



# 25G/10G/5G/2.5GBASE-AU

## LFSR example

### Comment #82 to D1.0

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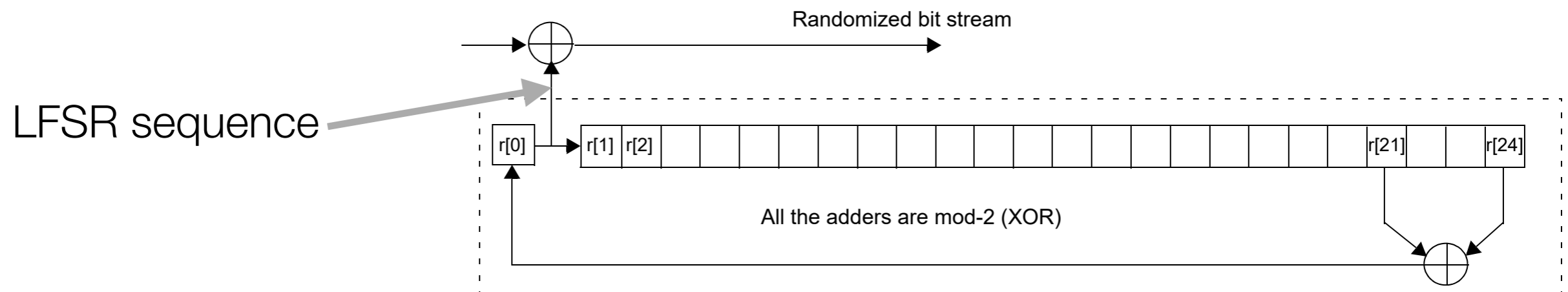
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- Comment #82 to D1.0:
  - In 802.3bv project, MATLAB code was used for formal definition of the LFSRs sequences along a transmit block. It was used for avoiding ambiguity in the specification and providing an unambiguous way to check the correct understanding of the specification.
- Suggested Remedy:
  - Add MATLAB code and corresponding text per baseline.
- Response:
  - REJECT.  
Follow other clauses in 802.3 and add informative annexes with examples of input and output bit streams.
- This contribution provides the LFSR sequence example and it is intended to be an starting point to discuss how to include this information in the draft from the editorial point of view

# PCS binary scrambler — a brief summary



- The 195840 bits composing the transmit block from the 36 RS codewords aggregation shall be scrambled prior to transmission using a binary scrambler that produces the same result as the implementation shown in figure
- The shift register is initialized with a hexadecimal value **0x0FB9659** for each transmit block, where the leftmost digit corresponds to the initial value of register element  $r[0]$ . The initial value of  $r[0]$  is xor-ed with the first bit from the first RS codeword to generate the first bit of the output binary sequence
- The shift register of the LFSR is initialized with a specific value, which has been searched to maximize the main correlation peak and to minimize the secondary correlation peaks, when Transmit Block synchronization is implemented by cross correlation functions



# LFSR sequence

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- The example data is given in a tabular form to facilitate reading of data. 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 hexadecimal representations of the data. For the hexadecimal representation, the most significant bit of each hex symbol is transmitted first
- Proposal: only data belonging to the beginning and to the end of the Transmit Block is going to be provided in tabular form as example to allow implementation verification in an informative annex
- Complete data of a full Transmit Block might be provided in a separate ASCII file
  - See file 25G\_10G\_5G\_2G5\_lfsr\_sequence.txt

# LFSR sequence — beginning of Transmit Block



First bit	Last bit	64-bit group 0	64-bit group 1	64-bit group 2	64-bit group 3
0	255	249393000785801D	D4C079B961DA3937	85F845D51D35BEFA	4C249416801A5140
256	511	646DA1A380565FC1	7250E5706BE7799A	6E5AA48E47C07E3C	E1C7EDF7FC41240F
512	767	24023B0209F18923	3EE01D64F07B21B9	D1163BACD3F36526	34260BCA8B2ACF69
768	1023	3E5A10664549AA37	827DC5C8C9F5C743	2DFEAD2105E21495	79581F59CC72CBD7
1024	1279	F24AB4300F8AD839	EE0CFB4F35909B4C	8A20946D921B8081	63C2453EE83664D4
1280	1535	C2A1396BD4791ABB	D8E7B28FED137842	C45D2A735A3CF4C5	EDA97540716FA1FD
1536	1791	09570AA1F7AFD725	68B70716879FD15D	B0ADD81AE18C66F6	F7A8A0A576D2C760
1792	2047	227E3098C7DA2F7C	85AA4C547C177BCE	5652DE726216F0B9	50BAB9EAB7BB5F85
2048	2303	30D1D65B2FB24129	102430C882DB464A	00BA0D02B5328B8E	536BFE641A06A265
2304	2559	19D8A6EB8EC8DBFC	47020F3F893B61E0	703771F8C67F1F7A	C3F2566E30728FD9
2560	2815	F3788B345E694B56	9188F10EE7BCBCED	2CADC224E1E981F7	52C726E27F08F8C3
2816	3071	A79F6F4DB20A9011	2F084C2BA516BB46	D1B0B82E1ABCAF67	ACEA2D65DDA32598
3072	3327	5D04AD5A90E3C70B	FEFFAA04817D1045	4AC9378E4045FE21	3507944E9D9B1D38
3328	3583	A1FA7ED714C437D9	72C48972706170F9	B57B9A0F53A53AE7	4676EEBAE0CDB6F3
3584	3839	5000B4E80289D40B	63BA283F35B4E34C	09FC96230C139DB6	47B8023D3C09EA6E
3840	4095	235C8F9CDC79BD1F	DA2AF085BEBA5425	B47A840BD7522AB6	E1BF80F621C3A397
4096	4351	EF5F944AD19B0E2E	A1BFADD62161B395	36179E4355B62CFC	03A58E0F44FF3AB1
4352	4607	83779ECC65B457A4	0B7542286FA9B589	720CE17135F57C4D	2F4F122A9BC1BF22
4608	4863	E6231AEB9DE6DBB9	680339140D78DA33	5F05D4D395B9279C	380DBEFC30248ED8
4864	5119	807C0E41CE3E27DF	E78C906DF409812A	22C43D9A72E8A4F2	D6C1B2306611D9AB
5120	5375	4F8A7899ECDE2B45	17B8B6D53E803E65	40E6A7A3E9CD5E53	D3D666A6B2A9C993
5376	5631	F3C28636EB5BC0D8	C2E30F6AFDBA1E88	357564CF6F215A0B	15C529DDF6339923
5632	5887	D7A81EB574758F6B	ECFA1A459564349F	22C8331A44D5E431	3D62DC6B3A1F9975
5888	6143	71A96F7E710A46FC	AC388CE6FE75E886	ED5658C3F24F6E30	1A0FD865388DA67E
6144	6399	704AC6F90E7898BE	DE2EA417ADC25561	E87F3755C346FDEC	B88944BE61B0A6B6
6400	6655	1AC9836642CC2A2A	56BDBC71A82FFE74	A806E8F418D7AA6F	357C8B4F4C689A97

# LFSR sequence — end of Transmit Block



First bit	Last bit	64-bit group 0	64-bit group 1	64-bit group 2	64-bit group 3
189184	189439	D3D752A6B6E3C980	FEC2C3846A6FD39C	88A7BC66CD2FA852	297561B16F361D0B
189440	189695	437AA8AC57F6E774	20EE6A93CE9F06DD	33981A57AC647567	A3EF2D5E4B23D609
189696	189951	1EB320F59513AC9E	C764347E22CBC79A	4AFDA40E88423D65	29EB2633590BD4C8
189952	190207	AAB946FFB9B8813A	3E4475E633ED6BD6	431AB22DE791A16D	8E5500FE7E8386C5
190208	190463	4FD877988DE5AE71	646EFD238C8A1FF4	6D702B8378BBCC5E	B2D7559236FC81C0
190464	190719	8C47E2773C78E76F	DFEE08904F26091B	0B20E1A913F670C6	22FB7B9A9053A709
190720	190975	674FA12E99542D29	FAA23317D9D5D48B	BDB86B283D9934E8	A849D6F503B0AE8F
190976	191231	1AED7BE6C352686C	E09585F21CD5317D	3E5D4A665B8CAA43	F4FC2E298EAFB2FD
191232	191487	E9128950C361EB6C	375806C6CC187856	6DDD72819B7346A0	74B9D1E8BBAF56B3
191488	191743	6AF1941EBE9A75A5	24EC4601C73B07FF	719C027EBE08C5A7	27744F0E6B1BBE99
191744	191999	E3252B7D06384A9B	FD0F220ABB192FB1	E8291F54B0F2F89B	B29E2313379DC545
192000	192255	B9F7B43B250AF106	AEBC99EDAC2B4066	B8A1A9BED6722432	F182D2BECA23A44D
192256	192511	9F4310B2ADCA93E1	CF0677DB9AE483A6	E04F48F11A87BCE7	5D2DEEDA214C0595
192512	192767	96149C93583C04CC	EE1155CF4DFDDA91	09870CA2DFB4DA11	09054CA09794D215
192768	193023	99215CA815DCF45D	9DAB58B878CEBDDF	5DA992D872820DF3	493134805C48415F
193024	193279	0525D39605A79314	4D85DB10D581CB3C	C7C96D7CC1034D64	8C9320740511EA16
193280	193535	CF5D505ADBE94602	51BB086E31A58FDE	44F896319E13DEB7	469586B91CD9B8FD
193536	193791	0A3F8AADE1EFE177	48756685EF29554B	31FF895F01E1D387	77A7DE654C96A794
193792	194047	11CD9A4FD0A418AA	C26EFE688C869674	5912EB48C2D8876A	0E5E1D3E577A6676
194048	194303	54AAE278FEF8DF84	9F11D033CFA8D6D9	7730096758212ECC	942C541AA77A67CE
194304	194559	54ACDE78E516DFE6	D01068284994B502	988E8B2E7D692ECB	102C49C8A703C6CF
194560	194815	8EF859FC9D4B0C3B	89B6F3E200B67902	82D88B4A0E688D3E	96726512F0A6C2BA
194816	195071	C86BB6459B0234A1	89C8D6E3C730FEFF	5B8482C3D04A6EA9	0C8DF0B4713A8BFC
195072	195327	776A0FE61D386B7A	7D9854C8AD7946E3	59B8FCCA3F8D4DE1	F39177378D6745F3
195328	195583	2EB5352D8E4E20FE	1F93877187DE7EDC	96C41C10727E49F0	C6033B7B0D7051B3
195584	195839	796E14590F5B48BA	C086B6625982B84A	CBBD0E4B2ABE093F	A720614F11B59BCE



Thank you!