Radio Test Report

(Radiated Spurious Emissions and Conducted Emissions Only)

For

IW-6300H

Supports

2.4 GHz / 5 GHz 802.11 a/ac/b/g/n Wi-Fi radio

FCC ID: LDKESW6300

ISED ID: 2461B-ESW6300

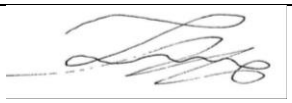
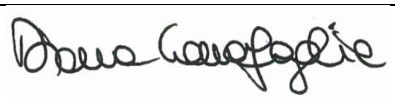
Operating Frequency Band: ISM (2400-2483.5 MHz)

Against the following Specifications:

47 CFR 15.247
47 CFR 15.209
47 CFR 15.205
RSS-247 issue 2
RSS-Gen issue 5

ACCREDITED

Cisco Systems
170 West Tasman Drive
San Jose, CA 95134

Author:	
Tested By: **Title**: Test Engineers	 Jose Huamani  Farida Rahmanzai
Approved By: **Title**: Compliance Manager	
Version:	1.0

This report replaces any previously entered test report under EDCS – This test report has been electronically authorized and archived using the CISCO Engineering Document Control system. Test Report Template EDCS# 703456

Section 1: Overview

1.1 Test Summary

The samples were assessed against the tests detailed in section 3 under the requirements of the following specifications:

Specifications
CFR47 Part 15.247 CFR47 Part 15.205 CFR47 Part 15.209 RSS-247 Issue 2: Feb 2017 RSS-Gen Issue 5: Nov 2018

Section 2: Assessment Information

2.1 General

This report contains an assessment of an apparatus against Radio Standards based upon tests carried out on the samples submitted. The testing was performed by and for the use of Cisco systems Inc:

With regard to this assessment, the following points should be noted:

a) The results contained in this report relate only to the items tested and were obtained in the period between the date of the initial assessment and the date of issue of the report. Manufactured products will not necessarily give identical results due to production and measurement tolerances.

b) The apparatus was set up and exercised using the configuration and modes of operation defined in this report only.

c) Where relevant, the apparatus was only assessed using the susceptibility criteria defined in this report and the Test Assessment Plan (TAP).

d) All testing was performed under the following environmental conditions:

Temperature	15°C to 35°C (54°F to 95°F)
Atmospheric Pressure	860mbar to 1060mbar (25.4" to 31.3")
Humidity	10% to 75*%

1.All AC testing was performed at one or more of the following supply voltages:

110V 60 Hz (+/-20%)

2.2 Units of Measurement

The units of measurements defined in the appendices are reported in specific terms, which are test dependent. Where radiated measurements are concerned these are defined at a particular distance. Basic voltage measurements are defined in units of [dBuV]

As an example, the basic calculation for all measurements is as follows:

Emission level [dBuV] = Indicated voltage level [dBuV] + Cable Loss [dB] + Other correction factors [dB]

The combinations of correction factors are dependent upon the exact test configurations [see test equipment lists for further details] and may include:-

Antenna Factors, Pre Amplifier Gain, LISN Loss, Pulse Limiter Loss and Filter Insertion Loss..

Note: to convert the results from dBuV/m to uV/m use the following formula:-

Level in uV/m = Common Antilogarithm [(X dBuV/m)/20] = Y uV/m

Measurement Uncertainty Values

voltage and power measurements	± 2 dB
conducted EIRP measurements	± 1.4 dB
radiated measurements	± 3.2 dB
frequency measurements	± 2.4 10-7
temperature measurements	± 0.54º.
humidity measurements	± 2.3%
DC and low frequency measurements	± 2.5%.

Where relevant measurement uncertainty levels have been estimated for tests performed on the apparatus. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Radiated emissions (expanded uncertainty, confidence interval 95%)

30 MHz - 300 MHz	+/- 3.8 dB
300 MHz - 1000 MHz	+/- 4.3 dB
1 GHz - 10 GHz	+/- 4.0 dB
10 GHz - 18GHz	+/- 8.2 dB
18GHz - 26.5GHz	+/- 4.1 dB
26.5GHz - 40GHz	+/- 3.9 dB

Conducted emissions (expanded uncertainty, confidence interval 95%)

30 MHz – 40GHz	+/- 0.38 dB

A product is considered to comply with a requirement if the nominal measured value is below the limit line. The product is considered to not be in compliance in case the nominal measured value is above the limit line.

2.3 Date of testing (initial sample receipt date to last date of testing)

18-Sep-2019 to 12-Nov-2019

2.4 Report Issue Date

Cisco uses an electronic system to issue, store and control the revision of test reports. This system is called the Engineering Document Control System (EDCS). The actual report issue date is embedded into the original file on EDCS. Any copies of this report, either electronic or paper, that are not on EDCS must be considered uncontrolled

2.5 Testing facilities

This assessment was performed by:

Testing Laboratory

Cisco Systems, Inc.
425 East Tasman Drive (Building 7)
San Jose, CA 95134
USA

Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134
USA

Registration Numbers for ISED (Innovation, Science and Economic Development Canada)

Cisco System Site	Address	Site Identifier
Building P, 10m Chamber	125 West Tasman Dr San Jose, CA 95134, USA	Company #: 2461N-2
Building P, 5m Chamber	125 West Tasman Dr San Jose, CA 95134, USA	Company #: 2461N-1
Building I, 5m Chamber	285 W. Tasman Drive San Jose, California 95134, USA	Company #: 2461M-1
Building 7, 5m Chamber	425 E. Tasman Drive San Jose, California 95134, USA	Company #: 2461N-3

Test Engineer(s)

Farida Rahmanzai
Jose Huamani

2.6 Equipment Assessed (EUT)

IW-6300H

2.7 EUT Description

IW-6300H is the next generation Industrial Wireless Access Point designed for hazardous location environments known on a go-forward basis as the “IW-6300-Hazloc” or “IW-6300H” model. The IW-6300 supports one 5GHz radio capable of 2x2:2SS and one 2.4 GHz radio 2x2:2SS with the capability of accommodate 5GHz Mesh and 2.4GHz access simultaneously.

Features Supported:

802.11 AC Wave 2, IP67 rated, and HazLoc Class 1 Division 2 certified Aironet Access Point supporting advanced features.
--> Light weight and compact size
--> Improved temperature range: -50C to 75C
--> Powering Options: AC, DC, and POE In Power
--> Redundant Power via AC & POE-In
--> Dual POE Out provides industry leading versatility
--> IoT Module: Supports a bolt-on module with USB and POE connectivity to enable Wireless HART, ISA 100.11a, and other types of functionality.

IW-6300H has 3 versions,

IW-6300H-AC-X-K9 with ESW-6300-CON-X-K9 is DUPLO with AC Power(100-240V, 50/60Hz)
IW-6300H-DC-X-K9 with ESW-6300-CON-X-K9 is DUPLO with DC Power (44-57VDC)
IW-6300H-DCW-X-K9 with ESW-6300-CON-X-K9 is DUPLO with DC Power (10.8-36VDC)

Wireless Protocols support

● Wi-Fi: IEEE 802.11a, 802.11b, 802.11g, 802.11n, 802.11ac

- **2.4GHz WLAN Radio Supported Modes:**
- 802.11b (1Mbps – 11Mbps)
- 802.11g (6Mbps - 54Mbps)

MIMO single antenna
- 802.11n (HT20, M0 – M7)
- 802.11n (HT40, M0 – M7)

MIMO dual antenna
- 802.11n (HT20, M0 – M15)
- 802.11n (HT40, M0 – M15)

5GHz WLAN Radio Supported Modes:
- 802.11a (6Mbps – 54Mbps)

MIMO Single antenna
- 802.11n (HT20, M0 – M7)
- 802.11n (VHT20, M0 – M7)
- 802.11n (HT40, M0 – M7)
- 802.11n (VHT40, M0 – M7)

MIMO dual antenna
- 802.11n (HT20, M0 – M15)
- 802.11n(VHT20, M0 – M15)
- 802.11n (HT40, M0 – M15)
- 802.11n (VHT40, M0 – M15)

MIMO Single/Dual antenna
- 802.11ac (VHT20, M0 – M9)
- 802.11ac (VHT40, M0 – M9)
- 802.11ac (VHT80, M0 – M9)

Model / PID Differences

IW-6300H-AC-x-K9, IW-6300H-DC-x-K9, IW-6300-DCW-x-K9 and ESW-6300-CON-x-K9, all have the same identical components, electronics circuitries, PCB layout and enclosure.

The only differences are listed as below:

IW-6300H-AC-x-K9
IW-6300H-DC-x-K9
IW-6300-DCW-x-K9
ESW-6300-CON-x-K9

Where “x” can be replaced with another letter to indicate country domain.
Domain letters: A, B, C, D, E, F, H, I, L, M, N, Q, R, S, T, Z

Where “AC” is Alternating Current (AC power supply)
Where “DC” is Direct Current (DC power supply), 54V native input
Where “DCW” is Direct Current; wide range 10-36VDC
Where “K9” is encryption software.

Antenna Specification

The following antennas are supported by this product series.

Frequency	Part Number	Antenna Type	Antenna Gain (dBi)
2.4 GHz	AIR-ANT2450V-N	Single Band Omni	**5**
	AIR-ANT2450V-N-HZ	Single Band Omni, Hazloc	**5**
	AIR-ANT2480V-N	Single Band Omni	**8**
	AIR-ANT2450HG-N	Horizontal Polarized Omni	**5**
	AIR-ANT2450VG-N	Vertical Polarized Omni	**5**
	AIR-ANT2413P2M-N	Single Band, Dual Polarized Directional Patch	**13**
2.4 GHz	AIR-ANT2547V-N=	Dual-band Omni	**4**
	AIR-ANT2547VG-N=	Dual-band Omni, Gray	**4**
	AIR-ANT2547V-N-HZ=	Dual-band Omni, Hazloc	**4**
	AIR-ANT2568VG-N	Dual-band Omni	**6**
	AIR-ANT2588P3M-N=	Dual-band/Dual Polarized Directional, Patch	**8**
	AIR-ANT2513P4M-N	Dual-band Polarization Diverse Patch Array	**13**

Note: The data included in this report represent the worst case data for all antennas.

Section 3: Result Summary

3.1 Results Summary Table

RF Conducted Emissions		
Basic Standard	**Technical Requirements / Details**	**Result**
FCC15.247 RSS-247	**99% & 6 dB Bandwidth**: **FCC/RSS**: The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. There is no limit for 99% OBW. The 6 dB emission bandwidth is the width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Systems using digital modulation techniques may operate in the 2400-2483.5 MHz band. The minimum 6dB bandwidth shall be at least 500 kHz	Pass See Note 1
FCC 15.247 RSS-247	**Output Power**: **15.247** The maximum conducted output power of the intentional radiator for systems using digital modulation in the 2400-2483.5 MHz band shall not exceed 1 Watt (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. **RSS-247** For DTSs employing digital modulation techniques operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. Except as provided in Section 5.4(e), the e.i.r.p. shall not exceed 4 W.	Pass See Note1
FCC 15.247 RSS-247	**Power Spectral Density** For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.	Pass See Note1
FCC15.247 RSS-247	**Conducted Band-Edge / Out of band emissions:** **FCC/RSS:** In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in FCC§15.209(a) & RSS-Gen is not required.	Pass See Note1

Note1: See Radio test report EDCS#xxxxxxxx

AC Conducted Emissions		
Basic Standard	**Technical Requirements / Details**	**Result**
FCC 15.207 RSS-Gen	**FCC:** (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 section, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). **RSS:** Unless stated otherwise in the applicable RSS, for radio apparatus that are designed to be connected to the public utility AC power network, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the range 150 kHz to 30 MHz shall not exceed the limits in table 4, as measured using a 50 µH / 50 Ω line impedance stabilization network.	Pass

Radiated Spurious Emission		
Basic Standard	**Technical Requirements / Details**	**Result**
FCC 15.209 RSS-Gen 8.9	**TX Radiated emissions limits:** (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the table of this subpart. **TX Spurious Emissions:** RSS: 8.9 Except when the requirements applicable to a given device state otherwise, emissions from licence-exempt transmitters shall comply with the field strength limits shown in Table 4 and Table 5 below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.	Pass
FCC 15.205 RSS-Gen 8.10	**Restricted band:** (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed in the table of this subpart. (b) Except as provided 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 §15.209. **Restricted band:** (b) Unwanted emissions that fall into restricted bands of Table 6 shall comply with the limits specified in RSS-Gen.	Pass

Note2: * MPE calculation to be reported in separate reports

Section 4: Sample Details

Note: Each sample was evaluated to ensure that its condition was suitable to be used as a test sample prior to the commencement of testing. Please also refer to the "Justification for worst Case test Configuration" section of this report for further details on the selection of EUT samples.

4.1 Sample Details

Sample No.	Equipment Details	Manufacturer	Hardware Rev.	Firmware Rev.	Software Rev.	Serial Number
S01	IW-6300H (radiated sample)	Cisco	12	9.1.8.1	2.4.26	FOC23241G3L
S02	IW-6300H (AC conducted sample)	Cisco	12	9.1.8.1	2.4.26	FOC23241G3Q
S03	Air-ANT2513P4M-N Antenna	Cisco	Production	--------	--------	MAS19440415
S04	IW-6300H-AC-X-K9 Power Supply	Delta	Production	--------	--------	DTH2329000P

4.2 System Details

System #	Description	Samples
1	IW-6000H	S01, S03, S04
2	IW-6000H	S02, S03, S04

4.3 Mode of Operation Details

Mode (# of Antenna) Setting#	Wi-Fi Mode	Modulation	Data Rate
Single Mode Antenna			
1 (single antenna)	802.11b*	CCK	1 Mbps
2 (single antenna)	802.11g	BPSK	6 Mbps
3 (single antenna)	802.11n (HT20)	BPSK	6.5 (MCS0)
4 (single antenna)	802.11n (HT40)		13.5 Mbps (MCS0)
Dual Mode Antenna			
5 (dual antenna)	802.11n (HT20)	BPSK	13.0 Mbps (MCS0)
6 (dual antenna)	802.11n (HT40)*	BPSK	27.0 Mbps (MCS0)

Note: Table above represents the worst case scenarios for all modulations and data rate combination of each mode.
***: Setting**# was determined to be the worst case emissions of all modes and selected for RSE testing.

Appendix A: RF Conducted Emissions

Target Maximum Channel Power

The following table details the maximum supported Total Channel Power for all operating modes.

Operating Mode	Maximum Channel Power (dBm) Frequency (MHz)		

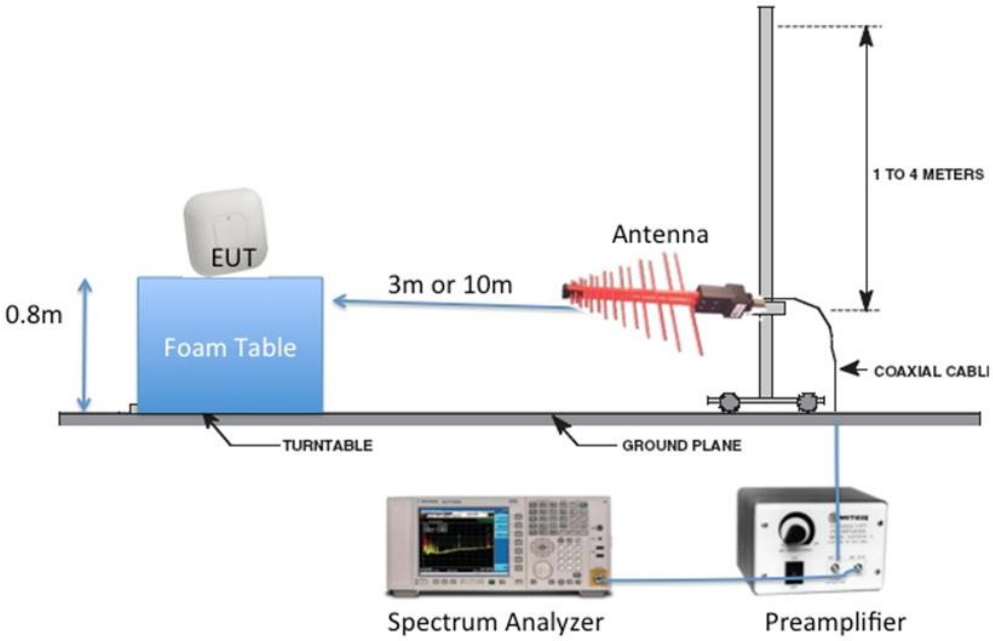
Appendix B: Radiated Spurious and AC Conducted Emissions

Testing Laboratory: Cisco Systems, Inc., 425 East Tasman Drive, San Jose, CA 95134, USA

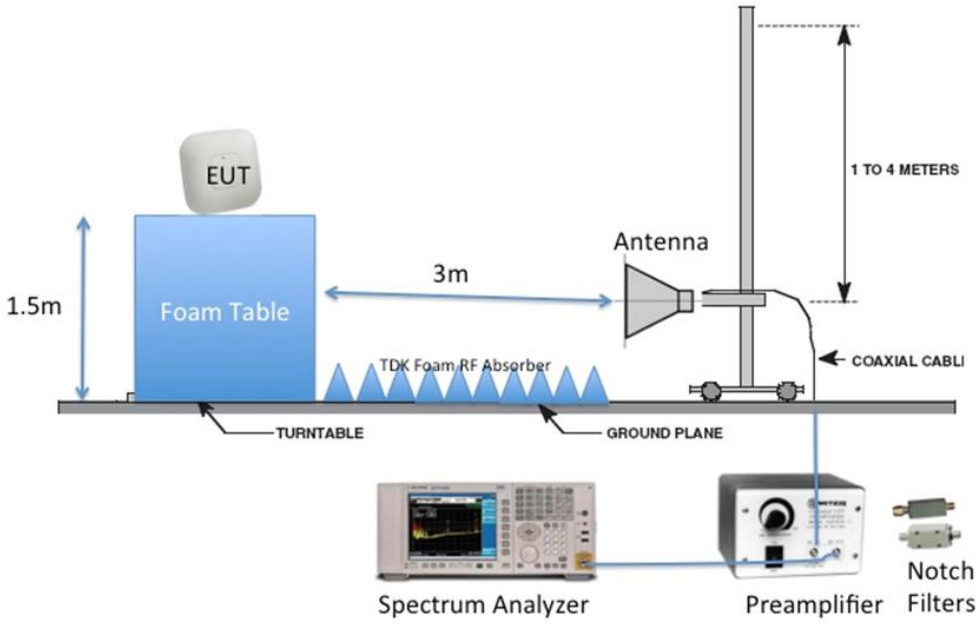
B.1 Radiated Spurious Emissions

B1.1 Setup Diagram

Below 1G (Preamp used is optional)



Above 1G



B1.2 Restricted Bands

15.205 (b) Except as provided 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 §15.209. Refer to limit section for detailed limits.

FCC Restricted Bands Table			
MHz	**MHz**	**MHz**	**GHz**
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

RSS-Gen 8.10

(**b**) Unwanted emissions that fall into restricted bands of Table 6 shall comply with the limits specified in RSS-Gen.

Table 6 Restricted Bands

MHz	MHz	GHz
0.090-0.110	74.8-75.2	9.0-9.2
2.1735-2.1905	108-138	9.3-9.5
3.020-3.026	156.52475-156.52525	10.6-12.7
4.125-4.128	156.7-156.9	13.25-13.4
4.17725-4.17775	240-285	14.47-14.5
4.20725-4.20775	322-335.4	15.35-16.2
5.677-5.683	399.9-410	17.7-21.4
6.215-6.218	608-614	22.01-23.12
6.26775-6.26825	960-1427	23.6-24.0
6.31175-6.31225	1435-1626.5	31.2-31.8
8.291-8.294	1645.5-1646.5	36.43-36.5
8.362-8.366	1660-1710	Above 38.6
8.37625-8.38675	1718.8-1722.2	*
8.41425-8.41475	2200-2300	
12.29-12.293	2310-2390	
12.51975-12.52025	2655-2900	
12.57675-12.57725	3260-3267	
13.36-13.41	3332-3339	
16.42-16.423	3345.8-3358	
16.69475-16.69525	3500-4400	
16.80425-16.80475	4500-5150	
25.5-25.67	5350-5460	
37.5-38.25	7250-7750	
73-74.6	8025-8500	

B1.3 Limits

FCC 15.209

The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the table specified in the table in FCC§15.209(a).

RSS-Gen 8.9:

Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table below. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.

RSS-Gen 8.10:

(**c**) Unwanted emissions that do not fall within the restricted frequency bands of Table 6 shall comply either with the limits specified in the applicable RSS or with those specified in this RSS-Gen.

General Field Strength Limits Table			
Frequency (MHz)	**Field strength (uV/meter)**	**Field strength (dBuV/meter)**	**Measurement distance (meters)**
30-88	100**	40 Qp	3
88-216	150**	43.5 Qp	3
216-960	200**	46 Qp	3
Above 960	500	54 Av / 74 Pk	3

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector

B1.4 Test Procedure

Ref. ANSI C63.10-2013 section 6.5 & 6.6, Cispr16-1-1

ANSI C63.10: 2013 section 4.1.4 / section 12.7.5 (Quasi-Peak), section 12.7.6 (peak), section 12.7.7.3 (average)

Test parameters
(i) Span = Entire frequency range or segment if necessary. (ii) Reference Level = 80 dBuV (iii) RBW = 100 kHz (less than or equal to 1 GHz); 1 MHz (above 1 GHz) (iv) VBW ≥ 3 x RBW (v) Detector = Peak & Quasi-Peak (frequency range 30 MHz to 1 GHz); Peak & Average (frequency range above 1 GHz); Change VBW to 10 Hz for average measurement (vi) Sweep Time = Couple

Using Vasona, configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer). Place the radio in continuous transmit mode.

Terminate the access Point RF ports with 50 ohm loads.
Maximize Turntable (find worst case table angle), Maximize Antenna (find worst case height)

30MHz – 18GHz,
Save plots: Peak plot (Vertical and Horizontal) @3m

Above 18 GHz,
Save plots: Peak plot (Vertical and Horizontal) @1m

Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands.

Note: The data displayed on the plots detailed in the graphical test results section were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements.

This report represents the worst case data for all supported operating modes with antenna which has maximum gain.

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
1	EUT	IW-6300H with Air-ANT2513P4M-N antenna	☑	☐
	Support	IW-6300H-AC-X-K9 power supply	☐	☑

Mode Setting#	Wi-Fi Mode	Modulation	Data Rate
1 (single antenna)	802.11b*	CCK	1 Mbps
6 (dual antenna)	802.11n (HT40)*	BPSK	27.0 Mbps (MCS0)

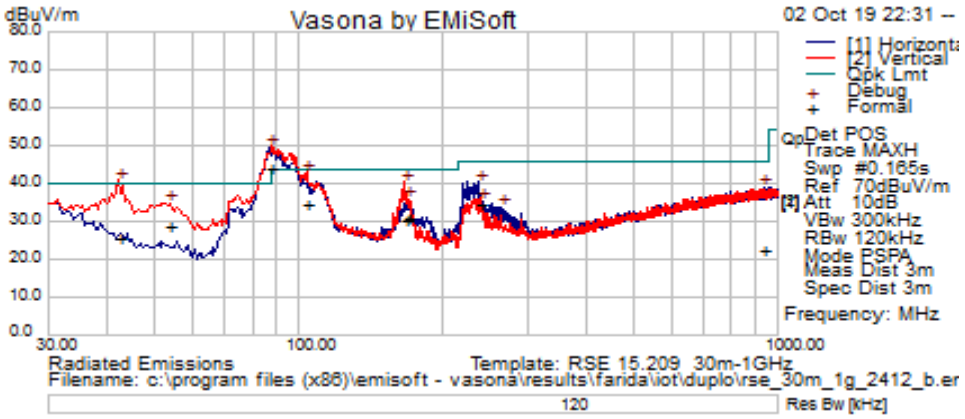
Tested By:	**Date of testing:**
Test Engineer(s): Farida Rahmanzai, Jose Huamani	**Date of testing:** 18-Sept-2019 - 02-Oct-2019
Test Result: PASS	

Test Equipment

See Appendix C for list of test equipment

B1.5 TX Radiated Spurious Emissions Graphical Data Results

Subtest Date:	02-Oct-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	30MHz - 1GHz
Comments on the above Test Results	802.11b, Tx Channel 1 (2412 MHz)

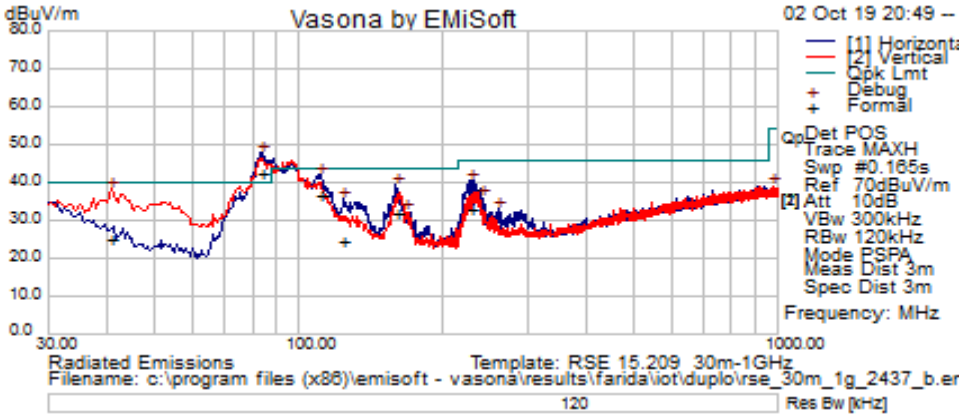


Title: **TX Spurious Emissions from 30MHz-1GHz – Ch1 (2412 MHz)**

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
87.7775	35.4	0.98	7.5	43.88	Quasi Max	H	201	129	50*	-6.12	Pass	See notes
42.4095	13.05	0.67	12.17	25.9	Quasi Max	V	225	133	40	-14.1	Pass	Tx/Ch1
103.9508	22.45	1.06	10.99	34.5	Quasi Max	H	164	135	43.5	-9	Pass	Tx/Ch1
166.364	17.45	1.37	11.66	30.48	Quasi Max	V	198	170	43.5	-13.02	Pass	Tx/Ch1
53.53525	20.83	0.8	7.25	28.88	Quasi Max	V	142	215	40	-11.12	Pass	Tx/Ch1
237.6725	21.22	1.61	11.6	34.43	Quasi Max	H	103	231	46	-11.57	Pass	Tx/Ch1
935.0443	-3.03	3.19	22.4	22.56	Quasi Max	H	221	125	46	-23.44	Pass	Tx/Ch1
169.6078	17.97	1.38	11.44	30.78	Quasi Max	V	107	157	43.5	-12.72	Pass	Tx/Ch1

Note1: 87.77MHz is detemined to be non-radio related signal. FCC part15.109 class A limit applied.
Also see FCC Part15.109 test report.
Note2: * means FCC part15.109 class A limit

Subtest Date:	02-Oct-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	30MHz - 1GHz
Comments on the above Test Results	802.11b, Tx Channel 6 (2437 MHz)



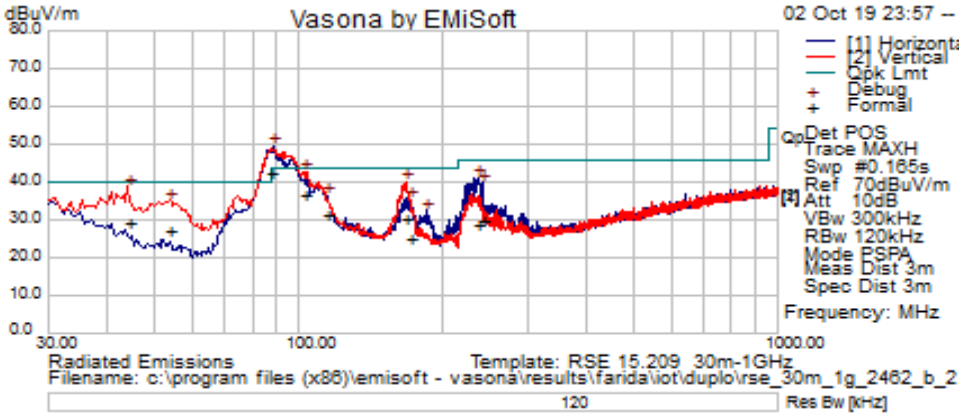
Title: **TX Spurious Emissions from 30MHz-1GHz – Ch6 (2437 MHz)**

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
83.924	33.92	0.96	7.51	42.39	Quasi Max	H	238	257	50*	-7.61	Pass	See notes
111.003	23.25	1.1	12.4	36.75	Quasi Max	H	189	209	43.5	-6.75	Pass	Tx/Ch6
40.514	10.89	0.66	13.59	25.14	Quasi Max	V	130	255	40	-14.86	Pass	Tx/Ch6
159.299	18.65	1.34	12.1	32.08	Quasi Max	H	105	153	43.5	-11.42	Pass	Tx/Ch6
229.229	20.19	1.59	11.12	32.9	Quasi Max	H	116	223	46	-13.1	Pass	Tx/Ch6
123.7275	9.58	1.17	14	24.74	Quasi Max	H	324	174	43.5	-18.76	Pass	Tx/Ch6

Note1: 83.92MHz is detemined to be non-radio related signal. FCC part15.109 class A limit applied.
Also see FCC Part15.109 test report.

Note2: * means FCC part15.109 class A limit.

Subtest Date:	02-Oct-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	30MHz - 1GHz
Comments on the above Test Results	802.11b, Tx Channel 11 (2462 MHz)



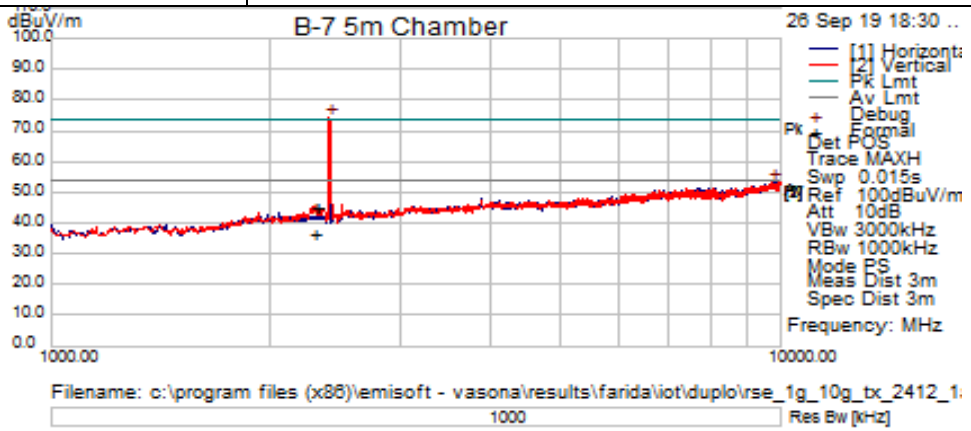
Title: **TX Spurious Emissions from 30MHz-1GHz – Ch11 (2462 MHz)**

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
87.75775	33.84	0.98	7.5	42.32	Quasi Max	H	340	258	50*	-7.68	Pass	See notes
102.5253	24.99	1.05	10.61	36.65	Quasi Max	V	103	268	43.5	-6.85	Pass	Tx/Ch11
44.23925	17.89	0.68	10.93	29.5	Quasi Max	V	148	217	40	-10.5	Pass	Tx/Ch11
167.27	17.36	1.37	11.57	30.3	Quasi Max	V	104	240	43.5	-13.2	Pass	Tx/Ch11
236.8153	15.56	1.61	11.58	28.75	Quasi Max	V	150	309	46	-17.25	Pass	Tx/Ch11
53.873	19.44	0.8	7.21	27.45	Quasi Max	V	189	333	40	-12.55	Pass	Tx/Ch11
241.8898	16.69	1.62	11.7	30.02	Quasi Max	H	120	228	46	-15.98	Pass	Tx/Ch11
114.642	17.32	1.13	13.13	31.57	Quasi Max	H	211	238	43.5	-11.93	Pass	Tx/Ch11
171.297	12.63	1.39	11.3	25.32	Quasi Max	H	176	29	43.5	-18.18	Pass	Tx/Ch11

Note1: 87.75MHz is detemined to be non-radio related signal. FCC part15.109 class A limit applied. Also see FCC Part15.109 test report.

Note2: * means FCC part15.109 class A limit.

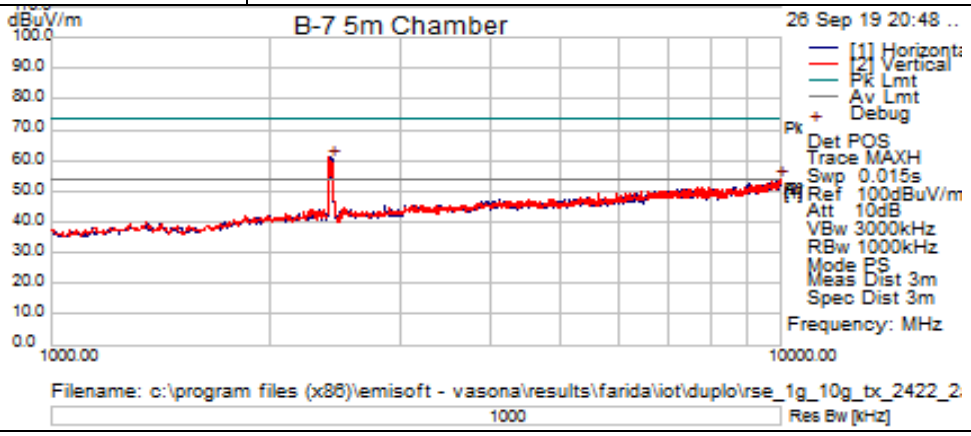
Subtest Date:	26-Sep-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	1GHz - 10GHz
Comments on the above Test Results	802.11b, Tx Channel 1 (2412 MHz)



Title: **TX Spurious Emissions from 1GHz-10GHz – Ch1 (2412 MHz)**

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
2406.25	76.13	5.82	-7.44	74.51	Peak	V	100	19	None	N/A	Ignored	Fundamental
2300.395	47.2	5.71	-7.85	45.06	Peak	V	109	24	74	-28.94	Pass	Tx/Ch11
2300.108	38.49	5.71	-7.85	36.35	Average	V	109	24	54	-17.65	Pass	Tx/Ch11

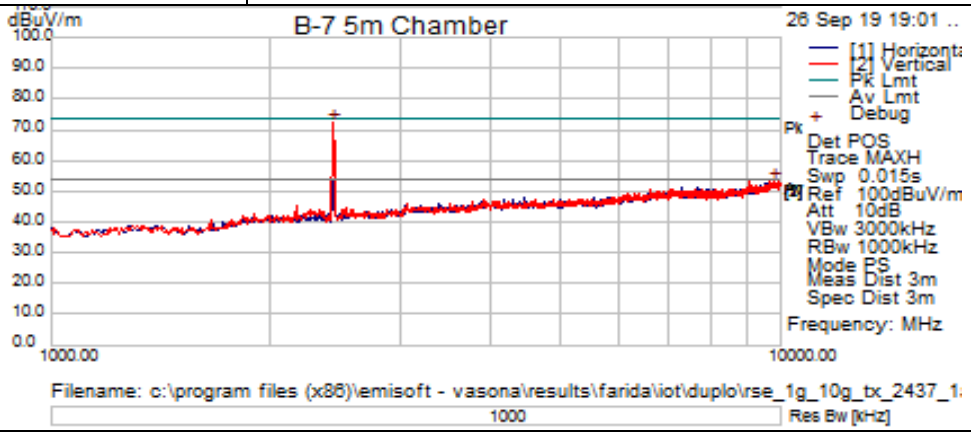
Subtest Date:	26-Sep-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	1GHz - 10GHz
Comments on the above Test Results	**802.11n40**, Tx Channel 3 (2422 MHz)



Title: **TX Spurious Emissions from 1GHz-10GHz – Ch3 (2422 MHz)**

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
2423.125	62.35	5.87	-7.3	60.92	Peak [Scan]	H	150	20	None	N/A	Ignored	Fundamental

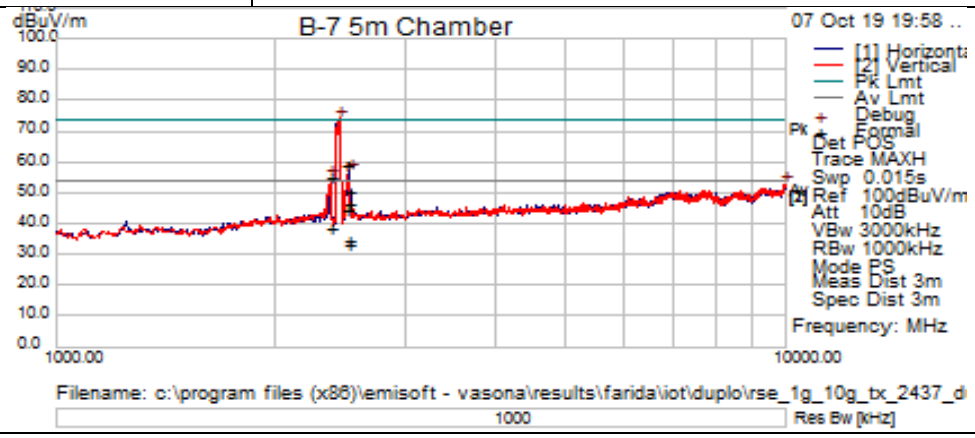
Subtest Date:	26-Sep-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	1GHz - 10GHz
Comments on the above Test Results	802.11b, Tx Channel 6 (2437 MHz)



Title: **TX Spurious Emissions from 1GHz-10GHz – Ch6 (2437 MHz)**

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
2434.375	73.85	5.89	-7.18	72.56	Peak	V	100	23	None	N/A	Ignored	Fundamental

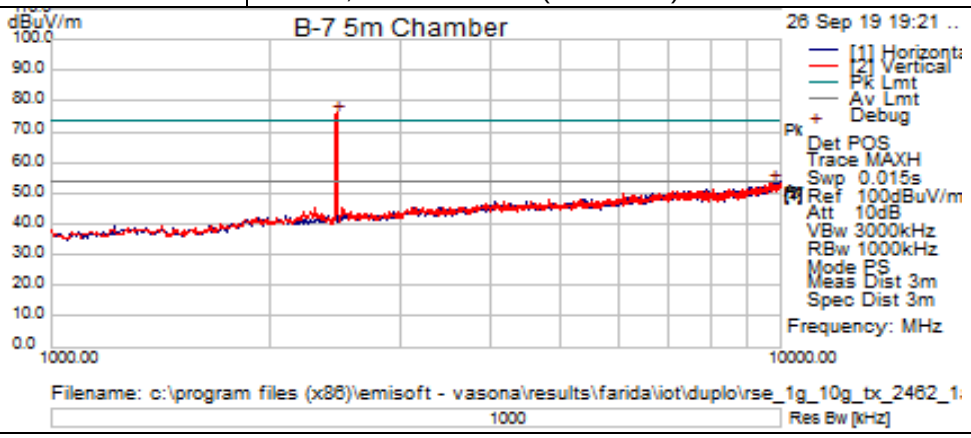
Subtest Date:	07-Oct-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	1GHz - 10GHz
Comments on the above Test Results	**802.11n40**, Tx Channel 6 (2437 MHz)



Title: **TX Spurious Emissions from 1GHz-10GHz – Ch6 (2437 MHz)**

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
2445.625	75.6	5.63	-7.04	74.2	Peak [Scan]	V	150	10	NA	None	Ignored	Fundamental
2499.357	45.47	5.71	-6.74	44.44	Average	V	125	14	54	-9.56	Pass	
2500.194	60.04	5.71	-6.73	59.01	Peak	V	125	14	74	-14.99	Pass	
2373.618	41.06	5.54	-7.67	38.94	Average	V	100	6	54	-15.06	Pass	
2373.693	57.11	5.54	-7.66	54.98	Peak	V	100	6	74	-19.02	Pass	
2516.66	35.59	5.71	-6.78	34.51	Average	H	100	0	54	-19.49	Pass	
2520.865	34.73	5.71	-6.79	33.65	Average	H	100	0	54	-20.35	Pass	
2514.878	51.74	5.71	-6.78	50.67	Peak	H	100	0	74	-23.33	Pass	
2521.14	47.6	5.71	-6.79	46.52	Peak	H	100	0	74	-27.48	Pass	

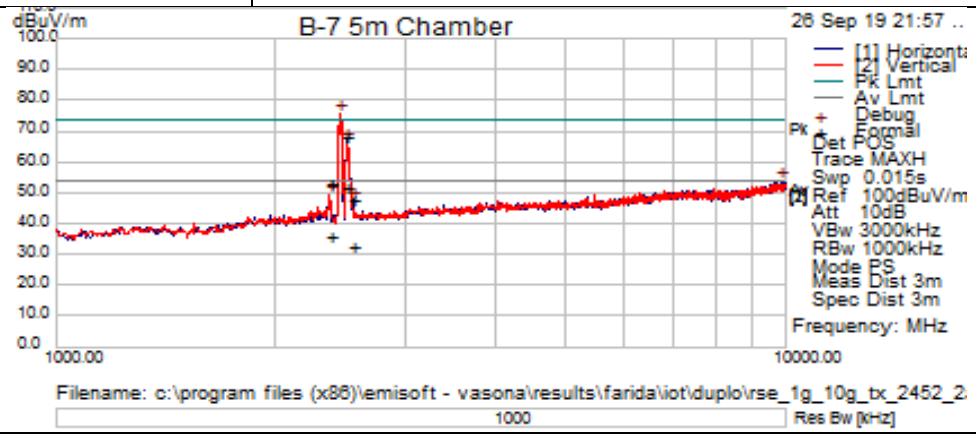
Subtest Date:	26-Sep-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	1GHz - 10GHz
Radio Mode	**802.11b**, Tx Channel 11 (2462 MHz)



Title: **TX Spurious Emissions from 1GHz-10GHz – Ch11 (2462 MHz)**

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
2462.5	77.26	5.92	-7.06	76.12	Peak [Scan]	V	100	23	None	N/A	Ignored	Fundamental

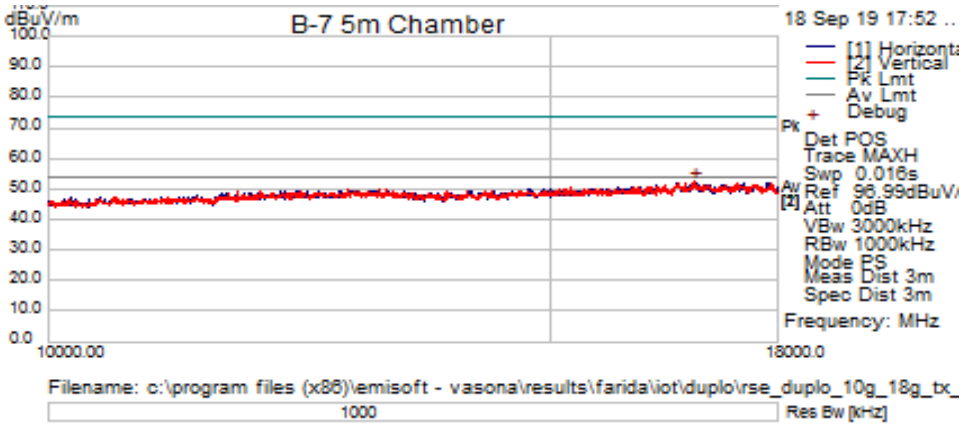
Subtest Date:	26-Sep-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	1GHz - 10GHz
Comments on the above Test Results	**802.11n40**, Tx Channel 9 (2452 MHz)



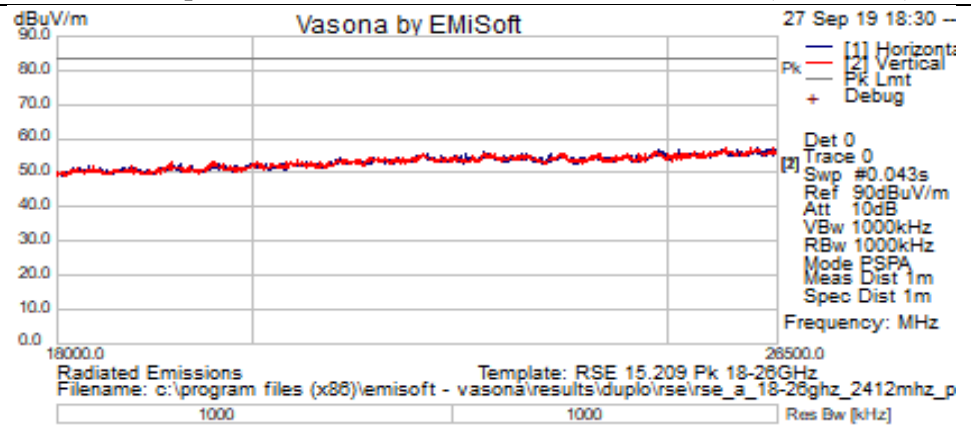
Title: **TX Spurious Emissions from 1GHz-10GHz – Ch9 (2452 MHz)**

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
2445.625	77.01	5.9	-7.04	75.87	Peak [Scan]	V	100	19	None	N/A	Ignored	Fundamental
2372.76	54.75	5.81	-7.67	52.89	Peak	V	108	32	74	-21.11	Pass	Tx/Ch11
2372.652	37.68	5.81	-7.67	35.82	Average	V	108	32	54	-18.18	Pass	Tx/Ch11
2500.983	69.39	5.98	-6.74	68.63	Peak	H	120	21	74	-5.37	Pass	Tx/Ch11
2500.953	52.43	5.98	-6.74	51.68	Average	H	120	21	54	-2.32	Pass	Tx/Ch11
2558.013	48.63	6.04	-6.83	47.83	Peak	H	99	21	74	-26.17	Pass	Tx/Ch11
2558.373	33.31	6.04	-6.83	32.51	Average	H	99	21	54	-21.49	Pass	Tx/Ch11

Subtest Date:	18-Sep-2019 – 27-Sep-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	10GHz – 26GHz
Comments on the above Test Results	**802.11b**, Tx Channel 1 (2412 MHz)

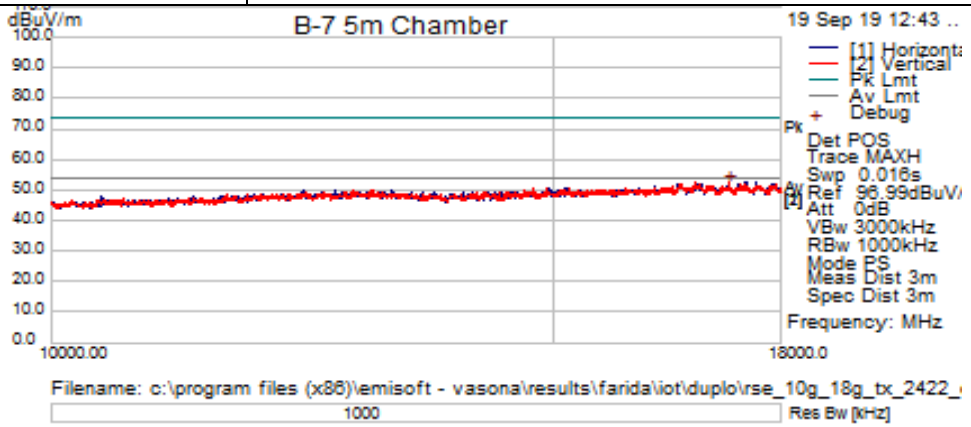


Title: **TX Spurious Emissions from 10GHz-18GHz – Ch1 (2412 MHz)**



Title: **TX Spurious Emissions from 18GHz-26GHz – Ch1 (2412 MHz)**

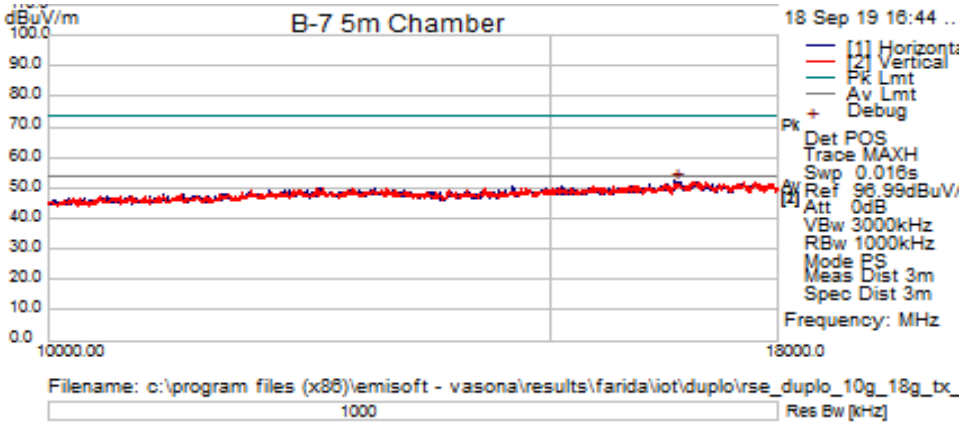
Subtest Date:	19-Sep-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	10GHz – 26GHz
Comments on the above Test Results	**802.11n40**, Tx Channel 3 (2422 MHz)



Title: **TX Spurious Emissions from 10GHz-18GHz – Ch3 (2422 MHz)**

Note: No emissions found above 18GHz

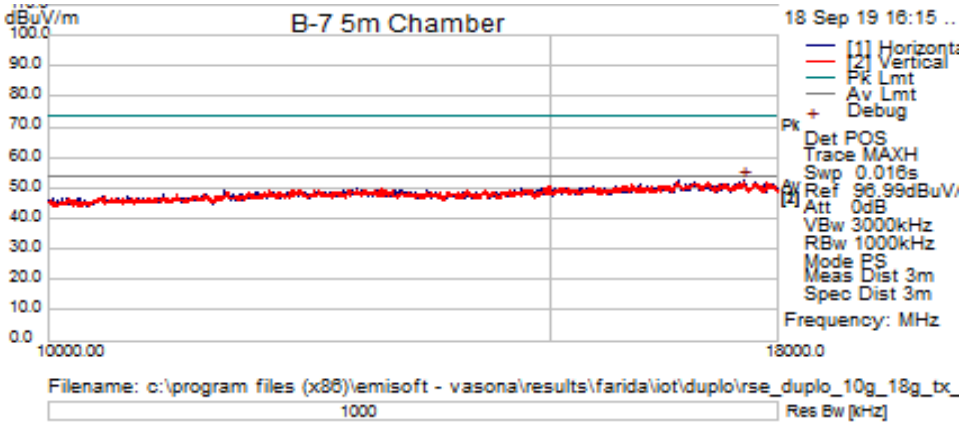
Subtest Date:	18-Sep-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	10GHz - 26GHz
Comments on the above Test Results	802.11b, Tx Channel 6 (2437 MHz)



Title: **TX Spurious Emissions from 10GHz-18GHz – Ch6 (2437 MHz)**

Note: No emissions found above 18GHz

Subtest Date:	18-Sep-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	10GHz - 26GHz
Comments on the above Test Results	802.11b, Tx Channel 11 (2462 MHz)



Title: **TX Spurious Emissions from 10GHz-18GHz – Ch11 (2462 MHz)**

Note: No emissions found above 18GHz

B.2 AC Conducted Emissions

B2.1 Limits

FCC 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 μH/50 ohms line impedance stabilization network (LISN).

	Conducted Limits	
Frequency of Emission (MHz)	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

RSS-Gen 8.8: Unless stated otherwise in the applicable RSS, for radio apparatus that are designed to be connected to the public utility AC power network, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the range 150 kHz to 30 MHz shall not exceed the limits in table 4 (AC power-line conducted emissions limit), as measured using a 50 μH / 50 Ω line impedance stabilization network. This requirement applies for the radio frequency voltage measured between each power line and the ground terminal of each AC power-line mains cable of the EUT.

B2.2 Test Procedures

Ref: C63.10:2013, section 6.2.2

Section 6.2.2 Measurement requirements

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument, or where permitted or required, the emission currents on the power line sensed by a current probe. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer, and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements, using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having a 50 Ω input impedance. All other ports are terminated in 50 Ω loads. Figure 5, Figure 6, and Figure 7 show typical test setups for ac power-line conducted emissions testing (see 6.13). For information about the use of a RF-shielded (screen) room, vertical conducting plane and voltage probe, see ANSI C63.4.

Tabletop devices shall be placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screen) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

Section 6.2.5 Final ac power-line conducted emission measurements

Based on the exploratory tests of the EUT performed in 6.2.4, the one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT. If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements are performed. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation. If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.

Record the six highest EUT emissions relative to the limit of each of the current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency.

Ref. C63.10-2013 section 6.2

Test Procedure
1. Using Vasona software, configure the spectrum analyzer as shown above (be sure to enter all losses between the transmitter output and the spectrum analyzer). 2. Set the radio in continuous transmit mode. 3. Connect cable end to LISN Hot port and other cable end to the spectrum Analyzer/EMC receiver RF input port. Terminate the LISN neutral port with a 50 Ω impedance terminator. 4. Sweep the frequency range from 150 kHz to 30 MHz (segment if necessary) 5. Use the peak marker function to determine the maximum amplitude level. 6. Center marker frequency and perform final measurement using applicable detector (Quasi-Pk/Average). 7. Record at least 6 highest reading for the worst case operating modes in Quasi-peak/Average. 8. Repeat the test on Neutral lead. 9. Repeat step 3 – 7 with the radio sets in the Receiver mode. 10. Record at least 6 highest reading in Quasi-peak/Average

Ref. C63.10-2013 section 4 / CISPR16-1-1

Test Parameters
Span = Entire frequency range or segment if necessary. Reference Level = 70 dBuV RBW = 9 kHz VBW ≥ 3 x RBW Sweep Time = Couple Detector = Quasi-Peak & Average

Samples, Systems, and Modes

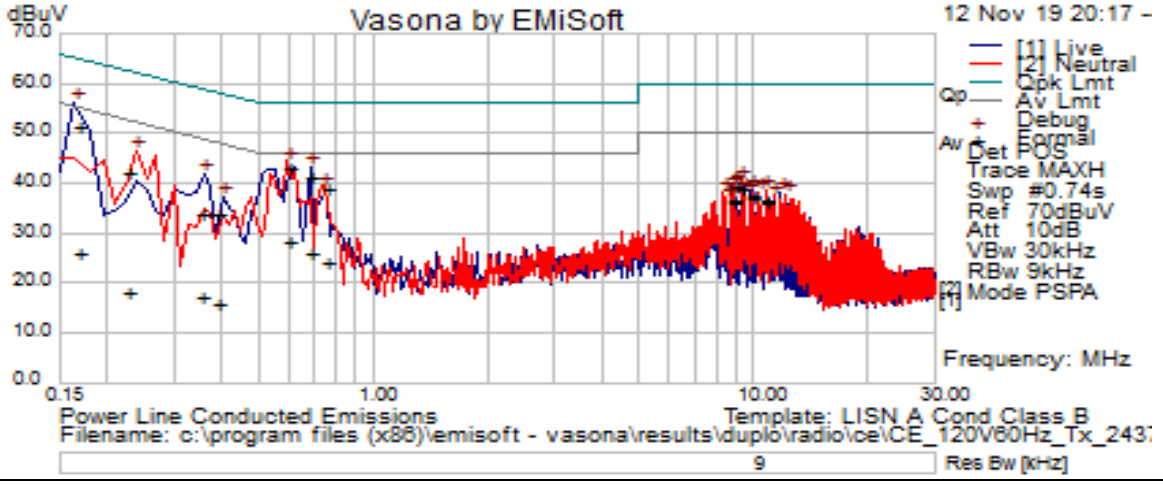
System Number	Description	Samples	System under test	Support equipment
2	EUT	IW-6300H with Air-ANT2513P4M-N antenna	☑	☐
	Support	IW-6300H-AC-X-K9 power supply	☐	☑

Mode Setting#	Wi-Fi Mode	Modulation	Data Rate
1	802.11b*	CCK	1 Mbps

Tested By: Test Engineer(s): Farida Rahmanzai, Jose Huamani	**Date of testing:** **Date of testing:** 12-Nov-2019
Test Result: PASS	

B2.3 AC Conducted Emissions Test Data and Graphical Test Results

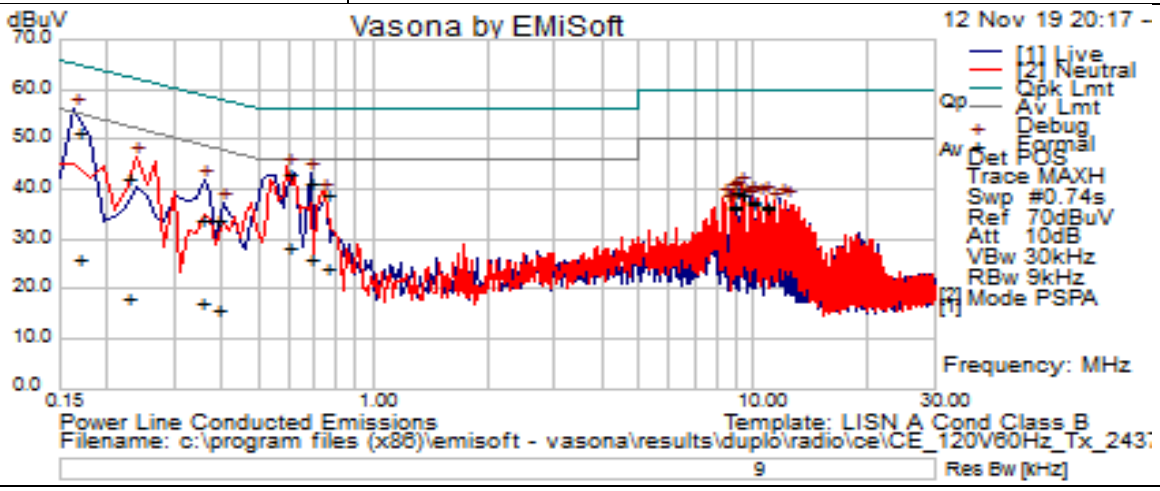
Subtest Date:	12-Nov-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, formal immunity room
Subtest Title	Conducted Emissions
Frequency Range	150 kHz - 30 MHz
Comments on the above Test Results	TX Ch6 (2437 MHz) with CCK modulation – 1 Mbps



AC Conducted Emissions Test Result Tables for 802.11b / TX Ch6

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	Factors (dB)	Level (dBuV)	Detector	Lines (Live/Neutral)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
0.390873	13.56	20.14	0.07	33.77	Quasi Peak	Live	58.05	-24.28	Pass	TX / Ch 6
0.390873	-4.15	20.14	0.07	16.06	Average	Live	48.05	-31.99	Pass	TX / Ch 6
0.169407	30.48	21.07	0.11	51.67	Quasi Peak	Live	64.99	-13.32	Pass	TX / Ch 6
0.169407	4.93	21.07	0.11	26.11	Average	Live	54.99	-28.87	Pass	TX / Ch 6
0.356214	13.84	20.24	0.07	34.15	Quasi Peak	Live	58.82	-24.66	Pass	TX / Ch 6
0.356214	-2.97	20.24	0.07	17.35	Average	Live	48.82	-31.47	Pass	TX / Ch 6
0.68847	21.3	19.98	0.07	41.34	Quasi Peak	Live	56	-14.66	Pass	TX / Ch 6
0.68847	5.94	19.98	0.07	25.99	Average	Live	46	-20.01	Pass	TX / Ch 6
8.775606	16.56	20.13	0.11	36.8	Quasi Peak	Live	60	-23.2	Pass	TX / Ch 6
8.775606	16.1	20.13	0.11	36.34	Average	Live	50	-13.66	Pass	TX / Ch 6
9.925209	17.33	20.15	0.1	37.58	Quasi Peak	Live	60	-22.42	Pass	TX / Ch 6
9.925209	17.06	20.15	0.1	37.31	Average	Live	50	-12.69	Pass	TX / Ch 6

Subtest Date:	12-Nov-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, formal immunity room
Subtest Title	Conducted Emissions
Frequency Range	150 kHz - 30 MHz
Comments on the above Test Results	TX Ch6 (2437 MHz) with CCK modulation – 1 Mbps



AC Conducted Emissions Test Result Tables for 802.11b / TX Ch6

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	Factors (dB)	Level (dBuV)	Detector	Lines (Live/Neutral)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
0.22542	21.61	20.75	0.09	42.45	Quasi Peak	Neutral	62.62	-20.17	Pass	TX / Ch 6
0.22542	-2.61	20.75	0.09	18.23	Average	Neutral	52.62	-34.39	Pass	TX / Ch 6
0.601782	23.18	19.98	0.07	43.22	Quasi Peak	Neutral	56	-12.78	Pass	TX / Ch 6
0.601782	8.56	19.98	0.07	28.6	Average	Neutral	46	-17.4	Pass	TX / Ch 6
0.751572	19.19	19.98	0.07	39.23	Quasi Peak	Neutral	56	-16.77	Pass	TX / Ch 6
0.751572	4.15	19.98	0.07	24.19	Average	Neutral	46	-21.81	Pass	TX / Ch 6
8.920515	19.11	20.14	0.1	39.34	Quasi Peak	Neutral	60	-20.66	Pass	TX / Ch 6
8.920515	19.15	20.14	0.1	39.38	Average	Neutral	50	-10.62	Pass	TX / Ch 6
9.351	18.59	20.14	0.11	38.85	Average	Neutral	50	-11.15	Pass	TX / Ch 6
9.351	18.74	20.14	0.11	38.99	Quasi Peak	Neutral	60	-21.01	Pass	TX / Ch 6
10.79036	16.54	20.17	0.1	36.82	Quasi Peak	Neutral	60	-23.18	Pass	TX / Ch 6
10.79036	16.17	20.17	0.1	36.44	Average	Neutral	50	-13.56	Pass	TX / Ch 6

Appendix C: List of Test Equipment Used to perform the test

Equip#	Manufacturer/ Model	Description	Last Cal	Next Due	Test Item
Test Equipment used for Radiated Emissions					
CIS008113	Cisco/NSA 5m Chamber	NSA 5m Chamber	01-Oct-19	01-Oct-20	B1
CIS037581	ETS Lindgren / 3117	Double Ridged Guide Horn Antenna	25-Jan-19	25-Jan-20	B1
CIS039131	Cisco / TH0118	Mast Mount Preamplifier Array, 1-18GHz	25-Feb-19	25-Feb-20	B1
CIS038404	Sunol Sciences / JB1	Combination Bi-Log Antenna, 30MHz-2GHz	31-Jan-19	31-Jan-20	B1
CIS036710	Cisco/1840	18-40GHz EMI Test Head/Verification Fixture	12-Aug-19	12-Aug-20	B1
CIS018231	Rohde & Schwarz /ESI 40(ESIB 40)	EMI RECEIVER TEST 20Hz-40GHz	07-Mar-19	07-Mar-20	B1
CIS042012	Rohde & Schwarz / ESCI	EMI Test Receiver	12-Aug-19	12-Aug-20	B1
CIS040604	Agilent / E4440A	Precision Spectrum Analyzer	19-Oct-18	19-Oct-20	B1
CIS047311	Huber+ Suhner/Sucoflex 106PA	RF Coaxial Cable, to 18GHz, 8.5 m	30-Sep-19	30-Sep-20	B1
CIS025660	Micro-Coax / UFB311A-1-0840-504504	RF Coaxial Cable, to 18GHz, 8.5 m	30-Sep-19	30-Sep-20	B1
CIS025640	Micro-Coax / UFB311A-0-2720-520520	Coaxial Cable, 272.0 in. to 18GHz	30-Sep-19	30-Sep-20	B1
CIS056055	Wainwright Instruments/ WRCGV8-2360-2400-2483.5-40SS	SMA Band Reject Filter 2.36GHz to 2.5235 GHz	10-Apr-19	10-Apr-20	B1
Test Equipment used for AC Conducted Emissions					
CIS41955	Rohde & Schwarz / ESCI	EMI Test Receiver	25-Apr-19	25-Apr-20	B2
CIS08187	Fisher Custom Com / FCC-450B-2.4-N	Pulse Limiter	15-May-19	15-May-20	B2
CIS019210	TTE / H785-150K-50-21378	High Pass Filter 150KHz	25-Feb-19	25-Feb-20	B2
CIS05039	Fisher Custom Com / 50/250-50-2-02	LISN (9kHz-30MHz)	21-Feb-19	21-Feb-20	B2
CIS034158	Fisher Custom Com / 50-2-RA-NEMA-5-20R	LISN Receptacle Adaptor	21-Feb-19	21-Feb-20	B2
CIS040532	Coleman / RG-223	25 ft RG-223 Cable	04-Dec-18	04-Dec-19	B2
51663	Bird / 5-T-MB	50Ω termination	04-Dec-18	04-Dec-19	B2

Appendix D: Abbreviation Key and Definitions

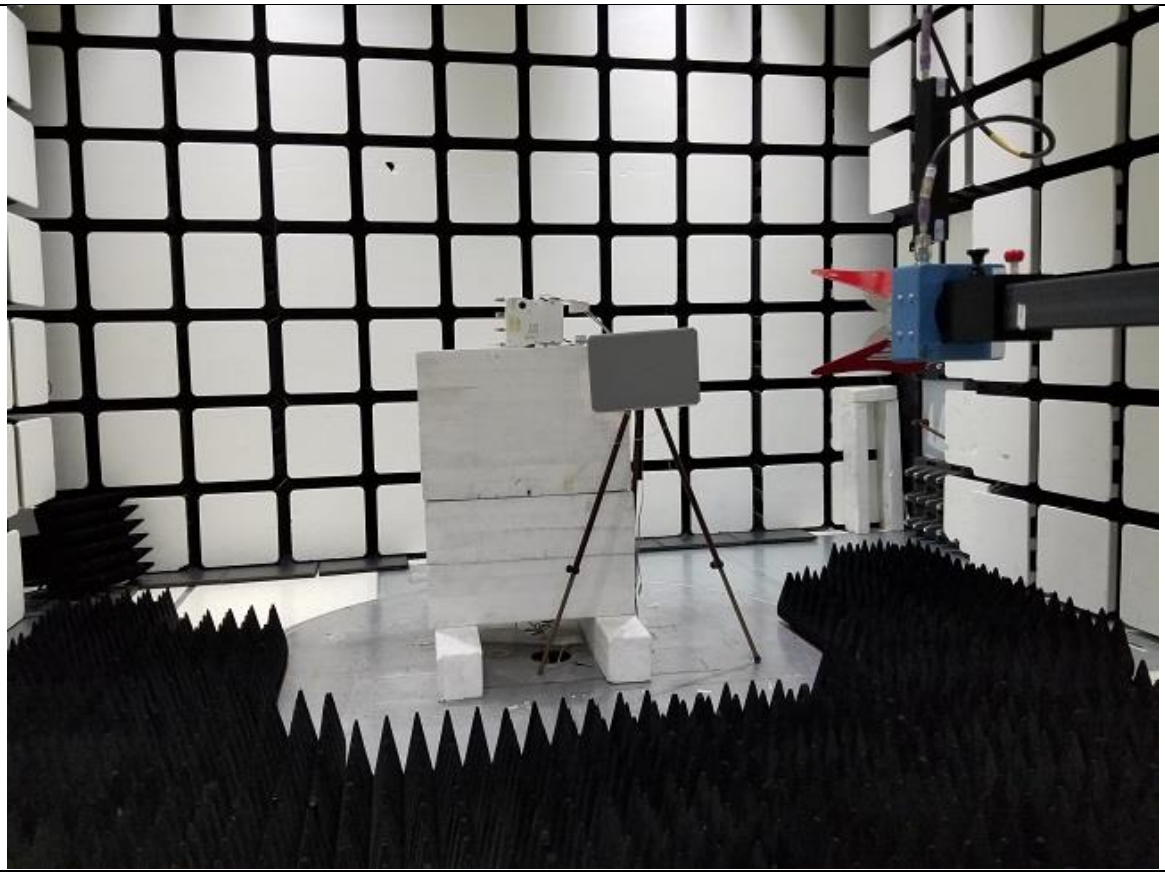
The following table defines abbreviations used within this test report.

Abbreviation	Description	Abbreviation	Description
EMC	Electro Magnetic Compatibility	°F	Degrees Fahrenheit
EMI	Electro Magnetic Interference	°C	Degrees Celsius
EUT	Equipment Under Test	Temp	Temperature
ITE	Information Technology Equipment	S/N	Serial Number
TAP	Test Assessment Schedule	Qty	Quantity
ESD	Electro Static Discharge	emf	Electromotive force
EFT	Electric Fast Transient	RMS	Root mean square
EDCS	Engineering Document Control System	Qp	Quasi Peak
Config	Configuration	Av	Average
CIS#	Cisco Number (unique identification number for Cisco test equipment)	Pk	Peak
Cal	Calibration	kHz	Kilohertz ($1x10^3$)
EN	European Norm	MHz	MegaHertz ($1x10^6$)
IEC	International Electro technical Commission	GHz	Gigahertz ($1x10^9$)
CISPR	International Special Committee on Radio Interference	H	Horizontal
CDN	Coupling/Decoupling Network	V	Vertical
LISN	Line Impedance Stabilization Network	dB	decibel
PE	Protective Earth	V	Volt
GND	Ground	kV	Kilovolt ($1x10^3$)
L1	Line 1	µV	Microvolt ($1x10^{-6}$)
L2	Line2	A	Amp
L3	Line 3	µA	Micro Amp ($1x10^{-6}$)
DC	Direct Current	mS	Milli Second ($1x10^{-3}$)
RAW	Uncorrected measurement value, as indicated by the measuring device	µS	Micro Second ($1x10^{-6}$)
RF	Radio Frequency	µS	Micro Second ($1x10^{-6}$)
SLCE	Signal Line Conducted Emissions	m	Meter
Meas dist	Measurement distance	Spec dist	Specification distance
N/A or NA	Not Applicable	SL	Signal Line (or Telecom Line)
P	Power Line	L	Live Line
N	Neutral Line	R	Return
S	Supply	AC	Alternating Current

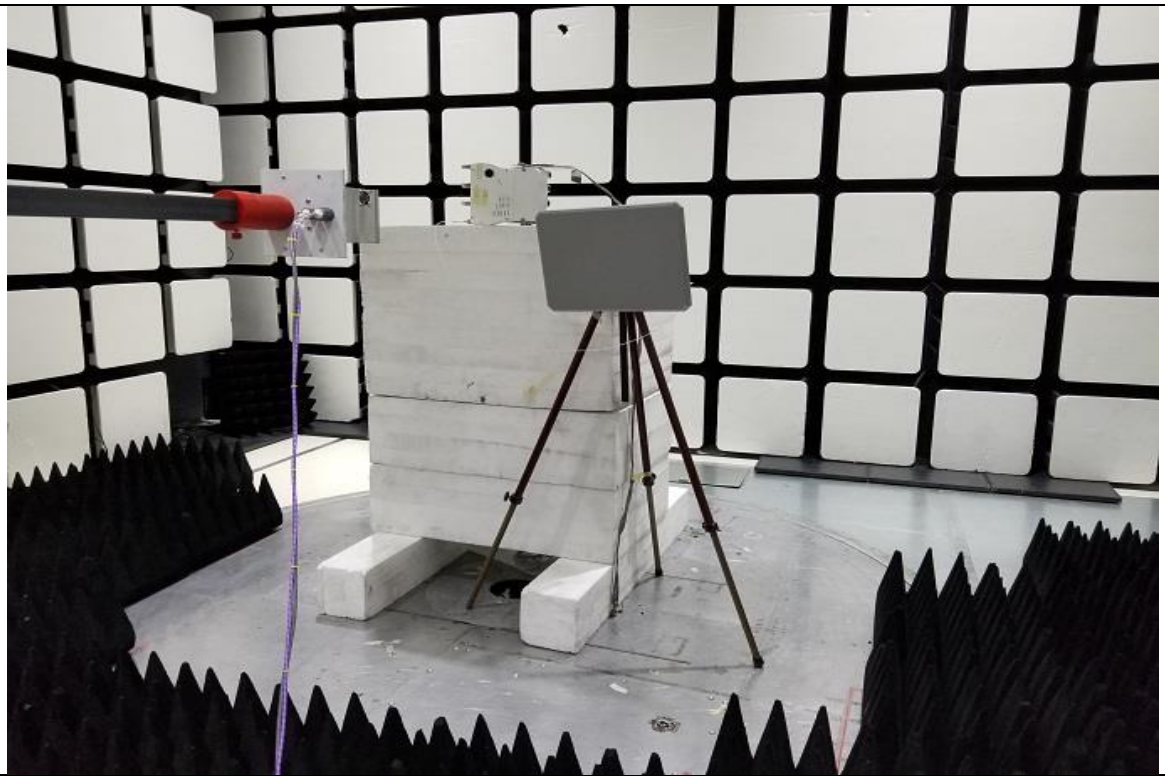
Appendix E: Photographs of Test Setups

Title: Radiated Spurious Emissions Test Setup

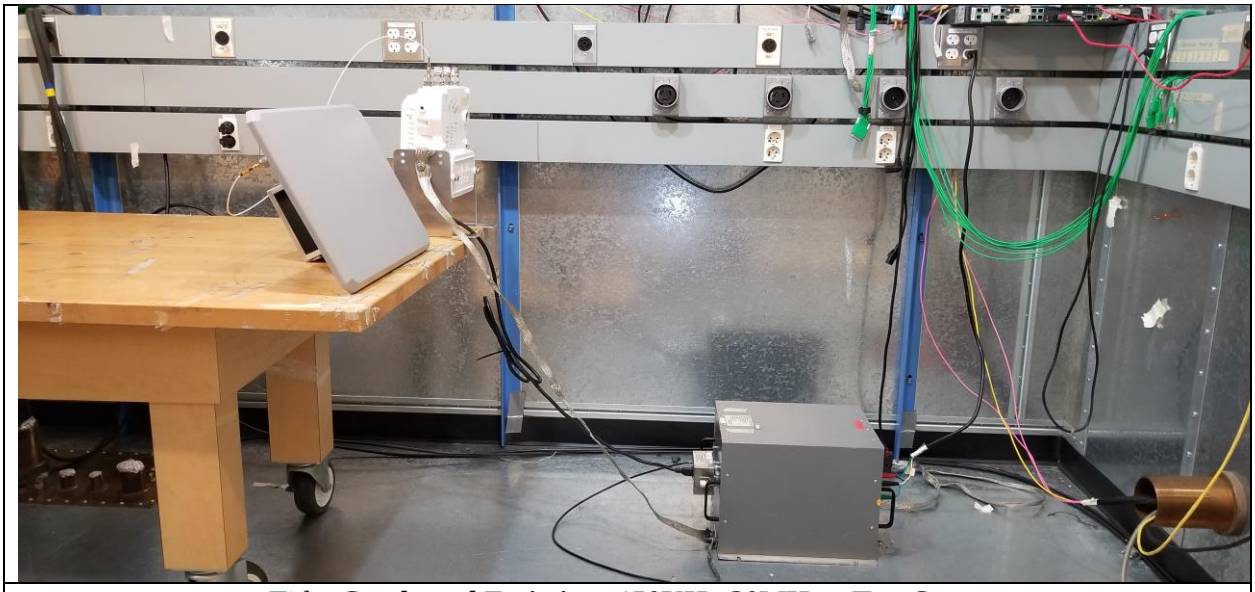
Title: **Radiated Spurious Emissions 30MHz-1GHz – Test Setup**



Title: **Radiated Spurious Emissions 1GHz-18GHz – Test Setup**



Title: **Radiated Spurious Emissions 18GHz-40GHz – Test Setup**



Title: **Conducted Emissions 150KHz-30MHz – Test Setup**

Appendix F: Software Used to Perform Testing

EMIsoft Vasona, version 6.024

Appendix G:Test Procedures

Measurements were made in accordance with

- KDB 662911 - MIMO
- ANSI C63.4 2014 Unintentional Radiators
- ANSI C63.10 2013 Intentional Radiators

Test procedures are summarized below

FCC 2.4GHz RSE Test Procedures	EDCS # 1480386

Appendix H: Scope of Accreditation (A2LA certificate number 1178-01)

The scope of accreditation of Cisco Systems, Inc. can be found on the A2LA web page at:

http://www.a2la.org/scopepdf/1178-01.pdf

Appendix I: Test Assessment Plan

Compliance Test Plan (Excel) EDCS# 18357550
Target Power Tables EDCS# 18295686

Appendix J: Worst Case Justification

All 3 orientations (Z, Y, Z) of the EUT were assessed by performing pre-scan.
The Z orientation was determined to be the worst case orientation.

Worst Case Mode: Worst case mode shall be the mode that produces the highest power level based on conducted power measurement.

Also see Appendix A the test report.

Compliance testing for Radiated Spurious and AC Conducted Emissions shall be performed with the highest gain antenna installed.

All formal data can be found in EDCS# 18295686