

1417WCE

User & Installation Manual

- English

R-DHF-USM-048

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Preface

Please note that this information is for proper use and safety of the equipment. The following symbols may indicate a hazardous situation in which, if not heeded, may result in serious injury or even death to the user or others, or damage to the equipment.



Used to emphasize essential information.
Be sure to read this information to avoid incorrect operation.



WARNING

Indicates warning and safety instructions. If not adhered to, it could result in death or serious injury to the user or others.



CAUTION

Indicates a hazardous situation which, if not heeded, may result in minor or moderate injury to the user or others, or damage to the equipment.

For users in the United States:

- United State federal law restricts this equipment to be used by or on the order of a physician.
- Since the X-ray exposure condition can be changed depending on the age, gender and bone density of the patient, in case of Pediatric, X-ray exposure condition can be changed by expert's judge. For further information, please refer to FDA Pediatric X-ray Imaging webpage.

<http://www.fda.gov/radiation-emittingproducts/radiationemittingproductsandprocedures/medicalimaging/ucm298899.htm>

For users in other countries:

- This equipment is to be used by or on the order of a licensed person under the related laws for each country.

Intended use:

Digital Flat Panel X-Ray Detector is indicated for digital imaging solution designed for general radiographic system for human anatomy. It is intended to replace film or screen based radiographic systems in all general purpose diagnostic procedures. Not to be used for mammography.



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1. Safety Information

1.1 Safety Standard

1.1.1 Medical Device Fification

Item	Description
Classification by protection type against Electric Shock	Class I or Internally Powered Equipment
Classification according to the degree of protection against ingress of water	IP67
Mode of operation	Continuous Operation
Environment of Use	This equipment is not suitable for use in the presence of flammable anesthetic or oxygen.



- IP67 does not mean completely waterproof, so use with caution. If the connector is contaminated with liquids or foreign substances, clean and dry it sufficiently before use. If you operate the equipment outside of recommended operating conditions, the equipment may be damaged. This damage is not covered by warranty.

1.1.2 Regulations

1. Safety and Electromagnetic Compatibility Information

Item	Description
IEC/EN/UL 60601-1	Medical electrical equipment Part 1: General requirements for safety
IEC/EN 60601-1-2	Medical electrical equipment Part 2: Electromagnetic compatibility-requirements and tests

This equipment has been tested and found to comply with the limits for medical devices in IEC 60601-1-2. These limits are designed to provide reasonable protection against harmful interference in a typical medical installation.

This equipment generates, uses and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to other devices in the vicinity. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to other devices, 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 equipment.
- Increase the separation between the equipment.
- Connect the equipment into an outlet on a circuit different from that to which the other devices are connected.
- Contact Rayence Customer Service team or authorized agent for help.

2. Radio Frequency compliance

FCC (For USA)

- **FCC ID: QIIRYRWM001A**
- 5.15- 5.25 GHz band is restricted to indoor operations only.
- Host device of the approved module shall be marked with the following item:
- Compliance with FCC requirement 15.407(c)

Data transmission is always initiated by software, which is then passed down through the MAC, through the digital and analog baseband, and finally to the RF chip. Several special packets are initiated by the MAC. These are the only ways the digital baseband portion will turn on the RF transmitter, which it then turns off at the end of the packet. Therefore, the transmitter will be on only while one of the aforementioned packets is being transmitted. In other words, this device automatically discontinues transmission in case of either absence of information to transmit or operational failure.

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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

▪ **FCC CAUTION**

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

When installing it in a mobile equipment

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines in CFR §2.1093.

When you use the detector with wire mode, the wireless function is automatically off.

- 5150-5250 MHz band is restricted to indoor operations only.
- 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.

IC Notice (For CANADA)▪ **IC: 10742A-RWM001A**

This Class A digital apparatus complies with Canadian ICES-003

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RED Notice (European Union)

The product compliance to the Directive 2014/53/EU as Radio Equipment.

- 5150-5250 MHz band is restricted to indoor operations only.

3. Electro-Magnetic Compatibility Information

- Do not use mobile phones in the vicinity of this device. Use of mobile phones near this device can cause errors in operation due to electromagnetic wave interference, so such devices should be turned off in the vicinity of this device.
- The use of accessories and cables other than those sold by RAYENCE Co., Ltd. as internal components, may result in increased emissions or decreased electromagnetic immunity of this device.
- Do not use this device adjacent to or stacked with other devices. If adjacent or stacked use is necessary, confirm normal operation in the configuration in which this device will be used.
- Cable

Item	Length	Unit
Link cable (Shielded)	7	m
LAN cable (Shielded)	10	m
Power cord (3-Wire No Shielding)	1.8	m
USB cable (A to B type)	1.8	m
Trigger cable (Rayence I/F Cable)	10	m
P-interface cable (Rayence I/F Cable)	8	m

The Electromagnetic Compatibility Directive sets the essential requirements for electrical and electronic equipment that may disturb or even be disturbed by other equipment. The 1417WCE complies with these requirements as tabled below. Follow the guidance on the tables for use of the device in the electromagnetic environment.

Equipment is suitable for use in professional healthcare facility environment only.

Guidance and manufacturer's declaration – electromagnetic emissions

1417WCE is designed for use in the electromagnetic environment specified below.

Customers or users of 1417WCE must ensure that it is used in such an environment.

Emissions test	Compliance limit	Electromagnetic environment – guidance
Mains terminal disturbance voltage CISPR 11	Group 1 Class A	The EMISSIONS characteristics of 1417WCE make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this equipment might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.
Radiated disturbance CISPR 11	Group1, Class A	
Harmonics IEC 61000-3-2	Class A	The 1417WCE is suitable for use in all establishments other than domestic, and may be used in domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes, provided the following warning is heeded: Warning: This equipment/system is intended for use by healthcare professionals only. This equipment/system may cause radio interference or may disrupt the operation of nearby
Voltage fluctuations/Flicker IEC 61000-3-3	Complies	

		equipment. It may be necessary to take mitigation measures, such as re-orienting or relocating the 1417WCE or shielding the location
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Guidance and manufacturer's declaration – electromagnetic immunity

1417WCE is designed for use in the electromagnetic environment specified below.

Customers or users of 1417WCE must ensure that it is used in such an environment.

Immunity test	IEC 60601 test level	IEC 60601 Compliance level	Electromagnetic environment – guidance
Electrostatic Discharge Immunity (ESD) IEC 61000-4-2	± 8 kV/Contact $\pm 2, \pm 4, \pm 8, \pm 15$ kV /Air	± 8 kV/Contact $\pm 2, \pm 4, \pm 8, \pm 15$ kV /Air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Radiated RF Electromagnetic Field Immunity IEC 61000-4-3	3 V/m 80 MHz - 2.7 GHz 80% AM at 1 kHz	3 V/m 80 MHz - 2.7 GHz 80% AM at 1 kHz	1417WCE is suitable to use in professional healthcare environment. RF communication equipment is used no closer than 30 cm to any part of the 1417WCE, including cables specified by RAYENCE
Immunity to Proximity Fields from RF wireless Communications Equipment IEC 61000-4-3	28 V/m Max. 385-5785 MHz in according to table 9 in IEC 60601-1-2	28 V/m Max. 385-5785 MHz in according to table 9 in IEC 60601-1-2	
Electrical Fast Transient/Burst Immunity IEC 61000-4-4	± 2 kV, 100 kHz repetition frequency	± 2 kV, 100 kHz repetition frequency	The quality of supplied power should be suitable for general

			business site or hospital environment.
Surge IEC 61000-4-5	Line to Line $\pm 0.5 \text{ kV}, \pm 1 \text{ kV}$ Line to Ground $\pm 0.5 \text{ kV}, \pm 1 \text{ kV}, \pm 2 \text{ kV}$	Line to Line $\pm 0.5 \text{ kV}, \pm 1 \text{ kV}$ Line to Ground $\pm 0.5 \text{ kV}, \pm 1 \text{ kV}, \pm 2 \text{ kV}$	The quality of supplied power should be suitable for general business site or hospital environment.
Immunity to Conducted Disturbances Induced by RF fields IEC 61000-4-6	3 V 0.15 MHz - 80 MHz 6 V in ISM bands Between 0.15 MHz and 80 MHz 80% AM at 1 kHz	3 V 0.15 MHz - 80 MHz 6 V in ISM bands Between 0.15 MHz and 80 MHz 80% AM at 1 kHz	The strength of RF field in the frequency range in 150kHz~80MHz, the strength of the RF field is smaller than 3 V
Power Frequency Magnetic Field Immunity IEC 61000-4-8	30 A/m 50 & 60 Hz	30 A/m 50 & 60 Hz	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical domestic, residential or Home Health Care environment.
Voltage dips IEC 61000-4-11*	0 % U_T : 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0 % U_T ; 1 cycle and 70 % U_T ; 30 cycles Single phase: at 0°	0 % U_T : 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0 % U_T ; 1 cycle and 70 % U_T ; 30 cycles Single phase: at 0°	Mains power quality should be that of a typical residential or hospital environment. If the user of the 1417WCE requires continued operation during power mains interruptions, it is recommended that the 1417WCE be powered
Short interruptions IEC 61000-4-11*	0 % U_T ; 250/300 cycles	0 % U_T ; 250/300 cycles	

			from an uninterruptible power supply or a battery be used with the system power source.
*Note: U_T is the AC voltage of the power before using test level			

1.2 Symbols

Symbols	Descriptions
	Refer to instruction manual / booklet
	Consult instructions for use
	Alternate current
	Protective earth (Ground)
	Off (power : disconnect from the main switch)
	On (power : connect from the main switch)
	On / Off (button type)
	Warning
	Caution
	To indicate a reference to the X-ray tube, for example to identify the surface of a component such as a focused ant scatter grid, that has to be oriented towards the X-ray tube.
	This is a Type B applied part according to UL 60601-1 and IEC 60601-1.
	Handle with care
	Non-ionizing radiation
	Partial Pressure Limit
	Overall Pressure
	Read carefully
	Manufacturer

Symbols	Descriptions
	Date of manufacture
	Serial number
	WEEE : Waste Electrical and Electronic Equipment
	Authorized representative in the European community.
	Batteries Marking (Battery Directive 2006/66/EC)
	Recognized Component Mark for Canada and the United States
	For Korea Symbol for safety
	Keep dry
	Fragile, handle with care
	This side up
	4 layer stacking
	Temperature limit

1.3 Warning (MISE EN GARDE)



WARNING
MISE
EN
GARDE

Environment of Use and Storage

- Follow the specified process of operational instructions written in this manual for the safety of the users and patients.
- Does not use or store the detector near any flammable chemicals such as thinner, benzene, etc. Also, this detector is not a category AP or APG equipment. If chemicals are spilled or evaporate, it may result in fire or electric shock through contact with electric parts inside the detector. Also, some disinfectants are flammable. Be sure to take care when using them.

Environnement d'utilisation et de stockage

- Pour la sécurité des utilisateurs et des patients, suivez le processus spécifié dans les instructions d'utilisation figurant dans ce manuel.
- N'utilisez pas et ne stockez pas le capteur près de produits chimiques inflammables tels que du diluant, du benzène, etc. De plus, ce capteur n'est pas un équipement de catégorie AP ou APG. Si des produits chimiques sont renversés ou s'évaporent, un incendie ou une électrocution peut en résulter en cas de contact avec des pièces électriques situées à l'intérieur du capteur. En outre, certains désinfectants sont inflammables. Veillez à faire attention lorsque vous en utilisez.



WARNING
MISE
EN
GARDE

Connection

- Do not connect the detector with anything other than specified. Otherwise, it may result in fire or electric shock.
- To avoid the risk of electric shock, this detector must only be connected to supply mains with protective earth.
- Do not touch SIP/SOP and the patient simultaneously. There is a risk of electric shock from current leakage.
- Additional equipment connected to medical electrical equipment must comply with the respective IEC or ISO standards (e.g. IEC 60950 for data processing equipment). Furthermore all configurations shall comply with the requirements for medical electrical systems (see IEC 60601-1-1 or clause 16 of the 3 Ed. of IEC 60601-1, respectively). Anybody connecting additional equipment to medical electrical equipment configures a medical system and is therefore responsible that the system complies with the requirements for medical electrical systems. Attention is drawn to the fact that local laws take priority over the above-mentioned requirements. If in doubt, contact Rayence Customer Service team or authorized agent.
- Equipment connected to the detector and in the patient environment must be powered from a medically-isolated power source or must be a medically-isolated device. Equipment powered from a non-isolated source can result in chassis leakage currents exceeding safe levels. Chassis leakage current created by an accessory or device connected to a non-isolated outlet may add to the chassis leakage current of the detector.

Connexion

- Ne branchez le capteur avec aucun autre élément que ceux spécifiés. Dans le cas contraire, cela peut provoquer un incendie ou une électrocution.
- Pour éviter le risque d'électrocution, ce capteur ne doit être connecté à l'alimentation secteur qu'avec le conducteur de protection.
- Ne touchez pas simultanément SIP/SOP et le patient. Il existe un risque d'électrocution lié à une fuite de courant.
- Les équipements supplémentaires connectés à l'équipement électrique médical

doivent être conformes aux normes CEI et ISO correspondantes (par ex. CEI 60950 pour l'équipement de traitement de données). De surcroît, toutes les configurations doivent être conformes aux exigences relatives aux systèmes électriques médicaux (reportez-vous à la norme CEI 60601-1-1 ou à la clause 16 de l'édition 3 de la norme CEI 60601-1, respectivement). Toute personne connectant un équipement supplémentaire à l'équipement électrique médical configure un système médical. Il relève par conséquent de sa responsabilité de veiller à ce que le système soit conforme aux exigences relatives aux systèmes électriques médicaux. Nous attirons votre attention sur le fait que les lois locales ont priorité sur les exigences susmentionnées. En cas de doute, prenez contact avec l'équipe du service clientèle de Rayence ou avec un agent agréé.

- L'équipement connecté au capteur et se trouvant dans l'environnement du patient doit être alimenté par une source électrique médicalement isolée ou doit être un dispositif médicalement isolé. L'équipement alimenté par une source non isolée peut provoquer des courants de fuite du châssis dépassant les niveaux de sécurité. Le courant de fuite du châssis créé par un accessoire ou un dispositif connecté à une prise électrique non isolée peut augmenter le courant de fuite du châssis du capteur.

Handling

- Always be sure to keep checking the condition of the system and the patient to ensure they are normal during the use of the detector. If any problem is found, take appropriate measures, such as stopping the operation of the detector, as required.
- Never disassemble or modify the detector as it may result in fire or electric shock. Also, since the detector incorporates parts that may cause electric shocks and other hazardous parts, touching them may cause death or serious injury.
- Do not hit or drop the detector. The detector may be damaged if it receives a strong jolt, which may result in fire or electric shock if the detector is used without being repaired.
- Do not touch static-discharge (ESD) measures and do not touch or connect connector pins or sockets
- Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
- A grounding wrist strap is not essential for typical use.

Manipulation

- Pendant l'utilisation du capteur, veillez à contrôler régulièrement l'état du système et du patient pour vous assurer que tout est normal. Un cas de problème quelconque, prenez des mesures appropriées notamment l'arrêt du capteur si nécessaire.
- Ne démontez et ne modifiez jamais le capteur car cela pourrait provoquer un incendie ou une électrocution.
De plus, étant donné que le capteur intègre des pièces pouvant causer une électrocution ou d'autres pièces dangereuses, tout contact avec ces dernières pourrait provoquer des blessures graves voire mortelles.
- Ne heurtez pas et ne faites pas tomber le capteur. Le capteur risque d'être endommagé en cas de secousse violente, ce qui pourrait provoquer un incendie ou une électrocution si le capteur était utilisé sans être réparé.
- Ne touchez pas les mesures de décharge statique (ESD) et ne touchez pas ou ne connectez pas les broches ou les prises du connecteur.



- Les planchers doivent être en bois, en béton ou en carreaux de céramique. Si les sols sont recouverts de matériaux synthétiques, l'humidité relative doit être d'au moins 30 %.
- Un bracelet de mise à la terre n'est pas essentiel pour une utilisation typique.



WARNING
MISE
EN
GARDE

When Problem Occurs

Should any of the following occur, immediately turn OFF the power of each detector, unplug the power supply cord from the AC outlet, and contact Rayence Customer Service team or authorized agent.

- When there is smoke, odd smell or abnormal sound.
- When liquid has been spilled into the detector or a metal object has entered through an opening.
- When the detector has been dropped and it is damaged.

En cas de problème

Si l'une des situations suivantes vient à se présenter, mettez immédiatement chaque capteur hors tension, débranchez le cordon d'alimentation de la prise CA et prenez contact avec l'équipe du service clientèle de Rayence ou avec un agent agréé.

- En présence de fumée, de mauvaise odeur ou de bruit anormal.
- Lorsque du liquide a été renversé sur le capteur ou qu'un objet métallique a pénétré via une ouverture.
- Lorsque le capteur est tombé et qu'il est endommagé.



WARNING
MISE
EN
GARDE

Maintenance and Inspection

- For safety reasons, be sure to turn off the power of the detector when the following inspections are going to be performed. Otherwise, it may result in electric shock.
 - When the detector is going to be cleaned, be sure to turn off the power of each detector, and unplug the power cable from the AC outlet.
- Do not use any type of solvent, such as benzene. Otherwise, fire or electric shock may result.

Wear waterproof gloves to protect your hands from direct contact with IPA (Isopropyl-alcohol) or any other liquid.

- Maintenance of the detector should be done by an authorized service provider. If problem still cannot be corrected, it may result in fire or electric shock.

Maintenance et inspection

- Pour des raisons de sécurité, veillez à mettre le capteur hors tension lorsque les inspections suivantes vont être effectuées. Dans le cas contraire, cela peut provoquer une électrocution.
 - Lorsque le capteur va être nettoyé, veillez à mettre hors tension chaque capteur et à débrancher le câble d'alimentation de la prise CA.
- N'utilisez aucun type de solvant, comme du benzène. Dans le cas contraire, il existe un risque d'incendie ou d'électrocution.
- Portez des gants imperméables pour protéger vos mains de tout contact direct avec de l'IPA (alcool isopropylique) ou tout autre liquide.
- La maintenance du capteur doit être effectuée par un prestataire de services agréé. Dans le cas contraire, cela pourrait provoquer un incendie ou une électrocution.



WARNING
MISE
EN
GARDE

Wireless Connection

- SSID & PSK value should match to Router's setting. If these values are not matched with Detector and Router, the connection is not allowed for security.
- Avoid using co-channel or adjacent-channel with other wireless devices for high quality wireless performance.
- Transmitting omnidirectional radio wave and sending same information to different place at once is against the law.
- Any service related to the human life safety cannot be supported since this wireless detector has potential electric wave interference.
- This wireless detector has potential electric wave interference during use.

Connexion sans fil

- Les valeurs SSID et PSK doivent correspondre au réglage du routeur. Si ces valeurs ne correspondent pas à celles du capteur et du routeur, la connexion n'est pas autorisée pour des questions de sécurité.
- Évitez d'utiliser des canaux communs ou adjacents avec d'autres appareils sans fil pour garantir des performances sans fil de haute qualité.
- Il est illégal de transmettre des ondes radio omnidirectionnelles et d'envoyer les mêmes informations à un autre endroit simultanément.
- Tout service lié à la protection de la vie humaine ne peut pas être pris en charge car ce capteur sans fil comporte des interférences potentielles d'onde électrique.
- Ce capteur sans fil comporte des interférences potentielles d'onde électrique lorsqu'il est utilisé.

1.4 Caution (ATTENTION)



CAUTION
ATTENTION

Environment of Use and Storage

Do not install the detector in a location with the conditions listed below. Otherwise, it may result in failure or malfunction, cause fire or injury.

- Do not position the equipment so that it is difficult to disconnect the power cord.
- Close to facilities where water is used.
- Where it will be exposed to direct sunlight.
- Close to air-conditioner or ventilation equipment.
- Close to heat source such as a heater.
- Prone to vibration
- Insecure place.
- Dusty environment.
- Saline or sulfurous environment.
- High temperature or humidity.
- Freezing or condensation.

Do not place the storage case in a location with the conditions listed below.

- Where the cable of the detector unit will be strongly pulled when the detector is put into the case, otherwise, the cable may be damaged, resulting in fire or electric shock.
- Where someone might get their foot caught in the cable of the detector.
- Non-medical equipment such as the battery charger, access point cannot be used in patient's vicinity.

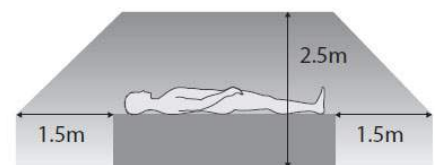
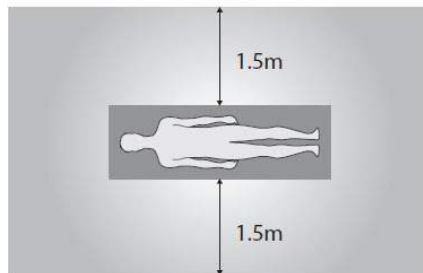
Environnement d'utilisation et de stockage

N'installez pas le capteur dans un lieu présentant les conditions répertoriées ci-dessous. Dans le cas contraire, une défaillance ou un dysfonctionnement peut survenir et provoquer un incendie ou des blessures.

- Positionnez l'équipement d'une manière permettant de débrancher le cordon d'alimentation facilement.
- Près d'installations où de l'eau est utilisée.
- À un endroit où il sera exposé à la lumière directe du soleil.
- Près de l'équipement de climatisation ou de ventilation.
- Près d'une source de chaleur comme un radiateur.
- À un endroit exposé à des vibrations.
- Dans un lieu non sécurisé.
- Dans un environnement poussiéreux.
- Dans un environnement salin ou sulfureux
- À un endroit avec une température élevée ou un fort taux d'humidité.
- Dans un endroit enclin au gel ou à la condensation.

Ne placez pas l'étui de rangement dans un lieu présentant les conditions répertoriées ci-dessous.

- À un endroit où le câble du capteur sera fortement tiré lorsque le capteur sera placé dans l'étui. Le câble risque d'être endommagé, ce qui provoquerait un incendie ou une électrocution.
- Dans des cas où quelqu'un risquerait de s'entraver dans le câble du capteur.
- L'équipement non médical, tel qu'un chargeur de batterie ou un point d'accès, ne peut pas être utilisé à proximité du patient.



Handling



CAUTION
ATTENTION

- Applied part: CFRP (Carbon Fiber Reinforced Plastic) Applied part having contact with the patient for a time "t": $1 \text{ min} \leq t < 10 \text{ min}$
- If contact over 24 hours on CFRP (Carbon Fiber Reinforced Plastic) of detector, it could be cause skin irritation.
- In order to prevent infection, please wipe the CFRP (Carbon Fiber Reinforced Plastic) with a soft cloth moistened with IPA (Isopropyl-alcohol) liquid. Wear waterproof gloves to protect your hands from direct contact with IPA or any other liquid.
- For safety reasons, be sure to turn off the power of each equipment when detector is not used.
- This detector is contraindicated for pregnant woman.

- Pièce appliquée : pièce appliquée en PRFC (plastique renforcé de fibres de carbone), étant en contact avec le patient pendant un temps « t » : $1 \text{ min} \leq t < 10 \text{ min}$
- Un temps de contact de plus de 24 heures avec le PRFC (plastique renforcé de fibres de carbone) du capteur risque de provoquer une irritation cutanée.
- Afin d'éviter une infection, veuillez essuyer le PRFC avec un chiffon doux humidifié avec du liquide IPA (alcool isopropylique). Portez des gants imperméables pour protéger vos mains de tout contact direct avec de l'IPA ou tout autre liquide.
- Pour des raisons de sécurité, veuillez à couper l'alimentation de chaque équipement lorsque le détecteur n'est pas utilisé.
- Ce détecteur est contre-indiqué chez la femme enceinte.



Location of Cables

- Make sure all cables are located so that they cannot be stepped on, tripped over, or otherwise subjected to damage or stress.

Emplacement des câbles

- Assurez-vous que tous les câbles sont positionnés de manière à ce que l'on ne marche pas dessus, ne s'entrave pas dedans ou à ce qu'on ne les expose d'aucune autre façon à des dommages ou tensions.



Maintenance and Inspection

- For safety reasons, be sure to inspect the detector before using it. In addition, carry out a regular inspection at least once a year.
- If the detector is defective, do not disassemble the detector randomly. Maintenance of the detector should be done by an authorized service provider. Please contact Rayence Customer Service team or authorized agent.
- Be sure to check the user's manual for replaceable components.

Maintenance et inspection

- Pour des raisons de sécurité, veuillez à inspecter le capteur avant de l'utiliser. De plus, effectuez une inspection régulière au moins une fois par an.
- Si le capteur est défectueux, ne le démontez pas au hasard. La maintenance du capteur doit être effectuée par un prestataire de services agréé. Veuillez contacter l'équipe du service clientèle de Rayence ou un agent agréé.
- Veuillez à consulter le manuel d'utilisation pour les composants remplaçables.



Modifications

- Any changes or modifications in construction of this detector which are not expressly approved by the party responsible for compliance could void the user's authority to operate the detector.

Modification

- Tout changement ou toute modification à la construction de ce capteur n'étant pas expressément approuvé(e) par l'entité chargée de la conformité pourrait entraîner l'annulation de l'autorisation de l'utilisateur à utiliser le capteur.



Battery

- Do not let the detector or battery come in contact with liquids. Liquids can get into the detector's circuits, leading to corrosion. Even when the detector appears to be dry and appears to operate normally, the circuitry could slowly corrode and pose a safety

ATTENTION

hazard. If the battery gets wet, have them checked by authorized agent or contact Rayence Customer Service team, even if they appear to be working properly.

- Do not place your battery near a heat source. Excessive heating can damage the detector or the battery and could cause the detector or the battery to explode.
- Do not dry a wet or damp battery with an appliance or heat source such as a microwave oven, hair dryer, iron, or radiator.
- Do not dispose of the detector or the battery in a fire. The detector or the battery may explode when overheated.
- Use only Rayence-approved batteries and recharge your battery (Model name: RB37BLA) only with Rayence-approved chargers (Model name: RMC002A) which are specifically designed for your detector.
- Use of a non-Rayence-approved battery or charger may present a risk of fire, explosion, leakage, or other hazard. Rayence's warranty does not cover damage to the detector caused by non-Rayence-approved batteries and/or chargers.
- Misuse or use of incompatible batteries and charging detectors could result in damage to the detector and a possible risk of fire, explosion, or leakage, leading to serious injuries, damages to your detector, or other serious hazard.
- Check the battery status frequently to avoid battery empty. When the low battery LED of detector is turned on, change the battery or charge the battery using cable.

Batterie

- Ne laissez pas le capteur ou la batterie entrer en contact avec des liquides. Les liquides peuvent pénétrer dans les circuits du capteur et entraîner l'apparition de corrosion. Même lorsque le capteur semble être sec et fonctionner normalement, les circuits pourraient se corroder lentement et présenter un danger de sécurité. Si la batterie vient à être mouillée, faites-la vérifier par un agent agréé ou prenez contact avec le service clientèle de Rayence, même si elle semble fonctionner correctement.
- Ne placez pas votre batterie près d'une source de chaleur. Une surchauffe peut endommager le capteur ou la batterie et pourrait provoquer l'explosion du capteur ou de la batterie.
- Ne faites pas sécher une batterie mouillée à l'aide d'un appareil ou d'une source de chaleur comme un four à micro-ondes, un sèche-cheveux, un fer à repasser ou un radiateur.
- Ne jetez pas le capteur ou la batterie au feu. Le capteur ou la batterie peut exploser en cas de surchauffe.
- Utilisez uniquement les batteries approuvées par Rayence et rechargez votre batterie (nom du modèle : RB37BLA) uniquement à l'aide de chargeurs approuvés par Rayence (nom du modèle : RMC002A) qui sont spécifiquement conçus pour votre capteur.
- L'utilisation d'une batterie ou d'un chargeur non approuvé par Rayence peut présenter un risque d'incendie, d'explosion, de fuite ou autre. La garantie de Rayence ne couvre pas les dommages subis par le capteur en raison de batteries et/ou chargeurs non approuvés par Rayence.
- Une utilisation inappropriée ou l'utilisation de batteries et capteurs de charge incompatibles pourrait provoquer des dommages sur le capteur et un risque potentiel d'incendie, d'explosion ou de fuite entraînant de graves blessures, des dommages sur votre capteur ou d'autres dangers majeurs.
- Vérifiez fréquemment l'état de la batterie pour éviter de vous retrouver avec une batterie vide. Lorsque le voyant de batterie faible du capteur s'allume, remplacez la batterie ou rechargez-la à l'aide du câble.

**Recommendations to equipment manufacturers and battery assemblers**

**CAUTION
ATTENTION**

- The following represents a typical, but non-exhaustive, list of good advice to be provided by the manufacturer of secondary cells and batteries to equipment manufacturers and battery assemblers.
- Do not dismantle, open or shred cells. Batteries should be dismantled only by trained personnel. Multicell battery cases should be designed so that they can be opened only with the aid of a tool.
- Do not short-circuit a cell or battery. Do not store cells or batteries haphazardly in a box or drawer where they may short-circuit each other or be short-circuited by conductive materials.
- Do not remove a cell or battery from its original packaging until required for use.
- Do not expose cells or batteries to heat or fire. Avoid storage in direct sunlight.
- Do not subject cells or batteries to mechanical shock.
- In the event of a cell leaking, do not allow the liquid to come into contact with the skin or eyes. If contact has been made, wash the affected area with copious amounts of water and seek medical advice.
- Equipment should be designed to prohibit the incorrect insertion of cells or batteries and should have clear polarity marks. Always observe the polarity marks on the cell, battery and equipment and ensure correct use.
- Do not mix cells of different manufacture, capacity, size or type within a battery.
- Seek medical advice immediately if a cell or battery has been swallowed.
- Consult the cell/battery manufacturer on the maximum number of cells, which may be assembled in a battery and on the safest way in which cells may be connected.
- A dedicated charger should be provided for each equipment. Complete charging instructions should be provided for all secondary cells and batteries offered for sale.
- Keep cells and batteries clean and dry.
- Wipe the cell or battery terminals with a clean dry cloth if they become dirty.
- Secondary cells and batteries need to be charged before use. Always refer to the cell or battery manufacturer's instructions and use the correct charging procedure.
- Do not maintain secondary cells and batteries on charge when not in use.
- After extended periods of storage, it may be necessary to charge and discharge the cells or batteries several times to obtain maximum performance.
- Secondary cells and batteries give their best performance when they are operated at normal room temperature.
- Retain the original cell and battery literature for future reference.
- When disposing of secondary cells or batteries, keep cells or batteries of different electrochemical systems separate from each other.
- Contact the Rayence Customer Service team to destroy a battery.

Recommandations aux fabricants d'équipements et assembleurs de batteries

- Ce qui suit représente une liste typique mais non exhaustive de conseils fournis par les fabricants de batteries et piles rechargeables aux fabricants d'équipements et assembleurs de batteries.
- Ne démontez pas, n'ouvrez pas et ne détruisez pas les piles. Les batteries ne doivent être démontées que par un personnel qualifié. Les boîtiers de batteries à piles multiples doivent être conçus de manière à ne pouvoir être ouverts qu'à l'aide d'un outil.
- Ne court-circuitiez pas une pile ou une batterie. Ne rangez pas les piles ou batteries n'importe comment dans une boîte ou un tiroir où elles risquent de se court-circuiter.

entre elles ou d'être court-circuitées par des matériaux conducteurs.

- Ne retirez pas une pile ou une batterie de son emballage d'origine tant que vous ne comptez pas l'utiliser.
- N'exposez pas les piles ou batteries à la chaleur ou au feu. Évitez de les ranger à la lumière directe du soleil.
- Ne soumettez pas des piles ou des batteries à des chocs mécaniques.
- Si une pile venait à fuir, ne laissez pas le liquide entrer en contact avec la peau ou les yeux. En cas de contact, lavez la zone concernée à grandes eaux et demandez conseil à un médecin.
- L'équipement doit être conçu de manière à éviter l'insertion incorrecte des piles ou batteries et la polarité doit être indiquée clairement. Vérifiez toujours la polarité de la pile, de la batterie et de l'équipement, et veillez à une bonne utilisation.
- Ne mélangez pas dans une même batterie des piles dont le fabricant, la capacité, la taille ou le type sont différents.
- Demandez immédiatement conseil à un médecin en cas d'ingestion d'une pile ou d'une batterie.
- Consultez le fabricant de la pile/batterie pour connaître le nombre maximal de piles pouvant être assemblées dans une batterie et le moyen de plus sûr de connecter les piles.
- Un chargeur dédié doit être fourni pour chaque équipement. Des instructions de recharge complètes doivent être fournies pour toutes les batteries et piles rechargeables proposées à la vente.
- Veillez à ce que les piles et batteries restent propres et sèches.
- Essuyez les bornes de la pile ou de la batterie à l'aide d'un chiffon propre et sec si elles sont sales.
- Les batteries et piles rechargeables doivent être chargées avant utilisation. Reportez-vous toujours aux instructions du fabricant de la pile ou de la batterie et suivez la procédure de recharge appropriée.
- Ne laissez pas les batteries et piles rechargeables en charge lorsqu'elles ne sont pas utilisées.
- Après de longues périodes de stockage, il peut s'avérer nécessaire de recharger et décharger plusieurs fois les piles ou batteries pour obtenir des performances optimales.
- Les batteries et piles rechargeables délivrent des performances optimales lorsqu'elles sont utilisées à température ambiante normale.
- Conservez la documentation d'origine de la batterie et de la pile pour pouvoir vous y reporter ultérieurement.
- Lors de l'élimination des batteries ou piles rechargeables, ne mélangez pas les piles ou batteries des différents systèmes électrochimiques.
- Contactez l'équipe du service clientèle de Rayence pour détruire la batterie.



Recommendations to the end-users

- The following represents a typical, but not exhaustive list of good advice to be provided by the equipment manufacturer to the end-user.
- Do not dismantle, open or shred secondary cells or batteries.
- Do not expose cells or batteries to heat or fire. Avoid storage in direct sunlight.
- Do not short-circuit a cell or a battery. Do not store cells or batteries haphazardly in a box or drawer where they may short-circuit each other or be short-circuited by other metal objects.
- Do not remove a cell or battery from its original packaging until required for use.
- Do not subject cells or batteries to mechanical shock.
- In the event of a cell leaking, do not allow the liquid to come in contact with the skin or eyes. If contact has been made, wash the affected area with copious amounts of water and seek medical advice.
- Do not use any charger other than that specifically provided for use with the equipment.
- Observe the plus (+) and minus (–) marks on the cell, battery and equipment and ensure correct use.
- Do not use any cell or battery which is not designed for use with the equipment.
- Do not mix cells of different manufacture, capacity, size or type within a device.
- Keep cells and batteries out of the reach of children.
- Seek medical advice immediately if a cell or a battery has been swallowed.
- Always purchase the correct cell or battery for the equipment.
- Keep cells and batteries clean and dry.
- Wipe the cell or battery terminals with a clean dry cloth if they become dirty.
- Secondary cells and batteries need to be charged before use. Always use the correct charger and refer to the manufacturer's instructions or equipment manual for proper charging instructions.
- Do not leave a battery on prolonged charge when not in use.
- After extended periods of storage, it may be necessary to charge and discharge the cells or batteries several times to obtain maximum performance.
- Secondary cells and batteries give their best performance when they are operated at normal room temperature (20 °C ± 5 °C).
- Retain the original product literature for future reference.
- Use only the cell or battery in the application for which it was intended.
- When possible, remove the battery from the equipment when not in use.
- Dispose of properly.
- Contact the Rayence Customer Service team to destroy a battery.

Recommandations à l'attention des utilisateurs finaux

- La liste suivante est une liste type mais non exhaustive des bons conseils à donner par le fabricant de l'équipement à l'utilisateur final.
- Ne démontez pas, n'ouvrez pas et ne détruisez pas les batteries ou piles rechargeables.
- N'exposez pas les piles ou batteries à la chaleur ou au feu. Évitez de les ranger à la lumière directe du soleil.
- Ne court-circuitiez pas une pile ou une batterie. Ne rangez pas les piles ou batteries

n'importe comment dans une boîte ou un tiroir où elles risquent de se court-circuiter entre elles ou d'être court-circuitées par d'autres objets métalliques.

- Ne retirez pas une pile ou une batterie de son emballage d'origine tant que vous ne comptez pas l'utiliser.
- Ne soumettez pas des piles ou des batteries à des chocs mécaniques.
- Si une pile venait à fuir, ne laissez pas le liquide entrer en contact avec la peau ou les yeux. En cas de contact, lavez la zone concernée à grandes eaux et demandez conseil à un médecin.
- N'utilisez pas de chargeur autre que celui spécifiquement fourni avec l'équipement.
- Respectez les marques plus (+) et moins (-) sur la pile, la batterie et l'équipement et veillez à une bonne utilisation.
- N'utilisez pas de pile ou de batterie n'étant pas conçue pour être utilisée avec l'équipement.
- Ne mélangez pas dans un même dispositif des piles dont le fabricant, la capacité, la taille ou le type sont différents.
- Tenez les piles et batteries hors de la portée des enfants.
- Demandez immédiatement conseil à un médecin en cas d'ingestion d'une pile ou d'une batterie.
- Achetez toujours la pile ou batterie appropriée pour l'équipement.
- Veillez à ce que les piles et batteries restent propres et sèches.
- Essuyez les bornes de la pile ou de la batterie à l'aide d'un chiffon propre et sec si elles sont sales.
- Les batteries et piles rechargeables doivent être chargées avant utilisation. Utilisez toujours le bon chargeur et reportez-vous aux instructions du fabricant ou au manuel de l'équipement pour consulter les instructions de recharge appropriée.
- Ne laissez pas une batterie en charge prolongée lorsqu'elle n'est pas utilisée.
- Après de longues périodes de stockage, il peut s'avérer nécessaire de recharger et décharger plusieurs fois les piles ou batteries pour obtenir des performances optimales.
- Les batteries et piles rechargeables délivrent des performances optimales lorsqu'elles sont utilisées à température ambiante normale (20 °C ± 5 °C).
- Conservez la documentation d'origine du produit pour pouvoir vous y reporter ultérieurement.
- Utilisez la pile ou la batterie uniquement dans l'application pour laquelle elle a été conçue.
- Quand cela est possible, retirez la batterie de l'équipement lorsque celui-ci n'est pas utilisé.
- Mettez-la au rebut de manière appropriée.
- Contactez l'équipe du service clientèle de Rayence pour détruire la batterie.

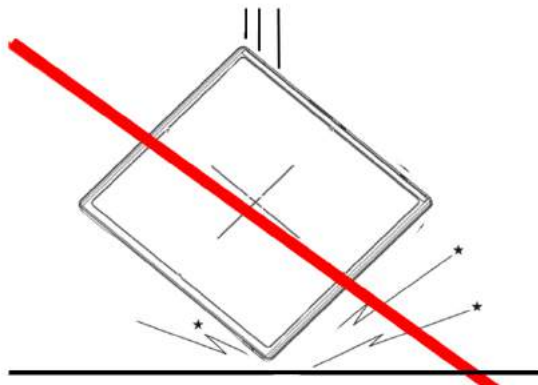
1.5 Safety Information

Preparation

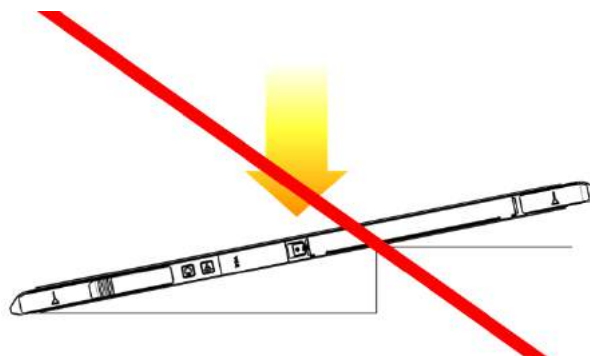
- Be sure to connect the cables to the proper connectors. Otherwise, the detector may malfunction or may be damaged.
- The power supply provided by Rayence is designed for the detector from Rayence. Please contact Rayence, if any other type of power supply is needed to be used.
- Be sure to fully charge the battery before use. Charge the battery on the day of examination or on the previous day.
- Battery slowly discharges even when not in use. The battery may have expired if it discharges immediately after being fully charged. You can purchase an optional battery to replace an exhausted one.
- The battery charger provided by Rayence is designed for the dedicated battery.
- When the detector will not be used for some time, remove the battery.
- (When purchasing additional battery) Lithium ion batteries State of Charge of the battery must not exceed 30% as per the Safe Transport of Dangerous Goods by Air. Charge the battery before use.

Handling

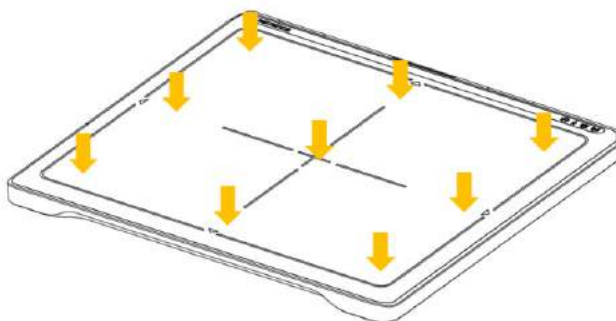
- Handle the detector carefully, as it may become damaged if it is hit, dropped, or receives a strong jolt.



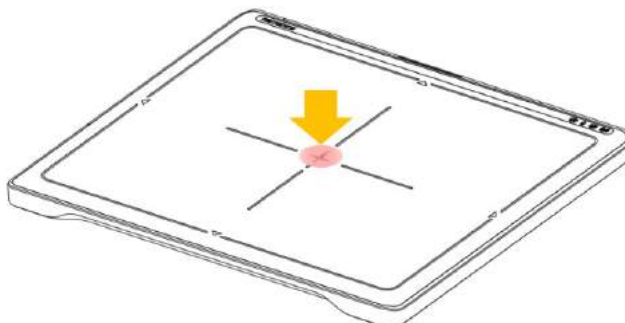
- Be sure to use the detector on a flat place so it will not bend. Otherwise, the detector may be damaged.



- Be sure to check the detector daily and confirm that it works properly. Sudden heating of the room in cold areas will cause condensation to form on the detector. In this case, wait until condensation disappears before performing exposure. If the detector is used with condensation formed on it, problems may occur in the quality of the detector. When an air-conditioner is going to be used, be sure to raise/lower the temperature gradually so that a difference in temperature in the room and in the detector does not occur, to prevent forming of condensation. Follow the recommended proper Room temp.
- Do not use the detector near devices generating a strong magnetic field. Doing so may produce image noise or artifacts.
- Keep the connectors free from being in contact with the patient.
- Connectors are intended to be connected to an external device and must follow IEC standards.
- Do not apply excessive weight to the detector. Otherwise, the detector may be damaged.



Overall Pressure: 300kg(661lb) over the whole area of detector window.



Partial Pressure: 150kg(330lb) on an area 40 mm in diameter.

Disinfection and Cleaning

- Do not spray disinfectants or detergents on the detector.
- When cleaning the detector, be sure to turn off the power, and unplug the power cable from the AC outlet.
- Do not use any flammable chemicals such as thinner, benzene for cleaning. Otherwise, fire or electric shock may result.
- Wear waterproof gloves to protect your hands from direct contact with disinfectants or detergents.

1.6 Label and Location of Attachment

Refer to the back of the device for details.

1.7 Summary of usability specifications

Medical purposes

- Provision and reading of disease and injury diagnostic images

Patient groups

- No patient population exists who uses or is in contact with the device.
- Patient population for the X-ray images read is not specified.

Parts of body or organizations to which the device is mounted or that interact with the device

- Detector contacts the body surface of a patient and an operator.

Significant physical and performance characteristics

- Refer to **Chap. 2.4 Part Specifications** in this manual

Operating principles

- Flat panel detector is a system that can acquire, save, process and transfer digital images of an area of interest taken with X-ray. X-ray beam entering the X-ray imaging sensor is converted into visible light by scintillation layer of the sensor. The amorphous silicon (a-Si) and Photo Diode on TFT Array of the sensor further converts visible light into electric signal. Electric signals are amplified and converted to digital signals to form image data. Obtained image data is transferred to the computer via Ethernet or Wi-Fi interface and visually displayed on the monitor screen.

Intended user profile

- No special training is required to use this device. The intended users of this device are as follows.

A professional in good health with specialist knowledge/ qualifications who has fully understood the content of this document. (Such as a doctor or radiological technologist)

2. Product Introduction and Specification

2.1 Product Features

The 1417WCE are wireless digital flat panel detectors that has been designed for a faster, more streamlined approach to digital radiography systems.

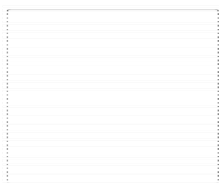
The 1417WCE detectors utilize a combination of propriety TFT glass and high quality scintillators, which along with a pixel pitch of 100 or 140 microns and 5.0 lp/mm(100 type), 3.5 lp/mm(140 type) of resolution, assures delivery of sharp, high quality images.

The 1417WCE detector contains a built-in Access Point (AP) enabling images to be directly sent to a Wi-Fi connected computer within seconds. Built-in image memory storage permits taking images where a computer connection is not available and also prevents lost images should there be an interruption of power. Whether an image was taken with the detector in the portrait or landscape position, the auto image rotation function allows images to be displayed in the correct orientation.

These features, coupled with an auto-trigger signal sensing technology that allows the detectors to be used without generator integration, makes the 1417WCE the ideal flat panel detector solutions for both fixed and portable applications.

2.2 Product Components

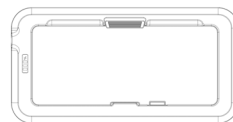
2.2.1 Basic Components



Detector 1EA



Battery 1EA



Battery charger 1EA



Battery charger adaptor
1EA



AC power cord 1EA
(110V or 220V 1.8m)



Installation CD 1EA



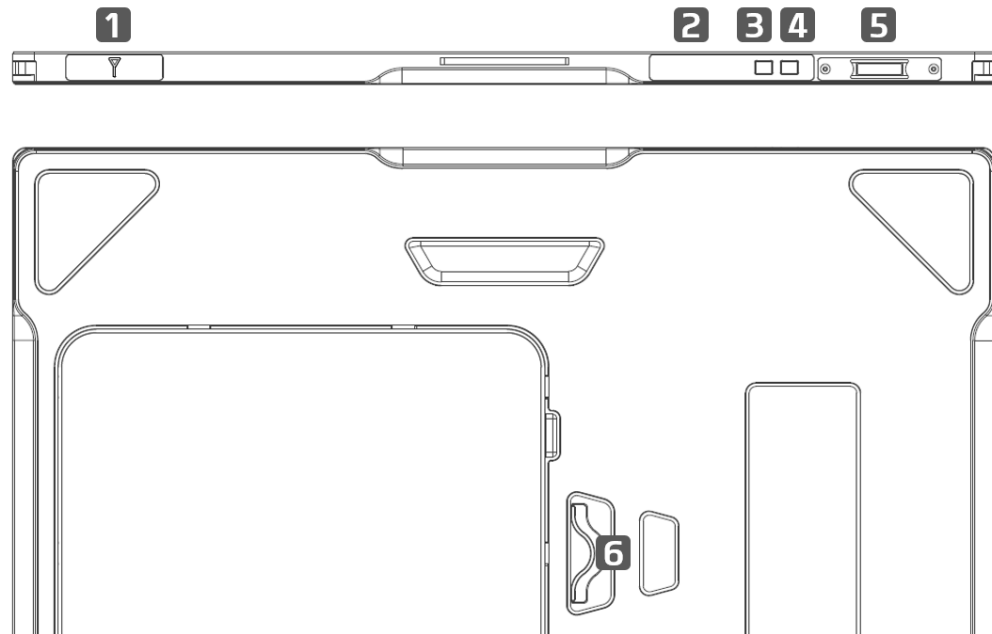
Manual 1EA

2.2.2 Optional Components

Power supply package				
	Power supply1EA	AC power cord 1EA (110V or 220V 1.8m)	LAN cable 1EA (10m)	Link Cable 1EA (7m)
AGI package				
	Trigger Cable 1EA	P-interface Cable 1EA	AGI Box 1EA	USB Cable 1EA

2.3 Part Names and Functions

2.3.1 Detector



1. Wireless Antenna
2. OLED window
Informs the detector status.
3. Mode select button & LED indicator

Mode Change

Press the 1 second

Indicates current mode of detector.

Name of LED	Status of LED	Status of product
Mode	Orange on	Station mode(wireless)
	Green on	AP mode(wireless)
	Off	Wired mode
	Blinking Orange and Green alternatively	Sleep mode

4. Power button & LED indicator

Power On / Off

Press over than 3 seconds

Indicates current power status of detector.

Name of LED	Status of LED	Status of product
Power	Green	Power on
	Blinking green	Power booting
	Orange	Low battery (Battery remain 0~7%)

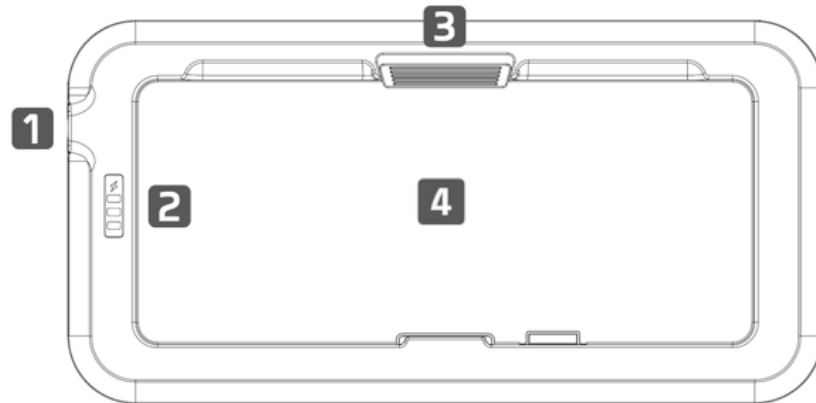
5. Link cable connector

Use for data transfer and charging battery while wired mode is in use (Connect between detector and power supply.)

6. Battery Unlock button

This is an unlock button to remove battery

2.3.2 Battery charger



1. Power connector

Connects to the mobile charger adapter

2. Battery LED Indicator: Display battery status

In the diagram below, the box shows where the remaining battery percentage is displayed.

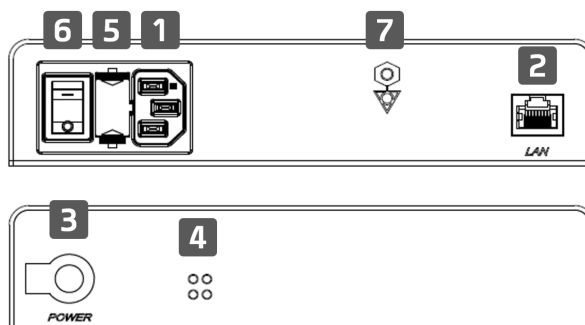
Mode	Battery LED Indicator	Discription
Battery Charging		Battery Capacity 99 ~ 100 %
		Battery Capacity 63 ~ 98 %
		Battery Capacity 33 ~ 62 %
		Battery Capacity 0 ~ 32 %
Error Mode		Charge suspend
		Timer fault
		Communication error
		Input over-voltage
Battery absent		No battery in battery charger

3. Battery unlock level

This is an unlock-level to remove battery

4. Battery: Rechargeable Lithium Ion battery

2.3.3 Power Supply (Optional)

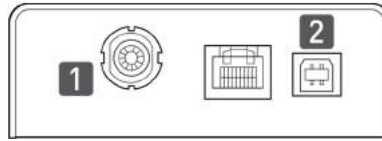


1. Power Plug Connector
Connects to the AC power cord
2. LAN Connector
Ethernet port for transmitting an image/command between the detector and PC
3. Link Connector
Used for charging the battery while the detector is in use (Connect the detector and power supply)
4. LED Indicator
Display status of the power supply.

Color	Status	Power Status
Green	On	Power on

5. Fuse
T3.15 AH 250V
6. Switch
Power On/Off switch
7. Frame ground

2.3.4 AGI Box (Optional)



1. Trigger Connector

This is a connector to synchronize the detector and generator. Connect the AGI to the generator by using a P-interface cable or trigger cable.

2. USB Connector

This is a connector for communication between the AGI and PC. Connect the AGI to the PC by using a USB cable.

2.4 Part Specifications

2.4.1 Detector

Parameter	Spec.		Unit
Sensor Type	Amorphous Silicon with TFT (Single panel)		-
Scintillator Type	CsI:TI		-
Total Pixel Matrix	100 type: 3534 X 4302 140 type: 2500 X 3052		Pixels
Total Pixel Area	100 type: 353.4 X 430.2 140 type: 350.0 X 427.3		mm
Pixel Pitch	100 type: 100 140 type: 140		μm
Effective Pixel Matrix	100 type: 3450 X 4218 140 type: 2440 X 2992		Pixels
A/D Conversion	14 / 16		bits
Data Transfer	1Gbps Ethernet 802.11 n/ac Wireless LAN, up to 867Mbps		-
Energy range	40 ~ 150		kVp
Limiting Resolution	100 type: 5.00 140 type: 3.57		lp/mm
MTF (@1lp/mm)	100 – Typ. 62 140 – Typ. 57		%
DQE (@0lp/mm)	100 – Typ. 65 140 – Typ. 65		%
Dimension	384 X 460 X 15		mm
Weight	≤ 2.7 (incl. 1 battery)		kg
Trigger mode	Manual Mode Auto Trigger Mode (Auto Exposure Detection)		-
Power consumption	6		W
Wireless specifications	Standard	802.11 n/ac compliance Without DFS (5.25GHz to 5.35GHz and 5.47 to 5.725) Band	
	Peak Rate	1300Mbps	
	Frequency	2.4GHz / 5GHz	
	Bandwidth	20MHz / 40MHz / 80MHz	
	MIMO	3 X 3	

- Limiting spatial resolution of 1417WCE is determined by its pixel pitch, 100/140 microns. In theory, the detector cannot show higher resolution performance than 5.00/3.57 lp/mm.
- Maximum wireless signal rate derived from IEEE standard specifications. Actual data throughput will vary. Network conditions and environmental factors, including volume of network traffic, building materials and construction, and network overhead, lower actual data throughput rate.

- Recommended Maximum operable distance: 10m (From the Access Point)
- Wireless Module and Wireless Antenna
 - Wireless antennas: The module adopts the latest 802.11n Dual-Band technology (2.4Ghz and 5Ghz). The transmitter of the module is powered by host equipment (Detector). The antennas are 2 printed-dipole antennas.
 - Wireless module: 1417WCE in the RF module does not use DFS band.

2.4.2 Battery [Model name: RB37BLA]

Parameter	Spec.	Unit
Size	205.9 X 88 X 6.4	mm
Weight	0.2	kg
Input	13.2	VDC
Output	11.55	VDC
Cycle life	Max. 500	cycles
Operation temp. range	0~45	°C
Charging time	Typ. 3 (Using the battery charger)	hours
Capacity	Typ. 3920	mAh
Operating time	Typ. 8	hours

2.4.3 Battery charger [Model name: RMC002A]

Parameter	Spec.	Unit
Dimension	252 X 128 X 17.2	mm
Weight	0.25	kg
Input	19	VDC
Output	13.2	VDC
Pre charge Current	0.23 ± 25%	A
Rapid Charging Current	2.3 ± 0.3	A
Charging Termination Current	0.23 (+ 25%, - 65%)	A
Recharge Vbatt	Vterm - [0.15 ± 30%]	V
Max Charging Time	≤ 180	min
Efficiency	≥ 85% at 2.1A	-

2.4.4 Battery charger Adaptor [Model name: ALM65US19]

Parameter	Spec.	Unit
Dimension	125.5 X 55.5 X 33.5	mm
Weight	0.3	kg
Input	80-264VAC, 47~63Hz, Typ. 1.2/0.6A (115/230VAC)	-

Parameter	Spec.	Unit
Output	19VDC, 3.40A	-

2.4.5 Power Supply (Optional) [Model name: RP003A]

Parameter	Spec.	Unit
Dimension	188 X 92 X 41.5	mm
Weight	0.5	kg
Rated power supply (Input)	100-240VAC (50/60Hz)	-
Rated power supply (Output)	Typ. 24VDC (Max 1.7A)	-

2.4.6 AGI Box (Optional)

Parameter	Spec.	Unit
Dimension	92.5 X 119 X 33.5	mm
Weight	0.3	kg

2.4.7 Cable

Parameter	Length	Unit
Link cable (Shielded)	7	m
LAN cable (Shielded)	10	m
Power cord (3-Wire No Shielding)	1.8	m
USB cable (A to B type)	1.8	m
Trigger cable (Rayence I/F Cable)	10	m
P-interface cable (Rayence I/F Cable)	8	m

2.5 Environmental Requirements

2.5.1 PC Requirement

The specific PC requirements for the detector follow the those of the console software.

Item	Detail
RAM	At least 3GB of RAM requirement (4GB for 32 BITS OS and 8GB for 64 BITS OS recommended)
Capacity of Disk Drive	At least 500GB for application and archiving. Recommended 500GB for applications and secondary drive of 1TB for image archiving.
Network Card	- Dual 10/100/1000 network card system required. One for network (Internet) and one for the DR Panel communication 802.11 n Wireless LAN card required (optional)
Graphic Card / Monitor	Graphics card / monitor: Resolution of at least 1,600 x 900 for desktop and 1366 x 768 for laptop. For diagnostics purpose we recommend 1920 x 1080 resolution (2 mega pixels) monitor
ETC	No antivirus except for Microsoft® Security Essentials.

2.5.2 Environmental Requirement

Environment	Min.	Typ.	Max.	Unit	Note
Temperature (Storage)	-10		50	℃	
Temperature (Operation)	5		35	℃	
Humidity (Storage)	10		80	% H.R.	
Humidity (Operation)	30		75	% H.R.	
Pressure (Operation)	70		106	kPa	

2.5.3 Grid Requirement

100 type

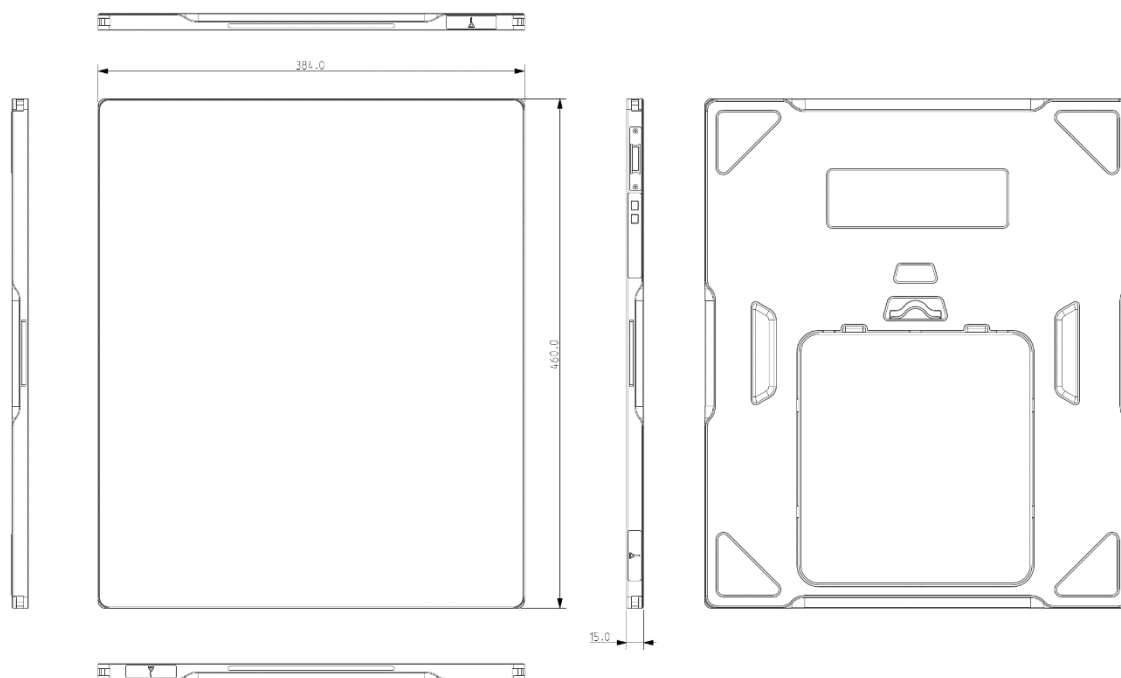
Item	Requirement		
SID	100	130	180
Ratio	10:1	8:1	10:1
Frequency	T.B.D		

140 type

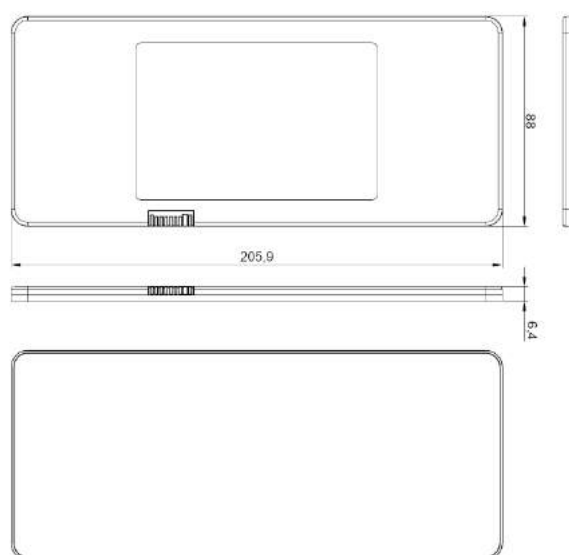
Item	Requirement		
SID	100	130	180
Ratio	10:1	8:1	10:1
Frequency	230 Line/inch		

2.6 Dimensions (Unit: mm)

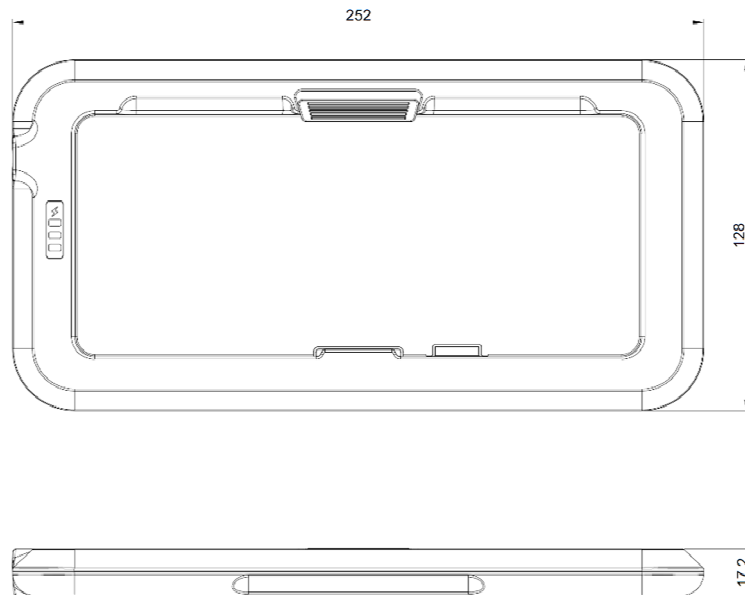
2.6.1 Detector



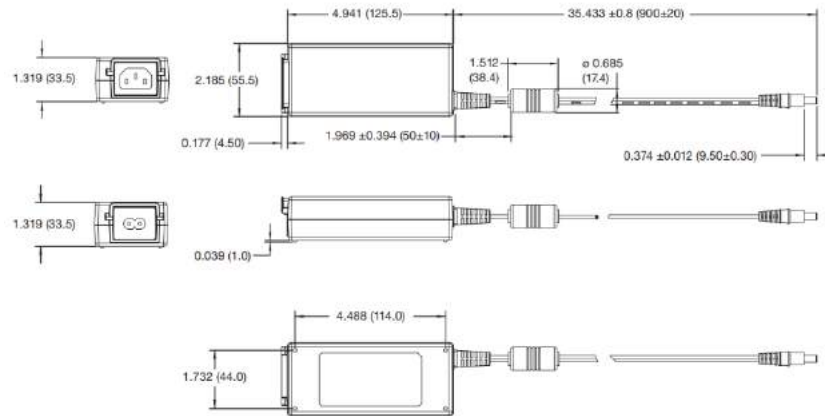
2.6.2 Battery



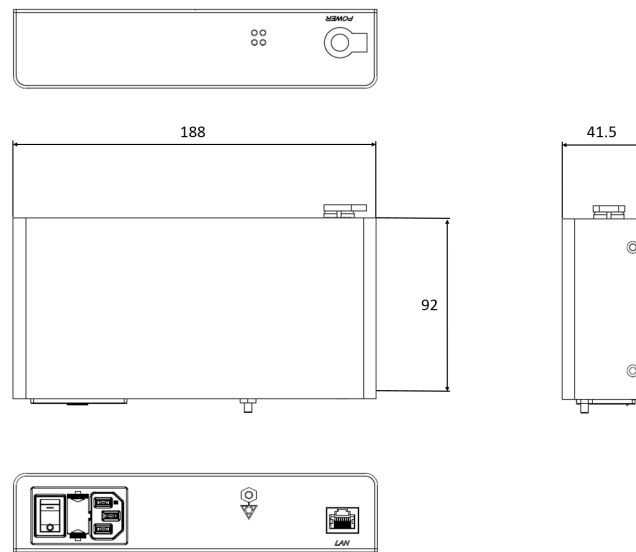
2.6.3 Mobile charger



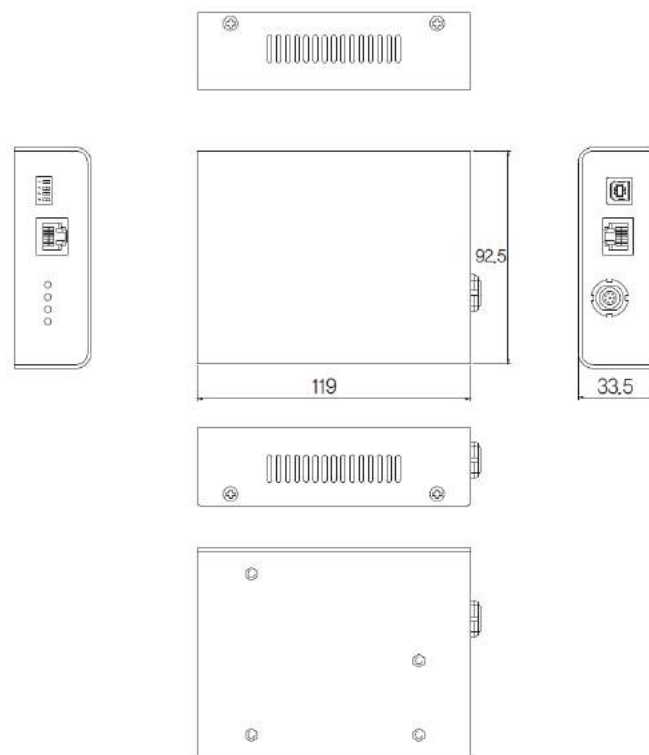
2.6.4 Mobile charger adapter



2.6.5 Power Supply (Optional)



2.6.6 AGI Box (Optional)



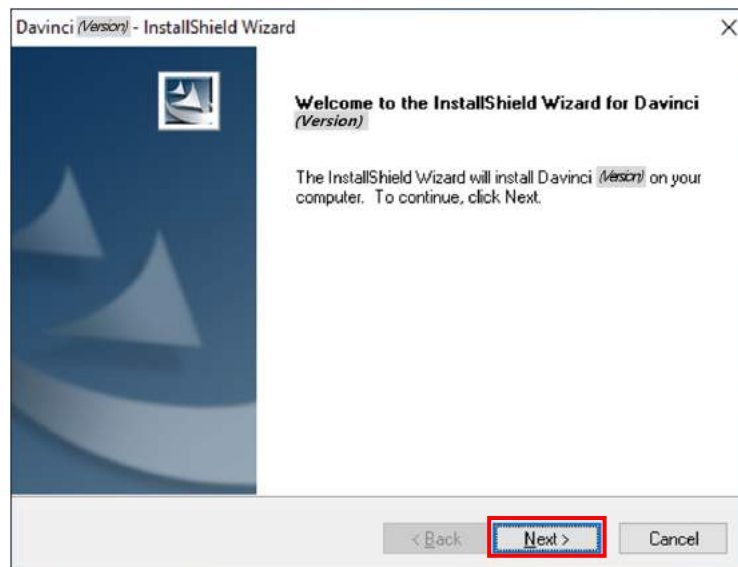
3. Installation and Calibration

3.1 Installation

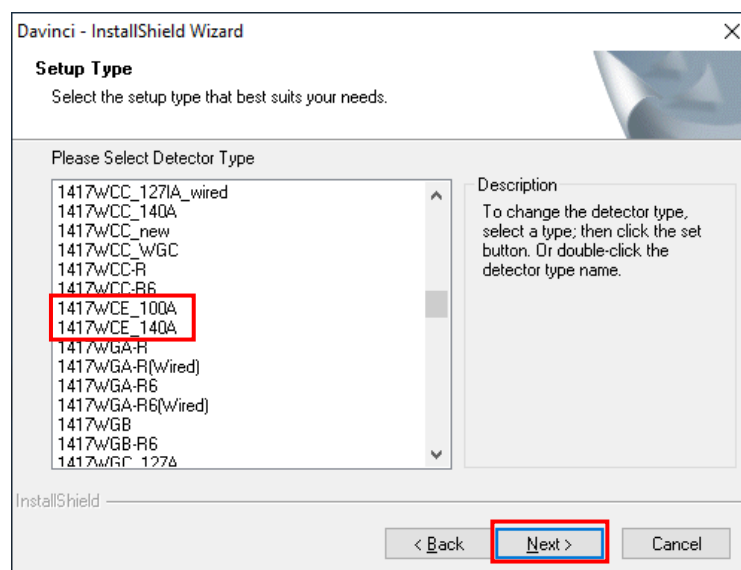
3.1.1 Software Installation

The installation must be proceeded in the Administrator mode.

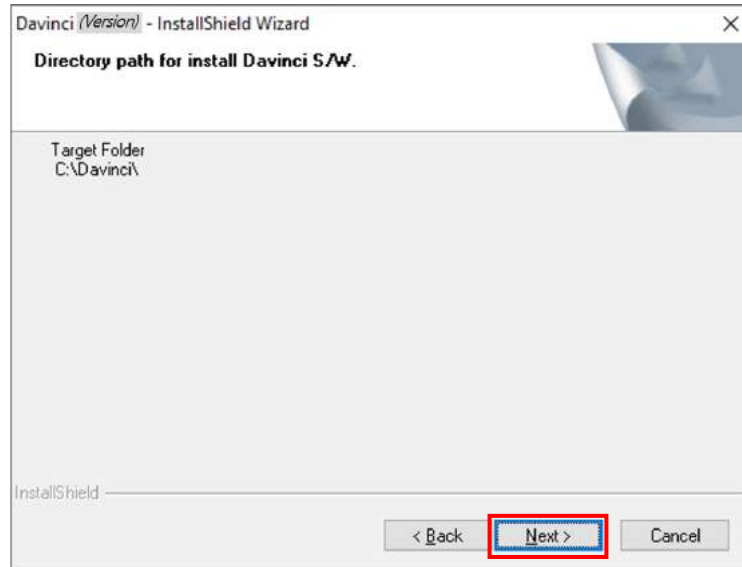
1. Insert the CD that comes with the detector.
2. Install "setup.exe" from "\Release Davinci_(version)" and click "Next".



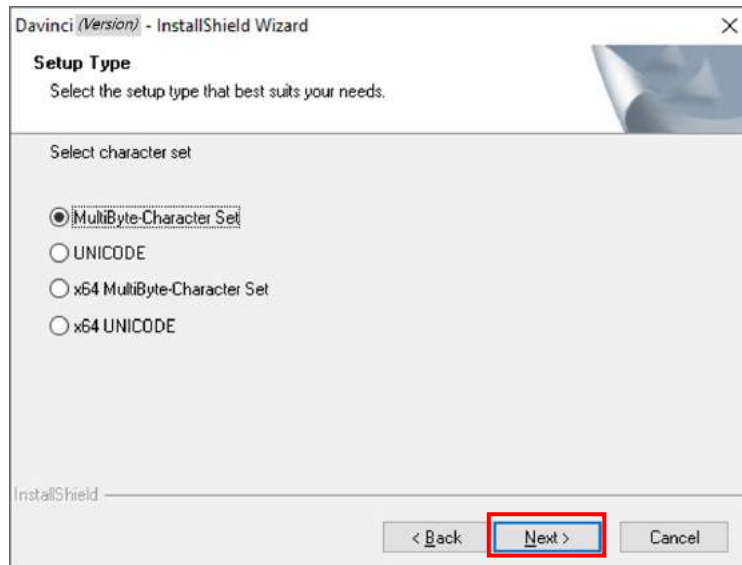
3. Choose the model from the Detector Type list and click "Next".



4. Click “Next”.

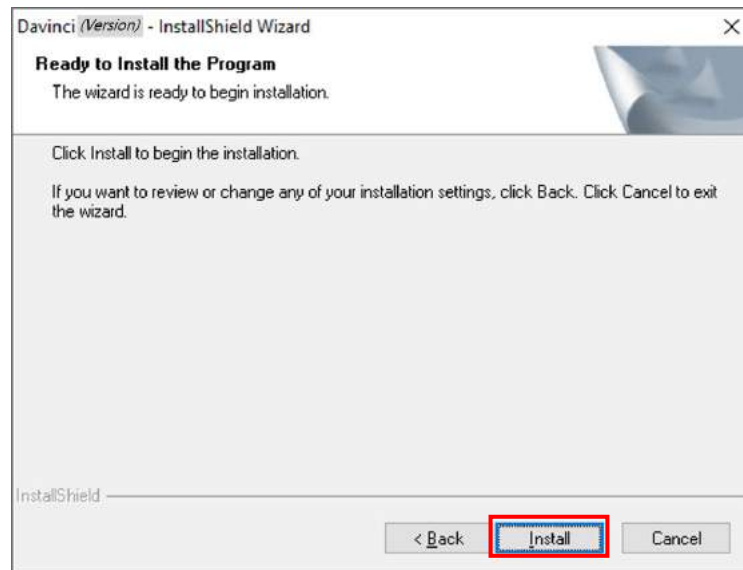


5. Select “MultiByte-Character Set” and click “Next”.

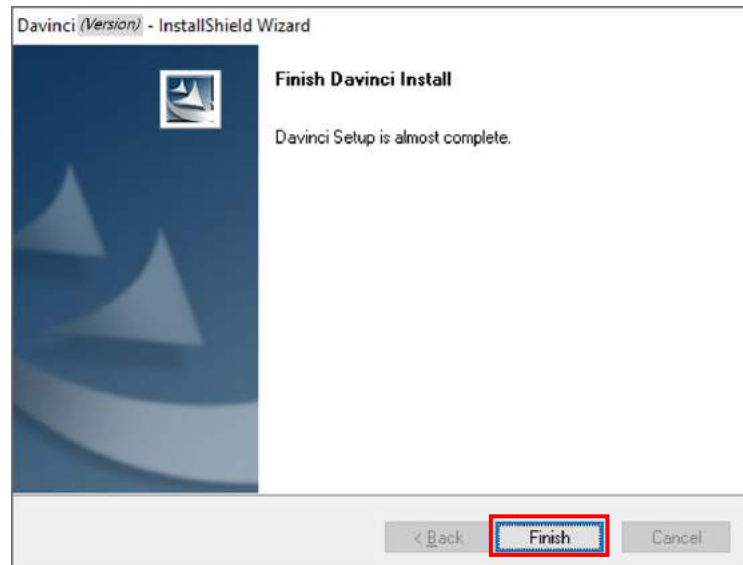


- Choose UNICODE if console SW is supporting UNICODE.
- If Character set is not installed correctly, images will not be properly acquired.

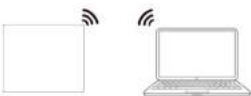
6. Click "Install".



7. Click "Finish".

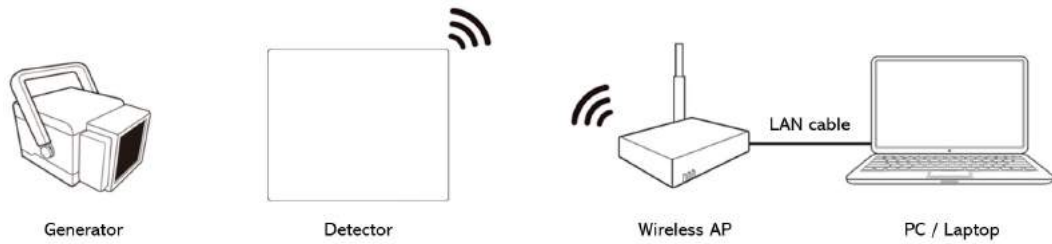


3.1.2 Mode Selection

Mode	Description
<Auto Trigger> 	Automatically detects X-ray radiation without integration of the generator and detector.
<Manual Trigger> 	Detects X-ray radiation by sending and receiving sync signals through the integration between generator and detector.
<Station Mode> 	Communicates with the wireless AP, and the wireless AP communicates with the PC through the LAN cable. (Rayence does not provide wireless AP.)
<AP Mode> 	Detector communicates with the PC without the wireless AP. (PC must maintain wireless network card.)
<Wired Mode> 	Communicates with the power supply, and the power supply communicates with the PC through the LAN cable.

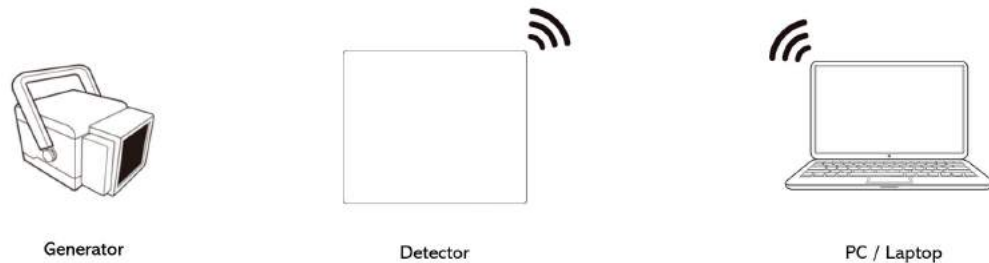
3.1.3 Product Set Up

1. Auto Trigger & Station Mode

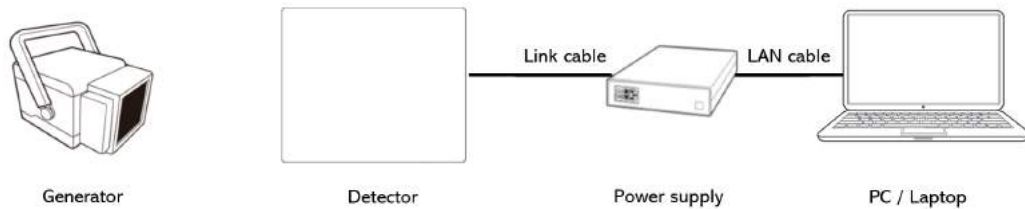


1. Connect the wireless AP and PC/Laptop with the LAN cable.

2. Auto Trigger & AP Mode

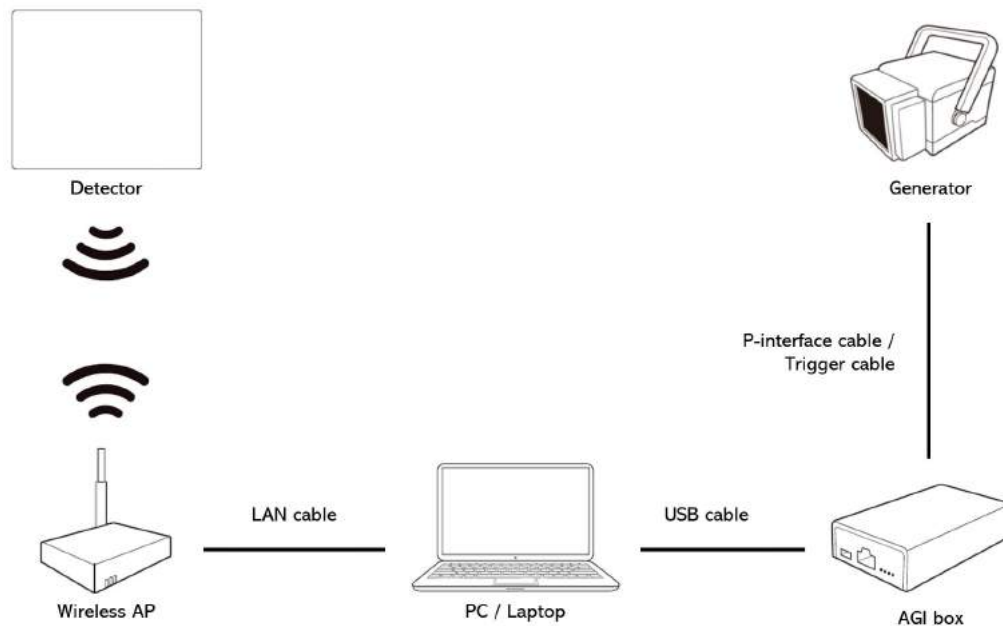


3. Auto Trigger & Wired Mode



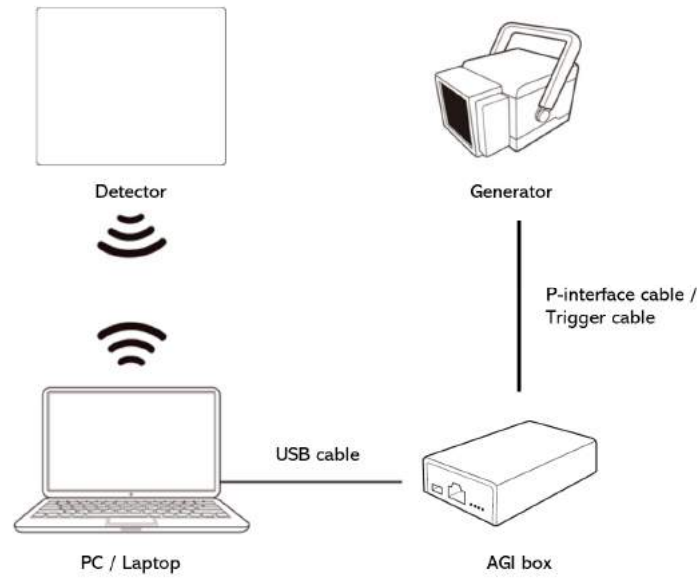
1. Connect the power supply and PC/Laptop with the LAN cable.
2. Connect the power supply and detector with the link cable.

4. Manual Trigger & Station Mode



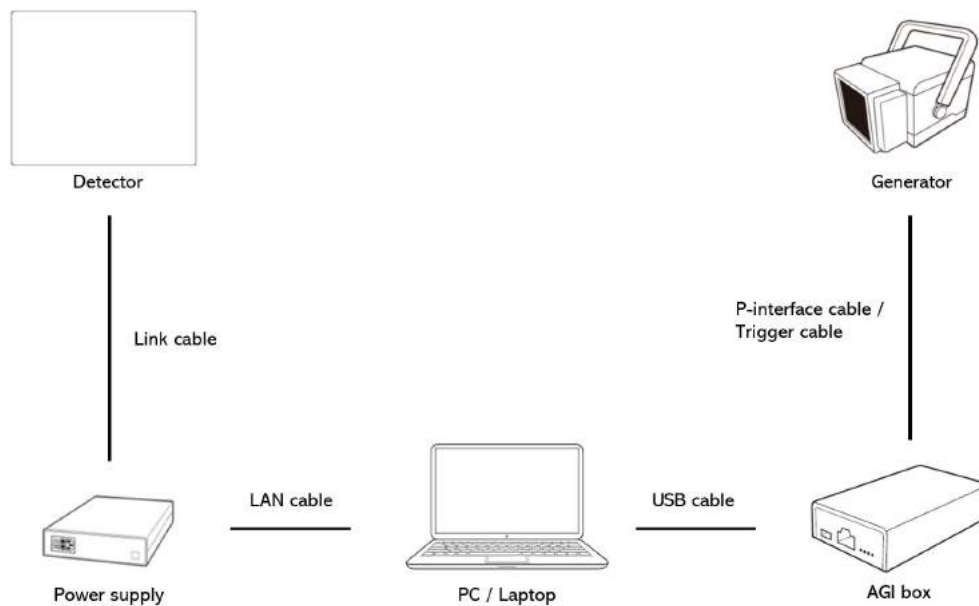
1. Connect the wireless AP and PC/Laptop with the LAN cable.
2. Connect the AGI box and PC/Laptop with the USB cable.
3. Connect the AGI box and generator with the P-interface or trigger cable.

5. Manual Trigger & AP Mode



1. Connect the AGI box and PC/Laptop with the USB cable.
2. Connect the AGI box and generator with the P-interface or trigger cable.

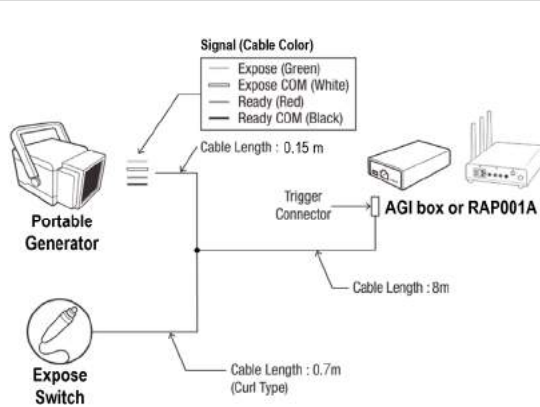
6. Manual Trigger & Wired Mode



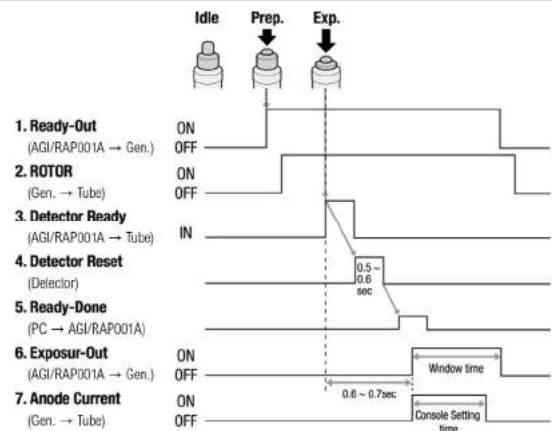
1. Connect the power supply and PC/Laptop with the LAN cable.
2. Connect the power supply and detector with the link cable.
3. Connect the AGI box and PC/Laptop with the USB cable.
4. Connect the AGI box and generator with the P-interface or trigger cable.

7. Instruction of P-interface and trigger cable integration

Instruction of P-interface cable Integration

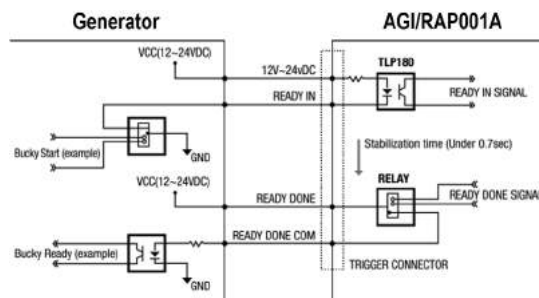


Assembly Diagram

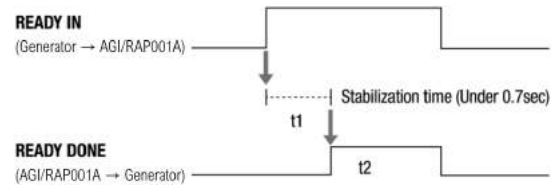


Timing Chart

Instruction of trigger cable Integration



Assembly Diagram

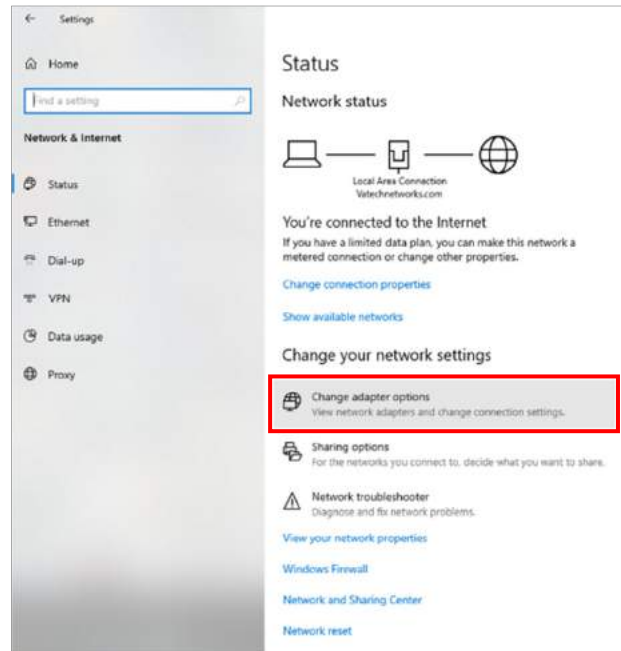


Timing Chart

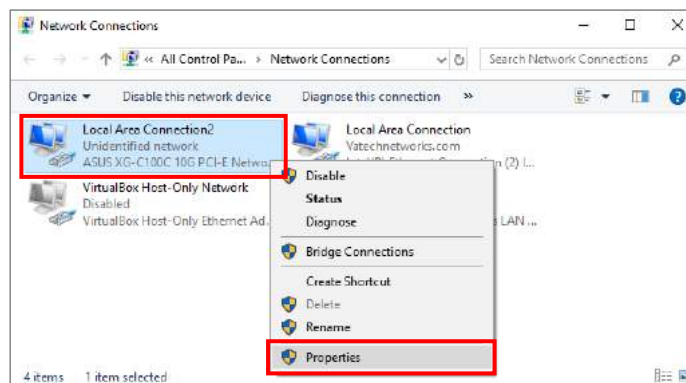
3.1.4 PC Set Up

1. Set up the network as below.

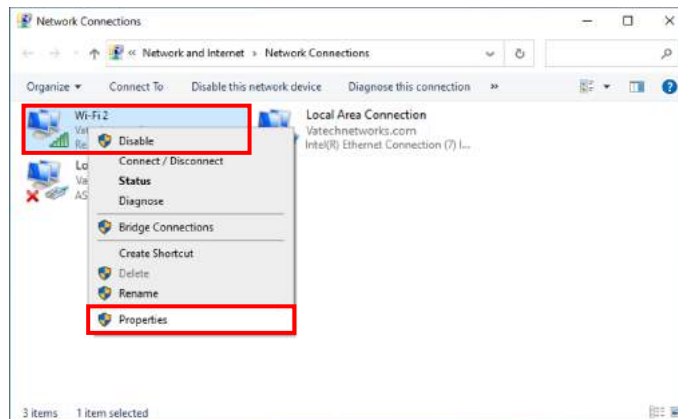
- Desktop > Network Icon > Right click > Properties > Change Adaptor Settings
- Control Panel > Network and Sharing Center > Change Adaptor Settings



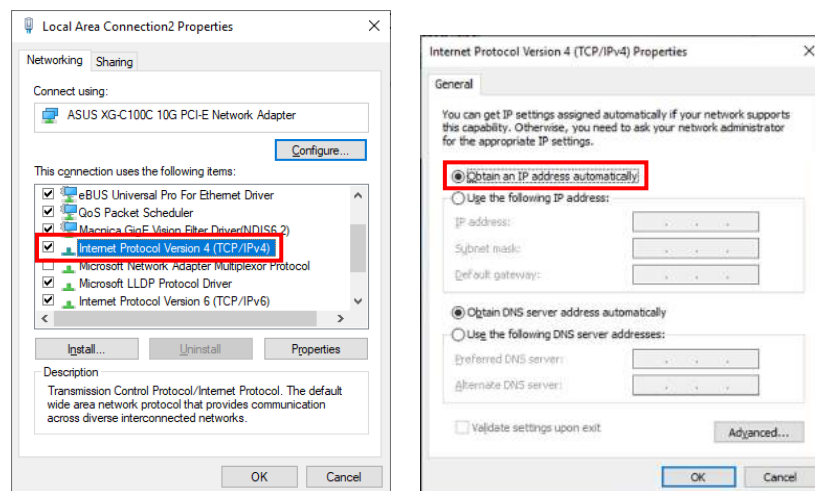
2. ① To use station or wired mode, right click "Local Area Connection" and click "Properties".



- ② To use AP mode, right click "Wireless Network Connection" and click "Properties".

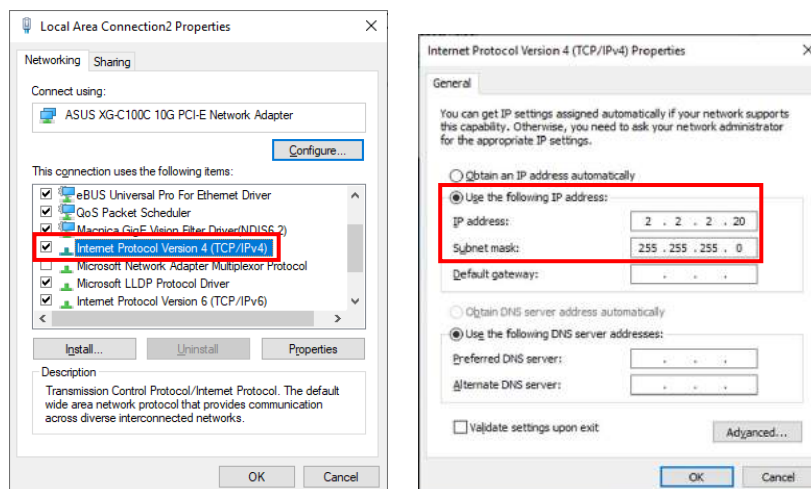


3. Double click "Internet Protocol Version 4 (TCP/IPv4)".
4. ① For station or AP mode, select "Obtain an IP address automatically" and click "OK".



- In AP mode, if the detector cannot connect to PC with automatic IP address setting, select "Use the following IP address" and type "2.2.2.50" at the "IP address" and type "255.255.255.0" at the "Subnet mask".
- It is recommended to use the IP of the product independently of each other as it can cause PC to disconnect when two or more products use the same IP.

- ② For wired mode, select "Use the following IP address" and type "2.2.2.20" at the "IP address" and type "255.255.255.0" at the "Subnet mask".



5. For station mode, set up wireless AP (Access Point) as below.

- SSID: Griffon
- Internal network
 - IP address: 2.2.2.1
 - Subnet mask: 255.255.255.0
 - Dynamic IP allocation range: 2.2.2.2 ~ 2.2.2.254
- Pre-Shared Key(PSK): project302
 - Authentication methods: WPAPSK or WPA2PSK
 - Password methods: TKIP/AES
- Channel (Frequency)

Avoid the crowded channel option.



- Rayence does not provide wireless AP. Please use certified wireless AP and follow each manufacture's setup manual.
- Recommended Model: Minimum ASUS RT-AC66U or RAP001A



- It is recommended to use "Auto-Channel selection" function if external AP has the feature.

- Refer to **PART II. Service Manual Supplement 1. Wireless AP Set Up Instruction.**

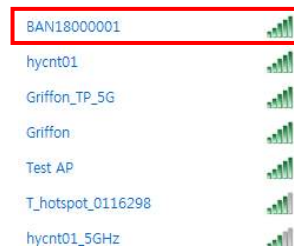
3.1.5 SW Set Up

1. Connect the detector and turn on the power. For wired mode, you can connect the detector to either power supply or RAP001A using the link cable.
2. Choose the station mode/AP mode by pressing and holding the mode button. Wired mode will be selected automatically when connected using the link cable.



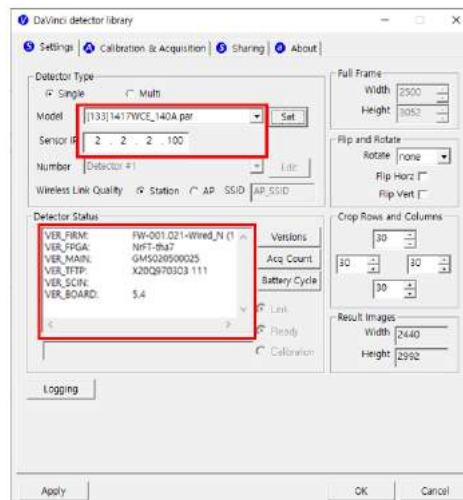
LED	LED Color	Mode
MODE	Orange	Station mode (Wireless)
	Green	AP mode (Wireless)
	None	Wired Mode
	Blinking Orange and Green alternatively	Sleep Mode

3. For AP mode, choose the SSID (serial number of the detector) from “Wireless Network Connection” list. (PW: project302)



4. Open “_vadav.lnk” from “C:\Davinci”.

Once the program is opened and the detector is connected, “LINK” LED light from the detector will blink and the “Detector Status” will display information of the detector as below.





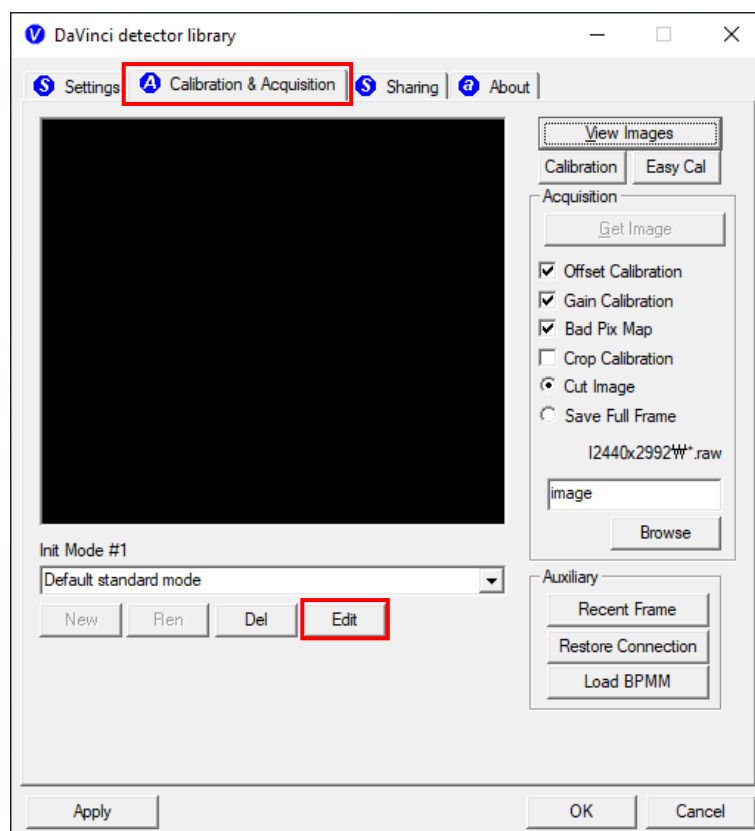
- Once the correct sensor IP is put into the Davinci, it will automatically pull the parameter of the connected detector.

Model type	Parameter selected
1417WCE_100A	[134]1417WCE_100A.par
1417WCE_140A	[133]1417WCE_140A.par

- Default IP address for wireless connection is 2.2.2.100 and for wired connection is 2.2.2.101. If the IP address needs to be changed, refer to **PART II. Service Manual Chap. 2.1 Detector IP Address Set Up**.
- For AP mode, select "AP" from "Wireless Link Quality" and type the detector's serial number at the "SSID".

If the detector does not communicate with the PC, please check the connection of the cable, PC set up and power of the detector.

- After checking connectivity, go to the "Calibration & Acquisition" tab and click "Edit".



6. Another window for detector setting pops up. Click “Get Settings” button and you can load and change parameters settings.

- ① To use auto trigger mode, select "AED" from "Acquisition Mode".
- ② To use manual trigger mode, select “Sync” from “Acquisition Mode”.

If the "Window time" needs to be changed, type the value at "Window Time" from "Setting".

Mode 1 "Default standard mode"

Acquisition Mode

☐ Free Running

☐ Sync

☒ AED

Ready Delay: 0 msec

Threshold: 15 LSB (2~100)

Threshold: 500 LSB

Arb Shock

Motor Grid

Setting

Window Time: 500 msec

0.5 sec 1 sec 2 sec 3 sec 4 sec

Sleep Timeout: 0 min (0~180)

☐ 16Bit ADC

☐ Storage mode

☒ Dynamic Offset

☒ Preview

☒ 4x4 Binning Preview

☒ Wireless Message

GPR (Grid Pattern Removal)

☐ GPR Enable

Grid Type (Size - Grid LPI - Direction)

GPR_1717_127_103_V

AGPR Enable

High SNR

☐ High SNR Enable

Get Settings

Set Settings

OK

Cancel

7. Click “Set Settings” and wait for about 10 seconds to apply new settings.

Mode 1 "Default standard mode"

Acquisition Mode

☐ Free Running

☐ Sync

☒ AED

Ready Delay: 0 msec

Threshold: 500 LSB

Arb Shock

Motor Grid

Setting

Window Time: 500 msec

0.5 sec 1 sec 2 sec 3 sec 4 sec

Sleep Timeout: 0 min (0~180)

☐ 16Bit ADC

☐ Storage mode

☒ Dynamic Offset

☒ Preview

☒ 4x4 Binning Preview

☒ Wireless Message

GPR (Grid Pattern Removal)

☐ GPR Enable

Grid Type (Size - Grid LPI - Direction)

GPR_1717_127_103_V

AGPR Enable

High SNR

☐ High SNR Enable

Get Settings

Set Settings

OK

Cancel

8. Click “OK” to finish setting and close the window.

Mode 1 "Default standard mode"

Acquisition Mode:

☐ Free Running Ready Delay: msec

☐ Sync

☒ AED Threshold: LSB (2~100)

☒ Anti Shock Threshold: LSB

Setting

Window Time: msec

Sleep Timeout: min (0~180)

☐ 16Bit ADC ☐ Storage mode ☒ Dynamic Offset

☐ Preview ☐ 4x4 Binning Preview ☐ Wireless Message

GPR (Grid Pattern Removal)

☐ GPR Enable Grid Type (Size · Grid LPI · Direction) ☐ AGPR Enable

High SNR

☐ High SNR Enable



- In Auto trigger mode, be sure to set the "Window time" longer than an exposure time. If the "Window time" is shorter than the exposure time, images will not be properly acquired.

3.2 Calibration

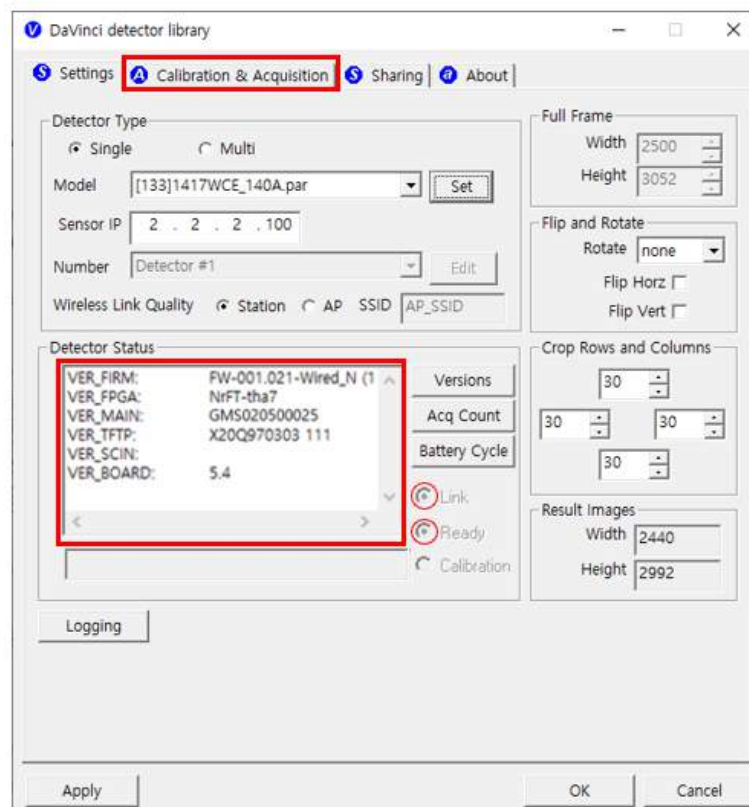
In order to properly acquire images, calibration must be performed. Without calibration, optimum images cannot be acquired.



- Rayence recommends to warm up the detector for 5 minutes after turning on the power.
- Calibration should be performed at regular intervals, typically once every 6 months, or whenever the central beam of the X-ray source has been moved relative to the detector.

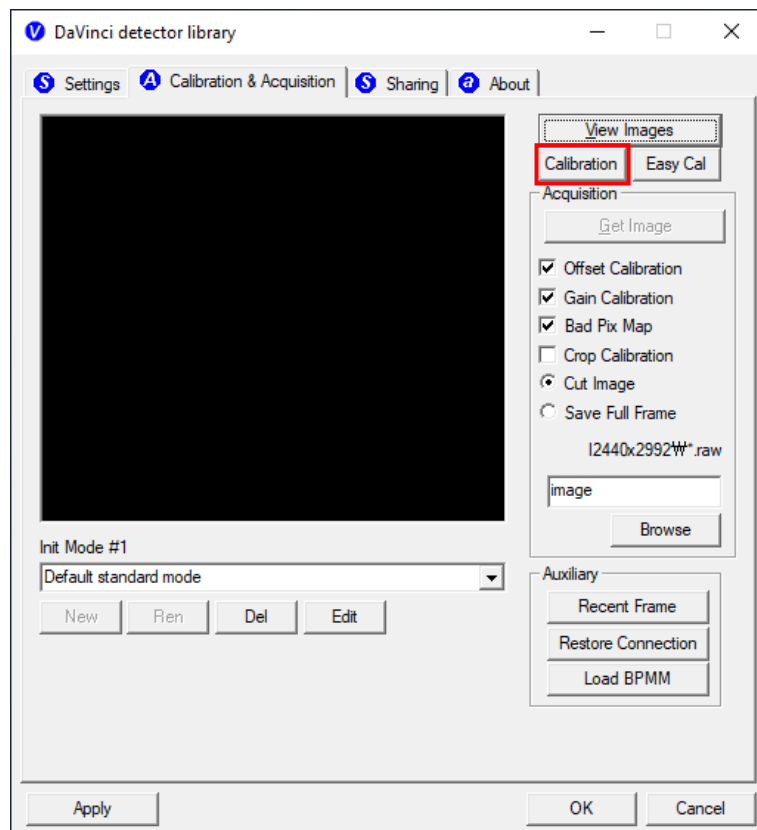
3.2.1 Auto Calibration Mode

1. After checking connection at "Detector Status", go to the "Calibration & Acquisition" tab.

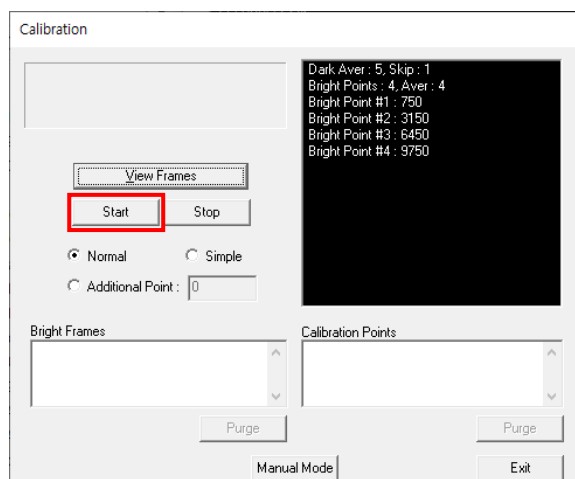


- If "Detector Status" does not show anything, refer to **Chap. 3.1 Installation** to connect the detector properly.

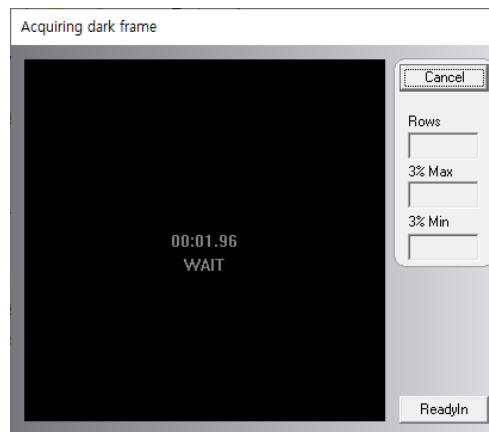
- Click "Calibration".



- Click "Start" and the program automatically gets a dark frame. The acquired dark frame is stored in "C:\Davinci\CAL".

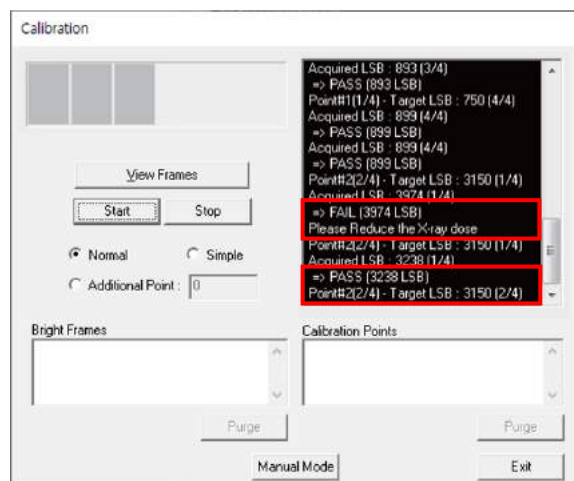


4. After acquiring the dark frame, shoot an X-ray when the “Acquiring bright frame” window pops up.



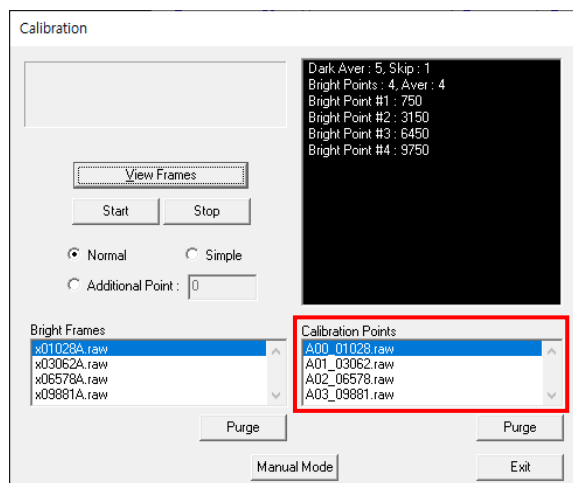
- Depending on the dark level of the product, 1~2 additional calibration points may be created.

5. “Acquiring bright frame” is closed after radiation is detected, and the program will show if the detected radiation is within acceptable range.

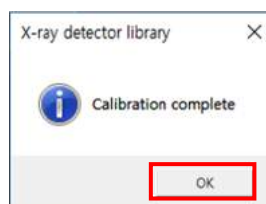


When PASS is displayed	When FAIL is displayed
Shoot X-ray with the same exposure condition when “Acquiring bright frame” window pops up again.	Adjust the exposure condition to get acceptable value and shoot X-ray when “Acquiring bright frame” window pops up again.

6. For each calibration point, 4 frames must successfully be acquired. Repeat the step 4-5 for all calibration points.

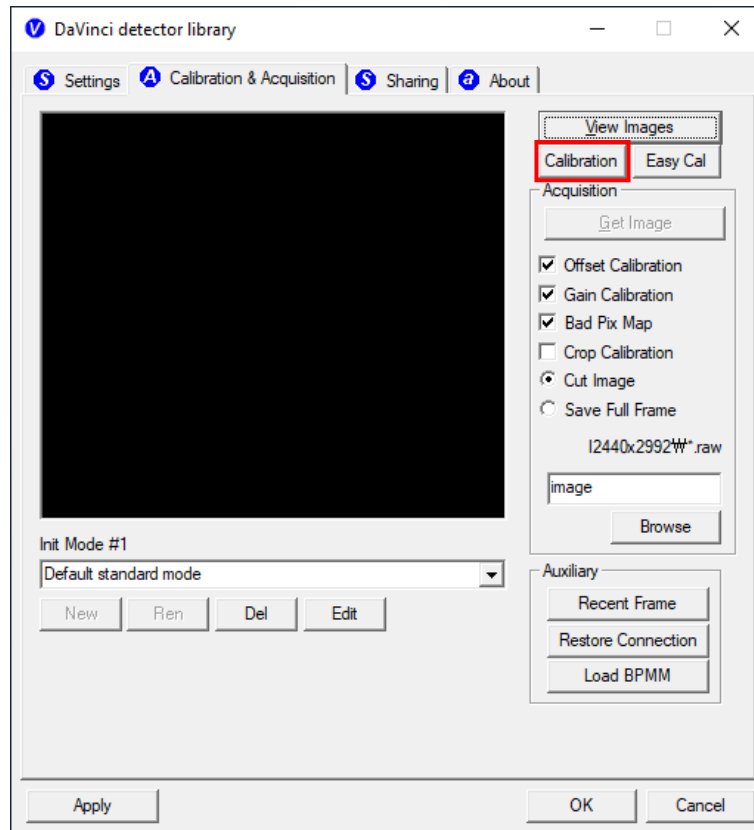


7. After calibration process is completed, click "OK".

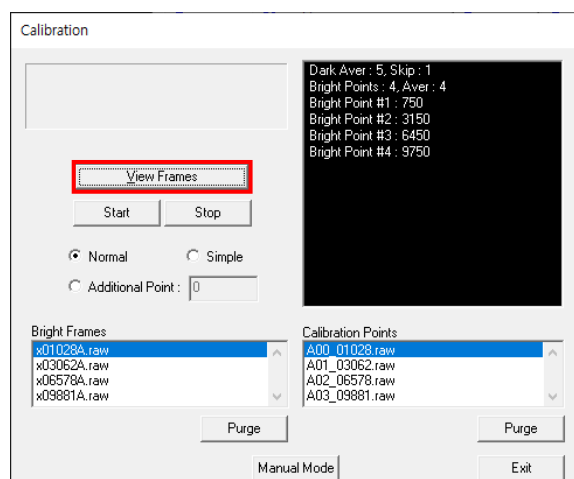


3.2.2 Manual Bad Pixel Map Set Up

1. Go to the "Calibration & Acquisition" tab and click "Calibration".



2. Click "View Frames".



3. Set Manual bad pixel map (BPMM) as below.

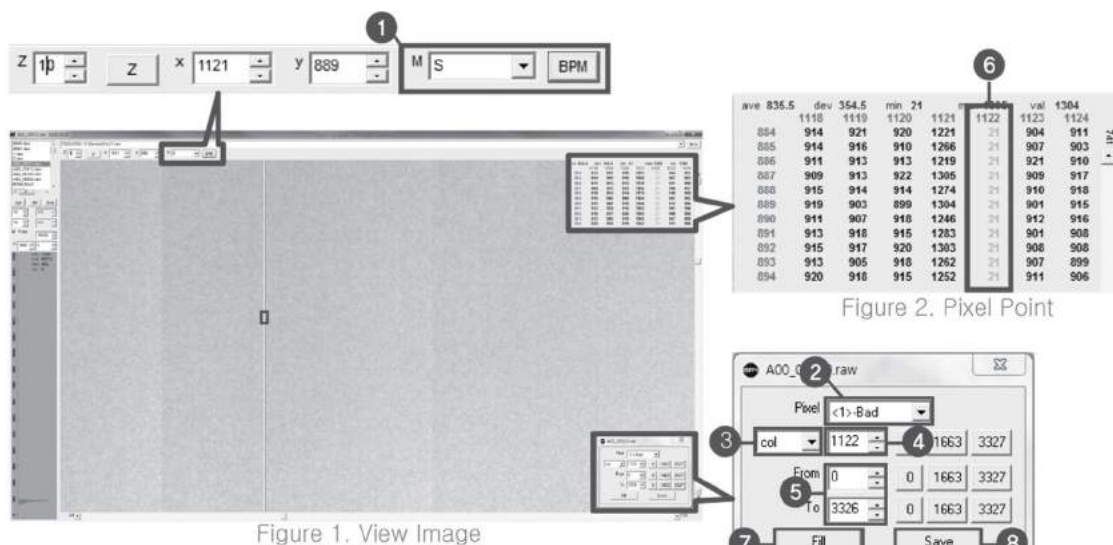


Figure 1. View Image

Figure 2. Pixel Point

Figure 3. BPMM Control Tab

No.	Overview									
1	At Figure 1, choose S from the list of M(❶) and click "BPM". Check if BPMM window is popped up as Figure 3.									
2	Choose "Bad" from Pixel list (Figure 3 - ❷).									
3	Choose either "row" or "col" from Figure 3 - ❸.									
4	Put the coordinate of pixel to set bad pixel at Figure 3 - ❹.									
5	If bad pixel is a line, put the range as below at Figure 3 – ❺. <table><tr><th></th><th>From</th><th>To</th></tr><tr><td>Row</td><td>0</td><td>4301 (100type) 2499 (140type)</td></tr><tr><td>Col</td><td>0</td><td>3533 (100type) 3051 (140type)</td></tr></table> If bad pixel is not a line but some pixels, put the rest coordinate at Figure 3 - ❺.		From	To	Row	0	4301 (100type) 2499 (140type)	Col	0	3533 (100type) 3051 (140type)
	From	To								
Row	0	4301 (100type) 2499 (140type)								
Col	0	3533 (100type) 3051 (140type)								
6	After completing step 5, check if bad pixel has been changed to green as Figure 2 - ❻.									
7	Click "Fill" at Figure 3 - ❼.									
8	Click "Save" at Figure 3 - ❽.									

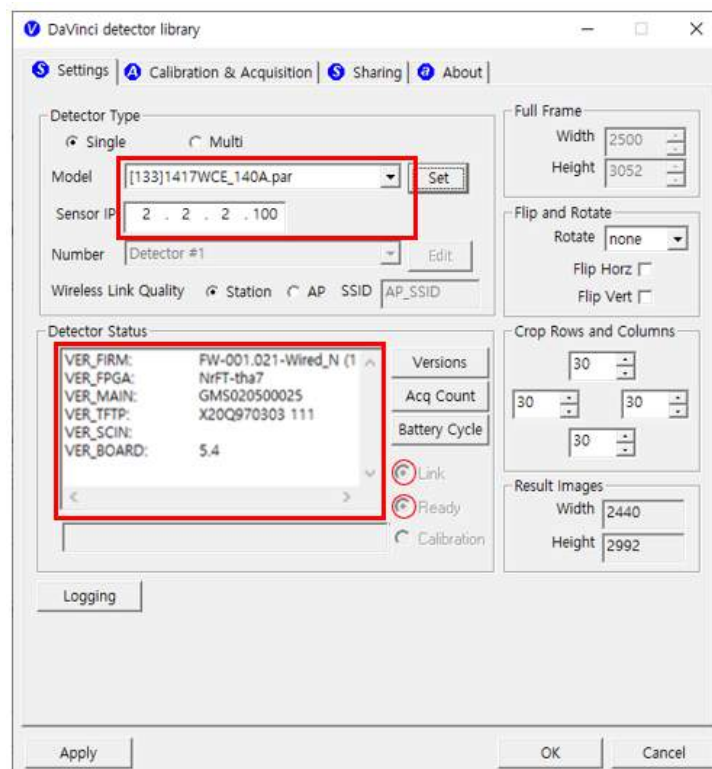
4. Once setting BPMM is done, "BPMM.raw" file will be saved at "C:\Davinci\CAL".

4. Usage

4.1 Set Up

4.1.1 Product Connectivity

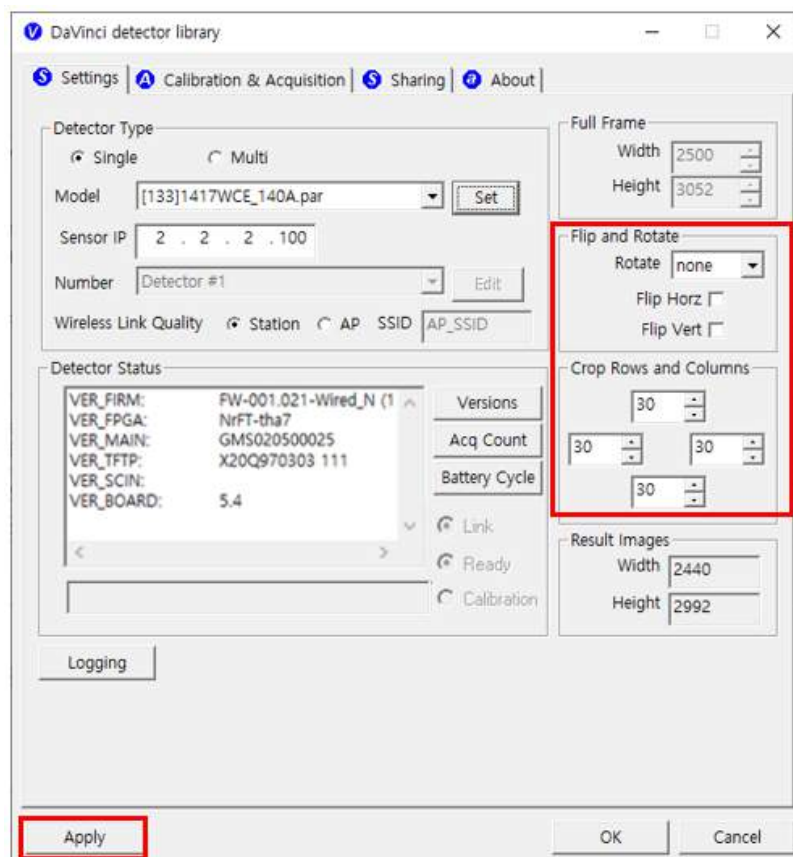
1. Connect the detector and turn on the power.
2. Open “_vadav.lnk” from “C:\Davinci”.
3. Once the detector is connected, detector information is displayed in “Detector Status” and “Link” and “Ready” indicators are marked as below.



- If "Detector Status" does not show anything, refer to **Chap. 3.1 Installation** to connect the detector properly.

4.1.2 Image Set Up

1. In order to rotate or flip an image, use "Flip and Rotate" option as shown below.
2. In order to change the size of an image, use "Crop Rows and Columns" option as shown below.
3. Click "Apply" to save.



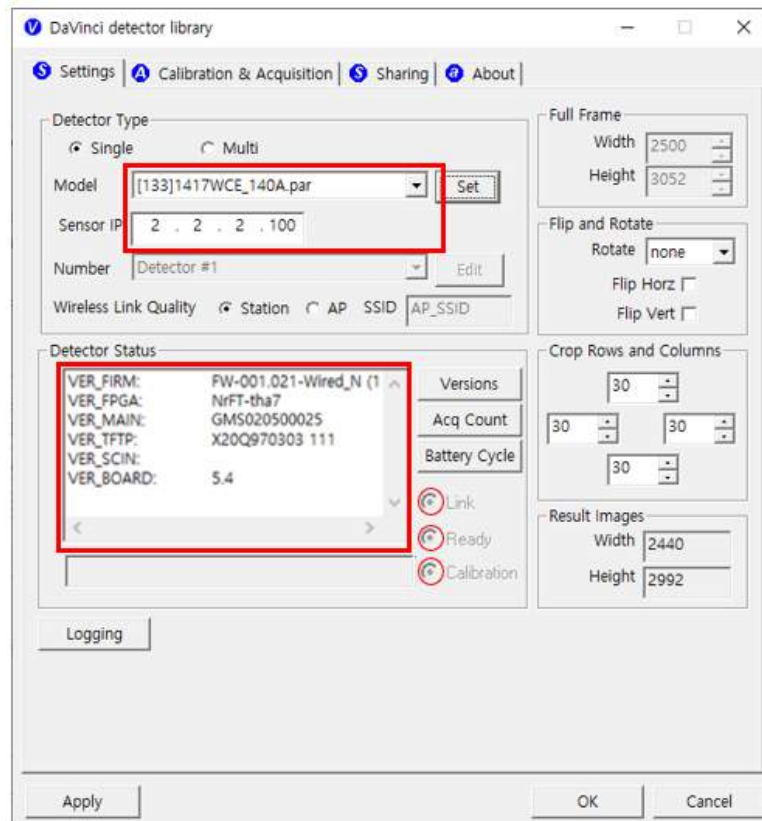
4.1.3 Multi Detector Set Up

Refer to **PART II. Service Manual Chap. 3 Multi Detector Set Up** for multi-detector setting.

4.2 Image Acquisition

4.2.1 Product Connection

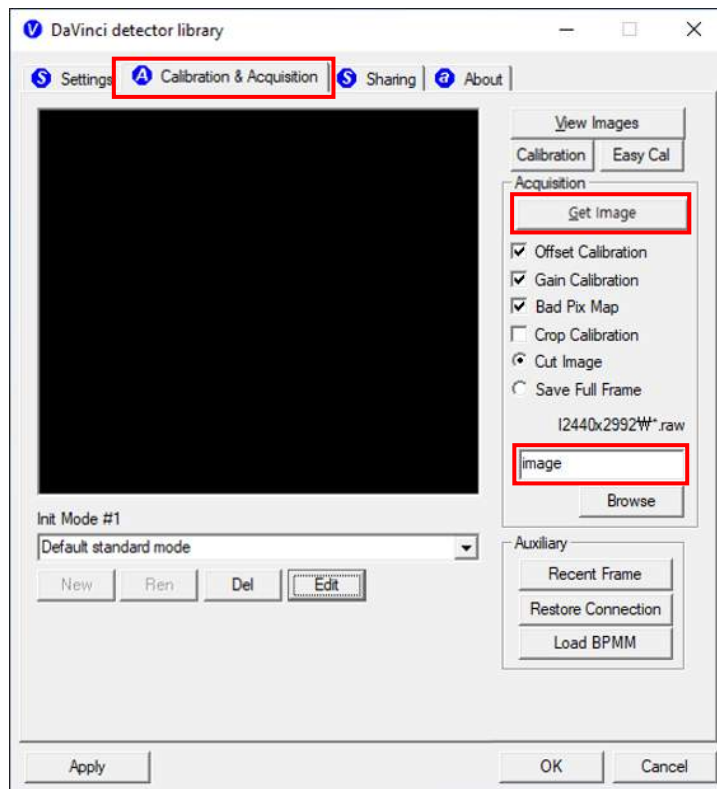
1. Connect the detector and turn on the power.
2. Open “_vadav.lnk” from “C:\Davinci”.
3. Once the detector is connected, detector information is displayed under “Detector Status” and “Link”, “Ready” and “Calibration” indicators are marked as below.



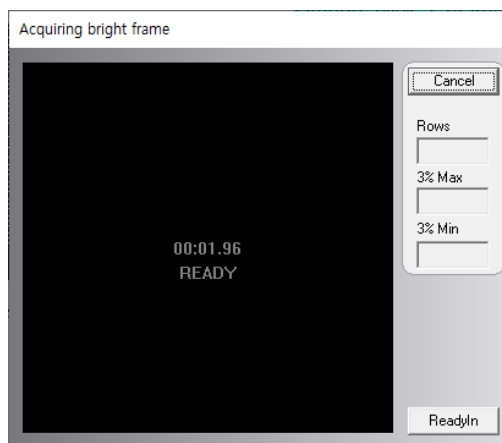
- If "Detector Status" does not show anything, refer to **Chap. 3.1 Installation** to connect the detector properly.
- If "Calibration" indicator is not marked as "Link" or "Ready" indicators above, refer to **Chap. 3.2 Calibration** 오류! 참조 원본을 찾을 수 없습니다. and perform calibration again.

4.2.2 Image Acquisition

1. Go to the "Calibration & Acquisition" tab and set the name of the image inside the marked box below. After naming the image, click "Get Image".



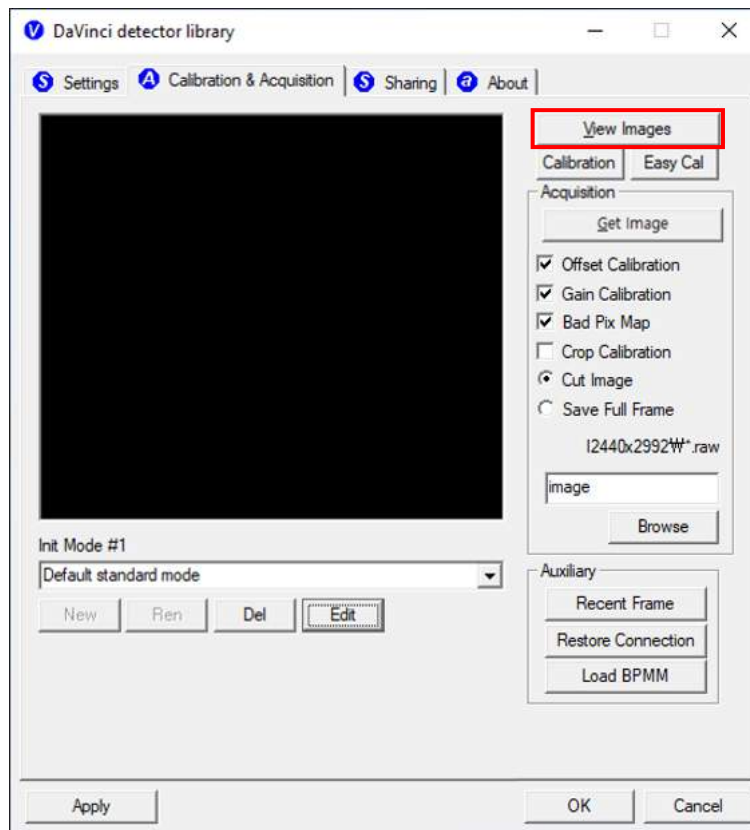
2. Shoot an X-ray once the "Acquiring bright frame" window pops up.



3. An acquired image will be stored in "C:\Davinci\l3450x4218" for 100 type or "C:\Davinci\l2440x2992" for 140 type. The name of the file will be "(typed name from Step 1).raw".

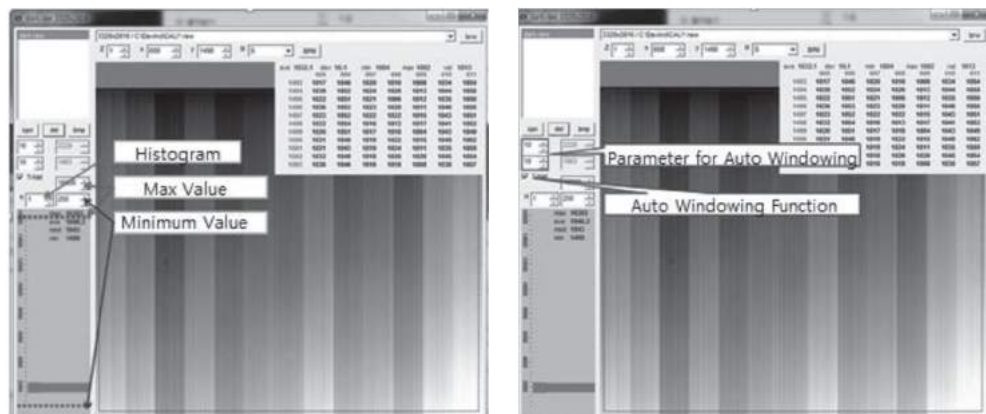
4.3 View Images

1. Click "View Images".



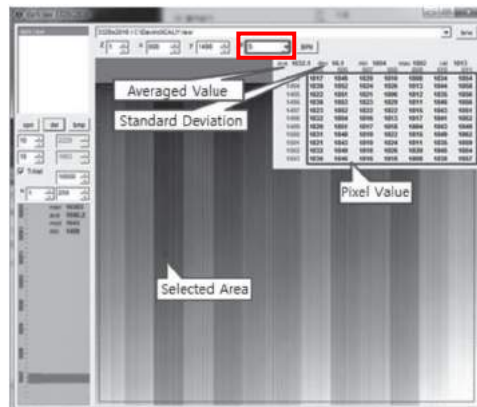
2. Another window will be popped up as below.

- Histogram Set Up



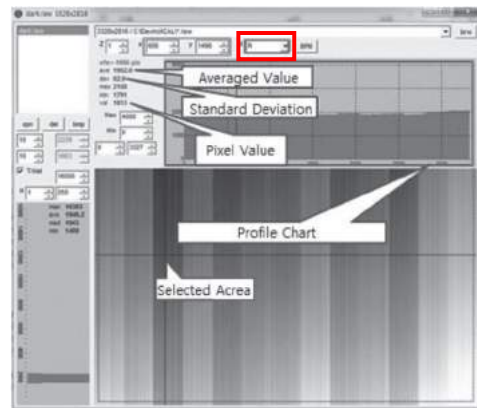
- Pixel value at certain level

Choose "S" from marked box.



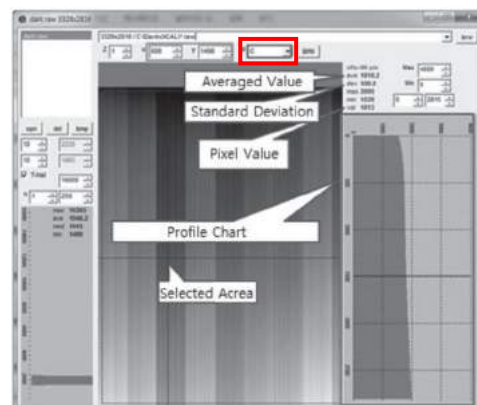
- Profile for horizontal line

Choose "R" from marked box.



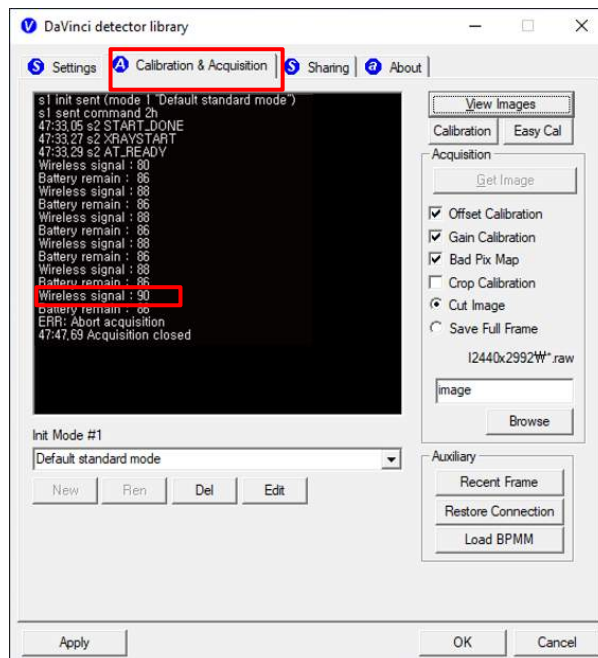
- Profile for vertical line

Choose "C" from the marked box.

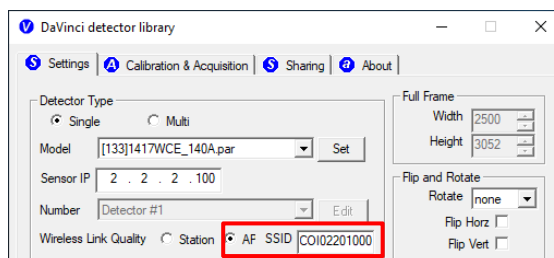


4.4.2 Wireless Signal Strength

Once you click "Get Image" under the "Calibration & Acquisition" tab, the status window will show the strength of the wireless signal.

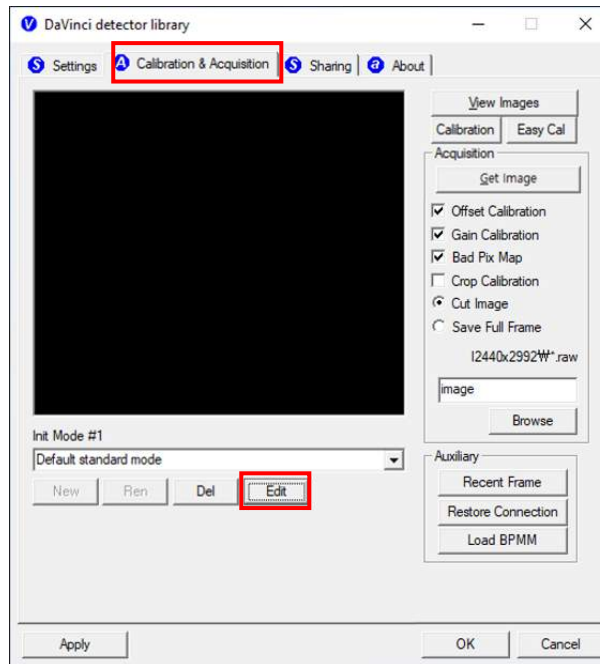


- Before you check the wireless signal in the AP mode, the detector's serial number should be entered at the "SSID".

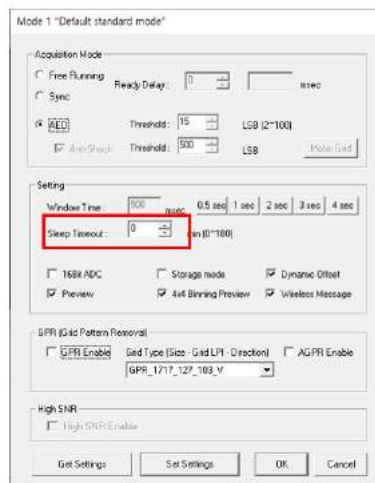


4.4.3 Sleep Mode

1. Click “Edit” under the “Calibration & Acquisition” tab.



2. Another window will now be opened as shown below. Click “Get Settings” button and you can load and change parameters settings. In the “Sleep Timeout” setting, enter a designated time for the detector to go into the sleep mode.



- Sleep mode is disabled when the value of “Sleep Timeout” is set to zero.
- Power consumption is reduced by 40% in the sleep mode.

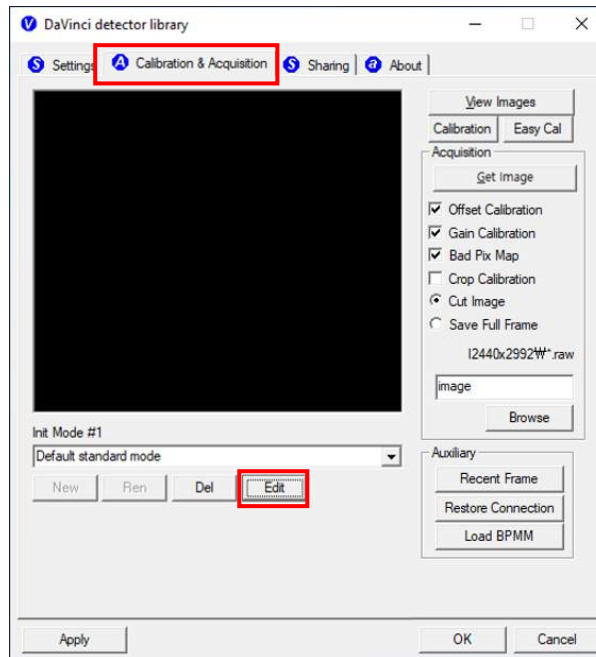
3. To turn off the sleep mode, attempt to acquire an image or press the power button on the detector just once.



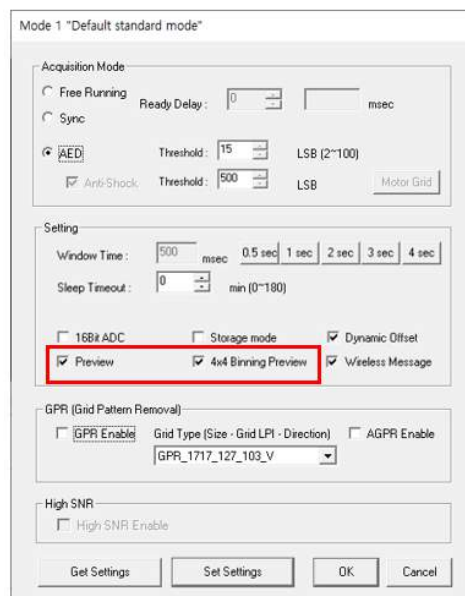
- You can acquire a normal image at least 10 seconds after the sleep mode has been turned off.

4.4.4 Preview

1. Go to the “Calibration & Acquisition” tab and click “Edit”.



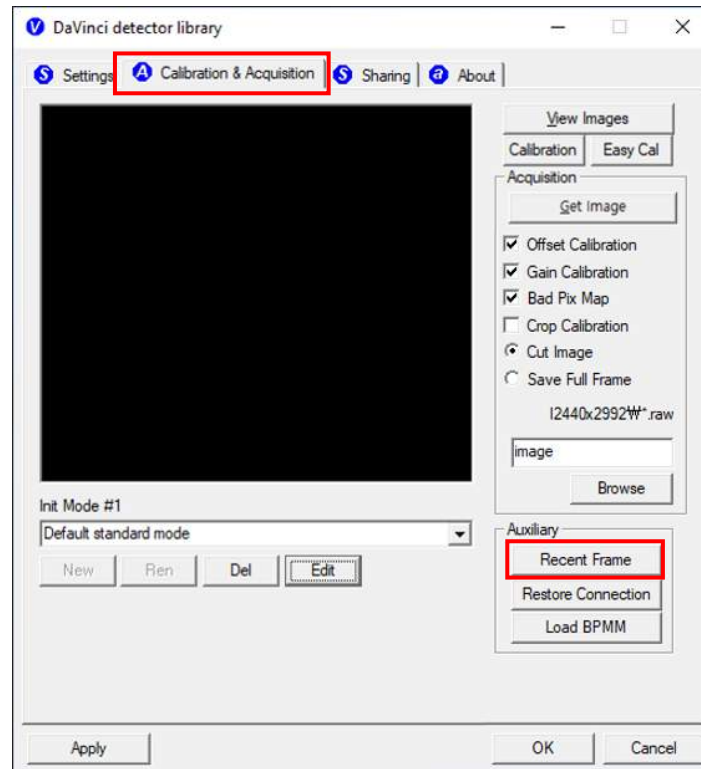
2. Another window for detector setting pops up. Click “Get Settings” button and you can load and change parameters settings. Checking the “Preview” and “4x4 Binning” check boxes allows a preview image to be shown more quickly.



- By unchecking “4x4 Binning”, a normal preview image appears.
- By unchecking “Preview”, a full frame image appears.

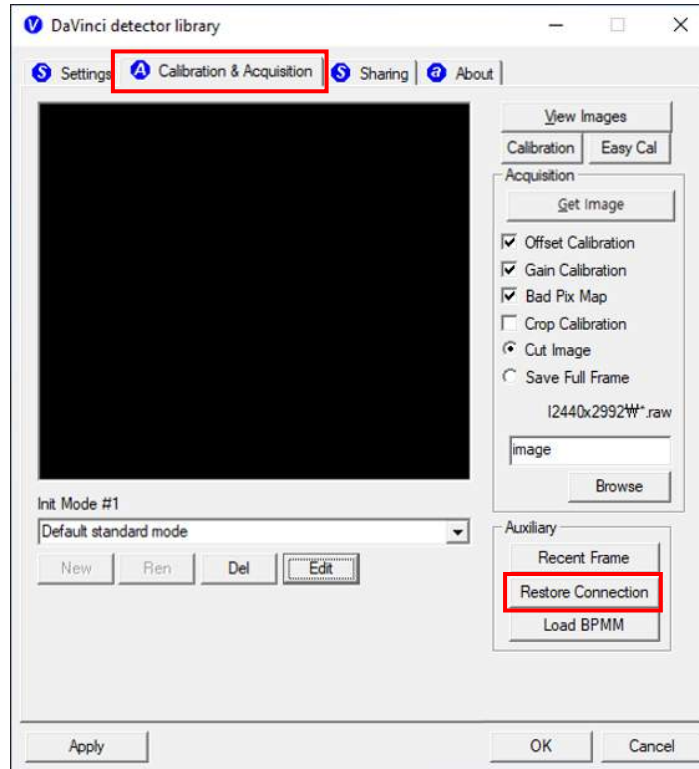
4.4.5 Recent Frame

The last acquired image can be opened by clicking "Recent Frame" under the "Calibration & Acquisition" tab.



4.4.6 Restore Connection

When the connection between the detector and PC is lost, the connection can be made again by clicking "Restore Connection" under the "Calibration & Acquisition" tab.

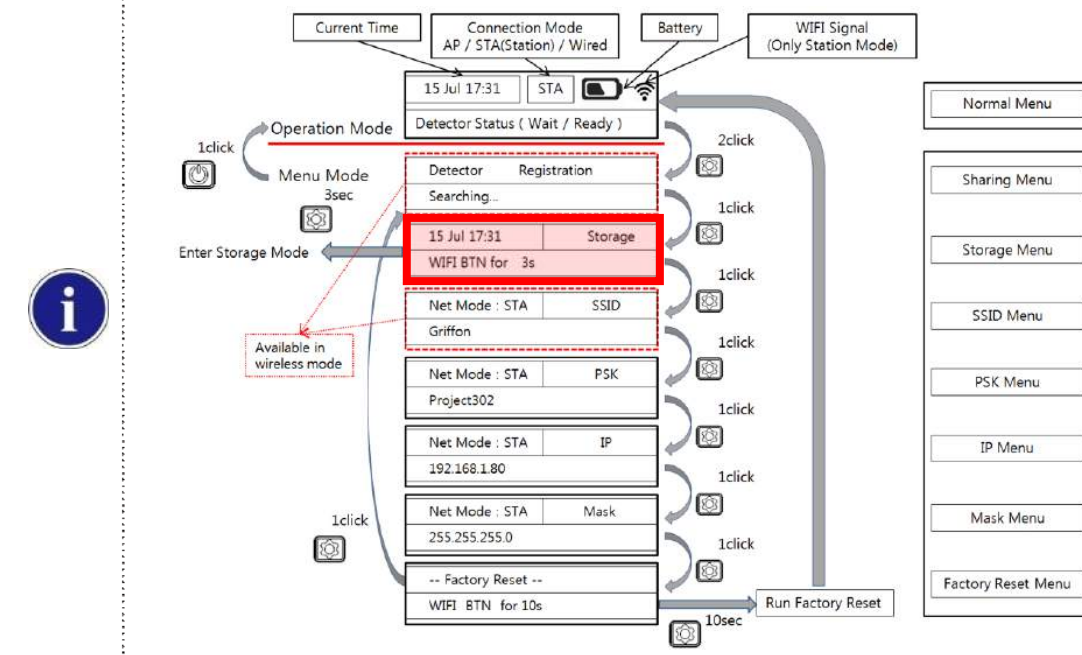


4.4.7 Image Storage function

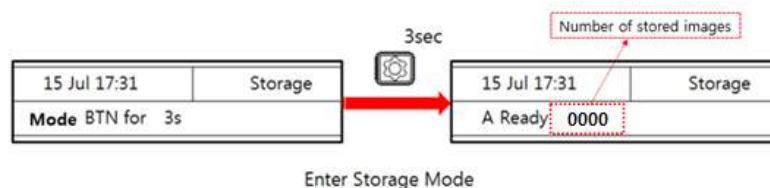
1. Press the mode select button twice (within 2 seconds) and click one more time to go to "storage mode".



- Mode status can be checked by the OLED window of the detector



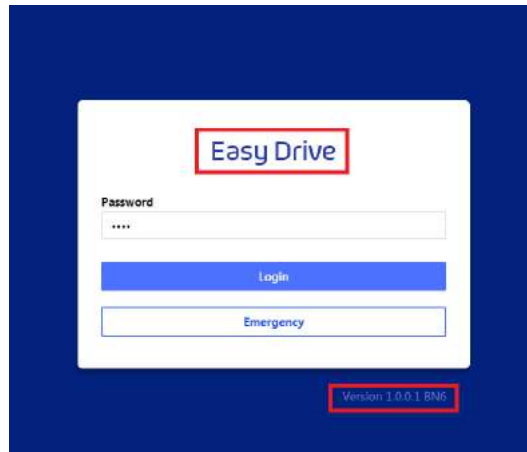
2. Press the mode select button for 3 seconds to check the status of stored images.



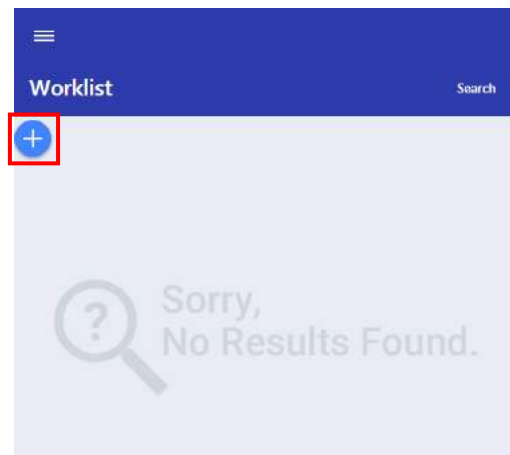
- If the storage mode is used when the detector and PC are connected, the image is stored at the internal memory in the detector.
- When mobile device connects to the detector, user can check the images correctly by Storage Viewer Web Server.
- For storage viewer, must running DBMS and Web Server environment.
- For running Storage Viewer environment, OLED is displayed "Check DB Server".
- Stored images can be opened and deleted by referring SDK.



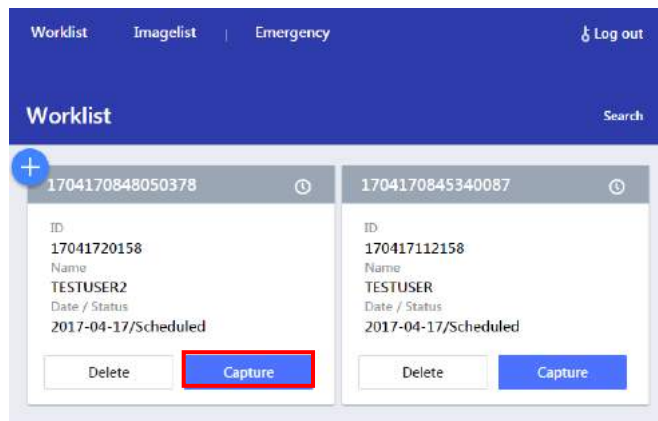
- ① Connect a smart device, such as a smartphone or tablet, to the detector which is in the AP mode. Press the mode select button for 3 seconds to check the status of stored images.
- ② Access to <http://2.2.2.100:3000> via browser and sign in with the password “1234”.



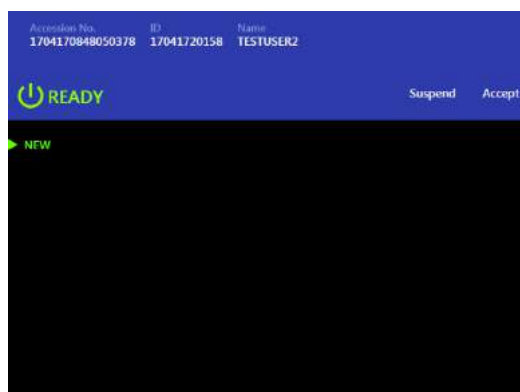
- ③ Go to the “Worklist” menu. Click “+” icon in order to create a new worklist.



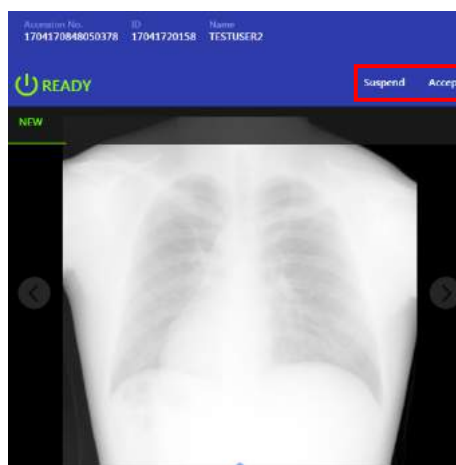
- ④ You can see all worklist for acquiring images. Click “Capture” button to acquire images for the corresponding worklist.



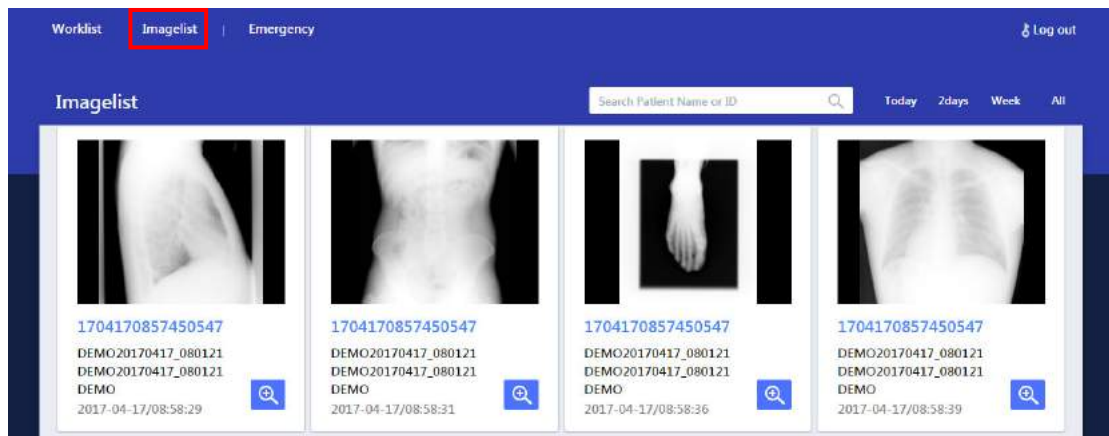
- ⑤ In the detector ready status, you can take an X-ray image.



- ⑥ Shoot X-ray to acquire an image. The acquired image is shown on the smart device. After checking if the image is correct, select “Accept” or “Suspend”.



- ⑦ You can see the list of all acquired images in the “Imagelist” menu.



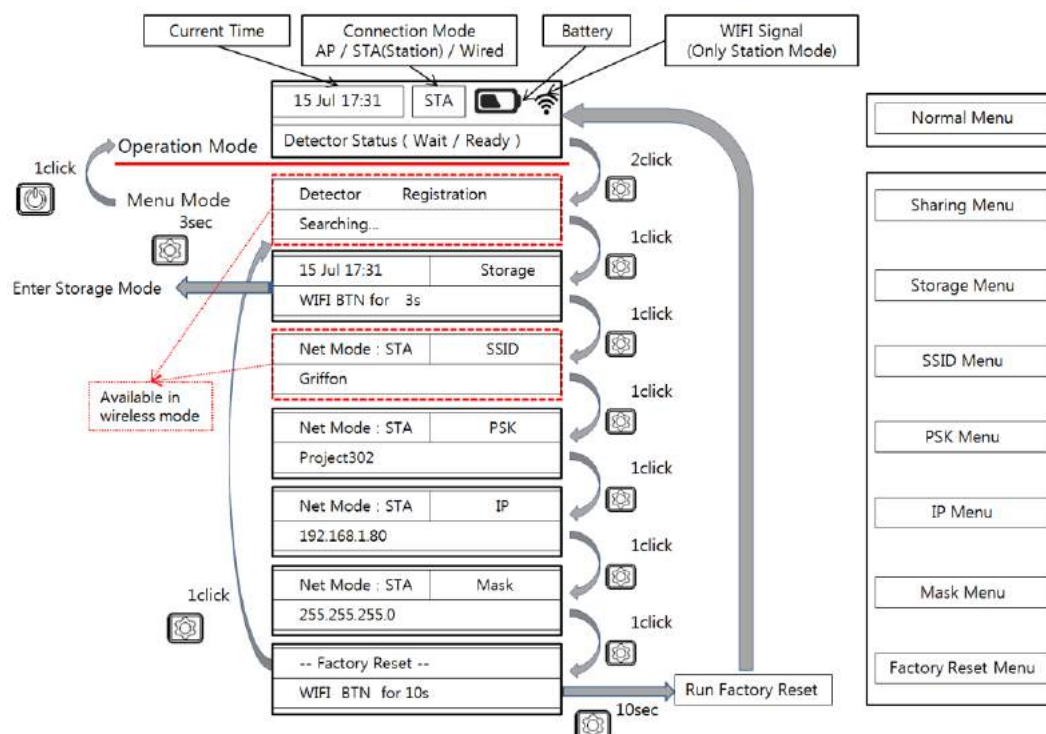
- When worklist menu is empty, detector will automatically create worklist and match.
- Some guide images have been created in web server demo mode.

4.4.8 OLED function

1. OLED is operating when detector is turned on.



2. Use the mode select button and the power button for OLED function as follows.



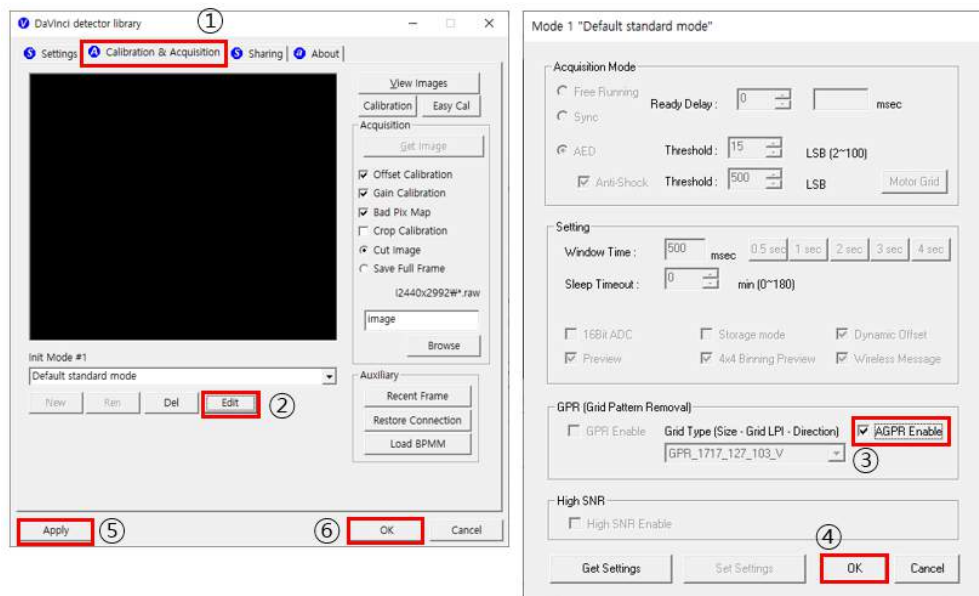
		1 click	Press the mode select button
		2 click	Press the mode select button twice (within 2 seconds)
		10 sec	Press the mode select button for 10 seconds
		1 click	Press the power button
	Normal menu		Shows the detector status.
	Sharing menu		Operates the sharing function.
	Storage menu		Operate the storage function.
	SSID menu		Shows the SSID information of the detector.
	PSK menu		Shows the PSK information of the detector.
	IP Menu		Shows the IP information of the detector.
	Mask menu		Shows the mask information of the detector
	Factory reset menu		Factory reset

4.4.9 AGPR function

AGPR (Auto Grid Pattern Removal) is an option to remove grid line artifacts without selecting a specific grid type.

- Applicable grid
 - Moving grid environment : 85lp/inch, 103lp/inch grid
 - Static grid environment : 103lp/inch (10:1, 12:1 ratio) grid
- Use the AGPR option by default if you are using analog grid above.

1. Set VADAV as below.



No.	Overview
①	Go to the "Calibration & Acquisition" tab.
②	Click "Edit".
③	Check "AGPR Enable" check box.
④	Click "OK".
⑤	Click "Apply".
⑥	Click "OK".



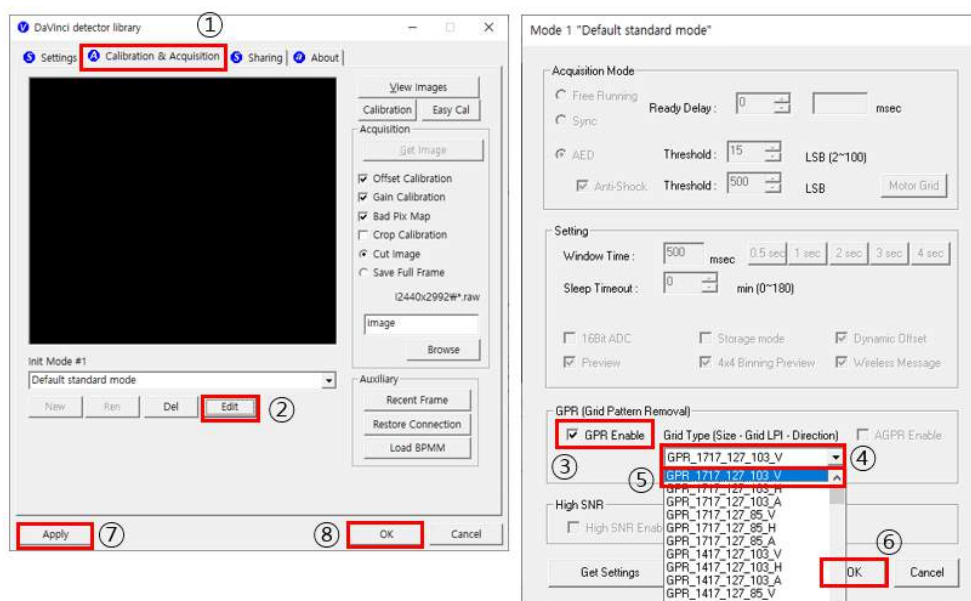
- Validated with 1.8cm gap between the grid and the detector.
- Tests were performed under 100/130/170cm SID conditions.

4.4.10 GPR function

GPR function is an option to remove grid line artifacts caused by using specific analog grid.

- Applicable grid
 - Moving grid environment : 85lp/inch, 103lp/inch grid
 - Static grid environment : 103lp/inch (10:1) grid

1. Set VADAV as below.



No.	Overview
①	Go to the "Calibration & Acquisition" tab.
②	Click "Edit".
③	Check "GPR Enable" check box when using an analog grid.
④	Click "Grid Type" combo box.
⑤	Select appropriate GPR parameter.
⑥	Click "OK".
⑦	Click "Apply".
⑧	Click "OK".

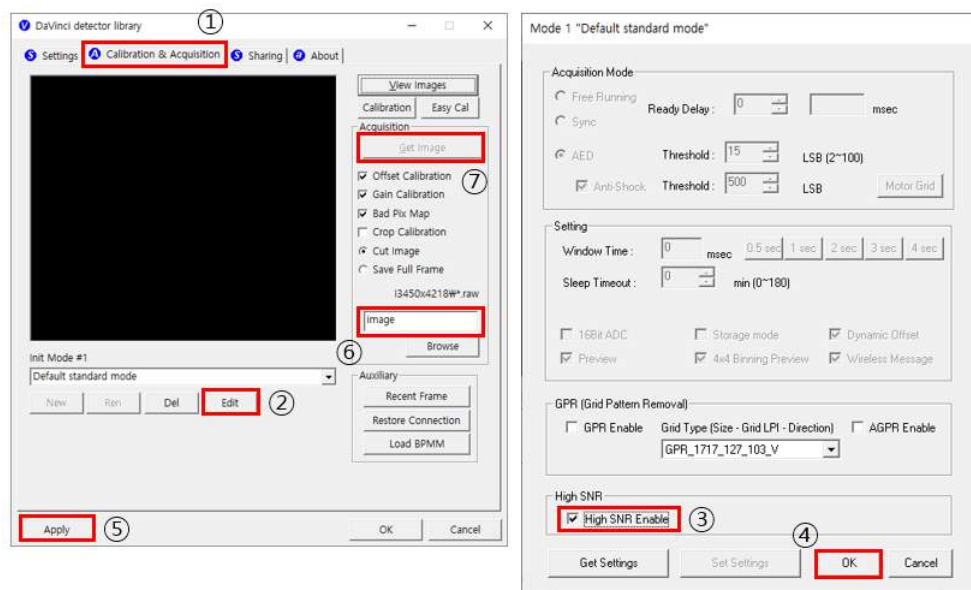
4.4.11 High SNR function

- Using the High SNR option changes the pixel matrix of the raw image and improves the SNR performance.
 - Original image: 3450 x 4218
 - High SNR image: 2464 x 3012
- An acquired image will be stored in “C:\Davinci\I3450x4218”. The name of the file will be “(typed name from Step ⑥).raw”



- High SNR function is only available for 1417WCE 100μm model.
- This function is disabled on other models other than 1417WCE 100μm.

2. Set VADAV as below.



No.	Overview
①	Go to the “Calibration & Acquisition” tab.
②	Click “Edit”.
③	Check “High SNR Enable” check box
④	Click “OK”.
⑤	Click “Apply”.
⑥	Set the name of the image inside the box.
⑦	Click “Get image”.

5. Maintenance

5.1 Cleaning

1. Clean the detector with IPA (Isopropyl-alcohol) when it is contaminated.
2. Before cleaning the detector, turn off the power and separate the battery.
3. Wear waterproof gloves to protect your hands from direct contact with IPA.
4. Do not pour or spray IPA directly on the detector. Use fabric or soft cloth moistened with IPA to clean.
5. Avoid getting IPA or any other liquid into the detector.
6. After cleaning, wait until the IPA is dried completely.

5.2 Inspection

1. In order to ensure that the detector is used safely and normally, please be sure to inspect the product regularly before use. If any problem occurs, please contact Rayence Customer Service team.
2. Please perform inspections based on the check list below.

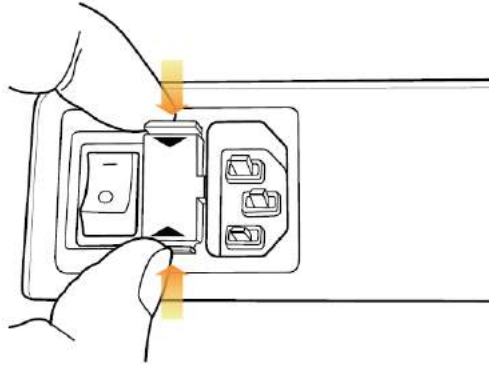
Inspection List	User	Vendor	Cycle
Check if cables are not damaged	☐		Daily
Check if plugs and connectors are not loose or damaged	☐		Daily
Check if cover or part is not damaged	☐		Daily
Check the LED indicator	☐		Daily
Re-Calibration		☐	Half Year
Check the performance of the product by doing test shots with Phantom or resolution chart		☐	Yearly

5.3 Replaceable Parts and Instruction of Replacement

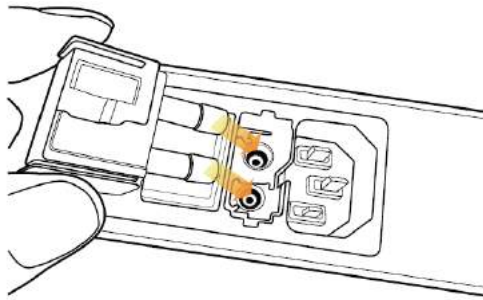
- Fuse: T3.15 AH 250V

Replacing the Fuse

1. Press the fuse as below and pull the fuse box.



2. Pull the fuse and replace with another fuse.



- Power cord: H05VV-F 0.75SQ * 3C
- Ethernet Cable: UTP 4PR 24AWG

5.4 Disposal or Recycling

Follow local governing ordinances and recycling plans regarding the disposal or recycling of device components.



Disposal of old Electrical & Electronic Equipment

(Application in the European Union and other European countries with separate collection system.) This symbol indicates that this product shall not be treated as household waste. Instead, it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about recycling this product, please refer to local governing ordinances and recycling plans.

6. Warranty

6.1 Warranty

If Buyer promptly notifies RAYENCE or Seller regarding any parts that fail to perform as specified under normal usage during the Warranty Period and RAYENCE determines that such failure resulted from a defect in materials or workmanship during the Warranty Period, then RAYENCE, at its option, shall repair, rebuild or adjust the affected parts.

RAYENCE shall have no obligation for any defects to the extent that such defect arises out of (i) normal and fair wear and tear or Product which has been modified without RAYENCE's approval, (ii) Product which has not been installed in strict conformity to the RAYENCE's directions or which have been subjected to electrical or other abuse, or damaged by improper handling, storage or use by Buyer or a third party, (iii) use of Product in combination with devices or products not purchased from RAYENCE; (iv) use or application of Product in a field or in an environment for which such Product was not designed or contemplated; (v) use of any parts or material not provided by RAYENCE for warranty service; or (vi) the third party's maintenance not certified by RAYENCE; or (vii) force majeure such as natural disaster.

The remedies contained in this warranty are Buyer's exclusive remedies. RAYENCE shall not, in any event or under any circumstances, be responsible for damages or other sums in excess of the total purchase price actually paid by Buyer to Seller i.e., RAYENCE or RAYENCE's authorized agent. Without limiting the generality of the foregoing under no circumstance shall RAYENCE be responsible or liable in any regard with respect to damages from loss of use, loss of time, loss of data, inconvenience, commercial loss, lost profits or savings, or other incidental, special or consequential damages claimed by Buyer to arise out of the use or inability to use the Product, even if Buyer has been advised of the possibility of such damages.

In the event that the product is returned to RAYENCE after the warranty has expired, RAYENCE reserves the right to invoice a reasonable fee for the repair services provided to Buyer.

RAYENCE shall make the sole final determination about whether the fail to perform occurred in normal usage (under warranty) or not (excluded from warranty). If the authorized agent or the Buyer doesn't accept the result of RAYENCE's investigation, the burden of proof is on them.

Warranty Procedure

If Buyer needs to make a claim based on this Warranty, Buyer should advise Seller in writing immediately at the following address:

※ All accessory's warranty follows Rayence CS policy. (Except detector and battery)

RAYENCE Co., Ltd.

14, Samsung 1-ro 1-gil, Hwaseong-si, Gyeonggi-do, Korea

- Tel: +82-31-8015-6245
- Fax: +82-31-8015-6300
- E-mail: marketing@rayence.com
- www.rayence.com

PART II. Service Manual

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1. Overview

This service manual gives additional instructions for setting up the detector.

2. FPD Manager Instruction (IP, SSID Set Up / Firmware, FPGA Update)

2.1 Detector IP Address Set Up

1. Turn on the detector and connect to the PC. (IP address: 2.2.2.100)
 - Connect as wired mode with the link cable (IP address: 2.2.2.101) or wireless mode (IP address: 2.2.2.100)
2. After the detector is turned on, open "FPD_Manager.exe".
3. Check "ADI Wireless Model" check box.
4. Type detector's current IP address at "Detector IP Address" from "Current Setting" as below.



- Detector's Ethernet Controller is operated with the second IP address, 192.168.124.80.

FPD Manager V2.0.1.2 (build 1.6.4.22)

Current Setting

Detector IP Address: 2 . 2 . 2 . 100 Get Current Settings

☐ IP Change ☐ TLI Wireless Model ☒ ADI Wireless Model ☐ Kernel Update

Change to

Wired IP address: 0 . 0 . 0 . 0

Subnet Mask: 0 . 0 . 0 . 0

Wireless IP address: 0 . 0 . 0 . 0

Station Mode Setup

Setting

External AP's SSID:

PSK (Pre-Shared Key):

Emptying Storage Folder in Detector

AP Mode Setup

Setting

HostAP's SSID:

PSK (Pre-Shared Key):

Frequency (Ghz):

Firmware/FPGA Update Uploading

Firmware: Select ☐ Preserve current setting

FPGA: Select

Shock Detection History Start Setting Exit

5. Select "IP change" and type the IP address. Click "Start Setting".

FPD Manager V2.0.1.2 (build 1.6.4.22)

Current Setting
Detector IP Address: 2 . 2 . 2 . 100 [Get Current Settings]

☒ IP Change ☐ TLI Wireless Model ☒ ADI Wireless Model ☐ Kernel Update

Change to

Wired IP address: 2 . 2 . 2 . 80

Subnet Mask: 255 . 255 . 255 . 0

Wireless IP address: 2 . 2 . 2 . 81

☐ Station Mode Setup ☐ AP Mode Setup

Setting

External AP's SSID: [] PSK (Pre-Shared Key): []

Emptying Storage Folder in Detector

Setting

HostAP's SSID: [] PSK (Pre-Shared Key): [] Frequency (Ghz): []

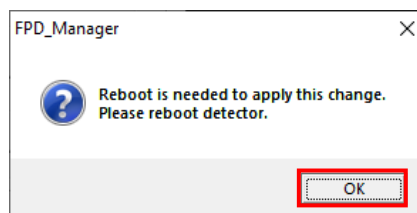
☐ Firmware/FPGA Update [Uploading]

Firmware: [] [Select] ☐ Preserve current setting

FPGA: [] [Select]

Shock Detection History [Start Setting] [Exit]

6. Click "OK" once the message below pops up.



7. Turn off the power of the detector and after 5 seconds, turn the power back on.

2.2 SSID, PSK (Pre-Shared Key) Set Up

1. Turn on the detector and connect to the PC. (IP address: 2.2.2.100)
 - Connect as wired mode with the link cable (IP address: 2.2.2.101) or wireless mode (IP address: 2.2.2.100)
2. After the detector is turned on, open "FPD_Manager.exe".
3. Check "ADI Wireless Model" check box.
4. Type detector's current IP address at "Detector IP Address" from "Current Setting" as below.



- Detector's Ethernet Controller is operated with the second IP address, 192.168.124.80.

FPD Manager V2.0.1.2 (build 1.6.4.22)

Current Setting

Detector IP Address: 2 . 2 . 2 . 100 Get Current Settings

☐ IP Change ☐ TLI Wireless Model ☒ ADI Wireless Model ☐ Kernel Update

Change to

Wired IP address: 0 . 0 . 0 . 0

Subnet Mask: 0 . 0 . 0 . 0

Wireless IP address: 0 . 0 . 0 . 0

☐ **Station Mode Setup**

Setting:

External AP's SSID:

PSK (Pre-Shared Key):

Emptying Storage Folder in Detector

☐ **AP Mode Setup**

Setting:

HostAP's SSID:

PSK (Pre-Shared Key):

Frequency (Ghz):

☐ **Firmware/FPGA Update** Uploading

Firmware: Select ☐ Preserve current setting

FPGA: Select

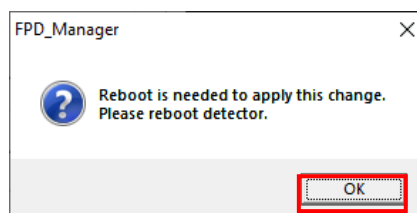
Shock Detection History Start Setting Exit

5. Press "Get Current Settings" and current SSID and PSK(Pre-Shared Key) is displayed.
6. Check "Station Mode Setup" and "AP Mode Setup" check box. Type the SSID and PSK and click "Start Setting".



- Station Mode Setup: When external AP is being used, use the same SSID and PSK as applied.
- AP Mode Setup: When built-in AP is being used, use the same SSID and PSK as applied.
- Frequency (Ghz): Default Channel is set to 11n/2.4G/Auto. (802.11n/2.4Ghz/ACS). The ACS (Automatic Channel Selection) feature is setting automatically channel for good AP Mode connection quality. If the Channel causes conflict, the channel can be changed through this program.

7. Click "OK" once the message below pops up.



8. Turn off the power of the detector and after 5 seconds, turn the power back on.

2.3 Firmware, FPGA Update

1. Turn on the detector and connect to the PC. (IP address: 2.2.2.100)
 - Connect as wired mode with the link cable (IP address: 2.2.2.101) or wireless mode (IP address: 2.2.2.100)
2. After the detector is turned on, open "FPD_Manager.exe".
3. Check "ADI Wireless Model" check box.
4. Type detector's current IP address at "Detector IP Address" from "Current Setting" as below.



- Detector's Ethernet Controller is operated with the second IP address, 192.168.124.80.

FPD Manager V2.0.1.2 (build 1.6.4.22)

Current Setting

Detector IP Address: 2 . 2 . 2 . 100 Get Current Settings

☐ IP Change ☐ TLI Wireless Model ☒ ADI Wireless Model ☐ Kernel Update

Change to

Wired IP address: 0 . 0 . 0 . 0

Subnet Mask: 0 . 0 . 0 . 0

Wireless IP address: 0 . 0 . 0 . 0

☐ **Station Mode Setup**

Setting

External AP's SSID:

PSK (Pre-Shared Key):

Emptying Storage Folder in Detector

☐ **AP Mode Setup**

Setting

HostAP's SSID:

PSK (Pre-Shared Key):

Frequency (Ghz):

☐ **Firmware/FPGA Update** Uploading

Firmware: Select ☐ Preserve current setting

FPGA: Select

Shock Detection History
Start Setting
Exit

5. Select "Firmware/FPGA Update" and click "Select" to browse the Firmware and FPGA. Once the files are selected, click "Start Setting".

FPD Manager V2.0.1.2 (build 1.6.4.22)

Current Setting
Detector IP Address: 2 . 2 . 2 . 100 [Get Current Settings]

☐ IP Change ☐ TLI Wireless Model ☒ ADI Wireless Model ☐ Kernel Update

Change to
Wired IP address: 0 . 0 . 0 . 0
Subnet Mask: 0 . 0 . 0 . 0
Wireless IP address: 0 . 0 . 0 . 0

☐ Station Mode Setup ☐ AP Mode Setup

Setting
External AP's SSID:
PSK (Pre-Shared Key):
Emptying Storage Folder in Detector:

Setting
HostAP's SSID:
PSK (Pre-Shared Key):
Frequency (Ghz):

☒ Firmware/FPGA Update [Uploading...]

Firmware
C:\Users\WV12561\Downloads\W1417WCE_003003_DBMS [Select] ☐ Preserve current setting

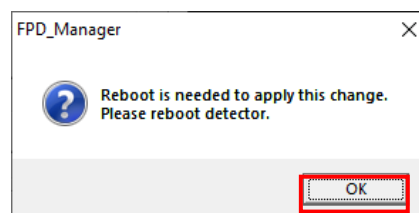
FPGA
 [Select]

[Shock Detection History] [Start Setting] [Exit]



- Firmware File: File extension is either Davinci or tar.
- FPGA file: File extension is bin.

6. Click "OK" once the message below pops up.



7. Turn off the power of the detector and after 5 seconds, turn the power back on.



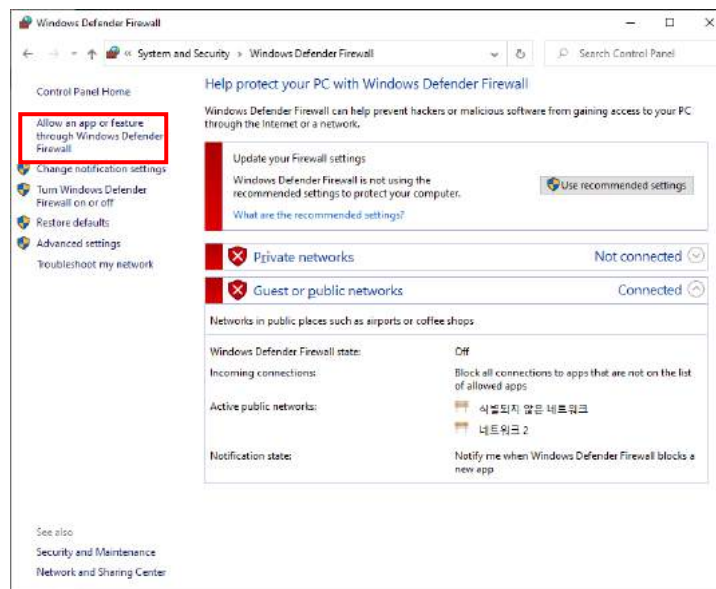
- Detector IP address might be changed to 192.168.1.80 after updating depending on the firmware.

2.4 Set Windows Firewall to use FPD_Manager (For Win 7)

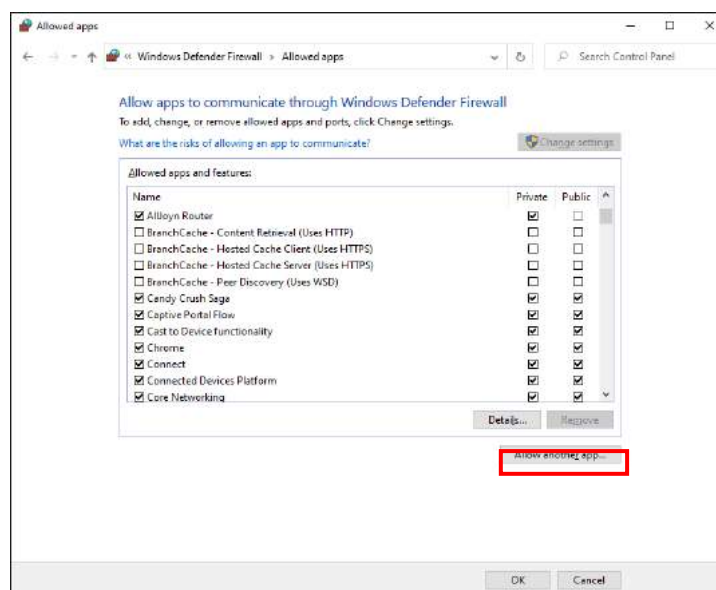


- FPD_Manager would not be performed properly if Windows Firewall blocks FPD_Manager. Please follow the steps below in this case.

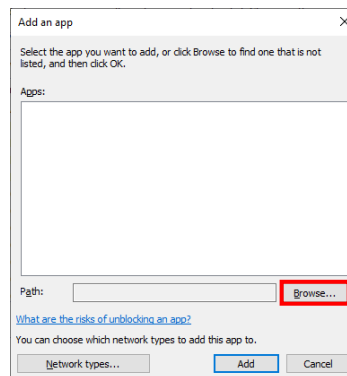
- Control Panel > Windows Defender Firewall > Allow an app or feature through Windows Defender Firewall



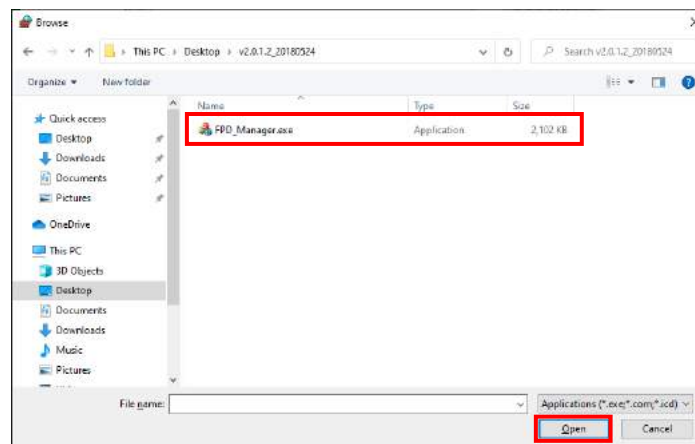
- Check "Name", "Private" and "Public" if FPD_Manager program is already on the list. Click "Allow another app..." when FPD_Manager program is not on the list.



3. Select the program and add if it is already on the list. Click "Browse..." when the program is not on the list.

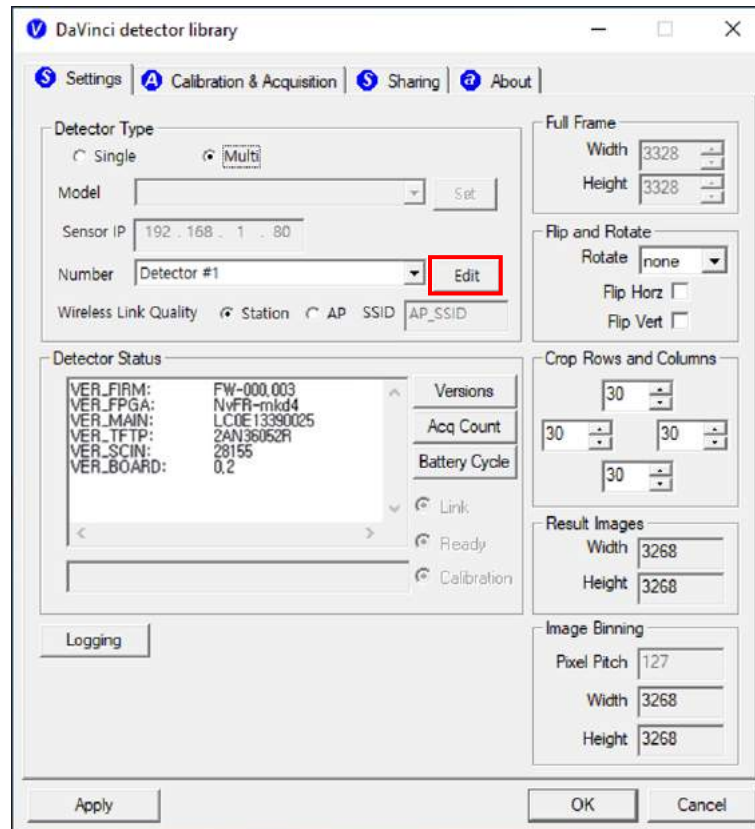


4. Browse and open FPD_Manager.exe and repeat Step 2.

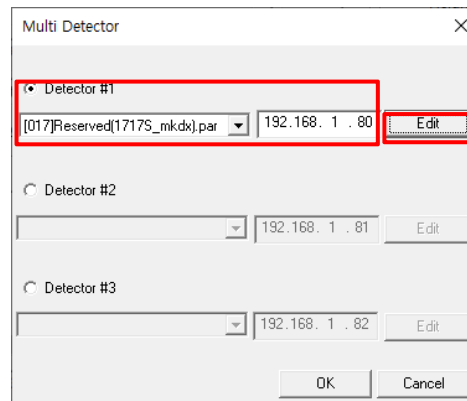


3. Multi Detector Set Up

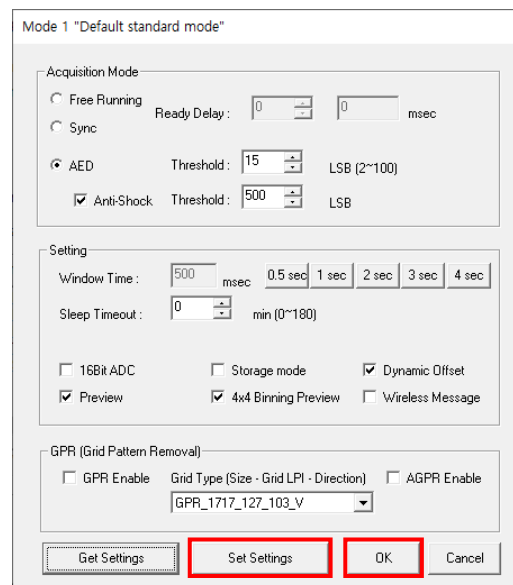
1. Open “_vadav.lnk” from “C:\Davinci”.
2. Click “Edit” under the “Settings” tab.



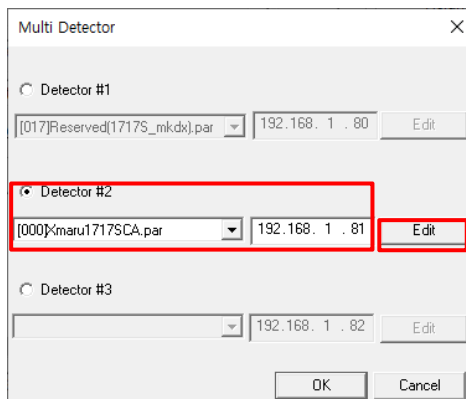
1. Click "Detector #1". Select appropriate model and type the IP address and click "Edit".



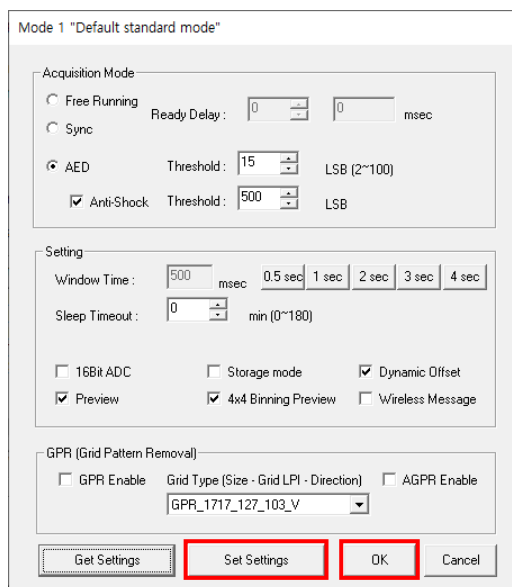
2. Another window for detector setting pops up. Click "Get Settings" button first and you can load parameters and change their settings. Set up the "Trigger Mode" and "Setting".
3. Click "Set Settings" and wait for about 10 seconds to apply new settings.
4. Click "OK" to finish setting and close the window.



1. If a second detector is used, click "Detector #2" and select appropriate model. Insert the IP address and click "Edit".



2. Another window for detector setting pops up. Click "Get Settings" button first and you can load parameters and change their settings. Set up the "Trigger Mode" and "Setting".
3. Click "Set Settings" and wait for about 10 seconds to apply new settings.
4. Click "OK" to finish setting and close the window.



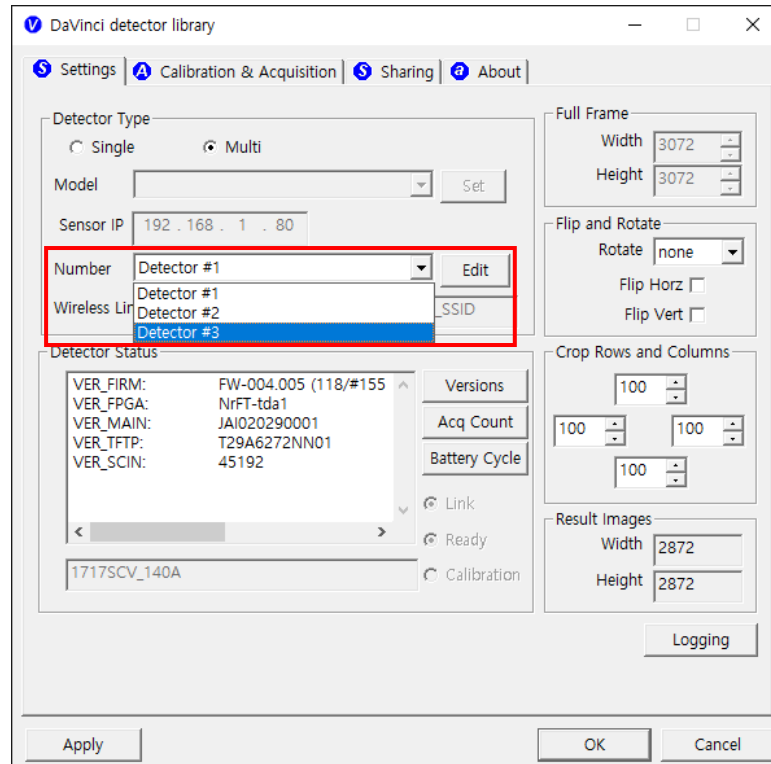
1. If a third detector is used, click "Detector #3" and select appropriate model. Insert the IP address and click "Edit"

The "Multi Detector" dialog box contains three sections for Detector #1, Detector #2, and Detector #3. Each section has a radio button, a dropdown menu for the model, a text field for the IP address, and an "Edit" button. Detector #3 is selected, and its model "[007]1210SGA.par" and IP address "192.168. 1 . 82" are highlighted with a red box, along with the "Edit" button.

2. Another window for detector setting pops up. Click "Get Settings" button first and you can load parameters and change their settings. Set up the "Trigger Mode" and "Setting".
3. Click "Set Settings" and wait for about 10 seconds to apply new settings.
4. Click "OK" to finish setting and close the window.

The "Mode 1 'Default standard mode'" dialog box is divided into three main sections: Acquisition Mode, Setting, and GPR (Grid Pattern Removal). The Acquisition Mode section has radio buttons for Free Running, Sync, and AED (selected), with a Ready Delay field and Threshold fields. The Setting section has fields for Window Time and Sleep Timeout, and checkboxes for 16Bit ADC, Storage mode, Dynamic Offset, Preview, 4x4 Binning Preview, and Wireless Message. The GPR section has checkboxes for GPR Enable and AGPR Enable, and a Grid Type dropdown menu. The "Get Settings", "Set Settings", and "OK" buttons are highlighted with red boxes.

5. Choose the detector from the "Number" option and perform the calibration.



- The calibration folder is named according to the third and fourth numbers of the IP address. (e.g. C:\Davinci\CAL_01_80)
- For further instructions on calibration, refer to **PART I**. 오류! 참조 원본을 찾을 수 없습니다. **Chap. 3.2** 오류! 참조 원본을 찾을 수 없습니다..

4. Troubleshooting

If any problem occurs during the usage of the product, please use this chapter as a troubleshooting guide.

Follow the instructions to resolve the problem. If the problem is not resolved, please contact our Rayence Customer Service team (E-mail: marketing@rayence.com).

4.1 LAN Connection Issue

1. Wireless mode

Check the power

- Make sure the remaining battery percentage is above 25%.
- Check that the power of the detector is on.

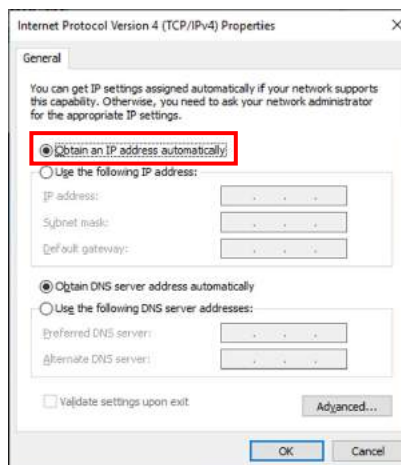
Check the AP (Access Point) IP setting

Make sure the AP (Access Point) is set up as recommended.

- SSID: Griffon
- Internal network
 - IP address: 2.2.2.1
 - Subnet mask: 255.255.255.0
 - Dynamic IP allocation range: 2.2.2.2 ~ 2.2.2.254
- Pre-Shared Key(PSK): project302
 - Authentication methods: WPAPSK or WPA2PSK
 - Password methods: TKIP/AES
- Channel (Frequency)
 - Avoid the crowded channel option.
 - Use the "Auto-Channel selection" function if the external AP has the feature.

Check PC Set up

Make sure that the "Obtain an IP address automatically" is selected from "Internet Protocol Version 4 (TCP/IPv4)".



2. Wired Mode

Check the power

- Check the link cable and the power cord are connected properly.
- Check that the power of the detector is on.

Check PC set up

- Make sure that the IP address is set to "2.2.2.20" from "Internet Protocol Version4 (TCP/IPv4)".



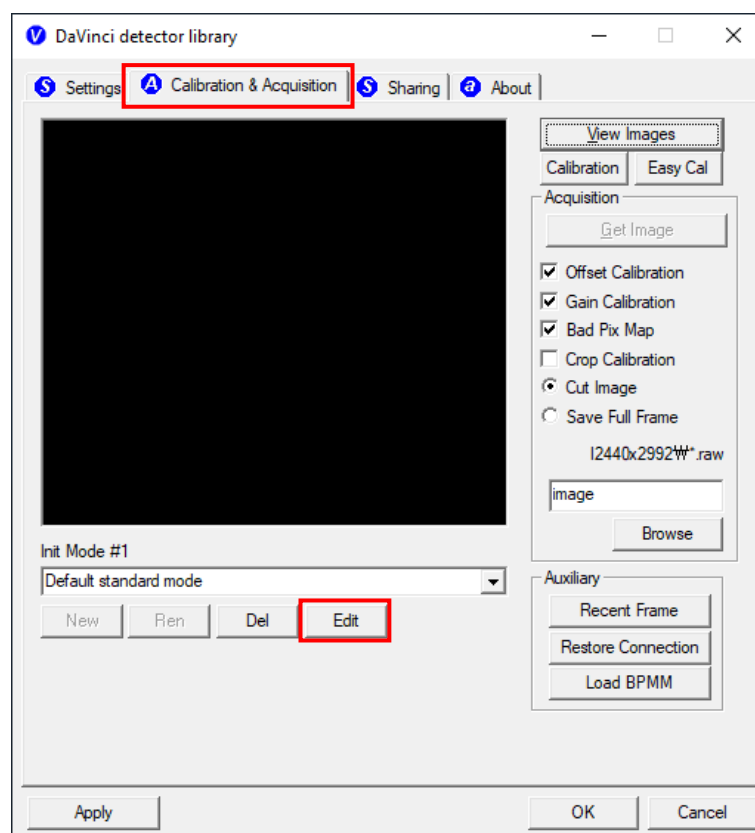
4.2 Lost IP Address (Use one of the methods below)

1. Use a second IP address (192.168.124.80) and change the IP address
2. Press the "Reset" button to reset the IP address. (Default IP : 2.2.2.100)

4.3 When using a reciprocating bucky

If there is image noise caused by the electromagnetic, follow the instructions below.

1. Open "_vadav.lnk" from "C:\Davinci".
2. Go to the "Calibration & Acquisition" tab.



3. Click "Edit".

4. Another window for detector setting pops up. Click “Get Settings” button and you can load and change parameters settings. Change "window time" from 2 to 4 sec and click “OK”.

Mode 1 "Default standard mode"

Acquisition Mode

☐ Free Running Ready Delay : 6 msec

☐ Sync

☒ AED Threshold : 15 LSB (2~100)

☒ Anti-Shock Threshold : 500 LSB

Setting

Window Time : 500 msec **0.5 sec 1 sec 2 sec 3 sec 4 sec**

Sleep Timeout : 0 min (0~180)

☐ 16Bit ADC ☐ Storage mode ☒ Dynamic Offset

☐ Preview ☐ 4x4 Binning Preview ☐ Wireless Message

GPR (Grid Pattern Removal)

☐ GPR Enable Grid Type (Size - Grid LPI - Direction) ☐ AGPR Enable

GPR_1717_127_103_V

Get Settings Set Settings OK Cancel

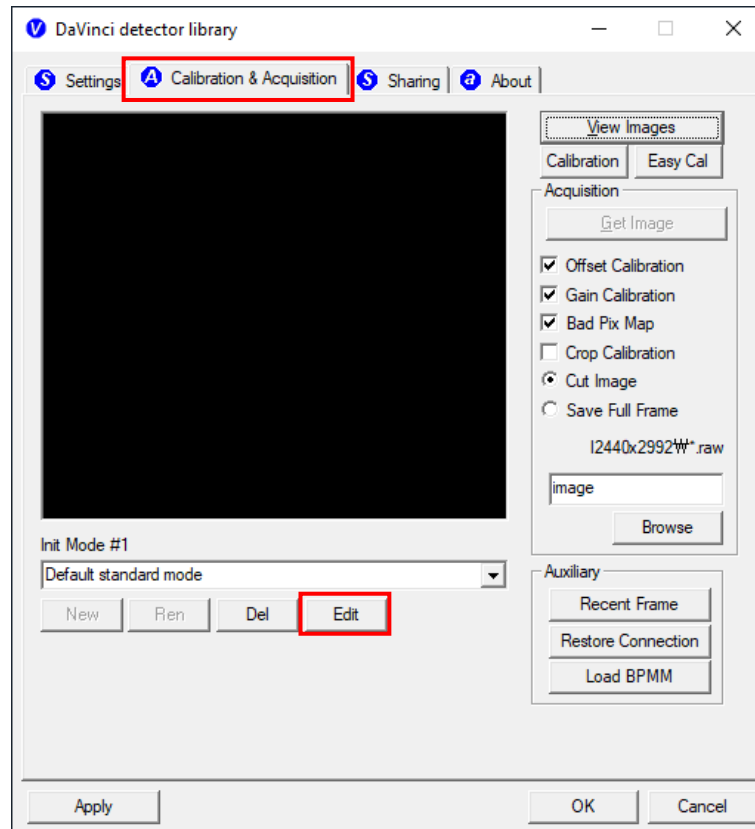


- The default value of window time is 0.5sec.

4.4 Auto Trigger Mode

Follow these instructions when the auto trigger on its own and/or unintentionally acquires blank images.

1. Open “_vadav.lnk” from “C:\Davinci”.
2. Go to the "Calibration & Acquisition" tab.



3. Click "Edit".

4. Another window for detector setting pops up. Click "Get Settings" button and you can load and change parameters settings. Change "Auto Trigger Threshold" from 2 to 100 and click "OK".

Mode 1 "Default standard mode"

Acquisition Mode

☐ Free Running Ready Delay : 6 600 msec

☐ Sync

☒ AED Threshold : 15 LSB (2~100)

☒ Anti-Shock Threshold : 500 LSB

Setting

Window Time : 500 msec 0.5 sec 1 sec 2 sec 3 sec 4 sec

Sleep Timeout : 0 min (0~180)

☐ 16Bit ADC ☐ Storage mode ☒ Dynamic Offset

☐ Preview ☐ 4x4 Binning Preview ☐ Wireless Message

GPR (Grid Pattern Removal)

☐ GPR Enable Grid Type (Size - Grid LPI - Direction) ☐ AGPR Enable

GPR_1717_127_103_V

Get Settings Set Settings OK Cancel



- The default value of auto trigger threshold is 15.

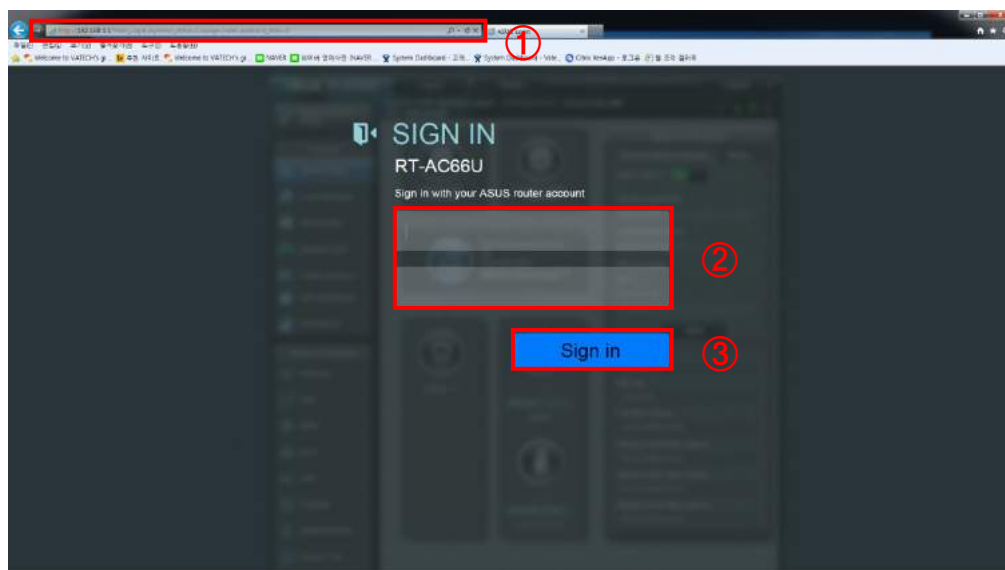
Supplement 1. Wireless AP Set Up Instruction

WAP Model: ASUS RT-AC66U

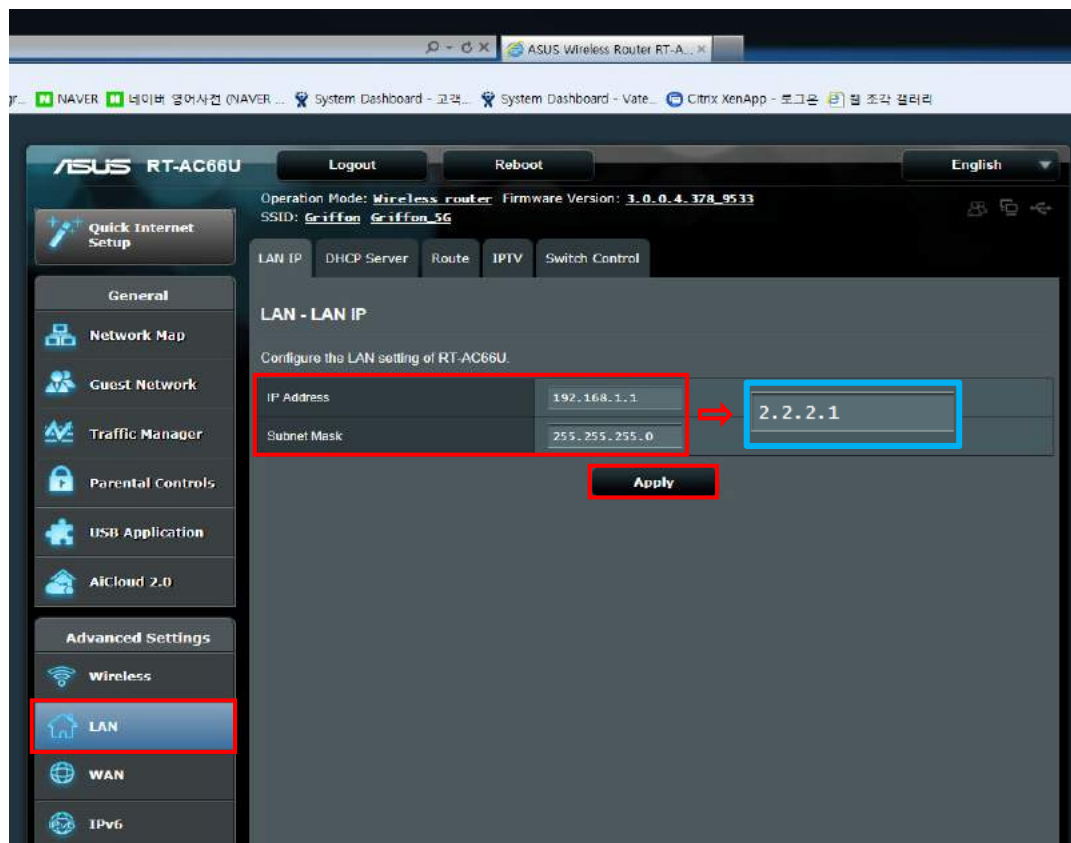
1. Connect the LAN cable from the Ethernet port #1 on the PC to the Ethernet port #1 on the AP.
2. Access AP set up page.
 - Open a web browser. Once type 192.168.1.1. In the browser address bar a login window appears.
 - Enter the ID and password. (ID: admin / PW: admin)
 - Click "Ok".

IP address for the first access is 192.168.1.1.

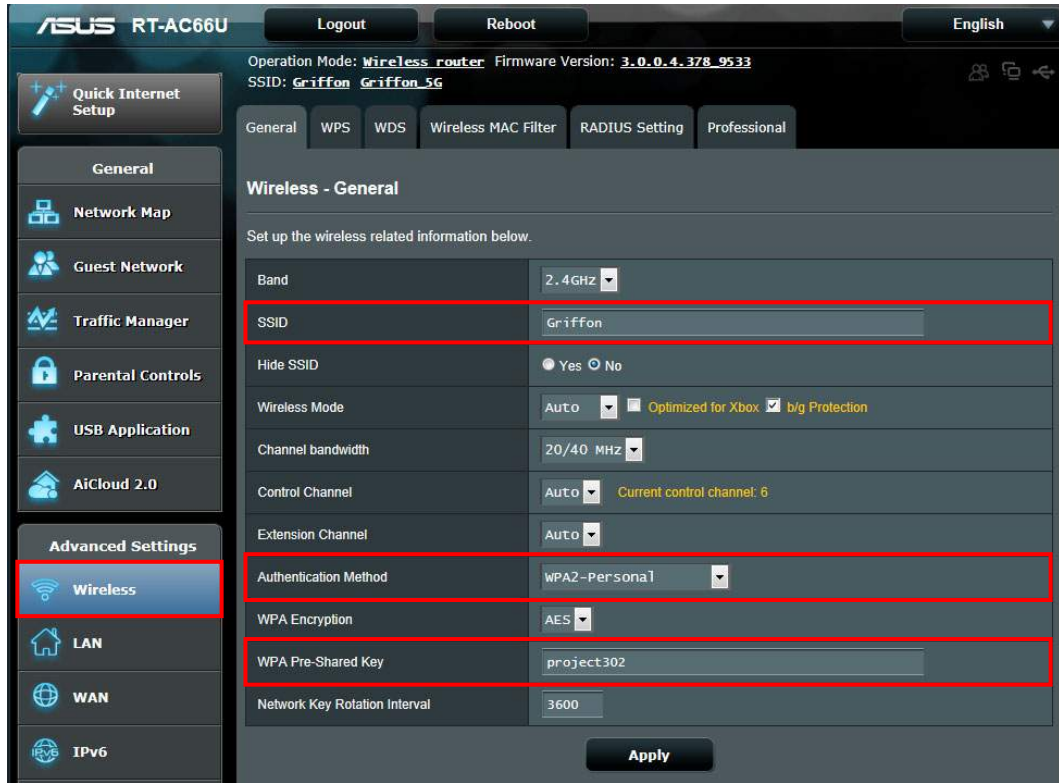
After changing the IP address to 2.2.2.1, use IP address 2.2.2.1 for accessing.



3. Click the "Setup" tab, and then click the "Basic Setup" page.
 - Type 2.2.2.1 at "IP Address".
 - Type 255.255.255.0 at "Subnet Mask".
 - Click "Apply".



4. Click the "Wireless" tab, and then click the "Basic Wireless Settings" page.
 - Set up Wireless Settings as below.
(SSID: Griffon, WPA2-Personal, Pre-Shared Key: project302)



ASUS RT-AC66U

Logout Reboot English

Operation Mode: **Wireless router** Firmware Version: **3.0.0.4.378_9533**
SSID: **Griffon** **Griffon_5G**

General WPS WDS Wireless MAC Filter RADIUS Setting Professional

Wireless - General

Set up the wireless related information below.

Band	2.4GHz
SSID	Griffon
Hide SSID	☐ Yes ☒ No
Wireless Mode	Auto ☐ Optimized for Xbox ☒ b/g Protection
Channel bandwidth	20/40 MHz
Control Channel	Auto Current control channel: 6
Extension Channel	Auto
Authentication Method	WPA2-Personal
WPA Encryption	AES
WPA Pre-Shared Key	project302
Network Key Rotation Interval	3600

Apply

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