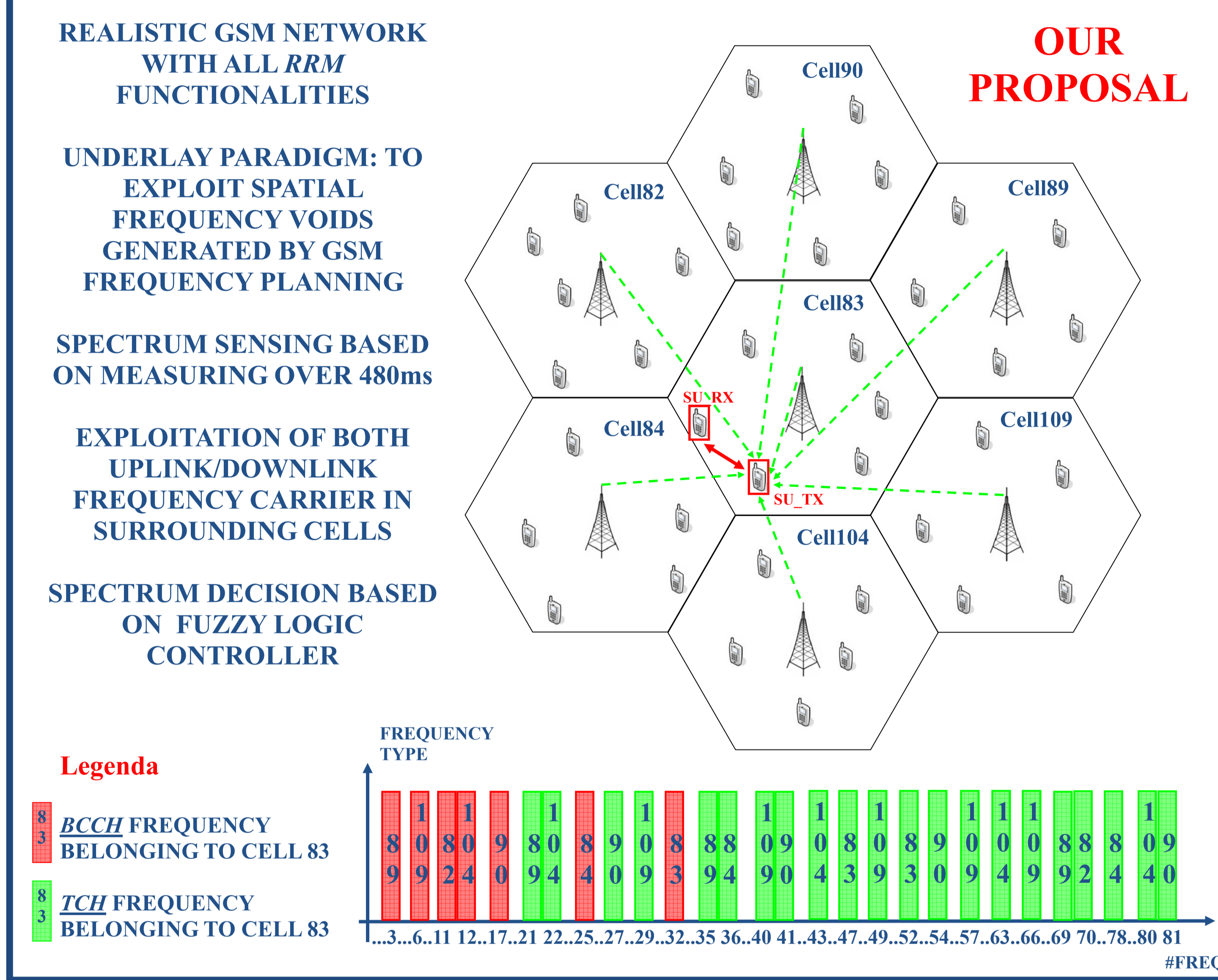


OTHER WORKS PRESENTED IN LITERATURE

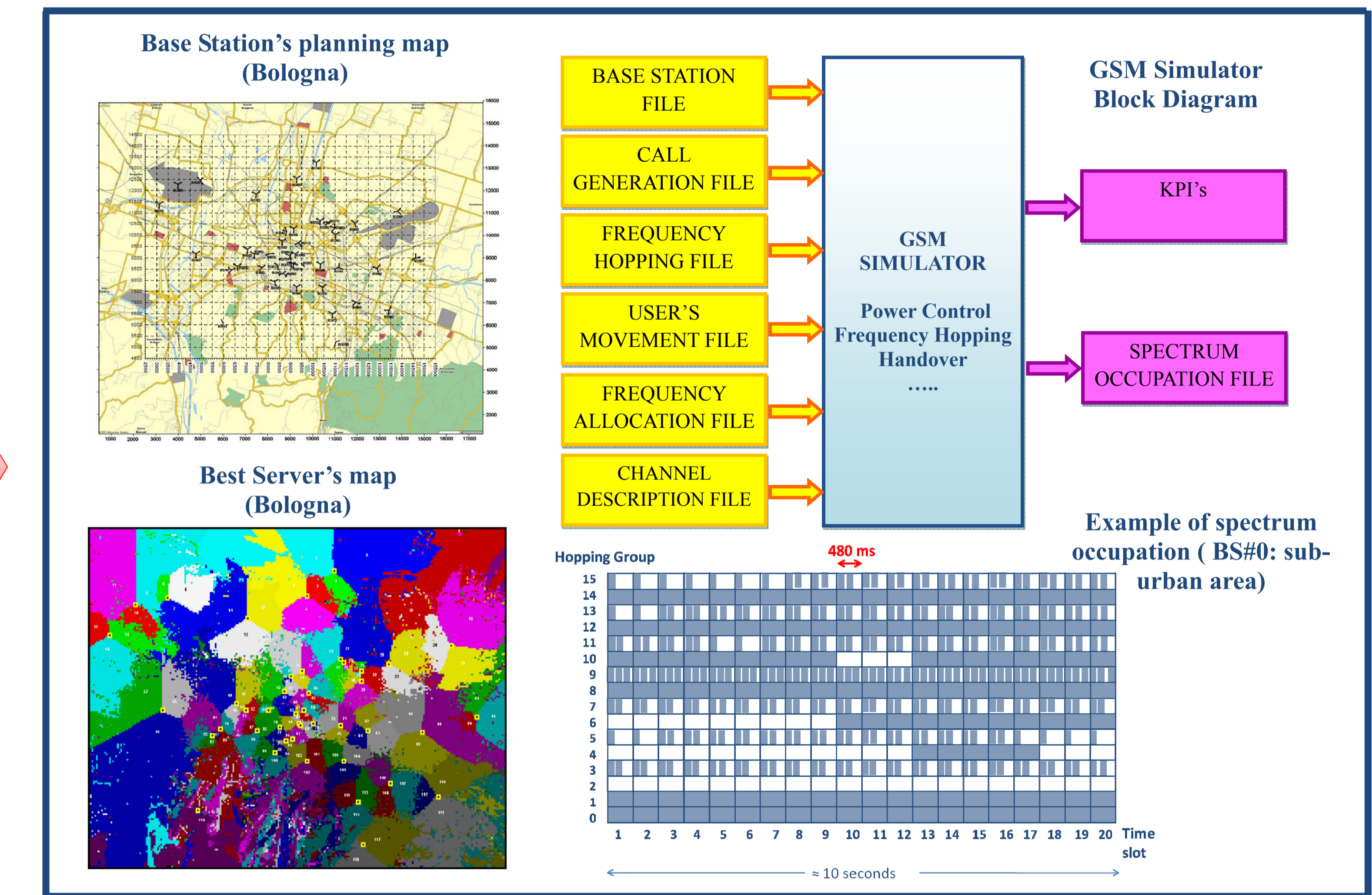
- 1) SECONDARY USERS (SUs) EXPLOIT THE GSM DOWNLINK FREQUENCIES ALLOCATED IN THEIR CELL USING INTERWEAVE PARADIGM
- 2) SECONDARY USERS (SUs) EXPLOIT THE GSM UPLINK FREQUENCIES ALLOCATED IN THEIR CELL USING UNDERLAY PARADIGM

LIMITS

- FREQUENCY HOPPING IS NOT CONSIDERED ANYWHERE IN LITERATURE
- Case 1)**
- OVERLAP OF PRIMARY TRANSMISSION AND SECONDARY TRANSMISSION DUE TO DELAY IN THE SPECTRUM SENSING OPERATION
 - IMPRECISE INTERFERENCE MEASUREMENT DUE TO FADING EFFECT ON THE GSM TIME SLOT (577µs)
 - NEED OF COMMON CONTROL CHANNEL TO EXCHANGE RTS AND CTS MESSAGES TO DECIDE SECONDARY TRANSMISSION CHANNEL (HANDSHAKE)
 - THE OVERLOAD OF GSM BANDS LIMITS THE BENEFIT OF INTERWEAVE APPROACH WHICH AIMS AT EXPLOITING TEMPORAL FREQUENCY VOIDS
- Case 2)**
- SECONDARY TRANSMISSION WOULD EASILY INTERFERE WITH THE BASE STATION SINCE THE SECONDARY USER IS ALWAYS IN LINE OF SIGHT (LOS)



APPLICATION SCENARIO AND GSM SIMULATOR



CONCLUSIONS

WE STUDIED HOW TO EXPLOIT THE SPECTRUM OPPORTUNITIES IN THE GSM BAND (USING DOWNLINK/UPLINK CARRIERS, FREQUENCY ALLOCATED IN SECONDARY USER'S CELL OR IN SURROUNDING CELLS, INTERWEAVE/UNDERLAY PARADIGM)

WE HAVE PRESENTED AN ALGORITHM TO ESTABLISH A DEVICE TO DEVICE (D2D) COGNITIVE COMMUNICATION IN A REALISTIC GSM SCENARIO

THIS ALGORITHM USES FREQUENCY CARRIERS ACTIVE IN OTHER CELL THAN SECONDARY USER'S CELL TO TAKE ADVANTAGE OF THE PLANNING OF GSM FREQUENCY CARRIERS

FUTURE WORKS

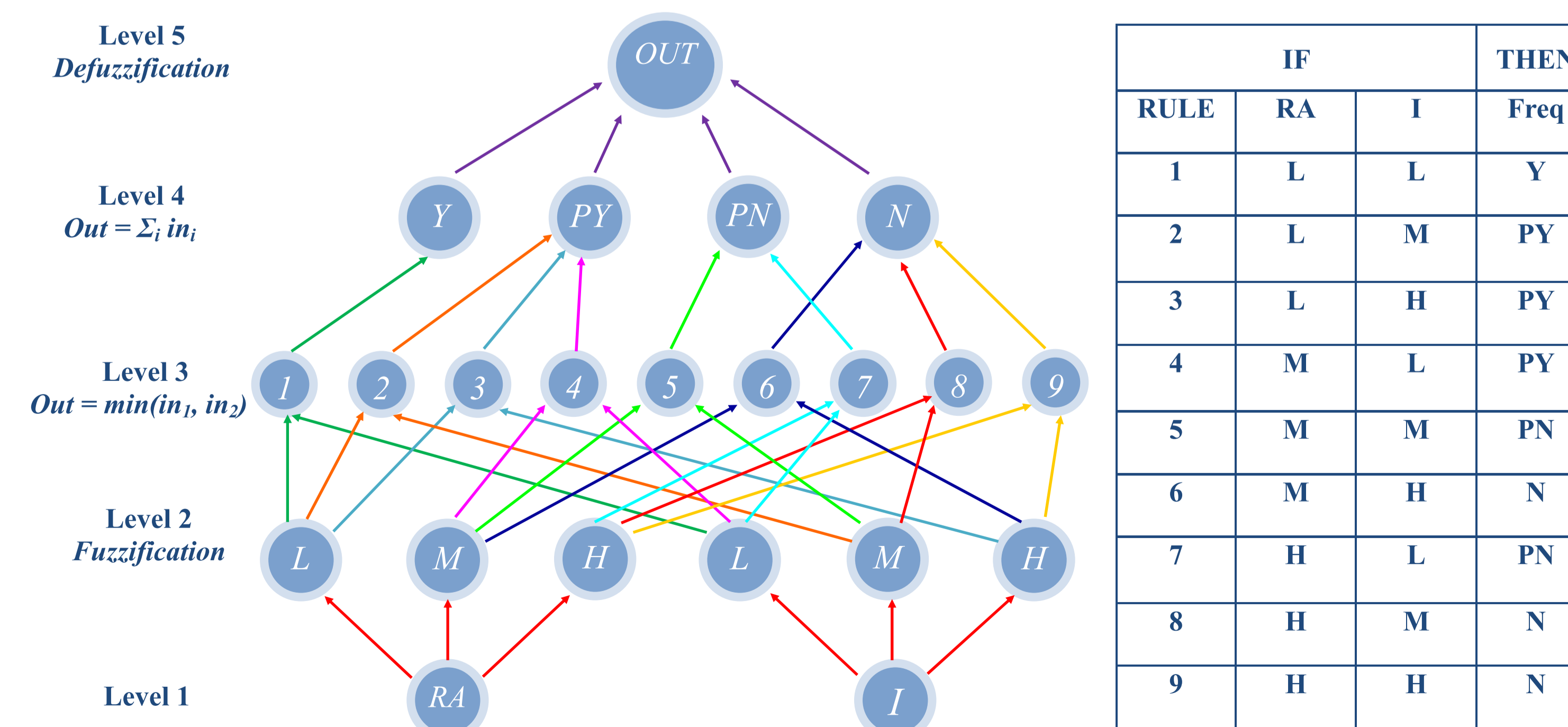
IMPLEMENT THE SPECTRUM DECISION ALGORITHM

EVALUATE THE PERFORMANCE OF D2D COGNITIVE COMMUNICATION AND EVALUATE THE INTERFERENCE WHICH SECONDARY USERS CAUSE TO PRIMARY (GSM) USERS

FUZZY LOGIC CONTROLLER (FLC)

INPUT: Resource Allocation (RA), Aggregate Interference (I) = { LOW (L), MEDIUM (M), HIGH (H)}

OUTPUT: Frequency choice (Freq) = { YES (Y), PROBABLY YES (PY), PROBABLY NOT (PN), NO (N)}



FLOW CHART OF THE PROPOSED ALGORITHM

