Test of: Hewlett Packard MRLBB-1303 Wireless Module

To: FCC 47 CFR Part 15.407

Test Report Serial No.: HPWD78-U3 Rev A

# TEST REPORT

FROM

Test of: Hewlett Packard MRLBB-1303 Wireless Module

to

To: FCC 47 CFR Part 15.407

Test Report Serial No.: HPWD78-U3 Rev A

Note: this report contains data with regard to the 5,150 - 5,250, 5,250 - 5,350, 5,470 - 5,725 and 5,725 – 5850 MHz frequency bands for Hewlett Packard, MRLBB-1303 Wireless Access module.

This report supersedes None

Applicant: Hewlett Packard
8000 Foothills Blvd
Roseville, 95747 California
USA

Product Function: WLAN 802.11a/n/ac Module

Copy No: pdf Issue Date: 22nd February 2016

**This Test Report is Issued Under the Authority of;**

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ACCREDITED
TESTING CERT #2381.01

**MiCOM Labs is an ISO 17025 Accredited Testing Laboratory**

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# ACCREDITATION, LISTINGS & RECOGNITION

## Testing Accreditation

MiCOM Labs, Inc. is an accredited Electrical testing laboratory per the international standard EN ISO/IEC 17025. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; http://www.a2la.org/scopepdf/2381-01.pdf

ilac-MRA A2LA

**Accredited Laboratory**

A2LA has accredited

**MICOM LABS**

*Pleasanton, CA*

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 4th day of February 2016.

Senior Director of Quality & Communications
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2017

*For the tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.*

## Recognition

MiCOM Labs, Inc has widely recognized Electrical testing capabilities. Our international recognition includes Conformity Assessment Body designation by APEC MRA** countries. Our test reports are widely accepted for global type approvals.

| Country | Recognition Body | Status | Phase | Identification No. |
|---|---|---|---|---|
| USA | Federal Communications Commission (FCC) | TCB | - | US0159 Listing #: 102167 |
| Canada | Industry Canada (IC) | FCB | APEC MRA 2 | US0159 Listing #: 4143A-2 |
| Japan | MIC (Ministry of Internal Affairs and Communication) | CAB | APEC MRA 2 | RCB 210 |
| | VCCI | -- | -- | A-0012 |
| Europe | European Commission | NB | EU MRA | NB 2280 |
| Australia | Australian Communications and Media Authority (ACMA) | CAB | APEC MRA 1 | US0159 |
| Hong Kong | Office of the Telecommunication Authority (OFTA) | CAB | APEC MRA 1 | |
| Korea | Ministry of Information and Communication Radio Research Laboratory (RRL) | CAB | APEC MRA 1 | |
| Singapore | Infocomm Development Authority (IDA) | CAB | APEC MRA 1 | |
| Taiwan | National Communications Commission (NCC) Bureau of Standards, Metrology and Inspection (BSMI) | CAB | APEC MRA 1 | |
| Vietnam | Ministry of Communication (MIC) | CAB | APEC MRA 1 | |

**APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement.
Is a recognition agreement under which test lab is accredited to regulatory standards of the APEC member countries.
Phase I - recognition for product testing
Phase II – recognition for both product testing and certification
N/A – Not Applicable

**EU MRA – European Union Mutual Recognition Agreement.
Is a recognition agreement under which test lab is accredited to regulatory standards of the EU member countries.

**NB – Notified Body

## Product Certification

MiCOM Labs, Inc. is an accredited Product Certification Body per the international standard EN ISO/IEC Guide 65. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.02. MiCOM Labs test schedule is available at the following URL; http://www.a2la.org/scopepdf/2381-02.pdf

Accredited Product Certification Body

A2LA has accredited

MICOM LABS

Pleasanton, CA

This product certification body is accredited in accordance with the recognized International Standard ISO/IEC 17065:2012 *Requirements for bodies certifying products, processes and services*. This accreditation demonstrates technical competence for a defined scope and the operation of a management system.

Presented this 4th day of February 2016.

Senior Director of Quality & Communications
For the Accreditation Council
Certificate Number 2381.02
Valid to November 30, 2017

*For the product certification schemes to which this accreditation applies, please refer to the organization's Product Certification Scope of Accreditation.*

**USA Telecommunication Certification Body (TCB)** - TCB Identifier – US0159

**Industry Canada Certification Body** - CAB Identifier – US0159

**European Notified Body** - Notified Body Identifier - 2280

**Japan – Recognized Certification Body (RCB)** - RCB Identifier - 210

# DOCUMENT HISTORY

| Document History | | |
|---|---|---|
| **Revision** | **Date** | **Comments** |
| | | |
| Draft | 21st February 2016 | |
| Rev A | 22nd February 2016 | Update to original report to align with new FCC rules. Frequency band 5725 – 5850 MHz was tested under the UNII Band for the following series of tests;<br>1).. Conducted<br>2).. Radiated<br>3).. DFS radar testing;<br>- tested new Type 1 radar signature<br>- spot checked the existing DFS signatures |
| | | |
| | | |
| | | |
| This report was originally release as HPWD41-U6, see below | | |
| Draft | 13th September 2013 | |
| Rev A | 1st October 2013 | Initial release |
| Rev B | 16th October 2013 | Implemented FCC KDB 644545<br>"Guidance for IEEE 802.11ac and Pre-ac Device Emissions Testing" |
| | | |

# 1. TEST RESULT CERTIFICATE

| | | | |
|---|---|---|---|
| Applicant: | Hewlett Packard<br>8000 Foothills Blvd<br>Roseville, 95747 California<br>USA | Tested By: | MiCOM Labs, Inc.<br>575 Boulder Court<br>Pleasanton<br>California, 94566, USA |
| EUT: | WLAN 802.11a/n/ac Module | Tel: | +1 925 462 0304 |
| Model: | MRLBB-1303 | Fax: | +1 925 462 0306 |
| S/N: | Not Available | | |
| Test Date(s): | 18th June - 16th October 2013<br>12th February 2016 | Website: | www.micomlabs.com |

| STANDARD(S) | TEST RESULTS |
|---|---|
| FCC 47 CFR Part 15.407 | EQUIPMENT COMPLIES |

MiCOM Labs, Inc. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

**Notes:**

1. This document reports conditions under which testing was conducted and the results of testing performed.
2. Details of test methods used have been recorded and kept on file by the laboratory.
3. Test results apply only to the item(s) tested.

ACCREDITED
TESTING CERT #2381.01

**Approved & Released for MiCOM Labs, Inc. by:**

Graeme Grieve
Quality Manager MiCOM Labs,

Gordon Hurst
President & CEO MiCOM Labs, Inc.

# 2. REFERENCES AND MEASUREMENT UNCERTAINTY

## 2.1. Normative References

| Ref. | Publication | Year | Title |
|---|---|---|---|
| **(i)** | FCC 47 CFR Part 15.407 | 2012 | Code of Federal Regulations |
| **(ii)** | FCC 06-96 | June 2006 | Memorandum Opinion and Order |
| **(iii)** | FCC OET KDB 662911 | 4th April 2011 | Emissions Testing of Transmitters with Multiple Outputs in the Same Band |
| **(iv)** | Industry Canada RSS-210 | 2010 | Low Power License-Exempt Radiocommunication Devices (All Frequency Bands): Category 1 Equipment |
| **(v)** | Industry Canada RSS-Gen | 2010 | General Requirements and Information for the Certification of Radiocommunication Equipment |
| **(vi)** | ANSI C63.4 | 2009 | American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz |
| **(vii)** | CISPR 22/ EN 55022 | 2008 2006+A1:2007 | Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment |
| **(viii)** | M 3003 | Edition 1 Dec. 1997 | Expression of Uncertainty and Confidence in Measurements |
| **(ix)** | LAB34 | Edition 1 Aug 2002 | The expression of uncertainty in EMC Testing |
| **(x)** | ETSI TR 100 028 | 2001 | Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics |
| **(xi)** | A2LA | July 2012 | Reference to A2LA Accreditation Status – A2LA Advertising Policy |
| **(xii)** | FCC Public Notice – DA 02-2138 | 2002 | Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices |

## 2.2. Test and Uncertainty Procedures

Conducted and radiated emission measurements were conducted in accordance with American National Standards Institute ANSI C63.4, listed in the Normative References section of this report.

Measurement uncertainty figures are calculated in accordance with ETSI TR 100 028 Parts 1 and 2.

Measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95 % in accordance with UKAS document M 3003 listed in the Normative References section of this report.

# 3. PRODUCT DETAILS AND TEST CONFIGURATIONS

## 3.1. Technical Details

| Details | Description |
|---|---|
| Purpose: | Test of the Hewlett Packard MRLBB-1303 Wireless Module in the frequency range 5,150 - 5,250, 5,250 – 5,350 and 5,470 - 5725 MHz to FCC Part 15.407 and Industry Canada RSS-210 regulations. |
| Applicant: | Hewlett Packard<br>8000 Foothills Blvd<br>Roseville, 95747 California,USA |
| Manufacturer: | As applicant |
| Laboratory performing the tests: | MiCOM Labs, Inc.<br>575 Boulder Court<br>Pleasanton, California 94566 USA |
| Test report reference number: | HPWD78-U3 Rev A |
| Date EUT received: | 12th June 2013 |
| Standard(s) applied: | FCC 47 CFR Part 15.407 & IC RSS-210 |
| Dates of test (from - to): | 18th June - 16th October 2013 |
| No of Units Tested: | One |
| Type of Equipment: | 802.11a/n/ac Wireless Access Point 3x3 Spatial Multiplexing MIMO configuration |
| Applicants Trade Name: | Wireless Access Point |
| Model(s): | MRLBB-1303 |
| Location for use: | Indoor only |
| Declared Frequency Range(s): | 5150–5250, 5250- 5350, 5470 – 5725, 5725-5850 MHz |
| Hardware Rev | LP2 |
| Software Rev | LSDK 10.1.357 |
| Type of Modulation: | Per 802.11 – OFDM |
| EUT Modes of Operation: | 802.11a, 802.11n HT-20, HT-40, VHT-40, VHT-80 |
| Declared Nominal Output Power: (Average Power) | 802.11a Legacy, HT-20: +20 dBm<br>802.11n: HT-40/VHT-40 +20 dBm<br>802.11n: VHT-80 +20 dBm |
| Transmit/Receive Operation: | Time Division Duplex |
| Rated Input Voltage and Current: | 3.3 Vdc ±10% |
| Operating Temperature Range: | Declared range 0° to +55ºC |
| ITU Emission Designator: | 802.11a 16M9D1D<br>802.11n HT-20 18M0D1D<br>802.11n HT-40 36M5D1D<br>802.11ac-40 36M5D1D<br>802.11ac-80 76M6D1D |
| Equipment Dimensions: | 50mm wide, 55.8mm length, 4mm thick |
| Weight: | 0.40 ounces |
| Primary function of equipment: | Wireless Access Point for transmitting data and voice. |

## 3.2. Scope of Test Program

**Hewlett Packard MRLBB-1303 Wireless Module RF Testing**
The scope of the test program was to test the Hewlett Packard MRLBB-1303Wireless LAN Access Point, 3X3 Spatial Multiplexing MIMO configurations in the frequency range 5,150 - 5,250, 5,250 – 5,350 5,470 – 5,725 and 5,725 – 5,850 MHz for compliance against FCC 47 CFR Part 15.407 specification.

**FCC OET KDB Implementation**
This test program implements the following FCC KDB – 662911 4/4/2011;
***Emissions Testing of Transmitters with Multiple Outputs in the Same Band***

The KDB document provides guidance for measurements of conducted output emissions of devices that employ a single transmitter with multiple outputs in the same band, with the outputs occupying the same or overlapping frequency ranges. It applies to EMC compliance measurements on devices that transmit on multiple antennas simultaneously in the same or overlapping frequency ranges through a coordinated process. Examples include, but are not limited to, devices employing beam forming or multiple-input and multiple-output (MIMO.) This guidance applies to both licensed and unlicensed devices wherever the FCC rules call for conducted output measurements. Guidance is provided for in-band, out-of-band and spurious emission measurements.

This guidance does not apply to the multiple transmitters included in a composite device, such as a device that combines an 802.11 modem with a cell phone in one enclosure with each driving its own antenna.

Hewlett Packard Inc
MRLBB-1303 802.11 a/n/ac Wireless Module

Hewlett Packard Inc
MRLBB-1303 802.11 a/n/ac Wireless Module

## 3.3. Equipment Model(s) and Serial Number(s)

| Equipment Type | Equipment Description (Including Brand Name) | Mfr | Model No. | Serial No. |
|---|---|---|---|---|
| EUT | Wireless LAN Access Point | Hewlett Packard | MRLBB-1303 | Not Available |
| Support | Laptop PC | IBM | Thinkpad | None |

## 3.4. Antenna Details

| Model | Type | Gain | Freq. Band | Note |
|---|---|---|---|---|
| | | dBi | MHz | |
| 5184-6684 | PIFA | 7.4 | 5150 - 5350 | |
| 5184-6684 | PIFA | 7.81 | 5470 - 5725 | |
| 5184-6684 | PIFA | 7.79 | 5725 - 5850 | |

## 3.5. Cabling and I/O Ports

Number and type of I/O ports

1. 3 x u.FL RF connectors

## 3.6. Test Configurations

Testing was performed to determine the highest power level versus bit rate. The variant with the highest power was used to exercise the product.

Matrix of test configurations

| Operational Mode(s) (802.11) | Variant | Data Rates with Highest Power | Frequencies (MHz) |
|---|---|---|---|
| 5150-5250 | 802.11a | 6 MBit/s | 5180, 5200, 5240 |
| | HT-20 | 6.5 MBit/s | |
| | HT-40 | 13.5 MBit/s | 5190, 5230 |
| | VHT-40 | | |
| | VHT-80 | 29.3 MBit/s | 5,210 |
| 5250-5350<br>5470-5725 | 802.11a | 6 MBit/s | 5260,5280,5300,5320<br>5500,5580,5720* |
| | 802.11n HT-20 | 6.5 MBit/s | |
| | 802.11n HT-40 | 13.5 MBit/s | 5270,5310<br>5510,5550,5710* |
| | VHT-40 | | |
| | VHT-80 | 29.3 MBit/s | 5290<br>5530, 5690* |
| 5725-5850 | 802.11a | 6 MBit/s | 5745, 5785, 5825 |
| | 802.11n HT-20 | 6.5 MBit/s | |
| | 802.11n HT-40 | 13.5 MBit/s | 5755, 5795 |
| | VHT-40 | | |
| | VHT-80 | 29.3 MBit/s | 5775 |

***Note:*** Testing 802.11 a, n (HT-20, HT-40), VHT-40, VHT-80 all straddles the 5725 MHz band-edge. This is recognized by the FCC and is covered under FCC KDB 644545 Guidance for 802.11ac and Pre-ac Device Emission Testing

**Spurious Emission and Band-Edge Test Strategy**

**Bands 5,150 – 5250**

| 11a | 11n HT-20 | 11n HT-40 | 11ac-40 | 11ac-80 |
|---|---|---|---|---|
| SE 5180 | SE 5180 | SE 5190 | SE 5190 | SE 5210 |
| SE 5200 | SE 5200 | -- | -- | -- |
| SE 5240 | SE 5240 | SE 5230 | SE 5230 | -- |
| BE 5150 | BE 5150 | BE 5150 | BE 5150 | BE 5150 |

**Bands 5,250 – 5,350**

| 11a | 11n HT-20 | 11n HT-40 | 11ac-40 | 11ac-80 |
|---|---|---|---|---|
| SE 5260 | SE 5260 | SE 5270 | SE 5270 | SE 5290 |
| SE 5300 | SE 5300 | -- | -- | -- |
| SE 5320 | SE 5320 | SE 5310 | SE 5310 | -- |
| BE 5350 | BE 5350 | BE 5350 | BE 5350 | BE 5350 |

**Band 5,470 – 5,725**

| 11a | 11n HT-20 | 11n HT-40 | 11ac-40 | 11ac-80 |
|---|---|---|---|---|
| SE 5500 | SE 5500 | SE 5510 | SE 5510 | SE 5530 |
| SE 5580 | SE 5580 | SE 5550 | SE 5550 | -- |
| SE 5720 | SE 5720 | SE 5710 | SE 5710 | SE 5690 |
| BE 5470 | BE 5470 | BE 5470 | BE 5470 | BE 5470 |

**Band 5,725 – 5,850**

| 11a | 11n HT-20 | 11n HT-40 | 11ac-40 | 11ac-80 |
|---|---|---|---|---|
| SE 5745 | -- | -- | -- | -- |
| SE 5785 | -- | -- | -- | -- |
| SE 5825 | -- | -- | -- | -- |
| BE 5725 | BE 5725 | BE 5725 | BE 5725 | BE 5725 |
| BE 5850 | BE 5850 | BE 5850 | BE 5850 | BE 5850 |

KEY:-

SE – Spurious Emissions

BE – Band-Edge

## 3.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:

1. NONE

## 3.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:

1. NONE

## 3.9. Subcontracted Testing or Third Party Data

1. NONE

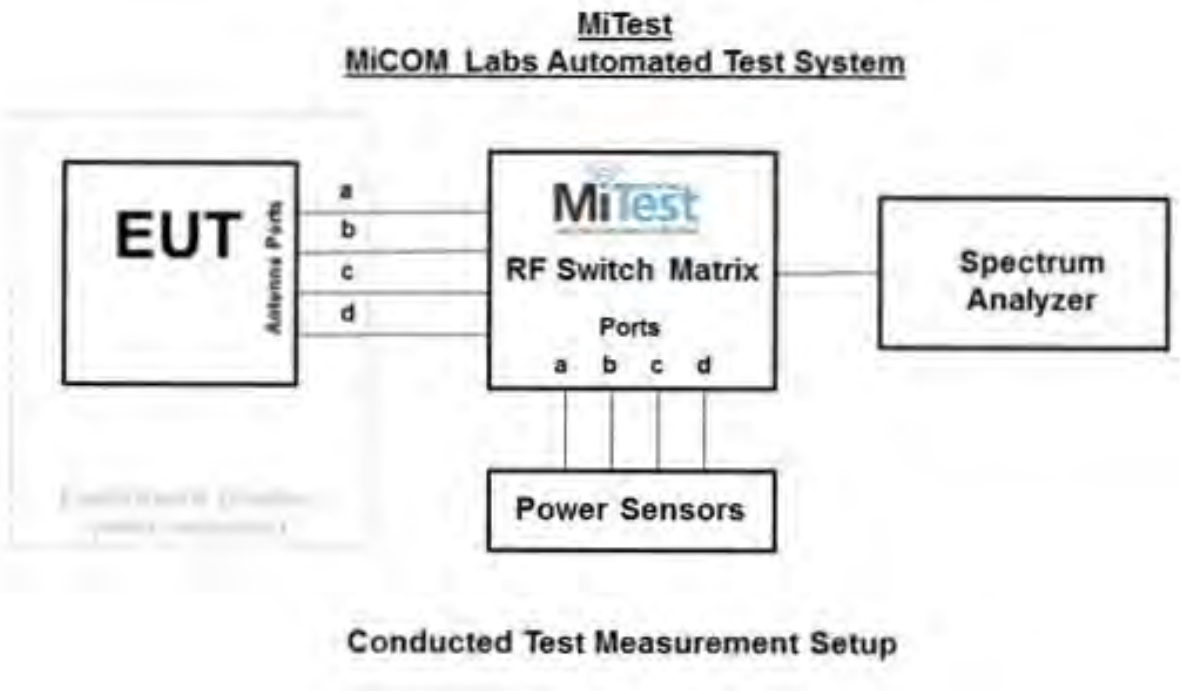
# 4. TESTING EQUIPMENT CONFIGURATION(S)

## 4.1. Conducted RF Emission Test Set-up

The following tests were performed using the conducted test set-up shown in the diagram below.

1. Section 7.1.1.1. 26 dB and 99% Bandwidth
2. Section 7.1.1.2. Maximum Conducted Output Power
3. Section 7.1.1.3. Peak Power Spectral Density

**Conducted Test Set-Up Pictorial Representation**




**Conducted Test Measurement Setup**

A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.

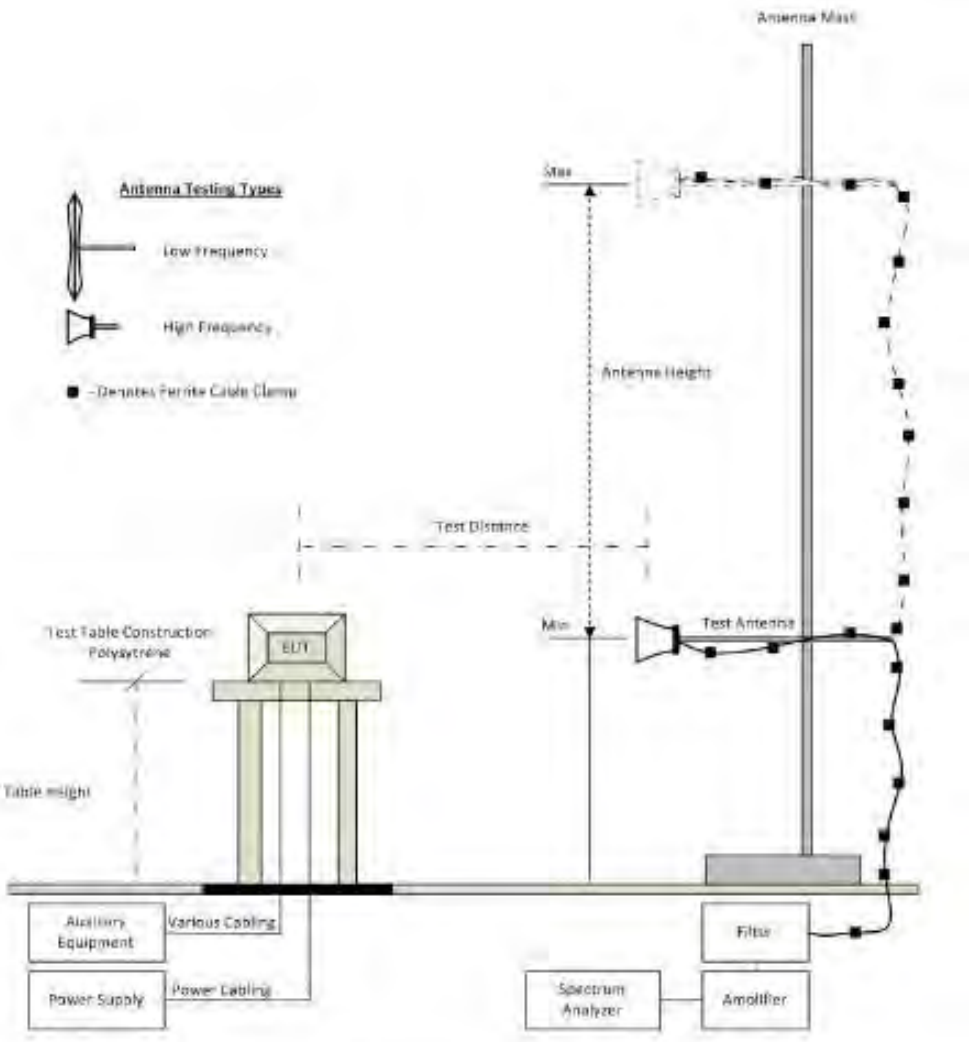
| Asset# | Description | Manufacturer | Model# | Serial# | Calibration Due Date |
|---|---|---|---|---|---|
| 158 | Barometer/Thermometer | Control Company | 4196 | E2846 | 01 Dec 2016 |
| 287 | Rohde & Schwarz 40 GHz Receiver | Rhode & Schwarz | ESIB40 | 100201 | 27 Aug 2016 |
| 376 | USB 10MHz - 18GHz Average Power Sensor | Agilent | U2000A | MY51440005 | 23 Oct 2016 |
| 381 | 4x4 RF Switch Box | MiCOM Labs | MiTest RF Switch Box | MIC002 | 18 Jun 2016 |
| 419 | Laptop with Labview Software | Lenova | W520 | TS02 | Not Required |
| 420 | USB to GPIB Interface | National Instruments | GPIB-USB HS | 1346738 | Not Required |
| 435 | USB Wideband Power Sensor | Boonton | 55006 | 8730 | 31 Jul 2016 |
| 440 | USB Wideband Power Sensor | Boonton | 55006 | 9178 | 25 Sep 2016 |
| 441 | USB Wideband Power Sensor | Boonton | 55006 | 9179 | 25 Sep 2016 |
| 442 | USB Wideband Power Sensor | Boonton | 55006 | 9181 | 25 Sep 2016 |
| 460 | Dell Computer with installation of MiTest executable. | Dell | Optiplex330 | BC944G1 | Not Required |
| RF#2 GPIB#1 | GPIB cable to Power Supply | HP | GPIB | None | Not Required |
| RF#2 SMA#1 | EUT to Mitest box port 1 | Flexco | SMA Cable port1 | None | 18 Jun 2016 |
| RF#2 SMA#2 | EUT to Mitest box port 2 | Flexco | SMA Cable port2 | None | 18 Jun 2016 |
| RF#2 SMA#3 | EUT to Mitest box port 3 | Flexco | SMA Cable port3 | None | 18 Jun 2016 |
| RF#2 SMA#4 | EUT to Mitest box port 4 | Flexco | SMA Cable port4 | None | 18 Jun 2016 |
| RF#2 SMA#SA | Mitest box to SA | Flexco | SMA Cable SA | None | 18 Jun 2016 |
| RF#2 USB#1 | USB Cable to Mitest Box | Dynex | USB Cable | None | Not Required |

## 4.2. Radiated Spurious Emission Test Set-up

The following tests were performed using the conducted test set-up shown in the diagram below.

1. Section 7.1.2 Radiated Emissions

**Radiated Emission Measurement Setup**




**Radiated Emission Test Setup**

A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.

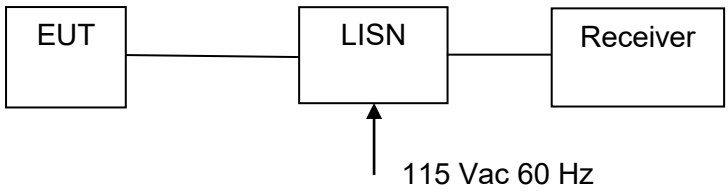
| Asset# | Description | Manufacturer | Model# | Serial# | Calibration Due Date |
|---|---|---|---|---|---|
| 158 | Barometer/Thermometer | Control Company | 4196 | E2846 | 01 Dec 2016 |
| 170 | Video System Controller for Semi Anechoic Chamber | Panasonic | WV-CY101 | 04R08507 | Not Required |
| 377 | Band Rejection Filter 5150 to 5880MHz | Microtronics | BRM50716 | 034 | 18 Aug 2016 |
| 378 | Rohde & Schwarz 40 GHz Receiver with Generator | Rhode & Schwarz | ESIB40 | 100107/040 | 04 Aug 2016 |
| 399 | ETS 1-18 GHz Horn Antenna | ETS | 3117 | 00154575 | 10 Oct 2016 |
| 406 | Amplifier for Radiated Emissions | MiCOM Labs | 40dB 1 to 18GHz Amp | 0406 | 28 May 2016 |
| 410 | Desktop Computer | Dell | Inspiron 620 | WS38 | Not Required |
| 411 | Mast/Turntable Controller | Sunol Sciences | SC98V | 060199-1D | Not Required |
| 412 | USB to GPIB Interface | National Instruments | GPIB-USB HS | 11B8DC2 | Not Required |
| 413 | Mast Controller | Sunol Science | TWR95-4 | 030801-3 | Not Required |
| 415 | Turntable Controller | Sunol Sciences | Turntable Controller | None | Not Required |
| 416 | Gigabit ethernet filter | ETS-Lingren | Gigafoil 260366 | None | Not Required |
| 447 | Rad Emissions Test Software | MiCOM | Rad Emissions Test Software Version 1.0.73 | 447 | Not Required |
| 462 | Schwarzbeck cable from Antenna to Amplifier. | Schwarzbeck | AK 9513 | 462 | 25 Feb 2016 |
| 463 | Schwarzbeck cable from Amplifier to Bulkhead. | Schwarzbeck | AK 9513 | 463 | 25 Feb 2016 |
| 464 | Schwarzbeck cable from Bulkhead to Receiver | Schwarzbeck | AK 9513 | 464 | 25 Feb 2016 |
| 480 | Cable - Bulkhead to Amp | SRC Haverhill | 157-157-3050360 | 480 | 11 Aug 2016 |
| 481 | Cable - Bulkhead to Receiver | SRC Haverhill | 151-151-3050787 | 481 | 11 Aug 2016 |
| 482 | Cable - Amp to Antenna | SRC Haverhill | 157-157-3051574 | 482 | 11 Aug 2016 |

## 4.3. ac Wireline Emission Test Set-up

The following tests were performed using the conducted test set-up shown in the diagram below.

1. Section 7.1.3 ac Wireline Conducted Emissions

**Conducted Test Set-Up Pictorial Representation**




Measurement set up for ac Wireline Conducted Emissions Test

| Asset# | Description | Manufacturer | Model# | Serial# | Calibration Due Date |
|---|---|---|---|---|---|
| 158 | Barometer/Thermometer | Control Company | 4196 | E2846 | 01 Dec 2016 |
| 184 | Pulse Limiter | Rhode & Schwarz | ESH3Z2 | 357.8810.52 | 13 Mar 2016 |
| 190 | LISN (two-line V-network) | Rhode & Schwarz | ESH3Z5 | 836679/006 | 29 Oct 2016 |
| 287 | Rohde & Schwarz 40 GHz Receiver | Rhode & Schwarz | ESIB40 | 100201 | 27 Aug 2016 |
| 307 | BNC-CABLE | Megaphase | 1689 1GVT4 | 15F50B002 | 13 Mar 2016 |
| 316 | Dell desktop computer workstation with Vasona | Dell | Desktop | WS04 | Not Required |
| 351 | Data Impedance Stabilization Network | Teseq | ISN T800 | 24809 | 30 Nov 2016 |
| 372 | AC Variable PS | California Instruments | 1251P | L06951 | Cal when used |
| 378 | Rohde & Schwarz 40 GHz Receiver with Generator | Rhode & Schwarz | ESIB40 | 100107/040 | 04 Aug 2016 |
| 388 | LISN (3 Phase) 9kHz - 30MHz | Rohde & Schwarz | ESH2-Z5 | 892107/022 | 30 Oct 2016 |
| ADAPT SMA#1 | SMA Cable | Megaphase | SMA Cable #1 | None | 13 Aug 2016 |

# 5. MEASUREMENT AND PRESENTATION OF TEST DATA

The measurement and graphical data presented in this test report was generated automatically using state-of-the-art technology creating an easy to read report structure. Numerical measurement data is separated from supporting graphical data (plots) through hyperlinks. Numerical measurement data can be reviewed without scrolling through numerous graphical pages to arrive at the next data matrix.

Plots have been relegated into the Appendix 'Graphical Images.

Test and report automation was performed by MiTest. MiTest is an automated test system developed by MiCOM Labs. MiTest is the first cloud based modular test system enabling end-to-end automation of regulatory compliance testing for conducted RF testing.


The MiCOM Labs "MiTest" Automated Test System" (Patent Pending)

# 6. TEST SUMMARY

## List of Measurements

The following table represents the list of measurements required under the FCC CFR47 Part 15.407.

| Section(s) | Test Items | Description | Condition | Result | Test Report Section |
|---|---|---|---|---|---|
| **15.407(a)** | 26dB and 99% Emission BW | Emission bandwidth measurement | Conducted | Complies | 6.1.1.1<br>A.1.1 |
| **15.407(a)** | Maximum Conducted Output Power | Power Measurement | Conducted | Complies | 6.1.1.2 |
| **15.407(a)** | Peak Power Spectral Density | PPSD | Conducted | Complies | 6.1.1.3<br>A.1.2 |
| **15.407(g)** | Frequency Stability | Limits: contained within band of operation at all times. | Applicant declaration | Complies | 6.1.1.4 |
| **15.407(f)** | Radio Frequency Radiation Exposure | Exposure to radio frequency energy levels, Maximum Permissible Exposure (MPE) | Conducted | See included MPE exhibit | -- |

## List of Measurements (continued)

The following table represents the list of measurements required under the FCC CFR47 Part 15.407

| Section(s) | Test Items | Description | Condition | Result | Test Report Section |
|---|---|---|---|---|---|
| **15.407(b)(2)**<br>**15.205(a)**<br>**15.209(a)** | Radiated Emissions | | Radiated | | 6.1.2 |
| | Transmitter Radiated Spurious Emissions | Emissions above 1 GHz | | Complies | *6.1.2.1*<br>*6.1.2.2*<br>*6.1.2.3* |
| | Radiated Band Edge | Band edge results | | Complies | *6.1.2.1*<br>*6.1.2.2*<br>*6.1.2.3* |
| **15.407(b)(6)**<br>**15.205(a)**<br>**15.209(a)** | Radiated Emissions | Emissions <1 GHz (30M-1 GHz) | | Complies | *6.1.2.4* |
| **15.407(b)(6)**<br>**15.207** | AC Wireline Conducted Emissions 150 kHz–30 MHz | Conducted Emissions | Conducted | Complies<br>ac/dc adaptor only, POE not marketed with equipment | 6.1.3 |

Note 1: Test results reported in this document relate only to the items tested

Note 2: The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria

Note 3: Section 3.7 Equipment Modifications highlights the equipment modifications that were required to bring the product into compliance with the above test matrix

## List of Measurements (cont'd)

**Dynamic Frequency Selection (DFS)**
The following table represents the list of measurements required under the **FCC CFR47 Part 15.407(h)(2)** and **FCC Memorandum Opinion and Order FCC 06-96 (Compliance Measurement procedures for Unlicensed National Information Infrastructure devices operating in the 5250-5350 MHz and 5470-5725 MHz bands incorporating dynamic frequency selection).**

### Tests performed on Master Device

| Section | Test Items | Description | Condition | Result | Test Report Section |
|---|---|---|---|---|---|
| | DFS | Dynamic Frequency Selection | Conducted | | 6.1.4 |
| 7.8.1 | Detection Bandwidth | UNII Detection Bandwidth | Conducted | Complies | |
| 7.8.2.1 | Performance Requirements Check | Initial Channel Availability Check Time | Conducted | Complies | |
| 7.8.2.2 | | Radar Burst at the Beginning of the Channel Availability Check Time | Conducted | Complies | |
| 7.8.2.3 | | Radar Burst at the End of the Channel Availability Check Time | Conducted | Complies | |
| 7.8.3 | In-Service Monitoring | In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period | Conducted | Complies | |
| 7.8.4 | Radar Detection | Statistical Performance Check | Conducted | Complies | |

# 7. TEST RESULTS

## 7.1. Device Characteristics

### 7.1.1. Conducted Testing

#### 7.1.1.1. 26 dB and 99 % Bandwidth

| Conducted Test Conditions for 26 dB and 99% Bandwidth | | | |
|---|---|---|---|
| **Standard:** | FCC CFR 47:15.407 | **Ambient Temp. (ºC):** | 24.0 - 27.5 |
| **Test Heading:** | 26 dB and 99 % Bandwidth | **Rel. Humidity (%):** | 32 - 45 |
| **Standard Section(s):** | 15.407 (a) | **Pressure (mBars):** | 999 - 1001 |
| **Reference Document(s):** | KDB 789033 - D01 DTS General UNII Test Procedures v01 | | |

**Test Procedure for 26 dB and 99% Bandwidth Measurement**

The bandwidth at 26 dB and 99 % is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency. KDB 789033 Section 5.1 Emission Bandwidth was used in order to prove compliance. The Resolution Bandwidth was set to approximately 1% of the emission bandwidth.

**Limits 26 dB and 99% Bandwidth**

**Operating Frequency Band 5150-5250 MHz**

15. 407 (a)(1)
(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Operating Frequency Band 5250-5350 and 5470 – 5725 MHz**

15. 407 (a)(2)
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Operating Frequency Band 5725 – 5850 MHz**

15. 407 (a)(3)
For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

## Measurement Results for 26 dB and 99 % Operational Bandwidth(s)

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6 MBit/s | **Antenna Gain (dBi):** | Not Applicable |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Highest | Lowest | | |
| 5180.0 | 24.449 | 23.948 | 24.248 | -- | 24.449 | 23.948 | | |
| 5200.0 | 24.349 | 23.948 | 24.248 | -- | 24.349 | 23.948 | | |
| 5240.0 | 24.048 | 23.848 | 24.349 | -- | 24.349 | 23.848 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Highest | Lowest | | |
| 5180.0 | 16.834 | 16.834 | 16.934 | -- | 16.934 | 16.834 | | |
| 5200.0 | 16.834 | 16.934 | 16.934 | -- | 16.934 | 16.834 | | |
| 5240.0 | 16.733 | 16.733 | 16.834 | -- | 16.834 | 16.733 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth |
|---|

| | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-20 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6.5 MBit/s | **Antenna Gain (dBi):** | Not Applicable |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5180.0** | 24.950 | 24.549 | 25.351 | -- | 25.351 | 24.549 | | |
| **5200.0** | 25.150 | 24.148 | 25.351 | -- | 25.351 | 24.148 | | |
| **5240.0** | 25.050 | 24.349 | 25.251 | -- | 25.251 | 24.349 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5180.0** | 18.036 | 17.936 | 17.936 | -- | 18.036 | 17.936 | | |
| **5200.0** | 17.936 | 17.936 | 17.936 | -- | 17.936 | 17.936 | | |
| **5240.0** | 18.036 | 17.836 | 17.936 | -- | 18.036 | 17.836 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 13.5 MBit/s | **Antenna Gain (dBi):** | Not Applicable |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5190.0** | 48.898 | 46.894 | 49.098 | -- | 49.098 | 46.894 | | |
| **5230.0** | 48.497 | 47.695 | 48.297 | -- | 48.497 | 47.695 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5190.0** | 36.473 | 36.473 | 36.473 | -- | 36.473 | 36.473 | | |
| **5230.0** | 36.473 | 36.473 | 36.473 | -- | 36.473 | 36.473 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 13.5 MBit/s | **Antenna Gain (dBi):** | Not Applicable |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Highest | Lowest | | |
| 5190.0 | 48.297 | 46.894 | 48.297 | -- | 48.297 | 46.894 | | |
| 5230.0 | 48.497 | 49.098 | 48.898 | -- | 49.098 | 48.497 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Highest | Lowest | | |
| 5190.0 | 36.473 | 36.473 | 36.473 | -- | 36.473 | 36.473 | | |
| 5230.0 | 36.473 | 36.473 | 36.473 | -- | 36.473 | 36.473 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-80 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 29.3 MBit/s | **Antenna Gain (dBi):** | Not Applicable |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5210.0** | 100.601 | 101.002 | 100.200 | -- | 101.002 | 100.200 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5210.0** | 76.152 | 76.152 | 76.553 | -- | 76.553 | 76.152 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6 MBit/s | **Antenna Gain (dBi):** | Not Applicable |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Highest | Lowest | | |
| 5260.0 | 24.549 | 24.248 | 24.649 | -- | 24.649 | 24.248 | | |
| 5300.0 | 24.349 | 24.048 | 24.850 | -- | 24.850 | 24.048 | | |
| 5320.0 | 24.349 | 22.946 | 24.248 | -- | 24.349 | 22.946 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Highest | Lowest | | |
| 5260.0 | 16.934 | 16.934 | 16.834 | -- | 16.934 | 16.834 | | |
| 5300.0 | 16.934 | 16.934 | 16.934 | -- | 16.934 | 16.934 | | |
| 5320.0 | 16.934 | 16.733 | 16.934 | -- | 16.934 | 16.733 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth |
|---|

| | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-20 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6.5 MBit/s | **Antenna Gain (dBi):** | Not Applicable |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5260.0** | 25.050 | 23.948 | 25.351 | -- | 25.351 | 23.948 | | |
| **5300.0** | 25.150 | 23.948 | 25.150 | -- | 25.150 | 23.948 | | |
| **5320.0** | 24.749 | 24.248 | 25.351 | -- | 25.351 | 24.248 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5260.0** | 18.036 | 17.836 | 17.936 | -- | 18.036 | 17.836 | | |
| **5300.0** | 17.836 | 17.836 | 17.936 | -- | 17.936 | 17.836 | | |
| **5320.0** | 17.936 | 18.036 | 17.936 | -- | 18.036 | 17.936 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 13.5 MBit/s | **Antenna Gain (dBi):** | Not Applicable |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5270.0** | 47.295 | 46.693 | 49.098 | -- | 49.098 | 46.693 | | |
| **5310.0** | 47.695 | 46.894 | 48.497 | -- | 48.497 | 46.894 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5270.0** | 36.273 | 36.473 | 36.473 | -- | 36.473 | 36.273 | | |
| **5310.0** | 36.473 | 36.273 | 36.273 | -- | 36.473 | 36.273 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 144 MBit/s | **Antenna Gain (dBi):** | Not Applicable |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Highest | Lowest | | |
| 5270.0 | 47.896 | 47.695 | 48.697 | -- | 48.697 | 47.695 | | |
| 5310.0 | 47.295 | 47.094 | 48.297 | -- | 48.297 | 47.094 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Highest | Lowest | | |
| 5270.0 | 36.273 | 36.473 | 36.273 | -- | 36.473 | 36.273 | | |
| 5310.0 | 36.273 | 36.473 | 36.473 | -- | 36.473 | 36.273 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-80 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 192 MBit/s | **Antenna Gain (dBi):** | Not Applicable |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Highest | Lowest | | |
| 5290.0 | 95.391 | 95.792 | 99.399 | -- | 99.399 | 95.391 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Highest | Lowest | | |
| 5290.0 | 76.152 | 76.152 | 75.752 | -- | 76.152 | 75.752 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6 MBit/s | **Antenna Gain (dBi):** | Not Applicable |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Highest | Lowest | | |
| 5500.0 | 23.948 | 23.747 | 23.447 | -- | 23.948 | 23.447 | | |
| 5580.0 | 23.948 | 23.547 | 23.447 | -- | 23.948 | 23.447 | | |
| 5720.0 | 24.850 | 24.048 | 24.048 | -- | 24.859 | 24.048 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Highest | Lowest | | |
| 5500.0 | 16.834 | 16.834 | 16.733 | -- | 16.834 | 16.733 | | |
| 5580.0 | 16.733 | 16.834 | 16.733 | -- | 16.834 | 16.733 | | |
| 5720.0 | 17.034 | 16.834 | 16.934 | -- | 17.034 | 16.834 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-20 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6.5 MBit/s | **Antenna Gain (dBi):** | Not Applicable |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5500.0** | 24.950 | 24.048 | 24.449 | -- | 24.950 | 18.437 | | |
| **5580.0** | 24.449 | 24.449 | 24.248 | -- | 24.449 | 24.248 | | |
| **5720.0** | 24.749 | 24.248 | 24.148 | -- | 24.749 | 24.148 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5500.0** | 17.936 | 17.936 | 17.936 | -- | 17.936 | 17.936 | | |
| **5580.0** | 17.936 | 17.936 | 17.836 | -- | 17.936 | 17.836 | | |
| **5720.0** | 16.834 | 16.834 | 16.834 | -- | 16.834 | 16.834 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 13.5 MBit/s | **Antenna Gain (dBi):** | Not Applicable |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5510.0** | 47.695 | 46.493 | 47.495 | -- | 47.695 | 46.493 | | |
| **5550.0** | 47.695 | 46.693 | 47.094 | -- | 47.695 | 46.693 | | |
| **5710.0** | 47.695 | 49.098 | 47.495 | -- | 49.098 | 47.495 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5510.0** | 36.273 | 36.273 | 36.273 | -- | 36.273 | 36.273 | | |
| **5550.0** | 36.273 | 36.273 | 36.273 | -- | 36.273 | 36.273 | | |
| **5710.0** | 36.473 | 36.473 | 36.473 | -- | 36.473 | 36.473 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 13.5 MBit/s | **Antenna Gain (dBi):** | Not Applicable |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Highest | Lowest | | |
| 5510.0 | 48.297 | 45.691 | 47.295 | -- | 48.297 | 45.691 | | |
| 5550.0 | 47.695 | 46.894 | 46.894 | -- | 47.695 | 46.894 | | |
| 5710.0 | 47.094 | 49.499 | 46.894 | -- | 46.092 | 45.691 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Highest | Lowest | | |
| 5510.0 | 36.273 | 36.273 | 36.273 | -- | 36.273 | 36.273 | | |
| 5550.0 | 36.273 | 36.273 | 36.273 | -- | 36.273 | 36.273 | | |
| 5710.0 | 36.473 | 36.473 | 36.473 | -- | 36.273 | 36.273 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-80 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 192 MBit/s | **Antenna Gain (dBi):** | Not Applicable |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Highest | Lowest | | |
| 5530.0 | 96.593 | 93.387 | 95.792 | -- | 96.593 | 93.387 | | |
| 5690.0 | 95.792 | 93.788 | 92.986 | -- | 95.792 | 92.986 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Highest | Lowest | | |
| 5530.0 | 75.752 | 75.752 | 75.752 | -- | 75.752 | 75.752 | | |
| 5690.0 | 75.752 | 76.152 | 75.752 | -- | 76.152 | 75.752 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth |
|---|

| | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 96.6 |
| **Data Rate:** | 6.00 MBit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | GMH |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5745.0** | 23.146 | 23.287 | 23.146 | -- | 23.287 | 23.146 | | |
| **5785.0** | 22.866 | 23.146 | 23.146 | -- | 23.146 | 22.866 | | |
| **5825.0** | 23.707 | 23.427 | 22.866 | -- | 23.707 | 22.866 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5745.0** | 16.834 | 16.834 | 16.834 | -- | 16.834 | 16.834 | | |
| **5785.0** | 16.834 | 16.834 | 16.834 | -- | 16.834 | 16.834 | | |
| **5825.0** | 16.834 | 16.834 | 16.693 | -- | 16.834 | 16.693 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the links in the above matrix to view the graphical image (plot).

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-40 | **Duty Cycle (%):** | 92.0 |
| **Data Rate:** | 13.50 MBit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | GMH |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5755.0** | 47.415 | 47.415 | 47.695 | -- | 47.695 | 47.415 | | |
| **5795.0** | 47.976 | 47.134 | 48.257 | -- | 48.257 | 47.134 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5755.0** | 36.754 | 36.754 | 36.754 | -- | 36.754 | 36.754 | | |
| **5795.0** | 36.754 | 36.754 | 36.754 | -- | 36.754 | 36.754 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the links in the above matrix to view the graphical image (plot).

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-80 | **Duty Cycle (%):** | 84.1 |
| **Data Rate:** | 29.30 MBit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | GMH |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5775.0** | 95.391 | 92.024 | 92.585 | -- | 95.391 | 92.024 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5775.0** | 76.874 | 76.313 | 76.874 | -- | 76.874 | 76.313 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the links in the above matrix to view the graphical image (plot).

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-20 | **Duty Cycle (%):** | 96.4 |
| **Data Rate:** | 6.50 MBit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | GMH |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5745.0** | 23.567 | 24.269 | 23.848 | -- | 24.269 | 23.567 | | |
| **5785.0** | 23.707 | 24.409 | 23.287 | -- | 24.409 | 23.287 | | |
| **5825.0** | 23.567 | 24.689 | 23.146 | -- | 24.689 | 23.146 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5745.0** | 17.816 | 17.956 | 17.956 | -- | 17.956 | 17.816 | | |
| **5785.0** | 17.956 | 17.816 | 17.816 | -- | 17.956 | 17.816 | | |
| **5825.0** | 17.816 | 17.816 | 17.956 | -- | 17.956 | 17.816 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the links in the above matrix to view the graphical image (plot).

| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-40 | **Duty Cycle (%):** | 92.0 |
| **Data Rate:** | 13.50 MBit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | GMH |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) Port(s) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5755.0** | 47.134 | 46.854 | 47.695 | -- | 47.695 | 46.854 | | |
| **5795.0** | 47.695 | 47.134 | 48.257 | -- | 48.257 | 47.134 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) Port(s) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **Highest** | **Lowest** | | |
| **5755.0** | 36.754 | 36.754 | 37.034 | -- | 37.034 | 36.754 | | |
| **5795.0** | 36.754 | 36.754 | 36.754 | -- | 36.754 | 36.754 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the links in the above matrix to view the graphical image (plot).

## 7.1.1.2. Maximum Conducted Output Power

| Conducted Test Conditions for Maximum Conducted Output Power | | | |
|---|---|---|---|
| **Standard:** | FCC CFR 47:15.407 | **Ambient Temp. (ºC):** | 24.0 - 27.5 |
| **Test Heading:** | Maximum Conducted Output Power | **Rel. Humidity (%):** | 32 - 45 |
| **Standard Section(s):** | 15.407 (a) | **Pressure (mBars):** | 999 - 1001 |
| **Reference Document(s):** | KDB 789033 - D01 DTS General UNII Test Procedures v01 | | |

**Test Procedure for Maximum Conducted Output Power Measurement**
Method PM (Measurement using an RF average power meter). KDB 789033 defines a methodology using an average wideband power meter. Measurements were made while the EUT was operating in a continuous transmission mode (100% duty cycle) at the appropriate center frequency. All operational modes and frequency bands were measured independently and the resultant calculated. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported separately. A summation (Σ) of each antenna port output power is provided which includes any offset due to Duty Cycle Correction Factor (DCCF). Testing was performed under ambient conditions at nominal voltage.

Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document.
Supporting Information
Calculated Power = A + G + Y+ 10 log (1/x) dBm

A = Total Power [10*Log10 ($10^{a/10}$ + $10^{b/10}$ + $10^{c/10}$ + $10^{d/10}$)]
G = Antenna Gain
Y = Beamforming Gain
x = Duty Cycle (average power measurements only)

**Limits Maximum Conducted Output Power**

**Operating Frequency Band 5150-5250 MHz**

15. 407 (a)(1)
(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Operating Frequency Band 5250-5350 and 5470 – 5725 MHz**

15. 407 (a)(2)
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Operating Frequency Band 5725 – 5850 MHz**

15. 407 (a)(3)
For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

**Antenna Beam and Non-Beam Forming Power Levels**

The MRLBB-1303 does not implement beam-forming

**Maximum Transmit (Conducted) Power, FCC Limits**

**Bands 5250 – 5350**

Limit lesser of: 250 mW or 11 dBm + 10 log (B) dBm.

| Mode | Frequency Range (MHz) | Maximum 26 dB Bandwidth (MHz) | 11 + 10 Log (B) (dBm) | Limit (dBm) |
|---|---|---|---|---|
| a | 5250 – 5350<br>5470 – 5725 | 24.9 | 25.0 | +24.0 |
| HT-20 | | 25.4 | 25.0 | +24.0 |
| HT-40 | | 49.1 | 27.9 | +24.0 |
| VCT-40 | | 48.7 | 27.9 | +24.0 |
| VCT-80 | | 99.4 | 31.0 | +24.0 |

**Bands 5470 – 5725 MHz**

Limit lesser of: 250 mW or 11 dBm + 10 log (B) dBm.

| Mode | Frequency Range (MHz) | Maximum 26 dB Bandwidth (MHz) | 11 + 10 Log (B) (dBm) | Limit (dBm) |
|---|---|---|---|---|
| a | 5250 – 5350<br>5470 – 5725 | 24.6 | 24.9 | +24.0 |
| HT-20 | | 25.0 | 25.0 | +24.0 |
| HT-40 | | 47.7 | 27.8 | +24.0 |
| VCT-40 | | 48.3 | 27.8 | +24.0 |
| VCT-80 | | 96.6 | 30.8 | +24.0 |

## Frequency Band 5150 – 5250 MHz

| Equipment Configuration for Peak Transmit Power |
|---|

| | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dBm | |
| 5180.0 | 9.29 | 9.67 | 8.47 | -- | 13.94 | 23.948 | 15.60 | -3.06 | 9.00 |
| 5200.0 | 9.36 | 9.74 | 8.71 | -- | 14.06 | 23.948 | 15.60 | -2.94 | 9.00 |
| 5240.0 | 9.74 | 9.92 | 8.78 | -- | 14.28 | 23.848 | 15.60 | -2.72 | 9.00 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Transmit Power |
|---|

| | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-20 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6.5 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dBm | |
| 5180.0 | 9.28 | 9.42 | 8.45 | -- | 13.84 | 24.549 | 15.60 | -3.16 | 9.00 |
| 5200.0 | 9.62 | 9.70 | 8.63 | -- | 14.11 | 24.148 | 15.60 | -2.89 | 9.00 |
| 5240.0 | 9.57 | 9.67 | 8.60 | -- | 14.08 | 24.349 | 15.60 | -2.92 | 9.00 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 13.5 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dBm | |
| **5190.0** | 10.53 | 11.10 | 10.57 | -- | 15.51 | 46.894 | 15.60 | -0.09 | 11.00 |
| **5230.0** | 10.60 | 11.17 | 10.43 | -- | 15.52 | 47.695 | 15.60 | -0.08 | 11.00 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 13.5 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dBm | |
| **5190.0** | 10.68 | 10.97 | 10.41 | -- | 15.46 | 46.894 | 15.60 | -0.14 | 11.00 |
| **5230.0** | 10.71 | 11.17 | 10.33 | -- | 15.52 | 48.497 | 15.60 | -0.08 | 11.00 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-01 MEASURING RF OUTPUT POWER |
| Measurement Uncertainty: | ±2.81 dB |

| | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-80 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 29.3 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dBm | |
| **5210.0** | 10.44 | 10.89 | 10.14 | -- | 15.27 | 100.200 | 15.60 | -0.73 | 11.00 |

**Traceability to Industry Recognized Test Methodologies**

| | |
|---|---|
| Work Instruction: | WI-01 MEASURING RF OUTPUT POWER |
| Measurement Uncertainty: | ±2.81 dB |

## Frequency Band 5250 – 5350 MHz

| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dBm | |
| 5260.0 | 17.58 | 17.57 | 16.96 | -- | 22.15 | 24.248 | 22.60 | -0.45 | 15.50 |
| 5300.0 | 17.73 | 17.67 | 16.91 | -- | 22.22 | 24.048 | 22.60 | -0.38 | 15.00 |
| 5320.0 | 17.83 | 17.87 | 16.89 | -- | 22.32 | 22.946 | 22.60 | -0.28 | 15.50 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-20 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6.5 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dBm | |
| 5260.0 | 17.53 | 17.78 | 16.85 | -- | 22.18 | 23.948 | 22.60 | -0.42 | 15.50 |
| 5300.0 | 17.94 | 17.97 | 16.96 | -- | 22.42 | 23.948 | 22.60 | -0.18 | 15.50 |
| 5320.0 | 17.94 | 17.82 | 16.96 | -- | 22.37 | 24.248 | 22.60 | -0.23 | 16.00 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 13.5 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dBm | |
| **5270.0** | 17.18 | 17.82 | 16.89 | -- | 22.09 | 46.693 | 22.60 | -0.51 | 17.50 |
| **5310.0** | 17.73 | 18.14 | 17.18 | -- | 22.47 | 46.894 | 22.60 | -0.13 | 17.50 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-01 MEASURING RF OUTPUT POWER |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 13.5 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dBm | |
| **5270.0** | 17.53 | 17.91 | 17.08 | -- | 22.29 | 47.695 | 22.60 | -0.31 | 17.50 |
| **5310.0** | 17.75 | 18.12 | 17.53 | -- | 22.58 | 47.094 | 22.60 | -0.02 | 17.50 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-01 MEASURING RF OUTPUT POWER |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-80 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 29.3 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dBm | |
| **5290.0** | 17.49 | 17.87 | 17.20 | -- | 22.30 | 95.391 | 22.60 | -0.30 | 17.50 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-01 MEASURING RF OUTPUT POWER |
| Measurement Uncertainty: | ±2.81 dB |

## Frequency Band 5470 – 5700 MHz

| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6 MBit/s | **Antenna Gain (dBi):** | 7.80 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dBm | |
| **5500.0** | 16.81 | 15.95 | 16.11 | -- | 21.08 | 23.447 | 22.20 | -1.12 | 16.00 |
| **5580.0** | 17.10 | 16.89 | 16.12 | -- | 21.49 | 23.447 | 22.20 | -0.71 | 16.00 |
| **5720.0** | 17.65 | 17.45 | 16.36 | -- | 21.96 | 23.747 | 22.20 | -0.24 | 15.00 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-20 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6.5 MBit/s | **Antenna Gain (dBi):** | 7.80 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dBm | |
| **5500.0** | 16.92 | 15.90 | 15.82 | -- | 21.01 | 18.437 | 22.20 | -1.19 | 16.50 |
| **5580.0** | 17.04 | 16.92 | 16.06 | -- | 21.47 | 24.248 | 22.20 | -0.73 | 16.00 |
| **5720.0** | 17.44 | 17.52 | 16.27 | -- | 21.88 | 24.048 | 22.20 | -0.32 | 15.50 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 13.5 MBit/s | **Antenna Gain (dBi):** | 7.80 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dBm | |
| **5510.0** | 17.01 | 17.68 | 16.97 | -- | 22.00 | 46.493 | 22.20 | -0.20 | 17.50 |
| **5550.0** | 16.65 | 17.88 | 16.99 | -- | 21.98 | 46.693 | 22.20 | -0.22 | 17.50 |
| **5710.0** | 16.99 | 17.74 | 17.29 | | 22.12 | 47.495 | 24.00 | -0.08 | 16.50 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-01 MEASURING RF OUTPUT POWER |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 13.5 MBit/s | **Antenna Gain (dBi):** | 7.80 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | N/A |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dBm | |
| **5510.0** | 17.06 | 17.69 | 16.85 | | 21.99 | 45.691 | 22.20 | -0.21 | 17.50 |
| **5550.0** | 16.75 | 17.77 | 16.84 | | 21.92 | 46.894 | 22.20 | -0.28 | 17.50 |
| **5710.0** | 16.95 | 17.75 | 17.20 | | 22.08 | 46.894 | 22.20 | -0.12 | 16.50 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-01 MEASURING RF OUTPUT POWER |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Transmit Power |
|---|

| | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-80 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 29.3 MBit/s | **Antenna Gain (dBi):** | 7.80 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dBm | |
| **5530.0** | 16.65 | 17.34 | 16.82 | -- | 21.72 | 93.387 | 22.20 | -0.48 | 17.50 |
| **5690.0** | 17.17 | 17.77 | 17.09 | -- | 22.13 | 92.986 | 22.20 | -0.07 | 17.50 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-01 MEASURING RF OUTPUT POWER |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 96.6 |
| **Data Rate:** | 6.00 MBit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | GMH |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power + DCCF (+0.13 dB) (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dB | |
| **5745.0** | 19.58 | 20.52 | 20.15 | -- | 24.87 | -- | 28.21 | -3.34 | 20.00 |
| **5785.0** | 19.78 | 20.04 | 20.06 | -- | 24.73 | -- | 28.21 | -3.48 | 20.00 |
| **5825.0** | 20.12 | 20.08 | 20.21 | -- | 24.91 | -- | 28.21 | -3.30 | 20.00 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-01 MEASURING RF OUTPUT POWER |
| Measurement Uncertainty: | ±1.33 dB |

DCCF - Duty Cycle Correction Factor

| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-40 | **Duty Cycle (%):** | 92.0 |
| **Data Rate:** | 13.50 MBit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | GMH |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power + DCCF (+0.36 dB) (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dB | |
| **5755.0** | 19.75 | 20.48 | 20.33 | -- | 24.97 | -- | 28.21 | -3.24 | 20.00 |
| **5795.0** | 19.90 | 20.22 | 20.30 | -- | 24.92 | -- | 28.21 | -3.29 | 20.00 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-01 MEASURING RF OUTPUT POWER |
| Measurement Uncertainty: | ±1.33 dB |

DCCF - Duty Cycle Correction Factor

| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-80 | **Duty Cycle (%):** | 84.1 |
| **Data Rate:** | 29.30 MBit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | GMH |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power + DCCF (+0.76 dB) (dBm) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| | Port(s) | | | | | | | | |
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dB | |
| **5775.0** | 19.84 | 20.31 | 20.38 | -- | 24.96 | -- | 28.21 | -3.25 | 20.00 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-01 MEASURING RF OUTPUT POWER |
| Measurement Uncertainty: | ±1.33 dB |

DCCF - Duty Cycle Correction Factor

| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-20 | **Duty Cycle (%):** | 96.4 |
| **Data Rate:** | 6.50 MBit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | GMH |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power + DCCF (+0.18 dB) (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dB | |
| **5745.0** | 19.51 | 20.53 | 20.06 | -- | 24.82 | -- | 28.21 | -3.39 | 20.00 |
| **5785.0** | 19.60 | 20.01 | 19.95 | -- | 24.63 | -- | 28.21 | -3.58 | 20.00 |
| **5825.0** | 19.90 | 20.10 | 20.50 | -- | 24.94 | -- | 28.21 | -3.27 | 20.00 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-01 MEASURING RF OUTPUT POWER |
| Measurement Uncertainty: | ±1.33 dB |

DCCF - Duty Cycle Correction Factor

| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-40 | **Duty Cycle (%):** | 92.0 |
| **Data Rate:** | 13.50 MBit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | GMH |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power + DCCF (+0.36 dB) (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dB | |
| **5755.0** | 19.81 | 20.46 | 20.33 | -- | 24.98 | -- | 28.21 | -3.23 | 20.00 |
| **5795.0** | 19.84 | 20.32 | 20.33 | -- | 24.94 | -- | 28.21 | -3.27 | 20.00 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-01 MEASURING RF OUTPUT POWER |
| Measurement Uncertainty: | ±1.33 dB |

DCCF - Duty Cycle Correction Factor

## 7.1.1.3. Peak Power Spectral Density

| Conducted Test Conditions for Power Spectral Density | | | |
|---|---|---|---|
| **Standard:** | FCC CFR 47:15.407 | **Ambient Temp. (ºC):** | 24.0 - 27.5 |
| **Test Heading:** | Power Spectral Density | **Rel. Humidity (%):** | 32 - 45 |
| **Standard Section(s):** | 15.247 (a) | **Pressure (mBars):** | 999 - 1001 |
| **Reference Document(s):** | KDB 789033 - D01 DTS General UNII Test Procedures v01 | | |

**Test Procedure for Power Spectral Density**
The in-band power spectral density was measured using the test technique specified in KDB 789033. A 1 MHz measurement bandwidth was implemented for the analyzer sweep. Once the sweep is complete the analyzer trace data is downloaded and used for post processing purposes.
Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured separately. The Peak Power Spectral Density is the highest level found across the emission bandwidth. With multiple antenna port measurements the numerical analyzer data from each port is summed (å) and a link to this additional graphic is provided.

Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document.

Measure and sum the spectra across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The individual spectra are then summed mathematically in linear power units. Unlike in-band power measurements, in which the sum involves a single measured value (output power) from each output, measurements for compliance with PSD limits involve summing entire spectra across corresponding frequency bins on the various outputs. Consistency is maintained for any device with multiple transmitter outputs to be certain the individual outputs are all aligned with the same span and same number of points. In this instance, the linear power spectrum value within the first spectral bin of output 0 is summed with that in the first spectral bin of output 1, and the first spectral bin of output 2, and so on up to the Nth output to obtain the true value for the first frequency bin of the summed spectrum. The summed spectrum value for each frequency bin is computed in this fashion. These summed spectral values were post processed and the resulting numerical and graphical data presented.

NOTE: It may be observed that spectrum in some plots break the limit line however this in itself does NOT constitute a failure. In all cases a spectrum summation plot is provided in order to prove compliance. A failure occurs only after the summation of all spectrum plots have been summed and are found to be greater than the limit line.

Supporting Information
Calculated Power = A + 10 log (1/x) dBm
A = Total Power Spectral Density [10*Log10 ($10^{a/10}$ + $10^{b/10}$ + $10^{c/10}$ + $10^{d/10}$)]
x = Duty Cycle

**Limits Power Spectral Density**

**Operating Frequency Band 5150-5250 MHz**

15. 407 (a)(1)
(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and

maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Operating Frequency Band 5250-5350 and 5470 – 5725 MHz**

15. 407 (a)(2)
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Operating Frequency Band 5725 – 5850 MHz**

15. 407 (a)(3)
For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Calculated Power Spectral Density Σ Port(s) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | dBm/MHz | dBm/MHz | dB |
| 5180.0 | -1.745 | -1.442 | -3.100 | -- | 2.733 | 15.6 | -12.9 |
| 5200.0 | -1.855 | -1.551 | -3.043 | -- | 2.668 | 15.6 | -12.9 |
| 5240.0 | -2.030 | -1.850 | -2.980 | -- | 2.512 | 15.6 | -13.1 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

## Power Spectral Density Summation Ports A+B+C+D

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | Limit | Margin |
|---|---|---|---|
| MHz | Summation A+B+C+D | dBm/MHz | dB |
| 5180.0 | 2.353 | 2.6 | -0.25 |
| 5200.0 | 2.489 | 2.6 | -0.11 |
| 5240.0 | 2.351 | 2.6 | -0.25 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-20 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6.5 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Calculated Power Spectral Density Σ Port(s) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | dBm/MHz | dBm/MHz | dB |
| 5180.0 | -1.684 | -1.686 | -2.926 | -- | 2.711 | 2.6 | 0.1 |
| 5200.0 | -1.859 | -1.779 | -3.067 | -- | 2.575 | 2.6 | 0.0 |
| 5240.0 | -2.115 | -2.041 | -3.250 | -- | 2.337 | 2.6 | -0.3 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

## Power Spectral Density Summation Ports A+B+C+D

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-20 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6.5 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | Limit | Margin |
|---|---|---|---|
| MHz | Summation A+B+C+D | dBm/MHz | dB |
| 5180.0 | 2.352 | 2.6 | -0.25 |
| 5200.0 | 2.203 | 2.6 | -0.40 |
| 5240.0 | 2.092 | 2.6 | -0.51 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 13.5 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Calculated Power Spectral Density Σ Port(s) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **dBm/MHz** | **dBm/MHz** | **dB** |
| **5190.0** | -2.499 | -1.924 | -3.450 | -- | 2.192 | 2.6 | -0.4 |
| **5230.0** | -2.546 | -2.055 | -3.851 | -- | 2.018 | 2.6 | -0.6 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 13.5 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Calculated Power Spectral Density Σ Port(s) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **dBm/MHz** | **dBm/MHz** | **dB** |
| **5190.0** | -2.781 | -1.823 | -3.563 | -- | 2.107 | 2.6 | -0.5 |
| **5230.0** | -2.701 | -2.153 | -3.735 | -- | 1.957 | 2.6 | -0.6 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-80 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 29.3 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Calculated Power Spectral Density Σ Port(s) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **dBm/MHz** | **dBm/MHz** | **dB** |
| **5210.0** | -5.946 | -5.809 | -7.219 | -- | -1.509 | 2.6 | -4.1 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Calculated Power Spectral Density Σ Port(s) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **dBm/MHz** | **dBm/MHz** | **dB** |
| **5260.0** | 4.462 | 5.008 | 4.716 | -- | 9.506 | 9.6 | -0.1 |
| **5300.0** | 3.875 | 4.634 | 4.260 | -- | 9.039 | 9.6 | -0.6 |
| **5320.0** | 4.412 | 4.778 | 4.824 | -- | 9.446 | 9.6 | -0.2 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-20 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6.5 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Calculated Power Spectral Density Σ Port(s) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | dBm/MHz | dBm/MHz | dB |
| 5260.0 | 4.256 | 4.880 | 4.559 | -- | 9.344 | 9.6 | -0.3 |
| 5300.0 | 4.083 | 4.531 | 4.541 | -- | 9.161 | 9.6 | -0.4 |
| 5320.0 | 4.549 | 5.329 | 4.845 | -- | 9.691 | 9.6 | 0.1 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

## Power Spectral Density Summation A+B+C+D

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-20 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6.5 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | Limit | Margin |
|---|---|---|---|
| MHz | Summation A+B+C+D | dBm/MHz | dB |
| 5320.0 | 9.550 | 9.6 | -0.1 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 13.5 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Calculated Power Spectral Density Σ Port(s) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **dBm/MHz** | **dBm/MHz** | **dB** |
| **5270.0** | 4.137 | 4.006 | 2.974 | -- | 8.507 | 9.6 | -1.1 |
| **5310.0** | 3.948 | 4.460 | 2.958 | -- | 8.604 | 9.6 | -1.0 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 144 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Calculated Power Spectral Density Σ Port(s) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **dBm/MHz** | **dBm/MHz** | **dB** |
| **5270.0** | 3.835 | 4.098 | 3.032 | -- | 8.449 | 9.6 | -1.2 |
| **5310.0** | 3.894 | 4.170 | 2.753 | -- | 8.419 | 9.6 | -1.2 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-80 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 192 MBit/s | **Antenna Gain (dBi):** | 7.40 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Calculated Power Spectral Density Σ Port(s) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **dBm/MHz** | **dBm/MHz** | **dB** |
| **5290.0** | 0.226 | 0.567 | -0.703 | -- | 4.834 | 9.6 | -4.8 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6 MBit/s | **Antenna Gain (dBi):** | 7.80 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Calculated Power Spectral Density Σ Port(s) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | dBm/MHz | dBm/MHz | dB |
| 5500.0 | 4.577 | 4.828 | 3.437 | -- | 9.093 | 9.2 | -0.1 |
| 5580.0 | 4.574 | 4.962 | 3.977 | -- | 9.294 | 9.2 | 0.1 |
| 5720.0 | 3.926 | 4.789 | 3.954 | -- | 9.013 | 9.2 | -0.2 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

## Power Spectral Density Summation A+B+C+D

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6 MBit/s | **Antenna Gain (dBi):** | 7.80 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | Limit | Margin |
|---|---|---|---|
| MHz | Summation A+B+C+D | dBm/MHz | dB |
| 5580 | 9.080 | 9.2 | -1.2 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-20 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6.5 MBit/s | **Antenna Gain (dBi):** | 7.80 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Calculated Power Spectral Density Σ Port(s) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | dBm/MHz | dBm/MHz | dB |
| 5500.0 | 4.636 | 4.927 | 3.749 | -- | 9.237 | 9.2 | 0.0 |
| 5580.0 | 4.126 | 4.644 | 3.328 | -- | 8.837 | 9.2 | -0.4 |
| 5720.0 | 3.825 | 4.606 | 3.826 | -- | 8.874 | 9.2 | -0.3 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

## Power Spectral Density Summation A+B+C+D

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-20 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 6.5 MBit/s | **Antenna Gain (dBi):** | 7.80 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | Limit | Margin |
|---|---|---|---|
| MHz | Summation A+B+C+D | dBm/MHz | dB |
| 5500.0 | 9.150 | 9.2 | 0.5 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 13.5 MBit/s | **Antenna Gain (dBi):** | 7.80 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Calculated Power Spectral Density Σ Port(s) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | dBm/MHz | dBm/MHz | dB |
| 5510.0 | 3.377 | 3.625 | 2.112 | -- | 7.858 | 9.2 | -1.3 |
| 5550.0 | 3.557 | 3.883 | 1.796 | -- | 7.942 | 9.2 | -1.3 |
| 5710.0 | 3.262 | 3.659 | 3.051 | -- | 8.103 | 9.2 | -1.1 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-40 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 13.5 MBit/s | **Antenna Gain (dBi):** | 7.80 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Calculated Power Spectral Density Σ Port(s) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | dBm/MHz | dBm/MHz | dB |
| 5510.0 | 3.544 | 3.580 | 2.182 | -- | 7.920 | 9.2 | -1.3 |
| 5550.0 | 3.664 | 3.750 | 1.836 | -- | 7.940 | 9.2 | -1.3 |
| 5710.0 | 2.986 | 3.683 | 3.113 | -- | 8.043 | 9.2 | -1.2 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-80 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 29.3 MBit/s | **Antenna Gain (dBi):** | 7.80 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | | |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Calculated Power Spectral Density Σ Port(s) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **dBm/MHz** | **dBm/MHz** | **dB** |
| **5530.0** | 0.823 | 0.389 | -0.752 | -- | 4.974 | 9.2 | -4.2 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

| Equipment Configuration for Peak Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-80 | **Duty Cycle (%):** | 100 |
| **Data Rate:** | 29.3 MBit/s | **Antenna Gain (dBi):** | 7.80 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | SB |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Calculated Power Spectral Density Σ Port(s) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **dBm/MHz** | **dBm/MHz** | **dB** |
| **5690.0** | -1.440 | -1.688 | -1.408 | -- | 3.261 | 9.2 | -5.9 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the link in the above results matrix to view the plot

| Equipment Configuration for Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 96.6 |
| **Data Rate:** | 6.00 MBit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | GMH |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/500 KHz) | | | | Amplitude Summation + DCCF (+0.13 dB) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | dBm/500 KHz | dBm/500 KHz | dB |
| 5745.0 | 5.209 | 6.202 | 5.534 | -- | 10.184 | 28.2 | -18.0 |
| 5785.0 | 5.311 | 5.935 | 5.718 | -- | 9.955 | 28.2 | -18.2 |
| 5825.0 | 5.593 | 5.872 | 6.481 | -- | 10.480 | 28.2 | -17.7 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

| Equipment Configuration for Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-40 | **Duty Cycle (%):** | 92.0 |
| **Data Rate:** | 13.50 MBit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | GMH |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/500 KHz) | | | | Amplitude Summation + DCCF (+0.36 dB) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **dBm/500 KHz** | **dBm/500 KHz** | **dB** |
| **5755.0** | 1.652 | 2.343 | 1.663 | -- | 5.952 | 28.2 | -22.2 |
| **5795.0** | 1.272 | 1.390 | 1.833 | -- | 5.903 | 28.2 | -22.3 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

| Equipment Configuration for Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11ac-80 | **Duty Cycle (%):** | 84.1 |
| **Data Rate:** | 29.30 MBit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | GMH |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/500 KHz) | | | | Amplitude Summation + DCCF (+0.76 dB) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | dBm/500 KHz | dBm/500 KHz | dB |
| 5775.0 | -3.476 | -2.466 | -3.152 | -- | 1.184 | 28.2 | -27.0 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

| Equipment Configuration for Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-20 | **Duty Cycle (%):** | 96.4 |
| **Data Rate:** | 6.50 MBit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | GMH |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/500 KHz) | | | | Amplitude Summation + DCCF (+0.18 dB) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | dBm/500 KHz | dBm/500 KHz | dB |
| 5745.0 | 4.670 | 5.705 | 5.433 | -- | 9.603 | 28.2 | -18.6 |
| 5785.0 | 4.834 | 5.549 | 5.167 | -- | 9.823 | 28.2 | -18.3 |
| 5825.0 | 5.398 | 5.700 | 6.191 | -- | 10.227 | 28.2 | -17.9 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

| Equipment Configuration for Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT-40 | **Duty Cycle (%):** | 92.0 |
| **Data Rate:** | 13.50 MBit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | GMH |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/500 KHz) | | | | Amplitude Summation + DCCF (+0.36 dB) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| **MHz** | **a** | **b** | **c** | **d** | **dBm/500 KHz** | **dBm/500 KHz** | **dB** |
| **5755.0** | 1.403 | 1.836 | 1.770 | -- | 6.014 | 28.2 | -22.2 |
| **5795.0** | 1.390 | 1.882 | 2.187 | -- | 5.978 | 28.2 | -22.2 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

### 7.1.1.4. Frequency Stability

**FCC, Part 15 Subpart C §15.407(g)**

**Test Procedure**

The manufacturer of the equipment is responsible for ensuring that the frequency stability is such that emissions are always maintained within the band of operation under all conditions.

**Manufacturer Declaration**

The frequency stability of the reference oscillator sets the frequency stability of the RF transceiver signals. Therefore all of the RF signals should have ±20ppm stability.
This stability accounts for room temp tolerance of the crystal oscillator circuit, frequency variation across temperature, and crystal ageing.

±20ppm at 5.250 GHz translates to a maximum frequency shift of ±105 KHz. As the edge of the channels is at least one MHz from either of the band edges, ±105 KHz is more than sufficient to guarantee that the intentional emission will remain in the band over the entire operating range of the EUT.

## Specification

## Limits

| |
|---|
| **§15.407 (g)** Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual. |

### 7.1.2. Radiated Emission Testing

**FCC, Part 15 Subpart C §15.407(b)(2), §15.205(a)/15.209(a)**

**Test Procedure**

Testing was performed in a 3-meter anechoic chamber. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. Preliminary emissions were recorded with in Spectrum Analyzer mode, using a maximum peak detector while in peak hold mode. Depending on the frequency band spanned a notch filter and/or waveguide filter was used to remove the fundamental frequency.

Emissions nearest the limits were chosen for maximization and formal measurement using a CISPR compliant receiver. Emissions above 1000 MHz are measured utilizing a CISPR compliant average detector with a tuned receiver, using a bandwidth of 1 MHz. Emissions from 30 MHz – 1000 MHz are measured utilizing a CISPR compliant quasi-peak detector with a tuned receiver, using a bandwidth of 120 kHz. Only the highest emissions relative to the limit are listed.

**Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

**FS = R + AF + CORR – FO**

FS = Field Strength
R = Measured Spectrum analyzer Input Amplitude
AF = Antenna Factor

**CORR = Correction Factor = CL – AG + NFL**

CL = Cable Loss
AG = Amplifier Gain
FO = Distance Falloff Factor
NFL = Notch Filter Loss or Waveguide Loss

Field Strength Calculation Example:

Given receiver input reading of 51.5 dBμV; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength of the measured emission is:

FS = 51.5 + 8.5 + 1.3 - 26.0 +1 = 36.3 dBμV/m

Conversion between dBμV/m (or dBμV) and μV/m (or μV) are done as:

Level (dBμV/m) = 20 * Log (level (μV/m))

40 dBμV/m = 100 μV/m
48 dBμV/m = 250 μV/m

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength (dBµV/m);

$$E = 1000000 \times \sqrt{30P} / 3 \ \mu V/m$$

where P is the EIRP in Watts

Therefore: -27 dBm/MHz = 68.23 dBuV/m

**Note:** The data in this Section identifies that the EUT is in compliance with the -27dBm/MHz EIRP limit (68.23 dBµV/m) for out of band emissions. All out of band emissions are less than 68.23 dB µV/m.

**Specification**

**Radiated Spurious Emissions**

**15.407 (b)(2).** All emissions outside of the 5,150-5,350MHz band shall not exceed an EIRP of -27dBm/MHz.

**FCC §15.205 (a)** Except as shown in paragraph (d) of 15.205 (a), only spurious emissions are permitted in any of the frequency bands listed.

**FCC §15.205 (a)** Except as shown in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

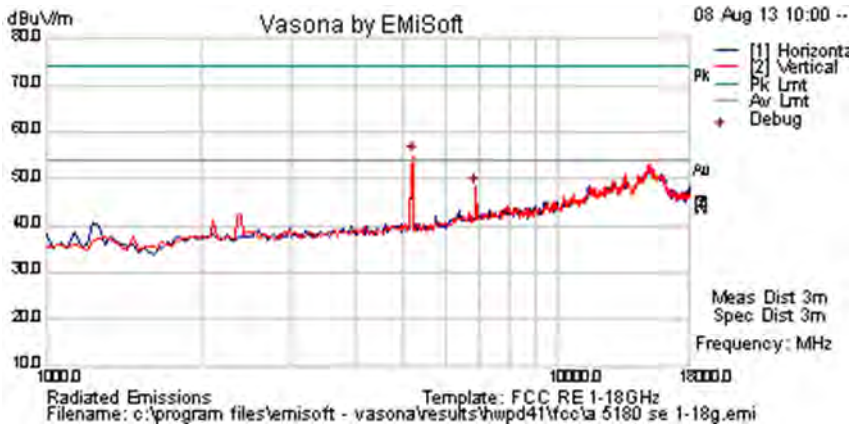
**FCC §15.209 (a)** Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table.

**Table 1: FCC 15.209 Spurious Emissions Limits**

| Frequency (MHz) | Field Strength (µV/m) | Field Strength (dBµV/m) | Measurement Distance (meters) |
|---|---|---|---|
| 30-88 | 100 | 40.0 | 3 |
| 88-216 | 150 | 43.5 | 3 |
| 216-960 | 200 | 46.0 | 3 |
| Above 960 | 500 | 54.0 | 3 |

### 7.1.2.1. Integral Antenna – Spurious Emissions

| | | | |
|---|---|---|---|
| **Test Freq.** | 5180 MHz | **Engineer** | SB |
| **Variant** | 802.11a; 6 Mbs | **Temp (ºC)** | 24 |
| **Freq. Range** | 1000 MHz - 18000 MHz | **Rel. Hum.(%)** | 30 |
| **Power Setting** | 18 | **Press. (mBars)** | 1010 |
| **Antenna** | integral | **Duty Cycle (%)** | 100 |
| **Test Notes 1** | | | |
| **Test Notes 2** | | | |

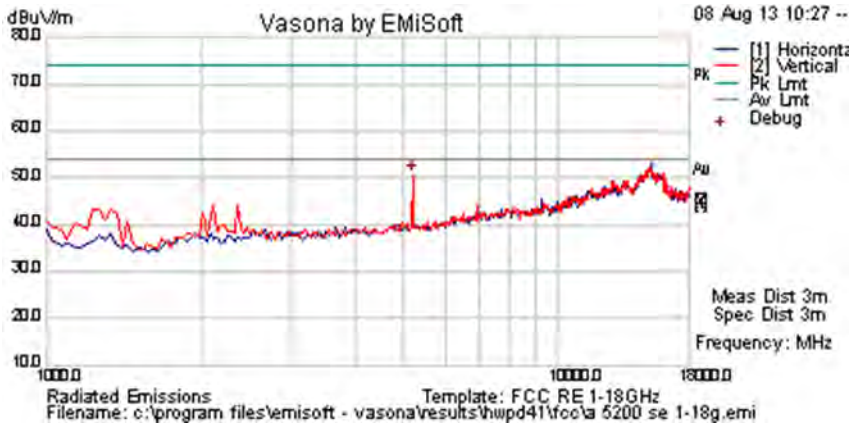



**Formally measured emission peaks**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5190.381 | 60.1 | 4.8 | -9.9 | 55.0 | Peak [Scan] | V | 100 | 0 | | | | FUND |
| 6893.787 | 49.3 | 5.6 | -6.5 | 48.4 | Peak [Scan] | V | 100 | 0 | 54.0 | -5.6 | Pass | NRB |

| | |
|---|---|
| Legend: | TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission |
| | NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205 |

| | | | |
|---|---|---|---|
| **Test Freq.** | 5200 MHz | **Engineer** | SB |
| **Variant** | 802.11a; 6 Mbs | **Temp (ºC)** | 24 |
| **Freq. Range** | 1000 MHz - 18000 MHz | **Rel. Hum.(%)** | 30 |
| **Power Setting** | 9 | **Press. (mBars)** | 1010 |
| **Antenna** | integral | **Duty Cycle (%)** | 100 |
| **Test Notes 1** | | | |
| **Test Notes 2** | | | |

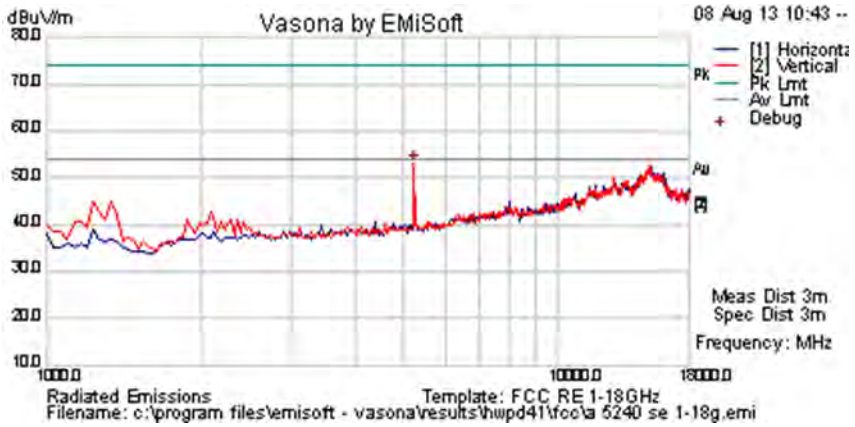



**Formally measured emission peaks**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5190.381 | 55.8 | 4.8 | -9.9 | 50.7 | Peak [Scan] | V | 100 | 0 | | | | FUND |

| | |
|---|---|
| Legend: | TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission |
| | NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205 |

| | | | |
|---|---|---|---|
| **Test Freq.** | 5240 MHz | **Engineer** | SB |
| **Variant** | 802.11a; 6 Mbs | **Temp (ºC)** | 24 |
| **Freq. Range** | 1000 MHz - 18000 MHz | **Rel. Hum.(%)** | 30 |
| **Power Setting** | 9 | **Press. (mBars)** | 1010 |
| **Antenna** | integral | **Duty Cycle (%)** | 100 |
| **Test Notes 1** | | | |
| **Test Notes 2** | | | |

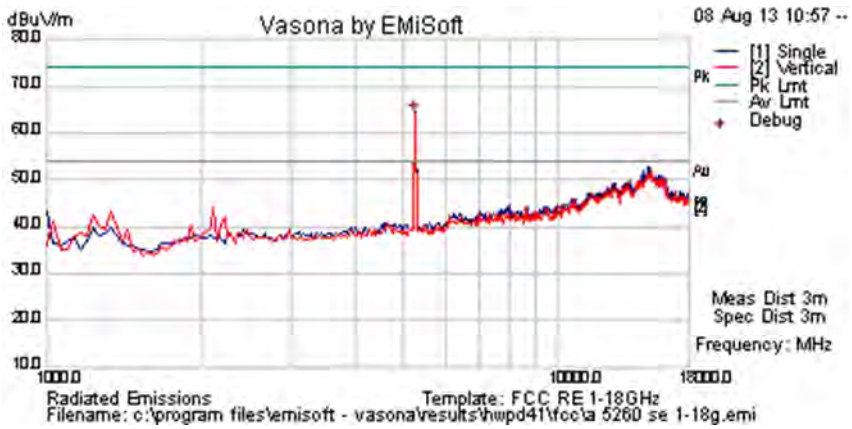



## Formally measured emission peaks

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5224.449 | 58.0 | 4.8 | -9.8 | 53.0 | Peak [Scan] | V | 100 | 0 | | | | FUND |

| | |
|---|---|
| Legend: | TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission |
| | NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205 |

| | | | |
|---|---|---|---|
| **Test Freq.** | 5260 MHz | **Engineer** | SB |
| **Variant** | 802.11a; 6 Mbs | **Temp (ºC)** | 24 |
| **Freq. Range** | 1000 MHz - 18000 MHz | **Rel. Hum.(%)** | 30 |
| **Power Setting** | 16.5 | **Press. (mBars)** | 1010 |
| **Antenna** | integral | **Duty Cycle (%)** | 100 |
| **Test Notes 1** | | | |
| **Test Notes 2** | | | |

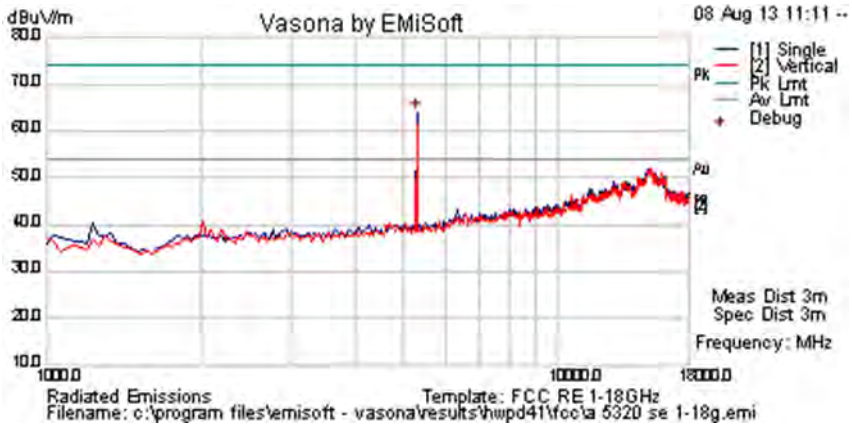



## Formally measured emission peaks

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5258.517 | 69.0 | 4.8 | -9.7 | 64.1 | Peak [Scan] | V | 0 | 0 | | | | FUND |

Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

| | | | |
|---|---|---|---|
| **Test Freq.** | 5300 MHz | **Engineer** | SB |
| **Variant** | 802.11a; 6 Mbs | **Temp (ºC)** | 24 |
| **Freq. Range** | 1000 MHz - 18000 MHz | **Rel. Hum.(%)** | 30 |
| **Power Setting** | 16.5 | **Press. (mBars)** | 1010 |
| **Antenna** | integral | **Duty Cycle (%)** | 100 |
| **Test Notes 1** | | | |
| **Test Notes 2** | | | |

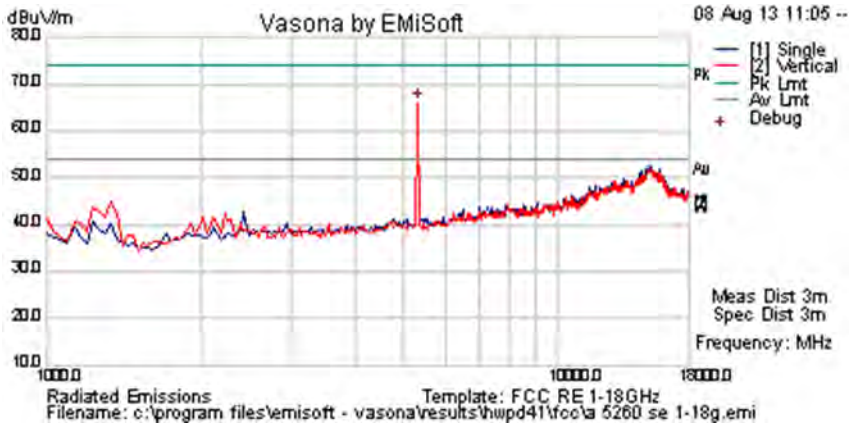



**Formally measured emission peaks**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5292.585 | 68.7 | 4.8 | -9.6 | 63.9 | Peak [Scan] | | 0 | 0 | | | | FUND |

| | |
|---|---|
| Legend: | TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission |
| | NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205 |

| | | | |
|---|---|---|---|
| **Test Freq.** | 5320 MHz | **Engineer** | SB |
| **Variant** | 802.11a; 6 Mbs | **Temp (ºC)** | 24 |
| **Freq. Range** | 1000 MHz - 18000 MHz | **Rel. Hum.(%)** | 30 |
| **Power Setting** | 16.5 | **Press. (mBars)** | 1010 |
| **Antenna** | integral | **Duty Cycle (%)** | 100 |
| **Test Notes 1** | | | |
| **Test Notes 2** | | | |

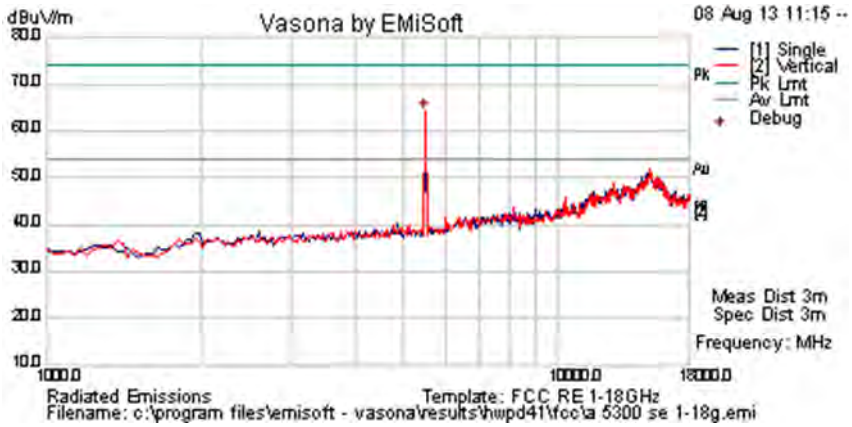



**Formally measured emission peaks**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5326.653 | 70.8 | 4.9 | -9.5 | 66.1 | Peak [Scan] | V | 0 | 0 | | | | FUND |

| | |
|---|---|
| Legend: | TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission |
| | NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205 |

| | | | |
|---|---|---|---|
| **Test Freq.** | 5500 MHz | **Engineer** | SB |
| **Variant** | 802.11a; 6 Mbs | **Temp (ºC)** | 24 |
| **Freq. Range** | 1000 MHz - 18000 MHz | **Rel. Hum.(%)** | 30 |
| **Power Setting** | 16.5 | **Press. (mBars)** | 1010 |
| **Antenna** | integral | **Duty Cycle (%)** | 100 |
| **Test Notes 1** | | | |
| **Test Notes 2** | | | |

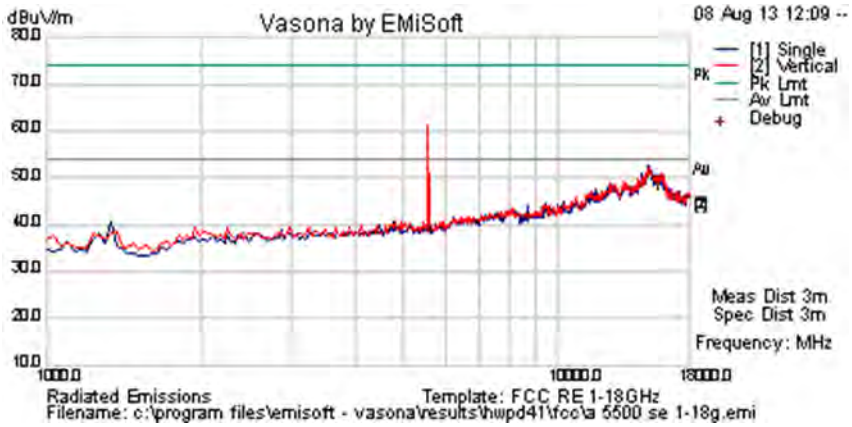



## Formally measured emission peaks

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5496.994 | 68.8 | 5.0 | -9.6 | 64.2 | Peak [Scan] | V | 0 | 0 | | | | FUND |

| | |
|---|---|
| Legend: | TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission |
| | NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205 |

| | | | |
|---|---|---|---|
| **Test Freq.** | 5580 MHz | **Engineer** | SB |
| **Variant** | 802.11a; 6 Mbs | **Temp (ºC)** | 24 |
| **Freq. Range** | 1000 MHz - 18000 MHz | **Rel. Hum.(%)** | 30 |
| **Power Setting** | 16.5 | **Press. (mBars)** | 1010 |
| **Antenna** | integral | **Duty Cycle (%)** | 100 |
| **Test Notes 1** | | | |
| **Test Notes 2** | | | |

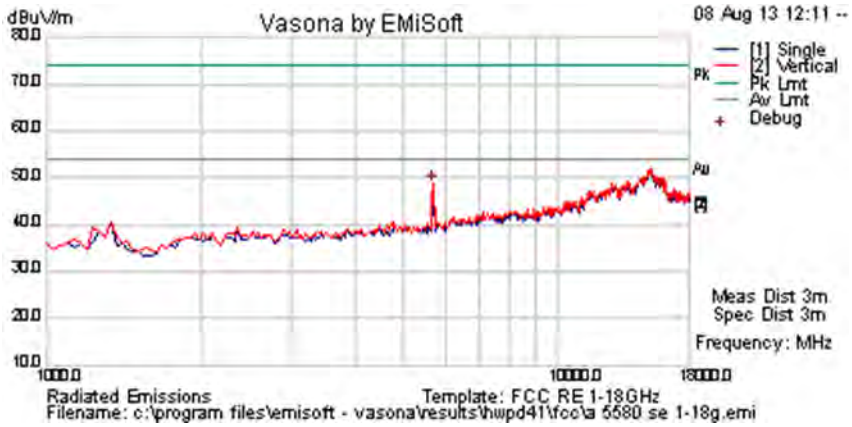



**Formally measured emission peaks**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5565.130 | 66.1 | 4.9 | -9.7 | 61.3 | Peak [Scan] | V | 0 | 0 | | | | FUND |

| | |
|---|---|
| Legend: | TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission |
| | NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205 |

| | | | |
|---|---|---|---|
| **Test Freq.** | 5720 MHz | **Engineer** | SB |
| **Variant** | 802.11a; 6 Mbs | **Temp (ºC)** | 24 |
| **Freq. Range** | 1000 MHz - 18000 MHz | **Rel. Hum.(%)** | 30 |
| **Power Setting** | 16.5 | **Press. (mBars)** | 1010 |
| **Antenna** | integral | **Duty Cycle (%)** | 100 |
| **Test Notes 1** | | | |
| **Test Notes 2** | | | |



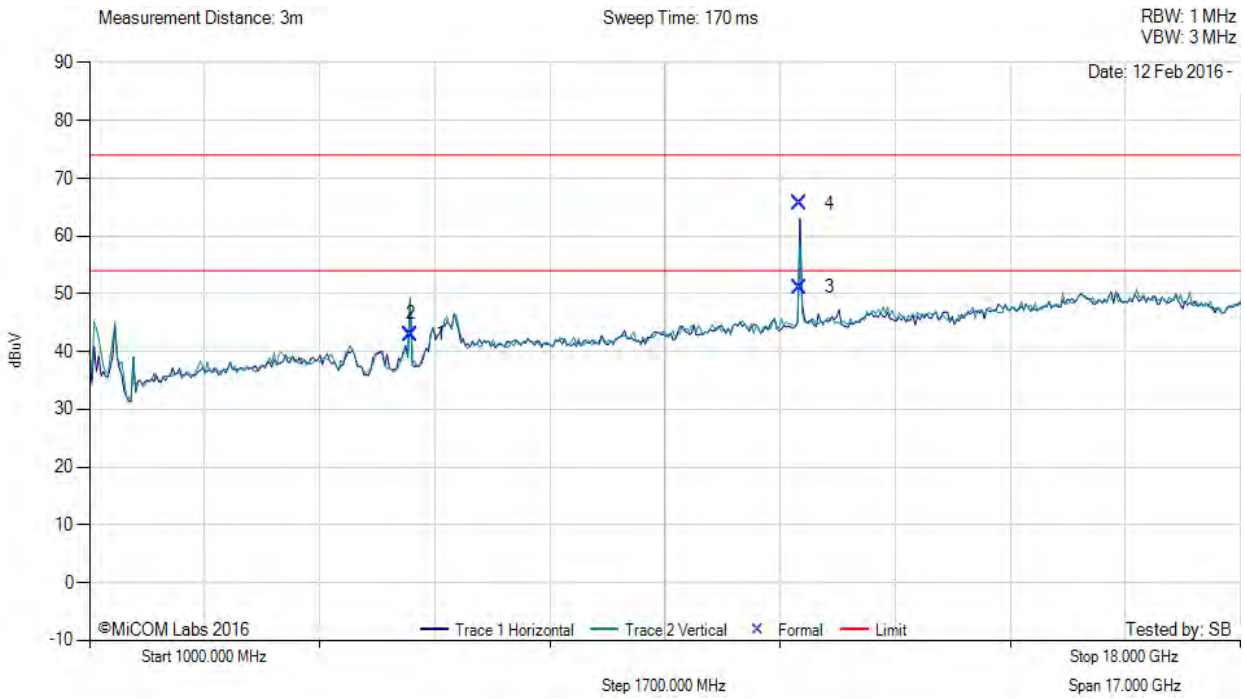

**Formally measured emission peaks**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5701.403 | 53.4 | 5.0 | -9.6 | 48.8 | Peak [Scan] | V | 0 | 0 | | | | FUND |

| | |
|---|---|
| Legend: | TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission |
| | NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205 |

RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS

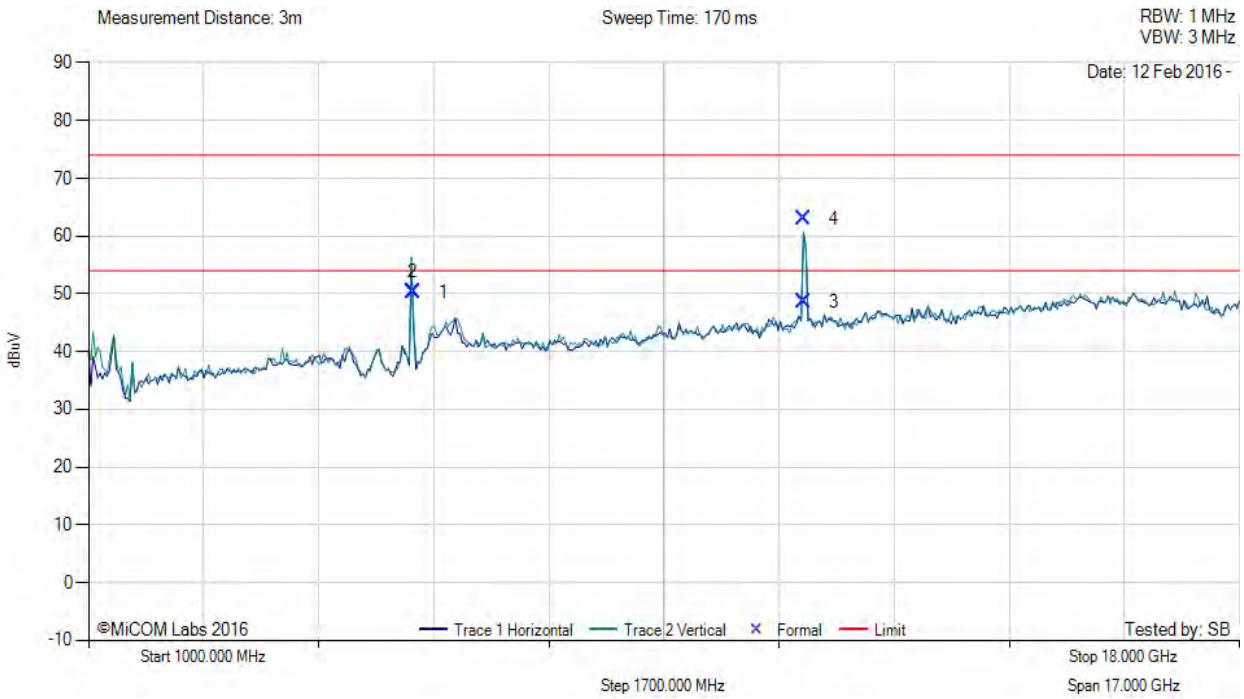
Variant: 802.11a, Test Freq: 5745.00 MHz, Antenna: 5184-6684, Power Setting: Target, Duty Cycle (%): 99




| Num | Frequency MHz | Raw dBµV | Cable Loss | AF dB | Level dBµV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBµV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5738.16 | 49.80 | 3.82 | -10.67 | 42.95 | Fundamental | Horizontal | 100 | 1 | -- | -- | |
| 2 | 5738.16 | 49.80 | 3.82 | -10.67 | 42.95 | Peak (NRB) | Horizontal | 100 | 1 | -- | -- | Pass |
| 3 | 11486.42 | 50.55 | 5.46 | -4.86 | 51.15 | Max Avg | Horizontal | 187 | 1 | 54.0 | -2.9 | Pass |
| 4 | 11486.42 | 65.02 | 5.46 | -4.86 | 65.62 | Max Peak | Horizontal | 187 | 1 | 74.0 | -8.4 | Pass |

RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS

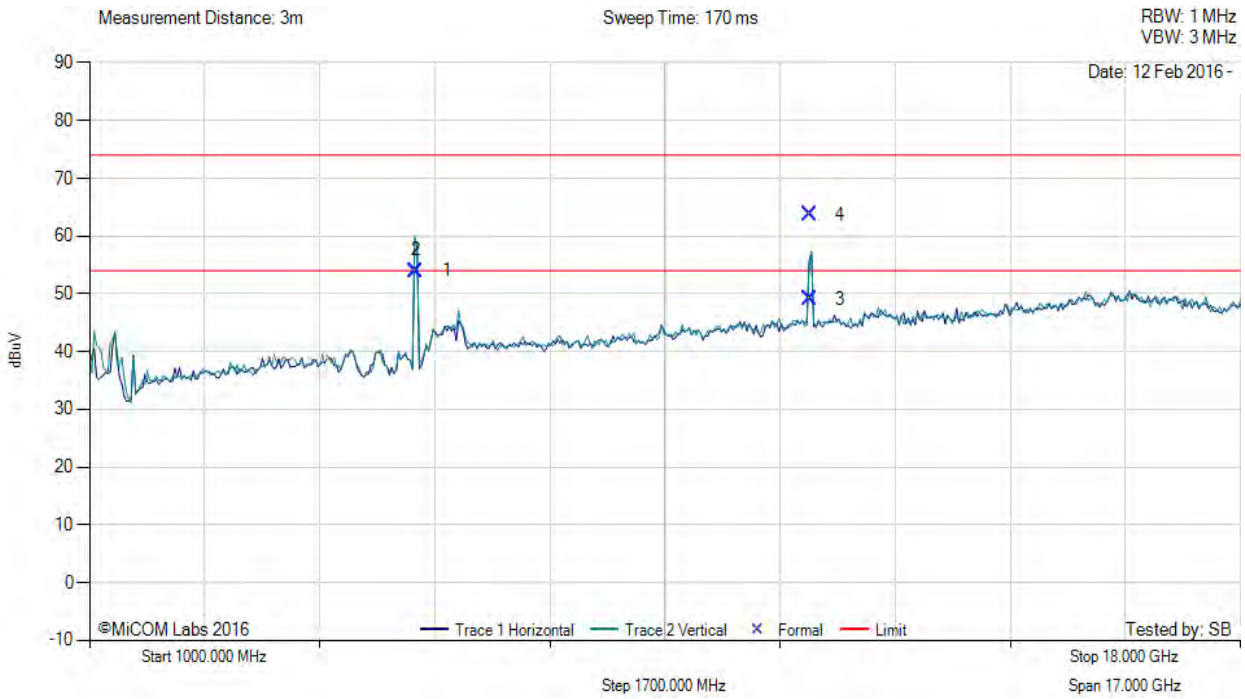
Variant: 802.11a, Test Freq: 5785.00 MHz, Antenna: 5184-6684, Power Setting: Target, Duty Cycle (%): 99




| Num | Frequency MHz | Raw dBµV | Cable Loss | AF dB | Level dBµV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBµV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5788.74 | 56.96 | 3.79 | -10.42 | 50.33 | Fundamental | Horizontal | 101 | 1 | -- | -- | |
| 2 | 5788.74 | 56.96 | 3.79 | -10.42 | 50.33 | Peak (NRB) | Horizontal | 101 | 1 | -- | -- | Pass |
| 3 | 11565.89 | 47.65 | 5.54 | -4.65 | 48.54 | Max Avg | Horizontal | 100 | 60 | 54.0 | -5.5 | Pass |
| 4 | 11565.89 | 62.08 | 5.54 | -4.65 | 62.97 | Max Peak | Horizontal | 100 | 60 | 74.0 | -11.0 | Pass |

RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS

Variant: 802.11a, Test Freq: 5825.00 MHz, Antenna: 5184-6684, Power Setting: Target, Duty Cycle (%): 99




| Num | Frequency MHz | Raw dBµV | Cable Loss | AF dB | Level dBµV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBµV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5825.78 | 60.37 | 3.84 | -10.24 | 53.97 | Fundamental | Horizontal | 101 | 1 | -- | -- | |
| 2 | 5825.78 | 60.37 | 3.84 | -10.24 | 53.97 | Peak (NRB) | Horizontal | 101 | 1 | -- | -- | Pass |
| 3 | 11645.65 | 48.14 | 5.46 | -4.47 | 49.13 | Max Avg | Horizontal | 118 | 60 | 54.0 | -4.9 | Pass |
| 4 | 11645.65 | 62.70 | 5.46 | -4.47 | 63.69 | Max Peak | Horizontal | 118 | 60 | 74.0 | -10.3 | Pass |

### 7.1.2.2. Radiated Band-Edge - Integral Antenna

Peak Limit 74.0 dBµV, Peak Limit 54.0 dBµV

| | 5150 MHz | | | 5350 MHz | | |
|---|---|---|---|---|---|---|
| | dBµV | | Power Setting | dBµV | | Power Setting |
| Operational Mode | Peak | Average | | Peak | Average | |
| a | 52.73 | 33.58 | 9.0 | 64.88 | 37.80 | 16.5 |
| n HT-20 | 54.00 | 33.26 | 9.0 | 64.64 | 36.50 | 16.5 |
| n HT-40 | 50.83 | 37.50 | 9.0 | 63.90 | 49.11 | 18.0 |
| VHT-40 | 51.79 | 35.26 | 12.0 | 63.65 | 49.22 | 18.0 |
| VHT-80 | 61.92 | 46.64 | 12.0 | 62.68 | 48.60 | 18.0 |

| | 5460 MHz | | |
|---|---|---|---|
| Operational Mode | Peak | Average | Power Setting |
| a | 59.94 | 35.92 | 16.5 |
| n HT-20 | 58.86 | 36.16 | 16.5 |
| n HT-40 | 52.85 | 40.00 | 18.0 |
| VHT-40 | 52.19 | 38.48 | 18.0 |
| VHT-80 | 63.90 | 47.04 | 18.0 |

## 5725 and 5850 MHz Restricted Band-Edge

Band-Edge Summary

5725 - 5850 MHz

| 5184-6684 | | Band-Edge Freq | Limit 68.2dBµV/m | Limit 78.2dBµV/m | Power Setting |
|---|---|---|---|---|---|
| Operational Mode | Operating Frequency (MHz) | MHz | dBµV/m | dBµV/m | |
| 802.11a | 5745.00 | 5725.00 | 55.13 | 56.49 | 20.00 |
| 802.11ac-40 | 5755.00 | 5725.00 | 68.23 | 78.23 | 20.00 |
| 802.11ac-80 | 5775.00 | 5725.00 | 68.23 | 78.23 | 20.00 |
| 802.11n HT-20 | 5745.00 | 5725.00 | 68.23 | 78.23 | 0.00 |
| 802.11n HT-40 | 5755.00 | 5725.00 | 68.23 | 78.23 | 0.00 |

| 5184-6684 | | Band-Edge Freq | Limit 78.2dBµV/m | Limit 68.2dBµV/m | Power Setting |
|---|---|---|---|---|---|
| Operational Mode | Operating Frequency (MHz) | MHz | dBµV/m | dBµV/m | |
| 802.11a | 5825.00 | 5850.00 | 56.82 | 55.50 | 20.00 |
| 802.11ac-40 | 5795.00 | 5850.00 | 78.23 | 68.23 | 20.00 |
| 802.11ac-80 | 5775.00 | 5850.00 | 78.23 | 68.23 | 20.00 |
| 802.11n HT-20 | 5825.00 | 5850.00 | 78.23 | 68.23 | 20.00 |
| 802.11n HT-40 | 5795.00 | 5850.00 | 78.23 | 68.23 | 20.00 |

Click on the links to view the data.

**Equipment Configuration for 5725 MHz Radiated Band-Edge Emissions**

| | | | |
|---|---|---|---|
| **Antenna:** | 5184-6684 | **Variant:** | 802.11a |
| **Antenna Gain (dBi):** | 7.79 | **Modulation:** | OFDM |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5745.00 | **Data Rate:** | 6.00 MBit/s |
| **Power Setting:** | Target | **Tested By:** | SB |

**Test Measurement Results**

| Num | Frequency MHz | Raw dBµV | Cable Loss | AF dB | Level dBµV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBµV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 5715.00 | 16.98 | 3.81 | 34.34 | 55.13 | Marker | Horizontal | 157 | 352 | 68.2 | -13.1 | Pass |
| #2 | 5725.00 | 18.35 | 3.79 | 34.35 | 56.49 | Marker | Horizontal | 157 | 352 | 78.2 | -21.7 | Pass |
| #3 | 5725.00 | -- | -- | -- | -- | Band-Edge | -- | -- | -- | -- | -- | -- |

**Equipment Configuration for 5725 MHz Radiated Band-Edge Emissions**

| | | | |
|---|---|---|---|
| **Antenna:** | 5184-6684 | **Variant:** | 802.11ac-40 |
| **Antenna Gain (dBi):** | 7.79 | **Modulation:** | OFDM |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5755.00 | **Data Rate:** | 13.50 MBit/s |
| **Power Setting:** | Target | **Tested By:** | SB |

**Test Measurement Results**

| Num | Frequency MHz | Raw dBµV | Cable Loss | AF dB | Level dBµV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBµV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 5715.00 | 22.25 | 3.81 | 34.34 | 60.40 | Marker | Horizontal | 157 | 352 | 68.2 | -7.8 | Pass |
| #2 | 5716.76 | 23.01 | 3.81 | 34.34 | 61.16 | Marker | Horizontal | 157 | 352 | 78.2 | -17.1 | Pass |
| #3 | 5725.00 | -- | -- | -- | -- | Band-Edge | -- | -- | -- | -- | -- | -- |

**Equipment Configuration for 5725 MHz Radiated Band-Edge Emissions**

| | | | |
|---|---|---|---|
| **Antenna:** | 5184-6684 | **Variant:** | 802.11ac-80 |
| **Antenna Gain (dBi):** | 7.79 | **Modulation:** | OFDM |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5775.00 | **Data Rate:** | 29.30 MBit/s |
| **Power Setting:** | Target | **Tested By:** | SB |

**Test Measurement Results**

| Num | Frequency MHz | Raw dBµV | Cable Loss | AF dB | Level dBµV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBµV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 5706.51 | 21.37 | 3.85 | 34.34 | 59.56 | Marker | Horizontal | 157 | 352 | 68.2 | -8.7 | Pass |
| #2 | 5725.00 | 29.05 | 3.79 | 34.35 | 67.19 | Marker | Horizontal | 157 | 352 | 78.2 | -11.0 | Pass |
| #3 | 5725.00 | -- | -- | -- | -- | Band-Edge | -- | -- | -- | -- | -- | -- |

**Equipment Configuration for 5725 MHz Radiated Band-Edge Emissions**

| | | | |
|---|---|---|---|
| **Antenna:** | 5184-6684 | **Variant:** | 802.11n HT-20 |
| **Antenna Gain (dBi):** | 7.79 | **Modulation:** | OFDM |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5745.00 | **Data Rate:** | 6.50 MBit/s |
| **Power Setting:** | Target | **Tested By:** | SB |

**Test Measurement Results**

| Num | Frequency MHz | Raw dBµV | Cable Loss | AF dB | Level dBµV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBµV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 5715.00 | 17.44 | 3.81 | 34.34 | 55.59 | Marker | Horizontal | 157 | 352 | 68.2 | -12.6 | Pass |
| #2 | 5725.00 | 19.05 | 3.79 | 34.35 | 57.19 | Marker | Horizontal | 157 | 352 | 78.2 | -21.0 | Pass |
| #3 | 5725.00 | -- | -- | -- | -- | Band-Edge | -- | -- | -- | -- | -- | -- |

**Equipment Configuration for 5725 MHz Radiated Band-Edge Emissions**

| | | | |
|---|---|---|---|
| **Antenna:** | 5184-6684 | **Variant:** | 802.11n HT-40 |
| **Antenna Gain (dBi):** | 7.79 | **Modulation:** | OFDM |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5755.00 | **Data Rate:** | 13.50 MBit/s |
| **Power Setting:** | Target | **Tested By:** | SB |

**Test Measurement Results**

| Num | Frequency MHz | Raw dBµV | Cable Loss | AF dB | Level dBµV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBµV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 5715.00 | 22.25 | 3.81 | 34.34 | 60.40 | Marker | Horizontal | 157 | 352 | 68.2 | -7.8 | Pass |
| #2 | 5717.48 | 23.01 | 3.81 | 34.34 | 61.16 | Marker | Horizontal | 157 | 352 | 78.2 | -17.1 | Pass |
| #3 | 5725.00 | -- | -- | -- | -- | Band-Edge | -- | -- | -- | -- | -- | -- |

**Equipment Configuration for 5850 MHz Radiated Band-Edge Emissions**

| | | | |
|---|---|---|---|
| **Antenna:** | 5184-6684 | **Variant:** | 802.11a |
| **Antenna Gain (dBi):** | 7.79 | **Modulation:** | OFDM |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5825.00 | **Data Rate:** | 6.00 MBit/s |
| **Power Setting:** | Target | **Tested By:** | SB |

**Test Measurement Results**

| Num | Frequency MHz | Raw dBµV | Cable Loss | AF dB | Level dBµV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBµV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #2 | 5851.68 | 18.37 | 3.82 | 34.63 | 56.82 | Marker | Horizontal | 157 | 352 | 78.2 | -21.4 | Pass |
| #3 | 5861.05 | 16.98 | 3.86 | 34.66 | 55.50 | Marker | Horizontal | 157 | 352 | 68.2 | -12.7 | Pass |
| #1 | 5850.00 | -- | -- | -- | -- | Band-Edge | -- | -- | -- | -- | -- | -- |

**Equipment Configuration for 5850 MHz Radiated Band-Edge Emissions**

| | | | |
|---|---|---|---|
| **Antenna:** | 5184-6684 | **Variant:** | 802.11ac-40 |
| **Antenna Gain (dBi):** | 7.79 | **Modulation:** | OFDM |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5795.00 | **Data Rate:** | 13.50 MBit/s |
| **Power Setting:** | Target | **Tested By:** | SB |

**Test Measurement Results**

| Num | Frequency MHz | Raw dBµV | Cable Loss | AF dB | Level dBµV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBµV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 5850.00 | -- | -- | -- | -- | Band-Edge | -- | -- | -- | -- | -- | -- |
| #2 | 5853.58 | 17.36 | 3.83 | 34.64 | 55.83 | Marker | Horizontal | 157 | 352 | 78.2 | -22.4 | Pass |
| #3 | 5860.00 | 15.99 | 3.86 | 34.65 | 54.50 | Marker | Horizontal | 157 | 352 | 78.2 | -23.7 | Pass |

**Equipment Configuration for 5850 MHz Radiated Band-Edge Emissions**

| | | | |
|---|---|---|---|
| **Antenna:** | 5184-6684 | **Variant:** | 802.11ac-80 |
| **Antenna Gain (dBi):** | 7.79 | **Modulation:** | OFDM |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5775.00 | **Data Rate:** | 29.30 MBit/s |
| **Power Setting:** | Target | **Tested By:** | SB |

**Test Measurement Results**

| Num | Frequency MHz | Raw dBµV | Cable Loss | AF dB | Level dBµV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBµV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 5850.00 | -- | -- | -- | -- | Band-Edge | -- | -- | -- | -- | -- | -- |
| #2 | 5853.58 | 21.45 | 3.83 | 34.64 | 59.92 | Marker | Horizontal | 157 | 352 | 78.2 | -18.3 | Pass |
| #3 | 5874.94 | 18.37 | 3.80 | 34.70 | 56.87 | Marker | Horizontal | 157 | 352 | 68.2 | -11.4 | Pass |

**Equipment Configuration for 5850 MHz Radiated Band-Edge Emissions**

| | | | |
|---|---|---|---|
| **Antenna:** | 5184-6684 | **Variant:** | 802.11n HT-20 |
| **Antenna Gain (dBi):** | 7.79 | **Modulation:** | OFDM |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5825.00 | **Data Rate:** | 6.50 MBit/s |
| **Power Setting:** | Target | **Tested By:** | SB |

**Test Measurement Results**

| Num | Frequency MHz | Raw dBµV | Cable Loss | AF dB | Level dBµV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBµV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 5850.00 | 17.04 | 3.81 | 34.63 | 55.48 | Marker | Horizontal | 157 | 352 | 78.2 | -22.8 | Pass |
| #2 | 5850.00 | -- | -- | -- | -- | Band-Edge | -- | -- | -- | -- | -- | -- |
| #3 | 5860.00 | 15.41 | 3.86 | 34.65 | 53.92 | Marker | Horizontal | 157 | 352 | 78.2 | -24.3 | Pass |

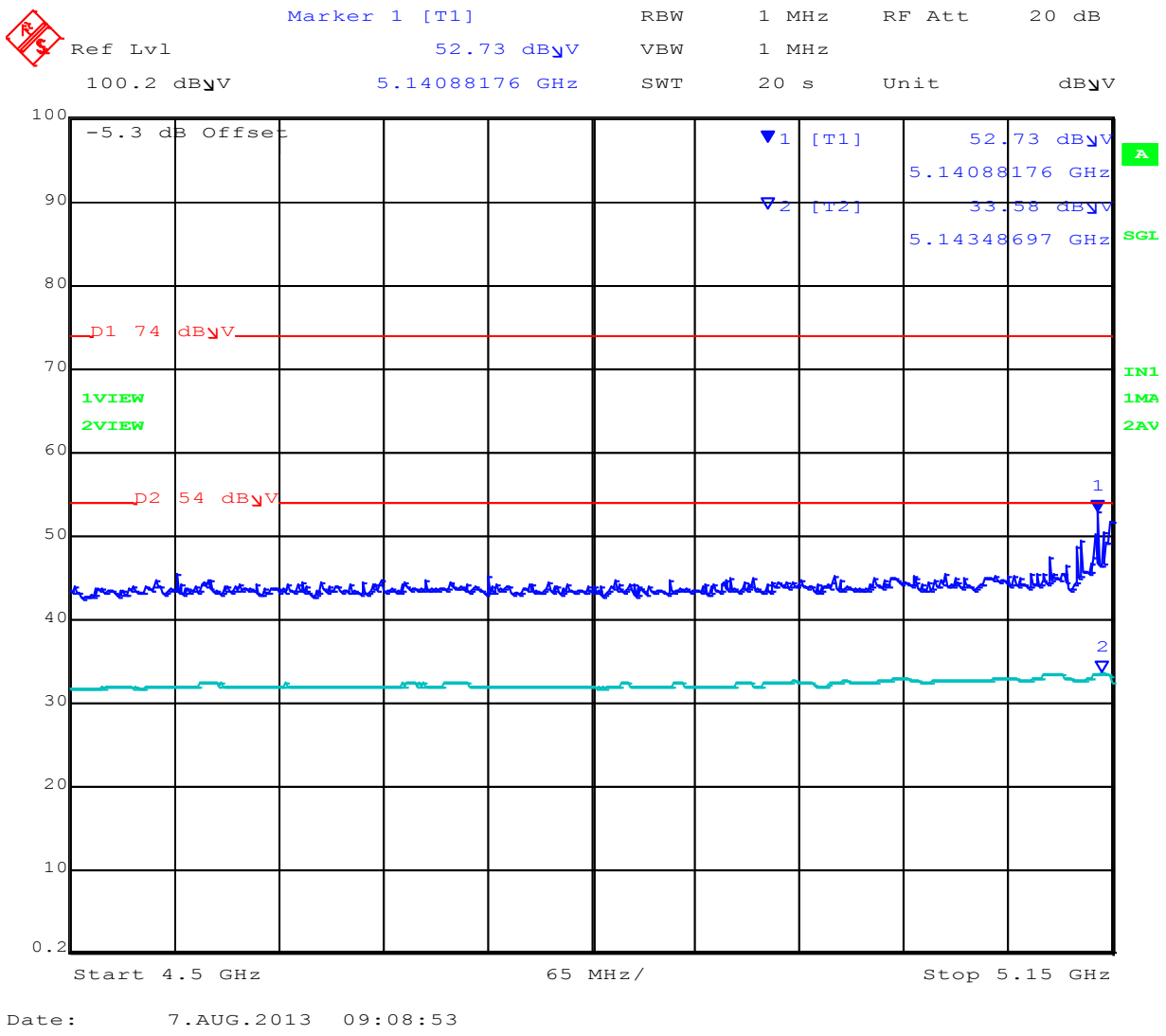
**Equipment Configuration for 5850 MHz Radiated Band-Edge Emissions**

| | | | |
|---|---|---|---|
| **Antenna:** | 5184-6684 | **Variant:** | 802.11n HT-40 |
| **Antenna Gain (dBi):** | 7.79 | **Modulation:** | OFDM |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5795.00 | **Data Rate:** | 13.50 MBit/s |
| **Power Setting:** | Target | **Tested By:** | SB |

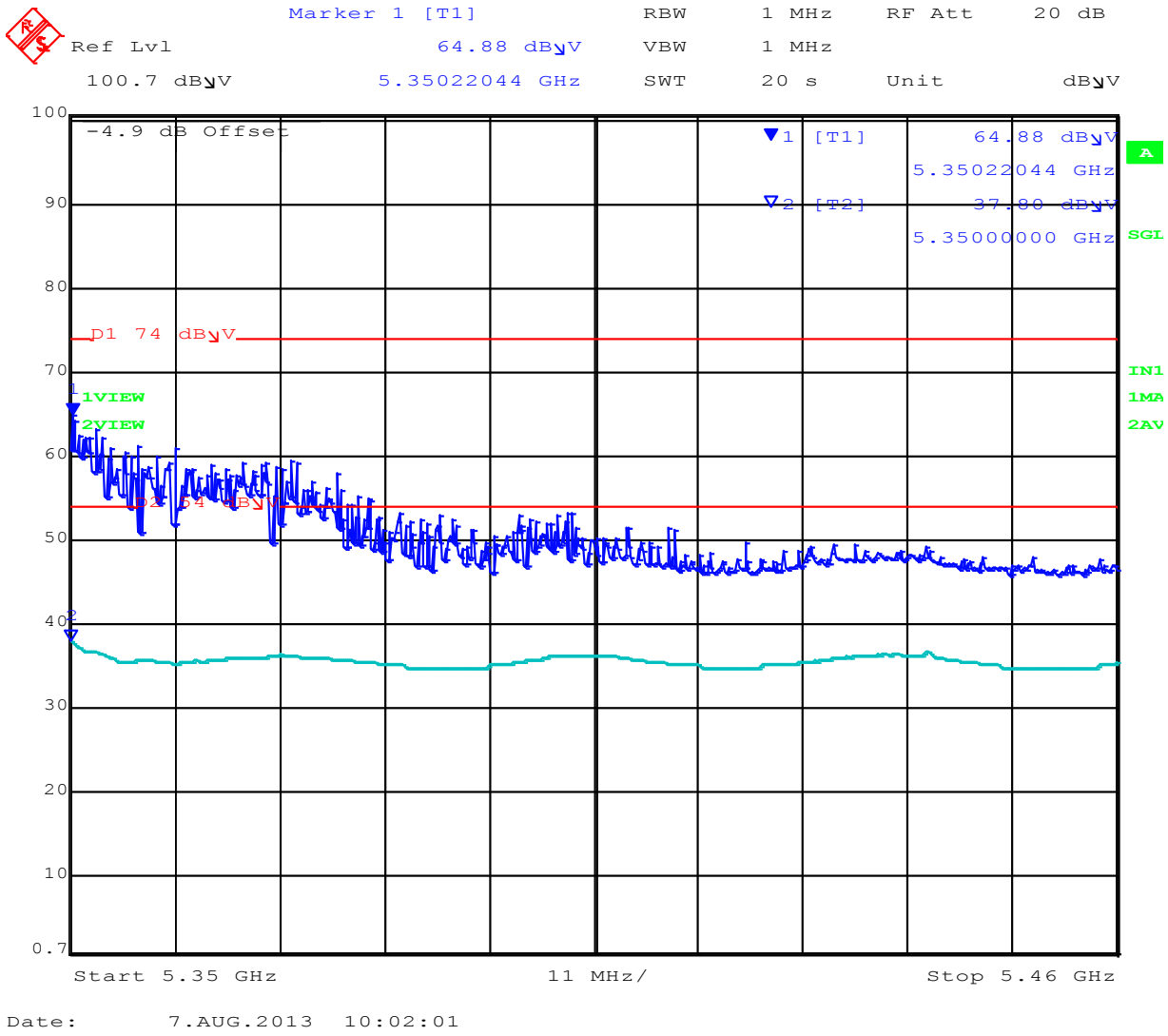
**Test Measurement Results**

| Num | Frequency MHz | Raw dBµV | Cable Loss | AF dB | Level dBµV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBµV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 5850.00 | -- | -- | -- | -- | Band-Edge | -- | -- | -- | -- | -- | -- |
| #2 | 5850.84 | 17.04 | 3.81 | 34.63 | 55.48 | Marker | Horizontal | 157 | 352 | 78.2 | -22.8 | Pass |
| #3 | 5860.00 | 15.41 | 3.86 | 34.65 | 53.92 | Marker | Horizontal | 157 | 352 | 78.2 | -24.3 | Pass |

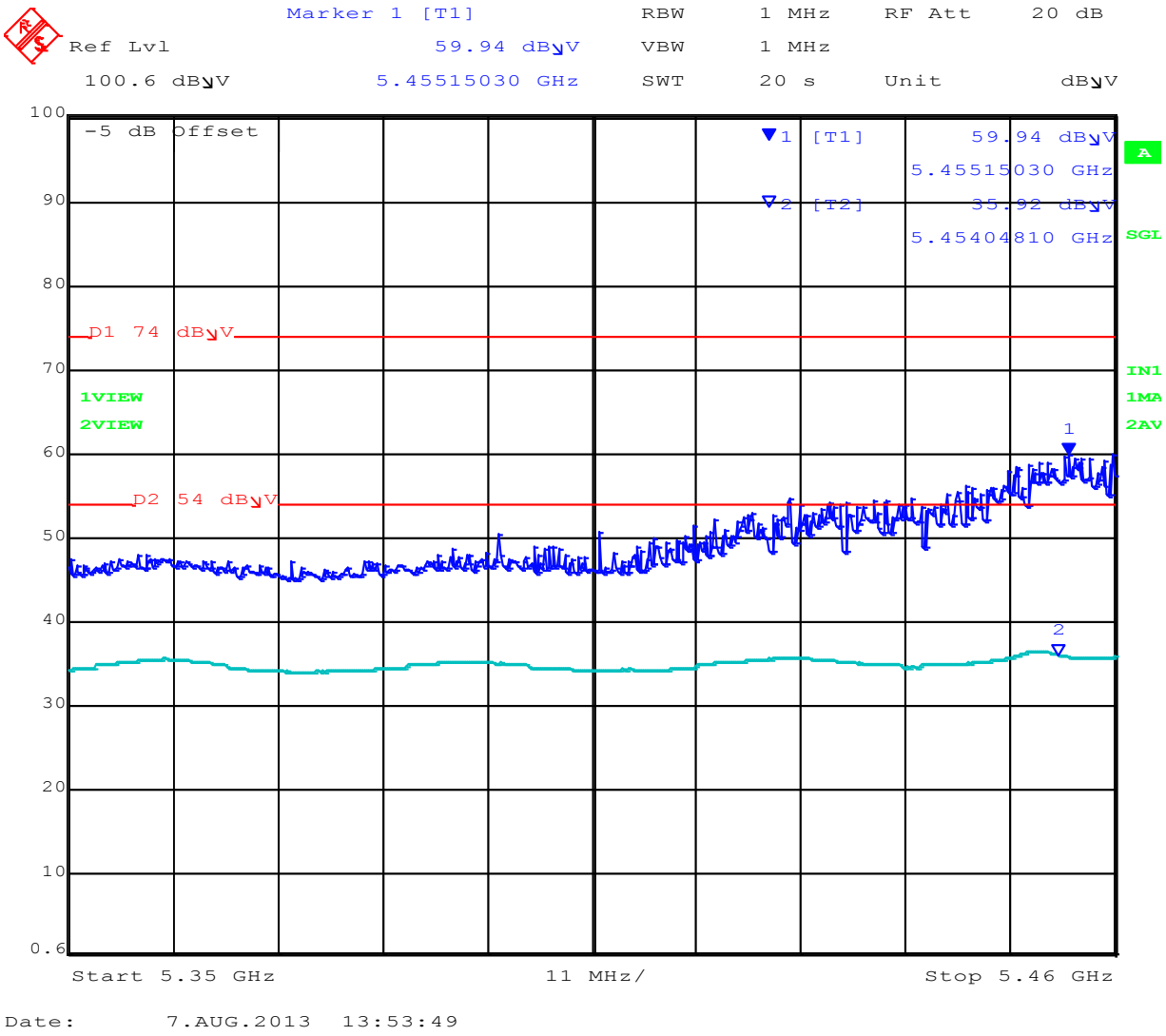
## 802.11a Frequency 5180 MHz Band-Edge Frequency 5150



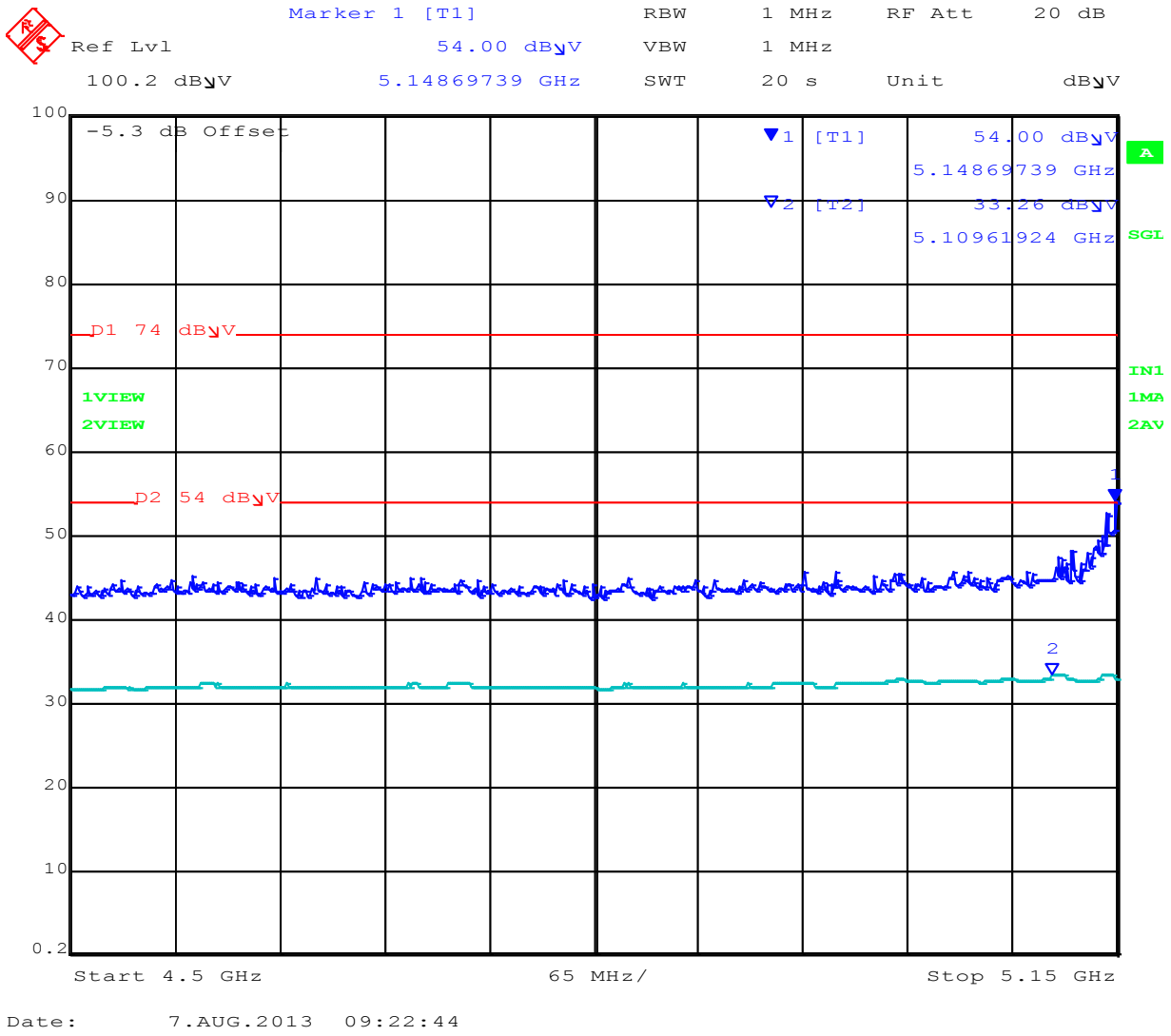
## 802.11a Frequency 5320 MHz Band-Edge Frequency 5350



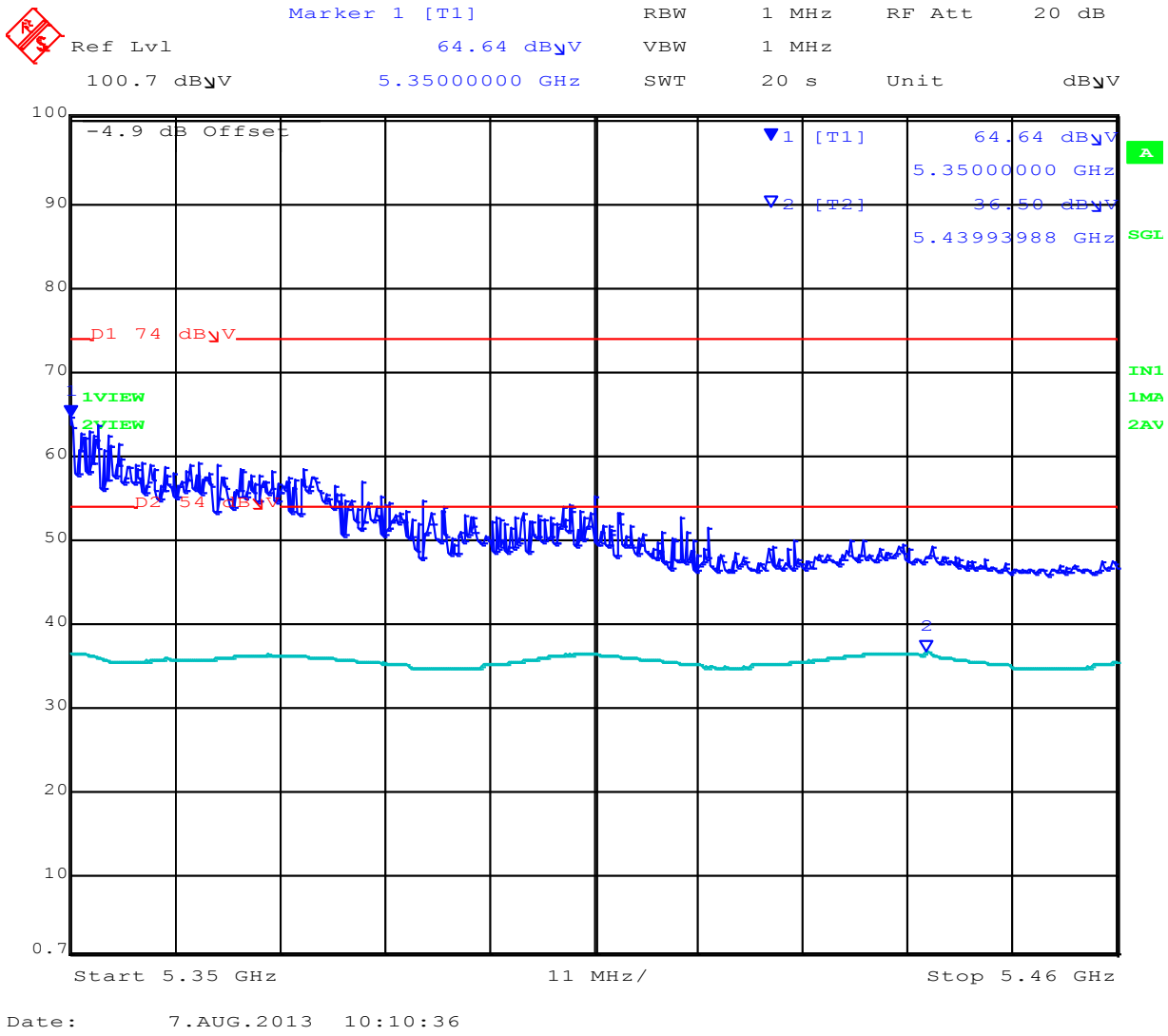
## 802.11a Frequency 5500 MHz Band-Edge Frequency 5460



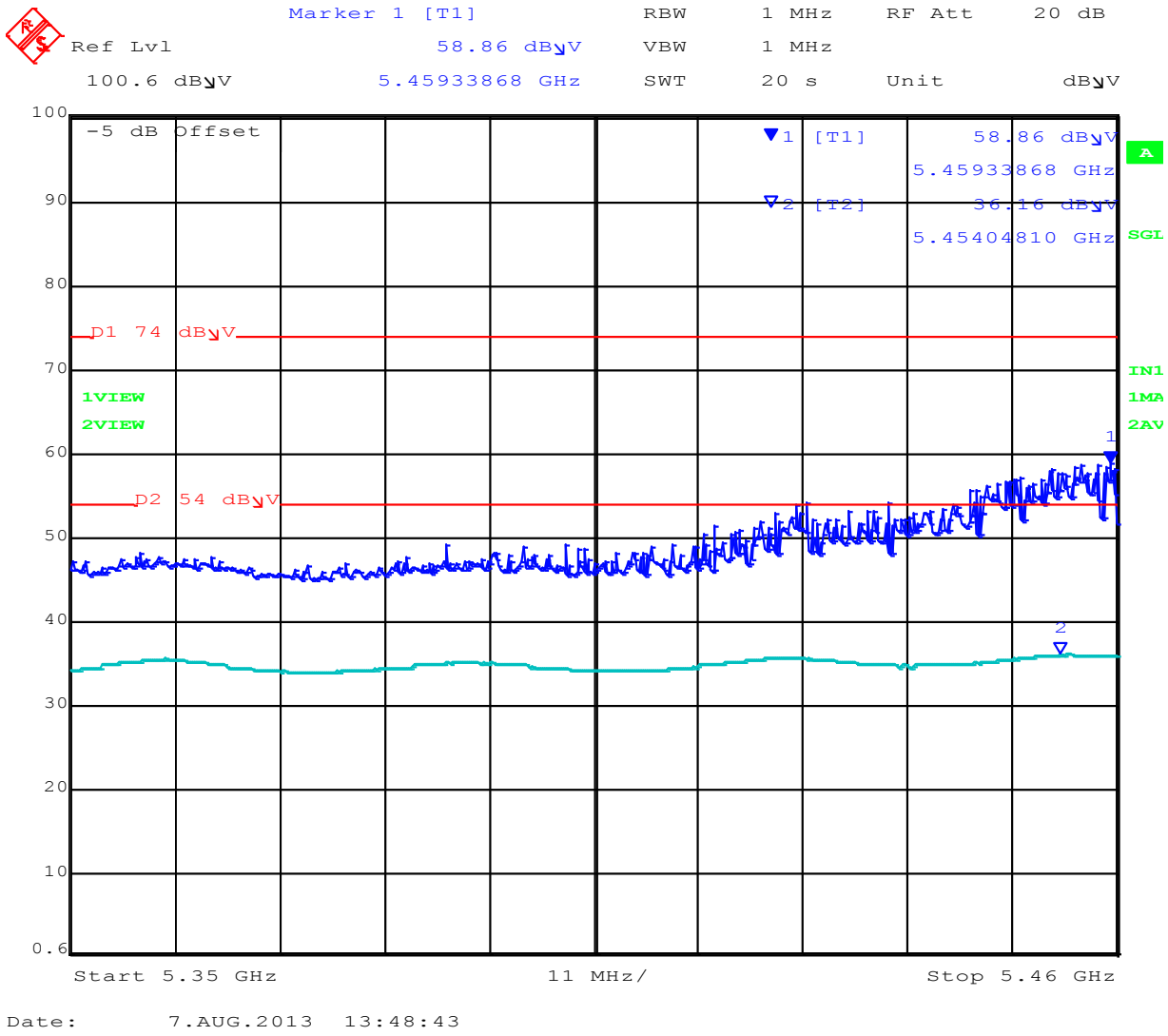
## 802.11n HT-20 Frequency 5180 MHz Band-Edge Frequency 5150



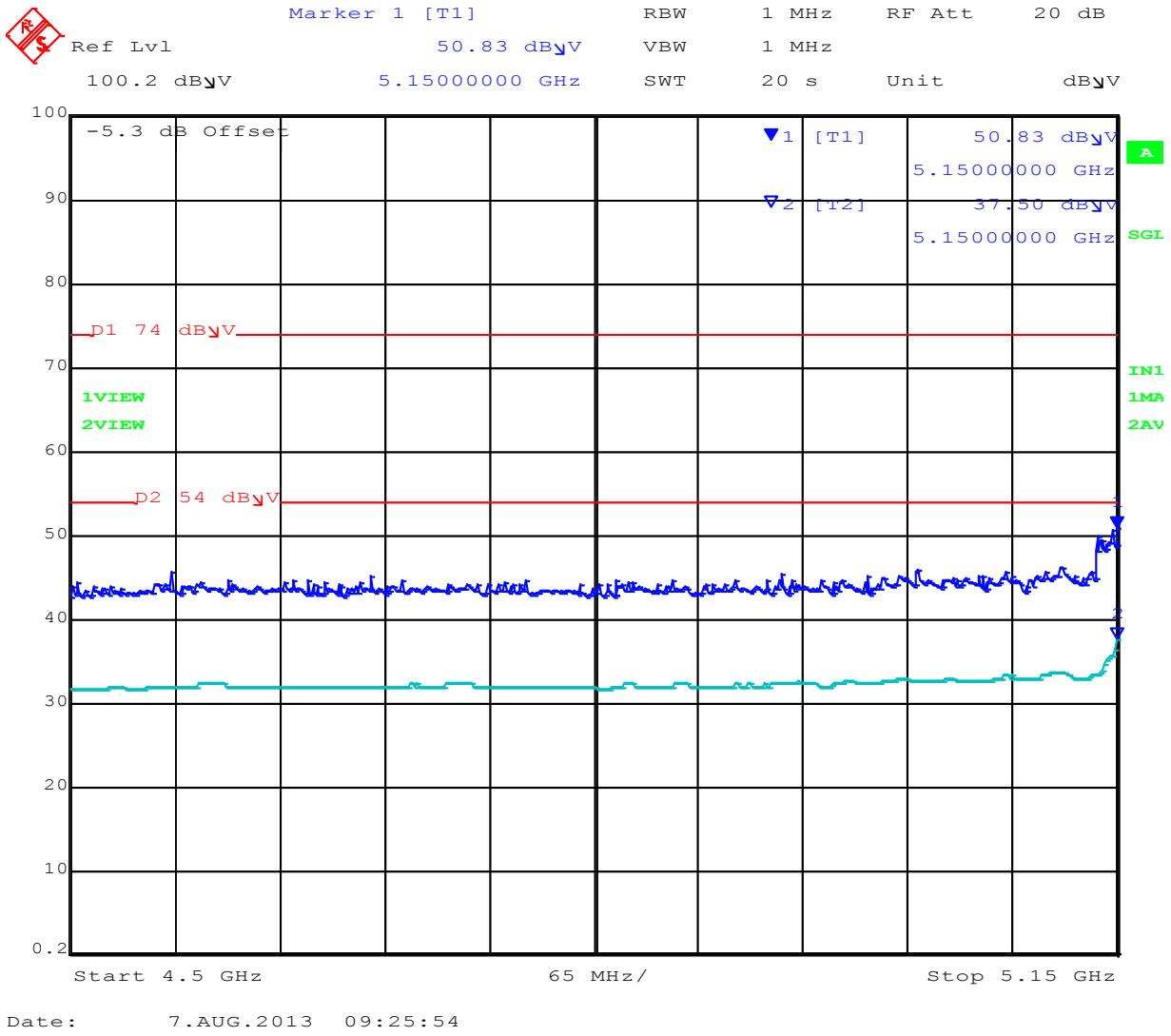
## 802.11n HT-20 Frequency 5320 MHz Band-Edge Frequency 5350



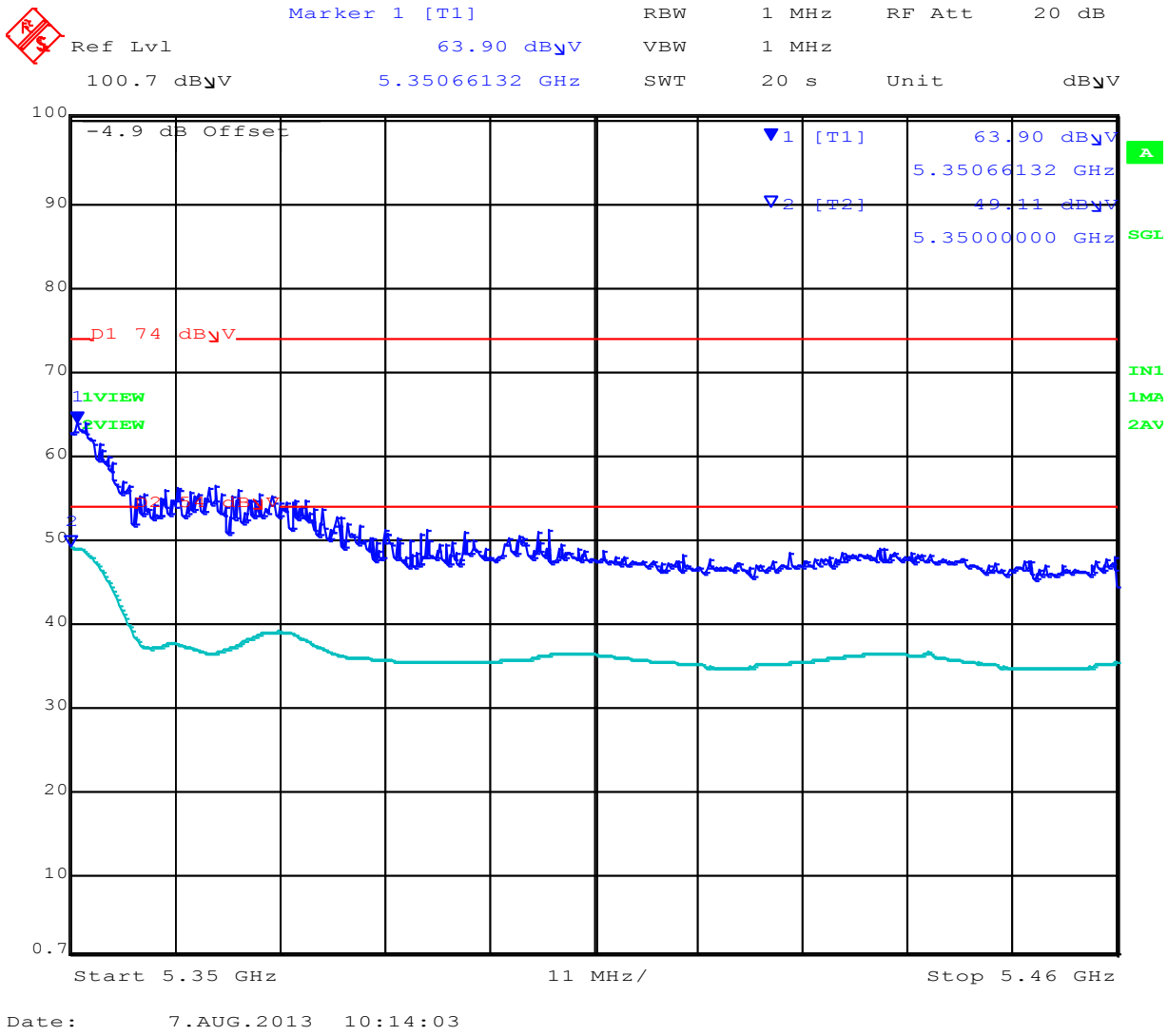
## 802.11n HT-20 Frequency 5500 MHz Band-Edge Frequency 5460



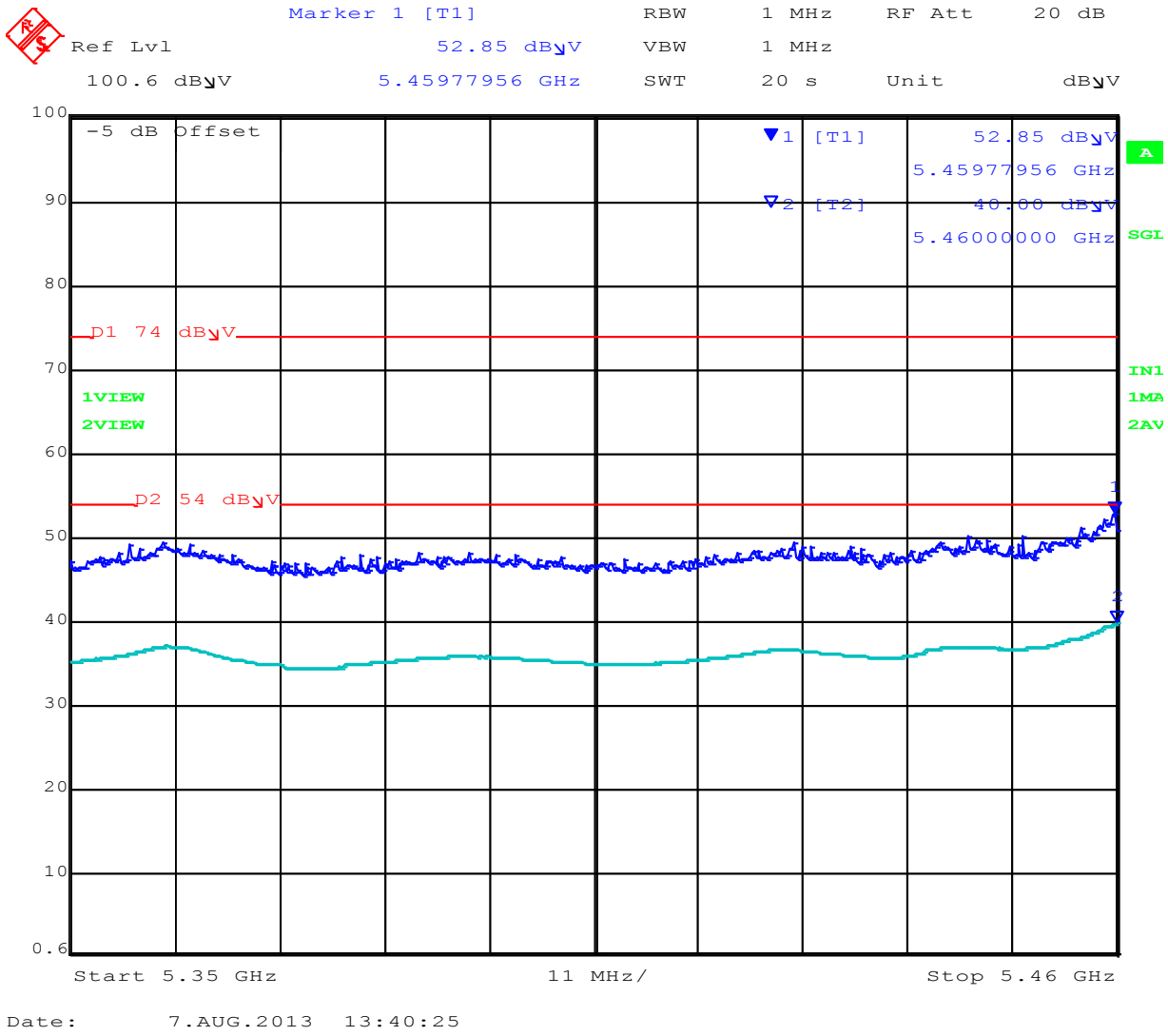
## 802.11n HT-40 Frequency 5190 MHz Band-Edge Frequency 5150



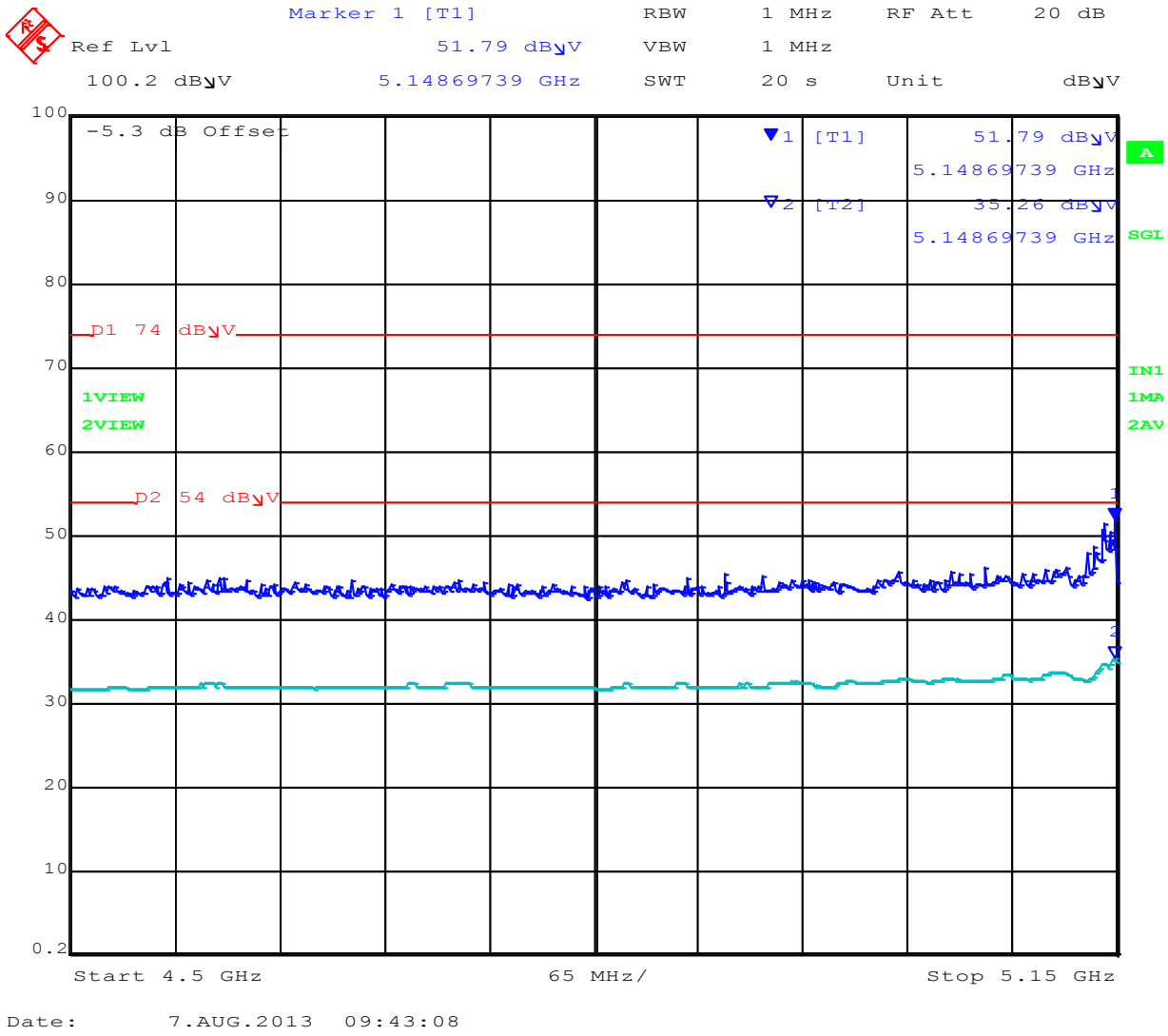
## 802.11n HT-40 Frequency 5310 MHz Band-Edge Frequency 5350



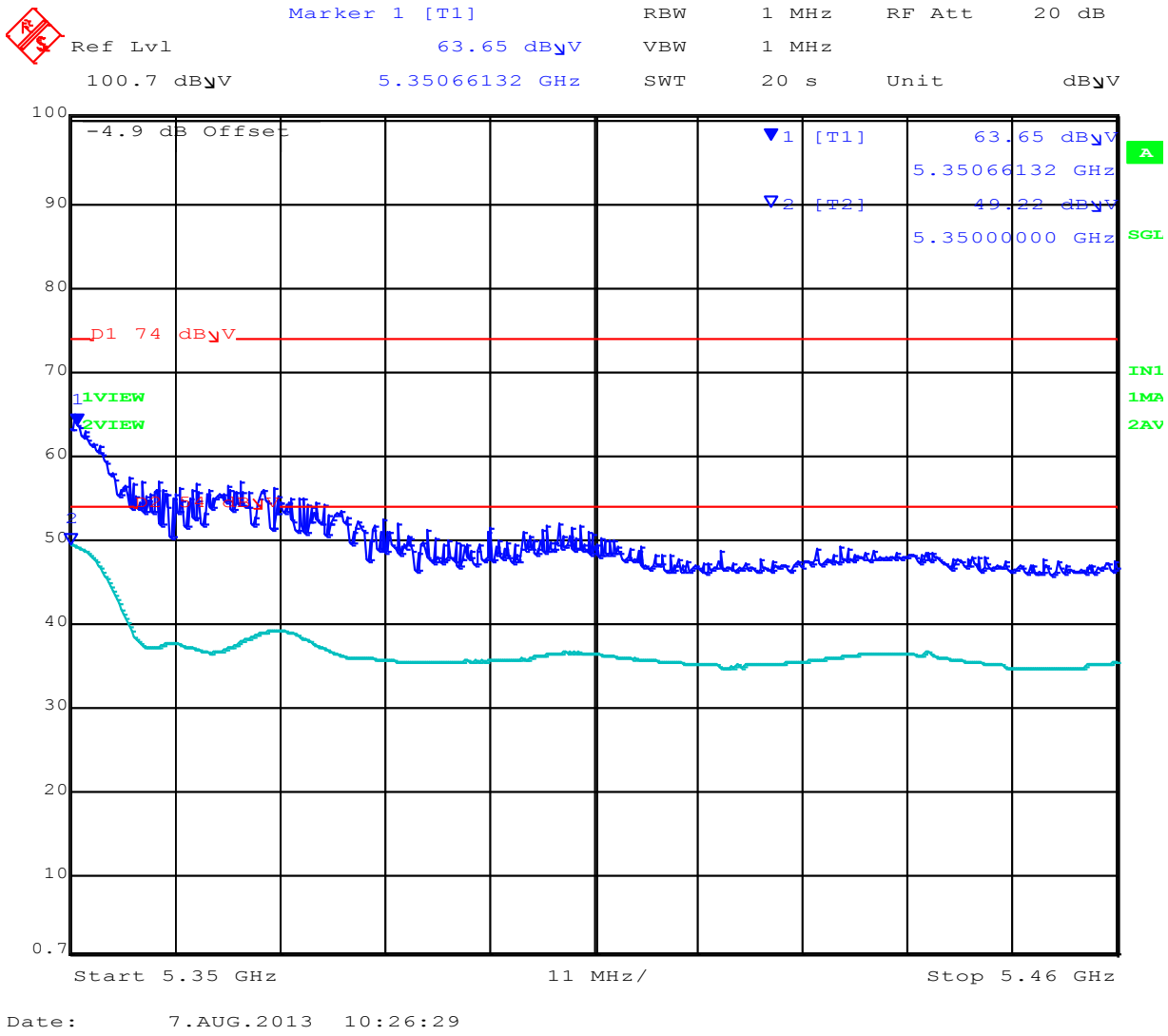
## 802.11n HT-40 Frequency 5510 MHz Band-Edge Frequency 5460



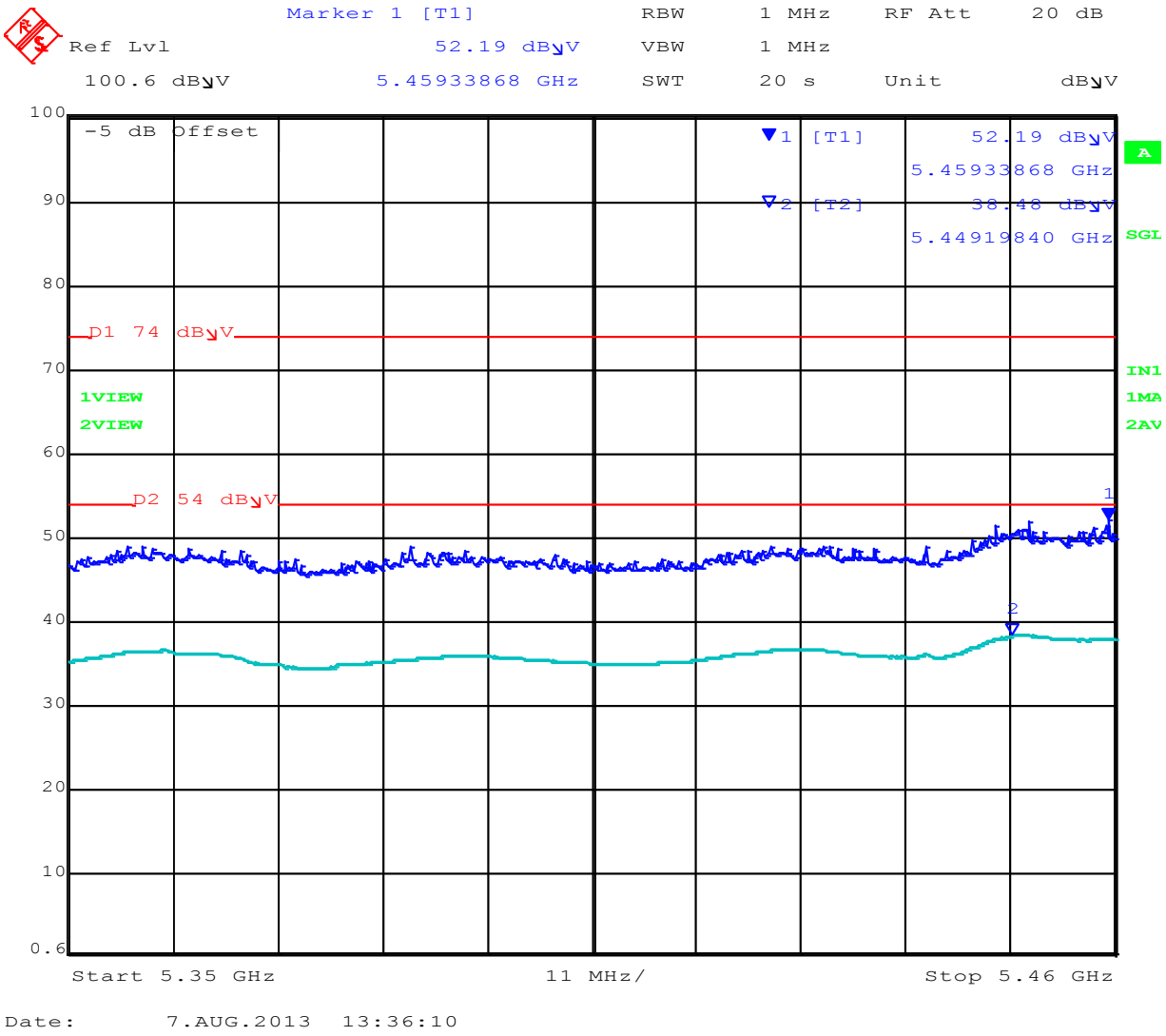
## 802.11VHT-40 Frequency 5190 MHz Band-Edge Frequency 5150



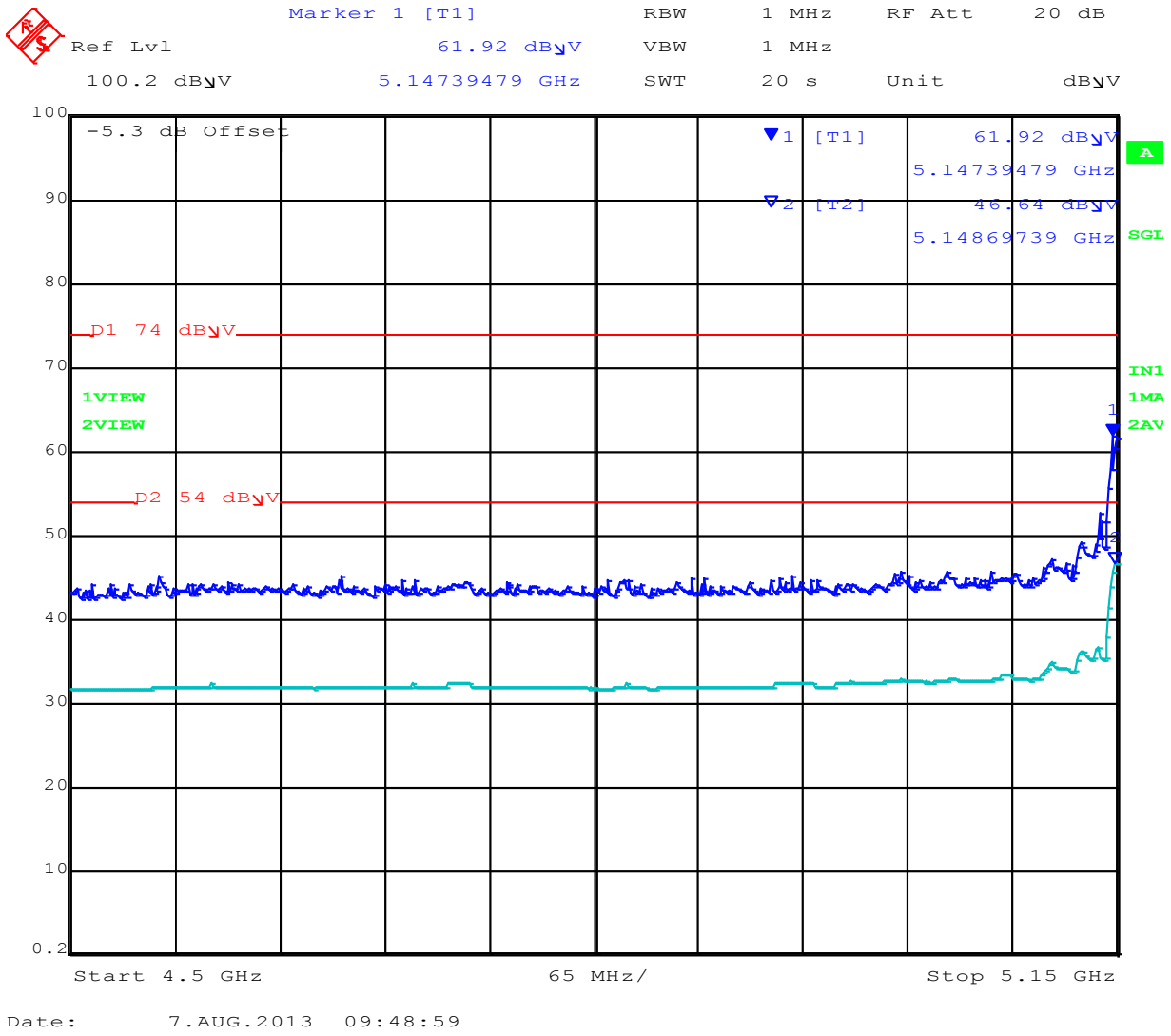
## 802.11VHT-40 Frequency 5310 MHz Band-Edge Frequency 5350



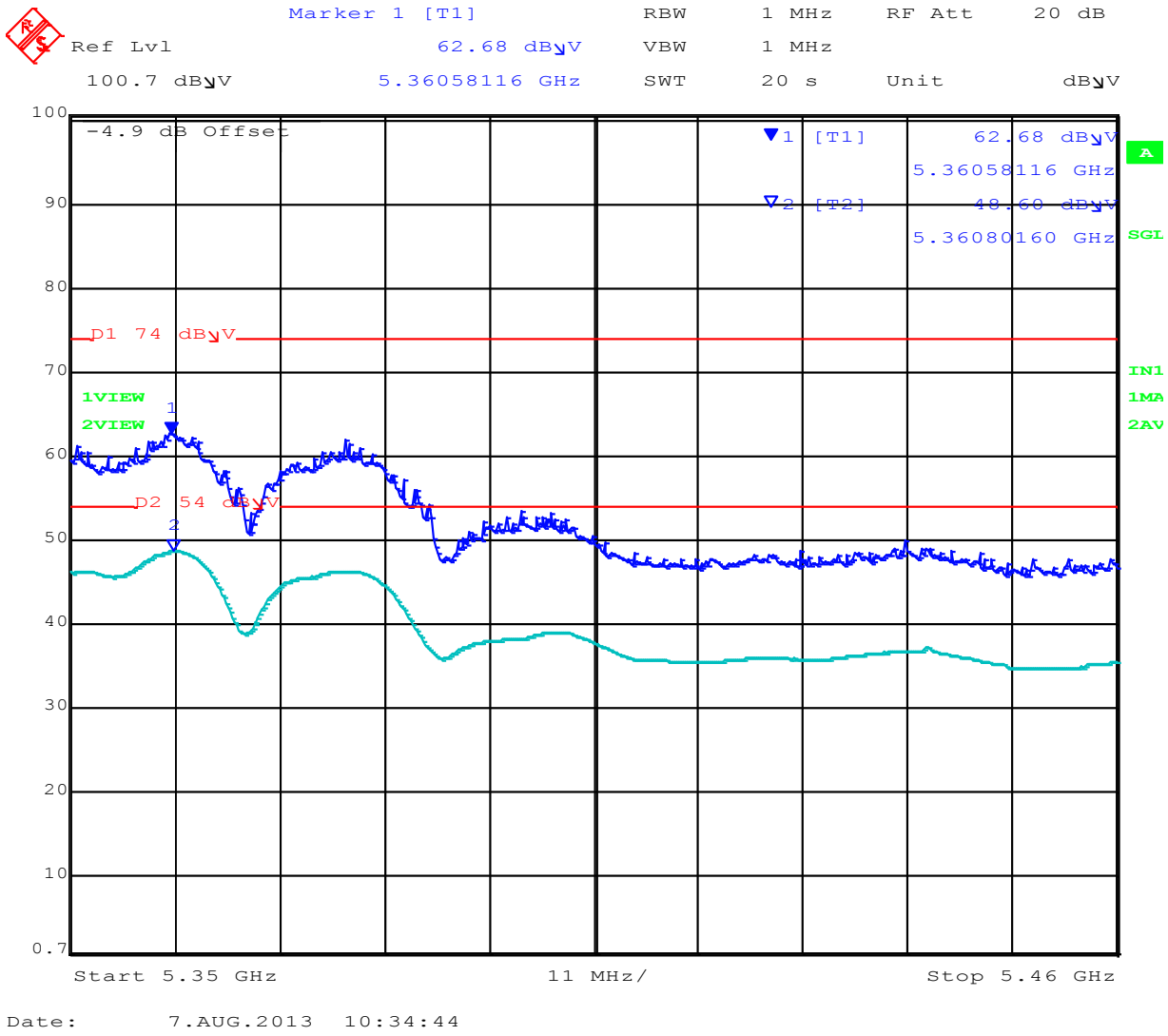
## 802.11VHT-40 Frequency 5510 MHz Band-Edge Frequency 5460



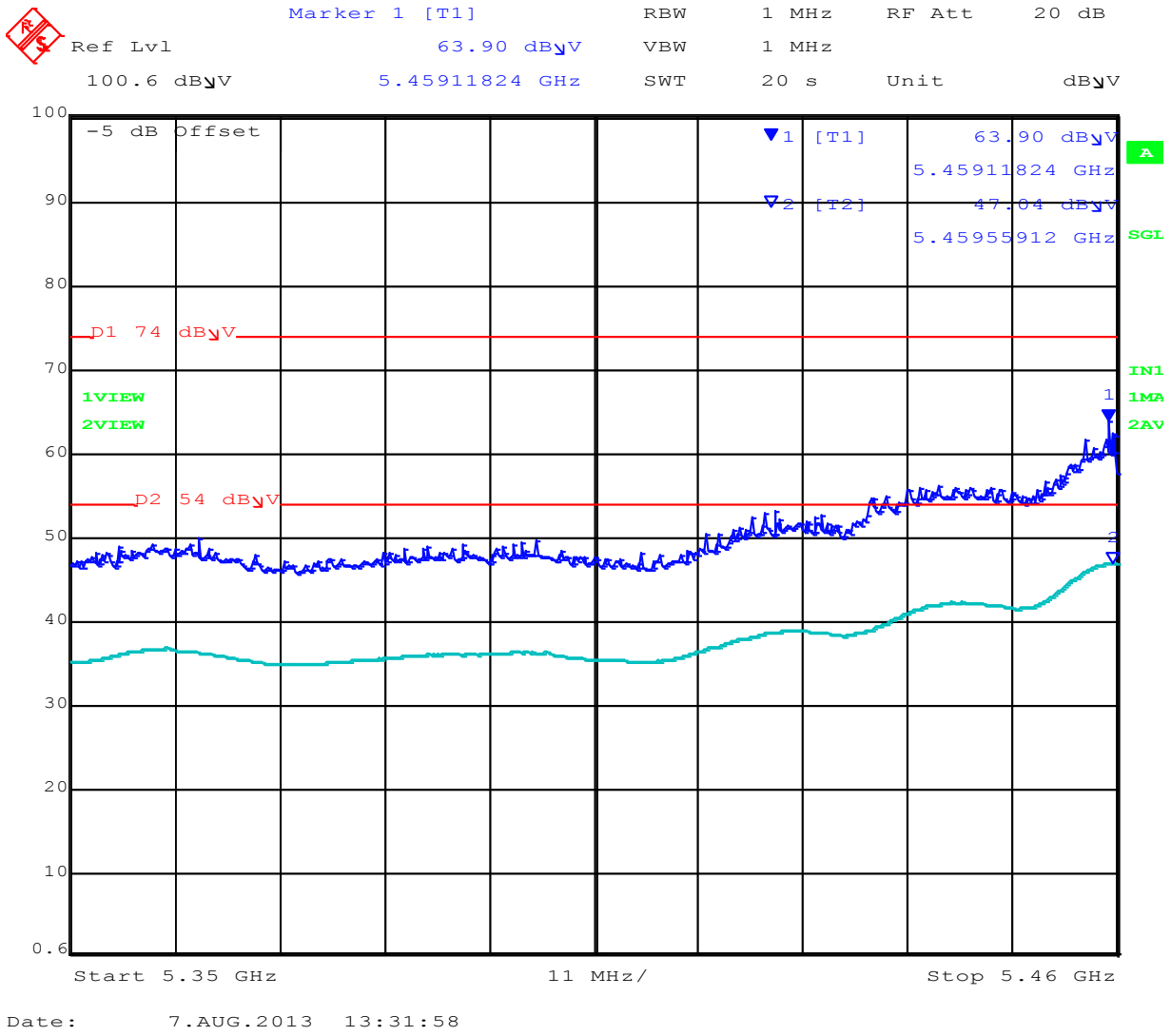
## 802.11VHT-80 Frequency 5210 MHz Band-Edge Frequency 5150



## 802.11VHT-80 Frequency 5290 MHz Band-Edge Frequency 5350



## 802.11VHT-80 Frequency 5530 MHz Band-Edge Frequency 5460 MHz



### 7.1.2.3. Digital Emissions (30M-1 GHz)

**FCC, Part 15 Subpart C §15.205/ §15.209**
**Industry Canada RSS-210 §2.2**

**Test Procedure**

Testing 30M-1 GHz was performed in a 3-meter anechoic chamber using a CISPR compliant receiver. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. To further maximize emissions the receive antenna was varied between 1 and 4 meters. The emissions are recorded with receiver in peak hold mode. Emissions closest to the limits are measured in the quasi-peak mode with the tuned receiver using a bandwidth of 120 kHz. Only the highest emissions relative to the limit are listed. The anechoic chamber test set-up is identified in Section 6 Test Set-Up Photographs.

The EUT had two methods of powering on ac/dc converter and Power over Ethernet (POE). Both modes were tested for emissions below 1GHz.

**Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. In this test facility, the Antenna Factor, Cable Loss, and Amplifier Gains are loaded into the Rohde & Schwarz Receiver and the corrected field strength can be read directly on the receiver.

$$FS = R + AF + CORR$$

where:

FS = Field Strength
R = Measured Receiver Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain

For example:
Given a Receiver input reading of 51.5dBμV; Antenna Factor of 8.5dB; Cable Loss of 1.3dB; Falloff Factor of 0dB, an Amplifier Gain of 26dB and Notch Filter Loss of 1dB. The Field Strength of the measured emission is:

FS = 51.5 + 8.5 + 1.3 - 26.0 +1 = 36.3dBμV/m

Conversion between dBμV/m (or dBμV) and μV/m (or μV) are done as:

Level (dBμV/m) = 20 * Log (level (μV/m))

40 dBμV/m = 100μV/m
48 dBμV/m = 250μV/m

## Specification

### Limits

**§15.205 (a)** Except as shown in paragraph (d) of 15.205 (a), only spurious emissions are permitted in any of the frequency bands listed.

**§15.205 (a)** Except as shown in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

**§15.209 (a)** Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table.

**§15.209 (a)** and **RSS-Gen §2.2** Limit Matrix

| Frequency(MHz) | Field Strength (μV/m) | Field Strength (dBμV/m) | Measurement Distance (meters) |
|---|---|---|---|
| 30-88 | 100 | 40.0 | 3 |
| 88-216 | 150 | 43.5 | 3 |
| 216-960 | 200 | 46.0 | 3 |
| Above 960 | 500 | 54.0 | 3 |

### Laboratory Measurement Uncertainty for Radiated Emissions

| | |
|---|---|
| Measurement uncertainty | +5.6/ -4.5 dB |

### Traceability

| Method | Test Equipment Used |
|---|---|
| Measurements were made per work instruction WI-03 'Measurement of Radiated Emissions' | 0088, 0158, 0134, 0304, 0311, 0315, 0310, 0312 |

### 7.1.3. AC Wireline Conducted Emissions (150 kHz – 30 MHz)

**FCC, Part 15 Subpart C §15.207**
**Industry Canada RSS-Gen §7.2.2**

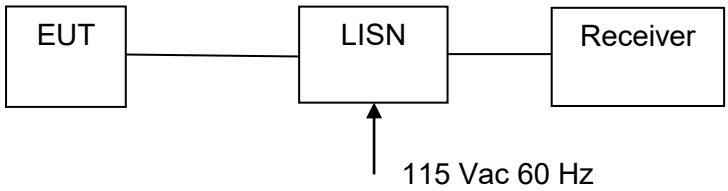
**Test Procedure**

The EUT is configured in accordance with ANSI C63.4. The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation. The highest emissions relative to the limit are listed.

**Measurement Results for AC Wireline Conducted Emissions (150 kHz – 30 MHz)**

Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

**Test Measurement Set up**



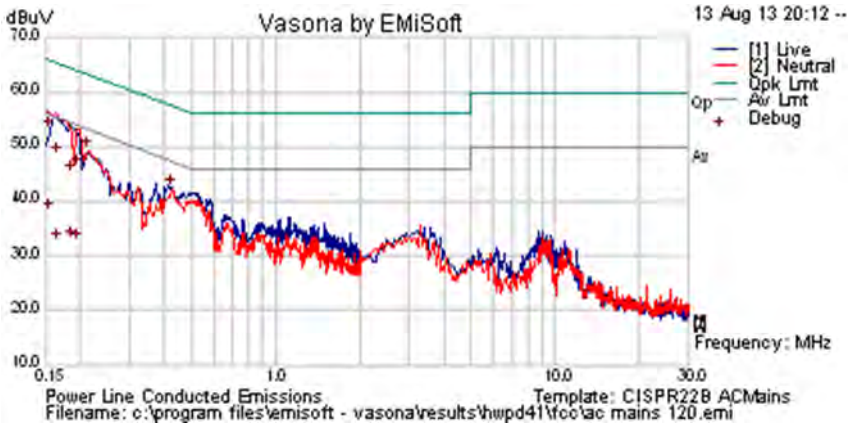

Measurement set up for AC Wireline Conducted Emissions Test

**Measurement Results for AC Wireline Conducted Emissions (150 kHz – 30 MHz)**

Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

## Laptop 120 Vac, 60 Hz Supply Voltage

| | | | |
|---|---|---|---|
| **Test Freq.** | N/A | **Engineer** | JMH |
| **Variant** | AC Line Emissions | **Temp (ºC)** | 28 |
| **Freq. Range** | 0.150 MHz - 30 MHz | **Rel. Hum.(%)** | 37 |
| **Power Setting** | Maximum | **Press. (mBars)** | 998 |
| **Antenna** | Terminated in 50 Ω | | |
| **Test Notes 1** | 120V 60 Ha, module installed in laptop | | |
| **Test Notes 2** | | | |




### Formally measured emission peaks

| Frequency MHz | Raw dBuV | Cable Loss | Factors dB | Level dBuV | Measurement Type | Line | Limit dBuV | Margin dB | Pass /Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.155 | 43.3 | 9.9 | 0.1 | 53.2 | Quasi Peak | Neutral | 65.73 | -12.5 | Pass | |
| 0.155 | 28.1 | 9.9 | 0.1 | 38.1 | Average | Neutral | 55.73 | -17.6 | Pass | |
| 0.166 | 38.2 | 9.9 | 0.1 | 48.2 | Quasi Peak | Neutral | 65.16 | -17.0 | Pass | |
| 0.166 | 22.6 | 9.9 | 0.1 | 32.6 | Average | Neutral | 55.16 | -22.6 | Pass | |
| 0.187 | 23.0 | 9.9 | 0.1 | 32.9 | Average | Live | 54.17 | -21.2 | Pass | |
| 0.187 | 35.1 | 9.9 | 0.1 | 45.1 | Quasi Peak | Live | 64.17 | -19.1 | Pass | |
| 0.196 | 22.3 | 9.9 | 0.1 | 32.3 | Average | Neutral | 53.78 | -21.5 | Pass | |
| 0.196 | 36.1 | 9.9 | 0.1 | 46.0 | Quasi Peak | Neutral | 63.78 | -17.8 | Pass | |
| 0.213 | 39.3 | 9.9 | 0.1 | 49.3 | Peak [Scan] | Neutral | 53.09 | -3.8 | Pass | |
| 0.426 | 32.5 | 9.9 | 0.1 | 42.5 | Peak [Scan] | Live | 47.33 | -4.9 | Pass | |

| | |
|---|---|
| Legend: | DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency |
| | NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band |

## Specification

### Limit

**§15.207 (a)** Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μΩ line impedance stabilization network (LISN), see §15.207 (a) matrix below. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

**RSS-Gen §7.2.2**
The radio frequency voltage that is conducted back into the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the table below. The tighter limit applies at the frequency range boundaries.

**§15.207 (a)** and **RSS-Gen §7.2.2** Limit Matrix
The lower limit applies at the boundary between frequency ranges

| Frequency of Emission (MHz) | Conducted Limit (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency

### Laboratory Measurement Uncertainty for Conducted Emissions

| | |
|---|---|
| Measurement uncertainty | ±2.64 dB |

### Traceability

| Method | Test Equipment Used |
|---|---|
| Measurements were made per work instruction WI-EMC-01 'Measurement of Conducted Emissions' | 0158, 0184, 0287, 0190, 0293, 0307 |

### 7.1.4. Dynamic Frequency Selection (DFS)

**FCC, Part 15 Subpart C §15.407(h)**
**FCC 06-96 Memorandum Opinion and Order**

#### 7.1.4.1. Interference Threshold values, Master or Client incorporating In-Service Monitoring

| Maximum Transmit Power | Value (see note) |
|---|---|
| ≥ 200 milliwatt | -64 dBm |
| < 200 milliwatt | -62 dBm |
| Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna | |

#### 7.1.4.2. 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 99% power bandwidth See Note 3. |

Note 1: The instant that the *Channel Move Time* and the *Channel Closing Transmission Time* begins is as follows:

- For the Short pulse radar Test Signals this instant is the end of the *Burst*.
- For the Frequency Hopping radar Test Signal, this instant is the end of the last radar *Burst* generated.
- For the Long Pulse radar Test Signal this instant is the end of the 12 second period defining the radar transmission.

Note 2: 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 *Channel* changes (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.

Note 3: 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%. Measurements are performed with no data traffic.

### 7.1.4.3. Radar Test Waveforms

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

**Short Pulse Radar Test Waveforms**

| Radar Type | Pulse Width (µsec) | PRI (µsec) | Number of Pulses | Minimum Percentage of Successful Detection | Minimum 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 (Radar Types 1-4) | | | | 80% | 120 |

A minimum of 30 unique waveforms are required for each of the short pulse radar types 2 through 4. For short pulse radar type 1, the same waveform is used a minimum of 30 times. If more than 30 waveforms are used for short pulse radar types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. The aggregate is the average of the percentage of successful detections of short pulse radar types 1-4.

**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 Trials |
|---|---|---|---|---|---|---|---|
| 5 | 50-100 | 5-20 | 1000-2000 | 1-3 | 8-20 | 80% | 30 |

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse radar test signal. If more than 30 waveforms are used for the Long Pulse radar test signal, then each additional waveform must also be unique and not repeated from the previous waveforms.

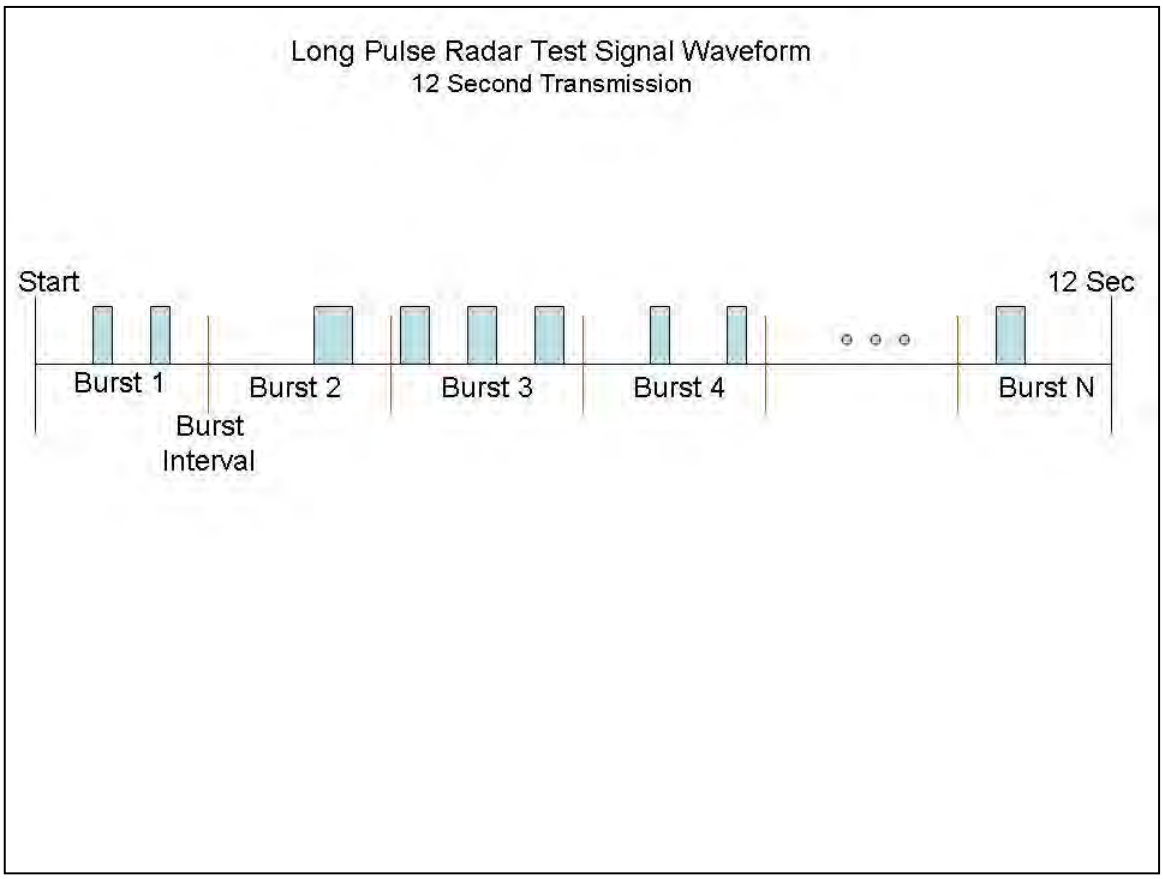
Each waveform is defined as follows:

1) The transmission period for the Long Pulse Radar test signal is 12 seconds.
2) There are a total of 8 to 20 *Bursts* in the 12 second period, with the number of *Bursts* being randomly chosen. This number is *Burst Count*.
3) Each *Burst* consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each *Burst* within the 12 second sequence may have a different number of pulses.
4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a *Burst* will have the same pulse width. Pulses in different *Bursts* may have different pulse widths.
5) Each pulse has a linear FM chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a *Burst* will have the same chirp width. Pulses in different *Bursts* may have different chirp widths. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.
6) If more than one pulse is present in a *Burst*, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a *Burst*, the time between the first and second pulses is chosen independently of the time between the second and third pulses.
7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to *Burst_Count*. Each interval is of length (12,000,000 / *Burst_Count*) microseconds. Each interval contains one *Burst*. The start time for the *Burst*, relative to the beginning of the interval, is between 1 and [(12,000,000 / *Burst_Count*) – (Total *Burst* Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each *Burst* is chosen independently.

**A representative example of a Long Pulse radar test waveform:**

1) The total test signal length is 12 seconds.
2) 8 *Bursts* are randomly generated for the *Burst_Count*.
3) *Burst* 1 has 2 randomly generated pulses.
4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.
5) The PRI is randomly selected to be at 1213 microseconds.
6) *Bursts* 2 through 8 are generated using steps 3 – 5.
7) Each *Burst* is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, *Burst* 1 is randomly generated (1 to 1,500,000 minus the total *Burst* 1 length + 1 random PRI interval) at the 325,001 microsecond step. *Bursts* 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. *Burst* 2 falls in the 1,500,001 – 3,000,000 microsecond range).

**Graphical representation of the Long Pulse radar Test Waveform.**



### 7.1.4.4. Frequency Hopping Radar Test Waveform

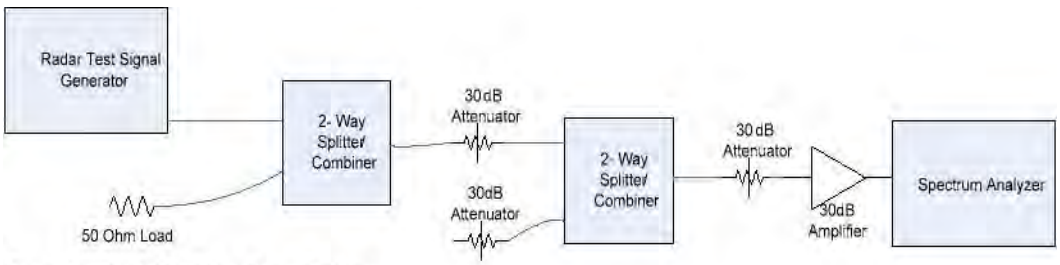
**Frequency Hopping Radar Test Waveform**

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

For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm:

### 7.1.4.5. Radar Waveform Calibration

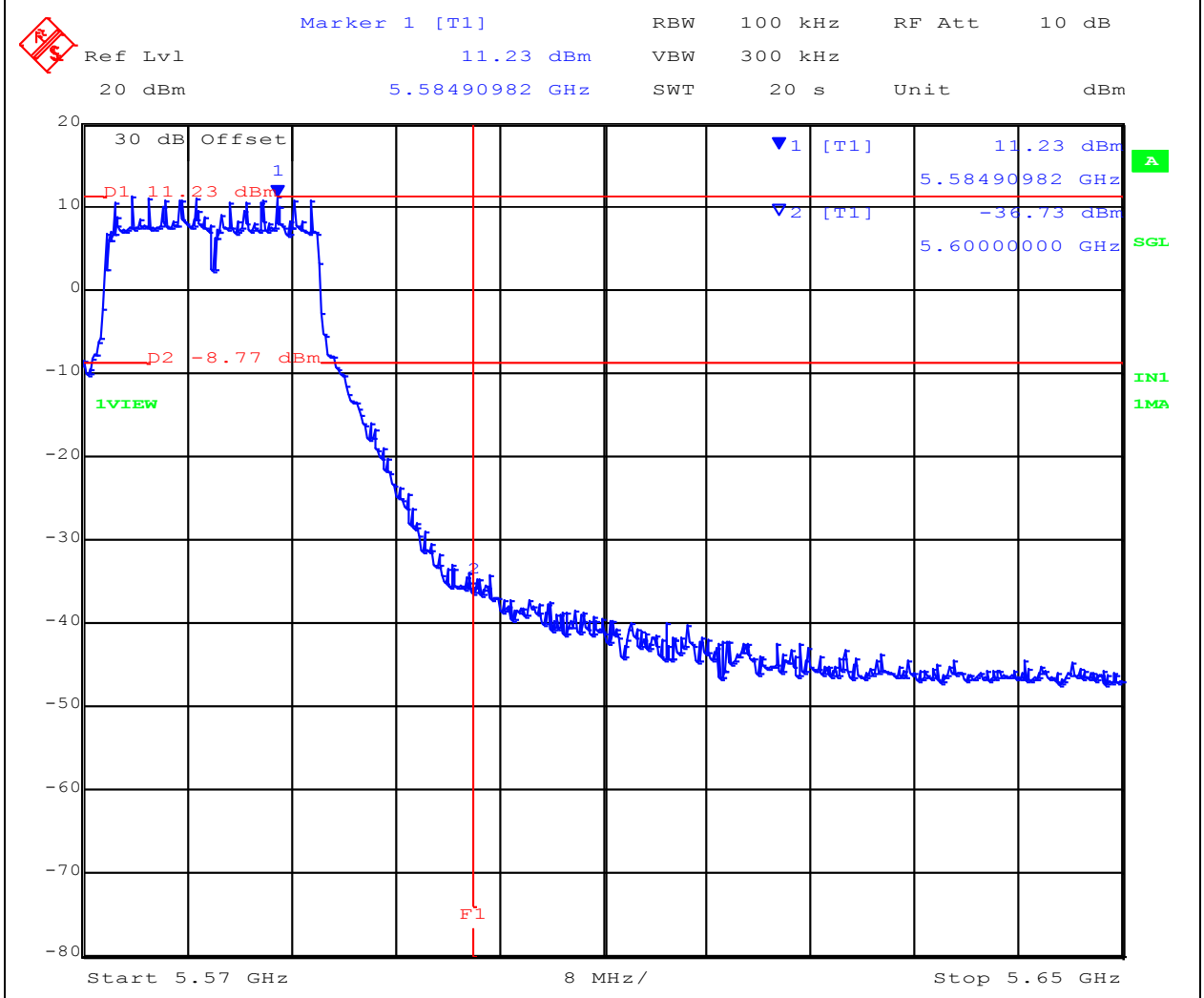
The following equipment setup was used to calibrate the conducted Radar Waveform. A spectrum analyzer was used to establish the test signal level for each radar type. During this process there were no transmissions by either the Master or Client Device. The spectrum analyzer was switched to the zero span (Time Domain) mode at the frequency of the Radar Waveform generator. Peak detection was utilized. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) were set to 3 MHz.
The signal generator amplitude was set so that the power level measured at the spectrum analyzer was -61dBm (Ref Section 5.1). The 30dB amplifier gain was entered as an amplitude offset on the spectrum analyzer.



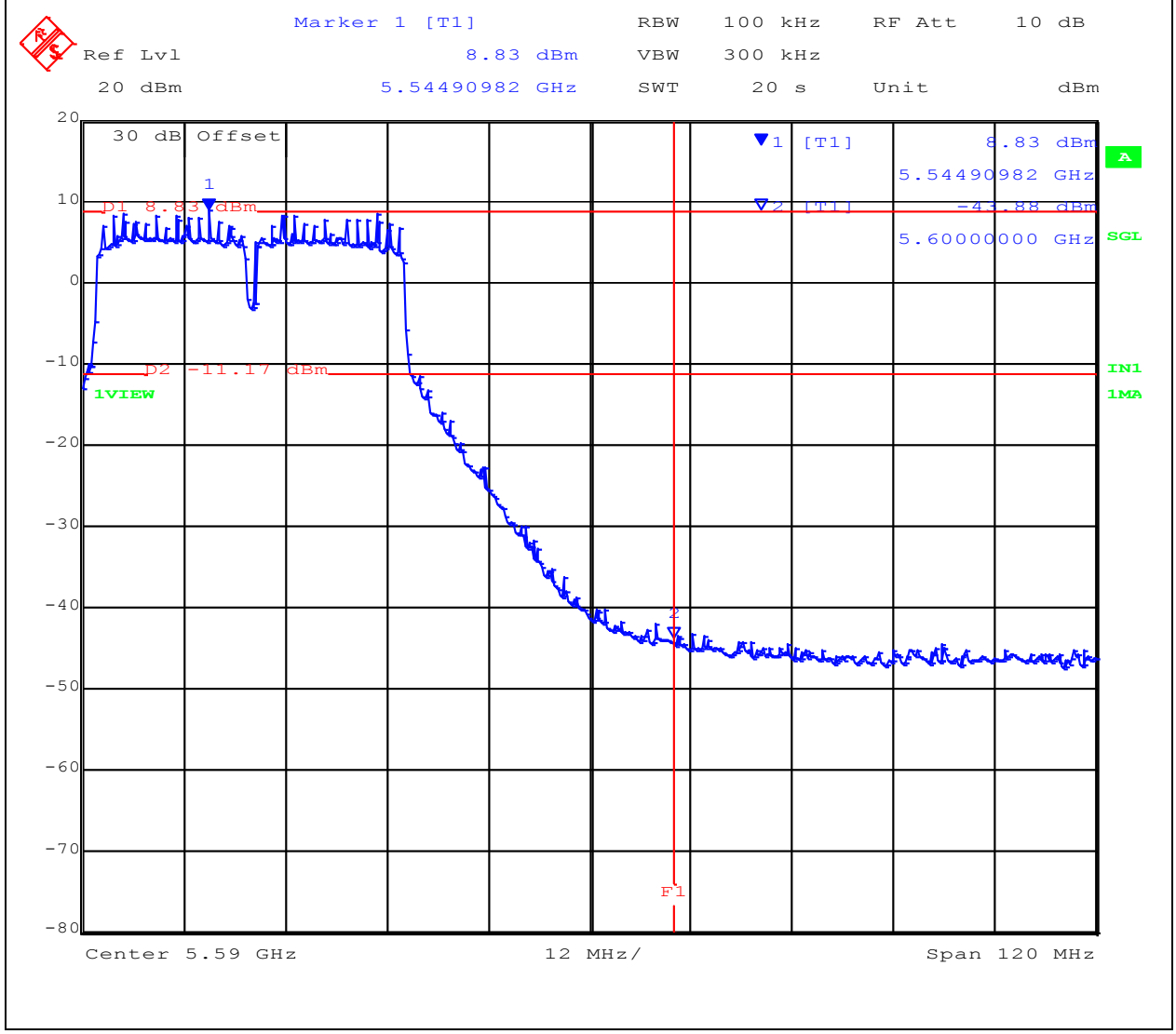

***Conducted Calibration Setup***

### 7.1.4.6. Weather Radar Band Edge Plots

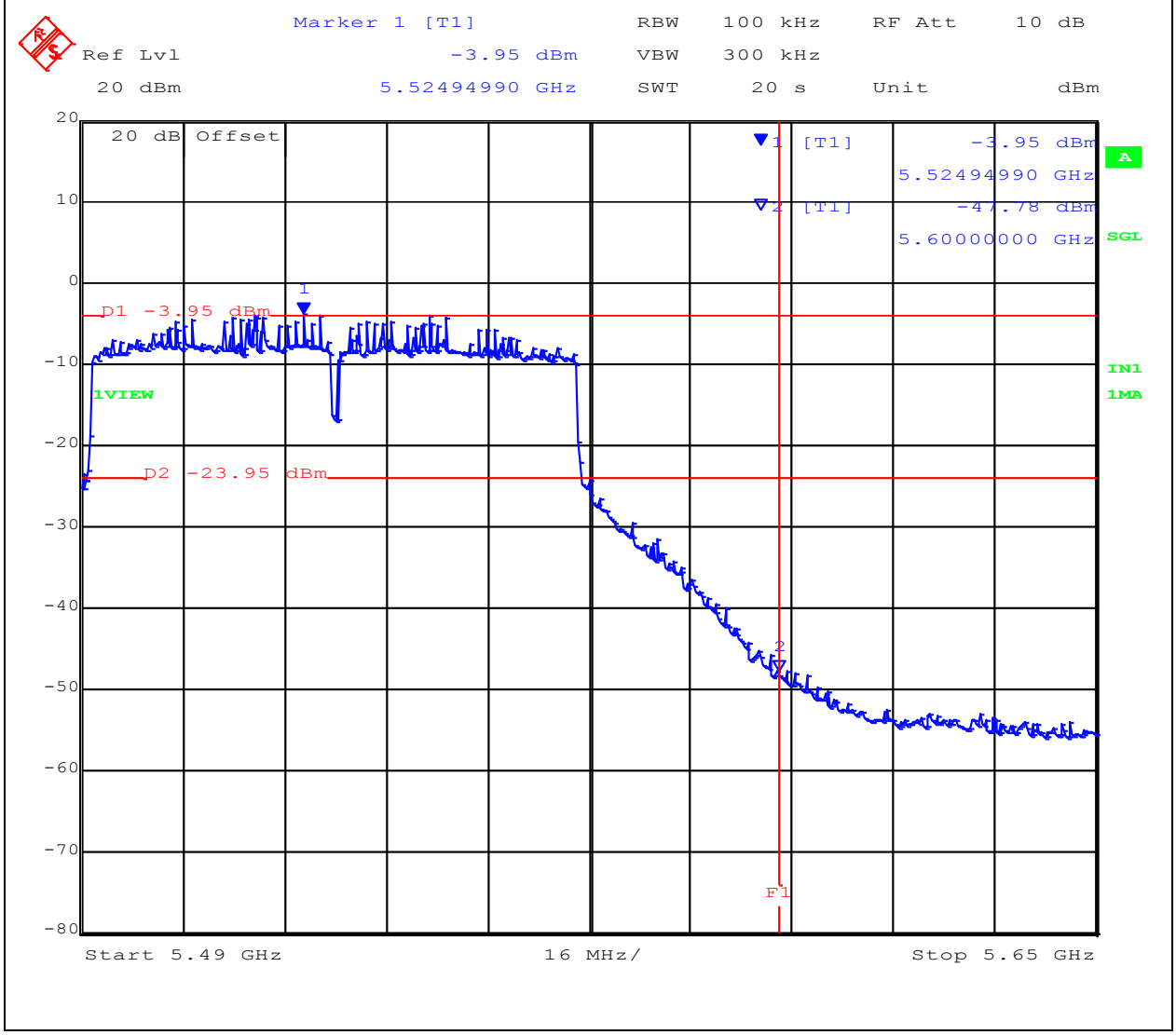
Center Frequency 5,580MHz 802.11a



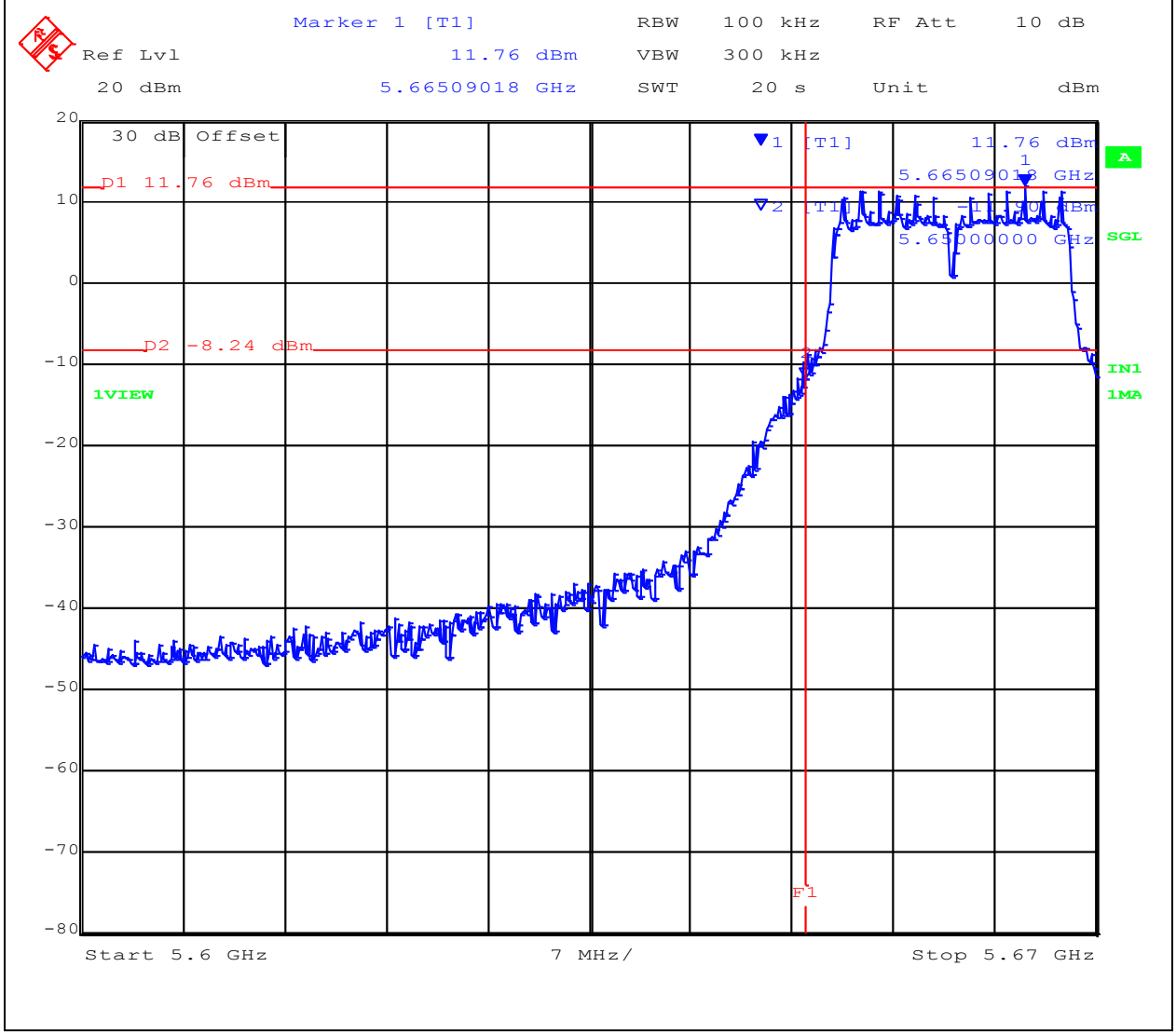
## Center Frequency 5,550MHz 802.11n HT40



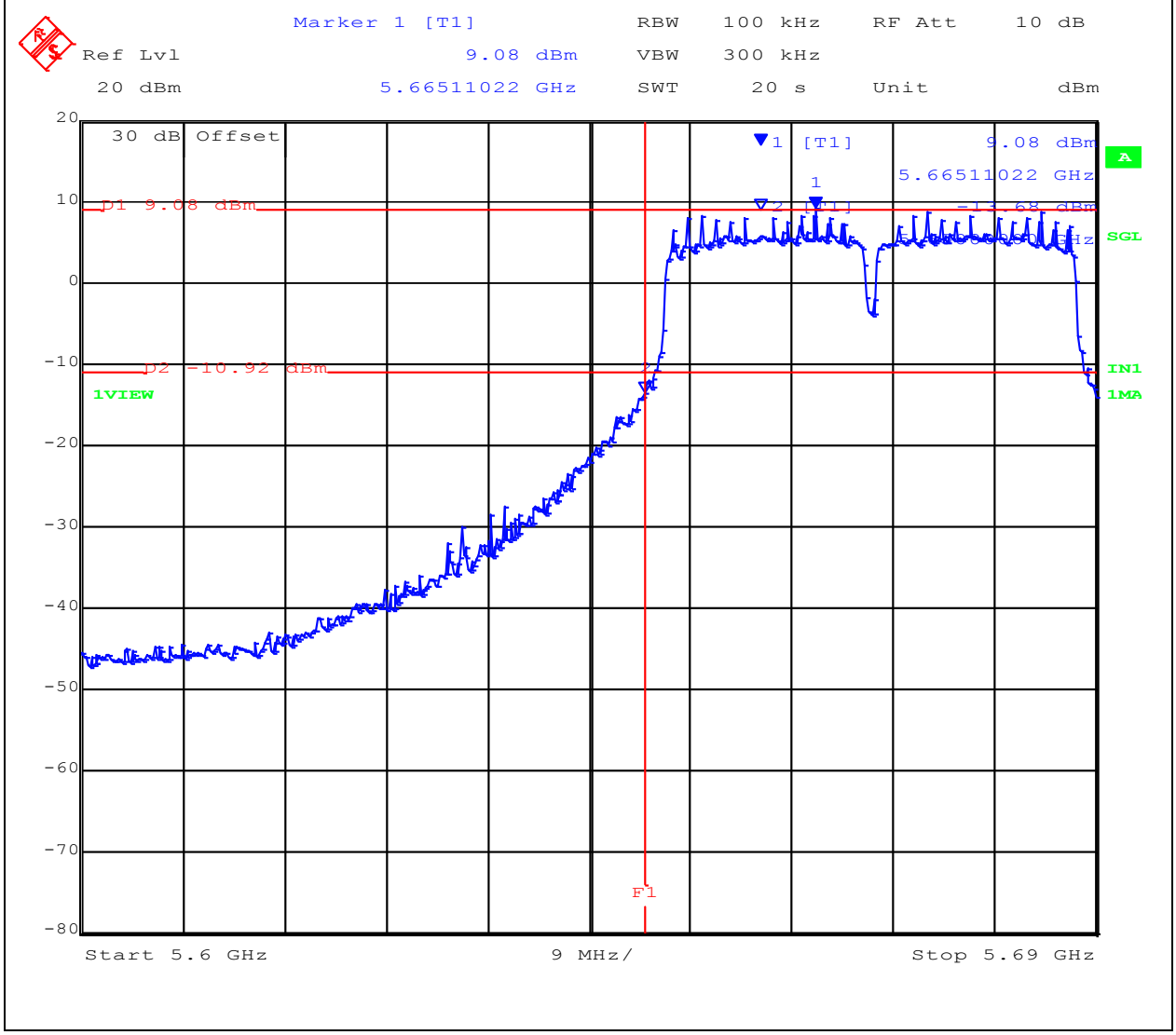
## Center Frequency 5,530MHz 802.11AC 80



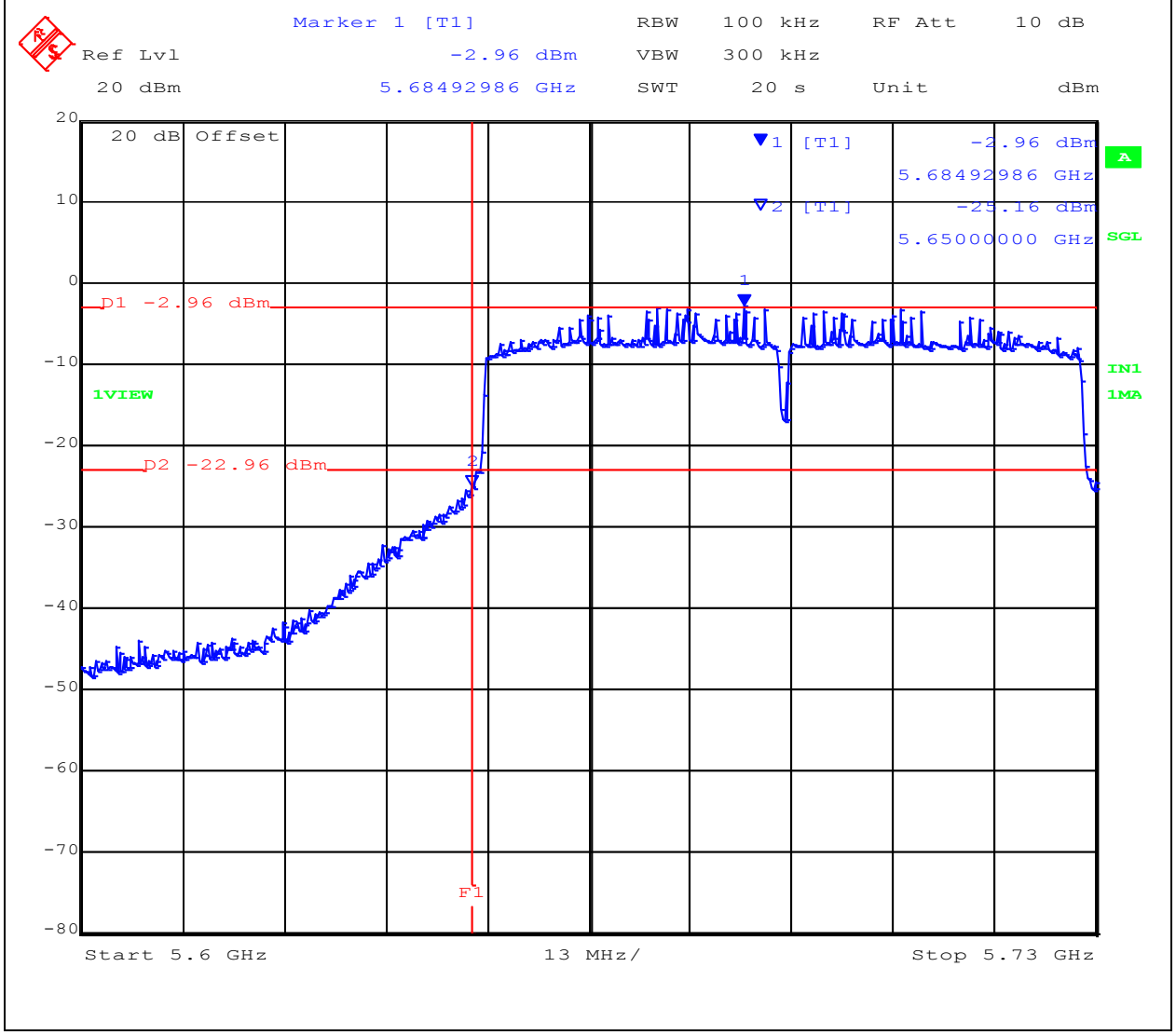
## Center Frequency 5,660MHz 802.11a



## Center Frequency 5,670MHz 802.11n HT40



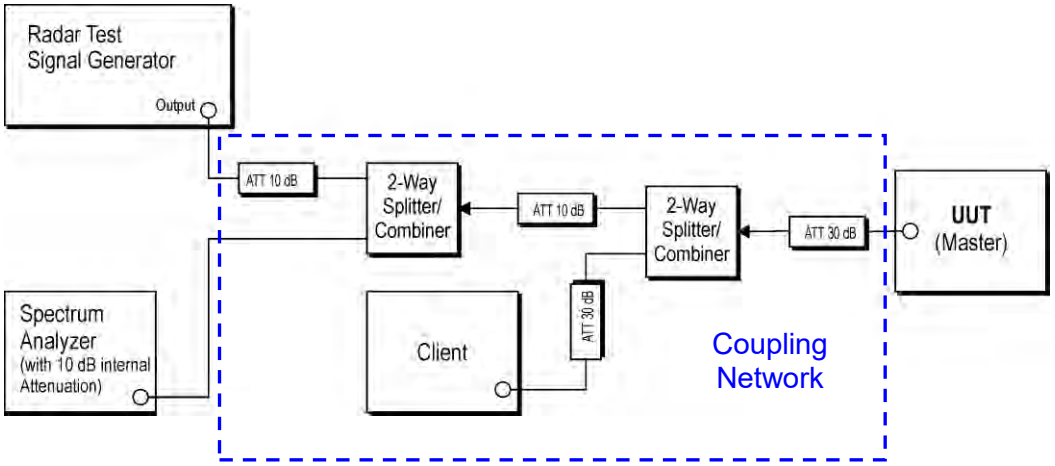
## Center Frequency 5,690 MHz 802.11AC 80



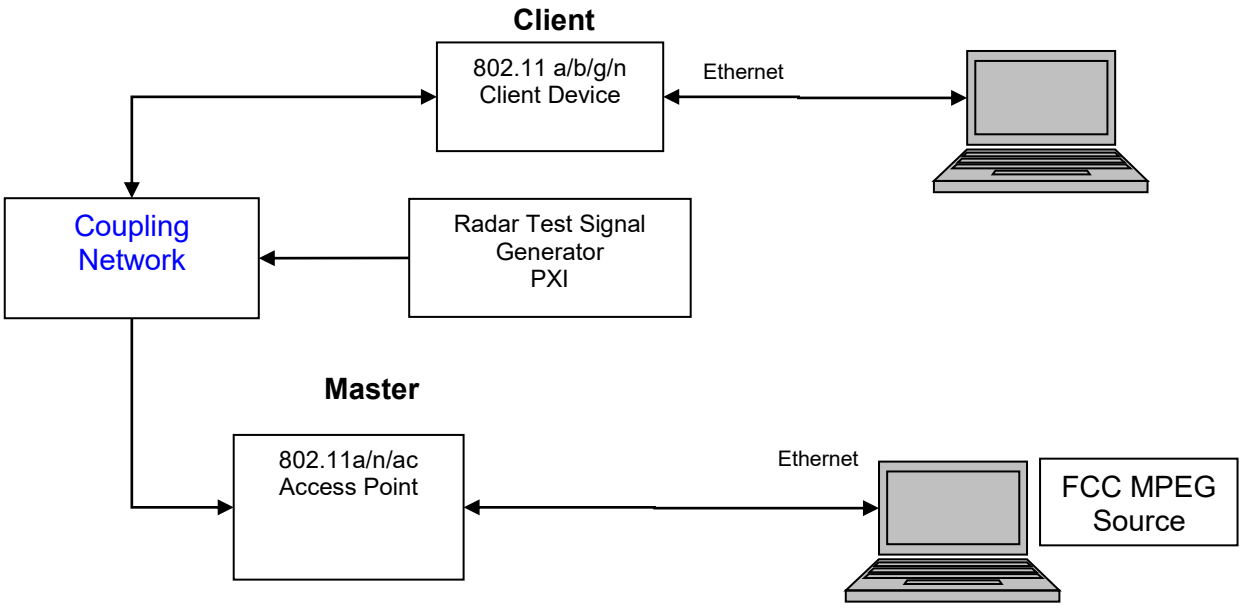
### 7.1.4.7. Test Set Up:

## Block Diagram(s) of Test Setup

Setup for Conducted Measurements where the EUT is the Master with injection of Radar Test Waveforms at the Master.




## Support Equipment Configuration



The EUT is a Master Device with radar detection.

**Applicability of DFS Requirements Prior to Use of a Channel**

**(Ref Table 1 of FCC 06-96)**

| 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**

**(Ref Table 2 of FCC 06-96)**

| 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 |

For the frequency band 5,470 – 5,725 MHz, the Master device provides, on aggregate, uniform loading of the spectrum across all devices by selecting an operating channel among the available channels using a random algorithm. The EUT was tested in HT-40 mode.

Declared minimum antenna gain 0 dBi. ;

Radar receive signal level = -62 dBm + minimum antenna gain + 1 dB

= -62 + 0 + 1

Radar receive signal level = -61 dBm

**Measurement Results - Dynamic Frequency Selection (DFS)**

Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57% Pressure: 999 to 1012 mbar

Radio parameters.
Test methodology: Conducted
Device Type: Master
Transmit Power: Maximum

**Operational Details - Dynamic Frequency Selection (DFS)**

Operational Modes: 802.11a, 802.11n HT40, 802.11AC80

Data Rates: 6mpbs 802.11a, 0MCS 802.11n, MCS0 802.11AC

**Note* No video pixilation was observed during the video stream at these rates. Video frames per second were noted to be at 30fps.*

**Video Streaming Method - Dynamic Frequency Selection (DFS)**

Using the VideoLan player a video stream was setup on the master laptop with the destination being the client laptop. The video profile chosen for the video stream is “MPEG-2 + MPGA (TS)”. On the client laptop the VideoLan player was setup to listen to an incoming video stream from the master device.

The requisite MPEG video file (“TestFile.mpg” available on the NTIA website at the following link http://ntiacsd.ntia.doc.gov/dfs/) is used during this video stream.

### 7.1.4.8. UNII Detection Bandwidth:

All UNII channels for this device have identical channel bandwidths and DFS testing was completed on channel 5,500 MHz (802.11a) and 5510MHz (HT40).

The generating equipment is configured as shown in the Conducted Test Setup above. A single Burst of the short pulse radar Type 1 through 6 was produced at 5,500 MHz (802.11a) and 5,510 MHz (802.11n HT40) at a level of -61 dBm (Ref Section 5.1). The EUT is set up as a standalone device (no associated Client and no traffic).

A single radar Burst is generated for a minimum of 10 trials, and the response of the EUT is noted. The EUT must detect the Radar Waveform 90% or more of the time.

The radar frequency is increased in 1 MHz steps, repeating the above test sequence, until the detection rate falls below 90%. The highest frequency at which detection is greater than or equal to 90% is denoted as $F_H$.

The radar frequency is decreased in 1 MHz steps, repeating the above test sequence, until the detection rate falls below 90%. The lowest frequency at which detection is greater than or equal to 90% is denoted as $F_L$.

The U-NII Detection Bandwidth is calculated as follows:

U-NII Detection Bandwidth = $F_H - F_L$

The U-NII Detection Bandwidth must be at least 80% of the EUT transmitter 99% power
Table of results are continued on the next page.

| EUT Frequency= 5,500 MHz 802.11a (Detection = √, No Detection = 0) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Radar Frequency (MHz)** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **Detection Rate (%)** |
| -20 | | | | | | | | | | | % |
| -19 | | | | | | | | | | | % |
| -18 | | | | | | | | | | | % |
| -17 | | | | | | | | | | | % |
| -16 | | | | | | | | | | | % |
| -15 | | | | | | | | | | | % |
| -14 | | | | | | | | | | | % |
| -13 | | | | | | | | | | | % |
| -12 | | | | | | | | | | | % |
| -11 | 0 | 0 | | | | | | | | | <90% |
| -10 | v | v | v | v | v | v | v | v | v | v | 100% |
| -9 | v | v | v | v | v | v | v | v | v | v | 90% |
| -8 | v | v | v | v | v | v | v | v | v | v | 100% |
| -7 | v | v | v | v | v | v | v | v | v | v | 100% |
| -6 | v | v | v | v | v | v | v | v | v | v | 100% |
| -5 | v | v | v | v | v | v | v | v | v | v | 100% |
| -4 | v | v | v | v | v | v | v | v | v | v | 90% |
| -3 | v | v | v | v | v | v | v | v | v | v | 100% |
| -2 | v | v | v | v | v | v | v | v | v | v | 100% |
| -1 | v | v | v | v | v | v | v | v | v | v | 100% |
| $F_0$ | v | v | v | v | v | v | v | v | v | v | 100% |
| +1 | v | v | v | v | v | v | v | v | v | v | 100% |
| +2 | v | v | v | v | v | v | v | v | v | v | 90% |
| +3 | v | v | v | v | v | v | v | v | v | v | 100% |
| +4 | v | v | v | v | v | v | v | v | v | v | 100% |
| +5 | v | v | v | v | v | v | v | v | v | v | 100% |
| +6 | v | v | v | v | v | v | v | v | v | v | 100% |
| +7 | v | v | v | v | v | v | v | v | v | v | 100% |
| +8 | v | v | v | v | v | v | v | v | v | v | 100% |
| +9 | v | v | v | v | v | v | v | v | v | v | 100% |
| +10 | v | v | v | v | v | v | v | v | v | v | 100% |
| +11 | 0 | 0 | | | | | | | | | <90% |
| +12 | | | | | | | | | | | % |
| +13 | | | | | | | | | | | % |
| +14 | | | | | | | | | | | % |
| +15 | | | | | | | | | | | % |
| +16 | | | | | | | | | | | % |
| +17 | | | | | | | | | | | % |
| Detection Bandwidth = $F_H$-$F_L$ = 5590-5510 = 20 MHz | | | | | | | | | | | |
| EUT 99% Bandwidth = 17.134 MHz (ref. bandwidth channel 5500 MHz) | | | | | | | | | | | |
| 17.134 MHz *80% = 13.707MHz | | | | | | | | | | | |
| For each frequency step the minimum percentage detection is 90% | | | | | | | | | | | |

| EUT Frequency= 5,510 MHz 802.11n HT40 (Detection = √, No Detection = 0) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Radar Frequency (MHz)** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **Detection Rate (%)** |
| -21 | | | | | | | | | | | % |
| -20 | 0 | 0 | | | | | | | | | <90% |
| -19 | v | v | v | v | v | v | v | v | v | v | 100% |
| -18 | v | v | v | v | v | v | v | v | v | v | 100% |
| -17 | v | v | v | v | v | v | v | v | v | v | 100% |
| -16 | v | v | v | v | v | v | v | v | v | v | 100% |
| -15 | v | v | v | v | v | v | v | v | v | v | 100% |
| -14 | v | v | v | v | v | v | v | v | v | v | 100% |
| -13 | v | v | v | v | v | v | v | v | v | v | 100% |
| -12 | v | v | v | v | v | v | v | v | v | v | 100% |
| -11 | v | v | v | v | v | v | v | v | v | v | 100% |
| -10 | v | v | v | v | v | v | v | v | v | v | 100% |
| -9 | v | v | v | v | v | v | v | v | v | v | 100% |
| -8 | v | v | v | v | v | v | v | v | v | v | 100% |
| -7 | v | v | v | v | v | v | v | v | v | v | 100% |
| -6 | v | v | v | v | v | v | v | v | v | v | 100% |
| -5 | v | v | v | v | v | v | v | v | v | v | 100% |
| -4 | v | v | v | v | v | v | v | v | v | v | 100% |
| -3 | v | v | v | v | v | v | v | v | v | v | 100% |
| -2 | v | v | v | v | v | v | v | v | v | v | 100% |
| -1 | v | v | v | v | v | v | v | v | v | v | 100% |
| $F_0$ | v | v | v | v | v | v | v | v | v | v | 100% |

| EUT Frequency= 5,510 MHz 802.11n HT40 (Detection = √, No Detection = 0) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Radar Frequency (MHz)** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **Detection Rate (%)** |
| $F_0$ | v | v | v | v | v | v | v | v | v | v | 100% |
| +1 | v | v | v | v | v | v | v | v | v | v | 100% |
| +2 | v | v | v | v | v | v | v | v | v | v | 100% |
| +3 | v | v | v | v | v | v | v | v | v | v | 100% |
| +4 | v | v | v | v | v | v | v | v | v | v | 100% |
| +5 | v | v | v | v | v | v | v | v | v | v | 100% |
| +6 | v | v | v | v | v | v | v | v | v | v | 100% |
| +7 | v | v | v | v | v | v | v | v | v | v | 100% |
| +8 | v | v | v | v | v | v | v | v | v | v | 100% |
| +9 | v | v | v | v | v | v | v | v | v | v | 100% |
| +10 | v | v | v | v | v | v | v | v | v | v | 100% |
| +11 | v | v | v | v | v | v | v | v | v | v | 100% |
| +12 | v | v | v | v | v | v | v | v | v | v | 100% |
| +13 | v | v | v | v | v | v | v | v | v | v | 100% |
| +14 | v | v | v | v | v | v | v | v | v | v | 100% |
| +15 | v | v | v | v | v | v | v | v | v | v | 100% |
| +16 | v | v | v | v | v | v | v | v | v | v | 100% |
| +17 | v | v | v | v | v | v | v | v | v | v | 100% |
| +18 | v | v | v | v | v | v | v | v | v | v | 100% |
| +19 | v | v | v | v | v | v | v | v | v | v | 100% |
| +20 | v | 0 | 0 | | | | | | | | <90% |
| +21 | | | | | | | | | | | % |
| Detection Bandwidth = $F_H$-$F_L$ = 5590-5530 = 40 MHz | | | | | | | | | | | |
| EUT 99% Bandwidth = 36.472 MHz (ref. bandwidth channel 5510 MHz) | | | | | | | | | | | |
| 36.472 MHz *80% = 29.177 MHz | | | | | | | | | | | |

For each frequency step the minimum percentage detection is 90%

| EUT Frequency= 5,530 MHz 802.11n HT80 (Detection = √, No Detection = 0) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Radar Frequency (MHz)** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **Detection Rate (%)** |
| -41 | 0 | 0 | | | | | | | | | <90% |
| -40 | v | v | v | v | v | v | v | v | v | v | 100% |
| -39 | v | v | v | v | v | v | v | v | v | v | 100% |
| -38 | v | v | v | v | v | v | v | v | v | v | 100% |
| -37 | v | v | v | v | v | v | v | v | v | v | 100% |
| -36 | v | v | v | v | v | v | v | v | v | v | 100% |
| -35 | v | v | v | v | v | v | v | v | v | v | 100% |
| -34 | v | v | v | v | v | v | v | v | v | v | 100% |
| -33 | v | v | v | v | v | v | v | v | v | v | 100% |
| -32 | v | v | v | v | v | v | v | v | v | v | 100% |
| -31 | v | v | v | v | v | v | v | v | v | v | 100% |
| -30 | v | v | v | v | v | v | v | v | v | v | 100% |
| -29 | v | v | v | v | v | v | v | v | v | v | 100% |
| -28 | v | v | v | v | v | v | v | v | v | v | 100% |
| -27 | v | v | v | v | v | v | v | v | v | v | 100% |
| -26 | v | v | v | v | v | v | v | v | v | v | 100% |
| -25 | v | v | v | v | v | v | v | v | v | v | 100% |
| -24 | v | v | v | v | v | v | v | v | v | v | 100% |
| -23 | v | v | v | v | v | v | v | v | v | v | 100% |
| -22 | v | v | v | v | v | v | v | v | v | v | 100% |
| -21 | v | v | v | v | v | v | v | v | v | v | 100% |
| -20 | v | v | v | v | v | v | v | v | v | v | 100% |
| -19 | v | v | v | v | v | v | v | v | v | v | 100% |
| -18 | v | v | v | v | v | v | v | v | v | v | 100% |
| -17 | v | v | v | v | v | v | v | v | v | v | 100% |
| -16 | v | v | v | v | v | v | v | v | v | v | 100% |
| -15 | v | v | v | v | v | v | v | v | v | v | 100% |
| -14 | v | v | v | v | v | v | v | v | v | v | 100% |
| -13 | v | v | v | v | v | v | v | v | v | v | 100% |
| -12 | v | v | v | v | v | v | v | v | v | v | 100% |
| -11 | v | v | v | v | v | v | v | v | v | v | 100% |
| -10 | v | v | v | v | v | v | v | v | v | v | 100% |
| -9 | v | v | v | v | v | v | v | v | v | v | 100% |
| -8 | v | v | v | v | v | v | v | v | v | v | 100% |
| -7 | v | v | v | v | v | v | v | v | v | v | 100% |
| -6 | v | v | v | v | v | v | v | v | v | v | 100% |
| -5 | v | v | v | v | v | v | v | v | v | v | 100% |
| -4 | v | v | v | v | v | v | v | v | v | v | 100% |
| -3 | v | v | v | v | v | v | v | v | v | v | 100% |
| -2 | v | v | v | v | v | v | v | v | v | v | 100% |
| -1 | v | v | v | v | v | v | v | v | v | v | 100% |
| $F_0$ | v | v | v | v | v | v | v | v | v | v | 100% |

| EUT Frequency= 5,530 MHz 802.11n HT80 (Detection = √, No Detection = 0) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Radar Frequency (MHz)** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **Detection Rate (%)** |
| +1 | v | v | v | v | v | v | v | v | v | v | 100% |
| +2 | v | v | v | v | v | v | v | v | v | v | 100% |
| +3 | v | v | v | v | v | v | v | v | v | v | 100% |
| +4 | v | v | v | v | v | v | v | v | v | v | 100% |
| +5 | v | v | v | v | v | v | v | v | v | v | 100% |
| +6 | v | v | v | v | v | v | v | v | v | v | 100% |
| +7 | v | v | v | v | v | v | v | v | v | v | 100% |
| +8 | v | v | v | v | v | v | v | v | v | v | 100% |
| +9 | v | v | v | v | v | v | v | v | v | v | 100% |
| +10 | v | v | v | v | v | v | v | v | v | v | 100% |
| +11 | v | v | v | v | v | v | v | v | v | v | 100% |
| +12 | v | v | v | v | v | v | v | v | v | v | 100% |
| +13 | v | v | v | v | v | v | v | v | v | v | 100% |
| +14 | v | v | v | v | v | v | v | v | v | v | 100% |
| +15 | v | v | v | v | v | v | v | v | v | v | 100% |
| +16 | v | v | v | v | v | v | v | v | v | v | 100% |
| +17 | v | v | v | v | v | v | v | v | v | v | 100% |
| +18 | v | v | v | v | v | v | v | v | v | v | 100% |
| +19 | v | v | v | v | v | v | v | v | v | v | 100% |
| +20 | v | v | v | v | v | v | v | v | v | v | 100% |
| +21 | v | v | v | v | v | v | v | v | v | v | 100% |
| +22 | v | v | v | v | v | v | v | v | v | v | 100% |
| +23 | v | v | v | v | v | v | v | v | v | v | 100% |
| +24 | v | v | v | v | v | v | v | v | v | v | 100% |
| +25 | v | v | v | v | v | v | v | v | v | v | 100% |
| +26 | v | v | v | v | v | v | v | v | v | v | 100% |
| +27 | v | v | v | v | v | v | v | v | v | v | 100% |
| +28 | v | v | v | v | v | v | v | v | v | v | 100% |
| +29 | v | v | v | v | v | v | v | v | v | v | 100% |
| +30 | v | v | v | v | v | v | v | v | v | v | 100% |
| +31 | v | v | v | v | v | v | v | v | v | v | 100% |
| +32 | v | v | v | v | v | v | v | v | v | v | 100% |
| +33 | v | v | v | v | v | v | v | v | v | v | 100% |
| +34 | v | v | v | v | v | v | v | v | v | v | 100% |
| +35 | v | v | v | v | v | v | v | v | v | v | 100% |
| +36 | v | v | v | v | v | v | v | v | v | v | 100% |
| +37 | v | v | v | v | v | v | v | v | v | v | 100% |
| +38 | v | v | v | v | v | v | v | v | v | v | 100% |
| +39 | v | v | v | v | v | v | v | v | v | v | 100% |
| +40 | v | v | v | v | v | v | 0 | v | v | v | 90% |
| +41 | 0 | 0 | | | | | | | | | < 90% |
| Detection Bandwidth = $F_H$-$F_L$ = 5531-5489 = 42 MHz | | | | | | | | | | | |
| EUT 99% Bandwidth = 36.6 MHz (ref. bandwidth channel 5510 MHz) | | | | | | | | | | | |
| 36.6 MHz *80% = 29.28 MHz | | | | | | | | | | | |

### 7.1.4.9. Initial Channel Availability Check Time

This test verifies that the EUT does not emit pulse, control, or data signals on the test Channel until the power-up sequence has been completed and the U-NII device checks for Radar Waveforms for one minute on the test Channel. This test does not use any Radar Waveforms.

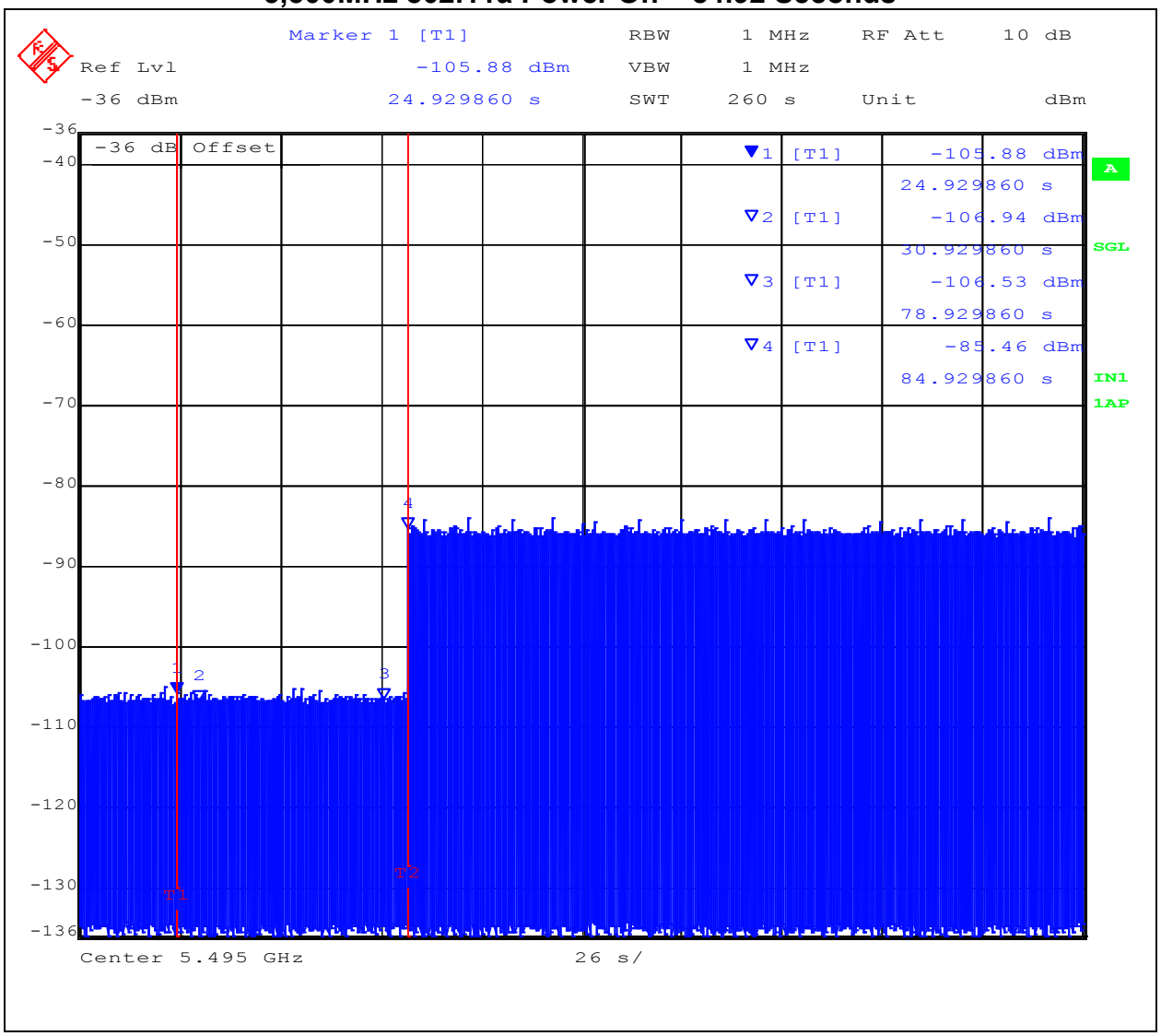
The U-NII device is powered on and be instructed to operate at 5,500MHz 802.11a, 5,510MHz 802.11n HT40, and 802.11AC 80.. At the same time the EUT is powered on, the spectrum analyzer is set for zero span with a 1 MHz resolution bandwidth at 5,500, 5,510, and 5530 MHz with a 260 second sweep time. The analyzer's sweep will be started the same time power is applied to the U-NII device.

The EUT should not transmit any pulse or data transmissions until at least 1 minute after the completion of the power-on cycle.

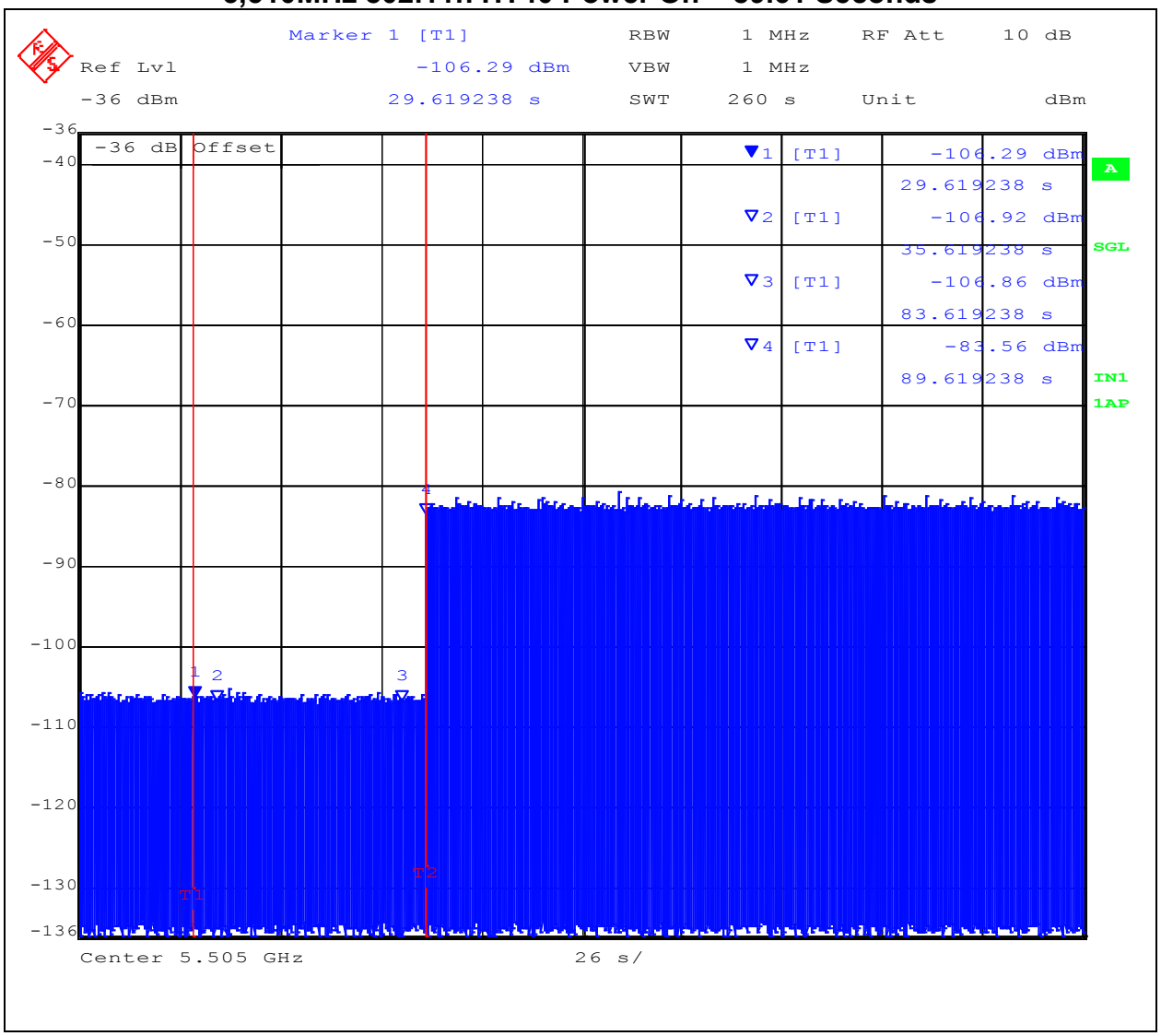
The first red marker line shown on the following plot denotes the instant when the EUT starts its power-up sequence i.e. $T_0$ (as defined within the FCC's MO&O 06-96 Normative Reference 2 ). The power-up reference $T_0$ is determined by the time it takes for the EUT to start "beaconing" i.e. initial beacon – 60 secs = end of power-up.

The Channel Availability Check Time commences at instant $T_0$ and will end no sooner than $T_0$ + 60 seconds.

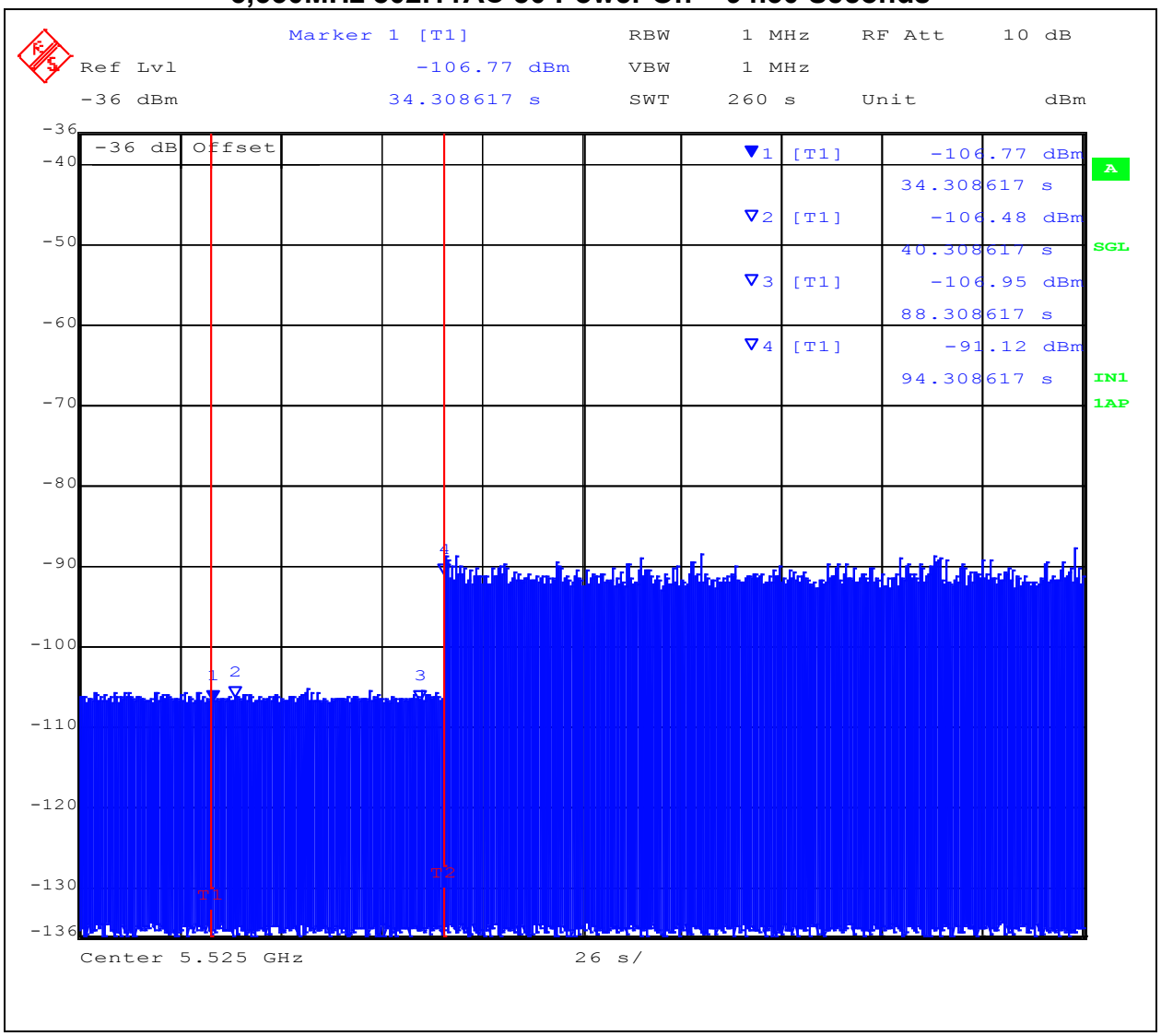
## EUT power up and Initial Channel Availability Check Time
## 5,500MHz 802.11a Power On = 84.92 Seconds



## EUT power up and Initial Channel Availability Check Time
## 5,510MHz 802.11n HT40 Power On = 89.61 Seconds



## EUT power up and Initial Channel Availability Check Time
## 5,530MHz 802.11AC 80 Power On = 94.30 Seconds



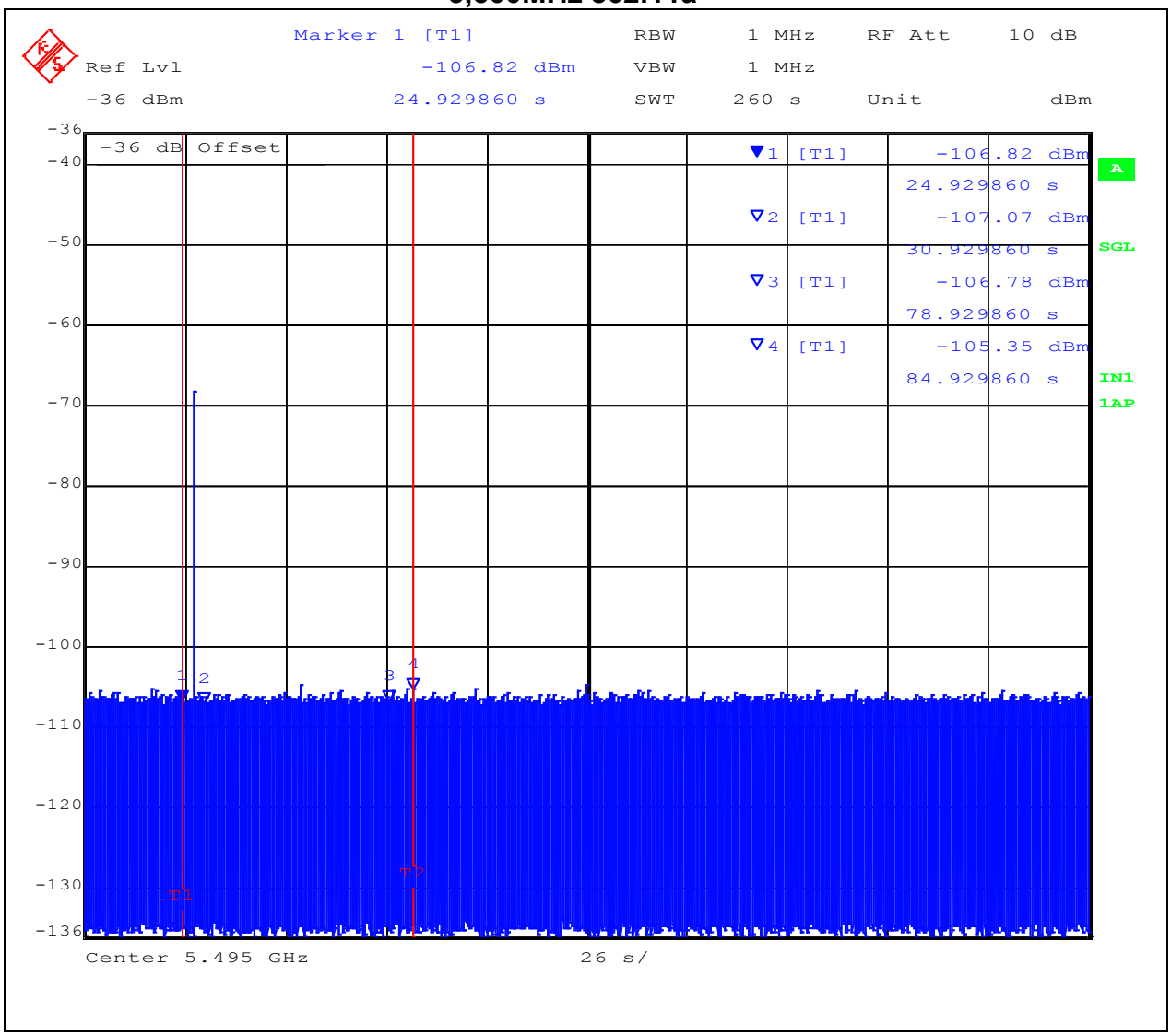
### 7.1.4.10.Radar Burst at the Beginning of the Channel Availability Check Time:

The steps below define the procedure to verify successful radar detection on the selected Channel during a period equal to the Channel Availability Check Time and avoidance of operation on that Channel when a radar Burst with a level equal to the DFS Detection Threshold +6 dB (-62 dBm Ref Section 6.1.7) occurs at the beginning of the Channel Availability Check Time.

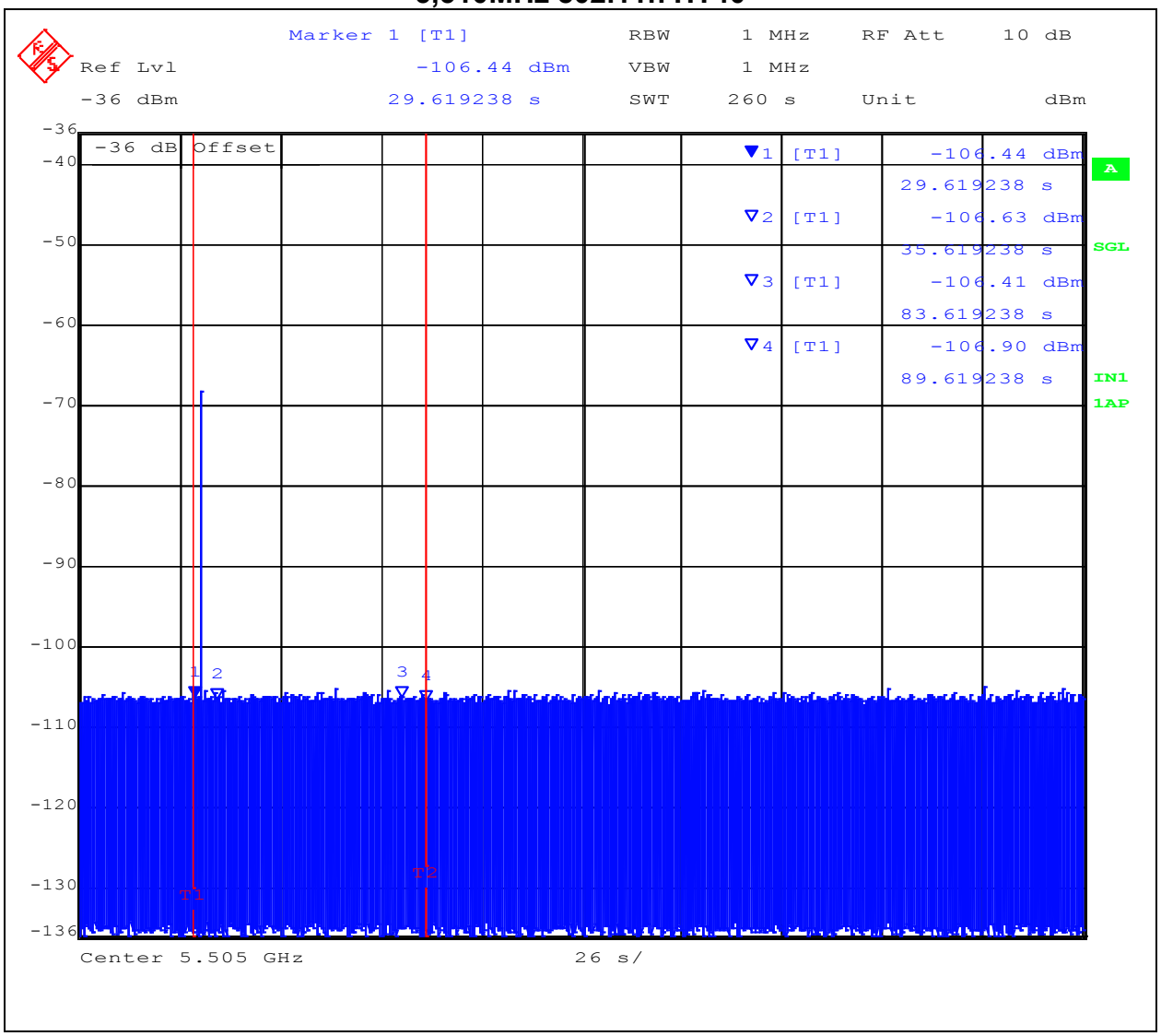
A single Burst of short pulse of radar Type 1 will commence within a 6 second window starting at $T_0$ (first red marker line on the following plot).

Visual indication on the EUT of successful detection of the radar Burst will be recorded and reported. Observation of emissions at 5,500MHz 802.11a, 5,510MHz 802.11n HT40, and 802.11AC 80 will continue for 2.5 minutes after the radar burst has been generated.

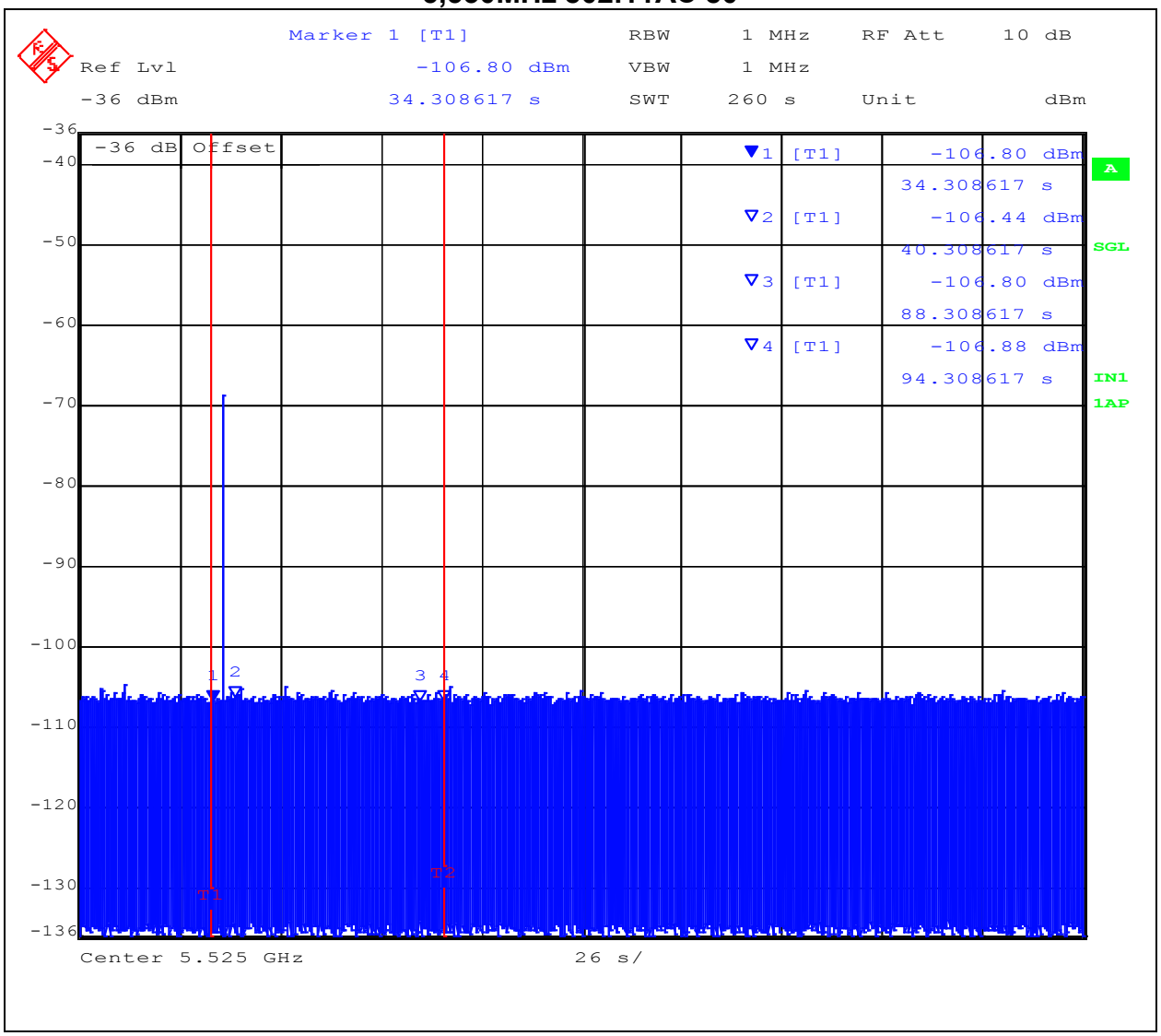
## Channel Availability Check Time at the start T0 + 6 seconds Check Time 5,500MHz 802.11a



## Channel Availability Check Time at the start T0 + 6 seconds Check Time 5,510MHz 802.11n HT40



## Channel Availability Check Time at the start T0 + 6 seconds Check Time 5,530MHz 802.11AC 80



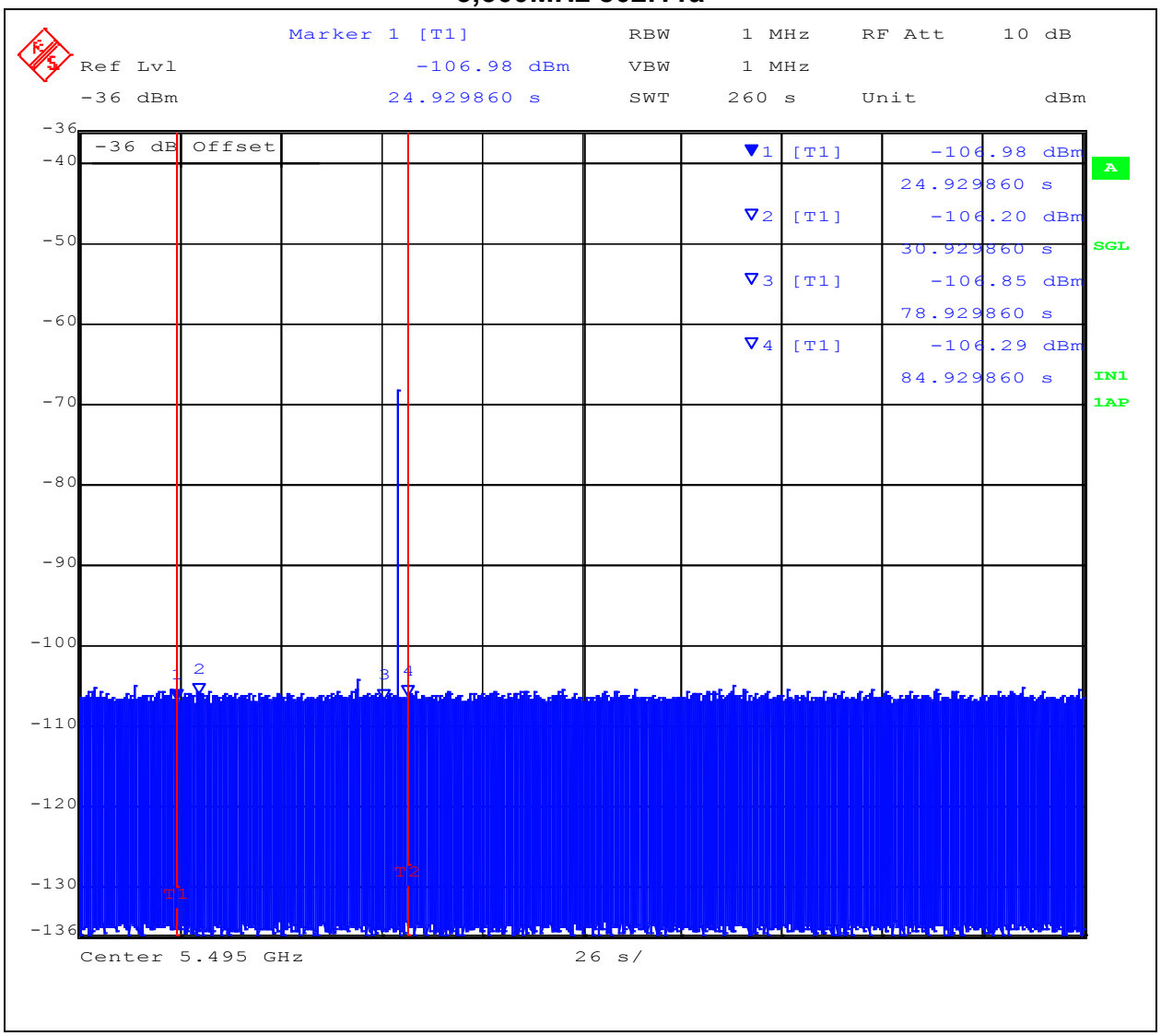
### 7.1.4.11.Radar Burst at the End of the Channel Availability Check Time:

The steps below define the procedure to verify successful radar detection on the selected Channel during a period equal to the Channel Availability Check Time and avoidance of operation on that Channel when a radar Burst with a level equal to the DFS Detection Threshold occurs at the end of the Channel Availability Check Time.

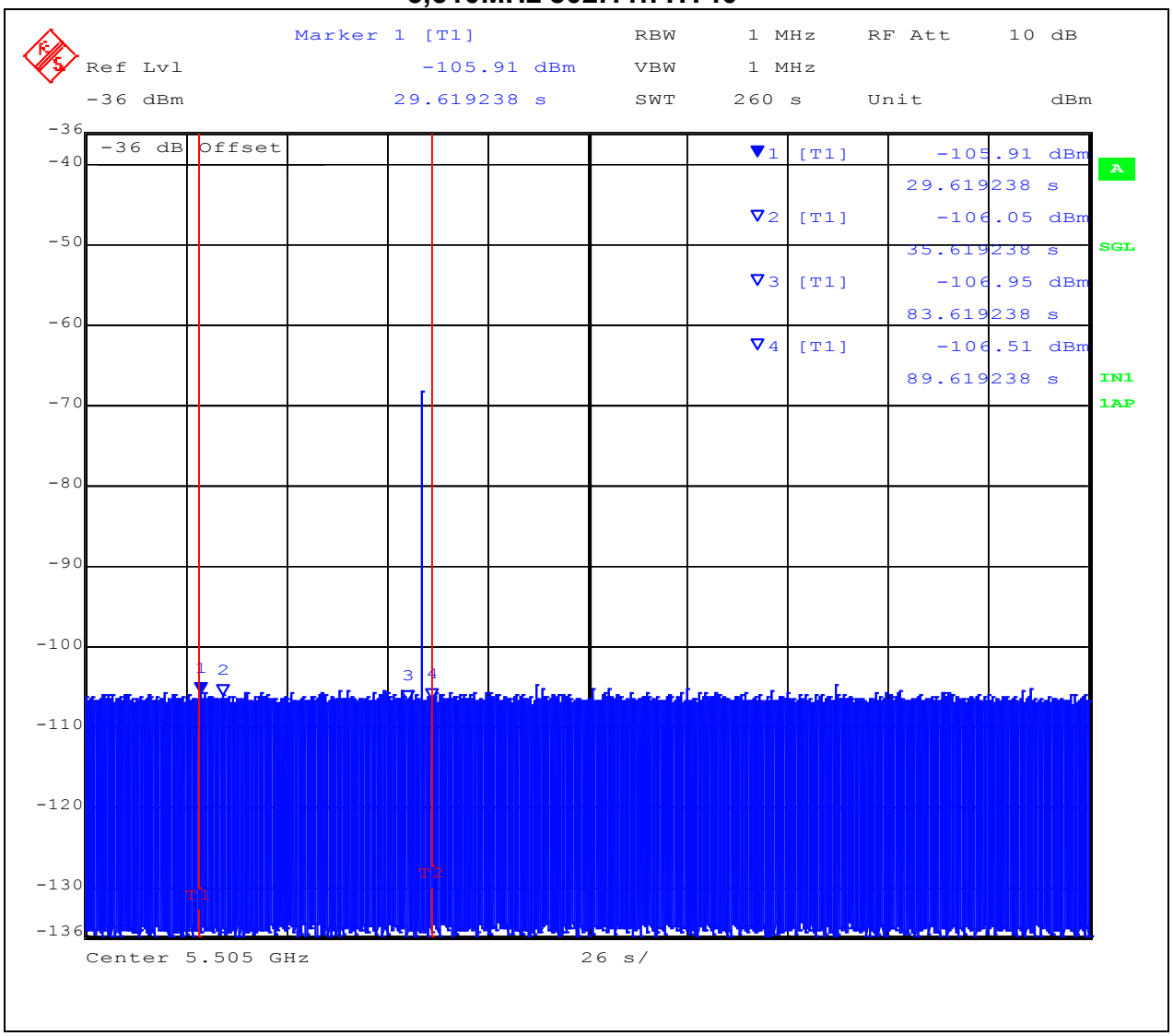
A single Burst of short pulse of radar type 1 will commence within a 6 second window starting at $T_0$+ 54 seconds. The window will commence at marker 2 and end at the red frequency line $T_2$.

Visual indication on the EUT of successful detection of the radar Burst will be recorded and reported. Observation of emissions at 5,500MHz 802.11a, 5,510MHz 802.11n HT40, and 802.11AC 80 will continue for 2.5 minutes after the radar burst has been generated.

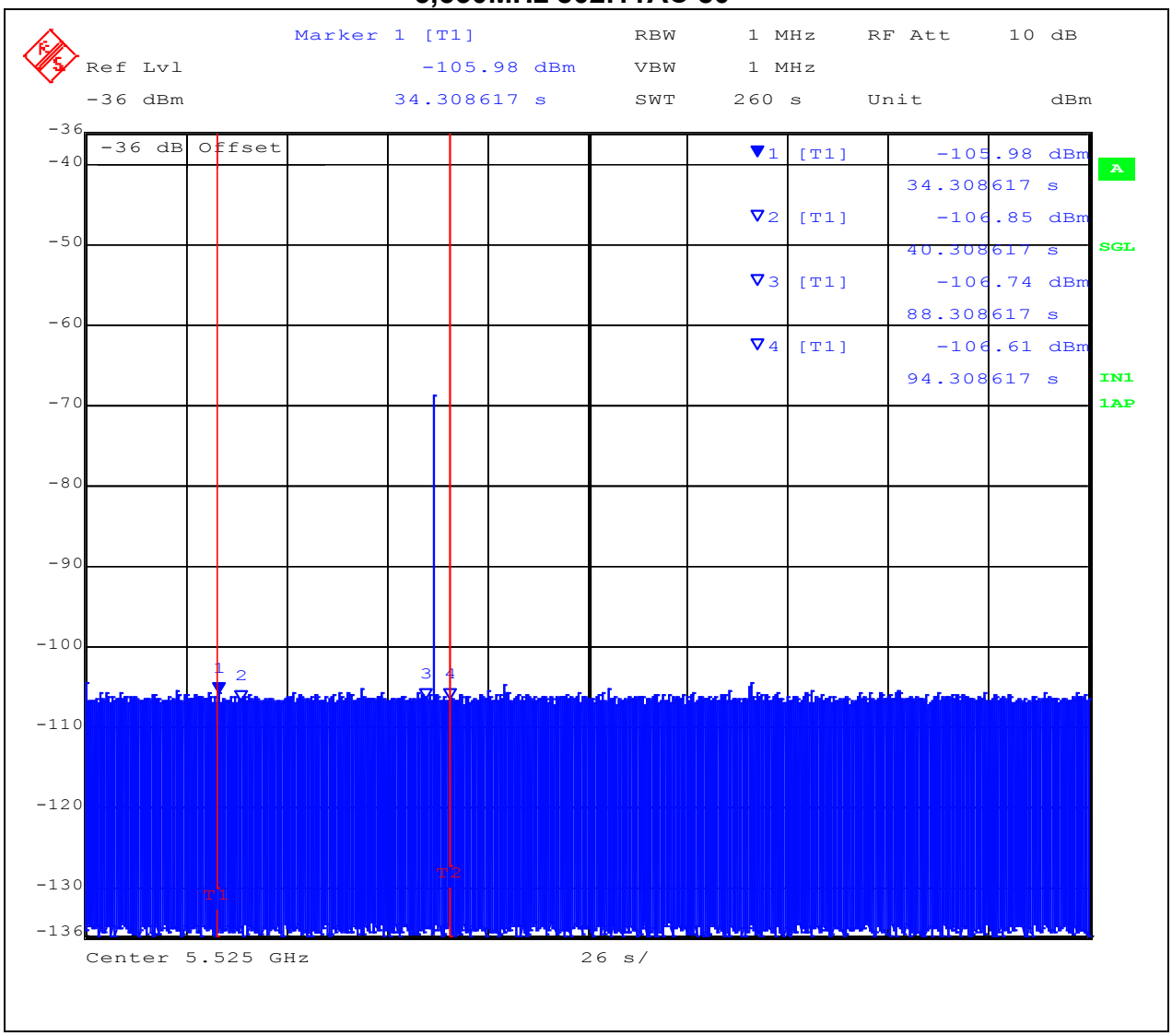
## Channel Availability Check Time at T0 + 54 seconds Check Time 5,500MHz 802.11a



## Channel Availability Check Time at T0 + 54 seconds Check Time 5,510MHz 802.11n HT40



## Channel Availability Check Time at T0 + 54 seconds Check Time
## 5,530MHz 802.11AC 80



### 7.1.4.12. In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period

**FCC §15.407(h)(2)(iii)**

The steps below define the procedure to determine the above mentioned parameters when a radar Burst with a level equal to the DFS Detection Threshold is generated on the Operating Channel of the U-NII device.

A U-NII device operating as a Client Device will associate with the EUT (Master). The requisite MPEG video file ("TestFile.mpg" available on the NTIA website at the following link http://ntiacsd.ntia.doc.gov/dfs/) is streamed from the master device (AP) to the client.

**Channel Closing Transmission Time - Measurement**

A Type 1 waveform was introduced to the EUT, from which a 12 second transmission record was digitally captured, collecting nearly 250M samples of data, which included in excess of 600 ms of pre-trigger data. This Type 1 waveform had an integral marker built into its construction, marking the start of the radar waveform play, which directly triggered the PXI digitizer's data capture via the PXI backplane trigger bus.

The test system was set-up to capture all transmission data for access point events above a threshold level of -50 dBm. The test equipment time stamps all captured events with respect to $T_0$ (zero time indicating the start of the measurements sequence) starting the 612.1 ms pre-trigger period followed by the radar type 1 burst period.

Radar (Type 1) Pre-trigger period 612.1 ms

Type 1 burst period 25.70 ms

(The period of the 18 pulse burst includes [18 pulses *1.428mS PRI] = 25.704 ms. Then add 1 µs pulse width for the final pulse.)

Channel Closing Transmission Time starts immediately after the last radar pulse is transmitted i.e. 637.8 ms after the start of the trace capture period.

Therefore, pulses seen after this 637.8 ms boundary are identified and totaled to provide an aggregate total of transmissions in order to determine whether the EUT is compliant with the Channel Closing Transmission Time requirements as described in MO&O FCC 06-96. In this case, it was found that an aggregate total of 0.00 ms of transmission time accrued. This value is found at the right hand side at the foot of the following plot (10s Total).

**Channel Closing Transmission Time 5,500 MHz (802.11a) = 0.237 mSecs (limit 260 mSecs)**
**Channel Move Time 5,500MHz (802.11a) = 0.8 Secs (limit 10 Secs)**

**Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 0 to 12 seconds**

**Channel Closing Transmission Time 5,510 MHz (802.11n HT40) = 1.061 mSecs (limit 260 mSecs)**

**Channel Move Time 5,510 MHz (802.11n HT40) = 1.12 Secs (limit 10 Secs)**

**Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 0 to 12 seconds**

**Channel Closing Transmission Time 5,530 MHz (802.11AC 80) = 0.001 uSecs (limit 260 mSecs)**

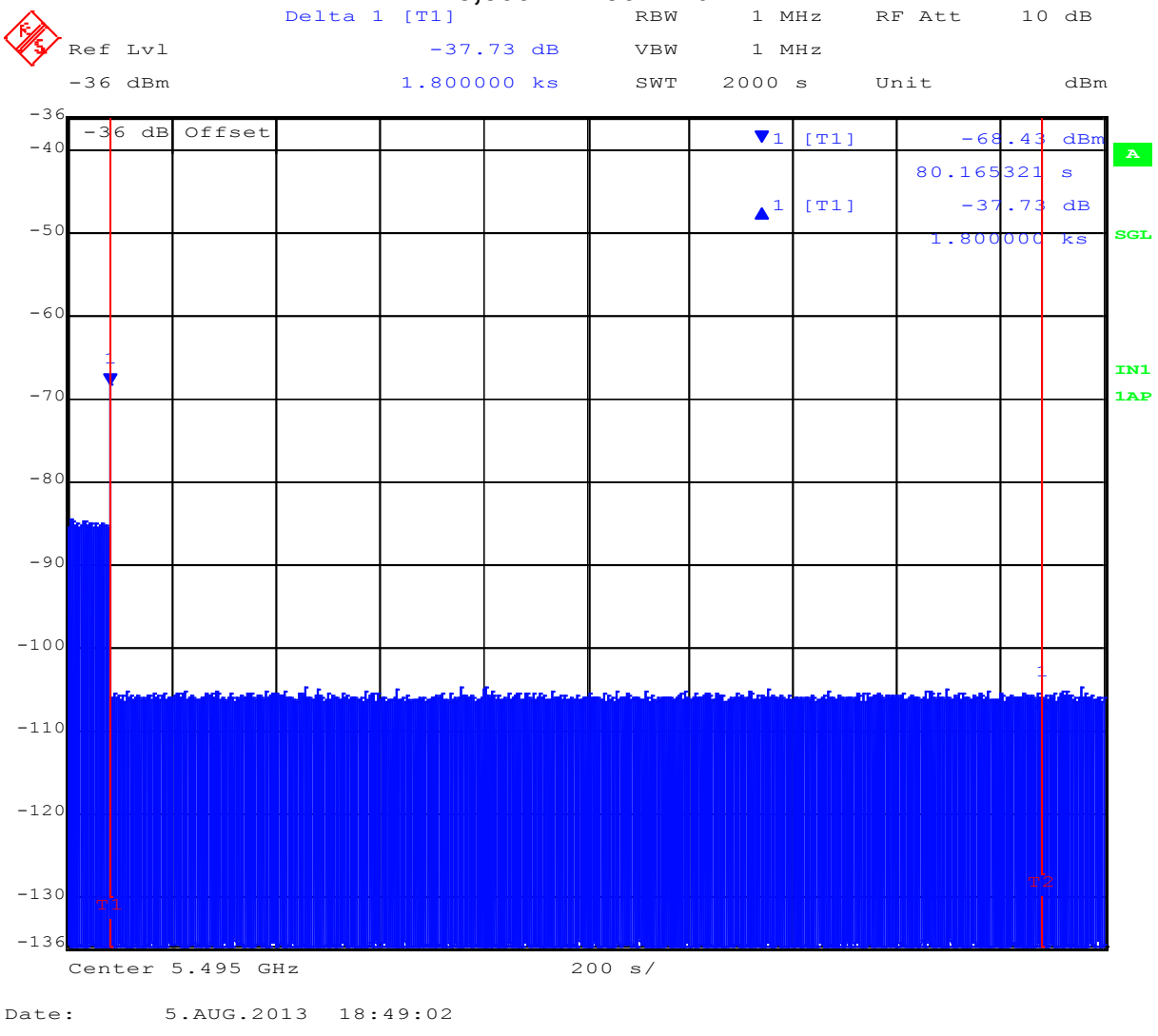
**Channel Move Time 5,530 MHz (802.11AC 80) = 0.00001 Secs (limit 10 Secs)**

**Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 0 to 12 seconds**

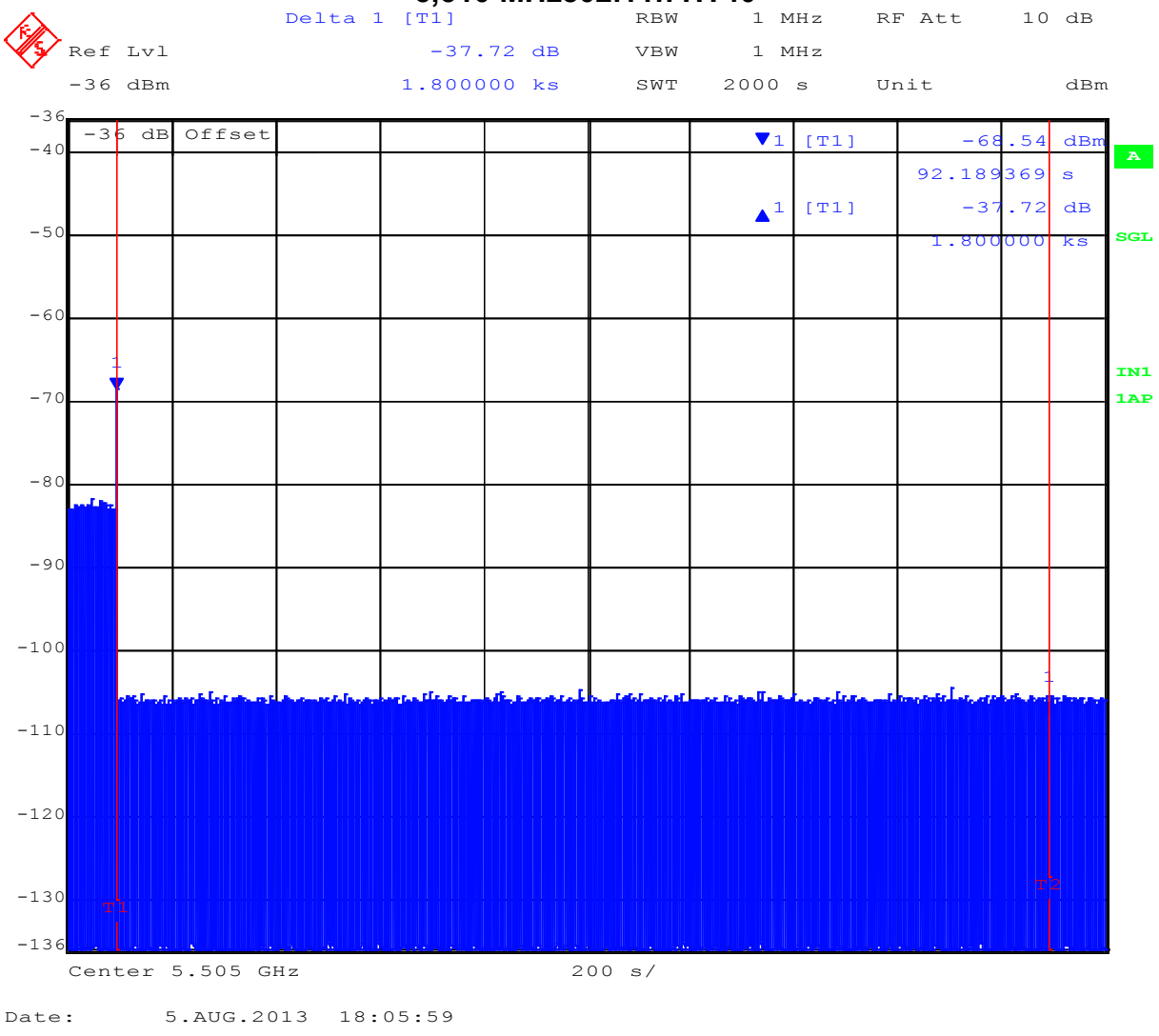
## 30 Minute Non-Occupancy Period

The EUT is monitored for more than 30 minutes following the channel close/move time to verify no transmissions resume on this Channel.

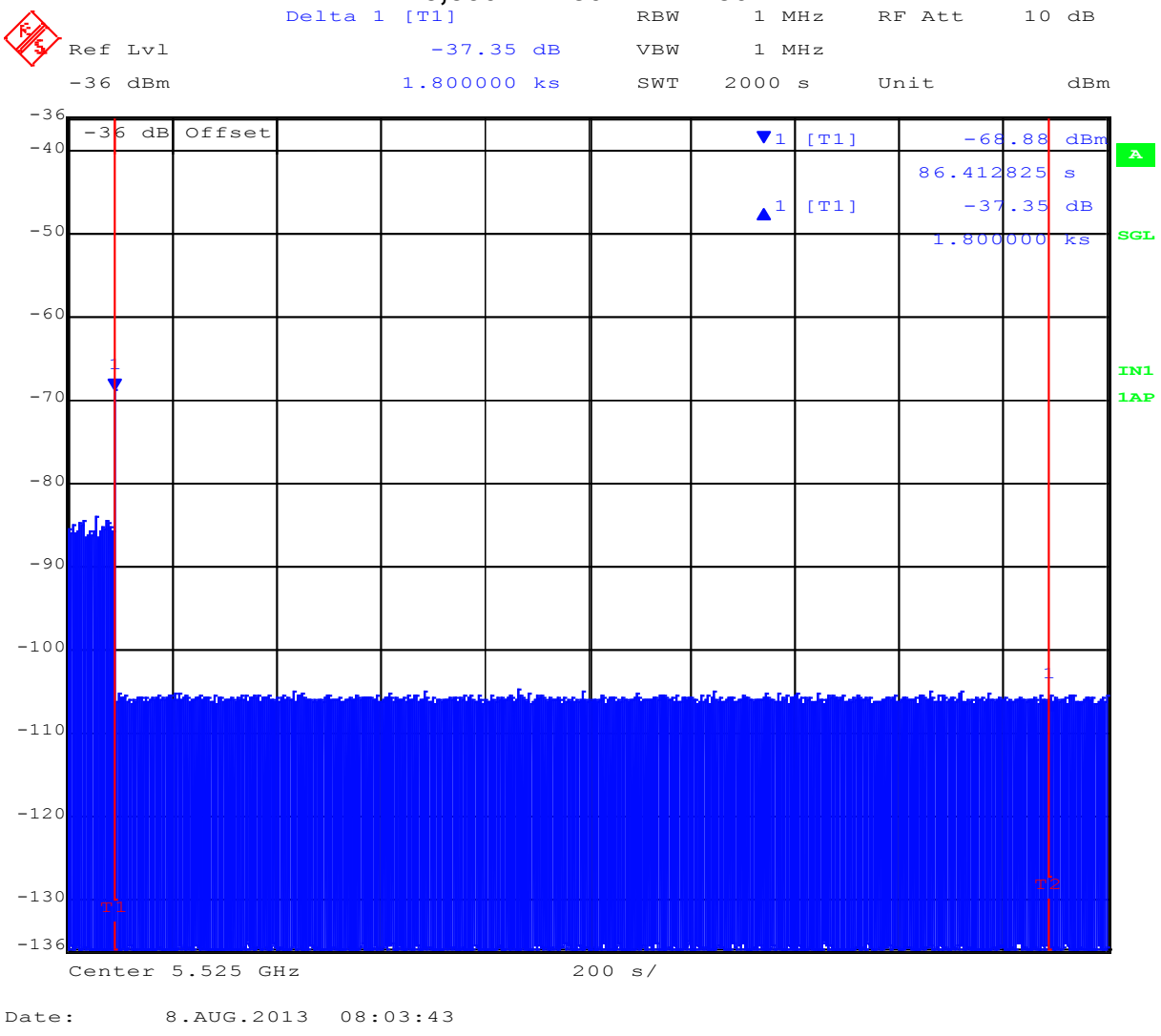
**30 Minute Non-Occupancy Period Type 1 Radar**
**5,500MHz 802.11a**



## 30 Minute Non-Occupancy Period Type 1 Radar
## 5,510 MHz802.11n HT40



## 30 Minute Non-Occupancy Period Type 1 Radar
## 5,530 MHz802.11AC 80



### 7.1.4.13.Statistical Performance Check

The steps below define the procedure to determine the minimum percentage of detection when a radar burst with a level equal to the DFS Detection Threshold is generated on the Operating Channel of the U-NII device.

A U-NII device operating as a Client Device will associate with the UUT (Master) at 5,500MHz 802.11a, 5,510MHz 802.11n HT40, and 802.11AC 80.

The Radar Waveform generator sends the individual waveform for each of the radar types 1-6. Statistical data will be gathered to determine the ability of the device to detect the radar test waveforms. The device can utilize a test mode to demonstrate when detection occurs to prevent the need to reset the device between trial runs. The percentage of successful detection is calculated by:

Total # of detections ÷ Total # of Trials × 100 = Probability of Detection

The Minimum number of trails, minimum percentage of successful detection and the average minimum percentage of successful detection are found in the Radar Test Waveforms section.

**Verification of Detection 5,500MHz 802.11a**

| Trial # | Detection = √, No Detection = 0 | | | | | |
|---|---|---|---|---|---|---|
| | Type 1 | Type 2 | Type 3 | Type 4 | Type 5 | Type 6 |
| 1 | √ | √ | √ | √ | √ | √ |
| 2 | √ | √ | √ | √ | √ | √ |
| 3 | √ | √ | √ | √ | √ | √ |
| 4 | √ | √ | √ | √ | √ | √ |
| 5 | √ | √ | √ | √ | √ | √ |
| 6 | √ | √ | √ | √ | √ | √ |
| 7 | √ | √ | √ | √ | √ | √ |
| 8 | √ | √ | √ | √ | √ | √ |
| 9 | √ | √ | √ | √ | √ | √ |
| 10 | √ | √ | √ | √ | √ | √ |
| 11 | √ | √ | √ | √ | √ | √ |
| 12 | √ | √ | √ | √ | √ | √ |
| 13 | √ | √ | √ | √ | √ | √ |
| 14 | √ | √ | √ | √ | √ | √ |
| 15 | √ | √ | √ | √ | √ | √ |
| 16 | √ | √ | √ | √ | √ | √ |
| 17 | √ | √ | √ | √ | √ | √ |
| 18 | √ | √ | √ | √ | √ | √ |
| 19 | √ | √ | √ | √ | √ | √ |
| 20 | √ | √ | √ | √ | √ | √ |
| 21 | √ | √ | √ | **0** | √ | √ |
| 22 | √ | √ | √ | **0** | √ | √ |
| 23 | √ | √ | √ | √ | √ | √ |
| 24 | √ | √ | √ | √ | √ | √ |
| 25 | √ | √ | √ | √ | **0** | √ |
| 26 | √ | √ | √ | √ | √ | √ |
| 27 | √ | √ | √ | √ | √ | √ |
| 28 | √ | √ | √ | √ | √ | √ |
| 29 | √ | √ | √ | √ | √ | √ |
| 30 | √ | √ | √ | √ | √ | √ |
| **Detection Percentage** | 100% (>60%) | 100% (>60%) | 100% (>60%) | 93.3% (>60%) | 96.6% (>80%) | 100% (>70%) |

In addition an average minimum percentage of successful detection across all four Short pulse radar test waveforms is required and calculated as follows;

$(P_d1 + P_d2 + P_d3 + P_d4) / 4 = 100\% + 100\% + 93.3\% + 96.6\%) / 4 = 97.5\%$ (> 80%)

**Verification of Detection 5,510MHz 802.11n HT40**

| Trial # | Detection = √, No Detection = 0 | | | | | |
|---|---|---|---|---|---|---|
| | Type 1 | Type 2 | Type 3 | Type 4 | Type 5 | Type 6 |
| 1 | √ | √ | √ | √ | √ | √ |
| 2 | √ | √ | √ | √ | √ | √ |
| 3 | √ | √ | √ | √ | √ | √ |
| 4 | √ | √ | √ | √ | √ | √ |
| 5 | √ | √ | √ | √ | √ | √ |
| 6 | √ | √ | √ | √ | √ | √ |
| 7 | √ | √ | √ | √ | √ | √ |
| 8 | √ | √ | √ | √ | √ | √ |
| 9 | √ | √ | √ | √ | √ | √ |
| 10 | √ | √ | √ | √ | √ | √ |
| 11 | √ | √ | √ | √ | √ | √ |
| 12 | √ | √ | √ | √ | √ | √ |
| 13 | √ | √ | √ | √ | √ | √ |
| 14 | √ | √ | √ | √ | √ | √ |
| 15 | √ | √ | √ | √ | √ | √ |
| 16 | √ | √ | √ | √ | √ | √ |
| 17 | √ | √ | √ | √ | √ | √ |
| 18 | √ | √ | √ | √ | √ | √ |
| 19 | √ | √ | √ | √ | √ | √ |
| 20 | √ | √ | √ | √ | √ | √ |
| 21 | √ | √ | √ | √ | √ | √ |
| 22 | √ | √ | √ | √ | √ | √ |
| 23 | √ | √ | √ | √ | √ | √ |
| 24 | √ | √ | √ | √ | √ | √ |
| 25 | √ | √ | √ | √ | √ | √ |
| 26 | √ | √ | √ | √ | √ | √ |
| 27 | √ | √ | √ | √ | √ | √ |
| 28 | √ | √ | √ | √ | √ | √ |
| 29 | √ | √ | √ | √ | √ | √ |
| 30 | √ | √ | √ | √ | √ | √ |
| **Detection Percentage** | 100% (>60%) | 100% (>60%) | 100% (>60%) | 100% (>60%) | 100% (>80%) | 100% (>70%) |

In addition an average minimum percentage of successful detection across all four Short pulse radar test waveforms is required and calculated as follows;

$\underline{(P_d1 + P_d2 + P_d3 + P_d4)} / 4 = \underline{(100\% + 100\% + 100\% + 100\%) / 4} = 100\%$ (> 80%)

**Verification of Detection 5,530MHz 802.11n HT80**

| Trial # | Detection = √, No Detection = 0 | | | | | |
|---|---|---|---|---|---|---|
| | Type 1 | Type 2 | Type 3 | Type 4 | Type 5 | Type 6 |
| 1 | √ | √ | √ | √ | √ | √ |
| 2 | √ | √ | √ | √ | √ | √ |
| 3 | √ | √ | √ | √ | √ | √ |
| 4 | √ | √ | √ | √ | √ | √ |
| 5 | √ | √ | √ | √ | √ | √ |
| 6 | √ | √ | √ | √ | √ | √ |
| 7 | √ | √ | √ | √ | √ | √ |
| 8 | √ | √ | √ | √ | √ | √ |
| 9 | √ | √ | √ | √ | √ | √ |
| 10 | √ | √ | √ | √ | √ | √ |
| 11 | √ | √ | **0** | √ | √ | √ |
| 12 | √ | √ | √ | √ | √ | √ |
| 13 | √ | √ | √ | √ | √ | √ |
| 14 | √ | √ | √ | √ | √ | √ |
| 15 | √ | √ | √ | √ | √ | √ |
| 16 | √ | √ | √ | √ | √ | √ |
| 17 | √ | √ | √ | √ | √ | √ |
| 18 | √ | √ | √ | √ | √ | √ |
| 19 | **0** | √ | √ | √ | √ | √ |
| 20 | √ | √ | √ | √ | √ | √ |
| 21 | √ | √ | √ | √ | √ | √ |
| 22 | √ | √ | √ | √ | √ | √ |
| 23 | √ | √ | √ | √ | √ | √ |
| 24 | √ | √ | √ | √ | √ | √ |
| 25 | √ | √ | √ | √ | √ | √ |
| 26 | √ | √ | √ | √ | √ | √ |
| 27 | √ | √ | √ | √ | √ | √ |
| 28 | √ | √ | √ | √ | √ | √ |
| 29 | √ | √ | √ | √ | √ | √ |
| 30 | √ | √ | √ | √ | √ | √ |
| **Detection Percentage** | 96.67% (>60%) | 100% (>60%) | 96.67% (>60%) | 100% (>60%) | 100% (>80%) | 100% (>70%) |

In addition an average minimum percentage of successful detection across all four Short pulse radar test waveforms is required and calculated as follows;

$(P_d1 + P_d2 + P_d3 + P_d4) / 4 = (96.67\% + 100\% + 96.67\% + 100\%) / 4 = 98.3\%$ (> 80%)

**Measurement Uncertainty Time/Power**

| | |
|---|---|
| Measurement uncertainty | |
| - Time | 4% |
| - Power | 1.33dB |

**Traceability**

| Test Equipment Used |
|---|
| 0072, 0083, 0098, 0116, 0132, 0158, 0313, 0314, 0193, 0223, 0252, 0253, 0251, 0256, 0328, 0329 |

### 7.1.5. DFS New Rules

This section tests the new Type 1 radar signature and performs a spot check on the additional radar signatures. This DFS section addresses the update to the FCC's New Rules.

**Short Pulse Radar Test Waveforms**

| Radar Type | Pulse Width (µS) | PRI (µS) | 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 | $\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{\text{PRI}_{\mu\text{sec}}}\right)\right\}$ | 60% | 30 |
| | | Test B: 15 unique PRI values randomly selected in the range 518-3066 µS, with a minimum increment of 1 µS, 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 |

Note 1: Short Radar Pulse Type 0 should be used for the Detection Bandwidth test, Channel Move Time and Channel Closing Time tests

Type 1 short radar signature is the new FCC radar signature. All additional radar signatures and long pulse signatures were tested in the initial DFS test program.

A full test was performed on Type 1 Radar Signature with a spot-check on all others. For a description on the test strategy for each signature see Section 7.1.4 Dynamic Frequency Selection (DFS).

MiCOM Labs has a complete suite of tests for the DFS spot-check.

## Test Program Details

**EUT Type:** Master with radar detection

**Frequency band(s):** 5,250 - 5,350 MHz and 5,470 – 5,725 MHz

**Uniform Loading:** For the above frequency band(s) the manufacturer declared that the device provides an aggregate uniform loading of the spectrum across all devices by selecting an operating channel among the available channels using a random algorithm.

**Test Environment:** Conducted
**Antenna Gain used for Testing:** 7.79 dBi

**Radio parameters: 802.11a:** Tx Power: +20 dBm Data Rate: 6 Mbit/s Duty Cycle: 22%
**Radio parameters: 802.11ac-80:** Tx Power: +20 dBm Data Rate: 23 Mbit/s Duty Cycle: 22%
**Radio parameters: 802.11n HT-40:** Tx Power: +20 dBm Data Rate: 13 Mbit/s Duty Cycle: 22%

**Number of Antenna Chains:** 3
**Test Communication Throughput Methodology**
The requisite MPEG video file ("TestFile.mpg" available on the NTIA website at the following link http://ntiacsd.ntia.doc.gov/dfs/) is used during this video stream.

**EUT Software Version:** 6.6.3.1-22869
**Test Environmental Conditions - Ambient**:
Temperature: 17 to 23 °C
Relative humidity: 31 to 57%
Pressure: 999 to 1012 mbar

**Probability of Detection**

802.11a - 5500 MHz

| Statistical Performance Check | | | | | |
|---|---|---|---|---|---|
| **Radar Type** | **Number of Trials** | **Number of Successful Detections** | **Percentage of Successful Detections** | **Result** | **Data Link** |
| Radar Type 1 | 30 | 30 | 100.00% | Complies | View Data |
| Radar Type 2 | 11 | 11 | 100.00% | Complies | View Data |
| Radar Type 3 | 11 | 11 | 100.00% | Complies | View Data |
| Radar Type 4 | 11 | 11 | 100.00% | Complies | View Data |
| **Aggregate (100.00% + 100.00% + 100.00% + 100.00%)/4 = 100.00%** | | | | Complies | -- |
| Radar Type 5 | | | | Complies | View Data |
| Radar Type 6 | | | | Complies | View Data |

802.11ac 80 - 5530 MHz

| Statistical Performance Check | | | | | |
|---|---|---|---|---|---|
| **Radar Type** | **Number of Trials** | **Number of Successful Detections** | **Percentage of Successful Detections** | **Result** | **Data Link** |
| Radar Type 1 | 30 | 30 | 100.00% | Complies | View Data |
| Radar Type 2 | 11 | 9 | 81.82% | Complies | View Data |
| Radar Type 3 | 10 | 10 | 100.00% | Complies | View Data |
| Radar Type 4 | 11 | 10 | 90.91% | Complies | View Data |
| **Aggregate (100.00% + 81.82% + 100.00% + 90.91%)/4 = 93.18%** | | | | Complies | -- |
| Radar Type 5 | | | | Complies | View Data |
| Radar Type 6 | | | | Complies | View Data |

802.11n HT40 - 5510 MHz

| Statistical Performance Check | | | | | |
|---|---|---|---|---|---|
| **Radar Type** | **Number of Trials** | **Number of Successful Detections** | **Percentage of Successful Detections** | **Result** | **Data Link** |
| Radar Type 1 | 30 | 30 | 100.00% | Complies | View Data |
| Radar Type 2 | 11 | 11 | 100.00% | Complies | View Data |
| Radar Type 3 | 11 | 11 | 100.00% | Complies | View Data |
| Radar Type 4 | 11 | 11 | 100.00% | Complies | View Data |
| **Aggregate (100.00% + 100.00% + 100.00% + 100.00%)/4 = 100.00%** | | | | Complies | -- |
| Radar Type 5 | | | | Complies | View Data |
| Radar Type 6 | | | | Complies | View Data |

**Equipment Configuration for Radar Type 1**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 6 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5500.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Pulse Width (us) | PRF (Hz) | PRI | # Pulses | Injections | Detections | Detection Rate | Result |
|---|---|---|---|---|---|---|---|
| 1 | 326 | 3066 | 18 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1089 | 918 | 58 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1433 | 698 | 76 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1285 | 778 | 68 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1520 | 658 | 81 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1114 | 898 | 59 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1567 | 638 | 83 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1355 | 738 | 72 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1222 | 818 | 65 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1792 | 558 | 95 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1319 | 758 | 70 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1672 | 598 | 89 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1475 | 678 | 78 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1859 | 538 | 99 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1139 | 878 | 61 | 1 | 1 | 100.00% | DETECTED |
| 1 | 978 | 1022 | 52 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1894 | 528 | 100 | 1 | 1 | 100.00% | DETECTED |
| 1 | 329 | 3036 | 18 | 1 | 1 | 100.00% | DETECTED |
| 1 | 332 | 3011 | 18 | 1 | 1 | 100.00% | DETECTED |
| 1 | 739 | 1354 | 39 | 1 | 1 | 100.00% | DETECTED |
| 1 | 360 | 2779 | 19 | 1 | 1 | 100.00% | DETECTED |
| 1 | 828 | 1208 | 44 | 1 | 1 | 100.00% | DETECTED |
| 1 | 623 | 1606 | 33 | 1 | 1 | 100.00% | DETECTED |
| 1 | 577 | 1734 | 31 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1364 | 733 | 73 | 1 | 1 | 100.00% | DETECTED |
| 1 | 382 | 2615 | 21 | 1 | 1 | 100.00% | DETECTED |
| 1 | 347 | 2882 | 19 | 1 | 1 | 100.00% | DETECTED |
| 1 | 524 | 1907 | 28 | 1 | 1 | 100.00% | DETECTED |
| 1 | 414 | 2416 | 22 | 1 | 1 | 100.00% | DETECTED |
| 1 | 816 | 1226 | 44 | 1 | 1 | 100.00% | DETECTED |
| | | | **Aggregate:** | **30** | **30** | **100.00%** | **Complies** |

**Equipment Configuration for Radar Type 2**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 6 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5500.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | Radar type was spot checked for the update. | | |

**Test Measurement Results**

| Pulse Width (us) | PRF (Hz) | PRI | # Pulses | Injections | Detections | Detection Rate | Result |
|---|---|---|---|---|---|---|---|
| 1 | 5208 | 192 | 25 | 1 | 1 | 100.00% | DETECTED |
| 1.3 | 4367 | 229 | 26 | | | -- | Not Tested |
| 1.3 | 4739 | 211 | 27 | | | -- | Not Tested |
| 1.4 | 5155 | 194 | 27 | 1 | 1 | 100.00% | DETECTED |
| 1.5 | 6173 | 162 | 29 | | | -- | Not Tested |
| 1.7 | 4566 | 219 | 25 | | | -- | Not Tested |
| 1.9 | 5435 | 184 | 23 | 1 | 1 | 100.00% | DETECTED |
| 2 | 5495 | 182 | 27 | | | -- | Not Tested |
| 2.1 | 6024 | 166 | 25 | | | -- | Not Tested |
| 2.3 | 4762 | 210 | 29 | 1 | 1 | 100.00% | DETECTED |
| 2.4 | 4950 | 202 | 26 | | | -- | Not Tested |
| 2.4 | 4878 | 205 | 29 | | | -- | Not Tested |
| 2.6 | 6494 | 154 | 25 | 1 | 1 | 100.00% | DETECTED |
| 2.8 | 5181 | 193 | 25 | | | -- | Not Tested |
| 3.1 | 5952 | 168 | 29 | | | -- | Not Tested |
| 3.2 | 4587 | 218 | 26 | 1 | 1 | 100.00% | DETECTED |
| 3.3 | 4386 | 228 | 24 | | | -- | Not Tested |
| 3.5 | 5747 | 174 | 23 | | | -- | Not Tested |
| 3.5 | 6536 | 153 | 27 | 1 | 1 | 100.00% | DETECTED |
| 3.5 | 5236 | 191 | 26 | | | -- | Not Tested |
| 3.6 | 4854 | 206 | 27 | | | -- | Not Tested |
| 3.8 | 4484 | 223 | 25 | 1 | 1 | 100.00% | DETECTED |
| 4.1 | 4673 | 214 | 25 | | | -- | Not Tested |
| 4.2 | 5780 | 173 | 24 | | | -- | Not Tested |
| 4.2 | 6211 | 161 | 28 | 1 | 1 | 100.00% | DETECTED |
| 4.3 | 6579 | 152 | 27 | | | -- | Not Tested |
| 4.4 | 6369 | 157 | 29 | | | -- | Not Tested |
| 4.9 | 6494 | 154 | 29 | 1 | 1 | 100.00% | DETECTED |
| 4.9 | 5291 | 189 | 27 | | | -- | Not Tested |
| 5 | 4464 | 224 | 27 | 1 | 1 | 100.00% | DETECTED |
| | | | **Aggregate:** | **11.00** | **11.00** | **100.00%** | **Pass** |

**Equipment Configuration for Radar Type 3**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 6 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5500.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | Radar type was spot checked for the update. | | |

**Test Measurement Results**

| Pulse Width (us) | PRF (Hz) | PRI | # Pulses | Injections | Detections | Detection Rate | Result |
|---|---|---|---|---|---|---|---|
| 10 | 2732 | 366 | 18 | 1 | 1 | 100.00% | DETECTED |
| 6 | 2326 | 430 | 17 | | | -- | Not Tested |
| 6.1 | 2967 | 337 | 16 | | | -- | Not Tested |
| 6.5 | 2110 | 474 | 18 | 1 | 1 | 100.00% | DETECTED |
| 6.7 | 2062 | 485 | 18 | | | -- | Not Tested |
| 6.7 | 3003 | 333 | 17 | | | -- | Not Tested |
| 6.8 | 2227 | 449 | 16 | 1 | 1 | 100.00% | DETECTED |
| 6.8 | 2959 | 338 | 18 | | | -- | Not Tested |
| 6.9 | 2092 | 478 | 18 | | | -- | Not Tested |
| 7 | 2079 | 481 | 18 | 1 | 1 | 100.00% | DETECTED |
| 7.2 | 2747 | 364 | 16 | | | -- | Not Tested |
| 7.6 | 2695 | 371 | 18 | | | -- | Not Tested |
| 7.6 | 2123 | 471 | 18 | 1 | 1 | 100.00% | DETECTED |
| 7.7 | 2227 | 449 | 16 | | | -- | Not Tested |
| 8 | 4049 | 247 | 18 | | | -- | Not Tested |
| 8.1 | 2778 | 360 | 18 | 1 | 1 | 100.00% | DETECTED |
| 8.3 | 2494 | 401 | 17 | | | -- | Not Tested |
| 8.5 | 2500 | 400 | 17 | | | -- | Not Tested |
| 8.7 | 2551 | 392 | 17 | 1 | 1 | 100.00% | DETECTED |
| 8.8 | 2451 | 408 | 16 | | | -- | Not Tested |
| 8.9 | 2513 | 398 | 18 | | | -- | Not Tested |
| 9 | 3215 | 311 | 17 | 1 | 1 | 100.00% | DETECTED |
| 9.2 | 2114 | 473 | 18 | | | -- | Not Tested |
| 9.2 | 2558 | 391 | 16 | | | -- | Not Tested |
| 9.3 | 2660 | 376 | 18 | 1 | 1 | 100.00% | DETECTED |
| 9.3 | 2941 | 340 | 18 | | | -- | Not Tested |
| 9.4 | 2151 | 465 | 16 | | | -- | Not Tested |
| 9.4 | 3086 | 324 | 16 | 1 | 1 | 100.00% | DETECTED |
| 9.5 | 2062 | 485 | 18 | | | -- | Not Tested |
| 9.7 | 2105 | 475 | 17 | 1 | 1 | 100.00% | DETECTED |
| | | | **Aggregate:** | **11** | **11** | **100.00%** | **Pass** |

**Equipment Configuration for Radar Type 4**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 6 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5500.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | Radar type was spot checked for the update. | | |

**Test Measurement Results**

| Pulse Width (us) | PRF (Hz) | PRI | # Pulses | Injections | Detections | Detection Rate | Result |
|---|---|---|---|---|---|---|---|
| 11 | 2257 | 443 | 13 | 1 | 1 | 100.00% | DETECTED |
| 11.2 | 3096 | 323 | 16 | | | -- | Not Tested |
| 11.5 | 2591 | 386 | 16 | | | -- | Not Tested |
| 12.8 | 2004 | 499 | 13 | 1 | 1 | 100.00% | DETECTED |
| 12.8 | 3906 | 256 | 14 | | | -- | Not Tested |
| 13.6 | 3831 | 261 | 16 | | | -- | Not Tested |
| 13.6 | 2639 | 379 | 13 | 1 | 1 | 100.00% | DETECTED |
| 14 | 3077 | 325 | 13 | | | -- | Not Tested |
| 14.1 | 3125 | 320 | 15 | | | -- | Not Tested |
| 14.6 | 3401 | 294 | 15 | 1 | 1 | 100.00% | DETECTED |
| 14.6 | 3311 | 302 | 12 | | | -- | Not Tested |
| 14.6 | 4292 | 233 | 15 | | | -- | Not Tested |
| 14.7 | 2967 | 337 | 15 | 1 | 1 | 100.00% | DETECTED |
| 15.3 | 2315 | 432 | 15 | | | -- | Not Tested |
| 15.3 | 2817 | 355 | 13 | | | -- | Not Tested |
| 15.5 | 2639 | 379 | 13 | 1 | 1 | 100.00% | DETECTED |
| 16.1 | 4115 | 243 | 13 | | | -- | Not Tested |
| 16.3 | 3165 | 316 | 12 | | | -- | Not Tested |
| 16.8 | 3623 | 276 | 13 | 1 | 1 | 100.00% | DETECTED |
| 16.9 | 2519 | 397 | 14 | | | -- | Not Tested |
| 17 | 3106 | 322 | 16 | | | -- | Not Tested |
| 17.4 | 2933 | 341 | 15 | 1 | 1 | 100.00% | DETECTED |
| 17.4 | 2208 | 453 | 13 | | | -- | Not Tested |
| 17.6 | 2653 | 377 | 12 | | | -- | Not Tested |
| 18 | 2062 | 485 | 12 | 1 | 1 | 100.00% | DETECTED |
| 18.2 | 4132 | 242 | 12 | | | -- | Not Tested |
| 18.9 | 3049 | 328 | 14 | 1 | 1 | 100.00% | DETECTED |
| 19.5 | 2283 | 438 | 12 | | | -- | Not Tested |
| 19.6 | 3236 | 309 | 16 | | | -- | Not Tested |
| 19.8 | 3012 | 332 | 12 | 1 | 1 | 100.00% | DETECTED |
| | | | **Aggregate:** | **11** | **11** | **100.00%** | **Pass** |

**Equipment Configuration for Radar Type 5**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 6 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5500.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | Radar type was spot checked for the update. | | |

**Test Measurement Results**

| Burst Segment | Injections | Detections | Detection Rate | Result |
|---|---|---|---|---|
| Type 5 #1 5506.79 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #2 5503.23 | | | -- | Not Tested |
| Type 5 #3 5491.54 | | | -- | Not Tested |
| Type 5 #4 5500.59 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #5 5504.85 | | | -- | Not Tested |
| Type 5 #6 5498.17 | | | -- | Not Tested |
| Type 5 #7 5504.09 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #8 5506.21 | | | -- | Not Tested |
| Type 5 #9 5491.85 | | | -- | Not Tested |
| Type 5 #10 5490.51 | 1 | 0 | 0.00% | NOT DETECTED |
| Type 5 #11 5504.80 | | | -- | Not Tested |
| Type 5 #12 5490.49 | | | -- | Not Tested |
| Type 5 #13 5507.05 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #14 5499.49 | | | -- | Not Tested |
| Type 5 #15 5502.79 | | | -- | Not Tested |
| Type 5 #16 5504.67 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #17 5492.43 | | | -- | Not Tested |
| Type 5 #18 5509.65 | | | -- | Not Tested |
| Type 5 #19 5501.15 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #20 5495.21 | | | -- | Not Tested |
| Type 5 #21 5507.23 | | | -- | Not Tested |
| Type 5 #22 5504.93 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #23 5495.49 | | | -- | Not Tested |
| Type 5 #24 5491.09 | | | -- | Not Tested |
| Type 5 #25 5503.52 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #26 5502.49 | | | -- | Not Tested |
| Type 5 #27 5492.84 | | | -- | Not Tested |
| Type 5 #28 5501.97 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #29 5491.26 | 1 | 0 | 0.00% | NOT DETECTED |
| Type 5 #30 5501.32 | | | -- | Not Tested |

**Equipment Configuration for Radar Type 6**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11a | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 6 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5500.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | Radar type was spot checked for the update. | | |

**Test Measurement Results**

| Burst Segment | Detections | Injection # | Detection Rate | Pass/Fail |
|---|---|---|---|---|
| Type 6 #1 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #2 | | | -- | Not Tested |
| Type 6 #3 | | | -- | Not Tested |
| Type 6 #4 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #5 | | | -- | Not Tested |
| Type 6 #6 | | | -- | Not Tested |
| Type 6 #7 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #8 | | | -- | Not Tested |
| Type 6 #9 | | | -- | Not Tested |
| Type 6 #10 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #11 | | | -- | Not Tested |
| Type 6 #12 | | | -- | Not Tested |
| Type 6 #13 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #14 | | | -- | Not Tested |
| Type 6 #15 | | | -- | Not Tested |
| Type 6 #16 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #17 | | | -- | Not Tested |
| Type 6 #18 | | | -- | Not Tested |
| Type 6 #19 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #20 | | | -- | Not Tested |
| Type 6 #21 | | | -- | Not Tested |
| Type 6 #22 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #23 | | | -- | Not Tested |
| Type 6 #24 | | | -- | Not Tested |
| Type 6 #25 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #26 | | | -- | Not Tested |
| Type 6 #27 | | | -- | Not Tested |
| Type 6 #28 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #29 | | | -- | Not Tested |
| Type 6 #30 | 1 | 1 | 100.00% | DETECTED |

**Equipment Configuration for Radar Type 1**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11ac 80 | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 23 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5530.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Pulse Width (us) | PRF (Hz) | PRI | # Pulses | Injections | Detections | Detection Rate | Result |
|---|---|---|---|---|---|---|---|
| 1 | 326 | 3066 | 18 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1089 | 918 | 58 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1433 | 698 | 76 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1285 | 778 | 68 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1520 | 658 | 81 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1114 | 898 | 59 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1567 | 638 | 83 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1355 | 738 | 72 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1222 | 818 | 65 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1792 | 558 | 95 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1319 | 758 | 70 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1672 | 598 | 89 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1475 | 678 | 78 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1859 | 538 | 99 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1139 | 878 | 61 | 1 | 1 | 100.00% | DETECTED |
| 1 | 978 | 1022 | 52 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1894 | 528 | 100 | 1 | 1 | 100.00% | DETECTED |
| 1 | 329 | 3036 | 18 | 1 | 1 | 100.00% | DETECTED |
| 1 | 332 | 3011 | 18 | 1 | 1 | 100.00% | DETECTED |
| 1 | 739 | 1354 | 39 | 1 | 1 | 100.00% | DETECTED |
| 1 | 360 | 2779 | 19 | 1 | 1 | 100.00% | DETECTED |
| 1 | 828 | 1208 | 44 | 1 | 1 | 100.00% | DETECTED |
| 1 | 623 | 1606 | 33 | 1 | 1 | 100.00% | DETECTED |
| 1 | 577 | 1734 | 31 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1364 | 733 | 73 | 1 | 1 | 100.00% | DETECTED |
| 1 | 382 | 2615 | 21 | 1 | 1 | 100.00% | DETECTED |
| 1 | 347 | 2882 | 19 | 1 | 1 | 100.00% | DETECTED |
| 1 | 524 | 1907 | 28 | 1 | 1 | 100.00% | DETECTED |
| 1 | 414 | 2416 | 22 | 1 | 1 | 100.00% | DETECTED |
| 1 | 816 | 1226 | 44 | 1 | 1 | 100.00% | DETECTED |
| | | | **Aggregate:** | **30** | **30** | **100.00%** | **Complies** |

**Equipment Configuration for Radar Type 2**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11ac 80 | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 23 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5530.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | Radar type was spot checked for the update. | | |

**Test Measurement Results**

| Pulse Width (us) | PRF (Hz) | PRI | # Pulses | Injections | Detections | Detection Rate | Result |
|---|---|---|---|---|---|---|---|
| 1 | 5208 | 192 | 25 | 1 | 1 | 100.00% | DETECTED |
| 1.3 | 4367 | 229 | 26 | | | -- | Not Tested |
| 1.3 | 4739 | 211 | 27 | | | -- | Not Tested |
| 1.4 | 5155 | 194 | 27 | 1 | 1 | 100.00% | DETECTED |
| 1.5 | 6173 | 162 | 29 | | | -- | Not Tested |
| 1.7 | 4566 | 219 | 25 | | | -- | Not Tested |
| 1.9 | 5435 | 184 | 23 | 1 | 1 | 100.00% | DETECTED |
| 2 | 5495 | 182 | 27 | | | -- | Not Tested |
| 2.1 | 6024 | 166 | 25 | | | -- | Not Tested |
| 2.3 | 4762 | 210 | 29 | 1 | 1 | 100.00% | DETECTED |
| 2.4 | 4950 | 202 | 26 | | | -- | Not Tested |
| 2.4 | 4878 | 205 | 29 | | | -- | Not Tested |
| 2.6 | 6494 | 154 | 25 | 1 | 1 | 100.00% | DETECTED |
| 2.8 | 5181 | 193 | 25 | | | -- | Not Tested |
| 3.1 | 5952 | 168 | 29 | | | -- | Not Tested |
| 3.2 | 4587 | 218 | 26 | 1 | 1 | 100.00% | DETECTED |
| 3.3 | 4386 | 228 | 24 | | | -- | Not Tested |
| 3.5 | 5747 | 174 | 23 | | | -- | Not Tested |
| 3.5 | 6536 | 153 | 27 | 1 | 1 | 100.00% | DETECTED |
| 3.5 | 5236 | 191 | 26 | | | -- | Not Tested |
| 3.6 | 4854 | 206 | 27 | | | -- | Not Tested |
| 3.8 | 4484 | 223 | 25 | 1 | 0 | 0.00% | NOT DETECTED |
| 4.1 | 4673 | 214 | 25 | | | -- | Not Tested |
| 4.2 | 5780 | 173 | 24 | | | -- | Not Tested |
| 4.2 | 6211 | 161 | 28 | 1 | 1 | 100.00% | DETECTED |
| 4.3 | 6579 | 152 | 27 | | | -- | Not Tested |
| 4.4 | 6369 | 157 | 29 | 1 | 0 | 0.00% | NOT DETECTED |
| 4.9 | 6494 | 154 | 29 | | | -- | Not Tested |
| 4.9 | 5291 | 189 | 27 | | | -- | Not Tested |
| 5 | 4464 | 224 | 27 | 1 | 1 | 100.00% | DETECTED |
| | | | **Aggregate:** | **11** | **9** | **81.82%** | **Pass** |

**Equipment Configuration for Radar Type 3**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11ac 80 | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 23 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5530.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | Radar type was spot checked for the update. | | |

**Test Measurement Results**

| Pulse Width (us) | PRF (Hz) | PRI | # Pulses | Injections | Detections | Detection Rate | Result |
|---|---|---|---|---|---|---|---|
| 10 | 2732 | 366 | 18 | 1 | 1 | 100.00% | DETECTED |
| 6 | 2326 | 430 | 17 | | | -- | Not Tested |
| 6.1 | 2967 | 337 | 16 | | | -- | Not Tested |
| 6.5 | 2110 | 474 | 18 | 1 | 1 | 100.00% | DETECTED |
| 6.7 | 2062 | 485 | 18 | | | -- | Not Tested |
| 6.7 | 3003 | 333 | 17 | | | -- | Not Tested |
| 6.8 | 2227 | 449 | 16 | 1 | 1 | 100.00% | DETECTED |
| 6.8 | 2959 | 338 | 18 | | | -- | Not Tested |
| 6.9 | 2092 | 478 | 18 | | | -- | Not Tested |
| 7 | 2079 | 481 | 18 | 1 | 1 | 100.00% | DETECTED |
| 7.2 | 2747 | 364 | 16 | | | -- | Not Tested |
| 7.6 | 2695 | 371 | 18 | | | -- | Not Tested |
| 7.6 | 2123 | 471 | 18 | 1 | 1 | 100.00% | DETECTED |
| 7.7 | 2227 | 449 | 16 | | | -- | Not Tested |
| 8 | 4049 | 247 | 18 | | | -- | Not Tested |
| 8.1 | 2778 | 360 | 18 | 1 | 1 | 100.00% | DETECTED |
| 8.3 | 2494 | 401 | 17 | | | -- | Not Tested |
| 8.5 | 2500 | 400 | 17 | | | -- | Not Tested |
| 8.7 | 2551 | 392 | 17 | 1 | 1 | 100.00% | DETECTED |
| 8.8 | 2451 | 408 | 16 | | | -- | Not Tested |
| 8.9 | 2513 | 398 | 18 | | | -- | Not Tested |
| 9 | 3215 | 311 | 17 | 1 | 1 | 100.00% | DETECTED |
| 9.2 | 2114 | 473 | 18 | | | -- | Not Tested |
| 9.2 | 2558 | 391 | 16 | | | -- | Not Tested |
| 9.3 | 2660 | 376 | 18 | 1 | 1 | 100.00% | DETECTED |
| 9.3 | 2941 | 340 | 18 | | | -- | Not Tested |
| 9.4 | 2151 | 465 | 16 | | | -- | Not Tested |
| 9.4 | 3086 | 324 | 16 | 1 | 1 | 100.00% | DETECTED |
| 9.5 | 2062 | 485 | 18 | | | -- | Not Tested |
| 9.7 | 2105 | 475 | 17 | | | -- | Not Tested |
| | | | **Aggregate:** | **10** | **10** | **100.00%** | **Pass** |

**Equipment Configuration for Radar Type 4**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11ac 80 | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 23 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5530.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | Radar type was spot checked for the update. | | |

**Test Measurement Results**

| Pulse Width (us) | PRF (Hz) | PRI | # Pulses | Injections | Detections | Detection Rate | Result |
|---|---|---|---|---|---|---|---|
| 11 | 2257 | 443 | 13 | 1 | 1 | 100.00% | DETECTED |
| 11.2 | 3096 | 323 | 16 | | | -- | Not Tested |
| 11.5 | 2591 | 386 | 16 | | | -- | Not Tested |
| 12.8 | 2004 | 499 | 13 | 1 | 1 | 100.00% | DETECTED |
| 12.8 | 3906 | 256 | 14 | | | -- | Not Tested |
| 13.6 | 3831 | 261 | 16 | | | -- | Not Tested |
| 13.6 | 2639 | 379 | 13 | 1 | 1 | 100.00% | DETECTED |
| 14 | 3077 | 325 | 13 | | | -- | Not Tested |
| 14.1 | 3125 | 320 | 15 | | | -- | Not Tested |
| 14.6 | 3401 | 294 | 15 | 1 | 1 | 100.00% | DETECTED |
| 14.6 | 3311 | 302 | 12 | | | -- | Not Tested |
| 14.6 | 4292 | 233 | 15 | | | -- | Not Tested |
| 14.7 | 2967 | 337 | 15 | 1 | 1 | 100.00% | DETECTED |
| 15.3 | 2315 | 432 | 15 | | | -- | Not Tested |
| 15.3 | 2817 | 355 | 13 | | | -- | Not Tested |
| 15.5 | 2639 | 379 | 13 | 1 | 1 | 100.00% | DETECTED |
| 16.1 | 4115 | 243 | 13 | | | -- | Not Tested |
| 16.3 | 3165 | 316 | 12 | | | -- | Not Tested |
| 16.8 | 3623 | 276 | 13 | 1 | 1 | 100.00% | DETECTED |
| 16.9 | 2519 | 397 | 14 | | | -- | Not Tested |
| 17 | 3106 | 322 | 16 | | | -- | Not Tested |
| 17.4 | 2933 | 341 | 15 | 1 | 1 | 100.00% | DETECTED |
| 17.4 | 2208 | 453 | 13 | | | -- | Not Tested |
| 17.6 | 2653 | 377 | 12 | | | -- | Not Tested |
| 18 | 2062 | 485 | 12 | 1 | 1 | 100.00% | DETECTED |
| 18.2 | 4132 | 242 | 12 | | | -- | Not Tested |
| 18.9 | 3049 | 328 | 14 | | | -- | Not Tested |
| 19.5 | 2283 | 438 | 12 | 1 | 1 | 100.00% | DETECTED |
| 19.6 | 3236 | 309 | 16 | | | -- | Not Tested |
| 19.8 | 3012 | 332 | 12 | 1 | 0 | 0.00% | NOT DETECTED |
| | | | **Aggregate:** | **11** | **10** | **90.91%** | **Pass** |

**Equipment Configuration for Radar Type 5**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11ac 80 | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 23 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5530.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | Radar type was spot checked for the update. | | |

**Test Measurement Results**

| Burst Segment | Injections | Detections | Detection Rate | Result |
|---|---|---|---|---|
| Type 5 #1 5554.75 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #2 5516.75 | | | -- | Not Tested |
| Type 5 #3 5557.16 | | | -- | Not Tested |
| Type 5 #4 5535.01 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #5 5515.58 | | | -- | Not Tested |
| Type 5 #6 5514.57 | | | -- | Not Tested |
| Type 5 #7 5545.39 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #8 5565.12 | | | -- | Not Tested |
| Type 5 #9 5512.96 | | | -- | Not Tested |
| Type 5 #10 5494.25 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #11 5538.51 | | | -- | Not Tested |
| Type 5 #12 5532.10 | | | -- | Not Tested |
| Type 5 #13 5531.84 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #14 5519.71 | | | -- | Not Tested |
| Type 5 #15 5505.65 | | | -- | Not Tested |
| Type 5 #16 5514.66 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #17 5550.11 | | | -- | Not Tested |
| Type 5 #18 5515.41 | | | -- | Not Tested |
| Type 5 #19 5553.43 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #20 5519.33 | | | -- | Not Tested |
| Type 5 #21 5511.31 | | | -- | Not Tested |
| Type 5 #22 5566.87 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #23 5495.55 | | | -- | Not Tested |
| Type 5 #24 5525.26 | | | -- | Not Tested |
| Type 5 #25 5509.11 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #26 5503.00 | | | -- | Not Tested |
| Type 5 #27 5490.85 | | | -- | Not Tested |
| Type 5 #28 5526.01 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #29 5519.49 | | | -- | Not Tested |
| Type 5 #30 5491.72 | | | -- | Not Tested |

**Equipment Configuration for Radar Type 6**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11ac 80 | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 23 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5530.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | Radar type was spot checked for the update. | | |

**Test Measurement Results**

| Burst Segment | Detections | Injection # | Detection Rate | Pass/Fail |
|---|---|---|---|---|
| Type 6 #1 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #2 | | | -- | Not Tested |
| Type 6 #3 | | | -- | Not Tested |
| Type 6 #4 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #5 | | | -- | Not Tested |
| Type 6 #6 | | | -- | Not Tested |
| Type 6 #7 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #8 | | | -- | Not Tested |
| Type 6 #9 | | | -- | Not Tested |
| Type 6 #10 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #11 | | | -- | Not Tested |
| Type 6 #12 | | | -- | Not Tested |
| Type 6 #13 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #14 | | | -- | Not Tested |
| Type 6 #15 | | | -- | Not Tested |
| Type 6 #16 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #17 | | | -- | Not Tested |
| Type 6 #18 | | | -- | Not Tested |
| Type 6 #19 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #20 | | | -- | Not Tested |
| Type 6 #21 | | | -- | Not Tested |
| Type 6 #22 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #23 | | | -- | Not Tested |
| Type 6 #24 | | | -- | Not Tested |
| Type 6 #25 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #26 | | | -- | Not Tested |
| Type 6 #27 | | | -- | Not Tested |
| Type 6 #28 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #29 | | | -- | Not Tested |
| Type 6 #30 | | | -- | Not Tested |

**Equipment Configuration for Radar Type 1**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT40 | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 13 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5510.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Pulse Width (us) | PRF (Hz) | PRI | # Pulses | Injections | Detections | Detection Rate | Result |
|---|---|---|---|---|---|---|---|
| 1 | 326 | 3066 | 18 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1089 | 918 | 58 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1433 | 698 | 76 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1285 | 778 | 68 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1520 | 658 | 81 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1114 | 898 | 59 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1567 | 638 | 83 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1355 | 738 | 72 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1222 | 818 | 65 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1792 | 558 | 95 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1319 | 758 | 70 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1672 | 598 | 89 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1475 | 678 | 78 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1859 | 538 | 99 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1139 | 878 | 61 | 1 | 1 | 100.00% | DETECTED |
| 1 | 978 | 1022 | 52 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1894 | 528 | 100 | 1 | 1 | 100.00% | DETECTED |
| 1 | 329 | 3036 | 18 | 1 | 1 | 100.00% | DETECTED |
| 1 | 332 | 3011 | 18 | 1 | 1 | 100.00% | DETECTED |
| 1 | 739 | 1354 | 39 | 1 | 1 | 100.00% | DETECTED |
| 1 | 360 | 2779 | 19 | 1 | 1 | 100.00% | DETECTED |
| 1 | 828 | 1208 | 44 | 1 | 1 | 100.00% | DETECTED |
| 1 | 623 | 1606 | 33 | 1 | 1 | 100.00% | DETECTED |
| 1 | 577 | 1734 | 31 | 1 | 1 | 100.00% | DETECTED |
| 1 | 1364 | 733 | 73 | 1 | 1 | 100.00% | DETECTED |
| 1 | 382 | 2615 | 21 | 1 | 1 | 100.00% | DETECTED |
| 1 | 347 | 2882 | 19 | 1 | 1 | 100.00% | DETECTED |
| 1 | 524 | 1907 | 28 | 1 | 1 | 100.00% | DETECTED |
| 1 | 414 | 2416 | 22 | 1 | 1 | 100.00% | DETECTED |
| 1 | 816 | 1226 | 44 | 1 | 1 | 100.00% | DETECTED |
| | | | **Aggregate:** | **30** | **30** | **100.00%** | **Complies** |

**Equipment Configuration for Radar Type 2**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT40 | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 13 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5510.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | Radar type was spot checked for the update. | | |

**Test Measurement Results**

| Pulse Width (us) | PRF (Hz) | PRI | # Pulses | Injections | Detections | Detection Rate | Result |
|---|---|---|---|---|---|---|---|
| 1 | 5208 | 192 | 25 | 1 | 1 | 100.00% | DETECTED |
| 1.3 | 4367 | 229 | 26 | | | -- | Not Tested |
| 1.3 | 4739 | 211 | 27 | | | -- | Not Tested |
| 1.4 | 5155 | 194 | 27 | 1 | 1 | 100.00% | DETECTED |
| 1.5 | 6173 | 162 | 29 | | | -- | Not Tested |
| 1.7 | 4566 | 219 | 25 | | | -- | Not Tested |
| 1.9 | 5435 | 184 | 23 | 1 | 1 | 100.00% | DETECTED |
| 2 | 5495 | 182 | 27 | | | -- | Not Tested |
| 2.1 | 6024 | 166 | 25 | | | -- | Not Tested |
| 2.3 | 4762 | 210 | 29 | 1 | 1 | 100.00% | DETECTED |
| 2.4 | 4950 | 202 | 26 | | | -- | Not Tested |
| 2.4 | 4878 | 205 | 29 | | | -- | Not Tested |
| 2.6 | 6494 | 154 | 25 | 1 | 1 | 100.00% | DETECTED |
| 2.8 | 5181 | 193 | 25 | | | -- | Not Tested |
| 3.1 | 5952 | 168 | 29 | | | -- | Not Tested |
| 3.2 | 4587 | 218 | 26 | 1 | 1 | 100.00% | DETECTED |
| 3.3 | 4386 | 228 | 24 | | | -- | Not Tested |
| 3.5 | 5747 | 174 | 23 | | | -- | Not Tested |
| 3.5 | 6536 | 153 | 27 | 1 | 1 | 100.00% | DETECTED |
| 3.5 | 5236 | 191 | 26 | | | -- | Not Tested |
| 3.6 | 4854 | 206 | 27 | | | -- | Not Tested |
| 3.8 | 4484 | 223 | 25 | 1 | 1 | 100.00% | DETECTED |
| 4.1 | 4673 | 214 | 25 | | | -- | Not Tested |
| 4.2 | 5780 | 173 | 24 | | | -- | Not Tested |
| 4.2 | 6211 | 161 | 28 | 1 | 1 | 100.00% | DETECTED |
| 4.3 | 6579 | 152 | 27 | | | -- | Not Tested |
| 4.4 | 6369 | 157 | 29 | | | -- | Not Tested |
| 4.9 | 6494 | 154 | 29 | 1 | 1 | 100.00% | DETECTED |
| 4.9 | 5291 | 189 | 27 | | | -- | Not Tested |
| 5 | 4464 | 224 | 27 | 1 | 1 | 100.00% | DETECTED |
| | | | **Aggregate:** | **11** | **11** | **100.00%** | **Pass** |

**Equipment Configuration for Radar Type 3**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT40 | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 13 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5510.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | Radar type was spot checked for the update. | | |

**Test Measurement Results**

| Pulse Width (us) | PRF (Hz) | PRI | # Pulses | Injections | Detections | Detection Rate | Result |
|---|---|---|---|---|---|---|---|
| 10 | 2732 | 366 | 18 | 1 | 1 | 100.00% | DETECTED |
| 6 | 2326 | 430 | 17 | | | -- | Not Tested |
| 6.1 | 2967 | 337 | 16 | | | -- | Not Tested |
| 6.5 | 2110 | 474 | 18 | 1 | 1 | 100.00% | DETECTED |
| 6.7 | 2062 | 485 | 18 | | | -- | Not Tested |
| 6.7 | 3003 | 333 | 17 | | | -- | Not Tested |
| 6.8 | 2227 | 449 | 16 | 1 | 1 | 100.00% | DETECTED |
| 6.8 | 2959 | 338 | 18 | | | -- | Not Tested |
| 6.9 | 2092 | 478 | 18 | | | -- | Not Tested |
| 7 | 2079 | 481 | 18 | 1 | 1 | 100.00% | DETECTED |
| 7.2 | 2747 | 364 | 16 | | | -- | Not Tested |
| 7.6 | 2695 | 371 | 18 | | | -- | Not Tested |
| 7.6 | 2123 | 471 | 18 | 1 | 1 | 100.00% | DETECTED |
| 7.7 | 2227 | 449 | 16 | | | -- | Not Tested |
| 8 | 4049 | 247 | 18 | | | -- | Not Tested |
| 8.1 | 2778 | 360 | 18 | 1 | 1 | 100.00% | DETECTED |
| 8.3 | 2494 | 401 | 17 | | | -- | Not Tested |
| 8.5 | 2500 | 400 | 17 | | | -- | Not Tested |
| 8.7 | 2551 | 392 | 17 | 1 | 1 | 100.00% | DETECTED |
| 8.8 | 2451 | 408 | 16 | | | -- | Not Tested |
| 8.9 | 2513 | 398 | 18 | | | -- | Not Tested |
| 9 | 3215 | 311 | 17 | 1 | 1 | 100.00% | DETECTED |
| 9.2 | 2114 | 473 | 18 | | | -- | Not Tested |
| 9.2 | 2558 | 391 | 16 | | | -- | Not Tested |
| 9.3 | 2660 | 376 | 18 | 1 | 1 | 100.00% | DETECTED |
| 9.3 | 2941 | 340 | 18 | | | -- | Not Tested |
| 9.4 | 2151 | 465 | 16 | | | -- | Not Tested |
| 9.4 | 3086 | 324 | 16 | 1 | 1 | 100.00% | DETECTED |
| 9.5 | 2062 | 485 | 18 | | | -- | Not Tested |
| 9.7 | 2105 | 475 | 17 | 1 | 1 | 100.00% | DETECTED |
| | | | **Aggregate:** | **11** | **11** | **100.00%** | **Pass** |

**Equipment Configuration for Radar Type 4**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT40 | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 13 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5510.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | Radar type was spot checked for the update. | | |

**Test Measurement Results**

| Pulse Width (us) | PRF (Hz) | PRI | # Pulses | Injections | Detections | Detection Rate | Result |
|---|---|---|---|---|---|---|---|
| 11 | 2257 | 443 | 13 | 1 | 1 | 100.00% | DETECTED |
| 11.2 | 3096 | 323 | 16 | | | -- | Not Tested |
| 11.5 | 2591 | 386 | 16 | | | -- | Not Tested |
| 12.8 | 2004 | 499 | 13 | 1 | 1 | 100.00% | DETECTED |
| 12.8 | 3906 | 256 | 14 | | | -- | Not Tested |
| 13.6 | 3831 | 261 | 16 | | | -- | Not Tested |
| 13.6 | 2639 | 379 | 13 | 1 | 1 | 100.00% | DETECTED |
| 14 | 3077 | 325 | 13 | | | -- | Not Tested |
| 14.1 | 3125 | 320 | 15 | | | -- | Not Tested |
| 14.6 | 3401 | 294 | 15 | 1 | 1 | 100.00% | DETECTED |
| 14.6 | 3311 | 302 | 12 | | | -- | Not Tested |
| 14.6 | 4292 | 233 | 15 | | | -- | Not Tested |
| 14.7 | 2967 | 337 | 15 | 1 | 1 | 100.00% | DETECTED |
| 15.3 | 2315 | 432 | 15 | | | -- | Not Tested |
| 15.3 | 2817 | 355 | 13 | | | -- | Not Tested |
| 15.5 | 2639 | 379 | 13 | 1 | 1 | 100.00% | DETECTED |
| 16.1 | 4115 | 243 | 13 | | | -- | Not Tested |
| 16.3 | 3165 | 316 | 12 | | | -- | Not Tested |
| 16.8 | 3623 | 276 | 13 | 1 | 1 | 100.00% | DETECTED |
| 16.9 | 2519 | 397 | 14 | | | -- | Not Tested |
| 17 | 3106 | 322 | 16 | | | -- | Not Tested |
| 17.4 | 2933 | 341 | 15 | 1 | 1 | 100.00% | DETECTED |
| 17.4 | 2208 | 453 | 13 | | | -- | Not Tested |
| 17.6 | 2653 | 377 | 12 | | | -- | Not Tested |
| 18 | 2062 | 485 | 12 | 1 | 1 | 100.00% | DETECTED |
| 18.2 | 4132 | 242 | 12 | | | -- | Not Tested |
| 18.9 | 3049 | 328 | 14 | | | -- | Not Tested |
| 19.5 | 2283 | 438 | 12 | 1 | 1 | 100.00% | DETECTED |
| 19.6 | 3236 | 309 | 16 | | | -- | Not Tested |
| 19.8 | 3012 | 332 | 12 | 1 | 1 | 100.00% | DETECTED |
| | | | **Aggregate:** | **11** | **11** | **100.00%** | **Pass** |

**Equipment Configuration for Radar Type 5**

| | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT40 | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 13 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5510.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | Radar type was spot checked for the update. | | |

**Test Measurement Results**

| Burst Segment | Injections | Detections | Detection Rate | Result |
|---|---|---|---|---|
| Type 5 #1 5521.23 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #2 5512.55 | | | -- | Not Tested |
| Type 5 #3 5501.03 | | | -- | Not Tested |
| Type 5 #4 5527.58 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #5 5498.03 | | | -- | Not Tested |
| Type 5 #6 5528.85 | | | -- | Not Tested |
| Type 5 #7 5508.46 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #8 5503.91 | | | -- | Not Tested |
| Type 5 #9 5514.36 | | | -- | Not Tested |
| Type 5 #10 5524.20 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #11 5521.73 | | | -- | Not Tested |
| Type 5 #12 5516.90 | | | -- | Not Tested |
| Type 5 #13 5520.31 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #14 5507.83 | | | -- | Not Tested |
| Type 5 #15 5516.07 | | | -- | Not Tested |
| Type 5 #16 5527.18 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #17 5505.90 | | | -- | Not Tested |
| Type 5 #18 5526.96 | | | -- | Not Tested |
| Type 5 #19 5513.88 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #20 5509.63 | | | -- | Not Tested |
| Type 5 #21 5505.70 | | | -- | Not Tested |
| Type 5 #22 5499.83 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #23 5510.31 | | | -- | Not Tested |
| Type 5 #24 5529.34 | | | -- | Not Tested |
| Type 5 #25 5497.22 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #26 5498.40 | | | -- | Not Tested |
| Type 5 #27 5499.50 | | | -- | Not Tested |
| Type 5 #28 5523.01 | 1 | 1 | 100.00% | DETECTED |
| Type 5 #29 5514.27 | | | -- | Not Tested |
| Type 5 #30 5517.48 | | | -- | Not Tested |

**Equipment Configuration for Radar Type 6**

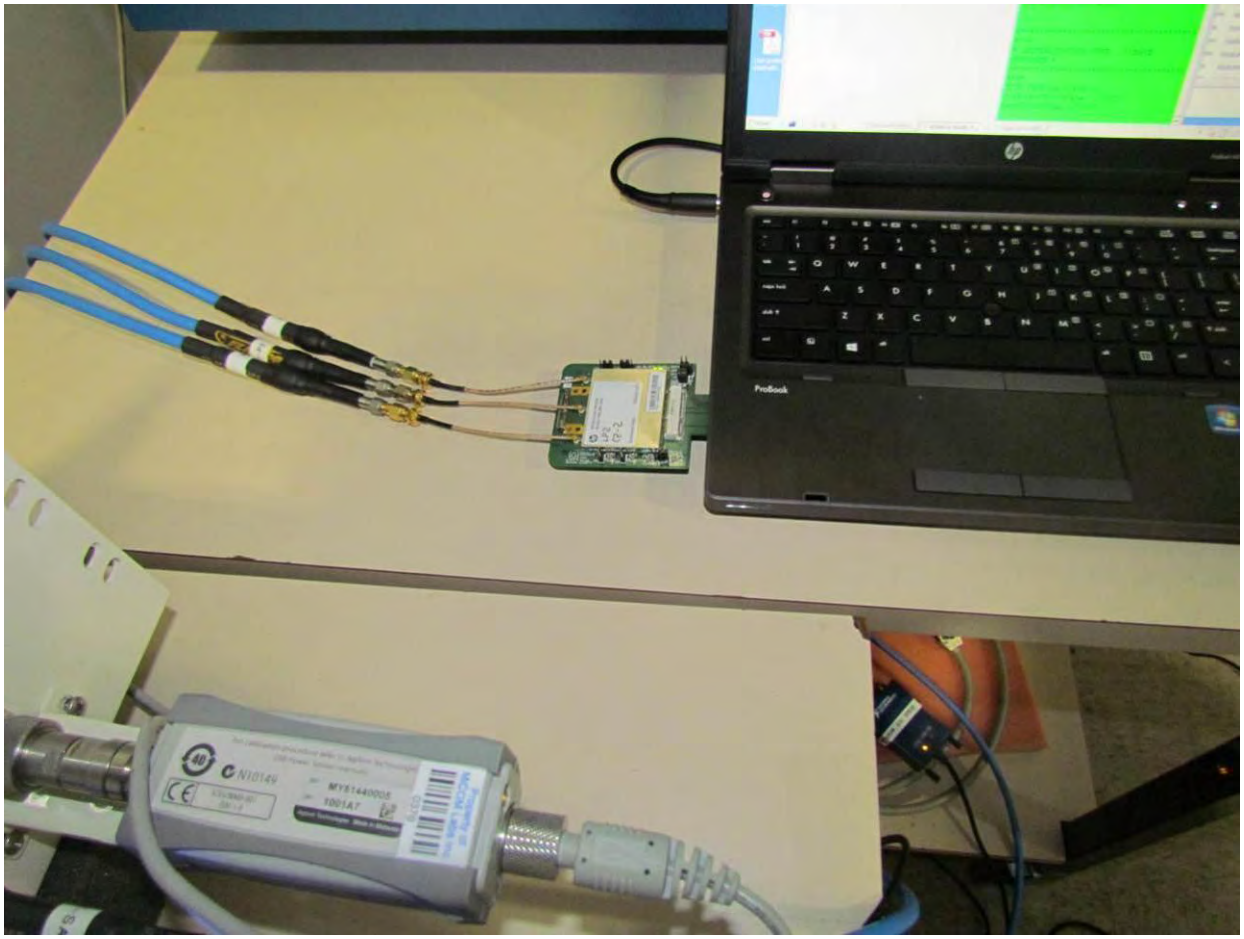
| | | | |
|---|---|---|---|
| **Variant:** | 802.11n HT40 | **Duty Cycle (%):** | 22.00 |
| **Data Rate:** | 13 Mbit/s | **Antenna Gain (dBi):** | 7.79 |
| **Modulation:** | OFDM | **Beam Forming Gain (Y):** | Not Applicable |
| **Channel Frequency:** | 5510.00 MHz | **Tested By:** | JK |
| **Engineering Test Notes:** | Radar type was spot checked for the update. | | |

**Test Measurement Results**

| Burst Segment | Detections | Injection # | Detection Rate | Pass/Fail |
|---|---|---|---|---|
| Type 6 #1 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #2 | | | -- | Not Tested |
| Type 6 #3 | | | -- | Not Tested |
| Type 6 #4 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #5 | | | -- | Not Tested |
| Type 6 #6 | | | -- | Not Tested |
| Type 6 #7 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #8 | | | -- | Not Tested |
| Type 6 #9 | | | -- | Not Tested |
| Type 6 #10 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #11 | | | -- | Not Tested |
| Type 6 #12 | | | -- | Not Tested |
| Type 6 #13 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #14 | | | -- | Not Tested |
| Type 6 #15 | | | -- | Not Tested |
| Type 6 #16 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #17 | | | -- | Not Tested |
| Type 6 #18 | | | -- | Not Tested |
| Type 6 #19 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #20 | | | -- | Not Tested |
| Type 6 #21 | | | -- | Not Tested |
| Type 6 #22 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #23 | | | -- | Not Tested |
| Type 6 #24 | | | -- | Not Tested |
| Type 6 #25 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #26 | | | -- | Not Tested |
| Type 6 #27 | | | -- | Not Tested |
| Type 6 #28 | 1 | 1 | 100.00% | DETECTED |
| Type 6 #29 | | | -- | Not Tested |
| Type 6 #30 | | | -- | Not Tested |

# 8. PHOTOGRAPHS

## 8.1. Test Setup - Conducted



## 8.2. Test Setup - Digital and Spurious Emissions Configuration

## 8.3. Dynamic Frequency Selection (DFS)

# 9. TEST EQUIPMENT DETAILS

| Asset # | Instrument | Manufacturer | Part # | Serial # | Calibration Due Date |
|---|---|---|---|---|---|
| 0070 | Power Meter | Hewlett Packard | 437B | 3125U11552 | 28th Nov 13 |
| 0117 | Power Sensor | Hewlett Packard | 8487D | 3318A00371 | 15th Nov 13 |
| 0223 | Power Meter | Hewlett Packard | EPM-442A | US37480256 | 15th Nov 13 |
| 0374 | Power Sensor | Hewlett Packard | 8485A | 3318A19694 | 29th Nov 13 |
| 0158 | Barometer /Thermometer | Control Co. | 4196 | E2846 | 8th Dec 13 |
| 0193 | EMI Receiver | Rhode & Schwartz | ESI 7 | 838496/007 | 2nd Dec 13 |
| 0287 | EMI Receiver | Rhode & Schwartz | ESIB40 | 100201 | 16th Nov 13 |
| 0338 | 30 - 3000 MHz Antenna | Sunol | JB3 | A052907 | 8th Nov 13 |
| 0335 | 1-18 GHz Horn Antenna | EMCO | 3117 | 00066580 | 7th Nov 13 |
| 0252 | SMA Cable | Megaphase | Sucoflex 104 | None | N/A |
| 0293 | BNC Cable | Megaphase | 1689 1GVT4 | 15F50B001 | N/A |
| 0307 | BNC Cable | Megaphase | 1689 1GVT4 | 15F50B002 | N/A |
| 0310 | 2m SMA Cable | Micro-Coax | UFA210A-0-0787-3G03G0 | 209089-001 | N/A |
| 0312 | 3m SMA Cable | Micro-Coax | UFA210A-1-1181-3G0300 | 209092-001 | N/A |
| 0314 | 30dB N-Type Attenuator | ARRA | N9444-30 | 1623 | N/A |
| | EMC Test Software | EMISoft | Vasona | 5.0051 | N/A |
| | RF Conducted Test Software | National Instruments | Labview | Version 8.2 | N/A |
| | RF Conducted Test Software | MiCOM Labs ATS | | Version 1.5 | N/A |

# APPENDIX

# A. SUPPORTING INFORMATION

## A.1. CONDUCTED TEST PLOTS