



## EMC TEST REPORT

For

Descartes System Group Inc

Inventory control beacon tag

Test Model: BIN001-2

Prepared for : Descartes System Group Inc  
Address : 105 Trafalgar Street, Floor 2 Floor 2, Nelson, New Zealand

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.  
Address : Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China

Tel : (+86)755-82591330  
Fax : (+86)755-82591332  
Web : www.LCS-cert.com  
Mail : webmaster@LCS-cert.com

Date of receipt of test sample : March 31, 2025  
Number of tested samples : 2  
Sample No. : A03275110-1, A03275110-2  
Serial number : Prototype  
Date of Test : March 31, 2025 ~ April 10, 2025  
Date of Report : April 11, 2025





|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>EMC TEST REPORT</b><br><b>EN 55032:2015/A1:2020</b><br>Electromagnetic compatibility of multimedia equipment - Emission Requirements<br><b>EN 55035:2017/A11:2020</b><br>Electromagnetic compatibility of multimedia equipment – Immunity requirements                                                                                                                                                                                                                                                                     |  |
| <b>Report Reference No. .... : LCSA03275110EF</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Date of Issue..... : April 11, 2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| <b>Testing Laboratory Name..... : Shenzhen LCS Compliance Testing Laboratory Ltd.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| Address..... : Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China                                                                                                                                                                                                                                                                                                                                                          |  |
| Testing Location/ Procedure.... : Full application of Harmonised standards ■<br>Partial application of Harmonised standards □<br>Other standard testing method □                                                                                                                                                                                                                                                                                                                                                              |  |
| <b>Applicant's Name..... : Descartes System Group Inc</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| Address..... : 105 Trafalgar Street, Floor 2 Floor 2, Nelson, New Zealand                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| <b>Test Specification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| Standard..... : EN 55032:2015/A1:2020<br>EN 55035:2017/A11:2020                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| Test Report Form No..... : TRF-4-E-006 A/0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| TRF Originator..... : Shenzhen LCS Compliance Testing Laboratory Ltd.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| Master TRF..... : Dated 2011-03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
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| <b>Test Item Description..... : Inventory control beacon tag</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| Trade Mark..... : N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| Test Model..... : BIN001-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Ratings ..... : DC 3V By CR2477 Button Battery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| <b>Result ..... : PASS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |

Compiled by:

Kevin Huang

Kevin Huang/Administrator

Supervised by:

Jack Liu

Jack Liu/ Technique principal

Approved by:

Gavin Liang

Gavin Liang/ Manager



Shenzhen LCS Compliance Testing Laboratory Ltd.

Add: Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

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## EMC -- TEST REPORT

|                                         |                                        |
|-----------------------------------------|----------------------------------------|
| Test Report No. : <b>LCSA03275110EF</b> | <u>April 11, 2025</u><br>Date of issue |
|-----------------------------------------|----------------------------------------|

|                          |                                                              |
|--------------------------|--------------------------------------------------------------|
| Test Model.....          | : BIN001-2                                                   |
| EUT.....                 | : Inventory control beacon tag                               |
| <b>Applicant.....</b>    | <b>: Descartes System Group Inc</b>                          |
| Address.....             | : 105 Trafalgar Street, Floor 2 Floor 2, Nelson, New Zealand |
| Telephone.....           | : /                                                          |
| Fax.....                 | : /                                                          |
| <b>Manufacturer.....</b> | <b>: Descartes System Group Inc</b>                          |
| Address.....             | : 105 Trafalgar Street, Floor 2 Floor 2, Nelson, New Zealand |
| Telephone.....           | : /                                                          |
| Fax.....                 | : /                                                          |
| <b>Factory.....</b>      | <b>: Descartes System Group Inc</b>                          |
| Address.....             | : 105 Trafalgar Street, Floor 2 Floor 2, Nelson, New Zealand |
| Telephone.....           | : /                                                          |
| Fax.....                 | : /                                                          |

|                    |             |
|--------------------|-------------|
| <b>Test Result</b> | <b>PASS</b> |
|--------------------|-------------|

The test report merely corresponds to the test sample.  
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.





Revision History

| Report Version | Issue Date     | Revision Content | Revised By |
|----------------|----------------|------------------|------------|
| 000            | April 11, 2025 | Initial Issue    | ---        |
|                |                |                  |            |
|                |                |                  |            |





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## 1. TEST STANDARDS

The tests were performed according to following standards:

EN 55032:2015/A1:2020 Electromagnetic compatibility of multimedia equipment - Emission Requirements

EN 55035:2017/A11:2020 Electromagnetic compatibility of multimedia equipment – Immunity requirements





## 2.SUMMARY OF STANDARDS AND RESULTS

### 2.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

| Emission (EN 55032:2015/A1:2020)                  |                               |                      |         |
|---------------------------------------------------|-------------------------------|----------------------|---------|
| Description of Test Item                          | Standard                      | Limits               | Results |
| Conducted disturbance at mains terminals          | EN 55032:2015/A1:2020         | Class B              | N/A     |
| Conducted disturbance at telecommunication port   | EN 55032:2015/A1:2020         | Class B              | N/A     |
| Radiated disturbance                              | EN 55032:2015/A1:2020         | Class B              | PASS    |
| Harmonic current emissions                        | EN IEC 61000-3-2:2019/A1:2021 | Class A              | N/A     |
| Voltage fluctuations & flicker                    | EN 61000-3-3:2013/A2:2021     | -----                | N/A     |
| Immunity (EN 55035:2017/A11:2020)                 |                               |                      |         |
| Description of Test Item                          | Basic Standard                | Performance Criteria | Results |
| Electrostatic Discharge (ESD)                     | EN 61000-4-2                  | B                    | PASS    |
| Radio-frequency, Continuous Radiated Disturbance  | EN 61000-4-3                  | A                    | PASS    |
| Electrical Fast Transient (EFT)                   | EN 61000-4-4                  | B                    | N/A     |
| Surge (Input a.c. Power Ports)                    | EN 61000-4-5                  | B                    | N/A     |
| Surge (Telecommunication Ports)                   |                               | B                    | N/A     |
| Radio-frequency, Continuous Conducted Disturbance | EN 61000-4-6                  | A                    | N/A     |
| Power Frequency Magnetic Field                    | EN 61000-4-8                  | A                    | PASS    |
| Voltage Dips, >95% Reduction                      | EN IEC 61000-4-11             | B                    | N/A     |
| Voltage Dips, 30% Reduction                       |                               | C                    | N/A     |
| Voltage Interruptions                             |                               | C                    | N/A     |

\*\*\*Note: N/A is an abbreviation for Not Applicable.

**Test mode:**

Mode 1

Normal operation

Record





## 2.2. Description of Performance Criteria

### General Performance Criteria

Examples of functions defined by the manufacturer to be evaluated during testing include, but are not limited to, the following:

- essential operational modes and states;

#### 2.2.1. Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacture when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

#### 2.2.2. Performance criterion B

After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacture, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

During the test, degradation of performance is allowed. However, no change of operation state or stored data is allowed to persist after the test.

If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

#### 2.2.3. Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacture's instructions.

Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.





### 3. GENERAL INFORMATION

#### 3.1. Description of Device (EUT)

EUT : Inventory control beacon tag

Trade Mark : N/A

Test Model : BIN001-2

Ratings : DC 3V By CR2477 Button Battery

| Highest internal frequency (Fx)                                                                                                                                                                                                                          | Highest measured frequency                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| $F_x \leq 108 \text{ MHz}$<br>$108 \text{ MHz} < F_x \leq 500 \text{ MHz}$<br>$500 \text{ MHz} < F_x \leq 1 \text{ GHz}$<br>$F_x > 1 \text{ GHz}$                                                                                                        | 1 GHz<br>2 GHz<br>5 GHz<br>$5 \times F_x$ up to a maximum of 6 GHz |
| NOTE 1 For FM and TV broadcast receivers, Fx is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.<br>Where Fx is unknown, the radiated emission measurements shall be performed up to 6 GHz. |                                                                    |





### 3.2. Description of Test Facility

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.

### 3.3. Support Equipment List

| Manufacturer | Description | Model | Serial Number | Certificate |
|--------------|-------------|-------|---------------|-------------|
| --           | --          | --    | --            | --          |

### 3.4. External I/O

| I/O Port Description | Quantity | Cable |
|----------------------|----------|-------|
| --                   | --       | --    |

### 3.5. Statement of The Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

### 3.6. Measurement Uncertainty

| Test                                                                                                                                                                                                                                                                                                                                                                           | Parameters                                              | Expanded Uncertainty ( $U_{lab}$ ) | Expanded Uncertainty ( $U_{cispr}$ ) |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|------------------------------------|--------------------------------------|
| Conducted Emission                                                                                                                                                                                                                                                                                                                                                             | Level accuracy<br>(9kHz to 150kHz)<br>(150kHz to 30MHz) | $\pm 2.63$ dB<br>$\pm 2.35$ dB     | $\pm 3.8$ dB<br>$\pm 3.4$ dB         |
| Radiated Emission                                                                                                                                                                                                                                                                                                                                                              | Level accuracy<br>(9kHz to 30MHz)                       | $\pm 3.68$ dB                      | N/A                                  |
| Radiated Emission                                                                                                                                                                                                                                                                                                                                                              | Level accuracy<br>(30MHz to 1000MHz)                    | $\pm 3.48$ dB                      | $\pm 5.3$ dB                         |
| Radiated Emission                                                                                                                                                                                                                                                                                                                                                              | Level accuracy<br>(above 1000MHz)                       | $\pm 3.90$ dB                      | $\pm 5.2$ dB                         |
| Mains Harmonic                                                                                                                                                                                                                                                                                                                                                                 | Voltage                                                 | $\pm 0.510\%$                      | N/A                                  |
| Voltage Fluctuations<br>& Flicker                                                                                                                                                                                                                                                                                                                                              | Voltage                                                 | $\pm 0.510\%$                      | N/A                                  |
| 1) Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.<br>2) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$ , which for a normal distribution corresponds to a coverage probability of approximately 95%. |                                                         |                                    |                                      |



Shenzhen LCS Compliance Testing Laboratory Ltd.

Add: Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

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#### 4. MEASURING DEVICES AND TEST EQUIPMENT

##### Test Item: Radiated Disturbance (Electric Field)

| Item | Equipment                | Manufacturer | Model No.  | Serial No.  | Last Cal.  | Due Date   |
|------|--------------------------|--------------|------------|-------------|------------|------------|
| 1    | EMI Test Software        | Farad        | EZ         | /           | N/A        | N/A        |
| 2    | 3m Full Anechoic Chamber | MRDIANZI     | FAC-3M     | MR009       | 2022-08-17 | 2025-08-16 |
| 3    | Positioning Controller   | Max-Full     | MF7802BS   | MF780208586 | N/A        | N/A        |
| 4    | By-log Antenna           | SCHWARZBECK  | VULB9163   | 9163-470    | 2024-08-03 | 2027-08-02 |
| 5    | Horn Antenna             | SCHWARZBECK  | BBHA 9120D | 9120D-1925  | 2024-07-13 | 2027-07-12 |
| 6    | EMI Test Receiver        | R&S          | ESPI       | 101940      | 2024-06-06 | 2025-06-05 |
| 7    | Low-frequency amplifier  | SchwarzZBECK | BBV9745    | 00253       | 2024-10-08 | 2025-10-07 |
| 8    | High-frequency amplifier | JS Denki Pte | PA0118-43  | JSPA21009   | 2024-10-08 | 2025-10-07 |
| 9    | MXA Signal Analyzer      | Agilent      | N9020A     | MY50510140  | 2024-10-08 | 2025-10-07 |

##### Test Item: Electrostatic Discharge

| Item | Equipment     | Manufacturer | Model No. | Serial No. | Last Cal.  | Due Date   |
|------|---------------|--------------|-----------|------------|------------|------------|
| 1    | ESD Simulator | SCHLODER     | SESD 230  | 604035     | 2024-07-15 | 2025-07-14 |

##### Test Item: RF Field Strength Susceptibility

| Item | Equipment                              | Manufacturer | Model No.         | Serial No.     | Last Cal.  | Due Date   |
|------|----------------------------------------|--------------|-------------------|----------------|------------|------------|
| 1    | RS Test Software                       | Tonscend     | /                 | /              | N/A        | N/A        |
| 2    | MXG Vector Signal Generator            | Agilent      | E4438C            | MY42081396(6G) | 2024-10-08 | 2025-10-07 |
| 3    | 3m Full Anechoic Chamber               | MRDIANZI     | FAC-3M            | MR009          | 2022-08-17 | 2025-08-16 |
| 4    | RF POWER AMPLIFIER                     | OPHIR        | 5225R             | 1052           | 2024-06-06 | 2025-06-05 |
| 5    | RF POWER AMPLIFIER                     | OPHIR        | 5273F             | 1019           | 2024-06-06 | 2025-06-05 |
| 6    | RF POWER AMPLIFIER                     | SKET         | HAP_0306<br>G-50W | /              | 2024-06-06 | 2025-06-05 |
| 7    | Stacked Broadband Log Periodic Antenna | SCHWARZBECK  | STLP 9128         | 9128ES-145     | 2023-07-14 | 2026-07-13 |
| 8    | Stacked Mikrowellen Log.-Per Antenna   | SCHWARZBECK  | STLP 9149         | 9149-482       | 2024-07-20 | 2027-07-19 |
| 9    | RS Electric field probe                | narda        | EP 601            | 611WX80208     | 2024-06-06 | 2025-06-05 |

Note: NCR means no calibration requirement

##### Test Item: Power Frequency Magnetic Field Susceptibility

| Item | Equipment                                  | Manufacturer | Model No.   | Serial No. | Last Cal.  | Due Date   |
|------|--------------------------------------------|--------------|-------------|------------|------------|------------|
| 1    | Power frequency mag-field generator System | EVERFINE     | EMS61000-8K | 906003     | 2024-06-06 | 2025-06-05 |

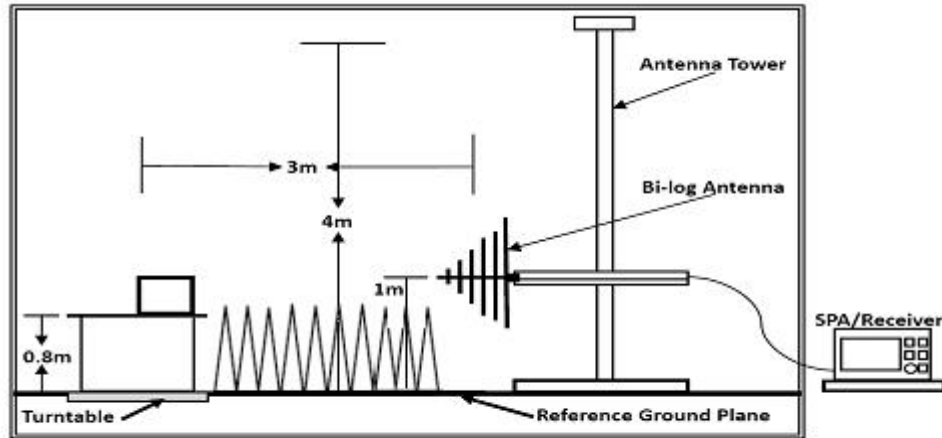




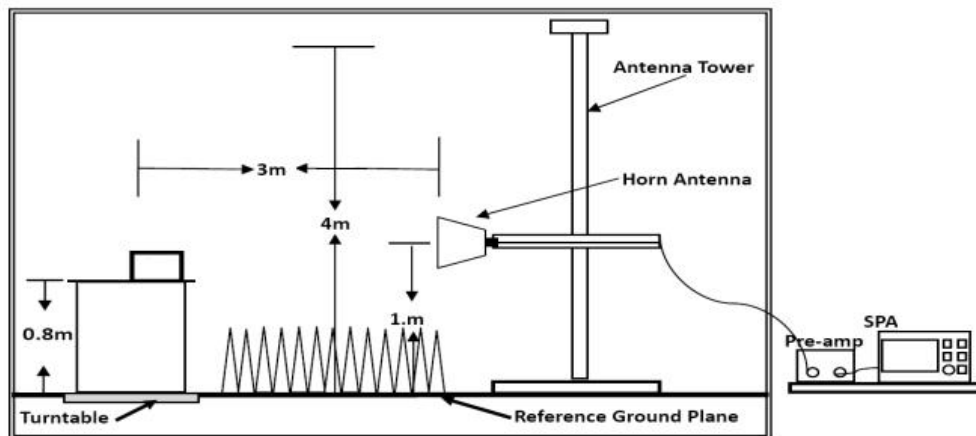
## 5. TEST RESULTS

### 5.1. RADIATED EMISSION MEASUREMENT

#### 5.1.1. Block Diagram of Test Setup



Below 1GHz



Above 1GHz





### 5.1.2. Test Standard

EN 55032:2015/A1:2020 Class B

All emanations from a class B device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

| Limits for Radiated Emission Below 1GHz                                                                                                                                                                                                    |                      |                                   |                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------|---------------------------|
| Frequency<br>(MHz)                                                                                                                                                                                                                         | Distance<br>(Meters) | Field Strengths Limit<br>(dBμV/m) |                           |
| 30 ~ 230                                                                                                                                                                                                                                   | 3                    | 42-35                             |                           |
| 230 ~ 1000                                                                                                                                                                                                                                 | 3                    | 42                                |                           |
| ***Note:<br>(1) The smaller limit shall apply at the combination point between two frequency bands.<br>(2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT. |                      |                                   |                           |
| Limits for Radiated Emission Above 1GHz                                                                                                                                                                                                    |                      |                                   |                           |
| Frequency<br>(MHz)                                                                                                                                                                                                                         | Distance<br>(Meters) | Peak Limit<br>(dBμV/m)            | Average Limit<br>(dBμV/m) |
| 1000 ~ 6000                                                                                                                                                                                                                                | 3                    | 74                                | 54                        |
| ***Note: The lower limit applies at the transition frequency.                                                                                                                                                                              |                      |                                   |                           |

### 5.1.3. EUT Configuration on Test

The EN 55032 regulations test method must be used to find the maximum emission during emission measurement.

### 5.1.4. Operating Condition of EUT

5.1.4.1. Turn on the power.

5.1.4.2. Let the EUT work in the test mode 1 and measure it.

### 5.1.5. Test Procedure

The EUT is placed on a turntable, which is 0.8 meter high above the ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. By-log antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

The bandwidth of the EMI test receiver is set at RBW/VBW=120kHz/300kHz.

The frequency range from 30MHz to 1000MHz is checked.

The bandwidth of the Spectrum analyzer is set at RBW/VBW=1MHz/3MHz.

The frequency range from 1GHz to the frequency which about 5th carrier harmonic or 6GHz is checked.

### 5.1.6. Test Results

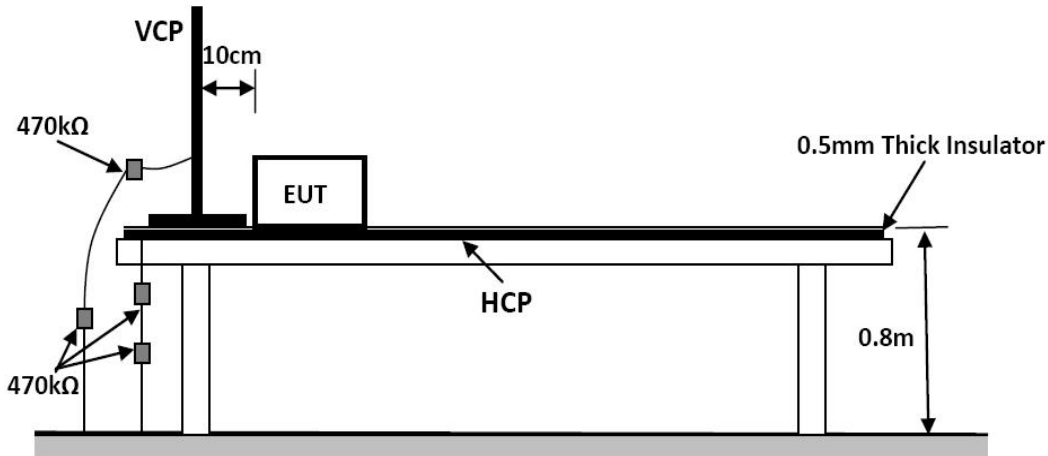
**PASS.**

Refer to attached Annex B.1



## 5.2. ELECTROSTATIC DISCHARGE IMMUNITY TEST

### 5.2.1. Block Diagram of Test Setup



### 5.2.2. Test Standard

EN 55035:2017/A11:2020 (EN 61000-4-2, Severity Level: 3 / Air Discharge:  $\pm 8\text{KV}$ , Level: 2 / Contact Discharge:  $\pm 4\text{KV}$ )

### 5.2.3. Severity Levels and Performance Criterion

#### 5.2.3.1. Severity level

| Level | Test Voltage<br>Contact Discharge (KV) | Test Voltage<br>Air Discharge (KV) |
|-------|----------------------------------------|------------------------------------|
| 1     | $\pm 2$                                | $\pm 2$                            |
| 2     | $\pm 4$                                | $\pm 4$                            |
| 3     | $\pm 6$                                | $\pm 8$                            |
| 4     | $\pm 8$                                | $\pm 15$                           |
| X     | Special                                | Special                            |

#### 5.2.3.2. Performance Criterion

Performance Criterion: B

### 5.2.4. EUT Configuration on Test

The configuration of EUT is listed in Section 5.2.1.

### 5.2.5. Operating Condition of EUT

Same as radiated emission measurement, which is listed in Section 5.1.4. Except the test set up replaced by Section 5.2.1.





## 5.2.6. Test Procedure

### 5.2.6.1. Air Discharge

This test is done on a non-conductive surfaces. The round discharge tip of the Electrostatic Discharge simulator shall be approached as fast as possible then to touch the EUT. After each discharge, the simulator shall be removed from the EUT. The simulator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

### 5.2.6.2. Contact Discharge

All the procedure shall be same as air discharge, except using the acute discharge tip. The top end of the Electrostatic Discharge simulator is touch the EUT all the time when the simulator is re-triggered for a new single discharge and repeated 10 times for each pre-selected test point.

### 5.2.6.3. Indirect Discharge For Horizontal Coupling Plane

The vertical coupling plane(VCP) is placed 0.1m away from EUT. The top end of Electrostatic Discharge simulator should aim at the center of one border of the VCP for at least 25 times discharge.

### 5.2.6.4. Indirect Discharge For Vertical Coupling Plane

The top end of Electrostatic Discharge simulator should place at the point 0.1m away from EUT on the horizontal coupling plane(HCP). At least 25 times discharge should be done for every pre-selected point around EUT.

Record any performance degradation of the EUT during the test and judge the test result according to ce criterion.

## 5.2.7. Test Results

**PASS.**

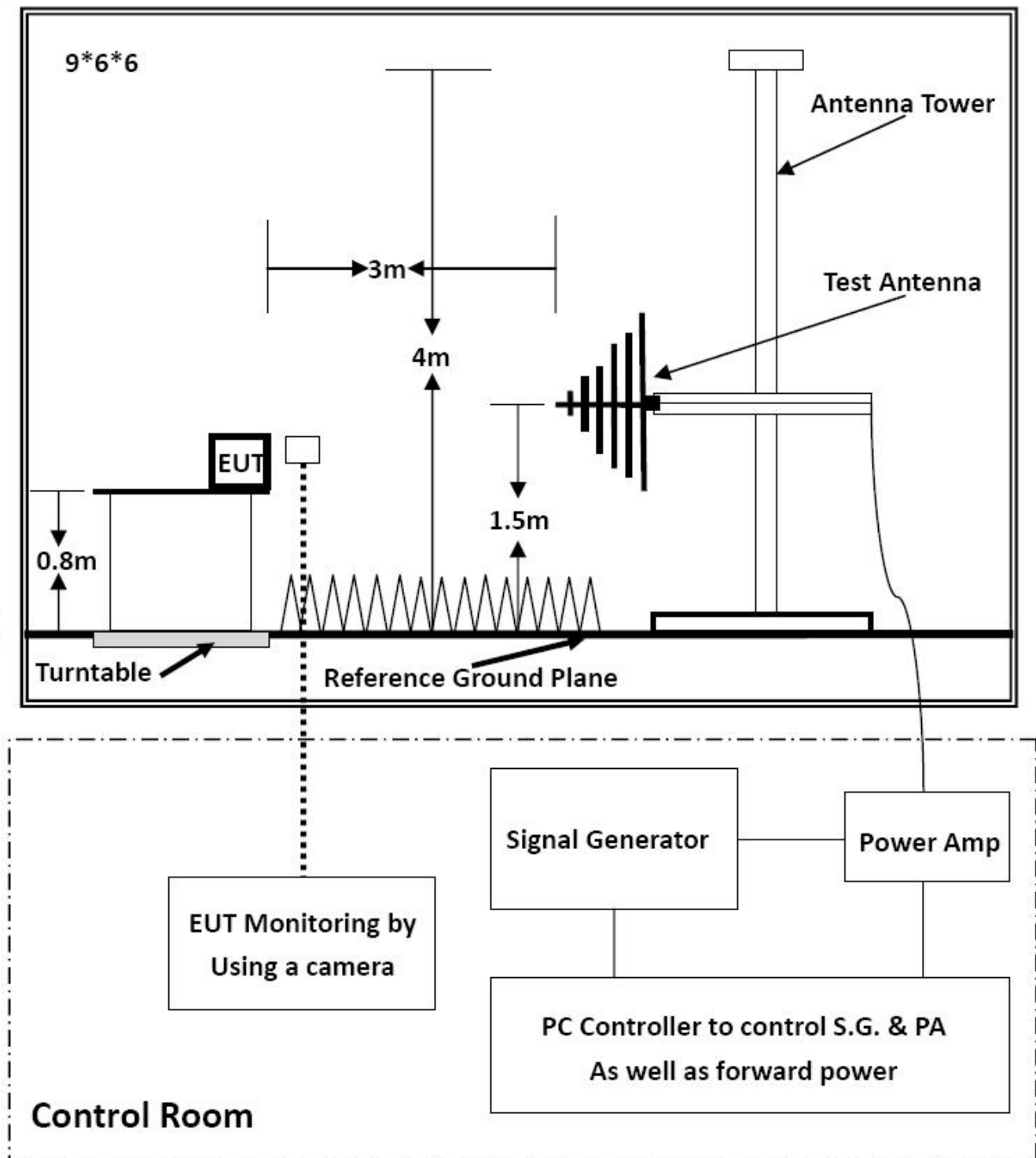
Refer to attached Annex B.2





### 5.3. RF FIELD STRENGTH SUSCEPTIBILITY TEST

#### 5.3.1. Block Diagram of Test Setup





### 5.3.2. Test Standard

EN 55035:2017/A11:2020 (EN 61000-4-3 Severity Level: 2, 3V/m)

### 5.3.3. Severity Levels and Performance Criterion

#### 5.3.3.1. Severity level

| Level | Field Strength (V/m) |
|-------|----------------------|
| 1     | 1                    |
| 2     | 3                    |
| 3     | 10                   |
| X     | Special              |

#### 5.3.3.2. Performance Criterion

Performance Criterion: A

### 5.3.4. EUT Configuration on Test

The configuration of EUT is listed in Section 5.3.1.

### 5.3.5. Operating Condition of EUT

Same as radiated emission measurement, which is listed in Section 5.1.4, except the test setup replaced as Section 5.3.1.

### 5.3.6. Test Procedure

The EUT are placed on a table, which is 0.8 meter high above the ground. The EUT is set 3 meters away from the transmitting antenna, which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna is set on test. Each of the four sides of the EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD Recording is used to monitor its screen. All the scanning conditions are as following:

| Condition of Test                 | Remark                             |
|-----------------------------------|------------------------------------|
| Fielded Strength                  | 3 V/m (Severity Level 2)           |
| Radiated Signal                   | Unmodulated                        |
| Test Frequency Range (Swept Test) | 80-1000MHz                         |
| Test Frequency (spot test)        | 1800MHz, 2600MHz, 3500MHz, 5000MHz |
| Dwell Time of Radiated            | 0.0015 decade/s                    |
| Waiting Time                      | 3 Sec.                             |

### 5.3.7. Test Results

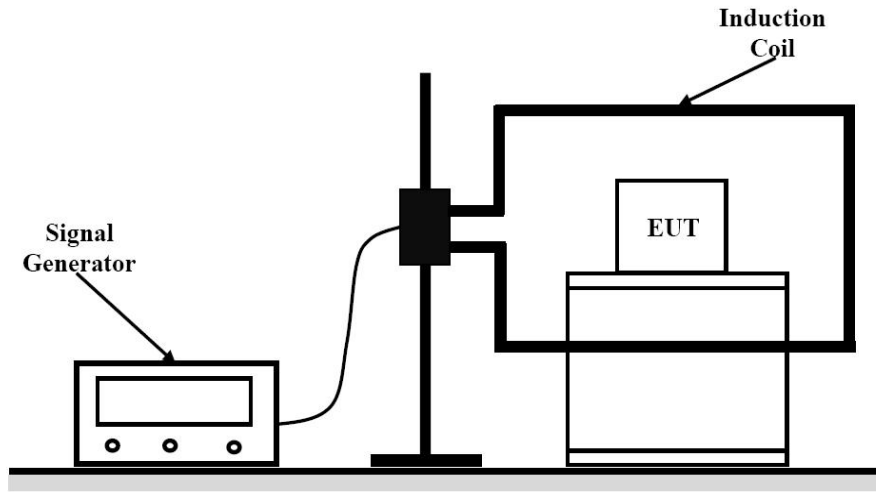
**PASS.**

Refer to attached Annex B.3



## 5.4. MAGNETIC FIELD SUSCEPTIBILITY TEST

### 5.4.1. Block Diagram of Test Setup



### 5.4.2. Test Standard

EN 55035:2017/A11:2020 (EN 61000-4-8, Severity Level: Level 1, 1A/m)

### 5.4.3. Severity Levels and Performance Criterion

#### 5.4.3.1. Severity level

| Level | Field Strength (A/m) |
|-------|----------------------|
| 1     | 1                    |
| 2     | 3                    |
| 3     | 10                   |
| 4     | 30                   |
| 5     | 100                  |
| X     | Special              |

#### 5.4.3.2. Performance Criterion

Performance Criterion: A

### 5.4.4. EUT Configuration on Test

The configuration of EUT is listed in Section 5.4.1.

### 5.4.5. Test Procedure

EUT is placed on an insulating support of 0.1m high above a table of 0.8m high. There is a minimum 1m\*1m ground metallic plane put on this table. EUT is put in the center of the magnetic coil then two orientations of the magnetic coil, horizontal and vertical, shall be rotated in order to expose the EUT to the difference polarization magnetic field.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

### 5.4.6. Test Results

**PASS.**

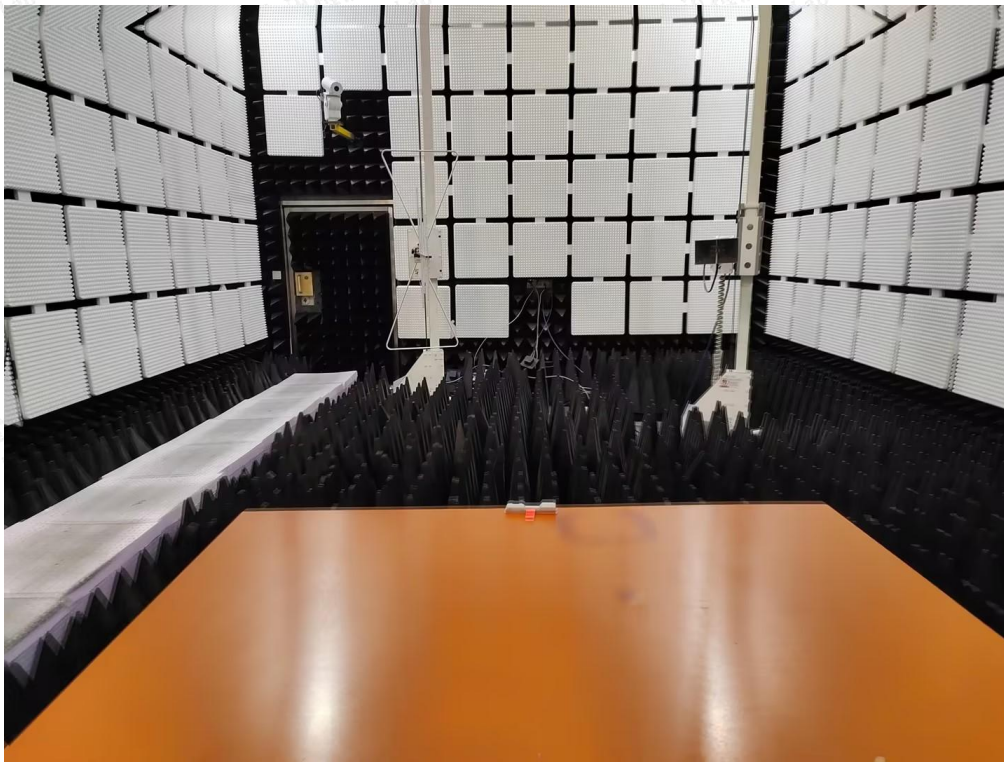
Refer to attached Annex B.4



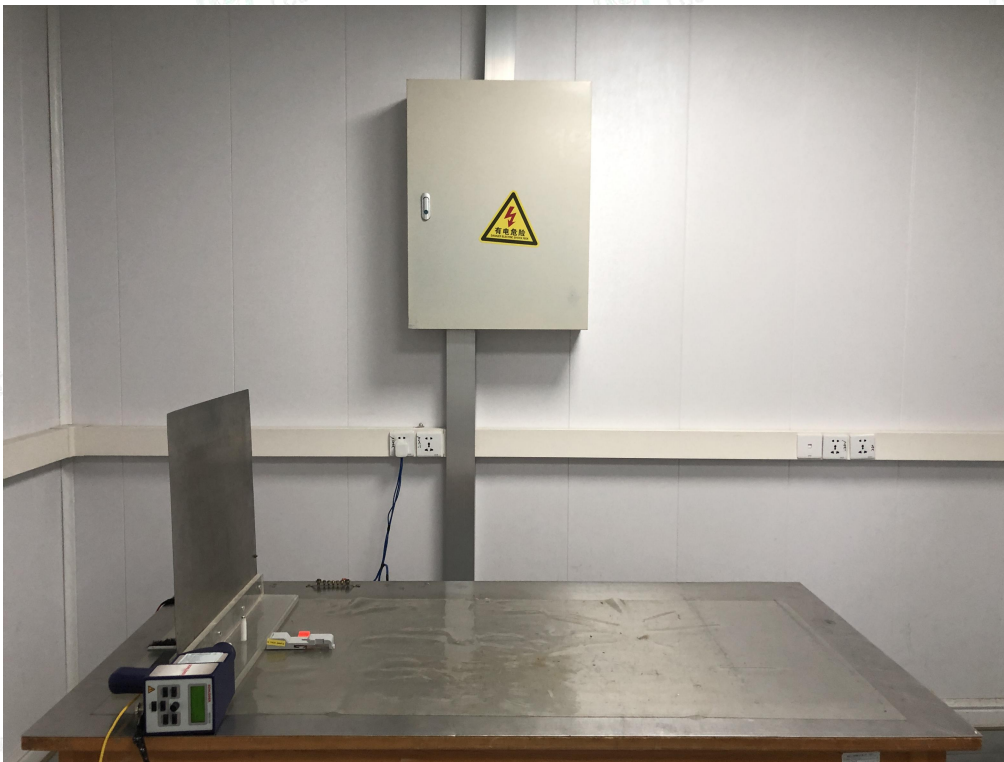


## ANNEX A

(Test photograph)

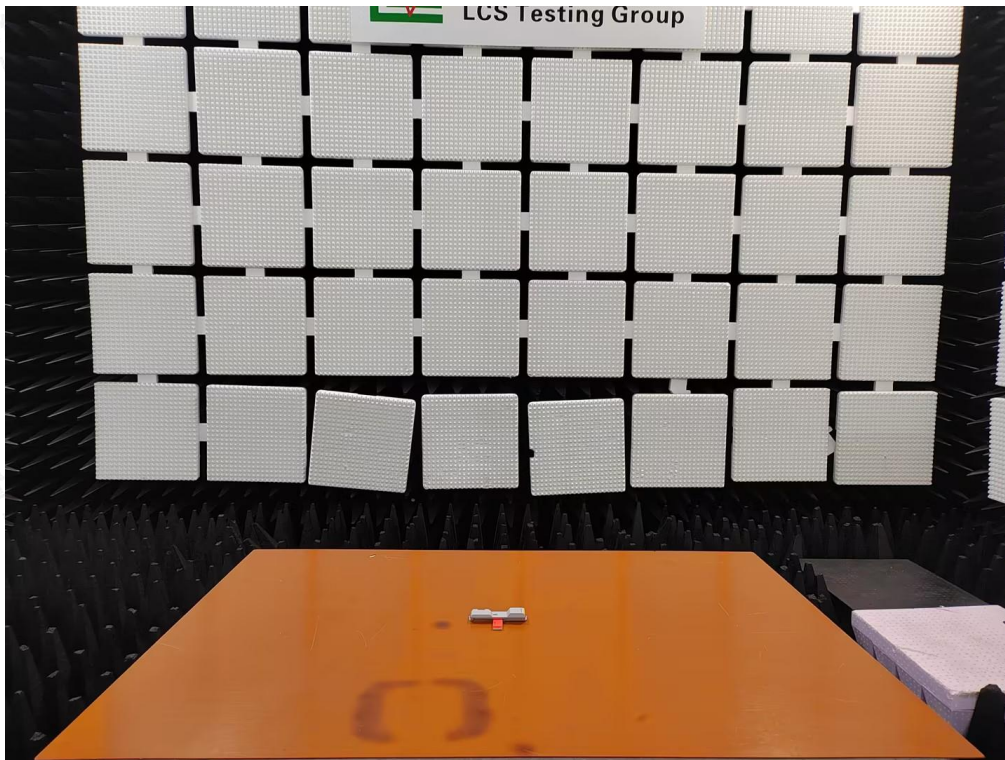


Test Setup Photo of Radiated Measurement (Below 1 GHz & Above 1 GHz)



Test Setup Photo of Electrostatic Discharge Test





RF Electromagnetic Field (80MHz to 6 000MHz )



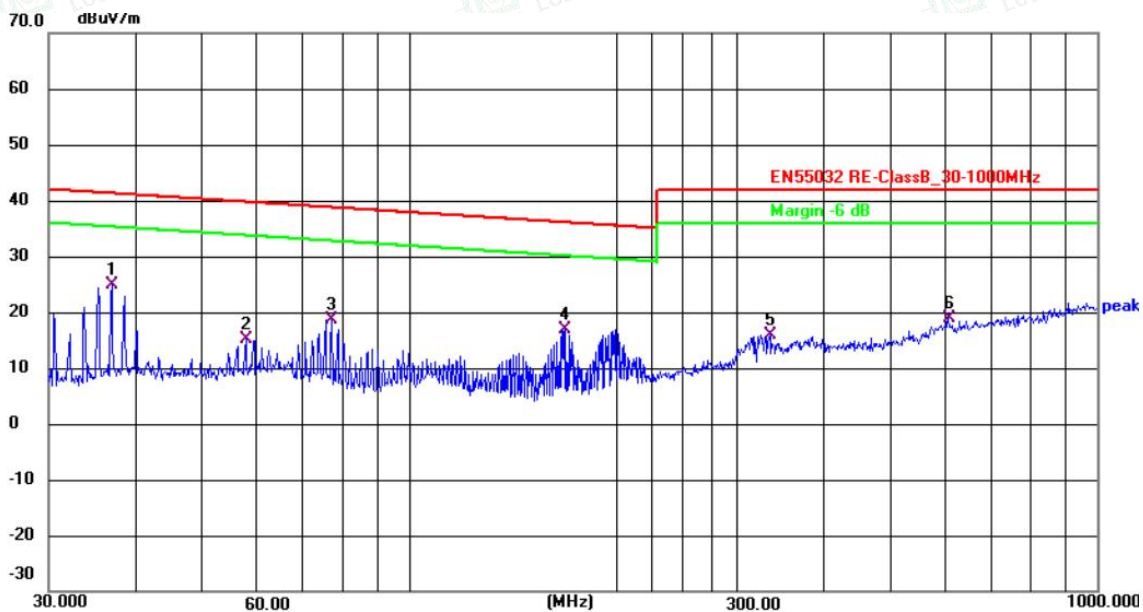
Test Setup Photo of Magnetic Field Immunity Test



**ANNEX B****(Emission and Immunity test results)****B.1 Radiated Disturbance Test Results (30MHz to 1000MHz)**

|                           |                  |
|---------------------------|------------------|
| Environmental Conditions: | 23.8°C, 52.3% RH |
| Test Voltage:             | DC 3V            |
| Test Model:               | BIN001-2         |
| Test Mode:                | Mode 1           |
| Test Engineer:            | Jay Luo          |
| Pol:                      | Vertical         |

Detailed results are shown below



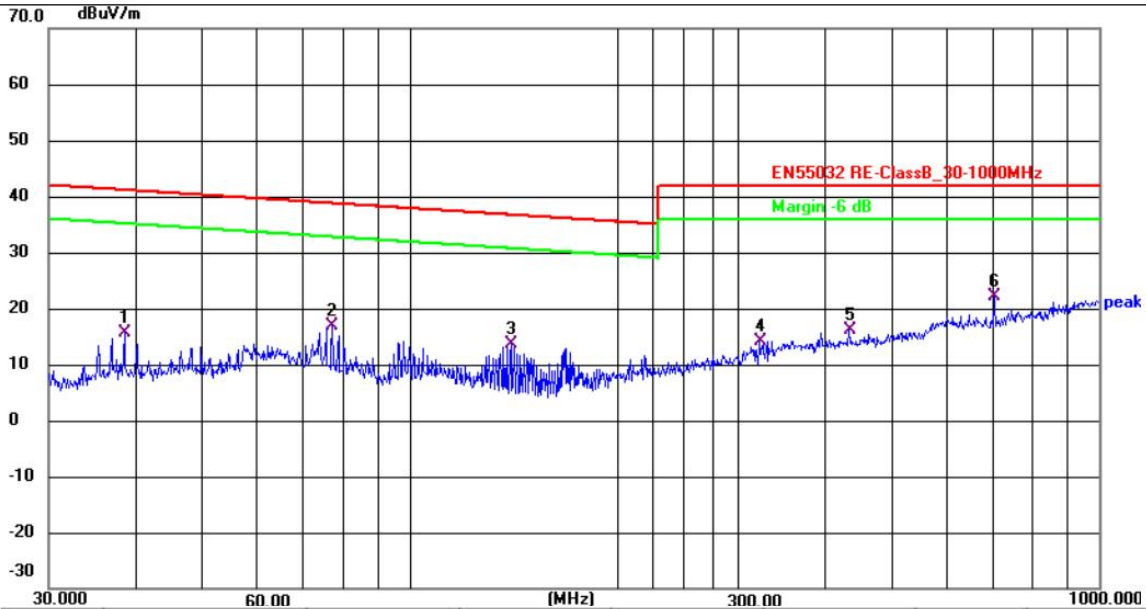
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 37.0248         | 42.56          | -17.69        | 24.87          | 41.28          | -16.41      | QP       |
| 2   | 57.9992         | 33.70          | -18.49        | 15.21          | 39.73          | -24.52      | QP       |
| 3   | 77.3210         | 38.45          | -19.77        | 18.68          | 38.75          | -20.07      | QP       |
| 4   | 169.0053        | 36.50          | -19.54        | 16.96          | 36.06          | -19.10      | QP       |
| 5   | 334.8588        | 30.34          | -14.46        | 15.88          | 42.00          | -26.12      | QP       |
| 6   | 607.7867        | 29.50          | -10.64        | 18.86          | 42.00          | -23.14      | QP       |





|                           |                 |
|---------------------------|-----------------|
| Environmental Conditions: | 23.8℃, 52.3% RH |
| Test Voltage:             | DC 3V           |
| Test Model:               | BIN001-2        |
| Test Mode:                | Mode 1          |
| Test Engineer:            | Jay Luo         |
| Pol:                      | Horizontal      |

Detailed results are shown below



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 38.6160         | 32.72          | -17.11        | 15.61          | 41.13          | -25.52      | QP       |
| 2   | 77.3210         | 36.61          | -19.74        | 16.87          | 38.75          | -21.88      | QP       |
| 3   | 140.3420        | 34.06          | -20.51        | 13.55          | 36.70          | -23.15      | QP       |
| 4   | 322.1885        | 29.39          | -15.32        | 14.07          | 42.00          | -27.93      | QP       |
| 5   | 434.0650        | 29.41          | -13.18        | 16.23          | 42.00          | -25.77      | QP       |
| 6   | 704.2261        | 31.63          | -9.45         | 22.18          | 42.00          | -19.82      | QP       |

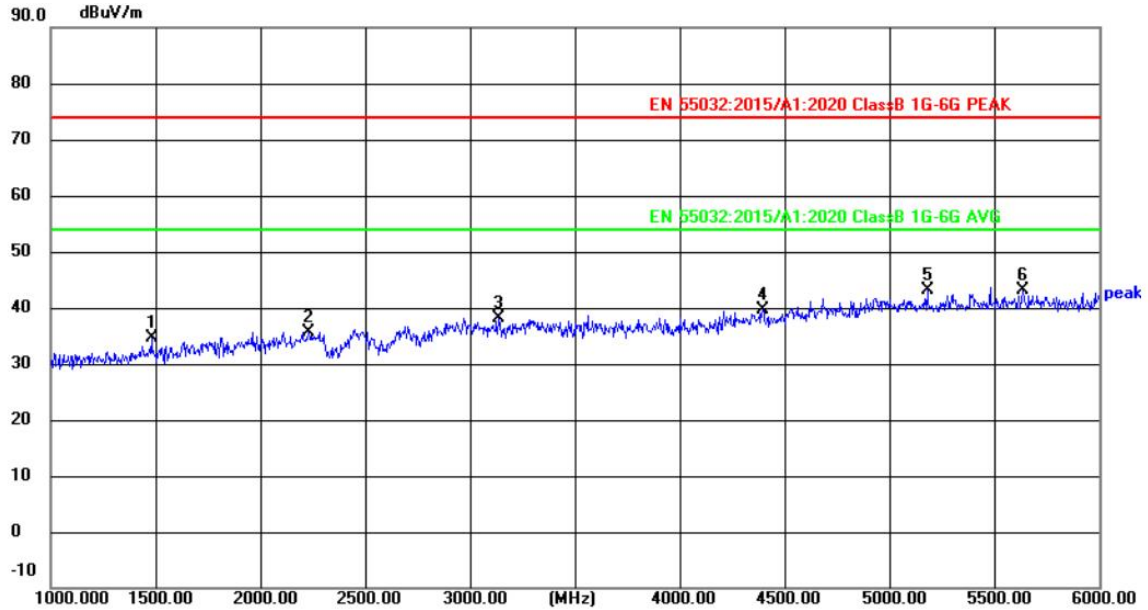
Note: Margin= Reading level + Correct factor – Limit

Correct Factor=Antenna Factor+Cable Factor- Pre-amplifier Factor





|                          |                  |                   |              |
|--------------------------|------------------|-------------------|--------------|
| Test Model               | BIN001-2         | Test Mode         | Mode 1       |
| Environmental Conditions | 23.5°C, 52.1% RH | Test Engineer     | Jay Luo      |
| Pol.                     | Vertical         | Detector Function | Peak+Average |
| Distance                 | 3m               | Test Voltage      | DC 3V        |

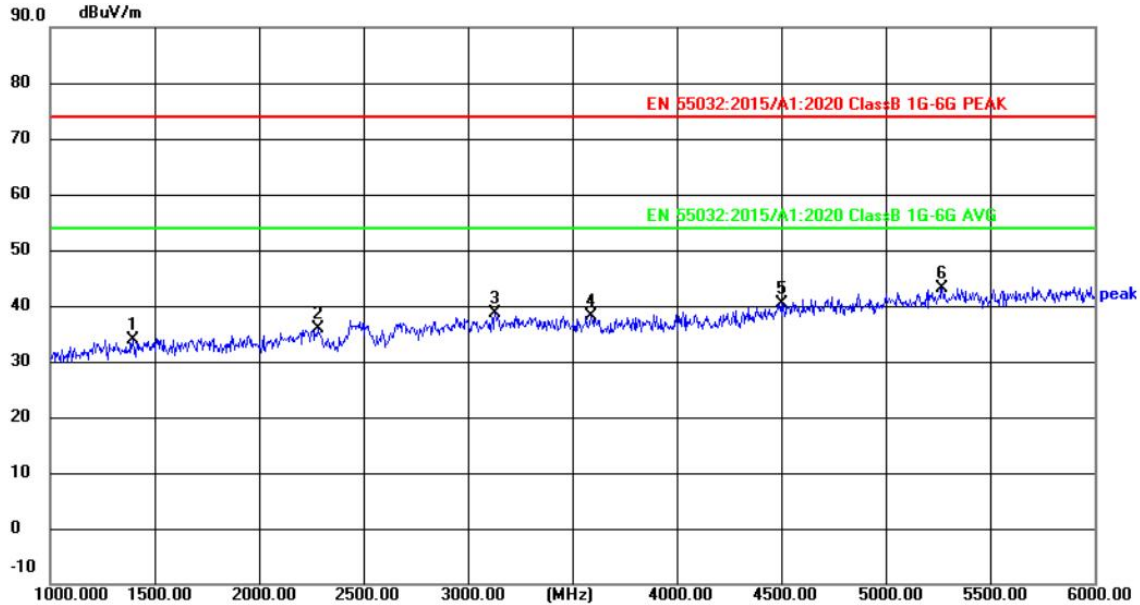


| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 1480.000        | 49.62          | -14.99        | 34.63          | 74.00          | -39.37      | peak     |
| 2   | 2230.000        | 48.04          | -12.30        | 35.74          | 74.00          | -38.26      | peak     |
| 3   | 3135.000        | 47.61          | -9.54         | 38.07          | 74.00          | -35.93      | peak     |
| 4   | 4395.000        | 46.63          | -6.99         | 39.64          | 74.00          | -34.36      | peak     |
| 5   | 5180.000        | 46.80          | -3.79         | 43.01          | 74.00          | -30.99      | peak     |
| 6   | 5635.000        | 46.48          | -3.33         | 43.15          | 74.00          | -30.85      | peak     |





|                          |                  |                   |              |
|--------------------------|------------------|-------------------|--------------|
| Test Model               | BIN001-2         | Test Mode         | Mode 1       |
| Environmental Conditions | 23.5°C, 52.1% RH | Test Engineer     | Jay Luo      |
| Pol.                     | Horizontal       | Detector Function | Peak+Average |
| Distance                 | 3m               | Test Voltage      | DC 3V        |



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 1395.000        | 49.14          | -15.25        | 33.89          | 74.00          | -40.11      | peak     |
| 2   | 2280.000        | 48.11          | -12.12        | 35.99          | 74.00          | -38.01      | peak     |
| 3   | 3130.000        | 48.27          | -9.54         | 38.73          | 74.00          | -35.27      | peak     |
| 4   | 3590.000        | 47.46          | -9.26         | 38.20          | 74.00          | -35.80      | peak     |
| 5   | 4500.000        | 46.84          | -6.58         | 40.26          | 74.00          | -33.74      | peak     |
| 6   | 5270.000        | 46.76          | -3.63         | 43.13          | 74.00          | -30.87      | peak     |

**Note:**

- Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- Measurements above show only up to 6 maximum emissions noted.
- Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- Margin= Reading level + Correct factor – Limit  
Correct Factor=Antenna Factor+Cable Factor- Pre-amplifier Factor





## B.2 ELECTROSTATIC DISCHARGE IMMUNITY TEST

| Electrostatic Discharge Test Results |                                                                                         |               |          |
|--------------------------------------|-----------------------------------------------------------------------------------------|---------------|----------|
| Standard                             | <input type="checkbox"/> IEC 61000-4-2 <input checked="" type="checkbox"/> EN 61000-4-2 |               |          |
| Applicant                            | Descartes System Group Inc                                                              |               |          |
| EUT                                  | Inventory control beacon tag                                                            | Temperature   | 23.5°C   |
| M/N                                  | BIN001-2                                                                                | Humidity      | 53.2%    |
| Criterion                            | B                                                                                       | Pressure      | 1021mbar |
| Test Mode                            | Mode 1                                                                                  | Test Engineer | Jay Luo  |

| Air Discharge                          |                                     |                                     |                                     |                                     |                            |                                       |                                       |
|----------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------------------|---------------------------------------|---------------------------------------|
| Test Points                            | Test Levels                         |                                     |                                     | Results                             |                            |                                       |                                       |
|                                        | ± 2kV                               | ± 4kV                               | ± 8kV                               | Passed                              | Fail                       | Performance Criterion                 |                                       |
| Front                                  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> A            | <input checked="" type="checkbox"/> B |
| Back                                   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> A            | <input checked="" type="checkbox"/> B |
| Left                                   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> A            | <input checked="" type="checkbox"/> B |
| Right                                  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> A            | <input checked="" type="checkbox"/> B |
| Top                                    | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> A            | <input checked="" type="checkbox"/> B |
| Bottom                                 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>   | <input type="checkbox"/> A            | <input checked="" type="checkbox"/> B |
| Contact Discharge                      |                                     |                                     |                                     |                                     |                            |                                       |                                       |
| Test Points                            | Test Levels                         |                                     | Results                             |                                     |                            |                                       |                                       |
|                                        | ± 2 kV                              | ±4 kV                               | Passed                              | Fail                                | Performance Criterion      |                                       |                                       |
| Front                                  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> A | <input checked="" type="checkbox"/> B |                                       |
| Back                                   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> A | <input checked="" type="checkbox"/> B |                                       |
| Left                                   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> A | <input checked="" type="checkbox"/> B |                                       |
| Right                                  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> A | <input checked="" type="checkbox"/> B |                                       |
| Top                                    | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> A | <input checked="" type="checkbox"/> B |                                       |
| Bottom                                 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> A | <input checked="" type="checkbox"/> B |                                       |
| Discharge To Horizontal Coupling Plane |                                     |                                     |                                     |                                     |                            |                                       |                                       |
| Side of EUT                            | Test Levels                         |                                     | Results                             |                                     |                            |                                       |                                       |
|                                        | ± 2 kV                              | ± 4 kV                              | Passed                              | Fail                                | Performance Criterion      |                                       |                                       |
| Front                                  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> A | <input checked="" type="checkbox"/> B |                                       |
| Back                                   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> A | <input checked="" type="checkbox"/> B |                                       |
| Left                                   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> A | <input checked="" type="checkbox"/> B |                                       |
| Right                                  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> A | <input checked="" type="checkbox"/> B |                                       |
| Discharge To Vertical Coupling Plane   |                                     |                                     |                                     |                                     |                            |                                       |                                       |
| Side of EUT                            | Test Levels                         |                                     | Results                             |                                     |                            |                                       |                                       |
|                                        | ± 2 kV                              | ± 4 kV                              | Passed                              | Fail                                | Performance Criterion      |                                       |                                       |
| Front                                  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> A | <input checked="" type="checkbox"/> B |                                       |
| Back                                   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> A | <input checked="" type="checkbox"/> B |                                       |
| Left                                   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> A | <input checked="" type="checkbox"/> B |                                       |
| Right                                  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> A | <input checked="" type="checkbox"/> B |                                       |



**B.3 RF FIELD STRENGTH SUSCEPTIBILITY TEST****RF Field Strength Susceptibility Test Results**

|                       |                                                                                                              |                      |         |
|-----------------------|--------------------------------------------------------------------------------------------------------------|----------------------|---------|
| <b>Standard</b>       | <input type="checkbox"/> IEC 61000-4-3 <input checked="" type="checkbox"/> EN 61000-4-3                      |                      |         |
| <b>Applicant</b>      | Descartes System Group Inc                                                                                   |                      |         |
| <b>EUT</b>            | Inventory control beacon tag                                                                                 | <b>Temperature</b>   | 23.3℃   |
| <b>M/N</b>            | BIN001-2                                                                                                     | <b>Humidity</b>      | 53.6%   |
| <b>Field Strength</b> | 3 V/m                                                                                                        | <b>Criterion</b>     | A       |
| <b>Test Mode</b>      | Mode 1                                                                                                       | <b>Test Engineer</b> | Jay Luo |
| <b>Test Frequency</b> | 80MHz to 1000MHz (Swept Test)<br>1800MHz, 2600MHz, 3500MHz,<br>5000MHz (spot test)                           |                      |         |
| <b>Modulation</b>     | <input type="checkbox"/> None <input type="checkbox"/> Pulse <input checked="" type="checkbox"/> AM 1KHz 80% |                      |         |
| <b>Steps</b>          | 1%                                                                                                           |                      |         |

|              | Horizontal | Vertical |
|--------------|------------|----------|
| <b>Front</b> | PASS       | PASS     |
| <b>Right</b> | PASS       | PASS     |
| <b>Rear</b>  | PASS       | PASS     |
| <b>Left</b>  | PASS       | PASS     |

**Test Equipment:**

1. Signal Generator: 2031 (MARCONI)
2. Power Amplifier: 500A100 & 100W/1000M1 (A&R)
3. Power Antenna: 3108 (EMCO) & AT1080 (A&R)
4. Field Monitor: FM2000 (A&R)

**Note:**

**B.4 MAGNETIC FIELD SUSCEPTIBILITY TEST**

| Magnetic Field Immunity Test Result |                                                                                         |             |       |
|-------------------------------------|-----------------------------------------------------------------------------------------|-------------|-------|
| Standard                            | <input type="checkbox"/> IEC 61000-4-8 <input checked="" type="checkbox"/> EN 61000-4-8 |             |       |
| Applicant                           | Descartes System Group Inc                                                              |             |       |
| EUT                                 | Inventory control beacon tag                                                            | Temperature | 22.3℃ |
| M/N                                 | BIN001-2                                                                                | Humidity    | 52.1% |
| Test Mode                           | Mode 1                                                                                  | Criterion   | A     |
| Test Engineer                       | Jay Luo                                                                                 |             |       |

| Test Level (A/M) | Testing Duration | Coil Orientation | Criterion | Result |
|------------------|------------------|------------------|-----------|--------|
| 1                | 5 mins           | X                | A         | PASS   |
| 1                | 5 mins           | Y                | A         | PASS   |
| 1                | 5 mins           | Z                | A         | PASS   |

Note:



Shenzhen LCS Compliance Testing Laboratory Ltd.  
Add: Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street,  
Bao'an District, Shenzhen, Guangdong, China  
Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com  
Scan code to check authenticity



## 6. PHOTOGRAPHS OF THE EUT

Please refer to separated files Appendix C for Photographs of The EUT.

----- THE END OF TEST REPORT -----

