IEEE 802.19.1a
Wireless Coexistence

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| Text proposal on the algorithm and parameters for successive interference cancellation based coexistence management  |
| Date: 2016-03-16 |
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Abstract

This contribution provides text proposals for coexistence algorithm based on receiver information.

7.2.2.x Algorithm for successive interference cancellation coordination

7.2.2.x.1 Introduction

Based on the receiver information, the transmission parameters of WSOs that are interfering to each other can be adjusted by the coexistence management services in order to improve their individual performance. The receiver information includes but not limited to information such as receiver type (linear receiver such as zero forcing, Nonlinear receiver such as successive interference cancellation (SIC), etc.) modulation information (OFDM, FBMC, etc) and filter characteristics (ACS, filter overlapping factor, etc). The following algorithm consider that the WSO transmitter and receiver pair employ the FBMC and the receiver employs the SIC as an example.

7.2.2.x.2 Demodulation procedure of coexisting WSOs

In Figure xx, there are two WSOs. Each WSO consists of one WSO master and one WSO slave. We consider the situation that the master is transmitting to the slave. WSO1 slave receive interference from WSO2 master and vice versa. Assume that the pathloss is proportional to the distance as in case of line of sight propagation environment. If

$$\frac{d\_{12}}{d\_{11}}>\frac{d\_{21}}{d\_{22}}$$

WSO1 slave is considered as closer to its associated master then WSO2 slave is. WSO1 slave shall decode its desired signal directly (called as demodulation procedure 1), whereas WSO2 slave decodes interference and desired signal (called as demodulation procedure 2). On the other hand, if

$$\frac{d\_{12}}{d\_{11}}<\frac{d\_{21}}{d\_{22}}$$

WSO1 slave is considered as further to its associated master then WSO2 slave is. WSO1 slave shall employ demodulation procedure 2 and WSO2 slave shall use demodulation procedure 1.



Figure XX Example of deployment for determining demodulation procedure at the receiver

7.2.2.x.3 Algorithm description

The processes are as follows.

* P#1
P#1 is the procedure operated at the CDIS where the CDIS obtains the receiver information of the WSO through the WSO registration procedure as specified in 5.2.3.1 WSO registration procedure.
* P#2
If the interfering WSOs does not employ SIC, the other coexistence algorithms can be used.
* P#3
In the process, the CM identifies the demodulation procedures for the WSOs based on the condition given in subclause 7.2.2.x.2 demodulation procedures of coexisting WSOs based on the location information of the WSO master and WSO slave.
* P#4
In P#4 CM increase the transmit power of WSO that utilizes demodulation procedure 1 under the power limit of available channels.
* P#5
If the WSO that utilizes demodulation procedure 1 employs FBMC, the overlapping K factor can be increased so that WSO can utilize more channel bandwidth while maintaining the interference in the adjacent channel.
* P#6
The reconfiguration information and the demodulation procedure information are sent to the WSO through the procedure as specified in 5.2.10.1 WSO reconfiguration procedure.
* P#6
No configuration is made.

The branch conditions are as follows.

* BC#1
This branch condition shall be conducted based on the discover procedure based on the information of WSOs registered at the CDIS. If coexistence is needed, go to BC#2. If not go to P#6. No reconfiguration is needed.
* BC#2
This branch condition shall be conducted based on receiver information from the WSO. If the WSOs that requirement coexistence management is capable of using SIC, go to P#3. If not go to P#2 where other coexistence method can be utilized.
* BC#3
This branch condition shall be conducted based on receiver information from the WSO. If the WSOs that requirement coexistence management utilize FBMC, go to P#5. If not go to P#6.



Figure XX

**Annex A** (normative) **Data types**

**-----------------------------------------------------------**

**--Installation parameters**

**-----------------------------------------------------------**

--Installation parameters

InstallationParameters ::= SEQUENCE {

 --Operating height of master station [m]

 opMasterHeight REAL OPTIONAL,

 --Operating height of slave station [m]

 opSlaveHeight REAL OPTIONAL,

 --Operating transmission power [dBm]

 opTxPower REAL OPTIONAL,

 --Adjacent channel selectivity of the WSO [dB]

 aCS REAL OPTIONAL,

 --Adjacent channel leakage ratio of the WSO [dB]

 aCLR REAL OPTIONAL,

 --Guaranteed QoS of backhaul connection of the WSO

 guaranteedQoSOfBackhaulConnection GuaranteedQoSOfBackhaulConnection OPTIONAL,

 --Receiver information

 receiverInfo ENUMERATED{

 --The parameter is used when WSO has the SIC capability

 SIC,

--The parameter is used when WSO uses linear receiver such as zero forcing

 ZeroForcing,

 ...},

 --Modulation type

 modulationType ENUMERATED{

 OFDM,

 FBMC,

 ...},

 --Filter characteristics

 filterCharacteristics SEQUENCE{

 --Adjacent channel selectivity of the WSO [dB]

 aCS REAL OPTIONAL,

 --FBMC overlapping factor range as the maximum number

 fbmcOverlappingFactor INTEGER OPTIONAL,

 ...

}

**Annex C** (normative) **Messages8**

**-----------------------------------------------------------**

**--WSO reconfiguration**

**-----------------------------------------------------------**

--Reconfiguration request

ReconfigurationRequest ::= SEQUENCE OF SEQUENCE {

 --WSO ID

 wsoID OCTET STRING OPTIONAL,

 --Operating frequency

 operatingFrequency FrequencyRange OPTIONAL,

 --List of operating channel number

 listOfOperatingChNumber SEQUENCE OF INTEGER OPTIONAL,

 --Transmission power limit [dBm]

 txPowerLimit REAL OPTIONAL,

 --Indication whether the channel is shared

 channelIsShared BOOLEAN OPTIONAL,

 --Transmission schedule

 txSchedule TxSchedule OPTIONAL,

 -- Channel classification information

 chClassInfo ChClassInfo OPTIONAL,

 -- Mobility information

 mobilityInformation MobilityInformation OPTIONAL,

 --Additionally operable network technology

 addNetworkTechnology NetworkTechnology OPTIONAL,

--Modulation parameter

 modulationParameter SEQUENCE OF CHOICE{

 ofdm BOOLEAN,

 --The overlapping K factor for FBMC

 fbmcoverlappingFactor INTEGER,

 ...},

--Demodulation procedure

 sicdemodulationProcedure ENUMERATED{

 --demodulate desired signal directly procedure1,

 --demodulate interference then desired signal

 procedure2,

 ...} OPTIONAL

}

**-----------------------------------------------------------**

**--WSO reconfiguration**

**-----------------------------------------------------------**

--Reconfiguration request

CxMediaReconfigurationRequest ::= SEQUENCE OF SEQUENCE {

 --WSO ID

 wsoID OCTET STRING OPTIONAL,

 --Operating frequency

 operatingFrequency FrequencyRange OPTIONAL,

 --List of operating channel number

 listOfOperatingChNumber SEQUENCE OF INTEGER OPTIONAL,

 --Transmission power limit [dBm]

 txPowerLimit REAL OPTIONAL,

 --Indication whether the channel is shared

 channelIsShared BOOLEAN OPTIONAL,

 --Transmission schedule

 txSchedule TxSchedule OPTIONAL,

 -- Channel classification information

 chClassInfo ChClassInfo OPTIONAL,

 --Additionally operable network technology

 addNetworkTechnology NetworkTechnology OPTIONAL,

--Modulation parameter

 modulationParameter SEQUENCE OF CHOICE{

 ofdm BOOLEAN,

 --The overlapping K factor for FBMC

 fbmcoverlappingFactor INTEGER,

 ...},

--Demodulation procedure

 sicdemodulationProcedure ENUMERATED{

 --demodulate desired signal directly procedure1,

 --demodulate interference then desired signal

 procedure2,

 ...} OPTIONAL

}

**-----------------------------------------------------------**

**--WSO reconfiguration for another CM**

**-----------------------------------------------------------**

--Reconfiguration request

CMReconfigurationRequest ::= SEQUENCE {

 --Indication for CE to be reconfigured

 reconfigTarget CxID OPTIONAL,

 --List of operating channel number

 listOfOperatingChNumber SEQUENCE OF INTEGER OPTIONAL,

 --Transmission power limitation [dBm]

 txPowerLimit REAL OPTIONAL,

 --Indication whether the channel is shared

 channelIsShared BOOLEAN OPTIONAL,

 --Transmission schedule

 txSchedule TxSchedule OPTIONAL,

 -- Channel classification information

 chClassInfo ChClassInfo OPTIONAL,

 --Additionally operable network technology

 newNetworkTechnology NetworkTechnology OPTIONAL,

 wsoID OCTET STRING OPTIONAL,

 cmID cxID OPTIONAL,

 operatingFreqency OperatingFrequency OPTIONAL,

 --Transmission power limit [dBm]

 txPowerLimit REAL OPTIONAL,

 --Modulation parameter

 modulationParameter SEQUENCE OF CHOICE{

 ofdm BOOLEAN,

 --The overlapping K factor for FBMC

 fbmcoverlappingFactor INTEGER,

 ...},

 --Demodulation procedure

 sicdemodulationProcedure ENUMERATED{

 --demodulate desired signal directly procedure1,

 --demodulate interference then desired signal

 procedure2,

 ...} OPTIONAL

}