SUMATRONIC

Some of our customers

As well as various customers in:

m electronics MIGROS

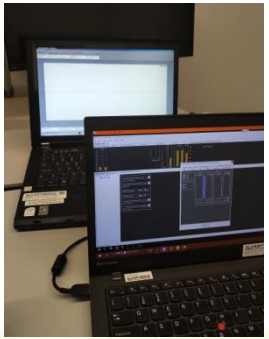
Our services

- Studio technology and infrastructure (construction and maintenance)




- Sound design






PHILIPS


OPTIMOD
OPTIMOD
OPTIMOD
FACTUM
FACTUM


power

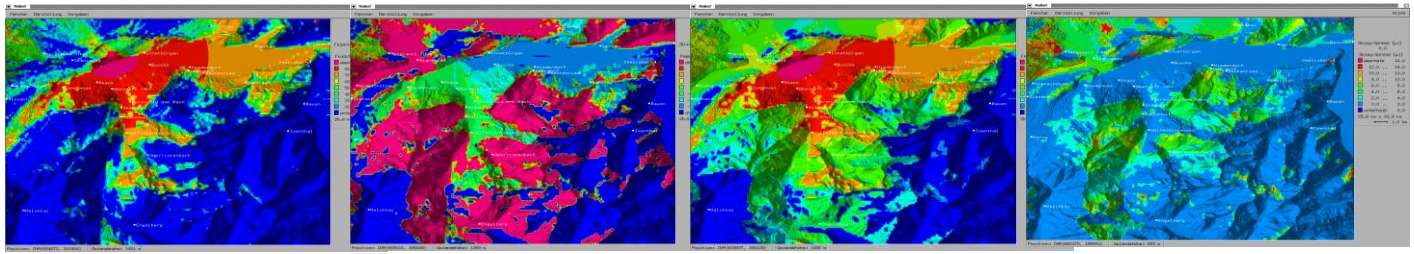

DRS
DRS



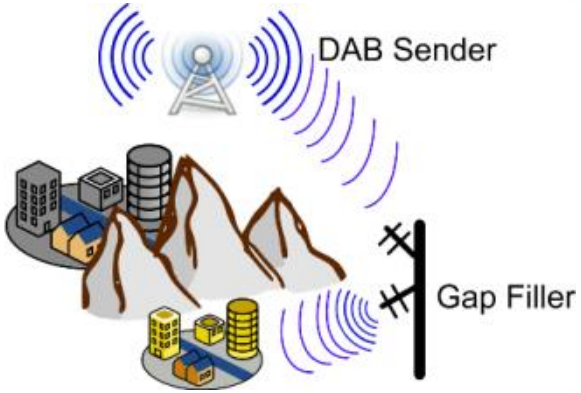






Everything around DAB+ and FM



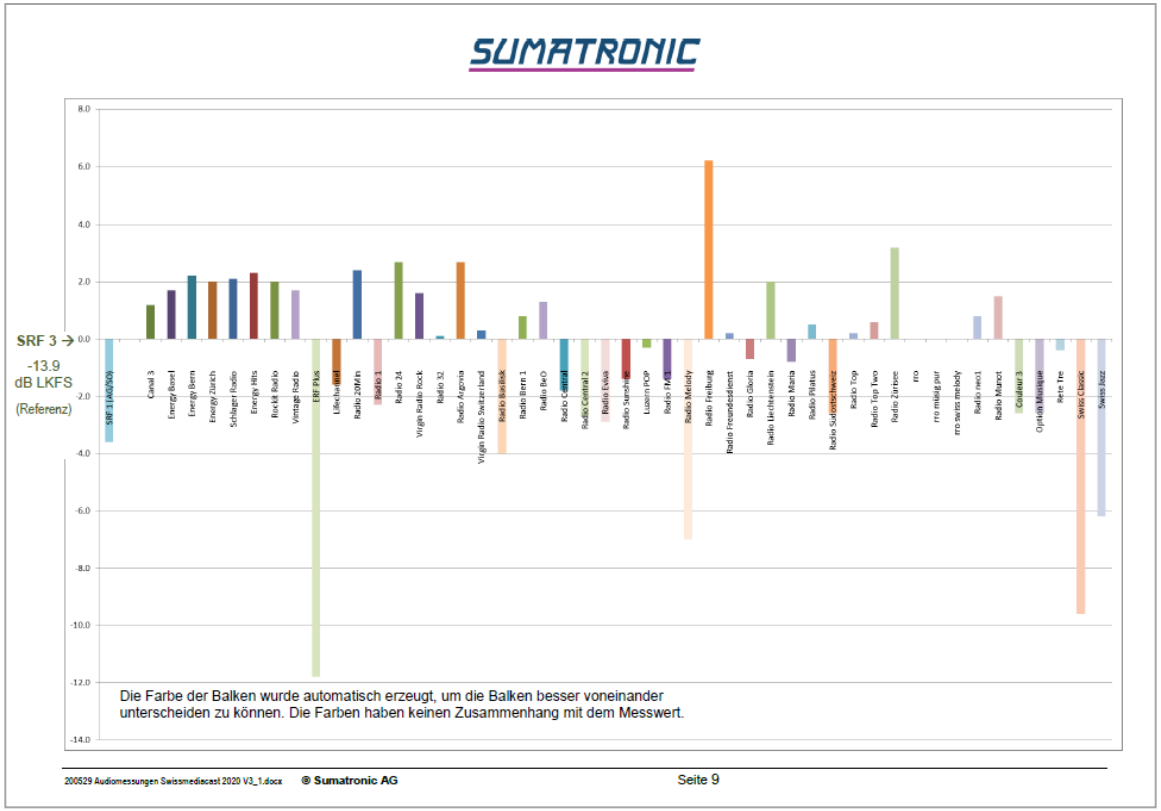
dab+

7/24h on-call / maintenance

SRG SSR · RadioCentral · SUNSHINE RADIO · FM1 · RADIO 32 · RadioL LIECHTENSTEIN verbindet · swiss media cast · RADIO EVIVA

Studies / Consultations for DAB

- Receiver tests
- Measurement report regarding reception
  (among others bit errors, field strengths)
- Optimizations of transmitter networks (SFN). RF and audio analyses
- Audio level comparisons in ensemble
- Many more



Ensemble Loudness Level Comparisons

Device testing report

SUMATRONIC

3.2 Geräte empfängerseitig

Diverse DAB+ Geräte unterschiedlicher Kategorien:

- Tisch- und Kleingeräte (portabel / fix)
- Autoradios
- Auto DAB+-Adapter

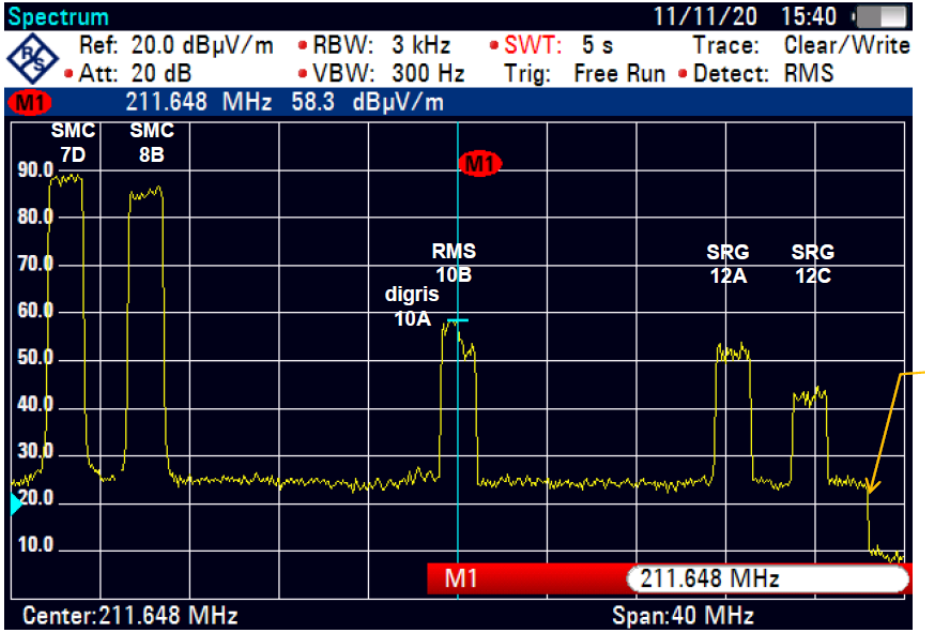
Es wurden bewusst auch ältere Geräte in die Tests einbezogen, weil sie im Markt vermutlich in relevanten Stückzahlen vorhanden sind.

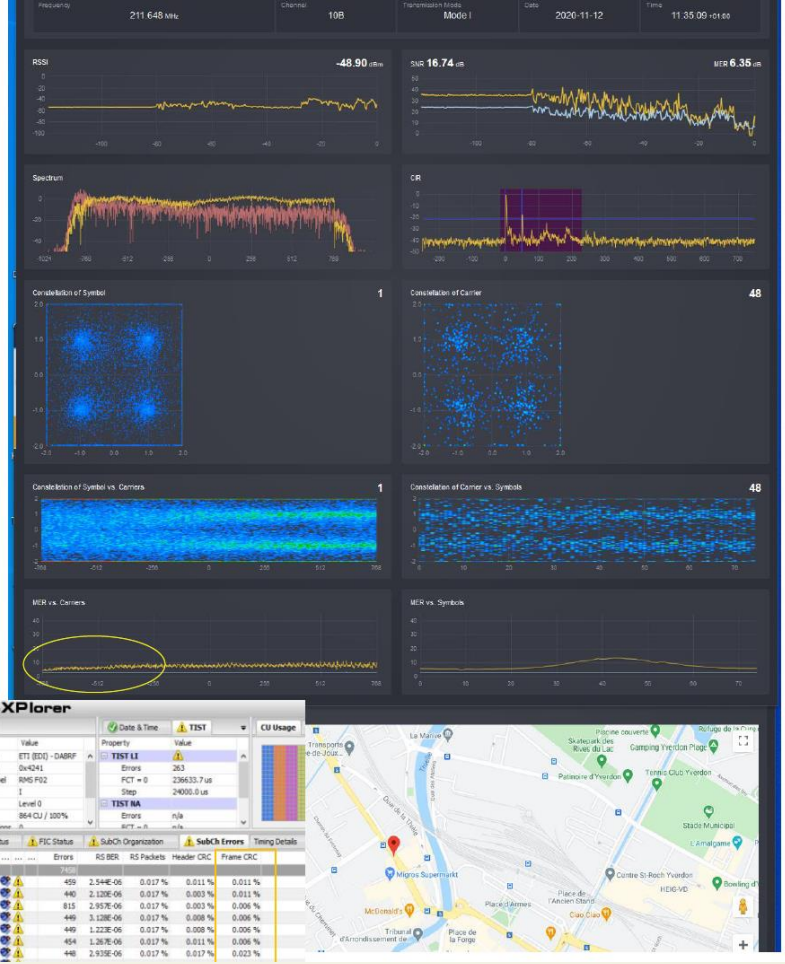
Es können noch zusätzliche DAB+ Geräte in den Test eingebunden werden, sofern wir diese innert der nächsten fünf Arbeitstage (oder nach Absprache) erhalten.

Nicht getestet haben wir selten gebrauchte DAB-Radio-Gattungen wie USB-Sticks…

4 Testergebnisse

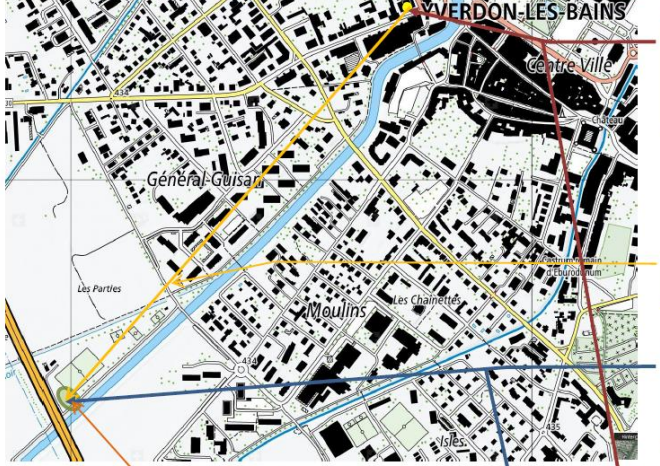
Gerät	Test / Verhalten des Empfängers				Bemerkungen
Marke / Typ / Bild	Auffinden beider Programme beim SCAN, auch wenn nur das Hauptprogramm gesendet wird.	Das zweite Programm (Splitting / Regio) kann ausgewählt werden, auch wenn nur das Hauptprogramm gesendet wird.	Wechsel von Normalbetrieb (ohne Splitting) zu Splitting 64kb/s → 32 kb/s Beide Programme empfangbar	Wechsel zurück von Splitting) zu Splitting zu Normalbetrieb 32kb/s → 64 kb/s Beide Programme empfangbar	
Kategorie Tisch- und Kleingeräte (Portabel / Fix)					
Pure Elan E3 	✓	✓	✓	✓	
Pure One mini Serie 2 	✓	✓	✓	✓	





Measurement reports

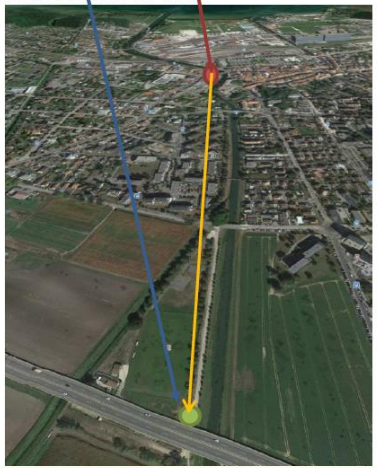
Interference-Analyses

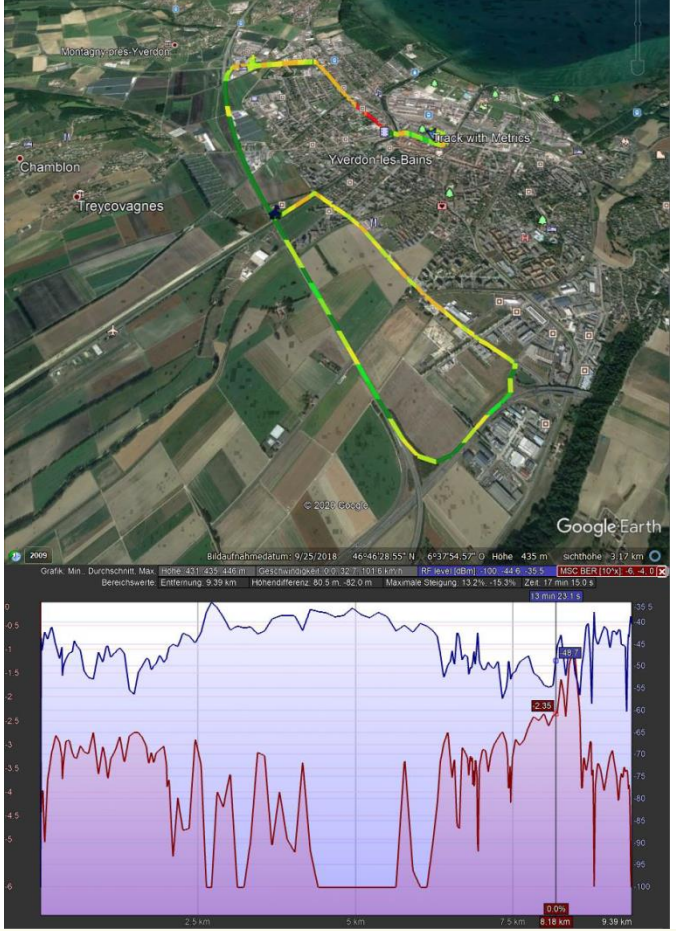


Tx
Yverdon Rue Neuchatel
YVNE
digris 10A

line of sight

Rx 4
A5 Bridge at Thièle
digris 10A
RMS 10B



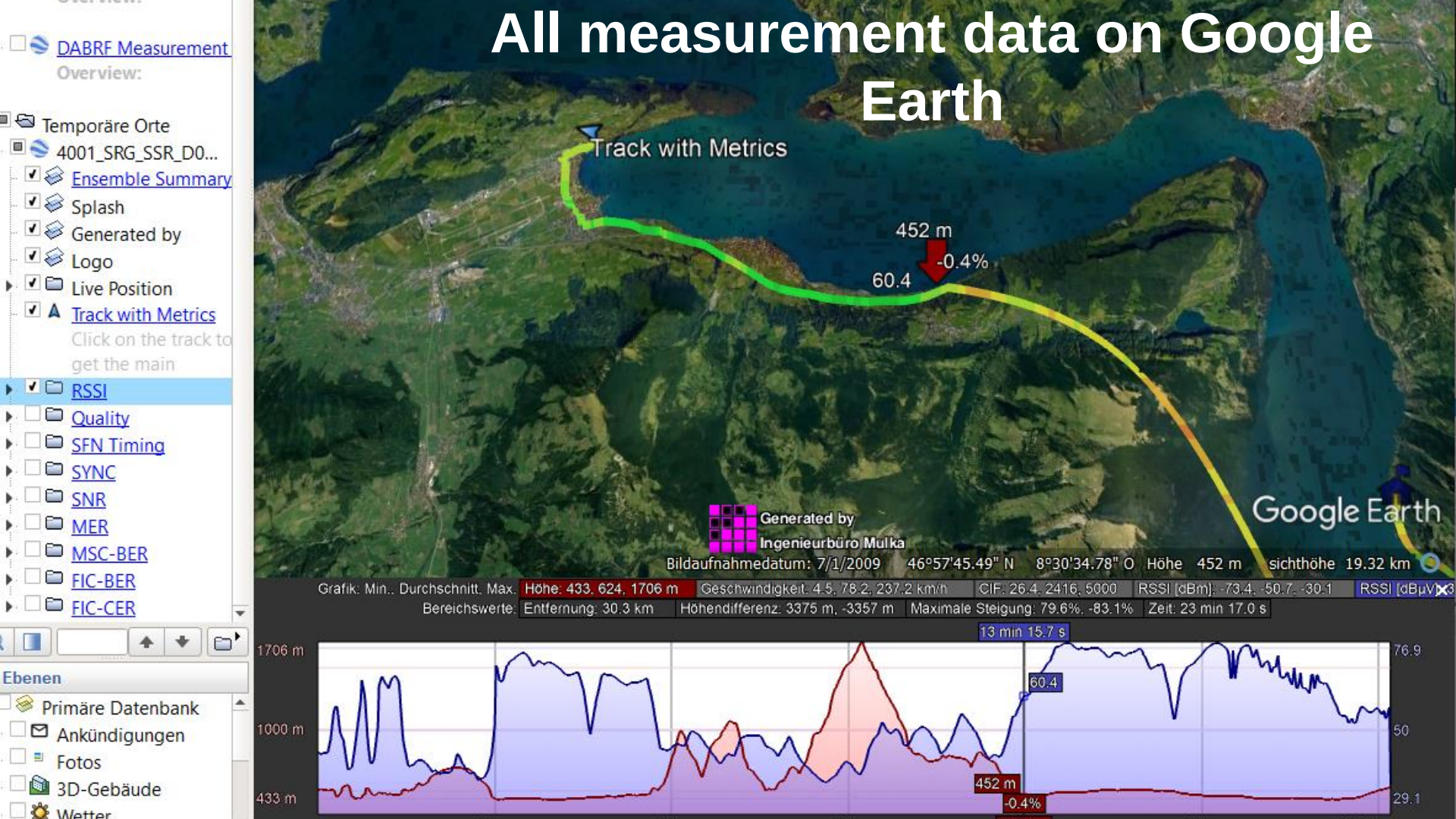


Situation:

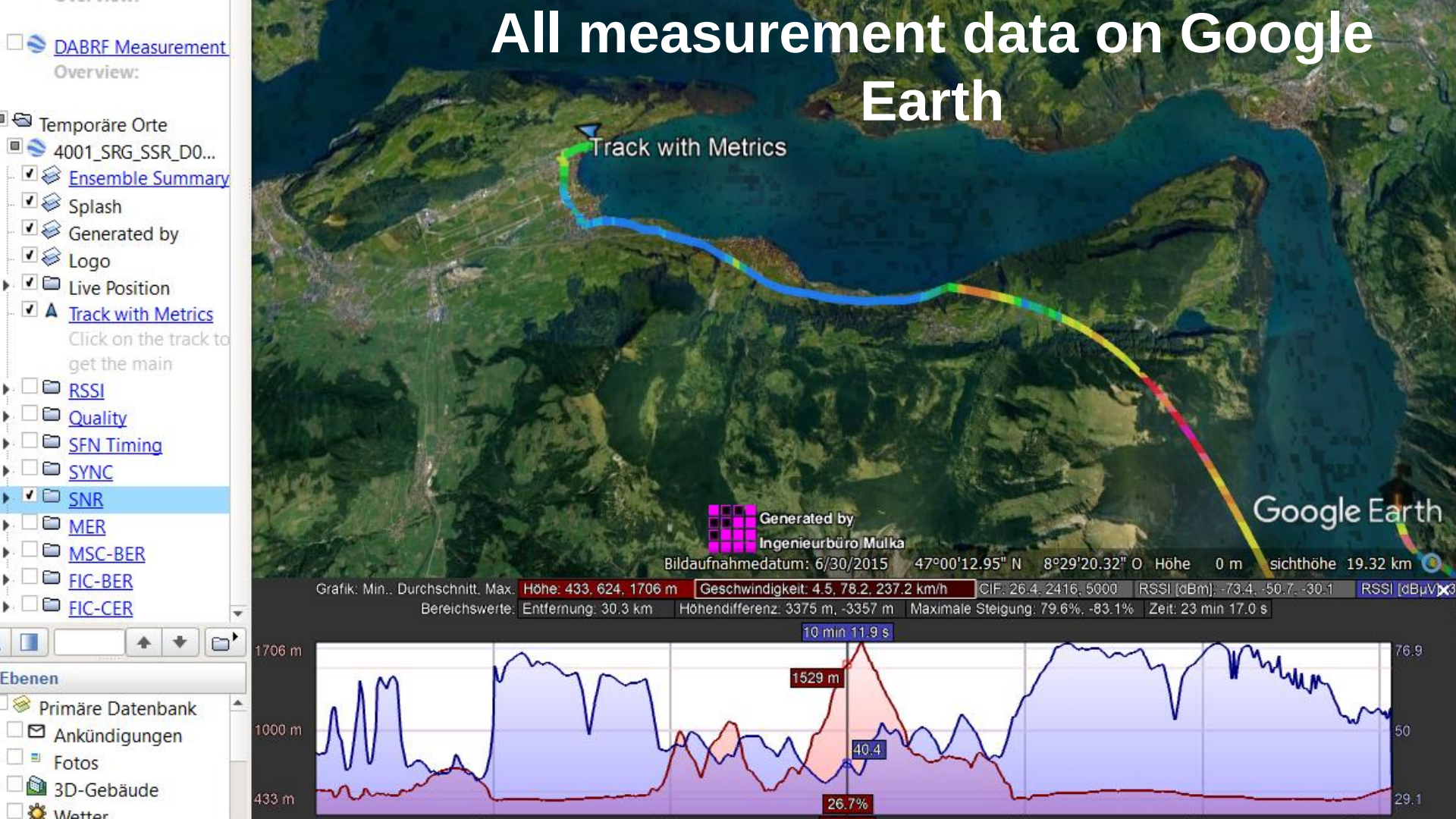
This measurement was made on the small road just before the bridge of the A5 highway. The Digris 10A transmitter was not completely in sight due to trees obscuring the line of sight. Therefore the signal will be stronger on the 7 m elevated highway. The DAB reception of RMS (10B) will be impaired despite the relatively large distance to the

ference.

All measurement data on Google Earth



All measurement data on Google Earth



Our services

From A-Z

Complete DAB playouts

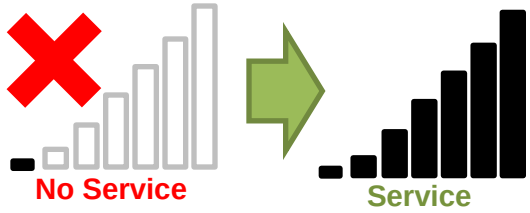
Measuring & monitoring systems

Special solutions

DAB laboratory testing & design services

DAB Repeater

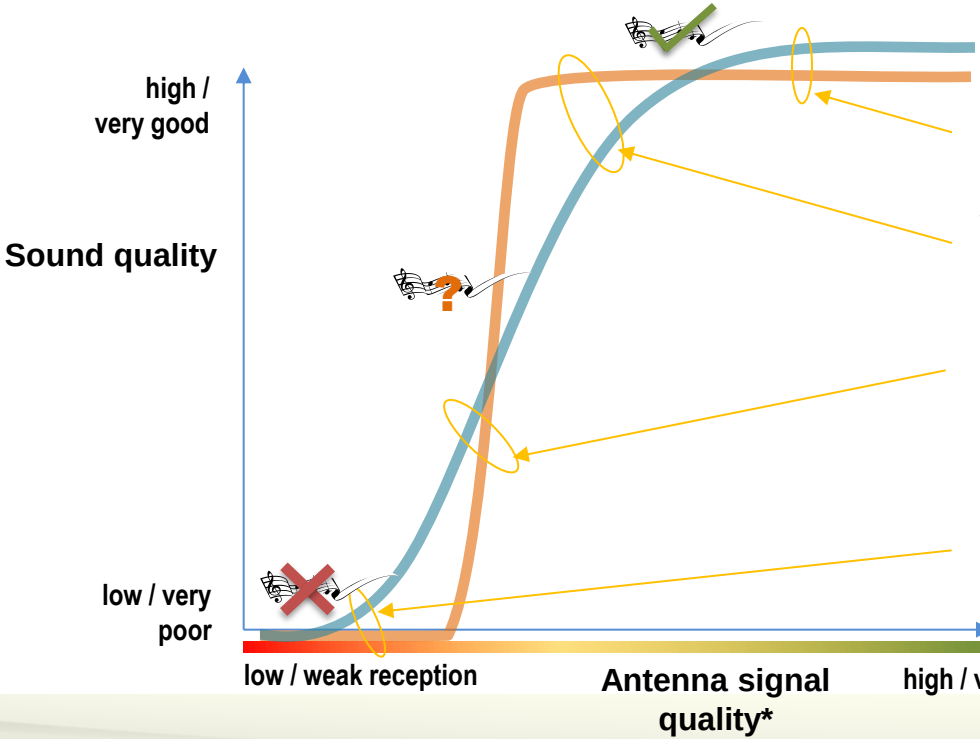
From simple to complex projects.



- Stores
- Offices
- Parking garages
- public buildings
- ...

Swiss Made
by Sumatronic

Differences FM / DAB+



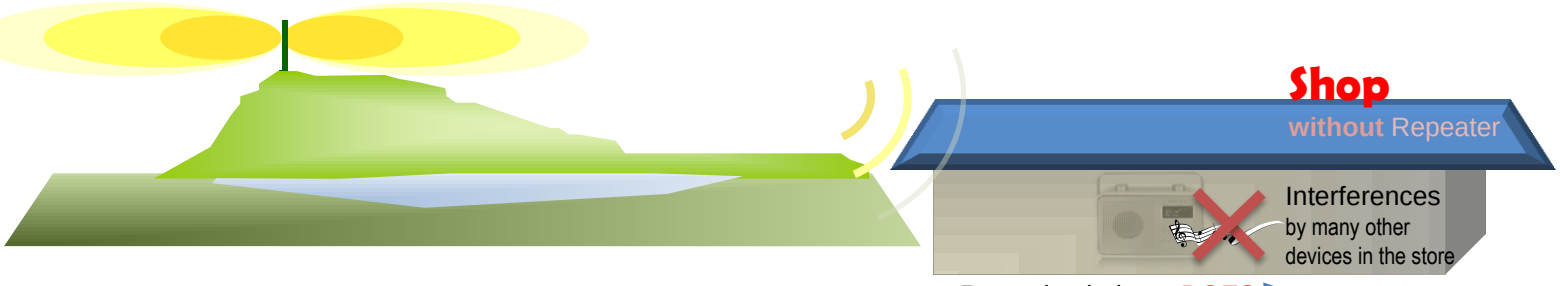
With good reception, DAB and FM offer perfect reception.

With sufficient reception, the sound quality remains practically the same with DAB, but decreases with FM.

If the quality of the antenna signal (reception) falls below a certain value, DAB remains mute or the sound sounds choppy. Via FM, the radio programme can still be heard in reduced audio quality (noise...).

If the quality of the antenna signal decreases even further, usable reception is no longer possible even with FM.

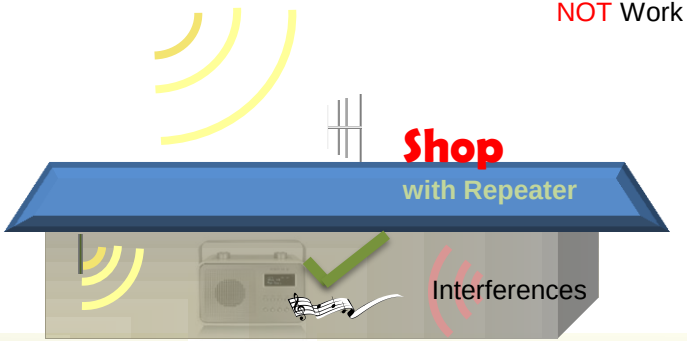
First need for DAB repeaters



Reception indoors DOES NOT Work

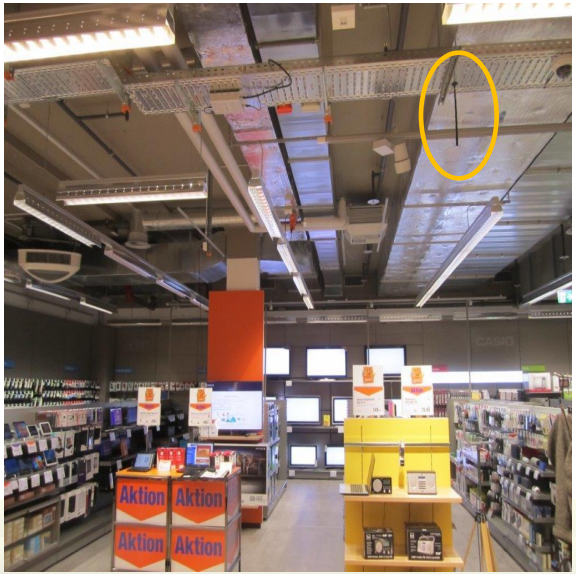
Attenuation
of the transmission
signal through the
building envelope

Reception outdoors
and at home works



Reception inside only works with
repeater system

DAB coverage with Repeaters



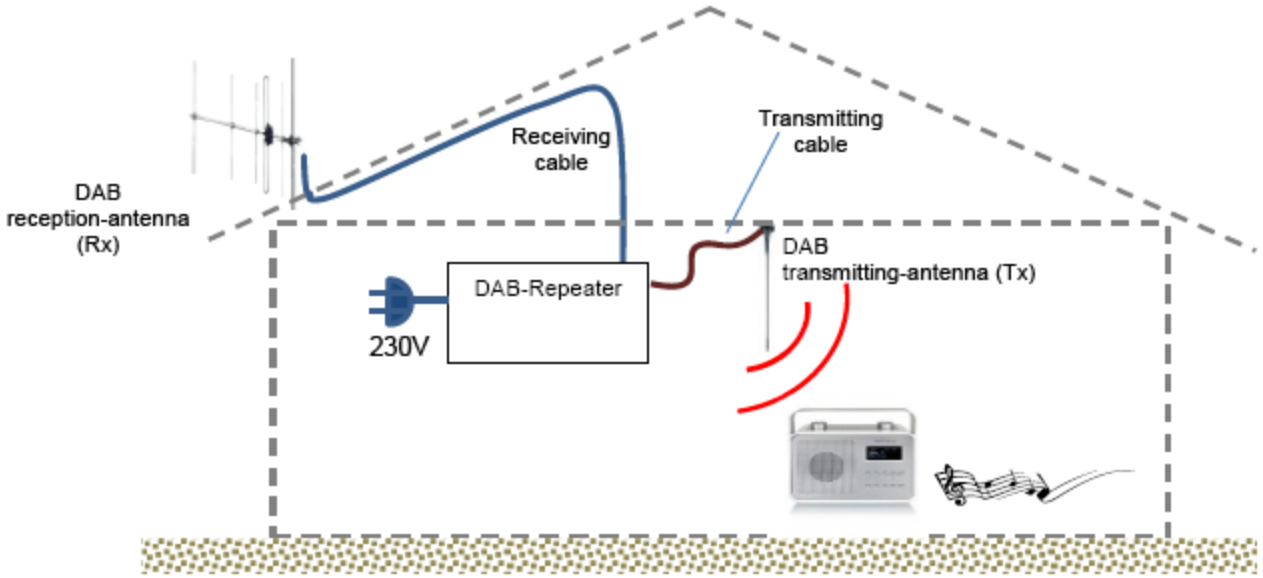
DAB penetrates buildings less than FM.

DAB reception in buildings, e.g. in:

- **Stores**
- **Offices**
- **Parking garages**
- **public buildings**
- **Underpasses**
- **...**

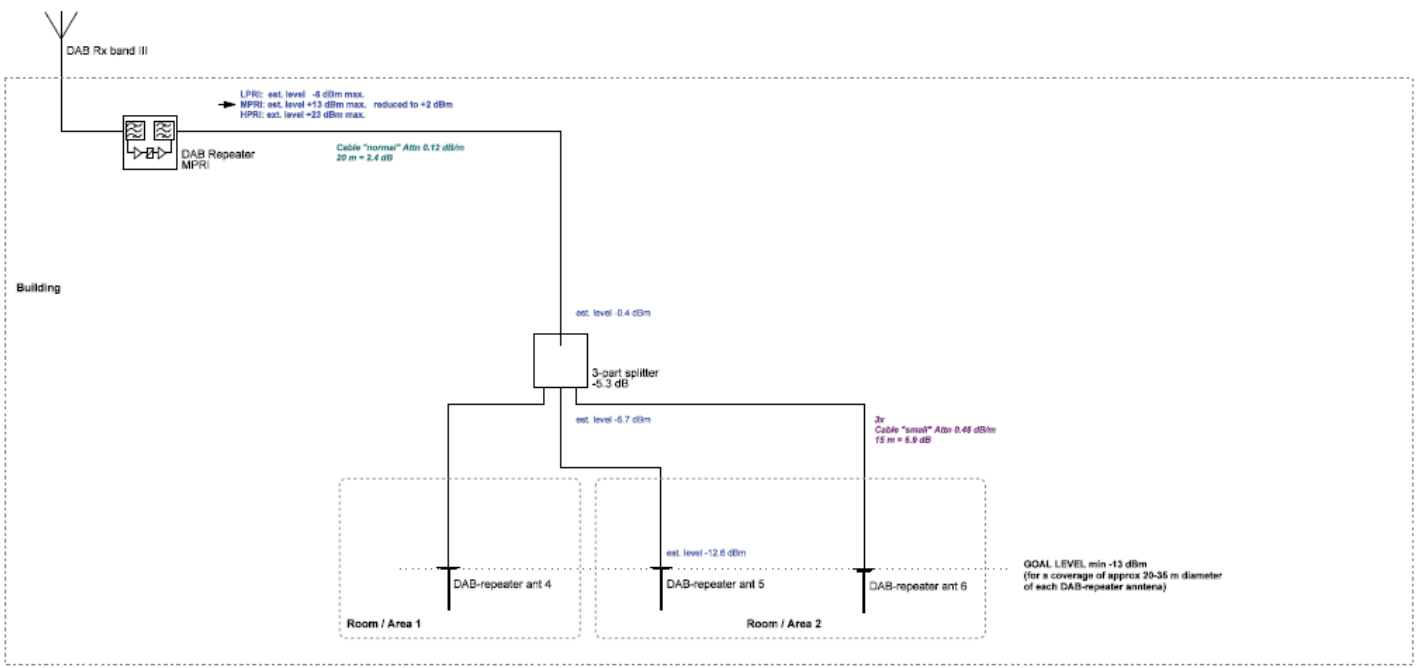

DAB reception in the parking garage is feasible
dab+
mehr radio
DAB-reception.ch

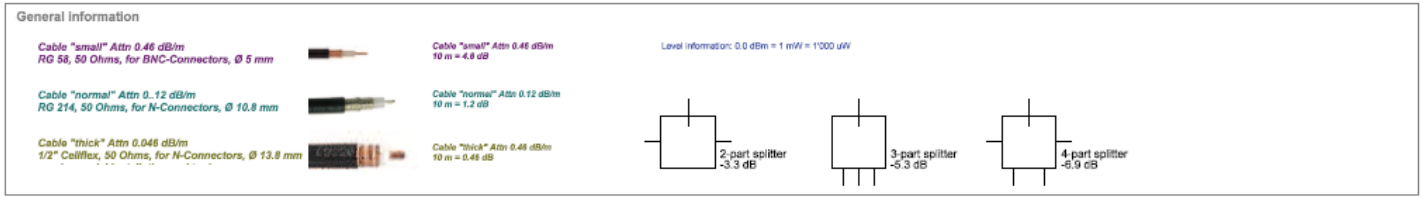
Installation of a DAB-Repeater-System



Principle of a DAB repeater system

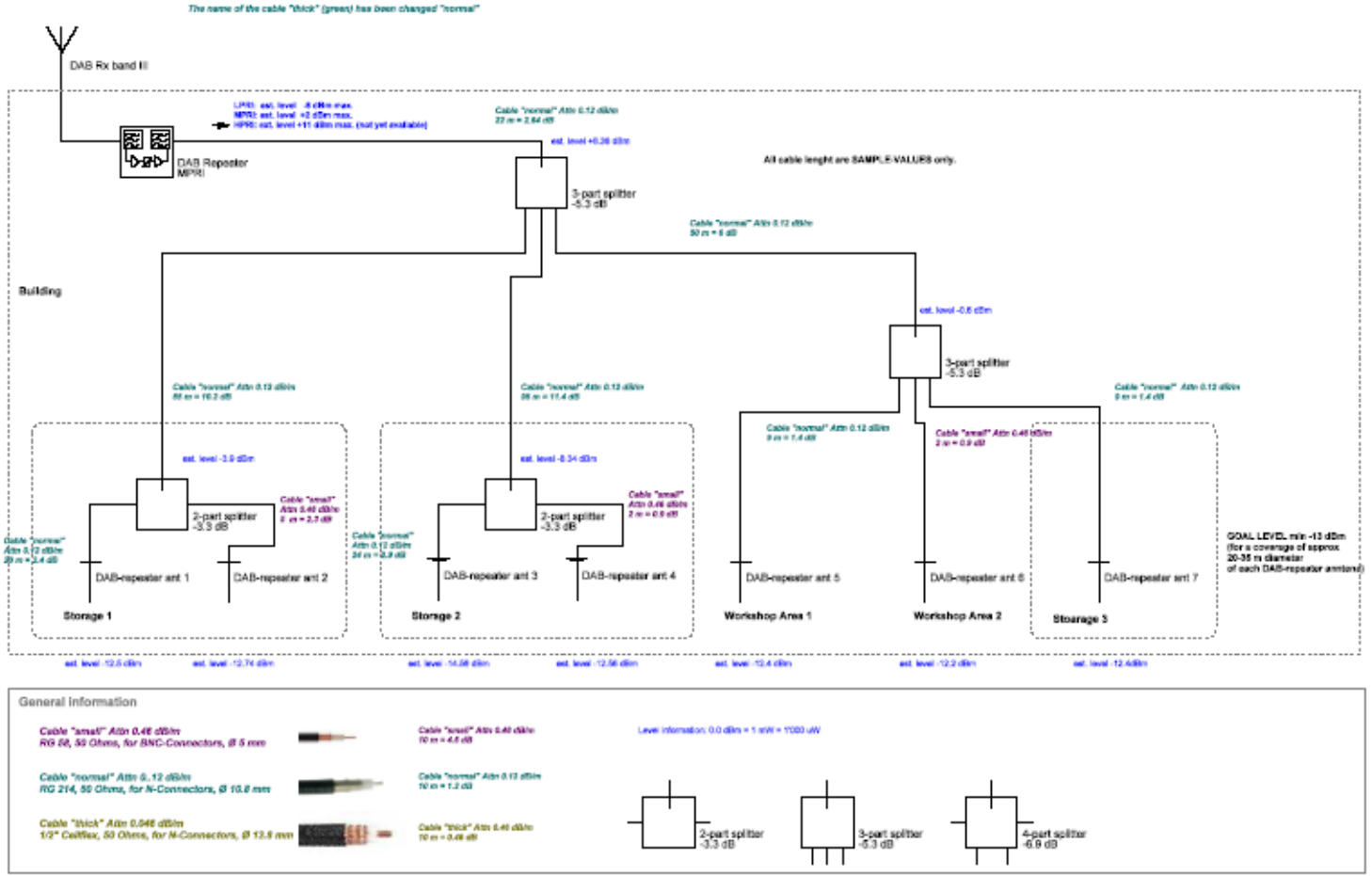
Example 1





SUMATRONIC AG	Date	Name	Description: DAB-Repeater System	Sheet 1 of total 1
Rainstrasse 35a CH-6314 Unterageri, Switzerland Tel. +41 41-752 08 08, Fax +41 41-752 0 www.sumatronic.ch info@sumatronic.ch	Drawn 09.12.2016	Peter H. Matter		
	Changed 09.12.2016	Peter H. Matter	File DAB Repeater System -SAMPLE-.spl7	

Example 2



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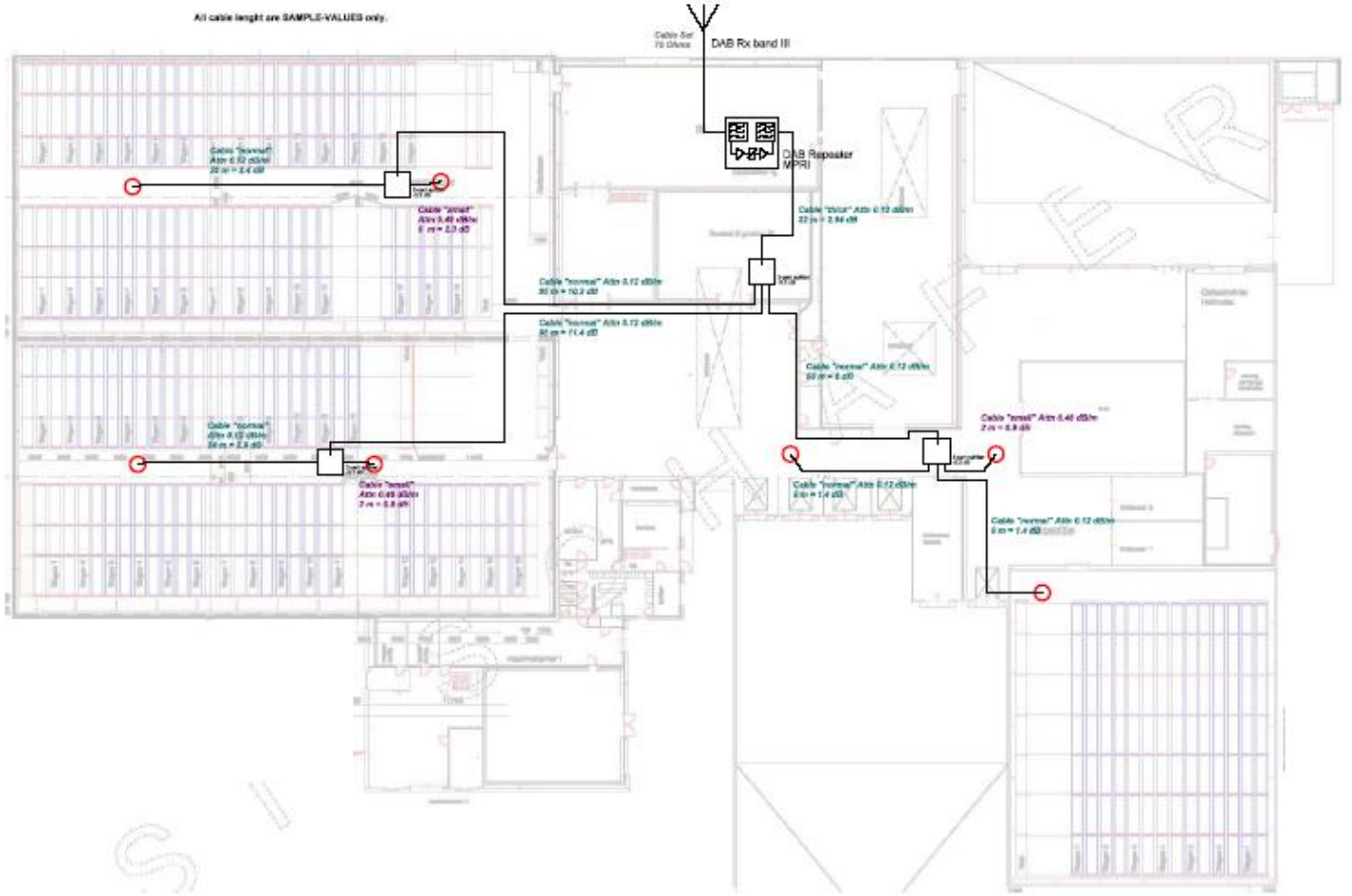
	Date	Name
Drawn	20.10.2016	Peter H. Matter
Changed	28.10.2016	Peter H. Matter

Description: DAB-Repeater System

File: DAB Repeater System Industrial Facitlity -SAMPLE-.spl7

Sheet 1 of total 3

Example 2



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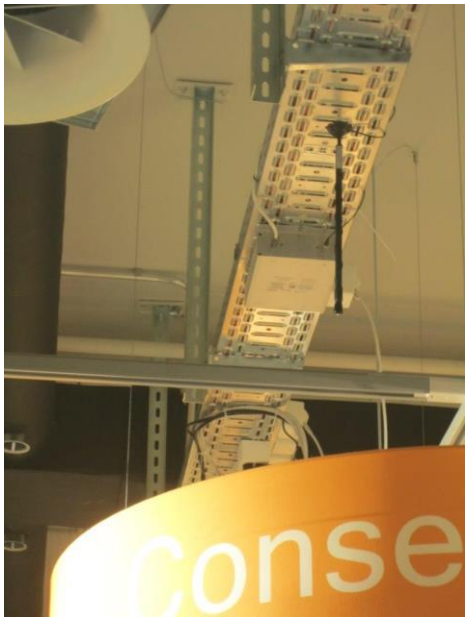
	Date	Name
Drawn	20.10.2016	Peter H. Matter
Changed	26.10.2016	Peter H. Matter

Description: DAB-Repeater System

File: DAB Repeater System Industrial Facitlity -SAMPLE-.spl7

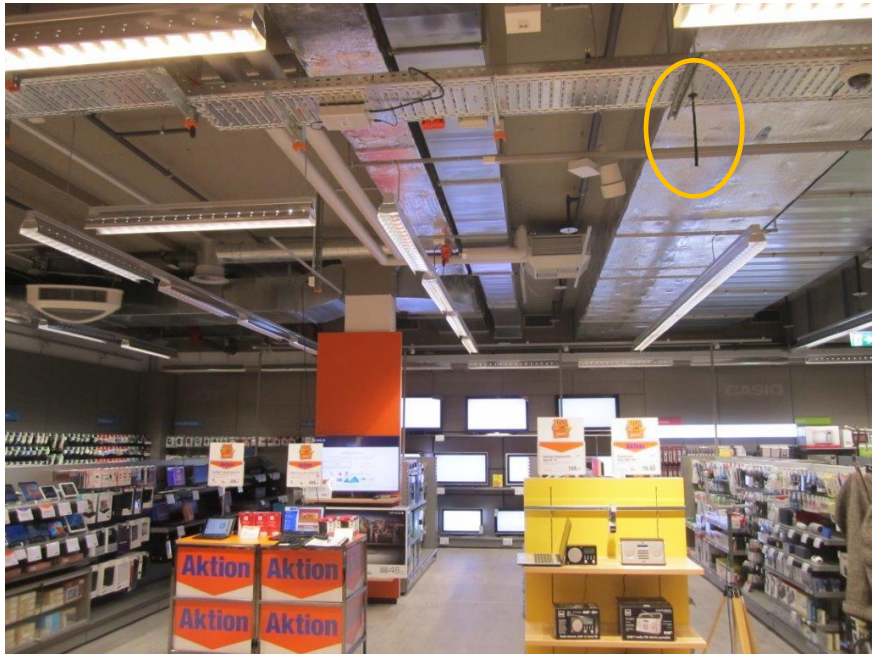
Sheet 2 of total 3

Installation of a DAB-Repeater-System



Indoor Tx

Installation of a DAB-Repeater-System



Is DAB+ just a bridge technology

until everything is IP?

Is DAB+ just a bridge technology
until everything is IP?

- ***Every technology is a bridging technology until a better, more convenient and efficient technology comes on the market.***

- ***FM was a bridge from AM to DAB+, while it was invented about already 90 years ago.***

Is DAB+ just a bridge technology
until everything is IP?

At first glance: It sounds logical that IP is everywhere and therefore ideal, but:

- ***DAB+ is here, millions of receivers and a large variety of radio programs are available.***

- ***IP / Internet is neither energy-efficient nor reliable***

Is DAB+ just a bridge technology
until everything is IP?

DAB+ has the potential to be the main broadcast technology for the next 20 to 30 years,
not just for a few years as some claim.

The lack of DAB+ coverage indoors

can be a disadvantage to DAB-broadcasters, -Audience and the DAB+ standard

- ***In car parks there is usually a mobile phone service (via repeaters) to ensure connectivity for emergency calls.***

- ***Listeners with suitable mobile service can stream anything there, but regular DAB+ audiences have no reception.***

The lack of DAB+ coverage indoors

can be a disadvantage to DAB-broadcasters, -Audience and the DAB+ standard

- ***This is a disadvantage for broadcasters as it favors streaming services (e.g. Spotify).***
- ***It pushes the audience to streaming rather than DAB+.***
- ***This pushes the audience to social media with dubious "news", away from the serious broadcasters.***

The lack of DAB+ coverage indoors

can be a disadvantage to DAB-broadcasters, -Audience and the DAB+ standard

- ***DAB should be available everywhere people expect it.***
- ***As this is not possible to ensure coverage from outside in many cases, DAB-repeaters are essential.***
- ***Building owners should have options to equip their buildings with DAB+ reception if they want to.***

DAB+ becomes important in emergencies

- *During natural disasters, broadcast services are often the only services still available.*

- *IP services break down and can be attacked much more easily*

EBU recommends to use the regular broadcast services for crisis → DAB+ (R 156 infrastructure strategy to ensure content distribution during times of crisis)

In-Door reception would be important but

- *no technical standards in Europe*
- *no license-free operations*
- *ONLY Switzerland has a standard + license free operation*

SUMATRONIC

30 YEARS RADIO A-Z

Radio from A to Z

www.sumatronic.ch