MultiPoint
A Rhein Tech EMC Regulatory Update

March 2010

RF/EMC Regulatory Update

for the United States, Canada & European Union

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.

FCC Measurement Procedure for Spectral Emissions (Multiple Antennas)

QUESTION: We are a WiMAX technology chip developer for mobile terminals. Our latest chipsets support two receiver and two transmit paths, for MIMO and other smart antenna technologies. Our customers build terminals around these chipsets and they certify their products in their respective targeted markets. As a chip vendor, we need to guarantee conformance of our chips to FCC, ETSI rules, and others.

While ETSI has clear procedures for measuring spectral emissions for wireless terminals with multiple antennas at 2.5 GHz (EN 302 544), the equivalent FCC rules are not so explicit (Title 47, Part 27, Section 53 (m)(6)). What is the measurement procedure for spectral emissions for multiple antennas? Specifically, should we add the emissions from all antennas and then apply the stated attenuation rule, or does the attenuation rule apply to each antenna individually?

ANSWER: Power should be measured across each "chain" or output port. The FCC will list the sum of all powers on the grant and as a result, the out of band emissions (spurious) measure individual emissions and apply attenuation if necessary. The test report must show output power and aggregate power and for Part 27 devices and it should also have average power as well. MIMO typically deals with fundamental aggregate power.

FCC Rules for Permanent Antenna Connection

QUESTION: Our firm manufactures a wireless module and we are applying to the FCC for full Part 15 transmitter modular approval. The module's antenna (a wire antenna) is permanently soldered on the motherboard. The antenna connects to the module through a trace on the motherboard. We believe the permanent connection of the wire antenna on the motherboard through a trace and solder connection to the module, meets the **§15.212(a)(1) iv** requirement of having a unique antenna coupler. Can you provide us with your confirmation of this?

ANSWER: A soldered antenna connection would qualify, under **§15.212(a) (1)** of the FCC's rules, as permanent connection. Furthermore, the instructions to the OEM must provide clear direction for the proper conditions of use.

FCC Rules: Part 90 EIRP Limit

QUESTION: Our lab is testing a WiMAX OFDM base station to Part 90, Subpart Z and we have a question pertaining to the peak power spectral density test. The EIRP limit for the radio in a 5 MHz channel bandwidth is 5 W or 37 dBm. The limit for peak power spectral density is 30 dBm per 1 MHz EIRP. Since OFDM has a high peak-to-average ratio and EIRP is measured using an RMS detector, is the 30 dBm per MHz EIRP Power Spectral Density (PSD) limit using a peak detector still applicable?

ANSWER: RMS detector can be used for the PSD if it is also used for the RF Power. The PSD limit is EIRP, not conducted.

FCC Rules for Low-Power Non-Licensed Transmitters

QUESTION: We manufacture **§15.231** wireless devices and have the following comments and questions in reference to Understanding the FCC Regulations for Low-Power Non-Licensed TX, herein referred to as the document:

Comments:

- Referring to page 20 (PDF page numbering) and using a 315 MHz transmitter for example, it is possible to send "Intermittent Control Signals", and "Periodic Transmissions", both of which are governed by **§15.231**. According to the document, " Intermittent Control Signals" is governed by the field strength specified in **§15.231(a)-(c)** and "Periodic Transmissions" is governed by the field strength specified in **5.231(e)**.
- **§15.231** is titled, "Periodic operation in the band 40.66-40.70 MHz and above 70 MHz", yet devices, which have been approved under **§15.231** (e.g. the key fob that unlocks a car door), actually transmit intermittently as the document suggests is permissible. In fact, under **§15.231(a)(1)** it's permissible to "manually operate a transmitter." The car key fob as an example of such transmitters, in practice, transmits "intermittently."
- **§15.231(a)** governs "periodic operation," yet the document calls operation under **§5.231** "intermittent operation."
- **§15.231(e)** mentions "periodic rate," yet the attached document calls it "periodic transmissions."
- **§15.231(a)(3)** prohibits "periodic transmissions at regular predetermined intervals," yet it is a subsection of **§15.231**, which makes provisions for "periodic operation."
- We are confused by the inconsistent usage of the word "periodic." We are also wondering why we do not see the word "intermittent" in **§15.231**.

Here are our Specific Questions:

1. What is the definition of "periodic operation?"
2. What is the definition of "periodic rate?"
3. What is the definition of "intermittent operation?"
4. How are "intermittent" and "periodic" the same?
5. How are they different?
6. In the context of the title of **§15.231**, how is the term "Periodic Operation" interpreted?
7. In the context of **§15.231(a)** , how is the term "periodic operation" interpreted?
8. In the context of **§15.231(e)** , how is the term "periodic rate" interpreted?

ANSWER:

Response to comments:
§15.231 is for devices that do not transmit all the time. The term periodic includes transmit intervals that operate at (1) occasional, intermittent or fortuities times and (2) at predetermined intervals. Transmission intervals that occur occasionally, intermittent or fortuities are referred to in this response as aperiodic operation. Transmission intervals that occur at predetermined intervals recurring at regular intervals or at pseudorandom interval sequences that approximate the properties of random numbers are referred to in this response as periodic predetermined operation.

§15.231 is divided into two basic technical requirements:

- Aperiodic operation falls under **§15.231 (a)** .
- Periodic predetermined operation falls under **§15.231 (e).**

§5.231 (a) Aperiodic Control Signal Devices:

§5.231 (a) is for manually operated or automatically operated devices that transmit an aperiodic control signal. For example, an automatic operated transmission can be the result of a fortuities event that takes place? animal or human presence detected- which results in a transmission that causes a far end alert sound.
§15.231 (a) (1) defines the time conditions for manually activated transmissions and
§15.231 (a) (2) for automatic transmissions. A second condition is that the transmission must be a control signal and not data. This control signal must be the result of an aperiodic event that controls some far end hard outcome like turning on an indicator (light), mechanical (door openers), sound an alarm. A soft consequence like recording and logging data is not permitted and is considered data transmission. However, a device sending a hard control signal is permitted to also send data with the control signal.
§15.231 (a) (3) defines the prohibition to periodic predetermined operation for **15.231 (a)** devices limiting operation to aperiodic operation.
Under **§15.231 (a) (3)** there are certain types of devices that are permitted to violate the prohibition against periodic predetermined intervals. These are devices that send a control transmission for indicating that there is a security and safety situation present. These systems are limited to periodic predetermined intervals transmissions to determine system integrity.
Under **§15.231 (a) (4),** security and safety devices that transmit fire and safety of life situations are also permitted to transmit the alarm control signal for the duration of the alarm condition.
§15.231 (a) (5) allows security systems to exceed the timing limits for manual [**§15.231 (a) (1)**] and automatic operation [**§15.231 (a) (2)**] when a professional installer is setting up the system.
§15.231 (b) is the field strength limits for all **§15.231 (a)** devices.
§15.231 (c) and **(d)** are the technical limits for all devices.

§5.231 (e) Periodic Predetermined Control Signal Devices:

A device is permitted to operate at periodic predetermined internals without (1) restriction for periodic operation and (2) restriction for type of transmission (data or control signals). Thus **§15.231** (a) and (a) (1) through (a) (5) do not apply to **§15.231 (e)** devices.
The field strength of **§15.231 (e)** is applicable instead of **§15.231 (b)** The device must still comply with **§15.231 (c)** through **(d)**
§15.231 (e) devices have a transmission duration requirements limit to be no greater than 1-second with silent period between transmissions to be at least 30 times the transmission period but not less than 10 seconds.

Specific Responses to Questions 1-7:

1. What is the definition of "periodic operation"? *The term periodic operation includes: transmit intervals that operate at occasional, intermittent or fortuities times and at predetermined intervals.*
2. What is the definition of "periodic rate"? ***§15.231 (a)*** *aperiodic control signal devices that has a rate determined by fortuities events.* ***§15.231 (e****) periodic predetermined control signal has a rate determined by design: transmission duration requirements limit to be no greater than 1- second with silent period between transmissions to be at least 30 times the transmission period but not less than 10 seconds*.
3. What is the definition of "intermittent operation"? *aperiodic intervals*.
4. How are "intermittent" and "periodic" the same? *Not the same: Intermittent is aperiodic intervals which is a subclass of periodic*.
5. How are they different? *Being a subclass the term different is not applicable. Man is a subclass of human. How is man different from human is not applicable*.
6. In the context of the title of **§15.231**, how is the term "Periodic Operation" interpreted? *The term "Periodic Operation" includes: aperiodic operation and periodic predetermined operation*.
7. In the context of **§15.231(a),** how is the term "periodic operation" interpreted? *aperiodic operation.*
8. In the context of **§15.231(e),** how is the term "periodic rate" interpreted? *As periodic predetermined operation*.

Link - Understanding the FCC Regulations for Low-Power Non-Licensed TX

FCC Rules for Net Books with Wireless Modules

QUESTION: We are an OEM wireless module provider and we provide Wi-Fi (802.11b/g) modules to our customer. Our customer's products are Net Books. Do we need FCC Declaration of Conformity (DoC) logo and an FCC Identifier on the Net Books?

ANSWER: The full modular approval would have its own FCC ID on the device. The host that uses any modular approval device must contain a label the clearly states "Contains FCC ID: XXXYYY," where XXXYYY is the FCC ID of the module. This can be found in the FCC's rules under **§15.212(a)(1) (vi)(A)**. It states the following: "If using a permanently affixed label, the modular transmitter must be labeled with its own FCC identification number, and, if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module." This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: XYZMODEL1" or "Contains FCC ID: XYZMODEL1." Any similar wording that expresses the same meaning may be used. The Grantee may either provide such a label, an example of which must be included in the application for equipment authorization, or, must provide adequate instructions along with the module which explain this requirement. In the latter case, a copy of these instructions must be included in the application for equipment authorization.

Here are some other scenarios to consider:

1. Scenario 1; this would be where the host had no intentional radiator but only a DoC for the computer peripheral device. If the manufacturer adds a modular approved intentional radiator to the host and uses the FCC ID of the module, then the DoC and the "Contains FCC ID: XXXMODULE" would be on the host.
2. Scenario 2; this would be where the host has both an intentional radiator and a computer peripheral. In this instance, the manufacturer could either do an FCC ID for both the intentional radiator and the Part 15B computer peripheral, or they could do an FCC ID for the intentional radiator and a DoC for the computer peripheral (assuming adequate test lab accreditation and acceptance is done). Then, if the manufacturer adds another intentional radiator or licensed transmitter module with its own ID, they would have a DoC logo, their FCC ID number and the FCC ID number of the modular transmitter as Contains FCC ID: XXXMODULE.
3. Alternately, if the manufacturer wishes, they could do one identifier for the device with their transmitter, the new module (not using the modular approved FCC ID), and the computer peripheral. This would allow the new device to have one identifier.

STANDARDS UPDATE

EU: NEW CENELEC STANDARDS RECENTLY RELEASED

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

- **EN 62493:2010** (02/12/2010) Assessment of lighting equipment related to human exposure to electromagnetic fields
- **EN 61850-6:2010** (02/12/2010) Communication networks and systems for power utility automation -- Part 6: Configuration description language for communication in electrical substations related to IEDs
- **EN 61000-4-8:2010** (02/12/2010) Electromagnetic compatibility (EMC) -- Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test
- **EN 60335-2-41:2003/A2:2010** (02/12/2010) Household and similar electrical appliances - Safety -- Part 2-41: Particular requirements for pumps
- **EN 60335-2-29:2004/A2:2010** (02/12/2010) Household and similar electrical appliances - Safety -- Part 2-29: Particular requirements for battery chargers
- **EN 45502-2-3:2010** (02/19/2010) Active implantable medical devices -- Part 2-3: Particular requirements for cochlear and auditory brainstem implant systems
- **EN 60335-2-13:2010** (02/26/2010) Household and similar electrical appliances - Safety -- Part 2-13: Particular requirements for deep fat fryers, frying pans and similar appliances
- **EN 61029-2-1:2010** (02/26/2010) Safety of transportable motor-operated electric tools -- Part 2-1: Particular requirements for circular saw benches
- **EN 60335-2-2:2010** (02/26/2010) Household and similar electrical appliances - Safety -- Part 2-2: Particular requirements for vacuum cleaners and water-suction cleaning appliances
- **EN 60695-1-10:2010** (03/05/2010) Fire hazard testing -- Part 1-10: Guidance for assessing the fire hazard of electrotechnical products - General guidelines

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 62616** (2/11/2010) Maritime navigation and radiocommunication equipment and systems - Bridge navigational watch alarm system (BNWAS)
- **IEC 61326-1 Corr.2** (2/18/2010) Corrigendum 2 - Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements
- **IEC 62476** (2/18/2010) Guidance for evaluation of product with respect to substance-use restrictions in electrical and electronic products
- **IEC 62497-1** (2/18/2010) Railway applications - Insulation coordination - Part 1: Basic requirements - Clearances and creepage distances for all electrical and electronic equipment
- **IEC 60335-2-24** (2/24/2010) Household and similar electrical appliances - Safety - Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice makers
- **IEC 60335-2-89** (2/24/2010) Household and similar electrical appliances - Safety - Part 2-89: Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant unit or compressor
- **CISPR 11-am1** (3/10/2010) Amendment 1 - Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement
- **IEC 61000-4-3-am2** (3/10/2010) Amendment 2 - Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
- **IEC 60730-1** (3/10/2010) Automatic electrical controls for household and similar use - Part 1: General requirements
- **IEC 62630** (3/10/2010) Guidance for evaluating exposure from multiple electromagnetic sources

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 TS 134 124 V8.4.0 (February 2010) Universal Mobile Telecommunications System (UMTS); LTE; Electromagnetic compatibility (EMC) requirements for mobile terminals and ancillary equipment (3GPP TS 34.124 version 8.4.0 Release 8)
- ETSI TR 134 926 V9.0.0 (February 2010) Universal Mobile Telecommunications System (UMTS); LTE; Electromagnetic compatibility (EMC); Table of international requirements for mobile terminals and ancillary equipment (3GPP TR 34.926 version 9.0.0 Release 9)
- ETSI TS 136 113 V8.2.0 (February 2010) LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) and repeater ElectroMagnetic Compatibility (EMC) (3GPP TS 36.113 version 8.2.0 Release 8)
- ETSI EN 300 330-1 V1.7.1 (February 2010) Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz; Part 1: Technical characteristics and test methods
- ETSI EN 300 330-2 V1.5.1 (February 2010) Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz; Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
- ETSI EN 302 208-1 V1.3.1 (February 2010) Electromagnetic compatibility and Radio spectrum Matters (ERM); Radio Frequency Identification Equipment operating in the band 865 MHz to 868 MHz with power levels up to 2 W; Part 1: Technical requirements and methods of measurement
- ETSI EN 302 208-2 V1.3.1 (February 2010) Electromagnetic compatibility and Radio spectrum Matters (ERM); Radio Frequency Identification Equipment operating in the band 865 MHz to 868 MHz with power levels up to 2 W; Part 2: Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive
- ETSI EN 300 220-1 V2.3.1 (February 2010) Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW; Part 1: Technical characteristics and test methods
- ETSI EN 300 220-2 V2.3.1 (February 2010) Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels ranging up to 500 mW; Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive
- ETSI EN 300 338-1 V1.3.1 (February 2010) Electromagnetic compatibility and Radio spectrum Matters (ERM); Technical characteristics and methods of measurement for equipment for generation, transmission and reception of Digital Selective Calling (DSC) in the maritime MF, MF/HF and/or VHF mobile service; Part 1: Common requirements

See new ETSI website for additional information.

FCC: PROPOSED RULE CHANGES TO IMPROVE DECISION-MAKING AND EFFICIENCY, PROMOTE PARTICIPATION IN FCC PROCEEDINGS

On February 18, 2010, the FCC proposed revisions to its rules as part of its larger effort to reform and transform the agency into a model of excellence in government. In the two approved notices of proposed rulemaking, the FCC seeks public comment on revisions to rules governing FCC practice and procedure, and its "ex parte" rules dealing with communications between stakeholders and decision- makers at the agency.

In one notice of proposed rulemaking, The Procedures NPRM, the FCC proposed changes to its procedural and organization rules concerning reconsideration of agency proceedings and case management, as well as other miscellaneous procedural rules. The proposals are designed to enhance efficiency and reduce backlogs, improve the transparency and openness of FCC proceedings by making it easier for interested persons to follow and participate in the process, and reduce confusion by the public about certain deadlines.

In the second notice of proposed rulemaking, The Ex Parte NPRM, the FCC proposed changes to its rules governing disclosure of communications with FCC staff and decision makers, when all parties to a proceeding are not present (so-called ex parte communications). Building on suggestions and recommendations made by participants at a public workshop held in October 2009, and based on its own experience with the disclosure rules, the FCC proposes rule changes designed to make the FCC's decision-making processes more open, transparent, fair, and effective.

IC: RELEASE OF RSS-197, SRSP-303.65 AND RSS-243

On February 27, 2010, Industry Canada released the following three documents:

- Radio Standards Specification 197 (RSS-197), Issue 1: Wireless Broadband Access Equipment Operating in the Band 3650-3700 MHz, which sets out certification requirements for radio transmitters and receivers of wireless access systems operating in the Wireless Broadband Services (WBS) in the band 3650-3700 MHz.
- Standard Radio System Plan 303.65 (SRSP- 303.65), Issue 1: Technical Requirements for Wireless Broadband Services (WBS) in the Band 3650-3700 MHz, which sets out the minimum technical requirements for the efficient utilization of this band.
- Radio Standards Specification 243 (RSS-243), Issue 3: Medical Devices Operating in the 401-406 MHz Frequency Band, sets out the minimum certification requirements for active Medical Implant Communications Service (MICS) devices, which include Medical Implant Telemetry System (MITS) and Medical Data Service (MEDS) devices using new and emerging technologies for medical applications.

CONTACT RHEIN TECH FOR YOUR FCC AND INTERNATIONAL REGULATORY APPROVALS

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.

A special thank you to those who have recommended and contributed articles for our newsletter. Please continue to forward new and interesting material to our attention: multipoint@rheintech.com. We respect the privacy of our customers and colleagues. If you would like to cancel your MultiPoint updates, please follow the instructions at the end of this email. The information in the MultiPoint update is subject to change without notice.

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