

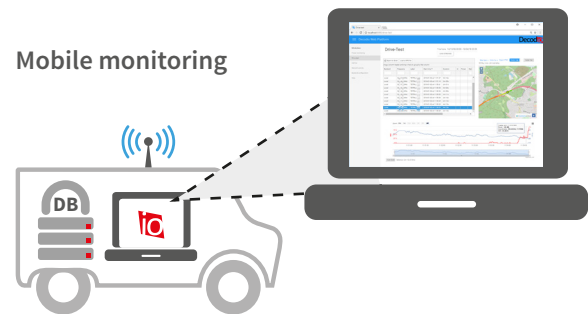
# DECODIO **RUNNER**

**Decodio RUNNER** extends the well proven and tested, state of the art air-interface analysis system Decodio NET by a location mapping capability to provide an advanced mobile drive-test solution for network verification, coverage assessment and troubleshooting.

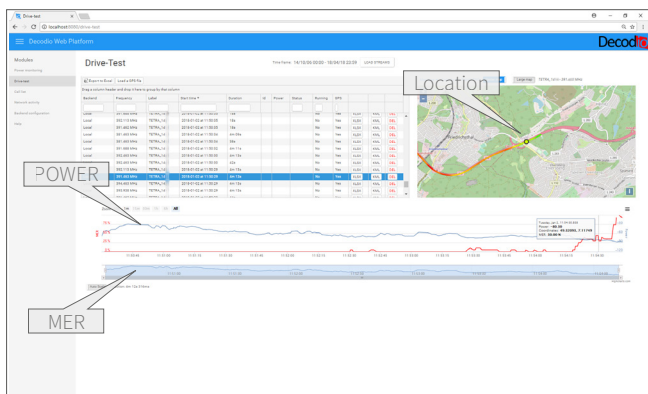
## APPLICATIONS

- **Coverage tests**  
perform real-time network coverage tests and get cartographic information with power and quality values
- **Network planning and verification**  
verify your network planning with „real world“ measured coverage parameters
- **Interference tests**  
find interfering channels and signals

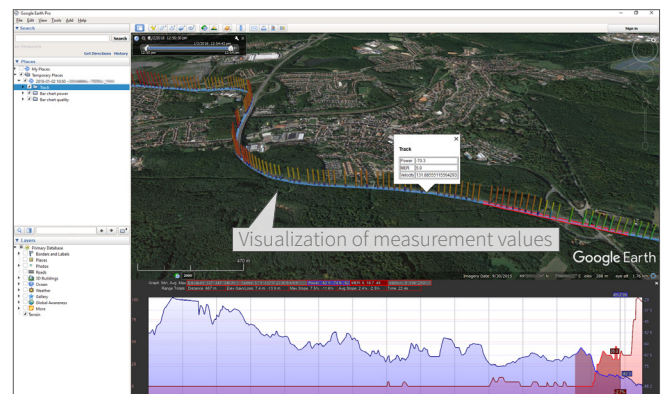
## Mobile monitoring



A wideband input signal is acquired, channelized and decoded. All protocol data are logged into a database and available for further processing.



Drive test GUI



Data export into Google Earth

## HIGHLIGHTS

### Wideband, multi-channel drive tests

- do it in one ride!
- multiple receivers can scan multiple channels and protocols
- auto detection of protocol/carrier

### Portable and mobile solution

- portable, lightweight solution with high autonomy time
- possible to mount into a measurement vehicle

### Professional data acquisition

- Short measurement intervals
- Reliable, stable and calibrated measurement values
- Different measurement triggers (time or position)
- Standard interface for GNSS receiver (NMEA data)

### Wide range of post analysis

- the whole measurement can be recorded for post-analysis
- Data export (e.g. Microsoft Excel, Google Earth)
- Protocol dependent events shown on map (e.g. handover)

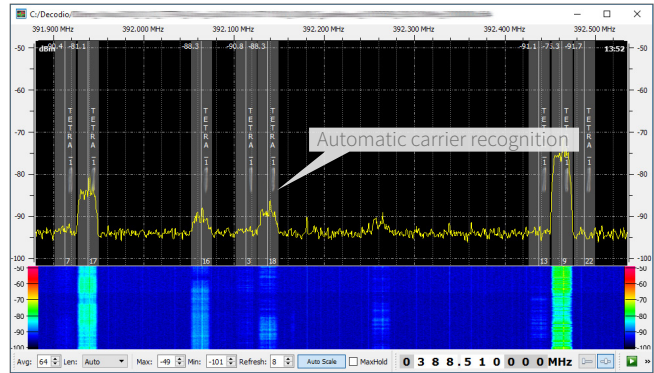
### Easy to use

- intuitive and self-explaining drive test application
- ready to go (no timely startup sequences)
- wide range of maps for visualization incl. offline cache (GoogleMaps, OpenStreetMap, MapQuest, SwissTopo)

The intuitive application allows a decoding and measurement of up to 255 narrow band channels and an easy detection of spots with weak signal coverage. A data export to 3rd party software such as Microsoft Excel or Google Earth allows different post data analysis workflows. Decodio offers full support for TETRA, Tetrapol, NXDN, DMR, dPMR and P25 protocols.

The power measurements are carried out in time-domain with a sampling rate larger than the signal bandwidth.

Sampling rate and averaging/quantile values meet the Lee criteria for any given carrier frequency and measurement unit velocity.



Spectrum analysis

Item	Frequency	MER	Status	Load	Cell Info	No of Carriers	No of Calls
MCC: 282 - DE						11	2
MNC: 10						2	
LA: 14					...1.462500 - Sec: 1, 3 - CC: 21	2	1
> CN: 3658	381.4625 (ID: 7)		DISC				0
> CN: 3658 - MC	391. (ID: 1)	0%	ACTIVE				1
LA: 14					...1.687500 - Sec: 1, 3 - CC: 51	1	0
> CN: 3667 - MC	391.6880 (ID: 5)	n/a	DISC				0
LA: 14					...3.937500 - Sec: 1, 3 - CC: 16	1	1
> CN: 3757 - MC	393.9 (ID: 4)	70%	ACTIVE				1
LA: 14					...0.462500 - Sec: 1, 3 - CC: 43	1	0
> CN: 3619 - MC	390.4 (ID: 11)	n/a	DISC				0
LA: 14					...0.462500 - Sec: 1, 3 - CC: 13	1	0
> CN: 3618 - MC	390.4 (ID: 10)	90%	ACTIVE				0
LA: 14					...2.462500 - Sec: 1, 3 - CC: 34	1	0
> CN: 3778 - MC	394.4 (ID: 3)	n/a	DISC				0
LA: 14					...4.537500 - Sec: 1, 3 - CC: 10	1	0
> CN: 3698 - MC	392.4 (ID: 6)	n/a	DISC				0
LA: 14					...2.112500 - Sec: 1, 3 - CC: 11	1	0
> CN: 3781 - MC	394.5 (ID: 8)	n/a	DISC				0
LA: 14							0
> CN: 3684 - MC	392.1 (ID: 2)	n/a	DISC				0

TETRA tree-view for network-overview

StreamId	Label	Frequency	Power	Running	ChannelStatus	CalculatedFreq	MainFreq	System	BER	MER	MCC	MNC	LA	CN	CC	SecClass	ServiceDetails	Calls
2	TET...	391.76	-89.5	true	DISC	391.7500	391.7	TMO			282	10	14	36	51	1, 3	0x067	0
3	TET...	392.10	-90.2	true	DISC	392.1250	392.2	TMO			282	10	14	36	11	1, 3	0x067	0
4	TET...	391.26	-90.6	true	DISC	391.2500	391.3	TMO			282	10	14	37	15	1, 3	0x067	0
5	TET...	393.80	-90.0	true	DISC	393.7500	393.7	TMO			282	10	14	37	16	1, 3	0x067	0
6	TET...	394.80	-73.7	true	ACTIVE	394.7500	394.7	TMO	5	15	282	10	14	37	10	1, 3	0x067	1
7	TET...	391.26	-90.1	true	DISC	391.2500	391.2	TMO			282	10	14	36	6	1, 3	0x067	0
8	TET...	390.26	-90.1	true	DISC	390.2500	390.2	TMO			282	10	14	36	43	1, 3	0x067	0
9	TET...	392.26	-84.3	true	ACTIVE	392.2500	392.2	TMO	20	79	282	10	14	36	34	1, 3	0x067	1
10	TET...	391.27	-90.8	true	DISC	391.2500	391.2	Uplink			282	10	14	36	21	1, 3	0x067	0
11	TET...	390.82	-79.5	true	ACTIVE	390.7500	390.7	TMO	5	35	282	10	14	36	61	1, 3	0x067	0
12	TET...	394.13	-89.2	true	DISC	394.1250	394.1	TMO			282	10	14	37	10	1, 3	0x067	0
13	TET...	392.77	-90.2	true	DISC	392.7500	392.7	TMO			282	10	14	36	26	1, 3	0x067	0
14	TET...	391.67	-90.9	true	DISC	391.7500	391.7	Uplink			282	10	14	36	51	1, 3	0x067	0
15	TET...	394.77	-90.3	true	DISC	394.7500	394.7	Uplink			282	10	14	37	10	1, 3	0x067	0
16	TET...	392.36	-90.0	true	DISC	392.2500	392.2	TMO			282	10	14	36	13	1, 3	0x067	0
17	TET...	391.85	-90.0	true	DISC	391.7500	391.7	TMO			282	10	14	36	18	1, 3	0x067	0
18	TET...	392.74	-89.8	true	DISC	392.7500	392.7	TMO			282	10	14	36	12	1, 3	0x067	0
19	TET...	391.79	-89.6	true	DISC	391.7500	391.7	TMO			282	10	14	36	12	1, 3	0x067	0
20	TET...	393.27	-90.1	true	DISC	393.2500	393.2	TMO			282	10	14	37	43	1, 3	0x067	0
21	TET...	394.85	-90.3	true	DISC	394.7500	394.7	TMO			282	10	14	37	15		0x020	0
22	TET...	392.78	-90.2	true	DISC	392.7500	392.7	TMO			282	10	14	36	7	1, 3	0x067	0
23	TET...	393.79	-90.3	true	DISC	393.7500	393.7	TMO			282	10	14	37	50	1, 3	0x067	0
24	TET...	390.28	-89.9	true	DISC	390.2500	390.2	TMO			282	10	14	36	12	1, 3	0x067	0
25	TET...	380.67	-90.8	true	DISC	390.1250	390.1	Uplink			282	10	14	36	61	1, 3	0x067	0

TETRA carriers

**TECHNICAL DATA**

Channel bandwidth	8 kHz to 2 MHz
Max. number of channels (in parallel)	255
Measurement triggers	<ul style="list-style-type: none"> <li>time based (e.g. every millisecond)</li> <li>position based (e.g. every meter)</li> </ul>
Measurement interval	1 / sampling rate (time-domain measurement)
Measurement sample averaging	10ms - 2sec (calculation of quantiles and averaging)
Measurements	<ul style="list-style-type: none"> <li>Power (dBm)</li> <li>Quality (BER, MER)</li> </ul>
Supported maps	<ul style="list-style-type: none"> <li>Google Maps</li> <li>OpenStreetMap</li> <li>MapQuest</li> <li>SwissTopo (Switzerland)</li> </ul>
NMEA data (GNSS)	<ul style="list-style-type: none"> <li>GNSS receiver</li> <li>Spectrum analysers with GNSS</li> <li>Network socket</li> </ul>
Maximum real-time bandwidth	Up to 40 MHz (depending on receiver)
Supported digital PMR protocols	<ul style="list-style-type: none"> <li>TETRA</li> <li>Tetrapol</li> <li>NXDN</li> <li>DMR</li> <li>dPMR</li> <li>P25</li> <li>Analog modulations</li> <li>others on request</li> </ul>

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