

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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**Intel Corporation**  
Petitioner

v.

**Qualcomm Incorporated**  
Patent Owner

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Case IPR2019-00049  
Patent 9,154,356

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**PRELIMINARY PATENT OWNER RESPONSE TO PETITION FOR  
INTER PARTES REVIEW PURSUANT TO 37 C.F.R. § 42.107**

## TABLE OF CONTENTS

I.	INTRODUCTION.....	1
II.	THE '356 PATENT AND ITS PROSECUTION HISTORY .....	1
A.	Overview of the '356 Patent.....	1
B.	Prosecution History of the '356 Patent .....	4
III.	CLAIM CONSTRUCTION.....	7
IV.	THE PETITION SHOULD BE DENIED BECAUSE IT IS CUMULATIVE TO IPR2019-00129.....	7
V.	CONCLUSION.....	10

## **I. INTRODUCTION**

Intel Corporation (“Intel” or “Petitioner”) seeks review of claims 2-8 and 11 of U.S. Patent No. 9,154,356 (the “’356 Patent”) based on obviousness grounds that are redundant to a contemporaneously-filed petition. IPR2019-00129 challenges largely the same claims, with substantially the same arguments. Petitioner makes no attempt to explain how the primary reference in the present Petition is more relevant than or differs from the primary reference in IPR2019-00129. Moreover, Petitioner relies on a secondary reference in both petitions to allegedly plug the same hole in the primary references. Thus, each ground presented in this Petition is cumulative to the arguments Petitioner advances in IPR2019-00129.

The Board should not reward Petitioner for its redundant and cumulative attacks but should instead exercise its discretion under 35 U.S.C. §§ 314(a) to deny institution.

## **II. THE ’356 PATENT AND ITS PROSECUTION HISTORY**

### **A. Overview of the ’356 Patent**

The ’356 Patent, titled “Low Noise Amplifiers for Carrier Aggregation,” generally relates to the design and operation of amplifiers in a wireless device receiving radio frequency (RF) signals employing carrier aggregation.

Receiving signals that employ carrier aggregation, a communication technique that Qualcomm pioneered, allows a mobile device to increase the bandwidth available to a user for receiving the user’s desired content. With carrier

aggregation, data is split up and transmitted over multiple frequencies (carriers) to create more bandwidth for the device. Carrier aggregation therefore allows more data to be transmitted more quickly than traditional single-frequency methods. However, a typical mobile device is not always receiving RF signals employing carrier aggregation. For example, sometimes a mobile device may receive RF signals on a single carrier, and at other times it receives no RF signals at all. One aspect of the invention of the '356 Patent is a receiver design that offers the flexibility of activating circuitry to receive a signal employing carrier aggregation when needed and deactivating that circuitry when it is not needed. By allowing flexibility of circuit components between carrier aggregation and non-carrier-aggregation modes, a mobile device can conserve power when less bandwidth is needed, and provide increased bandwidth to the user when desired.

Aspects of the '356 Patent may be found in the RF transceiver of mobile devices. The RF transceiver is a component that receives radio-frequency (RF) signals transmitted over the air (which can be at frequencies in the MHz to GHz ranges) and converts the RF signals to baseband signals that can be provided to digital circuitry for processing, for example, to recover user data. The RF transceiver is connected to the antenna that receives the RF signals through RF front-end circuitry, which prepares the received signals for conversion to baseband signals, such as by filtering the signals.

The '356 Patent's claims are directed to an RF receiver (for example, within an RF transceiver) with two amplifiers that separately amplify a common input RF signal, where each of the two amplifiers can be independently enabled or disabled. By independently controlling the amplifier stages, the amplifier stages may be enabled or disabled as needed for carrier aggregation operation. For example, the two amplifiers may be enabled in carrier aggregation mode. Alternatively, one of the amplifiers may be enabled and the other disabled in non-carrier-aggregation mode.

By allowing the flexibility to disable an amplifier stage when it is not needed for carrier aggregation, the invention of the '356 Patent reduces power consumption in the RF transceiver and extends battery life for the mobile device. Furthermore, by sharing a common RF input signal between both amplifier stages, the invention of the '356 Patent reduces the number of connections needed in the RF transceiver, which in turn reduces the size of the transceiver and of the mobile device, and reduces the number of components required for multiple modes of operation.

Claim 1 illustrates an exemplary embodiment of the '356 Patent's inventions:

1. An apparatus comprising:  
a first amplifier stage configured to be independently enabled or disabled, the first amplifier stage further configured to receive and amplify an input radio frequency (RF) signal and provide a first output RF signal to a first load circuit when the first amplifier stage is enabled, the

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