Okay so here is what I’ve found for power limitations.  
Helpful resources on this adventure were:

[ac dc - BeagleBone Black - power supply sensitivity - Electrical Engineering Stack Exchange](https://electronics.stackexchange.com/questions/128865/beaglebone-black-power-supply-sensitivity)  
^This link is for the Black, not the green gateway, and thus uses the LDO instead of the TLV chip, as the Black has a 5v barrel plug whereas the green gateway has a 12v one.

and the datasheet schematic for the BeagleBone itself.

The CC1352, our Zigbee radio chip, uses 2.89mA when active, and a max of 85mA when in high power transmit mode +20db.

This gives us a max power draw of less than 100mA for the zigbee radio.

The BeagleBone Green Gateway has two main power chips on it.

The TPS 54302 that takes 12v and regulates down to 5v with a 3amp max output, and

The TLV 6259DBVT that takes 5 down to 3.3v with a 2 amp max output to the DCDC\_VDD4\_3P3V rail

It has implimented inductor and capacitor on the output to be a low pass filter, though it doesn't say how low of a lowpass

[A picture containing text, electronics, circuit

Description automatically generated](https://cdn.discordapp.com/attachments/821138628993613884/833893109485666344/image0.jpg)

Figure , TPS 54302 12->5v regulator

[A picture containing text, electronics, circuit

Description automatically generated](https://cdn.discordapp.com/attachments/821138628993613884/833893289786343464/image0.jpg)

Figure , TLV 6259DBVT 5v->3.3v

The TLV 3.3v regulator takes input power from either the TPS 5v, USB 5v, or SYS\_VOUT\_5V

So regardless of how we power the BB, we will have 2amps of 3.3v power. (Assuming our USB supply can keep up, but a 10w usb supply isn't hard to come by)

[9:37 PM]

Page 2 of the SeeedStudio-BeagleBoneGreemGateway-SCH.PDF

Diagram, schematic

Description automatically generated

Figure From page 2 of SeeedStudio-BeagleBoneGreemGateway-SCH

Notes about our cape design: VDDR decoupling capacitors, added to pin 45 and 48:

Chart

Description automatically generated with medium confidence

Figure , From Launchxl-cc1352R1\_Schematic

The datasheet says that DCDC\_SW is the output of the DC/DC converter and it is acceptable to leave it not connected (remove the inductor L331) if the DC/DC is not used. the internal DC/DC is trimmed to 1.68v

However, VDDR is an internal supply, and must be powered either by the internal DC/DC, or the interal LDO.

LDO is the Low DropOut regulator that supplies 1.68v

Sounds like, from the datasheet, that if we don't use the DCDC\_SW, then VDDR is supplied internally from the main LDO.

using the DC/DC is enabled by the reference design.

The capacitors are typically used to smooth out the ripple caused by the oscillator. Since 48 MHz is such a high frequency, the caps are not needed since the ripple is too fast to cause problems in other components. Note: The higher the frequency, the smaller the cap and wires can be seen as small caps at high frequencies