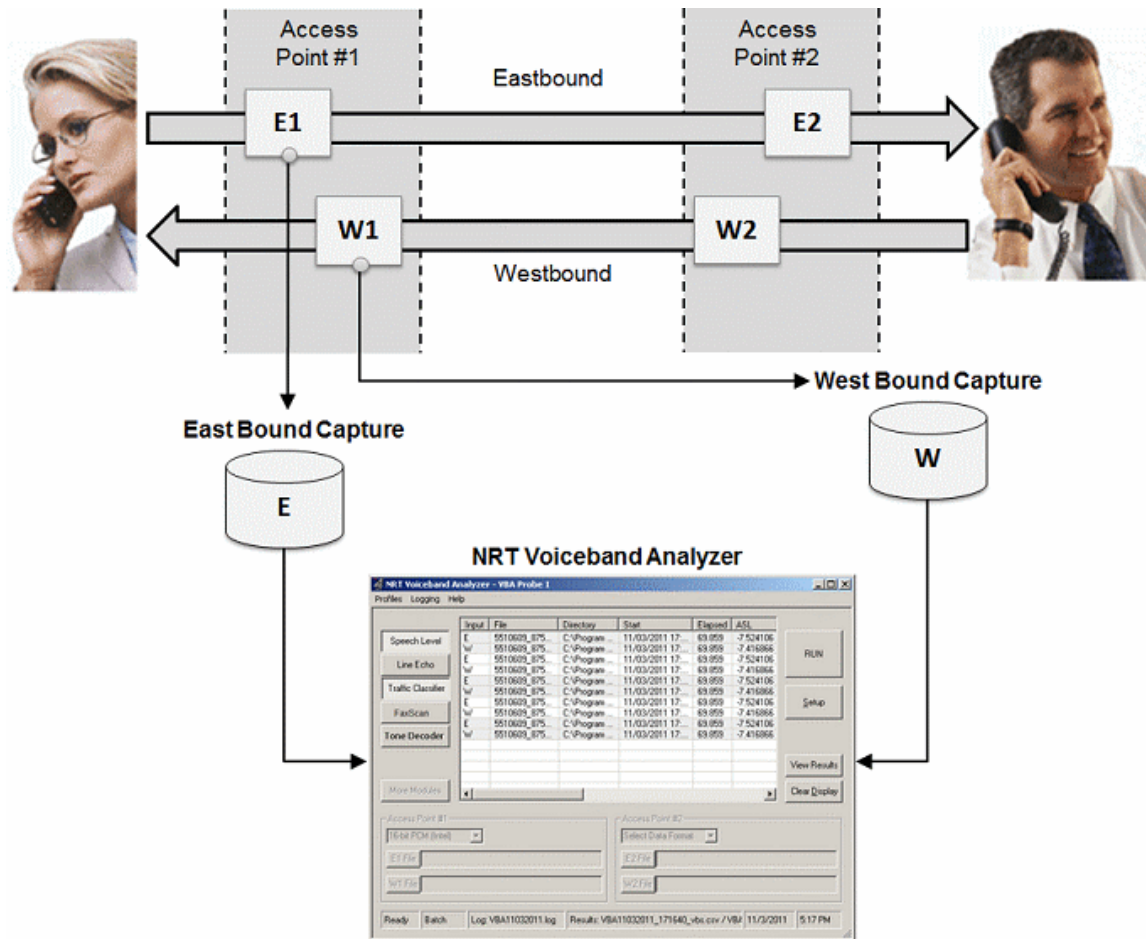# Near Real-time Voice-band Analyzer

Overview

The Near Real-time Voice-band Analyzer (VBA) is an analysis tool for monitoring the quality of voice band traffic over VoIP, TDM, 2-Wire, and wireless networks. It can host an arbitrary number of analysis algorithms. Built-in algorithms include ITU-T P.56 Active Voice Level analysis, Line Echo (Hybrid) analysis, and licensed modules include 2-Wire Echo Analysis, Traffic Classifier, and Fax analysis. Other analysis modules such as ITU-T P.561, P.562, and P.563 can be hosted as plug-ins. The VBA application can operate on previously captured files, making it a near-real time (as opposed to a strictly real-time) tool.

VBA records its output into two files, the first containing overall channel measurements, and the second containing event records. It produces summary measurements of the captured signals, including active speech levels, noise level, percent time active, DC offset and the like The optional VBA Fax decoder/demodulator module (require additional license) can be used to analyze both 2-wire and 4-wire voiceband captures for Fax traffic and output fax signaling frames in a log file and fax image as TIFF format.

VBA works in conjunction with GL's TDM, Packet, and Wireless non-intrusive capture products:

- VBA with GL's TDM T1 E1 Call Capture and Analysis, or
- VBA with GL's VoIP PacketScan™/ MLPPP Analyzer
- VBA with GL's GSM, CDMA, and 3G Call Capture Products
- VBA with GL's 2-Wire (FXO RJ11) Hardware Tap and Audio Capture Software

For more details refer to, Near Real-time Voice-band Analyzer webpage.

Main Features

- Near real-time (NRT) non-intrusive analysis platform
- Supports 1, 2, 3, and 4-port signal data analysis
- Manual, batch, and automatic processing modes
- Accepts the following encoding formats –

A-Law	μ-Law
MS Wave	16 kHz G.722 (64 kbps) Wideband
13-bit PCM	14-bit PCM
16-bit 8 kHz PCM (Intel)	16-bit 16 kHz PCM (Intel)
16-bit 8 kHz PCM (Motorola)	16-bit 16 kHz PCM (Motorola)

- Hosts built-in P.56 Active Voice Level analysis, Tone decoder, and other optional analysis algorithms such as Line Echo analysis, Traffic Classifier analysis, and Fax analysis
- Allows to implement Psophometric and C-Message signal conditioning before the Active Speech Level analysis; reports C-Message filtered files in dBrnC
- User-selectable analysis output fields
- Voice Band Status (*_vbs.csv) and Voice Band Event (*_vbe.csv) files are generated
- Analysis output mode directly compatible with Microsoft® Excel and other analysis tools
- With a Tone Decoder module, the VBA monitors the captured receiving signal and decodes the tone type as DTMF, MF, Frequency-Shift Keying (FSK), Teletype (TTY), Special Information Tone (SIT), Specific Area Message Encoding (SAME), Voice Mail Waiting Indication (VMWI), Paging Tones, or any Custom Tones. The module also detects and decodes the Type 1 Caller ID, Type 2 Caller ID - Call Waiting (CID-CW), silence, ring-back, busy or other phone tones

Operation Modes

The VBA operates in three fundamental modes: **Manual, Batch** and **Automatic**.

In **manual** mode, the user specifies the files to be analyzed. This is useful for quick analysis, and for verifying algorithm configuration before a **batch** or **auto** run.

Batch mode allows users to analyze an entire set of data stored in a designated folder or subfolders. In **automatic** mode, the process continues indefinitely until the user manually stops the analysis.
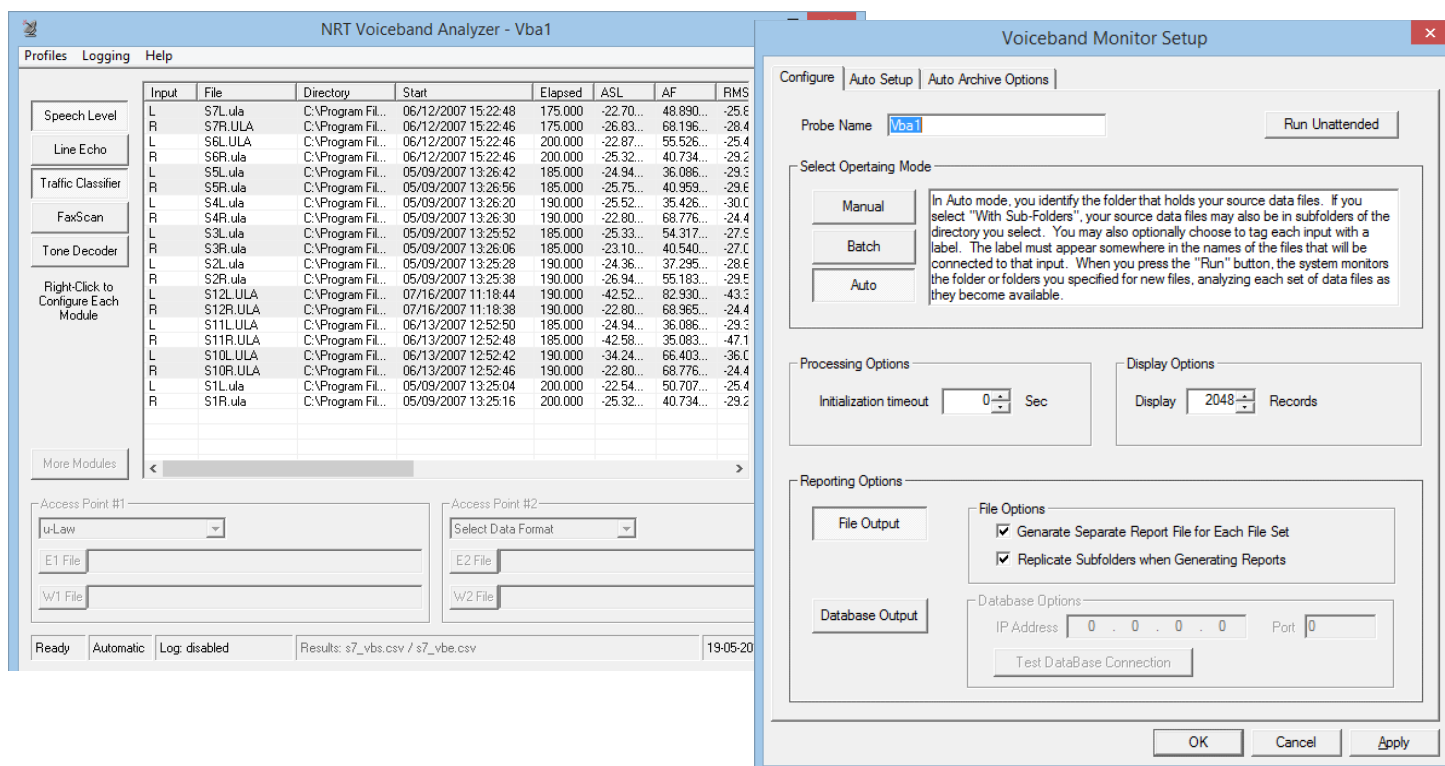

Figure: Manual, Batch, and Auto Mode

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File Naming Conventions

The file name convention allows users to identify source data files and to group them into data sets in Batch or Auto Mode operations. The built-in naming conventions are **CCA – Standard**, **CCA-MFCR2**, and **CCA-ISDN**, which are compatible with GL's Call Capture and Analysis application. The application also allows users to customize the naming convention according to user's requirements and create corresponding a file name pattern.
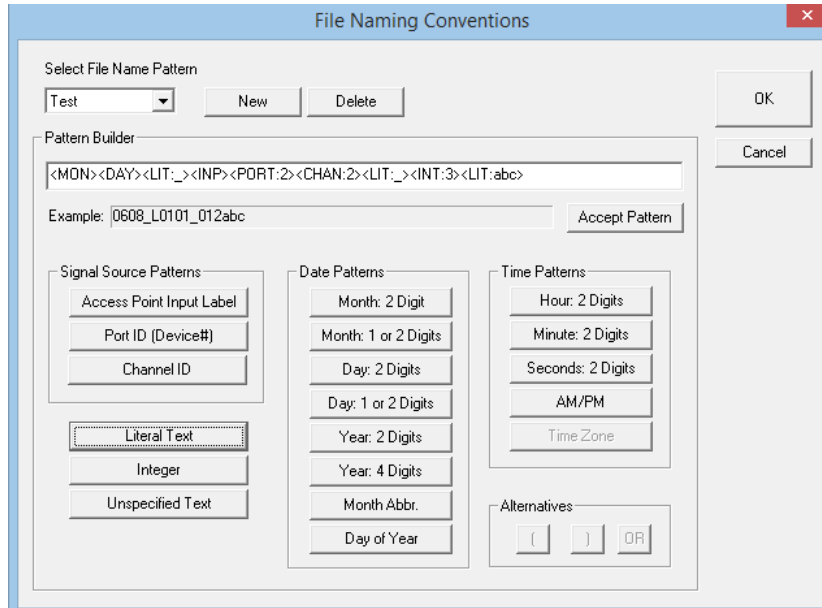

Figure: File Naming Conventions

Built-in and Optional VBA Algorithms

The active speech level is measured in accordance with P.56 Method B. Line module displays Echo Return Loss - ERL (dB), Echo Delay (ms), and Echo Dispersion (ms). Traffic Classifier displays the amount of Fax/Voice/Digits/Tones/Silent types of traffic present in the network. FaxScan™ used to analyze voice band traffic files for Fax traffic and output Fax signaling frames in a log file.
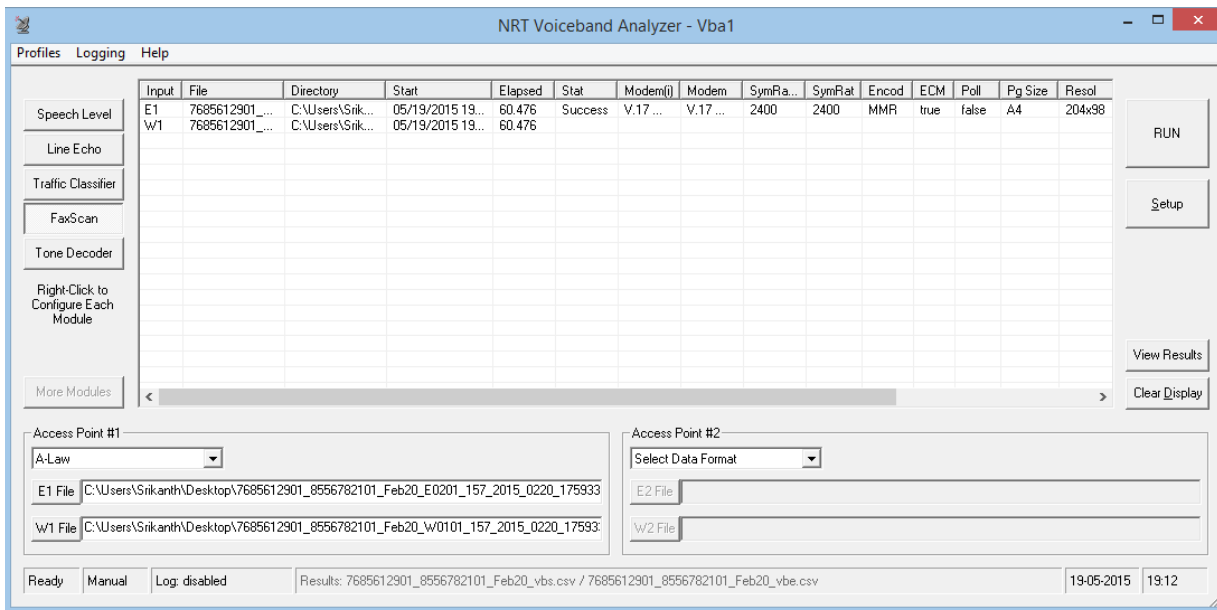

Figure: FaxScan

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Algorithms Parameters and Output Fields

Active Speech Level Module

In the Active Speech Level algorithm, parameters such as Sample Rate, Smoothing Constant, Hangover-time, and Threshold Margin all have fixed values. The ASL modelers allows you to apply Signal Conditioning (either a Psophometric or a C-Message channel profile) to the signal before the Active Speech Level analysis is performed. C-Message is normally used in North American systems, where T1/ μ-Law is the norm. It displays Activity factor, RMS factor, Noise Level, Possibly Clipped Samples, Maximum Positive Sample Value, Maximum Negative Sample Value and DC level.
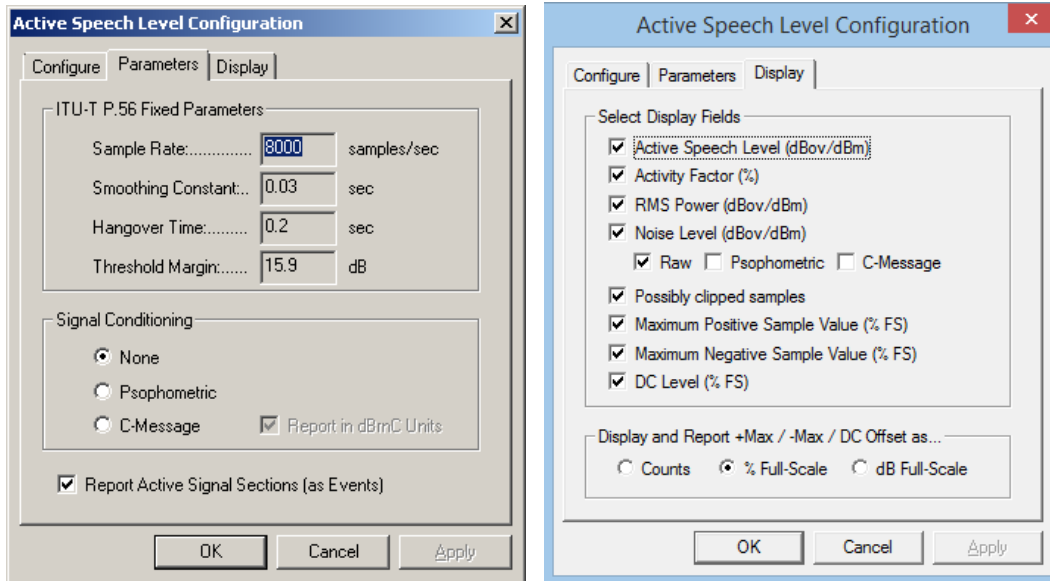
Figure: Active Speech Level Display and Parameters

Performance Measure

Processor: 1.66 GHz, single-core, non-hyper threaded.

Algorithm	Number of Channels
P.56 Active Speech Level	470
Line Echo	
Tail = 16 ms.	70
Tail = 32 ms.	44
Tail = 64 ms.	27
Tail = 128 ms.	16

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Line Echo Module

Line Echo has two classes of variable parameters: Echo Path Model and Double-Talk Detection parameters. Echo Path Model parameter allows setting values for 'Tail Length' and 'Bulk Delay' (Tail Offset), while, double talk detection (DTD) allows raising or lowering the **ON Sensitivity** and **OFF Sensitivity**. It displays the echo parameters such as Echo Return Loss - ERL (dB), Echo Delay (ms) and Echo Dispersion (ms).
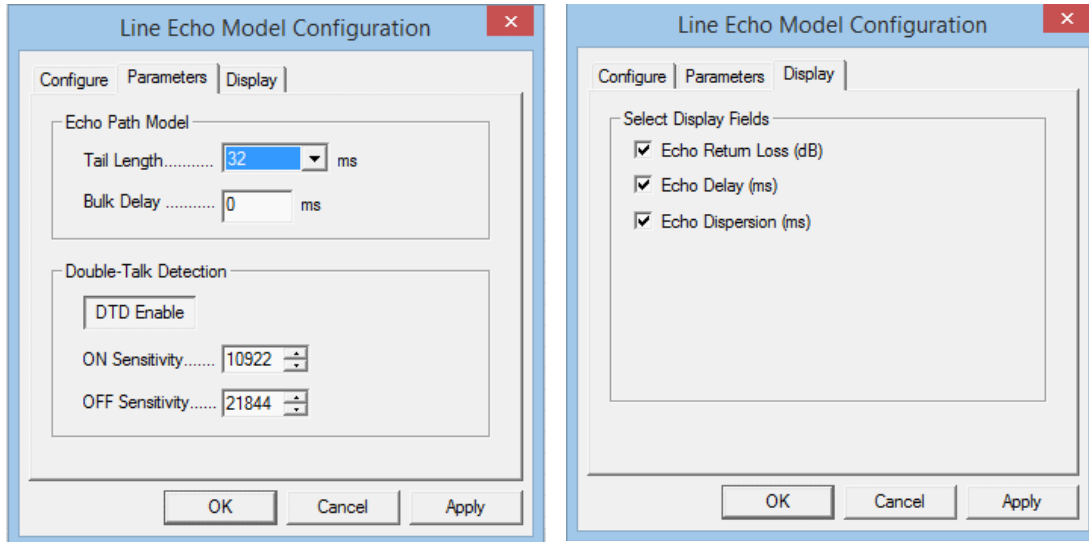
Figure: Line Echo Display and Parameter Fields

Traffic Classifier Module

Traffic Classifier algorithm allows VBA to choose to display the amount of Fax/Voice/Digits/Tones/Silent types of traffic present in the network and generate corresponding reports. Traffic Classifier allows Idle Code settings for signaling bits and options to detect DTMF, MF, MFR2-fwd, MFR2-bkwd digits, and Tones (Dial/Ring/Busy).
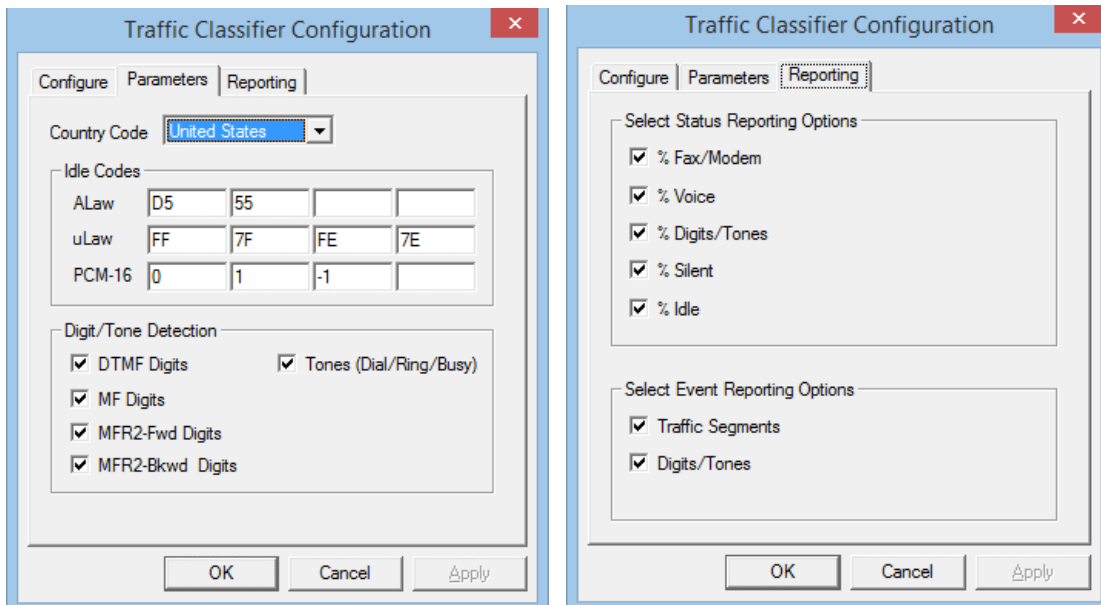
Figure: Traffic Classifier Reporting and Parameters

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FaxScan™ Module

FaxScan™ application is used to process 2-Wire and 4-Wire voice band capture files as well as Win PCAP captures to provide analysis of the T.38 packets, T.30 frames, decode a Fax TIF image, and general call-flow indicators for detail analysis.

The **FaxScan™** module allows you to choose the output fields such as Fax status, Standard, Data Rate, Resolution, Encoding, Page Size, Error Lines, Total Lines, Total Bytes, and Total Pages. The total lines decoded is a good indication as to the success of the decode process. A typical page should indicate over 1000 lines.
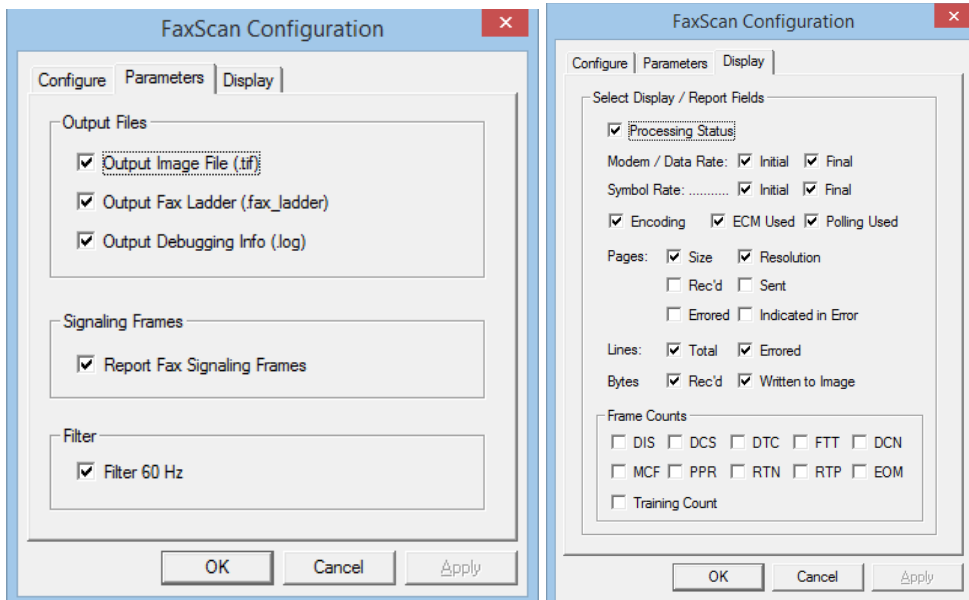
Figure: FaxScan™ Parameters and Display Fields

Tone Decoder Module

This Tone Decoder module within VBA features a highly efficient FFT module, converts a raw captured file to spectrum data. With this module, the VBA can monitor the signal arriving at the receive end, detect, and decode the tone.
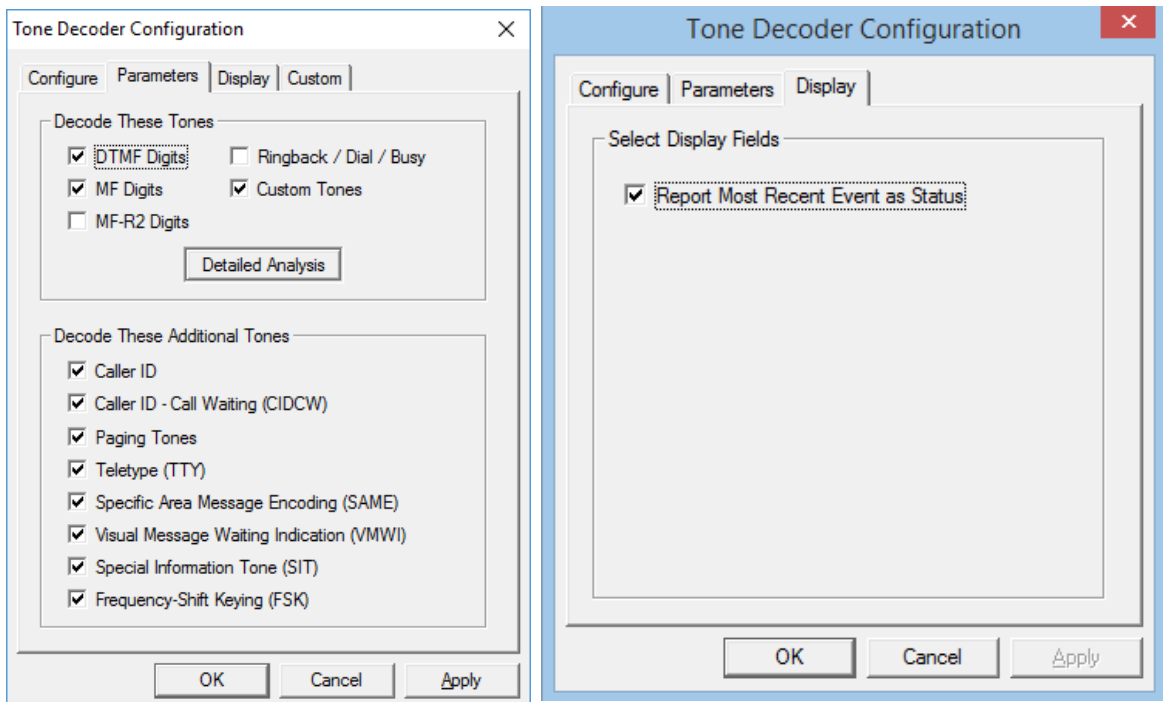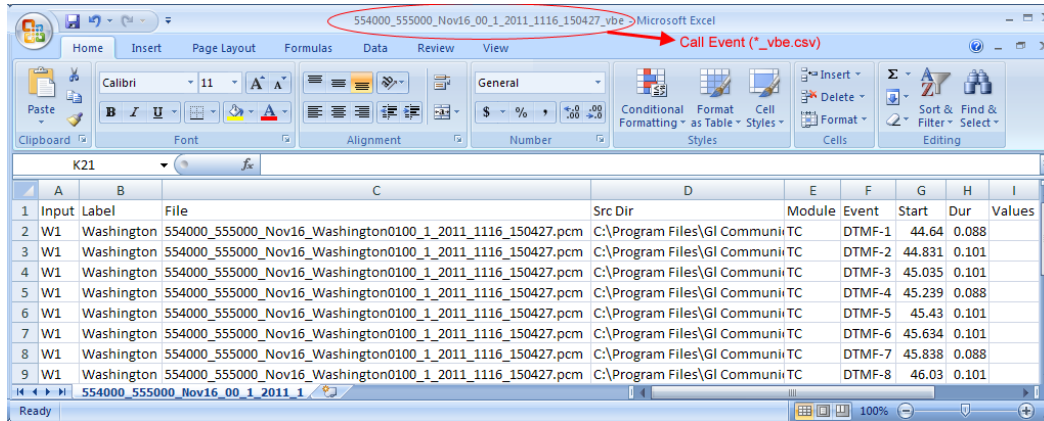
Figure: Tone Decoder Display and Parameters

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VBA Reports

Call Event

The **Voiceband Events** output file contains various signaling (ISDN, CAS, SS7) events, traffic events (Digits, Fax messages), start time, event duration, and so on.
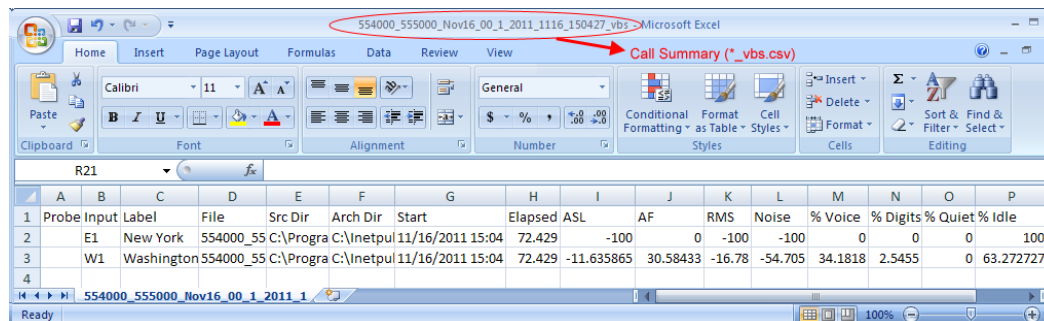

Figure: Voiceband Call Event Output File

Call Summary

The **Voiceband Summary or Status** output file contains an overall summary of the call, including the input direction (E / W), the call duration, the elapsed time and various measurements based on the modules selected.

Figure: Voiceband Call Summary Output File

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VBA FaxScan™ Reports

VBA FaxScan™ always outputs the fax image as a TIFF ("Tagged Image File Format") file and a log file.

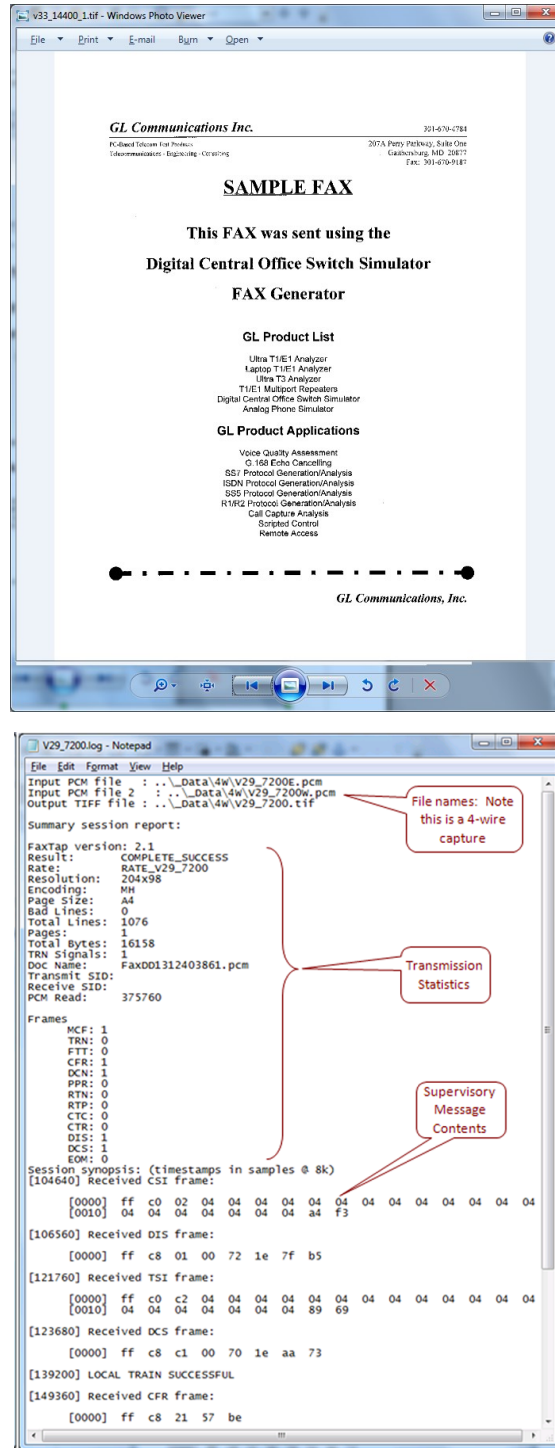**Figure: Voiceband FaxScan™ Tiff Image and Text Report**

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Buyer's Guide

Item No	Product Description
VBA032	Voiceband Analyzer
VBA033	Two-Wire Echo Analysis for VBA
VBA036	Traffic Analysis for VBA
VBA038	FaxScan™

Item No	Related Software
PKV104	FaxScanT38
XX031	Call Capture and Analysis
CDR032	Call Data Records
PKV100	PacketScan™ (Real-time and Offline)
PKV101	PacketScan™ - Offline
VQT035	2-Wire Voice/Data Capture

Item No	Related Hardware
PTE001	tProbe™ T1 E1 Base Unit
FTE001,	Quad and Octal T1 E1 Analyzer Boards
XTE001	Dual Express (PCIe) T1 E1 Boards
TTE001	tScan16™ T1 E1 Boards

For more details refer, Near Real-time Voice-band Analyzer webpage.

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