Description

Based on ActiveCore® Platform, AVQ1020DVBT is an embedded RF layer monitoring receiver and signal analyzer for DVB-T, DVB-H, and DVB-T2 digital television standards. It has been designed as an easy-to-use and cost-effective solution for remote monitoring digital transmitter system performance and transmitted signal quality and, therefore, ensuring consistent Quality of Service (QoS) of the network. AVQ1020DVBT features a comprehensive alarm system that can be accessed via multiple interfaces and be set up to control the main components of the transmitter system in case of emergency. Additionally, the receiver is versatile for use as a stand-alone unit during in-field and production tests.

Technical Specification

<table>
<thead>
<tr>
<th>Main signal input “RF in”(1):</th>
<th>Monitored Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Connector:</strong> 50Ω, N-type</td>
<td><strong>General:</strong> PAR, RMS.</td>
</tr>
<tr>
<td><strong>Level:</strong> 0 .. -50dBm, -20 dBm optimum</td>
<td><strong>Spectral:</strong> Bandwidth, Central Frequency shift, Peak-to-Average Power, Shoulder Attenuation.</td>
</tr>
<tr>
<td><strong>Frequency range:</strong> 48, 1000 MHz(2)</td>
<td><strong>DVB-T/H/T2 Standard Specific:</strong> Spectral mask (ETSI TR 101 290); SNR/EVM/MER; DVB-T2 L1 Signaling and Frame Structure; Amplitude/Phase signal errors; Group Delay; SFN drift(3).</td>
</tr>
<tr>
<td><strong>Frequency tuning step:</strong> 10Hz</td>
<td><strong>Distortions:</strong> AM-AM, AM-PM curves(4).</td>
</tr>
<tr>
<td><strong>Analyzed bandwidth:</strong> ≥ 50MHz</td>
<td><strong>Linear:</strong> Amplitude/Phase/Group Delay response.</td>
</tr>
<tr>
<td><strong>Reference frequency:</strong></td>
<td><strong>Default set of alarms:</strong> Spectrum shoulder levels; Signal MER/SNR; Frequency shift.</td>
</tr>
<tr>
<td>1PPS: LVTTL, BNC</td>
<td><strong>Application-specific alarm events(5):</strong> User-defined set of parameters and their thresholds.</td>
</tr>
<tr>
<td>10MHz: 50Ω, BNC, 1Vp-p, sine</td>
<td><strong>Parameter update rate:</strong> ≤ 60 sec.</td>
</tr>
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</table>

**DVB-T/H:**
- **Channel bandwidth:** 5/6/7/8 MHz
- **FFT size:** 2k, 4k, 8k
- **Guard interval:** 1/4, 1/8, 1/16, 1/32
- **Constellation:** QPSK, 16-QAM, 64-QAM

**DVB-T2:**
- **Channel bandwidth:** 1.7/5/6/7/8/10 MHz
- **FFT size:** 1k, 2k, 4k, 8k, 16k, 32k
- **Guard interval:** 1/32, 1/16, 1/8, 1/4, 1/128, 19/128, 19/256
- **Constellation:** QPSK, 16-QAM, 64-QAM, 256-QAM

**Control and Monitor Ports:**
- **Ethernet:** 10/100 Ethernet, RJ45
- **Serial:** RS232, DB9M
- **Relay Control (x2):** Dry contacts, DB9F
- **Power Supply:** 110-250V, 50/60Hz AC
- **Operating temperature:** 0 .. 50 °C
- **Form factors:** 48.3cm x 33cm x 4.3cm

<table>
<thead>
<tr>
<th>Control and Monitor Ports:</th>
<th>Software interfaces:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet: 10/100 Ethernet, RJ45</td>
<td><strong>WEB GUI:</strong></td>
</tr>
<tr>
<td>Serial: RS232, DB9M</td>
<td><strong>SNMP agent:</strong></td>
</tr>
<tr>
<td>Relay Control (x2): Dry contacts, DB9F</td>
<td><strong>Email:</strong></td>
</tr>
<tr>
<td>Power Supply: 110-250V, 50/60Hz AC</td>
<td><strong>Event and alarm log:</strong></td>
</tr>
<tr>
<td>Operating temperature: 0 .. 50 °C</td>
<td><strong>SNR/MER/EVM variation history:</strong></td>
</tr>
<tr>
<td>Form factors: 48.3cm x 33cm x 4.3cm</td>
<td><strong>Shoulder attenuation history:</strong></td>
</tr>
<tr>
<td>1U stand-alone unit: 19” x 13” x 1.7”</td>
<td><strong>SFN drift(3):</strong></td>
</tr>
</tbody>
</table>

(1) Optional 2nd RF input available.
(2) Please, contact Avateq for an extended frequency range.
(3) SFN drift is estimated as DVB-T2 frame start time variations at the transmitter output, for DVB-T2 only.
(4) For DVB-T/H only.
(5) Set of alarms can be tailored to Customer’s application specifics.
AVQ1020DVBT ActiveCore®
RF Layer Monitoring Receiver for DVB-T/H/T2

Measurements and Metrics
► Signal statistic: MER/SNR, signal RMS, PAR, maximum peak value, signal CCDF;
► Frequency spectrum, shoulder attenuation;
► Signal bandwidth and standard specific parameters;
► Effects of the transmission system non-linearity in terms of AM-AM/AM-PM curves measured on the broadcasted signal;
► Linear distortions found in the output RF signal - signal-group delay and frequency response;
► Results of the non-linearity and linearity measurements recalculated in a form of complex LUT and FIR suitable for pre-correction;
► Complex channel estimation for re-broadcasting applications;
► Multipath echo and feedback interference detection, estimation and visualization.

Applications
► DVB-T/H/T2 transmitter/repeater performance and 24/7 QoS monitor;
► Remote monitoring for broadcasting repeater system network;
► Test and design verification equipment;
► DVB-T/H/T2 signal analyzer for a wide variety of applications;
► R & D;
► In-field and production testing.

Samples of Plots

**DVB-T2 L1 Signaling and Frame Structure**

```
S1 found = 0, T2_SISO
S2 found = 2, 8k - GI/32/16/8/4, not Mixed
GI = 1/16
MER = 31.577 dB
L1 pre:
  L1 pre: T2 version = 1, 1.2.1
  L1 pre: stream = 0, T2 only
  L1 pre: bit_rate = 1
  L1 pre: DCI = T2_SISO
  L1 pre: SC = 0, DCI = T2_SISO
  L1 pre: RLC = 1, 8k - GI/32/16/8/4, not Mixed
  L1 pre: QAM = 64-QAM
  L1 pre: L1 Rate = 1/2
  L1 pre: L1 Bandwidth = 316
  L1 pre: L1 PAPR = 0, L1-ACE/P2-TR
  L1 pre: L1 mod = 3, 64-QAM
  L1 pre: L1 code = 0, 1/2
  L1 pre: L1 FEC = 0, LDPC 16k
  L1 pre: L1 Post Size = 250
  L1 pre: L1 Post Info Size = 318
  L1 pre: PP = 7, PP8
  L1 pre: Tx_ID = 0, FREQUENCY = 729833333
  L1 pre: FEF_TYPE = non
  L1 pre: (1) PLP_ID = 0
  L1 pre: (1) PLP_TYPE = 1, Data PLP Type 1
  L1 pre: (1) PLP_PAYLOAD_TYPE = 3, TS
  L1 pre: (1) FIRST_RF_IDX = 0
  L1 pre: (1) FIRST_FRAME_IDX = 0
  L1 pre: (1) PLP_GROUP_ID = 1
  L1 pre: (1) PLP_MOD = 3, 256-QAM
  L1 pre: (1) PLP_FEC_TYPE = 1, 64k LDPC
  L1 pre: (1) PLP_NB_BLOCKS_MAX = 50
  L1 pre: (1) FRAME_INTERVAL = 1
  L1 pre: (1) FRAME_ID = 0, LENGTH = 3
  L1 pre: (1) FRAME_ID = 0, Reserved = 0
  L1 pre: (1) FRAME_ID = 0, Reserved = 0
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