

UWB15F Ultra-wideband devices operating under Part 15 Subpart F § 15.519.

1. Show that the device mode operation is permissible under the Part 15 subpart.

FCC Part 15.519 requires the device to be hand held. The device is small enough to fit in the palm of a hand and will be attached to the user's clothing.

KDB 393764 D01 UWB FAQ v02r01 Q5/A5 provides guidance on what kinds of devices can be considered "hand held" under rule Part 15.519:

"A small size UWB device that is intended to operate outdoors on a frequent basis and is capable of operating without the need for fixed infrastructure installation (e.g., antennas mounted on poles or towers). Where it is not practical for the device to actually be held in a person's hand during operation, it is sufficient to show that the operator can exercise control over the device, or the object to which the device is affixed, while the device is operating."

The device is small and fits within the palm of the hand. It is self-contained and requires no additional tower or pole-mounted antennas. We therefore believe that it can be considered hand-held and certified under Part 15.519



2. Specify if § 15.250 (15C) is used as alternative to § 15.519.

A: § 15.250 is not used as alternative nor can be used because it utilizes frequencies other than the band 5925–7250 MHz which are allowed under provision of this section.

3. Show that KDB 393764 Q6 is being followed.

Question 6: What compliance information should be included with an application for certification?

A: We provide all necessary documentation:

- UWB Application category: **hand-held device / 15.519**
- Lower and upper -10 dB frequencies: **3993.6 – 6489.6 MHz**

3.2.6 Results

Test Results				
Channel [MHz]	Emission [MHz]	Power [dBm EIRP]	Limit [dBm EIRP]	Margin [dB]
3993.6	3988.21	-4.3	0	-4.3
6489.6	6491.74	-9.3	0	-9.3

- Maximum radiated emissions: pg 33 of report

Highest emissions with respect to limit

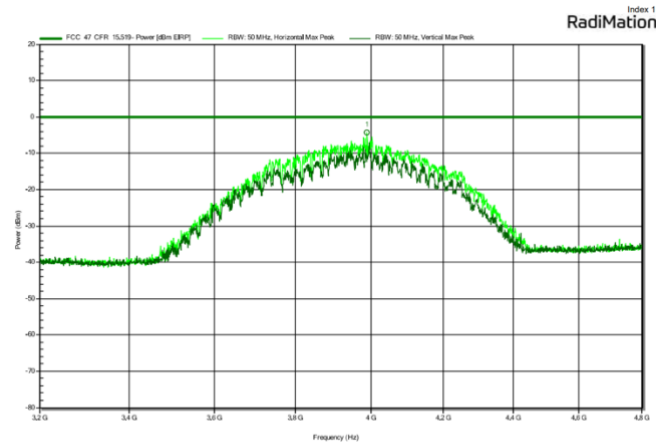
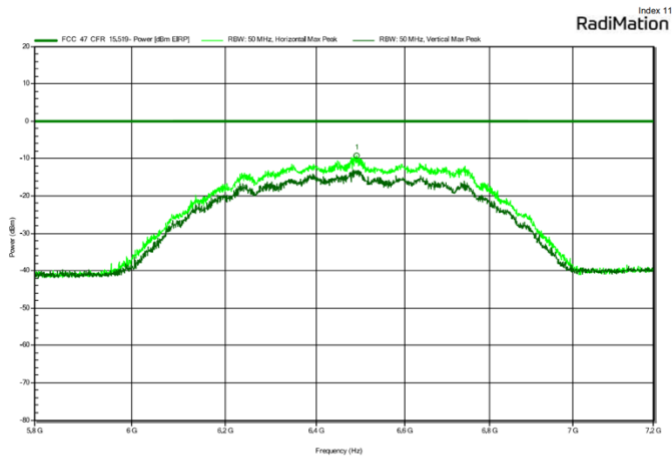
6489.6 GHz, emission level = -42.9 dBm peak. Limit = -41.3 dBm Margin = 1.6 dB

Test Results - above 960 MHz						
Channel [MHz]	Emission [MHz]	Level [dBm]	Det.	Pol.	Limit [dBm]	Margin [dB]
3993.6	2478.048	-66.9	RMS	hor	-61.3	-5.56
3993.6	3993.6	-43.5	RMS	hor	-41.3	-2.17
3993.6	7987.2	-62.2	RMS	ver	-41.3	-20.94
3993.6	39897.4	-67.5	RMS	ver	-61.3	-6.17
6489.6	6489.6	-42.9	RMS	hor	-41.3	-1.6
6489.6	17835.6667	-65.2	RMS	ver	-61.3	-3.85
6489.6	39899.2	-67.6	RMS	ver	-61.3	-6.29

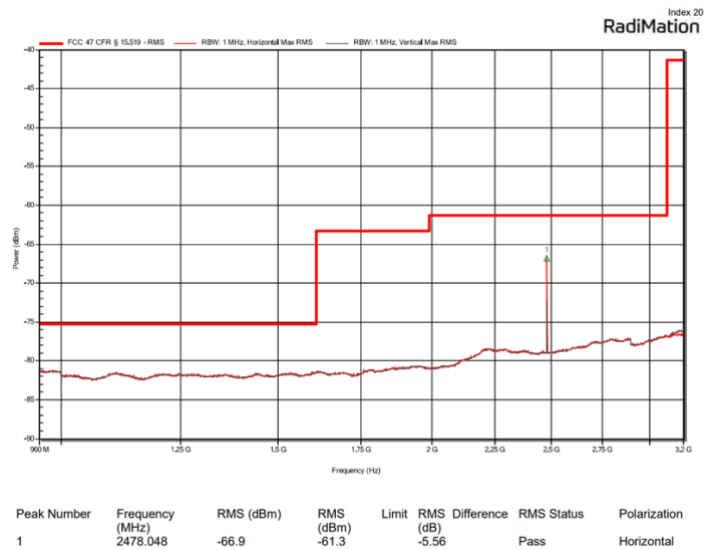
- If applicable, noise-floor measurements: **Not applicable**
- If applicable, digital circuitry emissions that exceed UWB limits: **Not applicable**

KDB 338624 D02 - APPENDIX UWB15F - CHECKLIST FOR THE PAG REVIEW
FCC ID: 2AK6M-52445055

- Frequency vs. amplitude plots depicting
 - o fundamental emission



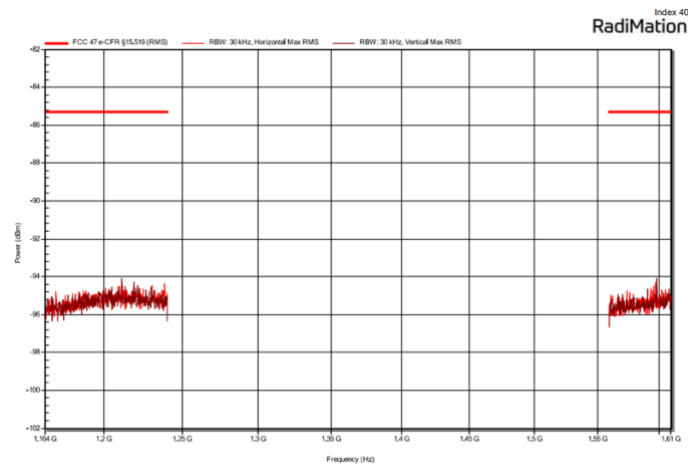
- o Out-of-band-emission



3.2.6 Results

Test Results				
Channel [MHz]	Emission [MHz]	Power [dBm EIRP]	Limit [dBm EIRP]	Margin [dB]
3993.6	3988.21	-4.3	0	-4.3
6489.6	6491.74	-9.3	0	-9.3

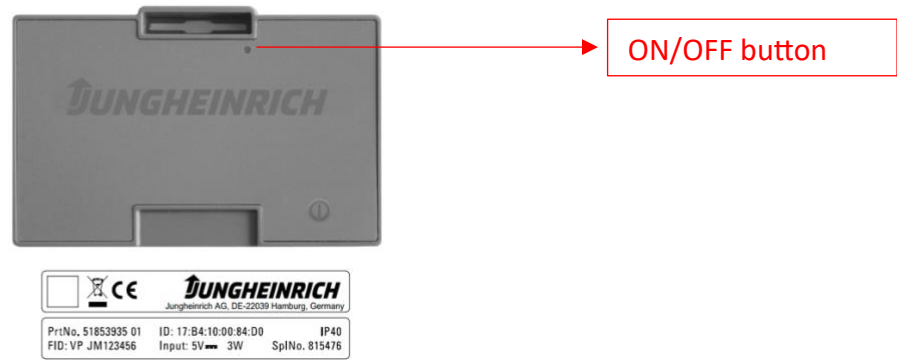
Emission in GPS band



Limits - GPS Band					
Frequency [MHz]	Bandwidth	Detector	Power [dBm EIRP]	Field Strength [dBµV/m@3m]	Field Strength [dBµV/m@1m]
1164-1240	1 kHz	RMS	-85.3	9.9	19.5
1559-1610	1 kHz	RMS	-85.3	9.9	19.5

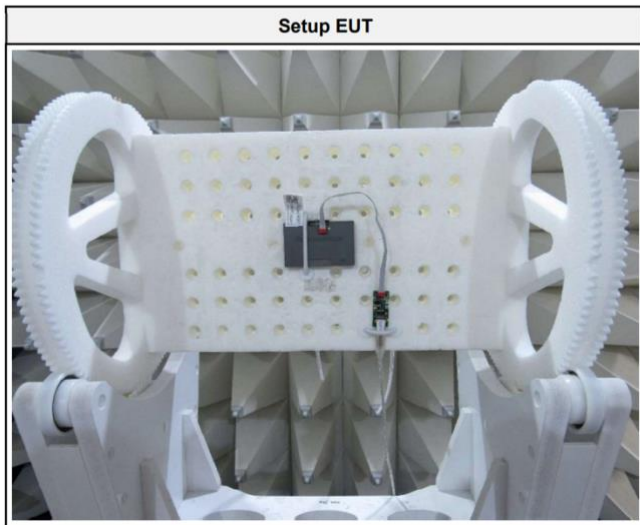
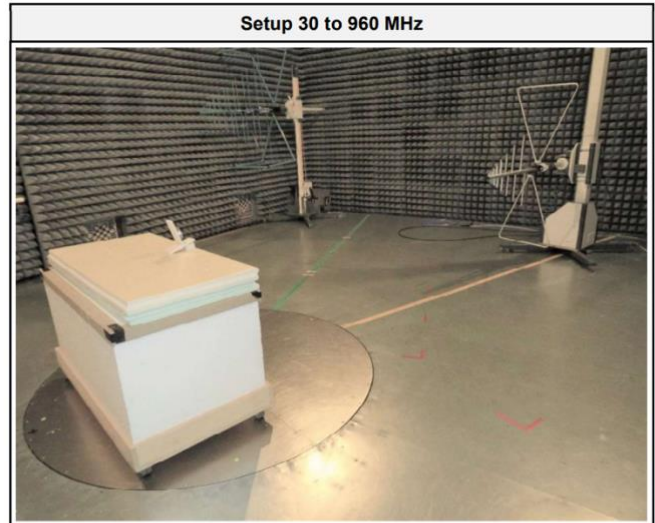
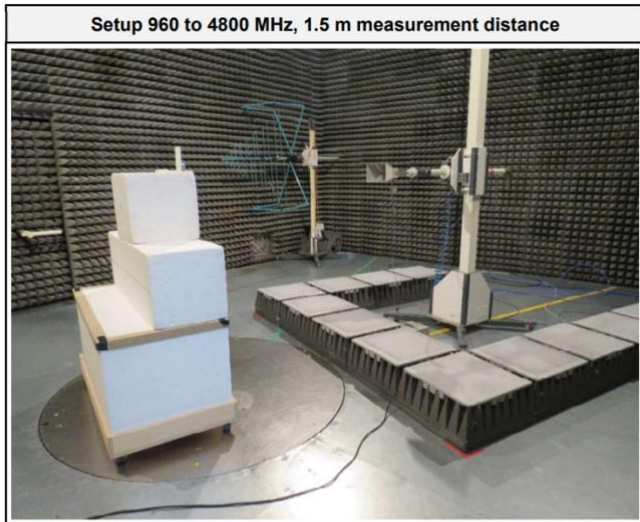
Location of operating labels and/or disable switch

4.2 Personnel tag



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- Test setup photos



See EMC test report G0M-2403-2508-TFC15FUW-V01 for original source of all of the above information,

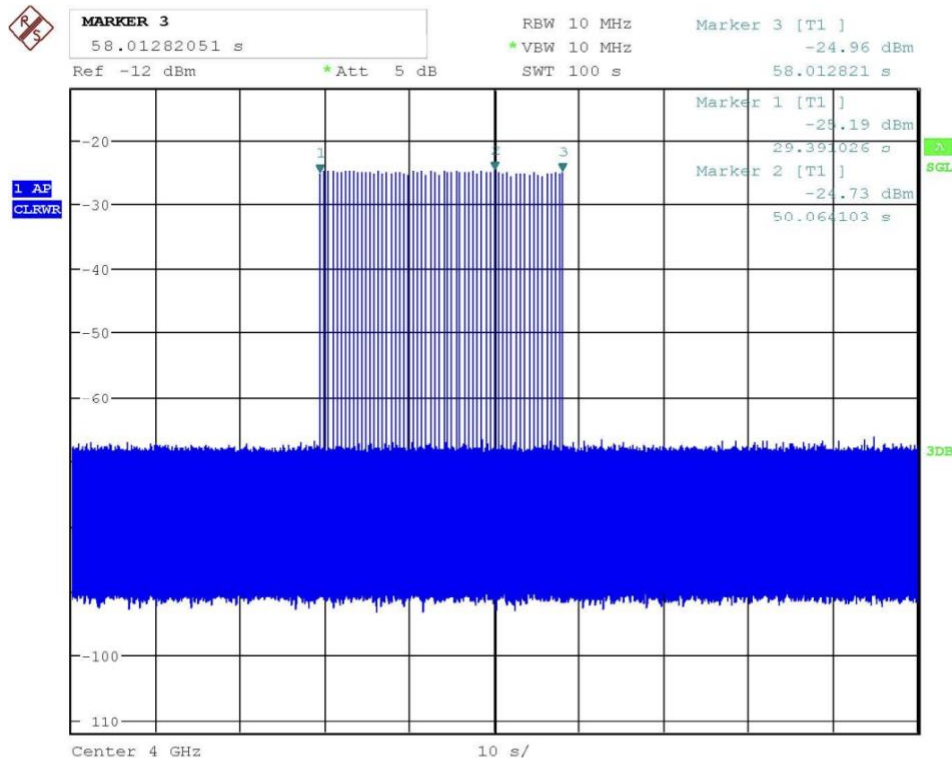
4. Account for all technical requirements specific to each UWB mode of operation.

All technical requirements are met. See operational description.

Especially “§15.519 (1) ... cease transmission within 10 seconds ...” is implemented and tested in Eurofins test report G0M-2403-2508-TFC15FUW-V01 in Section 3.3.

Cease of transmitter operation test

Project Number: G0M-2403-2497
Applicant: Jungheinrich AG
Model Description: UWB-Location-System is able to measure distances between the UWB components
Model: 52445055, Person Tag
Test Sample ID: 48553
Test Site: Eurofins Product Service GmbH
Operator: Mr. Siddique
Mode: Tx; 3993.6 MHz, BPSK, UWB
Test Date: 2024-08-02



Date: 2.AUG.2024 12:59:37

Marker Number	Time(s)	Comment
1	29.391	Start of communication between EUT and companion device
2	50.064	Companion device was turned off
3	58.013	Cease of transmit from EUT

5. Verify that §15.519 devices do not utilize fixed infrastructure.

Due to the nature of its design, the product family FCC ID: 2AK6M-52445055 used to track the position of a person. Therefore it is attached to a person.

In according to §15.519 it cannot be mounted on fixed infrastructure. Furthermore, it makes no sense to mount the device permanently, as its use case is to locate its position when it is indoors.

6. Verify requirements and restrictions for UWB modular approvals.

Not applicable. The product family FCC ID: 2AK6M-52445052 is not a radio module nor incorporates a radio module.

7. TCB to include §15.521(a) statement on Grant Restrictions and verify the required device/user manual for all UWB modes of operation.

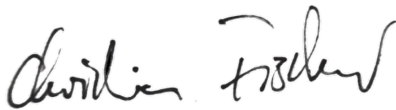
See statement in User Manual at page 42.

Note

FCC Regulations §15.521 - Technical requirements applicable for all UWB devices.

(a) UWB devices may not be employed for the operation of toys. Operation onboard an aircraft, a ship or a satellite is prohibited.

Grant note: "Not for use on fixed infrastructure. UWB devices may not be employed for the operation of toys. Operation onboard an aircraft, a ship or a satellite is prohibited."



NAME	Christian Fischer
TITLE	
COMPANY	Jungheinrich AG