



TECHNICAL PAPER 9

Large 128-Carrier Channel Clusters Example (Carrier Sort)

Composite controlled clustering of overlapping bandwidth orthogonal carriers while maintaining common synchronization parameters of transmit and receive time of day parameters is not possible with multiple binary code lengths and chipping rates or with additional data overlays on shift register codes. This is an extreme limitation of shift register based binary codes based communications and navigation systems. The patent was explicitly written to remove this limitation by generating RANDOM binary CSK codes that have a COMMON time of day reference independent of binary code length and chipping rate.

These CSK Codes are consistent with I and Q quadrature phased QPSK modulation introduced in the 1960s. Each individual CSK root code is defined as a tier0 code. The half-code pairs are uniquely tandem shuffled and remerged to a full length binary code. Pairs of tier0 codes are XORed to form tier1 codes. Pairs of tier1 codes are XORed to form the tier2 codes defined as the final CSK full length codes. The figure bottom text summary shows the example total of 128 carriers (including duplicates) with an average of about 2 CSK carriers per unique carrier.

Primary CSK Codes Advantages

- All position determination algorithms do not require more than 2 ranges to local cell towers
- Each line-of-site tower is assumed to be broadcasting precision LAT-LONG plus ALTITUDE
- There are 76 unique carriers in the total list of 128 transmitted carriers
- This code generation creates final CSK Codes with a bandwidth of 2/3 X symbol chipping rate
- There are 1 to 5 orthogonal CSK binary codes per carrier
- Total receive throughput possible is about 2048+ Mbps

CarrierMHz	CSKCode	Chips	ChiprateMHz	ChipRateMult	CSKBWMHz
3161.6	304	15.2	208	10.13	
3162	340	17	195	11.33	
3162	372	18.6	170	12.4	
3162	408	20.4	155	13.6	
3162.2	388	19.4	163	12.93	
3164.8	344	17.2	184	11.46	
3164.8	368	18.4	172	12.26	
3165	300	15	211	10	
3165.2	328	16.4	193	10.93	
3166.8	312	15.6	203	10.4	
3166.8	348	17.4	182	11.6	
3166.8	364	18.2	174	12.13	
3168	320	16	198	10.66	
3168	352	17.6	180	11.73	
3168	360	18	176	12.2	
3168	384	19.2	165	12.8	
3168	396	19.8	160	13.2	
3168	408	20.4	158	13.6	
3170.6	332	16.6	191	11.06	
3171.4	404	20.2	157	13.46	
3172.4	308	15.4	206	10.26	
3172.4	412	20.6	158	13.73	
3173	380	19	167	12.66	
3175.2	324	16.2	196	10.8	
3175.2	336	16.8	189	11.2	
3175.2	392	19.6	162	13.06	
3175.8	316	15.8	201	10.53	
3175.8	324	16.2	209	10.13	
3177.2	376	18.8	169	12.53	
3179	340	17	187	11.33	
3180	300	15	212	10	
3180	400	20	159	13.33	
3180.6	372	18.6	171	12.4	
3181.6	328	16.4	194	10.93	
3181.6	388	19.4	164	12.93	
3182	344	17.2	185	11.46	
3182.4	312	15.6	204	10.4	
3182.4	408	20.4	156	13.6	
3183.2	368	18.4	173	12.26	
3184	320	16	199	10.66	
3184.2	348	17.4	183	11.6	
3185	364	18.2	175	12.13	
3185.6	352	17.6	181	11.73	
3186	360	18	177	12.2	
3186.2	356	17.8	179	11.86	
3187.2	332	16.6	192	11.06	
3187.2	384	19.2	166	12.8	
3187.8	308	15.4	207	10.26	
3187.8	396	19.8	161	13.2	
3191.4	324	16.2	197	10.8	
3191.6	316	15.8	202	10.53	
3191.6	404	20.2	158	13.46	
3192	304	15.2	210	10	
3192	336	16.8	190	11.2	
3192	380	19	168	12.66	
3193	412	20.6	155	13.73	
3194.8	392	19.6	163	13.06	
3196	340	17	188	11.33	
3196	376	18.8	170	12.4	
3198	312	15.6	205	10.4	
3198	328	16.4	195	10.93	
3199.2	344	17.2	186	11.46	
3199.2	372	18.6	172	12.4	
3200	320	16	200	10.66	
3200	400	20	160	13.33	
3201	388	19.4	165	12.93	
3201.6	348	17.4	184	11.46	
3201.6	368	18.4	174	12.26	
3202.8	408	20.4	157	13.6	
3203.2	308	15.4	208	10.26	
3203.2	352	17.6	182	11.73	
3203.2	364	18.2	176	12.13	
3203.8	332	16.6	193	11.06	
3204	356	17.8	180	11.86	
3204	360	18	178	12.2	
3206.4	384	19.2	167	12.8	
3207.2	304	15.2	211	10.13	
3207.4	316	15.8	203	10.53	
3207.6	324	16.2	198	10.8	
3207.6	396	19.8	162	13.2	
3208.8	336	16.8	191	11.2	
3211	380	19	169	12.66	
3211.8	404	20.2	159	13.46	
3213	340	17	189	11.33	
3213.6	312	15.6	206	10.4	
3213.6	412	20.6	156	13.73	
3214.4	328	16.4	195	10.93	
3214.4	392	19.6	164	13.06	
3214.8	376	18.8	171	12.53	
3216	320	16	201	10.66	
3216.4	344	17.2	187	11.46	
3217.8	372	18.6	173	12.4	
3218.6	308	15.4	209	10.26	
3220	348	17.4	185	11.6	
3220	368	18.4	175	12.26	
3220.4	400	20	161	13.33	
3220.4	332	16.6	194	11.06	
3220.4	388	19.4	166	12.93	
3220.8	352	17.6	183	11.73	
3221.4	364	18.2	177	12.13	
3221.8	356	17.8	181	11.86	
3222	360	18	179	12	
3222.4	304	15.2	212	10.13	
3223.2	316	15.8	204	10.53	
3223.2	408	20.4	158	13.6	
3223.8	324	16.2	199	10.8	
3225.6	336	16.8	192	11.2	
3225.6	384	19.2	168	12.8	
3227.4	396	19.8	163	13.2	
3229.2	312	15.6	207	10.4	
3230	340	17	190	11.33	
3230	380	19	170	12.66	
3230.8	328	16.4	197	10.93	
3232	320	16	202	10.66	
3232	404	20.2	160	13.46	
3233.6	344	17.2	188	11.46	
3233.6	376	18.8	172	12.53	
3234	308	15.4	210	10.26	
3234	392	19.6	165	13.06	
3234.2	412	20.6	157	13.73	
3236.4	348	17.4	186	11.6	
3236.4	372	18.6	174	12.4	
3237	332	16.6	195	11.06	
3237.6	304	15.2	213	10.13	
3238.4	352	17.6	184	11.73	
3238.4	368	18.4	176	12.26	
3239	316	15.8	205	10.53	
NumCarrier	UniqNumCodes	RunDate			
128	29	5Feb2020			