

**Additional online material to  
"Solar energetic particles and radio burst emission"  
by Miteva, Samwel, Krupar**

Table 1. Table of visual identification [or observatory reports only] of the radio emission signatures of type II, III and IV at different wavelengths ranges in the period 1996–2009. The date and onset time (in UT) are given for the SEP-associated flare or CME; E: eastern location of the solar origin, W: western; U: uncertain.

Event date yyyy-mm-dd	onset time	dm- $\lambda$ [GHz]		m- $\lambda$ [MHz]		Dm-km- $\lambda$ [MHz]
		3–1	1–0.3	300–100	100–30	30–0.01
1996-11-30 W	20:16	-	III, IV	III, IV	IV	III
1996-12-24 W	13:03	[III]	no data	[III]	[II]	III
1997-04-01 E	13:43	IV	[III, IV]	III, [IV]	II, III, IV	II, III
1997-04-07 E	13:50	IV	[III, IV]	[II, III, IV]	[II, III, IV]	II, III
1997-05-12 W	04:42	[III], IV	III, IV	III, IV	II, [IV]	II, III
1997-05-21 W	20:03	[III], IV	[III], IV	II, [III], [IV]	II, [IV]	II, III
1997-07-25 W	21:01	III?, IV	III, IV	II, III, IV	II, III	III
1997-09-24 E	02:43	IV	[III], IV	[III], IV	II, [III], IV	III
1997-10-07 W	13:30	no data	no data	[II, III]	II, III	[II], III
1997-10-21 E	17:00	no data	no data	no data	[III, IV]	III
1997-11-03 W	10:18	IV	[III, IV]	II, III, IV	II, III, [IV]	II, III
1997-11-04 W	05:52	III, IV	III, IV	[II], III, IV	[II], III, IV	II, III
1997-11-06 W	11:49	IV	[III, IV]	[II], III, [IV]	II, III, IV	II, III
1997-11-13 W	22:26	-	-	III	III, [IV]	III
1997-11-14 E	09:05	IV	[IV]	[III, IV]	[III]	[II], III
1997-12-06 W	10:27	no data	no data	no data	-	III
1998-01-25 E	21:26	-	-	III	II, III	III
1998-04-20 W	09:38	no data	-	[III]	[II, III, IV]	II, III
1998-04-29 E	16:06	IV	[III, IV]	[II, III, IV]	[II, III, IV]	II?, III, IV?
1998-05-02 W	13:31	IV	III, IV	II, III, IV	II, III, IV	II, III, IV
1998-05-06 W	07:58	IV	[III], IV	II, III, IV	II, III, IV	II, III
1998-05-09 W	03:04	IV	III, IV	[II], III, IV	II, III, [IV]	II, III
1998-05-09 W	15:18	no data	[IV]	[III, IV]	III	III
1998-05-14 W	03:55	-	-	II, [III]	[II, III]	III
1998-05-27 W	13:30	IV	[III, IV]	[III, IV]	II?, III, IV	II, III
1998-05-30 E	15:54	no data	no data	no data	III	III
1998-06-04 W	02:05	-	-	[III]	[III, IV]	III
1998-06-16 W	18:03	no data	no data	no data	[II]	II, III
1998-08-18 E	22:10	IV	[II], IV	[II, III], IV	[II, III], IV	II, III, IV?
1998-08-19 E	21:35	IV?	IV?	II, III	II, III, [IV]	III
1998-08-21 E	23:57	-	-	II, III	II, III, [IV]	III
1998-08-24 E	21:50	?	IV	II, III, IV	II, III, IV	II, III
1998-09-06 U	05:56	?	IV	[III], IV	[III], IV?	III
1998-09-09 U	04:52	-	III	II, III	II, III, [IV]	III
1998-09-20 E	09:44	no data	[III, IV]	[III, IV]	II?, III	III
1998-09-23 E	06:40	IV	[III], IV	[II, III], IV	II, [III], IV	II, III
1998-09-27 W	08:06	IV	[III, IV]	[III]	III	III
1998-09-30 W	13:08	IV	III, IV	III, IV	[II, III, IV]	II, III
1998-10-18 E	22:10	-	-	[II], III	[II], III	II, III

Table 1. continued.

Event date yyyy-mm-dd	onset time	dm- $\lambda$ [GHz]		m- $\lambda$ [MHz]		Dm-km- $\lambda$ [MHz]
		3-1	1-0.3	300-100	100-30	30-0.01
1998-11-05 W	19:00	IV	IV	IV	[II, III], IV	III
1998-11-07 W	11:02	IV	IV	no data	III	III
1998-11-07 W	20:07	-	-	III	III	III
1998-11-14 W	05:15	-	-	II, III	II, III, [IV]	II, III
1998-11-22 W	06:30	IV	[III]	II, III?	II, III?	III
1998-11-24 W	02:07	-	-	[II], III	II, III	III
1998-12-17 W	07:40	-	[III], III	II, III	II, III	III
1999-01-03 W	14:49	no data	no data	no data	[II, III]	III
1999-01-06 W	23:54	-	-	II, III	II, III, [IV]	III
1999-01-20 U	19:06	no data	no data	no data	[II, IV]	II, III
1999-04-24 W	13:31	no data	[III]	[III, IV]	II, III, IV	II, III
1999-05-03 E	05:36	IV	IV	[II], III, IV	II, III, IV	II, III
1999-05-09 W	17:53	no data	no data	no data	[III, IV]	III
1999-05-27 W	11:06	no data	no data	[III, IV]	II, III, IV	II, III
1999-06-01 W	18:53	no data	no data	no data	[IV]	II, III
1999-06-04 W	06:52	IV	[III], IV	II, III, IV	II, III, [IV]	II, III, IV?
1999-06-11 W	01:27	-	-	II, III	II, III, [IV]	II, III, IV
1999-06-18 E	16:38	[III, IV]	[III]	[III, IV]	[II, III, IV]	III
1999-06-27 W	08:34	IV	[III], IV	III	II, III, IV	III
1999-06-29 E	07:31	no data	no data	[III]	[III]	III
1999-07-25 W	13:08	IV	[III], IV	[III, IV]	[II, III, IV]	III
1999-07-31 W	11:26	no data	[IV]	[IV]	[III, IV]	III
1999-08-28 W	17:52	no data	no data	no data	[II, III]	[II], III
1999-09-13 E	16:30	no data	no data	no data	[III]	III
1999-11-17 E	09:47	IV	IV	no data	II, III, IV	II, III
1999-12-28 W	00:39	IV	III, IV	II, III, IV	II, III, IV	III
2000-01-08 E	22:17	-	-	III	III	?
2000-01-18 E	17:07	no data	no data	no data	[II, III, IV]	II, III
2000-01-19 W	02:54	-	-	[III, IV]	III, [IV]	III
2000-02-12 W	03:51	IV	IV	[II], III, IV	II, III, IV	II, III
2000-02-17 E	20:17	-	-	[II], III, IV	II, III, IV?	II, III
2000-02-18 W	09:21	no data	no data	II	II, III	III
2000-03-02 W	08:20	[III], IV	III, IV	II, III, IV	II, III, IV	III
2000-03-03 W	02:08	[III]	III	[II], III, IV	II, III, IV	III
2000-03-22 W	18:34	no data	no data	[II, IV]	[II, IV]	III
2000-03-23 W	07:56	no data	no data	III	II, III	III
2000-04-04 W	15:12	IV	[IV]	[II, IV]	[II, III, IV]	II, III
2000-04-23 W	12:54	no data	no data	[III]	[III]	III
2000-04-27 W	14:30	no data	no data	[III]	[III]	II, III, [IV]
2000-05-01 W	10:16	IV	IV	III, IV	III	III
2000-05-04 W	10:57	IV	IV	[II], III, [IV]	II, III	[II], III
2000-05-05 W	15:19	IV	IV	no data	[IV]	II, III
2000-05-07 W	20:50	-	?	II, [III]	II, III	II, III
2000-05-10 E	19:26	-	-	IV?	II, III, IV	III

Table 1. continued.

Event date yyyy-mm-dd	onset time	dm- $\lambda$ [GHz]		m- $\lambda$ [MHz]		Dm-km- $\lambda$ [MHz] 30–0.01
		3–1	1–0.3	300–100	100–30	
2000-05-15 W	15:46	IV	IV	no data	no data	II, III
2000-05-17 W	19:27	no data	no data	no data	no data	III
2000-05-23 E	20:48	IV?	III, IV?	III, IV	III, IV	III
2000-06-06 E	14:58	IV	[II, III, IV]	[II, III]	II, III, IV	II, III
2000-06-10 W	16:40	[IV]	no data	[II, III]	[II, III]	II, III
2000-06-15 W	19:38	-	-	III, IV	[II], III, IV	[II], III
2000-06-17 W	02:25	IV?	[III], IV	III, IV	III, IV	II, III, [IV]
2000-06-18 W	01:52	IV	[II], III	II, III	II, III	III
2000-06-23 W	14:18	IV	IV	[III]	II, III, IV	II, III
2000-06-25 W	07:17	IV	IV	III	III	III
2000-06-28 W	18:48	no data	no data	[II, III]	[II, III]	III
2000-07-10 E	21:05	IV	[III], IV	[II], III, IV	II, III, IV	[II], III, IV
2000-07-12 W	18:41	no data	no data	[IV]	[III, IV]	III?
2000-07-14 W	10:03	IV	[II], III, IV	II, III, IV	II, III, IV	II, III
2000-07-22 W	11:17	IV	IV	II, III, IV	II, III, IV	II, III
2000-07-27 W	19:54	no data	no data	no data	no data	III
2000-07-28 E	18:30	no data	no data	no data	no data	III?
2000-08-11 E	07:13	-	-	-	[III]	III
2000-08-12 W	09:45	[IV]	[III, IV]	[II], III	[II, III]	III
2000-08-12 W	13:48	IV	IV	III, IV	III, IV	III
2000-08-12 W	15:54	IV	IV	no data	no data	III?
2000-08-13 E	05:10	-	-	-	III?	?
2000-09-04 E	06:49	-	-	-	[III]	III
2000-09-07 W	20:32	-	-	II, III	II, III	III
2000-09-09 W	08:28	IV	[II, III], IV	II, [III], IV	II, [III]	III
2000-09-12 W	11:31	no data	no data	[II, III]	II, [III], IV?	II, III
2000-09-19 W	08:06	IV	[II], IV	II, III, IV	II, III, [IV]	II, III
2000-10-09 W	23:19	IV?	[II, III], IV	[II], III, IV	II, III, IV	III
2000-10-16 W	06:40	IV	IV	[III], IV	II, III, IV	II, III
2000-10-25 W	08:45	no data	no data	[IV]	III, IV	II, III
2000-10-30 E	18:07	no data	no data	no data	no data	III?
2000-11-08 W	22:42	IV	[III], IV	III, IV	III, IV	II, III
2000-11-24 W	04:55	[III], IV	III, IV	II, III	II, III	II, III
2000-11-24 W	14:51	no data	no data	[II, III, IV]	II, III, [IV]	II, III
2000-11-25 E	00:59	IV	IV	[II], III, IV	II, III, IV	[II], III
2000-12-28 W	12:06	no data	no data	[III]	[III]	II, III
2000-12-29 W	03:54	-	-	-	III?	III?
2001-01-05 W	17:06	no data	no data	no data	no data	III
2001-01-21 E	19:17	no data	no data	[III]	[III]	III
2001-01-26 W	11:50	no data	no data	[III]	II, III	II, III
2001-01-28 W	15:40	no data	no data	no data	no data	[II], III
2001-02-11 W	00:57	-	-	III	II, III	II, III
2001-02-26 W	05:30	-	-	-	-	III

Table 1. continued.

Event date yyyy-mm-dd	onset time	dm- $\lambda$ [GHz]		m- $\lambda$ [MHz]		Dm-km- $\lambda$ [MHz]
		3-1	1-0.3	300-100	100-30	30-0.01
2001-03-10 W	04:00	[III]	III	II, III	II, III	II, III
2001-03-25 E	16:25	[III, IV]	no data	no data	no data	III
2001-03-29 W	09:57	[III], IV	[II], IV	II, III, IV	II, III, IV	II, III, IV?
2001-04-02 W	10:04	[III, IV]	IV?	[III]	III	III?
2001-04-02 W	10:58	[III], IV	IV	[II], III, IV	II, III, IV	II, III, IV?
2001-04-02 W	21:32	IV	IV	II, [III], IV	II, III	II, III
2001-04-09 W	15:20	IV	IV	II, III, IV	II, III, IV	II, III
2001-04-10 W	05:06	IV	[III], IV	II, III, IV	II, III, IV	[II], III, IV?
2001-04-12 W	09:39	[III], IV	IV	II, III, IV	II, III, IV	III
2001-04-14 W	17:15	no data	no data	[III]	[II, III, IV]	III
2001-04-15 W	13:19	IV	IV	[II, III, IV]	[II, III, IV]	II, III
2001-04-18 W	02:11	IV	[II], III, IV	II, III, IV	[II], III	II, III
2001-04-26 W	11:26	IV	IV	III, [IV]	[III, IV]	II, III
2001-05-07 W	11:36	no data	no data	-	-	III
2001-05-20 W	06:00	IV	[III], IV	[II], III, [IV]	II, III, IV	III
2001-05-30 E	00:06	-	-	III, IV	III, IV	II, III
2001-06-04 W	16:11	no data	no data	[II, III, IV]	[II, III]	III
2001-06-15 E	10:01	IV	[II], IV	[II], III, IV	[II], III, IV	II, III
2001-06-15 W	15:56	IV	IV	no data	[II], III, IV?	II, III
2001-06-18 W	21:50	-	-	[III], IV	III, [IV]	III
2001-06-19 W	03:54	-	IV	II, III	II, III	III
2001-07-19 W	09:52	IV	IV	III	III	III
2001-08-09 W	10:30	no data	no data	-	[III]	III?
2001-08-09 E	20:35	-	-	-	-	III
2001-08-14 W	11:30	no data	no data	[III]	II, III, IV	III
2001-08-15 W	23:54	-	-	II, III	II, III	II, III
2001-09-12 W	21:05	-	III	III, IV	[II], III, IV	III
2001-09-15 W	11:04	IV	IV	II, III, [IV]	II, III, IV	II, III
2001-09-18 E	18:33	no data	no data	[III]	[III]	III
2001-09-19 W	06:59	[III]	[II]	II, III, IV	II, III, IV	III
2001-09-24 E	09:32	[III], IV	IV	III, IV	III, IV	II, III
2001-10-01 W	04:41	[IV]	[III, IV]	III, IV	III, IV	II, III, IV
2001-10-05 W	10:30	no data	no data	[III, IV]	III, IV	[II], III, IV
2001-10-08 E	08:09	IV	no data	[III]	II, III, IV?	III
2001-10-09 E	10:46	IV	IV	[II, III], IV	II, III, IV	II, III
2001-10-19 W	00:47	IV	IV	II, III, IV	II, III, IV	II, III
2001-10-19 W	16:13	no data	no data	II, III, IV	II, III, IV	II, III
2001-10-22 W	00:22	-	-	III	III	III
2001-10-22 E	14:27	[IV]	[IV]	[II, III, IV]	II, III, IV	II, III
2001-11-04 W	16:03	no data	no data	II, III, IV	II, III, IV	II, III
2001-11-17 E	04:49	?	[III], IV	[II, III], IV	II, III, IV	III, IV?
2001-11-18 W	21:30	-	-	-	[III]	III
2001-11-22 W	20:18	-	-	[II], III	[II], III	II, III
2001-11-22 W	22:32	III, IV	III, IV	[II], III, IV	[II], III, IV	II, III

Table 1. ccontinued.

Event date yyyy-mm-dd	onset time	dm- $\lambda$ [GHz]		m- $\lambda$ [MHz]		Dm-km- $\lambda$ [MHz] 30-0.01
		3-1	1-0.3	300-100	100-30	
2001-11-28 E	16:26	no data	no data	[II, III, IV]	[II, III, IV]	III
2001-12-16 W	01:14	-	-	-	-	III
2001-12-25 W	11:30	no data	[III]	[III]	[II], III	II, III
2001-12-26 W	04:32	IV	IV	II, III, IV	II, III, IV	II, III
2001-12-28 E	20:02	-	-	[II, III]	II, III, IV	II, III
2002-01-08 W	17:13	no data	no data	no data	[III]	II, III
2002-01-14 W	05:29	-	-	[II], III	[II], III	II, III
2002-01-27 W	12:30	no data	no data	-	II?	II, III
2002-02-20 W	05:52	-	[III], IV	II, III	II, III, [IV]	III
2002-03-10 E	22:48	-	-	[III, IV]	III, IV	II, III
2002-03-15 W	22:09	?	IV	III, IV	III, IV	II, III
2002-03-18 W	02:16	?	IV	III, IV	III, IV	II, III
2002-03-22 W	10:12	IV	no data	[II], III, IV	II, III, [IV]	II, III
2002-04-11 W	16:16	IV	IV	[II, III, IV]	[II, III]	III
2002-04-14 W	07:28	[III]	III, [IV]	III, [IV]	II, III, [IV]	II, III
2002-04-17 W	07:46	[III], IV	[II, III], IV	[II], III, IV	[II], III, IV	[II], III, IV
2002-04-21 W	00:43	IV	[III], IV	[II], III, IV	[II], III, [IV]	II, III
2002-04-30 W	23:26	-	-	[III]	[III]	[III], III
2002-05-20 E	15:21	[IV]	[II, III, IV]	[II, III, IV]	[II, III, IV]	III
2002-05-22 W	03:18	-	-	III, [IV]	III, [IV]	II, III, IV
2002-07-04 W	20:06	-	-	[III]	III	III
2002-07-07 W	11:15	no data	[III]	III	III	II, III
2002-07-09 W	19:32	no data	no data	no data	[III]	II, III
2002-07-15 W	19:59	IV	[III], IV	III, IV	III, IV	II, III
2002-07-19 E	19:32	no data	[III, IV]	[III, IV]	no data	III
2002-07-20 E	21:04	[III], IV	[II, III], IV	II, III, IV	II, III, IV	II, III
2002-08-03 W	18:59	no data	no data	[III, IV]	[III, IV]	II, III
2002-08-05 W	04:21	no data	[IV]	no data	[III]	III
2002-08-14 W	01:47	-	-	[II], III, IV	II, III, IV	II, III
2002-08-16 W	05:46	IV	[III], IV	[II, III], IV	[II], III, IV	II, III
2002-08-16 E	11:32	IV	[II], IV	[II], III, IV	II, III, IV	II, III, IV
2002-08-18 W	21:12	[III], IV	[III], IV	[II], III, IV	II, III, IV	III
2002-08-20 W	08:22	III, IV	III, [IV]	III, [IV]	III	III
2002-08-22 W	01:47	[III], IV	[III], IV	[II], III, IV	II, III, IV	III
2002-08-24 W	00:49	[III], IV	III, IV	[II], III, IV	II, III, IV	II, III
2002-09-05 E	16:18	IV	IV	[II, III, IV]	[II, III, IV]	II, III
2002-09-27 W	01:18	IV	-	-	-	III
2002-10-20 W	14:21	IV	[III], IV	[II, III, IV]	II, [III]	III
2002-11-09 W	13:08	IV	IV	III, IV	II, III, IV	II, III
2002-11-24 W	20:14	-	-	-	II, [III]	II, III
2002-12-19 W	21:34	-	[III]	II, III, IV	II, III, IV	II, III
2002-12-22 W	02:14	[III], IV	[III], IV	[II], III, IV	II, III, IV	II, III
2003-03-17 W	18:50	no data	no data	[III]	[III]	III
2003-03-18 W	11:51	IV	IV	[III, IV]	[II], III, IV	[II], III

Table 1. continued.

Event date yyyy-mm-dd	onset time	dm- $\lambda$ [GHz]		m- $\lambda$ [MHz]		Dm-km- $\lambda$ [MHz]
		3-1	1-0.3	300-100	100-30	30-0.01
2003-04-07 W	09:25	no data	no data	-	III	III
2003-04-21 E	12:54	IV	[III], IV	II, III, IV	II, III, IV	III
2003-04-23 W	00:39	[III], IV	[III], IV	[II], III, IV	[II], III, IV	III
2003-04-24 W	12:45	IV	[II], IV	[II], IV	II, III, IV	II, III
2003-04-25 E	05:23	[III]	III, [IV]	II, III, [IV]	II, III, [IV]	III, IV
2003-05-27 W	05:06	[III], IV	III, IV	III, IV	III, IV	III
2003-05-28 W	00:17	[III], IV	[III], IV	[II], III, IV	[II], III, IV	II, III, IV
2003-05-30 W	06:39	-	-	-	[III]	III?
2003-05-31 W	02:13	IV	[III], IV	II, III, [IV]	II, III, [IV]	II, III
2003-06-02 W	00:07	-	IV	III, IV	[II], III, [IV]	III
2003-06-15 E	23:25	IV	IV	[II], III, IV	[II], III, IV	II, III
2003-06-17 E	22:27	IV	[III], IV	II, III, IV	II, III, IV	II, III
2003-07-10 W	13:54	[IV]	[IV]	II, III	II, III	[II], III
2003-07-17 E	08:17	IV	[III], IV	II, III, IV	II, III, IV	III
2003-08-19 W	07:38	IV	III	II, III	II, III	III
2003-10-21 E	03:19	IV	[II], IV	[II]	II, III	[II], III
2003-10-22 W	08:31	IV	IV	[III, IV]	[III, IV]	III
2003-10-26 E	05:57	IV	[II], IV	II, III, IV	II, III, IV	II, III, IV
2003-10-26 W	17:21	no data	no data	[II, IV]	[II, III, IV]	II, III
2003-10-28 E	09:51	[III], IV	[III], III, IV	II, III, IV	II, III, IV	II, III, IV
2003-10-29 W	20:37	[III], IV	[II, III], IV	[II], III, IV	[II], III, IV	[II], III, IV
2003-11-02 W	09:30	no data	[IV]	III, [IV]	II, III, IV?	II, III
2003-11-02 W	17:03	no data	no data	[II, III, IV]	[II, III, IV]	II, III, IV
2003-11-04 W	19:29	IV	IV	[II], III, IV	[II], III, IV	[II], III, IV
2003-11-11 W	02:30	-	-	-	-	III
2003-11-18 E	08:12	IV	IV	II, III, IV	II, III, IV	[II], III, IV?
2003-11-20 W	07:35	[III]	[III]	III, [IV]	III, [IV]	III
2003-11-20 W	23:42	[III], IV	[III], IV	III, IV	III	III
2003-12-02 W	09:40	[IV]	-	-	-	III, IV?
2004-01-07 E	10:14	IV	IV	III, [IV]	II, III, IV?	II, III
2004-02-04 W	11:12	IV	[III], III, IV	II, III, IV	II, III, IV	III
2004-04-11 W	03:54	-	III	III	III	II, III
2004-06-04 W	07:50	-	-	II, III	II, III, [IV]	II, III
2004-07-13 W	00:09	[III], IV	[III], IV	II, III, IV	II, III, IV	III
2004-07-22 E	11:02	IV	IV	III	III	III
2004-07-22 E	22:40	-	III	III, IV	III, IV	III
2004-07-23 W	06:41	[III], IV	III, IV	III, IV	III, IV	III
2004-07-25 W	14:19	IV	III, IV	III, IV	[II], III, IV	II, III, IV
2004-07-29 W	11:42	no data	no data	IV	III, IV	II, III, IV?
2004-07-31 W	05:16	-	-	III, IV	III, IV	[II], III
2004-08-18 W	17:29	no data	no data	[II]	II, III, IV	III
2004-09-03 E	00:30	-	-	[III]	[III]	III
2004-09-19 W	16:46	no data	no data	[II, III]	II, III, [IV]	[II], III
2004-10-30 W	06:08	[III], IV	[III], IV	II, III, IV	II, III, IV	II, III
2004-10-30 W	11:38	IV	IV	II, III, IV	II, III, IV	III

Table 1. continued.

Event date yyyy-mm-dd	onset time	dm- $\lambda$ [GHz]		m- $\lambda$ [MHz]		Dm-km- $\lambda$ [MHz]
		3-1	1-0.3	300-100	100-30	30-0.01
2004-10-30 W	16:18	no data	no data	[II, III]	II, III	III
2004-11-01 W	03:04	[III], IV	[III], IV	II, III	II, III	III
2004-11-04 E	22:53	III, IV	III, IV	III, IV	III, IV	III
2004-11-06 W	19:38	no data	no data	[III]	[III]	III
2004-11-07 W	15:42	no data	no data	[II, IV]	[II], III, IV	II, III, IV
2004-11-09 W	16:59	no data	no data	[III, IV]	[II], III, IV	II, III, IV
2004-11-10 W	01:59	[III], IV	[III], IV	[II], III, IV	II, III, IV	[II], III
2004-12-02 W	23:44	[III], IV	[III], IV	[II], III, IV	[II], III, IV	II?, III
2005-01-15 E	05:54	IV	IV	[II], III, IV	II, III, IV	II, III, IV
2005-01-15 W	22:25	IV	[II], IV	[II], III, IV	[II], III, IV	II, III, IV
2005-01-17 W	06:59	[IV]	IV	[II], III, IV	II, III, IV	II, III, IV
2005-01-20 W	06:36	[III], IV	II?, III, IV	II, III, IV	[II], III, IV	II, III
2005-05-05 W	20:09	-	III	[II], III, IV	[II], III, IV	III
2005-05-06 W	11:11	IV	[III], IV	III	III, IV	III
2005-05-06 E	16:03	IV	IV	[II, IV]	II	[II], III
2005-05-11 W	19:22	-	-	IV	II, III, IV	II, III, [IV]
2005-05-13 E	16:13	IV	[II], IV	[II, III, IV]	[II], III, IV	II, III, IV?
2005-05-31 W	14:33	IV	IV	II, III	II, III	[II], III, IV?
2005-06-03 E	11:51	IV	IV	[II], III	II, III, IV	II, III
2005-06-16 W	20:01	-	IV?	[II], IV	II, III, IV	II, III
2005-07-09 W	21:47	IV	III, IV	[II], III, IV	II, III, IV	II, III
2005-07-10 W	05:09	-	IV?	III	III	III
2005-07-10 W	08:54	-	[III]	III	III, IV?	III
2005-07-12 W	15:47	IV	IV	III, IV	III, [IV]	III
2005-07-13 W	02:35	IV	IV	III, IV	III, IV	III
2005-07-13 W	14:01	IV	IV	III, IV	II, III, IV	[II], III
2005-07-13 W	21:49	III	[II], III	[II], III	[II], III	III
2005-07-17 W	11:30	IV	IV	III, [IV]	III, IV?	II, III
2005-07-21 E	03:54	-	-	-	?	III
2005-07-24 E	13:54	no data	no data	[III]	II, III, IV	II, III
2005-07-26 E	04:54	-	-	[III]	[III]	III
2005-07-27 E	04:33	IV	IV	[II], III, IV	II, III, IV	II, III
2005-08-22 W	00:44	IV	[II], IV	II, IV	II, III, IV	II, III, IV
2005-08-22 W	16:46	IV	IV	III?, IV	II, III, IV	II, III, IV
2005-08-29 W	10:54	no data	no data	?	III, IV?	III
2005-08-31 W	22:30	-	-	?	?	II, III
2005-09-05 E	08:53	IV	[III], IV	[II], III	II, III, IV	[II], III, IV?
2005-09-07 E	17:17	IV	IV	[II], IV	[II], III, IV	II, III
2005-09-13 E	19:19	IV	IV	III, IV	II?, III, IV	II, III, IV
2006-07-06 W	08:13	IV	[IV]	II, III, IV	II, III, IV	II, III
2006-12-05 E	10:18	IV	[III], IV	[II], III, IV	II, III, IV	II, III
2006-12-06 E	08:02	IV	[II], IV	[II], III, IV	III, IV	[II], III
2006-12-13 W	02:14	III, IV	III, IV	[II], III, IV	[II], III, IV	II, III, IV
2006-12-14 W	21:07	III, IV	III, IV	[II], III, IV	II, III, IV	II, III, IV
2007-2009				no events		

Table 2. Table of visual identification [or observatory reports only] of the radio emission signatures of type II, III and IV at different wavelengths ranges in the period 2010–2016. The date and onset time (in UT) are given for the SEP-associated flare or CME; E: eastern location of the solar origin, W: western; U: uncertain.

Event date yyyy-mm-dd	onset time	dm- $\lambda$ [GHz]		m- $\lambda$ [MHz]		Dm-km- $\lambda$ [MHz]
		3–1	1–0.3	300–100	100–30	30–0.01
2010-06-12 W	00:30	III?	III	II, III	II, III	II, III
2010-08-03 E	11:12	-	III	III	III	III?
2010-08-03 E	21:17	-	-	[III]	III	III?
2010-08-07 E	17:55	no data	IV?	[II], IV?	[II, IV]	II, III, IV?
2010-08-14 W	09:38	III?, IV	[III], III, IV	[III], III, IV	II, III, IV	II, III
2010-08-18 W	04:45	-	-	-	II	II, III
2010-09-08 W	23:05	-	-	-	III, [IV]	II, III
2011-01-28 W	00:44	-	-	[II], III	II, III	II, III
2011-01-28 W	10:05	-	-	-	IV?	III
2011-02-15 W	01:44	IV	IV	[II], III, IV	II, III, IV	II, III, IV
2011-03-07 W	19:43	III?, IV	III, IV	III, IV	II, III, IV	II, III
2011-03-21 W	02:24	-	-	-	II, III, IV	II, III
2011-03-21 E	16:12	-	III	III	III	?
2011-05-11 W	02:23	-	-	[II, III]	II, [III]	II?, III
2011-06-04 W	06:48	-	-	III	III	II, III
2011-06-04 W	22:05	-	-	[III]	III	II, III
2011-06-07 W	06:16	IV	[III], IV	[II], III, IV	[II], III, IV	II, III
2011-08-02 W	05:19	IV	[III], IV	[III], IV	II, III, IV	II, III
2011-08-03 W	13:17	IV	III?, IV	III, IV	II, III, IV	II, III
2011-08-04 W	03:41	IV	[III], IV	[II], III, IV	II, III, IV	II, III
2011-08-08 W	18:00	IV	IV	[II], III, IV	II, III, [IV]	II, III
2011-08-09 W	07:48	IV	III, IV	II, III, IV	[II], III, IV	II, III
2011-09-06 W	01:35	IV?	[III], IV	II?, III, IV	II?, III, [IV]	II, III
2011-09-06 W	22:12	IV	II?, III?, IV	[II], III, IV	II?, III, IV	II, III
2011-09-22 E	10:29	IV	IV	III?, IV	II, III, IV	II, III, IV
2011-10-22 W	10:00	-	IV?	IV?	IV	[II], III
2011-11-03 E	23:30	-	-	[III]	III	II, III
2011-11-26 W	06:09	-	-	III	III	II, III
2011-12-25 W	18:11	no data	-	II, III?, IV	II, III, IV	II, III
2012-01-02 W	14:31	no data	IV?	IV?	II?, III?	II, III
2012-01-19 E	13:44	IV?	IV?	[IV]	[IV]	II, III
2012-01-23 W	03:38	IV	IV	III, IV	III, IV	II, III
2012-01-27 W	17:37	IV	III, IV	[II], III, IV	[II], III?, [IV]	II, III, IV
2012-02-24 E	03:46	-	-	-	-	II, III?
2012-03-04 E	10:29	IV	IV	IV	IV	II, III, IV
2012-03-07 E	01:05	IV	IV	[II], III, IV	[II], III, IV	II, III
2012-03-13 W	17:12	IV	IV	IV	III, IV	II, III
2012-03-29 W	23:19	-	-	[III]	[III]	III
2012-04-05 W	20:49	-	IV?	III?, IV	[II, III, IV]	III
2012-05-17 W	01:25	[IV]	[III], IV	[II], III, IV	II, III, IV	II, III
2012-05-26 W	20:58	-	-	[II], III?, [IV]	[II], III?, [IV]	II, III

Table 2. continued.

Event date yyyy-mm-dd	onset time	dm- $\lambda$ [GHz]		m- $\lambda$ [MHz]		Dm-km- $\lambda$ [MHz]
		3-1	1-0.3	300-100	100-30	30-0.01
2012-06-14 E	12:52	IV	IV	IV	III?, IV	II?, III
2012-07-06 W	23:01	[III], IV	[III], IV	[II], III, IV	II, III, IV	II, III
2012-07-08 W	16:23	IV	III, IV	[II], III, IV	[II], III, IV	II, III
2012-07-12 W	15:37	IV	III, IV	III, IV	II, III, [IV]	II, III
2012-07-17 W	12:03	-	-	IV	IV	II?, III
2012-07-19 W	04:17	[III]	III?, IV	III, IV	[II, III], IV	II, III, [IV]
2012-07-23 W	02:36	-	III?	III?, [IV]	[II, III]	II, III
2012-08-31 E	19:45	no data	-	-	[IV]	II, III, [IV]
2012-09-08 W	10:00	-	-	?	III	II, III
2012-09-23 E	14:48	-	-	-	[III]	III
2012-09-27 W	23:36	-	IV?	III, IV	II, III, IV	II, III
2012-11-08 W	11:00	-	-	-	-	II, III
2012-12-14 W	02:00	-	-	-	-	III
2013-01-16 W	18:21	-	-	-	-	II?, III
2013-02-26 W	09:12	-	-	-	-	II, III
2013-03-05 E	03:48	-	-	-	III	II, III
2013-03-15 E	05:46	IV	IV	III, IV	III, IV	II, III
2013-03-16 E	06:55	-	-	-	-	III
2013-04-11 E	07:24	IV	[III], IV	[II], III, IV	II, III, IV	II, III
2013-04-20 W	21:05	-	-	-	-	III
2013-05-13 E	15:48	IV	IV	II?, III, IV	II, III, IV	II, III
2013-05-15 E	01:25	IV	IV	[II], III?, IV	[II], III, IV	II, III
2013-05-22 W	13:08	IV	III?, IV	III, IV	II, III, IV	II, III, IV?
2013-06-21 E	02:30	IV	IV	III, IV	III, IV	II, III
2013-06-22 W	17:31	-	-	-	-	III
2013-06-28 W	01:36	-	IV	[III], IV	III, [IV]	II?, III
2013-07-22 W	06:24	-	-	-	-	II, III
2013-08-17 W	18:16	no data	-	[IV]	[II], III?, IV	[II], III, [IV]
2013-08-20 W	08:12	-	-	III?	-	III?
2013-09-29 W	21:43	-	-	-	II?, [III]	II, III
2013-10-22 W	21:15	-	III, IV?	[II], III, [IV]	II, III, IV	II?, III
2013-10-25 W	14:51	no data	III, IV	[II], III, IV	II, III, IV	II, III, [IV]
2013-10-28 W	04:32	-	III?, IV	III, IV	[II], III, IV	II?, III
2013-10-28 E	15:07	no data	IV	[II], III?, IV	II, III, IV	[II], III
2013-11-02 W	04:40	-	III	II?, III	[II], III	III
2013-11-06 W	23:44	-	-	[III]	[II, III]	II, III
2013-11-07 E	10:26	-	-	III?, IV	III?, IV	II?, III
2013-11-19 W	10:14	IV	IV	II, III	II, III	II, III
2013-12-12 W	03:11	-	-	II, [IV]	II, III, [IV]	II?, III, [IV]
2013-12-13 E	21:24	-	-	-	[III]	III
2013-12-26 E	03:34	-	-	[III]	III	II, III
2013-12-28 E	17:53	-	-	-	-	II, III
2014-01-04 E	18:47	-	-	[IV]	[IV]	III, [IV]
2014-01-06 W	08:00	-	[III], IV?	II, III, IV?	II, III	II, III

Table 2. continued.

Event date yyyy-mm-dd	onset time	dm- $\lambda$ [GHz]		m- $\lambda$ [MHz]		Dm-km- $\lambda$ [MHz] 30–0.01
		3–1	1–0.3	300–100	100–30	
2014-01-07 W	18:04	-	-	IV?	[II]	II, III
2014-02-14 W	08:48	-	IV?	III, IV	III	III
2014-02-18 E	01:36	-	-	-	[II]	III
2014-02-19 E	04:48	-	-	-	-	III
2014-02-19 W	16:00	no data	IV?	-	-	III?
2014-02-20 W	07:26	IV	IV	II, III, IV	II, III, IV	II?, III
2014-02-25 E	00:39	-	III, IV	II, III, IV	II, III	II, III
2014-03-25 W	05:36	-	-	-	[III]	III?
2014-03-28 W	23:44	IV?	III?, IV?	II, III, IV?	II, III, [IV]	II, III
2014-03-29 W	17:35	no data	-	[II, III], IV?	II, III, IV?	II, III
2014-04-05 W	06:24	-	IV?	IV?	III	III
2014-04-18 W	12:31	IV	III?, IV	III?, IV	II, III, IV	II, III
2014-05-07 E	16:07	IV	IV	III, IV	III	II, III
2014-05-09 W	02:48	-	-	II?, [III]	II, III, [IV]	II, III, [IV]
2014-06-12 W	21:34	IV	IV	[III], IV	[II, III], IV	II, III
2014-08-25 W	14:46	IV	IV	III, IV	II, III, IV?	II, III, [IV]
2014-09-01 E	11:12	IV	IV	III, IV	II, III, IV	II, III, IV
2014-09-10 E	17:21	-	III, IV	III, IV	II, III, IV?	II, III
2014-09-22 W	06:12	-	IV?	IV?	[III]	II, III
2014-09-24 W	21:30	IV	IV	II, III, IV	II, III, IV	II, III, [IV]
2014-10-10 W	15:42	-	-	-	[III]	III?, IV?
2014-12-13 W	14:24	-	?	II?, III	II, III	II, III
2014-12-17 E	04:25	IV	[III], IV	III, IV?	II, III, [IV]	II, III, [IV]
2015-02-21 W	09:24	-	-	-	-	III
2015-03-15 W	01:15	-	[IV]	[III], IV	II, III, IV	[II], III
2015-03-24 W	08:24	?	-	-	II?	II, III
2015-04-21 W	11:49	-	III?	-	?	III?
2015-05-12 W	02:15	-	-	III, [IV]	[II, III, IV]	III
2015-06-18 W	00:33	-	-	[IV]	[III, IV]	III, [IV]
2015-06-21 E	02:06?	IV	IV	[II], III, IV	[II], III, IV	II, III
2015-06-25 W	08:02	IV	IV	III, IV	II?, III, IV	II?, III, IV
2015-07-01 W	14:36	no data	-	IV	II?, III, IV	II?, III
2015-09-20 W	17:32	no data	-	[III]	[II, III]	II, III
2015-09-30 W	09:36	-	-	III	III	III?
2015-10-29 W	02:36	-	[II], III	II, III	II, III, IV	III
2015-11-04 E	13:31	III, IV	III, IV	III, IV	II, III, IV	II?, III
2015-11-09 W	12:49	III, IV	III, IV	III, IV	II, III, IV	III
2015-12-28 W	11:20	IV	III?, IV	III, IV	III, IV	II?, III
2016-01-01 W	23:10	III?	III?	III, IV	[II], III, IV	III
2016-03-16 W	06:34	-	-	[II], III, IV?	II, III	III
2016-04-18 W	00:14	-	IV	[II], III, IV	II, III, IV	III, IV?
2016-05-15 W	15:19	-	IV	IV?	no data	III
2016-07-23 W	05:00	-	IV	III, IV	[II], III, IV	III