

# FCC Test Report

Report No.: AGC01559190905FE06

**FCC ID** : 2AANZAIR2

**APPLICATION PURPOSE** : Original Equipment

**PRODUCT DESIGNATION** : QUIRKY AIR

**BRAND NAME** : QUIRKY

**MODEL NAME** : QKY-AIR, QKY-AIR-5, QKY-AIR-5-BLK, EU-QKY-AIR,  
EU-QKY-AIR-5, EU-QKY-AIR-7, QKY-AIR-7, QKY-AIR-7-BLK

**APPLICANT** : DGL Group LTD.

**DATE OF ISSUE** : Oct. 21, 2019

**STANDARD(S)** : FCC Part 15.407

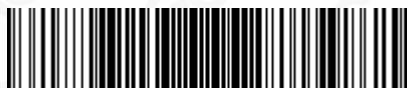
**TEST PROCEDURE(S)** : KDB 789033 D02 v02r01

**REPORT VERSION** : V1.0

**Attestation of Global Compliance (Shenzhen) Co., Ltd**

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## REPORT REVISE RECORD

| Report Version | Revise Time | Issued Date   | Valid Version | Notes           |
|----------------|-------------|---------------|---------------|-----------------|
| V1.0           | /           | Oct. 21, 2019 | Valid         | Initial Release |



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## 1. VERIFICATION OF CONFORMITY

|                                 |                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------|
| <b>Applicant</b>                | DGL Group LTD.                                                                             |
| <b>Address</b>                  | 195 Raritan Center Parkway Edison, New Jersey United States 08837                          |
| <b>Manufacturer</b>             | DGL Group LTD.                                                                             |
| <b>Address</b>                  | 195 Raritan Center Parkway Edison, New Jersey United States 08837                          |
| <b>Product Designation</b>      | QUIRKY AIR                                                                                 |
| <b>Brand Name</b>               | QUIRKY                                                                                     |
| <b>Test Model</b>               | QKY-AIR                                                                                    |
| <b>Series Model</b>             | QKY-AIR-5, QKY-AIR-5-BLK, EU-QKY-AIR, EU-QKY-AIR-5, EU-QKY-AIR-7, QKY-AIR-7, QKY-AIR-7-BLK |
| <b>Model Difference</b>         | All the same except for the model name and different appearance color                      |
| <b>Date of test</b>             | Sep. 12, 2019 to Sep. 20, 2019                                                             |
| <b>Deviation</b>                | None                                                                                       |
| <b>Condition of Test Sample</b> | Normal                                                                                     |
| <b>Test Result</b>              | Pass                                                                                       |
| <b>Report Template</b>          | AGCRT-US-BGN/RF                                                                            |

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with requirement of FCC Part 15 Rules requirement.

Prepared By

*Draven Li*

Draven Li  
(Project Engineer)

Sep. 20, 2019

Reviewed By

*Max Zhang*

Max Zhang  
(Reviewer)

Oct. 21, 2019

Approved By

*Forrest Lei*

Forrest Lei  
(Authorized Officer)

Oct. 21, 2019

## 2. GENERAL INFORMATION

### 2.1. PRODUCT DESCRIPTION

The EUT is designed as “QUIRKY AIR”. It is designed by way of utilizing the GFSK technology to achieve the system operation.

A major technical description of EUT is described as following

|                                 |                                        |
|---------------------------------|----------------------------------------|
| <b>Operation Frequency</b>      | 5727 MHz~5800MHz                       |
| <b>Output Power(Max)</b>        | 9.21dBm                                |
| <b>Modulation</b>               | GFSK                                   |
| <b>Number of channels</b>       | 16                                     |
| <b>Hardware Version</b>         | V1.1                                   |
| <b>Software Version</b>         | V1.0                                   |
| <b>Antenna Designation</b>      | FPC Antenna                            |
| <b>Number of transmit chain</b> | 1                                      |
| <b>Antenna Gain</b>             | 0.5dBi                                 |
| <b>Power Supply</b>             | DC 3.7V by battery or DC 5V by adapter |

### 2.2. TABLE OF CARRIER FREQUENCIES

| Frequency Band   | Channel Number | Frequency | Channel Number | Frequency |
|------------------|----------------|-----------|----------------|-----------|
| 5727 MHz~5800MHz | 1              | 5727      | 9              | 5767      |
|                  | 2              | 5731      | 10             | 5771      |
|                  | 3              | 5734      | 11             | 5774      |
|                  | 4              | 5738      | 12             | 5778      |
|                  | 5              | 5749      | 13             | 5789      |
|                  | 6              | 5753      | 14             | 5793      |
|                  | 7              | 5756      | 15             | 5796      |
|                  | 8              | 5760      | 16             | 5800      |

### 2.3. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for FCC ID: 2AANZAIR2 filing to comply with the FCC Part 15 requirements.

### 2.4. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013).

Radiated testing was performed at an antenna to EUT distance 3 meters.

Others testing (listed at item 5.3) was performed according to the procedures in FCC Part 15.407 rules KDB 789033 D02

### 2.5. SPECIAL ACCESSORIES

Refer to section 5.2.

### 2.6. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.



### 3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR and ANSI.

- Uncertainty of Conducted Emission,  $U_c = \pm 3.2$  dB
- Uncertainty of Radiated Emission below 1GHz,  $U_c = \pm 3.9$  dB
- Uncertainty of Radiated Emission above 1GHz,  $U_c = \pm 4.8$  dB



#### 4. DESCRIPTION OF TEST MODES

| Mode | Available channel | Tested channel | Date rate(Mbps) |
|------|-------------------|----------------|-----------------|
| GFSK | 1~16              | 1,8,16         | 1               |

**Note:**

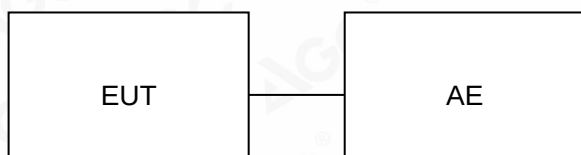
1. The EUT has been set to operate continuously on tested channel individually, and the EUT is operating at its maximum duty cycle>or equal 98%
2. All modes under which configure applicable have been tested and the worst mode test data recording in the test report, if no other mode data.
3. Use engineering instruction set the EUT into the individual test modes.



## 5. SYSTEM TEST CONFIGURATION

### 5.1. CONFIGURATION OF EUT SYSTEM

Configure 1:



### 5.2. EQUIPMENT USED IN EUT SYSTEM

| Item | Equipment  | Model No. | ID or Specification | Remark |
|------|------------|-----------|---------------------|--------|
| 1    | QUIRKY AIR | QKY-AIR   | 2AANZAIR2           | EUT    |
| 3    | Adapter    | KUANTEN   | KT05W050100USU      | AE     |

### 5.3. SUMMARY OF TEST RESULTS

| FCC RULES | DESCRIPTION OF TEST                    | RESULT    |
|-----------|----------------------------------------|-----------|
| §15.407   | 6dB Bandwidth                          | Compliant |
| §15.407   | Emission Bandwidth                     | Compliant |
| §15.407   | Maximum conducted output power         | Compliant |
| §15.407   | Conducted Spurious Emission            | Compliant |
| §15.407   | Maximum Conducted Output Power Density | Compliant |
| §15.209   | Radiated Emission                      | Compliant |
| §15.407   | Band Edges                             | Compliant |
| §15.207   | Line Conduction Emission               | Compliant |

## 6. TEST FACILITY

|                                          |                                                                                                                                          |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Site</b>                         | Attestation of Global Compliance (Shenzhen) Co., Ltd                                                                                     |
| <b>Location</b>                          | 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China |
| <b>Designation Number</b>                | CN1259                                                                                                                                   |
| <b>FCC Test Firm Registration Number</b> | 975832                                                                                                                                   |
| <b>A2LA Cert. No.</b>                    | 5054.02                                                                                                                                  |
| <b>Description</b>                       | Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA                                                                |

### TEST EQUIPMENT OF CONDUCTED EMISSION TEST

| Equipment     | Manufacturer | Model   | S/N    | Cal. Date     | Cal. Due      |
|---------------|--------------|---------|--------|---------------|---------------|
| TEST RECEIVER | R&S          | ESPI    | 101206 | Jun. 12, 2019 | Jun. 11, 2020 |
| LISN          | R&S          | ESH2-Z5 | 100086 | Aug. 26, 2019 | Aug. 25, 2020 |

### TEST EQUIPMENT OF RADIATED EMISSION TEST

| Equipment                      | Manufacturer   | Model        | S/N        | Cal. Date     | Cal. Due      |
|--------------------------------|----------------|--------------|------------|---------------|---------------|
| TEST RECEIVER                  | R&S            | ESCI         | 10096      | Jun. 12, 2019 | Jun. 11, 2020 |
| EXA Signal Analyzer            | Aglient        | N9010A       | MY53470504 | Dec. 20, 2018 | Dec. 19, 2019 |
| 2.4GHz Fliter                  | EM Electronics | 2400-2500MHz | N/A        | Feb. 27, 2019 | Feb. 26, 2020 |
| Attenuator                     | ZHINAN         | E-002        | N/A        | Sep. 09, 2019 | Sep. 08, 2020 |
| Horn antenna                   | SCHWARZBECK    | BBHA 9170    | #768       | Sep. 09, 2019 | Sep. 08, 2021 |
| Active loop antenna (9K-30MHz) | ZHINAN         | ZN30900C     | 18051      | Jun. 14, 2018 | Jun. 13, 2020 |
| Double-Ridged Waveguide Horn   | ETS LINDGREN   | 3117         | 00034609   | May. 26, 2018 | May. 25, 2020 |
| Broadband Preamplifier         | ETS LINDGREN   | 3117PA       | 00225134   | Oct. 25, 2018 | Oct. 24, 2019 |
| ANTENNA                        | SCHWARZBECK    | VULB9168     | D69250     | Sep. 28, 2017 | Sep. 27, 2019 |

## 7. MAXIMUM CONDUCTED OUTPUT POWER

### 7.1. MEASUREMENT PROCEDURE

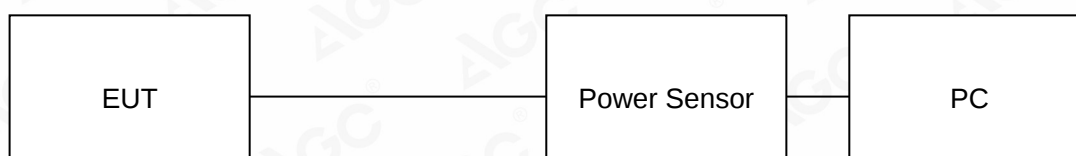
For average power test:

1. Connect EUT RF output port to power sensor through an RF attenuator.
2. Connect the power sensor to the PC.
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Record the maximum power from the software.

**Note :** The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

### 7.2. TEST SET-UP

#### AVERAGE POWER SETUP



### 7.3. LIMITS AND MEASUREMENT RESULT

| LIMITS AND MEASUREMENT RESULT FOR 802.11A20 MODULATION |                     |                         |              |
|--------------------------------------------------------|---------------------|-------------------------|--------------|
| Frequency (MHz)                                        | Average Power (dBm) | Applicable Limits (dBm) | Pass or Fail |
| 5727                                                   | 9.21                | 30                      | Pass         |
| 5760                                                   | 9.13                | 30                      | Pass         |
| 5800                                                   | 9.04                | 30                      | Pass         |



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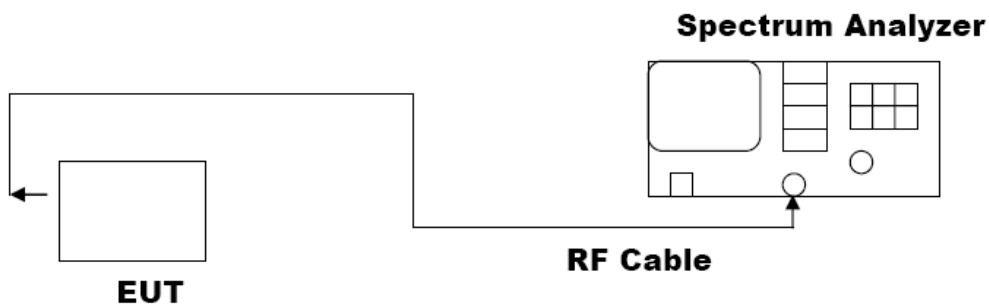
## 8. 6dB BANDWIDTH

### 8.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on operation frequency individually.
3. Set RBW = 100kHz.
4. Set the VBW  $\geq 3 \times$  RBW. Detector = Peak. Trace mode = max hold.
5. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.

**Note:** The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

### 8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



### 8.3. LIMITS AND MEASUREMENT RESULTS

| LIMITS AND MEASUREMENT RESULT FOR GFSK MODULATION |                   |       |          |
|---------------------------------------------------|-------------------|-------|----------|
| Applicable Limits                                 | Applicable Limits |       |          |
|                                                   | Test Data (MHz)   |       | Criteria |
| >500KHZ                                           | 5727MHz           | 1.524 | PASS     |
|                                                   | 5760MHz           | 1.649 | PASS     |
|                                                   | 5800MHz           | 1.628 | PASS     |



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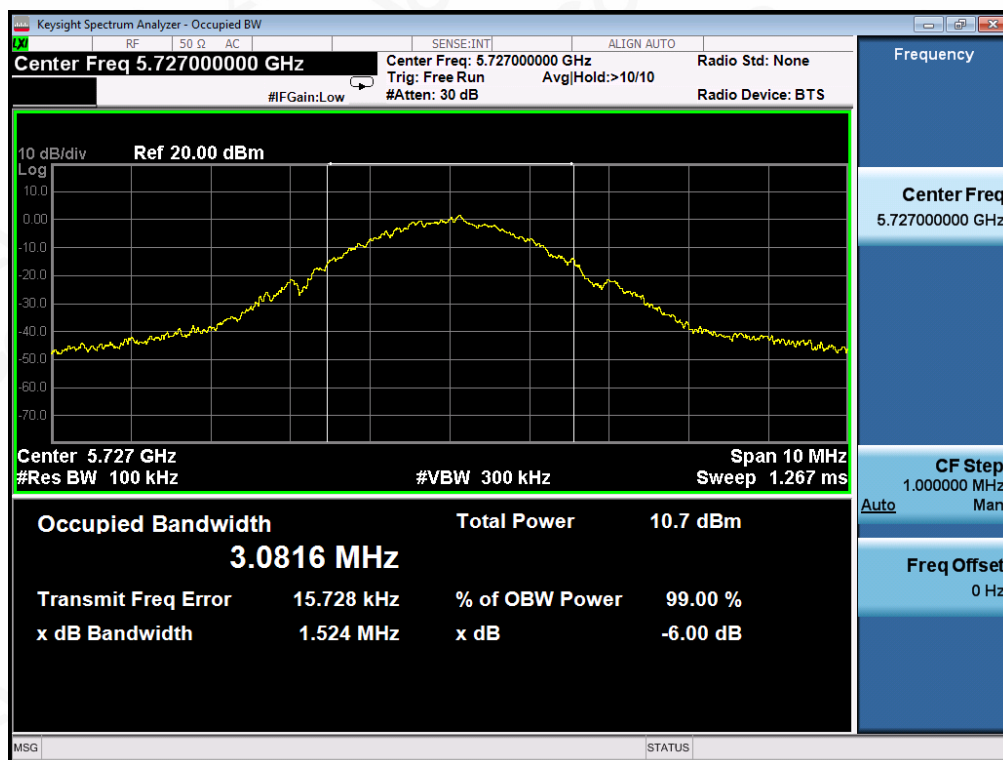
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## TEST RESULT

### TEST PLOT OF BANDWIDTH FOR 5727MHz



### TEST PLOT OF BANDWIDTH FOR 5760MHz



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### TEST PLOT OF BANDWIDTH FOR 5800MHZ



## 9. MAXIMUM CONDUCTED OUTPUT PEAK POWER SPECTRAL DENSITY

### 9.1 MEASUREMENT PROCEDURE

Refer to KDB 789033 section F

### 9.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

Refer To Section 8.2.

### 9.3 MEASUREMENT EQUIPMENT USED

Refer To Section 6.

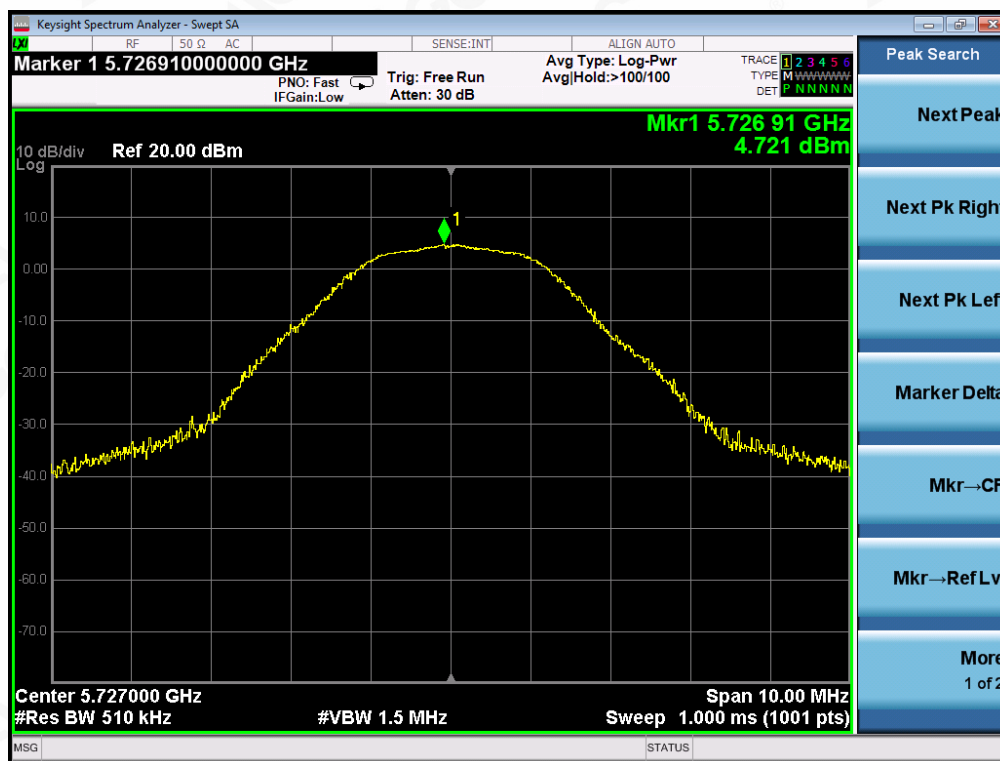
### 9.4 LIMITS AND MEASUREMENT RESULT

| Frequency<br>(MHz) | Power density<br>(dBm/500kHz) | Applicable Limits<br>(dBm/500kHz) | Pass or Fail |
|--------------------|-------------------------------|-----------------------------------|--------------|
| 5727               | 4.721                         | 30                                | Pass         |
| 5760               | 3.596                         | 30                                | Pass         |
| 5800               | 3.592                         | 30                                | Pass         |

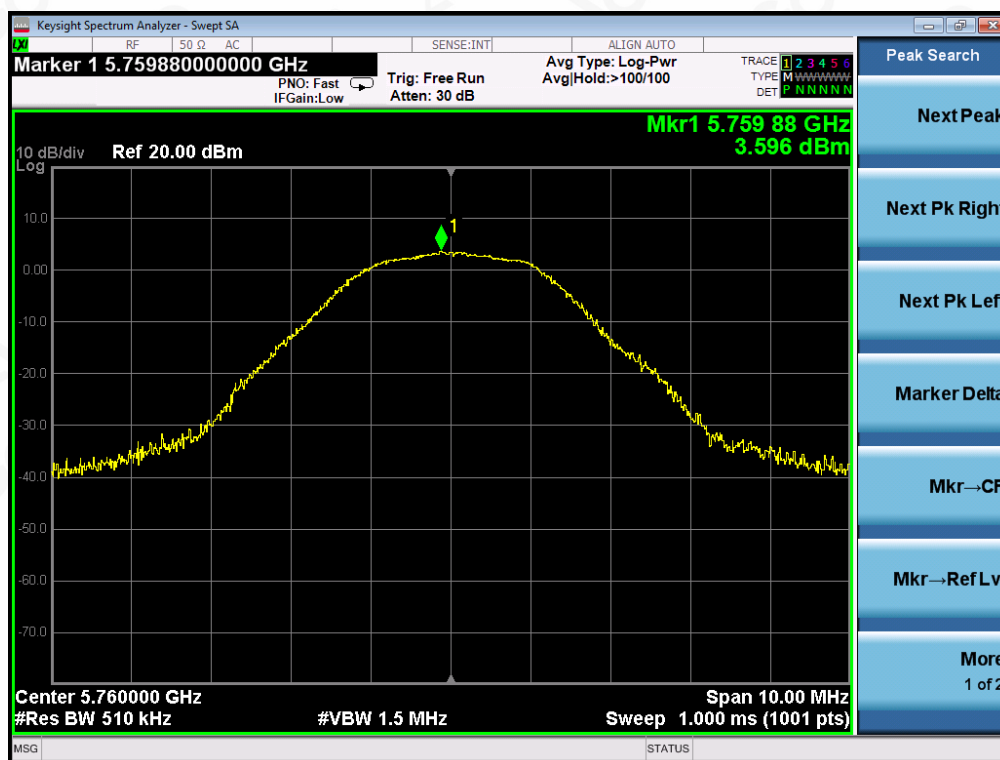


## TEST RESULT

### TEST PLOT OF SPECTRAL DENSITY FOR 5727MHz



### TEST PLOT OF SPECTRAL DENSITY FOR 5760MHz



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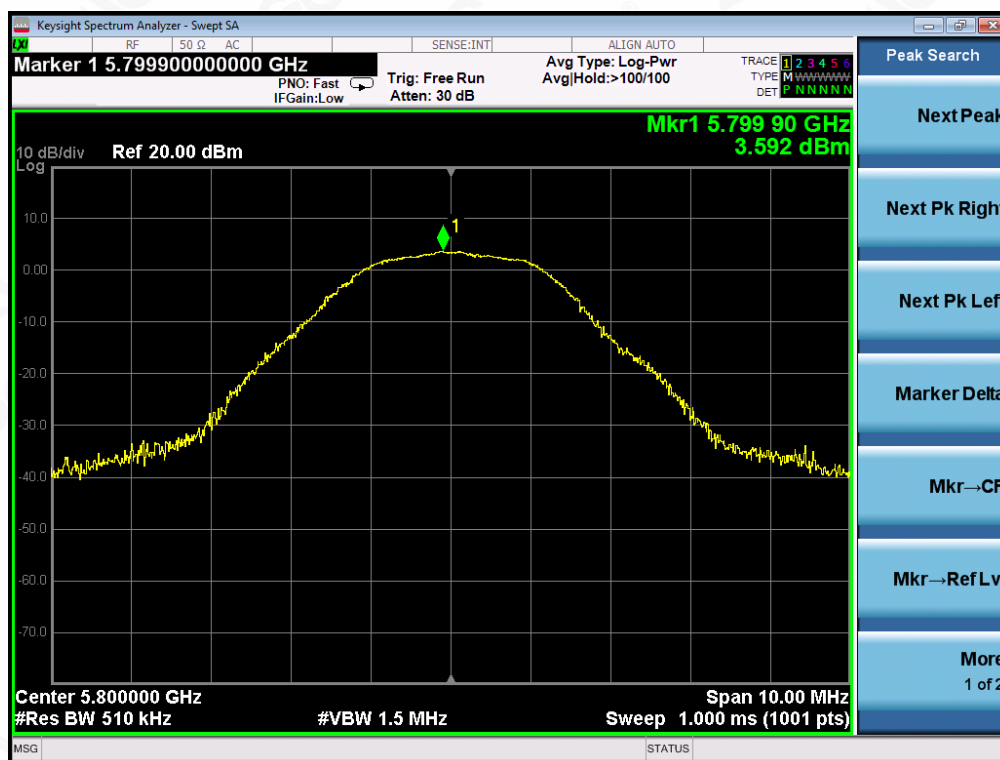
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# TEST PLOT OF SPECTRAL DENSITY FOR 5800MHz



## 10. CONDUCTED SPURIOUS EMISSION

### 10.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Trace 1 Max hold, then View.

**Note:** The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

### 10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 8.2.

### 10.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6.

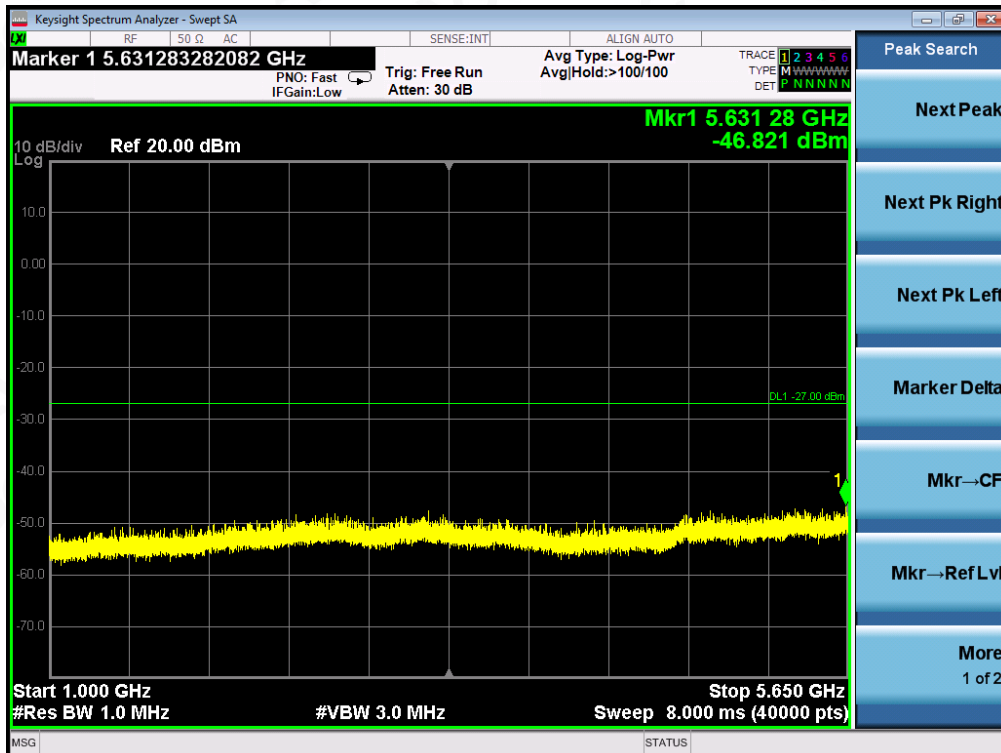
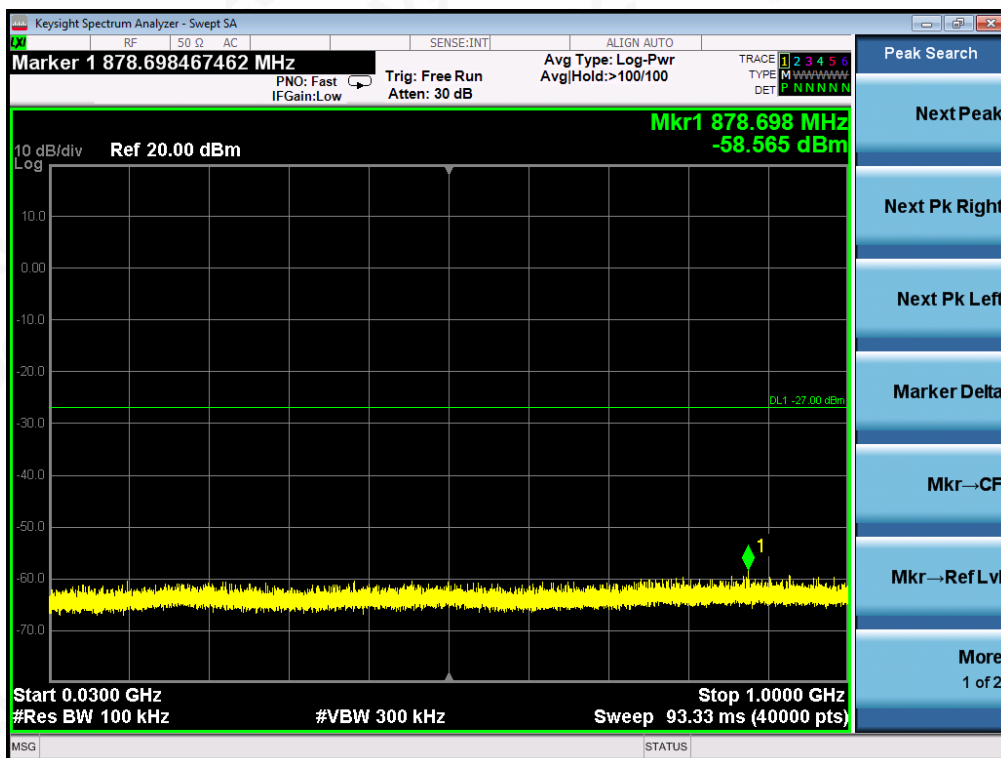
### 10.4. LIMITS AND MEASUREMENT RESULT

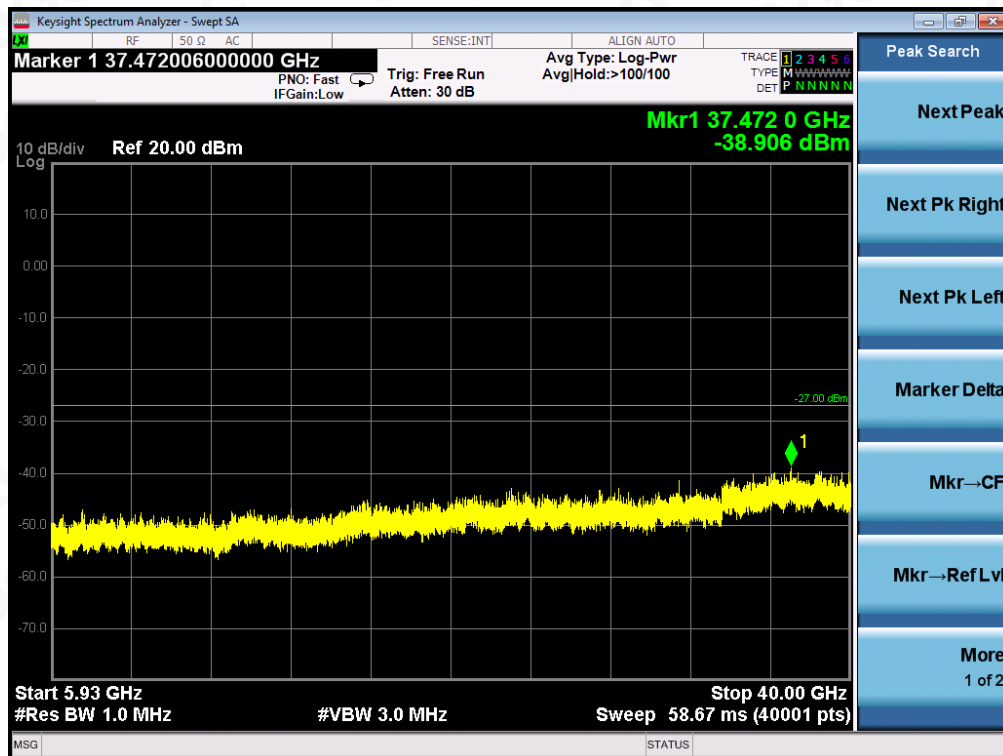
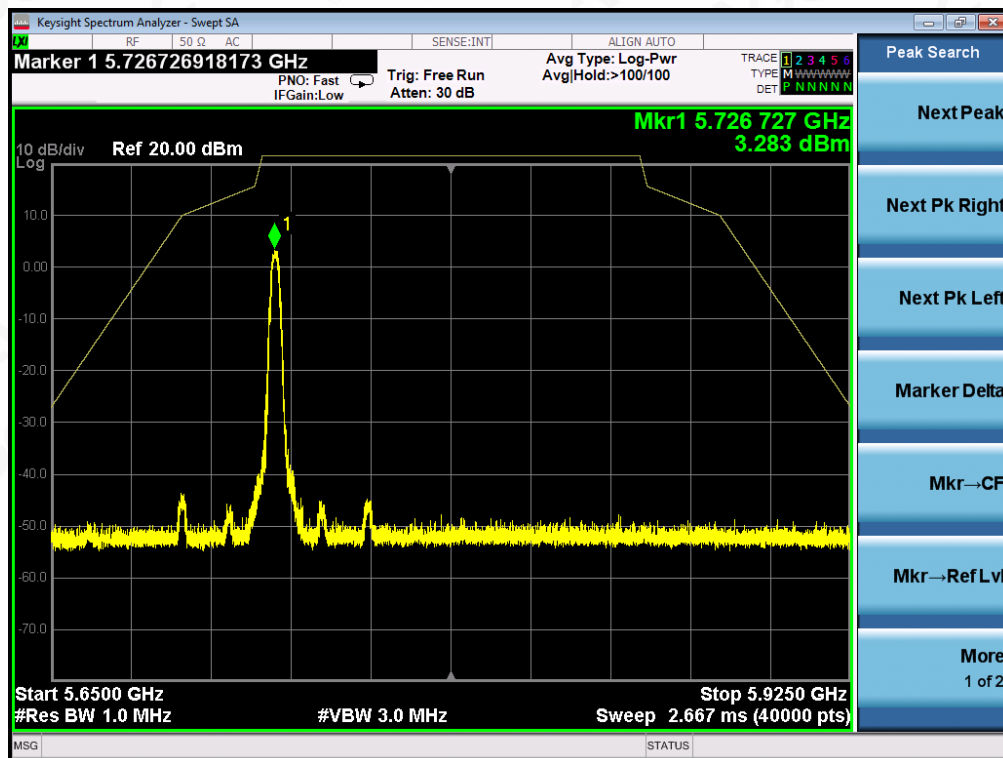
| LIMITS AND MEASUREMENT RESULT                                                                                                                                                                                                                                                                                                                                                                                                   |                    |          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|
| Applicable Limits                                                                                                                                                                                                                                                                                                                                                                                                               | Measurement Result |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                 | Test channel       | Criteria |
| 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. | 5725MHz-5850MHz    | PASS     |



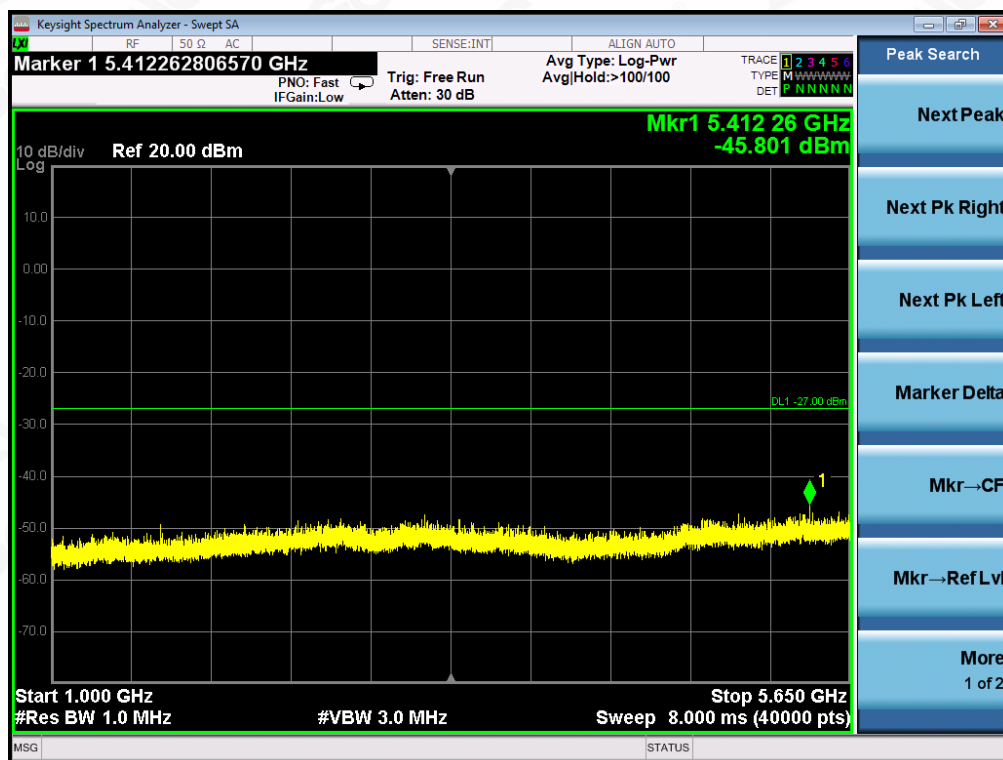
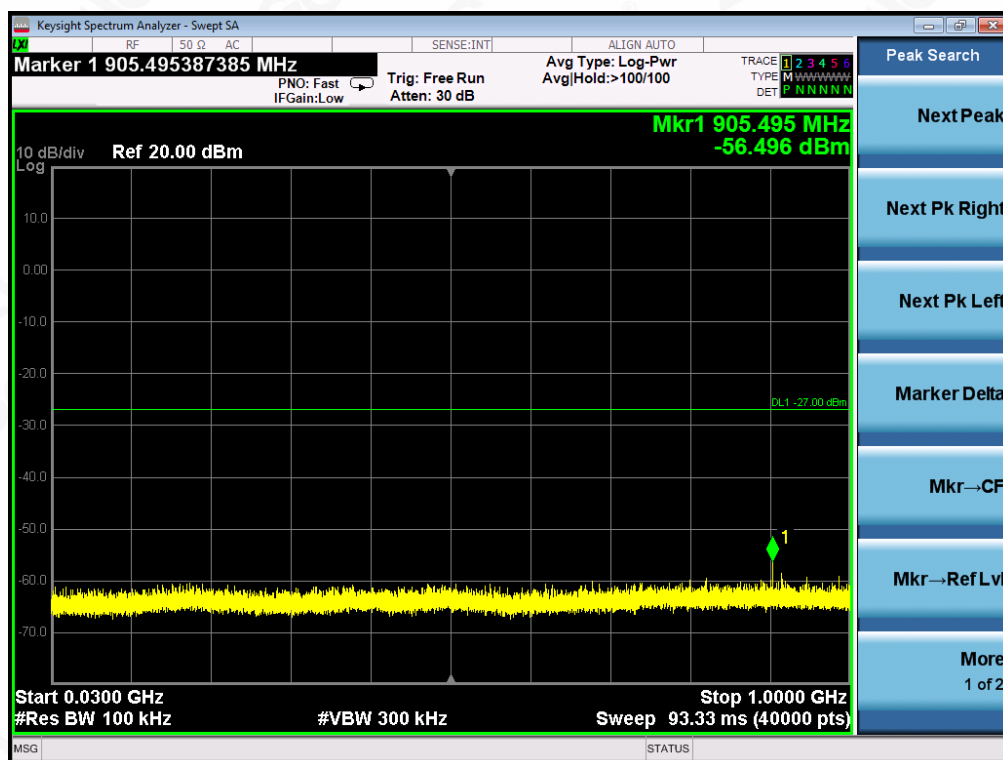
## TEST RESULT

### TEST PLOT OF OUT OF BAND EMISSIONS FOR MODULATION IN 5727MHz





# TEST PLOT OF OUT OF BAND EMISSIONS FOR MODULATION IN 5800MHZ



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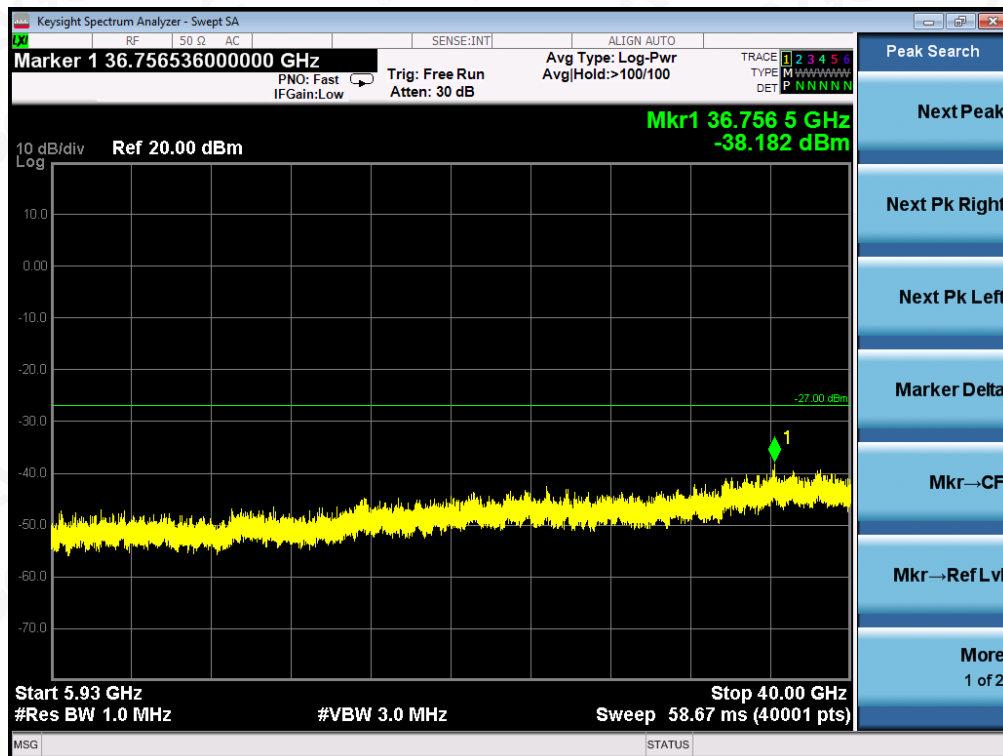
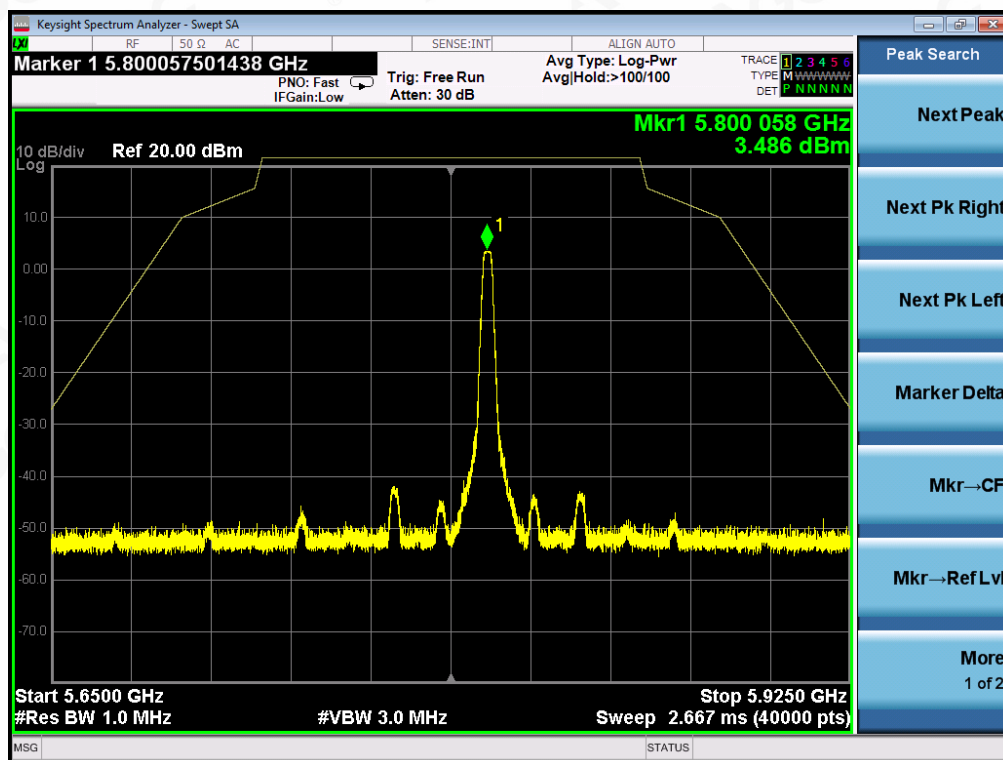
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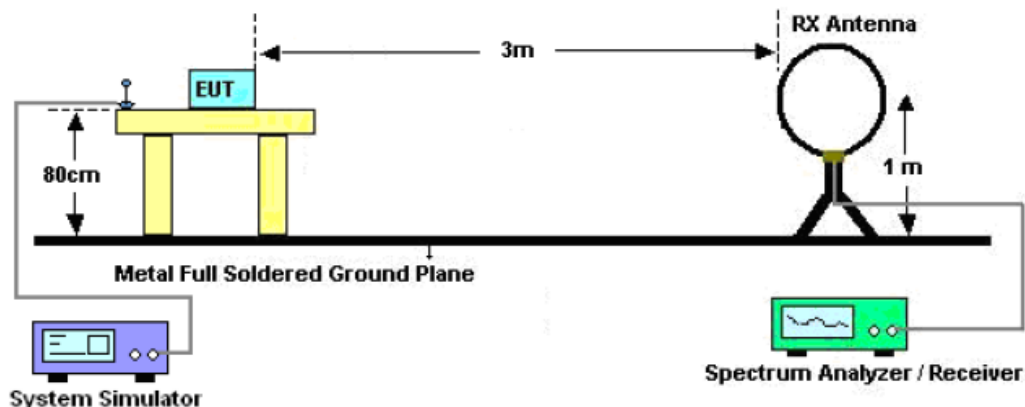
## 11. RADIATED EMISSION

### 11.1. MEASUREMENT PROCEDURE

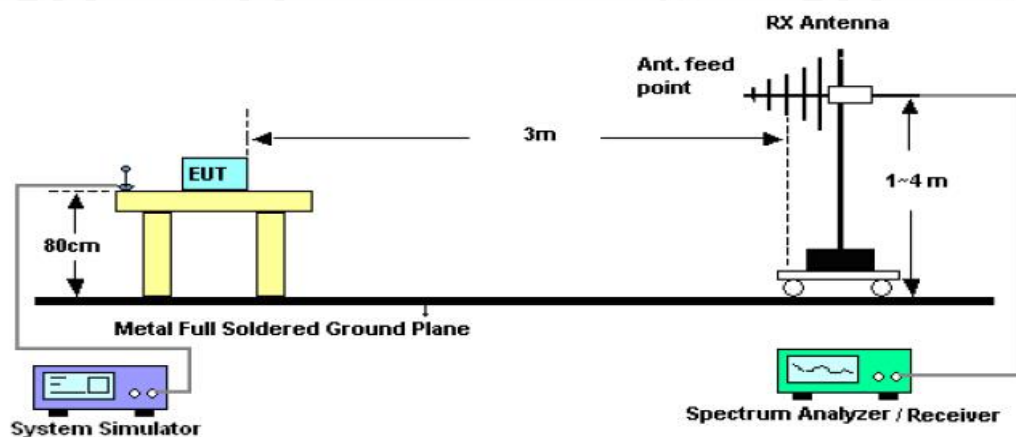
1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3M VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

## 11.2. TEST SETUP

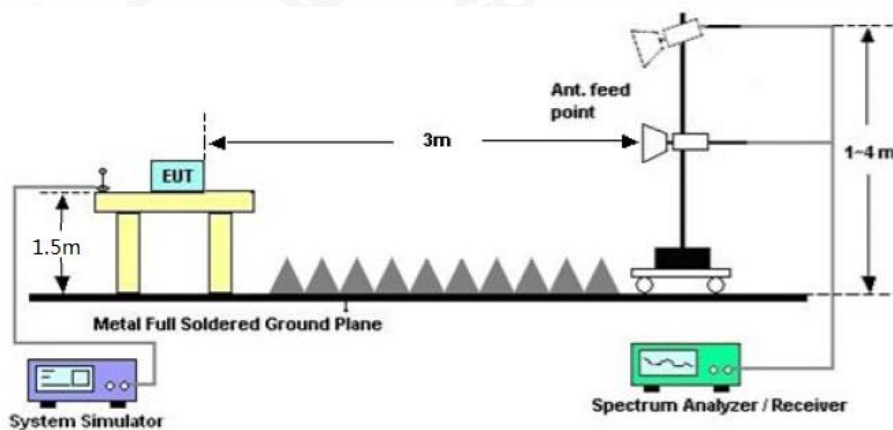
### Radiated Emission Test-Setup Frequency Below 30MHz



### RADIATED EMISSION TEST SETUP 30MHz-1000MHz



### RADIATED EMISSION TEST SETUP ABOVE 1000MHz



### 11.3. LIMITS AND MEASUREMENT RESULT

15.209(a) Limit in the below table has to be followed

| Frequencies (MHz) | Field Strength (micorvolts/meter) | Measurement Distance (meters) |
|-------------------|-----------------------------------|-------------------------------|
| 0.009~0.490       | 2400/F(KHz)                       | 300                           |
| 0.490~1.705       | 24000/F(KHz)                      | 30                            |
| 1.705~30.0        | 30                                | 30                            |
| 30~88             | 100                               | 3                             |
| 88~216            | 150                               | 3                             |
| 216~960           | 200                               | 3                             |
| Above 960         | 500                               | 3                             |

Note: All modes were tested For restricted band radiated emission, the test records reported below are the worst result compared to other modes.

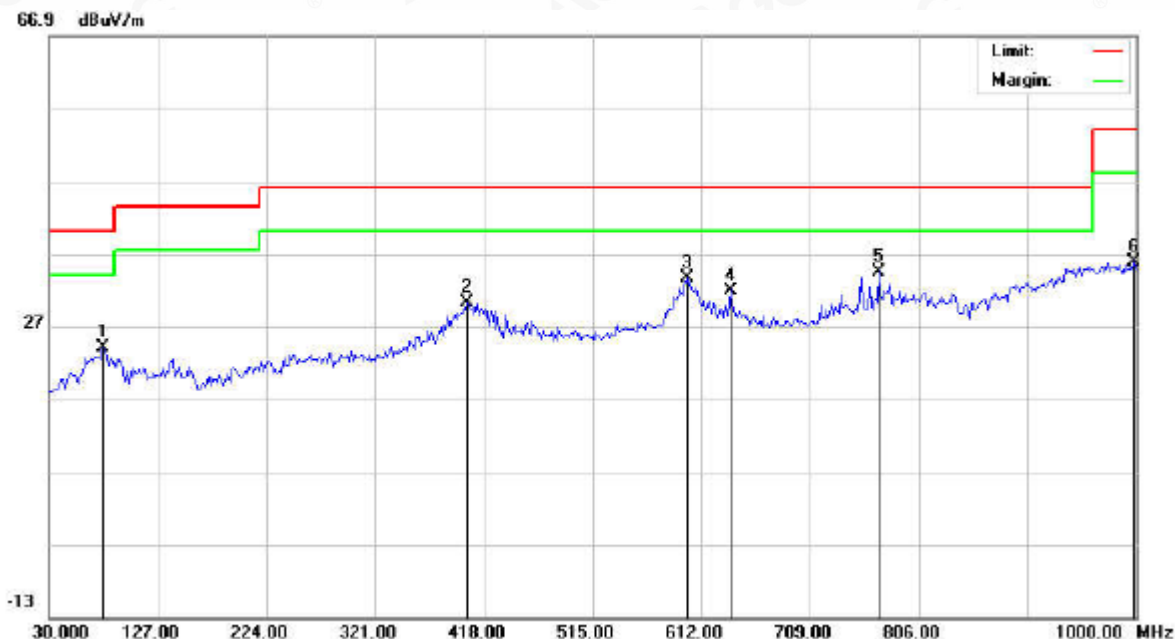
### 11.4. TEST RESULT

#### RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

### RADIATED EMISSION BELOW 1GHZ

|             |            |                   |                |
|-------------|------------|-------------------|----------------|
| EUT         | QUIRKY AIR | Model Name        | QKY-AIR        |
| Temperature | 25°C       | Relative Humidity | 55.4%          |
| Pressure    | 960hPa     | Test Voltage      | Normal Voltage |
| Test Mode   | 5727MHz    | Antenna           | Horizontal     |



| No. | Mk | Freq.<br>MHz | Reading<br>dBuV | Factor<br>dBuV/m | Measurement<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Detector | Antenna<br>Height<br>cm | Table<br>Degree<br>degree | Comment |
|-----|----|--------------|-----------------|------------------|-----------------------|-----------------|------------|----------|-------------------------|---------------------------|---------|
| 1   |    | 78.5000      | 8.74            | 15.27            | 24.01                 | 40.00           | -15.99     | peak     |                         |                           |         |
| 2   |    | 403.4499     | 7.13            | 23.05            | 30.18                 | 46.00           | -15.82     | peak     |                         |                           |         |
| 3   |    | 599.0666     | 6.61            | 26.93            | 33.54                 | 46.00           | -12.46     | peak     |                         |                           |         |
| 4   |    | 637.8667     | 4.50            | 27.40            | 31.90                 | 46.00           | -14.10     | peak     |                         |                           |         |
| 5   | *  | 770.4333     | 4.76            | 29.74            | 34.50                 | 46.00           | -11.50     | peak     |                         |                           |         |
| 6   |    | 998.3832     | 3.20            | 32.55            | 35.75                 | 54.00           | -18.25     | peak     |                         |                           |         |

RESULT: PASS

|             |            |                   |                |
|-------------|------------|-------------------|----------------|
| EUT         | QUIRKY AIR | Model Name        | QKY-AIR        |
| Temperature | 25°C       | Relative Humidity | 55.4%          |
| Pressure    | 960hPa     | Test Voltage      | Normal Voltage |
| Test Mode   | 5727MHz    | Antenna           | Vertical       |



| No. | Mk | Freq.    | Reading | Factor | Measurement | Limit  | Over   | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
|     |    | MHz      | dBuV    | dBuV/m | dBuV/m      | dBuV/m | dB     |          | cm             | degree       |         |
| 1   |    | 60.7167  | 6.42    | 18.74  | 25.16       | 40.00  | -14.84 | peak     |                |              |         |
| 2   |    | 135.0833 | 10.58   | 18.92  | 29.50       | 43.50  | -14.00 | peak     |                |              |         |
| 3   |    | 314.5332 | 8.63    | 19.98  | 28.61       | 46.00  | -17.39 | peak     |                |              |         |
| 4   |    | 403.4499 | 6.46    | 23.05  | 29.51       | 46.00  | -16.49 | peak     |                |              |         |
| 5   |    | 597.4500 | 7.00    | 26.90  | 33.90       | 46.00  | -12.10 | peak     |                |              |         |
| 6   | *  | 953.1167 | 3.09    | 32.16  | 35.25       | 46.00  | -10.75 | peak     |                |              |         |

# RESULT: PASS

**Note:** All test channels had been tested. The 5727MHz is the worst case and recorded in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Level.

The "Factor" value can be calculated automatically by software of measurement system.

### RADIATED EMISSION ABOVE 1GHZ

|                    |            |                          |                     |
|--------------------|------------|--------------------------|---------------------|
| <b>EUT</b>         | QUIRKY AIR | <b>Model Name</b>        | QKY-AIR             |
| <b>Temperature</b> | 25°C       | <b>Relative Humidity</b> | 55.4%               |
| <b>Pressure</b>    | 960hPa     | <b>Test Voltage</b>      | Normal Voltage      |
| <b>Test Mode</b>   | 5727MHz    | <b>Antenna</b>           | Horizontal/Vertical |

### RADIATED EMISSION ABOVE 1GHZ–Horizontal

| Frequency<br>(MHz) | Meter Reading<br>(dBμV) | Factor<br>(dB) | Emission Level<br>(dBμV/m) | Limits<br>(dBμV/m) | Margin<br>(dB) | Value Type |
|--------------------|-------------------------|----------------|----------------------------|--------------------|----------------|------------|
| 11454.062          | 43.32                   | 9.42           | 52.74                      | 74.00              | -21.26         | peak       |
| 11454.062          | 38.19                   | 9.42           | 47.61                      | 54.00              | -6.39          | AVG        |
| 17181.093          | 35.19                   | 10.51          | 45.70                      | 74.00              | -28.30         | peak       |
| 17181.093          | 33.33                   | 10.51          | 43.84                      | 54.00              | -10.16         | AVG        |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

### RADIATED EMISSION ABOVE 1GHZ–Vertical

| Frequency<br>(MHz) | Meter Reading<br>(dBμV) | Factor<br>(dB) | Emission Level<br>(dBμV/m) | Limits<br>(dBμV/m) | Margin<br>(dB) | Value Type |
|--------------------|-------------------------|----------------|----------------------------|--------------------|----------------|------------|
| 11454.062          | 47.57                   | 9.42           | 56.99                      | 74.00              | -17.01         | peak       |
| 11454.062          | 38.65                   | 9.42           | 48.07                      | 54.00              | -5.93          | AVG        |
| 17181.093          | 35.43                   | 10.51          | 45.94                      | 74.00              | -28.06         | peak       |
| 17181.093          | 32.71                   | 10.51          | 43.22                      | 54.00              | -10.78         | AVG        |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



|             |            |                   |                     |
|-------------|------------|-------------------|---------------------|
| EUT         | QUIRKY AIR | Model Name        | QKY-AIR             |
| Temperature | 25°C       | Relative Humidity | 55.4%               |
| Pressure    | 960hPa     | Test Voltage      | Normal Voltage      |
| Test Mode   | 5800MHz    | Antenna           | Horizontal/Vertical |

#### RADIATED EMISSION ABOVE 1GHZ–Horizontal

| Frequency<br>(MHz) | Meter Reading<br>(dBμV) | Factor<br>(dB) | Emission Level<br>(dBμV/m) | Limits<br>(dBμV/m) | Margin<br>(dB) | Value Type |
|--------------------|-------------------------|----------------|----------------------------|--------------------|----------------|------------|
| 11600.062          | 42.15                   | 9.62           | 51.77                      | 74.00              | -22.23         | peak       |
| 11600.062          | 36.30                   | 9.62           | 45.92                      | 54.00              | -8.08          | AVG        |
| 17400.093          | 36.29                   | 10.75          | 47.04                      | 74.00              | -26.96         | peak       |
| 17400.093          | 34.15                   | 10.75          | 44.90                      | 54.00              | -9.10          | AVG        |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

#### RADIATED EMISSION ABOVE 1GHZ–Vertical

| Frequency<br>(MHz) | Meter Reading<br>(dBμV) | Factor<br>(dB) | Emission Level<br>(dBμV/m) | Limits<br>(dBμV/m) | Margin<br>(dB) | Value Type |
|--------------------|-------------------------|----------------|----------------------------|--------------------|----------------|------------|
| 11600.062          | 43.12                   | 9.62           | 52.74                      | 74.00              | -21.26         | peak       |
| 11600.062          | 39.26                   | 9.62           | 48.88                      | 54.00              | -5.12          | AVG        |
| 17400.093          | 36.89                   | 10.75          | 47.64                      | 74.00              | -26.36         | peak       |
| 17400.093          | 34.33                   | 10.75          | 45.08                      | 54.00              | -8.92          | AVG        |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

**Note:**Other frequencies radiation emission from 1GHz to 40GHz at least have 20dB margin and not recorded in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Level.

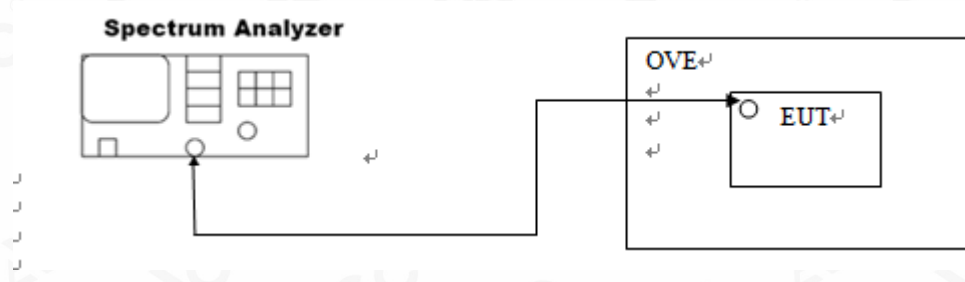
The “Factor” value can be calculated automatically by software of measurement system.

## 12. FREQUENCY STABILITY

### 12.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the operation frequency.
3. Set SPA Centre Frequency = Operation Frequency. SPAN=enough to measure the emission is maintained within the band
4. Set SPA Trace 1 Max hold, then View.
5. Extreme temperature rule is -10°C~60°C.

### 12.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



### 12.3. MEASUREMENT RESULTS

| Test Mode | Temperature | Measurement Frequency (MHz) | Result          | Conclusion |
|-----------|-------------|-----------------------------|-----------------|------------|
| GFSK      | - 10℃       | 5727                        | within the band | PASS       |
|           | 0℃          | 5727                        | within the band | PASS       |
|           | 10℃         | 5727                        | within the band | PASS       |
|           | 20℃         | 5727                        | within the band | PASS       |
|           | 30℃         | 5727                        | within the band | PASS       |
|           | 40℃         | 5727                        | within the band | PASS       |
|           | 50℃         | 5727                        | within the band | PASS       |
|           | 60℃         | 5727                        | within the band | PASS       |
|           | - 10℃       | 5800                        | within the band | PASS       |
|           | 0℃          | 5800                        | within the band | PASS       |
|           | 10℃         | 5800                        | within the band | PASS       |
|           | 20℃         | 5800                        | within the band | PASS       |
|           | 30℃         | 5800                        | within the band | PASS       |
|           | 40℃         | 5800                        | within the band | PASS       |
|           | 50℃         | 5800                        | within the band | PASS       |
|           | 60℃         | 5800                        | within the band | PASS       |



### 13. FCC LINE CONDUCTED EMISSION TEST

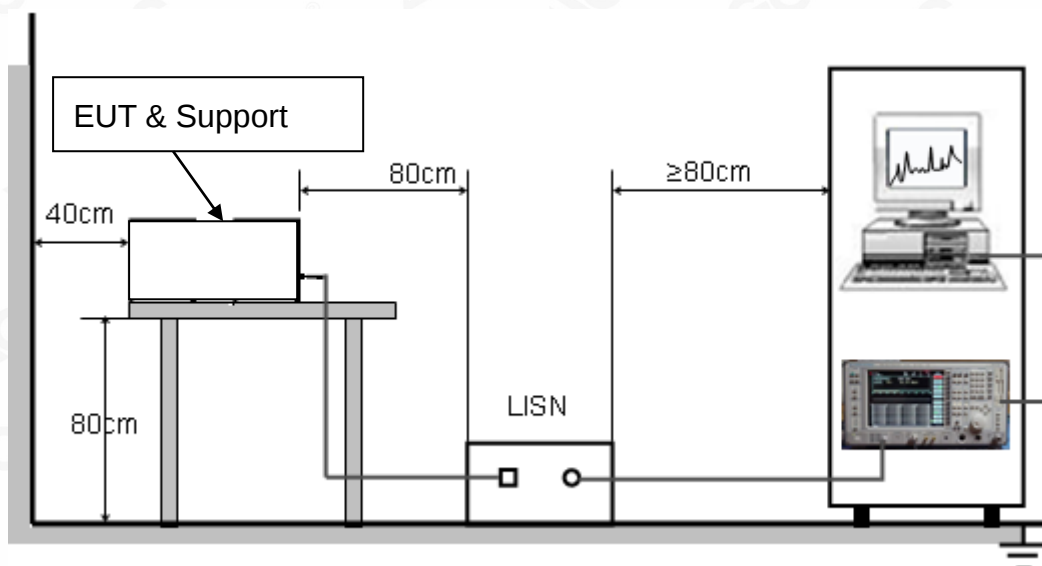
#### 13.1. LIMITS OF LINE CONDUCTED EMISSION TEST

| Frequency     | Maximum RF Line Voltage |                |
|---------------|-------------------------|----------------|
|               | Q.P.( dBuV)             | Average( dBuV) |
| 150kHz~500kHz | 66-56                   | 56-46          |
| 500kHz~5MHz   | 56                      | 46             |
| 5MHz~30MHz    | 60                      | 50             |

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

#### 13.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



### 13.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received charging voltage by adapter which received 120V/60Hz power by a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.



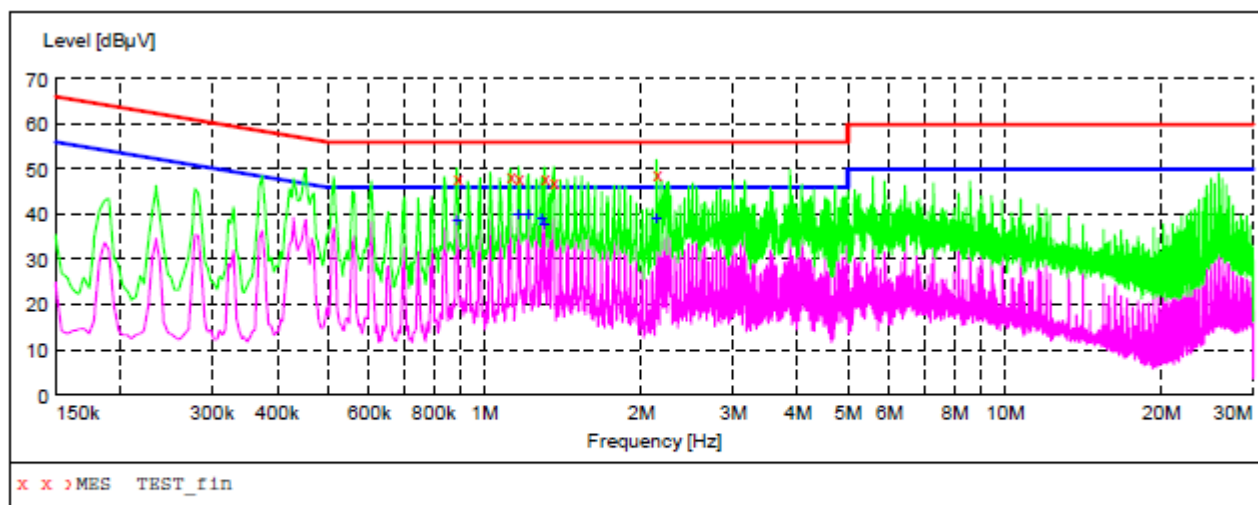
#### 13.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.



### 13.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

#### LINE CONDUCTED EMISSION TEST-L



#### MEASUREMENT RESULT: "TEST\_fin"

9/18/2019 9:23AM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.886000         | 47.90         | 11.1         | 56            | 8.1          | QP       | L1   | FLO |
| 1.122000         | 48.70         | 11.5         | 56            | 7.3          | QP       | L1   | FLO |
| 1.166000         | 48.40         | 11.5         | 56            | 7.6          | QP       | L1   | FLO |
| 1.306000         | 48.00         | 11.5         | 56            | 8.0          | QP       | L1   | FLO |
| 1.358000         | 47.30         | 11.5         | 56            | 8.7          | QP       | L1   | FLO |
| 2.146000         | 49.10         | 11.5         | 56            | 6.9          | QP       | L1   | FLO |

#### MEASUREMENT RESULT: "TEST\_fin2"

9/18/2019 9:23AM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.886000         | 39.00         | 11.1         | 46            | 7.0          | AV       | L1   | FLO |
| 1.166000         | 40.10         | 11.5         | 46            | 5.9          | AV       | L1   | FLO |
| 1.214000         | 40.00         | 11.5         | 46            | 6.0          | AV       | L1   | FLO |
| 1.290000         | 39.40         | 11.5         | 46            | 6.6          | AV       | L1   | FLO |
| 1.306000         | 37.80         | 11.5         | 46            | 8.2          | AV       | L1   | FLO |
| 2.146000         | 39.10         | 11.5         | 46            | 6.9          | AV       | L1   | FLO |



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.

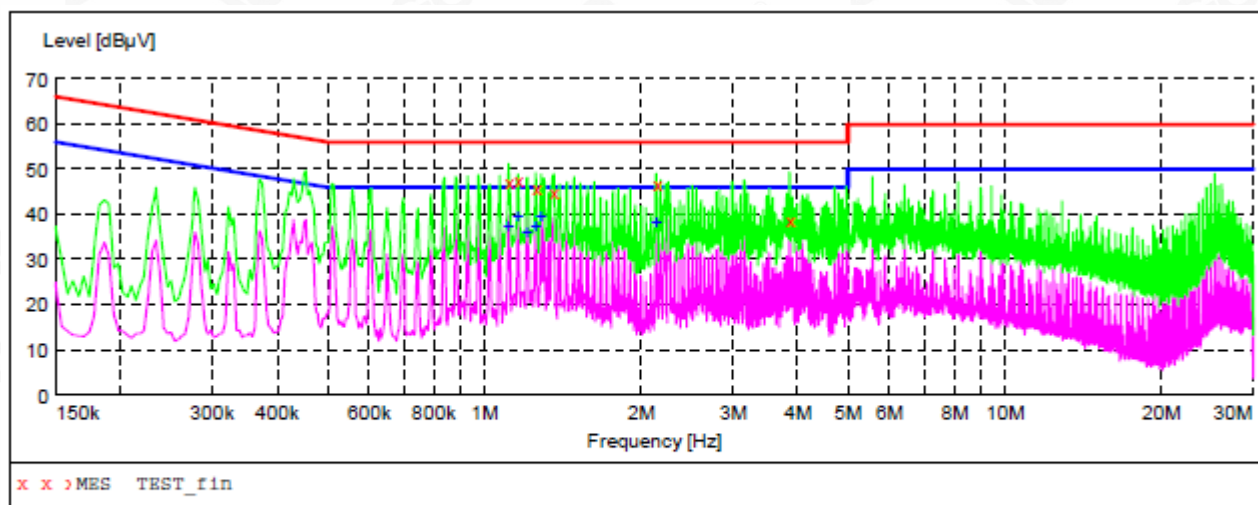
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

# LINE CONDUCTED EMISSION TEST-N



## MEASUREMENT RESULT: "TEST\_fin"

9/18/2019 9:13AM

| Frequency<br>MHz | Level<br>dBuV | Transd<br>dB | Limit<br>dBuV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 1.114000         | 47.20         | 11.5         | 56            | 8.8          | QP       | N    | FLO |
| 1.162000         | 47.70         | 11.5         | 56            | 8.3          | QP       | N    | FLO |
| 1.254000         | 45.60         | 11.5         | 56            | 10.4         | QP       | N    | FLO |
| 1.358000         | 44.80         | 11.5         | 56            | 11.2         | QP       | N    | FLO |
| 2.142000         | 46.70         | 11.5         | 56            | 9.3          | QP       | N    | FLO |
| 3.854000         | 38.70         | 11.6         | 56            | 17.3         | QP       | N    | FLO |

## MEASUREMENT RESULT: "TEST\_fin2"

9/18/2019 9:13AM

| Frequency<br>MHz | Level<br>dBuV | Transd<br>dB | Limit<br>dBuV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 1.114000         | 37.40         | 11.5         | 46            | 8.6          | AV       | N    | FLO |
| 1.162000         | 39.50         | 11.5         | 46            | 6.5          | AV       | N    | FLO |
| 1.206000         | 36.20         | 11.5         | 46            | 9.8          | AV       | N    | FLO |
| 1.254000         | 37.30         | 11.5         | 46            | 8.7          | AV       | N    | FLO |
| 1.286000         | 39.70         | 11.5         | 46            | 6.3          | AV       | N    | FLO |
| 2.142000         | 38.20         | 11.5         | 46            | 7.8          | AV       | N    | FLO |

RESULT: PASS



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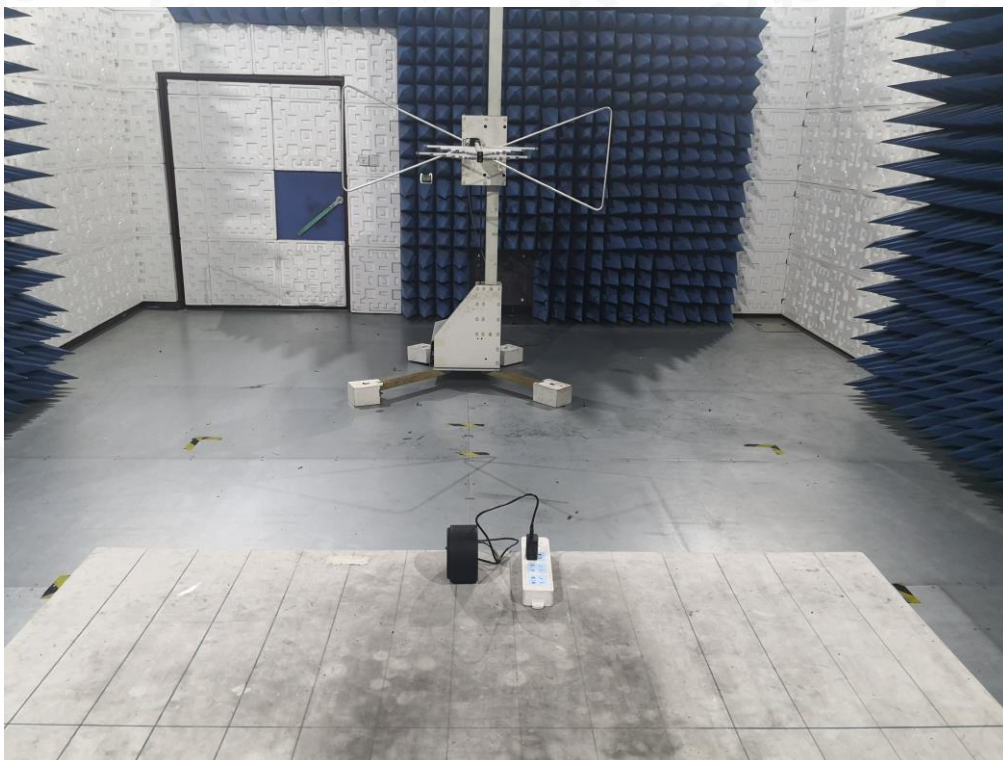
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**APPENDIX A: PHOTOGRAPHS OF TEST SETUP****FCC LINE CONDUCTED EMISSION TEST SETUP****FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ**

## FCC RADIATED EMISSION TEST SETUP ABOVE 1GHZ



----END OF REPORT----

