RELEASE NOTE OF SEAMCAT v5.2.0

1. LIBRARIES

1.1. SYSTEMS

1.1.1. 5G SYSTEMS (IMT-2020)

- Addition of new modules for simulating **5G systems** (IMT-2020) Macro and Micro cells, uplink and downlink, according to Recommendation ITU-R M.2101 (ST-26, ST-357, ST-375, ST-380, ST-385, ST-394, ST-395, ST-397, ST-410), including:
  - Addition of **aggregated (hybrid) IMT-2020 systems** (ST-370, ST-389, ST-400, ST-402, ST-450)
  - Addition of **Base Station transmit power distributions** for IMT-2020 Downlink Macro and Micro systems (ST-399, ST-406)
  - Addition of the **coupling-loss percentile pre-simulation** in the IMT-2020 uplink modules (ST-442)
  - Addition of **spectrum emission masks** for IMT-2020 systems, as specified by ITU-R TG 5-1 (ST-390, ST-404)
  - Updated default values for the **bit rate mapping** (link level performance) for IMT2020 systems according to 3GPP TR 38.803 V14.2.0 (2017-09) (ST-440)

1.1.2. CELLULAR MODULES (OFDMA, CDMA)

- Enhancements of the **coupling loss percentile** pre-simulation to display the corresponding Cumulative Distribution Function (CDF) (ST-28)
- Improvements to the **scenario outline** of cellular systems (ST-382, ST-446)
- Changes to the single **cell sector offset** in cellular systems (ST-393)
- Corrections to the **CDMA pre-simulation** (ST-36)
- Corrections to the **cellular wrap-around** (ST-30, ST-362)
- Introduction of **default settings** of the cellular modules (ST-439)

1.1.3. GENERIC MODULE

- Corrections to the **scenario tab** of the generic systems (ST-379)
- Corrections to the **relative positioning** of the generic systems (ST-396)

1.2. SPECTRUM EMISSION MASKS (SEM)

- Addition of **SEM for IMT-2020 systems**, as specified by ITU-R TG 5-1 (ST-390, ST-404)
- Modification of the step size for **Narrow-Band systems SEM** according to the specified receiver bandwidth and addition of corresponding consistency checks (ST-429)

1.3. INTERMODULATION REJECTION MASKS (IM)

- Addition of a new library to contain **intermodulation rejection masks** (ST-20)

1.4. BITRATE MAPPING (Link Level Performance)

- Addition of a new library to contain **bitrate mappings** (Link Level Performance) for OFDMA & IMT-2020 systems (ST-440)

1.5. ANTENNA GAIN PLUGINS (AGP)

- Addition of the **beam forming antenna** implementation based on Recommendation ITU-R M.2101 (ST-26, ST-31, ST-371, ST-385)
- Addition of **3GPP TR 37.840** Antenna Gain Plugin (ST-365, ST-377, ST-409, ST-412)
- Addition of **3GPP TR 37.814** Antenna Gain Plugin (ST-365, ST-373)
- Addition to optional distributions in the Antenna Gain Plugin defined in Recommendation **ITU-R F.1336-4 Recommends 2** (ST-374)
- Correction to **antenna angles** (ST-352, ST-353, ST-355)
- Corrections to the **antenna gain calculations** (front-to-back lobe ratio) (ST-363)
- Correction to the **receiver antenna gain calculation** for the elevation angle between ILT and VLR (ST-453)

1.6. PROPAGATION MODEL PUGINS (PMP)

- Implementation of Recommendation **ITU-R P.2109**, "Prediction of Building Entry Loss" (ST-8)
- Implementation of Recommendation **ITU-R P.2108**, "Prediction of Clutter Loss" (ST-9, ST-398)
- Implementation of Recommendation **ITU-R P.2001-2** (ST-354)
- Implementation of Recommendation **ITU-R P.1411-9** site general models (§4.1.1, §4.2.1, and §4.3.1) (ST-432)
- Addition of a description for the antenna height limitations in the **Extended-Hata** propagation model (ST-430)
- Corrections to the **Local Environment** window (ST-414, ST-416)

1.7. EVENT PROCESSING PLUGINS (EPP)

- Inclusion of a new ***EPP Demo 11: Report Antenna Gains*** to collect simulated antenna gains (ST-360, ST-413)
- Extension of ***EPP Demo 10 : OFDMA Internals*** to cover also IMT-2020 systems (ST-413)
- Refining the descriptions and names of **EPP Demo 2** and **Demo3** (ST-401)
- New EPP for intermodulation calculations from broadband interferers into narrow band victims. Pending discussions within ECC/WGSE/SE7 for its final implementation (ST-391, ST-451)

1.8. PLUGIN DEVELOPMENT

- Creation of a **plugin templates without MAVEN** dependencies (ST-17)
- Correction to minimum size of entries in the installed Jar files (ST-411)

- Reordering and decluttering the libraries (ST-376, ST-358)

2. SEAMCAT TOOLS

2.1. TEST DISTRIBUTIONS

- **New bounded Gaussian, Rayleigh and Log-normal distributions** for the parameters Delta X, Delta Y, Path Azimuth and Path Distance Factor (ST-433)
- Replacement of the old algorithm of the Rayleigh distribution to match ITU-R TG 5/1 specifications (ST-455)
- Deactivation of distributions that are parameter dependent to ease the setting of a workspace (ST-350, ST-378, ST-407)

2.2. TEST PROPAGATION MODELS

- Enhancements to the tool t**est propagation models** (ST-35, ST-37)

2.3. COMPARE VECTORS

- Correction to the **compare vectors functionality** to update the P.D.F. legend, to add a grid in the scatter diagram and to display vector names from EPPs(ST-420, ST-424, ST-425)
- Improvements to the **simultaneous display** of multiple vectors (ST-24)
- Enhancements of the **background colour** to enhance the visibility (ST-428)

2.4. VECTOR SCATTER TOOL

- Addition of a new **vector scatter tool** to plot scatter diagrams from simulated and imported vectors (ST-434)

3. BATCH SIMULATION

- Corrections to the **batch functionality** (ST-33, ST-421)

4. **INTERFERENCE CALCULATIONS ENGINE PANE (ICE)**
   - Improvements to the ICE pane to display the **cumulative and probability distribution functions** of the calculated signal ratios (C/I, C/(I+N), I/N, (N+I)/N) (ST-438)
   - Addition to the possibility to compute the **probability of interference** also for events for which the wanted signal is lower than the receiver sensitivity(ST-438)
   - Corrections to the **Translation mode** – Interfering power supplied (ST-423)

5. **SIMULATION CONTROL**
   - New keyboard shortcuts to **Stop, Pause and Resume simulations** (ST-447)
   - Improvements to the simulation control pane (ST-34)

6. **SIMULATION OUTLINE PANE**
   - Improvements to the simulation outline pane, including the **display of simulated angles** (ST-21, ST-25)
   - **Addition of event numbers** in the mouse-over information in the simulation outline (ST-383)
   - Improvements to show **different interfering links in different colours** (ST-27)
   - **Harmonisation of colours** for transceivers in simulations (ST-445)
   - Modification to the positioning of systems (path distance factor, protection distance …) (ST-351)

7. **EVENT RESULTS PANE**
   - Corrections to the event results pane to include **simulation details** (ST-392, ST-444, ST-454)

8. **USER MANUAL (HELP BUTTONS)**
   - **Addition of help buttons** in the local environment windows, the general settings for OFDMA and IMT2020 systems, transmitter settings and mobile / base station settings (ST-441)

9. **CONSISTENCY CHECKS**
   - Addition of consistency checks to the IMT-2020 UL and DL systems (ST-369)
   - Addition of consistency checks for the cluster size of IMT-2020 micro systems (ST-384)
   - Addition of consistency checks for antenna patterns (ST-347)
   - Consistency checks corrections for the ILT bandwidth in generic systems (ST-349) and for the protection distance (ST-364)
   - Addition of consistency checks for the path loss correlation (ST-381, ST-403)
   - Enhancements to the consistency check for the local environments to add generic systems (ST-415)

10. **COMPATIBILITY BETWEEN VERSIONS**
    - Enhancement of the **compatibility** of old workspaces which were not compatible with recent versions producing a system crash (ST-405)
    - Correction to SEAMCAT **initialization problems** (ST-422)