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# RTP ToolBox™

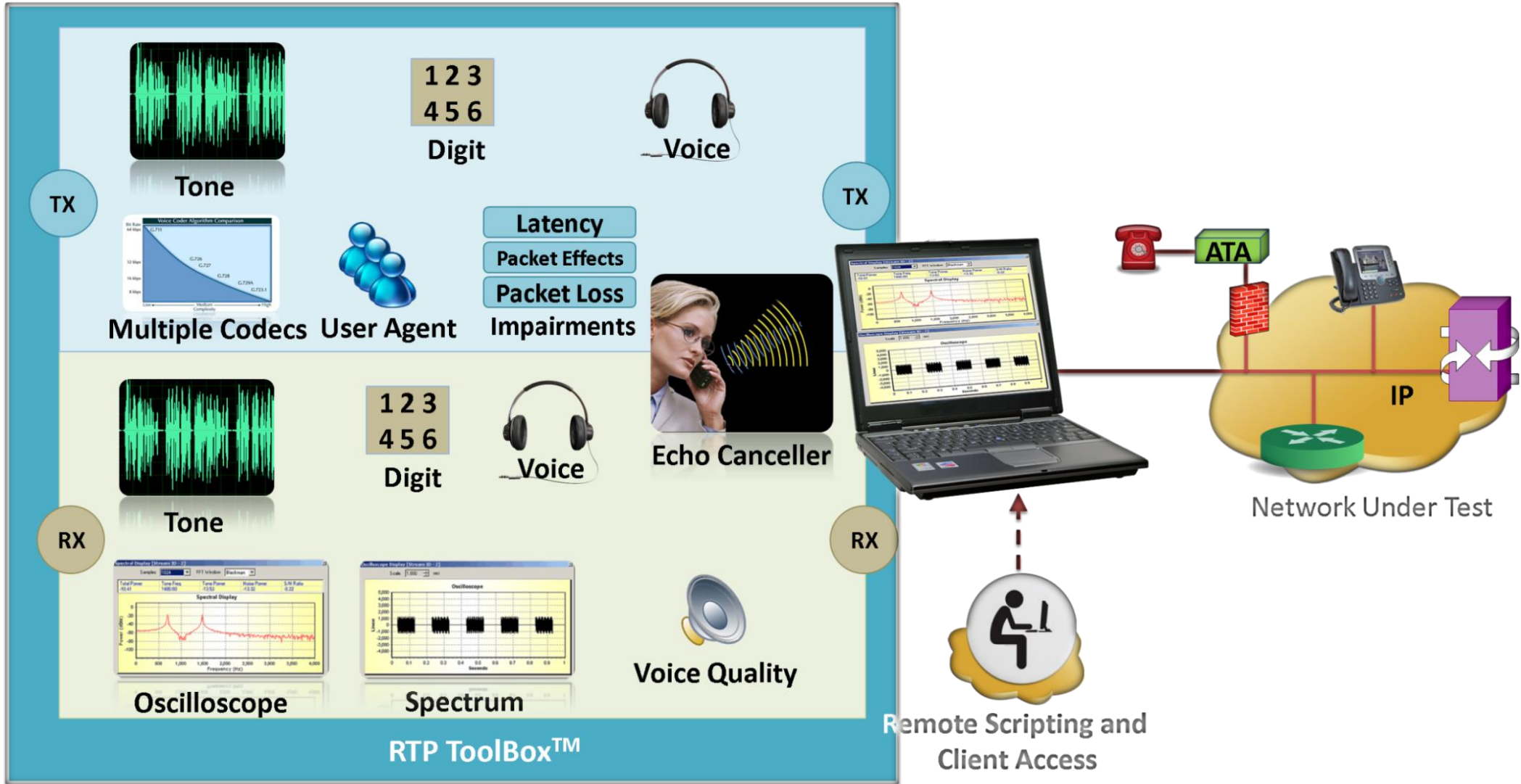
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# RTP ToolBox™



# Applications

- Testing and developing enhanced voice features (VAD, Echo Cancellation, Codec, Digit Regeneration, Digit Generation, Fax over IP, Jitter Implementation etc) within end-user equipment (IP Phones, ATA, MTA etc)
- End-to-End network testing before and during VoIP deployment
- Testing media gateway telephony interfaces
- Supported Codec's: G.711 (Mu-law/A-law), G.729a, G.729b, G.726-5 bit 40kbps/4 bit 32 kbps/3 bit 24 kbps/2 bit 16kbps, G.726-40/32/24/16kbps with VAD, GSM (Full rate), AMR (All rates), EVRC, EVRC0, EVRCB, EVRCB0, EVRC\_C, SMV, ILBC (20 msec), ILBC (30 msec), SPEEX, G.722, G.722.1(32 k and 24 k), SPEEX\_WB, G.711 App II (ALaw & MuLaw with VAD), iSAC, and AMR\_WB
- Automated testing of Digital Signal Processing embedded into network elements
- Echo cancellation testing & compliance

# Key Features

- Manually create and terminate RTP sessions independent of call-signaling protocols such as SIP, H323, MEGACO, or MGCP
- Monitor RTP and RTCP packets
- Automatic scan option to capture all incoming RTP and RTCP packets
- Monitoring RTP streams using scalable oscilloscope and spectrum analyzer
- Generation / detection of in-band and out-of-band digits / tones (DTMF, MF, user-defined)/ events per RFC-2833
- User-defined impairments: latency, packet loss, out of sequence and duplicate packets
- Multiple frame interval or Packetisation Time supported for almost all codecs

# Key Features (Contd.)

- Sending and recording of voice files (.glw) with a synchronous Tx / Rx option
- G.168 testing for echo cancellation equipment
- Call generation and reception ability provides UA simulation (up to 8 UAs through CLI)
- Customize Codec options (payload type,ptime) for UA during Call Generation (Dial) & Call Reception
- Quality metrics with R-Factor and MOS Factors, Jitter Buffer Statistics, Degradation Factor, and Burst Metrics are graphically represented
- Supports client-server functionality (requires additional license) - C++ & TCL clients

# Supported Codecs

Codec Name	Sampling Rate	VAD Support
G,711 (Mu-law / A-law -64 kbps)	8000	No
G.726 (5 bit 40 kbps/4 bit 32 kbps/ 3 bit 24 kbps/2 bit 16 kbps)	8000	No
GSM 6.10 FR (13.2 kbps) GSM HR (5.6 Kbps)	8000	No
GSM EFR (12.2kbps, packet time fixed at 20 ms)	8000	No
G729 (8 kbps)	8000	No
G729B (8 kbps)	8000	Yes
AMR (4.75kbps, 5.15kbps, 5.9kbps, 6.7kbps, 7.4kbps, 7.95kbps, 10.2kbps, 12.2 kbps)	8000	Yes
EVRC (Rates - 1/8, 1/2 and 1), EVRC0	8000	No
SMV (Modes – 0, 1, 2 and 3)	8000	No
ILBC (for 20msec)	8000	No
ILBC_13_33 (for 30msec)	8000	No

# Supported Codecs (Contd.)

Codec Name	Sampling Rate	VAD Support
SPEEX	8000	Yes
G722 / G722.1 (rates - 24 kbps and 32 kbps)	16000	No
SPEEX_WB	16000	Yes
G,711 (MuLAW_2 / ALAW_2)	8000	Yes
ISAC	16000	No
AMR_WB (optional codec)	16000	Yes
G726_40_VAD	8000	Yes
G726_32_VAD	8000	Yes
G726_24_VAD	8000	Yes
G726_16_VAD	8000	Yes
EVRCB, EVRCB0	8000	Yes
EVRC_C	16000	Yes

# Create and Manage RTP Sessions

RTP Tool - GL Communication - 192.168.1.21

File View Monitor Special Application Call Control Configurations Window Help

S/nc	Source Address	SourPort	Destination Addr	DestinPort	Codec	Status	Profile	Impairmei	Script File Name	Script Status
1	192.168.10.21	2000	192.168.10.29	3002	Mu-law	Stop	Default	Default	test	Stop
2	192.168.10.21	3000	192.168.10.29	2002	Mu-law	Start	Default	Default	...	Start
3	192.168.10.21	4000	192.168.10.29	4002	Mu-law	Start	Default	Default	...	Start
4	192.168.10.21	3002	192.168.10.29	2000	Mu-law	Start	Default	Default	...	Start
5	192.168.10.21	2002	192.168.10.29	3000	Mu-law	Start	Default	Default	...	Start

Insert Add Delete Start Script Stop Script

Show Progress

Script Contents

```
tx file : filename = "\Send\

Ready NUM


```

- Scanned Session
- Manually Added Session
- Selected Test Script to Run
- Scripts Running



# Create RTP Sessions

- RTP session can be created in either of the following ways -
  - Manually
  - Using 'Auto scan for Incoming Session' feature
- Auto Scan Feature –
  - Monitors all incoming packets addressed to the machine on which RTP ToolBox™ is running
  - Automatically displays the RTP sessions on which the RTP packets are being transmitted if there are any RTP packets in the traffic

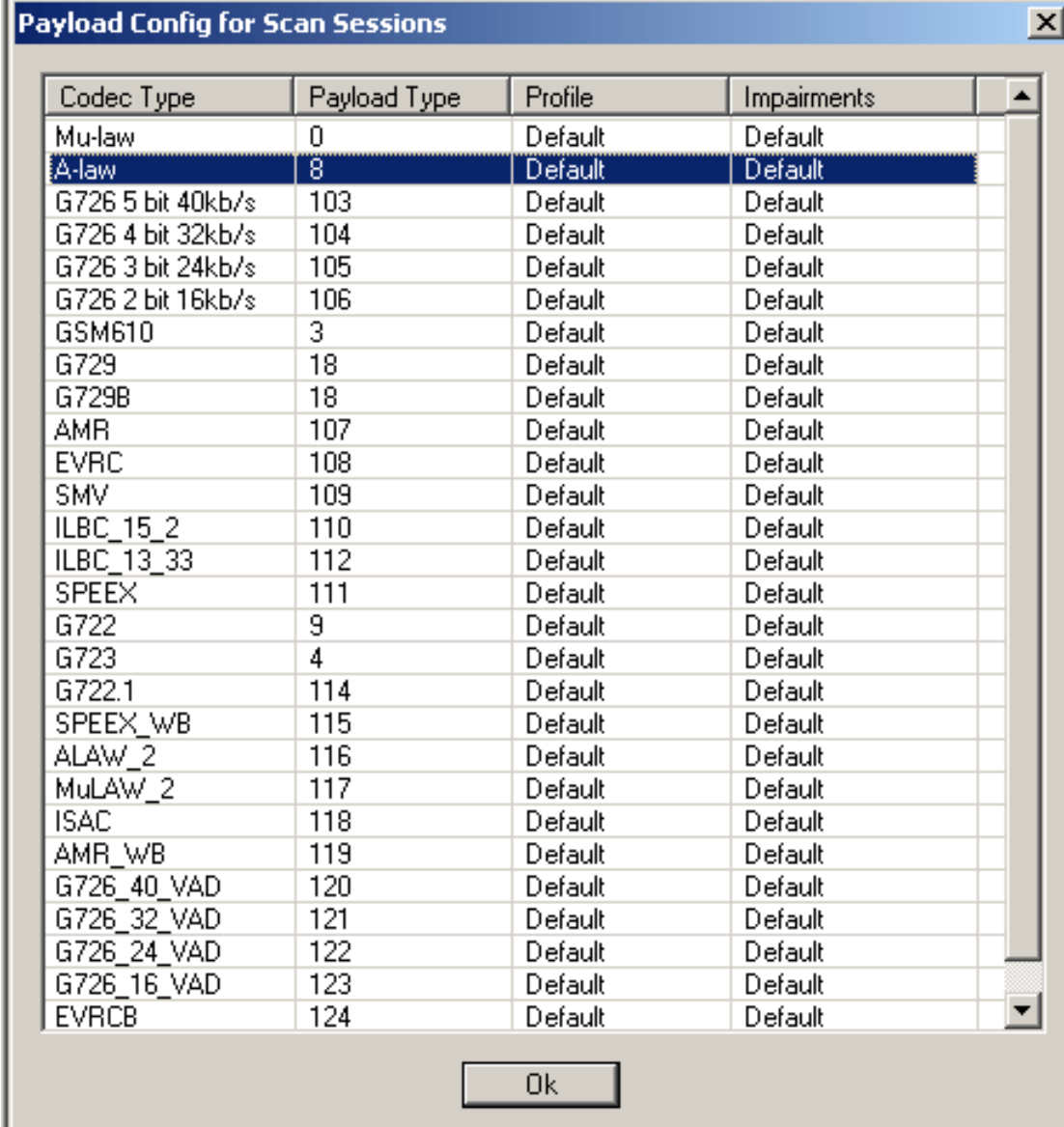
# Manage RTP Sessions

## Transmit and Receive Settings

- Configure the properties for sending / receiving RTP Traffic
- On transmitting session –
  - Type of codec needed, sampling rate, voice payload type, RFC 2833 payload type, comfort noise payload type, packetization time, SSRC, timestamp, and sequence number for the out going Traffic can be set
  - 'Quality Of Service (QoS)', i.e., IP Type of Service properties such as precedence, delay, throughput, and reliability values can be assigned to the stream
- On receiving session –
  - Specify a desired voice payload type for each codec, payload type to receive RFC 2833 events, and Comfort Noise Payload Type
  - Set the buffer used for delayed packets that arrive at receiving end (Supports both static and dynamic jitter buffers)

# Payload Configuration

- Configures and saves Payload type, Tx Rx profile and Impairment's settings for the scanned sessions



Codec Type	Payload Type	Profile	Impairments
Mu-law	0	Default	Default
A-law	8	Default	Default
G726 5 bit 40kb/s	103	Default	Default
G726 4 bit 32kb/s	104	Default	Default
G726 3 bit 24kb/s	105	Default	Default
G726 2 bit 16kb/s	106	Default	Default
GSM610	3	Default	Default
G729	18	Default	Default
G729B	18	Default	Default
AMR	107	Default	Default
EVRC	108	Default	Default
SMV	109	Default	Default
ILBC_15_2	110	Default	Default
ILBC_13_33	112	Default	Default
SPEEX	111	Default	Default
G722	9	Default	Default
G723	4	Default	Default
G722.1	114	Default	Default
SPEEX_WB	115	Default	Default
ALAW_2	116	Default	Default
MuLAW_2	117	Default	Default
ISAC	118	Default	Default
AMR_WB	119	Default	Default
G726_40_VAD	120	Default	Default
G726_32_VAD	121	Default	Default
G726_24_VAD	122	Default	Default
G726_16_VAD	123	Default	Default
EVRCB	124	Default	Default

Ok

# Transmit Settings

Profile - A-Law

Profile Name

Tx Profile | Rx Profile

Codec

Sampling Rate

Voice Payload Type

RFC 2833 Payload Type

Comfort Noise Payload Type

Frame Interval  ms

SSRC

Time Stamp

Initial Seq No

**Note : If Parameters are invalid previous values will be retained**

## QOS Settings

QoS Settings

IP Type of Service

Precedence

Delay

Throughput

Reliability

# Receive Settings

Profile - Default

Profile Name Profile1

Tx Profile Rx Profile

Voice Payload Type 0

RFC 2833 Payload Type 101

Comfort Noise Payload Type 13

Static  Dynamic

Jitter Buffer Len 100 msec

Dynamic Jitter Buffer Option

Min Delay 40 msec

Max Delay 40 msec

Fill with Last Packet

Note : If Parameters are invalid previous values will be retained

Set as Default Save Profile

# RTP Traffic – Generate, Impair, Detect

RTP ToolBox™ includes the following RTP generation and detection features –

- Digit / tone generation
- Detection of digits and tones
- Record data to file
- Playback from file
- RTP Event Generation
- Capture RTP Events
- Play to Speaker
- Talk Using Microphone
- Synchronous Tx/Rx Utility
- Loopback
- Delay And Attenuate
- Impairments

# Digit / Tone Generation

## Generation and Detection of RTP Traffic

- Generates in-band digits and tones (continuous or at once)
- Supported tones include single, dual, and multi-tones
- Supported digits include DTMF, MF, and MFR2 forward and backward digits

Dig	F1	P1	F2	P2	Pwr	Twist	C
2	697	-13.01	1336	-13.01	-10.00	0.00	11
5	770	-13.01	1336	-13.01	-10.00	0.00	11
8	852	-13.01	1336	-13.01	-10.00	0.00	11
9	852	-13.01	1477	-13.01	-10.00	0.00	11
6	770	-13.01	1477	-13.01	-10.00	0.00	11

**Digit Power**  
Power: -10 dB  
Twist: 0  
Duration: 1600 ms  
 Continuous Transmission

**Digit Cadence**  
On Time: 100 ms  
Off Time: 100 ms

**Pause Duration**  
Short Pause: 2000 ms  
Long Pause: 5000 ms

**Generation Parameters**  
Sample Rate: 8000 /sec  
 Randomize Starting Phase Angle  
 Mix White Noise  
-10 dB

**Keypad:** 1, 2, 3, A, 4, 5, 6, B, 7, 8, 9, C, \*, 0, #, D, LP, SP, Clear Digit

**DTMF Digits** | MF Digits | MFR2 (Fwd) Digits | MFR2 (Bkwd) Digits | Tones | MultiTones

Status: Action Stopped

Start Stop

# Transmission of Digits and Tones

## Generation and Detection of RTP Traffic

Sl no	Source Address	SourPort	Destination Addr	DestinPort	Codec	Status	Profile	Impairment	Script File Name	Script Status
1	192.168.10.21	2000	192.168.10.29	3002	Mu-law	Stop	Default	Default	test	Stop
2	192.168.10.21	3000	192.168.10.29	2002	Mu-law	Stop	Default	Default	...	Start
3	192.168.10.21	4000	192.168.10.29	4002	Mu-law	Start	Default	Default	...	Start
4	192.168.10.21	3002	192.168.10.29	2000	Mu-law	Start	Default	Default	...	Start
5	192.168.10.21	2002	192.168.10.29	3000	Mu-law	Start	Default	Default	...	Start

Script Contents

```
tx file : filename = "\\Send\<codec>\Vijay.glw", duration = 10000 ;  
tx dtmf digits : digits = "0123456789ABCD", band = inband, power1 = -6, power2 = -4, ontime = 80, offtime = 80;  
tx mf digits : digits = "0123456789ABCDE", band = inband, power1 = -6, power2 = -4, ontime = 80, offtime = 80;  
tx tone : freq1 = 1004, power1 = -10, freq2 = 2004, power2 = -10, ontime = 1000, offtime = 1000, iteration = 1;  
tx dtmf digits : digits = "0123456789ABCD", band = outband, power1 = -6, power2 = -4, ontime = 80, offtime = 80;  
tx mf digits : digits = "0123456789ABCDFE", band = outband, power1 = -6, power2 = -4, ontime = 80, offtime = 80;  
tx speech;  
wait [15 sec];
```

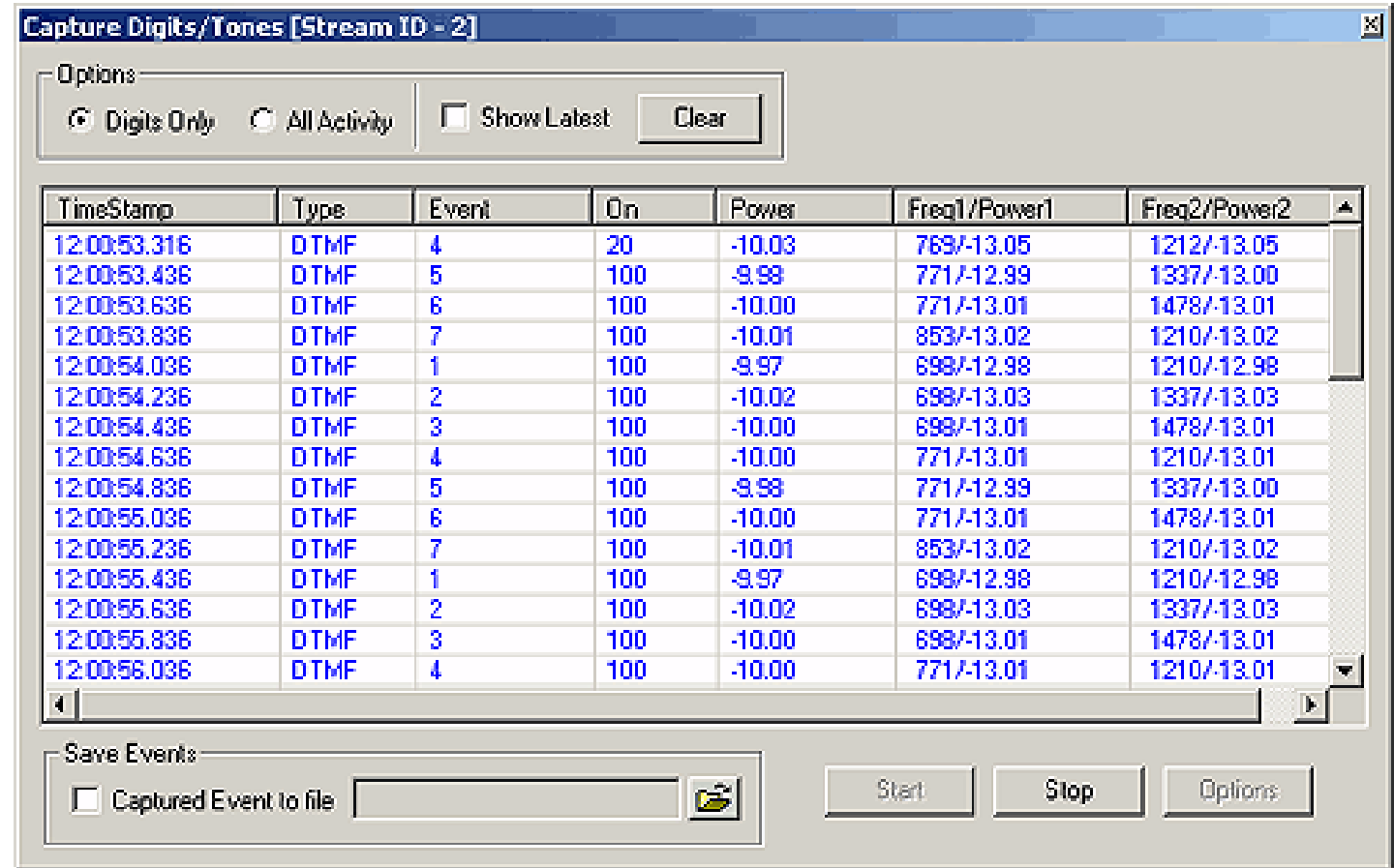
- Generation / Detection of in-band and out-of-band digits / tones (DTMF, MF, user-defined, etc.) / events per RFC-2833



# Detection of Digits and Tones

## Generation and Detection of RTP Traffic

- Captures tones and digits in the traffic
- Displays additional information such as type of the signal, timestamp, event, power, and accept/reject frequencies
- Completely supported for both in-band digits/tones and RTP digits/events per RFC-2833



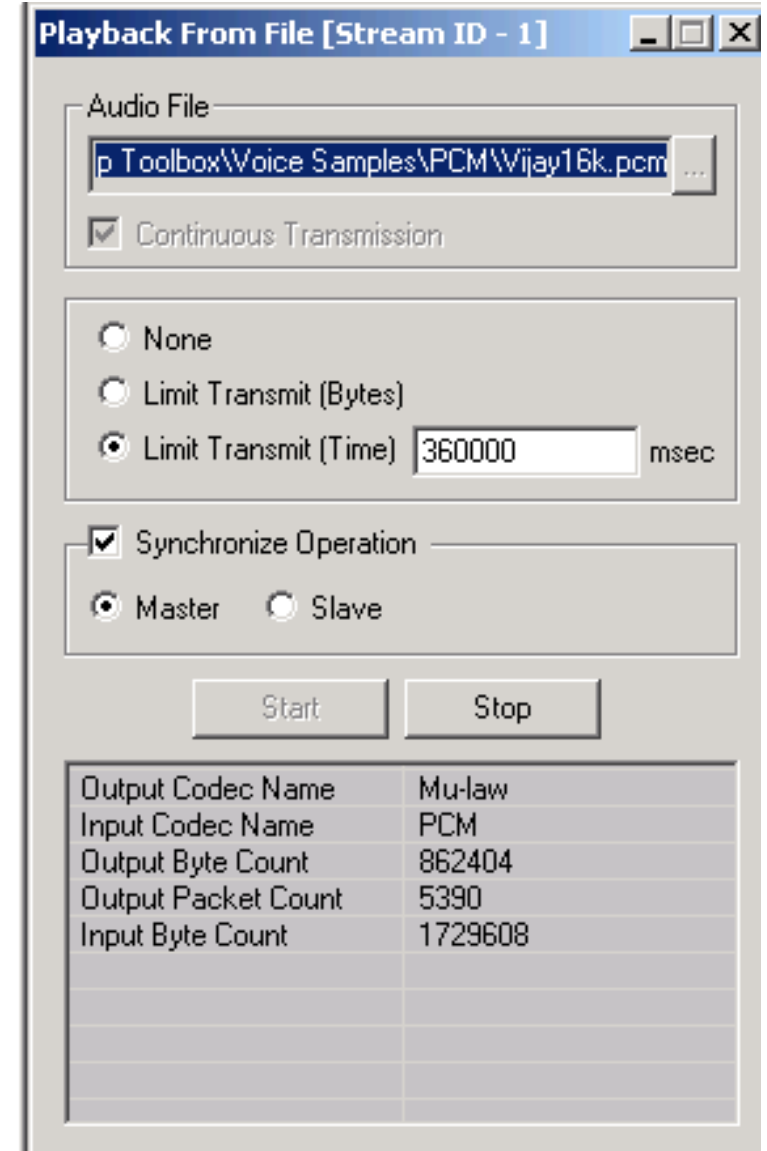
The screenshot shows a software window titled "Capture Digits/Tones [Stream ID - 2]". It features an "Options" section with radio buttons for "Digits Only" (selected), "All Activity", and a checkbox for "Show Latest", along with a "Clear" button. Below this is a table with columns: TimeStamp, Type, Event, On, Power, Freq1/Power1, and Freq2/Power2. The table contains 15 rows of DTMF event data. At the bottom, there is a "Save Events" section with a checkbox for "Captured Event to file" and a file selection icon, and three buttons: "Start", "Stop", and "Options".

TimeStamp	Type	Event	On	Power	Freq1/Power1	Freq2/Power2
12:00:53.316	DTMF	4	20	-10.03	769/-13.05	1212/-13.05
12:00:53.436	DTMF	5	100	-9.99	771/-12.99	1337/-13.00
12:00:53.636	DTMF	6	100	-10.00	771/-13.01	1478/-13.01
12:00:53.836	DTMF	7	100	-10.01	853/-13.02	1210/-13.02
12:00:54.036	DTMF	1	100	-9.97	698/-12.98	1210/-12.98
12:00:54.236	DTMF	2	100	-10.02	698/-13.03	1337/-13.03
12:00:54.436	DTMF	3	100	-10.00	698/-13.01	1478/-13.01
12:00:54.636	DTMF	4	100	-10.00	771/-13.01	1210/-13.01
12:00:54.836	DTMF	5	100	-9.98	771/-12.99	1337/-13.00
12:00:55.036	DTMF	6	100	-10.00	771/-13.01	1478/-13.01
12:00:55.236	DTMF	7	100	-10.01	853/-13.02	1210/-13.02
12:00:55.436	DTMF	1	100	-9.97	698/-12.98	1210/-12.98
12:00:55.636	DTMF	2	100	-10.02	698/-13.03	1337/-13.03
12:00:55.836	DTMF	3	100	-10.00	698/-13.01	1478/-13.01
12:00:56.036	DTMF	4	100	-10.00	771/-13.01	1210/-13.01

# Transmit / Record Voice File

## Generation and Detection of RTP Traffic

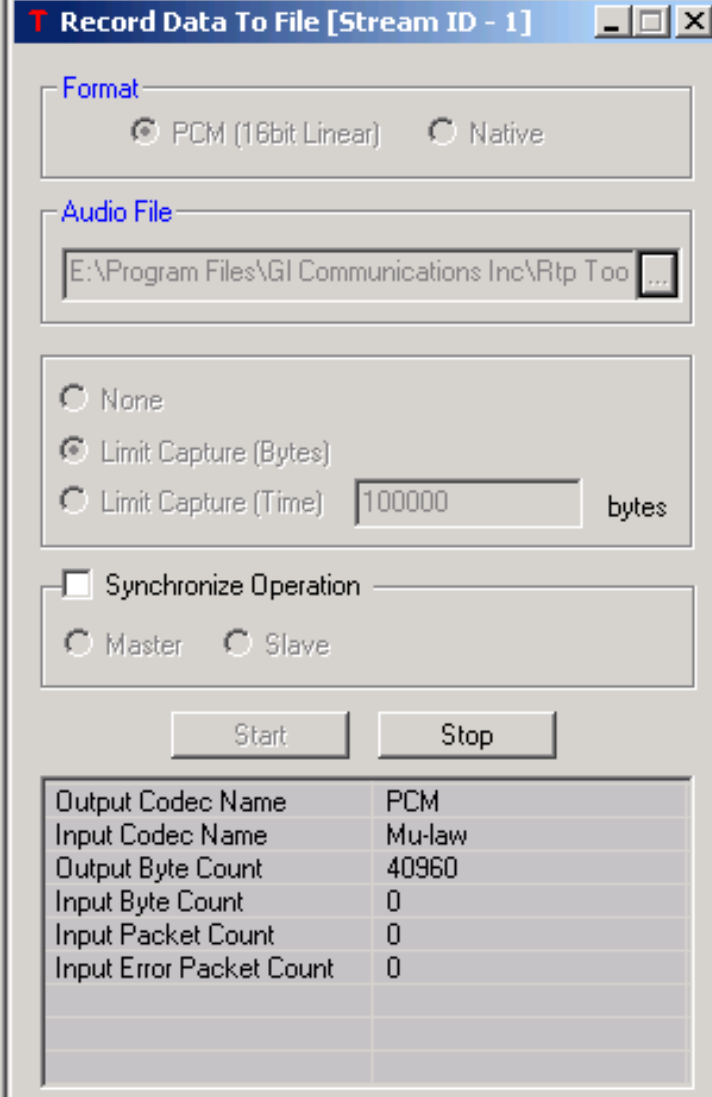
- PCM or Wave files can be sent over an established session using playback feature
- Can transmit a file on more than one session simultaneously



# Transmit / Record Voice File

## Generation and Detection of RTP Traffic

- Records the incoming voice data to file
- The recorded files can be compared using GL's Voice Quality Testing software, providing PESQ score



Output Codec Name	PCM
Input Codec Name	Mu-law
Output Byte Count	40960
Input Byte Count	0
Input Packet Count	0
Input Error Packet Count	0

# RTP Event Generation

## Generation and Detection of RTP Traffic

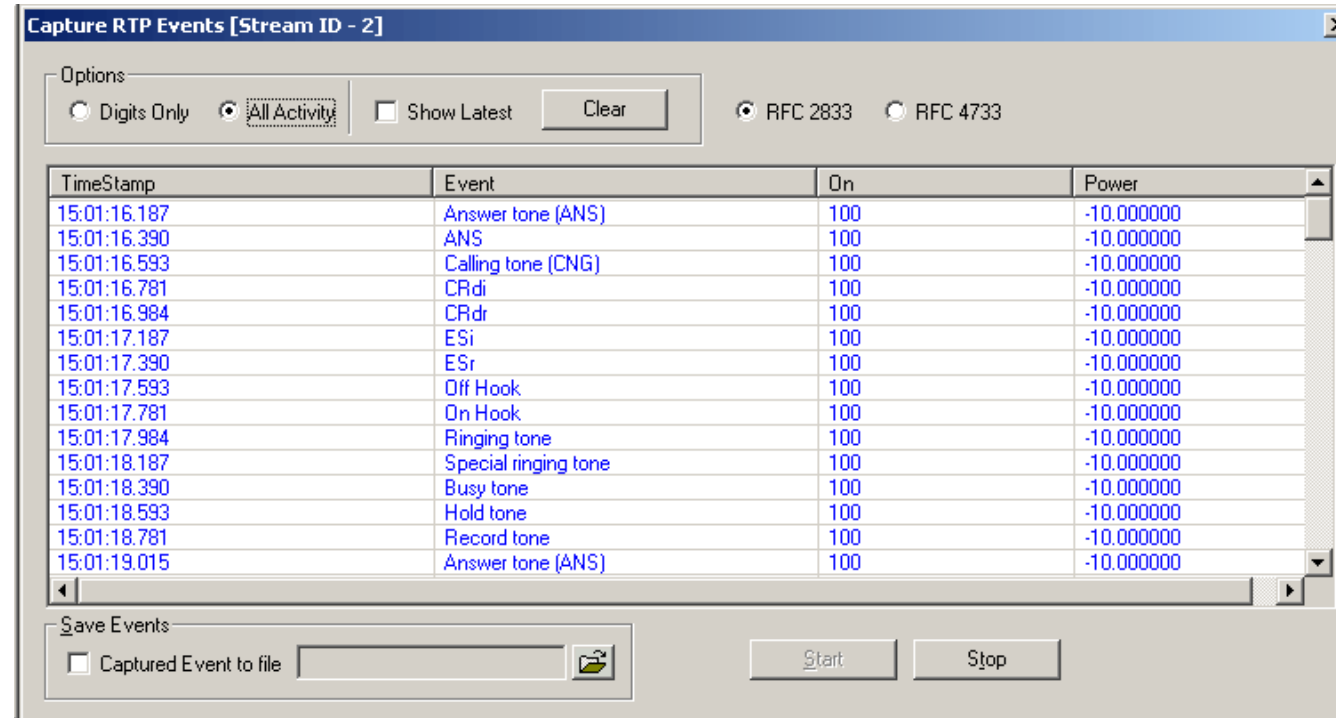
- Allows to transmit out of band digits on a session
- Supports 2 types of RFC events – 2833 and 4733

The screenshot shows the 'RTP Event Generation [Stream ID - 2]' window. It features two radio buttons for 'RFC 2833' (selected) and 'RFC 4733'. A table lists various events with their 'On Time', 'Off Time', and 'Power' values. To the right, 'Event Values' are set to 'On Time: 100', 'Off Time: 100', and 'Power: -10'. Below the table is a 'Delete Event' button. At the bottom left is a keypad with digits 1-9, \*, #, and letters A-F, along with 'DTMF' and 'MF' radio buttons. At the bottom right is an 'Other Events' list containing 'Answer tone (ANS)', '/ANS', 'ANSam', '/ANSam', and 'Calling tone (CNG)', with an 'Add' button. At the very bottom, there is a 'Send Continuously' checkbox (checked) and 'Start' and 'Stop' buttons.

Events	On Time	Off Time	Power
Answer tone (ANS)	100	100	-10
Calling tone (CNG)	100	100	-10
CRdi	100	100	-10
CRdr	100	100	-10
ESi	100	100	-10
ESr	100	100	-10
Ringling tone	100	100	-10
Special ringing tone	100	100	-10

# Capture RTP Events

## Generation and Detection of RTP Traffic



Options:  Digits Only  All Activity  Show Latest   RFC 2833  RFC 4733

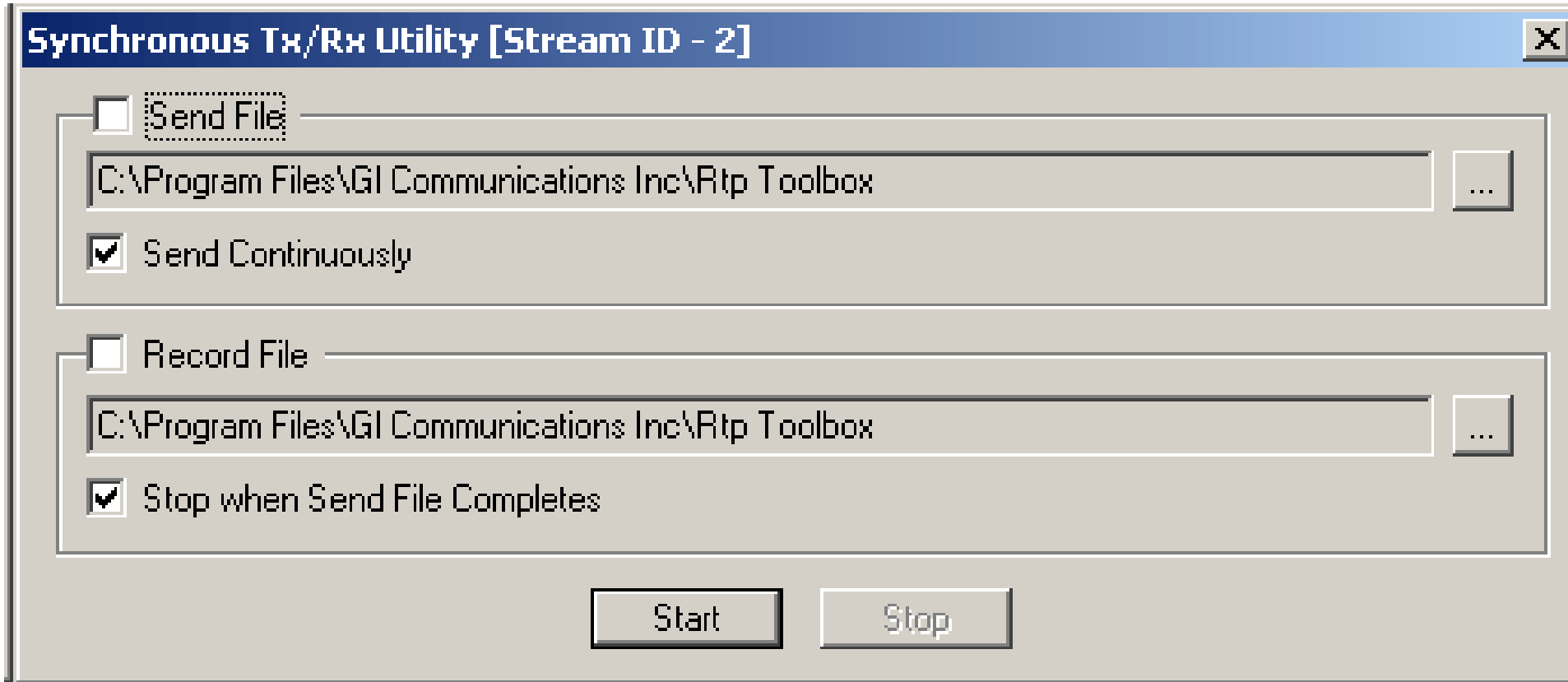
TimeStamp	Event	On	Power
15:01:16.187	Answer tone (ANS)	100	-10.000000
15:01:16.390	ANS	100	-10.000000
15:01:16.593	Calling tone (CNG)	100	-10.000000
15:01:16.781	CRdi	100	-10.000000
15:01:16.984	CRdr	100	-10.000000
15:01:17.187	ESi	100	-10.000000
15:01:17.390	ESr	100	-10.000000
15:01:17.593	Off Hook	100	-10.000000
15:01:17.781	On Hook	100	-10.000000
15:01:17.984	Ringing tone	100	-10.000000
15:01:18.187	Special ringing tone	100	-10.000000
15:01:18.390	Busy tone	100	-10.000000
15:01:18.593	Hold tone	100	-10.000000
15:01:18.781	Record tone	100	-10.000000
15:01:19.015	Answer tone (ANS)	100	-10.000000

Save Events:  Captured Event to file

- Allows to detect out of band digits
- Supports two types of RFC events – 2833 and 4733
- Provides an option to view only digits being captured or to view all the events being captured

# Synchronous Tx / Rx Utility and Loopback

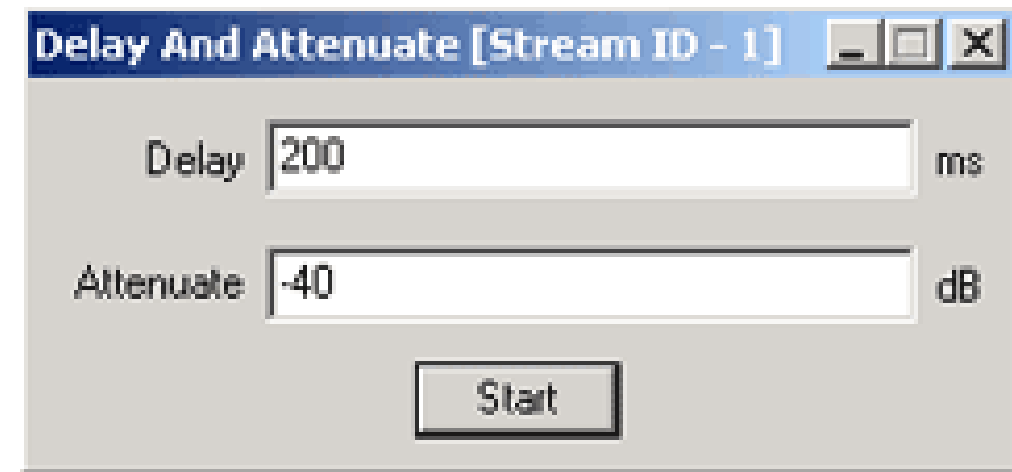
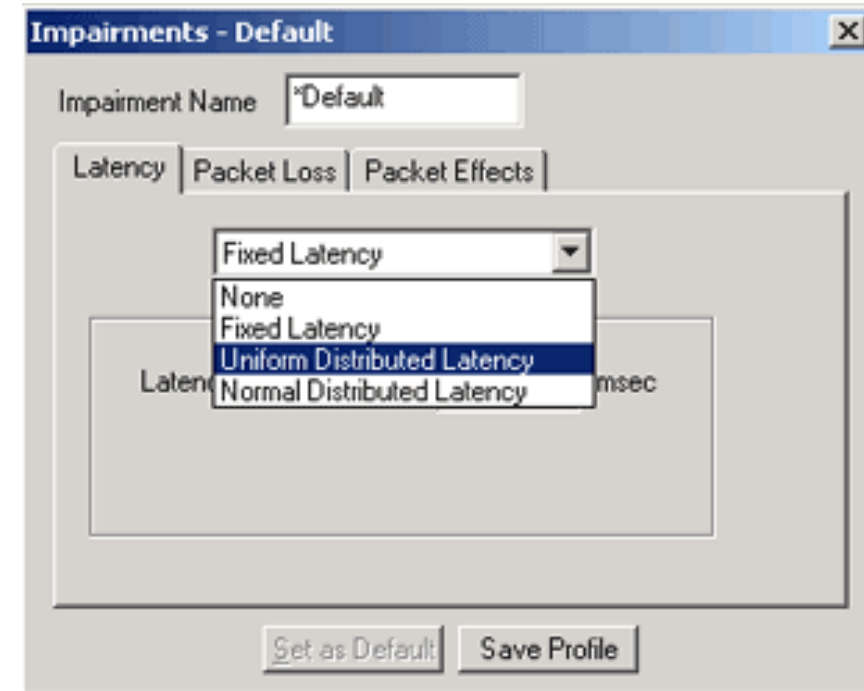
## Generation and Detection of RTP Traffic



- Transmit and receives a file simultaneously on a session
- Loopback feature allows the user to loop back the incoming data on a session

# Impairments

- Can introduce impairments manually and transmit on the RTP sessions
- Includes fixed latency, uniform/normal distributed latency, periodic/random/burst packet loss, out-of-order packets, and duplicate packets
- Delay value ranges from 0 to 2000ms; attenuate value ranges from -40 to 20dBm



# Sip Call Generation and Reception

- Users can configure and simulate a user agent (UA) for manual SIP call generation and reception using public URL and contact IP addresses
- Up to 8 User Agents can be configured using the CLI.
- Multiple SIP calls can be placed and received through a single user agent
- Supports transport type as either UDP or TCP
- Customize Codec options (payload type,ptime) for UA during Call Generation (Dial) & Call Reception
- All the calls at the application end will be answered automatically



# Sip Call Generation and Reception (Contd.)

- User Agent configuration requires Public URL and Contact field to be entered mandatorily.
- Other optional parameters include - Outbound Proxy, Registrar Address, NAT Address, Username and Password

Call Generation					
To URL	Type	Port No	Codec	Status	Description
0001@192.168.10.21	UDP	9000	A-law	HangUp	Call Established
0001@192.168.10.21	UDP	9002	Mu-law	Dial	Call Terminated
0001@192.168.10.21	UDP	9000	GSM610	Dial	Idle

Buttons: Add, Delete

Call Reception					
From URL	Type	Port No	Codec	Status	Description
0111@192.168.10.18	UDP	9000	Mu-law	HangUp	Call Established
0111@192.168.10.18	UDP	9000	Mu-law	HangUp	Call Established
0111@192.168.10.18	UDP	9000	Mu-law	HangUp	Call Established

## User Agent Configuration

Useragent Config - [Untitled]

File

**User Identity**

Public URL \* 001@192.168.1.114

Contact \* 001@192.168.1.114

**Server Information**

Outband Proxy

Registrar Address

Expiry Time 3600 msec

Register on Startup

Re-Register

**User Account Information**

Username

Password

Nat Address

0 . 0 . 0 . 0

Start Stop

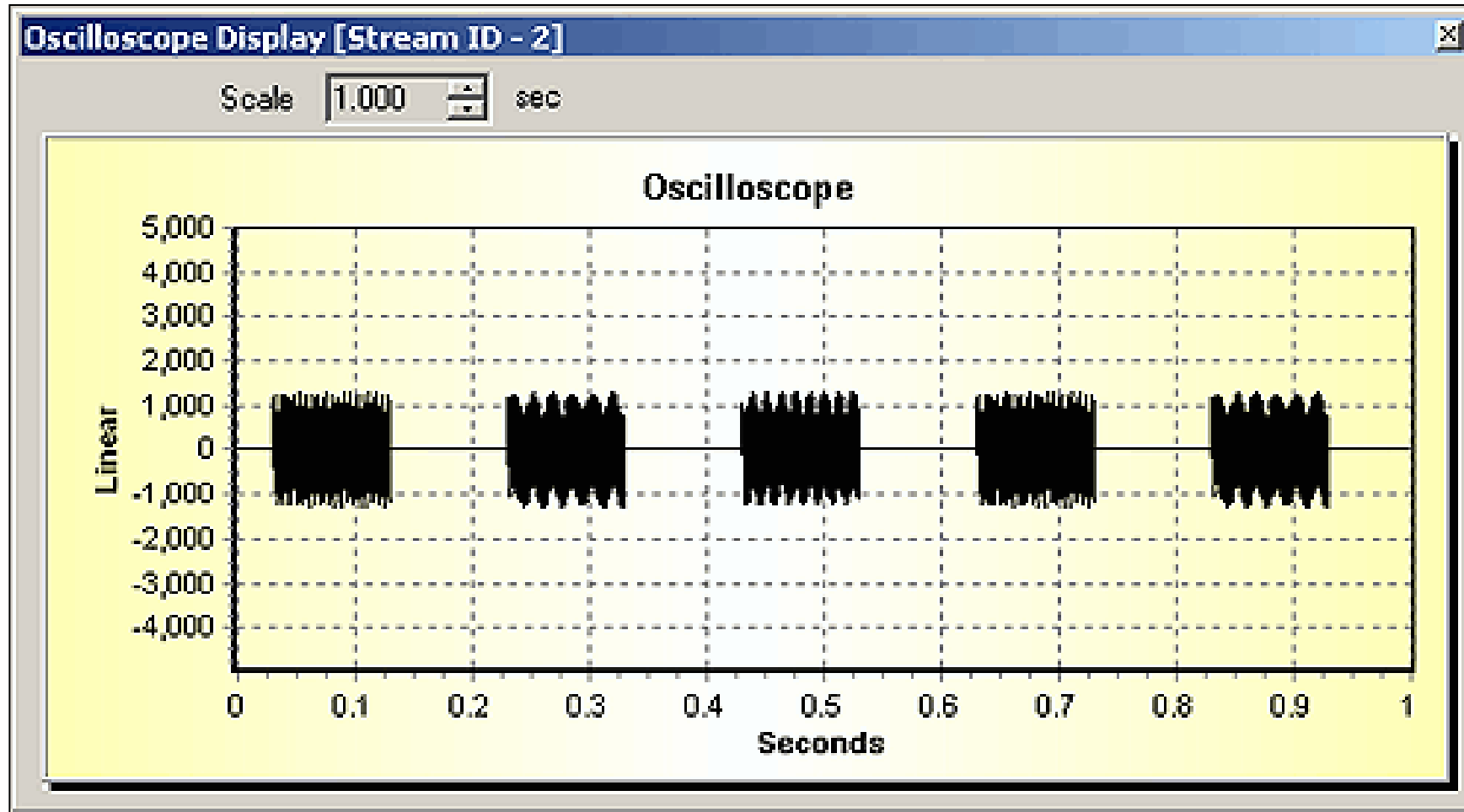
# Analysis Tools

The RTP ToolBox™ has the following analysis tools –

- Graphical Analysis
  - Oscilloscope
  - Spectral Display
  - G.168 Waveform Viewer
- Statistics
  - RTP / RTCP Statistics
  - R Factor - Quality Metrics (R-Factor & MOS Factor), Degradation Factor, Burst Metrics, Delay Metrics, & Jitter Buffer Statistics

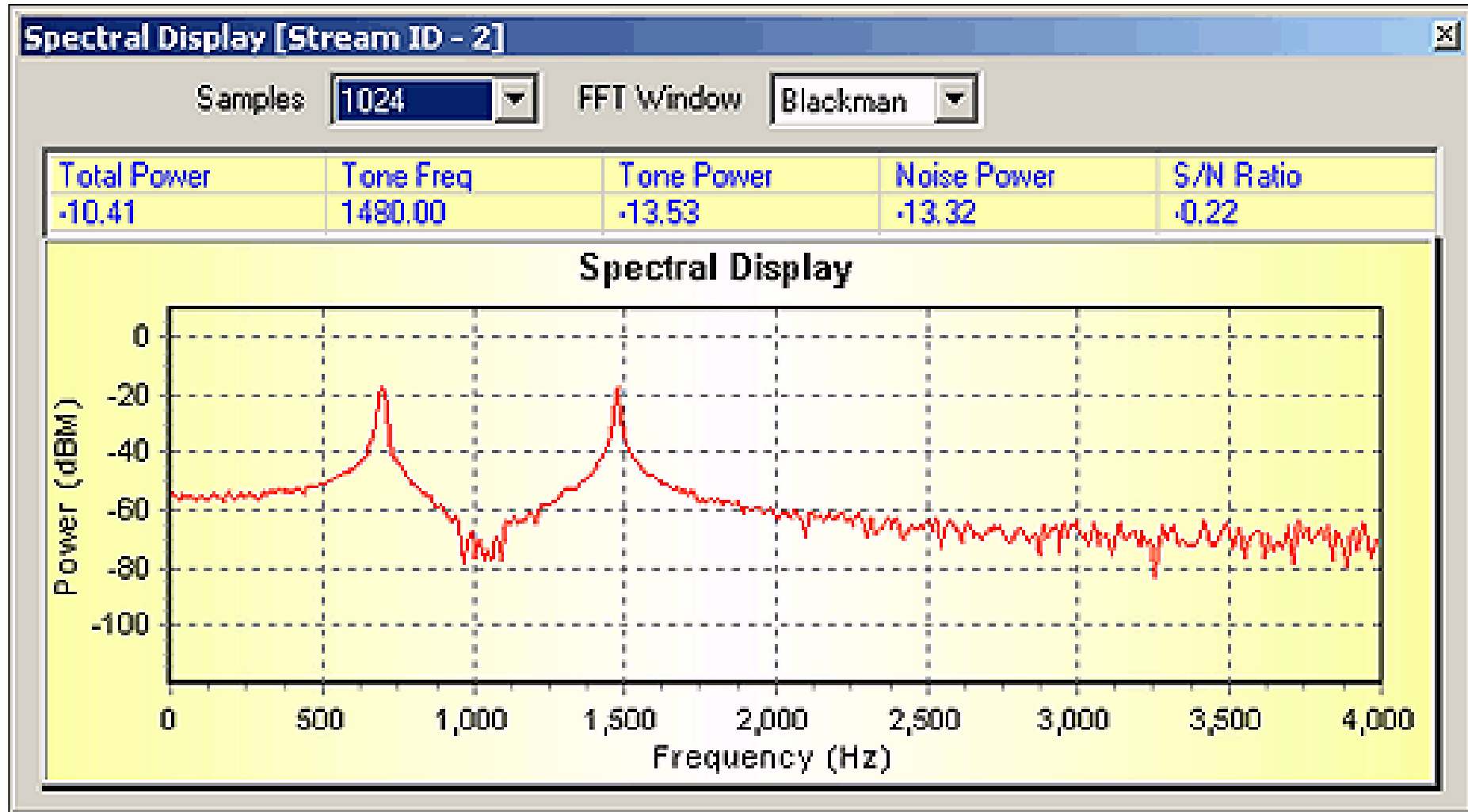
# Oscilloscope

- The PCM codes (amplitude of the incoming signal) for any selected session are graphically displayed in real-time as a function of time

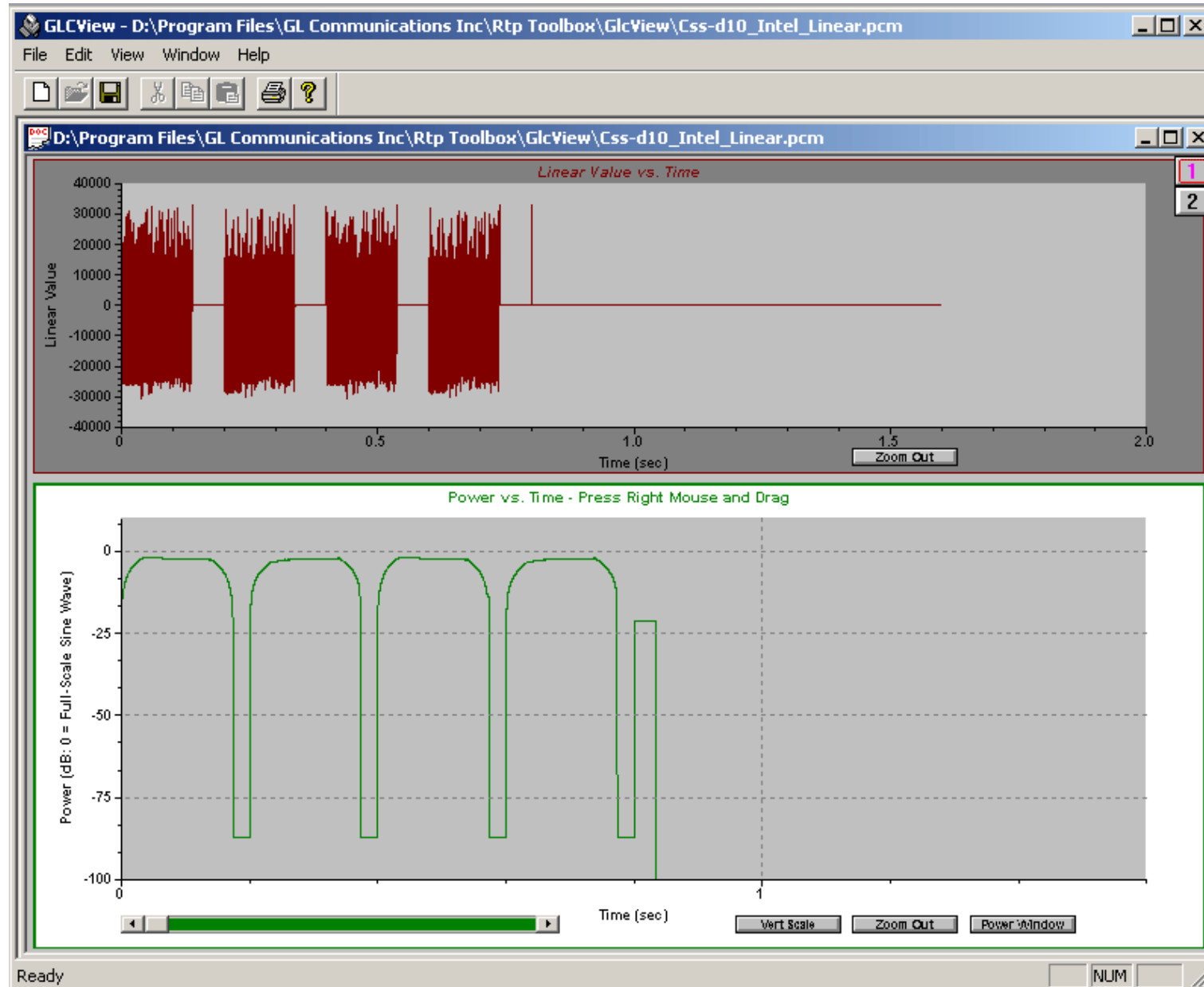


# Spectral Display

- Displays data received in spectral domain (Spectral Amplitude vs. Frequency)

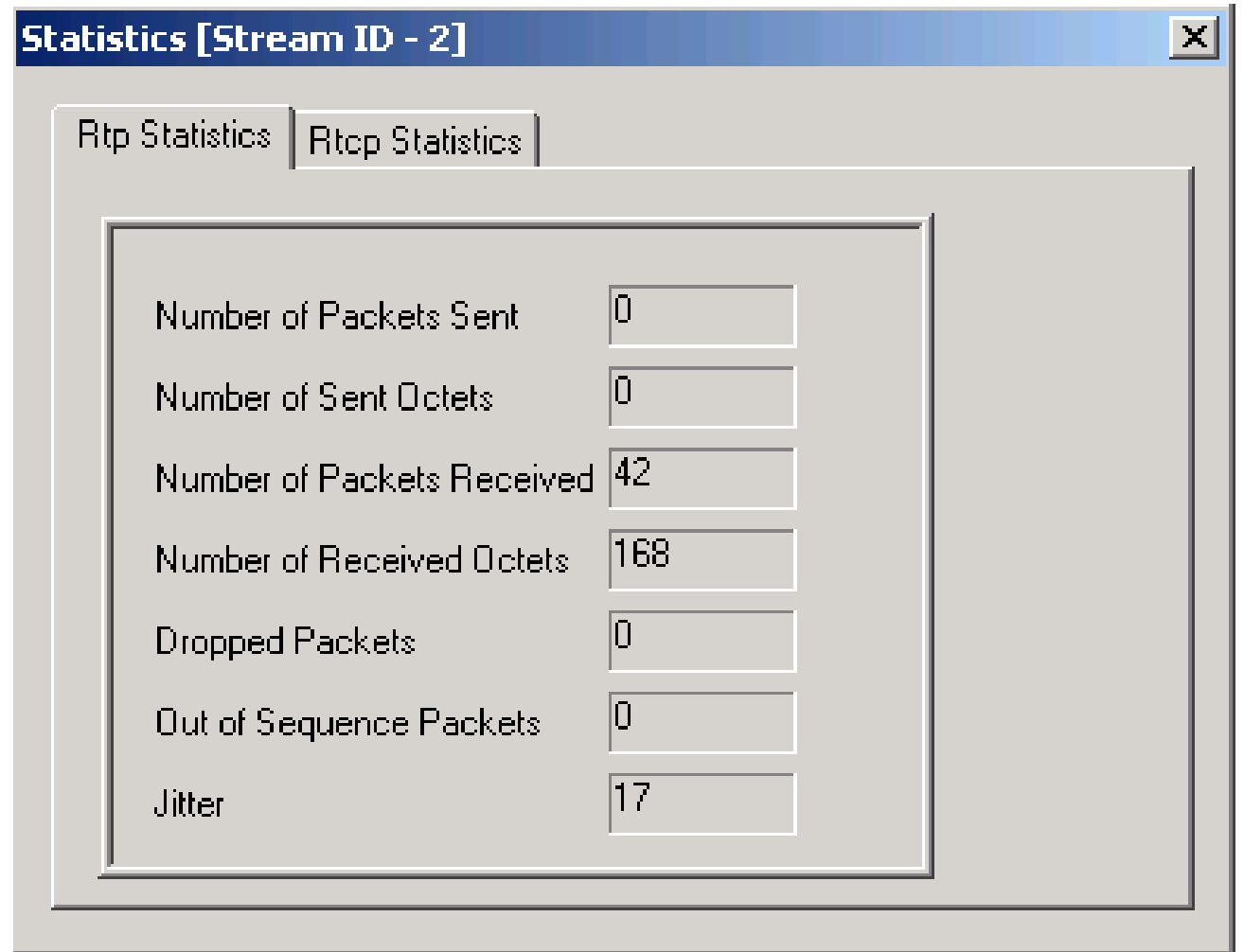


# G.168 Waveform Viewer



# RTP / RTCP Statistics

- Statistics reports of RTP and RTCP packets transmitted on a session
- RTP Statistics includes Number of Packets Sent, Packets Received, Dropped Packets, Out of Sequence Packets, and Jitter
- Sender Reports and Receiver Reports are displayed using RTCP statistics



Statistics [Stream ID - 2]	
Rtp Statistics	
Number of Packets Sent	0
Number of Sent Octets	0
Number of Packets Received	42
Number of Received Octets	168
Dropped Packets	0
Out of Sequence Packets	0
Jitter	17

# Estimating Speech Quality of Packets

Codec Name	MOS-LQ	MOS-CQ	MOS-PQ	R-LQ	R-CQ	VQmon-Nom MOS	VQmon-Nom R-factor
G.711 $\mu$ -law	4.2	4.18	4.45	93	92	4.2	93
G.711 A-law	4.2	4.18	4.45	93	92	4.2	93
G.722	3.91	3.91		96	95	3.91	96
G.722.1 (32 K)	4.04	4.01		100	99	4.09	102
G.722.1 (24 K)	3.91	3.91		96	95	3.98	98
G.729A/G.729AB	3.91	3.88	3.8	82	81	3.91	82
GSM-FR	3.57	3.53	3.63	73	72	3.57	73
G.726-40k	4.16	4.14	4.13	91	90	4.16	91
G.726-32k	4.04	4.01	3.89	86	85	4.04	86
G.726-24k	3.35	3.3	3.52	68	67	3.35	68
G.726-16k	2.82	2.77	3.2	57	56	2.82	57
G.726-40k with VAD	4.16	4.14	4.13	91	90	4.16	91
G.726-32k with VAD	4.04	4.01	3.89	86	85	4.04	86
G.726-24k with VAD	3.35	3.3	3.52	68	67	3.35	68
G.726-16k with VAD	2.82	2.77	3.2	57	56	2.82	57

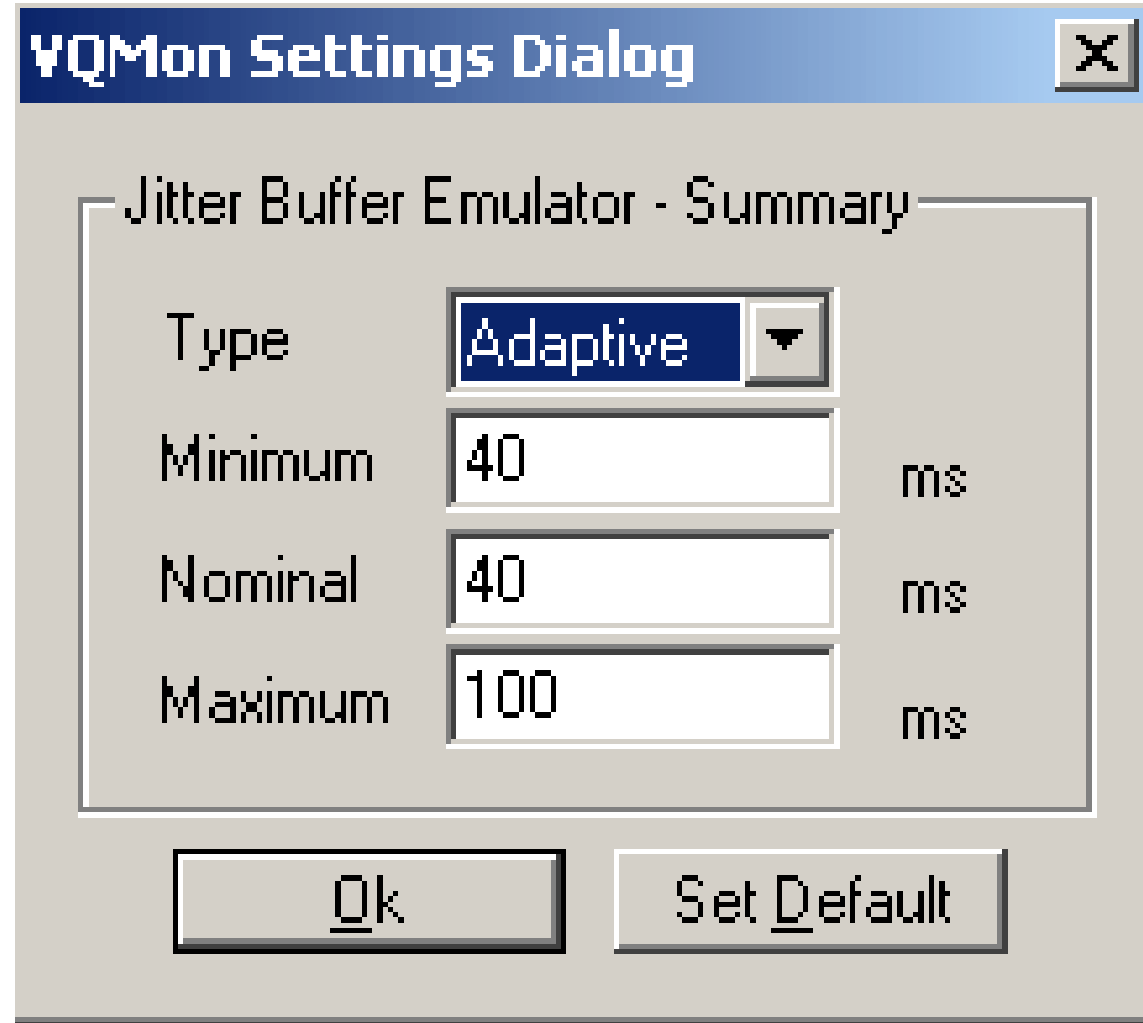
# Estimating Speech Quality of Packets (Contd.)

Codec Name	MOS-LQ	MOS-CQ	MOS-PQ	R-LQ	R-CQ	VQmon-Nom MOS	VQmon-Nom R-factor
AMR NB 7.95k	3.69	3.65	3.7	76	75	3.69	76
EVRCB	3.98	3.98		84	84	3.98	84
SMV	3.61	3.57		74	73	3.88	81
Speex WB	4.14	4.16		106	105	4.16	106
Speex NB	4.14	4.16		91	90	4.16	91
iLBC 13.3k	3.88	3.84	3.79	81	80	3.88	81
iLBC 15.2k	3.95	3.91	3.82	83	82	3.95	83



# Jitter Buffer Emulator Settings

- Depending on the Jitter Buffer Emulator settings, the R-Factor and MOS are calculated



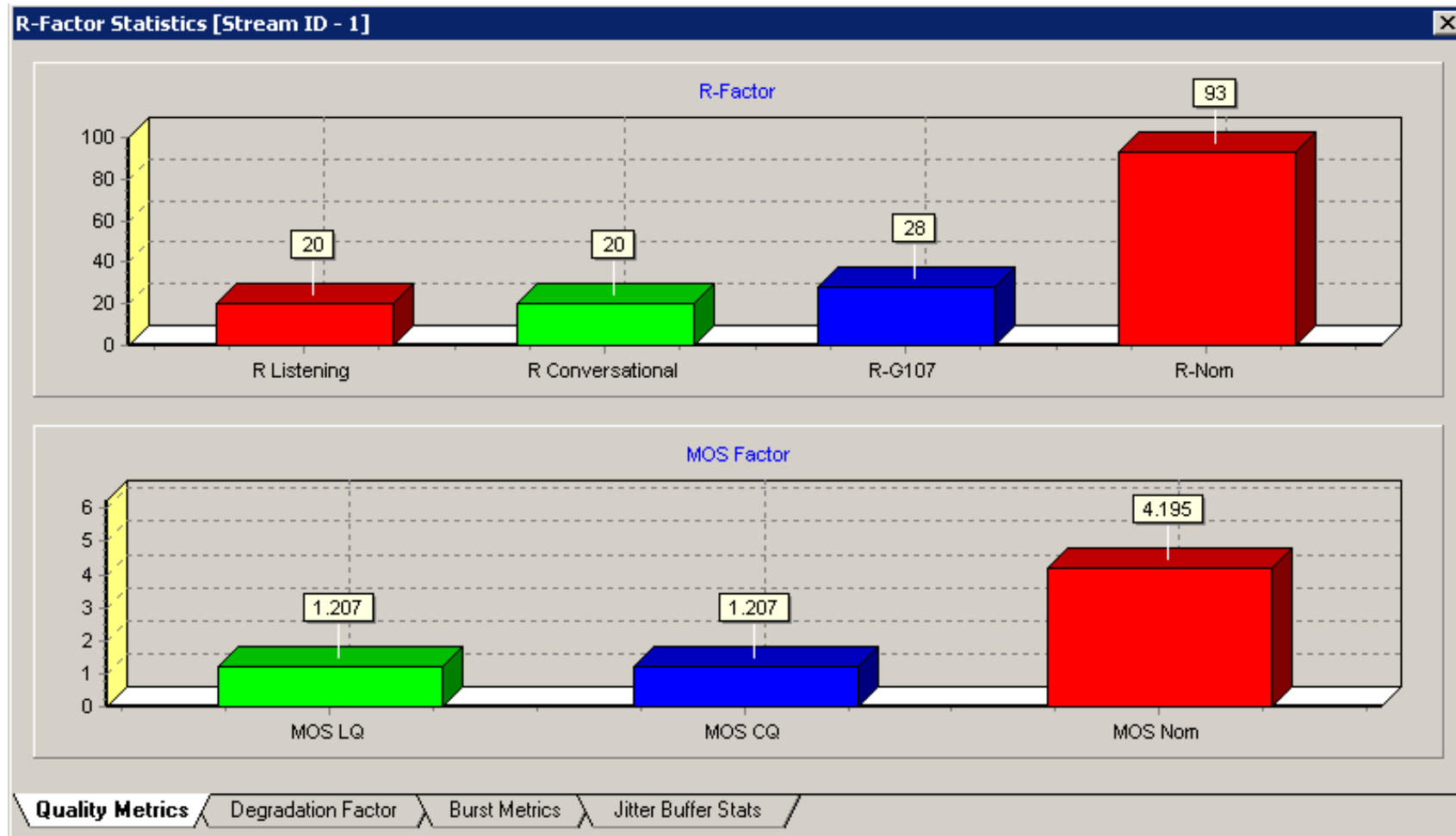
The screenshot shows a dialog box titled "YQMon Settings Dialog" with a close button (X) in the top right corner. The main content area is titled "Jitter Buffer Emulator - Summary" and contains the following settings:

Parameter	Value	Unit
Type	Adaptive	
Minimum	40	ms
Nominal	40	ms
Maximum	100	ms

At the bottom of the dialog, there are two buttons: "Ok" and "Set Default".

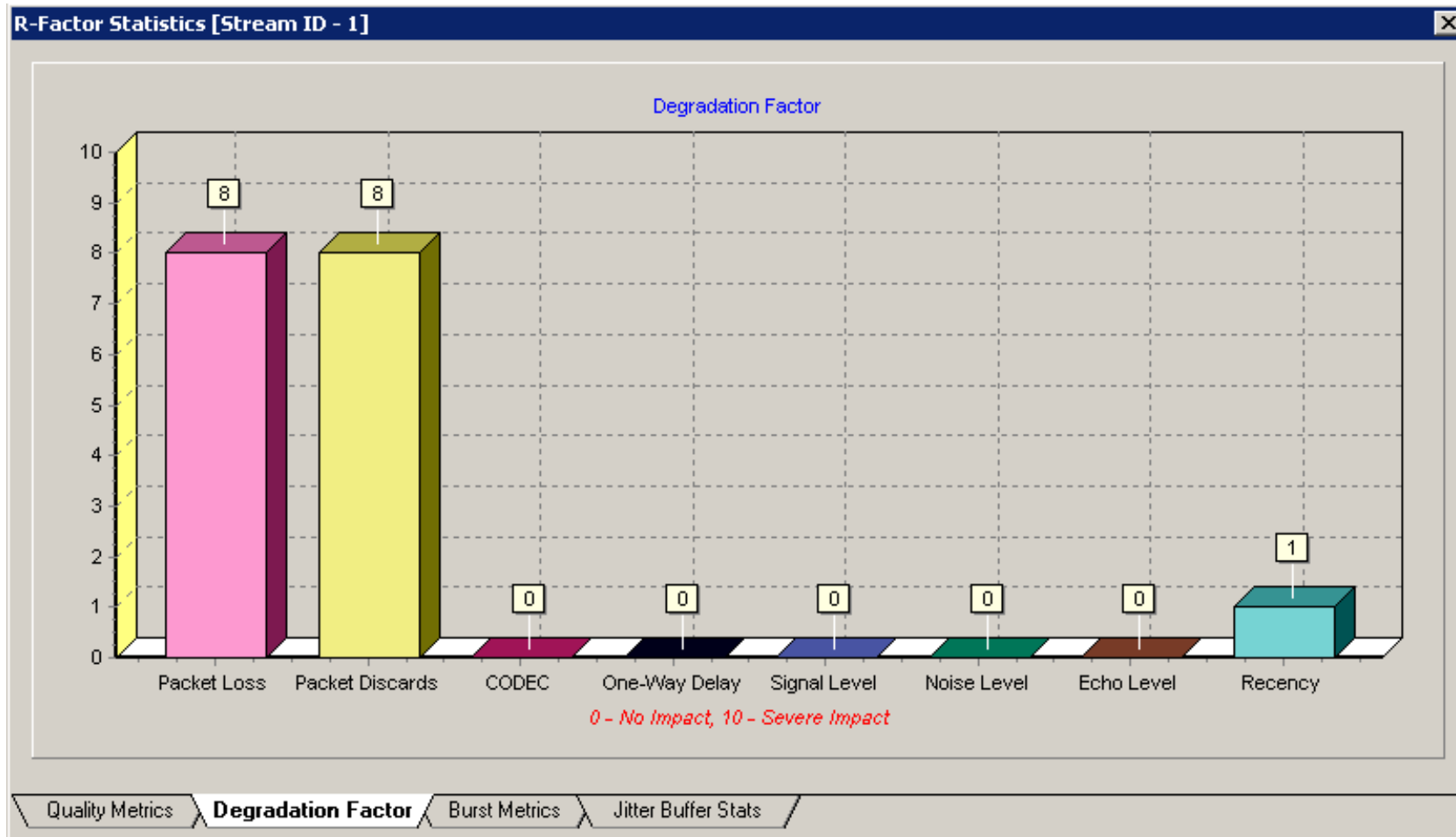
# Quality Metrics

- Quality metrics displays for R-Factor and MOS Factor graphs
- R Factor graph – displays statistics such as, R-Listening, R-Conversational, R-G107 and R-Nom
- MOS Factor graph – displays statistics such as MOS CQ, MOS LQ and MOS Nom



# Degradation Factor

- Displays a bar graph to indicate different degradation factor statistics.
- For voice quality measurement, various degradation factors are included such as network packet loss (Packet Loss), jitter buffer packet discards (Packet Discards), voice CODEC selection (CODEC),
- one-way delay, voiced segment signal level (Signal Level), silence period noise level (Noise Level), echo level, and recency.



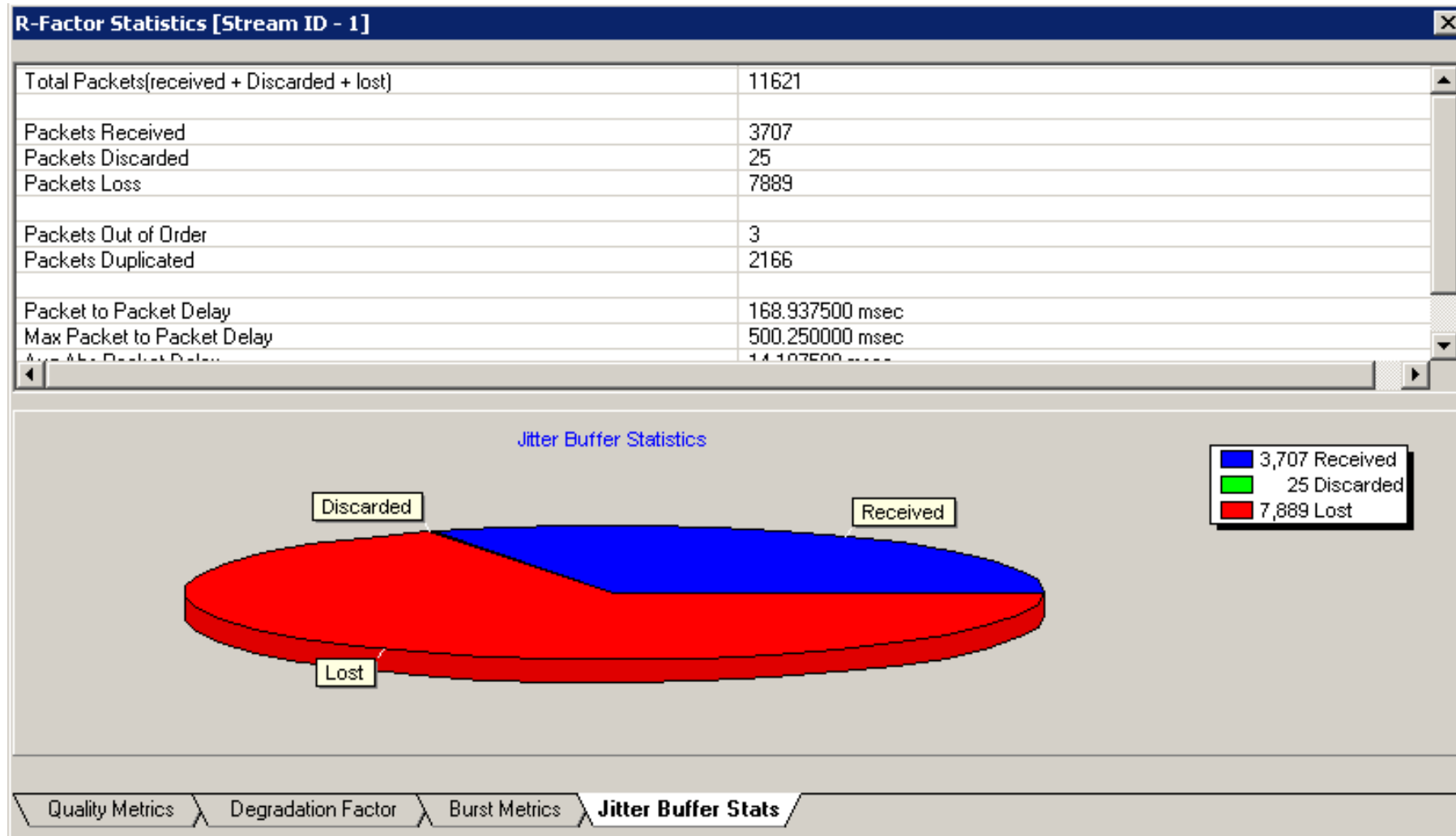
# Burst Statistics

R-Factor Statistics [Stream ID - 1]	
Burst R	20
Burst Count	45
Burst Loss Rate Proportion	0.76147
Avg Burst Packet Count	193
Avg Burst Length	3862 msec
Gap R	93
Gap Loss Rate Proportion	0.00000
Avg Gap Packet Count	21
Avg Gap Length	435 msec

Quality Metrics   Degradation Factor   **Burst Metrics**   Jitter Buffer Stats

# Jitter Buffer Statistics

- Displays a pie chart indicating number of packets received, discarded, lost, out of order, duplicated, and more



# Scripting Traffic Actions

- Simple user interface to create scripts
- Automated script control of traffic
- Conditional statements, stack multiple actions

RTP Tool - GL Communication - 192.168.1.52 [1]

Sl no	Source Address	Source Port	Destination Addr...	Destination Port	Codec	Statu
1	192.168.1.52	1024	192.168.1.52	1090	GSM610	Str
2	192.168.1.52	1090	192.168.1.52	1024	GSM610	Str

Buttons: Insert, Add, Delete, Start Script, Stop Script

Script Contents

```
tx file : filename = "\Send\<codec>\Vijay.glw", duration = 10000 ;
tx dtmf digits : digits = "0123456789ABCD", band = inband, power1 = -10, power2 = -10, ontime = 8
tx mf digits : digits = "0123456789ABCDE", band = inband, power1 = -10, power2 = -10, ontime = 8
tx tone : freq1 = 1004, power1 = -10, freq2 = 2004, power2 = -10, ontime = 1000, offtime = 1000, ite
tx dtmf digits : digits = "0123456789ABCD", band = outband, power1 = -10, power2 = -10, ontime =
tx mf digits : digits = "0123456789ABCDFE", band = outband, power1 = -10, power2 = -10, ontime =
```

Packetgen RTP Action Script Editor

Script Name: D:\Program Files\GL Communications Inc\PacketGen\ScriptFiles\IVRSendSide.psc Test Script

State Machine Components

- Actions
  - Start Send...
  - Start Recv...
  - Stop Send...
  - Stop Recv...
  - Stop All
  - Define User Tone
- Conditional
  - If... Statements...
  - Wait Statements...
  - Loop Statements...
  - Add Lable...
  - GoTo...
- Variable
  - Declaration/Assignmen
  - Increment
  - Decrement
- Write Event
- Add Comment (//)

State Machine Script

#	Script Item
1	loop (10)
2	monitor digits : band = outband , digitype = dtmf;
3	waitforevent (digitsdetected, 10 sec);
4	stop monitor;
5	if (digitsdetected)
6	if (detecteddigits == "1")
7	tx file : filename = "\Send\<codec>\Vijay.glw", duration = 10000 ;
8	if (txfiledone)
9	writeevent: event = "PASS::SEND FILE";
10	else
11	writeevent: event = "FAIL::SEND FILE";
12	endif
13	elseif (detecteddigits == "2")
14	tx dtmf digits : digits = "0123456789ABCD", band = inband, power1 = -6, power2 = -4, ontime
15	if (txdigitsdone)
16	writeevent: event = "PASS::SEND DTMF DIGIT";
17	else
18	writeevent: event = "FAIL::SEND DTMF DIGIT";
19	endif
20	elseif (detecteddigits == "3")
21	tx mf digits : digits = "0123456789ABCDE", band = inband, power1 = -6, power2 = -4, ontime
22	if (txdigitsdone)
23	writeevent: event = "PASS::SEND MF DIGIT";
24	else
25	writeevent: event = "FAIL::SEND MF DIGIT";
26	endif
27	elseif (detecteddigits == "4")
28	tx tone : freq1 = 1004, power1 = -10, freq2 = 2004, power2 = -10, ontime = 1000, offtime = 10
29	if (txtonedone)

# Server Client Functionality

- RTP ToolBox™ can be configured as server-side application
- Enables remote controlling of the application through multiple command-line based clients
- Supported clients include C++ and TCL based clients
- Perform all functions such as creating RTP sessions, Digit/Tones/Event generation and reception, Setting impairments, Creating session profiles and so on remotely
- Generates and receives SIP calls through commands

# Server Client Functionality

```
Rtptool Server
File View Setup Help
Commands
1 create_session 192.168.10.21 2000 ssrc 1 timestamp 1 SeqNo 1;
1 set_tx_profile PCMA 20 payloadtype 8;
1 start_session 192.168.10.21 2000;
1 tx dtmfdigits("1234567890ABCD", -10.0 dbm, 100 msec, 100 msec);
wait 3000;
1 stop tx digit;
1 tx mfdigits("1234567890KPSTSTPST2PST3P", -10.0 dbm, 100 msec, 100 msec);
wait 3000;
1 stop tx digit;
1 tx mfr2fdigits("1234567890KPSTSTPST2PST3P", -10.0 dbm, -10.0 dbm, 100 msec, 100 msec);
wait 3000;
1 stop tx digit;
1 tx mfr2bdigits("1234567890KPSTSTPST2PST3P", -10.0 dbm, -10.0 dbm, 100 msec, 100 msec);
wait 3000;
1 stop tx digit;
1 tx tone (1004, -10.0) 5000 msec;
wait 5000;
1 stop tx tone;
1 tx tone (3000, -10.0) continuous;
wait 10000;
1 stop tx tone;
1 tx dual tone (500 hz , 1000 hz , -10.0 dbm) 5000 latency 100;
wait 5000;
1 stop tx tone;
1 tx dual tone (500 hz , 1000 hz , -10.0 dbm);
wait 10000;
1 stop tx tone;
1 tx noise -10.2 dbm 5000 msec ;
wait 5000;
```

```
Untitled - RtptoolClient
File View Connect Script Help
L 1 tx mfdigits("1234567890KPSTSTPST2PST3P", -10.0 dbm, 100 msec, 100 msec);
wait 3000;
L 0 tx_digitone 0 Action Stopped
L 0 tx_mfdigits 0 Transmitting MF Digits
L 6 tx_mfdigits 0 Tx mfdigits Completed
L stop tx digit;
L 1 tx mfr2fdigits("1234567890KPSTSTPST2PST3P", -10.0 dbm, -10.0 dbm, 100 msec, 100 msec);
wait 3000;
L 0 tx_digitone 0 Action Stopped
L 0 tx_mfr2fdigits 0 Transmitting MFR2F Digits
L 6 tx_mfr2fdigits 0 Tx mfr2fdigits Completed
L stop tx digit;
L 1 tx mfr2bdigits("1234567890KPSTSTPST2PST3P", -10.0 dbm, -10.0 dbm, 100 msec, 100 msec);
wait 3000;
L 0 tx_digitone 0 Action Stopped
L 0 tx_mfr2bdigits 0 Transmitting MFR2B Digits
1 stop tx digit;
1 tx mfdigits("1234567890KPSTSTPST2PST3P", -10.0 dbm, 100 msec, 100 msec);
wait 3000;
1 stop tx digit;
1 tx mfr2fdigits("1234567890KPSTSTPST2PST3P", -10.0 dbm, -10.0 dbm, 100 msec, 100 msec);
wait 3000;
1 stop tx digit;
1 tx mfr2bdigits("1234567890KPSTSTPST2PST3P", -10.0 dbm, -10.0 dbm, 100 msec, 100 msec);
wait 3000;
1 stop tx digit;
1 tx tone (1004, -10.0) 5000 msec;
wait 5000;
```



**Thank you**