

**FCC 47 CFR PART 15 SUBPART E**

**DFS TEST REPORT**

*For*

Tablet PC

MODEL No.: MS-NB32

FCC ID: I4L-MSNB32

Trade Mark: MSI

REPORT NO.: ES180718002W05

ISSUE DATE: December 01, 2018

*Prepared for*

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*Prepared by*

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**1. TEST RESULT CERTIFICATION**

|                      |   |
|----------------------|---|
| Applicant:           | Micro-Star International Co., Ltd.<br>No., 69, Lide St., Zhonghe Dist., New Taipei City, Taiwan       |
| Manufacturer:        | MSI Electronics (Kunshan) Co., Ltd.<br>No.88 East Qianjin Road, Kunshan city, Jiangsu province, China |
| Product Description: | Tablet PC   |
| Model Number:        | MS-NB32   |
| Trade Mark:          | MSI   |

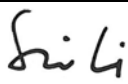
Measurement Procedure Used:


| APPLICABLE STANDARDS                       |             |
|--|-------------|
| STANDARD                                   | TEST RESULT |
| FCC 06-96<br>FCC 47 CFR Part 15, Subpart E | PASS        |

The above equipment was tested by EMTEK(SHENZHEN) CO., LTD.. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 2 and Part 15.407.

The test results of this report relate only to the tested sample identified in this report.

Date of Test : July 18, 2018 to August 27, 2018

Prepared by :   
Sevin Li/Editor

Reviewer :   
Joe Xia/Supervisor

Approve & Authorized Signer :   
Lisa Wang/Manager



**2. EUT DESCRIPTION**

| Characteristics  | Description  |                           |                      |                      |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
|--|--|---------------------------|----------------------|----------------------|--------------------|-------------|---------------------------|-----------|---|-------------------------|-----------|---|------------------|------|---|----------------|---------------------------|-----------|---|-------------------------|-----------|---|------------------|------|---|----------------|---------------------------|-----------|----|-------------------------|-----------|---|------------------|-----------|---|---------------|---------------------------|-----------|---|-------------------------|-----------|---|------------------|------|---|
| <b>Device style</b>                                    | 5G WIFI (Slave equipment without radar detection function)   |                           |                      |                      |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
| <b>IEEE 802.11 WLAN Mode Supported</b>                 | <input checked="" type="checkbox"/> 802.11a(20MHz channel bandwidth)<br><input checked="" type="checkbox"/> 802.11n(20MHz channel bandwidth)<br><input checked="" type="checkbox"/> 802.11n(40MHz channel bandwidth)<br><input checked="" type="checkbox"/> 802.11ac(20MHz channel bandwidth)<br><input checked="" type="checkbox"/> 802.11ac(40MHz channel bandwidth)<br><input checked="" type="checkbox"/> 802.11ac(80MHz channel bandwidth)  |                           |                      |                      |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
| <b>Data Rate</b>                                       | WIFI:<br>802.11 a:6,9,12,18,24,36,48,54Mbps;<br>802.11n(HT20)/ac(HT20): MCS0-MCS15;<br>802.11n(HT40): MCS0-MCS15;<br>802.11ac(HT40):MCS0-MCS15;<br>802.11ac(VHT80):MCS0-MCS15;   |                           |                      |                      |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
| <b>Modulation</b>                                      | WIFI:<br>OFDM with BPSK/QPSK/16QAM/64QAM/25QAM for 802.11a/g/n;<br>DSSS with DBPSK/DQPSK/CCK for 802.11b;  |                           |                      |                      |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
| <b>Operating Frequency Rang</b>                        | <table border="1"> <thead> <tr> <th>WIFI 5G Band</th> <th>Mode</th> <th>Frequency Range(MHz)</th> <th>Number of channels</th> </tr> </thead> <tbody> <tr> <td rowspan="3">UNII Band I</td> <td>802.11a/n(HT20)/ac(VHT20)</td> <td>5180-5240</td> <td>4</td> </tr> <tr> <td>802.11n(HT40)/ac(VHT40)</td> <td>5190-5230</td> <td>2</td> </tr> <tr> <td>802.11 ac(VHT80)</td> <td>5210</td> <td>1</td> </tr> <tr> <td rowspan="3">UNII Band II-A</td> <td>802.11a/n(HT20)/ac(VHT20)</td> <td>5260-5320</td> <td>4</td> </tr> <tr> <td>802.11n(HT40)/ac(VHT40)</td> <td>5270-5310</td> <td>2</td> </tr> <tr> <td>802.11 ac(VHT80)</td> <td>5290</td> <td>1</td> </tr> <tr> <td rowspan="3">UNII Band II-C</td> <td>802.11a/n(HT20)/ac(VHT20)</td> <td>5500-5700</td> <td>11</td> </tr> <tr> <td>802.11n(HT40)/ac(VHT40)</td> <td>5510-5670</td> <td>5</td> </tr> <tr> <td>802.11 ac(VHT80)</td> <td>5530-5610</td> <td>2</td> </tr> <tr> <td rowspan="3">UNII Band III</td> <td>802.11a/n(HT20)/ac(VHT20)</td> <td>5745-5825</td> <td>5</td> </tr> <tr> <td>802.11n(HT40)/ac(VHT40)</td> <td>5755-5795</td> <td>2</td> </tr> <tr> <td>802.11 ac(VHT80)</td> <td>5775</td> <td>1</td> </tr> </tbody> </table> | WIFI 5G Band              | Mode                 | Frequency Range(MHz) | Number of channels | UNII Band I | 802.11a/n(HT20)/ac(VHT20) | 5180-5240 | 4 | 802.11n(HT40)/ac(VHT40) | 5190-5230 | 2 | 802.11 ac(VHT80) | 5210 | 1 | UNII Band II-A | 802.11a/n(HT20)/ac(VHT20) | 5260-5320 | 4 | 802.11n(HT40)/ac(VHT40) | 5270-5310 | 2 | 802.11 ac(VHT80) | 5290 | 1 | UNII Band II-C | 802.11a/n(HT20)/ac(VHT20) | 5500-5700 | 11 | 802.11n(HT40)/ac(VHT40) | 5510-5670 | 5 | 802.11 ac(VHT80) | 5530-5610 | 2 | UNII Band III | 802.11a/n(HT20)/ac(VHT20) | 5745-5825 | 5 | 802.11n(HT40)/ac(VHT40) | 5755-5795 | 2 | 802.11 ac(VHT80) | 5775 | 1 |
|  | WIFI 5G Band   | Mode                      | Frequency Range(MHz) | Number of channels   |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
|  | UNII Band I  | 802.11a/n(HT20)/ac(VHT20) | 5180-5240            | 4                    |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
|  |  | 802.11n(HT40)/ac(VHT40)   | 5190-5230            | 2                    |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
|  |  | 802.11 ac(VHT80)          | 5210                 | 1                    |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
|  | UNII Band II-A   | 802.11a/n(HT20)/ac(VHT20) | 5260-5320            | 4                    |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
|  |  | 802.11n(HT40)/ac(VHT40)   | 5270-5310            | 2                    |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
|  |  | 802.11 ac(VHT80)          | 5290                 | 1                    |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
|  | UNII Band II-C   | 802.11a/n(HT20)/ac(VHT20) | 5500-5700            | 11                   |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
|  |  | 802.11n(HT40)/ac(VHT40)   | 5510-5670            | 5                    |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
| 802.11 ac(VHT80)                                       |  | 5530-5610                 | 2                    |                      |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
| UNII Band III  | 802.11a/n(HT20)/ac(VHT20)  | 5745-5825                 | 5                    |                      |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
|  | 802.11n(HT40)/ac(VHT40)  | 5755-5795                 | 2                    |                      |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
|  | 802.11 ac(VHT80)   | 5775                      | 1                    |                      |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
| For DFS frequency band: UNII Band II-A. UNII Band II-C |  |                           |                      |                      |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
| <b>Antenna Type</b>                                    | FPC Antenna<br>Two antenna for WIFI  |                           |                      |                      |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
| <b>Smart system</b>                                    | <input checked="" type="checkbox"/> SISO <span style="margin-left: 200px;"><input checked="" type="checkbox"/>MIMO</span>  |                           |                      |                      |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |
| <b>Antenna Gain</b>                                    | Antenna 0<br>5150-5350: 2.77dBi<br>5500-5700: 2.35dBi<br>5725-5850: 1.81dBi<br>Antenna 1<br>5150-5350: 1.40dBi<br>5500-5700: 1.50dBi   |                           |                      |                      |                    |             |                           |           |   |                         |           |   |                  |      |   |                |                           |           |   |                         |           |   |                  |      |   |                |                           |           |    |                         |           |   |                  |           |   |               |                           |           |   |                         |           |   |                  |      |   |

|                             |  |
|-----------------------------|--|
|                             | 5725-5850: 1.70dBi   |
| <b>Direction Gain</b>       | 5150-5350: 5.15dBi<br>5500-5700: 4.96dBi<br>5725-5850: 4.77dBi   |
| <b>Power supply</b>         | <input checked="" type="checkbox"/> DC 3.7V internal rechargeable lithium battery<br><input checked="" type="checkbox"/> DC 19V from Adapter |
|                             | <input checked="" type="checkbox"/> Adapter:<br>Model: ADP-65JH HB<br>INPUT: 100-240V~ 1.5A 50-60Hz<br>OUTPUT: DC 19V, 3.42A                 |
| <b>Battery information:</b> | Rating: DC 3.7V, 11850mAh, 43.845Wh  |

**Note:** for more details, please refer to the User's manual of the EUT.

**3. SUMMARY OF TEST RESULT**

| FCC Part Clause   | Test Parameter              | Verdict | Remark |
|---|-----------------------------|---------|--------|
| 15.407 (h) (i) (j)  | Dynamic Frequency Selection | PASS    |        |
| <p>NOTE1: N/A (Not Applicable)</p> <p>NOTE2: According to FCC OET KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02, In addition, the radiated test is also performed to ensure the emissions emanating from the device cabinet also comply with the applicable limits.</p> |                             |         |        |

#### 4. TEST METHODOLOGY

##### 4.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:  
 FCC 06-96  
 FCC 47 CFR Part 15, Subpart E  
 FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02

##### 4.2 MEASUREMENT EQUIPMENT USED

| EQUIPMENT TYPE          | MFR     | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | Due Cal.   |
|-------------------------|---------|--------------|---------------|------------|------------|
| Vector Signal Generator | Agilent | N5182B       | My53050553    | 05/19/2018 | 05/18/2019 |
| Analog Signal Generator | Agilent | N5171B       | My53050878    | 05/19/2018 | 05/18/2019 |
| Signal Analyzer         | Agilent | N9010A       | My53470879    | 05/19/2018 | 05/18/2019 |
| Power Analyzer          | Agilent | PS-X10-100   | N/A           | 05/19/2018 | 05/18/2019 |
| Test Accessories        | Agilent | PS-X10-100   | N/A           | 05/19/2018 | 05/18/2019 |

**Remark:** Each piece of equipment is scheduled for calibration once a year.

##### 4.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Those data rates (802.11a: 6 Mbps; 802.11n (HT20): MCS0; 802.11n (HT20): MCS7; 802.11n (HT40): MCS0; 802.11n (HT40): MCS7; 802.11ac (HT20): MCS0; 802.11ac (HT20): MCS7; 802.11ac (HT40): MCS0; 802.11ac (HT40): MCS7; 802.11ac (HT80): MCS0; 802.11ac (HT80): MCS7;) were used for all test.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Wifi 5G with UNII Band II-A

Frequency and Channel list for 802.11a/n(HT20)/ac(VHT20):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|
| 52      | 5260            | 60      | 5300            |         |                 |
| 56      | 5280            | 64      | 5320            |         |                 |

Frequency and Channel list for 802.11n(VHT40)/ac(VHT40):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|
| 54      | 5270            |         |                 |         |                 |
| 62      | 5310            |         |                 |         |                 |

Frequency and Channel list for 802.11ac(VHT80):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|
| 58      | 5290            |         |                 |         |                 |
|         |                 |         |                 |         |                 |

**Test** Frequency and Channel for 802.11a/n(HT20)/ac(VHT20):

| Lowest Frequency |                 | Middle Frequency |                 | Highest Frequency |                 |
|------------------|-----------------|------------------|-----------------|-------------------|-----------------|
| Channel          | Frequency (MHz) | Channel          | Frequency (MHz) | Channel           | Frequency (MHz) |
| 52               | 5260            | 56               | 5280            | 64                | 5320            |

**Test** Frequency and channel for 802.11n(HT40)/ac(VHT40):

| Lowest Frequency |                 | Middle Frequency |                 | Highest Frequency |                 |
|------------------|-----------------|------------------|-----------------|-------------------|-----------------|
| Channel          | Frequency (MHz) | Channel          | Frequency (MHz) | Channel           | Frequency (MHz) |
| 54               | 5270            | N/A              | N/A             | 62                | 5310            |

**Test** Frequency and channel for 802.11ac(VHT80):

| Lowest Frequency |                 | Middle Frequency |                 | Highest Frequency |                 |
|------------------|-----------------|------------------|-----------------|-------------------|-----------------|
| Channel          | Frequency (MHz) | Channel          | Frequency (MHz) | Channel           | Frequency (MHz) |
| 58               | 5290            | N/A              | N/A             | N/A               | N/A             |



Wifi 5G with UNII Band II-C

Frequency and Channel list for 802.11a/n(HT20)/ac(VHT20):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|
| 100     | 5500            | 116     | 5580            | 132     | 5660            |
| 104     | 5520            | 120     | 5600            | 136     | 5680            |
| 108     | 5540            | 124     | 5620            | 140     | 5700            |
| 112     | 5560            | 128     | 5640            |         |                 |

Frequency and Channel list for 802.11n(VHT40)/ac(VHT40):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|
| 102     | 5510            | 126     | 5630            |         |                 |
| 110     | 5550            | 134     | 5670            |         |                 |
| 118     | 5590            |         |                 |         |                 |

Frequency and Channel list for 802.11ac(VHT80):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|
| 106     | 5530            |         |                 |         |                 |
| 122     | 5610            |         |                 |         |                 |

**Test** Frequency and Channel for 802.11a/n(HT20)/ac(VHT20):

| Lowest Frequency |                 | Middle Frequency |                 | Highest Frequency |                 |
|------------------|-----------------|------------------|-----------------|-------------------|-----------------|
| Channel          | Frequency (MHz) | Channel          | Frequency (MHz) | Channel           | Frequency (MHz) |
| 100              | 5500            | 120              | 5600            | 140               | 5700            |

**Test** Frequency and channel for 802.11n(VHT40)/ac(VHT40):

| Lowest Frequency |                 | Middle Frequency |                 | Highest Frequency |                 |
|------------------|-----------------|------------------|-----------------|-------------------|-----------------|
| Channel          | Frequency (MHz) | Channel          | Frequency (MHz) | Channel           | Frequency (MHz) |
| 102              | 5510            | 118              | 5590            | 134               | 5670            |

**Test** Frequency and channel for 802.11ac(VHT80):

| Lowest Frequency |                 | Middle Frequency |                 | Highest Frequency |                 |
|------------------|-----------------|------------------|-----------------|-------------------|-----------------|
| Channel          | Frequency (MHz) | Channel          | Frequency (MHz) | Channel           | Frequency (MHz) |
| 106              | 5530            | N/A              | N/A             | 122               | 5610            |

## 5. FACILITIES AND ACCREDITATIONS

### 5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

Bldg 69, Majialong Industry Zone District, Nanshan District, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

### 5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### 5.3 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

EMC Lab.

: Accredited by CNAS, 2016.10.24

The certificate is valid until 2022.10.28

The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2005)

The Certificate Registration Number is L2291.

Accredited by TUV Rheinland Shenzhen 2015.4

The Laboratory has been assessed according to the requirements ISO/IEC 17025.

Accredited by FCC, August 06, 2018

The certificate is valid until August 07, 2020

Designation Number: CN1204

Test Firm Registration Number: 882943

Accredited by Industry Canada, November 09, 2018

The Conformity Assessment Body Identifier is CN0008.

Name of Firm

: EMTEK(SHENZHEN) CO., LTD.

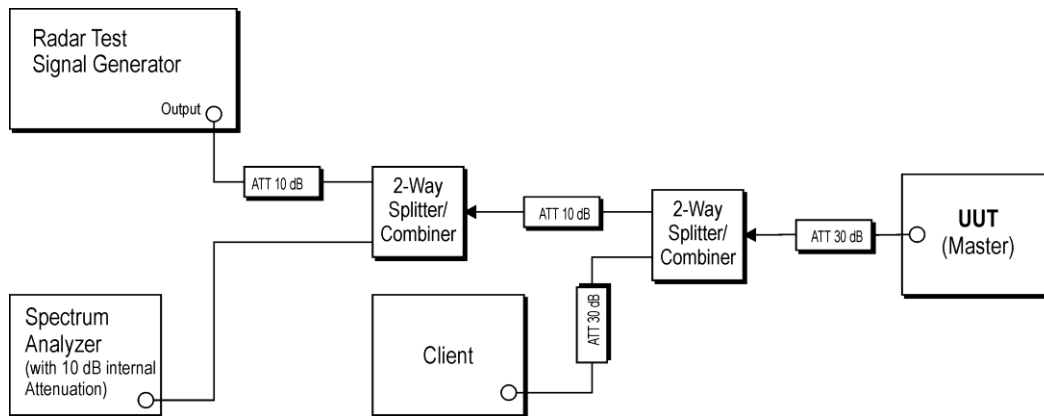
Site Location

: Bldg 69, Majialong Industry Zone,  
Nanshan District, Shenzhen, Guangdong, China

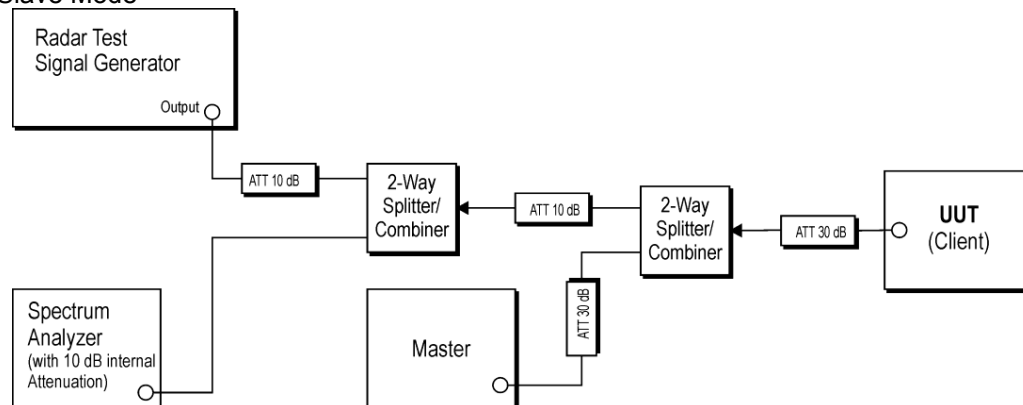
## 6. SETUP OF EQUIPMENT UNDER TEST

### 6.1 SETUP CONFIGURATION OF EUT

#### Master Modes



#### Slave Mode



### 6.2 CALIBRATION OF DFS DETECTION THRESHOLD LEVEL:

A 50 ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected in place of the master device and the signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of  $-62$  dBm as measured on the spectrum analyzer. Without changing any of the instrument settings, the spectrum analyzer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. Measure the amplitude and calculate the difference from  $-62$  dBm. Adjust the Reference Level Offset of the spectrum analyzer to this difference. The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of  $-62$  dBm and the spectrum analyzer will still indicate the level as received by the Master Device. Set the signal generator to produce a radar waveform, trigger a burst manually and measure the level on the spectrum analyzer. Readjust the amplitude of the signal generator as required so that the peak level of the waveform is at a displayed level equal to the required or desired interference detection threshold. Separate signal generator amplitude settings are determined as required for each radar type.

**6.3 SUPPORT EQUIPMENT**

| Item | Equipment             | Mfr/Brand | Model/Type No.    | Series No.  | Note                                 |
|------|-----------------------|-----------|-------------------|-------------|--------------------------------------|
| 1.   | Wireless Access Point | Cisco     | AIR-CAP3702E-A-K9 | FTX182276QD | FCC ID: LDK102087<br>IC:2461B-102087 |
|      |                       |           |                   |             |                                      |
|      |                       |           |                   |             |                                      |

Note: Software for transferring data between master and slave devices is TFGEN-1.00

**Notes:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

## 7. DYNAMIC FREQUENCY SELECTION REQUIREMENTS

### 7.1 APPLICABLE STANDARD

According to 15.407

### 7.2 CONFORMANCE LIMIT

The dynamic frequency selection requirement

| Parameter  | Value   |
|--|---|
| Non-occupancy period   | Minimum 30 minutes  |
| Channel Availability Check Time  | 60 seconds  |
| Channel Move Time  | 10 seconds<br>See Note 1.   |
| Channel Closing Transmission Time  | 200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period.<br>See Notes 1 and 2. |
| U-NII Detection Bandwidth  | Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 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> |   |

The following table lists the DFS The detection threshold values

| Maximum Transmit Power  | Value<br>(See Notes 1, 2, and 3) |
|---|----------------------------------|
| EIRP $\geq$ 200 milliwatt   | -64 dBm                          |
| EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz  | -62 dBm                          |
| EIRP < 200 milliwatt that do not meet the power spectral density 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> |                                  |

### 7.3 TEST CONFIGURATION

Conducted measurements shall be used for DFS test

**7.4 TEST PARAMETERS OF DFS TEST SIGNAL**

The following table lists the parameters of radar test signals

**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 $\left\{ \begin{matrix} \left( \frac{1}{360} \right) \cdot \\ \left( \frac{19 \cdot 10^6}{PRI_{\mu sec}} \right) \end{matrix} \right\}$ | 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. |                    |   |   |  |                          |

**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                       |

**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                       |

**7.5 TRANSMITTER OUTPUT POWER**

25°C

**Humidity:**

55 % RH

| Band            | Max Power              |                    |
|-----------------|------------------------|--------------------|
|                 | Conducted Output Power | E.I.R.P            |
| 5250MHz-5350MHz | 16.41dBm(43.76mW)      | 21.56dBm(143.25mW) |
| 5470MHz-5725MHz | 17.35dBm(54.30mW)      | 22.30dBm(170.14mW) |

## 7.6 OPERATION MODES AND REQUIREMENT TEST ITEMS

The manufacture shall state whether the EUT is capable of operating as a Master or a Slave modes,if the EUT is capable of operating in more than one operational mode then every operating mode shall be assessed separately.

Applicability of DFS Requirements Prior to Use of a Channel

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

Applicability of DFS requirements during normal operation

| Requirement                       | Operational Mode |                                |                             |
|-----------------------------------|------------------|--------------------------------|-----------------------------|
|                                   | Master           | Client Without Radar Detection | Client With Radar Detection |
| DFS Detection Threshold           | Yes              | Not required                   | Yes                         |
| Channel Closing Transmission Time | Yes              | Yes                            | Yes                         |
| Channel Move Time                 | Yes              | Yes                            | Yes                         |
| U-NII Detection Bandwidth         | Yes              | Not required                   | Yes                         |

## 7.7 TEST PROCEDURE

According to KDB 905462 D02v02 Section 7.



**8. TEST RESULT**

**8.1 DETAILED TEST RESULTS**

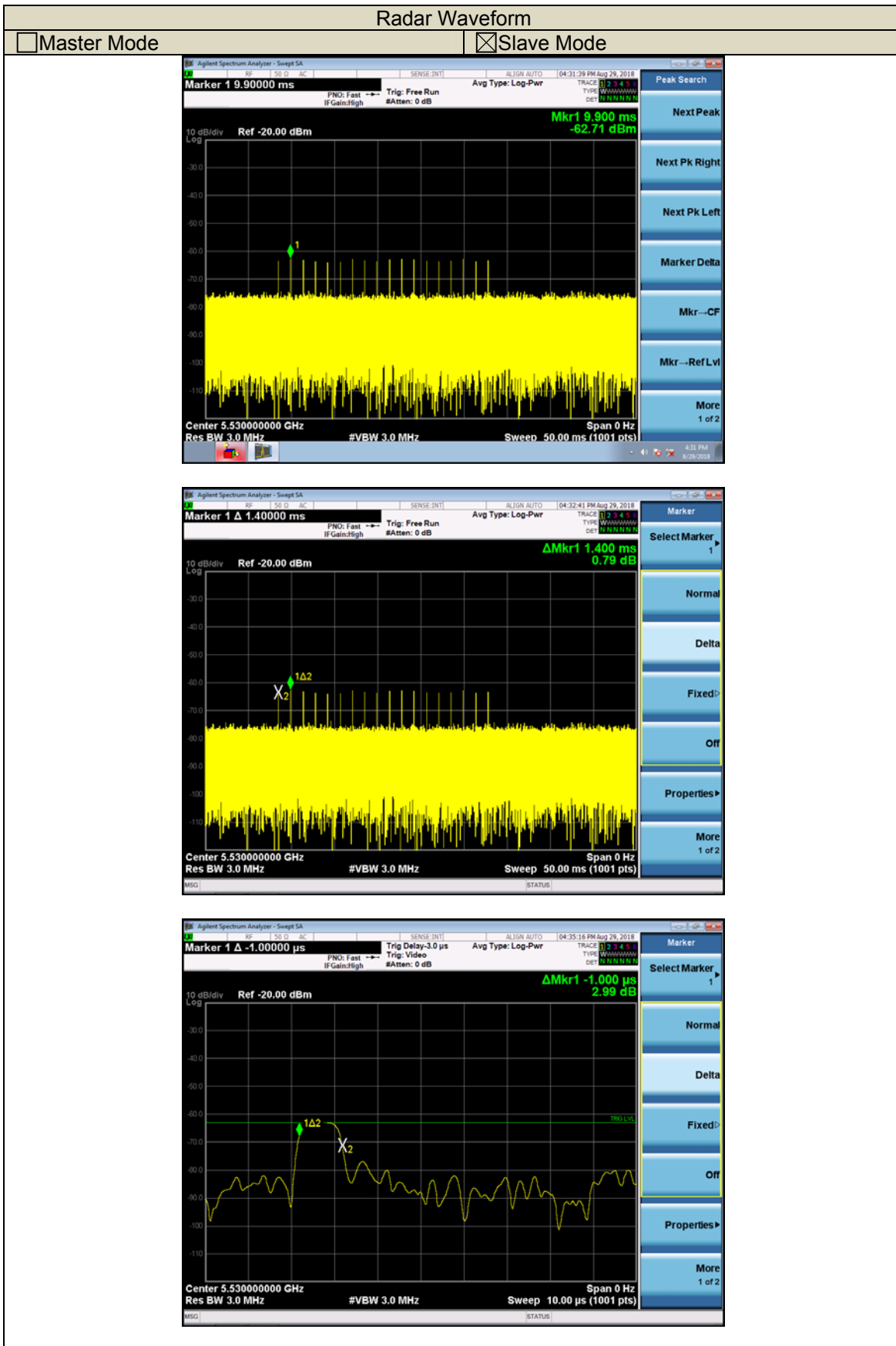
| Clause | MODES                                     | Test Parameter                    | Remark     | Verdict |
|--------|---|-----------------------------------|------------|---------|
| 15.407 | <input type="checkbox"/> Master           | DFS Detection Threshold           | N/A        | N/A     |
| 15.407 |   | Channel Availability Check Time   | N/A        | N/A     |
| 15.407 |   | Channel Move Time                 | N/A        | N/A     |
| 15.407 |   | Channel Closing Transmission Time | N/A        | N/A     |
| 15.407 |   | Non-Occupancy Period              | N/A        | N/A     |
| 15.407 |   | Uniform Spreading                 | N/A        | N/A     |
| 15.407 |   | U-NII Detection Bandwidth         | N/A        | N/A     |
| 15.407 | <input checked="" type="checkbox"/> Slave | Radar Detection Threshold         | N/A        | N/A     |
| 15.407 |   | Channel Move Time                 | Applicable | PASS    |
| 15.407 |   | Channel Closing Transmission Time | Applicable | PASS    |
| 15.407 |   | Non-Occupancy Period              | N/A        | N/A     |
| 15.407 |   | U-NII Detection Bandwidth         | N/A        | N/A     |

## **8.2 RADAR WAVEFORM**

Calibration:

Maximum Transmit Power is less than 200 milliwatt in this report, so detection threshold level is -62dBm.

The 801.11a/n/ac have been tested, and the worst result have been recorded in the below page.



**8.3 IN-SERVICE MONITORING**

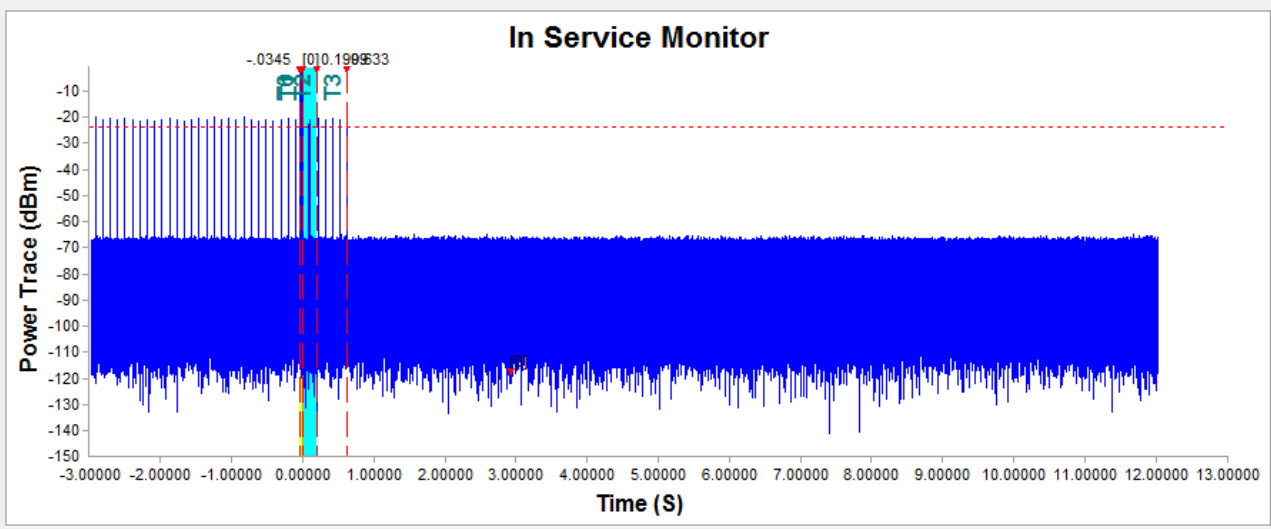
UNII Band II-A

| Radar test signal type 0 |                 |         |                  |                     | Detection(Y/N) |
|--------------------------|-----------------|---------|------------------|---------------------|----------------|
| Trial ID                 | Pulse Width(us) | PRI(us) | Number of Pulses | Waveform Length(us) |                |
| 0                        | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 1                        | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 2                        | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 3                        | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 4                        | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 5                        | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 6                        | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 7                        | 1.0             | 1428.0  | 18               | 25704.0             | N              |
| 8                        | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 9                        | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 10                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 11                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 12                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 13                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 14                       | 1.0             | 1428.0  | 18               | 25704.0             | N              |
| 15                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 16                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 17                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 18                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 19                       | 1.0             | 1428.0  | 18               | 25704.0             | N              |
| 20                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 21                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 22                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 23                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 24                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 25                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 26                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 27                       | 1.0             | 1428.0  | 18               | 25704.0             | N              |
| 28                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 29                       | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| <b>Detection Rate</b>    |                 |         |                  |                     | 86.7%          |

UNII Band II-C

| <b>Radar test singal type 0</b> |                 |         |                  |                     | Detection(Y/N) |
|---------------------------------|-----------------|---------|------------------|---------------------|----------------|
| Trial ID                        | Pulse Width(us) | PRI(us) | Number of Pulses | Waveform Length(us) |                |
| 0                               | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 1                               | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 2                               | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 3                               | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 4                               | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 5                               | 1.0             | 1428.0  | 18               | 25704.0             | N              |
| 6                               | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 7                               | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 8                               | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 9                               | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 10                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 11                              | 1.0             | 1428.0  | 18               | 25704.0             | N              |
| 12                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 13                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 14                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 15                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 16                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 17                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 18                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 19                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 20                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 21                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 22                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 23                              | 1.0             | 1428.0  | 18               | 25704.0             | N              |
| 24                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 25                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 26                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 27                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 28                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| 29                              | 1.0             | 1428.0  | 18               | 25704.0             | Y              |
| <b>Detection Rate</b>           |                 |         |                  |                     | 90%            |

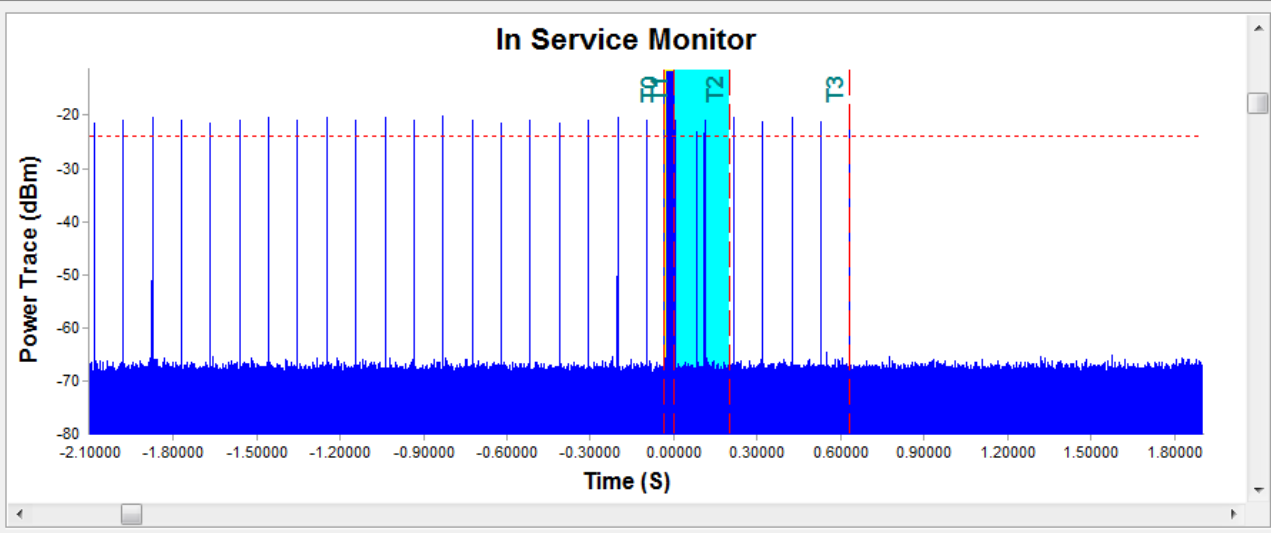
|   |                                      |  |
|---|--------------------------------------|--|
| <b>In-Service Monitoring</b>                            |                                      |  |
| Channel Move Time and Channel Closing Transmission Time | <input type="checkbox"/> Master Mode | <input checked="" type="checkbox"/> Slave Mode |
| Operation Frequency                                     | 5530MHz                              |  |



|  |                                     |                                 |
|--|-------------------------------------|---------------------------------|
| Time Index Info                        |                                     |                                 |
| T0 : -0.0345 S (Radar Injection Start) | Time Per Bin: 0.3749906             | Channel Move Time: 0.6329842 S  |
| T1 : 0.0000 S (Radar Injection Stop)   | T2~T3 Bins Over Threshold: = 6 Bins | Channel Close Time: 0.0022499 S |
| T2 : 0.1999 S (200msec Interval)       |                                     |                                 |
| T3 : 0.6330 S (Channel Move Time)      |                                     |                                 |

**Note:** T0 = Start time of Radar Burst  
 T1 = end time of Radar Burst  
 T2 = 200ms from end of Radar Burst  
 T3 = Last traffic burst from Client (Channel Move Time)

For Detail Plot for Channel Closing Transmission Time: 0.0022499s < 0.26s



|  |                                     |                                 |
|--|-------------------------------------|---------------------------------|
| Time Index Info                        |                                     |                                 |
| T0 : -0.0345 S (Radar Injection Start) | Time Per Bin: 0.3749906             | Channel Move Time: 0.6329842 S  |
| T1 : 0.0000 S (Radar Injection Stop)   | T2~T3 Bins Over Threshold: = 6 Bins | Channel Close Time: 0.0022499 S |
| T2 : 0.1999 S (200msec Interval)       |                                     |                                 |
| T3 : 0.6330 S (Channel Move Time)      |                                     |                                 |

End of Report