25 Oct 1989

TSDNN-D

TEST SET, ENVELOPE DELAY

1. GENERAL. This procurement requires an envelope delay test set containing a digital storage oscilloscope.

2. CLASSIFICATION. Type II, Class 5, Style E, and Color R in accordance with MIL-T-28800 for shipboard applications.

3. OPERATIONAL REQUIREMENTS. The equipment shall be capable of circuit quality measurement of voice band transmission networks within the minimum parameters and accuracies specified below.

3.1 Transmitter output level. Adjustable from -39 dBm to +9 dBm in 1 dB steps.

3.1.1 Holding tone. 1.004 kHz within ±0.1 Hz.

3.1.2 Carrier frequency range. 200 Hz to 4 kHz. Selectable modulation frequencies of 25 Hz and 83.3 Hz shall provide up to 50% modulation.

3.1.3 Oscillator tuning. Manual, single sweep, and auto sweep. The sweep rate shall be variable up to at least one second.

3.1.4 Distortion tones.

a. Pair A: Centered at 860 Hz, 6 Hz apart.

b. Pair B: Centered at 1.38 kHz, 16 Hz apart.

3.1.5 Output impedance. Selectable 600 ohms and 900 ohms nominal.

3.1.6 Harmonic distortion. 0.5% or less of the fundamental amplitude.

3.2 Receiver.

3.2.1 Frequency range. 200 Hz to 4 kHz.

3.2.2 Input level. -50 dBm to +9 dBm.

3.2.3 Input impedance.

a. Bridged: Greater than 25 kilohms.

b. Terminated: 600 ohms and 900 ohms nominal.

3.3 Level measurement.

3.3.1 Dynamic range. 59.9 dB.

3.3.2 Level measurement accuracy. ±0.2 dB from +9 dBm to -40 dBm.

3.3.3 Level measurement resolution. 0.1 dB or less.

3.4 Noise measurement. Noise-with-tone and idle noise measurement capabilities shall be provided.

3.4.1 Filters. C-message and 3 kHz filter weighing shall be provided. A notch filter from 995 Hz to 1.025 kHz referenced at -50 dB or greater shall be provided.

3.4.2 Receiver range. 99 dBrn to 20 dBrn.

3.4.3 Noise measurement resolution. 1 dB or less.

3.5 Phase jitter.

3.5.1 Holding tone range. 990 Hz to 1.03 kHz.

3.5.2 Phase jitter bandwidth. 20 Hz to 300 Hz.

3.5.3 Phase jitter measurement range. 0° to 30° peak-to-peak.

3.5.4 Phase jitter accuracy. 5% ±0.2° of indication.

3.6 Distortion. The equipment shall be capable of nonlinear second and third order distortion measurements.

3.6.1 Distortion measurement range. 10 dB to 55 dB.

3.6.2 Distortion accuracy. ±1 dB.

3.6.3 Distortion measurement resolution. 1 dB or less.

3.7 Envelope delay.

3.7.1 Envelope delay measurement range.

a. ±6 ms with 50% modulation at 83.3 Hz.

b. ±10 ms with 50% modulation at 25 Hz.

3.7.2 Envelope delay measurement accuracy. ±1.75 ms over the range of 500 Hz to 3.2 kHz.

3.7.3 Sync control. The equipment shall be provided with a variable sync control to adjust the internal modulation reference to the modulating source frequency at the far end of two-wire circuits.

3.8 Hit measurements. The equipment shall be capable of gain and phase transient variations, impulse noise, and signal dropout measurements.

3.8.1 Timer. Selectable ranges of 5 minutes, 15 minutes, and continuous shall be provided.

3.8.2 Count rate. 7 per second minimum.

3.8.3 Count range. 0 to 9,999.

3.8.4 Hit duration. The equipment shall sense hits of a width of 4 ms or greater.

3.8.5 Dropout. The equipment shall sense dropouts of 4 ms or greater. The dropout threshold value

shall be adjustable to a constant value of 12 dB below the input level setting.

3.8.6 Phase hit threshold. Adjustable in 5° increments from 5° to 45°.

3.8.7 Gain hit threshold. Adjustable in 1 dB increments from ±1 dB to ±6 dB.
3.8.8 Impulse threshold. Adjustable in 1 dB increments from 99 dBrn to 40 dBrn.

3.9 Peak to average ratio (PAR).

3.9.1 Display range. 0 to 120 PAR units.

3.9.2 PAR measurement accuracy. ±4 PAR units.

3.10 Oscilloscope. The equipment shall contain a dual memory storage oscilloscope.

3.10.1 Display controls. Focus, intensity, astigmatism, and graticule illumination controls shall be provided.

3.10.2 Memory selection. A minimum of three memory positions shall be provided, typically memory A, memory B, and memories A and B.

3.10.3 Mode selection. The following mode positions shall be provided:

a. Clear: Selected memory is reset.

b. Load: Selected memory is loaded with the response signal.

c. Input: Input signals are displayed in real time.

d. Memory: Display is derived from the selected memory.

e. Input and memory: Both the selected memory and the real time input are displayed.

f. Dynamic: Both A and B memories are displayed. B memory is also updated continuously by the input signal.

3.11 Outputs. The equipment shall be provided with outputs for external display, recording, and equipment control as follows. Hit counter outputs shall be buffered and TTL compatible.

a. Gain hit.

b. Phase hit.

c. Impulse.

d. Dropout.

e. Phase jitter.

f. X-Y plotter, ±2V full scale.

g. X-Y axis for CRT display.

3.11.1 Monitor. The equipment shall be provided with an internally mounted monitor speaker.

4. GENERAL REQUIREMENTS.

4.1 Power source. MIL-T-28800 nominal power source requirements are invoked. Operation at 400 Hz is not required. Maximum power consumption: 50W.

4.2 Weight. 20 kg (44 lb) maximum.

4.3 Lithium batteries. Per MIL-T-28800, lithium batteries are prohibited without prior authorization. A request for approval for the use of lithium batteries, including those encapsulated in integrated circuits, shall be submitted to the procuring activity at the time of submission of proposals. Approval shall apply only to the specific model proposed.