Before the
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
Investigation of the Spectrum Requirements for Advanced Medical Technologies	)	ET Docket No. 06-135
	)	
Amendment of Parts 2 and 95 of the Commission's Rules to Establish the Medical Device Radio Communications Service at 401-402 and 405-406 MHz	)	RM-11271
	)	
DexCom, Inc. Request for Waiver of the Frequency Monitoring Requirements of the Medical Implant Communications Service Rules	)	ET Docket No. 05-213
	)	
Biotronik, Inc. Request for Waiver of the Frequency Monitoring Requirements for the Medical Implant Communications Service Rules	)	ET Docket No. 03-92

COMMENTS OF DEXCOM, INC.

DexCom, Inc. ("DexCom"), by its attorneys, hereby comments on the above-captioned *Notice of Proposed Rulemaking* ("*NPRM*") and *Notice of Inquiry* ("*NOI*").[1] DexCom supports permitting medical devices that do not use listen-before-transmit ("LBT") technology, but opposes more stringent power limits and any bifurcation of spectrum based on the technology used. Devices such as DexCom's present virtually no risk of interference to LBT devices and need higher operating power than the proposed limit to serve patients effectively.

[1] FCC 06-103 (rel. July 18, 2006).

INTRODUCTION

DexCom manufactures a system of blood glucose implant devices that continuously monitor blood glucose data and periodically transmit such data to an external receiver. Studies have shown that the DexCom system is highly effective in allowing diabetics to manage their blood glucose levels and thus avoid the terrible complications of diabetes.

DexCom's system operates in the existing MICS band pursuant to a waiver granted by the Commission.[2] Although DexCom's system does not comply with the existing MICS band listen-before-transmit ("LBT") requirements, the Commission found that the likelihood that DexCom's devices would cause interference is "virtually nil," and that given the proximity of the receiver to the transmitter in DexCom's system, the probability of DexCom's devices receiving interference would be similarly minuscule.[3] In granting the waiver for DexCom's devices, the Commission also recognized the significant medical benefits that would accrue to diabetic patients.[4]

DISCUSSION

DexCom supports permitting medical devices that do not use LBT, but opposes more stringent power limits and any bifurcation of spectrum based on

---

[2] DexCom, Inc., Request for Waiver of the Frequency Monitoring Requirements for the Medical Implant Communications Service Rules, ET Docket No. 05-213, FCC 06-1 (rel. Jan. 18, 2006) ("DexCom Waiver").
[3] *Id.* at para. 16.
[4] *Id.* at para. 15.

the technology used. DexCom opposes the proposed rule change that would create two tiers of medical devices operating in different spectrum bands, with devices that do not use LBT technology restricted to the 401-402 MHz and 405-406 MHz "wing" bands.[5] The stated reasons for the bifurcation of medical implant devices are not supported, as the risk of interference from devices such as those of DexCom — *i.e.*, devices that transmit on a single frequency with a low duty cycle — is minuscule. Instead, DexCom supports the proposal to permit the operation of low-duty cycle medical devices that do not have frequency monitoring capability,[6] but such devices should not be subject to unnecessary stringent power restrictions and should be permitted in the entire 401-406 MHz band rather than being limited to the wing bands.

The proposal to require more stringent power levels would have an adverse affect on DexCom's devices that currently operate in the 402-405 MHz MICS band. A reduction in the permitted output power to 250 nW EIRP would dramatically decrease the effectiveness of DexCom's STS transmitter. Such a restrictive power output requirement would lower the useful operating range of the DexCom STS devices to less than two feet.[7] Requiring patients to keep the handheld receiver less than two feet from the body worn transmitter to ensure reliable communication is simply not realistic, and such a requirement would

---

[5] *NPRM* at para. 23.
[6] *Id.* at para. 25 (proposing to permit devices that operate without frequency monitoring capability with a duty cycle that does not exceed 0.1%).
[7] *Ex Parte* Filing by DexCom, Inc., ET Docket No. 06-135, RM-11271, Attachment at 10 (Oct. 12, 2006).

render DexCom's STS devices unusable by patients. Other devices that use miniature transmitters and receivers — which can be very important for implantable medical devices — will have similar difficulty operating at such reduced output power.

At present, the DexCom system operates at just under the 25 microwatt maximum power level allowed under the MICS rules, permitting a reliable range of transmission of up to five (5) feet from the receiver. This range is necessary so that patients can lead normal lives by, for example, being able to lie on the sensor while asleep or to shower with the receiver placed outside the shower stall. Moreover, a reduction in power by 100 times (or 20 dB) would leave the DexCom system with no fade margin and very little allowance for antenna polarization losses. This means that if a patient turns over onto the sensor during sleep, for example, the data transmission would not conduct through the patient's body to the handheld receiver placed nearby. Note that diabetics, including children in particular, are especially vulnerable while sleeping, and DexCom's system addresses this risk by triggering an alarm and waking up the patient when the glucose level gets too high or low. Thus, it is particularly important to protect the operation of DexCom's glucose monitoring system during times when the patient is asleep.

As the Commission recognized when it granted a waiver for DexCom to operate within the existing MICS band, DexCom's STS devices present a

"virtually nil" probability of interference.[8] The DexCom system currently operates at a single fixed frequency of 402.142 MHz, occupies only 120 kHz of bandwidth, and has duty cycle of only 0.003%. This combination of transmission on a single fixed frequency with an extremely low duty cycle makes interference with devices that use LBT extremely unlikely.[9]

Moreover, the effects of whatever minuscule risk of interference there is to LBT devices can be eliminated by using well-known interference mitigation techniques such as retransmission of missed packets, cyclic redundancy checks (CRC) with error correction, and fail-safe operation in the event of a communications failure. Similarly, non-LBT devices can use mitigation techniques so that such devices will continue to operate correctly even if there are any missed packets. Such mitigation techniques are required given the secondary status of MICS.

In summary, DexCom's STS transmitters present a minimal risk of interference in the existing MICS band — as the Commission recognized when it granted the waiver to such devices — and the STS systems require the maximum power approved under the existing waiver to operate within a practical range and serve diabetic patients effectively. Given the virtually non-existent interference risk posed by DexCom's STS devices, the Commission should not require such devices to move out of their existing operating frequency or operate

[8] DexCom Waiver at para. 16.
[9] *Id.* at para. 16.

under more stringent power limits.

* * *

Respectfully submitted,

DEXCOM, INC.

Henry Goldberg
Devendra T. Kumar
GOLDBERG, GODLES, WIENER
& WRIGHT
1229 19th Street, N.W.
Washington, DC 20036
(202) 429-4900 – Telephone
(202) 429-4912 – Facsimile

Counsel to DexCom, Inc.

Dated: October 31, 2006