

# FCC RF Test Report

| APPLICANT      | : | Ubiquiti Networks, Inc.           |
|----------------|---|-----------------------------------|
| EQUIPMENT      | : | BULLET M2                         |
| BRAND NAME     | : | UBIQUITI                          |
| MODEL NAME     | : | BulletM2-HP, BM2-Ti               |
| FCC ID         | : | SWX-M2BW                          |
| STANDARD       | : | FCC Part 15 Subpart C §15.247     |
| CLASSIFICATION | : | (DTS) Digital Transmission System |

The product was received on Dec. 19, 2017 and testing was completed on Feb. 08, 2018. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in 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.

Reviewed by: Anderson Chiu / Manager

Approved by: Jones Tsai / Manager



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**SPORTON INTERNATIONAL INC.** TEL : 886-3-327-3456 FAX : 886-3-328-4978 FCC ID: SWX-M2BW Page Number : 1 of 154 Report Issued Date : Feb. 14, 2018 Report Version : Rev. 01 Report Template No.: BU5-FR15CWL AC MA Version 2.0



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| AP | PEND  | X E. DUTY CYCLE PLOTS                                  |    |

**APPENDIX F. SETUP PHOTOGRAPHS** 



# **REVISION HISTORY**

| REPORT NO.  | VERSION | DESCRIPTION             | ISSUED DATE   |
|-------------|---------|-------------------------|---------------|
| FR712408-03 | Rev. 01 | Initial issue of report | Feb. 14, 2018 |
|             |         |                         |               |
|             |         |                         |               |
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|             |         |                         |               |
|             |         |                         |               |
|             |         |                         |               |



# SUMMARY OF TEST RESULT

| Report<br>Section | FCC Rule   | Description                 | Limit                    | Result | Remark                                      |
|-------------------|--|-----------------------------|--------------------------|--------|---|
| 3.1               | 15.247(a)(2)   | 6dB Bandwidth               | ≥ 0.5MHz                 | Pass   | -   |
| 3.1               | -  | 99% Bandwidth               | -                        | Pass   | -   |
| 3.2               | 15.247(b)  | Power Output Measurement    | ≤ 30dBm                  | Pass   | -   |
| 3.3               | 15.247(e)  | Power Spectral Density      | ≤ 8dBm/3kHz              | Pass   | -   |
|                   | /  | Conducted Band Edges        | ≤ 20dBc                  | Pass   | -   |
| 3.4               | 15.247(d)  | Conducted Spurious Emission |                          | Pass   | -   |
| 3.5               | 3.5 15.247(d) Radiated Band Edges and Radiated Spurious Emission |                             | 15.209(a) &<br>15.247(d) | Pass   | Under limit<br>1.06 dB at<br>145.020<br>MHz |
| 3.6               | 15.207   | AC Conducted Emission       | 15.207(a)                | Pass   | Under limit<br>5.00 dB at<br>0.150 MHz      |
| 3.7               | 15.203 &<br>15.247(b)  | Antenna Requirement         | N/A                      | Pass   | -   |



# **1** General Description

# 1.1 Applicant

### Ubiquiti Networks, Inc.

685 Third Avenue, 27th Floor New York, New York 10017 USA

# 1.2 Manufacturer

Ubiquiti Networks, Inc. 685 Third Avenue, 27th Floor New York, New York 10017 USA

# **1.3 Product Feature of Equipment Under Test**

Wi-Fi 2.4GHz 802.11b/g/n

| Product Specification subjective to this standard      |  |  |  |  |
|--|--|--|--|--|
| Sample 1 EUT in Gray Case and Model Name: BM2-Ti       |  |  |  |  |
| Sample 2 EUT in White Case and Model Name: BulletM2-HP |  |  |  |  |

| Antenna Information |                      |                |          |  |  |  |  |
|---------------------|----------------------|----------------|----------|--|--|--|--|
|                     | Model Name Type Gain |                |          |  |  |  |  |
| Ant. 1              | AMO-2G10             | Omni Antenna   | 10dBi    |  |  |  |  |
| Ant. 2              | AMO-2G13             | Omni Antenna   | 13dBi    |  |  |  |  |
| Ant. 3              | AM-V2G-Ti            | Sector Antenna | 15~17dBi |  |  |  |  |
| Ant. 4              | RD-2G24              | Dish Antenna   | 24dBi    |  |  |  |  |

# **1.4 Modification of EUT**

No modifications are made to the EUT during all test items.



# 1.5 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1190 and TW0007 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

| Test Site          | SPORTON INTERNATIONAL INC.                                  |  |  |
|--------------------|---|--|--|
|                    | No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, |  |  |
| Toot Site Logation | Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.           |  |  |
| Test Sile Location | TEL: +886-3-327-3456  |  |  |
|                    | FAX: +886-3-328-4978  |  |  |
| Toot Site No       | Sporton Site No.  |  |  |
| Test Sile No.      | CO05-HY   |  |  |

Note: The test site complies with ANSI C63.4 2014 requirement.

| Test Site          | SPORTON INTERNATIONAL INC.                            |  |
|--------------------|---|--|
|                    | No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd. Guishan Dist, |  |
| Toot Site Logation | Taoyuan City, Taiwan (R.O.C.)                         |  |
| Test Site Location | TEL: +886-3-327-0868                                  |  |
|                    | FAX: +886-3-327-0855                                  |  |
| Teet Cite No       | Sporton Site No.                                      |  |
| lest Site No.      | 03CH15-HY   |  |

Note: The test site complies with ANSI C63.4 2014 requirement.

# **1.6 Applicable Standards**

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

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04
- ANSI C63.10-2013

#### Remark:

- 1. All test items were verified and recorded according to the standards and without any deviation during the test.
- 2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

# 2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower)..
- b. AC power line Conducted Emission was tested under maximum output power.

| Frequency Band   | Freq.<br>(MHz) | Freq.<br>(MHz) | Freq.<br>(MHz) | Freq.<br>(MHz) |
|------------------|----------------|----------------|----------------|----------------|
|                  | 2412           | 2427           | 2442           | 2457           |
|                  | 2414           | 2429           | 2444           | 2459           |
| 0400 0480 E MU-  | 2417           | 2432           | 2447           | 2462           |
| 2400-2463.5 MITZ | 2419           | 2434           | 2449           |                |
|                  | 2422           | 2437           | 2452           |                |
|                  | 2424           | 2439           | 2454           |                |

# 2.1 Carrier Frequency and Channel



# 2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

| Modulation | Bandwidth                     | Data Rate |  |
|------------|-------------------------------|-----------|--|
| 802.11b    | (5, 8, 10, 20) MHz            | 1 Mbps    |  |
| 802.11g    | (5, 8, 10, 20) MHz            | 6 Mbps    |  |
| 802.11n    | HT (5, 8, 10, 20, 30, 40) MHz | MCS0      |  |

| Test Cases  |  |  |  |  |  |  |  |
|---|--|--|--|--|--|--|--|
| AC  | Mode 1 :WLAN (2.4GHz) Tx + LAN Link + PoE + Omni Antenna for Sample 1      |  |  |  |  |  |  |
| AC  | Mode 2 WLAN (2.4GHz) Tx + LAN Link + PoE + AM-V2G-Ti Antenna for Sample 1  |  |  |  |  |  |  |
|   | Mode 3 :WLAN (2.4GHz) Tx + LAN Link + PoE + RD-2G24 Antenna for Sample 1   |  |  |  |  |  |  |
| Emission  | Mode 4 :WLAN (2.4GHz) Tx + LAN Link + PoE + AM-V2G-Ti Antenna for Sample 2 |  |  |  |  |  |  |
| <b>Remark:</b> The worst case of conducted emission is mode 2; only the test data of it was reported. |  |  |  |  |  |  |  |

# 2.3 Connection Diagram of Test System



# 2.4 Support Unit used in test configuration and system

| Item | Equipment | Trade Name | Model Name     | FCC ID                                       | Data Cable | Power Cord   |
|------|-----------|------------|----------------|--|------------|--|
| 1.   | Notebook  | DELL       | Latitude E6320 | FCC DoC/<br>Contains FCC ID:<br>QDS-BRCM1054 | N/A        | AC I/P:<br>Unshielded, 1.2 m<br>DC O/P:<br>Shielded, 1.8 m |
| 2.   | POE       | Ubiquiti   | GP-A240-050G   | FCC DoC                                      | N/A        | N/A  |

# 2.5 EUT Operation Test Setup

The RF test items, utility "Putty" was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

# 2.6 Measurement Results Explanation Example

### For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB). = 4.2 + 10 = 14.2 (dB)



# 3 Test Result

# 3.1 6dB and 99% Bandwidth Measurement

## 3.1.1 Limit of 6dB and 99% Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

### 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.1.3 Test Procedures

- 1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v04.
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
- 5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 1MHz and set the Video bandwidth (VBW) = 3MHz.
- 6. Measure and record the results in the test report.

# 3.1.4 Test Setup



Spectrum Analyzer



# 3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A.

#### <Dish Antenna>



Note : The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

#### <Omni Antenna>



Note : The occupied channel bandwidth is maintained within the band of operation for all of the modulations



#### <Sector Antenna>



Note : The occupied channel bandwidth is maintained within the band of operation for all of the modulations



# 3.2 Output Power Measurement

### 3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

### **3.2.2 Measuring Instruments**

The measuring equipment is listed in the section 4 of this test report.

### **3.2.3 Test Procedures**

- 1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v04 section 9.1.3 PKPM1 Peak power meter method.
- 2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Measure the conducted output power and record the results in the test report.

<Average output power>

- 1. The testing follows the Measurement Procedure of FCC KDB No. 558074 D01 DTS Meas. Guidance v04 section 9.3.2 AVGPM-G Method.
- 2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.
- 4. Record the test results in the test report.

# 3.2.4 Test Setup





# 3.2.5 Test Result of Peak Output Power

Please refer to Appendix A.

# 3.2.6 Test Result of Average output Power (Reporting Only)

Please refer to Appendix A.



# 3.3 Power Spectral Density Measurement

## 3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

### **3.3.2 Measuring Instruments**

The measuring equipment is listed in the section 4 of this test report.

### **3.3.3 Test Procedures**

- The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz.
   Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
- 5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
- 6. Measure and record the results in the test report.



# 3.3.4 Test Setup



# 3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



#### <Dish Antenna>



#### <Omni Antenna>



#### <Sector Antenna>





# 3.4 Conducted Band Edges and Spurious Emission Measurement

# 3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement.

### 3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### **3.4.3 Test Procedures**

- 1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
- 5. Measure and record the results in the test report.
- 6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

### 3.4.4 Test Setup





### 3.4.5 Test Result of Conducted Band Edges and Spurious Emission

| Test Engineer : How | Howard Kao | Temperature :       | <b>26</b> ℃ |
|---------------------|------------|---------------------|-------------|
|                     | Howard Kab | Relative Humidity : | 66%         |

<Dish Antenna>

#### Number of TX = 1, Ant. 1 (Measured)





| Test Mode :  | 802.11b (5MHz)  |   | Test Channel :  | 06  |  |
|--|---|---|---|---|--|
| 100  | kHz PSD reference Level   | l   |   | Channel Plot  |  |
| Spectrum           Ref Level 23.20 dBm           Att           20 dB SWT           10 dBm           10 dBm           -10 dBm           -10 dBm           -30 dBm           -30 dBm           -60 dBm           -70 dBm           -70 dBm           -70 dBm | 13.20 dB @ RBW 100 kHz<br>1 ms @ VBW 300 kHz<br>MI[1]<br>MB<br>MB<br>1001 pts | 0.06 dBm<br>2.43699230 GHz                              |   |   |  |
| Date: 5.FEB.2018 09:08:50 Spuric Spectrum Ref Level 13.20 dBm Offset   |   | Hz  | Spectrum<br>Ref Level 13.20 dBm Offset 13.20 d        | Emission 2GHz~25  | jGHz<br>₩  |
| Att 10 dB SWT  | 29.7 ms • VBW 300 kHz Mode Sweep  | 1   | Att 10 dB SWT 230 m                                   | s - VBW 300 kHz Mode Sweep  |  |
| 10 dBm   | M1[1]<br>M2[1]  | -52.12 dBm<br>2.46450 GHz<br>M2 0.06 dBm<br>2.43770 GHz | 10 dBm  | M1[1]<br>M2[1]  | -53.47 dBm<br>4.8840 GHz<br>0.25 dBm<br>2.4480 GHz |
| -20 dBm 01 -19.940 dBm   |   |   | -20 dBm-01 -19.940 dBm-                               |   |  |
| -40 dBm  | يونين من                                  | And the state of the state of the                       | -0 dBm - M2<br>-0 dBm - M2<br>-20 dBm - M2<br>-70 dBm | Ungering hat we are a start and a start | where the second and the                           |
| -80 dBm  | 1001 pts  | Stop 3.0 GHz  | -80 dBm   | 1001 pts  | Stop 25.0 GHz                                      |
| Date: 5.FEB.2018 09:09:07  |   |   | Date: 5.FEB.2018 09:09:16                             |   |  |











| Test Mode :  | 802.11g (5MHz)  | Test Channel :  | 06   |
|--|---|---|--|
| 100k   | KHz PSD reference Level   |   | Channel Plot   |
| Spectrum           Ref Level 23.20 dbm         Offset 1           20 db         SWT           20 dbm         10           10 dbm         0           0 dbm         -10           -20 dbm         -0           -20 dbm         -0           -50 dbm         -60 dbm           -70 dbm         -70 dbm | 13.20 dB = RBW 100 lH2<br>1ms = VBW 300 lH2: Mode Sweep<br>   | -1.83 dBm<br>70550 GHz  |  |
| Spectrum<br>Ref Level 13.20 dBm Offset 1   |   | Spectrum<br>Ref Level 13.20 dBm Offset 13.20 dB   | Emission 2GHz~25GHz  |
| Att         10 dB         SWT           9 JPk View         10 dBm         0         0           10 dBm         -0         0 dBm         -10 dBm           -10 dBm         01 -21.830 dBm         -20 dBm         -20 dBm   | 29.7 ms   VBW 300 lHz Mode Sweep  | Att 10 dB SWT 230 ms     Att 10 dB SWT     230 ms     Att 2370 GHz     Att 2 At | • VBW 300 kHz         Mode Sweep   |
| -40 dBm<br>-50 dBm<br>-60 dBm<br>-60 dBm<br>-80 dBm  | and brown on the for the state of the state | -0 dBm<br>-0 dBm<br>-0 dBm<br>-0 dBm<br>-0 dBm<br>-0 dBm<br>-70 dBm<br>-70 dBm<br>-70 dBm<br>-80 dBm  | MI MI MANAGAMANA MANAGAMANAGAMANA MANAGAMANAGAMANA MANAGAMANAGAMANA MANAGAMANAGAMANA MANAGAMANAGAMANA MANAGAMANAGAMANA MANAGAMANA MANAGAMANA MANAGAMANAGAMANAGAMANA MANAGA |
| Date: 5.FEB.2018 09:55:14  | 1001 pts Stop   | p 3.0 GHz<br>Bate: 5.FEB.2018 09:55:22  | 1001 pts Stop 25.0 GHz ]   |











| Test Mode :  | 802.11n HT (5MHz)  | Т   | est Channel :  | 06   |   |
|--|--|---|--|--|---|
| 100  | )kHz PSD reference Lev   | el  |  | Channel Plot   |   |
| Spectrum           Ref Level 23.20 dBm         Offset           124 Max         20 dB           20 dBm         10 dBm           10 dBm         0           -10 dBm   | t 13 20 dB @ RBW 100 LHz<br>1 ms @ VBW 300 LHz<br>M1[1]<br>M1[1]<br>M1<br>M1<br>M1<br>M1<br>M1<br>M1<br>M1<br>M1<br>M1<br>M1 | -2.23 dBm<br>2.43662660 GHz   |  |  |   |
| Spuri  | ous Emission 30MHz~3   | GHz   | Spurior  | us Emission 2GHz~2   | 25GHz   |
| Spectrum           Ref Level 13.20 dBm         Offset           10 dB         SWT           ● 1Pk. View         0           10 dBm         0           -10 dBm         0           -20 dBm         01 -22.230 dBm           -30 dBm         -30 dBm           -60 dBm         -60 dBm           -700µtBpatration         -10 dbm | t 13.20 dB   | -5-1-29 dbm<br>2-46450 GHz<br>-3.89 dbm<br>2.43770 GHz<br>-3.89 dbm<br>-1<br> | Spectrum         Offset 13           Ref Level 13.20 dBm         Offset 13           10 dB         SWT           10 H         SWT           10 H         Odb           10 dBm         Image: State | 120 dB = RBW 100 KHz<br>130 ms = VBW 300 KHz Mode Sweep<br>M1[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[1]<br>M2[ | -56.55 dBm<br>19.5430 GHz<br>-5.37 dBm<br>2.4480 GHz<br>-5.37 dBm<br> |
| -80 dBm  | 1001 pts   | Stop 3.0 GHz  | 80 dBm   | 1001 pts   | Stop 25.0 GHz   |











| Test Mode :  | 802.11b (8MHz)  |   | Test Channel :  | 06   |   |
|--|---|---|---|--|---|
| 100  | kHz PSD reference Level   |   |   | Channel Plot   |   |
| Spectrum           Ref Level 23.20 dBm         Offset           4.11         20 dB         SWT           9 IPK Max         20 dBm         0           10 dBm         0         0           -20 dBm | 13.20 dB         RBW 100 kHz           1 ms         VBW 300 kHz           Mode Sweep  | -0.44 dBm<br>2.436559340 GHz                          |   | Channel Plot   |   |
| Date: 5.FEB.2018 09:23:22 Spuric Spectrum Ref Level 13.20 dBm Offset   | ous Emission 30MHz~3GHz   |   | Spurious  | Emission 2GHz~   | 25GHz<br>   |
| Att 10 db SWT<br>att 10 db SWT<br>10 dbm<br>0 dbm<br>-10 dbm<br>-20 dbm<br>-20 dbm<br>-20 dbm  | 29.7 ms • VBW 300 kHz Mode Sweep  | -55.21 dBm<br>2.45850 GHz<br>-0.40 dBm<br>2.43770 GHz | Att 10 dB SWT 230 m<br>att 10 dB SWT 230 m<br>10 dBm<br>M2<br>00f8m<br>-10 dBm<br>-10 dBm<br>-10 dBm<br>D1 -20,440 dBm<br>-20 dBm | MI[1]<br>M2[1]   | -53.82 dBm<br>4.8840 GHz<br>-0.27 dBm<br>2.4480 GHz   |
| -40 dBm  | tophalser and have been all and and the set of the set | he have been a  | -0 dBm<br>-0 dBm<br>  | and an and a second a | the de the the second and the second s |
| Date: 5.FEB.2018 09:23:33  | 1001 pts  | Stop 3.0 GHz  | Start 2.0 GHz   | 1001 pts   | Stop 25.0 GHz   |











| Test Mode :   | 802.11g (8MHz)  |  | Test Channel :   | 06   |  |
|---|---|--|--|--|--|
| 100k  | <pre></pre>   |  |  | Channel Plot   |  |
| Spectrum           Ref Level 23.20 dBm         Offset 1           Att         20 dB         SwT           © JPK Max         20 dBm         10 dBm           10 dBm         0 dBm         10 dBm           -20 dBm         -10 dBm         Max           -30 dBm         -50 dBm         -50 dBm           -50 dBm         -60 dBm         -60 dBm | 13.20 dB = RBW 100 kHz           1 ms = VBW 300 kHz           M1[1]           2,432           1 | -5.54 dbm<br>503700 GHz                              |  |  |  |
| Date: 5.FEB.2018 10:08:34 Spurio Spectrum Ref Level 13.20 dBm Offset 1  | US Emission 30MHz~3GHz  |  | Spurious   | Emission 2GHz~2                                      | 5GHz<br>₩  |
| Att 10 dB SWT     ● IPk View     10 dBm     0 dBm     -10 dBm     -20 dBm     -30 dBm     -40 dBm   | 29.7 ms @ VBW 300 kHz Mode Sweep  | -58.72 dBm<br>!28050 GHz<br>-6.04 dBm<br>!.43480 GHz | Att 10 dB SWT 230 m     DFk View     D dBm     D dBm     -10 dBm     O1 -25.540 dBm     -30 dBm     -0 dBm | VBW 300 kHz Mode Sweep                               | -57.33 dBm<br>19.5660 GHz<br>-7.57 dBm<br>2.4230 GHz |
| -50 dBm<br>-60 dBm<br>-7476เปรษญาสะ เกาะการหน้าไปประกา<br>-80 dBm<br>-80 dBm  | mandelen ut stemption with the bury of monorability of the bury bury bury bury bury bury bury bury  | op 3.0 GHz   | -SO dBm<br>-SO dBm<br>-70 dBm<br>-70 dBm<br>-80 dBm<br>-80 dBm<br>-80 dBm<br>-80 dBm<br>-10 GHz            | ารู้เก็บก็สูง เป็นเป็นไขสู่หุกกรมีก็ก ในประสิทธิประจ | Stop 25.0 GHz  |
| Date: 5.FEB.2018 10:08:45   |   |  | Date: 5.FEB.2018 10:08:53  |  |  |









| Test Mode :  | 802.11n HT (8MHz)  |   | Test Channel :  | 06   |  |
|--|--|---|---|--|--|
| 100  | kHz PSD reference Level  |   |   | Channel Plot   |  |
| Spectrum           Ref Level 23.20 dBm         Offset           10 dBm         20 dB         SWT           10 dBm         0         0           10 dBm         0         0           -10 dBm         -         -           -20 dBm         -         -           -50 dBm         -         -           -60 dBm         -         -           -70 dBm         -         -           Date: 5.FEB.2018         10:54:42 | 13.20 dB = RBW 100 HHz<br>1.1 ms = VBW 300 HHz Mode Sweep<br>M1[1] 2.4<br>M1[1] 2.4 | -5.91 dBm<br>(379295 GHz                              |   |  |  |
| Spuri  | ous Emission 30MHz~3GHz  |   | Spurious  | Emission 2GHz~2  | 5GHz   |
| Spectrum           Ref Level 13.20 dBm         Offset           110 dBm         10 dB           10 dBm         0 dBm           -10 dBm   | 1 13.20 dB = RBW 100 HHz<br>29.7 ms = VBW 300 HHz Mode Sweep<br>   | -57.64 dBm<br>2-10210 CH2<br>-5.22 dBm<br>2.13770 GH2 | Spectrum           Reflevel 13:20 dbm           Att         10 dB           SWT         230 m           ID dbm         0           0 dbm         0           40 dbm         0           -0 dbm         -0           -0 dbm         -0 | 3B         RBW 100 kHz         Mode Sweep           vBW 300 kHz         Mode Sweep | -56.44 dBm<br>19.5430 GHz<br>-7.45 dBm<br>2.4250 GHz |
| Start 30.0 MHz   | 1001 pts St  | top 3.0 GHz   | Start 2.0 GHz   | 1001 pts   | Stop 25.0 GHz  |
| Date: 5.FEB.2018 10:54:52  |  |   | Date: 5.FEB.2018 10:55:00   |  |  |











| Test Mode :   | 802.11b (10MHz)   | Test Channel : 06  |
|---|---|--|
| 100   | kHz PSD reference Level   | Channel Plot   |
| Spectrum           Ref Level 23.20 dBm           10 dBm           10 dBm           10 dBm           -10 dBm           -20 dBm           -30 dBm           -50 dBm           -60 dBm           -70 dBm | 13.20 dB = RBW 100 HHz<br>1 ms = VBW 300 HHz Mode Sweep<br>MI[1]<br>2.436<br>MI<br>100 pts Span 7 | 0.00 dBm<br>36/3910 GHz  |
| Spuric  | ous Emission 30MHz~3GHz   | Spurious Emission 2GHz~25GHz   |
| Spectrum           Ref Level 13.20 dBm         Offset           4tt         10 dB         SWT           9 JPk View         10 dBm         0 dBm           -10 dBm   | 13.20 dB • RBW 100 kHz<br>29.7 ms • VBW 300 kHz Mode Sweep<br>M1[1]                               | Spectrum         Image: Constraint of the second secon |
| -80 dBm<br>-80 dBm<br>Start 30.0 MHz<br>Date: 5.FEB.2018 09:39:24   | 1001 pts Stor   | top 3.0 GHz  Start 2.0 GHz  Date: 5.FEB.2018 09:39:32  |