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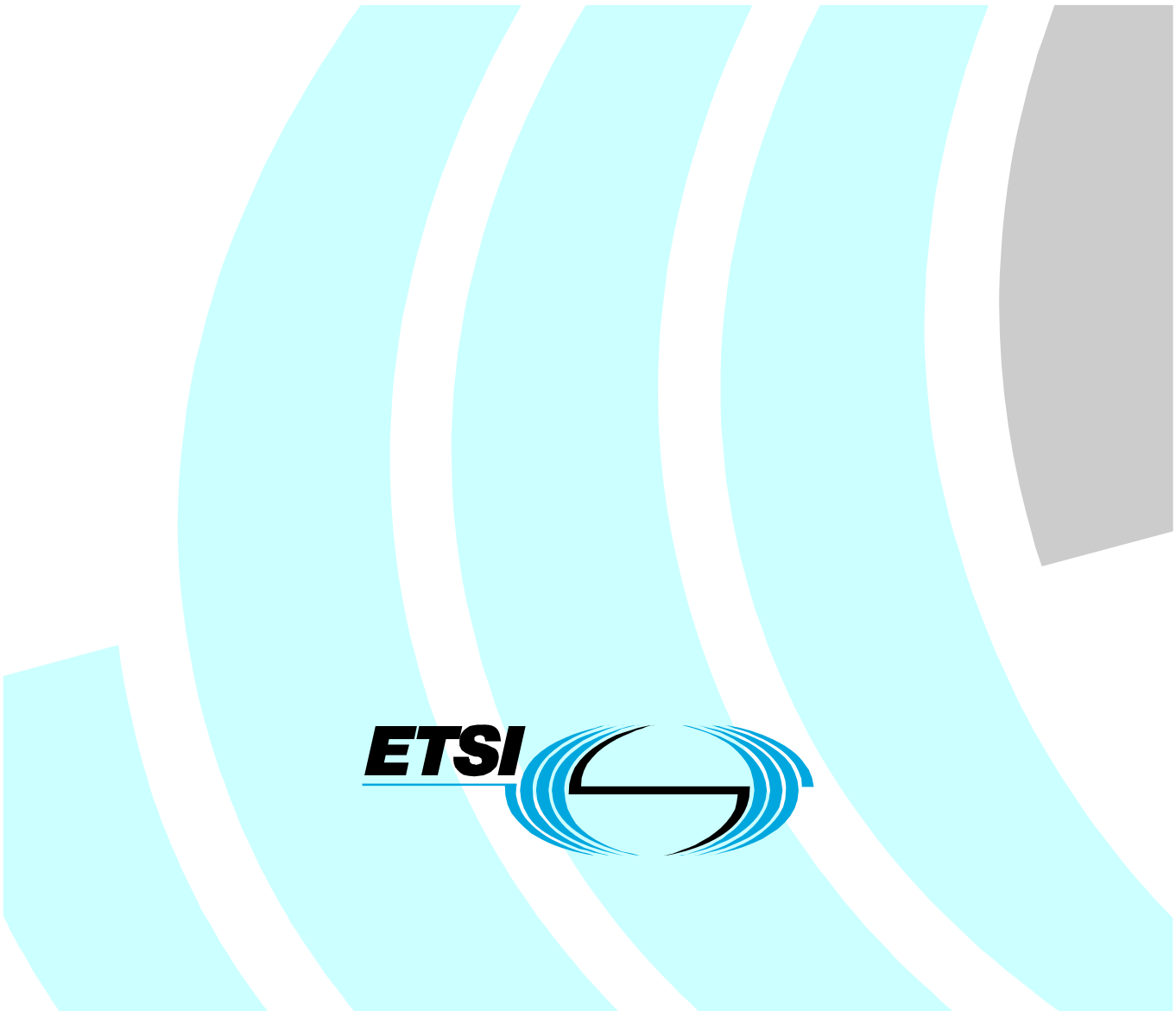
Technical Report

Electromagnetic compatibility and Radio spectrum Matters (ERM); System Reference document (SRdoc); DVB-H Small Gap Fillers



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Contents

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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

Executive summary

DVB-H Small Gap Fillers are low power on-channel repeaters of a DVB-H multiplex, with the aim of improving domestic indoor reception in areas where outdoor reception is available.

Consumers of mobile TV services, now familiar with the user experience of 2G/3G, are likely to expect good indoor coverage also for DVB-H. However, indoor reception of DVB-H services, especially in urban areas, in the lower floors and if using receivers with integrated antenna, requires high levels of e.m. field strength. To achieve this goal, DVB-H Small Gap Fillers can be adopted.

These devices are installed by the users in their apartments and are intended to be connected to a roof-top antenna, e.g. via a direct cable in a single private house, or using the existing in-building cable distribution system (MATV network) in a multi-apartment building. Each apartment is supposed to use their own device.

A DVB-H Small Gap Filler is essentially a filtered amplifier, whose purpose is to boost a specific DVB-H signal to improve its field strength in the target coverage area (100 m^2 apartment). It can be modelled as consisting of two sections:

- A signal processing section (channel filtering and amplification).
- A signal monitoring section, using a built-in DVB-H receiver for quality monitoring of the output signal and for verification that the input signal is a valid DVB-H signal. This section includes an automatic power control mechanism based on the measured signal quality, with the task of imposing a proper power reduction (or switch-off) in case of problems.

A Technical Specification regulating such devices is required, to guarantee that no disturbance can be caused to the reception of the same DVB-H service or to other services, e.g. traditional TV services (i.e. analogue TV, DVB-T, CATV) also received in the UHF band. A number of technical parameters are specified, as follows:

- The Maximum Effective Radiated Power is limited to 0 dBm (taking into account the aerial's maximum nominal gain).
- The frequency response mask allows to selectively amplify a single DVB-H channel so as to provide sufficient rejection of unwanted adjacent channels, which should not be amplified to a much higher level
- The DVB-H Small Gap Filler receives and transmits on UHF band IV/V (channels 21÷60 MHz, 470÷790 MHz). DVB-H channels with 5 MHz, 6 MHz, 7 MHz or 8 MHz bandwidth can be retransmitted.
- Out-of-band emissions and spurious emissions are according to existing regulations.
- The maximum delay is 2,8 μs, i.e. only a portion of the Guard Interval duration.

The signal radiated by a DVB-H Small Gap Filler is identical to the signal received from the main DVB-H transmitter covering that area, with a delay kept well below the Guard Interval duration, therefore the two COFDM signals radiated by the main DVB-H transmitter and by the DVB-H Small Gap Filler sum coherently as in an SFN network, without the risk of interference in any reception condition.

The DVB-H Small Gap Filler implements features to monitor the signal quality according to specific criteria and take proper actions when needed, by reducing the output power level, and consequently limiting the coverage. This guarantees that only an error-free DVB-H signal is being retransmitted, avoiding the risk of retransmitting a bad quality signal, caused i.e. by degradation in the source signal quality, failure in the device electronics, or self-oscillation conditions due to poor shielding of the home network components,

The automatic output power control mechanism allows the DVB-H Small Gap Filler to transmit at the maximum achievable output power level, under the constraint of satisfying the signal quality criteria. This mechanism is based on a signal monitoring section and an output level control section. In normal conditions, the output power level adjustment takes place only at the switch-on of the device, while after the transient period the output power should stay constant (and corresponding to the maximum ERP in optimal environments). Anyway, the DVB-H Small Gap Filler continuously monitors the signal quality in order to activate the power control mechanism as soon as signal impairments are detected. It is required that, in case of serious quality impairments (e.g. oscillation or loss of a valid input DVB-H signal), the DVB-H Small Gap Filler is able to take proper actions to avoid radiating an errored signal (i.e. reducing the output power properly, or switching off if needed) in no more than 5 seconds.

No change in the radio spectrum allocation is required, as only a legitimate DVB-H signal, already broadcast in the same area by a licensed network operator, is re-radiated by the device on the same frequency in a non-interfering way (SFN). It is requested that the DVB-H Small Gap Fillers be unlicensed devices so that final users are authorised to install such low-power devices, re-radiating a legitimate DVB-H signal in the licensed UHF channel. The devices do not easily fall into an existing category due to their broadcast nature, but the authors would request that these devices fall into the category of SRD and appear in ERC/REC 70-03 [i.4] in a similar way to the low power FM devices in annex 13 of ERC/REC 70-03 [i.4]. However, it will be for CEPT and individual Administrations to define their status.

Therefore, a Technical Specification for DVB-H Small Gap Fillers, according to [i.1], is proposed as a new harmonised EN.

Introduction

The present document has been developed to support the co-operation between ETSI and the Electronic Communications Committee (ECC) of the European Conference of Post and Telecommunications Administrations (CEPT).

DVB-H Small Gap Fillers are low power on-channel repeaters of a DVB-H multiplex, with the aim of improving domestic indoor reception in areas where outdoor reception is available. Target coverage of the device is a 100 m^2 apartment. The DVB-H Small Gap Filler input is connected to aerials receiving authorised over-air emissions relevant to that specific usage area: this ensures that only authorised signals can be re-radiated by the device. Moreover, the radio spectrum characteristics of the device are specified so that no disturbance can be caused to the reception of other services, e.g. traditional TV services (i.e. analogue TV, DVB-T, CATV) also received in the UHF band.

Status of pre-approval draft

Target version	Pre-approval date version (see note)				
V1.1.1	a	s	m	Date	Description
	0.0.1			February 2010	Initial draft version
NOTE: See clause A.2 of EG 201 788 (V2.1.1) [i.5].					

1 Scope

The present document describes the DVB-H Small Gap Fillers intended for consumer use. These devices are low-power on-channel repeaters of a DVB-H multiplex, with the aim of improving indoor reception in areas where outdoor reception is available.

It includes in particular:

- Market information.
- Technical information.
- Regulatory issues.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

Not applicable.

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI EN 301 558: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Digital Video Broadcasting (DVB); Technical Specifications for DVB-H Small Gap Fillers; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive".

[i.2] CEPT/ERC/Recommendation 74-01E: "Unwanted Emissions in the Spurious Domain".

[i.3] CELTIC B21C Project: "Validation of DVB-H Small Gap Fillers".

[i.4] CEPT/ERC/Recommendation 70-03: "Relating to the use of Short Range Devices (SRD)".

[i.5] ETSI EG 201 788 (V2.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Guidance for drafting an ETSI System Reference document (SRdoc)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

erroneous second: a particular one-second interval when any of the following two quality criteria fails on the demodulated output signal:

1) No detected erroneous TS packets during this 1 s interval;

2) Post-Viterbi BER $\leq 2 \cdot 10^{-4}$ measured over this 1 s interval.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

2G	Second Generation
3G	Third Generation
BER	Bit Error Rate
CATV	CAble TV
COFDM	Coded Orthogonal Frequency Division Multiplexing
DVB	Digital Video Broadcasting
DVB-H	DVB Handheld
DVB-T	DVB Terrestrial
e.m.	Electromagnetic
EN	European Norm
ERP	Effective Radiated Power
GI	Guard Interval
MATV	Master Antenna TV
NIT	Network Information Table
SFN	Single Frequency Network
TS	Transport Stream
TV	TeleVision
UHF	Ultra-High Frequency

4 Comments on the System Reference Document

There were no comments received.

4.1 Statements by ETSI Members

There were no statements received.

5 Presentation of the system or technology

DVB-H Small Gap Fillers are low power on-channel repeaters of a DVB-H multiplex, with the aim of improving domestic indoor reception in areas where outdoor reception is available.

Consumers of mobile TV services, now familiar with the user experience of 2G/3G, are likely to expect good indoor coverage also for DVB-H. However, indoor reception of DVB-H services, especially in urban areas, in the lower floors and if using receivers with integrated antenna, requires high levels of e.m. field strength. To achieve this goal, DVB-H Small Gap Fillers can be adopted.

These devices are installed by the users in their apartments and are intended to be connected to a roof-top antenna, e.g. via a direct cable in a single private house, or using the existing in-building cable distribution system (MATV network) in a multi-apartment building. Each apartment is supposed to use their own DVB-H Small Gap Filler.

The signal radiated by a DVB-H Small Gap Filler is identical to the signal received from the main DVB-H transmitter covering that area, with a delay kept well below the Guard Interval duration, therefore the two COFDM signals radiated by the main DVB-H transmitter and by the DVB-H Small Gap Filler sum coherently as in an SFN network, without the risk of interference in any reception condition.

The radio spectrum characteristics of the device are specified in terms of maximum ERP, frequency response, maximum delay, out-of-band emissions, etc. so that no disturbance can be caused to the reception of the same DVB-H service or to other services, e.g. traditional TV services (i.e. analogue TV, DVB-T, CATV) also received in the UHF band.

DVB-H Small Gap Fillers are consumer-grade products, intended to be installed by the final user, without the help of a professional installer. Therefore, mandatory methods are included to prevent oscillation and to ensure that no other signal than a valid DVB-H stream is radiated, continuously monitoring the quality of the emitted signal and taking proper actions when needed. Also requirements for an easy and fail-proof installation procedure are defined.

6 Market information

Sales figures for DVB-H Small Gap Fillers in Europe strongly depend on market penetration of DVB-H network and services.

The maximum demand is expected in correspondence with the introduction of DVB-H services in urban areas, when networks are planned mainly for outdoor coverage.

The devices could be sold in bundle with DVB-H terminals, or separately.

7 Technical information

7.1 Detailed technical description

DVB-H Small Gap Fillers are low power on-channel repeaters of a DVB-H multiplex, with the aim of improving domestic indoor reception in areas where outdoor reception is available.

These devices are intended to be connected to a roof-top antenna, e.g. via a direct cable in a single private house, or using the existing in-building cable distribution system (MATV network) in a multi-apartment building, as shown in figure 1. Each apartment is supposed to use their own DVB-H Small Gap Filler.

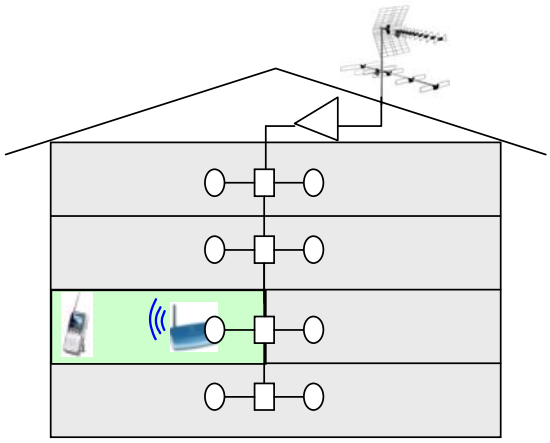

Figure 1: Small Gap Filler to improve indoor DVB-H coverage within an apartment

As DVB-H Small Gap Fillers are connected to the MATV network as well as normal TV sets and DVB-T Set-Top-Boxes, also EMC immunity requirements are the same.

Wall-mounted receiving antennas may in some cases be used, but with technical constraints due to the limited isolation (i.e. the ERP could be severely limited by the automatic power control mechanism, as described below).

The target coverage of a DVB-H Small Gap Filler is a standard private home of 100 m^2. Given this target coverage, the actual coverage of the device depends on a number of factors, i.e. number and consistency of the internal walls, kind of the furniture, position and height of the transmitting antenna, radiation diagram, quality of the input DVB-H signal, modulation scheme of the DVB-H signal, sensibility of the handheld terminals (i.e. internal or external antenna), etc. Coverage of wider areas (e.g. stores) is possible with the same device, provided that no internal walls are present, as well as position and height are properly chosen and the input signal quality is adequate.

A DVB-H Small Gap Filler is essentially a filtered amplifier, whose purpose is to boost a specific signal to improve its field strength in the target coverage area. It can be modelled as consisting of two sections [i.1]:

- A signal processing section (channel filtering and amplification).
- A signal monitoring section, using a built-in DVB-H receiver for quality monitoring of the output signal. This section includes an automatic power control mechanism based on the measured signal quality, with the task of imposing a proper power reduction (or switch-off) in case of problems, to avoid the risk of retransmitting a bad quality signal, caused i.e. by degradation in the source signal quality, failure in the device electronics, or self-oscillation conditions due to poor shielding of the home network components.

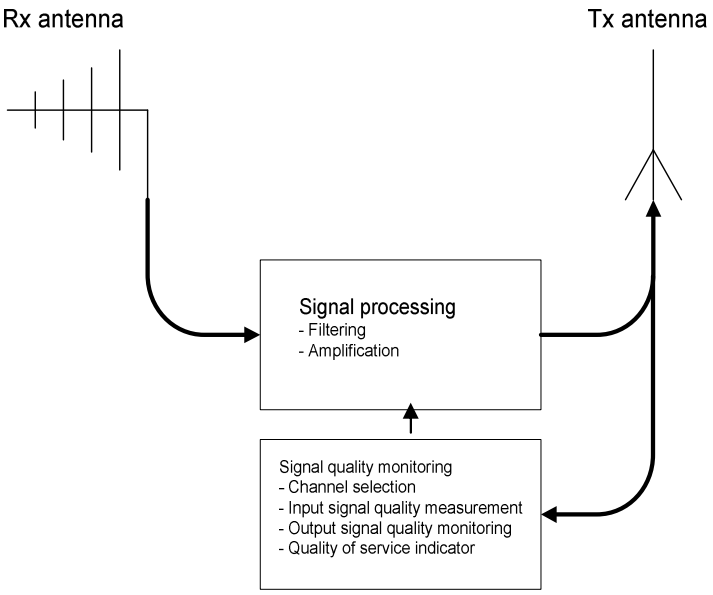

Figure 2: Functional block diagram of a DVB-H Small Gap Filler

The signal retransmitted by the DVB-H Small Gap Filler is a valid DVB-H signal, identical to the signal radiated in the area as received outdoor, with a delay kept well below the Guard Interval duration, therefore the two COFDM signals radiated by the main DVB-H transmitter and by the DVB-H Small Gap Filler sum coherently as in an SFN network, without the risk of interference in any reception condition.

It may happen that, from time to time, due to impaired receiving conditions (e.g. impulse interference), the output signal is affected by some errors, but in any case the DVB-H Small Gap Filler transmits no more than 5 consecutive erroneous seconds before proper actions are taken.

In order to guarantee that only an error-free DVB-H signal is being retransmitted, the DVB-H Small Gap Filler implements features to monitor the signal quality according to specific criteria and take proper actions when needed, by reducing the output power level, and consequently limiting the coverage. Signal quality is expressed using the parameter "Erroneous second", where a particular one-second interval is said to be an "erroneous second", or simply "erroneous", if any of the following two signal quality criteria fails during this second when the output signal is demodulated:

- No detected erroneous TS packets during 1 second (1)

- Post-Viterbi BER $\leq 2 \cdot 10^{-4}$ measured over 1 second (2)

The automatic output power control mechanism allows the DVB-H Small Gap Filler to transmit at the maximum achievable output power level, under the constraint of satisfying the signal quality criteria. This mechanism is based on a signal monitoring section and an output level control section.

The role of the monitoring section is to perform periodic BER measurements and TS erroneous packets count, in order to keep the transmitted signal under control.

The role of the output power level control section is to perform an adjustment of the output power in accordance with the result of the measurements made by the monitoring section of the device:

- The output power level control section performs a rapid reduction of the output power in case, for any reason, the quality criteria are no more met, until the quality criteria are satisfied again (or a lower output power bound is reached). If the quality criteria are not satisfied and the output power level has already been reduced to the lower bound, the device does not retransmit the input signal by switching the output power off (in this case, the DVB-H Small Gap Filler can be activated again after user input, e.g. pressing a button).

- The output power level control section performs a gradual increment of the output power until the output signal continues to satisfy the quality criteria, or the output power level reaches the maximum allowed ERP value, which can never be exceeded, in any functional condition of the device.

In normal conditions, the output power level adjustment takes place only at the switch-on of the device, while after the transient period the output power should stay constant (and corresponding to the maximum ERP in optimal environments). Anyway, the DVB-H Small Gap Filler continuously monitors the signal quality in order to activate the power control mechanism as soon as signal impairments are detected.

It is required that, in case of serious quality impairments (e.g. oscillation or loss of a valid input DVB-H signal), the DVB-H Small Gap Filler is able to take proper actions to avoid radiating an errored signal (i.e. reducing the output power properly, or switching off if needed) in no more than 5 seconds.

The algorithm adopted in the DVB-H Small Gap Filler to fulfil these requirements is implementation dependent. However, a reference algorithm for signal quality monitoring and automatic power control is given in annex A of [i.1]. A DVB-H Small Gap Filler, in the same conditions, behaves no worse than if implementing the reference algorithm, in terms of output signal quality, output power level and reaction times to possible impairments of the input signal. The reference algorithm is therefore a reference for the actual algorithms implemented by manufacturers.

As DVB-H Small Gap Fillers are intended to be installed by the final user, without special technical skills, an easy and fail-proof installation procedure is implemented in the device. At switch-on or in case of reset, the DVB-H Small Gap Filler has an algorithm to acquire the desired DVB-H multiplex. This algorithm is implementation dependent, and may make use of e.g. a complete frequency scanning (with possibility for the user to select the desired DVB-H stream, in case many of them are available), a pre-stored list of suggested channels, etc. Anyway, whatever the implemented algorithm is, the DVB-H Small Gap Filler always checks that the input signal is a valid DVB-H signal *before* taking any other action, and in particular *before* an output signal is radiated. This is possible by checking that an error-free Transport Stream can be obtained by demodulating the DVB-H signal and by checking that the DVB-H signalling bit is set in the TPS signalling of the DVB-H signal. If these checks are performed it is absolutely impossible that a non-DVB-H signal is being radiated from the Small Gap Filler.

7.2 Technical parameters and implications on spectrum

7.2.1 Status of technical parameters

7.2.1.1 Current ITU and European Common Allocations

No special allocation is needed since the DVB-H Small Gap Filler is using existing allocation according to the ITU GE06 plan.

7.2.1.2 Sharing and compatibility studies (if any) already available

DVB-H Small Gap Fillers are intended for use in the UHF frequency band, and therefore co-exist with other services also distributed in the UHF band, e.g. traditional TV services (i.e. analogue TV, DVB-T, CATV). The limiting condition is when a neighbour is watching an analogue terrestrial TV signal using an indoor antenna (amplified or non-amplified) and behind a single wall.

Also, the reception of DVB-H services should be not degraded by the presence of a DVB-H Small Gap Filler in another apartment.

A validation activity on first prototypes of DVB-H Small Gap Fillers has been carried out in the framework of the CELTIC B21C Project [i.3]. The results of this validation activity have been used in the refinement of the present technical parameters.

7.2.1.3 Sharing and compatibility issues still to be considered

Void.

7.2.2 Transmitter parameters

7.2.2.1 Transmitter Output Power/Radiated Power

The Maximum Effective Radiated Power (ERP_{max}) (see note 1) is limited to 0 dBm. This value allows to achieve the target coverage and, at the same time, prevents potential interference to other services.

NOTE 1: With reference to a half wave dipole.

NOTE 2: The maximum power input to the aerial should be limited to take into account the aerial's maximum nominal gain. For example, if the radiation pattern of the aerial in use is similar to that of a vertical dipole it will have a gain of 0 dBd (2,14 dBi) in the horizontal plane and the maximum power input to the aerial is therefore limited to 0 dBm.

The actual radiated power may be reduced by the automatic power control mechanism implemented in the device as described in clause 7.1, in order to cope with possible impairments of the output signal quality (e.g. oscillation).

7.2.2.1a Antenna Characteristics

Given the limits on the ERP fixed in clause 7.2.2.1, there are no specific requirements on the form and type of the transmission antenna of the device. However, to ensure that the overall ERP remains in those limits, the antenna is an integral part of the device, preventing its replacement by the user with another model.

7.2.2.2 Operating Frequency

The DVB-H Small Gap Filler receives and transmits on UHF band IV/V (channels 21÷60 MHz, 470÷790 MHz).

The difference between receive and transmit frequencies is as small as possible, and ideally zero. The maximum frequency error does not exceed 0,1 % of the carrier spacing of the DVB-H mode in question. As an example: for an 8K DVB-H signal in 8 MHz bandwidth, the maximum frequency error does not exceed about 1 Hz (see note).

NOTE: On-channel gap fillers can use the same local oscillator for receive and transmit mixing, resulting in the cancellation of any receive/transmit errors as well as cancelling out low frequency phase noise.

The quality monitoring mechanism ensures that the DVB-H Small Gap Filler only transmits a valid DVB-H signal. Thus empty channels or channels containing analogue TV signals or other types of signals will not be re-transmitted if the wrong frequency is initially selected by error.

The DVB-H Small Gap Filler does not change its input frequency in any case, and the only possible frequency is the frequency of the cell, as it is indicated in the Network Information Table Actual (NIT-Actual) descriptor of the DVB-H Transport Stream.

7.2.2.3 Bandwidth

It is an on-channel device, where a DVB-H multiplex with a 5 MHz, 6 MHz, 7 MHz or 8 MHz bandwidth is retransmitted on the same frequency and in the same bandwidth as the received signal.

The DVB-H Small Gap Filler has to selectively amplify a single input DVB-H channel so as not to re-radiate unwanted signals present at the input.

The device therefore complies with the following frequency response mask (table 1 and figure 3) within the frequency band defined in clause 7.2.2.2. The mask is derived for a 8 MHz bandwidth, and should be scaled appropriately for 5 MHz, 6 MHz or 7 MHz.

Table 1: Frequency response mask table

Frequency offset (MHz)	Upper mask corner points (dB)	Lower mask corner points (dB)
-12	-70	-∞
-4,76	-70	-∞
-3,81	0	-∞
-3,35	0	-5
3,35	0	-5
3,81	0	-∞
4,76	-70	-∞
12	-70	-∞

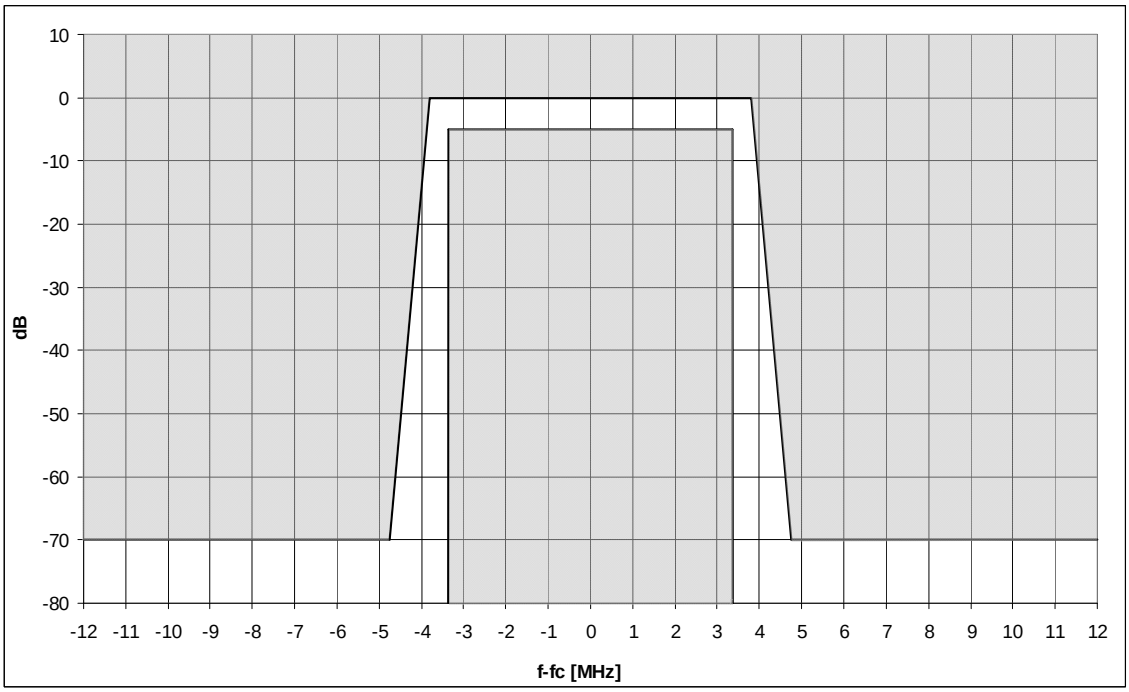

Figure 3: Frequency response mask

7.2.2.4 Unwanted emissions

Out-of-band emissions are unwanted emissions immediately outside the nominal channel resulting from non-linearity in the amplifier but excluding spurious emissions. For the purposes of the present document, out-of-band emissions are emissions at frequencies outside the channel bandwidth and within the frequency ranges $f_0 \pm 12$ MHz for 8 MHz channels, where f_0 is the centre frequency of the channel, irrespective of the number of carriers employed.

Out-of-band emissions limits are given as mean power level measured in a 4 kHz bandwidth. The device fulfils these requirements if it is set to its maximum allowed ERP; in any other cases the absolute out-of-band emissions are lower.

Out-of-band emissions do not exceed the limits specified in table 2, additionally shown in figure 4 as a spectrum mask (see note).

NOTE: The proposed mask is derived for a 8 MHz bandwidth, and should be scaled appropriately for 5 MHz, 6 MHz or 7 MHz.

Table 2: Out-of-band emissions limits

Frequency offset (MHz)	Out-of-band emissions (dBm)
12	-91
-6	-91
-4,2	-62,8
-3,81	-32,8
3,81	-32,8
4,2	-62,8
6	-91
12	-91

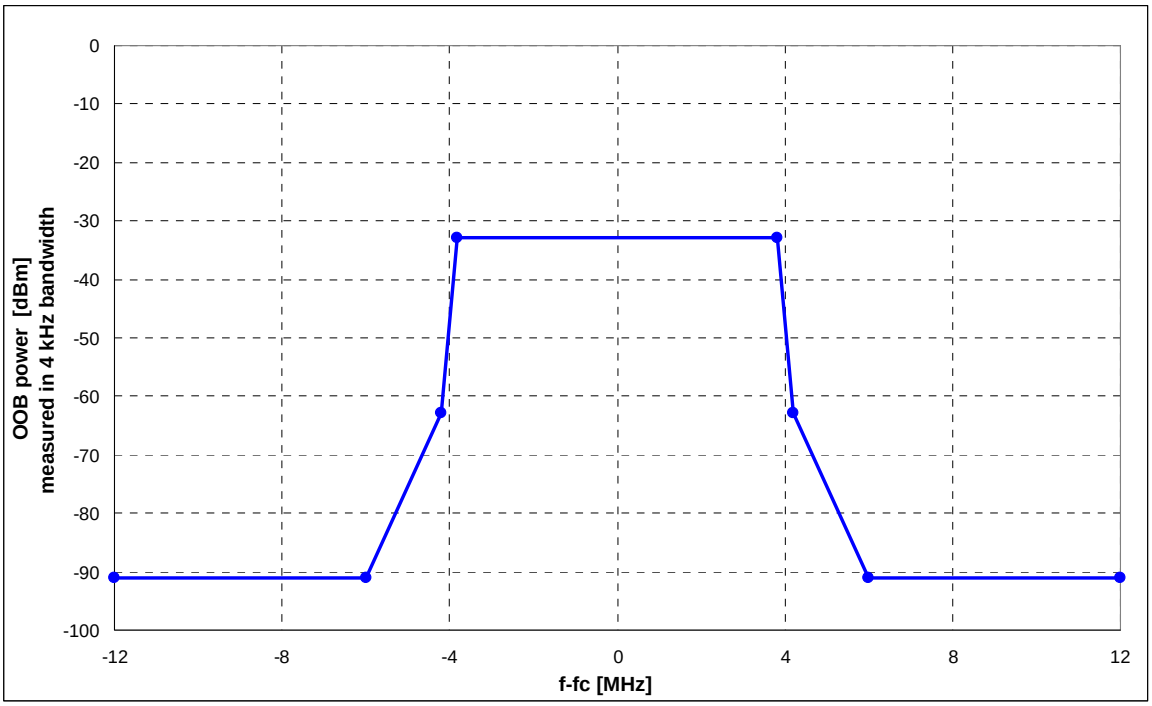

Figure 4: Out-of-band spectrum mask limit

The unwanted emissions of the DVB-H Small Gap Filler in the spurious domain cover the frequency band ranging from 30 MHz to F_{UPPER} equal to 3 GHz or to the 5^{th} harmonic of the upper frequency of the channel, whichever is the greater, as referred to Rec. 3 of [i.2] and following the reference bandwidth referred to Rec. 4 of [i.2]).

Spurious emissions should be measured as effective radiated power in an anechoic room.

Referring to annex 2 of [i.2], the spurious domain emissions limits are as in table 3.

Table 3: Spurious emissions limits for the DVB-H Small Gap Filler

Frequency range of the spurious emission (MHz)	Limits of the spurious emission (dBm)		
	Reference bandwidth 100 kHz	Reference bandwidth 1 MHz	Reference bandwidth 1 Hz
30 ÷ 47	-36	-	-86
47 ÷ 74	-54	-	-104
74 ÷ 87,5	-36	-	-86
87,5 ÷ 118	-54	-	-104
118 ÷ 174	-36	-	-86
174 ÷ 230	-54	-	-104
230 ÷ 470	-36	-	-86
470 ÷ 790	-54 (see note)	-	-104
790 ÷ 1 000	-36	-	-86
> 1 000 up to 5th harmonic	-	-30	-90
NOTE: Except for specific frequency in the out of band domain.			

A spectrum overview ranging from 30 MHz to 3 GHz or the 5th harmonic of the upper frequency of the channel is presented in figure 5.

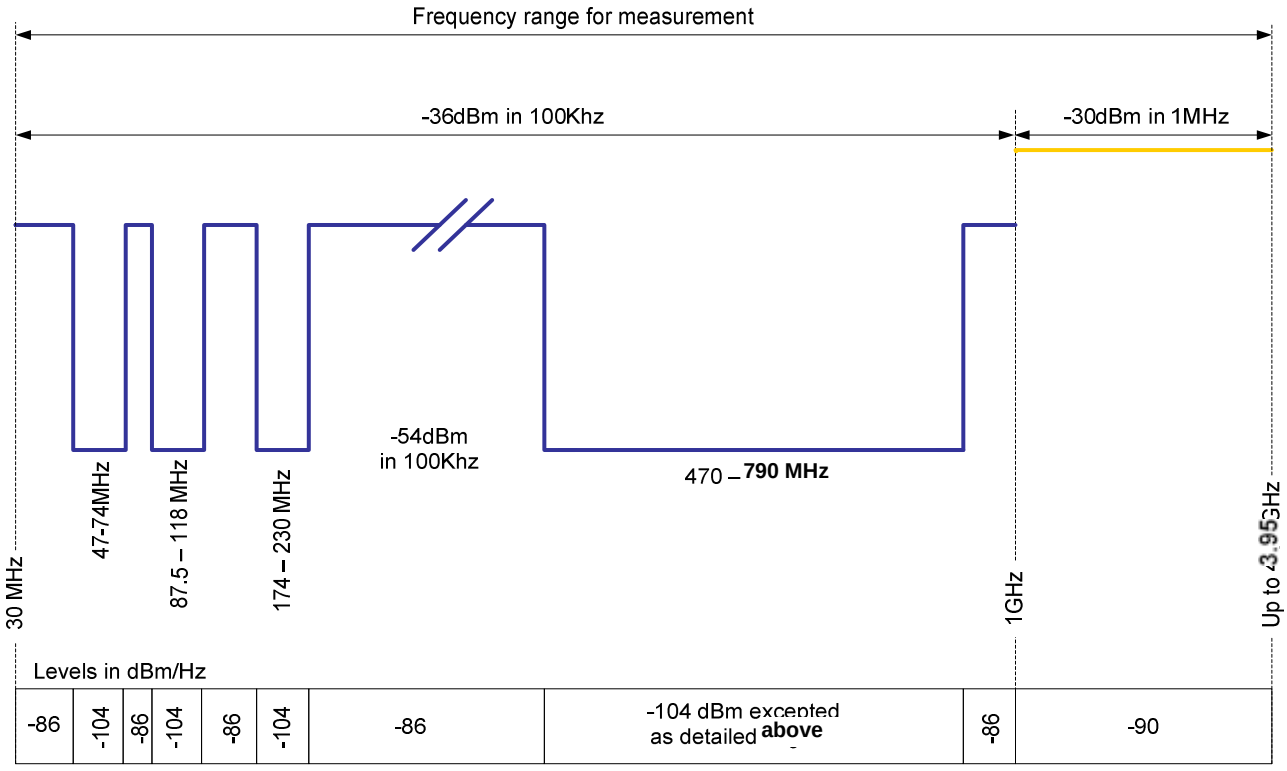

Figure 5: Spectrum overview for unwanted emissions in the spurious domain

7.2.2.5 Maximum delay

The maximum delay of the DVB-H Small Gap Filler is limited to 2,8 µs. The maximum delay is defined as the time difference between a single received path and the first path in the impulse response of the retransmitted signal.

The delay introduced by the DVB-H Small Gap Filler has also implications at RF level, since the RF signal on the air is the combination of the signal generated by the main DVB-H transmitter and the signal re-transmitted by the DVB-H Small Gap Filler as in an SFN (Single Frequency Network).

Due to the feedback, there will also be a series of delayed and attenuated paths of the impulse response (with the same time spacing as between the received and first retransmitted path). The total power of all delayed paths exceeding 2,8 µs delay relevant to the first retransmitted path does not exceed 10 % of the total transmitted power.

As reported in table 4, this delay represents only a portion of the Guard Interval, thus allowing a proper working in SFN also in case the DVB-H signal is already processed in the head-end of the MATV network.

Table 4: 2,8 µs delay relative consumption of Guard Interval in the various modes

Mode	Guard Interval	GI (µs)	% of GI for 2,8 µs delay
8k	1/4	224	1,25 %
	1/8	112	2,5 %
	1/16	56	5 %
	1/32	28	10 %
4k	1/4	112	2,5 %
	1/8	56	5 %
	1/16	28	10 %
	1/32	14	20 %
2k	1/4	56	5 %
	1/8	28	10 %
	1/16	14	20 %
	1/32	7	40 %

7.2.3 Receiver parameters

Void.

7.3 Information on relevant standard(s)

Void.

8 Radio spectrum request and justification

No additional radio spectrum allocation is required, since only a legitimate DVB-H signal, already broadcast in the same area by a licensed network operator, is re-radiated by the device on the same frequency in a non-interfering way (SFN).

9 Regulations

In this clause the term "regulation" should be taken in its broadest sense.

9.1 Current regulations

Current regulations include, in particular, ITU, EU and ECC applicable regulations.

9.2 Proposed regulation and justification

A Technical Specification for DVB-H Small Gap Fillers, according to [i.1], is proposed as a new harmonised EN.

This new harmonised EN will allow to provide a satisfactory DVB-H coverage in indoor reception, also in urban areas, in the lower floors and if using receivers with integrated antenna. This new harmonised EN at the same time guarantees that only valid DVB-H signals are re-radiated and no interference is caused on existing (TV or other) services in the same frequency bands. The proposed new harmonised EN provide a firm ground for the provision to use of unlicensed low power gap fillers for retransmission of existing broadcast services. It is proposed that the relevant European body recommend to national administrations to allow for the public use of unlicensed DVB-H Small Gap Fillers in their respective countries, based on the relevant ETSI standards. The SGFs are intended to work as on-channel repeaters in Single Frequency Network with the licensed transmitter(s) - not adding interference - and therefore improving coverage. As a special case the SFN may only consist of a licensed main transmitter and the Small Gap Filler. These devices do however not easily fall into an existing category due to their broadcast nature, but the authors would request that these devices fall into the category of SRD and appear in ERC/REC 70-03 [i.4] in a similar way to the low power FM devices in annex 13. However, it will be for CEPT and individual Administrations to define their status.

Annex A: Bibliography

ETSI EN 302 304: "Digital Video Broadcasting (DVB); Transmission System for Handheld Terminals (DVB-H)".

ETSI TR 102 377: "Digital Video Broadcasting (DVB); DVB-H Implementation Guidelines".

ETSI TR 101 190: "Digital Video Broadcasting (DVB); Implementation guidelines for DVB terrestrial services; Transmission aspects".

ETSI EN 300 468: "Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems".

ETSI TR 101 211: "Digital Video Broadcasting (DVB); Guidelines on implementation and usage of Service Information (SI)".

CELTIC B21C Project: "Test methodology for DVB-H Small Gap Fillers".

History

Document history		
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