

## CBSD-EUD Test Report

**Report No.:** RF200109E02-5

**FCC ID:** 2AQ68T99W175

**Test Model:** T99W175

**Received Date:** Jan. 10, 2020

**Test Date:** Feb. 20, 2020

**Issued Date:** Mar. 18, 2020

**Applicant:** Hon Lin Technology Co., Ltd.

**Address:** 11F, No. 32, Jihu Rd., Neihu Dist., Taipei City 114, Taiwan R.O.C.

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Lin Kou Laboratories

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**Test Location:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City  
33383, Taiwan

**FCC Registration/  
Designation Number:** 788550 / TW0003

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### Release Control Record

| Issue No.     | Description      | Date Issued   |
|---------------|------------------|---------------|
| RF200109E02-5 | Original release | Mar. 18, 2020 |

## 1 Certificate of Conformity

**Product:** 5G WWAN Module

**Brand:** Foxconn

**Test Model:** T99W175

**Sample Status:** Engineering sample

**Applicant:** Hon Lin Technology Co., Ltd.

**Test Date:** Feb. 20, 2020

**Standards:** FCC Part 96.47

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

**Prepared by :**



**, Date:**

Mar. 18, 2020

Pettie Chen / Senior Specialist

**Approved by :**



**, Date:**

Mar. 18, 2020

Bruce Chen / Senior Project Engineer

## 2 Summary of Test Results

| Applied Standard : FCC Part 96.47 |                                         |        |                      |
|-----------------------------------|-----------------------------------------|--------|----------------------|
| FCC Clause                        | Test Item                               | Result | Remarks              |
| 96.47(a)(1)                       | End User Device additional requirements | Pass   | Meet the requirement |

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.1 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

|                     |                                                     |
|---------------------|-----------------------------------------------------|
| Product             | 5G WWAN Module                                      |
| Brand               | Foxconn                                             |
| Test Model          | T99W175                                             |
| Status of EUT       | Engineering sample                                  |
| Power Supply Rating | 5 Vdc (Host equipment)<br>3.135Vdc~3.63Vdc (Module) |
| Accessory Device    | NA                                                  |
| Data Cable Supplied | NA                                                  |

Note:

1. There are four Difference HW of T99W175.

| Brand   | Model   | HW                                          |
|---------|---------|---------------------------------------------|
| Foxconn | T99W175 | 1. 3G+LTE+Sub6+eSIM                         |
|         |         | 2. 3G+LTE+Sub6 only w/o eSIM                |
|         |         | 3. 3G+LTE+Sub6+eSIM+GNSS connector          |
|         |         | 4. 3G+LTE+Sub6 only+w/o eSIM+GNSS connector |

\*After pre-testing, "HW: 1. 3G+LTE+Sub6+eSIM" is the worst for the final tests.

## 2. The following antennas were provided to the EUT.

| Antenna No. | RF Chain No. | Brand        | Model          | Antenna Net Gain(dBi)                                                    | Frequency range (MHz)                                                                                         | Antenna Type | Connector Type |
|-------------|--------------|--------------|----------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------|----------------|
| 1           |              | WHA YU       | C107-511720-A  | 4.41                                                                     | 660~803                                                                                                       | PCB          | I-PEX          |
| 2           |              | WHA YU       | C107-511721-A  | 3.81<br>4.03                                                             | 791~960<br>1447.9~1606                                                                                        | PCB          | I-PEX          |
| 3           |              | WHA YU       | C107-511722-A  | 4.27<br>5.31                                                             | 1710~2170<br>2500~2690                                                                                        | PCB          | I-PEX          |
| 4           |              | WHA YU       | C107-511723-A  | 2.99<br>0.92                                                             | 2300~2400<br>3500~3700                                                                                        | PCB          | I-PEX          |
| 5           |              | WHA YU       | C107-511724-A  | 6.45                                                                     | 5150~5925                                                                                                     | PCB          | I-PEX          |
| 6           |              | WHA YU       | C107-511725-A  | 4.89                                                                     | 3400~3700                                                                                                     | PCB          | I-PEX          |
| 7           |              | AVX          | 5000106-R1-X01 | 2.91                                                                     | 699~803                                                                                                       | Monopole     | I-PEX          |
| 8           |              | AVX          | 5000107-R1-X01 | 2.59                                                                     | 791~960                                                                                                       | Monopole     | I-PEX          |
| 9           |              | AVX          | 5000108-R1-X01 | 2.85                                                                     | 1427~1610                                                                                                     | Monopole     | I-PEX          |
| 10          |              | AVX          | 5000109-R1-X01 | 2.23<br>2.94                                                             | 1710~2200<br>5150~5925                                                                                        | Monopole     | I-PEX          |
| 11          |              | AVX          | 5000110-R1-X01 | 0.9                                                                      | 2300~2690                                                                                                     | Monopole     | I-PEX          |
| 12          |              | AVX          | 5000111-R1-X01 | 0.87                                                                     | 3300~5000                                                                                                     | Monopole     | I-PEX          |
| 13          | Tx1/<br>Rx1  | Ethertronics | 5003806        | 0.4<br>-1.61<br>0.39<br>2.95<br>1.98<br>0.38<br>0.83<br>2.31             | 698-821<br>824-960<br>1425-1515<br>1710-2200<br>2300-2690<br>3300-4200<br>4400-5000<br>5150-5925              | PIFA         | I-PEX          |
|             | Rx2          | Ethertronics | 5003807        | -2.24<br>-4.52<br>2.87<br>2.99<br>2.93<br>2.91<br>2.23<br>-0.85<br>-3.04 | 716-821<br>824-960<br>1425-1515<br>1557-1610<br>1805-2200<br>2300-2690<br>3300-4200<br>4400-5000<br>5150-5925 | PIFA         | I-PEX          |
|             | Tx2/<br>Rx3  | Ethertronics | 5003806        | 2.21<br>2.25<br>-0.45<br>2.6                                             | 1710-2200<br>2300-2690<br>3300-4200<br>4400-5000                                                              | PIFA         | I-PEX          |
|             | Rx4          | Ethertronics | 5003700        | 1.38<br>2.87<br>0.6<br>-2.09                                             | 1805-2200<br>2300-2690<br>3300-4200<br>4400-5000                                                              | PIFA         | I-PEX          |

| Antenna No. | RF Chain No.   | Brand       | Model | Antenna Net Gain(dBi)                  | Frequency range (MHz)                                              | Antenna Type | Connector Type |
|-------------|----------------|-------------|-------|----------------------------------------|--------------------------------------------------------------------|--------------|----------------|
| 14          | Ant. 0 (TX/RX) | Master Wave | NA    | 2.4<br>2.2<br>2.9<br>2.9<br>2.9<br>NA  | 880~960<br>1020~2170<br>2545~2595<br>3565~3600<br>3900~4000<br>GPS | PCB          | I-PEX          |
|             | Ant. 2 (TX/RX) | Master Wave | NA    | NA<br>2.2<br>2.8<br>2.9<br>2.8<br>NA   | 880~960<br>1020~2170<br>2545~2595<br>3565~3600<br>3900~4000<br>GPS | PCB          | I-PEX          |
|             | Ant. 1 (RX)    | Master Wave | NA    | NA<br>5.3<br>5.1<br>4.3<br>4.5<br>NA   | 880~960<br>1020~2170<br>2545~2595<br>3565~3600<br>3900~4000<br>GPS | PCB          | I-PEX          |
|             | Ant. 3 (RX)    | Master Wave | NA    | 1.3<br>6.8<br>3.7<br>6.4<br>6.2<br>3.7 | 880~960<br>1020~2170<br>2545~2595<br>3565~3600<br>3900~4000<br>GPS | PCB          | I-PEX          |

3. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

## 4 Measurement

### 4.1 End User Device additional requirements

FCC Part 96.47

- (a) End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation.
- (1) An End User Device must discontinue operations, change frequencies, or change its operational power level within 10 seconds of receiving instructions from its associated CBSD.

### 4.2 Test Procedure

Following test procedure can be done by WINNF-TS-0122 CBRS CBSD Test Specification, use the certified CBSD(FCC ID: P27P208) as CBSD device to show compliance with FCC Part 96.47 requirements for End User Device(EUD):

Test #1:

- a) Setup WINNF.PT.C.HBT.1 with 3615 ~ 3635 MHz and MaxEIRP at 10 dBm/MHz.
- b) Enable CBSD service from EPC management.
- c) **Check** EUD Tx Frequency and connection successful.
- d) Disable AP service from EPC management.
- e) **Check** if EUT stop transmission within 10s.

Test #2:

- a) Setup WINNF.PT.C.HBT.1 with 3595 ~ 3615 MHz and MaxEIRP at 15 dBm/MHz.
- b) Enable CBSD service from EPC management.
- c) **Check** EUD Tx Frequency and connection successful.
- d) Change power to 10 dBm/MHz.
- e) **Check** EUD Tx output power.
- f) Disable AP service from EPC management.
- g) **Check** if EUT stop transmission within 10s.

Note: Test #1 and #2 to show compliance with the hadshake testing under Part 96.

### 4.3 Test Environment

#### Test Condition

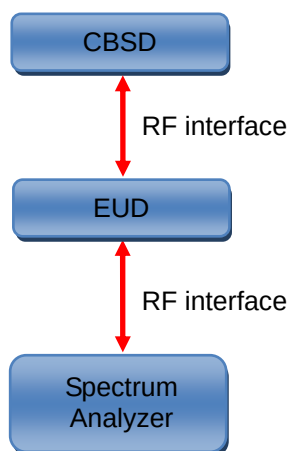
| Test Item                               | Environmental Conditions | Input Power  | Tested By    |
|-----------------------------------------|--------------------------|--------------|--------------|
| End User Device additional requirements | 25deg. C, 70%RH          | 120Vac, 60Hz | Matthew Yang |

### 4.4 Test Equipment

| Description & Manufacturer           | Model no.                    | Serial No.    | Calibrated Date | Calibrated Until |
|--------------------------------------|------------------------------|---------------|-----------------|------------------|
| CBSD<br>Sercomm                      | P208-TP<br>(FCC ID: P27P208) | 1801BVV000034 | NA              | NA               |
| Laptop<br>DELL                       | Inspiron 15 3000             | D67MYN2       | NA              | NA               |
| Spectrum Analyzer<br>ROHDE & SCHWARZ | FSV                          | E2-010642     | May 28, 2019    | May 27, 2020     |

**NOTE:** 1. The test was performed in OVEN 4 Test Room  
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.5 Test Setup

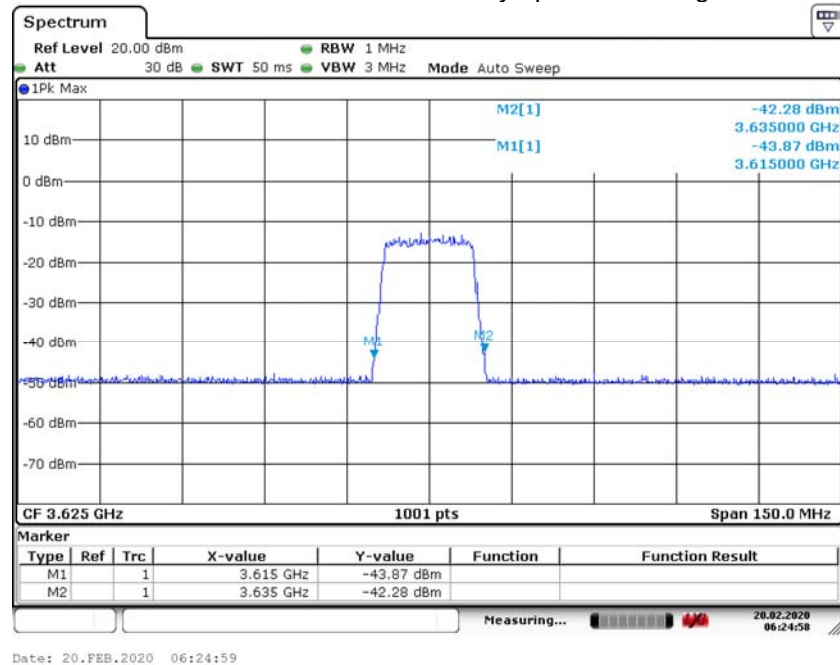


NOTE: The CBSD device is certified CBSD(FCC ID: P27P208). Where the CBSD device connection with EUD is by radiated method. The EUD device connection with Spectrum Analyzer is by conducted method.

## 5 Test Result

### Step Test #1-(c)

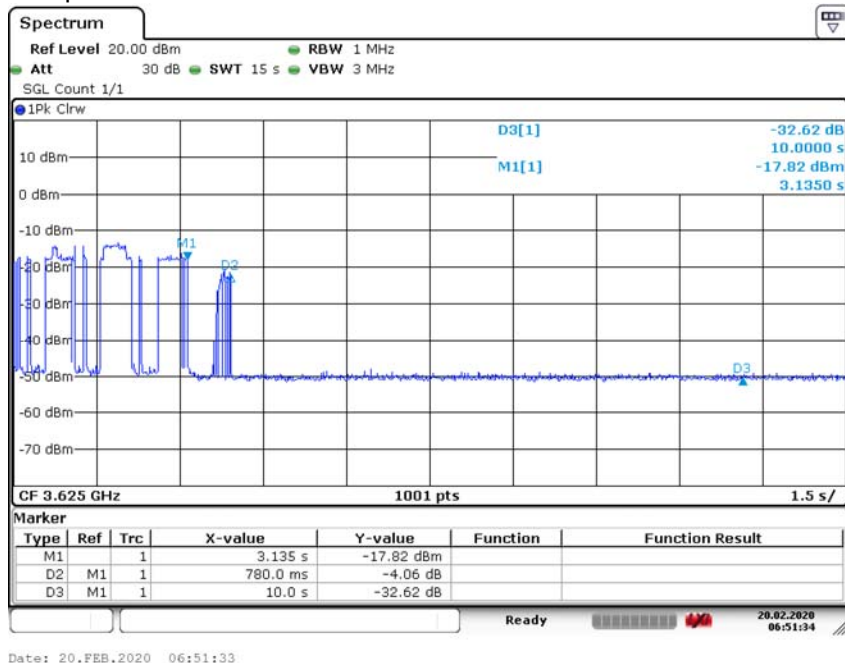
EUD follow instruction from associate CBSD and successfully operate at assigned 3615-3635MHz channel.



Plot 5-1 EUD frequency of operations

### Step Test #1(e)

EUD discontinues the operation within 10 seconds after CBSD terminates the service:



Plot 5-2 EUD discontinues operations within 10s

Note :

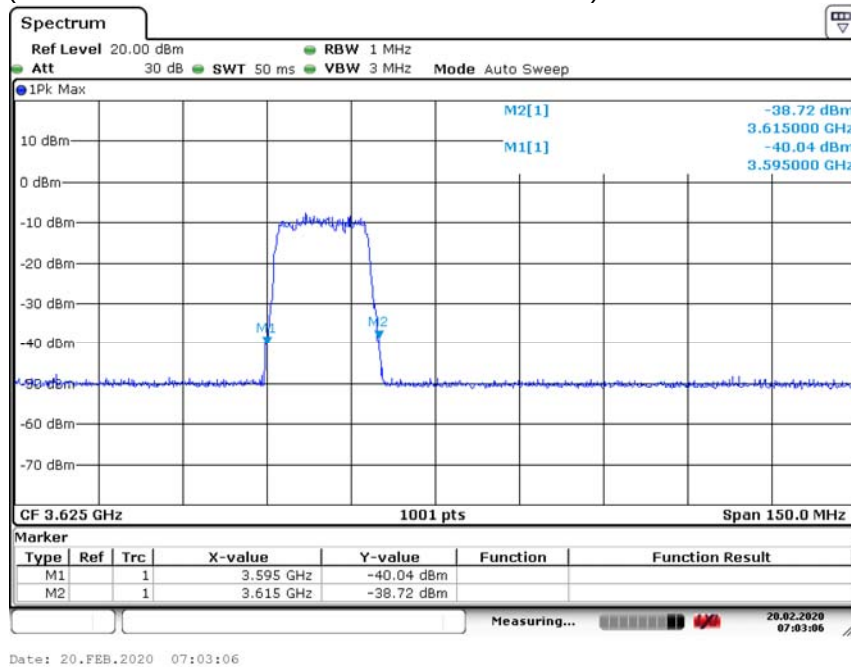
Marker 1: CBSD sends instructions to discontinues operations.

Marker 2: EUD discontinues operation.

Marker 3: 10 seconds elapsed time from CBSD sending instructions to EUD.

### Test #2(c)

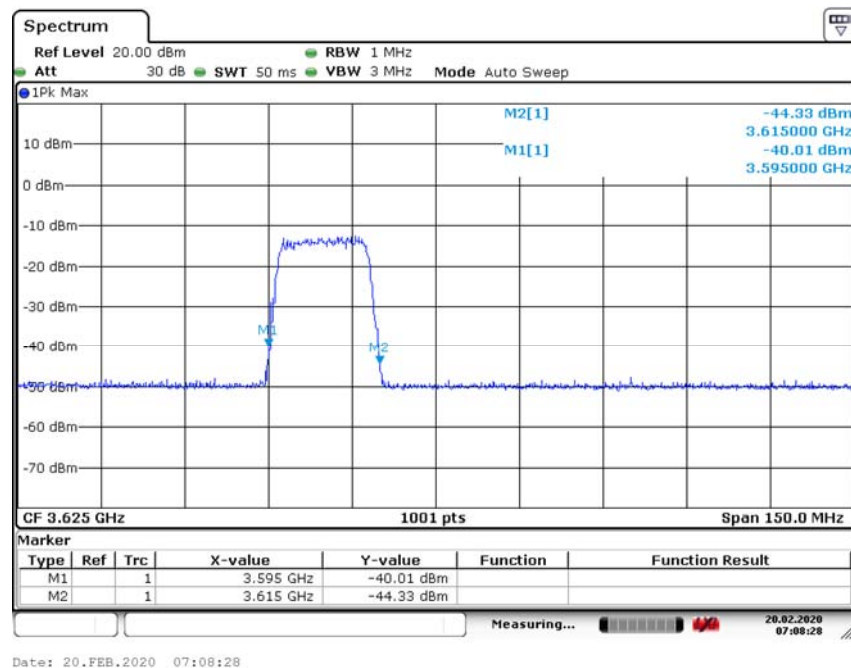
following plots demonstrate that EUD response to the associated CBSD instruction and operate at a new assigned channel (3595 ~ 3615 MHz and MaxEIRP at 15 dBm/MHz)



Plot 5-3 EUD frequency of operations

### Test #2(e)

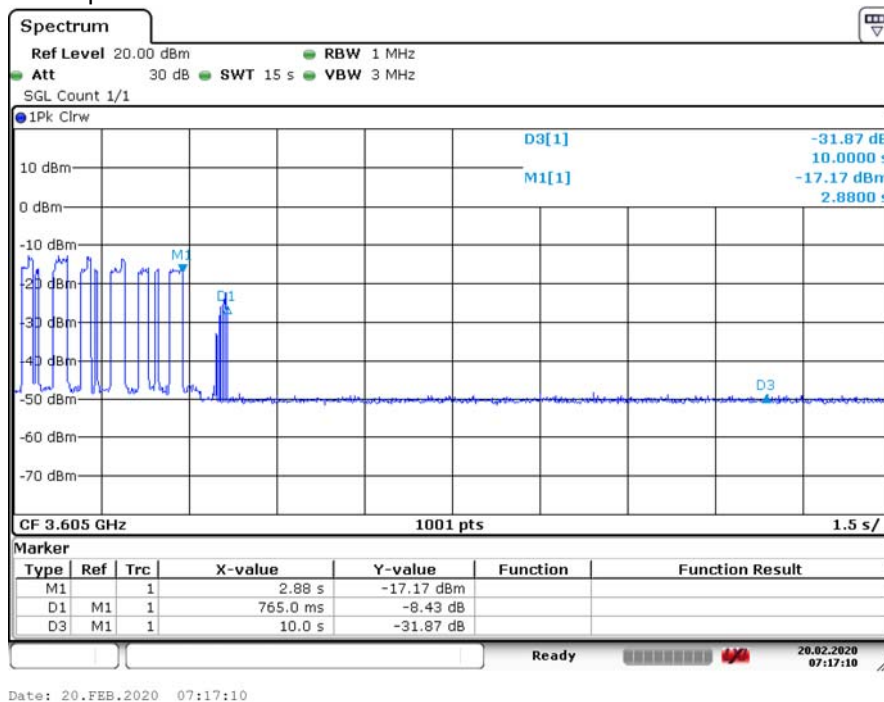
following plot demonstrates that EUD response to the associated CBSD power reduce instruction and reduce the power for 5 dB.



Plot 5-4 EUD changed output power

# Step Test #2(g)

EUD discontinues the operation within 10 seconds after CBSD terminates the service:



Date: 20.FEB.2020 07:17:10

Plot 5-5 EUD discontinues operations within 10s.

Note :

Marker 1: CBSD sends instructions to discontinues operations.

Marker 2: EUD discontinues operation.

Marker 3: 10 seconds elapsed time from CBSD sending instructions to EUD.

## 6 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

## Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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