MERlin
DVB-T2 and DVB-T
Monitoring receiver

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MERlin DVB-T2 and DVB-T monitoring

The MERlin receiver provides high performance monitoring of RF modulation parameters including the Modulation Error Ratio (MER) and Low Density Parity Check (LDPC). It delivers consistent, stable measurements even in difficult conditions where echoes are present or where signals are received from other transmitters operating at the same frequency.

Relay site monitoring
MERlin's combination of measurement capability and cost effectiveness make it the ideal solution for monitoring the RF status of remote transposer and re-broadcast link sites. MERlin's adjacent channel performance enables operation in the presence of high power adjacent channels - a key requirement for relay site monitoring. MERlin can be deployed to monitor the RF signal quality at either the input or output of the relay site and to check the DVB-T2 modulation parameters are correct.

Off-air monitoring
MERlin can be used as an off-air monitoring device to receive, demodulate and monitor key RF Quality of Service (QoS) metrics on the RF signal with essential transport stream checks. DVB-ASI output is available for additional transport stream diagnostics and decoding.

Transmitter site monitoring
At main transmitter sites the signal at the RF monitor port can be monitored for correct configuration of DVB-T2 signal parameters and as a check on signal quality. Essential transport stream content checks can be made within MERlin and a DVB-ASI output is available for additional transport stream diagnostics or video/audio decoding to perform a final check on content quality after modulation.

DVB-T2 and DVB-T support
MERlin is able to receive, demodulate and monitor RF signal quality for both DVB-T2 and DVB-T broadcast signals. All DVB-T2 single PLP (mode A) modes are supported in accordance with the DVB-T2 standards. In addition to deployment in DVB-T2 networks, MERlin can also be deployed in DVB-T networks, providing a future proof solution for those considering the possibility of DVB-T2 deployment in the future.

MERlin web interface

DVB-T2 summary

DVB-T2 receiver settings and alarm configuration

DVB-T2 template configuration

Templates
The structure of a DVB-T2 signal is complex and requires detailed monitoring to ensure that the correct format is transmitted. Templates are a powerful tool to simplify the verification of such complex signals.

MERlin allows a template to be generated, which is used to compare the received DVB-T2 signal against the expected modulation parameters.

Seven fixed templates that correspond to the UK OFCOM standard are provided plus seven user definable templates.

Template configuration
Templates are configured either using the built in web page interface or by SNMP.

Each parameter of the template can be programmed to verify that the parameters of the broadcast signal are as expected by the transmitter operator.

Error correction monitoring
Monitoring Low Density Parity Check codes (LDPC) is useful to determine how hard the error corrector is working and particularly relevant at relay sites.

MERlin provides the capability to monitor LDPC performance enabling operators to determine when a broadcast signal is close to becoming un-correctable.

Signal quality monitoring
DVB-T2 can use 256QAM modulation to achieve higher data rate when compared with DVB-T. The higher modulation index results in loss of signal margin, compensated by improved error detection and correction.

Monitoring MER (and LDPC) provides an early indication of any degradation in quality of service enabling operators to be proactive in resolving network issues.

Adjacent channel performance
A relay site is typically a difficult RF environment. Low power reception signals are received in the presence of high power transmissions on the transmitter side. A key requirement for relay site monitoring is the ability to operate successfully in the presence of higher power adjacent channels (better than +10dB). A highly specified receiver is of little use if the adjacent channel performance is marginal.

MERlin comfortably exceeds adjacent channel performance requirements for use at relay sites.

Payload checking
The most common source of payload/content problems is incorrect Mux configuration. A payload checking option is available to monitor PAT conformance and PID presence against a user defined list of expected PIDs.

Alarms and event log
MERlin can provide the following alarms in the event that a signal condition is out of specification and a log is provided which records all alarms and timestamp information.

- If the received DVB-T2 signal parameters are different to the current template, an alarm can be generated.
- RF input level is monitored against upper and lower limits.
- Modulation Error Ratio (MER) is measured on a continuous basis. If the value of MER falls below a programmable level, an alarm is generated.
- Alarm limits can be set for LDPC and an alarm generated if error correction exceeds the threshold set by the user.
- Alarms can be set for frequency error to ensure that the transmitter is on frequency.
- Upper and lower TS bit rate alarms can be set.
- Pre LDPC and Pre BCH BER alarms can also be set.
- With the payload checking option an alarm can be triggered if the basic transport stream content and structure is not as expected.

A pair of closing contacts is available for monitoring of alarms and a reset in pin is included as not all remote relay sites have Ethernet access. Alarms are configured by either the web page or by SNMP.

Design for high reliability
All measurements, tests and logs are performed and maintained in the MERlin device itself so it will continue to function in the event of control network problems.

MERlin is not PC based so in the event of a power outage boots up in seconds.

SNMP control
The SNMP interface improves the ease with which customers can control and monitor MERlin using their existing network management systems.

Web page interface
The web page is contained within MERlin, enabling a suitable browser enabled PC to monitor and control the unit.

All pages may be viewed and configuration pages are password protected before changes can be made.

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MERlin is a self-contained receiver for continuous off-air demodulation and monitoring of DVB-T2 and DVB-T signals. MERlin monitors input RF modulation parameters and signal performance metrics including Modulation Error Ratio (MER) and Low Density Parity Check (LDPC) status. With a high reliability design for use at remote sites, MERlin combines technical performance and versatility with excellent value in a 1RU package.

Technical specifications:

RF input
- Input connector: N type
- Return loss: 6dB typical
- Tuning range: 178MHz to 858MHz

ASI output
- Output connectors: 2 off BNC type, 75Ω typical, DVB-ASI compliant
- ASI format: Byte mode

Power
100-240 VAC, 60/50Hz 50W max

Physical/Environment
- Dimensions: 1RU high, 483mm wide, 320mm deep
- Weight: 2.4kg
- Operating temperature: 0 - 40ºC

Graphical User Interface
- PC requirements: Microsoft Internet Explorer 9

	DVB-T2	DVB-T
DVB standard	All single PLP (mode A) modes defined within EN 302	755DVB-T in accordance with specification EN 300 744
Modulation		
Guard interval:	1/4, 19/128, 1/8, 1/32, 1/128, 19/256, 1/16	1/4, 1/8, 1/16, 1/32
Code rate:	1/2, 2/3, 3/4, 5/6, 7/8, 3/5, 4/5	1/2, 2/3, 3/4, 5/6, 7/8
Modulation:	QPSK, 16, 64, 256 QAM	QPSK, 16QAM, 64QAM
FFT:	1k, 2k, 4k, 8k, 16k, 32k	2k, 8k
Modulation status		
[T] denotes parameter tested with template	Selected PLP, Pilot pattern [T], Constellation [T], FFT [T], Guard interval, FEC [T], Rotation [T], PAPR, Extended carrier, L2 post signalling [T], No of T2 frames/superframe [T], Time interleaving blocks/frame [T], Time interleaving blocks/frame [T], No of data symbols/T2 frame [T], FEC blocks/interleaving frame, FEC block length [T]	Constellation COFDM mode Guard interval Hierarchy HP FEC LP FEC
Modulation ident	Cell ident, T2 system ident, network ident	
Measurements and alarms		
Measured parameters:	Input level (dBm) MER (dB) Lock status Frequency (kHz) Offset Frequency error (kHz) TS bit rate Pre LDPC BER Pre BCH BER LDPC error ratio, LDPC instantaneous iterations LDPC error total/period, samples/period, mean error rate LDPC means error (upper), warning (upper), iteration (upper) Tuner temperature (°C)	Input level (dBm) MER (dB) Lock status Frequency (kHz) Offset Frequency error (kHz) BER pre viterbi BER post viterbi UCE UCE total Tuner temperature (°C)
Alarm parameters:	TS sync loss PAT repetition* PID presence against user defined list (up to 6 PIDs checked)* Tuned Alarm relay (summary) RF input level (upper and lower) MER (lower) Frequency error (upper and lower) T2 template error LDPC mean error (upper) LDPC warning (upper) LDPC interation (upper) Pre LDPC BER (lower), Pre BCH BER (lower) TS bit rate (upper and lower) Receiver lock Tuner temperature (upper and lower)	TS sync loss PAT repetition* PID presence against user defined list (up to 6 PIDs checked)* Tuned Alarm relay (summary) RF input level MER Frequency error BER pre viterbi BER post viterbi Receiver lock Tuner temperature

* available with Payload Checking Option

As a result of continual product development, specifications are subject to change without notice.