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3GPP TSG GERAN

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OUTLINE



- 3GPP TSG GERAN overview
- Release 13 evolution of GSM/EDGE
 - Market drivers
 - Extended Coverage EGPRS [EC-EGPRS]
 - Power Efficient Operation [PEO]

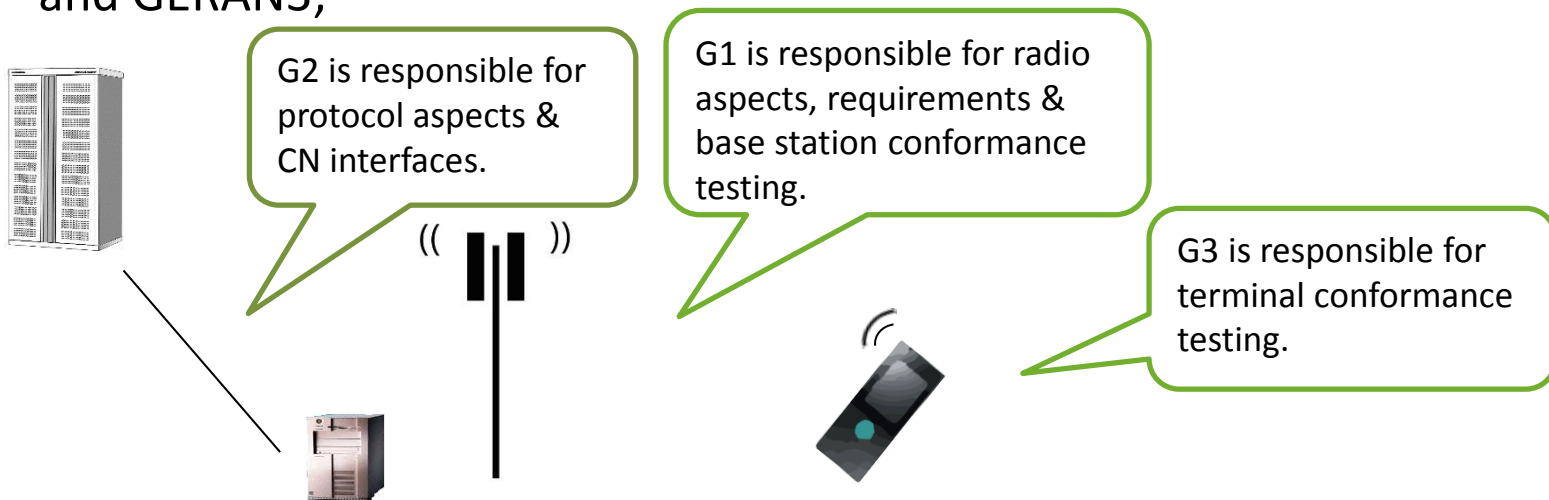


TSG GERAN

OVERVIEW



- TSG **GSM EDGE Radio Access Network** [GERAN] is responsible for overall development and maintenance of GSM and EGPRS.
- The TSG is divided in three working groups GERAN1, GERAN2 and GERAN3;



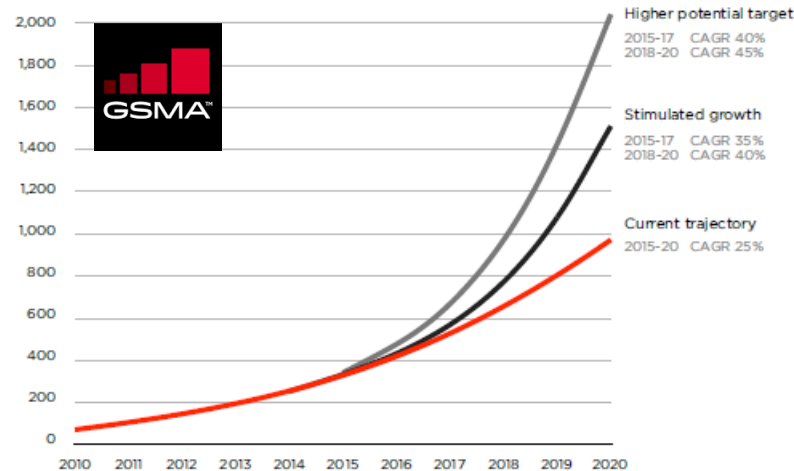


TSG GERAN RELEASE 13

MARKET DRIVER



- During Release 13 the work in GERAN has been influenced by the expected growth in Machine-to-Machine communication [M2M], popularly called the Internet of Things [IoT].
- During 2014 the GSM Association estimated a significant Compound Annual Growth [CAGR] for M2M over the next five years.
- Currently EGPRS is a backbone in many cellular M2M deployments.
- To cater for the expected growth and new emerging M2M use cases GERAN have started work items on Extended Coverage EGPRS & Power Efficient Operation.



Source: GSMA Intelligence, 2014.09



EXTENDED COVERAGE EGPRS [EC-EGPRS]

OBJECTIVES



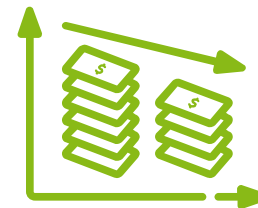
20 dB improved coverage compared to GPRS



Reduce energy consumption to reach 10 years battery lifetime



Reduce device complexity



Re-Use existing BS and avoid impacts to existing systems



WCDMA

GSM

LTE

Support massive number of devices



Enhanced security



Image Source: Ericsson Inc.

EXTENDED COVERAGE EGPRS [EC-EGPRS] EXTENDED COVERAGE

- Perhaps the most challenging objective is to improve coverage by 20 dB to support ubiquitous connectivity.
- For EC-EGPRS this is achieved through “Blind Physical Layer Repetitions”, where a predetermined number of repetitions are sent blindly, without feedback from the receiving end.
 - To maximize the processing gain at the receiver, phase coherency at the transmitter, between repetitions, are required.
 - As a result the Maximum Coupling Loss [MCL] is increased from 144 to 164 dB.





POWER EFFICIENT OPERATION [PEO]

eDRX & RELAXED IDLE MODE BEHAVIOUR



- To cater for 10 years battery life; Power Efficient Operation relaxes idle mode behavior and introduces extended Discontinues Reception [eDRX].
- Relaxed Idle mode behavior;
 - The key is to allow a device to camp on a suitable cell, but not necessarily the best cell.
 - This allows a significant reduction in monitoring of neighboring cells, which facilitates reduced power consumption.
- eDRX
 - With legacy DRX a device must be reachable for networked trigger reporting every few seconds. This requirement drains the device battery.
 - Extended DRX allows a device to be reachable for networked trigger reporting on a interval ranging from a few minutes, up to an hour.



PEO & EC-EGPRS

BATTERY LIFE



- With the use of PEO up to 10 years, 5 Wh battery life is achievable both for devices within regular GPRS coverage (144 dB) as well for extended coverage (154/164 dB).

Packet size, reporting interval	Coupling loss		
	144 dB	154 dB	164 dB
50 bytes, 2 hrs	> 10	6.0	3.1
200bytes, 2 hrs	> 10	2.5	1.2
50 bytes, 1 day	> 10	> 10	> 10
200 bytes, 1 day	> 10	> 10	> 10



For more Information:



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www.3gpp.org/geran

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