

References (database v4.0, 15.5.2018)

References for the low frequency dielectric conductivities listed in our material properties database. Values for tissues of which the properties are not available in the literature are substituted with values from other tissues. In these cases, the tissue used for the value is listed instead of a reference. The rationale for each individual substitution is provided in the Rationale for Tissue Substitutions.

| Tissue | Low Frequency Conductivity |
|--|---|
| Air | Gabriel et al., 1996 |
| Bile | Gabriel et al., 2009 Geddes and Baker, 1967 |
| Blood | Gabriel et al., 2009 Geddes and Baker, 1967 Hahn et al., 1980 Mohapatra and Hill, 1975 |
| Blood Plasma | Geddes and Baker, 1967 |
| Blood Serum | Geddes and Baker, 1967 |
| Blood Vessel Wall | Gabriel et al., 1996 |
| Bone | Geddes and Baker, 1967 |
| Bone (Cancellous) | Saha and Williams, 1989 |
| | Sierpowska et al., 2003 Gabriel et al., 1996 |
| Bone (Cortical) - Accross | Reddy and Saha, 1984 |
| Bone (Cortical) - Along | Reddy and Saha, 1984 |
| Bone (Cortical) - Around | Reddy and Saha, 1984 |
| Bone Marrow (Red) | Sigman et al., 1936 |
| Bone Marrow (Yellow) | Gabriel et al., 1996 |
| Brain | Freygang and Landau, 1955 Geddes and Baker, 1967 Van Harreveld et al., 1963 |
| Brain (Grey Matter) | Latikka et al., 2001 Raicu et al., 1998 Stoy et al., 1982 Van Harreveld et al., 1963 Gabriel et al., 1996 |
| Brain (Grey Matter) - x along | Yedlin et al., 1974 |
| Brain (Grey Matter) - y across | Yedlin et al., 1974 |
| Brain (Grey Matter) - z Normal to Surface Axis | Yedlin et al., 1974 |
| Brain (White Matter) | Latikka et al., 2001 Stoy et al., 1982 Gabriel et al., 1996 |

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| Tissue | Low Frequency Conductivity |
|--------------------------------------|--|
| Brain (White Matter) - across fibers | Nicholson, 1965 |
| Brain (White Matter) - along fibers | Nicholson, 1965 |
| Breast Fat | Fat |
| Bronchi | Blood Vessel Wall |
| Bronchi lumen | Air |
| Cartilage | Binette et al., 2004 |
| Cerebellum | Nicholson and Freeman, 1975 |
| Cerebellum - x | Nicholson and Freeman, 1975 |
| Cerebellum - y | Nicholson and Freeman, 1975 |
| Cerebellum - z | Nicholson and Freeman, 1975 |
| Cerebrospinal Fluid | Baumann et al., 1997 |
| Cervix | Gabriel et al., 2009 Gabriel et al., 1996 |
| Commissura Anterior | Brain (White Matter) |
| Commissura Posterior | Brain (White Matter) |
| Diaphragm | Muscle |
| Diaphragm - Parallel | Muscle - Parallel |
| Diaphragm - Perpendicular | Muscle - Perpendicular |
| Dorsal Column | Rank and BeMent, 1965 |
| Dorsal Column - Across | Rank and BeMent, 1965 |
| Dorsal Column - Along | Rank and BeMent, 1965 |
| Ductus Deferens | Blood Vessel Wall |
| Dura | Tendon/Ligament |
| Epididymis | Ovary |
| Esophagus | Large Intestine |
| Esophagus Lumen | Air |
| Eye (Cornea) | Eye (Sclera) |
| Eye (Lens) | Pauly and Schwan, 1964 |
| Eye (Sclera) | Gabriel et al., 1996 |
| Eye (Vitreous Humor) | Pauly and Schwan, 1964 |
| Eye Lens (Cortex) | Pauly and Schwan, 1964 |
| Eye Lens (Nucleus) | Pauly and Schwan, 1964 |
| Fat | Gabriel et al., 2009 Geddes and Baker, 1967 Hahn et al., 1980 Rush et al., 1963 Schwan and Kay, 1957 Gabriel et al., 1996 |
| Fat (Average Infiltrated) | Fat |
| Fat (Not Infiltrated) | Fat |
| Gallbladder | Bladder Wall |
| Heart Lumen | Blood |

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| Tissue | Low Frequency Conductivity |
|----------------------------|--|
| Heart Muscle | Cinca et al., 1997 Ellenby et al., 1987 Fallert et al., 1993 Gabriel et al., 2009 Geddes and Baker, 1967 Hahn et al., 1980 Schwan and Kay, 1957 Smith et al., 1995 Tsai et al., 2002 Gabriel et al., 1996 |
| Heart Muscle - Longitudial | Rush et al., 1963 Steendijk et al., 1994 |
| Heart Muscle - Longitudial | Rush et al., 1963 Steendijk et al., 1994 |
| Hippocampus | Brain (Grey Matter) |
| Hypophysis | Thyroid Gland |
| Hypothalamus | Brain (Grey Matter) |
| Intervertebral Disc | Cartilage |
| Kidney | Hahn et al., 1980 Stoy et al., 1982 Gabriel et al., 1996 |
| Kidney (Cortex) | Kidney |
| Kidney (Medulla) | Kidney |
| Large Intestine | Gabriel et al., 1996 |
| Large Intestine Lumen | Muscle |
| Larynx | Cartilage |
| Liver | Gabriel et al., 2009 Geddes and Baker, 1967 Haemmerich et al., 2009 Hahn et al., 1980 Raicu et al., 1998 Rush et al., 1963 Schwan and Kay, 1957 Stoy et al., 1982 |
| Lung | Geddes and Baker, 1967 Schwan and Kay, 1957 |
| Lung (Deflated) | Gabriel et al., 2009 Hahn et al., 1980 Rush et al., 1963 Sanchez et al., 2013 |
| Lung (Inflated) | Gabriel et al., 2009 Hahn et al., 1980 Rush et al., 1963 Sanchez et al., 2013 |
| Lymph | |
| Lymphnode | Spleen |
| Mandible | Bone (Cortical) |

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| Tissue | Low Frequency Conductivity |
|------------------------|--|
| Medulla Oblongata | Brain |
| Meniscus | Cartilage |
| Mucous Membrane | Muscle |
| Midbrain | Brain |
| Muscle | Hahn et al., 1980 Geddes and Baker, 1967 Hart and Dunfee., 1993 Stoy et al., 1982 Gabriel et al., 1996 |
| Muscle - Parallel | Gabriel et al.,2009 Epstein and Foster, 1983 Geddes and Baker, 1967 Rush et al., 1963 |
| Muscle - Perpendicular | Gabriel et al.,2009 Epstein and Foster, 1983 Geddes and Baker, 1967 Rush et al., 1963 |
| Nerve | Brain (White Matter) |
| Ovary | Gabriel et al., 1996 |
| Pancreas | Geddes and Baker, 1967 |
| Patella | Bone (Cortical) |
| Penis | Blood Vessel Wall |
| Pharynx | Air |
| Pineal Body | Thyroid Gland |
| Placenta | Blood |
| Pons | Brain |
| Prostate | Halter et al., 2007 |
| Salivary Gland | Prostate |
| SAT (Subcutaneous Fat) | Fat |
| Seminal vesicle | Prostate |
| Skin | Yamamoto and Yamamoto, 1976 Wake et al., 2016 |
| Skull (Cancellous) | Gabriel et al.,2009 |
| Skull (Cortical) | Gabriel et al.,2009 |
| Small Intestine | Large Intestine |
| Small Intestine Lumen | Muscle |
| Spinal Cord | Dorsal Column |
| Spleen | Geddes and Baker, 1967 Hahn et al., 1980 Stoy et al., 1982 Gabriel et al., 1996 |
| Stomach | Large Intestine |
| Stomach Lumen | Muscle |
| Tendon\Ligament | Gabriel et al., 1996 |
| Testis | Ovary |
| Thalamus | Brain (Grey Matter) |
| Thymus | Spleen and Fat |
| Thyroid Gland | Gabriel et al., 1996 |
| Tongue | Muscle |

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| Tissue | Low Frequency Conductivity |
|----------------------|--|
| Tooth | Bone (Cortical) |
| Tooth (Dentine) | Bone (Cortical) |
| Tooth (Enamel) | Bone (Cortical) |
| Trachea Lumen | Air |
| Ureter\Urethra | Blood Vessel Wall |
| Urinary Bladder Wall | Keshtkar et al., 2006 |
| Urine | Geddes and Baker, 1967 |
| Uterus | Gabriel et al., 1996 |
| Vagina | Large Intestine |
| Vertebrae | Bone (Cortical) |
| Water | Aldosky and Shamdeen, 2011 |

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