

BRALCO

Advanced Materials Pte Ltd

"Materials by Design, Manufacturing on Demand."

#03-66,81 Ayer Rajah Crescent, Singapore 139967

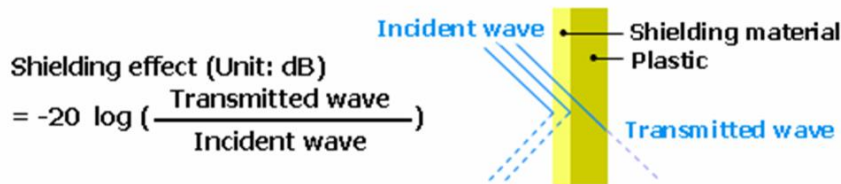
Tel: +65 69800689

www.bralcoadvancedmaterials.com

Next Generation High Frequency EMI absorbing materials for 5G frequencies

EMI (electromagnetic interference) is a disturbance that affects an electrical circuit due to electromagnetic conduction or radiation emitted from an external source. The source can be high current/low voltage or low current/high voltage, switching of electronic circuits to control the flow of electrical energy in power supplies, power converters, power inverters, motor drives, and motor soft starters in power electronics. EMI reduction is a serious problem in modern electronics and communication systems. In fact it's not just a good idea, it's the law!! In the advent of current technological push towards the 5G devices, which is about to start seeing high frequency applications (>18GHz), the main concern is regulating the EMI. Currently, most of the existing practices cover narrow frequency band and are suitable for KHz –few GHz frequency and are reflective type. In addition, just shielding, with no absorption, may result in malfunction of the device because of interference resonances inside the device chassis and of cross-talk between neighbouring devices. EMI regulations are the ability of electrical and electronic systems to operate without interfering with other systems.

EMI Shielding mechanism:



Absorption loss (A) = 8.69 (d/δ) [dB]

Where:

$$\delta = \text{skin depth (mm)} = \sqrt{\frac{2}{\omega\mu\sigma}} = \frac{1}{\sqrt{\pi f\mu\sigma}} = \frac{2.6}{\sqrt{\mu_r\epsilon_r}}$$

ω= angular (radian) frequency

μ=materials permeability

σ= materials conductivity

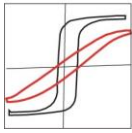
f= frequency (Hz)

Global efforts are directing to develop spectrum strategy for the 5G wireless networks (10-25GHz). Industry 4.0: industrial-IoT machine communications, EMI shielding -> factory of the future. [CAGR of 7.0% to reach \$10.45 billion by 2023. Factors include rising Electric Vehicle, global telecom industry, implementation of EMI shields in all electronic devices are driving the market growth]. Many countries pledged to cut CO₂ emissions intensity levels by adopting electric vehicles. From the EMC point of view, the integration of electric drive system is a new component consisting of a high-voltage power source, a frequency converter, an electric motor and shielded high-power cables. Treating this new electric drive system require substantial EMI test procedures for compatibility and safety requirements.

5G networks will be supporting a vast multiplicity of devices with a speed, scale and complexity never seen before. The sectors impacted will include the wireless communications, IIOT. It will be widely used in the transportation industry as well.

GST Reg No: 201534054H

Confidentiality Notice: This message is intended exclusively for the individual or entity to which it is addressed and may contain privileged, proprietary, or otherwise private information. If you are not the named addressee, you are not authorised to read, print, retain, copy or disseminate this message or any part of it. If you have received this message in error, please notify the sender immediately by e-mail and delete all copies of the message.



BRALCO

Advanced Materials Pte Ltd

"Materials by Design, Manufacturing on Demand."

#03-66,81 Ayer Rajah Crescent, Singapore 139967

Tel: +65 69800689

www.bralcoadvancedmaterials.com

Shielding for 5G is the new network system which cover a wide range of frequencies. To better shielding electronic components on board level, proper selection of shielding solutions is necessary. Space is always the key limitation for mobile devices and gap between board and can be limited to 0.1 mm. To able to achieve absorption shielding within such ultra thin gap, Bralco has the key technological solutions that can create a thin coating to provide an absorption shielding capability. In addition, Bralco can provide customized EMI absorbing materials (Figure 1) with good absorption with the working frequency range 5G frequency, with various physical forms including Nano powders, nano-ink, thin/thick sheet, 3D structures, etc. which are suitable for low temperature coating over a large area and long functional life, and suitable for harsh environment.

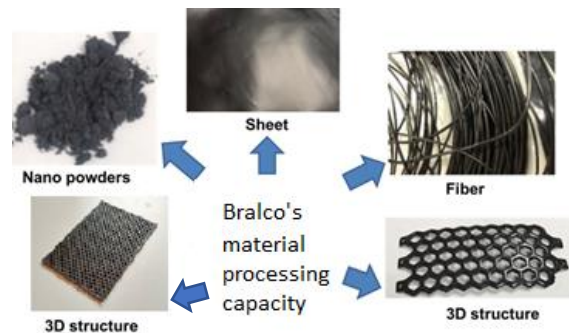


Figure 1: Bralco's various state-of-the-art materials processing capacity.

For detail requirements, kindly feel free to contact: amit@bralcoadvancedmaterials.com

GST Reg No: 201534054H

Confidentiality Notice: This message is intended exclusively for the individual or entity to which it is addressed and may contain privileged, proprietary, or otherwise private information. If you are not the named addressee, you are not authorised to read, print, retain, copy or disseminate this message or any part of it. If you have received this message in error, please notify the sender immediately by e-mail and delete all copies of the message.