

Errata Sheet – “Development of packaging and products for use in microwave ovens”, Lorence and Pesheck (ed.), Woodhead, 2009.

Chapter 1

Notation

ε

In all sections up to 1.10, the authors use $\varepsilon = \varepsilon_0 \cdot \varepsilon'_p$, where ε_0 is the total real permittivity of free space, ε is real, and all losses are described by the conductivity σ . Beginning in section 1.10, the authors switch to $\varepsilon = \varepsilon' - j\varepsilon''$ (the notation used elsewhere in this volume), where $\varepsilon_0 \cdot \varepsilon$ is the total complex permittivity of the material. Under this latter notation ε'' and the effective conductivity σ are related by $\sigma = 2\pi f \varepsilon_0 \varepsilon''$.

Page 8: Revise sentence following eq. 1.12 to “In eq. 1.12 ω is the angular frequency, j denotes the imaginary unit ($j = \sqrt{-1}$) and all losses are described by the conductivity σ . This ε is a real number in all sections up to section 1.10, in which the dielectric properties and heating of foods are treated.”

P

In Figure 1.4 and in eq. 1.84, P is used for power density (watts per volume unit). However, in section 1.4.3 \mathbf{P} (in bold typeface to denote a vector) is used for the (complex or real) Poynting vector, which is a flux density in watts per unit surface area.

List of specific errors and related issues

Page 4: revise Table 1.1 to remove reference to 2375 MHz[†]. The Soviet Union, including its satellite countries, officially removed this in 1976. See the official Int'l Telecommunication Union reference: <http://www.itu.int/ITU-R/terrestrial/faq/index.html#g013>.

Pages 6 and 11: Revise speed of light in a vacuum; the digits at the end should be ...458. This error occurs just below eq 1.1 and also in eq. 1.26a.

Page 7, last paragraph before the table: Delete the last sentence.

Page 7, footnote: The unit of S should be siemens (=1/Ωm), not “siemen”.

Page 9, 2nd line from the bottom: The first term should be $e^{-j\beta z} \cdot e^{-j\theta \eta}$ (i.e. a minus sign on both exponents).

Page 10, two places: Watts should be written W (not w).

Page 10: Revise the last sentence in 1.4.3 to: “Eq. 1.22, which holds only for propagation into an absorptive (i.e. lossy) semi-infinite body, is of the same form as the empirically developed Beer-Lambert law commonly used in optical spectroscopy.”

Page 11, section 1.5.1: The numerical value of c (the speed of light in free space) and the magnetic constant μ_0 are exact in the SI system, and the values of ε_0 and η_0 are derived from these. The = signs in several equations should thus be replaced by \approx .

Page 20, Figure 1.8: All incident and reflected waves are TEM. The amplitudes illustrated in the right column are intended to equal the sum of the corresponding amplitudes in the left column.

Page 21, last paragraph: It is to be noted that both the x - and y -directed field components are usually $\neq 0$ (E for TE^z modes and H for TM^z modes), and that m (or n) can be 0 only for TE^z modes, thus resulting in E_x (or E_y) = 0 .

Page 24: The last term in eq. 1.77 should be $j\beta_{mn}$.

Page 26, last paragraph: It is understood that the modes are TE^z_{mp} and TM^z_{mp}. Furthermore, the modes may not be degenerate in an empty cavity; depending of the cavity feed only one of TE^z and TM^z may exist, or a hybrid mode (e.g. TE^y_{mp}) may exist. When the cavity is loaded, some TE^z and TM^z modes may become degenerate, and TE^y modes may split up. Finally, only one of the indices m n p may be 0, for any TE_{mp} or TM_{mp} mode.

Page 28, Table 1.3: The modes and frequencies given were calculated for a 360 mm × 350 mm × 260 mm cavity (Chan and Reader, 2000).

Additional information

Additional introductory material can be found in sections 2.3.4, 3.2, 3.3, 3.4, 4.4, 13.3, 15.2 and 15.2.1.

Chapter 3

Page 76, Fig 3.7 : Swap the two permittivity values (4-j2 and 52-j20).

[†] The same error appears in the footnote in Chapter 2, page 39.