IEEE P802.19

Wireless Coexistence Working Group

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Abstract	This file contains proposal to System Description and Reference Model clauses in response to Call for Proposals (P802.19-10/57r2). It uses IEEE draft standard template.
Purpose	To propose text for System Description and Reference Model clauses of P802.19.1 draft standard
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- **5 Systems Local and Metropolitan**
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- Requirements Part 19: TV White
- **Space Coexistence Methods**
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Introduction

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- **Draft Standard for Information**
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- 16 1. Overview
- 17 1.1 Scope
- 18 The standard specifies radio technology independent methods for coexistence among dissimilar or
- 19 independently operated TV Band Device (TVBD) networks and dissimilar TV Band Devices
- 20 1.2 Purpose
- 21 The purpose of the standard is to enable the family of IEEE 802 Wireless Standards to most effectively use
- TV White Space by providing standard coexistence methods among dissimilar or independently operated

- 1 TVBD networks and dissimilar TVBDs. This standard addresses coexistence for IEEE 802 networks and
- 2 devices and will also be useful for non IEEE 802 networks and TVBDs.

3 2. Normative references

- 4 The following referenced documents are indispensable for the application of this document (i.e., they must
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- the referenced document (including any amendments or corrigenda) applies.

8 3. Definitions, Abbreviations and Acronyms

9 3.1 Definitions

- 10 For the purposes of this draft standard, the following terms and definitions apply. The Authoritative
- 11 Dictionary of IEEE Standards, Seventh Edition, should be referenced for terms not defined in this clause.

12 3.2 Abbreviations and Acronyms

13 4. System Description

14 4.1 System Architecture

- 15 The 802.19.1 system architecture has three logical entities and five logical interfaces. An 802.19.1 logical
- 16 entity is defined by its functional role(s) and its interfaces with other 802.19.1 logical entities and with
- 17 external elements.

- 19 Three logical entities are:
- 20 Coexistence Manager (CM)
- 21 — Coexistence Enabler (CE)
- 22 23 — Coexistence Discovery and Information Server (CDIS).

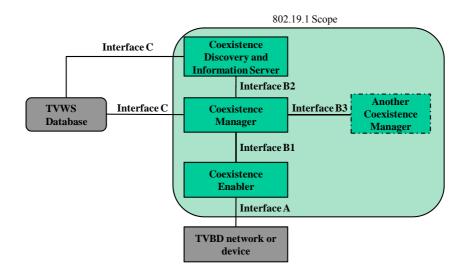
- 24 Five logical interfaces are:
- 25 - Interface A
- 26 — Interface B1
- 27 — Interface B2
- 28 — Interface B3

1 — Interface C.

- The 802.19.1 system interacts with two external elements:
- 4 TVWS database
- 5 TVBD network or device.

6

Figure 1 shows 802.19.1 system architecture.



8

9

11

Figure 1 System Architecture

10 4.2 Logical entities

4.2.1 Coexistence Enabler

- 12 Coexistence Enabler has the following functional roles:
- 13 Obtain information required for coexistence from TVBD network or device and provide it to CM
- Provide information required for coexistence (generated by IEEE 802.19.1 system or obtained by IEEE 802.19.1 system from external entities) to TVBD network or device
- Facilitate sharing of information required for coexistence among TVBD networks or devices via the
 IEEE 802.19.1 system
- 18 Request TVBD network or device to perform measurements required for coexistence by itself or according to commands received from CM
- 20 Obtain measurement results required for coexistence from TVBD network or device and provide them to CM
- 22 Request TVBD network or device to perform reconfiguration required for coexistence according to commands received from CM
- Receive information about observed or predicted events related to coexistence from TVBD network or
 device and provide it to CM

1 2	 Provide information about observed or predicted events related to coexistence (generated by IEEE 802.19.1 system) to TVBD network or device.
3	4.2.2 Coexistence Manager
4	Coexistence Manager has the following functional roles:
5	 Coexistence decision making
6	 — Discovery of other CMs
7	 Support exchange of information required for coexistence among CMs
8	 Support sharing of information required for coexistence among TVBD networks or devices.
9	4.2.3 Coexistence Discovery and Information Server
10	Coexistence Discovery and Information Server has the following functional roles:
11	 Support discovery of CMs
12	 Collect, store, aggregate, and provide information required for coexistence
13	 Support exchange of information required for coexistence among CMs
14	 Support sharing of information required for coexistence among TVBD networks or devices.
15	4.3 Logical Interfaces
16	Five logical interfaces defined in the 802.19.1 system architecture can be split into three groups:
17	— Interfaces between 802.19.1 entities:
18	— Interface B1
19	— Interface B2
20	— Interface B3
21	— Interface between an 802.19.1 entity and TVBD network/device:
22	— Interface A
23	— Interface between 802.19.1 entities and TVWD database:
24 25	— Interface C.
26 27	Different interfaces in each group are distinguished by their usage, types of information exchanged, and underlying protocols.
28	4.3.1 Interface A
29	Interface A between CE and TVBD network or device is used to transmit the following:
30	— From TVBD network or device to CE:
31	 Information required for coexistence
32	Measurement results required for coexistence
33	Information about observed or predicted events related to coexistence
34	— From CE to TVBD network or device:

- Information required for coexistence (generated by IEEE 802.19.1 system or obtained by IEEE 802.19.1 system from external entities)
- 3 Measurement requests required for coexistence
- 4 Reconfiguration requests required for coexistence
- 5 Information about observed or predicted events related to coexistence (generated by IEEE 802.19.1 system).

7 4.3.2 Interface B1

- 8 Interface B1 between CE and CM is used to transmit the following:
- 9 From CE to CM:
- 10 Information required for coexistence
- 11 From CM to CE:
- Reconfiguration commands required for coexistence.

13 **4.3.3 Interface B2**

- 14 Interface B2 between CM and CDIS is used to transmit the following:
- 15 From CM to CDIS:
- Information required for discovery
- 17 Information required for coexistence
- 18 From CDIS to CM:
- Information required for discovery
- Information required for coexistence.

21 **4.3.4 Interface B3**

- Interface B3 between different CMs is used to transmit the following:
- Information required for coexistence.

24 **4.3.5** Interface C

- 25 Interface C between CM and TVWS database or between CDIS and TVWS database is used to transmit the
- 26 following:
- 27 From TVWS database:
- 28 Information required for coexistence.

29 **5. IEEE 802.19.1 reference model**

30 5.1 General description

Figure 2 illustrates reference model of Coexistence Enabler.

COEX_MEDIA_SAP Coexistence Enabler COEX_TR_SAP 1 2 Figure 2 Reference model of Coexistence Enabler 3 Coexistence Enabler has two service access points: 4 — Coexistence Media SAP (COEX MEDIA SAP) 5 6 Coexistence Transport SAP (COEX_TR_SAP). Figure 3 illustrates reference model of Coexistence Manager and Coexistence Discovery and Information Server. Coexistence Manager or Coexistence Discovery and Information Server COEX TR SAP 8 9 Figure 3 Reference model of Coexistence Manager and Coexistence Discovery and 10 **Information Server** 11 Coexistence Manager and Coexistence Discovery and Information Server have one service access point: 12 Coexistence Transport SAP (COEX_TR_SAP). 13 14 COEX_MEDIA_SAP defines the interface A between CE and TVBD network/device. Example reference

15

model of CE describing example implementation of interface A inside a base station is shown in Figure 4.

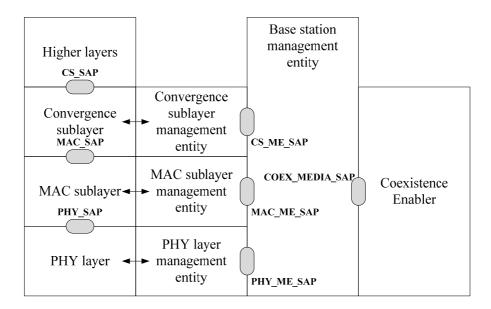
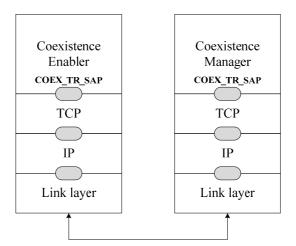


Figure 4 Example reference model for interface A

The left side of Figure 4 shows typical reference model of radio interface including data, control and management planes for physical layer, MAC sublayer, and convergence sublayer. The middle part of Figure 4 shows base station management entity. The right part of Figure 4 shows CE.

Typically, radio interface is implemented in such a way that it provides management interface for base station management entity. In Figure 4, such interface is represented by three service access points PHY_ME_SAP, MAC_ME_SAP, and CS_ME_SAP, corresponding to physical layer, MAC sublayer, and convergence sublayer. This service access points can be used to obtain information from radio interface and to request reconfiguration of radio interface. Correspondingly, CE can use these service access points to implement interface A. Interface A is defined by service access point COEX_MEDIA_SAP. Communication between radio interface management service access points PHY_ME_SAP, MAC_ME_SAP, and CS_ME_SAP and CE service access point COEX_MEDIA_SAP is done via base station management entity.

16 COEX_TR_SAP provides means for Coexistence Enabler, Coexistence Manager, and Coexistence
17 Discovery and Information Server to communicate with each other and with external entities by using
18 transport services provided by underlying layers. The underlying layers could be application layer,
19 transport layer, network layer, and link layer. Example reference model of CE and CM describing example
20 of using COEX_TR_SAP for interface B1 is shown in Figure 5.



1

2 Figure 5 Example of using COEX_TR_SAP for interface B1

- Information required for coexistence and reconfiguration commands that are exchanged between CE and CM over interface B1 are forwarded to transport layer, for example, to TCP, for transmission. This is done
- 5 using COEX_TR_SAP service access point of CE and CM.

6 5.2 Service access points

7 5.2.1 Coexistence Media SAP

8 5.2.1.1 General description

- Ocexistence Media SAP (COEX_MEDIA_SAP) defines the interface A between CE and TVBD network/device. The Coexistence Media SAP is defined as a set of primitives that provides the following
- 11 services:

- 12 Information service:
- 13 Used by CE to obtain information required for coexistence from TVBD network/device
- Used by TVBD network/device to obtain information required for coexistence from CE
- Used by TVBD network/device to share information required for coexistence with other TVBD networks/devices via the IEEE 802.19.1 system
- 17 Measurement service:
 - Used by CE to request TVBD network/device to perform measurements required for coexistence
- Used by CE to to obtain measurement results required for coexistence from TVBD network/device
- 20 Reconfiguration service:
- Used by CE to request TVBD netrwork/device to perform reconfiguration required for coexistence
- 22 Event service:
- Used by TVBD network/device to receive information about observed or predicted events related to
 coexistence from CE
- Used by CE to receive information about observed or predicted events related to coexistence from
 TVBD network/device.

Primitives described in Table 1 are used to define the Coexistence Media SAP.

Table 1 – Coexistencre Media SAP primitives

Primitive	Service	Description
COEX_INFO_OBTAINING	Information	Used by CE to obtain information required for coexistence from TVBD network/device.
		Also, used by TVBD network/device to obtain information required for coexistence from CE.
COEX_INFO_SHARING	Information	Used by TVBD network/device to identify the capability of sharing information to other TVBD networks/devices via the IEEE 802.19.1 system.
COEX_INFO_PROVISION	Information	Used by TVBD network/device to provide information to the IEEE 802.19.1 system for sharing with other TVBD networks/devices.
COEX_RCF	Reconfiguration	Used by CE to request reconfiguration of TVBD networks/devices required for coexistence.
COEX_MEAS	Measurement	Used by CE to request TVBD network/device to perform measurement required for coexistence and to obtain measurement results.
COEX_EVENT	Event	Used by TVBD network/device to inform CE about events related to coexistence observed or predicted by TVBD network/device. Also, used by CE to inform TVBD network/device about events related to coexistence observed or predicted by IEEE 802.19.1 system.

5 5.2.1.2 Information service

6 5.2.1.2.1 COEX_INFO_OBTAINING

7 5.2.1.2.1.1 COEX_INFO_OBTAINING.request

- 8 Function
- 9 Used by CE to request information required for coexistence from TVBD network/device.
- Also, used by TVBD network/device to request information required for coexistence from CE.
- 12 Semantics
- 13 COEX_INFO_OBTAINING.request(
- 14 CoexInfoParamIds
- 15)

1

Name	Type	Descr	ription				
CoexInfoParamIds	COEX_I_PARAM_IDs	This	parameter	contains	list	of	information
		paran	neter IDs req	uested by (CE.		

2

3

When generated

- 4 Generated by CE to request information required for coexistence from TVBD network/device.
- 5 Generated by TVBD network/device to request information required for coexistence from CE.

6

7 Effect on receipt

- 8 When TVBD network/device receives this primitive, the TVBD network/device shall send
- 9 COEX INFO OBTAINING.confirm back to the CE.
- When CE receives this primitive, CE shall send COEX_INFO_OBTAINING.confirm back to the TVBD
- 11 network/device.

12 **5.2.1.2.1.2 COEX_INFO_OBTAINING.confirm**

- 13 Function
- 14 Used by TVBD network/device to provide information required for coexistence to CE.
- 15 Used by CE to provide information required for coexistence to TVBD network/device.

16

17 Semantics

- 18 COEX INFO OBTAINING.confirm(
- 19 CoexInfoParams
- 20)

21

Name	Туре	Descr	ription				
CoexInfoParams	COEX_I_PARAMs	This	parameter	contains	list	of	information
		parameters requested by CE.					

22

23 When generated

- Generated by TVBD network/device in response to COEX_INFO_OBTAINING.request from CE.
- Generated by CE in response to COEX INFO OBTAINING.request from TVBD network/device.

1 Effect on receipt

- When CE receives this primitive, it examines the received information required for coexistence.
- 3 When TVBD network/device receives this primitive, it examines the received information required for
- 4 coexistence.

5 **5.2.1.2.2 COEX_INFO_SHARING**

6 5.2.1.2.2.1 COEX_INFO_SHARING.request

7 Function

- B Used by TVBD network/device to identify the capability of sharing information to other TVBD
- 9 networks/devices via the IEEE 802.19.1 system.

10

11 Semantics

- 12 COEX_INFO_SHARING.request(
- 13 InfoDestination,
- 14 CoexInfoParamIds
- 15)

16

Name	Type	Description
InfoDestination	INFO_DEST	This parameter contains list of destinations to which TVBD network/device would like to provide information for sharing with other TVBD networks/devices.
CoexInfoParamIds	COEX_I_PARAM_IDs	This parameter contains list of information parameter IDSs which TVBD network/device would like to share with other TVBD networks/devices.

17

18

When generated

Generated by TVBD network/device to initiate the procedure to share information with other TVBD networks/devices via the IEEE 802.19.1 system.

21

22 Effect on receipt

- When CE receives this primitive, CE shall send COEX_INFO_SHARING.confirm back to the TVBD
- When CE recei network/device.

5.2.1.2.2.2 COEX_INFO_SHARING.confirm

- 2 **Function**
- 3 Used by CE to inform TVBD network/device about the capability of sharing information to other TVBD
- 4 networks/devices via the IEEE 802.19.1 system.

5

1

- 6 **Semantics**
- 7 COEX_INFO_SHARING.confirm(
- 8 CoexInfoParamIds
- 9)

10

Name	Туре	Description
CoexInfoParamIds	COEX_I_PARAM_IDs	This parameter contains list of information
		parameter IDs which IEEE 802.19.1 system can
		share with other TVBD networks/devices.

11

- 12 When generated
- 13 Generated by CE in response to COEX_INFO_SHARING.request from TVBD network/device.

14

- 15 Effect on receipt
- 16 When TVBD network/device receives this primitive, it examines the received information about the
- 17 capability of sharing information to other TVBD networks/devices via the IEEE 802.19.1 system.
- 18 5.2.1.2.3 COEX_INFO_PROVISION
- 19 5.2.1.2.3.1 COEX_INFO_PROVISION.request
- 20 **Function**
- 21 Used by TVBD network/device to provide information to the IEEE 802.19.1 system for sharing with other
- 22 TVBD networks/devices.

- 24 **Semantics**
- 25 COEX_INFO_PROVISION.request(
- 26 InfoDestination,
- 27 CoexInfoParams
- 28)

1

Name	Туре	Description		
InfoDestination INFO_DEST		This parameter contains list of destinations to which		
		TVBD network/device provides information.		
CoexInfoParams	COEX_I_PARAMs	This parameter contains list of information		
		parameters which TVBD network/device is		
		providing.		

2

3

When generated

4 Generated by TVBD network/device to provide information to the IEEE 802.19.1 system for sharing with 5 other TVBD networks/devices.

6

7 Effect on receipt

8 When CE receives this primitive, CE shall send COEX INFO PROVISION.confirm back to the TVBD

network/device.

10 5.2.1.2.3.2 COEX_INFO_PROVISION.confirm

11 Function

12 Used by CE to inform TVBD network/device about the status of the request to provide information to the

13 IEEE 802.19.1 system for sharing with other TVBD networks/devices.

14

15 Semantics

16 COEX INFO PROVISION.confirm(

17 InfoProvisionStatus

18)

19

Name	Type	Description
InfoProvisionStatus	I_STATUS	This parameter describes the status of information provision request issued by the TVBD network/device.

20

When generated

22 Generated by CE in response to COEX_INFO_PROVISION.request from TVBD network/device.

23

21

24 Effect on receipt

- When TVBD network/device receives this primitive, it examines the received information about the status
- 2 3 of the request to provide information to the IEEE 802.19.1 system for sharing with other TVBD
- networks/devices.
- 4 5.2.1.3 Reconfiguration service
- 5 5.2.1.3.1 COEX_RCF
- 6 5.2.1.3.1.1 COEX_RCF.request
- 7 Function
- Used by CE to request reconfiguration of TVBD networks/devices required for coexistence.

9

- 10 **Semantics**
- 11 COEX_RCF.request(
- 12 CoexReconParams
- 13)

14

Name	Type	Description
CoexReconParams	COEX_R_PARAMs	This parameter contains list of reconfiguration
		parameters according to which TVBD
		network/device shall perform reconfiguration.

15

16

- When generated
- Generated by CE to request reconfiguration of TVBD networks/devices required for coexistence. 17

18

- 19 Effect on receipt
- 20 When TVBD network/device receives this primitive, it performs corresponding reconfiguration. Then,
- 21 TVBD network/device shall send COEX_RCF.confirm back to the CE.
- 22 5.2.1.3.1.2 COEX_RCF.confirm
- 23 **Function**
- 24 Used by TVBD network/device to inform CE about the results of the request to perform reconfiguration of
- 25 TVBD networks/devices required for coexistence.

26

27 **Semantics** 1 COEX_RCF.confirm(

2 CoexReconResults

3)

4

Name	Type	Descr	iption					
CoexReconResutls	COEX_R_RESULTs	This	parameter	describes	the	result	of	the
		reconfiguration requested by the CE.						

5

6 When generated

7 Generated by TVBD network/device in response to the COEX_RCF.request from CE.

8

9 Effect on receipt

- 10 When CE receives this primitive, it examines the received information about the status of the request to
- 11 perform reconfiguration of TVBD networks/devices required for coexistence.

12 5.2.1.4 Measurement service

13 5.2.1.4.1 COEX_MEAS

14 5.2.1.4.1.1 COEX_MEAS.request

- 15 Function
- 16 Used by CE to request TVBD network/device to perform measurement required for coexistence.

17

- 18 **Semantics**
- 19 COEX MEAS.request(
- 20 CoexMeasuParams
- 21)

22

Name	Туре	Description
CoexMeasuParams	COEX_M_PARAMs	This parameter contains list of measurement
		parameters according to which TVBD
		network/device shall perform measurement.

23

24

When generated

1 Generated by CE to request TVBD network/device to perform measurement required for coexistence.

2

- 3 Effect on receipt
- 4 When TVBD network/device receives this primitive, it performs requested measurement. Then, TVBD
- 5 network/device shall send COEX MEAS.confirm back to CE.

6 **5.2.1.4.1.2 COEX_MEAS.confirm**

- 7 Function
- 8 Used by TVBD network/device to provide requested measurement results to CE.

9

- 10 Semantics
- 11 COEX MEAS.confirm(
- 12 CoexMeasuResults
- 13)

14

Name	Type	Descri	iption					
CoexMeasuResults	COEX_M_RESULTs	This	parameter	contains	list	of	results	of
		measu	rement perfe	ormed by T	VBD	netw	ork/devi	ce

15

- 16 When generated
- Generated by TVBD network/device in response to the COEX MEAS.request from CE.

18

- 19 Effect on receipt
- When CE receives this primitive, it examines the received measurement results required for coexistence.
- 21 **5.2.1.5** Event service

22 5.2.1.5.1 COEX EVENT.indication

- 23 Function
- Used by TVBD network/device to inform CE about events related to coexistence observed or predicted by
- TVBD network/device.
- 26 Also, used by CE to inform TVBD network/device about events related to coexistence observed or
- predicted by IEEE 802.19.1 system.

4		
	Carno	un ti aa
	Sema	uuucs

- 2 COEX_EVENT.indication(
- 3 CoexEventParams

4)

5

Name	Type	Description
CoexEventParams	COEX_E_PARAMs	This parameter contains list of event parameters.

6

7 When generated

- 8 Generated by TVBD network/device to inform CE about events related to coexistence observed or 9 predicted by TVBD network/device.
- 10 Generated by CE to inform TVBD network/device about events related to coexistence observed or 11 predicted by IEEE 802.19.1 system.

12

13 Effect on receipt

- 14 When CE receives this primitive, it examines the received information about events realted to coexistence
- 15 observed or predicted by TVBD network/device.
- 16 When TVBD network/device receives this primitive, it examines the received information about events
- 17 realted to coexistence observed or predicted by IEEE 802.19.1 system.

18 5.2.2 Coexistence Transport SAP

19 5.2.2.1 General description

- 20 Coexistence Transport SAP (COEX TR SAP) provides means for Coexistence Enabler, Coexistence
- 21 Manager, and Coexistence Discovery and Information Server to communicate with each other and with
- 22 external entities by using transport services provided by underlying layers. The Coexistence Transport SAP
- 23 is defined as a set of primitives that provides the following service:
- 24 — Transport service:

25 — Used by CE, CM, CDIS or external entity to send coexistence protocol data unit to each other and 26 to external entities and to receive acknoledgement of such operation

Used by CE, CM, and CDIS or external entity to receive coexistence protocol data unit from each other and from external entities.

27

Primitives described in Table 2 are used to define the Coexistence Transport SAP.

32

Table 2 – Coexistencre Transport SAP primitives

Primitive	Service	Description
CP_PACKET_SEND	Transport	Used by CE, CM, CDIS or external entity to
		send a coexistence protocol data unit using a

		transport service provider.
CP_PACKET_RECEIVE	Transport	Used by a transport service provider to deliever a coexistence protocol data unit to CE, CM, CDIS or external entity.

5.2.2.2 Transport service

2 CP_PACKET_SEND

3 CP_PACKET_SEND.request

4 Function

5 Used by CE, CM, CDIS or external entity to request the transport service provider to transport a

6 coexistence protocol data unit.

7

1

8 Semantics

9 CP_PACKET_SEND.request

TransportPref,

11 SourceID,

12 DestinationID,

13 CoexProtocolPDU

14)

15

Name	Туре	Description
TransportPref	TRANSPORT_PREF	Transport protocol preference.
SourceID	TRANSPORT_ADDR	Address of the entity sending coexistence protocol
	_	data unit.
DestinationID	TRANSPORT_ADDR	Address of the entity to receive coexistence
		protocol data unit.
CoexProtocolPDU	OCTET STRING	Coexistence protocol data unit to be transported.

16

17

When generated

Generated by CE, CM, CDIS or external entity to request the transport service provider to transport a coexistence protocol data unit.

20 Effect on receipt

The specific transport servce provider receiving this primitive attempts to transport the coexistence protocol data unit.

CP_PACKET_SEND.confirm

2 Function

3 Used by transport service provider to acknowledge transportation of the coexistence protocol data unit if

such acknowledgment is supported by the transport service provider.

5

1

6 Semantics

- 7 CP_PACKET_SEND.confirm(
- 8 TransportPref,
- 9 SourceID,
- 10 DestinationID,
- 11 TransportStatus
- 12)

13

Name	Type	Description			
TransportPref	TRANSPORT_PREF	Transport protocol preference.			
SourceID	TRANSPORT_ADDR	Address of the entity sending coexistence protocol			
		data unit.			
DestinationID	TRANSPORT_ADDR	Address of the entity to receive coexistence			
		protocol data unit.			
TransportStatus	BOOLEAN	Indicates whether the transfer of coexistence			
		protocol data unit is successful or not.			

14

15

16

17

When generated

Generated by the transport service provider to confirm delivery of coexistence protocol data if such acknowledgement is supported by the transport service provider.

18

19 Effect on receipt

When CE, CM, CDIS or external entity receives this primitive, it learns about the staus of the requested

21 delivery of coexistence protocol data.

22 CP_PACKET_RECEIVE

23 Function

Used by transport service provider to deliver a coexistence protocol data unit to CE, CM, CDIS or external

entity.

2	CD DACKET DECEIVE
2	CP_PACKET_RECEIVE(
3	TransportPref,
4	SourceID,
5	DartinationID
J	DestinationID,

CoexProtocolPDU

Semantics

7)

8

6

1

Name	Туре	Description
TransportPref	TRANSPORT_PREF	Transport protocol preference.
SourceID	TRANSPORT_ADDR	Address of the entity sending coexistence protocol data unit.
DestinationID	TRANSPORT_ADDR	Address of the entity to receive coexistence protocol data unit.
CoexProtocolPDU	OCTET_STRING	Coexistence protocol data unit to be delivered.

9

10 When generated

- Generated by the transport service provider when it has coexistence protocol data unit for CE, CM, CDIS
- or external entity.

13 Effect on receipt

14 The CE, CM, CDIS or external entity receiving this primitive gets coexistence protocol data unit.

15 **5.3 Data types**

16 5.3.1 Coexistence Media SAP data types

17 The following data types are defined for Coexistence Media SAP.

18 5.3.1.1 Information service data types

19 The following data types are defined for information service of Coexistence Media SAP.

```
20
```

```
21    I_PARAM_ID ::= ENUMERATED{
22         BSSID,
23         SSID,
24         BSSType,
25         BeaconPeriod,
26         DTIMPeriod,
27         Timestamp,
```

```
1
       LocalTime,
 2
       PHYParameterSet,
        CFParameterSet,
 4
5
6
        IBSSATIMWindow,
       CapabilityInformation,
       BSSBasicRateSet,
 7
       OperationalRateSet,
 8
       Country,
9
       IBSSDFSRecoveryInterval,
10
       Load,
11
       TPCTransmitPower,
12
       TPCLinkMargin,
13
       NeighbourBSSSet,
14
       ListOfAvailableChannels,
15
       NetworkChannels,
16
       AntennaInfo,
17
       TVBDInfo,
18
       SysEntityID,
19
       TVBDID,
20
21
22
23
24
       ListOfNeighbours,
     }
     COEX_I_PARAM_IDs ::= SEQUENCE OF I_PARAM_ID
25
26
27
28
     I_PARAM_VALUE ::= CHOICE{
       BSSID
                                            STRING,
       SSID
                                            STRING,
29
30
       BSSType
                                            ENUMERATED,
       BeaconPeriod
                                            INTEGER,
31
       DTIMPeriod
                                            INTEGER,
32
       Timestamp
                                            INTEGER,
33
       LocalTime
                                           INTEGER,
34
       PHYParameterSet
                                           PHY_PARAM_SET,
35
       CFParameterSet
                                           CF_PARAM_SET,
36
       IBSSATIMWindow
                                            TU,
37
       CapabilityInformation
                                           BSS_CAPA_INFO,
38
       BSSBasicRateSet
                                           SET OF INTEGER,
39
       OperationalRateSet
                                            SET OF INTEGER,
40
       Country
                                            STRING,
41
       IBSSDFSRecoveryInterval
                                            INTEGER,
42
       Load
                                            BSS_LOAD,
43
       TPCTransmitPower
                                            INTEGER,
44
       TPCLinkMargin
                                            INTEGER,
45
       NeighbourBSSSet
                                            NEIBR_BSS_SET,
46
       ListOfAvailableChannels
                                            LIST_TV_CHANNELS,
47
       NetworkChannels
                                            NETWORK_CHANNELS,
48
       AntennaInfo
                                            ANTENNA_INFO,
49
       TVBDInfo
                                            TVBD INFO,
50
       SysEntityID
                                            INTEGER,
51
        TVBDID
                                            STRING,
52
53
54
       ListOfNeighbours
                                           LIST_NEIGHBOURS,
     }
55
56
     COEX_I_PARAM ::= SEQUENCE{
        InfoParamId
                               I_PARAM_ID,
```

```
1
2
3
4
5
6
7
8
9
        InfoStatus
                                I_STATUS,
        InfoParamValue
                                I_PARAM_VALUE
     COEX_I_PARAMS ::= SEQUENCE OF COEX_I_PARAM
     I_STATUS ::= ENUMERATED{
        SUCCESS,
        NOT_AVAILABLE_NOW,
10
        NOTSUPPORTED,
11
        BUSY,
12
13
     }
14
15
     SYS_ENTITY_ID ::= INTEGER
16
17
     INFO_DEST ::= SEQUENCE OF SYS_ENTITY_ID
18
```

Table 3 describes parameters of data types of information service of Coexistence Media SAP.

20 21

19

Table 3 – Parameters of data types of information service of Coexistence Media SAP

Name	Type	Valid range	Description	Note
			_	
BSSID	MAC ADDR	N/A	The BSSID of the found	802.11-2007
	_		BSS.	Scan.
SSID	OCTET_STRING	132 octets	The SSID of the found	confirm
			BSS.	
BSSType	ENUMERATED	INFRASTRUC	The type of the found	BSS
		TURE,	BSS.	Description
		INDEPENDENT		Set
BeaconPeriod	INTEGER	N/A	The Beacon period of the	
D.T.D. (D.) 1	D INTEGED	A 1 C 1:	found BSS (in TU).	
DTIMPeriod	INTEGER	As defined in	The DTIM period of the	
TP:	DITECED	frame format	BSS (in beacon periods).	
Timestamp	INTEGER	N/A	The timestamp of the	
			received frame (probe	
			response/beacon) from the found BSS.	
LocalTime	INTEGER	N/A	The value of the STA fs	
Locarrine	INTEGER	IN/A	TSF timer at the start of	
			reception of the first octet	
			of the timestamp field of	
			the received frame (probe	
			response or beacon) from	
			the found BSS.	
PHYParameter	PHY PARAM	As defined in	The parameter sets	
Set	SET	frame format or	relevant to the PHY from	
		according to the	the received Beacon or	
		relevant PHY	Probe Response frame. If	
		clause	no PHY Parameter Set	
			information element is	
			present in the received	
			frame, this parameter	

			contains the channel	
			number on which the	
			frame was received. Valid	
			channel numbers are	
			defined in the relevant	
			PHY clause.	
CFParameter	CF_PARAM_	As defined in	The parameter set for the	
Set	SET SET	frame format	CF periods, if found BSS	
SCI	SEI	Hame format		
IDCC ATD A	TEL I	A 1 C 1:	supports CF mode.	
IBSSATIM	TU	As defined in	The parameter set for the	
Window		frame format	IBSS, if found BSS is an	
			IBSS.	
Capability	BSS_CAPA_	As defined in	The advertised capabilities	
Information	INFO	frame format	of the BSS.	
BSSBasicRate	SET OF	1127 inclusive	The set of data rates that	
Set	INTEGER	(for each integer	must be sup-ported by all	
		in the set)	STAs that desire to join	
			this BSS. The STAs must	
			be able to receive and	
			transmit at each of the	
			data rates listed in the set.	
Operational	SET OF	1127 inclusive	The set of data rates that	
RateSet	INTEGER	(for each integer	the STA desires to use for	
RateSet	INTEGER	in the set)	communication within the	
		in the set)	BSS. The STA must be	
			able to receive at each of	
			the data rates listed in the	
			set. This set is a superset	
			of the rates contained in	
			the BSSBasicRateSet	
			parameter.	
Country	STRING	As defined in the	The information required	
		Country element	to identify the regulatory	
			domain in which the STA	
			is located and to configure	
			its PHY for operation in	
			that regulatory domain.	
			Present only when TPC	
			functionality is required,	
			as specified in 11.8, or	
			when dot11MultiDomain	
			CapabilityEnabled is true.	
IBSSDFS	INTEGER	1255	Only present if BSSType	
Recovery	1		= INDEPENDENT. The	
Interval			time interval that is used	
			for DFS recovery. Present	
			only when DFS	
			functionality is required.	
Lond	DCC LOAD	As defined in	The values from the BSS	
Load	BSS_LOAD			
		frame format	Load information element	
			if such an element was	
			present in the probe	
			response or Beacon frame,	
			else null.	
TPCTransmit	INTEGER	1	The Transmit Power field	802.11-20

Power			shall be set to the transmit power used to transmit the frame containing the TPC Report element. The field is coded as a signed integer in units of decibels relative to 1 mW. The maximum tolerance for the transmit power value reported in the TPC Response element shall be ± 5 dB. This tolerance is defined as the difference, in decibels, between the reported power value and the actual EIRP of the STA (measured when transmitting 1500 octet frames).	TPC report MLME- TPCADAPT .confirm
TPCLink Margin	INTEGER		The Link Margin field contains the link margin at the time and for the rate at which the frame containing the TPC Request element was received. The field is coded as a signed integer in units of decibels. The LinkMargin field shall be set to 0 and shall be ignored when a TPC Report element is included in a Beacon frame or Probe Response frame. The measurement method of Link Margin is beyond the scope of this standard.	
Neighbour BSSSet	NEIBR_BSS_ SET	Specified in the regulatory domain	Report the neighbor of an BSS Repot the channel of the neighbor BSS	11k Neighbour report
ListOfAvailable Channels	LIST_TV_ CHANNELS			802.11af 802.22
Network Channels	NETWORK_ CHANNELS		The parameter reports the network channels that TV band devices and networks are operating on.	802.12af IEEE 802.22 M-WRAN- SERVICE- REPORT
AntennaInfo	ANTENNA_ INFO		Specifying the antenna information of TV band devices.	IEEE 1900.6
TVBDInfo	TVBD_INFO		The value identifies the type of device at the geolocation registering	IEEE 802.22 IEEE 802.11

				device types are denoted as WLAN STA and WLAN AP
NeighbourBSS Set	NEIBR_BSS_ SET	Specified in the regulatory domain	Report the neighbor of an BSS. Repot the channel of the neighbor BSS.	802.11k Neighbour report
SysEntityID	INTEGER		Logical ID of IEEE 802.19.1 system entity.	Parameters added for
TVBDID	STRING		This TVBDID can be the FCC ID	TVBD
ListOfAvailable Channels	LIST_TV_CHAN NELS		This parameter gives the list of availe channels (TV channels) as decided by the IEEE 802.19.1 system.	From IEEE 802.19.1 system to TVBDs
ListOf Neighbours	LIST_ NEIGHBOURS		This parameters gives the TVBD ID, TVBDInfo, occupied channels, mobility (fixed, moible),	

5.3.1.2 Reconfiguration service data types

1

2

3 The following data types are defined for reconfiguration service of Coexistence Media SAP.

```
4
 5
6
7
8
9
     COEX_R_OBJ_ID ::= ENUMERATED{
        ChannelSwitch,
        ChangeTransmitPower,
        Scheduling
10
11
     R_PROFILE_PARAM_ID ::= ENUMERATED{
12
        NewRegulatoryClass,
13
        ChannelNumber,
14
        ChannelSwitchMode,
15
        ChannelSwitchCount,
16
        DSELocalPowerConstraint,
17
        NewNetworkChannels,
18
19
20
21
22
23
24
25
26
27
28
29
30
        DisallowedChannels,
        OperatingChannels,
        Scheduling
     }
     R_PROFILE_PARAM _VALUE ::= CHOICE{
        NewRegulatoryClass
                                             INTEGER,
        ChannelNumber,
                                             INTEGER,
                                             CHANNEL_SWITCH_MODE,
        ChannelSwitchMode
        ChannelSwitchCount
                                             INTEGER,
        DSELocalPowerConstraint
                                             INTEGER,
        NewNetworkChannels
                                             NET_CHANNELs,
        DisallowedChannels
                                             SET OF INTEGER,
```

```
1
                                           SET OF INTEGER,
       OperatingChannels
2 3 4 5 6 7 8 9
        Schedule
                                           SCHEDULE,
     }
     R_PROFILE_PARAM ::= SEQUENCE{
       ReconProfileParamID
                                          R_PROFILE_PARAM_ID,
       ReconProfileParamValue
                                          R_PROFILE_PARAM_VALUE
10
11
     COEX_R_PROFILE ::= SEQUENCE OF R_PROFILE_PARAM
12
13
     COEX_R_PARAM ::= SEQUENCE{
14
       CoexReconObjID
                                           COEX_R_OBJ_ID,
15
       CoexReconProfile
                                           COEX_R_PROFILE
16
     }
17
18
     COEX_R_PARAMS ::= SEQUENCE OF COEX_R_PARAM
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
     R_STATUS ::= ENUMERATED{
       SUCCESS,
       NOTSUPPORTED,
       BUSY,
       TOANOTHERVALUE,
     COEX_R_RESULT ::= SEQUENCE{
       CoexReconObjID COEX_R_OBJ_ID,
       ReconStatus
                              R_STATUS,
       CoexReconParams
                            COEX_R_PARAMs
                                                OPTIONAL
     }
34
     COEX_R_RESULTs ::= SEQUENCE of COEX_R_RESULT
35
```

Table 4 and Table 5 describe parameters of data types of reconfiguration service of Coexistence Media SAP.

38

39

36

37

Table 4 – Parameters of data types of reconfiguration service of Coexistence Media SAP

Name	Type	Valid range	Description	Note
			_	
NewRegulatory	INTEGER		The New Regulatory	802.11-2007
Class			Class field is set to the	Channel
			number of the regulatory	Switch
			class after the channel	
			switch, as	802.11y
			defined in Annex J in	Extended
			IEEE 802.11 standards	Channel
NewChannel	INTEGER	As specified in	The number of the new	Switch
Number		the regulatory	channel to be switched to.	
		domain		
ChannelSwitch	CHANNEL_	0 or 1	A Channel Switch Mode	
Mode	SWITCH_MODE		set to 1 means that the	

Count in the channel switch cevent, as described for the Channel Switch Announcement element. DSELocal Power Constraint Constraint DSELocal Power Constraint Constraint DSELocal Power Constraint Constraint NewNetwork Channels Maximum 4w Constraint Count field either shall be set to the number of TBTTs until the STA sending the Channel Switch Announcement element switches to the new channel or shall be set to 0. A value of 1 indicates that the switch shall occur are any time after the frame containing the element is transmitted. The local maximum transmit power for a channel is thus defined as the maximum transmit power for a channel is thus defined as the maximum transmit power level specified for the channel in the Country element minus the local power constraint specified for the channel in the DSE Power Constraint frame. NewNetwork Channels NET CHANNELS NewNetwork Channels NET CHANNELS Reading the Channels either shall be set to the number of TBTTs sending the Channel small the Switch sending the Channel small the Switch sending the Channel in the Set to the number of TBTTs sending the Channel small the Switch sending the Channel small the Switch sending the Channel small the Switch sending the Channel in the Switch sending the Channel small the Switch sending the Channel in the Set to the number of TBTTs until the STA sending the Channel small the Switch sending the Channel small the Switch sending the Channel small the Switch sending the Channel in the Switch sending the Channel sending the Channel in the Switch sending the Channel sending the Channel in the Switch sending the Channel s				STA in a BSS to which the frame containing the element is addressed shall transmit no further frames within the BSS until the scheduled channel switch. A STA in an IBSS may treat a Channel Switch Mode field set to 1 as advisory. A Channel Switch Mode set to 0 does not impose any requirement on the receiving STA.	
Power Constraint transmit power for a channel is thus defined as the maximum transmit power level specified for the channel in the Country element minus the local power constraint specified for the channel in the DSE Power Constraint frame. NewNetwork Channels NET_ CHANNELS NET_ CHANNELS Specifies the network channels and maximum transmit power in a regulation domain that the TVBD are allowed to operate in TV band. The parameter has been defined in subclause 5.2.1.2 but is used for reconfiguration purpose. The parameter is used here to indicate the network channels that the		INTEGER	until the channel switch event, as described for the Channel Switch Announcement	set to the number of TBTTs until the STA sending the Channel Switch Announcement element switches to the new channel or shall be set to 0. A value of 1 indicates that the switch shall occur immediately before the next TBTT. A value of 0 indicates that the switch shall occur at any time after the frame containing	
Channels Channels and maximum transmit power in a regulation domain that the TVBD are allowed to operate in TV band. The parameter has been defined in subclause 5.2.1.2 but is used for reconfiguration purpose. The parameter is used here to indicate the network channels that the	Power	INTEGER	Maximum 4w	transmit power for a channel is thus defined as the maximum transmit power level specified for the channel in the Country element minus the local power constraint specified for the channel in the DSE	
Disallowed SET OF The parameter is used for IEEE 802.22	Channels	CHANNELS		channels and maximum transmit power in a regulation domain that the TVBD are allowed to operate in TV band. The parameter has been defined in subclause 5.2.1.2 but is used for reconfiguration purpose. The parameter is used here to indicate the network channels that the TVBD should change to.	

Channels	INTEGER	disallowing a number of channels among the list of available channels from the TVWS database.	
Operating Channels	SET OF INTEGER	The parameter is used to select chanels for operation from the list of available channels	IEEE 802.22

1

Table 5 – Parameters of data types of reconfiguration service of Coexistence Media SAP

Name	Type	Valid range	Description	Note
BSSType	BSS_TYPE	INFRASTRUC TURE, INDEPENDENT, ANY_BSS	Determines whether infrastructure BSS, IBSS, or both, are included in the scan.	802.11-2007 Scan.request
BSSID	STRING	Any valid individual orbroadcast MAC address	Identifies a specific or wildcard BSSID.	
SSID	STRING	032 octets	Specifies the desired SSID or the wildcard SSID.	
ScanType	ENUMERATED	ACTIVE, PASSIVE	Indicates either active or passive scanning.	
ProbeDelay	INTEGER	N/A	Delay (in microseconds) to be used prior to transmitting a Probe frame during active scanning.	
ChannelList	SEQUENCE OF INTEGER	Each channel will be selected from the valid channel range for the appropriate PHY and carrier set.	Specifies a list of channels that are examined when scanning for a BSS.	
MinChannel Time	INTEGER	ProbeDelay	The minimum time (in TU) to spend on each channel when scanning.	
MaxChannel Time	INTEGER	MinChannelTime	The maximum time (in TU) to spend on each channel when scanning.	
ChMeasuType	Ch_MEASU_ TYPE	0,1,2	0: Basic request; 1: Clear channel assessment (CCA) request 2: Receive power indication (RPI) histogram request	.11-2007 measure ment request
Channel Number	INTEGER	Specified in regulatory domain	Channel number for which the measurement request applies	
StartTime	INTEGER		The parameter specifies the time at which the requested measurement, as specified by the	

	T		Marriage	
			MeasurementType	
			parameter, shall start. A	
			value of 0 shall indicate it	
			shall start immediately.	
Duratioin	INTEGER		The Measurement	
			Duration field shall be set	
			to the duration of the	
			requested measurement, as	
			specified by the	
			MeasurementType	
			parameter, expressed in	
			TUs.	
LinkMeasu	STRING	Any valid	The address of the peer	802.11k
PeerAdd	briding	individual	MAC entity to which the	Link
1 cci Aud		MAC address	Link Measure Request	
		WIAC address		measure
T: 134	DITECED		shall be sent.	ment
LinkMeasu	INTEGER		The transmit power to be	
TxPower			used when transmitting	
			the Link Measurement	
			Request frame and	
			included in the	
			frame body	
LinkMeasu	INTEGER		The maximum transmit	
MaxiTxPower			power to be used by the	
			transmitting STA on its	
			operating channel.	
Sensing	SENSING		Specification consists of:	802.22
Window	WINDOW		NumSensingPeriods	SM-SSF
	.,		SensingPeriodDuration	2112 222
			SensingPeriodInterval	
SignalType	SIGNAL TYPE		The interger number	
Signai i ype	SIGIVIE_ITTE		specifies the following	
			types of signals to be	
			sensed by the spectrum	
			sensor.	
			0: Any Signal Type	
			1: IEEE 802.22 WRAN	
			2: ATSC	
			3: DVB-T	
			4: ISDB-T	
			5: NTSC	
			6: PAL	
			7: SECAM	
			8: Wireless Microphone	
			9: IEEE 802.22.1 Sync	
			Burst	
			10: IEEE 802.22.1 PPDU	
			MFS1	
			11: DVB-TIEEE 802.22.1	
			PPDU	
			MSF2	
			12: IEEE 802.22.1 PPDU	
			MSF3	
			13: Medical telemetry	
İ	i	i contract of the contract of	dormoon	i l
			devices 14: Studio-transmitter link	

			15-24 Reserved	
SensingMode	SENSING_ MODE		Mode 0: For each signal type the SSF generates a binary decision as to whether the signal is present in the television channel Mode 1: Same as sensing mode 0 with the addition of a confidence metric for binary decision Mode 2: For each signal type the spectrum sensor generates an estimate of the field strength of that Signal Mode 3: Same as sensing mode 2 with the standard deviation of the field strength estimate from sensing mode 2. Mode4: reserved	
Detection Threshold	REAL	-160~70	The parameter specifies the noise power in dBm.	IEEE 1900.6
Performance Metric	PERF_METRIC		Parameter that indicates the quality of sensing.	
Geolocation	STRING		Reques to obtain the geolocation information of the TV band devices.	IEEE 802.22 GL-SAP, 802.11af, 1900.6

5.3.1.3 Measurement service data types

1

2

4

3 The following data types are defined for measurement service of Coexistence Media SAP.

```
5
     COEX_M_OBJ_ID ::= ENUMERATED{
6
7
8
9
        802.11BSSScan,
        802.11ChannelMeasu,
        802.11kLinkMeasu,
        802.22Sensing
10
     }
11
12
13
14
15
     M_PROFILE_PARAM_ID ::= ENUMERATED{
        BSSType,
        BSSID,
        SSID,
16
        ScanTYpe,
17
        ProbeDelay,
18
        ChannelList,
19
        MinChannelTime,
20
        MaxChannelTIme,
21
        ChMeasuType,
```

```
1
        Channel Number,
 2
       StartTime,
       Duration,
 4
5
6
       LinkMeasuPeerAdd,
       LinkMeasuTxPower,
       LinkMesuMaxiTxPower,
 7
       SensingWindow,
 8
       SignalType,
9
       SensingMode,
10
       DetectionThreshold,
11
       PerformanceMetric,
12
       Geolocation,
13
14
     }
15
16
     M_PROFILE_PARAM_VALUE ::= CHOICE{
17
       BSSType
                                            BSS_TYPE,
18
       BSSID
                                            STRING,
19
       SSID
                                            STRING,
20
21
22
23
24
25
26
27
28
       ScanType
                                            SCAN_TYPE,
       ProbeDelay
                                            INTEGER,
       ChannelList
                                            SEQUENCE OF INTEGER,
       MinChannelTIme
                                            INTEGER,
       MaxChannelTime
                                            INTEGER,
                                            CH_MEASU_TYPE,
       ChMeasuType
       ChannelNumber
                                            INTEGER,
       StartTime
                                            INTEGER,
       Duration
                                            INTEGER,
29
30
31
       LinkMeasuPeerAdd
                                            STRING,
       LinkMeasuTxPower
                                            INTEGER,
       LinkMeasuMaxiTxPower
                                            INTEGER,
32
33
       SensingWindow
                                            SENSING_WINDOW,
       SignalType
                                            SIGNAL_TYPE,
34
       SensingMode
                                           SENSING_MODE,
35
       DetectionThreshold
                                           REAL,
36
       PerformanceMetric
                                           PERF_METRIC,
37
       Geolocation
                                            STRING,
38
39
40
41
     M_PROFILE_PARAM ::= SEQUENCE{
42
       MeasuProfileParamID
                                            M_PROFILE_PARAM_ID,
43
       MeasuProfileParamValue
                                            M_PROFILE_PARAM_VALUE
44
     }
45
46
     COEX_M_PROFILE ::= SEQUENCE OF M_PROFILE_PARAM
47
48
     COEX_M_PARAM ::= SEQUENCE{
49
       CoexMeasuObjID
                                            COEX_M_OBJ_ID,
50
        CoexMeasuProfile
                                            COEX_M_PROFILE
51
52
53
     COEX M PARAMS ::= SEQUENCE OF COEX M PARAM
54
55
     M_STATUS ::= ENUMERATED{
56
       SUCCESS,
57
       NOTSUPPORTED,
```

```
BUSY,
 2
 4
5
6
7
     M_RESULT_PARAM_ID ::= ENUMERATED{
        BSSID,
        SSID,
 89
        BSSType,
        BeaconPeriod,
10
        DIMPeriod,
11
        TimeStamp,
12
        LocalTime,
13
        PHYParameterSet,
14
        CFParameterSet,
15
        IBSSATIMWindow,
16
        CapabilityInformation,
17
        BSSBasicRateSet,
18
        OperationalRateSet,
19
        Country,
20
21
22
23
24
25
26
27
28
        IBSSDFSRecoveryInterval,
        Load,
        ChMeasuType,
        ChannelNumber,
        StartTime,
        Duration,
        ChMeasuReport,
        TransmitPower,
        LinkMagin,
29
30
31
32
33
34
        RCPI,
        RSNI,
       ReceiveAntennaID,
       TransmitAntennaID,
        SensingResult,
        Geolocation,
35
36
     }
37
38
     M_RESULT_PARAM_VALUE ::= CHOICE{
39
        BSSID
                                              STRING,
40
        SSID
                                              STRING,
41
        BSST
                                              BSS_TYPE,
42
        BeaconPeriod
                                              INTEGER,
43
        DIMPeriod
                                              INTEGER,
44
                                              INTEGER,
        TimeStamp
45
        LocalTime
                                              INTEGER,
46
        PHYParameterSet
                                              PHY_PARAM_SET,
47
        CFParameterSet
                                              CF_PARAM_SET,
48
                                              TU,
        IBSSATIMWindow
49
        CapabilityInformation
                                              BSS_CAPA_INFO,
50
        BSSBasicRateSet
                                              SET OF INTEGER,
51
        OperationalRateSet
                                              SET OF INTEGER,
52
        Country
                                              STRING,
53
        IBSSDFSRecoveryInterval
                                              INTEGER,
54
        Load
                                              BSS_LOAD,
55
        ChMeasuType
                                              CH MEASU TYPE,
56
57
        ChannelNumber
                                              INTEGER,
        StartTime
                                              INTEGER,
```

```
1
                                           INTEGER,
       Duration
23456789
       ChMeasuReport
                                           CH_MEASU_REPORT,
       TransmitPower
                                          INTEGER,
      LinkMargin
                                          INTEGER,
                                          REAL,
      RCPI
      RSNI
                                          REAL,
      ReceiveAntennaID
                                          INTEGER,
      TransmitAntennaID
                                         INTEGER,
      SensingResult
                                          SENSING_RESULT,
10
      Geolocation
                                          STRING,
11
12
    }
13
14
    M_RESULT_PARAM ::= SEQUENCE{
15
                                         M_RESULT_PARAM_ID,
       MeasuResultParamID
16
       MeasuResultParamValue
                                         M_RESULT_PARAM_VALUE
17
18
19
20
21
22
23
24
25
26
27
     M_RESULT_PARAMS ::= SEQUENCE OF M_RESULT_PARAM
     COEX_M_RESULT ::= SEQUENCE{
       CoexMeasuObjID
                                          COEX_M_OBJ_ID,
       MeasuStatus
                                          M_STATUS,
       MeasuResultParams
                                          M_RESULT_PARAMs
     COEX_M_RESULTs ::= SEQUENCE of COEX_M_RESULT
28
```

Table 6 describes parameters of data types of measurement service of Coexistence Media SAP.

30

31

Table 6	 Parameters of da 	* *	t service of Coexistence Medi	a SAP
Name	Type	Valid range	Description	Note
			The BSSID of the found	802.11-2007
BSSID	STRING	N/A	BSS.	Scan.
			The SSID of the found	confirm
SSID	STRING	132 octets	BSS.	
		INFRASTRUC		BSS
		TURE,	The type of the found	Description
BSSType	BSS TYPE	INDEPENDENT	BSS.	Set
• •	_		The Beacon period of the	
BeaconPeriod	INTEGER	N/A	found BSS (in TU).	
		As defined in	The DTIM period of the	
DTIM Period	INTEGER	frame format	BSS (in beacon periods).	
			The timestamp of the	
			received frame (probe	
			response/beacon) from the	
Timestamp	INTEGER	N/A	found BSS.	
			The value of the STA fs]
			TSF timer at the start of	
			reception of the first octet	
			of the timestamp field of	
LocalTime	INTEGER	N/A	the received frame (probe	

response or beacon) from the found BSS. The parameter sets relevant to the PHY from the received Beacon or Probe Response frame. If no PHY Parameter Set information element is present in the received frame, this parameter contains the channel number on which the frame format or according to the relevant PHY glause. The parameter Set information element is present in the received frame, this parameter contains the channel number on which the frame was received. Valid channel numbers are defined in the relevant PHY clause. The parameter set for the CF periods, if found BSS supports CF mode. The parameter set for the CF periods, if found BSS supports CF mode. The parameter set for the IBSS, if found BSS is an IBSS. The set of data rates that must be sup-ported by all STAs that desire to join this BSS. The STAs must be able to receive and transmit at each of the data rates listed in the set. The set of data rates that must be sup-ported by all STAs that desire to join this BSS. The STAs must be able to receive and transmit at each of the data rates listed in the set. The set of data rates that the STA desires to use for communication within the BSS. The STAs must be able to receive and transmit at each of the data rates listed in the set. The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive and transmit at each of the data rates listed in the set. The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. The information required to identify the regulatory domain in which the STA is located and to configure its PHY for opera			T	T	
PHYParameter PHYParameter Set Set PHYParameter Set				response or beacon) from	
As defined in frame format or according to the relevant PHY clause. PHYParameter Set information element is present in the received frame, this parameter contains the channel number on which the frame sare received. Valid channel numbers are defined in the relevant PHY clause. CFParameter Set SET OF SET OF INTEGER BSSBasicRate Set INTEGER Operational SET OF INTEGER Operational SET OF INTEGER Operational Set Operational S					
As defined in frame format or clause. PHYParameter Set information element is present in the received frame, this parameter contains the channel number on which the frame format or clause. CFParameter SeT SET As defined in frame format Set SET SET As defined in frame format or clause. CFParameter Set SET SET SET SET As defined in frame format Set				The parameter sets	
PHYParameter Set PHY_PARAM_ Set PHYParameter Set				relevant to the PHY from	
PHYParameter Set PHY_PARAM_ Set PHYParameter Set				the received Beacon or	
PHYParameter PHYParameter PHYParameter Set CFPARAM_Set As defined in Frame format Frame format As defined in Frame format As defined in Frame format IBSS, if found BSS is an IBSS. The parameter set for the IBSS, if found BSS is an IBSS. The advertised capabilities of the BSS. The set of data rates that must be sup-ported by all STAs that desire to join this BSS. The STA smust be able to receive and transmit at each of the data rates listed in the set. The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. This set is a superset of the atta rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. This set is a superset of the trates contained in the set. This set is a superset of the data rates listed in the set. The information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. Present only when TPC functionality is required, as specified in 11.8, or when As defined in the set. Country The parameter set for the CP provide in the set. This information to the provide provide provide provide provide provide provide provid					
As defined in frame format or according to the relevant PHY clause. The parameter set for the CF Parameter Set					
PHYParameter Set SET OF INTEGER BSSBasicRate Set SET OF INTEGER As defined in the relevant phy clause. 1127 inclusive (for each integer in the set) SET OF INTEGER SET OF INTEGER As defined in the relevant channel numbers are defined in the relevant phy clause. The parameter set for the CF periods, if found BSS supports CF mode. The parameter set for the IBSS, if found BSS is an IBSS. The sate of data rates that must be sup-ported by all STAs that desire to join this BSS. The STAs must be able to receive and transmit at each of the data rates listed in the set. The set of data rates that the STA desires to use for communication within the BSS. The STAs must be able to receive and the STA desires to use for communication within the BSS. The STAs must be able to receive and the STA desires to use for communication within the BSS. The STAs must be able to receive and the STA desires to use for communication within the BSS. The STA must be able to receive and the STA desires to use for communication within the BSS. The STA must be able to receive and the STA desires to use for communication within the BSS and a rates listed in the set. This set is a superset of the data rates listed in the set. This set is a superset of the data rates listed in the set. This set is a superset of the data rates listed in the set. This set is a superset of the data rates listed in the set. This set is a superset of the data rates listed in the set. This set is a superset of the data rates listed in the set. This set is a superset of the data rates listed in the set. This set is a superset of the data rates listed in the set. This set is a superset of the data rates listed in the set. This set is a superset of the data rates listed in the set. This set is a superset of the data rates listed in the set. This set is a superset of the data rates listed in the set. This					
As defined in frame format or according to the relevant PHY clause. CFParameter SET					
As defined in frame format or according to the relevant PHY clause. CFParameter SET				*	
As defined in frame format or frame format or seconding to the relevant PHY clause. CFParameter SET CFPARAM_ SET As defined in frame format pHy clause. The parameter set for the CF periods, if found BSS supports CF mode. The parameter set for the IBSS, if found BSS supports CF mode. The parameter set for the IBSS, if found BSS supports CF mode. The parameter set for the IBSS, if found BSS is an IBSS. The parameter set for the CF periods, if found BSS supports CF mode. The parameter set for the IBSS, if found BSS is an IBSS. The set of alta rates that must be sup-ported by all STAs that desire to join this BSS. The STAs must be able to receive and transmit at each of the data rates listed in the set. The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. This set is a superset of the rates contained in the set. This set is a superset of the rates contained in the set. This set is a superset of the rates contained in the set. This set is a superset of the rates contained in the set. This set is a superset of the attas contained in the STA is located and to configure its PHY for operation in that regulatory domain. Present only when TPC functionality is required, as specified in 11.8, or when dot11 MultIDomainCapabi lityEnabled is true. Country STRING Only present if BSSType					
frame format or according to the relevant PHY clause. CFParameter SET					
PHYParameter Set SET SET clause. PHY claus					
PHYParameter Set SET SET set set of the CF parameter Set			frame format or	frame was received. Valid	
Set SET CF Clause. PHY clause. CFParameter CF PARAM_ SET Gramme format SET Gramme format SET Gramme format SET Gramme format IBSSATIM Window TU frame format IBSS, if found BSS is an IBSS. The STA must be able to receive and transmit at each of the SET Gramme format the SET A desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. This set is a superset of the rates contained in the BSS. The STA must be able to receive at each of the data rates listed in the set. This set is a superset of the rates contained in the set. This set is a superset of the rates contained in the BSSBasicRateSet parameter. Operational RateSet INTEGER The set of alta rates listed in the set. This set is a superset of the rates contained in the set. This set is a superset of the rates contained in the BSSBasicRateSet parameter. The information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. Present only when TPC functionality is required, as specified in 11.8, or when dot11MultiDomainCapabil lityEnabled is true. Country STRING Country element Only present if BSSType			according to the	channel numbers are	
Set SET clause. PHY clause. CFParameter SET CF_PARAM_ SET Frame format SET CF PARAM_ SET	PHYParameter	PHY PARAM	relevant PHY	defined in the relevant	
CF_Parameter Set	Set		clause.	PHY clause.	
CF_Parameter Set					
Set	CFParameter	CF PARAM	As defined in		
As defined in IBSS, if found BSS is an IBSS. If a devertised capabilities of the BSS. If a devertised capabilities of the BSS If a devertised capabilities of the BSS. If a devertised capabilities of the BSS If a devertised capabilities of the BSS. If a devertised capabilities o					
BSSATIM TU Frame format IBSS, if found BSS is an IBSS I	501	JL1	name minat		
Capability	IDCCATIM		An defined in		
Capability		TOTAL			
Information BSS APA INFO frame format of the BSS. The set of data rates that must be sup-ported by all STAs that desire to join this BSS. The STAs must be able to receive and transmit at each of the data rates listed in the set. SET OF (for each integer in the set) The set of data rates that the same transmit at each of the data rates listed in the set. The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. This set is a superset of the rates contained in the BSS BasicRateSet NTEGER (for each integer in the set) The information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. Present only when TPC functionality is required, as specified in 11.8, or when Country STRING Country element lityEnabled is true. Only present if BSSType		TU			
BSSBasicRate SET OF (for each integer in the set) Operational RateSet INTEGER SET OF (for each integer in the set) Integer in the set in the se					
BSSBasicRate SET OF (for each integer in the set) Operational RateSet SET OF (for each integer in the set) 1127 inclusive (for each integer in the set) IThe set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. This set is a superset of the rates contained in the BSSBasicRateSet parameter. IThe information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. Present only when TPC functionality is required, as specified in 11.8, or when dot11MultiDomainCapabi lityEnabled is true. STRING Only present if BSSType	Information	BSS_APA_INFO	frame format		
BSSBasicRate SET OF (for each integer in the set) Operational RateSet INTEGER SET OF (for each integer in the set) Operational SET OF (for each integer in the set) Operational Set INTEGER As defined in the set) SET OF (for each integer in the set) Operational Set OF (for each integer in the set) Operational Set OF (for each integer in the set) As defined in the country STRING STAs that desire to join this BSS. The STAs must be be able to receive and transmit at each of the data rates listed in the set. The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. This set is a superset of the rates contained in the BSSBasicRateSet parameter. The information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. Present only when TPC functionality is required, as specified in 11.8, or when dot11MultiDomainCapabi lityEnabled is true. Only present if BSSType					
BSSBasicRate Set INTEGER INTEGER INTEG				must be sup-ported by all	
BSSBasicRate Set					
BSSBasicRate Set INTEGER (for each integer in the set) The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. This set is a superset of the data rates listed in the set. This set is a superset of the data rates listed in the set. This set is a superset of the rates contained in the BSSBasicRateSet parameter. The information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. Present only when TPC functionality is required, as specified in 11.8, or when As defined in the Country element STRING Country element Inty Enabled is true. STRING Country element Integer in the set of the atar rates listed in the data rates listed in the set. This set is a superset of the rates contained in the BSSBasicRateSet parameter. The information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. Present only when TPC functionality is required, as specified in 11.8, or when dot1 IMultiDomainCapabilityEnabled is true. Only present if BSSType				this BSS. The STAs must	
BSSBasicRate Set INTEGER (for each integer in the set) The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. This set is a superset of the data rates listed in the set. This set is a superset of the data rates listed in the set. This set is a superset of the rates contained in the BSSBasicRateSet parameter. The information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. Present only when TPC functionality is required, as specified in 11.8, or when As defined in the Country element STRING Country element Inty Enabled is true. STRING Country element Integer in the set of the atar rates listed in the data rates listed in the set. This set is a superset of the rates contained in the BSSBasicRateSet parameter. The information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. Present only when TPC functionality is required, as specified in 11.8, or when dot1 IMultiDomainCapabilityEnabled is true. Only present if BSSType			1127 inclusive	be able to receive and	
Set INTEGER in the set) In the set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. This set is a superset of the data rates listed in the set. This set is a superset of the rates contained in the BSSBasicRateSet parameter. Operational SET OF (for each integer in the set) The information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. Present only when TPC functionality is required, as specified in 11.8, or when As defined in the Country element Country STRING Country element IBSSDFS In the set) In the set of data rates listed in the set. The set of data rates that the STA desired to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. The set of data rates that the STA desired to use for communication within the BSS able to receive at each of the data rates listed in the set. The set of data rates that the STA desired to use for communication within the BSSBasicRateSet parameter. The information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. Present only when TPC functionality is required, as specified in 11.8, or when dot11MultiDomainCapabilityEnabled is true. Only present if BSSType	BSSBasicRate	SET OF		transmit at each of the	
The set of data rates that the STA desires to use for communication within the BSS. The STA must be able to receive at each of the data rates listed in the set. This set is a superset of the rates contained in the BSSBasicRateSet parameter. The information required to identify the regulatory domain in which the STA is located and to configure its PHY for operation in that regulatory domain. Present only when TPC functionality is required, as specified in 11.8, or when As defined in the Country STRING Country element Country STRING Country element Country STRING Country element Country Conly present if BSSType Country element Country Country element Country Country element Country Country element Coun					
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As defined in the Country element STRING Country element IityEnabled is true. Only present if BSSType					
Country STRING Country element lityEnabled is true. IBSSDFS Only present if BSSType			A 1 C 11 11		
IBSSDFS Only present if BSSType		GED D I C			
		STRING	Country element		
Recovery INTEGER 1255 = INDEPENDENT. The					
	Recovery	INTEGER	1255	= INDEPENDENT. The	

Interval			time interval that is used	
miervar				
			for DFS recovery. Present only when DFS	
			functionality is required.	
			The values from the BSS	
			Load information element	
			if such an element was	
			present in the probe	
		As defined in	response or Beacon frame,	
Load	BSS LOAD	frame format	else null.	
Measurement	CH MEASU	0,1,2	0: Basic request;	.11-2007
Type	TYPE	0,1,2	1: Clear channel	measure
Турс	1111		assessment (CCA) request	ment report
			2: Receive power	ment report
			indication (RPI) histogram	
			request	
Channel	INTEGER	Specified in	channel number for which	
Number	INTLOCK	regulatory domain	the measurement report	
TAILIOCI		10guiatory domain	applies	
StartTime	INTEGER		The parameter specifies	
Start Fillic	INTEGER		the time at which the	
			requested measurement, as	
			specified by the	
			MeasurementType	
			parameter, has started. A	
			value of 0 shall indicate it	
			shall start immediately.	
Duratioin	INTEGER		The Measurement	
Burunom	INTEGER		Duration field shall be set	
			to the duration of the	
			requested measurement, as	
			specified by the	
			MeasurementType	
			parameter, expressed in	
			TUs.	
ChMeasu	CH MEASU		Result of selected	
Report	REPORT		measurement. See the	
			following tables for the	
			parameter description of	
			BasicReport, CCAReport	
			and RPIhistogramReport	
			The contents of the	802.11k
			Transmit Power field of	Link
			the received Link	measure
			Measurement Report	ment
		As defined in the	frame. Present	
		TPC Report	only(#1472) if ResultCode	
TransmitPower	INTEGER	element	= SUCCESS.	
			The contents of the Link	
			Margin field of the	
			received Link	
			Measurement Report	
		As defined in the	frame. Present	
		TPC Report	only(#1472) if Result-	
LinkMargin	INTEGER	element	Code = SUCCESS.	

		As defined in 15.4.8.5 (Received Channel Power Indicator	The RCPI level of the corresponding Link Measurement Request frame received at the reporting STA. Present	
		Measurement(11k)), or 17.3.10.6 (Received Channel Power Indicator	only(#1472) if ResultCode = SUCCESS.	
		Measure- ment(11k)), or 18.4.8.5 (Received Channel Power		
RCPI	REAL	Indicator Measurement(11k		
			The RSNI of the corresponding Link Measurement Request frame received at the	
RSNI	REAL	As defined in 7.3.2.41 (RSNI element(11k))	reporting STA. Present only(#1472) if ResultCode = SUCCESS	
Receive AntennaID	INTEGER	0~255	The Antenna ID corresponding to the antenna on which the Link Measurement Request frame was received at the report-ing STA. Antenna ID is defined in 7.3.2.29 (EDCA Parameter Set element).	
Transmit AntennaID	INTEGER	0~255	The Antenna ID corresponding to the antenna used to transmit the Link Mea-surement Report frame. Antenna ID is defined in 7.3.2.29 (EDCA Parameter Set element).	
SensingResult	SENSING_ RESULT		Return the result of spectrum measurement for the selected sensing mode.	
Geolocation	String		Result of geolocation measurement	IEEE 802.22 GL-SAP, 802.11af and 1900.6

2 5.3.1.4 Event service data types

3 The following data types are defined for event service of Coexistence Media SAP.

```
1
 2
     COEX_E_ID ::= ENUMERATED{
       NewBSSStart,
 4
       Interference,
 5
6
7
       NewChannelAdded,
       ChannelRemoved,
       NeighbourChange,
89
       InformationForSharing,
       NetworkChannelChanged,
10
11
     }
12
13
     E_PARAM_ID ::= ENUMERATED{
14
       BSSID,
15
      NeighbourChange,
16
       InterferenceLevels,
17
       AddedChannelList,
18
       RemovedChannelList,
19
       UpdatedNetworkChannels
20
21
22
23
24
25
26
27
28
29
30
     }
     E_PARAM_VALUE ::= CHOICE {
       BSSID
                                            STRING,
       NeighbourChange
                                            NEIGHBOUR_CHANGE,
       InterferenceLevels
                                            INTERFERENCE_LEVELs,
       AddedChannelList
                                           LIST_TV_CHANNELS,
       RemovedChannelList
                                           LIST_TV_CHANNELS,
       UpdatedNetworkChannels
                                            NETWORK_CHANNELS,
31
32
33
     E_PARAM ::= SEQUENCE{
34
       EventParamID
                                           E_PARAM_ID
35
       EventParamValue
                                           E_PARAM_VALUE
36
37
38
     E_PARAMs ::= SEQUENCE OF E_PARAM
39
40
     COEX_E_PARAM ::= SEQUENCE{
41
       CoexEventId
                             COEX_E_ID
42
       CoexEvenParams
                               E_PARAMs
43
     }
44
45
     COEX_E_PARAMS ::= SEQUENCE OF COEX_E_PARAM
46
```

Table 7 describes parameters of data types of event service of Coexistence Media SAP.

48 49

47

Table 7 – Parameters of data types of event service of Coexistence Media SAP

Name	Туре	Valid range	Description	Note
BSSID	STRING	Any valid	Identifies a specific or	11-2007

		individual or broadcast MAC address	wildcard BSSID that just started.	Start(a new BSS)
Neighbour Change	NEIGHBOUR_ CHANGE		A set of BSSID that	802.11-2007
InterfereLevels	INTERFERENCE _LEVELs			802.19.1 specific
AddedChannel List	LIST_TV_ CHANNELS	Specified in regulatory domain	This parameter indicates the changes on the available channels by specifiying a list of channel numbers that become available.	802.19.1 specific
Removed ChannelList	LIST_TV_ CHANNELS	Specified in regulatory domain	This parameter indicates the changes on the available channels by specifiying a list of channel numbers that are no more available.	802.19.1 specific
Neighbour Change	NEIGHBOUR_ CHANGE		A set of BSSID that	802.19.1
Updated Network Channels	NET_ CHANNELS		Indicates the changes of network channels	802.19.1

5.3.1.5 Common data types

1

2

5

3 4 The following common data types are defined. They are used in the data type definitions of several services of Coexistence Media SAP.

6	TU ::= INTEGER	
7		
8	PHY_PARAM_SET ::= SET{	
9	aSlotTime	INTEGER
10	aSIFSTime	INTEGER
11	aCCATime	INTEGER
12	aPHY-RX-START-Delay	INTEGER
13	aRxTxTurnaroundTime	INTEGER
14	aTxPLCPDelay	INTEGER
15	aRxPLCPDelay	INTEGER
16	aRxTxSwitchTime	INTEGER
17	aTxRampOnTime	INTEGER
18	aTxRampOffTime	INTEGER
19	aTxRFDelay	INTEGER
20	aRxRFDelay	INTEGER
21	aAirPropagationTime	INTEGER
22	aMACProcessingDelay	INTEGER
23	aPreambleLength	INTEGER
24	aPLCPHeaderLength	INTEGER
25	aMPDUDurationFactor	INTEGER
26	aMPDUMaxLength	INTEGER
27	aCWmin	INTEGER

```
1
                                             INTEGER
        aCWmax
2
3
4
5
6
7
8
9
     CF_PARAM_SET ::= SET{
                               INTEGER
       CfpCount
        CfpPeriod
                               INTEGER
        CfpMaxDur
                               TU
        CfpDurRem
                               TU
10
11
     BSS_CAPA_INFO ::= SET{
12
                                             BOOLEAN
13
        IBSS
                                             BOOLEAN
14
       CFPollable
                                             BOOLEAN
15
       CFPollRequest
                                            BOOLEAN
16
       Privacy
                                            BOOLEAN
17
       ShortPreamble
                                             BOOLEAN
18
       PBCC
                                             BOOLEAN
19
       ChannelAgility
                                             BOOLEAN
20
21
22
23
24
25
26
27
28
29
30
31
32
33
       SpectrumMgmt
                                             BOOLEAN
       QoS
                                             BOOLEAN
       ShortSlotTime
                                             BOOLEAN
       APSD
                                             BOOLEAN
        DSSSOFDM
                                             BOOLEAN
        DelayedBlockAck
                                             BOOLEAN
        ImmediateBlockAck
                                             BOOLEAN
     BSS_LOAD ::= SET{
        STACount
                                            INTEGER
        CHUtilization
                                             INTEGER
        AvailableAddmissionCap
                                             INTEGER
34
35
     NEIBR_BSS ::= SEQUENCE{
36
       NeighbourBSSId
                                             BSSID,
37
        NeighbourBSSChannel
                                             INTEGER
38
     }
39
40
     NEIBR_BSS_SET ::= SEQUENCE OF NEIBR_BSS
41
42
     TV_CHANNEL_NUMBER ::= INTEGER
43
44
     TV_CHANNEL_NUMBERS ::= SEQUENCE OF TV_CHANNEL_NUMBER
45
46
     TV_POWER_LIMIT ::= INTEGER
47
48
     TV POWER LIMITS ::= SEQUENCE OF TV POWER LIMIT
49
50
     LIST_TV_CHANNELS ::= SEQUENCE{
51
       NumTVChannels
                                             INTEGER,
52
        TimeStamp
                                             TU,
53
54
                                             TV_CHANNEL_NUMBERS,
        TVChannelNums
        TVChannelPowerLimits
                                             TV POWER LIMITS
55
56
```

1 Table 8 describes parameters of LIST_TV_CHANNELS data type.

2

Table 8 – Parameters of LIST_TV_CHANNELS data type

Name	Туре	Valid range	Description	Note
NumberOfTV Channels	INTEGER	Dependens on country	The number of available TV channels. The parameter also specifies the vector size of information element xxx.2 and xxx.3	802.11af whitespace map
TimeStamp	TU		It indicates the TSF timestamp when a STA accesses TV bands database to get the White Space Map information	
TVChannel Numbers	SEQUENCE OF INTEGER		Specifies the list of TV channels for a given regulatory domin	
TVChannel PowerLimits	SEQUENCE OF INTEGER		Specifies the power constraints of availbel TV channels	

4

```
5 NETWORK_CHANNEL ::= SEQUENCE{
6 OperationClass INTEGER,
7 NumberofNetworkChannels INTEGER,
8 NetworkChannelNumber INTEGER,
9 NetworkChPowerConstraint REAL
10 }
11
```

12 T

Table 9 describes parameters of NETWORK_CHANNEL data type.

13 14

Table 9 – Parameters of NETWORK_CHANNEL data type

Name	Type	Valid range	Description	Note
NumberOf Network Channel	INTEGER		The number of available network channels for 802.11 devices. The parameter also specifies the vector size of information element xxx.1, xxx.2 and xxx.3	802.11af network channel enablement
OperationClass	INTEGER		It indicates the operation classes that the listed network channels apply.	
Network Channel Number	INTEGER		Specifies the list of network channels for a given regulatory domin	
NetworkCh	rREAL		Specifies the power	

Power		constraints of availbel	
Constraint		network channels	

```
1
 2
     NETWORK_CHANNELS ::= SEQUENCE OF NETWORK_CHANNEL
3
4
5
6
7
8
9
     POLARIZATION ::= ENUMERATED{
       Linear,
       Elliptical,
       Circular,
     }
10
11
     ANTENNA_GAIN ::= SEQUENCE{
12
       Country
                                           STRING,
13
       TVChannelNumber
                                           TV_CHANNEL_NUMBER,
14
       AntennaGain
                                           REAL
15
16
17
     ANTENNA_GAINS ::= SEQUENCE OF ANTENNA_GAIN
18
19
     ANTENNA_INFO ::= SEQUENCE{
20
       AntennaBandwidth
                                           REAL,
21
22
23
24
25
26
27
       AntennaBeamPointing
                                          REAL,
       AntennaBeamwidth
                                          REAL,
       AntennaDirectivityGain
                                          REAL,
       AntennaHeight
                                          REAL,
       AntennaPolarization
                                          POLARIZATION,
       AntennaGains
                                           ANTENNA_GAINS
     }
28
```

Table 10 describes parameters of ANTENNA_INFO data type.

30

29

Name	Type	Valid range	Description	Note
Antenna Bandwidth	REAL		Bandwidth of the antenna used at the TV band devices.	1900.6
AntennaBeam Pointing	REAL		The DataSeet.AntennaBeamPo inting parameter specifies the beam pointing direction of the antenna used at the spectrum measurement module by giving the azimuthal angle with respect to North and elevation angle with respect to the horizon.	
Antenna Beamwidth	REAL		Beamwidth of the antenna used at the spectrum measurement module,	

	DELL	normally specified as half- power horizontal and vertical beamwidth.	
Antenna DirectivityGain	REAL	Directivity gain in dBi of the antenna radiation pattern at the TV band devices.	
AntennaHeight	REAL	Height of the antenna in meters with respect to sea level. (cf. 6.3.32)	
Antenna Polarization	ENUMERATED	Polarization of the antenna used at the TV band devices. (cf. 6.3.32) 0: Linear polarization 1: Circular polarization 2: Elliptical polarization	
AntennaGain	ANTENNA_ GAINS	Power gain in dB of the antenna used at the TV band devices for a list of TV channels.	

```
2 3 4 5 6 7 8 9
     TVBD_INFO ::= ENUMERATED{
        WRAN_BS,
        WRAN_CPE,
       WLANSTA,
        WLANAP,
       MAN_AP,
        MAN_STA
10
11
12
     NEIGHBOUR ::= SEQUENCE{
13
        TVBDID,
                                               STRING,
14
                                 TVBD_INFO,
        TVBDInfo
15
        TVBDOccupiedChannels,
                                               LIST_TV_CHANNELS,
16
        Mobility
                                               MOBILITY,
17
18
     }
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
     LIST_NEIGHBOURS ::= SEQUENCE OF NEIGHBOUR
     MOBILITY ::= ENUMERATED{
       FIXED,
        MOBILE,
     CHANNEL_SWITCH_MODE ::= ENUMERATED{
        TXRestricted,
        NOTRestricted
     BSS_TYPE ::= ENUMERATED{
```

```
INFRASTRUCTURE,
 2 3 4 5 6 7 8 9
        INDEPENDENT,
        ANYBSS
     SCAN_TYPE ::= ENUMERATED{
        ACTIVE,
        PASSIVE
10
11
     CH_MEASU_TYPE ::= ENUMERATED{
12
        BASIC,
13
        CCA,
14
        RPI
15
16
17
     SENSING_WINDOW ::= SEQUENCE{
18
       NumSensingPeriods
                                              INTEGER,
19
        SensingPeriodDuration
                                              INTEGER,
20
21
22
        SensingPeriodInterval
                                             INTEGER
```

Table 11 describes parameters of SENSING_WINDOW data type.

2425

23

Table 11 – Parameters of SENSING_WINDOW data type

Name	Туре	Valid range	Description	Note
NumSensing Periods	INTEGER	0 to 63	The number of sensing periods	
SensingPeriod Duration	INTEGER	0 to 1023	Duration of each sensing in terms of the number symbols	
SensingPeriod Interval	INTEGER	0 to 2047	Duration of interval in terms of the number of frames.	802.22 SM- SSF

```
26
```

```
27
28
29
30
31
32
33
34
35
      SIGNAL_TYPE ::= ENUMERATED{
        Any,
        802.22WRAN,
        ATSC,
        DVB_T,
        ISDB_T,
        NTSC,
        PAL,
        SECAM,
36
37
        Microphone,
        802.22.1SyncBurst,
38
        802.22.1PPDUMFS1,
39
        802.22.1PPDUMSF2,
40
        802.22.1PPDUMSF3,
41
        MedicalTele,
42
        Studio,
```

```
1
2
3
4
5
6
7
8
9
10
11
     }
     SENSING_MODE ::= ENUMERATED{
        Hard,
        HardWithConfidenceValue,
        Soft,
        SoftWithConfidenceValue
     PERF_METRIC ::= SEQUENCE{
12
13
        PerfMetricPd
                                 INTEGER,
        PerfMetricPfa
                                 INTEGER
14
     }
15
```

Table 12 describes parameters of PERF_METRIC data type.

1718

16

Table 12 – Parameters of PERF_METRIC data type

Name	Type	Valid range	Description	Note
PerfMetricPd	INTEGER			When the PerformanceMetric.pd is specified sensors perform sensing by setting the rate of detection according to this value. Rate of detection is expressed as a percentage bounded between 0% and 100%.
PerfMetricPfa	INTEGER			When the PerformanceMetric.pfa is specified sensors perform sensing by setting the rate of false alarm according this value. Rate of false alarm is expressed as a percentage bounded between 0% and 100%.

19

```
20 BASIC_REPORT ::= SEQUENCE {
21 BSS BOOLEAN,
22 OFDM BOOLEAN,
23 UnidentifiedSignal BOOLEAN,
24 PrimaryServiceSignal BOOLEAN,
25 Unmeasured BOOLEAN,
26 ...
27 }
```

2829

Table 13 describes parameters of BASIC REPORT data type.

30

31

Name

Table 13 – Parameters of BASIC_REPORT data type

Type Valid range Description Note

BSS	BOOLEAN	BSS bit, which shall be set	
ВЗЗ	BOOLEAN		
		to 1 when at least one	
		valid MPDU was received	
		in the channel during	
		the measurement period	
		from another BSS or	
		IBSS. Otherwise, the BSS	
		bit shall be set to 0.	
OFDM	BOOLEAN	OFDM preamble bit,	
		which shall be set to 1	
		when at least one	
		sequence of short training	
		symbols, as	
		defined in 17.3.3, was	
		detected in the channel	
		during the measurement	
		period without a	
		subsequent	
		valid Signal field (see	
		17.3.4). This may indicate	
		the presence of an OFDM	
		preamble, such as	
		highperformance	
		RLAN/2 (HIPERLAN/2).	
		Otherwise, the OFDM	
		preamble bit shall be set to	
		0.	
Unidentified	BOOLEAN	May be set to 1 when	
Signal		significant power is	
		detected in the channel	
		during the measurement	
		period that cannot be	
		characterized as radar, an	
		OFDM preamble, or a	
		valid	
		MPDU. Otherwise, the	
		Unidentified Signal bit	
		shall be set to 0. The	
		definition of significant	
		power	
		is implementation	
		dependent.	
PrimaryService	BOOLEAN	Shall be set to 1 when	
	BOOLEAN		
Signal		primary service signals	
		was detected operating in	
		the channel during the	
		measurement period. The	
		algorithm to detect radar	
		shall satisfy regulatory	
		requirements and is	
		outside the scope of this	
		standard. Otherwise, the	
		Radar bit shall be set to 0.	
Unmeasured	BOOLEAN	Shall be set to 1 when this	
		channel has not been	
		measured. Otherwise, the	
	•	, , , , , , , , , , , , , , , , , , , ,	

	11	
	Unmeasured bit shall be	
	set to 0. When the	
	Unmeasured field is set to	
	1, all the other bit fields	
	shall	
	be set to 0.	

Table 14 describes parameters of CCA_REPORT data type.

8

7

1

Table 14 – Parameters of CCA REPORT data type

Name	Туре	Valid range	Description	Note
CCABusy	REAL	From 0 to 1	The CCA Busy Fraction field shall contain the fractional duration over which CCA indicated the channel was busy during the measurement duration. The resolution of the CCA busy measurement is in microseconds. The CCA Busy Fraction value is defined as Ceiling (255 * [Duration CCA indicated channel was busy (microseconds)] / (1024 * [Measurement duration (TUs)])).	

```
10
```

```
11
    RPI_REPORT ::= SEQUENCE{
12
      RPIHistogramReportRPI0Density0
                                                      INTEGER,
13
       RPIHistogramReportRPIODensity1
                                                      INTEGER,
14
       RPIHistogramReportRPI0Density2
                                                      INTEGER,
15
       RPIHistogramReportRPI0Density3
                                                      INTEGER,
16
       RPIHistogramReportRPI0Density4
                                                      INTEGER,
17
       RPIHistogramReportRPIODensity5
                                                      INTEGER,
18
       RPIHistogramReportRPIODensity6
                                                      INTEGER,
19
       RPIHistogramReportRPI0Density7
                                                      INTEGER
20
     }
```

Table 15 describes parameters of RPI_REPORT data type.

23

Table 15 – Parameters of RPI REPORT data type

Name	Туре	Valid range	Description	Note
RPIHistogram ReportRPI0 Density0	INTEGER	0~255	Density for Power ≤ –87	
RPIHistogram ReportRPI0 Density1	INTEGER	0~255	Density for −87 < Power ≤−82	
RPIHistogram ReportRPI0 Density2	INTEGER	0~255	Density for −82 < Power ≤−77	
RPIHistogram ReportRPI0 Density3	INTEGER	0~255	Density for −77 < Power ≤−72	
RPIHistogram ReportRPI0 Density4	INTEGER	0~255	Density for −72 < Power ≤−67	
RPIHistogram ReportRPI0 Density5	INTEGER	0~255	Density for −67 < Power ≤−62	
RPIHistogram ReportRPI0 Density6	INTEGER	0~255	Density for −62 < Power ≤−57	
RPIHistogram ReportRPI0 Density7	INTEGER	0~255	Density for –57 < Power	

```
2
```

```
3
    CH_MEASU_REPORT ::= CHOICE{
4
5
6
7
8
9
      BasicReport BASIC_REPORT,
CCAREport CCA REPORT.
       CCAReport
                            CCA_REPORT,
       RPIHistogramReport RPI_REPORT
    INTERVAL ::= SEQUENCE{
10
    IntervalStart
                             REAL,
11
       IntervalStop
                            REAL
12
13
14
    CONFIDENCE_LEVEL ::= SEQUENCE {
      ConfidenceLevelValue
15
                                        REAL,
16
       ConfidenceLevelInterval
                                        INTERVAL
17
18
19
    MODEORESULT ::= SEQUENCE{
20
21
22
23
24
       SignalType SIGNAL_TYPE,
       Presence
                             BOOLEAN
    MODEORESULTS ::= SEQUENCE OF MODEORESULT
25
```

Table 16 describes parameters of MODE0RESULT data type.

27

Table 16 – Parameters of MODE0RESULT data type

Name	Type	Valid range	Description	Note
SignalType	SIGNAL_TYPE			
Presence	BOOLEAN	0 or 1	For each signal type the SSF generates a binary decision as to whether the signal is present in the television channel	IEEE 802.22

2

9

10

Table 17 describes parameters of MODE1RESULT data type.

1112

Table 17 – Parameters of MODE1RESULT data type

Name	Type	Valid range	Description	Note
SignalType	SIGNAL_TYPE			
SignalPresence	BOOLEAN		For each signal type the SSF generates a binary decision as to whether the signal is present in the television channel	IEEE 802.22
Confidence Level	CONFIDENCE_ LEVEL		Confidence of measurement result for each type of signal specified	IEEE 1900.6

13

19 20

Table 18 describes parameters of MODE2RESULT data type.

22

21

23

Table 18 – Parameters of MODE2RESULT data type

Name	Туре	Valid range	Description	Note
SignalType	SIGNAL_TYPE			
Strength	REAL		For each signal type the	IEEE 802.22

SSF generates an estimate	
of the field strength of that	
signal	

```
MODE3RESULT ::= SEQUENCE{
Mode2Result MODE2RESULT,
StandardDeviation REAL
}

MODE3RESULTS ::= SEQUENCE OF MODE3RE
```

MODE3RESULTS ::= SEQUENCE OF MODE3RESULT

Table 19 describes parameters of MODE3RESULT data type.

11

12

10

8

9

1

Table 19 – Parameters of MODE3RESULT data type

Name	Type	Valid range	Description	Note
SignalType	SIGNAL_TYPE			
Strength	REAL		For each signal type the SSF generates an estimate of the field strength of that signal	IEEE 802.22
Standard Deviatoin	REAL		The standard deviation of the field strength estimate from sensing mode	IEEE 802.22

```
13
     SENSING_RESULT ::= CHOICE{
14
      ModeOResults MODEORESULTs,
15
       Mode1Results
                            MODE1RESULTs,
16
       Mode2Results
                            MODE2RESULTs,
17
       Mode3Results
                             MODE3RESULTs
18
19
20
21
22
23
24
25
26
27
28
29
31
32
33
34
35
    TRANSMISSIONINTERVAL ::= SEQUENCE{
       TransmissionStart
                                           TU,
       TransmissionDuration
                                           TU,
       TransmissionChannel
                                          Network_CHANNEL
     }
     TRANSMISSIONSEQUENCE ::= SEQUENCE OF TRANSMISSIONINTERVAL
     SCHEDULE ::= SEQUENCE{
       SchedulingStartTime
                                           TU,
       SchedulingPeriodDuration
                                           TU,
       NumberOfSchedulingPeriods
                                           INTEGER,
       TransmissionSequence
                                          TRANSMISSIONSEQUENCE
     INTERFERENCE_LEVEL ::= SEQUENCE{
36
       NetworkChannel
                                           NETWORK_CHANNEL,
       Interference
                                           REAL
```

```
1
2
3
4
5
6
7
8
9
      }
      INTERFERENCE_LEVELs ::= SEQUENCE OF INTERFERENCE_LEVEL
      NEIGHBOUR_CHANGE ::= SEQUENCE{
         AddedBSSs SEQUENCE OF STRING,
RemovedBSSs SEQUENCE OF STRING
10
      5.3.2 Coexistence Transport SAP data types
11
      The following data types are defined for Coexistence Transport SAP.
12
13
      TRANSPORT_PREF ::= ENUMERATED{
14
                     TCP,
15
16
         UDP,
```

- 23 6. Procedures and protocols
- 24 6.1 Generic procedures for information exchange

TRANSPORT_ADDR ::= OCTET_STRING

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27

17

18 19

20 $\overline{21}$ }