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„modern engineering for modern design“

Our focus:

Long-term relationship

with our customers and partners!

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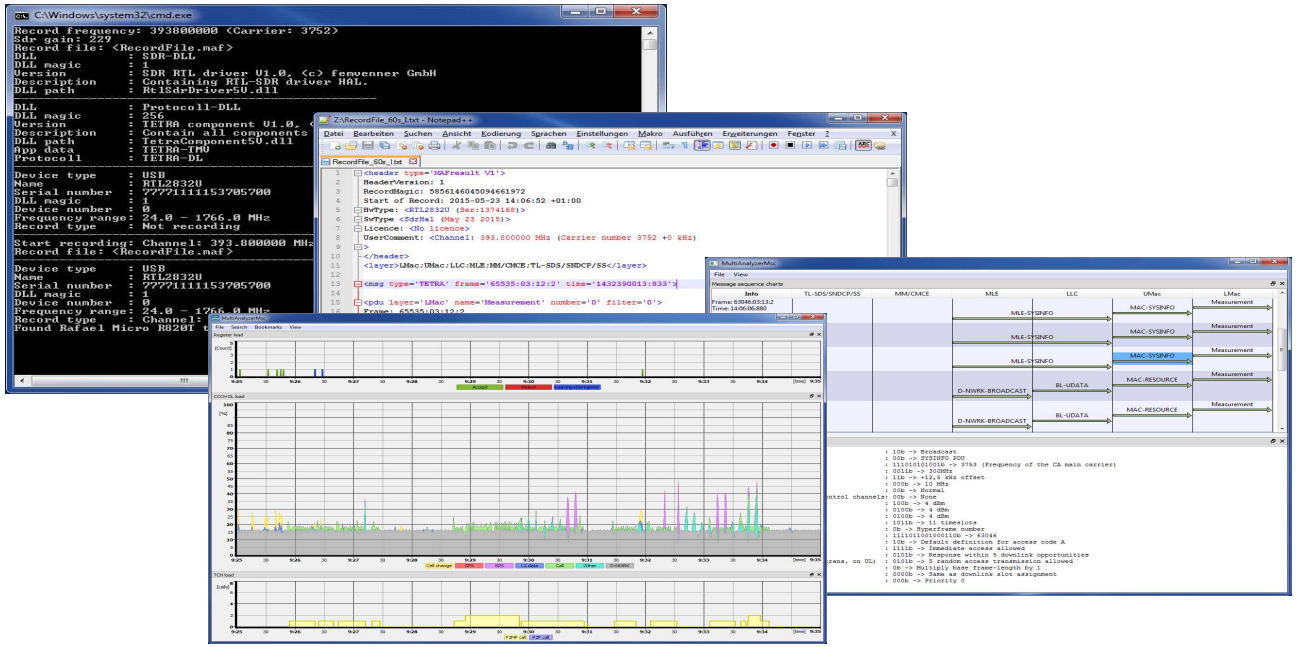
MultiAnalyzer Software MAS



Just a little bit more than analyzing...

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MultiAnalyzer Software

- Intuitive operated Software -

to record, monitor and analyse in real time

- TETRA ready (TS 100 392-2, SS, Encryption)
- DMO-TETRA ready (Gateway, Repeater)
- DMR ready (TIER I / II and III)
- TEDS on roadmap
- PDT on roadmap
- NXDN on roadmap
- P25 on roadmap

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Supported Hardware

- RTL2832U DVB-T stick (low cost solution)
- powerful **S**oftware **D**efined **R**adios like AirSpy's
- test receivers from renowned manufacturers
  - EM100 / PR100 from R&S®
  - ESMD from R&S®
  - gew SKY 7000i
  - Anritsu MS 2710x
- TCP/IP input for analyzing SwMI export

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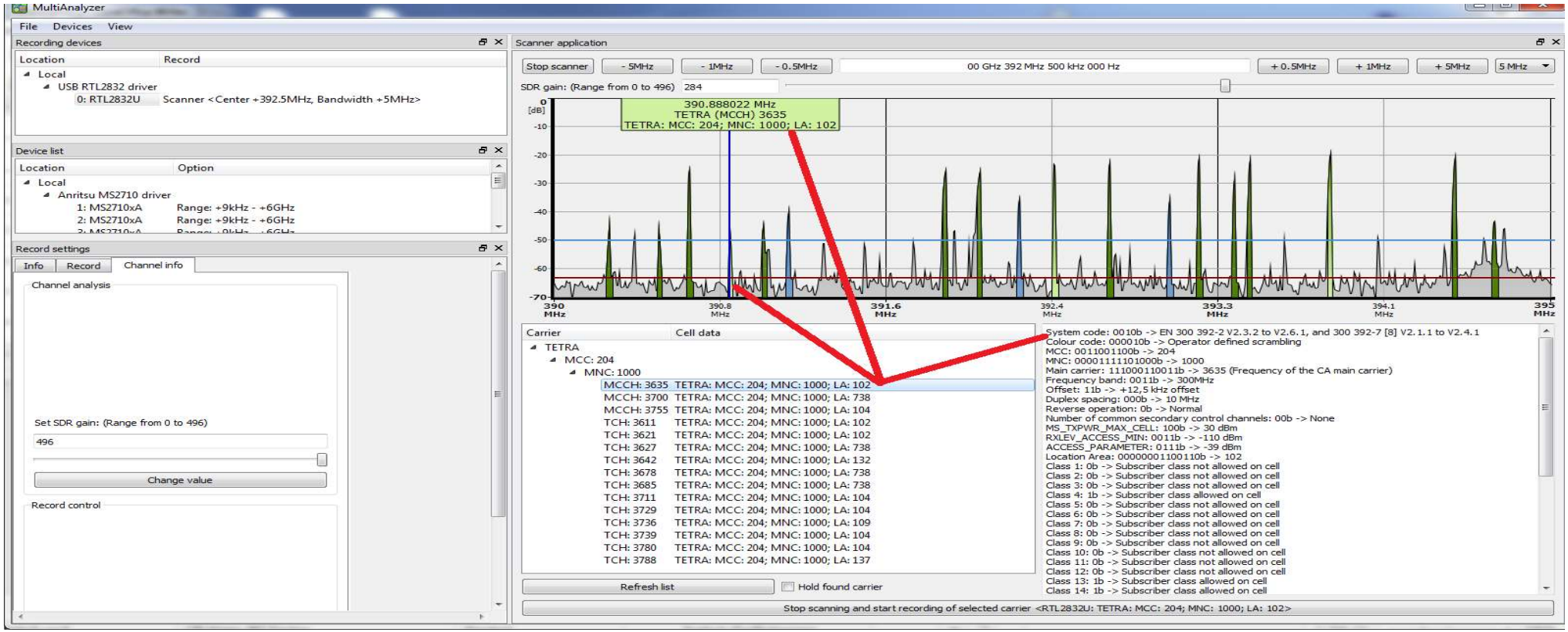
Scanner-Option

- shows directly all cell information and kind of channel -



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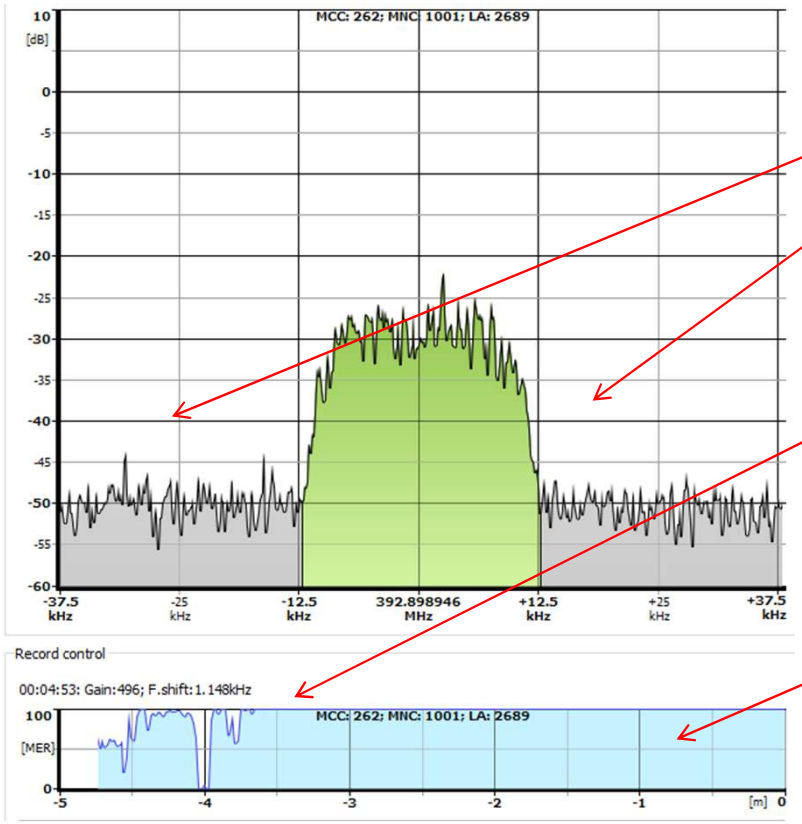
Measuring in real time



AC = adjacent channel

F.shift = frequency shift of receiver

MER = message erasure rate

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Presentation of the protocol

- MSC-View real time (message sequence charts)
  - Same as ETSI-Norm provide it
- details of the PDU will be show in text field
- Powerful filters suppress redundant information's
- search options allows to find errors, SSIs or protocol sequences
- Errors in PDU coding are highlighted in color
- Encryption of Class 2 (static) and Class 3 (dynamic) for TETRA
- Supported encryption algorithm TAA1; TEA1; TEA2; TEA3; TEA4

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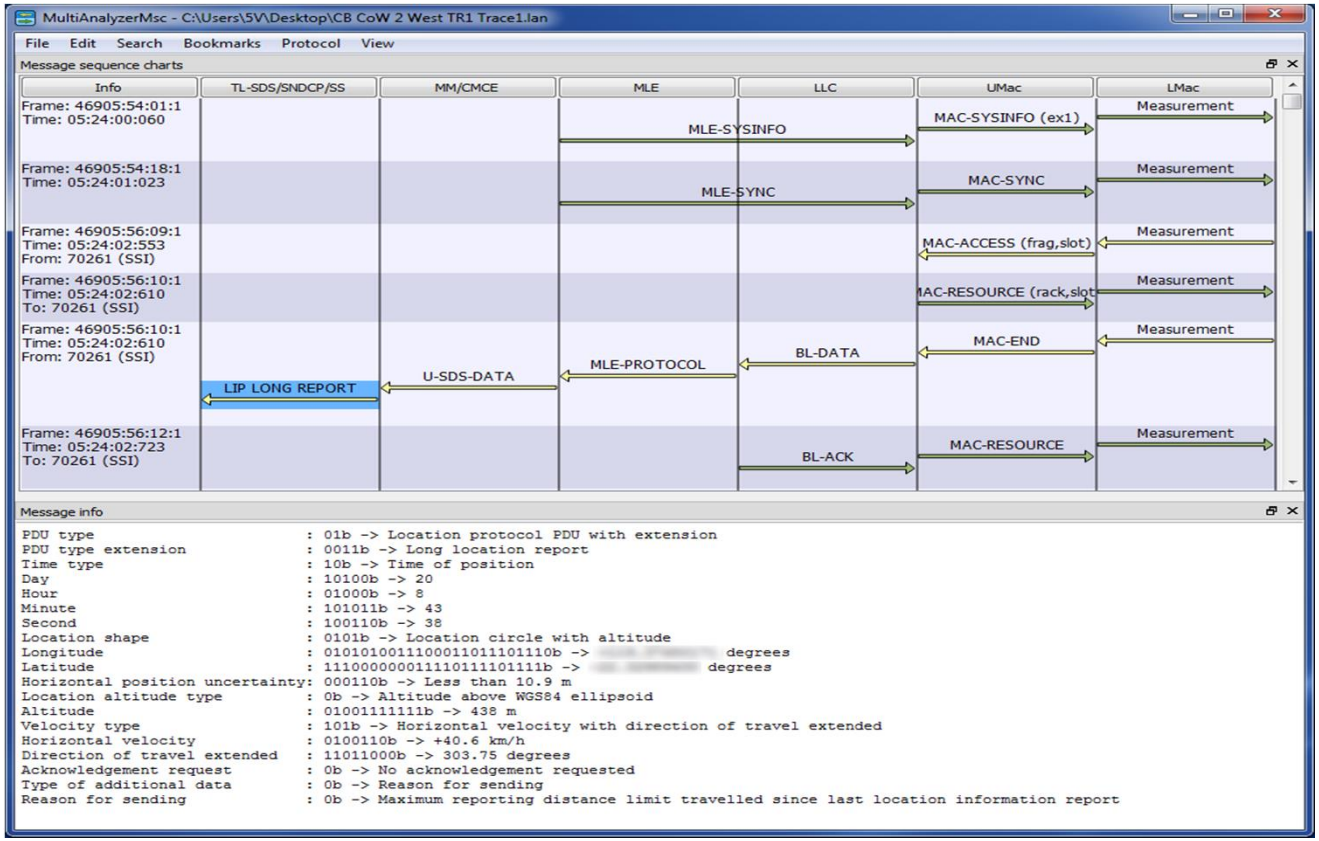
MSC-View



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QoS-Option

graphical view of the protocol

- customized view
- user could arrange own view for each PDU-type
- Identify which and how many radio does a cell reselection (incoming and leaving)
- detecting rejections and seesaw cell reselection
- group the signaling
- view the load of the control and assigned traffic channel
- find unexpected signaling and high load conditions,
- recognizes bottlenecks
- find weaknesses in the carrier planning.
- filter data for radio behavior
- and much more statistics views

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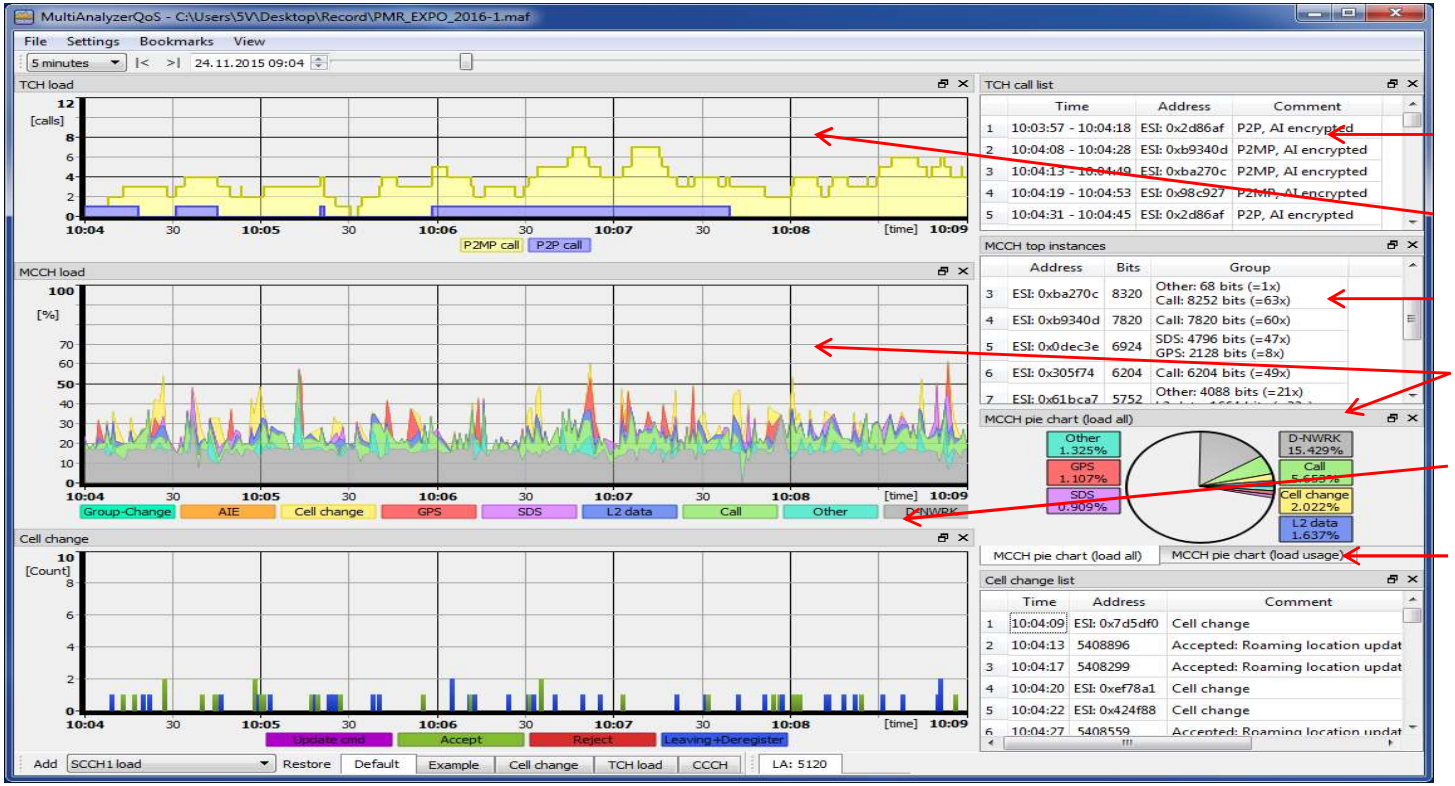
QoS-Option



User defined view

- TCH Call list
- TCH Load
- MCCH Top list
- MCCH Load
- Cell Change
- Cell Change list

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"User defined message bar"

The users could choose from all available messages (up to 10) and merge individual messages in one display.

- five independent displays as bar graph (message will be displayed over time)
- no limitation of the colour design
- five individual displays in the list form

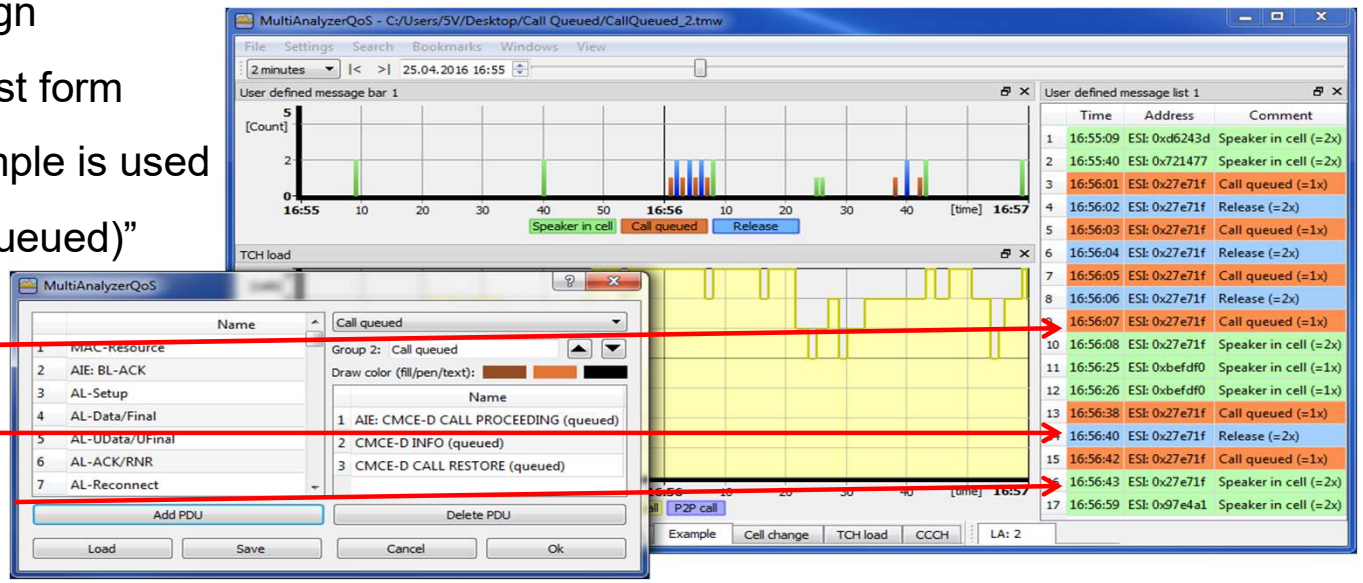
For illustration the following example is used

“calls appear in the queue (call queued)”

brown ➔ call get queued

blue ➔ call setup failed / release

green ➔ successful call set-up in cell



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Which data will be stored?

- record data are stored as maf-files (proprietary format low level data)
- all recorded information's are saved
- data could be reanalyzed and recreated (MSC and QoS-View)
- new versions with enhanced capabilities (as new statistic options, …)

  could also apply their new features on former recorded data
- a low amount of storage space is needed.
- no result files needed to be archived, the low level data file contains all needed information (TETRA needs less than 512kb per minute)

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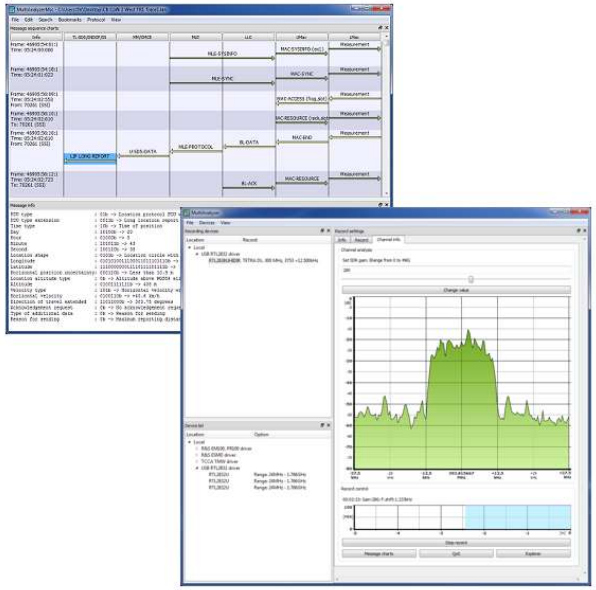
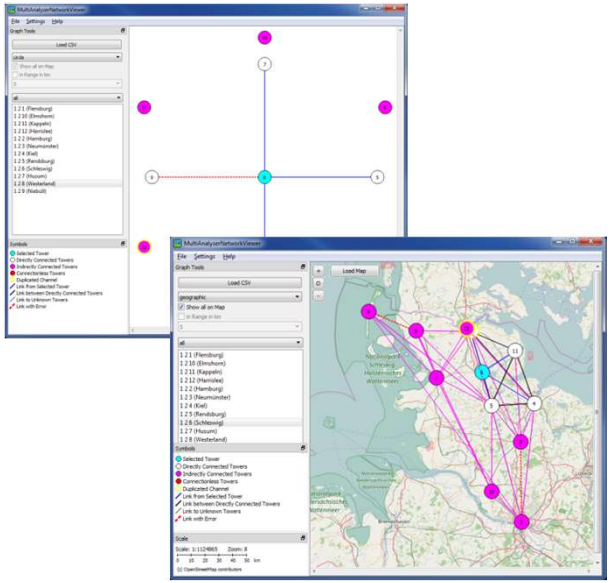
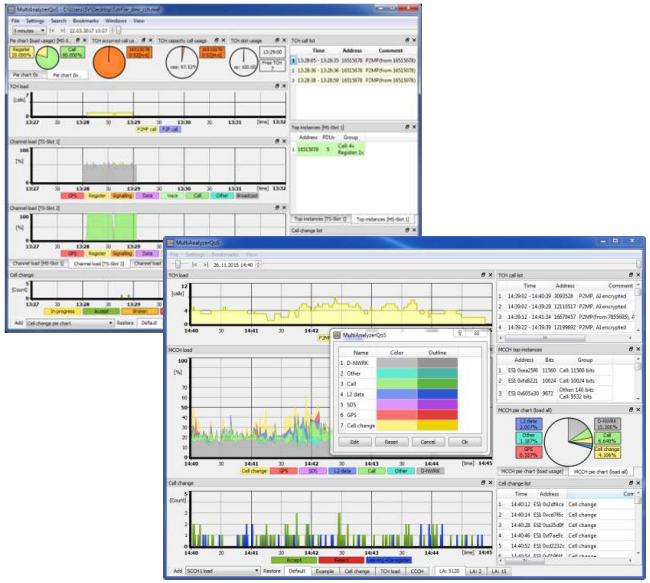
MAS 555 MultiAnalyzer Software

Protocol analysis software for digital PMR standards (TETRA/DMR)







Just a little bit more than analyzing...

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Advantages of modern real-time Monitoring

- Independence from the manufacturer
- data streaming in real time
- resolution of data streams secondly
- subsequent analysis of recorded data
- new measurement methods equally applicable to older records
- tamper-proof archiving

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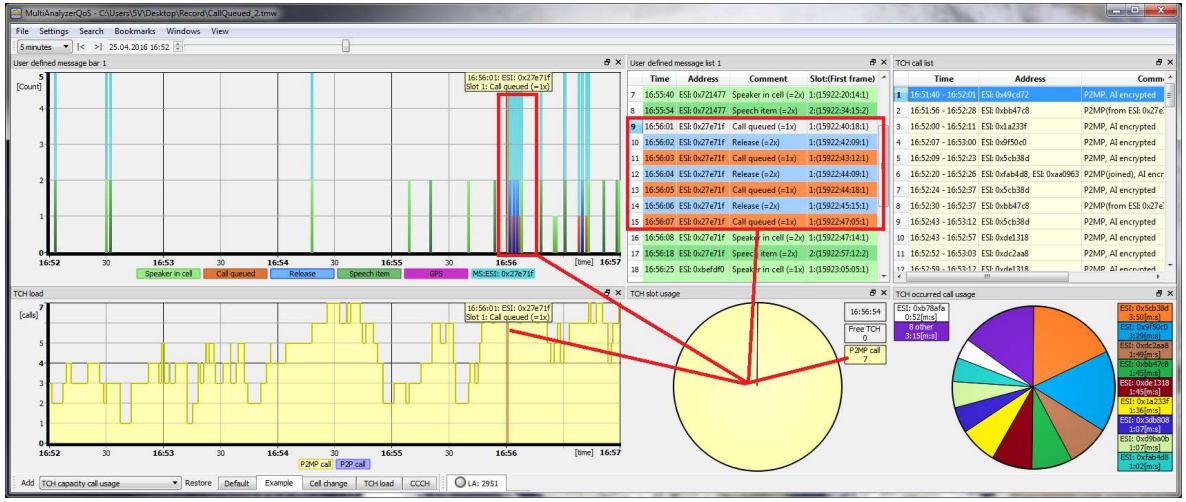
Control of TCH-Load

- ISSUES -



fast detecting with MAS:

- Involvement of third parties
- Point to point calls
- Call queue delays
- Utilization of group calls

Active and effective counter-control by MAS:

Optimization of the TCH load during an “operation” ➔ meaningful use of resources!

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Identification of data applications

- problem is the increasing of the load-

Data applications (SDS) lead to increased the load

The display of the MCCH load helps to identify the causative participants (e.g., non-wired dispatchers)

radio-bound dispatcher can be rebooked example-wise in a less critical and underutilized cell

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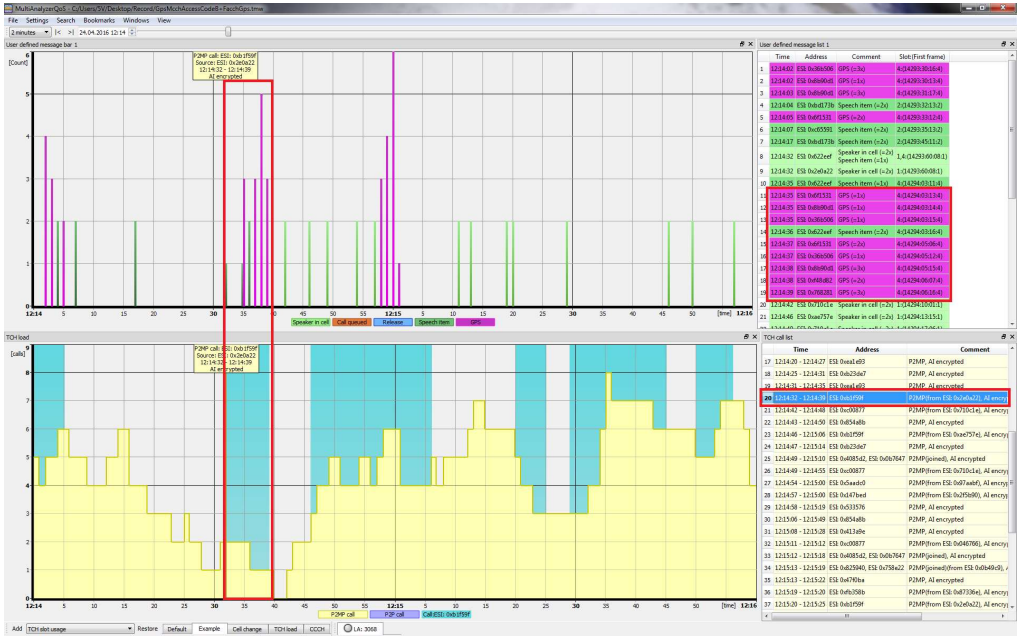
Identification of GPS-Messages during a call

- critical issue „less voice quality“ -



GPS messages can lead to a deterioration in voice quality or to a delayed resumption of voice during a call

identification of calls with GPS data ➔ mobiles are recognizable and their subscriber numbers are displayed in the MAS

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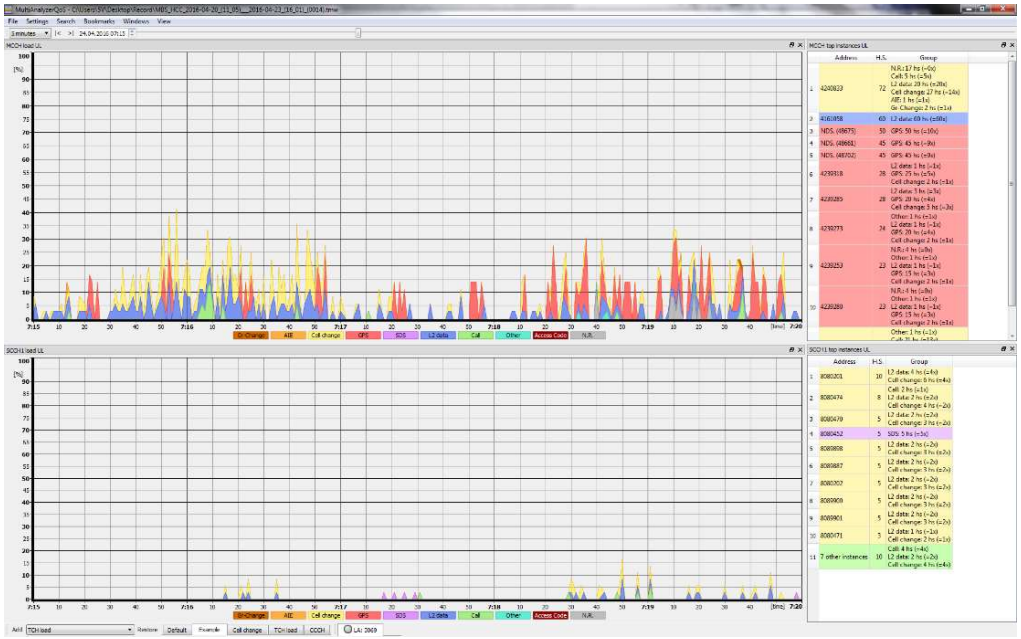
Identification unsymmetrical load

- successful use of SCCH -



To use the SCCH, the terminals must be configured accordingly.

If, for example, locals / non-organizing forces are involved in a situation, an unbalanced load occurs in the event of a lack of clearance.

With the MultiAnalyzer software it is possible to easily identify these forces and to use the resources more effectively.

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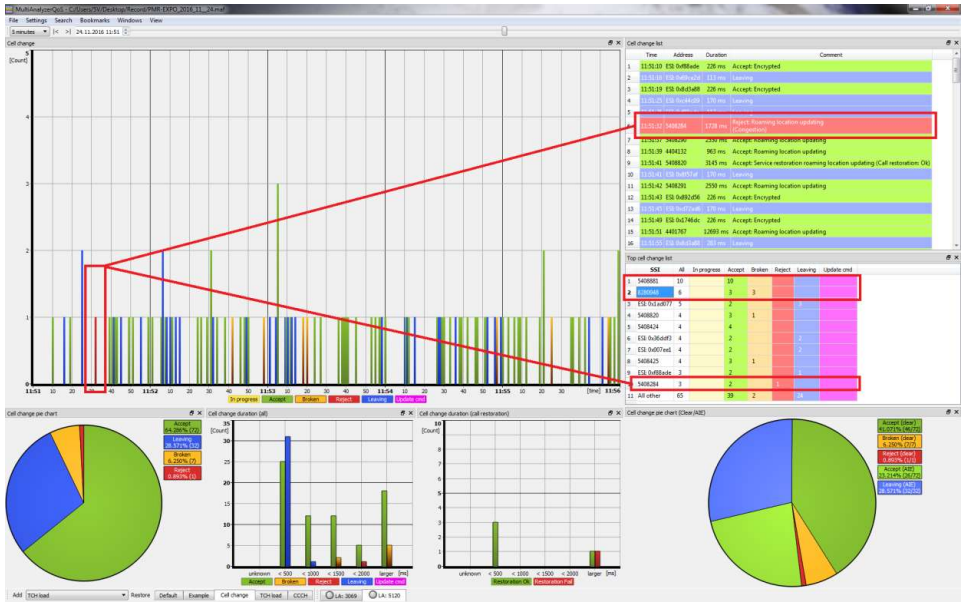
Monitoring of cell changes

- MCCH load and poor voice quality -



The behavior of the terminal devices during the cell change affects the load on the control channels, correspondingly it is important to consider this more precisely.
If there is an accumulation of cell changes of single or several devices, there will be an increase in the load and a marked deterioration in service quality

critical

- long cell change times ➔ no service

Voice calls can not be established ➔ audible gaps in voice transmission

The times for the cell change are collected during a recording and archived with the MultiAnalyzer, as opposed to a preparatory measurement with a DriveTest solution!

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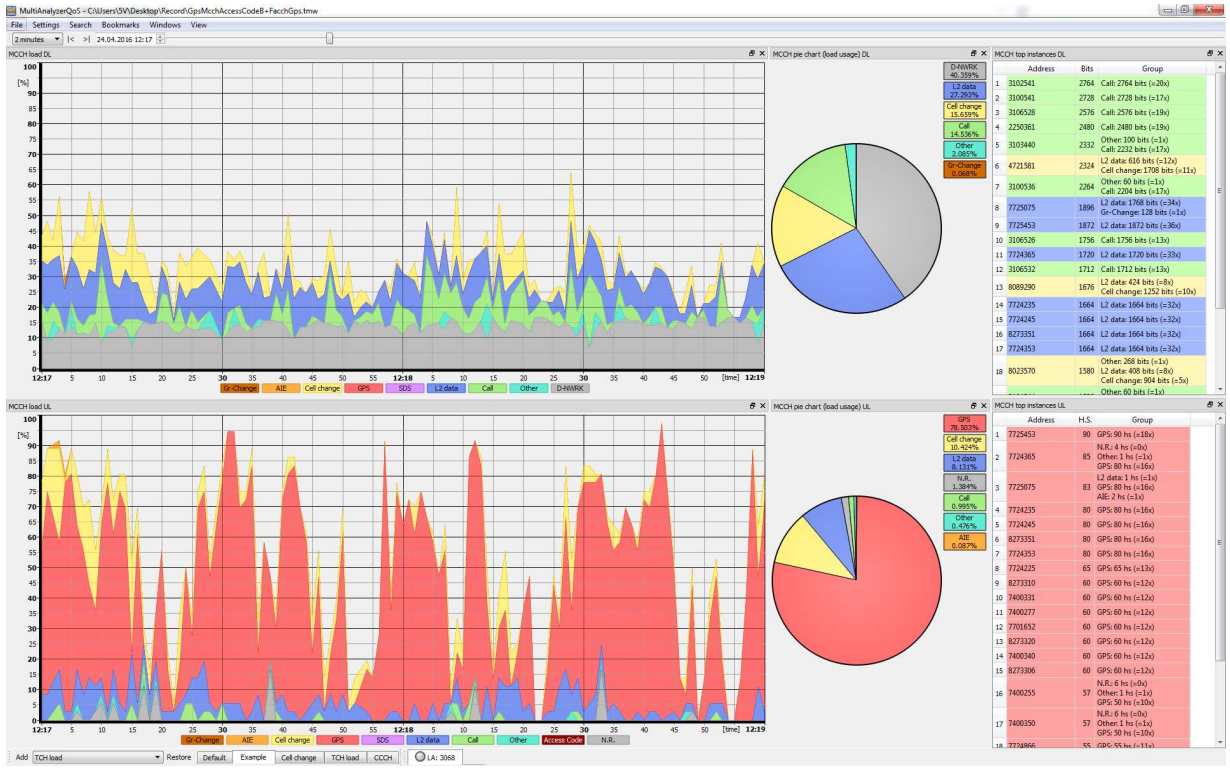
Identification of the load type



Simple, fast and efficient identification of the cause of load on the control channels, as well as the determination of the load types (GPS, cell exchange)

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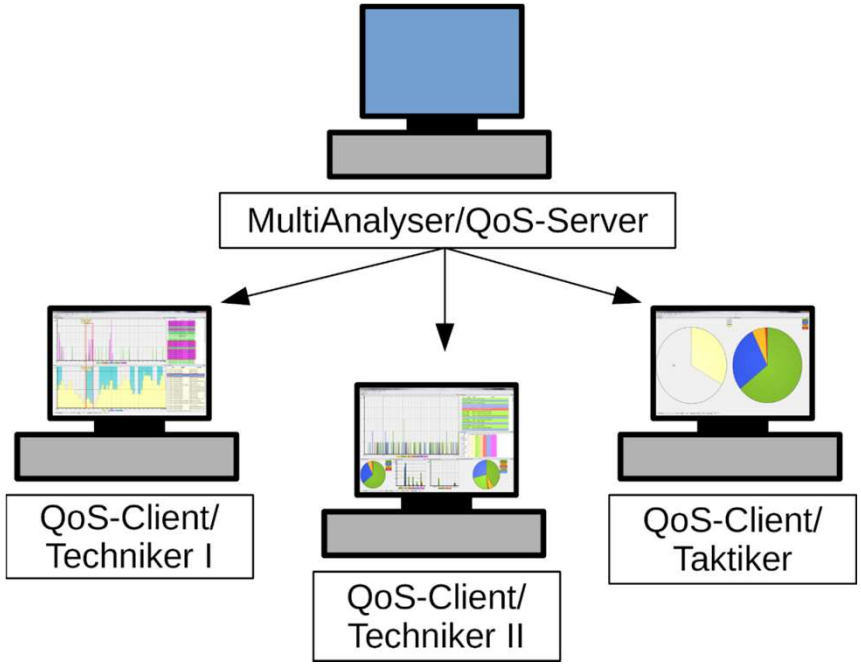
individual QoS-Streaming



The QoS streaming option allows arbitrary views (layouts) which can be configured differently for the addressees.

For example, for a tactical employee, a layout is available, which allows a quick overview and for a technician, one with specialized displays for details.

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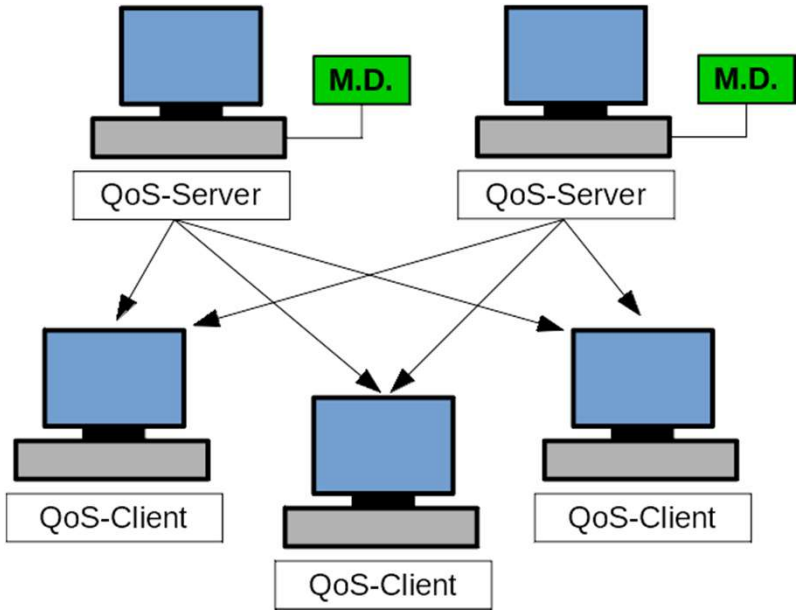
Operation of remote instances of the MAS



- Distributed recording at different locations
- Analysis at different workstations

M.D. = MAS-Decryptor-Box

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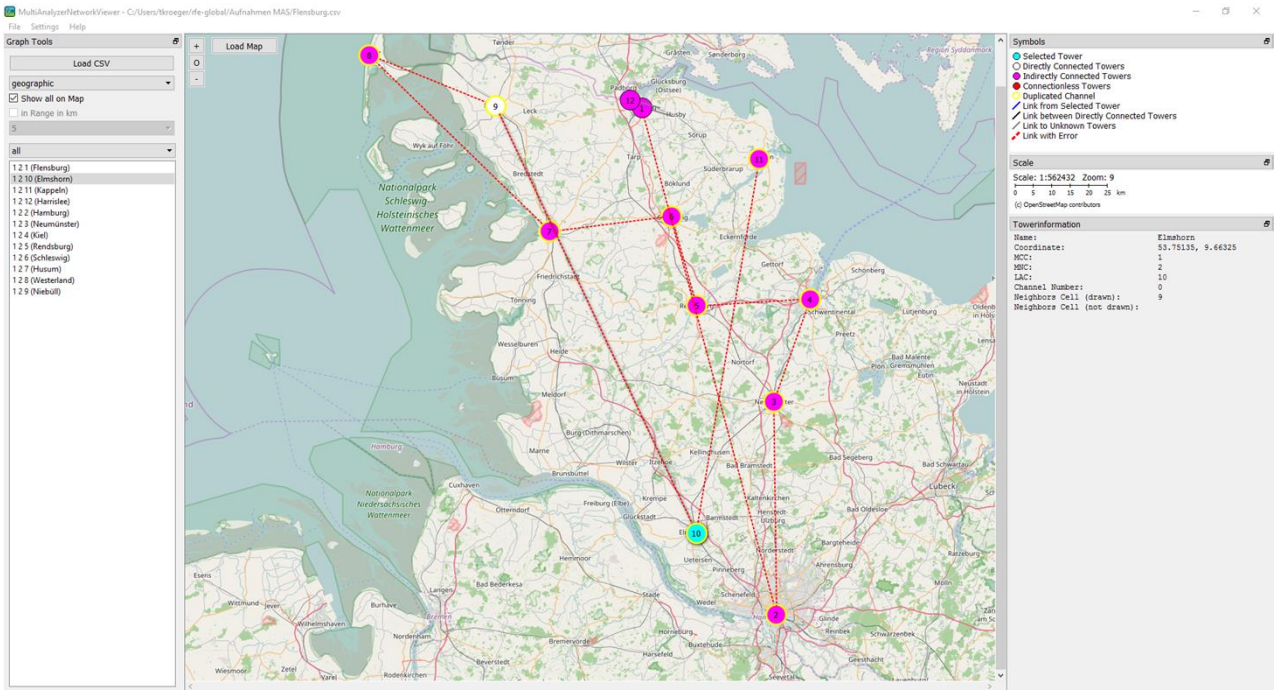
NetworkAnalyzer (geographic-Mode)



Detailed target / actual analysis based on measured data from the real-time operation

Display of problems, e.g. Doubled supply frequencies

Verification of registered neighborhood relations

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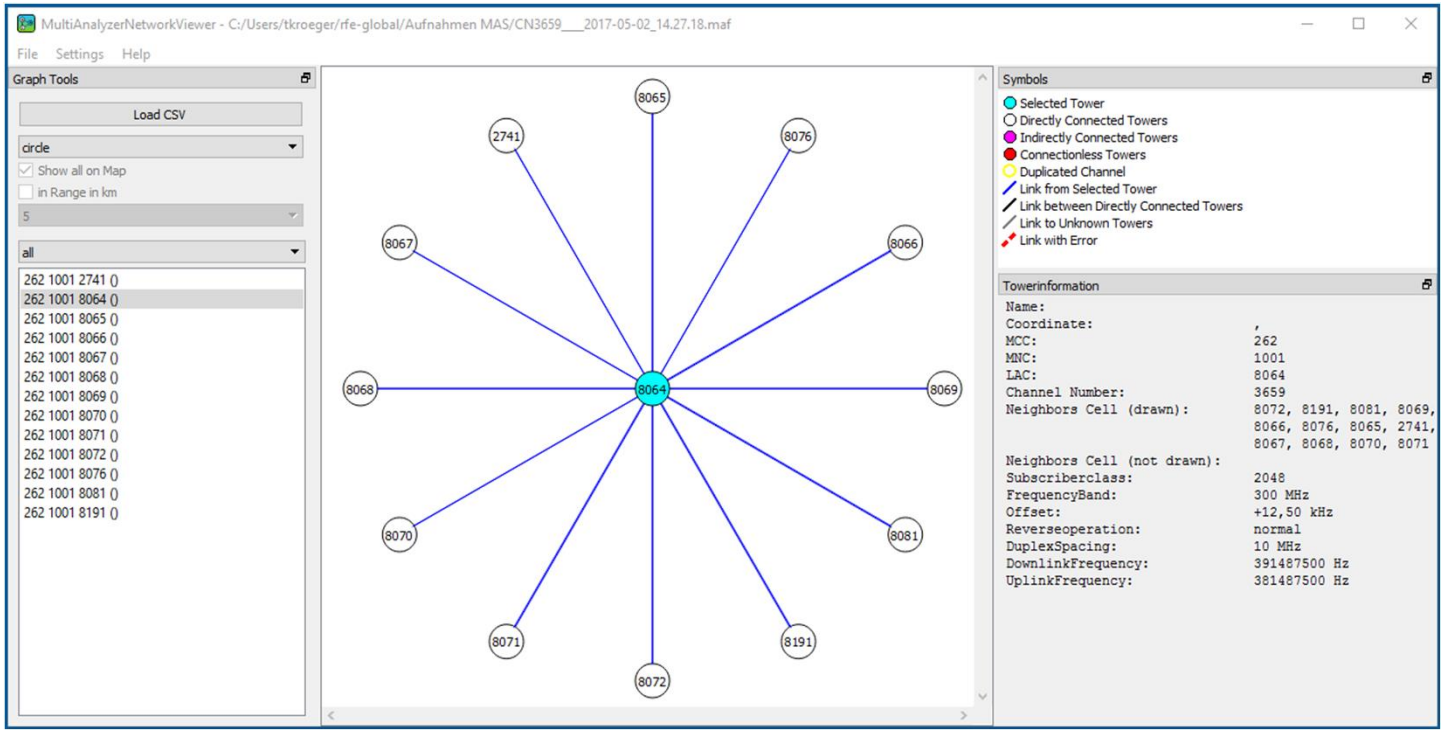
NetworkAnalyzer (circle-Mode)



abstract display of neighborhood (neighbor cell) relations

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MAS-DECRYPTOR

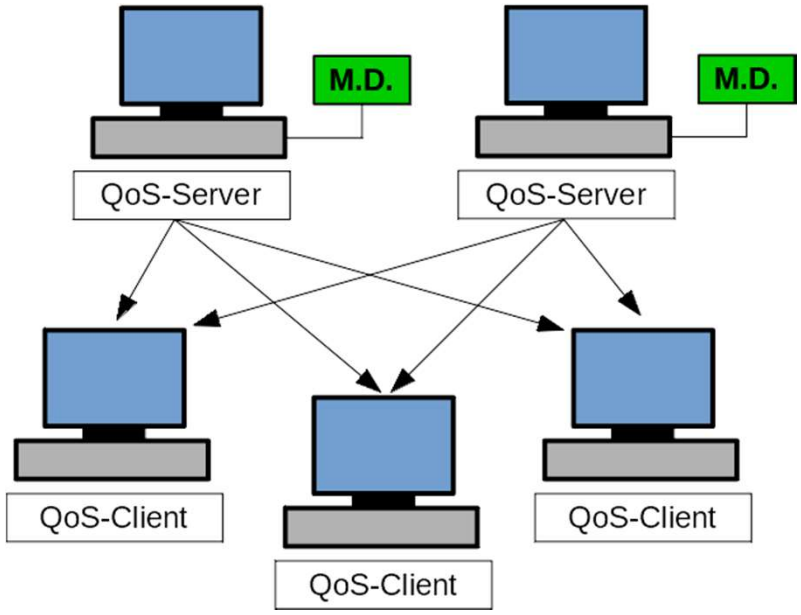
QoS-Streaming-Data

QoS-Server will stream the data (TETRA-AIE) decrypted so each remote streaming server needs a MASDecryptor

- used program:

  "MultiAnalyzerQoS.exe"

- used dongle : green and black.



M.D. = MASDecryptor

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MAS-DECRYPTOR

- DCK-Keyserver

If DCK keys are be shared during a recording, each remote key server needs a MAS-Decryptor-Box.

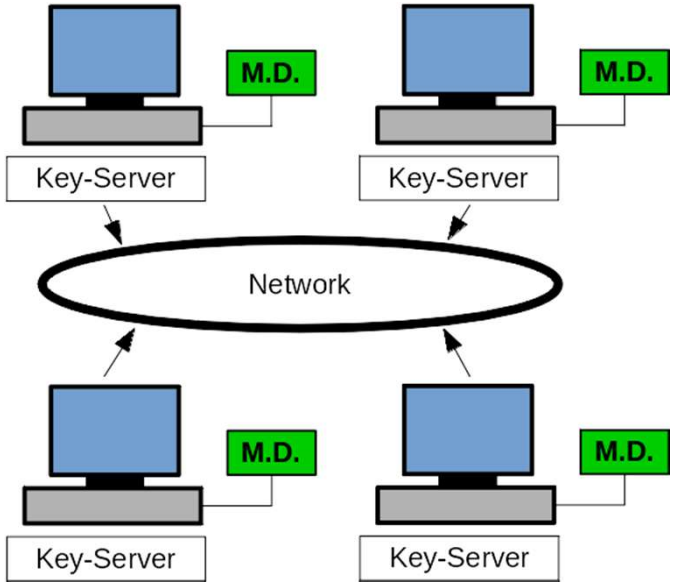
The recording GUI "MultiAnalyzer.exe“ (also used for Key-Server-application) keeps the connection with other servers on the network and the programs which are running locally on the same PC (MultiAnalyzerMsc.exe, MultiAnalyzerQosServer.exe and MultiAnalyzerQoS.exe).

These locally programs receive or request data from the key server. At the same time, these programs can also use the locally connected **MASDecryptor**.

– used programs are:

"MultiAnalyzer.exe"

– used dongle : green, violet and black



M.D. = MASDecryptor

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usage by Police force of Rheinland-Pfalz

Demonstrationen gegen Tagung der ENF in Koblenz – auch für den Digitalfunk ein großer Einsatz

Bis zu 5000 Demonstranten, 1000 Tagungsteilnehmer und daraus resultierend 850 Polizisten im Einsatz, die alle den Digitalfunknetz nutzen. Soviel war klar: Dieser Einsatz war auch für die Autorisierte Stelle Digitalfunk BOS Rheinland-Pfalz (AS RP) nicht alltäglich.

MultiAnalyzer im Einsatz

Ein wichtiges Instrument zur Analyse des Funks war hierbei der sogenannte „MultiAnalyzer", eine Software, mit der die Auslastung und der Funkverkehr der zugeschalteten Basisstationen überwacht wurde. Auf zwei großen Bildschirmen wurde die Netzauslastung graphisch und übersichtlich dargestellt, so dass die Mitarbeiterinnen und Mitarbeiter der AS RP jederzeit den genauen Überblick hatten. Das Analysetool zeigte dabei, dass höchstens die Hälfte der Auslastung der Funkzellen erreicht wurde. Es standen also jederzeit noch genug Reserven zur Verfügung.

Durch die Funküberwachung konnte die AS RP mögliche Störungen, Netzüberlastungen oder sonstige Ereignisse, die den Funkbetrieb hätten beeinträchtigen können, frühzeitig erkennen und – falls notwendig – Gegenmaßnahmen einleiten. Hätte sich zum Beispiel gezeigt, dass einzelne Gesprächsgruppen zu stark ausgelastet gewesen wären, hätten die Mitarbeiter der AS RP direkt eingreifen können, um die Belastung des Digitalfunknetzes zu reduzieren.

Mitarbeiter der AS im Einsatz in den Räumen der Feuerwehr- und Katastrophenschutzschule in Koblenz-Asterstein.

Quelle: https://digitalfunk.rlp.de/de/archiv/detail/news/detail/News/demonstrationen-gegen-tagung-der-enf-in-koblenz-auch-fuer-den-digitalfunk-ein-grosser-einsatz/

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