signals or frequencies. It is designed to absorb and convert signal, carrier and any associated interference for a chosen band or range of frequencies into reusable power.

In contrast, to traditional RF receiving devices, this methodology and apparatus **10** avoids selectivity. It has the unique characteristic of accepting broad ranges of the RF spectrum as a collection of frequencies. Each collected range of frequencies is then rectified, or converted, as a whole into a single voltage. Preferably, at the same time of RF absorption, the resultant voltage is generated. The apparatus **10** makes no attempt to tune for any specific frequency or signal. Each voltage, which is gathered from a given range of frequencies, is then added together and made available to power a device directly, to be stored, or to supply energy to a recharging apparatus.

The radiated electrical energy, to be utilized by the circuit, can be in the form of a wide range of the RF spectrum. Some examples of ambient RF sources can include, but are not limited to: Very Low Frequency—VLF (Maritime/Aeronautical Mobile), Medium Frequency—MF (AM Radio Broadcast), High Frequency—HF (Shortwave Radio Broadcast), Very High Frequency—VHF (TV and FM Radio Broadcast), Ultra High Frequency—UHF (TV, HDTV, PCS, WiFi) and certain Microwave transmissions. In addition, the apparatus **10** allows for the reception of dedicated RF transmission that are generated and broadcast for the specific purpose of transmitting power to the apparatus **10** for absorption, collection and utilization. In this case, it is not necessary for the dedicated RF transmission to contain a specific signal or data that needs to be interpreted for ancillary purposes such as audio/video or data reception and interpretation.

Using the technique described herein, one can design and create an apparatus **10** that is optimized for any given portion of the RF Spectrum. The necessary electrical and magnetic characteristics of the apparatus **10** components will vary depending on the chosen portion of the spectrum. Because of this, it is impractical to create one single apparatus **10** to cover the entire RF spectrum. However, it is possible to create individual apparatus **10**, each designed for a given RF band, and combine both the apparatus **10**, their outputs for maximum power efficiency.

A portion of a selected RF frequency band is intercepted by an antenna **22** placed in the field of emitted energy. The antenna **22** receives energy, in accordance with its design efficiency, and directs it into a system where it is absorbed, rectified, summed and delivered for use or storage.

RF Energy→Antenna–→ [Absorbed→Rectified→Integrated→Delivered] →Used

RF signals striking an antenna **22** are fed into an inductor (L), which is resonant for the desired band of RF spectrum. Note: In areas with a high concentration of RF energy, there is no need to attach an antenna **22**. The absorbed RF energy, consisting of fundamental, harmonic, inter-harmonic and standing waves is accessed via taps **20** (T**1**–Tx) on the inductor **18** which are placed at points along the inductor **18**. A key characteristic of this device is that a capacitor-less front-end allows for the inductors' wide bandwidth and maximum admittance of the incoming RF energy. The tap points are calculated by matching the inductor **18** section's impedance to the desired RF range.

The resultant RF energy, available at each tap point, is rectified by a device, such as diodes **26** (D**1**–Dx), and converted into DC Voltages. The individual rectified voltages are spread among a series capacitor integrator consisting of capacitors (C**1**–Cx). This broadband approach allows maximum energy to be spread among the series capacitor stack.

The sum of the voltages available from C**1**–Cx is stored in any storage device **28** such as a capacitor or group of capacitors Cs (s**1**–sx) and made available for immediate use, or to supply electronic device(s) requiring intermittent power. The electrical characteristics of the storage devices or capacitors, the configuration and actual number of storage devices is dependent on the voltage and power requirements of the device the apparatus **10** is delivering power to. (See Figure One)

Although not considered part of the apparatus **10**, the antenna **22** is an integral component of any practical device utilizing the method and apparatus **10** described. The key characteristics of the antenna **22** would be that it is capable of wide band reception, optimized for the chosen bandwidth, and takes into consideration the necessary effective area to support the power requirements of the target device.

Ideally, the antenna **22** impedance is matched 1:1 with the inductor **18** impedance of the apparatus **10**.

Note: In areas with a high concentration of RF energy, there is no need to attach an antenna **22** to the apparatus **10**.

Inductor **18**:

The characteristics of the inductor **18** is dependent on the chosen bandwidth of frequencies to be collected and utilized. The ideal inductor **18** should be constructed so that the mid point of total inductance would be resonant at the center frequency of the chosen RF segment or spectrum.

Multiple taps **20** provide fundamental and inter-harmonic output voltages from the selected band segments of radio frequency energy.

For example, a medium wave circuit (FIG. **2**), utilizing an antenna **22** impedance of 375 ohms, into an inductive circuit with 375 ohms of reactance, with a center frequency of 1.2 MHz would require an inductance of 100 uH. The effective bandwidth would be approximately 2 MHz wide. (−3 db down at each end of the band).

The inductor **18** can be calculated using the following standard resonance formula (Formula 1):

L=(d squared times n squared) divided by (18 times d plus 40 times j)

Where

L=inductance in micro-henrys.

d=conductor diameter in inches.

j=conductor length in inches.

n=number of conductor iterations.

Using similar formulae, the required inductance can be re-calculated for henrys, milli-henrys, pico-henrys and nano-henrys. ie. VLF, LF, MW, HF, VHF, UHF and Microwave frequency band segments.

Utilizing a capacitor-less front-end insures the inductors' wide bandwidth, and maximum admittance to the incoming RF energy.