

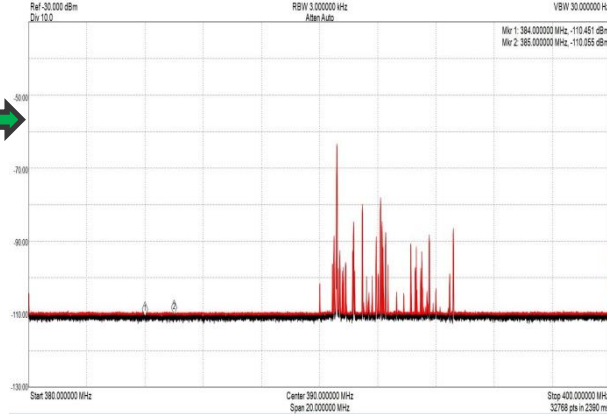


Michael Braun | 03.07.2019

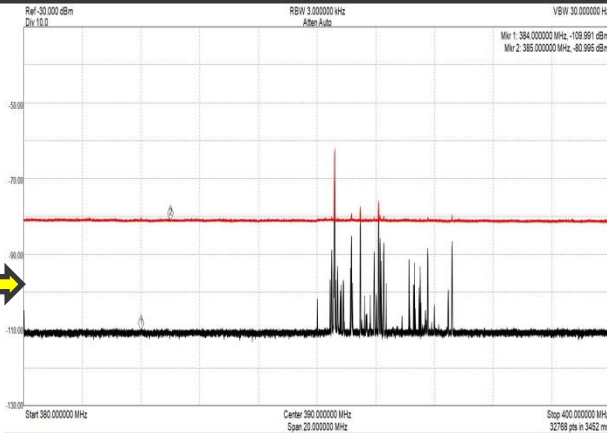
Five steps to keep your spectrum clean

Problem: „Dirty Radio Spectrum“ (Example TETRA)

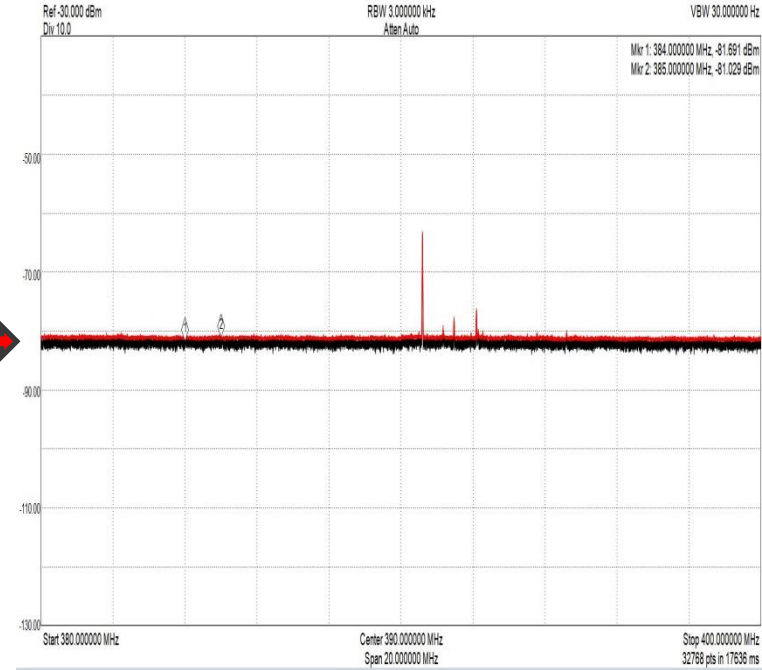
- Clean Spectrum
07:30 a.m.:



- Broadband
Man Made Noise
08:15 a.m.:



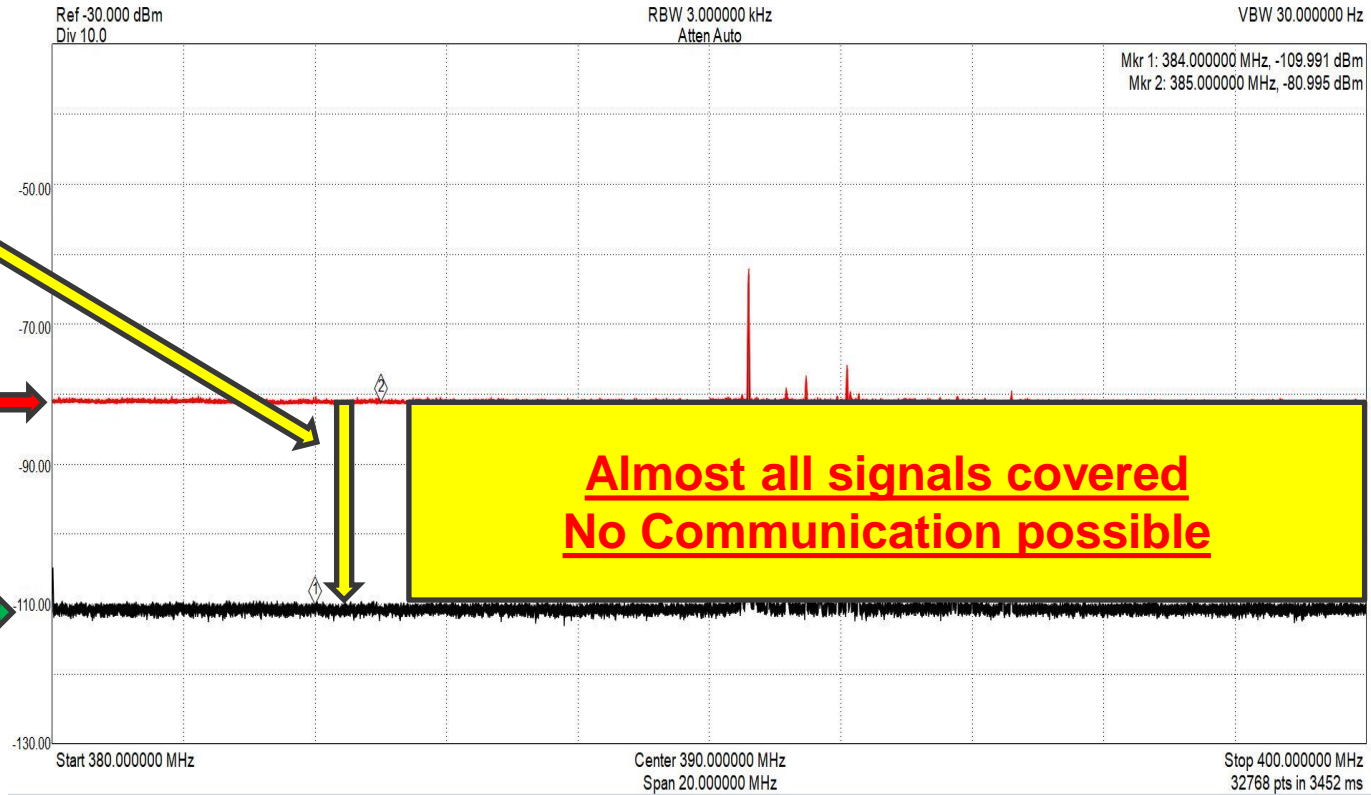
- The comparison
08:45 a.m.:

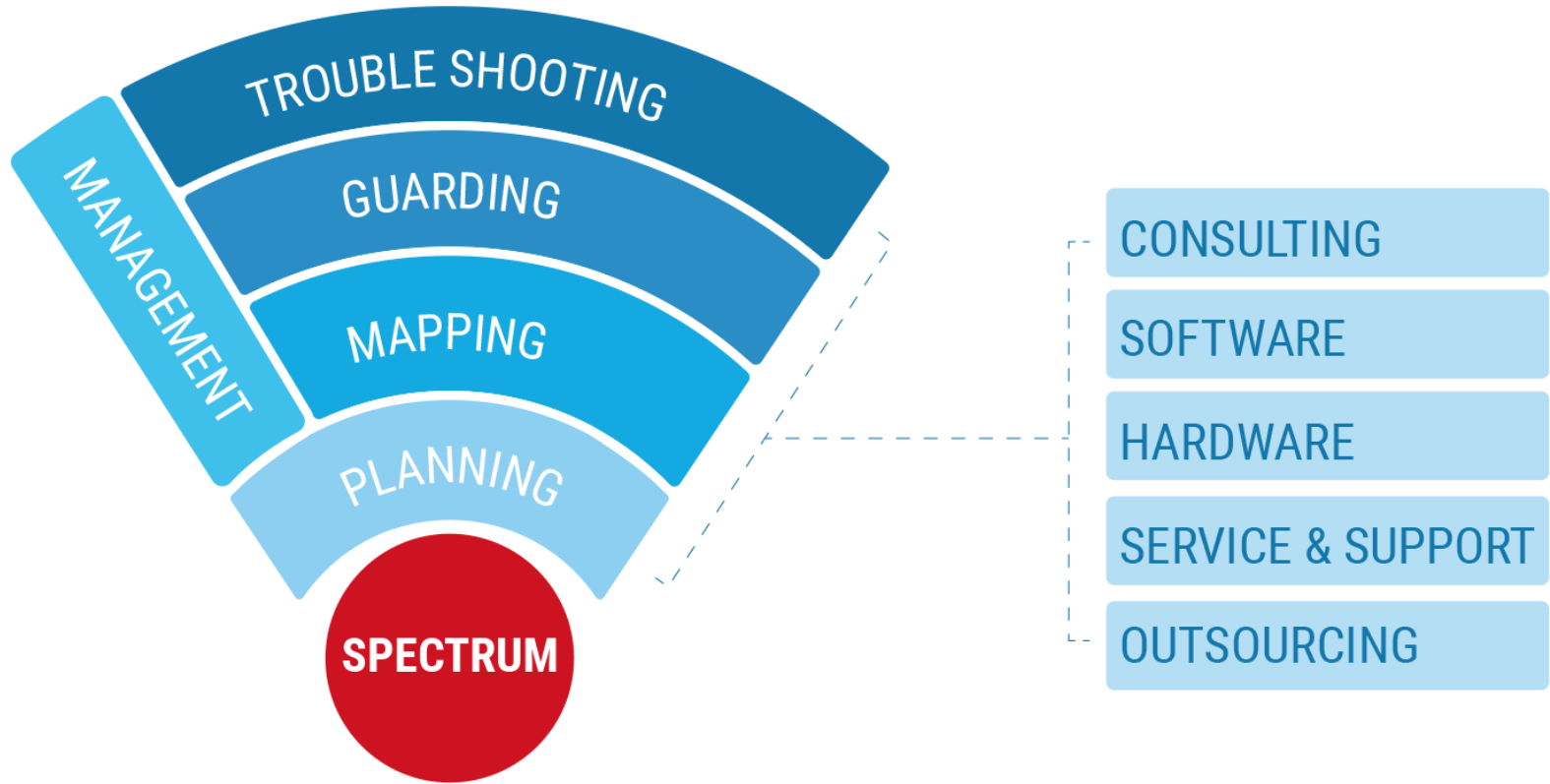


- Difference Clean to Dirty Spectrum 29 dB:

- Interfering Man-Made Noise -81 dBm:

- Clean Noise Floor -110 dBm:





Planning

Services and tools for conception, design, realization and optimization of reliable, highly available and safe indoor and outdoor radio networks.

Management

Workflow-based approval & management processes for radio communication infrastructure and users. Management solution based on a central spectrum database, co-existence, analysis, governance and internal rules.

Mapping

Spectrum inventory measurements and coverage simulations to validate the current spectrum usage. Identification, location and assessment of unknown transmissions. Improving the data basis for future decisions.

Guarding

Permanent radio monitoring as a preventive early-warning system to avoid, identify, locate and solve network problems. Avoiding problems preferably before they become safety or business critical.

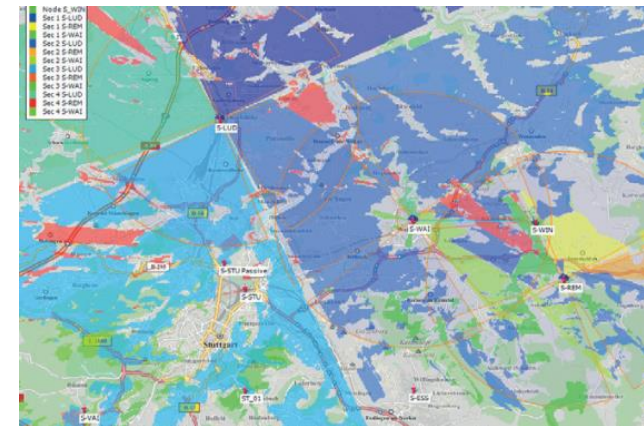
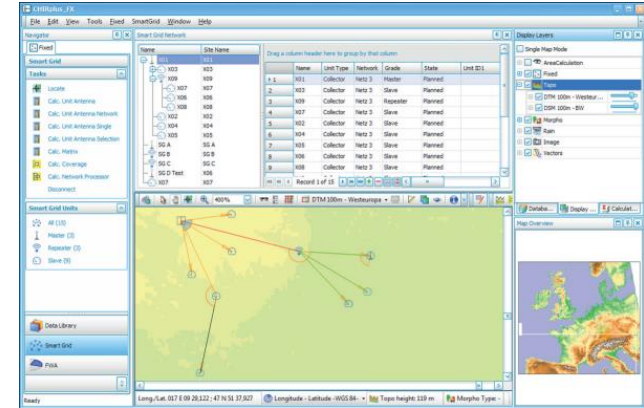
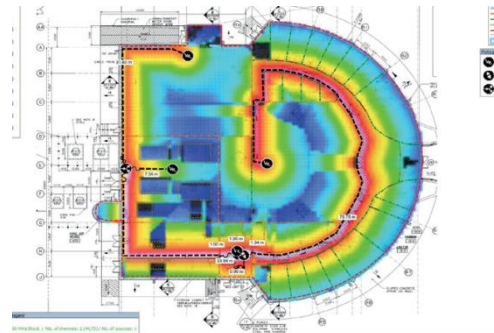
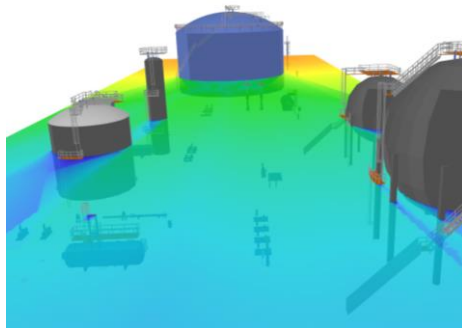
Trouble shooting

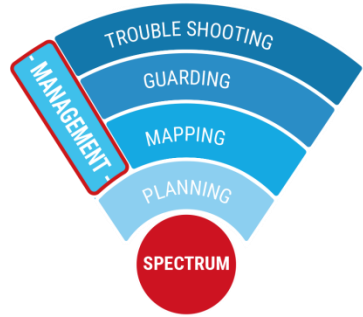
Elimination of identified problems and issues.



Module at a glance

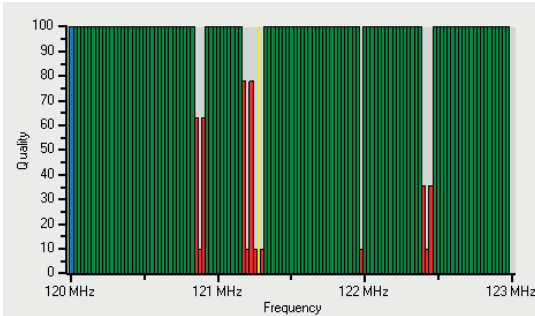
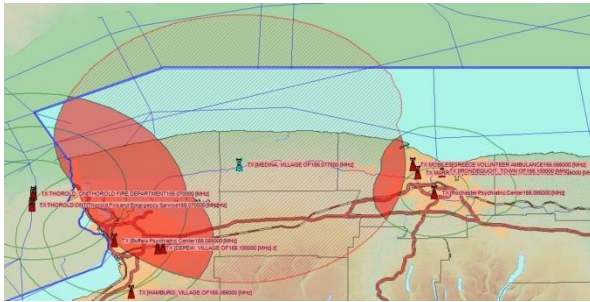
- P1 Concept definition
- P2 System design
- P3 Procurement process
- P4 Network rollout
- P5 System acceptance
- P6 Network optimization





Module at a glance

- MG1 Central database
- MG2 Web-based access
- MG3 Workflow-based approval processes
- MG4 Co-existence / compatibility analysis
- MG5 Equipment & user management
- MG6 Cloud-based: private / public



License holder License holder contact Applicant

Company name Name Company Name

Address Function Name

Postal address Telephone Function

Telephone Mobile Telephone

Website Email Mobile

Email

General information

8/03/2018

Period of use Purpose

8/03/2018 - 8/03/2018

frequency power transmitter receiver transmitter & receiver

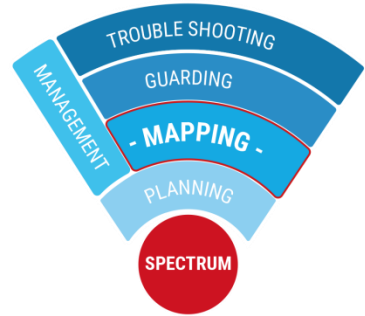
Low Power Devices WIFI

Equipment manufacturer type band

Antenna manufacturer type height direction beam width

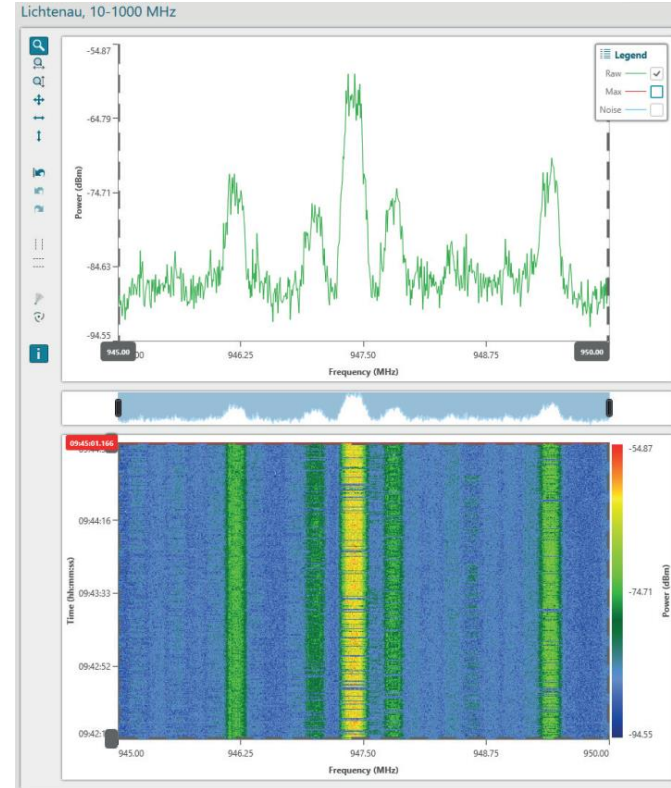
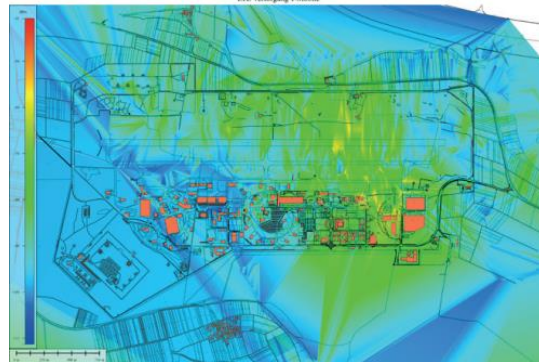
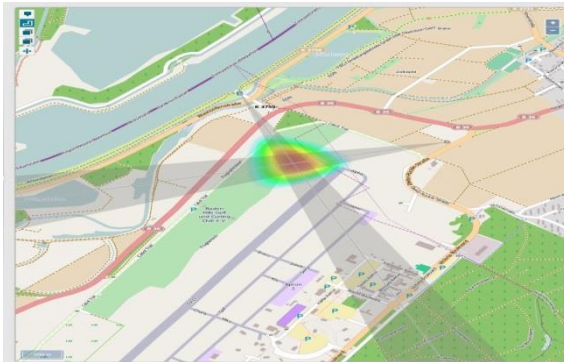
Location GPS coordinates description

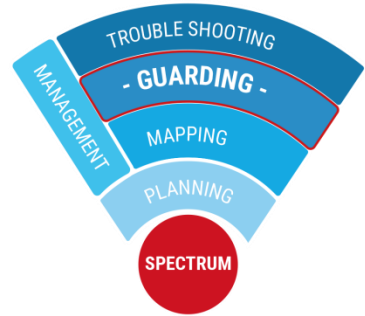
Amsterdam Airport Schiphol



Module at a glance

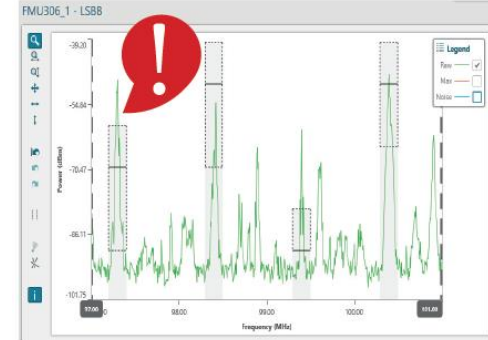
- M1 Inventory by data collection
- M2 Inventory by measurements
- M3 Radio coverage measurements
- M4 Coverage calculations & simulations
- M5 Co-spectrum usage identification
- M6 Transmitter localization





Module at a glance

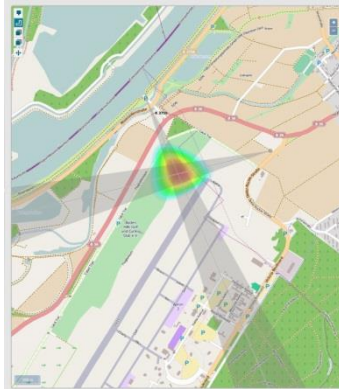
- G1 Monitoring hardware
- G2 Monitoring software
- G3 Monitoring operation
- G4 Database comparison
- G5 Automatic violation detection & alarming
- G6 Reporting & documentation



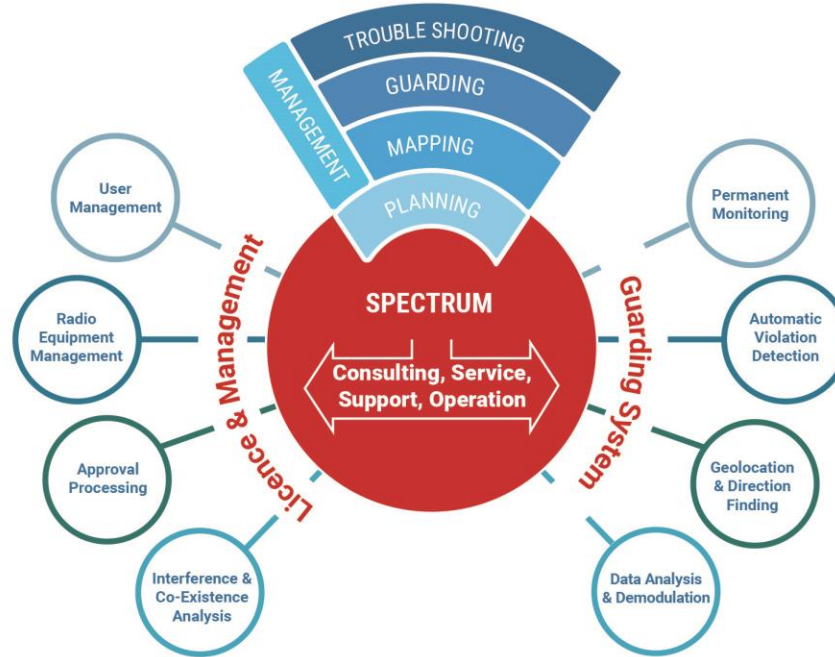


Module at a glance

- TS1 Radio monitoring equipment
- TS2 Geolocation & direction finding equipment
- TS3 On-demand operations
- TS4 Remote & on-site services
- TS5 Different insurance packages
- TS6 Interface to 3rd party 'regulators'









Thank you for your attention

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