A broadband printed monopole antenna is designed by using ELC (Electric Inductive–Capacitive) based metamaterial element for WLAN applications. The design of a miniaturized broadband antenna plays significant role in modern wireless devices due to small size and cost effective which covers all the specified frequencies .The proposed antenna comprises of 3 different structure where single ring hexagon loaded with ELC metamaterial for broadband radiation is the 1st diagram and 2nd diagram comprises of 2 different Hexagonal structure in cooperated with another hexagonal ring inside with ELC meta material for the broadband radiation and last diagram is same as 1st diagram in a inverted version. ELC is designed with a square loop nested inside the ring hexagon structure which is coupled by the small metal stub for the 1st and 3rd diagram. ELC is introduced purpose fully so that it improves the impedance bandwidth because of its unique EM Wave Property. Negative permeability of the ELC and it’s Meta material is explained through Wave Guide Setup Method. The designed antenna involves fabricated on a low-cost Flame Retardant-4 substrate having er = 4.4 and tan d = 0.02. It yields an impedance bandwidth of 2600 MHz (2.61–5.21 GHz) with a dual resonance of 3.21 GHz and 4.89 GHz for the 1st diagram,4.8GHz for 3rd diagram which has single resonance, whereas the 2nd diagram has more than one resonating point and it is usable for WiMAX, C-band and WLAN applications. The measured far-filed pattern exhibits a stable pattern. The proposed antenna has many benefits, such as comprising compact size, simple structure, lower S11 (dB) and capable of broadband characteristics.

Metamaterial element governs electric and magnetic currents to generate wideband characteristics. Many Features such High gain, Multi band, Broad Band can be disclosed with Zeroth Order resonance, Negative constitutive parameter such as permability, anti-parallel Phase and group velocity .

Usage of Meta Material are beneficial in many other ways like Chip-Based Analog Computers and other integrable computing elements. The equivalent circuit model concepts like Capacitance and inductance value for realizing the resonance behaviour computed from Field and Circuit Theory.

ELC metamaterial is substantial in addition to the hexagonal closed ring resonator, to produce a broad bandwidth without increasing the size of the substrate. The proposed antenna has focused on the bandwidth improvement of hexagonal patch antenna only. The proposed technique can also be useful for other radiating structures. In future, the proposed antenna can also be carried out with CSRR based metamaterial structures.







