

Unresolved negative comments and rebuttal report

Background:

After the IEEE 802 LMSC July 2001 plenary the IEEE P802.15 WG for WPANs worked with the IEEE-SA Balloting Center to conduct two (2) Sponsor Ballots during the late summer and early fall of 2001. The P802.15.1/D0.9.2 initial 30-day ballot opened 27Jul01 and closed 25Aug01. Six (6) Balloters provided a total of 95 new comments; three (3) of which were DISAPPROVING Balloters. Additionally, this initial ballot met the 75% returned ballot requirement and the 75% affirmation requirement was met too. By virtue of meeting these requirements and the numbers in Table 1 below, the ballot is considered to have passed.

A Ballot Review Committee (BRC) was formed and led by the Project Chair. There were sixty-five (65) Editorial comments received (includes Balloters and Coordinators) and of these sixty-two (62) were accepted and three (3) were rejected. There were thirty (30) Technical comments received and of these eleven (11) were accepted and nineteen (19) were unresolved.

All balloting group members, observers, and coordinating groups were advised of substantive changes made with respect to P802.15.1/D0.9.2 the balloted draft standard (in response to comments, in resolving negative votes, or for other reasons) and received copies of all unresolved negative votes with reasons from the negative voter and the rebuttal, and were advised that they have an opportunity to change their votes. The edits were applied and draft standard P802.15.1/D1.0.1 was produced, with both change bar and clean versions.

The P802.15.1/D1.0.1 10-day recirculation ballot opened 2Oct01 and closed 11Oct01. No new DISAPPROVING Balloters were introduced and the only comments received were from coordinators submitting approving votes and/or that the "IEEE P802.15.1/D1.0.1 meets all aspects of IEEE editorial coordination." By virtue of this result, the comment resolutions have been approved, and ballot is still considered to have passed.

The BRC continues to communicate to the three (3) DISAPPROVING Balloters and we are happy to report that one (1) DISAPPROVING Balloter has reviewed the resolutions and changed his initial and recirculation vote from DISAPPROVING to YES WITH COMMENTS (see Comment #7) on 12Oct01.

Basis for the second recirculation:

Based on the results of the first recirculation the 802.15 WG for WPANs submitted to the IEEE-SA Standards Board Review Committee (RevCom) their application for approval of 802.15.1 on 26Oct01. However, on 7Dec01 the Project 802.15.1 received the following disapproval notification from the IEEE-SA RevCom.

"I must inform you that P802.15.1 was disapproved because the Sponsor must insure that the scope stated in the PAR is consistent with the scope of the document. The Sponsor shall conduct a recirculation ballot with proper technical rebuttals to unresolved negative comments. Gary Robinson will be the RevCom mentor to the Sponsor." David L. Ringle, RevCom Administrator

During and after the Dec01 IEEE-SA Standards Board Committee Meetings the Project 802.15.1 has been conducting discussions with our RevCom Mentor, Sponsor, etc. and we discerned that Comments #1, #2, #9, #26, #27, and #28 were problematic and needed proper technical rebuttals. The change bars below reflect the new responses from the 802.15.1 Ballot Review Committee based on the disapproval notification from the IEEE-SA RevCom. The second (designated Sponsor Ballot #3) P802.15.1/D1.0.1 10-day recirculation ballot should open 7Jan02 and close 17Jan02. The draft is available but has not changed the only issue before the Balloting Group are these six (6) new technical rebuttals.

Thank you for your participation in this ballot.

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Ian Gifford, Vice Chair, IEEE 802.15 Working Group for WPANs
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Note 1: Unresolved negative comments and rebuttal report legend:

COMMENT TYPE: T/technical E/editorial, COMMENT STATUS: D/dispatched A/accepted R/rejected, SORT ORDER: Comment #, Clause, Page, Line, RESPONSE STATUS: O/open W/written C/closed U/unsatisfied Z/withdrawn

Note 2: The 6 unresolved "T"echnical comments follow:

COMMENT #: 1

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PAGE: 0
LINE: 0
CLAUSE: 0

TYPE OF COMMENT: T

COMMENT: "This proposed standard operates in the same band as an existing IEEE approved standard, 802.11 and its approved supplement 802.11b. It has been demonstrated that the operation of this proposed standard interferes with devices complying with the 802.11 standard operating in the same band."

SUGGESTED REMEDY: "A means of mitigating or, preferably, eliminating the interference with the 802.11 standard is required and must be incorporated into this proposed standard in order for it to be acceptable. It is not acceptable to approve this proposed standard based on potential work being done in other task groups that, obviously, will not be incorporated in devices built to comply with this proposed standard."

RESPONSE: "REJECT.

We, the 802.15.1 Ballot Review Committee (BRC), thank the voter very much for taking the time to comment on the draft standard. The BRC acknowledges that it did not communicate its position properly to the sponsor voter in earlier opportunities. The BRC has re-reviewed the voter's comments and it does not share the voter's view.

In the original 802.15 WG IEEE 802 Five Criteria response (<http://ieee802.org/15/pub/par/5C.html>), we identified that coexistence with 802.11 LANs in the 2.4 GHz band is a critical success factor. The WG has worked and continues to work to assure that its family of 802.15 WPAN standards does coexist with other technologies in this band.

The WG established the 802.15.2 coexistence task group to study this issue within the WG (e.g., 802.15.1) and across WGs (e.g., 802.11). The 802.11 WG formally participates in 802.15.2 activities. Based on studies within and outside this task group, it has been shown, as expected and as the voter mentions, that there is interference between 802.11 and 802.15 nodes operating in the same space, at the same time, and in the same spectrum. However, these studies have also repeatedly demonstrated that the 802.11 nodes continue communicating with each other, and the 802.15.1 nodes continue to communicate with each other even when the 802.11 and 802.15.1 nodes are in the vicinity of each other and utilize the same (2.4 GHz) band. Thus, the 802.15.1 draft standard has demonstrated to satisfy the level of coexistence (the 6th of the IEEE 802 five criteria) advocated in the 802.15.1 PAR.

Based on studies that the group has made (plus studies outside the group and everyday observations), nodes designed based on the first IEEE WPAN draft standard have demonstrated that they can successfully coexist with other 802 wireless solutions.

Some of the coexistence results from the 802.15.2 studies are tabulated in document IEEE 802.15-01/195r0 (http://ieee802.org/15/pub/2001/May01/01195r0P802-15_TG2-BT-802-11-Model-Results.pdf). Some of the external studies have been recently reported in the press, e.g., http://www.80211-planet.com/news/article/0,4000,1481_937781,00.html. In terms of the suggested remedy: "A means of mitigating or, preferably, eliminating the interference with the 802.11 standard is required and must be incorporated into this proposed standard in order for it to be acceptable." we reject this requirement because we believe the IEEE should, wherever possible, rely on market forces to ensure economically efficient use of spectrum. Also, we consider a standard that uses a designated spectrum shall not constitute ownership of that spectrum. The Ballot Review Committee (BRC) suggests that the IEEE and the P802 Sponsor Executive Committee carefully review the resolution of this issue as it may arise again; that one working group member is attempting to block another working group from having their Project's deliverable approval based on a similar fallacy of logic - argumentum ad baculum (Appeal to Force). For example given that the 802.11 Working Group has received approval for standards in the 2.4 and 5 GHz bands will this type of 802.11 requirement reoccur at Sponsor Ballot for 802.15.3 at 2.4GHz, 802.15.3 at 5 GHz, 802.15.4 at 2.4 GHz, and/or 802.16b at 5 GHz?

The IEEE should not be put into the position of deciding which technology and/or standard is the best to promote. The IEEE approval policies, therefore, should both permit and promote the operation of competitive market forces. In large part, the IEEE can serve these principles simply by not interfering where it concludes that the judgment of the marketplace is sufficiently reliable.

Also, and more importantly an approved standard that uses a designated spectrum shall not constitute ownership of that spectrum. Specifically, the BRC believes based on an approved IEEE Std. 802.15.1-2001 that the marketplace will continue to demand Wi-Fi™ (802.11b) and Bluetooth™ (802.15.1) products. The IEEE should approve the IEEE Std. 802.15.1-2001."

COMMENT STATUS: R

RESPONSE STATUS: U

COMMENT #: 2

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PAGE: 1

LINE: 29-30

CLAUSE: 1.1

TYPE OF COMMENT: T

COMMENT: "In clause 1.1 it states: ""The proposed WPAN standard will be developed to ensure coexistence with all 802.11 networks." " however this subject is not addressed in any normative clause of this draft. In fact, the word ""coexistence"" does not even appear anywhere else within the 1159 pages of D0.0.2. The characteristics of the 2.4GHz radio and physical layer protocol specified in subsequent clauses shows no clear manner by which such coexistence is even possible in overlapping space with any of the 802.11 PHYs that operate in the 2.4GHz band (FH, DS, 802.11B, and the pending P802.11G). 802.15.1 is the first instance in the past 10 years, and probably the first instance ever in the history of 802 that an 802 draft has gone to sponsor ballot with a proposal to transmit conflicting and mutually incompatible signals onto the SAME INSTANCE of the physical medium as is already in use by another 802 MAC/PHY. There is not even a plausible argument that 802.11 and 802.15 networks will rarely be operated in overlapping space, since there are devices, such as notebook and subnotebook computers, which are explicitly stated as needing to attach to both WLANs and WPANS, concurrently if not simultaneously."

SUGGESTED REMEDY: "The proper technical solution is to modify the Bluetooth protocol to support an ""etiquette"" for sharing access to the 2.4GHz ISM band -- preferably listen-before-talk, although an approach based on a maximum duration for any transmission and a maximum transmit duty cycle are likely to be easier to implement than LTB."

RESPONSE: "REJECT.

We, the 802.15.1 Ballot Review Committee (BRC), thank the voter very much for taking the time to comment on the draft standard. The BRC acknowledges that it did not communicate its position properly to the sponsor voter in earlier opportunities. The BRC has re-reviewed the voter's comments and it does not share the voter's view.

In the original 802.15 WG IEEE 802 Five Criteria response (<http://ieee802.org/15/pub/par/5C.html>), we identified that coexistence with 802.11 LANs in the 2.4 GHz band is a critical success factor. The WG has worked and continues to work to assure that its family of 802.15 WPAN standards does coexist with other technologies in this band.

The WG established the 802.15.2 coexistence task group to study this issue within the WG (e.g., 802.15.1) and across WGs (e.g., 802.11). The 802.11 WG formally participates in 802.15.2 activities. Based on studies within and outside this task group, it has been shown, as expected and as the voter mentions, that there is interference between 802.11 and 802.15 nodes operating in the same space, at the same time, and in the same spectrum. However, these studies have also repeatedly demonstrated that the 802.11 nodes continue communicating with each other, and the 802.15.1 nodes continue to communicate with each other even when the 802.11 and

802.15.1 nodes are in the vicinity of each other and utilize the same (2.4 GHz) band. Thus, the 802.15.1 draft standard has demonstrated to satisfy the level of coexistence (the 6th of the IEEE 802 five criteria) advocated in the 802.15.1 PAR.

Based on studies that the group has made (plus studies outside the group and everyday observations), nodes designed based on the first IEEE WPAN draft standard have demonstrated that they can successfully coexist with other 802 wireless solutions.

Some of the coexistence results from the 802.15.2 studies are tabulated in document IEEE 802.15-01/195r0 (http://ieee802.org/15/pub/2001/May01/01195r0P802-15_TG2-BT-802-11-Model-Results.pdf). Some of the external studies have been recently reported in the press, e.g., http://www.80211-planet.com/news/article/0,4000,1481_937781,00.html.

The 802.15.1 editors believe that a coexistence analysis is not part of a protocol standards document. Having assured a desired level of coexistence, such analyses, can be added and presented through the continuing work from the 802.15.2 task group. Thanks to the voter's comments, the editors have located a typo where the term "co-existence" instead of "coexistence" appears on page 1069, line 2, subclause C.2.5.

Regarding the assertion that 802.15.1 is the first 802 draft to go to sponsor ballot transmitting conflicting and mutually incompatible signals onto the same instance of the physical medium, the BRC notes that the FH and DS PHYs in 802.11 are a previous instance of such a proposal. In CSMA one can listen only to transmissions from similarly modulated transmissions. Furthermore, energy detection is not a required feature for 802.11 implementations. Thus, it is quite possible that FH and DS 802.11 systems operating in the same space interfere with each other. However, there exists no assertion that they cannot coexist. Similarly, the work by 802.15.2 (and from outside groups) has shown that despite mutual interference between 802.11 and 802.15.1 systems, the two technologies can coexist. In terms of the suggested remedy: "The proper technical solution is to modify the Bluetooth protocol to support an "etiquette" for sharing access to the 2.4GHz ISM band..." we reject this solution because we believe the IEEE should, wherever possible, rely on market forces to ensure economically efficient use of spectrum. Also, we consider a standard that uses a designated spectrum shall not constitute ownership of that spectrum.

Specifically, the Ballot Review Committee believes based on an approved IEEE Std. 802.15.1 2001 that the marketplace will continue to demand Wi-Fi™ (802.11b) and Bluetooth™ (802.15.1) products. The IEEE should approve the IEEE Std. 802.15.1 2001. Additionally, that the market will continue to review the myriad of emerging coexistence approaches for collocated Wi-Fi & Bluetooth e.g.:

- * 802.15.2 collaborative and non-collaborative coexistence mechanisms
- * Simple device collocation with no coexistence mechanisms
- * Restricted or adaptive band hopping for Bluetooth devices
- * Switching between the two protocols
- * System level approaches covering the entire wireless sub-system and many of the above techniques

Note: Some of these mechanisms will provide "...sharing access to the 2.4GHz ISM band..." but note that they are outside of the scope and charter of 802. (see SB1 #1 response for more information)

Finally, the word coexistence, does appear again in the GAP, so if the commentor has not closely reviewed the text, how can we trust his comment. Based on the definition of coexist as defined in the PAR and Five criteria, coexistence does not imply cooperation (exchange of information to reduce or avoid the other) between or among WPANS and WLANs. Therefore there is no requirement to add or change the current procedures to include a cooperating mechanism to detect other WPANS or WLANs before creating a WPAN (i.e. piconet). It is not clear what criteria would be used to determine whether a channel, frequency, or both would be busy/free. When such criteria are defined for the IEEE 802.11, all parts), then one might be able to consider such a requirement from another standard. The IEEE 802.5 is not a listen before talk mechanism, in fact in some ways the token ring is

much like the master/slave relationship defined in IEEE 802.15.1.

The bottom line is the Ballot Review Committee is aware of the mutual interference between IEEE 802.11 and IEEE 802.15.1 and as was correctly pointed out by the commenter the 802.15 Working Group has formed a Task Group, IEEE 802.15.2, to address the issue of coexistence of IEEE WLAN and WPAN systems. The work of that task group will publish recommended practices to allow systems to reduce levels of mutual interference between the IEEE WLAN and WPAN systems. Based on the preceding response we REJECT the comment but we look forward to reviewing the 802.15.2 draft. More info:

<http://ieee802.org/15/pub/TG2.html>

COMMENT STATUS: R

RESPONSE STATUS: U

COMMENT #: 9

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PAGE: 29

LINE: 34-48

CLAUSE: 7.3

TYPE OF COMMENT: T

COMMENT: "Power class 1 specifies a maximum transmit power of 100mW, which is far in excess of what is reasonably required to provide RF coverage for a 10-meter personal operating space (see 6.1.2.1). Indeed, according to 6.1.2.1 the principal difference in radio characteristics which justifies the distinction between WLAN and WPAN is that WLAN radios are optimized to provide coverage on the order of 100 meters at the expense of power consumption, and therefore typically use 100mW of transmit power!"

SUGGESTED REMEDY: "Power class 1 should be eliminated, or reduced to a maximum level which is sensible for coverage of a 10-meter personal operating space (such as 4mW or 10mW). This has the ancillary benefit of simplifying the 802.11 coexistence scenarios by reducing the range at which a Bluetooth piconet can interfere with an 802.11 BSS."

RESPONSE: "REJECT.

We, the 802.15.1 Ballot Review Committee (BRC), thank the voter very much for taking the time to comment on the draft standard. The BRC recognizes that it did not communicate its position properly to the sponsor voter in earlier opportunities. Following a re-review of the voter's comments, the BRC continues not sharing the voter's view.

The BRC is in full agreement with the voter that power considerations and battery life are indeed among the key differentiating elements between wireless LANs and wireless PANs. Devices that will primarily employ wireless PAN technologies are personal, portable devices like headsets, PDAs, digital cameras, cellular phones, notebook computers, etc. All these devices (even, on occasion, notebook computers) typically operate in a cordless manner away from permanent power (AC) sources. Because of the power constraints, these personal devices will indeed use class 2 (2.5mW) or class 3 (1mW) radios.

However, due to the nature of personal area networking, wireless PAN technologies are heavily driven by the wide range of applications that users of these technologies are and will be involved with. Wireless PAN usage scenarios do not consider simply the wireless connectivity between, say, a PDA and a notebook computer for synchronizing one's PIM data stored in these personal devices.

Applications involving wireless PANs envision people in public spaces like malls, airports, museums, etc., using their personal devices to access (extremely) local information resources. For example, using their personal, carry-on devices like PDAs and 3G cellular phones, users will access mall maps, airline flight schedules, exhibit and floor plan information in museums, and so on. For these important wireless PAN applications, the battery-operated personal devices will typically communicate over WPANs with "fixed" WPAN devices, like data

attachment gateways (e.g., information kiosks) These fixed devices do not have the power constraints of the personal, carry-on devices, as they can be powered from fixed (regular) electrical outlets. The radios used for these (non-personal) fixed WPAN devices could be made to exceed the power and cost constraints covering the radios to be used in the overwhelming majority of personal devices. Radios for these fixed WPAN devices can thus use class 1 (100mW) radios and, as manufacturers have already demonstrated, have radio receiver sensitivity much higher than the minimum required by the draft standard. The increased power and receiver sensitivity will enable personal devices that use class 2 or 3 radios to interact with information kiosks located beyond the small coverage of these battery-operated devices. Furthermore, the increased coverage area for these fixed WPAN devices will permit information providers to reach WPAN users using a decreased number of information kiosks thus reducing the overall cost for deploying this WPAN application.

The larger coverage area for class 1 radios results in increased challenges in managing their coverage in the presence of additional wireless technologies (WPAN or not) cohabiting in the same space. To provide the necessary tools to the wireless network/deployment administrators to manage the coverage of multiple radios located in the same space, class 1 radios have a mandatory power control feature down to a class 2 level, and an additional optional power control feature (down to -30dBm). In terms of the suggested remedy: "Power class 1 should be eliminated, or reduced to a maximum level..." we reject this solution because we believe the IEEE should, wherever possible, rely on market forces to ensure economically efficient use of spectrum. Also, we consider a standard that uses a designated spectrum shall not constitute ownership of that spectrum. Specifically, the Ballot Review Committee believes based on an approved IEEE Std. 802.15.1 2001 that the marketplace will continue to demand Wi-Fi™ (802.11b) and Bluetooth™ (802.15.1) products. The IEEE should approve the IEEE Std. 802.15.1 2001. Additionally, that the market will continue to review the myriad of emerging coexistence approaches for collocated Wi-Fi & Bluetooth e.g.:

- * 802.15.2 collaborative and non-collaborative coexistence mechanisms
- * Simple device collocation with no coexistence mechanisms
- * Restricted or adaptive band hopping for Bluetooth devices
- * Switching between the two protocols

* System level approaches covering the entire wireless sub-system and many of the above techniques

Note: Some of these mechanisms are "...simplifying the 802.11 coexistence scenarios..." but note that they are outside of the scope and charter of 802. (see SB1 comment #1 response for more information)

COMMENT STATUS: R

RESPONSE STATUS: U

COMMENT #: 26

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PAGE: 440-441
LINE: 49-54 and 1-47
CLAUSE: 12.2.2

TYPE OF COMMENT: T

COMMENT: "This clause appears to have been copied from 8802-2, clause 2.3.2.2, which defines MA-UNITDATA.indication from the LLC side of the MAC SAP. Much of this text is inappropriate when defining the MAC side of the MAC SAP (for example, line 22 on page 441)."

SUGGESTED REMEDY: Please modify this clause to be a definition of the MA-UNITDATA.indication primitive and associated parameter values that will actually be generated by 802.15.1 MAC entities.

RESPONSE: "REJECT.

We, the 802.15.1 Ballot Review Committee (BRC), thank the voter very much for taking the time to comment on the draft standard. The BRC acknowledges that it did not communicate its position properly to the sponsor voter in earlier opportunities. The BRC has re-reviewed the voter's comments and it does not share the voter's view. We believe that the use of this section from the IEEE Std 802.2 is valid and consistent with this draft standard. The BRC understands the comment but based on our understanding of the Bluetooth Specification we decline the suggested remedy. We are open to further discussion but based on the signed agreement (see note below) we refer the commenter to the two (2) Bluetooth document references to Clause 2:

* 2.4.5. Bluetooth Personal Area Networking Profile Bluetooth Special Interest Group, "Bluetooth Personal Area Networking Profile Revision 0.95a", June 26, 2001. [PAN Profile.pdf]

* 2.4.6. Bluetooth Network Encapsulation Protocol (BNEP) Specification Bluetooth Special Interest Group, "Bluetooth Network Encapsulation Protocol (BNEP) Specification Revision 0.95a", June 12, 2001. [BNEP.pdf]

Note: Bluetooth documents are available from the IEEE website: <http://ieee802.org/15/Bluetooth/>

Note: License Agreement - The signed Bluetooth SIG - IEEE Copyright License Agreement to publish the Derivative Work states: ""Make such limited changes to the licensed portion of the Bluetooth Specification as the Licensee determines are required for the Derivative Work." The Ballot Review Committee (BRC) considers the suggested remedy a misapplication of the license agreement and would therefore constitute an infringement and nullify the contract."

COMMENT STATUS: R

RESPONSE STATUS: U

COMMENT #: 27

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CLAUSE: 12.2.3

TYPE OF COMMENT: T

COMMENT: "This clause appears to have been copied from 8802-2, clause 2.3.2.3, which defines MA-UNITDATA-STATUS.indication from the LLC side of the MAC SAP. Much of this text is inappropriate when defining the MAC side of the MAC SAP (a glaring example is the discussion of an ""excessive collisions"" status value on line 19 of page 442)."

SUGGESTED REMEDY: Please modify this clause to be a definition of the MA-UNITDATA-STATUS.indication primitive and associated parameter values that will actually be generated by 802.15.1 MAC entities.

RESPONSE: "REJECT.

We, the 802.15.1 Ballot Review Committee (BRC), thank the voter very much for taking the time to comment on the draft standard. The BRC acknowledges that it did not communicate its position properly to the sponsor voter in earlier opportunities. The BRC has re-reviewed the voter's comments and it does not share the voter's view. We believe that the use of this section from the IEEE Std 802.2 is valid and consistent with this draft standard. See comment resolution SB1 #26."

COMMENT STATUS: R

RESPONSE STATUS: U

COMMENT #: 28

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LINE: 1-54
CLAUSE: 12.3.2

TYPE OF COMMENT: T

COMMENT: "This is a critically important section that appears to be seriously incomplete. A useful nomenclature is defined, along with references to appropriate items in the foregoing clauses. There is also useful information in the attempt to identify what portions of the Bluetooth functional decomposition correspond to the 802 PHY layer and 802 MAC sublayer. However, there is no information about what L2CA primitives are generated, in what order, to perform the MA-UNITDATA.request function; what L2CA_Indications cause an MA-UNITDATA.indication; nor what transmission status information is conveyed in the MA-UNITDATA-STATUS.indication and which (if any) L2CA_Confirm messages supply this status information. Without a definition of the mapping between the MAC SAP primitives and L2CA primitives, there is insufficient information to understand the ""relationship of Bluetooth entities to IEEE 802 constructs.""

SUGGESTED REMEDY: "Please define which L2CA primitives are generated, in what order, to perform the MA-UNITDATA.request function; which L2CA_Indications cause an MA-UNITDATA.indication; and which transmission status information is conveyed in the MA-UNITDATA-STATUS.indication and which (if any) L2CA_Confirm messages supply this status information. State whether these definitions are strict (normative) or exemplary (informative), with consideration for whether interoperation of peer MAC entities will be reliable if these definitions are exemplary."

RESPONSE: "REJECT.

We, the 802.15.1 Ballot Review Committee (BRC), thank the voter very much for taking the time to comment on the draft standard. The BRC acknowledges that it did not communicate its position properly to the sponsor voter in earlier opportunities. The BRC has re-reviewed the voter's comments and it does not share the voter's view. We believe that a sufficient level of detail has been provided in this draft standard that allows implementers to build interoperable WPAN devices compliant to this document. See comment resolution SB1 #26."

COMMENT STATUS: R

RESPONSE STATUS: U

Note: This Unresolved negative comments and rebuttal report is an excerpt from the posted IEEE 802.15 document -01/420r11 contribution. More info: <http://ieee802.org/15/pub/SB3/SB3.html>

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