



July 2009

RF/EMC Regulatory Update

Dear Colleague,

We have provided typical questions and answers that represent in most cases technical opinions with justification in FCC and CE requirements. The particulars of the product for certification must be considered with respect to the applicability of these questions and answers. We hope you find our update valuable and welcome your feedback if you have any special needs or questions. Call us at 703-689-0368 for your testing requirements. You can view archived issues of MultiPoint at our [web site](#).

New FCC Rules for BPL

QUESTION: We heard the FCC recently modified its rules for Broadband Over Power Line devices. Is this correct? If so, what are the new rules?

ANSWER: On 7/17/09, the FCC released [FCC 09 60A1](#) which proposed a 30 dB/decade extrapolation factor for BPL devices operating below 30 MHz by adding paragraph 15.31(f)(3) to Part 15 of its rules and regulations as follows:

"For Access BPL devices operating at frequencies below 30 MHz, the results shall be extrapolated to the specified distance by using an extrapolation factor of 30 dB/decade. Measurements may be performed at a distance closer than that specified with the radiated emissions limit in section 15.209 of this part; however, an attempt should be made to avoid making measurements in the near field. The distance correction to the emission limit for measurements on overhead power line installations shall be based on the slant range distance, which is the line-of-sight distance from the measurement antenna to the overhead line. Alternatively, a site-specific extrapolation factor may be used in lieu of the 30 dB/decade standard. This extrapolation factor shall be derived from a best-fit straight-line fit determined by a first-order regression calculation from measurements for at least four lateral distances from the overhead line. Compliance measurements for Access BPL and use of site-specific extrapolation factors shall be made in accordance with the Guidelines for Access BPL systems specified by the Commission."

The FCC also provided two equations to calculate, namely, slant distance and extrapolated emission limit in a new measurement guidance contained in FCC 09-60A1 for slant range method for measuring BPL emissions on overhead power lines. The new proposed rule will modified the FCC's adopted slant range method for measuring BPL emissions on overhead power lines in Appendix C of the BPL Order FCC 04-245.

FCC Requirements for WMTS

QUESTION: Our company is in the process of designing a Wireless Medical Telemetry Systems (WMTS) device for the US market. What are the FCC requirements for submitting an application for certification of a spread spectrum transmitter operating under the WMTS?

ANSWER: FCC Subpart H of Part 95 describes the requirements for spread spectrum transmitters operating in the Wireless Medical Telemetry Service. WMTS requires a capability to operate in one or more 1.5 MHz channel(s) as specified in Section 95.1115(d)(2) of the FCC's rules. Spread Spectrum devices that operate in the WMTS bands under Part 95H require the 1.5 MHz channel mode in the event there are frequency coordination issues as specified in Section 95.1115(d)(4). The application should have test data for the 1.5 MHz channel mode. In addition, there should be two line items in the application (one for each mode) and grant conditions stating that there is a 1.5 MHz channel mode to support frequency coordination, if the spread spectrum mode causes frequency coordination issues.

FCC Rules for UWB

QUESTION: Our company manufactures Ultra Wide Band (UWB) devices and we have the following questions:

1. What constitutes the bandwidth of a UWB emission?
2. How is the UWB emission bandwidth determined?
3. What portion of the UWB emission spectrum is required to be within the authorized frequency bands? Is it adequate for just the center frequency to be within the authorized band?
4. Can a device be certified under the UWB rules if its emission bandwidth resides outside of the authorized frequency bands when all of its emissions are below the specified limits?
5. What other subtleties should be considered when determining the bandwidth of a UWB device emission spectrum?
6. How are the emissions limits applied in determining compliance of a UWB device?
7. Is any specialized test equipment necessary for performing UWB compliance measurements?
8. What compliance information should be included with the application for certification?
9. What type of measurement antenna should be used for performing radiated emissions measurements on UWB devices when assessing compliance to the UWB rules?
10. Is there a provision for operating wireless tank level gauges under the UWB rules?

ANSWER: Please see the following answers to your questions:

1. The points on the emission spectrum define the bandwidth of a UWB emission where the amplitude is 10 dB below the maximum emission amplitude (i.e., the -10 dBc points). In cases where the measured emission spectrum contains multiple (more than two) -10 dB points, the outermost points define the bandwidth (i.e., the widest bandwidth is assumed).
2. The bandwidth of a UWB emission must be determined from a radiated measurement with the device using the antenna with which it is designed to operate (i.e., the antenna frequency characteristics may define the radiated bandwidth of a UWB device and is thus considered an integral part of the system). It is recommended that this measurement be performed using the spectrum analyzer peak detector with a resolution bandwidth of 1 MHz or greater and the maximum-hold function. The device under test should be measured for maximum bandwidth by varying the antenna height between 1 to 4 meters, varying antenna polarization between horizontal and vertical and rotating the device 360 degrees several times.
3. For a UWB emission spectrum, the entire fundamental bandwidth (that portion of the spectrum between the outermost -10 dB points) must be contained within the authorized frequency band. For example, the emissions spectrum from a ground penetrating radar (GPR) applying for authorization under Section 15.509 must have its fundamental bandwidth located below 960 MHz.
4. It is presumed that this question refers to a scenario whereby the frequencies associated with the maximum emission and the -10 dB points are located within a frequency band that is outside of those bands authorized for UWB operation (e.g., 960- 3100 MHz), but are less than the applicable emissions limit. Under these conditions, the requirement that the -10 dB bandwidth be fully contained within the authorized frequency bands is not realized and thus the device cannot be authorized.
5. When measuring the bandwidth of a UWB device using a radiated test set-up, it is imperative that appropriate adjustments be made to the measured amplitude levels to account for the frequency-dependent components of the measurement system (e.g., antenna gain or factor, pre-amplifier gain, cable loss, etc). Since UWB emissions can have bandwidths several GHz wide, these frequency-dependent characteristics can vary dramatically over the fundamental emission.
6. In each rule section pertaining to specific UWB applications, a table is included listing the emission limit applicable in each frequency band. The device under test must comply with all applicable limits accounting for all specified frequency bands. For example, an application for authorization of a device under Section 15.509 (low frequency imaging device) must demonstrate compliance not only to the emission limits provided for the 960-1610 MHz band, but also to those limits specified for both the 1610- 1990 MHz and the above 1990 MHz band.
7. A spectrum analyzer with a quasi-peak detector is required for measuring UWB emissions below 960 MHz to verify compliance with the emissions limits in that portion of the spectrum. An analyzer with a true RMS detector is recommended, but not required, for measuring UWB emissions above 960 MHz. An alternative is provided in procedure (3) contained in Appendix F of the UWB First Report and Order (ET Docket No.98-153) for performing the emissions measurements with an analyzer that does

not include an RMS detector. Also, a low-noise preamplifier is required to measure emissions to the levels necessary to determine compliance with the limits specified in the frequency band 960 to 1610 MHz for some UWB applications (e.g., indoor UWB devices authorized under Section 15.517). If the radiated measurements are not conducted in an anechoic chamber, then the use of this pre-amplifier may also require that a pre-select filter be inserted ahead of the pre-amplifier to prevent saturation from strong ambient RF signals.

8. At a minimum, the following information is required for processing a UWB application for certification: The UWB application category (e.g., imaging device, indoor system, handheld device, etc.) and the applicable rule section -The lower and upper - 10 dB frequencies (fL and fH, respectively) and the frequency of the maximum observed emission level (fM) - A description of the procedure used to determine the UWB bandwidth -The maximum radiated emissions (including narrowband emissions) and the associated frequencies observed in each frequency band identified in the applicable emission limits tables -In the event that no emissions are observed in the above frequency bands, report the measurement systems minimum sensitivity (noise floor) in these bands (i.e., show that the measurement system was capable of detecting emissions down to the level dictated by the applicable emissions limit). - A complete description of the measurement system, including antenna, pre-amplifier, etc. This should include information such as antenna gain/factor, preamplifier noise figure and gain, particularly at each frequency for which a data point is provided (peak emission frequency, -10 dB points, etc.) - Calibration information for the measurement system at each frequency for which a data point is reported. - If applicable, report all digital circuitry emissions exceeding the applicable UWB limits and provide a complete description of the process used to justify invoking the exception stated in Section 15.521(c) - A description of the technique used to determine RMS average emission levels - A description of the test site used, specifying whether the measurements were performed in a test chamber, outdoor test site, with or without a ground screen, and any other pertinent information. - Where applicable, indicate the presence of required labels and/or a manual disable switch - Describe the pulse characteristics (PRF, pulse width, etc.). Is the pulse pseudo random (dithered) or periodic? An oscilloscope plot would be helpful. - Supporting photographs depicting the measurement system set-up and the device under test.
9. Two measurement antennas will likely be necessary for performing these tests. A log-periodic antenna is recommended for performing the necessary radiated measurements below 960 MHz, although other types of measurement antennas (e.g., Biconical) can be used. For the radiated measurements above 960 MHz, a broadband horn antenna or a broadband log periodic antenna may be used. When using a horn antenna to measure emissions from a device that is not placed on a turntable (e.g., a ground penetrating radar placed near the ground to replicate actual operating conditions), the antenna should be pointed in the direction of the radiating head. This is consistent with ANSI C63.4 Section 8.3.1.2, which states that the antenna must be kept within the cone of radiation and pointed at the area of the device under test.
10. Section 15.517(a)(4) authorizes the use of tank level gauges as indoor UWB devices only if they are used within metal or underground storage tanks, and the emissions are directed downward.

FCC Rules for WiMax

QUESTION: My company designs and manufactures WiMAX products. Can you tell me which FCC rule part addresses operation in the 3.65-3.7 GHz band? Also, where do I find equipment authorization test requirements for WiMAX (802.16e) broadband equipment operating in the band?

ANSWER: Please see the [Table of Frequency Allocations](#) in 47 CFR 2.106. This table shows the various rule parts applicable to particular frequency bands - 3650 MHz - 3700 MHz, Part 25 (Satellite Communications), Part 90 (Private Land Mobile Radio Service); and various qualifying footnotes also apply.

In 2005, the FCC adopted new rules for operation in the 3650 - 3700 MHz band (See 47 CFR 90 Subpart Z Wireless Broadband Services in the 3650-3700 MHz Band). There are presently several petitions for reconsideration for the order. One issue is a request to review a technical requirement for the use of a contention-based protocol for equipment to operate in this band (see 47 CFR 90.7, 90.203, 90.1305 and 90.1321). At the present time, any application for Equipment Authorizations under 47 CFR 90 subpart Z may be delayed until proper resolution of this issue. The technical rules do not reference any specific technologies or protocols, e.g., WiMAX, 802.16 or 16e.

The contention based protocol issue for this band is still a problem. Consequently, only the FCC and not a TCB can review and issue grants for the band.

INTERNATIONAL UPDATE

EU: NEW CENELEC STANDARDS RECENTLY RELEASED

This is a shortened list of the CENELEC standards published during the past month:

- **EN 60669-1:1999/IS1:2009** (6/24/2009) Switches for household and similar fixed-electrical installations -- Part 1: General requirements
- **EN 61204-7:2006/A11:2009** (6/26/2009) Low voltage power supplies, d.c. output -- Part 7: Safety requirements
- **EN 61984:2009** (6/26/2009) Connectors - Safety requirements and tests
- **EN 55020:2007/IS1:2009** (6/29/2009) Sound and television broadcast receivers and associated equipment - Immunity characteristics - Limits and methods of measurement
- **EN 55013:2001/IS1:2009** (6/29/2009) Sound and television broadcast receivers and associated equipment - Radio disturbance characteristics - Limits and methods of measurement
- **EN 55013:2001/IS1:2009** (6/29/2009) Sound and television broadcast receivers and associated equipment - Radio disturbance characteristics - Limits and methods of measurement
- **EN 55012:2007/A1:2009** (7/17/2009) Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of off-board receivers
- **EN 55103-1:2009** (7/17/2009) Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use -- Part 1: Emissions
- **EN 55016-1-4:2007/A2:2009** (7/17/2009) Specification for radio disturbance and immunity measuring apparatus and methods -- Part 1-4: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Radiated disturbances
- **EN 55103-2:2009** (7/17/2009) Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use -- Part 2: Immunity

See [CENELEC](#) for additional information.

EU: NEW IEC STANDARDS RECENTLY RELEASED

This is a shortened list of the new IEC standards published during the past month:

- **IEC 60745-2-15** (6/25/2009) Hand- held motor- operated electric tools - Safety - Part 2-15: Particular requirements for hedge trimmers
- **IEC 61547** (6/25/2009) Equipment for general lighting purposes - EMC immunity requirements
- **CISPR 13** (6/29/2009) Sound and television broadcast receivers and associated equipment - Radio disturbance characteristics - Limits and methods of measurement
- **IEC 60601-2-54** (6/26/2009) Medical electrical equipment - Part 2-54: Particular requirements for the basic safety and essential performance of X-ray equipment for radiography and radioscopy
- **IEC 61000-3-5** (7/8/2009) Electromagnetic compatibility (EMC) - Part 3-5: Limits - Limitation of voltage fluctuations and flicker in low-voltage power supply systems for equipment with rated current greater than 75 A
- **IEC 61000-5-9** (7/8/2009) Electromagnetic compatibility (EMC) - Part 5-9: Installation and mitigation guidelines - System-level susceptibility assessments for HEMP and HPEM
- **IEC 62384-am1** (7/14/2009) Amendment 1 - DC or AC supplied electronic control gear for LED modules - Performance requirements
- **IEC 61020-1** (7/16/2009) Electromechanical switches for use in electrical and electronic equipment - Part 1: Generic specification

See [IEC](#) for additional information.

EU: NEW ETSI STANDARDS RECENTLY RELEASED

This is a shortened list of the new ETSI standards published during the past month:

- [ETSI EN 300 176-1 V2.1.1](#) (July 2009) Digital Enhanced Cordless Telecommunications (DECT); Test specification; Part 1: Radio
- [ETSI EN 300 753 V1.2.1](#) (July 2009) Equipment Engineering (EE); Acoustic noise emitted by telecommunications equipment
- [ETSI EN 301 406 V2.1.1](#) (July 2009) Digital Enhanced Cordless Telecommunications (DECT); Harmonized

EN for Digital Enhanced Cordless Telecommunications (DECT) covering the essential requirements under article 3.2 of the R&TTE Directive; Generic radio

- [ETSI EN 301 908-10 V4.1.1](#) (July 2009) Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT- 2000 Third-Generation cellular networks; Part 10: Harmonized EN for IMT-2000, FDMA/TDMA (DECT) covering essential requirements of article 3.2 of the R&TTE Directive
- [ETSI TS 132 425 V8.1.0](#) (July 2009) LTE; Telecommunication management; Performance Management (PM); Performance measurements Evolved Universal Terrestrial Radio Access Network (E-UTRAN) (3GPP TS 32.425 version 8.1.0 Release 8)
- [ETSI TS 186 016-2 V2.2.1](#) (July 2009) Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); PSTN/ISDN simulation services; Closed User Group (CUG); Part 2: Test Suite Structure and Test Purposes (TSS&TP)

See new [ETSI website](#) for additional information.

US: FCC SEEKS COMMENT ON MBANs On 6/29/09, the FCC adopted a Notice of Proposed Rulemaking that seeks comment on allocating spectrum and establishing service and technical rules for the operation of Medical Body Area Networks (MBANs). MBAN could be used to create wireless body sensor networks around individual patients to monitor an array of physiological data - such as temperature, pulse, blood glucose level, blood pressure, respiratory function and a variety of other physiological metrics. MBAN systems would primarily be used in health care facilities, with the potential also of being used in other patient care/monitoring circumstances. Unlike traditional medical telemetry systems which rely on separate uncoordinated links for each physiological function being monitored, MBAN systems could serve to wirelessly monitor all of the desired data of a single patient, which could then be aggregated and wirelessly transmitted to a remote location for evaluation. MBAN systems eliminate much of the wired cables that typically connect patients to monitoring equipment and to facilitate the aggregation and transfer of physiological data will offer clinical benefits such as improved patient mobility, reduced risks of infection, reduced clinical errors, and reduced patient monitoring costs.

The FCC's Notice seeks comment on options for accommodating MBAN operations in several frequency bands, and on the amount of spectrum that should be allocated for such use. More specifically, the Notice seeks comment on the feasibility of using the 2360-2400 MHz; 2300-2305 MHz and 2395-2400 MHz; the 2400-2483.5 MHz; or 5150-5250 MHz bands for this purpose, and on various licensing schemes that would be appropriate for any of these bands under consideration. In addition, the Notice seeks comment on tentative service and eligibility rules that would be similar in many respects to those for other wireless body-worn and implanted medical devices operating in the MedRadio Service in the 401-406 MHz bands. [Link](#)

US : DoE ISSUES FINAL RULE ON FLOURESCENT & INCANDESCENT LAMPS On 7/6/09, the US Department of Energy (DoE) issued a final rule to amend its test procedures for certain fluorescent and incandescent lamps, which manufacturers are required to use to certify compliance with energy conservation standards mandated under the US Energy Policy and Conservation Act. The final rule will be effective on 8/5/09. Specifically, the amendments (i) update citations and references to the industry standards currently referenced in DoE's test procedures, and make several technical modifications; (ii) provide test methods for some general service fluorescent lamps (GSFLs), which are subject to existing energy conservation standards but do not currently have test procedures in place; (iii) will adopt test procedures for additional GSFLs, which will be covered in the upcoming energy conservation standards final rule; and (iv) provide appropriate methods to test the general service incandescent lamps. [Link to FR Notice](#)

EU: NEW SAFETY REQUIREMENTS FOR PORTABLE MUSIC PLAYERS On 6/23/09, the EC adopted a Decision setting out the safety requirements to be met by European standards for personal music players. Details are set out in the Commission Decision 2009/490/EC (the Decision). [Link](#)

The Decision establishes the safety requirements for ensuring that, under normal usage conditions, exposure to sound from personal music players, including mobile phones with a music playing function, does not pose a risk to hearing. Under the Decision, personal music players shall be designed and manufactured in a manner that under reasonably foreseeable conditions of use, they are inherently safe and do not caused hearing damage. Particular safety requirements include:

- Exposure to sound levels shall be time limited to avoid hearing damage. At 80 dB(A), exposure time shall be limited to 40 hours/week. At 89 dB(A), exposure time shall be limited to 5 hours/week. For other exposure levels, a linear intra- and extrapolation applies. One shall also takes into account the dynamic range of sound and the use of the products; and
- Personal music players shall provide adequate warnings on the risks involved in using the device, the ways of avoiding them and information to users in cases where exposure poses a risk of hearing damage

BOSNIA & HERZEGOVINA: ADOPT R&TTE RULES Bosnia and Herzegovina recently adopted the new Rule (number 46/2009) on radio equipment that can be used without individual licenses for devices issued by the Communications Regulatory Agency (CRA). The new rule is effective as of 7/15/09 and revokes the Decision which stipulated that short range devices needed type approvals. Conditions from the Law on Communications refer to essential requirements in RF, EMC and Safety standards, which is identical to the EC R&TTE Directive 99/05. Under this new regulation, product imported to Bosnia & Herzegovina must comply against the Harmonized standards and the CE marking will be affixed as per EU regulation.

CANADA: NEW ISSUE OF RSS-102 On 6/20/2009, Industry Canada released Issue 3 of Radio Standards Specification 102, Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands). RSS-102 sets out the requirements and measurement techniques used to evaluate radio frequency (RF) exposure compliance of radiocommunication apparatus designed to be used within the vicinity of the human body. Issue 3 of RSS-102 includes the following changes:

- Section 1: The scope of this standard has been revised.
- Section 3: Procedures for SAR probe calibration and system verification for measurements between 150 MHz and 300 MHz have been added.
- Section 3.1.1: Procedures for SAR evaluation for 3- 6 GHz have been added.
- Section 3.1.3: SAR test procedures for devices containing multiple transmitters have been specified.
- Section 3.1.4: SAR test procedures for 3G devices, 802.11 a/b/g transmitters, laptop computers with built-in antennas on display screens, as well as licensed and license-exempt modular transmitters have been specified.

[Link](#)

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Rhein Tech Laboratories' worldwide homologation services offer the best strategy for gaining product approval in a large number of target countries. In addition, we reduce the number of emissions, immunity, and product safety tests required by defining the minimum subset of regulatory standards at the onset, thus reducing the time and cost to enter multiple target countries. We offer research and approvals in over 50 countries.

ABOUT US

RTL has provided EMC compliance engineering & testing services since 1988 and has a superior reputation with both the Federal Communications Commission and others in the industry. RTL provides testing services to meet the emissions, immunity, and safety requirements of the European EMC Directive and the EU R&TTE Directive, all FCC rules and regulations, VCCI (Japan), ACMA (Australia), and other international standards.

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