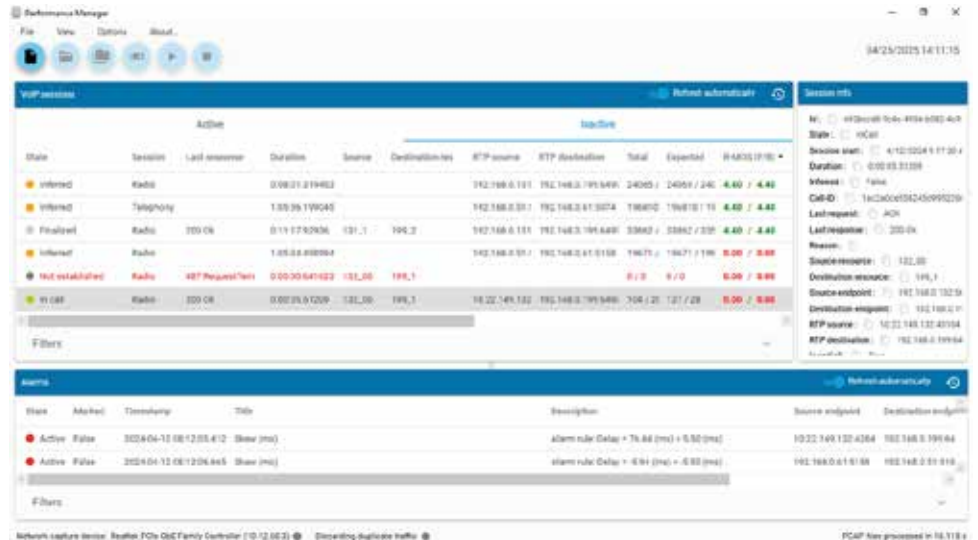


ATC PERFORMANCE MANAGER

The **ATC PERFORMANCE MANAGER** software is a powerful tool used for Analysis, Monitoring and Diagnosis of ATC network following the EUROCAE ED137 and ED138 standards. This equipment is currently almost the only tool in the market capable of identify faults of network interoperability (ED137) and network parameters (ED138) with an user-friendly interface ability fast troubleshooting.



The **ATC PERFORMANCE MANAGER** calculates in real time audio quality metrics: dropped packets, delay, jitter, duplicate packets and, from these parameters, calculates an estimated MOS according to (ITU G.107) corresponding to each of the RTP sessions for each of the established communications. Shows graphs of the evolution of the magnitudes of the parameters of lost packets, delay, jitter, MOS, etc.

It also displays a dashboard with the temporal evolution of the parameters corresponding to a whole set of SIP sessions.

The **ATC PERFORMANCE MANAGER** monitors all existing RTP flows on the network and their corresponding SIP session state. If the SIP session establishment was not captured, the system will infer the conversation and display the associated RTP flow.

The application allows the user to select which RTP flows to analyse in real time: All RTP flows, RTP flows of radio sessions, RTP flows of telephony sessions, RTP flows of specific IP addresses.

For each active flow the system allows:

Listen RTP audio.

- View the message diagram (call-flow) and, by positioning yourself on the packet, view the decoded message.
- View in table and graphical form the evolution of the MOS, as well as the evolution of the parameters used for its calculation, such as delay, lost packets, duplicated packets and jitter.
- View in table and graphical form the evolution of simultaneous radio transmissions (CLIMAX).

Session	Call flow	Call quality graphs	Call quality table
192.168.0.131.5060 -> 192.168.0.199.5060			
General	SIP		RTP
Session ID: 283b4c38-0c08-465b-760d-26a5eb	Source resource: 131.1	is radio? True	Source endpoint: 192.168.0.131
Session start: 2024-04-12 08:34:13.093	Destination resource: 199.2	State: Finalized	Destination endpoint: 192.168.0.199
Session end: 2024-04-12 08:45:31.022	Source endpoint: 192.168.0.131.5060	Subject: radio	Total packets (F/R): 33862 / 3351
Inferred: No	Destination endpoint: 192.168.0.199.5060	ip_req: 1	Wrong seq. packets (F/R) (%): 0.00 / 0.00
			Expected packets (F/R): 33862 / 3351
			Lost packets (F/R) (%): 0.00 / 0.00



The **ATC PERFORMANCE MANAGER** displays real-time alarms when communications parameters do not meet defined thresholds. These thresholds are configurable by the user at any time. The system can detect failures in the interoperability of radio communications (loss of KEEP ALIVE, end-of-session sending with a given Reason) and telephony (OPTIONS messages that are not answered correctly or sessions that are not established correctly or that are terminated by a Reason), so that the end user can immediately recognise the anomaly, storing the information that allows the incident to be analysed and Troubleshooting to be carried out.

Status	Marked	Timestamp	Title	Description	Source endpoint	Destination endpoint
Active	False	2017-05-31 16:35:29.890	Call failed with status Decline	Source resource = RadLocal, target resource = wIFI	10.10.184.13.5060	10.10.184.3.5062
Active	False	2017-05-31 16:35:38.184	Call finalized with error. Cause = 2007, text = "Missing R25 KeepAlive"	Source resource = RadLocal, target resource = wIFI	10.10.184.13.5060	10.10.184.3.5062
Active	False	2017-05-31 16:35:38.211	Call finalized with error. Cause = 2007, text = "Missing R25 KeepAlive"	Source resource = RadLocal2, target resource = wIFI	10.30.184.13.5060	10.10.184.3.5062
Active	False	2017-05-31 16:35:41.624	Call finalized with error. Cause = 2007, text = "Missing R25 KeepAlive"	Source resource = RadLocal, target resource = wIFI	10.10.184.13.5060	10.10.184.3.5062
Active	False	2017-05-31 16:35:42.919	Call finalized with error. Cause = 2007, text = "Missing R25 KeepAlive"	Source resource = RadLocal2, target resource = wIFI	10.30.184.13.5060	10.10.184.3.5062

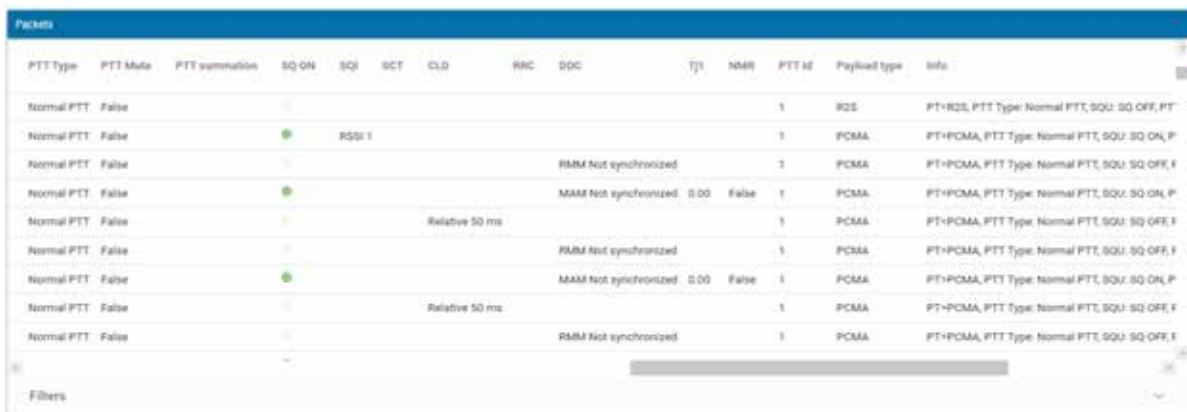
Alarms can be configured on the following parameters:

- MOS
- Delay
- Packet loss
- Duplicate packets
- Jitter
- Duration of a telephony session
- Duration of a radio session
- Duration of PTT
- Duration of SQ
- Simultaneous sessions
- Establishment/Termination of communications
- Simultaneous transmissions.



The **ATC PERFORMANCE MANAGER** monitors the BSS and CLIMAX behaviour of the radio equipment involved in the offset frequencies of a VCS. Up to 10 radios can be selected to be monitored.

The system detects high CLD values, which indicate that there is a problem and the delay is being excessive, generating the corresponding alarms. The system has access to the RMM/MAM protocol messaging and CLD sends from all the equipment involved in a frequency offset in order to analyse the behaviour of the systems and equipment; in addition to allowing the raw data to be analysed, the system extracts the most relevant information for the user.



The **ATC PERFORMANCE MANAGER** analyses the real-time behaviour of the radio transmitter and receiver sets (main and reserve) that are part of a frequency or of different frequencies. The status of each individual device is displayed with the radio parameters according to ED137:

- Session Type
- PTT
- SQ
- R2 period/multiplier
- Session Status
- PTT_Mute
- CLD
- RSSI



The **ATC PERFORMANCE MANAGER** allows easy analysis of PTT-SQ delays between the PTT_ON sent by a VCS and the PTT acknowledgement by the corresponding TX radio or gateway. It also allows SQ_ON carrier detection and acknowledgement.

For each frequency to be analysed, the equipment to be monitored can be configured, thus selecting the transmitters and receivers that conform to a frequency (Example: one transmitter and two receivers, one main and one backup, as both will send their SQ independently).

In addition, the application monitors the PTT OFF and the corresponding SQ OFF of the selected radio equipment, which is especially useful for calculating SQ queue delays that could cause annoying RTX loops.

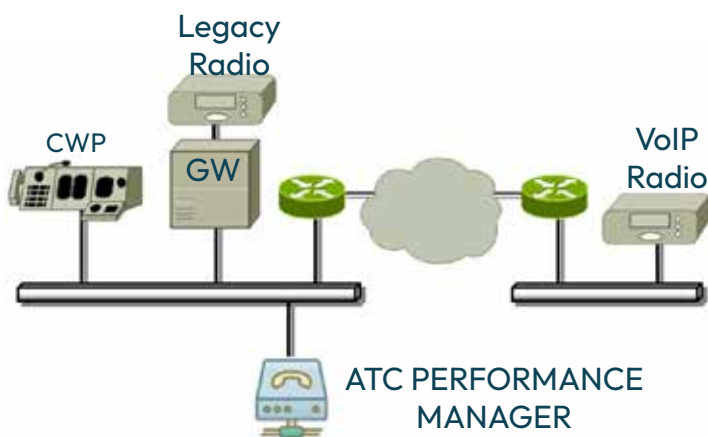
The application has the ability to generate a full monitoring report:

- PTT ON confirmation time
- Carrier return time
- PTT OFF confirmation time
- SQ OFF reception time from PTT OFF

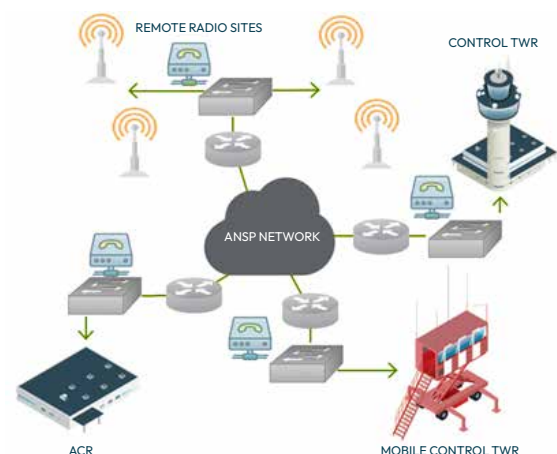
The **ATC PERFORMANCE MANAGER** is able to store in a database all the described information for later offline analysis and to export/import all or part of the information to another computer. It is also possible to analyse from PCAP files captured with another application.

Also allows the user to store all the information necessary to be able to carry out off-line exploitation of the alarms and data monitored by the ATC PERFORMANCE MANAGER, allowing the display of evolution graphs, tables of calculated values, call-flow and decoded messages.

The **ATC PERFORMANCE MANAGER** system is designed to work in local mode or distributed mode with the use of capture probes distributed over an ATC network.



ATC PERFORMANCE MANAGER Local Mode



ATC PERFORMANCE MANAGER Distributed Mode