

vtech



VTech Communications Ltd

Date: Dec 2020

About VTech Group

1976 Established in 1976 with headquarters in Hong Kong and state-of-the-art manufacturing facilities in China.

3 Core Businesses

Electronic Learning Products (ELP) from infancy through toddler and preschool years.

Cordless Phones & Telecommunication Products (TEL) world's largest manufacturer

Contract Manufacturing Services (CMS) one of the world's leading electronic manufacturing service providers



14 Countries & Regions



HouJie 1985



QingYuan 2005



Malaysia 2018

26,000 Employees



LiaoBu 1997



Shenzhen 2008

1,600 R&D professionals

US, Canada, Germany, Hong Kong and China

HKSE: 303 Shares of VTech Holdings Limited are listed on The Stock Exchange of Hong Kong

About VTech Group

Educational Learning Products (ELP)

No. 1 supplier of electronic learning toys from infancy through toddler & preschool globally
59 million products shipped in FY19
94 countries selling VTech ELPs in 28 languages



Telecommunication Products (TEL)

No. 1 residential phones & baby monitors manufacturer in the US
20.2 million handsets shipped in FY19
79 countries selling VTech TEL products

vtech



AT&T

snom

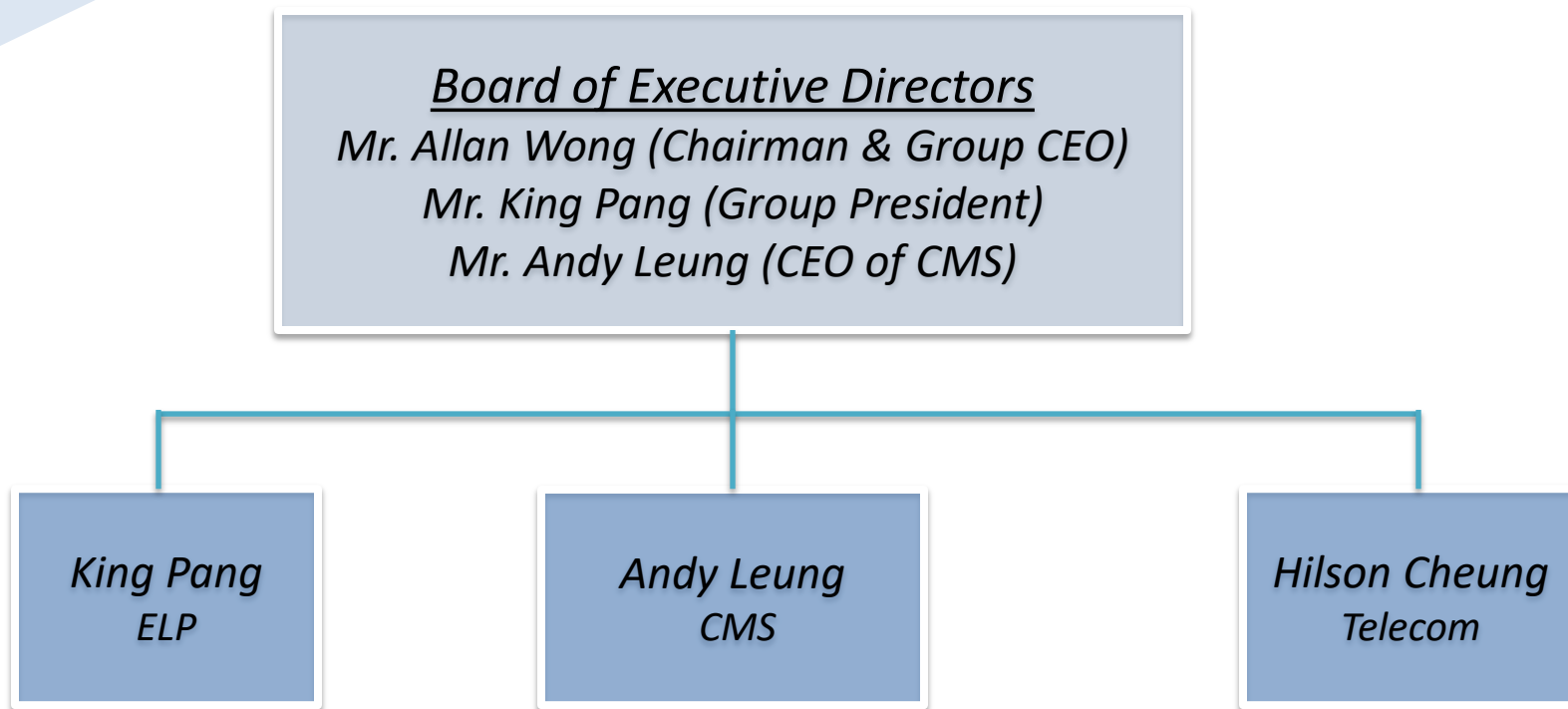


Contract Manufacturing Services (CMS) Flexibility in service, excellence in product quality, manufacturing know-how in a number of product categories & strong reputation

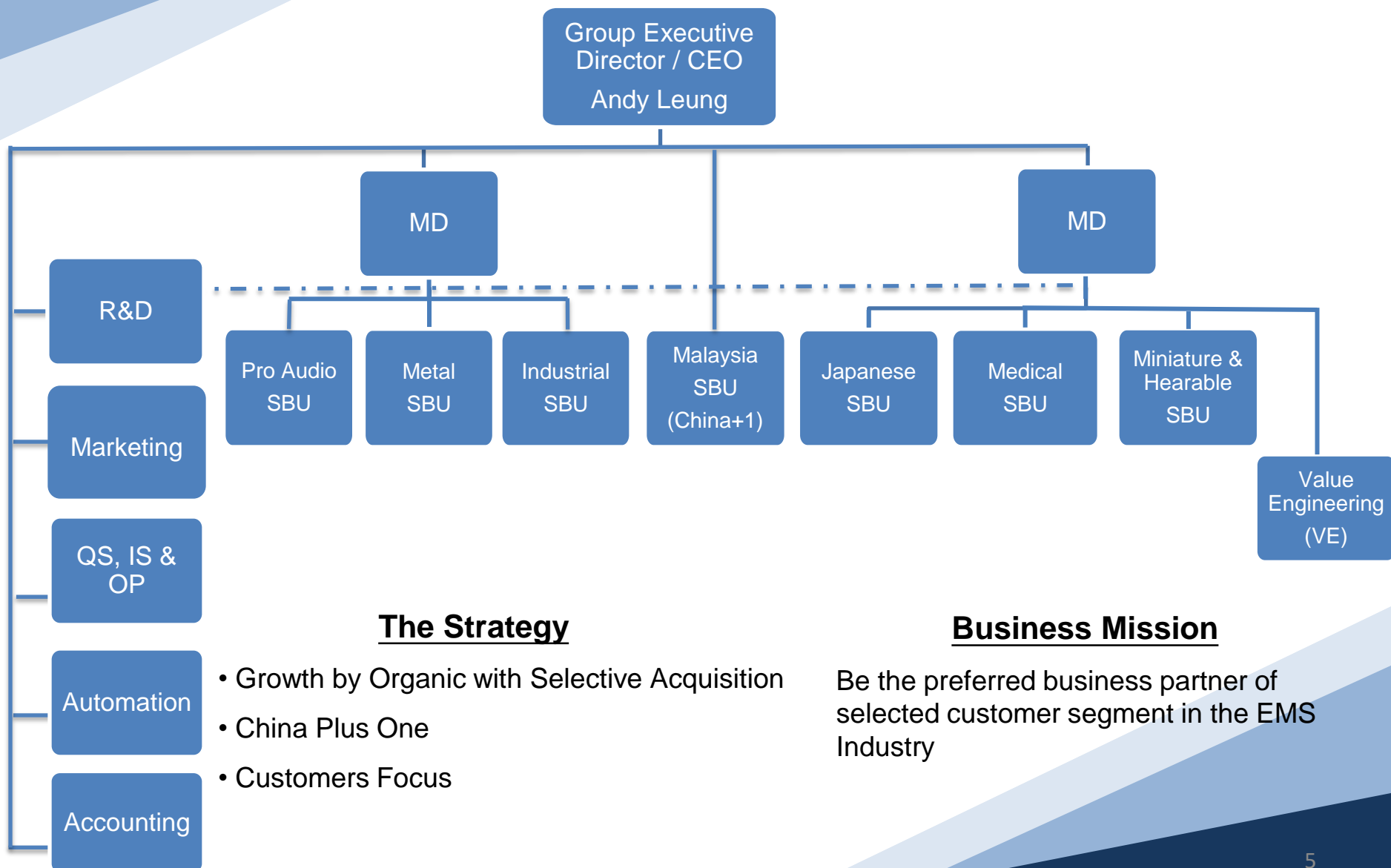
No. 1 among all EMS providers in Hong Kong
18th consecutive year of sales growth
25th among the world's top 50 EMS providers



VTech Group Organization Chart



CMS Organization Chart



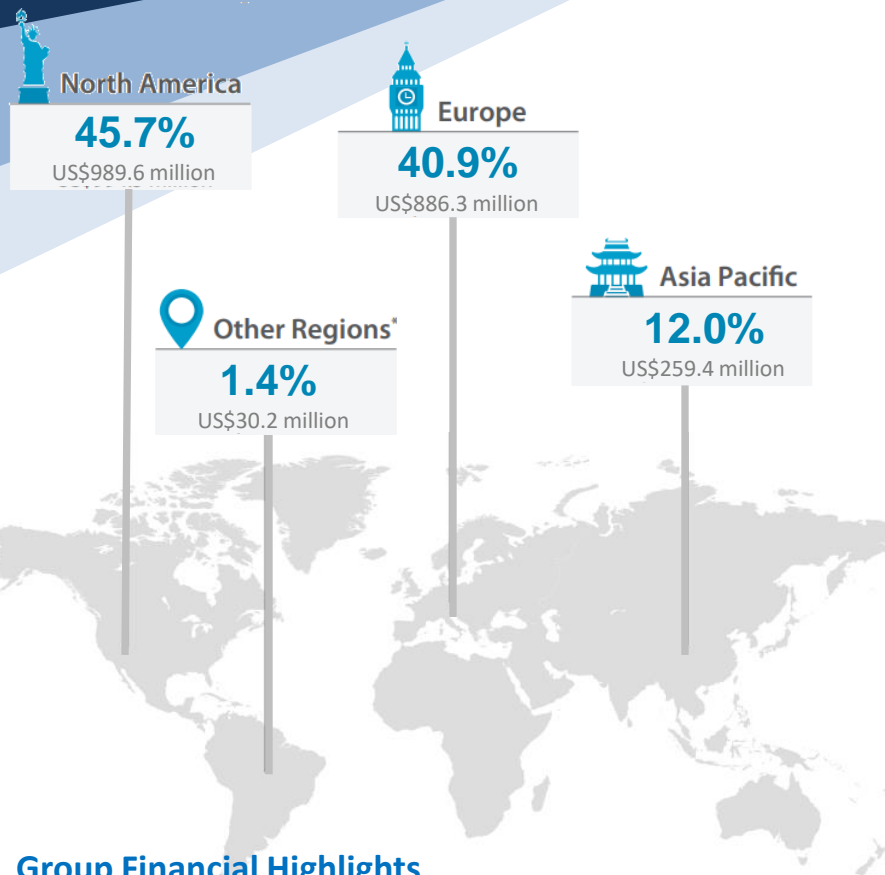
The Strategy

- Growth by Organic with Selective Acquisition
- China Plus One
- Customers Focus

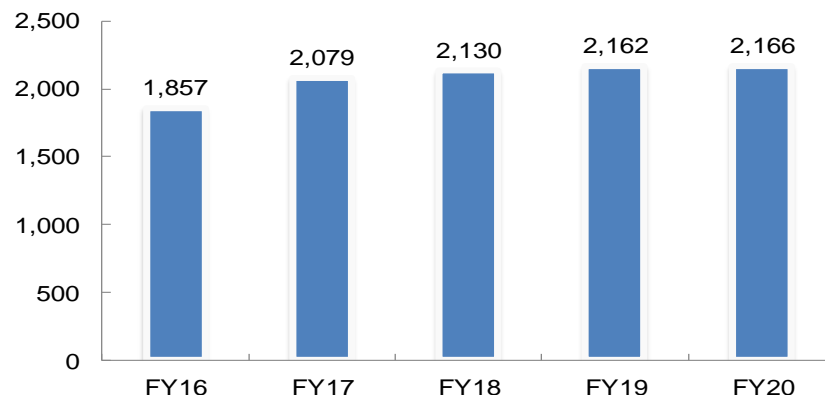
Business Mission

Be the preferred business partner of selected customer segment in the EMS Industry

VTech Group Financial Performance



Group Turnover in the Past 5 Years, US\$M



Sales by Companies, US\$M

FY20: 1st Apr 2019 – 31st Mar 2020

US\$M	FY17	FY18	FY19	FY20	1H FY20	1H FY21
ELP	878	907	914	922	453	482
VTT	565	531	441	401	206	205
CMS	636	691	807	842	465	436

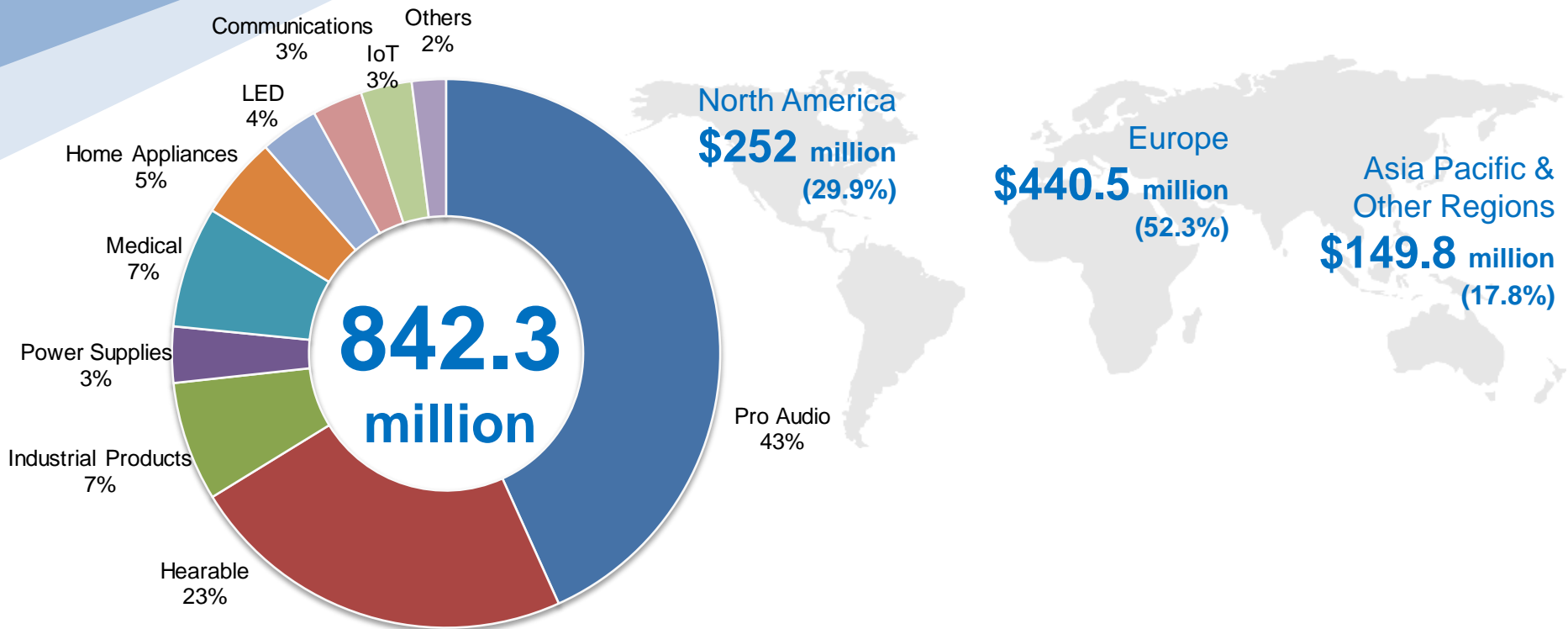
Group Financial Highlights

US\$M	FY17	FY18	FY19	FY20	1H FY20	1H FY21
Sales	2,079	2,130	2,162	2,166	1,124.1	1,123.6
Operating Profit	200	231	193	220	135	143
Profit Before Tax	200	231	192	212	132	139
R&D Expenses	77	77	77	82	41	42
Cash on Hand	269	254	237	243	103	137
No. of Employee	27,200	26,000	26,000	26,000	26,037	26,876

Highlights of the 2019/2020 Result:

- Group revenue increased by 0.2% to US\$2,166 million
- Profit attributable to shareholders of the Company grew by 11.3% to US\$190.7 million
- Gross profit margin increased from 29.4% to 30.6%
- Reinforcing cost control with strict focus on cash and liquidity
- Malaysian manufacturing base to expand to about 25% of the Group's total production capacity

FY20 CMS Sales Distribution



Major Product Line Up



Pro Audio

Hearable

Industrial

Power Supplies

Medical

LED

IoT

Home Appliance

CMS Global Presence



	Head Office	Manufacturing	Procurement	R&D
Hong Kong	V		V	
Guangdong, China		V	V	V
Johor, Malaysia		V	V	
Singapore			V	
Boston, MA, US			V	
Smithtown, NY, US (Partner)				V

Locations (China)

 **VTech (QingYuan) Plastic and Electronics**

Headquarters - Hong Kong

VTech Communications Ltd.
23/F, Tai Ping Industrial Center,
Block 1, 57 Ting Kok Road,
Tai Po, N.T., Hong Kong

Manufacturing Site - Dongguan, China

VTech (Dongguan) Communications Ltd.
VTech Science Park,
Xia Ling Bei Management Zone,
Liao Bu District, Dongguan,
Guangdong, China

Business Development – North America

VTech Telecom, L.L.C.
237 Lexington Street, Suite 201,
Woburn, MA 01801

Business Development – Japan

VTech Communications Japan Ltd.
Okumura Building,
3-14, Kanda Ogawamachi,
Chiyoda-ku, Tokyo 101-0052 Japan

Travel Time to VTech Science Park (CMS) from:

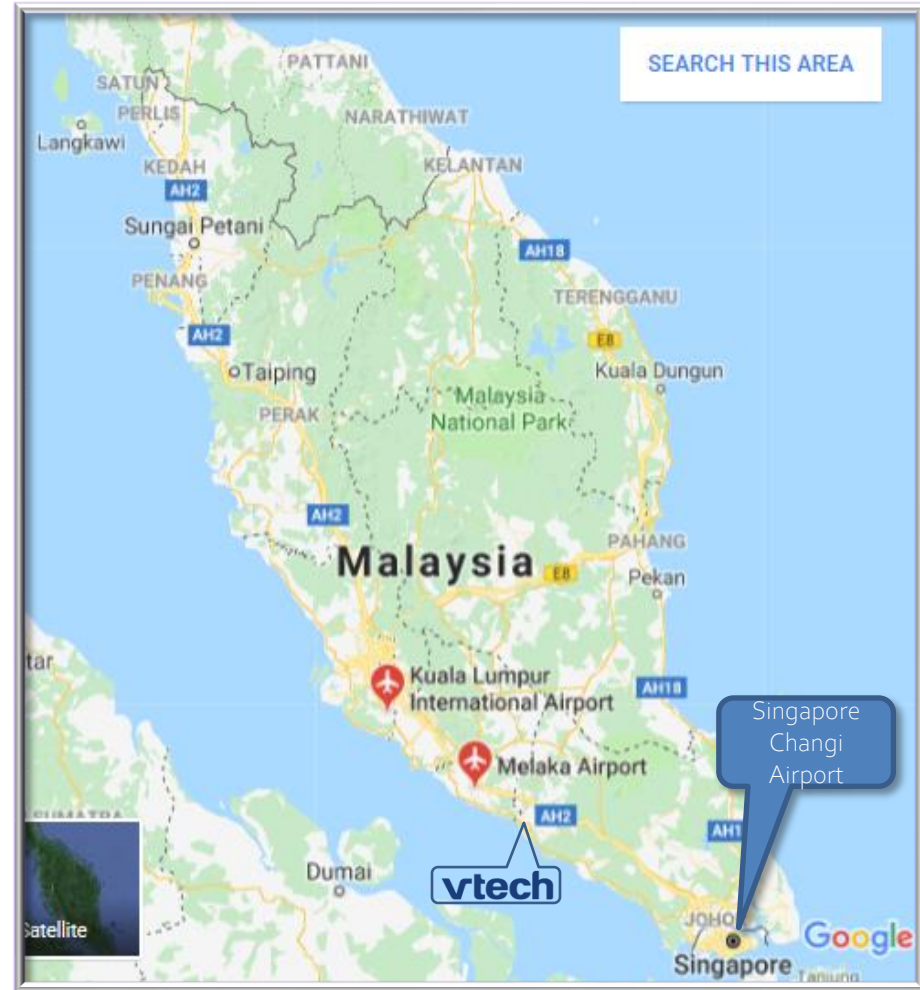
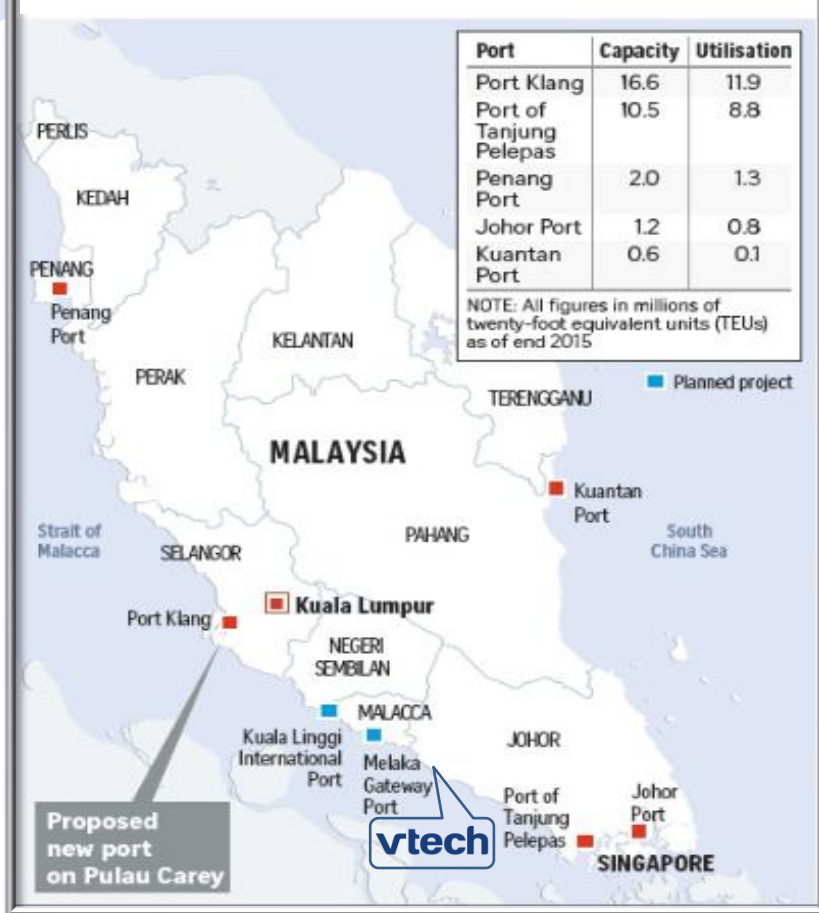
- Hong Kong Airport : 2.5 hours
- Shenzhen Airport : 1.5 hours
- Guangzhou Airport : 1.5 hours



Locations (Malaysia)

Nearest Seaports & Airport to VTech facilities (VTM)

Major Ports in Malaysia



VTech CMS Manufacturing Capacity

China (LiaoBu)

China LB	FY18	FY19	FY20
Manufacturing Area (Sq. M)	85	120	120
Wave Soldering (Lines)	26	28	33
SMT (Lines)	25	26	27
Auto Insertion (Units)	10	11	11
Capital Investment (USD' M)	10.3	11	9

Malaysia

Malaysia	No. of Lines
Wave Soldering	8
SMT	19
Auto Insert	15
Manual Insert	10

China (LiaoBu) factory

Building 5



- Commenced in 2005

Building 6



- Commenced in 2007

Building 7



- Commenced in 2008

Building 8



- Commenced in 2011

Building 9



- Commenced in 2015

Building 10



- Commenced in FY19

Malaysia factory



VTech Metal Capabilities

VTech Metal Shop (in Xixi)

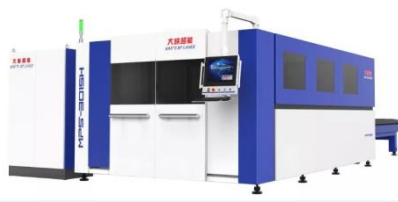
- One Stop Service: Tooling Design & Making, Stamping, NC-Punching & Bending, Welding and Surface Treatment

Products Categories:

- Professional Audio Equipment, Home Appliance, Computing Electronics, Office Automation, Power Supply Units and Automotive Products.



Stamping Line with Robot Arm



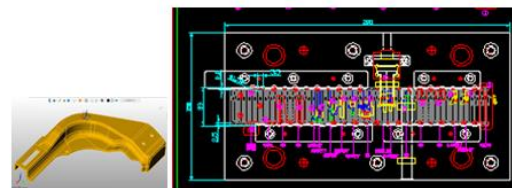
Laser Cutting



CNC Punching & Bending



Automated Painting / Powder coating



In-house Tooling Design & Fabrication

Note: VTech metal shop also serves 3rd party non-EMS business partners

Manufacturing Capabilities

CMS Manufacturing Capabilities

- 7 buildings with over 120K Sq. M. Manufacturing Area
- SMT, Thru-Hole, RoHS, REACH,
- ISO9001, ISO14001, ISO13485, TS16949, ISO18001, SA8000
- ANSI ESD S20.20 for all production floors
- 33+ 19 SMT Lines, State-of-the-Art Equipment
- In-housed design and fabrication for ICT, AOI, ATE, FAT
- Chip on Board in Class 1,000 Clean Room
- Class 10,000 Clean Room for precise products
- Burn-in Chambers, X-Ray Inspection, Conformal Coating
- Reliability life tests e.g. drop test, high/low temp cycle
- Intensive Core Processes Automation



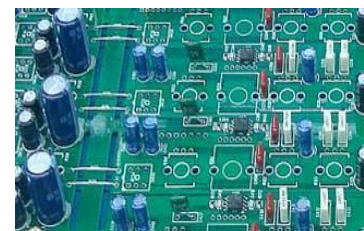
SMT implementation

Board size: 534 x 610mm
 Chip size: min size [01005](#)
 QFP (pitch): 0.3mm
 BGA (pitch): 0.4mm
 CSP (pitch): 0.4mm
 Reflow: Lead free compliant
[Nitrogen process](#)
 Solder Paste:
 SN100C (Sn-Cu-Ni+Ge)
 SAC305 (Sn-Ag-Cu)



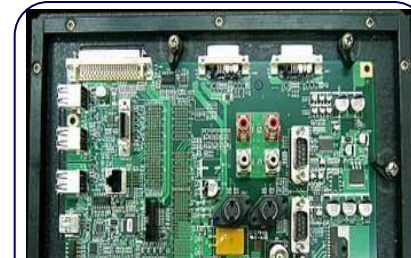
COB implementation

Wire type: Al wire
 Wire size: 0.8-2.0mil
 Bond pad pitch: 68 um
 Bond angle: 30 deg
 Die size: 6X6 to 200X200mil
 Wafer size: 8" max



Discrete implementation

Board size: 450x450mm max
 Radial type: 2.5 / 5.0mm pitch
 Axial type: 5 – 22.5mm pitch



Wave Soldering

Board size: 450mm width max
 Solder: Lead free compliant
 Solder Bar:
 SN100C (Sn-Cu-Ni+Ge)
 SAC305 (Sn-Ag-Cu)

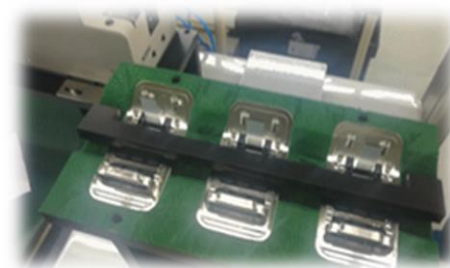
Automation – Intensive Core Processes

Example of some automation equipment

Auto Screwing

Auto screwing assembly on the Overlay Lens of Electronic Locker Lock

- Using self tapping screws
- Screws feeding by vibratory bowl or sword feeder
- Free area: 1mm clearance around the screw
- Tolerance: $\pm 0.05\text{mm}$
- Torque: 0.5kgf – 12.0kgf
- Design all screws with same thread type and locate on same side of work piece



Auto Conformal Coating

Auto conformal coating machine for water proof purpose

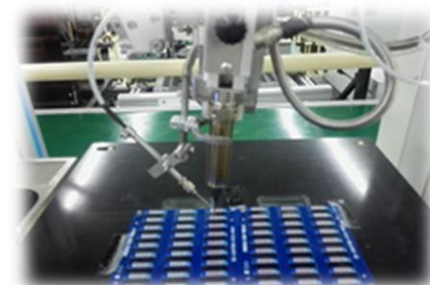
- Accurate coating for area needed $\pm 0.02\text{mm}$
- Programmable for area not needed to coat
- Prevent bubbles and waves by manual coating



Auto Soldering

Auto soldering to replace manual soldering with stable quality

- Reserve 3mm free area to load soldering tips, component height in free area $< 5\text{mm}$
- Tolerance: $\pm 0.02\text{mm}$
- choose components with pitch 0.5mm to prevent solder bridge issues
- design to use same soldering tip type, temperature and angle on one machine



Automation - Precise and Testing

Example of some automation equipment

Laser Soldering

Auto soldering
on microphone

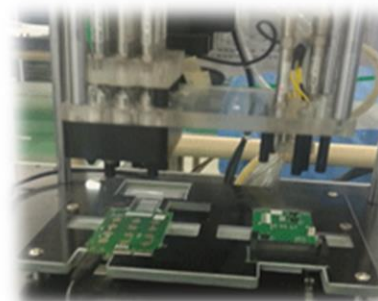
- Laser soldering for microphone
- Array of PCBA 8 x 8
- Soldering temperature is adjustable
- Soldering position fixed by CCD camera



Auto Testing

Auto PCBA
Testing

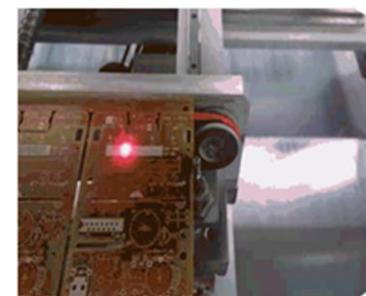
- Assign individual test points (with size > dia0.8mm) , reserve clearance 0.5mm to PCB edge and do not use solder pad of components as test points
- Eliminate the visual check during testing, measure the parameter value in the circuit instead of visual check.



Auto Marking

Auto serial
number (SN)
and barcode
marking on
PCB by laser
marker to
reduce the SN
labels

- Mark serial number and barcode by 1D or 2D (QR-code) format by laser marker
- Reserve a fixed white-ink area on PCB top side with dimension for VTech barcode:
 - a) 32x5mm for 1D barcode
 - b) 5x5mm or 8x8mm for 2D barcode
- No circuit at the top layer within the white ink area
- Reserve 5mm clearance to PCB edge for machine



Quality – “Do it right the first time!”

Quality System



ISO9002

Certificate for
Manufacturing
Control System

1994



ISO14001

Certificate for
Environment
Management
System

2001



ISO9001

Certificate for
Manufacturing
Control System

2002



ISO13485

Certificate for
Medical Devices
(Blood Coagulation
Instrument)

2003



IATF16949

Certificate for
Automotive Products



SA8000

Certificate for
Social
Accountability

2009



OHSAS18001

Certificate for
Occupational Health &
Safety



QC080000

Certificate for
Hazardous Substances
Process Management
System

2015

Regulatory & Directives Compliance / FDA Registered



Medical Device Directive (MDD)
93/42/EEC



MO 169 Reg.

PMDA (Pharmaceuticals & Medical Devices Agency)
MHLW (Ministry of Health Labor & Welfare)



Continues Improvement & Quality Sustainability



20 Black Belt Holders
33 Green Belt Holders



> 1,000 in FY19



**BALANCED
SCORECARD**

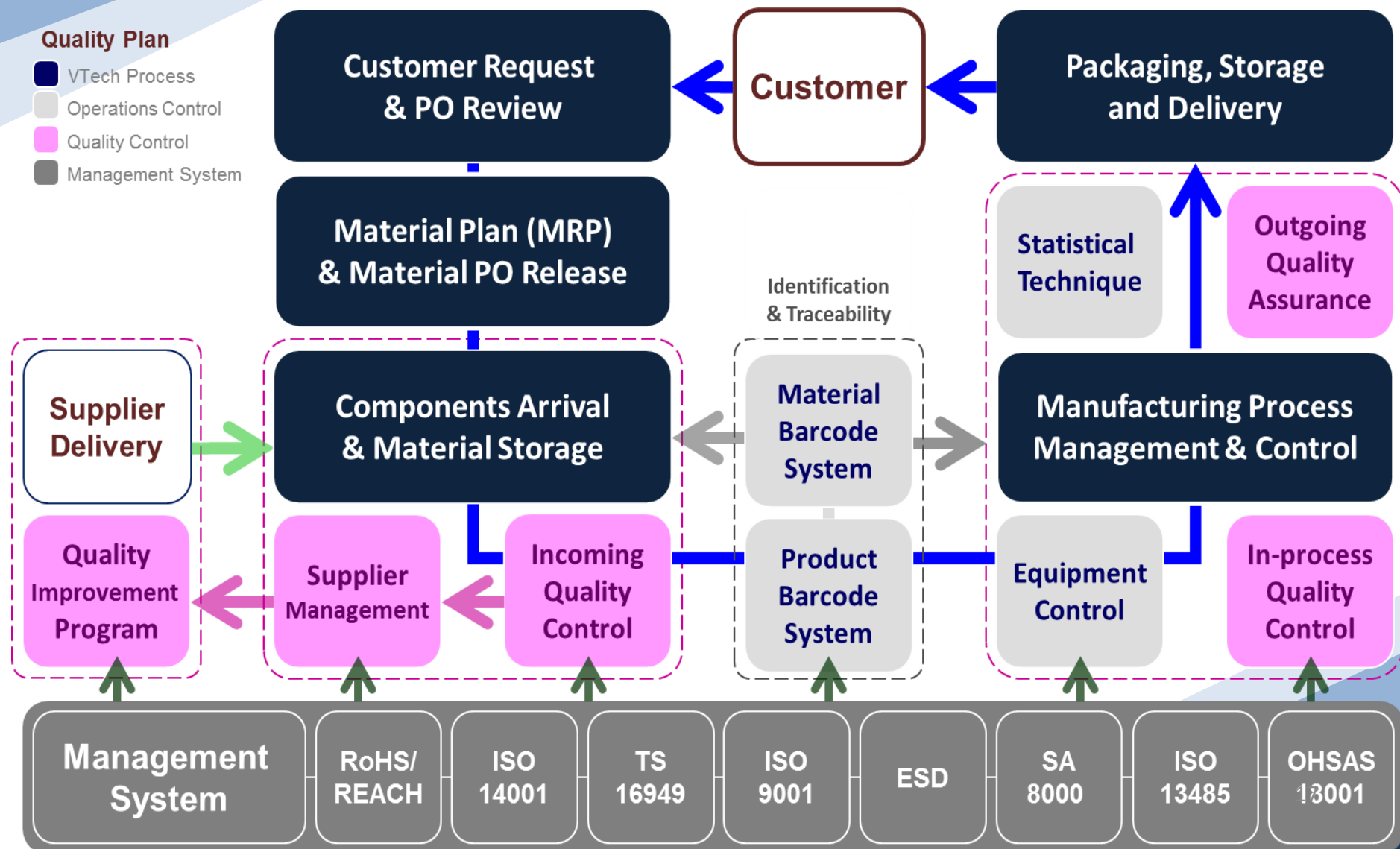


21 CFR 820 (QSR)

CMS Quality Management System

Quality Plan

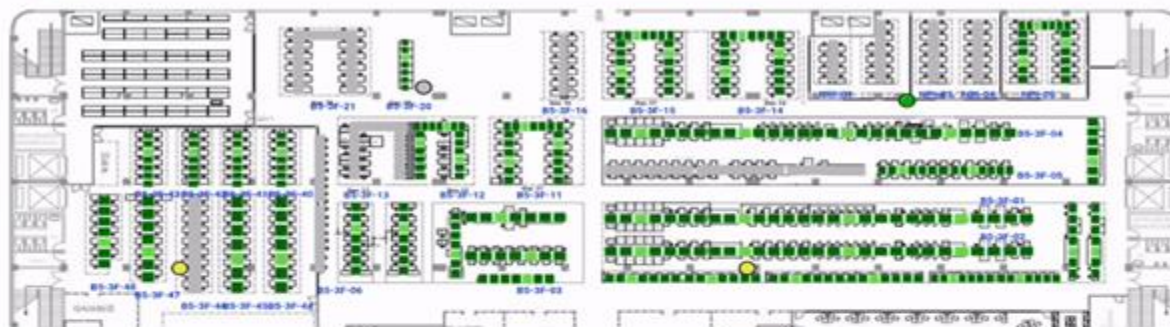
- VTech Process
- Operations Control
- Quality Control
- Management System



Industrie 4.0 Program in CMS

MIS Overview for Admin

🔒 CMS MIS - MFG (Real-time)



B5-3F (SBU 5) Floor Overview

Utilization: (SBU1=37.1% / SBU2=41.6% / SBU4=57.7% / SBU5=36.8% / SBU6=14.3% / SBU8=48.4%)

Notice Board:

SBU View:

Select:

Will Show B8-2F in 20s

1

SBU 1	SBU 4	SBU 6
CRM	FI	INV
MES	NPI	PUR
QES	SC	ST
SBU 2	SBU 5	SBU 8
CRM	FI	INV
MES	NPI	PUR
QES	SC	ST
SBU 3		
CRM	FI	INV
MES	NPI	PUR
QES	SC	ST

Status Legend

Normal	Warning	Alert
Offline	Setup	



Conduct Stage

- Training
- Core team
- Strategy
- Guideline

Setup Stage

- Platform
- Infrastructure
- Project team



Develop Stage

- Application
- LMS
- Sensor/Actuator
- Big data



MIS Stage

- MIS
- Visibility
- EDI/Apps
- Supply Chain



VIC Module

- Fully Visibility
- Robot +X
- Intensification
- Improve OMS



VIC II Develop

- Web services
- Connection
- 5M Flow control



Advanced Management

- Auto decision making
- Auto processing based on information



Y2017: I2.4

Y2018

Y2019

Y2019: I3.0

Y2021

Y2022

Y2023: I3.5

Protection Our Client's Patents and IP



Our Procedures to protect IP

- NDA or General Confidentiality Agreement
- Tightly Controlled Documentation and Copying of Doc's
- Access on an "As needed Basis"
- Continuous Training of our Employees
- Return of all files after the completion of a Project

The Result

- Our Customers and potential Clients are fully protected
- Our manufacturing Buildings as Technology Protection in Projects

High-Tech Client



vtech

Specifications & Manufacturing Drawings

History and Forward Looking

- No History of any IP Violation since our Existence
- Ongoing IP & Patent Awareness Training

Sustainability at VTech

Our sustainability vision is to design, manufacture and supply innovative and high quality products in a manner that minimizes any impact on the environment, while creating sustainable value for our stakeholders and the communities.



Hang Seng Corporate
Sustainability Index
Series Member 2018-2019



FTSE4Good

MSCI



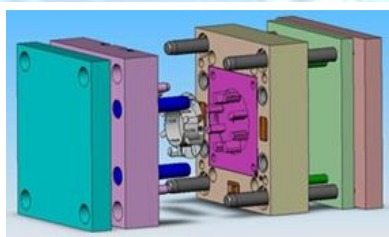
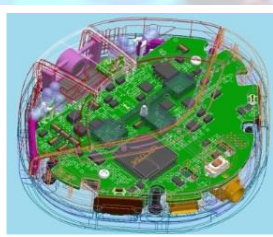
- With our dedicated sustainability resources and efforts, VTech continues to be a constituent member of the **Hang Seng Corporate Sustainability Benchmark Index** with the score of **AA rating**
- VTech Group is also included in **FTSE4Good Global Index4** in FY2019
- We have also received a **rating of AA** in the **MSCI ESG Ratings assessment**.

Engineering & Design Support



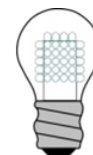
ISO13485

Certificate for
Medical Devices
(Blood Coagulation
Instrument)



R&D Design Services Include

- Product Design, ID Support, Cost-Down Re-design
- Electronics including Hardware & Software Design
- Mechanical, Structural & Assembly Design
- Schematic and PCB Layout Design
- Packaging Design (Gift Box, Clamshell, Export Carton, etc)



Typical Applications and Competence

- HW & SW developments for MCU, MPU, DSP, etc.
- Drivers and Embedded System Applications
- RF, Wireless, Audio, Consumer Electronics, Medical, Health Care, Telecomm, LED Lighting, IOT...etc
- Prototype, Testing and Agency Approval

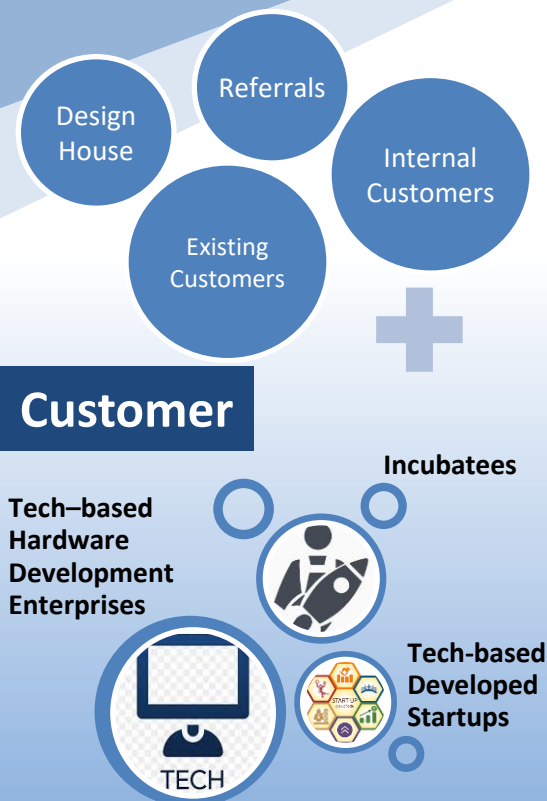
New Product Introduction - NPI

- Design for Manufacturability (DFM)
- Sample Production and Design Verification & Validation
- Selection of Low Cost Components

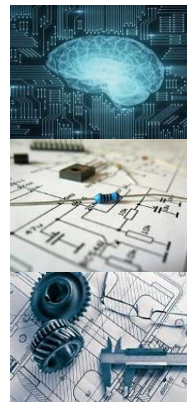
Resources

- In-House Acoustic Room
- Professional Audio Test Lab
- CAD & Simulation Software e.g. ProE, Solidworks, FloEFD
- 50 Engineers & Technicians support design professionally

CMS NPI Service Overview



Innovative Idea and Unique/Patent Technology
Preliminary Schematic Circuitry Design
Draft Mechanical Design Sketches



VTech CMS



Global Supply Chain Market



Metal Shop

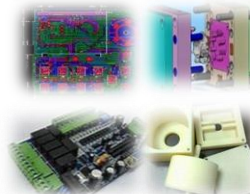


Plastic Shop



PCBA & Assembly Plants (Backup)

NPI Center



DFM/PCB Layout/Mechanical Design Services

PCBA /Hardware samples built



Complete Prototyping Sample/Assembly



Support Value-Engineering, i.e. DFx, Testing, ATE..



Expertise Advise & Mfg Consultation

Overall Budget & Schedule Planning

CUSTOMER DIFFERENCES			
COMPANY	Type	[NPI Centre]	[Factory]
	Size	Start-Up	Established
PRODUCT	Volume	Small to Mid	Mid to Large
	Mix	Super-Low	Mid to High
ORDER	Continuity	Super-High	Mid to High
	Forecast	Discrete	Continuous
DEMAND	Engineer Support	May be	YES
	Mfg Expertise	Super-High	Mid to High
	Quality Level	Super-High	Mid
		Low to Mid	Mid to High

CMS NPI Capability & Service Coverage

Full Prototyping Capability



Prototyping is an essential step in the product development process
 "Prototypes help designers and developers build partial product implementations, which potential end-users or customers use to provide feedback to the development team before full-scale development begins" - Wikipedia



Ideate



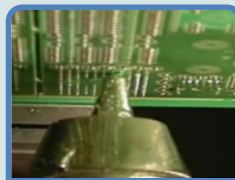
Prototype



Validate



Pick &
Place SMT



Selective
Soldering



Additive
3D Printing



Small-scale
CNC



Workshop



Testing
Laboratory

< SERVICES Coverage in 5 Stages of NPI >



1 Concept

- Feasibility Study
- Evaluate Product Features
- Budget Estimation
- Schedule Planning
- **POC** Proof Of Concept Sampling



2 Design

- ID/ ME / EE / SW Drawing, Schematic, PCB layout
- DFx / DTC
- Component & Material Selection
- **EV** Engineering Verification



3 Development

- Prototyping
- Sampling
- Testing
- **DV** Design Verification
- Soft / Hard tool fabrication
- BOM Generation



4 Validation

- DFMEA
- **PV** Product Validation
- Test-Method Evaluation
- Reliability Testing
- Type Approval
- Cost Finalization



5 Preparation for Manufacturing

- MFG Documentation
- Quality Standard
- Component Procurement
- Test Gears
- MFG Fixture/Automation
- ME Tooling Finalization

Thank You
for
Doing business with VTech