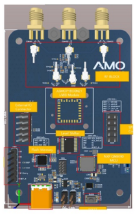

AMOSENSE AMO UWB Module Series EVB User Guide

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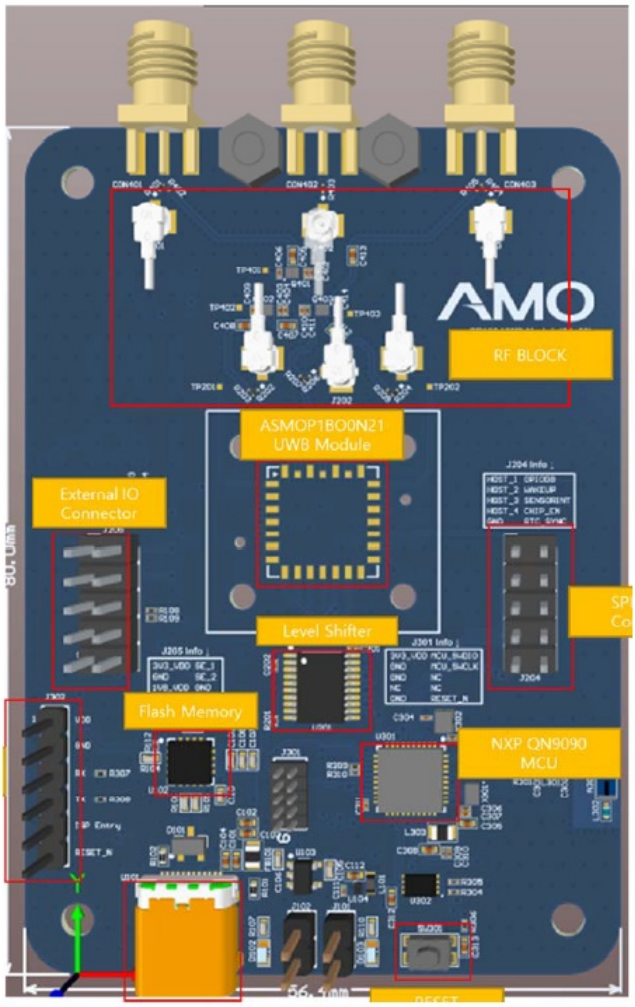
AMOSENSE AMO UWB Module Series EVB



REVISION HISTORY

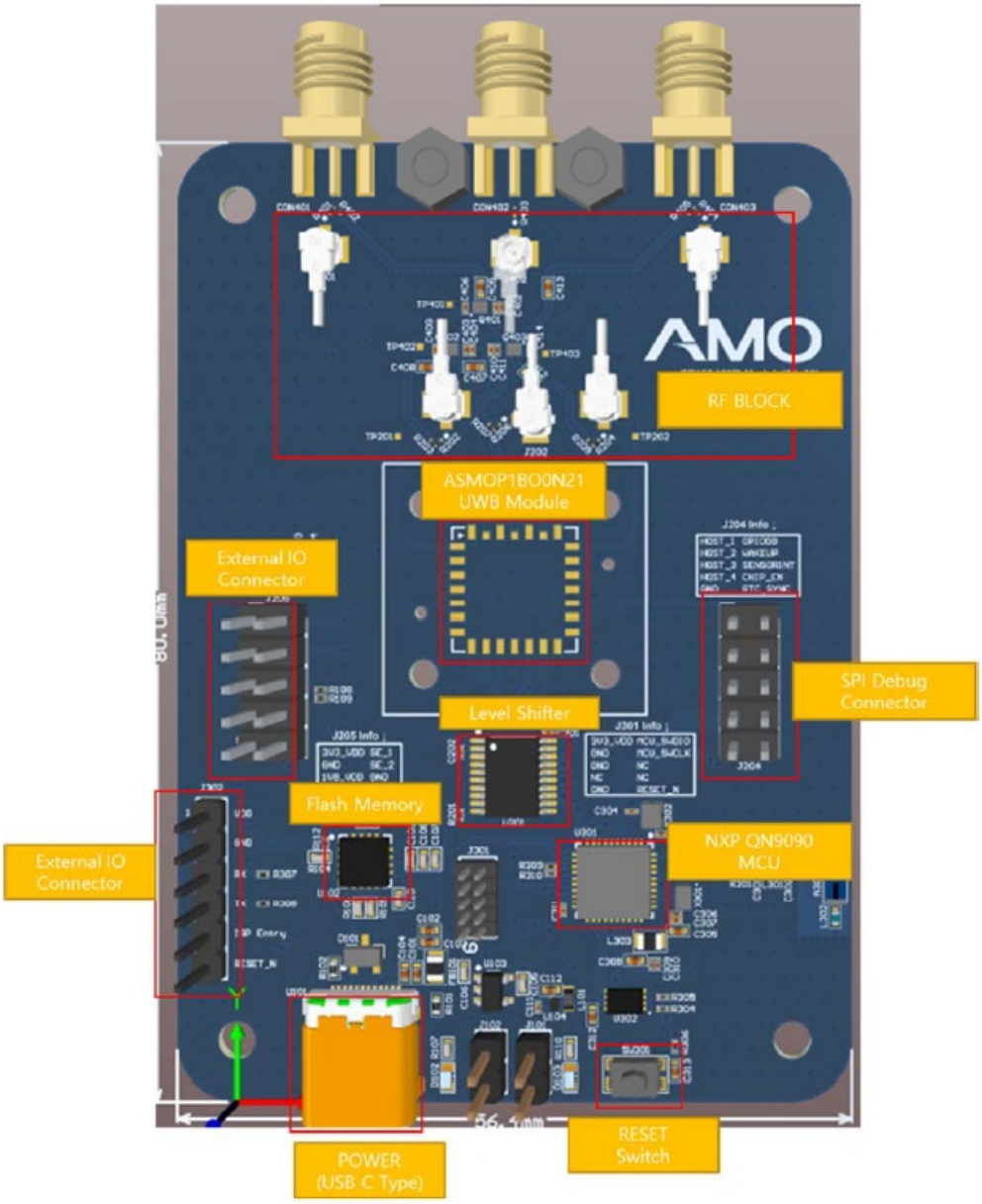
Date / Contents / Rev. No

- 21.12.28 / First Version / 0.0
- 22.01.20 /Command List add (Rx_Mode) Test example add (Rx_Mode) Modified the Block diagram / Add a caution note /0.1

This device is prohibited application to the operation of toys, aircraft, ships, satellites, and model airplanes

EVKIT HW DESCRIPTION

EVKIT HW Default

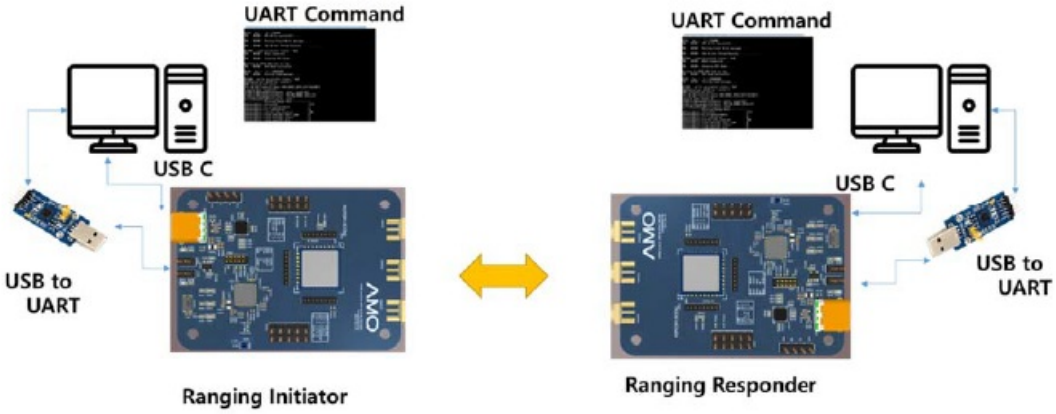


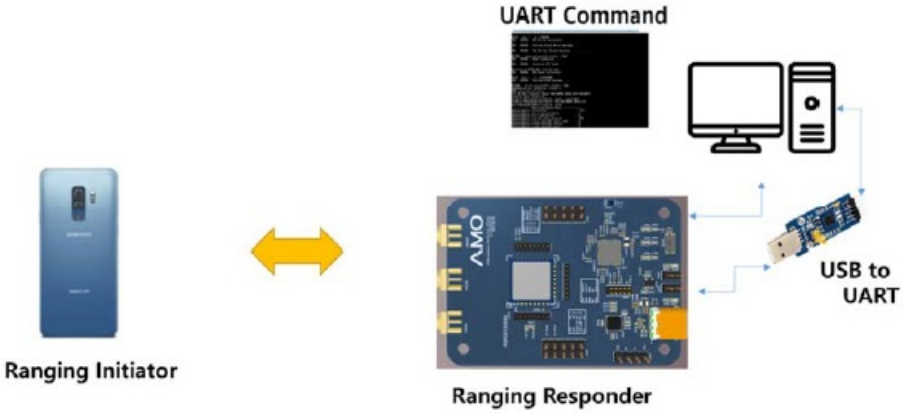
ASMOP1BO021 EVB uses C type USB power, and ASMOP1BO021 is powered from DC 1.8 V, 1 A or less. (The jig is not included in the module.)

EVKIT Block Diagram (Confidential)

- Delete content for security

Test Block Diagram

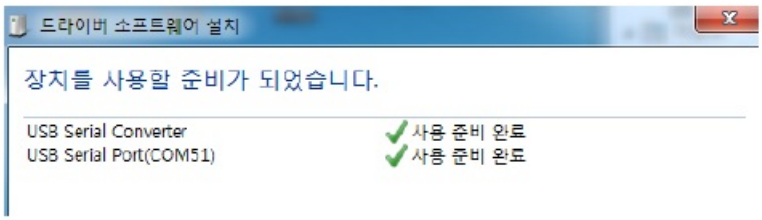




HOW TO TEST

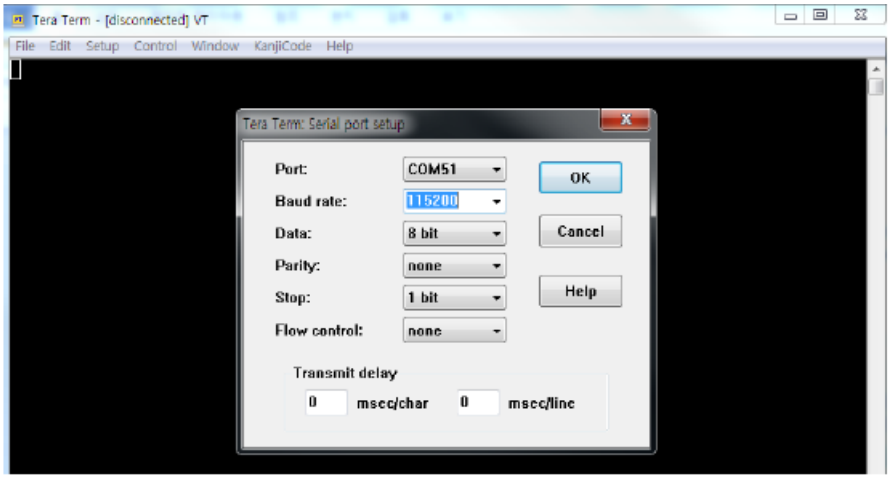
Set the AMO ASMOP1BO0N21 Module Test

If you connect the AMO SMOP1BO0NI Module to PC, automatically installing a USB Serial Port.
And also, you can use usb to uart device directly connect to UART connector.



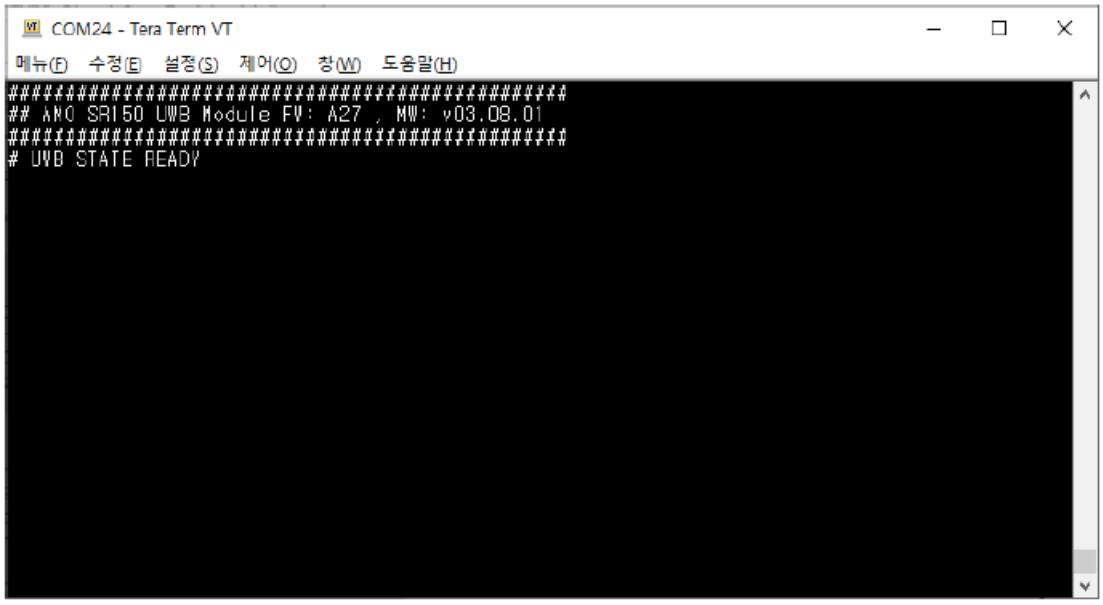
If you want to check the Serial Port Number, Set to like this Computer Management -> Device manager -> Port(COM & LPT)

Install a serial program(ex. TeraTerm)
(https://osdn.jp/projects/ttssh2/downloads/65898/teraterm-4.91.exe)–TeraTerm



- **Baud rate** : 115200
- **Data** : 8Bit
- **Parity**: None
- **Stop**: 1bit,
- **Flow Control :** None

Initial screen / AT Command Syntax



List	Test syntax
Write Command	UWB <cmd> <value>
Read Command	UWB <cmd>?
Execution Command	UWB <cmd>

The UWB prefix must be added at the beginning of each command line. Entering <CR> will terminate a command line. Commands are usually followed by a response that includes <CR><LF><response><CR><LF>. Throughout this document, only the response will be presented, <CR><LF>are omitted intentionally
These UWB commands have the format of UWB <x><n>, where <x> is the command, and <n> is/are the

argument(s) for that command.
<CR> : Carriage return character, **<LF>** : Line feed character

UWB RF Configuration

Channel Number	Frequency (MHz)	STS packet configuration	Payload	Preamble index	PRF mode
5	6489.6	0	25	9	BPRF
				10	
				11	
				12	
			65	9	
				10	
				11	
				12	
			125	9	
				10	
				11	
				12	
		3	–	9	
				10	
				11	
				12	
		0	25	9	
				10	
				11	
				12	
			65	9	
				10	
				11	
				12	
			125	9	
				10	
				11	
				12	

9	**7987.2**	**3**	**–**	**9**	**BPRF**
				10	
				11	
				12	

Command Full-List

Command	Value	Return	Description	R/W
SID	{id}	OK + Session ID {value}	UWB ranging session #0 ID Configuration {value} : 1111 ~ NNNN(default : 1111)	R/W
SID1	{id}	OK + Session ID #1 {value}	UWB ranging session #1 ID Configuration {value} : 1111 ~ NNNN(default : 2222)	R/W
SID2	{id}	OK + Session ID #2 {value}	UWB ranging session #2 ID configuration {value} : 1111 ~ NNNN(default : 3333)	R/W
INTERVAL	{ interval }	OK + Ranging interval {value}	UWB ranging interval Configuration (Unit : ms) {value} : 1 ~ N (deault : 192)	R/W
SLOTPRR	{ slot }	OK + Slot per ranging round {value}	UWB ranging slot per ranging round configuration (Unit : ms) {value} : 1 ~ N (deault : 24)	R/W
ANTPAIR	{ value }	OK + Antenna pair {value}	Antenna pair Configuration {value} : 1 -> Azimuth, 2 -> Elevation	R/W
FLIPEN	[0, 1]	OK + Flip enable {value1}, Antenna Pair {value2}	UWB AoA flip enable Configuration, for each Antenna pair {value1} : 0 (default)or 1 {value2} : 1 (default) or 2 -> Azimuth : 1, Elevation : 2	R/W
ANTSPACE	{ spacing }	OK + Antenna spacing {value1}, Antenna Pair {value2}	Antenna spacing configuration (unit : mm), for each Antenna pair {value1} : 1 ~ N (default : 20) {value2} : 1 (default) or 2 -> Azimuth : 1, Elevation : 2	R/W

DISOFFSET	{ offset }	OK + Distance offset { value1}	Distance offset configuration (unit : cm) {value1} : -M ~ N (default : 0 / Integer value)	R/W
PDOAOFFSET	{ offset }	OK + PDoA offset {value1}, Antenna Pair {value2}	PDoA offset configuration (unit : degree) for each Antenna pair {value1} : -180 ~ 180 (Integer value) {value2} : 1 (default) or 2 -> Azimuth : 1, Elevation : 2	R/W
PWR	{ index }	OK + Tx power index { value}	UWB Tx power index Configuration {value} : 0 ~ 127 (Default : 0 , 0.25dB step attenuation)	R/W

Command	Value	Return	Description	R/W
PWROFFSET	{ index }	OK + Tx power index { value}, session ID : {id }	UWB Tx power index Configuration for each session {value} : 0 ~ 127 (Default : 0 , 0.25dB step attenuation)	R/W
SP	[0, 3]	OK + STS packet configuration {value}	STS packet configuration {value} : 0 (default) or 3	R/W
PRIDX	[9, 10, 11, 12]	OK + Preamble index { value}	Preamble index {value} : 9 (default)or 10 or 11 or 12	R/W
CHN	[5, 9}	OK + UWB Channel number {value}	UWB channel number {value} : 5 or 6 or 8 or 9 (default)	R/W
PLEN	{ length }	OK + UWB Payload length {value}	UWB packet payload length (for the STS packet configuration 0) {value} : 4 ~ 127 (default 20)	R/W
TESTN	{ number }	OK + Number of UWB PER Tx test {value}	UWB PER Tx number of tests {value} : 1 ~ 1000 (default 1)	R/W
TX	ON	OK	UWB PER Tx test start	
RX	ON	OK	UWB PER Rx2 test start	
RXV	ON	OK	UWB PER Rx1 Vertical test start	
RXH	ON	OK	UWB PER Rx1 Horizontal test start	
INIT	ON	OK	UWB ranging initiator role setting	
RESP	ON	OK	UWB ranging responder role setting	
RST		UWB STATE READY	MCU reset / Delay 1sec	R
VER		UWB FW version.MW version (ex.A27.030801)	Check the FW version	R

Test Example(TX Only Mode)

- RST?
- UWB PWR 30
- UWB SP 0
- UWB CHN 9
- UWB PRIDX 9

- UWB PLEN 20
- UWB TESTN 1000
- UWB TX ON

Test Example(RX Only Mode)

RX2 Test

- RST?
- UWB CHN 9
- UWB RX ON

RX1 Vertical Test

- RST?
- UWB CHN 9
- UWB RXV ON

RX1 Horizontal Test

- RST?
- UWB CHN 9
- UWB RXH ON

Test Example(Ranging Mode)

Initiator Role

- RST?
- UWB PWR 40
- UWB CHN 9
- UWB INIT

Responder Role

- RST?
- UWB PWR 40
- UWB CHN 9
- UWB RESP

The Power Index should be set in consideration of the peak gain of the using antenna.
For example, when you set the 3.58dBi peak gain Antenna, the Power Index Value should be higher than 52 in Channel 5 and 40 in Channel 9.

RF CONNECTION

SR150 has 2 RF inputs (RX1, and RX2) and one RF output (TX). Our module has changed RF Pass to Tx/Rx2, Rx1_V and Rx1_H by embedded RF Switch. These 3 RF ports can be connected to 3 antennas. RX1_V and RX1_H path was guaranteed the same path characteristics (insertion loss, electrical delay). Connecting each Antenna to the Tx/Rx2 pad and Rx1_H pad are fulfilled ranging and 2D AoA

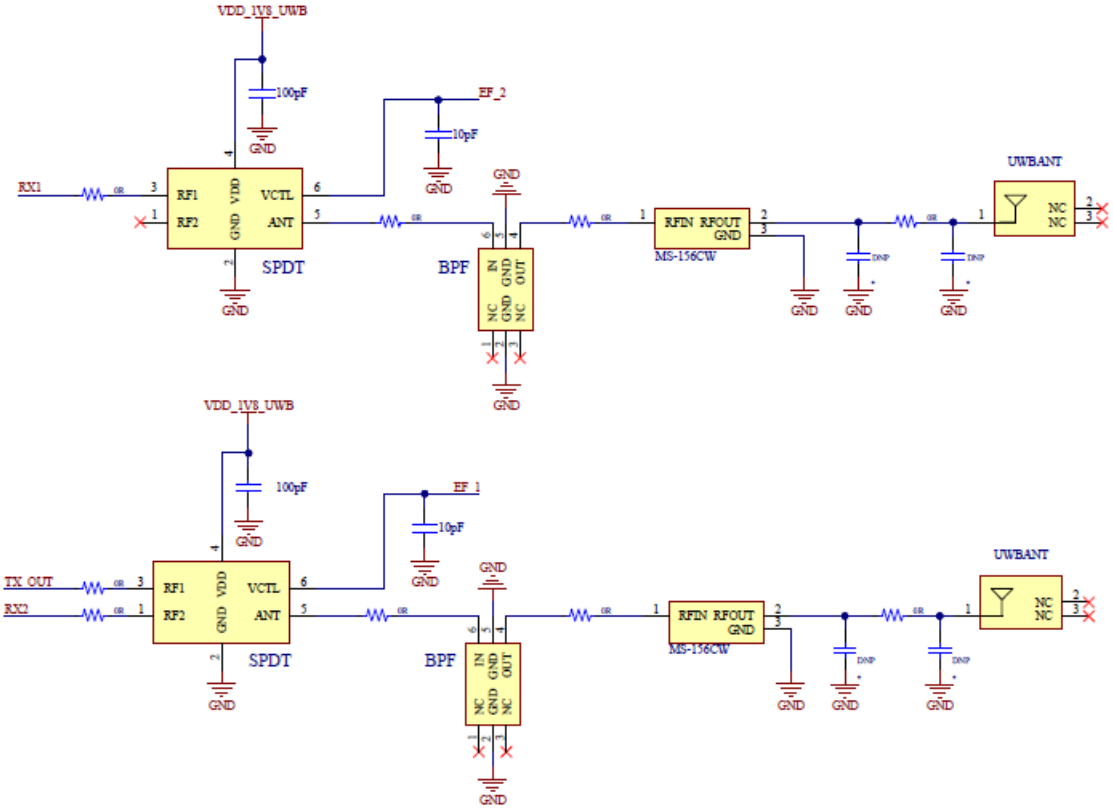


Figure 5 : UWB SR150 Module 2D AoA configuration

Routing of RF paths and layout recommendations

- RF paths must be perfectly symmetrical in terms of components used, placement and copper pads and shapes (transmission lines) joining them.
- RF traces must be 50Ω and components should be matched to 50Ω to minimize mismatch losses. The transmission line and reference plane layers must be at stitched thoroughly with ground vias.
- Maintain good isolation between TX, RX2, and RX1.
- The antenna structure should follow the manufacturer's guidelines with regards to position with respect to the ground plane and the printed circuit board, the thickness of the PCB and dielectric constant. Where these are driven by other factors adjustments to the antenna structure may be necessary.
- No component or ground plane should be placed in the antenna area.
- It is highly desirable to shield the UWB radio to prevent unwanted emissions and to provide immunity from external sources of interference.

Regulatory notice to host manufacturer according to KDB 996369 D03 OEM Manual List of applicable FCC rules This module has been granted modular approval as below listed FCC rule parts. FCC Rule parts 15C (15.209), 15F (15.519)

RF exposure considerations

If RF exposure statement or module layout is changed, then the host product manufacturer required to take responsibility of the module through a change in FCC ID or new application. The FCC ID of the module cannot be

used on the final product. In these circumstances, the host manufacturer will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Antennas

Antenna Specification are as follows:

- **Type:** Dipole Antenna (The dipole antenna on JIG board is provided for testing)
- **Gain:** 3.58 dBi
- This device is intended only for host manufacturers under the following conditions:
- If the host system contains other transmitters that can transmit at the same time as this module additional RF exposure assessment and assessment for compliance with
- FCC's rules with transmitters operating simultaneously will be required. A permissive change filing may be required to address rf exposure, please refer to KDB 447498 of the FCC rules.
- The antenna must be either permanently attached or employ a 'unique' antenna coupler.
- As long as the conditions above are met, further transmitter test will not be required. However, the host manufacturer is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.)
- This module can only be used in portable host systems. The host system and the antenna cannot be mounted on outdoor structures such as the outside of a building or on a telephone pole.

Label and compliance information

The module is labeled with its own FCC ID Certification Number. If the FCC ID Certification Number are not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. Contains FCC ID: 2A36P-ASMOP1BO0N21

Information on test modes and additional testing requirements

- **Operation Frequency:** 6 ~ 8.5 GHz
- **Max Target Power :** -41.5 dBm/MHz (E.I.R.P)
- **Modulation: Orthogonal Frequency** Division Multiplexing

FCC Instructions

FCC Compliance Statement – this statement must also be included in the user manual for the host system
This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:
This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

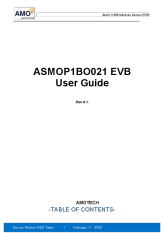
FCC Caution– this statement must also be included in the user manual for the host system Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
UWB devices operating under the provisions of this section must be hand-held. (This module may only be used in the handheld host.)
Under FCC's rules, a UWB device shall transmit only when it is sending information to an associated receiver and shall cease transmission within 10 seconds unless it receives an acknowledgment from the associated receiver that its transmission is being received. This module is configured to comply with the requirement when installed in

accordance with the instructions in this manual.

CE RED_EU declaration

This product can be used in EU members, in accordance with Article 10(10) / or this product can be used in at least one EU country, in accordance with Article 10(2)
Suwon Module R&D Team February 17, 2022

Documents / Resources

	AMOSENSE AMO UWB Module Series EVB [pdf] User Guide AMO UWB Module Series EVB, AMO UWB Module Series, EVB

References

- Downloading File /65898/teraterm-4.91.exe - Tera Term - OSDN