

In the Matter of)
)
Revision of Part 15 of the Commission's)
Rules Regarding Ultra-Wideband (UWB)) ET Docket No. 98-153
Transmission Systems)

Further Comments of Rosemount Inc.

1.0 Summary:

Rosemount Inc. has reviewed the numerous comments submitted concerning the revision of Part 15 of the Commission's Rules concerning the Ultra-Wide Band (UWB) Transmission systems in ET Docket No. 98-153. These comments indicate that there are several main issues that should be addressed by the Commission in a rule making. The comments can be classified into two categories.

A.) Generally Agreed Upon and B.) Conflicting.

The Generally Agreed Upon issues are:

- 1) The Pulse Desensitization Correction Factor (PDCF) is not an appropriate measure of the interference potential of an UWB device and should not be applied as part of a rule.
- 2) Spectral power density (SPD) is the best measure of interference potential for UWB devices.
- 3) A general definition for UWB should be based on spectrum occupancy.
- 4) There are widespread applications and immeasurable potential for this technology.
- 5) UWB devices should be regulated under Part 15 of the rules.
- 6) Required filtering of UWB devices to avoid the restricted bands would seriously limit the technology.

The Conflicting issues are:

- 1) The expected power levels and operating distances of UWB devices.
- 2) The emissions limits.
- 3) Measurement procedures.
- 4) The impact on the restricted bands.
- 5) The interference potential of UWB systems.

Rosemount Inc. submits the following comments on these issues.

2.0 Generally Agreed Upon Points

A. PDCF

All submissions commenting on the PDCF considered it inappropriate for UWB devices. Rosemount Inc. supports this conclusion and believes that there is no reason to comment on it further.

B. SPD

Using spectral power density as a way of determining the interference potential of UWB devices is the correct method to use to measure this potential. However, the main issue is the bandwidth of the victim receiver. As the bandwidth of the victim receiver increases, the probability that it will intercept more of the UWB signal also increases. The Commission has used a 1MHz bandwidth in the past to represent victim receivers for intentional as well as spurious emission testing. Rosemount Inc. believes that there is no reason to deviate from the

1MHz bandwidth that has protected potential victim receivers from both intentional and spurious emissions. Another concern is that all of the certified test labs have equipment capable of at least a 1MHz bandwidth and lower. If the Commission were to increase the bandwidth requirement, the test labs would need to acquire, calibrate, and verify new or existing equipment. This could place an undue expense on the labs, as well as, delay the certification procedure for the manufacturers of UWB devices.

C. UWB Definition

Although all the comments consider spectrum usage as a baseline for the definition of UWB systems, the specific comments have a range from any system with a spectrum usage greater than 500 MHz to the $2(f_h - f_l) / (f_h + f_l)$ being greater than 25%. Rosemount Inc. supports the definition of UWB as devices with a bandwidth of 1.5 GHz or more. The reasons for this preferred definition are: 1) Nearly all systems with less than 1.5 GHz of bandwidth could be accommodated under the existing rules without general rule changes. 2) We do not agree with the $2(f_h - f_l) / (f_h + f_l)$ being greater than 25% method because it creates a disadvantage to systems with a higher center frequency. For example: If two systems are the same except for the center frequency and each system only needs 2 GHz of bandwidth to operate, then the system that operates from 5-7 GHz would be considered UWB while the system that operates from 24-26 GHz would not. If f_l is 24 GHz, f_h would have to increase to about 31 GHz before this system would be an UWB device. This is clearly the wrong way to define UWB, because manufacturers would unnecessarily increase the bandwidths of their devices, even though it's not required for them to operate, in order to be classified as UWB. The object of every manufacturer of UWB devices should be to produce the minimal bandwidth required to achieve the operation of the device. The $2(f_h - f_l) / (f_h + f_l)$ being greater than 25% method would obviously undermine this objective.

D. Applications

Clearly there are a wide variety of applications for UWB devices. These range from level sensors to covert communications. Although UWB technology has been available for years, the development of most of these applications is quite recent and is on the leading edge of a possible applications explosion of UWB techniques. Rosemount Inc. believes the Commission is in a unique position to provide manufacturers with appropriate rules for new applications if it acts quickly. The Commission should provide new Part 15 rules that pertain to UWB devices in general, and application specific rules that address the interference potential of the devices based on their intended use.

E. Regulation

The Commission needs to act quickly in order to provide guidelines to manufacturers developing new applications for UWB devices. Rosemount Inc. is of the view that if the Commission attempts to create one general rule for all UWB devices, the process could take in excess of 12 to 18 months. Given the development speed of the new applications already documented by the time this NOI is complete, there could be several new applications that may require special consideration under a general rule. Rosemount Inc. therefore, urges the Commission to propose rule changes based on the application characteristics of the UWB devices. This will be discussed in more detail later.

F. Restricted Band Filtering

Rosemount Inc. has stated that requiring filtering for UWB systems would increase their cost and create limits on their capabilities. We, therefore, agree that the best solution is to rely on the use of spurious emission limits which have served to protect the restricted bands and are well understood by industry.

3.0 Conflicting Issues:

The overriding reason for the conflicting issues is the diversity of UWB products and applications. However, upon closer inspection of the comments, the different UWB products can be split into three different groups. These are:

A) Industrial Measurement and Control Systems

The basic characteristics of these systems include: non-mobile, very low power (typically < 2W EIRP peak), maximum operating distance of 100 meters, center frequencies from around 1GHz to 77GHz, typically used for level measurement, highly directional antennas, low probability to cause interference in TV and restricted bands due to location at industrial sites and highly directional emissions

B) Digital Communication Systems

The basic characteristics of these systems include: mobile, transmit voice or data signals, antennas employ a more isotropic like pattern, center frequencies typically < 10 GHz, low power levels typically < 10W EIRP peak), long operating distances

C) Imaging Radar Systems

The basic characteristics of these systems include: mobile, very low power typically < 2W EIRP peak to very high power 1 KW peak, typically used to "see through" objects like ground, walls, or ice, typical operating distances of 10-20 meters, can be very susceptible to interference,

4.0 Conclusion:

As the comments indicate, there is extensive interest in UWB. It clearly provides a basis for initiating a Notice of Proposed Rule Making to modify Part 15 of the rules. However, it is unlikely that one set of rules could fairly regulate all of these types of devices, or be implemented soon enough to provide guidelines for new applications. Therefore, Rosemount Inc., as an immediate first step, urges the Commission to provide for application categories to better manage the spectrum used by these devices. These application categories would provide flexibility for the Commission to regulate the large operational requirements of the different UWB systems. This would facilitate the process of implementation of the rules because each group could comment within its own area of expertise. Each group of manufacturers would be able to provide data on their basic systems, making it easier for the Commission to develop fair rules based on the operational requirements, intended use, and interference potential of each major application. Therefore, Rosemount Inc. recommends the following changes to the Part 15 rules to accommodate UWB devices.

1 Define UWB devices as emission systems that have a spectrum usage greater than 1.5 GHz.

2 Create application categories of UWB devices based on their intended use attributes (mobility, installation environment, range, etc.) and provide emission limit relief based on these application categories.

3 Provide relief of the measured peak power limits based on the pulse width and duty cycle of the system. (as the duty cycle or pulse width goes down, the peak can go up)

4 Allow operation in the restricted bands as long as the "Center" frequency is not aligned there and the UWB device can meet the spurious emission limit within that band.

5 Take into consideration the directionality of the antenna system when applying emission limits.

6 Replace the PDCF with Spectral Power Density at a 1MHz bandwidth as the measurement that determines the interference potential of the UWB device.

Sincerely,

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