

**Practical Principle and  
Technical Standards  
Addendum 3 to DAB+ Plan  
(DAB+ Call Signs and  
SId Codes)**

**Deliverable No. 3-A3**



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## Notice

This document is provided in good faith and is based on the Consultants' understanding of the NBTC's Radio Frequency Plan Project requirements. We would be pleased to discuss the contents of this document with you, particularly if NBTC's requirements have in any way changed.

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**Rev. No.: 3    Date: 11.05.2015**

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## **1. Summary**

The Office of the National Broadcast and Telecommunications Commission, hereinafter referred to as “NBTC”, has the mandate to implement and promote the Thai Government’s policy objectives for the broadcast and telecommunications sector in Thailand, and to establish and monitor the regulatory frameworks and to provide guidance for the telecommunications and broadcast industry.

The NBTC has entrusted LS telcom Limited, hereinafter referred to as the “Consultant”, with the task to conduct this Radio Frequency Plan Project.

This Addendum 3 to the Practical Principle and Technical Standards for DAB+ National and Local Planning report includes the Consultant’s recommendation in respect to the usage of Call Signs and Sid Code for the DAB+ system in Thailand.

## 2. Call Signs for DAB+

NBTC has requested LS telcom to provide a recommendation for the usage of Call Signs and Pi codes for DAB+ in Thailand. The Consultant would like to note that these features are more relevant to the FM service.

The Call Sign usage in FM broadcasting is used to define a unique identifier for each radio license (each frequency usage in each market) to one radio programme. If a FM broadcaster chooses to simulcast its programme on DAB+, it is recommended to use the same methodology as it is proposed for the FM Plan (Practical Principle and Technical standards for FM Planning), with the difference that the suffix **-DAB** should be used instead of **-FM**.

The Consultant recommends that these Call Signs are only used for administrative purposes, and for the generation of the Sid (see also section 3 in this report) as the license holder will most likely be using its own branding name as the station's label.

In order to define a unique Call Sign for each radio station, the Consultant has also considered the FIPS Code (derived from the Federal Information Processing Standards) as defined by the Thailand National Statistical Office. The FIPS Code table is represented in Appendix A of this document.

In order to create a unique call sign for each DAB+ license, the Consultant has developed the following naming convention recommendation:

1. All broadcast station Call Signs should start with the prefix **"HS"**.
2. The next letter should usually be **"A"**, but in the FIPS area where many stations are located (like in Bangkok), the Consultant recommends to also make use of the letter **"B"**.
3. The next field would represent the FIPS code, e.g. **"40"** for the Bangkok province.
4. The next following field would be a letter from **"A"** to **"Z"** representing the FM stations in the province defined by the previous field. This letter is arbitrary and does not represent an increase or a position in the frequency band. If the number of stations in one province exceeds the number of 26 stations, the 3<sup>rd</sup> letter (see point #2 above) should be incremented from **"A"** to **"B"** and the letter of the field following the FIPS Code should be again a letter selected from the range **"A"** up to **"Z"**. To easily distinguish the type of station (e.g. commercial, community) it is recommended that for the field following the FIPS code, regular stations shall use letters in the ranges from **"A"** to **"F"**, while community stations should use **"G"** up to **"Z"**. Such an approach will ensure that the station type can be rapidly identified.
5. The unique call sign sequence should be completed with the suffix **"-DAB"**.

As an example, a station in Bangkok could have the following call sign number: **HSA40A-DAB**

Since it is unknown to the Consultant at this point which DAB+ station will go on-the-air, the Consultant could not provide a list of Call Sign numbers. As stations start using DAB+, the NBTC can make the next available Call Sign number, as shown in the respective table in Appendix B of the Practical Principle and Technical Standards for DAB+ Planning.

### 3. Service Identifier (SId) for DAB+

In DAB+, the SId is the equivalent of the PI code in FM-RDS. The complete definition of the SId is provided in section 6.3.1 of the specification ETSI EN 300 401 V1.4.1 (which can be downloaded on the ETSI web site, at: <http://www.etsi.org>).

The SId is a 16-bit or 32-bit field which identifies the service. Typically, DAB+ receivers will store the SId information related to each individual service in one ensemble in order to provide the channel browsing table. It should be noted that this table will be displayed using the information from the service label of each station. If one of this service is broken into sub-channels, the main SId remains the same. Over time, the service label might change, but each station (each license) must not modify its unique SId. If two different stations are using the same SId, DAB+ receivers will get confused and might have problems to tune to the correct service.

Since the default usage of the SId is defined as a 16-bit identifier (where the first 4 bits are used for the definition of the Country Code), the Consultant recommends that the FM PI Code generator should be used also as the SId code generator.

The following section presents the manual calculation of the SId:

- To calculate the SId, the Consultant proposes using the last 4 digits of the Call Sign:
  - i.e. for HSA40C-DAB: A40C.
  - Using 7 bits (128 possibilities) to encode the province code “40”.
    - 40 in binary = 0101 000
  - Using 5 bits (32 possibilities) to encode the station specific code, using this rule :
    - Use the 5 least significant bits for the last letter, where A = 0, B=1, ..., Z = 25
      - In our example: “C” = 00010
  - Only one province (Bangkok) has currently more than 26 stations. In order to ensure that each regular station has its unique PI code, the Consultant recommends that Bangkok is split in 2 province code areas:
    - 40: for “A” series (3<sup>rd</sup> digit of the call letter)
    - 80: for “B” series (80 in binary is: 101 0000)
    - If another province will have more than 26 stations in the future or if Bangkok will have more than 52 stations, the province codes 81 to 127 can be used as these codes are still unused.
  - The complete PI CODE in this example for HSA40C would then be as follows:
    - **1010 0101 0000 0010** (bin) or A502 (hex) or 42242 (dec)
    - Where:
      - **1010** : First bit “1” for reserved bit usage & 010-> “2” : reserved code for Extended Country Code usage (Thailand must use F3 for ECC, as per table 7:ITU Region 3 (Asia and Pacific) as described in the document ETSI TS 101 756 V1.6.1 (2014-05))
      - **0101 000** : 40, province code for Thailand

- 0 0010 : 2, representing "C"
- Another example for HSB40E, will be as follows:
  - 1010 1010 0000 0100 (bin) or AA04 (hex) or 43524 (dec)
- The Consultant has provided NBTC with an MS Excel based PI calculator that will help the NBTC to create the FM PI Code, which is fully compatible with the DAB+ Sid calculation.

## 4. References

The Consultant derived the presented recommendations on the following sources and documents that describe and define international specifications that are considered as the fundamental basis of the DAB and DAB+ technology:

- ETSI EN 300 401 Radio Broadcasting Systems; Digital Audio Broadcasting (DAB) to Mobile, Portable and Fixed receivers.
- ETSI TS 101 756 Digital Audio Broadcasting (DAB); Registered Tables.

At this point we would like to highlight that the ETSI standards are available and can be retrieved free of charge from the ETSI's website [www.etsi.org](http://www.etsi.org).



## Appendix A – FIPS Code for Thailand

The following table has been extracted from the web site: <http://www.statoids.com/uth.html>. This information was extracted from the Thai Census of 2000 (as explained in the web site).

Province	FIPS
Amnat Charoen	TH77
Ang Thong	TH35
Bangkok Metropolis	TH40
Bueng Kan	TH81
Buri Ram	TH28
Chachoengsao	TH44
Chai Nat	TH32
Chaiyaphum	TH26
Chanthaburi	TH48
Chiang Mai	TH02
Chiang Rai	TH03
Chon Buri	TH46
Chumphon	TH58
Kalasin	TH23
Kamphaeng Phet	TH11
Kanchanaburi	TH50
Khon Kaen	TH22
Krabi	TH63
Lampang	TH06
Lamphun	TH05
Loei	TH18
Lop Buri	TH34
Mae Hong Son	TH01
Maha Sarakham	TH24
Mukdahan	TH78
Nakhon Nayok	TH43
Nakhon Pathom	TH53
Nakhon Phanom	TH73
Nakhon Ratchasima	TH27
Nakhon Sawan	TH16
Nakhon Si Thammarat	TH64
Nan	TH04
Narathiwat	TH31
Nong Bua Lam Phu	TH79
Nong Khai	TH17
Nonthaburi	TH38
Pathum Thani	TH39
Pattani	TH69
Phangnga	TH61
Phatthalung	TH66
Phayao	TH41
Phetchabun	TH14
Phetchaburi	TH56

<b>Province</b>	<b>FIPS</b>
Phichit	TH13
Phitsanulok	TH12
Phrae	TH07
Phra Nakhon Si Ayutthaya	TH36
Phuket	TH62
Prachin Buri	TH74
Prachuap Khiri Khan	TH57
Ranong	TH59
Ratchaburi	TH52
Rayong	TH47
Roi Et	TH25
Sa Kaeo	TH80
Sakon Nakhon	TH20
Samut Prakan	TH42
Samut Sakhon	TH55
Samut Songkhram	TH54
Saraburi	TH37
Satun	TH67
Sing Buri	TH33
Si Sa Ket	TH30
Songkhla	TH68
Sukhothai	TH09
Suphan Buri	TH51
Surat Thani	TH60
Surin	TH29
Tak	TH08
Trang	TH65
Trat	TH49
Ubon Ratchathani	TH75
Udon Thani	TH76
Uthai Thani	TH15
Uttaradit	TH10
Yala	TH70
Yasothon	TH72
<b>65,981,659</b>	<b>513,120</b>