



Certification Rules for smart module integration

Europe, USA, Canada

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BUREAU
VERITAS

SPEAKER



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BUREAU VERITAS

BV CPS GERMANY

Hamburg



Tuerkheim



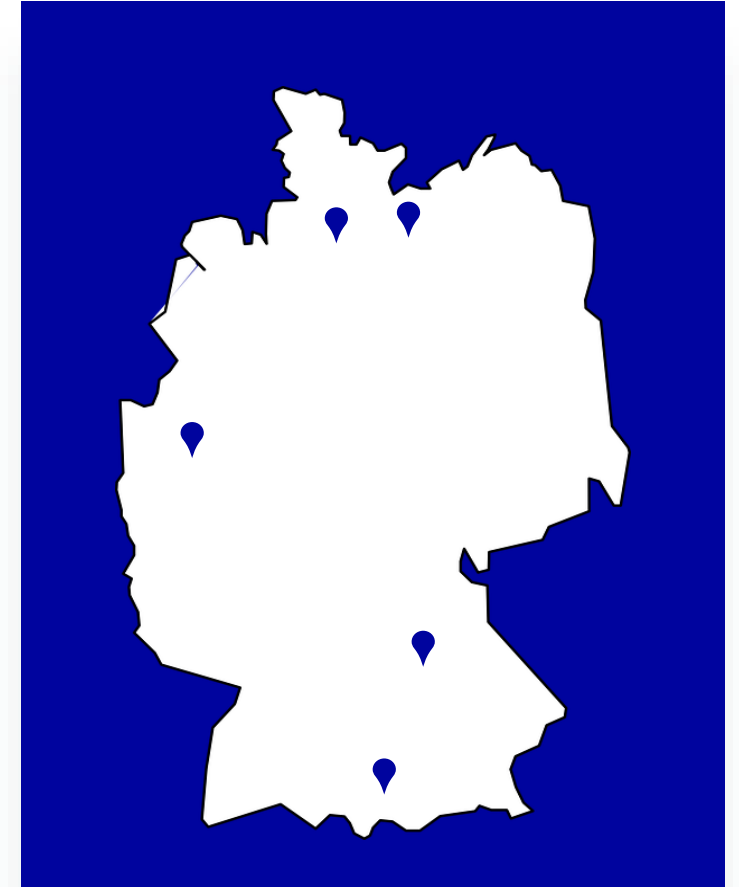
Ratingen



Nuremberg



Schwerin



SERVICE CATEGORIES

EMC

Wireless Testing

Electrical Safety & Environmental Testing

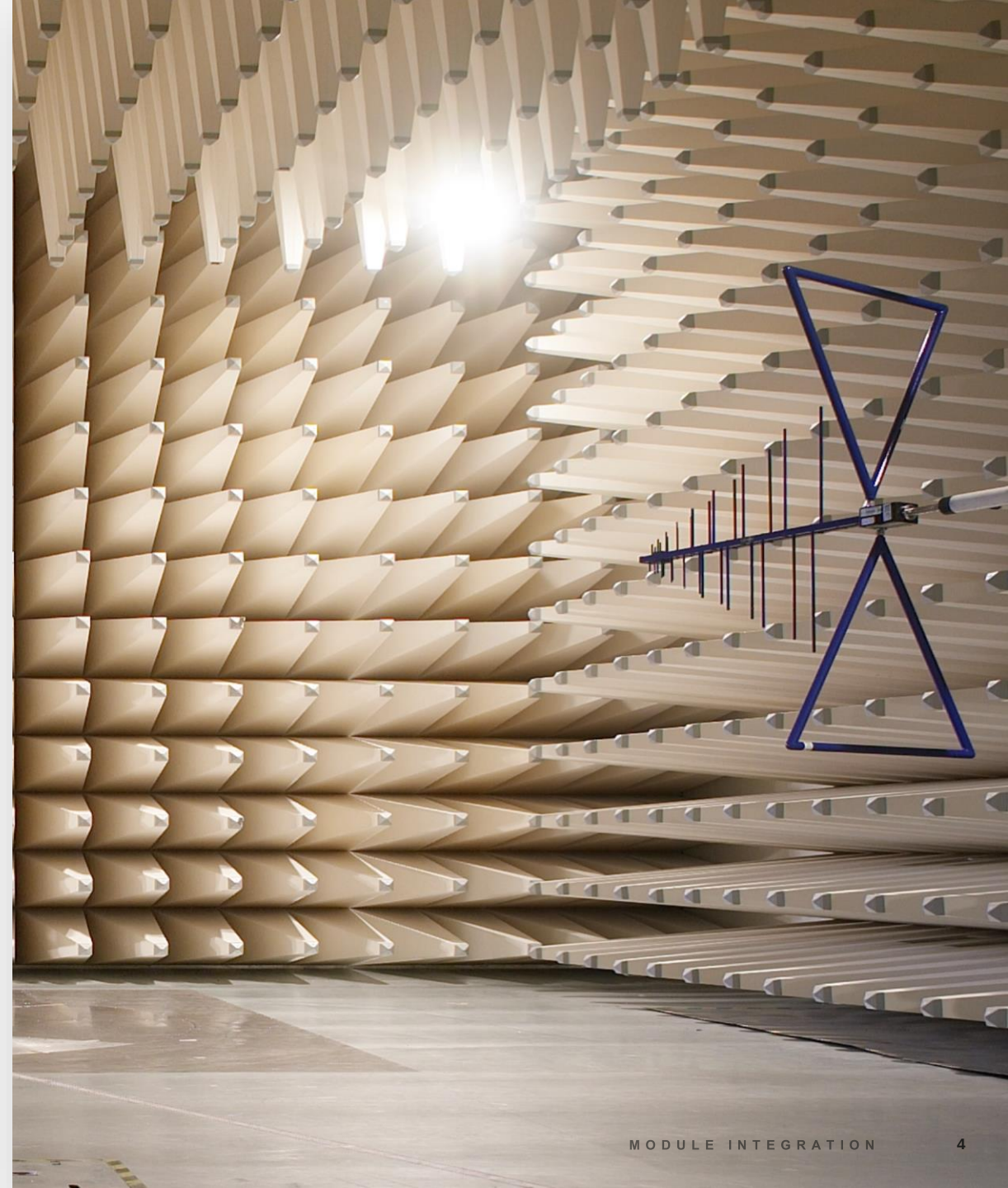
Cyber Security

Homologation

Alaytical (ROHS, ELV, VOC)

Type Approvals

Sustainability



SUMMARY

01 Hurdles to market for radio devices

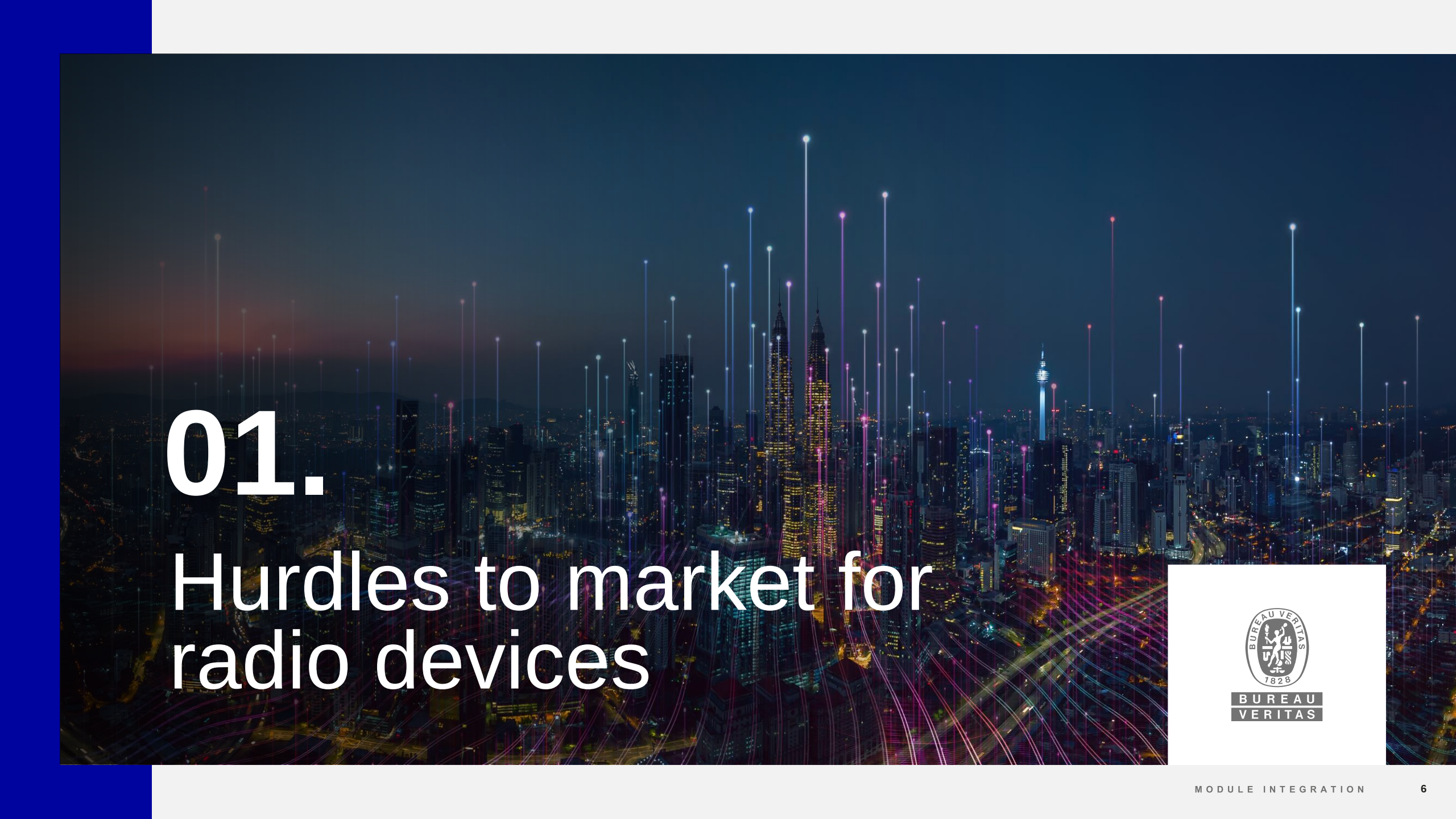
02 Certification requirements

03 RED for Europe

04 UK

05 FCC/ISED for North America

06 Conclusion

A nighttime aerial view of a city skyline, likely Singapore, with numerous skyscrapers illuminated. Overlaid on the city is a complex network of glowing lines and dots in various colors (blue, purple, pink, green), representing a digital or communication network. The lines connect various points across the city, some extending upwards into the dark sky.

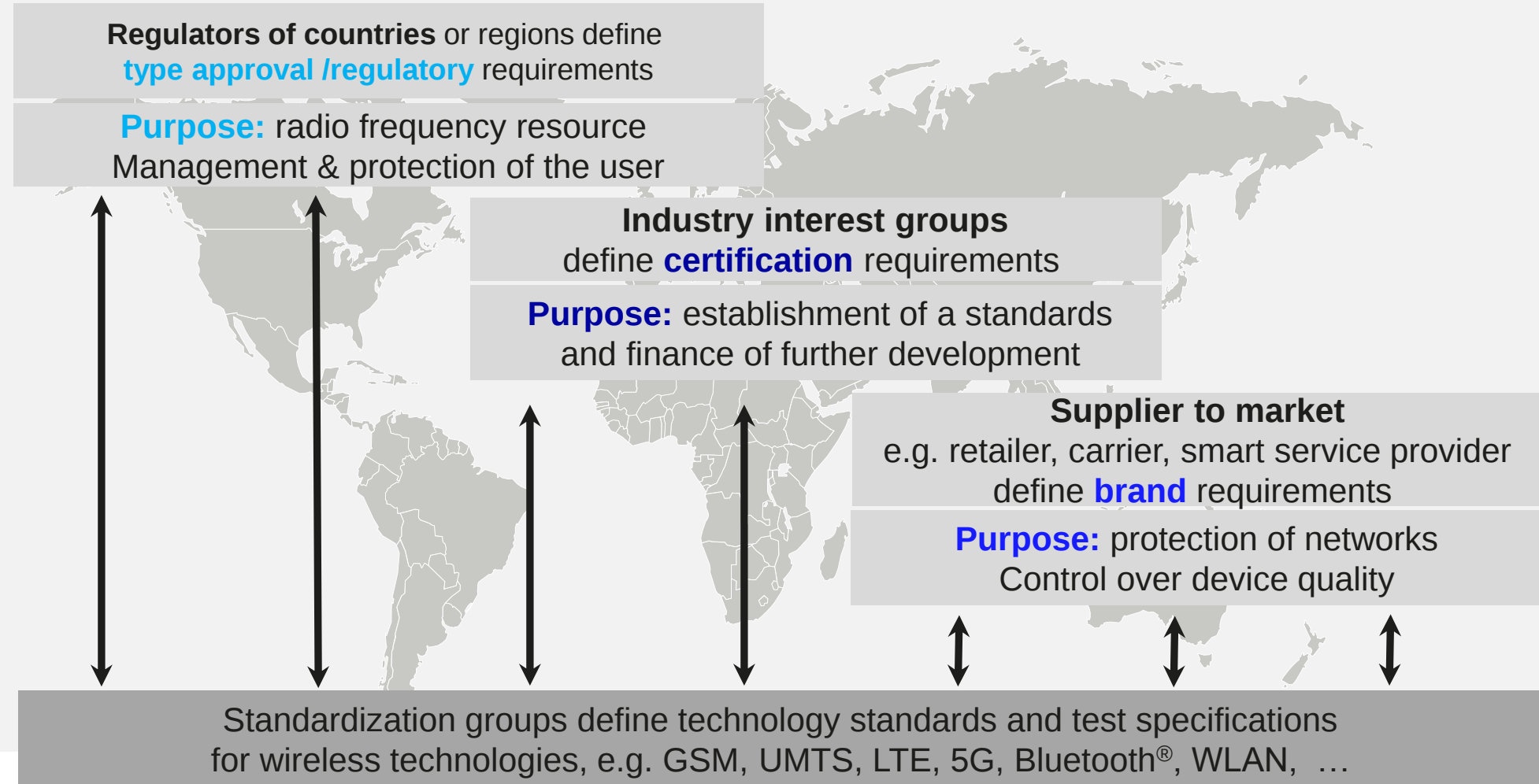
01.

Hurdles to market for radio devices



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HURDLES TO MARKET



FREQUENCY SPECTRUM – A VALUABLE RESOURCE

Valuable resources:

Oil / Gas

Coal

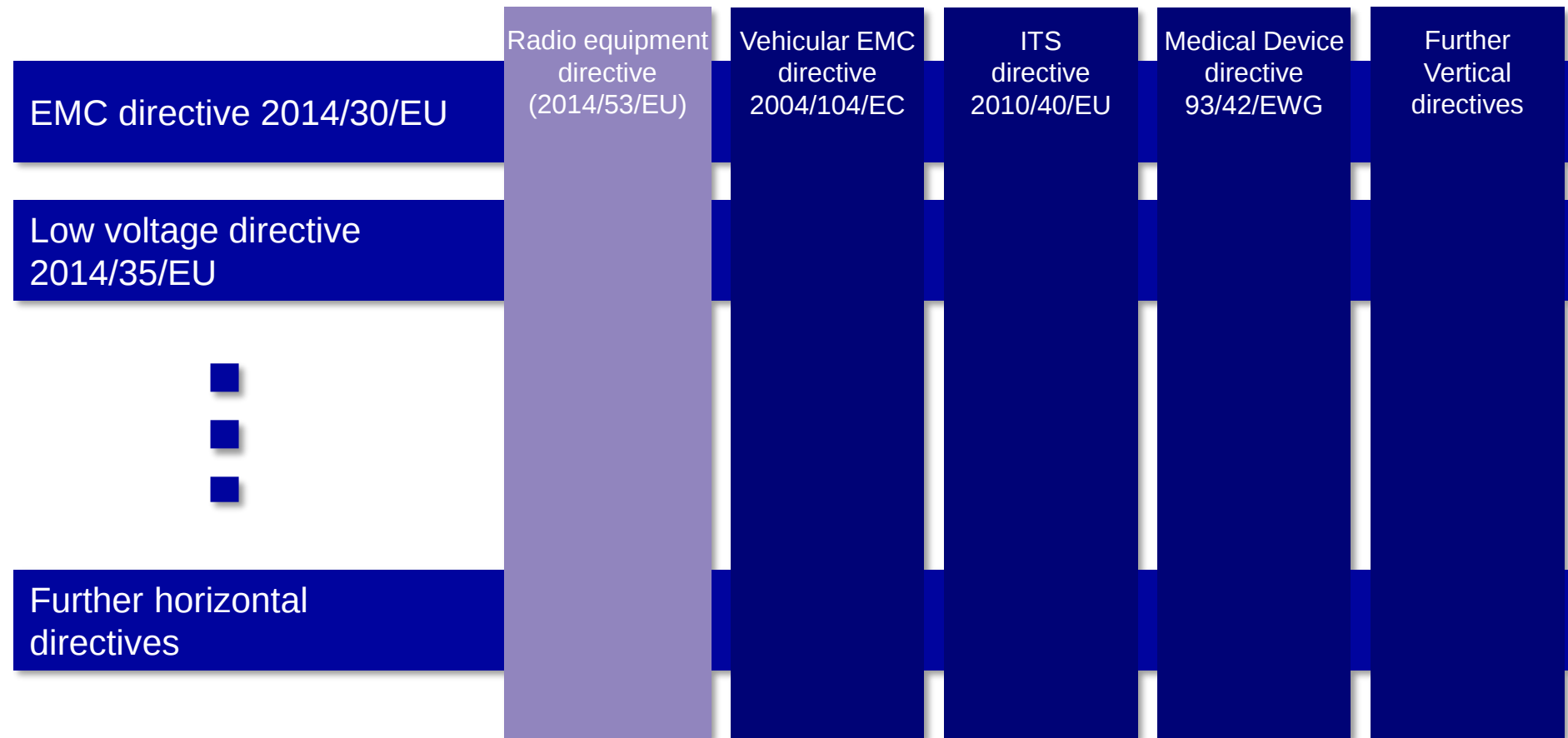
Water

Phosphat

Radio Frequency Spectrum

- › Controlled by individual states, the usage of regulatory radio frequency spectrum is a „resource management“.
- › International standards are developed for global harmonization beyond the control of states.

EUROPEAN DIRECTIVES



02.

Certification Requirements



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CERTIFICATION / TYPE APPROVAL

- › Around 200 countries in the world with different requirements for product certification and type approval
- › National labelling requirements
- › Special logos and/or Type approval numbers
- › Statements and/or Declarations in the user manuals



STANDARDS & TESTING

TWO MAIN INTERNATIONAL STANDARDS: EU (EN) AND US (FCC)

- › these standards are recognized in most countries
- › only approximately 30 countries perform in-country testing

NATIONAL STANDARDS USUALLY ARE

- › paste-and-copy from international standards
- › or a subset of the requirements
 - › small deviations are possible
 - › e.g., difference in limits and test methods

WHEN PASSING THE EU/US STANDARDS

- › the risk of failing national standards is low
- › EU/US results
 - › should be compared with national standards before starting national testing

THE FAMILY / VARIANT STRATEGY

IN CASE MORE OR MANY VARIANTS OF A PRODUCT EXIST, THE CERTIFICATION STRATEGY IS IMPORTANT

Goal – Risk Management:

- › Minimize costs and at the same time
- › keep risks at acceptable level

03. RED for Europe



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SELF DECLARATION EU-RADIO EQUIPMENT DIRECTIVE

RED (2014/53/EU) OF THE EU

- › currently the most relevant self declaration regime
- › covers the whole EU/EFTA market



ESSENTIAL REQUIREMENTS OF THE RED

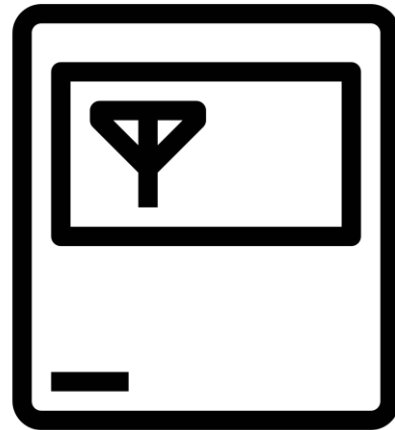
- › ART. 3.1A): HEALTH AND SAFETY
the protection of health and safety of persons and of domestic animals and the protection of property, including the objectives with respect to safety requirements set out in Directive 2014/35/EU, but with no voltage limit applying
- › ART. 3.1B): ELECTROMAGNETIC COMPATIBILITY
an adequate level of electromagnetic compatibility as set out in the Directive 2014/30/EU
- › ART. 3.2: EFFECTIVE USE OF THE RADIO SPECTRUM
- › ART. 3.3: CYBER SECURITY

RED



APPLICABLE STANDARDS – PURE RADIO EQUIPMENT

WLAN
Module



WLAN
Repeater

Assumption: WLAN module is CE approved!

EMC: EN 301489-1 general EMC for radio equip.

EN 301489-17 specific EMC for WLAN

Radio: EN 300 328 for WLAN 2,4 GHz

EN 301 893 for WLAN 5 GHz

EN 300 440 for WLAN 5 GHz (5,75-5,85)

EN 303 687 for WLAN 6 GHz

only “radiated spurious emissions” test

el. safety: EN 62368

Health: MPE calculation acc. to EN 62311

SAR measurement not applicable (EN 62209)

EMC STANDARD FOR COMBINED EQUIPMENT

EN 303 446-1 / -2 (RESIDENTIAL, LIGHT INDUSTRY / INDUSTRIAL ENVIRONMENT)

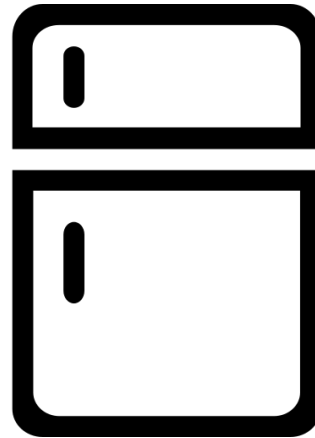
- › applicable for combined equipment (radio and non-radio equipment)
- › officially released by ETSI, not harmonized
- › covers those devices, where the EMC-standard of the non-radio equipment is listed in chapter 2.1.2 of EN 303 446, like e.g.:
 - › EN 50130, Alarm systems
 - › EN 55011, ISM equipment
 - › EN 55014, Household appliances, electric tools and similar apparatus
 - › EN 55024, IT equipment
 - › EN 55032, Multimedia equipment
 - › EN 50370, Machine tools
 - › EN 50561, Power line communication apparatus
 - › EN 61000-6-x (1..4), Generic standards !
 - › ...

APPLICABLE STANDARDS – COMBINED EQUIPMENT

Radio
Module 1



Radio
Module 2



Fridge

Assumption: Radio module is CE approved!

EMC: EN 303 446-1

Radio: EN 301 908-1/-2 for NB IOT

EN 300 328 for BT/WLAN 2,4 GHz

EN 301 893 for WLAN 5 GHz

EN 300 220, 300 330, 300 440 for SRD
etc.

only “radiated spurious emissions” test

el. safety: EN 62368

Health: MPE calculation acc. to EN 62311

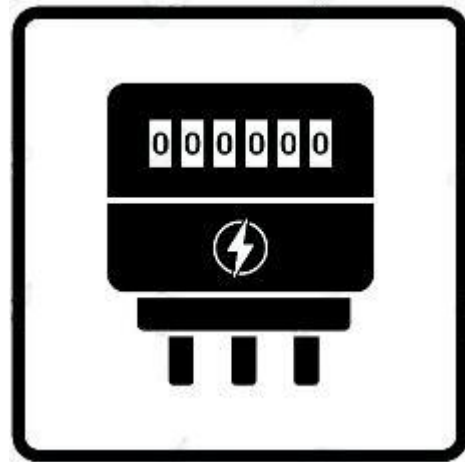
SAR measurement not applicable (EN 62209)

APPLICABLE STANDARDS – COMBINED EQUIPMENT

Radio
Module 1



Radio
Module 2



Electricity
Meter

Assumption: Radio module is CE approved!

EMC: EN 50470 electricity metering equipment
EN 301489-1 general EMC for radio equip.
EN 301489-x specific EMC for radio equip.

Radio: EN 301 908-1/-2 for NB IOT
EN 300 328 for BT/WLAN 2,4 GHz
EN 301 893 for WLAN 5 GHz
EN 300 220, 300 330, 300 440 for SRD
etc.
only “radiated spurious emissions” test

el. safety: EN 62368

Health: MPE calculation acc. to EN 62311
SAR measurement not applicable (EN 62209)

RED – RISK ANALYSIS I

A PRODUCT MUST COMPLY WITH THE DIRECTIVE (RED 2014/53/EU)

- › not with the requirements of standards but with the essential requirements of the Directive
- › RED Essential requirements are Safety/Health, EMC and use of RF spectrum

ASK YOURSELF E.G.:

- › environment
 - › Have you tested or assessed the product over the correct temperature range for the intended use?
 - › Have you considered additional concerns due to weather location, such as outdoor use or use in other hostile locations?
- › input voltage
 - › Have you assessed the device for use with all possible input supply options: AC input, DC supply, vehicle 12V or 24V, battery?
- › cables and ports (cable length, cable types, number of ports)
- › ...

RED – RISK ANALYSIS II

SOME HELPFUL SOURCES

- › „Blue Guide“, [<http://ec.europa.eu/DocsRoom/documents/18027/attachments/1/translations>]
- › „RED Guide“, [<https://ec.europa.eu/docsroom/documents/29782>]
- › CENELEC Guide 32, „Guidelines for Safety Related Risk Assessment and Risk Reduction for Low Voltage Equipment”
→ contains in Annex D, Table D.1 a good structured checklist, which can also be used for aspects going beyond safety
- › ETSI EG 203 336, overview of applicable radio tests
→ Identification of risks according article 3.2
- › EN 61000-4-1, overview of electromagnetic susceptibility phenomena
→ Identification of risks according article 3.1(b)

04. UK



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BREXIT – IMPLICATION TO CERTIFICATION PROCESS

- › UKCA started on the 1st January 2021 and both CE & UKCA marked products will be acceptable
- › UK government announced that for the time being, EU/CE regulations will be accepted – so for no date when UKCA becomes mandatory again for the RED scope
- › UK government publishes “Designated Standards”. It works in the same way as the OJEU.

BV can offer UKCA service now!

Official link from UK government:
<https://www.gov.uk/guidance/using-the-ukca-marking>

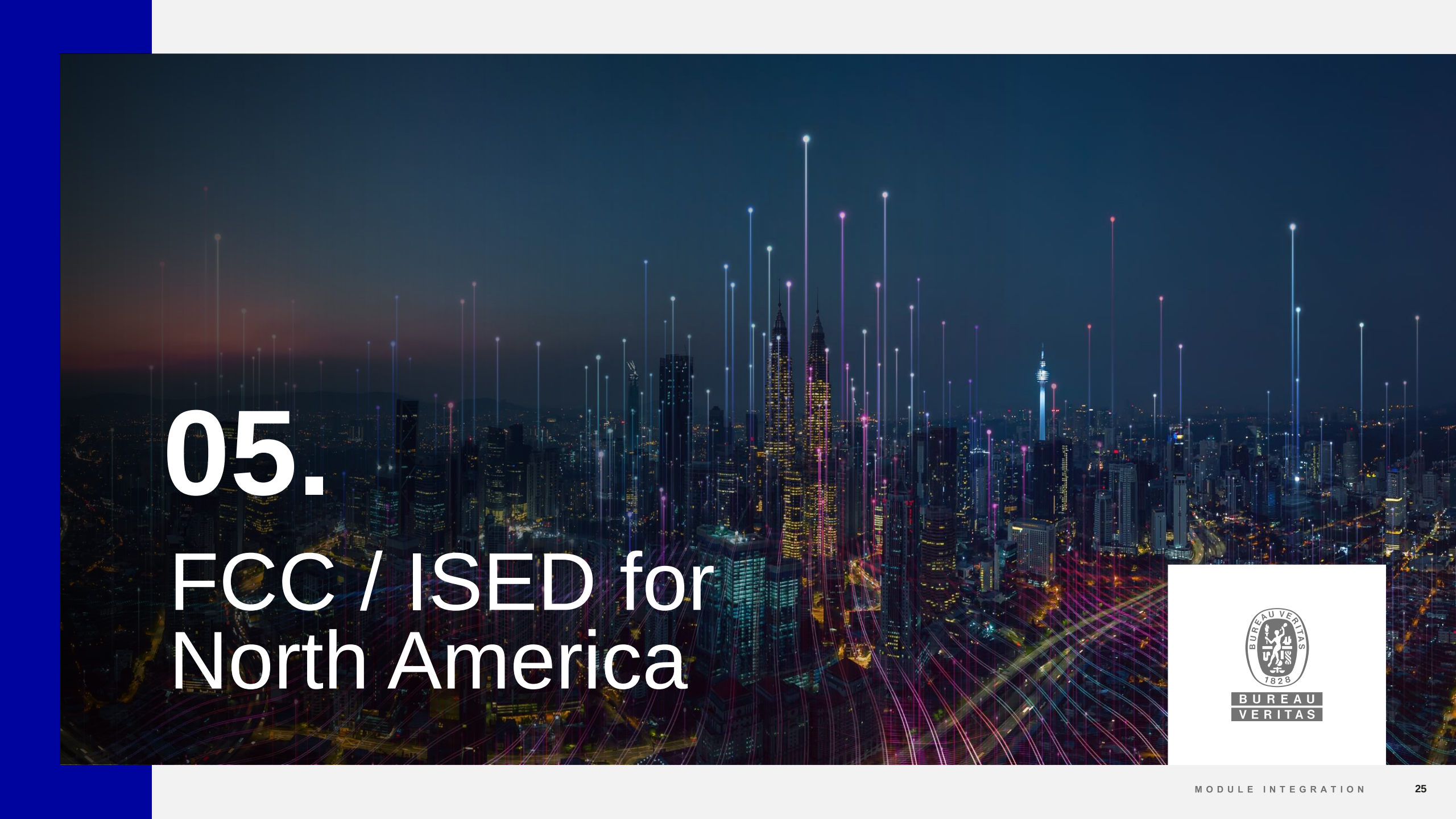


**UK
CA**

BREXIT – IMPLICATION TO CERTIFICATION PROCESS

- › UKCA marking is a self-declaration
- › If harmonised radio standards are applied, you don't need to involve a UK certification body.
- › The UK Declaration of Conformity should be available to market surveillance authorities on request.
- › The information required on the Declaration of Conformity is largely the same as what was required on an EU Declaration of Conformity.

**UK
CA**

A nighttime aerial view of a city skyline, likely New York City, with numerous skyscrapers illuminated. Overlaid on the city are numerous vertical lines of varying colors (blue, purple, pink, red) that extend upwards from the buildings, each topped with a small glowing dot, creating a digital network or data flow visualization.

05.

FCC / ISED for North America



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CLASSICAL TYPE APPROVAL: US FCC/TCB CERTIFICATION

- › The only regulatory body in the USA for telecommunication approvals is the FCC (Federal Communications Commission)
- › Applications can also be submitted via TCBs, however, the TCB finally submits certificates to the FCC webpage
- › Marking with FCC ID for radio products
- › The FCC certification covers radio, EMC and SAR aspects
- › Electrical safety is not a regulatory requirement, but safety certification is a market requirement

EQUIPMENT AUTHORIZATION PROCEDURES AND LABELS §15.19

CERTIFICATION: FCC ID XXXXX1234 WHERE:

- › “XXXXX” is the Grantee Code made of 5 (formerly 3) alphanumeric characters (A-Z, 0-9), assigned by the FCC
- › “1234” is the Equipment Product Code, made of at most 14 alphanumeric characters (A-Z, 0-9) assigned by the applicant
- › Test laboratory needs to be accredited
- › All radio transmitters need to follow the Certification authorization procedure

SUPPLIERS DECLARATION OF CONFORMITY (SDOC):

- › Test laboratory does not need to be accredited
- › Local representative in USA required

EQUIPMENT AUTHORIZATION OF UNINTENTIONAL RADIATORS §15.101

Type of device	Equipment authorization required
TV Broadcast Receiver	SDoC or Certification.
FM Broadcast Receiver	SDoC or Certification.
CB Receiver	SDoC or Certification.
Superregenerative Receiver	SDoC or Certification.
Scanning Receiver	Certification.
Radar Detector	Certification.
All other receivers subject to Part 15	SDoC or Certification.
TV Interface Device	SDoC or Certification.
Cable System Terminal Device	SDoC or Certification.
Stand-alone Cable input selector switch	SDoC or Certification.
Class B personal computers and peripherals	SDoC or Certification.
CPU boards and internal power supplies used with Class B personal computers	SDoC or Certification.
Class B personal computers assembled using authorized CPU boards or power supplies	SDoC or Certification.
Class B external switching power supplies	SDoC or Certification.
Other Class B digital devices & peripherals	SDoC or Certification.
Class A digital devices, peripherals & external switching power supplies	SDoC or Certification.
Access Broadband over Power Line (Access BPL)	Certification.
All other devices	SDoC or Certification.

APPLICABLE STANDARDS – COMBINED EQUIPMENT

Module

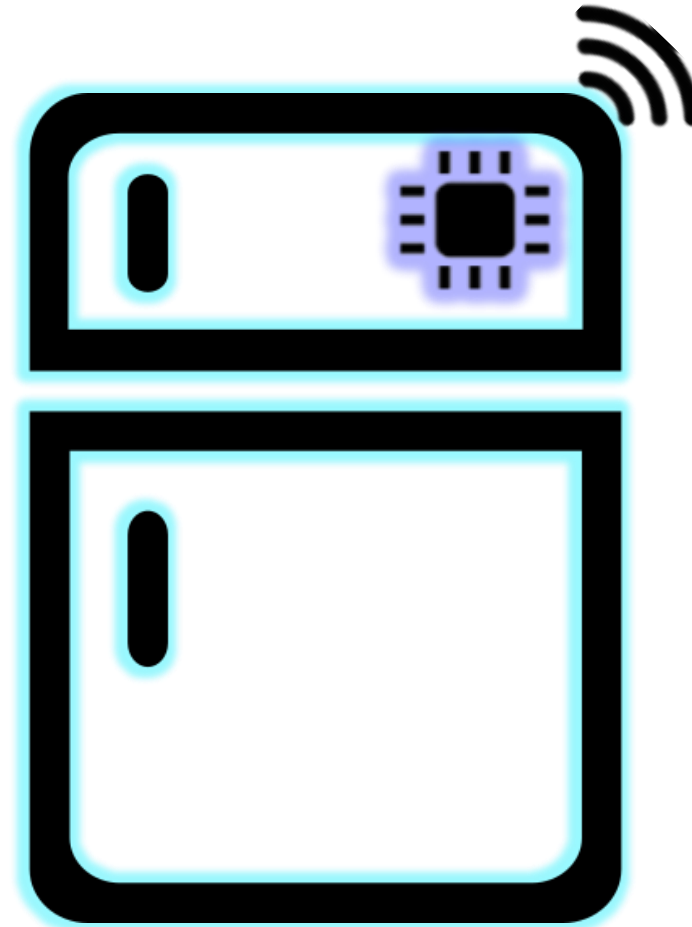
FCC grant mentions

- › Restrictions of use (mobile, portable, fixed)
- › Antenna issue (which antennas may be used?)
- › Co-location issue
- › SAR issue
- › ...

FCC ID: XXXXXYYYYYY...

XXXXX: Grantee code (3 or 5 chars.)

YYYYY: Product code (up to 14 chars.)



Final product

No retesting except

- › Radiated spurious emissions (at least, according to kdb 996369, d04)
- › FCC Part 15b for unintentional radiators
- › SAR tests (if applicable)

contains FCC ID: XXXXXYYYYY...

or: own FCC ID

IMPORTANT NOTES FCC GRANT FOR USA

TCB	GRANT OF EQUIPMENT AUTHORIZATION Certification Issued Under the Authority of the Federal Communications Commission By:	TCB																												
Date of Grant: Application Dated:																														
Attention:																														
NOT TRANSFERABLE EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.																														
FCC IDENTIFIER: [REDACTED] Name of Grantee: [REDACTED] Equipment Class: PCS Licensed Transmitter Notes: GSM/GPRS/UMTS/HSDPA QUAD BAND PCI MINI CARD																														
<u>Grant Notes</u>	<u>FCC Rule Parts</u>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Frequency Range (MHz)</th> <th style="text-align: center;">Output Watts</th> <th style="text-align: center;">Frequency Tolerance</th> <th style="text-align: center;">Emission Designator</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">22H</td> <td style="text-align: center;">824.2 - 848.8</td> <td style="text-align: center;">2.5 PM</td> <td style="text-align: center;">300KGXW</td> </tr> <tr> <td style="text-align: center;">22H</td> <td style="text-align: center;">824.2 - 848.8</td> <td style="text-align: center;">2.5 PM</td> <td style="text-align: center;">300KG7W</td> </tr> <tr> <td style="text-align: center;">22H</td> <td style="text-align: center;">826.4 - 846.6</td> <td style="text-align: center;">2.5 PM</td> <td style="text-align: center;">4M20F9W</td> </tr> <tr> <td style="text-align: center;">24E</td> <td style="text-align: center;">1850.2 - 1909.8</td> <td style="text-align: center;">2.5 PM</td> <td style="text-align: center;">300KGXW</td> </tr> <tr> <td style="text-align: center;">24E</td> <td style="text-align: center;">1850.2 - 1909.8</td> <td style="text-align: center;">2.5 PM</td> <td style="text-align: center;">300KG7W</td> </tr> <tr> <td style="text-align: center;">24E</td> <td style="text-align: center;">1852.4 - 1907.6</td> <td style="text-align: center;">2.5 PM</td> <td style="text-align: center;">4M20F9W</td> </tr> </tbody> </table>	Frequency Range (MHz)	Output Watts	Frequency Tolerance	Emission Designator	22H	824.2 - 848.8	2.5 PM	300KGXW	22H	824.2 - 848.8	2.5 PM	300KG7W	22H	826.4 - 846.6	2.5 PM	4M20F9W	24E	1850.2 - 1909.8	2.5 PM	300KGXW	24E	1850.2 - 1909.8	2.5 PM	300KG7W	24E	1852.4 - 1907.6	2.5 PM	4M20F9W
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Power listed is conducted. This device contains functions that are not operational in U.S. Territories. This device is to be used only for mobile and fixed applications. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance. Antennas used for this OEM module must not exceed 4.0 dBi gain (GSM1900) and 3.37 dBi (GSM850) for mobile and fixed operating-configurations. This device is approved as a module to be installed in other devices.																														

IMPORTANT NOTES FCC GRANT FOR USA – CONT.



Power listed is conducted.

This device contains functions that are not operational in U.S. territories.

This device is to be used only for mobile and fixed applications.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

Antennas used for this OEM module must not exceed 4.0 dBi gain (GSM1900) and 3.37 dBi (GSM850) for mobile and fixed operating-configurations.

This device is approved as a module to be installed in other devices.

IN CASE OF CONFLICTS WITH THE MODULE'S FCC GRANT



- › Target: Change module's FCC grant to avoid conflicts
- › But: Changes to the grant may only be done by the grantee

either:

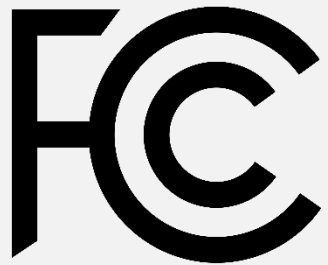
1. Change in ID (with the permission of the module manufacturer)
 - › The end-product manufacturer becomes the owner of the module's grant
2. Class II permissive change
to change the FCC grant conditions

specific testing is required e.g. SAR testing or emission testing

or:

1. Authorization by module manufacturer for the integrator or his agent to change the FCC grant
2. Class II permissive change
 - › to change the FCC grant conditions
 - › specific testing is required e.g. SAR testing or emission testing

STATUS AT BUREAU VERITAS



Bureau Veritas / 7layers is listed as accredited laboratory for the intentional and unintentional radiator part on the FCC website

ISED AUTHORISATION PROCEDURES

- › Telecommunication Apparatus
DoC – Declaration of Compliance
- › Category II Radio, Broadcasting and Interfering-Causing Equipment
SDoC – Suppliers Declaration of Compliance
- › Category I Radio and Broadcasting Equipment
Certification (RSP-100)
local representative required

Category I Equipment Standards List:

http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf01342.html

Category II Equipment Standards List:

http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf01340.html

ISED LABEL FOR CERTIFICATION

IC: XXXXXX-YYYYYYYYYYY, where:

- › “XXXXXX” is the Company Number (CN) assigned by ISED
newly assigned CNs are made of 5 numeric characters
existing CNs may consist of up to five numeric characters followed by an alphabetic character
- › “YYYYYYYYYYY” is the Unique Product Number (UPN) assigned by the applicant
made up of a maximum of 11 alphanumeric characters
- › The CN and UPN are limited to numeric (0-9) and capital alphabetic (A-Z) characters only

DIFFERENCES FCC / ISED EXAMPLES

DIFFERENCES BETWEEN FCC/ISED STANDARDS FOR INTENTIONAL RADIATORS

- › Nerve stimulation measurement required for transmitters operating in the frequency range 3 kHz to 10 MHz
- › Minor differences in bandwidth measurement (6 dB, 20 dB, 99% etc.)
- › Indoor/outdoor usage of 5 GHz WLAN devices
(UNII band I, only indoor use in Canada, exemption for vehicles)
- › Canadian representative required for Certifications
- › ...

06. Conclusion



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BV GLOBAL TYPE APPROVAL SERVICES

- › Worldwide network of
- › Local type approval consultants
- › BV/7layers accredited laboratories
- › Partner laboratories

- › Participates in major committees and review boards
- › Provides inside knowledge and understanding
- › Informs about the latest developments

- › Experience and knowledge base for more than 200 countries

You only need



one point of service!

- › Realistic time schedules for the approval process
- › Up-to-date know-how combined with years of experience
- › Distribution of all necessary subcontracting
- › Services on a fixed price basis for most countries worldwide



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