Annex A

(informative)

RS-FEC Codeword Examples

32GFC

This annex provides example RS-FEC codewords produced by 64B/66B to 256B/257B transcoding, Reed-Solomon encoding (defined in Section 5.4.3) and scrambling (based on PN-5280 defined in Section 5.4.4) computations. Results of each computation are provided in a tabular form. The contents of the tables are transmitted from left to right within each row starting from the top row and ending at the bottom row. The tables contain both binary and hexadecimal representations of the data. For the hexadecimal representation, the most significant bit of each hex symbol is transmitted first.

A.1 Input to the 64B/66B to 256B/257B transcoder

Table A-1 contains a sequence of 80 66-bit blocks corresponding to the PCS transmission of Idle control characters. The initial value of the scrambler was set to 0x0ea1e77eed301ec, which corresponds to bits 6 to 63 of the first 64-bit payload in the first row of 802.3-2012, Annex 74A, Table 74A–2. Bit 6 is assigned to S57 and bit 63 is assigned to S0 (see Section 5.3.3).

Table A-1: 64B/66B to 256B/257B transcoder input

Sync <0:1>	64-bit payload, hex<2:65>	Sync <0:1>	64-bit payload, hex<2:65>	Sync <0:1>	64-bit payload, hex<2:65>	Sync <0:1>	64-bit payload, hex<2:65>
10	ad5a3bf86d9acf5c	10	de55cb85df0f7ca0	10	e6ccff8e8212b1c6	10	d63bc6c309000638
10	70e3b0ce30e0497d	10	dc8df31ec3ab4491	10	66fb9139c81cd37b	10	b57477d4f05e3602
10	8cfd495012947a31	10	e7777cf0c6d06280	10	44529cf4b4900528	10	85ce1d27750ad61b
10	456d5c71743f5c69	10	c1bf62e5dc5464b5	10	dc6011be7ea1ed54	10	1cf92c450042a75f
10	cc4b940eaf3140db	10	77bb612a7abf401f	10	c22d341e90545d98	10	ce6daf1f248bbd6d
10	dd22d0b3f9551ed6	10	574686c3f9e93898	10	2e52628f4a1282ce	10	f20c86d71944aab1
10	55133c9333808a2c	10	1aa825d8b817db4d	10	637959989f3021eb	10	976806641b26aae9
10	6a37d4531b7ed5f2	10	53c3e96d3b12fb46	10	528c7eb8481bc969	10	ab8f9980d5a54559
10	9a4d2abfda65cc33	10	94fe646efe5af02d	10	9a65ae5fcd88c03a	10	5ef08673168def9b
10	220c871a953fffc6	10	ce0bb95ac263e6c1	10	4f6a917d1a676571	10	5890918c7b687d75
10	44d2b3e43096f836	10	84cdd4fc48b79608	10	b3e4503e3c824a8c	10	fd6d0b1a39687929
10	1730167c08302a69	10	4c15ff56de92b1ad	10	d0c2f0d4ff0dee95	10	e1422ee2e8b92125
10	ed5acaf86592fcee	10	de799be0b903c880	10	2714ffbf40bc09f6	10	c3be97c3c285009f
10	1020faf19f606631	10	93007cabbb3f8c9d	10	ef6955f7f43df5d0	10	4dbd0616afe60e1f
10	3a1e49b7c7f7bb5d	10	901d828746ceec61	10	71ed3c097158c224	10	11adb3d81e13d263
10	a350d1a343b2394b	10	eab30ca27b5b34e3	10	90359ef711ed53d9	10	9b446763c8627ea8
10	6e891c0f4842b823	10	c4d786a25727a7fc	10	094fe7da31fb60cd	10	9f9a004de5e70767
10	054bdd77b7cb4e7b	10	c598cb710558af67	10	fc386d1f99d3a925	10	4928e0b43e781893
10	5a44dd3eb8b2ad6c	10	94462af4f583d770	10	8061ba9381f51f55	10	476d4eded7c90fcc
10	1efc25aa6a7e0b4c	10	93dd968c06a56809	10	9768e9d1ba74d3b6	10	014e9dc9f13670bb

A.2 Output of the 64B/66B to 256B/257B transcoder

Table A-2 contains a series of 257-bit transmission words. Each row of the table is a set of 4 66-bit blocks (representing Idle control characters output by the PCS) that has been converted to one 257-bit block using the procedure defined in Section 5.4.2. The resulting set of 20 257-bit blocks is input to the RS(528,514) encoder.

Table A-2: 64B/66B to 256B/257B transcoder output

Header <0:4>	Payload, hex <5:64>	Payload, hex <65:128>	Payload, hex <129:192>	Payload, hex <193:256>
00000	a5a3bf86d9acf5c	de55cb85df0f7ca0	e6ccff8e8212b1c6	d63bc6c309000638
00000	7e3b0ce30e0497d	dc8df31ec3ab4491	66fb9139c81cd37b	b57477d4f05e3602
00000	8fd495012947a31	e7777cf0c6d06280	44529cf4b4900528	85ce1d27750ad61b
00000	46d5c71743f5c69	c1bf62e5dc5464b5	dc6011be7ea1ed54	1cf92c450042a75f
00000	c4b940eaf3140db	77bb612a7abf401f	c22d341e90545d98	ce6daf1f248bbd6d
00000	d22d0b3f9551ed6	574686c3f9e93898	2e52628f4a1282ce	f20c86d71944aab1
00000	5133c9333808a2c	1aa825d8b817db4d	637959989f3021eb	976806641b26aae9
00000	637d4531b7ed5f2	53c3e96d3b12fb46	528c7eb8481bc969	ab8f9980d5a54559
00000	94d2abfda65cc33	94fe646efe5af02d	9a65ae5fcd88c03a	5ef08673168def9b
00000	20c871a953fffc6	ce0bb95ac263e6c1	4f6a917d1a676571	5890918c7b687d75
00000	4d2b3e43096f836	84cdd4fc48b79608	b3e4503e3c824a8c	fd6d0b1a39687929
00000	130167c08302a69	4c15ff56de92b1ad	d0c2f0d4ff0dee95	e1422ee2e8b92125
00000	e5acaf86592fcee	de799be0b903c880	2714ffbf40bc09f6	c3be97c3c285009f
00000	120faf19f606631	93007cabbb3f8c9d	ef6955f7f43df5d0	4dbd0616afe60e1f
00000	31e49b7c7f7bb5d	901d828746ceec61	71ed3c097158c224	11adb3d81e13d263
00000	a50d1a343b2394b	eab30ca27b5b34e3	90359ef711ed53d9	9b446763c8627ea8
00000	6891c0f4842b823	c4d786a25727a7fc	094fe7da31fb60cd	9f9a004de5e70767
00000	04bdd77b7cb4e7b	c598cb710558af67	fc386d1f99d3a925	4928e0b43e781893
00000	544dd3eb8b2ad6c	94462af4f583d770	8061ba9381f51f55	476d4eded7c90fcc
00000	1fc25aa6a7e0b4c	93dd968c06a56809	9768e9d1ba74d3b6	014e9dc9f13670bb

A.3 Output of the RS(528,514) encoder

Table A-3 contains an RS(528,514) codeword. The resulting set of 20 257-bit blocks constitute the message portion of the codeword. The parity is computed using the encoder defined in Section 5.4.3 and is appended to the message to complete the codeword.

Table A-3: RS(528,514) codeword output

Header <0:4>	Payload, hex <5:64>	Payload, hex <65:128>	Payload, hex <129:192>	Payload, hex <193:256>
00000	a5a3bf86d9acf5c	de55cb85df0f7ca0	e6ccff8e8212b1c6	d63bc6c309000638
00000	7e3b0ce30e0497d	dc8df31ec3ab4491	66fb9139c81cd37b	b57477d4f05e3602
00000	8fd495012947a31	e7777cf0c6d06280	44529cf4b4900528	85ce1d27750ad61b
00000	46d5c71743f5c69	c1bf62e5dc5464b5	dc6011be7ea1ed54	1cf92c450042a75f
00000	c4b940eaf3140db	77bb612a7abf401f	c22d341e90545d98	ce6daf1f248bbd6d
00000	d22d0b3f9551ed6	574686c3f9e93898	2e52628f4a1282ce	f20c86d71944aab1
00000	5133c9333808a2c	1aa825d8b817db4d	637959989f3021eb	976806641b26aae9
00000	637d4531b7ed5f2	53c3e96d3b12fb46	528c7eb8481bc969	ab8f9980d5a54559
00000	94d2abfda65cc33	94fe646efe5af02d	9a65ae5fcd88c03a	5ef08673168def9b
00000	20c871a953fffc6	ce0bb95ac263e6c1	4f6a917d1a676571	5890918c7b687d75
00000	4d2b3e43096f836	84cdd4fc48b79608	b3e4503e3c824a8c	fd6d0b1a39687929
00000	130167c08302a69	4c15ff56de92b1ad	d0c2f0d4ff0dee95	e1422ee2e8b92125
00000	e5acaf86592fcee	de799be0b903c880	2714ffbf40bc09f6	c3be97c3c285009f
00000	120faf19f606631	93007cabbb3f8c9d	ef6955f7f43df5d0	4dbd0616afe60e1f
00000	31e49b7c7f7bb5d	901d828746ceec61	71ed3c097158c224	11adb3d81e13d263
00000	a50d1a343b2394b	eab30ca27b5b34e3	90359ef711ed53d9	9b446763c8627ea8
00000	6891c0f4842b823	c4d786a25727a7fc	094fe7da31fb60cd	9f9a004de5e70767
00000	04bdd77b7cb4e7b	c598cb710558af67	fc386d1f99d3a925	4928e0b43e781893
00000	544dd3eb8b2ad6c	94462af4f583d770	8061ba9381f51f55	476d4eded7c90fcc
00000	1fc25aa6a7e0b4c	93dd968c06a56809	9768e9d1ba74d3b6	014e9dc9f13670bb
Parity, hex <0:63>	**Parity, hex <64:127>**	**Parity, hex <128:139>**		
0be96448a1153f95	d8adb9032ab47d9c	d0b		

A.4 Output of the PN-5280 scrambler

Table A-4 contains the RS(528,514) codeword scrambled according to the PN-5280 scrambler with the initial value defined in Section 5.4.4.

Table A-4: Scrambled RS(528,514) codeword output

Scrambled Header <0:4>	Scrambled Payload, hex <5:64>	Scrambled Payload, hex <65:128>	Scrambled Payload, hex <129:192>	Scrambled Payload, hex <193:256>
11111	5a5c407933065dc	de57612f75a5d9f5	b333006e82101b6c	69c43b965cd5536d
01010	d4a4f318f1fb028	898df30396ff11c4	1c513ec637fcd37a	e020482b0af49e28
10101	d081c0ded6b85ce	21ddd470c6a2c820	eef859a1e96ff888	85c4b78b4af5ab4e
01011	1c7f79bdeeaa393	7e4033b09c5464b8	893444ee640b46ab	e9d92d14550218a0
11101	91e3e5bf0c4147a	886e1ed4c415c29f	ca0f9eb43ae4b8cf	9392647f2609172c
10111	2cd6a1bbeffe17c	fc27792d460011cd	2b524b721a52d7dc	48a679292c24bbe0
01010	8b943ccc6d37679	cfdd55dd474224d8	35dbf31860e281eb	3e3d031beedc00c9
10101	362810164816f0d	a26942873b1f11ed	ec269fed1c1c3644	ab9fc32b8e5aaeac
01010	c0f80bdf0dab3ce	c0019a1bab2cf084	4f30df0bc3a240ad	a3b08671b3d74a64
01010	899ecdfc5382abb	e1f147a439c94c77	4c227b969ccb5924	5da773157a6d07f1
01111	b27ea8ea3d450bb	acbd0b09824d54fd	444658c969ddb3e0	fb45893db69a732c
11000	b4ecd93e621d53c	0c7f2753f06db14d	c0290f9e80ec016f	4f423fa2e59edfac
00000	e66f504d26dc011	28199ab4b920377f	1714ed40b623f61f	3c5717c1b68529e0
11111	c30fb6e608ef9cd	e8ffc66bb86f8cf6	908145f7f6c23f2f	b7bcf983efe0b21e
10101	6e199e7c2024428	4fe27d78d00ecee9	713f43a9d151c4db	647249fde2b9d24a
00111	25f6b5db24232a0	14be5309d0a5d4a3	443589dd6ffd43c2	cfbd8ddc7acf8ba8
01000	4b6f4021fbc47d3	5182780849b2f024	080d67f224ac13cd	9f10a4aeb03ad22e
11100	84edb887eb1e084	3b4b81dea40eb60d	17a86ac51982d390	1829b4e14084b76f
11101	015053e354ff0a9	c12bd06c007e7dd0	eaf4e7fbbe4a9df5	32456bd478c3f79b
01011	f528b1cb27f7dbe	55c639d7e374e3e6	a6489c3f10746891	9407e7153e322bab
Scrambled Parity, hex <0:63>	**Scrambled Parity, hex <64:127>**	**Scrambled Parity, hex <128:139>**		
e029dbcd41d47ad0	2343daf19112f025	ce5		

128GFC

Reference 802.3bj, Annex 91A, Sections 91A.1 and 91A.2 for example RS-FEC codewords.