

APPLICATION NOTE





Establish LTE and 2G/3G connections to labCORE via Anritsu MD8475B

Application Note

Establish LTE and 2G/3G connections to *lab*CORE via Anritsu MD8475B

Revision 1

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Table of contents

1	Intro	oduction	6
	1.1	Brief Description	6
	1.2	Reference Documentation	6
	1.3	Acronyms and Abbreviations	6
	1.4	Applied Interfaces at <i>lab</i> CORE and Anritsu MD8475B	7
		1.4.1 <i>lab</i> CORE Interfaces Front Panel	7
		1.4.2 <i>lab</i> CORE Interfaces Back Panel	7
		1.4.3 Anritsu MD8475B Interfaces Front Panel	8
		1.4.4 Anritsu MD8475B Interfaces Back Panel	8
2	LTE	E Connection	10
	2.1	Equipment List	10
		2.1.1 HEAD acoustics Equipment	10
		2.1.2 Anritsu Equipment	10
		2.1.3 Third Party Equipment	10
	2.2	Configuration Example	11
	2.3	Cabling	11
		2.3.1 Antenna	11
		2.3.2 <i>lab</i> CORE to Anritsu MD8475B	11
	2.4	LTE Connection Establishment	12
		2.4.1 Preparations	12
		2.4.2 Connection Procedure	12
3	2G	Connection	22
	3.1	Equipment List	22
		3.1.1 HEAD acoustics Equipment	22
		3.1.2 Anritsu Equipment	22
		3.1.3 Third Party Equipment	22
	3.2	Configuration Example	23
	3.3	Cabling	23
		3.3.1 Antenna	23
		3.3.2 <i>lab</i> CORE to Anritsu MD8475B	23
	3.4	2G Connection Establishment	24
		3.4.1 Preparation	24
		3.4.2 Connection Procedure	24

3G	Connection	32
4.1	Equipment List	32
	4.1.1 HEAD acoustics Equipment	32
	4.1.2 Anritsu Equipment	32
	4.1.3 Third Party Equipment	. 32
4.2	Configuration Example	. 33
4.3	Cabling	33
	4.3.1 Antenna	33
	4.3.2 <i>lab</i> CORE to Anritsu MD8475B	33
4.4	3G Connection Establishment	34
	4.4.1 Preparation	34
	4.4.2 Connection Procedure	. 34
	3G 4.1 4.2 4.3	 3G Connection

1 Introduction

1.1 Brief Description

This application note approaches the connection establishment between the Anritsu Signaling Tester MD8475B, HEAD acoustics equipment, and the DUT. The presented configurations intend testing mobile devices with current mobile communication standards (LTE, 3G, 2G).

The document consists of three main chapters. One for the LTE (4G) connection and two others for 2G or 3G connection. The structure of the main chapters is similar. The first sub-chapter illustrates the interconnection of all necessary hardware. Afterwards, the next sub-chapter guides step by step through the procedure for a successful connection establishment.

The application requires an advanced user knowledge of HEAD acoustics equipment as well as Anritsu MD8475B. HEAD acoustics will not respond to support requests concerning general handling and technical configuration of Anritsu MD8475B.

1.2 Reference Documentation

Document name
<i>lab</i> CORE Manual
HMS II Manual
ACQUA Online Help
Anritsu MD8475B User Manual

1.3 Acronyms and Abbreviations

Acronym / Abbreviation	Description
ACQUA	Advanced Communication Quality Analysis
AES	Audio Engineering Society
AMR	Adaptive multi-rate
APN	Access point name
BNC	Bayonet Neill Concelman
DUT	Device under test
GSM / GPRS	Global System for Mobile Communications / General Packet Radio Service
HHP	HEAD Handset Positioner
HMS	Head Measurement System
IMS	IP multimedia subsytem
IPsec	Internet protocol security
IPv4	Internet protocol version 4
IPv6	Internet protocol version 6
LED	Light-emitting diode
LTE	Long Term Evolution
MCC	Mobile country code
MNC	Mobile network code
PDN	Packet data network
QCI	QoS class identifier
RF	Radio frequency
RTP	Real-time transport protocol

SIM	Subscriber identity module
SIP	Session initiation protocol
UIM	User identity module
VoIP	Voice over Internet Protocol
W-CDMA	Wideband Code Division Multiple Access
XLR	Ground - left - right

1.4 Applied Interfaces at *lab*CORE and Anritsu MD8475B

1.4.1 *lab*CORE Interfaces Front Panel



Ethernet interface (RJ45) for measuring IP-based communication

1.4.2 *lab*CORE Interfaces Back Panel



D-Sub (DE-15) Pulse interface



1.4.3 Anritsu MD8475B Interfaces Front Panel

Type N RF antenna connector

1.4.4 Anritsu MD8475B Interfaces Back Panel



- CallProc Ethernet I/O socket (RJ45)
- Ethernet 0 socket (RJ45)
- Trigger output socket (BNC)

2 LTE Connection

2.1 Equipment List

2.1.1 HEAD acoustics Equipment

Required

- IabCORE (Code 7700), Modular multi-channel hardware platform
 - coreBUS (Code 7710), I/O bus mainboard
 - coreOUT-Amp2 (Code 7720), Power amplifier board
 - coreIN-Mic4 (Code 7730), Microphone input board
 - coreIP (Code 7770), VoIP software extension with at least one of the following voice codecs
 - ► coreIP-AMR (Code 7772), AMR extension
 - ► coreIP-EVS (Code 7773), EVS extension
- ACQUA (Code 6810), Advanced Communication Quality Analysis software
- HMS II.3 (Code 1703), HEAD measurement system with ear simulator and artificial mouth

Optional

- IabCORE extensions depending on device under test and/or application case
 - coreIP-IMP (Code 7771), VoIP impairment extension
 - coreBEQ (Code 7741), Binaural equalization
- Any HEAD acoustics handset positioner
 - HHP IV (Code 1406), Motorized handset positioner
 - HHP III.1 (Code 1403), Handset positioner

2.1.2 Anritsu Equipment

- Anritsu MD8475B Signaling Tester
- Enhanced Multi-signaling Unit
- SmartStudio©
- LTE FDD Option
- Extended CSCF Option
- LTE Simulation Software
- 1 Year Support Service

2.1.3 Third Party Equipment

- Ethernet switch
- 3 x Ethernet cable
- RF antenna
- Computer for ACQUA software
- DUT
- Test SIM card

2.2 Configuration Example



2.3 Cabling

2.3.1 Antenna



2.3.2 IabCORE to Anritsu MD8475B



System

<u>H</u>elp

* *

2.4 LTE Connection Establishment

2.4.1 Preparations

- Interconnect the hardware according to chapter 2.2 and chapter 2.3

<u>F</u>ile

🔳 🐩

Save..

View

- Boot up Anritsu MD8475B
- Open SmartStudio© on Anritsu MD8475B
- Boot up computer and start ACQUA
- Boot up labCORE
- Insert test SIM card into DUT and boot up DUT

2.4.2 Connection Procedure

Anritsu MD8475B: Simulation Parameter Setup

- 1. Open SmartStudio© on Anritsu MD8475B.
- 2. Select **e** to open **Simulation Parameter Setup**.
- 3. If available, load existing Simulation Parameter Setup by selecting Load...
- 4. Select Simulation.
- 5. Set Simulation Model to LTE.
- 6. Select UIM/SIM.
- 7. Check if the UIM/SIM settings apply to the SIM card of the DUT.
- 8. If desired, save the Simulation Parameter Setup by selecting <u>Save...</u>.
- 9. Confirm Simulation Parameter Setup by selecting <u>OK</u>.

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Simulation	Simulatio	n Mod	lel												
Common Status Change Trigger Message Log Monitor			Ľ						W-CDMA	TD-SCDMA	CDMA 1X	EV-DO	GSM/GPRS	WLAN	
Media Gateway		ŵ.	мім	0	Мо	dulatio	n Suppo	ort	ŵ	ŵ	ŵ	iĝi	Ŵ	ŵ	
- PPP		₿ -	Supp	ort	D	L	1	JL	₽₩	₽ 1	₿ C	DO	G	WL	
PDN Parameter	BTS1	۲	-	-	64	-	16		\odot	\odot	\odot	\bigcirc	\bigcirc		
···· Mobile IP	BTS2	۲	-	-	64	-	16	-	\odot	\odot	\odot	\odot	\odot	\odot	
LIIM/SIM	DTCO														
ulation Parameter Setup	-	-		-	-			-	-		_		_		-
Simulation Common Status Change Inager Message Log Montor Defaul Gateway PPP PDF Traineter I. Services Mode IP UIM/SIM				UIM/SIM IMSI: 3G Secu CP: OP: OPc: TOP: TOP: TOP: TOP: RAND: AUTN: IK: CK:	1 Name: P 0010 nty: <u>TS34</u> UIM/SIM N 00112 00000 00000 00000 01234 54CD 6754C 32675	0135Ax 012345678 108 ode (a) (1 (2233445566 000000000 0000000000 0000000000 56789ABCI FEAB98890 CDFEAB988 4CDFEAB98	39 • • • • • • • • • • • • • • • • • • •	OP-/TO BCCDDEEF 00000000 000000000 000000000 5789ABCDE 54CDFEAB9 5762310013 2457623100	Po F 000000000 = 3 2 1		0000000	-	00		

Anritsu - SmartStudio - Ver.7.20a_ST03

Load.

Setup

Simulation

<u>T</u>est

🔆 🍳 🔍 Measurement

Log

Anritsu MD8475B: Cell Parameter Setup

1. Select is to open Cell Parameter Setup.

Anritsu - SmartStudio - Ver.7.20a_ST03										
<u>F</u> ile	<u>V</u> iew	<u>S</u> etup	S <u>i</u> mulation	<u>T</u> est	<u>L</u> og	S <u>y</u> stem	<u>H</u> elp			
1 💷 🕯	🖗 🛛 🛛		🔳 🕴 👒 I 🥨	- 92	Measure	ment	• *			

2. If available, load existing Cell Parameter Setup setup by selecting Load ... <u>S</u>ave.. Load. 3. Select LTE from Cell List. Cell Parameter Setup 4. Unfold Common in Cell Parameter. Cell List: Cell Parameter: LTE - Default Cell SISO 🛈 🕕 👂 💩 114 114 114 114 114 114 114 114 5. Set the external attenuation (DL Common
 Cell Name Ref Power and UL Ref Power). It Default Cell SISO Default Cell SISO Default Cell MIMO TRx Ref Point BTS shall match the attenuation of the -30.0 Default Cell C DL Ref Power UE Rx Powe DL Pathloss -30.0 0.0 - W-CDMA RF antenna and the antenna · Default Cell R99 Default Cell HSDPA Default Cell HSPA cable. UL Ref Powe -30.0 -30.0 UE Tx Powe 6. Set the operating band (E-Default Cell HSPA R7 UL Pathloss 0.0 Default Cell HSPA_R8 MCC 001 UTRA Band) according to the DUT. - TD-SCDMA MNC 01F Default Cell R4 Cell Identity 0 7. Set the network identity MCC IMS Emergency Support E-PLMN List Default Cell HSDPA not supported Default Cell HSUPA according to SIM card Emergency Number List Cell Barred Default Cell HSPA ⊳ CDMA 1X Not Barred preferences. - Default Cell A Access Class Barred Not Barred Access Class Barred Default Cell B Not Barred 8. Set the network identity MNC EV-DO LTE Access Class Barred Default Cell A ▲ LTE RS EPRE according to SIM card -57.8 -57.8 preferences. GSM/GPRS Uplink Target Power Density Default Cell GPRS MME Group ID 32769 Default Cell EGPRS MME Code 0 9. If desired, save the simulation Default Cell NonGPRS TAC - WLAN Duplex Mode parameter setup by FDD E-UTRA Band Band1 selecting <u>Save...</u> Channel (DL) 300 2140.0 Frequency (DL) 10. Confirm cell parameter setup by Channel (UL) Synchronizes with DL 1950.0 requency (UL) selecting OK 10MHz DL Bandwidth UL Bandwidth Number of DL Antennas SameAsDL Transmission Mode DL Modulation Order TM1 64QAM Cell Name Input = ASCII, Length: 1 to 25 Load.. OK Cancel <u>S</u>ave...

Anritsu MD8475B: IPsec and Authentication Settings

- 1. Select from the task bar to open IMS services.
- 2. Select and highlight **IPsec settings** from the **Property** list.
- 3. Select [...] to edit IPsec settings.

File View Virtual	Network Tool Help				
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Mirtual Notwork Lint					
	lata 197				
r£ a≣ 🥵 vad 🔏 De	iele T.				
VNID CSCF		DHCPV6	DNS	DNS2	MVVI
1 192.168.1	.2		192.168.1.2		
2001:0:0:	102		2001:0:0:1::2		
2 192.100.1	- 12		-	-	-
(III				
/irtual Network Informati	on				
	Property			Information	
Monitoring UA	sip:user@anritsu-cscf.co	m 🔺 Target Servig	e CSCF 👻		
SMSC Auto Forward	False				
IMS Authentication	False	Monitoring U	JA Virtual UA User Info		
> User List	[Count = 0]	= User List-			Advanced Mod
Response Compare	False	MS Aut	hentication		R Server's Behav
IPsec Settings	Active		1.00 00 10 1		 O Namel
Extension	True	User Nan	ne		• Normai
Virtual UA Enabled	True				Ignore Reques
Virtual UA	sip:0123456789@test.3g	IPP			Send Error Respo
Max-Expires	1000000				400 Bad Dequeet
Communication For	IDUU VO Foloo	Bagistara	d List		 400 Dua request
Originating ID	True	Registere			P-CSCF Restorat
Terminating ID	True	Min-Expire:	s 0 👘 🗼 rejected	*	B Virtual UA's Beh
Precondition	False		Public Identity	Expire Date	Make Call
Early Media	False				
AutoAnswer	True	-			make video ca
					End Call

4. Check the IPsec Active box and edit × IPsec Settings the settings according to the DUT. ✓ IPsecActive or Active algorithm Uncheck the IPsec Active box to 🔽 hn deactivate IPsec. hmac-sha-1-96 5. Select to confirm IPsec OK Settings. Active encrypt-algorithm V T 🔽 aes-cbc 🔽 null OK Cancel 6. Set IMS Authentication to either True Monitoring UA sip:user@anritsu-cscf.com ٠ Target Service or False according to the DUT. SMSC Auto Forward False Monitoring UA IMS Authentication False User List [Count = 0] User List-Ξ Response Compare False IMS Authe IPsec Settings Active m User Name Extension True Virtual UAEnabled True Virtual UA sip:0123456789@test.3gpp Max-Expires 1000000 Min-Expires 1500

Anritsu MD8475B: PDN Parameter Setup

- Select *P* from the task bar to switch back to the SmartStudio© main screen.
- 2. Select the **Packet** icon to display the PDN information window.
- Double-click on the row of the DUT that is connected via LTE connection to the radio tester. The PDN Parameter Setup of the DUT pops up.
- 4. Confirm the APN name at **Check APN**. Change it if necessary.
- Confirm the IP Type. Change if necessary.
- 6. Select the tab **User Equipment**. Check and confirm the **IPv6** address of the DUT.





- 7. Select the **Bearer** tab.
- 8. Confirm the value **5** for the **QCI** of the default service.



- 9. Select the Network tab.
- 10. The default settings apply.
- 11. Select <u>OK</u> to confirm and finish the PDN Parameter Setup.
- 12. Select b to start the simulation.



Anritsu MD8475B: IMS Server

- 1. Select from the task bar to open IMS services.
- 2. Set the DUT in offline mode / airplane mode.



- 3. Select the User Info tab.
- 4. Select Authentication to unlock IMS authentication.

Eile View Virtual Network Iool Help											
Virtual Network List											
🚓 🚅 🞇 Add 📜 Delete 🛛 -											
VNID CSCF DHCPv6	DNS	DNS2	MWI	NDP							
* 1 192.168.1.2 2001:0:0:1::2	192.168.1.2 2001:0:0:1::2			fe80::200:ff:fe00:1							
* 2 192.168.1.12 2001:0:0:1::2 -				fe80::200:ff:fe00:2							
* 3 192.168.1.22 - 2001:0:0:1::2 -	192.168.1.22 2001:0:0:1:2			fe80::200:ff:fe00:3							
★ 4 192.168.1.32 2001:0:0:1:2 -	192.168.1.32 2001:0:0:1:2	192.168.1.32 2001/0.0.1.2		fe80::200:ff:fe00:4							
Virtual Network Information				7							
Property		Infor	mation								
Vision 1 Sync Enabled Tue CSGF Tue Enabled Tue Enabled Tue Exactly Tue Part Stop PAdresses (IPv8) IPA 48 L2nnes L(none), (none Part 2001 0.0.1.2, (none), (none Part 500 Monton-Grade Forward sp. user@les1.2pp.com Mits Authentication Tue Pact List Count = 21 Response Compare False Pace Coll Tue Vac List Tue Vac List Tue Vac List Tue Vac Visual Network (dentifier	Peption Constraints Person Constraints Person Constraints Peption Peption Peption Peption Peption Peption Peption Person	er indo	Date	Advanced Node Server's Bithodor O Normal Gyron Regust Send form Response Color Response Color Response Victual DA's Bithvior Maa Color Cal End Cal							

ACQUA Computer: Hardware Configuration and Radio Tester Wizard

- 1. Start Hardware Configuration.
- 2. Select *lab*CORE and build the configuration.



3. Select the VolP block.



- 4. Select the Call tab.
- 5. Enable Automatic Jitter Buffer Reset.
- 6. Select Radio Tester Wizard.

VoIP Settings		>
🝸 🔄 🖬 🔍 Network Impair	ments	
Network Settings SIP Settings RTP Settings Call Radio T	ester Wizard	
SIP Call Target Autocomplete Type to see auto completion Status Idle RTP Stream Remote 127.0.0.1 Status Idle Example Status Idle Status Idle Status Status S	Debug VolP Log Active Download Reset Jitter Buffer Reset Automatic Manual Reset	
Status: Audio System 🥥 Reset VoIP System 🥥 Reset	SIP Registration 🔘 SIP Call 🔘	<u>R</u> TP Stream 🔘

 Select the Anritsu MD8475B. The Internet protocol (IPv4, IPv6) depends on the DUT.

VoIP Settings						2
7		- 🛛 🖬 🔍	Network Impai	rments		
Network Settings SIP Se	ettings F	RTP Settings Ca	II Radio	Tester Wizard		
Select Radio Tester IP Settings	Select	Radio Test	er			
SIP Settings Registrar Settings Check Parameter	Anrit Anrit Anrit Anrit Anrit Rohe	su MD8475 LTE (IP) su MD8475 LTE (IP) su MD8475 2G/3G de & Schwarz CMW	4 <u>4</u> (6) V 500			
					< <u>B</u> ack	<u>N</u> ext >
Status: Audio System 🥝	Reset	VoIP System 🥝	Reset	SIP Registration 🔘	SIP Call 🔘	<u>R</u> TP Stream

- 8. Select IP Settings.
- 9. Enter / verify the IP Settings.

VoIP Settings >											
7	•	0 🖬 🛛	K Netv	vork Impa	irments						
Network Settings SIP Settings RTP Settings Call Radio Tester Wizard											
Select Radio Tester IP Settings											
IP Settings											
RTP Settings					101						
SIP Settings	IP	192 .	168 .	1 .	101						
Registrar Settings	s Subnet Mask Gateway	255 .	255 .	0.	0						
Check Parameter		192 .	168 .	1.	2						
	DNS	υ.	0.	0.	0						
						< <u>B</u> ack	<u>N</u> ext >				
Status: Audio System 🥝	Reset V	OIP System	0	Reset	SIP Registration	n 🔘 SIP Call 🔘	<u>R</u> TP Stream 🔘				

10. Select RTP Settings.

- 11. Enter a suitable initial jitter buffer length. Default setting is 140 ms.
- 12. Select the desired voice codec.

VoIP Settings					>
Network Settings SIP Se	• 🖸	🛃 🔌 Network Impairm ngs Call Radio Te	ents ster Wizard		
Select Radio Tester IP Settings	RTP Setting	S			
SIP Settings Registrar Settings Check Parameter	General Initial jitter buffe Packet Length Codec Configura Codec Encoder Param. FMTP	r length 140 20 tion AMR octet-align=1;fixed-local-n octet-align=1;max-red=0) ms ms 		
				< <u>B</u> ack	<u>N</u> ext >
Status: Audio System 🥝	Reset VolP	System 🥝 Reset	SIP Registration 🔘	SIP Call 🔘	RTP Stream

13. Select SIP Settings.

14. Enter / verify the SIP settings.

VoIP Settings						>
7		🔹 🖸 🖬 🔍 i	Network Impairr	nents		
Network Settings SIP Set	ettings R	TP Settings Call	Radio T	ester Wizard		
Select Radio Tester	SIP Se	ttings				
IP Settings						
RTP Settings SIP Settings	SIP Port	7060	UDP	~		
Registrar Settings	Contact	sip:2345@192.16	58.1.3:7060			
Check Parameter						
					< <u>B</u> ack	<u>N</u> ext >
Status: Audio System 🥥	Reset	VoIP System 🥝	Reset	SIP Registration 🔘	SIP Call 🔘	<u>R</u> TP Stream 🔘

- 15. Select Registrar Settings.
- 16. Enter / verify the Registrar settings.

VoIP Settings					>
7	- 00 🖬	🔌 Network Impa	irments		
Network Settings SIP Set	ettings RTP Settings	Call Radio	Tester Wizard		
Select Radio Tester	Registrar Sett	ings			
IP Settings					
RTP Settings	Registrar				
SIP Settings	Server Address	192.168.1.2:5060			
Registrar Settings	User ID	2345			
Check Parameter	Password				
	Identity	sip:2345@test.3gp	p.com		
	Contact Parameter	I			
	Outbound Proxy	192.168.1.2			
				< <u>B</u> ack	<u>N</u> ext >
Status: Audio System 🥥	Reset VoIP Syst	em 🥝 Reset	SIP Registration 🥥	SIP Call 🔘	<u>R</u> TP Stream 🥥

- 17. Select Check Parameters.
- 18. Verify all set parameters.
- 19. Select **Apply** to register the *lab*CORE at Anritsu MD8475B.

VoIP Settings						>
Network Settings SIP S	ettings R	TP Settings Cal	Network Impa) Tester Wizard		
Select Radio Tester IP Settings RTP Settings	Check Press Apply	v to configure the la	CORE			
SIP Settings	IP: 192.168 Subnet M	3.1.3 ask: 255.255.0.0				
Registrar Settings	Gateway: DNS: 192.	192.168.1.2 168.1.2				
Check Parameter	Initial jitte Codec: AN Encoder P FMTP: oct	r buffer length: 14 IR arameter: octet-ali et-align=1;max-red	0 gn=1;fixed-lo =0	cal-mode=7;request-rem	ote-mode=7;d	tx=0
	<					>
	_				< <u>B</u> ack	Apply
Status: Audio System 🥝	Reset	VoIP System 🥝	Reset	SIP Registration 🥥	SIP Call 🔘	<u>R</u> TP Stream

- 20. The green LED at the bottom confirms the successful **SIP Registration**.
- 21. The SIP address of *lab*CORE appears in the **Registered List** on Anritsu MD8475B.

🔽 🔲 🔚 📉 Network Impair	ments	
etwork Settings SIP Settings RTP Settings Call Radio T	Fester Wizard	
SIP Call	Debug	
Target 🗸 🗸 🗸	VoIP Log Active	
Autocomplete Type to see auto completion	Download	
	Reset	
Status 🥝 Streams running		
	Jitter Buffer Reset	
• can	Automatic	
RTP Stream	Manual Reset	
Remote 127.0.0.1		
Status 🕘 Unavailable		
Start Stop		

Anritsu MD8475B: IMS Server

- 1. Set the DUT back online and let it register at the IMS server.
- 2. The SIP address of the DUT appears in the **Registered List** on Anritsu MD8475B.
- 3. If IPsec is active at Anritsu MD8475B: Select

IMS Authentication to lock IMS authentication. Do not lock IMS authentication if IPsec is inactive at Anritsu MD8475B and not required by the DUT.

4. Check if DUT and *lab*CORE have the same public identity address (example@test3gpp.com) in the **Registered List**.

1 (P) (P) (P) (P) (P)	ouk Tool Telb				
() Set and the set of					
Virtual Network List	V .				
VNID CSCF	DHCPv6	DNS	DNS2	MWI	NDP
1 192.168.1.2		192.168.1	.2		fe80::200:ff:fe00:1
192.168.1.12		2001:0:0:	1.:2		
2001:0:0:1:2					fe80::200:ff:fe00:2
k 3 192.168.1.22		192.168.1	.22		fe80::200:ff:fe00:3
192 168 1 32		2001.0.0.	32 192 168 1 32		
4 2001-0-0-1-2		2001-0-0	1-2 2001-0-0-1-2		fe80::200:ff:fe00:4
ual Network Information					
	Property			Information	
Common		 Target Service CSCF 	•		
VNID	1	I manual sector	The second		
Sync Enabled	True	Monitoring UA Virtua	II UA Oser Inio		
CSCF		User List			Advanced Moo
CSCF Enabled	True	User List	าววรุห		Advanced Moo Server's Behaviore
CSCF Enabled Host Name	True test.3gpp.com	User List	1393×		Advanced Moo Server's Behav Normal
CSCF Enabled Host Name IP Version	True test.3gpp.com IPv4 & IPv6	User List	A E C E F		Advanced Moc Server's Behav Normal
CSCF Enabled Host Name IP Version IP Addresses (IPv4)	True test.3gpp.com IPv4 & IPv6 192.168.1.2,(none),(none)	User List) 🐊 🌙 🐊 🗙 🗙		Advanced Moc Server's Behav Normal Ignore Reques
CSCF Enabled Host Name IP Version IP Addresses (IPv4) IP Addresses (IPv6) Deut	True test.3gpp.com IPV4 & IPV6 192.168.1.2,(none),(none) 2001:0:0:1:2,(none),(none)	User List User List Wins Authenticatio User Name 001010123456789 001010123456789) C C C C C C C C C C C C C C C C C C C		Advanced Mod Sorver/s Behav Normal Ignore Reques Send Error Respo
CSCF Enabled Host Name IP Version IP Addresses (IPv4) IP Addresses (IPv6) Port Hontering LIA	True test.3gpp.com IPv4.& IPv6 192.168.1.2,(none),(none) 2001:0.0:1::2,(none),(none) 5060	User List User Name 001010123455789	Rims.mnc001.mcc001.3gppnetwork.org		Advanced Mod Advanced Mod Server's Behav Advanced Mod Server's Behav Advanced Mod Server's Behav Server's Behav
CSCF Enabled Host Name IP Version IP Addresses (IPv6) Port Monitoring UA SMSC Auto Expensed	True test3gpp.com IPv4 & IPv6 192.168.1.2,(none),(none) 2001:0:0:1:2,(none),(none) 5060 sipruser@test3gpp.com Evice	User List MAS Authenticatio User Name 0010101234567890 0010101234567890) 김 과 곳 X Rims minc001 Mcc001 3ppnetwork.org Rtest 3ppp.com		Advanced Mod Server's Birbar D Normal Senver's Birbar Senver's Birbar Senver's Birbar Senver's Birbar Senver's Birbar Senverse
CSCF Enabled Host Name IP Version IP Addresses (IPv4) IP Addresses (IPv6) Port Monitoring UA SMSC Auto Forward UKS authenication	True test.3gpp.com IPV4 & IPV6 192.168.12.(none),(none) 2001.0:0.1:2.(none),(none) 5060 sipusee@dest.3gpp.com False True	User List	য় 🔉 🔉 🔭 🗙 Rims minc001 mcc001 3gppnetwork org Riest 3gpp.com		Advancet Mod Server's Bohav Server's Bohav Server's Bohav Server's Bohav Send Error Response 400 Bod Request P-CSCF Restorat
CSCF Enabled Host Name IP Version IP Addresses (IPv4) IP Addresses (IPv6) Port Monitoring UA SMSC Auto Forward INS Authentication User Liet	True test 3gpp com IPv4 & IPv6 192.168.12,(none),(none) 2001:00.1-2,(none),(none) 5060 sippuser@test.3gpp.com False True Ifouet = 3	E User List User Name Octotot224567899 Dototo1224567899 Registered List Name Course (1500)	Construction of the second sec		Advancet lod Server's Biblys O Normal byore Reques bond Error Respon dol Band Reruest P-CSCF Restorat Virtual UA/s Beh
CSCF Enabled Host Name IP Version IP Addresses (IPv6) Port Monitoring UA SMSC Auto Forward IMS Authentication User List Besences Compare	True test 3gpp.com IPv4 8/Pv6 192,168.12,(none) 2001:00-12,(none),(none) 5000 sipuser@stest3gpp.com False True [Count = 2] Ealse	EUser List User Vame OUT01234557899 O010101234557899 Registered List Min-Expires 1500	I I I I I I I I I I I I I I I I I I I		Advancet Mod Server's Ghave Unoreal Unoreal Unoreal Unoreal Unoreal Unoreal O Instructure O Dad Request P-CSCF Restoreal Virtual UAX Beh Make Cel
CSCF Enabled Host Name IP Version IP Addresses (IPv4) IP Addresses (IPv6) Port IP Addresses (IPv6) Port MIS Auto Forward MIS Auto Forward MIS Auto-entocation User List Response Compare IPsan Settinone	True lest 3,pp com IPv4 & IPv6 192:168.1.2,(none),(none) 5000 sip user[@test.3,pp,com False True [Count = 2] False Arbue	E User List MIA Authenticatio User Name Octotot1234567889 Octoto1234567889 Registered List Min-Expires 1500		Expire Date	Advanced Work Server's Behav D Normal Unormal Unormal Good Request Accord Request Accord Request Virtual V/No Beh Make Cal
CSCF Enabled Host Name IP Version IP Version IP Addresses (IPv4) IP Addresses (IPv6) Port Monitoring UA SM3C Auto Forward IIIS Authentication User List Response Compare IPsoc Settings	True fest3gpp.com [PV4.8.IP/6 192.108.12_(none)(none) 20010.01_2(none)(none) 5000 sip usergitest3gpp.com Failse True [Count = 2] Failse Adhre True	E User List User List User Name 0010101234557899 0010101234557899 Registered List Mm-Expires 1500	Source of the second s	Expire Date 1221/2017 9 51 13 44	Advanced Work Server's Dihay Orace Request Orace
CSCF Enabled Host Name IP Version IP Addresses (IPv6) Port Monitoring UA SMSC Aulo Forward MS Authenteation User List Response Compare IPsec Settings Extension Virtual UA Enabled	True test 3gp.com IPA & IPA 192.183 12, Inone), Inone) 2001 0.01:2, Inone), Inone) 5090 aip usergitest 3gp.com Patie Toue = 21 Fatis True True	EUserList MISAuhenticatio UserKame 001010123459789 001010123459789 Registered List Min-Expires 1500	A J J X Constructed Independence Constructed Independence Constructed Independence Constructed	Expire Date 122/12037 351 13 AM 121/1207 12 2351 FM	Advanced tool Screeds Beyls Constraint Beyls Sond Street Beyls Sond Street Beyls Sond Street Beyls Kond Street Beyls Kond Street Beyls Made Cal Make Cal Make Cal Make Cal Sond Street Beyls
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ACQUA Computer: Call Execution

- 1. Enter the SIP address of the DUT in ACQUA and select **Call** to connect DUT and *lab*CORE.
- 2. The connection is established.

VoIP Settings		2
🝸 🛄 🖃 🔍 Network Impairm	nents	
Network Settings SIP Settings RTP Settings Call Radio Te	ester Wizard	
SIP Call Target Autocomplete Type to see auto completion Status Status Call Target Call	Debug VoIP Log Active Download Reset Jitter Buffer Reset	
RTP Stream Remote I127.0.0.1 Status Unavailable	Manual Reset	
Start Stop		
Status: Audio System 🥝 Reset VoIP System 🥥 Reset	SIP Registration 🥥 SIP Call 🥝 <u>R</u> TP Strear	n 🔘

3 2G Connection

3.1 Equipment List

3.1.1 HEAD acoustics Equipment

Required

- IabCORE (Code 7700), Modular multi-channel hardware platform
 - coreBUS (Code 7710), I/O bus mainboard
 - coreOUT-Amp2 (Code 7720), Power amplifier board
 - coreIN-Mic4 (Code 7730), Microphone input board
 - coreIP (Code 7770), VoIP software extension with codec
- ACQUA (Code 6810), Advanced Communication Analysis software
- HMS II.3 (Code 1703), HEAD measurement system with ear simulator and artificial mouth
- CDM V (Code 1637), Cable D-Sub 15-pin 2 x XLR (AES/EBU in/out) + 2 x BNC (pulse in/out)

Optional

- IabCORE extensions depending on device under test and/or application case
 - coreIP-IMP (Code 7771), VoIP impairment extension
 - coreIP-AMR (Code 7772), AMR extension
 - coreBEQ (Code 7741), Binaural equalization
- Any HEAD acoustics handset positioner
 - HHP IV (Code 1406), Motorized handset positioner
 - HHP III.1 (Code 1403), Handset positioner

3.1.2 Anritsu Equipment

- Anritsu MD8475B Signaling Tester
- SmartStudio©
- GSM Option
- GSM/GPRS Simulation Software
- GSM Signalling Unit
- 1 Year Support Service
- SIPviaMD8475

3.1.3 Third Party Equipment

- Ethernet switch
- 3 x Ethernet cable
- BNC cable
- RF antenna
- Computer for ACQUA software
- DUT
- Test SIM card

3.2 Configuration Example



3.3 Cabling

3.3.1 Antenna

12:45

3.3.2 IabCORE to Anritsu MD8475B



3.4 2G Connection Establishment

3.4.1 Preparation

- Interconnect the hardware according to chapter 3.2 and chapter 3.3
- Boot up Anritsu MD8475B
- Open SmartStudio© on Anritsu MD8475B
- Boot up computer and start ACQUA
- Boot up labCORE
- Insert test SIM card into DUT and boot up DUT

3.4.2 Connection Procedure

ACQUA Computer: Hardware Configuration

- 1. Start Hardware Configuration.
- 2. Select *lab*CORE and build the configuration.



3. Select the VolP block.



- 4. Select the **Call** tab.
- 5. Enable Automatic Jitter Buffer Reset.

Vetwork Settings SIP Settings RTP Settings Call Radio Tes SIP Call Target Autocomplete Type to see auto completion	ster Wizard Debug VoIP Log Active Download
SIP Call Target Autocomplete Type to see auto completion	Debug VoIP Log Active Download
Status Olde RTP Stream Remote 127.0.0.1 Status Olde Status Start Stop	Reset Jitter Buffer Reset Automatic Manual Reset

Anritsu MD8475B: Connection Parameters

1. Open SmartStudio© on Anritsu Anritsu - SmartStudio - Ver.7.20a_ST03 MD8475B. System File View Setup Simulation Test Log <u>H</u>elp 2. Select **m** to open Simulation Parameter Setup. • * 1 🗄 🗬 🤹 🤍 Measurement 影 3. If available, load existing Simulation Parameter Setup by selecting Load Save.. Load. 4. Select Simulation. Simulation Parameter Setup Set Simulation Model to GSM/GPRS. 5. Simulation Model imulatior 6. Select UIM/SIM. Common TD-SCDMA GSM/GPBS Status Change ¥ W-CDMA EV-DO Trigger WLAN CDMA. Message Log Monitor Щ Default Gateway Modulation Support MIMO Media Gateway PPP Support DL UL PDN Parameter Ė BTS1 0 0 64 16 ۲ 0 0 C ---- Services BTS2 ٢ Mobile IP LIIM/SIM 7. Check if the UIM/SIM settings ulation Parameter Setur UIM/SIM List: apply to the SIM card of the DUT. Simulation Common Status Change UIM/SIM Name: P0135Ax 8. If desired, save the Simulation - Trigger - Message Log Mo - Default Gateway - Media Gateway - PPP - PDN Parameter 001010123456789 Parameter Setup by IMSI: 3G Security: TS34.108 selecting <u>Save...</u>. Mobile IP Test UIM/SIM Mode
OP/TO 00112233445566778899AABBCCDDEEFF 9. Confirm Simulation Parameter Setup OP-by OPc: TOP: selecting OK TOPc RAND: 0123456789ABCDEF0123456789ABCDEF AUTN: 54CDFEAB9889000001326754CDFEAB98 6754CDFEAB9889BAEFDC457623100132 IK: 326754CDFEAB9889BAEFDC4576231001 CK:



- 20. Open SIPviaMD8475.
- 21. Set GSM as Simulation Type.
- 22. Set desired codec as **Voice Codec** consistent to SmartStudio©.
- 23. Select Register.

🖳 SI	PviaMD8475			-	×
File	Help				
Se	etting Parameters			Desister	
~	General			Register	
	Local IP Address	192.168.1.2		Unregister	
	Simulation Type	GSM	\sim		
~	SIP				
	CSCF Address	192.168.1.2			
	CSCF Port	5060		Voice Codec	
	CSCF URI	sip:anritsu-cscf.com		GSM-EFR	~
	Public URI	sip:user@anritsu-cscf.com			
				Destination URI	
				sip:1234@test.3gpp.com	
Si	mulation Type				
31	inulation type				

24. Go to SmartStudio©.

25. Select b to start the simulation.



ACQUA Computer: Radio Tester Wizard

- 1. Select the Radio Tester Wizard tab.
- 2. Select Anritsu MD8475 2G/3G.

VoIP Settings			
7	💌 🛄 🔛 🔌 Netv	work Impairments	
Network Settings SIP S	ettings RTP Settings Call	Radio Tester Wizard	
Select Radio Tester	Select Radio Tester		
RTP Settings SIP Settings Registrar Settings Check Parameter	Anritsu MD8475 LTE (IPv4) Anritsu MD8475 LTE (IPv6) Anritsu MD8475 2G/3G Rohde & Schwarz CMW 500	2	
L			< <u>B</u> ack <u>N</u> ext >
Status: Audio System 🥝	Reset VoIP System 🥝	Reset SIP Registration 🔘	SIP Call 🥥 <u>R</u> TP Stream 🔘

- 3. Select IP Settings.
- 4. Enter/verify the **IP Settings**.

VoIP Settings						>
7	-	🕕 🖬 🔍 Ne	etwork Impair	ments		
Network Settings SIP S	ettings RTP S	ettings Call	Radio 1	ester Wizard		
Select Radio Tester	IP Settin	gs				
IP Settings						
RTP Settings		100 100		24		
SIP Settings	IP	192 , 168				
Registrar Settings	Subnet Mask	255 . 255	. 0 . (
Check Parameter	Gateway	192 . 168	. 1	2		
	DNS	0.0	. 0 . (
					< <u>B</u> ack	<u>N</u> ext >
Status: Audio System 🥝	Reset V	/oIP System 🥝	Reset	SIP Registration 🔘	SIP Call 🔘	<u>R</u> TP Stream 🔘

- 5. Select RTP Settings.
- 6. Enter a suitable **Initial jitter buffer length**. Default setting is 140 ms.
- 7. Select the voice codec in accordance with SIPviaMD8475.

VoIP Settings				>
Network Settings SIP S	• 🖸	🖬 🔍 Network In ngs Call 🛛 Rí	npairments adio Tester Wizard	
Select Radio Tester IP Settings	RTP Setting	js		
SIP Settings SIP Settings Registrar Settings Check Parameter	General Initial jitter buffe Packet Length	er length 140 20	ms ~ ms	
	Codec Configura Codec Encoder Param. FMTP	stion GSM-EFR	> > >	
	_			< <u>B</u> ack <u>N</u> ext >
Status: Audio System 🥝	Reset VolP	System 🥝 🔹 Reset	SIP Registration 🥥	SIP Call 🔘 <u>R</u> TP Stream 🔘

- 8. Select SIP Settings.
- 9. Enter/verify the SIP Settings.

VolD Sattings						
		- 🛈 🖬 🔌 N	etwork Impairr	nents		,
Network Settings SIP Se	ettings R	TP Settings Call	Radio T	ester Wizard		
Select Radio Tester IP Settings RTP Settings	SIP Se	ttings				
SIP Settings Registrar Settings Check Parameter	SIP Port Contact	7060 sip:1234@192.16	UDP	~		
	J				< <u>B</u> ack	<u>N</u> ext >
Status: Audio System 🥝	Reset	VoIP System 🥝	Reset	SIP Registration 🔘	SIP Call 🔘	<u>R</u> TP Stream 🔘

- 10. Select Registrar Settings.
- 11. Enter/verify the Registrar Settings.

VoIP Settings					>
Network Settings SIP Se Select Radio Tester IP Settings RTP Settings	C RTP Settings RTP Settings Registrar Sett Registrar	Network Impai	rments Tester Wizard		
Check Parameter	Server Address User ID Password Identity Contact Parameter Outbound Proxy	192.168.1.2:5060 1234 sip:1234@test.3gpp			
		_		< <u>B</u> ack	<u>N</u> ext >
Status: Audio System 🥝	Reset VoIP Syst	em 🥝 🛛 Reset	SIP Registration 🥥	SIP Call 🔘	<u>R</u> TP Stream

- 12. Select Check Parameter.
- 13. Verify all set parameters.
- 14. Select **Apply** to register the *lab*CORE at Anritsu MD8475B.

VoIP Settings							>
7		- 🛈 🖬	🔍 Netw	ork Impaiı	ments		
Network Settings	SIP Settings	RTP Settings	Call	Radio	Tester Wizard		
Select Radio Tes IP Settings	ter Chee Press A	c k Parame pply to configure	ters the labCOR	E			
RTP Settings SIP Settings Registrar Settin Check Paramet	gs DNS: C Packet er Initial Codec Encod FMTP:	.168.1.101 t Mask: 255.255. ay: 192.168.1.2 .0.0.0 Length: 20 jitter buffer leng : GSM-EFR er Parameter:	0.0 yth: 140				
	<						>
						< <u>B</u> ack	Apply
Status: Audio Syste	em 🥝 🛛 Reset	VoIP Syste	em 🥝 🛛 F	Reset	SIP Registration 🥥	SIP Call 🔘	<u>R</u> TP Stream 🔘

Anritsu MD8475B: Call Execution

1. Go to the SmartStudio© main screen. The status of the DUT (UE status) is Idle.



2. Enter any number (e.g.,123) on the keypad of the virtual phone on the screen.

CC: 001

 Select the green call button to initiate the call. The radio tester waits for the call acceptance of the DUT.



- 4. Accept the call at the DUT.
- 5. The status of the DUT switches from **Termination** to **Communication**.



4 3G Connection

4.1 Equipment List

4.1.1 HEAD acoustics Equipment

Required

- IabCORE (Code 7700), Modular multi-channel hardware platform
 - coreBUS (Code 7710), I/O bus mainboard
 - coreOUT-Amp2 (Code 7720), Power amplifier board
 - coreIN-Mic4 (Code 7730), Microphone input board
 - coreIP (Code 7770), VoIP software extension with codec
 - coreIP-AMR (Code 7772), AMR extension
- ACQUA (Code 6810), Advanced Communication Analysis software
- HMS II.3 (Code 1703), HEAD measurement system with ear simulator and artificial mouth
- CDM V (Code 1637), Cable D-Sub 15-pin 2 x XLR (AES/EBU in/out) + 2 x BNC (pulse in/out)

Optional

- IabCORE extensions depending on device under test and/or application case
 - coreIP-IMP (Code 7771), VoIP impairment extension
 - coreBEQ (Code 7741), Binaural equalization
- Any HEAD acoustics handset positioner
 - HHP IV (Code 1406), Motorized handset positioner
 - HHP III.1 (Code 1403), Handset positioner

4.1.2 Anritsu Equipment

- Anritsu MD8475B Signalling Tester
- SmartStudio©
- W-CDMA Option
- Enhanced Multi-signalling Unit
- W-CDMA Simulation Software
- 1 Year Support Service
- SIPviaMD8475

4.1.3 Third Party Equipment

- Ethernet switch
- 3 x Ethernet cable
- BNC cable
- RF antenna
- Computer for ACQUA software
- DUT
- Test SIM card

4.2 Configuration Example



4.3 Cabling

4.3.1 Antenna

12:45

4.3.2 *lab*CORE to Anritsu MD8475B





4.4 3G Connection Establishment

4.4.1 Preparation

- Interconnect the hardware according to chapter 4.2 and chapter 4.3
- Boot up Anritsu MD8475B
- Open SmartStudio© on Anritsu MD8475B
- Boot up computer and start ACQUA
- Boot up labCORE
- Insert SIM card into DUT and boot up DUT

4.4.2 Connection Procedure

ACQUA Computer: Hardware Configuration

- 1. Start Hardware Configuration.
- 2. Select *lab*CORE and build the configuration.



3. Select the VolP block.



- 4. Select the Call tab.
- 5. Enable Automatic Jitter Buffer Reset.

Y 💽 🖬 🌂 Network Impairr	ments	
Network Settings SIP Settings RTP Settings Call Radio T	ester Wizard	
SIP Call Target Autocomplete Type to see auto completion Status	Debug VoIP Log Active Download Reset	
S Call 🖛 Terminate	Jitter Buffer Reset	
RIP Stream Remote 127.0.0.1	Manual Reset	
Status 🖉 Idle		

Anritsu MD8475B: Connection Parameters

- 1. Open SmartStudio© on Anritsu MD8475B.
- 2. Select **m** to open Simulation Parameter Setup.
- 3. If available, load existing Simulation Parameter Setup by selecting Load
- 4. Select Simulation.
- Set Simulation Model to W-CDMA. 5.

7. Check if the UIM/SIM settings

8. If desired, save the Simulation

Parameter Setup by

selecting OK

by

selecting <u>Save...</u>.

6. Select UIM/SIM.





- 20. Open SIPviaMD8475.
- 21. Set WCDMA as Simulation Type.
- 22. Set desired codec as Voice Codec consistent to SmartStudio©.
- 23. Select Register.

🖳 SI	PviaMD8475		– 🗆 X
File	Help		
Se	tting Parameters		Desister
~	General		Register
	Local IP Address	192.168.1.2	Unregister
	Simulation Type	WCDMA	
~	SIP		
	CSCF Address	192.168.1.2	
	CSCF Port	5060	Voice Codec
	CSCF URI	sip:anritsu-cscf.com	AMR-WB(12.65kbit/s)
	Public URI	sip:user@anritsu-cscf.com	
			Destination URI
			sip:1234@test.3gpp.com
Si	nulation Type		

24. Go to SmartStudio©.

25. Select b to start the simulation.



ACQUA Computer: Radio Tester Wizard

- 1. Select the Radio Tester Wizard tab.
- 2. Select Anritsu MD8475 2G/3G.

VoIP Settings			
7	💌 🛄 🔚 🔍 Netv	work Impairments	
Network Settings SIP S	ettings RTP Settings Call	Radio Tester Wizard	
Select Radio Tester	Select Radio Tester		
RTP Settings SIP Settings Registrar Settings Check Parameter	 Anritsu MD8475 LTE (IPv4) Anritsu MD8475 LTE (IPv6) Anritsu MD8475 2G/3G Rohde & Schwarz CMW 500 	5	
L]		< Back Next >
Status: Audio System 🥝	Reset VoIP System 🥝	Reset SIP Registration 🔘	SIP Call 🥥 <u>R</u> TP Stream 🔘

- 3. Select IP Settings.
- 4. Enter/verify the **IP Settings**.

VoIP Settings						>
7	• [[🛛 🖬 🔍 Net	work Impairr	ments		
Network Settings SIP Se	ettings RTP Set	tings Call	Radio T	ester Wizard		
Select Radio Tester	IP Settings	5				
RTP Settings SIP Settings Registrar Settings Cherk Parameter	IP Subnet Mask Gateway	192 . 168 255 . 255 192 . 168	. 1 . 10 . 0 . 0 . 1 . 2	01 0 2		
	DNS	0.0	. 0 . 0)		
Chathan Andia Sustan (Beach	D Surtan Q	Decet	CID Desidention	< <u>B</u> ack	Next >

- 5. Select RTP settings.
- 6. Enter a suitable **Initial jitter buffer length**. Default setting is 140 ms.
- 7. Select the voice codec in accordance with **SIPviaMD8475**.

VoIP Settings				×		
Network Settings SIP S	ettings RTP Setti	ngs Call Radi	airments o Tester Wizard			
Select Radio Tester IP Settings RTP Settings	RTP Setting	JS				
SIP Settings	General Initial jitter buffer length 140 ms Packet Length 20 v ms					
	Codec Configur Codec Encoder Param. FMTP	ation AMR octet-align=1;fixed-loo octet-align=1;max-red	cal-mc v =0 v			
Statue: Audio System @	Recet VolD	System 🖉 Reset		< Back Next >		

- 8. Select SIP Settings.
- 9. Enter/verify the SIP Settings.

VolD Sattings						
		- 🛈 🖬 🔌 N	etwork Impairr	nents		,
Network Settings SIP Se	ettings R	TP Settings Call	Radio T	ester Wizard		
Select Radio Tester IP Settings RTP Settings	SIP Se	ttings				
SIP Settings Registrar Settings Check Parameter	SIP Port Contact	7060 sip:1234@192.16	UDP	~		
	J				< <u>B</u> ack	<u>N</u> ext >
Status: Audio System 🥝	Reset	VoIP System 🥝	Reset	SIP Registration 🔘	SIP Call 🔘	<u>R</u> TP Stream 🔘

- 10. Select Registrar Settings.
- 11. Enter/verify the Registrar Settings.

VoIP Settings					>
VoIP Settings VoIP Settings SIP Settings Select Radio Tester IP Settings RTP Settings SIP Settings Registrar Settings Check Parameter	REGISTRAT Settings Registrar Sett Server Address User ID Password Identity Contact Parameter Outbound Proxy	Network Impa Call Radic cings 192.168.1.2:5060 1234 1234 sip:1234@test.3gp	irments Tester Wizard		
				< <u>B</u> ack	Next >
Status: Audio System 🥝	Reset VoIP Syst	.em 🌝 🛛 Reset	SIP Registration 🥥	SIP Call 🥥	<u>R</u> TP Stream

- 12. Select Check Parameter.
- 13. Verify all set parameters.
- 14. Select **Apply** to register the *lab*CORE at Anritsu MD8475B.

VoIP Settings			X
Network Settings SIP Se	🔹 🛄 🔚 🔌 Network Impairm	ents ster Wizard	
Select Radio Tester IP Settings	Check Parameters Press Apply to configure the labCORE		
RTP Settings SIP Settings Registrar Settings Check Parameter	IP: 192.168.1.101 Subnet Mask: 255.255.0.0 Gateway: 192.168.1.2 DNS: 0.0.0.0 Packet Length: 20 Initial jitter buffer length: 140 Codec: AMR Encoder Parameter: FMTP:		^
	<		>
		< <u>B</u> ac	k Apply
Status: Audio System 🥝	Reset VolP System 🥥 Reset	SIP Registration 🥥 SIP Call 🤇) <u>R</u> TP Stream ()

Anritsu MD8475B: Call Execution

1. Go to the SmartStudio© main screen. The status of the DUT (UE status) is Idle.



- 2. Enter any number (e.g., 123) on the keypad of the virtual phone on the screen.
- Select the green call button to initiate the call. The radio tester waits for the call acceptance of the DUT.

- 4. Accept the call at the DUT.
- 5. The status of the DUT switches from **Termination** to **Communication**.

