

**Before the
FEDERAL COMMUNICATION COMISSION**
Washington, D.C. 20554

In the matter of:

**Lockheed Martin Corporation Petition for
Rulemaking; Amendment of Part15 to Enable
More Flexible Use of Radio Frequency
Identification Systems in the 433 MHz Band**

RM-11651

Filed via ECFS

**The Response to ARRL Comments on Lockheed Martin Corporation Petition
for Rulemaking: Amendment of Part 15**

Introduction

Guard RFID Solutions Inc. (GuardRFID) is a privately held company incorporated in British Columbia, Canada. The primary and only business of GuardRFID is the development and manufacturing of RFID/RTLS systems used for people and asset protection, location and tracking. At this time, GuardRFID's market is primarily in the US, but it is also beginning to expand to other parts of the world. The RFID/RTLS technology that GuardRFID uses is entirely based on operation in the 433 MHz and 125 kHz bands.

GuardRFID is actively involved in communication standards development relevant to the 433 MHz band through the IEEE 802.15.4 working group and the ISO SC31/WG4 working group.

GuardRFID has chosen to base its technology on RF communications in the 433 MHz band for the following reasons:

- There are limited number of frequency bands that can be used throughout the world and be compliant with most local radio regulations, while at the same time achieving a communication range required for RFID/RTLS use cases;
- 433 MHz band offers superior performance in terms of pathloss when compared to 2.4 GHz band, which is the other widely accepted frequency band worldwide;
- Recognizing the importance of this frequency band, the electronic parts industry provides extensive selection of RF components that are used by product developers and manufacturers to simplify and reduce the cost of manufactured products.

The above listed advantages of the 433 MHz frequency band are the reasons that the number of companies developing commercial RFID/RTLS products in this band is fairly high and growing. Presently, most of these companies are either based, or have significant presence, in North America.

Based on above mentioned usage of the 433 MHz band by GuardRFID and based on the fact that the primary market of GuardRFID is in the United States, and also based on the fact that Industry Canada usually aligns its compliance standards with FCC, the issue raised in Lockheed Martin's Petition (RM-11561) is of vital interest to GuardRFID.

Analysis of Lockheed Martin Petition RM-11651

GuardRFID had chosen not to provide comments endorsing Lockheed Martin Petition RM-11561 during the regular comment period which ended on Jan 13, 2012, assuming there will be no significant opposition to proposed changes, in which case the value of positive comments is diminished. However, in light of negative comments of ARRL, the national Federation for Amateur Radio, GuardRFID feels compelled to respond to ARRL comments by providing support and endorsement for the following changes requested by Lockheed Martin’s Petition RM-11651.

- Extension of the 433 MHz frequency band:
 - o Extending the width of the frequency band from 433.5MHz – 434.5MHz to the new range of 433.05MHz – 434.79MHz allows the band to be in line with most of the regulations throughout the world. The new bandwidth would also be in line with the newly adopted IEEE 802.15.4f standard which specifies 3 data rates across this frequency band, divided into channels as in the diagram below:

	Center Frequencies	Low Datarate 31.25 kb/s		Normal Datarate 100 kb/s		High Datarate 250 kb/s	
		Start	End	Start	End	Start	End
0	433.164	433.110	433.218				
1	433.272	433.218	433.326	433.110	433.434		
2	433.380	433.326	433.434			433.110	433.650
3	433.488	433.434	433.542				
4	433.596	433.542	433.650	433.434	433.758		
5	433.704	433.650	433.758				
6	433.812	433.758	433.866				
7	433.920	433.866	433.974	433.758	434.082	433.650	434.190
8	434.028	433.974	434.082				
9	434.136	434.082	434.190				
10	434.244	434.190	434.298	434.082	434.406		
11	434.352	434.298	434.406				
12	434.460	434.406	434.514			434.190	434.730
13	434.568	434.514	434.622	434.406	434.730		
14	434.676	434.622	434.730				

Channel Spacing (KHz):	108	324	540
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ISO SC31/WG4/SG3 is also considering adopting the same frequency plan for a new revision of the ISO 18000-7 standard which is currently in Committee Draft (CD) Ballot stage.

- Utilization of Listen-Before-Talk mechanism:
 - o The frequency and data rates distribution described above allows effective use of Carrier Sense Multiple Access (CSMA) mechanism, also known as “Listen-Before-Talk” and requested in Petition RM-11651. The intention is to use CSMA as a method of minimizing interference towards all devices operating in this band and also, to allow more effective utilization of the band by allowing simultaneous operation of multiple channels as well as channel switching, in order to mitigate interference from other intentional or unintentional RF radiators operating in this band.
- Increase in allowed transmit power:
 - o Increase in allowed EIRP to 1 mW Peak and 3 mW across the entire band would bring FCC regulations closer in line with other radio regulations throughout the world which permit transmit power to be anywhere between 1 mW to 15 mW, depending on country or region. This would enable the following:

- Increase in applicable use cases for which RFID/RTLS products can be used in US. Currently, the majority of RFID/RTLS applications are manufactured to comply with 15.231 which severely limits maximum average EIRP (4,400 μ V/m), preventing usage of technology for applications where higher EIRP is needed to achieve longer communication range which is required due to:
 - *Physical constraints*: Inability to deploy RFID/RTLS readers at distances at which the communication can be achieved by devices which operate under 15.231.;
 - *Cost constraints*: High density of RFID/RTLS readers equals to significant increase in overall system cost (due to device count and cost of deployment), thereby preventing usage of technology for many cost sensitive use cases;
 - *Environmental constraints*: Deployment in harsh industrial or outdoor environment where RF signal is significantly degraded due to presence of metal, geographical obstacles, water, etc. and increased transmit power is needed to compensate for signal attenuation.
- Utilization of the same RFID/RTLS tags and readers worldwide, regardless of the product origin, which in many use cases is a mandatory requirement, as the products on which RFID/RTLS tags are being placed travel across multiple countries and continents. Currently, RFID/RTLS tags operating in the 433 MHz band, which are compliant with radio regulations in Europe, Asia, Australia and Africa, in many cases are not legal in US due to their emission level and duty cycle. This effectively prevents usage of this technology to track goods manufactured in the US and shipped abroad and the other way around.
- Abolishment of the requirement for the end user to register with the FCC a 433 MHz device, which operates at transmission levels proposed by this Petition:
 - Requirement for the end users to register 433 MHz deployments which would be compliant with the new rule is unnecessary, given the limited transmit power of such devices (even when taking into account increase in EIRP as requested by the Petition). The requirement needlessly burdens the end user, despite the evidence that similar or more power devices operating in this band are in use worldwide, without known significant complaints with respect to interference.

Conclusion:

The above described changes to the FCC rules relative to operation in 433 MHz band will allow growth of RFID/RTLS industry sector in US (and consequently Canada) and bring US regulations closer to already existing regulations in other countries. Accordingly, GuardRFID respectfully requests that the Commission evaluates ARRL comments relevant to the above listed changes requested by the Lockheed Martin's Petition in light of explanations given here and encourages the Commission to issue a Notice of Proposed Rulemaking to amend Part 15 to include the changes requested in Petition RM-11651 described in this document.

Respectfully submitted,

/s/

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