All Pages:

Typo in Footer, change 905642 to 905462.

Section 5.1, Footnote 1:

“Bridge mode” needs to be defined.

“operating as a relay” needs to be defined.

Section 5.1, Table 1:

Non-occupancy period states “Not required” for Client without radar detection, but the FCC Presentation at the February 2007 TCB Workshop and KDB 848637 (KDB 905462 D03) require it.

These should be aligned, and Sections 7 and 8 should be clarified accordingly.

Section 5.3, Table 4:

99% bandwidth measurement method specifies that a 100 kHz RBW be used. This is not in line with RBW = 1-3% of OBW as specified in ANSI C63.10.

KDB 905462 should cite ANSI C63.10 to avoid repeated testing for the same parameter.

Section 6.1, Table 5:

States that Radar Type 0 (previously Radar Type 1) shall only be used for channel availability and detection bandwidth tests however Draft KDB 905462 is not consistent in this regard. Section 7.1 specifies that Radar Type 0 may be used for Channel Move Time and Channel Closing Transmission Time. Section 8.3 #9 specifies that any Radar type may be used for the Non-Occupancy Period.

There are no known instances of non-compliance resulting from using previous Radar Type 1 (new Radar Type 0) in lieu of any other short pulse radar type or waveform, to measure short pulse Channel Move Time, Channel Closing Transmission Time or Non-Occupancy Period.

All inconsistencies within KDB 905462 should be aligned to specify that Radar Type 0 can be used to measure Channel Availability Check, Detection Bandwidth, short pulse Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period. See Section 6.1 Table 5, Section 7.1, Section 7.8.3 d), Section 8.3 #8 and Section 8.3 #9.
Section 7.4.1.3, Figure 10:

Annotation of Signal Generator stating “Set to Channel Center Frequency and Pulse Modulation Mode” is incorrect. Per text that follows this figure, the frequency is varied with each trial.

This annotation needs to be changed to “Set to Pulse Modulation Mode”

Section 7.4.1.3, middle of Page 29:

Text states, “Multiple trials are made, each at a different fixed frequency.” While this is true, no instructions for selecting the frequency for each trial are given.

When the DoD validated the simulated frequency hopping method in Boulder, CO they stated that the simulated hopping test should be done by adjusting the signal generator frequency in 1 MHz increments across the Detection Bandwidth, and that the frequencies should be equally weighted. Thus, the number of trials is \( N \ast (\text{Detection Bandwidth} + 1) \) and the minimum value of \( N \) is that which yields a total number of trials \( \geq 30 \). Therefore this test is performed in the following sequence

\[
\begin{align*}
\text{Trial 1 at } F_1 \text{ MHz, Trial 2 at } F_1+1 \text{ MHz, Trial 3 at } F_1+2 \text{ MHz, } \ldots, \text{ Trial } M \text{ at } F_H \\
\text{If } M \text{ is greater than or equal to } 30, \text{ the test is finished.} \\
\text{If } M \text{ is less than } 30, \text{ continue testing with} \\
\text{Trial } M+1 \text{ at } F_1, \text{ Trial } M+2 \text{ at } F_1+1, \text{ Trial 3 at } F_1+2 \text{ MHz, } \ldots, \text{ Trial } 2*M \text{ at } F_H \\
\text{If } 2*M \text{ is greater than or equal to } 30, \text{ the test is finished.} \\
\text{If } 2*M \text{ is less than } 30, \text{ repeat the above sequence as needed until } N*M \text{ is greater than or equal to } 30.
\end{align*}
\]

Above information regarding how to select the frequency for each trial should be added to the existing text.

Section 7.4.1.3, last two paragraphs on Page 29:

Typos in text, need to be changed as shown highlighted in red as follows:

“Referring to the actual hopping signal, the hops that are outside the U-NII Detection Bandwidth are shown as three dots in Figure 11 and Figure 12 and the hops that are within the U-NII Detection Bandwidth are shown as three lines. The center…”

“Referring to the simulated hopping signal, the hops that are generated are shown as three lines in Figure 12. Note that…”
Section 7.7:

Channel Loading needs to be defined, and a procedure to measure Channel Loading needs to be specified. We request that the procedure be based on zero-span time-domain measurements of RF Transmission time using instrumentation commonly available among regulatory test laboratories.

When Japan based their W56 band DFS requirements on the original FCC DFS requirements, the Japan MIC defined channel loading as the percentage of maximum throughput rather than RF duty cycle in percent. Based on the Japan MIC definition, 17% Channel Loading was equivalent to the 40 to 60% RF duty cycle associated with streaming the NTIA MPEG Test File in a legacy 802.11a network. Although the value of 17% is rather unique it cannot be determined if the FCC definition is intended to be percentage of maximum throughput. Measuring Channel Loading as the percentage of maximum throughput requires a traffic generator and traffic analysis instrumentation, which are not common among regulatory test laboratories.

Section 7.8.2.1 a):

In some cases the power-up plus CAC cycle time can exceed the required sweep time. The following change should be made to accommodate such a condition.

Change “...a 2.5 minute sweep time.” to “...a minimum 2.5 minute sweep time, as required to observe the UUT initiating transmissions on the Channel.”

Section 7.8.2.1:

The following step should be added to verify that the UUT is working properly, otherwise the subsequent test results from 7.8.2.2 will not necessarily be valid.

   c) Confirm that the UUT initiates transmissions on the Channel.

Section 7.8.2.2 d) and Section 8.3 #6 a):

Section 7.8.2.2 d) specifies observation for 2.5 minutes after radar Burst, while Section 8.3 #6 a) specifies minimum of 1.5 minutes after the T_power-up time period. Since the radar Burst is triggered approximately at T_power-up, the reporting requirement ought to be aligned with the procedure by changing 8.3 #6 a) to specify a minimum of 2.5 minutes after the T_power-up time period.

Section 7.8.2.3 d) and Section 8.3 #6 b):

Section 7.8.2.2 d) specifies observation for 2.5 minutes after radar Burst, while Section 8.3 #6 b) specifies minimum of 1.5 minutes T_power-up. Since the radar Burst is triggered approximately 1 minute after T_power-up, the reporting requirement ought to be aligned with the procedure by changing 8.3 #6 b) to specify a minimum of 3.5 minutes after the T_power-up time period.
Section 7.8.3:

Instructions to perform a Channel Closing Transmission Time test using one Long Pulse Radar waveform from Table 6 and a minimum sweep time of 22 seconds ought to be added for clarification.

Section 7.8.3 and Section 8:

The FCC Presentation at the February 2007 TCB Workshop requires a close-up plot showing compliance with the 200 ms Channel Closing Transmission Time, with a sweep time not to exceed 600 ms.

If this close-up plot is still required, it needs to be documented in Section 7.8.3 and Section 8.

Section 7.8.3 g):

The wording is vague, it ought to be changed to:

\[ g) \text{ In case the UUT is a U-NII device operating as a Client Device with In-Service Monitoring, perform steps a) to f) using both of the applicable RDD configurations specified in Section 7.5, with careful attention to isolate the radar signal from the device that is not detecting radar as specified in Section 7.1 for each configuration.} \]

Section 7.8.4 g):

The wording is vague, it ought to be changed to:

\[ g) \text{ In case the UUT is a U-NII device operating as a Client Device with In-Service Monitoring, perform steps a) to f) using both of the applicable RDD configurations specified in Section 7.5, with careful attention to isolate the radar signal from the device that is not detecting radar as specified in Section 7.1 for each configuration.} \]

Section 8.2 #2. e.:

Applying a calibration procedure to the U-NII Detection Bandwidth does not appear to be appropriate. Please clarify what is required or delete item #2. e. from Section 8.2.
Section 8.3 #4:

States that DFS tests are to be performed on the smallest U-NII Channel bandwidth, however we note the following inconsistencies.

The FCC Presentation at the February 2007 TCB Workshop requires that for devices with multiple bandwidths, all DFS tests must be performed in full on all bandwidths.

KDB 848637 (KDB 905462 D03) gives a conditional interim waiver to this February 2007 requirement for certain Client devices. Client devices with 80 MHz BW mode can be tested with an approved master operating in 40 MHz BW mode until suitable 802.11ac Master devices with the various bandwidths are approved.

If full testing at all bandwidths is still required, this needs to be documented in Sections 7 and 8.3 #4.

If testing at all bandwidths is no longer required, KDB 848637 (KDB 905462 D03) needs to be revised.

If full testing at one bandwidth is required, and partial testing at all bandwidths is required only for specific tests, these need to be clarified in Sections 7 and 8.3 #4

Section 8.3 #6 b):

Need to correct grammar by changing as shown highlighted in red as follows

“...minutes after the T_{power-up} time...”
Section 8.3 #7:

This section specifies verification that when the device is “off” that the RF energy is below the FCC rules for unintentional radiators.

Such a measurement is not feasible using the DFS instrumentation setup.

Referring to Sections 7.3 and 7.6 the only calibrated over-the-air path in a DFS test setup is the path between the Radar generating antenna and the UUT. All over-the-air paths to monitoring antennas are uncalibrated. Therefore the DFS test setup is unable to perform absolute measurements of the amplitude of UUT signals.

Following are considerations for relative measurements:

For DFS tests the spectrum analyzer is adjusted to accurately display the amplitude of the radar signal while the amplitude of the UUT signal is displayed at an arbitrarily lower level (but still above the noise floor) to facilitate timing measurements.

The FCC limit for unintentional radiators above 1 GHz is 54 dBuV/m at 3 m in a 1 MHz resolution bandwidth. The “off” state is equivalent to -41.2 dBm/MHz EIRP. The power spectral density limit for U-NII devices in the DFS bands is 11 dBm/MHz for antenna gain up to 6 dBi. The “on” state is 17 dBm/MHz EIRP. The required dynamic range is \((58.2 + 10 \times \log(\text{OBW}))\) dB [see ANSI C63.10-2013 Clause 4.1.5] assuming the amplitude of the UUT signal is set at the highest possible level on the spectrum analyzer display.

DFS tests are required to use peak detection, for which the unintentional device limit is 20 dB higher (reducing the dynamic range requirement) but the peak-to-average ratio of the UUT will partially offset this. Assuming a 13 dB peak-to-average ratio the net dynamic range requirement for peak detection becomes \((55.2 + 10 \times \log(\text{OBW}))\) dB. Furthermore DFS tests are required to use an instrumentation bandwidth of 3 MHz. This will decrease the headroom requirement and increase the noise floor in equal amounts therefore yields no net change to the required dynamic range.

In practice the actual required dynamic range is even greater than this to accommodate displaying the UUT signal lower than the displayed radar signal.

Section 8.3 #7 ought to be deleted.
Section 8.3, Sample Tables:

These should be revised to reflect the new Radar Type 1, and clarified for the Simulated Frequency Hopping Generator.

Section 8.3, Table 8:

Both this table and the associated title should be changed.

Change the Title to “Sample Detection Data Sheet for Radar Type 1”

The revised table is a modified version of existing Table 9 except the column headers are: Radar Type, Trial #, PRI (us), Number of Pulses, Test A/B, Detection Yes/No

Section 8.3:

Previous Table 8, changed above, is still required for Radar Types 5 and 6, therefore a new table should be added between existing Tables 9 and 10.

Make the Title “Sample Detection Data Sheet for Radar Type 5 and Actual Hopping Radar Type 6”

This table is identical to existing Table 8 except it is only applicable to Radar Type 5, and Radar Type 6 when using Section 7.4.1.2 Method #1 Frequency Hopping Radar Waveform Generator.

Section 8.3:

When the Simulated Hopping Radar Generator is used additional information is needed to document the waveforms, therefore a new table should be added after existing Table 10.

Make the Title “Sample Detection Data Sheet for Simulated Hopping Radar Type 6”

This table is a modified version of existing Table 9 except the column headers are: Trial #, Starting Index within NTIA Sequence, Frequency (MHz), Number of Hops within Detection Bandwidth, Detection Yes/No

This table is only applicable to Radar Type 6 when using Section 7.4.1.3 Method #2 Simulated Frequency Hopping Radar Waveform Generator.