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DLEP Radio Band Extension
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Abstract

This document defines an extension to the Dynamic Link Exchange Protocol (DLEP) to provide information about frequency bands used by the radio.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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1. Introduction

The dynamic Link Exchange Protocol (DLEP) is defined in [RFC8175]. It provides the exchange of link-related control information between DLEP peers. DLEP peers are consist of a modem and a router. DLEP defines a base set of mechanisms as well as support for possible extensions. This document defines one such extension to provide information about the frequency bands used by the radio.

1.1. Requirements Language

In many IETF documents, several words, when they are in all capitals as shown below, are used to signify the requirements in the specification. These capitalized words can bring significant clarity and consistency to documents because their meanings are well defined. This document defines how those words are interpreted in IETF documents when the words are in all capitals.

* These words can be used as defined here, but using them is not required. Specifically, normative text does not require the use of these key words. They are used for clarity and consistency when that is what's wanted, but a lot of normative text does not use them and is still normative.

* The words have the meanings specified herein only when they are in all capitals.

* When these words are not capitalized, they have their normal English meanings and are not affected by this document.

Authors who follow these guidelines should incorporate this phrase near the beginning of their document:

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

2. Extension Usage and Identification

The use of the Radio Band Extension SHOULD be configurable. To indicate that the Radio Band Extension is to be used, an implementation MUST include the Radio Band Extension Type Value in the Extensions Supported Data Item. The Extensions Supported Data Item is sent and processed according to [RFC8175].

The Radio Band Extension Type Value is described in Section 5.1.

3. Radio Band Data Item

Radio Band Data Item contains information which radio frequency resources are being used. These values are usually interface specific and static during the DLEP session.

The Radio Band Data Item can be used multiple times to represent multiple radio bands.

The Item can be used in a neighbor specific message if the radio uses dedicated subcarriers to talk to neighbors.

Frequency selection is often controlled by the radio configuration. By giving the radio a standardized way to transmit its selected frequency configuration the router can aggregate multiple radios settings into a common information page, can do some basic checking for configuration mistakes by comparing known radio group configuration with their frequency by radio (if the routers have a second communication channel) or forward the data to an upper layer for visualization.

The information in this Item gives the router an easy way to calculate the spectral efficiency of a radio link, how much bandwidth is used for the current data-rate reported by DLEP. This can be integrated into the routing metric to focus traffic on links that use the spectrum efficiently.

The Item can also be used as an interface to a cognitive radio controller on the router, analyzing the correlation of transmission disruptions with the frequency bands and could (together with the Request Link Characteristics message) be used to change the frequency of the radio in a standardized way.

Both values in the TLV (Carrier Frequency and Bandwidth) are 64 bit unsigned integers.

The format of the Radio Band Data Item is:

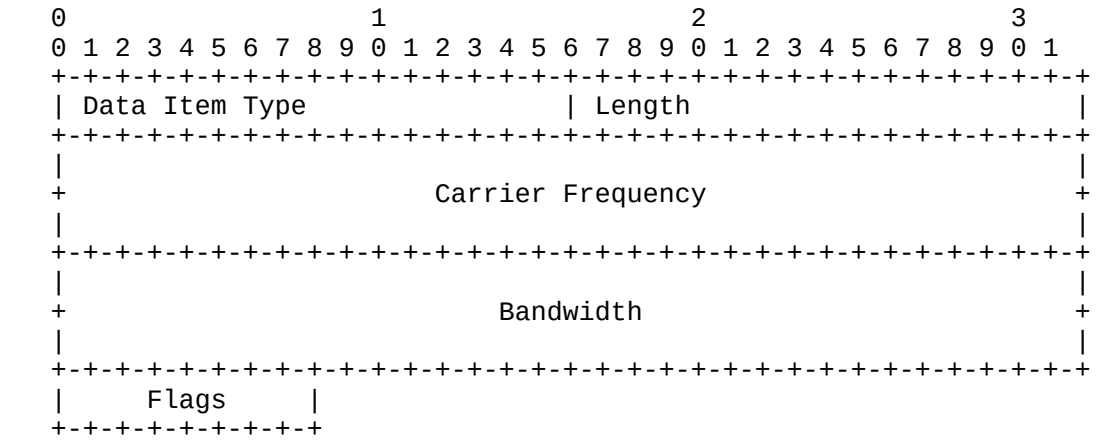

Figure 1: Radio Band Data Item Format

Data Item Type: TBD1

Length: 17

Center Frequency: The center frequency of the band in Hz.

Bandwidth: The bandwidth of the band in Hz.

Flags: Flags field as defined below.

The Flags field is defined as:

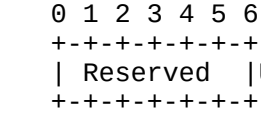

Figure 2: Radio Band Data Item Flags

U: Uplink Flag, indicating the band is used for transmitting data.

D: Downlink Flag, indicating the band is used for receiving data.

Reserved: MUST be written as zero. Ignored on receipt and left for future assignment.

4. Security Considerations

The extension introduces a new Data Item for DLEP. The extension does not inherently introduce any additional vulnerabilities above those documented in [RFC8175]. The approach taken to security in that document applies equally when running the extension defined in this document.

5. IANA Considerations

As described below, IANA has assigned two values per this document. Both assignments are to registries defined by [RFC8175].

5.1. Extension Type Value

IANA has assigned the following value in the "Extension Type Values" registry within the "Dynamic Link Exchange Protocol (DLEP) Parameters" registry. The new value is in the range with the "Specification Required" [RFC8126] policy:

Code	Description	Reference
TBD2	Radio Band	This document

Table 1: New Extension Type Value

5.2. Data Item Value

IANA has assigned the following value in the "Data Item Type Values" registry within the "Dynamic Link Exchange Protocol (DLEP) Parameters" registry. The new value is in the range with the "Specification Required" [RFC8126] policy:

Type Code	Description	Reference
TBD1	Radio Band	This document

Table 2: New Data Item Value

6. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

[RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <https://www.rfc-editor.org/info/rfc8174>.

[RFC8175] Ratliff, S., Jury, S., Satterwhite, D., Taylor, R., and B. Berry, "Dynamic Link Exchange Protocol (DLEP)", RFC 8175, DOI 10.17487/RFC8175, June 2017, <https://www.rfc-editor.org/info/rfc8175>.

7. Informative References

[RFC8126] Cotton, M., Leiba, B., and T. Narten, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 8126, DOI 10.17487/RFC8126, June 2017, <https://www.rfc-editor.org/info/rfc8126>.

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