Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Service Class Definitions Problem - Revisited**
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Source(s)	Phillip Barber Voice: +1 (972) 365-6314 Broadband Mobile Technologies, Inc. Fax: +1 (925) 396-0269 8302 Sebastian Inlet [mailto:pbarber@BroadbandMobileTech.com] Frisco, Tx 75035
Re:	Response to IEEE 802.16e-04/06 (Call for Contributions on IEEE 802.16e/D1)
Abstract	Service Class Definitions Problem
Purpose	Stimulate discussion on a more flexible definition and mechanism for facilitating multimedia Service Flow migration/hand-over between foreign networks.
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Service Class Definitions Problem

Phillip Barber
Broadband Mobile Technologies

Problem 1:
6.4.13.4 Service classes is an *optional* feature in the core document (P80216-REVd/D3); but required for several *optional* and <u>*required*</u> features in 16e/D1 (80216e/D1):

Dependent Value	**Feature**
Service Level Prediction, Service Class Name	Association (RNG-RSP)
Service Level Prediction	BS HO Request message (MOB_BSHO-REQ)
Service Level Prediction	MSS HO Request message (MOB_MSSHO-REQ)
Service Level Prediction	BS HO Response message (MOB_BSHO-RSP)
Service Level Prediction	MSS HO Response message (MOB_MSSHO-RSP)
Service Level Prediction	RNG-RSP message
Service Level Prediction	11.x.x REG-RSP TLVs for re-establishment of Service Flows
QoS Estimated	C.2.6 HO-pre-notification-response message
QoS Estimated	C.2.7 HO-confirm message

Problem 2:
While Service Class Name associated with AuthorizedQoSParamSet may be set globally for all BS common to a single network, individual BS are free to dynamically create AdmittedQoSParamSet Service Class Names based on unique DSx QoS Param Set requests (**11.13 Service flow encodings**), or to temporarily and locally modify the definition/QoSParamSet of existing, Globally defined Service Class names. This creates the problem that when Service Class Name is called to be transmitted for HO, Target BS may have no idea what a unique Service Class Name assigned by Serving BS references.

Remedy:
Three choices, either 1) ignore Global Service Class Name and require explicit use of 11.13 QoS Parameters, or 2) use a 'Global Service Class Name' system common across all BS, that provides for basic/common QoS definition, combined with those 11.13 QoS Parameters as may be necessary to further define the AdmittedQoSParamSet being evaluated, or 3) eliminate all AuthorizedQoSParamSet items from message. Proposal is option 2).

Remedy 1:
Note that the SLP return code values contemplate a single SLP return regardless of the number of SFID specific 11.13 sets presented. That would tend to invalidate the processing of Service Flow Encodings specific to a certain SLP response, when we are only allowing a single SLP response in the message. Choices are to 1) eliminate Service Flow Encodings from response, 2) allow multiple iterations of SLP response with supporting Service Flow Encodings, or 3) allow single SLP response not tied to a list of multiple iterations of Service Flow Encodings
Note that SLP here is based on AuthorizedQoSParamSet while we only pass AdmittedQoSParamSet during HO. This is intended.
*[In **6.4.2.3.6 Ranging Response (RNG-RSP) message**, page 19, lines 24-57, modify as:]*
When a BS sends a RNG-RSP message in response to a RNG-REQ message containing Serving BS ID, the BS may include the following TLV parameter in the RNG-RSP message:

Service Level Prediction —- This value indicates the level of service the MSS can expect from this BS. The following encodings apply:

0 = No service possible for this MSS.
1 = Some service is available for one or several Service Flow authorized for the MSS.
2 = For each authorized Service Flow, a MAC connection can be established with QoS specified by the AuthorizedQoSParamSet.
3 = No service level prediction available.

Service Level prediction may be accompanied by a number of Service Flow Encodings as specified in 11.4.913 sufficient to uniquely identify the AuthorizedQoSParamSet associated with the predicting SLP. If Service Flow Encodings are included, then the SLP response is specific to the presented AuthorizedQoSParamSet defined by the associated encodings. Included Service Flow Encodings are restricted to with the following parameters only:

- Global Service Class Name
- Service Flow QoS parameter set encodings as defined in 11.13 such that the combination of Global Service Class Name and any Service Flow modifying parameters fully defines an AuthorizedQoSParamSet profile being assessed

    When provided, Service Class Name shall be included only as an unmodified, Globally defined Service Class Name. Alternatively, QoS Parameter Set items as provided in 11.4.9. In the event that Service Class Name, when to be included in RNG-RSP, is unique to the BS, or has been temporarily modified from its Globally defined AuthorizedQoSParamSet, the RNG-RSP message shall include a combination of an unmodified, Global Service Class Name and QoS Param Set items as provided in 11.4.9 such that they, in combination, define the AdmittedQoSParamSet represented.

- Service Flow Identifier

If individual AuthorizedQoSParamSet profiles are provided for multiple Service Level Predictions, then each Service Level Prediction is specific to its associated AuthorizedQoSParamSet profile and shall include only response options '0' or '2'.
Service class name may refer either to AuthorizedQoSParamSet (then Service Level Prediction should be encoded as '2') or to a subset of it (then Service Level Prediction should be encoded as '1').

Remedy 2:
*[In **11.1.4 RNG-RSP TLVs for re-establishment of Service Flows**, Table 279a—RNG-RSP Message Encodings, page 60, lines 51-64,editor to provide Message Type number* nn, oo, pp*; modify as:]*

Table 279a—RNG-RSP Message Encodings

Syntax	Type (1 byte)	Length	Value (Variable Length)
Service Level Prediction	17	1	This value indicates the level of service the MSS can expect from this BS. The following encodings apply: 0 = No service possible for this MSS 1 = Some service is available for one or several Service Flows authorized for the MSS. 2 = For each authorized Service Flow, a MAC connection can be established with QoS specified by the AuthorizedQoSParamSet. 3 = No service level prediction available.
Global Service Class Name	nn	6	
QoS Parameters	[145/146].Variable	Variable	Compound TLV incorporating one or more 11.13 QoS

			Parameter Set definition encodings
SFID	[145/146].1	4	

Remedy 3:

Break-out **Required QoS** line item into TLV item encapsulating unmodified Global Service Class Name and necessary 11.13 items modifying Global Service Class Name sufficient to define the AdmittedQoSParamSet represented.

*[In **C.2.5 HO-pre-notification message**, Table C6—HO-pre-notification Message, page 72&73, lines 53-12:]*

Table C6—HO-pre-notification Message

Field	Size	Notes
Global Header	152-bits	
For (j=0; j<Num Records; j++) {		
MSS unique identifier	48-bits	48-bit unique identifier used by MSS (as provided by the MSS or by the I-am-host-of message)
Estimated Time to HO	16-bits	In milliseconds, relative to the time stamp. A value of 0 indicates that the estimated time is unknown.
Required BW	8-bits	Bandwith which is required by MSS (to gurarantee minimum packet data transmission)
For (i=0; i<Num QoS Records; i++) {		
Required QoS	Variable	11.13 QoS Parameter definition encodings that in combination define an AdmittedQoSParamSet
}		
~~Required QoS~~	~~8-bits~~	~~Name of Service Class representing AuthorizedQoSParamSet~~
}		
Security Field	TBD	A means to authenticate this message
CRC field	32-bits	IEEE CRC-32