Exhibitor/Sponsor Lightning talks Nov. 13 (Wed), 17:15 ~ 18:00

Participants

Kiswire Advanced Technology Co., Ltd (Booth #2)
 RADPION Inc. (Booth #5)
 HANMAC Co., Ltd (Booth #8)
 Jinmyung Communications (Booth #9)
 MARUWA Co., Ltd
 OSI Inc.
 DAWON Medax
 Euclid Techlabs LLC



Introduction of KAT

13-Nov-2024

Presented by Dr. Junho Han

(Kiswire Advanced Technology Co., Ltd.)



Kiswire Advanced Technology Co., Ltd.



Kiswire, Global Specialty Wire Company

Founded in 1945, Kiswire manufactures specialty steel wire products for a diverse range of industries including automotive, bridge, energy, construction and electronics. Kiswire exports to customer in over 80 countries.

Establishment	1945	Headquarters	Busan,Korea
Export countries	80	Annual total production capacity	1,200,000t
Worldwide employees	6,000	Annual sales	2.1 B USD (FY 2023
		00	13%
	M	achinery Construe	12%
Automo 649	bile	on try Er	nergy 7%
		Othe	rs — 4%



KAT is the branch company of Kiswire





Kiswire Advanced Technology Co., Ltd.)

KAT is a global leading superconducting wire company, located at Daejeon/South Korea.

Established in 2004 as a wholly owned subsidiary of Kiswire, KAT specializes in high-performance superconducting wires, including Nb₃Sn, NbTi, and MgB₂. These wires are utilized in fusion reactors such as K-STAR, ITER and DTT project. KAT has been also developing the High-Jc Nb₃Sn wire for the FCC project in collaboration with CERN.

Additionally, from 2018 to 2022, KAT supplied the cryomodule prototypes and cryostats to RAON and RIKEN, respectively. From 2021 to 2023, KAT successfully fabricated and tested the 1.5 GHz 3rd harmonic superconducting cavity for the Synchrotron light source.



ICABU 2024

Introduction of KAT

About KAT R&D for 1.3 GHz Single-cell cavity Established in 2004, KAT is a global leading R&D for 1.5 GHz 2024 superconducting wire company and wholly owned 3rd Harmonic cavity subsidiary of Kiswire. 2021~2023 Supply cryostats for 2023 cryomodule Supply HWR B Start SUCCEX in **RIKEN** Superconducting / Cryogenic cryomodule project in KOREA. 2019 prototype 1.4 tons High Jc **Applications** For RAON Supply 1.5T MRI 5.9 tons Nb₃Sn 2019 ~ 2022 2018 magnet to TCL, China (KAT NbTi Supply Nb₃Sn wire applied) Start R&D of 55 tons for DTT of SC MRI 2015 TF coil 2017 magnet ~ Now 2010 R&D contract with 2014 CERN for High Jc ~ 2021 Nb₃Sn wire Foundation of KAT 2009 Start R&D project of NbTi 2004 and MgB₂ wires funded Supply Nb₃Sn of by Korean Government 137 tons for ITER 2006 Superconducting (TF, CS Coils, Supply Nb₃Sn of 2009-2016) Wires 2 tons for KSTAR 1998 (PF Coil) Start R&D of Nb₃Sn superconducting wire (Kiswire R&D Center)

13.Nov.2024

ICABU 2024

4

ence on Accelerators and Beam Utilization



Superconducting Wire

High Jc Nb₃Sn

Nb₃Sn

NbTi

 MgB_2

KAT manufactures High Jc Nb₃Sn, Nb₃Sn, NbTi, and MgB₂ superconducting wires, which can be applied to various fields including nuclear fusion reactor, accelerator, MRI magnet, electricity, and motor. According to the requirements and applications of customers, our products can be supplied in various specifications.





High Jc & Nb₃Sn

The most commonly used wires for fusion reactors are manufactured with a diameter of 0.82 mm, the critical current of 250 A to 360 A at 4.2 K, 12 T, and the magnetization loss less than 1,000 mJ/cc.

High $J_c Nb_3Sn$ wire with a higher critical current density is designed to have a critical current density 1,000 A/mm² at 4.2 K, 16 T or more and an effective diameter less than 80 μ m with the same diameter.

Number of Filaments	Bare Diameter	Critical Curr (A/mm² (ent Density 04.2K)	Qh	RRR		
	(mm)	12T	16T	(mJ/cc, ±3T)			
> 25,000	1.0 ± 0.1	0.82 ± 0.005	> 2,300	> 1,000		> 100	High Jc Nb ₃ Sn Wire
> 3,000	1.0 ± 0.1	0.82 ± 0.005	> 1,200	> 500	< 1,000	> 100	
> 3,000	1.0 ± 0.1	0.82 ± 0.005	> 950	> 400	< 600	> 100	Nb ₃ Sn Wire
According to c	ustomer require	ements, our prod	ducts can be sup	plied in variou	us specifications.		

13.Nov.2024

ICABU 2024

13.Nov.2024





NbTi

KAT has developed NbTi wires for MRI, NMR, nuclear fusion reactor, and accelerator.

To meet customer demands, KAT customizes NbTi wire to various specifications according to our client's requirements.

Number of	Culto	Bare Filament Critical Current (A @4.2K)				∮4.2K)	000	000
Filaments	Cu/SC	(mm)	(µm)	3T	5T	7T	ККК	
		0.92	83	>1070	>750	>470		
	1.3	0.85	76	>920	>640	>410		
		0.70	63	>620	>450	>280		000
54		1.00	79	>980	>680	>420		54 Filaments with
	2.0	0.92	73	>830	>570	>360		
		0.70	55	>480	>330	>210	>100	
		0.60	47	>350	>240	>150	>100	
	1.6	0.82	8	>760	>520	>310		
>4,000	1.0	0.72	7	>590	>400	>240		
	1.9	0.82	7	>680	>470	>280		>4,000 Filaments w
>6.000		0.82	6	>680	>470	>280		
20,000	1.9	0.72	5	>520	>360	>215		

ICABU 2024

7

Filaments wire



MgB₂



MgB₂ wire is a cost-effective superconducting material as it's critical temperature of 39 K. MgB₂ wire maintains superconductivity with lower cost liquid hydrogen or cryocooler instead of using

Since 2011, KAT has developed a various types of MgB₂ wire and 4 km and longer piece length



Monel/Cu/Nb/MgB₂ wire

Product		18-	18-filamentary MgB₂ wires Un-doped (Φ0.90 mm)			18-filamentary MgB₂ wires C doped (Φ1.46 mm)				7-filamentary MgB ₂ stranded wires ($0.90 mm$)			
Temperature (K)		4.2		20		4.2				4.2			
Magnetic field (T)	3	4	5	2	3	4	4	6	8	10	3	4	5
Ic (A)	>460	>230	>110	>240	>80	>20	>410	>210	>110	>60	>490	>250	>110
Jc (A/mm²)	>3,510	>1,770	>850	>1,870	>680	>190	>1,710	>890	>480	>250	>3,670	>1,850	>880

13.Nov.2024

ICABU 2024

Introduction of KAT Superconducting Cryomodule





RAON HWR B Cryomodule Prototype (2018, IBS/Korea)

- Cavity, coupler, tuner were supplied by IRIS
- Cryostat design and manufacturing by KAT
- Cryomodule assembly including clean room work by KAT



Introduction of KAT Superconducting Cryomodule





RIKEN QWR Cryomodule Cryostat (2019, MHI-MS) (vacuum vessels, thermal shields, and other parts)

- KAT has manufactured the vacuum vessels and thermal shields and the helium leak test and pressure tests according to the Japanese Industrial standard.
- Those cryostat parts have been supplied to MHI-MS and assembled as the cryomodule.
- The cool-down process has been conducted in 2020 successfully.



Introduction of KAT Superconducting Cavity





1.5 GHz 3rd Harmonic Cavity Prototype for the Synchrotron Light Source

(2023, Collaboration with Korea Univ.)

- The cavities have been fabricated by KAT with the technical advices by Korea University.
- The vertical test of the cavity has been conducted utilizing the infrastructure of SARI-SSRF/China, and the test results met the targeted specifications.



the 1.5 GHz 2-cell 3rd harmonic cavity at 4 K

13.Nov.2024

ICABU 2024

Introduction of KAT Superconducting Cavity





1.3 GHz FG Single-cell cavity * FG : fine grain size Nb



(2024, Collaboration with Korea Univ.)

- KEK(JPN) and Korea Univ.(KOR) are proceeding the collaboration for the fabrication of 1.3 GHz 9-cell cavity.
- KAT Co., Ltd. has participated in the collaboration for manufacturing two 1.3 GHz single-cell cavities with the different grain size Nb materials (FG/MG).



1.3 GHz MG Single-cell cavity * MG : medium grain size Nb

	FG 1-cell cavity	MG 1-cell cavity
Resonant Freq. [GHz]	1.298588	1.299351
Leak Rate [mbar-L/sec]	< 0.5E-12	< 0.5E-12

Summary & Future Work



- KAT is a company specialized in superconducting technology, and its main products are superconducting wires for fusion reactors and accelerators, superconducting cavities for accelerators, and superconducting cryomodules.
- Recently, through collaborative R&D with domestic and international accelerator research institutions, KAT has successfully developed its own superconducting cavities and is looking forward to expanding commercialization in the future.
- KAT will continue to strive to contribute to the advancement of superconducting technology through collaboration with domestic and international accelerator research institutions.





Superconducting the Future





RADPION Inc. From Radiation To Plasma & Ion Science For Future Humanity

Company Profile

October 23, 2024



Company Information

Company Name	RADPION Inc.	Established	Dec. 21, 2017			
CEO	Dr. Myung-Jin Kim	Number of Employee	18			
Paid-in Capital	200 Million KRW	Company Website	www.radpion.com			
Address	#303, 75, Techno 1-ro, Yuseong-gu, Daejeon 34014, South Korea					
Contact	TEL) +82-42-364-8589, FAX) +82-42-364-8590, E-mail) radpion@radpion.com					
Business Sector	Plasma & Ion Beam Applications / Cultural Heritage Analyses / Sales of Ion Implanters & Accelerators					



< CEO, RADPION >



Business Overview

lon Beam Division

Biz. Activity

Provision of ion beam irradiation and supply of ion implanter for the 4th Industrial Revolution sector

Biz. Item

- Ion Beam Irradiation Service
- UHD Plasma Technology
- Ion sources & Ion Implanters
- R&BD

R&BD Partner

- Korea : KAERI-KOMAC, ETRI
- Thailand : STeP-CMU
- Europe: UWB

Cultural Heritage Division

Biz. Activity

Service for ion beam analysis and digital conservation in Korean archaeology and cultural heritage

Biz. Item

- Archaeological Science
- Paleoenvironmental Science
- Digital Archaeology
- Scientific Authentication

Customer

- Museum, University
- Cultural Heritage Institute
- Archaeological Excavation

Technical Sale Division

Biz. Activity

Supply for a comprehensive solution for establishment, maintenance and safety of the ion implanters and accelerators

Biz. Item

- Ion Implanters
- Accelerators
- High-voltage/Vacuum Parts
- RMS/CCTV

Official Sale Agency

- NEC, Spellman, EDWARDS
- Thermo, SURV, RITTAL
- Group3, Gel-PaK, Anoison, ARIM

Ion Beam Division : Development of Ion Implanter



radpion[.]

Ion Beam Division : Expansion of Ion Beam Business



"Providing advanced solutions for semiconductor, 6G and space/military applications using UHD plasma and ion implantation technology"

Ion Beam Division : Main Biz. Project (Anti-Static Device)



KOMAC : System Control Technology RADPION <-> SEMES : Certification & Evaluation SAINT : Physical Principle

Anti-Static



- AS-IMP -(Anti-Static Ion Implanter)



(top : Teflon, bottom : Ceramic)





SEMES

SEMES

SEMES

SEMES

Excellent

Excellent

Excellent

Excellent

10¹⁰ Ω/ 1070/ 20V 150 V < 30 µm < 30 µm Irradiated Area > 300 mm 0D

- Evaluation by SEMES Co., Ltd. -







radpion

- Semiconductor Equipment and Automated AS-IMP -

Others



Business



- Anti-Static Devices (left : Photo, right : clean) -

Ion Beam Division : Main Biz. Project (UMIS, ultra metal ion source)





- UMIS (left : Concept, middle : Prototype, right : Control mode) -



- Etching Test (left : Wet Etching, right : Nano Etching (UMIS)) -



Business Thermal Dissipation Material - Al semiconductor -- 6G Antenna Electrode -**Semiconductor Material** - Packaging Heat Sink -- Glass Substrate -**Medical Device** - Artificial Joint & Heart Stent -Dental Implant -

Ion Beam Division : Main Biz. Project (mRAPAC, 100 KV MS-MIMP)



KOMAC : System Control Technology RADPION <-> ETRI : Silicon Photonic Technology HYU : EUV Exposure Technology SKKU : EV Advanced Material

mRAPAC



- mRAPAC 3D Schematics (W*D*H = 8*5*2 m³) -

- MSIT R&BD -(700M KRW, '24~'25)



D – - Basic mRAPAC 3D Schematics -(W*D*H = 4*3*2 m³)



Ion Beam Division : Main Biz. Project (RAPAC, 10 MV Ion Beam Accelerator)



"Welcome to the world's first industrial 10 MV ion beam accelerator center (RAPAC) !!!"



Cultural Heritage Division : Archaeo-Science Leader in Korea and Asia





Paleoenviron. Science
Paleogeomorphology



Geoarchaeology

Artefacts





Technical Sale Division : RADPION & Global Biz. Partner



% Other Global Biz. Partner : Group3, Gel-Pak, Anoison, ARIM

History & Future Plan



* RADPION will contribute to a new culture creation for humanity with advanced plasma & ion beam technology. ??



2024.11.13. ICABU

IBS KoBRA Project

Hanmac Corporation 한맥전자㈜

ΗΛΝΜΛ









IBS 라온(RAON, Rare isotope Accelerator complex for ON-line experiments)







Design of Curved-edge bending magnet





620,00

Design of the large quadruple magnet

Chamfer (30 mm, 45°)



Moving range of Swinger magnet









Design of water-cooled collimator



Temperature distribution of the collimator for each swing angle



Water-cooled beam dump system without vacuum chamber(left) and with vacuum chamber(right)



Vacuum chamber between Swinger and Q1 magnets


Vacuum chamber between Q1 magnet and the beam dump



Vacuum pipe between dump and Q4 magnet



Vacuum pipe between Q5 and D2 magnets



Vacuum pipe between S2 and Q9 magnets



Vacuum pipe between Q9 and Q15 magnets



Design of F1 beam diagnostics chamber



Design of F2 beam diagnostics chamber



Design of the small quadrupole magnet

KoBRA stage 1(Part2)



Design of the vacuum pipes between Q10 and Q15 magnets



Design of F3 beam diagnostics chamber

SCL3용 MEBT Rebuncher를 위한 고출력증폭기(SSPA) 제작





RF SSPA(Solid State Power Amplifier) for Rebuncher



Connecting RF Amplifier and Controller







Cabling for the Cavity for rebuncher



After S/W calibration and training













Wien Filter Mechanical design

Electrode system

KoBRA Wien Filter)





Feed through



Vacuum Chamber



Dipole Magnet

Electrode

HANMAC

IBS KoBRA Project

Hanmac Corporation

한맥전자㈜

Jinmyung Communications RF SSPA (Various Frequencies & Output Power Levels)



2024.11

Tel. 031)706-0150 Fax. 031)707-6126 www.jmbroadcast.com

Contents

- I. Brief of Company
- II. Introduction JM SSPA
- III. Cooperating with Cryoelectra



- I. Brief of Company
 - 1. Gneneral

JM Jinmyung Communications

- Establish: Feb. 1995
- ✤ HQ & Lab: A-907 Technopark 697 Pangyo-ro Bundang Seongnam 13511 Korea
- ✤ Factory: A-204 Technopark 697 Pangyo-ro Bundang Seongnam 13511 Korea
- Main Products:
- RF SSPA for Particle Acceerator
- Broadcast Transmitter using High Power SSPA
- Broadcast Antenna System





I. Brief of Company

2. Organization



I. Brief of Company

3. Main Accomplishment



JM BROADCAST

• Export Digital TV Transmitter to the U.S.A & Mexico(ATSC), Cambodia(DVB-T2), Philippines, and Paraguay(ISDB-T)

- Supplied High Power Liquid Cooled DTV and UHD(ATSC 3.0) transmitter
- Successful SFN test for ATSC 3.0 RF method (first in the world)

2013~16



2017

The government's development projects were successfully completed,

2020

6kW UHD TV Transmitter

· Developed & Supplied30kW UHD/DTV Transmitter

2021

- · Supplied 30kW UHD/DTV Transmitter
 - Successfully Developed & Supplied SSPA for Accelerator (PAL 500MHz, 32kW)

2022

• Supply of SSPA for Accelerator to IBS (325MHz 20kW * 6 with EPICS Control)

2024

- · JM Broadcasting Transmitter FCC Grant(Part 47 & Part 15)
- · Cooperating with Cryoelectra (German SSPA Company)

JM BROADCAST

2018~19

• Exported 2.5kW Liquid Cooled Digital TV Transmitter to the Philippines

•Supplied UHD TV (ATSC 3.0) transmitters to KBS, MBC, SBS and G1.



I. Brief of Company

4. Grant & Prize



- ✔ TTA 시험인증 대상
- ✓ 기술경쟁력우수기업
- ✔ 히든챔피언 인증서
- ✔ ICT 분야 K-Global 300 인증서
- ✓ 경영혁신형 중소기업 확인서
- ✔ 안테나 결빙방지 특허증
- ✓ 기업부설연구소 인정서
- ✔ KBS 방송인증센터 DTV 송신기 인증서
- ✓ TTA DTV Modulator 품질 인증서
- ✔ TTA DTV 1kW 송신기 품질 인증서
- ✓ TTA DTV 100W 송신기 품질 인증서

JM BROADCAST

- ✔ TTA DTV 중계기 품질 인증서
- ✔ ISO9001 인증서
- ✔ 경기도 유망중소기업 인증
- ✔ 정보통신공사업등록증
- ✔ 저작권 등록

I. Brief of Company

- ISO 9001:2015 (Q.C.)



II. Introduction JM SSPA

1. 5kW SSPA Module Composition



상부

하부

2. 5kW SSPA Module – Performance

Frequency range:	325 MHz ± 1.0 MHz @ 1 dBcp
Class operation:	AB
Operation Mode:	CW & Pulse
Input – output impedance:	50 Ω
Input return loss:	≥ 20 dB
Input power:	-7dBm nominal
Output power:	≥ 5.5kW
RF input:	N connector
RF output:	EIA 1-5/8" un-flanged
Harmonics emission:	< 30 dBc
Spurious:	< 60 dBc (carrier offset >100kHz)
Gain Linearity:	< 3 dB (-10dB range)
	< 6 dB (-20dB range)

JM BROADCAST

3. DC Power Supply Hot Pluggable (GE 3500W)

GE CP3000/3500AC54TE Global Platform High Efficiency Rectifier Input: 100-120/200-277 Vac; Default Output: ±54 Vdc @ 3000W/3500W; 5 Vdc @ 10W **RoHS Compliant** Features **PM**:T Applications

- 48Vpc distributed power architectures
- Routers/VoIP/Soft and other Telecom Switches
- LAN/WAN/MAN applications
- File servers, Enterprise Networks, Indoor wireless
- SAN/NAS/iSCSI applications

- Efficiency meets 80plus Titanium requirements
- Compact 1RU form factor with 40 W/in³ density
- Constant power from 52 58Vpc
- 3000 or 3500W from nominal 200-277Vac
- 1500W from nominal 100 120Vac
- Output voltage programmable from 42V 58Vpc
- ON/OFF control of the main output
- Comprehensive input, output and overtemp. protection
- PMBus compliant dual I²C serial bus and RS485
- Precision measurement reporting such as input power consumption, input/output voltage & current
- Remote firmware upgrade capable
- Power factor correction (meets EN/IEC 61000-3-2 and EN 60555-2 requirements)
- Redundant, parallel operation with active load sharing
- Redundant +5V @ 2A Aux power
- Internally controlled Variable-speed fan
- Hot insertion/removal (hot plug)
- Four front panel LED indicators
- UL* Recognized, CAN/ CSA[†] C22.2 to IEC60950-1,
- CE mark meets 2006/95/EC directives
- CB report available



- 신뢰할 수 있는 상용 제품인 GE SMPS 사용
- SSPA Module 하단에 장착하여, 직류 전류 전원 공급 경로를 최소화
- 전면 탈/부착 가능 설계로 유지보수 용이
- 원격을 통한 전압 및 전류 감시 가능
- 과전류, 과전압 및 높은 온도로 부터 기기 보호기능
- 출력 전압 조정 가능 (42V-58Vdc)
- 섭씨 65도에서도 동작하여, 주변환경으로 부터의 영향 최소화
- HIGH MTBF : 450.000시간



4. EPICS Base Monitoring System

1) Block Diagram



II. 기술부문

4. EPICS Base Monitoring System

2) Main Mage



JM BROADCAST

4. EPICS Base Monitoring System

2) SSPA Module Page



4. EPICS Base Monitoring System

3) Cooling System Page



JM BROADCAST

II. Introduction JM SSPA

- 325MHz 20kW SSPA

SSPA Module & System Block Diagram





SSPA Module Block Diagram

SSPA System Block Diagram

Circulator on Each PA Pallet	Full Power with Full Reflection Condition at all Phase Angle
Hot Pluggable PA Module	Circulator on Each PA Module
Hot Pluggable Power Supply	EPICS Base Monitoring System
EASY Maintenance	EASY Operating

II. Introduction JM SSPA

- 500MHz 32kW SSPA Photos




III. Cooperating with Cryoelectra

Meeting JM Broadcast at Cryoelectra at 16th of Sept.2024



Company presentation and topics of cooperation

JM BROADCAST

III. Cooperating with Cryoelectra



JM BROADCAST

Thank you!!



Tel. 031)706-0150 Fax. 031)707-6126 www.jmbroadcast.com

Ceramic Hermetic Seals Introduction



MARUWA Co., Ltd.



1. Company Profile

- Name MARUWA CO., LTD.
- Head Office Aichi, Japan
- President
 Toshiro Kanbe (CEO)
- Establishment 5th April 1973
- Stock Exchange
 Listed on Prime Market in Tokyo, Nagoya, London and Singapore
- Paid-in Capital JPY 86,467 million (=USD 60 million)
- Sales (consolidated) JPY58.8 billion (=USD 410 million) / 2022 Financial Period
- Number of employees 696 (1,297 on consolidated basis)

Oct. 2017

Succession of Ceramic Hermetic Seals Business from Hitachi

2. Location of sales office and plant



Maruwa America Corp.



Maruwa Europe Ltd.



Maruwa Electronics GmbH

3. Utilized area of Ceramic Hermetic Seals



4. Superiority of Ceramic Hermetic Seals

Ultra-high vacuum feedthrough

Comparison to other hermetic seal materials



Core Technology of Maruwa

- 1. High Airtightness : 1×10⁻¹⁰ [Pa·m³/s]
- 2. Brazing Technique between ceramic and metal parts Ceramic material: Alumina, Aluminum Nitride, SiC etc. Metal material: Fe-Ni, Fe-Ni-Co, Ti, Cu, Alumel, Chromel, etc.

3. High Reliability (Metallization)

Mo-Mn metallization method Ti active metal method

4. Custom Design

New design support according to required specifications More than 90,000 types of products manufacturing over 30 years



Sapphire Duct



Core Technology of Maruwa

Cooling Plate with SiC Tile

Product introduction – MARUWA Achievements



Product introduction – MARUWA Achievements

No.	Component	Project	Specification
3	FormationCeramic Chamber	Lab Site: High Energy Accelerator Research Organization (KEK) Project: S-KEKB	Kovar sleeve is brazed with Ag-Cu brazing Copper electroforming for sleeve inner surface Water resistant metallization Product Total length : 500 mm Max. Outer diameter : 86 mm Thickness : 13 mm Ceramic Material : High Purity Alumina
4	Saramia Vacuum Duot	Lab Site: JAEA (Japan Atomic Energy Agency) Project: J-PARC (Japan Proton Accelerator Research Complex)	Ceramic: High purity alumina Metallization (Stripe shape) on outer surface The longest ceramic vacuum duct

Ceramic Hermetic Seals Items

Multipin Connector	Coaxial Connector	Current Feedthrough	Thermocouple	Electrical Isolator	Special Products
					BPM
	6	ale			
					Duct
			3		RF window



Thank you!

Contact Point: Japan (& Global) : 平野 一馬 <u>kazuma.hirano@maruwa-g.com</u> Republic of Korea : Kipum Lee <u>ben@maruwa.co.kr</u>



Loss Loss, Superior Stability

Microwave Interconnect Business Unit November 2024 5 MICROWAVE TECHNOLOGY





Address #315, Hyundai Silicon Alley, Hwaseong-si, Gyeonggi-do, South Korea, 18462

✓ Lower Loss RF / Microwave Interconnect Solution up to 67.5GHz

Areas of expertise

- ✓ 5G & 6G millimeter wave test applications
 ✓ EMC and EMI Antenna Chamber Test
- ✓ Semiconductor & High Speed Digital Test Solutions







Frequency Coverage	DC~8.5GHz	DC~26.5GHz	DC~40GHz	DC~50GHz
Product Image	LH18	LH21D	P35E14	LH13D
Advantage	Lower Loss, Phase, Delay, Amplitude Stable Application: Electrically stable versus Frequent Flexure Jacket: ø6 Carbon TPU, Very Flexible Temperature Range: -40°C~+85°C	Lower Loss, Phase, Delay, Amplitude Stable Application: Electrically stable versus Frequent Flexure Jacket: ø6.5 PTFE Braided Double Jacket, Very Flexible Temperature Range: -40°C~+85°C	Extremely Lower Loss, Phase, Delay, Amplitude Stable Lower PPM, Insertion & phase change Application: Thermal Chamber, Phased Array Antenna Ruggedized Armor Interconnect Construction provide enhanced protection from environmental and physical damage. Jacket: ø9 SUS304 with PTFE yarn Braided, Very Flexible Temperature Range: -40°C~+125°C	Lower Loss, Phase, Delay, Amplitude Stable Application: Electrically stable versus Frequent Flexure Jacket: ø5.5, PTFE Braided Double Jacket, Very Flexible Temperature Range: -40°C~+130°C
Popular Connections	SMA Male & Female N Male & Female	SMA Male & Female N Male	2.92mm Male & Female 2.4mm Male & Female	2.4mm Male & Female
Electrical Performance	-1.35dB @ 8.5GHz Max VSWR 1.25 typical Phase Change 1° vs flexure	-1.80dB @ 26.5GHz Max VSWR 1.25 typical Phase Change 3° vs flexure	-2.90dB @ 40GHz Max VSWR 1.25 typical Phase Change 6° vs flexure	-3.90dB @ 50GHz Max VSWR 1.25 typical Phase Change 9° vs flexure

* Customization length up to 100 meters

* Consultant with technical sales for further inquiries



Background - BPM test at PAL





4GSR BPM Pick-up beam test at PLS-II 7 Cell straight section

- There is only single cable connection from BPM to BPM electronics.
- BPM position resolution also measured by using there BPMs.
- 4 BPM cables for 4GSR are well delay matched within 30ps (30m Long).
- SiO2 pick-up shows higher sensitivity
- SiO2 BPM shows more precise beam position resolution than Al2O3 BPM.
- SiO2 BPM: ~1um position resolution, Al2O3 BPM: ~1.9um position resolution





Cable Performance under BPM test at PAL



Channel 1 (Min Time: -0.038 ns

Channel 2 (Min Time: -0.059 ns)

Channel 3 (Min Time: -0.049 ns)

Channel 4 (Min Time: -0.069 ns)



5

- Advantage of extreme delay matched cable assembly provides narrower range of phase shift!!
- OSI was able to manage approximately under 2.5mm tolerance of length delay matched under 30,000mm long cable assembly in an array of 4 sets
- LH18 cable is perfect solution because it is lower loss and very flexible while superior stability is maintained in delay and phase.



PLS-II SiO2 BPM Camshaft Signal Data with 1ps time step

0





Mechanically cut to 30m of all four cable assemblies under ±1.2mm will not guarannee 10ps delay matching capabilities

But,

Observed maximum of **100mm physical difference** to **match 10ps delay** which is theoretical approximate length of 2mm

Challenges:

- **Inconsistency of Impedance** throughout whole cable length so as velocity of propagation because dielectric constant in the dielectric core is inconsistent.
- Fine tunning in the connector less than 0.2~0.3mm of mechanical shifting. ٠
- Good electrically stable in Phase and Delay delta cable is a must factor.
- Higher understanding of **TDR measurement** capabilities is a preresiguite.
- The cable length is very very long.





To Learn More:

Reach us out at sales@osinter.com





Innovative Solutions for a Healthier Tomorrow

Accelerator-based Boron Neutron Capture Therapy (BNCT) Company

VISION

State-of-Art Technology

Innovations

Better Quality of Life

DAWONMEDAX is a leading healthcare company dedicated to developing advanced medical technologies. With a team of experts and a commitment to excellence, we strive to make healthcare more accessible and effective for everyone

« PAWON MEDAX »

2015~2017

Foundation & RnD

'15.09: Established DAWONMEDAX co.ltd.'16.05: R&D project (Ministry of Commerce Industry and Energy)

2018~2020

Growth as an Innovative company

'20.07: "Innovative Medical Device(A-BNCT)" by the Ministry of Food and Drug Safety

'20.11: Certification –"Innovative medical device company" by the Ministry of Health and Welfare



Journey to real world BNCT

'21.07: K-GMP cetified (clinical trials) for TPS
'21.11: K-GMP cetified (clinical trials) for Neutron irradiation system
22.03: Commissioning BNCT system at Song-do center
'22.12: 1st patient GBM clinical trials
'23. 07: 1st patient H&N clinical trials

~ 30 patients BNCT treatment

DAWONMEDAX BNCT System – Total Solution

Boron Neutron Capture Therapy is an innovative radiation therapy that can be treated in a cellular level using high-LET alpha particles produced by selective boron absorption and boron-neutron capture reactions in tumors.

BNCT aim to destroy cancer cells with only 1~2 session treatment while minimizing radiation exposure of normal organs.

As a consequence, this may enhance the outcome of the treatment and patients' quality of life .

© DAWONMEDAX



Accelerator-based High-efficiency neutron source for BNCT



"Innovative Medical Device Certification", 2021 by Korea Ministry of Food and Drug Safety

I Stability I \bigcirc Stable beam output with world-class stability RF modulator 2 Ion source :: stable high current beam output 3 Precision control of high-power RF system Long-stable neutron irradiation I Reliability I Target system :: Safety and long-life driving performance Beam Shaping Assembly :: High efficiency epithermal neutron conversion **Optimal neutron beam quality* for BNCT treatment** *Achieved IAEA recommendations(2023) - world best

방사선발생장치 사용허가증



전기 기계적 안전시험 성적서

kt sessen 1211-02111-0 시험·검사성적서 도표가약분만전체 시설했죠 · 제 15/2Ab2年 일반전호 에 18-063633-02-1 3 음무선호 月19月11日前5月2月ま E4 원호영 2020-10-13 3026-12-26 20100 2010/10/41 ERIPERTY. 利兴计经济的 DM-BNCT ******* 利益菜學(1)利益补偿制 高新建备业地内住 4.8 적선순 운세권 (中日19月二 121 광기도 만만시 단물구 세회유수로 486 (성극물) 2.414 (TRIFFIC TO AND THE OTHER STREET, STRE 2.43 中国番利市 제조합 체조국 티팔린국 875 PH4 587 A 557 E 40 (1935 MA) 1±44 1240 的问题和社会 44 1.01 1(60)2 서울특별석 저희구 양난태로 241 서울일일 12층 (서주운 1363-5) 지말김 의료가지 [[[김사명요감사 [][수가유사] 신제의 ([]고공합리사 121 相当于自由网站行动运动 由中 利用对萨 483989895424 4309-1280200234 사원 경식 성복 및 경기(위원성공) 5285-52 48248 NEE X A824838 893 57 ※ 시간의 우락한 정우 시장 감시 같은 것 경과한은 영지는 말을 가능했니다. 이 감사 문제를 물고해하고 물고 우들 동네 유사할 위에는 사용 감사들에서 한해 내용을 운두 유산하여야 한다며, A 11 21/42 HOUR BRY 424 1948, 37 9 TAUTUS PA 51221 ABS 8244 IN AT STATE MADE WERE AND A TABLE AND WE CANNOT SEE A WARE BOULD. "人物 的现在分词 有影 打开 新闻 进行 始果,用口菜喝炒饼 服 蒙古 输入的复数 网络法用利用用作用 내리 위에 같이 사람 감독입지사용 양갑한다다. 3100021121222400 영상 : 시험원처럼 시험상사관과 1부. 한국산업기술시형원

2228406-1140-Aut-108 221 610 의료기기 제조 및 품질관리 기준 적합인정서 (Certificate of GMP) I TANAN CAR CORPORT AND A AND AND A Linese In.1 Design of the local division of the local di GMP I the set it instant set on of Assistant) B Routh One of Sconestered HANNEL - BARIN LINE Dribwoods (s. 114) 18 . B. 18 (18) (19) (19) (19) (19) (19) (19) (19) B 484 A44 (Minus of Bearbanew) ARTICLE - THE PARTY BLOCKS & BLOCKS BERTSTER - 118 1984 IS D. O. ORANG PROVIDENCE OF DRAMA DRAMATING THE DRAMATING A.T.T. MINIS, Income as a Visition Descent WESTIGES & Sec. 8 . 1 . 1971. 67. 12 ##Rittete of Relitetion) : mit er til (제)한국건설상활환경시험연구원함 KCL Names Conformility Laborator link

임상 GMP 적합 인정서



	혁신의료기7	지정서
1. 대표	표자 성명(생년월일) : 박선순(19	961년 01월 12일)
2. 제3	업체(수입업체) 명칭 : 주식회시	사 다원메닥스
3. 제3	:업체(수입업체) 소재지 : 경기도 485	E 안산시 단원구 시화호수로
4. 혁신	의료기기군 종류 : 첨단기술군	
5. 혁신 (제품	!의료기기 명칭 : 가속기 기반 ! 경, 품목명, 모델명) (A-BNCT),치료	봉소 중성자 포획 암 치료장치 2용중성자조사장치,DM-BNCT
୮୦	료기기산업 육성 및 혁신의료기기 :	지원법」 제21조, 같은 법 시행령
제15조제	4항 및 「혁신의료기기 지원 및 굔	반리 등에 관한 규칙」 제2조제2항4
따라 위	와 같이 혁신의료기기로 지정합니다	ł.
		2020년 07월 22
	시프이야프아저	권자 북이 하
	-8800	



Clinical trials for Glioblastoma, Head & Neck





Join Us on Our Journey

DAWON

"Cutting-edge technology" "User-friendly design" "Proven efficacy and safety" "Comprehensive customer support"

Physics : jungyu.yi@dawonmedax.com Marketing : daniel.park@dawonmedax.com

Appendix Mode of Action



Brief Introduction of Euclid Techlabs LLC

Chunguang Jing Euclid Techlabs, LLC

11/13/2024, ICABU

Euclid Techlabs LLC

Euclid Techlabs, LLC is a research and development company specializing in linear particle accelerators, ultrafast electron microscopy, and advanced material technologies for energy, defense, and medical applications. The company was formed in 2003. Euclid has developed expertise and products in several innovative technologies: time-resolved ultra-fast electron microscopy; ultra-compact linear accelerators; electron guns with thermionic, field emission or photo-emission cathodes; fast tuners for SRF cavities; advanced dielectric materials; HPHT and CVD diamond growth and applications; thin-film applications in accelerator technologies; and beam physics. Merging these technologies allows Euclid to create cost-effective, compact and reliable solutions, which provide potential access to a wide variety of markets.



- 25 employees, 12 PhD, particle physicists, material scientists, as well as electrical and mechanical engineers
- 2 Lab/offices: Bolingbrook, IL and Washington DC.
- Tight collaborations with National Labs and Institutes: FNAL, ANL, BNL, LBL, SLAC, LANL, Jlab, NIST, NIU, IIT, etc.



www.euclidtechlabs.com

Corporate Profile At A Glance

Euclid Techlabs, LLC is a research and development company specializing in linear particle accelerators, ultrafast electron microscopy, and advanced material technologies.

- Experienced workforce with expertise in all aspects of electron accelerators, NC and SRF
- ✓ Spacious high bay area to house large assembly and testing work
- Trusted, qualified contracting work with national laboratories
- Extensive capabilities tailored to particle accelerators: EM modeling, thermal analysis, radiation simulation, engineering design, mechanical drawings, small scale fabrication, bench evaluation, beam tracking, LLRF design/installation
- Close customer relations, streamlined cooperative engagements
- ✓ Solution-oriented team and environment

www.euclidtechlabs.com



In-house work for a contract to perform QC and Class 7 cleanroom assembly of all components on the ANL/SLAC cavity-based XFEL project.



Electron Sources and Accelerators











Beamline Components Portfolio

PRODUCT: Photocathode growth system + UHV suitcase

Custom alkali-antimonide molecular beam epitaxy reactors with Cs, K, Na, Rb, and/or Sb effusion cells and user-friendly automated co-evaporation for repeatable, robust thin film growths.

- Optimized for uniform MBE and high reliability
- One-click software control using pre-programmed recipes
- In-situ multi-wavelength QE measurement

PRODUCT: Beam Position Monitors

Customers include Varian and ANI

Large charge dynamic range

Compact size

UHV compatible

Impedance matched

Custom cathode plug or flag options w/load lock



(left) Cathode growth system delivered and demonstrated for U.S. Dept. of Energy. Office of Science. Office of Basic Energy Resoletand E. Montgomery, Proc. IPAC 2024.

Standard and customized in-flange BPM and stripline BPM pickups and readout electronics

PRODUCT: SRF gun and injector (with booster, compressor)

Conduction cooled SRF photoinjectors for UED/UEM applications, fully developed inhouse and cold-tested to 4 K, including:

- Cryomodule design
- SRF gun design
- Beam dynamics
- LLRF



Ref: R.Kostin, Proc. IPAC 2024, WEPS23,

PRODUCT: High power RF windows

- Consistent, reliable RF windows for high power applications
- TiN coated to reduce multipacting and charging
- UHV compatible (10⁻¹⁰ torr)
- Waveguide or coaxial designs available
- · Customers include:
 - Argonne National Laboratory
 - Lawrence Berkeley National Laboratory
 - Los Alamos National Laboratory



Euclid Techlabs is a major partner in the advanced conduction cooled cryomodule development at Fermilab (IARC) which includes:

- SRF coaxial coupler
- Cooling design
- IIRF
- Injector design/fabrication
- Buncher/compressor design













Ultrafast Pulser for TEM





