RADWIN LTD. – Knowledge Database Request
Version 5.1 update

Document change history

Document revision	*Change date*	*Author*	*Change details*
Original	*December 2nd 2019*	*Eli Turgeman*	*Original version*
V1.1	*01/06/2022*	*Naftali Kopilevich* *Shlomo Weiss* *Ian Fountain*	*Updates identified with **
V2.1	*01/22/2023*	*Shlomo Weiss*	*Report adjusted with the present application details*
V3.1	*04/17/2024*	*Shlomo Weiss*	*Report adjusted with the RDWN96 application details*
V4.1	*06/13/2024*	*Shlomo Weiss*	*Report adjusted with the RDWN97 application details*
V5.1	*12/02/2024*	*Shlomo Weiss*	*Report adjusted with the RDWN98 application details*

FCC Approval history

Document revision	*Approval date*	*Tracking Number*
Original	*December 2nd 2019*	*321948*

1. Introduction and Overview

1.1. RADWIN LTD. ("RADWIN"), a leading provider of broadband solutions, manufactures and markets wireless broadband devices and systems on a worldwide basis. It seeks Commission confirmation that it may ship products to the United States that will be manufactured to be capable of configuration for different markets and regulatory environments and, once activated for use in the U.S. based on geolocation techniques, would operate consistently with a configuration approved during the U.S. equipment authorization process.

1.2.* In the U.S., RADWIN's products are currently certified under Parts 15 (§ 15.247 and § 15.407) and 90 (Subpart Y). The products operate in the frequency ranges 2.400-2.483.5 GHz, 5.725-5.850 GHz, 5.150-5.250 GHz, 5.250-5.350 GHz, 5.470-5.725 GHz, 4.940-4.990 GHz, 5.925-6.425 GHz, 6.525-6.875 GHz[1].

1.3.*As described more fully below, RADWIN proposes to use a geolocation procedure to configure its products to meet the different regulatory requirements for each country in which the products will be deployed, including the U.S. Using this new platform, products imported to

[1] *The frequencies listed above are presented for purposes providing complete information regarding RADWIN. The devices covered by this request will use only some of the listed frequencies. Actual used frequencies are listed below.

the U.S. would be configured automatically upon activation to meet the applicable FCC rules. RADWIN proposes to seek equipment approval as a software-defined radio. Attached as Exhibit 1 is the RDWN98 Security Description that conforms to the requirements of KDB 442812.

2. Description of Configuration Process

2.1. Each product will be marketed without the ability to operate (i.e., transmit) and without any default radio configurations. The product will self-configure to the parameters required by the jurisdiction in which it operates (i.e., frequency, power, EIRP, bandwidth, etc.) and will perform in conformance with those parameters once activated as described below. Devices submitted for FCC equipment authorization approval will assume that activation, as described below, has occurred and that the equipment will operate only under the approved parameters after self-configuration. Devices will be activated through the following method:

2.2. The device will be embedded with global positioning system ("GPS / GNSS") receiver and will detect the geographic coordinates of the product's location (i.e., latitude and longitude) and then configure the radio precisely as approved through the equipment authorization process for use in the U.S. *The device will check its geolocation every time it powers up.
*Once the regulation is determined, the regulation setting can only be changed by moving the device to a different regulation area and restarting the unit. After the reboot the unit compares the present location regulation to the previously used and if there is a mismatch will not transmit.

2.3. *User equipment ("UE") (intended to operate with point-to-multipoint base or hub transmitters) and point-to-point transmitters operating under the control of another point-to-point transmitter ("Dependent Point-to-Point transmitters") with or without embedded GNSS receivers but with direct wireless connectivity to an associated device with GNSS (i.e., to the base or hub transmitter in the case of UEs or to the primary point-to-point transmitter in the case of Dependent Point-to-Point transmitters) will obtain their configuration setting from that connected device and will thereafter operate as approved through the equipment authorization process. The UE or Dependent Point-to-Point transmitter will be unable to transmit until it receives the appropriate configuration settings from the base/hub or primary point-to-point station via a radiofrequency transmission message. If connection with the base/hub or primary point-to-point transmitter is ever lost, the UE/Dependent Point-to-Point station will cease transmissions and will not transmit until it again obtains the appropriate configuration settings from the base/hub or primary point-to-point transmitter.

2.4. *When there is no GNSS reception (indoor laboratory), the installer will manually select the country in the device web-UI, and the regulation will be automatically derived from the selected country. Once the installer deploys the device outdoors, during device powers up, it will identify the country and regulation from GNSS, and if they differ from what was previously manually set by the installer, the device will not transmit until the installer selects band and frequency which are allowed under the current regulation.

2.5. *Attached as Exhibit 2 is a diagram that shows how a User Equipment ("UE") or a dependent point-to-point device (one without its own GNSS sensing capability) will determine its location. In summary, the UE/dependent device will scan (and not transmit) for a signal from a base/hub or other point-to-point device. The base/hub or other point-to-point device will transmit a beacon once it establishes its location and appropriately configures itself based on location. When this process is complete, the link between the UE/dependent point-to-point device and the base/hub/other point-to-point device will be established.

2.6. *These configuration procedures will contain a number of specific safeguards.
*First, once the product automatically sets a specific regulation (derived from device location ascertained by GNSS upon power-up), the product cannot be reconfigured to another regulation. Next time the device powers up, it will again undergo regulation detection based on location. In case of a contradiction between the old and new regulations, the device will not transmit until the installer chooses a frequency which is allowed under the new regulation.
*Second, for both of the configuration methods (automatically derived from GNSS or manually selected for indoor lab use), any software upgrades or updates will not have the ability to modify the configuration settings initially established through the techniques described above. *While there may be software updates, they will have no impact upon the location-establishment techniques identified within this document.
*Third, backup and restore data procedures will not modify any of the regulation and frequency configuration settings.

3. Specific Bands of Operation – Configuration for U.S. Operations

3.1. *The device supports the frequency range 4.9-6.425 GHz. The chart below shows the sub-bands within the supported frequency range, and how they are regulated within in USA and Canada, under FCC and ISED. The installer will only be able to select the use of the bands authorized in the country location detected by the GNSS. Once a device identifies where it is located, band selection will be restricted to spectrum permitted for use in that jurisdiction. When a particular band is selected after the GNSS detects the device's location, all regulatory parameters for that jurisdiction will be applied by software. So, for example, as the device currently still doesn't support DFS (DFS support will be added in a future SW upgrade), if the device detects it is located in the U.S, it will not allow the user to select the band 5.25-5.35 GHz and 5.47-5.725 GHz (for which U.S, regulation requires DFS). User can select bands where there are no DFS requirements.

Band (GHz)	Permitted / Restricted	Jurisdiction Where Use Permitted/Relevant Regulation
4.940-4.990	**Permitted**	US – FCC Part 90. Canada – ISED RSS 111.*
5.150-5.250	**Permitted**	U.S. – FCC Part 15.407.
5.250-5.350	Restricted	U.S. – FCC Part 15.407. Canada – ISED RSS 247.
5.470-5.725	Restricted	U.S. – FCC Part 15.407. Canada – ISED RSS 247.
5.725-5.850	**Permitted**	U.S. – FCC Part 15.407. Canada – ISED RSS 247.
5.925-6.425	**Permitted**	U.S. – FCC Part 15.407. Canada – ISED RSS 248.

* Only 20 MHz channel bandwidth operation permitted

4. Description of SW upgrade process

4.1.*Upgrade is performed as follows:
The installer downloads a SW version from Radwin website.
The installer elects to upgrade from the web UI or from Radwin NMS.
The installer selects the SW file.
The system verifies, authenticates and deciphers the file, to make sure the file is authentic and was not tempered with.

4.2.*When any software update is performed – including the potential addition of frequency bands newly permitted for use – the device is required to be powered-off and then be powered-on.
*Once the device powers up, it will identify its country using GNSS.
From the country, it will identify the applicable regulation. If the device has never been configured, the installer must configure the device and select the operation band and channel before the device starts transmitting. The system will only allow to select the band which is allowed by the regulation (including any additional frequency bands added in the update). The system will enforce the technical limitations permitted for the regulation (e.g., max EIRP).
If the device has been configured before the SW upgrade, upon power up the system will make sure that the configured operating frequency still complies to the regulation limitations after the update. If the operating frequency doesn't comply to the new regulation limitations, the unit will not transmit until the installer configures the unit with operating frequency that complies to the updated regulation limitations. RADWIN recognizes that regardless of who performs the software update, it remains legally obligated to ensure that, after a SWU the devices only transmit on the frequencies, and with the operational parameters, appropriate for the country in which the device operates."

5. Test Plan

5.1.*Attached as Exhibit 3 to this document is the test plan that RADWIN will employ to validate the operation of GNSS and its effective method of control. As that diagram shows, the test will involve three components – a GNSS simulator (a device that can simulate receipt of GNSS data), a base station/hub and a UE. The base station and UE will be connected by cable that simulates an RF transmission. RADWIN understands that all applications using the system feature described in the request and in this document will be required to include this description in the theory of operation.

6. Labeling

6.1.Each RADWIN product will contain a single "uniform" label that will meet the requirements of all the relevant regulations (i.e., FCC, ISED). The devices will not be operated, marketed or sold as modules. The devices that are the subject of the request are only finished products – hub/base/UE/point-to-point devices. A sample label is attached as Exhibit 5.

7. Request

7.1.*RADWIN seeks confirmation that both of the proposed configuration procedures are permissible under the Commission's rules. The products could not transmit within the U.S. until they are activated and such U.S. activation would automatically result in operation consistent with parameters approved through the equipment authorization process. There would therefore be no "selection" by the product user of country codes to indicate regulatory domain, and the products will comply with the conditions of their equipment authorizations under all circumstances when outside the lab. Software could not be used to take the products out of compliance, as discussed above, as installers or other third parties would not have the ability to modify operations.

Exhibit 1 - Sample Software Defined Radio Security Description

Document supplied separately accompanying this document

Exhibit 2 – UE/Dependent Point-to-Point Transmitter Confirmation of Location

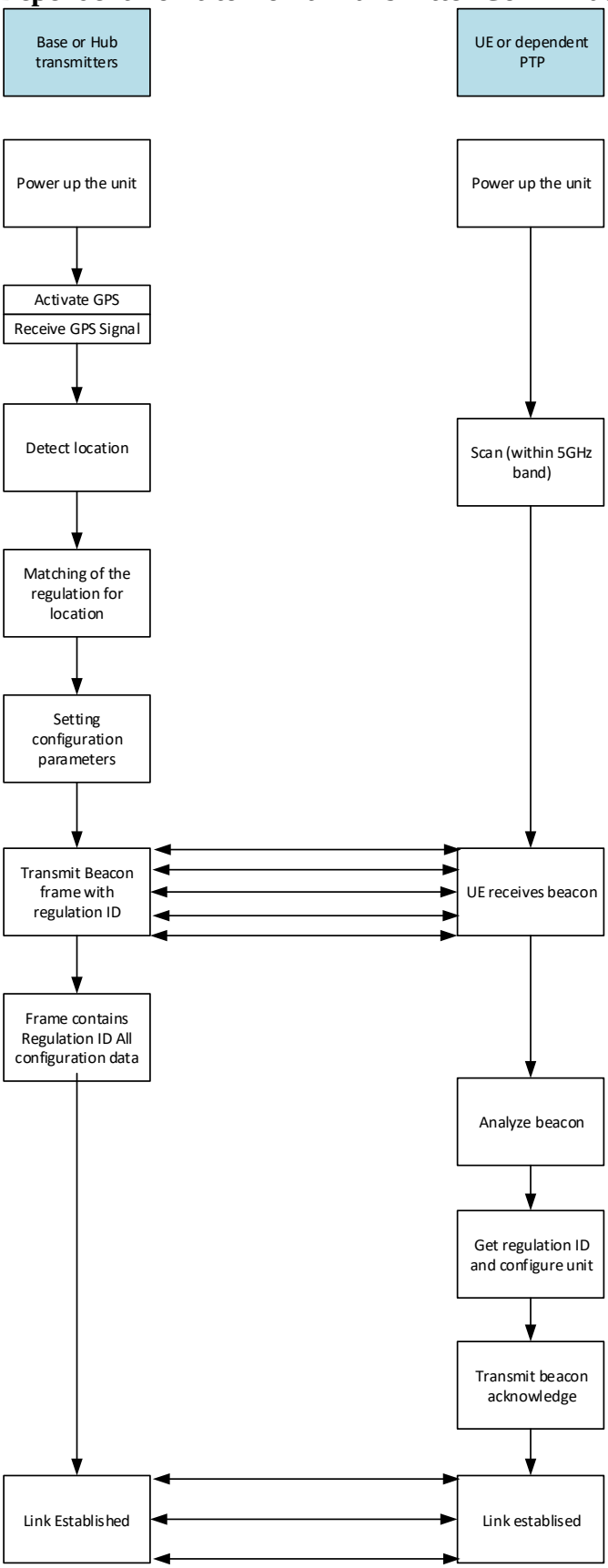
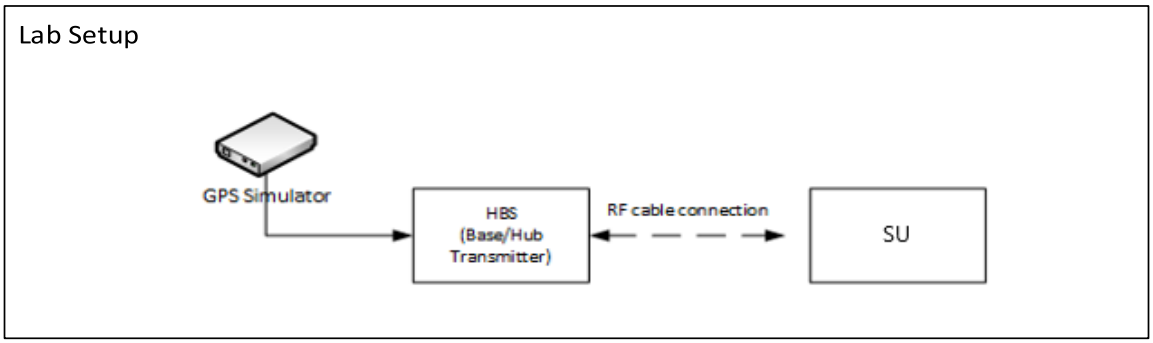


Exhibit 3 – Test Plan*



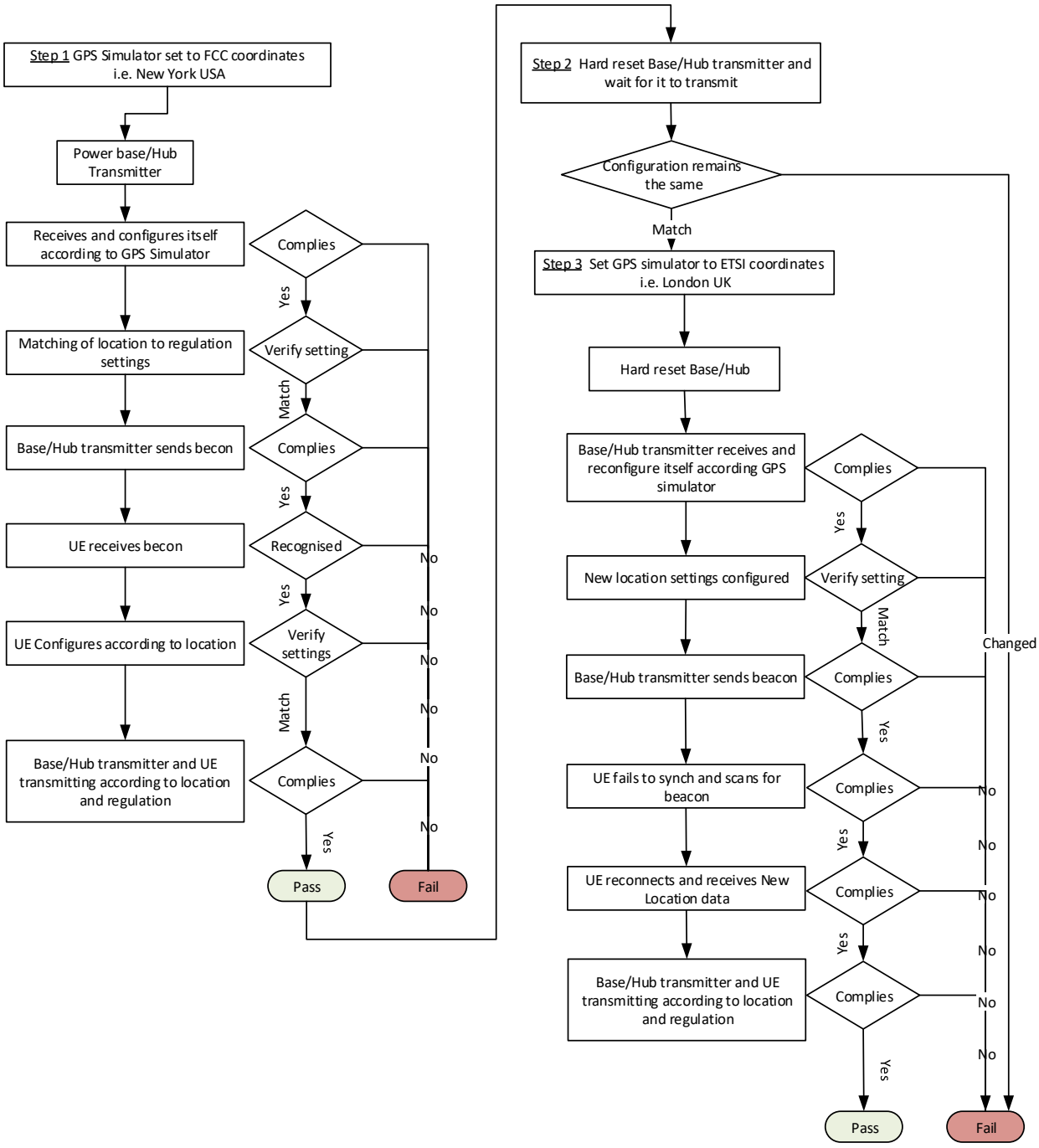


Exhibit 4 – Sample Label*