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Dates of Tests: December 01 ~ 06, 2016  
Test Report S/N: LR500111612E  
Test Site : LTA CO., LTD.

## CERTIFICATION OF COMPLIANCE

FCC ID

**W6YHP100**

APPLICANT

**PASSTECH CO., LTD**

|                                  |   |                                                           |
|----------------------------------|---|-----------------------------------------------------------|
| <b>FCC Classification</b>        | : | <b>Part 15 Low Power Communication Device Transmitter</b> |
| <b>Manufacturing Description</b> | : | <b>Hotel Door locks</b>                                   |
| <b>Manufacturer</b>              | : | <b>PASSTECH CO., LTD</b>                                  |
| <b>Model name</b>                | : | <b>HP100</b>                                              |
| <b>Test Device Serial No.:</b>   | : | <b>Identical prototype</b>                                |
| <b>Rule Part(s)</b>              | : | <b>FCC Part 15.225 Subpart C; ANSI C-63.4-2014</b>        |
| <b>Frequency Range</b>           | : | <b>13.56 MHz</b>                                          |
| <b>RF power</b>                  | : | <b>52.07 dBuV/m @ 3m</b>                                  |
| <b>Data of issue</b>             | : | <b>December 7, 2016</b>                                   |

This test report is issued under the authority of:

Yong-Cheol, Wang / Manager

The test was supervised by:

Young-jin Lee, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.



NVLAP LAB Code.: 200723-0

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## 1. General information

### 1-1 Test Performed

Company name : LTA Co., Ltd.  
 Address : 243, Jubug-ri, Yangji-Myeon, Youngin-Si, Kyunggi-Do, Korea. 449-822  
 Web site : <http://www.ltalab.com>  
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Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

### 1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

| Agency | Country | Accreditation No.  | Validity   | Reference             |
|--------|---------|--------------------|------------|-----------------------|
| NVLAP  | U.S.A   | 200723-0           | 2017-09-30 | ECT accredited Lab.   |
| RRA    | KOREA   | KR0049             | -          | EMC accredited Lab.   |
| FCC    | U.S.A   | 610755             | 2017-04-21 | FCC filing            |
| FCC    | U.S.A   | 649054             | 2017-04-13 | FCC CAB               |
| VCCI   | JAPAN   | R2133(10 m), C2307 | 2017-06-21 | VCCI registration     |
| VCCI   | JAPAN   | T-2009             | 2016-12-23 | VCCI registration     |
| VCCI   | JAPAN   | G-563              | 2018-12-13 | VCCI registration     |
| IC     | CANADA  | 5799A-1            | UPDATING   | IC filing             |
| KOLAS  | KOREA   | NO.551             | 2017-01-08 | KOLAS accredited Lab. |

## 2. Information about test item

### 2-1 Client& Manufacturer

Company name : PASSTECH CO., LTD  
 Address : No. B-402, Geumgang Penterium IT Tower, 215, Galmachi-ro, Jungwon-gu,  
 Seongnam-si, Gyeonggi-do, 13217 Rep. of KOREA  
 Tel / Fax : TEL No : +82-31-743-7277 / FAX No : +82-31-743-7276

### 2-2 Equipment Under Test (EUT)

Trade name : Hotel Door locks  
 Model name : HP100  
 Serial number : Identical prototype  
 Date of receipt : March 4, 2016  
 EUT condition : Pre-production, not damaged  
 Antenna type : Loop Antenna  
 Frequency Range : 13.56 MHz  
 RF output power : 52.07 dBuV/m @ 3m  
 Power Source : DC 6V by Battery  
 Firmware Version : V 1.0.0

### 2-3 Tested frequency

|                 | LOW | MID   | HIGH |
|-----------------|-----|-------|------|
| Frequency (MHz) | -   | 13.56 | -    |

### 3. Test Report

#### 3.1 Summary of tests

| FCC Part<br>Section(s) | Parameter                                      | Test Condition | Status<br>(note 1) |
|------------------------|------------------------------------------------|----------------|--------------------|
| 15.225(a)              | Electric Field Strength - Fundamental Emission | Radiated       | C                  |
| 15.225(b) (c)          | Electric Field Strength - Outside the Band     |                | C                  |
| 15.225(d) / 15.209     | Electric Field Strength - Spurious Emission    |                | C                  |
| 15.225(e)              | Frequency Tolerance                            |                | C                  |
| 15.215(c)              | 20 dB Bandwidth                                |                | C                  |
| 15.207 /15.107         | AC Conducted Emissions                         | Line Conducted | N/A                |

Note 1: C=Complies    NC=Not Complies    NT=Not Tested    NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

The sample was tested according to the following specification:

FCC Parts 15.225; ANSI C-63.4-2003

## 3.2 Transmitter requirements

### 3.2.1 Electric Field Strength

**Procedure:** About the Fundamental Emission, Outside the Band and Spurious Emission

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3m.

→ From 9 kHz to 30 MHz at distance 3 m

The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for each antenna angle 0 deg., 45 deg. and 90 deg.

→ From 30 MHz to 1000 MHz at distance 3 m

The measuring antenna height was varied between 1 and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization.

Bandwidth settings per frequency range;

|              | From 9 kHz to 150 kHz | From 150 kHz to 30 MHz | From 30 MHz to 1000 MHz |
|--------------|-----------------------|------------------------|-------------------------|
| IF Bandwidth | 200 Hz                | 9 kHz                  | 120 kHz                 |

Part 15 Section 15.31 (f)(2) (9 kHz ~ 30 MHz)

9 kHz ~ 490 kHz [Limit at 3 m] = [Limit at 300 m]-20log(3[m]/300[m])

490 kHz ~ 30 MHz [Limit at 3 m] = [Limit at 30 m]-20log(3[m]/30[m])

### 3.2.1.1 Electric Field Strength - Fundamental Emission

Test method : Part 15.225(a)  
 Tx Frequency : 13.56 MHz  
 Result : **Complies**

#### Measurement data:

| Freq<br>(MHz) | Pol. | Reading<br>(dB $\mu$ V/m) | T.F<br>(dB) | Field Strength<br>@3 m<br>(dB $\mu$ V/m) | Limit @3 m<br>(dB $\mu$ V/m) | Margin<br>(dB) |
|---------------|------|---------------------------|-------------|------------------------------------------|------------------------------|----------------|
| 13.56         | H    | 55.02                     | -2.95       | 52.07                                    | 104                          | -51.93         |
| 13.56         | V    | 54.45                     | -2.95       | 51.50                                    | 104                          | -52.50         |

-- Note 1--

Field strength of 13.553 MHz to 13.567 MHz Limit@3m = 84 dB $\mu$ V/m + 20log30 m/3 m  
 = 104 dB $\mu$ V/m

-- Note 2--

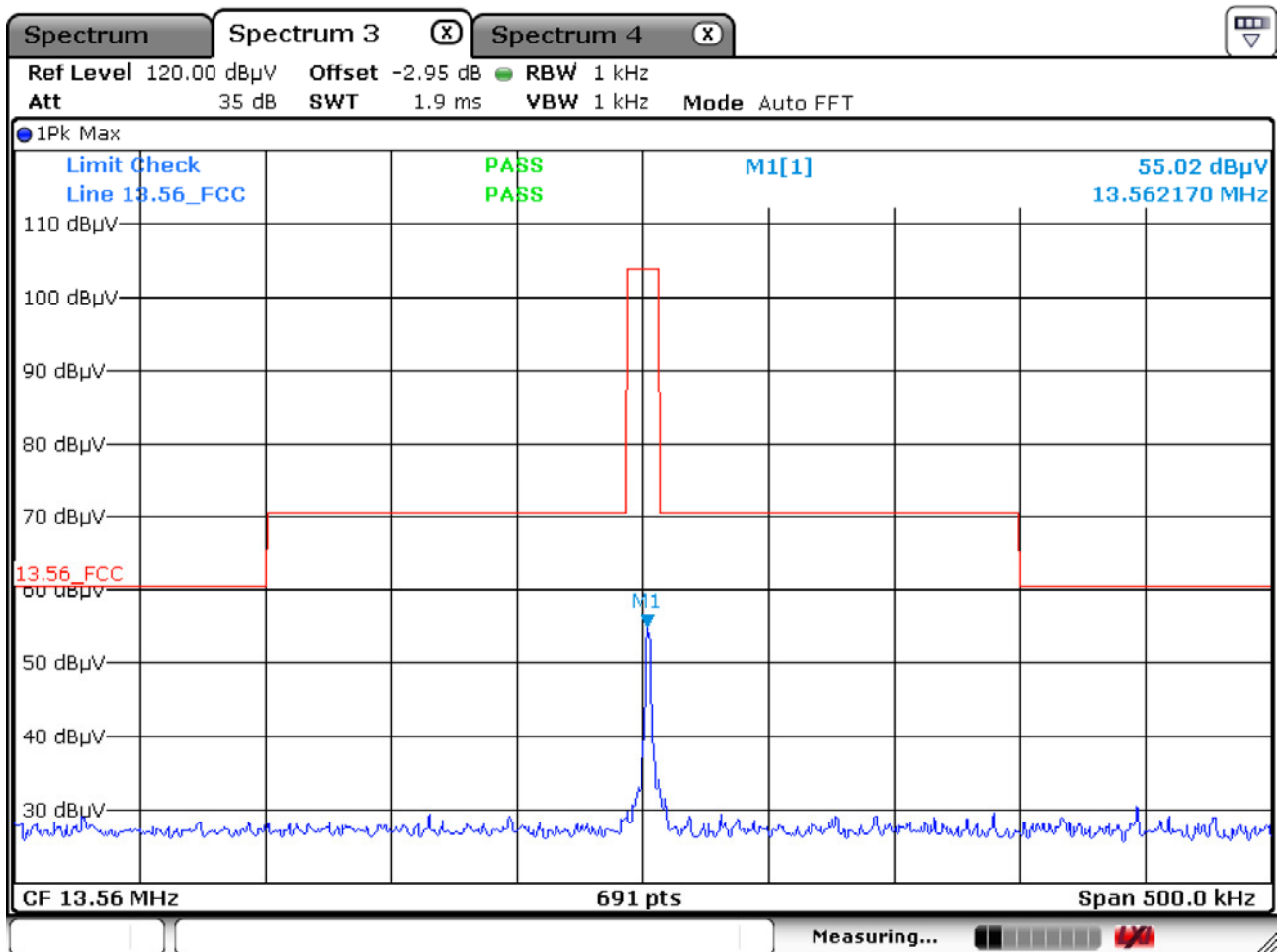
T.F(Total Factor) = Antenna Factor + Cable Loss –Amp Gain

Field Strength @3 m = Reading + T.F

### 3.2.1.2 Electric Field Strength - Outside the Allocated Band

Test method : Part 15.225(b) (c)  
 Tx Frequency : 13.56 MHz  
 Result : **Complies**

#### Measurement Data:



Result : **Complies**

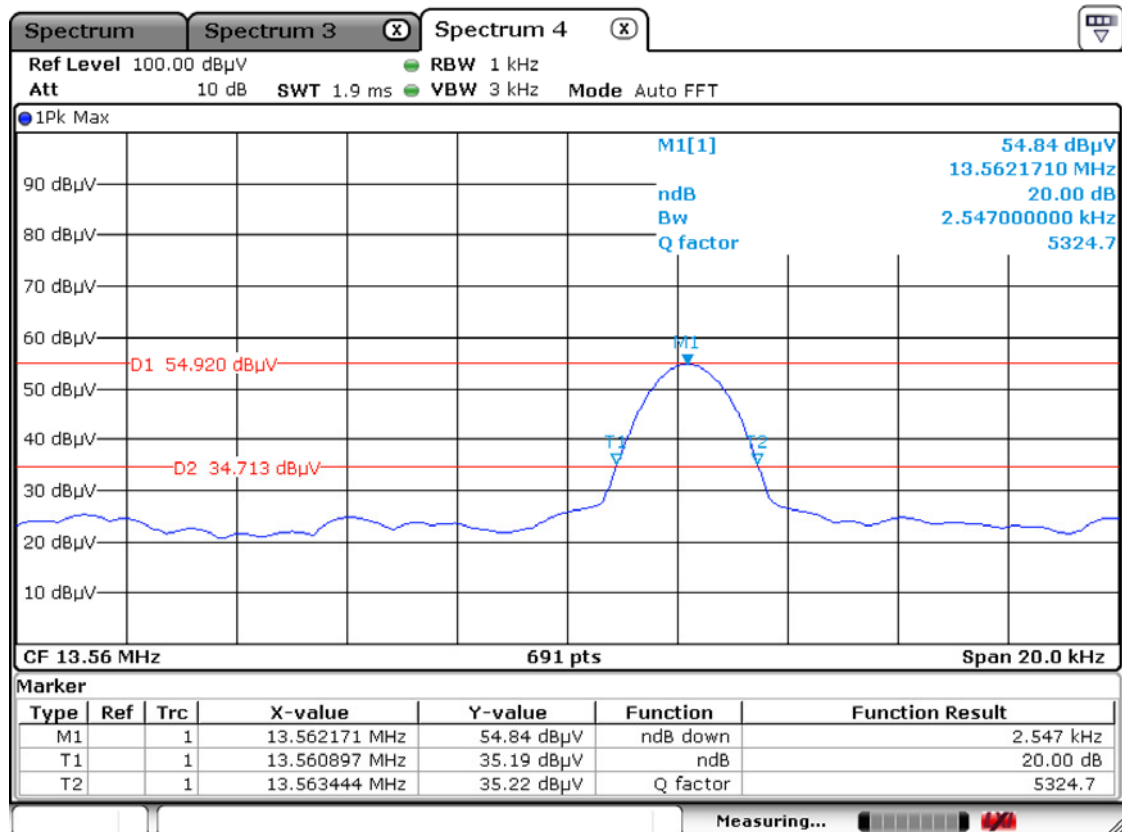
No other emissions were detected at a level greater than 20 dB below limit.

### 3.2.1.4 Emission Bandwidth

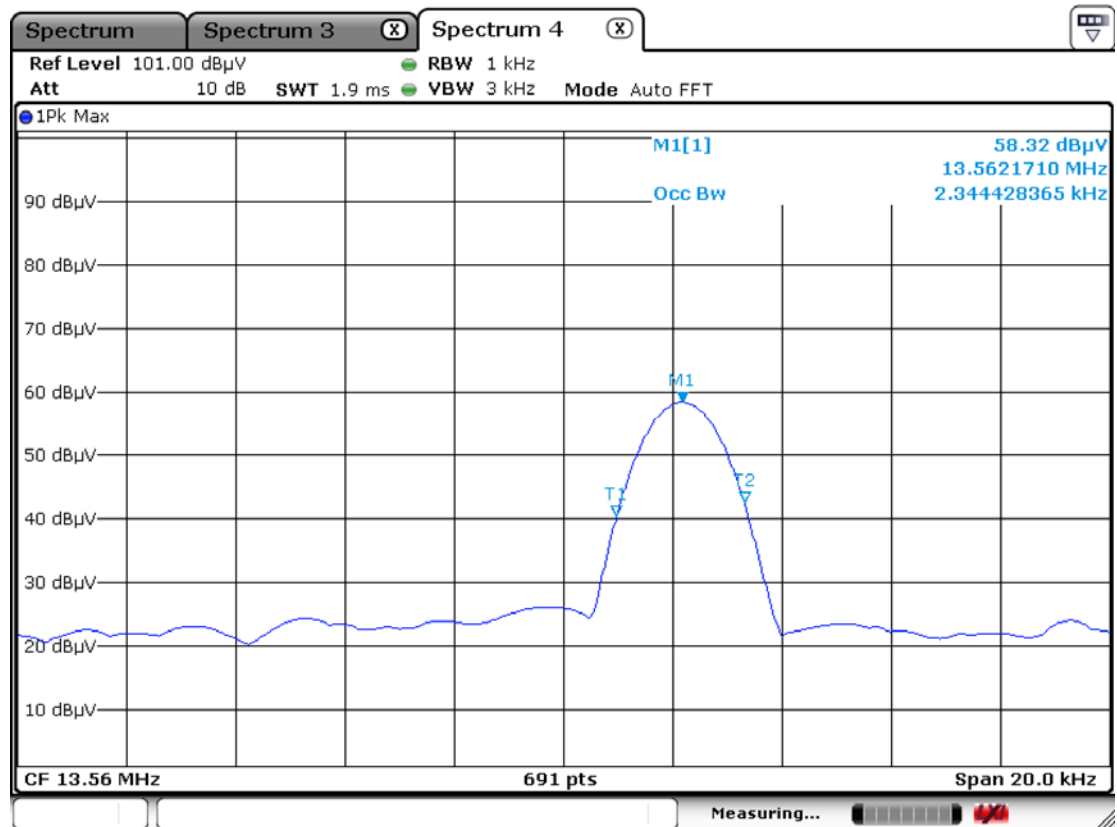
Test method : Part 15.215 (c)  
Tx Frequency : 13.56 MHz  
Result : **Complies**

| Occupied Channel Bandwidth Result |                    |                          |                        |
|-----------------------------------|--------------------|--------------------------|------------------------|
| Modulation<br>Mode                | Frequency<br>(MHz) | 20 dB Bandwidth<br>(kHz) | 99% Bandwidth<br>(kHz) |
| ASK                               | 13.56              | 2.55                     | 2.34                   |
| Limit                             |                    | N/A                      | N/A                    |
| Result                            |                    | PASS                     |                        |

## 20 dB Bandwidth



## 99% Bandwidth



### 3.2.2 Frequency Tolerance

#### Procedure:

The temperature test was started after the temperature stabilization time of 30 minutes.

#### Requirement:

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Test method : ANSI C63.4:2014

Tx Frequency : 13.56 MHz

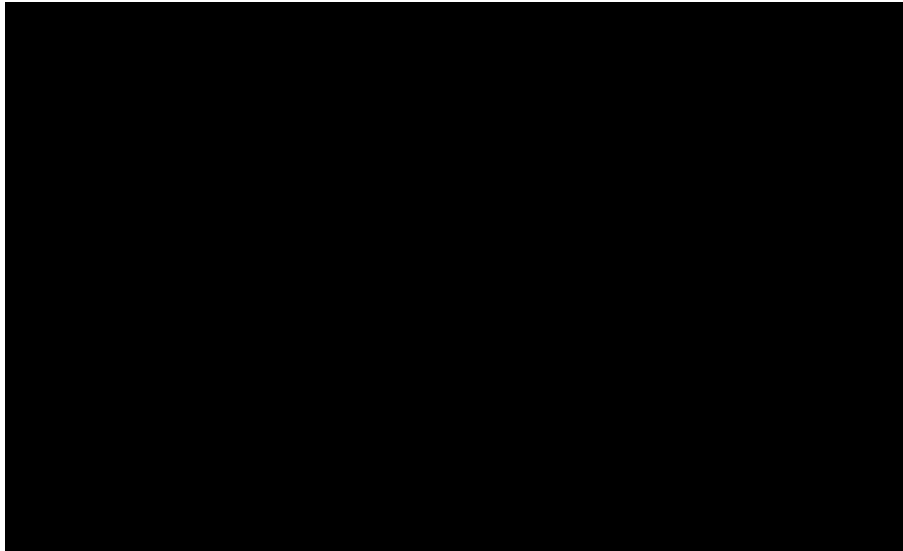
Result : **Complies**

#### Measurement Data:

OPERATING FREQUENCY: **13,562,600** Hz

Freq. Tolerance Limit: **± 0.01** %

| VOLTAGE<br>(%) | POWER<br>(VDC) | TEMP<br>(°C) | FREQ<br>(Hz) | Deviation<br>(%) |
|----------------|----------------|--------------|--------------|------------------|
| 100            | 6.00           | -20          | 13,561,236   | 0.000101         |
| 100            |                | -10          | 13,560,966   | 0.000120         |
| 100            |                | 0            | 13,561,186   | 0.000104         |
| 100            |                | 10           | 13,561,216   | 0.000102         |
| 100            |                | 20           | 13,561,160   | 0.000106         |
| 100            |                | 30           | 13,561,163   | 0.000106         |
| 100            |                | 40           | 13,561,093   | 0.000111         |
| 100            |                | 50           | 13,561,090   | 0.000111         |
| 85             | 5.10           | 20           | 13,561,132   | 0.000108         |
| 115            | 6.90           | 20           | 13,561,166   | 0.000106         |



### 3.2.3 AC Conducted Emissions

#### Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

#### Measurement Data: N/A

- See next pages for actual measured spectrum plots.
- No emissions were detected at a level greater than 20 dB below limit.

#### Minimum Standard: FCC Part 15.207(a) / EN 55022

Class B

| Frequency Range | quasi-peak | Average    |
|-----------------|------------|------------|
| 0.15 ~ 0.5      | 66 to 56 * | 56 to 46 * |
| 0.5 ~ 5         | 56         | 46         |
| 5 ~ 30          | 60         | 50         |

\* Decreases with the logarithm of the frequency

## APPENDIX

### TEST EQUIPMENT USED FOR TESTS

|    | Description                          | Model No.        | Serial No. | Manufacturer           | Interval | Last Cal. Date |
|----|--------------------------------------|------------------|------------|------------------------|----------|----------------|
| 1  | Signal Analyzer (9 kHz ~ 30 GHz)     | FSV30            | 100757     | R&S                    | 1 year   | 2016-10-11     |
| 2  | Signal Generator (~ 3.2 GHz)         | 8648C            | 3623A02597 | HP                     | 1 year   | 2016-03-21     |
| 3  | SYNTHESIZED CW GENERATOR             | 83711B           | US34490456 | HP                     | 1 year   | 2016-03-21     |
| 4  | Attenuator (3 dB)                    | 8491A            | 37822      | HP                     | 1 year   | 2016-09-12     |
| 5  | Attenuator (10 dB)                   | 8491A            | 63196      | HP                     | 1 year   | 2016-09-12     |
| 6  | Test Receiver (~ 30 MHz)             | ESHS10           | 828404/009 | R&S                    | 1 year   | 2016-03-21     |
| 7  | EMI Test Receiver (~ 7 GHz)          | ESCI7            | 100722     | R&S                    | 1 year   | 2016-09-12     |
| 8  | RF Amplifier (~ 1.3 GHz)             | 8447D            | 2944A07974 | HP                     | 1 year   | 2016-09-12     |
| 9  | RF Amplifier (1 ~ 26.5 GHz)          | 8449B            | 3008A02126 | HP                     | 1 year   | 2016-03-21     |
| 10 | Horn Antenna (1 ~ 18 GHz)            | 3115             | 00114105   | ETS                    | 1 year   | 2016-04-21     |
| 11 | DRG Horn (Small)(18GHz ~40GHz)       | 3116B            | 81109      | ETS-Lindgren           | 1 year   | 2016-05-03     |
| 12 | DRG Horn (Small) (18GHz ~40GHz)      | 3116B            | 133350     | ETS-Lindgren           | 1 year   | 2016-05-03     |
| 13 | TRILOG Antenna                       | VULB 9160        | 9160-3237  | SCHWARZBECK            | 2 year   | 2015-04-21     |
| 14 | Temp. Humidity Data Logger           | SK-L200TH II A   | 00801      | SATO                   | 1 year   | 2016-03-22     |
| 15 | Splitter                             | 1580             | SL769      | WEINSCHEL              | 1 year   | 2016-03-22     |
| 16 | Power Divider                        | 11636A           | 06243      | HP                     | 1 year   | 2016-09-12     |
| 17 | DC Power Supply                      | 6674A            | 3637A01657 | Agilent                | -        | -              |
| 18 | Frequency Counter                    | 5342A            | 2826A12411 | HP                     | 1 year   | 2016-03-21     |
| 19 | Power Meter                          | EPM-441A         | GB32481702 | HP                     | 1 year   | 2016-03-22     |
| 20 | Power Sensor                         | 8481A            | 3318A94972 | HP                     | 1 year   | 2016-01-05     |
| 21 | Audio Analyzer                       | 8903B            | 3729A18901 | HP                     | 1 year   | 2016-09-12     |
| 22 | Modulation Analyzer                  | 8901B            | 3749A05878 | HP                     | 1 year   | 2016-09-12     |
| 23 | TEMP & HUMIDITY Chamber              | YJ-500           | LTAS06041  | JinYoung Tech          | 1 year   | 2016-09-12     |
| 24 | Stop Watch                           | HS-3             | 812Q08R    | CASIO                  | 2 year   | 2016-03-22     |
| 25 | LISN                                 | KNW-407          | 8-1430-1   | Kyoritsu               | 1 year   | 2016-09-12     |
| 26 | Two-Lime V-Network                   | ESH3-Z5          | 893045/017 | R&S                    | 1 year   | 2016-03-21     |
| 27 | UNIVERSAL RADIO COMMUNICATION TESTER | CMU200           | 106243     | R&S                    | 1 year   | 2016-03-21     |
| 28 | Highpass Filter                      | WHKX1.5/15G-10SS | 74         | Wainwright Instruments | 1 year   | 2016-03-21     |
| 29 | Highpass Filter                      | WHKX3.0/18G-10SS | 118        | Wainwright Instruments | 1 year   | 2016-03-21     |
| 30 | Active Loop Antenna                  | FMZB1519         | 1519-031   | SCHWARZBECK            | 2 year   | 2016-01-12     |
| 31 | OSP120 BASE UNIT                     | OSP120           | 101230     | R&S                    | 1 year   | 2016-03-22     |
| 32 | Signal Generator(100 kHz ~ 40 GHz)   | SMB100A          | 177621     | R&S                    | 1 year   | 2016-03-22     |
| 33 | Signal Analyzer (10 Hz ~ 40 GHz)     | FSV40            | 101367     | R&S                    | 1 year   | 2016-03-22     |