

## Technical Note TN-21

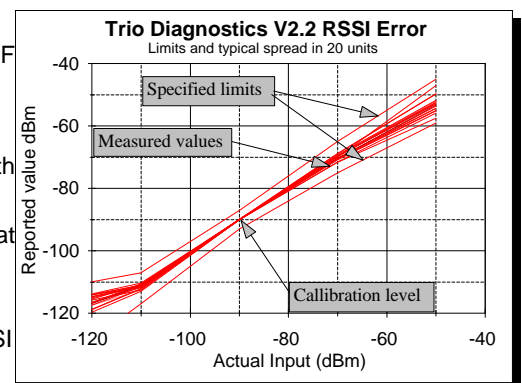
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# TRIO D SERIES RSSI ACCURACY

The following technote sets out the accuracy expectations of the Received Signal Strength of remote DR900 series product as reported by Trio Diagnostics V2.1 or any third party diagnostics software complying with the Trio Diagnostics protocol spec V1-Issue2.

There are 4 variables which determine the first order accuracy of the reported level, namely -

1. The linearity of the RSSI output current Vs signal input of the NE615 IF chip in the DR900 receiver.
2. The philosophy of the calibration and calculation algorithms.
3. The variation of the RSSI output current of the NE615 IF chip with temperature.
4. The accuracy and repeatability of the calibration phase carried out at point of manufacture.



Tests using the algorithms of V2.1 diagnostics have shown the reported RSSI output Vs input of 20 sample units at 25°C as follows -

This test provided the following statistical results at 25°C

Actual input level >	-110 dBm	-90 dBm	-70 dBm	-50 dBm
As reported by V2.1				
Mean reported level	-111.5 dBm	-90.3dBm	-70.2dBm	-53dBm
Standard deviation	±0.7dBm	±0.3dBm	±0.8dBm	±2.33dBm

The absolute accuracy of the calibration methods used by Trio in the manufacture of these radio units is expected to yield a 97% reliability of calibration to ±2 dB including effects of calibration at temperatures <> 25°C.

**We can therefore specify V2.1 diagnostics at 25°C -**

in terms of the mean value reported and 97% statistical confidence spread of the RSSI level as follows -

Actual input level >	-110 dBm	-90 dBm	-70 dBm	-50 dBm
As reported by V2.1				
Mean reported level	-111.5 dBm	-90.3dBm	-70.2dBm	-53dBm
97% statistical confidence accuracy	+/-4dB	+/- 3dB	+/- 4.5dB	+/- 9dB
Or a delta dB (97%) of >	+2.5..-5.5dB	+2.7..-3.3dBm	+4.3..-4.7dBm	+6..-12dBm

### Temperature effects -

Tests on the temperature drift of the NE615 IF chip show a **mean drift of -0.13dB / °C** over the range 25°C ±30°C.

**Note 1** that this effect is NOT included in the V2.1 diagnostics and must be carried out manually for the temperature reported by diagnostics.

**Note 2** There is not a large enough sample to show a 97% statistical confidence level however it seems likely that the range of this drift value may be about 2:1 which would give a likely **variance (after manual temperature correction) at-10°C and 60°C of about ± 2.2dB.**