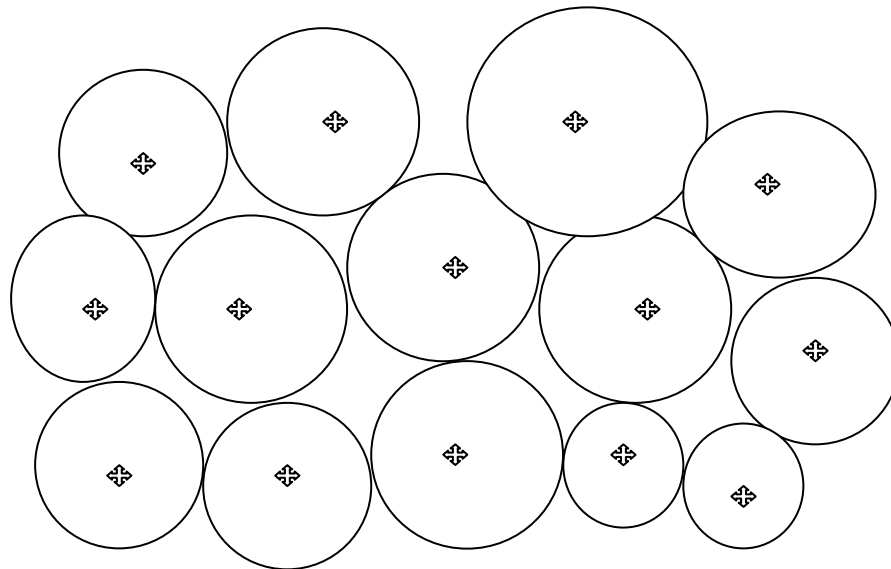


Mobile Phone Jammer Training Program

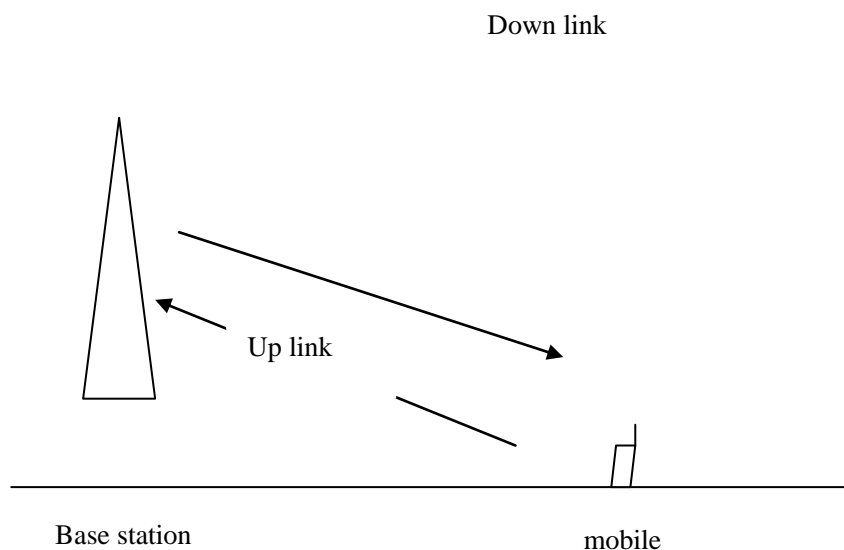
1. Cellular Mobile Communication System Introduction

1.1 Cellular base station



GSM network is composed of many base stations. Each base station are launching a different band microwave signal. So many base stations form a web is like honeycomb network.

1.2 how to link between the base station and Mobile phones?



Phone is always to keep in touch with the base station, Each base station contains a number of sets of transceiver. The microwave emission from the base station always track a cell phone. When the user transit from one area to another area, Phone automatically switch. In other words, Mobile phone is always in the "watch" among the base station, It is precisely because the base station and mobile phones is constantly exchanging information between them, We are able to maintain a normal mobile phone calls

1.3 Commonly used frequency band division of the domestic mobile communications

800M

Uplink:	825-835MHz	CDMA	10M
Downlink:	870-880MHz	CDMA	10M

900M

Uplink:	890-915MHz	GSM	25M
Which	890-909 MHz	19M	China Mobile Telecom
	909-915 MHz	6M	China Unicom Telecom
Downlink:	935-960MHz	GSM	25M
Which	935-954 MHz	19M	China Mobile Telecom
	954-960 MHz	6M	China Unicom Telecom

Note: It is slightly different among defferent parts

1800M

Uplink:	1710-1785MHz	DCS	75M
Which	1710-1745 MHz	35M	China Mobile Telecom
	1745-1755 MHz	10M	China Unicom Telecom
Downlink:	1805-1880MHz	GSM	75M
Which	1805-1840 MHz	35M	China Mobile Telecom
	1840-1850 MHz	10M	China Unicom Telecom

Note : China mainly to the above-band-based, However, some areas may have expanded

1900M

1.9G CDMA (PCS) Only use in Shenzhen and Qingdao,

Uplink: 1895-1900MHz 5M

Downlink: 1975-1980MHz 5M

The same frequency time-division : 1895-1918 MHz PHS 23M

3G

TD-SCDMA

The same frequency time-division: 1880-1900MHz 15M

The same frequency time-division: 2010-2025MHz 15M

CDMA2000

Uplink: 1920-1935MHz 15M

Downlink: 2110-2125MHz 15M

WCDMA

Uplink: 1940-1955MHz 15M

Downlink: 2130-2145MHz 15M

Another, There are a number of other regional parts of the band in the use, Such as: CDMA
450M, 1780-1805M

1.4 dBm 和 dB

1.4.1 dBm

dBm is a textual value of absolute power, Formula: $10\lg P$ ($P = \text{Power value} / 1\text{mw}$). Each additional 3dBm, Power doubling

[Cases 1] If the transmission power P is 1mw, Converted into dB is 0dBm, 2mW is 3dBm.

[case2] For 40W of power, dBm units according to the value after conversion should be:

$$10\lg (40\text{W}/1\text{mw}) = 10\lg (40000) = 10\lg 4 + 10\lg 10 + 10\lg 1000 = 46\text{dBm}.$$

Remember: -70dBm power of 10-th power is equal to 10 one-watt, which is 10 billionth of watts. Therefore, the use dBm this form to indicate the number of pairs of very small or great, when the power is not only very effective but also the original multiplication into a simple additive calculation of the calculation.

1.4.2 dB

dB is a characterization of the value of relative value, when considering a power-B power compared to large or small the number of dB, according to the following formula:

$$10\lg (A \text{ power} / B \text{ Power})$$

[case 3] A power ratio of B power doubled in size, then the $10\lg (A \text{ power} / B \text{ power}) = 10\lg 2 = 3\text{dB}$. In other words, the power of a great power than the B 3 dB.

[case4] 7 / 8 inches GSM900 cable is about 100 meters of transmission loss 3.9dB.

[case5] If the A's power of 46dBm, B's power 40dBm, you can say that B A large compared with 6 dB.

[case6] If the A antenna 12dBd, B antenna 14dBd, can be said that a smaller than the B 2 dB.

1.4.3 dBi and dBd

dBi, and dBd to indicate the amount of the antenna power gain, both a relative value, but not the same as reference. a reference point for the whole dBi directional antenna, dBd a reference point for the dipole, so the two slightly different. a reference point for the whole dBi directional antenna, Is generally that it is showed gain, Be expressed using dBi is larger by expressed dBd 2.15

1.4.4

[case] For the side of the antenna gain of 16dBd, Converted into units of its gains when the dBi, that is 18.15dbi (Tended to neglect the decimal places, so that is 18 dbi

[case] $0\text{dBd}=2.15\text{dBi}$.

1.5 The base station signal strength and the dissemination

1.5.1 The base station signal strength and status

Signal strength range (dBm)	Field-strength state
Above -30	Super strong signal area
-30— -40	Exceptionally strong signal area
-40— -50	High-strength signal area
-50— -60	In strong signal areas
-60— -70	Low intensity signal area
-70— -80	Low-weak signal area
-80 以下	High weak signal areas

1.5.2 The base station signal propagation

The effective coverage of base station determined by the base station transmit power, antenna gain, as well as factors such as its high point, usually a few kilometers. As the city more than the number of units within the area of mobile phones, base stations, the distribution will be more intensive. Septal area can be used with the frequency of cellular communications.

The signal in the dissemination process of decay will occur. Affect the basic mechanism of the spread of reflection, diffraction and scattering.

When the waves encounter many objects larger than the wavelength of reflection took place, as in the Earth's surface, buildings and wall surfaces.

When the receive and transmit a wireless path is between the sharp edge of diffraction occurs when blocked by blocking the surface of the second wave of walking in space, and even block the back of the body. When the receive and transmit path exists between the line of sight around the block body also occurred in the bending waves.

When the electromagnetic wave to travel through their medium, there is less than the wavelength of the object and the body per unit volume within the blocks occurs when the number of very large scattering often occurs occurs in rough surfaces, small objects or irregular objects. In a real communication system, leaves, street signs and lamp posts, which would cause scattering.

Signal propagation which will normally be through the attenuation of the following forms:

Free Space Attenuation: $L=32.4+20\log d+20\log f$ (d to 1000 meters as a unit, f in megahertz)

Prevent decay: Reinforced concrete structure: $\geq 28\text{dB}$

Brick structure: $\geq 20\text{dB}$

Wooden walls, gypsum walls keel: $\geq 10\text{dB}$

Network security: $\geq 20\text{dB}$

Glass curtain wall, windows and doors: $\geq 3\text{dB}$

2. Cell phone signal shielding System Introduction

2.1 Demand Background:

In recent years, been the rapid development of mobile communication, mobile phone (cell phone) users a sharp increase in this area and promoting economic and technological development, promoting social progress, but on the other hand, cell phone manufacturers are becoming more

and more noise pollution seriously. case such as: In the Convention Center (conference room), courts, prisons detention center, theaters, libraries, classrooms examination room and other public places, due to random cell phone use, destruction of its quiet, solemn atmosphere, affecting the corresponding activities of the normal.

Another example is the use of mobile phones is becoming a disclosure of political, economic, and military life can not be ignored, particularly in an important meeting place, information highly confidential government agency offices, the securities and trading center of financial management and other departments, often occur someone has intentionally or unintentionally, through mobile phones of important secrets leaked, resulting in significant political influence or economic loss. Such an incident after another, has aroused the close attention of the relevant departments

In addition, the use of mobile phones or other mobile communication devices detonated the bomb, destroy important military and civilian targets, and implemented a purpose or no purpose assassinations, has become the terrorists, hostile forces and criminal elements commonly used instrument. Such sabotage is extremely subtle, extremely lethal and accurate, give me security and defense has caused great difficulty.

On the other hand, with the rapid popularization of mobile phones, but also make people enveloped in high levels of RF radiation magnetic field. This radiation, gas stations, filling stations, chemical warehouses and security in the region caused by the increasing threat. To this end, Australia, Germany, the United Kingdom, the United States, Canada and other countries have been promulgated to prohibit the use of mobile phones in these areas of law.

2.2 Scope:

- 1, gas stations (security protection to prevent the cell phone static electricity gas explosion) can avoid the microwave signal interference caused by fire, explosion, due to the phenomenon of air bursts, the posted notices prohibiting cell phone calls, does not have the initiative.
- 2, government departments, the armed forces of the conference room, to avoid leakage of confidential government at present, new spy technology has been available via cell phone tapping, the environment of voice, for an important meeting place, it is necessary to take effective and proactive security measures Gao.
- 3, the examination sites, out of the field exam can prevent eliminate candidates, proctor cheating the use of modern communication tools. You can use blocking devices to prevent the cell phone cheating.
- 4, the public security units, as well as the whole building conference room at an important meeting prior to arresting action can avoid the use of mobile phones leak participants, using blocking devices to prevent the occurrence of these phenomena.
- 5, oil refineries, petrochemical plants, etc. (security, cell phone static electricity to prevent gas explosion)
- 6, the police unit (to control specific areas of the mass movement)
- 7, Terrorism Prevention Unit (mobile remote-controlled bomb locked to the target dynamic)
- 8, the military unit. (Strictly control the use of mobile phones of the region, place)
- 9, Haiphong units (aiming to halt the smuggling of mobile communications Coast)
- 10, Prison (to prevent the prisoners, the news media, visiting officers, the prison administration is not required external communications)
- 11, the school examination room, tertiary institutions amphitheater.

12, movie theaters, opera houses, performing venues. (To prevent the appreciation of the impact of public programs)

13, churches, temples, (need quiet area)

14, the library (which can maintain a quiet study and learning environment)

2.3 characteristics of the product

1, the technology leading advanced equipment.

2, only interfere with Downlink lines, has no effect on the base station (no points on the Downlink of the exception).

3, is compatible with all mobile communication system that can shield the existing mobile communication signals, including GSM, CDMA, DCS, PCS, PHS, 3G and large well-informed, etc.

4, using a special technology, the band will not interfere with each other between.

5, is equipped with intelligent power protection system, with maintenance-free backup power supply interface, ease of administration, maintenance workload is small, easy to use.

6, shielding responsive, functional and reliable. Shielding device boot, the shielding in the range of mobile phones had no signal; shielding device off after 10 seconds can be restored within a mobile phone.

7, small size, light weight, easy to install. According to the scope of security needs, placed on the desktop, walls, ceilings and other locations.

8, simple operation, ie, that would be. Just connect the power, open the switch to start work without the use of staff training.

9, no damage to the mobile phone, close the shield or the shield area out of mobile phone use

function can be restored.

10, automatic operation, no need to hand management and maintenance. SMT mobile phone jammers, high reliability, can be long-term work in a variety of environments.

11, green environmental protection product, for humans and other types of electronic equipment without harm, no interference.

12, adaptable, not weather conditions.

2.4 Cell phone signal jammers works

2.4.1 In the cellular mobile communication system, the system was divided into a number of cellular coverage areas, each hive area with a low-power base station transmitters, which transmit signals only within the limited confines of cellular phones have been received, If the base station the signal emitted by a certain intensity with the frequency of electromagnetic interference, then the communication can not be normal

2.4.2 frequency interference shielding device in accordance with the principles of design. Base stations and mobile phones through the specified frequency range of the electromagnetic signals connected.

The signal is sent to mobile phone base station Downlink signals, mobile phone base station signal is sent to Uplink signals, on the Downlink signals are in different frequency bands.

Shielding device is shielded Downlink signal that the shield with the base station sends a signal the same frequency to the mobile phone, cell phone shielding devices and base stations at the same time to receive the signal sent, as long as the signal jammers greater than the base station signals, mobile phones can not identify the base station signals revealed no signal.

2.4.3 Base Station Downlink signal strength

case, such as base stations fired by a group of Downlink signal of its strongest signal strength, -65dBm (with GSM as the case) as shown in Figure 1. Through a cell phone or spectrum analyzer, etc., measured in the. But we can 930-960 issued on the same frequency of this period set up a base station does not recognize the interference signal, then this band within the region where mobile phone base stations can not hear any signal sent to cell phones, cell phones would not be able to and the base station to establish a link, it will be impossible to achieve effective communication, also achieved our objective. Shown in Figure 2.

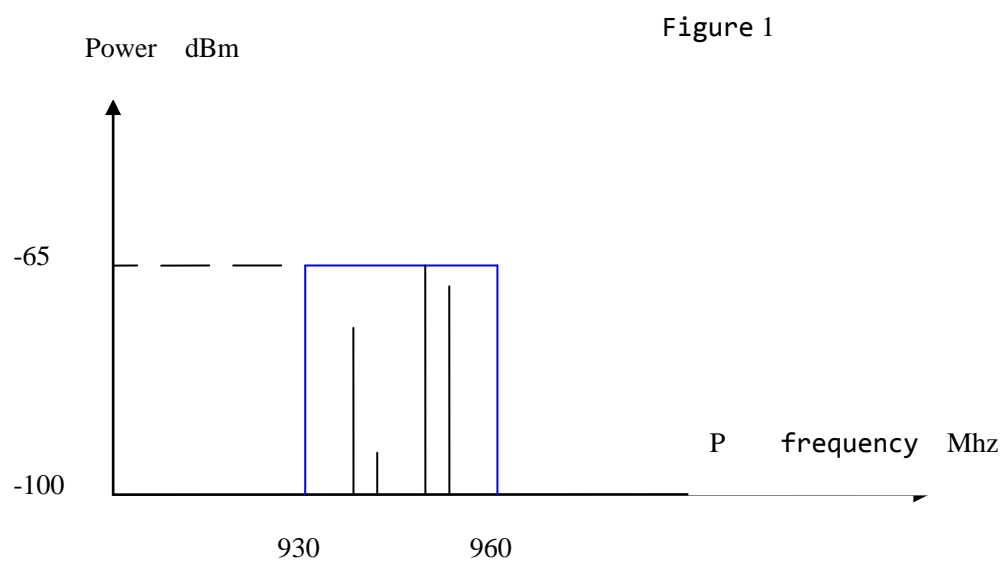
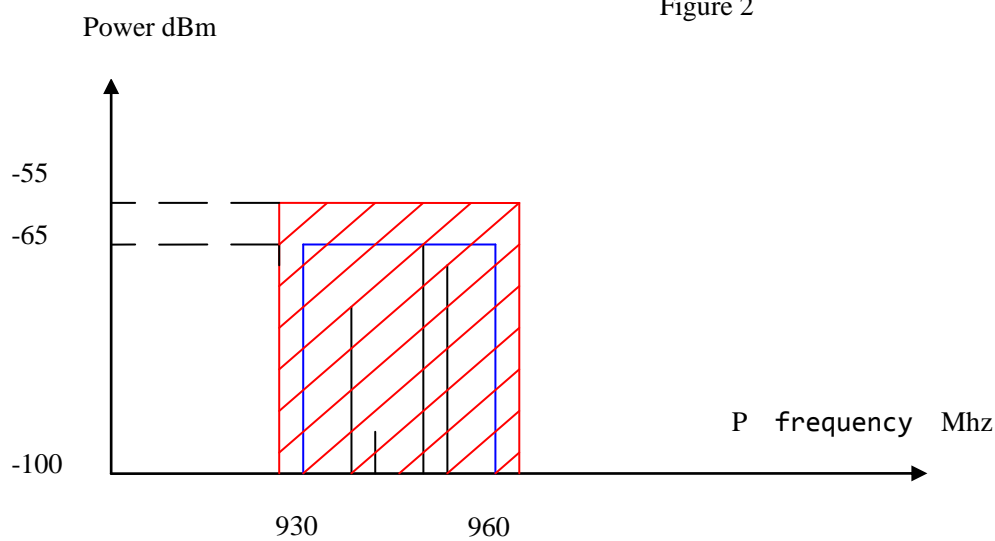
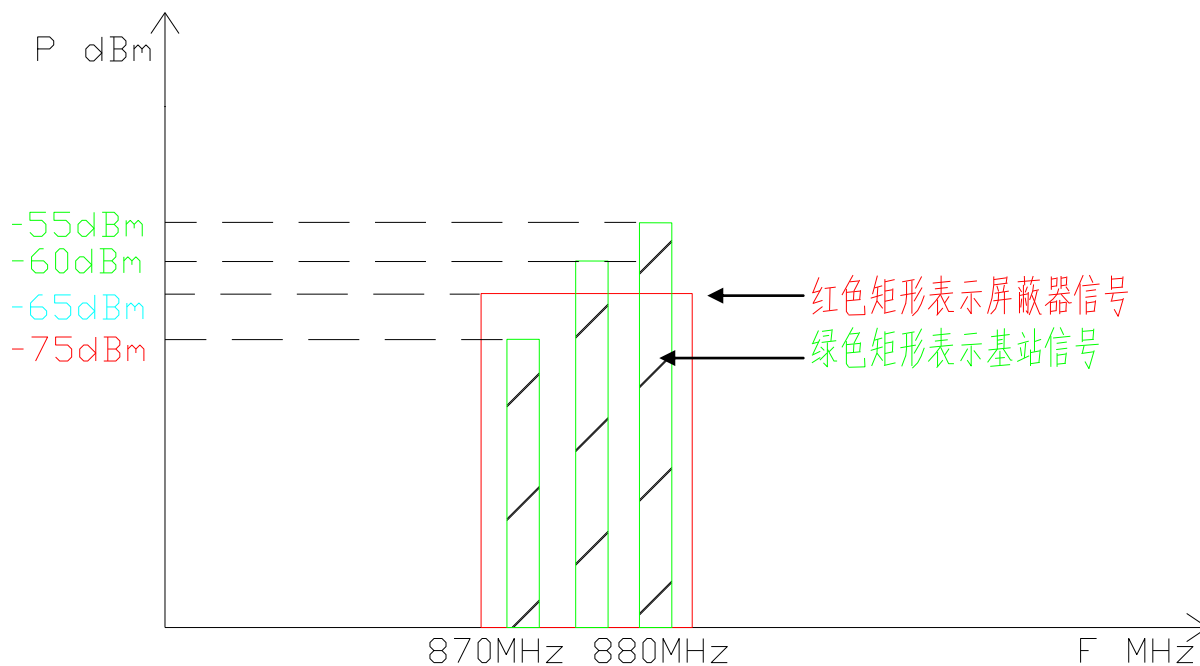


Figure 2



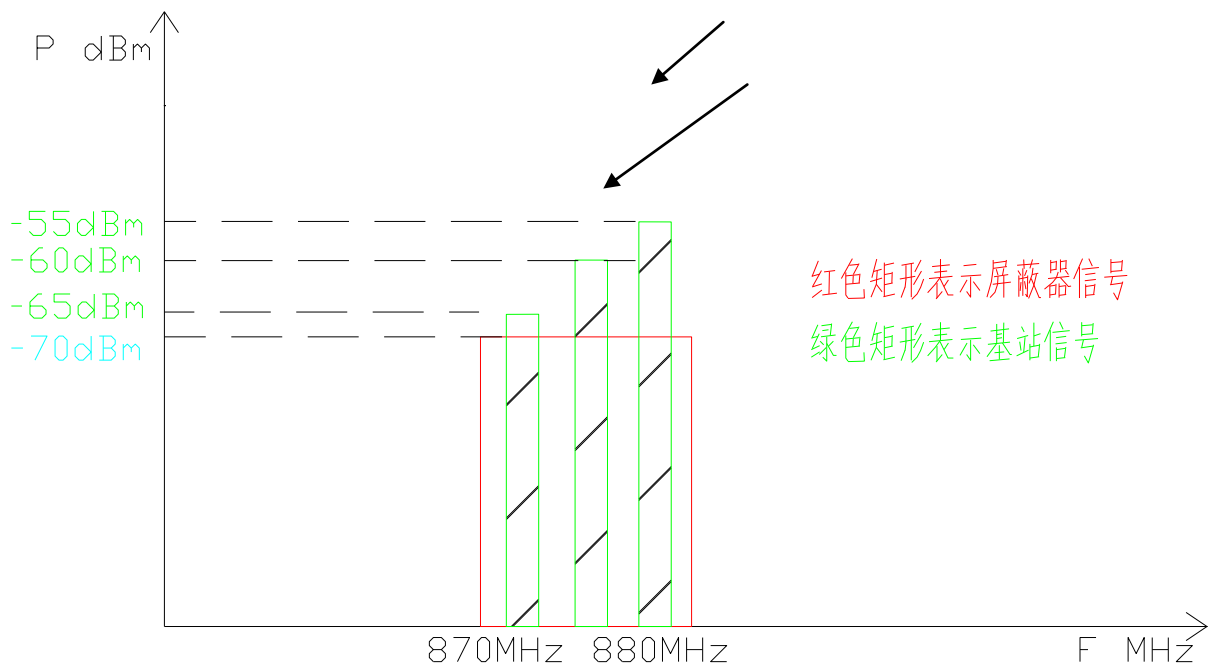
And then the following diagram, in order to CDMA as a case, if there is only one channel is shielded most of the CDMA mobile phone, or contact with the base station, and only the individual phone can not communications (work by shielding the channel Mobile)



Green rectangle, said base station signals

Red rectangle that shield Signal

If the CDMA channels may not be all the shield when the shield device, then this time does not play any role in shielding device



Green rectangle, said base station signals

Red rectangle that shield Signal

2.5 Why is the base station interference.

2.5.1 The power base stations and mobile phones are smart adjustable with automatic features,

while the base station through the phone's transmitter power to adjust the size of the size of its transmission power, while the base station can only be adjusted to a certain channel or a carrier frequency power, while working in the same channel to other mobile phones will be affected to the (for GSM and DCS systems in terms of eight time slots per channel, in addition to a broadcast channel, the channel can have in a mobile phone 7 At the same time communication). This way, if your jammers interfere with base stations Uplink signal to the base station to adjust its output power is invalid, thus interfering with the normal work of the base station.

2.5.2 On the other hand, if your jammers interfere with base stations Uplink signals, would be tantamount to launching a series of base stations it can not identify the language (such as base stations used in English, and you launch the Congolese language) This has the potential to confuse or even crash the base station.

2.6 Indicators of cell phone signal jammers Description:

2.6.1-band output power

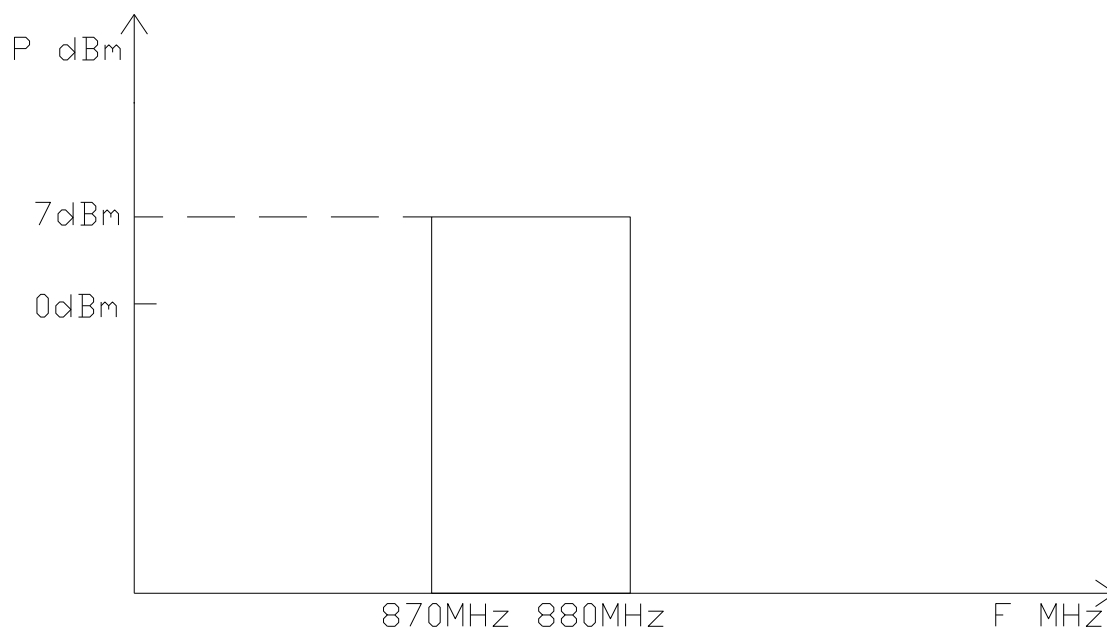
Band output power is an output port of output power (eg: CDMA800, GSM900, GSM1800, 3G)

2.6.2 Channel Output Power

Channel output power is one in a frequency band of power. Its relationship with the band the relationship between line and surface

The following figure is a waveform diagram CDMA power, channel power is +7 dBm, frequency output power is the next figure rectangular points.

Shielded from the calculation is based on the channel output power to be calculated.



2.6.3 Shielding calculation of the distance

Necessary to ensure an adequate wireless communications carrier-interference ratio (SNR), in order to effectively receive, complete the communication. Mobile Signal Jammer through the generation and mobile phones to receive the same frequency interference signals, to destroy the cell phone reception conditions, cut off the communication link between mobile phone and base station. To achieve the effect of shielding communications.

Interference shielding device power is certain, non-blocking space shield radius of the path attenuation and received by the base station signal level co-decision. The following table gives the distance and path attenuation comparison table. By the shielded output channel power, the base station signal level, covering the gain-line coverage radius can be determined. The following formula: $P_{ch} + G_{at} - L - FAF \geq P_{rx}$

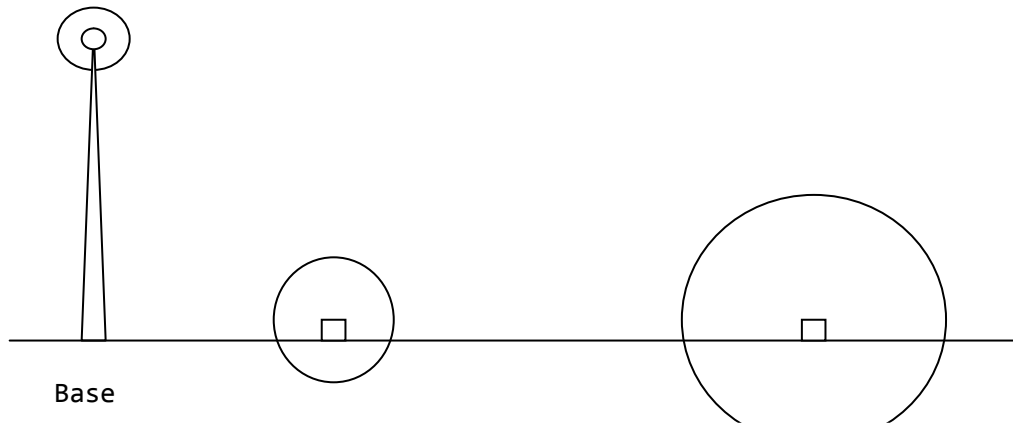
- Pch : Shielding channel power output of the minimum
- Gat : Cover the antenna gain
- L : Path attenuation
- FAF : Path loss value, is 6dB
- Prx : The base station signal strength

Comparison of distance and attenuation

$L=32+ 20\log d +20\log f+ FAF$ f in units of megahertz to 1000 meters as d in the unit of distance

	<i>900MHz</i>	<i>1800MHz</i>		<i>900MHz</i>	<i>1800MHz</i>
<i>Distance (m)</i>	<i>attenuation</i>	<i>attenuation</i>	<i>Distance (m)</i>	<i>attenuation</i>	<i>attenuation</i>
	<i>(dB)</i>	<i>(dB)</i>		<i>(dB)</i>	<i>(dB)</i>
1	38	44	25	66	72
2	44	50	30	67.5	73.5
3	48	54	35	69	75
4	50	56	40	70	76
5	52	58	45	71	77
6	53.5	59.5	50	72	78
7	55	61	60	73.5	79.5
8	56	62	70	75	81
9	57	63	80	76	82
10	58	64	90	77	83
15	61.5	67.5	100	78	84
20	64	70	200	84	90

Above table can be seen that the shield distance from the shield device is determined by the strength of the field strength



For the same shielding device is concerned, at different field strength conditions, the shielding device is not the same distance, the stronger the

2.7 Antenna

Antenna orientation and omni-directional antenna

2.7.1. Omni-directional Antenna



Product name : DCS Antenna

Frequency range : 1805-1880MHz

Electrical performance	
Frequency range	1850-1990MHz
VSWR	≤1.5
Impedance	50Ω

Gain	2dBi
Polarization Type	Vertical
Horizontal Beamwidth Θ_{HP}	360°
Vertical Beamwidth Θ_{HP}	78°±3°
Maximum input power	50W
Interface Type	TNC-type-yang head
Lightning Protection	DC Ground
Mechanical Indicators	
Height	157mm
Weight	23g
Radome Material	Plastic
Antenna Color	black
Temperature	-40°C~+55°C

2.7.2. Antenna orientation

Product name : Directional Panel Antenna



Model : SL15023B

Frequency range : 806-960MHz 1710-2500MHz

Electrical performance	
Frequency range	806-960MHz 和 1710-2500MHz
VSWR	≤1.5
Impedance	50Ω
Gain	7dBi
Polarization Type	Vertical
Horizontal Beamwidth Θ_{HP}	88°
Vertical Beamwidth Θ_{HP}	47°
Compared before and after	≥15dB
Maximum input power	250W
Interface Type	TNC-type-yang head

Lightning Protection	DC Ground
Mechanical Indicators	
size	210mm×180mm×44mm
weight	600g
Cable Length	260mm
Radome Material	ABS
Temperature	-40°C~+60°C

2.7.3 Dual-port directional antenna (GSM / DCS)

Frequency range: 890-960MHz 1710-1880MHz
 Gain: 12dBi 15dBi
 Half-power beam: 65°H-plane
 VSWR coefficient: ≤1.5
 Compared before and after: 25dB
 Polarization Type: Vertical polarization
 size: 1200×280×100 mm
 Connector Type: N Type
 Hold rod diameter: φ50-φ114mm



2.7.4 Connect cable



2.8 Several common conversion table from the models of shielding

Present blocker power is basically divided into three categories

2.8.1 Single output power of 2-3W in low-power jammers

Model	band	Machine Output (dBm/30k)	Antenna Gain (dBi)	Path loss value (dB)	Shielding distance (radius / m)									
					1	2	4	8	16	32	64	128	256	
101B	CDMA	7	2	10	-33	-39	-45	-51	-57	-63	-69	-75	-81	
	GSM	2	2	10	-38	-44	-50	-56	-62	-68	-74	-80	-86	
	DCS	0	2	10	-46	-52	-58	-64	-70	-76	-82	-88	-94	
	PHS	-2	2	10	-48	-54	-60	-66	-72	-78	-84	-90	-96	

2.8.2 Single output power of the medium-power 15-30W blocker)

Model	band	Machine Output (dBm/30k)	Antenna Gain (dBi)	Path loss value (dB)	Shielding distance (radius / m)									
					1	2	4	8	16	32	64	128	256	
101D-	900M	11	7	10	-24	-30	-36	-42	-48	-54	-60	-66	-72	
D	1800M	8	7	10	-33	-39	-45	-51	-57	-63	-69	-75	-81	

2.8.3 Single output power of more than 40W power blocker

Model	band	Machine Output (dBm/30k)	Antenna Gain (dBi)	Path loss value (dB)	Shielding distance (radius / m)										
					1	2	4	8	16	32	64	128	256	512	1024
101G (160W)	GS	20	12	10	-1	-1	-2	-2	-3	-4	-4	-5	-5	-6	-70
	M				0	6	2	8	4	0	6	2	8	4	
	CD	20	12	10	-1	-1	-2	-2	-3	-4	-4	-5	-5	-6	-70
	MA				0	6	2	8	4	0	6	2	8	4	
	DCS	18	15	10	-1	-2	-2	-3	-3	-4	-5	-5	-6	-6	-75
	PHS	16	15	10	-1	-2	-2	-3	-4	-4	-5	-5	-6	-7	-77

2.9 cell phone signal jammers radiation levels:

According to GB1043-89 health standards, the launch of single-channel signal strength can not exceed $50\mu\text{W}/\text{cm}^2$, and our cell phone signal shielding during microwave radiation detection device, at the same time, the work of 4-channel state, cell phone signal jammers 20cm away from a place radiation maximum $40.0\mu\text{W}/\text{cm}^2$, fully in line with national standards. In other words, as long as the left blocker 20cm, for users, cell phone signal jammers is absolutely safe.

3 shielding system design, installation and commissioning

3.1 Precautions before installation

1. Before installing this equipment, we must first sign is installed correctly in accordance with the antenna, and then open the power supply, in order to avoid the machine being burned out.
2. Installation of equipment should be preceded by knowledge base station position, as far as possible along the direction of jammers base station direction.
- 3 installation of equipment, they should pay attention to whether the machine around the 1 meter with metal objects, to avoid signal reflection that may affect shielding effectiveness.
4. In the outdoor installation of good water-proof, lightning protection measures.
5. Special circumstances, such as gas stations, filling stations, etc. should be installed in explosion-proof machines.
6. Mounting height 1.8-2 m better, can be directly placed on the table can be installed on a wall or installed in the ceiling, perpendicular to the antenna and the ground state for the better
7. If the indoor installation, should pay attention to indoor wireless devices already exist launch of the frequency is caused by the same frequency interference.
8. Must take into account the existing precision instrument indoors different frequency of

anti-interference ability and a safe distance from the tolerance

9 If the room is equipped with signal enhancement such as amplifiers, are not suitable for installation

of jammers.

10.. Fully understand the shielding region of non-shielded region boundaries.

3.2. On-site investigation

To understand the signal strength for the installation of shielding device is very important. Since there is a variety of signals in the environment, but also a variety of signal strength is different, therefore, to understand on-site signal strength can be targeted to design and installation of jammers.

In the absence of survey equipment, cases, need to know to install the base station locations surrounding the case, how far visual, what is the base station (Mobile, China Unicom, CDMA, big PHS, 3G base stations, etc.), the direction of base station antenna refers to the other side. In general the city to build more base stations to the roof of the building at a higher, suburban or rural, mostly tower.

If surveying equipment, as long as detailed records on-site indoor and outdoor signal strength of multiple points

3.3 Design and Installation

According to survey results, for different signals with reasonably have reached the ideal state, should fully take into account the degree of interference of non-shielded region and the impact on the surrounding base stations

3.3.1 determine the approximate installation diagram, in the actual installation process, first install

the signal strength of the local (that is, from the base station nearest place), using directional antennas, along the direction of base station antennas to start the installation.

3.3.2 consider the shielding region, floor height, high-level signal better than the bottom, using the installation from top to bottom in order to achieve the best shielding effectiveness

3.3.3 give full consideration to PHS base station, interference immunity, the general power of PHS base stations are relatively small, and the PHS did not attend Downlink lines of points, base stations and easy to absorb interfering signals, resulting in the base station does not work properly.