**New Horizons REX Data Set Review – KEM2 Raw & Calibrated**

**Reviewer:** Dustin Buccino

 Jet Propulsion Laboratory

 Planetary Radar and Radio Science

**Date:** January 23, 2025

1. **Executive Summary**

Two collections from the New Horizons Radio Science Experiment (REX) were provided and reviewed:

* urn:nasa:pds:nh\_rex:kem2\_raw
* urn:nasa:pds:nh\_rex:kem2\_cal

Plus a documents collection:

* urn:nasa:pds:nh\_documents:rex

Previous datasets from New Horizons REX were reviewed in PDS3 format. These are in PDS4 format. Although I cant find any issues with the format and labeling, the overall dataset is very confusing because there are new data IDs (“Thresholded data”) which I don’t know what they are, so documentation improvements are needed.

1. **Review Details**

***Data***

Unlike previous datasets this one includes new modes that are unfamiliar to me. The modes in the data file are:

* rbb\_\*\_0x7b6 – ***new***
* rex\_\*\_0x7b1 – known, REX Side-A RCP
* rex\_\*\_0x7b2 – ***new***
* rex\_\*\_0x7b3 – known, REX Side-B LCP
* rex\_\*\_0x7b4 – ***new***
* rnb\_\*\_0x7b6 – ***new***

I could not find any documentation what the new data IDs are (what does 0x7b2, 0x7b4 or 0x7b6 mean?). The labels mention “Thresholded data” but without additional documentation I’m not sure what it means. Furthermore, it’s not clear what is being measured by this as I could not find documentation about what these data are for. The data I am familiar with, the REX Side-A and REX Side-B, are FITS files and appeared to be labeled appropriately. The “Thresholded” data appear to be of similar format as the Side-A/Side-B.

I found several data chunks within the files as described below.

Table . Data the reviewer was able to find in the dataset and correlate with the documentation.

| Date | Start/End | Prefix | Comments |
| --- | --- | --- | --- |
| 2023-09-20 | 05:20:30-05:22:06 | rbb |  |
| 2023-08-02 | 00:16:45-00:17:49 | rex |  |
| 2023-10-02 | 14:09:06-14:47:54 | rex |  |
| 2023-10-02 | 22:15:06-23:33:32 | rex |  |
| 2023-10-03 | 05:34:09-06:12:59 | rex |  |
| 2023-10-03 | 14:35:11-16:32:38 | rex |  |
| 2023-10-04 | 05:10:14-05:49:05 | rex |  |
| 2023-10-04 | 10:35:16-11:14:11 | rex |  |
| 2023-10-04 | 18:30:10-19:08:55 | rex |  |
| 2023-10-05 | 06:25:15-07:43:21 | rex |  |
| 2023-10-05 | 15:35:00-15:35:36 | rex |  |
| 2023-10-07 | 14:20:17-15:38:19 | rex |  |
| 2023-10-08 | 04:49:19-05:28:07 | rex |  |
| 2023-10-08 | 17:24:28-18:93:23 | rex |  |
| 2023-10-08 | 18:00:26-18:03:23 | rex |  |
| 2023-10-08 | 22:04:21-23:41:55 | rex |  |
| 2023-10-09 | 15:29:24-16:08:13 | rex |  |
| 2023-10-09 | 22:09:25-22:48:17 | rex |  |
| 2023-10-11 | 06:14:26-08:50:58 | rex |  |
| 2024-02-27 | 21:34:29-22:13:17 | rex |  |
| 2023-08-05 to2023-08-07 | 06:07:2507:44:23 | rlm |  |
| 2023-09-17 to 2023-09-18 | 07:08:4307:55:43 | rlm |  |
| 2023-09-20 to 2023-09-22 | 05:40:4507:02:17 | rlm |  |
| 2023-08-05 to 2023-08-08 | 06:17:4507:20:17 | rnb |  |
| 2023-09-17 to 2023-09-18 | 06:52:3117:43:11 | rnb |  |
| 2023-09-20 to 2023-09-22 | 05:24:1806:48:08 | rnb |  |

I noticed no issues with the data in my review. I examined the calibrated dataset in more detail than the raw dataset, but everything appears in order with both from a data formatting perspective.

***Documentation***

The new data IDs are missing from documentation, or at least I could not find them. Furthermore, in previous datasets, a useful document was provided that describes the specific activities and was VERY useful (*rex\_activities\_kem1.pdf*). Is a similar document like that available for KEM2?