

Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: [Preamble and OVSF code generator for IEEE802.15.4k LECIM DSS PHY]

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Abstract: [A PHY Proposal for Low Energy Critical Infrastructure Networks Applications]

Purpose: [To be considered in IEEE 802.15.4k]

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Outline

- Korean Bands
- OVSF Code Generator
- Preamble and SFD Design

Korean 900Mhz Band

- Korean Band: 917.1 Mhz -923.5MHz

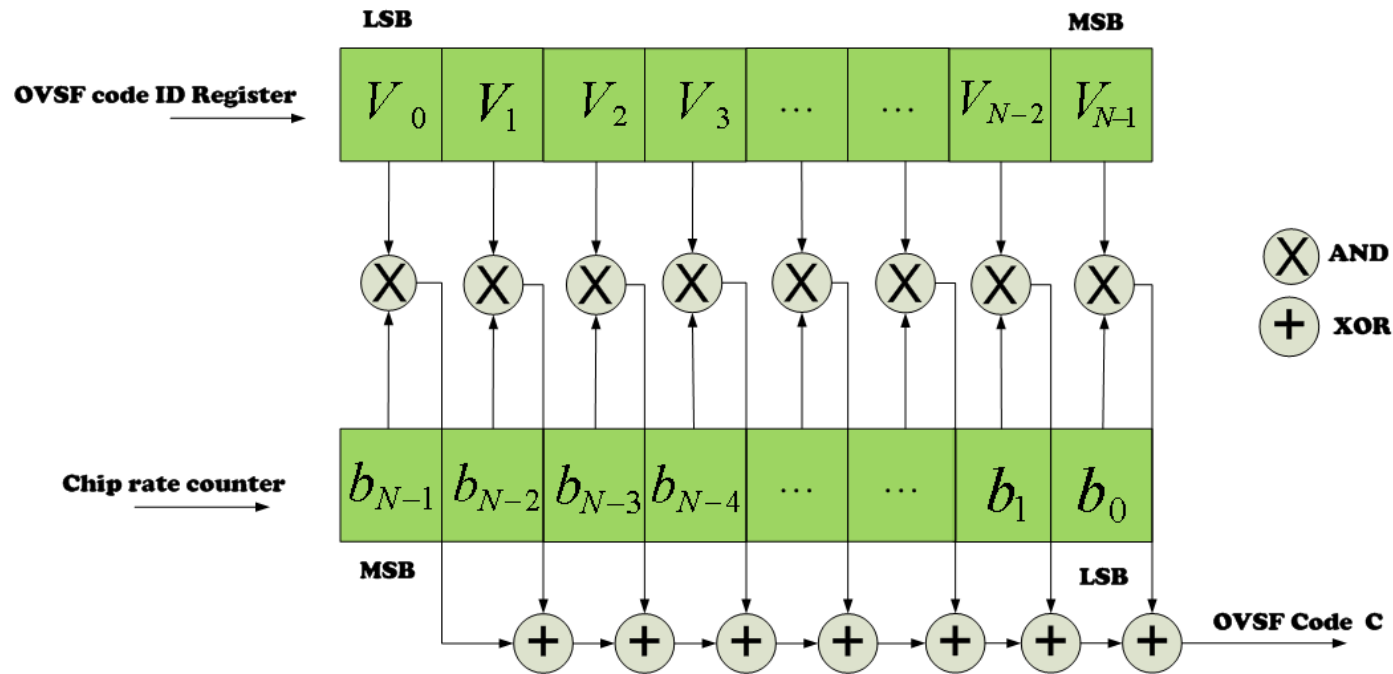
According to, $W=(1+\beta) \times R_c$, where $\beta=1$,and with SF: 32(15dB) -16384(42dB)

CS (KHz)	Channelization Formula	No. of Possible Channels	Chip Rate (KHz)	Possible Data Rate (bps)
200	$917.1+(n-1)*0.2$	32	100	6.1 - 3125
400	$917.1+(n-1)*0.4$	16	200	12.2 - 6250
600	$917.5+(n-1)*0.6$	10	300	18.3 - 9375
800	$917.1+(n-1)*0.8$	8	400	24.4 - 12500
1000	$917.5+(n-1)*1.0$	6	500	30.5 - 15625
2000	$917.5+(n-1)*2.0$	3	1000	61.0 - 31250

CS- Chanel spacing

OVSF Code generator

The logic level architecture of an OVSF code generator is shown in following figure:

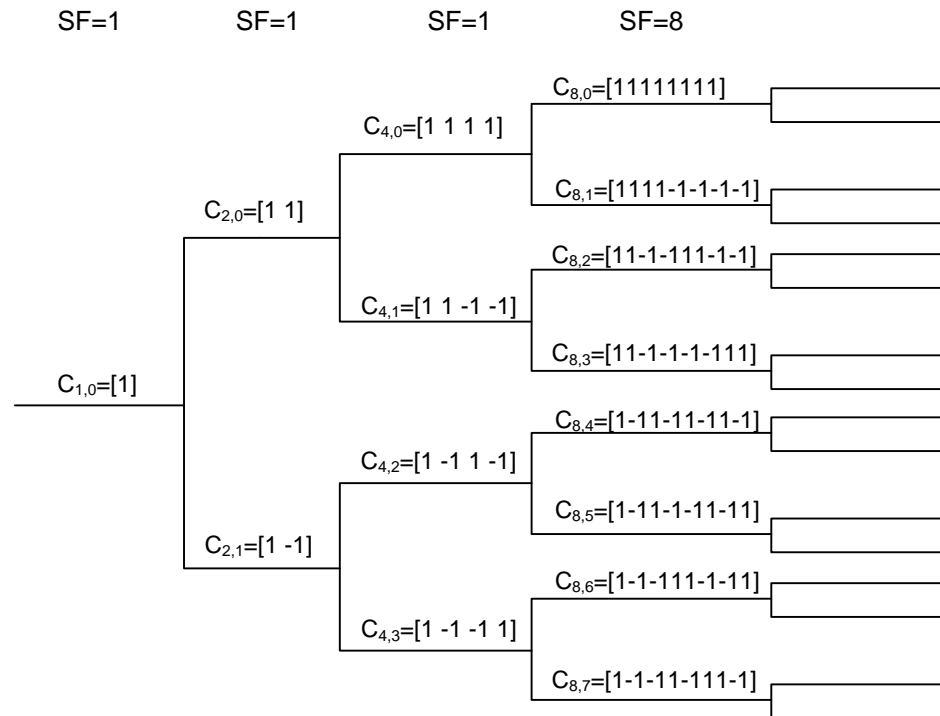


There are two inputs for OVSF code generator :

- an OVSF code ID Register
- a chip rate counter

OVSF Code generator

The least significant bit (LSB) of the counter enables the most significant bit (MSB) of OVSF code ID register to be included in the XOR operation. The MSB of the counter controls the LSB of OVSF code ID register. Finally, the generated OVSF code with various SF is along the OVSF code tree shown as



Preamble and SFD Design

- A 32 bits preamble is shown below,

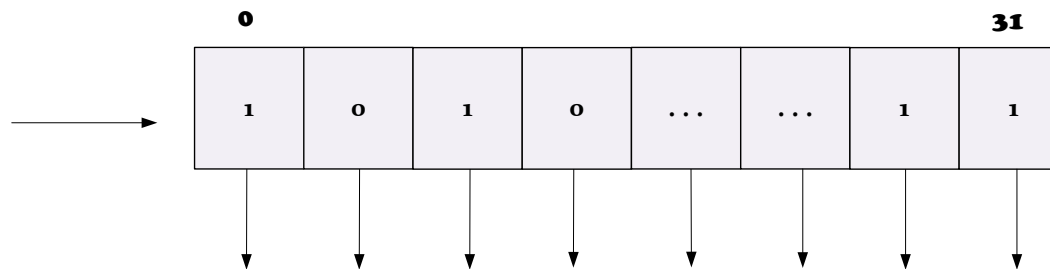
$P=[1010\ 1010\ 1010\ 1010\ 1010\ 1010\ 1010\ 1011]$

- A 8 bits SFD is as follows,

$SFD=[1010\ 1011]$

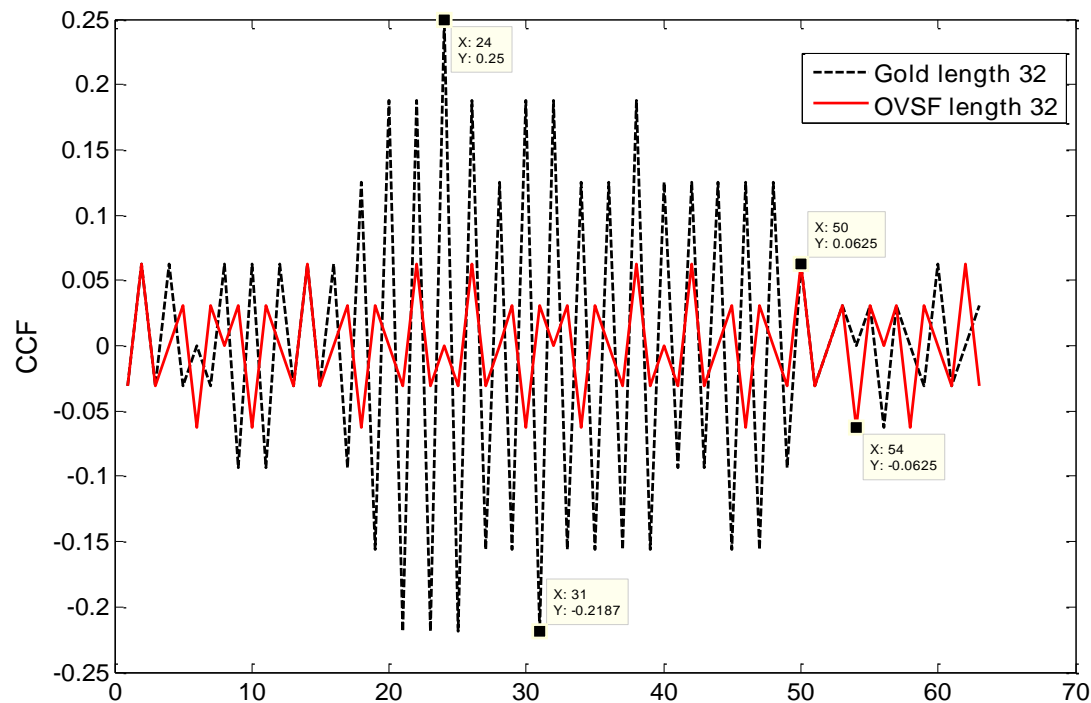
The Cross Correlation of Preamble

- CCF properties of a given fixed Code with Gold code and OVSF code
- The given a fixed ID code with length 32 is as follows,



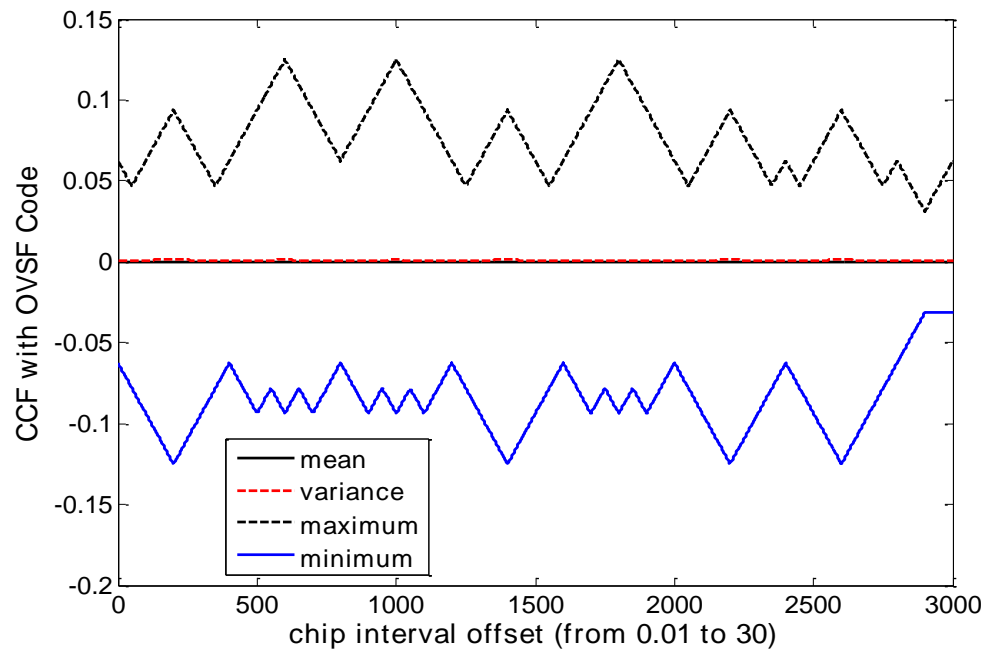
CCF under Perfect Synchronization

- The CCF properties of the fixed ID code with Gold code and OVSF code under perfect synchronization are shown,



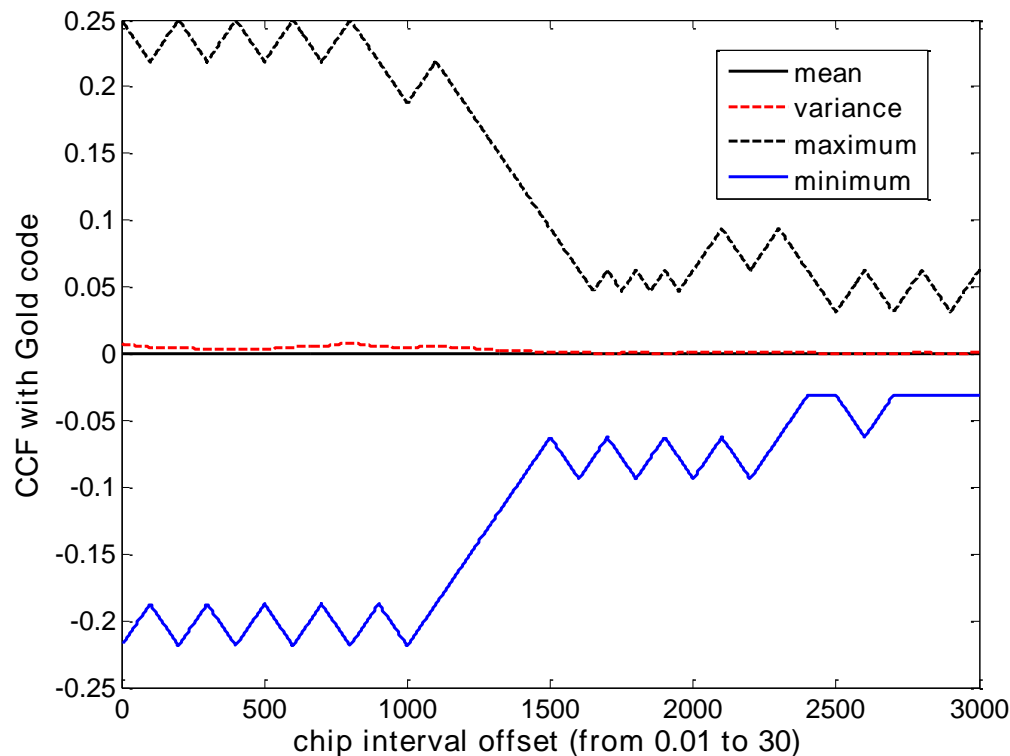
CCF under Imperfect Synchronization

- The CCF properties of the fixed ID code with OVSF code under imperfect synchronization is shown,



CCF under Imperfect Synchronization

- The CCF properties of the fixed ID code with OVSF code and Gold code under imperfect synchronization are shown,



The End

Thank You