MultiPoint
A Rhein Tech EMC Regulatory Update

December 2008

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 at 703-689-0368 or view archived issues of MultiPoint at our web site.

SAR Test Procedures for 3G Devices

QUESTION: Our firm manufactures cell phones and we would like to know the current FCC SAR test procedures for 3G devices. Can you explain this to us?

ANSWER: The SAR test procedures for 3G devices that operate under FCC Part 22H, 24E, and 27L are described in document - 941225 D01 SAR test for 3G devices v02 attached below. Attached document -941225 D02 Guidance PBA for 3GPP R6 HSPA v01 provides guidance for requesting a Permit- But-Ask for 3GPP R6-HSPA SAR testing. These procedures must be used for applications submitted to Telecommunication Certification Bodies (TCBs) for approval. Test labs are to submit questions to the Commission regarding the use of alternative procedures if the procedure is not covered in the aforementioned document by going to http://www.fcc.gov/labhelp and then use the link "Submit An Inquiry" to access the form to submit questions.

- 941225 D01 SAR test for 3G devices v02
- 941225 D02 Guidance PBA for 3GPP R6 HSPA v01

FCC Part 15 Transmitter System

QUESTION: I was reviewing the MultiPoint regulatory update from November 2008 and noted your response regarding Part 15 Transmitter System. However, I have noticed FCC has given various KDB answers within Pub No. 230398, 133857, 662614 and 602159. From FCC's past responses, I understand it would be acceptable to use multiple Part 15 repeaters that use the same inputs, provided it complied with certain criteria.

ANSWER: Thank you for taking the time to read our Multipoint newsletter. With questions and feedback, we are able to improve the quality of our newsletter. Please see below our answer to your question:

We see no reason why you could not use multiple repeaters, however, please bear in mind that inter- modulation products as a result of multiple repeaters being used may be a concern to the FCC. It would be prudent to post a question at the FCC's KDB site describing your intended application "multiple repeaters--with the same inputs," so that the FCC addresses all concerns. While the FCC's policy allows repeaters, actual use and configuration of repeaters may sometimes dictate additional testing, that otherwise may not be required for a single repeater configuration. Our Multipoint question and answer about "stringing transmitter" refers to using transceivers as "range extenders," which is clearly against the FCC rules and regulations because they do not operate as repeaters in accordance with KDB 602159 nor are they configured as a complete transmitter-amplifier-antenna configuration that the FCC would certify under one FCC Identifier as a Part 15 system. In this instance, the amplifier would not have its own FCC Identifier and cannot be used with any other transmitter or antenna that was not part of the certified system.

FCC Part 15 Testing Question

QUESTION: We are testing a Part 15 device operating in the 902-928 MHz frequency band that uses a mobile magnetic mount antenna. A vehicle's rooftop is required for maximum antenna gain. We also have a similar application using the same device with a slight change to the antenna design for a metal pit-lid. In the pit-lid example, the antenna gain is significantly reduced without a metal counterpoise. Since a metal plane is required for adequate antenna gain, can we employ a ground plane of nominal size during testing?

ANSWER: For EMC testing, the worst-case configuration is tested. If the antenna is normally used with a ground plane, then it must be tested with a sufficiently large ground plane since it is worst case. Therefore, all vehicle roof mounted antennas must be used with a sufficiently large sized ground plane because this would be worst case. The metal ground plane can be placed on top of the 80 cm high table on the test site. For the metal pit-lid test, if the worst case is without the pit-lid due to its installation configuration and the pit-lid actually reduces emissions, it can be tested without the pit-lid because it is worst case. Alternatively, in-situ testing is applicable for testing of transmitters with antennas designed for metal pit-lid(s). In this case, the grant would be conditioned for appropriate pit-lid(s) and installation requirements.

For MPE measurement procedures, a sufficiently large ground plane that enables the device to perform equivalently under normally device installation and operating conditions is required to conduct MPE measurements. For example, the FCC has accepted MPE testing for monopole antennas done with a ground plane mockup, and even done using actual vehicles or vehicle mockups.

FCC SAR Concerns

QUESTION: Our test lab recently informed us that the FCC has concerns regarding Specific Absorption Rate (SAR) measurements. Can you elaborate?

ANSWER: We have found the FCC has the following concerns:

1) SAR Probes Calibration And SAR System Accuracy Verification Requirements For Part 27.5(H) 1710 - 1755 MHz and Other Frequency Bands:
A number of applications approved by Telecommunication Certification Bodies (TCBs) were reviewed by the FCC in which SAR labs had used unacceptable SAR probe calibrations, dipoles and or tissue liquids to conduct SAR measurements for devices operating in this band. The FCC found that the reviews have not been performed according to the required procedures. SAR labs are to use SAR probes that are calibrated for the intended measurements. The most restrictive of all requirements among the test procedures, measurement standards, manufacturer specifications etc. must be applied by TCBs during reviews. If the SAR probe calibration is not suitable for the measurements, according to the probe design, calibration specifications or system requirements etc., then regardless of what the test procedures allow it is still not suitable for the measurement. SAR measurements in this frequency band require the SAR probe to be properly calibrated at around 1730 MHz. TCBs should ascertain that SAR measurement system accuracy is verified with a dipole calibrated for the corresponding frequency band. Depending on the design and calibration of an individual probe, the procedures in Knowledge Data Base (KDB) 450824 for probe calibration and system verification may be applied and fully explained in the SAR report. SAR measurements not conducted in accordance with the required procedures are not qualified for TCB approval; such filings may result in immediate dismissal by the FCC. When such is the case test labs should inquire through the FCC's Knowledge Data Base (KDB) "Submit an Inquiry" before conducting any tests. In order for these filings to qualify for TCB review, the tests must be conducted according to the required procedures.

2) SAR Probes Calibrated With Unacceptable Tissue Dielectric Parameters:
The FCC has noted that there have been several circumstances where SAR probes calibrated with out of tolerance tissue liquid dielectric parameters are used for SAR compliance measurements and ignored during TCB review. Such SAR measurements are unacceptable and therefore do not qualify for TCB approval. If these were filed at the FCC, depending on the deviations and other factors, the FCC may not guarantee the acceptance of such measurements without additional (proper) measurements.

3) Dipoles Calibrated Using Out Of Tolerance Tissue Dielectric Parameters:
The Commission has noticed there are some dipoles that have been calibrated using out of tolerance tissue liquid dielectric parameters and ignored during TCB review. SAR tests that are not in accordance with test requirements are not qualified for TCB approval. TCBs must alert applicants and their test labs to follow the required test procedures for such filings to qualify for TCB approval.

4) USB DONGLE WITH SWIVEL CONECTOR OR SWIVEL ANTENNA:
If a USB dongle has a swivel connector or a swivel antenna, the grantee or its test lab should inquire about applicable test

configurations and requirements before conducting SAR tests. It is not acceptable for a TCB to negotiate test configurations during or after the certification review process. All these need to be resolved by the test lab before testing.

5) PLACEMENT OF USB DONGLES IN THE TEST DEVICE HOLDER OF SAR MEASUREMENTS:
USB dongles are much smaller than the typical cell phones. When placed in the test device holder of typical SAR measurement systems, most USB dongles are likely to be substantially embedded or covered by the holder clamps. This can result in blocking the antenna or causing perturbation to device performance. Under such circumstances, the DUT must be surrounded by Styrofoam (5 cm or more in thickness) to facilitate the measurements. These should be clearly described in the test reports, along with test photos and applicable test separation distances fully identified. The same concerns also apply to other devices of similar packaging or footprints.

6) SAR SCAN RESOLUTIONS:
USB devices are much smaller than typical cell phones. The recommended area and zoom scan resolutions intended for cell phone SAR measurements may not apply to USB dongles or devices with similar packaging and dimensions. The scan resolutions must be adjusted (reduced) accordingly to satisfy the required SAR measurement uncertainty budget and requirements.

7) UNACCEPTABLE SAR PLOTS:
The FCC has indicated that SAR contour plots in the majority of SAR reports reviewed by TCBs do not have indications of how the test device has been oriented with respect to the SAR distribution. Therefore, it is unclear if the entire projection of a device has been measured or if the antenna (swivel antennas in various positions) has been fully captured by the measurements. Such plots are insufficient for the test results to demonstrate compliance; and therefore, are unacceptable. The FCC has also found discrepancies between results in the plots and those tabulated in the SAR report. TCBs must carefully review these plots, match the results to the reported values and ensure all required test configurations have been tested and clearly identified in the test reports.

8) VERIFY MEASURED SAR VALUES AGAINST DEVICE RATINGS AND OPERATING CAPABILITIES:
The FCC has noted several circumstances where substantially low SAR values are reported in the test data for rather high output devices. These generally represent device malfunction, incorrect test setup or equipment problems and have been totally overlooked during TCB review. Low reported SAR values do not always imply compliance. The test results must be verified against generally expected results to determined compliance or further explanation of possible discrepancies is required.

9) DOCUMENTING DEVICE OPERATING AND TEST SETUP: The FCC has noted that a large percentage of SAR reports have included certain unnecessary or inapplicable information that do not relate to the test device. In addition, the necessary information that describes the critical concerns on how the specific device is configured or tested to address specific (known) test concerns are often missing. The test report must have all the information necessary to support the test results for demonstrating compliance and enable the tests to be repeated.

FCC Rules for Importing RF Devices into the US

QUESTION: Our distribution firm in the United States will be importing radio frequency devices for sale. What are the FCC requirements for importation of such devices into the United States?

ANSWER: The FCC regulates the marketing, sale and importation of radio frequency devices in the United States. When importing a radio frequency (RF) device, the importer, ultimate consignee, or their designated broker, may be required to declare that the radio frequency device meets the FCC importation conditions under Title 47 of the Code of Federal Regulation (CFR) Section 2.1204. A radio frequency device is any device capable of emitting radio frequency energy (see Section 2.801).

This includes radio transmitters, any electrical device that uses internal electrical signals and/ or electrical pulses that may create radio frequency energy, etc. Digital cameras and other digital electronic devices are examples of RF devices that may unintentionally radiate radio frequency energy and cause interference. Technical standards for devices that are required to comply with the FCC requirements are specified in the applicable sections of the FCC rules. Most of these devices require testing and labeling as well as having their performance documented under the FCC's equipment authorization procedures.

Certain exclusions and/or specific conditions may modify or eliminate this requirement (discussed below, see FCC Form 740 Declaration, or Sections 2.1202 and 2.1203 of the Rules). When importing an RF device the designated broker or importer of record must declare the appropriate entry conditions on the FCC Form 740, either electronically or by attaching a Form 740 to the Customs entry papers.

To assist Customs in identifying when a declaration is necessary, a Schedule of FCC 740 requirements by Harmonized Tariff Schedule (HTS) indicates:
1) When an FCC Declaration may be needed (it is referred to electronically as FC3 code)

2) When a declaration is required (it is referred to as FC4 code).
When the importation of goods is identified as "FCC Declaration may be needed" (FC3 code), the following guidance applies:

A) The importer may disclaim the Declaration and not submit the Form 740 if the goods are not RF devices.

B) The importer may disclaim the Declaration and not submit the Form 740 if the goods are RF devices, but meet the following specific exclusion conditions:

- An RF device that is exempt from the equipment authorization procedure (CFR 47 Part 15.103).
- An RF device that does not meet the definition of a device requiring equipment authorization, or is considered an incidental radiator device and does not require equipment authorization (CFR 47 Part 15.101).
- An RF device that is excluded from the import conditions (CFR 47 Part 2.1202). See Note 1 below;

Note 1: 47 CFR Part 2.1202 (a) Excludes some items from the importation process. This does not exclude these items from the equipment authorization process. Exclusion for equipment authorization is defined in 15.103. If the harmonization schedule identifies the goods as maybe (FC3) the importer has the option to decline the declaration. If it identifies the goods as required (FC4) the importer must complete the declaration. The items excluded from the importation process are: Cameras, musical greeting cards, quartz watches and clocks, modules of quartz watches and clocks, hand-held Calculators and electronic games, and other similar unintentional radiators which use low level battery power and which do not contain provisions for operation while connected to AC power lines.
Note that instead of disclaiming the declaration, the importing party may elect to submit a Form 740 to facilitate the entry of goods.

C) The goods require an equipment authorization. A declaration must be done either electronically or in paper using the Form 740.

FCC Declaration required: Importation of goods is identified as "FCC Declaration required" (FC4 code); a Form 740 must be submitted either electronically or in paper.

FCC 740 Declaration: Part I of the Form 740 is for specific entry and product data. Only in the case of devices described in Part II, Item 1 is an FCC ID necessary. Otherwise, "Not Applicable" (NA) is appropriate.
For Part II of Form there are eight categories that require declaration:

- The FCC issued a Grant of Equipment Authorization for the FCC ID listed above. That is equipment that is granted under the Certification equipment authorization procedure and an FCC ID is issued.
- An FCC Grant of Equipment Authorization, and an FCC ID are not required, but the equipment complies with FCC technical requirements.

However it must be noted that, if the device meets specific exclusion conditions and the Form 740 harmonization schedule indicates a "required" (FC4 code), or the importer elects to make a Form 740 declaration (under the FC3 or as a "no code" option) then item 2 may be used to declare the following:

- An RF device that is exempt from the equipment authorization procedure (Section 15.103).
- An RF device that does not meet the definition of a device requiring equipment authorization; or considered an incidental radiator device and does not require equipment authorization (Section 15.101).
- An RF device that is excluded from the import conditions (Section 2.1202). See note * below
- A Non RF device that is categorized as required (FC4).

3) The described equipment is being imported in limited quantities for testing and evaluation for compliance with technical requirements or marketing suitability. The equipment will not be offered for sale or otherwise marketed.

4) The described equipment is being imported in limited quantities for demonstration at industry trade shows and will not be offered for sale or otherwise marketed.

5) The described equipment is being imported solely for export. It will not be offered for sale or otherwise marketed in the U.S. *a) The described equipment is a non-U.S. standard cellular phone that can only function outside of the U.S.*

6) Exclusively the U.S. Government is importing the equipment described for use.

7) Three or fewer radio receivers, computers, or other unintentional radiators as defined in Part 15 of the FCC Rules, are being imported for an individual's personal use and are not intended for sale.

8) The described equipment is being imported for repair and will not be offered for sale or otherwise marketed.

The following below are direct links Web Access to rules pertinent to FCC certification and importation of radio frequency devices:

- Electronic Access Code of Federal regulations (CFR): FCC Rules and Regulations
- Radio frequency (RF) device defined: 47 CFR FCC Part 2.801
- Radio frequency (RF) device defined and Marketing of radio frequency devices prior to equipment authorization: 47 CFR FCC Part 2.803

Importation of Devices Capable of Causing Harmful Interference Subpart K-Importation of Devices Capable of Causing Harmful Interference:

- Purpose: 47 CFR FCC Part 2.1201
- Exclusions: 47 CFR FCC Part 2.1202
- General requirements for entry into the USA: 47 CFR FCC Part 2.1203
- Import Conditions: 47 CFR FCC Part 1204
- Filling of required declaration: 47 CFR FCC Part 1205
- Examination of imported equipment: CFR 47 FCC Part 1207 47 CFR 2.1207

PART 15 SECTIONS:

- Definitions: 47 CFR FCC Part 15.3
- Unintentional Radiators: 47 CFR FCC Part 15.101
- Exempted devices that are exempt fro Part 15 specific technical standards: 47 CFR FCC Part 15.103

Form 740

Attachment: Harmonization Code 740 Schedule: 997198 D01 HTS Declaration Form 740 v01.pdf

INTERNATIONAL UPDATE

EU: NEW CENELEC STANDARDS RELEASED THIS MONTH

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

- **EN 50083-8:2002/A11:2008** (11/25/2008) Cable networks for television signals, sound signals and interactive services -- Part 8: Electromagnetic compatibility for networks
- **EN 60335-2-21:2003/A2:2008** (11/26/2008) Household and similar electrical appliances - Safety -- Part 2-21: Particular requirements for storage water heaters
- **EN 60335-1:2002/A13:2008** (11/26/2008) Household and similar electrical appliances - Safety - - Part 1: General requirements
- **EN 60335-2-97:2006/A11:2008** (11/27/2008) Household and similar electrical appliances - Safety -- Part 2-97: Particular requirements for drives for rolling shutters, awnings, blinds and similar equipment
- **EN 62040-1:2008** (11/27/2008) Uninterruptible power systems (UPS) -- Part 1: General and safety requirements for UPS
- **EN 60601-2-29:2008** (11/28/2008) Medical electrical equipment -- Part 2-29: Particular requirements for the basic safety and essential performance of radiotherapy simulators
- **EN 62431:2008** (12/4/2008) Reflectivity of electromagnetic wave absorbers in millimetre wave frequency - Measurement methods
- **EN 60519-7:2008** (12/5/2008) Safety in electroheat installations -- Part 7: Particular requirements for installations with electron guns
- **EN 50499:2008** (12/5/2008) Procedure for the assessment of the exposure of workers to electromagnetic fields
- **EN 50413:2008** (12/11/2008) Basic standard on measurement and calculation procedures for human exposure to electric, magnetic and electromagnetic fields (0 Hz - 300 GHz)

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:

- **ISO/IEC 18047-6** (11/26/2008) Information technology -- Radio frequency identification device conformance test methods -- Part 6: Test methods for air interface communications at 860 MHz to 960 MHz
- **IEC 61000-4-17-am2** (11/27/2008) Amendment 2 - Electromagnetic compatibility (EMC) - Part 4-17: Testing and measurement techniques - Ripple on d.c. input power port immunity test
- **IEC 61000-1-2** (11/27/2008) Electromagnetic compatibility (EMC) - Part 1-2: General - Methodology for the achievement of functional safety of electrical and electronic systems including equipment with regard to electromagnetic phenomena
- **IEC 60204-1-am1** (11/27/2008) Amendment 1 - Safety of machinery - Electrical equipment of machines - Part 1: General requirements
- **IEC 61000-4-2** (12/9/2008) Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques -

Electrostatic discharge immunity test

- **IEC 62321** (12/11/2008) Electrotechnical products - Determination of levels of six regulated substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers)
- **IEC 62236-2** (12/12/2008) Railway applications - Electromagnetic compatibility - Part 2: Emission of the whole railway system to the outside world
- **IEC 62236-5** (12/12/2008) Railway applications - Electromagnetic compatibility - Part 5: Emission and immunity of fixed power supply installations and apparatus
- **IEC 62236-1** (12/12/2008) Railway applications - Electromagnetic compatibility - Part 1: General
- **IEC 62236-4** (12/12/2008) Railway applications - Electromagnetic compatibility - Part 4: Emission and immunity of the signalling and telecommunications apparatus

See IEC for additional information.

EU: NEW ETSI STANDARDS RELEASED THIS MONTH

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

- ETSI TR 102 655 V1.1.1 (November 2008) Electromagnetic compatibility and Radio spectrum Matters (ERM); System reference document; Short Range Devices (SRD); Low Power Active Medical Implants (LP-AMI) operating in a 20 MHz band within 2 360 MHz to 3 400 MHz
- ETSI TS 102 658 V1.1.1 (December 2008) Electromagnetic compatibility and Radio spectrum Matters (ERM); Digital Private Mobile Radio (dPMR) using FDMA with a channel spacing of 6,25 kHz
- ETSI EN 301 893 V1.5.1 (December 2008) Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive

See new ETSI website for additional information.

INDIA: 3G LICENSE AUCTION CONFIRMED

India's government has finalized plans for its 3G and WiMAX auctions - with the 3G auctions starting on January 16, 2009. Auctions for WiMAX licenses will begin two days after the 3G licenses are sold.

FCC: FREE BROADBAND VOTE CANCELLED

The FCC has cancelled a Dec. 18, 2008 meeting that included a vote on free Internet wireless service. Democratic Sens. Jay Rockefeller and Henry Waxman joined the Republican White House in opposing the FCC vote. The cell-phone industry and some consumer advocates have also objected to the free-Internet plan.

CANADA: RELEASE OF SRSP-303.4, ISSUE 3

On December 6, 2008, Industry Canada released Technical Requirements for Fixed Wireless Access Systems Operating in the Band 3450-3650 MHz (SRSP-303.4, Issue 3). This SRSP states the minimum technical requirements for the efficient use of the frequency band 3450-3650 MHz by fixed wireless access (FWA) radio systems, including WiMAX systems, and replaces SRSP-303.4, Issue 2. Issue 3 of SRSP-303.4 also provides additional information on coexistence between FWA systems and other radio services sharing the same and adjacent spectrum. The main changes are as follows:

- The frequency change in the title has been modified to reflect the spectrum that is actually available for licensing. (Note, however, that the spectrum limits per Section 4.1.1 have not been changed)
- Information has been added on Canadian footnotes C18 and C20 (Section 2.7).
- Clarification has been provided regarding spectrum usage and coordination obligations vis-a- vis the United States (Sections 2.8 and 6.1).
- Clarification has been provided regarding spectrum usage and coordination obligations vis-a- vis the Fixed-Satellite Service (Sections 2.9, 2.10 and 7). Link

CONTACT RHEIN TECH FOR YOUR 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.

Learn More

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