RTT TECHNOLOGY TOPIC
December 2022

5G Satellite RF and Optical Integration

We are delighted to announce that our new book, **5G and Satellite RF and Optical Integration** is now available to order for immediate shipment in the US and to pre-order for shipment by the end of December to the rest of the world (ROW).

The book has eleven Chapters packed with useful information.

Chapter 1 covers 5G radio spectrum including RF C Band, RF link budgets and active and passive device efficiency.
Topics addressed in the rest of the book include
Chapter 2 Optical C Band link budgets and active and passive device efficiency
Chapter 3 RF over Fiber- link budgets and network architectures
Chapter 4 Space RF Link Budgets
Chapter 5 Optical Inter Satellite Links (OISL)
Chapter 6 Deep Space and Near Space technologies
Chapter 7 Ground Station and Earth Station Hardware and Software
Chapter 8 Low Altitude Platforms
Chapter 9 High Altitude Platforms
Chapter 10 RF and Optical Technology Enablers
Chapter 11 Technology Economics of RF and Fiber for terrestrial and space networks.

For more information and to order go to
https://uk.artechhouse.com/5G-and-Satellite-RF-and-Optical-Integration-P2194.aspx

This is the third and probably last of three books about 5G and satellite technology written for Artech House.

The first book, *5G Spectrum and Standards* published in 2016 was written just after the 2015 World Radio Conference and just before Release 15 of the 3GPP radio standard which marked the shift in focus from LTE Advanced (4G) to the fifth generation (5G) mobile broadband physical layer.

The second book, *5G and Satellite Spectrum, Standards and Scale* was published in 2018 a year prior to the 2019 World Radio Conference, and coincided with Release 16 of the 3GPP standard which added in additional capabilities such as narrow band IOT (internet of things) and enhanced positioning capabilities. We made the general point that space costs were reducing over time while 5G terrestrial costs were increasing in line with network density.

Real estate cost, the cost of digging a trench for fibre and the cost of electricity was remaining constant or increasing but not decreasing. The cost of getting to space in contrast was halving every eighteen months and the operational life of satellites was longer than expected and getting longer over time. The expected operational life of the first generation of Iridium satellites was seven years. Some satellites were replaced but the constellation remained operational until a major constellation upgrade twenty years later. No real estate costs in space and free electricity added to the logic of space telecommunication as a fast growth sector.

This third book, *5G and Satellite RF and Optical Integration* published in January 2023 was written while preparations were on going for the 2023 World Radio Conference and coincided with Release 17 of the 3GPP standard and finalisation of the work items for Release 18 including what is now known as 5G Advanced.

The Release 17 Standard took forward earlier study and work items on the integration of New Radio (NR) with Non Terrestrial Networks (NTN) defined as Low Earth Orbit (LEO), Medium Earth Orbit (MEO) and Geostationary (GSO) satellites and high altitude platforms (HAPS). A parallel work stream addressed Non Terrestrial Internet of Things (IoT) connectivity. New Radio introduced a new set of Band Numbers divided into Frequency Range 1 (FR1) from 410 MHz to 7.125 GHz and Frequency Range 2 (FR2) from 24.25 GHz to 52.6 GHz, subsequently extended to 71 GHz.

Copies of the two previous books in the Series can be ordered here
https://uk.artechhouse.com/5G-and-Satellite-Spectrum-Standards-and-Scale-P1935.aspx
https://uk.artechhouse.com/5G-Spectrum-and-Standards-P1805.aspx

If you are interested in writing a book for Artech House or have research work you would like included in future 5G and 6G and satellite titles then email geoff@rttonline.com who can put you in touch with the Artech commissioning team.

You may have noticed, or not noticed that we have not been posting Technology Topics for a while (we decided to write a book instead.). Life is now back to normal. In our January 2023 topic,**5G and Satellite Radio Spectrum** we address the merits and demerits of using the 2 GHz band and RF C Band for 5G terrestrial and satellite connectivity and related issues of flat panel and 3D antenna efficiency.

About RTT Technology Topics

RTT Technology Topics reflect areas of research that we are presently working on. We aim to introduce new terminology and new ideas to help inform present and future technology, engineering, market and business decisions.

The first technology topic (on GPRS design) was produced in August 1998. 24 years on there are over 270 technology topics **archived on the RTT web site.**

Do pass these Technology Topics and related links on to your colleagues, encourage them to join our **Subscriber List** and respond with comments.

Contact RTT

RTT, and **Niche Markets Asia** are presently working on research and forecasting projects in the mobile broadband, public safety radio, satellite and broadcasting industry and related copper, cable and fibre delivery options.

If you would like more information on this work then please contact **geoff@rttonline.com**
00 44 7710 020 040

We are also running a workshop on LEO, MEO, GSO, LEO, 5G, RF and optical integration in Prague 8th to 12th May 2023

More information here
www.cei.se/continuing-education-institute/satellite-communications.html