Scenarios – Unpaired 2 GHz bands

- Possible future use of the bands 1 900 - 1 920 MHz and 2 010 - 2 025 MHz -

The two scenarios as agreed in WG FM, which comprise the preferences arising from the contributions to the Call for Inputs and reflect the results of the studies that were to date carried out in WG SE, are summarised below.

General aspects

* Concerning DA2GC, the following three options, which are based on the system proposals (ETSI System Reference Documents) specified below, would appear to be the preferred ones, as a result of the compatibility studies between Broadband DA2GC (see also ECC Report 209 and draft ECC Report 214) and existing services adjacent to the unpaired 2 GHz bands:
	+ For an FDD system according to ETSI TR 103 054, frequency bands:
	1 900 - 1 910 MHz (FL) and 2 010 - 2 020 MHz (RL);
	+ For a TDD system according to ETSI TR 101 599, frequency band:
	1 900 - 1 920 MHz;
	+ For a TDD system according to ETSI TR 103 108, frequency band:
	1 900 - 1 920 MHz.
* All PMSE proponents responding to the Call for Inputs indicated that they do not consider that unlicensed applications such as DECT / SRD can co-exist with PMSE. Usage of these generally unlicensed devices (DECT / SRD) in the same band, where essentially professional services (PMSE) are being deployed, is considered undesirable/detrimental with regard to the QoS requirements of users of cordless cameras and other video links. This notion has also been provided by the one response from a PPDR solutions provider. Therefore, it is not foreseen to have co-frequency use of the two usage blocks PMSE / PPDR and DECT / SRD;
* So far, the PPDR stakeholders have not participated in the discussions of the unpaired 2 GHz bands and showed little interest in accommodating ad-hoc PPDR applications in the unpaired bands; however, as long as similar technologies are assumed for PMSE and for PPDR , the grouping of PMSE / PPDR could be kept and the PPDR uses under consideration are limited to cordless cameras, mobile and portable video links;
* No allocations are required for SRD to operate in a specific frequency band (SRDs typically operate on a non-interference and non-protection basis). A simple request from industry would be taken into account at any time but preferably, when a primary usage is identified. The principle for the unlicensed application block (DECT / SRD) should be to first place the radio services in the band (such as DA2GCS and PMSE / PPDR) and then investigate under which restrictions and use of mitigation techniques the use of unlicensed applications could be possible.

Particular aspects

Scenario 1

DA2GCS FDD + DECT / SRD + PMSE / PPDR, as follows:

* 1 900 - 1 910 MHz: DA2GCS FDD FL;
* 1 900 - 1 920 MHz: Outdoor CCL, PVL, MVL, coordinated (PMSE / PPDR); no separation distance required to DA2GC GS;
* 1 900 - 1 920 MHz: Unlicensed applications (DECT / SRD); restrictions may be necessary for DECT / SRD, such as duty cycle, indoor restriction and emission limit;
* 2 010 - 2 020 MHz: DA2GCS FDD RL;
* 2 010 - 2 020 MHz: PMSE (restrictions required to allow co-existence with DA2GC);
* 2 020 - 2 025 MHz: PMSE.

Unlicensed applications (DECT / SRD) with some restrictions to allow sharing with PMSE / PPDR

Outdoor CCL, PVL, MVL, coordinated (PMSE / PPDR)

IMT

Unlicensed applications (DECT / SRD) with some restrictions to allow sharing with DA2GCS FDD FL and PMSE / PPDR

1 900 MHz

1 910 MHz

1 920 MHz

DECT

DA2GCS FDD FL

PMSE

Space Res

PMSE

Fixed

Defence

PMSE (restricted to allow co-existence with DA2GC)

2 010 MHz

2 020 MHz

2 025 MHz

MSS / IMT

DA2GCS FDD RL

**Figure 1:** Scenario 1 (DA2GCS FDD, DECT / SRD, PMSE / PPDR)

Additional remarks:

* Non-specific SRD regulation with several medium access options may be implemented (e.g. DCS, SRD LDC); DECT can always use core band for RFP beacons (see remarks below for scenario 2). Considerable SRD information is available from ECC Reports 182, 189 and 200 dealing with UHF SRDs. It is assumed that information in these reports could be taken to investigate SRD spectrum access options concerning parameters such as emission levels, duty cycle restriction. It has been noted that many SRD application fields are actually fixed installed applications such as home automation, many M2M applications, metering applications, alarms installations;
* Possibilities for 2 010 - 2 020 MHz sharing with PMSE should be investigated, in order to identify if PMSE could possibly be allowed; in this respect, it has to be highlighted that SE7 studies point out that “Co-channel and adjacent operation of DA2GC RL and PMSE (CCL, MVL and PVL) is not feasible due to the exceeding of the protection criterion of the PMSE Rx.”; to overcome this difficulty, it might be necessary to restrict cordless cameras and portable video links use to indoor only;
* There may be PMSE applications (video as well as audio) with indoor usage scenario such as intercoms and conference systems that can make use of 2010-2020 MHz in case of a usage restriction. It was noted that ETSI is developing ETSI SRDocs for such applications.

Scenario 2

DA2GCS TDD + DECT / SRD + PMSE / PPDR, as follows:

* 1 900 - 1 920 MHz: DA2GCS TDD; sharing with DECT / SRD should be investigated (indoor restriction, duty cycle, emission limit restriction);
* 2 010 - 2 025 MHz: PMSE / PPDR.

IMT

1 900 MHz

1 910 MHz

Unlicensed applications (DECT / SRD) with some restrictions to allow sharing with DA2GCS TDD

(e.g. duty cycle, indoor restriction, emission limit restriction)

1 920 MHz

DECT

DA2GCS TDD

Outdoor CCL, PVL, MVL, coordinated
(PMSE / PPDR)

Space Res

PMSE

Fixed

Defence

2 010 MHz

2 020 MHz

2 025 MHz

MSS / IMT

**Figure 2:** Scenario 2 (DA2GCS TDD, DECT / SRD, PMSE / PPDR)

Additional remarks on 1 900 - 1 920 MHz:

* Concerning DECT / SRD restrictions, it is important to highlight that DECT has possibilities for unrestricted use in the DECT coreband and is dominantly indoor. Same on duty cycle (only unlicensed video applications such as for surveillance may not pass a duty cycle restriction; therefore, unlicensed video applications may use the DECT core band). Information on SRD with LDC is available;
* Two spectrum access options for unlicensed applications can be envisaged: 1. DECT DCS and DC and 2. SRD LDC;
* During the Call for inputs, the DECT community indicated that it is possible to modify the DECT channel selection rules as follows:
1. Only use the base band 1 880 - 1 900 MHz for RFP beacon transmissions;
2. Use the Least Interfered Channel within the entire 1 880 - 1 920 MHz for initial traffic bearer set up. If the setup is made on a channel within the extended band 1 900 - 1 920 MHz, and if the radio link is interfered, then the Least Interfered Channel selection for the intra-cell handover shall be limited to the DECT base band 1 880 - 1 900 MHz.

Conclusions

These two scenarios diminish the options to be considered further by concentrating the work, reducing complexity of the studies and facilitating the completion of CEPT’s response in the given schedule of the EC Mandate.

Further studies

In both scenarios, DECT / SRD studies are needed to assess the following sharing possibilities in the lower band:

1. DA2GCS FDD FL and PMSE / PPDR (1 900 - 1 910 MHz), as well as PMSE / PPDR (1 910 - 1 920 MHz);
2. DA2GCS TDD (1 900 - 1 920 MHz).

On PMSE, possibilities with DA2GC FDD RL (scenario 1) may need further refinement, to check whether there are any sharing possibilities in the upper band (considered as a challenging point).