



**Federal Communications Commission
Office of Engineering and Technology
Laboratory Division**

February 1, 2018

CLASSIFICATION OF ISM EQUIPMENT

Industrial, scientific, and Medical (ISM) equipment is defined as equipment or appliances designed to generate and use locally RF energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of telecommunication.¹ Typical ISM applications are the production of physical, biological, or chemical effects such as heating, ionization of gases, mechanical vibrations, and acceleration of charged particles.

The Commission has historically treated RF devices that transmit a radio signal for purposes such as measuring the level of a fluid in a container or for measuring some quantifiable property of a material as Part 15 devices.² Due to the modulated transmission of information, the Commission determined that Part 15 intentional transmitters were best treated as low power transmission communication devices as opposed to Part 18 equipment where RF energy is generated for the primary purpose of performing work energy, such as in an industrial heater or microwave oven.³

With some other applications, however, the applicability of Part 15 or 18 rules requires a case-by-case analysis. For example, in the case of magnetic resonance imaging systems used to stimulate molecules to produce a detectable RF field to form body images, the Commission determined that the use was so unique that it was appropriate to apply Part 18 rules.⁴ Similarly devices that use Nuclear Quadrupole Resonance (NQR) techniques for detecting metal properties, have been authorized under Part 18. In this case, we have focused on the fact that the RF energy is used to excite the molecules to create nuclear resonance of the material to determine its property. For certain wireless charging devices that use load modulation to adjust the instantaneous power levels, it was determined that this function should be appropriately authorized under the Part 18 rules.

More recently, there is the heightened interest with using RF spectrum in the frequency ranges above 95 GHz for devices, including devices designed for terahertz spectroscopy, to analyze material molecular properties and for imaging applications.⁵ Such applications are also

¹ 47 CFR § 18.107(c).

² *Amending Part 15 Subpart E –To Provide for RF Operated Measuring Devices*, Docket No. 18260, Report and Order, 20 FCC 2d 158 (1969).

³ *Id.*

⁴ 47 CFR §§ 18.107(c) and 18.121.

⁵ Terahertz spectroscopy is a technique in which the properties of a material are probed with short pulses of terahertz radiation.

appropriate for a case-by-case analysis. Under this approach, the Office of Engineering and Technology has authorized some equipment operating above 95 GHz designed to detect the presence of powders, solids and liquids inside sealed parcels and envelopes under Part 18 rules. Under the Part 18 rules, such devices have been subject to our Supplier's Declaration of Compliance (SDoC) procedures.⁶ Those rules require product to be tested and that compliance information be supplied with the product at the time of marketing.⁷ The Commission will continue to review devices using similar techniques or frequency bands on a case-by-case basis to determine if it is appropriate to authorize them under Part 18 rules or some other rules, if applicable.

⁶ 47 CFR §§ 2.1071 through 2.1077.

⁷ In cases where measurements may not be possible over the required frequency range, parties must consult with the Commission staff by submitting a Knowledge Database inquiry at <https://www.fcc.gov/labhelp>.