

REX Activities in KEM1 Approach, Encounter, and Cruise

Ivan Linscott

The REX activities in Loads 18240 to 19171, are associated with two tasks:

1. 2014 MU₆₉ (Arrokoth) Encounter Observations
2. Radio Path Characterization

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. MU69 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, 19073, 19108, 19150, 19171)

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:

- September 9, 2018
- October 20, 2018
- February 2, 2019
- March 21, 2019
- April 19, 2019
- May 07, 2019
- June 12, 2019
- July 10, 2019

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