

Response to email dated May 11, 2000 regarding additional information to be filed regarding Ericsson's Bluetooth module.
EA Number EA97254

Question 1.

Depending on the product that the module is used with, the final device could be subject to routine evaluation for rf exposure, either SAR limits or MPE limits. However, the maximum rf power output from the module is 0 dBm or 1 milliwatt. The device is also designed to use a quarter wave monopole antenna with a nominal gain of 0dBi as the radiating element. If the entire rf power output were absorbed by 1 gram of tissue (not possible considering typical rf circuits), the SAR limit would still not be exceeded. Further, with a separation distance of 20 cm or greater, the MPE limits are well above the potential this device is capable of producing.

There has been some discussion regarding the potential the module could exhibit for altering the ground currents in devices such as cell phones and pcs phones. However, these devices could not be retrofitted with a module the size of the Ericsson module without a redesign of phone to accommodate the additional space and the requirement for connecting data interfaces between the module and the phone. This redesign would require submission of the modified phone to the FCC for certification as a new phone. Thus, rf exposure issues related to a device such as a pcs or cell phone would be addressed at that time.

Question 2.

I am preparing a letter accepting your position that the internal photos and manual cannot be held as confidential.

Question 3.

The Bluetooth module has three modes of operation with two modes operating under the hybrid provisions of 15.247 and the third operating under the frequency hopping provisions of 15.247. In page mode and inquiry (acquisition) mode, the module uses a hopping sequence consisting of 32 frequencies. In these modes the combined processing gain from direct sequence and hopping operations is greater than 17 dB. In the connection (link) mode the module uses a pseudorandom hopping sequence of 79 channels. Each unit operating as a system member of a piconet will synchronize to the hopping sequence randomly selected by the master unit.

Theoretical process gain calculations in the conventional sense do not apply to the direct sequence operation of this equipment. A 68 bit or 72 bit sequence code is correlated to a true or false flag. In an effort to put this in context with typical direct sequence systems this would approximate to a spread/data rate of 18 dB although it is not recommended that this approach be used. Please refer to the measured processing gain report that has been accepted by the FCC (see letter filed with the application) for additional information.

Question 4.

Please review the following discussion and provide me with your comments. Modular approvals are not specifically addressed in the FCC Rules. Authorization of modules was permitted because the Commission determined that it was in the interest of the public to permit modules to be authorized and that under certain conditions there was little if potential for causing harmful interference. The Commission's policy was written around relatively high power modules that could potentially exceed the EIRP limits specified in the applicable rules if connected to a high gain antenna. This is not the case with the Ericsson module which is designed to be marketed for installation in a multitude of products. To impose a requirement for a permanently attached antenna on a module like the Ericsson module, with a 1 milliwatt output power, would not benefit the public because of the increased cost to the public for the finished product, would not benefit the FCC because of the resultant increase in the number of applications that would be required and would not reduce the potential for causing interference due to levels exceeding the levels permitted by the rules.

Ericsson intends to maintain the compliance of their product as follows. The Ericsson specification for the antenna will always be a short monopole configuration with a gain of 0dBi or as close as possible to this figure. Ericsson can provide an antenna if the customer wishes or the customer with sufficient expertise can design their own antenna for use with their product. In order to maintain the esthetic appearance of products, customers need the flexibility to incorporate their own antenna designs. Depending on module location and the overall product design, the antenna may be designed as a trace on a printed circuit board or as an antenna to be mounted external to the unit. For external configurations, the antenna will be connected via a shielded coax cable in accordance with Ericsson's specifications. Specific instructions will be given to the purchaser of these modules regarding the antenna gain and interconnecting cable requirements to maintain compliance with the FCC Rules and Ericsson will inform purchasers of the need for conducting measurements to insure the finished product meets all applicable FCC requirements.