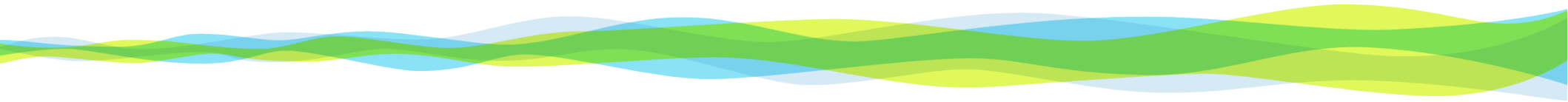# *Firmware Lockdown*

Updates 2017

Simon Wunderlich
(based on slides by Max Mehl, FSFE)
June 8th, 2017 – Wireless Battlemesh 2017

Agenda

1. Quick Facts

   Legal – Dates – Actors

2. Threats

   Scenarios – Concerned parties

3. Solutions?

   Alliance – Commission – ETSI

4. Uncertainties

5. Q&A

Simon Wunderlich

Quick Facts

- European "Radio Equipment Directive" (2014/53/EU)

- Successor of R&TTE (1999)

- Intentions

  - Harmonisation and modernisation of standards

  - Regulation of Software Defined Radio (SDR)

  - Avoid interferences with weather radars (5 GHz Wifi)

- Connected with FCC "Router Lockdown"

Simon Wunderlich

Quick Facts
Legal I

▶ "Radio Lockdown" is a small subset: Article 3(3)(i)

3(3) **Radio equipment** *[…] shall be so constructed that it complies with the following essential requirements:*

[…]

(i) supports **certain features** *in order to ensure that software can only be loaded into the radio equipment where the* **compliance of the combination** *of the radio equipment and software has been demonstrated.*

Quick Facts
Legal II

Radio Equipment

- ▶ <u>All newly introduced devices</u> which intentionally emit and/or receive radio waves for radio communication

- ▶ E.g. Laptops, Smartphones, Routers, IoT devices, TVs, FM Radios...

- ▶ Exceptions: (partly) radio amateurs, marine, airborne products, professional custom-built evaluation kits

Simon Wunderlich

Quick Facts
Legal III

Compliance of combination software/hardware

▶ Compliance with applicable radio regulations: frequency, strength, purity etc.

▶ Features like Dynamic Frequency Selection (DFS)

▶ To be assessed for every possible (third-party) software/hardware combination by manufacturers (Art. 17)

Certain features

▶ See later

Simon Wunderlich

Quick Facts
Legal IV

- Delegated Acts by EU Commission will define concerned devices

  *The Commission shall be empowered to adopt delegated acts [...] specifying which **categories or classes of radio equipment** are concerned by **each of the requirements** [...].*

- See Article 44 for DA details

Simon Wunderlich

Quick Facts
Important Dates

▶ April 2014:   adopted by European Parliament

▶ June 2016:   to be implemented in national laws

▶ **June 13, 2017:   new devices firstly made available on the market shall meet requirements (Art. 48)**

EC on April 7:   For missing standards not finished by ETSI yet, the old standards can apply temporarily

Simon Wunderlich

Quick Facts
Actors
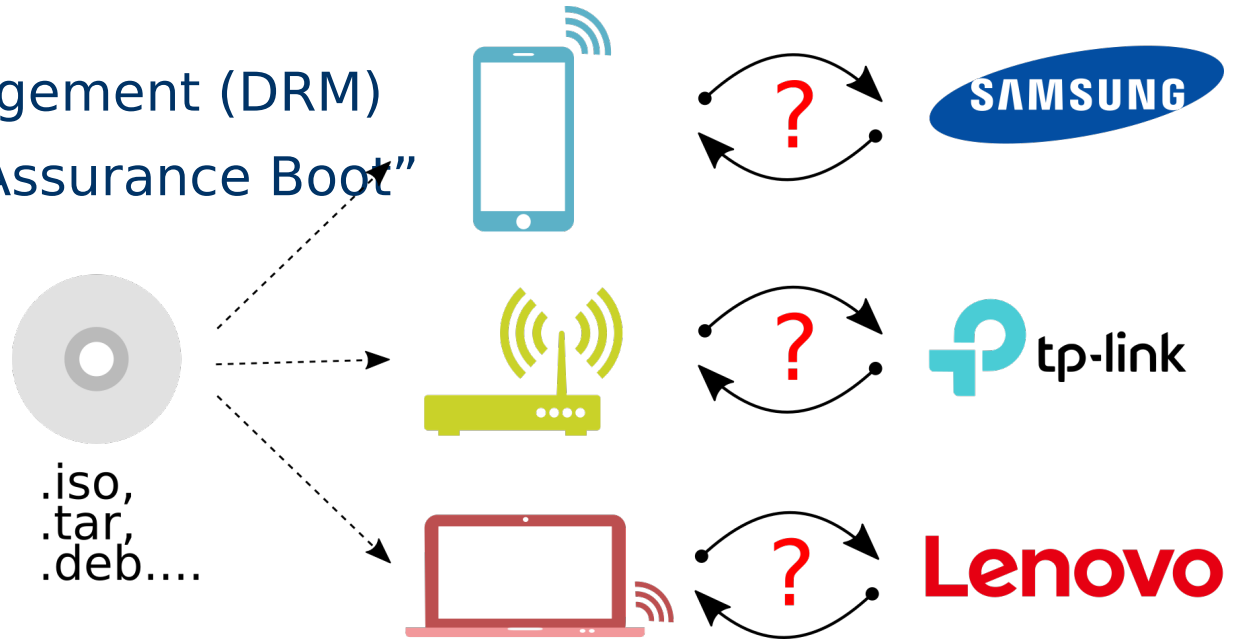
▶ ETSI (European Telecommunications Standards Institute)

▶ European Commission (DG Grow)

▶ European Parliament (rapporteurs)

▶ EU Member States (reporting, review, penalties)

Simon Wunderlich

Threats
Possible Scenarios I

▶ Signature-based verification of software

  ▶ Secure Boot

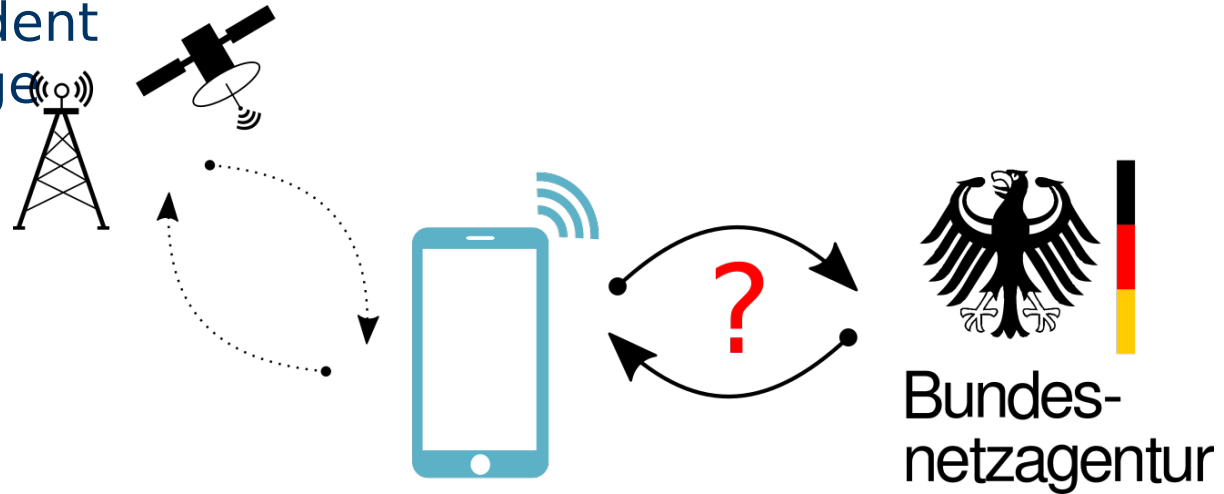 ▶ Digital Rights Management (DRM)

  ▶ Trustchains, "High Assurance Boot"

.iso,
.tar,
.deb....

Threats
Possible Scenarios II

- "Cognitive Radio"

  - Devices aware of their geographical location

  - Individual and spontaneous acquisition of limited radio usage permittance, dependent on location and usage

Threats
for...

- (Free Software) enterprises
    - Restriction of free competition
    - Disadvantages for software and hardware producers
    - Especially low-power Embedded devices manufactures
    - Especially third-party software creators
    - Unclear compliance assessment procedures
- Free Software projects (GNU/Linux, OpenWRT, Android)
    - Unclear scope of 3(3)(i)
    - Complicance assessment disadvantages
    - Additional bureaucracy

Simon Wunderlich

Threats
for...

- Security
  - Additional blackbox and complexity on devices
  - Disadvantage for privacy-friendly software
- Shift of legal Responsibility
  - Manufacturers shall prevent users from breaking rules
- Sustainability
  - No software updates after devices' End of Life
- Disproportion
  - Actual problem not solved: "Bad people" won't be stopped

Simon Wunderlich

Solutions?
Alliance

- Alliance with enterprise and community actors
- "Joint Statement against Radio Lockdown" (48 signees)

Simon Wunderlich

Solutions?
Commission

- Delegated Acts define concerned device classes/categories
    - See Art. 3(3), Art. 44
    - Earliest in 2-3 years
- EC's Expert Group on Reconfigurable Radio Systems
    - Prepare content of EU Commission's Delegated Acts
    - FSFE applied, no membership approvals yet

Simon Wunderlich

Solutions?
ETSI

▶ ETSI is supposed to interpret the Directive and work on new harmonised standards

  ▶ Influence the direction they're going

  ▶ Publish information and timeframes

Uncertainties

▶ Which devices and software affected?

▶ Does every software revision has to be assessed?

▶ When will harmonised standards be finished by ETSI? How will they interpret the requirements?

▶ Details of third-party software assessment?

▶ Opinion and status of industry actors?

▶ How can software developers' and users' rights be guaranteed?

Simon Wunderlich

Action Items

▶ Talk with us

▶ Sign the joint statement [1]

▶ Join the expert mailing list [2]

▶ Ask the Commission (DG Grow), ETSI, national authorities

[1] fsfe.org/activities/radiodirective/statement

[2] lists.fsfe.org/mailman/listinfo/radiodirective

Simon Wunderlich

FCC / US Situation

▶ TP-Link was forced to "find ways" to support open source software by the FCC, and fined $200.000

▶ However, TP-Link offended rules in 2.4 GHz originally

▶ Still, there were no changes to the FCC rules, although FCC saw this settlement as proof for to defend OSS

(personally, I don't think there was any improvement)

▶ Note: RED potentially restricts ANY radio, while the FCC rules only concern 5GHz capable devices

Thank you!

More information and links

fsfe.org/activities/radiodirective

lists.fsfe.org (radiodirective)

fsfe.org/donate

▶ Mail to max.mehl@fsfe.org if you want to help or get involved!

Simon Wunderlich

References

- 2014/53/EU Radio Equipment Directive: http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX%3A32014L0053

- ETSI's RED info page: http://www.etsi.org/technologies-clusters/technologies/regulation-legislation/red

- EC's RED info page: http://ec.europa.eu/growth/sectors/electrical-engineering/red-directive_en

- FSFE's analysis and statement: https://fsfe.org/activities/radiodirective/

- Expert mailing list: https://lists.fsfe.org/mailman/listinfo/radiodirective

- LWN artivcle: https://lwn.net/Articles/722197/

Simon Wunderlich