

Timeline for Cassini Rev 238: 2-Way RSS Saturn's Ring & Atmospheric Occultations

July 23-24, 2016 UTC (DOY-205/206)

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	ERT UTC OWLT = 01:17:59	SCET	PDT ERT-7hrs 07:00:00	Comments
DOY 2016-205				
RSSG: Load 1-W, 2-W, and 3-W Frequency Predicts				
DSS-65: Begin Pre-Cal	21:00:00	19:42:01	14:00:00	
DSS-65: Beginning Of Track	22:00:00	20:42:01	15:00:00	No downlink signals detectable
DSS-65 Transmitter ON, 18kW, LCP, RAMP, SWEEP	22:29:00	21:11:01	15:29:00	Start of 2- & 3-way baseline - RTLTL
DSS-14: Begin Pre-Cal	22:50:00	21:32:01	15:50:00	
Ka-Band ON	22:54:55	21:36:56	15:54:55	Per PEF
DSS-25: Begin Pre-Cal	22:55:00	21:37:01	15:55:00	
DSS-65 Transmitter OFF	23:27:42	22:09:43	16:27:42	Critical time
DSS-14: Beginning Of Track	23:50:00	22:32:01	16:50:00	No downlink signals detectable
DOY 2016-206				
S-Band ON	00:15:43	22:57:44	17:15:43	Per PEF
RSSG: Begin DSS-14 and DSS-25 Open-Loop Recordings (1-Way)	00:20:00	23:02:01	17:20:00	
DSS-25: Beginning Of Track	00:25:00	23:07:01	17:25:00	No downlink signals detectable
DSS-65 End Of Track	00:50:00	23:32:01	17:50:00	
Spacecraft is Earth Pointed	00:54:59	23:37:00	17:54:59	Detectable X/S/Ka downlink signals. Signals may be present earlier
RNG OFF/TLM OFF	00:55:00	23:37:01	17:55:00	Jump in X-band signal level
Start 20 m LMB Deadtime	00:55:01	23:37:02	17:55:01	
DSS-14: Begin X- and S-Band 1-Way Acquisition	00:55:01	23:37:02	17:55:01	PC/N0 (X-70m tlm OFF, S-70m) = 54, 42 dB-Hz
DSS-25: Begin X- and Ka-Band 1-Way Acquisition	00:55:01	23:37:02	17:55:01	PC/N0 (X-34m tlm OFF, Ka-34m) = 48, 48 dB-Hz
RSSG: Enter 1-Way Open-Loop Frequency Offsets as Needed				
Start Short (~10 m) 1-Way Baseline	00:55:01	23:37:02	17:55:01	
DSS-25: Enable Monopulse	00:57:00	23:39:01	17:57:00	Enable monopulse only when requested by RS Operations
DSS-25: Disable Monopulse Without Clearing the Offsets	01:03:00	23:45:01	18:03:00	Prior to switching to 3-way
DSS-14: Begin X- & S-Band 3-Way Acquisition (w/ DSS-65)	01:04:58	23:46:59	18:04:58	PC/N0 (X-70m tlm OFF, S-70m) = 54, 42 dB-Hz
DSS-25: Begin X- & Ka-Band 3-Way Acquisition(w/ DSS-65)	01:04:58	23:46:59	18:04:58	PC/N0 (X-34m tlm OFF, Ka-34m) = 48, 48 dB-Hz
DSS-65 End of Post-Cal	01:05:00	23:47:01	18:05:00	
Begin ~22 m 3-Way Free-Space Baseline	01:06:58	23:48:59	18:06:58	
DSS-25: Enable Monopulse	01:09:00	23:51:01	18:09:00	Enable monopulse only when requested by RS Operations
Ring F	01:28:50	00:10:51	18:28:50	Approx. time; Ring F is usually not detectable in real-time
Ring A In	01:33:57	00:15:58	18:33:57	Approximate time

Middle of Encke Gap	01:38:44	00:20:45	18:38:44	Increase in signal levels for a short period
Top of the Ionosphere (~68,000 km)	01:39:14	00:21:15	18:39:14	
DSS-14 Transmitter ON, 18 kW, LCP, RAMP	01:46:00	00:28:01	18:46:00	NO SWEEP
DSS-25: Disable Monopulse Without Clearing the Offsets	01:48:00	00:30:01	18:48:00	Disable monopulse only when requested by RS Operations
Ring A Out	01:56:05	00:38:06	18:56:05	Approximate time
Ring B In	02:02:56	00:44:57	19:02:56	Signals will likely be blocked over parts of Ring B
DSS-14: Begin X- and S-Band 1-Way Acquisition	02:03:40	00:45:41	19:03:40	
DSS-25: Begin X- and Ka-Band 1-Way Acquisition	02:03:40	00:45:41	19:03:40	
Top of the Troposphere (~0.01° Bending Angle)	02:05:59	00:48:00	19:05:59	
Severe Rings & Tropospheric Interference				Unpredictable signal behavior until all signals are extinguished
DSS-35: Begin Pre-Cal	02:45:00	01:27:01	19:45:00	
DSS-43: Begin Pre-Cal	03:10:00	01:52:01	20:10:00	
Cassini is Behind Saturn as Seen From Earth				No downlink signals detectable until about 04:55:34
RSSG: Begin DSS-43 and DSS-35 Open-Loop Recordings (3-Way w/ DSS-14)	03:40:00	02:22:01	20:40:00	
DSS-43: Beginning Of Track	04:10:00	02:52:01	21:10:00	No downlink detectable
DSS-35: Beginning Of Track	04:15:00	02:57:01	21:15:00	No downlink detectable
Begin Limb Track	04:41:56	03:23:57	21:41:56	
Cassini is Behind Saturn as Seen From Earth				
Weak S-band signal (~1.55° BA) at DSS-14	04:55:34	03:37:35	21:55:34	Approx. time; 1-Way until X-band uplink lock, then 2-Way
DSS-14: Begin S-Band 2-Way Acquisition	04:55:34	03:37:35	21:55:34	~13m earlier than detectable S-band downlink signals (margin)
DSS-43: S-Band 3-Way Acquisition (w/ DSS-14)	04:55:34	03:37:35	21:55:34	~13m earlier than detectable S-band downlink signals (margin)
Weak X-band signal (~1.35° BA)	05:03:49	03:45:50	22:03:49	Approx. time; 1-Way until X-band uplink lock, then 2-Way
DSS-14: Begin X-Band 2-Way Acquisition	05:03:49	03:45:50	22:03:49	~13m earlier than detectable S-band downlink signals (margin)
DSS-25: Begin X-Band 3-Way Acquisition (w/ DSS-14)	05:03:49	03:45:50	22:03:49	~13m earlier than detectable S-band downlink signals (margin)
DSS-43 and DSS-35: Begin X-Band 3-Way Acquisition (w/ DSS-14)	05:03:49	03:45:50	22:03:49	~13m earlier than detectable S-band downlink signals (margin)
Weak Ka-band signal (~1.15° BA) at DSS-25 & 35	05:11:34	03:53:35	22:11:34	Approx. time; 1-Way until X-band uplink lock, then 3-Way/14
DSS-25: Begin Ka-Band 3-Way Acquisition (w/ DSS-14)	05:11:34	03:53:35	22:11:34	~13m earlier than detectable S-band downlink signals (margin)
DSS-35: Begin Ka-Band 3-Way Acquisition (w/ DSS-14)	05:11:34	03:53:35	22:11:34	~13m earlier than detectable S-band downlink signals (margin)
Top of the Troposphere (~0.01° BA)	05:52:14	04:34:15	22:52:14	
End Tracking Egress Atmospheric Occultation	05:55:59	04:38:00	22:55:59	Pc/N0 (dB/Hz) ~ 54 14X, 48 25/34/X, 48 25/34K, 42 14S
Start of Egress Ring Occultation Baseline	05:58:59	04:41:00	22:58:59	
DSS-25: Enable Monopulse	06:01:00	04:43:01	23:01:00	Enable monopulse only when requested by RS Operations
DSS-35: Enable Monopulse	06:01:00	04:43:01	23:01:00	Enable monopulse only when requested by RS Operations
Top of the ionosphere (~68,000 km)	06:10:34	04:52:35	23:10:34	Ionosphere primarily affects signals frequency/phase
Ring C In	06:12:36	04:54:37	23:12:36	Approximate time
DSS-25: Disable Monopulse Without Clearing the Offsets	06:38:00	05:20:01	23:38:00	Disable monopulse only when requested by RS Operations
DSS-35: Disable Monopulse Without Clearing the Offsets	06:38:00	05:20:01	23:38:00	Disable monopulse only when requested by RS Operations
DSS-14: Transmitter OFF	06:39:00	05:21:01	23:39:00	Start of the egress 1-way baseline minus the RTLT

Ring B In	06:40:59	05:23:00	23:40:59	Signals will likely be blocked over parts of Ring B
Ring B Out	07:20:14	06:02:15	00:20:14	Approximate time; Strong signals in the Cassini Division
Ring A In	07:27:05	06:09:06	00:27:05	Detectable signals over most of Ring A
DSS-25: Enable Monopulse	07:30:00	06:12:01	00:30:00	Enable monopulse only when requested by RS Operations
DSS-35: Enable Monopulse	07:30:00	06:12:01	00:30:00	Enable monopulse only when requested by RS Operations
Middle of the Encke Gap	07:44:25	06:26:26	00:44:25	Strong signals over brief time period
Ring A Out	07:49:12	06:31:13	00:49:12	All signals back to full strength (free-space) levels
Ring F	07:54:19	06:36:20	00:54:19	Approximate time; Ring F is usually not detectable in real-time
DSS-14 & DSS-25: End Of Track	08:35:00	07:17:01	01:35:00	
DSS-14 & DSS-25: End of Post-Cal	08:50:00	07:32:01	01:50:00	
RSSG: End DSS-14 and DSS-25 Open-Loop Recordings	09:00:00	07:42:01	02:00:00	
DSS-35: Disable Monopulse Without Clearing the Offsets	09:13:00	07:55:01	02:13:00	Prior to switching to 1-way
DSS-43: Begin X- & S-band 1-Way Acquisition	09:14:58	07:56:59	02:14:58	PC/N0 (X-70m tlm OFF, S-70m) = 54, 42 dB-Hz
DSS-35: Begin X- & Ka-band 1-Way Acquisition	09:14:58	07:56:59	02:14:58	PC/N0 (X-34m tlm OFF, Ka-34m) = 48, 48 dB-Hz
RSSG: Adjust 1-Way Open-Loop Frequency Offsets as Needed				
Begin ~30 m 1-Way Baseline	09:16:00	07:58:01	02:16:00	
DSS-35: Enable Monopulse	09:19:00	08:01:01	02:19:00	Enable monopulse only when requested by RS Operations
TLM ON/RNG ON	09:45:53	08:27:54	02:45:53	
S-Band OFF	09:46:20	08:28:21	02:46:20	
Ka-Band OFF	09:46:22	08:28:23	02:46:22	
End of Rev 238 Observations (End of Egress Deadtime)	09:46:59	08:29:00	02:46:59	
Spacecraft Turns Off Earth Point	09:46:59	08:29:00	02:46:59	
DSS-35 & DSS-43: End Of Track	10:10:00	08:52:01	03:10:00	
RSSG: End DSS-35 and DSS-43 Open-Loop Recordings	10:15:00	08:57:01	03:15:00	
DSS-35 & DSS-43: End of Post-Cal	10:25:00	09:07:01	03:25:00	

- Madrid DSS-65 related activities
- Goldstone DSS-14 & DSS-25 related activities
- Canberra DSS-43 & DSS-35 related activities

Predicted atmospheric & ring event times are approximate and are based on reference trajectory 150901