



**Professional Training Courses:**

**Mobile Telecommunication Technologies**

# **UMTS and HSPA/HSPA+**

**3 Day Course Programme**

**14 – 16 November 2011**

## Why Choose Us?

At eXplanoTech, we have extensive experience in the mobile wireless domain and our consultants have worked with industry leaders in various roles. This gives us a very good understanding of the relevant technologies, not only from a theoretical viewpoint but also a practical one.

Our trainers remain abreast of the latest technology developments in the Telecom industry through active participation in technical and industry groups, as well as forums. This enables us to design and deliver training courses that incorporates the latest mobile telecommunication information. We are committed to our trainees and will continue to expand their skills as well as fill in gaps in their understanding by providing post-course support.

We are able to deliver client focused and in-house mobile telecommunication training, ranging from GSM to LTE/LTE-Advanced. From inception, eXplanoTech provide personalised training based on experience rather than just theoretical references and standards.

Group sizes are purposely kept small ensuring that personal touch and effective interaction between the trainers and trainees is continuously maintained.

We look forward to welcoming you to our courses.



Zahid Ghadialy  
Managing Director of eXplanoTech

*Zahid is a veteran of the global telecommunications industry. He blogs regularly at his personal blog: <http://3q4q.blogspot.com/> and also maintains a personal website: [www.3q4q.co.uk](http://www.3q4q.co.uk). You can follow him on Twitter: @zahidtg*

## Testimonials

### Introduction to LTE/SAE course

***“The course was very comprehensive and addressed most of the relevant areas of LTE. It also provided the right amount of details O2 wanted”***



– Dr. Sen Lin Zhang

### Introduction to MBMS course

***“Course content: Good. Covered the areas that Anritsu required as an Introduction. Tutor’s knowledge on the topic: Very Good”***

**Anritsu**

Discover What's Possible™

– David Corry

CT Framework Team Leader

### Introduction to UMTS, HSPA and HSPA+

***50% of the participants rated the 'Course Organisation' as Excellent and the other 50% rated it as Good.***



### Introduction to MBMS course

***“The training was very informative, presented in a clear, relaxed manner. Generated much group discussion. The trainer has good overall knowledge of the training area. Enjoyable training that combined technical knowledge with fun. Coverage of the material was good. The training has added appreciable value to my 3G application knowledge.”***



– Loknath Ghosh, Technical Leader,

## Day 1: UMTS (Release 99) - Introduction and Procedures

Universal Mobile Telecommunication Systems (UMTS Rel-99), more commonly known as 3G, was the first step towards a truly universal global roaming system that could handle SMS, voice, video, and many multimedia data with up to 2 Mbps downlink speed. The course will focus on the key drivers for UMTS technology, the architecture, and the radio interface protocol that enables the connection and communication or data transfer between two protocol entities. Finally, we will focus on some of the air interface procedures between network entities.

This course is designed to suit engineers, marketing professionals and non-technical people too.

### Day 1

	08.30 - 10.00 SESSION 1	10.30 - 12.00 SESSION 2
MORNING SESSIONS	<ul style="list-style-type: none"> <li>• Drivers and the need for 3G</li> <li>• Standard bodies, Standards, and Technical Specifications</li> <li>• Spectrum and Allocations</li> <li>• UMTS Architecture Overview</li> </ul> <p>10:00 – 10:30 Coffee Break and Q &amp; A</p>	<ul style="list-style-type: none"> <li>• UE Architecture</li> <li>• UTRAN and UE Identifiers</li> <li>• Bearers and Quality of Service (QoS)</li> </ul> <p>12:00 – 13:00 Lunch Break</p>
	13:00 - 14.30 SESSION 3	15:00 – 16:30 SESSION 4
AFTERNOON SESSIONS	<ul style="list-style-type: none"> <li>• Radio Interface Protocol (RIP) Architecture:               <ul style="list-style-type: none"> <li>○ Call Control (CC)</li> <li>○ Mobility Management (MM)</li> <li>○ Session Management (SM)</li> <li>○ GPRS Mobility Management (GMM)</li> <li>○ RRC</li> <li>○ PDCP</li> <li>○ RLC</li> <li>○ MAC</li> <li>○ Physical Layer (L1)</li> <li>○ Channel Mappings</li> </ul> </li> </ul> <p>14:30 – 15:00 Coffee Break and Q &amp; A</p>	<ul style="list-style-type: none"> <li>• Air Interface Procedures:               <ul style="list-style-type: none"> <li>○ Initial Cell Search</li> <li>○ Location Update</li> <li>○ Attach</li> <li>○ Cell Selection/Re-selection</li> <li>○ LAU &amp; RAU</li> <li>○ Packet Data transfer</li> <li>○ Cell Update</li> <li>○ Soft Handover, Inter-Frequency Handover</li> </ul> </li> </ul> <p>16:30 – 17:00 Test and final Q &amp; A</p>

## Day 2: UMTS Release 5+ (HSPA and HSPA+)

We will cover the limitations associated with UMTS technology and the need for HSPA (High Speed Packet Access). Within HSPA we will cover firstly, High Speed Downlink Packet Access (HSDPA), also referred to as 3.5G. The biggest advantage of HSDPA is fast downloads enabling end users to view video clips seamlessly with high quality. Secondly, High Speed Uplink Packet Access (HSUPA), also known as 3.75G was designed to complement HSDPA and increase the UL data transmission speeds to 5.8Mbps in the uplink. HSUPA is very important, as this in combination with HSDPA makes mobile broadband possible. Together they are known as High Speed Packet Access (HSPA). Finally, Evolved High Speed Packet Access (HSPA+), focuses on HSPA evolution based on Release 7 onwards. HSPA+ started as the first step towards the Long Term Evolution (LTE) of the UMTS networks, which is now a competing technology.

This course is designed to suit engineers and marketing professionals, and requires good understanding of UMTS technology.

### Day 2

	08.30 - 10.00 SESSION 1	10.30 - 12.00 SESSION 2
<b>MORNING SESSIONS</b>	<ul style="list-style-type: none"> <li>• 3GPP Releases:               <ul style="list-style-type: none"> <li>○ Release 99</li> <li>○ Release 5</li> <li>○ Release 6</li> <li>○ Release 7 onwards</li> </ul> </li> <li>• The need for HSPA</li> <li>• HSDPA Introduction:               <ul style="list-style-type: none"> <li>○ Motivation</li> <li>○ Changes to the existing R99 architecture</li> </ul> </li> </ul> <p>10:00 – 10:30 Coffee Break and Q &amp; A</p>	<ul style="list-style-type: none"> <li>• HSDPA Basic Principles:               <ul style="list-style-type: none"> <li>○ HSDPA UE Categories</li> <li>○ HSDPA Rate Calculation</li> <li>○ HSDPA Architecture</li> </ul> </li> </ul> <p>12:00 – 13:00 Lunch Break</p>
	13.00 - 14.30 SESSION 3	15.00 – 16:30 SESSION 4
<b>AFTERNOON SESSIONS</b>	<ul style="list-style-type: none"> <li>• HSUPA Basic Principles:               <ul style="list-style-type: none"> <li>○ HSUPA Overview</li> <li>○ HSUPA Architecture</li> </ul> </li> </ul> <p>14:30 – 15:00 Coffee Break and Q &amp; A</p>	<ul style="list-style-type: none"> <li>• HSPA+ Motivation</li> <li>• HSPA+ Enhancements               <ul style="list-style-type: none"> <li>○ Enhanced Cell_FACH</li> <li>○ CPC</li> <li>○ MIMO</li> <li>○ Higher Order Modulation (HOM)</li> <li>○ L2 Optimisation</li> <li>○ Multi-carrier evolution</li> <li>○ Carrier Aggregation</li> <li>○ Multipoint HSPA</li> </ul> </li> </ul> <p>16:30 – 17:00 Test and Final Q &amp; A</p>

## Day 3: UMTS and HSPA Air Interface Signalling Procedures

Signalling procedures illustrate the way in which protocol entities exchange information. In this course we will focus on a step-by-step description of signalling procedures in detail for UMTS and HSPA technologies across the air interface. We will focus on real world signalling examples for both packet switch (PS) and circuit switch (CS) in a variety of scenarios.

This course will only focus on Radio Resource Control (RRC) and Non-Access Stratum (NAS) signalling.

This course is designed to suit engineers and marketing professionals, it requires a good understanding of UMTS (Rel-99) and HSPA (Rel-5 onwards).

### Day 3

	08.30 - 10.00 SESSION 1	10.30 - 12.00 SESSION 2
MORNING SESSIONS	<ul style="list-style-type: none"> <li>Detailed look at the Location Update and Attach procedures</li> <li>NMOI and NMOII mode of operation</li> </ul> <p>10:00 – 10:30 Coffee Break and Q &amp; A</p>	<ul style="list-style-type: none"> <li>Detailed look at MO and MT CS voice call</li> <li>Detailed look at MO PS data call</li> </ul> <p>12:00 – 13:00 Lunch Break</p>
	13:00 - 14.30 SESSION 3	15:00 – 16:30 SESSION 4
AFTERNOON SESSIONS	<ul style="list-style-type: none"> <li>Measurements, Compressed Mode and Handovers Signalling                             <ul style="list-style-type: none"> <li>Soft Handovers</li> <li>Inter-frequency handovers</li> <li>Inter-RAT Hard handovers</li> </ul> </li> </ul> <p>14:30 – 15:00 Coffee Break and Q &amp; A</p>	<ul style="list-style-type: none"> <li>Channel Type Switching</li> <li>Cell Update</li> <li>Location Update and Routing Area Update</li> <li>Fast Dormancy</li> </ul> <p>16:30 – 17:00 Final Q &amp; A</p>

## Fees and Booking

We operate a flexible booking scheme that allows you to select and book any of the single day courses, or in combination, or all three day courses.

Course	Cost <sup>1,2</sup>
Any One Day	£600
Any Two Days	£1100
All Three Days	£1400

The booking fees include cost of the training sessions, course materials, coffee, and lunch.

1. Additional 20% VAT will be charged on top of the final cost
2. Universities and students can take advantage of discounts on our courses. Please email [training@explanotech.com](mailto:training@explanotech.com) for further details.

## Terms and Conditions

**Cancellation Policy:** Please note that the following cancellation fee applies if a delegate (or a company) cancels a training course booking:

Cancellation Period:	Fees Payable:
More than 14 days	20% admin fee
10- 14 days	50%
Less than 10 days	Full course fee is payable

## Location

eXplanoTech is based in Luton, which has a easy access from the M1 Motorway, the railway network, and International London Luton Airport.






### Training Location:

eXplanoTech Limited  
960 Capability Green, Luton. LU1 3PE  
United Kingdom

Email: [training@explanotech.com](mailto:training@explanotech.com)  
Tel: +44 (0)1582 635026

### Map and directions:



-  M1 Junction 10a – 0.5 miles
-  Luton Parkway Railway Station – 1.5 miles
-  Luton Main Railway Station 1.1 miles
-  Luton Airport - 2.4 miles
-  Buses: Number 3 or 30 from Luton Park Square (town centre)

### Local accommodation:

-  Hill House Bed and Breakfast [www.hillhouseluton.com](http://www.hillhouseluton.com) 1.3 miles
-  Luton Hotel Residence (self-catering rooms) [www.lutonhotelresidence.com](http://www.lutonhotelresidence.com) 0.7 miles
-  Easy Hotel [www.easyhotel.com](http://www.easyhotel.com) 2.4 miles
-  Hotel Ibis [www.ibishotel.com](http://www.ibishotel.com) 2.1 miles
-  Premier Inn (Airport) [www.premierinn.com](http://www.premierinn.com) 1.9 miles

**TO REGISTER**

E-Mail: [training@explanotech.com](mailto:training@explanotech.com)  
Tel: 01582 635026

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**DELEGATE DETAILS (please photocopy the form for multiple copies)**

Title  (Dr, Mr, Miss, Mrs, Ms)

Surname

First Name

Name of Company

Address

E-Mail

Tel

Dietary Requirements

**FOR INTERNAL INFORMATION**

Delegate Number  Code

Course Number