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| **Title\*:** | Extending the range of radiated immunity testing in the EN 301 489 series to 6GHz |
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| from **Source**\*: | Ofcom (U.K.) |
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| input for **Committee**\***:** | ERM WGEMC |
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| Contribution **For\*:** | Decision | **X** |  |
|  | Discussion |  |  |
|  | Information |  |  |
|  |  |
| Submission date**\***: | 2015-04-08 |
|  |  |
| Meeting & Allocation: | **ERMWGEMC#45** -  |
| Relevant WI(s), or deliverable(s): |   |
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**Decision/action requested:** Please approve the proposals in this document to be included as part of the work in revising EN 301 489-1 for the Radio Equipment Directive.

**Background and Proposal**

At its 44th meeting ETSI ERM WG\_EMC decided to revise the upper limit of the testing range for radiated immunity from 2.7GHz to 6GHz for EN 300 386 and ES 201 468. This was primarily driven by the recognition of new and increased mobile services operating in bands between 2.7GHz and 6GHz and the consequential need to ensure that equipment displays the relevant degree of immunity to the potential close proximity of devices transmitting in this frequency range.

It should also be noted that CISPR is considering a similar change with the introduction of CISPR 35, although at the present time it is unclear whether the CISPR upper limit will be 5GHz or 6GHz and whether the standards will specify spot frequencies or require a sweep through the identified bands.

We believe it is time to perform a similar revision on the EN 301 489 series for radio equipment.

We are also taking this opportunity to revisit the current gap in testing range between 1000MHz and 1400MHz, we with recent change in allocation puzzles us as to why there is no immunity testing within this range. Services using this frequency range include radr and fixed links and there will soon tb cellular services in the adjacent band just above 1400MHz. With this in mind we believe the no testing gap is hard to justify.

The justification for this revision is the same as was voiced for the revision to EN 300 386 and ES 201 468 that was accepted by WG\_EMC at its 44th meeting. However, there have been concerns raised about “double testing” for equipment that falls within the scope of both EN 55035 (CISPR35) and EN 301 489 series. This paper also takes these concerns into account.

The EN 301 489 series does not reference EN 55035 nor its predecessor EN 55024 for immunity requirements. Instead, the EN 301 489 series references the EN 61000-4-x series of basic standards for test methods etc. At the present time and for the future RED based editions we do not see the need to change this approach.

**Will “double testing” occur?**

There are two scenarios’ that could mean there is a risk of “double testing”. The first is where the scope of EN 55035 overlaps with that of the EN 301 489 series, whilst the second is where global products use CISPR 35 outside of Europe and the EN 301 489 series within the Europe. Both of these concerns are genuine, but equally both are manageable and with care “double testing” can be avoided”.

In an ideal world, scopes of different standards will not overlap, but unfortunately this does happen, so there needs to be clear agreement over which takes precedence in such situations. The simple solution here is that the scope of EN 55035 has a clear statement that it does not cover equipment containing any radio transmitting function, thus leaving the way for the EN 301 489 series to be the only standard applied. This would be in line with the concept that a fridge with a WiFi connection is a radio with a refrigeration function, rather than a fridge with a radio function and thus would be assessed against the EN 301 489 series for its EMC compliance. The risk with this approach is that performing such a change is outside of the control of ETSI.

A more comprehensive solution is to align the actual requirements within EN 50035 and the EN 301 489 series (and the new version of EN 300 386). This would mean that the tests would only have to be performed once and the results could be referenced by either standard. Furthermore, if this change were made to EN 301 489-1, then if justifiable exceptions for certain technologies exist they can be handled in the usual manner by defining different requirements in the relevant sub-parts. We should also remember that not all technologies covered by the EN 301 489 series are classed as multimedia in the way the CISPR 35 classes multimedia.

One area of potential conflict is “Smart TV’s”. EMC requirements for Broadcast receivers will be covered at present by EN55032 and EN 55035, but if the smart element is realised by a radio transmitter e.g. WiFi, then they fall into the scope of EN 301 489-1 and EN 301 489-17.

**Test level**

If we look at what is proposed and/or currently present in EN 300 386 we notice that for the frequency ranges of the cellular bands a test level of 10V/m is used as opposed to 3V/m. However, in EN 301 489-1 a test level of 3V/m is used throughout. The question is then should we adopt the 10V/m level as used in EN 300 386?

If we did, it would improve product resistance to the effects of RF fields from the ever increasing of mobile technology, but is this justified under the RED? For some products, such as infrastructure base stations we believe it is. Whereas for others, such as low cost SRD’s, it is probably not. Fortunately the structure of the EN 301 489 series allows for this, in that we specify a “standard” test level in part 1 and use the other parts to specify a different one where justified. This means the question is now, which level do we adopt for the standard level in EN 301 489-1, 3V/m or 10V/m for the cellular bands?

**Detailed Proposal**

The extension of the testing range for radiated immunity for the EN 301 489 series should follow the same format as that adopted in EN 300 386. In summary the key changes are:-

1. Extend upper range limit from 2700MHz to 6000MHz
2. In the range 2700MHz to 6000MHz the test level should be 10V/m
3. The step size for the sweep between 2700MHz and 6000MHz should be 4%.
4. Align radiated immunity test levels in EN 301 489-1 with EN 300 386
5. Review need to deviate from the above in product specific parts

6. Fill-in gap between 1000MHz and 1400MHz with a level of 3V/m and step size of 1%

This translates to the following text changes for sub-clauses 9.2 in EN 301 489-1:-

## 9.2 Radio frequency electromagnetic field (80 MHz to 1 400 MHz and 1 400 MHz to 6 000 MHz)

### 9.2.1. Introduction

This test is applicable for radio equipment and associated ancillary equipment.

This test shall be performed on a representative configuration of the radio equipment, the associated ancillary equipment, or a representative configuration of the combination of radio and ancillary equipment.

### 9.2.2 Definition

This test assesses the ability of the EUT to operate as intended in the presence of a radio frequency electromagnetic field disturbance.

### 9.2.3 Test method

The test method shall be in accordance with EN 61000‑4‑3 [3].

The following requirements and evaluation of test results shall apply:

* for the frequency ranges 80 MHz to 1 000 MHz and 1 400 MHz to 2 700 MHz with the exception of the exclusion band for transmitters, receivers and duplex transceivers (see clause 4), as appropriate;
	+ the test level shall be 3 V/m (measured unmodulated). The test signal shall be amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1 000 Hz. If the wanted signal is modulated at 1 000 Hz, then an audio signal of 400 Hz shall be used;
* for the frequency ranges 2 700 MHz to 6 000 MHz with the exception of the exclusion band for transmitters, receivers and duplex transceivers (see clause 4), as appropriate;
	+ the test level shall be 10 V/m (measured unmodulated). The test signal shall be amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1 000 Hz. If the wanted signal is modulated at 1 000 Hz, then an audio signal of 400 Hz shall be used;
	+ for receivers and transmitters the stepped frequency increments shall be 4 % frequency increment of the momentary used frequency, unless specified otherwise in the part of EN 301 489 series [i.13] dealing with the relevant type of radio equipment;
* further product related spot frequency tests may be specified in the relevant part of EN 301 489 series [i.13] dealing with the particular type of radio equipment;
* responses on receivers occurring at discrete frequencies, which are narrow band responses, shall be disregarded from the test (see clause 4);
* the frequencies selected and used during the test shall be recorded in the test report.

### 9.2.4 Performance criteria

For transmitters the performance criteria for continuous phenomena for transmitters shall apply (see clause 6 of the relevant part of EN 301 489 series [i.13] dealing with the particular type of radio equipment).

For receivers the performance criteria for continuous phenomena for receivers shall apply (see clause 6 of the relevant part of EN 301 489 series [i.13] dealing with the particular type of radio equipment).

For ancillary equipment the pass/failure criteria supplied by the manufacturer (see clause 6.4) shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.