

# 802.20 Technology Selection Process Document

Approved September 22, 2005

IEEE P802.20-PD-10

This document is a Permanent Document of IEEE Working Group 802.20. Permanent Documents (PD) are used in facilitating the work of the WG and contain information that provides guidance for the development of 802.20 standards.

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## 1.0 Introduction

This document specifies the IEEE 802.20 technology selection procedure (TSP).

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## 2.0 Definitions

**System Requirements** – This document establishes the detailed requirements for the IEEE 802.20 Mobile Broadband Wireless Access (MBWA) systems. These requirements are consistent with, but extend beyond the 802.20 PAR and 5 Criteria. The 802.20 System Requirements are presented in document IEEE P802.20-PD-06r1.

**Evaluation Criteria** – This document presents the criteria used for the evaluation of air interface (i.e. combined MAC/PHY) proposals for the future 802.20 standard. It emphasizes the MAC/PHY dependent IP performance of an 802.20 system. This document and the IEEE 802.20 requirements document form the basis for decisions. The Evaluation Criteria are presented in document IEEE P802.20-PD-09.

**Channel Models** – This document specifies a set of mobile broadband wireless channel models in order to facilitate the simulations of MBWA Air Interface schemes at link level, as well as system level. The Channel Models are presented in document IEEE P802.20-PD-08.

**Complete Proposal** – A proposal that is within the scope of the PAR and addresses all the System Requirements and is presented in accordance with the evaluation criteria document. A complete proposal shall include a document in Microsoft Word format that contains the specification of the MAC/PHY of the proposal in sufficient detail so that Draft 1.0 can be created from this specification without adding technical features. All complete proposals shall specify how the System Requirements are met.

**Partial Proposal** – A proposal that is within the scope of the PAR, but is not complete. A Partial Proposal shall disclose what functionality it supports, which System Requirements and Evaluation Criteria apply to that functionality and whether it complies with these requirements.

**Compliant Proposal** – A Compliant Proposal is a proposal that meets or exceeds all the system, simulation and evaluation requirements (all the “SHALL” entries in the SRD) that are within its declared scope. For a Complete Proposal to be a Compliant Proposal it shall meet all the requirements. A Partial Proposal shall be deemed compliant if it meets all the requirements that apply to the specified functionality of that proposal.

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## 3.0 Technology Selection Process Rules

### 3.1 Prerequisites

1. 802.20WG shall approve Channel Models that shall be used for evaluation of proposals.
2. 802.20WG shall approve System Requirements that shall be addressed by all proposals.
3. 802.20WG shall approve Evaluation Criteria that shall be addressed by all proposals.
4. 802.20 WG shall officially approve a Technology Selection Process.
5. 802.20WG shall issue a call for proposals (CFP) following completion of the above.

### 3.2 Proposal Package Documentation Requirement

Technology proposals shall be submitted in accordance with the requirements of this document and the instructions of the *802.20 Call for Proposals*.

A Proposal Package is a set of documents and presentations submitted for consideration of the 802.20 Working Group. A proposal package shall contain at minimum, the following:

1. A Summary Classification Statement: This shall state whether the proposal is for a TDD Technology or a FDD Technology or both. The statement shall whether the proposal is Complete or Partial and whether the proposal is Compliant or Not Compliant. Complete, Partial, Compliant and Not Compliant are defined in Section 2.0 of the approved IEEE 802.20 Technology Selection Process document (IEEE P802.20-PD-10.)
2. Technology Overview: The Technology Overview shall consist of a Technology Overview Document, and a Technology Overview Presentation. The Technology Overview Document included with the package shall provide a high-level description of all elements of the submitted design. Format and presentation of the Technology Overview Document should be consistent with a high-quality technical white paper, or a report submitted for publication to an IEEE Journal. The Technology Overview Presentation shall consist of a set of slides, with included speaker's notes describing in detail the salient features of the submitted technology. All slide presentations shall be formatted in accordance with accepted IEEE 802.20 document templates.
3. A proposed Draft Technology Specification: This shall specify the core technology submitted for consideration and shall be written and formatted in a manner consistent with other IEEE 802 Specifications. The Technology Specification shall contain a detailed

description of the proposed specification of physical and medium access layer of an air interface for the 802.20 standard. The detail and style of the text should be consistent with IEEE 802 draft standards documents.

4. A Systems Requirements Compliance Report: The Requirements Compliance Report shall contain a statement of Compliance Status either Compliant, or Not Compliant. The Proposal Compliance Report shall contain a Requirements Compliance Matrix, as defined and shown in Annex 1 of the IEEE 802.20 Technology Section Process document.. A Requirements Compliance Report may also contain textual clarification of the Proposal Type, Compliance Status, or one or more Compliance Matrix Elements. These may be presented as notes for the Requirements Compliance Matrix, or as separate discussion paragraphs, in the case of the Proposal Type, or Compliance Status. A question regarding whether a proposal is Compliant shall be raised by motion. The motion questioning Compliance shall need a simple majority for approval. If the motion questioning Compliance is approved, the working group by a 75% vote shall decide if the proposal is not compliant.

5. Technology Performance and Evaluation Criteria Report: The Technology Performance Report is a document containing simulation results of performance, consistent with the approved IEEE 802.20 Evaluation Criteria, and Channel Models documents. The Technology Performance Report shall contain separate sections to demonstrate that the technology meets all claimed performance requirements of the approved IEEE 802.20 Systems Requirements Document, using the methods specified in the IEEE 802.20 Evaluation Criteria Document for the Proposal Package. The Evaluation Criteria document, defines an Evaluation Report 1 and an Evaluation Report 2 that are required for submission. Data may be organized as appendices to validate the results presented. Proposals must specify and justify any deviation from the evaluation methodology or any evaluation criteria that are not applicable (N/A) to them.

6. Technology Performance Presentation: The Technology Performance Presentation shall consist of a slide set, consistent with the Technology Performance Report that describes in high-level form, the results of the evaluation of the technology. The Technology Performance Presentation slides shall be formatted in accordance with accepted IEEE 802.20 document templates.

### 3.3 Proposal submission and presentation

#### 3.3.1 Submission

(a) Proposals shall be submitted to the working group Chair or the Procedural Vice-chair who, in turn, shall post the proposal documents on the IEEE 802.20 website, within 3 business days of the receipt of the Proposal Package. The 802.20 working group shall be alerted to the posting by email.

(b) Proposals shall be presented, in either interim or plenary sessions, no earlier than 14 calendar days from their posting date. The Proposal Package and related material as specified in the 802.20WG call for proposals shall be available to the voting members 14

1 days prior to the session at which they will be presented. The Evaluation Report 2 specified  
2 in the Evaluation Criteria Document may be available at the beginning of the session at  
3 which it may be presented or a later session. Any mergers resulting from initial proposals  
4 shall be made available to the voting members at least 7 days prior to the session at which  
5 they will be presented. Merged proposals shall meet all the requirements of a Proposal  
6 Package.

7  
8 (c) Partial proposals may be submitted and presented, but must merge with other complete  
9 and/or partial proposals in such a way that the resulting proposal is a complete proposal to  
10 carry forward during the down selection procedure. If a partial proposal does not merge,  
11 then it will not be considered further in the voting.

### 12 13 **3.3.2 Presentation**

14 (a) Presentation material shall be fully consistent with the submitted proposal. In case of  
15 inconsistency or discrepancy between the proposal and the presentation slides, the  
16 inconsistency/discrepancy shall be corrected.

17  
18 (b) Revised material shall be submitted, if possible, in the course of the same session in  
19 which it was presented.

20  
21 (c) Presentation material shall be documented as regular working group contributions.

22  
23 (d) Presenters shall be allotted adequate time for presentation, discussion and Q&A.  
24 Initially complete and partial proposals shall be allocated 90 minutes presentation time  
25 including discussion. If necessary, presenters may ask for, and be granted if possible,  
26 additional time in the same session. The request for additional time may be made prior to  
27 the session or during the session.

### 28 29 **3.3.3 Proposal Revision and Consolidation**

30  
31 (a) After the initial submission and presentation, proposals may be revised and/or  
32 consolidated/harmonized with other proposals. If a revised proposal includes technical  
33 changes that significantly affect its performance, the applicable parts of the simulations  
34 shall be run again and the new results shall be submitted along with the revised proposal.

35  
36 (b) Revised proposals shall be submitted to the working group and posted on the 802.20  
37 website at least 7 days before the session they would be presented in. The presentation shall  
38 be limited to a description of the changes made in the proposal, an assessment of the impact  
39 of the changes on the technology's performance and presentation of any new simulation  
40 results.

41  
42 (c) Partial proposals may merge with other proposals and result in complete proposals. In  
43 the event of a merger, presenters of mergers shall be allowed to request additional time to  
44 generate the merged proposal and present to the Working Group. The Working Group will

1 approve and/or determine the amount of time allowed prior to presentation of the merged  
2 proposals, and the time for presentation shall be fixed in the agenda.

3 (d) Any remaining partial proposals, after the Initial Selection Voting, that are not merged  
4 with a complete proposal shall not be considered further during the selection process.

5 (e) During the selection process mergers will be allowed between remaining proposals, and  
6 between remaining proposals and proposals that have been eliminated. Mergers will not be  
7 allowed between only eliminated proposals. The 802.20WG chair will provide an  
8 opportunity for the working group to decide by simple majority whether proposals that  
9 have merged or that have technical changes require normal time for consideration prior to a  
10 down-selection vote (4 meeting hours) or require extended time. Time extension beyond  
11 24 hours shall require support of majority of the voting members present.

### 12 3.4 Selection Process

13 **The selection process and voting shall be for a TDD technology selection and a FDD**  
14 **technology selection. Proposals for a TDD technology and a FDD technology shall be**  
15 **considered and voted separately. A proposal containing both technologies shall be**  
16 **voted in each respective selection track.**

#### 17 3.4.1 Down-Selection for TDD and FDD

##### 18 Initial Selection Voting

- 19
- 20 1. Presenters of each complete proposal shall be given the opportunity to make a final  
21 5 minute statement to the group advocating their proposals just before the down  
22 selection voting starts. An elimination vote shall then be taken to remove proposals  
23 having little support within the working group. Each voting member shall cast a  
24 single written ballot and vote to further consider or not to consider each individual  
25 proposal. The working group shall eliminate from consideration all proposals that  
26 do not obtain at least 35% support of the ballots cast. Elimination voting shall  
27 occur at the first session that proposals are considered. Additional elimination votes  
28 may be taken in the same session or in subsequent sessions until one technology  
29 remains for consideration.

- 30 2.
- 31 In the sample ballot shown below, a single registered voter has voted for Proposals  
32 A, B, and C to continue to be under consideration and Proposals D and E to no  
33 longer be considered.  
34

| Voting Members Name: John Smith |               |               |               |               |               |
|---------------------------------|---------------|---------------|---------------|---------------|---------------|
| VOTE TYPE                       | PROPOSAL<br>A | PROPOSAL<br>B | PROPOSAL<br>C | PROPOSAL<br>D | PROPOSAL<br>E |
| CONSIDER                        | √             | √             | √             |               |               |
| NOT CONSIDER                    |               |               |               | √             | √             |

35 Note: One vote per column per voter is required for a valid ballot.

## Elimination Voting

3. After any voting that eliminates one or more proposals or after a reset (Step 7), the remaining proposals may undergo technical changes without having to merge with other proposals.
4. The remaining candidates, even if no changes have been made to the proposal, will be given 45 minutes to present new data, if they chose..
5. In the event that there is only one proposal of a given type (i.e. TDD or FDD) remaining, the procedure for its further consideration shall be advanced to step 7.
6. Following the Initial Selection Voting, rounds of voting will be held that successively eliminate one candidate proposal at a time. On each round of voting, the candidate proposal that receives the least number of votes shall be eliminated from consideration. In the event of a tie for the least number of votes, a separate vote shall be held to select which of the candidates receiving the least votes shall be eliminated in the current round. The other candidate(s) shall remain for the next round. Between rounds of voting, presenters will again have the opportunity to merge proposals and/or make technical changes to their proposals. If a merger occurs or if technical changes are made to a proposal, presenters shall have the opportunity to present the details of their proposal again. The rounds of voting will continue until only one candidate proposal remains. The order in which the proposals are eliminated will be recorded in the minutes. This ordering will serve as the ranking of the eliminated proposals needed for the possible reset in step 7. In the event a proposal receives 75% of the votes during elimination voting, a Confirmation Vote will occur

## Confirmation Voting

7. When only one proposal of a given type is left, there shall be confirmation vote either in favor or in opposition of the proposal. The confirmation vote shall occur as soon as possible following the elimination vote resulting in one proposal. Voting members of 802.20 present shall be given written ballots for the confirmation vote. The 802.20 Chair and the Vice Chair or others as appointed by the Chair shall act as the tally takers. The results shall be announced after the vote.
8. If the sole remaining proposal fails to receive 75% majority on the first confirmation vote, a second confirmation vote will occur. If the remaining proposal fails to receive 75% of the votes in the second vote, the process shall return to step 5 at the point where there were three proposals remaining or all proposals that initially entered step 5, if there were less than three. If two proposals decide to merge at this point or a proposal withdraws, the next previously eliminated proposal will be added to provide a total of three proposals on the floor unless there were not three proposals that initially entered step 5.

## Approval of Initial Specification Draft

9. Having attained 75% support, the prevailing proposal will be adopted as the initial technical specification of IEEE 802.20 without further vote.
10. The IEEE 802.20 Editor shall prepare Draft 1.0 from this technical specification. The Draft 1.0 shall be forwarded to the working group for letter ballot.

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## 4.0 Documents Precedence

In case of conflicts, between this TSP and IEEE 802 rules or the IEEE 802.20 Working Group procedures, the latter shall prevail and subsequently the TSP shall be amended to eliminate the conflicts.

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## 5.0 Changes of the Procedure

After an initial adoption by a majority vote, the working group reserves the right to change this selection process and selection criteria as required with a two-thirds approval vote.

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## 6.0 References

1. IEEE P802.11 - Task Group N - Selection Procedure. September 17, 2003  
Doc #: IEEE 802.11-03/665r8:
2. IEEE 802.20 – The approved System Requirements Document (SRD), 802.20-PD-06r1.
3. IEEE 802.20 – The adopted Channel Models Document, 802.20-PD-08.
4. IEEE 802.20 – The approved version of the Evaluation Criteria Document (ECD), 802.20-PD-09.

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## 7.0 Annexes



**Annex 1****System Requirements Document Compliance Table**

| # | Requirement   | SRD<br>Section # | Requirement Type |        | Compliance Level |       |
|---|---|------------------|------------------|--------|------------------|-------|
|   |   |                  | Shall            | Should | Yes              | Notes |
| 1 | PAR requirements  | 1.3              | •                |        |                  |       |
| 2 | VoIP Services   | 2.1              | •                |        |                  |       |
| 3 | Broadcast – Multicast services  | 2.2              | •                |        |                  |       |
| 4 | non-line of sight outdoor to indoor scenarios and indoor coverage                   | 3.1              | •                |        |                  |       |
| 5 | layered architecture and separation of functionality between user, data and control | 3.1              | •                |        |                  |       |
| 6 | Spectral efficiency – DL @ 3 km/hr: 2.0b/s/Hz/sector                                | 4.1.1            | •                |        |                  |       |
| 7 | Spectral efficiency – DL @ 120km/hr: 1.5b/s/Hz/sector                               | 4.1.1            | •                |        |                  |       |
| 8 | Spectral efficiency – UL @ 3km/hr: 1.0b/s/Hz/sector                                 | 4.1.1            | •                |        |                  |       |

| #  | Requirement   | SRD<br>Section # | Requirement Type |        | Compliance Level |   |
|----|---|------------------|------------------|--------|------------------|---|
|    |   |                  | Shall            | Should | Yes              | Notes   |
| 9  | Spectral efficiency – UL @ 120km/hr: .75b/s/Hz/sector | 4.1.1            | ●                |        |                  |   |
| 10 | Block assignment support                              | 4.1.2            | ●                |        |                  | <i>State what sized block assignment supported.</i> |
| 11 | Duplexing Scheme                                      | 4.1.3            | ●                |        |                  | <i>State if FDD or TDD scheme is supported.</i>     |
| 12 | Support for Half Duplex FDD subscriber station.       | 4.1.3            |                  | ○      |                  |   |
| 13 | Support for different mobility rates                  | 4.1.4            | ●                |        |                  | <i>State which mobility rates are supported.</i>    |
| 14 | Aggregated data rate consistent with item 6           | 4.1.5            | ●                |        |                  |   |
| 15 | Aggregated data rate consistent with item 7           | 4.1.5            | ●                |        |                  |   |
| 16 | Aggregated data rate consistent with item 8           | 4.1.5            | ●                |        |                  |   |
| 17 | Aggregated data rate consistent with item 9           | 4.1.5            | ●                |        |                  |   |
| 18 | Peak User Data Rate (DL) of 4.5 Mbps in 1.5 MHz       | 4.16             | ●                |        |                  |   |
| 19 | Peak User Data Rate (UL) of 2.25 Mbps in 1.25 MHz     | 4.16             | ●                |        |                  |   |

| #  | Requirement  | SRD<br>Section # | Requirement Type |        | Compliance Level |   |
|----|--|------------------|------------------|--------|------------------|---|
|    |  |                  | Shall            | Should | Yes              | Notes   |
| 20 | Peak User Data Rate (DL) of 18 Mbps in 5.0 MHz   | 4.16             | ●                |        |                  |   |
| 21 | Peak User Data Rate (UL) of 9 Mbps in 5.0 MHz  | 4.16             | ●                |        |                  |   |
| 22 | MAC layer to control >100 simultaneous active sessions per sector. (See section for conditions.) | 4.1.7            |                  | ○      |                  |   |
| 23 | QoS support per requirements in section 4.1.8  | 4.1.8            | ●                |        |                  | <i>State any deviations from requirements in 4.1.8.</i> |
| 24 | Support the configuration of a flexible set variety of traffic classes (see section 4.1.8.1)     | 4.1.8.1          | ●                |        |                  |   |
| 25 | MAC/PHY features to support multi-antenna capabilities at the BS                                 | 4.1.9            | ●                |        |                  |   |
| 26 | Base station antenna diversity   | 4.1.10           |                  | ○      |                  |   |
| 27 | Support coverage enhancing technologies  | 4.1.11           | ●                |        |                  |   |
| 28 | BS authentication  | 4.1.12           | ●                |        |                  |   |
| 29 | MT authentication  | 4.1.12           | ●                |        |                  |   |

| #  | Requirement   | SRD<br>Section # | Requirement Type |        | Compliance Level |   |
|----|---|------------------|------------------|--------|------------------|---|
|    |   |                  | Shall            | Should | Yes              | Notes   |
| 30 | Network and mobile terminal perform mutual entity authentication and session key agreement protocol.                                  | 4.1.12.1         | ●                |        |                  |   |
| 31 | Privacy and message integrity methods   | 4.1.12.2         | ●                |        |                  |   |
| 32 | Support for encryption across the air interface.  | 4.1.12.2         | ●                |        |                  |   |
| 33 | Protection from unauthorized disclosure of the device permanent identity to passive attackers.  | 4.1.12.3         | ●                |        |                  |   |
| 34 | Protection against Denial of Service (DOS) attacks  | 4.1.12.4         | ●                |        |                  |   |
| 35 | AES Support   | 4.1.12.5         | ●                |        |                  | <i>State any deviation from requirements in 4.1.12.5.</i> |
| 36 | automatic selection of optimized user data rates that are consistent with the RF environment constraints and application requirements | 4.2.1            | ●                |        |                  |   |

| #  | Requirement   | SRD<br>Section # | Requirement Type |        | Compliance Level |       |
|----|---|------------------|------------------|--------|------------------|-------|
|    |   |                  | Shall            | Should | Yes              | Notes |
| 37 | Graceful reduction or increase of user data rates, on the downlink and uplink   | 4.2.1            | ●                |        |                  |       |
| 38 | Link adaptation   | 4.2.1            | ●                |        |                  |       |
| 39 | BS and MS transmit power control mechanisms and exchange control and monitoring information   | 4.2.1            |                  | ○      |                  |       |
| 40 | Application in dense urban, urban, suburban, rural, outdoor-indoor, pedestrian, and vehicular environments and the relevant channel models. | 4.2.2            | ●                |        |                  |       |
| 41 | Physical layer Measurements - BS  | 4.2.4            | ●                |        |                  |       |
| 42 | Physical layer Measurements - MS  | 4.2.4            | ●                |        |                  |       |
| 43 | Design extensible to wider channels.  | 4.3              | ●                |        |                  |       |
| 44 | Mechanisms for quality of service (QOS) control and monitoring.   | 4.4.1            | ●                |        |                  |       |

| #  | Requirement  | SRD<br>Section # | Requirement Type |        | Compliance Level |       |
|----|--|------------------|------------------|--------|------------------|-------|
|    |  |                  | Shall            | Should | Yes              | Notes |
| 45 | Interfaces and procedures that facilitate the configuration, negotiation, and enforcement of QoS policies                                    | 4.4.1            | ●                |        |                  |       |
| 46 | Support both IPv4 and IPv6.  | 4.5              | ●                |        |                  |       |
| 47 | Handoff methods  | 4.5.1            | ●                |        |                  |       |
| 48 | Allow the use of either MobileIPv4, MobileIPv6 or of SimpleIP  | 4.5.1.1          | ●                |        |                  |       |
| 49 | Mechanism to enable the provisioning and collection of metrics.  | 4.5.2            | ●                |        |                  |       |
| 50 | Not preclude proprietary scheduling algorithms, so long as the standard control messages, data formats, and system constraints are observed. | 4.6              | ●                |        |                  |       |
| 51 | Power conservation features to improve battery life for idle mobile terminals.   | 4.7              | ●                |        |                  |       |

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Example SRD Compliance Table (Fragment)

| #  | Requirement   | SRD<br>Section # | Requirement Type |        | Compliance Level |   |
|----|---|------------------|------------------|--------|------------------|---|
|    |   |                  | Shall            | Should | Yes              | Notes   |
| 1  | PAR requirements  | 1.3              | ●                |        | ●                |   |
| 2  | VoIP Services   | 2.1              | ●                |        | ●                |   |
| 3  | Broadcast – Multicast services  | 2.2              | ●                |        | ●                |   |
| 4  | non-line of sight outdoor to indoor scenarios and indoor coverage                   | 3.1              | ●                |        | ●                |   |
| 5  | layered architecture and separation of functionality between user, data and control | 3.1              | ●                |        | ●                |   |
| 6  | Spectral efficiency – DL @ 3 km/hr: 2.0b/s/Hz/sector                                | 4.1.1            | ●                |        | ●                |   |
| 7  | Spectral efficiency – DL @ 120km/hr: 1.5b/s/Hz/sector                               | 4.1.1            | ●                |        |                  | 1.0b/s/Hz/sector                                    |
| 8  | Spectral efficiency – UL @ 3km/hr: 1.0b/s/Hz/sector                                 | 4.1.1            | ●                |        | ●                |   |
| 9  | Spectral efficiency – UL @ 120km/hr: .75b/s/Hz/sector                               | 4.1.1            | ●                |        |                  | .5b/s/Hz/sector                                     |
| 10 | Block assignment support  | 4.1.2            | ●                |        | 2.5, 5           | <i>State what sized block assignment supported.</i> |
| 11 | Duplexing Scheme  | 4.1.3            | ●                |        | FDD              | <i>State if FDD or TDD scheme is supported.</i>     |
| 12 | Support for Half Duplex   | 4.1.3            |                  | ○      |                  | Not supported                                       |

| # | Requirement             | SRD<br>Section # | Requirement Type |        | Compliance Level |       |
|---|-------------------------|------------------|------------------|--------|------------------|-------|
|   |                         |                  | Shall            | Should | Yes              | Notes |
|   | FDD subscriber station. |                  |                  |        |                  |       |

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3 Example 1:

4 The SRD requirement for downlink spectral efficiency, at 120 Km/hr is 0.75 b/s/Hz while  
 5 the proposal's specification is 0.5 b/s/Hz. In this case, the entry for line item 9 should  
 6 contain a note indicating that.

7

8 Example 2:

9 The SRD provides a choice of block assignments; this choice is indicated in line 10 of the  
 10 table.

11

12 Example 3:

13 "Should" type requirement that the proposal does not support are indicated by leaving the  
 14 entry blank.

15