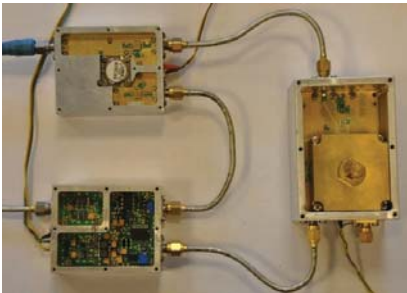
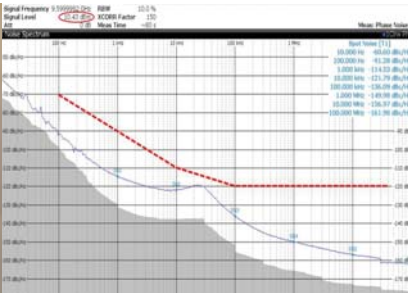


<b>Activity Title:</b>	<i>Development of key technologies for frequency generators</i>		
<b>Contract type</b>	<b>R&amp;D</b>	<b>Budget (k€)</b>	<b>200</b>
<b>Company (-ies) (including country)</b>	SpaceForest Ltd., Poland		
<b>Team (name of the participants in the project)</b>	Przemyslaw Kant, Karol Dobrzyniewicz, Marek Sollohub, Tomasz Chelstowski, Jerzy Michalski. All persons are SpaceForest full time employees.		
<b>(*) Speaker (s)</b>	Jerzy Michalski, Przemyslaw Kant	<b>Email</b>	jerzy.michalski@spaceforest.pl
<b>Short Speaker Information (experience and involvement in this project – maximum 60 words)</b>	Jerzy Michalski - project manager, microwave background, 17 years of professional experience. Przemyslaw Kant - main project contractor, 5 years of professional experience, microwave background.		
<b>Summary of the activity (maximum 400 words and 2 pictures)</b>	<p>The project motivations are related to the activities realized by ESA, also under the TRP program, to which Poland has subscribed. The TRP supports projects for deep space missions, where optimization of the circuit and reduction of the power usage is very important. A frequency generator based on the outcome of this proposal could be used in some upcoming ESA science missions. The examples are: JUICE, planned to be launched in 2022 and PLATO, planned to be launched in 2024. Both of these scientific missions will utilize the X-band or other bands for at least part of communications. After a successful completion of this and following project, thanks to long-term cooperation intentions of both RUAG Sweden and SpaceForest, the technology developed in cooperation with ESA and RUAG Sweden in this proposal could be further developed. We plan that the frequency generator proposed in this study could reach the TRL 6 or TRL 7 or higher level before the production of subsystems for these missions begin.</p> <p>Project "Development of key technologies for frequency generators" was focused on the design and manufacturing of a high reliability and performance frequency generator into a breadboard stage. The main technical objectives were:</p> <ul style="list-style-type: none"> <li>• design of all modules of frequency generator</li> <li>• simulation and optimization of subsequent version of generator subsystems</li> <li>• manufacture and assembly of frequency generator on a breadboard</li> <li>• verification and validation of a design by the means of a physical tests (measurements) according to the technical requirements.</li> </ul> <p>Project summary:</p> <ul style="list-style-type: none"> <li>• Three very stable generators were designed, manufactured and measured meeting very stringent phase noise requirements,</li> <li>• Most of requirements for the projects were met. In other cases small adjustments should be enough to meet all requirements,</li> <li>• Generator is already quite stable during temperature changes,</li> <li>• Continuation planned (proposal for TRL 5 &amp; 6 submitted),</li> <li>• Potential possibilities to obtain frequencies up to 12 GHz without doubler (investigated for the next proposal) with the same transistor,</li> <li>• Generator possesses great potential for minimization,</li> </ul> <p>SpaceForest performed the project in close cooperation with a space sector company, RUAG Space AB / Sweden.</p>		
	 		

(\*) The speaker needs to do the registration through this website