VoLTE Challenges

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UE VoLTE Testing Challenges (IR.92)

- VoLTE introduces additional challenges by offering voice services as a packet switched service over the LTE network that also interacts with an IMS system in the network core
  - VoLTE service quality is expected to be better, or worst case, "at least as good" as traditional CS voice
  - Integration of the LTE protocol stack with IMS control layer requires full end-to-end signalling tests which introduces increased complexity
  - Mobility between PS and CS networks with SRVCC needs to be a seamless experience to the end user, but network interoperability issues make this difficult when roaming
  - Supporting regional emergency calling requirements over IMS with positioning information is required by regulatory bodies causing variations in test methodologies
  - A set of configuration parameters from network to device to be defined in IR.92 V10 to alleviate these challenges
- IMS implementations while conforming to GSMA often have regional variations which introduce special procedures for IMS Signaling and Registrations
- There is more variability in communication quality due to delay and jitter in the system which need to be resolved
- Open Market Device implementations may have challenges with interoperability

Testing Implications (General)

- There are a number of areas that need to be address in testing moving forward post IR92 v10 (and sister PRDs):
    - The set of configuration parameters enables an IR92 OMD to be defined (i.e. all parameters set to their default values) and also enables variations as needed within a market (i.e. parameter(s) set to other than default values)
    - Ensure that a device supports the set of parameters included in and all possible values therein (see annex C of IR92v10)
    - There is a need to run tests on an IR92 OMD setting, a sub-set of other settings (need to define a set of such "likely" alternative settings) and also run tests between UEs with differing settings at each end (there should be universal inter-operability).
    - Same principle to be applied to other PRDs – initially PRD IR94 and then PRD IR.51. See annex C and annex B respectively of IR94 & IR51.
    - Also converged IP Comms devices (MMTEL/RCS converged services on a single device need to be considered whilst covering all scenarios described in PRD NG.102). Parameters are described in section 2.3. IMS implementations while conforming to GSMA often have regional variations which introduce special procedures for IMS Signaling and Registrations

Testing Implications (IR.92 & IR.94 & IR.51)

- Build on IR92-only tests and IR.92 & iR.94-only tests

- A suite of tests needs to be run on UEs configured as OMDs.

- Given the number of parameters and potential values therein, need to define a number of "likely" non-OMD settings.

- Repeat the suite of tests for non-OMD UEs with identical settings at each end.

- Repeat the suite of tests with non-identical settings at each end (all combinations)

- Handover LTE-WiFi & WiFi to LTE should also be covered.

- Add roaming tests – including both LBO and S8-HR options & ePDG in HPMN / VPMN.

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Testing Implications (Converged Devices – LTE only)

- A suite of tests needs to be run on UEs configured as OMDs (this means a single IMS core & 1 registration) (Config #1)

- Initially vary only the RCS VoLTE SINGLE REGISTRATION to test dual cores with 2 IMS registrations) (Config #2)

- Perform MMTEL/RCS sessions between Config#1 & Config#2 UEs

- Take account of NO MSRP parameter to test roaming differences with partners that support/do not support MSRP and perform sessions between them (Config#3 & Config #4).

- Finally, perform sessions between Config #1 to Config #3 & Config#4 and between Config#2 and Config#3 & Config #4.

How GCF Certification is addressing these issues

- GCF is working closely with GSMA to ensure testing methodologies for IR.92 V10, resolving many interoperability issues are being defined

- Default IMS and LTE parameters for Open Market Devices and Regional Profiles to be developed by GSMA and configurable by OEM and Operator

- Test Cases allowing for Open Market and Regional configurations will need to be created

- Roaming scenarios will need to be included covering both LBO and S8-HR options

- Tests for IR.94 and IR.51 needs to be developed

- Test Case Optimisation activities are underway to ensure the total number of executable tests are manageable without compromising quality. Focus on reduction is on GERAN and UTRA test cases as the number of EUTRA tests increase

- Efforts underway to coordinate testing activities between Conformance, Field and Interoperability type testing to ensure duplications and redundancies are eliminated

UE VoLTE Testing (i)
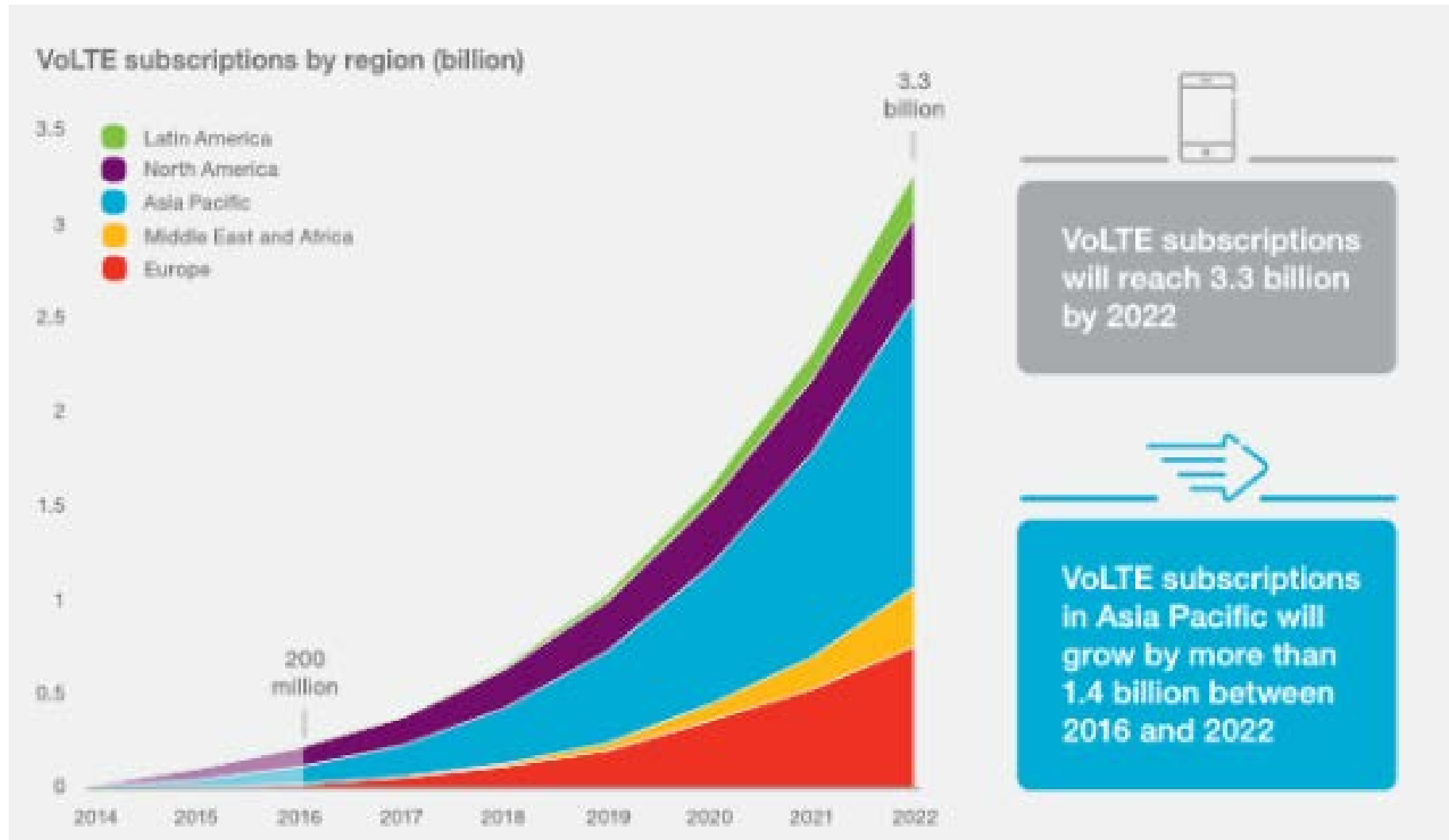
UE VoLTE Testing Collaboration

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Recommendations VoLTE Testing

- Having correct setting including verification for all networks supporting VoLTE is a challenge today
  - GCF Certification gives assurance for the networks tested as part of the field trials
  - Work with your chip set supplier and field trial RTOs to verify settings for networks
  - Monitor the development at GSMA and GCF
  - Expect your product will need updates when used in new networks

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