$$= \frac{n-r}{r+1}\binom{n}{r} \iota(v)\, \tilde{P}(\underbrace{-E, \cdots -E}_{n-r-1}, \underbrace{\Theta, \cdots \Theta}_{r+1})$$

$$= \frac{n-r}{r+1}\frac{n!}{(n-r)!\, r!} = \iota(v)\, P_{r+1}(E, \Theta) =$$

Again we used the linearity of $\tilde{P}$ here i.e

$$\iota(v)\ \tilde{P}(-E, \cdots -E, \Theta, \cdots \Theta)$$

$$= \tilde{P}(-E, \cdots -E, \iota(v)\Theta, \cdots \Theta) + \tilde{P}(-E, \cdots -E, \Theta, \iota(v)\Theta \cdots \Theta) + \cdots + \tilde{P}(-E, \cdots -E, \Theta, \cdots, \Theta, \iota(v)\Theta).$$

$= (r+1)\ \tilde{P}(-E, \cdots -E, \iota(v)\Theta, \Theta, \cdots \Theta)$ since Θ is two form.

It remains now to evaluate the integral of Φ over the boundary of $B_\epsilon(p_J)$. First of all, recall that by our choice of metric, Θ – and hence $P_r(E, \Theta)$ for $r > 0$ – vanishes identically in $B_\epsilon(p_J)$; thus

$$\int_{\partial B_\epsilon(p_J)} \Phi = \int_{\partial B_\epsilon(p_J)} P_0(E, \Theta) = \int_{\partial B_\epsilon(p_J)} \omega \wedge (\bar{\partial}\omega)^{n-1} P(E).$$

$\Theta \equiv 0$ in $B_\epsilon(p_J) \Rightarrow P_r(E, \Theta) \equiv 0$ in $B_\epsilon(p_J)$ for $r > 0$.

$$\int_{\partial B_\epsilon(p_J)} \Phi = \int_{\partial B_\epsilon(p_J)} \sum_{i=0}^{n-1} \Phi_i = \int_{\partial B_\epsilon(p_J)} \Phi_0 = \int_{\partial B_\epsilon(p_J)} \omega \wedge (\bar{\partial}\omega)^{n-1} \wedge P_0(E, \Theta)$$

$$= \int_{\partial B_\epsilon(p_J)} \omega \wedge (\bar{\partial}\omega)^{n-1} P_0(E)$$