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**Datasheet for the decision
of 14 February 2019**

Case Number: T 2233/13 - 3.5.02

Application Number: 06023742.7

Publication Number: 1786096

IPC: H03B5/18

Language of the proceedings: EN

Title of invention:

Low Cost Multi-octave-band Tunable Oscillator Having Low and Uniform Phase Noise

Applicant:

Synergy Microwave Corporation

Relevant legal provisions:

EPC 1973 Art. 84

Keyword:

Claims - clarity and support - all requests (no)



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Case Number: T 2233/13 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 14 February 2019

Appellant: Synergy Microwave Corporation
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 12 June 2013
refusing European patent application No.
06023742.7 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman R. Lord
Members: F. Giesen
W. Ungler

Summary of Facts and Submissions

- I. This appeal lies from the decision of the Examining Division refusing European patent application No. 06023742.7 pursuant to Article 97(2) EPC.
- II. The reasons given in the impugned decision were *inter alia* that none of the independent claims according to the requests admitted into the proceedings met the requirements of Article 84 EPC.
- III. Oral proceedings took place before the Board, at the end of which the Chairman announced the Board's decision.

The final requests of the appellant (applicant) were that the decision under appeal be set aside and that a patent be granted on the basis of the main request, or on the basis of one of the auxiliary requests AI to AIII and auxiliary requests I to IX, the main request and auxiliary requests I to VI filed with letter dated 22 March 2013, auxiliary requests AI to AIII and auxiliary request VII filed during the oral proceedings of 23 April 2013, auxiliary requests VIII and IX filed with letter dated 14 January 2019. The main request and auxiliary requests AI to AIII and I to VII were the requests on which the impugned decision was based.

- IV. Claim 1 according to the main request reads as follows:

*"An oscillator (100; 200; 250; 300) operable at an oscillating frequency, comprising:
a transistor (104) having base (B), emitter (E) and collector (C) terminals;
a multi-mode coupled resonator (120) coupled across the base (B) and collector (C) terminals through a*

*dynamically tunable capacitive element (D4, D5, D6, D7);
a slow-wave coupled resonator (124) and a progressive-wave coupled resonator (128) coupled in series to the collector (C) terminal;
a noise cancellation network (112) coupled across the base (B) and collector (C) terminals;
a phase compensating network (132) capacitively coupled between the base (B) and collector (C) terminals through the slow-wave and progressive-wave coupled resonators (124, 128); and
a distributed coupled medium (135) coupled across the slow-wave and progressive-wave coupled resonators (124, 128)."*

The exact wording of the independent claims according to the auxiliary requests AI to AIII and I to IX is immaterial for the present decision and is therefore not reproduced here. It is only important that auxiliary requests AII to AIII and I to VIII all also contain the feature

"a phase compensating network (132) capacitively coupled between the base (B) and collector (C) terminals through the slow-wave and progressive-wave coupled resonators (124, 128)".

In auxiliary requests AI the term "first coupled resonator" was used in this feature instead of "slow-wave coupled resonator" and in auxiliary request IX the term "second coupled resonator" and "third coupled resonator" were used instead of "slow-wave coupled resonator" and "progressive-wave coupled resonator".

V. The appellant argued essentially as follows:

The term "progressive-wave coupled resonator" was clear. Since the oscillator is a wide-band tunable oscillator, the resonant modes will be standing waves, but a skilled person would also expect non-resonant propagating waves. An excerpt from the textbook by Rohde, Ulrich L. et al., "The design of modern microwave oscillators for wireless applications, Theory and Optimization", 2005, John Wiley & Sons, Hoboken, New Jersey (filed as document A1 on 14 October 2013) showed that the claims used only terms common in the field of the invention.

Regarding the feature "phase compensating network coupled between the base (B) and collector (C) terminals through the slow-wave and progressive wave coupled resonators", the elements making up the phase compensating network were coupled between the collector and base terminals. They were further coupled to the slow-wave resonator and the progressive-wave resonator, too. They could thus be described as being coupled between the base and collector through the slow-wave and progressive resonators, because the RF signal had to travel through the resonators as well. In addition, the term "coupled through" had to be read in the light of the description and would also comprise the scenario that the resonators were in parallel to the phase compensating network. Figure 1 provided support in the description for the claim wording because it clearly showed the phase compensation network coupled to the collector through the slow-wave resonator. It was generic and applied to all embodiments. Furthermore, if other embodiments were not covered by the claim, then this was not a matter of support and could be addressed easily by amendment of the description.

Auxiliary requests VIII and IX should be admitted into the proceedings. They constituted a serious attempt to overcome at least some of the objections of the Board expressed in their preliminary opinion, by replacing "progressive-wave coupled resonator" by "third resonator". They were filed in time before the oral proceedings, so the Board had had enough time to deal with the requests. They could not have been filed earlier because of the need to communicate with the client.

Reasons for the Decision

1. The appeal is admissible.

2. *Lack of clarity and support (Article 84 EPC) - all requests*
 - 2.1 According to Article 84 EPC, the claims shall define the matter for which protection is sought. The claims shall be clear and concise and be supported by the description.

 - 2.2 The feature "progressive wave coupled resonator" renders claim 1 unclear.

This term does not have a generally recognised meaning in the field of oscillators and there is no definition in the application documents for it. Furthermore, the term appears to be contradictory as "progressive" indicates that a wave propagates and so that its phase velocity is non-zero. The resonant modes that exist in

any resonator, however, are standing waves with zero phase velocity and thus not "progressive waves" by definition.

The appellant argued that the term was nevertheless clear because in the context of a wide-band tunable oscillator and, due to the terms "slow-wave" and "progressive-wave", a skilled person had to expect not only standing but also propagating waves in the resonator. Document A1, a text book excerpt, demonstrated that only common terms were used in the claim.

The Board notes however that document A1 neither mentions the term "progressive-wave coupled resonator" nor does it provide any information about propagating waves in resonators. It therefore has no probative value concerning the issues that had to be clarified.

The Board can accept that it is a generally true statement about any resonator that there may exist non-resonant propagating modes, but this does not mean that the term in question is clear. The alleged meaning of the term offered by the appellant is neither a statement about the structure nor about the functionality of the resonator but rather, in as far as the appellant's argument can be understood, merely a general statement applicable to any resonator. Such a general statement neither clarifies the intended meaning of the term, nor can it even serve the purpose of distinguishing the "progressive wave" resonator from the "slow-wave" and the "multi-mode" resonators in the claim, since the latter two can evidently also support non-resonant propagating waves.

A skilled person reading the claim is thus faced with a term for which no generally recognised meaning exists, for which no definition is offered in the application, which appears contradictory and which is furthermore not even clear as a label for distinguishing the three resonators defined in the claim from each other. The skilled person is therefore left with a severe doubt as to what the meaning of the term "progressive wave coupled resonator" might be or what its function in the claim was, even after extensive attempts at properly construing the term.

Claim 1 is therefore not clear.

- 2.3 A related problem concerning the term "progressive wave coupled resonator" as discussed above is one of inconsistency of terminology. What the appellant indicates to be a "multi-mode coupled resonator" appears from figures such as figure 2B of the application to be two concentric semicircular striplines. The "progressive-wave" resonator is merely a further concentric quarter-circular stripline. It is not clear why the outermost of these three concentric striplines should be a "progressive-wave" coupled resonator, while the other two should form a "multi-mode" coupled resonator. This terminology appears to the Board to be arbitrary, in particular in view of the appellant's argument that the multi-mode resonator did allow for multi-mode operation, but did not necessarily comprise multi-modes.

Also for this reason, claim 1 is not clear.

- 2.4 Independent claim 1 according to the main request contains the feature "phase compensating network coupled between the base (B) and collector (C)

terminals through the slow-wave and progressive-wave coupled resonators". This definition of how the phase compensation network is connected to the other parts of the circuit lacks support in the description within the meaning of Article 84 EPC.

Figure 2a shows a box labelled 132 around a number of components which apparently constitute the phase compensating network. In this figure the phase compensating network (132) is capacitively coupled to the collector and base terminals of transistors Q2, Q3 via the capacitors labelled as P18 and P25. Furthermore, in this figure the schematically indicated resonators are also shown coupled in parallel to what is indicated to be the phase compensating network between the base and the collector terminals. The claim wording clearly means that the slow-wave and progressive wave resonators have to be connected between one of the collector and base terminals and one of the terminals of the phase compensating network and not, as is shown in the embodiment, across the terminals of the phase compensating network. In as far as the phase-compensating network can be identified in the other circuit diagrams or corresponding PCB layouts at all, the same inconsistency between the claimed subject-matter and the teaching of the description and figures exists throughout the application.

The appellant argued that the claim definition was not inconsistent with the description and the figures because the phase compensating network was on the one hand coupled between the collector and base and further coupled to the slow-wave resonator and progressive-wave resonator too. The RF signal had to travel through the phase compensating network and the resonators as well.

This argument is not convincing. The claim does not define where an RF signal has to travel, but rather how the phase compensation network and the resonators are connected. The appellant's paraphrasing of the wording of the feature in question clearly has a meaning different from the actual wording of the feature and is thus not suitable to demonstrate that the embodiments are consistent with the claim wording.

The appellant further argued that a skilled person would interpret the claims in the light of the description and thus would construe the term "through" to mean a parallel connection between phase compensation network and slow-wave and progressive wave resonators.

The appellant attempts to argue that the claim meets the requirements of Article 84 EPC because a skilled person could eliminate existing inconsistencies by interpretation in the light of the description. All that this argument shows is that there exist inconsistencies and *ipso facto* that the claims do not meet the requirements of Article 84 EPC. There is no legal basis for the assumption that the requirements of Article 84 EPC can be met if a skilled reader can eliminate inconsistencies between the description and the claim by interpretation.

The appellant further argued that Figure 1 represented the required support in the description.

In order for claims to be supported by the description there cannot be inconsistencies between the description and the claims, be they of a technical nature or of a formal nature. Inconsistencies of a technical nature exist for example where the technical teaching of the

description is inconsistent with the claimed subject-matter. According to the case law, the mere verbatim reproduction of the wording of a claim in the description does not provide support within the meaning of Article 84 EPC, see Case Law of the Boards of Appeal, Eighth Edition 2016, II.A.5.1. The Board considers this to be applicable in the present case, because the mere verbatim reproduction of a claim in the description is not suitable to address and resolve any technical inconsistencies.

Figure 1 of the present application is a schematic illustration of claim 1 using boxes and lines and, as far as technical information is concerned, is little more than a depiction of what is expressed by the wording of the claim. A skilled person would not consider the schematic depiction of Figure 1 as an embodiment in its own right alongside the other embodiments, because it contains no additional technical information compared to claim 1. On the other hand, all embodiments that do contain an actual technical disclosure going beyond the claim are inconsistent with the claim wording and its schematic depiction in Figure 1.

Therefore, with the feature "phase compensating network capacitively coupled between the base and collector terminals through the slow-wave and progressive-wave coupled resonators " in the claim, there exist technical inconsistencies between the claim and the technical teaching of the description that cannot be resolved by Figure 1.

Claim 1 therefore lacks support within the meaning of Article 84 EPC.

2.5 The above considerations regarding the main request apply *mutatis mutandis* to auxiliary requests AI to AIII and auxiliary requests I to VII, because they contain the above features in an identical form, or in the case of auxiliary request AI, with modifications that do not put into question the applicability of the above considerations. The claims according to these auxiliary requests therefore do not meet the requirements of Article 84 EPC.

3. *Admissibility of auxiliary requests VIII and IX*

3.1 According to Article 13(1) of the Rules of Procedure of the Boards of Appeal (RPBA) any amendment to a party's case after it has filed its grounds of appeal may be admitted and considered at the Board's discretion. That discretion shall be exercised in view of *inter alia* the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy.

3.2 Independent claim 1 according to both requests still contains the unclear feature regarding a phase compensation network coupled "through the slow-wave and progressive resonator" between the collector and the base. The Board had already indicated in the preliminary opinion that this feature appeared to lack support in the description.

The independent claim 1 according to both requests also contains the feature that "the slow-wave coupled resonator comprises a planar structure having projections that mate with openings". The Board had already pointed out in their preliminary opinion that this amendment probably did not meet the requirements of Article 123(2) EPC.

Therefore, these new requests are not an attempt to overcome all outstanding problems but, to the contrary, still contain deficiencies that the appellant was already aware of when filing them. Admitting such claims would not respect the need for procedural economy because the Board would be forced to repeat the objections and conclusions that already applied to the higher ranking request without advancing the procedure.

In this respect it is immaterial whether the appellant filed these requests as soon as possible for him after being informed of the Board's preliminary opinion because the response does not suitably address the preliminary opinion.

- 3.3 Furthermore, if the requests were to be admitted, a discussion would be necessary as to whether the replacement of the terms "slow-wave", "progressive-wave" and "multi-mode" by "first", "second" and "third" amounted to added subject-matter. At least the fact that replacing "slow-wave resonator" by "first resonator" might lead to problems under Article 123(2) EPC was already discussed in the impugned decision, and the Board can see no reason why the appellant did not address this issue until after receiving the summons to oral proceedings in appeal proceedings.

Thus, admitting auxiliary requests VIII and IX at this late stage of the procedure would not have respected the need for procedural economy.

- 3.4 The Board therefore exercises its discretion according to Article 13(1) RPBA not to admit auxiliary requests VIII and IX into the proceedings.

4. In conclusion, none of the requests forming a basis for this decision is allowable, so that the appeal has to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



C. Rodríguez Rodríguez

R. Lord

Decision electronically authenticated