UWB15F PAG Checklist

Subpart 15F and KDB 393764 D01

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Note: The views expressed in this presentation are those of the authors and may not necessarily represent the views of the Federal Communications Commission.

UWB Operation Modes

Operation	Rule Part
Ground penetrating radars and wall imaging systems	§ 15.509
Through-wall imaging systems	§ 15.510
Surveillance systems	§ 15.511
Medical imaging systems	§ 15.513
*Vehicular radar systems – No longer under §15.515	§ 95M
Indoor UWB systems	§ 15.517
Handheld UWB systems	§ 15.519

*** Phased out per FCC 17-94 R&O adopted on 13 July 2017**

Common Requirements

- **Technical**
  - Bandwidth: 10 dB BW ≥ 500 MHz, or Fractional BW ≥ .2 (15.503(a)
  - Frequency of highest emission occurs within the UWB bandwidth (15.521(e)
  - Digital circuitry are subject limits as specified in (15.521(c))
  - General Part 15 (15.209) limits apply below 960 MHz
  - 15.505 Cross Reference (15.521(a))
  - Unwanted emissions must be measured over the frequency ranges as specified in 15.521(h)
- **Grant Restrictions**
  - UWB devices may not be employed for the operation of toys.
  - Operation onboard an aircraft, a ship or a satellite is prohibited (15.521(a)).

15.509: UWB GPR and Wall Imaging Systems

- **Technical Requirements**
  - UWB bandwidth shall be confined to below 10.6 GHz (15.509(a))
  - Shall incorporate a dead man switch (15.509(c))
  - Radiated emissions above 960 MHz shall conform to the mask specified in 15.509(d)
  - Radiated emissions in the 1164-1240 MHz and 1559-1610 MHz bands shall conform to more stringent emissions limits specified in 15.509(e)
  - Peak limit applies if highest amplitude emission is above 960 MHz (15.509(f))

- **Grant Restrictions 15.509(b)**
  - Limited to purposes associated with law enforcement, fire fighting, emergency rescue, scientific research, commercial mining, or construction.
  - Parties operating this equipment must be eligible for licensing under provisions of part 90
  - Requires coordination, as detailed in § 15.525

15.510: UWB Through-Wall Imaging Systems

- **Technical Requirements**
  - UWB bandwidth must be below 960 MHz or highest radiated emission frequency must be contained between 1.99 and 10.6 GHz
  - Devices operating with UWB bandwidth below 960 MHz:
    - Radiated (unwanted) emissions above 960 MHz shall conform to the mask specified in15.510(c)
    - Shall cease operation within 10 seconds of being released by an operator per 15.510(c)(3)
  - Devices operating with center frequency and frequency of maximum emission between 1.99 and 10.6 GHz:
    - Radiated emissions above 960 MHz shall conform to the mask specified in 15.510(d)
    - Peak EIRP limit of 0 dBm/50 MHz as specified in 15.510(d)(5)
  - Radiated emissions in the 1164-1240 MHz and 1559-1610 MHz bands shall conform to the more stringent emissions limits specified in 15.510(d)(4)
  - The device shall bear the following or similar statement in a conspicuous location on the device:
    - "Operation of this device is restricted to law enforcement, emergency rescue and firefighter personnel. Operation by any other party is a violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties." 15.510(e)

15.510: UWB Through-Wall Imaging Systems

- **Grant Restrictions**
  - For systems operating with the UWB bandwidth below 960 MHz under 15.510(c):
    - Operation of this device is limited to law enforcement, emergency rescue or firefighting organizations that are under the authority of a local or state government.
    - Parties operating this equipment must be eligible for licensing under the provisions of part 90
    - Requires coordination, as detailed in §15.525
  - For systems operating with center frequency and frequency of maximum emission between 1.99 and 10.6 GHz:
    - Parties (paid or volunteer) or organizations operating this equipment must hold a license issued by the FCC to operate a transmitter in the Public Safety Radio Pool under part 90. This equipment may be operated only for law enforcement applications, the providing of emergency services, and necessary training operations. §15.510(d)(1)

15.511: UWB Surveillance Systems

- **Technical Requirements**
  - The UWB bandwidth shall be contained between 1.99 GHz and 10.6 GHz (15.511(a))
  - Radiated emissions above 960 MHz shall conform to the mask specified in15.511(c)
  - Peak EIRP limit of 0 dBm/50 MHz applies (15.511(e))
  - Radiated emissions limits in the 1164-1240 MHz and 1559-1610 MHz bands specified in 15.511(d)
  - The device shall bear a statement in a conspicuous location on the device (15.511(f)):
    - "Operation of this device is restricted to law enforcement, emergency rescue and firefighter personnel. Operation by any other party is a violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties."
- **Grant Restrictions**
  - Operation under the provisions of this section is limited to fixed surveillance systems operated by law enforcement, fire or emergency rescue organizations or by manufacturers licensees, petroleum licensees or power licensees as defined in 47 CFR § 90.7.
  - Parties operating this equipment must be eligible for licensing under provisions of 47 CFR Part 90

15.513: UWB Medical Imaging Systems

- **Technical Requirements**
  - UWB bandwidth shall be contained between 3.1 GHz and 10.6 GHz (15.513(a))
  - Shall cease operation within 10 seconds of being released by an operator (15.513(c))
  - Radiated emissions above 960 MHz shall conform to the mask specified in15.513(d)
  - Peak EIRP limit of 0 dBm/50 MHz applies (15.513(f))
  - Radiated emissions in the 1164-1240 MHz and 1559-1610 MHz bands shall conform to limits specified in 15.513(e)
- **Grant Restrictions**
  - Limited to use at the direction of, or under the supervision of, a licensed health care practitioner
  - Requires coordination, as detailed in 47 CFR 15.525

15.515: UWB Vehicular Radar Systems

- This rule part is now obsolete
- Vehicular field disturbance sensors fall under Part 95M
- No new certifications permitted under § 15.515 after 20 September 2018 (15.37(l))
- No Class II permissive changes permitted after 1 January 2022 (§ 15.37(m))

15.517: UWB Indoor UWB Systems

- **Technical Requirements**
  - Restricted to indoor operation by nature of design and manual notice (15.517(a)(1))
  - Shall not be intentionally directed to perform outside functions, such as entry detection (15.517(a)(2)
  - The use of fixed outdoor mounted antennas is prohibited (15.517(a)(3)
  - Metal or underground storage tanks are considered indoors per (15.517(a)(4))
    - Also applies to devices constrained to usage in underground mines (via KDB inquiry response)
  - Shall transmit only when sending information to an associated receiver (15.517(a)(5))
  - The UWB bandwidth shall be contained between 3.1 GHz and 10.6 GHz (15.517(b))
  - Radiated emissions above 960 MHz shall conform to the mask specified in 15.517(c)
  - Peak EIRP limit of 0 dBm/50 MHz applies (15.517(e))
  - Radiated emissions in the 1164-1240 MHz & 1559-1610 MHz bands limits as specified in 15.517(d)
  - Must bear a statement in a conspicuous location on the device or in the instruction manual:
    - "This equipment may only be operated indoors. Operation outdoors is in violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties."

15.519: Handheld UWB Systems

- **Technical Requirements**
  - Must be primarily handheld while being operated (15.519(a))
    - Per 393764 D01 Q5, if handheld operation is not practical, operator must be able to exercise control over the device, or the object to which the device is affixed – Evaluated on a case-by-case basis.
  - Transmit only when it is sending information to an associated receiver and cease transmission unless it receives acknowledgement from an associated receiver at least every 10 seconds (15.519(a)(1))
  - The use of antennas mounted on outdoor structures prohibited (15.519(a)(2))
    - Antennas may be mounted only on the handheld UWB device
  - Handheld UWB devices may operate indoors or outdoors (15.519(a)(3))
  - The UWB bandwidth shall be contained between 3100 MHz and 10,600 MHz (15.519(b))
  - Radiated emissions above 960 MHz shall conform to the mask specified in 15.519(c)
  - Peak EIRP limit of 0 dBm/50 MHz applies (15.519(e))
  - Radiated emissions in the 1164-1240 MHz and 1559-1610 MHz bands limits as specified in 15.519(d)
- **Grant Restrictions**
  - Antennas mounted on outdoor structures such, as antennas mounted on the outside of a building or on a telephone pole, or any fixed outdoors infrastructure are prohibited for use with this device.

UWB Modular Approval

- UWB modular certification shall satisfy all conditions specified in §15.212
- In addition, KDB 393764 D01 (Q&A #7) stipulates that UWB modular approval will only be considered under §15.519, regardless of whether the device is intended for indoor or outdoor operation
  - All UWB transmitter modules will be subject to the emission limits of §15.519(c)
  - It is not necessary that UWB modules/host devices intended for indoor-only usage under §15.517 to be restricted solely to handheld applications provided that:
    - Host device must be by nature restricted to indoor-only operation
    - Host integration and user manuals must state that host device is restricted to indoor only operation and shall bear a statement on the device or in the instruction manual:

      "This equipment may only be operated indoors. Operation outdoors is in violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties."
  - UWB modules/host devices with any potential for outdoor usage shall comply with all the requirements of §15.519, including the handheld limitation

General Comments

- For the purpose of presentation, rule parts were abbreviated
  - Consult with FCC 47 CFR for exact text
- Please use only FCC rules terminology – Refrain from using standards, industry or vendor specific terminology
- Restrictions/notices should be reflected on grants, device (if required), and device documentation
- Include photo exhibits of statements applied to devices as applicable
- Module certification will require detail host restrictions and requirements in the integration and end user manuals
- When in doubt, open a KDB Inquiry