

REX Activities in KEM1 Approach, Encounter, and Cruise

Ivan Linscott and Stuart J. Robbins

The REX activities in Loads 18240 to 21361, are associated with four tasks:

1. 2014 MU₆₉ (Arrokoth) Encounter Observations
2. Radio Path Characterization
3. Calibration Campaign for testing instrument response differences
4. Ecliptic Dust Radiometry test for second extended mission proposal

Each of the tasks was bookended with the REX Test Patterns, which use preset sequences with known response to compare with the REX output to test the performance of the REX process. Since the Test Patterns are run in concert with every REX event, they will not be further described in the four REX measurements to follow.

1. Arrokoth Encounter Observations (Load 18359), Lead-In (Load 18344), and Lead-Out (19003)

The following is the DataTrack listing of the REX data during the Arrokoth Encounter.

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|-------|----------------------------|-------------------|-----|-------------|-------------|
| 18344 | KARX_1ab_TestPatt_2018_358 | 2018-358_19:04:33 | S/C | 407,984,193 | 407,984,318 |
| 18344 | KARX_1ab_TestPatt_2018_358 | 2018-358_19:04:48 | S/C | 407,984,208 | 407,984,318 |

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| 18359 | KERX_MU69_CA03-TEMP_REX_2019001__RADIOMETRIC | 2019-001_04:28:04 | S/C | 408,622,807 | 408,623,822 |
| 18359 | KERX_MU69_CA03-TEMP_REX_2019001__RADIOMETRIC | 2019-001_04:28:19 | S/C | 408,622,822 | 408,623,689 |

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| 18359 | KERX_M_CA08P_REX | 2019-001_05:48:19 | S/C | 408,627,621 | 408,628,218 |
| 18359 | KERX_M_CA08P_REX | 2019-001_05:48:34 | S/C | 408,627,636 | 408,628,677 |

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| 18359 | KERX_EARTH_CA12-IONSPHR_REX_2019001 | 2019-001_06:05:44 | S/C | 408,628,674 | 408,630,748 |
| 18359 | KERX_EARTH_CA12-IONSPHR_REX_2019001 | 2019-001_06:05:59 | S/C | 408,628,689 | 408,671,798 |

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| 18359 | KERX_X_CA08-TEMP-BKGD_REX_2019002 | 2019-002_03:18:39 | S/C | 408,705,044 | 408,709,585 |
| 18359 | KERX_X_CA08-TEMP-BKGD_REX_2019002 | 2019-002_03:18:54 | S/C | 408,705,059 | 408,709,600 |
| 18359 | KERX_X_CA03-TEMP-BKGD_REX_2019002 | 2019-002_04:34:27 | S/C | 408,709,594 | 408,710,820 |
| 18359 | KERX_X_CA03-TEMP-BKGD_REX_2019002 | 2019-002_04:34:42 | S/C | 408,709,609 | 408,710,820 |

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| 19003 | KDRX_1ab_TestPatt_2019_004 | 2019-004_22:04:33 | S/C | 408,945,393 | 408,945,518 |
| 19003 | KDRX_1ab_TestPatt_2019_004 | 2019-004_22:04:48 | S/C | 408,945,408 | 408,945,518 |

2. Radio Path Characterization (Loads 18240, 18287, 19017–19213, 19276 thru subsequent loads up thru load 21361)

Radio path characterization measurements with REX were nominally on a monthly cadence during most of the New Horizons extended mission. Due to operations constraints such as spacecraft hibernation and DSN scheduling, the monthly cadence has been irregular. The REX data are from uplinks in both polarizations (RCP and LCP) when possible (sometimes there were transmitter failures), and are recorded and processed as described for the solar conjunctions. The objective is to assess the uplink’s frequency and amplitude stability, and to associate the standard deviation measure of the stability distributions with characteristics of the radio path such as multipath propagation. January 2022 was the last radio path characterization done and no future ones are currently planned.

The Radio Path Characterization was done on:

| 2018 | 2019 | 2020 | 2021 | 2022 |
|--------------|-------------|--------------|--------------|------------|
| | | January 09 | January 06 | January 13 |
| | February 02 | February 11 | February 15 | |
| | March 21 | March 10 | March 15 | |
| | April 19 | | April 15 | |
| | May 07 | May 19 | May 20 | |
| | June 12 | June 26 | June 15 | |
| | July 10 | July 29 | July 13 | |
| | August 08 | August 21 | August 11 | |
| September 09 | | September 22 | September 07 | |
| October 20 | October 19 | October 20 | October 09 | |
| | November 14 | November 18 | November 21 | |
| | December 21 | December 20 | December 12 | |

The following is the DataTrack listing of the REX data during the Radio Path Characterizations.

09/09/2018:

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|-------|---|-------------------|-----|-------------|-------------|
| 18240 | KARX_1ab_TestPatt_2018_252 | 2018-252_09:42:30 | S/C | 398,792,070 | 398,792,372 |
| 18240 | KARX_1ab_TestPatt_2018_252 | 2018-252_09:42:45 | S/C | 398,792,085 | 398,792,387 |
| 18240 | KARX_3ab_Radio_Path_Characterization_2018_252 | 2018-252_09:47:34 | S/C | 398,792,374 | 398,792,568 |
| 18240 | KARX_3ab_Radio_Path_Characterization_2018_252 | 2018-252_09:47:49 | S/C | 398,792,389 | 398,792,568 |

10/20/2018:

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| 18287 | KARX_1ab_TestPatt_2018_293 | 2018-293_07:36:17 | S/C | 402,326,897 | 402,327,199 |
| 18287 | KARX_1ab_TestPatt_2018_293 | 2018-293_07:36:32 | S/C | 402,326,912 | 402,327,214 |
| 18287 | KARX_3ab_Radio_Path_Characterization_2018_293 | 2018-293_07:41:21 | S/C | 402,327,201 | 402,327,390 |
| 18287 | KARX_3ab_Radio_Path_Characterization_2018_293 | 2018-293_07:41:36 | S/C | 402,327,216 | 402,327,390 |

02/02/2019:

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| 19017 | KDRX_1ab_TestPatt_2019_033 | 2019-033_21:08:59 | S/C | 411,447,659 | 411,447,961 |
| 19017 | KDRX_1ab_TestPatt_2019_033 | 2019-033_21:09:14 | S/C | 411,447,674 | 411,447,976 |
| 19017 | KDRX_3ab_Radio_Path_Characterization_2019_033 | 2019-033_21:14:03 | S/C | 411,447,963 | 411,448,152 |
| 19017 | KDRX_3ab_Radio_Path_Characterization_2019_033 | 2019-033_21:14:18 | S/C | 411,447,978 | 411,448,152 |

03/21/2019:

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| 19073 | KDRX_1ab_TestPatt_2019_080 | 2019-080_22:02:09 | S/C | 415,511,649 | 415,511,951 |
| 19073 | KDRX_1ab_TestPatt_2019_080 | 2019-080_22:02:24 | S/C | 415,511,664 | 415,511,966 |
| 19073 | KDRX_3ab_Radio_Path_Characterization_2019_080 | 2019-080_22:07:13 | S/C | 415,511,953 | 415,512,142 |
| 19073 | KDRX_3ab_Radio_Path_Characterization_2019_080 | 2019-080_22:07:28 | S/C | 415,511,968 | 415,512,142 |

04/19/2019:

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| 19108 | KDRX_1ab_TestPatt_2019_109 | 2019-109_20:05:00 | S/C | 418,010,220 | 418,010,522 |
| 19108 | KDRX_1ab_TestPatt_2019_109 | 2019-109_20:05:15 | S/C | 418,010,235 | 418,010,537 |
| 19108 | KDRX_3ab_Radio_Path_Characterization_2019_109 | 2019-109_20:10:04 | S/C | 418,010,524 | 418,010,713 |
| 19108 | KDRX_3ab_Radio_Path_Characterization_2019_109 | 2019-109_20:10:19 | S/C | 418,010,539 | 418,010,713 |

05/07/2019:

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| 19108 | KDRX_1ab_TestPatt_2019_127 | 2019-127_21:13:49 | S/C | 419,569,549 | 419,569,851 |
| 19108 | KDRX_1ab_TestPatt_2019_127 | 2019-127_21:14:04 | S/C | 419,569,564 | 419,569,866 |
| 19108 | KDRX_3ab_Radio_Path_Characterization_2019_127 | 2019-127_21:18:53 | S/C | 419,569,853 | 419,570,042 |
| 19108 | KDRX_3ab_Radio_Path_Characterization_2019_127 | 2019-127_21:19:08 | S/C | 419,569,868 | 419,570,042 |

06/12/2019:

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| 19150 | KDRX_1ab_TestPatt_2019_163 | 2019-163_17:04:25 | S/C | 422,664,985 | 422,665,287 |
| 19150 | KDRX_1ab_TestPatt_2019_163 | 2019-163_17:04:40 | S/C | 422,665,000 | 422,665,302 |
| 19150 | KDRX_3ab_Radio_Path_Characterization_2019_163 | 2019-163_17:09:29 | S/C | 422,665,289 | 422,665,478 |
| 19150 | KDRX_3ab_Radio_Path_Characterization_2019_163 | 2019-163_17:09:44 | S/C | 422,665,304 | 422,665,478 |

07/10/2019:

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|-------|---|-------------------|-----|-------------|-------------|
| 19171 | KDRX_1ab_TestPatt_2019_191 | 2019-191_16:03:49 | S/C | 425,080,549 | 425,080,851 |
| 19171 | KDRX_1ab_TestPatt_2019_191 | 2019-191_16:04:04 | S/C | 425,080,564 | 425,080,866 |
| 19171 | KDRX_3ab_Radio_Path_Characterization_2019_191 | 2019-191_16:08:53 | S/C | 425,080,853 | 425,081,042 |
| 19171 | KDRX_3ab_Radio_Path_Characterization_2019_191 | 2019-191_16:09:08 | S/C | 425,080,868 | 425,081,042 |

08/08/2019:

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| 19213 | KDRX_1ab_TestPatt_2019_220 | 2019-220_12:41:53 | S/C | 427,574,033 | 427,574,335 |
| 19213 | KDRX_1ab_TestPatt_2019_220 | 2019-220_12:42:08 | S/C | 427,574,048 | 427,574,350 |
| 19213 | KDRX_3ab_Radio_Path_Characterization_2019_220 | 2019-220_12:46:57 | S/C | 427,574,337 | 427,574,526 |
| 19213 | KDRX_3ab_Radio_Path_Characterization_2019_220 | 2019-220_12:47:12 | S/C | 427,574,352 | 427,574,526 |

10/19/2019:

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| 19276 | K2RX_1ab_TestPatt_2019_292 | 2019-292_07:55:28 | S/C | 433,777,647 | 433,777,949 |
| 19276 | K2RX_1ab_TestPatt_2019_292 | 2019-292_07:55:43 | S/C | 433,777,662 | 433,777,964 |
| 19276 | K2RX_3ab_Radio_Path_Characterization_2019_292 | 2019-292_08:00:32 | S/C | 433,777,951 | 433,778,140 |
| 19276 | K2RX_3ab_Radio_Path_Characterization_2019_292 | 2019-292_08:00:47 | S/C | 433,777,966 | 433,778,140 |

11/14/2019:

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| 19297 | K2RX_1ab_TestPatt_2019_318 | 2019-318_09:05:35 | S/C | 436,028,254 | 436,028,556 |
| 19297 | K2RX_1ab_TestPatt_2019_318 | 2019-318_09:05:50 | S/C | 436,028,269 | 436,028,571 |
| 19297 | K2RX_3ab_Radio_Path_Characterization_2019_318 | 2019-318_09:10:39 | S/C | 436,028,558 | 436,028,747 |
| 19297 | K2RX_3ab_Radio_Path_Characterization_2019_318 | 2019-318_09:10:54 | S/C | 436,028,573 | 436,028,747 |

12/21/2019:

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| 19339 | K2RX_1ab_TestPatt_2019_355 | 2019-355_04:36:04 | S/C | 439,208,883 | 439,209,185 |
| 19339 | K2RX_1ab_TestPatt_2019_355 | 2019-355_04:36:19 | S/C | 439,208,898 | 439,209,200 |
| 19339 | K2RX_3ab_Radio_Path_Characterization_2019_355 | 2019-355_04:41:08 | S/C | 439,209,187 | 439,209,376 |
| 19339 | K2RX_3ab_Radio_Path_Characterization_2019_355 | 2019-355_04:41:23 | S/C | 439,209,202 | 439,209,376 |

01/09/2020:

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| 20006 | K2RX_1ab_TestPatt_2020_009 | 2020-009_03:27:37 | S/C | 440,846,376 | 440,846,678 |
| 20006 | K2RX_1ab_TestPatt_2020_009 | 2020-009_03:27:52 | S/C | 440,846,391 | 440,846,693 |
| 20006 | K2RX_3ab_Radio_Path_Characterization_2020_009 | 2020-009_03:32:41 | S/C | 440,846,680 | 440,846,869 |
| 20006 | K2RX_3ab_Radio_Path_Characterization_2020_009 | 2020-009_03:32:56 | S/C | 440,846,695 | 440,846,869 |

02/11/2020:

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| 20041 | K2RX_1ab_TestPatt_2020_042 | 2020-042_20:48:25 | S/C | 443,760,024 | 443,760,326 |
| 20041 | K2RX_1ab_TestPatt_2020_042 | 2020-042_20:48:40 | S/C | 443,760,039 | 443,760,341 |
| 20041 | K2RX_3ab_Radio_Path_Characterization_2020_042 | 2020-042_20:53:29 | S/C | 443,760,328 | 443,760,517 |
| 20041 | K2RX_3ab_Radio_Path_Characterization_2020_042 | 2020-042_20:53:44 | S/C | 443,760,343 | 443,760,517 |

03/10/2020:

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| 20062 | K2RX_1ab_TestPatt_2020_070 | 2020-070_18:57:18 | S/C | 446,172,557 | 446,172,859 |
| 20062 | K2RX_1ab_TestPatt_2020_070 | 2020-070_18:57:33 | S/C | 446,172,572 | 446,172,874 |
| 20062 | K2RX_3ab_Radio_Path_Characterization_2020_070 | 2020-070_19:02:22 | S/C | 446,172,861 | 446,173,050 |
| 20062 | K2RX_3ab_Radio_Path_Characterization_2020_070 | 2020-070_19:02:37 | S/C | 446,172,876 | 446,173,050 |

05/19/2020:

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| 20140 | K2RX_1ab_TestPatt_2020_140 | 2020-140_14:12:39 | S/C | 452,203,478 | 452,203,780 |
| 20140 | K2RX_1ab_TestPatt_2020_140 | 2020-140_14:12:54 | S/C | 452,203,493 | 452,203,795 |
| 20140 | K2RX_3ab_Radio_Path_Characterization_2020_140 | 2020-140_14:17:43 | S/C | 452,203,782 | 452,203,971 |
| 20140 | K2RX_3ab_Radio_Path_Characterization_2020_140 | 2020-140_14:17:58 | S/C | 452,203,797 | 452,203,971 |

06/26/2020:

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| 20168 | K2RX_1ab_TestPatt_2020_178 | 2020-178_11:42:30 | S/C | 455,477,669 | 455,477,971 |
| 20168 | K2RX_1ab_TestPatt_2020_178 | 2020-178_11:42:45 | S/C | 455,477,684 | 455,477,986 |
| 20168 | K2RX_3ab_Radio_Path_Characterization_2020_178 | 2020-178_11:47:34 | S/C | 455,477,973 | 455,478,162 |
| 20168 | K2RX_3ab_Radio_Path_Characterization_2020_178 | 2020-178_11:47:49 | S/C | 455,477,988 | 455,478,162 |

07/29/2020:

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| 20202 | K2RX_1ab_TestPatt_2020_211 | 2020-211_09:30:03 | S/C | 458,320,922 | 458,321,224 |
| 20202 | K2RX_1ab_TestPatt_2020_211 | 2020-211_09:30:18 | S/C | 458,320,937 | 458,321,239 |
| 20202 | K2RX_3ab_Radio_Path_Characterization_2020_211 | 2020-211_09:35:07 | S/C | 458,321,226 | 458,321,415 |
| 20202 | K2RX_3ab_Radio_Path_Characterization_2020_211 | 2020-211_09:35:22 | S/C | 458,321,241 | 458,321,415 |

08/21/2020:

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| 20223 | K2RX_1ab_TestPatt_2020_234 | 2020-234_08:01:18 | S/C | 460,302,797 | 460,303,099 |
| 20223 | K2RX_1ab_TestPatt_2020_234 | 2020-234_08:01:33 | S/C | 460,302,812 | 460,303,114 |
| 20223 | K2RX_3ab_Radio_Path_Characterization_2020_234 | 2020-234_08:06:22 | S/C | 460,303,101 | 460,303,290 |
| 20223 | K2RX_3ab_Radio_Path_Characterization_2020_234 | 2020-234_08:06:37 | S/C | 460,303,116 | 460,303,290 |

09/22/2020:

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| 20257 | K2RX_1ab_TestPatt_2020_266 | 2020-266_06:04:05 | S/C | 463,060,564 | 463,060,866 |
| 20257 | K2RX_1ab_TestPatt_2020_266 | 2020-266_06:04:20 | S/C | 463,060,579 | 463,060,881 |
| 20257 | K2RX_3ab_Radio_Path_Characterization_2020_266 | 2020-266_06:09:09 | S/C | 463,060,868 | 463,061,057 |
| 20257 | K2RX_3ab_Radio_Path_Characterization_2020_266 | 2020-266_06:09:24 | S/C | 463,060,883 | 463,061,057 |

10/20/2020:

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|-------|---|-------------------|-----|-------------|-------------|
| 20293 | K2RX_1ab_TestPatt_2020_294 | 2020-294_04:19:48 | S/C | 465,473,507 | 465,473,809 |
| 20293 | K2RX_1ab_TestPatt_2020_294 | 2020-294_04:20:03 | S/C | 465,473,522 | 465,473,824 |
| 20293 | K2RX_3ab_Radio_Path_Characterization_2020_294 | 2020-294_04:24:52 | S/C | 465,473,811 | 465,474,000 |
| 20293 | K2RX_3ab_Radio_Path_Characterization_2020_294 | 2020-294_04:25:07 | S/C | 465,473,826 | 465,474,000 |

11/18/2020:

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| 20314 | K2RX_1ab_TestPatt_2020_323 | 2020-323_02:32:34 | S/C | 467,972,673 | 467,972,975 |
| 20314 | K2RX_1ab_TestPatt_2020_323 | 2020-323_02:32:49 | S/C | 467,972,688 | 467,972,990 |
| 20314 | K2RX_3ab_Radio_Path_Characterization_2020_323 | 2020-323_02:37:38 | S/C | 467,972,977 | 467,973,166 |
| 20314 | K2RX_3ab_Radio_Path_Characterization_2020_323 | 2020-323_02:37:53 | S/C | 467,972,992 | 467,973,166 |

12/20/2020:

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|-------|---|-------------------|-----|-------------|-------------|
| 20335 | K2RX_1ab_TestPatt_2020_355 | 2020-355_00:34:15 | S/C | 470,730,374 | 470,730,676 |
| 20335 | K2RX_1ab_TestPatt_2020_355 | 2020-355_00:34:30 | S/C | 470,730,389 | 470,730,691 |
| 20335 | K2RX_3ab_Radio_Path_Characterization_2020_355 | 2020-355_00:39:19 | S/C | 470,730,678 | 470,730,867 |
| 20335 | K2RX_3ab_Radio_Path_Characterization_2020_355 | 2020-355_00:39:34 | S/C | 470,730,693 | 470,730,867 |

01/06/2021:

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| 21004 | K2RX_1ab_TestPatt_2021_006 | 2021-006_16:19:52 | S/C | 472,255,911 | 472,256,213 |
| 21004 | K2RX_1ab_TestPatt_2021_006 | 2021-006_16:20:07 | S/C | 472,255,926 | 472,256,228 |
| 21004 | K2RX_3ab_Radio_Path_Characterization_2021_006 | 2021-006_16:24:56 | S/C | 472,256,215 | 472,256,404 |
| 21004 | K2RX_3ab_Radio_Path_Characterization_2021_006 | 2021-006_16:25:11 | S/C | 472,256,230 | 472,256,404 |

02/15/2021:

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| 21025 | K2RX_1ab_TestPatt_2021_046 | 2021-046_13:44:52 | S/C | 475,702,611 | 475,702,913 |
| 21025 | K2RX_1ab_TestPatt_2021_046 | 2021-046_13:45:07 | S/C | 475,702,626 | 475,702,928 |
| 21025 | K2RX_3ab_Radio_Path_Characterization_2021_046 | 2021-046_13:49:56 | S/C | 475,702,915 | 475,703,104 |
| 21025 | K2RX_3ab_Radio_Path_Characterization_2021_046 | 2021-046_13:50:11 | S/C | 475,702,930 | 475,703,104 |

03/15/2021:

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|-------|---|-------------------|-----|-------------|-------------|
| 21067 | K2RX_1ab_TestPatt_2021_074 | 2021-074_19:02:22 | S/C | 478,140,861 | 478,141,163 |
| 21067 | K2RX_1ab_TestPatt_2021_074 | 2021-074_19:02:37 | S/C | 478,140,876 | 478,141,178 |
| 21067 | K2RX_3ab_Radio_Path_Characterization_2021_074 | 2021-074_19:07:26 | S/C | 478,141,165 | 478,141,354 |
| 21067 | K2RX_3ab_Radio_Path_Characterization_2021_074 | 2021-074_19:07:41 | S/C | 478,141,180 | 478,141,354 |

04/15/2021:

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|-------|---|-------------------|-----|-------------|-------------|
| 21088 | K2RX_1ab_TestPatt_2021_105 | 2021-105_00:24:11 | S/C | 480,752,170 | 480,752,472 |
| 21088 | K2RX_1ab_TestPatt_2021_105 | 2021-105_00:24:26 | S/C | 480,752,185 | 480,752,487 |
| 21088 | K2RX_3ab_Radio_Path_Characterization_2021_105 | 2021-105_00:29:15 | S/C | 480,752,474 | 480,752,663 |
| 21088 | K2RX_3ab_Radio_Path_Characterization_2021_105 | 2021-105_00:29:30 | S/C | 480,752,489 | 480,752,663 |

05/20/2021:

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| 21137 | K2RX_1ab_TestPatt_2021_140 | 2021-140_14:37:57 | S/C | 483,827,396 | 483,827,698 |
| 21137 | K2RX_1ab_TestPatt_2021_140 | 2021-140_14:38:12 | S/C | 483,827,411 | 483,827,713 |
| 21137 | K2RX_3ab_Radio_Path_Characterization_2021_140 | 2021-140_14:43:01 | S/C | 483,827,700 | 483,827,889 |
| 21137 | K2RX_3ab_Radio_Path_Characterization_2021_140 | 2021-140_14:43:16 | S/C | 483,827,715 | 483,827,889 |

06/15/2021:

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| 21158 | K2RX_1ab_TestPatt_2021_166 | 2021-166_12:53:33 | S/C | 486,067,531 | 486,067,833 |
| 21158 | K2RX_1ab_TestPatt_2021_166 | 2021-166_12:53:48 | S/C | 486,067,546 | 486,067,848 |
| 21158 | K2RX_3ab_Radio_Path_Characterization_2021_166 | 2021-166_12:58:37 | S/C | 486,067,835 | 486,068,024 |
| 21158 | K2RX_3ab_Radio_Path_Characterization_2021_166 | 2021-166_12:58:52 | S/C | 486,067,850 | 486,068,024 |

07/13/2021:

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| 21179 | K2RX_1ab_TestPatt_2021_194 | 2021-194_17:07:46 | S/C | 488,501,984 | 488,502,286 |
| 21179 | K2RX_1ab_TestPatt_2021_194 | 2021-194_17:08:01 | S/C | 488,501,999 | 488,502,301 |
| 21179 | K2RX_3ab_Radio_Path_Characterization_2021_194 | 2021-194_17:12:50 | S/C | 488,502,288 | 488,502,477 |
| 21179 | K2RX_3ab_Radio_Path_Characterization_2021_194 | 2021-194_17:13:05 | S/C | 488,502,303 | 488,502,477 |

08/11/2021:

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|-------|---|-------------------|-----|-------------|-------------|
| 21221 | K2RX_1ab_TestPatt_2021_223 | 2021-223_02:00:49 | S/C | 490,953,168 | 490,953,470 |
| 21221 | K2RX_1ab_TestPatt_2021_223 | 2021-223_02:01:04 | S/C | 490,953,183 | 490,953,485 |
| 21221 | K2RX_3ab_Radio_Path_Characterization_2021_223 | 2021-223_02:05:53 | S/C | 490,953,472 | 490,953,661 |
| 21221 | K2RX_3ab_Radio_Path_Characterization_2021_223 | 2021-223_02:06:08 | S/C | 490,953,487 | 490,953,661 |

09/07/2021:

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|-------|---|-------------------|-----|-------------|-------------|
| 21242 | K2RX_1ab_TestPatt_2021_250 | 2021-250_08:15:29 | S/C | 493,308,448 | 493,308,750 |
| 21242 | K2RX_1ab_TestPatt_2021_250 | 2021-250_08:15:44 | S/C | 493,308,463 | 493,308,765 |
| 21242 | K2RX_3ab_Radio_Path_Characterization_2021_250 | 2021-250_08:20:33 | S/C | 493,308,752 | 493,308,941 |
| 21242 | K2RX_3ab_Radio_Path_Characterization_2021_250 | 2021-250_08:20:48 | S/C | 493,308,767 | 493,308,941 |

10/09/2021:

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|-------|---|-------------------|-----|-------------|-------------|
| 21277 | K2RX_1ab_TestPatt_2021_282 | 2021-282_22:15:57 | S/C | 496,123,676 | 496,123,978 |
| 21277 | K2RX_1ab_TestPatt_2021_282 | 2021-282_22:16:12 | S/C | 496,123,691 | 496,123,993 |
| 21277 | K2RX_3ab_Radio_Path_Characterization_2021_282 | 2021-282_22:21:01 | S/C | 496,123,980 | 496,124,169 |
| 21277 | K2RX_3ab_Radio_Path_Characterization_2021_282 | 2021-282_22:21:16 | S/C | 496,123,995 | 496,124,169 |

11/21/2021:

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|-------|---|-------------------|-----|-------------|-------------|
| 21319 | K2RX_1ab_TestPatt_2021_325 | 2021-325_19:36:23 | S/C | 499,829,302 | 499,829,604 |
| 21319 | K2RX_1ab_TestPatt_2021_325 | 2021-325_19:36:38 | S/C | 499,829,317 | 499,829,619 |
| 21319 | K2RX_3ab_Radio_Path_Characterization_2021_325 | 2021-325_19:41:27 | S/C | 499,829,606 | 499,829,795 |
| 21319 | K2RX_3ab_Radio_Path_Characterization_2021_325 | 2021-325_19:41:42 | S/C | 499,829,621 | 499,829,795 |

12/12/2021:

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|-------|---|-------------------|-----|-------------|-------------|
| 21341 | K2RX_1ab_TestPatt_2021_346 | 2021-346_02:23:26 | S/C | 501,581,725 | 501,582,027 |
| 21341 | K2RX_1ab_TestPatt_2021_346 | 2021-346_02:23:41 | S/C | 501,581,740 | 501,582,042 |
| 21341 | K2RX_3ab_Radio_Path_Characterization_2021_346 | 2021-346_02:28:30 | S/C | 501,582,029 | 501,582,218 |
| 21341 | K2RX_3ab_Radio_Path_Characterization_2021_346 | 2021-346_02:28:45 | S/C | 501,582,044 | 501,582,218 |

01/13/2022:

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|-------|---|-------------------|-----|-------------|-------------|
| 21361 | K2RX_1ab_TestPatt_2022_013 | 2022-013_03:41:26 | S/C | 504,351,204 | 504,351,506 |
| 21361 | K2RX_1ab_TestPatt_2022_013 | 2022-013_03:41:41 | S/C | 504,351,219 | 504,351,521 |
| 21361 | K2RX_3ab_Radio_Path_Characterization_2022_013 | 2022-013_03:46:30 | S/C | 504,351,508 | 504,351,697 |
| 21361 | K2RX_3ab_Radio_Path_Characterization_2022_013 | 2022-013_03:46:45 | S/C | 504,351,523 | 504,351,697 |

3. Calibration Campaign (Load 19234)

The calibration campaign for REX was run in concert with other *New Horizons* instruments in the 19234 load that began in late August 2019, and concluded in September 2019. Data were gathered to determine if instrument response had changed since the previous calibration event after the Pluto-Charon system flyby.

The following is the DataTrack listing of the REX data during the Radio Path Characterizations.

09/04/2017 and 09/09/2019:

| | | | | | |
|-------|---|-------------------|-----|-------------|-------------|
| 19234 | K2RX_1ab_TestPatt_2019_247a | 2019-247_05:29:34 | S/C | 429,880,893 | 429,884,849 |
| 19234 | K2RX_1ab_TestPatt_2019_247a | 2019-247_05:29:49 | S/C | 429,880,908 | 429,884,864 |
| 19234 | K2RX_11ab_Radiometric_2019_247 | 2019-247_06:35:32 | S/C | 429,884,854 | 429,886,202 |
| 19234 | K2RX_11ab_Radiometric_2019_247 | 2019-247_06:35:47 | S/C | 429,884,869 | 429,886,217 |
| 19234 | K2RX_11ab_Radiometric_2019_247 | 2019-247_06:58:05 | S/C | 429,886,207 | 429,889,535 |
| 19234 | K2RX_11ab_Radiometric_2019_247 | 2019-247_06:58:20 | S/C | 429,886,222 | 429,889,550 |
| 19234 | K2RX_11ab_Radiometric_2019_247 | 2019-247_07:53:38 | S/C | 429,889,540 | 429,890,888 |
| 19234 | K2RX_11ab_Radiometric_2019_247 | 2019-247_07:53:53 | S/C | 429,889,555 | 429,890,903 |
| 19234 | K2RX_11ab_Radiometric_2019_247 | 2019-247_08:16:11 | S/C | 429,890,893 | 429,895,085 |
| 19234 | K2RX_11ab_Radiometric_2019_247 | 2019-247_08:16:26 | S/C | 429,890,908 | 429,895,100 |
| 19234 | K2RX_11ab_Radiometric_2019_247 | 2019-247_09:26:08 | S/C | 429,895,090 | 429,896,438 |
| 19234 | K2RX_11ab_Radiometric_2019_247 | 2019-247_09:26:23 | S/C | 429,895,105 | 429,896,453 |
| 19234 | K2RX_11ab_Radiometric_2019_247 | 2019-247_09:48:41 | S/C | 429,896,443 | 429,900,671 |
| 19234 | K2RX_11ab_Radiometric_2019_247 | 2019-247_09:48:56 | S/C | 429,896,458 | 429,900,686 |
| 19234 | K2RX_11ab_Radiometric_2019_247 | 2019-247_10:59:14 | S/C | 429,900,676 | 429,902,024 |
| 19234 | K2RX_11ab_Radiometric_2019_247 | 2019-247_10:59:29 | S/C | 429,900,691 | 429,902,039 |
| 19234 | K2RX_11ab_Radiometric_2019_247 | 2019-247_11:21:47 | S/C | 429,902,029 | 429,905,658 |
| 19234 | K2RX_11ab_Radiometric_2019_247 | 2019-247_11:22:02 | S/C | 429,902,044 | 429,905,674 |
| 19234 | K2RX_REX18ab_HGASideLobe_2019_247 | 2019-247_12:22:21 | S/C | 429,905,662 | 429,908,669 |
| 19234 | K2RX_REX18ab_HGASideLobe_2019_247 | 2019-247_12:22:37 | S/C | 429,905,677 | 429,908,684 |
| 19234 | K2RX_20ab_CA08TempBkgd_2019_247 | 2019-247_13:12:32 | S/C | 429,908,680 | 429,911,543 |
| 19234 | K2RX_20ab_CA08TempBkgd_2019_247 | 2019-247_13:12:47 | S/C | 429,908,695 | 429,911,558 |
| 19234 | K2RX_Rex7_ColdSkyA_2019_247 | 2019-247_14:00:26 | S/C | 429,911,546 | 429,913,092 |
| 19234 | K2RX_Rex7_ColdSkyA_2019_247 | 2019-247_14:00:41 | S/C | 429,911,561 | 429,913,107 |
| 19234 | K2RX_Rex7_ColdSkyB_2019_247 | 2019-247_14:26:15 | S/C | 429,913,095 | 429,913,347 |
| 19234 | K2RX_Rex7_ColdSkyB_2019_247 | 2019-247_14:26:30 | S/C | 429,913,110 | 429,913,347 |
| 19234 | K2RX_1ab_TestPatt_2019_247b | 2019-247_14:31:34 | S/C | 429,913,413 | 429,990,713 |
| 19234 | K2RX_1ab_TestPatt_2019_247b | 2019-247_14:31:49 | S/C | 429,913,428 | 429,916,434 |
| 19234 | K2RX_1ab_TestPatt_2019_252 | 2019-252_14:57:16 | S/C | 430,346,955 | 430,347,257 |
| 19234 | K2RX_1ab_TestPatt_2019_252 | 2019-252_14:57:31 | S/C | 430,346,970 | 430,347,272 |
| 19234 | K2RX_3ab_Radio_Path_Characterization_2019_252 | 2019-252_15:02:20 | S/C | 430,347,259 | 430,347,448 |
| 19234 | K2RX_3ab_Radio_Path_Characterization_2019_252 | 2019-252_15:02:35 | S/C | 430,347,274 | 430,347,448 |

4. Ecliptic Dust Radiometry test for second extended mission proposal (Load 21263)

In 2021, REX spacecraft software that handles REX data was modified to allow for thresholding: If events above a certain threshold were observed, that REX data frame containing the event and the surrounding frames were saved. The purpose was to be able to record interesting events while dramatically shrinking the data volume that needed to be returned to Earth. This thresholding was tested as an EMP / dust event detection for proof-of-concept for a second extended mission proposal during load 21263 in the RAM, anti-RAM, and perpendicular-to-RAM spacecraft orientations. Part of the data have been returned to Earth as of the time of this writing, and those are included in this PDS delivery.

The following is the DataTrack listing of the REX data during the Ecliptic Dust Radiometry test.

09/23/2021:

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|-------|--|-------------------|-----|-------------|-------------|
| 21263 | K2RX_1ab_TestPatt_2021_266 | 2021-266_09:54:33 | S/C | 494,696,792 | 494,697,065 |
| 21263 | K2RX_1ab_TestPatt_2021_266 | 2021-266_09:54:48 | S/C | 494,696,807 | 494,697,080 |
| 21263 | K2RX_Rex22ab_EclipticDustRadiometry_2021_266 | 2021-266_09:59:08 | S/C | 494,697,149 | 494,713,270 |
| 21263 | K2RX_Rex22ab_EclipticDustRadiometry_2021_266 | 2021-266_09:59:23 | S/C | 494,697,164 | 494,713,285 |
| 21263 | K2RX_Rex22ab_EclipticDustRadiometry_2021_266 | 2021-266_14:29:13 | S/C | 494,713,354 | 494,731,275 |
| 21263 | K2RX_Rex22ab_EclipticDustRadiometry_2021_266 | 2021-266_14:29:28 | S/C | 494,713,369 | 494,731,290 |
| 21263 | K2RX_Rex22ab_EclipticDustRadiometry_2021_266 | 2021-266_19:29:18 | S/C | 494,731,359 | 494,747,480 |
| 21263 | K2RX_Rex22ab_EclipticDustRadiometry_2021_266 | 2021-266_19:29:33 | S/C | 494,731,374 | 494,747,495 |
| 21263 | K2RX_Rex22ab_EclipticDustRadiometry_2021_266 | 2021-266_23:59:23 | S/C | 494,747,564 | 494,838,981 |
| 21263 | K2RX_Rex22ab_EclipticDustRadiometry_2021_266 | 2021-266_23:59:38 | S/C | 494,747,579 | 494,762,938 |
| 21263 | K2RX_1ab_TestPatt_2021_271 | 2021-271_05:39:33 | S/C | 495,113,492 | 495,363,321 |
| 21263 | K2RX_1ab_TestPatt_2021_271 | 2021-271_05:39:48 | S/C | 495,113,507 | 495,114,238 |