Phone Line Impedances

26 AWG Reference Characteristics

Use v_p and Z_0 to determine the distributed parameters

Given

$$v_P = \frac{1}{\sqrt{L_0 \cdot C_0}}$$ *Speed of signal on the 26 AWG wire*

$$Z_0 = \sqrt{\frac{L_0}{C_0}}$$ *Wire impedance*

$$\text{Find}(L_0, C_0) \rightarrow \begin{pmatrix} \frac{Z_0}{v_P} & -\frac{Z_0}{v_P} \\ \frac{1}{Z_0 \cdot v_P} & -\frac{1}{Z_0 \cdot v_P} \end{pmatrix}$$

$v_P := 76\% \cdot c$ *Specification for 26 AWG phone wire*

$Z_0 := 110\Omega$ *Specification for 26 AWG phone wire*

$$L_0 := \frac{Z_0}{v_P} = 0.147154 \cdot \frac{\mu H}{ft} \qquad C_0 := \frac{1}{Z_0 \cdot v_P} = 12.161523 \cdot \frac{pF}{ft} \qquad R_{DC} := 40.81 \frac{\Omega}{1000 ft}$$

$$Z_{NZ}(f) := 370\Omega + \frac{1}{\frac{1}{620\Omega} + j \cdot 2 \cdot \pi \cdot f \cdot 310nF}$$

Off-hook impedance of the lumped model of the standard New Zealand phone cable

Australia Impedance Reference

$$Z_{Aus}(f) := 120\Omega + \frac{1}{\frac{1}{820\Omega} + j \cdot 2 \cdot \pi \cdot f \cdot 120nF}$$

Off-hook impedance of the lumped model of the standard Australian phone cable

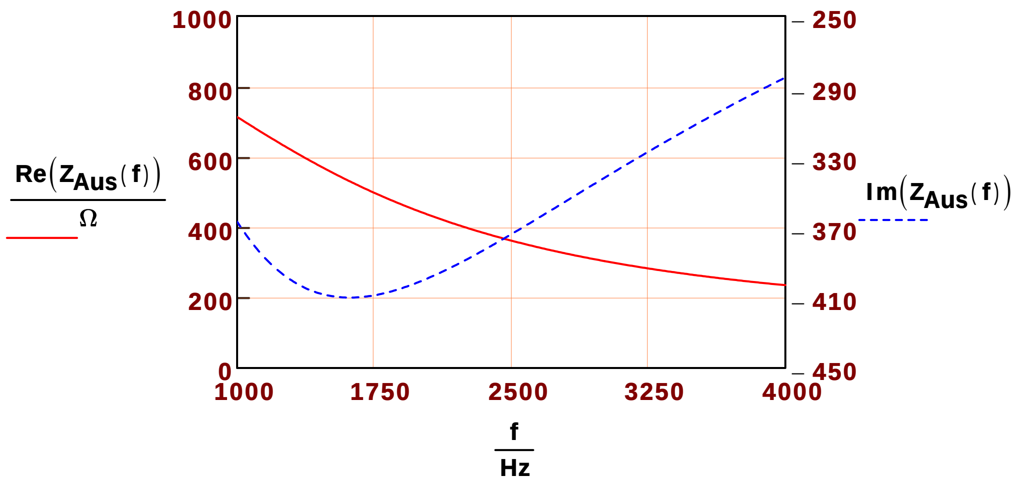
New Zealand Impedance Reference

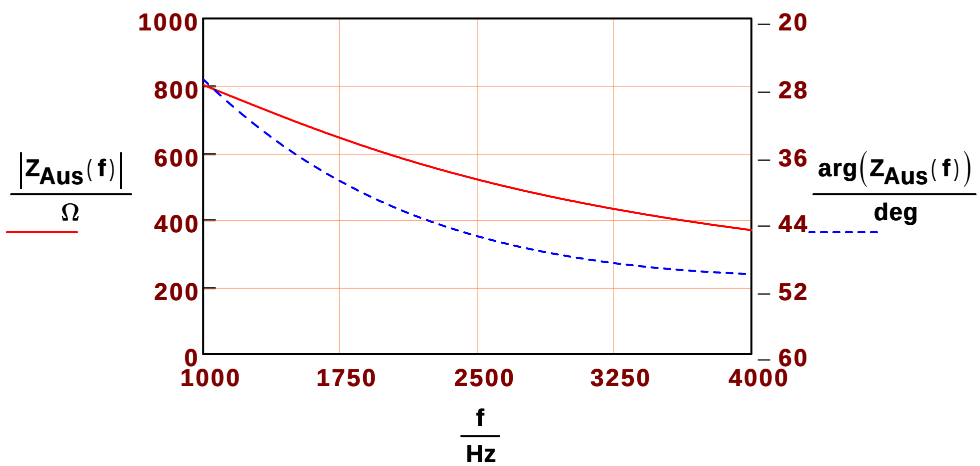
$$Z_C(\omega, L_0, C_0, R_{DC}) := \sqrt{\frac{j \cdot \omega \cdot L_0 + R_{DC}}{j \cdot \omega \cdot C_0}}$$

Characteristic impedance of a 26 AWG wire pair

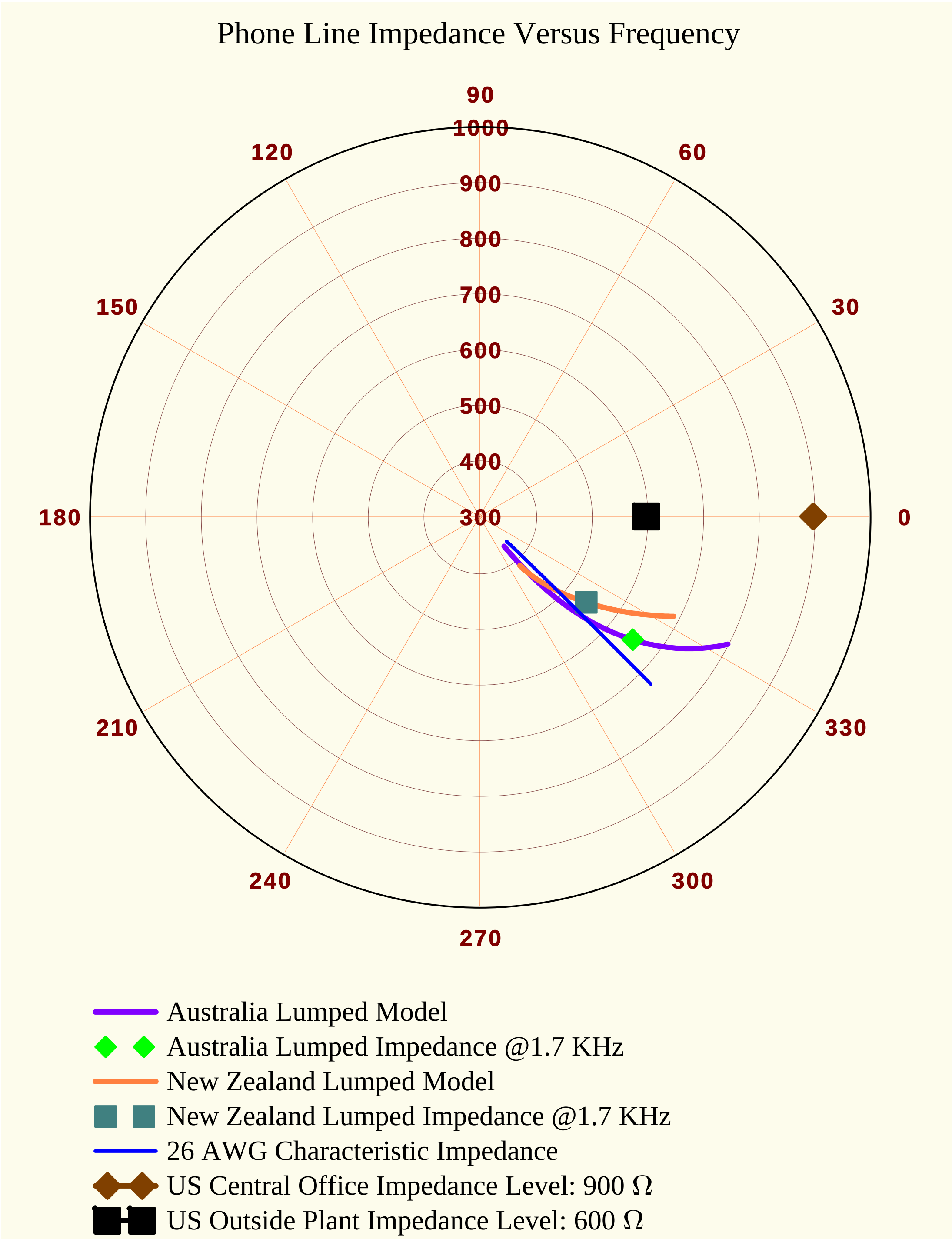
$f := 1000Hz, 1010Hz .. 4000Hz$ $\qquad$ $Z_{Aus}(0Hz) = 940.000000\,\Omega$

$|Z_{Aus}(1.5kHz)| = 694.042443\,\Omega$





http://www.sortius-is-a-geek.com/its-all-about-the-dbms/


Phone Line Impedance Versus Frequency
90
60
30
0
330
300
270
240
210
180
150
120
1000
900
800
700
600
500
400
300
Australia Lumped Model
Australia Lumped Impedance @1.7 KHz
New Zealand Lumped Model
New Zealand Lumped Impedance @1.7 KHz
26 AWG Characteristic Impedance
US Central Office Impedance Level: 900 Ω
US Outside Plant Impedance Level: 600 Ω