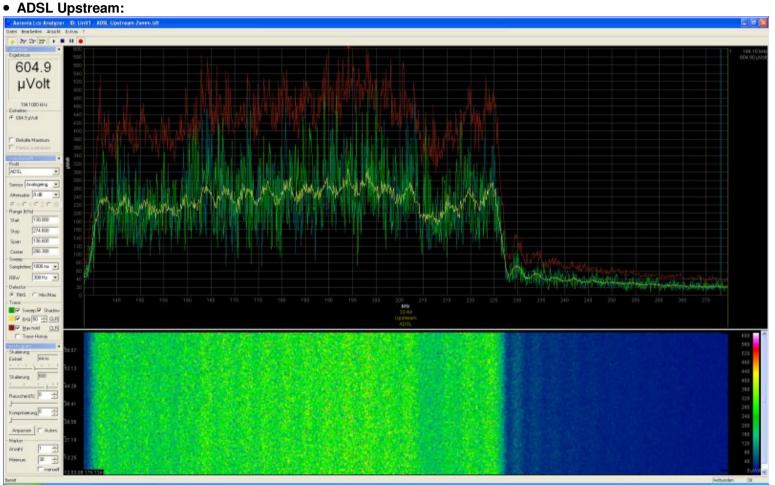
### PROFESSIONAL spectrum analyzer software for all SPECTRAN EMC handheld measurement devices

A MUST-HAVE for any professional: The high-quality analysis software for SPECTRAN. Included for free (downloadable over the internet). Also available as ENGLISH version on our DOWNLOAD area!

## SCREENSHOTS:



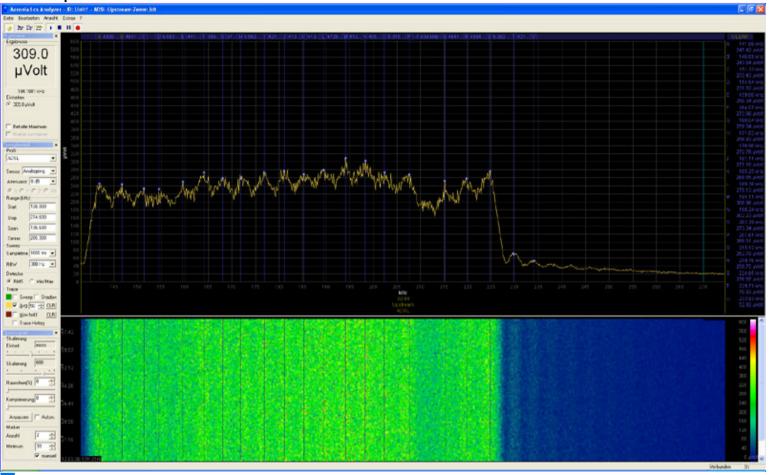
#### + Zoom Picture

## Does YOUR Spectrum-Analyzer offer THIS too?

Measured with our active Differentiel Probe and a SPECTRAN NF-50xx unit with DDC (option 005). Super high resolution of a ADSL upstream. Showing Sweep, Shadow, AVG and HOLD at the same time.

ADOI 11.......

#### • AUSL Upstream:



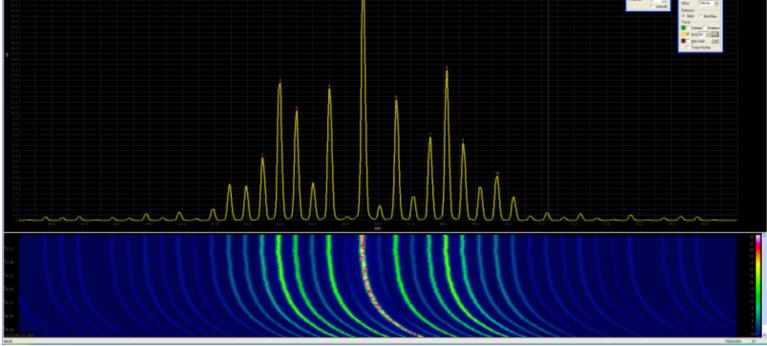
#### + Zoom Picture

#### Does YOUR Spectrum-Analyzer offer THIS too?

Measured with our active Differentiel Probe and a SPECTRAN NF-50xx unit with DDC (option 005). Super high resolution of a ADSL Upstream (AVG-Display). Free number of manual marker can be set.

#### • Magnetic field of switching power supply (Spread Spectrum) while "heating up":

* Association (as Assigned - Booting on Switching) was deployed.		() ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (
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• X27 + • • •		
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#### + Zoom Picture

#### Does YOUR Spectrum-Analyzer offer THIS too?

Measured with the internal sensor coil (standard) of a SPECTRAN NF-50xx unit with DDC (option 005). Ultra high resolution of the "heating up" period of a switching power supply (AVG-Display). Quadratic mean of measurement results of the 10 auto-marker.

## **USER INSTRUCTIONS:**

• After launching the SPECTRAN spectrum analyser software "LCS", among other things, the following window appears:



• Connect the SPECTRAN to your PC and turn it on. Now click on the "Ray" symbol to establish the connection to SPECTRAN:

4

• After correct connection the Symbol Bar will show the following:

```
Aaronia Los Analyzer - ID: Unit1
```



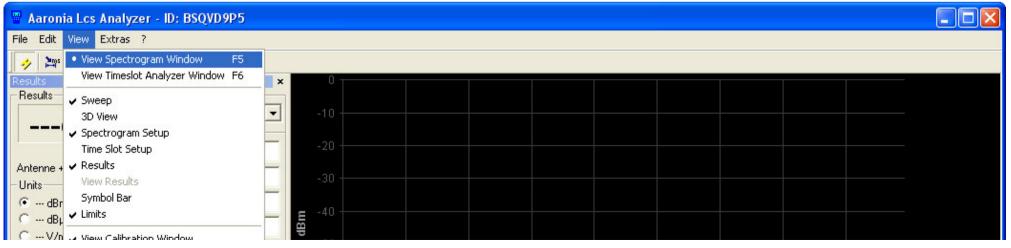
• With the current software, the following functions can already be performed:

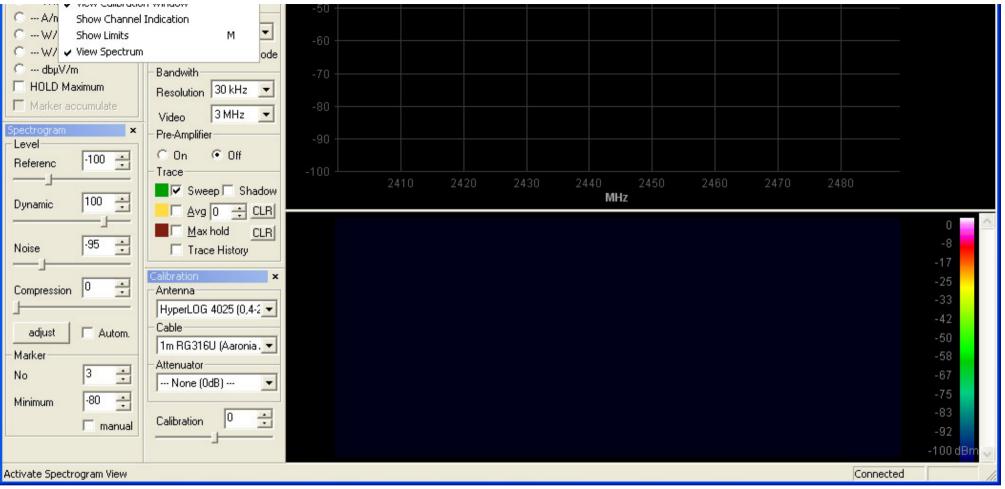
# 1.) HIGH RESOLUTION spectrum display with "Spectrogram" display and CHANNEL LIST display:

• Activate "View Spectrogram Window" in the "View" menu (or press the F5 key):

📱 Aaronia Lcs Analyzer - ID: BSQVD9P5				
File Edit	View Extras ?			
🤣 🎦	View Spectrogram Window F5			
Results	View Timeslot Analyzer Window F6			
-Results-	✓ Sweep			
	3D View ✔ Spectrogram Setup Time Slot Setup			
Antenne +	✓ Results			
-Units	View Results			
• dBr				
🔘 dBµ	✓ Limits			
○ V/n	<ul> <li>View Calibration Window</li> </ul>			
🔘 A/n	Show Channel Indication			
0 W/	Show Limits M			
© W/	✓ View Spectrum			

• After that, a complex Design of new Functions appears, as: (If the windows are placed "wrong", just start the Software with holded STRNG-Button.)





• Using the left-hand menu "Scan range", you can now adjust all parameters and control SPECTRAN remotely! After doing all desired adjustments, just click on the "Upload-Button":

**M**ms

• On the other hand, you can also download all parameters from SPECTRAN to your PC. For example, press "Hotkey 7" (GSM900) on your SPECTRAN. All relevant settings & parameters can now be downloaded to the PC using the "Download-Button":

k?ms ₩

R

• The easiest way to communicate is to activate" Always send Parameter immediately to unit". All settings & parameters will now directly be send to the SPECTRAN.

This Function is automatically set "on":

L\_\_\_\_\_

• Like with a video cassette recorder, you can start (PLAY-Button), stop (STOP-button), suspend (PAUSE-button) the sweep mode or start a record (Record-Function / red Dot):



• In the "Sweep Area" window, you can adjust the most important parameters. You can also select from a list of PRESETS (profiles) for UMTS, DECT, WLan, mobile phones etc. etc.:

	Sweep 🛛
Sweep 🔀	Profil
– Profil	ADSL 💌
WLANg 2,4GHz 🛛 💌	Sensor Magnetic Fiel 💌
– Range (MHz)	
Start 2399.500	Attenuator 0 dB 💌
Stop 2489.500	© X C Y C Z C 3D
00.000	– Range (kHz)
Span	Start 138
Center 2444.500	Stop 1104
- Sweep	Span 966
Sampletime 5000 ms <u>→</u> □ PEP ▼ Pulsemode	Center 621
- Bandwith	- Sweep
Resolution 3 MHz 💌	Sampletime 50 ms 💌
Video 3 MHz 💌	RB₩ 3 kHz 💌
- Pre-Amplifier	- Detector
⊂ On ⊛ Off	💿 RMS 🗢 Min/Max
- Trace	- Trace
📕 🔽 Sweep 🗔 Shadow	📕 🔽 Sweep 🗔 Shadow
📕 🗛 🛛 🕂 CLR	📕 🗌 🗛 🛛 🕂 CLR
Max hold CLR	Max hold CLR
Trace History	Trace History

## Profil-menu:

Select the desired profile (for example DECT)

Radio und T	V			>
TETRA				
UMTS (D)			_	

UMTS Downlink FDD [	
UMTS Uplink FDD (D)	
WIMAX WLAN 2.4	
WLAN 5.15	
WLAN 5.25	_
WLAN 5.47	=
WLAN 5.725	=
WLAN 5xxx	-
WLAN Total	≤,

Sensor = Choose Sensor of NF-SPECTRAN [Magnetic Field, E-Field, Stat.Magnet., Analoginput.] Attenuator = Choose Attenuator of NF-SPECTRAN [Auto, 0dB, 10dB, 20dB, 30dB, 40dB] X = Choose X-Axis of NF-Magnetic Field Sensor Y = Choose Y-Axis of NF-Magnetic Field Sensor Z = Choose Z-Axis of NF-Magnetic Field Sensor 3D = Activate Isotrop (3D) Measuring of NF-Magnetic Field Sensor

#### Range-menu (HF):

Start = START-Frequency [MHz] Stop = STOP-Frequency [MHz) Span = FREQUENCY span (Start to Stop) [MHz] Center = CENTER-Frequency [MHz]

Range-menu (NF): Start = START-Frequency [kHz] Stop = STOP-Frequency [kHz) Span = FREQUENCY span (Start to Stop) [kHz] Center = CENTER-Frequency [kHz]

#### Sweep-menu: (HF)

Sampletime = SAMPLETIME (1mS to 10000mS) [mS]. A Sampletime lower than 100mS is only usable with the SPECTRANV4. PEP = Peak Envelope Power Measuring (as long as saved in Profil), otherwise the Measurement will be in RMS. Pulsmode = PULSMODE [ON/OFF]

Sweep-menu: (NF) Sampletime = SAMPLETIME (50mS to 10000mS) [mS]. RBW = FilterBandwith (RBW).

Bandwith-menu: Resolution = FilterBandwith (RBW) Video = Videofilter (VBW)

**Pre-Ampliefier:** Turn ON/OFF the optional Pre-Amplifier of the Spectran4

Detector-menu:

Choose between RIVIS and Min/Max

#### Trace-menu:

Sweep = Show regular Sweep Shadow = Activate Sweepshadow Avg = Activate Average. Aside: Choose number of Sweeps, wich should be used (1-100). Aside (CLR): Delete Avg Cache. Max hold = Activate HOLD Function. Aside (CLR): Reset HOLD-View. Trace History = Any areas in the Spectrogram could be viewed again by moving the mouse over the Spectrogram. By holding the left mouse button, any areas could be marked. (AVG or Max Hold).

• In the "Spectrogram" window you can change any setting and scale of the Spectrum- and Spectrogram-View:

Spectrogram	×	Spectrogram	×
Level	100 ÷	- Scale Unit	femto
Dynamic		Scale	50
Noise	·95 ÷	Noise(%)	0 .
Compression	0 ÷	Compression	
adjust	C Autom.	adjust	🗖 Autom.
-Marker No	3 .	-Marker No	3 .
Minimum	80	Minimum	30 🛨
	manual		manual

#### Level-menu (HF):

Reference = Adjust Reference level (lowest level, where anything should be displayed) [dBm]

Dynamic = Adjust Dynamic (dB over Reference level) [dB]

Noise = Adjust Noise level (All lower level will not be displayed) [dBm]

Compression = Continuous compression of the Spectrogram from 1:1 to 1:40. Allows a quick overview of mounts of datas [whole number]

#### Scale-menu (NF):

Unit = Fix the unit, wich will be used for the Scale of the Spectrum [femto, pico, nano, micro, milli, 1:1, kilo] Scale = Adjust Dynamic. Highest value, wich should be viewed [1 - 1000 bzw. LG10, LG100, LG1000] Noise = Adjust Noise level (All lower level will NOT be displayed) [%] Compression = Continous compression of the Spectrogram from 1:1 to 1:40. Allows a guick overview of mounts of datas [whole number] Adjust = Allows a quick and optimal scale of the Spectrum- and Spectrogram-View per mouse click. Autom. = Constant and ideal Scale of the Spectrum- and Spectrogram View.

#### Marker-menu (HF):

No. = Change number of Markers. Possible are 1-10 Marker. Minimum = Level, from which on the marker will be showed [dBm]. Level-Resolution: 1dB.

#### Marker-menu (NF):

No = Change number of Markers. Possible are 1-10 Marker.

Minimum = PERCENTAGE (Relation between bottom edge and top edge of the screen), from which on the marker will be showed [%]. Resolution: 1%.

• In the "Calibration" window, you can perform a highly precise calibration of the entire measurement subsystem:

Calibration 🛛 🔀
Antenna
HyperLOG 4025 (0,4-2, 💌
- Cable
1m RG316U (Aaronia A 💌
- Attenuator
None (0dB) 💌
Calibration 0 🛨

• "Antenna" = Here you can select EXTREMELY PRECISE calibration data of various antennas (exact to 10MHz!). The corresponding entries for our HyperLOG antennas are included.

By selecting "None (0dBi)", no antenna is being chosen.

• "Cable" = Here, EXTREMELY PRECISE calibration data of a wide variety of cables can be selected. The matching entry for our included 1m RG316U cables is available as a preset.

By selecting "None (0dB)", no cable is being chosen.

- "Attenuator" = Here you can select EXTREMELY PRECISE calibration data of a wide variety of attenuators. ATTENTION: This function is ONLY applicable to the HF-6080! The matching entry for our 20dB attenuator is already included. By selecting "None (0dB)", no attenuator is being chosen.
- "Calibration" (OFFEST) = Here you can perform a MANUAL PRECISION CALIBRATION using a slider or direct numeric entry. A really nice function, as this way precision is adjustable in 0,1dB steps! Hence, you can, for example, "normalize" the readings of SPECTRAN as close as 0,1dB to the readings of foreign units. Another use of this function would be to do a HIGHLY EXACT calibration of your SPECTRAN including the used cables, in the desired frequency range, using an external signal generator! As a precaution, the current setting is continuously being displayed in the spectrum window.

• In the "Exposure limits" window, you can choose from a variety of complex authoritative exposure limits and perform a wide range of special displays and calculations:

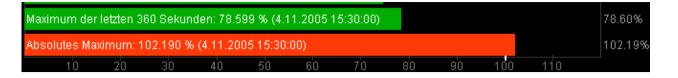
Limits 🛛 🔀		
Standard Limits		
ICNIRP 26.BlmSchV 💌		
🔽 Average		
🔽 Average Maximum		
Local Maximum		
🔽 Absolute Maximum		
Limit 100 %		
Period (s) 360 🔹		
Linear (%)		
Logarithmic 0 +		
Reset Datas		

- "Standard Limits" = Here you can choose among different exposure limits. After you made your selection, the current reading is being displayed as a green bar with percentage. Upon exceeding the limit, the bar becomes red. Additionally, you can display up to 4 further bargraphs:
- "Average" = Displays the current average (over the exposure time).
- "Average Maximum" = Displays the highest average maximum (over the exposure time) that has ever occured.
- "Local Maximum" = Displays the current maximum over the exposure time.
- "Absolute Maximum" = Displays the highest reading that ever occured.
- "Limit" = Informational field. Displays the selected exposure limit and its unit.
- "Period" = Here you can adjust the timespan used for the functions "Average", "Average maximum" and "Local maximum" via slider or direct input.
- "Linear" = Here you can change the scaling of the exposure limit display. Very helpful with "overflowing" or "hardly changing" exposure limit readings.
- "Logarithmic" = Here you can change the "dynamics" of the exposure limit display. Especially helpful for getting "sudden peaks" or "very low rates of change" under control.
- "Reset Datas" = Resets all bargraphs. All exposure limit calculations are restarted.

"LCS" offers infinite possibilities for calculating and displaying exposure limits. Here are two examples:

Authoritative exposure limit calculation according to ICNIRP (as percentages):

ICNIRP bzw. 26.BImSchV Grenzwert (Staatlicher Grenzwert Deutschland) für die Bevölkerung = ICNIRP-Formel	
Aktuell: 31.359 % (4.11.2005 15:35:56)	31.36%
Durchschnitt über 360 Sekunden: 44.920 %	44.92%
Maximum eines Durchschnitts über 360 Sekunden: 74.663 % (4.11.2005 15:31:20)	74.66%

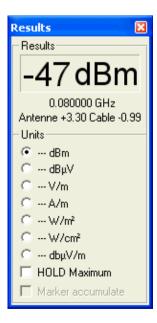


Building biological exposure limits according to ISB-2003 (readings in mW/m<sup>2</sup>):

Expo	ositionsberechnung nach ISB-2003		
Langzeitdurchschnitt: 0.152 mW//m²			15.15%
Durchschnitt der letzten 2 Minuten: 0.032 mW/m²			3.19%
Maximum eines 2 Minuten Durchschnitts: 0.197 mW	//m²		19.74%
Maximum innerhalb der letzten 2 Minuten: 1.154 mW	//m² (4.11.2005 15:40:52)		115.35%
Lezte Sekunde: 0.005 mW/m²			0.53%
Schwache Anomalie (5.0µ)	Starke Anomalie (100µ)	Extreme Anomalie (1m)	

**ADVANCED HINT:** Press the right mouse button in the exposure limit window for loading CUSTOM exposure limits. These can be added to the file "limits.ini". Various examples of the complex functionality are already included, amongst others, a comparison (simultaneous display) of the old "Salzburg precautionary limit" and the ICNIRP limit. For the scripting master, everything is possible here ;-)

• The "Results" window can be used to have the highest reading displayed, as well as for selecting the physical unit to use:



**Results:** 

Shows the maximum reading and the corresponding frequency. The unit selected under "Units" is being used for display. The size of the main display (font size) is adjusted automatically. Furthermore, if there is enough space, the unit is also being displayed in the big main display.

#### Units:

SIMULTANEOUSLY shows the current reading in dBm, dBµV, V/m, A/m and W/m<sup>2</sup>. In case of "small" values, an autorange feature (for example, **p**W/m<sup>2</sup>) is automatically activated.

You can also choose a physical unit here, which will be used automatically for the spectrum display as well as the "Results" display.

"HOLD Maximum" activates the Hold feature.

"Marker accumulate" simply shows an accumulation of all Markers.

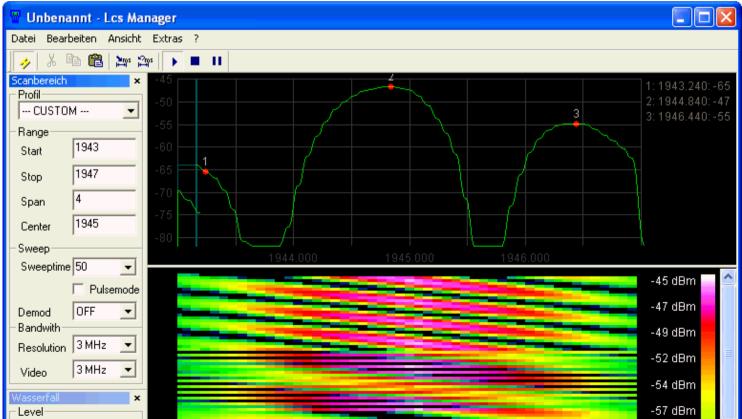
ATTENTION: The selected unit also influences the spectrum display. As these values are not displayed logarithmically, it might be necessary to adjust dynamics so that the complete sweep becomes visible again.

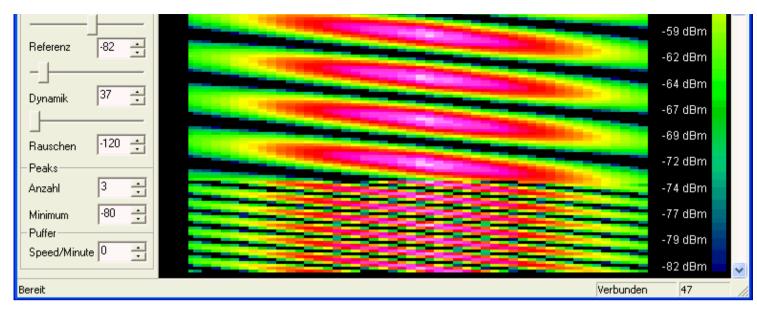
#### • EXAMPLES:

Well visible here: Optimal use of colour for displaying the level of a 1945 MHz signal modulated at different frequencies.

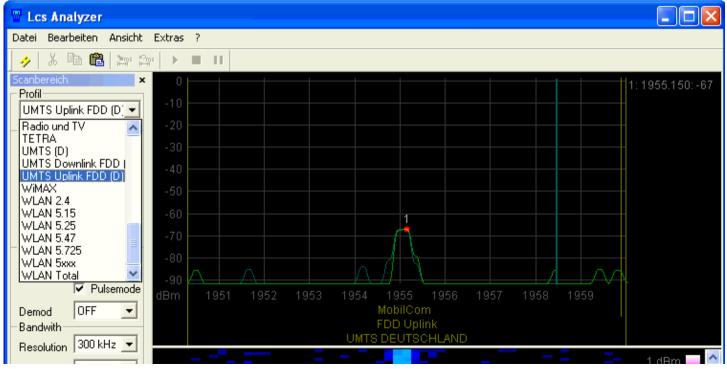
PRO feature: Up to 10! markers are being created automatically (what more could you ask).

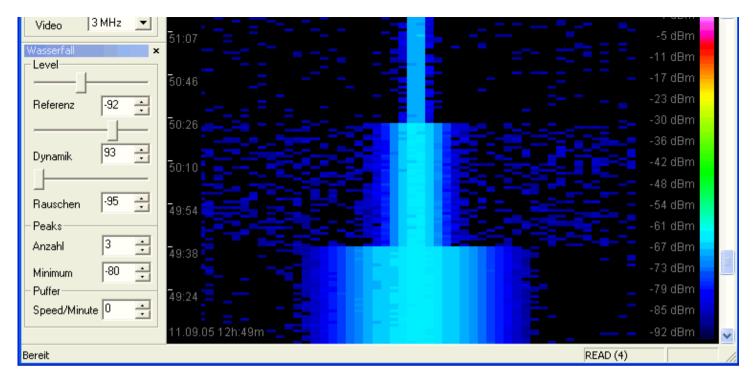
By the way: the readings used to create the waterfall display can also be queried AT A LATER TIME. Just move your mouse to the desired spot in the diagram, and hold the CTRL key. While holding the CTRL key, you can also just continue moving your mouse. The values will get updated continuously.





Nice graphical display of the influence of various filter types on a single UMTS signal (first 3MHz, then 1MHz, then 300kHz). Using the "Waterfall" display, this weak signal is still well visible in spite of backgrund noise:

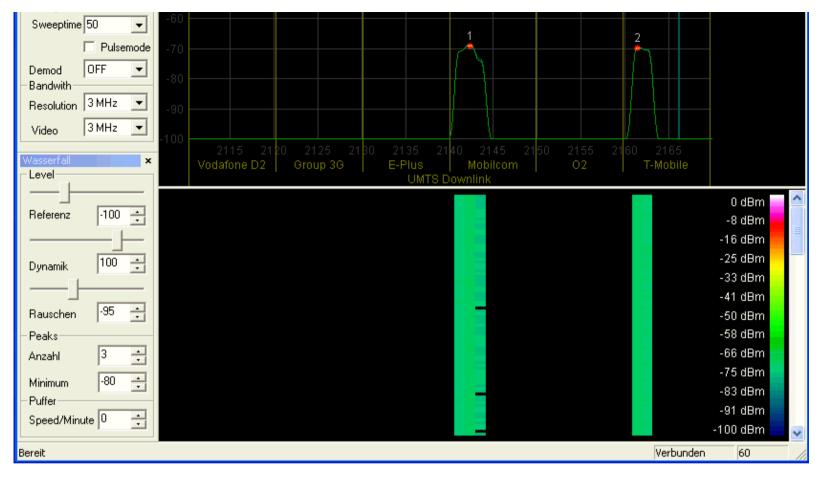




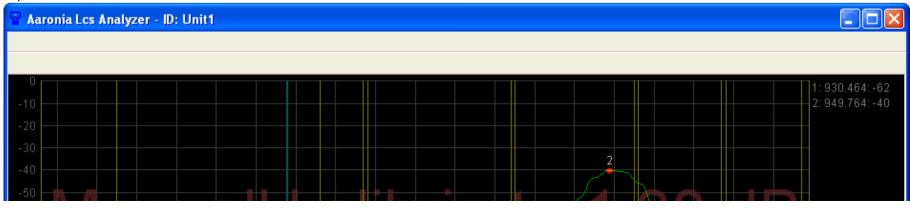
An amazing PROFESSIONAL feature is the display of channel grids! With this feature, arbitrary grids can be displayed and labelled in any desired way. Using this feature, you can, for instance, visualize the exact SERVICE PROVIDERS of transmission towers etc. in CLEAR TEXT, WITHOUT the need for looking them up in tedious tables. Even several hierarchical levels are possible: You could display an additional level "Uplink" and "Downlink" in addition to the "Providers" level.

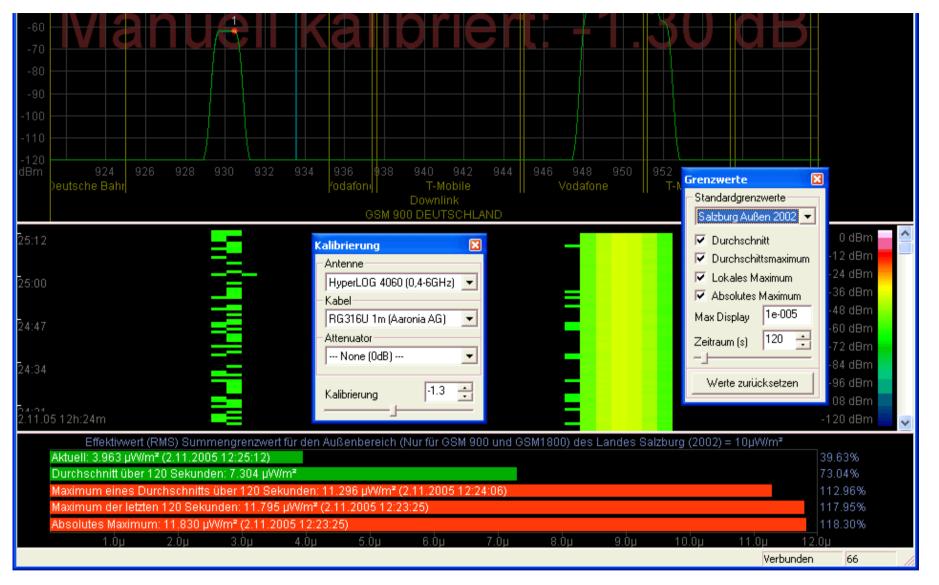
Unbenannt - Lcs Manager Datei Bearbeiten Ansicht Extras ? Ē. 🎽 🖓 🛗 > **H** II 1:2142.376:-69 Profil-2:2161.384:-70 UMTS Downlink Ŧ Range 2110.300 Start 2169.700 Stop 59.400 Span 2140.000 Center Sweep

The channel labels can be toggled in the "View" menu using the "Display channel labels" option.



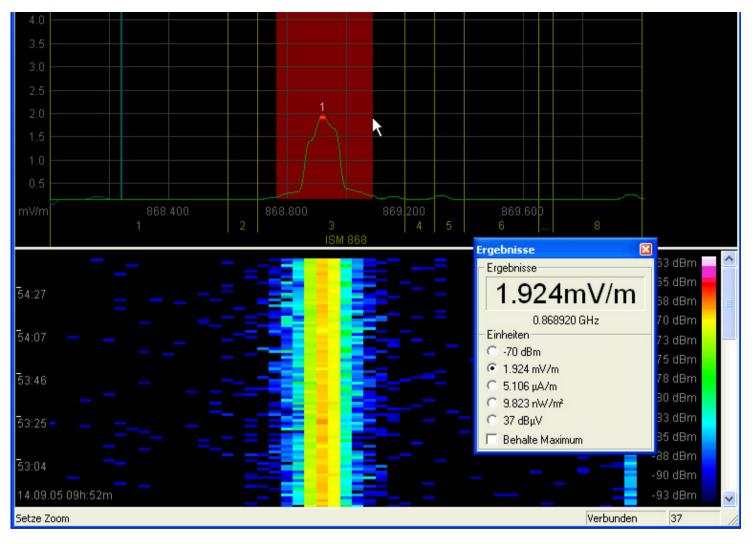
Want exposure limits ? No problem with LCS. Various ways of displaying a variety of exposure limits are at your disposal. Even a precise calibration up to 0,1dB is possible with LCS:





The intuitive zoom feature simplifies operation considerably. As shown, simply select the desired range with your mouse, and a new, full resolution sweep is initiated in the zoomed range. Simply AMAZING!



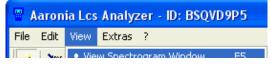


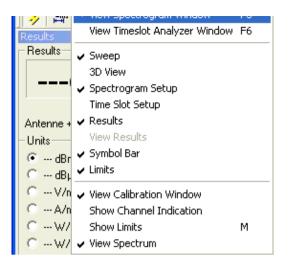
#### • HINT:

In the included file "scanprofile.ini", you can create CUSTOM profiles which then become available for instant selection in the spectrum analyser software. Various examples are already included.

## 2.) High resolution Slot Analyser:

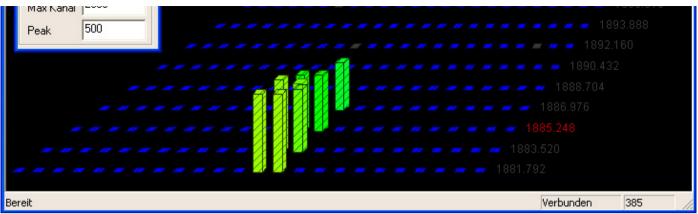
• Activate the "Timeslot analysis" entry in the "View" menu (or press the F6 key):





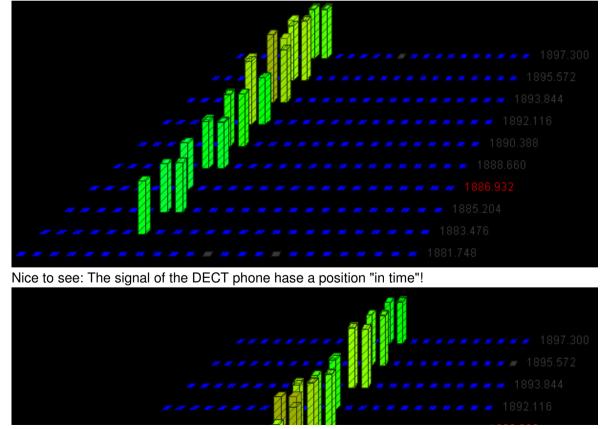
• Now, a complex panel with new functionality appears as follows:

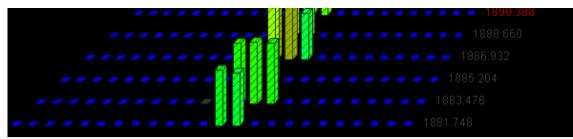
Aaronia Lcs Analyzer - I	D: Unit1	
Datei Bearbeiten Ansicht Ext	tras ?	
🤣 👗 🖻 🛍 🕍 🎬	▶ ■ 11	
Slotanalyse Profil DECT 1880 Frequenzkanäle Start 1881.792 M Stop 1899.072 M Bandbreite 1728 k Anzahl 10 Scandauer 70 Zeitschlitze	Scanbereich X   Profil Perspektive   DECT 1880 Perspektive   Range Scherung   Statt 1880   Stop 1900   Span 20   Center 1890   Sweep Sweeptime   Sweeptime 100	
Anzahl 24 Dauer (μs) 10000 Offset (μs) 0 - Auswertungszeitraum (ms) Maximal 15000	✓ Pulsemode       Demod       ØFF       Bandwith       Resolution       1 MHz       Video	• • • • • 1897.300
N K I 2500		7 🛷 1895.616



This is a true playground for the professional technician: This elaborate and complex level diagram allows, for instance, display of utilization of the individual channels including TIME SLOTS graphically. Here SPECTRAN truly shows off its capabilities! There are only a few very expensive high-end units which even offer this kind of functionality. Have fun building your own ;-)

Nicely visible in this example: DECT signals are, contrary to popular belief, a very complex THREE DIMENSIONAL signal and change position in TIME!





The new "position" of the DECT phone after the channelchange. Does your spectrum analyzer offer THIS too?

#### HINT:

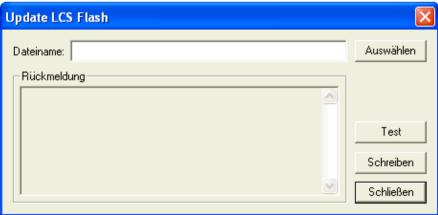
In the included file "scanprofile.ini", you can create CUSTOM profiles which then become available for instant selection in the spectrum analyser software. Various examples are already included.

## 3.) Convenient firmware updates (software updates) for your SPECTRAN unit:

• Activate the "Firmware update" entry in the "Extras" menu:



• Next, a new window appears:



• Click on "Select" and choose the full path and filename of the previously downloaded update, and then click on "Write". Afterwards, the following bargraph will appear:

Update LCS Flash	
	Auswählen
Rückmeldung	
Datei öffnen Verbinde Schalte Flashmode ein Setze Flash zurück Lösche Flash Starte Flashvorgang	Test Schreiben Schließen

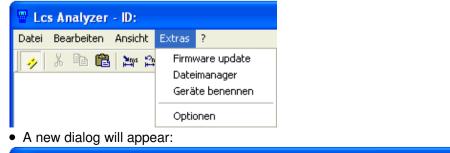
• Once completed successfully, the following dialog will appear:

Update LCS Flash	
Dateiname: C:\FLASH-Software\Radar.FSH	Auswählen
Rückmeldung	
Datei öffnen Verbinde Schalte Flashmode ein Setze Flash zurück Lösche Flash	Test
Starte Flashvorgang Erfolg	Schreiben
	Schließen

• After the update, you can turn SPECTRAN back on and use the "Factor" function in the "Setup" menu, as usual, to complete the update.

# 4.) File manager for SPECTRAN (incl. editable key assignments!):

• Activate the entry "File manager" in the "Extras" menu:



LCS Dateisystem

□       □       Tastatur         □       □       Taste 0         □       □       Taste 1         □       □       Taste 1         □       □       Taste 2         □       □       Taste 3         □       □       Taste 3         □       □       Taste 4         □       □       Taste 5         □       □       Taste 6         □       □       Taste 7         □       □       Taste 8         □       □       Taste 9         □       □       Shift         □       □       Auf         □       □       Ab	Id Beschreibung 107 Taste 7 SETUP STARTFREQ: 920 STOPFREQ: 960 RESBANDW: 1 VIDBANDW: 1 SWEEPTIME: 100 ATTENFAC: -10 REFLEVEL: 0 DISPRANGE: 100 PULSEMODE: 0 PRINTSTR 03h, "GSM900" STOP	Neu Lesen Löschen Hex Übersetzen Schreiben Alle Schreiben
Links Links Clear Enter Spezial Scanprog Enter Persönlich		Speichern Laden Trennen Schliessen

• Here you can manage and modify the key assignments in your SPECTRAN units, and even create and upload YOUR OWN CUSTOM PROGRAMS. **ATTENTION: For uploading changes or programs to SPECTRAN, you need to click on "Compile" and then on "Write"!** Key assignments can also be saved to and retrieved from disk by clicking "Save" or "Load".

# 5.) Managing and renaming several SPECTRAN units on the same PC:

• Choose the "Rename units" entry in the "Extras" menu:



• Next, a new dialog will appear:

Spectra	an Namen ändern	
Name	Garage	Setzen
Garage Haus1		
		Aktualisieren
	~	Schliessen

• Here you can rename each of your SPECTRAN units. This allows simple tracking when using several units on the same PC. One way to name your units is, as shown in the example, using the location as a name.

Enter the desired name for the respective SPECTRAN unit in the "Name" field.

Press "Set" to PERMANENTLY store the name in the SPECTRAN unit.

Press "Refresh" to refresh the list of currently connected SPECTRAN units. Use this button to find units which have been connected after launching LCS.

• You can change to a different SPECTRAN unit at AN TIME. For this, use the entry "Choose device" in the File menu:

Spectran auswähle	n 🔀
AIRBUS1 Flügel1 Flügel2 Cockpit Triebwerk4	<
	Auswählen

Simply choose the desired unit for acquiring readings or transmitting data.

# NOTE: For OPTIMUM usage of the PC software, we STRONGLY recommend the following options & accessories for your SPECTRAN device:

#### • 1MB MEMORY EXPANSION:

If you plan to use the SPECTRAN's INTERNAL datalogger (HF-4040 and above), we STRONGLY recommend our 1MB memory expansion (Option 001). It is

available at as low as € 99,95\*. For using this expansion, you will need to send us your unit for installation.

## • ADDITIONAL TRIPOD:

We STRONGLY recommend an ADDITIONAL miniature tripod for being able to use the SPECTRAN device as a tabletop unit (like a multimeter), or our large aluminum tripod for optimally adjusting the HyperLOG antenna.

Our miniature tripod is available at  $\in$  19,95<sup>\*</sup>, the large aluminum tripod at  $\in$  49,95<sup>\*</sup> <u>Order</u>

## • SMA extension cable:

With our special 5m or 10m low-loss SMA cables, you can install the HyperLOG antenna far away from your measurement equipment. Hence, you can install your PC and your SPECTRAN unit in a safe, well-protected place for performing long-time measurements or similar tasks. The 5m low-loss cable is available at  $\in$  79,95\*, the 10m version at  $\in$  99,95\* **Order**