

Mobile World Congress 2008

ABERTIS TELECOM

Official Mobile TV network provider

**Information & Technical Parameters for
DVB-H Receiver Manufacturers**

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 **MOBILE.**
WORLD CONGRESS

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Abertis Telecom network parameters information for Mobile World Congress

1. Object

The object of this document is to provide information to the receiver manufacturers about all the technical parameters of the DVB-H emissions that are going to take place in Barcelona during the Mobile World Congress 2008.

2. Introduction

The Mobile World Congress will take place in Barcelona the 11-14 of February 2008. The event will be performed in Fira de Barcelona with the following address:

Fira de Barcelona – Montjuïc
 Avinguda Reina Maria Cristina, s/n
 08004 Barcelona
 Spain

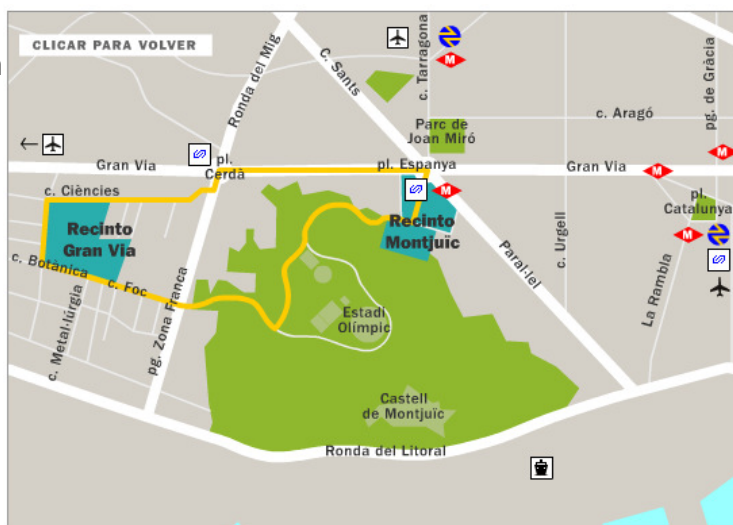


Fig 1. La Fira Barcelona.

Abertis Telecom, the main broadcast network operator in Spain, is the Official Mobile TV Network Provider of the event.

Abertis Telecom will have at one's disposal a technical area room where all the platform head end, equipments, content aggregations signals and distribution equipments will be centralized. This room is located in hall 6. See fig.2 .

The organization has communicated that the on-site installation in the congress can begin one week before the event.

From there, all the signals will be already encapsulated in a ready to transmit format and sent to the roof of the building from where it will be broadcasted. This year, the signals will be distributed also to several buildings to ensure indoor coverage.



Fig.2 Fira Barcelona Hall 7 location

3. Infrastructure Description

3.1. Broadcast Network

The DVB-H network is composed of four dedicated DVB-H multiplex, one for each of the platform providers. Abertis Telecom will provide indoor and outdoor coverage to the fairground. The transmitters will be compliant with the DVB-H Standard EN 302 304 [1].

The four DVB-H platforms are the following:

| Platform Name | Platform Manufacturer | Coverage |
|---------------|-----------------------|----------------------|
| Nokia | Nokia (v3.2) | City Wide + Congress |
| NSN | NSN (v3.3) | Congress |
| Thomson | Thomson | Congress |
| Alcatel | Alcatel | Congress |

3.2. Network Parameters

| Platform Provider | Channel | Frequency | Cell ID | Platform ID | Network Name | TS ID | ESG Provider Id | Service ID range |
|-------------------|---------|-----------|---------|-------------|------------------|-------|-----------------|------------------|
| Nokia | 22 | 482 | 1 | 0xFFFF001 | ABERTISTELECOM_1 | 22200 | 1 | 36600- 36649 |
| NSN | 28 | 530 | 2 | 0xFFFF002 | ABERTISTELECOM_2 | 22201 | 2 | 36660- 36699 |
| Alcatel | 30 | 546 | 3 | 0xFFFF003 | ABERTISTELECOM_3 | 22202 | 3 | 36760-36799 |
| Thomson | 42 | 642 | 4 | 0xFFFF004 | ABERTISTELECOM_4 | 22203 | 4 | 36700- 36749 |

For all the platforms:

| PSI/SI Parameter | Value |
|-----------------------------|-----------------|
| Original Network ID | 8916 |
| Network ID | 12780 |
| Demo Platform Name | Abertis Telecom |
| Demo Platform Provider Name | Abertis Telecom |

3.3. Physical parameters

| Parameter | Value |
|----------------|----------------------------|
| Band | UHF |
| Network | SFN (dedicated MUX) |
| Bandwidth | 8 MHz |
| Mode | 8k |
| Modulation | QPSK (non hierarchical) |
| Code Rate | 1/2 |
| Guard Interval | 1/8 |
| TPS Signaling | DVB-H signaling Cell Id |

The total channel capacity for the proposed network configuration is of **5.53 Mbps** (without MPE-FEC). Each platform provider will decide if MPE-FEC is applied to the services attending the channel capacity.

3.4. Video channel

Abertis Telecom will provide the baseband video channels. The initial program selection is the following but changes may change depending on platform provider.

| | Channel | Feed | Language | Audio | content |
|----|------------------------------|-------|----------|---|---------------------|
| 1 | 24h TVE | DTT | Spanish | 1 audio | news |
| 2 | Vevo (Sony Entertainment TV) | DTT | Spanish | 2 audios (Spanish / English (movies)) | TV films and comedy |
| 3 | | DTT | Spanish | 1 audio | generalist |
| 4 | | DTT | Spanish | 1 audio | generalist |
| 5 | | DTT | Spanish | 1 audio | generalist |
| 6 | | DTT | Spanish | 1 audio | music |
| 7 | | DTT | Spanish | 1 audio | sports |
| 8 | | DTT | Spanish | 1 audio | sports |
| 9 | | DTT | Spanish | 1 audio | generalist |
| 10 | | DTT | Spanish | 1 audio | generalist |
| 11 | | DTT | Catalan | 1 audio | generalist |
| | | | | 2 audios (Catalan / English (movies)) | TV films and comedy |
| 12 | Canal 300 | DTT | Catalan | (movies) | |
| 13 | Barça TV | SAT | Spanish | 1 audio | sports |
| 14 | CNN+ | DTT | Spanish | 1 audio | News |
| 15 | CNBC | SAT | English | 1 audio | News |
| 16 | 3GSM TV | local | | | |

The content selection for each platform will be assigned by Abertis Telecom ensuring Mobile World Congress media partners and sponsors inclusion.

Each channel will have no more than 16 services, where 10 services will be defined by Abertis Telecom, whereas the remaining capacity may be defined by platform operators that can include video, radio, applications or other added value services.

4. Platform Information

4.1. Platform Configuration

4.1.1. PSI/SI Signalling

Compliant with TS 102 470 [2]

| Repetition Rate | Value |
|-----------------|----------|
| NIT | < 10s |
| PAT | ≤ 100 ms |
| PMT | ≤ 100 ms |
| INT | ≤ 10s |

The recommended capacity reserved for PSI/SI is 300 kbps.

4.1.2. MPE-FEC Parameters

The parameters from Nokia 3.2 platform are:

| Parameter | Value |
|-------------------------|------------|
| MPE-FEC Code Rate | 15% |
| Burst Duration | ~150 ms |
| Burst Size | < 2 Mbit |
| Peak Bit Rate per Burst | ~ 5.5 Mbps |
| MPE-FEC Rows | 512 |

The parameters from NSN platform are:

| Parameter | Value |
|-------------------------|-----------|
| MPE-FEC Code Rate | 0% |
| Burst Duration | ~120 ms |
| Burst Size | < 4 Mbps |
| Peak Bit Rate per Burst | ~5.3 Mbps |
| MPE-FEC Rows | 512 |

The parameters from Thomson platform are:

| Parameter | Value |
|-------------------------|-------|
| MPE-FEC Code Rate | 3/4 |
| Burst Duration | |
| Burst Size | |
| Peak Bit Rate per Burst | |
| MPE-FEC Rows | 512 |

The parameters from Alcatel platform are:

| Parameter | Value |
|-------------------------|-------|
| MPE-FEC Code Rate | 10% |
| Burst Duration | |
| Burst Size | |
| Peak Bit Rate per Burst | |
| MPE-FEC Rows | 256 |

The maximum receiver synchronization time should be 100 ms.

Maximum delta_T jitter of 10 ms [5]

4.1.3. Detailed Service Parameters

The parameters from Nokia 3.2 platform are:

| Service | PID | Rows | MPE-FEC | Burst length | Average Bit rate | Description |
|------------|------|------|---------|--------------|------------------|-------------|
| Main ESG | 1100 | 512 | 3/4 | ~150 ms | ~350 kbps | ESG |
| Program 1 | 1200 | 512 | 3/4 | ~150 ms | ~390 kbps | TV |
| Program 2 | 1300 | 512 | 3/4 | ~150 ms | ~390 kbps | TV |
| Program 3 | 1400 | 512 | 3/4 | ~150 ms | ~390 kbps | TV |
| Program 4 | 1500 | 512 | 3/4 | ~150 ms | ~390 kbps | TV |
| Program 5 | 1600 | 512 | 3/4 | ~150 ms | ~390 kbps | TV |
| Program 6 | 1700 | 512 | 3/4 | ~150 ms | ~390 kbps | TV |
| Program 7 | 1800 | 512 | 3/4 | ~150 ms | ~390 kbps | TV |
| Program 8 | 1900 | 512 | 3/4 | ~150 ms | ~390 kbps | TV |
| Program 9 | 2000 | 512 | 3/4 | ~150 ms | ~390 kbps | TV |
| Program 10 | 2000 | 512 | 3/4 | ~150 ms | ~390 kbps | TV |
| Program 11 | 2100 | 512 | 3/4 | ~150 ms | ~390 kbps | TV |
| | | | | | | |

| Service | IP Version | Multicast Address | RTP/UDP ports | PID | Average Bitrate | Codec | Description |
|------------|------------|-------------------|---------------|-----------|-----------------|------------|-------------|
| Main ESG | IPV6 | 224.0.23.14 | 9214 | | | | |
| BCAST ESG | IPV6 | | | | | | |
| OAI ESG | IPV6 | | | | | | |
| Program 1 | IPV6 | 232.1.1.0 | 11000 | 1100-1199 | ~390 kbps | h264 / AAC | |
| Program 2 | IPV6 | 232.1.2.0 | 12000 | 1200-1299 | ~390 kbps | h264 / AAC | |
| Program 3 | IPV6 | 232.1.3.0 | 13000 | 1300-1399 | ~390 kbps | h264 / AAC | |
| Program 4 | IPV6 | 232.1.4.0 | 14000 | 1400-1499 | ~390 kbps | h264 / AAC | |
| Program 5 | IPV6 | 232.1.5.0 | 15000 | 1500-1599 | ~390 kbps | h264 / AAC | |
| Program 6 | IPV6 | 232.1.6.0 | 16000 | 1600-1699 | ~390 kbps | h264 / AAC | |
| Program 7 | IPV6 | 232.1.7.0 | 17000 | 1700-1799 | ~390 kbps | h264 / AAC | |
| Program 8 | IPV6 | 232.1.8.0 | 18000 | 1800-1899 | ~390 kbps | h264 / AAC | |
| Program 9 | IPV6 | 232.1.9.0 | 19000 | 1900-1999 | ~390 kbps | h264 / AAC | |
| Program 10 | IPV6 | 232.1.10.0 | 20000 | 2000-2099 | ~390 kbps | h264 / AAC | |
| Program 11 | IPV6 | 232.1.11.0 | 21000 | 2100-2199 | ~390 kbps | h264 / AAC | |
| | | | | | | | |

The parameters from NSN platform are:

| Service | PID | Rows | MPE-FEC | Burst length | Average Bit rate | Description |
|-----------|-----|------|---------|--------------|------------------|-------------|
| BCAST ESG | 100 | 512 | 15% | 120 ms | ~400 kbps | |
| Program1 | 101 | 512 | 0 | 120 ms | ~390 kbps | CBR |
| Program2 | 102 | 512 | 0 | 120 ms | ~390 kbps | CBR |
| Program3 | 103 | 512 | 0 | 120 ms | ~390 kbps | CBR |
| Program4 | 104 | 512 | 0 | 120 ms | ~390 kbps | CBR |
| Program5 | 105 | 512 | 0 | 120 ms | ~390 kbps | CBR |
| Program6 | 106 | 512 | 0 | 120 ms | ~390 kbps | CBR |
| Program7 | 107 | 512 | 0 | 120 ms | ~390 kbps | CBR |
| Program8 | 108 | 512 | 0 | 120 ms | ~370 kbps | Statmux |
| Program9 | 109 | 512 | 0 | 120 ms | ~370 kbps | Statmux |
| Program10 | 110 | 512 | 0 | 120 ms | ~370 kbps | Statmux |
| Program11 | 111 | 512 | 0 | 120 ms | ~370 kbps | Statmux |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| Service | IP Version | Multicast Address | RTP/UDP ports | PID | Average Bitrate | Codec | Description |
|-------------|------------|-------------------|---------------|-----|-----------------|------------|-------------|
| BCAST ESG | IPV4 | 232.0.1.0 | 9214 | | ~400 kbps | | |
| Esg SESSION | IPV4 | 232.0.2.0 | 9000-9100 | | | | |
| Program1 | IPV4 | 232.0.3.0 | 10100 | | ~390 Kbps | h264 / AAC | CBR |
| Program2 | IPV4 | 232.0.4.0 | 10200 | | ~390 Kbps | h264 / AAC | CBR |
| Program3 | IPV4 | 232.0.5.0 | 10300 | | ~390 Kbps | h264 / AAC | CBR |
| Program4 | IPV4 | 232.0.6.0 | 10400 | | ~390 Kbps | h264 / AAC | CBR |
| Program5 | IPV4 | 232.0.7.0 | 10500 | | ~390 Kbps | h264 / AAC | CBR |
| Program6 | IPV4 | 232.0.8.0 | 10600 | | ~390 Kbps | h264 / AAC | CBR |
| Program7 | IPV4 | 232.0.9.0 | 10700 | | ~390 Kbps | h264 / AAC | CBR |
| Program8 | IPV4 | 232.0.10.0 | 10800 | | ~370 Kbps | h264 / AAC | Statmux |
| Program9 | IPV4 | 232.0.11.0 | 10900 | | ~370 Kbps | h264 / AAC | Statmux |
| Program10 | IPV4 | 232.0.12.0 | 11000 | | ~370 Kbps | h264 / AAC | Statmux |
| Program11 | IPV4 | 232.0.13.0 | 11100 | | ~370 Kbps | h264 / AAC | Statmux |

The parameters from Thomson platform are:

| Service | PID | Rows | MPE-FEC | Burst length | Average Bit rate | Description |
|---------------|-----|------|---------|--------------|------------------|-------------|
| Service 1 | 101 | 512 | 3/4 | | 220 | QVGA |
| Service 2 | 102 | 512 | 3/4 | | 220 | QVGA |
| Service 3 | 103 | 512 | 3/4 | | 220 | QVGA |
| Service 4 | 104 | 512 | 3/4 | | 220 | QVGA |
| Service 5 | 105 | 512 | 3/4 | | 220 | QVGA |
| Service 6 | 106 | 512 | 3/4 | | 220 | QVGA |
| Service 7 | 107 | 512 | 3/4 | | 220 | QVGA |
| Service 8 | 108 | 512 | 3/4 | | 220 | QVGA |
| ESG Bootstrap | 200 | | | | | |
| CBMS ESG | 200 | | | | | |
| OMA ESG | 200 | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| Service | IP Version | Multicast Address | RTP/UDP ports | PID | Average Bitrate | Codec | Description |
|---------------|------------|--|---------------|-----|-----------------|-------|-------------|
| Service 1 | | 239.1.1.1 | 4000 | | | | |
| Service 2 | | 239.1.1.2 | 4000 | | | | |
| Service 3 | | 239.1.1.3 | 4000 | | | | |
| Service 4 | | 239.1.1.4 | 4000 | | | | |
| Service 5 | | 239.1.1.5 | 4000 | | | | |
| Service 6 | | 239.1.1.6 | 4000 | | | | |
| Service 7 | | 239.1.1.7 | 4000 | | | | |
| Service 8 | | 239.1.1.8 | 4000 | | | | |
| ESG Bootstrap | | 224.0.23.14 | 9214 | | | | |
| CBMS ESG | | 226.1.1.2 226.1.1.3 226.1.1.4 235.1.2.3 | 3937 | | | | |
| OMA ESG | | 235.1.2.4 235.1.2.5 | 9214 | | | | |
| | | | | | | | |

4.1.4. Video and Audio Formats

The parameters from Nokia 3.2 platform are:

| Parameter | Value |
|--------------------------|----------------------------------|
| Video Codec | H.264AVC |
| Profile | Baseline, Simple, Level 1.2, 1.3 |
| Picture Size | QVGA, 320x240 |
| Frame Rate | 12.5,15,25 fps |
| Max Bit Rate | 384 kbps |
| Preferred Bit Rate | 300 kbps |
| Video Encapsulation | RTP, RFC 3984 |
| Audio Codec | HE AACv1/v2 |
| Audio Format | Stereo |
| Audio Bit Rate | 24-64 kbps |
| Audio Sampling Frequency | 32-48 kHz |
| Audio Encapsulation | RTP, RFC 3640 |
| A/V Packetization Mode | Non-interleaved |

For Radio Services:

| Parameter | Value |
|--------------------------|-------------|
| Audio Codec | HE AACv1/v2 |
| Audio Format | |
| Audio Bit Rate | |
| Audio Sampling Frequency | |
| Audio Encapsulation | |
| A/V Packetization Mode | |

The parameters from NSN platform are:

| Parameter | Value |
|--------------------------|----------------|
| Video Codec | H.264AVC |
| Profile | |
| Picture Size | 320 x 240 QVGA |
| Frame Rate | 15 fps |
| Max Bit Rate | 320 Kbps |
| Preferred Bit Rate | |
| Video Encapsulation | RTP |
| Audio Codec | HE AACv1/v2 |
| Audio Format | Stereo |
| Audio Bit Rate | 64 kbps |
| Audio Sampling Frequency | 32 Hz |
| Audio Encapsulation | |
| A/V Packetization Mode | |

For Radio Services:

| Parameter | Value |
|--------------------------|-------------|
| Audio Codec | HE AACv1/v2 |
| Audio Format | |
| Audio Bit Rate | |
| Audio Sampling Frequency | |
| Audio Encapsulation | |
| A/V Packetization Mode | |

The parameters from Thomson platform are:

| Parameter | Value |
|--------------------------|--------------|
| Video Codec | H.264AVC |
| Profile | |
| Picture Size | 320x240 QVGA |
| Frame Rate | 25 |
| Max Bit Rate | |
| Preferred Bit Rate | 220kbps |
| Video Encapsulation | |
| Audio Codec | AAC-HEV1 |
| Audio Format | stereo |
| Audio Bit Rate | 32kbps |
| Audio Sampling Frequency | 24 |
| Audio Encapsulation | |
| A/V Packetization Mode | |

For Radio Services:

| Parameter | Value |
|--------------------------|-------------|
| Audio Codec | HE AACv1/v2 |
| Audio Format | |
| Audio Bit Rate | |
| Audio Sampling Frequency | |
| Audio Encapsulation | |
| A/V Packetization Mode | |

The parameters from Alcatel platform are:

| Parameter | Value |
|--------------------------|----------------|
| Video Codec | H.264AVC |
| Profile | ISMA Profile 2 |
| Picture Size | 320x240 QVGA |
| Frame Rate | 25 |
| Max Bit Rate | 330kbps |
| Preferred Bit Rate | 300kbps |
| Video Encapsulation | |
| Audio Codec | MPEG-4 AAC |
| Audio Format | stereo |
| Audio Bit Rate | 32kbps |
| Audio Sampling Frequency | 24 |
| Audio Encapsulation | |
| A/V Packetization Mode | |

For Radio Services:

| Parameter | Value |
|--------------------------|-------------|
| Audio Codec | HE AACv1/v2 |
| Audio Format | |
| Audio Bit Rate | |
| Audio Sampling Frequency | |
| Audio Encapsulation | |
| A/V Packetization Mode | |

4.1.5. ESG

The broadcast ESG should be compliant with specification [3], [10] and [16].

The parameters from Nokia 3.2 platform are:

| Parameter | Value |
|-----------------------|----------------|
| Data Model | OMA BCAST- OAI |
| Transport | ALC/FLUTE |
| Bootstrap IP Address | 224.0.23.14 |
| Bootstrap Port Number | 9214 |
| ESG Provider ID | 1 |

The parameters from NSN platform are:

| Parameter | Value |
|-----------------------|-------------|
| Data Model | OMA BCAST |
| Transport | ALC/FLUTE |
| Bootstrap IP Address | 224.0.23.14 |
| Bootstrap Port Number | 9214 |
| ESG Provider ID | 2 |

The parameters from Alcatel platform are:

| Parameter | Value |
|-----------------------|-------------|
| Data Model | |
| Transport | |
| Bootstrap IP Address | 224.0.23.14 |
| Bootstrap Port Number | |
| ESG Provider ID | 3 |

The parameters from Thomson platform are:

| Parameter | Value |
|-----------------------|-------------|
| Data Model | OMA BCAST |
| Transport | ALC/FLUTE |
| Bootstrap IP Address | 224.0.23.14 |
| Bootstrap Port Number | 9214 |
| ESG Provider ID | 4 |

4.1.6. Applications

Compliant with TS 102 472 [4]

5. Test Facilities

Abertis telecom will provide some test facilities in their laboratories in order to check the signals and the interoperability before the beginning of the event. In other hand, Abertis will also provide test string of all the platforms available in the ftp site. The information to access to the FTP site is the following. The directory to download is SW_OUT3 in the following address.

Address: ftp://SWD_3:san_8264@195.77.241.164/SW

6. Interoperability Tests

Interoperability among all Platform Providers and Receivers is the main objective of Abertis Telecom. Any receiver manufacturer is invited to attend and perform interoperability tests in the Abertis Technical Room. Abertis Telecom will cooperate with BMCO forum to guarantee interoperability among all the platform providers and receivers.

Contact information for this issue is (luis.moreno@abertistelecom.com)

7. Receiver Performance

The performance of the reference receiver should be in accordance with the corresponding DVB-H Implementation Guidelines [5].

8. Contact Information

Abertis Telecom contact details are :

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9. References

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 "Bmco**forum** Recommendation for Implementation Profile. Launch Profile Version Sep 30, 2007"

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10. Revision history

| <i>Document version</i> | <i>Author</i> | <i>Change Description</i> |
|-------------------------|--------------------|---|
| v1.0 | Luis Moreno Fraile | First Version |
| V2.0 | Luis Moreno Fraile | Platforms parameters added |
| V3.0 | Luis Moreno Fraile | Change IP version in Nokia platform |
| V3.1 | Luis Moreno Fraile | Update video bitrates in Nokia platform |
| V3.2 | Luis Moreno Fraile | Update Thomson comments |
| | | |
| | | |