

Malaysia
Survey on
High-end Calibration Business

Executive Summary

February 2013

Japan International Cooperation Agency

MTA Japan Co., Ltd.
International Development Center of Japan
Incorporated

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| JR |
| 13-015 |

Abbreviation

| | |
|------------|---|
| Calibrator | Multifunction Calibrator |
| CTI | Calibration and Testing International Pte. Ltd. Singapore |
| DCR | Department of Commercial Registration |
| DMM | Digital Multimeter |
| DSM | Department of Standards Malaysia |
| E&E | Electric and Electronic |
| F/S | Feasibility Study |
| IDCJ | International Development Center of Japan Incorporated |
| IEC | International Electrotechnical Commission |
| ISO | International Organization for Standardization |
| GUM | Guide to the expression of Uncertainty in Measurement |
| KRISS | Korean Research Institute of Standards and Science |
| MIDA | Malaysian Industrial Development Authority |
| NIMT | National Institute of Metrology Thailand |
| NIST | National Institute of Standards and Technology |
| NMI | National Metrology Institute |
| NML-SIRIM | National Metrology Laboratory-SIRIM |
| NVLAP | National Voluntary Laboratory Accreditation Program |
| QAS | SIRIM QAS International Sdn.Bhd. |
| SIRIM | Standards and Industrial Research Institute of Malaysia |
| SST | Sime SIRIM Technologies |
| UKAS | United Kingdom Accreditation Service |

1. Summary of New Business

NML-SIRIM in Malaysia owns the highest levels of skills in terms of standardization in ASEAN countries, but they are not effectively connected to the industries in Malaysia, which is one of the constraints for strengthening international competitiveness. Malaysia's Third Industrial Master Plan (2006-2020) states "the Government, through SIRIM Berhad, will formulate a standardized quality control management system to ensure that Malaysian E&E companies comply with international standards".

In this new business, a high-end (high quality and precise) calibration laboratory in E&E field to make traceability between NML-SIRIM and industries in Malaysia will be established. Concretely, following service and product will be provided to E & E industries in Malaysia;

- 1) Calibration Service to Reference (Calibrator) which is working as a Reference Standard in E & E industries in Malaysia.
- 2) Sell automated calibration software for Measurement Equipment (Digital Multimeter, DMM) which is working as production line measurement equipment in E & E industries.

To promote this business, the brand name of SIRIM Berhad and NML-SIRIM will be utilized effectively since they are trusted by E & E industries in Malaysia. By using their brand name, it is expected that market would recognize the new service and product (software) as "**De Facto Standard**" in Malaysia and ASEAN countries quickly. CTI, a brother company of MTA Japan in Singapore, has already developed necessary equipment and software, which are ready to be used to start up this business.

To elaborate the business plan, the most crucial and important factor is an estimation of "number of Calibrators" in Malaysia and ASEAN countries. During the F/S, the existence of 340 Calibrators in Malaysia (bottom line) was confirmed. The information has been provided by Fluke Corp (Calibrator manufacturer in USA) sales agent in Malaysia. However, an optimistic estimation of number of Calibrators in Malaysia is 1,000. It is based on the number of Japanese and American E & E manufacturing companies in Malaysia. Also, the existence of 5,600 Calibrators in ASEAN market has been confirmed based on the information obtained from Fluke Corp Singapore (Asian H.Q.). The business plan in this Report is elaborated based on these confirmed information.

2. Background of New Business

Most E & E and automotive industries, including E & E parts suppliers, have obtained ISO 9000

(quality system management certification) to make sure their quality and safety. The number of companies certified by ISO 9000 is over 800,000 in the world. To further strengthen competitiveness, companies are now working more than ISO 9000 by demonstrating their conformance to the ISO rule for the measurement equipment management accuracy in their testing and production line. In other words, they orient to demonstrate their conformance on technical credibility of measurement equipment they are using.

Large multinational companies hold “in-house laboratories” to make sure the traceability of their measurement equipment to NMIs in each country. ISO/IEC 17025 is an ISO standard which govern the rules for testing and calibration laboratories, including “in-house laboratories”. In each country, accreditation bodies have been established, and network among such accreditation bodies and accredited calibration and testing laboratories is becoming strong to avoid duplicated testing and calibration in export / import countries. In the global market, mutual recognition among calibration and testing laboratories are advancing, and the credibility of such “in-house laboratories” and professional calibration / testing laboratories is becoming important to decrease non-tariff barriers.

JICA has supported to develop and up-grade NMIs, and NML-SIRIM in Malaysia was one of the important counterparts in Malaysia during 1980 and 2000. JICA provided technical assistance to NML-SIRIM for about 10 years, and NML-SIRIM has become the most credible NMI in ASEAN countries. It is seen as “an equivalent NMI with Europe and U.S.A.

Next important issue shall be **improvement and up-grading of “technical levels” and “credibility” of accredited calibration laboratories** which work as an intermediary between NMIs and industries. In Malaysia, there are 59 accredited calibration laboratories. In terms of “calibration”, the most difficult and important issue is “**to calibrate Reference Standards**” which work as “**intermediary**” between “**National Standards**” and “**Measurement Equipment**” used in industries.

Not only in Malaysia but also in other ASEAN countries, almost all the accredited calibration laboratories are working to calibrate “**measurement equipment**” without having capability to calibrate their “**Reference Standards**” by themselves. They trust the external calibration of foreign manufacturers blindly or have to tolerate extraordinary long waiting time by NMIs in each country due to manual based calibration. NMIs in ASEAN do not want to spend too long time to the calibration of Reference Standards manually and practically they do not have technology to calibrate multiple points automatically. So they calibrate only a few calibration points as formality.

Fluke USA, a foreign manufacturer of Calibrator, has dominated the calibration business of

Calibrator. ISO/IEC is recommending the calibration by third party professional calibration laboratories. DMM calibration has been done manually in limited calibration points, which takes a long time without correct uncertainty evaluation. By using the automated calibration software, calibration will be quicker (from one to two weeks to less than one day). Calibration points will be increased and the quality of calibration will become more precise as it will automatically generate an uncertainty budget table. These are all required by ISO/IEC 17025.

3. Geographical Business Areas

(1) Business promotion area

Business promotion area of this New Business shall be as follows;

Country : Malaysia
Area : State of Selangor, Penang and Johor
Location of Laboratory: Sepang, Selangor

(2) Reasons to select City and Area

- Near industrial parks where many Japanese and American companies invested.
- Near E & E industries companies which need this new service and product
- Accumulation of E & E companies, which are orienting to Research and Development (not orienting cheap and simple labor).

Based on above background, Malaysia was selected as the first target.

In Malaysia, there are thick accumulations of E & E companies in following states.

- State of Johor Nearby Singapore
- State of Selangor Nearby Kuala Lumpur and thick accumulation of E & E companies.
- State of Penang Thick investment by American E & E companies.

As for the location of laboratory, City of Sepang was selected by following reasons.

- Nearby customers
- Nearby counterpart SIRIM
- Nearby NML-SIRIM which is a Traceability Provider for New Business.
- There is an incubation office in NML site.
- Nearby international airport and convenient with ASEAN deals.

4. Basic Framework of Business Plan

(1) Target market

The following markets have been identified as the target of New Business.

- Japanese and American companies in industrial parks, mainly in the selected states.
- Accredited testing laboratories.
- Accredited calibration laboratories.
- Local companies in E & E industries.

(2) Technical features of new service and product

As mentioned before, the new business will primarily consist of the following two services.

- Provide calibration service to Reference Standards in E & E industries, starting from the calibration of Calibrator.
- Sell DMM automated calibration software, which links between Calibrator and DMM.
DMM is very popular measurement equipment used in the production line in E & E industries by large number (usually over 100 DMM in one factory).

Calibration of Calibrator

New system and software have been developed to calibrate full functions of Calibrator (DC Voltage, AC Voltage, DC Current, AC Current and Resistance) with uncertainty budget tables of all the selected calibration points (around 300 points) based on ISO-GUM. MTA has also developed new system to calibrate DMM with the traceability of calibrated Calibrator so that calibrated DMM (it is called as Golden DMM) can be used as a Reference to calibrate Calibrator very quickly.

It is expected to reduce the term of calibration from over 1 month to less than one day.

Sale of DMM automated calibration software

New Business shall provide the results of calibration by electronic base (USB memory or CD-ROM), and users of the software can link such electronic data to the software so that users can easily manage the automated calibration of their DMM.

Technical feature of DMM automated software can be summarized as follows;

- Users can select various models of Calibrator and DMM and easily operate automated calibration by using software program.
- Software has a function of database so that users can manage the administrative data of

DMM and Calibrator, and they can extract past data to third parties in any moment.

- Users can generate uncertainty budget tables based on ISO-GUM, and they can reduce the burden to generate such budget tables of all the selected calibration points.

In order to export to Europe and U.S.A., they need calibration results and uncertainty budget tables of their DMM.

(3) Competitors

Theoretically, the following three categories could become as competitors.

- 1) Fluke Corporation, which is a manufacturer of Calibrator
- 2) New competitors, such as Korean calibration laboratories
- 3) Local accredited calibration laboratories

First category, Fluke Corporation's priority is to sell Calibrator, not to calibrate Calibrator, according to the Director of Fluke Singapore (Asia H.Q). Therefore, we cannot say that Fluke Corporation is a real competitor for New Business. In addition to that, they can provide only paper based calibration results, and it cannot be used as a Reference Data to calibrate the DMM automatically. As for the second category, Korean calibration laboratories, this risk is considered quite low simply because they do not have such high-level calibration technique. In terms of the third category, "local accredited calibration laboratories", companies like SST and NML-SIRIM are working manually to calibrate Calibrator, and it takes a long time. In addition, SST and NML-SIRIM will work as parent companies for New Business so that no risk is seen in this category. In summary, it is not likely that any competitor will appear in the same field within 5 years after starting New Business.

(4) Strong points of New Business

From the viewpoint of Customers in industries, strong points of New Business can be summarized as follows;

Calibrator Calibration Service

- Speed up of calibration.
- Calibration of multiple calibration points.
- Provide calibration result by electronic base, which can be linked easily to the DMM automated calibration software.

DMM Automated Calibration Software Sale

- Can manage automated calibration easily. Calibration shall be more precise than manual

base, and they can reduce the calibration term dramatically.

- Uncertainty evaluation based on ISO-GUM is managed by an Excel format. This new software can support the uncertainty evaluation in line with automated calibration by one simple procedure.
- Can clearly declare the Traceability to NML-SIRIM.
- Possible calibration points shall be increased by over 10 times so that users can analyze the linearity within the range.
- Can reduce the burden of administration of Calibrator and DMM by model and serial number, using Database functions.

(5) Business Target

In Malaysia, SIRIM and NML-SIRIM have strong credibility among industrial companies. It is likely that companies and laboratories will use the new service and product if they are promoted by SIRIM and/or NML-SIRIM. Then, the most important and crucial factor for the business plan shall be “number of Calibrators existing in Malaysia and ASEAN”.

In ASEAN region, the network among accredited calibration / testing laboratories are deepening and expanding. In Malaysia, there are over 50 calibration / testing laboratories in electric field. In Thailand, there are 91 accredited calibration laboratories in electric field. Almost 100 percent of those accredited calibration laboratories conduct the calibration of measurement equipment using simple technique.

They request the calibration of their Calibrator to a manufacturer, Fluke and/or local NMIs. It takes long time and high cost so that New Business will alleviate their burden. Once this new business starts in Malaysia, E & E industries will know the benefits to use the new system and software and such information will penetrate into the market quickly.

(6) Business expansion scenario

a. Short term scenario (In One Year)

Confirmed information about the number of Calibrator is as follows;

- There are 5,600 Calibrators in ASEAN market. (Confirmed by Fluke Singapore Asia H.Q.) .
- There are 340 Calibrators in Malaysia as bottom line (Confirmed by Fluke Agent in Malaysia) .
- There could be about 900 - 1,000 Calibrators in Malaysia (Estimated by the number of Japanese and American companies) .

To establish “**De Facto Standard**” in Malaysia by using brand name of SIRIM Berhad in short

term shall be targeted. So, the calibration of calibrators at and sale of software to around 30 calibration laboratories in electric field in Malaysia shall be targeted first.

b. Mid Term - Long Term (2~3 years after beginning of new business)

After having the status of “**De Fact Standard**” in Malaysia, stepping into Thai market shall start in 2014 since surface transportation is available between Thailand and Malaysia.

Following steps will be applied to have smooth logistic.

- 1) Bring Calibrators to Malaysia to calibrate and send them back to Thailand by using Carnet System (tax free treatment).
- 2) After confirming certain level of demand in Thailand, possibility to establish similar laboratory in Bangkok will be studied.

First year in Thailand would be focused to penetrate in the accredited laboratories’ market since there are 91 accredited calibration laboratories.

c. Long term plan (After the third year from the beginning of new business)

After having steady operation in Malaysia and Thailand, stepping into the other ASEAN market like Philippines, Vietnam and Indonesia will start from the third year. To deal with those countries, airfreight and custom clearance logistic know-how will be needed. To simplify the business plan, only the business in the Philippine market from third year will be considered.

In ASEAN market, multinational companies’ investment is concentrated in certain “industrial parks” and / or Free Trade Zones so that marketing will be efficient.

(7) Structure of New Business

a. Development of new service and new product

MTA’s brother company in Singapore, CTI, has already developed equipment, system and software to be used for New Business. New Business can be started at any moment.

To start this New Business, a conservative policy (commission based software sale) would be taken. So profitability will be low until 2017. In 2018, after having 5 years’ experience, however, the new company will be more aggressive.

b. Equipment purchase

Majority of equipment shall be purchased from CTI. The remaining equipment would be purchased mainly from Fluke Corp. Such equipment is not for general use but they will be used

to facilitate automated calibration among “**national standards**”, “**reference standards**” and “**industrial used measurement equipment**” with clear traceability to NMIs..

c. Sales Plan

A business plan is elaborated by focusing on the following two main businesses, although there are some other services and products.

- Calibrator calibration service
- DMM automated calibration software sale

To make a sales plan, a “**base line plan**” is prepared at first. During the F/S Study, it was found that laboratories and companies have, in principle, two Calibrators since they feel a risk of technical deficiency of one of their Calibrators and/or the absence of one of their Calibrator for external calibration. In spite of this observation, to be a conservative side, it is assumed that there is one Calibrator in each laboratory / company in the base line plan.

Basic sales strategy in each country would be as follows;

*** Malaysia**

The business plan is prepared based on the number of Calibrators (**340**) confirmed in the F/S. So, the ceiling of 340 in the sales plan of Malaysia is fixed.

*** Thailand and Philippines**

In Thailand, there are 91 accredited calibration laboratories in electric field. In addition to the accredited laboratories, there are thick investments to electric, electronic and automotive sectors by multinational companies. In the case of Thailand, the ceiling of **450** is fixed from the technical point of view.

Actually, manual base calibration for Calibrator takes more than one month either in Fluke Corporation and/or NMIs. But the new system and software takes less than one day. New company will be able to calibrate 10 Calibrators in a week and 40 in a month per line. An annual maximum number to Calibrators calibrated by one line shall be 480. Taking some holiday seasons off, **450** could be set as a technical ceiling by one line. In New Business, an assumption to have two (2) calibration lines in a laboratory is set. New company will use one line for Thailand.

Another line will be used for Malaysia and Philippines. Once **340** for Malaysian ceiling are set, **100** can be set as a ceiling to Philippines. Having ceilings as above, total number of Calibrator calibrated shall be **890**. Once new company reaches the ceiling (890), an alternative to add

another line would be studied but it would not be included in this 10 years plan.

5. Business Plan

(1) Management Structure

Basic policy regarding management structure to start up the business shall be;

- Start with a small professional team to be efficient and effective.
- Utilize the system and software already developed by CTI to build technical base quickly.

Originally, MTA and IDCJ thought they would take an active role in the new company but both MTA and IDCJ decided to take a supporting role for SIRIM Berhad and NML-SIRIM since their brand name value is strong in Malaysia.

In Malaysia, the important factor of business success shall be an establishment of good relationship with Bumiputra. So, both MTA and IDCJ decided to invest only minority portion, and SIRIM Berhad will take more active role to promote in Malaysia. During the F/S period, SIRIM Berhad proposed this idea. If SIRIM Berhad agrees, both MTA and IDCJ will send one Director to support the New Business.

(2) Corporate Structure

SIRIM Berhad is an independent corporate under Malaysian Government's regime (100 percent of shares are held by Ministry of Finance). SST, a subsidiary of SIRIM, is a pure private company (non-listed). The new company will be established as a subsidiary of SST. At present 50 percent of SST's shares are held by Sime Darby (Sime Darby Energy), and it will be bought back by SIRIM Berhad during first quarter of 2013. Therefore, SST's new direction will be decided by SIRIM Berhad.

(3) Investment Plan

Large investment to equipment and laboratory is not expected since the business will be conducted in a limited area using very advanced knowledge of professionals.

New Business will concentrate to the calibration of Calibrator and sales of DMM automated software without paying attention to other normal calibration of general measurement equipment since SST will assume such calibration service. By having this structure, synergy between SST and new company will be developed. **Investment to the equipment** shall be as follows;

Table 1 Investment to the Equipment

| | | (Unit: Thousand Yen) | | |
|-------------------------|------------------------------------|----------------------|------------|----------------|
| Equipment | Function | Unit | Unit price | Total |
| CTI-R005 | Resistance calibration | 3 | 2,500 | 7,500 |
| CTI-V002 | Calibrator full calibration | 4 | 25,700 | 102,800 |
| CTI-CPS-DMM | DMM full calibration | 4 | 2,700 | 10,800 |
| CTI-CPS-DMM-5790 | To make golden DMM ACV | 4 | 1,000 | 4,000 |
| Shunt Resistors | To calibrate DCI/ ACI | 28 | 100 | 2,800 |
| Golden DMM | To calibrate Calibrator quickly | 4 | 3,000 | 12,000 |
| Fluke 792A | DC-AC Transfer Standard | 1 | 12,000 | 12,000 |
| Proble. Calibe | To connect Calibrator & DMM | | | 15,000 |
| Calibrator 5720A/ 5500A | To simulate Calibrator calibration | 2 | | 16,000 |
| DMM | To simulate DMM calibration | | | 5,000 |
| 792A Auto Changer | To calibrate during night ACV | 1 | 4,000 | 4,000 |
| Others | Reserve | | | 28,100 |
| Total | | | | 220,000 |

Depreciation will follow the rule of Malaysia: 20 percent in first year and the rest shall have equal depreciation in 9 years (total 10 years). Software portion shall have depreciation in three (3) years by equal amount.

(4) Staffs

The staffs of the new company should be limited to the professionals who know very well about the New Business. For administration, there will be one president, one manager for business promotion and two business promotion staffs. On technical side, the new company should have one manager for calibration and three operators for calibration. The other administrative work shall be commissioned to SST with administrative commission fee.

Personnel costs are projected to be as follows.

Table 2 Personnel cost (2013-2022)

| | | (Unit: Thousand Yen) | | | | | | | | |
|--------------------------|---------------|----------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Class | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| President | 3,500 | 4,550 | 4,550 | 4,550 | 4,550 | 4,550 | 4,550 | 4,550 | 4,550 | 4,550 |
| Sales Manager | 3,000 | 3,900 | 3,900 | 3,900 | 3,900 | 3,900 | 3,900 | 3,900 | 3,900 | 3,900 |
| Sales staffs (2) | 3,600 | 5,200 | 5,200 | 5,200 | 5,200 | 5,200 | 5,200 | 5,200 | 5,200 | 5,200 |
| Calibration Manager | 4,000 | 5,200 | 5,200 | 5,200 | 5,200 | 5,200 | 5,200 | 5,200 | 5,200 | 5,200 |
| Calibration Operators(3) | 6,000 | 7,800 | 7,800 | 7,800 | 7,800 | 7,800 | 7,800 | 7,800 | 7,800 | 7,800 |
| Total | 20,100 | 26,650 | 26,650 | 26,650 | 26,650 | 26,650 | 26,650 | 26,650 | 26,650 | 26,650 |

(5) Administrative cost other than personnel

Regarding administration cost other than personnel cost, it is estimated as follows. It is assumed that office rent, car rental administration fee and the fee for lawyers and accountants will remain the same while the fee for external commissions and reserves shall increase by 10 percent each year.

Table 3 Administrative cost

| | (Unit: Thousand Yen) | | | | | | | | | |
|----------------------|----------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| Office Rent | 4,500 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 |
| Car Rental | 5,400 | 7,200 | 7,200 | 7,200 | 7,200 | 7,200 | 7,200 | 7,200 | 7,200 | 7,200 |
| Administraiton fee | 2,250 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| Lawyer, accountant | 4,500 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 |
| External commissions | 4,500 | 6,600 | 7,260 | 7,986 | 8,785 | 9,664 | 10,630 | 11,693 | 12,862 | 14,148 |
| Reserve | 7,500 | 11,000 | 12,100 | 13,310 | 14,641 | 16,105 | 17,716 | 19,488 | 21,437 | 23,581 |
| Total | 28,650 | 39,800 | 41,560 | 43,496 | 45,626 | 47,969 | 50,546 | 53,381 | 56,499 | 59,929 |

(6) Financing

During 2013, it is expected to obtain the finance from the following sources.

Table 4 Financing

| | | (Unit: Thousand Yen) | |
|--------------|--------------------------------|----------------------|----------|
| Class | Organization | Amount | Cost |
| Shares | SIRIM Bhd. | 50,000 | |
| | MTA Japan | 25,000 | |
| | IDCJ | 25,000 | |
| Loan | Long Term Loan | 250,000 | 5% P. A. |
| Loan | Local bank finance (roll over) | 100,000 | 3% P. A. |
| Total | | 450,000 | |

The long-term loan cost shall include interest payment and swap cost to hedge. Last line's local bank finance means short-term working capital funding by rolling over every year.

(7) Target numbers

1) 2013-2017

Table 5 Number of Calibrator calibration during first 5 years (2013 - 2017)

| | | | (Unit: Number of Calibrator) | | | | |
|-----------------------|--------------------------|----------|------------------------------|------------|------------|------------|------------|
| | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| Malaysia | Accredited laboratories | New | 25 | 25 | | | |
| | | Repeater | | 25 | 50 | 50 | 50 |
| | Companies (North) | New | 10 | 10 | 10 | 13 | 17 |
| | | Repeater | | 10 | 20 | 30 | 43 |
| | Companies (Selangor) | New | 20 | 20 | 20 | 26 | 34 |
| | | Repeater | | 20 | 40 | 60 | 86 |
| Companies (South) | New | 8 | 8 | 8 | 10 | 13 | |
| | Repeater | | 8 | 16 | 24 | 34 | |
| Malaysia Total | | | 63 | 126 | 164 | 213 | 277 |
| Thailand | Accredited laboratories | New | | 45 | 45 | | |
| | | Repeater | | | 45 | 90 | 90 |
| | Companies | New | | | | 70 | 70 |
| | | Repeater | | | | | 70 |
| Thailand Total | | | 0 | 45 | 90 | 160 | 230 |
| Philippines | Companies & Labos | New | | | 17 | 17 | 17 |
| | | Repeater | | | | 17 | 34 |
| | Philippines Total | | 0 | 0 | 17 | 34 | 51 |
| Grand Total | | | 63 | 171 | 271 | 407 | 558 |

Projections for the revenue side are explained. The number of Calibrator calibration and its revenue is shown in the table.

Calibration fee is set at Yen 200,000. It is slightly cheaper than the fee in Japan. During F/S, it was confirmed that Malaysian accredited laboratories are paying US\$ 4,000 to Fluke Corporation. It is almost half of the fee, and it shall be beneficial for accredited calibration laboratories and multinational companies.

Table 6 Revenue from calibration of calibrators (2013-2022)

| | Unit | 2013 | 2014 | 2015 | 2016 | 2017 |
|------------------------|--------------|--------|--------|--------|--------|---------|
| Number of Calibrator | Number | 63 | 171 | 271 | 407 | 558 |
| Unit calibration fee | Thousand Yen | 200 | 200 | 200 | 200 | 200 |
| Total revenue forecast | Thousand Yen | 12,600 | 34,200 | 54,200 | 81,400 | 111,600 |

Regarding DMM software sale, revenue in the first 5 years will accrue from sales commission (15 percent of total sales). The following is a breakdown of DMM software by function.

Table 7 Prices for DMM software by function

| | | (Unit: Thousand Yen) |
|---------------------------------|-------|----------------------|
| Funcion | Price | |
| Controller (installed & tested) | | 200 |
| DC Voltage | | 700 |
| AC Voltage | | 800 |
| DC Current | | 300 |
| AC Current | | 400 |
| Resistance | | 300 |
| Total | | 2,700 |

To have a conservative projection, it is assumed that customers purchase only Controller, DC Voltage and Resistance. Then the unit commission fee is set at Yen 180,000¹. The following is an estimation of DMM software sales commission during the first 5 years.

Table 8 Revenue from DMM software sales

| | Unit | 2013 | 2014 | 2015 | 2016 | 2017 | Total |
|----------------------------|--------------|--------|--------|--------|--------|--------|-------|
| Malaysia New | Number | 63 | 63 | 38 | 49 | 64 | 277 |
| Thailand New | Number | 0 | 45 | 45 | 70 | 70 | 230 |
| Philippines New | Number | 0 | 0 | 17 | 17 | 17 | 51 |
| Total | Number | 63 | 108 | 100 | 136 | 151 | 558 |
| Fee Unt | Thousand Yen | 180 | 180 | 180 | 180 | 180 | |
| DMM Software sales revenue | Thousand Yen | 11,340 | 19,440 | 18,000 | 24,480 | 27,180 | |

2) 2018-2022

As for Calibrator calibration, the technical ceiling was established as described before: 450 for

¹ Yen 1,200,000 (200,000+700,000+300,000) x 15 percent= Yen 180,000

Thailand, 340 for Malaysia and 100 for Philippines. With the ceiling, number of Calibrator calibration shall be as follows.

Table 9 Number of Calibrator calibration during 2018-2022

| | | (Unit: Number of Calibrator) | | | | |
|-------------|-------------------|------------------------------|------|------|------|------|
| | | 2018 | 2019 | 2020 | 2021 | 2022 |
| Malaysia | New | 63 | | | | |
| | Repeater | 277 | 340 | 340 | 340 | 340 |
| | Malaysia Total | 340 | 340 | 340 | 340 | 340 |
| Thailand | New | 81 | 93 | 46 | | |
| | Repeater | 230 | 311 | 404 | 450 | 450 |
| | Thailand Total | 311 | 404 | 450 | 450 | 450 |
| Philippines | New | 20 | 23 | 7 | | |
| | Repeater | 51 | 71 | 93 | 100 | 100 |
| | Philippines Total | 71 | 94 | 100 | 100 | 100 |
| Total | | 722 | 838 | 890 | 890 | 890 |

For the latter half, an average price of Calibrator calibration is expected to increase by 10 percent every year. This can be achieved by adding values in the service to customers, such as providing drift of each Calibrator based on past 5 years data, temperature co-efficiency so that users can reduce the level of uncertainty. Also, graphic tolerance check will be provided for the customers.

Table 10 Revenue from calibration of calibrators (2013-2022)

| | | (Unit: Thousand Yen) | | | | |
|----------------------|--------------|----------------------|---------|---------|---------|---------|
| Unit | | 2018 | 2019 | 2020 | 2021 | 2022 |
| Number of Calibrator | Number | 722 | 838 | 890 | 890 | 890 |
| Unit Price | Thousand Yen | 220 | 242 | 266 | 293 | 322 |
| Revenue Forecast | Thousand Yen | 158,840 | 202,796 | 236,918 | 260,610 | 286,671 |

As for the revenue from DMM Software sales, new company will purchase the sales right to DMM software after 5 years and have an aggressive sales policy from 2018. The projection is based on the number of New Customers. The unit price is set at Yen 1,950,000 which is the average of Full functions (Yen 2,700,000) and DC Voltage + Resistance (Yen 1,200,000). As we can see, big return is expected from 2018.

Table 11 Revenue from DMM software sales

| Unit | | 2018 | 2019 | 2020 | 2021 | 2022 | Total |
|-------------------|--------------|---------|---------|---------|-------|-------|-------|
| Malaysia New | Number | 63 | 0 | 0 | 0 | 0 | 63 |
| Thailand New | Number | 81 | 93 | 46 | 0 | 0 | 220 |
| Philippines New | Number | 20 | 23 | 7 | 0 | 0 | 50 |
| Total | Number | 164 | 116 | 53 | 0 | 0 | 333 |
| Unit price | Thousand Yen | 1,950 | 1,950 | 1,950 | 1,950 | 1,950 | |
| DMM Software sale | Thousand Yen | 319,800 | 226,200 | 103,350 | 0 | 0 | |

Based on above sales assumption, an estimated profit and loss statement has been prepared.

Table 12 Estimated Profit and Loss Statement for the New Business

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|----------------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|----------------|----------------|
| | (Unit: Thousand Yen) | | | | | | | | | |
| Revenue | | | | | | | | | | |
| Calibrator Calibration | | | | | | | | | | |
| Number of calibrators | 63 | 171 | 271 | 407 | 558 | 722 | 838 | 890 | 890 | 890 |
| Unit price of calibration | 200 | 200 | 200 | 200 | 200 | 220 | 242 | 266 | 293 | 322 |
| Revenue from calibrator calibration | 12,600 | 34,200 | 54,200 | 81,400 | 111,600 | 158,840 | 202,796 | 236,918 | 260,610 | 286,671 |
| DMM Software Sale | | | | | | | | | | |
| Number of new customers | 63 | 108 | 100 | 136 | 151 | 164 | 116 | 53 | 0 | 0 |
| DMM software sale commission and amount | 180 | 180 | 180 | 180 | 180 | 1,950 | 1,950 | 1,950 | 1,950 | 1,950 |
| Revenue from DMM software sales | 11,340 | 19,440 | 18,000 | 24,480 | 27,180 | 319,800 | 226,200 | 103,350 | 0 | 0 |
| Total Revenue | 23,940 | 53,640 | 72,200 | 105,880 | 138,780 | 478,640 | 428,996 | 340,268 | 260,610 | 286,671 |
| Expenditure | | | | | | | | | | |
| Personnel | 20,100 | 26,650 | 26,650 | 26,650 | 26,650 | 26,650 | 26,650 | 26,650 | 26,650 | 26,650 |
| Office rent | 4,500 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 |
| Car rental | 5,400 | 7,200 | 7,200 | 7,200 | 7,200 | 7,200 | 7,200 | 7,200 | 7,200 | 7,200 |
| Administrative commission fee to SST | 2,250 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| Lawyer and accountants | 4,500 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 | 6,000 |
| External services | 4,500 | 6,600 | 7,260 | 7,986 | 8,785 | 9,664 | 10,630 | 11,693 | 12,862 | 14,148 |
| General reserve | 7,500 | 11,000 | 12,100 | 13,310 | 14,641 | 16,105 | 17,716 | 19,488 | 21,437 | 23,581 |
| Depreciation | 47,573 | 26,107 | 26,107 | 17,173 | 17,173 | 17,173 | 17,173 | 17,173 | 17,173 | 17,173 |
| Software sales right purchase | | | | | | 70,000 | 70,000 | 60,000 | | |
| Interest payment | 7,875 | 15,500 | 15,500 | 15,500 | 15,500 | 15,500 | 13,000 | 10,500 | 8,000 | 5,500 |
| Total Expenditure | 104,198 | 108,057 | 109,817 | 102,819 | 104,949 | 177,292 | 177,369 | 167,704 | 108,322 | 109,252 |
| Profit/Loss before tax | -80,258 | -54,417 | -37,617 | 3,061 | 33,831 | 301,348 | 251,627 | 172,564 | 152,287 | 177,418 |
| Accumulated profit/loss | | -134,675 | -172,292 | -169,231 | -135,400 | 165,947 | 417,574 | 590,138 | 742,425 | 919,844 |
| Initial Investment | | | | | | | | | | |
| Equity investment by SIRIM Berhad | 50,000 | | | | | | | | | |
| Equity investment by MTA | 25,000 | | | | | | | | | |
| Equity investment by IDCJ | 25,000 | | | | | | | | | |
| Long Term Loan | 250,000 | | | | | | | | | |
| Short Term Loan | 100,000 | | | | | | | | | |
| Total Initial Investment | 450,000 | | | | | | | | | |

In overall business plan, the following trend can be pointed out.

- New Business shall have very conservative policy by working “commissioned-based DMM software sale” until 2017, and annual loss will continue until 2015. Thanks to increased number of Calibrator calibration, it will turn to black in 2016.
- By taking aggressive policy from 2018, the new company will have large profit from 2018. This business is considered as a Good Project with Government initiatives.
- New Company will need to finish the development of other software, such as mass, temperature, and dimension until 2018 with the collaboration of NML-SIRIM. If not, the revenue sources will be limited afterwards.
- The key for success (stable management) of the new business will be whether “Long Term Finance” can be secured, especially in the first 5 years.

10 Years’ monthly cash flow projection has been prepared, and the feasibility of the cash flow projection was confirmed.

6. Risk analysis

The project risk was analyzed with the following matrix. The analysis was done by three levels (L=low, M=moderate and H=high).

Table 13 Risk Analyses

| Risk Issue | Content of Risk | Level | Counter Plan |
|-----------------------------------|---|-------|---|
| (1) Country Risk | | | |
| a. Macro economy | Inflation Risk | L | |
| | Exchange rate risk | L ~ M | We can hedge in swap market. |
| | Interest rate increase | L | We can hedge in offshore market. |
| b. Political Risk | Administrative Regime Change | L | |
| | Nationalization Risk | L | |
| | Conflict of Interest | L | |
| c. Legal and Institutional change | Policy change of Department of Standards Malaysia | L | We can demonstrate by data. |
| | Other legal, institutional risk | L | |
| d. Social Risk | Environmental Risk | L | Our business is environmental friendly. |
| | Local claims | L | |
| | Riot/ Labor Union | L | Small size presence. |
| (2) Commercial Risk | | | |
| a. Market Risk | Demand Risk | L | Stable demand for Reference Standards |
| | Calibration price risk | L | Stable for Reference Standard |
| | Technical level confidence risk | L | Can demonstrate by Data |
| b. Sponsor, partner risk | Non-execution of contracts among sponsors, partners | L | We should trust SIRIM Berhad |
| c. Supply Chain Risk | Non delivery, non-operation of necessary equipment | L | Only one time investment in the initial stage |
| d. Finance | JICA/ IDCJ etc | L~M | We need to prepare some alternatives. |
| e. Construction Risk | Risk to construct laboratory | L | We can use incubator office. |
| f. Maintenance Risk | Infrastructure of water, energy | L | We can use incubator office. |
| | Operation Cost Risk | L | Small size investment |
| | Equipment become too old | L | Reference Standard shall be used for a long term. |
| | Technical innovation risk | L | Our technology for Traceability assurance itself is quite innovative. |

7. Action Plan to start up New Business

The summary of the issues raised during F/S period is as follows. The issues to be decided by SIRIM Berhad are highlighted.

Table 14 Issues finished during F/S period and issues to be cleared to start up

| F/S Issue | Result of F/S | Necessary issue for Action Plan |
|---|--|--|
| Objective of New Business | Clearly set 1) calibration of Calibrator and 2) DMM automated software sale | None |
| Business Area | First target shall be Malaysia (Penang, Selangor and Johor). Then Thailand and the Philippines. | None |
| Target category of customers | 1. Multinational companies in industrial parks which calibrate Calibrators in USA or Europe. 2. Local accredited laboratories. 3. Accredited laboratories and multinational companies in ASEAN | None |
| Technical feature of new service/ product | They have been identified and agreed. | None |
| Field of business | They have been identified and agreed. | None |
| Survey of competitors | They have been identified and agreed. | None |
| Strong points | They have been identified and agreed. | None |
| Revenue projection | We have prepared a conservative base line projection based on the confirmed number of Calibrator in Malaysia and ASEAN market. | 1. We need to discuss DMM software sales right issue with SIRIM. 2. Introduction of Calibrator calibration system |
| Short term target | We orient to have “ De Facto Standard ” in Malaysia. | None |
| Development of System and Software to be used | CTI, a brother company of MTA in Singapore, has already developed them. | Introduction of Calibrator calibration system and usage of DMM automated software |
| Introduction of equipment, system | First Time Installation and trainings are important. | None |
| Sales promotion plan | After restructuring in Jan 2013, we expect SIRIM will have sales promotion department. | None |
| Organization structure | We have discussed and agreed to establish a subsidiary under SST. | SIRIM Board has to approve this idea legally. |
| Plan of Staffs | We should have a small team but manpower itself should be approved by SIRIM Board. | SIRIM Board has to approve the human resources allocation idea |
| Investment Plan | We have discussed about necessary equipment, including software. | SIRIM Board has to approve the investment plan. |
| Finance | By using SST’s guaranty, we will ask JICA / IDCJ / Local Bank etc for financing. | SIRIM Board has to approve the plan legally. |
| P/L projection | We have prepared base line projection during F/S period. | SIRIM Board has to approve the projection. |
| Risk analysis | Have been examined using the risk analysis matrix. | None |