



IU-D-MA-0.0 : UWB Radar Module Datasheet VER.1.0

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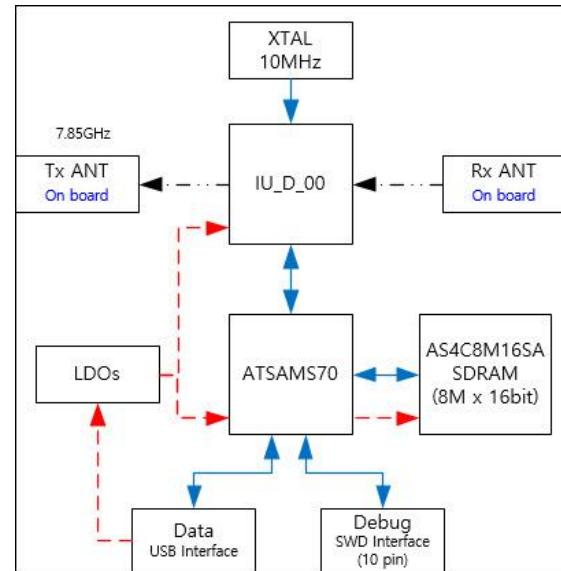
1 Preliminary Specification

UWB Radar Module (IU-D-MA-0.0)

1.1 Key Features

- Grit CIC Fully Integrated Impulse-based radar transceiver IC (IU_D_00)
- Microchip Technology ATSAMS70
- Power supply needed for 5 V (USB)
- SWD interface debugger
- SDK supported
- Supported external SDRAM
- Reference antenna is included on board
- Power Consumption : TBD mW
- PRF 10 MHz, 15 m unambiguous range.
- Satisfy to FCC/ETSI/KCC regulated UWB-masks (-48 dBm/MHz, wo/ antenna)
- Operating temperature: -20 to +80°C.
- USB interface
- Board size 40 x 98.4 x 20 mm³ (w/ ref. antenna)
- KC certification : R-R-GRu-GRIT-IU-D-MA

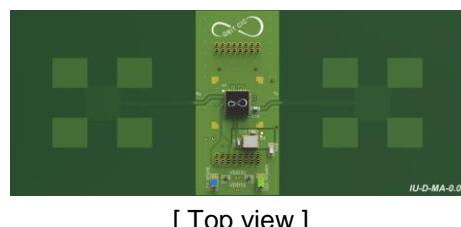
1.3 Functional Block Diagram



1.2 Applications

- Medical diagnostics.
- Vital signs detection (Respiration, Heartbeat)
- Motion Detection
- Presence Detection
- See-Through-Wall Radar
- Security Sensors
- Collision Avoidance
- Any UWB(Ultra-wideband) Radar Sensor

1.4 UWB Radar Module Photo



[Top view]



[Bottom view]

2 UWB Radar Module Performance

2.1 Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature	T _{ST}	- 20	25	+ 50	°C
Supply Voltage	V _{DD}	4.5	5	5.5	V

2.2 Electrical Specifications

Parameter	Min	Typ	Max	Unit	Descript.
Frequency Range (carrier)		7.85		GHz	Carrier tunable (±3%)
Bandwidth		1.7	1.9	GHz	BW tunable
EIRP	-45.7	-44.0	-43.1	dBm/MHz	Average power
	-17.9	-16.0	-14.7	dBm/50MHz	Peak power
Equivalent Sampling Rate		20.48		Gbps	Tunable (2.56 / 5.12 / 10.24 / 20.48)
Detection Range ⁽¹⁾	0.1		15	m	Max Range Tunable (3 ~ 15 m)
PRF (Pulse Repetition Rate)		10		MHz	
Scan time ⁽²⁾		204.8		ms	@ 1000 integration, full resolution and range
Power Consumption		TBD		mW	@ 5V
Power spectral density		-48		dBm/MHz	wo/ antenna

(1) Detection range may vary depending on the object (RCS) being measured.

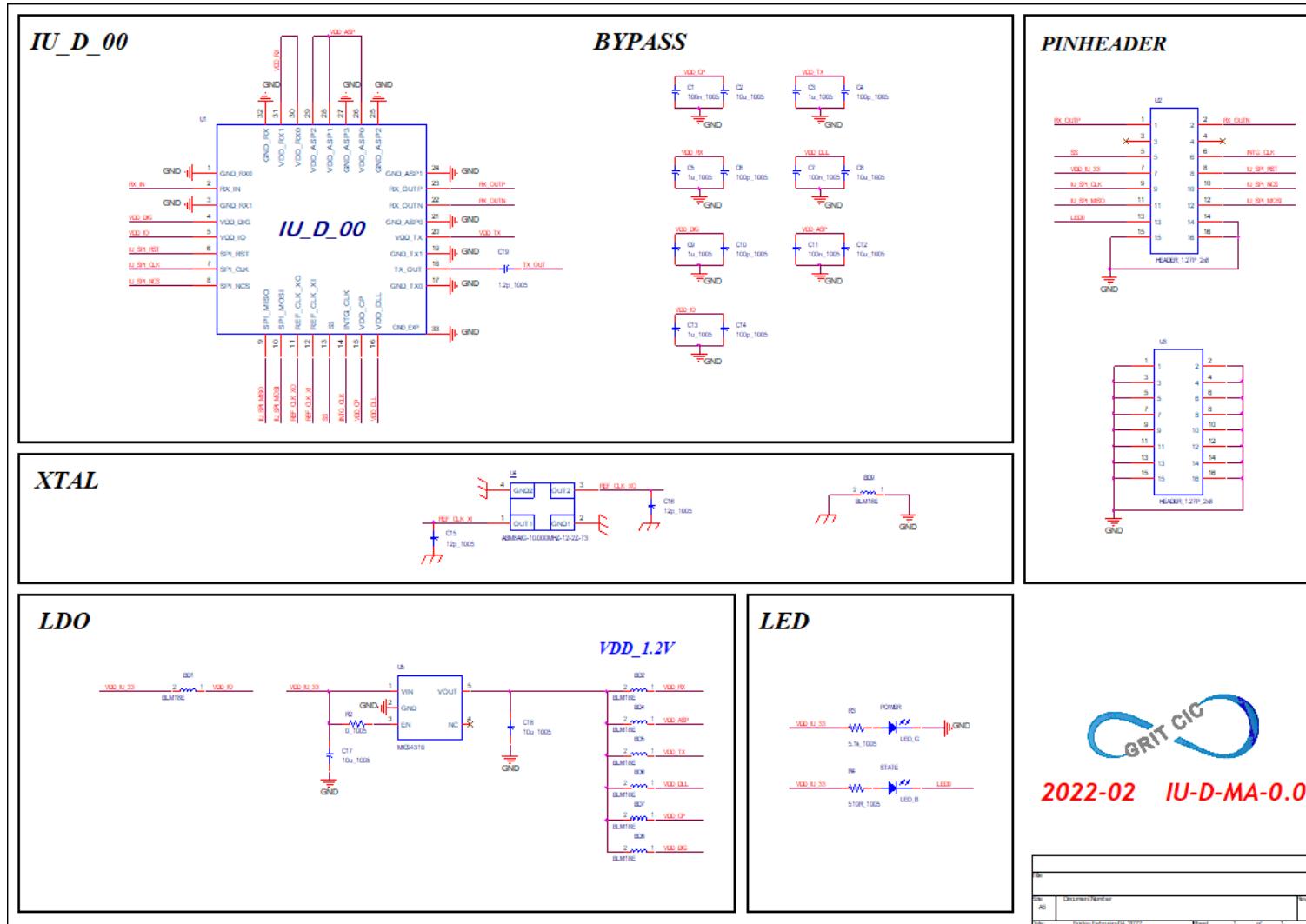
(2) Scan time = (1/PRF) X The number of integration X (Equivalent sampling rate / PRF).

3 Revision History

Revision	Comment
VER.1.0	Initial version

4 Schematic & BOM

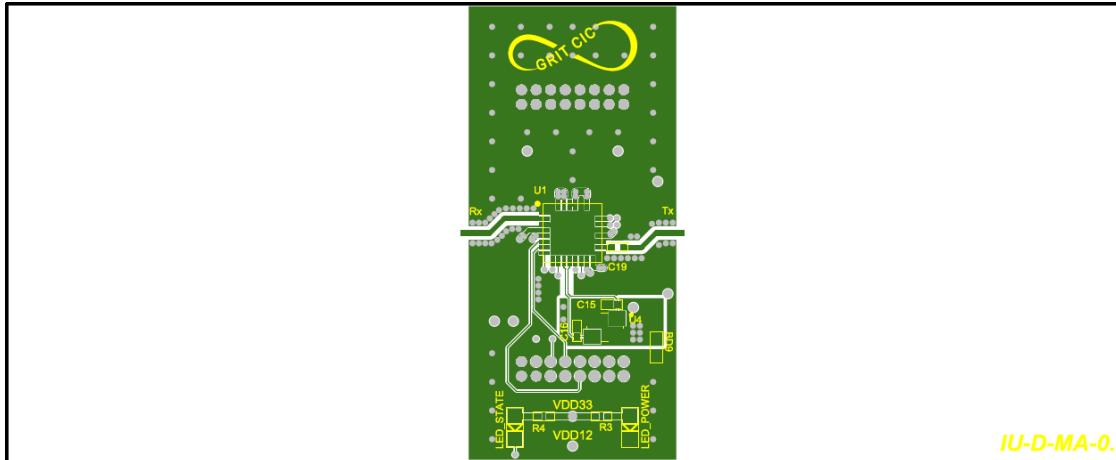
4.1 Schematic of RF part



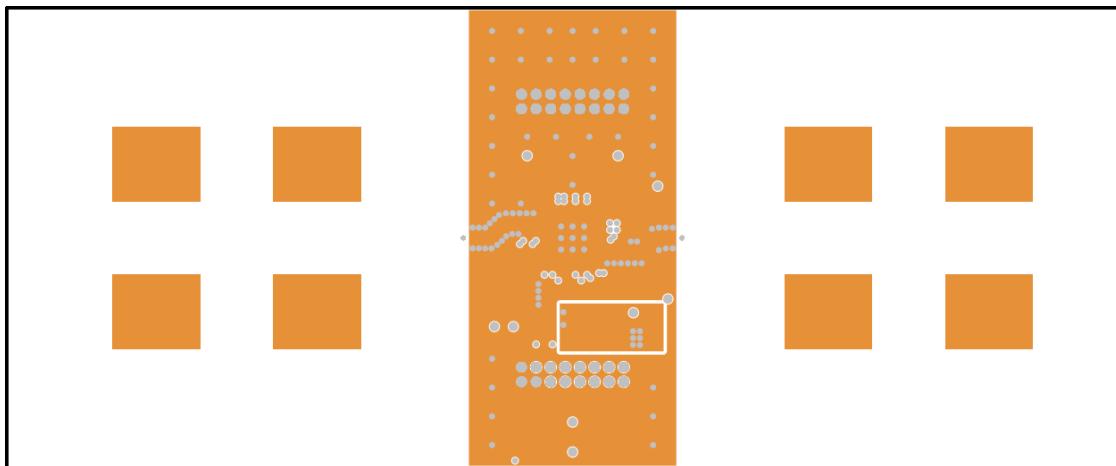
4.2 BOM of RF part

Part	Value	Part Number	Part Reference
IU_D	-	IU_D_00	U1
XTAL	-	ABM8AIG-10.000MHz-12-2z-T3	U4
LDO	-	MIC94310-4YM5	U5
Header 1.27p 2x8 FE	-	M50-3000845	U2, U3
Bead	-	BLM18E	BD1, BD2, BD4, BD5, BD6, BD7, BD8, BD9
Capacitor	1.2pF	CL05C1R2CB5NNNC	C19
Capacitor	12pF	CL05C120JB5NNNC	C15, C16
Capacitor	100pF	CL05C101JB5NNNC	C4, C6, C10, C14
Capacitor	100nF	CL05A104KA5NNNC	C1, C7, C11
Capacitor	1uF	CL05A105KA5NQNC	C3, C5, C9, C13
Capacitor	10uF	CL05A106MQ5NUNC	C2, C8, C12, C17, C18
Resistor	0 ohm	RC1005J000CS	R2
Resistor	510 ohm	RC1005F511CS	R4
Resistor	5.1k ohm	RC1005F512CS	R3
LED	Green	APT2012ZGCK	LED_POWER
LED	Blue	APHCM2012QBC/D-F01	LED_STATE
CAN	-	S03-10100300R	

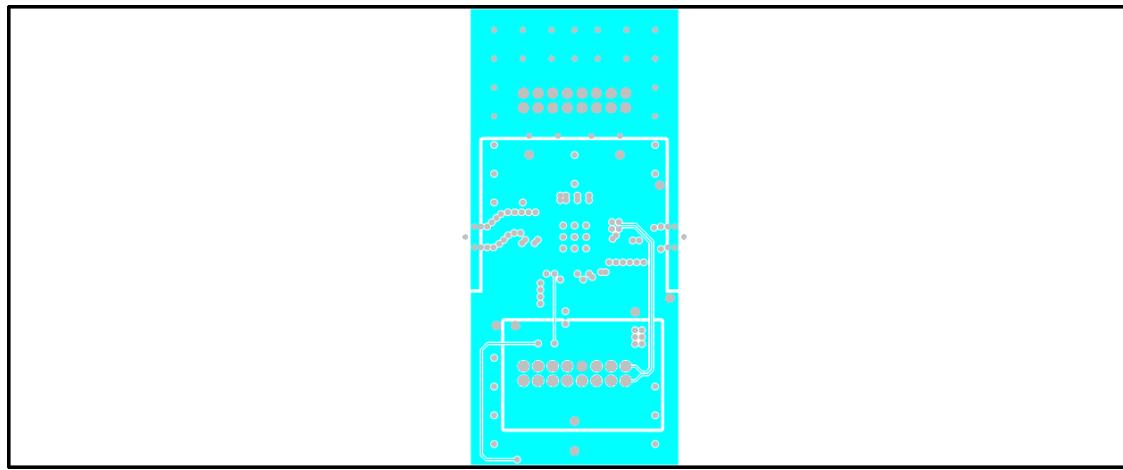
4.3 Layout of RF part



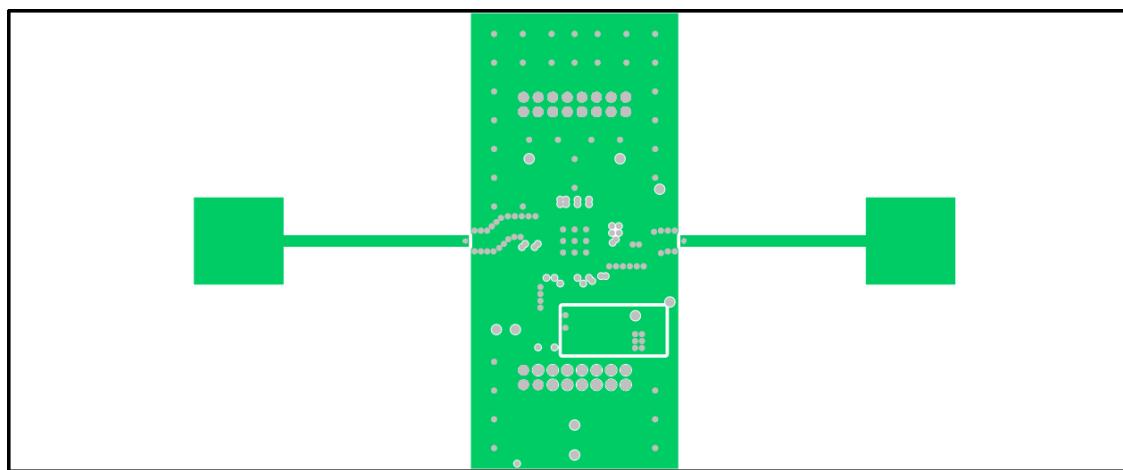
[Top Layer]



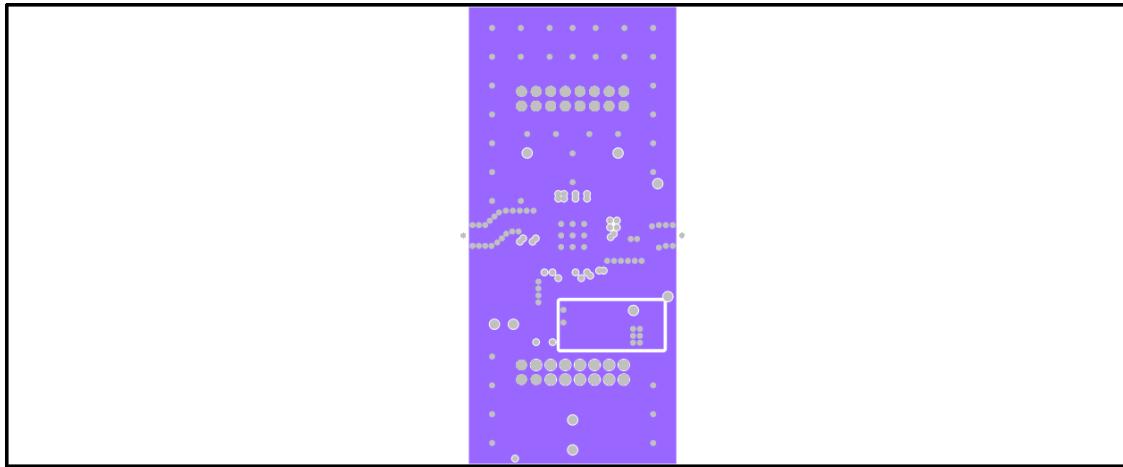
[Mid Layer 1 – Ground]



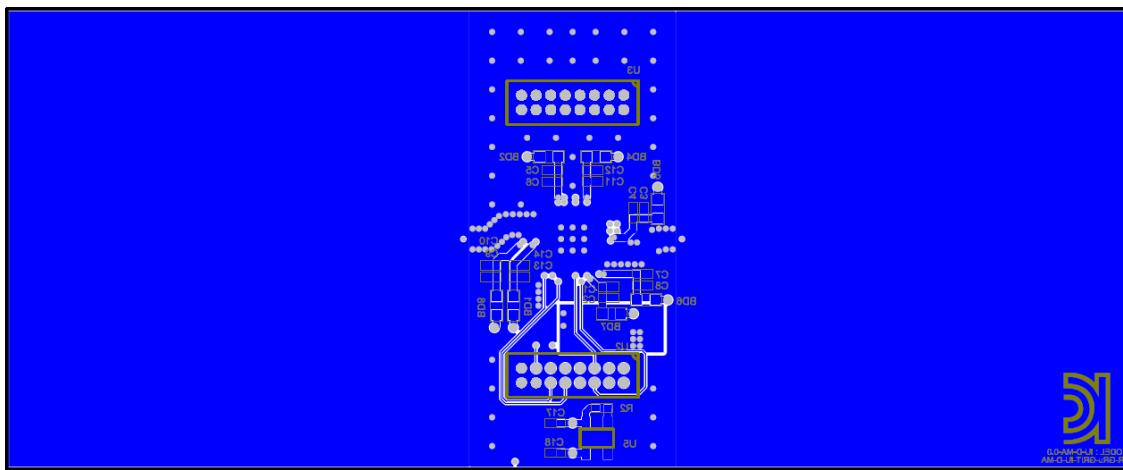
[Mid Layer 2 – Power]



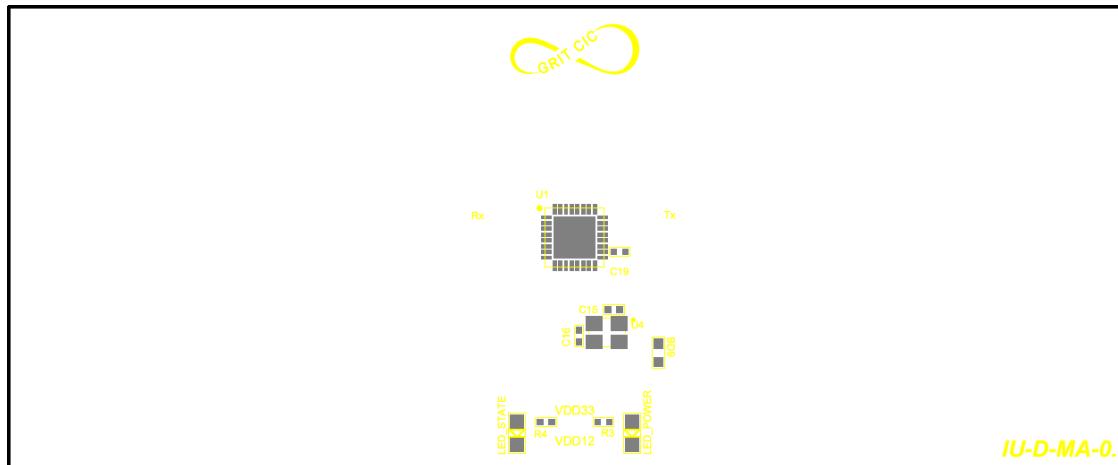
[Mid Layer 3 – Ground]



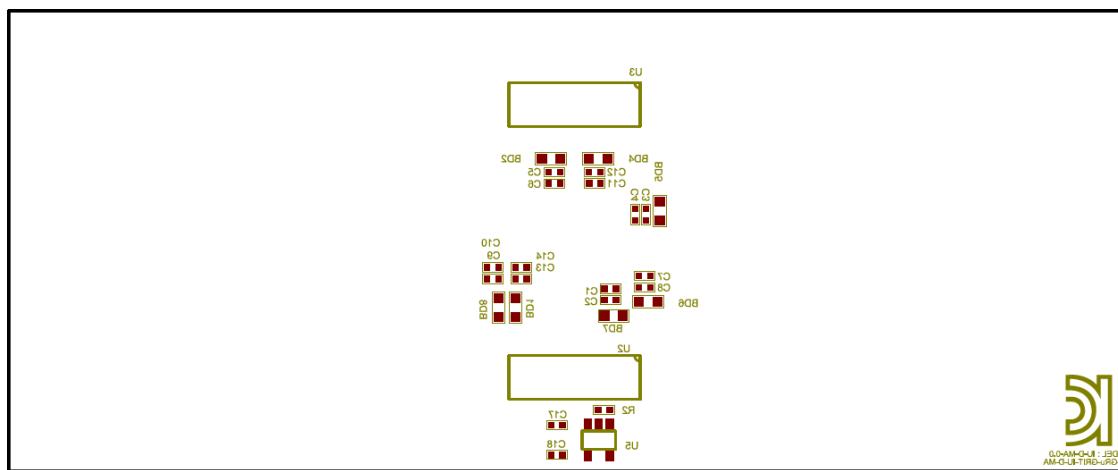
[Mid Layer 4 – Ground]



[Bottom Layer]

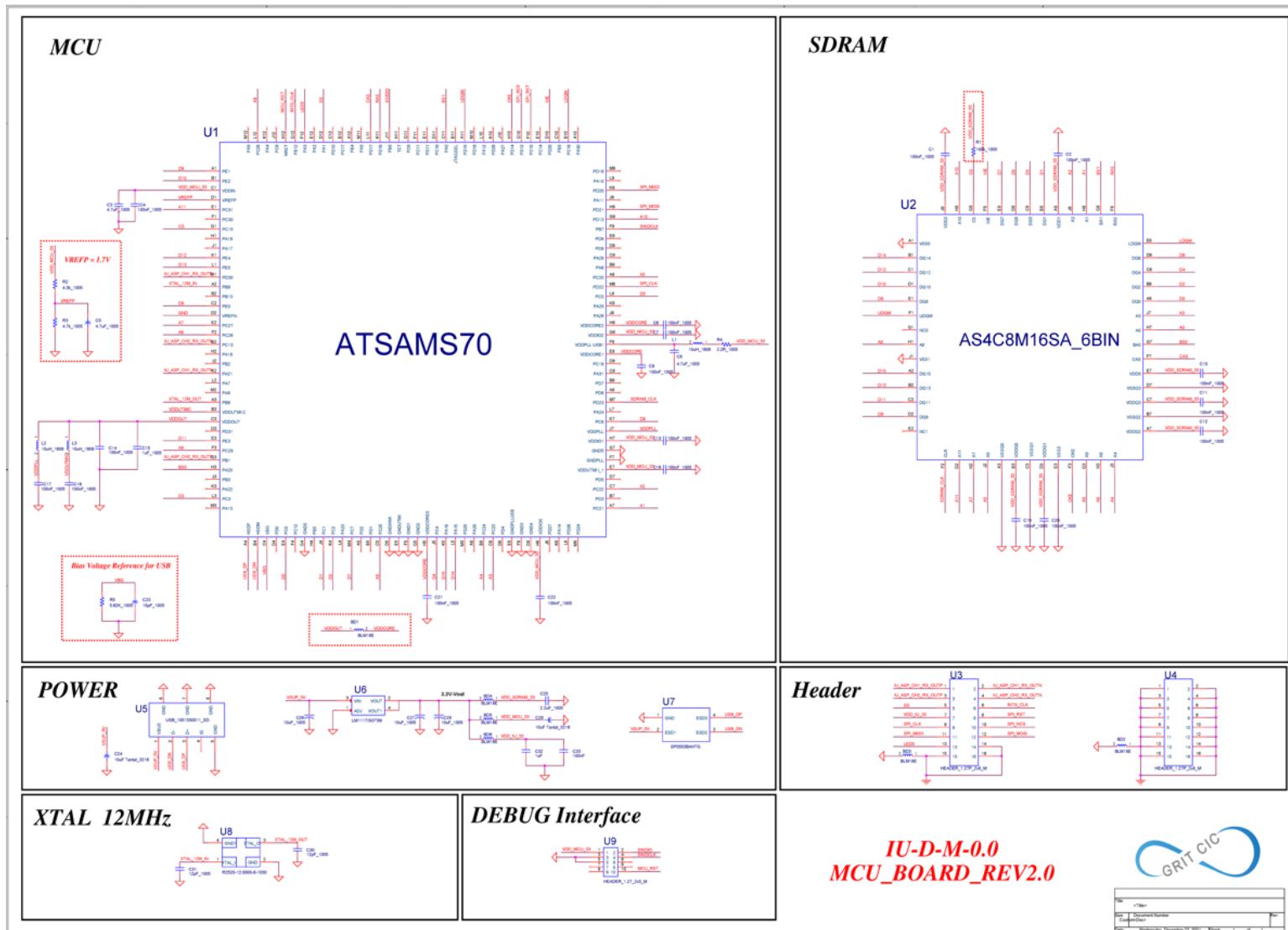


[Top Silkscreen / Paste]



[Bottom Silkscreen / Paste]

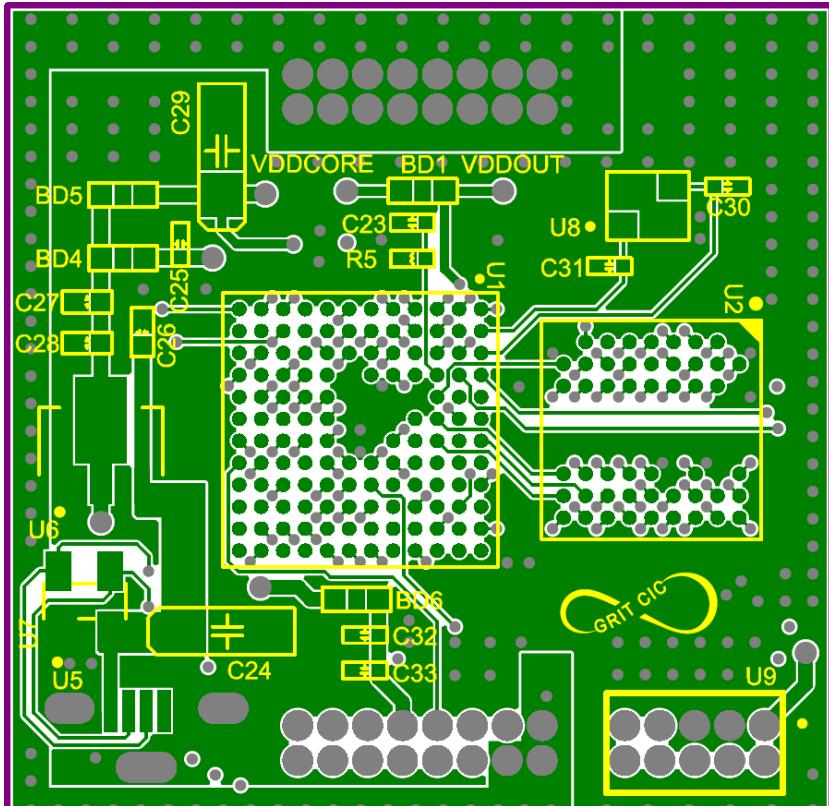
4.4 Schematic of MCU part



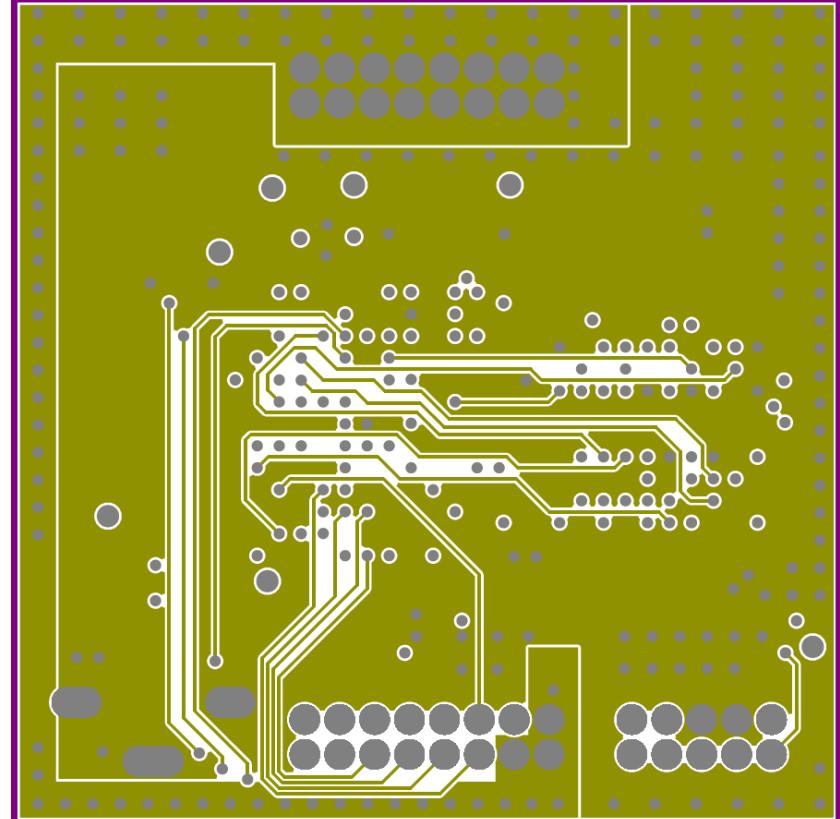
4.5 BOM of MCU part

Part	Value	Part Number	Part Reference
MCU	-	ATSAMS70Q20B_CNT	U1
SDRAM	-	AS4C8M16SA_6BIN	U2
HEADER_1.27p_2x8	-	HEADER_1.27P_2x8	U3, U4
USB	-	USB_1051330011_SD	U5
LDO	-	LM1117/SOT89	U6
Diode	-	SP0503BAHTG	U7
XTAL	-	R2520-12.000-8-1030-EXT-TR	U8
HEADER_1.27p_2x5	-	HEADER_1.27P_2x5	U9
Bead	-	BLM18AG102SN1D	BD1, BD2, BD3, BD4, BD5, BD6
Inductor	10uH	LQM18FN100M00D	L1, L2, L3
Capacitor	100nF	CL05A104KA5NNNC	C1, C2, C4, C6, C7, C8, C10, C11, C12, C13, C14, C16, C17, C18, C19, C20, C21, C22, C33
Capacitor	4.7uF	CL05A475MQ5NRNC	C3, C5, C9
Capacitor	1uF	CL05A105KA5NQNC	C15, C32
Capacitor	10pF	CL05C100DB5NNNC	C23
Tantal Capacitor	10uF	293D106X9016A2TE	C24, C29
Capacitor	2.2uF	CL05A225MQ5NSNC	C25
Capacitor	10uF	CL05A106MQ5NUNC	C26, C27, C28
Capacitor	12pF	CL05C120JB5NNNC	C30, C31
Resistor	100K ohm	RC1005J104CS	R1
Resistor	4.3K ohm	RC1005F432CS	R2
Resistor	4.7K ohm	RC1005F472CS	R3
Resistor	2.2 ohm	RC1005F2R2CS	R4
Resistor	5.62K ohm	RC1005F5621CS	R5

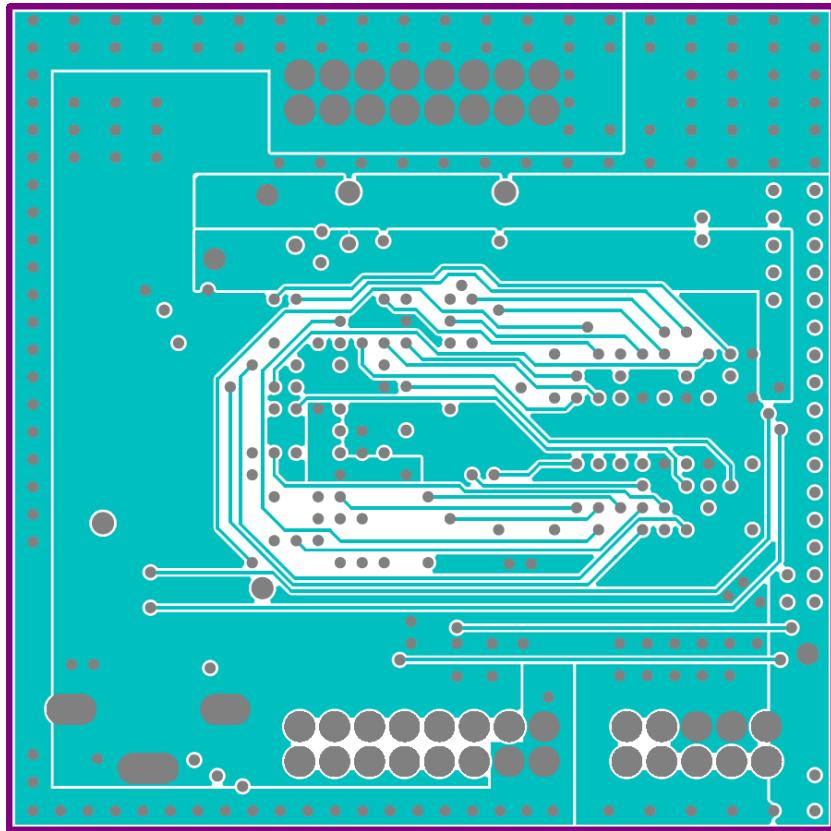
4.5 Layout of MCU part



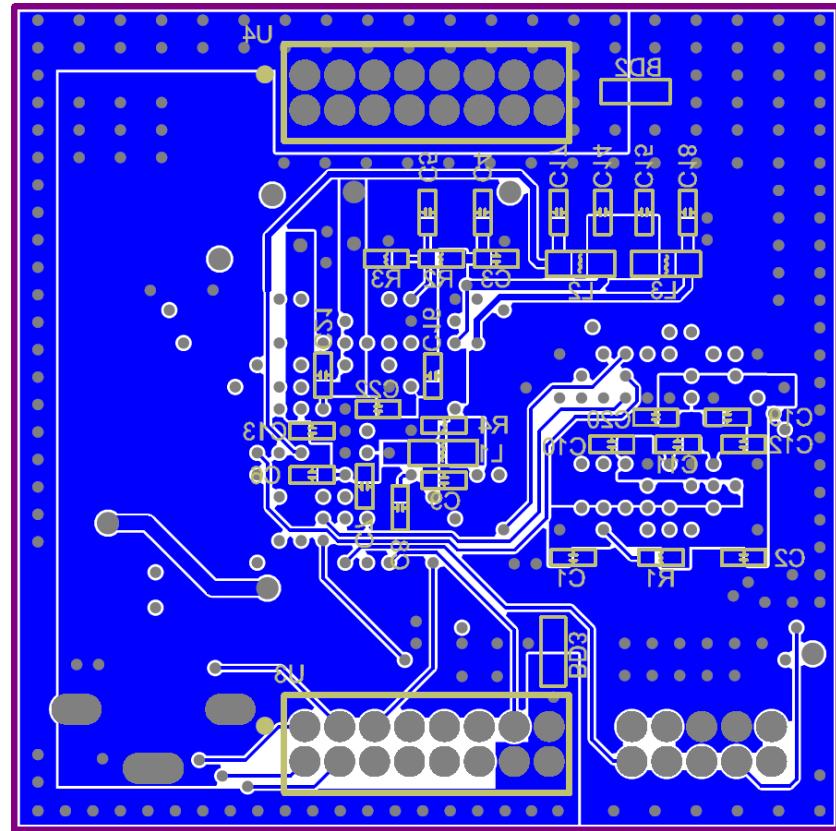
[Top Layer]



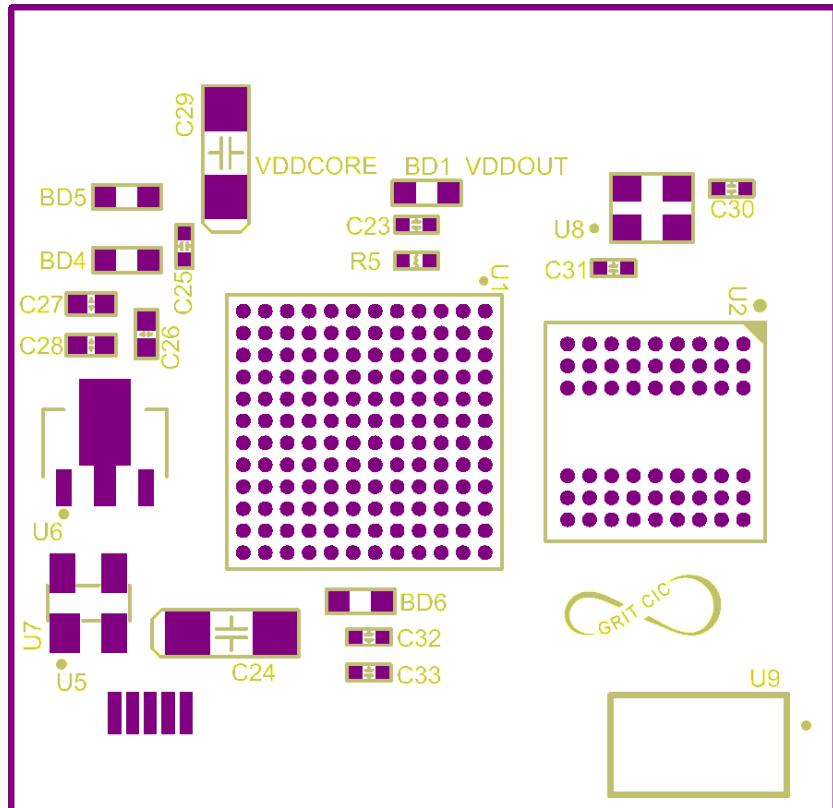
[Mid Layer 1 – Ground]



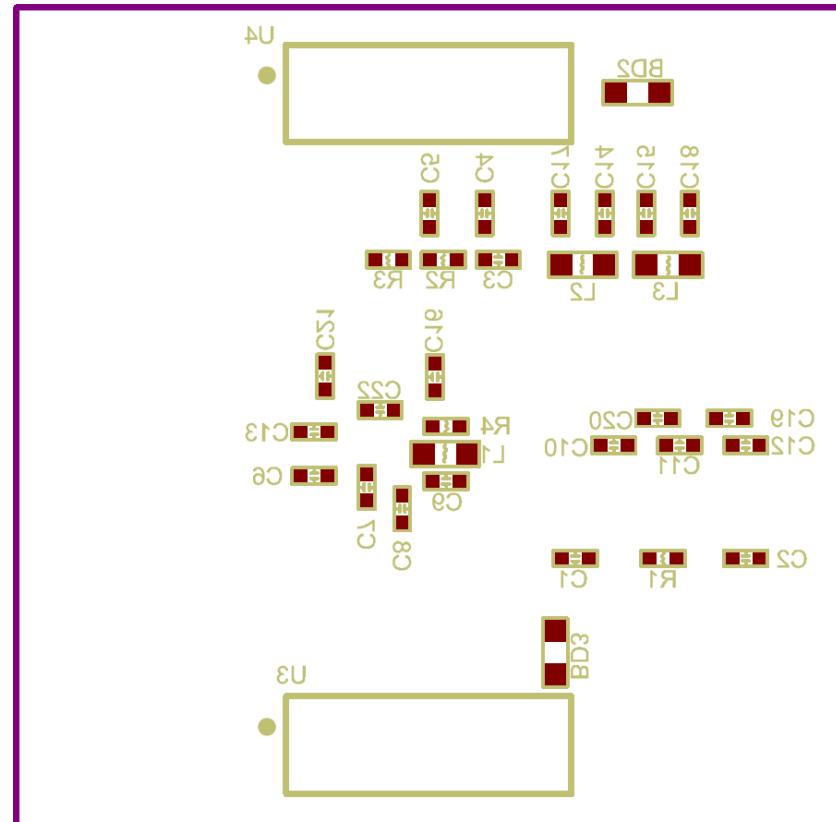
[Mid Layer 2 – Power]



[Bottom Layer]



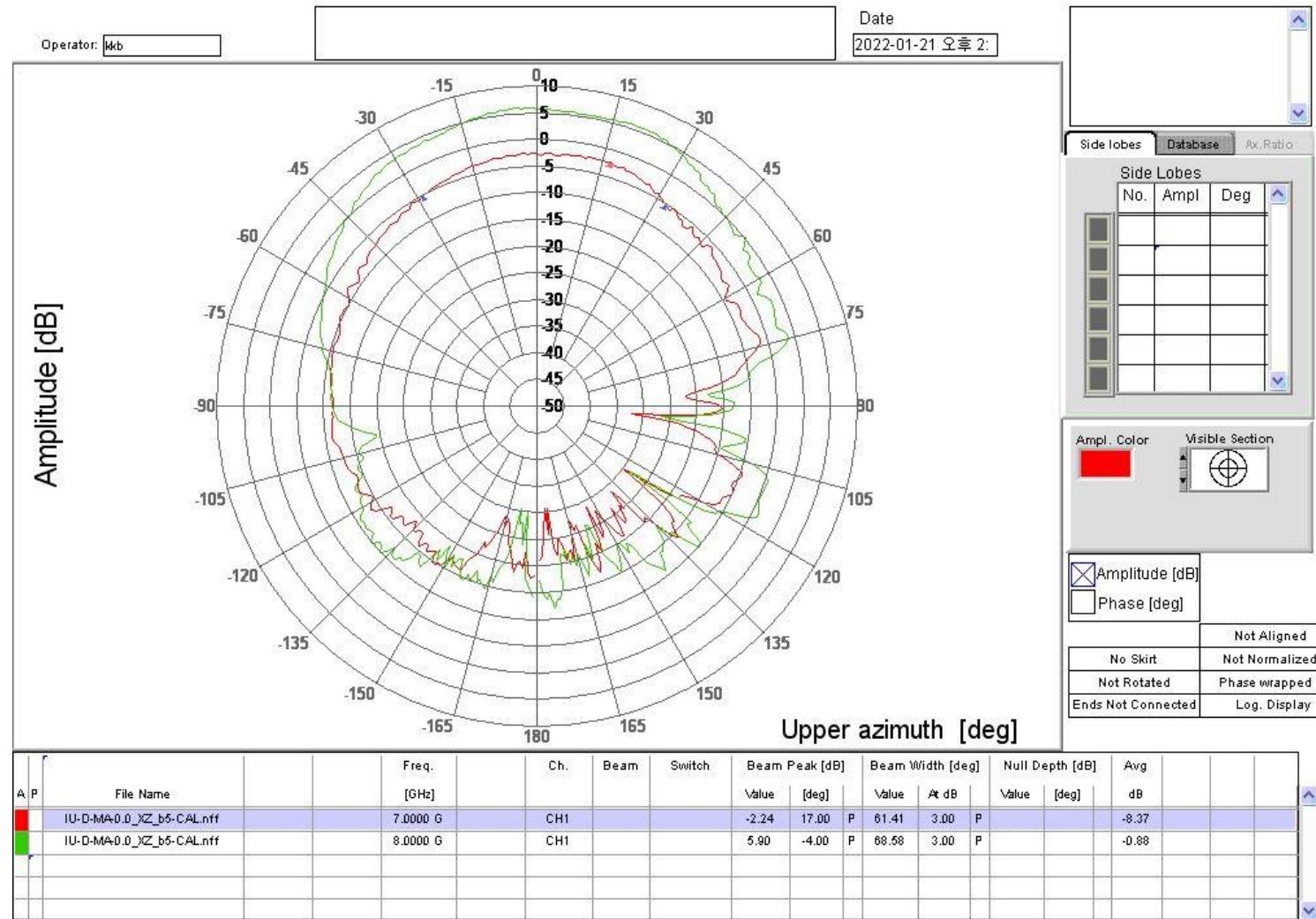
[Top Silkscreen / Paste]



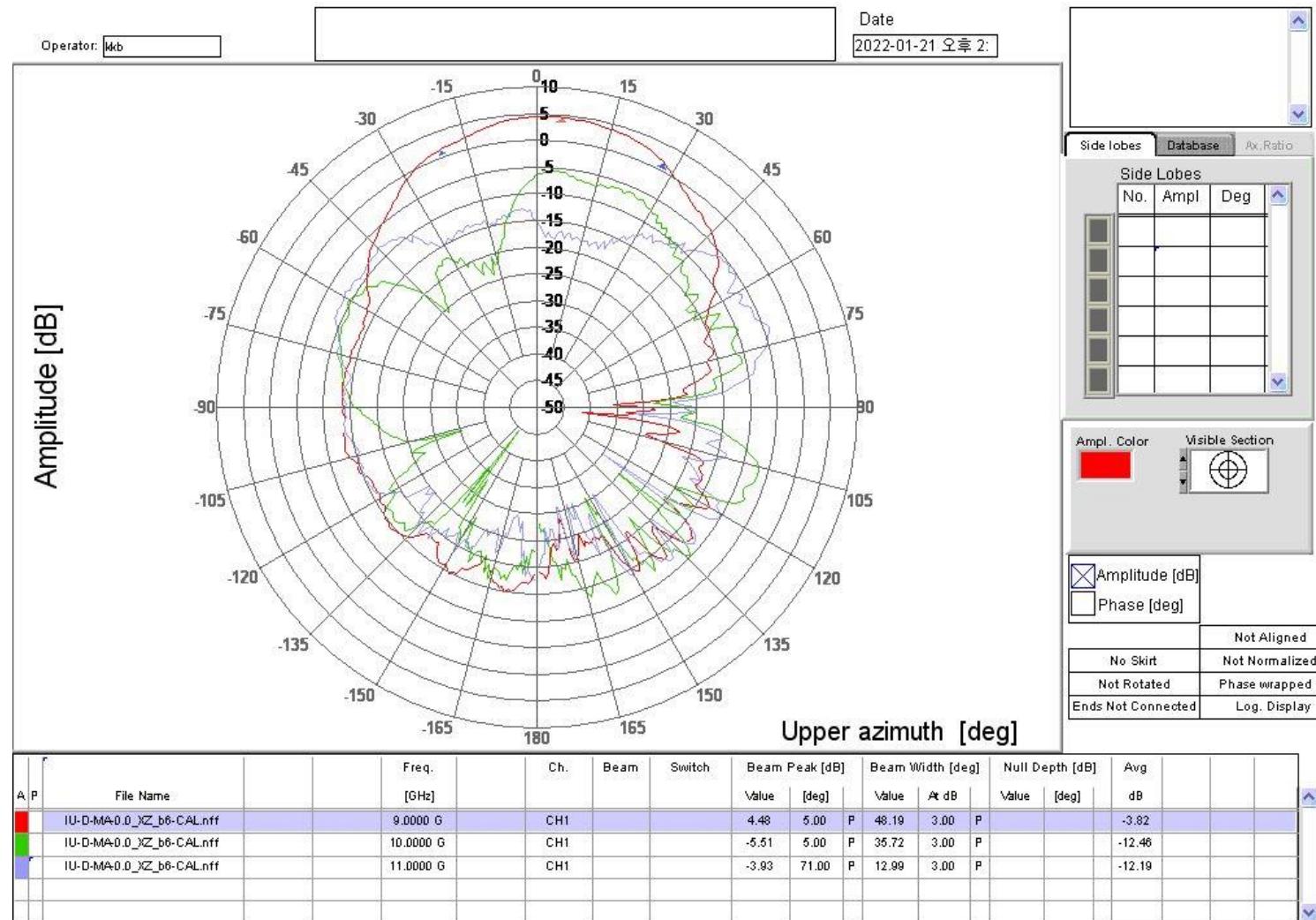
[Bottom Silkscreen / Paste]

5 Beam pattern of the reference antenna

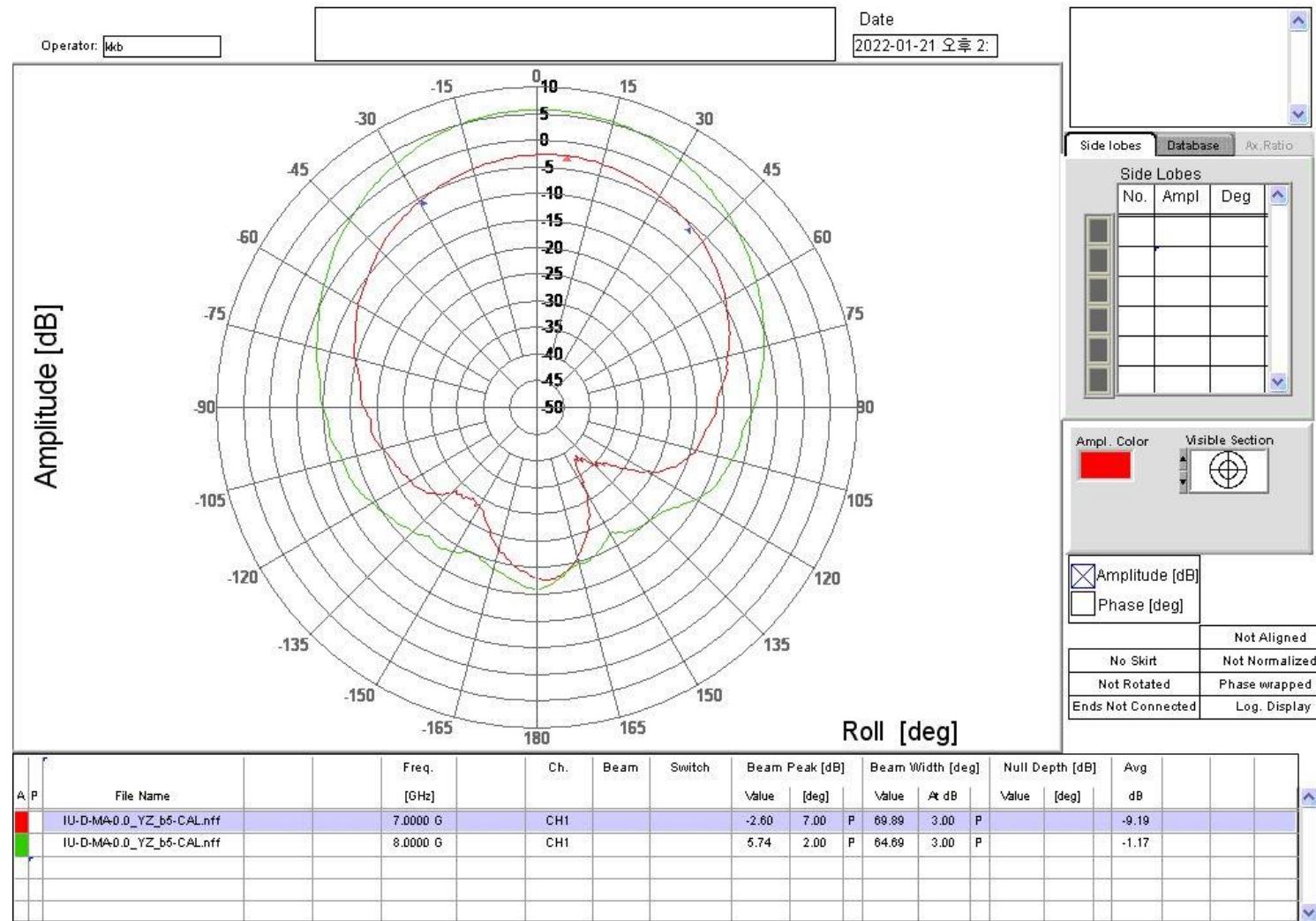
5.1 E-Field

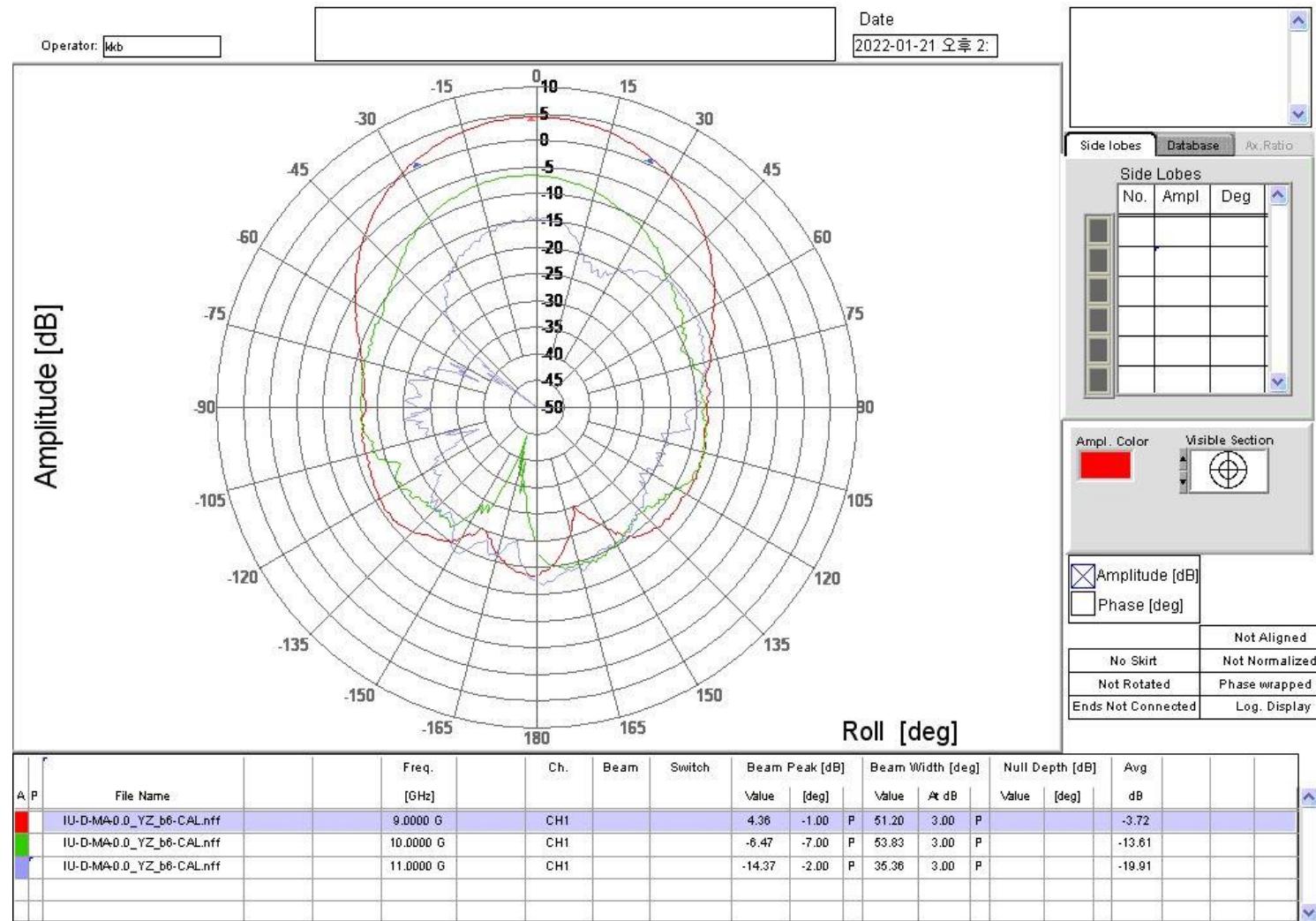


[Antenna E-field 7~8 GHz]



5.2 H-Field





[Antenna H-field 9~11 GHz]

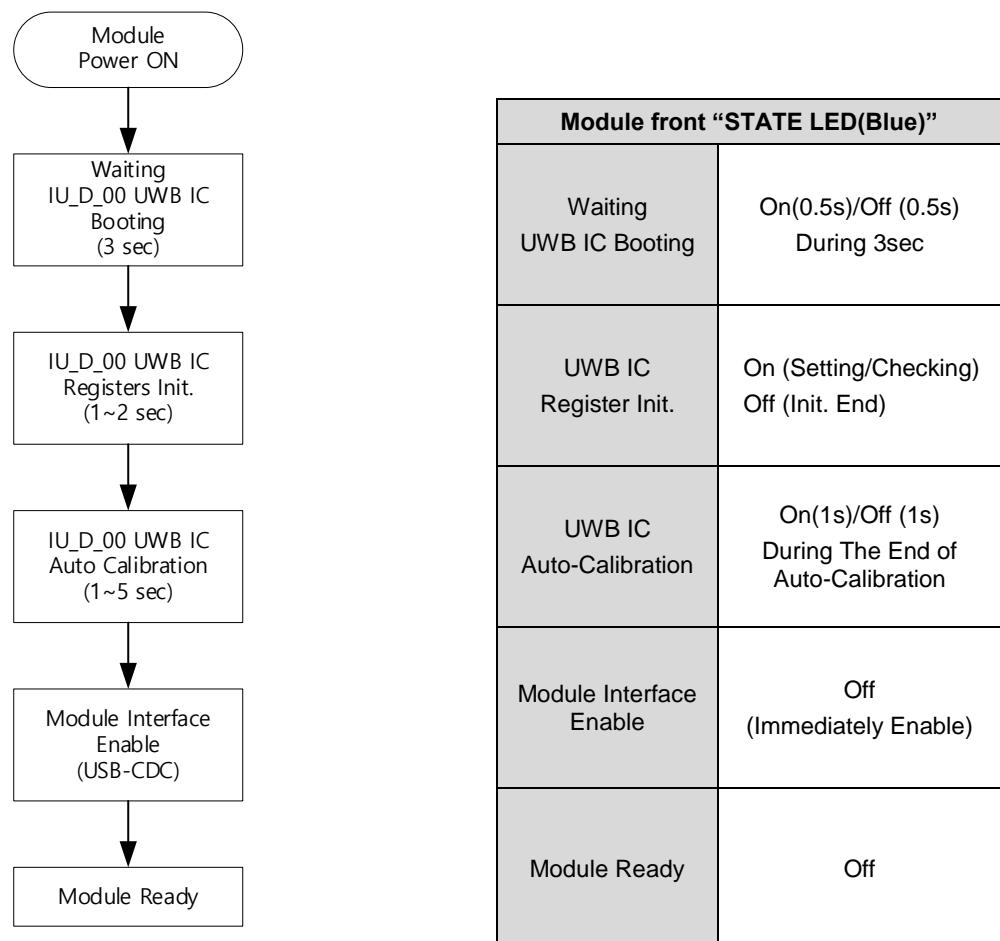
6 UWB Radar Module Operation

6.1 Power-Up

Power is supplied via USB.

6.2 Booting Sequence

The module operates up to "Module Ready" state, and the status can be checked through the module's STATE LED (LED_STATE).



6.3 Firmware Version 1.0.0

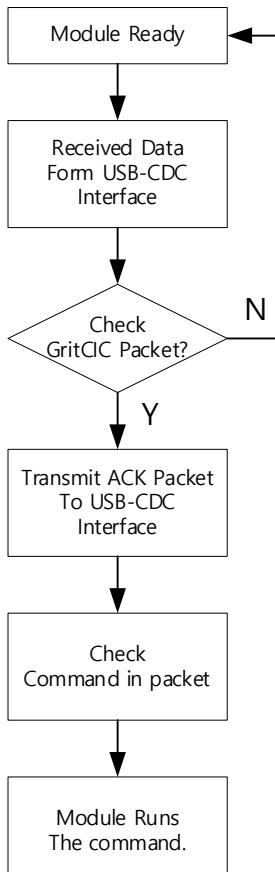
UWB IC Register R/W, Module Register Write and Module control are possible through USB-CDC interface. Matched filter, average filter, MTI filter and CFAR algorithm support for signal processing.

6.3.1 Supported Interface

UWB IC & Module Communication	
USB	USB 2.0 Specification : USB - CDC
Data Size	8 bits
Baud Rate	921600 bps
Stop bit	1 bit
Parity	No parity
H/W control	No H/W control
Module MCU Debug	
SWD	1.27mm pitch 2x5 (10 pin)

6.3.2 Communication

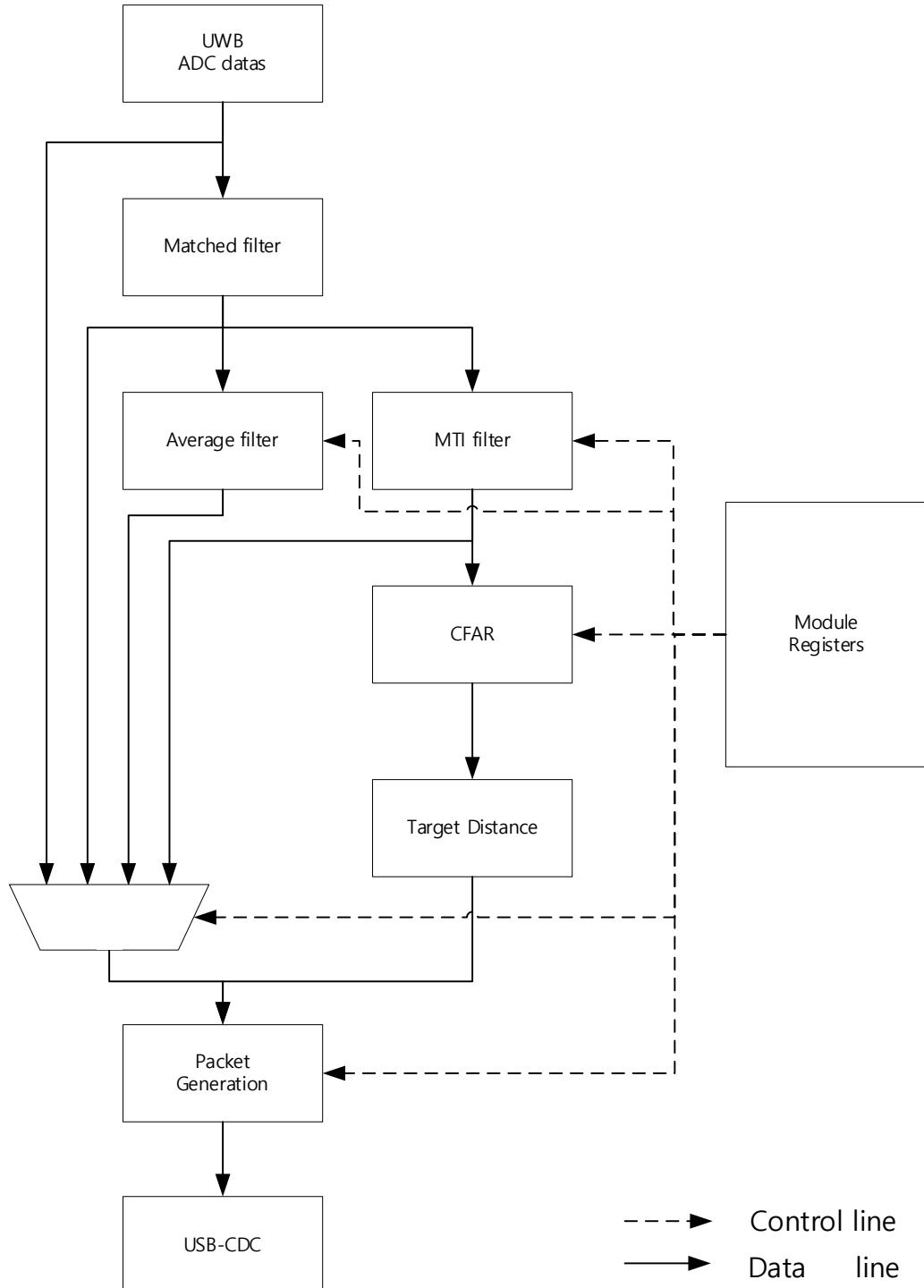
When booting is completed normally and the module is in “Module Ready” state, it can be controlled through USB-CDC and communicates according to the internal protocol.



6.3.3 GritCIC Communication Specification

GritCIC Communication Specification v3.0.0(Special request.)

6.3.4 Signal Processing Algorithm



7 UWB Radar Module GUI

- OS : Microsoft Windows 10 (64-bit).
- The GUI supports 3-mode :
 - 1) Distance detection mode
 - 2) Respiration measurement mode
 - 3) user-configurable manual mode.

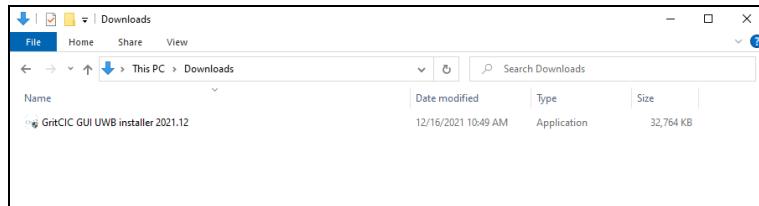
7.1 Install GUI

7.1.1 GUI Installer file

The Email contact request or download homepage.

7.1.2 Run Installer

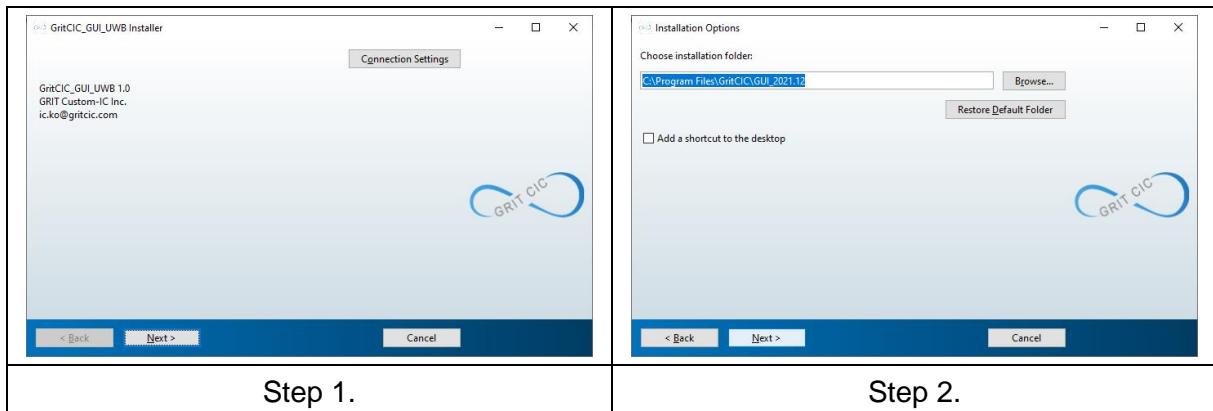
Run file downloaded from the homepage.("Gritcic GUI UWB installer yyyy.mm.exe")

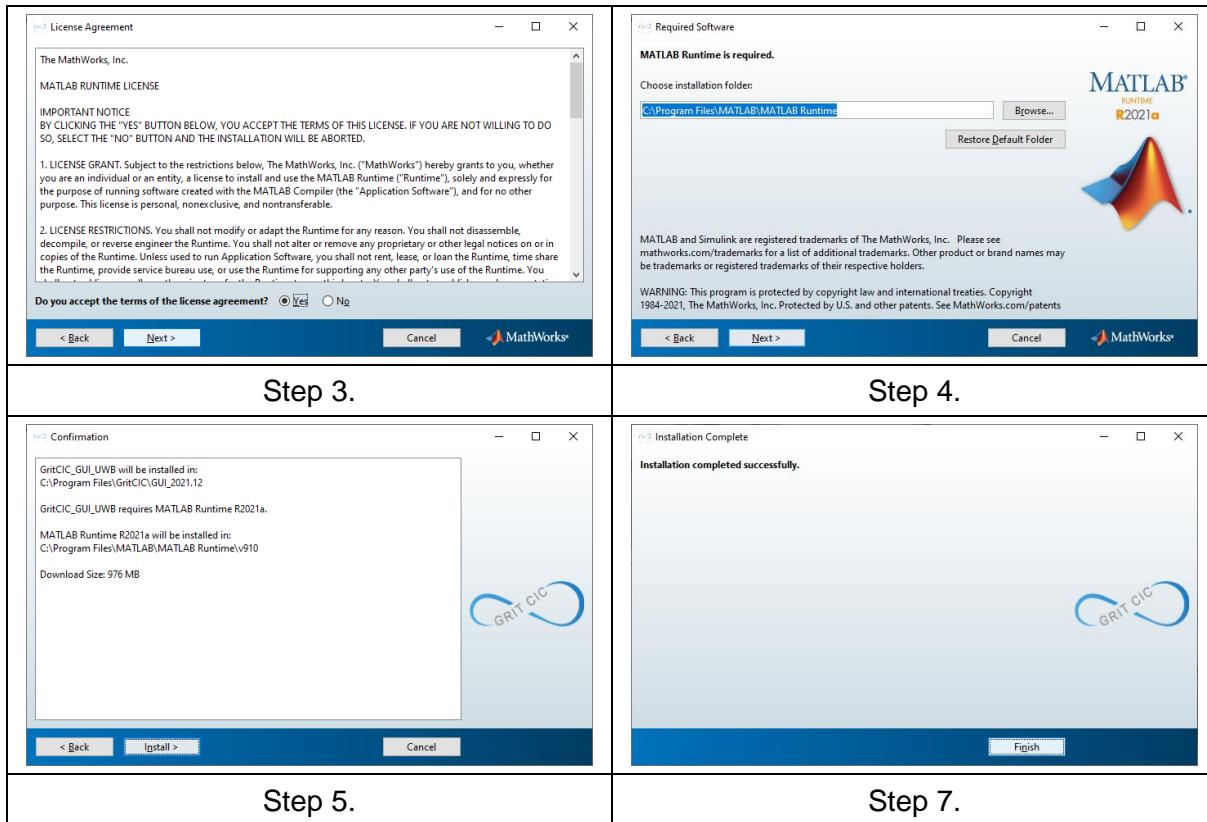


[GUI Installer]

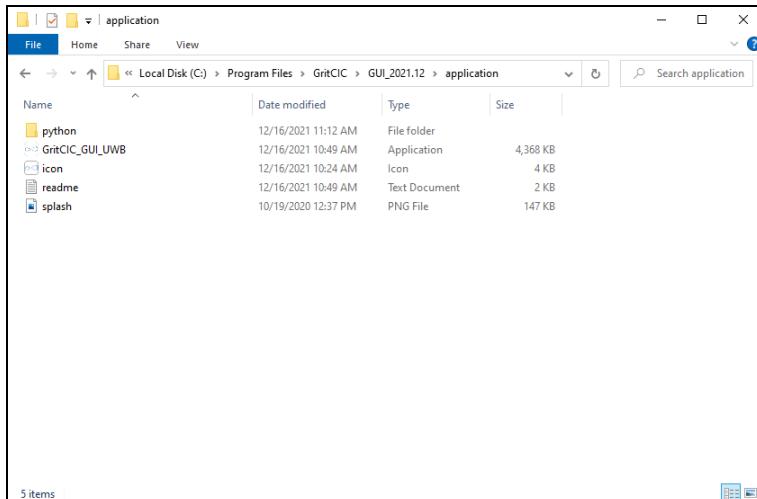
7.1.2.1 MATLAB Runtime (R2021a, Runtime v910) & GritCIC GUI UWB

GUI program and "MATLAB Runtime" are installed as follows.





[GUI installation sequence]



[completed installation]

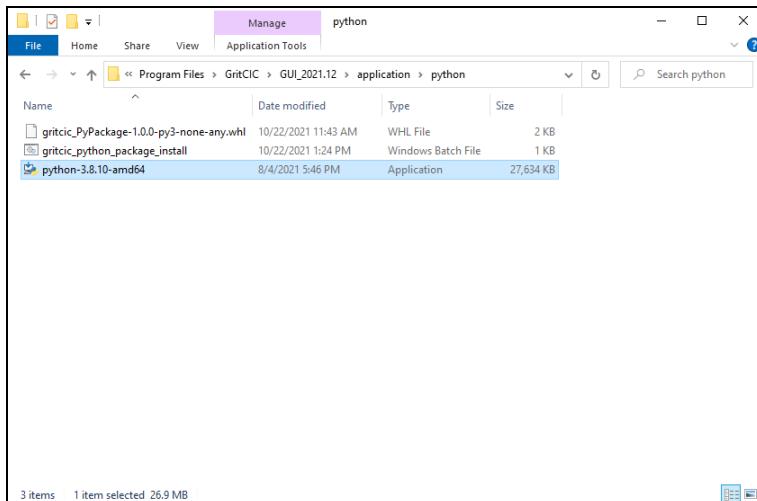
7.1.2.2 Python

Install python .

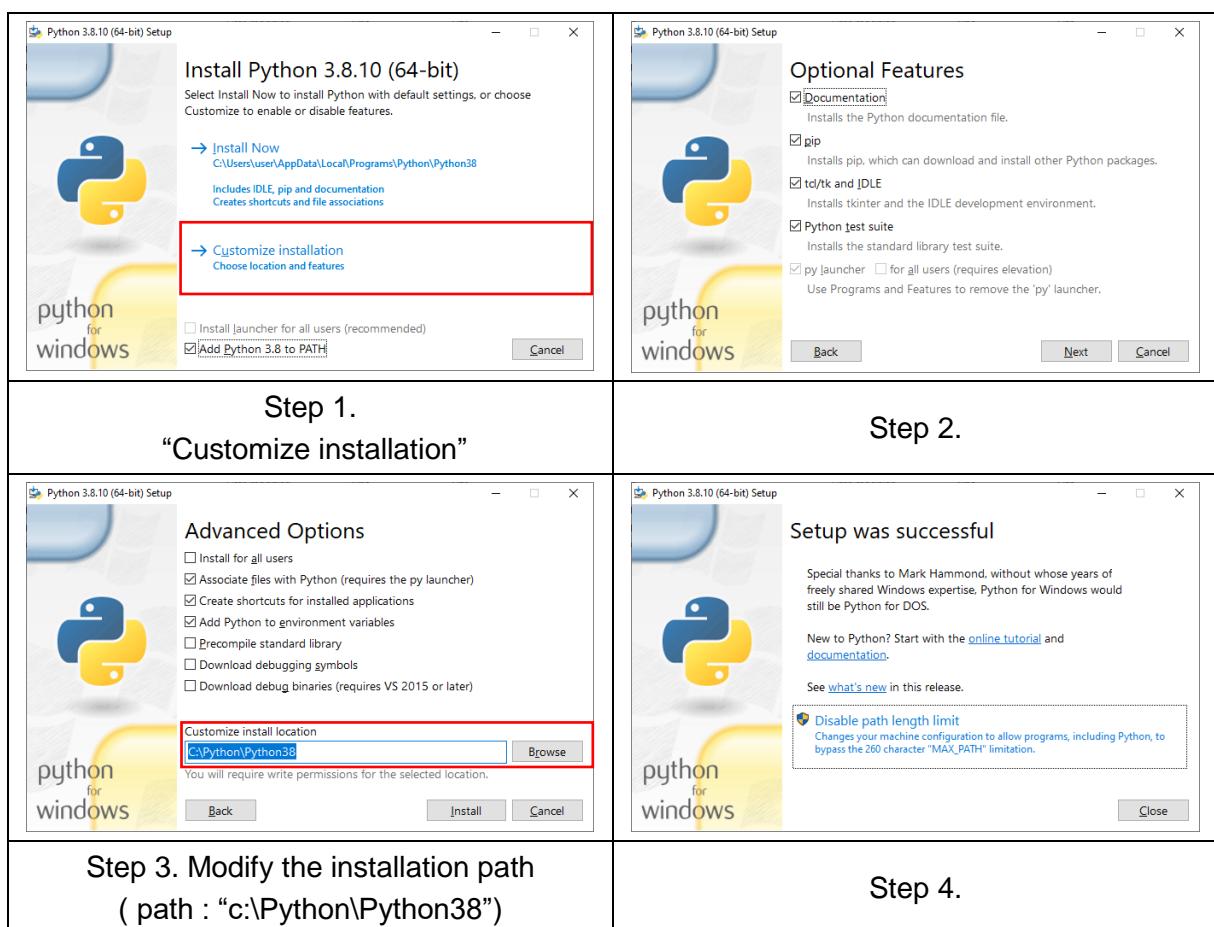
The python installation file is created after installing GritCIC installer

It is provided in the "c:\Program Files\GritCIC\GUI_(yyyy.mm)\application\python" folder.

(installer file name : "python-3.8.10-amd64.exe")

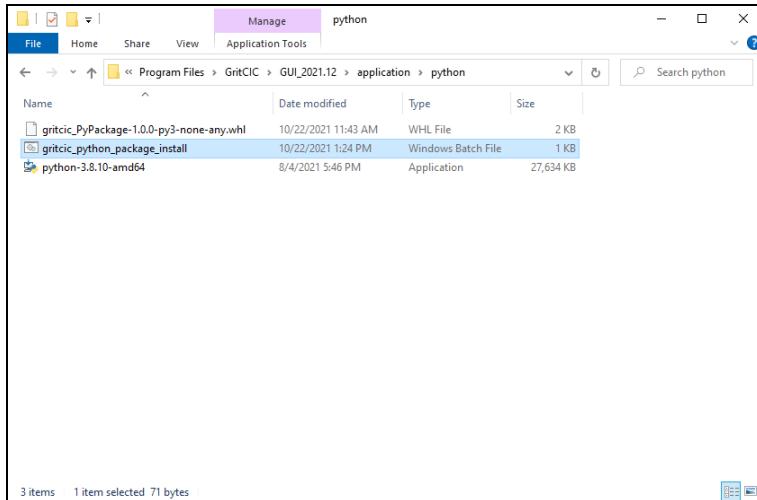


[python installer path]



[Python installation sequence]

7.1.2.3 Python - GritCIC library



[python – GritCIC library package installer]

```
C:\Program Files\GritCIC\GUI_2021.12\application\python>python -m pip install gritcic_PyPackage-1.0.0-py3-none-any.whl
Processing c:\program files\gritcic\gui_2021.12\application\python\gritcic_pypackage-1.0.0-py3-none-any.whl
Collecting numpy==1.21.3
  Using cached numpy-1.21.3-cp38-cp38-win_amd64.whl (14.0 MB)
Collecting pyserial==3.5
  Using cached pyserial-3.5-py2.py3-none-any.whl (90 kB)
Installing collected packages: pyserial, numpy, gritcic_PyPackage
Successfully installed pyserial numpy gritcic_PyPackage
WARNING: You are using pip version 20.1.1; however, version 21.0.1 is available.
You should consider upgrading the 'C:\Python\Python38\python.exe -m pip install --upgrade pip' command.
Press any key to continue . . .
```

[python – Completed GritCIC library package]

7.2 GUI Version 1.0.0(2021.12)

It searches and lists GritCIC UWB modules that can be connected automatically when GUI is executed.

The GUI supports 3 - mode : distance detection mode, respiration rate measurement mode and user manual mode.

7.2.1 main

After selecting a module from the list of connected modules, the user can select and execute one of distance detection, respiration rate measurement or user manual mode.



[GUI : main window]

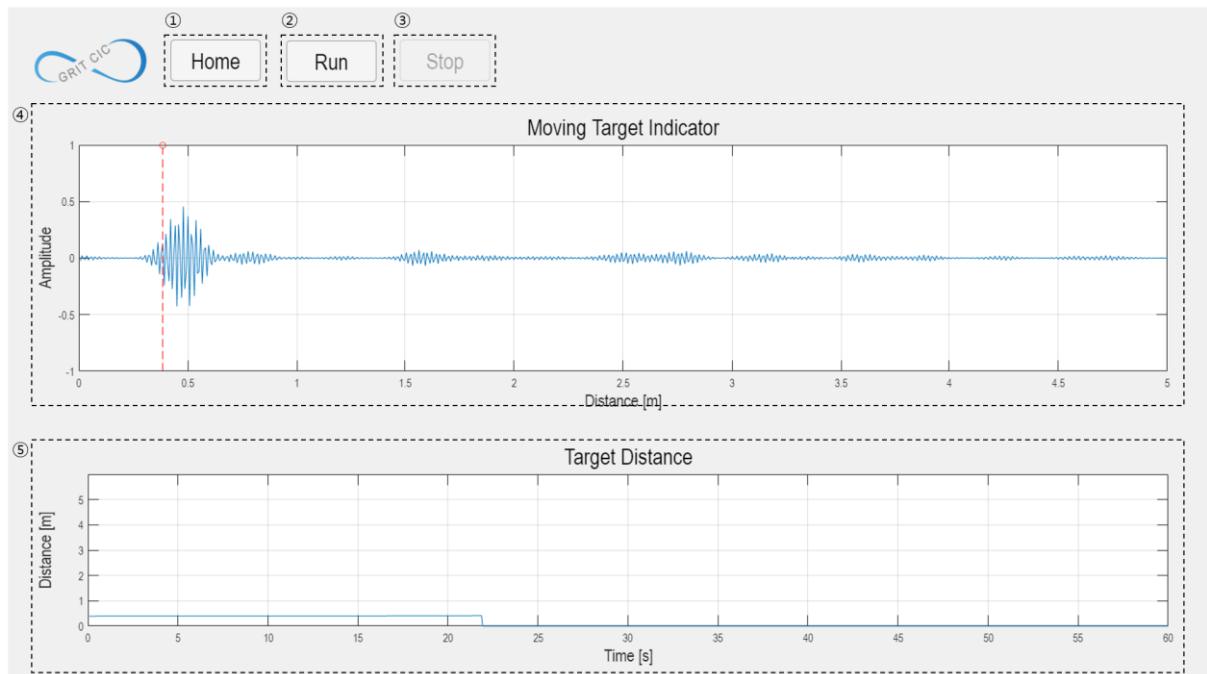
- ① GUI state window.
- ② Linked module refresh button.
- ③ Linked module list window.
- ④ "Port" information and module selection box of the searched module.
- ⑤ Information window of the searched module.
- ⑥ Button to run distance detection mode.
- ⑦ Button to run respiration rate mode.
- ⑧ Button to run user setting mode.

7.2.2 Distance Detection Mode

Runs the module and GUI to detect the distance of a moving object. (including respiration movement)

Parameter	Value	Unit
Center Frequency	8.0	GHz
Rx Gain	54	dB
Distance Range	5	m
Resolution	7.3	mm
Distance Offset	-0.65	m
STC Enable	Unchecked : off (default)	-
Frame Data	MTI filter Output	-
Average parameter	-	(Integer)
MTI parameter	REF. Average Num. : 16 TAG. Average Num. : 8	(Integer)

[Distance Detection Mode - Default Values]



[GUI : Distance detection mode window]

- ① Main screen return button.
- ② Distance detection mode run button.
- ③ Distance detection mode stop button.
- ④ The MTI filter output array-data and the distance information.
- ⑤ Distance information screen. (last 60 seconds information)

7.2.3 Breath Rate Detection Mode

Measure the respiration rate of an immobile person.

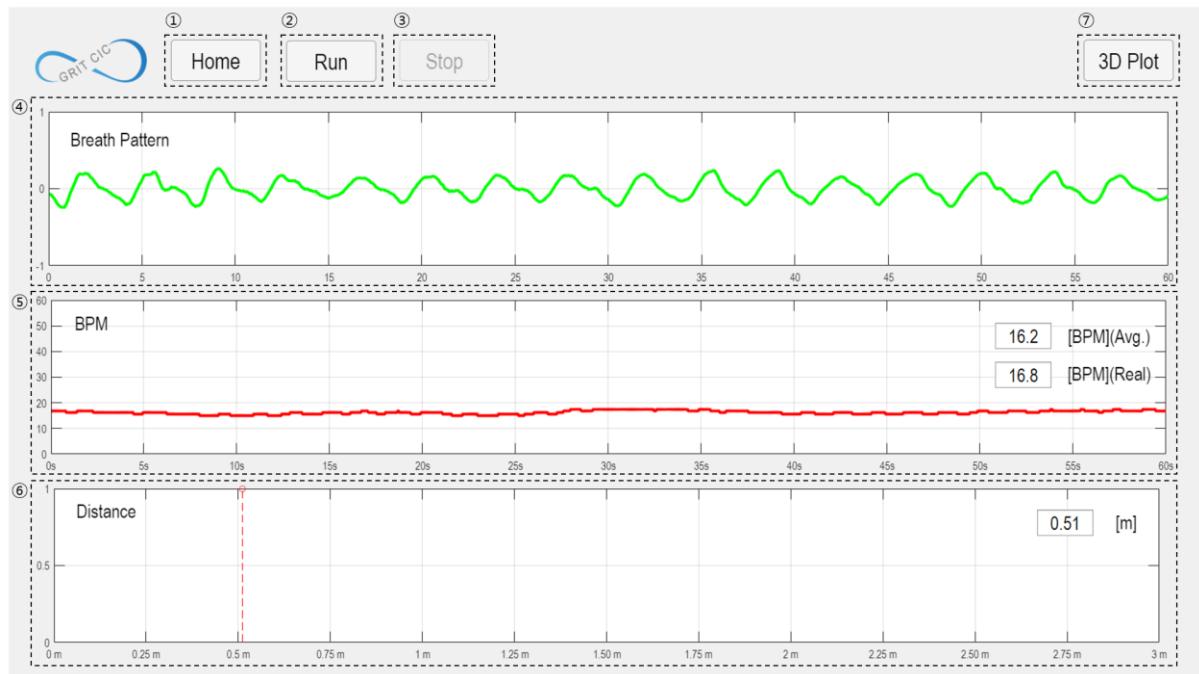
Parameter	Value	Unit
Center Frequency	8.0	GHz
Rx Gain	54	dB
Distance Range	3	m
Resolution	7.3	mm
Distance Offset	-0.65	m
STC Enable	Unchecked : off (default)	-
Frame Data	MTI filter Output	-
Average parameter	-	(Integer)
MTI parameter	REF. Average Num. : 16 TAG. Average Num. : 8	(Integer)

[Respiration Rate Detection Mode - Default Values]

7.2.3.1 A-scan mode(default)

Detect respiration in immobile people.

It measures a person's respiration rate and analyzes the respiration pattern, respiration rate, and distance information for 60 seconds and displays it in 2D.



[GUI : Respiration rate measurement A mode window]

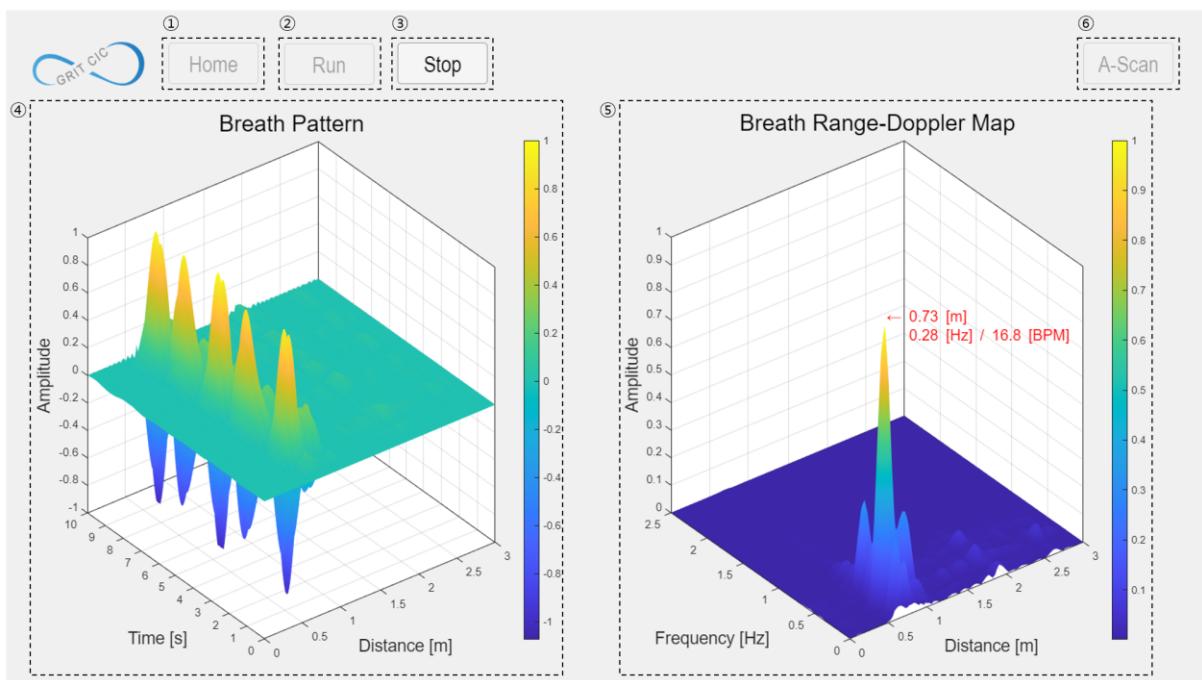
① Main screen return button.

② Respiration rate measurement A mode run button.

- ③ Respiration rate measurement A mode stop button.
- ④ Screen the breathing pattern.
- ⑤ Respiration rate accumulation screen (60s).
- ⑥ Distance information screen (real time).
- ⑦ 3D (B-scan) mode switch button.

7.2.3.2 B-scan mode (3D plot)

It measures a person's respiration rate and analyzes the respiration pattern, respiration rate, and distance information for 10 seconds and displays it in 3D.



[GUI : Respiration rate measurement B mode window]

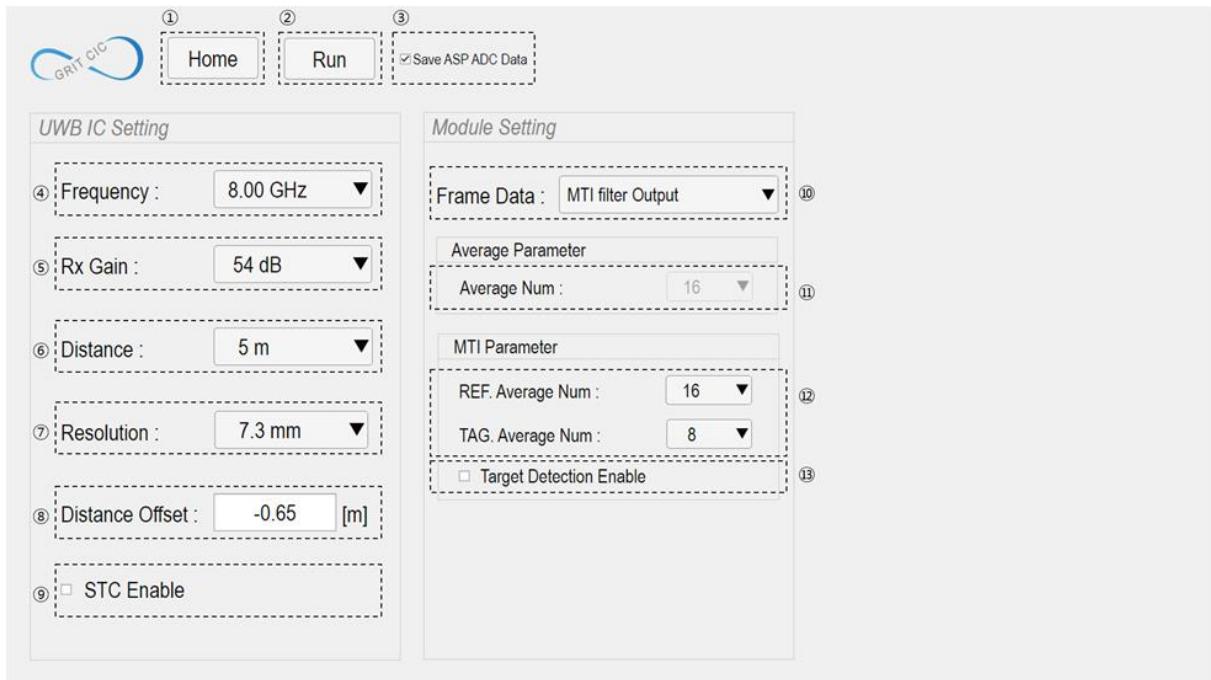
- ① Main screen return button.
- ② Respiration rate measurement B mode run button.
- ③ Respiration rate measurement B mode stop button.
- ④ Screen the respiration pattern. (10s)
- ⑤ Respiration rate frequency analysis.
- ⑥ 2D (A-scan) mode switch button.

7.2.4 User Manual Mode (User Custom setting - IC & Module)

In the setting screen provided by the user, the parameters of IC and module are set and operated.

7.2.4.1 IC & module setting

User settings window provided.



[GUI : User Manual mode – parameter window]

- ① Main screen return button.
- ② User manual mode run button.
- ③ Checkbox Allow storage of measurement data.

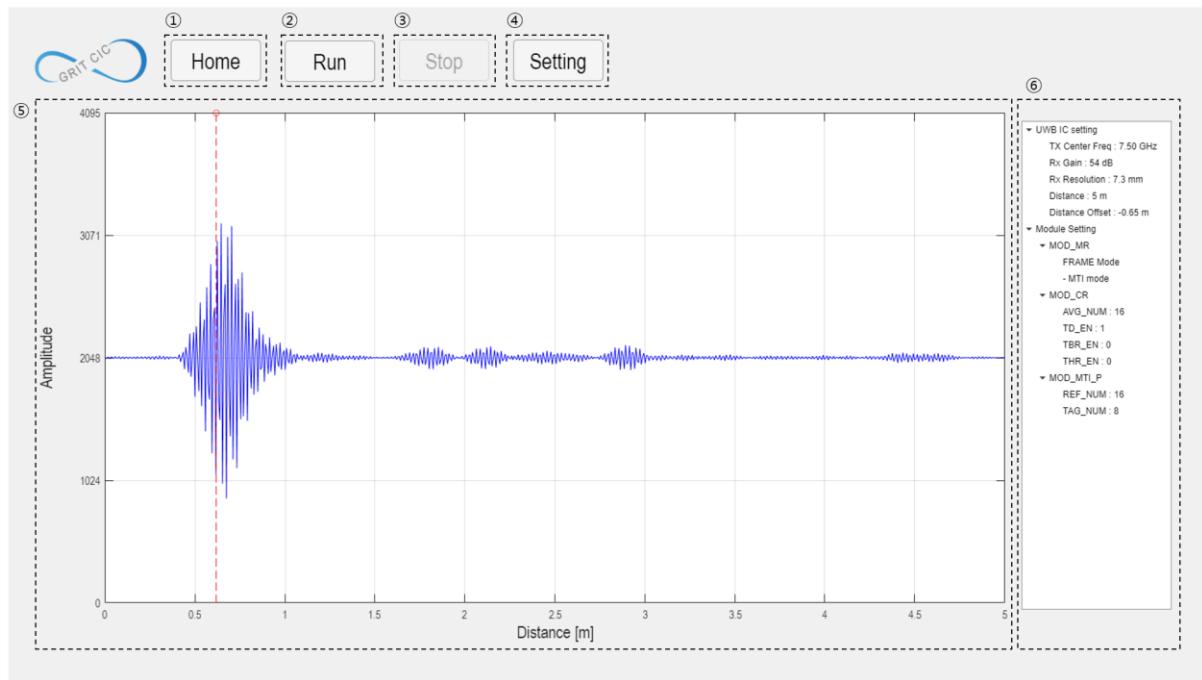
- Checked : on(default) / Unchecked : off

Parameter	Description		Value	Unit
UWB IC Setting				
④	Center Frequency	Select IU_D_00 UWB IC Center frequency	7.70 8.00 8.40	GHz
⑤	Rx Gain	Select IU_D_00_ UWB IC Rx Gain	54 48 42 36 30 24	dB
⑥	Distance	Select Radar Detected Range	3 ~ 15	m (integer)

⑦	Resolution	Select UWB IC Resolution	7.3 14.6 29.3 58.6	mm
⑧	Distance Offset	Write m (float)	-15.00 ~ 15.00	m (float)
⑨	STC Enable	H/W Sensitivity Time Control on/off	Checked : on Unchecked : off (default)	-
Module Setting				
⑩	Frame Data	Select UWB Module output frame data.	Raw Raw Avg. Matched filter Output Matched filter Output Avg. MIT filter Output	-
⑪	Average parameter Average NUM	Select Average Number (Raw Avg. & Matched filter output Avg. only)	2, 4, 8, 16, 32, 64	(Integer)
⑫	MTI parameter REF. Average NUM TAG. Average NUM	Select MTI filter parameter (MIT filter output = REF avg. data – TAG. Avg. data)	2, 4, 8, 16, 32	(Integer)
⑬	Target Detection Enable	Target Detection(CFAR filter) Enable on/off	Checked : on Unchecked : off (default)	

[User Manual Mode - User Configurable Parameter Table]

7.2.4.2 Run



[GUI : User manual mode – display window]

- ① Main screen return button.
- ② User manual mode run button.
- ③ User manual mode stop button.
- ④ Button to return to “IC & module setting” screen.
- ⑤ Set parameter information window.
- ⑥ Operation screen according to user set.

8 Regulatory Approval

8.1 CE/ETSI

This Chapter will cover the CE/ESTI approval of the IU-D-MA-0.0.

8.1.1 CE RF Radiation Exposure Statement

Caution

This equipment complies with European RF radiation Exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of centimeters between the device and your body.

8.2 FCC Approval

FCC Approval of IU-D-MA-0.0 is pending.

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.

FCC ID : 2BKPS-IUDMA00 (FCC Approval listing is in proceeding)

8.2.1 FCC Regulatory Notices

FCC MODULAR APPROVAL INFORMATION EXAMPLES for Manual

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

OEM INTEGRATION INSTRUCTIONS:

This device is intended only for OEM integrators under the following conditions:

The module must be installed in the host equipment such that 20 cm is maintained between the antenna and users, and the transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the internal onboard antenna that has been originally tested and certified with this module. External antennas are not supported. As long as these 3 conditions above are met, further transmitter test will not be required.

However, the OEM integrator 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.). The end-product may need Verification testing, Declaration of Conformity testing, a Permissive Class II Change or new Certification. Please involve a FCC certification specialist in order to determine what will be exactly applicable for the end-product.

Validity of using the module certification:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization. In such cases, please involve a FCC certification specialist in order to determine if a Permissive Class II Change or new Certification is required.

Upgrade Firmware:

The software provided for firmware upgrade will not be capable to affect any RF parameters as certified for the FCC for this module, in order to prevent compliance issues.

End product labeling:

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following:
"Contains FCC ID: 2BKPS-IUDMA00".

Information that must be placed in the end user manual:

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

WARNING

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

CAUTION: Exposure to Radio Frequency Radiation.

Antenna shall be mounted in such a manner to minimize the potential for human contact during normal operation. The antenna should not be contacted during operation to avoid the possibility of exceeding the FCC radio frequency exposure limit.

Requirement per KDB996369 D03

List of applicable FCC rules

List the FCC rules that are applicable to the modular transmitter. These are the rules that specifically establish the bands of operation, the power, spurious emissions, and operating fundamental frequencies.

Explanation: This module meets the requirements of FCC part 15F(15.521 & 15.517)

Summarize the specific operational use conditions

Describe use conditions that are applicable to the modular transmitter, including for example any limits on antennas, etc. For example, if point-to-point antennas are used that require reduction in power or compensation for cable loss, then this information must be in the instructions. If the use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual. In addition, certain information may also be needed, such as peak gain per frequency band and minimum gain, specifically for master devices in 5 GHz DFS bands.

Explanation: The EUT has a Array Antenna, and the antenna use a permanently attached antenna which is not replaceable.

Limited module procedures

If a modular transmitter is approved as a “limited module,” then the module manufacturer is responsible for approving the host environment that the limited module is used with. The manufacturer of a limited module must describe, both in the filing and in the installation instructions, the alternative means that the limited module manufacturer uses to verify that the host meets the necessary requirements to satisfy the module limiting conditions.

A limited module manufacturer has the flexibility to define its alternative method to address the conditions that limit the initial approval, such as: shielding, minimum signaling amplitude, buffered modulation/data inputs, or power supply regulation. The alternative method could include that the limited module manufacturer reviews detailed test data or host designs prior to giving the host manufacturer approval.

This limited module procedure is also applicable for RF exposure evaluation when it is necessary to demonstrate compliance in a specific host. The module manufacturer must state how control of the product into which the modular transmitter will be installed will be maintained such that full compliance of the product is always ensured. For additional hosts other than the specific host originally granted with a limited module, a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module.

Explanation: The Module is not a limited module.

Trace antenna designs

For a modular transmitter with trace antenna designs, see the guidance in Question 11 of KDB Publication 996369 D02 FAQ

- Modules for Micro-Strip Antennas and traces. The integration information shall include for the TCB review the integration instructions for the following aspects:
 - layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements.
 - a) Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna);
 - b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered);
 - c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout;
 - d) Appropriate parts by manufacturer and specifications;
 - e) Test procedures for design verification; and
 - f) Production test procedures for ensuring compliance. The module grantee shall provide a notice that any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

Explanation: Yes, The module with trace antenna designs, and This manual has been shown the layout of trace design, antenna, connectors, and isolation requirements.

RF exposure considerations

It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions (mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).

Explanation: This module complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

This module is designed to comply with the FCC statement, FCC ID is: 2BKPS-IUDMA00

Antennas

A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an "omni-directional antenna" is not considered to be a specific "antenna type")

For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product. The module manufacturers shall provide a list of acceptable unique connectors.

Explanation: The EUT has a Array Antenna, and the antenna use a permanently attached antenna which is unique.

Label and compliance information

Grantees are responsible for the continued compliance of their modules to the FCC rules. This includes advising host product manufacturers that they need to provide a physical or e-label stating "Contains FCC ID" with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748.

Explanation: The host system using this module, should have label in a visible area indicated the following texts: "Contains FCC ID: 2BKPS-IUDMA00."

Information on test modes and additional testing requirements

Additional guidance for testing host products is given in KDB Publication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host.

Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer's determination that a module as installed in a host complies with FCC requirements.

Explanation: Top band can increase the utility of our modular transmitters by providing instructions that simulates or characterizes a connection by enabling a transmitter.

Additional testing, Part 15 Subpart B disclaimer

The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Explanation: The module without unintentional-radiator digital circuitry, so the module does not require an evaluation by FCC Part 15 Subpart B. The host should be evaluated by the FCC Subpart B.

9 Certification

0135-4A61-CFD4-561D

방송통신기자재등의 적합등록 필증 Registration of Broadcasting and Communication Equipments	
상호 또는 성명 Trade Name or Registrant	그랫씨아이씨 주식회사
기자재명칭(제품명칭) Equipment Name	UWB 및 용도미지정 무선기기
기기번호/추가기기번호 Equipment code /Additional Equipment code	UWB1
기본모델명 Basic Model Number	IU-D-M-0.0
파생모델명 Series Model Number	
등록번호 Registration No.	R-R-GRu-GRIT-IU-D-M
제조자/제조국가 Manufacturer/Country of Origin	그랫씨아이씨 주식회사 / 한국
등록연월일 Date of Registration	2022-01-06
기타 Others	
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