

## REX Activities in KEM1 Approach, Encounter, and Cruise

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The REX activities in Loads 18240 to 20112, are associated with two tasks:

1. 2014 MU<sub>69</sub> (Arrokoth) Encounter Observations
2. Radio Path Characterization
3. Calibration Campaign for testing instrument response differences

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.

|       |                            |                   |     |             |             |
|-------|----------------------------|-------------------|-----|-------------|-------------|
| 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 |

|       |  |                   |     |             |             |
|-------|--|-------------------|-----|-------------|-------------|
| 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 |

|       |                  |                   |     |             |             |
|-------|------------------|-------------------|-----|-------------|-------------|
| 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 |

|       |                                     |                   |     |             |             |
|-------|-------------------------------------|-------------------|-----|-------------|-------------|
| 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 |

|       |                                   |                   |     |             |             |
|-------|-----------------------------------|-------------------|-----|-------------|-------------|
| 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 |

|       |                            |                   |     |             |             |
|-------|----------------------------|-------------------|-----|-------------|-------------|
| 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)

Radio path characterization measurements with REX are nominally on a monthly cadence during 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), 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.

The Radio Path Characterization was done on:

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

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

09/09/2018:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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 |

08/21/2020:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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_04:25:07 | S/C | 465,473,826 | 465,474,000 |

11/18/2020:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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 |

02/15/2020:

|       |   |                   |     |             |             |
|-------|---|-------------------|-----|-------------|-------------|
| 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 |

### 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.

09/04/2019 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 |

