

From: Joe Dichoso [mailto:Joe.Dichoso@fcc.gov]
Sent: Thursday, September 02, 2010 3:56 PM
To: Rashmi Doshi; Terry Mahn; Joe Dichoso
Cc: Raymond Laforge; Jim Szeliga
Subject: XM siruis device: RE: Short Telecon on Thursday?

Hi Terry,

Per our discussion of a XM device with a 3.8 GHz VCO that is used for the transmitter and for controls of other functions.

After review, per Q#7(see below) in a TCB conference Call meeting, in cases where the transmitter is controlled by a digital device(with no other function but to control the transmitter) whose frequency is much higher than the fundamental, testing of the transmitter can occur beyond the 10th harmonic. So while KDB788802 is not clear, it is possibly correct when applicable for certain cases.

For XM's case, the device is understood to be a composite device comprised of a transmitter and digital device in which the 3.8 GHz VCO controls the transmitter and is also used with the digital device that has other functions other than controlling the transmitter. Therefore, the composite devcies are tested separately. Please note that assuming the 3.8 GHz is the highest frequency for the tx and the digital device, they are both tested to 5 X 3.8 GHz or 19 GHz since this would be the higher frequency range.

Also note, that since the 3.8 GHz VCO emission is for both devices, it is allowed the higher limit allowed by either the tx (15.239 limits) or digital device under 15.109.

Regards,
-Joe

Question #7:

Suppose a case where an intentional radiator whose transmit frequency is relatively low (e.g., 13.56MHz) is incorporated into a digital device product subject to unintentional radiator rules whose highest oscillator is relatively high (e.g., 2GHz microprocessor). Let's also suppose that the digital device is a Class A product.

It seems reasonable for a product like this to be treated as being subject to two separate authorization procedures: 1) The transmitter portion is subject to Certification under 15.225, and 2) The digital device being subject to Verification under 15.109 limits.

In a situation such as this, how is 15.33(a)(4) to be interpreted?

Without this clause, it would have been clear that the Test Report submitted for Certification should include radiated emissions measurements up to 140MHz according to 15.209 limits (as per 15.225(d)), and the Test Report written for Verification should include radiated emission

measurements up to 10GHz according the 15.109 Class A limits.

However, 15.33(a)(4) clause, taken at face value, seems to imply that harmonics of the transmitter would have to be measured far above the tenth harmonic. If this is not the case, then what kind of emissions data would be required in the Test Report? 15.109 Class A limits? Or 15.209 limits without measurements of harmonics?

If, on the other hand, the intent of the 15.33(a)(4) clause is simply to ensure that the product "as a whole" is scanned up to an appropriate frequency as dictated by the rules for unintentional radiators (15.33(b)), then that intent would be met by the issuance of the Class A Verification test report containing the emissions data up to 10GHz; And the Test Report for Certification could still be limited to the scan up to 140MHz.

The example above is representative of the issues that we need clarification on.

Answer: If the intentional radiator contains a digital device that controls the functions of the intentional radiator and the digital device does not control additional functions or capabilities, the frequency range shall be investigated up to the range specified in paragraphs (a)(1)-(a)(3) of this section or up to the range applicable to digital devices, as shown in paragraph (b)(1) of this Section, whichever is the higher frequency range of investigation. If the digital device is used to control additional functions or capabilities, it is subject to the standards for unintentional radiators and the provisions of paragraphs (a)(1)-(a)(3) of this section apply to the intentional radiator.

Following the example, you can't have a 13.56 MHz transmitter that is controlled by a microprocessor chip running at 2 GHz and call the emissions above the tenth harmonic (135.6 MHz), digital emissions subject to, say, the Class A limits. Rather, these emissions are subject to the limit in 15.225(d), the 15.209 limits, and must be measured to the 10th harmonic of the fundamental or to the range specified in 15.33(b)(1), whichever is higher. For a 2 GHz microprocessor controller, the frequency range of measurement for the transmitter is 10 GHz.