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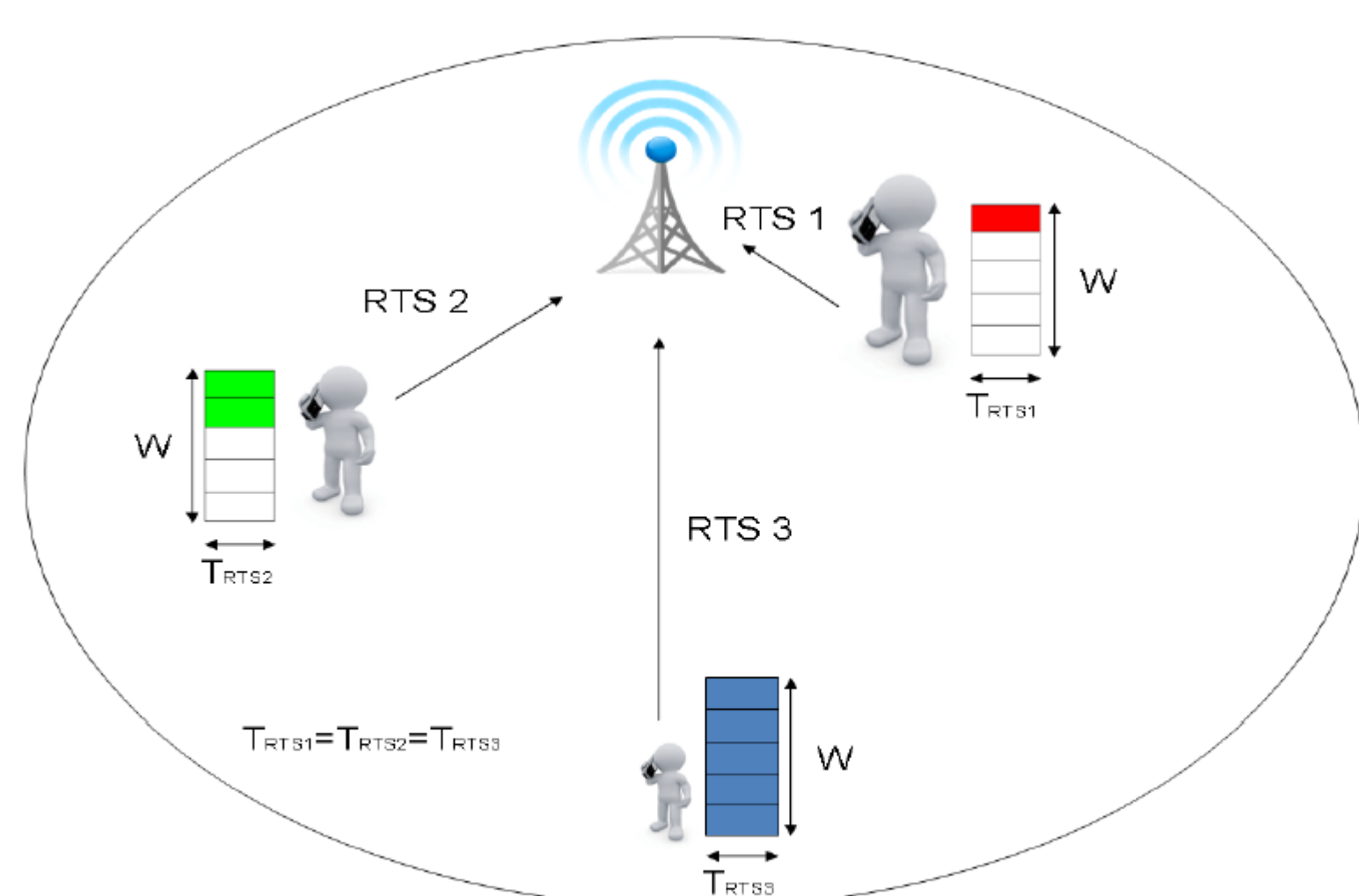
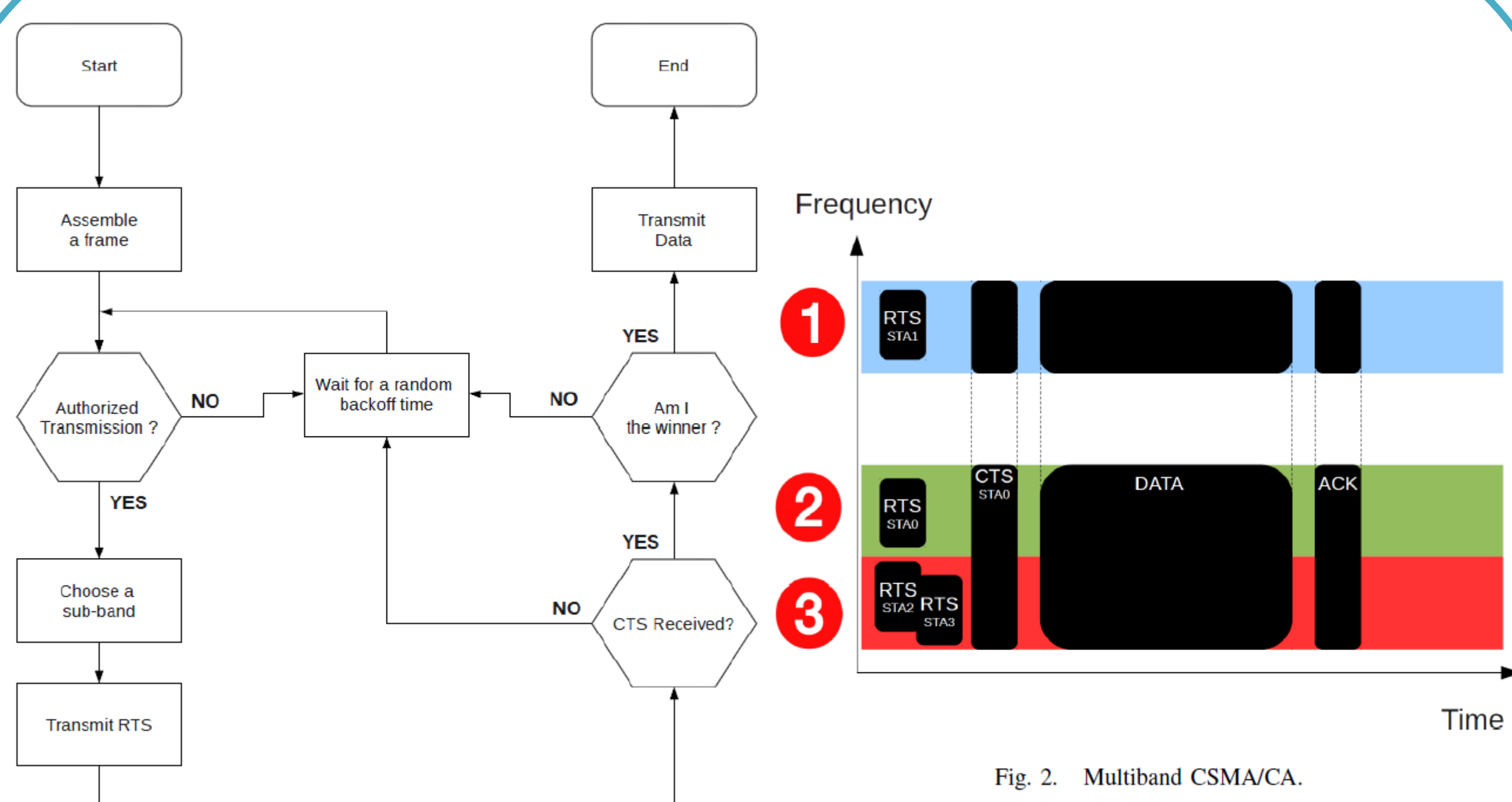
Abstract

New medium access control (MAC) scheme integrating physical channels into **multiband** CSMA/CA for OFDMA systems is considered. The proposed MAC is based on **CSMA / CA - RTS / CTS** and significantly **improve** the transmission **capacity**. The main idea is to consider an **asynchronous** frequency **multiplexing** of **RTS** messages to **improve** performance in terms of **throughput** and **latency**.

Introduction

- The development of services on wireless terminals leads to the expansion of the number of users
- Due to the presence of a **large amount of users** in the network, a very important **deterioration** is seen in term of throughput and system performance.
- A conventional single-channel **CSMA/CA** system has the advantage of requiring neither signaling for bandwidth request nor planned allocation. However, its effectiveness is quite low since its **performance degrades rapidly** when the number of **source nodes increases**.
- This limitation can be **overcome** by using **multiple division access** on different sub-bands where several source nodes can transmit simultaneously.

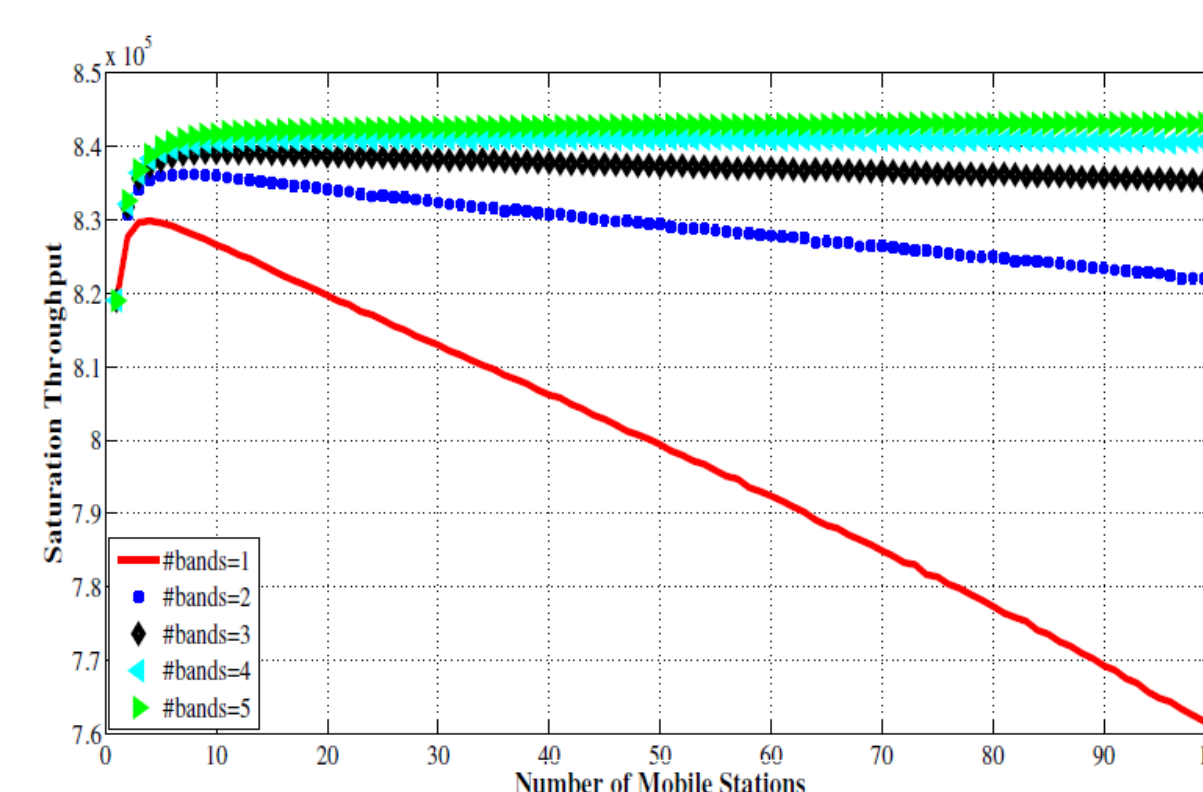
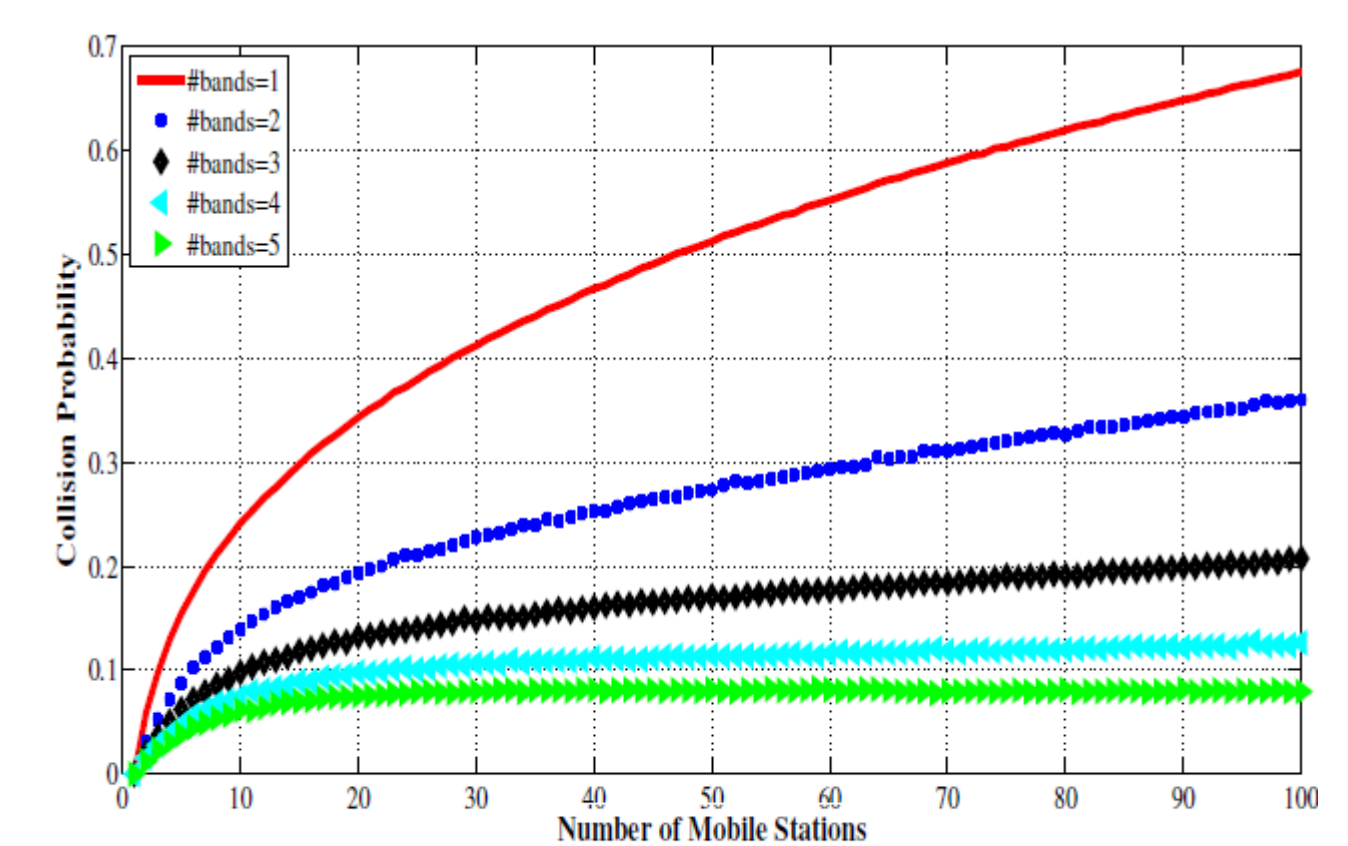
System Model



Simulation Results

Packet payload	8184 bits
MAC header	272 bits
PHY header	128 bits
ACK length	112 bits + PHY header
RTS length	160 bits + PHY header
CTS length	112 bits + PHY header
Channel Bit Rate	1 Mbit/s
Propagation Delay	1 μ s
SIFS	28 μ s
Slot Time	50 μ s
DIFS	128 μ s

TABLE I
PHY LAYER PARAMETERS



CDF	#RTS Bands	Delay (ms)	Gain (%)
99%	2	18.62	39.15
99%	3	17.16	50.99
99%	4	16.80	54.22
99%	5	16.60	56.08
98%	2	17.42	35.59
98%	3	16.09	46.79
98%	4	15.67	50.73
98%	5	15.55	51.89
95%	2	15.42	30.86
95%	3	14.49	39.26
95%	4	14.22	41.91
95%	5	14.05	43.62
90%	2	13.90	26.25
90%	3	13.35	31.46
90%	4	13.02	34.79
90%	5	13.00	35.00

TABLE II
DELAY GAIN WITH THE PROPOSED MAC FOR DIFFERENT RTS BANDS NUMBER WITH 100 USERS.

Conclusion

- We proposed an **innovative** scheme based on **frequency division multiplexing** of **RTS** messages.
- This technique is characterized by considering a **spectrum** which is **divided** into **sub-bands** of known size.
- The proposed **MAC** is very **interesting** especially in **crowded networks**.