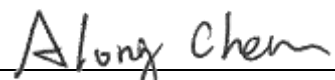


# FCC Test Report

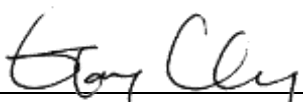
**FCC ID** : HDC-17600072  
**Equipment** : WiFi 6 Mesh AP  
**Model No.** : SDG-8622  
**Brand Name** : Adtran  
**Applicant** : Adtran  
**Address** : 901 Explorer Boulevard, Huntsville, Alabama,  
United States, 35806-2807  
**Standard** : 47 CFR FCC Part 15.407  
**Received Date** : May 31, 2023  
**Tested Date** : Jun. 02 ~ Jul. 05, 2023

We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:

  
Along Chen / Assistant Manager

Approved by:

  
Gary Chang / Manager

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## Release Record

| Report No. | Version | Description   | Issued Date   |
|------------|---------|---------------|---------------|
| FR353101AN | Rev. 01 | Initial issue | Sep. 01, 2023 |

## Summary of Test Results

| FCC Rules           | Test Items                        | Measured                                                                                                                                                                                                                                                           | Result |
|---------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 15.207              | AC Power Line Conducted Emissions | [dBuV]: 0.153MHz<br>49.40 (Margin -6.42dB) - AV                                                                                                                                                                                                                    | Pass   |
| 15.407(b)<br>15.209 | Unwanted Emissions                | [dBuV/m at 3m]: 5650.00MHz<br>68.10 (Margin -0.10dB) - PK                                                                                                                                                                                                          | Pass   |
| 15.407(a)           | Emission Bandwidth                | Meet the requirement of limit                                                                                                                                                                                                                                      | Pass   |
| 15.407(e)           | 6dB bandwidth                     | Meet the requirement of limit                                                                                                                                                                                                                                      | Pass   |
| 15.407(a)           | Conducted Output Power            | Max Power [dBm]:<br><b>Non-beamforming mode</b><br>5150~5250MHz: 26.86<br>5250~5350MHz: 23.35<br>5470~5725MHz: 23.83<br>5725~5850MHz: 27.77<br><b>Beamforming mode</b><br>5150~5250MHz: 25.91<br>5250~5350MHz: 19.42<br>5470~5725MHz: 19.46<br>5725~5850MHz: 25.44 | Pass   |
| 15.407(a)           | Power Spectral Density            | Meet the requirement of limit                                                                                                                                                                                                                                      | Pass   |
| 15.407(g)           | Frequency Stability               | Meet the requirement of limit                                                                                                                                                                                                                                      | Pass   |
| 15.203              | Antenna Requirement               | Meet the requirement of limit                                                                                                                                                                                                                                      | Pass   |

### Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

### 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 Description

## 1.1 Information

### 1.1.1 Specification of the Equipment under Test (EUT)

| RF General Information                                                                                                                                    |                  |                                                  |                                                       |                                    |                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------------------------|-------------------------------------------------------|------------------------------------|-----------------|
| Frequency Range (MHz)                                                                                                                                     | IEEE Std. 802.11 | Ch. Freq. (MHz)                                  | Channel Number                                        | Transmit Chains (N <sub>TX</sub> ) | Data Rate / MCS |
| 5150-5250<br>5250-5350<br>5470-5725<br>5725-5850                                                                                                          | a                | 5180-5240<br>5260-5320<br>5500-5720<br>5745-5825 | 36-48 [4]<br>52-64 [4]<br>100-144 [12]<br>149-165 [5] | 4                                  | 6-54 Mbps       |
| 5150-5250<br>5250-5350<br>5470-5725<br>5725-5850                                                                                                          | n (HT20)         | 5180-5240<br>5260-5320<br>5500-5720<br>5745-5825 | 36-48 [4]<br>52-64 [4]<br>100-144 [12]<br>149-165 [5] | 4                                  | MCS 0-31        |
| 5150-5250<br>5250-5350<br>5470-5725<br>5725-5850                                                                                                          | n (HT40)         | 5190-5230<br>5270-5310<br>5510-5710<br>5755-5795 | 38-46 [2]<br>54-62 [2]<br>102-142 [6]<br>151-159 [2]  | 4                                  | MCS 0-31        |
| 5150-5250<br>5250-5350<br>5470-5725<br>5725-5850                                                                                                          | ac (VHT20)       | 5180-5240<br>5260-5320<br>5500-5720<br>5745-5825 | 36-48 [4]<br>52-64 [4]<br>100-144 [12]<br>149-165 [5] | 4                                  | MCS 0-9         |
| 5150-5250<br>5250-5350<br>5470-5725<br>5725-5850                                                                                                          | ac (VHT40)       | 5190-5230<br>5270-5310<br>5510-5710<br>5755-5795 | 38-46 [2]<br>54-62 [2]<br>102-142 [6]<br>151-159 [2]  | 4                                  | MCS 0-9         |
| 5150-5250<br>5250-5350<br>5470-5725<br>5725-5850                                                                                                          | ac (VHT80)       | 5210<br>5290<br>5530~5690<br>5775                | 42 [1]<br>58 [1]<br>106-138 [3]<br>155 [1]            | 4                                  | MCS 0-9         |
| 5500-5700                                                                                                                                                 | ac (VHT160)      | 5570                                             | 114 [1]                                               | 4                                  | MCS 0-11        |
| 5150-5250<br>5250-5350<br>5470-5725<br>5725-5850                                                                                                          | ax (HE20)        | 5180-5240<br>5260-5320<br>5500-5720<br>5745-5825 | 36-48 [4]<br>52-64 [4]<br>100-144 [12]<br>149-165 [5] | 4                                  | MCS 0-11        |
| 5150-5250<br>5250-5350<br>5470-5725<br>5725-5850                                                                                                          | ax (HE40)        | 5190-5230<br>5270-5310<br>5510-5710<br>5755-5795 | 38-46 [2]<br>54-62 [2]<br>102-142 [6]<br>151-159 [2]  | 4                                  | MCS 0-11        |
| 5150-5250<br>5250-5350<br>5470-5725<br>5725-5850                                                                                                          | ax (HE80)        | 5210<br>5290<br>5530~5690<br>5775                | 42 [1]<br>58 [1]<br>106-138 [3]<br>155 [1]            | 4                                  | MCS 0-11        |
| 5500-5700                                                                                                                                                 | ax (HE160)       | 5570                                             | 114 [1]                                               | 4                                  | MCS 0-11        |
| Note 1: BPSK, QPSK, 16QAM, 64QAM, 256QAM and 1024QAM modulation.<br>Note 2: 802.11ax supports beamforming function.<br>Note 3: TPC function is supported. |                  |                                                  |                                                       |                                    |                 |

### 1.1.2 Antenna Details

| Ant. No. | Model         | Type   | Connector | Operating Frequencies (MHz) / Antenna Gain (dBi) |           |           |           |           |
|----------|---------------|--------|-----------|--------------------------------------------------|-----------|-----------|-----------|-----------|
|          |               |        |           | 2400~2483.5                                      | 5150~5250 | 5250~5350 | 5470~5725 | 5725~5850 |
| 1        | DB1           | Dipole | UFL       | 3.618                                            | --        | --        | 4.341     | 4.341     |
| 2        | DB2           | Dipole | UFL       | 3.414                                            | --        | --        | 4.289     | 4.174     |
| 3        | DB3           | Dipole | UFL       | 3.099                                            | --        | --        | 4.634     | 4.634     |
| 4        | DB4           | Dipole | UFL       | 4.574                                            | --        | --        | 4.188     | 4.223     |
| 5        | 5G1           | Dipole | UFL       | --                                               | 3.983     | 3.544     | --        | --        |
| 6        | 5G2           | Dipole | UFL       | --                                               | 3.713     | 4.354     | --        | --        |
| 7        | 5G3           | Dipole | UFL       | --                                               | 3.385     | 4.633     | --        | --        |
| 8        | 5G4           | Dipole | UFL       | --                                               | 4.338     | 4.69      | --        | --        |
| 9        | zero wait DFS | PIFA   | NA        |                                                  |           | 5.756     | 5.013     |           |

### 1.1.3 Power Supply Type of Equipment under Test (EUT)

|                          |                       |
|--------------------------|-----------------------|
| <b>Power Supply Type</b> | 15Vdc from AC adapter |
|--------------------------|-----------------------|

### 1.1.4 Accessories

| Accessories |            |                                                                                                                                                |
|-------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| No.         | Equipment  | Description                                                                                                                                    |
| 1           | AC adapter | Brand: LUCENT TRANS<br>Model: 1A78<br>I/P: 100-240Vac, 50/60Hz, 1.2A<br>O/P: 15V=3.0A, 45.0W<br>Power Line: USB 1.8m non-shielded without core |
| 2           | RJ45 cable | 2m non-shielded without core                                                                                                                   |

### 1.1.5 Channel List

| 802.11a / n HT20 / ac VHT20 / ax HE20 |                | 802.11n HT40 / ac VHT40 / ax HE40 |                |
|---------------------------------------|----------------|-----------------------------------|----------------|
| Channel                               | Frequency(MHz) | Channel                           | Frequency(MHz) |
| 36                                    | 5180           | 38                                | 5190           |
| 40                                    | 5200           | 46                                | 5230           |
| 44                                    | 5220           | 54                                | 5270           |
| 48                                    | 5240           | 62                                | 5310           |
| 52                                    | 5260           | 102                               | 5510           |
| 56                                    | 5280           | 110                               | 5550           |
| 60                                    | 5300           | 118                               | 5590           |
| 64                                    | 5320           | 126                               | 5630           |
| 100                                   | 5500           | 134                               | 5670           |
| 104                                   | 5520           | 142                               | 5710           |
| 108                                   | 5540           | 151                               | 5755           |
| 112                                   | 5560           | 159                               | 5795           |
| 116                                   | 5580           | 802.11ac VHT80 / ax HE80          |                |
| 120                                   | 5600           | 42                                | 5210           |
| 124                                   | 5620           | 58                                | 5290           |
| 128                                   | 5640           | 106                               | 5530           |
| 132                                   | 5660           | 122                               | 5610           |
| 136                                   | 5680           | 138                               | 5690           |
| 140                                   | 5700           | 155                               | 5775           |
| 144                                   | 5720           | ac VHT160 / ax HE160              |                |
| 149                                   | 5745           | 114                               | 5570           |
| 153                                   | 5765           | ---                               | ---            |
| 157                                   | 5785           | ---                               | ---            |
| 161                                   | 5805           | ---                               | ---            |
| 165                                   | 5825           | ---                               | ---            |

### 1.1.6 Test Tool and Duty Cycle

Frequency Range (MHz) : 5150-5250 & 5250-5350

| Test Tool                  | Non-beamforming: QATool, Version: UIv2.88_DLLv6.93_ap_2022.01.04(V14)c<br>Beamforming: Putty, Version: 0.6 |                 |                  |                |                  |
|----------------------------|------------------------------------------------------------------------------------------------------------|-----------------|------------------|----------------|------------------|
| Duty Cycle and Duty Factor | Mode                                                                                                       | Non-beamforming |                  | Beamforming    |                  |
|                            |                                                                                                            | Duty cycle (%)  | Duty factor (dB) | Duty cycle (%) | Duty factor (dB) |
|                            | 11a                                                                                                        | 98.98%          | 0.04             | ---            | ---              |
|                            | ax HE20                                                                                                    | 98.23%          | 0.08             | 77.27%         | 1.12             |
|                            | ax HE40                                                                                                    | 95.61%          | 0.20             | 65.91%         | 1.81             |
|                            | ax HE80                                                                                                    | 91.04%          | 0.41             | 51.16%         | 2.91             |

Frequency Range (MHz) : 5470-5725 & 5725-5850

| Test Tool                  | Non-beamforming: QATool, Version: UIv2.88_DLLv6.93_ap_2022.01.04(V14)c<br>Beamforming: Putty, Version: 0.6 |                 |                  |                |                  |
|----------------------------|------------------------------------------------------------------------------------------------------------|-----------------|------------------|----------------|------------------|
| Duty Cycle and Duty Factor | Mode                                                                                                       | Non-beamforming |                  | Beamforming    |                  |
|                            |                                                                                                            | Duty cycle (%)  | Duty factor (dB) | Duty cycle (%) | Duty factor (dB) |
|                            | 11a                                                                                                        | 98.98%          | 0.04             | ---            | ---              |
|                            | ax HE20                                                                                                    | 98.23%          | 0.08             | 95.87%         | 0.18             |
|                            | ax HE40                                                                                                    | 95.61%          | 0.20             | 87.79%         | 0.57             |
|                            | ax HE80                                                                                                    | 91.04%          | 0.41             | 77.21%         | 1.12             |
|                            | ax HE160                                                                                                   | 84.70%          | 0.72             | 65.28%         | 1.85             |

### 1.1.7 Power Index of Test Tool

| Modulation Mode | Test Frequency (MHz) | Power Index     |             |
|-----------------|----------------------|-----------------|-------------|
|                 |                      | Non-Beamforming | Beamforming |
| 11a             | 5180                 | 16              | ---         |
| 11a             | 5200                 | 16.5            | ---         |
| 11a             | 5240                 | 16              | ---         |
| 11a             | 5260                 | 9.5             | ---         |
| 11a             | 5300                 | 9.5             | ---         |
| 11a             | 5320                 | 9.5             | ---         |
| 11a             | 5500                 | 10              | ---         |
| 11a             | 5580                 | 10              | ---         |
| 11a             | 5700                 | 10              | ---         |
| 11a             | 5720                 | 10              | ---         |
| 11a             | 5745                 | 19.5            | ---         |
| 11a             | 5785                 | 18              | ---         |
| 11a             | 5825                 | 18.5            | ---         |
| ax HE20         | 5180                 | 17.5            | 35          |
| ax HE20         | 5200                 | 17              | 34          |
| ax HE20         | 5240                 | 17              | 34          |
| ax HE20         | 5260                 | 10.5            | 21          |
| ax HE20         | 5300                 | 10.5            | 21          |
| ax HE20         | 5320                 | 10.5            | 21          |
| ax HE20         | 5500                 | 11              | 21          |
| ax HE20         | 5580                 | 11              | 21          |
| ax HE20         | 5700                 | 11              | 21          |
| ax HE20         | 5720                 | 11              | 21          |
| ax HE20         | 5745                 | 19.5            | 34          |
| ax HE20         | 5785                 | 18.5            | 34          |
| ax HE20         | 5825                 | 18.5            | 35          |
| ax HE40         | 5190                 | 15.5            | 31          |
| ax HE40         | 5230                 | 18.5            | 35          |
| ax HE40         | 5270                 | 13              | 22          |
| ax HE40         | 5310                 | 12.5            | 22          |
| ax HE40         | 5510                 | 13              | 22          |
| ax HE40         | 5590                 | 13              | 22          |
| ax HE40         | 5670                 | 13              | 22          |

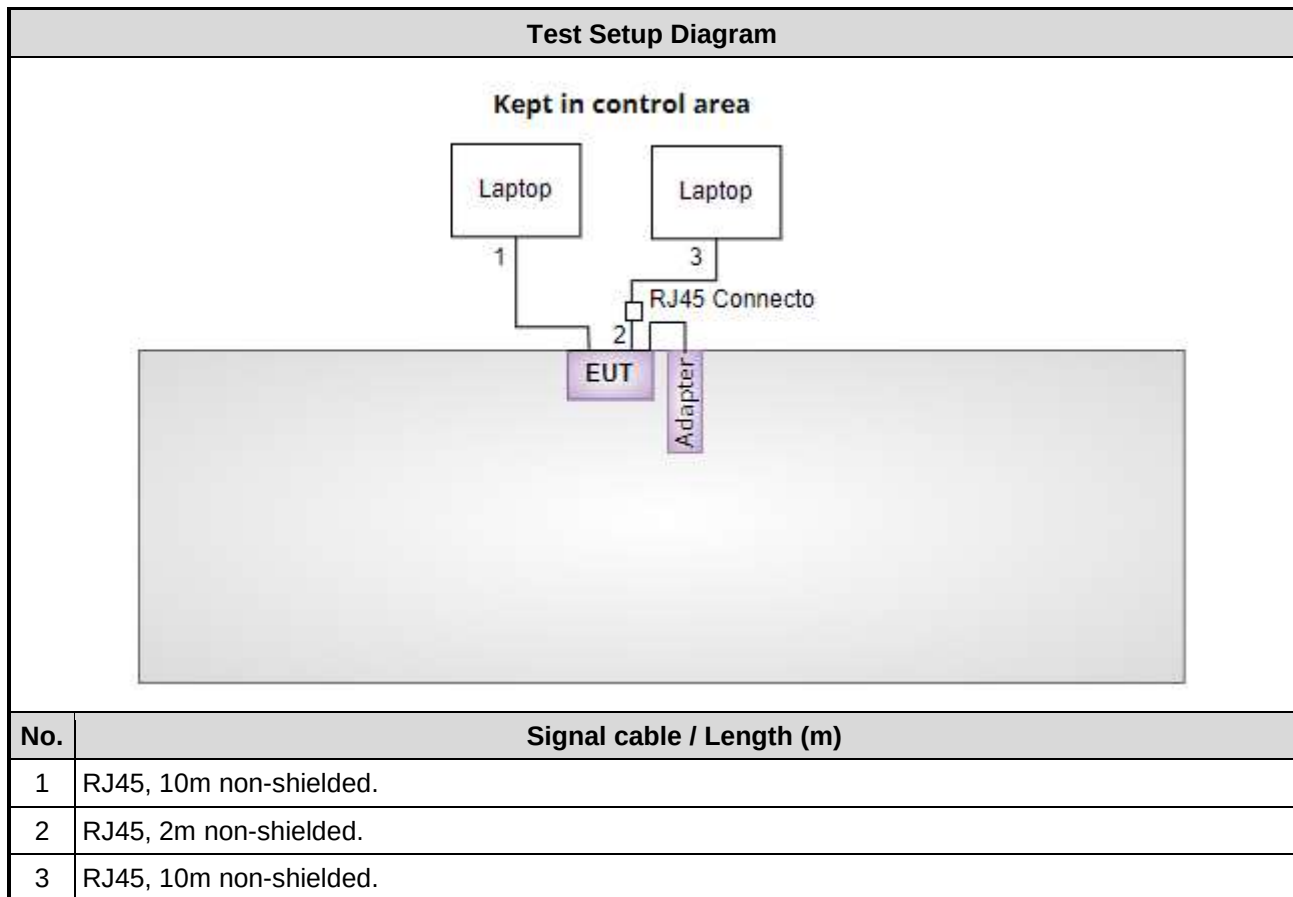
|          |      |      |    |
|----------|------|------|----|
| ax HE40  | 5710 | 13   | 22 |
| ax HE40  | 5755 | 18.5 | 35 |
| ax HE40  | 5795 | 19.5 | 35 |
| ax HE80  | 5210 | 14.5 | 29 |
| ax HE80  | 5290 | 15.5 | 24 |
| ax HE80  | 5530 | 13   | 22 |
| ax HE80  | 5610 | 16   | 22 |
| ax HE80  | 5690 | 15.5 | 23 |
| ax HE80  | 5775 | 15.5 | 31 |
| ax HE160 | 5570 | 14   | 27 |

## 1.2 Local Support Equipment List

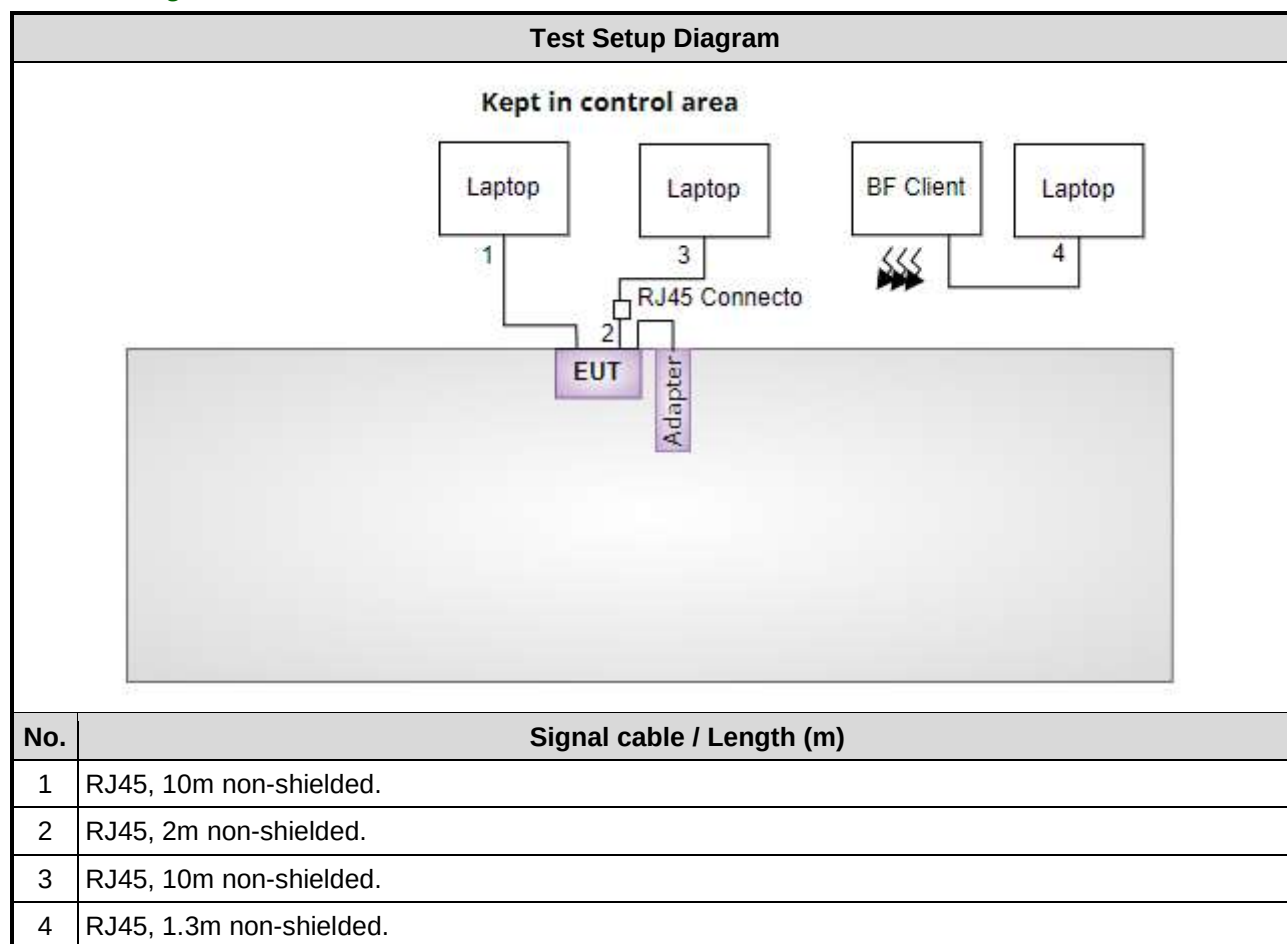
| Support Equipment List |               |           |                |        |                            |
|------------------------|---------------|-----------|----------------|--------|----------------------------|
| No.                    | Equipment     | Brand     | Model          | FCC ID | Remarks                    |
| 1                      | Laptop        | DELL      | Latitude 5400  | DoC    | ---                        |
| 2                      | Laptop        | DELL      | Latitude E5470 | DoC    | ---                        |
| 3                      | USB 3.0 Flash | Transcend | JetFlash 700   | ---    | ---                        |
| 4                      | Laptop        | DELL      | Latitude E5470 | DoC    | For Beamforming mode only. |
| 5                      | BF Client     | Gemtek    | SDG-8622       | ---    | For Beamforming mode only. |

## 1.3 Test Setup Chart

### Non-beamforming mode



### Beamforming mode



## 1.4 The Equipment List

|                                                                     |                               |                  |                   |                         |                          |
|---------------------------------------------------------------------|-------------------------------|------------------|-------------------|-------------------------|--------------------------|
| <b>Test Item</b>                                                    | Conducted Emission            |                  |                   |                         |                          |
| <b>Test Site</b>                                                    | Conduction room 1 / (CO01-WS) |                  |                   |                         |                          |
| <b>Tested Date</b>                                                  | Jun. 30, 2023                 |                  |                   |                         |                          |
| <b>Instrument</b>                                                   | <b>Brand</b>                  | <b>Model No.</b> | <b>Serial No.</b> | <b>Calibration Date</b> | <b>Calibration Until</b> |
| Receiver                                                            | R&S                           | ESR3             | 101658            | Feb. 17, 2023           | Feb. 16, 2024            |
| LISN                                                                | R&S                           | ENV216           | 101295            | Jan. 31, 2023           | Jan. 30, 2024            |
| LISN (Support Unit)                                                 | SCHWARZBECK                   | Schwarzbeck 8127 | 8127667           | Jan. 03, 2023           | Jan. 02, 2024            |
| RF Cable-CON                                                        | Woken                         | CFD200-NL        | CFD200-NL-001     | Oct. 17, 2022           | Oct. 16, 2023            |
| 50 ohm terminal (Support Unit)                                      | NA                            | 50               | 01                | Jun. 14, 2023           | Jun. 13, 2024            |
| Measurement Software                                                | AUDIX                         | e3               | 6.120210k         | NA                      | NA                       |
| Note: Calibration Interval of instruments listed above is one year. |                               |                  |                   |                         |                          |

|                                                                     |                         |                    |                   |                         |                          |
|---------------------------------------------------------------------|-------------------------|--------------------|-------------------|-------------------------|--------------------------|
| <b>Test Item</b>                                                    | RF Conducted            |                    |                   |                         |                          |
| <b>Test Site</b>                                                    | (TH01-WS)               |                    |                   |                         |                          |
| <b>Tested Date</b>                                                  | Jun. 16 ~ Jul. 05, 2023 |                    |                   |                         |                          |
| <b>Instrument</b>                                                   | <b>Brand</b>            | <b>Model No.</b>   | <b>Serial No.</b> | <b>Calibration Date</b> | <b>Calibration Until</b> |
| Spectrum Analyzer                                                   | R&S                     | FSV40              | 101910            | Apr. 14, 2023           | Apr. 13, 2024            |
| Power Meter                                                         | Anritsu                 | ML2495A            | 1241002           | Nov. 23, 2022           | Nov. 22, 2023            |
| Power Sensor                                                        | Anritsu                 | MA2411B            | 1207366           | Nov. 23, 2022           | Nov. 22, 2023            |
| Attenuator                                                          | Pasternack              | PE7005-10          | 10-2              | Oct. 06, 2022           | Oct. 05, 2023            |
| TEMP&HUMIDITY CHAMBER                                               | GIANT FORCE             | GTH-150-40-CP-AR-T | MAA1407-012       | Sep. 19, 2022           | Sep. 18, 2023            |
| AC POWER SOURCE                                                     | APC                     | AFC-500W           | F312060012        | Dec. 09, 2022           | Dec. 08, 2023            |
| Measurement Software                                                | Sporton                 | SENSE-15407_NII    | V5.11             | NA                      | NA                       |
| Note: Calibration Interval of instruments listed above is one year. |                         |                    |                   |                         |                          |

|                                                                     |                            |                             |                   |                         |                          |
|---------------------------------------------------------------------|----------------------------|-----------------------------|-------------------|-------------------------|--------------------------|
| <b>Test Item</b>                                                    | Radiated Emission          |                             |                   |                         |                          |
| <b>Test Site</b>                                                    | 966 chamber1 / (03CH01-WS) |                             |                   |                         |                          |
| <b>Tested Date</b>                                                  | Jun. 02 ~ Jun. 08, 2023    |                             |                   |                         |                          |
| <b>Instrument</b>                                                   | <b>Brand</b>               | <b>Model No.</b>            | <b>Serial No.</b> | <b>Calibration Date</b> | <b>Calibration Until</b> |
| Receiver                                                            | R&S                        | ESR3                        | 101657            | Mar. 03, 2023           | Mar. 02, 2024            |
| Spectrum Analyzer                                                   | R&S                        | FSV40                       | 101498            | Nov. 21, 2022           | Nov. 20, 2023            |
| Loop Antenna                                                        | R&S                        | HFH2-Z2                     | 100330            | Nov. 01, 2022           | Oct. 31, 2023            |
| Bilog Antenna                                                       | SCHWARZBECK                | VULB9168                    | VULB9168-522      | Aug. 03, 2022           | Aug. 02, 2023            |
| Horn Antenna<br>1G-18G                                              | SCHWARZBECK                | BBHA 9120 D                 | BBHA 9120 D 1096  | Nov. 25, 2022           | Nov. 24, 2023            |
| Horn Antenna<br>18G-40G                                             | SCHWARZBECK                | BBHA 9170                   | BBHA 9170517      | Oct. 27, 2022           | Oct. 26, 2023            |
| Preamplifier                                                        | EMC                        | EMC02325                    | 980225            | Jun. 28, 2022           | Jun. 27, 2023            |
| Preamplifier                                                        | EMC                        | EMC118A45SE                 | 980898            | Jul. 16, 2022           | Jul. 15, 2023            |
| Preamplifier                                                        | EMC                        | EMC184045SE                 | 980903            | Jul. 16, 2022           | Jul. 15, 2023            |
| Loop Antenna Cable                                                  | KOAX KABEL                 | 101354-BW                   | 101354-BW         | Oct. 04, 2022           | Oct. 03, 2023            |
| LF cable 3M                                                         | Woken                      | CFD400NL-LW                 | CFD400NL-001      | Oct. 04, 2022           | Oct. 03, 2023            |
| LF cable 11M                                                        | EMC                        | EMCCFD400-NW-N<br>W-11000   | 200801            | Oct. 04, 2022           | Oct. 03, 2023            |
| LF cable 1M                                                         | EMC                        | EMCCFD400-NM-N<br>M-1000    | 160502            | Oct. 04, 2022           | Oct. 03, 2023            |
| RF Cable                                                            | EMC                        | EMC104-35M-35M-<br>8000     | 210920            | Oct. 04, 2022           | Oct. 03, 2023            |
| RF Cable                                                            | EMC                        | EMC104-35M-35M-<br>3000     | 210922            | Oct. 04, 2022           | Oct. 03, 2023            |
| HIGHPASS FILTER<br>7-18G                                            | K&L                        | 11SH10-7000/T1800<br>0-O/OP | 18                | Oct. 06, 2022           | Oct. 05, 2023            |
| Attenuator                                                          | Pasternack                 | PE7005-10                   | 10-1              | Oct. 06, 2022           | Oct. 05, 2023            |
| Measurement<br>Software                                             | AUDIX                      | e3                          | 6.120210g         | NA                      | NA                       |
| Note: Calibration Interval of instruments listed above is one year. |                            |                             |                   |                         |                          |

## 1.5 Test Standards

47 CFR FCC Part 15.407

ANSI C63.10-2013

## 1.6 Reference Guidance

FCC KDB 412172 D01 Determining ERP and EIRP v01r01

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01

## 1.7 Deviation from Test Standard and Measurement Procedure

None

## 1.8 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ( $k=2$ )).

| Measurement Uncertainty        |                        |
|--------------------------------|------------------------|
| Parameters                     | Uncertainty            |
| Bandwidth                      | $\pm 34.130$ Hz        |
| Conducted power                | $\pm 0.808$ dB         |
| Frequency error                | $\pm 1 \times 10^{-9}$ |
| Power density                  | $\pm 0.583$ dB         |
| Conducted emission             | $\pm 2.715$ dB         |
| AC conducted emission          | $\pm 2.92$ dB          |
| Unwanted Emission $\leq 1$ GHz | $\pm 3.41$ dB          |
| Unwanted Emission $> 1$ GHz    | $\pm 4.59$ dB          |
| Time                           | $\pm 0.1\%$            |
| Temperature                    | $\pm 0.4$ °C           |

## 2 Test Configuration

### 2.1 Testing Facility

|                             |                                                                                        |
|-----------------------------|----------------------------------------------------------------------------------------|
| <b>Test Laboratory</b>      | International Certification Corporation                                                |
| <b>Test Site</b>            | CO01-WS, 03CH01-WS, TH01-WS                                                            |
| <b>Address of Test Site</b> | No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.) |

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- ISED#: 10807A
- CAB identifier: TW2732

## 2.2 The Worst Test Modes and Channel Details

### Non-beamforming mode

| Frequency band 5150~5350 MHz / 5470~5725 MHz                                                                        |                 |                                                                      |           |                    |
|---------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------|-----------|--------------------|
| Test item                                                                                                           | Modulation Mode | Test Frequency (MHz)                                                 | Data Rate | Test Configuration |
| AC Power Line Conducted Emissions                                                                                   | ax HE40         | 5230                                                                 | MCS 0     | ---                |
| Unwanted Emissions ≤1GHz                                                                                            | ax HE40         | 5230                                                                 | MCS 0     | ---                |
| Unwanted Emissions >1GHz<br>Conducted Output Power<br>Emission Bandwidth<br>Power Spectral Density                  | 11a             | 5180 / 5200 / 5240 / 5260 / 5300<br>5320 / 5500 / 5580 / 5700 / 5720 | 6 Mbps    | ---                |
|                                                                                                                     | ax HE20         | 5180 / 5200 / 5240 / 5260 / 5300<br>5320 / 5500 / 5580 / 5700 / 5720 | MCS 0     |                    |
|                                                                                                                     | ax HE40         | 5190 / 5230 / 5270 / 5310 / 5510<br>5590 / 5670 / 5710               | MCS 0     |                    |
|                                                                                                                     | ax HE80         | 5210 / 5290 / 5530 / 5610 / 5690                                     | MCS 0     |                    |
|                                                                                                                     | ax HE160        | 5570                                                                 | MCS 0     |                    |
| Frequency Stability                                                                                                 | Un-modulation   | 5300                                                                 | ---       | ---                |
| Frequency band 5725-5850 MHz                                                                                        |                 |                                                                      |           |                    |
| Test item                                                                                                           | Modulation Mode | Test Frequency (MHz)                                                 | Data Rate | Test Configuration |
| AC Power Line Conducted Emissions                                                                                   | 11a             | 5745                                                                 | 6 Mbps    | ---                |
| Unwanted Emissions ≤1GHz                                                                                            | 11a             | 5745                                                                 | 6 Mbps    | ---                |
| Unwanted Emissions >1GHz<br>Conducted Output Power<br>Emission Bandwidth<br>6dB bandwidth<br>Power Spectral Density | 11a             | 5745 / 5785 / 5825                                                   | 6 Mbps    | ---                |
|                                                                                                                     | ax HE20         | 5745 / 5785 / 5825                                                   | MCS 0     |                    |
|                                                                                                                     | ax HE40         | 5755 / 5795                                                          | MCS 0     |                    |
|                                                                                                                     | ax HE80         | 5775                                                                 | MCS 0     |                    |
| Frequency Stability                                                                                                 | Un-modulation   | 5785                                                                 | ---       | ---                |

### Beamforming mode

| Frequency band 5150~5350 MHz / 5470~5725 MHz                                                                        |                 |                                                               |           |                    |
|---------------------------------------------------------------------------------------------------------------------|-----------------|---------------------------------------------------------------|-----------|--------------------|
| Test item                                                                                                           | Modulation Mode | Test Frequency (MHz)                                          | Data Rate | Test Configuration |
| AC Power Line Conducted Emissions                                                                                   | ax HE40         | 5230                                                          | MCS 0     | ---                |
| Unwanted Emissions ≤1GHz                                                                                            | ax HE40         | 5230                                                          | MCS 0     | ---                |
| Unwanted Emissions >1GHz<br>Conducted Output Power<br>Emission Bandwidth<br>Power Spectral Density                  | ax HE20         | 5180 / 5200 / 5240 / 5260 / 5300<br>5320 / 5500 / 5580 / 5700 | MCS 0     | ---                |
|                                                                                                                     | ax HE40         | 5190 / 5230/ 5270 / 5310 / 5510<br>5590 / 5670                | MCS 0     |                    |
|                                                                                                                     | ax HE80         | 5210 / 5290 / 5530 / 5610                                     | MCS 0     |                    |
|                                                                                                                     | ax HE160        | 5570                                                          | MCS 0     |                    |
| Frequency band 5725-5850 MHz                                                                                        |                 |                                                               |           |                    |
| Test item                                                                                                           | Modulation Mode | Test Frequency (MHz)                                          | Data Rate | Test Configuration |
| AC Power Line Conducted Emissions                                                                                   | ax HE20         | 5745                                                          | MCS 0     | ---                |
| Unwanted Emissions ≤1GHz                                                                                            | ax HE20         | 5745                                                          | MCS 0     | ---                |
| Unwanted Emissions >1GHz<br>Conducted Output Power<br>Emission Bandwidth<br>6dB bandwidth<br>Power Spectral Density | ax HE20         | 5745 / 5785 / 5825                                            | MCS 0     | ---                |
|                                                                                                                     | ax HE40         | 5755 / 5795                                                   | MCS 0     |                    |
|                                                                                                                     | ax HE80         | 5775                                                          | MCS 0     |                    |

### 3 Transmitter Test Results

#### 3.1 Emission Bandwidth

##### 3.1.1 Limit of Emission Bandwidth

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

##### 3.1.2 Test Procedures

###### 26dB Bandwidth

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW, Detector = Peak.
3. Trace mode = max hold.
4. Measure the maximum width of the emission that is 26 dB down from the peak of the emission.

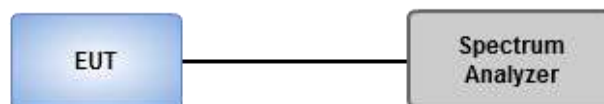
###### Occupied Bandwidth

1. Set RBW = 1 % to 5 % of the OBW.
2. Set VBW  $\geq$  3 RBW.
3. Sample detection and single sweep mode shall be used.
4. Use the 99 % power bandwidth function of the instrument.

###### 6dB Bandwidth

1. Set RBW = 100kHz, VBW = 300kHz.
2. Detector = Peak, Trace mode = max hold.
3. Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

##### 3.1.3 Test Setup



##### 3.1.4 Test Results

|                   |                  |           |            |
|-------------------|------------------|-----------|------------|
| Ambient Condition | 25-26°C / 65-66% | Tested By | Akun Chung |
|-------------------|------------------|-----------|------------|

Refer to Appendix A.

## 3.2 Conducted Output Power

### 3.2.1 Limit of Conducted Output Power

| Frequency band 5150-5250 MHz        |                                    |                                                                                                                                                   |
|-------------------------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Mode                      |                                    | Limit                                                                                                                                             |
| <input type="checkbox"/>            | Outdoor access point               | Conducted Power: 1 W<br>The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm) |
| <input checked="" type="checkbox"/> | Indoor access point                | Conducted Power: 1 W                                                                                                                              |
| <input type="checkbox"/>            | Fixed point-to-point access points | Conducted Power: 1 W                                                                                                                              |
| <input type="checkbox"/>            | Client devices                     | Conducted Power: 250 mW                                                                                                                           |

| Frequency Band (MHz)                             |             | Limit                                    |
|--------------------------------------------------|-------------|------------------------------------------|
| <input checked="" type="checkbox"/>              | 5250 ~ 5350 | Conducted Power: 250mW or 11dBm+10 log B |
| <input checked="" type="checkbox"/>              | 5470 ~ 5725 | Conducted Power: 250mW or 11dBm+10 log B |
| <input checked="" type="checkbox"/>              | 5725 ~ 5850 | Conducted Power: 1 W                     |
| Note: "B" is the 26dB emission bandwidth in MHz. |             |                                          |

### 3.2.2 Test Procedures

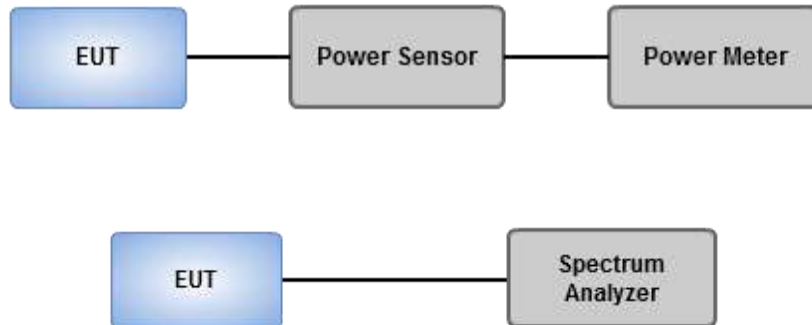
#### Method PM-G (Measurement using a gated RF average power meter)

Measurements is performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

#### Spectrum analyzer (For channel that extends across the 5.725 GHz boundary)

1. Set RBW = 1MHz, VBW = 3MHz, Sweep time = Auto, Detector = RMS.
2. Trace average at least 100 traces in power averaging mode.
3. Compute power by integrating the spectrum across the 26 dB EBW.
4. Add 10 log(1/X, X:duty cycle) if duty cycle is <98%.

### 3.2.3 Test Setup



### 3.2.4 Test Results

|                   |                  |           |            |
|-------------------|------------------|-----------|------------|
| Ambient Condition | 25-26°C / 65-66% | Tested By | Akun Chung |
|-------------------|------------------|-----------|------------|

Refer to Appendix B.

### 3.3 Power Spectral Density

#### 3.3.1 Limit of Power Spectral Density

| Frequency band 5150-5250 MHz        |                                    |              |
|-------------------------------------|------------------------------------|--------------|
| Operating Mode                      |                                    | Limit        |
| <input type="checkbox"/>            | Outdoor access point               | 17 dBm / MHz |
| <input checked="" type="checkbox"/> | Indoor access point                | 17 dBm / MHz |
| <input type="checkbox"/>            | Fixed point-to-point access points | 17 dBm / MHz |
| <input type="checkbox"/>            | Client devices                     | 11 dBm / MHz |

| Frequency Band (MHz)                |             | Limit           |
|-------------------------------------|-------------|-----------------|
| <input checked="" type="checkbox"/> | 5250 ~ 5350 | 11 dBm / MHz    |
| <input checked="" type="checkbox"/> | 5470 ~ 5725 | 11 dBm / MHz    |
| <input checked="" type="checkbox"/> | 5725 ~ 5850 | 30 dBm /500 kHz |

### 3.3.2 Test Procedures

**For 5150 ~ 5250 MHz / 5250 ~ 5350 MHz / 5470 ~ 5725 MHz**

Duty cycle  $\geq 98\%$

1. Set RBW = 1 MHz, VBW = 3 MHz, Sweep time = auto, Detector = RMS.
2. Trace average 100 traces.
3. Use the peak marker function to determine the maximum amplitude level.

Duty cycle  $< 98\%$

1. Set RBW = 1 MHz, VBW = 3 MHz, Detector = RMS.
2. Set sweep time  $\geq 10 \times (\text{number of points in sweep}) \times (\text{total on/off period of the transmitted signal})$ .
3. Perform a single sweep.
4. Use the peak marker function to determine the maximum amplitude level.
5. Add  $10 \log(1/x)$ , where x is the duty cycle.

**For 5725 ~ 5850 MHz**

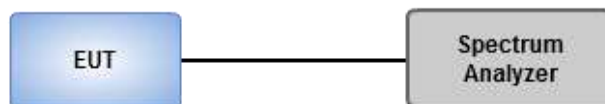
Duty cycle  $\geq 98\%$

1. Set RBW = 500 kHz, VBW = 3 MHz, Sweep time = auto, Detector = RMS.
2. Trace average 100 traces.
3. Use the peak marker function to determine the maximum amplitude level.

Duty cycle  $< 98\%$

1. Set RBW = 500 kHz, VBW = 3 MHz, Detector = RMS.
2. Set sweep time  $\geq 10 \times (\text{number of points in sweep}) \times (\text{total on/off period of the transmitted signal})$ .
3. Perform a single sweep.
4. Use the peak marker function to determine the maximum amplitude level.
5. Add  $10 \log(1/x)$ , where x is the duty cycle.

### 3.3.3 Test Setup



### 3.3.4 Test Results

|                          |                  |                  |            |
|--------------------------|------------------|------------------|------------|
| <b>Ambient Condition</b> | 25-26°C / 65-66% | <b>Tested By</b> | Akun Chung |
|--------------------------|------------------|------------------|------------|

Refer to Appendix C.

### 3.4 Unwanted Emissions

#### 3.4.1 Limit of Unwanted Emissions

| Restricted Band Emissions Limit |                       |                         |                      |
|---------------------------------|-----------------------|-------------------------|----------------------|
| Frequency Range (MHz)           | Field Strength (uV/m) | Field Strength (dBuV/m) | Measure Distance (m) |
| 0.009~0.490                     | 2400/F(kHz)           | 48.5 - 13.8             | 300                  |
| 0.490~1.705                     | 24000/F(kHz)          | 33.8 - 23               | 30                   |
| 1.705~30.0                      | 30                    | 29                      | 30                   |
| 30~88                           | 100                   | 40                      | 3                    |
| 88~216                          | 150                   | 43.5                    | 3                    |
| 216~960                         | 200                   | 46                      | 3                    |
| Above 960                       | 500                   | 54                      | 3                    |

**Note 1:**  
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

**Note 2:**  
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

| Un-restricted band emissions above 1GHz Limit |                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Band                                | Limit                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 5.15 - 5.25 GHz                               | e.i.r.p. -27 dBm [68.2 dBuV/m@3m]                                                                                                                                                                                                                                                                                                                                                                                               |
| 5.25 - 5.35 GHz                               | e.i.r.p. -27 dBm [68.2 dBuV/m@3m]                                                                                                                                                                                                                                                                                                                                                                                               |
| 5.47 - 5.725 GHz                              | e.i.r.p. -27 dBm [68.2 dBuV/m@3m]                                                                                                                                                                                                                                                                                                                                                                                               |
| 5.725 - 5.850 GHz                             | All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. |

**Note 1:** Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

### 3.4.2 Test Procedures

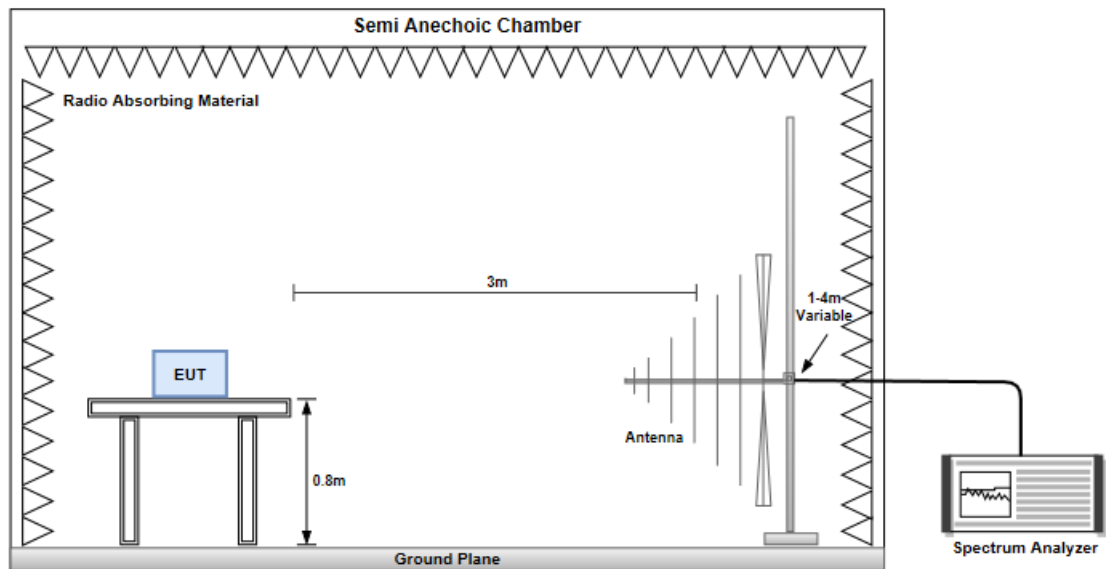
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

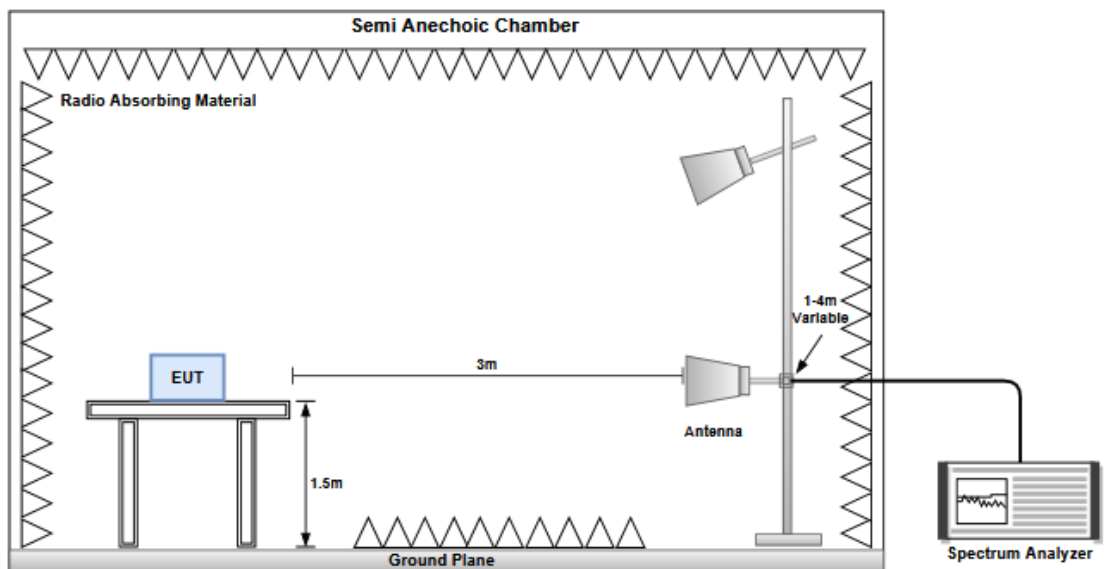
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

### 3.4.3 Test Setup

#### Unwanted Emissions below 1 GHz



#### Unwanted Emissions above 1 GHz



### 3.4.4 Test Results

Refer to Appendix D.

### 3.5 Frequency Stability

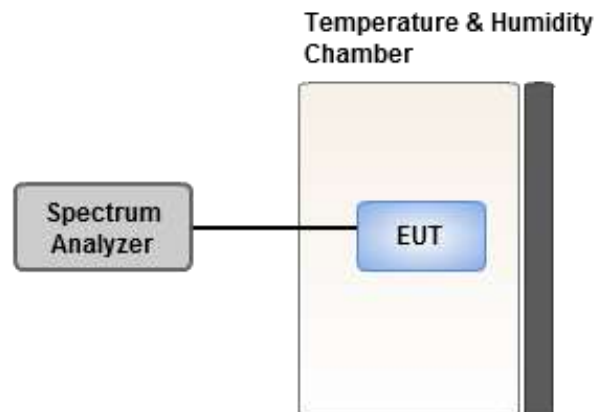
#### 3.5.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

#### 3.5.2 Test Procedures

1. The EUT is installed in an environment test chamber with external power source.
2. Set the chamber to operate at 20 centigrade and external power source to output at nominal voltage of EUT.
3. A sufficient stabilization period at each temperature is used prior to each frequency measurement.
4. When temperature is stabled, measure the frequency stability.
5. The test shall be performed under normal and extreme condition for temperature and voltage.

#### 3.5.3 Test Setup



#### 3.5.4 Test Results

|                   |                  |           |            |
|-------------------|------------------|-----------|------------|
| Ambient Condition | 25-26°C / 65-66% | Tested By | Akun Chung |
|-------------------|------------------|-----------|------------|

Refer to Appendix E.

### 3.6 AC Power Line Conducted Emissions

#### 3.6.1 Limit of AC Power Line Conducted Emissions

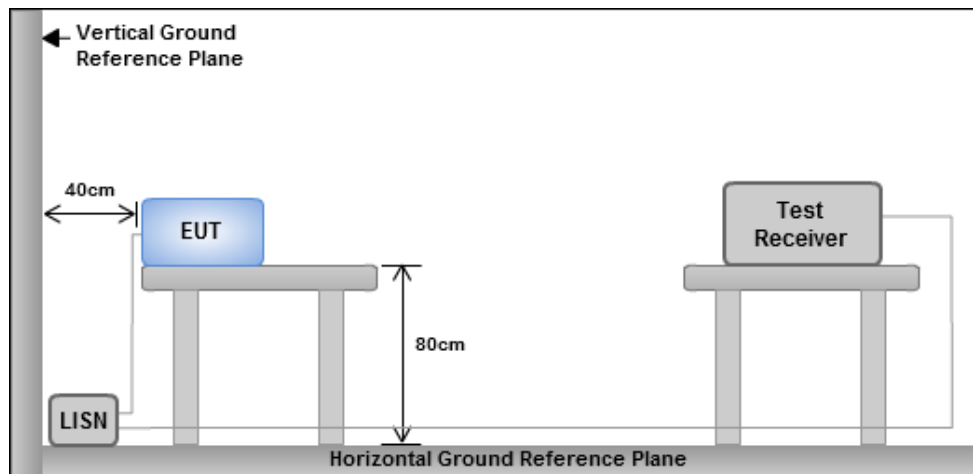
| Conducted Emissions Limit |            |           |
|---------------------------|------------|-----------|
| Frequency Emission (MHz)  | Quasi-Peak | Average   |
| 0.15-0.5                  | 66 - 56 *  | 56 - 46 * |
| 0.5-5                     | 56         | 46        |
| 5-30                      | 60         | 50        |

Note 1: \* Decreases with the logarithm of the frequency.

#### 3.6.2 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50  $\Omega$  LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V/60Hz

#### 3.6.3 Test Setup



- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

#### 3.6.4 Test Results

Refer to Appendix F.

## 4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

### **Linkou**

Tel: 886-2-2601-1640

No.30-2, Ding Fwu Tsuen, Lin Kou  
District, New Taipei City, Taiwan  
(R.O.C.)

### **Kwei Shan**

Tel: 886-3-271-8666

No.3-1, Lane 6, Wen San 3rd  
St., Kwei Shan Dist., Tao Yuan  
City 33381, Taiwan (R.O.C.)  
No.2-1, Lane 6, Wen San 3rd  
St., Kwei Shan Dist., Tao Yuan  
City 33381, Taiwan (R.O.C.)

### **Kwei Shan Site II**

Tel: 886-3-271-8640

No.14-1, Lane 19, Wen San 3rd  
St., Kwei Shan Dist., Tao Yuan  
City 33381, Taiwan (R.O.C.)

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666

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==END==