

## 2450 Hand Held FCC questions

**1) Photo's of the circuit board without the shields.**

See attached jpeg files.

**2) Confirm frequency of 2402-2480 MHz. you requested 2400-2483.5 MHz.**

The band of operation authorized for this devices is 2400-2483.5 MHz as per CFR 47 15.247. The 2450 Hand Held reader currently operates from 2402-2480 MHz and will accept 1 MHz above and below the operational frequencies shown. This will protect the band edges. Please revise the application to reflect operational frequencies of 2401-2481 MHz.

**3) There were 3 confidentiality exhibits. Schematics, block diagram a technical description were requested. However, the parts list, list of active components were listed in one exhibit. Please clarify. The parts list and list of active components were not found.**

The exhibit calling out the parts list and active components was included by mistake. There was no exhibit containing a parts list and active components list. Please disregard.

**4) Verify the antenna gain. It was listed as 5 dBiL. What is meant by dBiL? The conducted output power and the antenna gain should agree with the measured radiated data.**

The antenna gain is 5 dBi. It was listed as 5 dBiL to explain that it is referenced to a Linear Polarized source.

**5) Supply a sample of pseudo random sequence.**

The hopping sequence of the RF source is controlled by the Digital boards ASIC (U5). The code used to generate the hopping sequence is derived from the IEEE 802.11 standard. Specifically, the frequency conforms to the following formula:

$$F(i)=[b(i)+1]\text{mod}(79)+2$$

Where  $b(i)$  is defined in Table 42 of the IEEE 802.11 specification, and  $F(i)$  is the channel number for the  $i^{\text{th}}$  frequency, of Set 1 of the hopping patterns for North America.

The frequency to channel conversion is contained in Table 38 of the IEEE 802.11 standard.

**6) What is the receiver input bandwidth and how does the receiver synchronize with the transmitter?**

The 2450 Hand Held reader communicates with the tag through a spread spectrum, frequency hopping signal. The 2450 Hand Held reader modulates the carrier that is decoded by the tag. The tag then imposes modulation upon the carrier and reflects the carrier (modulated backscatter) to the 2450 Hand Held reader. The receiver operates in a homodyne mode. The received signals pass through a pre-selector filter designed to eliminate high frequency interference including the harmonics generated in the transmitter. The local oscillator used in the receiver is the same frequency hopping oscillator used to generate the carrier signal that is transmitted to the tag, modulated by the tag, and back-scattered to the receiver. Therefore, both signals are hopping at exactly the same frequency. Since the receiver operates simultaneously with the Hand Held reader transmission, the system receiver will shift frequency in synch with the transmitter signal. The received signals are directly converted to baseband in the homodyne. The down converted signals are band limited by a series of active filters that provide a 3 dB pass band of approximately 6 kHz to 120 kHz. The filters provide the receiver with a 20 dB IF bandwidth of 400 kHz. Since each received signal is down converted and band limited at baseband, the IF bandwidth, and hence the front end bandwidth of the receiver, exactly matches the transmitted signal from the tag.

**7) Does the device have the capability to coordinate with other transmitters to avoid interference?**

No, this product has no way of coordinating with any other transmitters.

- 8) The test setup photo's for the HAND SAR(touching) is dark. Send in a better version that shows how the device was placed during testing.**

See 1555-2450 Sar Report Revised and corresponding letter.

- 9) The SAR test was done at 5 cm, while the manual indicates 4-cm separation. Redo the SAR test or correct the manual.**

See 1555-2450 Sar Report Revised and corresponding letter. We are correcting the manual to read 5cm and will upload a corrected file when complete.

- 10) Correct the SAR test to specify the conducted output power value of the device for the test.**

See 1555-2450 Sar Report Revised and corresponding letter.