

User & Service
Experience



Spirent Nomad UX 产品培训

- 软件及License安装
- 硬件及连接方式介绍
- 测试操作
 - 语音质量测试
 - 呼叫性能测试
 - 呼叫性能与语音质量并行测试
 - 语音通话端到端时延测试

Nomad软件及License安装

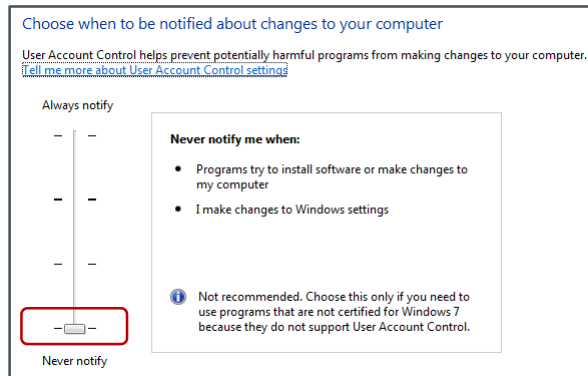
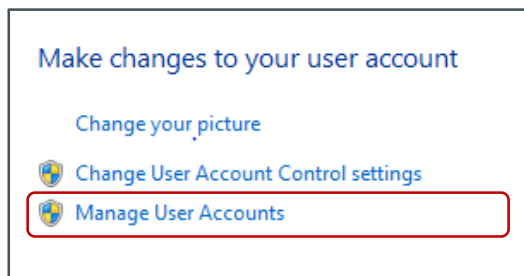
■ 软件安装步骤:

- 选取Windows操作系统相应位组的软件安装包（32位或64位）。
- 运行“Setup.exe”文件，根据相应提示进行相关组件及Nomad软件的自动安装。
 - 对于部分Windows操作系统无法运行“Setup.exe”文件进行自动安装的情况，请参见手动安装方式。
- 手动安装方式
 - 确保Windows操作系统已安装如下组件，如操作系统中未安装这些组件，可以使用Nomad软件安装包中提供的组件包先进行安装。
 - Microsoft .NET Frame Work 4.6 或以上版本
 - Microsoft Visual C++ 2013 Redistributable 或以上版本 (32位机需安装x86版本，64位机需安装x86和x64版本)
 - 安装Nomad相关软件。
 - ① 进入“Metrico_GPS_Drivers”目录，安装GPS驱动程序。
 - ② 运行“NomadSetup”安装文件，安装Nomad软件。

软件及License安装

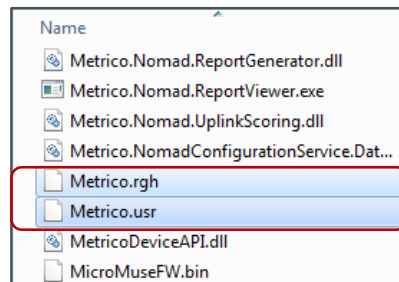
■ 系统设置

- 进入“控制面板->用户”，将用户控制管理权限设置最低。



■ License安装

- 将License文件复制到Nomad软件安装目录下。
 - 32位Win-7系统默认安装路径：C:\Program Files\Spirent Communications\NomadUX
 - 64位Win-7系统默认安装路径：C:\Program Files (x86)\Spirent Communications\NomadUX



Nomad硬件及连接方式介绍

硬件及连接方式介绍

■ 硬件介绍（前面板）



硬件及连接方式介绍

■ 硬件介绍（后面板）



硬件及连接方式介绍

■ 设备连接方式



Nomad软件通用参数配置

- 进入Nomad软件 → Configure Settings → General 菜单，根据需要配置相关通用参数

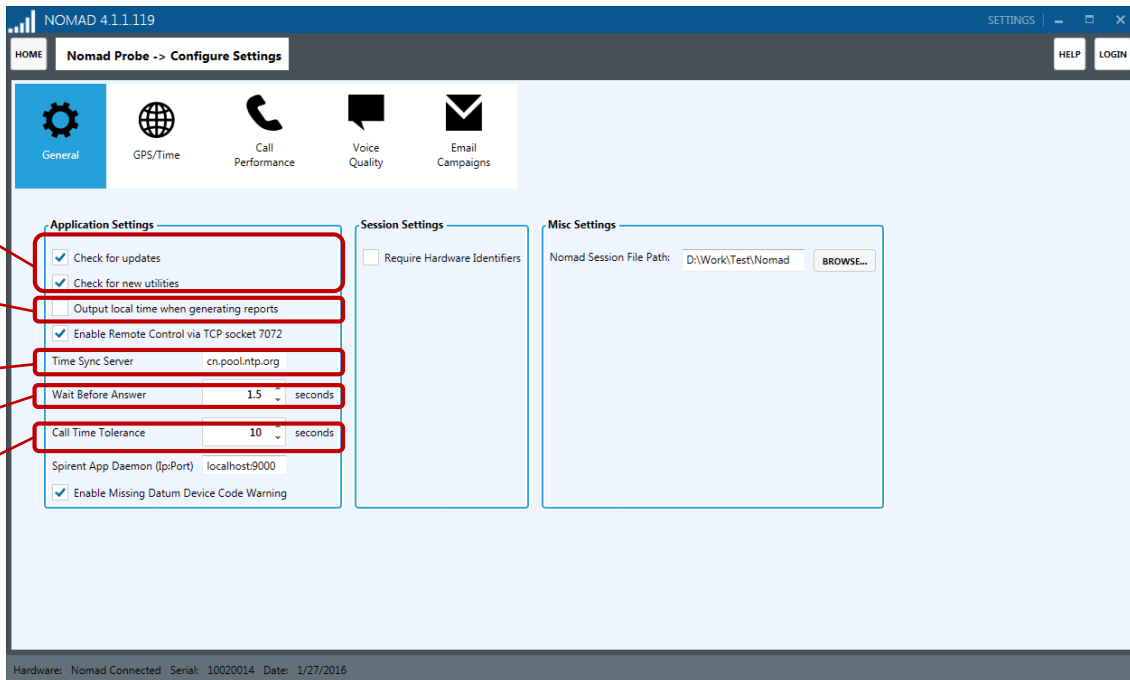
新版本、新组件自动检测

报告使用本地时间输出

时间同步服务器配置

被叫摘机等待时延

呼叫时间容差范围



NOMAD 411.119

SETTINGS

HOME

Nomad Probe -> Configure Settings

HELP

LOGIN

General

GPS/Time

Call Performance

Voice Quality

Email Campaigns

Application Settings

- ☒ Check for updates
- ☒ Check for new utilities
- ☐ Output local time when generating reports
- ☒ Enable Remote Control via TCP socket 7072
- Time Sync Server: cn.pool.ntp.org
- Wait Before Answer: 1.5 seconds
- Call Time Tolerance: 10 seconds
- Spirent App Daemon (Ip:Port): localhost:9000
- ☒ Enable Missing Datum Device Code Warning

Session Settings

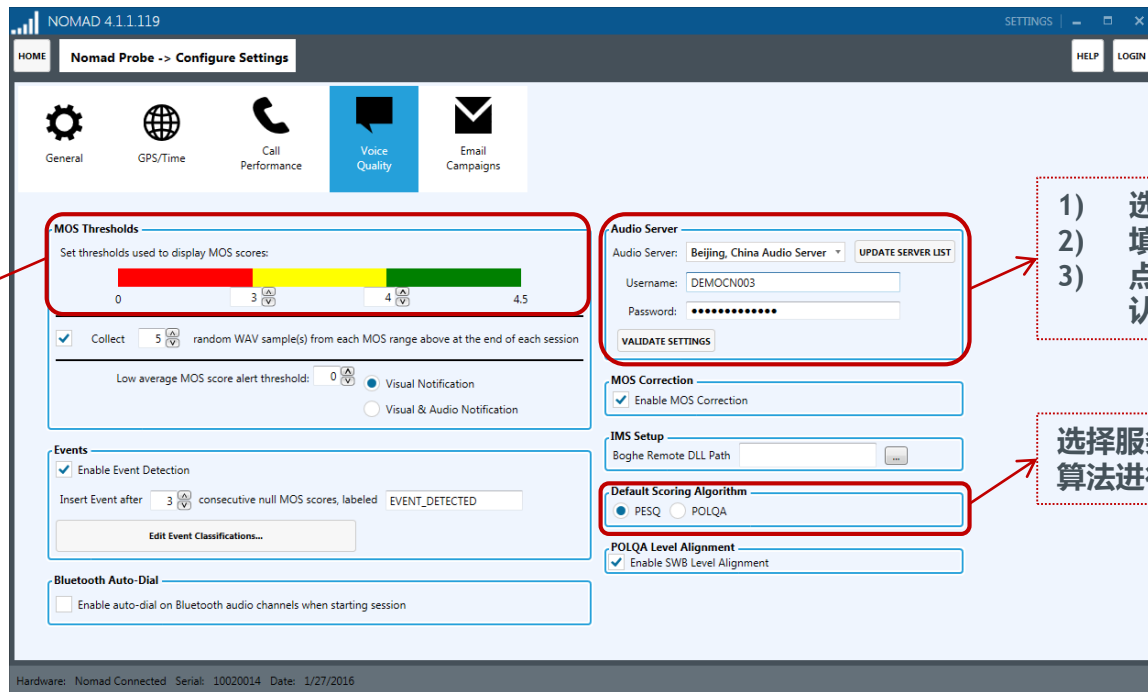
- ☐ Require Hardware Identifiers

Misc Settings

Nomad Session File Path: D:\Work\Test\Nomad BROWSE...

Hardware: Nomad Connected Serial: 10020014 Date: 1/27/2016

- 进入Nomad软件 → Configure Settings → Voice Quality菜单，配置语音服务器相关通用参数。（仅适用于手机拨打服务器方式）



选择测试中不同MOS分数的颜色呈现

- 1) 选择语音服务器位置
- 2) 填入语音服务器账号、密码
- 3) 点击“Validate Setting”，确认账号状态正常

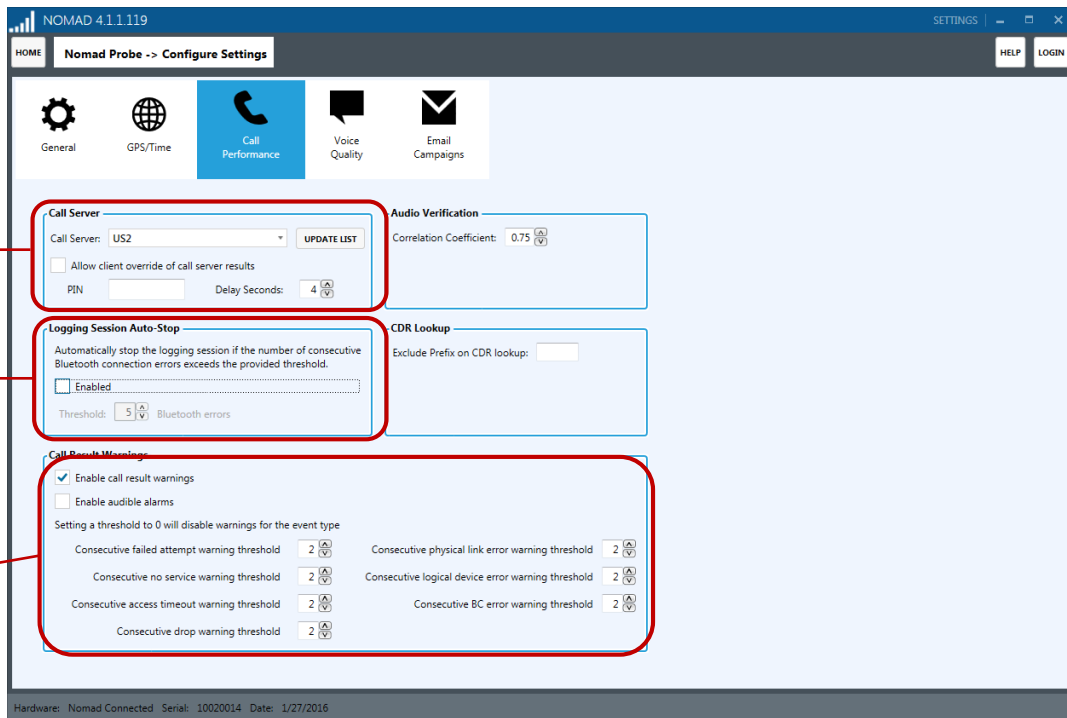
选择服务器端时延PESQ或POLQA算法进行评估

- 进入Nomad软件 → Configure Settings → Call Performance菜单，配置语音质量测试服务器相关通用参数。（仅适用于手机拨打服务器方式）

点击Update List后选择相应的呼叫服务器以配合进行呼叫性能测试

选择是否在蓝牙“几次”报错后自动停止测试

选择是否在发生事件时超过所设定的次数就弹出告警视窗



NOMAD 4.1.1.119

HOME Nomad Probe -> Configure Settings

General GPS/Time Call Performance Voice Quality Email Campaigns

Call Server

Call Server: US2 UPDATE LIST

☐ Allow client override of call server results

PIN Delay Seconds: 4

Audio Verification

Correlation Coefficient: 0.75

Logging Session Auto-Stop

Automatically stop the logging session if the number of consecutive Bluetooth connection errors exceeds the provided threshold.

☐ Enabled

Threshold: 5 Bluetooth errors

CDR Lookup

Exclude Prefix on CDR lookup:

Call Result Messages

☒ Enable call result warnings

☐ Enable audible alarms

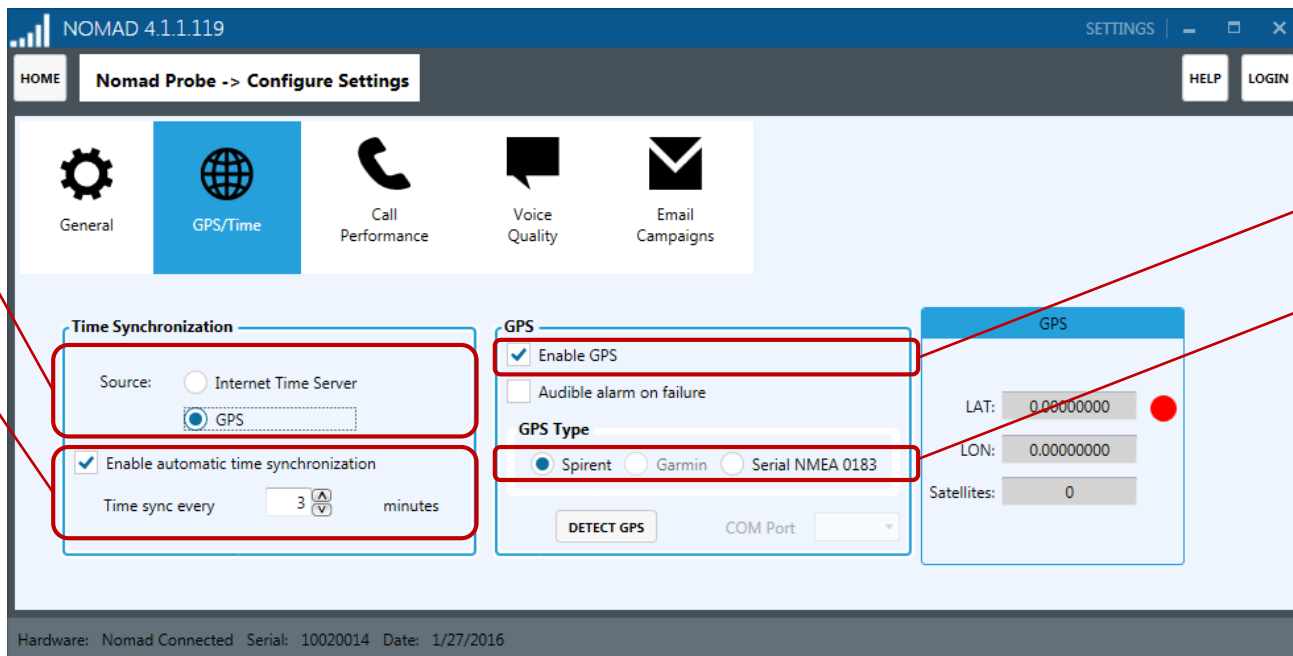
Setting a threshold to 0 will disable warnings for the event type

Consecutive failed attempt warning threshold	2	Consecutive physical link error warning threshold	2
Consecutive no service warning threshold	2	Consecutive logical device error warning threshold	2
Consecutive access timeout warning threshold	2	Consecutive BC error warning threshold	2
Consecutive drop warning threshold	2		

Hardware: Nomad Connected Serial: 10020014 Date: 1/27/2016

通用参数配置

- 进入Nomad软件 → Configure Settings → GPS/Time菜单，配置时间同步及GPS相关通用参数。（如使用GPS功能，需连接GPS天线至Nomad的USB接口）



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SETTINGS | - □ ×

HOME Nomad Probe -> Configure Settings HELP LOGIN

General GPS/Time Call Performance Voice Quality Email Campaigns

Time Synchronization

Source: ☐ Internet Time Server ☒ GPS

☒ Enable automatic time synchronization

Time sync every 3 minutes

GPS

☒ Enable GPS

☐ Audible alarm on failure

GPS Type

☒ Spirent ☐ Garmin ☐ Serial NMEA 0183

DETECT GPS COM Port

GPS

LAT: 0.00000000

LON: 0.00000000

Satellites: 0

Hardware: Nomad Connected Serial: 10020014 Date: 1/27/2016

选择时间同步方式

是否开启自动时间同步

是否开启GPS

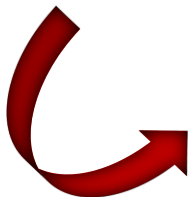
选择GPS天线类型

语音质量测试步骤

手机拨打手机方式

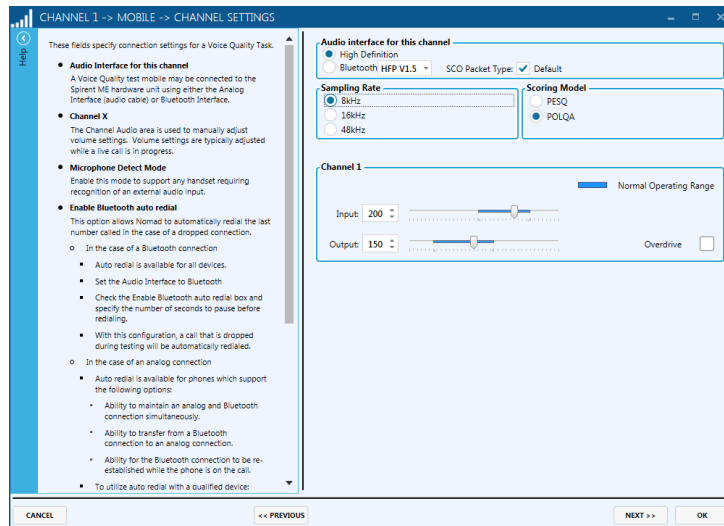
语音质量测试步骤（手机拨打手机方式）

1. 在Nomad软件 → Standalone Mode → Voice Quality菜单下，使用鼠标左键拖拽Mobile按钮至相应测试Channel，然后松开鼠标按键。



语音质量测试步骤（手机拨打手机方式）

2. 点击Channel Settings按钮，进入Channel配置界面。



语音质量测试步骤（手机拨打手机方式）

3. 进行测试Channel配置。

选择相应的Nomad物理测试端口：
窄带、HD或蓝牙

选择相应的MOS计算算法：PESQ
或POLQA

选择相应的测试语音采用率：
8KHz、16KHz或48KHz

如已知被测手机的输入输出音量
补偿，则输入相应数值；否则可
先暂不输入

点击OK确认配置

CHANNEL 1 -> MOBILE -> CHANNEL SETTINGS

These fields specify connection settings for a Voice Quality Task.

- **Audio interface for this channel**
A Voice Quality test mobile may be connected to the Spirent ME hardware unit using either the Analog Interface (audio cable) or Bluetooth Interface.
- **Channel X**
The Channel Audio area is used to manually adjust volume settings. Volume settings are typically adjusted while a live call is in progress.
- **Microphone Detect Mode**
Enable this mode to support any handset requiring recognition of an external audio input.
- **Enable Bluetooth auto redial**
This option allows Nomad to automatically redial the last number called in the case of a dropped connection.
 - o In the case of a Bluetooth connection
 - Auto redial is available for all devices.
 - Set the Audio Interface to Bluetooth
 - Check the Enable Bluetooth auto redial box and specify the number of seconds to pause before redialing.
 - With this configuration, a call that is dropped during testing will be automatically redialed.
 - o In the case of an analog connection
 - Auto redial is available for phones which support the following options:
 - Ability to maintain an analog and Bluetooth connection simultaneously.
 - Ability to transfer from a Bluetooth connection to an analog connection.
 - Ability for the Bluetooth connection to be re-established while the phone is on the call.
 - To utilize auto redial with a qualified device:

Audio interface for this channel
☒ High Definition
☐ Bluetooth HFP V1.5
SCO Packet Type: ☒ Default

Sampling rate
☒ 8kHz
☐ 16kHz
☐ 48kHz

Scoring Model
☐ PESQ
☒ POLQA

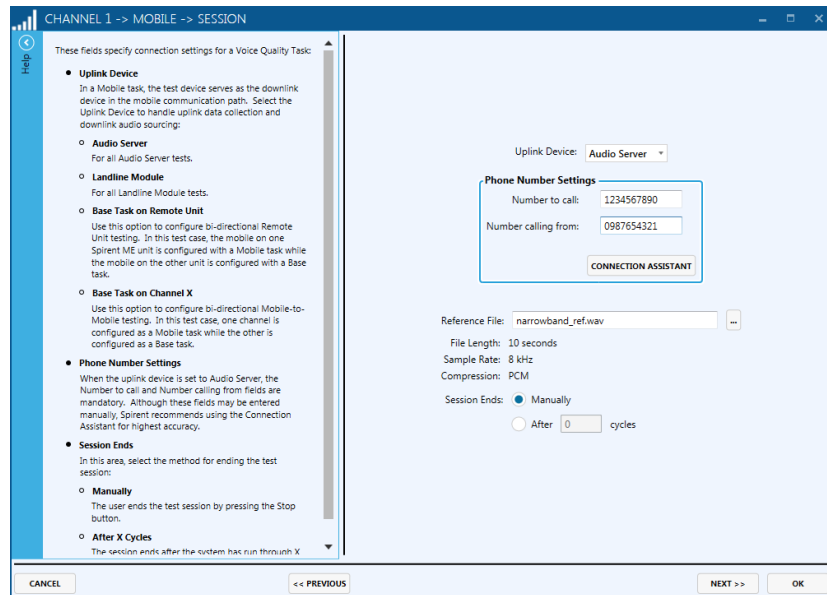
Channel 1
Input: 200
Output: 150
Overdrive: ☐

Normal Operating Range

CANCEL << PREVIOUS NEXT >> OK

语音质量测试步骤（手机拨打手机方式）

4. 点击Session按钮，进入Session配置界面。



语音质量测试步骤（手机拨打手机方式）

5. 进行测试Session配置。

CHANNEL 1 -> MOBILE -> SESSION

These fields specify connection settings for a Voice Quality Task:

- **Uplink Device**
In a Mobile task, the test device serves as the downlink device in the mobile communication path. Select the Uplink Device to handle uplink data collection and downlink audio sourcing:
 - **Audio Server**
For all Audio Server tests.
 - **Landline Module**
For all Landline Module tests.
 - **Base Task on Remote Unit**
Use this option to configure bi-directional Remote Unit testing. In this test case, the mobile on one Spirent ME unit is configured with a Mobile task while the mobile on the other unit is configured with a Base task.
 - **Base Task on Channel X**
Use this option to configure bi-directional Mobile-to-Mobile testing. In this test case, one channel is configured as a Mobile task while the other is configured as a Base task.
- **Phone Number Settings**
When the uplink device is set to Audio Server, the Number to call and Number calling from fields are mandatory. Although these fields may be entered manually, Spirent recommends using the Connection Assistant for highest accuracy.
- **Session Ends**
In this area, select the method for ending the test session:
 - **Manually**
The user ends the test session by pressing the Stop button.
 - **After X Cycles**
The session ends after the system has run through X

Uplink Device: Base task on channel 2

Reference File: narrowband_ref.wav

File Length: 10 seconds
Sample Rate: 8 kHz
Compression: PCM

Session Ends: ☒ Manually ☐ After 0 cycles

CANCEL << PREVIOUS NEXT >> OK

选择与此Channel所连接手机配合测试的对端手机所连接的Nomad的Channel

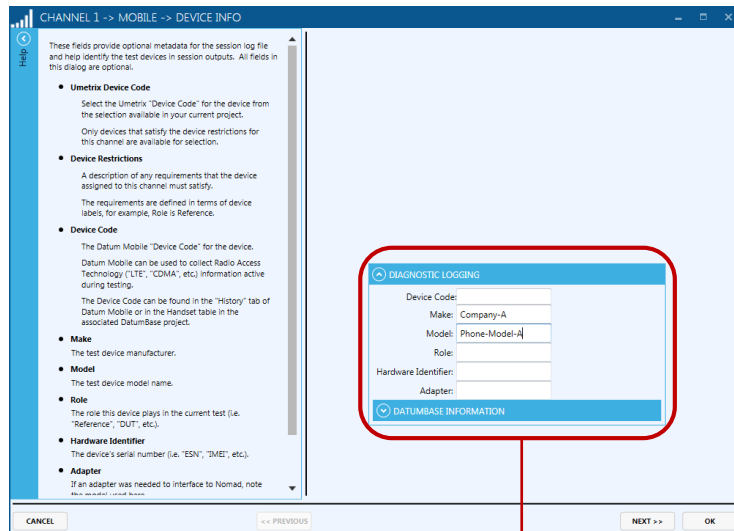
选择测试停止方式：

- Manually即手动停止
- After xxx Cycles即测试多少Cycle后自动停止

点击OK确认配置

语音质量测试步骤（手机拨打手机方式）

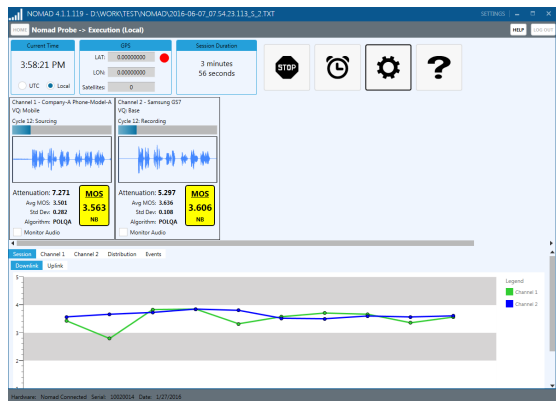
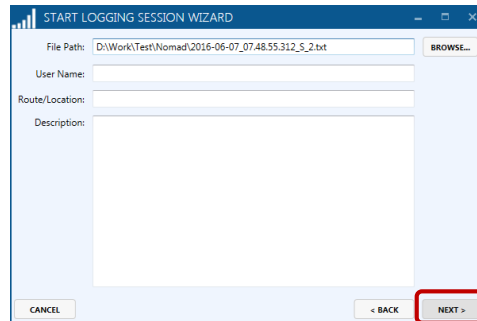
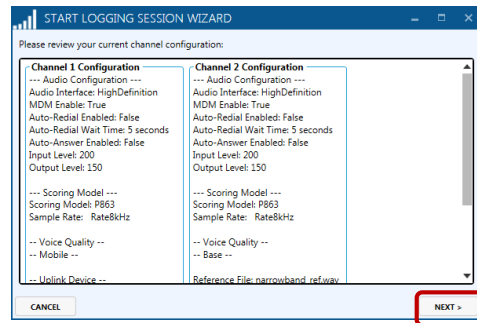
6. 点击Device Info按钮，进入被测设备信息配置界面。（此配置用于在输出的Excel报告的表头中显示被测设备信息）



输入被测终端设备信息

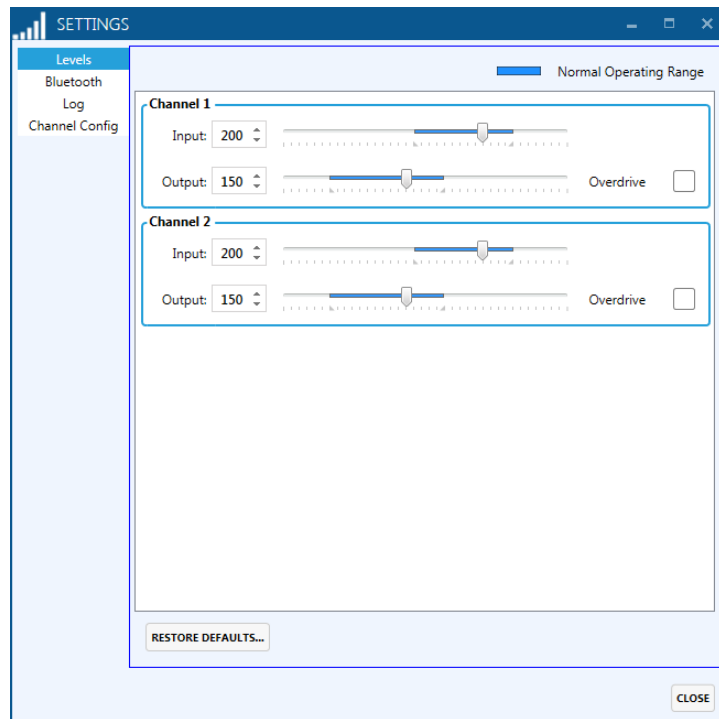
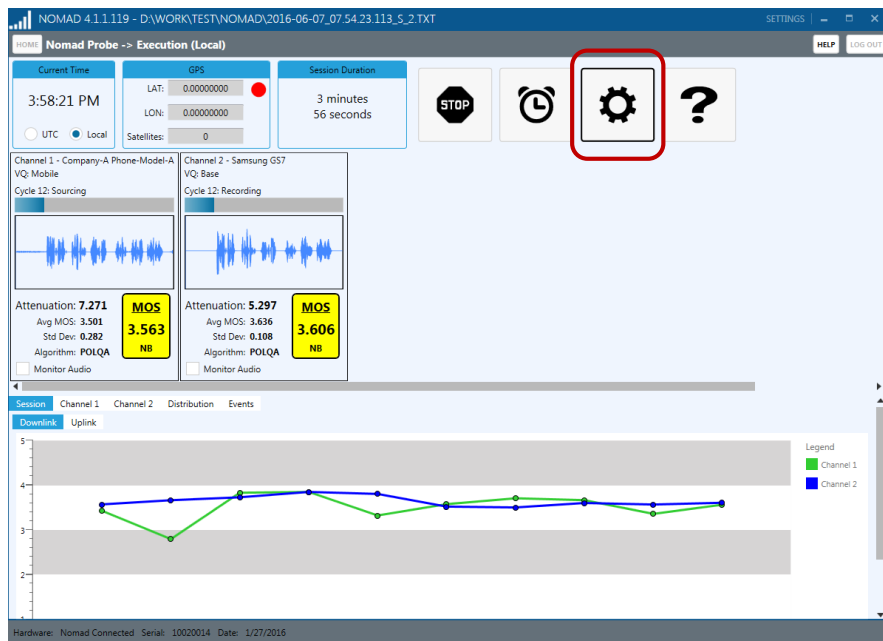
语音质量测试步骤（手机拨打手机方式）

7. 点击Start Logging Session按钮，输入Log文件存储位置，根据提示开始测试。



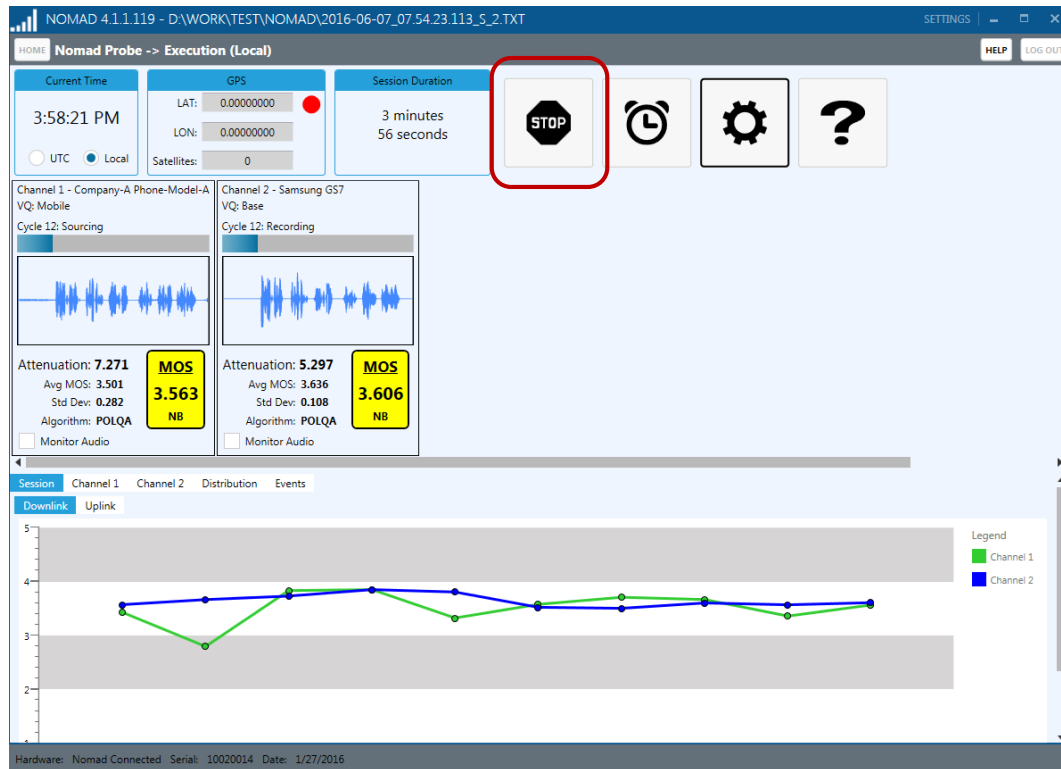
语音质量测试步骤（手机拨打手机方式）

8. 测试界面下点击Settings按钮可对输入输出音量补偿进行调整。



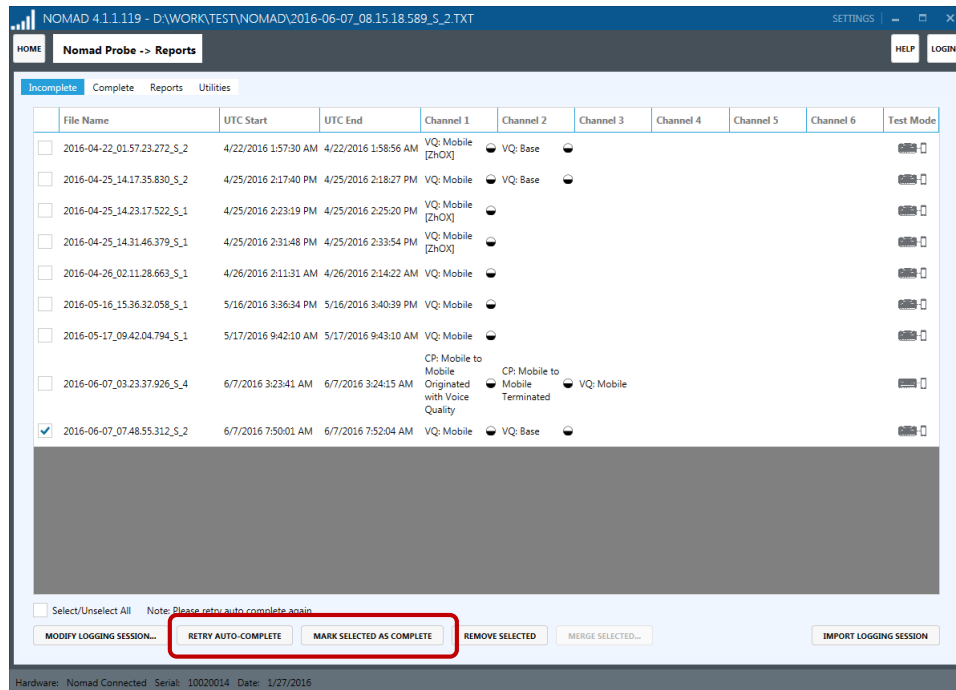
语音质量测试步骤（手机拨打手机方式）

9. 测试界面下点击Stop按钮可立即停止测试，并自动进入报告生成界面。



语音质量测试步骤（手机拨打手机方式）

10. 通常软件会自动进入Report→Complete界面，但如果跳转至Report→Incomplete界面，则需点击Retry Auto-Complete按钮进行自动log报告完成。如自动报告完成无法成功且并无任何告警信息出现，可选择该Logging Session行并点击Mark Select As Complete按钮强制跳转至Complete界面。



NOMAD 4.1.1.119 - D:\WORK\TEST\NOMAD\2016-06-07_08.15.18.589_S_2.TXT

HOME Nomad Probe -> Reports

SETTINGS - [X] HELP LOGIN

Incomplete Complete Reports Utilities

File Name	UTC Start	UTC End	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Test Mode
☐ 2016-04-22_01:57:23.272_S_2	4/22/2016 1:57:30 AM	4/22/2016 1:58:56 AM	VQ: Mobile [ZHOX]	VQ: Base					[Icon]
☐ 2016-04-25_14:17:35.830_S_2	4/25/2016 2:17:40 PM	4/25/2016 2:18:27 PM	VQ: Mobile	VQ: Base					[Icon]
☐ 2016-04-25_14:23:17.522_S_1	4/25/2016 2:23:19 PM	4/25/2016 2:25:20 PM	VQ: Mobile [ZHOX]						[Icon]
☐ 2016-04-25_14:31:46.379_S_1	4/25/2016 2:31:48 PM	4/25/2016 2:33:54 PM	VQ: Mobile [ZHOX]						[Icon]
☐ 2016-04-26_02:11:28.663_S_1	4/26/2016 2:11:31 AM	4/26/2016 2:14:22 AM	VQ: Mobile						[Icon]
☐ 2016-05-16_15:36:32.058_S_1	5/16/2016 3:36:34 PM	5/16/2016 3:40:39 PM	VQ: Mobile						[Icon]
☐ 2016-05-17_09:42:04.794_S_1	5/17/2016 9:42:10 AM	5/17/2016 9:43:10 AM	VQ: Mobile						[Icon]
☐ 2016-06-07_03:23:37.926_S_4	6/7/2016 3:23:41 AM	6/7/2016 3:24:15 AM	CP: Mobile to Mobile Originated with Voice Quality	CP: Mobile to Mobile Terminated	VQ: Mobile				[Icon]
☒ 2016-06-07_07:48:55.312_S_2	6/7/2016 7:50:01 AM	6/7/2016 7:52:04 AM	VQ: Mobile	VQ: Base					[Icon]

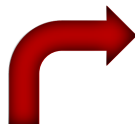
☐ Select/Unselect All Note: Please retry auto complete again

MODIFY LOGGING SESSION... **RETRY AUTO-COMPLETE** MARK SELECTED AS COMPLETE REMOVE SELECTED MERGE SELECTED... IMPORT LOGGING SESSION

Hardware: Nomad Connected Serial: 10020014 Date: 1/27/2016

语音质量测试步骤（手机拨打手机方式）

11. 在Data→Complete界面，选择要处理的Logging Session行，并点击Generate Report From Selected按钮，并随后点击Generate Report按钮以生成报告文件对应的Log文件。



REVIEW MERGED SESSION REPORT HEADER DATA

This dialog is used to move data between channels for reporting purposes and to indicate any inconsistencies in header data. Channels containing inconsistencies will be highlighted. Please review these channels and make any necessary changes before clicking the Generate Report button.

Voice Quality

Channel 1

Warning: The selected data sets for this channel have inconsistent header data

Name of Channel 1 in Report: Company-A Phone-Model-A

Session	Task	Make	Model	Role	Hardware Identifier
☐ 2016-06-07_08.15.18.589_S_2	Voice Quality: Mobile	Company-A	Phone-Model-A		
☐ 2016-06-07_08.15.18.589_S_2	Voice Quality: Base	Samsung	GS7		

MOVE SELECTED → REMOVE SELECTED

IP Analytics

File	Stream	Stream count	Uplink	Downlink	Time offset
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CANCEL IMPORTSESSION IP ANALYTICS **GENERATE REPORT**

NOMAD 4.1.1.119 - D:\WORK\TEST\NOMAD\2016-06-07_08.15.18.589_S_2.TXT

HOME **Nomad Probe -> Reports** HELP LOGIN

Incomplete **Complete** Reports Utilities

	File Name	UTC Start	UTC End	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Status	Upload Status	Test Mode
☐	2016-06-07_07.54.23.113_S_2	6/7/2016 7:54:26 AM	6/7/2016 7:58:40 AM	VQ: Mobile						No IP data		
☐	2016-05-25_02.14.06.255_S_2	5/25/2016 2:14:09 AM	5/25/2016 2:17:27 AM	CP: Mobile to Mobile Originated with Voice Quality	CP: Mobile to Mobile Terminated					No IP data		
☐	2016-05-25_01.51.39.631_S_2	5/25/2016 1:51:46 AM	5/25/2016 1:52:01 AM	VQ: Mobile						No IP data		
☒	2016-06-07_08.15.18.589_S_2	6/7/2016 8:15:21 AM	6/7/2016 8:18:49 AM	VQ: Mobile						No IP data		

☐ Select/Unselect All

GENERATE REPORT FROM SELECTED... REMOVE SELECTED IMPORT LOGGING SESSION FETCH SELECTED RF UPLOAD IMPORT IP ANALYTICS FILE

Hardware: Nomad Connected Serial: 10020014 Date: 1/27/2016

语音质量测试步骤（手机拨打手机方式）

12. 在Data→Report界面，选择要处理的Report Logging Session行：

- ❑ 点击View Standard按钮生成报告文件
- ❑ 点击KML列View按钮生成谷歌地图文件
- ❑ 点击Interactive按钮生成MOS分数趋势分析曲线

NOMAD 4.1.1.119 - D:\WORK\TEST\NOMAD\2016-06-07_08.15.18.589_5.2.TXT

HOME Nomad Probe -> Reports SETTINGS | - □ X

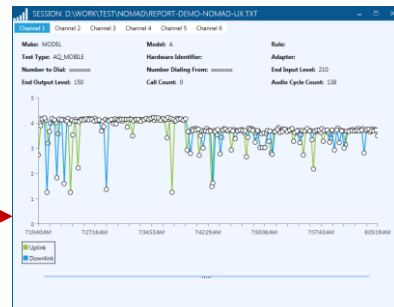
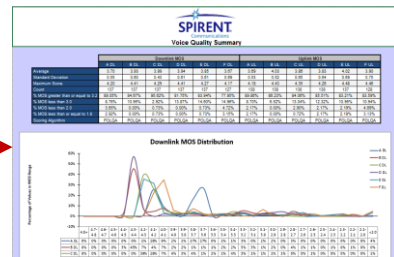
HELP LOGIN

Incomplete Complete Reports Utilities

File Name	Date Created UTC	Report	KML	Viewer
☐ D:\Work\Test\Nomad\report-201604221009.txt	4/22/2016 10:09:18 AM	View Standard	View	INTERACTIVE
☐ D:\Work\Test\Nomad\2016-04-25_14.25.42.823_S_1_report.txt	4/25/2016 10:28:46 PM	View Standard View Merged RF from Device	View	INTERACTIVE
☐ D:\Work\Test\Nomad\2016-04-25_14.35.01.787_S_1_report.txt	4/25/2016 10:40:44 PM	View Standard View Merged RF from Device	View	INTERACTIVE
☐ D:\Work\Test\Nomad\demo-vivo.txt	4/26/2016 10:02:14 AM	View Standard	View	INTERACTIVE
☐ D:\Work\Test\Nomad\demo-vivo-cp.txt	4/26/2016 10:32:27 AM	View Standard	View	INTERACTIVE
☐ D:\Work\Test\Nomad\2016-04-26_02.40.52.645_S_1_report.txt	4/26/2016 10:42:37 AM	View Standard	View	INTERACTIVE
☐ D:\Work\Test\Nomad\2016-05-16_15.33.36.137_S_1_report.txt	5/16/2016 11:35:40 PM	View Standard	View	INTERACTIVE
☐ D:\Work\Test\Nomad\2016-05-16_15.41.36.553_S_1_report.txt	5/16/2016 11:43:48 PM	View Standard	View	INTERACTIVE
☐ D:\Work\Test\Nomad\VTVO-VQ-20160517.txt	5/17/2016 4:57:59 PM	View Standard	View	INTERACTIVE
☐ D:\Work\Test\Nomad\RITT-Report-01.txt	5/25/2016 10:19:19 AM	View Standard	View	INTERACTIVE

Select/Unselect All REMOVE SELECTED IMPORT REPORT...

Hardware: Nomad Connected Serial: 10020014 Date: 1/27/2016

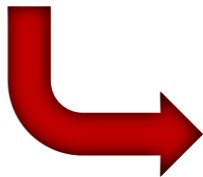


呼叫性能测试步骤

手机拨打手机方式

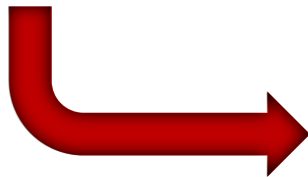
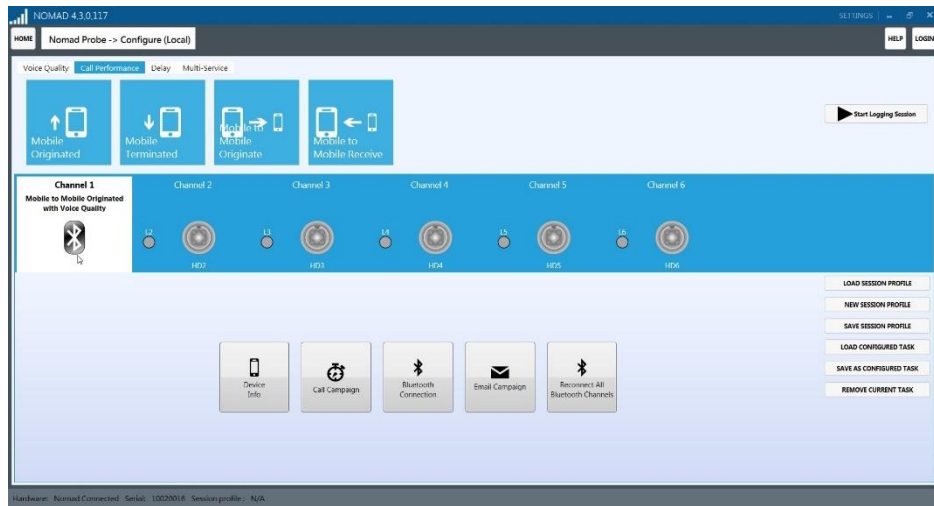
呼叫性能测试步骤（手机拨打手机方式）

1. 在Nomad软件 → Standalone Mode → Call Performance 菜单下，使用鼠标左键拖拽 Mobile to Mobile Originate按钮至相应测试Channel，然后松开鼠标按键。



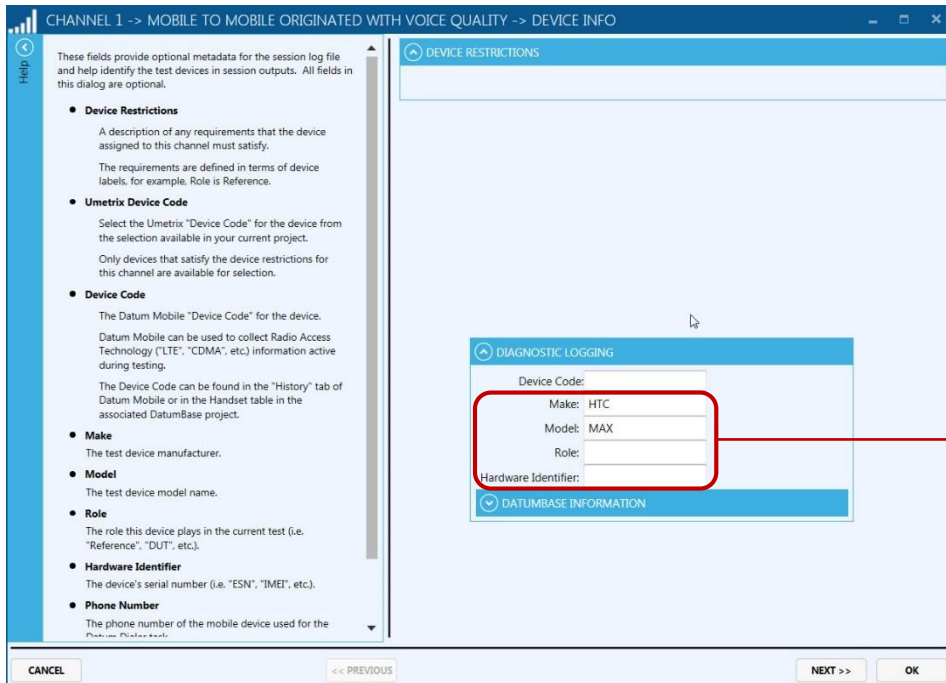
呼叫性能测试步骤（手机拨打手机方式）

2. 点击Device Info按钮，进入呼叫模型配置界面。



呼叫性能测试步骤（手机拨打手机方式）

3. 进入被测设备信息配置界面。（此配置用于在输出的Excel报告的表头中显示被测设备信息）



CHANNEL 1 -> MOBILE TO MOBILE ORIGINATED WITH VOICE QUALITY -> DEVICE INFO

These fields provide optional metadata for the session log file and help identify the test devices in session outputs. All fields in this dialog are optional.

- Device Restrictions**
A description of any requirements that the device assigned to this channel must satisfy.
The requirements are defined in terms of device labels, for example, Role is Reference.
- Umetrix Device Code**
Select the Umetrix "Device Code" for the device from the selection available in your current project.
Only devices that satisfy the device restrictions for this channel are available for selection.
- Device Code**
The Datum Mobile "Device Code" for the device.
Datum Mobile can be used to collect Radio Access Technology ("LTE", "CDMA", etc.) information active during testing.
The Device Code can be found in the "History" tab of Datum Mobile or in the Handset table in the associated DatumBase project.
- Make**
The test device manufacturer.
- Model**
The test device model name.
- Role**
The role this device plays in the current test (i.e. "Reference", "DUT", etc.).
- Hardware Identifier**
The device's serial number (i.e. "ESN", "IMEI", etc.).
- Phone Number**
The phone number of the mobile device used for the test.

DIAGNOSTIC LOGGING

Device Code:

Make: HTC

Model: MAX

Role:

Hardware Identifier:

DATUMBASE INFORMATION

CANCEL << PREVIOUS NEXT >> OK

输入被测终端设备信息

呼叫性能测试步骤（手机拨打手机方式）

4. 进行测试呼叫模型配置。

选择使用蓝牙接口进行拨打测试

选择对端手机的连接通道

设置要拨打的电话号码

选择所有被测终端每个Cycle同时触发，还是各被测终端不在每个Cycle开始时对齐同时触发测试。

配置呼叫模型：

- ☐ 呼叫接通等待超时定时器
- ☐ 呼叫时长（含起呼部分）
- ☐ 呼叫间等待时长
- ☐ 测试起呼次数

呼叫中通过蓝牙同时验证语音质量的相关配置，此选项必须在关闭状态

点击NEXT确认配置

CHANNEL 1 -> MOBILE TO MOBILE ORIGINATED WITH VOICE QUALITY -> CALL CAMPAIGN

These fields specify duration and sequencing a Call Performance Task.

- **Number to dial**
 - **MO campaign**
Call Server number to be dialed by the mobile.
 - **MT campaign**
Mobile phone number to be dialed by the Call Server.
- **Call Initiation Mode**
 - **Synchronous**
Calls start simultaneously on all devices regardless of call outcomes.
 - **Asynchronous**
Each device follows its own call sequence without regard to other device progress.
- **Access Timeout**
A call attempt that has not connected within this amount of time will be classified as an Access Timeout event. For an MT campaign, set this for longer than it takes the phone to go to voicemail.
- **Duration**
The length of each call in the test sequence.
- **Wait Time**
The amount of idle time between the end of one call in the sequence and the start of the next call.
- **Attempts**
The number of calls to attempt in this task sequence.

Dial/Answer Method: **Bluetooth** ☐ Audio over Bluetooth ☒ Audio over Analog

HFP **V1 6** SCO Packet Type: ☒ Default

Receiving Device: **Receiver on channel 2**

Number to dial **0955131330**

Number calling from **0955131330**

Mobile to Mobile Originated with Voice Quality Task Setup

☒ Synchronous ☐ Asynchronous

Access Timeout **25**

Duration **60**

Wait Time **15**

Attempts **100**

Max Call Length **1 minute**

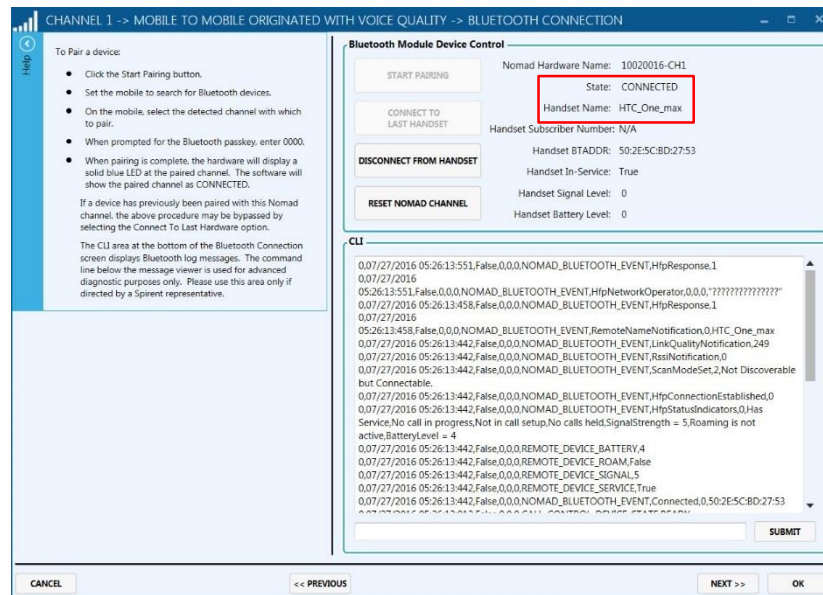
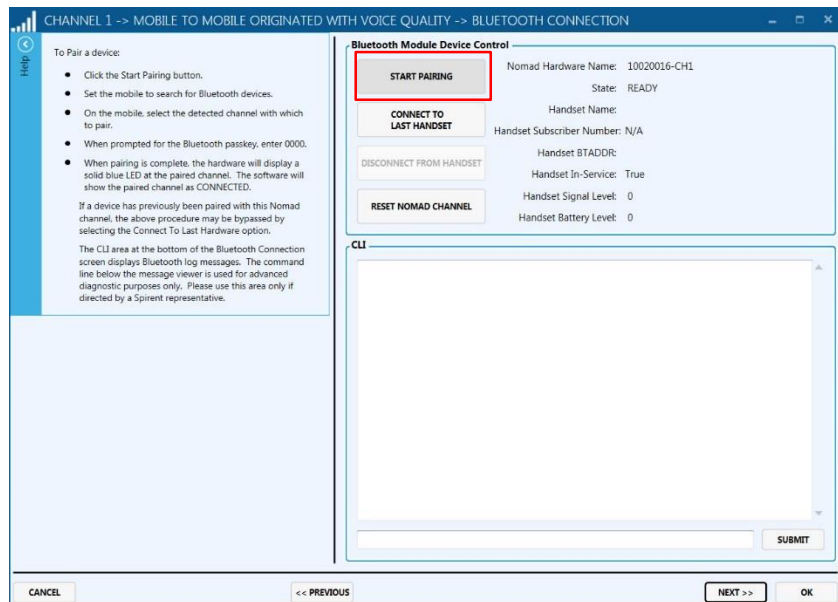
Max Task Length **2 hours, 4 minutes, 45 seconds**

☒ VQ DISABLED

CANCEL << PREVIOUS NEXT >> OK

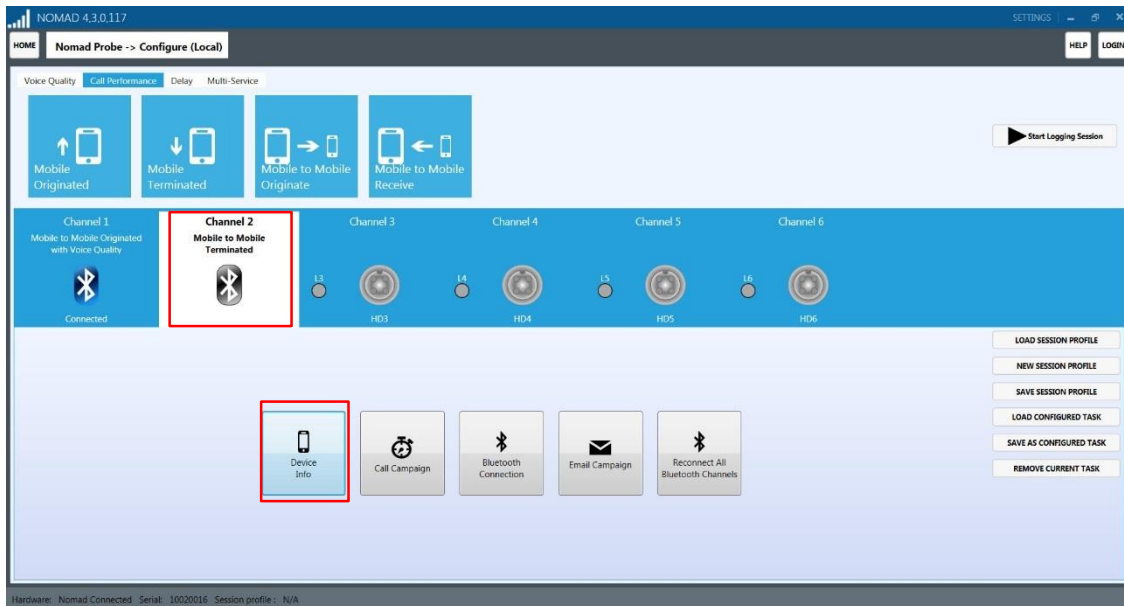
呼叫性能测试步骤（手机拨打手机方式）

5. 点击Bluetooth Connection按钮，进入蓝牙配对界面；点击Start Pairing与手机蓝牙进行配对，当配对成功时，Handset Name会出现手机的名称。最后再按OK确认所有的配置



呼叫性能测试步骤（手机拨打手机方式）

6. 点击Channel 及Device Info按钮，进入呼叫模型配置界面。



呼叫性能测试步骤（手机拨打手机方式）

7. 这个Device Info与步骤 3. 相同，在Call Campaign的配置只要填入呼叫及被呼手机的号码，再按Next确认配置。

These fields provide optional metadata for the session log file and help identify the test devices in session outputs. All fields in this dialog are optional.

- Device Restrictions**
A description of any requirements that the device assigned to this channel must satisfy.
The requirements are defined in terms of device labels, for example, Role is Reference.
- Umetrix Device Code**
Select the Umetrix "Device Code" for the device from the selection available in your current project.
Only devices that satisfy the device restrictions for this channel are available for selection.
- Device Code**
The Datum Mobile "Device Code" for the device.
Datum Mobile can be used to collect Radio Access Technology ("LTE", "CDMA", etc.) information active during testing.
The Device Code can be found in the "History" tab of Datum Mobile or in the Handset table in the associated DatumBase project.
- Make**
The test device manufacturer.
- Model**
The test device model name.
- Role**
The role this device plays in the current test (i.e. "Reference", "DUT", etc.).
- Hardware Identifier**
The device's serial number (i.e. "ESN", "IMEI", etc.).
- Phone Number**
The phone number of the mobile device used for the *Provision Number* test.

DIAGNOSTIC LOGGING

Device Code: _____
Make: HTC
Model: MAX
Role: _____
Hardware Identifier: _____

DATUMBASE INFORMATION

Navigation: CANCEL << PREVIOUS NEXT >> OK

These fields specify duration and sequencing a Call Performance Task.

- Number to dial**
MO campaign
Call Server number to be dialed by the mobile.
MT campaign
Mobile phone number to be dialed by the Call Server.
- Call Initiation Mode**
Synchronous
Calls start simultaneously on all devices regardless of call outcomes.
Asynchronous
Each device follows its own call sequence without regard to other device progress.
- Access Timeout**
A call attempt that has not connected within this amount of time will be classified as an Access Timeout event. For an MT campaign, set this for longer than it takes the phone to go to voicemail.
- Duration**
The length of each call in the test sequence.
- Wait Time**
The amount of idle time between the end of one call in the sequence and the start of the next call.
- Attempts**
The number of calls to attempt in this task sequence.

Dial/Answer Method: Bluetooth ☒ Audio over Bluetooth ☐ Audio over Analog
HFP: V1 5 SCO Packet Type: ☒ Default
Calling Device: Caller on channel 1
Number to dial: 0922070328
Number calling from: 0955131330

Mobile to Mobile Terminated Task Setup

☒ Synchronous ☐ Asynchronous

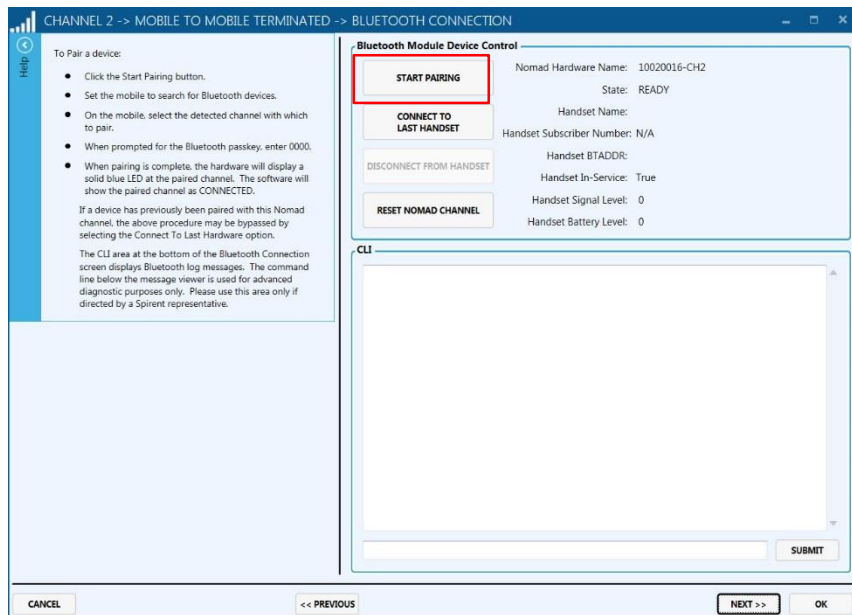
Access Timeout: 25
Duration: 60
Wait Time: 15
Attempts: 100
Max Call Length: 1 minute
Max Task Length: 2 hours, 4 minutes, 45 seconds

VQ DISABLED

Navigation: CANCEL << PREVIOUS NEXT >> OK

呼叫性能测试步骤（手机拨打手机方式）

8. 在Bluetooth Connection配置与步骤 5. 相同。



CHANNEL 2 -> MOBILE TO MOBILE TERMINATED -> BLUETOOTH CONNECTION

To Pair a device:

- Click the Start Pairing button.
- Set the mobile to search for Bluetooth devices.
- On the mobile, select the detected channel with which to pair.
- When prompted for the Bluetooth passkey, enter 0000.
- When pairing is complete, the hardware will display a solid blue LED at the paired channel. The software will show the paired channel as CONNECTED.

If a device has previously been paired with this Nomad channel, the above procedure may be bypassed by selecting the Connect To Last Hardware option.

The CLI area at the bottom of the Bluetooth Connection screen displays Bluetooth log messages. The command line below the message viewer is used for advanced diagnostic purposes only. Please use this area only if directed by a Spirent representative.

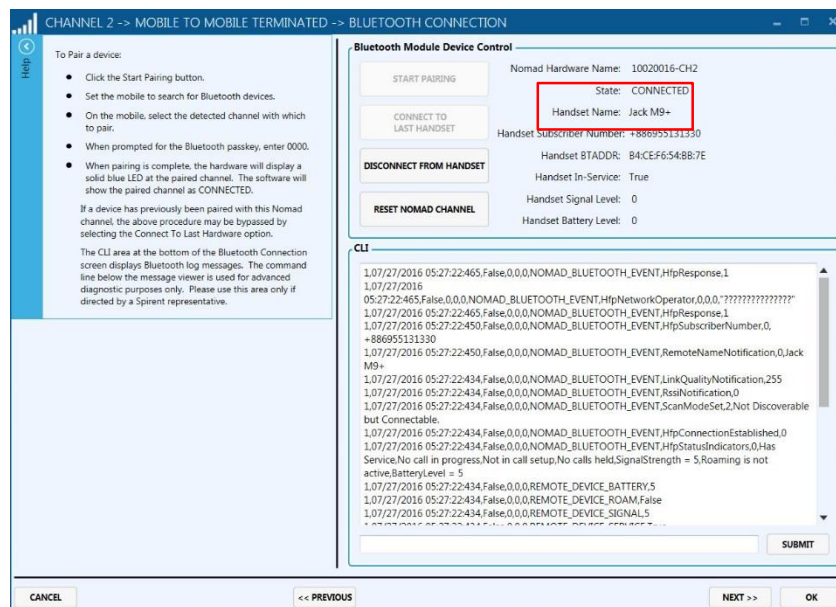
Bluetooth Module Device Control

Nomad Hardware Name: 10020016-CH2
State: READY
Handset Name:
Handset Subscriber Number: N/A
Handset BTADDR:
Handset In-Service: True
Handset Signal Level: 0
Handset Battery Level: 0

START PAIRING
CONNECT TO LAST HANDSET
DISCONNECT FROM HANDSET
RESET NOMAD CHANNEL

CLI

CANCEL << PREVIOUS NEXT >> OK



CHANNEL 2 -> MOBILE TO MOBILE TERMINATED -> BLUETOOTH CONNECTION

To Pair a device:

- Click the Start Pairing button.
- Set the mobile to search for Bluetooth devices.
- On the mobile, select the detected channel with which to pair.
- When prompted for the Bluetooth passkey, enter 0000.
- When pairing is complete, the hardware will display a solid blue LED at the paired channel. The software will show the paired channel as CONNECTED.

If a device has previously been paired with this Nomad channel, the above procedure may be bypassed by selecting the Connect To Last Hardware option.

The CLI area at the bottom of the Bluetooth Connection screen displays Bluetooth log messages. The command line below the message viewer is used for advanced diagnostic purposes only. Please use this area only if directed by a Spirent representative.

Bluetooth Module Device Control

Nomad Hardware Name: 10020016-CH2
State: CONNECTED
Handset Name: Jack M9+
Handset Subscriber Number: +886955131330
Handset BTADDR: B4:CE:F6:54:88:7E
Handset In-Service: True
Handset Signal Level: 0
Handset Battery Level: 0

START PAIRING
CONNECT TO LAST HANDSET
DISCONNECT FROM HANDSET
RESET NOMAD CHANNEL

CLI

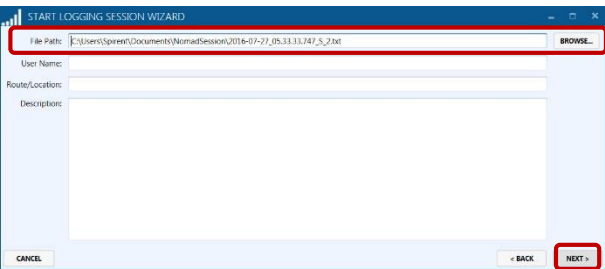
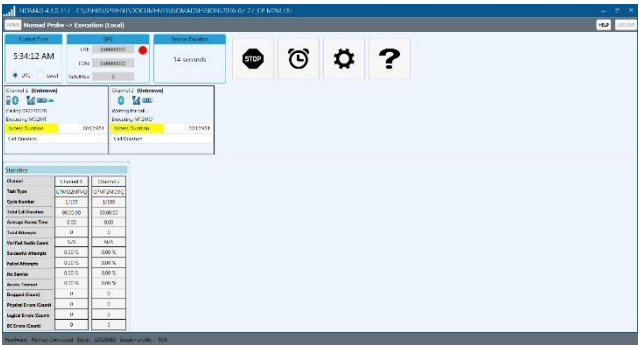
1.07/27/2016 05:27:22-465,False,0.0,0,NOMAD_BLUETOOTH_EVENT,HfpResponse,1
1.07/27/2016
05:27:22-465,False,0.0,0,NOMAD_BLUETOOTH_EVENT,HfpNetworkOperator,0.0,0,?????????????
1.07/27/2016 05:27:22-465,False,0.0,0,NOMAD_BLUETOOTH_EVENT,HfpResponse,1
1.07/27/2016 05:27:22-450,False,0.0,0,NOMAD_BLUETOOTH_EVENT,HfpSubscriberNumber,0,
+886955131330
1.07/27/2016 05:27:22-450,False,0.0,0,NOMAD_BLUETOOTH_EVENT,RemoteNameNotification,0,Jack
M9+
1.07/27/2016 05:27:22-434,False,0.0,0,NOMAD_BLUETOOTH_EVENT,LinkQualityNotification,255
1.07/27/2016 05:27:22-434,False,0.0,0,NOMAD_BLUETOOTH_EVENT,ResaNotification,0
1.07/27/2016 05:27:22-434,False,0.0,0,NOMAD_BLUETOOTH_EVENT,ScanModeSet,2,Not Discoverable
but Connectable.
1.07/27/2016 05:27:22-434,False,0.0,0,NOMAD_BLUETOOTH_EVENT,HfpConnectionEstablished,0
1.07/27/2016 05:27:22-434,False,0.0,0,NOMAD_BLUETOOTH_EVENT,HfpStatusIndicators,0,Has
Service.No call in progress.Not in call setup.No calls held.SignalStrength = 5,Roaming is not
active.BatteryLevel = 5
1.07/27/2016 05:27:22-434,False,0.0,0,REMOTE_DEVICE_BATTERY,5
1.07/27/2016 05:27:22-434,False,0.0,0,REMOTE_DEVICE_ROAM,False
1.07/27/2016 05:27:22-434,False,0.0,0,REMOTE_DEVICE_SIGNAL,5
1.07/27/2016 05:27:22-434,False,0.0,0,REMOTE_DEVICE_SIGNAL,5

CANCEL << PREVIOUS NEXT >> OK

呼叫性能测试步骤（手机拨打手机方式）

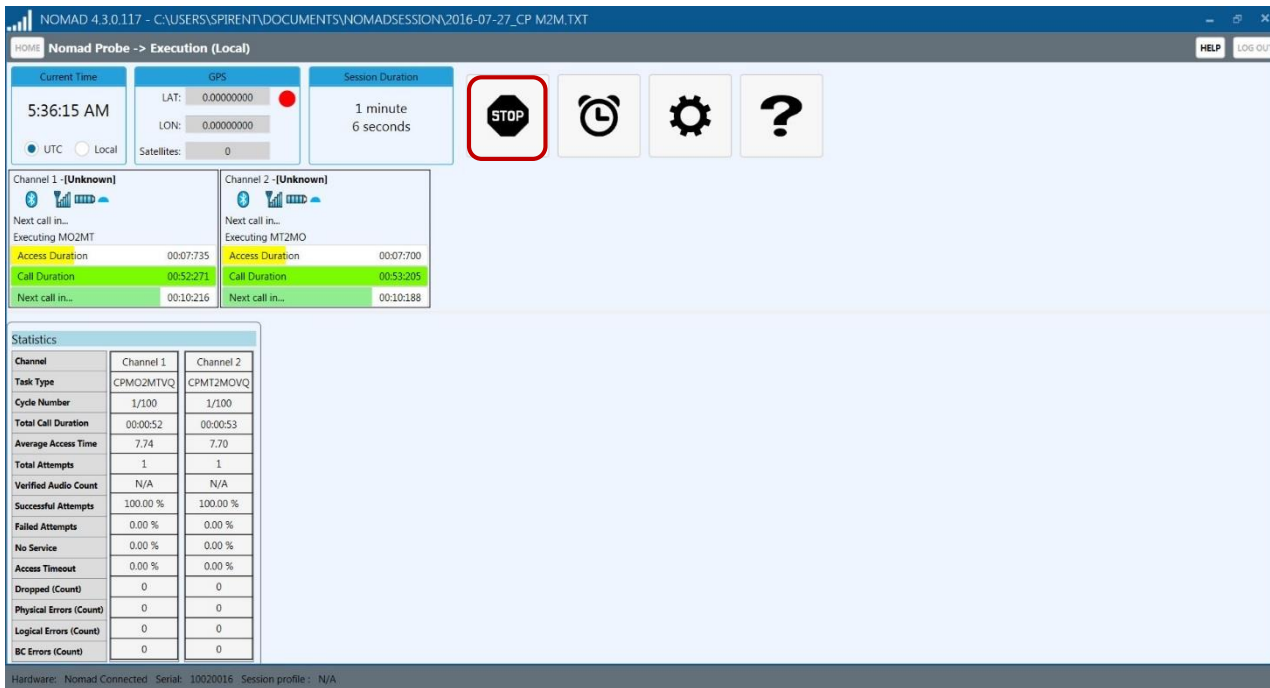


7. 点击Start Logging Session按钮，输入Log文件存储位置，根据提示开始测试。



呼叫性能测试步骤（手机拨打手机方式）

8. 测试结束后会自动完成并跳转至报告生成界面，也可在测试界面下点击Stop按钮可立即停止测试，并进入报告生成界面



NOMAD 4.3.0.117 - C:\USERS\SPIRENT\DOCUMENTS\NOMADSESSION\2016-07-27_CP M2M.TXT

Nomad Probe -> Execution (Local)

Current Time: 5:36:15 AM

GPS: LAT: 0.00000000, LON: 0.00000000, Satellites: 0

Session Duration: 1 minute 6 seconds

Channel 1 - [Unknown]: Next call in..., Executing MO2MT, Access Duration: 00:07:735, Call Duration: 00:52:271, Next call in...: 00:10:216

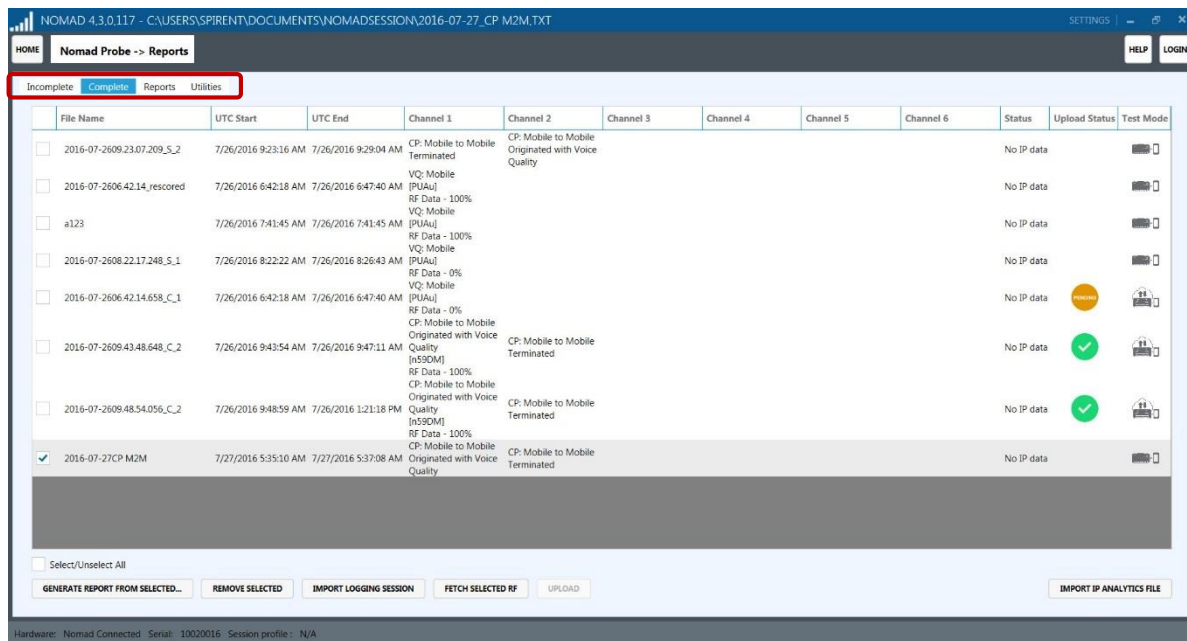
Channel 2 - [Unknown]: Next call in..., Executing MT2MO, Access Duration: 00:07:700, Call Duration: 00:53:205, Next call in...: 00:10:188

Channel	Channel 1	Channel 2
Task Type	CPMO2MTVQ	CPMT2MOVQ
Cycle Number	1/100	1/100
Total Call Duration	00:00:52	00:00:53
Average Access Time	7.74	7.70
Total Attempts	1	1
Verified Audio Count	N/A	N/A
Successful Attempts	100.00 %	100.00 %
Failed Attempts	0.00 %	0.00 %
No Service	0.00 %	0.00 %
Access Timeout	0.00 %	0.00 %
Dropped (Count)	0	0
Physical Errors (Count)	0	0
Logical Errors (Count)	0	0
BC Errors (Count)	0	0

Hardware: Nomad Connected Serial: 10020016 Session profile: N/A

呼叫性能测试步骤（手机拨打手机方式）

9. 通常软件会自动进入Data→Complete界面，但如果跳转至Data→Incomplete界面，则需点击Retry Auto-Complete按钮进行自动log报告完成。如自动报告完成无法成功且并无任何告警信息出现，可选择该Logging Session行并点击Mark Select As Complete按钮强制跳转至Complete界面。

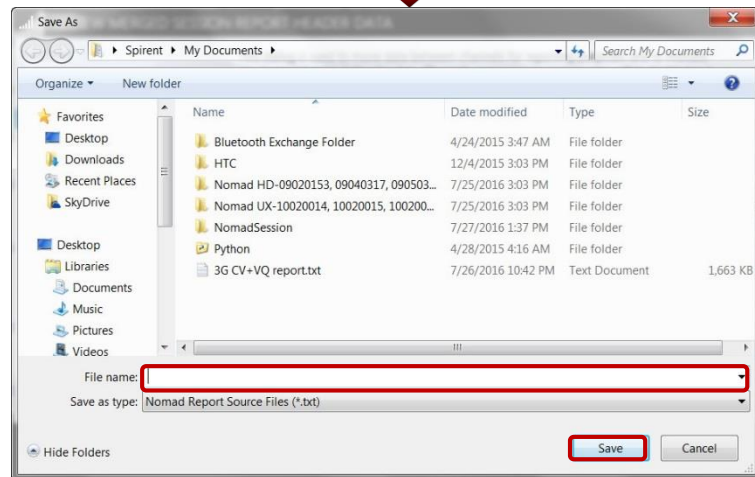
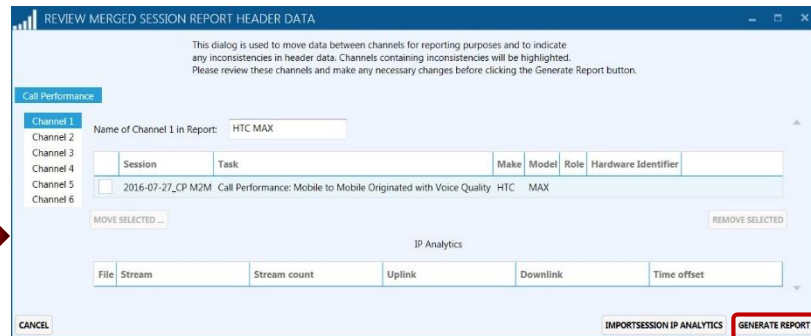
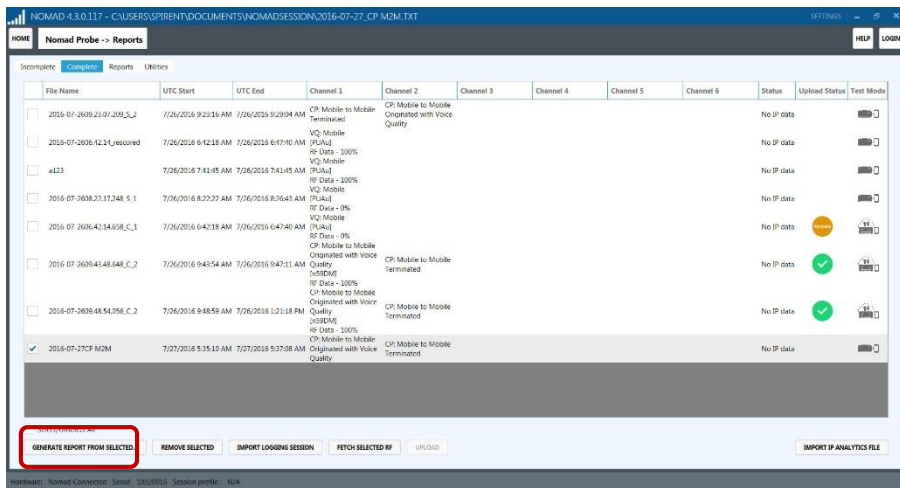


File Name	UTC Start	UTC End	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Status	Upload Status	Test Mode
2016-07-260923.07.209_S_2	7/26/2016 9:23:16 AM	7/26/2016 9:29:04 AM	CP: Mobile to Mobile Terminated	CP: Mobile to Mobile Originated with Voice Quality					No IP data		
2016-07-260642.14.rescored	7/26/2016 6:42:18 AM	7/26/2016 6:47:40 AM	VQ: Mobile (PUA)	RF Data - 100%					No IP data		
a123	7/26/2016 7:41:45 AM	7/26/2016 7:41:45 AM	VQ: Mobile (PUA)	RF Data - 100%					No IP data		
2016-07-260822.17.248_S_1	7/26/2016 8:22:22 AM	7/26/2016 8:26:43 AM	VQ: Mobile (PUA)	RF Data - 0%					No IP data		
2016-07-260642.14.658_C_1	7/26/2016 6:42:18 AM	7/26/2016 6:47:40 AM	VQ: Mobile (PUA)	RF Data - 0%					No IP data		
2016-07-260943.48.648_C_2	7/26/2016 9:43:54 AM	7/26/2016 9:47:11 AM	CP: Mobile to Mobile Originated with Voice Quality (n590M)	RF Data - 100%					No IP data	✓	
2016-07-260948.54.056_C_2	7/26/2016 9:48:59 AM	7/26/2016 1:21:18 PM	CP: Mobile to Mobile Originated with Voice Quality (n590M)	RF Data - 100%					No IP data	✓	
2016-07-27CP M2M	7/27/2016 5:35:10 AM	7/27/2016 5:37:08 AM	CP: Mobile to Mobile Originated with Voice Quality	CP: Mobile to Mobile Terminated					No IP data		

Hardware: Nomad Connected Serial: 10020016 Session profile: N/A

呼叫性能测试步骤（手机拨打手机方式）

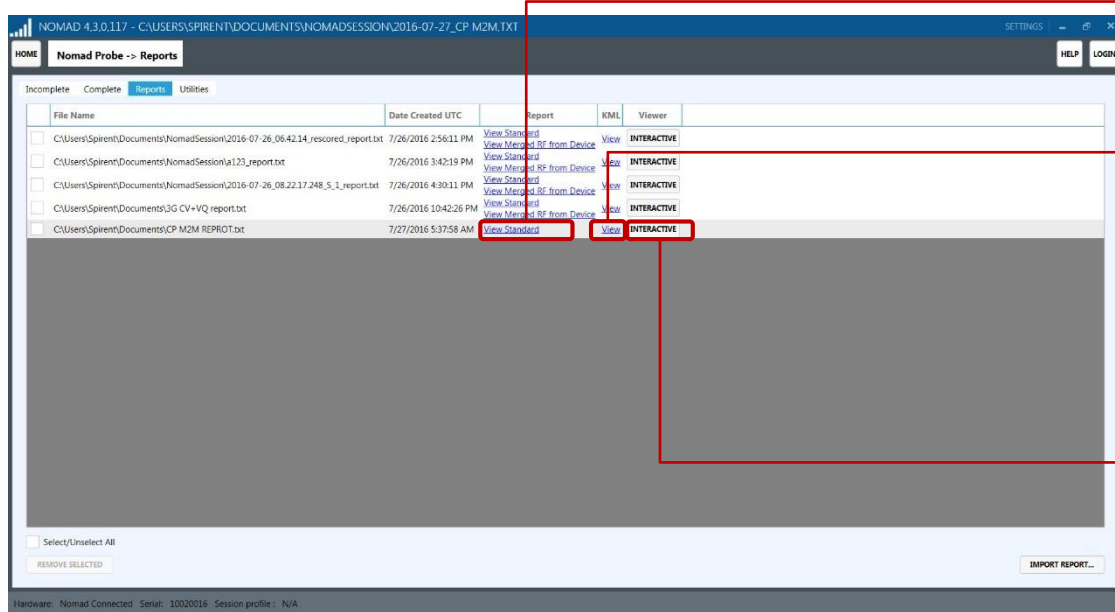
10. 在Data→Complete界面，选择要处理的Logging Session行，并点击Generate Report From Selected按钮，并随后点击Generate Report按钮以生成报告文件对应的Log文件。



呼叫性能测试步骤（手机拨打手机方式）

11. 在Data→Report界面，选择要处理的Report Logging Session行：

- 点击View Standard按钮生成报告文件
- 点击KML列View按钮生成谷歌地图文件
- 点击Interactive按钮进行快速呼叫性能分析



NOMAD 4.3.0.117 - C:\USERS\SPIRENT\DOCUMENTS\NOMADSESSION\2016-07-27_CP_M2M.TXT

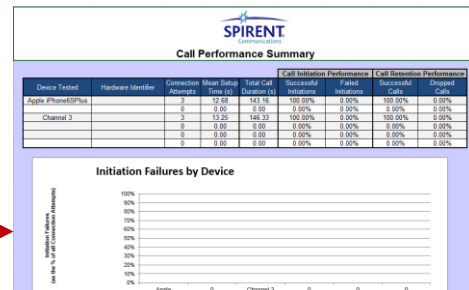
HOME Nomad Probe -> Reports SETTINGS HELP LOGIN

Incomplete Complete Reports UTILITIES

File Name	Date Created UTC	Report	KML	Viewer
C:\Users\SpiRent\Documents\NomadSession\2016-07-26_06:42:14_rescored_report.txt	7/26/2016 2:56:11 PM	View Standard	View Map of RF from Device	INTERACTIVE
C:\Users\SpiRent\Documents\NomadSession\2016-07-26_08:22:17_248_5_1_report.txt	7/26/2016 3:42:19 PM	View Standard	View Map of RF from Device	INTERACTIVE
C:\Users\SpiRent\Documents\NomadSession\2016-07-26_08:22:17_248_5_1_report.txt	7/26/2016 4:30:11 PM	View Standard	View Map of RF from Device	INTERACTIVE
C:\Users\SpiRent\Documents\2016-07-26_10:42:26 PM	7/26/2016 10:42:26 PM	View Standard	View Map of RF from Device	INTERACTIVE
C:\Users\SpiRent\Documents\CP M2M REPRT.txt	7/27/2016 5:37:58 AM	View Standard	View	INTERACTIVE

☐ Select/Unselect All

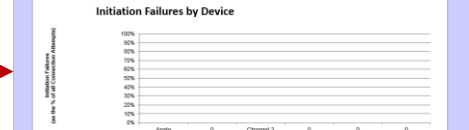
Hardware: Nomad Connected Serial: 10020016 Session profile: N/A



Call Performance Summary

Device Tested	Hardware Identifier	Connection Attempts	Mean Setup Time (s)	Total Call Duration (s)	Call Initiation Performance		Call Termination Performance	
					Successful	Failed	Successful	Failed
Apple iPhone6SPlus		0	0.00	0.00	0.00%	0.00%	0.00%	0.00%
Channel 3		0	0.00	0.00	0.00%	0.00%	0.00%	0.00%

Initiation Failures by Device



SESSION: D:\WORK\TEST\NOMAD\2016-08-02_01:59:26_122_5_3-CP+VQ-R.TXT

Channel 1 Channel 3

Make: Apple Model: iPhone6SPlus Role: Test Type: CP+VQ+VQ Hardware Identifier: Number to Dial: 18611726936 Number Dialing From: 18611726936 Adapter: Call Count: 4

Audio Cycle Count: 0

Session	Session Channel	Start Time	End Time
2016-08-02_01:59:26_122_5_3-CP+VQ-R.TXT	1	8/2/2016 2:00:04 AM	8/2/2016 2:04:47 AM
2016-08-02_01:59:26_122_5_3-CP+VQ-R.TXT	2	8/2/2016 2:00:40 AM	8/2/2016 2:04:40 AM

Cycle	Start Time (UTC)	End Time (UTC)	Result	Setup Time	Duration
1	8/2/2016 2:00:04 AM	8/2/2016 2:00:04 AM	SUCCESS	14.54	45.61
2	8/2/2016 2:01:34 AM	8/2/2016 2:02:34 AM	SUCCESS	10.17	49.88
3	8/2/2016 2:03:04 AM	8/2/2016 2:04:04 AM	SUCCESS	13.34	46.69
4	8/2/2016 2:04:35 AM	8/2/2016 2:04:47 AM	USER_TERMINATED	10.99	0.88

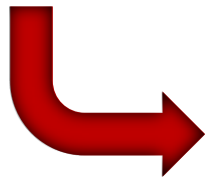
Start Time UTC: 8/2/2016 2:00:04 AM End Time UTC: 8/2/2016 2:04:47 AM

呼叫性能与语音质量并行测试步骤

手机拨打手机方式

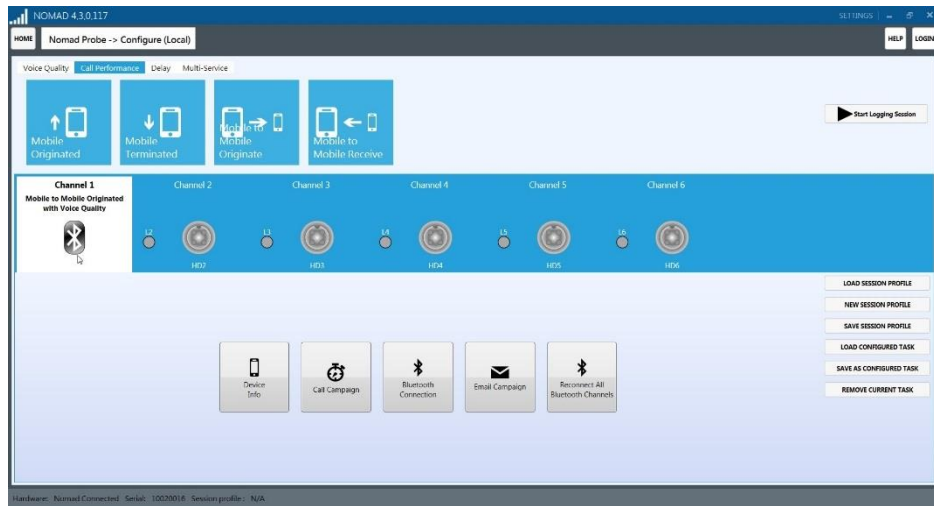
呼叫性能与语音质量并行测试步骤（手机拨打手机方式）

1. 在Nomad软件 → Standalone Mode → Call Performance 菜单下，使用鼠标左键拖拽 Mobile to Mobile Originate按钮至相应测试Channel，然后松开鼠标按键。



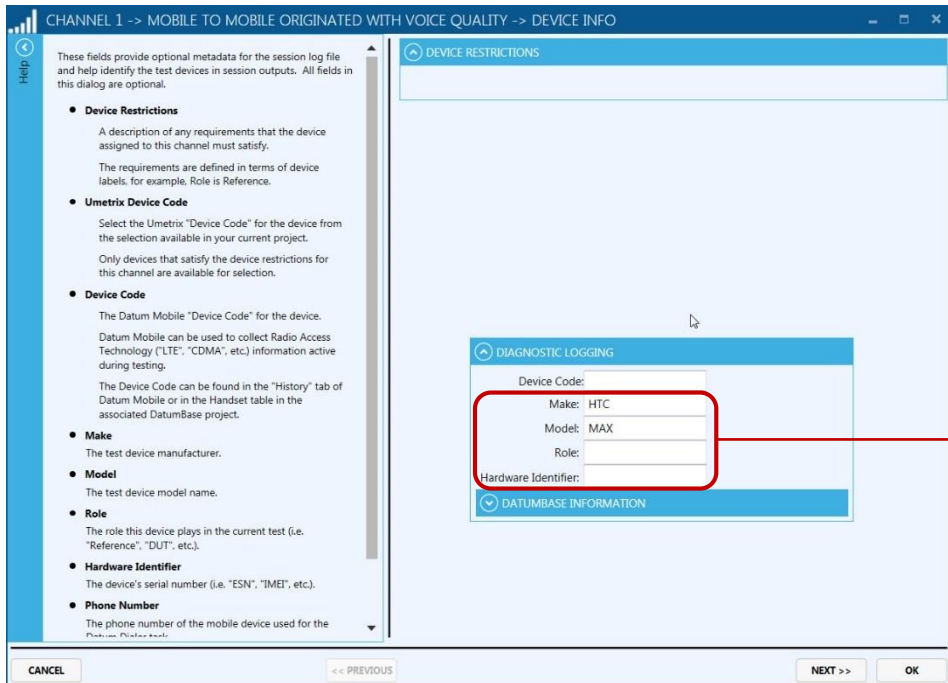
呼叫性能与语音质量并行测试步骤（手机拨打手机方式）

2. 点击Device Info按钮，进入呼叫模型配置界面。



呼叫性能与语音质量并行测试步骤（手机拨打手机方式）

3. 进入被测设备信息配置界面。（此配置用于在输出的Excel报告的表头中显示被测设备信息）



CHANNEL 1 -> MOBILE TO MOBILE ORIGINATED WITH VOICE QUALITY -> DEVICE INFO

These fields provide optional metadata for the session log file and help identify the test devices in session outputs. All fields in this dialog are optional.

- Device Restrictions**
A description of any requirements that the device assigned to this channel must satisfy.
The requirements are defined in terms of device labels, for example, Role is Reference.
- Umetrix Device Code**
Select the Umetrix "Device Code" for the device from the selection available in your current project.
Only devices that satisfy the device restrictions for this channel are available for selection.
- Device Code**
The Datum Mobile "Device Code" for the device.
Datum Mobile can be used to collect Radio Access Technology ("LTE", "CDMA", etc.) information active during testing.
The Device Code can be found in the "History" tab of Datum Mobile or in the Handset table in the associated DatumBase project.
- Make**
The test device manufacturer.
- Model**
The test device model name.
- Role**
The role this device plays in the current test (i.e. "Reference", "DUT", etc.).
- Hardware Identifier**
The device's serial number (i.e. "ESN", "IMEI", etc.).
- Phone Number**
The phone number of the mobile device used for the test.

DIAGNOSTIC LOGGING

Device Code:

Make: HTC

Model: MAX

Role:

Hardware Identifier:

DATUMBASE INFORMATION

CANCEL << PREVIOUS NEXT >> OK

输入被测终端设备信息

呼叫性能与语音质量并行测试步骤（手机拨打手机方式）

4. 进行测试呼叫模型配置。

选择使用耳机接口测试语音质量

选择使用蓝牙接口进行拨打测试

选择对端手机的连接通道

设置要拨打的电话号码

选择所有被测终端每个Cycle同时触发，还是各被测终端不在每个Cycle开始时对齐同时触发测试。

配置呼叫模型：

- ☐ 呼叫接通等待超时定时器
- ☐ 呼叫时长（含起呼部分）
- ☐ 呼叫间等待时长
- ☐ 测试起呼次数

呼叫中通过耳机接口同时验证语音质量的相关配置，此选项必须在开启状态

The screenshot shows the 'CHANNEL 1 -> MOBILE TO MOBILE ORIGINATED WITH VOICE QUALITY -> CALL CAMPAIGN' configuration window. The interface is divided into two main sections: a left sidebar with a 'Help' icon and a main configuration area. The main area is titled 'These fields specify duration and sequencing a Call Performance Task.' and contains several sections: 'Number to dial' (with sub-sections for MO and MT campaigns), 'Call Initiation Mode' (with Synchronous and Asynchronous options), 'Access Timeout', 'Duration', 'Wait Time', and 'Attempts'. The right side of the window is titled 'Mobile to Mobile Originated with Voice Quality Task Setup' and contains a 'Dial/Answer Method' section (with Bluetooth, Audio over Bluetooth, and Audio over Analog options), a 'Receiving Device' dropdown (set to 'Receiver on channel 2'), 'Number to dial' and 'Number calling from' fields, a 'Synchronous' vs 'Asynchronous' radio button selection, and a table of timing parameters (Access Timeout, Duration, Wait Time, Attempts, Max Call Length, Max Task Length). At the bottom, there is a 'VQ ENABLED' toggle, a 'Sampling Rate' section (with 8kHz, 16kHz, and 48kHz options), and a 'Scoring Model' section (with PESQ and POLQA options). The bottom of the window has 'CANCEL', '<< PREVIOUS', 'NEXT >>', and 'OK' buttons.

CHANNEL 1 -> MOBILE TO MOBILE ORIGINATED WITH VOICE QUALITY -> CALL CAMPAIGN

These fields specify duration and sequencing a Call Performance Task.

Dial/Answer Method: ☒ Bluetooth ☐ Audio over Bluetooth ☐ Audio over Analog

Receiving Device:

Number to dial:

Number calling from:

Mobile to Mobile Originated with Voice Quality Task Setup

☒ Synchronous ☐ Asynchronous

Access Timeout:

Duration:

Wait Time:

Attempts:

Max Call Length: 1 minute, 10 seconds

Max Task Length: 13 minutes, 55 seconds

VQ ENABLED

Sampling Rate: ☒ 8kHz ☐ 16kHz ☐ 48kHz

Scoring Model: ☐ PESQ ☒ POLQA

Channel 1

CANCEL << PREVIOUS NEXT >> OK

呼叫性能与语音质量并行测试步骤（手机拨打手机方式）

5. 进行测试呼叫模型的语音配置。

CHANNEL 2 -> MOBILE TO MOBILE TERMINATED -> CALL CAMPAIGN

Help

These fields specify duration and sequencing a Call Performance Task.

- Number to dial
 - MO campaign
Call Server number to be dialed by the mobile.
 - MT campaign
Mobile phone number to be dialed by the Call Server.
- Call Initiation Mode
 - Synchronous
Calls start simultaneously on all devices regardless of call outcomes.
 - Asynchronous
Each device follows its own call sequence without regard to other device progress.
- Access Timeout
A call attempt that has not connected within this amount of time will be classified as an Access Timeout event. For an MT campaign, set this for longer than it takes the phone to go to voicemail.
- Duration
The length of each call in the test sequence.
- Wait Time
The amount of idle time between the end of one call in the sequence and the start of the next call.
- Attempts
The number of calls to attempt in this task sequence.

Mobile to Mobile Terminated Task Setup

☒ Synchronous ☐ Asynchronous

Access Timeout: 25

Duration: 70

Wait Time: 15

Attempts: 10

Max Call Length: 1 minute, 10 seconds

Max Task Length: 13 minutes, 55 seconds

VQ ENABLED

Sampling Rate

- ☒ 8kHz
- ☐ 16kHz
- ☐ 48kHz

Scoring Model

- ☐ PESQ
- ☒ POLQA

Channel 2

Input: 215

Output: 145

Source file: narrowband_ref.wav

File Length: 10 seconds Sample Rate: 8 kHz Compression: PCM

Normal Operating Range

Overdrive ☐

CANCEL << PREVIOUS NEXT >> OK

选择相应的MOS计算算法：PESQ或POLQA

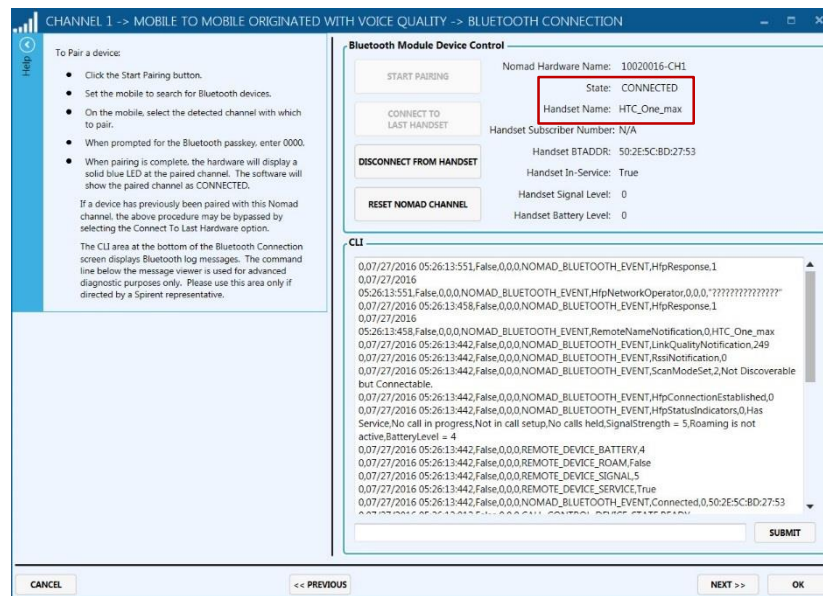
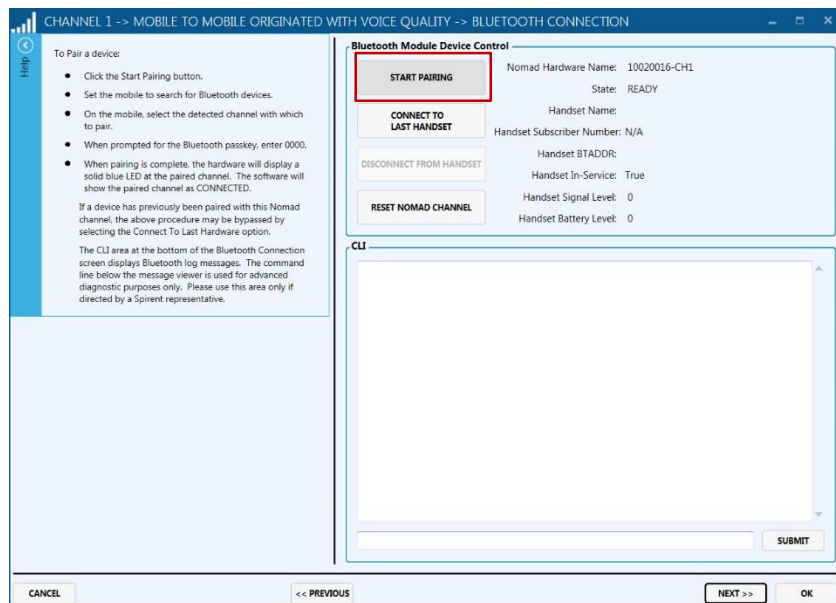
选择相应的测试语音采用率：8KHz、16KHz或48KHz

如已知被测手机的输入输出音量补偿，则输入相应数值；否则可先暂不输入

点击NEXT确认配置

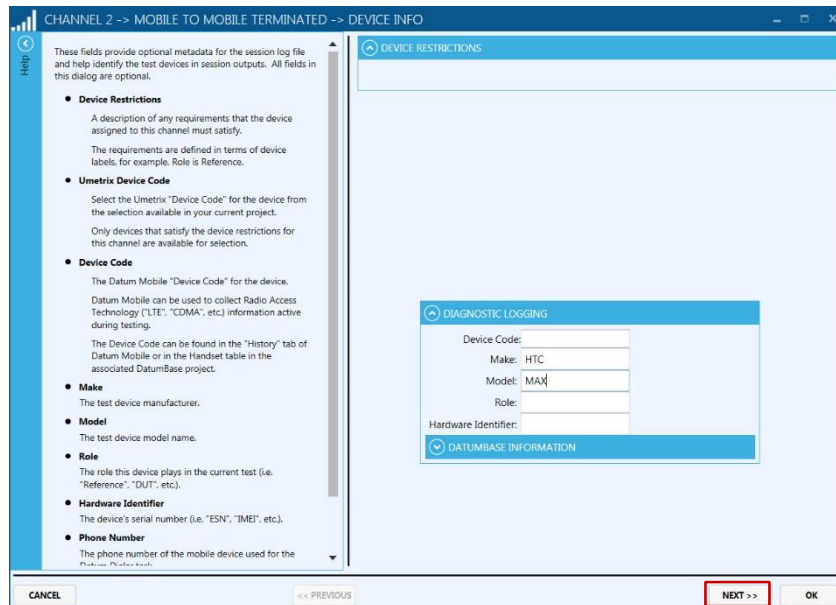
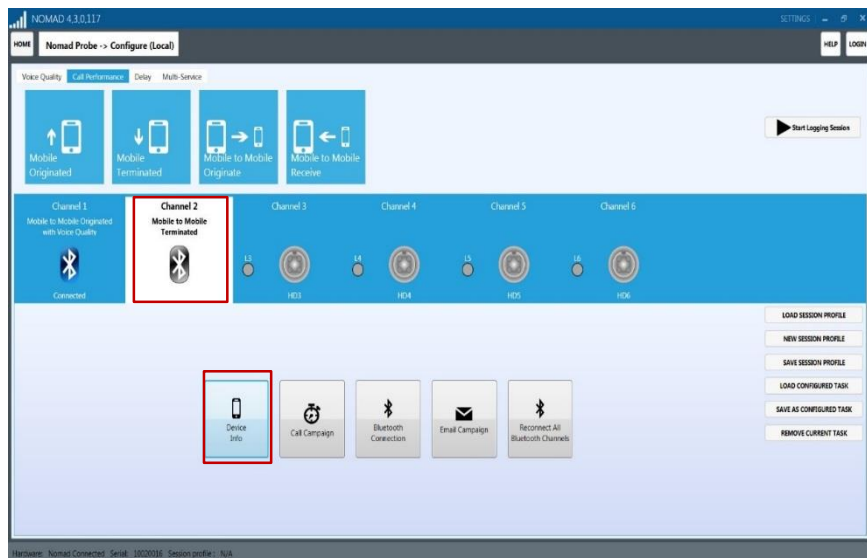
呼叫性能与语音质量并行测试步骤（手机拨打手机方式）

6. 点击Bluetooth Connection按钮，进入蓝牙配对界面；点击Start Pairing与手机蓝牙进行配对，当配对成功时，Handset Name会出现手机的名称。最后再按OK确认所有的配置



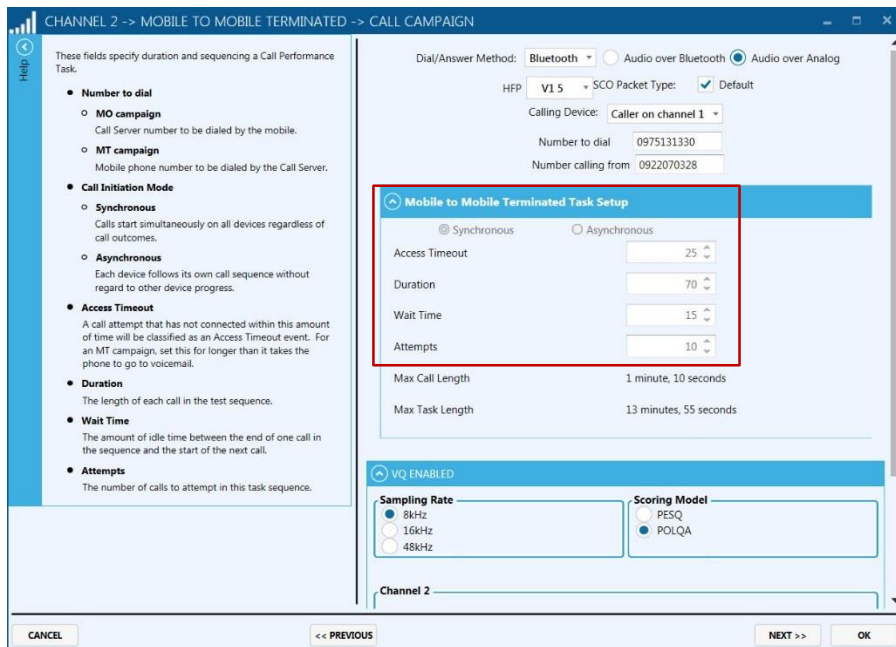
呼叫性能与语音质量并行测试步骤（手机拨打手机方式）

7. 点击Channel 及Device Info按钮，进入Device Info配置(请参考步骤3.)。



呼叫性能与语音质量并行测试步骤（手机拨打手机方式）

8. 在Call Campaign的配置请参考步骤 4.及5.，这Mobile to Mobile Terminated Task Setup会依Caller Channel配置直接套用。再按Next确认配置。



CHANNEL 2 -> MOBILE TO MOBILE TERMINATED -> CALL CAMPAIGN

These fields specify duration and sequencing a Call Performance Task.

- Number to dial**
 - MO campaign**
Call Server number to be dialed by the mobile.
 - MT campaign**
Mobile phone number to be dialed by the Call Server.
- Call Initiation Mode**
 - Synchronous**
Calls start simultaneously on all devices regardless of call outcomes.
 - Asynchronous**
Each device follows its own call sequence without regard to other device progress.
- Access Timeout**
A call attempt that has not connected within this amount of time will be classified as an Access Timeout event. For an MT campaign, set this for longer than it takes the phone to go to voicemail.
- Duration**
The length of each call in the test sequence.
- Wait Time**
The amount of idle time between the end of one call in the sequence and the start of the next call.
- Attempts**
The number of calls to attempt in this task sequence.

Dial/Answer Method: ☐ Bluetooth ☒ Audio over Bluetooth ☐ Audio over Analog

HFP: ☐ V1.5 ☒ SCO Packet Type: ☒ Default

Calling Device:

Number to dial:

Number calling from:

Mobile to Mobile Terminated Task Setup

☒ Synchronous ☐ Asynchronous

Access Timeout:

Duration:

Wait Time:

Attempts:

Max Call Length: 1 minute, 10 seconds

Max Task Length: 13 minutes, 55 seconds

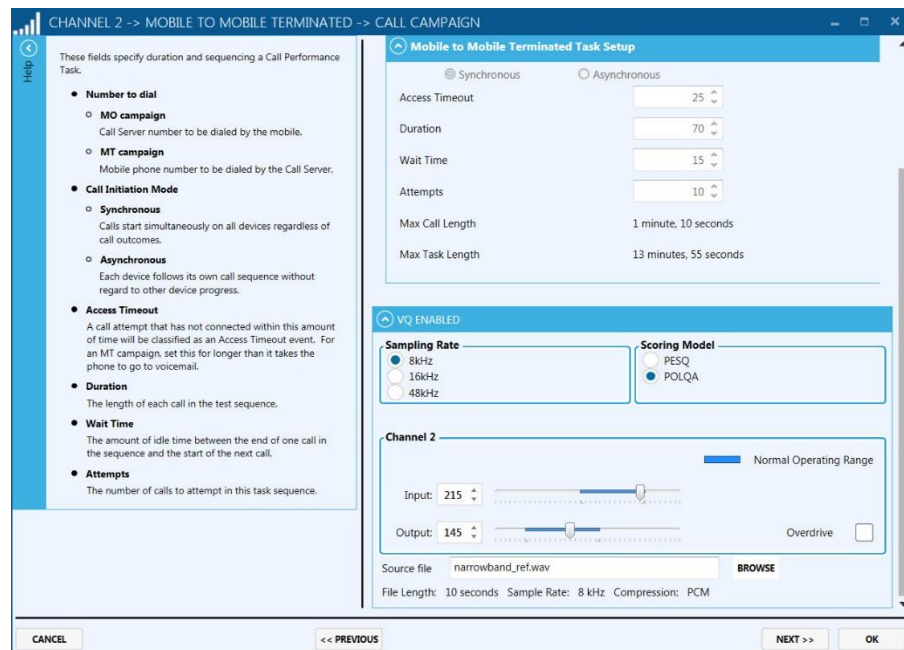
VQ ENABLED

Sampling Rate
☒ 8kHz ☐ 16kHz ☐ 48kHz

Scoring Model
☐ PESQ ☒ POLQA

Channel 2

CANCEL << PREVIOUS NEXT >> OK



CHANNEL 2 -> MOBILE TO MOBILE TERMINATED -> CALL CAMPAIGN

These fields specify duration and sequencing a Call Performance Task.

Mobile to Mobile Terminated Task Setup

☒ Synchronous ☐ Asynchronous

Access Timeout:

Duration:

Wait Time:

Attempts:

Max Call Length: 1 minute, 10 seconds

Max Task Length: 13 minutes, 55 seconds

VQ ENABLED

Sampling Rate
☒ 8kHz ☐ 16kHz ☐ 48kHz

Scoring Model
☐ PESQ ☒ POLQA

Channel 2

Input:

Output:

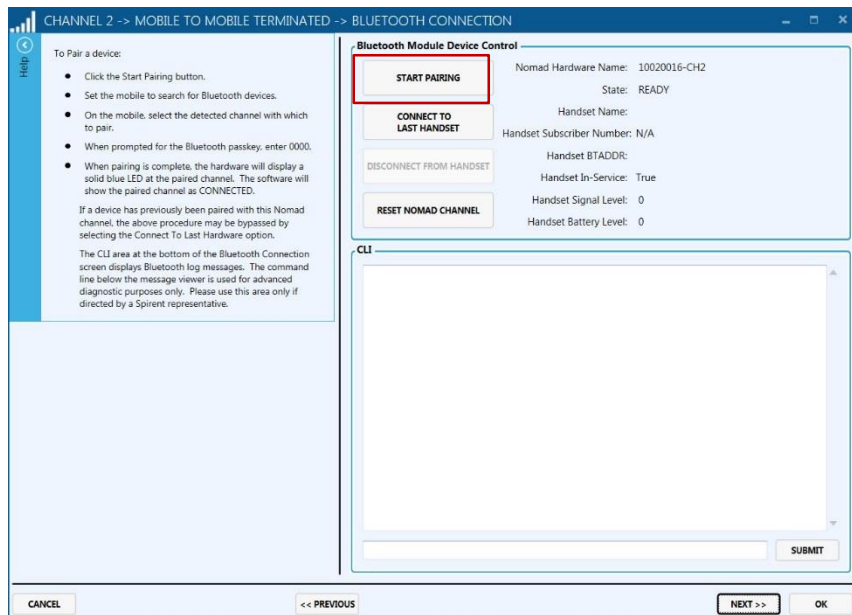
Source file: BROWSE

File Length: 10 seconds Sample Rate: 8 kHz Compression: PCM

CANCEL << PREVIOUS NEXT >> OK

呼叫性能与语音质量并行测试步骤（手机拨打手机方式）

9. 在Bluetooth Connection配置与步骤 6. 相同。



CHANNEL 2 -> MOBILE TO MOBILE TERMINATED -> BLUETOOTH CONNECTION

To Pair a device:

- Click the Start Pairing button.
- Set the mobile to search for Bluetooth devices.
- On the mobile, select the detected channel with which to pair.
- When prompted for the Bluetooth passkey, enter 0000.
- When pairing is complete, the hardware will display a solid blue LED at the paired channel. The software will show the paired channel as CONNECTED.

If a device has previously been paired with this Nomad channel, the above procedure may be bypassed by selecting the Connect To Last Hardware option.

The CLI area at the bottom of the Bluetooth Connection screen displays Bluetooth log messages. The command line below the message viewer is used for advanced diagnostic purposes only. Please use this area only if directed by a Spirent representative.

Bluetooth Module Device Control

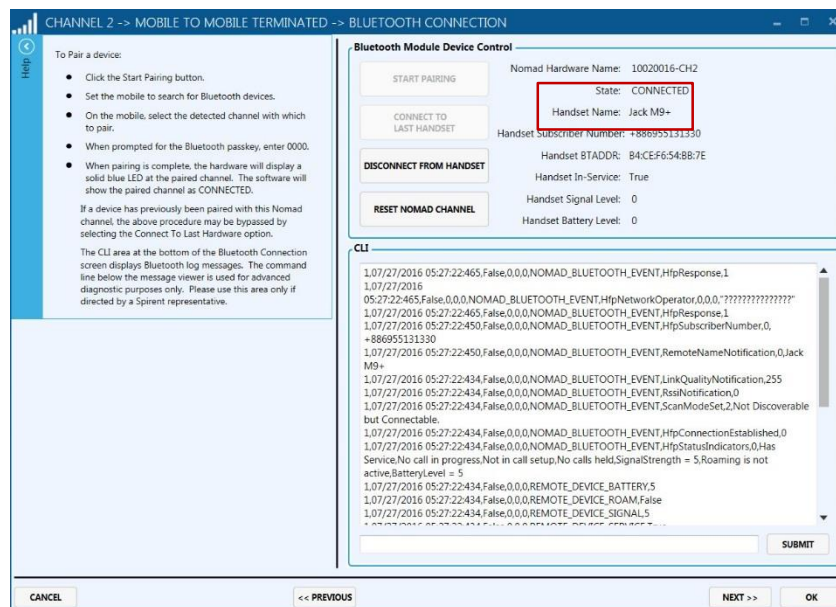
Nomad Hardware Name: 10020016-CH2
State: READY
Handset Name:
Handset Subscriber Number: N/A
Handset BTADDR:
Handset In-Service: True
Handset Signal Level: 0
Handset Battery Level: 0

Buttons: START PAIRING, CONNECT TO LAST HANDSET, DISCONNECT FROM HANDSET, RESET NOMAD CHANNEL

CLI

Submit: SUBMIT

Navigation: CANCEL, << PREVIOUS, NEXT >>, OK



CHANNEL 2 -> MOBILE TO MOBILE TERMINATED -> BLUETOOTH CONNECTION

To Pair a device:

- Click the Start Pairing button.
- Set the mobile to search for Bluetooth devices.
- On the mobile, select the detected channel with which to pair.
- When prompted for the Bluetooth passkey, enter 0000.
- When pairing is complete, the hardware will display a solid blue LED at the paired channel. The software will show the paired channel as CONNECTED.

If a device has previously been paired with this Nomad channel, the above procedure may be bypassed by selecting the Connect To Last Hardware option.

The CLI area at the bottom of the Bluetooth Connection screen displays Bluetooth log messages. The command line below the message viewer is used for advanced diagnostic purposes only. Please use this area only if directed by a Spirent representative.

Bluetooth Module Device Control

Nomad Hardware Name: 10020016-CH2
State: CONNECTED
Handset Name: Jack M9+
Handset Subscriber Number: +886955131330
Handset BTADDR: 84:CE:F6:54:88:7E
Handset In-Service: True
Handset Signal Level: 0
Handset Battery Level: 0

Buttons: START PAIRING, CONNECT TO LAST HANDSET, DISCONNECT FROM HANDSET, RESET NOMAD CHANNEL

CLI

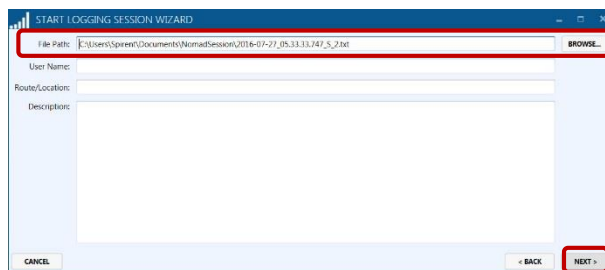
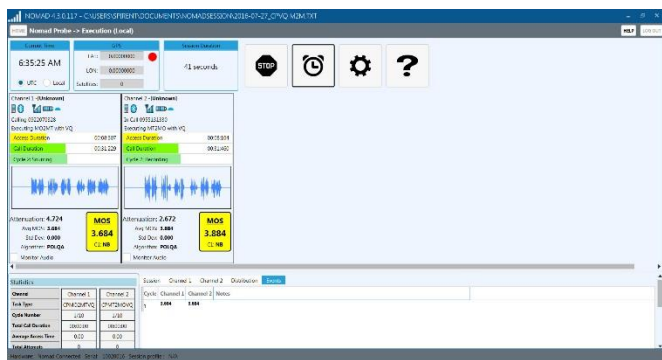
```
1,07/27/2016 05:27:22-465,False,0,0,0,NOMAD_Bluetooth_EVENT,HfpResponse,1
1,07/27/2016
05:27:22-465,False,0,0,0,NOMAD_Bluetooth_EVENT,HfpNetworkOperator,0,0,0,????????????????
1,07/27/2016 05:27:22-465,False,0,0,0,NOMAD_Bluetooth_EVENT,HfpResponse,1
1,07/27/2016 05:27:22-450,False,0,0,0,NOMAD_Bluetooth_EVENT,HfpSubscriberNumber,0,
+886955131330
1,07/27/2016 05:27:22-450,False,0,0,0,NOMAD_Bluetooth_EVENT,RemoteNameNotification,0,Jack
M9+
1,07/27/2016 05:27:22-434,False,0,0,0,NOMAD_Bluetooth_EVENT,LinkQualityNotification,255
1,07/27/2016 05:27:22-434,False,0,0,0,NOMAD_Bluetooth_EVENT,ResaNotification,0
1,07/27/2016 05:27:22-434,False,0,0,0,NOMAD_Bluetooth_EVENT,ScanModeSet,2,Not Discoverable
but Connectable.
1,07/27/2016 05:27:22-434,False,0,0,0,NOMAD_Bluetooth_EVENT,HfpConnectionEstablished,0
1,07/27/2016 05:27:22-434,False,0,0,0,NOMAD_Bluetooth_EVENT,HfpStatusIndicators,0,Has
Service.No call in progress.No in call setup.No calls held.SignalStrength = 5,Roaming is not
active.BatteryLevel = 5
1,07/27/2016 05:27:22-434,False,0,0,0,REMOTE_DEVICE_BATTERY,5
1,07/27/2016 05:27:22-434,False,0,0,0,REMOTE_DEVICE_ROAM,False
1,07/27/2016 05:27:22-434,False,0,0,0,REMOTE_DEVICE_SIGNAL,5
1,07/27/2016 05:27:22-434,False,0,0,0,REMOTE_DEVICE_SIGNAL,5
```

Submit: SUBMIT

Navigation: CANCEL, << PREVIOUS, NEXT >>, OK

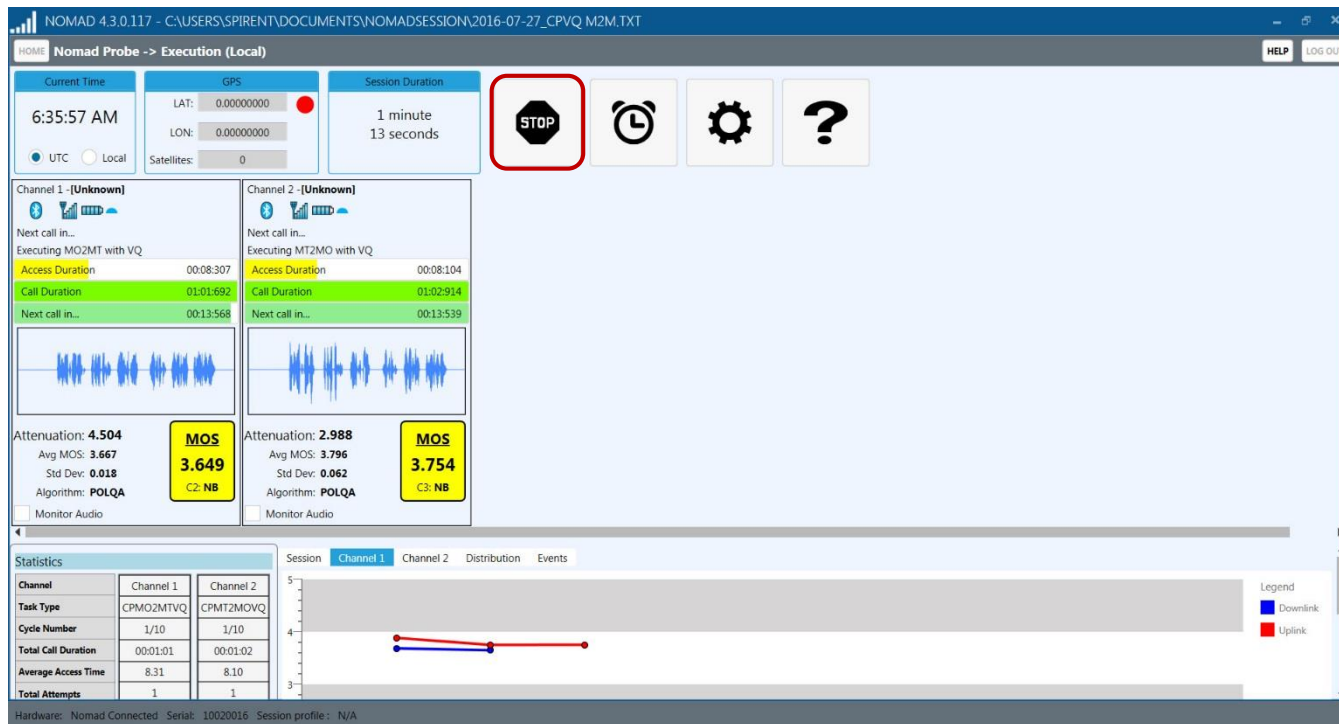
呼叫性能与语音质量并行测试步骤（手机拨打手机方式）

10. 点击Start Logging Session按钮，输入Log文件存储位置，根据提示开始测试。



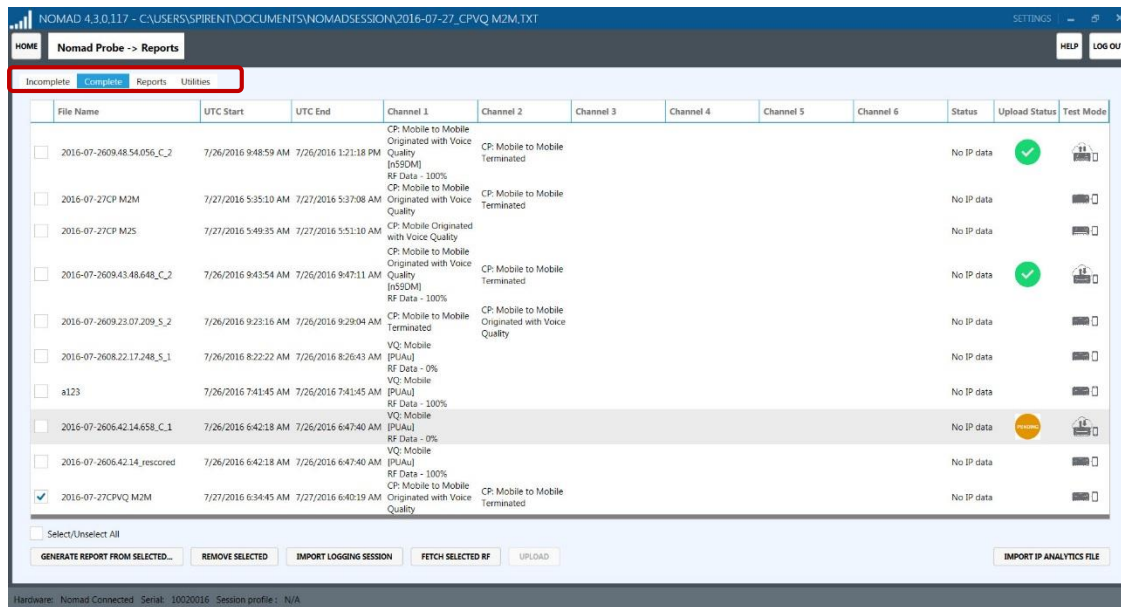
呼叫性能与语音质量并行测试步骤（手机拨打手机方式）

11. 测试结束后会自动完成并跳转至报告生成界面，也可在测试界面下点击Stop按钮可立即停止测试，并进入报告生成界面



呼叫性能与语音质量并行测试步骤（手机拨打手机方式）

12. 通常软件会自动进入Reports→Complete界面，但如果跳转至Data→Incomplete界面，则需点击Retry Auto-Complete按钮进行自动log报告完成。如自动报告完成无法成功且并无任何告警信息出现，可选择该Logging Session行并点击Mark Select As Complete按钮强制跳转至Complete界面。



NOMAD 4.3.0.117 - C:\USERS\SPIRENT\DOCUMENTS\NOMADSESSION\2016-07-CPVQ M2M.TXT

HOME Nomad Probe -> Reports SETTINGS HELP LOG OUT

Incomplete Complete Reports Utilities

File Name	UTC Start	UTC End	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Status	Upload Status	Test Mode
☐ 2016-07-2609.48.54.056_C_2	7/26/2016 9:48:59 AM	7/26/2016 1:21:18 PM	CP: Mobile to Mobile Originated with Voice Quality [nSSOM] RF Data - 100%	CP: Mobile to Mobile Terminated					No IP data	✓	
☐ 2016-07-27CP M2M	7/27/2016 5:35:10 AM	7/27/2016 5:37:08 AM	CP: Mobile to Mobile Originated with Voice Quality	CP: Mobile to Mobile Terminated					No IP data		
☐ 2016-07-27CP M2S	7/27/2016 5:49:35 AM	7/27/2016 5:51:10 AM	CP: Mobile Originated with Voice Quality						No IP data		
☐ 2016-07-2609.43.48.648_C_2	7/26/2016 9:43:54 AM	7/26/2016 9:47:11 AM	CP: Mobile to Mobile Originated with Voice Quality [nSSOM] RF Data - 100%	CP: Mobile to Mobile Terminated					No IP data	✓	
☐ 2016-07-2609.23.07.209_5_2	7/26/2016 9:23:16 AM	7/26/2016 9:29:04 AM	CP: Mobile to Mobile Terminated	CP: Mobile to Mobile Originated with Voice Quality					No IP data		
☐ 2016-07-2608.22.17.248_5_1	7/26/2016 8:22:22 AM	7/26/2016 8:26:43 AM	VQ: Mobile [PUAu] RF Data - 0%						No IP data		
☐ a123	7/26/2016 7:41:45 AM	7/26/2016 7:41:45 AM	VQ: Mobile [PUAu] RF Data - 100%						No IP data		
☐ 2016-07-2606.42.14.658_C.1	7/26/2016 6:42:18 AM	7/26/2016 6:47:40 AM	VQ: Mobile [PUAu] RF Data - 0%						No IP data	⚠	
☐ 2016-07-2606.42.14_jesscored	7/26/2016 6:42:18 AM	7/26/2016 6:47:40 AM	VQ: Mobile [PUAu] RF Data - 100%						No IP data		
☒ 2016-07-27CPVQ M2M	7/27/2016 6:34:45 AM	7/27/2016 6:40:19 AM	CP: Mobile to Mobile Originated with Voice Quality	CP: Mobile to Mobile Terminated					No IP data		

Select/Unselect All

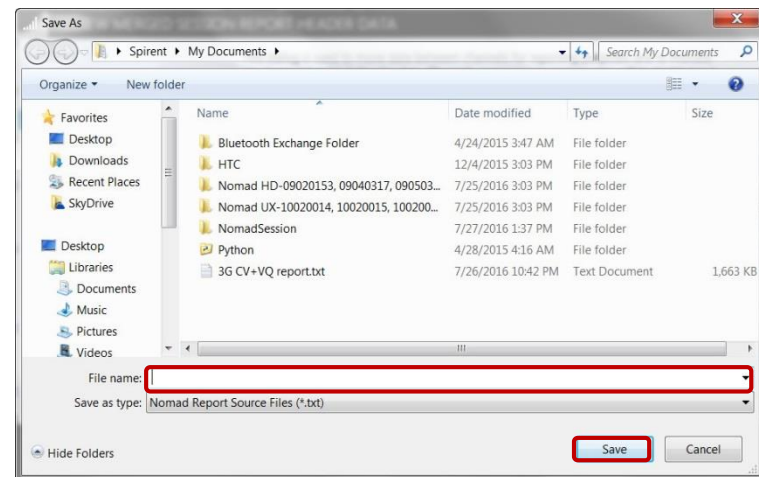
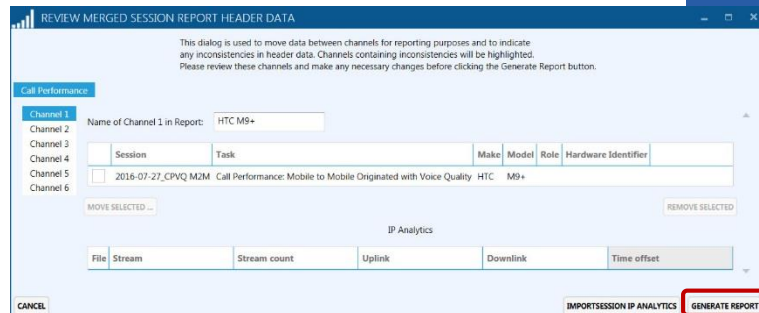
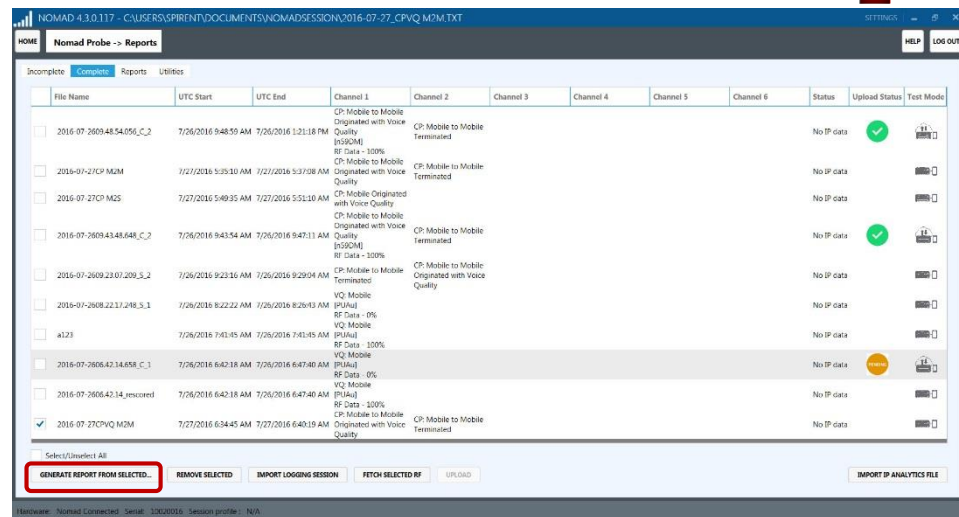
GENERATE REPORT FROM SELECTED... REMOVE SELECTED IMPORT LOGGING SESSION FETCH SELECTED RF UPLOAD

IMPORT IP ANALYTICS FILE

Hardware: Nomad Connected Serial: 10020016 Session profile: N/A

呼叫性能与语音质量并行测试步骤（手机拨打手机方式）

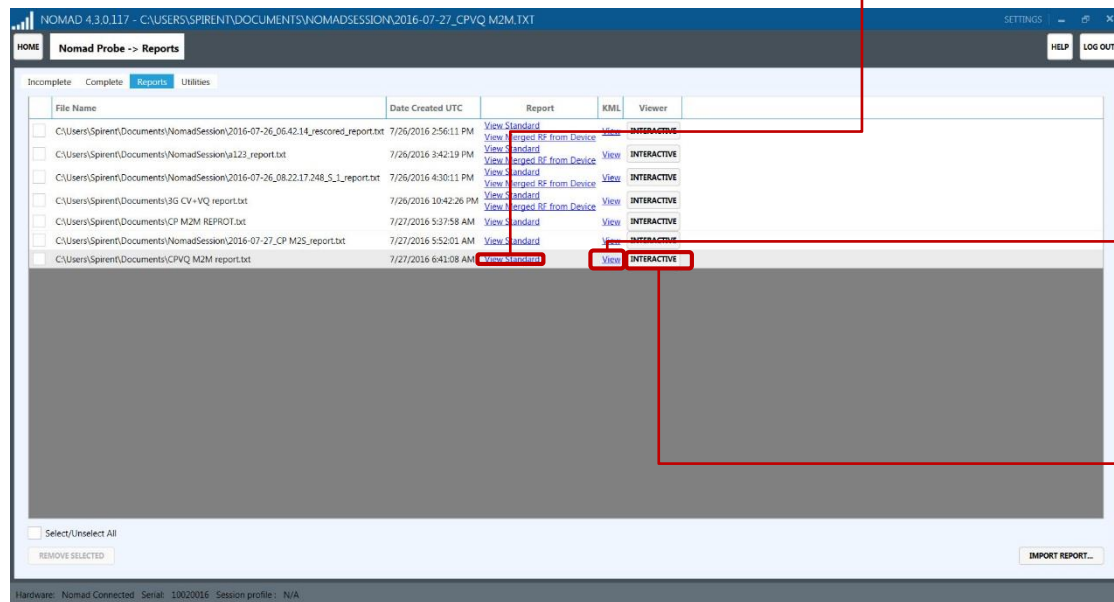
13. 在Reports→Complete界面，选择要处理的Logging Session行，并点击Generate Report From Selected按钮，并随后点击Generate Report按钮以生成报告文件对应的Log文件。



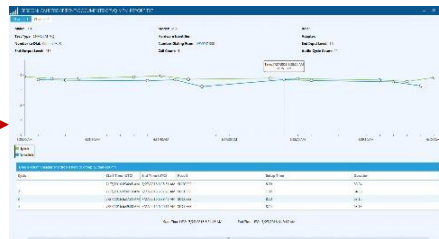
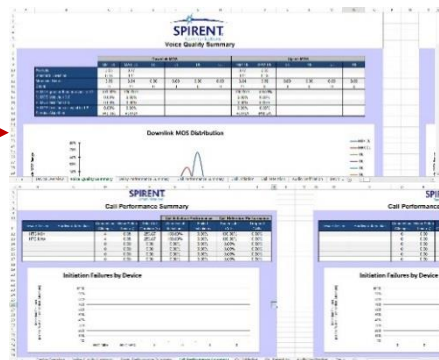
呼叫性能与语音质量并行测试步骤（手机拨打手机方式）

14. 在Reports界面，选择要处理的Report Logging Session行：

- 点击View Standard按钮生成报告文件
- 点击KML列View按钮生成谷歌地图文件
- 点击Interactive按钮进行快速呼叫性能分析



The screenshot shows the SPIRENT Reports interface. At the top, there's a header with 'NOMAD 4.3.0.117' and a file path. Below that, a navigation bar includes 'HOME', 'Nomad Probe -> Reports', 'SETTINGS', 'HELP', and 'LOG OUT'. The main area has tabs for 'Incomplete', 'Complete', 'Reports', and 'Utilities'. A table lists report sessions with columns for 'File Name', 'Date Created UTC', 'Report', 'KML', and 'Viewer'. The last row is highlighted, and red boxes are drawn around the 'View Standard', 'View', and 'INTERACTIVE' buttons in its row. At the bottom, there are buttons for 'Select/Unselect All', 'REMOVE SELECTED', and 'IMPORT REPORT...'.



语音通话端到端时延测试步骤

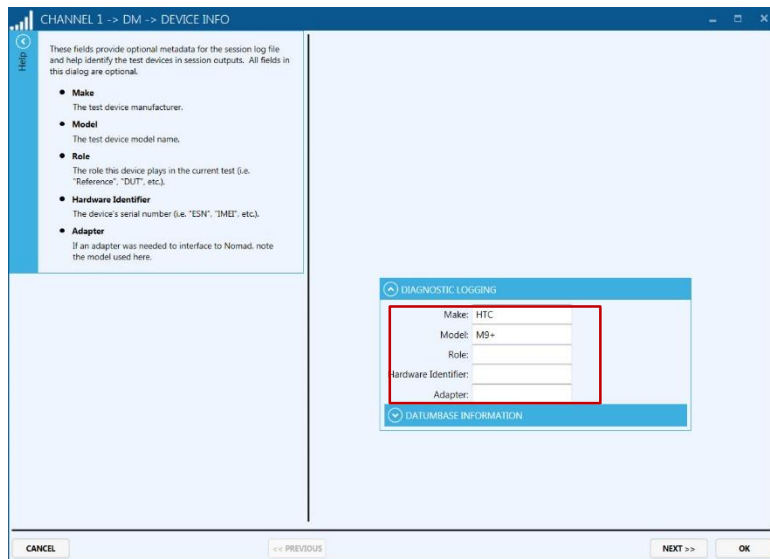
语音通话端到端时延测试步骤

1. 在Nomad软件 → Standalone Mode → Delay菜单下，使用鼠标左键拖拽Voice Delay按钮至相应测试Channel，然后松开鼠标按键。



语音通话端到端时延测试步骤

2. 点击Channel 1 → Device Info按钮，进入测试手机讯息配置，。



语音通话端到端时延测试步骤

3. 进行测试Session配置。

选择是否进行两Channel交互测试，还是进行两Channel间的单方向测试

配置测试模型：

- ☐ Sample Per Cycle：每个测试Cycle的音频脉冲音个数
- ☐ Sample Spacing：每个测试Cycle内各音频脉冲音间的发送间隔（单位ms）
- ☐ Cycles：测试周期数
- ☐ Measurement Method：延迟量测量方式
- ☐ Delay Subtraction Constant (ms)：减去外在所影响的延迟时间
- ☐ Enable side tone rejection:启用侧音抑制，使用于Nomad HD
- ☐ Side Tone Duration (ms):侧音持续时间

选择是否在时延测试前先发送一段标准语音

点击Next确认配置

CHANNEL 1 -> DM -> SESSION

These fields specify settings for a Voice Delay Task.

- Destination Channel**
The local Nomad channel of the device receiving audio from this channel.
- Alternate channels after each cycle**
With this option checked the Nomad channel that is sourcing audio will alternate between each cycle.
- Samples Per Cycle**
The number of samples to collect for each cycle. The total sample count for a test will be Cycles multiplied by Samples Per Cycle.
- Sample Spacing**
The time in milliseconds between each sample. For example, a test configured for 10 samples per cycle with sample spacing set to 1000 will result in a 10 samples being collected with a 1 second space between samples.
- Cycles**
The number of cycles to run. The total sample count for a test will be Cycles multiplied by Samples Per Cycle.
- Delay Subtraction Constant**
The time in milliseconds to subtract from each delay measurement. Use this when you are introducing a known delay value and wish to have it removed from the results.
- Side Tone Duration**
The time in milliseconds to ignore from the beginning of the delay measurement. This time must be sufficient enough to skip the side tone. This feature is only applicable to the High Definition port.
- Audio Priming**
Enable this to prime the channel with Audio. This feature is only applicable to the High Definition port.

Destination Channel: 2

☒ Alternate channels after each cycle

Samples Per Cycle: 10

Sample Spacing: 2000

Cycles: 10

Measurement Method: Sliding Window

Delay Subtraction Constant (ms): 0

☐ Enable side tone rejection

Side Tone Duration (ms): 35

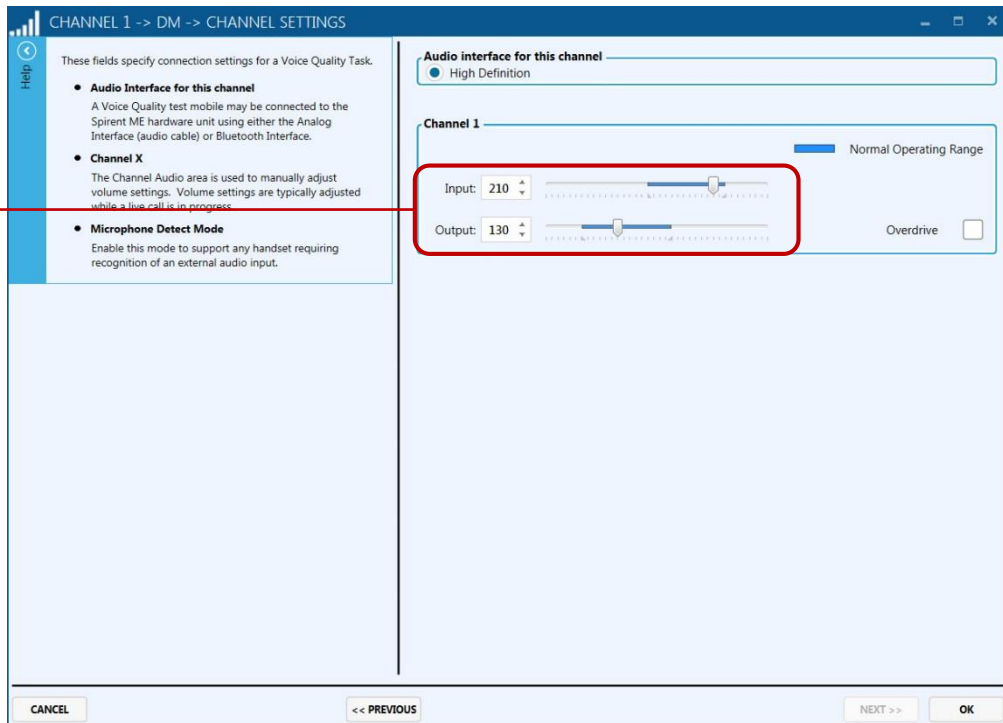
☐ Enable audio priming (High Definition Only)

CANCEL << PREVIOUS NEXT >> OK

语音通话端到端时延测试步骤

4. 进行测试Channel Settings配置

如已知被测手机的输入输出音量补偿，则输入相应数值；否则可先暂不输入



CHANNEL 1 -> DM -> CHANNEL SETTINGS

These fields specify connection settings for a Voice Quality Task.

- Audio Interface for this channel**
 - High Definition
- Channel X**
 - The Channel Audio area is used to manually adjust volume settings. Volume settings are typically adjusted while a live call is in progress.
- Microphone Detect Mode**
 - Enable this mode to support any handset requiring recognition of an external audio input.

Channel 1

Normal Operating Range

Input: 210

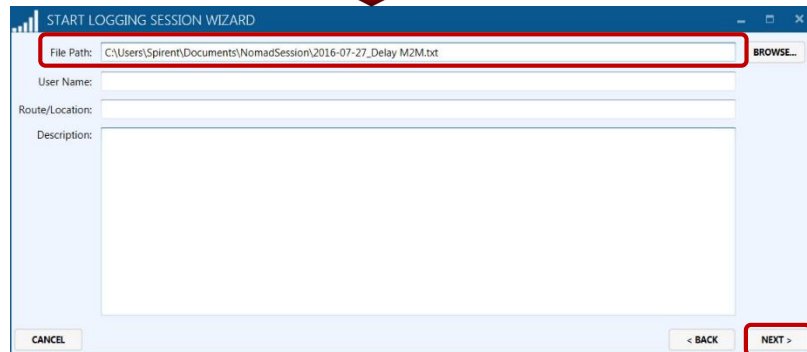
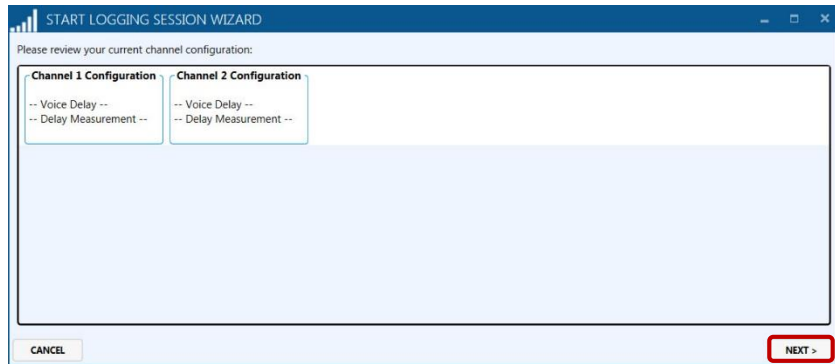
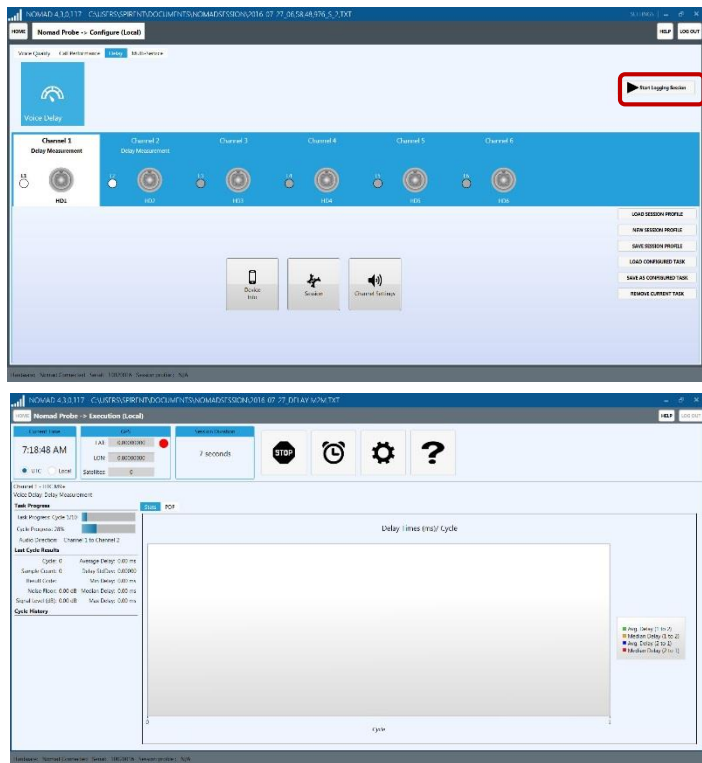
Output: 130

Overdrive ☐

CANCEL << PREVIOUS NEXT >> OK

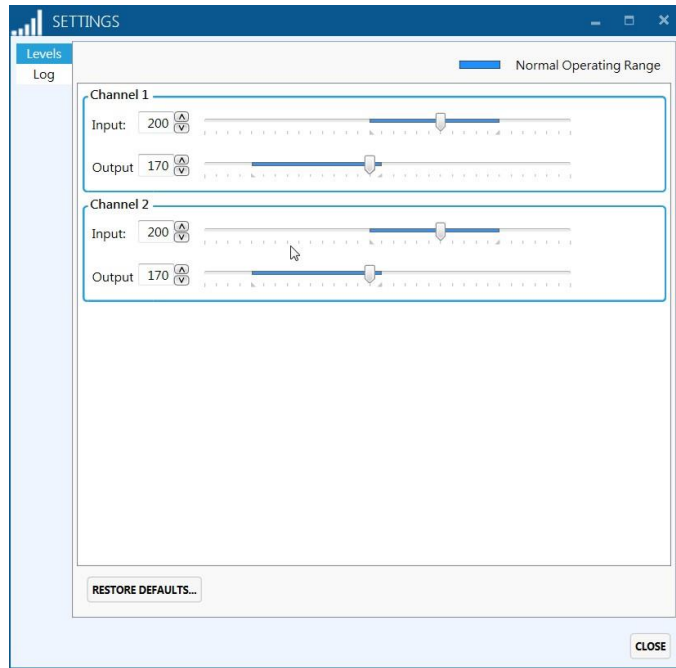
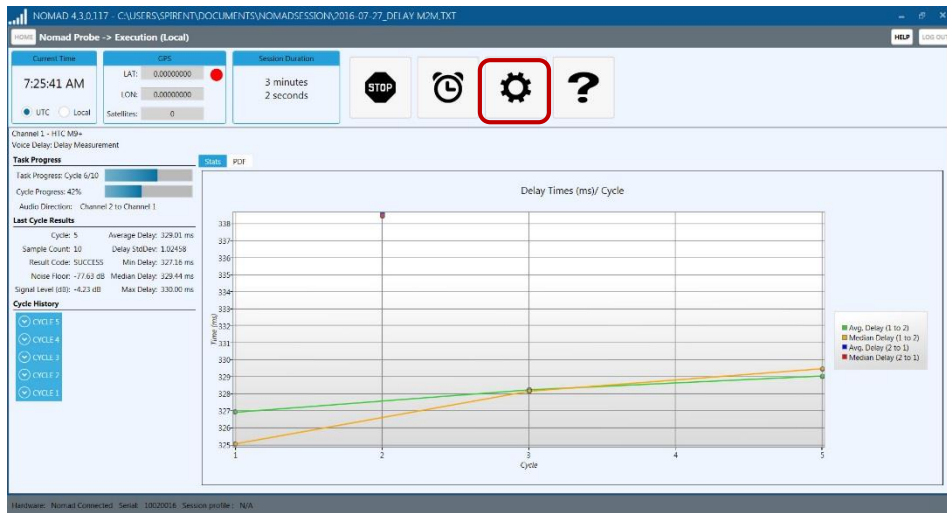
语音通话端到端时延测试步骤

5. 点击Start Logging Session按钮，输入Log文件存储位置，根据提示开始测试。



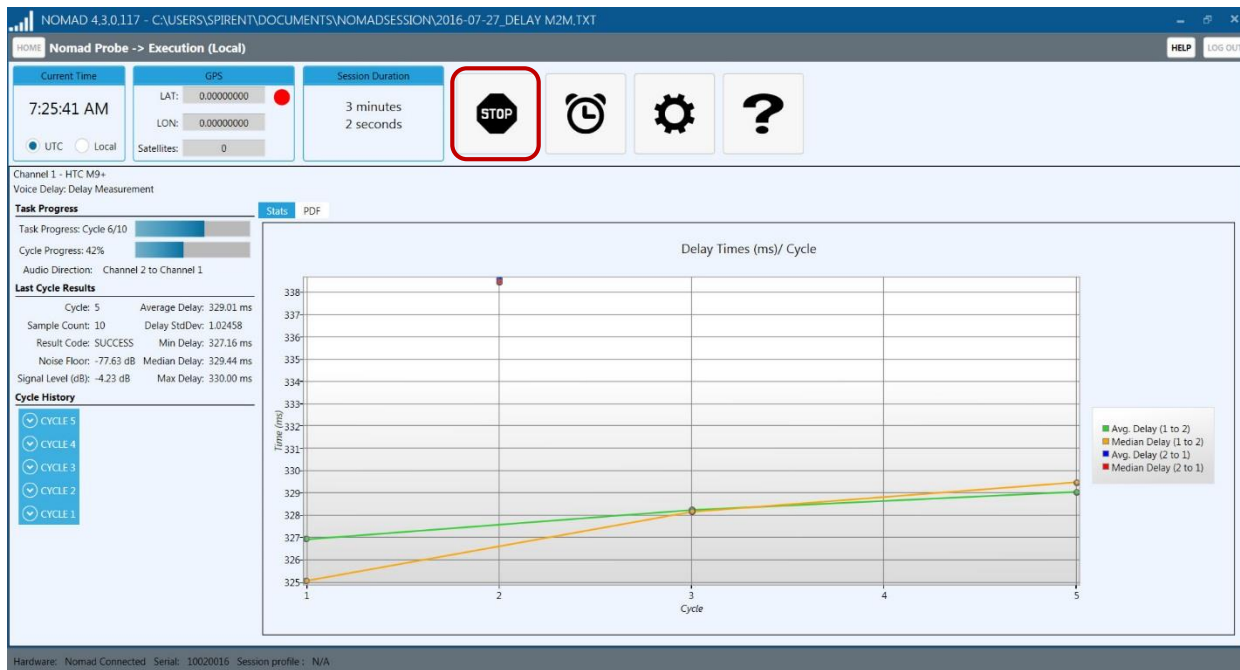
语音通话端到端时延测试步骤

6. 测试界面下点击Settings按钮可对输入输出音量补偿进行调整。



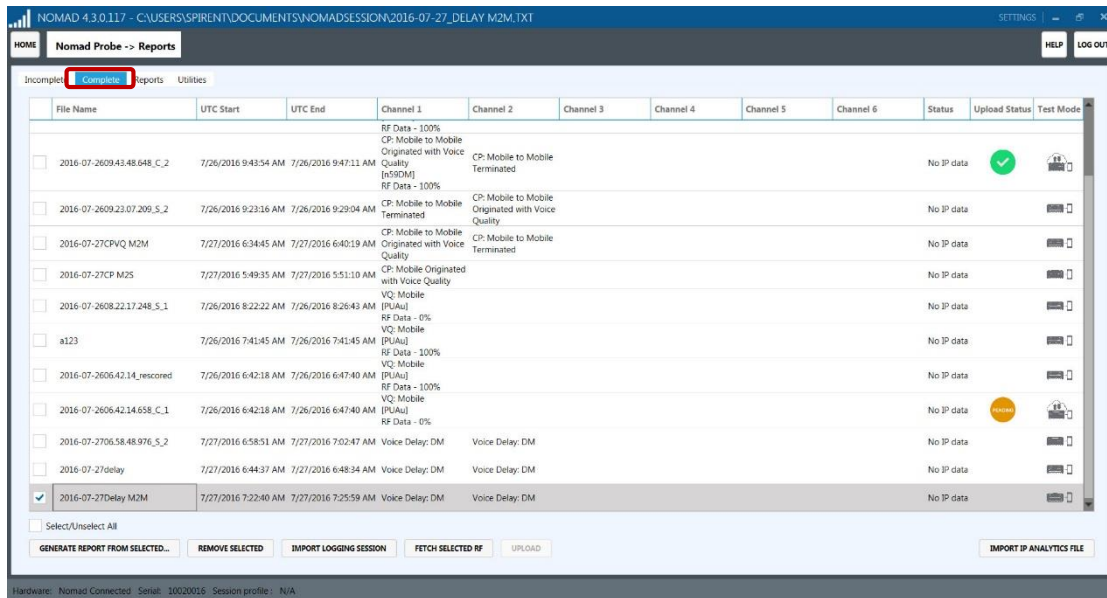
语音通话端到端时延测试步骤

7. 测试结束后会自动完成并跳转至报告生成界面，也可在测试界面下点击Stop按钮可立即停止测试，并进入报告生成界面



语音通话端到端时延测试步骤

8. 通常软件会自动进入Complete界面，但如果跳转至Data→Incomplete界面，则需点击Retry Auto-Complete按钮进行自动log报告完成。如自动报告完成无法成功且并无任何告警信息出现，可选择该Logging Session行并点击Mark Select As Complete按钮强制跳转至Complete界面。



NOMAD 4.3.0.117 - C:\USERS\SPIRENT\DOCUMENTS\NOMADSESSION\2016-07-27_DELAY M2M.TXT

HOME Nomad Probe -> Reports SETTINGS HELP LOG OUT

Incomplete **Complete** reports Utilities

File Name	UTC Start	UTC End	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Status	Upload Status	Test Mode
☐ 2016-07-260943.48.648_C_2	7/26/2016 9:43:54 AM	7/26/2016 9:47:11 AM	RF Data - 100% CP: Mobile to Mobile Originated with Voice Quality [n58DM] RF Data - 100%	CP: Mobile to Mobile Terminated					No IP data		
☐ 2016-07-260923.07.209_5_2	7/26/2016 9:23:16 AM	7/26/2016 9:29:04 AM	CP: Mobile to Mobile Terminated	CP: Mobile to Mobile Originated with Voice Quality					No IP data		
☐ 2016-07-27CPVQ M2M	7/27/2016 6:34:45 AM	7/27/2016 6:40:19 AM	CP: Mobile to Mobile Originated with Voice Quality	CP: Mobile to Mobile Terminated					No IP data		
☐ 2016-07-27CP M2S	7/27/2016 5:49:35 AM	7/27/2016 5:51:10 AM	CP: Mobile Originated with Voice Quality						No IP data		
☐ 2016-07-260822.17.248_5_1	7/26/2016 8:22:22 AM	7/26/2016 8:26:43 AM	VQ: Mobile [PUAu] RF Data - 0%						No IP data		
☐ x123	7/26/2016 7:41:45 AM	7/26/2016 7:41:45 AM	VQ: Mobile [PUAu] RF Data - 100%						No IP data		
☐ 2016-07-260642.14.rescored	7/26/2016 6:42:18 AM	7/26/2016 6:47:40 AM	VQ: Mobile [PUAu] RF Data - 100%						No IP data		
☐ 2016-07-260642.14.658_C_1	7/26/2016 6:42:18 AM	7/26/2016 6:47:40 AM	VQ: Mobile [PUAu] RF Data - 0%						No IP data		
☐ 2016-07-270658.48.976_5_2	7/27/2016 6:58:51 AM	7/27/2016 7:02:47 AM	Voice Delay: DM	Voice Delay: DM					No IP data		
☐ 2016-07-27Delay	7/27/2016 6:44:37 AM	7/27/2016 6:48:34 AM	Voice Delay: DM	Voice Delay: DM					No IP data		
☒ 2016-07-27Delay M2M	7/27/2016 7:22:40 AM	7/27/2016 7:25:59 AM	Voice Delay: DM	Voice Delay: DM					No IP data		

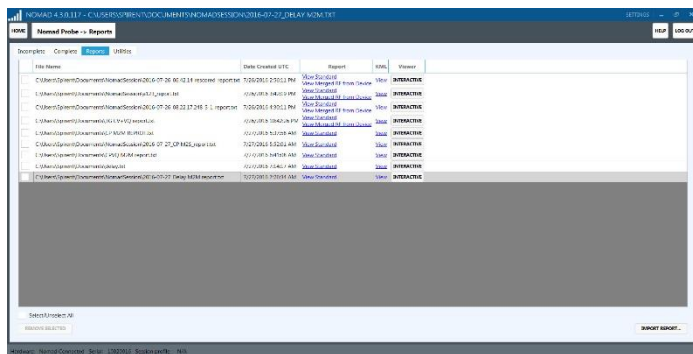
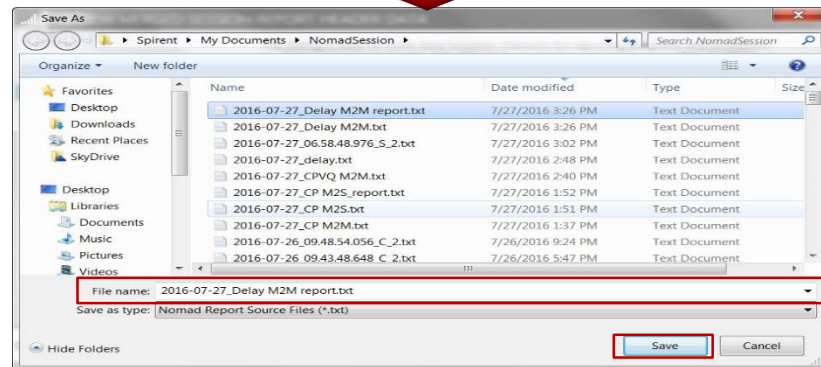
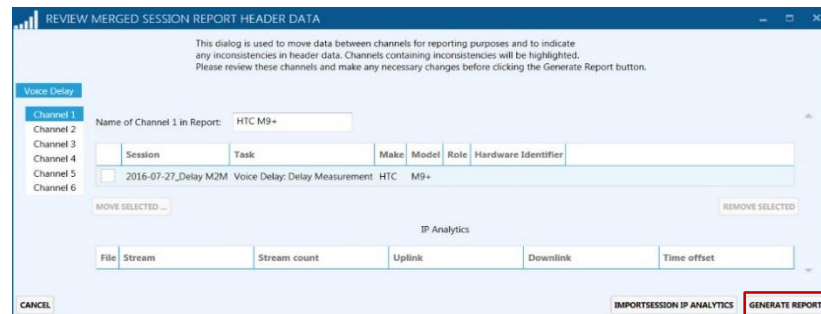
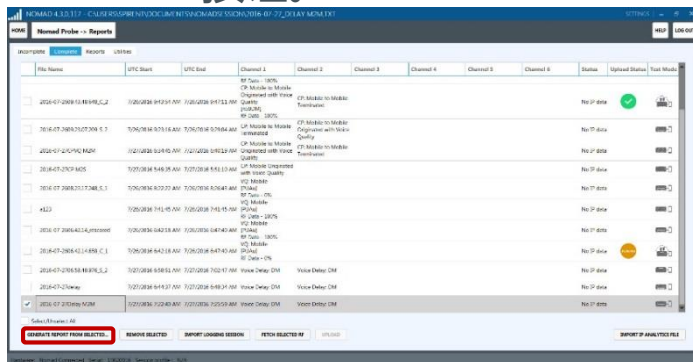
☐ Select/Unselect All

GENERATE REPORT FROM SELECTED... REMOVE SELECTED IMPORT LOGGING SESSION FETCH SELECTED RF UPLOAD IMPORT IP ANALYTICS FILE

Hardware: Nomad Connected Serial: 10020016 Session profile: N/A

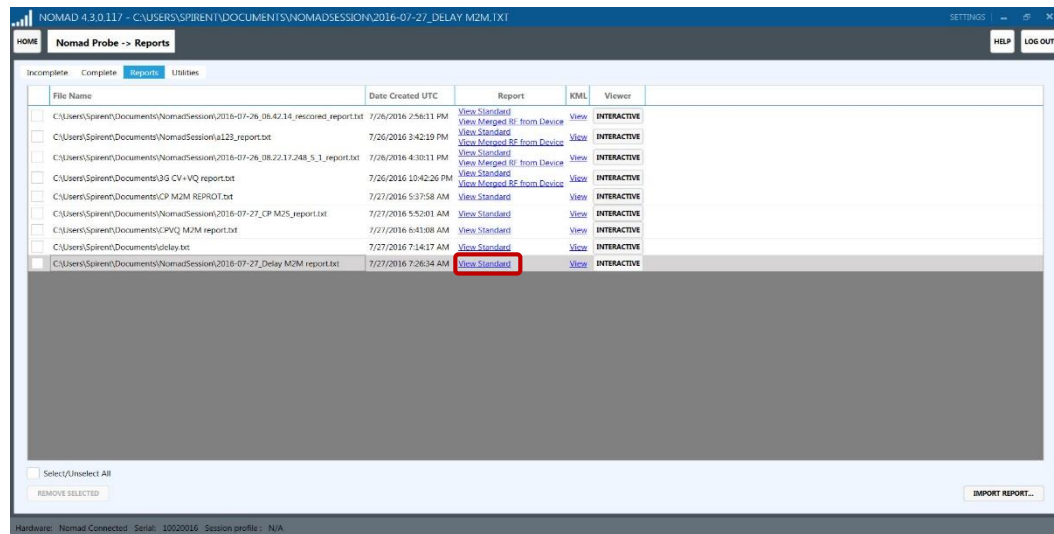
语音通话端到端时延测试步骤

9. 在Complete界面，选择要处理的Logging Session行，并点击Generate Report From Selected按钮。



语音通话端到端时延测试步骤

10. 在Report界面，选择要处理的Report Logging Session行，点击View Standard按钮生成报告文件



NOMAD 4.3.0.117 - C:\USERS\SPIRENT\DOCUMENTS\NOMADSESSION\2016-07-27_DELAY M2M.TXT

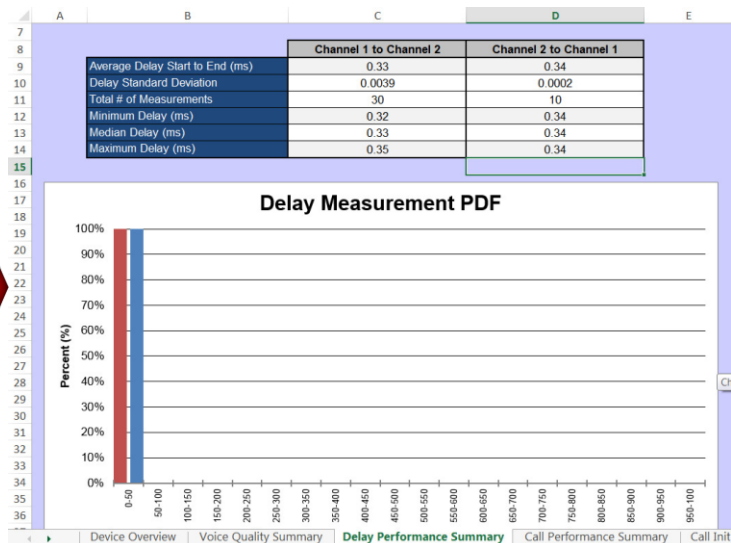
HOME Nomad Probe -> Reports SETTINGS HELP LOG OUT

Incomplete Complete Reports Utilities

File Name	Date Created UTC	Report	KML	Viewer
C:\Users\Spirent\Documents\NomadSession\2016-07-26_084214_rescored_report.txt	7/26/2016 2:56:11 PM	View Standard		INTERACTIVE
C:\Users\Spirent\Documents\NomadSession\2016-07-26_084214_rescored_report.txt	7/26/2016 2:56:11 PM	View Merged RF from Device		INTERACTIVE
C:\Users\Spirent\Documents\NomadSession\2016-07-26_084214_rescored_report.txt	7/26/2016 2:56:11 PM	View Standard		INTERACTIVE
C:\Users\Spirent\Documents\NomadSession\2016-07-26_084214_rescored_report.txt	7/26/2016 2:56:11 PM	View Merged RF from Device		INTERACTIVE
C:\Users\Spirent\Documents\CP CV+VQ report.txt	7/26/2016 3:42:10 PM	View Standard		INTERACTIVE
C:\Users\Spirent\Documents\CP CV+VQ report.txt	7/26/2016 3:42:10 PM	View Merged RF from Device		INTERACTIVE
C:\Users\Spirent\Documents\CP M2M REPORT.txt	7/26/2016 5:37:58 AM	View Standard		INTERACTIVE
C:\Users\Spirent\Documents\CP M2M REPORT.txt	7/26/2016 5:37:58 AM	View Merged RF from Device		INTERACTIVE
C:\Users\Spirent\Documents\NomadSession\2016-07-27_CP M2S_report.txt	7/27/2016 5:52:01 AM	View Standard		INTERACTIVE
C:\Users\Spirent\Documents\NomadSession\2016-07-27_CP M2S_report.txt	7/27/2016 5:52:01 AM	View Merged RF from Device		INTERACTIVE
C:\Users\Spirent\Documents\CPVQ M2M report.txt	7/27/2016 6:41:08 AM	View Standard		INTERACTIVE
C:\Users\Spirent\Documents\CPVQ M2M report.txt	7/27/2016 6:41:08 AM	View Merged RF from Device		INTERACTIVE
C:\Users\Spirent\Documents\Delay report.txt	7/27/2016 7:14:17 AM	View Standard		INTERACTIVE
C:\Users\Spirent\Documents\Delay report.txt	7/27/2016 7:14:17 AM	View Merged RF from Device		INTERACTIVE
C:\Users\Spirent\Documents\NomadSession\2016-07-27_Delay M2M report.txt	7/27/2016 7:26:34 AM	View Standard		INTERACTIVE
C:\Users\Spirent\Documents\NomadSession\2016-07-27_Delay M2M report.txt	7/27/2016 7:26:34 AM	View Merged RF from Device		INTERACTIVE

Select/Unselect All REMOVE SELECTED IMPORT REPORT...

Hardware: Nomad Connected Serial: 10020016 Session profile: N/A



Thank You

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