INNES

DME204 configuration in DVB-T mode

July 2015

Version 001A

Table of content

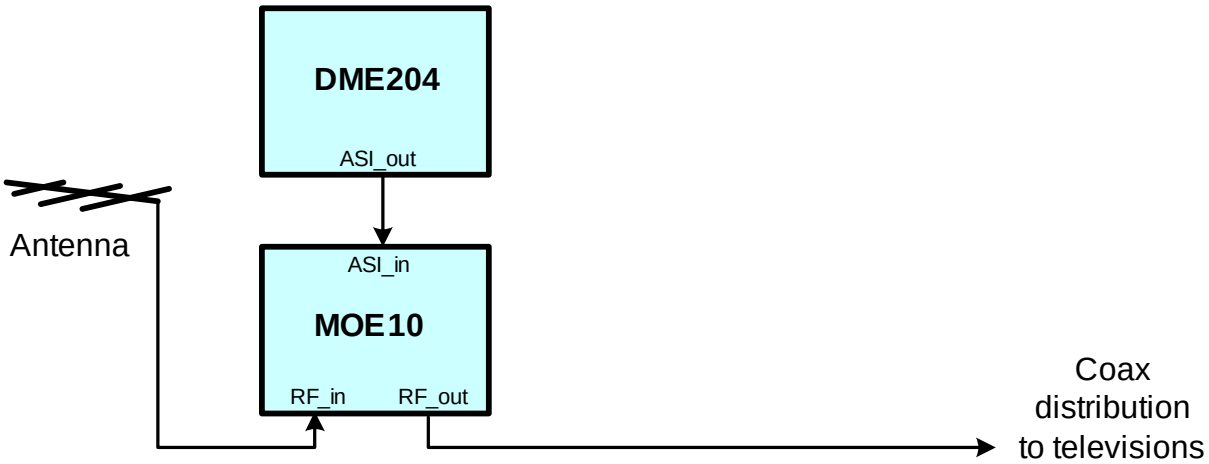
1. Introduction

The goal of this document is to describe how to properly configure a DME204 platform with an MOE system (RF modulator) in order to compose a private TV channel.

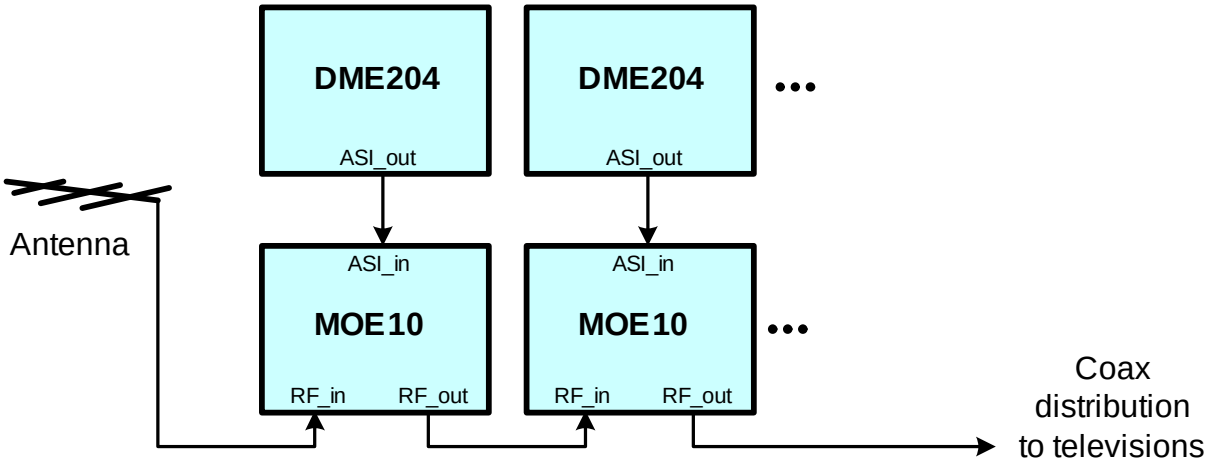
2. Different configurations

The Innes DME204 platform is a player-encoder able to produce a private TV channel (ASI format).
Connected to DVB-T modulator, the private TV channel can be broadcasted through DVB-T wired on-promises installation (coax).
The Innes MOE10 is a DVB-T modulator able to mix personal digital signage (ASI format) with television DVB-T channels (in UHF band).

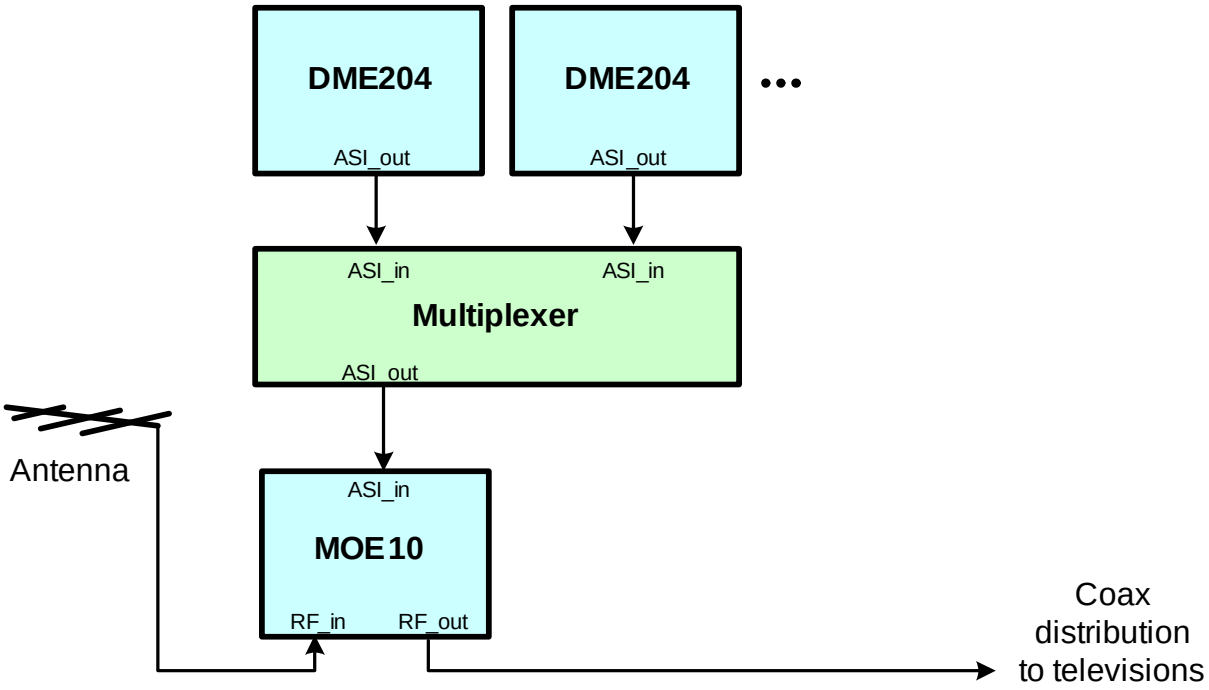
Example 1: Add one private TV channel to the television DVB-T programs:



Example 2: Add 2 (or more…) private TV channels to the television DVB-T programs:



Example 3: Add 2 (or more) private TV channels to television DVB-T programs:



The backwards of this solution compared to the example2:

- Requires an additional ASI multiplexer with several ASI inputs (can be costly)

The advantages of this solution compared to the example2:

- Requires only one MOE10 system
- Can multiplex as much new private TV channels as there is multiplexer ASI inputs
- Uses only one RF channel (UHF), so can be easily inserted is the existing television DVB-T network

On the following part of the document, example 2 is used as reference for the system configuration.

3. DVB-T basis

The DVB-T network is composed of different multiplex situated at different frequencies and each multiplex includes several services of video/audio and data.

Below is an example of a multiplex table at a precise location (Saint-Pern, Bretagne, France), where we can see that the R6 multiplex frequency (containing TF1, ARTE, TMC, NRJ12) is 498MHz:

CHAINES GRATUITES : diffusées en mpeg2 SD (vert) et en mpeg4 HD (gris)					
NUMERO	CHAINE	MULTIPLEX	CANAL	FREQUENCE	LANCEMENT
1	TF1	R6	24	498,166	31/03/05
2	FRANCE2	R1	21	474,166	31/03/05
3	FRANCE3	R1	21	474,166	31/03/05
5	FRANCE5	R1	21	474,166	31/03/05
6	M6	R4	49	698,166	31/03/05
7	ARTE	R6	24	498,166	31/03/05
8	DIRECT8	R2	40	626,166	31/03/05
9	W9	R4	49	698,166	31/03/05
10	TMC	R6	24	498,166	31/03/05
11	NT1	R4	49	698,166	31/03/05
12	NRJ12	R6	24	498,166	31/03/05
13	LCP-AN / PS (2)	R1	21	474,166	31/03/05
14	FRANCE4	R2	40	626,166	31/03/05
15	BFM TV	R2	40	626,166	28/11/05
16	I-TELE	R2	40	626,166	14/10/05
17	VIRGIN 17	R2	40	626,166	17/10/05
18	GULLI	R2	40	626,166	18/11/05
19	FRANCE Ô	R1	21	474,166	15/06/10
20	TV RENNES 35	R1	21	474,166	13/09/07
51	TF1 HD	R5	37	602,166	30/10/08
52	FRANCE2 HD	R5	37	602,166	30/10/08
56	M6 HD	R5	37	602,166	30/10/08
57	ARTE HD	R4	49	698,166	30/10/08

DVB standard specifies a service unique identification determined by 3 identifiers:

- **network_id**: unique identifier for DVB-T network in a given country (for example, in France, the number is 0x20FA)
- **transport_stream_id**: identifier for each multiplex in a given country
- **service_id**: unique identifier for each service, but can be used for local variations of the same service

Example in France:

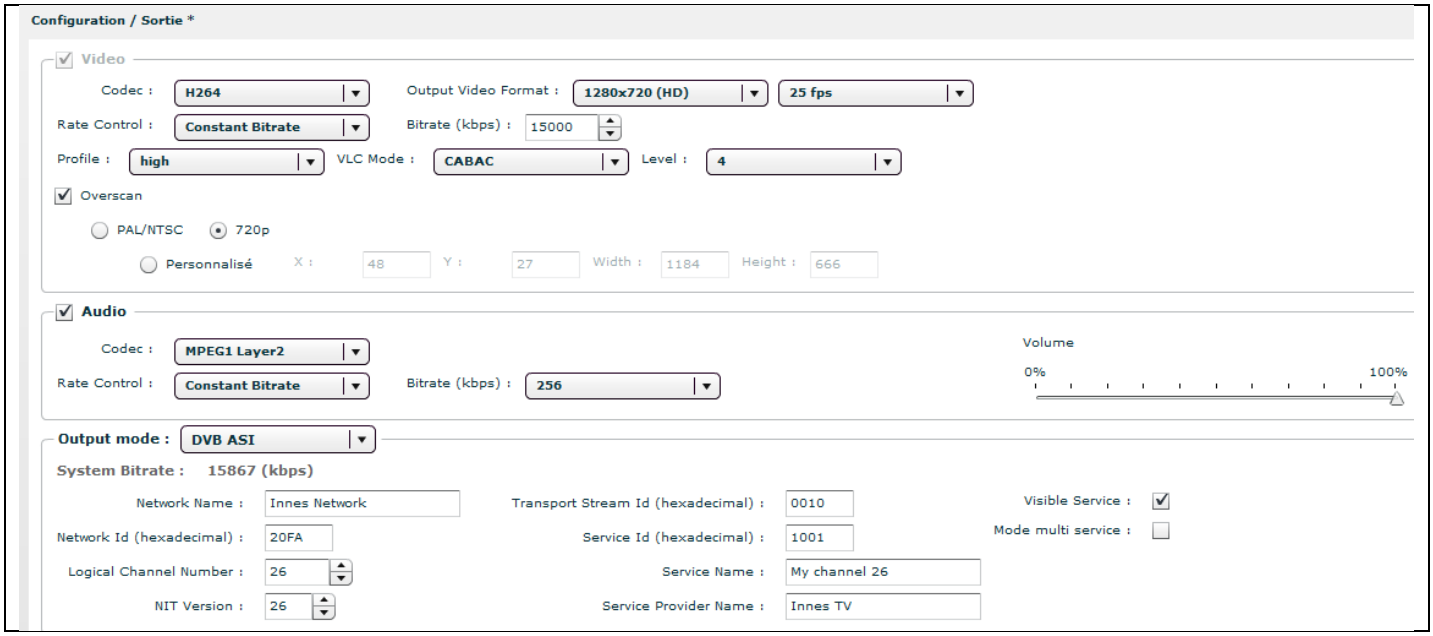
Multiplex	transport_stream_id	service_id (values range)
R1	0x0001	0x0101 to 0x01EF
R2	0x0002	0x0201 to 0x02EF
R3	0x0003	0x0301 to 0x03EF
R4	0x0004	0x0401 to 0x04EF
R5	0x0005	0x0501 to 0x05EF
R6	0x0006	0x0601 to 0x06EF
R7	0x000A	0x0A01 to 0x0A0F
R8	0x000B	0x0B01 to 0x0B0F
L8	0x0008	0x0801 to 0x08EF
OM1	0x0021	0x2101 to 0x21EF
OM2	0x0022	0x2201 to 0X22EF

4. DME204 configuration

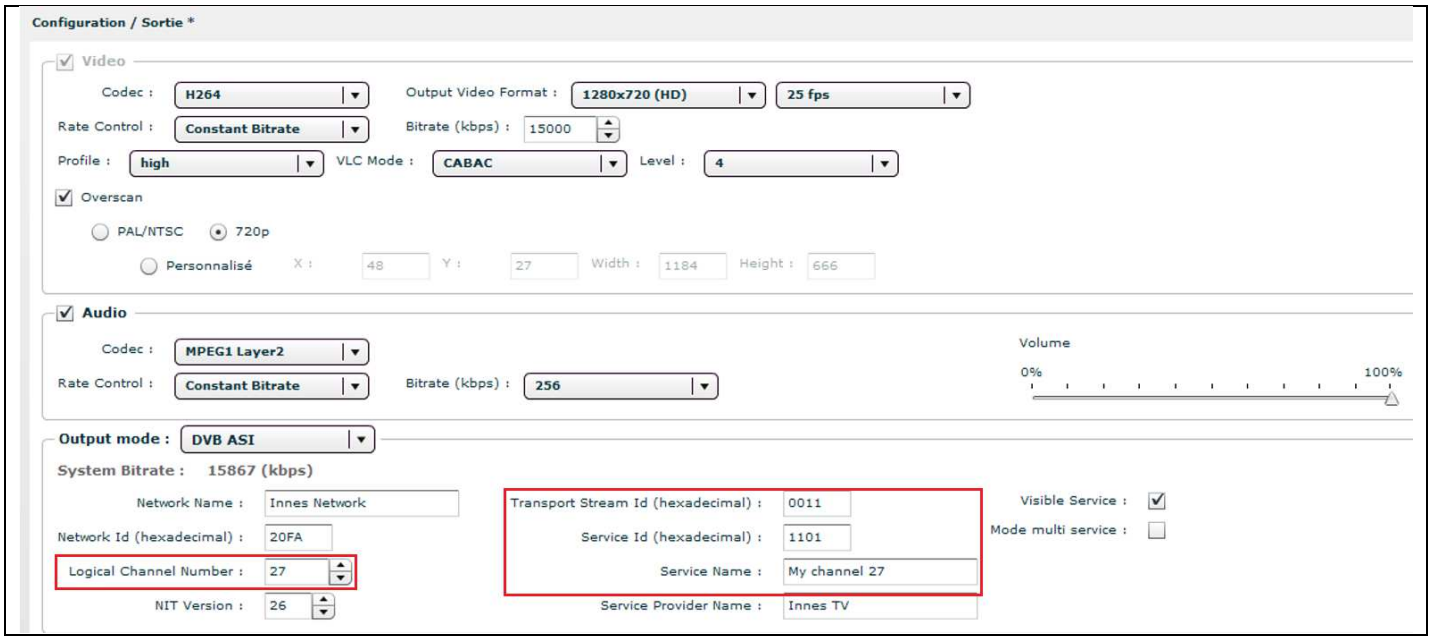
According to the previous paragraph, below is proposed a DME204 configuration (as described in example 2).
In order to not face DVB-T channels conflicts, you can configure the DME204 like described below:

	Transport Stream Id	Service Id (video)	Logical Channel Number
DME204 n°1	0x0010	0x1001	26
DME204 n°2	0x0011	0x1101	27

DME204 n°1



DME204 n°2



In the section 'Output Mode', other parameters permit to configure:

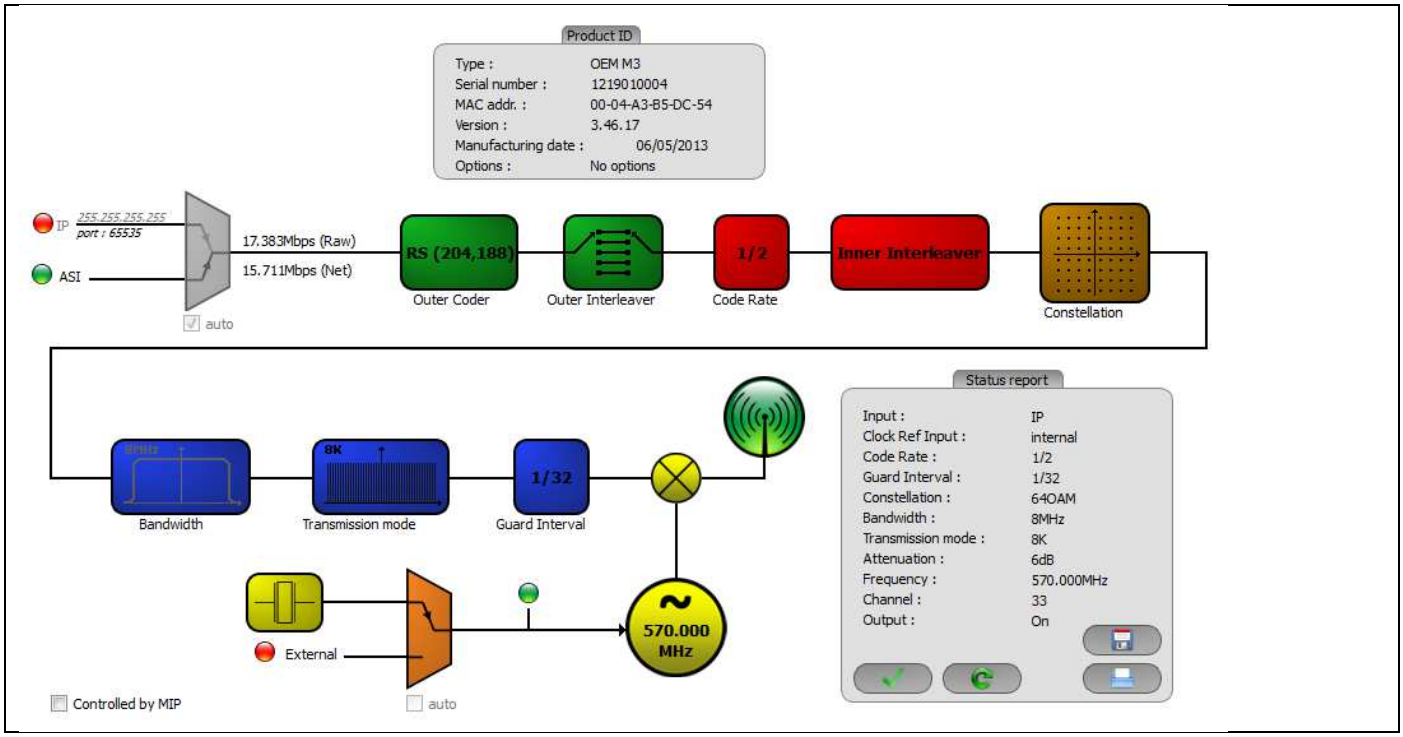
- **Network Name**: any label you want (this label is not visible in the standard cases)
- **Logical channel number**: channel number used on the TV set (must be different of already existing number, else you could face zapping issue with TV set).
- **NIT version (Network Information Table version)**: permits for a broadcaster to launch a channel rescan of television(s) each time the NIT version is changing. A television should propose the user to launch a rescan when the NIT version is not up-to-date.
- **Service Name**: label shown on the TV set when you select the channel.
- **Service Provider Name**: label shown on the TV set during the channel scanning.
- **System bitrate:** overall bitrate estimation of multiplex (sum of audio bitrate + video bitrate + signalization table's bitrate). When you are configuring DVB-T modulator, this parameter need to be adjusted in order to be in line with the maximum bandwidth of your multiplex (cf. next paragraph).

5. MOE10 configuration

The DVB-T modulator must be configured to be able to transmit properly the multiplex, especially the modulation modes (64QAM, code rate), which changes the ability for the receiver to correct different noises from the RF environment.

Note:

The more you protect the data flow, the less you can transmit useful bitrate. In a wired environment, the noises sources are very poor, and you can select the mode which permits to obtain the higher useful bitrate (64QAM, code rate 7/8).



IMPORTANT

The output frequency is one of the most important parameter: a “free” frequency in the UHF band has to be chosen (potentially an additional margin of +/-166KHz can be taken to avoid to face interferences with neighbor frequencies)

For example, with a standard bandwidth of 8 MHz, take care to choose a MOE10 frequency at 8MHz at least far from the next (or previous) used multiplex frequency.

- Frequency:
  - ✓ UHF IV et V (474MHz – 858MHz),

Example of modulation configuration

- Code rate: 7/8
- Constellation: 64QAM
- Guard interval: 1/32
- Transmission mode : 8K (TNT France)
- Channel bandwidth: 8 MHz (TNT France)

Here is a table of useful bitrate (DVB-T standard) depending on modulation parameters.

The useful bitrate must be higher than the system bitrate given by DME204 (data stuffing will be automatically inserted)

Table 17: Useful bitrate (Mbit/s) for all combinations of guard interval, constellation and code rate for non-hierarchical systems for 8 MHz channels (irrespective of the transmission modes)

Modulation	Code rate	Guard interval			
		1/4	1/8	1/16	1/32
QPSK	1/2	4,98	5,53	5,85	6,03
	2/3	6,64	7,37	7,81	8,04
	3/4	7,46	8,29	8,78	9,05
	5/6	8,29	9,22	9,76	10,05
	7/8	8,71	9,68	10,25	10,56
16-QAM	1/2	9,95	11,06	11,71	12,06
	2/3	13,27	14,75	15,61	16,09
	3/4	14,93	16,59	17,56	18,10
	5/6	16,59	18,43	19,52	20,11
	7/8	17,42	19,35	20,49	21,11
64-QAM	1/2	14,93	16,59	17,56	18,10
	2/3	19,91	22,12	23,42	24,13
	3/4	22,39	24,88	26,35	27,14
	5/6	24,88	27,65	29,27	30,16
	7/8	26,13	29,03	30,74	31,67