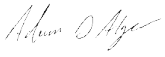
# Test Report # 317050

| | |
|---|---|
| **Equipment Under Test:** | Sterling-LWB |
| **Test Date(s):** | February 9-11, April 28, May 25, June 8, 2017 |
| **Prepared for:** | Laird<br>Attn: Bill Steinike<br>W66 N220 Commerce Ct.<br>Cedarburg, WI 53012 |

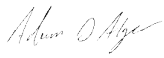
**Report Issued by:** Adam Alger, Quality Systems Engineer

Signature:  Date: June 12, 2017

**Report Reviewed by:** Ryan Urness, Director of Test Services

Signature:  Date: June 11, 2017

**Report Constructed by:** Adam Alger, Quality Systems Engineer

Signature:  Date: June 9, 2017

# CONTENTS

## Laird Technologies Test Services in Review

The Laird Technologies, Inc. laboratory located at W66 N220 Commerce Court Cedarburg, Wisconsin, 53012 USA is recognized through the following organizations:

TESTING CERT #1255.01

**A2LA – American Association for Laboratory Accreditation**

*Accreditation based on ISO/IEC 17025: 2005 with Electrical (EMC) Scope*
*A2LA Certificate Number: 1255.01*
*Scope of accreditation includes all test methods listed herein, unless otherwise noted.*

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**Federal Communications Commission (FCC) – USA**

*Accredited recognition of two 3 meter Semi-Anechoic Chambers*

*Accredited Test Firm Registration Number: 953492*

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Government of Canada

**Innovation, Science and Economic Development Canada**

*ISED Site listing of two 3 meter Semi-Anechoic Chambers based on RSS-GEN – Issue 4*
*File Number: IC 3088A-2*
*File Number: IC 3088A-3*

# 1 TEST REPORT SUMMARY

On **February 9-11, April 28, May 25, and June 8, 2017**, the Equipment Under Test (EUT), **Sterling-LWB**, as provided by **Laird** was tested to the following requirements:

**ETSI EN 300 328 V2.1.1**

| Requirement | Description | Specification | Method | Compliant |
|---|---|---|---|---|
| 4.3.1.12 | Receiver Blocking - FHSS (Bluetooth) | Manufacture Declared* | 5.4.11 | Yes |
| 4.3.2.11 | Receiver Blocking - Wide Band Modulation (BLE) | Manufacture Declared* | 5.4.11 | Yes |
| 4.3.2.11 | Receiver Blocking - Wide Band Modulation (WLAN) | ≤ 10 % | 5.4.11 | Yes |

**Draft ETSI EN 301 489-17 V3.2.0 referencing Draft ETSI EN 301 489-1 V2.2.0**

| Method | Phenomenon | Application | Specification | Compliant |
|---|---|---|---|---|
| EN 61000-4-3 | Radiated RF Immunity | Enclosure | 1 - 6 GHz: 3 V/m | Yes |

*See test data for details

**Notice:**

The results relate only to the item tested and described in this report. Any modifications made to the equipment under test after the specified test date(s) may invalidate the data herein.

If the resulting measurement margin is seen to be within the uncertainty value, as listed in this report, the possibility exists that this unit may not meet the required limit specification if subsequently tested.

# 2 CLIENT INFORMATION

| | |
|---|---|
| **Company Name** | Laird |
| **Contact Person** | Bill Steinike |
| **Address** | W66 N220 Commerce Ct. Cedarburg, WI 53012 |

## 2.1 Equipment Under Test (EUT) Information

*The following information has been supplied by the client*

| | |
|---|---|
| **Product Name** | Sterling-LWB |
| **Model Number** | Sterling-LWB |
| **Serial Number** | 13, 16, 26 |

## 2.2 Product Description

The Sterling-LWB is a multi-standard module with support for WLAN (802.11 b/g/n), and Bluetooth V2.1 and Bluetooth 4.0 & 4.1 with multiple antenna options.

This device has been designed to operate with the antenna listed below, and having a maximum gain of 2.0 dBi. The required antenna impedance is 50 ohms.

## 2.3 Modifications Incorporated for Compliance

None noted at time of test

## 2.4 Deviations and Exclusions from Test Specifications

None noted at time of test

## 2.5 Performance Criteria (Immunity)

**Minimum Performance level specified by manufacturer:**

No resets or drop in communication during test

# 3 REFERENCES

| Publication | Edition | Date |
|---|---|---|
| ETSI EN 300 328 | V2.1.1 | 2016-11 |
| ETSI EN 301 489-17 | V3.2.0 Draft | 2017-03 |
| ETSI EN 301 489-1 | V2.2.0 Draft | 2017-03 |

# 4 UNCERTAINTY SUMMARY

Using the guidance of the following publications the calculated measurement uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of k = 2.

| References | Version / Date |
|---|---|
| CISPR 16-4-1 | Ed. 2 (2009-02) |
| CISPR 16-4-2 | Ed. 2 (2011-06) |
| CISPR 32 | Ed. 1 (2012-01) |
| ANSI C63.23 | 2012 |
| A2LA P103 | February 4, 2016 |
| A2LA P103c | August 10, 2015 |
| ETSI TR 100-028 | V1.3.1 (2001-03) |

| Measurement Type | Configuration | Uncertainty ± |
|---|---|---|
| Radiated Emissions | Biconical Antenna | 5.0 dB |
| Radiated Emissions | Log Periodic Antenna | 5.3 dB |
| Radiated Emissions | Horn Antenna | 4.7 dB |
| AC Line Conducted Emissions | Artificial Mains Network | 3.4 dB |
| Telecom Conducted Emissions | Asymmetric Artificial Network | 4.9 dB |
| Disturbance Power Emissions | Absorbing Clamp | 4.1 dB |
| Radiated Immunity | 3 Volts/meter | 2.2 dB |
| Conducted Immunity | CDN/EM/BCI | 2.4/3.5/3.4 dB |
| EFT Burst/Surge | Peak pulse voltage | 164 volts |
| ESD Immunity | 15 kV level | 1377 Volts |

| Parameter | ETSI U.C. ± | U.C. ± |
|---|---|---|
| Radio Frequency, from F0 | $1x10^{-7}$ | $0.55x10^{-7}$ |
| Occupied Channel Bandwidth | 5 % | 2 % |
| RF conducted Power (Power Meter) | 1.5 dB | 1.2 dB |
| RF conducted emissions (Spectrum Analyzer) | 3.0 dB | 1.7 dB |
| All emissions, radiated | 6.0 dB | 5.3 dB |
| Temperature | 1° C | 0.65° C |
| Humidity | 5 % | 2.9 % |
| Supply voltages | 3 % | 1 % |

# 5 TEST DATA

## 5.1 Antenna Port Conducted Emissions – Receiver Blocking BT

| | |
|---|---|
| **Operator** | Aidi Zainal |
| **QA** | Adam Alger |
| **Test Date** | 4/28/2017 |
| **Location** | Screen room |
| **Temp. / R.H.** | 20-25° C / 30-50 % R.H. |
| **Requirement** | ETSI EN 300 328 V2.1.1 Section 4.3.1.12 |
| **Method** | ETSI EN 300 328 V2.1.1 Section 5.4.11 |

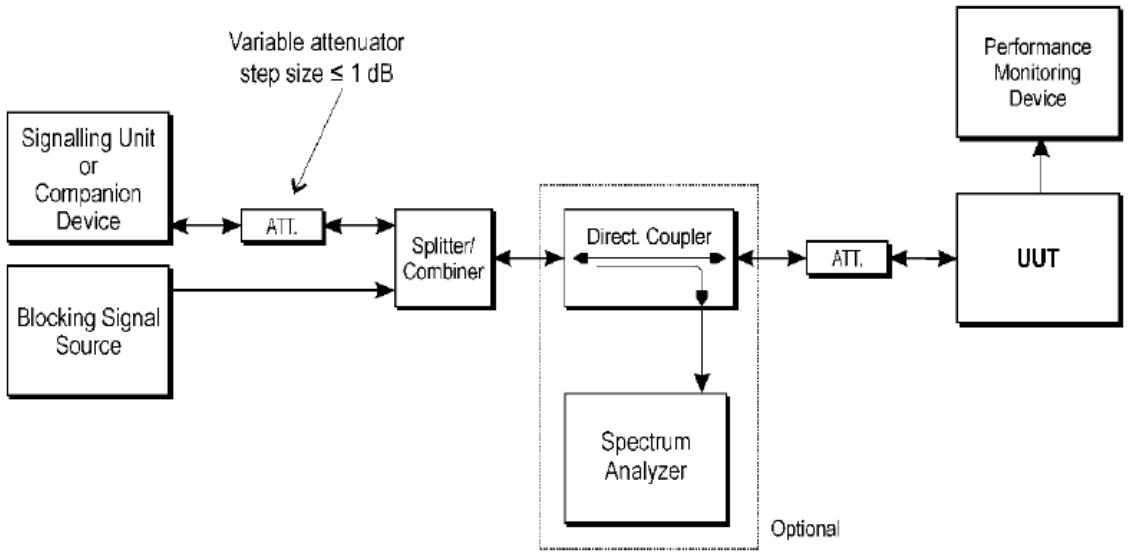
**Receiver Blocking parameters receiver category 1 equipment**

| Wanted signal mean power from companion device (dBm) | Blocking signal frequency (MHz) | Blocking signal power (dBm) (see note 2) | Type of blocking signal |
|---|---|---|---|
| $P_{min}$ + 6 dB | 2 380<br>2 503,5 | -53 | CW |
| $P_{min}$ + 6 dB | 2 300<br>2 330<br>2 360 | -47 | CW |
| $P_{min}$ + 6 dB | 2 523,5<br>2 553,5<br>2 583,5<br>2 613,5<br>2 643,5<br>2 673,5 | -47 | CW |

NOTE 1: $P_{min}$ is the minimum level of wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.

## Block Diagram




## Instrumentation

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Smart Technology. Delivered.

| No. | Asset # | Description | Manufacturer | Model # | Serial # | Cal Date | Cal Due Date | Equipment Status |
|---|---|---|---|---|---|---|---|---|
| 1 | EE 960073 | Spectrum Analyzer | Agilent | E4446A | US45300564 | 11/21/2016 | 11/21/2017 | Active Calibration |
| 2 | CC 000284C | Signal Generator | Agilent | E4421B | MY41000402 | 11/17/2016 | 11/17/2017 | Active Verification |
| 3 | EE 960093 | Splitter/Combiner | mini-circuits | ZFSC-2-10G | SF702900616 | 2/27/2017 | 2/27/2018 | Active Verification |

**Test Parameters**

| | |
|---|---|
| **Mode** | BT Hopping 1 MBPS (BR) DH1 |
| **Rx Category** | 1 |
| **Minimum Performance** | 0.1% BER |
| **EUT** | Serial 13 |
| **Companion / Monitoring Device** | R&S CBT BT Tester |

**Setup Parameters**

| Frequency (MHz) | CBT level/Pmin (dBm) | Pmin + 6DB (dfBm) | Path loss (dB) | CBT signal to EUT (dBm) | BER at CBT/Pmin (%) |
|---|---|---|---|---|---|
| Hopping | -70 | -64 | -20 | -84 | 0.11077 |

| Frequency (MHz) | Level | Ant Gain | Blocking level | Sig gen setting (dBm) |
|---|---|---|---|---|
| 2380.0 | -53.0 | 4.3 | -51.0 | -24.4 |
| 2503.5 | -53.0 | 4.3 | -51.0 | -24.4 |
| 2300.0 | -47.0 | 4.3 | -45.0 | -18.8 |
| 2330.0 | -47.0 | 4.3 | -45.0 | -18.4 |
| 2360.0 | -47.0 | 4.3 | -45.0 | -18.3 |
| 2523.5 | -47.0 | 4.3 | -45.0 | -18.3 |
| 2553.5 | -47.0 | 4.3 | -45.0 | -18.8 |
| 2583.5 | -47.0 | 4.3 | -45.0 | -18.2 |
| 2613.5 | -47.0 | 4.3 | -45.0 | -17.9 |
| 2643.5 | -47.0 | 4.3 | -45.0 | -18.1 |
| 2673.5 | -47.0 | 4.3 | -45.0 | -18.4 |

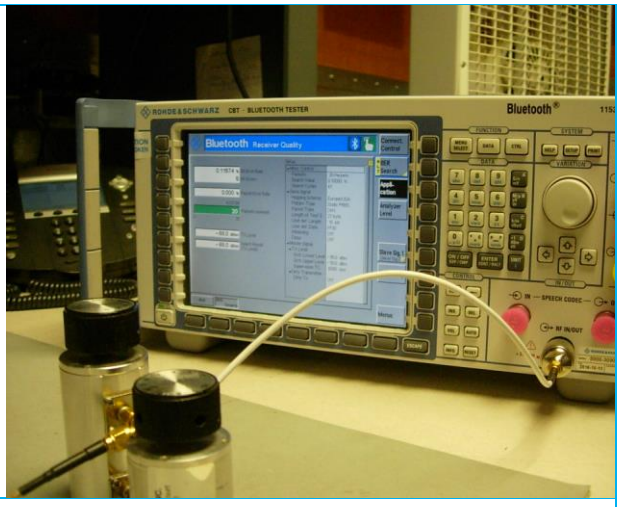
## Results

| Technology /Mode | Data rate | Packet type | Result at Blocking frequencies listed (% BER) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2380 | 2503.5 | 2300 | 2330 | 2360 | 2523.5 | 2553.5 | 2583.5 | 2613.5 | 2643.5 | 2673.5 |
| BT/Hopping | 1MBPS | DH1 | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 | 0.002 | 0.000 | 0.000 | 0.002 | 0.001 | 0.001 |

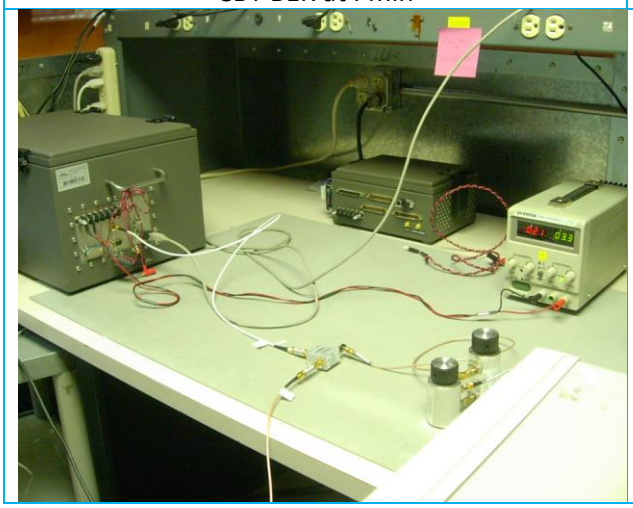
| Notes: |
|---|
| 1. CBT sending 8200 Packets which is approximately 1.8 million bits. BER test performed 3 times at each blocking frequency. |
| 2. Variable attenuator set at 3dB. 10dB attenuator in path of EUT. 10dB attenuator in path of Blocking signal |
| 3. Pmin is companion/CBT level where the EUT has a BER at or worse than manufacturer declared minimum performance. |

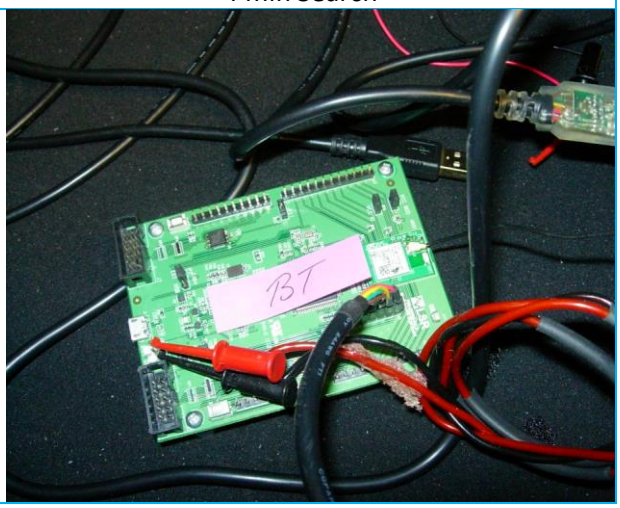
## Setup Photos


CBT BER at Pmin

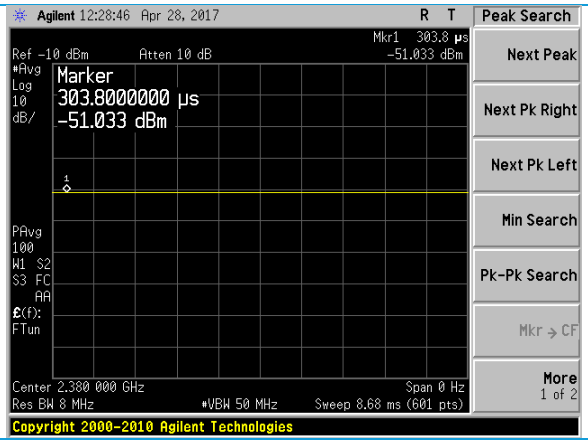



Pmin Search

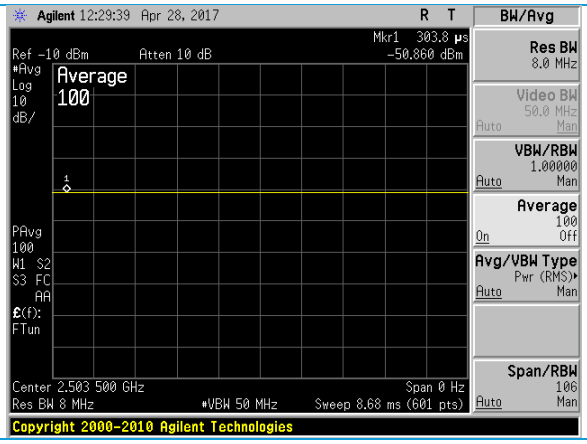




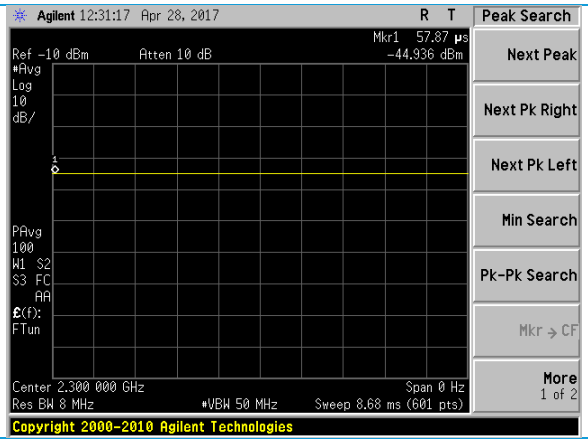
## Blocking Level at input of EUT (BT Classic)



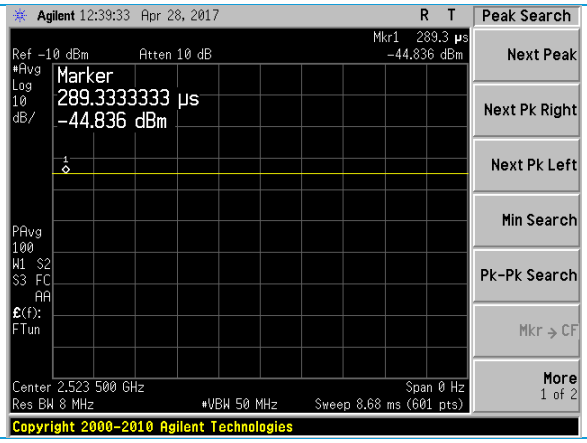

2380 MHz



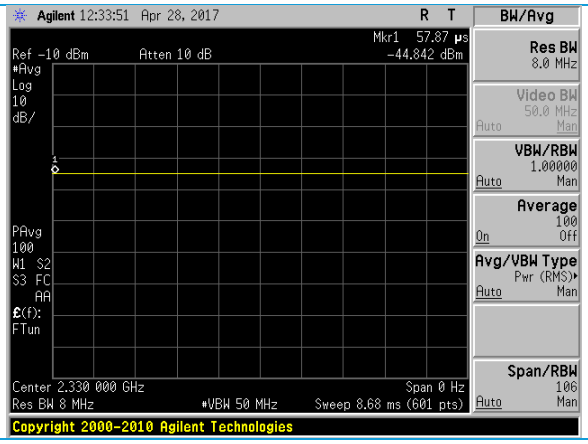

2503.5 MHz



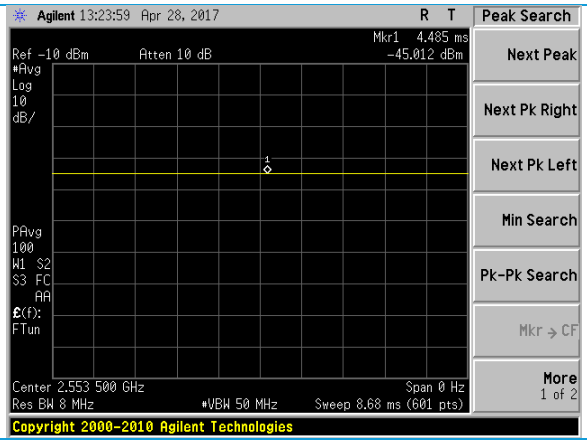

2300 MHz




2523.5 MHz

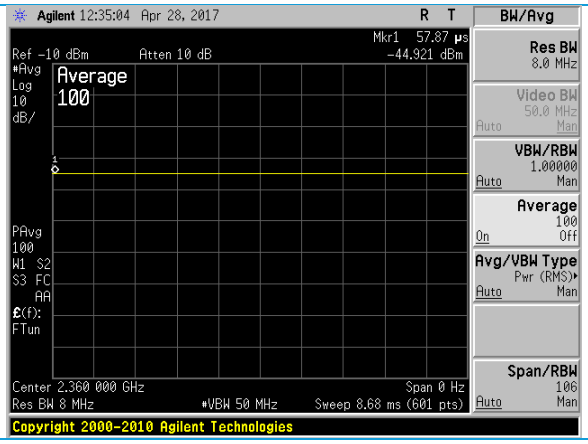



2330 MHz

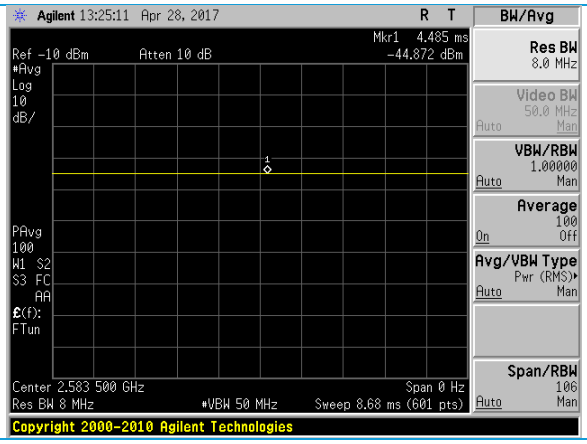



2553.5 MHz

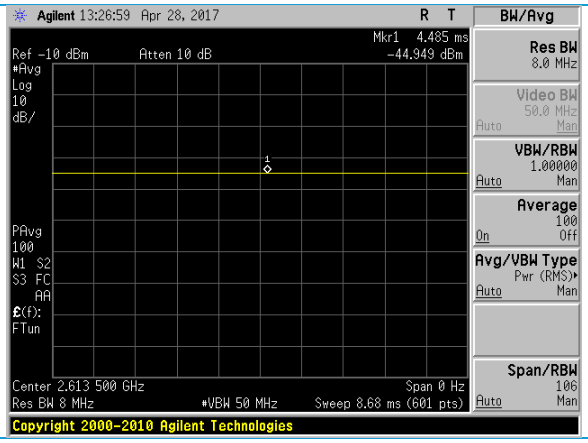
## Blocking Level at input of EUT (BT Classic)



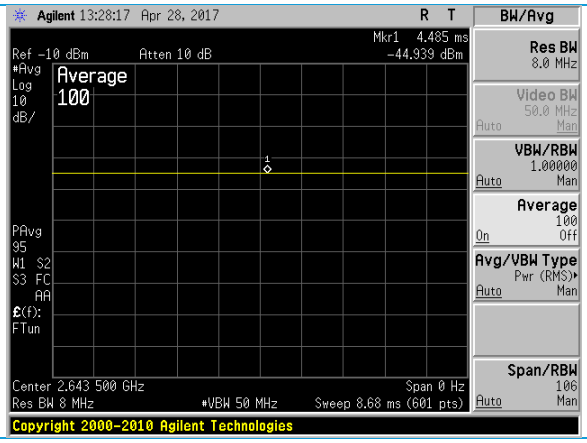

2360 MHz



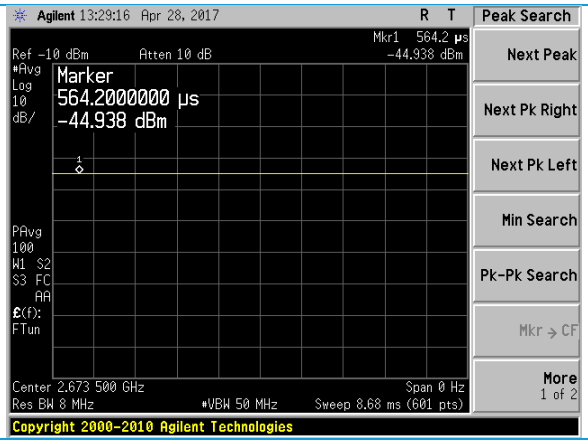

2583.5 MHz




2613.5 MHz




2643.5 MHz




2673.5 MHz

## 5.2 Antenna Port Conducted Emissions – Receiver Blocking BLE

| | |
|---|---|
| **Operator** | Aidi Zainal |
| **QA** | Adam Alger |
| **Test Date** | 2/11/2017 |
| **Location** | Screen room |
| **Temp. / R.H.** | 20-25° C / 30-50 % R.H. |
| **Requirement** | ETSI EN 300 328 V2.1.1 Section 4.3.2.11 |
| **Method** | ETSI EN 300 328 V2.1.1 Section 5.4.11 |

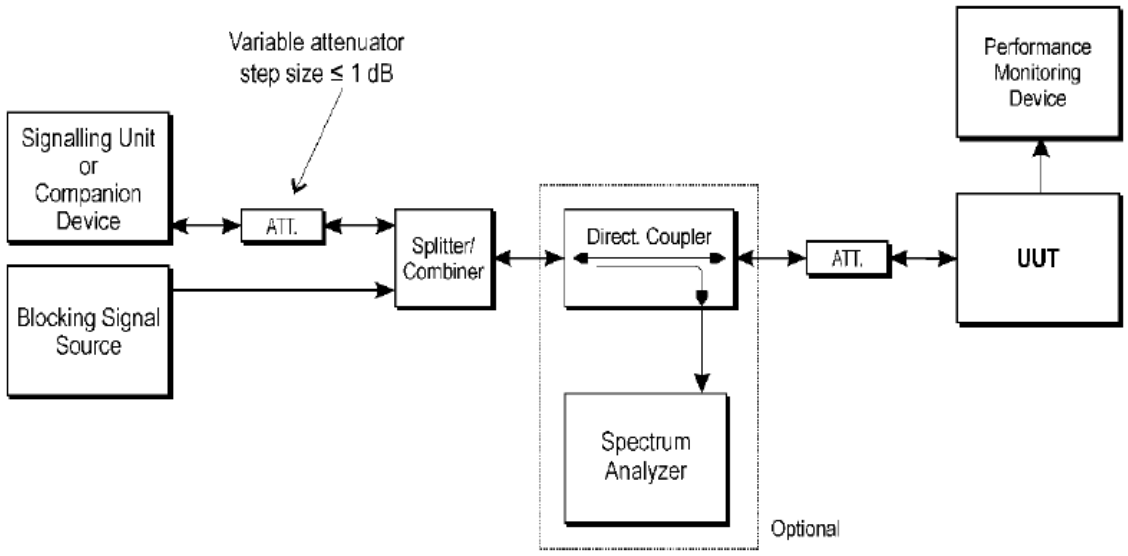
**Table 15: Receiver Blocking parameters receiver category 2 equipment**

| Wanted signal mean power from companion device (dBm) | Blocking signal frequency (MHz) | Blocking signal power (dBm) (see note 2) | Type of blocking signal |
|---|---|---|---|
| $P_{min}$ + 6 dB | 2 380<br>2 503,5 | -57 | CW |
| $P_{min}$ + 6 dB | 2 300<br>2 583,5 | -47 | CW |

NOTE 1: $P_{min}$ is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.2.11.3 in the absence of any blocking signal.

NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.

## Block Diagram




## Instrumentation

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| No. | Asset # | Description | Manufacturer | Model # | Serial # | Cal Date | Cal Due Date | Equipment Status |
|---|---|---|---|---|---|---|---|---|
| 1 | EE 960088 | MXE Spectrum Analyzer | Agilent | N9038A | MY51210138 | 2/24/2016 | 2/23/2017 | Active Calibration |
| 2 | CC 000284C | Signal Generator | Agilent | E4421B | MY41000402 | 11/17/2016 | 11/17/2017 | Active Verification |
| 3 | EE 960093 | Splitter/Combiner | mini-circuits | ZFSC-2-10G | SF702900616 | 2/27/2017 | 2/27/2018 | Active Verification |

**Test Parameters**

| | |
|---|---|
| **Mode** | BLE 4.0 |
| **Rx Category** | 2 |
| **Minimum Performance** | 0.1% BER = 30.8% PER |
| **EUT Serial** | 26 |
| **Companion / Monitoring Device** | Litepoint |

**Setup Parameters**

| Frequency (MHz) | Litepoint level | Var. Att (dB) |
|---|---|---|
| 2402 | -43.0 | 17.0 |
| 2480 | -42.5 | 17.0 |

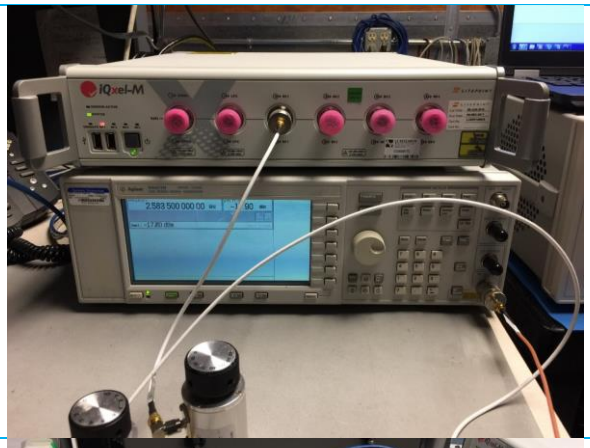
| Frequency (MHz) | Level | Ant Gain | Blocking level | Sig gen setting (dBm) |
|---|---|---|---|---|
| 2380.0 | -57.0 | 2.0 | -55.0 | -27.5 |
| 2503.5 | -57.0 | 2.0 | -55.0 | -27.5 |
| 2300.0 | -47.0 | 2.0 | -45.0 | -18.0 |
| 2583.5 | -47.0 | 2.0 | -45.0 | -17.9 |

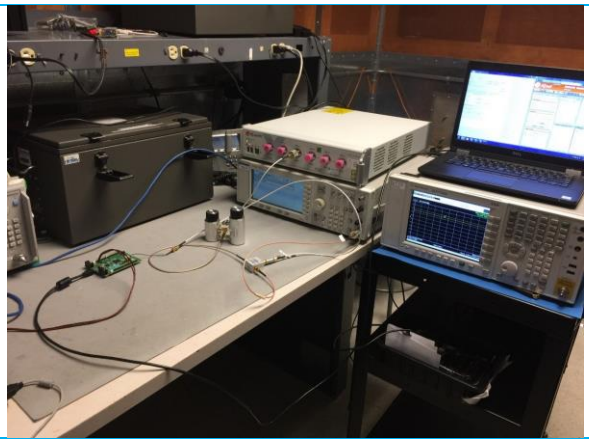
## Results

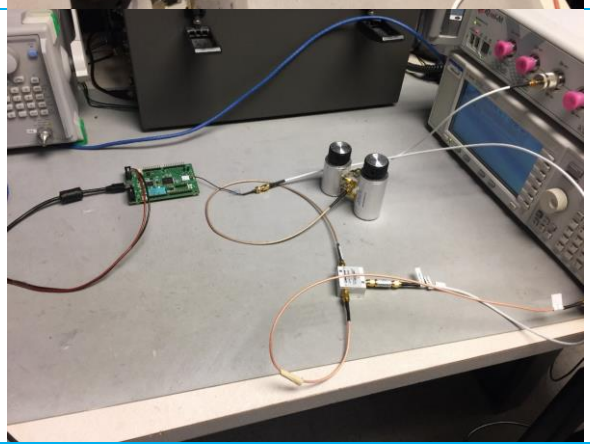
| Data rate | EUT Channel | Result at Blocking frequencies listed | | | |
|---|---|---|---|---|---|
| | | 2380 | 2503.5 | 2300 | 2583.5 |
| BLE 4.0 | 2402 | Pass | Pass | Pass | Pass |
| BLE 4.0 | 2480 | Pass | Pass | Pass | Pass |

| Test Notes | |
|---|---|
| | 1 - Found a 30.8% PER per 0.1% bit error rate based on Bluetooth Sig Spec (see note 4-5). |
| | 2 - Minimum performance declared by customer at 30.8% PER (see note 1). |
| | 3 - In addition to variable attenuation, path has a 20dB pad an cable losses. |
| | 4 - You can calculate the BER directly from the PER. The BT Sig Spec calls for testing sensitivity with a PER limit of 30.8%. This translates to a BER of 0.1% while using the max BLE packet size (37 octet payload). I would recommend just testing PER with a pass/fail threshold of 30.8%. |
| | 5 - The calculation is as follows: Assume a model receiver where all the bits have the same error probability and bit errors are statistically independent events. If any bit in the packet, except for the preamble, is incorrect, the packet will be lost, as the access address has to be error-free if the packet is to be received, and the header and payload is protected with CRC. This means that 368 bits have to received error-free for the maximum length packet to be received correctly. If the bit error rate is 0.1%, or 0.001, this means that the packet error rate is:<br>1-((1-0.001)^368) = 0.308010241105056 |

## Setup Photos





## 5.3 Antenna Port Conducted Emissions – Receiver Blocking WLAN

| | |
|---|---|
| **Operator** | Zach Wilson |
| **QA** | Adam Alger |
| **Test Date** | Feb. 9, 10 2017 |
| **Location** | Screen room |
| **Temp. / R.H.** | 20-25° C / 30-50 % R.H. |
| **Requirement** | ETSI EN 300 328 V2.1.1 Section 4.3.2.11 |
| **Method** | ETSI EN 300 328 V2.1.1 Section 5.4.11 |

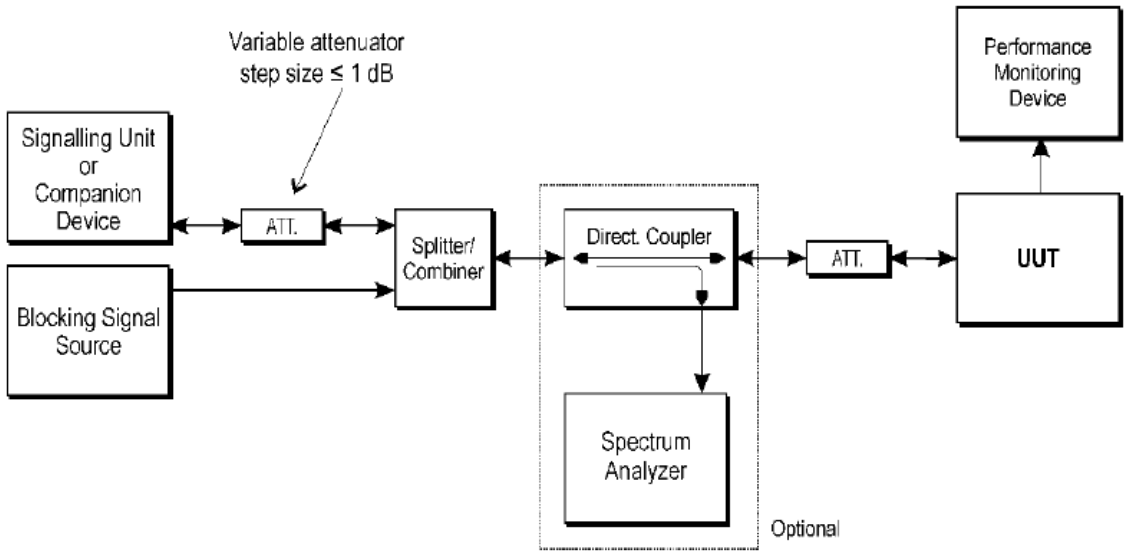
**Receiver Blocking parameters receiver category 1 equipment**

| Wanted signal mean power from companion device (dBm) | Blocking signal frequency (MHz) | Blocking signal power (dBm) (see note 2) | Type of blocking signal |
|---|---|---|---|
| $P_{min}$ + 6 dB | 2 380<br>2 503,5 | -53 | CW |
| $P_{min}$ + 6 dB | 2 300<br>2 330<br>2 360 | -47 | CW |
| $P_{min}$ + 6 dB | 2 523,5<br>2 553,5<br>2 583,5<br>2 613,5<br>2 643,5<br>2 673,5 | -47 | CW |

NOTE 1: $P_{min}$ is the minimum level of wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.

## Block Diagram




## Instrumentation

| No. | Asset # | Description | Manufacturer | Model # | Serial # | Cal Date | Cal Due Date | Equipment Status |
|---|---|---|---|---|---|---|---|---|
| 1 | EE 960088 | MXE Spectrum Analyzer | Agilent | N9038A | MY51210138 | 2/24/2016 | 2/23/2017 | Active Calibration |
| 2 | CC 000284C | Signal Generator | Agilent | E4421B | MY41000402 | 11/17/2016 | 11/17/2017 | Active Verification |
| 3 | EE 960093 | Splitter/Combiner | mini-circuits | ZFSC-2-10G | SF702900616 | 2/27/2017 | 2/27/2018 | Active Verification |

**Test Parameters**

| | |
|---|---|
| **Mode** | WLAN 802.11bgn (1 Mbps, 6 Mbps, MCS 0 HT 20) |
| **Rx Category** | 1 |
| **Minimum Performance** | 10% PER |
| **EUT Serial** | 16 |
| **Companion / Monitoring Device** | Litepoint |

**Setup Parameters**

| 1 MBPS Data Rate | | |
|---|---|---|
| Frequency (MHz) | Litepoint level | Attenuation (dB) |
| 2412 | -43.5 | 17 |
| 2472 | -43 | 17 |

| 6 MBPS Data Rate | | |
|---|---|---|
| Frequency (MHz) | Litepoint level | Attenuation (dB) |
| 2412 | -38.5 | 17 |
| 2472 | -37.5 | 17 |

| MCSO HT20 MBPS Data Rate | | |
|---|---|---|
| Frequency (MHz) | Litepoint level | Attenuation (dB) |
| 2412 | -38.5 | 17 |
| 2472 | -37.5 | 17 |

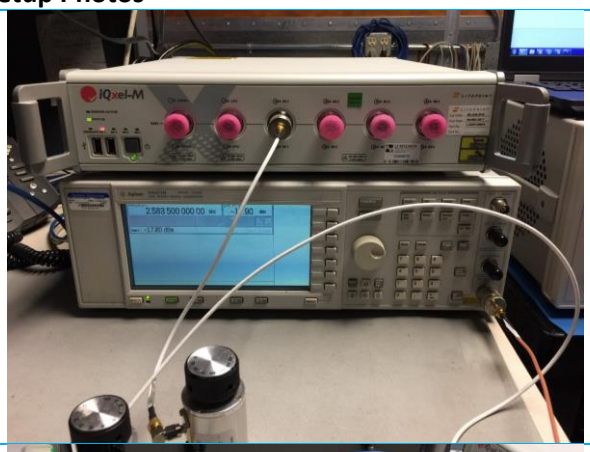
**Setup Parameters**

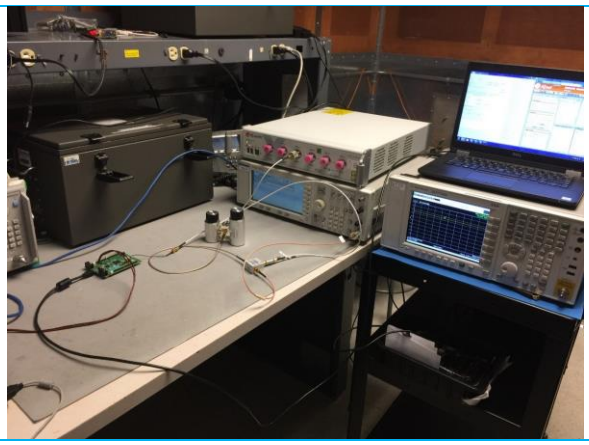
| Frequency (MHz) | Level | Ant Gain | Blocking level | Sig gen setting (dBm) |
|---|---|---|---|---|
| 2380.0 | -53.0 | 2.0 | -51.0 | -23.8 |
| 2503.5 | -53.0 | 2.0 | -51.0 | -23.9 |
| 2300.0 | -47.0 | 2.0 | -45.0 | -17.8 |
| 2330.0 | -47.0 | 2.0 | -45.0 | -17.8 |
| 2360.0 | -47.0 | 2.0 | -45.0 | -17.7 |
| 2523.5 | -47.0 | 2.0 | -45.0 | -17.7 |
| 2553.5 | -47.0 | 2.0 | -45.0 | -17.7 |
| 2583.5 | -47.0 | 2.0 | -45.0 | -17.7 |
| 2613.5 | -47.0 | 2.0 | -45.0 | -17.7 |
| 2643.5 | -47.0 | 2.0 | -45.0 | -17.6 |
| 2673.5 | -47.0 | 2.0 | -45.0 | -17.6 |

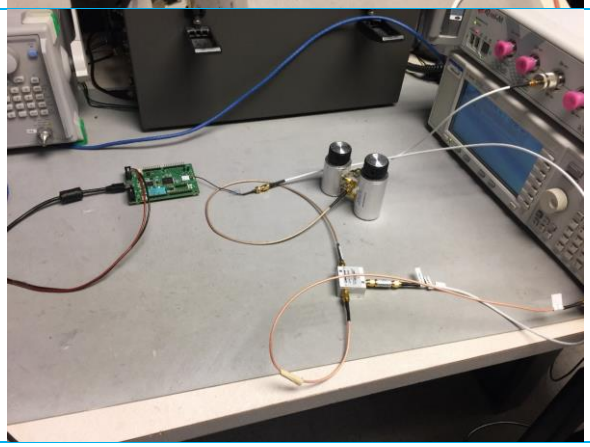
**Results**

| Mode | Data rate | EUT Channel | Result at Blocking frequencies listed | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2380 | 2503.5 | 2300 | 2330 | 2360 | 2523.5 | 2553.5 | 2583.5 | 2613.5 | 2643.5 | 2673.5 |
| 802.11b | 1MBPS | 2412 | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass |
| 802.11g | 6MBPS | 2412 | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass |
| 802.22n | MCS0 HT20 | 2412 | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass |
| 802.11b | 1MBPS | 2472 | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass |
| 802.11g | 6MBPS | 2472 | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass |
| 802.22n | MCS0 HT20 | 2472 | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass | Pass |

**Setup Photos**





## 5.4 Radiated Immunity

**Description of Measurement**

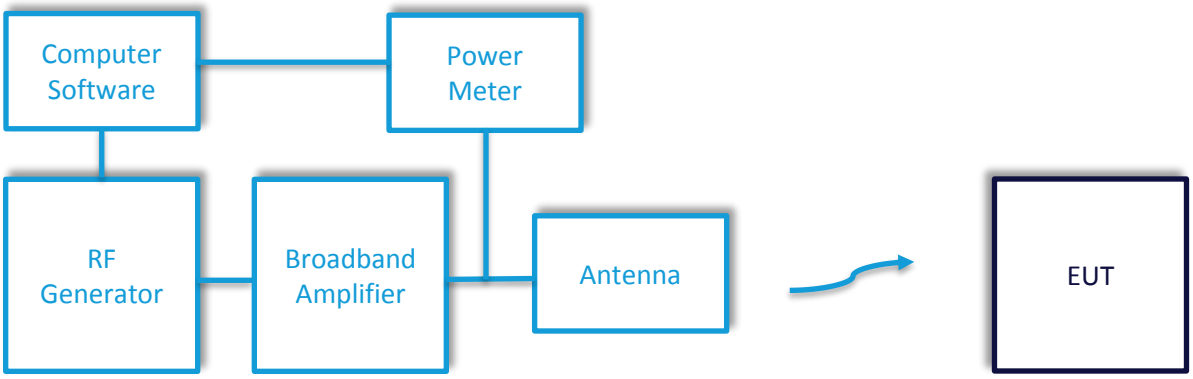
The EUT is illuminated with uniform electromagnetic radiation by means of a RF generator, power amplifier, and field generating antenna.

Ferrite panels and/or absorbers are placed on the ground between the antenna and EUT to achieve a uniform field area. The UFA is measured with an isotropic probe positioned in a planar grid at the desired test distance.

The power required to create a uniform test field strength is stored in a calibration file for each frequency and antenna polarity.

The response of the EUT during and after test is observed, recorded, and compared to the defined performance criteria.

**Block Diagram**



### 5.4.1 Radiated Immunity (Bluetooth)

| | |
|---|---|
| **Operator** | Zach Wilson |
| **QA** | Shane Dock |
| **Test Date** | 5/25/2017 (BT) |
| **Location** | Chamber 5 |
| **Temp. / R.H.** | 70° F / 45 % |
| **Requirement** | ETSI EN 301 489-17, ETSI EN 301 489-1 |
| **Method** | EN 61000-4-3 |

**Test Parameters**

| | |
|---|---|
| **Frequency** | 1.0 - 6.0 GHz, Exclusion Band 2280-2603.5 MHz |
| **Level** | 3 V/m (horizontal and vertical antenna polarity) |
| **Modulation** | 80% 1 kHz Sine Wave |
| **Step / Dwell** | Logarithmic 1%, 3 sec |
| **Power** | USB |
| **Tx Mode** | BT Classic (BLE mode not tested) |
| **Monitoring** | Using BlueTool to Tx and Rx with another LWB unit. EUT not to drop link. |
| **EUT Orientation** | Front, Back |

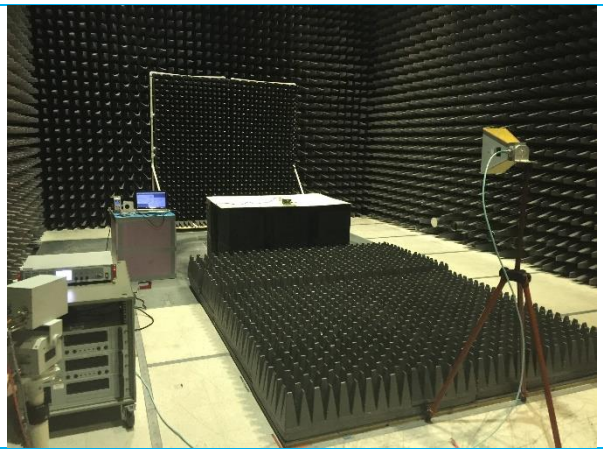
**Instrumentation**

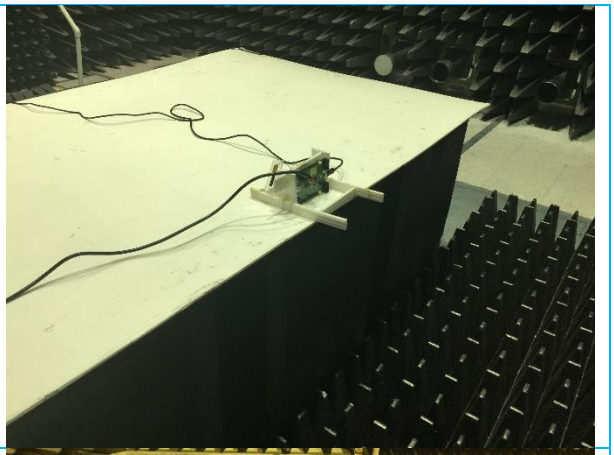
Laird
Smart Technology. Delivered.

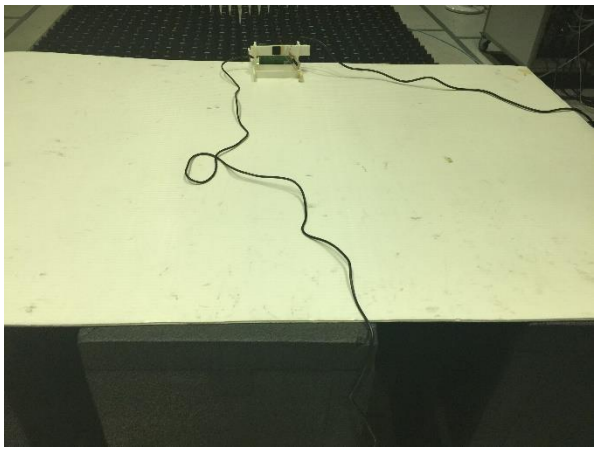
| No. | Asset # | Description | Manufacturer | Model # | Serial # | Cal Date | Cal Due Date | Equipment Status |
|---|---|---|---|---|---|---|---|---|
| 1 | EE 960098 | RF Generator | Teseq | ITS 6006 | 33022 | 1/23/2017 | 1/23/2018 | Active Calibration |
| 2 | EE 960099 | Power Meter | Teseq | PM 6006 | 73409 | 1/23/2017 | 1/23/2018 | Active Calibration |
| 3 | EE 960101 | Power Meter | Teseq | PM 6006 | 73410 | 1/23/2017 | 1/23/2018 | Active Calibration |
| 4 | AA 960081 | Double Ridge Horn Antenna | EMCO | 3115 | 6907 | 3/17/2017 | 3/17/2018 | Active Calibration |
| 5 | EE 960108 | Power Amplifier | Milmega | AS1860-100 | 1060507 | 3/5/2017 | 3/5/2018 | Active Validation |
| 6 | EE 960107 | Power Amplifier | Milmega | AS0102-250 | 1060508 | 3/5/2017 | 3/5/2018 | Active Validation |

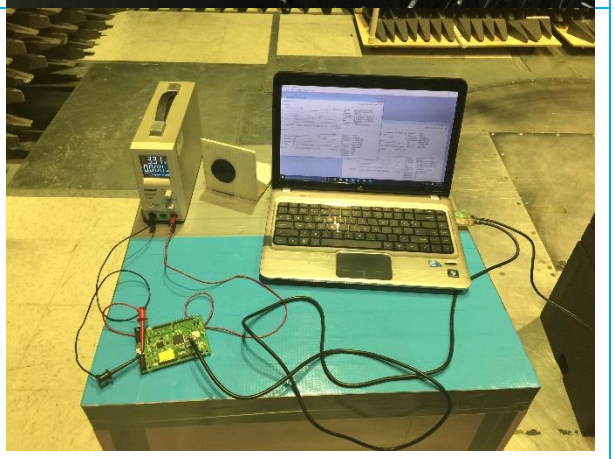
## Setup Photos

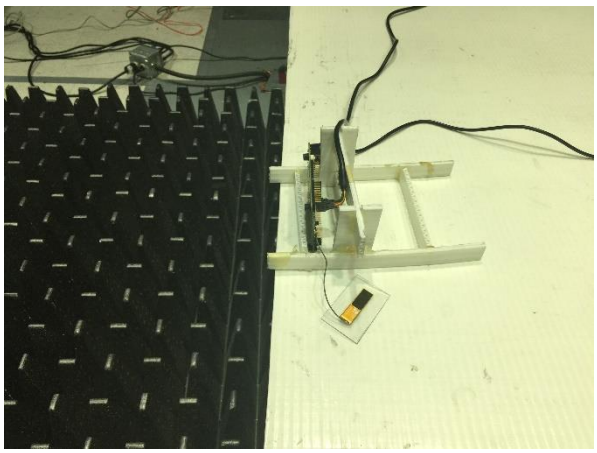
### BT Classic

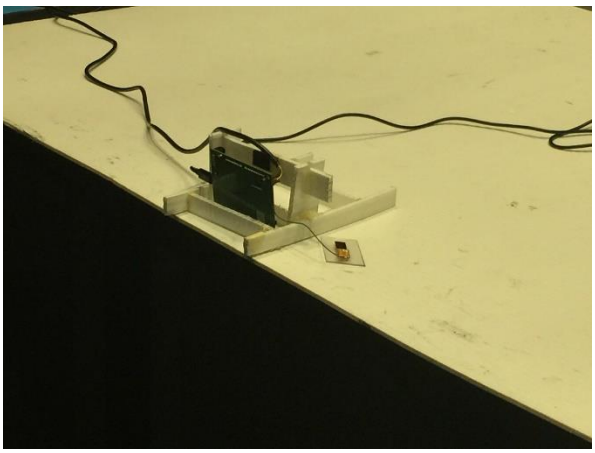












## Radiated Immunity (WLAN)

| | |
|---|---|
| **Operator** | Zach Wilson |
| **QA** | Adam Alger |
| **Test Date** | 6/08/2017 |
| **Location** | Chamber 5 |
| **Temp. / R.H.** | 70° F / 50 % |
| **Requirement** | ETSI EN 301 489-17, ETSI EN 301 489-1 |
| **Method** | EN 61000-4-3 |

### Test Parameters

| | |
|---|---|
| **Frequency** | 1.0 - 6.0 GHz, Exclusion Band 2280-2603.5 MHz |
| **Level** | 3 V/m (horizontal and vertical antenna polarity) |
| **Modulation** | 80% 1 kHz Sine Wave |
| **Step / Dwell** | Logarithmic 1%, 3 sec |
| **Power** | USB |
| **Tx Mode** | WLAN |
| **Monitoring** | Using Cisco AP and iPerf to create a continuos Tx/Rx. EUT set up as client. EUT not to drop link |
| **EUT Orientation** | Front, Back |
| **Note** | Issue at 1220, & 2603.5 - 2683.28 MHz, drops packets but keeps link |

### Instrumentation

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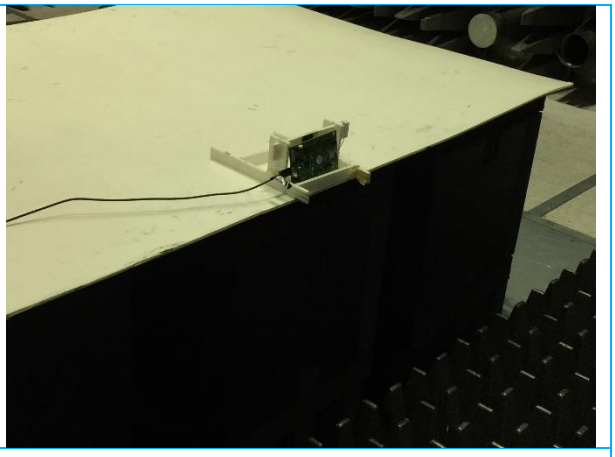
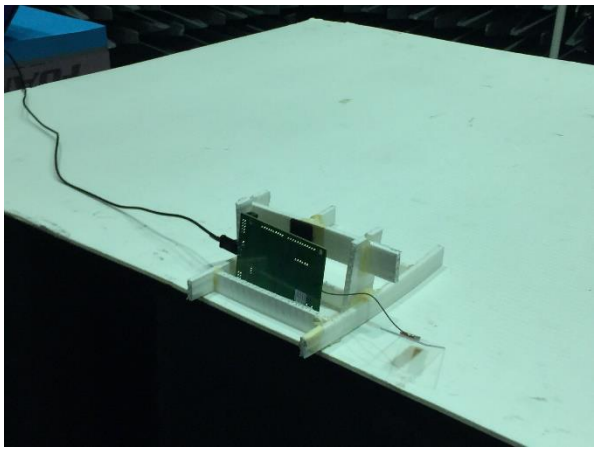
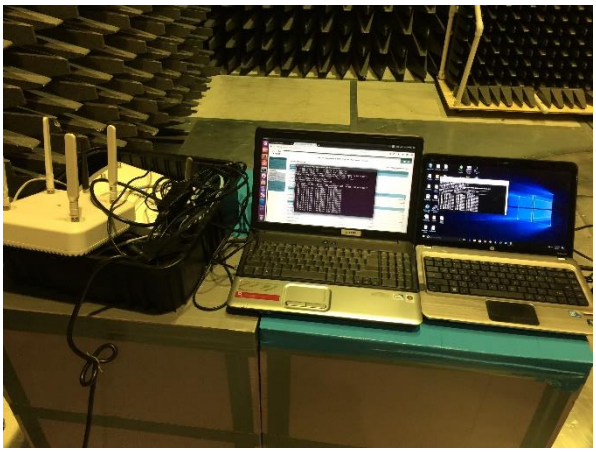
| No. | Asset # | Description | Manufacturer | Model # | Serial # | Cal Date | Cal Due Date | Equipment Status |
|---|---|---|---|---|---|---|---|---|
| 1 | EE 960098 | RF Generator | Teseq | ITS 6006 | 33022 | 1/23/2017 | 1/23/2018 | Active Calibration |
| 2 | EE 960099 | Power Meter | Teseq | PM 6006 | 73409 | 1/23/2017 | 1/23/2018 | Active Calibration |
| 3 | EE 960101 | Power Meter | Teseq | PM 6006 | 73410 | 1/23/2017 | 1/23/2018 | Active Calibration |
| 4 | AA 960081 | Double Ridge Horn Antenna | EMCO | 3115 | 6907 | 3/17/2017 | 3/17/2018 | Active Calibration |
| 5 | EE 960108 | Power Amplifier | Milmega | AS1860-100 | 1060507 | 3/5/2017 | 3/5/2018 | Active Validation |
| 6 | EE 960107 | Power Amplifier | Milmega | AS0102-250 | 1060508 | 3/5/2017 | 3/5/2018 | Active Validation |

## Setup Photos

### WLAN







# 6 REVISION HISTORY

| Version | Date | Notes | Person |
|---|---|---|---|
| V0 | 6/09/2017 | Draft | Adam Alger |
| V1 | 6/11/2017 | Review | Ryan Urness |
| V1 | 6/12/2017 | Release | Adam Alger |

**END OF REPORT**