

# Arguments for requesting the modification/unification between Standards EN 300 135 and the EN 300 433

## Background

In September 1990, during the third meeting of Radio Equipment & Systems (RES) (predecessor of the current Electromagnetic compatibility & Radio spectrum Matters (ERM)) the definitive draft of the standard ETS BA-CB equipment was approved.

This Standard, definitively approved in 1991 under the name ETS 300 135, only included frequency modulation (FM), leaving aside amplitude modulation (AM), the most commonly used modulation system in the world in the 27 MHz. sector.

Due to user pressure from a variety of European countries and after many political objections and NO techniques in the 9th meeting of the RES in Berlin, in January 1993, an agreement was reached whereby the Technical Assembly (TA) of the European Telecommunications Standards Institute (ETSI) was given the decision to create a new Standard that would include amplitude modulation.

This new Standard, with power restricted to an average power of 1W in AM and 4 W PEP in side band mode with suppressed carrier, became a Work Program in the 11<sup>th</sup> meeting of the RES held in July 1993 on the island of Jersey.

After two years this WP ended with the publication in November 1995 of the ETS 300 433, which was accepted as the only possible option for the continual use of AM by CB radio enthusiasts, who were disappointed as it did not live up to their hopes of having a CB which was compatible with the rest of the world.

This European Telecommunications Standard (ETS) was later published in 2000 in the European Community Publication as a Standard in line with the fulfilling of the Directive 1999/5/EC entitled EN 300 433 (EN= European Norm).

## Technical issues

One of the few technical reasons given at the time of the standardisation of AM with the creation of a specific Standard such as the current EN 300 433 was the argument that it created more interferences than FM. The constant debate between detractors and supporters of AM was halted by the publication in August 2000 of the Technical Recommendation TR 101 837. This technical recommendation was based on the final university thesis by a young French engineer, currently employed by Teledifusión de Francia (TDF).

This thesis showed that a BI TV aerial and the remaining domestic installations could provide certain advantages for the basic CB frequency when supplied by a signal of 27 MHz. This signal, available in TV and radio reception sockets is higher than current immunity given by analogue televisions, causing interference due to saturation of the input stage.

The aforementioned TR 101 837 also showed that there was practically no rejection by domestic amplifiers for broadcasting in BI and BII bands at frequencies of 27 Mhz, confirming tests carried out in laboratories with 20 real installations.

Attached below are the conclusions of the recommendation:

### 7 Conclusions

The data contained in the present document enables some conclusions to be drawn as to the disturbance that will be experienced by a TV receiver installation when subjected to a 27 MHz EM field.

One significant element studied in the present document is the signal level received at 27 MHz on the wall antenna connector. To date the radiation level at 27 MHz at this point had not been quantified, that is taking into account the various elements making up the TV receiver installation measurements have only made at the antenna input of the TV receiver.

It is clearly not representative to consider just the TV receiver. The complete installation i.e. the elements outside the television set need also to be considered. It could be argued that the severity of such a test is insufficient to verify that the EMC requirements are complied with as the wanted environment includes the TV receiver installation and thus the whole needs to be considered as a system.

The results obtained from the installations described in the present document are identified in Table 17, which shows that with an EM field limit value of 125 dB $\mu$ V/m, the levels developed for the different TV set-ups exceed the limits set by Table 7 of EN 55020 [3]. In other words, the TV antenna installation itself supplies at its terminals a higher level than those identified in the above standard.

Furthermore, these levels can also be increased if an RF amplifier is included in the installation. The role of such amplifiers should be only to amplify the signal TV channels, whilst in fact, as there are no standards for such products, these RF devices frequently also amplify signals outside the broadcast bands including 27 MHz. Because of this lack of standards, some competent laboratories use EN 50083-2 [6] (for cable distribution systems) to check the behaviour of antenna amplifiers.

In conclusion, levels developed by significant number of TV installations exceed the limits of input immunity set by EN 55020 [3]. We believe that the EMC limits defined in EN 55020 [3] and EN 50083-2 [6] should be reviewed by CENELEC taking due account of the data contained in the present document.

The chairman of ERM, Mr. O. Weaton, has written various communications to CENELEC to request a review of the limits of the standards EN 55020 and EN 50083-2 and received no reply. At the end of 2001 ERM therefore decided to create the ERM TG17 WG05 in order to create a Standard that would cover the gap in terms of amplifiers and active aerials for TV reception and sound reception.

This new work (NWI) from the very onset was supported by the following members of ETSI: Three administrations: ICP, Secr ariat d'Etat   l'Industrie, Ficora; two user administrations: ECBF and AER, a TDF operator and a manufacturer Uniden.

Work by this group, in which one of the largest manufacturers of TV aerials and amplifiers in Europe also participated, along with several members of ETSI, resulted in two TSI Standards; the ES 202 127 Amplifiers and pre-amplifiers for use in TV broadcasting and sound reception in 47MHz to 860 MHz bands and the ES 202 056 active aerials used in TV broadcasting and sound reception in 47MHz to 860 MHz bands.

These ES, published in 2005, and that notably improve immunity from emissions from CB and GSM bands of domestic amplifiers and active aerials, cover a gap in Standards for the aforementioned equipment.

These reports and standards did not exist in 1993 and should now include the positive experience of several European administrations that have permitted the use of AM, and others such as Spain and Italy that has permitted AM use with 4 W RMS and 12 PEP in BLU since before 1993.

Another strong argument is the next "analogue black-out" by which in a few years (2010 or 2011) analogue modulation will no longer be used to transmit TV signals; TDT only will be used.

Also extremely important is the application, for over a decade now, of the Directive 1999/5/EC that forces a considerable improvement in the immunity of all kinds of telecommunication terminals. In 1993 this immunity was scarcely applied in the manufacturing of electronic and communication equipment.

## **Uniformity with other countries**

As the introductions to the EN 300135 and the EN 300433 indicate, adopting these standards does not have to affect the use of other means of modulation of other power levels, that is, that these harmonised standards can coexist with regulations specific to different countries.

The AM frequency is the most commonly used CB modulation in the world with FM prohibited in most countries and only used in Europe. When creating the current CB standards, countries with standards that were considered progressive at the time with 4 W and 12W pep in AM and BLU respectively, using the excuse that the

CEPT recommended the use of FM, prohibited AM, and subsequently, due to pressure by users, came back years later to legalise AM again, but in this time with a lower level of power, 1W and 4W pep, but the damage had already been done.

The excuse of CEPT recommendations is a mere fallacy. After the two afore mentioned CB standards were published other countries have doubled the number of channels from 40 established by the standards to 80, using a rare case, the radio electric spectrum. This proves it is not a standardisation problem but more to do with regulations of each country.

Under these two standards, the manufacturers or importer are needed to made the more or less the double of tests, with the unification in only one standard, the common tests should be made only one time with real economic impact. Both standards have more than 80% common parts

## **Users**

Each and every European CB user is against reducing features enjoyed by their colleagues who have more channels; they want to be able to transmit under the same power conditions. The current AM standard is basically a result of personal efforts by user associations, mainly the ECBF.

Some users state that equipment in Europe is more expensive than those marketed in America.

On the one hand there is the tax issue; in Europe we pay more taxes than American citizens and these results in the welfare state we enjoy in Europe. This has a price, a price to which the use of FM must be added. In AM/FM equipment it is necessary to add the complete circuitry corresponding to the FM modem stages.

The idea is not to eliminate frequency modulation, but rather that CB transceivers should not have to complicate their circuitry in the RF output stage. They should keep the same power in both types of modulation. Everyone knows that power equals voltage squared divided by the impedance,  $W=V^2/Z$ .

In order to maintain the level of spurious radiations within the limits set by the standards, RF output stages must be drawn up very carefully, along with their adaptation of impedances to the 50 ohm standardised by the cables, connectors and aerials. This design becomes more expensive when you need to reduce the power from 4W FM to 1W AM.

At the moment Poland, Italy and Spain allow a power of 4W in AM with spurious radiation limits established by the EN 300 433 and they do not register interference problems with other services.

In one country, the users every four years live with the "Damocles sword", they don't know how many time can use the actual output level, and for this reason the sales decrease the half year before the end of dead date.

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