

Chapter 1

Single Band VS Dual Band Boosters

Overview:

Before examining single band and dual band boosters it is important to understand what the bands are and where they are deployed.

Chapter 2

What are cellular frequency bands?

All Cellular communications in North America (with the exception of Nextel, Southern Linc and Mike) are conducted on two frequency bands. Service providers have purchased licences from the FCC that cover specific geographic areas to use channels within one or both of these bands.

The first band that was sold by the FCC at the dawn of cellular was called the "Cellular Band", also commonly referred to as the "800 or 850 Band", and it spans a frequency range between 824-849 Mhz (megahertz) for signals that are sent by the cell phone to the tower and 869-894 Mhz for signals that are sent from the tower to the cell phone.

The second band that was sold by the FCC in the 1990's was called the "PCS Band", also commonly referred to as the "1900 Band". PCS stands for personal communication system. This band spans the frequency range of 1850-1910 Mhz for signals that are sent by the cell phone to the tower and 1930-1990 Mhz for signals that are sent from the tower to the cell phone.

Chapter 3

Why are both bands required?

Why are both bands required? The cellular band was the first to be deployed and it was the only frequency for use with wireless telephones. It was originally used by every provider and covered

all of North America , Canada , Mexico and South America, however, as cellular phones became more popular the providers operating in urban areas experienced a rapid increase in cellular subscribers and more bandwidth was required to accommodate the increase in subscribers.

Chapter 4

Who uses the PCS band?

The existing service providers that offered service in urban areas purchased PCS licenses to cover the urban areas where they needed increased capacity because the PCS band is 60Mhz wide in each direction and could accommodate a greater number channels and a greater number of subscribers than the Cellular Band band which is only 25 Mhz wide and contains fewer channels.

At the same time as the FCC offered PCS licences to the existing cellular providers, they also invited new participants to the "spectrum auctions". This new group of companies that purchased PCS licenses and deployed PCS networks included Sprint, T-Mobile and numerous others that had wanted to enter the cellular business but could not because there was no spectrum available until the PCS Band became available.

Chapter 5

Where are Cellular 800Mhz and PCS 1900Mhz systems deployed?

The original group of service providers that already had Cellular Band networks covering their urban and rural coverage areas deployed their PCS networks only in the urban areas where they had capacity issues. Since they did not not have capacity problems in their rural coverage areas and they already had Cellular Band networks in these areas, the Cellular Band networks were left in place. It is important to state that the small rural service providers that already had their Cellular Band licenses and networks in place left them alone and did not deploy PCS.

The new group of entrants that purchased PCS licenses were aware that if they stood a chance of making a profit that they had to do so in the urban areas where the cellular subscriber numbers were increasing, so they set up their PCS networks in the urban areas and, as the 21st century approached, they deployed some limited coverage on major highways on which their urban subscribers would often commute so they could stay competitive with the dual band service providers.

At this present time cellular coverage in North America has evolved and stabilized as such: the

Cellular 800 Mhz band is almost omnipresent in both urban areas and rural areas and in particular it is almost exclusive in remote areas. The PCS 1900 Mhz band is primarily found in large urban areas and some major highways. If one was to paint a visual picture of cellular coverage in North America and Cellular 800 was the color red and PCS 1900 was the color green, then the whole map would be red with green spots covering major cities and some major highways.

Chapter 6

How does Dual band service work?

Before PCS, all cell phones were single band devices that operated only in the Cellular 800 band. When service providers started to deploy both Cellular band and PCS band service, the cellular phone manufacturers started to make dual-band phones. These phones constantly report the signals and channels that are receiving to the towers, even when there is no call engaged. Based on this information the network sends commands back to the phones that include which tower to communicate with and which band to communicate on. This allows the service provider to make the cell phone operate on the PCS band when the provider wants it to and to operate in the Cellular band when no PCS signal is reported by the cell phone.

Chapter 7

What is the difference between a single band and a dual band booster amplifier?

A booster is a radio frequency amplifier that will do two things: it will take the signal that is transmitted by the cell phone when a call is engaged and use electrical energy to make it stronger and send it out through the antenna to the tower. The booster will also receive the signal that was generated by the tower, through the booster antenna, use electrical energy to amplify the tower signal and send it to the phone.

A single band amplifier will amplify only one of the two cellular frequencies. For example: a Cellular Band 800 Mhz amplifier will amplify signal when the phone is operating in the Cellular 800 band but will not amplify when the cell phone is in a PCS 1900 area and operating in PCS 1900.

A dual band booster will amplify signal when the phone is in either coverage area, essentially, it is two amplifiers that are housed in the same case and share the same power supply and antenna.

Chapter 8

Is a dual band booster better than a single band booster?

Even though it would seem that a dual band booster is better than a single band booster, after all, this device will amplify all the time, there are valid reasons that a dual band booster is not better than a single band booster and will almost always have inferior performance and practical reasons that it is not needed.

1-virtually all consistently poor coverage areas in North America occur in rural and remote areas where only Cellular 800 Mhz signal is present and only Cellular 800 systems are deployed, therefore a dual band booster is not required in this instance. A cellular 800 Mhz booster is sufficient.

2-PCS 1900 is almost always found in major cities and even if you attach a dual band or PCS 1900 booster to your phone, the coverage in urban areas is so dense that the network will command the cell phone to power down as you approach the PCS area and the booster will have no effect. In a sense it would be like having a car with a 700 horsepower engine but you can't get out of traffic.

3-if you have a single band PCS only phone like T-Mobile for example, a dual band booster would not ever operate in Cellular 800 Mhz because the phone does not operate in this band, therefore, a dual-band booster is not required. A single band 1900 Mhz booster is required.

4-a booster is an amplifier and as such, it has the inherent deficiency of creating "noise" in the normal course of amplification. All amplifiers, (radio frequency amplifiers, stereo amplifiers, hearing aid amplifiers) use electrical energy to amplify and this energy creates thermal noise that is generated along with the increased signal (amplified signal/sound) that is desired. This "noise" causes the device to become less sensitive and this translates to inferior performance when the signal that is being amplified is at a very low level; a cell phone signal that is very far from a tower for example. The 800 Mhz section and the 1900 Mhz sections of a dual-band booster are always "on" and even though only one section is being used at any given time the "noise" that is generated by the unused section is present regardless.

5-a truly well designed and well produced dual-band booster should cost about twice as much a single band amplifier because it is two amplifiers in one housing. An inexpensive dual-band booster, one that sells for a price similar to a single -band booster, will always have some deficiency.

Chapter 9

Why are dual-band booster/amplifiers sold?

Simply put, dual-band boosters sound more appealing. From the user's point of view, It seems

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that you get more for the same price. From the seller's point of view it is an easier sell, the consumer is easier to sell and the seller does not have to assess which phone, coverage area, service provider or any other technical information to recommend the correct device to the consumer.

Chapter 10

Why does Smoothtalker have so many types of boosters?

Essentially, all boosters are amplifiers and as such, any one can be used with any phone and the booster will improve the phone's performance, however, all cellular telephones and the networks that they operate on are not the same. Cellular phones on different networks receive and transmit digital signals using different types of digital signals, but more importantly, the digital cellular telephones will transmit these signals at different levels of maximum power. A Cingular GSM phone can transmit up to two watts of power and a Verizon CDMA phone can transmit at only two tenths of a watt of power, therefore, a booster for a Cingular phone must amplify the phone's originating signal fewer times than a booster that is used on a Verizon phone. To achieve the same type of performance and power from a booster using different types of phones, the booster should be set to amplify the type of digital signal that is input into the booster and match the phone and network type. If this is not done, there will be a compromise in power and signal quality and maximum efficiency and power will not generally be achieved, which translates into decreased range potential.

Chapter 11

Booster Choices: Dual Band CDMA (Model BST800):

Most CDMA handsets are capable of digital PCS band, digital Cellular band and analog communication.

CDMA coverage is normally deployed in major cities using the PCS (1900 Mhz band) and cities are normally covered with large numbers of towers and repeaters. Coverage is usually very good. Because of the large numbers of towers and their close proximity to handsets, towers (which control the transmit power of the handset) rarely command a handset to transmit at maximum power, therefore using a PCS 1900 Mhz booster on a dual-band cell phone would be of no benefit because the tower would command the handset to reduce power when the booster is connected.

CDMA coverage in non-urban areas is usually in the Cellular (800 Mhz band) and this is where towers are spaced at greater distances from each other. This is also the band that analog is on. This is the band where spotty coverage exists and using a Cellular 800 Mhz booster is advisable. A dual band CDMA phone with Analog capability used with a Cellular 800 Mhz booster will get

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coverage in as many places as possible and have the best coverage of any CDMA phone/booster combination.

When using a Sprint phone that you have set to home only and use this phone only in the PCS band, then a PCS 1900 Mhz booster for CDMA phones is your only and logical choice whether it used in a city or in urban areas. Chapter 15 covers this in more detail.

Chapter 12

Dual Band GSM (Model BST850):

Urban Areas: GSM coverage is normally deployed as follows: in major cities GSM850 and GSM 1900 are both deployed at the same time. The Cellular Network uses a method called "channel hopping" to command the phone to use a particular channel on one of the two frequencies at any given time. The network will give preference to channels in the GSM1900 frequency when the phone reports that it is receiving any channel in this frequency at a pre-determined signal level that the network deems acceptable. When the phone reports signal below the pre-determined acceptable level in GSM1900 frequency, then the network commands the phone to use a channel in the GSM850 frequency. When the phone next reports that it is receiving GSM1900 at an acceptable level again, then the network will command it to use a GSM1900 channel. This switching of channels (channel hopping) occurs very frequently, in the order of as frequently as a few seconds. If the phone does not report acceptable signal in either of the two frequencies, then the network will keep it on a GSM850 channel until the signal improves or the call fails.

Rural Areas: Rural areas are almost always covered by GSM850 only and when signal deteriorates it is in the GSM850 frequency.

Given the way the GSM dual band cellular providers have deployed the networks and how they use the channels allotted to them, the last frequency that will be in use by a phone before a "dropped call" will be in the GSM850 band, therefore a BST850 booster that amplifies the 850 band is the only booster that is required.

Chapter 13

Dual Band TDMA (Model BST300)

This category is the same as the dual band CDMA. TDMA coverage is normally deployed in major cities using the PCS (1900 Mhz band) and cities are normally covered with large numbers of towers and repeaters and coverage is usually very good. Because of the large numbers of towers and their close proximity to handsets, towers (which control the transmit power of the handset) rarely command a handset to transmit at maximum power, therefore using a PCS 1900 Mhz booster in this case would be of no use and the tower would command the handset to power down even further and since PCS only TDMA phones do not exist, a Cellular Band 800 Mhz TDMA booster that will improve coverage for both digital and analog in rural areas is the only choice.

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Chapter 14

GSM 1900 (Model BST1900)

this category includes service providers T-Mobile and Fido and all GSM1900 only capable handsets from providers like Cingular, AT&T and others. They only use one frequency and one digital standard. The choice is only one: a GSM1900 booster. Model BST1900.

Chapter 15

Sprint PCS

This category applies to Sprint customers that do not let their phones "roam". A sprint phone is capable of operating in Cellular 800 and PCS 1900 and when in rural or remote areas where Sprint signal is not available, the phone will operate on another carriers Cellular network but only if it is allowed to roam. If you don't let your phone roam or you need increased Sprint signal use BST1901 booster.

Note: The BST1901 booster will increase Sprint home network signal as far as is possible, but it will not provide signal where there is no Sprint network. If you need signal in remote areas and do let your phone "roam", choose the BST800 booster, the Cellular 800 mhz networks of Sprint's roaming partners are more widespread in rural areas than Sprint's own network.

Chapter 16

Iden (Model BST801)

This category includes Nextel, Southern Linc and Mike. This system and the handsets for this system use only one frequency and the same digital standard. The choice is only one, an Iden booster. Model BST801