AP200 series

Dual band differences

Introduction

Up to now NEC Philips has developed different AP200 access points for each geographical area in the world (US: UPCS frequencies and EU: DECT frequencies). For some applications (For example: Luxury cruise ships), it is required that an access point can automatically switch between various geographical frequency ranges (Cruise ship in multiple geographic areas). Switching is automated and fully under control of a manufacturer supplied Global Positioning System (GPS). (For an overview of this concept see Annex 1)

This document gives an overview of the differences between two versions of the AP200 series DECT access points, of which the standard US version (Commercial name AP200 North America; FCC-ID UTCAP200-001) supports the US UPCS (DECT) frequencies and the Dual Band version (AP200D; Authorization in progress based on Class II permissive change.) supports both the European DECT and North American UPCS (DECT) frequencies.

The objective of this document is to clarify why the already available FCC grant for the AP200NA (FCC-ID: UTCAP200-001) is also valid for the AP200D Dual Band base station when an FCC Class II permissive change is made.

Related products

This document is applicable to the DECT access point listed below:

AP200 INT Filter for Europe RF output power 24 dBm PCB version: X Firmware version A	ETS report: G0M20411-9119-T-61 G0M20411-9119-E-12 CE marking
AP200 NA Filter for North America RF output power 21 dBm PCB version: X Firmware version B	ETS report: G0M20611-1021-C-1 FCC-ID: UTCAP200-001
AP200D One filter for EU + NA RF output power 21 dBm PCB version: X Firmware version C	Under development To be FCC and CE approved FCC part via Class II permissive change @ UTCAP200-001 CE part via Annex 5 of R&TTE 1999/5/EC

Note: Only differences are in Red the rest is fully identical

Table 1

Product differences

The DECT chipset used in all the current access points is the same, and the frequency synthesizer will be factory programmed to receive and transmit at one of the allowed frequencies in a geographic region (For example UPCS band in the US). The only component difference in these regional variants is the RF input filter. This filter is an accurate ceramic band pass filter that is tuned to one of the worlds regional frequency ranges as given below. The North American variant uses the same filter as for Latin America, because it is a subset.

Europe:	1881 - 1897 MHz	10 fixed frequencies
China:	1900 - 1920 MHz	10 fixed frequencies
Latin America:	1910 - 1930 MHz	10 fixed frequencies
North America:	1920 - 1930 MHz	5 fixed frequencies

The new multiband access point that we are now developing has to be approved for Europe (R&TTE: R&TTE CE) and the USA (FCC: Part 15). For this new product we will use the identical product as covered by FCC-ID: UTCAP200-001 and replace the band pass filter by a filter that passes all frequencies from 1880 – 1930 MHz. To implement the new multi band product we will use the identical product covered by FCC-ID: UTCAP200-001 and replace the band pass filter by a filter that passes all frequencies from 1880 – 1930 MHz. Notice that this input filter only affects the characteristics of the receive part; it has no influence on the transmit part. To implement the new multi band product, the firmware of the product covered by FCC-ID: UTCAP200-001 will be adapted to support selection of the operating mode (EU or US operation) under control of a manufacturer supplied Global Positioning System (GPS). (See annex 1)

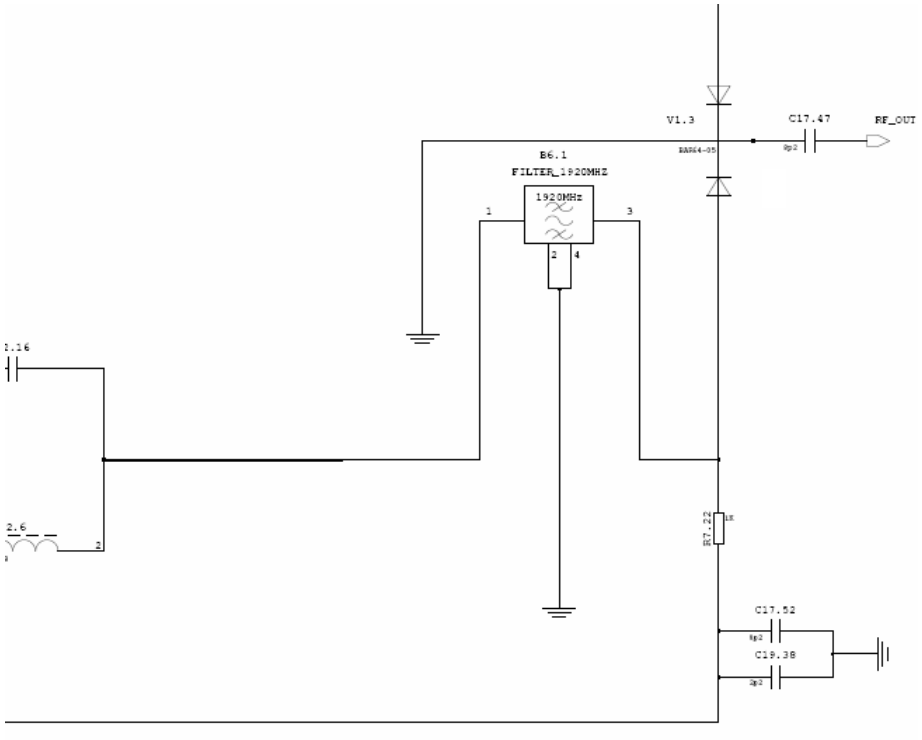
Component changes

The AP200D Dual Band access point is a DECT Access Point (base station) that can operate in the European frequency band (1881–1897MHz) and in the US frequency band of (1920-1930MHz). The difference in hardware compared to the AP200 NA is a ceramic input filter in each of the 2 RF-modules, see schematics and pictures. The AP200 NA module uses an input filter for the 1920-1930MHz band and the AP200D module will use a filter that will pass frequencies of 1880-1930 MHz.
Switching over the AP200D from the European frequency range to US range is controlled by the system, based on geographical info delivered by a GPS antenna. If the GPS antenna is not operational, the DECT system will shut down. It is not possible to switch over by hand.

The printed circuits for the AP200 NA and AP200D are identical and the mentioned filters are of identical size and delivered by the same supplier. It is therefore assumed (and checked), that these filters only affect the receiver part (frequency range) of the base station.

The component difference between the AP200 NA RF module and the AP200D module is depicted on the next pages. The AP200 NA and AP200D each apply 2 of these RF modules.

Part of RF Module AP200NA
(UPCS mode only)



Part RF module AP200D Dual Band
(UPCS or DECT mode)

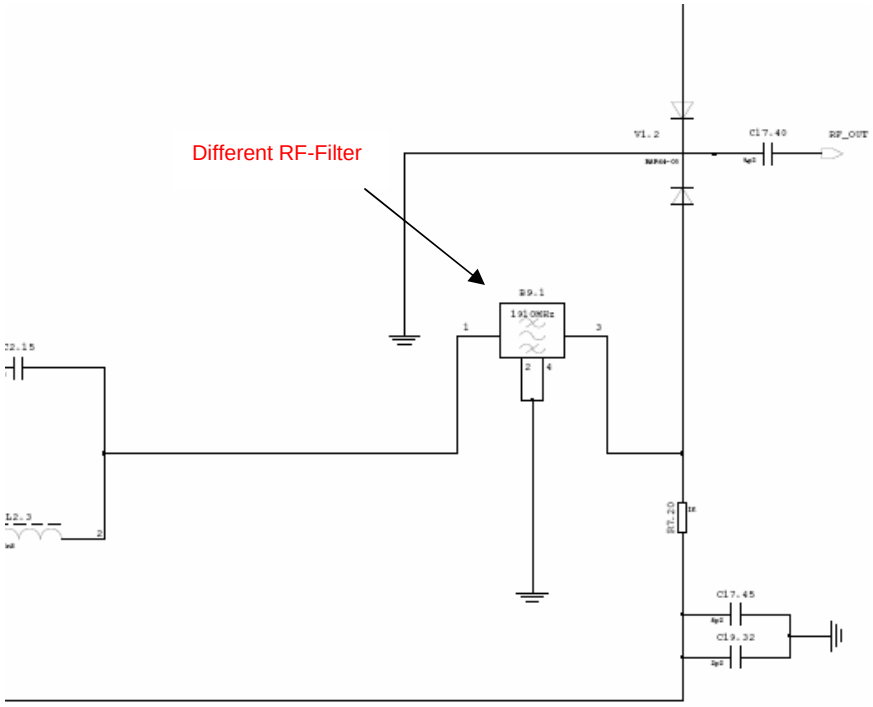
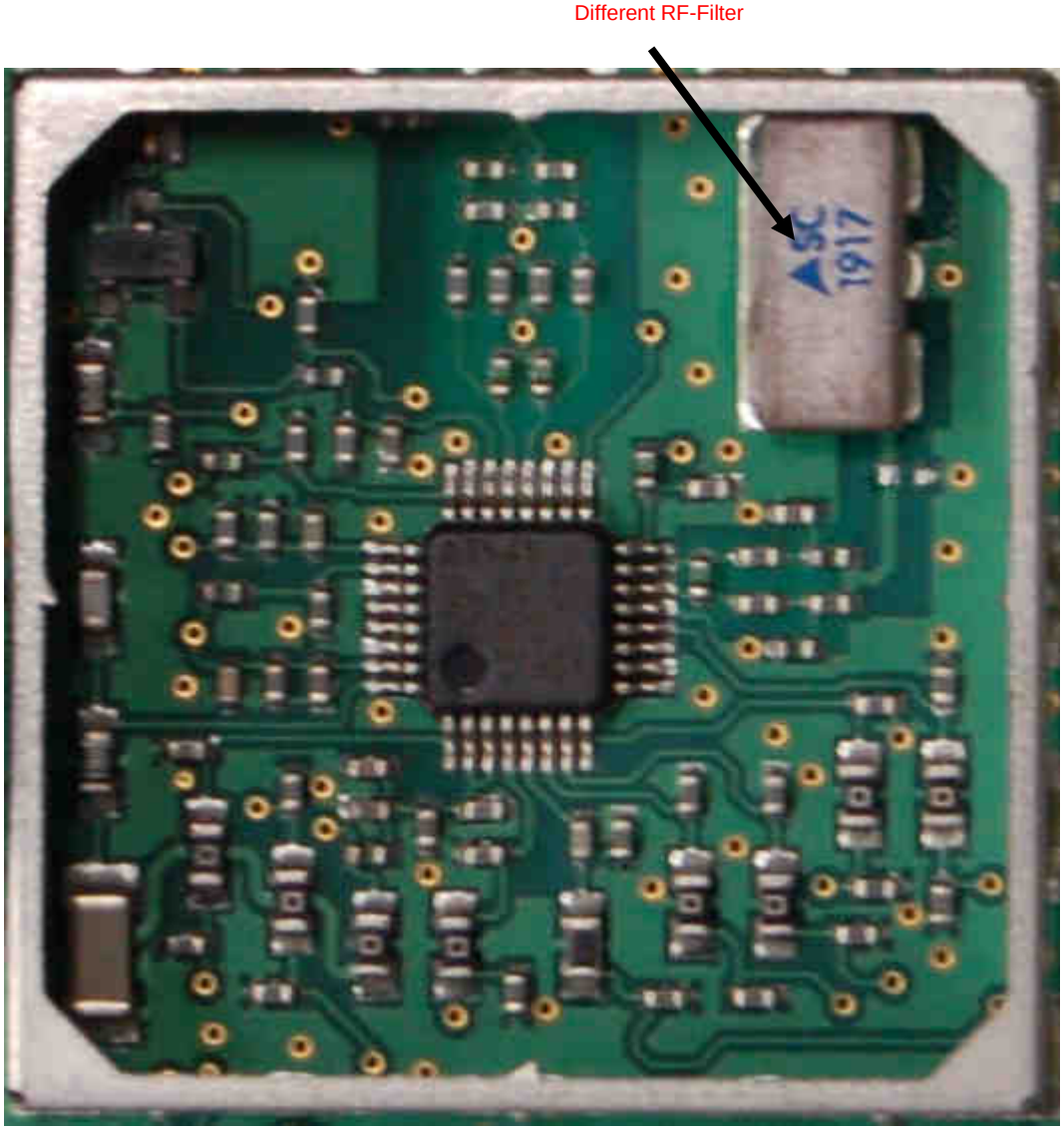
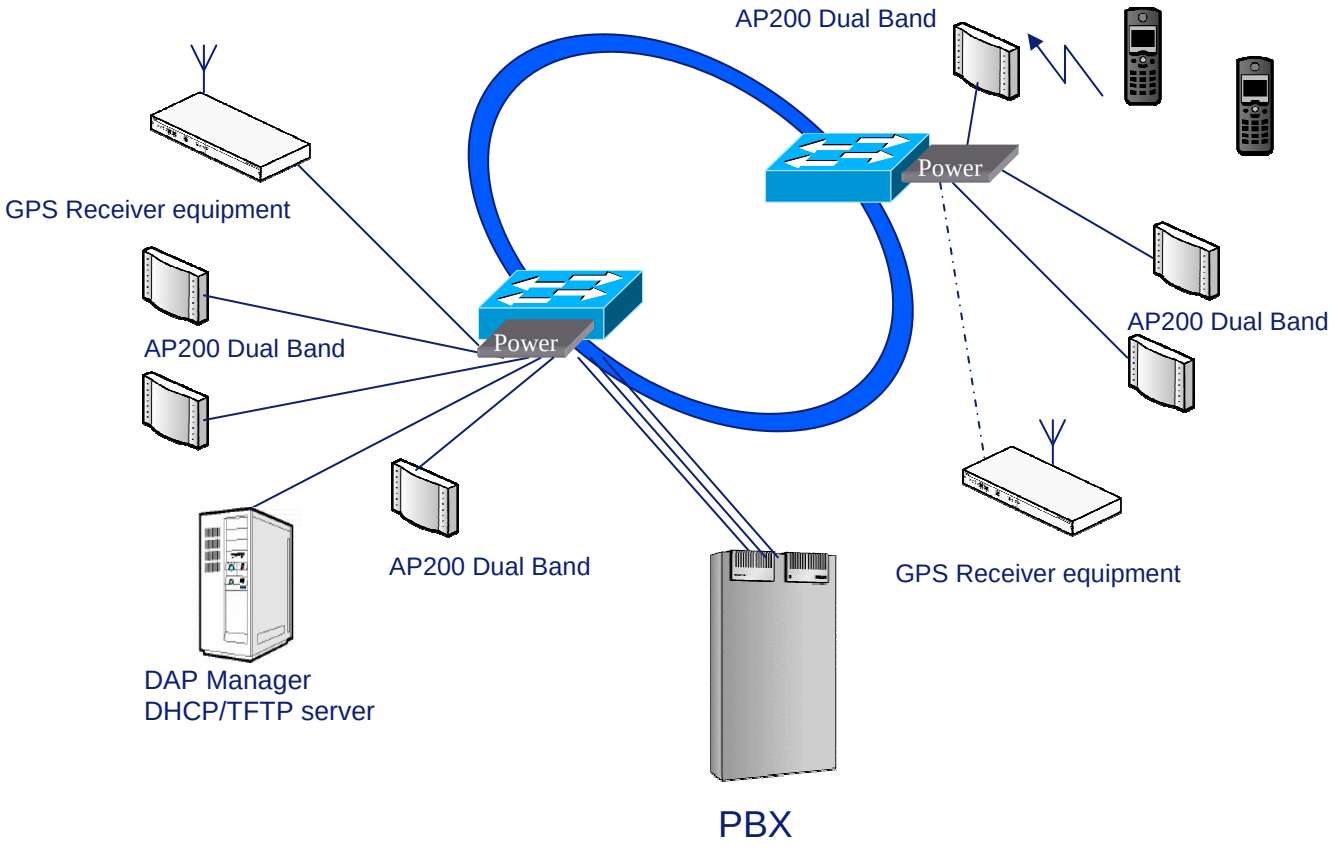


Photo of AP200NA RF module

Photo of AP200D Dual Band RF module



Annex 1: Concept of automatic frequency switch-over



Concept of automatic frequency switch-over (continued)

The IP-DECT system of NEC-Philips Unified Solutions is based on an IP-Network and a number of IP-DECT access points of the AP200 series (Picture previous page). All access points can communicate to each other over the IP local area network via the Ethernet in order to perform connection-handover from one access point to another.

The Dual Mode access point members of the AP200-family can transmit and receive in the European frequency band (1881-1897 MHz) or in the American frequency band (1920-1930MHz). In order to be sure that the right frequency range is automatically chosen, a GPS receiver selected by NEC Philips is connected to the on-board network of the cruise ship.

Via a proprietary protocol each basestation is notified every minute about the correct frequency range. With a timer the period since the last frequency range message is guarded. If a certain timeout period is exceeded after receiving the last message, the DECT system is switched off. In this way the system is prevented from transmitting in a frequency range that is not allowed.

Frequency switching occurs when a ship is crossing the line between region 1 and region 2 (See picture below from 47CFR 2.104) or between region 2 and region 3. Region 1 and 3 use the same frequency range (with exception of China, Korea and Japan). Around these crossing lines there is an certain area where no switching occurs to prevent too many switchovers when a ships sails parallel to the crossing line.

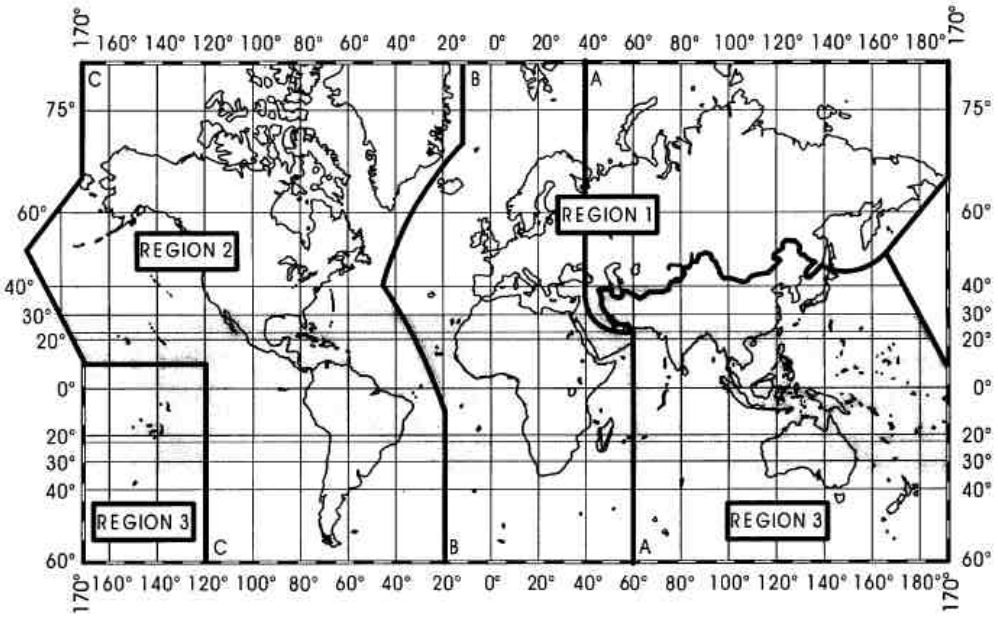


Figure 1: Map identifying Region 1, Region 2, and Region 3, as defined in paragraph 2.104(b), and the Tropical Zone (shaded area), as defined in paragraph 2.104(c)(4).