

LPRAs response to ETSI Remote Consensus regarding EN 300 440

Preamble:

The LPRAs has been involved in the drafting of EN 300 440 by providing input from a Council Member who has specific knowledge of the general requirements for radio determination devices (Doppler Radar Detectors etc.) that use this standard for approvals processes. ETSI has published a remote consensus requesting input from ETSI members on the use cases (applications), performance criteria & test methods to be included in the standard.

The standard is being drafted in 3 parts as follows:-

- EN 300 440-1 – Radiocommunication devices
- EN 300 440-2 – Location Tracking devices
- EN 300 440-3 – Intrusion Radiodetermination equipment

The LPRAs response is specific to Part 3 – Radiodetermination equipment

Questions raised in the remote consensus are duplicated below. [LPRAs responses are beneath each section in blue.](#)

- For Part 1:

What kind of transmitter categories / modulation shall be covered?

see current draft: <https://docbox.etsi.org/ERM/ERMTG28/70-DRAFTS/TG28562/ERM-TG28-562v005.docx>

Note: Important to specify and provide matching conformance test procedures

- Is a Duty Cycle requirement important → today there is a 50% DC requirement (differentiation) implemented?
- What kind of RX-requirement (Sensitivity, Blocking, Receiver class) you need?
- What are the use-cases (intended use) for communication and what are the “technical wanted performance criteria you could provide for the test (e.g. bit error rate,...)
- What emission mask / levels for the OOB domain shall be reflected in the EN for TX unwanted emission requirements?

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- For Part 2 and Part 3:

- What are the use-cases and/or what is the intended use?

[Single & dual technology intruder detectors using microwave or microwave & PIR technology that can be installed indoors or outdoors.](#)

- [6m minimum detection range for volumetric \(corner mounted\) detectors](#)
- [10m minimum detection range for curtain \(corridor\) detectors](#)
- [4m minimum radius detection range for ceiling mounted detectors](#)

[The LPRAs is aware that there are other use cases that utilise radiodetermination in the frequency ranges covered by this standard but does not have any members that are involved in these additional use cases.](#)

- For radio determination it is essential to “know” what shall be detected/investigated by the EUT

[Human or vehicular targets moving within the specified field of view of the device.](#)

- What could be the wanted technical performance criteria for the RX-test → detection probability, doppler info, ...
A selection from :- Detection Probability, Doppler velocity, received energy
- Therefore think about: a “representative object” (incl. movement if necessary) in a specified distance, or e.g. for tracking a minimum tracking distance.

Note: For the RX-tests and necessary info we propose that you consider EN 300 883-2, see https://docbox.etsi.org/ERM/ERMTGUWB/70-Draft/TGUWB149-2/ERM-TGUWB-149-2v111_018.docx

To provide consistent test results, it is proposed to specify a mechanical or electronic dummy target that can be programmed to emulate the size & speed of the intended target. It is proposed that this target should consist of a triple reflector sized by calculation to have the same RCS as the intended target and programmed to move repeatedly through a predetermined cycle of movement exceeding one wavelength at the operating frequency. It is suggested that the test speed for human targets be based on speeds specified in EN 50131. In the case of dual technology detectors, it will also be necessary to provide a PIR dummy target to simultaneously exercise the PIR element of the detector.

Challenges are envisaged with testing more intelligent dual technology detectors that, for example, treat one technology as primary and use the other technology to confirm a detection by the primary technology. When microwave is the secondary technology, as is often the case in wireless (i.e. battery powered) products, the amount of time the microwave element is active is severely restricted by battery lifetime considerations and it is not clear whether sufficient active time is available to make the necessary measurements.

It is felt that the test methods contained in EN 303 883-2 are overly complex for the requirements of EN 300 440 and it would be preferable to include simpler tests, less reliant on expensive test equipment and appropriate for non-UWB devices.

- What kind of modulation / TX categories shall be covered, incl. the appropriate conformance test procedure. We propose to use EN 300 883-1 as a basis for conformance test, see https://docbox.etsi.org/ERM/ERMTGUWB/70-Draft/TGUWB149new_number_883-1/ERM-TGUWB-149-1v121_018.docx

The following modulation schemes are required:-

- CW – (primarily for door opener & energy management detectors)
- Pulsed – (primarily for intrusion detectors operating in the 10GHz range)
- Binary FSK (to provide range/direction capabilities to 10GHz band detectors)
- FMCW (primarily for 24GHz intrusion detectors)

It is felt that the test methods contained in EN 303 883-1 are overly complex for the requirements of EN 300 440 and it would be preferable to include simpler tests, less reliant on expensive test equipment and appropriate for non-UWB devices.

- What emission mask / levels for the OOB domain shall be reflected in the EN for TX unwanted emission requirements?

Since these devices are radars, it is proposed that the OFR (Operating Frequency Range) be measured as the span of frequencies between the frequency below & above the frequency of peak power emission at which the power level has reduced to -23dBc, using a RBW appropriate to the pulse width of the emission from the device as specified in ITU-R M.1177. This can be made as a direct measurement on most equipment and does not rely on the measuring instrument integrating power over the emission spectrum as currently proposed in draft EN 303 883 V1.1.1. For clarity, we do acknowledge the measurement method proposed

in draft EN 303 883-1 V1.1.1 is appropriate for wideband devices but is overly complicated for the narrow band radiodetermination devices covered by EN 300 440-3.

OOB limits that apply at the edges of the Operating Frequency Band (OFB) should be developed that are acceptable to neighbouring services.

Within the OFB, the OOB domain should be $\pm 250\%$ of the OFR at any one temperature as recommended by ITU-R SM1539. It will be appropriate to develop an OOB mask based on the principles contained in ITU-R SM1541.