



# RADIO TEST REPORT

**Test Report No. : 32IE0154-HO-01-D-R1**

**Applicant** : **silex technology, Inc.**  
**Type of Equipment** : **SDIO Wireless Module**  
**Model No.** : **SX-SDMAN**  
**FCC ID** : **N6C-SDMAN**  
**Test regulation** : **FCC Part 15 Subpart E: 2012  
(DFS test only)**  
**Test Result** : **Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This report is a revised version of 32IE0154-HO-01-D. 32IE0154-HO-01-D is replaced with this report.

**Date of test:** July 12, 2012

**Representative test engineer:**

Katsunori Okai  
Engineer of WiSE Japan,  
UL Verification Service

**Approved by:**

Takahiro Hatakeda  
Leader of WiSE Japan,  
UL Verification Service



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.  
\*As for the range of Accreditation in NVLAP, you may refer to the WEB address,  
<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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13-EM-F0429

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## **SECTION 1: Customer information**

|                  |   |                                                   |
|------------------|---|---------------------------------------------------|
| Company Name     | : | silex technology, Inc.                            |
| Address          | : | 2-3-1 Hikaridai, Seika-cho, Kyoto 619-0237, Japan |
| Telephone Number | : | +81-774-98-3878                                   |
| Facsimile Number | : | +81-774-98-3758                                   |
| Contact Person   | : | Toshiro Kometani                                  |

## **SECTION 2: Equipment under test (E.U.T.)**

### **2.1 Identification of E.U.T.**

|                            |   |                                                                                           |
|----------------------------|---|-------------------------------------------------------------------------------------------|
| Type of Equipment          | : | SDIO Wireless Module                                                                      |
| Model No.                  | : | SX-SDMAN                                                                                  |
| Serial No.                 | : | Refer to Section 5, Clause 5.2                                                            |
| Rating                     | : | DC3.3V                                                                                    |
| Receipt Date of Sample     | : | July 11, 2012                                                                             |
| Country of Mass-production | : | Japan                                                                                     |
| Condition of EUT           | : | Production prototype<br>(Not for Sale: This sample is equivalent to mass-produced items.) |
| Modification of EUT        | : | No Modification by the test lab                                                           |

## 2.2 Product Description

Model No: SX-SDMAN (referred to as the EUT in this report) is the SDIO Wireless Module.

### General Specification

Clock frequency(ies) in the system : 26MHz

### Radio Specification

Radio Type : Transceiver  
 Method of Frequency Generation : Synthesizer  
 Power Supply (inner) : DC1.2V

### Specification of Wireless LAN (IEEE802.11b/g/a/n-20/n-40)

| Type of radio          | IEEE802.11b                                                                                                                                                                                                | IEEE802.11g                            | IEEE802.11a                        | IEEE802.11n<br>(20 M band)                              | IEEE802.11n<br>(40 M band)       |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------|---------------------------------------------------------|----------------------------------|
| Frequency of operation | 2412-2462MHz                                                                                                                                                                                               | 2412-2462MHz                           | 5180-5320MHz<br>5745-5825MHz       | 2412 - 2462MHz<br>5180-5320MHz<br>5745-5825MHz          | 5190 - 5310MHz<br>5755 - 5795MHz |
| Type of modulation     | DSSS<br>(CCK, DQPSK, DBPSK)                                                                                                                                                                                | OFDM-CCK<br>(64QAM, 16QAM, QPSK, BPSK) | OFDM<br>(64QAM, 16QAM, QPSK, BPSK) |                                                         |                                  |
| Channel spacing        | 5MHz                                                                                                                                                                                                       |                                        | 20MHz                              | <u>2.4GHz band</u><br>5MHz<br><u>5GHz band</u><br>20MHz | 40MHz                            |
| Antenna type           | Sleeve antenna: Sansei<br>Embedded antenna: Ethertronics                                                                                                                                                   |                                        |                                    |                                                         |                                  |
| Antenna Gain           | Sleeve antenna: 1.0dBi (2.4GHz including cableloss 0.5dB), 1.1dBi (5GHz including cableloss 1.0dB)<br>Embedded antenna: 2.0dBi (2.4GHz including cableloss 0.5dB), 2.5dBi (5GHz including cableloss 1.0dB) |                                        |                                    |                                                         |                                  |
| Antenna Connector type | U.FL connector                                                                                                                                                                                             |                                        |                                    |                                                         |                                  |

### Specification of Bluetooth (Ver.4.0 + EDR)

| Type of radio          | Bluetooth                                                                             |
|------------------------|---------------------------------------------------------------------------------------|
| Frequency of Operation | 2402-2480MHz                                                                          |
| Type of Modulation     | FHSS                                                                                  |
| Channel spacing        | 1MHz                                                                                  |
| Antenna type           | Embedded antenna: Ethertronics                                                        |
| Antenna Gain           | 2.0dBi (2.4GHz including cableloss 0.5dB),<br>2.5dBi (5GHz including cableloss 1.0dB) |
| Antenna Connector Type | U.FL Alternative connector                                                            |

### Specification of Low Energy (Ver.4.0 + EDR/LE Dual mode)

| Type of radio          | Low Energy                                                                            |
|------------------------|---------------------------------------------------------------------------------------|
| Frequency of Operation | 2402-2480MHz                                                                          |
| Type of Modulation     | DSSS                                                                                  |
| Channel spacing        | 2MHz                                                                                  |
| Antenna type           | Embedded antenna: Ethertronics                                                        |
| Antenna Gain           | 2.0dBi (2.4GHz including cableloss 0.5dB),<br>2.5dBi (5GHz including cableloss 1.0dB) |
| Antenna Connector Type | U.FL Alternative connector                                                            |

\*This test report applies for Wireless LAN (IEEE802.11a/n-20/n-40).

Wireless LAN and Bluetooth do not transmit simultaneously.

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### **SECTION 3: Scope of Report**

This report only covers DFS requirement, as specified by the following referenced procedures.

### **SECTION 4: Test specification, procedures & results**

#### **4.1 Test Specification**

|                    |   |                                                                                                                                                                                                        |
|--------------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Specification | : | FCC Part 15 Subpart E: 2012, final revised on May 17, 2012 and effective June 18, 2012                                                                                                                 |
| Title              | : | FCC 47CFR Part15 Radio Frequency Device<br>Subpart E Unlicensed National Information Infrastructure Devices<br>Section 15.407 General technical requirements                                           |
| Test Specification | : | FCC 06-96 APPENDIX                                                                                                                                                                                     |
| Title              | : | COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-<br>NATIONAL INFORMATION INFRASTRUCTURE DEVICES<br>OPERATING IN THE 5250-5350 MHz AND 5470-5725MHz BANDS<br>INCORPORATING DYNAMIC FREQUENCY SELECTION |

#### **FCC 15.31 (e)**

The RF Module has own regulator.

The RF Module is constantly provided voltage through own regulator regardless of input voltage (DC3.3V).

Therefore, this EUT complies with the requirement.

#### **FCC Part 15.203/212 Antenna requirement**

The EUT has a unique antenna connector (U.FL).

Therefore the equipment complies with the requirement of 15.203/212.

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## 4.2 Procedures and results

**Table 1: Applicability of DFS Requirements**

| Requirement                                          | Operating Mode                 | Test Procedures & Limits      | Deviation | Results  |
|------------------------------------------------------|--------------------------------|-------------------------------|-----------|----------|
|                                                      | Client without Radar Detection |                               |           |          |
| U-NII Detection Bandwidth                            | Not required                   | FCC 06-96<br>Appendix 7.8.1   | N/A       | N/A      |
| Channel Availability Check Time                      | Not required                   | FCC15.407 (h)                 | N/A       | N/A      |
|                                                      |                                | FCC 06-96<br>Appendix 7.8.2.1 |           |          |
|                                                      |                                | Appendix 7.8.2.2              |           |          |
|                                                      |                                | Appendix 7.8.2.3              |           |          |
| Channel Move Time, Channel Closing Transmission Time | Yes                            | RSS-210 A9.3                  | N/A       | Complied |
|                                                      |                                | FCC15.407 (h)                 |           |          |
|                                                      |                                | FCC 06-96<br>Appendix 7.8.3   |           |          |
| Non-Occupancy period                                 | Yes                            | RSS-210 A9.3                  | N/A       | Complied |
|                                                      |                                | FCC15.407 (h)                 |           |          |
|                                                      |                                | FCC 06-96<br>Appendix 7.8.3   |           |          |
| In-Service Monitoring                                | Not required                   | RSS-210 A9.3                  | N/A       | N/A      |
|                                                      |                                | FCC15.407 (h)                 |           |          |
| Overlapping Channel Tests                            | Not required                   | FCC 06-96<br>Appendix 7.8.4   | N/A       | N/A      |
|                                                      |                                | FCC15.407 (h)                 |           |          |

**Table 2: DFS Detection Thresholds for Master Devices and Client Devices With Radar**

| Maximum Transmit Power                                                                                                                                                                                                                                                                                                                                                                                  | Value (See Notes 1 and 2) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| ≥ 200 milliwatt                                                                                                                                                                                                                                                                                                                                                                                         | -64 dBm                   |
| < 200 milliwatt                                                                                                                                                                                                                                                                                                                                                                                         | -62 dBm                   |
| <p>Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.</p> <p>Note 2: 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> |                           |

**Table 3 DFS Response Requirement Values**

| 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 80% of the U-NII 99% transmission power bandwidth<br>See Note 3                                  |
| <p><b>Note 1:</b> The instant that the Channel Move Time and the Channel Closing Transmission Time begins is as follows:</p> <ul style="list-style-type: none"> <li>• For the Short Pulse Radar Test Signals this instant is the end of the <i>Burst</i>.</li> <li>• For the Frequency Hopping radar Test Signal, this instant is the end of the last radar <i>Burst</i> generated</li> <li>• For the Long Pulse Radar Test Signal this instant is the end of the 12 second period defining the <i>Radar Waveform</i>.</li> </ul> <p><b>Note 2:</b> The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signal will not count quiet periods in between transmissions.</p> <p><b>Note 3:</b> During the U-NII Detection Bandwidth detection test, radar type 1 is used and for each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.</p> |                                                                                                          |

**Table 4 Short Pulse Radar Test Waveform**

| Radar Type                  | Pulse Width (μsec) | PRI (μsec) | Number of Pulses | Minimum Percentage of Successful Detection | Minimum Number of Trials |
|-----------------------------|--------------------|------------|------------------|--------------------------------------------|--------------------------|
| 1                           | 1                  | 1428       | 18               | 60%                                        | 30                       |
| 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 (Rader Types 1-4) |                    |            |                  | 80%                                        | 120                      |

**Table 5 Long Pulse Radar Test Waveform**

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

**Table 6 Frequency Hopping Radar Test Waveform**

| Radar Type | Pulse Width (μsec) | PRI (μsec) | Pulse per Hop (kHz) | 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                       |

#### 4.3 Test Location

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|                            | FCC Registration Number | IC Registration Number | Width x Depth x Height (m) | Size of reference ground plane (m) / horizontal conducting plane | Other rooms            |
|----------------------------|-------------------------|------------------------|----------------------------|------------------------------------------------------------------|------------------------|
| No.1 semi-anechoic chamber | 313583                  | 2973C-1                | 19.2 x 11.2 x 7.7m         | 7.0 x 6.0m                                                       | No.1 Power source room |
| No.2 semi-anechoic chamber | 655103                  | 2973C-2                | 7.5 x 5.8 x 5.2m           | 4.0 x 4.0m                                                       | -                      |
| No.3 semi-anechoic chamber | 148738                  | 2973C-3                | 12.0 x 8.5 x 5.9m          | 6.8 x 5.75m                                                      | No.3 Preparation room  |
| No.3 shielded room         | -                       | -                      | 4.0 x 6.0 x 2.7m           | N/A                                                              | -                      |
| No.4 semi-anechoic chamber | 134570                  | 2973C-4                | 12.0 x 8.5 x 5.9m          | 6.8 x 5.75m                                                      | No.4 Preparation room  |
| No.4 shielded room         | -                       | -                      | 4.0 x 6.0 x 2.7m           | N/A                                                              | -                      |
| No.5 semi-anechoic chamber | -                       | -                      | 6.0 x 6.0 x 3.9m           | 6.0 x 6.0m                                                       | -                      |
| No.6 shielded room         | -                       | -                      | 4.0 x 4.5 x 2.7m           | 4.75 x 5.4 m                                                     | -                      |
| No.6 measurement room      | -                       | -                      | 4.75 x 5.4 x 3.0m          | 4.75 x 4.15 m                                                    | -                      |
| No.7 shielded room         | -                       | -                      | 4.7 x 7.5 x 2.7m           | 4.7 x 7.5m                                                       | -                      |
| No.8 measurement room      | -                       | -                      | 3.1 x 5.0 x 2.7m           | N/A                                                              | -                      |
| No.9 measurement room      | -                       | -                      | 8.0 x 4.5 x 2.8m           | 2.0 x 2.0m                                                       | -                      |
| No.10 measurement room     | -                       | -                      | 2.6 x 2.8 x 2.5m           | 2.4 x 2.4m                                                       | -                      |
| No.11 measurement room     | -                       | -                      | 3.1 x 3.4 x 3.0m           | 2.4 x 3.4m                                                       | -                      |

\* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

#### 4.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.  
Time Measurement uncertainty for this test was: ( $\pm$ ) 0.012%

#### 4.5 Data of DFS test, Test instruments of DFS, Test set up

Refer to APPENDIX.

## **SECTION 5: Operation of E.U.T. during testing**

### **5.1 Operating Modes**

The EUT, which is a Client Device without Radar detection capability, operates over the 5250-5350MHz.

Power level(EIRP) of the EUT[dBm]

| 5250-5350MHz Band* |                   |
|--------------------|-------------------|
| Output Power (Min) | Output Power(Max) |
| 13.37              | 16.24             |

\*Refer to 32IE0154-HO-01-C, FCC Part 15E (FCC 15.407) report for other parts than DFS.

The EUT uses one transmitter connected to two 50-ohm coaxial antenna ports. Both antenna ports are connected to the test system via a power divider to perform conducted tests.

WLAN traffic is generated by streaming the MPEG Test file “6 ½ Magic Hours” from the Master to the Client in full motion video mode.

The EUT utilizes the 802.11a architecture, with a nominal channel bandwidth.

The FCC ID for the Master Device used with EUT for DFS testing is LDK102056.

The rated output power of the Master unit is >200mW(23dBm). Therefore the required interference threshold level is -64 dBm. After correction for antenna gain and procedural adjustments, the required conducted threshold at the antenna port is  $-64 + 1 + 3.5 = -59.5$  dBm (threshold level + additional 1dB + antenna gain).

It is impossible for users to change DFS control, because the DFS function is written on the firmware and users cannot access it.

The EUT was set by the software as follows:

Software name & version: HW: PW100120, SW: OLCA 3.1.1

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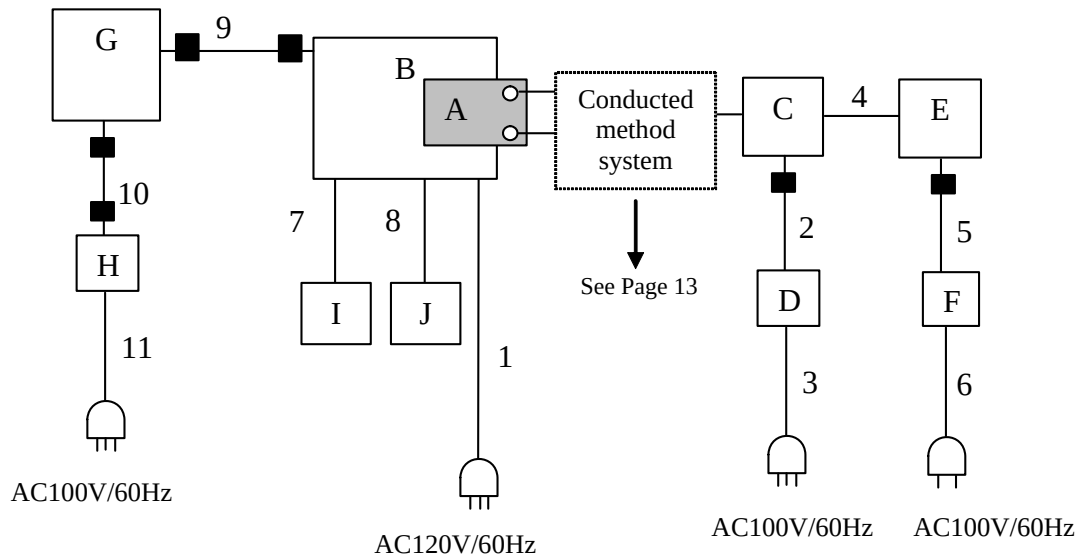
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## 5.2 Configuration and peripherals



■ : Standard Ferrite Core

### Description of EUT and Support equipment

| No. | Item                      | Model number      | Serial number           | Manufacturer  | Remarks |
|-----|---------------------------|-------------------|-------------------------|---------------|---------|
| A   | SDIO Wireless Module      | SX-SDMAN          | 008092012A09            | Silex         | EUT     |
| B   | Desktop PC                | SX02130           | 050479532               | Faith         | -       |
| C   | Wireless LAN access point | AIR-AP1242AG-A-K9 | FTX1045B9L0             | Cisco Systems | -       |
| D   | AC Adaptor                | ADP-18PB          | PZT0639562214           | Cisco Systems | -       |
| E   | Note PC                   | 7661-CB9          | L3R2056                 | Lenovo        | -       |
| F   | AC Adaptor                | 92P1160           | 11S92P1160Z1ZBG H7B99A8 | Lenovo        | -       |
| G   | Monitor                   | 15NE2-W C         | 1004642B20945           | iiyama        | -       |
| H   | AC Adaptor                | UP04821120A       | 03524F100007681         | POTRANS       | -       |
| I   | Mouse                     | Rev 6-1           | 0146177                 | -             | -       |
| J   | Keyboard                  | 5121W             | H92002386               | BTC           | -       |

### List of cables used

| No. | Name           | Length (m) | Shield     |            |
|-----|----------------|------------|------------|------------|
|     |                |            | Cable      | Connector  |
| 1   | AC Cable       | 2.5        | Unshielded | Unshielded |
| 2   | DC Cable       | 1.8        | Unshielded | Unshielded |
| 3   | AC Cable       | 2.0        | Unshielded | Unshielded |
| 4   | LAN Cable      | 2.0        | Unshielded | Unshielded |
| 5   | DC Cable       | 1.8        | Unshielded | Unshielded |
| 6   | AC Cable       | 0.9        | Unshielded | Unshielded |
| 7   | Mouse Cable    | 1.5        | Shielded   | Shielded   |
| 8   | Keyboard Cable | 1.6        | Shielded   | Shielded   |
| 9   | Monitor Cable  | 1.8        | Shielded   | Shielded   |
| 10  | DC Cable       | 1.8        | Unshielded | Unshielded |
| 11  | AC Cable       | 1.0        | Unshielded | Unshielded |

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### 5.3 Test and Measurement System

#### SYSTEM OVERVIEW

The measurement system is based on a conducted test method.

The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution. The short pulse types 2, 3, and 4, the long pulse type 5, and the frequency hopping type 6 parameters are randomized at run-time.

The signal monitoring equipment consists of a spectrum analyzer with the capacity to display 8001 bins on the horizontal axis. A time-domain resolution of 2 msec/bin is achievable with a 16 second sweep time, meeting the 10 seconds short pulse reporting criteria. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection.

#### FREQUENCY HOPPING RADAR WAVEFORM GENERATING SUBSYSTEM

The first 100 frequencies are selected out of the hopping sequence of the randomized 475 hop frequencies.

Only a *Burst* that has the frequency falling within the receiver bandwidth of the tested U-NII device is selected among those frequencies. (Frequency-domain simulation). The radar waveform generated at the start time of the selected *Burst* (Time-domain simulation) is download to the Signal Generator.

If all of the randomly selected 100 frequencies do not fall within the receiver bandwidth of the U-NII device, the radar waveform is not used for the test.

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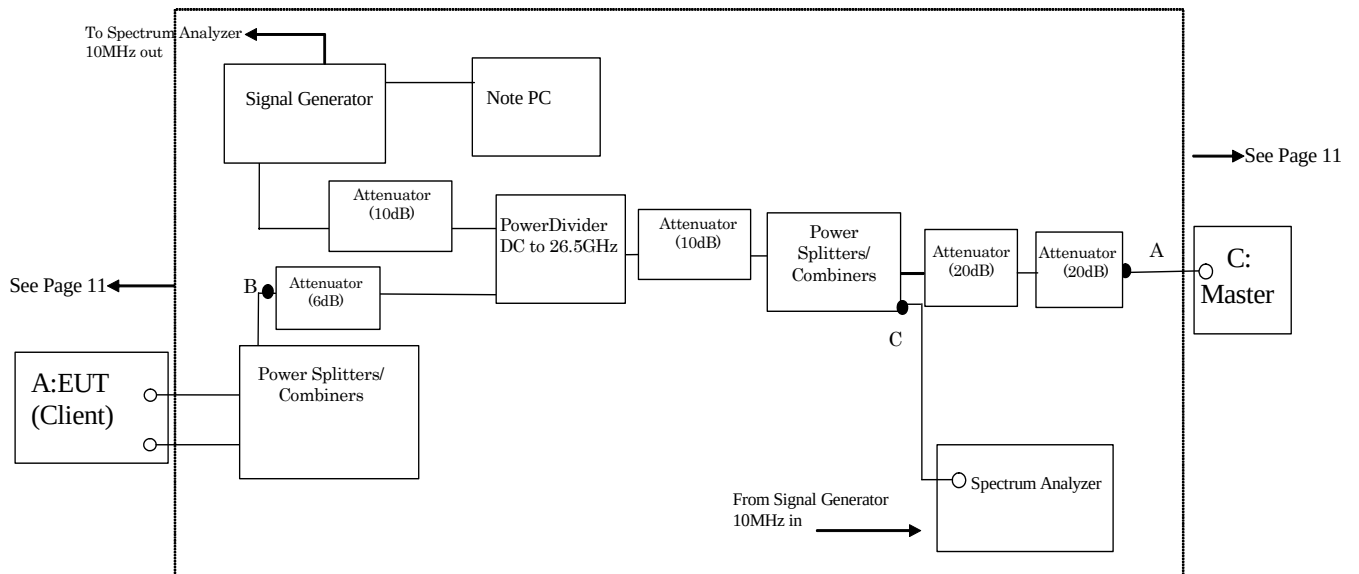
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## **CONDUCTED METHODS SYSTEM BLOCK DIAGRM**



## **MEASUREMENT SYSTEM FREQUENCY REFERENCE**

Lock the signal generator and the spectrum analyzer to the same reference sources as follows: Connect the 10MHz OUT on the signal generator to the 10MHz IN on the spectrum analyzer and set the spectrum analyzer 10MHz In to On.

## SYSTEM CALIBRATION

**Step 1:** Set the system as shown in Figure 3 of FCC 06-96 7.2.1.

**Step 2:** Adjust each attenuator to fulfill the following three conditions:

- WLAN can be communicated, and
- Radar detection threshold level is bigger than Client Device traffic level on the spectrum analyzer, and
- Master Device traffic level is not displayed on the spectrum analyzer.

**Step 3:** Terminate 50 ohm at B and C points, and connect the spectrum analyzer to the point A. (See the figure on page 13) At the point A, adjust the signal generator and spectrum analyzer to the center frequency of the channel to be measured. Download the applicable radar waveforms to the signal generator. Select the radar waveform, trigger a burst manually and measure the amplitude 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.

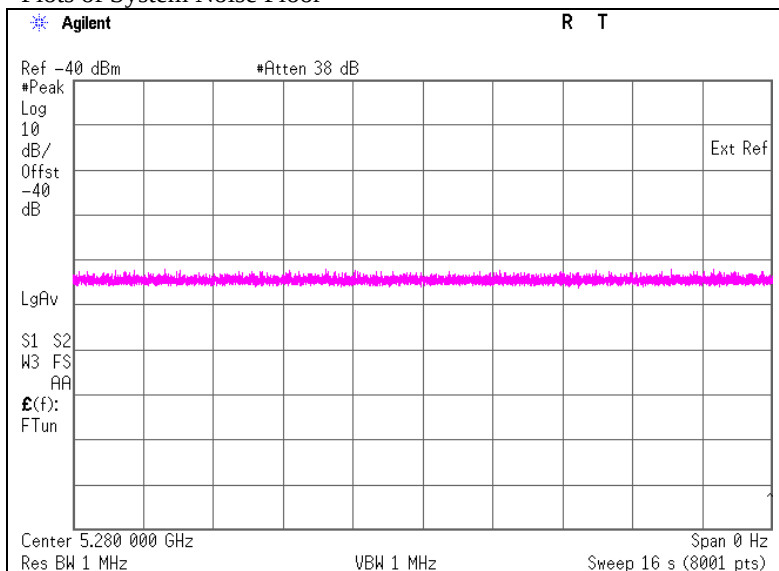
**Step 4:** Without changing any of the instrument settings, restore the system setting to Step 2 and adjust the Reference Level Offset of the spectrum analyzer to the level at Step 3.

By taking the above steps 1 to 4, the spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device.

See Clause 5.4 for Plots of Noise, Radar Waveforms, and WLAN signals.

## 5.4 Plots of Noise, Radar Waveforms, and WLAN signals

Plots of System Noise Floor



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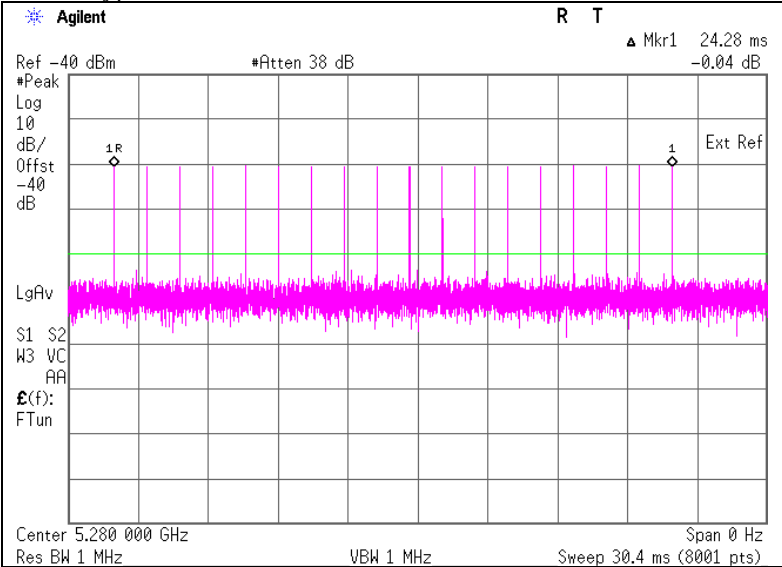
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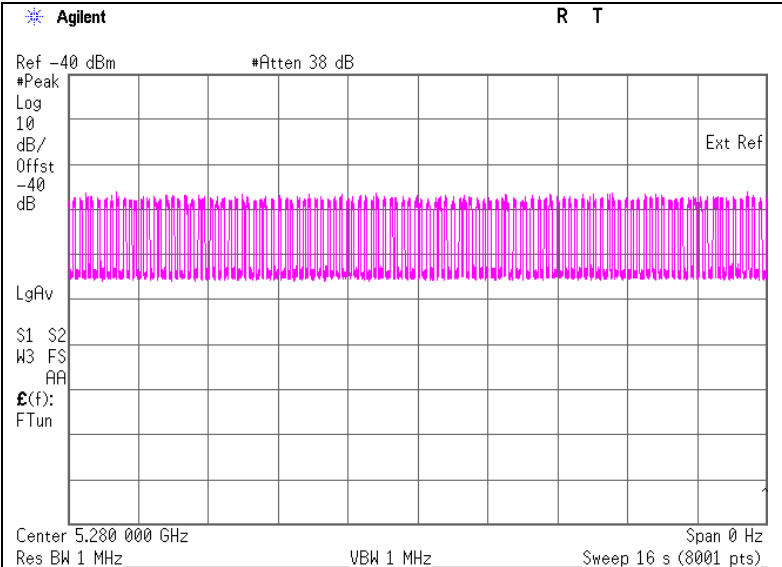
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Plots of Radar Waveforms

Rader Type 1



Plots of WLAN Traffic



## **SECTION 6: Channel Move Time, Channel Closing Transmission Time**

### **6.1 Operating environment**

Test place : No.11 measurement room  
Temperature : 23 deg.C  
Humidity : 68 % RH

### **6.2 Test Procedure**

Stream the MPEG test file from the Master Device to the Client Device on the test Channel for the entire period of the test. The Radar Waveform generator sends a Burst of pulses for one of the Short Pulse Radar Types 1-4 at levels defined , on the Operating Channel. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.  
Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds.

### **6.3 Test data**

| Test Item                             | Unit   | Measurement Time | Limit  | Results |
|---------------------------------------|--------|------------------|--------|---------|
| Channel Move Time *1)                 | [sec]  | 0.204            | 10.000 | Pass    |
| Channel Closing Transmission Time *2) | [msec] | 2                | 60     | Pass    |

\*1) Channel Move Time is calculated as follows:

$$(\text{Channel Move Time}) = (\text{End of Transmission}) - (\text{End of Burst}) = 1.628 - 1.424$$

\*2) Channel Closing Transmission Time is calculated from (End of Burst + 200msec) to (End of Burst + 10sec )

$$\begin{aligned} (\text{Channel Closing Transmission Time}) &= (\text{Number of analyzer bins showing transmission}) * (\text{dwell time per bin}) \\ &= 1 * 2(\text{msec}) \end{aligned}$$

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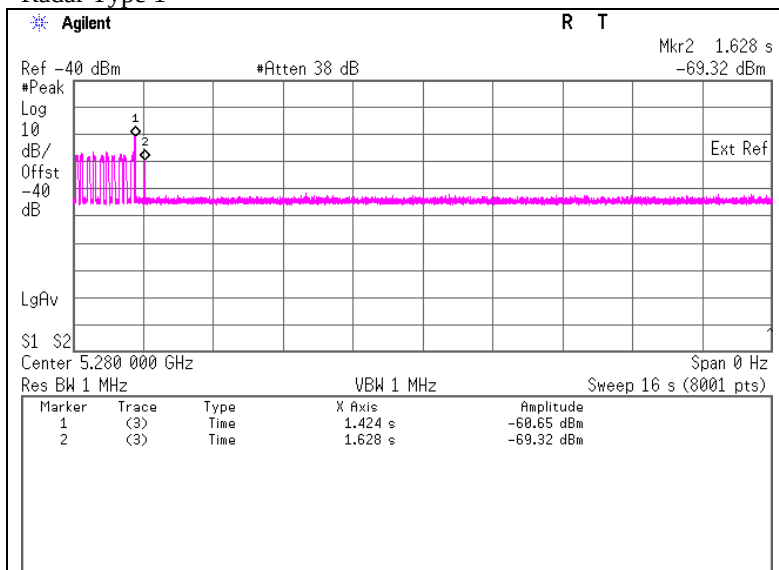
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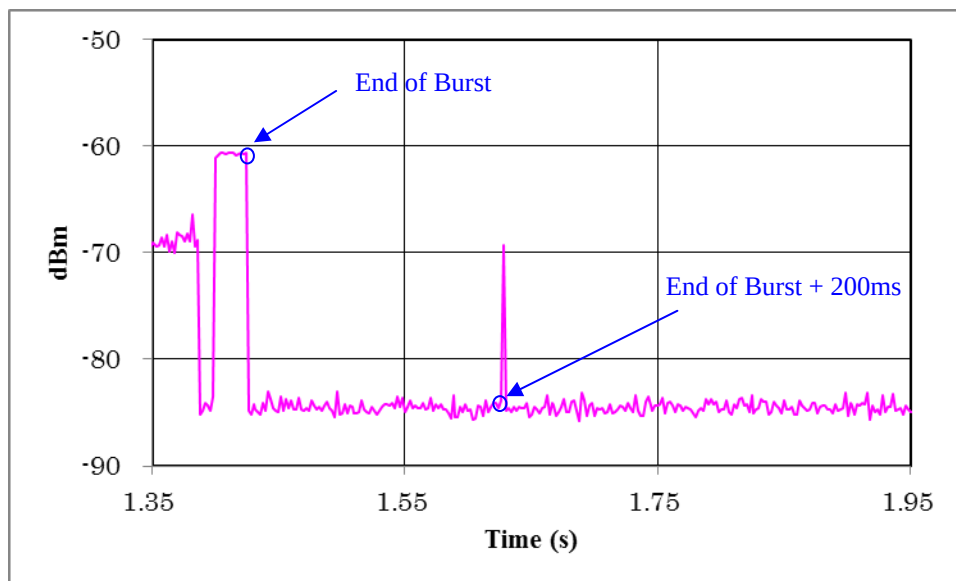
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#### Radar Type 1



Marker 1 : End of Burst : 1424 ms  
Marker 2 : End of Transmission : 1628 ms



#### 6.4 Test result

Test result: Pass

Date :July 12, 2012

Test engineer : Katsunori Okai

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## SECTION 7: Non-Occupancy Period

### 7.1 Operating environment

Test place : No.6 measurement room  
 Temperature : 23 deg.C  
 Humidity : 68 % RH

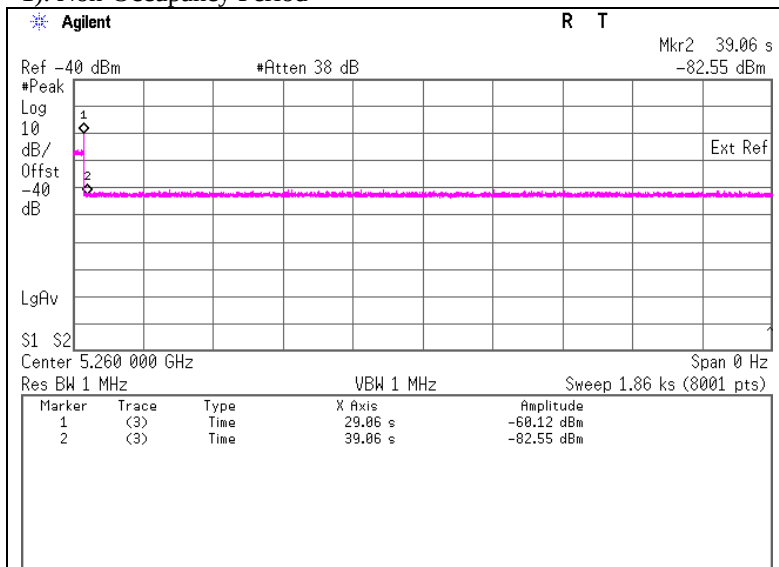
### 7.2 Test Procedure

The following two tests are performed:

- 1). Stream the MPEG test file from the Master Device to the Client Device on the test Channel for the entire period of the test.  
 The Radar Waveform generator sends a Burst of pulses for one of the Radar Types 1-6 at levels defined on the Operating Channel. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.  
 Observe the transmissions of the EUT after the Channel Move Time on the Operating Channel for duration greater than 30 minutes.
- 2). Stream the MPEG test file from the Master Device to the Client Device on the test Channel for the entire period of the test. Observe the transmissions of the EUT on the Operating Channel for duration greater than 30 minutes after the Master Device is shut off.

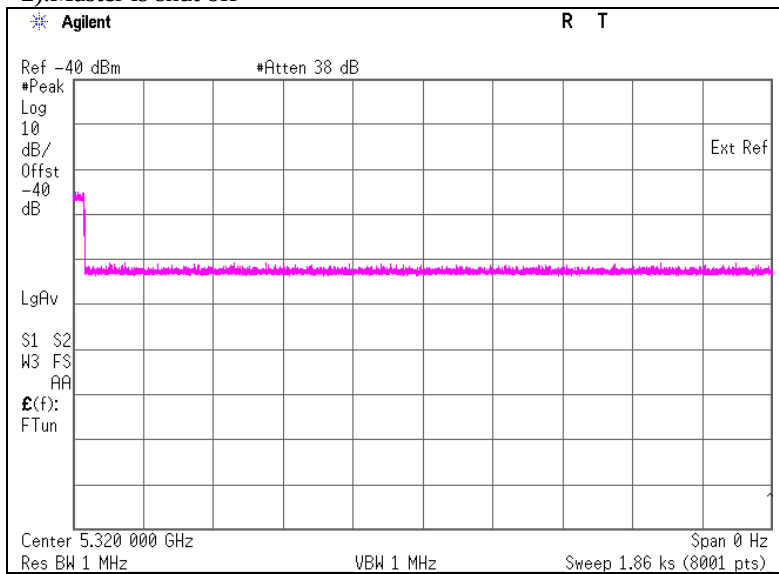
### 7.3 Test data

#### 1). Non-Occupancy Period



Marker 1 : End of Burst : 29.06 sec  
 Marker 2 : End of Burst +10sec : 39.06 sec

## 2).Master is shut off



## 7.4 Test result

Test result: Pass

Date :July 12, 2012

Test engineer : Katsunori Okai

## **APPENDIX 1: Test instruments**

### **EMI Test Equipment**

| Control No.  | Instrument                        | Manufacturer             | Model No              | Serial No  | Test Item | Calibration Date * Interval(month) |
|--------------|-----------------------------------|--------------------------|-----------------------|------------|-----------|------------------------------------|
| MOS-19       | Thermo-Hygrometer                 | Custom                   | CTH-201               | 0001       | DFS       | 2011/12/09 * 12                    |
| MSA-10       | Spectrum Analyzer                 | Agilent                  | E4448A                | MY46180655 | DFS       | 2012/02/03 * 12                    |
| EST-48 *1)   | Signal Generator                  | Agilent                  | E4438C                | MY45090353 | DFS       | 2011/11/09 * 12                    |
| COTS-MDFS-01 | Signal Studio Software for DFS    | Agilent                  | N7620A-101            | 5010-7739  | DFS       | -                                  |
| COTS-MDFS-02 | Radar Generating Software for DFS | Agilent                  | -                     | -          | DFS       | -                                  |
| MCC-96       | Microwave Cable 1G-40GHz          | Schner                   | SUCOFLEX102           | 30817/2    | DFS       | 2012/05/09 * 12                    |
| MCC-67       | Microwave Cable 1G-40GHz          | Suhner                   | SUCOFLEX102           | 28635/2    | DFS       | 2012/04/25 * 12                    |
| MCC-36       | Microwave Cable                   | Hirose Electric          | U.FL-2LP-066-A-(200)  | -          | DFS       | 2011/09/30 * 12                    |
| MCC-102      | Microwave Cable                   | Hirose Electric          | U.FL-2LP-066J1-A(200) | -          | DFS       | 2012/06/27 * 12                    |
| MCC-137      | Microwave cable                   | HUBER+SUHNER             | SUCOFLEX 102          | 37954/2    | DFS       | 2011/10/28 * 12                    |
| MAT-60       | Attenuator(20dB)                  | Suhner                   | 6820.19.A             | -          | DFS       | Pre Check                          |
| MAT-61       | Attenuator(20dB)                  | Suhner                   | 6820.19.A             | -          | DFS       | Pre Check                          |
| MAT-57       | Attenuator(10dB)                  | Suhner                   | 6810.19.A             | -          | DFS       | Pre Check                          |
| MAT-19       | Attenuator(6dB)(above1 GHz)       | HIROSE ELECTRIC CO.,LTD. | AT-106                | -          | DFS       | 2012/01/12 * 12                    |
| MAT-56       | Attenuator(10dB)                  | Suhner                   | 6810.19.A             | -          | DFS       | Pre Check                          |
| MPD-01       | PowerDivider DC to 26.5GHz        | Agilent                  | 11636B                | 52258      | DFS       | 2012/03/27 * 12                    |
| MPSC-01      | Power splitters/Combiners         | Mini-Circuit             | ZFSC-2-2500           | 0124       | DFS       | 2011/09/27 * 12                    |
| MPSC-02      | Power Splitters/Combiners         | Mini-Circuit             | ZFSC-2-10G            | 0127       | DFS       | Pre Check                          |

**\*1) Signal generator is only used to generate radar test signal, and the wave form is confirmed with spectrum analyzer every time before the test.**

**The expiration date of the calibration is the end of the expired month.**

**All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.**

**As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.**

**DFS: Dynamic Frequency Selection**

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