Chris Harvey

From: EASTECH [EASTECH@fcc.gov]
Sent: Wednesday, September 21, 2005 6:54 PM
To: Mike Kuo
Cc: Chris Harvey -TCB
Subject: RE: Part 90 Subpart Y questions

Mike:

Sorry for the delay in response. Here is a summary of our answers:

Question #1: In section 90.210 Mask L, it refer to Authorized Bandwidth. Does authorized bandwidth equal to 99% Bandwidth based upon the measurement ? or is it based upon the channel bandwidth as indicated in section 90.1215 ?

Answer 1: Authorized Bandwidth is the channel bandwidth listed in 90.1215.

Question #2: In section 90.1215 power limit which is based upon the channel bandwidth (1,5,10,15 and 20 MHz), if the 26dB bandwidth or 99% bandwidth is grater than channel bandwidth, is this device complied with technical requirement? for example, carrier frequency is 4980 MHz, the measured 26dB or 99% bandwidth is 25 MHz. Does it comply ?

Answer 2: No. The measured bandwidth may not exceed the authorized channel bandwidth.

Question #3: Necessary bandwidth for emission designator purpose. Shall necessary bandwidth base upon channel bandwidth or based upon 99% Bandwidth measurement ?

Answer 3: Necessary bandwidth is based upon 99% bandwidth measurement and is used for the emission designator

Further you asked if the access point that you describe will be a composite device and does not need to be an SDR. This is based on your description and assumption that there are no configuration options for non-US operation. We are also assuming that these devices are not portable and based on our guidance in the past TCBs may review them. Please let us know if there are any other questions.

Rashmi Doshi, PhD
Chief, FCC Laboratories

-----Original Message-----
From: Mike Kuo [mailto:mike.kuo@ccsemc.com]
Sent: Wednesday, September 14, 2005 3:27 PM
To: EASTECH
Cc: Chris Harvey -TCB
Subject: Part 90 Subpart Y questions

§ 90.209 Bandwidth limitations.

(a) Each authorization issued to a station licensed under this part will show an emission designator representing the class of emission authorized. The designator will be prefixed by a specified necessary bandwidth. This number does not necessarily indicate the bandwidth occupied by the emission at any instant. In those cases where §2.202 of this chapter does not provide a formula for the computation of necessary bandwidth, the occupied bandwidth, as defined in part 2 of this chapter, may be used in lieu of the necessary bandwidth.

§ 2.202 Bandwidths.

(a) *Occupied bandwidth.* The frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission. In some cases, for example multichannel frequency-division systems, the percentage of 0.5 percent may lead to certain difficulties in the practical application of the definitions of occupied and necessary bandwidth; in such cases a different percentage may prove useful.

§ 90.7 Definitions.

Authorized bandwidth. The frequency band, specified in kilohertz and centered on the carrier frequency containing those frequencies upon which a total of 99 percent of the radiated power appears, extended to include any discrete frequency upon which the power is at least 0.25 percent of the total radiated power.

FCC Part 90 Subpart Y

Section 90.210 Emission Mask

Emission Mask L:

(l) *Emission Mask L.* For low power transmitters (20 dBm or less) operating in the 4940–4990 MHz frequency band, the power spectral density of the emissions must be attenuated below the output power of the transmitter as follows:

(1) On any frequency removed from the assigned frequency between 0–45% of the authorized bandwidth (BW): 0 dB.

(2) On any frequency removed from the assigned frequency between 45–50% of the authorized bandwidth: 219 log (% of (BW)/45) dB.

(3) On any frequency removed from the assigned frequency between 50–55% of the authorized bandwidth: 10 + 242 log (% of (BW)/50) dB.

(4) On any frequency removed from the assigned frequency between 55–100% of the authorized bandwidth: 20 + 31 log (% of (BW)/55) dB attenuation.

(5) On any frequency removed from the assigned frequency between 100–150% of the authorized bandwidth: 28 + 68 log (% of (BW)/100) dB attenuation.

(6) On any frequency removed from the assigned frequency above 150% of the authorized bandwidth: 50 dB.

(7) The zero dB reference is measured relative to the highest average power of the fundamental emission measured across the designated channel bandwidth using a resolution bandwidth of at least one percent of the occupied bandwidth of the fundamental emission and a video bandwidth of 30 kHz. The power spectral density is the power measured within the resolution bandwidth of the measurement device divided by the resolution bandwidth of the measurement device. Emission levels are also based on the use of measurement instrumentation employing a resolution bandwidth of at least one percent of the occupied bandwidth.

With above definition in mind, I would like to post the following questions which are related to Part 90 Subpart Y.

Question #1: In section 90.210 Mask L, it refer to Authorized Bandwidth. Does authorized bandwidth equal to 99% Bandwidth based upon the measurement ? or is it based upon the channel bandwidth as indicated in section

90.1215 ?

Question #2: In section 90.1215 power limit which is based upon the channel bandwidth (1,5,10,15 and 20 MHz), if the 26dB bandwidth or 99% bandwidth is grater than channel bandwidth, is this device complied with technical requirement? for example, carrier frequency is 4980 MHz, the measured 26dB or 99% bandwidth is 25 MHz. Does it comply ?

Question #3: Necessary bandwidth for emission designator purpose. Shall necessary bandwidth base upon channel bandwidth or based upon 99% Bandwidth measurement ?

Currently, we have received two applications which are very similar to each other. Both EUT(Access Point) are equipped with Atheros AR2112 (for 2.4 GHz operation) and AR5112 (for 5 GHz) chipset. For 5 GHz operation, the application can use software / firmware to tune AR5112 chipset so this device can be operated under FCC Part 90 Subpart Y. Both EUTs are required professional installation due to high gain antenna. Both applications submit 15.247 DTS test report (for 2412-2462 GHz, 5,725-5,825 GHz), 15.407 UNII (for 5125-5.35 GHz) and Part 90 Subpart Y (for 4940-4990 MHz) under one FCC ID number and require composite device filing (DTS/UNII/ TNB). Once it is approved, the manufacturer would like to offer this Access Point with the following configuration:

A) As 802.11 a/b/g WLAN (2.4 and 5 GHz) Access point requires professional installation.

or

B) As 802.11 b/g WLAN and Part 90Y (2.4 GHz and 4.9 GHz) Access Point requires professional installation.

A) and B) are identical in term of hardware. The only difference is to limit radio function via factory firmware. As far as we know, firmware change can only be done at the factory. End user / installer will not be able to change the firmware.

Question 1: Shall these two applications classified as Software Define Radio ?

Question 2: If it is not a Software Define Radio, can TCB handle this composite device review ?

Best Regards

Mike Kuo
Compliance Certification Services
561F Monterey Road
Morgan Hill CA 95037
Tel: (408)463-0885 x: 105
Fax: (408)463-0888

e-mail:mike.kuo@ccsemc.com
http://www.ccsemc.com