

**Variation to the Class Licence for Short Range Device to
Regulate the Use of and Trade in
Ultra-Wideband Radiocommunications Devices under
Section 7C of the Telecommunications Ordinance (Chapter 106)**

Consultation Paper

6 April 2018

INTRODUCTION

Ultra-Wideband (“UWB”) is a technology for short-range radiocommunications, involving the generation and transmission of very low power radio-frequency signal that spreads over a very large frequency range, typically of some 500 MHz. According to the International Telecommunication Union, devices employing UWB technology are not considered as operating under allocations to radiocommunications services and are normally required to operate in an unprotected and uncoordinated manner. UWB may be integrated into various applications such as short-range indoor and outdoor communications, medical imaging, radar imaging, material sensing, asset tracking, surveillance, etc. UWB devices have been available in the international market for some time. In most European countries, the United States, Mainland China and many countries in the Asia-Pacific region, UWB devices are allowed to be used either on a licence-exempted basis or under a class licensing regime.

2. In view of the recent demand from the industry, the Communications Authority (“CA”) proposes to vary the existing Class Licence for Short Range Device¹ (hereinafter referred to as the “Class Licence”) pursuant to sections 7C(1) and 7C(2) of the Telecommunications Ordinance (Cap 106) (“TO”) with a view to expanding its scope to regulate the possession, use and trading of UWB devices in Hong Kong. This paper seeks to consult the public and the industry on the CA’s proposal.

3. For the avoidance of doubt, views expressed on matters covered in this paper are for the purpose of discussion and consultation only. Nothing in this paper represents or constitutes a decision made by the CA. The consultation contemplated by this paper is without prejudice to the exercise of powers by the CA under the TO.

¹ The Class Licence for Short Range Device currently regulates the use of radiocommunications equipment operating in the 433 – 434.79 MHz band for short-range applications.

BACKGROUND

Relevant Statutory Provisions

4. Pursuant to section 7C(1) of the TO, the CA may vary the conditions of a class licence by notice in the Gazette. Pursuant to section 7C(2) of the TO, the CA may in varying a class licence –

- (a) specify further telecommunications networks, systems, installations or services that a person may supply under the licence;
- (b) vary or revoke the type telecommunications network, system, installation or service that a person may supply under the licence;
- (c) add conditions to the licence; and
- (d) vary or revoke conditions in the licence.

5. Pursuant to section 7C(4) of the TO, before varying a class licence, the CA shall by notice in the Gazette –

- (a) state that it proposes to vary the class licence specified in the notice;
- (b) state the subject matter of the variations to the class licence;
- (c) set out where a member of the public may purchase a copy of the class licence and the proposed variations;
- (d) invite members of the public who are interested to make representations by a date set out in the notice; and
- (e) give an address to which a member of the public may send representations about the proposed variation.

Class Licensing

6. Class licensing is commonly used by telecommunications regulators to license telecommunications networks, systems, installations or services that share the use of a limited set of common frequencies under a common set of conditions. A class licence sets out the conditions under which any person is permitted to operate and/or trade in the telecommunications networks, systems, installations or services. It is not issued to an individual user or trader. Since only minimal licence administration by the regulator is involved, it usually does not entail any licence fee. The former Telecommunications Authority (“TA”) has adopted

the class licensing approach since 2002 to regulate the use of telecommunications networks, systems, installations or services. Since then, a number of class licences were created, covering public wireless local area networking services, in-building telecommunications systems, 27 MHz citizens band radio stations, 433 MHz short-range devices (“SRD”), 60 GHz radiocommunications devices and 79 GHz automotive radar, etc.

Consultation on UWB Devices in 2009

7. In March 2009, the former TA conducted a public consultation on the proposed creation of a class licence for UWB devices². In the consultation paper, potential interference of UWB transmissions in the 3.1 – 10.6 GHz band to other radiocommunications services was assessed, with a particular focus on the possible impact to receiving earth stations in the fixed-satellite service operating in the 3.4 – 4.2 GHz band.

8. After considering the comments received during the consultation and the results of tests conducted by satellite operators after the consultation, the former TA issued a statement (“the TA Statement”)³ in March 2010 summarising the technical issues on UWB and responding to concerns of satellite operators. The former TA concluded that UWB devices might operate in the frequency range from 3.1 GHz to 10.6 GHz in Hong Kong and that the class licence would be the appropriate regulatory vehicle for regulating such use of UWB devices. Nevertheless, given the limited availability of such devices in the market at that time, the former TA decided not to create the class licence immediately but to monitor the market situation for a period of 18 months from the date of the TA Statement. If there was sufficient evidence within that period indicating that UWB-enabled consumer products would proliferate in Hong Kong, the former TA would proceed to create the class licence. As UWB-enabled products were not widely available in Hong Kong and there was no request from the industry for creation of the class licence at that time, the class licence for UWB devices was not created in the end.

Development of UWB

9. In 2011, the Institute of Electrical and Electronics Engineers (“IEEE”) released an amendment to IEEE 802.15.4, an industry standard for low-rate wireless personal area networks, to expand the scope of the standard to cover UWB operation in frequencies from below 1 GHz up to 10 GHz.

² See <http://tel.archives.ofca.gov.hk/en/report-paper-guide/paper/consultation/20090320.pdf>.

³ See <http://tel.archives.ofca.gov.hk/en/tas/others/tas20100330.pdf>.

This facilitates the industry in deployment of the UWB technology. The IEEE 802.15.4 standard specifies 16 channels for UWB operation: one below 1 GHz, four in the low-band 3.1 – 4.8 GHz, and eleven in the high-band 6 – 10 GHz, most of about 500 MHz bandwidth. One channel in the low-band at about 4.2 – 4.8 GHz and another in the high-band at about 7.7 – 8.3 GHz are specified as the mandatory channels for UWB deployment.

10. In Europe, over the years, the European Telecommunications Standards Institute has developed the EN 302 065 series of European harmonised standards that specify the technical requirements of UWB devices to ensure the effective use of spectrum without causing harmful interference. These standards cover UWB devices for a variety of applications including generic applications (EN 302 065-1), location tracking (EN 302 065-2), ground-based vehicular applications (EN 302 065-3), material sensing (EN 302 065-4), and use on board aircraft (EN 302 065-5). In the United States, the rules of the Federal Communications Commission (“FCC”) applicable to UWB devices are Code of Federal Regulations, FCC Part 15 Subpart F (“FCC Part 15F”). These rules also cover various applications of UWB devices, including medical imaging systems, ground penetration radars, wall imaging systems, surveillance systems, etc.

11. After years of development and efforts of the standardisation bodies, UWB has now become a mature and commercially viable technology. It may be deployed in consumer products and applications in various industry sectors, including automotive, healthcare, factory automation, electronic point of sale, retail, etc. At present, most European countries, the United States, Mainland China and many countries in the Asia-Pacific region already have the regulatory frameworks in place permitting the use of UWB devices.

PROPOSAL

Regulating UWB Devices

12. The Office of the Communications Authority (“OFCA”) recently received requests from the industry for supplying UWB-enabled consumer products in Hong Kong in the near future. With such market development in mind, the CA considers it timely to revisit the need of regulating the possession, use and trading of UWB devices in Hong Kong and would like to set out a proposed licensing regime for public consultation.

Existing Class Licence for Short Range Device

13. SRD are low power radiocommunications devices which provide either unidirectional or bi-directional short-range radiocommunications. They may be deployed for a wide range of wireless applications including radio-activated car key, remote controller, radio frequency identification (“RFID”) device, wireless computer peripheral, etc. In 2011, after conducting a public consultation, the former TA varied the class licence originally covering RFID tag operating in the 433 – 434.79 MHz band to cover also other SRD operating in the same frequency band (SRD operating in the 433 – 434.79 MHz band are hereinafter referred to as “433 MHz devices”).

14. With low power transmission, UWB devices are intended for short-range applications and fall within the scope of SRD. Instead of creating a new class licence for UWB devices, the CA proposes that the existing Class Licence should be varied to include the use of UWB devices.

15. The existing Class Licence for Short Range Device permits the use, but not the trading, of 433 MHz devices. As 433 MHz devices are commonly used in Hong Kong and it is anticipated that UWB devices will also be commonly used in the future, the CA proposes that the existing Class Licence should be varied to cover the sale of such devices as well in order to facilitate traders in doing business.

Variation to the Existing Class Licence for Short Range Device

16. In gist, the CA proposes to vary the Class Licence under sections 7C(1) and 7C(2) of the TO with a view to expanding its scope to regulate –

- (a) the use of UWB devices in addition to the existing 433 MHz devices; and
- (b) trading activities in relation to SRD (i.e. UWB devices and 433 MHz devices), including the related sale and demonstration activities, which would otherwise be subject to individual licensing requirements under the radio dealers licensing regime.

Frequency Bands for UWB Devices

17. As stated in the TA Statement, UWB devices could be allowed to operate in a wide frequency range from 3.1 GHz to 10.6 GHz in Hong Kong. On the other hand, notwithstanding the industry’s interests in UWB applications, the use and deployment of UWB devices in Hong Kong, if they are allowed, remains to be observed. In order to better serve the general

public and the industry, it is advisable that some frequency bands below 10 GHz be opened up for UWB operation initially. In this regard, the CA considers that the 4.2 – 4.8 GHz and 6 – 8.5 GHz bands, which include the two mandatory channels advocated by IEEE and the channels recently requested by the industry, should be opened up for UWB operation at the initial stage as they already cover most UWB applications. Depending on future development and demand, the CA will review the situation in due course and decide on whether more frequency bands should be opened up for UWB operations as well. Based on the above considerations, the CA proposes to designate the 4.2 – 4.8 GHz and 6 – 8.5 GHz bands for UWB operation.

Power Limits for UWB Devices

18. As stated in the TA Statement, UWB devices operating in the 4.2 – 4.8 GHz and 6 – 8.5 GHz bands should operate at mean power spectral density not exceeding -41.3 dBm/MHz equivalent isotropically radiated power (“EIRP”) and such power limit would be tightened to -70 dBm/MHz for devices operating in the 4.2 – 4.8 GHz band without employing mitigation techniques⁴. The said limit of -41.3 dBm/MHz EIRP is the least stringent limit for UWB devices operating in the 4.2 – 4.8 GHz and 6 – 8.5 GHz bands as specified in the current EN 302 065 series of the European harmonised standards and FCC Part 15F. Depending on specific types of UWB applications and whether mitigation techniques are implemented, the EN 302 065 series standards specify more stringent limits than -41.3 dBm/MHz EIRP essentially in line with that stated in the TA Statement. As such, the CA proposes that the power limit of -41.3 dBm/MHz EIRP should generally be adopted for UWB devices operating in the 4.2 – 4.8 GHz and 6 – 8.5 GHz bands, subject to the compliance of such devices with the specification, which may impose more stringent limits depending on the types of UWB applications and whether mitigation measures are implemented, as set out in paragraph 19 below.

HKCA Performance Specification for UWB Devices

19. The CA proposes that UWB devices shall comply with a new performance specification, HKCA 1080, developed by OFCA after taking into account the following widely recognised standards for UWB –

EN 302 065-1 “Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard

⁴ Such mitigation techniques include detect and avoid, low duty cycle, etc. which are implemented to minimise interference from UWB devices to other legitimate radiocommunications equipment.

covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 1: Requirements for Generic UWB applications”

EN 302 065-2 “Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 2: Requirements for UWB location tracking”

EN 302 065-3 “Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 3: Requirements for UWB devices for ground based vehicular applications”

EN 302 065-4 “Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 4: Material Sensing devices using UWB technology below 10.6 GHz”

Code of Federal Regulations (USA); Title 47 Telecommunication; Chapter I Federal Communications Commission, Part 15 Radio Frequency Devices: Subpart F – Ultra-Wideband Operation

The Varied Class Licence

20. The proposed varied Class Licence (with the proposed amendments highlighted) is at **Appendix 1**. It authorises a person to establish, maintain, possess, use, deal in the course of trade or business in or demonstrate, with a view to sale in the course of trade or business, SRD operating within the 4.2 – 4.8 GHz and 6 – 8.5 GHz bands or the 433 – 434.79 MHz band, without the need to obtain an individual licence. Major conditions and technical requirements of the proposed varied Class Licence are set out below –

- (a) same as 433 MHz devices, the Class Licence does not authorise provision of any public telecommunications service with the use of UWB devices (which will be subject to separate consideration by the CA if any such request arises in the future);

- (b) same as 433 MHz devices, UWB devices will share the use of the relevant frequency bands with other legitimate devices and applications in an uncoordinated and unprotected manner. In other words, users will not be protected from harmful interference and shall use the frequency bands in such a way to cause no harmful interference to other legitimate telecommunications service or apparatus; and
- (c) UWB devices must comply with the proposed new performance specification HKCA 1080 entitled “Performance Specification for Short Range Devices Operating in the 4.2 – 4.8 GHz and/or 6 – 8.5 GHz Bands Employing Ultra-Wideband Technology” (at **Appendix 2**).

INVITATION OF VIEWS AND COMMENTS

21. Pursuant to section 7C(4) of the TO, the CA invites views and comments on the proposed variation of the Class Licence (with the varied terms and conditions therein), and the new performance specification HKCA 1080 as proposed in this consultation paper. After considering the views and comments received, the CA will finalise the variation of the Class Licence primarily to regulate UWB devices.

22. Any person wishing to respond to the public consultation should do so on or before 4 May 2018, i.e. four weeks from the date of this consultation paper. **Late submission will not be considered.** The CA may publish all or part of the views and comments received, and disclose the identity of the source in such manner as the CA sees fit. Any part of the submissions considered commercially confidential should be clearly marked. The CA would take such markings into account in making the decision as to whether or not to disclose such information. Submissions should be sent to –

Office of the Communications Authority
29/F Wu Chung House
213 Queen’s Road East
Wanchai, Hong Kong

Attention: Senior Telecommunications Engineer
(Spectrum Planning) 1

Fax: 2803 5112

Email: spenq@ofca.gov.hk

An electronic copy of the submission should be provided by email to the address indicated above.

Office of the Communications Authority
6 April 2018

Draft

TELECOMMUNICATIONS ORDINANCE
(Chapter 106)

CLASS LICENCE

SHORT RANGE DEVICE

The ~~Telec~~ommunications Authority, in exercise of the powers conferred on ~~it~~ ~~him~~ by sections 7(5) and 7B(2) of the Telecommunications Ordinance (Chapter 106), issues this Licence on this ~~[13th]~~ day of ~~[May, 2018]~~.

1. Interpretation

1.1 In this Licence –

“Authority” means the ~~Telec~~ommunications Authority⁺ ~~appointed under established by~~ section ~~3 5~~ of the ~~Communications Authority Ordinance (Chapter 616)~~;

“Licensee” means a person licensed under Condition 2 of this Licence;

“Ordinance” means ~~the~~ Telecommunications Ordinance (Chapter 106);

“Short Range Device” means a radio station falling within the description of the Schedule to this Licence; and

“Telecommunication Convention” means any Constitution and Convention of the International Telecommunication Union and the Radio Regulations annexed thereto, which have from time to time or at any time been acceded to by or applied to Hong Kong.

1.2 Any word or expression used in this Licence shall, unless otherwise provided, have the same meaning as it has in the Ordinance or regulations made under the Ordinance.

1.3 For the purposes of interpreting this Licence, headings and titles shall be disregarded.

~~⁺ Pursuant to Section 27 of the Communications Authority Ordinance, the “Telecommunications Authority” referred to in this Class Licence shall be construed as the “Communications Authority”.~~

2. Grant of Licence

- 2.1 Subject to the terms and conditions of this Licence, a person is licensed to establish, maintain, possess, ~~and use,~~ deal in the course of trade or business in and demonstrate, with a view to sale in the course of trade or business, the Short Range Device ~~described in the Schedule.~~

3. General

- 3.1 This Licence shall not be construed as granting an exclusive right to the Licensee.
- 3.2 This Licence replaces any licence or any exemption from licensing for the establishment, maintenance, possession and ~~or~~ use of, dealing in the course of trade or business in and demonstration, with a view to sale in the course of trade or business, of the Short Range Device, however described, which the Authority may have granted to the Licensee.
- 3.3 This Licence shall remain in full force unless expressly revoked by the Authority.

4. Compliance Generally

- 4.1 The Licensee shall comply with the Ordinance, regulations made under the Ordinance, licence conditions or any other instruments which may be issued by the Authority under the Ordinance and such guidelines or codes of practice which may be issued by the Authority as in ~~his~~ its opinion are suitable for the purpose of providing practical guidance on any particular aspect of any conditions of this Licence.
- 4.2 The Licensee shall observe and comply with all provisions of the Telecommunication Convention relevant to ~~the establishment, maintenance, possession, operation and/or use of~~ the Short Range Device.
- 4.3 The Licensee shall not use the Short Range Device to provide a public telecommunications service, except under and in accordance with an appropriate licence granted by the Authority.

5. Interference

- 5.1 ~~Where the Licensee establishes, operates, maintains or uses the Short Range Device, The-the~~ Licensee shall take reasonable measures to do so establish, operate, maintain and use the Short Range Device in such a way as ~~not~~ to cause ~~any-no~~ direct or indirect harmful interference with any lawful telecommunications service or any telecommunications apparatus licensed or authorised under the Ordinance.
- 5.2 The Authority may give such reasonable directions as ~~he-it~~ thinks fit to prevent any direct or indirect harmful interference referred to in Condition 5.1. The Licensee shall comply with the directions.
- 5.3 The Licensee shall make the Short Range Device available for inspection and testing, if so required, by any person authorised for the purpose by the Authority.
- 5.4 The Licensee should be aware that the frequencies allocated to the Short Range Device are shared with other applications in an uncoordinated manner and ~~are therefore~~ not protected from harmful interference caused by other telecommunications installations or radio equipment operating in accordance with the provisions of the Ordinance, or regulations or orders made under the Ordinance.

6. Technical Criteria

- 6.1 The Licensee shall ensure that any Short Range Device that it they establishes, maintains, operates, and uses, at all times deals in the course of trade or business in, and demonstrates, with a view to sale in the course of trade or business, the Short Range Device which shall at all times fully complies-comply with the technical criteria and technical specifications specified in the Schedule.

SCHEDULE

Short Range Device

A Short Range Device under this Licence refers to a radio station for short range radiocommunications. ~~The~~ A Short Range Device shall comply with the relevant technical criteria below and the technical specifications (issued by the Authority pursuant to section 32D of the Ordinance) applicable to the relevant frequency bands as listed respectively in Part I and/or Part II below. ~~HKCA 1061 issued by the Authority pursuant to section 32D of the Ordinance.~~

Technical Criteria and Technical Specifications

Part I

Frequency band: 433.00 – 434.79 MHz

Maximum power: 10 mW effective radiated power

Technical specification: HKCA 1061 “Performance Specification for Short Range Devices Operating in the 433 MHz Band”

Part II

Frequency band: 4.2 – 4.8 GHz
6 – 8.5 GHz

Maximum power: -41.3 dBm/MHz mean power spectral density
equivalent isotropically radiated power

Technical specification: HKCA 1080 “Performance Specification for Short Range Devices Operating in the 4.2 – 4.8 GHz and/or 6 – 8.5 GHz Bands Employing Ultra-Wideband Technology”

D R A F T

HKCA 1080
ISSUE 1
[Date]

**PERFORMANCE SPECIFICATION FOR
SHORT RANGE DEVICES
OPERATING IN THE 4.2 – 4.8 GHz
AND/OR 6 – 8.5 GHz BANDS
EMPLOYING ULTRA-WIDEBAND
TECHNOLOGY**

FOREWORD

1. This specification is prescribed under section 32D of the Telecommunications Ordinance (Cap 106) (“the Ordinance”) to set out set out the technical requirements for Short Range Devices (SRD) operating in the 4.2 - 4.8 GHz and/or 6 - 8.5 GHz bands employing ultra-wideband technology. Radiocommunications apparatus falling into the scope of this specification shall meet the stipulated requirements.
2. Under the Ordinance, the possession or use of any radiocommunications apparatus or any apparatus emitting radio frequency energy must be covered by an appropriate licence issued by the Communications Authority (CA) with the exception of those specifically exempted from licensing under the Ordinance, such as those covered by the Telecommunications (Telecommunications Apparatus)(Exemption from Licensing) Order.
3. At present, the Office of the Communications Authority (OFCA) operates a Hong Kong Telecommunications Equipment Evaluation and Certification (HKTEC) Scheme. Details of the HKTEC Scheme can be found in the information note OFCA I 421. Under the Scheme, suppliers or manufacturers of the radiocommunications apparatus may apply for certification of their apparatus against this specification. The application procedures for certification of radiocommunications apparatus can be found in the information note OFCA I 401. A prescribed label may be affixed to the certified equipment. Details of the labelling arrangement can be found in the Standardisation Guide HKCA 3211.
4. The CA may amend any part of this specification as and when it deems necessary.
5. In case of doubt about the interpretation of this specification, the methods of carrying out the test and the validity of statements made by the equipment manufacturers or suppliers about the equipment, the decision of the CA shall be final.
6. The HKCA specifications and information notes issued by the CA can be downloaded from OFCA’s website at <http://www.ofca.gov.hk>. Enquiries about this specification may be directed to:

Senior Telecommunications Engineer
Standards Section
Office of the Communications Authority
29/F Wu Chung House
213 Queen’s Road East
Wanchai
Hong Kong

Fax : +852 2838 5004
Email : standards@ofca.gov.hk

AMENDMENT HISTORY

Item	Issue No.	Paragraph	Descriptions
1.	Issue 1 [Date]	All	First release

CONTENTS

1. Scope of Specification
2. Electrical Safety Requirements
3. Technical Requirments
4. Evaluation Requirements
5. Reference

1. SCOPE OF SPECIFICATION

This specification defines the minimum performance requirements for Short Range Devices (SRD) operating in the 4.2 – 4.8 GHz and/or 6 – 8.5 GHz frequency bands employing ultra-wideband technology (hereafter referred to as “the equipment”).

2. ELECTRICAL SAFETY REQUIREMENTS

If the equipment is for connection to the public telecommunications networks, it shall comply with the electrical safety requirements set out in HKCA 2001 “Compliance Test Specification - Safety and Electrical Protection Requirements for Subscriber Telecommunications Equipment” issued by the Communications Authority (CA).

3. TECHNICAL REQUIREMENTS

3.1 The equipment shall meet the following technical requirements:

- (a) Frequency bands: 4.2 – 4.8 GHz and/or
6 – 8.5 GHz
- (b) Maximum mean spectral
power density (e.i.r.p.): – 41.3 dBm/MHz

3.2 The equipment shall meet the technical requirements in accordance with the appropriate standard in the following list:

- (i) ETSI EN 302 065-1 “Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 1: Requirements for Generic UWB applications”
- (ii) ETSI EN 302 065-2 “Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 2: Requirements for UWB location tracking”
- (iii) ETSI EN 302 065-3 “Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 3: Requirements for UWB devices for ground based vehicular applications”
- (iv) ETSI EN 302 065-4 “Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 4: Material Sensing devices using UWB technology below 10.6 GHz”

- (v) Code of Federal Regulations (USA); Title 47 Telecommunication; Chapter 1 Federal Communications Commission, Part 15 Radio Frequency Devices: Subpart F— “Ultra-Wideband Operation”

4. EVALUATION REQUIREMENTS

Compliance of the equipment with the technical requirements shall be evaluated in accordance with the procedures specified in any one of the standards stated in clause 3.2.

5. REFERENCE

- (i) ETSI EN 302 065-1 “Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 1: Requirements for Generic UWB applications”
- (ii) ETSI EN 302 065-2 “Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 2: Requirements for UWB location tracking”
- (iii) ETSI EN 302 065-3 “Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 3: Requirements for UWB devices for ground based vehicular applications”
- (iv) ETSI EN 302 065-4 “Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 4: Material Sensing devices using UWB technology below 10.6 GHz”
- (v) Code of Federal Regulations (USA); Title 47 Telecommunication; Chapter 1 Federal Communications Commission, Part 15 Radio Frequency Devices: Subpart F— “Ultra-Wideband Operation”

- END -