed twice can also cause the case to have "Fail" result.	Fail
The test cannot complete due to UE/Network Failures or an unknown failure.	Incomplete (Other)

4.3.3. Application Layer Throughput Stress – Test

4.3.3.1 Description

This test case is designed to evaluate UE's LTE data throughput performance during a LTE data call. Once the initial conditions are configured, the system waits to detect the initial network attach. Following the network attach, different parameters are configured such as RF impairments (AWGN, Fade Profile, MIMO), using configurable Resource Block Allocations.

If SVLTE is enabled, this test case is designed to evaluate LTE Data Throughput performance of the UE during a LTE Data Call and a 1xRTT Voice Call. The parameters "CDMA 1xRTT Enabled" and "Call Enabled" should be set to **True** to support SVLTE. After configuring the initial conditions, the system waits to detect the initial network attach. Following the network attach, different parameters can be configured; such as RF impairments (AWGN, Fade Profile, MIMO), using configurable Resource Block Allocations.

If Advanced/Dynamic Models is enabled, this test case evaluates LTE Data Throughput with integration of SR5500M to enable advanced channel emulation. You can select the .wce file where the Fading and Noise parameters are set.

4.3.3.2 Required Test Equipment

This test requires the following equipment:

- LTE Network Emulators: Depending on the technologies specified in the configured scenarios.
- CDMA 1xRTT Network Emulators: Depending on the technologies specified in the configured scenarios.
- SR8078 TCU: Depending on the parameters specified in the configured scenarios.
- **SR5500M**: Depending on the parameters specified in the configured scenarios.

4.3.3.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters			
General	Description		
Network	Configuration File Path		
Configurati	PDN Gateway		
on	PDNs		
	• PDN		
	IP Address Type		
	Default Barer OCI		
	Enable Dedicated Bearers		
	eNodeB 1		
	o Operating Band		
	 Downlink Channel Number 		
	 Downlink Bandwidth 		
	o MCC		
	o MNC		
	o RLC		
	 Mode 		
	o MAC		
	 Downlink Reference Channel 		
	Scheduling Module		
	RB Allocation		
	Allocated RBs		
	Modulation		
	IBSIZE Inlink Deference Channel		
	Optifik Reference Chamiler Schoduling Module		
	RB Allocation		
	Allocated RBs		
	Modulation		
	TBSize		
	o Physical		
	 RSTP 		
	 Transmission Mode 		
	 CFI 		
	 UE Specific Search Space Aggregation 		
	 EPRE Ratios 		
	Synchronization Signals		
	o PSS RA		
	0 P22 KR		
	Control Channels		
	o PBCH RA		
	o PBCH RB		

Test Paramete	ers				
	o PCFICH RA				
	o PCFICH RB				
	o PDCCH RA				
	o PDCCH RB				
	o PHICH RA				
	o PHICH RB				
	Shared Channels				
	o PDSCH RA				
	o PDSCH RB				
	CQI Parameters				
	 CQI Reporting Type 				
	 Periodic CQI - ConfigIndex 				
	 CQI Reproting Channel 				
	 CQI Feedback Type 				
	 CQI Reporting Mode 				
	 Default Imcs for CW1 				
	 Default Imcs for CW2 				
	 CQI Mapping Type 				
	• CQI Mapping File Path				
	CDMA 1xRTT				
	CDMA 1xRTT Enabled				
	 SID 				
	NID Dend Class				
	Band Class Channel Number				
	Channel Number Dedia Configuration				
	Kadio Configuration Santiae Ontione				
	Service Options Dewer Control				
	Power Control				
	• RF Power Level				
Channel	Advanced/Dynamic Models				
Conditions	SR5500 Configuration File				
	Fade Model				
	MIMO Correlation				
	MIMO Correlation Matrix Alpha				
	MIMO Correlation Matrix Beta				
	Noise Enabled				
	Noc				
	• SNR				
	• Final RSTP(dBm/15kHz)				
Test	Stress Duration				
Options	Transfer Direction				
	Transfer Protocol				
	FTP Optimization Enabled				
	Max Transfer Duration				
	Download File Name				
	Upload File Name				

Test Paramet	ers			
	Transfer Duration			
	Blaster Rate			
	Downlink Blaster Rate			
	Uplink Blaster Rate			
	Voice Call Options			
	o Call Enabled			
	o Call Direction			
	• Call Duration			
	o Delay Between Calls			
Test	Advanced Criteria Enabled			
Criteria	 Cat 1 Required Downlink Throughput 			
	 Cat 2 Required Downlink Throughput 			
	 Cat 3 Required Downlink Throughput 			
	 Cat 4 Required Downlink Throughput 			
	 Cat 5 Required Downlink Throughput 			
	 Cat 1 Required Uplink Throughput 			
	 Cat 2 Required Uplink Throughput 			
	 Cat 3 Required Uplink Throughput 			
	 Cat 4 Required Uplink Throughput 			
	 Cat 5 Required Uplink Throughput 			
	Minimum Downlink Throughput			
	Minimum Uplink Throughput			
	Transfer Check Criteria			
	Require Data Integrity			
	Early Termination Enabled			
Logging	CQI Stats Enabled			
Options	RLC Layer Stats Enabled			
Advanced	Downlink Socket Buffer Size			
Options	Uplink Socket Buffer Size			
	IPv4 UDP Packet Size			
	IPv6 UDP Packet Size			

4.3.3.4 Test Results

The following results are generated for this test:

• Pass/Fail

4.3.3.5 Pass / Fail Criteria

Testing Scenario	Test Result
The test completes performing average throughput exceeding the Minimum Downlink (Uplink) Throughput. If SVLTE is enabled, the voice calls all succeed or fail once.	Pass

Testing Scenario	Test Result
The test completes performing average throughput not meeting the Minimum Downlink (Uplink) Throughput. If SVLTE is enabled, the voice call failed twice can also cause the case to have "Fail" result.	Fail
The test cannot complete due to UE/Network Failures or an unknown failure.	Incomplete (Other)

4.3.4. Control Plane Timing – Test

4.3.4.1 Description

This test case is designed to measure the control plane latency of the UE from initial attachment to the network, and transition from RRC_Idle to RRC_Connected state.

If Advanced/Dynamic Models is enabled, this test case evaluates the control plane latency of the UE with integration of SR5500M to enable advanced channel emulation. You can select the .wce file where the Fading and Noise parameters are set.

4.3.4.2 Required Test Equipment

This test requires the following equipment:

- LTE Network Emulators: Depending on the technologies specified in the configured scenarios.
- SR8078 TCU: Depending on the parameters specified in the configured scenarios.
- **SR5500M**: Depending on the parameters specified in the configured scenarios.

4.3.4.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General	Description
Network Configuration	 Configuration File Path
	 PDN Gateway
	 PDNs
	PDN
	 IP Address Type
	 Default Barer QCI
	Enable Dedicated Bearers
	 eNodeB 1
	 Operating Band
	 Downlink Channel Number
	 Downlink Bandwidth

Test Parameters		
	 MCC MNC RLC Mode Physical RSTP Transmission Mode CQI Reporting Type Periodic CQI ConfigIndex EPRE Ratios Synchronization Signals PSS RA PSS RB SSS RB Control Channels PBCH RA PBCH RB PCFICH RA PCFICH RA PCFICH RA PCCH RA PDCCH RB PHICH RB Shared Channels PDSCH RA PDSCH RA PDSCH RA 	
Channel Conditions Test Options	 Advanced/Dynamic Models SR5500 Configuration File Fade Model MIMO Correlation MIMO Correlation Matrix Alpha MIMO Correlation Matrix Beta Noise Enabled Noc SNR Final RSTP(dBm/15kHz) Execution Limit Iterations Test Time Latency Measurement Initiation 	
Test Criteria	 Pass/Fail Measurement(s) Maximum Connect Time Maximum Attach Time 	

Test Parameters		
	٠	Iteration Check Criteria
	٠	Early Termination Enabled
Logging Options	•	CQI Stats Enabled

4.3.4.4 Test Results

The following results are generated for this test:

• Pass/Fail

4.3.4.5 Pass / Fail Criteria

Testing Scenario	Test Result
The test completes performing average measurement time less than or equal to maximum connect (attach) time.	Pass
The test completes performing average measurement time more than maximum connect (attach) time.	Fail
The test cannot complete due to UE/Network Failures or an unknown failure.	Incomplete (Other)

4.3.5. User Plane Timing – Test

4.3.5.1 Description

This test case is designed to evaluate the performance of the UE for user plane round trip delay.

If Advanced/Dynamic Models is enabled, this test case evaluates the performance of the UE in user plane round trip delay with integration of SR5500M to enable advanced channel emulation. You can select the **.wce** file where the Fading and Noise parameters are set.

4.3.5.2 Required Test Equipment

This test requires the following equipment:

- LTE Network Emulators: Depending on the technologies specified in the configured scenarios.
- **SR8078 TCU**: Depending on the parameters specified in the configured scenarios.
- **SR5500M**: Depending on the parameters specified in the configured scenarios.

4.3.5.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters		
General	Description	
Network Configuration	 Configuration File Path PDN Gateway PDN IP Address Type Default Barer QCI Enable Dedicated Bearers eNodeB 1 Operating Band Downlink Channel Number Downlink Bandwidth MCC MNC RLC Mode MAC Downlink Reference Channel Scheduling Module RB Allocation 	

Test Parameters	
	Allocated RBs
	Modulation
	• TBSize
	 Uplink Reference Channel
	Scheduling Module
	RB Allocation
	Allocated RBs
	Modulation
	• TBSize
	o Physical
	Iransmission Mode
	 UE Specific Search Space Aggregation
	CQI Reporting Type
	 Periodic CQI ConfigIndex
	EPRE Ratios
	Synchronization Signals
	O PSS KA
	Control Channels
	• PBCH RA
	o PBCH RB
	o PCFICH RA
	 PCFICH RB
	o PDCCH RA
	o PDCCH RB
	o PHICH RA
	 PHICH RB
	Shared Channels
	o PDSCH RA
	o PDSCH RB
Channel Conditions	Advanced/Dynamic Models
	SR5500 Configuration File
	Fade Model
	MIMO Correlation
	MIMO Correlation Matrix Alpha
	MIMO Correlation Matrix Beta
	Noise Enabled
	• Noc
	• SNR
	• Final RSTP(dBm/15kHz)
Test Options	Execution Limit
	Iterations
	Test Time

Test Parameters	
	Ping Direction
	Packet Size
Test Criteria	Minimum Delay
	Delay Check Criteria
	Maximum Timeouts
	Early Termination Enabled
Logging Options	CQI Stats Enabled

4.3.5.4 Test Results

The following results are generated for this test:

• Pass/Fail

4.3.5.5 Pass / Fail Criteria

Testing Scenario	Test Result
The test completes performing average round trip delay less than or equal to Minimum Delay.	Pass
The test completes performing average round trip delay more than Minimum Delay.	Fail
The test cannot complete due to UE/Network Failures or an unknown failure.	Incomplete (Other)

4.3.6. UDP Power Sweep – Test

4.3.6.1 Description

This test case is designed to measure UE's data throughput variation by varying the power sweep. Once the initial conditions are configured, the system waits to detect the initial network attach. Once the initial conditions are configured, the system waits to detect the initial network attach. Following the network attach, different parameters are configured such as RF impairments (AWGN, Fade Profile, MIMO), using configurable Resource Block Allocations.

If SVLTE is enabled, this test case is designed to evaluate LTE Data Throughput performance of the UE during a LTE Data Call and a 1xRTT Voice Call. The parameters "CDMA 1xRTT Enabled" and "Call Enabled" should be set to **True** to support SVLTE. After configuring the initial conditions, the system waits to detect the initial network attach. Following the network attach, different parameters can be configured; such as RF impairments (AWGN, Fade Profile, MIMO), using configurable Resource Block Allocations.

If Advanced/Dynamic Models is enabled, this test case evaluates LTE Data Throughput with integration of SR5500M to enable advanced channel emulation. You can select the .wce file where the Fading and Noise parameters are set.

4.3.6.2 Required Test Equipment

This test requires the following equipment:

- LTE Network Emulators: Depending on the technologies specified in the configured scenarios.
- **CDMA 1xRTT Network Emulators:** Depending on the technologies specified in the configured scenarios.
- SR8078 TCU: Depending on the parameters specified in the configured scenarios.
- **SR5500M**: Depending on the parameters specified in the configured scenarios.

4.3.6.3 Test Parameters

The following test parameters are supported for this test.

Test Parameters	
General	Description
Network Configuration	 Configuration File Path PDN Gateway PDN IP Address Type Default Barer QCI Enable Dedicated Bearers eNodeB 1 Operating Band Downlink Channel Number Downlink Bandwidth MCC MNC RLC Mode MAC Downlink Reference Channel Scheduling Module RB Allocation Allocated RBs Modulation TBSize Uplink Reference Channel Scheduling Module RB Allocation TBSize Uplink Reference Channel Scheduling Module RB Allocation

Test Parameters	
	Allocated RBs
	Modulation
	• TBSize
	o Physical
	 RSTP Sweep Options
	Initial RSTP
	Final RSTP
	• Step
	 Transmission Mode
	 CFI
	 UE Specific Search Space Aggregation
	 EPRE Ratios
	Synchronization Signals
	o PSS RA
	o PSS RB
	o SSS RA
	o SSS RB
	Control Channels
	o PBCH RA
	o PBCH RB
	o PCFICH RA
	 PCFICH RB
	 PDCCH RA
	o PDCCH RB
	 PHICH RA
	 PHICH RB
	Shared Channels
	 PDSCH RA
	 PDSCH RB
	CQI Parameters
	 CQI Reporting Type
	 Periodic CQI - ConfigIndex
	 CQI Reproting Channel
	 CQI Feedback Type
	 CQI Reporting Mode
	 Default Imcs for CW1
	 Default Imcs for CW2
	 CQI Mapping Type
	 CQI Mapping File Path
•	CDMA 1xRTT
	 CDMA 1xRTT Enabled
	o SID
	o NID
	o Band Class
	 Channel Number

Test Parameters		
	 Radio Configuration 	
	 Service Options 	
	 Power Control 	
	o RF Power Level	
Channel Conditions	Advanced/Dynamic Models	
	SR5500 Configuration File	
	• Fade Model	
	MIMO Correlation	
	MIMO Correlation Matrix Alpha	
	MIMO Correlation Matrix Beta	
	Noise Enabled	
	• Noc	
	• SNR	
Test Options	Number of Transfers	
	Transfer Direction	
	Transfer Duration	
	Blaster Rate	
	Downlink Blaster Rate	
	Uplink Blaster Rate	
	Voice Call Options	
	o Call Enabled	
	o Call Direction	
	o Call Duration	
	o Delay Between Calls	
Test Criteria	Advanced Criteria Enabled	
	Minimum Downlink (Uplink) Throughput	
	Minimum Downlink (Uplink) Throughput with UE Category	
	Transfer Check Criteria	
	Require Data Integrity	
	Early Termination Enabled	
Logging Options	CQI Stats Enabled	
	RLC Layer Stats Enabled	
Advanced Options	Downlink Socket Buffer Size	
	Uplink Socket Buffer Size	
	IPv4 UDP Packet Size	
	IPv6 UDP Packet Size	

4.3.6.4 Test Results

The following results are generated for this test:

• Pass/Fail

4.3.6.5 Pass / Fail Criteria

Testing Scenario	Test Result
The test completes performing average throughput exceeds the Minimum Downlink (Uplink) Throughput for each RSTP value. If SVLTE is enabled, the voice calls all succeed or fail once.	Pass
The test completes performing average throughput does not meeting the Minimum Downlink (Uplink) Throughput for each RSTP value. If SVLTE is enabled, if the voice call fails twice, it can cause the test case to have a "Fail" result.	Fail
The test cannot complete due to UE/Network Failures or an unknown failure.	Incomplete (Other)

4.4. Description of Data Throughput – LTE Module Test Parameters

Most testing tasks can be accomplished using the defined User Test Suites. For individual testing needs, you can create custom Test Suites using the Module Test Cases and user-defined parameters.

You can change the following Test Parameters to define your testing needs:

- Network Configuration
- Channel Conditions
- Test Options
- Test Criteria

These parameters are described in detail in the following sections.

4.4.1. General

Parameter

Description

Specifies a short description for the test case.

4.4.2. Network Configuration

Parameter

Configuration File Path

Specifies the eAirAccess Configuration File to be loaded. This file contains the configuration details of the eNodeB, MME, PGW, HSS and SGW.

PDN Gateway

PDNs \rightarrow IP Address Type

Specifies the type of PDN to configure. Valid Values: IPv4, IPv6.

PDNs → Default Bearer QCI

Specifies QCI for the default bearer. Valid Range: 1 to 9.

PDNs → Enable Dedicated Bearers

Enables or disables the use of dedicated bearers.

Parameter	
eNodeB 1	
eNodeB 1 \rightarrow Operating Band	
Sets the operating band. Supported Band is 1, 2, 4, 7, 10, 13, 14 and 17.	
eNodeB 1 \rightarrow Downlink Channel Number	
Sets the downlink channel number.	
eNodeB 1 \rightarrow Downlink Bandwidth	
Sets the downlink bandwidth (MHz).	
eNodeB 1 \rightarrow Security Information	
Sets the Security information.	
eNodeB 1 \rightarrow MCC	
Sets the MCC.	
eNodeB 1→ MNC	
Sets the MNC.	
eNodeB 1 \rightarrow RLC	
Sets the operating band.	
RLC-> Mode	
Sets the RLC transmission modes.	
eNodeB 1 \rightarrow MAC	
MAC->Downlink Reference Channel->Scheduling Mode	
Sets the Scheduler Mode.	
MAC->Downlink Reference Channel->RB Allocation	
Sets the Resource Block Allocation type.	
MAC->Downlink Reference Channel->Allocated RBs	
Sets the number of Resource Blocks to be allocated.	
MAC->Downlink Reference Channel->Start RB	
Sets the starting index for Resource Block Allocation.	
MAC->Downlink Reference Channel->Modulation	
Specifies the Modulation type.	
MAC->Downlink Reference Channel->TBSize	
Specifies the TBSize type.	
MAC->Uplink Reference Channel->Scheduling Mode	
Sets the Scheduler Mode.	
MAC-> Uplink Reference Channel->RB Allocation	
Sets the Resource Block Allocation type.	
MAC-> Uplink Reference Channel->Allocated RBs	
Sets the number of Resource Blocks to be allocated.	
MAC-> Uplink Reference Channel->Start RB	
Sets the starting index for Resource Block Allocation.	
MAC-> Uplink Reference Channel->Modulation	
Specifies the Modulation type.	
MAC + Unitals Defense of Channel ATDC:	

MAC-> Uplink Reference Channel->TBSize

Specifies the TBSize type.

eNodeB 1 \rightarrow Physical Physical -> RSTP Sets the Reference Signal Transmit Power (dBm). Physical -> Reference Signal Ratio Sets the cell-specific reference signal power ratio (Ers/lor) in dB. Physical -> Transmission Mode Sets the transmission mode. Physical -> CFI Sets the CFI value. Physical -> Aggregation Level Sets the UE-Specific Search Space Aggregation (in CCEs). Physical -> CQI Parameters -> CQI Reporting Type Set the CQI Reporting Type Physical -> CQI Parameters -> Periodic CQI - ConfigIndex Set the CQI Configure Index Physical -> CQI Parameters -> CQI Reporting Channel Set the CQI Reporting Channel Physical -> CQI Parameters -> CQI Feedback Type Set the CQI Reporting Feedback Type Physical -> CQI Parameters -> CQI Reporting Mode Indicates the CQI Reporting Mode Physical -> CQI Parameters -> Default Imcs for CW1 Set the default Imcs for CW1 if no CQI reported Physical -> CQI Parameters -> Default Imcs for CW2 Set the default Imcs for CW2 if no CQI reported Physical -> CQI Parameters -> CQI Mapping Type Set the CQI Mapping Type Physical -> CQI Parameters -> CQI Mapping File Path Set the CQI Mapping File Path Physical -> EPRE Ratios -> Synchronization Signals -> PSS RA Specifies the PSS-to-RS EPRE ratio (Pa)in Db. Physical -> EPRE Ratios -> Synchronization Signals -> PSS RB Specifies the PSS-to-RS EPRE ratio (Pb)in Db. Physical -> EPRE Ratios -> Synchronization Signals -> SSS RA Specifies the SSS-to-RS EPRE ratio (Pa) in Db. Physical -> EPRE Ratios -> Synchronization Signals -> SSS RA Specifies the SSS-to-RS EPRE ratio (Pb) in Db. Physical -> EPRE Ratios -> Control Channels -> PBCH RA Specifies the PBCH-to-RS EPRE ratio (Pa) in Db. Physical -> EPRE Ratios -> Control Channels -> PBCH RB Specifies the PBCH-to-RS EPRE ratio (Pb) in Db. Physical -> EPRE Ratios -> Control Channels -> PCFICH RA Specifies the PCFICH-to-RS EPRE ratio (Pa) in Db. Physical -> EPRE Ratios -> Control Channels -> PCFICH RA Specifies the PCFICH-to-RS EPRE ratio (Pb) in Db. Physical -> EPRE Ratios -> Control Channels -> PDCCH RA Specifies the PDCCH-to-RS EPRE ratio (Pa) in Db. Physical -> EPRE Ratios -> Control Channels -> PDCCH RA Specifies the PDCCH-to-RS EPRE ratio (Pb) in Db. Physical -> EPRE Ratios -> Control Channels -> PHICH RA

CDMA 1Xrtt CDMA 1Xrtt → CDMA 1Xrtt Enabled Enable or disable CDMA 1Xrtt. CDMA 1Xrtt \rightarrow SID Sets the SID for CDMA 1Xrtt. CDMA 1Xrtt → NID Sets the NID for CDMA 1Xrtt. CDMA 1Xrtt → Band Class Sets the Band Class for CDMA 1Xrtt. CDMA 1Xrtt → Channel Number Sets the Channel Number for CDMA 1Xrtt. CDMA 1Xrtt \rightarrow Radio Configuration Sets the Radio Configuration for CDMA 1Xrtt. CDMA 1Xrtt \rightarrow Service Options Sets the Service Options for CDMA 1Xrtt. CDMA 1Xrtt \rightarrow Power Control Sets the Power Control for CDMA 1Xrtt. CDMA 1Xrtt → RF Power level Sets the BTS Power Level (dBm).

4.4.3. Channel Conditions

Parameter

Advanced/Dynamic Models

Sets the Advanced/Dynamic Models. Valid Values: Yes, No

SR5500M Configuration File

Specifies the SR5500M Configuration File to be loaded.

Fade Model

Sets the use of standard LTE fade models. Available profiles: EVA5, EPA5, ETU70, EVA70, HST

MIMO Correlation

Sets the MIMO correlation. Valid Values: Low, Medium High

MIMO Correlation Matrix Alpha

Sets the Alpha value of MIMO Correlation Matrix

MIMO Correlation Matrix Beta

• Sets the Beta value of MIMO Correlation Matrix

Noise Enabled

Enables or disables the noise.

Noc

Sets the power spectral density (dBm/15KHz) of a white noise source as measured at the UE antenna connector.

SNR

Sets the cumulative Signal to Noise Ratio (Db) for UE Channel(s).

Final RSTP

Display the final RSTP after setting SNR and fading (dBm/15kHz).

4.4.4. Test Options

Parameter	
Iterations	
Sets the number of times to perform the file transfer.	
Test Time	
Sets the duration to perform the transfers (minutes).	
Transfer Direction	
Sets the transfer direction from the perspective of the client application.	
Transfer Duration	
Sets the duration to transmit UDP packets (seconds).	
FTP Optimization Enabled Enables or disables FTP optimization which limits the maximum transfer duration of an FTP transfer. (When enabled, The Data Integrity check will be disabled.)	
Max Transfer Duration	
Specifies the maximum duration (seconds) that an FTP transfer will be allowed to run.	
Download File Name	
Specifies the file to download. Files requested for download must be stored in the "C:\Inetpub\ftproot\Spirent\APEX-FTP\Download" directory on the application server.	
Upload File Name Specifies the file to upload. Files requested for upload must be stored in 'C:\Program Files\Spirent Communications\Spirent Data Client\Upload Files' on the client laptop.	
Voice Call Options	
Sets the Voice Call Related Parameters.	
Voice Call Options → Call Enabled	
Enables/disables the Simultaneous Voice Call.	
Voice Call Options \rightarrow Call Direction	
Set the Mode of Voice Call.	
Voice Call Options → Call Duration	
Set the Duration of Voice Call.	
Voice Call Options Delay Between Calls Cet the Delay Detugen two Vision Cells	
Execution Limit Determines if the test will perform a specified number of iterations or repeat for a specified duration.	
Latency Measurement	
Sets the latency measurement type.	
Initiation	
Set the initiation of the connection.	

Ping Direction

Sets the ping direction from the perspective of the client application.

Packet Size

Sets the size of the ping packet to transmit during the test (bytes).

4.4.5. Test Criteria

Parameter		
Advanced Criteria Enabled		
Enable/Disable the advanced criteria for multiple UE categories		
Cat 1 Required Downlink Throughput		
Set the downlink throughput criteria for UE Category 1		
Cat 2 Required Downlink Throughput		
Set the downlink throughput criteria for UE Category 2		
Cat 3 Required Downlink Throughput		
Set the downlink throughput criteria for UE Category 3		
Cat 4 Required Downlink Throughput		
Set the downlink throughput criteria for UE Category 4		
Cat 5 Required Downlink Throughput		
Set the downlink throughput criteria for UE Category 5		
Cat 1 Required Uplink Throughput		
Set the uplink throughput criteria for UE Category 1		
Cat 2 Required Uplink Throughput		
Set the uplink throughput criteria for UE Category 2		
Cat 3 Required Uplink Throughput		
Set the uplink throughput criteria for UE Category 3		
Cat 4 Required Uplink Throughput		
Set the uplink throughput criteria for UE Category 4		
Cat 5 Required Uplink Throughput		
Set the uplink throughput criteria for UE Category 5		
Maximum Connect Time		
Defines the maximum connect time to pass the test (ms).		
Maximum Attach Time		
Defines the maximum attach time to pass the test (ms).		
Maximum Delay		
Defines the maximum delay to pass the test (ms).		
Maximum Timeouts		
Defines the maximum number of timeouts allowed to pass the test.		

4.4.6. Logging Options

Parameter	

CQI Stats Enabled

Enables/disables the CQI Statistics.

RLC Layer Stats Enabled

Enables/disables the RLC Layer Statistics.

4.4.7. Advanced Options

Parameter

Uplink Socket Buffer Size

Sets the Socket Buffer Size for Uplink.

Downlink Socket Buffer Size

Sets the Socket Buffer Size for Downlink.

IPv4 UDP Packet Size

Sets UDP packet size for IPv4.

IPv6 UDP Packet Size

Sets UDP packet size for IPv6.