

Test Report No:  
2440193R-RFUSV01S-B

## TEST REPORT

### FCC Rules&Regulations

|                                 |  |
|---------------------------------|--|
| Product Name                    | DC Collector   |
| Brand Name                      | Farmfit LLC  |
| Model No.                       | FF-COLDC-1.0-915   |
| FCC ID                          | 2BEWM-FFCOLDC1915  |
| Contains FCC ID                 | MCQ-XBEE3  |
| Applicant's Name / Address      | Farmfit LLC<br>22575 State Hwy 6 South, Navasota, Texas 77868, United States |
| Manufacturer's Name             | Farmfit LLC  |
| Test Method Requested, Standard | FCC CFR Title 47 Part 15 Subpart C Section 15.247<br>ANSI C63.10-2013        |
| Verdict Summary                 | IN COMPLIANCE  |
| Documented By Ida Tung          | <i>Ida Tung</i>  |
| Tested By Ivan Chuang           | <i>Ivan Chuang</i>   |
| Approved By Alan Chen           | <i>Alan Chen</i>   |
| Date of Receipt                 | 2024/04/09   |
| Date of Issue                   | 2024/07/11   |
| Report Version                  | V1.0   |

## INDEX

|  | page |
|--|------|
| Competences and Guarantees.....                            | 4    |
| General Conditions .....                                   | 4    |
| Revision History .....                                     | 5    |
| Summary of Test Result.....                                | 6    |
| 1. General Information.....                                | 7    |
| 1.1. EUT Description .....                                 | 7    |
| 1.2. EUT Information .....                                 | 8    |
| 1.3. Testing Location Information .....                    | 9    |
| 1.4. Measurement Uncertainty .....                         | 10   |
| 1.5. List of Test Equipment .....                          | 11   |
| 2. Test Configuration of EUT .....                         | 12   |
| 2.1. Test Condition.....                                   | 12   |
| 2.2. Test Frequency Mode.....                              | 12   |
| 2.3. Duty Cycle .....                                      | 13   |
| 2.4. Measurement Configuration.....                        | 14   |
| 2.5. Tested System Details.....                            | 15   |
| 2.6. Configuration of Tested System .....                  | 15   |
| 2.7. EUT Exercise Software .....                           | 15   |
| 3. AC Power Line Conducted Emission .....                  | 16   |
| 3.1. Test Setup .....                                      | 16   |
| 3.2. Test Limit .....                                      | 16   |
| 3.3. Test Procedure .....                                  | 16   |
| 3.4. Test Result of AC Power Line Conducted Emission ..... | 16   |
| 4. 20dB Bandwidth .....                                    | 17   |
| 4.1. Test Setup .....                                      | 17   |
| 4.2. Test Limit .....                                      | 17   |
| 4.3. Test Procedures .....                                 | 17   |
| 4.4. Test Result of 20dB Bandwidth .....                   | 17   |
| 5. Carrier Frequency Separation .....                      | 18   |
| 5.1. Test Setup .....                                      | 18   |
| 5.2. Test Limit .....                                      | 18   |
| 5.3. Test Procedures .....                                 | 18   |
| 5.4. Test Result of Carrier Frequency Separation.....      | 18   |
| 6. Maximum Conducted Output Power .....                    | 19   |
| 6.1. Test Setup .....                                      | 19   |
| 6.2. Test Limit .....                                      | 19   |

|   |  |    |
|---|--|----|
| 6.3.  | Test Procedures .....                                | 19 |
| 6.4.  | Test Result of Maximum Conducted Output Power .....  | 19 |
| 7.  | Number of Hopping Frequency .....                    | 20 |
| 7.1.  | Test Setup .....                                     | 20 |
| 7.2.  | Test Limit .....                                     | 20 |
| 7.3.  | Test Procedure .....                                 | 20 |
| 7.4.  | Test Result of Number of Hopping Frequency .....     | 20 |
| 8.  | Dwell Time .....                                     | 21 |
| 8.1.  | Test Setup .....                                     | 21 |
| 8.2.  | Test Limit .....                                     | 21 |
| 8.3.  | Test Procedure .....                                 | 21 |
| 8.4.  | Test Result of Dwell Time .....                      | 21 |
| 9.  | Antenna Port Conducted Emission .....                | 22 |
| 9.1.  | Test Setup .....                                     | 22 |
| 9.2.  | Test Limit .....                                     | 22 |
| 9.3.  | Test Procedure .....                                 | 22 |
| 9.4.  | Test Result of Antenna Port Conducted Emission ..... | 22 |
| 10.   | Radiated Emission .....                              | 23 |
| 10.1.   | Test Setup .....                                     | 23 |
| 10.2.   | Test Limit .....                                     | 24 |
| 10.3.   | Test Procedure .....                                 | 24 |
| 10.4.   | Test Result of Radiated Emission .....               | 24 |
| Appendix A. Test Result of AC Power Line Conducted Emission |  |    |
| Appendix B. Test Result of 20dB Bandwidth                   |  |    |
| Appendix C. Test Result of Carrier Frequency Separation     |  |    |
| Appendix D. Test Result of Maximum Conducted Output Power   |  |    |
| Appendix E. Test Result of Number of Hopping Frequency      |  |    |
| Appendix F. Test Result of Dwell Time                       |  |    |
| Appendix G. Test Result of Antenna Port Conducted Emission  |  |    |
| Appendix H. Test Result of Radiated Emission                |  |    |
| Appendix I. Test Setup Photograph                           |  |    |

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## Competences and Guarantees

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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## General Conditions

1. The test results relate only to the samples tested.
2. The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.
3. This report must not be used to claim product endorsement by TAF or any agency of the government.
4. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.
5. Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Revision History

| Version | Description             | Issued Date |
|---------|-------------------------|-------------|
| V1.0    | Initial issue of report | 2024/07/11  |

## Summary of Test Result

| Report Clause | Test Items                       | Result (PASS/FAIL) | Remark |
|---------------|----------------------------------|--------------------|--------|
| 3             | AC Power Line Conducted Emission | PASS               | -      |
| 4             | 20dB Bandwidth                   | PASS               | -      |
| 5             | Carrier Frequency Separation     | PASS               | -      |
| 6             | Maximum Conducted Output Power   | PASS               | -      |
| 7             | Number of Hopping Frequency      | PASS               | -      |
| 8             | Dwell Time                       | PASS               | -      |
| 9             | Antenna Port Conducted Emission  | PASS               | -      |
| 10            | Radiated Emission                | PASS               | -      |

### Comments and Explanations

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

## 1. General Information

### 1.1. EUT Description

|                     |                  |
|---------------------|------------------|
| Frequency Range     | 902 ~ 928 MHz    |
| Operating Frequency | 915 ~ 919.86 MHz |
| Channel Number      | 50 Channels      |
| Type of Modulation  | FHSS             |

| Accessories Information |                |            |            |  |   |
|-------------------------|----------------|------------|------------|--|---|
| No.                     | Equipment Name | Brand Name | Model No.  | Rating   | Remark                                  |
| 1                       | Power Supply   | TRI-MAG    | L6R06H-120 | INPUT: 100-240V~50/60Hz 0.3A<br>OUTPUT: 12V==500mA | With power cable:<br>Non-shielded, 1.4m |

| Antenna Information |            |          |       |            |
|---------------------|------------|----------|-------|------------|
| Item.               | Brand Name | Part No. | Type  | Gain (dBi) |
| 1                   | L-COM      | HG908P   | Patch | 8          |

**Note:**

1. The above EUT information is declared by the manufacturer.
2. The antenna of EUT conforms to FCC 15.203.

| Working Frequency of Each Channel |                 |         |                 |         |                 |
|-----------------------------------|-----------------|---------|-----------------|---------|-----------------|
| Channel                           | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 00                                | 915.00          | 01      | 915.10          | 02      | 915.20          |
| 03                                | 915.30          | 04      | 915.40          | 05      | 915.50          |
| 06                                | 915.60          | 07      | 915.69          | 08      | 915.79          |
| 09                                | 915.89          | 10      | 915.99          | 11      | 916.09          |
| 12                                | 916.19          | 13      | 916.29          | 14      | 916.39          |
| 15                                | 916.49          | 16      | 916.59          | 17      | 916.69          |
| 18                                | 916.79          | 19      | 916.88          | 20      | 916.98          |
| 21                                | 917.08          | 22      | 917.18          | 23      | 917.28          |
| 24                                | 917.38          | 25      | 917.48          | 26      | 917.58          |
| 27                                | 917.68          | 28      | 917.78          | 29      | 917.88          |
| 30                                | 917.98          | 31      | 918.07          | 32      | 918.17          |
| 33                                | 918.27          | 34      | 918.37          | 35      | 918.47          |
| 36                                | 918.57          | 37      | 918.67          | 38      | 918.77          |
| 39                                | 918.87          | 40      | 918.97          | 41      | 919.07          |
| 42                                | 919.17          | 43      | 919.26          | 44      | 919.36          |
| 45                                | 919.46          | 46      | 919.56          | 47      | 919.66          |
| 48                                | 919.76          | 49      | 919.86          | --      | --              |

## 1.2. EUT Information

|                |              |
|----------------|--------------|
| EUT Power Type | From Adapter |
|----------------|--------------|



### 1.3. Testing Location Information

|        |   |
|--------|---|
| USA    | FCC Registration Number: TW0033                       |
| Canada | CAB Identifier Number: TW3023 / Company Number: 26930 |

|                  |                         |
|------------------|-------------------------|
| Site Description | Accredited by TAF       |
|                  | Accredited Number: 3023 |

|                    |  |
|--------------------|--|
| Test Laboratory    | DEKRA Testing and Certification Co., Ltd.                                    |
|                    | Linkou Laboratory  |
| Address            | No. 5-22, Ruishukeng Linkou District, New Taipei City, 24451, Taiwan, R.O.C. |
| Performed Location | No. 26, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan, R.O.C.    |
| Phone Number       | +886-3-275-7255  |
| Fax Number         | +886-3-327-8031  |

Ambient conditions in the laboratory:

| Performed Item                   | Items            | Required | Actual  | Test Date             |
|----------------------------------|------------------|----------|---------|-----------------------|
| AC Power Line Conducted Emission | Temperature (°C) | 10~40 °C | 23.4 °C | 2024/04/30            |
|                                  | Humidity (%RH)   | 10~90 %  | 55.2 %  |                       |
| Radiated Emission                | Temperature (°C) | 10~40 °C | 25.3 °C | 2024/04/08~2024/04/12 |
|                                  | Humidity (%RH)   | 10~90 %  | 66.0 %  |                       |
| RF Conducted Emission            | Temperature (°C) | 10~40 °C | 23.6 °C | 2024/04/17            |
|                                  | Humidity (%RH)   | 10~90 %  | 55.2 %  |                       |

#### 1.4. Measurement Uncertainty

Uncertainties have been calculated according to the DEKRA internal document with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

| Test item                        | Uncertainty   |
|----------------------------------|---|
| AC Power Line Conducted Emission | $\pm 3.50$ dB   |
| 20dB Bandwidth                   | $\pm 1580.61$ Hz  |
| Carrier Frequency Separation     | $\pm 1580.61$ Hz  |
| Maximum Conducted Output Power   | Spectrum Analyzer: $\pm 2.14$ dB<br>Power Meter: $\pm 1.05$ dB  |
| Number of Hopping Frequency      | N/A   |
| Dwell Time                       | $\pm 0.53$ %  |
| Antenna Port Conducted Emission  | $\pm 2.14$ dB   |
| Radiated Emission                | 9 kHz~30 MHz: $\pm 3.88$ dB<br>30 MHz~1 GHz: $\pm 4.42$ dB<br>1 GHz~18 GHz: $\pm 4.28$ dB<br>18 GHz~40 GHz: $\pm 3.90$ dB |

## 1.5. List of Test Equipment

### For Conduction Measurements / HY-SR01

|   | Equipment          | Manufacturer | Model No. | Serial No. | Cal. Date  | Due Date   |
|---|--------------------|--------------|-----------|------------|------------|------------|
| V | EMI Test Receiver  | R&S          | ESR7      | 101601     | 2023/06/20 | 2024/06/19 |
| V | Two-Line V-Network | R&S          | ENV216    | 101478     | 2023/09/13 | 2024/09/12 |
| V | Two-Line V-Network | R&S          | ENV216    | 101307     | 2023/08/17 | 2024/08/16 |
| V | Coaxial Cable      | SUHNER       | RG400_BNC | RF001      | 2024/01/10 | 2025/01/09 |

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "V" are used to measure the final test results.
3. Test Software Version: e3 230303 dekra V9.

### For Conducted Measurements / HY-SR02

|   | Equipment             | Manufacturer | Model No. | Serial No. | Cal. Date  | Due Date   |
|---|-----------------------|--------------|-----------|------------|------------|------------|
| V | Spectrum Analyzer     | R&S          | FSV30     | 103465     | 2023/06/14 | 2024/06/13 |
| V | Spectrum Analyzer     | KEYSIGHT     | N9010A    | MY53470892 | 2023/11/09 | 2024/11/08 |
| V | Peak Power Analyzer   | KEYSIGHT     | 8990B     | MY51000539 | 2023/05/15 | 2024/05/14 |
| V | Wideband Power Sensor | KEYSIGHT     | N1923A    | MY59240002 | 2023/05/18 | 2024/05/17 |
| V | Wideband Power Sensor | KEYSIGHT     | N1923A    | MY59240003 | 2023/05/18 | 2024/05/17 |

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "V" are used to measure the final test results.
3. Test Software Version: RF Conducted Test Tools R3 V3.0.0.14.

### For Radiated Measurements /HY-CB03

|   | Equipment         | Manufacturer  | Model No.         | Serial No.   | Cal. Date  | Due Date   |
|---|-------------------|---------------|-------------------|--------------|------------|------------|
|   | Loop Antenna      | AMETEK        | HLA6121           | 56736        | 2023/05/23 | 2024/05/24 |
| V | Bi-Log Antenna    | SCHWARZBECK   | VULB9168          | 9168-0675    | 2023/08/09 | 2025/08/08 |
| V | Horn Antenna      | RF SPIN       | DRH18-E           | 210507A18ES  | 2023/05/11 | 2024/05/10 |
|   | Horn Antenna      | Com-Power     | AH-840            | 101100       | 2023/10/02 | 2025/10/01 |
| V | Pre-Amplifier     | SGH           | SGH0301-9         | 20211007-11  | 2024/01/10 | 2025/01/09 |
| V | Pre-Amplifier     | SGH           | SGH118-HS         | 20200701     | 2024/01/10 | 2025/01/09 |
| V | Pre-Amplifier     | EMCI          | EMC05820SE        | 980310       | 2024/01/10 | 2025/01/09 |
|   | Pre-Amplifier     | EMCI          | EMC184045SE       | 980369       | 2024/01/10 | 2025/01/09 |
|   | Coaxial Cable     | EMCI          | EMC102-KM-KM-600  | 1160314      | 2024/01/10 | 2025/01/09 |
|   | Coaxial Cable     | EMCI          | EMC102-KM-KM-7000 | 170242       | 2024/01/10 | 2025/01/09 |
|   | Filter            | MICRO TRONICS | BRM50702          | G249         | 2024/01/05 | 2025/01/04 |
|   | Filter            | MICRO TRONICS | BRM50716          | G067         | 2024/01/05 | 2025/01/04 |
| V | EMI Test Receiver | R&S           | ESR3              | 102793       | 2023/12/11 | 2024/12/10 |
| V | Spectrum Analyzer | R&S           | FSV3044           | 101115       | 2024/01/11 | 2025/01/10 |
| V | Coaxial Cable     | SGH           | HA800             | GD20110223-2 | 2024/01/10 | 2025/01/09 |
| V | Coaxial Cable     | SGH           | HA800             | GD20110222-4 | 2024/01/10 | 2025/01/09 |
| V | Coaxial Cable     | SGH           | SGH18             | 202108-5     | 2024/01/10 | 2025/01/09 |
| V | Coaxial Cable     | SGH           | SGH18             | 202212-2     | 2023/11/27 | 2024/11/26 |

Note:

1. Bi-Log Antenna and Horn Antenna (AH-840) is calibrated every two years, the other equipments are calibrated every one year.
2. The test instruments marked with "V" are used to measure the final test results.
3. Test Software Version: e3 230303 dekra V9.

**2. Test Configuration of EUT**

**2.1. Test Condition**

|                           |              |
|---------------------------|--------------|
| EUT Operational Condition |              |
| Testing Voltage           | AC 120V/60Hz |

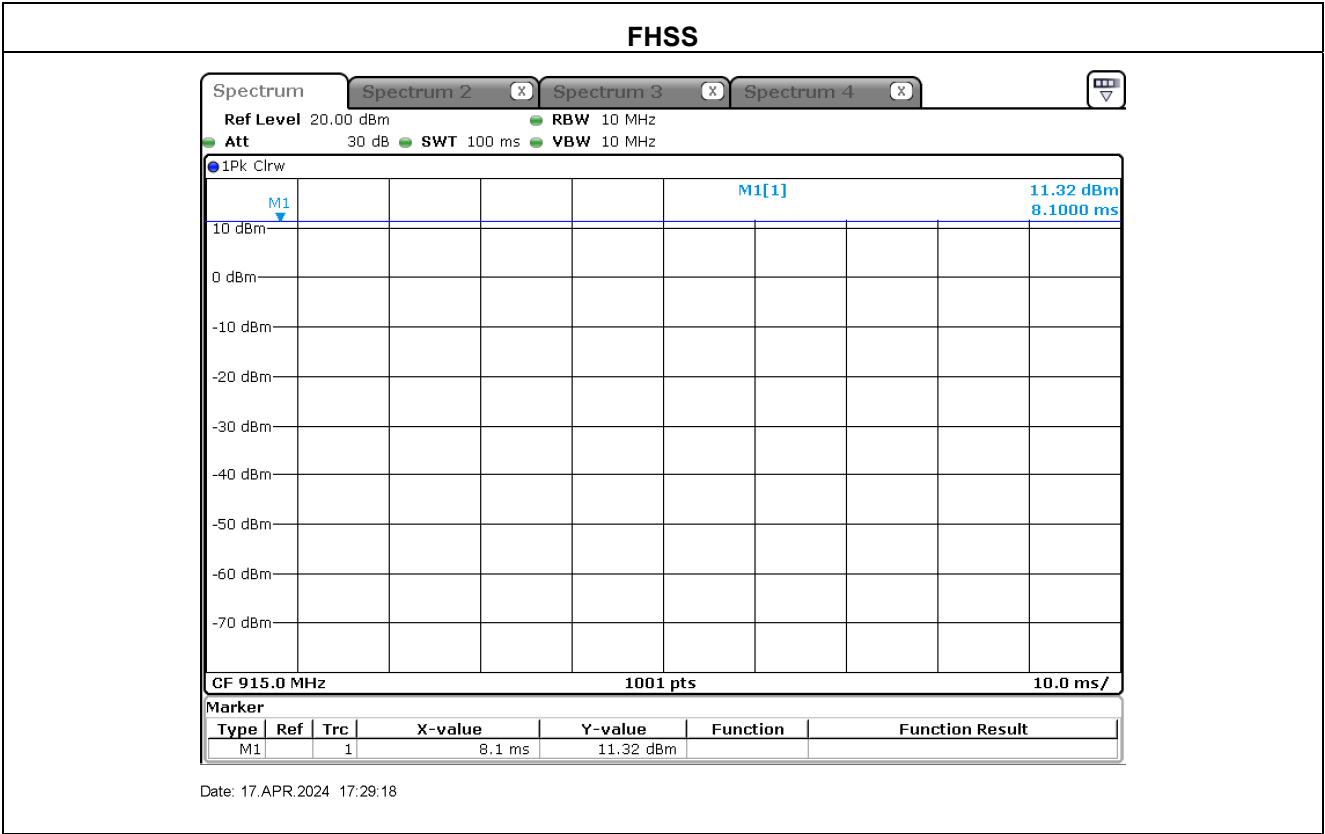
**2.2. Test Frequency Mode**

|                       |  |
|-----------------------|--|
| Test Software Version | Collector build / Version 1.56-100641172 |
|-----------------------|--|

| Modulation | Frequency (MHz) | Power Setting |
|------------|-----------------|---------------|
| FHSS       | 915             | 11            |
|            | 919.86          | 11            |

2.3. Duty Cycle

| Modulation | On Times (ms) | On+Off Times (ms) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) |
|------------|---------------|-------------------|----------------|-----------------------------------|
| FHSS       | --            | --                | 100            | --                                |



**2.4. Measurement Configuration**

|           |        |          |
|-----------|--------|----------|
| Test Mode | Mode 1 | Transmit |
|-----------|--------|----------|

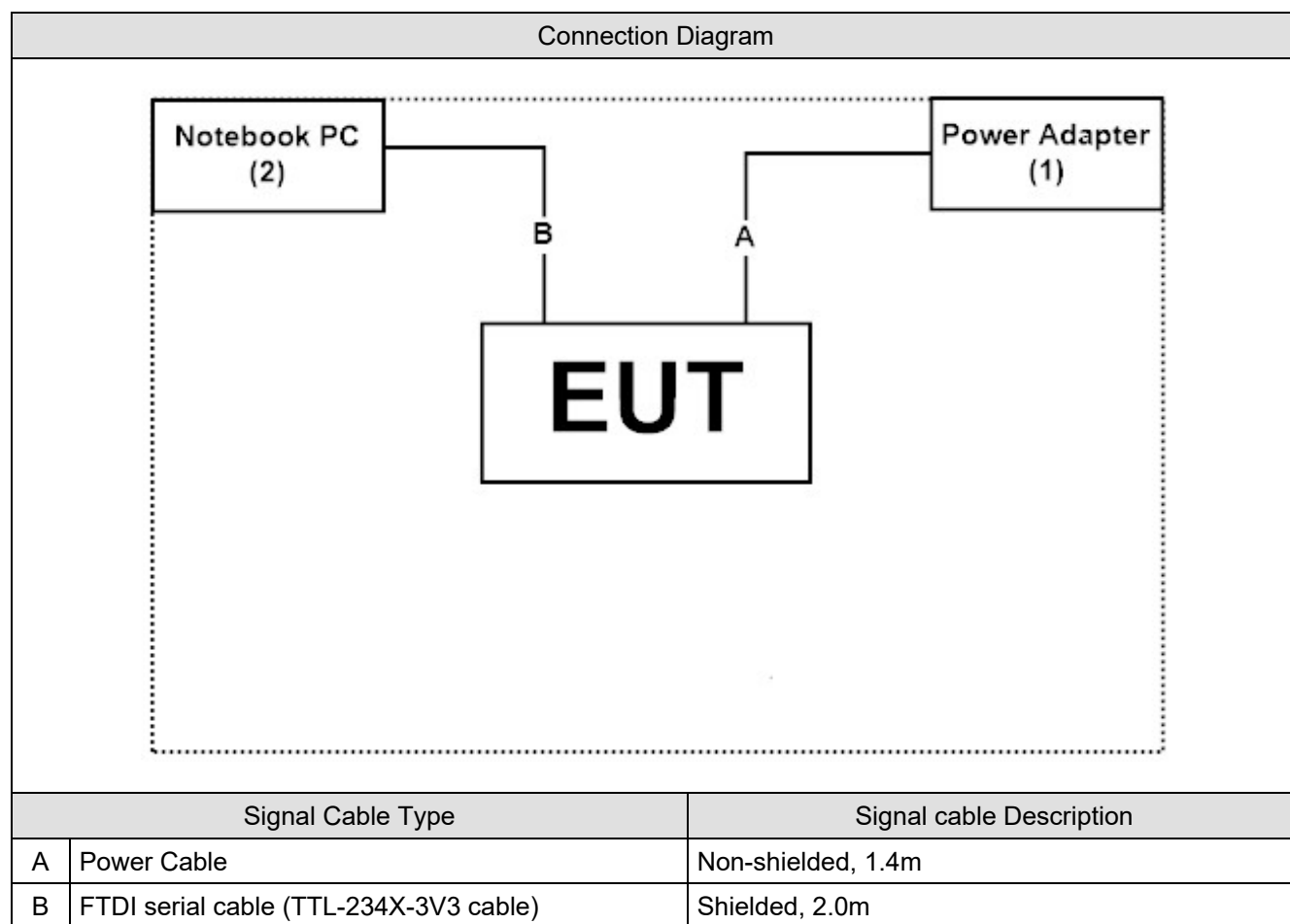
Note:

- 1. Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- 2. For radiated emission below 1 GHz and AC power line conducted emission have performed all modes of operation were investigated and the worst-case emissions are reported.

## 2.5. Tested System Details

| No. | Equipment     | Brand Name | Model No.     | Serial No. | Power Cord |
|-----|---------------|------------|---------------|------------|------------|
| 1   | Power Adapter | TRI-MAG    | L6R06H-120    | N/A        | N/A        |
| 2   | Notebook PC   | DELL       | Latitude 5580 | GDZN7H2    | N/A        |

## 2.6. Configuration of Tested System

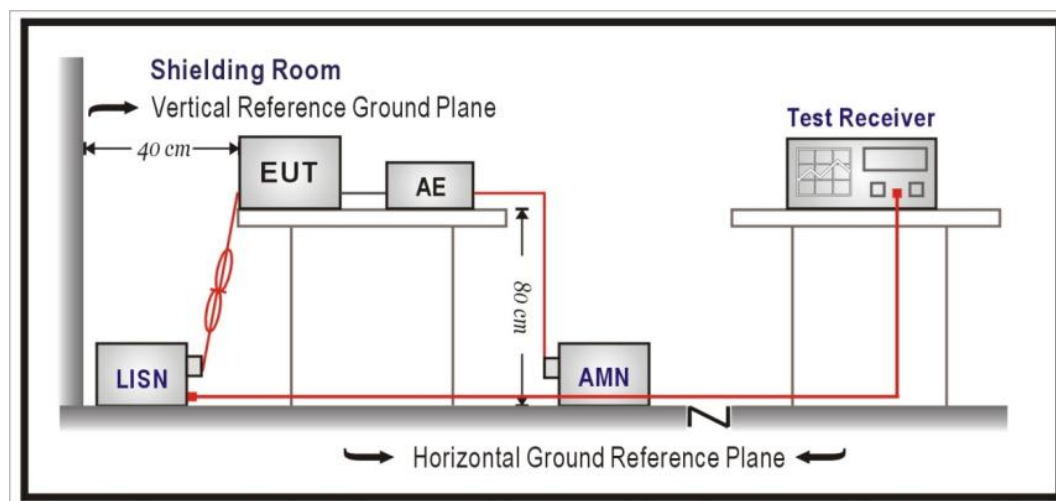


## 2.7. EUT Exercise Software

|    |   |
|----|---|
| 1. | Setup the EUT as shown in Section 2.6.  |
| 2. | Execute software "Collector build / Version 1.56-100641172" on the Notebook PC. |
| 3. | Configure the test mode.  |
| 4. | Verify that the EUT works properly.   |

### 3. AC Power Line Conducted Emission

#### 3.1. Test Setup



#### 3.2. Test Limit

| Frequency (MHz) | QP (dBuV) | AV (dBuV) |
|-----------------|-----------|-----------|
| 0.15 - 0.50     | 66 - 56   | 56 - 46   |
| 0.50 - 5.0      | 56        | 46        |
| 5.0 - 30        | 60        | 50        |

Remarks: In the above table, the tighter limit applies at the band edges.

#### 3.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 for AC Power Line Conducted Emissions.

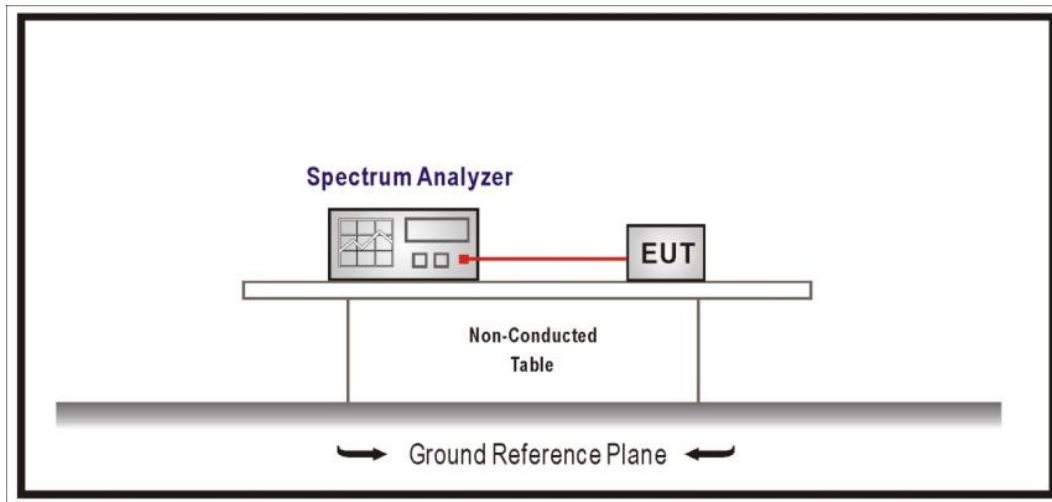
#### 3.4. Test Result of AC Power Line Conducted Emission

Refer as Appendix A



#### 4. 20dB Bandwidth

##### 4.1. Test Setup



##### 4.2. Test Limit

N/A

##### 4.3. Test Procedures

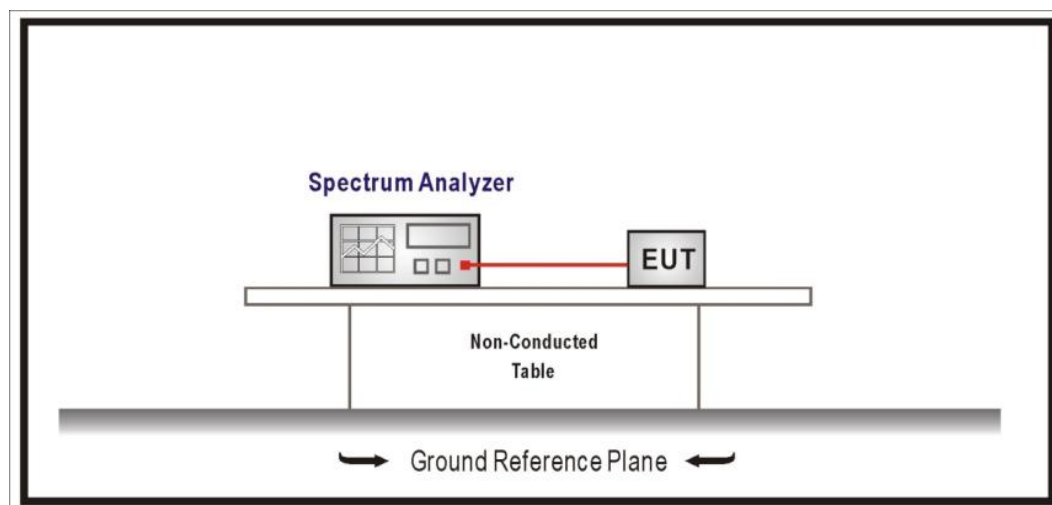
The EUT was setup according to ANSI C63.10: 2013 and tested according to FHSS test procedure of KDB 558074.

##### 4.4. Test Result of 20dB Bandwidth

Refer as Appendix B

## 5. Carrier Frequency Separation

### 5.1. Test Setup



### 5.2. Test Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400 ~ 2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with a Maximum Conducted Output Power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

### 5.3. Test Procedures

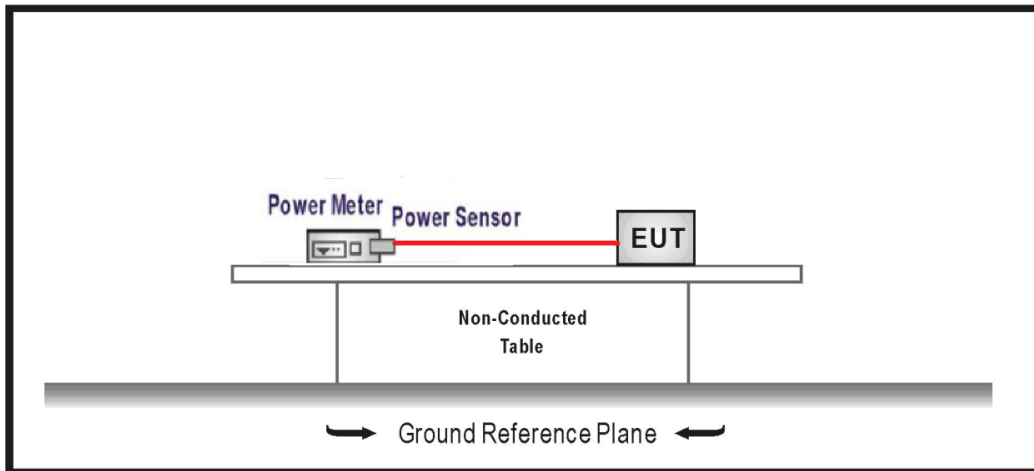
The EUT was setup according to ANSI C63.10: 2013 and tested according to FHSS test procedure of KDB 558074.

### 5.4. Test Result of Carrier Frequency Separation

Refer as Appendix C

## 6. Maximum Conducted Output Power

### 6.1. Test Setup



### 6.2. Test Limit

For frequency hopping systems operating in the 902 ~ 928 MHz band:

1. Number of Hopping Frequencies  $\geq 50$ : 1 watt (30dBm)
2.  $50 >$  Number of Hopping Frequencies  $\geq 25$ : 0.25 watt (23.98dBm)

For frequency hopping systems operating in the 2400 ~ 2483.5 MHz band:

1. Number of Hopping Frequencies  $\geq 75$ : 1 watt (30dBm)
2.  $75 >$  Number of Hopping Frequencies  $\geq 15$ : 0.125 watts (20.97dBm)

For frequency hopping systems operating in the 5725 ~ 5850 MHz band:

Number of Hopping Frequencies  $\geq 75$ : 1 watt (30dBm)

### 6.3. Test Procedures

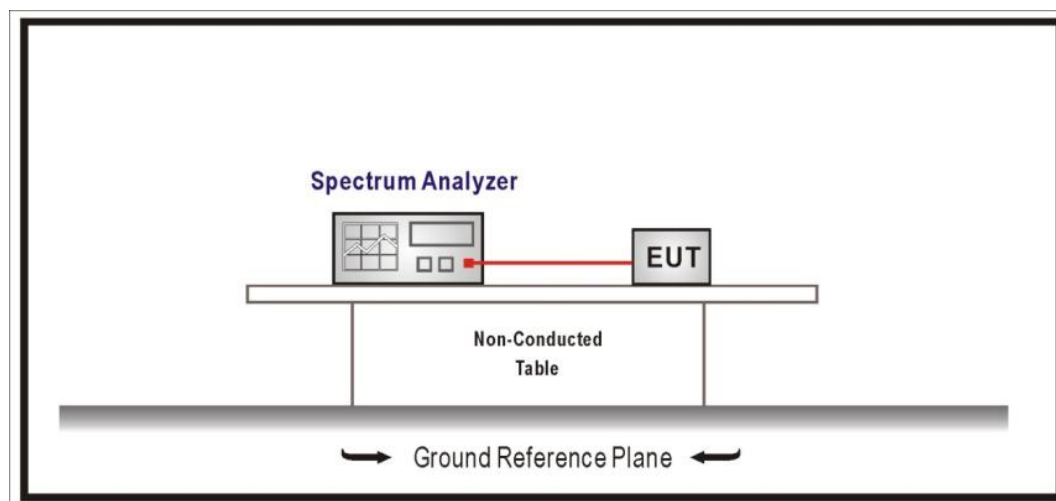
The EUT was setup according to ANSI C63.10: 2013 and tested according to FHSS test procedure of KDB 558074.

### 6.4. Test Result of Maximum Conducted Output Power

Refer as Appendix D

## 7. Number of Hopping Frequency

### 7.1. Test Setup



### 7.2. Test Limit

For frequency hopping systems operating in the 902 ~ 928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Frequency hopping systems in the 2400 ~ 2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Frequency hopping systems operating in the 5725 ~ 5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

### 7.3. Test Procedure

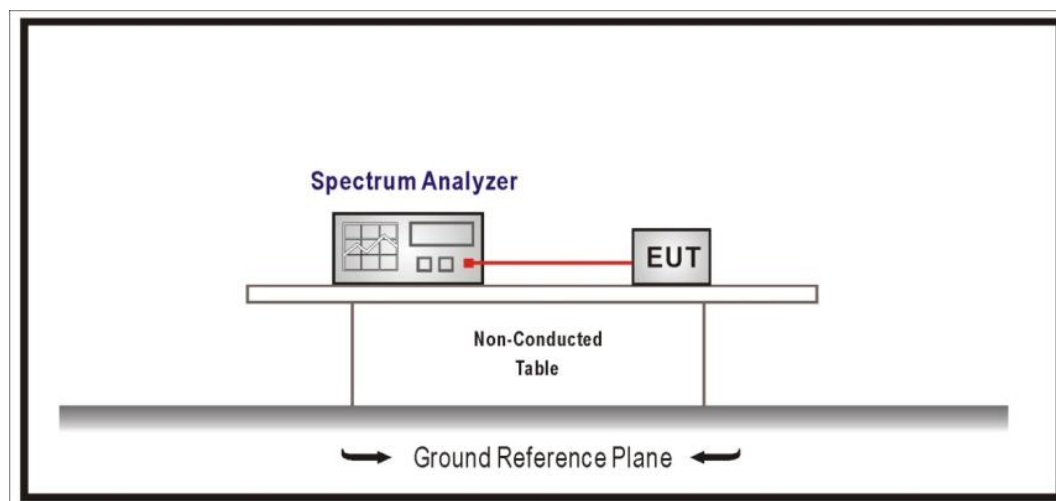
The EUT was setup according to ANSI C63.10: 2013 and tested according to FHSS test procedure of KDB 558074.

### 7.4. Test Result of Number of Hopping Frequency

Refer as Appendix E

## 8. Dwell Time

### 8.1. Test Setup



### 8.2. Test Limit

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

For frequency hopping systems operating in the 2400-2483.5 MHz bands. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

For frequency hopping systems operating in the 5725-5850 MHz bands. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

### 8.3. Test Procedure

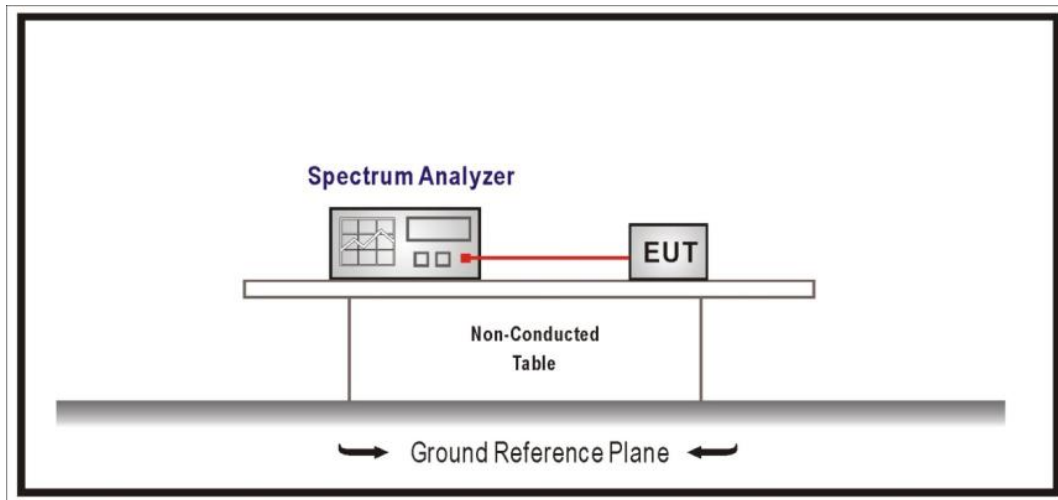
The EUT was setup according to ANSI C63.10: 2013 and tested according to FHSS test procedure of KDB 558074.

### 8.4. Test Result of Dwell Time

Refer as Appendix F

## 9. Antenna Port Conducted Emission

### 9.1. Test Setup



### 9.2. Test Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted measurement, provided the transmitter demonstrates compliance with the peak conducted power limit.

### 9.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to FHSS test procedure of KDB 558074.

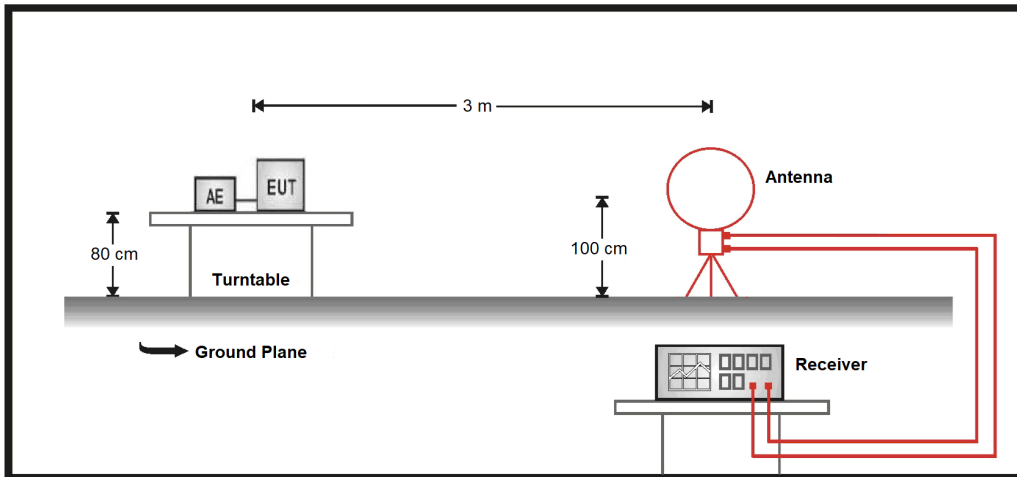
### 9.4. Test Result of Antenna Port Conducted Emission

Refer as Appendix G

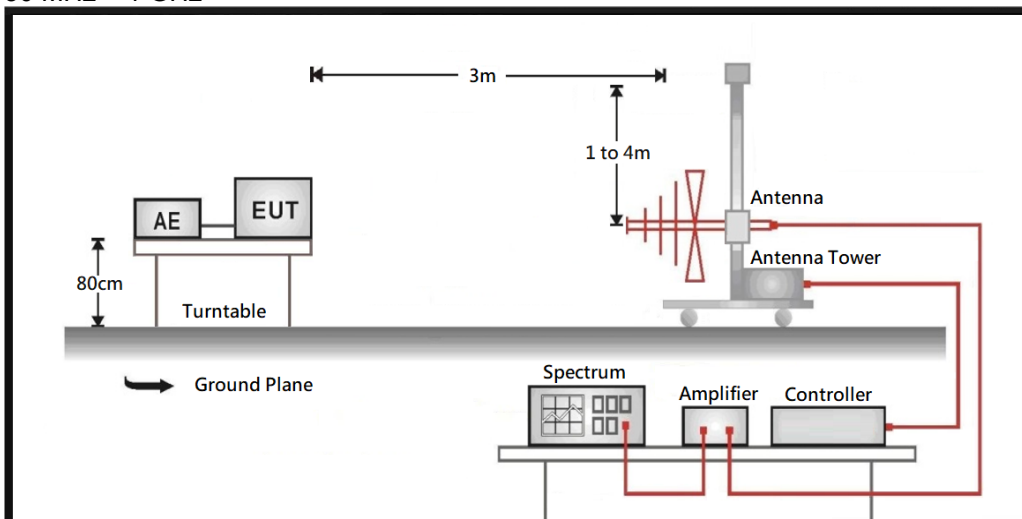
## 10. Radiated Emission

### 10.1. Test Setup

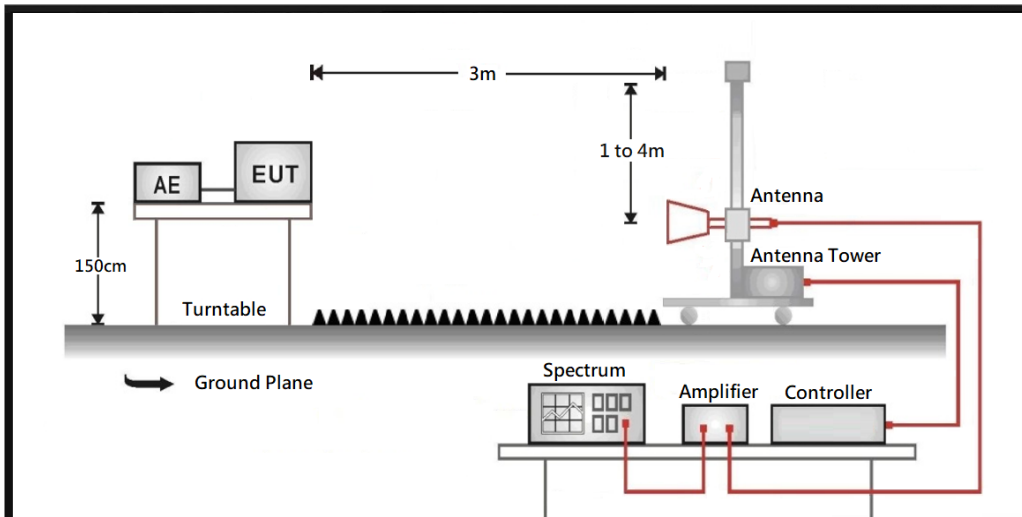
9 kHz ~ 30 MHz



30 MHz ~ 1 GHz



Above 1 GHz



## 10.2. Test Limit

| Frequency (MHz) | Field strength (uV/m) | Field strength (dBuV/m) | Measurement distance (m) |
|-----------------|-----------------------|-------------------------|--------------------------|
| 0.009 – 0.490   | 2400/F(kHz)           | 20 log (2400/F(kHz))    | 300                      |
| 0.490 – 1.705   | 24000/F(kHz)          | 20 log (24000/F(kHz))   | 30                       |
| 1.705 - 30      | 30                    | 29.5                    | 30                       |
| 30 - 88         | 100                   | 40                      | 3                        |
| 88 - 216        | 150                   | 43.5                    | 3                        |
| 216 - 960       | 200                   | 46                      | 3                        |
| Above 960       | 500                   | 54                      | 3                        |

Remarks:

1. Field strength (dBuV/m) = 20 log Field strength (uV/m)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

## 10.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to FHSS test procedure of KDB 558074.

The EUT and its simulators are placed on a turn table which is 0.8 or 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

On any frequency or frequencies from 9 kHz (include The the lowest oscillator frequency generated within the device up to the 10th harmonic) to 1000 MHz, the limit shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limit shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

The bandwidth below 1 GHz setting on the field strength meter is 120 kHz and above 1 GHz is 1 MHz.

## 10.4. Test Result of Radiated Emission

Refer as Appendix H