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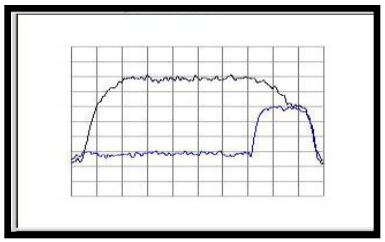
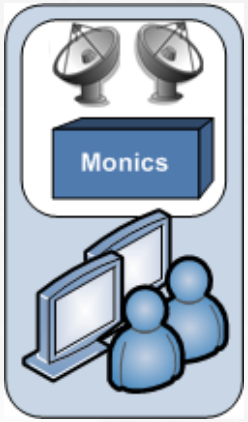
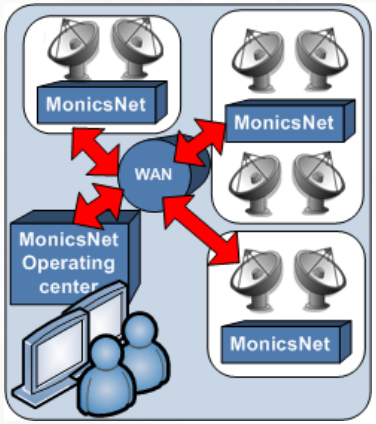
SAT-DSA Presentation



ISE Monitoring Products

SAT-DSA	Monics	MonicsNet	SigMon
Low cost Digital Spectrum Analyzer	Carrier Monitoring System for one site	Advanced Carrier Monitoring System with a global network	Terrestrial Signal and Interference Monitoring
Standalone Unit DSP technology Less than 500 carriers	Satellite database Options available	Advanced Monics Central database	Mobile solutions. Signal monitoring, Interference Detection and Direction Finding.
			

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SAT-DSA
Digital Spectrum Analyzer

ISE : One Stop Shop for CSM

Spectrum Analyzer

Spectrum analyzer controlled by SAT-DSA

Antennas for C, X, Ku, Ka-bands

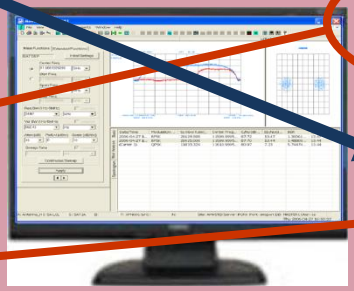
Multiple RF switches for C, X, Ku Ka Bands

BDCs for C, X, Ku , Ka-bands

L Band Switch

RF elements

Digital Signal Processor with 70 MHz or L Band input



SAT-DSA server

Core SAT-DSA

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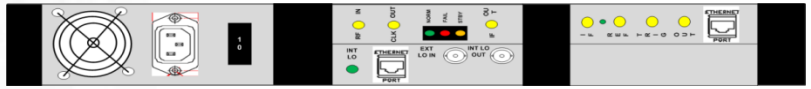
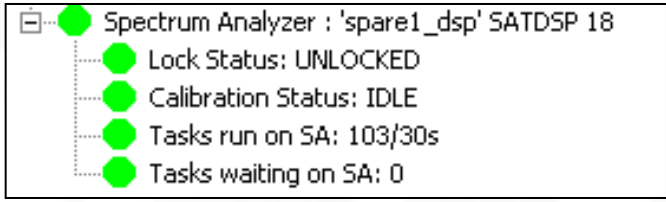
SAT-DSP Instrument

- Integrated Tuner/Digitizer in 1RU Chassis
  - 1RU Assembly (Tuner + Digitizer)
  - L-Band Input for the tuner
  - 266MHz IF Input for the digitizer
  - Gigabit Ethernet Connection to the Digitizer
  - 100/10 TCP/IP tuner connection
  - 10MHz Reference
  - SAT-DSP-5000-IT
  - SAT-DSP-5010-IT (Adds On board Decimation)
- High Speed Digitizer Firmware 4~5 times faster than Digitizers presently implemented
  - SAT-DSP-3000 or -5000 ~ 0.8 measurements/sec
  - SAT-DSP-5010 ~ 3.5 measurements/sec
  - Measurement Speed based on a monitoring plan with 200 carriers over 1.5 transponders with a large number of narrow carriers

DG 5000 Front Panel

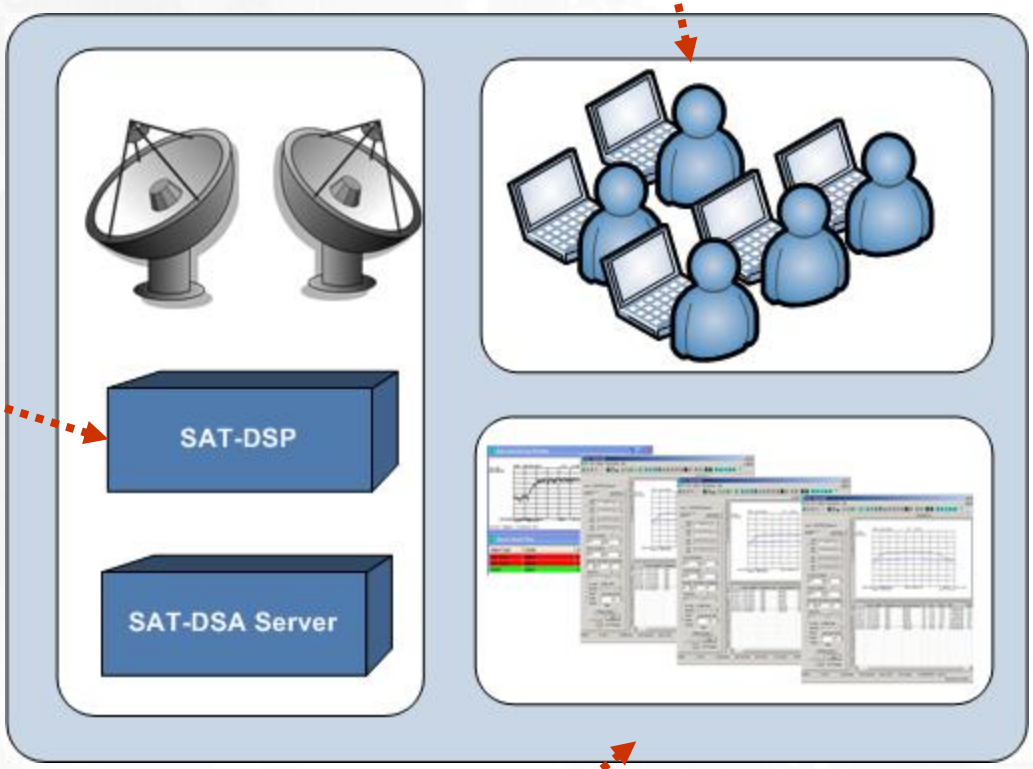


DG 5000 Back Panel



SAT-DSA features

Up to 5 simultaneous users (option)



SAT-DSP

- provides digital samples in the time domain
- generates a 10 MHz Reference to stabilize BDC drift

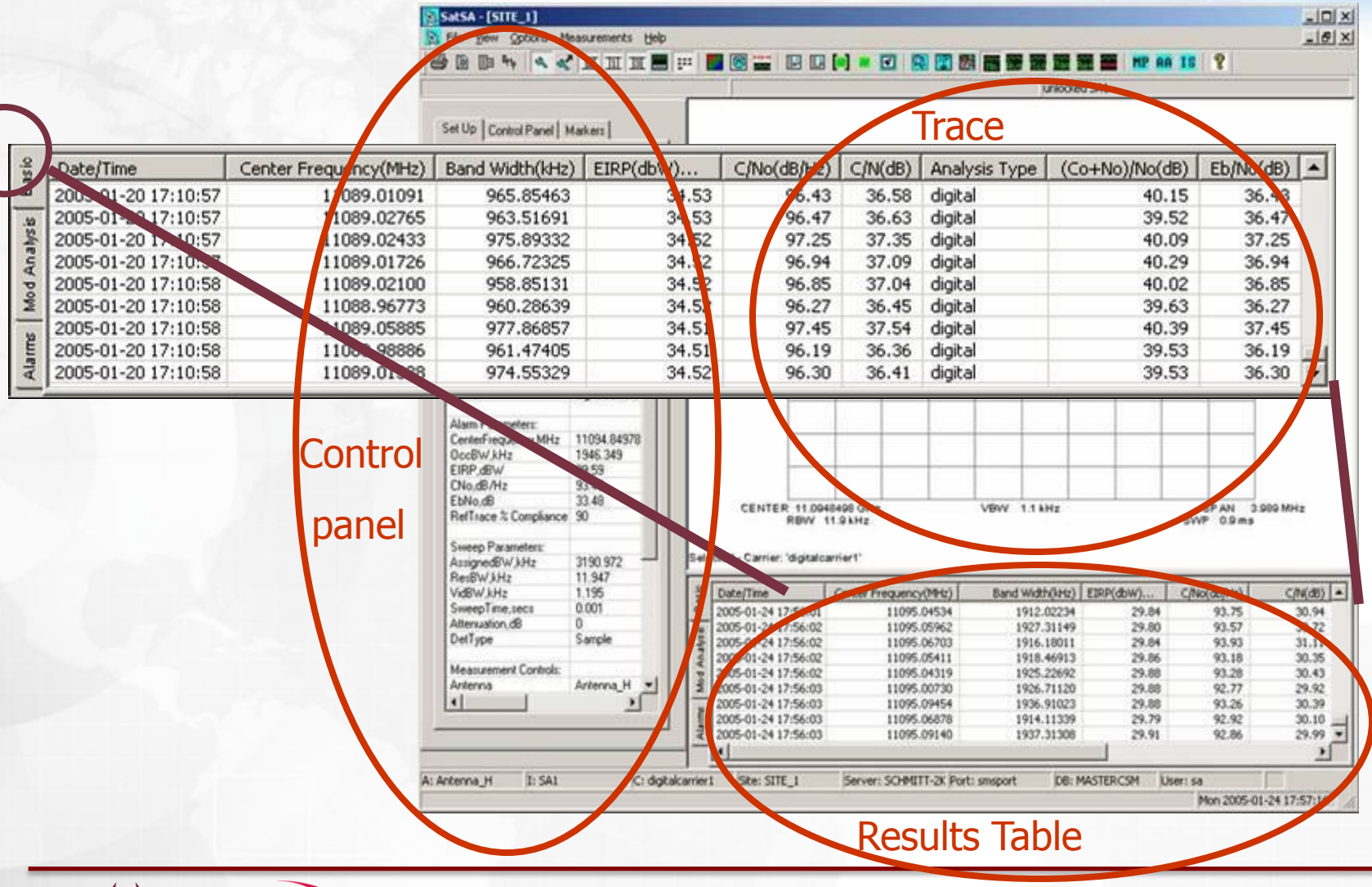
Interleaved monitoring between:

- Automatic Monitoring
- Manual Dwell Measurement Request From Operator

Powerful & Friendly Environment

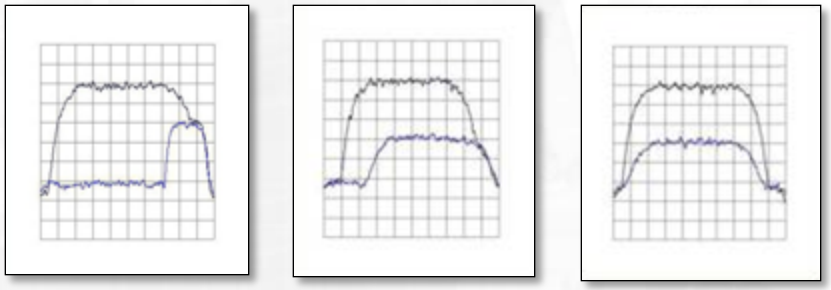
- Spectrum Analyzer “look and feel” with enhanced features
- Remote user interface (up to 5 simultaneous)
- “Point and click” philosophy
- DSP reports: Symbol Rate, Modulation Type, BER, Eb/No
- Alarming for abnormal/unwanted/out-of-bound carriers
- One monitoring plan for automated measurements
- Stores and Replay data and traces
- Carrier under carrier display and analysis
- Monitor both traditional analog & digital video carrier

Point & Click



Carrier Under Carrier Analysis

Display with SAT DSA



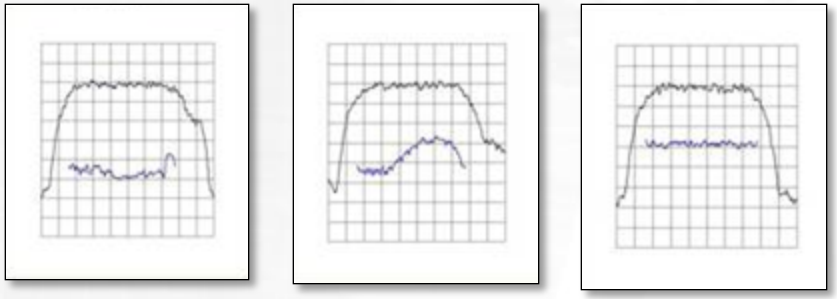
True Interference position

with respect to main carrier

Display with

Typical

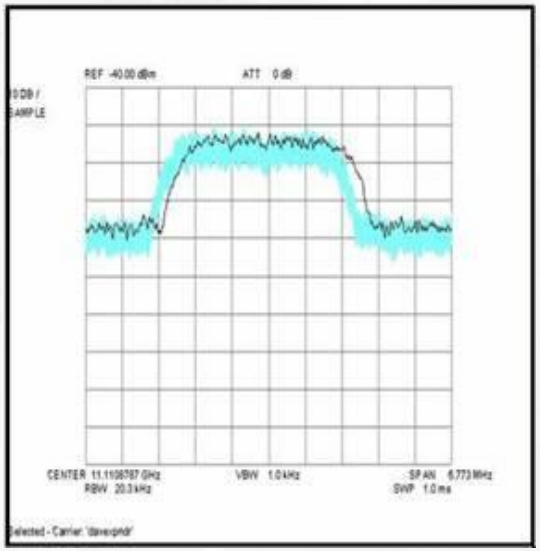
EVM Approach



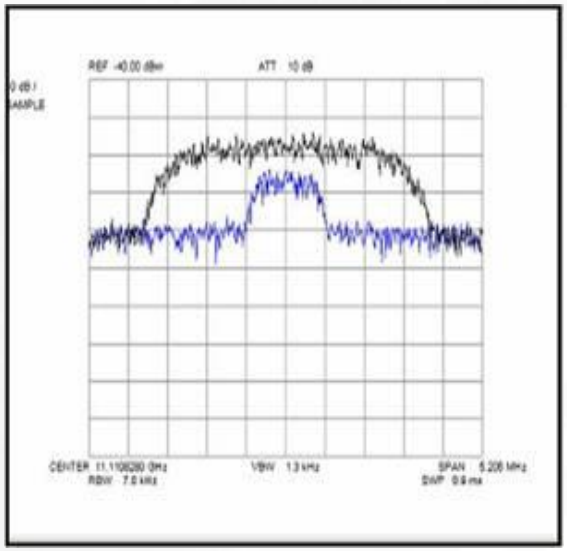
Note distortion of interfering carrier

Multiple Display

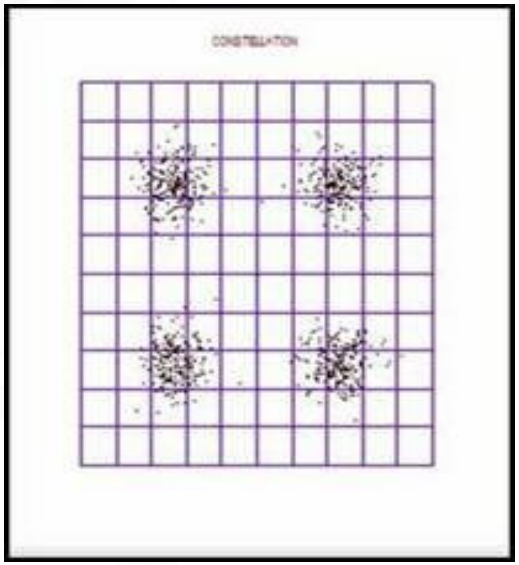
Alerts operator to abnormal carriers and transponders



Spectral Mask (Reference Trace) automatic monitoring of carrier shape

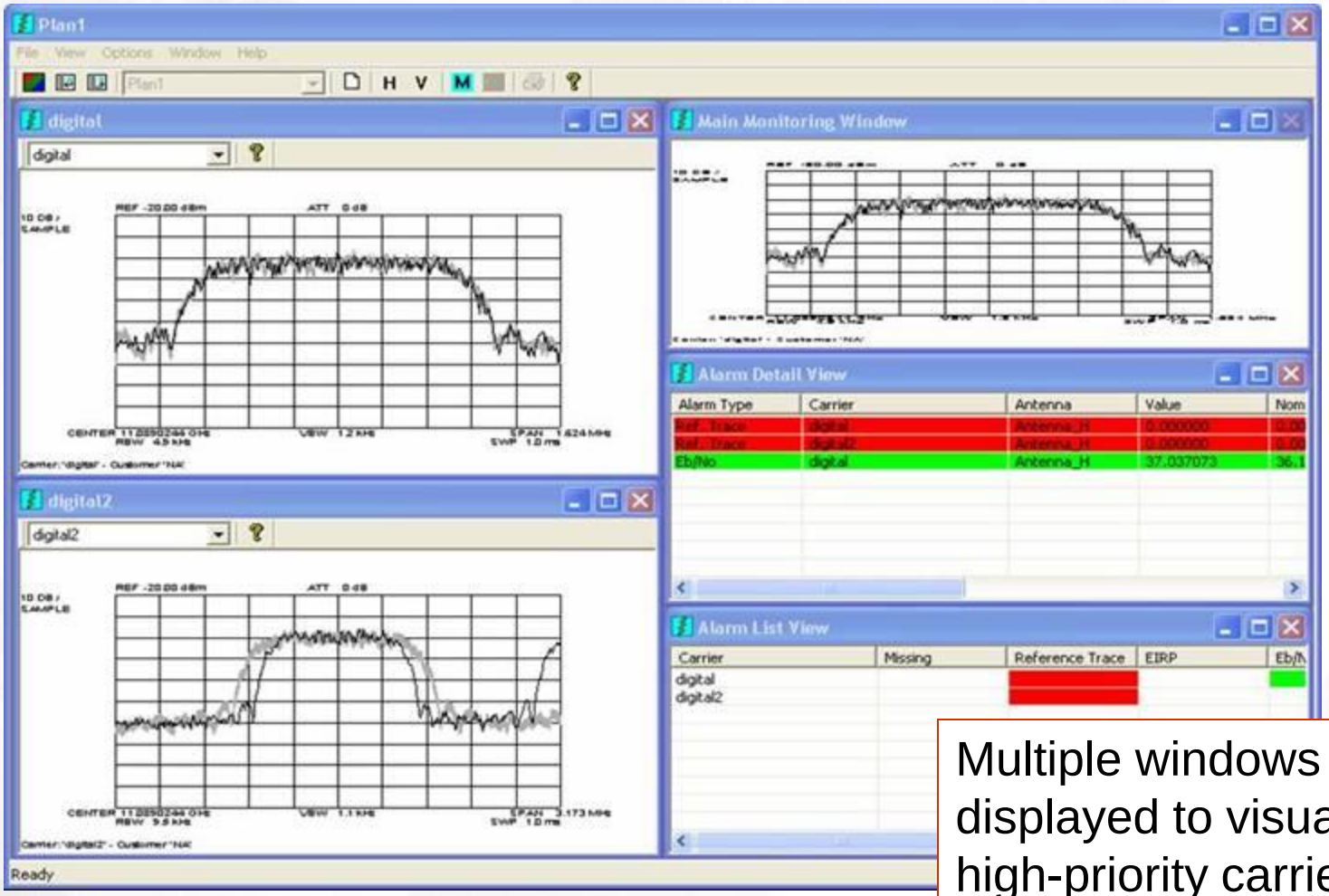


“Carrier under Carrier” Interference alarm based on Eb/No



“Constellation display”

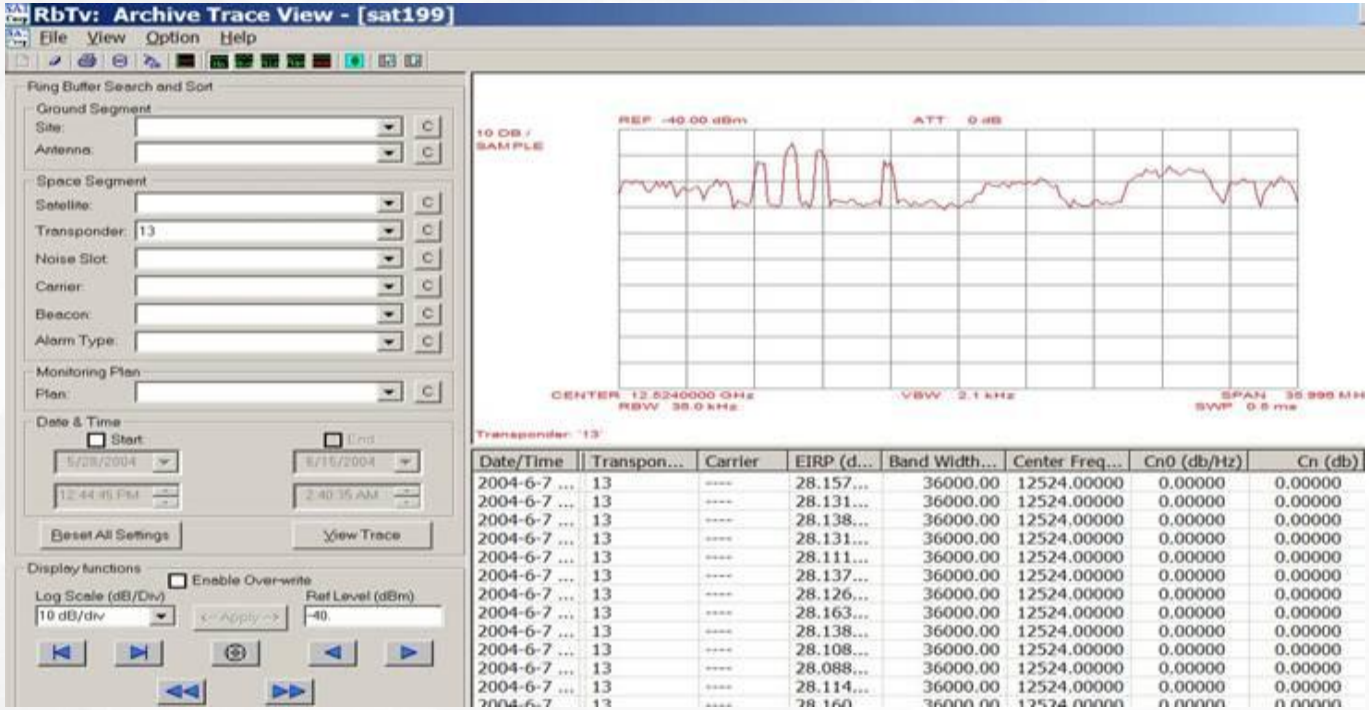
Alarm GUI With Dwell window



Multiple windows can be displayed to visualize high-priority carriers.

Archive Viewer

- Automatic monitoring stores measurement data and traces:
  - up to 10 Giga-bytes in Basic DSA
  - 5 weeks of traces and measurement data or 5 months of only measurement data



Date/Time	Transpon...	Carrier	EIRP (d...	Band Width...	Center Freq...	Cn0 (db/Hz)	Cn (db)
2004-6-7 ...	13	----	28.157...	36000.00	12524.00000	0.00000	0.00000
2004-6-7 ...	13	----	28.131...	36000.00	12524.00000	0.00000	0.00000
2004-6-7 ...	13	----	28.138...	36000.00	12524.00000	0.00000	0.00000
2004-6-7 ...	13	----	28.131...	36000.00	12524.00000	0.00000	0.00000
2004-6-7 ...	13	----	28.111...	36000.00	12524.00000	0.00000	0.00000
2004-6-7 ...	13	----	28.137...	36000.00	12524.00000	0.00000	0.00000
2004-6-7 ...	13	----	28.126...	36000.00	12524.00000	0.00000	0.00000
2004-6-7 ...	13	----	28.163...	36000.00	12524.00000	0.00000	0.00000
2004-6-7 ...	13	----	28.138...	36000.00	12524.00000	0.00000	0.00000
2004-6-7 ...	13	----	28.108...	36000.00	12524.00000	0.00000	0.00000
2004-6-7 ...	13	----	28.088...	36000.00	12524.00000	0.00000	0.00000
2004-6-7 ...	13	----	28.114...	36000.00	12524.00000	0.00000	0.00000

Architectural Advantages

- MSDE database
- Interface directly with Excel, Access, Crystal Reports …
- Remote access (open or VPN)
- Up to five simultaneous operators
- 10 MHz Reference output for block-down-converter
- 85 MHz IBW time-domain measurement of wide carriers
- Simultaneous display of cross-pol and co-pol
- Faster monitoring than E4402 and most standard SA
- Switch control for ETL, Agilent and Quintech switches

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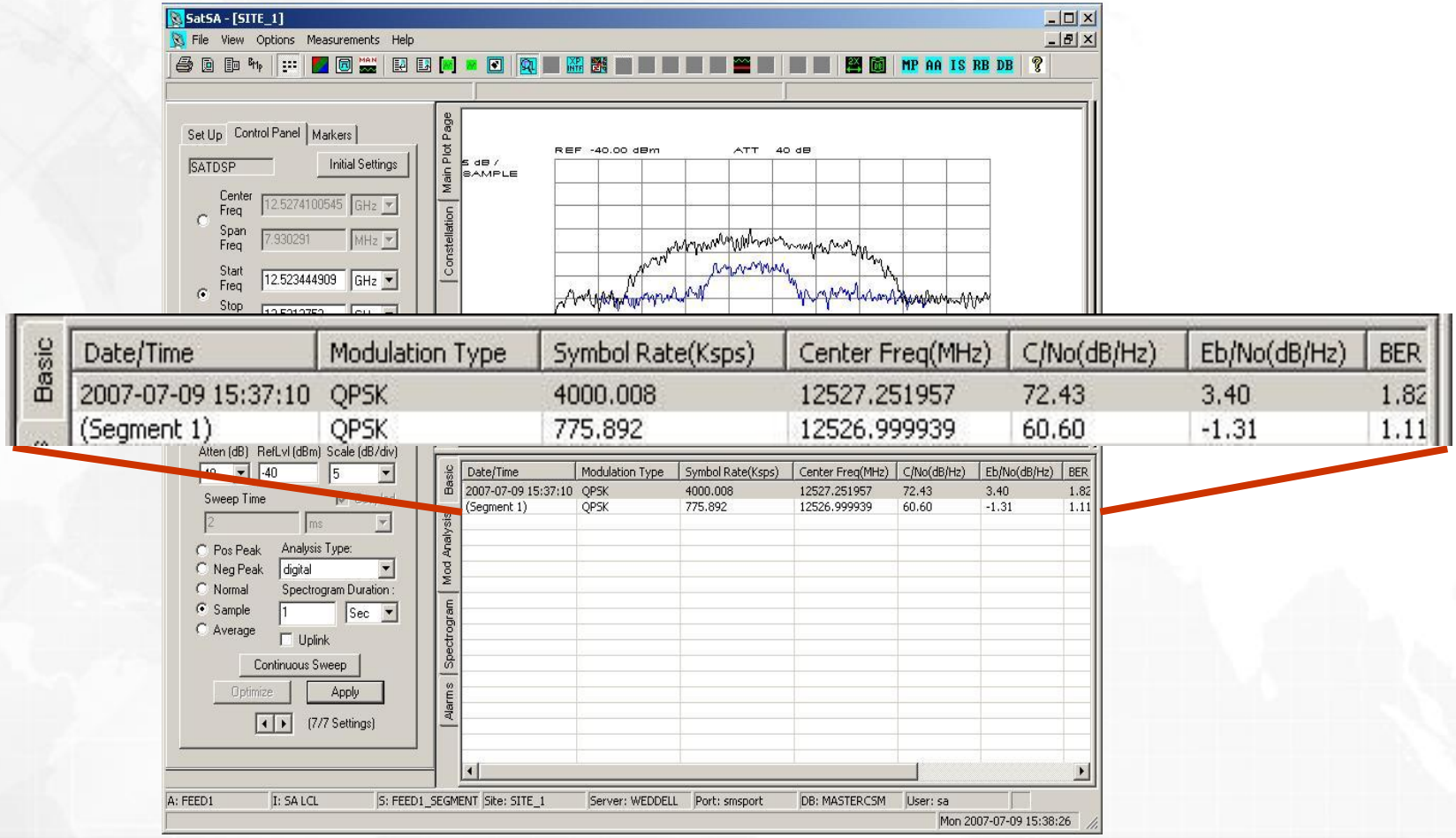
SAT-DSA Options

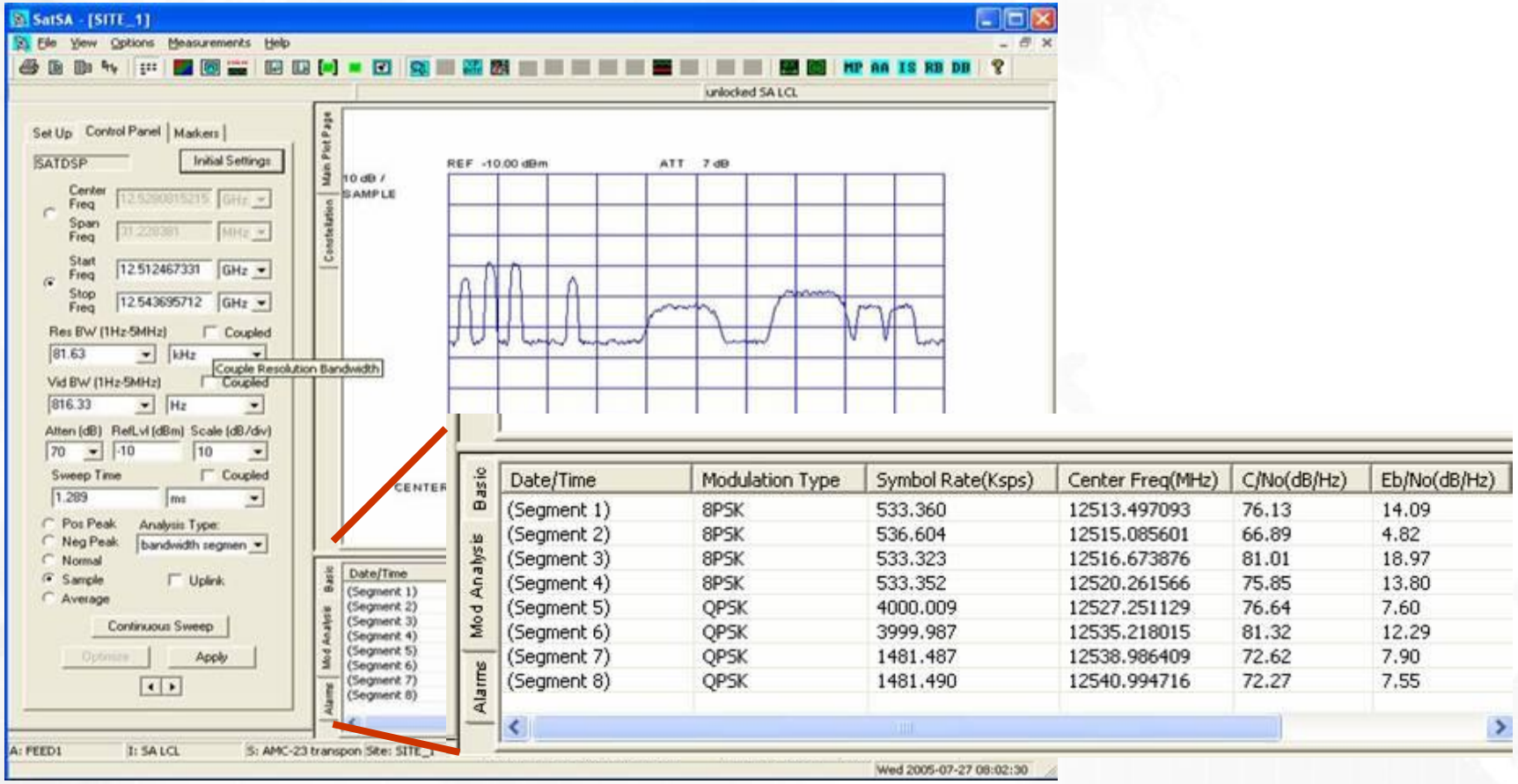
Carrier under Carrier Characterization

Provide characterization of interfering carrier without dropping main carrier



Frequency Scan Analysis

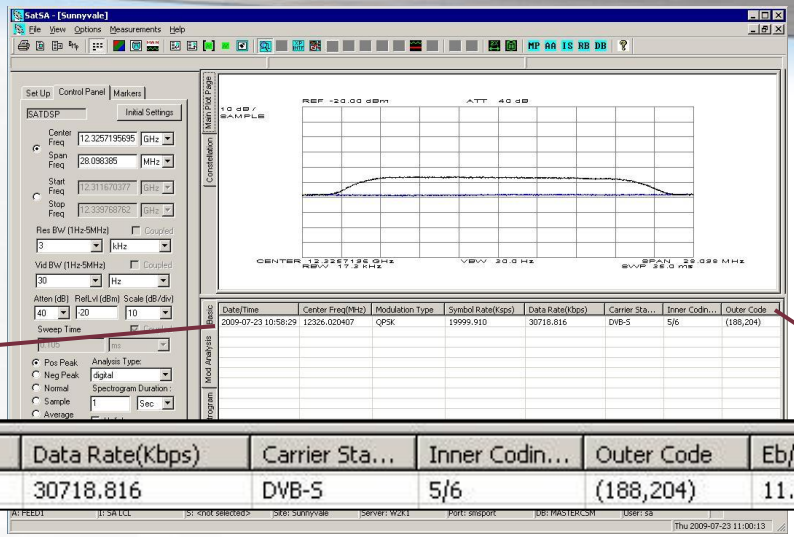
Reports characteristics for all carriers in display



Date/Time	Modulation Type	Symbol Rate(Ksps)	Center Freq(MHz)	C/No(dB/Hz)	Eb/No(dB/Hz)
(Segment 1)	8PSK	533.360	12513.497093	76.13	14.09
(Segment 2)	8PSK	536.604	12515.085601	66.89	4.82
(Segment 3)	8PSK	533.323	12516.673876	81.01	18.97
(Segment 4)	8PSK	533.352	12520.261566	75.85	13.80
(Segment 5)	QPSK	4000.009	12527.251129	76.64	7.60
(Segment 6)	QPSK	3999.987	12535.218015	81.32	12.29
(Segment 7)	QPSK	1481.487	12538.986409	72.62	7.90
(Segment 8)	QPSK	1481.490	12540.994716	72.27	7.55

FEC Analysis

Presently detects QPSK ½, ¾, and 7/8 Viterbi encoding with k=7 per IESS-308 and DVB-S and DVB-S2



Date/Time	Center Freq(MHz)	Modulation Type	Symbol Rate(Ksps)	Data Rate(Kbps)	Carrier Sta...	Inner Codin...	Outer Code	Eb/No(dB/Hz)
2009-07-23 10:58:29	12326.020407	QPSK	19999.910	30718.816	DVB-S	5/6	(188,204)	11.63

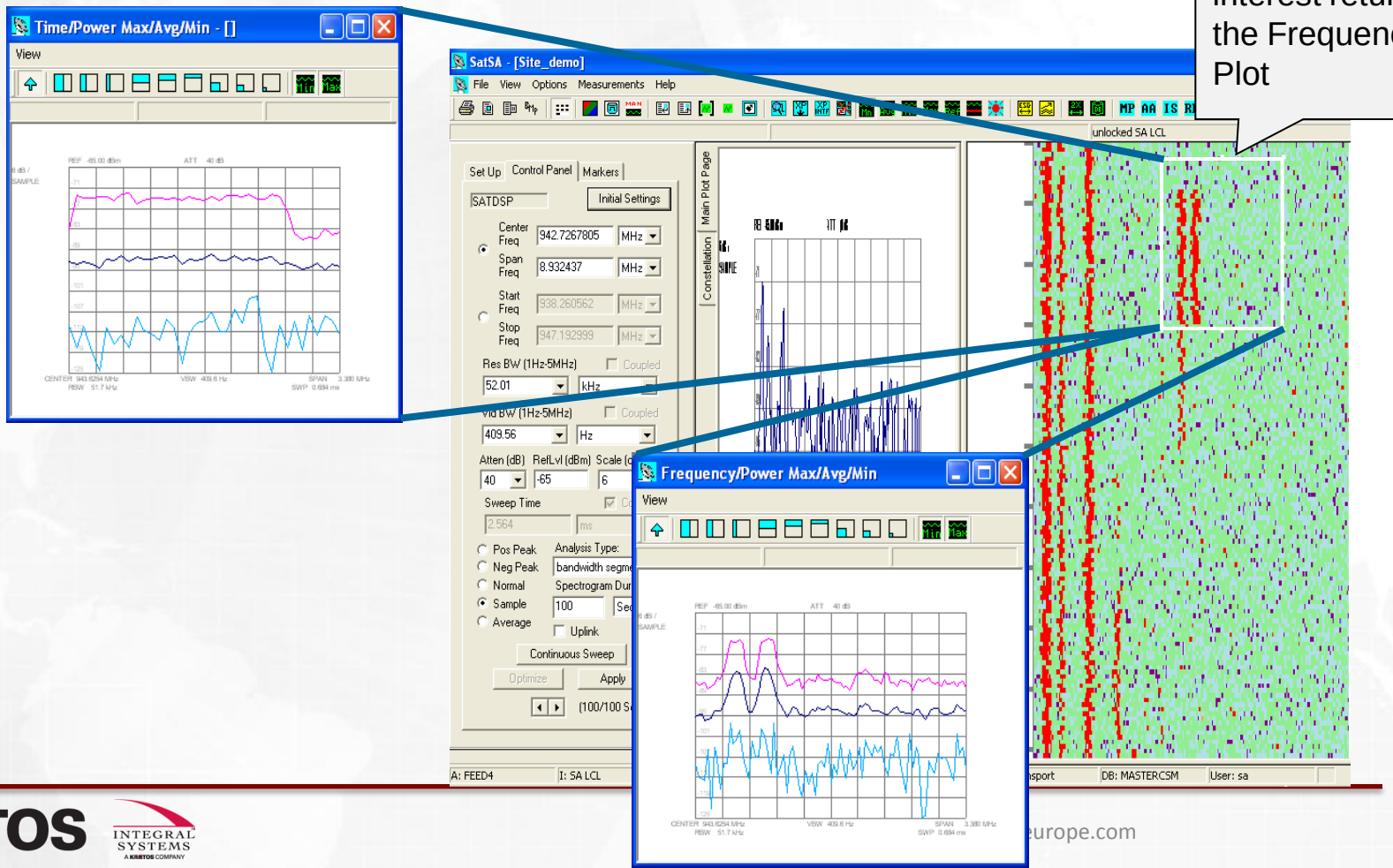
Note: To achieve full FEC measurement VBW =30Hz and Eb/No reading of >10dB/Hz may be required.

Mod Analysis	FEC Analysis	Advanced Signals
CW, BPSK, QPSK, OQPSK 8PSK, 16QAM, 32APSK, 8QAM, 64QAM ACM	IESS-308, IESS-310 DVB-S,DVB-S2 Inner and Outer Coding Rate	TDMA & Frequency Hopping Signal Recognition Double Carrier Recognition

TDMA Spectrogram

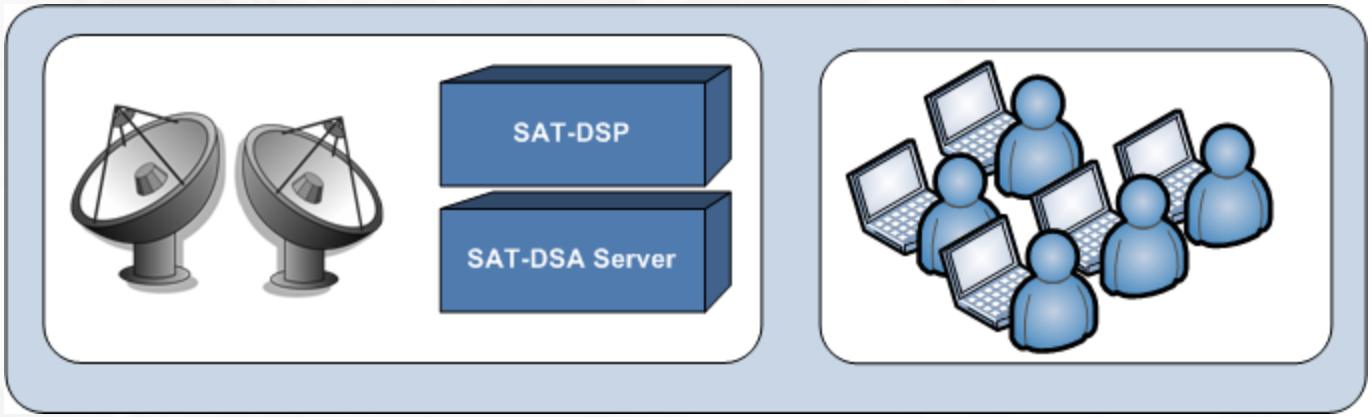
- TDMA Spectrogram to gain more in-site into your TDMA network.
- Individual burst can be identified and information returned.

Drawing a box around the burst of interest returns the Frequency Plot



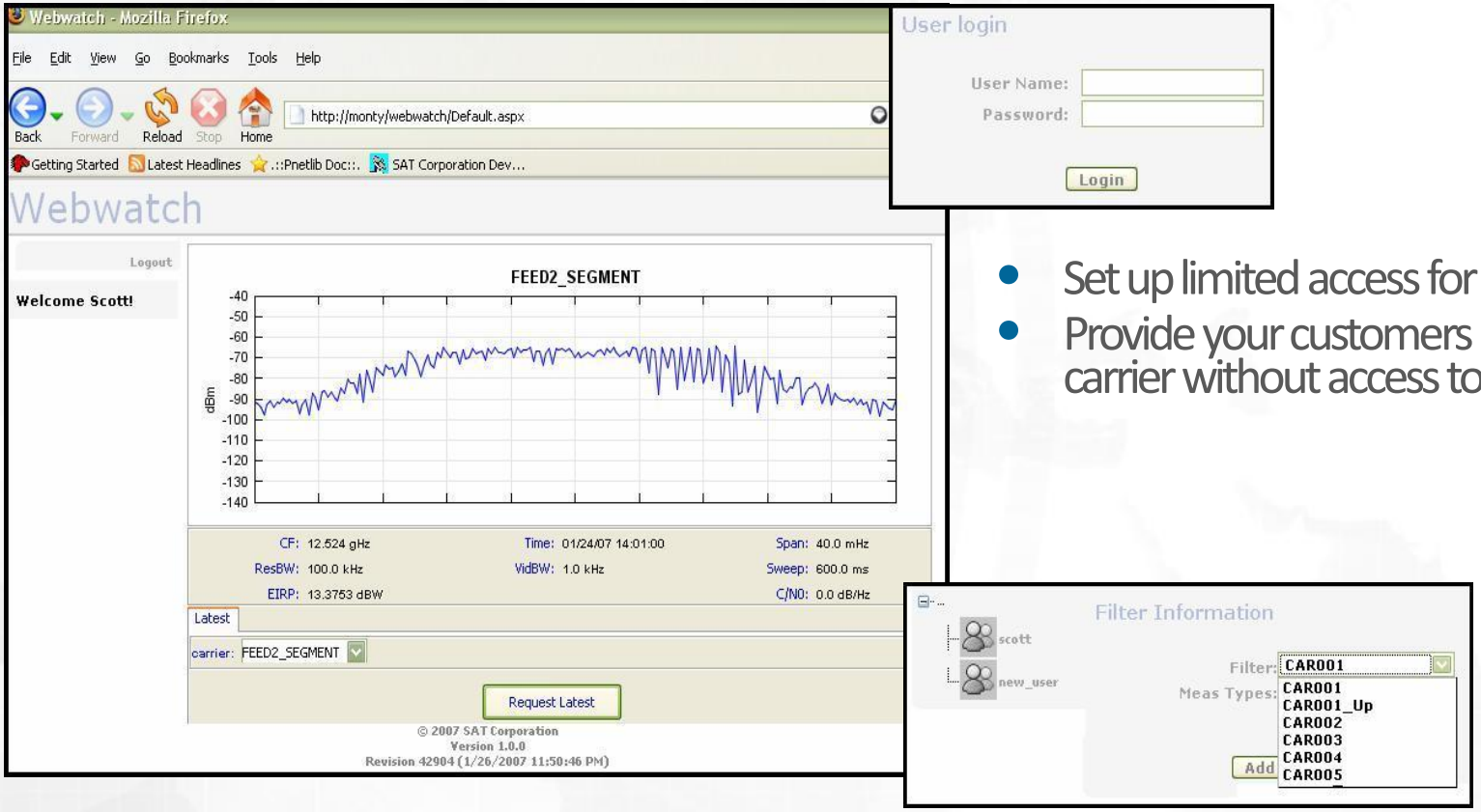
5 simultaneous users

- Use of Microsoft Terminal Services,
- Up to 5 users can simultaneously operate the SAT-DSA in manual mode



Web watch

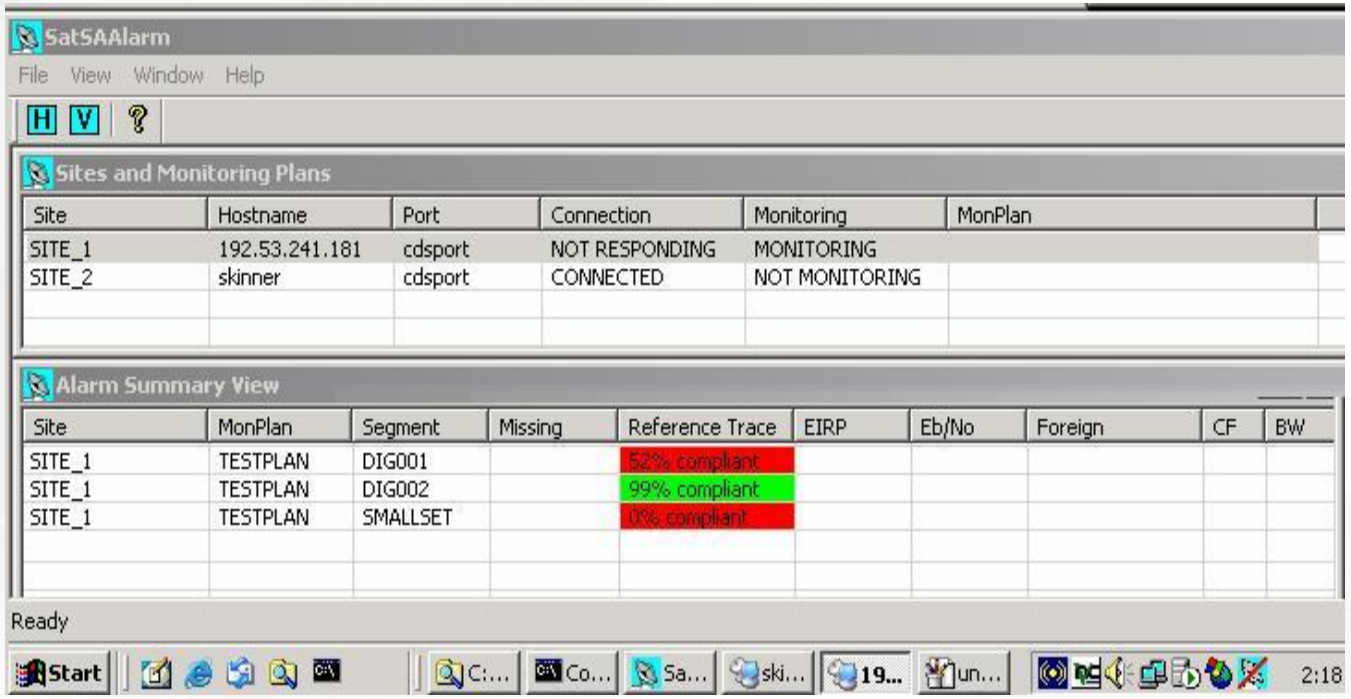
- True Web based tools for controlled accesses to see traces taken by DSA
- Let your customers or your sales staff see their customers carriers being monitored



- Set up limited access for users
- Provide your customers access to their carrier without access to the full system

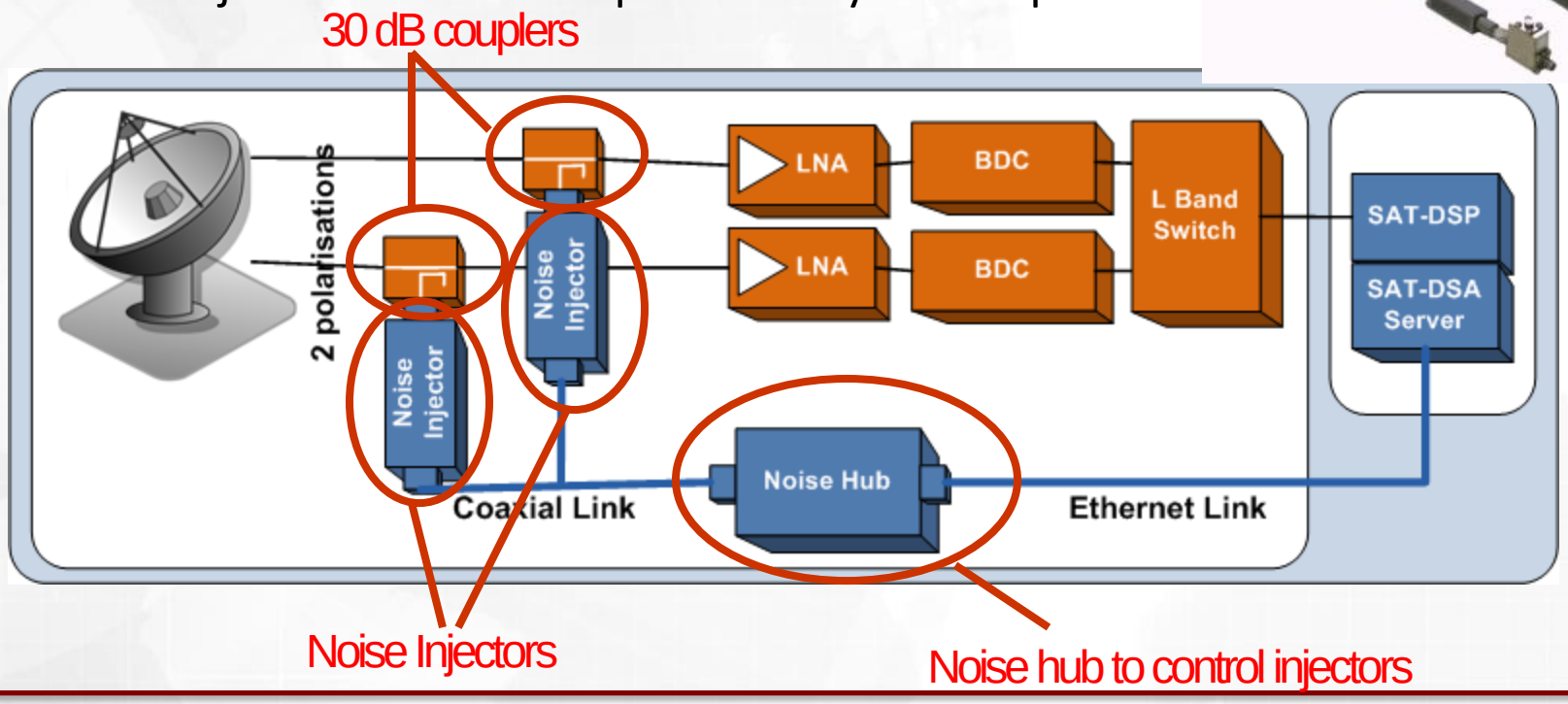
Remote NOC GUI

- Brings back alarms from Multiple SAT-DSAs
- Remote Alarm and Alarm actions from any SAT-DSA



Earth Station Gain Calibration

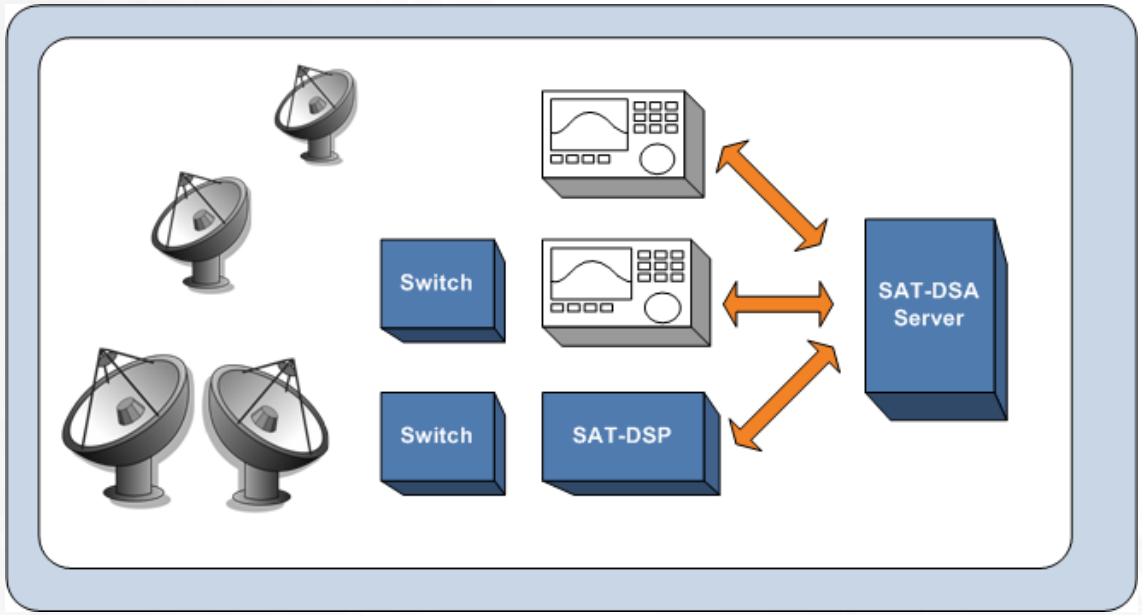
- Without ESG calibration inaccuracy
  - LNA/LNB gain is 0.15 dB per degree C :
  - 10°C results in 1.5 dB error
- With Noise Injection Calibration : +/-0.5 dB
- Noise Injection Calibration patented by Sat Corp



Parallel Instruments

One SAT-DSA can control :

- one DSP
- Several Spectrum Analyzers via their USB, Ethernet or GBIP ports:
  - Agilent
  - Rhode-Schwartz
  - Willtech
  - LP Tech



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Conclusion

DSA licensing Summary

- Basic DSA
  - Manual Measurement with enhanced DSP functions
  - Monitoring plan
  - Alarm Viewer and Actions on alarms
  - Archive Viewer
  - Interference trace Display

- DSA options:
  - Carrier under carrier analysis
  - Frequency scan
  - FEC analysis
  - TDMA spectrogram
  - TDMA Analysis on burst
  - Web watch
  - 5 simultaneous users
  - Network Operational Center for alarms
  - Earth station gain calibration by noise injection
  - Parallel instruments
  - RF additional hardware : BDC, switches
  - Interface with Compass

Unique Features

- DSP technology – 5 to 10 times faster, 85MHz IBW
- Unique Carrier under Carrier technique
- Simultaneous Manual/automated measurements
- Intuitive, User friendly GUI
- Line Up Tools
- Low cost ESG calibration technique
- Database architecture
- Compact design
- Well known in the industry

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A state of the art solution for satellite and terrestrial communications monitoring and interference detection

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Thank You

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