17-76)

The reflection coëfficient is given by

$$a = \frac{(Z_2 - Z_1)^2}{(Z_2 + Z_1)^2}$$

Looking up values in the text, we have that

Material	Impedance (kg/m^{2}s)
Barium titanate	30.8×10^6
Fat (under the skin) (about the same for muscle when compared to air)	1.34×10^6
Air	429
Water	1.5×10^6

At the transducer/air interface, we have

$$a = \frac{(Z_2 - Z_1)^2}{(Z_2 + Z_1)^2} = \frac{(429 - 30.8\times10^6)^2}{(429 + 30.8\times10^6)^2} = 0.99994 \quad .$$

At the transducer/gel interface, we have

$$a = \frac{(Z_2 - Z_1)^2}{(Z_2 + Z_1)^2} = \frac{(1.5\times10^6 - 30.8\times10^6)^2}{(1.5\times10^6 + 30.8\times10^6)^2} = 0.82287 \quad .$$

In other words, about 3000 times as much signal transmits into the gel as compared to air:

$$\frac{1 - 0.82287}{1 - 0.99994} = 2952$$

Extra:

Now, we should expect a similar effect at an air body or gel body interface, thereby compounding the problem.