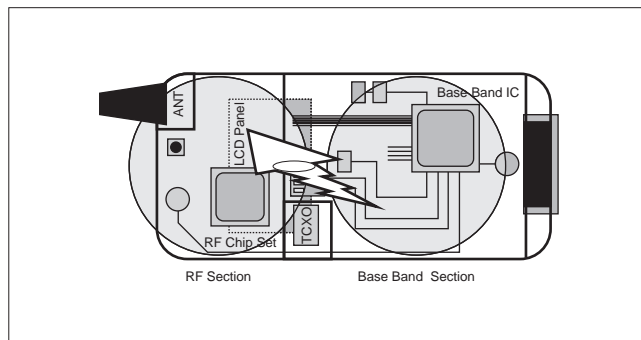


# 10 Example of Noise Suppression in Mobile Phones

## Noise Emission Status :

**When noise from the base band section flows into RF section, sensitivity suppression occurs, resulting in BER (Bit Error Rate) deterioration.**

Mobile phone base band section, typically the base band IC, controls various signals such as voice signal and LCD signal. The base band IC is a significant noise source, because it operates at a high-speed and connects many data lines. If such noise flows into the RF section through the data line or power/GND line, sensitivity suppression occurs, resulting in BER (Bit Error Rate) deterioration.



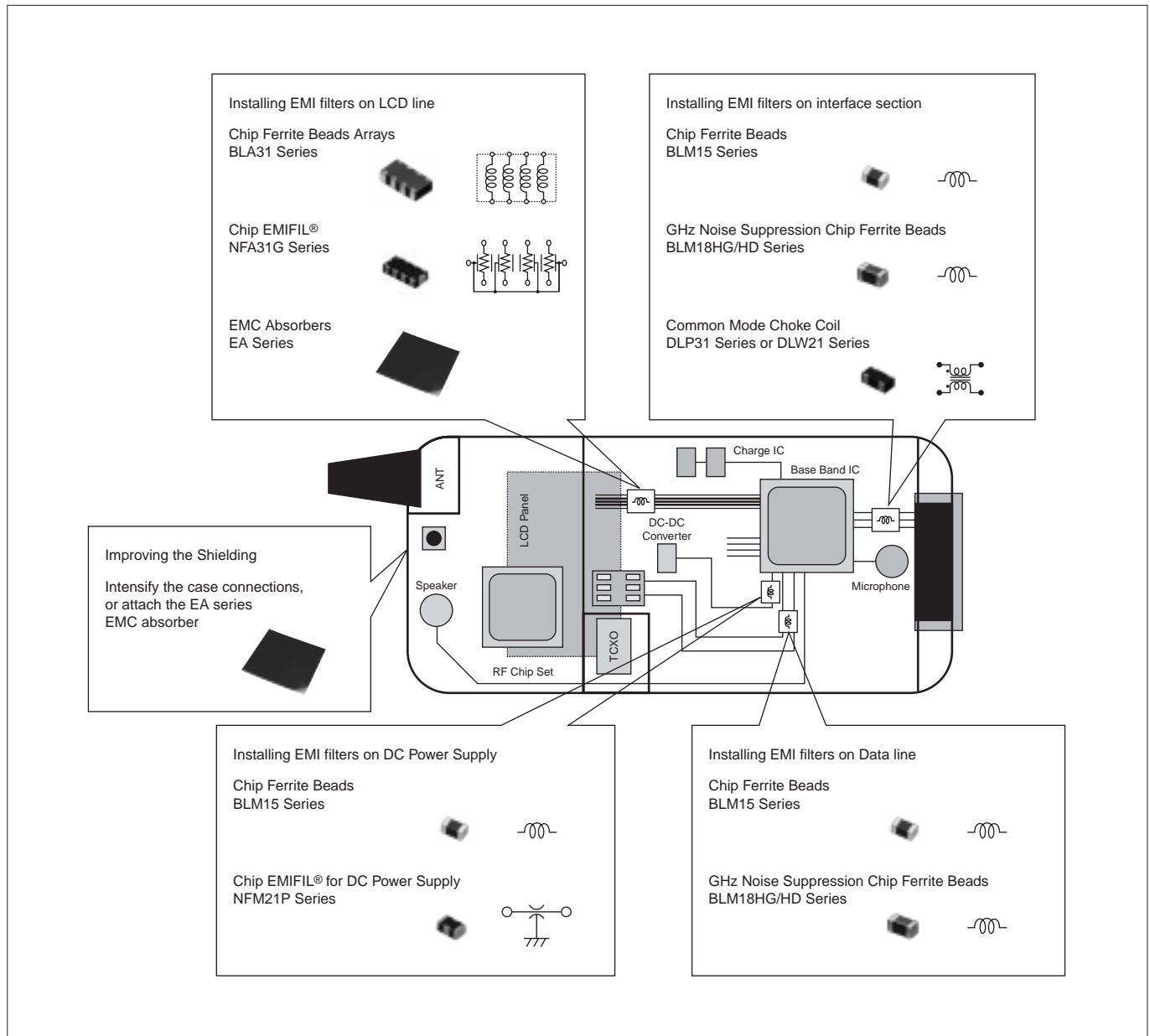
## 10 Example of Noise Suppression in Mobile Phones

### Noise Suppression content in Mobile Phones

To improve BER (Bit Error Rate) deterioration, it is necessary to suppress noise conduction from the base band section to the RF section. For this purpose, the EMI filter should be mounted to the noise conduction route between the base band section and the RF section.

Recently, as the base band section's noise level has become higher, shielding the base band section is now also important.

The following pages provide detailed description on noise suppression models for the above five items.

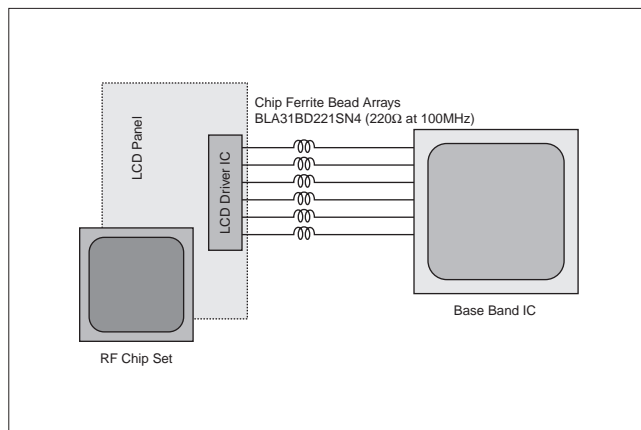


## Example of Noise Suppression in Mobile Phones 10

### Installing EMI filters on LCD line

Because LCD's data bus and address bus are comprised of many lines that simultaneously turn on or off, a large current flows into the power/CND line instantaneously. Therefore, it is necessary to take measures for suppressing the current flow into the signal line. Typically, the BLA31 series chip ferrite bead array, and the NFA31G series chip EMIFIL<sup>®</sup> with resistance can be used for this purpose.

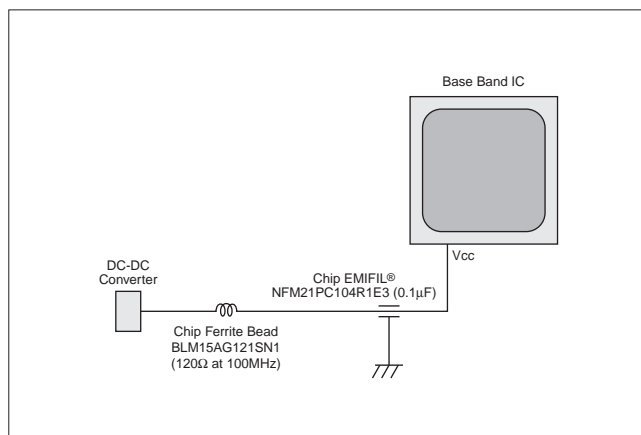
If these components cannot be inserted, the EA series EMC absorber should be attached to the flexible cable for the LCD, to suppress noise conduction through the flexible cable.



### Installing EMI filters on DC Power Supply

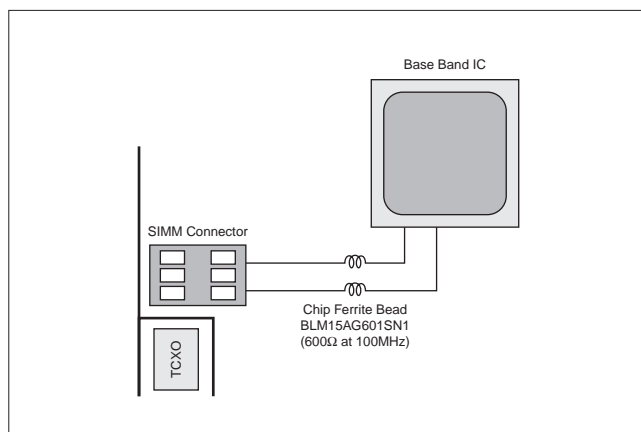
To suppress noise conduction from the base band section to the RF section through a DC power supply line, the BLM15 series chip ferrite bead should be mounted to the DC power supply line. A combination of the ferrite bead and the NFM21P series chip EMIFIL<sup>®</sup> for DC power supply lines provides an enhanced noise suppressing effect.

The NFM21 P series chip EMIFIL<sup>®</sup> is a three terminal capacitor, which provides better high frequency characteristics than a two terminal capacitor. When a bypass capacitor is comprised of several two terminal capacitors with different constants, they can be replaced with a single chip EMIFIL<sup>®</sup>, which provides an advantage in mounting space.



### Installing EMI filters on Data Line

The base band section contains many data lines. As a typical example, a SIMM data line is described here. A chip ferrite bead BLM15AG601SN1 is mounted to the SIMM data line to suppress noise conduction. Since the SIMM data line operates at a relatively low speed, a chip ferrite bead with large impedance can be used. However, if a chip ferrite bead with large impedance is used for a high-speed data transmission line, it will adversely affect the transmission signal waveform, resulting in waveform deformation, rounding or operation failure. To prevent these problems, the BLM15BB/BD series ferrite bead for signal lines, which has little influence on the signal waveform, should be used for high-speed signal lines.



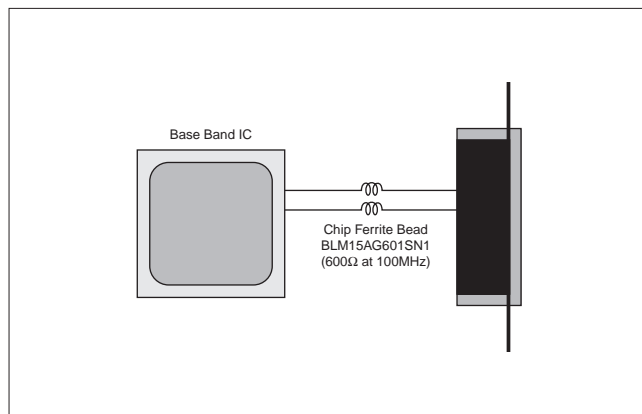
## 10 Example of Noise Suppression in Mobile Phones

### Installing EMI filters on interface section

If noise flows through an interface cable, noise emitted from the cable is diffracted and flows into the antenna, causing BER deterioration. To suppress noise conduction through the interface cable, the BLM15 series chip ferrite bead should be mounted between the base band IC and the cable connector.

For mobile phones with high communication frequency (e.g. PDC1.5, DCS, PCS), using the DLP31 or DLW21 series common mode choke coil, which provides high impedance in this frequency range, offers more excellent noise suppressing effect.

For noise suppression in interfaces, immunity test and transmission wave diffraction preventive measures are required. Therefore, it is necessary to select the optimum EMI filters according to the intended purpose and frequency band.



### Improving the Shielding

Generally, the mobile phone resin case is shielded by conductive plating. As mobile phones have become more functional, the noise level from the base band section has been increased. Therefore, it is important to shield the base band Section, as well as the RF section. Mobile phones should be designed to make the contact surface of the case as large as possible, and to reduce high frequency impedance.

Shielding the base band section partially with a metal case or attaching the EMC absorber to the shield contact surface can also intensify the shielding condition.

