

FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)	
)	
Massachusetts Institute of Technology)	ET Docket No. 19-89
Request for Waiver of Part 15 of the)	
Commission's Rules Applicable to)	
Ultra-Wideband Devices)	

Reply Comments
of
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Massachusetts Institute of Technology ("MIT") hereby submits these Reply Comments in response to the limited issues raised by commenters in the above-captioned proceeding ("Waiver Request"). MIT requests a waiver of certain Federal Communications Commission's Part 15 rules governing ultra-wideband ("UWB") indoor devices to permit the operation of its unique non-invasive UWB system for the health and safety monitoring of patients and senior adults (the "WiTrack System").

Three commenters responded to the Waiver Request. Two of the commenters, LEO Pharma Science & Tech Hub, and Harvard Medical School/McLean Hospital, support the Waiver Request, while a third commenter, Mr. Ron Anderson, raises some questions about the noise floor and potential alternatives for health monitoring. These Reply Comments will respond to the commenters.

LEO Pharma Science & Tech Hub Comments.

LEO Pharma Science & Tech Hub fully support the waiver request. The letter describes some of the benefits of the WiTrack System, both in the process of evaluating new drugs, as well as in ongoing care. Specifically, the letter states:

The Witrack device enables companies like us to perform better clinical research, understand patient needs, and react to them in a more effective way. Further, it can lead to the validation of a new standard of measurement for itching to be used as an end-point in clinical trials. Such a measurement of itching can also fundamentally change the way in which doctors manage skin conditions by allowing them to monitor their patients' condition, and adjust medication dosage and regimen on an individual basis. The net result will be a significant improvement in the health outcomes and quality of life for a large population - over 10 million children, and 7 million adults.

Furthermore, the letter emphasizes the inadequacy of current alternatives, particularly within the context of quantifying the severity of skin conditions such as eczema/atopic dermatitis, saying:

Because the severity of itching is currently rated by the patient on a 1-10 scale, it is hard to truly quantify and is entirely subjective. MIT's highly innovative and unique passive remote monitoring device has the potential to remedy this problem.

Harvard Medical School/McLean Hospital Comments.

These comments fully support the waiver request. The letter describes in great detail the burdens imposed on the healthcare system by chronic diseases, Alzheimer's disease and related dementias both in terms of costs and stress on caregivers. It states:

Chronic diseases account for two thirds of the current \$3 trillion dollars of annual health care costs in the United States. The overwhelming majority of these costs are incurred by seniors, with over 90% of seniors suffering from one or more chronic diseases.

Furthermore, Alzheimer's disease and related dementias currently affect 5.8 million Americans with prevalence numbers expected to nearly triple by the year 2050. The behavioral symptoms of dementia, including agitation, aggression, depression and psychosis, are nearly universal over the course of illness, drive morbidity and mortality

associated with dementia, increase long term care placement and hospitalizations and contribute greatly to caregiver burden and stress.

It describes how the Witrack System has enabled doctors to effectively monitor patients with dementia and quantify key aspects of the disease. Additionally, it states the interest of the Harvard Medical School team in further expanding the use of the Witrack System, as follows:

With my colleagues at Harvard Medical School, and in collaboration with the Witrack team, we have explored the use of the Witrack device in monitoring patients with advanced dementia. In our studies, we were able to use Witrack's passive measurement to detect and quantify repetitive pacing which is associated with anxiety and agitation, commonly exhibited in patients with dementia and Alzheimer's. We are looking further into the potential use of this device in improving care for such patients.

Finally, the letter emphasizes the inadequacy of alternative technologies and methods to monitor aging patients, and the ability of the Witrack System to overcome these deficiencies, saying:

A key difficulty in providing care for such patients is getting reliable information about their health status and activities to understand their condition and progress. Today, doctors have to rely on incomplete, and often inaccurate, information from patients and caregivers.

Witrack directly improves patient monitoring, particularly for older patients, since traditional monitoring methods, which often require the patient to regularly charge and wear one or more devices on their body, are ill suited to their needs.

Witrack's ability to provide accurate and objective measurements without encumbering patients in any way will allow doctors to make more informed decisions, and ultimately improve healthcare outcomes for the U.S.'s aging population.

Mr. Ron Anderson's Comments.

Mr. Anderson's brief comments raise a couple of questions, which we address below.

(a) Noise. The comment states:

This system would increase the noise floor in the 500mhz bandwidth it is assigned in, and the applicant indicates that the system could use one or both of the allocations it is asking for. I'm not sure that a higher noise level is a desirable thing, and something that the FCC

needs to seriously consider when allowing unlicensed part 15 devices to take up spectrum space.

First, MIT clarifies that it does not require any additional allocations, and that the UWB Witrack System operates in the same spectrum assigned to other unlicensed UWB devices under FCC Part 15.

Second, with regard to the noise floor, MIT emphasizes that it is not asking for any increase in either the peak power or average power permitted by the FCC for UWB devices. MIT only asks for a change in the measurement procedure for average power for the Witrack System. As noted in MIT's petition, the Commission already recognizes that the original FCC Part 15 rules were written for impulse UWB radios, has specifically expressed willingness to consider alternate measurement procedures for UWB radios in section 15.521(d) of its rules, and has granted such waivers to devices using different types of modulation. (See OFDMA, Kyma, Proceq, Curtiss-Wright cases cited on pages 14-17 of MIT's Petition for Waiver.) In so doing, the FCC also determined that such waivers will not undermine the intent of the Commission's rules. (See, for example, the Proceq Waiver Order at paragraph ¶ 6, as cited on Page 15 of MIT's Petition for Waiver.)

Finally, MIT notes that its device is intended solely for indoor operation. This is demonstrated by the fact that the Witrack device needs to be connected to AC power lines for operation, its emissions are directed towards internal areas, and does not use any outdoor mounted antennas, all of which are considered sufficient for demonstrating indoor operation in 47 CFR § 15.517(a). As noted by the FCC at footnote 41 of its First Report and Order in ET Docket No. 98-153, establishing the USB rules (17 F.C.C. Rcd. 7435 (2002)), indoor systems

impose an even lower risk of interference to other devices because of the additional shielding provided by building walls.

(b) Alternatives. The comment states:

The applicant invoked the humanitarian license in their application. This must be balanced with the fact that these measurements are already available with existing technology.

The commenter does not provide examples of any alternatives. MIT does not believe that there are alternative systems that provide extensive and accurate measurements comparable to the Witrack System to enable fully passive and non-invasive health and safety monitoring of patients and senior adults. MIT's position is further supported by comments from LEO Science and Tech Hub, and Harvard Medical Hospital/McLean, which emphasize the uniqueness and importance of the Witrack System for two diverse health conditions - skin conditions, and dementia and Alzheimer's, and the inadequacy of a variety of other methods such as scores, patient and caregiver reports, and wearables.

In light of the significant benefits that this technology can provide in health care that cannot be provided by other available technologies, the fact that the requested waiver will not undermine the intent of the relevant rules, and the prior similar waiver grants by the FCC, we seek favorable consideration of the subject waiver request.

Respectfully submitted,

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May 3, 2019