



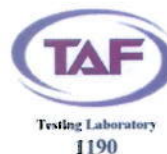
# FCC Radio Test Report

**Equipment** : WGSoCAiP  
**Brand Name** : MRLOOP  
**Model No.** : ML60EF1  
**FCC ID** : 2AJAS60EFA100201606  
**Standard** : 47 CFR FCC Part 15.255  
**Applicant** : MR.Loop  
7F.-6,NO.237,Sec.1,Datong Rd. Xizhi Dist., New  
Taipei City, Taiwan  
**Manufacturer** : Siliconware Precision Industries Co., Ltd  
No. 123, Sec.3,Da Fong Rd., Tantz, Taichung  
427, Taiwan, R.O.C

The product sample received on May 20, 2016 and completely tested on Jul. 14, 2016. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013, 47 CFR FCC Part 15.255 and Millimeter Wave Test Procedures and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

  
Sam Chen  
SPORTON INTERNATIONAL INC.





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## Summary of Test Result

| Standard Requirements and Conformance Test Specifications |                   |                                              |          |        |
|-----------------------------------------------------------|-------------------|----------------------------------------------|----------|--------|
| Report Clause                                             | Ref. Std. Clause  | Description                                  | Result   | Remark |
| 3.1                                                       | FCC 15.207        | AC Power Conducted Emissions                 | Complied | -      |
| 3.2                                                       | FCC 15.255(e)     | Occupied Bandwidth                           | Complied | -      |
| 3.3                                                       | FCC 15.255(b)(1)  | EIRP Power                                   | Complied | -      |
| 3.4                                                       | FCC 15.255(e)     | Peak Conducted Power                         | Complied | -      |
| 3.5                                                       | FCC 15.255(c)     | Transmitter Spurious Emissions               | Complied | -      |
| 3.6                                                       | FCC 15.255(f)     | Frequency Stability                          | Complied | -      |
| 3.7                                                       | FCC 15.255(a),(h) | Operation Restriction and Group Installation | Complied | -      |



SPORTON INTERNATIONAL INC.  
TEL : 886-3-327-3456  
FAX : 886-3-327-0973  
FCC ID: 2AJAS60EFA100201606

# 1 General Description

## 1.1 Information

### 1.1.1 The Channel Plan(s)

|                            |                                                      |
|----------------------------|------------------------------------------------------|
| Frequency Range            | 57-64 GHz                                            |
| <b>The Channel Plan(s)</b> |                                                      |
| High-rate PHY (HRP) Band   | Channel 2 HRP: 60.48 GHz<br>Channel 3 HRP: 62.64 GHz |

### 1.1.2 Transmit Operating Modes

| <b>The Different Transmit Operating Modes</b> |                                                                |
|-----------------------------------------------|----------------------------------------------------------------|
| <input checked="" type="checkbox"/>           | Operating mode 1: Smart Antenna Systems - with beam forming    |
| <input type="checkbox"/>                      | Operating mode 2: Smart Antenna Systems - without beam forming |
| <input type="checkbox"/>                      | Operating mode 3: Single Antenna Equipment                     |

### 1.1.3 Antenna Information

| <b>Antenna Information</b>          |                                                                               |
|-------------------------------------|-------------------------------------------------------------------------------|
| <input type="checkbox"/>            | Equipment placed on the market without antennas                               |
| <input checked="" type="checkbox"/> | Integral antenna                                                              |
| Integral antenna gain               | 10.5 dBi for HRP                                                              |
|                                     | <input type="checkbox"/> Temporary RF connector provided                      |
|                                     | <input checked="" type="checkbox"/> No temporary RF connector provided        |
| <input type="checkbox"/>            | External antenna (dedicated antennas)                                         |
|                                     | <input type="checkbox"/> Single power level with corresponding antenna(s)     |
|                                     | <input type="checkbox"/> Multiple power settings and corresponding antenna(s) |

**1.1.4 Power Levels**

| Worst Power Levels for HRP |                                                                             |          |            |
|----------------------------|-----------------------------------------------------------------------------|----------|------------|
| Applicable power levels    | <input type="checkbox"/> Conducted <input checked="" type="checkbox"/> EIRP |          |            |
| Antenna gain               | 10.5    dBi                                                                 |          |            |
| Frequency (GHz)            | Highest setting ( $P_{high}$ ): (dBm)                                       |          |            |
|                            | Modulation                                                                  | AV Power | Peak Power |
| 60.48                      | QPSK                                                                        | 12.11    | 23.97      |

**1.1.5 Extreme Operating**

| The Extreme Operating Temperature Range that Apply to the Equipment |                                                                                                          |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> -40 °C to +80 °C                |                                                                                                          |
| <input type="checkbox"/> 0 °C to +40 °C                             |                                                                                                          |
| <input type="checkbox"/> Other:                                     |                                                                                                          |
| EUT Power Type                                                      | From Host System                                                                                         |
| Supply Voltage                                                      | <input type="checkbox"/> AC                      State AC voltage                      V                 |
| Supply Voltage                                                      | <input checked="" type="checkbox"/> DC                      State DC voltage    5                      V |

**1.1.6 Equipment Use Condition**

| Equipment Use Condition                                                       |
|-------------------------------------------------------------------------------|
| <input type="checkbox"/> Fixed field disturbance sensors at 61-61.5GHz        |
| <input type="checkbox"/> Except fixed field disturbance sensors at 61-61.5GHz |
| <input checked="" type="checkbox"/> Except fixed field disturbance sensors    |

**1.1.7 User Condition**

| Intended Operation                              |
|-------------------------------------------------|
| <input checked="" type="checkbox"/> Indoor only |
| <input type="checkbox"/> Outdoor only           |



## 1.2 Additional Information Provided by the Submitter

### 1.2.1 Modulation

| Modulation                                |                                                                     |
|-------------------------------------------|---------------------------------------------------------------------|
| The HRP modulation is QPSK, 16-QAM.       |                                                                     |
| Can the transmitter operate un-modulated: | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |

### 1.2.2 Duty Cycle

| Duty Cycle                      |     |       | Duty Cycle Factor |
|---------------------------------|-----|-------|-------------------|
| The transmitter is intended for | HRP | 100 % | 0.00              |

## 1.3 Accessories

N/A

## 1.4 Support Equipment

Test Site: CO01-CB / For AC Power Conducted Emissions test

| Support Equipment |                 |            |             |                     |
|-------------------|-----------------|------------|-------------|---------------------|
| No.               | Equipment       | Brand Name | Model Name  | FCC ID              |
| 1                 | NB              | DELL       | Inspiron 15 | DoC                 |
| 2                 | Earphone        | SHYARO CHI | MIC-04      | DoC                 |
| 3                 | Mouse           | Logitech   | M-U0026     | DoC                 |
| 4                 | NB              | DELL       | E6430       | DoC                 |
| 5                 | Module (Device) | MR.Loop    | ML60EF1     | 2AJAS60EFA100201606 |
| 6                 | Test fixture*2  | MR.Loop    | N/A         | N/A                 |

Test Site: 03CH01-CB / For Transmitter Spurious Emissions (below 1 GHz) test

| Support Equipment |                 |            |             |                     |
|-------------------|-----------------|------------|-------------|---------------------|
| No.               | Equipment       | Brand Name | Model Name  | FCC ID              |
| 1                 | NB              | DELL       | E4300       | DoC                 |
| 2                 | Module (Device) | MRLOOP     | ML60EF1     | 2AJAS60EFA100201606 |
| 3                 | Earphone        | SHYARO CHI | MIC-04      | N/A                 |
| 4                 | Mouse           | Logitech   | M-U0026     | DoC                 |
| 5                 | NB              | DELL       | Inspiron 15 | DoC                 |
| 6                 | Test fixture*2  | MR.Loop    | N/A         | N/A                 |



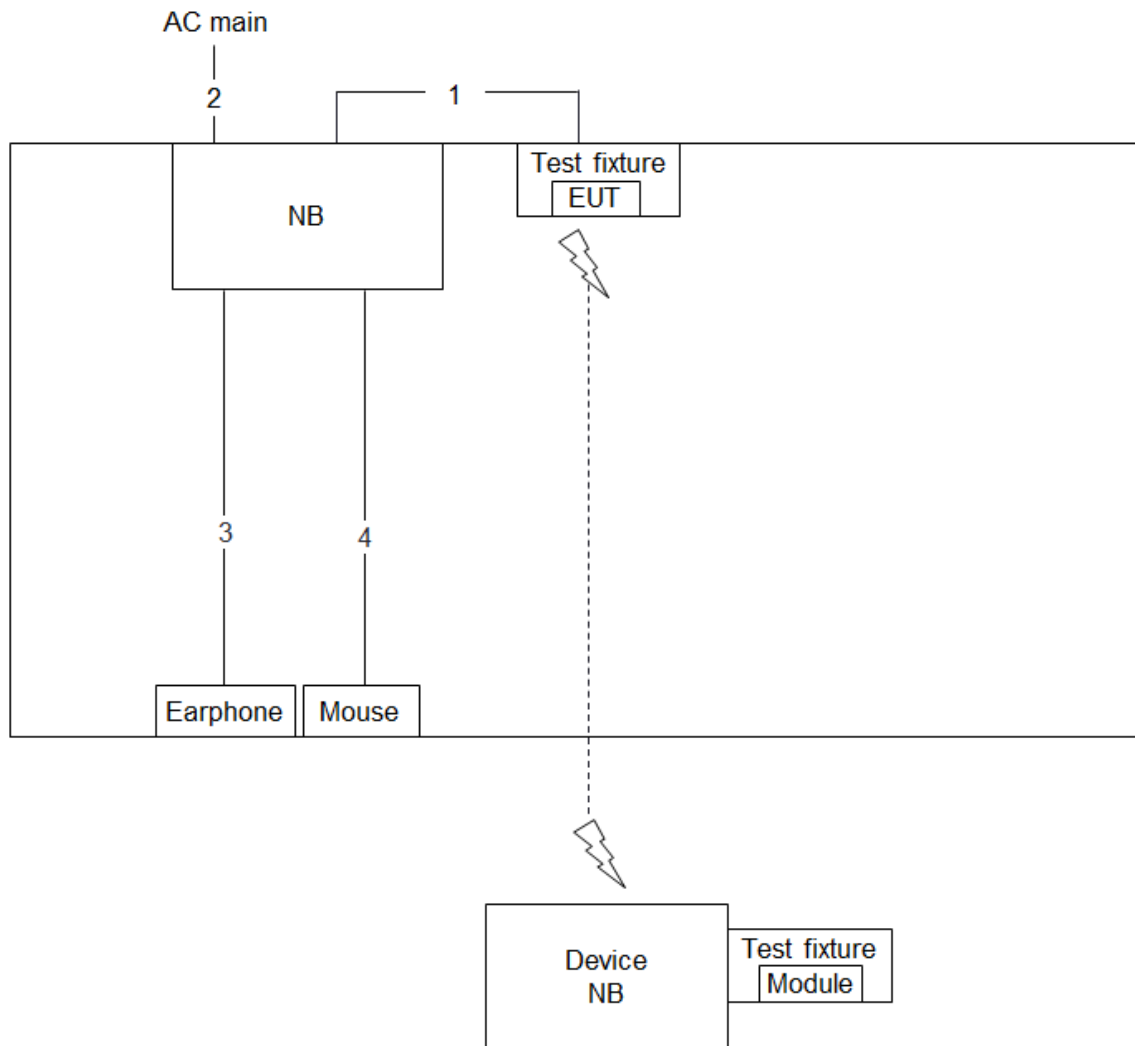
Test Site: 03CH01-CB and TH01-CB / For Other test

| Support Equipment |                |            |             |        |
|-------------------|----------------|------------|-------------|--------|
| No.               | Equipment      | Brand Name | Model Name  | FCC ID |
| 1                 | NB             | DELL       | Inspiron 15 | DoC    |
| 2                 | Test fixture*2 | MR.Loop    | N/A         | N/A    |

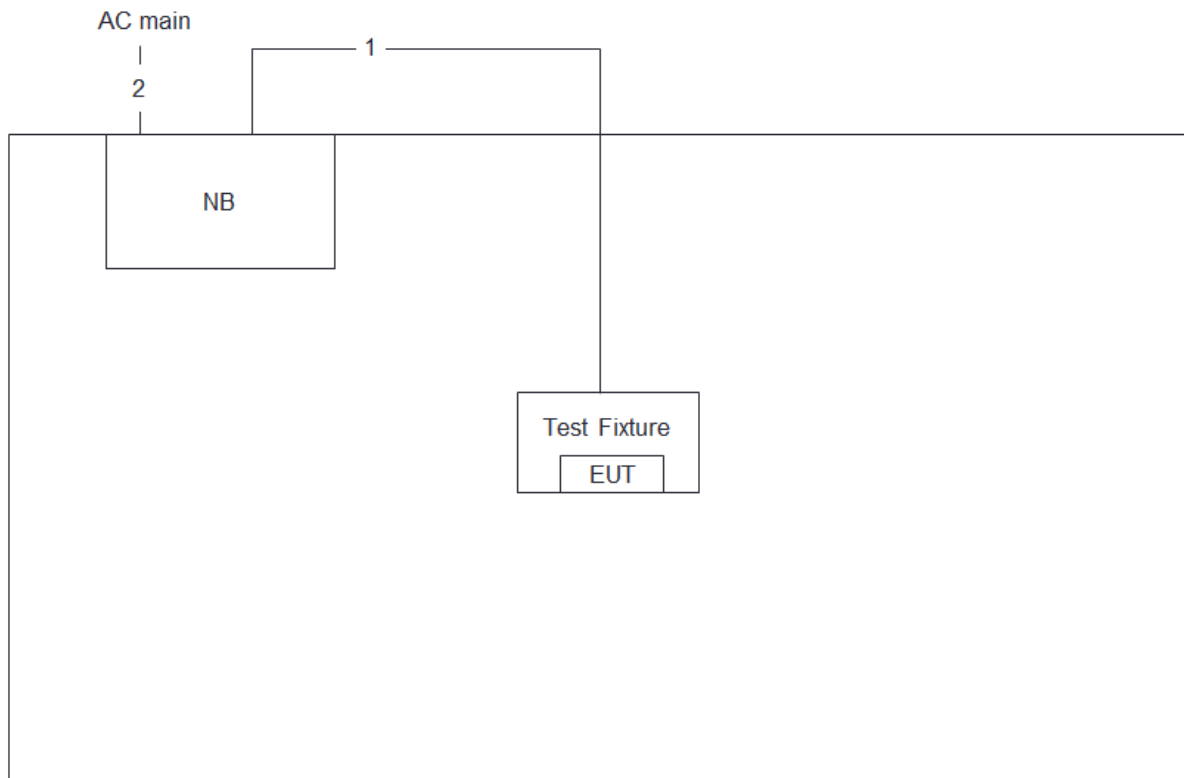
## 1.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



**Test Setup Diagram - Transmitter Spurious Emissions below 1 GHz**


| Item | Connection  | Shielded | Length |
|------|-------------|----------|--------|
| 1    | USB cable   | Yes      | 1m     |
| 2    | Power cable | No       | 2.7m   |
| 3    | USB cable   | Yes      | 1.8m   |
| 4    | Audio cable | No       | 1.4m   |

**Test Setup Diagram - Transmitter Spurious Emissions above 1 GHz**


| Item | Connection  | Shielded | Length |
|------|-------------|----------|--------|
| 1    | USB cable   | Yes      | 1.8m   |
| 2    | Power cable | No       | 2.7m   |

## 1.7 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15.255
- ♦ ANSI C63.10-2013 Section 9. "Procedures for testing millimeter-wave systems"

## 1.8 Testing Location

| Testing Location                    |           |                                                                                                                               |
|-------------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | HWA YA    | ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.<br>TEL : 886-3-327-3456 FAX : 886-3-327-0973   |
| <input checked="" type="checkbox"/> | JHUBEI    | ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.<br>TEL : 886-3-656-9065 FAX : 886-3-656-9085 |
| Test Site No.                       |           |                                                                                                                               |
| CO01-CB                             | 03CH01-CB | TH01-CB                                                                                                                       |

## 2 Test Configuration of Equipment under Test

### 2.1 Test Channel Frequencies

| Nominal Channel Bandwidth |                      |                         |                       |
|---------------------------|----------------------|-------------------------|-----------------------|
| Channel Plan<br>(GHz)     | Low Channel<br>(GHz) | Middle Channel<br>(GHz) | High Channel<br>(GHz) |
| Channel 2 HRP: 60.48      | -                    | 60.48                   | -                     |
| Channel 3 HRP: 62.64      | -                    | 62.64                   | -                     |

### 2.2 Conformance Tests and Related Test Frequencies

| Test Item                                     | Test Frequencies (GHz)  |
|-----------------------------------------------|-------------------------|
|                                               | Channel Plan 2&3<br>HRP |
| AC Power Conducted Emissions                  | Normal Link             |
| Occupied Bandwidth                            | 60.48 & 62.64           |
| EIRP Power                                    | 60.48 & 62.64           |
| Peak Conducted Power                          | 60.48 & 62.64           |
| Transmitter Spurious Emissions (below 1 GHz)  | Normal Link             |
| Transmitter Spurious Emissions (1 GHz-40 GHz) | 60.48 & 62.64           |
| Transmitter Spurious Emissions (above 40 GHz) | 60.48 & 62.64           |
| Frequency Stability                           | Un-Modulation           |



## 2.3 Far Field Boundary Calculations

The far-field boundary is given as:

$$\text{far field} = (2 * L^2) / \lambda$$

where:

L = Largest Antenna Dimension, including the reflector, in meters

$\lambda$  = wavelength in meters

| Far Field (m)   |       |            |                  |                   |
|-----------------|-------|------------|------------------|-------------------|
| Frequency (GHz) | L (m) | Lambda (m) | d(Far Field) (m) | d(Far Field) (cm) |
| 60.48           | 0.02  | 0.0049603  | 0.161            | 16.13             |
| 62.64           | 0.02  | 0.0047893  | 0.167            | 16.70             |



### AC Power Conducted Emissions

1. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long (see ANSI C63.10, clause 6.2.3.2).
2. I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m (see ANSI C63.10, clause 6.2.2).
3. EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 ohm loads. LISN can be placed on top of, or immediately beneath, reference ground plane (see ANSI C63.10, clauses 6.2.2 and 6.2.3).
  - 3.1. All other equipment powered from additional LISN(s).
  - 3.2. A multiple-outlet strip can be used for multiple power cords of non-EUT equipment.
  - 3.3. LISN at least 80 cm from nearest part of EUT chassis.
4. Non-EUT components of EUT system being tested.
5. Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop (see ANSI C63.10, clause 6.2.3.2).
6. Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane (see ANSI C63.10, clause 6.2.2 for options).
7. Antenna may be integral or detachable. If detachable, the antenna shall be attached for this test.

### 3.1.5 Test Result of AC Power Conducted Emissions

**Test Conditions**      see ANSI C63.10, clause 5.11

**Test Setup**            see ANSI C63.10, clause 6.2.3

NOTE 1: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.1), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes. If equipment having different transmit operating modes (see test report clause 1.1.2), the measurements are uninfluenced by different transmit operating modes, may not need to be repeated for all the operating modes. Similar, if the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.12 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing.

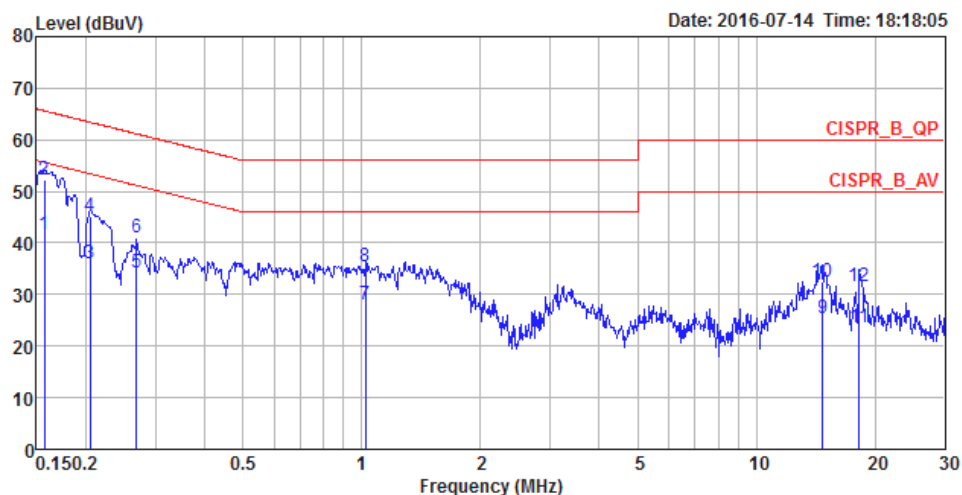
NOTE 2: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit, see ANSI C63.4, clause 10.1.8.1.



# FCC Radio Test Report

Report No. : FR651828

|               |             |          |      |
|---------------|-------------|----------|------|
| Temp          | 22°C        | Humidity | 59%  |
| Test Engineer | GN Hou      | Phase    | Line |
| Configuration | Normal Link |          |      |



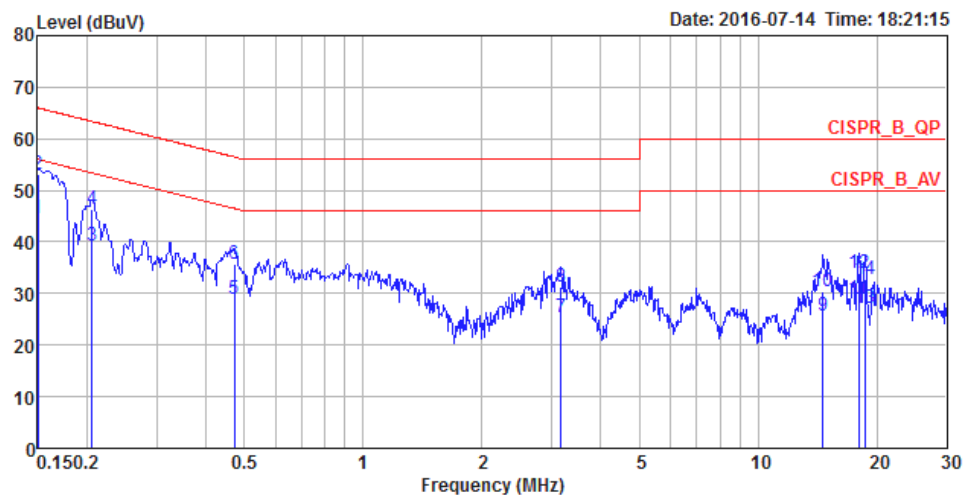
|    | Freq    | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Pol/Phase | Remark  |
|----|---------|-------|------------|------------|------------|-------------|------------|-----------|---------|
|    | MHz     | dBuV  | dB         | dBuV       | dBuV       | dB          | dB         |           |         |
| 1  | 0.1573  | 41.52 | -14.08     | 55.60      | 31.33      | 10.02       | 0.17       | LINE      | Average |
| 2  | 0.1573  | 52.16 | -13.44     | 65.60      | 41.97      | 10.02       | 0.17       | LINE      | QP      |
| 3  | 0.2050  | 35.92 | -17.48     | 53.40      | 25.82      | 9.92        | 0.18       | LINE      | Average |
| 4  | 0.2050  | 45.29 | -18.11     | 63.40      | 35.19      | 9.92        | 0.18       | LINE      | QP      |
| 5  | 0.2687  | 34.14 | -17.02     | 51.16      | 24.11      | 9.92        | 0.11       | LINE      | Average |
| 6  | 0.2687  | 40.98 | -20.18     | 61.16      | 30.95      | 9.92        | 0.11       | LINE      | QP      |
| 7  | 1.0211  | 28.03 | -17.97     | 46.00      | 17.37      | 9.94        | 0.72       | LINE      | Average |
| 8  | 1.0211  | 35.39 | -20.61     | 56.00      | 24.73      | 9.94        | 0.72       | LINE      | QP      |
| 9  | 14.7497 | 25.26 | -24.74     | 50.00      | 14.81      | 10.23       | 0.22       | LINE      | Average |
| 10 | 14.7497 | 32.52 | -27.48     | 60.00      | 22.07      | 10.23       | 0.22       | LINE      | QP      |
| 11 | 18.2316 | 23.76 | -26.24     | 50.00      | 13.25      | 10.28       | 0.23       | LINE      | Average |
| 12 | 18.2316 | 31.68 | -28.32     | 60.00      | 21.17      | 10.28       | 0.23       | LINE      | QP      |



# FCC Radio Test Report

Report No. : FR651828

|               |             |          |         |
|---------------|-------------|----------|---------|
| Temp          | 22°C        | Humidity | 59%     |
| Test Engineer | GN Hou      | Phase    | Neutral |
| Configuration | Normal Link |          |         |



|    | Freq    | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Pol/Phase | Remark  |
|----|---------|-------|------------|------------|------------|-------------|------------|-----------|---------|
|    | MHz     | dBuV  | dB         | dBuV       | dBuV       | dB          | dB         |           |         |
| 1  | 0.1500  | 44.51 | -11.49     | 56.00      | 34.33      | 10.02       | 0.16       | NEUTRAL   | Average |
| 2  | 0.1500  | 53.25 | -12.75     | 66.00      | 43.07      | 10.02       | 0.16       | NEUTRAL   | QP      |
| 3  | 0.2061  | 39.26 | -14.10     | 53.36      | 29.16      | 9.92        | 0.18       | NEUTRAL   | Average |
| 4  | 0.2061  | 46.21 | -17.15     | 63.36      | 36.11      | 9.92        | 0.18       | NEUTRAL   | QP      |
| 5  | 0.4711  | 28.79 | -17.70     | 46.49      | 18.73      | 9.92        | 0.14       | NEUTRAL   | Average |
| 6  | 0.4711  | 35.66 | -20.83     | 56.49      | 25.60      | 9.92        | 0.14       | NEUTRAL   | QP      |
| 7  | 3.1731  | 25.32 | -20.68     | 46.00      | 15.26      | 9.98        | 0.08       | NEUTRAL   | Average |
| 8  | 3.1731  | 31.28 | -24.72     | 56.00      | 21.22      | 9.98        | 0.08       | NEUTRAL   | QP      |
| 9  | 14.5942 | 25.55 | -24.45     | 50.00      | 15.12      | 10.22       | 0.21       | NEUTRAL   | Average |
| 10 | 14.5942 | 30.31 | -29.69     | 60.00      | 19.88      | 10.22       | 0.21       | NEUTRAL   | QP      |
| 11 | 17.9441 | 28.94 | -21.06     | 50.00      | 18.43      | 10.28       | 0.23       | NEUTRAL   | Average |
| 12 | 17.9441 | 33.80 | -26.20     | 60.00      | 23.29      | 10.28       | 0.23       | NEUTRAL   | QP      |

## 3.2 Occupied Bandwidth

### 3.2.1 Limit of Occupied Bandwidth

|                                            |      |
|--------------------------------------------|------|
| <b>6dBc Bandwidth</b> (see Note 1)         | None |
| <b>26dBc Bandwidth</b>                     | None |
| <b>99% Occupied Bandwidth</b> (see Note 2) | None |

NOTE 1: The 6dBc bandwidth is the frequency bandwidth of the signal power at the -6 dBc points when measured with a 100 kHz resolution bandwidth. These measurements shall also be performed at normal test conditions.

NOTE 2: The 99% occupied bandwidth is the frequency bandwidth of the signal power at the 99% channel power of occupied bandwidth when resolution bandwidth should be approximately 1 % to 5 % of the occupied bandwidth (OBW). These measurements shall also be performed at normal test conditions.

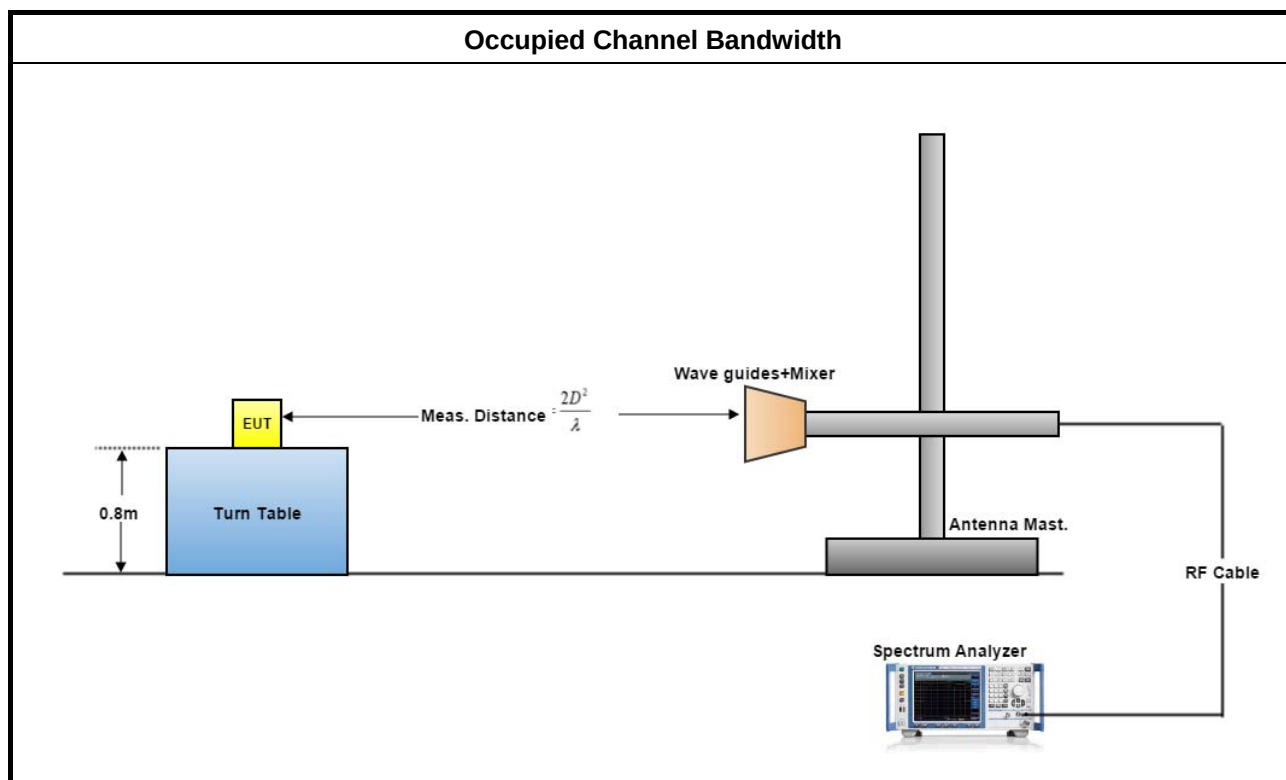
### 3.2.2 Measuring Instruments

Refer a measuring instruments list in this test report.

### 3.2.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clauses 6.9.2.

### 3.2.4 Test Setup

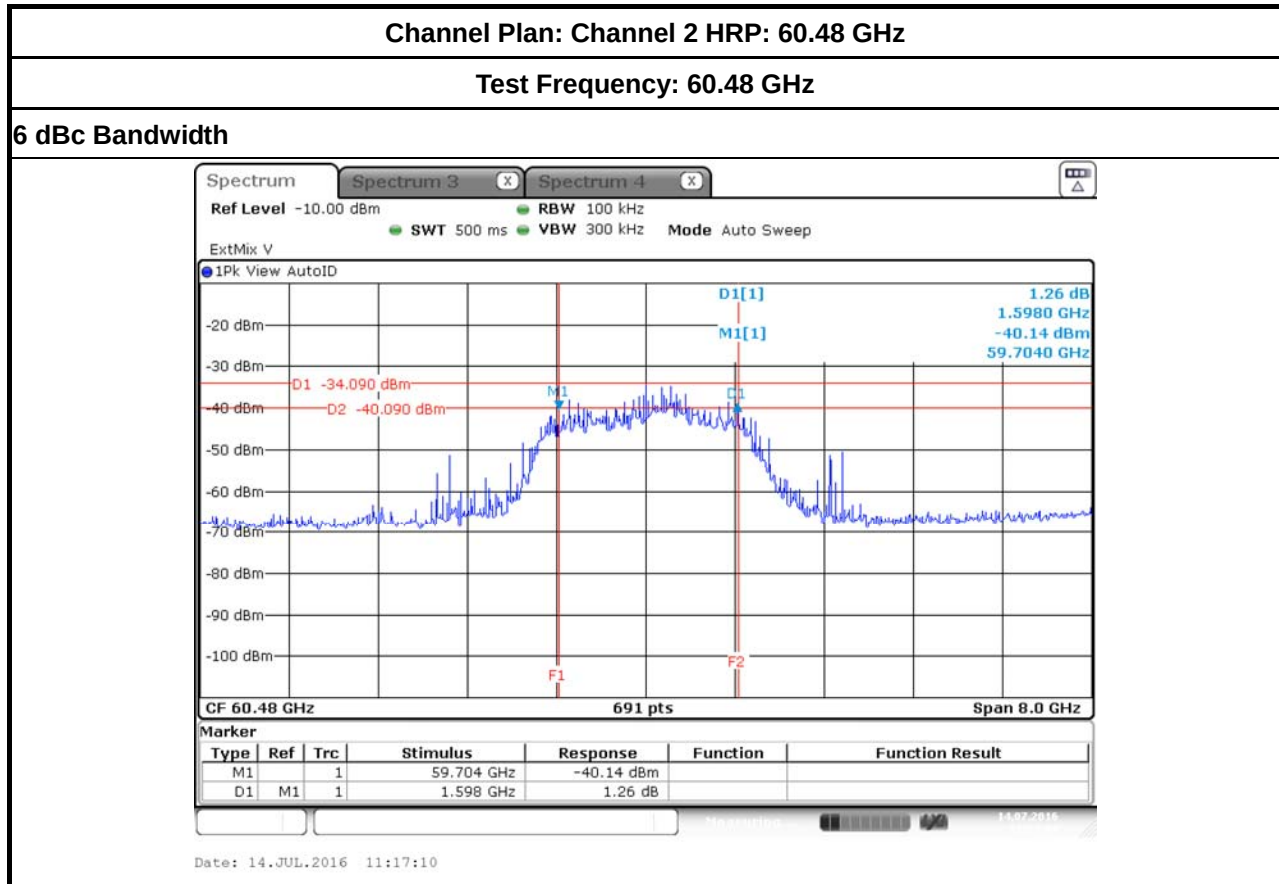


### 3.2.5 Test Result of Occupied Bandwidth

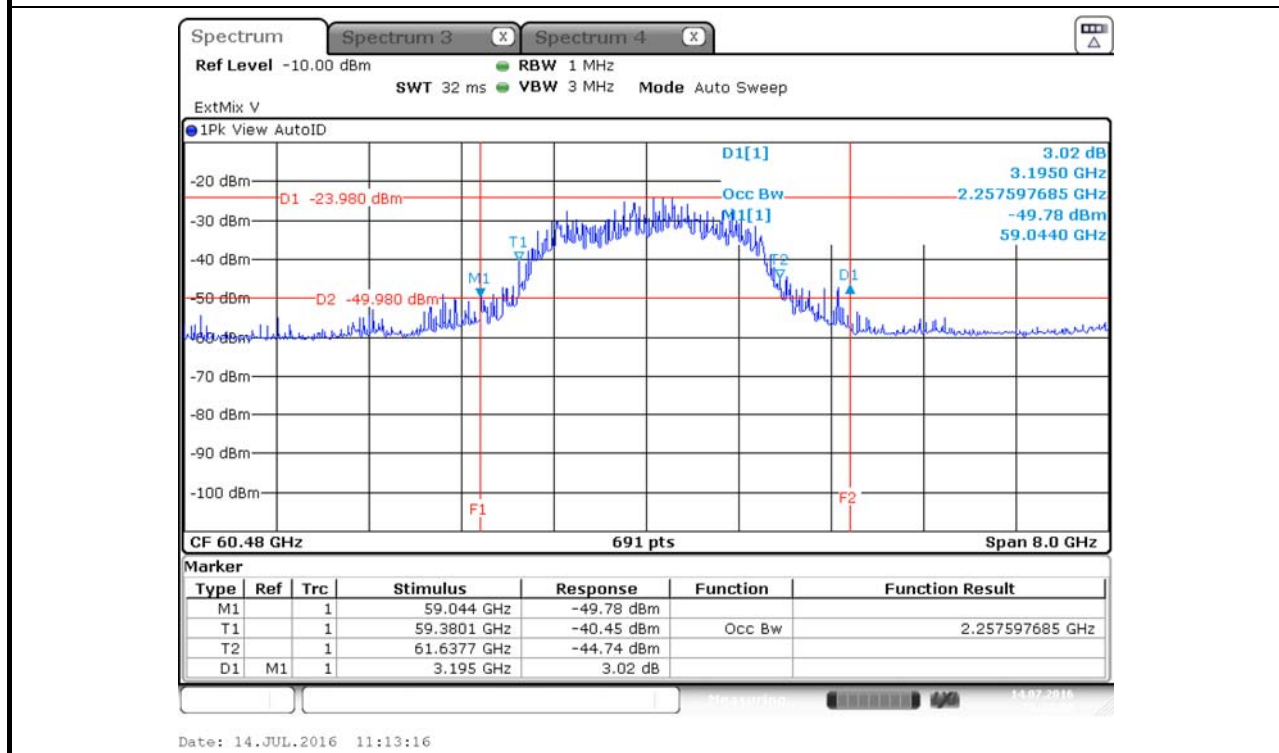
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Test Conditions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | see ANSI C63.10, clause 5.11  |
| <b>Test Setup</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | see ANSI C63.10, clause 6.9.2 |
| <p>NOTE: If equipment having different transmit operating modes (see test report clause 1.1.2), the measurements are uninfluenced by different transmit operating modes, may not need to be repeated for all the operating modes. Similar, if the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.11 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing. Refer as ANSI C63.10, clause 15, observe and record with plotted graphs or photographs the worst-case (i.e., widest) occupied bandwidth produced by these different modulation sources.</p> |                               |

|                       |                     |                             |                                |                              |                |
|-----------------------|---------------------|-----------------------------|--------------------------------|------------------------------|----------------|
| Temp                  | 23°C                | Humidity                    | 61%                            |                              |                |
| Test Engineer         | Peter Wu            |                             |                                |                              |                |
| Test Results          |                     |                             |                                |                              |                |
| Channel Plan<br>(GHz) | Test Freq.<br>(GHz) | 6 dBc<br>Bandwidth<br>(MHz) | Occupied<br>Bandwidth<br>(MHz) | 26 dBc<br>Bandwidth<br>(MHz) | Limit<br>(MHz) |
| Channel 2 HRP: 60.48  | 60.48               | 1598                        | 2257.60                        | 3195.00                      | N/A            |
| Channel 3 HRP: 62.64  | 62.64               | 1866.9                      | 2720.69                        | 3716.00                      | N/A            |

### 3.2.5.1 Bandwidth Plots



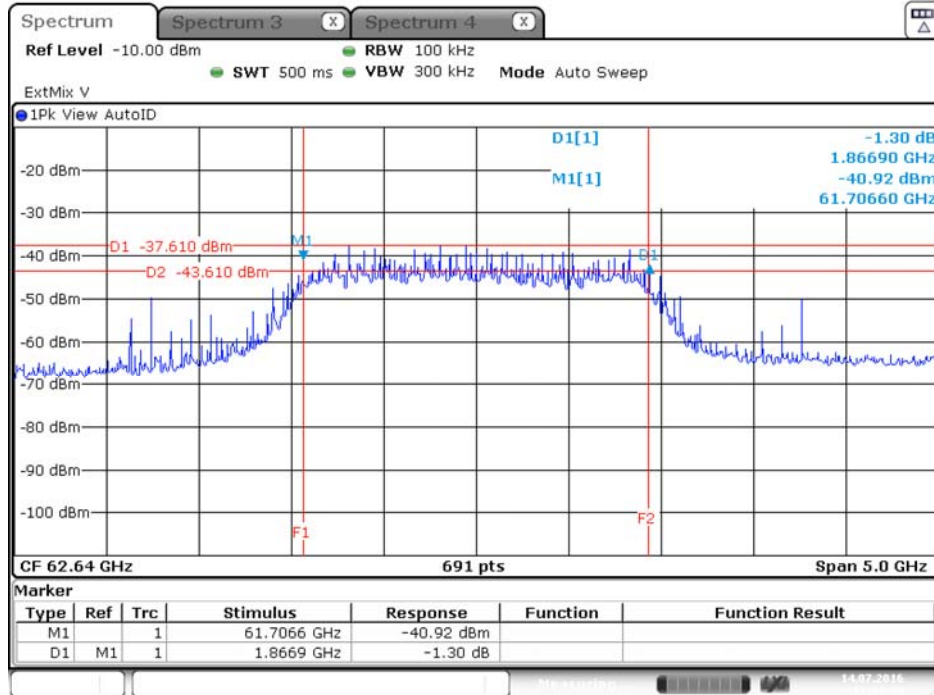
### Occupied Bandwidth&26 dBc Bandwidth



Channel Plan: Channel 3 HRP: 62.64 GHz

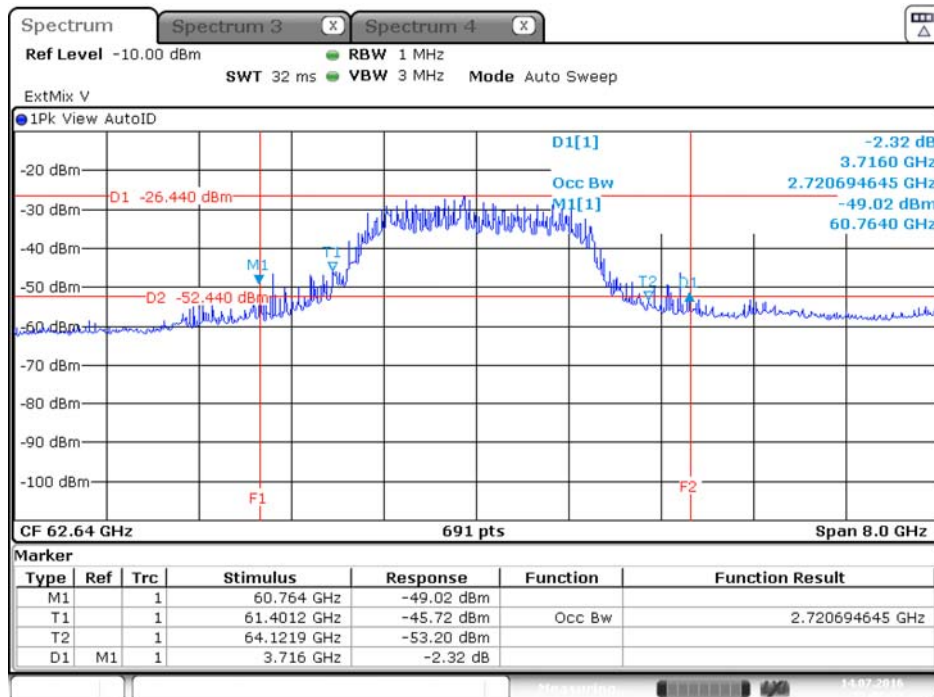
Test Frequency: 62.64 GHz

6 dBc Bandwidth



Date: 14.JUL.2016 11:07:30

Occupied Bandwidth&26 dBc Bandwidth



Date: 14.JUL.2016 11:09:21

### 3.3 EIRP Power

#### 3.3.1 Limit of EIRP Power

| EIRP Power Limit                                     |                    |                 |
|------------------------------------------------------|--------------------|-----------------|
| Use Condition                                        | EIRP Average Power | EIRP Peak Power |
| Fixed field disturbance sensors at 61-61.5GHz        | 10 dBm             | 13 dBm          |
| Except fixed field disturbance sensors at 61-61.5GHz | N/A                | 10 dBm          |
| Except fixed field disturbance sensors(indoor)       | 40 dBm             | 43 dBm          |
| Except fixed field disturbance sensors(outdoor)      | 82 dBm             | 85 dBm          |

Note: For outdoor device minus 2 dB for every dB that the antenna gain is less than 51 dBi.

For the applicable limit, see FCC 15.255 (b)

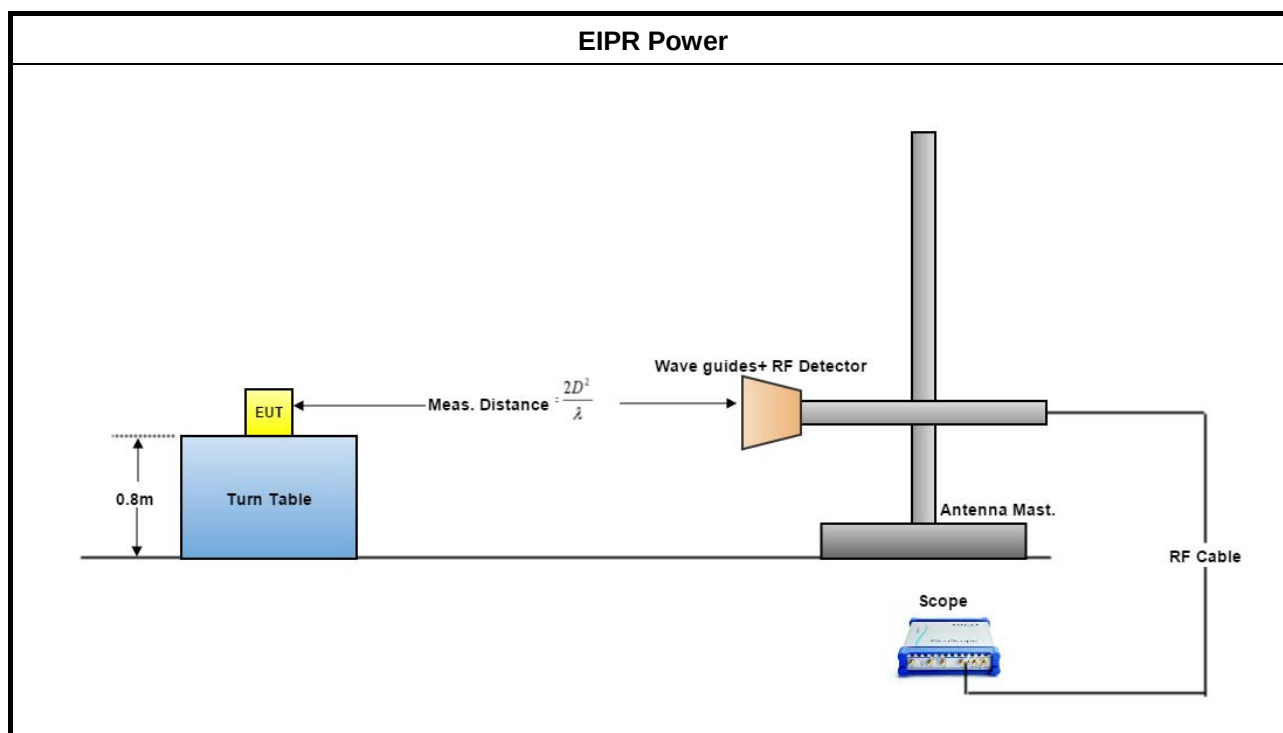
#### 3.3.2 Measuring Instruments

Refer a measuring instruments list in this test report.

#### 3.3.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013 clause 9.3 & 9.5.

#### 3.3.4 Test Setup



**3.3.5 Test Result of EIRP Power**

|                                                                                                                                                                                                                                                                                                                                                                                                          |                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Test Conditions</b>                                                                                                                                                                                                                                                                                                                                                                                   | see ANSI C63.10, clause 5.11 & clause 9 |
| <b>Test Setup</b>                                                                                                                                                                                                                                                                                                                                                                                        | see ANSI C63.10, clause 9.11            |
| NOTE: If the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.11 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worst case combination to be used for the conformance testing. |                                         |



### 3.3.5.1 Test Result of EIRP Power

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |             |       |                         |        |                               |        |               |       |                                 |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------|-------|-------------------------|--------|-------------------------------|--------|---------------|-------|---------------------------------|----|
| Temp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 23℃                 |             |       |                         |        | Humidity                      | 61%    |               |       |                                 |    |
| Test Engineer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Peter Wu            |             |       |                         |        | Test Distance                 | 0.25   |               |       |                                 |    |
| Test Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |             |       |                         |        |                               |        |               |       |                                 |    |
| Channel Plan<br>(GHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Test Freq.<br>(GHz) | DSO<br>(mV) |       | Power Measured<br>(dBm) |        | E <sub>Meas</sub><br>(dBuV/m) |        | EIRP<br>(dBm) |       | EIRP Limit<br>(dBm)<br>(note 1) |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     | Peak        | AV    | Peak                    | AV     | Peak                          | AV     | Peak          | AV    | Peak                            | AV |
| Channel 2 HRP: 60.48                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 60.48               | 108.27      | 11.33 | -9.08                   | -20.94 | 140.81                        | 128.95 | 23.97         | 12.11 | 43                              | 40 |
| Channel 3 HRP: 62.64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 62.64               | 102.14      | 8.06  | -9.84                   | -22.78 | 140.35                        | 127.41 | 23.51         | 10.57 | 43                              | 40 |
| The measured power level is converted to EIRP using the Friis equation:<br>For radiated emissions, calculate the field strength (E) in dBμV/meter.<br>E = 126.8 – 20log( λ ) + P - G<br>where:<br>E : is the field strength of the emission at the measurement distance, in dBμV/m<br>P : is the power measured at the output of the test antenna, in dBm<br>λ : is the wavelength of the emission under investigation [300/fMHz], in m<br>G : is the gain of the test antenna, in dBi For radiated emissions, calculate the EIRP (dBm). If the measurement was performed in the far field, calculate the EIRP.<br>EIRP = E-meas +20log(d-meas)-104.7<br>where:<br>EIRP : is the equivalent isotopically radiated power, in dBm<br>E-meas. : is the field strength of the emission at the measurement distance, in dBμV/m<br>d-meas. : is the measurement distance, in m<br>NOTE 1: For the applicable limit, see FCC 15.255 (b) |                     |             |       |                         |        |                               |        |               |       |                                 |    |

### 3.4 Peak Conducted Power

#### 3.4.1 Limit of Peak Conducted Power

| Peak Conducted Power Limit                          |                               |
|-----------------------------------------------------|-------------------------------|
| 6dBc Bandwidth                                      | Peak Conducted Power (note 1) |
| > 100MHz                                            | 500mW                         |
| ≤ 100MHz                                            | 500mW x (BW/100) (see note 2) |
| NOTE 1: For the applicable limit, see FCC 15.255(e) |                               |
| NOTE 2: BW= 6dB bandwidth (measured at RBW 100kHz)  |                               |

#### 3.4.2 Measuring Instruments

Refer a measuring instruments list in this test report.

#### 3.4.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clause 9.5

#### 3.4.4 Test Result of Peak Conducted Power

|                                                                                                                                                                                                                                                                                                                                                                                                          |                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Test Conditions</b>                                                                                                                                                                                                                                                                                                                                                                                   | see ANSI C63.10, clause 5.11 & clause 9 |
| <b>Test Setup</b>                                                                                                                                                                                                                                                                                                                                                                                        | see ANSI C63.10, clause 9.11            |
| NOTE: If the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.11 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worst case combination to be used for the conformance testing. |                                         |

**3.4.4.1 Peak Conducted Power**

|                                                                                                                                                                             |                               |               |                               |                                   |                       |                             |                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------|-------------------------------|-----------------------------------|-----------------------|-----------------------------|-------------------------------------|
| Temp                                                                                                                                                                        | 23℃                           |               | Humidity                      |                                   | 61%                   |                             |                                     |
| Test Engineer                                                                                                                                                               | Peter Wu                      |               |                               |                                   |                       |                             |                                     |
| Test Date                                                                                                                                                                   | Jul. 06, 2016 ~ Jul. 14, 2016 |               |                               |                                   |                       |                             |                                     |
| Test Results                                                                                                                                                                |                               |               |                               |                                   |                       |                             |                                     |
| Channel Plan<br>(GHz)                                                                                                                                                       | Test Freq.<br>(GHz)           | EIRP<br>(dBm) | Max.<br>Ant.<br>Gain<br>(dBi) | Peak<br>Power<br>(dBm)<br>(note1) | Peak<br>Power<br>(mW) | 6dBc BW<br>(MHz)<br>(note2) | Peak Power<br>Limit (mW)<br>(note3) |
| Channel 2 HRP: 60.48                                                                                                                                                        | 60.48                         | 23.97         | 10.5                          | 13.47                             | 22.226                | 1598.00                     | 500.00                              |
| Channel 3 HRP: 62.64                                                                                                                                                        | 62.64                         | 23.51         | 10.5                          | 13.01                             | 20.014                | 1866.90                     | 500.00                              |
| NOTE 1: Because EUT used for the integral antenna without temporary RF connector provided. Therefore peak conducted power is equal to EIRP power subtract the antenna gain. |                               |               |                               |                                   |                       |                             |                                     |
| NOTE 2: For the 6dBc bandwidth, see test report clause 3.2.5.                                                                                                               |                               |               |                               |                                   |                       |                             |                                     |
| NOTE 3: For the applicable limit, see FCC 15.255(e)                                                                                                                         |                               |               |                               |                                   |                       |                             |                                     |
| NOTE 4: For radiated emission measurements, calculate conducted transmitter output power P(cond)(dBm)                                                                       |                               |               |                               |                                   |                       |                             |                                     |
| P(cond) = EIRP - G(dBi)                                                                                                                                                     |                               |               |                               |                                   |                       |                             |                                     |
| where:                                                                                                                                                                      |                               |               |                               |                                   |                       |                             |                                     |
| G(dBi) is gain of EUT antenna.                                                                                                                                              |                               |               |                               |                                   |                       |                             |                                     |

### 3.5 Transmitter Spurious Emissions

#### 3.5.1 Limit of Transmitter Spurious Emissions

| Frequency Range                          | Limit                                                          |
|------------------------------------------|----------------------------------------------------------------|
| Radiated emissions below 40 GHz          | FCC 15.209                                                     |
| Radiated emissions above 40 GHz – 200GHz | 90 pW/cm <sup>2</sup> @ 3 m (Equivalent EIRP 102 μW, -9.91dBm) |

NOTE 1: For the applicable limit, see FCC 15.255(c)

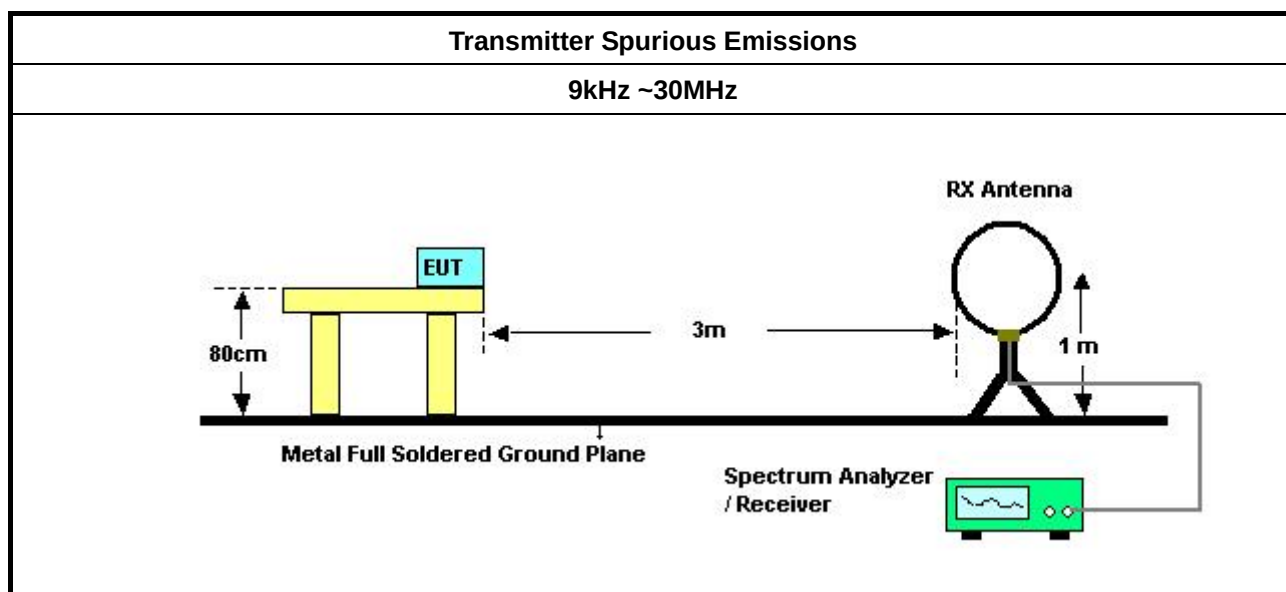
NOTE 2: Spurious emissions shall not exceed the level of the fundamental emission.

NOTE 3: publicly-accessible coordination channel, whose purpose is to coordinate operation between diverse transmitters with a view towards reducing the probability of interference throughout the 57-64 GHz band, are permitted in the 57-57.05 GHz band. The development of standards for this channel shall be performed pursuant to authorizations issued under part 5 of this chapter.

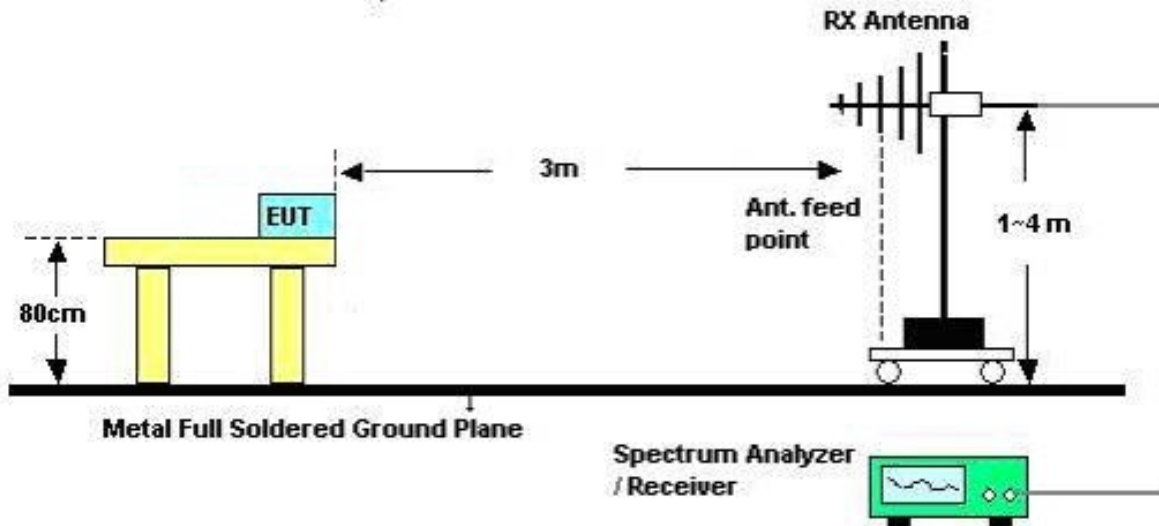
#### 3.5.2 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clause 9.12

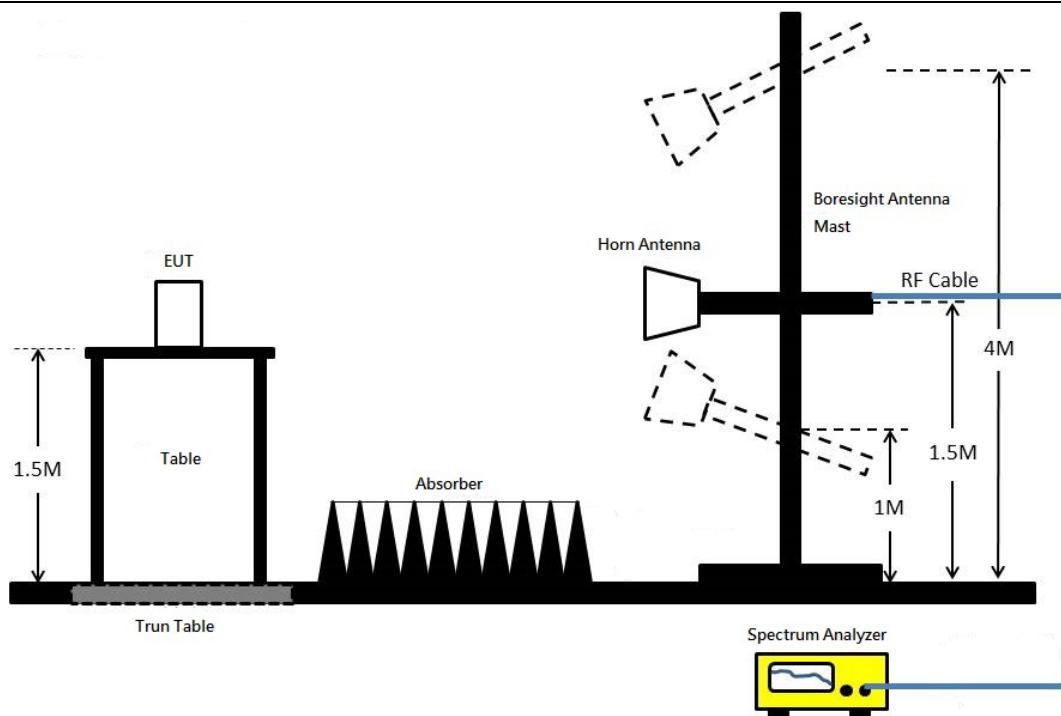
#### 3.5.3 Test Setup

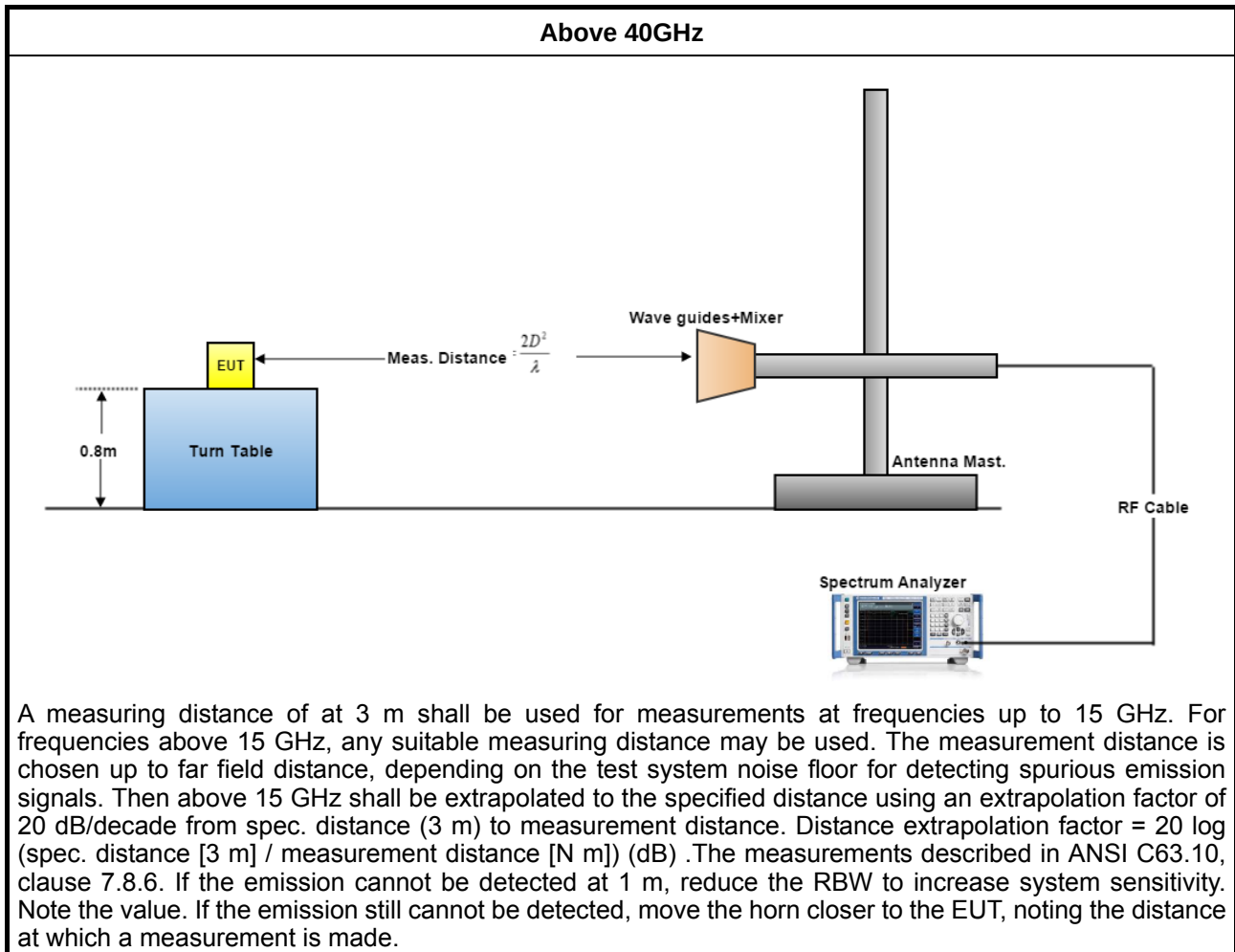


30MHz~1GHz



1GHz ~40GHz





### 3.5.4 Test Result of Transmitter Spurious Emissions

|                                                                                                                                                                                                                                                                  |                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Test Conditions</b>                                                                                                                                                                                                                                           | see ANSI C63.10, clause 5.11 & clause 9 |
| <b>Test Setup</b>                                                                                                                                                                                                                                                | see ANSI C63.10, clause 9.12 ~ 9.13     |
| NOTE: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.1), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes. |                                         |

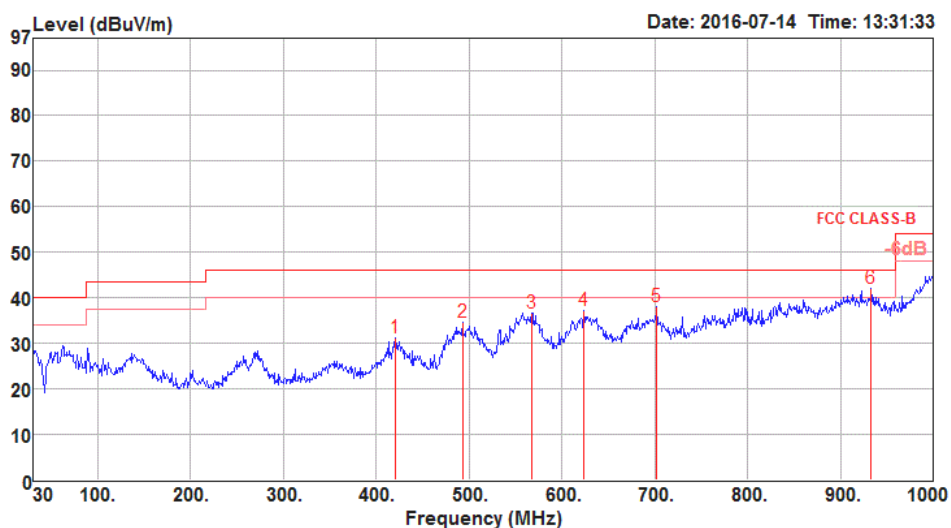
#### 3.5.4.1 Test Result of Transmitter Spurious Emissions (Below 30MHz)

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

**3.5.4.2 Test Result of Transmitter Spurious Emissions**

|                      |                   |                           |             |
|----------------------|-------------------|---------------------------|-------------|
| <b>Temp</b>          | 23°C              | <b>Humidity</b>           | 61%         |
| <b>Test Engineer</b> | Peter Wu          | <b>Test Distance</b>      | 3 m         |
| <b>Test Range</b>    | 30 MHz – 1000 MHz | <b>Test Configuration</b> | Normal Link |

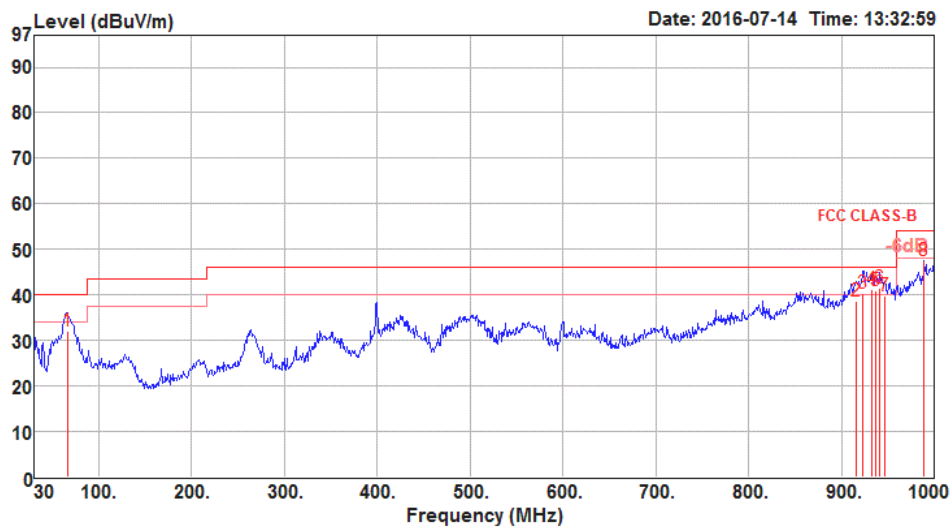
Vertical



|   | Freq   | Level  | Limit  | Over   | Read  | CableAntenna | Preamp | A/Pos | T/Pos | Remark | Pol/Phase        |
|---|--------|--------|--------|--------|-------|--------------|--------|-------|-------|--------|------------------|
|   | MHz    | dBuV/m | dBuV/m | dB     | dBuV  | dB           | dB/m   | dB    | cm    | deg    |                  |
| 1 | 420.91 | 31.13  | 46.00  | -14.87 | 34.58 | 2.41         | 22.55  | 28.41 | 100   | 360    | Peak<br>VERTICAL |
| 2 | 492.69 | 34.51  | 46.00  | -11.49 | 37.17 | 2.57         | 23.51  | 28.74 | 150   | 360    | Peak<br>VERTICAL |
| 3 | 567.38 | 36.71  | 46.00  | -9.29  | 37.95 | 2.75         | 24.80  | 28.79 | 100   | 360    | Peak<br>VERTICAL |
| 4 | 623.64 | 37.16  | 46.00  | -8.84  | 37.78 | 2.91         | 25.24  | 28.77 | 125   | 360    | Peak<br>VERTICAL |
| 5 | 702.21 | 38.07  | 46.00  | -7.93  | 37.93 | 3.16         | 25.62  | 28.64 | 200   | 360    | Peak<br>VERTICAL |
| 6 | 933.07 | 42.03  | 46.00  | -3.97  | 38.43 | 3.56         | 27.93  | 27.89 | 100   | 360    | Peak<br>VERTICAL |



Horizontal



|   | Freq   | Level  | Limit  | Over  | Read  | CableAntenna | Preamp | A/Pos | T/Pos | Remark   | Pol/Phase  |
|---|--------|--------|--------|-------|-------|--------------|--------|-------|-------|----------|------------|
|   | MHz    | dBuV/m | dBuV/m | dB    | dBuV  | dB           | dB/m   | dB    | cm    | deg      |            |
| 1 | 65.89  | 32.02  | 40.00  | -7.98 | 46.51 | 1.42         | 12.48  | 28.39 | 125   | 360 QP   | HORIZONTAL |
| 2 | 915.61 | 38.52  | 46.00  | -7.48 | 35.20 | 3.50         | 27.77  | 27.95 | 125   | 360 QP   | HORIZONTAL |
| 3 | 923.37 | 40.44  | 46.00  | -5.56 | 37.01 | 3.52         | 27.83  | 27.92 | 100   | 250 QP   | HORIZONTAL |
| 4 | 932.10 | 41.10  | 46.00  | -4.90 | 37.50 | 3.56         | 27.93  | 27.89 | 150   | 360 QP   | HORIZONTAL |
| 5 | 936.95 | 40.85  | 46.00  | -5.15 | 37.20 | 3.57         | 27.97  | 27.89 | 125   | 360 QP   | HORIZONTAL |
| 6 | 941.80 | 41.57  | 46.00  | -4.43 | 37.80 | 3.59         | 28.03  | 27.85 | 125   | 360 QP   | HORIZONTAL |
| 7 | 946.65 | 39.65  | 46.00  | -6.35 | 35.80 | 3.60         | 28.07  | 27.82 | 150   | 360 QP   | HORIZONTAL |
| 8 | 989.33 | 47.54  | 54.00  | -6.46 | 43.30 | 3.74         | 28.18  | 27.68 | 100   | 360 Peak | HORIZONTAL |



**Test Plan: Channel 2 HRP: 60.48**

|                      |                              |                         |       |
|----------------------|------------------------------|-------------------------|-------|
| <b>Temp</b>          | 23°C                         | <b>Humidity</b>         | 61%   |
| <b>Test Engineer</b> | Peter Wu                     | <b>Test Distance</b>    | 3 m   |
| <b>Test Range</b>    | 1 GHz – 18 GHz               | <b>Test Freq. (GHz)</b> | 60.48 |
| <b>Test Date</b>     | Jul. 06, 2016 ~ Jul.14, 2016 |                         |       |

**Vertical**

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark  | Pol/Phase |
|---|---------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | cm    | deg   |         |           |
| 1 | 1152.29 | 52.79  | 74.00      | -21.21     | 59.43      | 3.28       | 24.32          | 34.24         | 151   | 75    | Peak    | VERTICAL  |
| 2 | 1161.28 | 40.65  | 54.00      | -13.35     | 47.25      | 3.29       | 24.36          | 34.25         | 151   | 75    | Average | VERTICAL  |

**Horizontal**

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark  | Pol/Phase  |
|---|---------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | cm    | deg   |         |            |
| 1 | 1145.13 | 57.10  | 74.00      | -16.90     | 63.77      | 3.27       | 24.30          | 34.24         | 160   | 121   | Peak    | HORIZONTAL |
| 2 | 1151.23 | 43.49  | 54.00      | -10.51     | 50.13      | 3.28       | 24.32          | 34.24         | 160   | 121   | Average | HORIZONTAL |



|                      |                              |                         |       |
|----------------------|------------------------------|-------------------------|-------|
| <b>Temp</b>          | 24°C                         | <b>Humidity</b>         | 64%   |
| <b>Test Engineer</b> | Peter Wu                     | <b>Test Distance</b>    | 1 m   |
| <b>Test Range</b>    | 18 GHz – 40 GHz              | <b>Test Freq. (GHz)</b> | 60.48 |
| <b>Test Date</b>     | Jul. 06, 2016 ~ Jul.14, 2016 |                         |       |

**Vertical**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | cm    | deg   |         |           |
| 1 | 29000.27 | 39.83  | 63.54      | -23.71     | 37.95      | 10.56      | 40.10          | 48.78         | 100   | 126   | Average | VERTICAL  |
| 2 | 29000.27 | 53.65  | 83.54      | -29.89     | 51.77      | 10.56      | 40.10          | 48.78         | 100   | 126   | Peak    | VERTICAL  |

**Horizontal**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | cm    | deg   |         |            |
| 1 | 36875.70 | 42.85  | 63.54      | -20.69     | 42.69      | 11.69      | 42.05          | 53.58         | 100   | 244   | Average | HORIZONTAL |
| 2 | 36875.70 | 57.15  | 83.54      | -26.39     | 56.99      | 11.69      | 42.05          | 53.58         | 100   | 244   | Peak    | HORIZONTAL |



**Test Plan: Channel 3 HRP: 62.64**

|                      |                              |                         |       |
|----------------------|------------------------------|-------------------------|-------|
| <b>Temp</b>          | 23°C                         | <b>Humidity</b>         | 61%   |
| <b>Test Engineer</b> | Peter Wu                     | <b>Test Distance</b>    | 3 m   |
| <b>Test Range</b>    | 1 GHz – 18 GHz               | <b>Test Freq. (GHz)</b> | 62.64 |
| <b>Test Date</b>     | Jul. 06, 2016 ~ Jul.14, 2016 |                         |       |

**Vertical**

|   | Freq    | Level  | Limit<br>Line | Over<br>Limit | Read<br>Level | CableAntenna<br>Loss | Antenna<br>Factor | Preamp<br>Factor | A/Pos | T/Pos | Remark  | Pol/Phase |
|---|---------|--------|---------------|---------------|---------------|----------------------|-------------------|------------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m        | dB            | dBuV          | dB                   | dB/m              | dB               | cm    | deg   |         |           |
| 1 | 1152.29 | 52.96  | 74.00         | -21.04        | 59.60         | 3.28                 | 24.32             | 34.24            | 143   | 67    | Peak    | VERTICAL  |
| 2 | 1160.68 | 40.52  | 54.00         | -13.48        | 47.12         | 3.29                 | 24.36             | 34.25            | 143   | 67    | Average | VERTICAL  |

**Horizontal**

|   | Freq    | Level  | Limit<br>Line | Over<br>Limit | Read<br>Level | CableAntenna<br>Loss | Antenna<br>Factor | Preamp<br>Factor | A/Pos | T/Pos | Remark  | Pol/Phase  |
|---|---------|--------|---------------|---------------|---------------|----------------------|-------------------|------------------|-------|-------|---------|------------|
|   | MHz     | dBuV/m | dBuV/m        | dB            | dBuV          | dB                   | dB/m              | dB               | cm    | deg   |         |            |
| 1 | 1144.76 | 57.26  | 74.00         | -16.74        | 63.93         | 3.27                 | 24.30             | 34.24            | 161   | 109   | Peak    | HORIZONTAL |
| 2 | 1152.00 | 43.62  | 54.00         | -10.38        | 50.26         | 3.28                 | 24.32             | 34.24            | 161   | 109   | Average | HORIZONTAL |



|                      |                              |                         |       |
|----------------------|------------------------------|-------------------------|-------|
| <b>Temp</b>          | 24°C                         | <b>Humidity</b>         | 64%   |
| <b>Test Engineer</b> | Peter Wu                     | <b>Test Distance</b>    | 1 m   |
| <b>Test Range</b>    | 18 GHz – 40 GHz              | <b>Test Freq. (GHz)</b> | 62.64 |
| <b>Test Date</b>     | Jul. 06, 2016 ~ Jul.14, 2016 |                         |       |

## Vertical

|   | Freq     | Level  | Limit<br>Line | Over<br>Limit | Read<br>Level | CableAntenna<br>Loss | Preamp<br>Factor | A/Pos | T/Pos | Remark | Pol/Phase |          |
|---|----------|--------|---------------|---------------|---------------|----------------------|------------------|-------|-------|--------|-----------|----------|
|   | MHz      | dBuV/m | dBuV/m        | dB            | dBuV          | dB                   | dB/m             | dB    | cm    | deg    |           |          |
| 1 | 36391.57 | 42.27  | 63.54         | -21.27        | 42.09         | 11.52                | 42.11            | 53.45 | 100   | 314    | Average   | VERTICAL |
| 2 | 36391.57 | 56.54  | 83.54         | -27.00        | 56.36         | 11.52                | 42.11            | 53.45 | 100   | 314    | Peak      | VERTICAL |

## Horizontal

|   | Freq     | Level  | Limit<br>Line | Over<br>Limit | Read<br>Level | CableAntenna<br>Loss | Preamp<br>Factor | A/Pos | T/Pos | Remark | Pol/Phase |            |
|---|----------|--------|---------------|---------------|---------------|----------------------|------------------|-------|-------|--------|-----------|------------|
|   | MHz      | dBuV/m | dBuV/m        | dB            | dBuV          | dB                   | dB/m             | dB    | cm    | deg    |           |            |
| 1 | 36700.04 | 42.44  | 63.54         | -21.10        | 42.20         | 11.63                | 42.12            | 53.51 | 100   | 264    | Average   | HORIZONTAL |
| 2 | 36700.04 | 56.20  | 83.54         | -27.34        | 55.96         | 11.63                | 42.12            | 53.51 | 100   | 264    | Peak      | HORIZONTAL |



|                      |                |                  |                               |
|----------------------|----------------|------------------|-------------------------------|
| <b>Temp</b>          | 23°C           | <b>Humidity</b>  | 61%                           |
| <b>Test Engineer</b> | Peter Wu       | <b>Test Date</b> | Jul. 06, 2016 ~ Jul. 14, 2016 |
| <b>Test Range</b>    | 40GHz – 200GHz |                  |                               |

**Test Plan: Channel 2 HRP: 60.48**

| <b>Test Frequency<br/>(GHz)</b> | <b>Rx Antenna Gain<br/>(dBi)</b>          | <b>Measurement<br/>Distance<br/>(m)</b>     | <b>Read Worse<br/>Frequency<br/>(GHz)</b> | <b>Read Level<br/>(dBm)</b> |
|---------------------------------|-------------------------------------------|---------------------------------------------|-------------------------------------------|-----------------------------|
| 60.48                           | 23.0                                      | 0.25                                        | 42.33                                     | -78.48                      |
| <b>EIRP<br/>(dBm)</b>           | <b>Specification<br/>Distance<br/>(m)</b> | <b>Power Density<br/>(pW/m<sup>2</sup>)</b> | <b>Limit<br/>(pW/cm<sup>2</sup>)</b>      | <b>Test Result</b>          |
| -48.55                          | 3                                         | 0.1236                                      | 90.00                                     | Complied                    |

**Test Plan: Channel 3 HRP: 62.64**

| <b>Test Frequency<br/>(GHz)</b> | <b>Rx Antenna Gain<br/>(dBi)</b>          | <b>Measurement<br/>Distance<br/>(m)</b>     | <b>Read Worse<br/>Frequency<br/>(GHz)</b> | <b>Read Level<br/>(dBm)</b> |
|---------------------------------|-------------------------------------------|---------------------------------------------|-------------------------------------------|-----------------------------|
| 62.64                           | 23.0                                      | 0.25                                        | 43.77                                     | -77.62                      |
| <b>EIRP<br/>(dBm)</b>           | <b>Specification<br/>Distance<br/>(m)</b> | <b>Power Density<br/>(pW/m<sup>2</sup>)</b> | <b>Limit<br/>(pW/cm<sup>2</sup>)</b>      | <b>Test Result</b>          |
| -47.40                          | 3                                         | 0.1611                                      | 90.00                                     | Complied                    |

### 3.6 Frequency Stability

#### 3.6.1 Limit of Frequency Stability

| Frequency Stability                                                                     | Limit                      |
|-----------------------------------------------------------------------------------------|----------------------------|
| Refer as FCC 15.255(f) and<br>ANSI C63.10-2013, clause 9.14                             | within the frequency bands |
| Note: These measurements shall also be performed at normal and extreme test conditions. |                            |

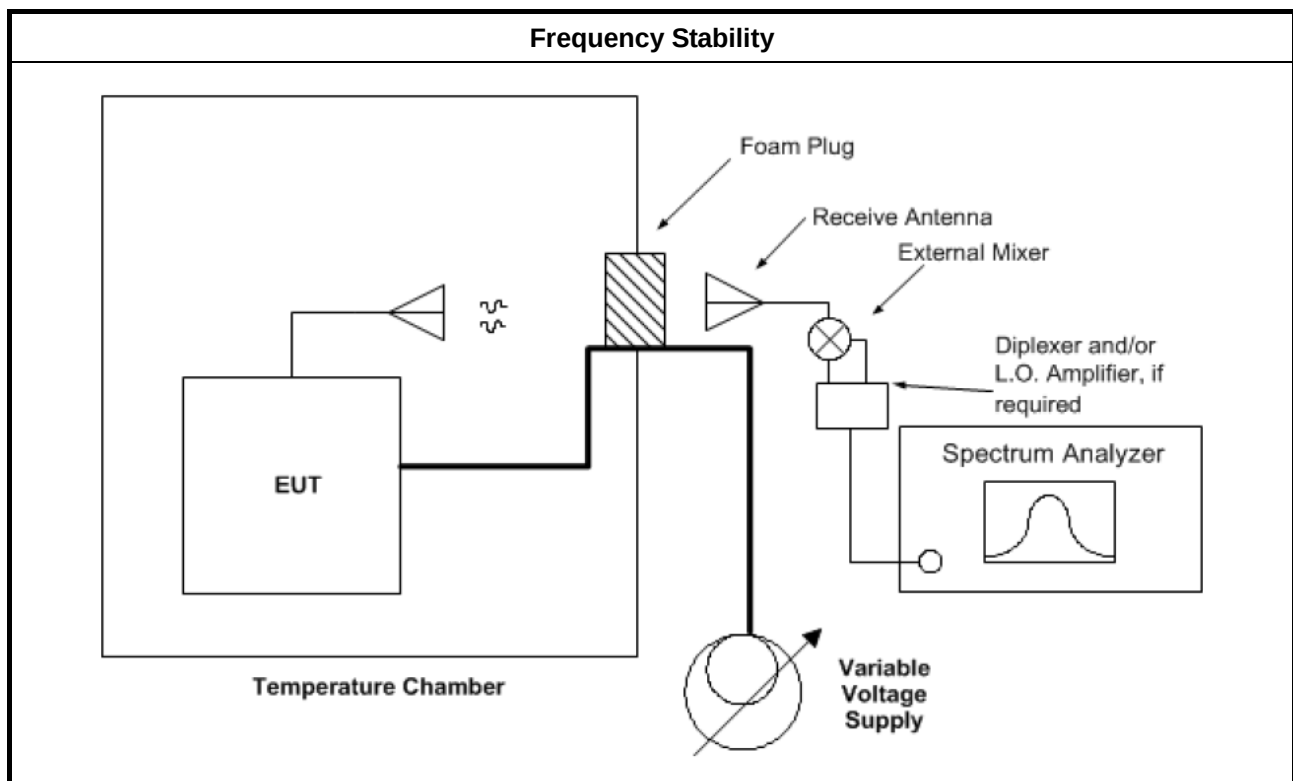
#### 3.6.2 Measuring Instruments

Refer a measuring instruments list in this test report.

#### 3.6.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clauses 9.14.

#### 3.6.4 Test Setup



### 3.6.5 Test Result of Frequency Stability

|                                                                                                                                                                                                                                                                  |                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Test Conditions</b>                                                                                                                                                                                                                                           | see ANSI C63.10, clause 5.11 & clause 9 |
| <b>Test Setup</b>                                                                                                                                                                                                                                                | see ANSI C63.10, clause 9.14            |
| NOTE: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.1), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes. |                                         |

#### 3.6.5.1 Frequency Stability with Respect to Ambient Temperature

| Frequency Stability with Respect to Ambient Temperature           |                          |                       |                               |
|-------------------------------------------------------------------|--------------------------|-----------------------|-------------------------------|
| <b>Temp</b>                                                       | 23°C                     | <b>Humidity</b>       | 61%                           |
| <b>Test Engineer</b>                                              | Peter Wu                 | <b>Test Date</b>      | Jul. 06, 2016 ~ Jul. 14, 2016 |
| Test Results                                                      |                          |                       |                               |
| Test Temperature (°C)                                             | Measured Frequency (MHz) | Delta Frequency (kHz) | Limit (±kHz)                  |
| -40                                                               | 60485.5                  | -500                  | Within band                   |
| -30                                                               | 60491.5                  | 5500                  | Within band                   |
| -20                                                               | 60491.5                  | 5500                  | Within band                   |
| -10                                                               | 60515                    | 29000                 | Within band                   |
| 0                                                                 | 60503.5                  | 17500                 | Within band                   |
| 10                                                                | 60503.5                  | 17500                 | Within band                   |
| 20                                                                | 60486                    | Reference             | Within band                   |
| 30                                                                | 60491.5                  | 5500                  | Within band                   |
| 40                                                                | 60485.5                  | -500                  | Within band                   |
| 50                                                                | 60480                    | -6000                 | Within band                   |
| 60                                                                | 60486                    | 0                     | Within band                   |
| 70                                                                | 60480                    | -6000                 | Within band                   |
| 80                                                                | 60492                    | 6000                  | Within band                   |
| NOTE:                                                             |                          |                       |                               |
| 1. For the applicable limit, see FCC 15.255(f).                   |                          |                       |                               |
| 2. The manufacturer's specified temperature range of -40 to 80°C. |                          |                       |                               |

**3.6.5.2 Frequency Stability When Varying Supply Voltage**

| Frequency Stability When Varying Supply Voltage    |                             |                          |                               |
|----------------------------------------------------|-----------------------------|--------------------------|-------------------------------|
| Temp                                               | 23℃                         | Humidity                 | 61%                           |
| Test Engineer                                      | Peter Wu                    | Test Date                | Jul. 06, 2016 ~ Jul. 14, 2016 |
| Test Results                                       |                             |                          |                               |
| Test Voltage: (Vdc)                                | Measured Frequency<br>(MHz) | Delta Frequency<br>(kHz) | Limit<br>(±kHz)               |
| 4.25                                               | 60503.5                     | 17500                    | Within band                   |
| 5                                                  | 60486                       | Reference                | Within band                   |
| 5.75                                               | 60503                       | 17000                    | Within band                   |
| NOTE: For the applicable limit, see FCC 15.255(f). |                             |                          |                               |

### 3.7 Operation Restriction and Group Installation

#### 3.7.1 Limit of Operation Restriction and Group Installation

| Item                  | Limit                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operation Restriction | Operation is not permitted for the following products: <ul style="list-style-type: none"> <li>• Equipment used on aircraft or satellites. (Refer as FCC 15.255 (a))</li> <li>• Field disturbance sensors, including vehicle radar systems, unless the field disturbance sensors are employed for fixed operation. (Refer as FCC 15.255 (a))</li> </ul> |
| Group Installation    | Operation is not permitted for the following products: <ul style="list-style-type: none"> <li>• External phase-locking (Refer as FCC 15.255 (h))</li> </ul>                                                                                                                                                                                            |

#### 3.7.2 Result of Operation Restriction

Manufacturer declares that EUT will not been used on aircraft or satellites. Then user manual will include a statement to caution EUT is not permitted for used on aircraft or satellites. EUT is a wireless video area network (WVAN) for the connection of consumer electronic (CE) audio and video devices.

#### 3.7.3 Result of Group Installation

The frequency, amplitude and phase of the transmit signal are set within the EUT. There are no external phase-locking inputs or any other means of combining two or more units together to realize a beam-forming array.

## 4 Test Equipment and Calibration Data

| Instrument        | Manufacturer | Model No.        | Serial No.   | Characteristics | Calibration Date | Remark                |
|-------------------|--------------|------------------|--------------|-----------------|------------------|-----------------------|
| EMI Receiver      | Agilent      | N9038A           | My52260123   | 9kHz ~ 8.45GHz  | Jan. 27, 2016    | Conduction (CO01-CB)  |
| LISN              | F.C.C.       | FCC-LISN-50-16-2 | 04083        | 150kHz ~ 100MHz | Dec. 08, 2015    | Conduction (CO01-CB)  |
| LISN              | Schwarzbeck  | NSLK 8127        | 8127647      | 9kHz ~ 30MHz    | Dec. 23, 2015    | Conduction (CO01-CB)  |
| EMI Receiver      | Agilent      | N9038A           | My52260123   | 9kHz ~ 8.45GHz  | Jan. 27, 2016    | Conduction (CO01-CB)  |
| COND Cable        | Woken        | Cable            | 01           | 150kHz ~ 30MHz  | May 24, 2016     | Conduction (CO01-CB)  |
| Software          | Audix        | E3               | 6.120210n    | -               | N.C.R.           | Conduction (CO01-CB)  |
| Loop Antenna      | Teseq        | HLA 6120         | 24155        | 9kHz - 30 MHz   | Mar. 12, 2015*   | Radiation (03CH01-CB) |
| BILOG ANTENNA     | Schaffner    | CBL6112D         | 37880        | 20MHz ~ 2GHz    | Sep. 03, 2015    | Radiation (03CH01-CB) |
| Horn Antenna      | EMCO         | 3115             | 00075790     | 750MHz ~ 18GHz  | Oct. 22, 2015    | Radiation (03CH01-CB) |
| Horn Antenna      | SCHWARZBECK  | BBHA 9170        | BBHA 9170585 | 18GHz ~ 40GHz   | Sep. 22, 2015    | Radiation (03CH01-CB) |
| Pre-Amplifier     | Agilent      | 8447D            | 2944A10991   | 0.1MHz ~ 1.3GHz | Mar. 15, 2016    | Radiation (03CH01-CB) |
| Pre-Amplifier     | Agilent      | 8449B            | 3008A02310   | 1GHz ~ 26.5GHz  | Jan. 18, 2016    | Radiation (03CH01-CB) |
| Pre-Amplifier     | WM           | TF-130N-R1       | 923365       | 26GHz ~ 40GHz   | Nov. 13, 2015    | Radiation (03CH01-CB) |
| Spectrum Analyzer | R&S          | FSP40            | 100056       | 9kHz ~ 40GHz    | Oct. 27, 2015    | Radiation (03CH01-CB) |
| EMI Test          | R&S          | ESCS             | 100355       | 9kHz ~ 2.75GHz  | May 16, 2016     | Radiation (03CH01-CB) |
| RF Cable-low      | Woken        | Low Cable-1      | N/A          | 30 MHz ~ 1 GHz  | Nov. 02, 2015    | Radiation (03CH01-CB) |
| RF Cable-high     | Woken        | High Cable-16    | N/A          | 1 GHz ~ 18 GHz  | Nov. 02, 2015    | Radiation (03CH01-CB) |
| RF Cable-high     | Woken        | High Cable-17    | N/A          | 1 GHz ~ 18 GHz  | Nov. 02, 2015    | Radiation (03CH01-CB) |
| RF Cable-high     | Woken        | High Cable-40G-1 | N/A          | 18GHz ~ 40 GHz  | Nov. 02, 2015    | Radiation (03CH01-CB) |



| Instrument                 | Manufacturer     | Model No.        | Serial No. | Characteristics | Calibration Date | Remark                |
|----------------------------|------------------|------------------|------------|-----------------|------------------|-----------------------|
| RF Cable-high              | Woken            | High Cable-40G-2 | N/A        | 18GHz ~ 40 GHz  | Nov. 02, 2015    | Radiation (03CH01-CB) |
| Mixer                      | OML              | M19HW/A          | U91113-1   | 40 ~ 60 GHz     | Sep. 09, 2015*   | Radiation (03CH01-CB) |
| Mixer                      | OML              | M15HW/A          | V91113-1   | 50 ~ 75 GHz     | Sep. 14, 2015*   | Radiation (03CH01-CB) |
| Mixer                      | OML              | M12HW/A          | E91113-1   | 60 ~ 90 GHz     | Sep. 17, 2015*   | Radiation (03CH01-CB) |
| Mixer                      | OML              | M08HW/A          | F91113-1   | 90 ~ 140 GHz    | Sep. 21, 2015*   | Radiation (03CH01-CB) |
| Mixer                      | OML              | M05HW/A          | G91113-1   | 140 ~ 220 GHz   | Sep. 24, 2015*   | Radiation (03CH01-CB) |
| Standard Horn Antenna      | Custom Microwave | HO19R            | U91113-A   | 40 ~ 60 GHz     | Sep. 09, 2015*   | Radiation (03CH01-CB) |
| Standard Horn Antenna      | Custom Microwave | HO15R            | V91113-A   | 50 ~ 75 GHz     | Sep. 14, 2015*   | Radiation (03CH01-CB) |
| Standard Horn Antenna      | Custom Microwave | HO12R            | E91113-A   | 60 ~ 90 GHz     | Sep. 17, 2015*   | Radiation (03CH01-CB) |
| Standard Horn Antenna      | Custom Microwave | HO08R            | F91113-A   | 90 ~ 140 GHz    | Sep. 21, 2015*   | Radiation (03CH01-CB) |
| Standard Horn Antenna      | Custom Microwave | HO05R            | G91113-A   | 140 ~ 220 GHz   | Sep. 24, 2015*   | Radiation (03CH01-CB) |
| Pico Scope                 | Pico             | Pico Scope 6402C | CX372/002  | N/A             | Jul. 06, 2015    | Radiation (03CH01-CB) |
| RF Detector                | millitech        | DET-15-RPFW0     | 38         | 50 ~ 75 GHz     | Oct. 31, 2015*   | Radiation (03CH01-CB) |
| Temp. and Humidity Chamber | Ten Billion      | TTH-D3SP         | TBN-931011 | -30~100 degree  | Jun. 03, 2016    | Conducted (TH01-CB)   |

Note: Calibration Interval of instruments listed above is one year.

“\*\*” Calibration Interval of instruments listed above is two years.

N.C.R means Non-Calibration required.

## 5 Measurement Uncertainty

| Test Items                           | Uncertainty | Remark                   |
|--------------------------------------|-------------|--------------------------|
| Conducted Emission (150kHz ~ 30MHz)  | 3.2 dB      | Confidence levels of 95% |
| Radiated Emission (30MHz ~ 1,000MHz) | 3.6 dB      | Confidence levels of 95% |
| Radiated Emission (1GHz ~ 18GHz)     | 3.7 dB      | Confidence levels of 95% |
| Radiated Emission (18GHz ~ 40GHz)    | 3.5 dB      | Confidence levels of 95% |
| Radiated Emission (40GHz ~ 220GHz)   | 4.7 dB      | Confidence levels of 95% |
| Temperature                          | 0.7°C       | Confidence levels of 95% |