# Comments to OET Lab Report (940660 D01 Part 96 CBSD v01)

## Working Document WINNF-17-R-00145

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# WinnForum Comments to OET Lab Report (940660 D01 Part 96 CBSD v01)

## 1 Introduction

The Wireless Innovation Forum (WinnForum or the Forum) hereby responds to Federal Communications Commission Office of Engineering and Technology Laboratory Division call for comments with regards to document 940660 D01 Part 96 CBSD v01.

## 2 WinnForum Comments to 940660 D01 Part 96 CBSD v01

The following table provides the page number and text within the lab report which WinnForum has comments on.

**Table 1 Comments to the OET Lab Report**

| Page | Text / area within OET Lab Report | Comment / Discussion |
|---|---|---|
| 2 | ,CBSDs are required to demonstrate the capability to access at least one Spectrum Access System (SAS), which authorizes and manages CBRS spectrum use. | This seems to suggest that for passing certification, the CBSD UUT needs to pass test cases with the SAS test harness and provide proof of working with at least one certified SAS.<br>Suggestion: ",CBSDs are required to demonstrate compliance with the connection and interaction with a Spectrum Access System (SAS) test harness." |
| 2 | It also specifies verification tests and recommended procedures for demonstrating compliance with the rules governing the connection and interaction between the CBSD and one or more SASs. | The CBSD can connect to a single SAS at a time. If it attempts to connect to another SAS, this constitutes a new and separate registration.<br>Suggestion: "between the CBSD and the SAS." |
| 2 | Footnote 2 | At what time does a sample need to be submitted to the FCC for PAG (e.g. before or after going to the test lab). Can basic information be provided as to what is done in the PAG, what is required of the test lab and device manufacturer? |
| 3 | a) The ability to compel the device-under-test (DUT) to operate on a channel selectable by test personnel. | This action can be accomplished by having the SAS provide a grant in the chosen channel and verifying externally that the CBSD under test is transmitting in that channel. |

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| 3 | b) The ability to vary the output power from the minimum to the maximum realizable levels and set it to a desired level. | The grant has an associated maximum EIRP value. Cycling the CBSD through a series of grant allocations with varying power and measuring the output power can provide the needed verification.<br>Clarification on the minimum level is requested. |
| 3 | c) As needed, the ability to continuously transmit a modulated signal (i.e., with no time bursting or signal gating applied). | Since many CBSDs are likely to support TD-LTE where transmission DL alternates with receiving UL, this would require a special mode for the radio.<br>Please be specific about what needs may be found that would require this continuous transmission, what power levels would be used, what frequency range(s) might be tested, etc. |
| 3 | a), b), c) | What is the essence for these test, are they intended for RF test where unit is not connected to a SAS or CBSD-SAS protocol |
| 3 | d) The ability to enter all required SAS registration information. | CBSDs may be designed such that a significant amount of registration information is entered directly into the SAS by the CBSD vendor or by the CBSD User/Owner. Examples include the User/Owner name and contact information, antenna characteristics that apply to all units of a particular model from the CBSD vendor, EIRP capability, measurement capability, etc. There may be no provision in the CBSD software to hold or transmit all SAS registration information. |
| 3 | e) The ability to view all information provided to the radio by the SAS. | This function can most easily and reliably be provided by an external protocol analyzer. |
| 3 | Footnote 6 | Who determines whether a SAS test harness or actual SAS is used? I assume this would require running through the WINN Forum CBSD test cases on a certified SAS. It may be difficult for an actual SAS to run many tests designed for a SAS test harness.<br>Could the CBSD vendor and SAS vendor work together on a test plan / execution / results to demonstrate compliance? |
| 4 | 1. Geo-location<br>Must determine its location to an accuracy of ±50 meters horizontal and ±30 meters of elevation. For non-professional installed devices it must report any location changes within 60 seconds. | The R&O specifies a vertical accuracy of (+/-)3 meters. Maybe a clarification is needed. |

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| 4 | 2. Operability (Two-way communication) Devices should be able to transmit and receive any communication on any channel assigned by the SAS and respond accordingly. | The expression “any communication” includes transmissions of a different radio technology that may not be known or understood by a CBSD configured to operate with a given radio technology. |
| 4 | The management software must be able to collect the data listed below. | It is understood that “management software” here refers to the SAS harness communicating with the CBSD under test, since it is in the particular position of verifying that all data required for registration is available.<br>Or is management software referring to Domain Proxy? |
| 4 | iv. Requested authorization status (PAL or GAA) | The CBSD that uses the WInnForum protocol does not request a PAL/GAA authorization. PALs and PPAs are already known to the SAS. A request for a given spectrum range to the SAS will result in the SAS determining if the CBSD is entitled to PAL protection for that range. If so, the SAS response will indicate “PAL”, if not, the SAS response will indicate “GAA”. This avoids much complexity of having to program into the CBSD what PAL ranges it has, and having to reprogram them when PAL auction results change. |
| 5 | 4. Signal level reporting<br>A CBSD must report to a SAS received signal strength in its occupied and adjacent frequencies, received packet error rates, and other common standard metrics of interference for itself and its associated end user devices as directed by SAS. | The WInnForum measurement reporting requires that a CBSD with measurement capability “RECEIVED_POWER_WITHOUT_GRANT” must measure Received Power in the entire CBRS band in 10 MHz segments and report that at least at the time of the first Grant Request.<br>A CBSD with measurement capability “RECEIVED_POWER_WITH_GRANT” performs and reports Received Power measurements over one or more frequency ranges that do not exceed 10 MHz per measurement report. The measurement report(s) are sent to the SAS in the subsequent Heartbeat Request message.<br>There is no provision in the protocol for packet error rates or other metrics at this time. |
| 5 | 4 … frequencies, received packet error rates, and other common.. | The "or" in the 39(d) became an "and". |

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| 5 | 5. Frequency reporting<br>If directed by the SAS, a CBSD that receives a range of available frequencies or channels from an SAS must promptly report to the SAS which of the available channels or frequencies it will utilize. | The WInnForum protocol uses a different procedure. The CBSD requests a single specific frequency range in a Grant Request that is either accepted or rejected by the SAS. In this way, there is synchronization on spectrum allocation between SAS and CBSD without further messaging or uncertainty on the part of the SAS. |
| 5 | 1. Power limits and power management<br>All CBSDs must meet both, the maximum EIRP limit and maximum PSD limit. | This text implies that all CBSDs must be capable of transmission at the maximum EIRP of their category (A/B). This text would disallow CBSDs that are designed to operate at less than the maximum EIRP of their category. Suggestion: "All CBSDs must be capable of operating at no greater than the maximum EIRP limit and the maximum PSD limit." |
| 7 | c) Will the device change its operating power and/or channel in response to a command from an SAS? | The WInnForum CBSD concept is that the CBSD (after successful registration) requests a grant that includes both the allowed frequency range and the maximum EIRP to be used. The SAS does not command the CBSD to change power level or frequency range. The SAS may revoke a grant with a suggestion for a new grant. The CBSD may choose to ask for a new grant using the suggestion frequency range and power level. |
| 7 | a), c), d), e), f), g), h) | These sub-items are asking questions. They should be changed to reflect a test case result, e.g. "a) The DUT will only transmit after receiving authorization from a SAS."<br>Or are these questions that the testing lab needs to answer for certification? |
| 7 | 1. Will the device correctly configure based on the different license classes? | The CBSD does not change configuration. It is either registered as Category A or B. PAL and GAA grants operate exactly the same, with the SAS being responsible for PAL and incumbent protection. |
| 7 | 2. Will the device change power levels on commands from the device? | The SAS does not command the CBSD to change power levels. It can revoke the Grant and suggest a new grant. |
| 7 | 4. Will the device send measurements in response to the command from the SAS? | The SAS is restricted from requesting measurements that are outside the capabilities reported by the CBSD. |
| 7 | e) Is the device capable of signal level and frequency reporting to SAS? | The frequency in use by the CBSD is known to the SAS as part of the Grant procedure. Signal level reporting is interpreted here as "measurement reporting" as covered on page 5. |

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| 7 | f) For a device that operates as a Category A and then as a Category B (or vice versa), will it notify the SAS of the change and report the necessary information? | The WInnForum procedures require that a CBSD must re-register if it wants to operate as a different category CBSD. Such notification would then be handled as a Registration Request. |
| 7 | g) How compliance with all requirements is met when CBSDs communicate through a management system. | "management system" is interpreted here as "Domain Proxy". If this is not correct, then clarification is required. |
| 7 | 1. How would CBSD react if the communications between the device and the SAS is lost? CBSD should stop transmitting once it loses the link to the SAS. | The WInnForum *transmitExpireTime* timer is used to guarantee that a CBSD that loses communication with the SAS will cease transmission in no more than 5 minutes. However, transmission is not necessarily stopped as soon as communication is lost, since communication may be re-established before the *transmitExpireTime* timer expires. |
| 7 | 3. Review power-on restart process for registration (re-registration) process. | The WInnForum has implemented the "registration" of the R&O in two parts. The first part is a generally static registration of the CBSD with the SAS where all installation parameters are given to the SAS. This registration can remain over multiple poweroffs, etc. The second part is the CBSD obtaining a Grant from the SAS to operate in a given frequency range with up to a maximum EIRP level. Thus, power-on of a CBSD may or may not require registration. If the CBSD has stored in non-volatile memory the CBSD ID it received when it registered, it could use that CBSD ID to immediately request a new Grant. |
| 7 | IV. The device operating procedures if communicating directly to a SAS, or to a domain proxy if that manages multiple devices, must include documentation with detailed explanations for the following for each SAS the device is expected to work | Is this the SAS used for testing (that is based on footnote 6)? Or does documentation need to be supplied for every certified SAS as it may not be known what SAS an operator will connect a CBSD to?<br>Also, as a suggestion, change "or to a domain proxy" to " or through a domain proxy". |

# 3 Summary

WinnForum appreciates the opportunity to comment on document 940660 D01 Part 96 CBSD v01. We believe this FCC OET document provides guidance that is very beneficial for understanding the approval process and technical requirements for evaluating the compliance of CBSDs under Part 96. This leading to the overall goal of deploying certified CBSD by the end of 2017.