

# TEST REPORT



**CTK Co., Ltd.**  
(Ho-dong), 113, Yejik-ro, Cheoin-gu,  
Yongin-si, Gyeonggi-do, Korea  
Tel: +82-31-339-9970  
Fax: +82-31-624-9501

Report No.:  
CTK-2018-03454  
Page (1) / (26) Pages

## 1. Client

- Name : KAONMEDIA Co., Ltd.
- Address : KAONMEDIA Building, 884-3 Seongnam-daero, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea
- Date of Receipt : 2018-10-11

## 2. Manufacturer

- Name : KAONMEDIA Co., Ltd.
- Address : KAONMEDIA Building, 884-3, Seongnam-daero, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea

## 3. Use of Report : For FCC Certification

## 4. Test Sample / Model: SETTOP BOX / VM3011C

## 5. Date of Test : 2018-10-29 to 2018-10-31

## 6. Test Standard(method) used : FCC 47 CFR part 15 subpart C 15.247

## 7. Testing Environment: Temp.: (25 ± 5) °C, Humidity: (50 ± 3) % R.H.

## 8. Test Results : Compliance

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full.

|             |                         |                             |
|-------------|-------------------------|-----------------------------|
| Affirmation | Tested by               | Technical Manager           |
|             | Ji-Hye Kim: (Signature) | Won-Jae, Hwang: (Signature) |

2018-10-31

Republic of KOREA **CTK Co., Ltd.**



**CTK Co., Ltd.**  
(Ho-dong), 113, Yejik-ro, Cheoin-gu,  
Yongin-si, Gyeonggi-do, Korea  
Tel: +82-31-339-9970  
Fax: +82-31-624-9501

Report No.:  
CTK-2018-03454  
Page (2) / (26) Pages

## REPORT REVISION HISTORY

| Date       | Revision                | Page No |
|------------|-------------------------|---------|
| 2018-10-31 | Issued (CTK-2018-03454) | all     |
|            |                         |         |
|            |                         |         |
|            |                         |         |
|            |                         |         |
|            |                         |         |
|            |                         |         |
|            |                         |         |
|            |                         |         |
|            |                         |         |
|            |                         |         |

***This report shall not be reproduced except in full, without the written approval of CTK Co., Ltd. This document may be altered or revised by CTK Co., Ltd. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by CTK Co., Ltd. will constitute fraud and shall nullify the document.***

## **CONTENTS**

|                                                                     |    |
|---------------------------------------------------------------------|----|
| 1. General Product Description .....                                | 4  |
| 1.1 Client Information .....                                        | 4  |
| 1.2 Product Information .....                                       | 4  |
| 1.3 Peripheral Devices .....                                        | 5  |
| 2. Facility and Accreditations .....                                | 6  |
| 2.1 Test Facility .....                                             | 6  |
| 2.2 Laboratory Accreditations and Listings .....                    | 6  |
| 2.3 Calibration Details of Equipment Used for Measurement .....     | 6  |
| 3. Summary of tests .....                                           | 7  |
| 3.1 Description of Dynamic Frequency Selection Test .....           | 8  |
| 3.2 Measuring Systematic diagram .....                              | 12 |
| 3.3 Description of EUT .....                                        | 13 |
| 3.4 Test Results .....                                              | 14 |
| 3.4.1 Test Channel .....                                            | 14 |
| 3.4.2 Radar waveform, Traffic and Dwell time per bin .....          | 14 |
| 3.4.3 Channel move time and Channel closing Transmission time ..... | 20 |
| 3.4.4 Client beacon test .....                                      | 24 |
| APPENDIX A – Test Equipment Used For Tests .....                    | 26 |

## 1. General Product Description

### 1.1 Client Information

|                       |                                                                                                        |
|-----------------------|--------------------------------------------------------------------------------------------------------|
| <b>Company</b>        | KAONMEDIA Co., Ltd.                                                                                    |
| <b>Contact Point</b>  | KAONMEDIA Building, 884-3 Seongnam-daero, Bundang-gu,<br>Seongnam-si, Gyeonggi-do, Korea               |
| <b>Contact Person</b> | Name : Kim hang seob<br>E-mail : khs79@kaonmedia.com<br>Tel : +82-31-724-8668<br>Fax : +82-31-724-8999 |

### 1.2 Product Information

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                     |  |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--|
| FCC ID                | WQTVM3011C                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     |  |
| Product Description   | SETTOP BOX                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     |  |
| Model name            | VM3011C                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                     |  |
| Variant Model name    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                     |  |
| Operating Frequency   | UNII 1 : 5 180 MHz – 5 240 MHz (20 MHz_BW)<br>5 190 MHz – 5 230 MHz (40 MHz_BW)<br>5 210 MHz (80 MHz_BW)<br>UNII 2A : 5 260 MHz – 5 320 MHz (20 MHz_BW)<br>5 270 MHz – 5 310 MHz (40 MHz_BW)<br>5 290 MHz (80 MHz_BW)<br>UNII 2C : 5 500 MHz – 5 720 MHz (20 MHz_BW)<br>5 510 MHz – 5 710 MHz (40 MHz_BW)<br>5 530 MHz – 5 690 MHz (80 MHz_BW)<br>UNII 3 : 5 745 MHz – 5 825 MHz (20 MHz_BW)<br>5 755 MHz – 5 795 MHz (40 MHz_BW)<br>5 775 MHz (80 MHz) |                                     |  |
| RF Output Power       | 802.11a : 26.70 dBm (467.21 mW)<br>802.11n_HT20 : 26.63 dBm (460.40 mW)<br>802.11n_HT40 : 26.97 dBm (497.73 mW)<br>802.11ac_VHT20 : 26.60 dBm (456.95 mW)<br>802.11ac_VHT40 :26.87 dBm (486.01 mW)<br>802.11ac_VHT80 : 23.00 dBm (199.59 mW)                                                                                                                                                                                                            |                                     |  |
| Antenna Specification | Antenna type : PCB Antenna<br>Peak Gain : 2.0 dBi                                                                                                                                                                                                                                                                                                                                                                                                       |                                     |  |
| Type of Modulation    | OFDM                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                     |  |
| Data Rate             | 802.11a : 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6 Mbps<br>802.11n : up to 600 Mbps<br>802.11ac : up to 1.7 Gbps                                                                                                                                                                                                                                                                                                                                             |                                     |  |
| Power Source          | DC 12 V (Adaptor)                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                     |  |
| Hardware Rev          | v1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                     |  |
| Software Rev          | 00.00.00.01                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                     |  |
| DFS Mode of Operation | Master Device                                                                                                                                                                                                                                                                                                                                                                                                                                           | <input type="checkbox"/>            |  |
|                       | Client Device (No radar detection)                                                                                                                                                                                                                                                                                                                                                                                                                      | <input checked="" type="checkbox"/> |  |
|                       | Client Device With Radar Detection                                                                                                                                                                                                                                                                                                                                                                                                                      | <input type="checkbox"/>            |  |

### 1.3 Peripheral Devices

| Device                       | Manufacturer                          | Model No.         | Serial No.   |
|------------------------------|---------------------------------------|-------------------|--------------|
| Note Computer                | HP                                    | 15-bs563TU        | CND7253R6N   |
| AC/DC Adapter                | HP                                    | HSTNN-CA40        | -            |
| Switching Mode Power Adaptor | SHENZHEN FRECOM ELECTRONICS CO., LTD. | F18L16-120150SPAU | -            |
| WLAN Access Point            | Cisco Systems                         | WAP371            | CCQ19100R7P  |
| AC/DC Adapter                | LITE-ON POWER TECHNOLOGY CO.,LTD      | PA-1041-71        | L21432051723 |

|                                                                                   |                                                                                                                                               |                                                        |  |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|--|
|  | <b>CTK Co., Ltd.</b><br>(Ho-dong), 113, Yejik-ro, Cheoin-gu,<br>Yongin-si, Gyeonggi-do, Korea<br>Tel: +82-31-339-9970<br>Fax: +82-31-624-9501 | Report No.:<br>CTK-2018-03454<br>Page (6) / (26) Pages |  |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|--|

## 2. Facility and Accreditations

### 2.1 Test Facility

The measurement facility is located at (Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea.

### 2.2 Laboratory Accreditations and Listings

| Country | Agency | Scope of Accreditation                                                                           | Registration Number                | Logo                                                                                  |
|---------|--------|--------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------|
| USA     | FCC    | FCC Part 15 & 18<br>EMI (Electromagnetic Interference / Emission)                                | 805871                             |    |
| CANADA  | ISED   | ISED<br>EMI (3/10m test site)                                                                    | 8737A-2                            |    |
| JAPAN   | VCCI   | VCCI V-3<br>EMI (Electromagnetic Interference / Emission)                                        | C-986<br>T-1843<br>R-3627<br>G-387 |   |
| KOREA   | MSIP   | EMI (Electromagnetic Interference / Emission)<br>EMS (Electromagnetic Susceptibility / Immunity) | KR0025                             |  |

### 2.3 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

### 3. Summary of tests

| Parameter                         | Limit                                                        | Status<br>(note 1) |
|-----------------------------------|--------------------------------------------------------------|--------------------|
| Channel Move Time                 | 10 seconds                                                   | C                  |
| Channel Closing Transmission Time | 200ms + aggregate of 60ms over<br>remaining 10 second period | C                  |
| Client beacon test                | Monitored for 10 minutes with no<br>client transmission      | C                  |

Note 1: C=Complies   NC=Not Complies   NT=Not Tested   NA=Not Applicable

### 3.1 Description of Dynamic Frequency Selection Test

**Table 1: Applicability of DFS Requirements Prior to Use of a Channel**

| Requirement                            | Operational Mode |                                |                             |
|----------------------------------------|------------------|--------------------------------|-----------------------------|
|                                        | Master           | Client Without Radar Detection | Client With Radar Detection |
| <i>Non-Occupancy Period</i>            | Yes              | Not required                   | Yes                         |
| <i>DFS Detection Threshold</i>         | Yes              | Not required                   | Yes                         |
| <i>Channel Availability Check Time</i> | Yes              | Not required                   | Not required                |
| <i>U-NII Detection Bandwidth</i>       | Yes              | Not required                   | Yes                         |

**Table 2: Applicability of DFS requirements during normal operation**

| Requirement                              | Operational Mode                             |                                |
|------------------------------------------|----------------------------------------------|--------------------------------|
|                                          | Master Device or Client with Radar Detection | Client Without Radar Detection |
| <i>DFS Detection Threshold</i>           | Yes                                          | Not required                   |
| <i>Channel Closing Transmission Time</i> | Yes                                          | Yes                            |
| <i>Channel Move Time</i>                 | Yes                                          | Yes                            |
| <i>U-NII Detection Bandwidth</i>         | Yes                                          | Not required                   |

| Additional requirements for devices with multiple bandwidth modes                                                                                                                                                                                                                                                                                            | Master Device or Client with Radar Detection | Client Without Radar Detection                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------------|
| <i>U-NII Detection Bandwidth and Statistical Performance Check</i>                                                                                                                                                                                                                                                                                           | All BW modes must be tested                  | Not required                                         |
| <i>Channel Move Time and Channel Closing Transmission Time</i>                                                                                                                                                                                                                                                                                               | Test using widest BW mode available          | Test using the widest BW mode available for the link |
| <i>All other tests</i>                                                                                                                                                                                                                                                                                                                                       | Any single BW mode                           | Not required                                         |
| <b>Note:</b> Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency. |                                              |                                                      |

**Table 3: DFS Detection Thresholds for Master Devices  
and Client Devices with Radar Detection**

| Maximum Transmit Power                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Value<br>(See Notes 1, 2, and 3) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| EIRP $\geq$ 200 milliwatt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | -64 dBm                          |
| EIRP < 200 milliwatt and<br>power spectral density < 10 dBm/MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | -62 dBm                          |
| EIRP < 200 milliwatt that do not meet the power spectral density<br>requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                             | -64 dBm                          |
| <p><b>Note 1:</b> This is the level at the input of the receiver assuming a 0 dBi receive antenna.</p> <p><b>Note 2:</b> Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.</p> <p><b>Note3:</b> EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.</p> |                                  |

**Table 4: DFS Response Requirement Values**

| Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Value                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <i>Non-occupancy period</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Minimum 30 minutes                                                                                                 |
| <i>Channel Availability Check Time</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 60 seconds                                                                                                         |
| <i>Channel Move Time</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 10 seconds<br>See Note 1.                                                                                          |
| <i>Channel Closing Transmission Time</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 200 milliseconds + an<br>aggregate of 60<br>milliseconds over remaining<br>10 second period.<br>See Notes 1 and 2. |
| <i>U-NII Detection Bandwidth</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Minimum 100% of the U-<br>NII 99% transmission<br>power bandwidth. See Note<br>3.                                  |
| <p><b>Note 1:</b> <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.</p> <p><b>Note 2:</b> The <i>Channel Closing Transmission Time</i> is comprised of 200 milliseconds starting at the beginning of the <i>Channel Move Time</i> plus any additional intermittent control signals required to facilitate a <i>Channel</i> move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.</p> <p><b>Note 3:</b> During the <i>U-NII Detection Bandwidth</i> detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.</p> |                                                                                                                    |

**Table 5 – Short Pulse Radar Test Waveforms**

| Radar Type                                                                                                                                  | Pulse Width (μsec) | PRI (μsec)                                                                                                                                                    | Number of Pulses                                                                                                              | Minimum Percentage of Successful Detection | Minimum Number of Trials |
|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------|
| 0                                                                                                                                           | 1                  | 1428                                                                                                                                                          | 18                                                                                                                            | See Note 1                                 | See Note 1               |
| 1                                                                                                                                           | 1                  | Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a                                                                     | Roundup $\left\{ \left( \frac{1}{360} \right) \cdot \left( \frac{19 \cdot 10^6}{\text{PRI}_{\mu\text{sec}}} \right) \right\}$ | 60%                                        | 30                       |
|                                                                                                                                             |                    | Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A |                                                                                                                               |                                            |                          |
| 2                                                                                                                                           | 1-5                | 150-230                                                                                                                                                       | 23-29                                                                                                                         | 60%                                        | 30                       |
| 3                                                                                                                                           | 6-10               | 200-500                                                                                                                                                       | 16-18                                                                                                                         | 60%                                        | 30                       |
| 4                                                                                                                                           | 11-20              | 200-500                                                                                                                                                       | 12-16                                                                                                                         | 60%                                        | 30                       |
| Aggregate (Radar Types 1-4)                                                                                                                 |                    |                                                                                                                                                               |                                                                                                                               | 80%                                        | 120                      |
| <b>Note 1:</b> Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests. |                    |                                                                                                                                                               |                                                                                                                               |                                            |                          |

**Table 5a - Pulse Repetition Intervals Values for Test A**

| Pulse Repetition Frequency Number | Pulse Repetition Frequency (Pulses Per Second) | Pulse Repetition Interval (Microseconds) |
|-----------------------------------|------------------------------------------------|------------------------------------------|
| 1                                 | 1930.5                                         | 518                                      |
| 2                                 | 1858.7                                         | 538                                      |
| 3                                 | 1792.1                                         | 558                                      |
| 4                                 | 1730.1                                         | 578                                      |
| 5                                 | 1672.2                                         | 598                                      |
| 6                                 | 1618.1                                         | 618                                      |
| 7                                 | 1567.4                                         | 638                                      |
| 8                                 | 1519.8                                         | 658                                      |
| 9                                 | 1474.9                                         | 678                                      |
| 10                                | 1432.7                                         | 698                                      |
| 11                                | 1392.8                                         | 718                                      |
| 12                                | 1355                                           | 738                                      |
| 13                                | 1319.3                                         | 758                                      |
| 14                                | 1285.3                                         | 778                                      |
| 15                                | 1253.1                                         | 798                                      |
| 16                                | 1222.5                                         | 818                                      |
| 17                                | 1193.3                                         | 838                                      |
| 18                                | 1165.6                                         | 858                                      |
| 19                                | 1139                                           | 878                                      |
| 20                                | 1113.6                                         | 898                                      |
| 21                                | 1089.3                                         | 918                                      |
| 22                                | 1066.1                                         | 938                                      |
| 23                                | 326.2                                          | 3066                                     |

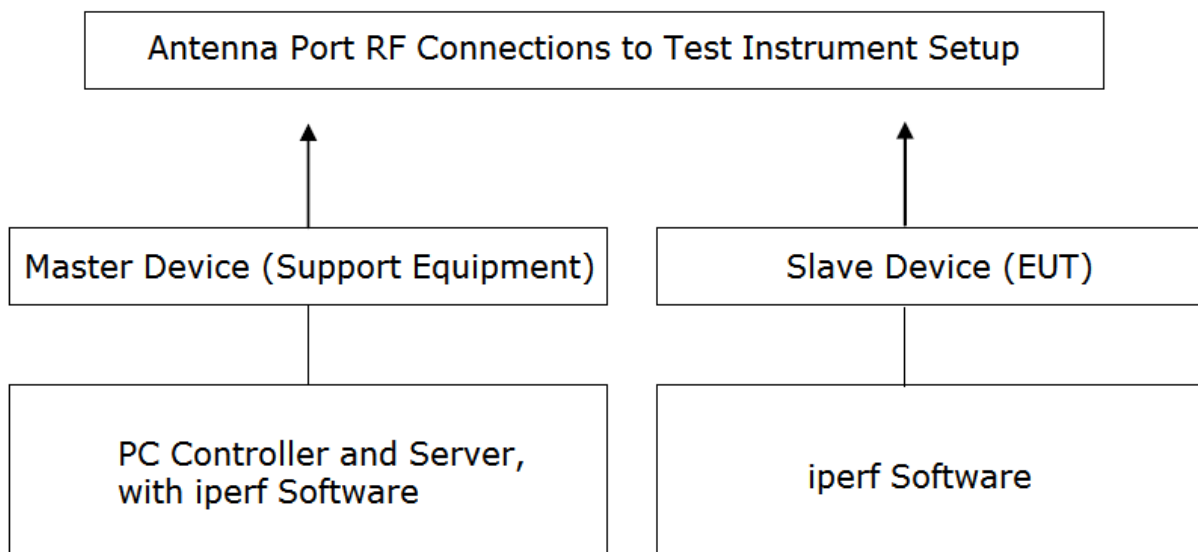
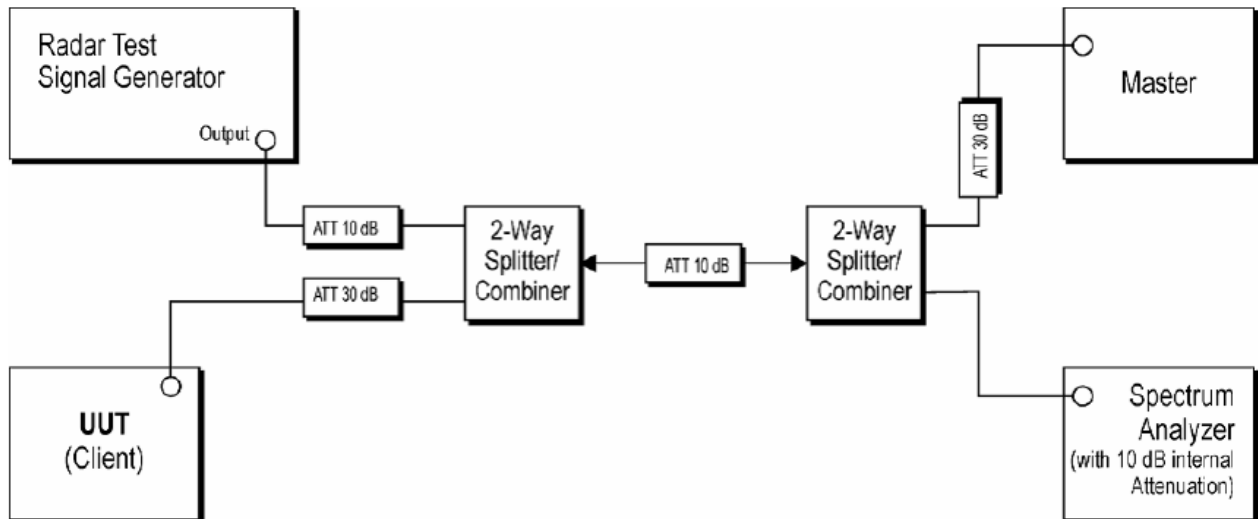
**Table 6 – Long Pulse Radar Test Waveform**

| Radar Type | Pulse Width (μsec) | Chirp Width (MHz) | PRI (μsec) | Number of Pulses per Burst | Number of Bursts | Minimum Percentage of Successful Detection | Minimum Number of Trials |
|------------|--------------------|-------------------|------------|----------------------------|------------------|--------------------------------------------|--------------------------|
| 5          | 50-100             | 5-20              | 1000-2000  | 1-3                        | 8-20             | 80%                                        | 30                       |

**Table 7 – Frequency Hopping Radar Test Waveform**

| Radar Type | Pulse Width (μsec) | PRI (μsec) | Pulses per Hop | Hopping Rate (kHz) | Hopping Sequence Length (msec) | Minimum Percentage of Successful Detection | Minimum Number of Trials |
|------------|--------------------|------------|----------------|--------------------|--------------------------------|--------------------------------------------|--------------------------|
| 6          | 1                  | 333        | 9              | 0.333              | 300                            | 70%                                        | 30                       |

### 3.2 Measuring Systematic diagram



|                                                                                                                                                                       |                                                                                                                                                          |                                                                  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|--|
|  <p><b>CTK Co., Ltd.</b><br/>The Prime Leader of Global Regulatory Certification</p> | <p><b>CTK Co., Ltd.</b><br/>(Ho-dong), 113, Yejik-ro, Cheoin-gu,<br/>Yongin-si, Gyeonggi-do, Korea<br/>Tel: +82-31-339-9970<br/>Fax: +82-31-624-9501</p> | <p>Report No.:<br/>CTK-2018-03454<br/>Page (13) / (26) Pages</p> |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|--|

### 3.3 Description of EUT

#### Overview Of EUT With Respect To §15.407 (H) Requirements

The EUT operates over the 5250-5350 MHz and 5470-5725 MHz range.

The EUT is a Client Device that does not have radar detection capability.

The antenna assembly utilized with the EUT has a gain of 2.0 dBi.

The Slave device associated with the EUT during these tests does not have radar detection capability.

All tests are conducted with Pulse Type 0.

A sample with temporary antenna connector was provided to perform the measurements in a conducted way.

Iperf was used to generate the required channel load (duty cycle greater 17 percent).

The EUT utilizes the 802.11a/n/ac architecture, with a nominal channel bandwidth of 20/40/80 MHz.

The Master Device is a Cisco WAP371 802.11a/b/g/n/ac WLAN Access Point,  
FCC ID: N89-WAP371

Threshold level is lower than the required level hence it provides margin to the limit.

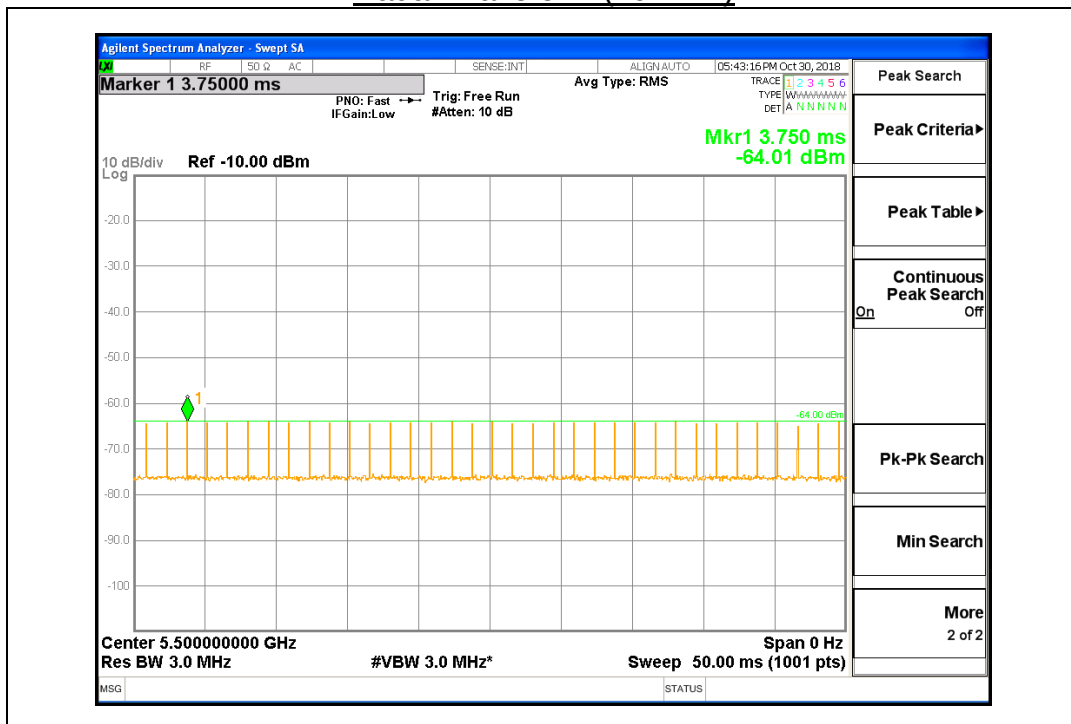
## 3.4 Test Results

### 3.4.1 Test Channel

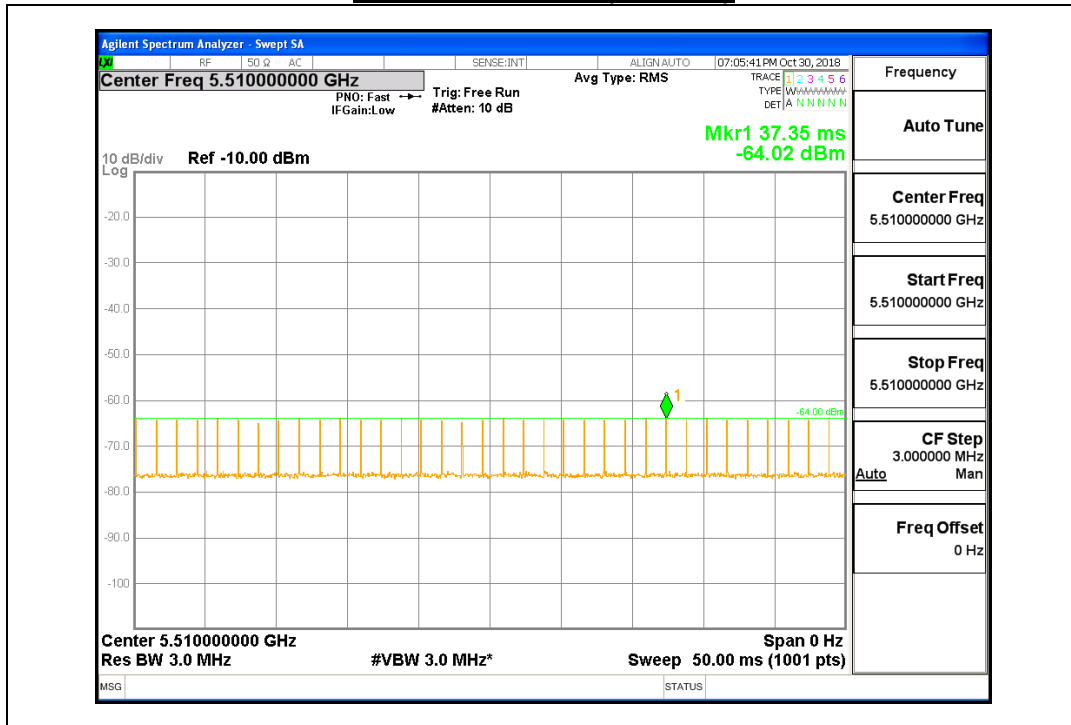
All test were performed at a channel center frequency of 5500 MHz for 20 MHz Bandwidth.  
All test were performed at a channel center frequency of 5510 MHz for 40 MHz Bandwidth.  
All test were performed at a channel center frequency of 5530 MHz for 80 MHz Bandwidth.

### 3.4.2 Radar waveform, Traffic and Dwell time per bin

Radar Waveform (20 MHz)



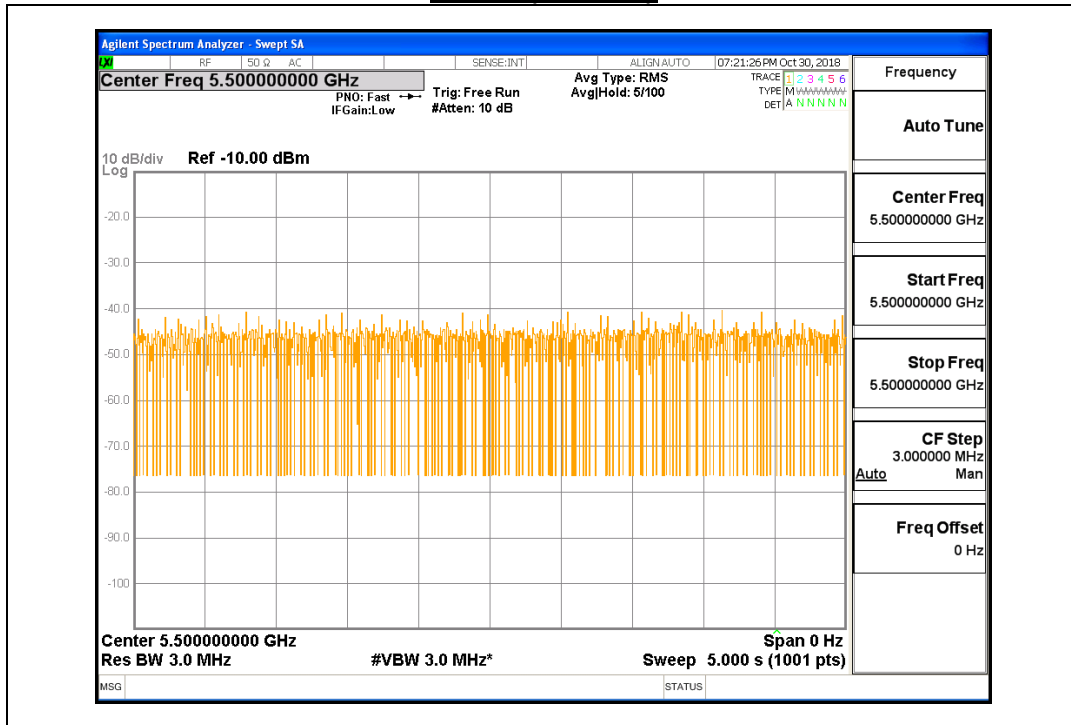
### Radar Waveform (40 MHz)



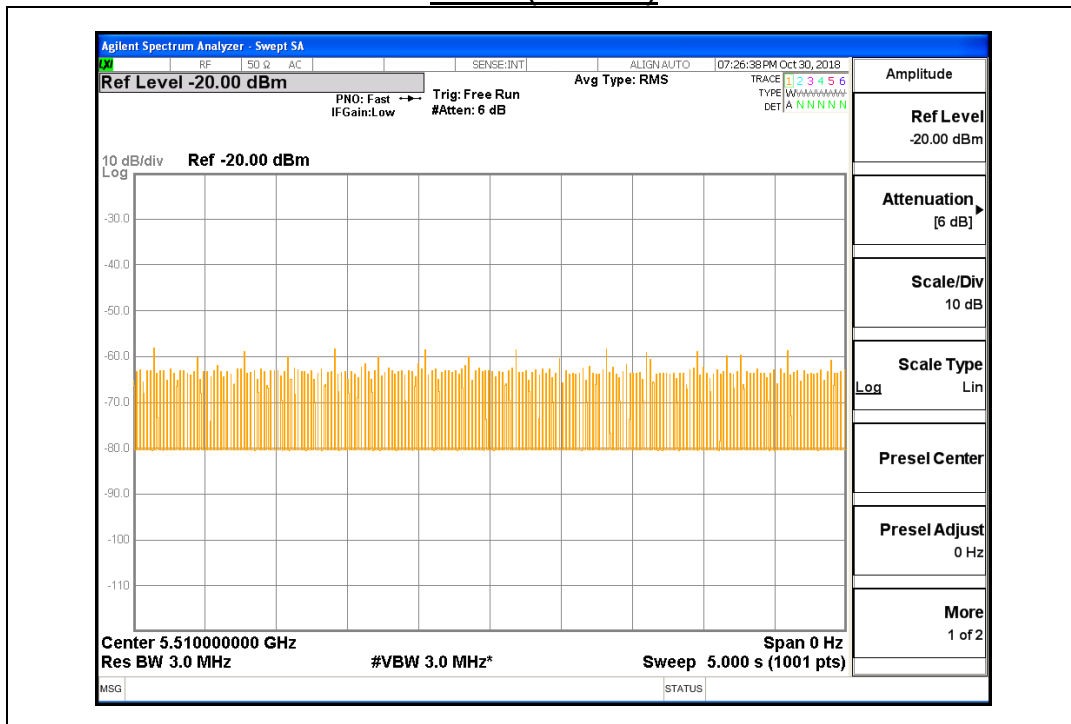
### Radar Waveform (80 MHz)



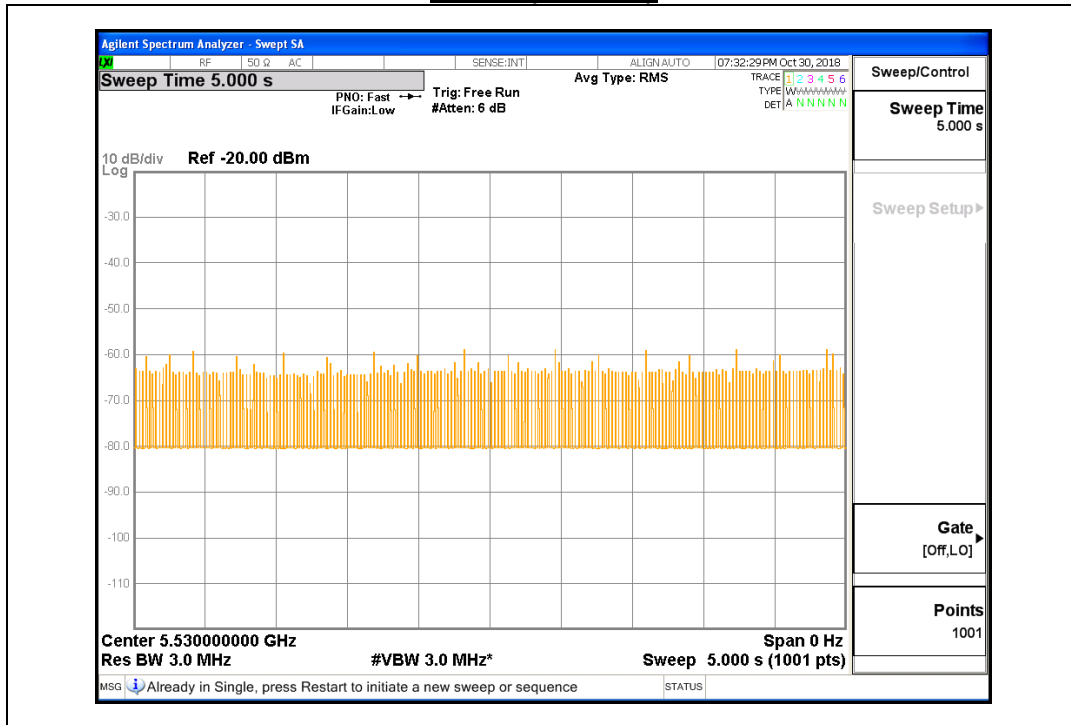
### Traffic (20 MHz)



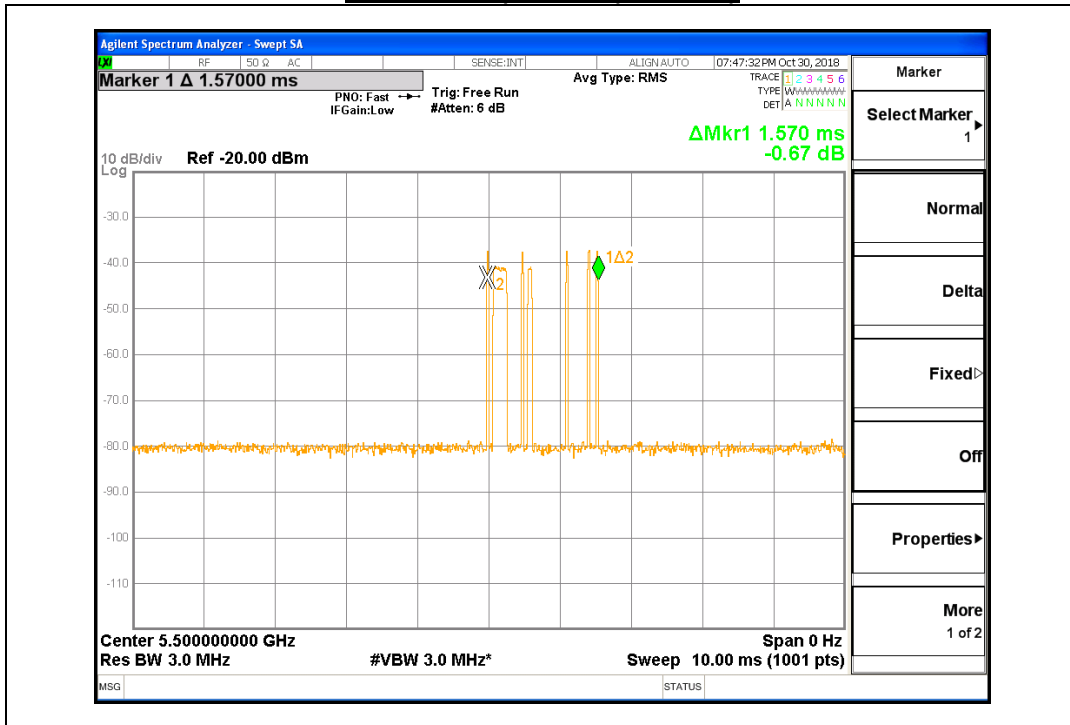
### Traffic (40 MHz)



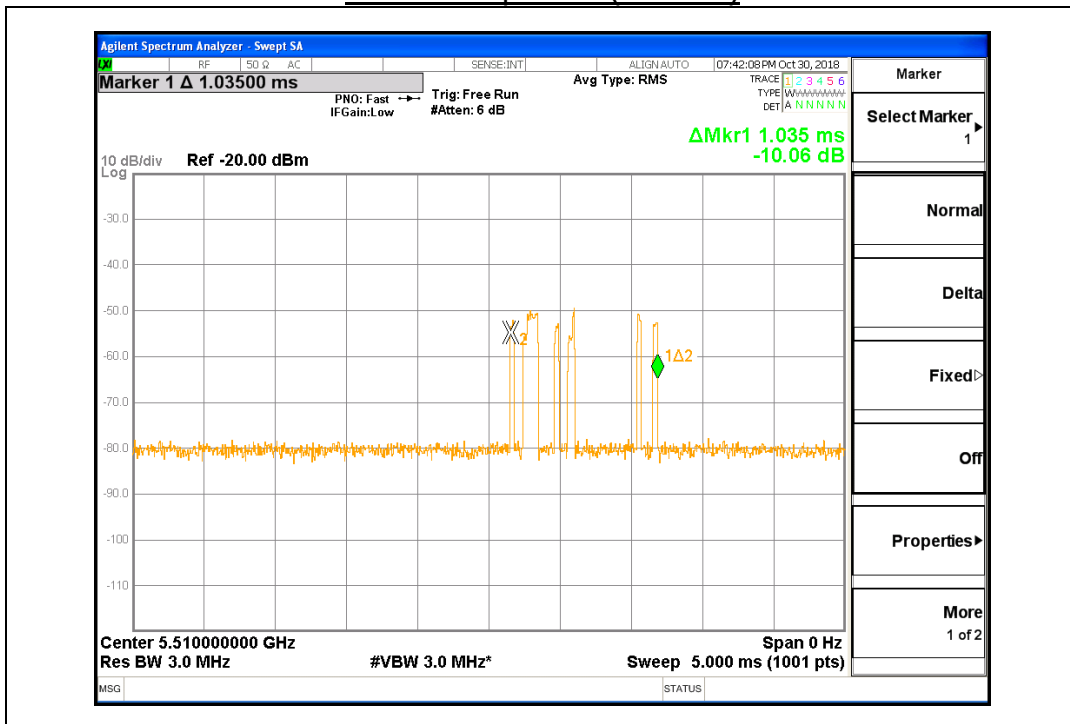
### Traffic (80 MHz)



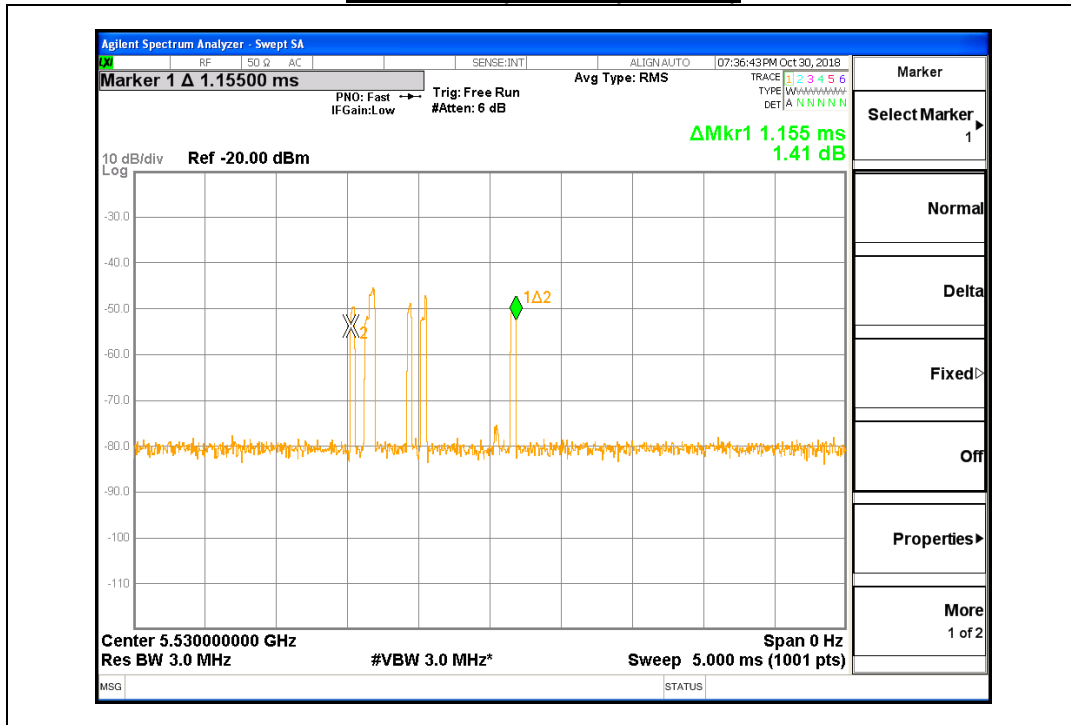
### Dwell time per bin (20 MHz)



### Dwell time per bin (40 MHz)



### Dwell time per bin (80 MHz)



|                                                                                                                                                                          |                                                                                                                                               |                                                         |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|--|
| <br>CTK Co., Ltd.<br><small>The Prime Leader of Global Regulatory Certification</small> | <b>CTK Co., Ltd.</b><br>(Ho-dong), 113, Yejik-ro, Cheoin-gu,<br>Yongin-si, Gyeonggi-do, Korea<br>Tel: +82-31-339-9970<br>Fax: +82-31-624-9501 | Report No.:<br>CTK-2018-03454<br>Page (20) / (26) Pages |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|--|

### 3.4.3 Channel move time and Channel closing Transmission time

#### REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse.

This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =

(Number of analyzer bins showing transmission) \* (dwell time per bin)

The observation period over which the aggregate time is calculated Begins at

(Reference Marker + 200 msec) and Ends no earlier than (Reference Marker + 10 sec).

## Test Results

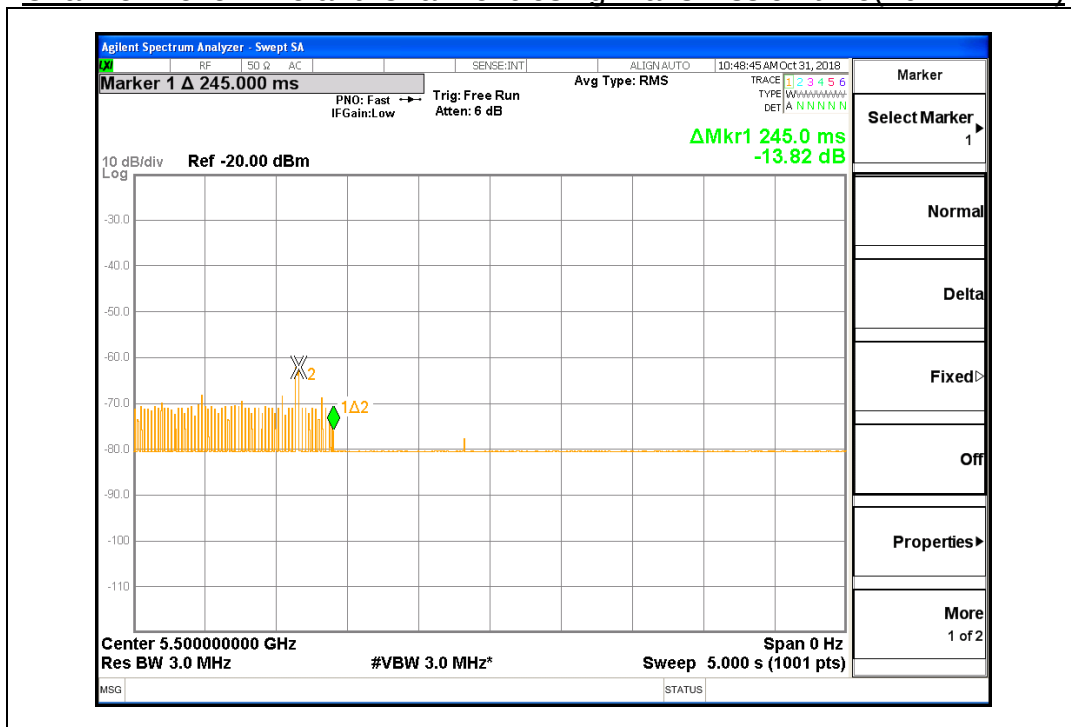
<Bandwidth 20 MHz Mode>

| Channel Move Time (sec) | Limit (sec) |
|-------------------------|-------------|
| 0.25                    | 10          |

| Channel Closing Transmission Time (msec) | Limit (msec) |
|------------------------------------------|--------------|
| 14.13                                    | 260          |

### Channel Move Time and Channel closing Transmission time(20 MHz BW)

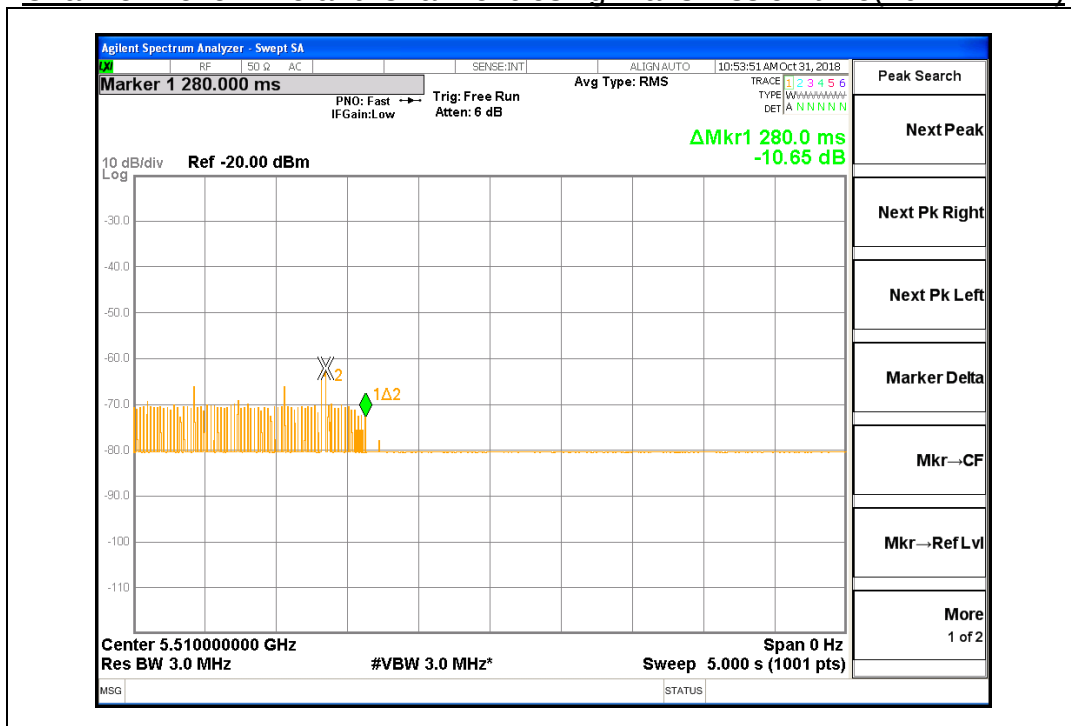


| Channel Closing Transmission Time calculated | Test results |
|----------------------------------------------|--------------|
| Sampling bins                                | 9            |
| Dwell time per bin (msec)                    | 1.57         |
| Closing Transmission Time (msec)             | 14.13        |

<Bandwidth 40 MHz Mode>

| Channel Move Time (sec)                  | Limit (sec)  |
|------------------------------------------|--------------|
| 0.28                                     | 10           |
| Channel Closing Transmission Time (msec) | Limit (msec) |
| 11.44                                    | 260          |

Channel Move Time and Channel closing Transmission time(40 MHz BW)

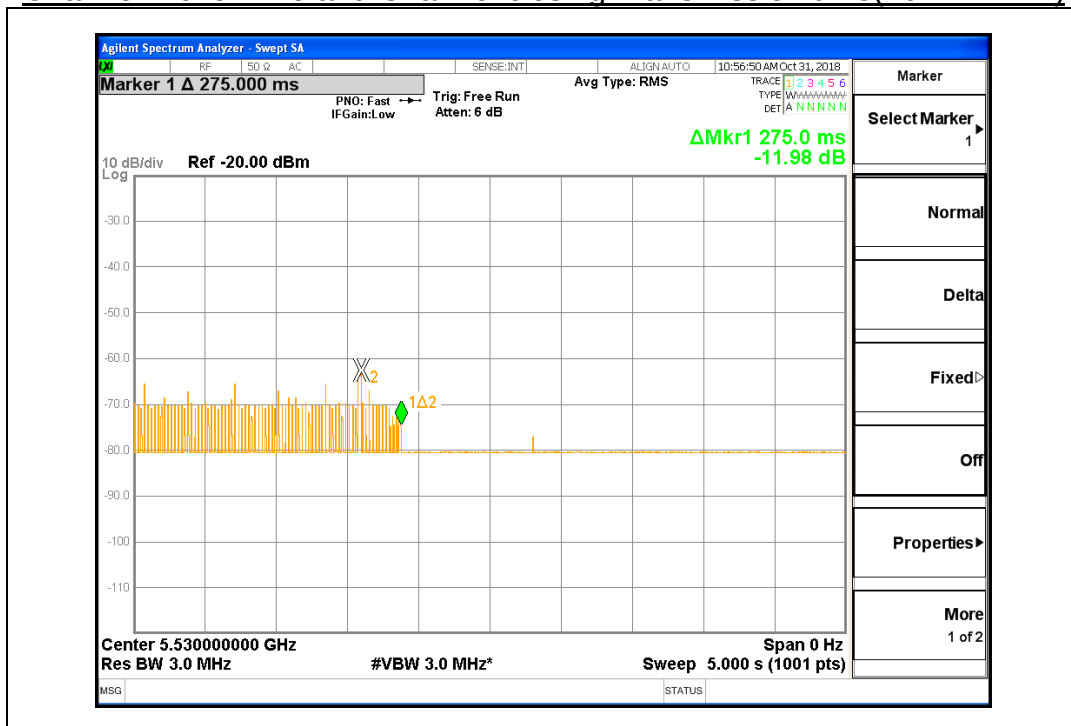


| Channel Closing Transmission Time calculated | Test results |
|----------------------------------------------|--------------|
| Sampling bins                                | 11           |
| Dwell time per bin (msec)                    | 1.04         |
| Closing Transmission Time (msec)             | 11.44        |

<Bandwidth 80 MHz Mode>

| Channel Move Time (sec)                  | Limit (sec)  |
|------------------------------------------|--------------|
| 0.28                                     | 10           |
| Channel Closing Transmission Time (msec) | Limit (msec) |
| 12.76                                    | 260          |

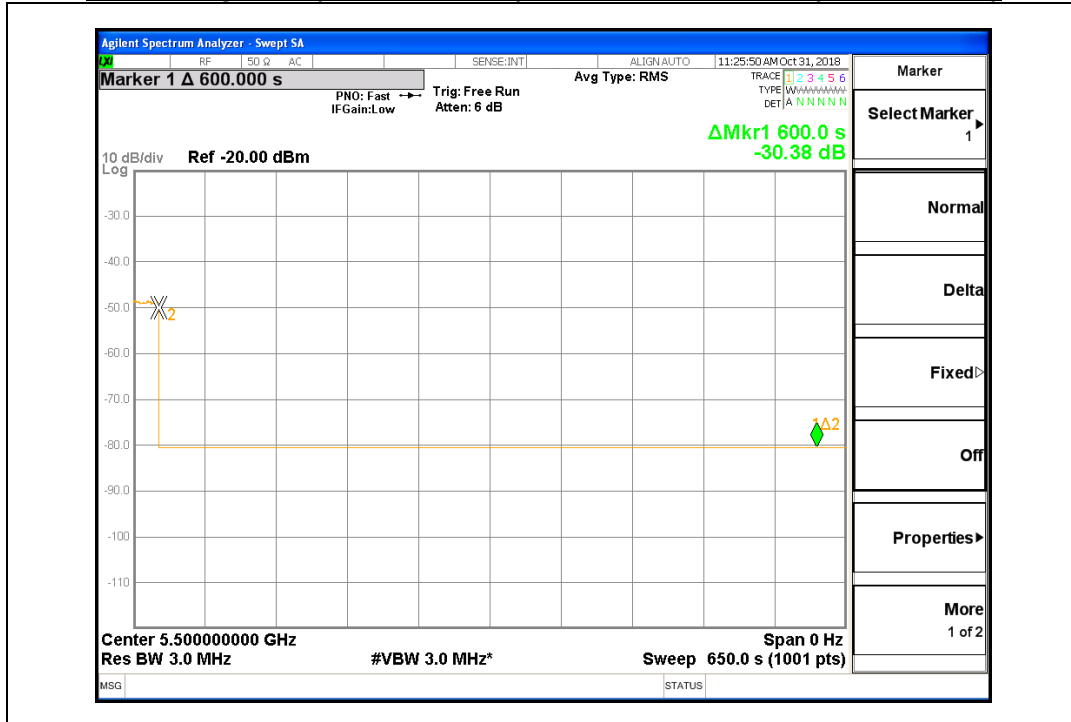
Channel Move Time and Channel closing Transmission time(40 MHz BW)



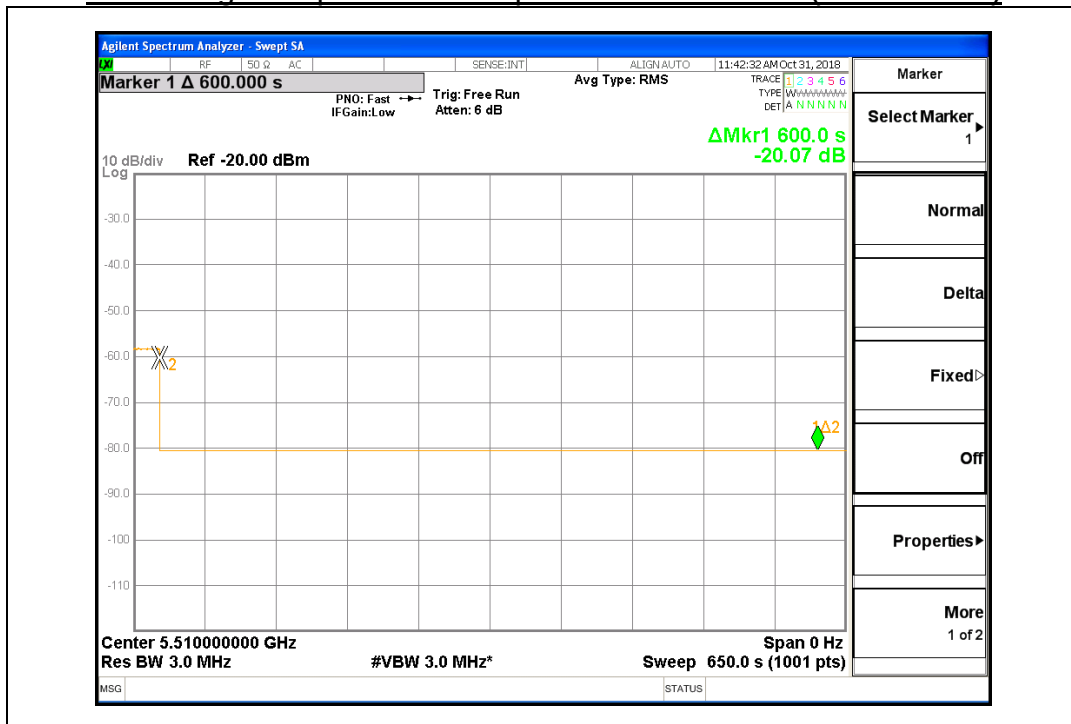
| Channel Closing Transmission Time calculated | Test results |
|----------------------------------------------|--------------|
| Sampling bins                                | 11           |
| Dwell time per bin (msec)                    | 1.16         |
| Closing Transmission Time (msec)             | 12.76        |

### 3.4.4 Client beacon test

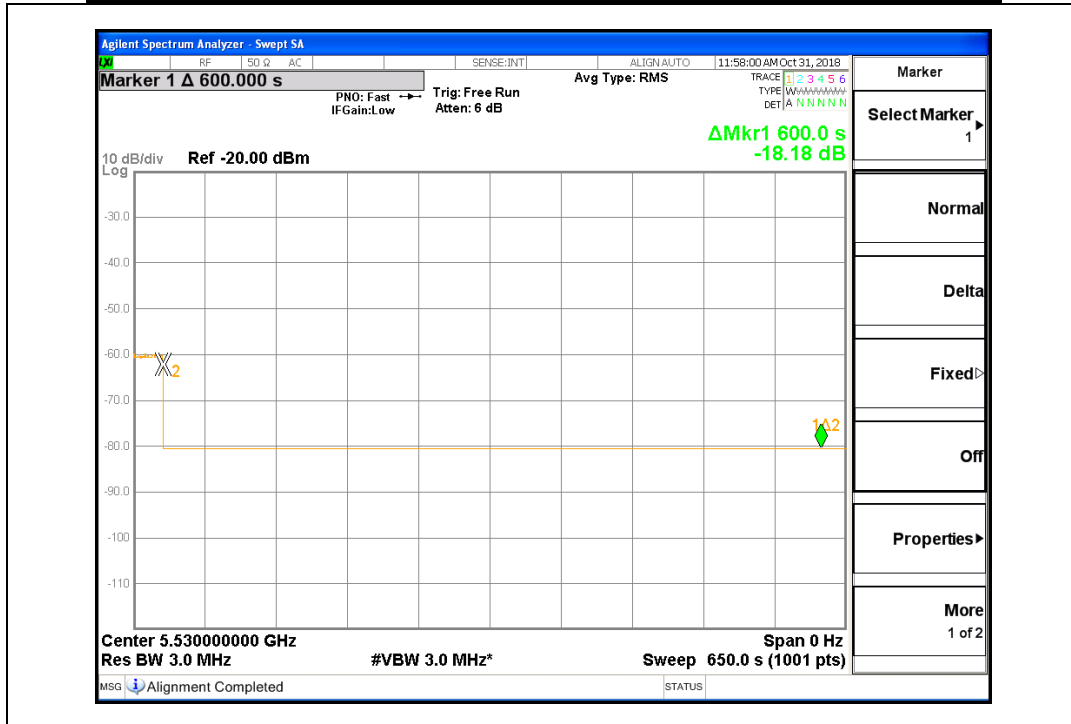
#### Monitoring live spectrum – Elapse time 10 minutes (20 MHz BW)



#### Monitoring live spectrum – Elapse time 10 minutes (40 MHz BW)



### Monitoring live spectrum – Elapse time 10 minutes (80 MHz BW)





**CTK Co., Ltd.**  
(Ho-dong), 113, Yejik-ro, Cheoin-gu,  
Yongin-si, Gyeonggi-do, Korea  
Tel: +82-31-339-9970  
Fax: +82-31-624-9501

Report No.:  
CTK-2018-03454  
Page (26) / (26) Pages

## APPENDIX A – Test Equipment Used For Tests

|   | Name of Equipment           | Manufacturer    | Model No. | Serial No. | Cal Date   | Due Date   |
|---|-----------------------------|-----------------|-----------|------------|------------|------------|
| 1 | Signal Analyzer             | Agilent         | N9020A    | MY48011598 | 2018-10-25 | 2019-10-25 |
| 2 | Signal Generator            | Rohde & Schwarz | SMB100A   | 175528     | 2018-10-24 | 2019-10-24 |
| 3 | Vector Signal Generator     | Rohde & Schwarz | SMBV100A  | 258008     | 2018-01-26 | 2019-01-26 |
| 4 | DUAL DIRECTIONAL<br>COUPLER | HP              | 11692D    | 1212A03629 | 2018-10-24 | 2019-10-24 |