Radio Test Report

ISR-1100 Series

C1111-4PWB, C1111-8PWB, C1111-8PLTEEAWB, C1111-4PWA, C1111-8PWA, C1111-8PLTEEAWA

FCC ID: LDKC11111696

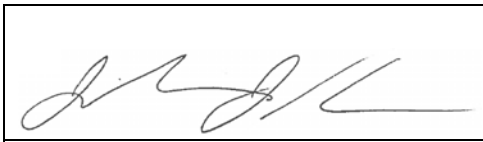
IC: 2461L-C11111696

2400-2483.5 MHz

Against the following Specifications:

CFR47 Part 15.247
RSS-247
RSS-Gen

Cisco Systems
170 West Tasman Drive
San Jose, CA 95134

	
Author: Johanna Knudsen **Tested By: Johanna Knudsen**	**Approved By:** Gerard Thorpe **Title:** Manager, Engineering - EMC Standards & Operations **Revision:** See EDCS

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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 RSS-247 Issue 2: Feb 2017 RSS-Gen Issue 4: Nov 2014

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)

27-JUN-2017 to 19-APR-2018

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.
125 West Tasman Drive (Building P)
San Jose, CA 95134
USA

Headquarters

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

Registration Numbers for Industry Canada

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

Test Engineers

Johanna Knudsen, Marie Higa

2.6 Equipment Assessed (EUT)

C1111-4PW with ISR-AP1100AC-B

2.7 EUT Description

The Cisco ISR-AP1100AC Wi-Fi module supports the following modes of operation. The modes are further defined in the radio Theory of Operation. The modes included in this report represent the worst case data for all modes. Data is recorded at the lowest supported data rate for each mode. This report covers operation on channels 1-11.

802.11n/ac - Legacy CCK, One Antenna, 1 to 11 Mbps
802.11n/ac - Legacy CCK, Two Antennas, 1 to 11 Mbps

802.11n/ac - Non HT20, One Antenna, 6 to 54 Mbps
802.11n/ac - Non HT20, Two Antennas, 6 to 54 Mbps

802.11n/ac - HT/VHT20, One Antenna, M0 to M7
802.11n/ac - HT/VHT20, Two Antennas, M0 to M7
802.11n/ac - HT/VHT20, Two Antennas, M8 to M15

802.11n/ac - HT/VHT20 Beam Forming, Two Antennas, M0 to M7
802.11n/ac - HT/VHT20 Beam Forming, Two Antennas, M8 to M15

802.11n/ac - HT/VHT20 STBC, Two Antennas, M0 to M7

The following antennas are supported by this product series.
The data included in this report represent the worst case data for all antennas.

Frequency	Part Number	Antenna Type	Antenna Gain (dBi)
2.4 / 5 GHz	2x2 Internal	AP Omni	2 / 4

Section 3: Result Summary

3.1 Results Summary Table

Conducted emissions

Basic Standard	Technical Requirements / Details	Result
FCC 15.247 RSS-247	**6dB Bandwidth** Systems using digital modulation techniques may operate in the 2400-2483.5MHz band. The minimum 6dB bandwidth shall be at least 500 kHz	Pass
FCC 15.247 RSS-247	**99% & 26 dB Bandwidth**: 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 26 dB emission 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 26 dB relative to the maximum level measured in the fundamental emission.	Pass
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
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

FCC 15.247 RSS-247	**Conducted Spurious Emissions / Band-Edge**: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.	Pass
FCC 15.247 RSS-247 FCC 15.205 RSS-Gen	**Restricted band**: Unwanted emissions falling within the restricted bands, as defined in FCC 15.205 (a) and RSS-Gen 8.10 must also comply with the radiated emission limits specified in FCC 15.209 (a) and RSS-Gen 8.9	Pass

Radiated Emissions (General requirements)

Basic Standard	Technical Requirements / Details	Result
FCC 15.209 RSS-Gen	**TX Spurious Emissions:** Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the filed strength limits table in this section. Unwanted emissions falling within the restricted bands, as defined in FCC 15.205 (a) and RSS-Gen 8.10 must also comply with the radiated emission limits specified in FCC 15.209 (a) and RSS-Gen 8.9	Pass
RSS-Gen	**RX Spurious Emissions:** **RSS-Gen 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. **RSS-Gen 8.10 Restricted Bands** Unwanted emissions that fall into restricted bands of Table 6 shall comply with the limits specified in RSS-Gen; and (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.	Pass
FCC 15.207 RSS-Gen	**AC conducted Emissions:** Except when the requirements applicable to a given device state otherwise, for any radio apparatus equipped to operate from the public utility AC power supply, either directly or indirectly (such as with a battery charger), the radio frequency voltage of emissions conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the table in these sections. The more stringent limit applies at the frequency range boundaries.	Pass

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	C1111-4PW (TSN-M-P2A)	Cisco Systems, Inc	74-114193-01 03	NA	NA	FGL211421YH (board: FOC21124R20)
S02	AC/DC Adapter ADP-66CR B	Delta Electronics, Inc	341-100346-01 A0	NA	NA	DAB2110G3CH
S03	C1111-8PWB	Cisco Systems, Inc	74-111526-01	NA	NA	FGL2123915E (board: FOC21193P24)
S04	C1111-8PLTEEAWB (TSN-H)	Cisco Systems, Inc	74-111526-01	NA	NA	FGL2123915D
S05	PA-2121-1-LF	LiteOn	341-0502-01	NA	NA	LIT21152ML6

4.2 System Details

System #	Description	Samples
1	Conducted Testing: EUT + Power Supply	S01, S02
2	RSE Testing: EUT + Power Supply	S02, S03
3	AC Power Conducted Emissions: EUT + Power Supply	S04, S05

4.3 Mode of Operation Details

Mode#	Description	Comments
1	Conducted Testing	Continuous TX mode. Image version 8.4.100.1
2	Radiated Testing	Continuous TX mode. Image version 8.4.100.1
3	AC Conducted Emissions	Wi-Fi operating in TX mode

Appendix A: Emission Test Results

A.1 Duty Cycle

Duty Cycle Test Requirement

From KDB 558074, Section 6

6.0 Duty cycle, transmission duration and maximum power control level

Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (*i.e.*, with a duty cycle of greater than or equal to 98%). When continuous operation cannot be realized, then the use of sweep triggering/signal gating techniques can be utilized to ensure that measurements are made only during transmissions at the maximum power control level. …

When continuous transmission cannot be achieved and sweep triggering/signal gating cannot be implemented, alternate procedures are provided that can be used to measure the average power; however, they will require an additional measurement of the transmitter duty cycle. Within this guidance document, the duty cycle refers to the fraction of time over which the transmitter is on and is transmitting at its maximum power control level. The duty cycle is considered to be constant if variations are less than ± 2 percent, otherwise the duty cycle is considered to be non-constant.

Duty Cycle Test Method

From KDB 558074, Section 6:

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average. The zero-span measurement method shall not be
used unless both RBW and VBW are > 50/T and the number of sweep points across duration T
exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span
method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

Duty Cycle Test Information

Tested By : Johanna Knudsen	**Date of testing:** July 5th, 2017
Test Result : N/A	

Test Equipment

See Appendix C for list of test equipment

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
1	Conducted testing: EUT + AC/DC Adapter	S01 and S02	☑	☐

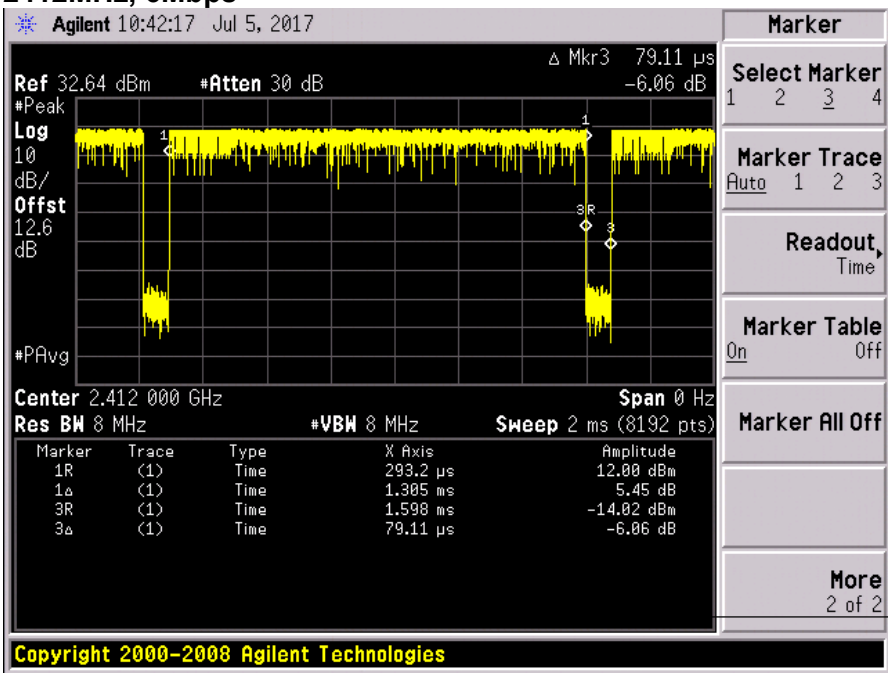
Duty Cycle Data Table

Duty Cycle table and screen captures are shown below for power/psd modes.

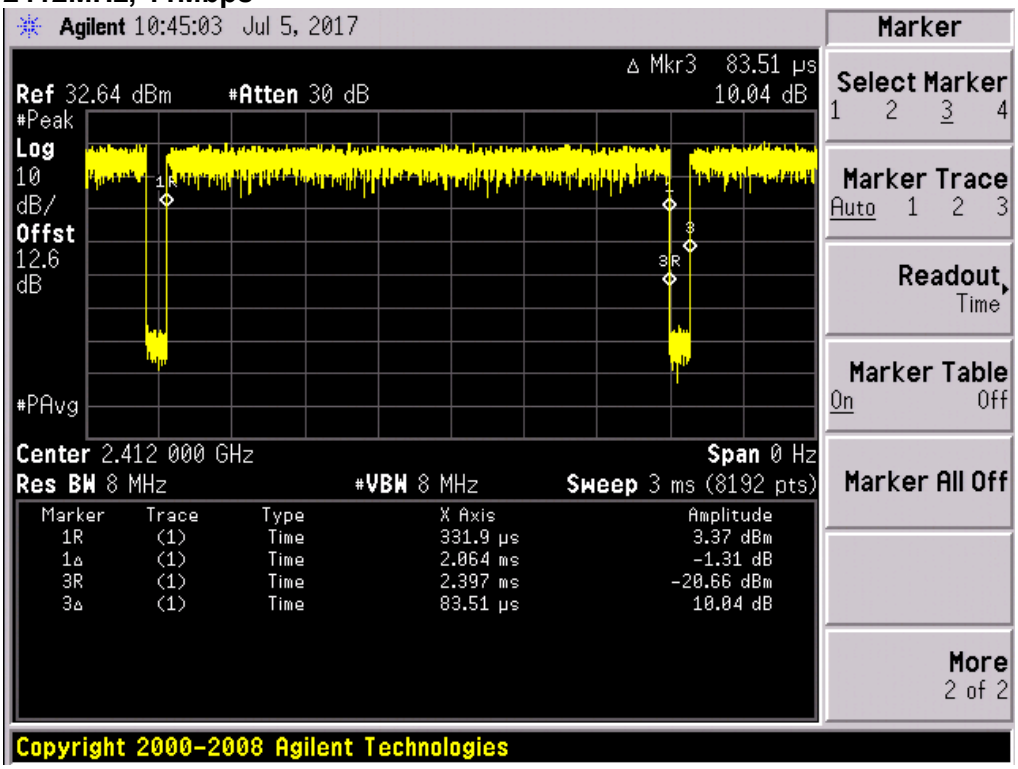
Mode	Data Rate	On-time (ms)	Total Time (ms)	Duty Cycle (%)	Correction Factor (dB)
NonHT20	6Mbps	1.305	1.38411	94.3	0.25
CCK	11Mbps	2.064	2.1475	96.1	0.17
HT20	M0	5.008	5.103	98.1	0.08

Duty Cycle Data Screenshots

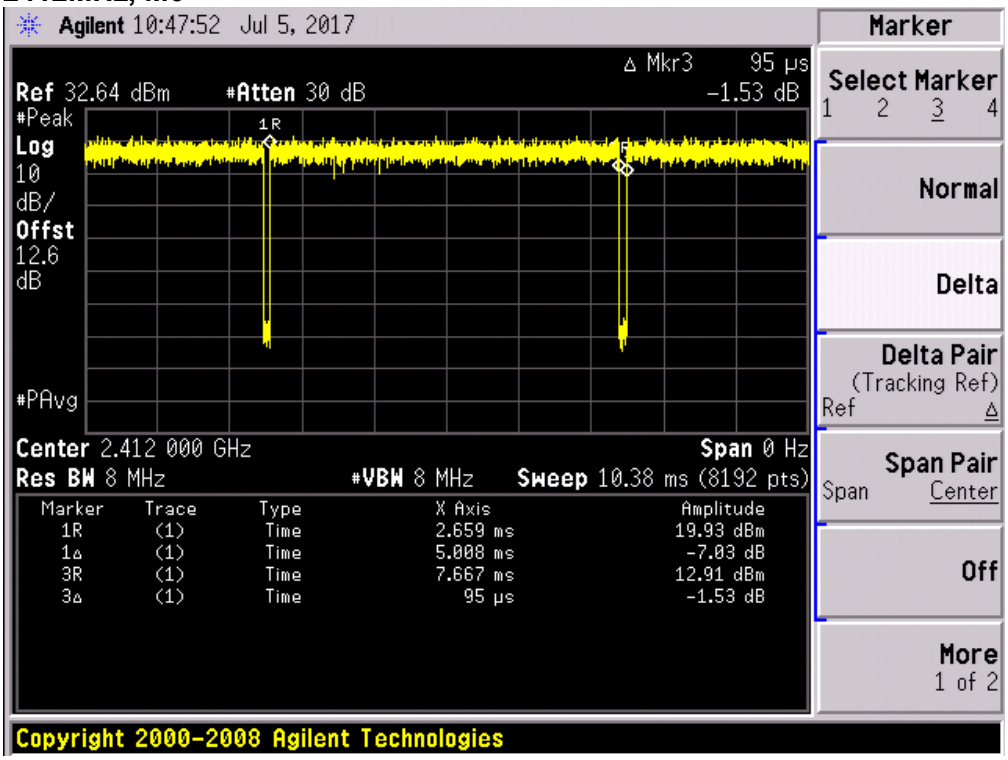
2412MHz, 6Mbps



2412MHz, 11Mbps



2412MHz, M0



A.2 6dB Bandwidth

6dB Bandwidth Test Requirement

For the FCC:
15.247 (2)

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

For Industry Canada:
RSS-247 5.2 (a)

5.2 Digital transmission systems
DTSs include systems that employ digital modulation techniques resulting in spectral characteristics similar to direct sequence systems. The following applies to the bands 902-928 MHz and 2400-2483.5 MHz:
a) The minimum 6 dB bandwidth shall be 500 kHz.

6dB Bandwidth Test Procedure

Ref. KDB 558074 D01 DTS Meas Guidance v04, 8.2 Option 2
ANSI C63.10: 2013

6dB BW Test Procedure
1. Set the radio in the continuous transmitting mode. 2. Allow the trace to stabilize. 3. Setting the x-dB bandwidth mode to -6dB within the measurement set up function. 4. Select the automatic OBW measurement function of an instrument to perform bandwidth measurement. 5. Capture graphs and record pertinent measurement data.

Ref. KDB 558074 D01 DTS Meas Guidance v04, 8.2 Option 2
ANSI C63.10: 2013 section 11.8.2 Option 2

6dB BW Test parameters

8.0 DTS bandwidth

One of the following procedures may be used to determine the modulated *DTS bandwidth*.

8.1 Option 1

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum 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.

8.2 Option 2

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (*i.e.*, RBW = 100 kHz, VBW ≥ 3 × RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
1	Conducted testing: EUT + AC/DC Adapter	S01 and S02	☑	☐

Tested By : Johanna Knudsen	**Date of testing:** July 3rd, 2017
Test Result : PASS	

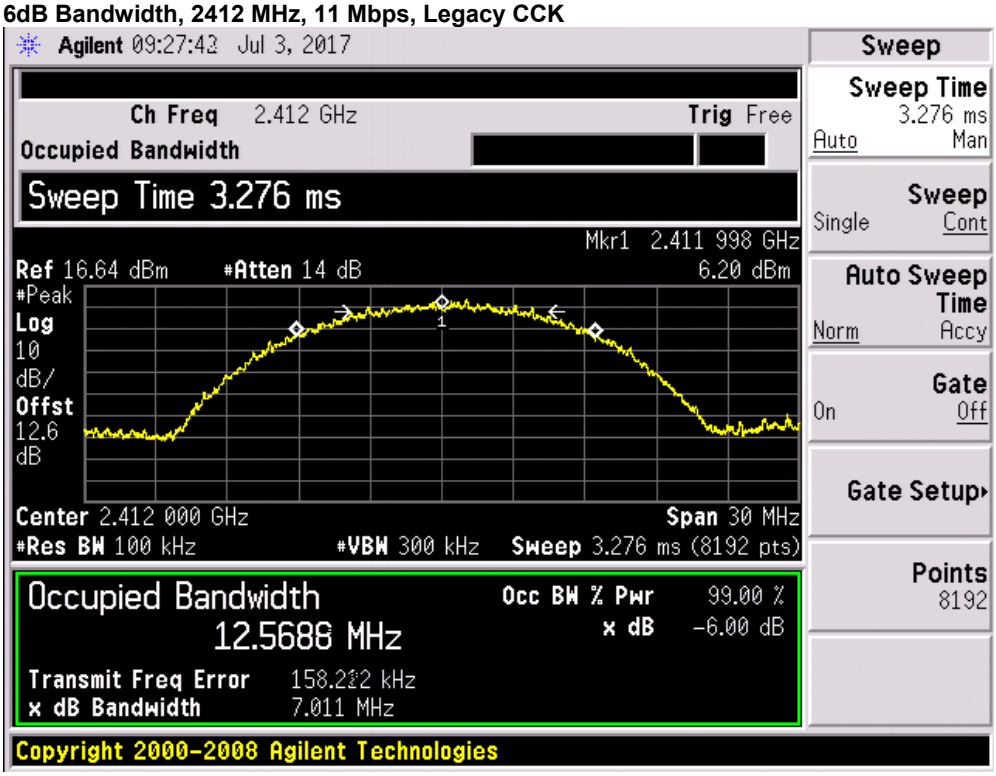
Test Equipment

See Appendix C for list of test equipment

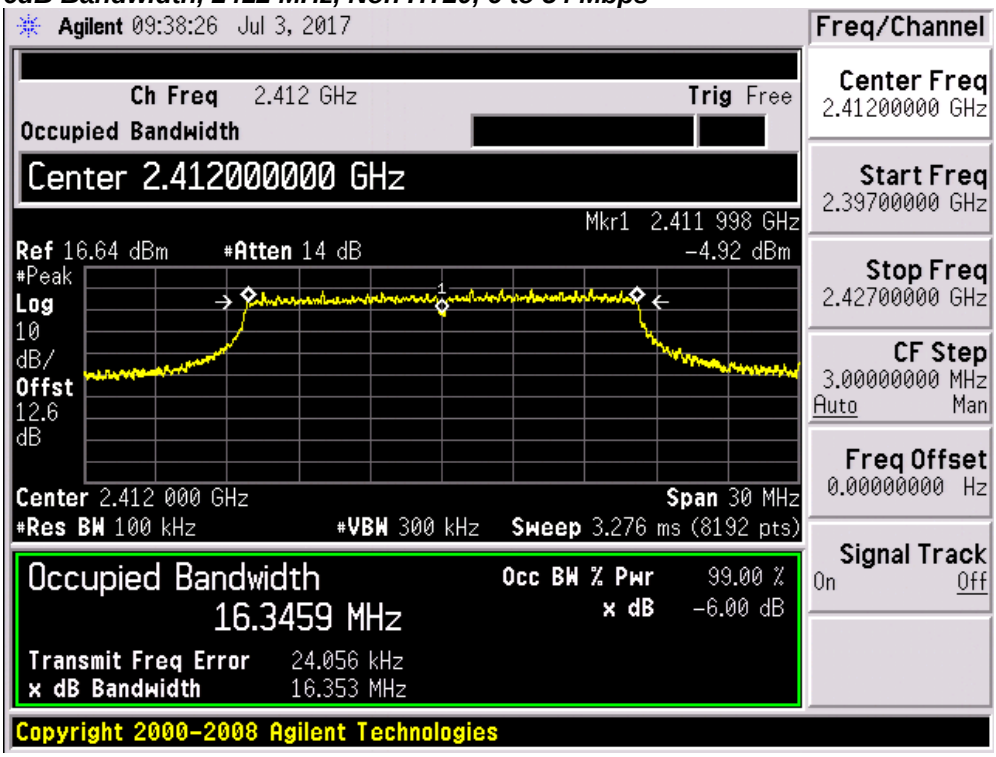
6dB Bandwidth Data Table

Frequency (MHz)	Mode	Data Rate (Mbps)	6dB BW (MHz)	Limit (kHz)	Margin (MHz)
2412	CCK, 1 to 11 Mbps	11	7.011	>500	6.511
	Non HT20, 6 to 54 Mbps	6	16.353	>500	15.853
	HT/VHT20, M0 to M15	m0	17.175	>500	16.675
2437	CCK, 1 to 11 Mbps	11	7.016	>500	6.516
	Non HT20, 6 to 54 Mbps	6	16.366	>500	15.866
	HT/VHT20, M0 to M15	m0	17.55	>500	17.05
2462	CCK, 1 to 11 Mbps	11	7.668	>500	7.168
	Non HT20, 6 to 54 Mbps	6	16.355	>500	15.855
	HT/VHT20, M0 to M15	m0	17.543	>500	17.043

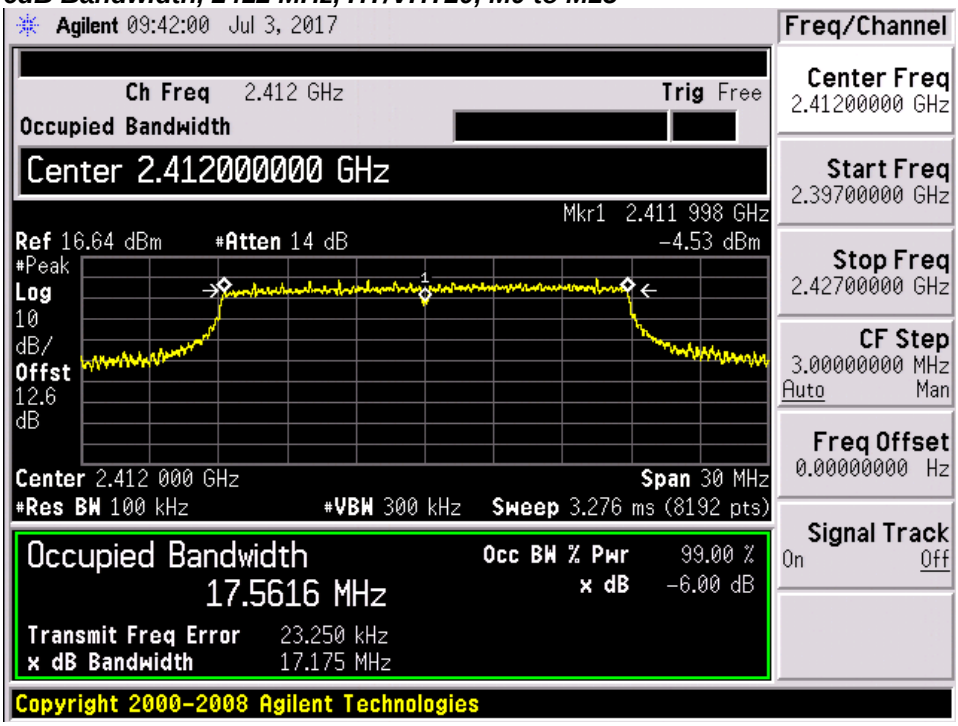
6dB Bandwidth, 2412 MHz, 11 Mbps, Legacy CCK



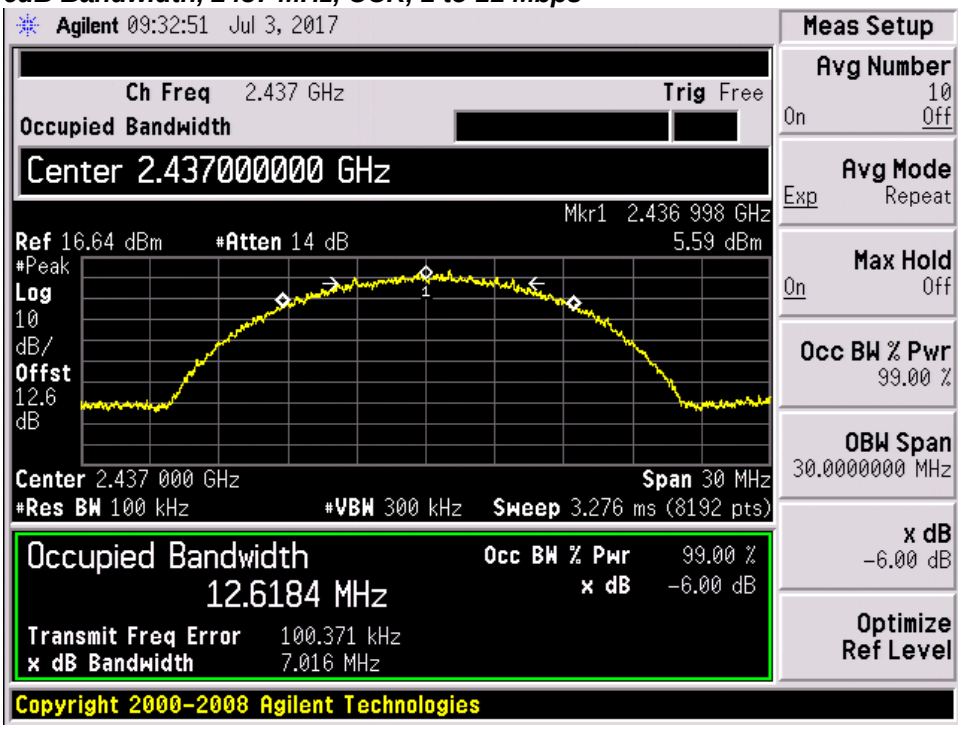
6dB Bandwidth, 2412 MHz, Non HT20, 6 to 54 Mbps



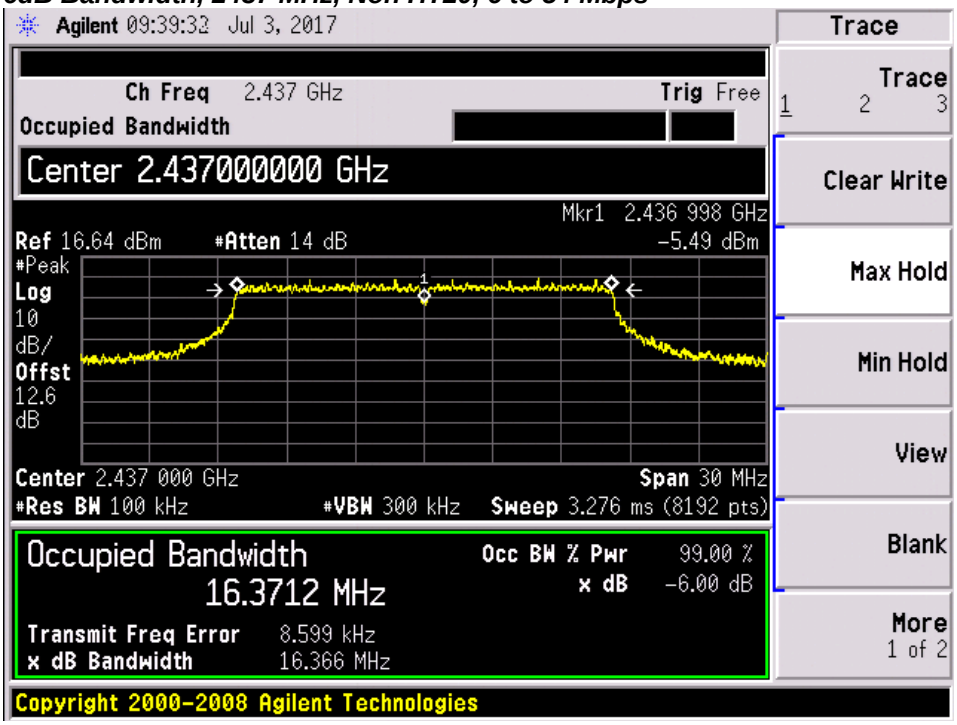
6dB Bandwidth, 2412 MHz, HT/VHT20, M0 to M15



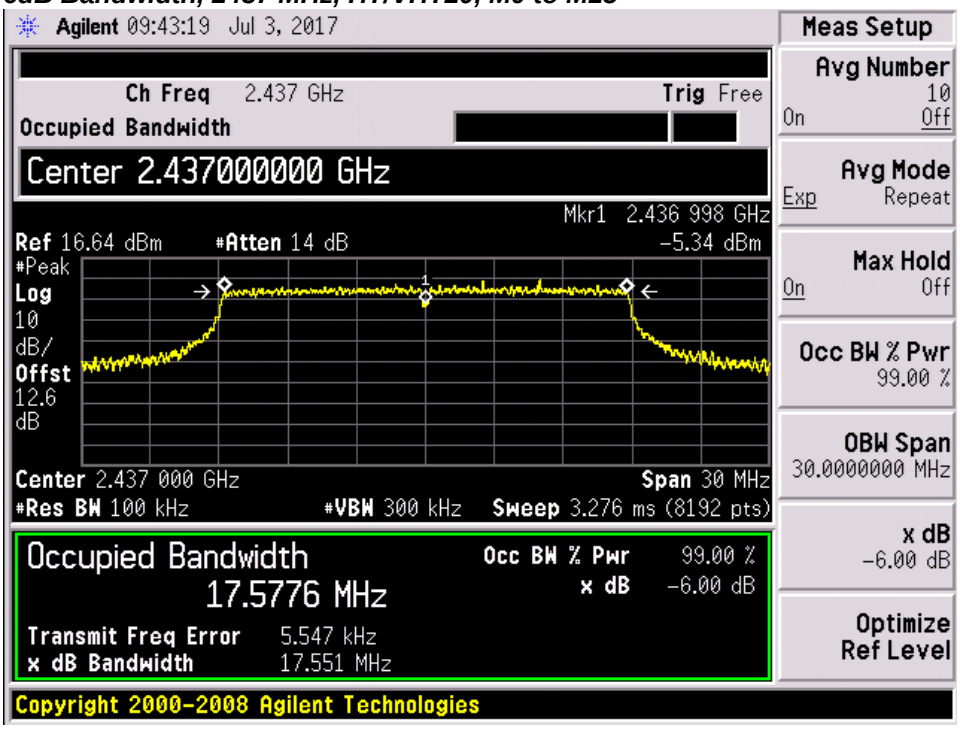
6dB Bandwidth, 2437 MHz, CCK, 1 to 11 Mbps



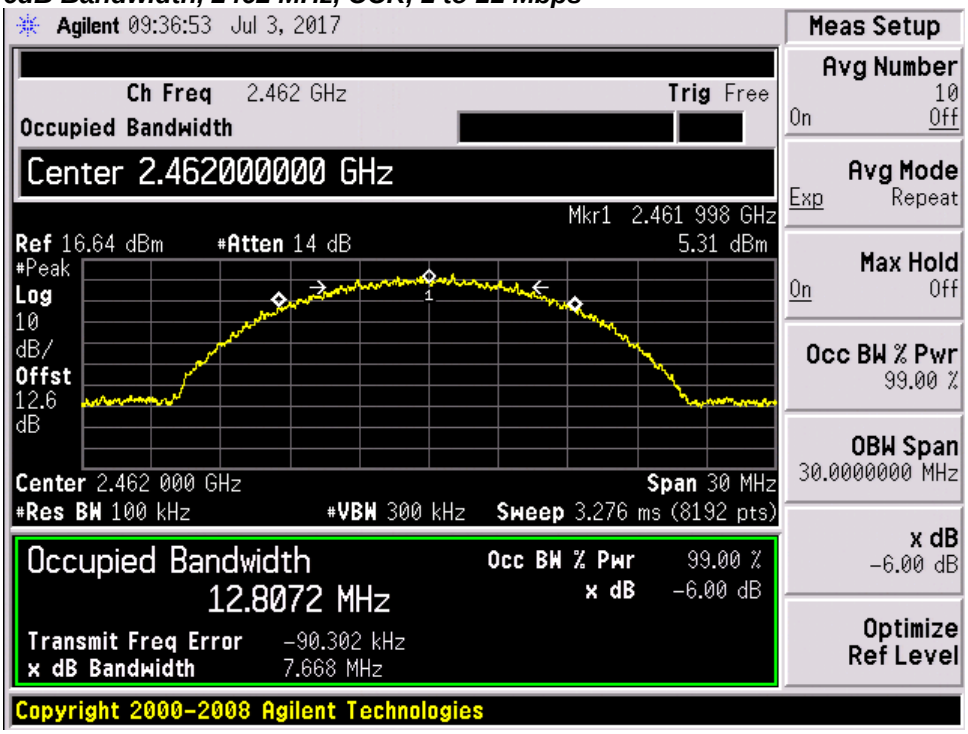
6dB Bandwidth, 2437 MHz, Non HT20, 6 to 54 Mbps



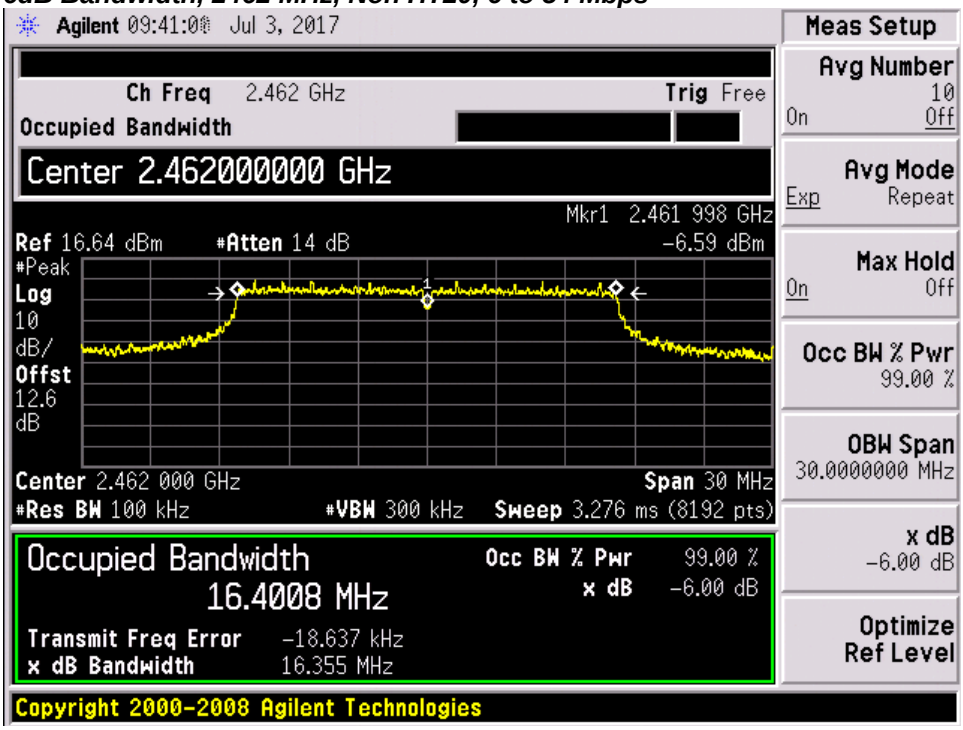
6dB Bandwidth, 2437 MHz, HT/VHT20, M0 to M15



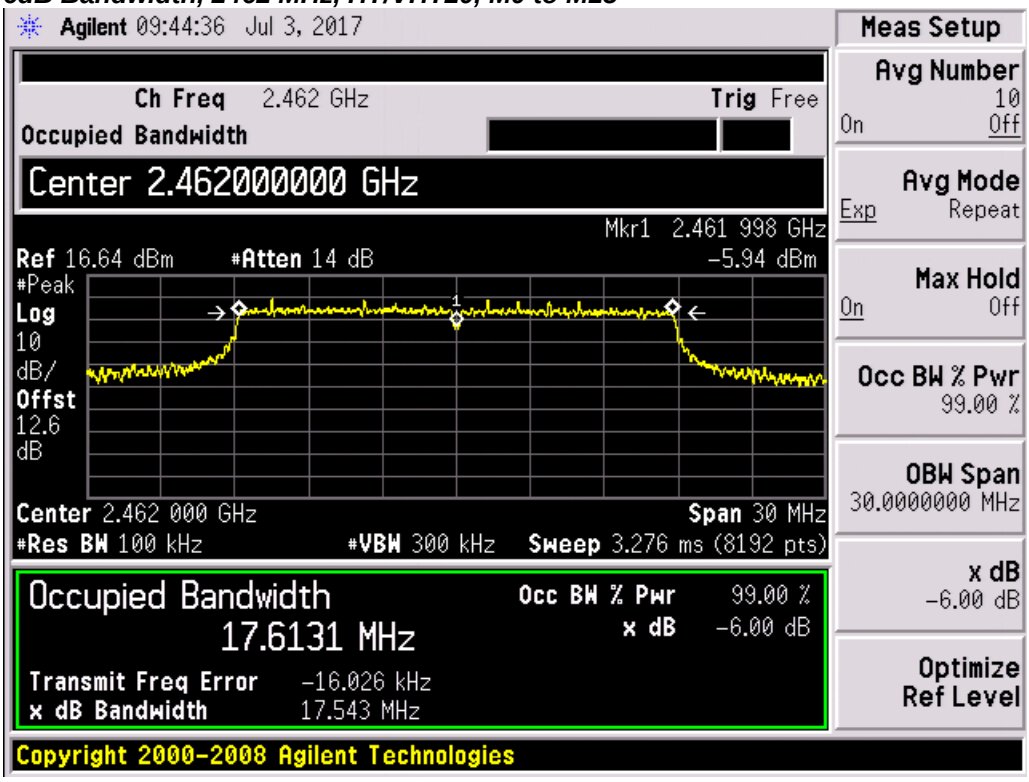
6dB Bandwidth, 2462 MHz, CCK, 1 to 11 Mbps



6dB Bandwidth, 2462 MHz, Non HT20, 6 to 54 Mbps



6dB Bandwidth, 2462 MHz, HT/VHT20, M0 to M15



A.3 Occupied Bandwidth

Occupied Bandwidth Test Requirement

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 26 dB emission 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 26 dB relative to the maximum level measured in the fundamental emission.

Occupied Bandwidth Test Method

Ref. ANSI C63.10: 2013

26 BW & 99% BW Test Procedure
1. Set the radio in the continuous transmitting mode. 2. Allow the trace to stabilize. 3. Setting the x-dB bandwidth mode to -26dB & OBW to 99% within the measurement set up function. 4. Select the automatic OBW measurement function of an instrument to perform bandwidth measurement. 5. Capture graphs and record pertinent measurement data.

Ref. ANSI C63.10: 2013 section 6.9.3

26 BW & 99% BW Test parameters
6.9.3 Occupied bandwidth—power bandwidth (99%) measurement procedure The 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. The following procedure shall be used for measuring 99% power bandwidth: a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW. b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement. c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2. d) Step a) through step c) might require iteration to adjust within the specified range. e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used. f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth. g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies. h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
1	Conducted testing: EUT + AC/DC Adapter	S01 and S02	☑	☐

Tested By : Johanna Knudsen	**Date of testing:** July 3rd, 2017
Test Result : PASS	

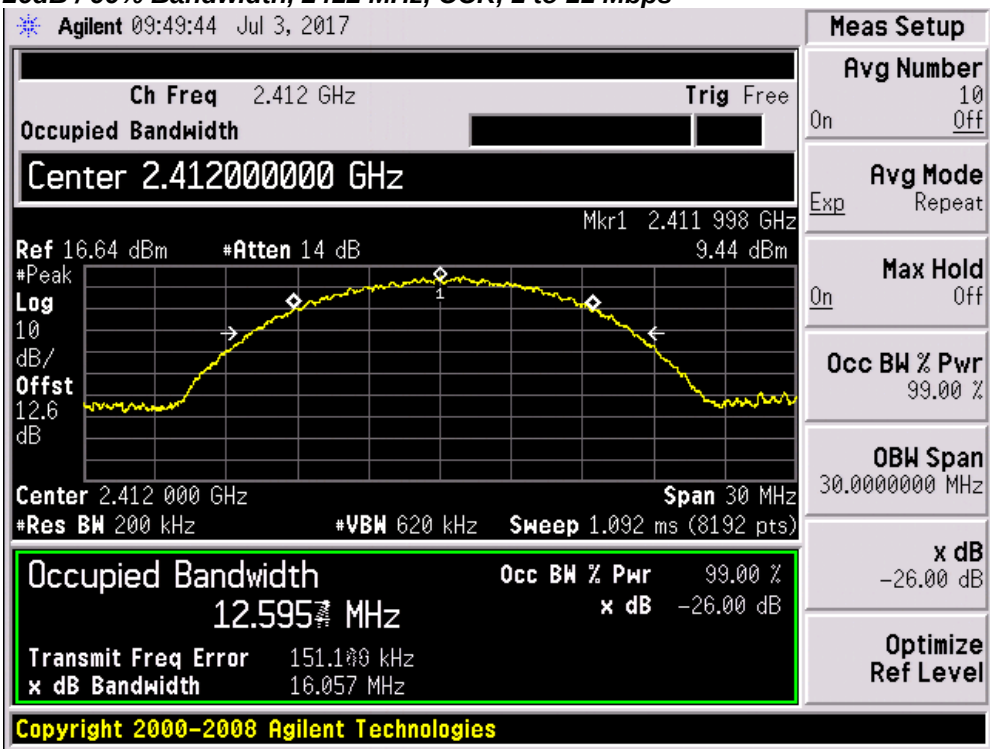
Test Equipment

See Appendix C for list of test equipment

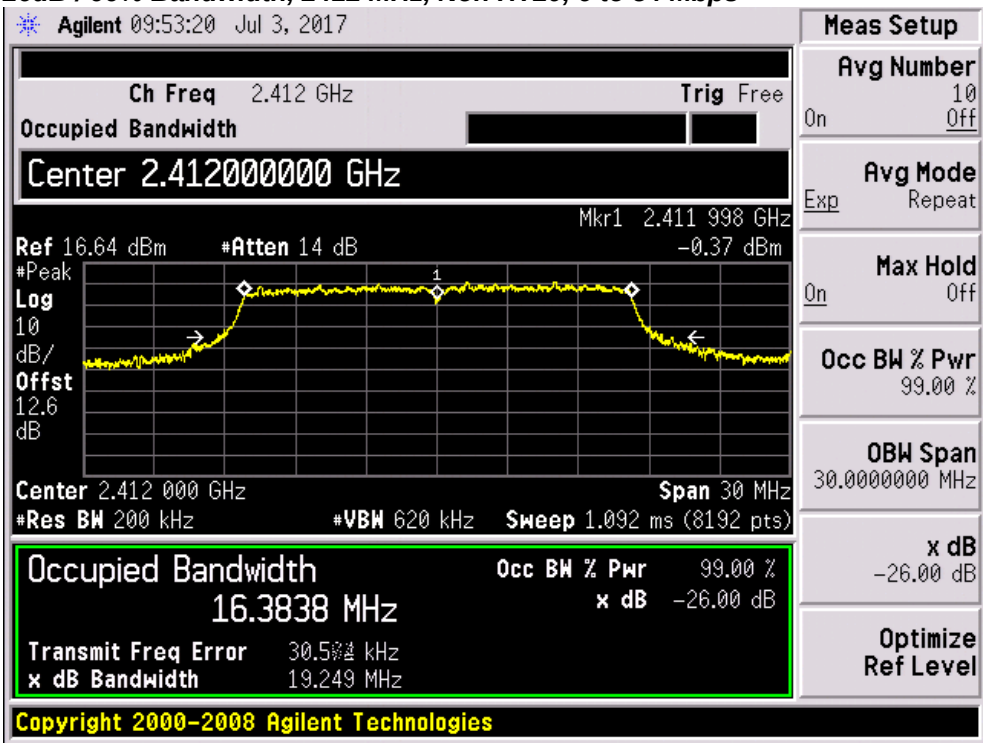
Occupied Bandwidth Data Table

Frequency (MHz)	Mode	Data Rate (Mbps)	26dB BW (MHz)	99% BW (MHz)
2412	Non HT20, 6 to 54 Mbps	6	19.249	16.3838
	CCK, 1 to 11 Mbps	11	16.057	12.5957
	HT/VHT20, M0 to M15	m0	20.195	17.5886
2437	Non HT20, 6 to 54 Mbps	6	19.350	16.4193
	CCK, 1 to 11 Mbps	11	16.278	12.6917
	HT/VHT20, M0 to M15	m0	19.953	17.5950
2462	Non HT20, 6 to 54 Mbps	6	21.179	16.4815
	CCK, 1 to 11 Mbps	11	16.357	12.8407
	HT/VHT20, M0 to M15	m0	20.807	17.6419

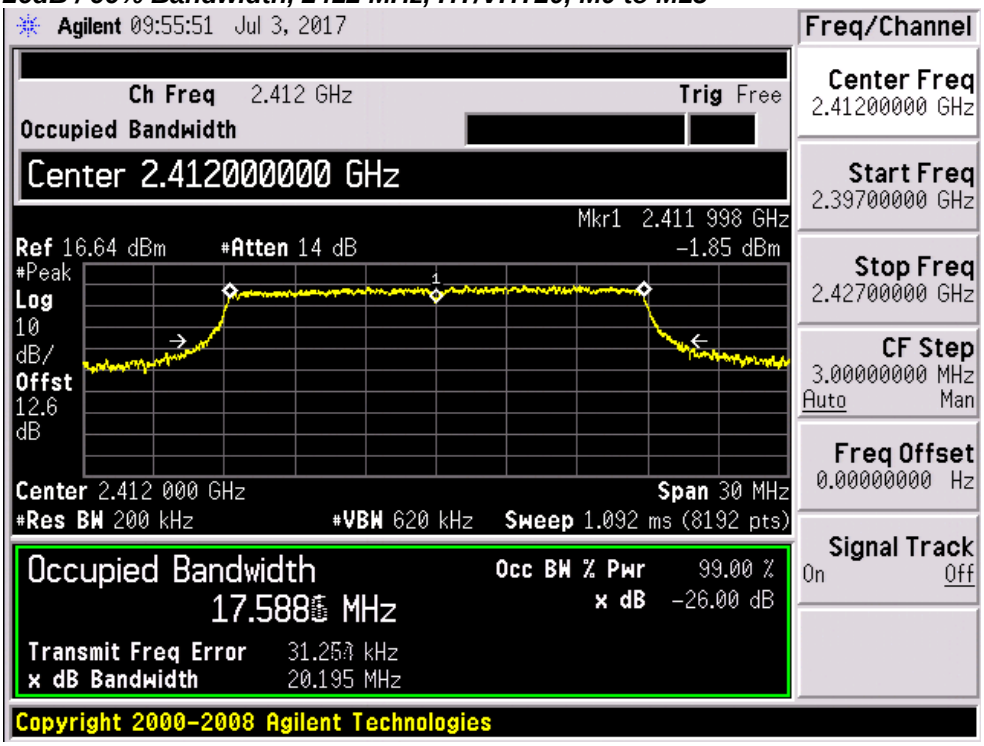
26dB / 99% Bandwidth, 2412 MHz, CCK, 1 to 11 Mbps



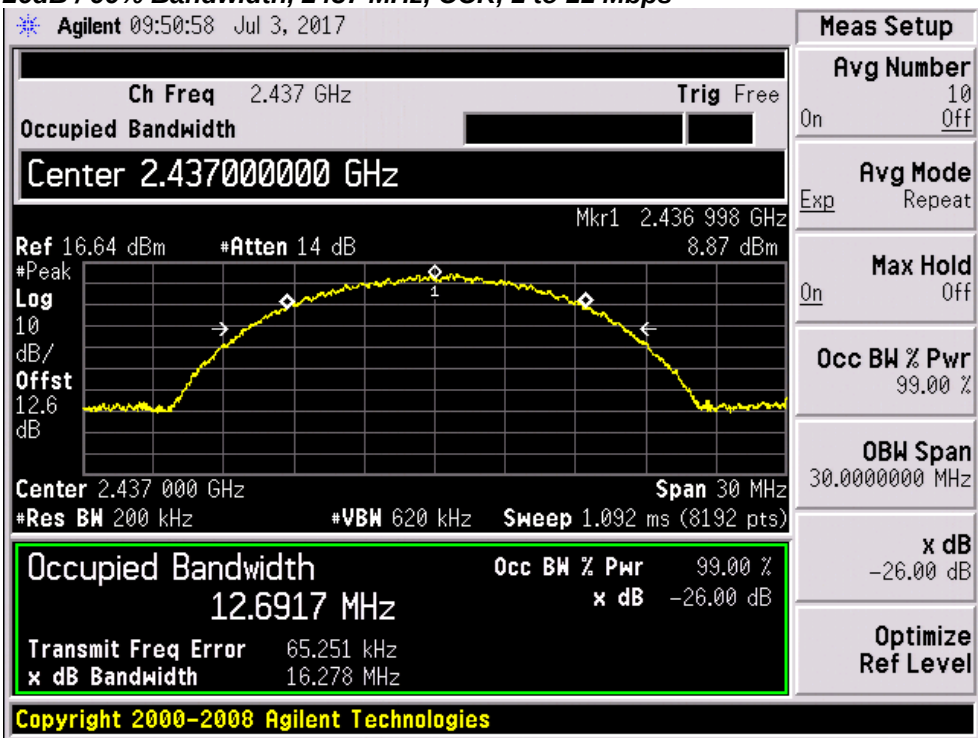
26dB / 99% Bandwidth, 2412 MHz, Non HT20, 6 to 54 Mbps



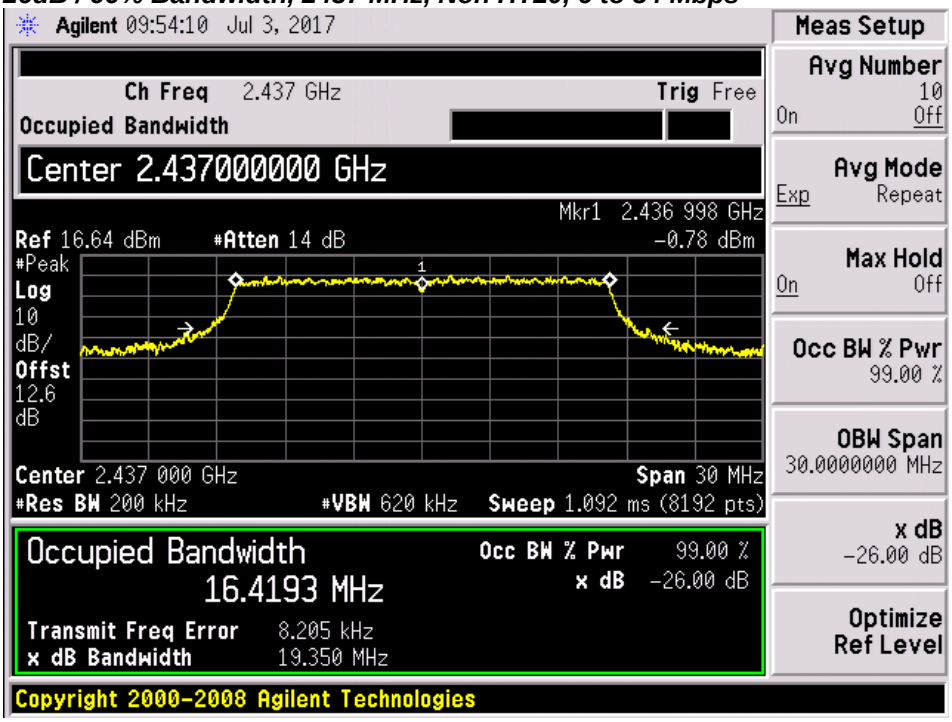
26dB / 99% Bandwidth, 2412 MHz, HT/VHT20, M0 to M15



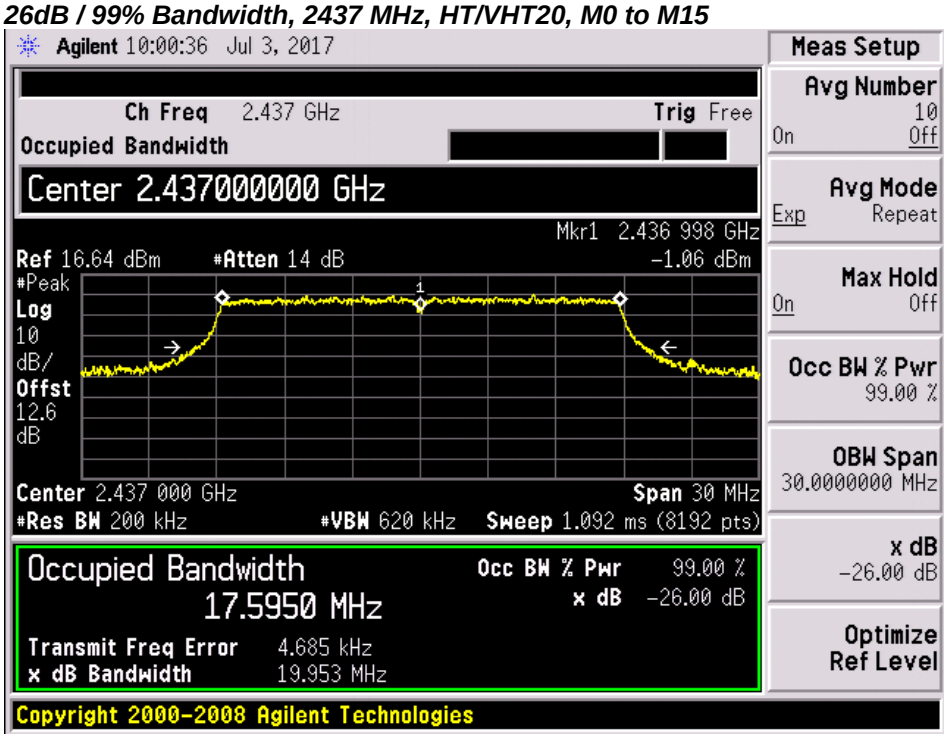
26dB / 99% Bandwidth, 2437 MHz, CCK, 1 to 11 Mbps



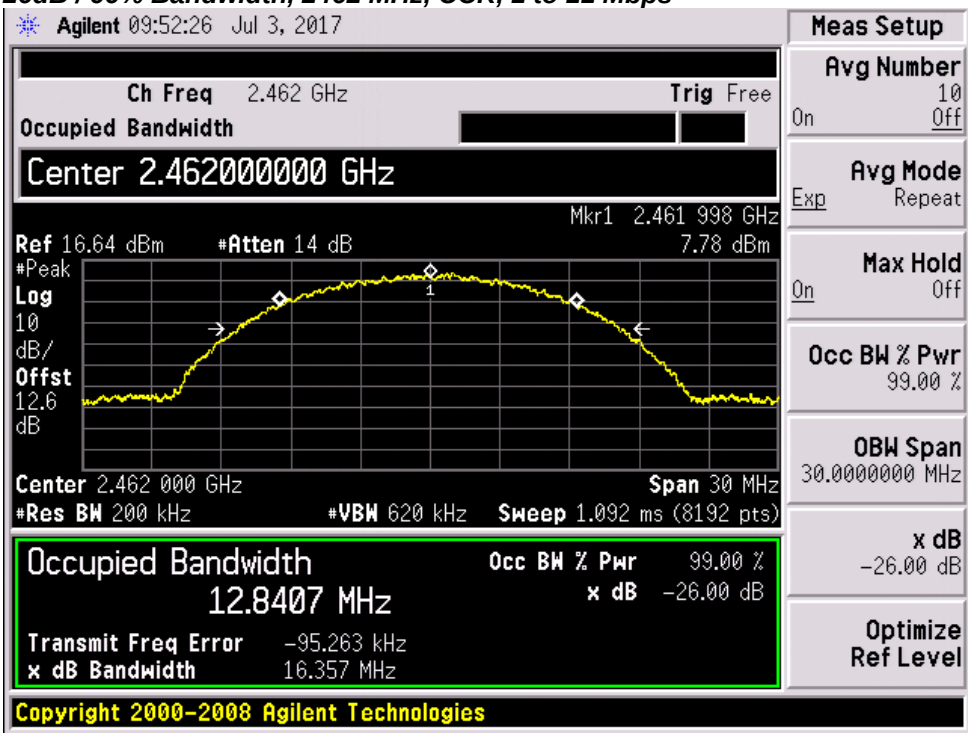
26dB / 99% Bandwidth, 2437 MHz, Non HT20, 6 to 54 Mbps



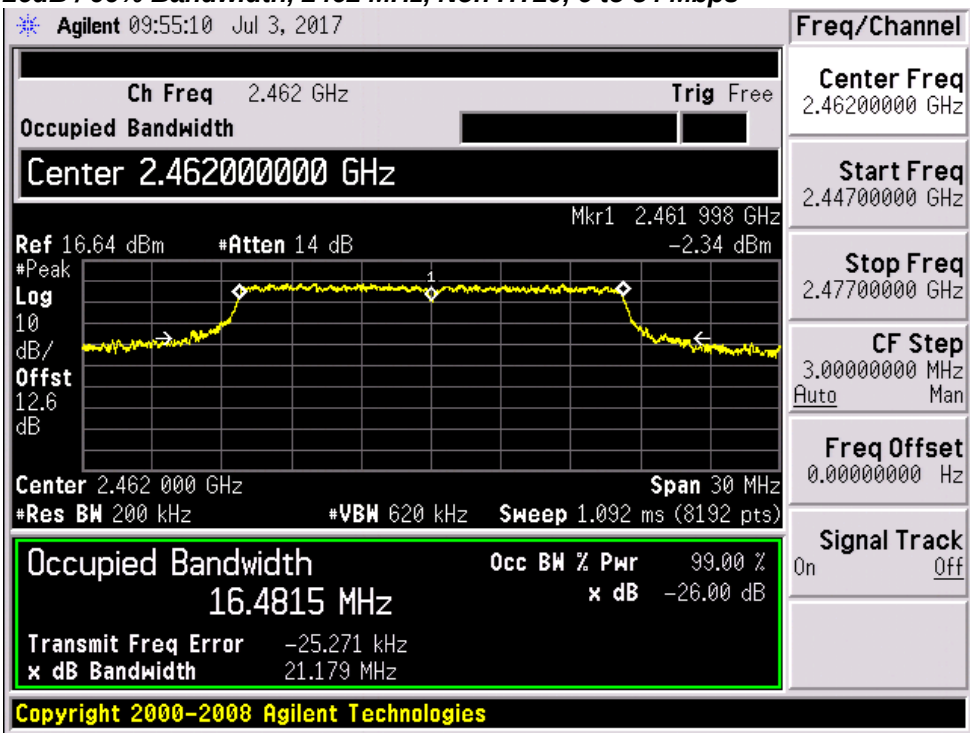
26dB / 99% Bandwidth, 2437 MHz, HT/VHT20, M0 to M15



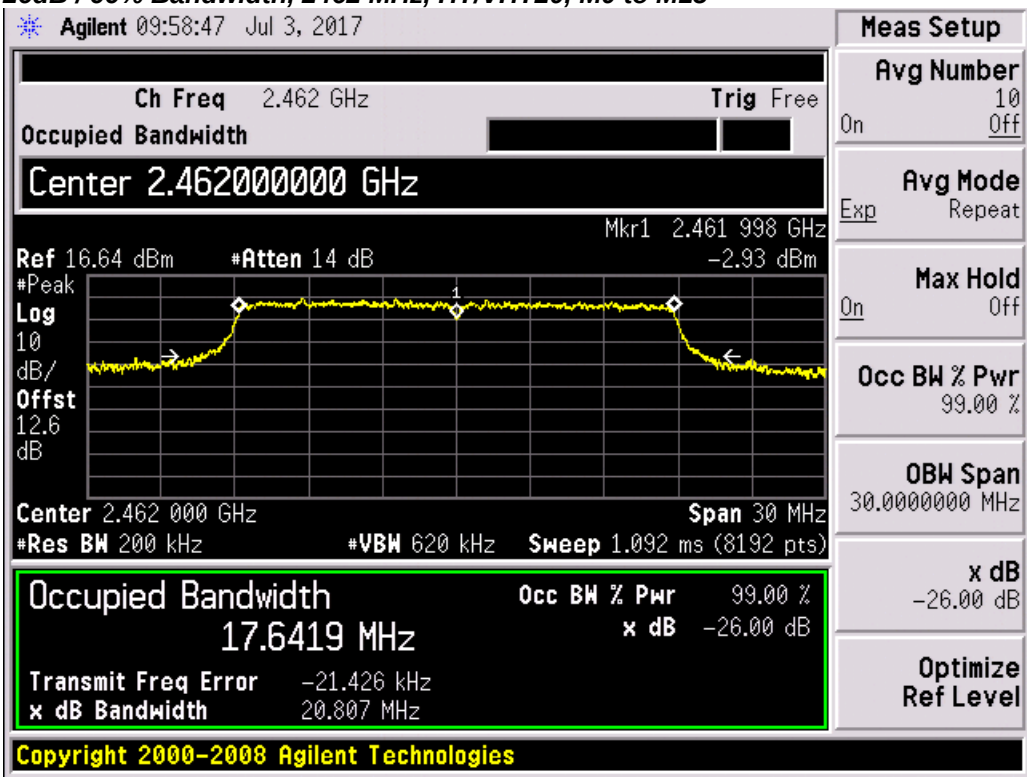
26dB / 99% Bandwidth, 2462 MHz, CCK, 1 to 11 Mbps



26dB / 99% Bandwidth, 2462 MHz, Non HT20, 6 to 54 Mbps



26dB / 99% Bandwidth, 2462 MHz, HT/VHT20, M0 to M15



A.4 Maximum Conducted Output Power

Maximum Conducted Output Power Test Requirement

FCC, 15.247:
(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following: (3) For systems using digital modulation in the 902-928 MHz, **2400-2483.5 MHz**, and 5725-5850 MHz bands: **1 Watt**. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Industry Canada, RSS-247:

5.4 Transmitter output power and equivalent isotropically radiated power (e.i.r.p.) requirements

d) For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.

Maximum Conducted Output Power Test Method

Ref. KDB 558074 D01 DTS Meas Guidance v04
ANSI C63.10: 2013

Maximum Conducted Output power
Test Procedure
1. Set the radio in the continuous transmitting mode at full power 2. Compute power by integrating the spectrum across the EBW (or alternatively entire 99% OBW) of the signal using the instrument's band power measurement function. The integration shall be performed using the spectrum analyzer band-power measurement function with band limits set equal to the EBW or the OBW band edges. 3. Capture graphs and record pertinent measurement data.

Ref. 558074 D01 DTS Meas Guidance v04, section 9.2.2.4 **Method AVGSA-2**
ANSI C63.10: 2013, section 11.9.2.2.4 **Method AVGSA-2**

Maximum Conducted Output power
Test parameters

9.2.2.4 Method AVGSA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction)

a) Measure the duty cycle, x, of the transmitter output signal as described in 6.0.
b) Set span to at least 1.5 times the OBW.
c) Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
d) Set VBW ≥ 3 x RBW.
e) Number of points in sweep ≥ 2 × span / RBW. (This gives bin-to-bin spacing ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
f) Sweep time = auto.
g) Detector = RMS (*i.e.*, power averaging), if available. Otherwise, use sample detector mode.
h) Do not use sweep triggering. Allow the sweep to "free run".
i) Trace average at least 100 traces in power averaging (*i.e.*, RMS) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the on and off periods of the transmitter.
j) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
k) Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add 10 log (1/0.25) = 6 dB if the duty cycle is 25 %.

The "measure-and-sum technique" is used for measuring in-band transmit power of a device. In the measure-and-sum approach, the conducted emission level is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in linear power units. (See ANSI C63.10 section 14.3 for Guidance)

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
1	Conducted testing: EUT + AC/DC Adapter	S01 and S02	☑	☐

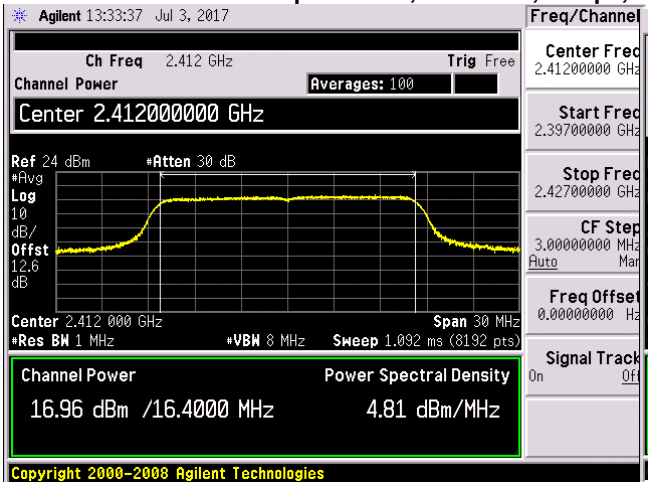
Tested By :	Date of testing:
Johanna Knudsen	July 3rd, 2017
Test Result : PASS	

Test Equipment
See Appendix C for list of test equipment

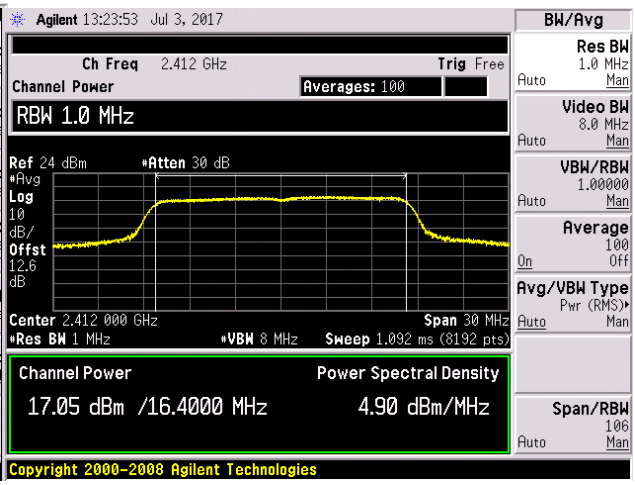
Maximum Conducted Output Power Data Table

Frequency (MHz)	Mode	Tx Paths	Correlated Antenna Gain (dBi)	Duty Cycle	Tx 1 Max Power (dBm)	Tx 2 Max Power (dBm)	Total Tx Channel Power (dBm)	Total TX Channel Power - corrected for duty cycle (dBm)	Limit (dBm)	Margin (dB)
2412	CCK, 1 to 11 Mbps	1	2	96.1	17.07		17.07	17.24	30.00	12.76
	CCK, 1 to 11 Mbps	2	2	96.1	17.07	17.35	20.22	20.40	30.00	9.60
	Non HT20, 6 to 54 Mbps	1	2	94.3	16.96		16.96	17.21	30.00	12.79
	Non HT20, 6 to 54 Mbps	2	2	94.3	16.96	17.05	20.02	20.27	30.00	9.73
	Non HT20 Beam Forming, 6 to 54 Mbps	2	5	94.3	16.96	17.05	20.02	20.27	30.00	9.73
	HT/VHT20, M0-M7	1	2	98.1	16.85		16.85	16.93	30.00	13.07
	HT/VHT20, M0-M7	2	2	98.1	16.85	16.81	19.84	19.92	30.00	10.08
	HT/VHT20, M8-M15	2	2	98.1	16.85	16.81	19.84	19.92	30.00	10.08
	HT/VHT20, Beam Forming, M0 to M7	2	5	98.1	16.85	16.81	19.84	19.92	30.00	10.08
	HT/VHT20, Beam Forming, M8 to M15	2	2	98.1	16.85	16.81	19.84	19.92	30.00	10.08
	HT/VHT20, STBC, M0 to M7	2	2	98.1	16.85	16.81	19.84	19.92	30.00	10.08
2437	CCK, 1 to 11 Mbps	1	2	96.1	16.53		16.53	16.70	30.00	13.30
	CCK, 1 to 11 Mbps	2	2	96.1	16.53	16.57	19.56	19.73	30.00	10.27
	Non HT20, 6 to 54 Mbps	1	2	94.3	16.69		16.69	16.94	30.00	13.06
	Non HT20, 6 to 54 Mbps	2	2	94.3	16.69	16.42	19.57	19.82	30.00	10.18
	Non HT20 Beam Forming, 6 to 54 Mbps	2	5	94.3	16.69	16.42	19.57	19.82	30.00	10.18
	HT/VHT20, M0-M7	1	2	98.1	16.73		16.73	16.81	30.00	13.19
	HT/VHT20, M0-M7	2	2	98.1	16.73	16.33	19.54	19.63	30.00	10.37
	HT/VHT20, M8-M15	2	2	98.1	16.73	16.33	19.54	19.63	30.00	10.37
	HT/VHT20, Beam Forming, M0 to M7	2	5	98.1	16.73	16.33	19.54	19.63	30.00	10.37
	HT/VHT20, Beam Forming, M8 to M15	2	2	98.1	16.73	16.33	19.54	19.63	30.00	10.37
	HT/VHT20, STBC, M0 to M7	2	2	98.1	16.73	16.33	19.54	19.63	30.00	10.37
2462	CCK, 1 to 11 Mbps	1	2	96.1	15.99		15.99	16.16	30.00	13.84
	CCK, 1 to 11 Mbps	2	2	96.1	15.99	15.85	18.93	19.10	30.00	10.90
	Non HT20, 6 to 54 Mbps	1	2	94.3	16.08		16.08	16.33	30.00	13.67
	Non HT20, 6 to 54 Mbps	2	2	94.3	16.08	15.93	19.02	19.27	30.00	10.73
	Non HT20 Beam Forming, 6 to 54 Mbps	2	5	94.3	16.08	15.93	19.02	19.27	30.00	10.73
	HT/VHT20, M0-M7	1	2	98.1	16.06		16.06	16.14	30.00	13.86
	HT/VHT20, M0-M7	2	2	98.1	16.06	15.92	19.00	19.08	30.00	10.92
	HT/VHT20, M8-M15	2	2	98.1	16.06	15.92	19.00	19.08	30.00	10.92
	HT/VHT20, Beam Forming, M0 to M7	2	5	98.1	16.06	15.92	19.00	19.08	30.00	10.92
	HT/VHT20, Beam Forming, M8 to M15	2	2	98.1	16.06	15.92	19.00	19.08	30.00	10.92
	HT/VHT20, STBC, M0 to M7	2	2	98.1	16.06	15.92	19.00	19.08	30.00	10.92

Maximum Conducted Output Power, 2412 MHz, 6Mbps, nonHT20



Antenna A



Antenna B

A.5 Power Spectral Density

Power Spectral Density Test Requirement

15.247 (e) / RSS-247 5.2 (b)

5.2 Digital transmission systems

DTSs include systems that employ digital modulation techniques resulting in spectral characteristics similar to direct sequence systems. The following applies to the bands 902-928 MHz and 2400-2483.5 MHz:

b) The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of section 5.4(d), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

Power Spectral Density Test Method

Ref. KDB 558074 D01 DTS Meas Guidance v04
ANSI C63.10: 2013

Power Spectral Density Test Procedure
1. Set the radio in the continuous transmitting mode at full power 2.Configure Spectrum analyzer as per test parameters below and Peak search marker 3. Capture graphs and record pertinent measurement data.

Ref. 558074 D01 DTS Meas Guidance v04, section 10.5 **Average PSD**
ANSI C63.10: 2013, section 11.10.5 **Average PSD**

Power Spectral Density Test parameters

10.5 Method AVGPSD-2 (trace averaging across on- and off-times of the EUT transmissions, followed by duty cycle correction)

This procedure is applicable when the EUT cannot be configured to transmit continuously (i.e., duty cycle < 98 %), and when sweep triggering/signal gating cannot be used to measure only when the EUT is transmitting at its maximum power control level, and when the transmission duty cycle is constant (i.e., duty cycle variations are less than ± 2 %):

a) Measure the duty cycle (x) of the transmitter output signal as described in Section 6.0.
b) Set instrument center frequency to DTS channel center frequency.
c) Set span to at least 1.5 × OBW.
d) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
e) Set VBW ≥3 × RBW.
f) Detector = power averaging (RMS) or sample detector (when RMS not available).
g) Ensure that the number of measurement points in the sweep ≥ 2 × span/RBW.
h) Sweep time = auto couple.
i) Do not use sweep triggering. Allow sweep to "free run".
j) Employ trace averaging (RMS) mode over a minimum of 100 traces.
k) Use the peak marker function to determine the maximum amplitude level.
l) Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time.
m) If resultant value exceeds the limit, then reduce RBW (no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span in order to meet the minimum measurement point requirement as the RBW is reduced).

The "Measure and add 10 log(N) dB technique", where N is the number of outputs, is used for measuring in-band Power Spectral Density. With this technique, spectrum measurements are performed at each output of the device, and the quantity 10 log(4) (or 6dB) is added to the worst case spectrum value before comparing to the emission limit. (See ANSI C63.10 section 14.3.2.3)

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
1	Conducted testing: EUT + AC/DC Adapter	S01 and S02	☑	☐

Tested By : Johanna Knudsen	**Date of testing:** July 5th, 2017
Test Result : PASS	

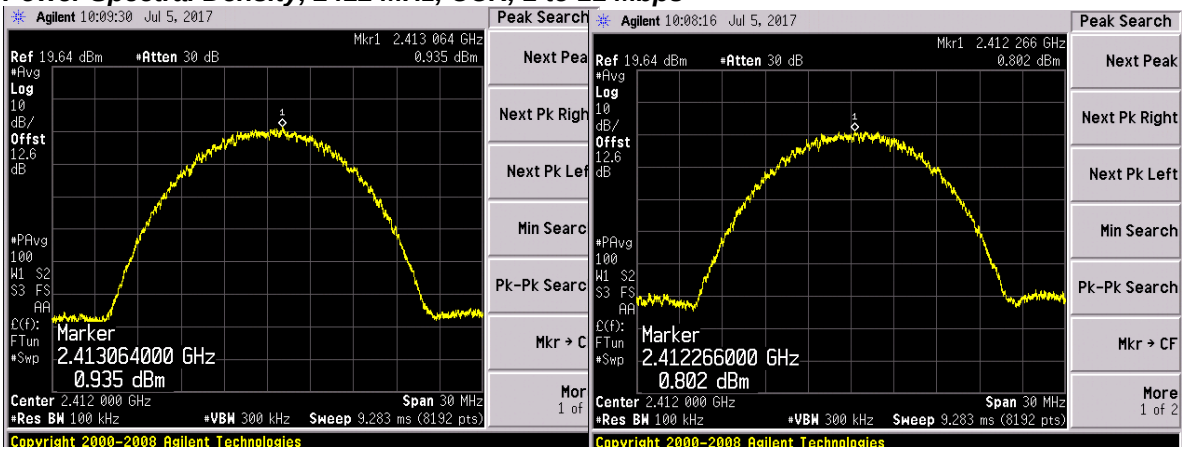
Test Equipment

See Appendix C for list of test equipment

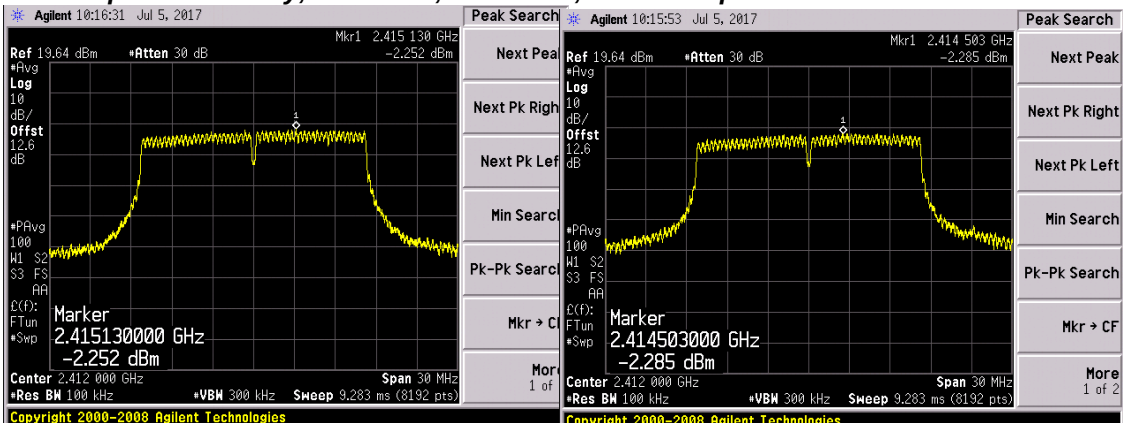
Power Spectral Density Data Table

Frequency (MHz)	Mode	Tx Paths	Correlated Antenna Gain (dBi)	Duty Cycle	Tx 1 PSD (dBm/3kHz)	Tx 2 PSD (dBm/3kHz)	Total PSD (dBm/3kHz)	Total PSD - corrected for duty cycle (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
2412	CCK, 1 to 11 Mbps	1	2	96.1	0.935		1.24	1.41	8.00	6.59
	CCK, 1 to 11 Mbps	2	2	96.1	0.935	0.802	2.44	2.62	8.00	5.38
	Non HT20, 6 to 54 Mbps	1	2	94.3	-2.252		0.60	0.85	8.00	7.15
	Non HT20, 6 to 54 Mbps	2	2	94.3	-2.252	-2.285	1.19	1.44	8.00	6.56
	Non HT20 Beam Forming, 6 to 54 Mbps	2	5	94.3	-2.252	-2.285	1.19	1.44	8.00	6.56
	HT/VHT20, M0-M7	1	2	98.1	-2.249		0.60	0.68	8.00	7.32
	HT/VHT20, M0-M7	2	2	98.1	-2.249	-2.356	1.18	1.26	8.00	6.74
	HT/VHT20, M8-M15	2	2	98.1	-2.249	-2.356	1.18	1.26	8.00	6.74
	HT/VHT20, Beam Forming, M0 to M7	2	5	98.1	-2.249	-2.356	1.18	1.26	8.00	6.74
	HT/VHT20, Beam Forming, M8 to M15	2	2	98.1	-2.249	-2.356	1.18	1.26	8.00	6.74
	HT/VHT20, STBC, M0 to M7	2	2	98.1	-2.249	-2.356	1.18	1.26	8.00	6.74
2437	CCK, 1 to 11 Mbps	1	2	96.1	0.534		1.13	1.30	8.00	6.70
	CCK, 1 to 11 Mbps	2	2	96.1	0.534	0.114	2.16	2.33	8.00	5.67
	Non HT20, 6 to 54 Mbps	1	2	94.3	-3.112		0.49	0.74	8.00	7.26
	Non HT20, 6 to 54 Mbps	2	2	94.3	-3.112	-3.122	0.98	1.23	8.00	6.77
	Non HT20 Beam Forming, 6 to 54 Mbps	2	5	94.3	-3.112	-3.122	0.98	1.23	8.00	6.77
	HT/VHT20, M0-M7	1	2	98.1	-2.879		0.52	0.60	8.00	7.40
	HT/VHT20, M0-M7	2	2	98.1	-2.879	-3.37	0.98	1.06	8.00	6.94
	HT/VHT20, M8-M15	2	2	98.1	-2.879	-3.37	0.98	1.06	8.00	6.94
	HT/VHT20, Beam Forming, M0 to M7	2	5	98.1	-2.879	-3.37	0.98	1.06	8.00	6.94
	HT/VHT20, Beam Forming, M8 to M15	2	2	98.1	-2.879	-3.37	0.98	1.06	8.00	6.94
	HT/VHT20, STBC, M0 to M7	2	2	98.1	-2.879	-3.37	0.98	1.06	8.00	6.94
2462	CCK, 1 to 11 Mbps	1	2	96.1	0.1		1.02	1.20	8.00	6.80
	CCK, 1 to 11 Mbps	2	2	96.1	0.1	-0.476	1.92	2.09	8.00	5.91
	Non HT20, 6 to 54 Mbps	1	2	94.3	-3.115		0.49	0.74	8.00	7.26
	Non HT20, 6 to 54 Mbps	2	2	94.3	-3.115	-3.452	0.94	1.19	8.00	6.81
	Non HT20 Beam Forming, 6 to 54 Mbps	2	5	94.3	-3.115	-3.452	0.94	1.19	8.00	6.81
	HT/VHT20, M0-M7	1	2	98.1	-3.418		0.46	0.54	8.00	7.46
	HT/VHT20, M0-M7	2	2	98.1	-3.418	-3.885	0.86	0.95	8.00	7.05
	HT/VHT20, M8-M15	2	2	98.1	-3.418	-3.885	0.86	0.95	8.00	7.05
	HT/VHT20, Beam Forming, M0 to M7	2	5	98.1	-3.418	-3.885	0.86	0.95	8.00	7.05
	HT/VHT20, Beam Forming, M8 to M15	2	2	98.1	-3.418	-3.885	0.86	0.95	8.00	7.05
	HT/VHT20, STBC, M0 to M7	2	2	98.1	-3.418	-3.885	0.86	0.95	8.00	7.05

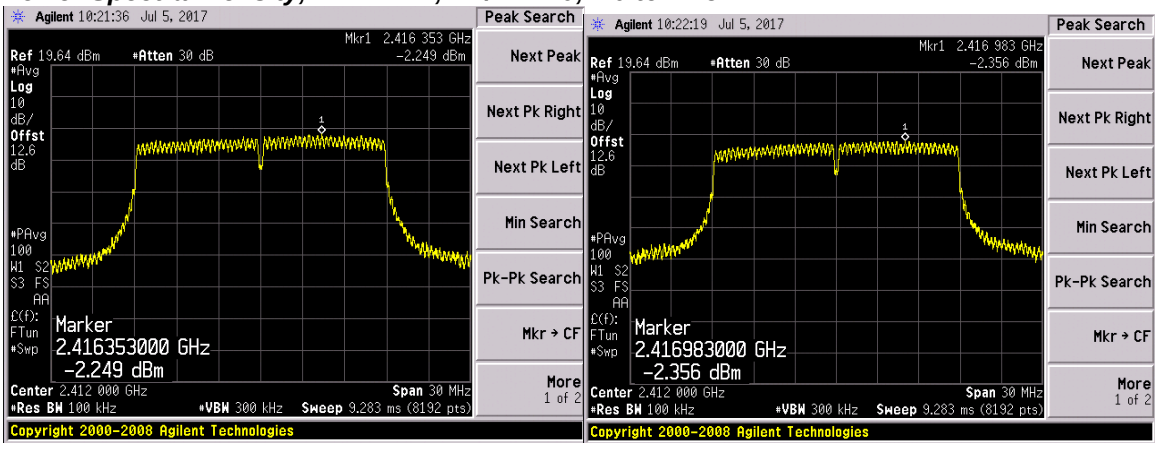
Power Spectral Density, 2412 MHz, CCK, 1 to 11 Mbps



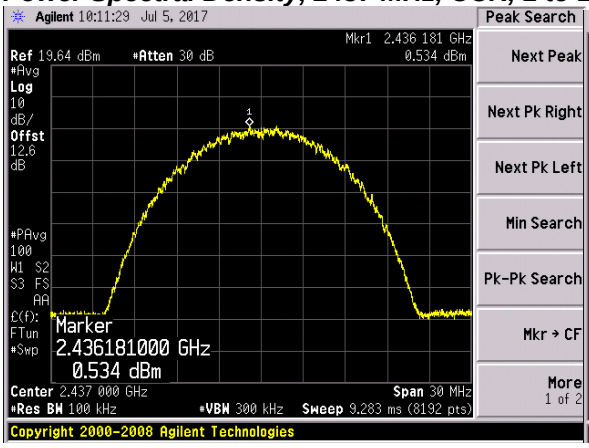
Power Spectral Density, 2412 MHz, Non HT20, 6 to 54 Mbps

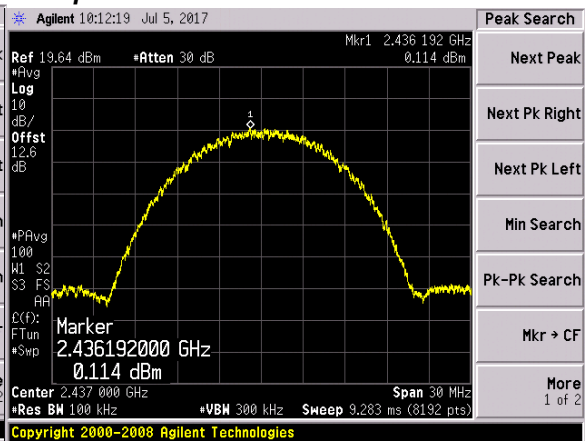


Power Spectral Density, 2412 MHz, HT/VHT20, M0 to M15

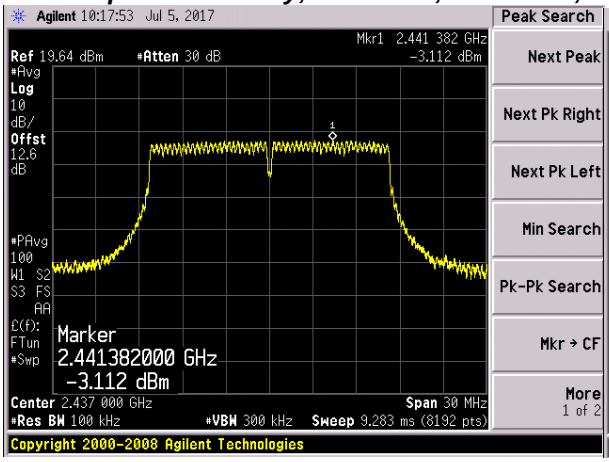


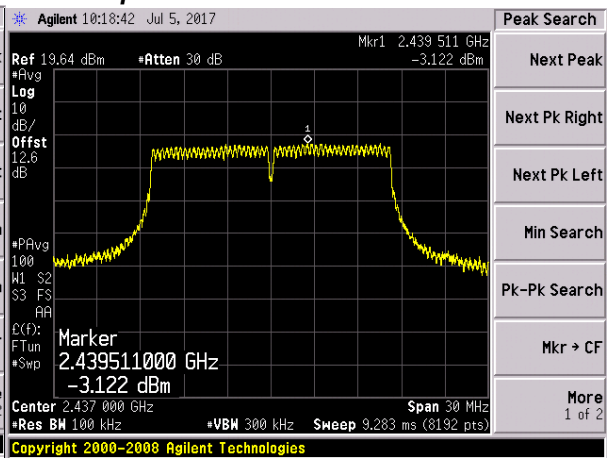
Power Spectral Density, 2437 MHz, CCK, 1 to 11 Mbps



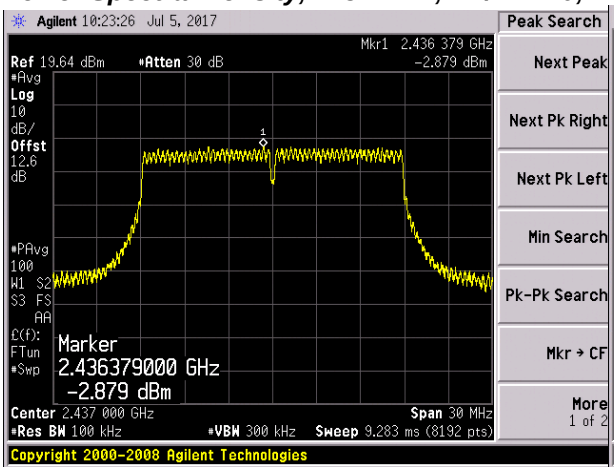


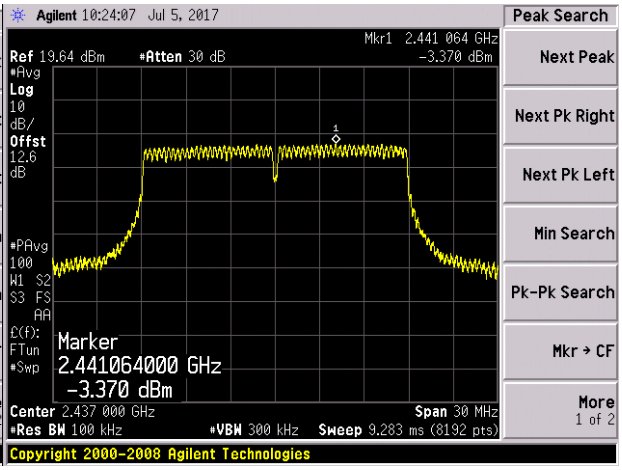
Power Spectral Density, 2437 MHz, Non HT20, 6 to 54 Mbps



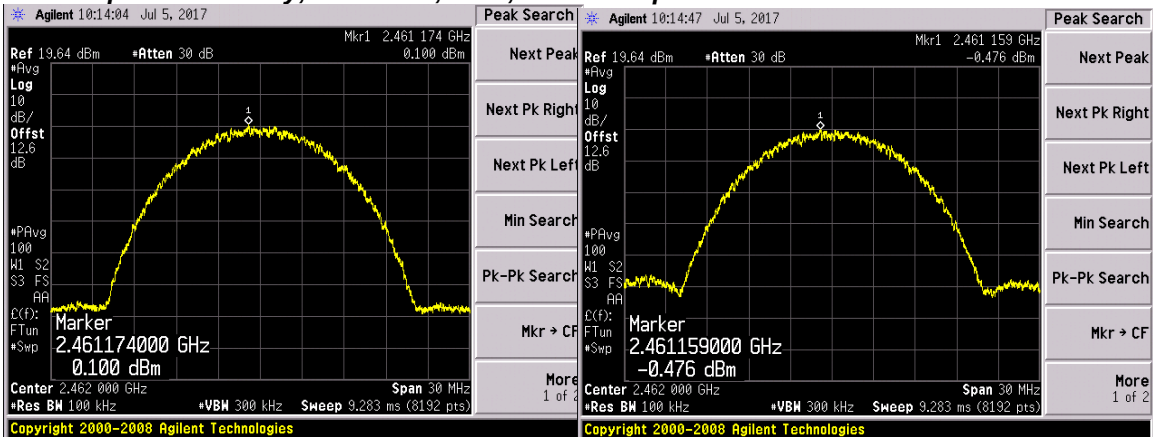


Power Spectral Density, 2437 MHz, HT/VHT20, M0 to M15

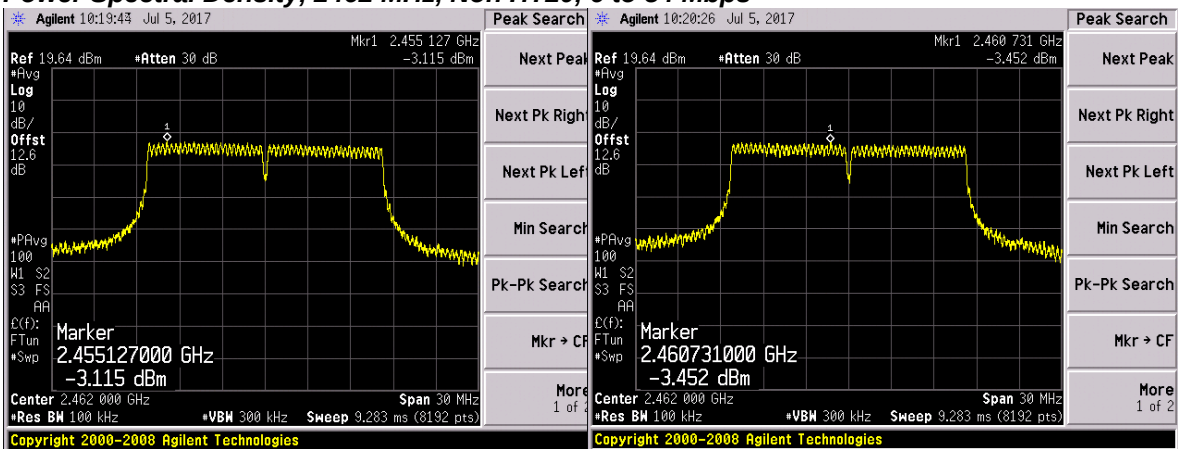




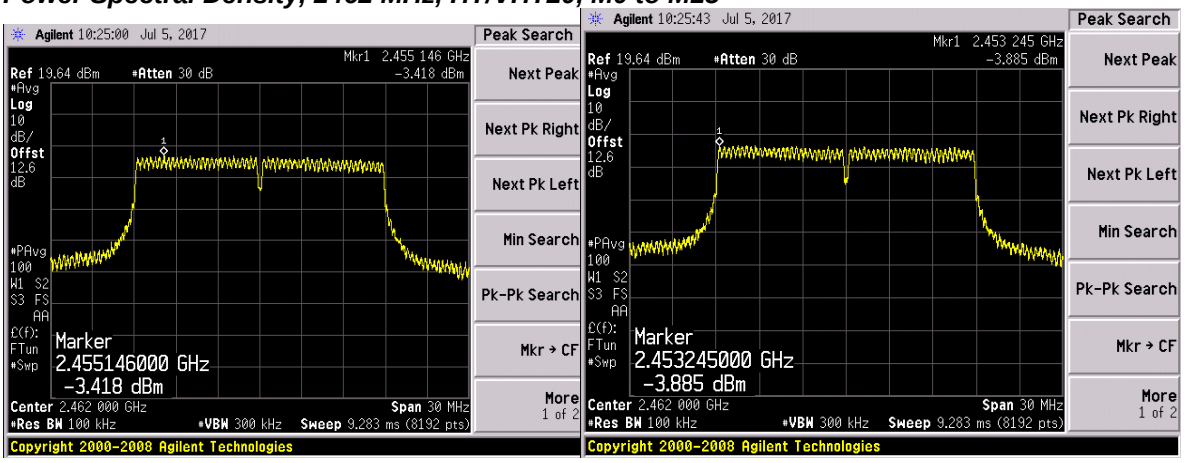
Power Spectral Density, 2462 MHz, CCK, 1 to 11 Mbps



Power Spectral Density, 2462 MHz, Non HT20, 6 to 54 Mbps



Power Spectral Density, 2462 MHz, HT/VHT20, M0 to M15



A.6 Conducted Spurious Emissions

Conducted Spurious Emissions Test Requirement

15.205 / RSS-Gen

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) and RSS-GEN section 8.10, must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)) and RSS-Gen section 8.9

RSS-Gen 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.

RSS-Gen 8.10□□b□□Unwanted emissions that fall into restricted bands of Table 6 shall comply with the limits specified in RSS-Gen; and (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.

Conducted Spurious Emissions Test Method

Ref. KDB 558074 D01 DTS Meas Guidance v04
ANSI C63.10: 2013

Conducted Spurious Emissions Test Procedure
1. Connect the antenna port(s) to the spectrum analyzer input. 2. Place the radio in continuous transmit mode 3. Configure Spectrum analyzer as per test parameters below (be sure to enter all losses between the transmitter output and the spectrum analyzer). 4. Use the marker function to determine the maximum spurs amplitude level. 5. The "measure-and-sum technique" is used for measuring in-band transmit power of a device. In the measure-and-sum approach, the conducted emission level is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in linear power units. The worst case output is recorded. (see ANSI C63.10 2013 section 14.3.2.2) 6. Capture graphs and record pertinent measurement data.

Ref. 558074 D01 DTS Meas Guidance v04 section 11.1b, 11.2-3, 12.2.4 (Peak) & 12.2.5.2 (Average)
ANSI C63.10: 2013 section 11.10.3 & 11.12.2.4 (Peak) & 11.12.2.5.2 (Average)

Conducted Spurious Emissions Test parameters	
Peak	**Average**
Span = 30MHz to 26.5GHz / 26.5GHz to 40GHz RBW = 1 MHz VBW ≥ 3 MHz Sweep = Auto Detector = Peak Trace = Max Hold.	Span = 30MHz to 26.5GHz / 26.5GHz to 40GHz RBW = 1 MHz VBW ≥ 3 MHz Sweep = Auto Detector = RMS Power Averaging

KDB 558074 D01 DTS Meas Guidance v04 section 12.2.2 © add the max antenna gain + ground reflection factor (4.7 dB for frequencies between 30 MHz and 1000 MHz, and 0 dB for frequencies > 1000 MHz).

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
1	Conducted testing: EUT + AC/DC Adapter	S01 and S02	☑	☐

Tested By :	**Date of testing:**
Johanna Knudsen	July 7th, 2017
Test Result : PASS	

Test Equipment

See Appendix C for list of test equipment

Conducted Spurious Emissions Data Table – Average

Frequency (MHz)	Mode	Tx Paths	Duty Cycle	Correlated Antenna Gain (dBi)	Conducted Spur TX path 1 (dBm/MHz)	Conducted Spur TX path 2 (dBm/MHz)	Total Conducted Spur - corrected for duty cycle(dBm/MHz)	Limit (dBm)	Margin (dB)
2412	CCK, 1 to 11 Mbps	1	96.1	2	-57.22		-55.05	-41.25	13.80
	CCK, 1 to 11 Mbps	2	96.1	2	-57.22	-57.90	-52.36	-41.25	11.11
	Non HT20, 6 to 54 Mbps	1	94.3	2	-57.43		-55.18	-41.25	13.93
	Non HT20, 6 to 54 Mbps	2	94.3	2	-57.43	-57.49	-52.19	-41.25	10.94
	Non HT20 Beam Forming, 6 to 54 Mbps	2	94.3	5	-57.43	-57.49	-49.19	-41.25	7.94
	HT/VHT20, M0 to M7	1	98.1	2	-57.49		-55.41	-41.25	14.16
	HT/VHT20, M0 to M7	2	98.1	2	-57.49	-57.21	-52.25	-41.25	11.00
	HT/VHT20, M8 to M15	2	98.1	2	-57.49	-57.21	-52.25	-41.25	11.00
	HT/VHT20 Beam Forming, M0 to M7	2	98.1	5	-57.49	-57.21	-49.25	-41.25	8.00
	HT/VHT20 Beam Forming, M8 to M15	2	98.1	5	-57.49	-57.21	-49.25	-41.25	8.00
	HT/VHT20 STBC, M0 to M7	2	98.1	2	-57.49	-57.21	-52.25	-41.25	11.00
2437	CCK, 1 to 11 Mbps	1	96.1	2	-57.29		-55.12	-41.25	13.87
	CCK, 1 to 11 Mbps	2	96.1	2	-57.29	-57.23	-52.08	-41.25	10.83
	Non HT20, 6 to 54 Mbps	1	94.3	2	-57.54		-55.29	-41.25	14.04
	Non HT20, 6 to 54 Mbps	2	94.3	2	-57.54	-57.40	-52.20	-41.25	10.95
	Non HT20 Beam Forming, 6 to 54 Mbps	2	94.3	5	-57.54	-57.40	-49.20	-41.25	7.95
	HT/VHT20, M0 to M7	1	98.1	2	-57.44		-55.36	-41.25	14.11
	HT/VHT20, M0 to M7	2	98.1	2	-57.44	-57.55	-52.40	-41.25	11.15
	HT/VHT20, M8 to M15	2	98.1	2	-57.44	-57.55	-52.40	-41.25	11.15
	HT/VHT20 Beam Forming, M0 to M7	2	98.1	5	-57.44	-57.55	-49.40	-41.25	8.15
	HT/VHT20 Beam Forming, M8 to M15	2	98.1	5	-57.44	-57.55	-49.40	-41.25	8.15
	HT/VHT20 STBC, M0 to M7	2	98.1	2	-57.44	-57.55	-52.40	-41.25	11.15
2462	CCK, 1 to 11 Mbps	1	96.1	2	-57.37		-55.20	-41.25	13.95
	CCK, 1 to 11 Mbps	2	96.1	2	-57.37	-57.22	-52.11	-41.25	10.86
	Non HT20, 6 to 54 Mbps	1	94.3	2	-57.33		-55.08	-41.25	13.83
	Non HT20, 6 to 54 Mbps	2	94.3	2	-57.33	-57.35	-52.07	-41.25	10.82
	Non HT20 Beam Forming, 6 to 54 Mbps	2	94.3	5	-57.33	-57.35	-49.07	-41.25	7.82
	HT/VHT20, M0 to M7	1	98.1	2	-57.17		-55.09	-41.25	13.84
	HT/VHT20, M0 to M7	2	98.1	2	-57.17	-57.40	-52.19	-41.25	10.94
	HT/VHT20, M8 to M15	2	98.1	2	-57.17	-57.40	-52.19	-41.25	10.94
	HT/VHT20 Beam Forming, M0 to M7	2	98.1	5	-57.17	-57.40	-49.19	-41.25	7.94
	HT/VHT20 Beam Forming, M8 to M15	2	98.1	5	-57.17	-57.40	-49.19	-41.25	7.94

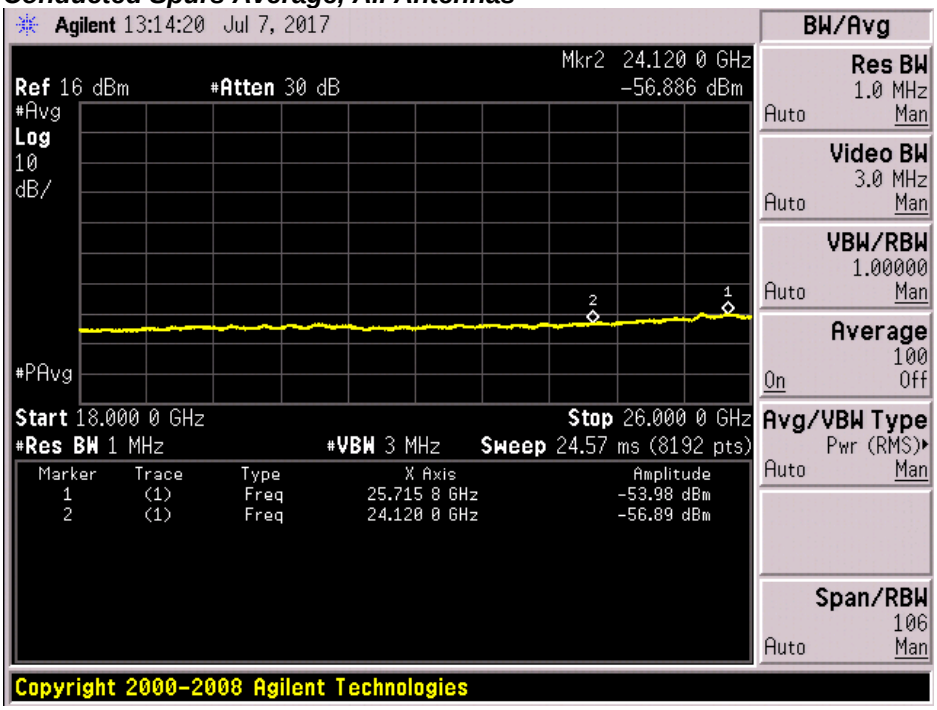
	HT/VHT20 STBC, M0 to M7	2	98.1	2	-57.17	-57.40	-52.19	-41.25	10.94

Conducted Spurious Emissions Data Table - Peak

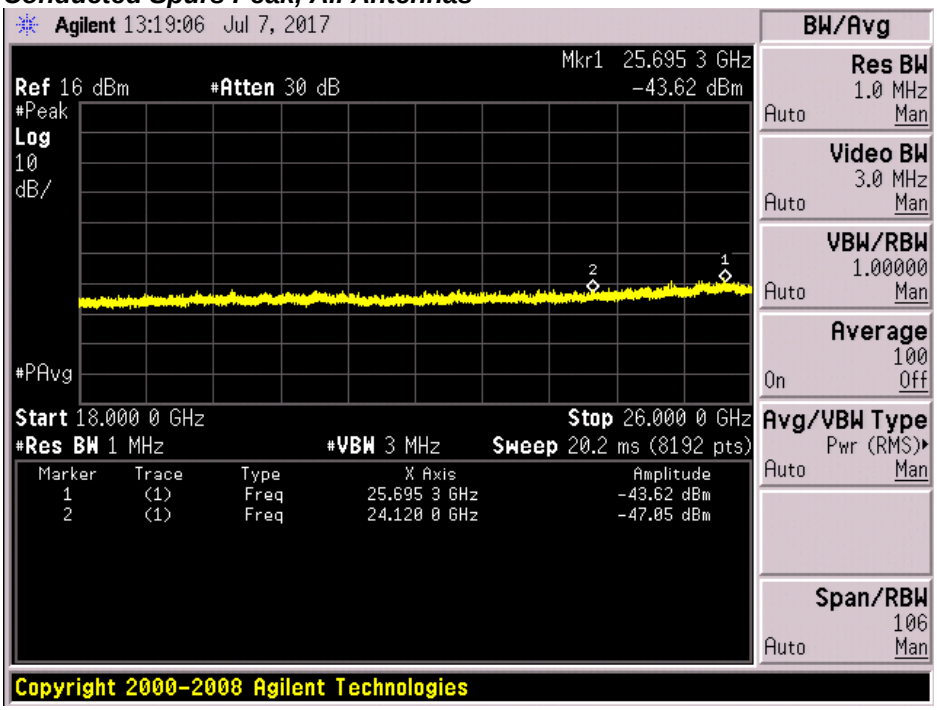
Frequency (MHz)	Mode	Tx Paths	Duty Cycle	Correlated Antenna Gain (dBi)	Conducted Spur TX path 1 (dBm/MHz)	Conducted Spur TX path 2 (dBm/MHz)	Total Conducted Spur - corrected for duty cycle(dBm/MHz)	Limit (dBm)	Margin (dB)
2412	CCK, 1 to 11 Mbps	1	96.1	2	-48.55		-46.55	-21.25	25.30
	CCK, 1 to 11 Mbps	2	96.1	2	-48.55	-47.85	-43.18	-21.25	21.93
	Non HT20, 6 to 54 Mbps	1	94.3	2	-46.53		-44.53	-21.25	23.28
	Non HT20, 6 to 54 Mbps	2	94.3	2	-46.53	-47.63	-42.03	-21.25	20.78
	Non HT20 Beam Forming, 6 to 54 Mbps	2	94.3	5	-46.53	-47.63	-39.03	-21.25	17.78
	HT/VHT20, M0 to M7	1	98.1	2	-48.15		-46.15	-21.25	24.90
	HT/VHT20, M0 to M7	2	98.1	2	-48.15	-49.57	-43.79	-21.25	22.54
	HT/VHT20, M8 to M15	2	98.1	2	-48.15	-49.57	-43.79	-21.25	22.54
	HT/VHT20 Beam Forming, M0 to M7	2	98.1	5	-48.15	-49.57	-40.79	-21.25	19.54
	HT/VHT20 Beam Forming, M8 to M15	2	98.1	5	-48.15	-49.57	-40.79	-21.25	19.54
	HT/VHT20 STBC, M0 to M7	2	98.1	2	-48.15	-49.57	-43.79	-21.25	22.54
2437	CCK, 1 to 11 Mbps	1	96.1	2	-46.25		-44.25	-21.25	23.00
	CCK, 1 to 11 Mbps	2	96.1	2	-46.25	-46.77	-41.49	-21.25	20.24
	Non HT20, 6 to 54 Mbps	1	94.3	2	-48.01		-46.01	-21.25	24.76
	Non HT20, 6 to 54 Mbps	2	94.3	2	-48.01	-48.34	-43.16	-21.25	21.91
	Non HT20 Beam Forming, 6 to 54 Mbps	2	94.3	5	-48.01	-48.34	-40.16	-21.25	18.91
	HT/VHT20, M0 to M7	1	98.1	2	-47.59		-45.59	-21.25	24.34
	HT/VHT20, M0 to M7	2	98.1	2	-47.59	-46.79	-42.16	-21.25	20.91
	HT/VHT20, M8 to M15	2	98.1	2	-47.59	-46.79	-42.16	-21.25	20.91
	HT/VHT20 Beam Forming, M0 to M7	2	98.1	5	-47.59	-46.79	-39.16	-21.25	17.91
	HT/VHT20 Beam Forming, M8 to M15	2	98.1	5	-47.59	-46.79	-39.16	-21.25	17.91
	HT/VHT20 STBC, M0 to M7	2	98.1	2	-47.59	-46.79	-42.16	-21.25	20.91
2462	CCK, 1 to 11 Mbps	1	96.1	2	-47.45		-45.45	-21.25	24.20
	CCK, 1 to 11 Mbps	2	96.1	2	-47.45	-45.38	-41.28	-21.25	20.03
	Non HT20, 6 to 54 Mbps	1	94.3	2	-47.24		-45.24	-21.25	23.99
	Non HT20, 6 to 54 Mbps	2	94.3	2	-47.24	-47.65	-42.43	-21.25	21.18
	Non HT20 Beam Forming, 6 to 54 Mbps	2	94.3	5	-47.24	-47.65	-39.43	-21.25	18.18
	HT/VHT20, M0 to M7	1	98.1	2	-47.74		-45.74	-21.25	24.49
	HT/VHT20, M0 to M7	2	98.1	2	-47.74	-45.29	-41.33	-21.25	20.08

	HT/VHT20, M8 to M15	2	98.1	2	-47.74	-45.29	-41.33	-21.25	20.08
	HT/VHT20 Beam Forming, M0 to M7	2	98.1	5	-47.74	-45.29	-38.33	-21.25	17.08
	HT/VHT20 Beam Forming, M8 to M15	2	98.1	5	-47.74	-45.29	-38.33	-21.25	17.08
	HT/VHT20 STBC, M0 to M7	2	98.1	2	-47.74	-45.29	-41.33	-21.25	20.08

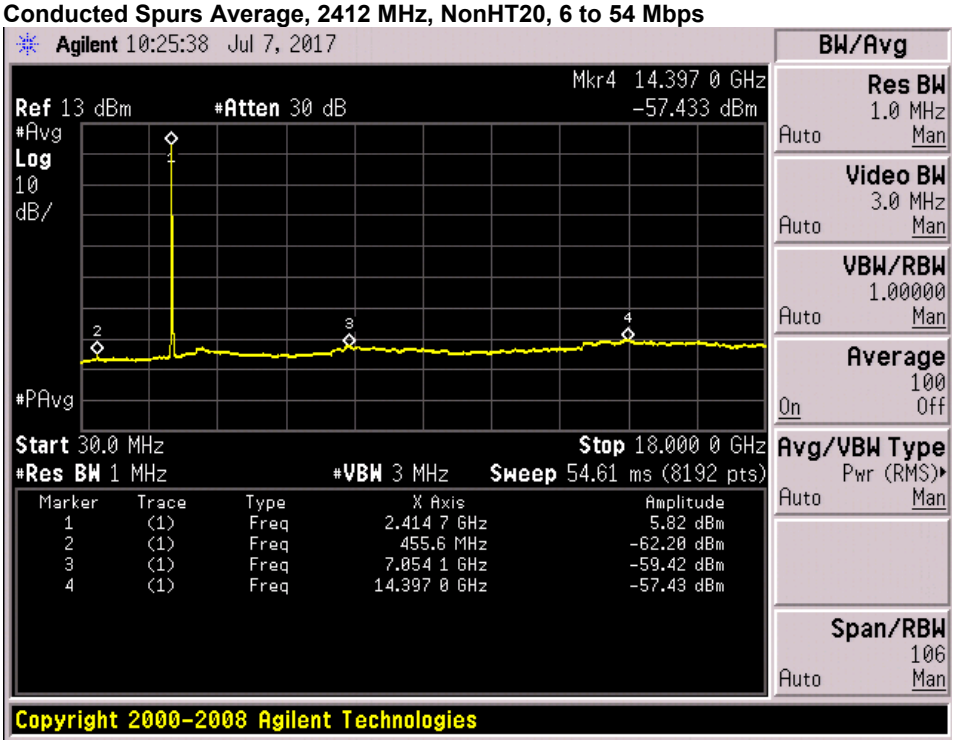
Conducted Spurs Average, All Antennas



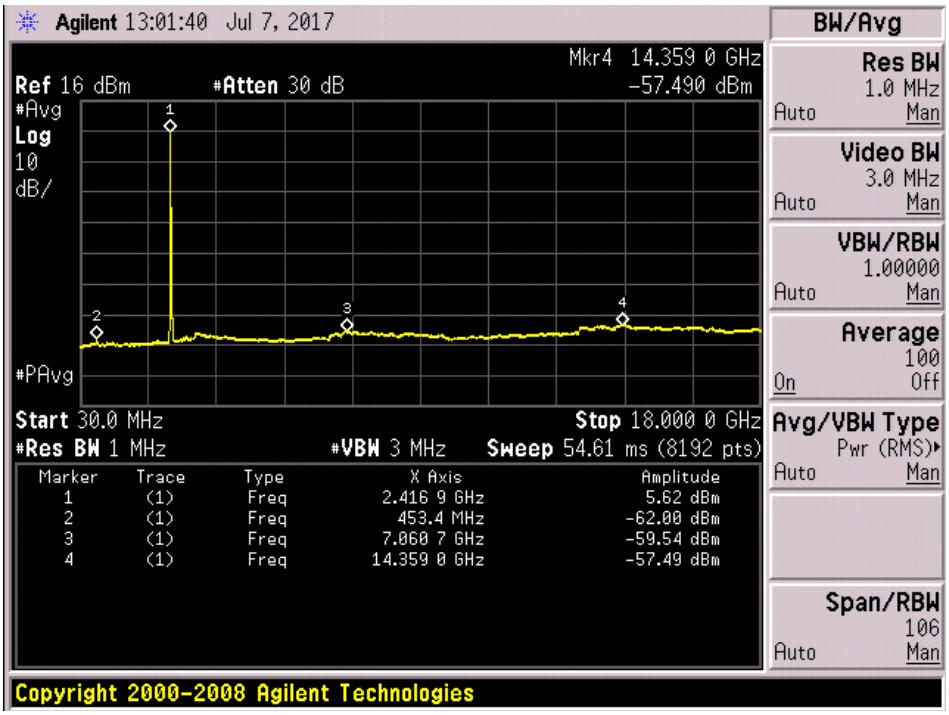
Conducted Spurs Peak, All Antennas



Conducted Spurs Average, 2412 MHz, NonHT20, 6 to 54 Mbps

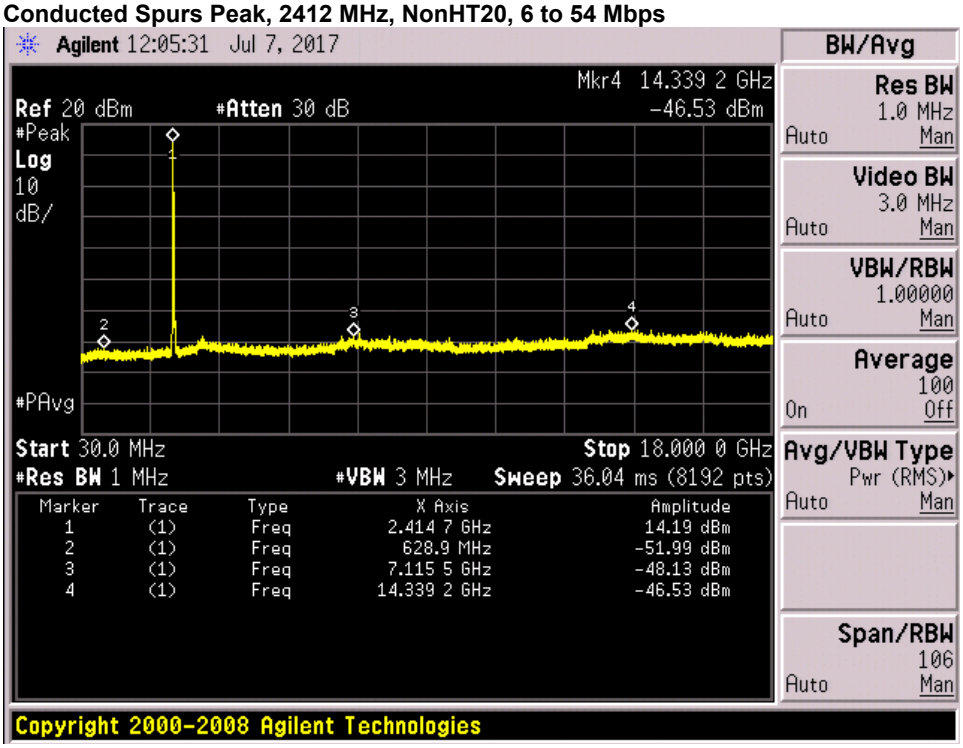


Antenna A

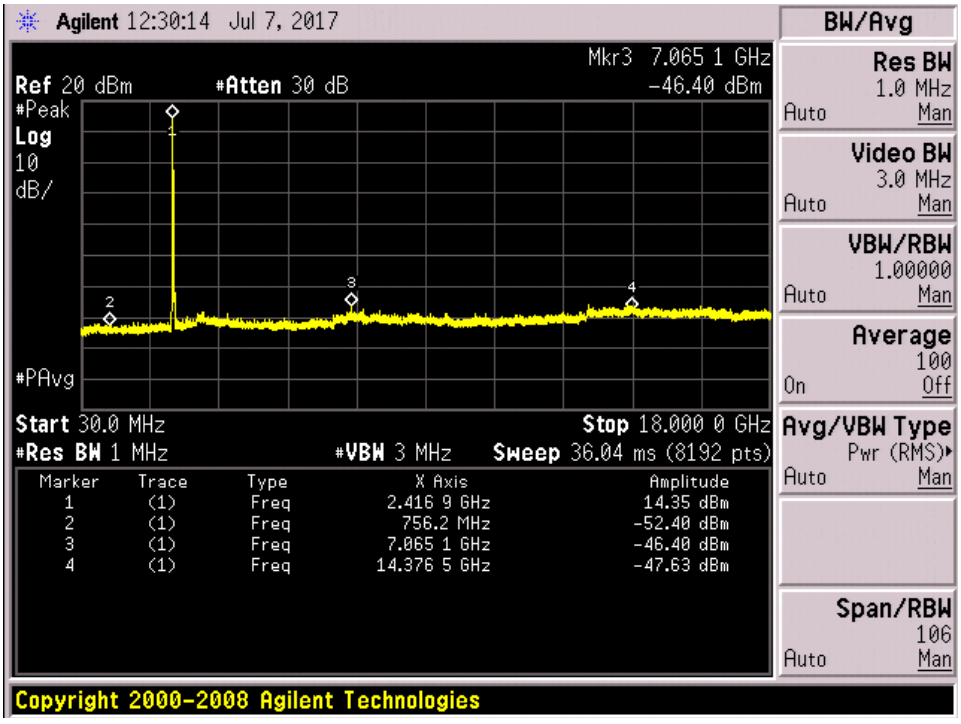


Antenna B

Conducted Spurs Peak, 2412 MHz, NonHT20, 6 to 54 Mbps



Antenna A



Antenna B

A.7 Conducted Band Edge

Conducted Band Edge Test Requirement

15.247

(d) 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

RSS-247

5.5 Unwanted emissions

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

15.205 / RSS-Gen

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), and RSS-Gen 8.10 must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)) and RSS-Gen 8.9.

Conducted Bandedge Test Method

Ref. KDB 558074 D01 DTS Meas Guidance v04
ANSI C63.10: 2013

Conducted Bandedge Test Procedure
1. Connect the antenna port(s) to the spectrum analyzer input. 2. Place the radio in continuous transmit mode. Use the procedures in KDB 558074 D01 DTS Meas Guidance v04 to substitute conducted measurements in place of radiated measurements. 3. Configure Spectrum analyzer as per test parameters below (be sure to enter all losses between the transmitter output and the spectrum analyzer). 4. 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. 5. The "measure-and-sum technique" is used for measuring in-band transmit power of a device. In the measure-and-sum approach, the conducted emission level is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in linear power units. The worst case output is recorded. 6. 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 7. Capture graphs and record pertinent measurement data.

Ref. 558074 D01 DTS Meas Guidance v04 section 12.2.4 (Peak) & 12.2.5.2 (Average)
ANSI C63.10: 2013 section 11.10.3 & 11.12.2.4 (Peak) & 11.12.2.5.2 (Average)

Conducted Spurious Emissions Test parameters	
Peak RBW = 1 MHz VBW ≥ 3 MHz Sweep = Auto Detector = Peak Trace = Max Hold.	**Average** RBW = 1 MHz VBW ≥ 3 MHz Sweep = Auto Detector = RMS Power Averaging

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
1	Conducted testing: EUT + AC/DC Adapter	S01 and S02	☑	☐

Tested By : Johanna Knudsen	**Date of testing:** July 5th, 2017 – July 6th, 2017
Test Result : PASS	

Test Equipment

See Appendix C for list of test equipment

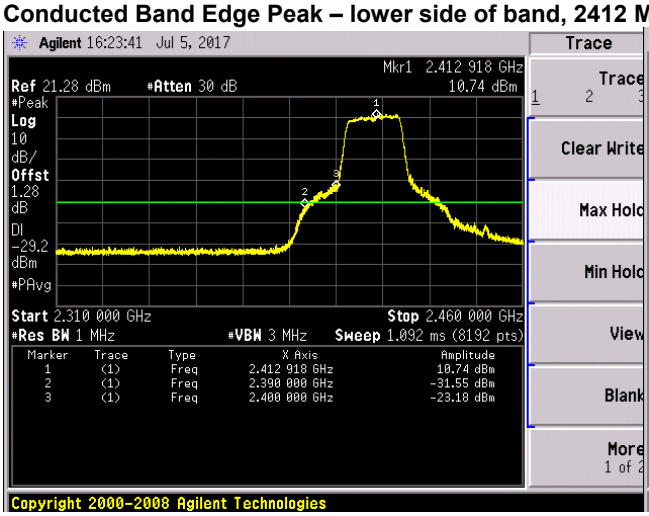
Conducted Band Edge (Restricted band) Data Table – Peak

Frequency (MHz)	Mode	Tx Paths	Duty Cycle	Correlated Antenna Gain (dBi)	Conducted Spur TX path 1 (dBm/MHz)	Conducted Spur TX path 2 (dBm/MHz)	Total Conducted Spur (dBm/MHz)	Limit (dBm)	Margin (dB)
2412	CCK, 1 to 11 Mbps	1	96.1	2	-47.40		-45.40	-21.25	24.15
	CCK, 1 to 11 Mbps	2	96.1	2	-48.00	-50.27	-43.98	-21.25	22.73
	Non HT20, 6 to 54 Mbps	1	94.3	2	-32.85		-30.85	-21.25	9.60
	Non HT20, 6 to 54 Mbps	2	94.3	2	-35.50	-37.64	-31.43	-21.25	10.18
	Non HT20 Beam Forming, 6 to 54 Mbps	2	94.3	5	-37.94	-36.03	-28.87	-21.25	7.62
	HT/VHT20, M0 to M7	1	98.1	2	-30.31		-28.31	-21.25	7.06
	HT/VHT20, M0 to M7	2	98.1	2	-33.91	-40.11	-30.98	-21.25	9.73
	HT/VHT20, M8 to M15	2	98.1	2	-34.47	-40.13	-31.43	-21.25	10.18
	HT/VHT20 Beam Forming, M0 to M7	**2**	**98.1**	**5**	-31.55	-40.07	-25.98	**-21.25**	**4.73**
	HT/VHT20 Beam Forming, M8 to M15	2	98.1	2	-34.47	-40.13	-31.43	-21.25	10.18
	HT/VHT20 STBC, M0 to M7	2	98.1	2	-31.55	-40.07	-28.98	-21.25	7.73
2462	CCK, 1 to 11 Mbps	1	96.1	2	-50.85		-48.85	-21.25	27.60
	CCK, 1 to 11 Mbps	2	96.1	2	-50.48	-52.84	-46.49	-21.25	25.24
	Non HT20, 6 to 54 Mbps	**1**	**94.3**	**2**	-30.29		-28.29	**-21.25**	**7.04**
	Non HT20, 6 to 54 Mbps	2	94.3	2	-41.83	-40.59	-36.16	-21.25	14.91
	Non HT20 Beam Forming, 6 to 54 Mbps	2	94.3	5	-43.37	-39.03	-32.67	-21.25	11.42
	HT/VHT20, M0 to M7	1	98.1	2	-33.51		-31.51	-21.25	10.26
	HT/VHT20, M0 to M7	2	98.1	2	-40.59	-44.81	-37.20	-21.25	15.95
	HT/VHT20, M8 to M15	2	98.1	2	-42.30	-46.89	-39.00	-21.25	17.75
	HT/VHT20 Beam Forming, M0 to M7	2	98.1	5	-44.01	-46.97	-37.23	-21.25	15.98
	HT/VHT20 Beam Forming, M8 to M15	2	98.1	2	-42.30	-46.89	-39.00	-21.25	17.75
	HT/VHT20 STBC, M0 to M7	2	98.1	2	-44.01	-46.97	-40.23	-21.25	18.98

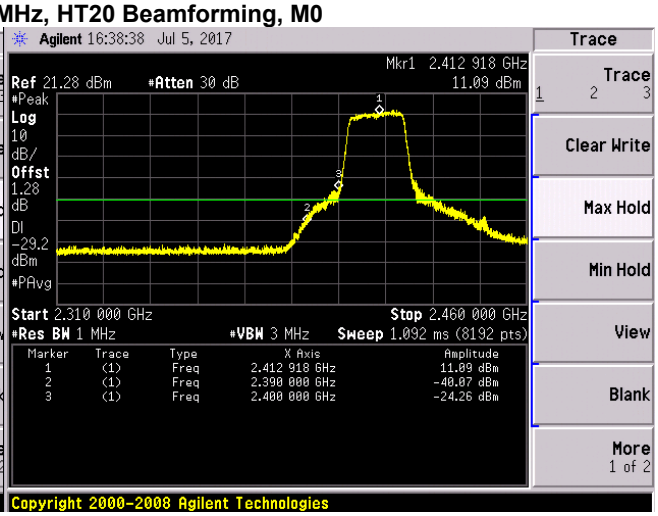
Conducted Band Edge (Restricted band) Data Table – Average

Frequency (MHz)	Mode	Tx Paths	Duty Cycle	Correlated Antenna Gain (dBi)	Conducted Spur TX path 1 (dBm/MHz)	Conducted Spur TX path 2 (dBm/MHz)	Total Conducted Spur (dBm/MHz)	Limit (dBm)	Margin (dB)
2412	CCK, 1 to 11 Mbps	1	96.1	2	-57.31		-55.14	-41.25	13.89
	CCK, 1 to 11 Mbps	2	96.1	2	-57.17	-59.10	-52.85	-41.25	11.60
	Non HT20, 6 to 54 Mbps	**1**	**94.3**	**2**	-43.76		-41.51	**-41.25**	**0.26**
	Non HT20, 6 to 54 Mbps	2	94.3	2	-46.95	-49.11	-42.63	-41.25	1.38
	Non HT20 Beam Forming, 6 to 54 Mbps	2	94.3	5	-50.96	-52.85	-43.54	-41.25	2.29
	HT/VHT20, M0 to M7	1	98.1	2	-45.16		-43.08	-41.25	1.83
	HT/VHT20, M0 to M7	2	98.1	2	-48.30	-52.86	-44.91	-41.25	3.66
	HT/VHT20, M8 to M15	2	98.1	2	-46.55	-50.19	-42.91	-41.25	1.66
	HT/VHT20 Beam Forming, M0 to M7	2	98.1	5	-48.30	-52.86	-41.91	-41.25	0.66
	HT/VHT20 Beam Forming, M8 to M15	2	98.1	2	-46.55	-50.19	-42.91	-41.25	1.66
	HT/VHT20 STBC, M0 to M7	2	98.1	2	-46.58	-50.39	-42.99	-41.25	1.74
2462	CCK, 1 to 11 Mbps	1	96.1	2	-57.92		-55.75	-41.25	14.50
	CCK, 1 to 11 Mbps	2	96.1	2	-58.42	-59.27	-53.64	-41.25	12.39
	Non HT20, 6 to 54 Mbps	**1**	**94.3**	**2**	-44.04		-41.79	**-41.25**	**0.54**
	Non HT20, 6 to 54 Mbps	2	94.3	2	-49.84	-50.95	-45.09	-41.25	3.84
	Non HT20 Beam Forming, 6 to 54 Mbps	2	94.3	5	-52.03	-54.48	-44.82	-41.25	3.57
	HT/VHT20, M0 to M7	1	98.1	2	-45.41		-43.33	-41.25	2.08
	HT/VHT20, M0 to M7	2	98.1	2	-51.06	-53.39	-46.98	-41.25	5.73
	HT/VHT20, M8 to M15	2	98.1	2	-51.52	-53.39	-47.26	-41.25	6.01
	HT/VHT20 Beam Forming, M0 to M7	2	98.1	5	-51.80	-55.28	-45.11	-41.25	3.86
	HT/VHT20 Beam Forming, M8 to M15	2	98.1	2	-51.52	-53.39	-47.26	-41.25	6.01
	HT/VHT20 STBC, M0 to M7	2	98.1	2	-51.80	-55.28	-48.11	-41.25	6.86

Conducted Band Edge Peak – lower side of band, 2412 MHz, HT20 Beamforming, M0

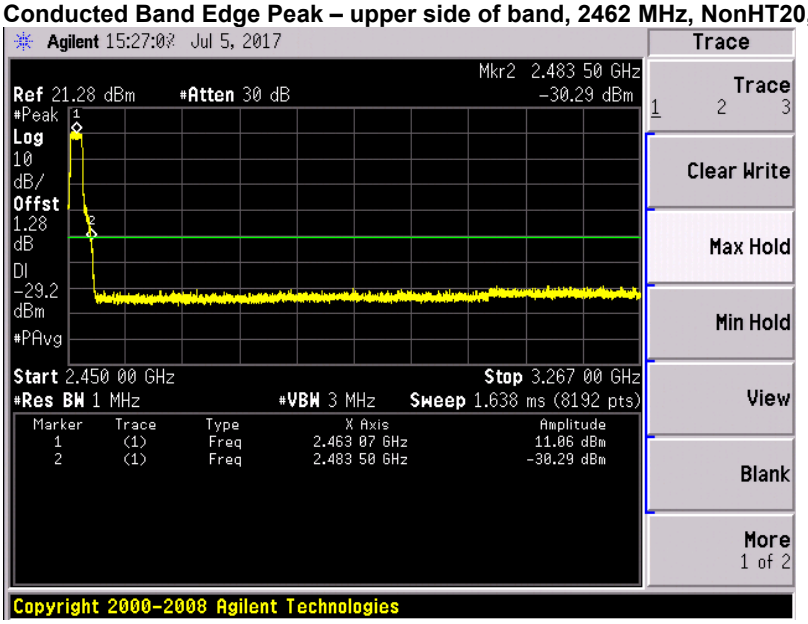


Antenna A



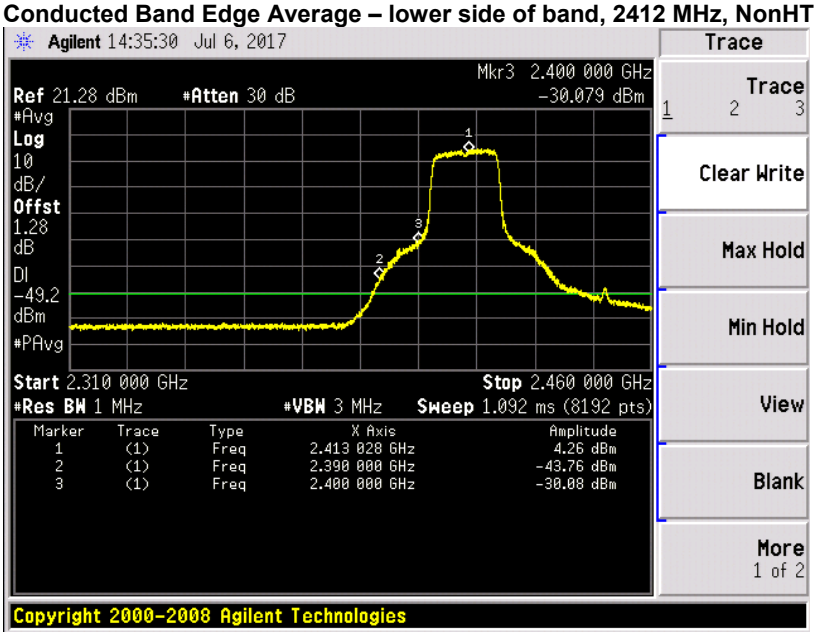
Antenna B

Conducted Band Edge Peak – upper side of band, 2462 MHz, NonHT20, 6 Mbps



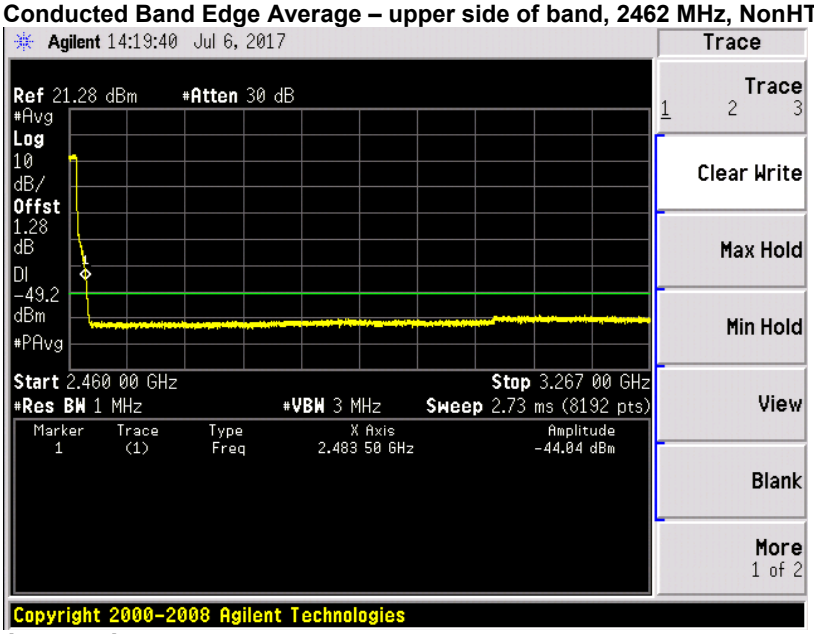
Antenna A

Conducted Band Edge Average – lower side of band, 2412 MHz, NonHT20, 6 Mbps



Antenna A

Conducted Band Edge Average – upper side of band, 2462 MHz, NonHT20, 6 Mbps



Antenna A

A.8 Conducted Bandedge (Non-Restricted Band)

Emissions in non-restricted frequency bands - Test Requirement

KDB 558074

11.0 Emissions in non-restricted frequency bands

11.1 General

The DTS rules specify that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:

> b) If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

RSS-Gen 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.

RSS-Gen 8.10□□b□□Unwanted emissions that fall into restricted bands of Table 6 shall comply with the limits specified in RSS-Gen; and (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.

Emissions in non-restricted frequency bands - Test Method

Ref. KDB 558074 D01 DTS Meas Guidance v04
ANSI C63.10: 2013

Emissions in non-restricted frequency bands - Conducted Test Procedure
1. Connect the antenna port(s) to the spectrum analyzer input. 2. Place the radio in continuous transmit mode 3. Configure Spectrum analyzer as per test parameters below (be sure to enter all losses between the transmitter output and the spectrum analyzer). 4. Use the marker function to determine the maximum spurs amplitude level. 5. Capture graphs and record pertinent measurement data.

Ref. 558074 D01 DTS Meas Guidance v04 section 11.1b, 11.2, 11.3
ANSI C63.10: 2013 section 11.11.1b, 11.11.12, 11.11.13

Emissions in non-restricted frequency bands - Conducted Test parameters	
11.2 Reference Level measurement Establish a reference level by using the following procedure: a) Set instrument center frequency to DTS channel center frequency. b) Set the span to ≥ 1.5 x *DTS bandwidth*. c) Set the RBW = 100 kHz. d) Set the VBW ≥ 3 x RBW. e) Detector = peak. f) Sweep time = auto couple. g) Trace mode = max hold. h) Allow trace to fully stabilize. i) Use the peak marker function to determine the maximum PSD level.	**11.3 Emission Level Measurement** a) Set the center frequency and span to encompass frequency range to be measured. b) Set the RBW = 100 kHz. c) Set the VBW ≥ 3 x RBW. d) Detector = peak. e) Sweep time = auto couple. f) Trace mode = max hold. g) Allow trace to fully stabilize. h) Use the peak marker function to determine the maximum amplitude level.

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
1	Conducted testing: EUT + AC/DC Adapter	S01 and S02	☑	☐

Tested By : Johanna Knudsen	**Date of testing:** July 7th, 2017
Test Result : PASS	

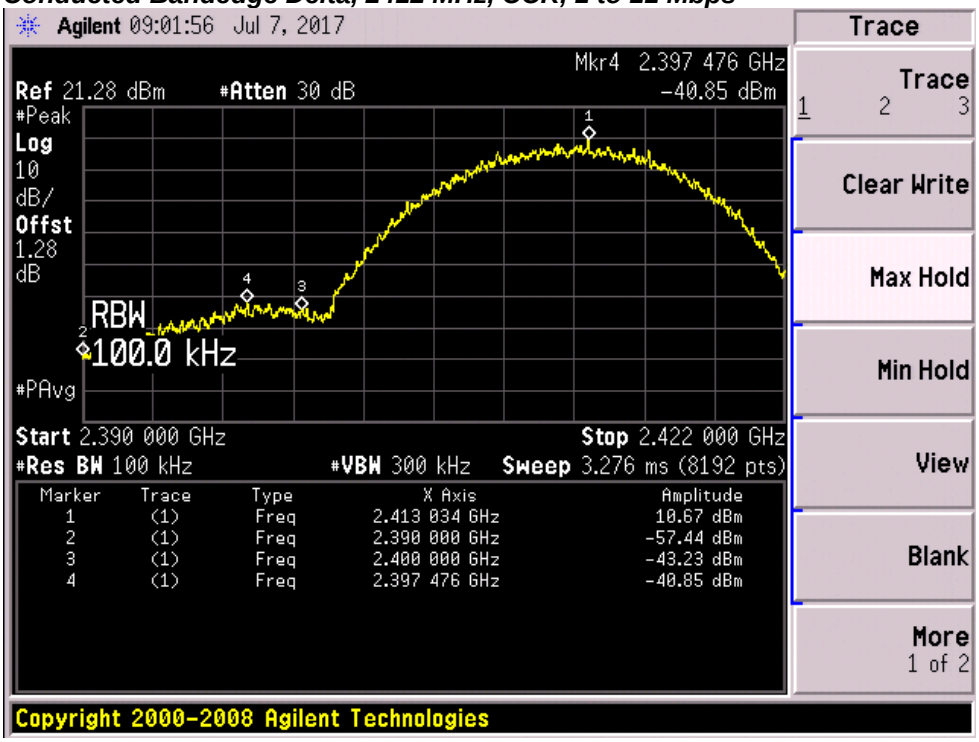
Test Equipment

See Appendix C for list of test equipment

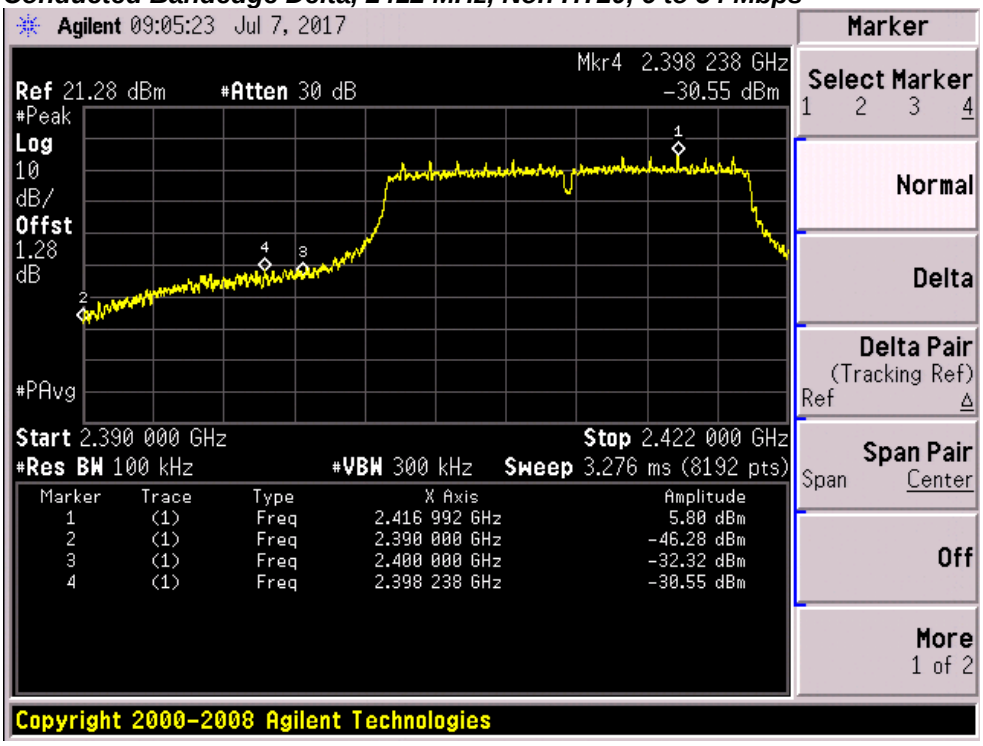
Emissions in non-restricted frequency bands

Frequency (MHz)	Mode	Tx Paths	Duty Cycle	Conducted Spur TX path 1 (dBm/100kHz)	Fundamental TX level path 1 (dBm/100kHz)	Conducted Spur TX path 2 (dBm/100kHz)	Fundamental TX level path 2 (dBm/100kHz)	Worst Case Conducted Spur Delta (dBm/100kHz)	Limit (dBc)	Margin (dB)
2412	CCK, 1 to 11 Mbps	1	96.1	-43.23	10.67			53.90	30	23.90
	CCK, 1 to 11 Mbps	2	96.1	-43.62	10.59	-48.57	10.25	54.21	30	24.21
	Non HT20, 6 to 54 Mbps	1	94.3	-32.32	5.8			38.12	30	8.12
	Non HT20, 6 to 54 Mbps	2	94.3	-34.51	4.52	-37.52	4.37	39.03	30	9.03
	Non HT20 Beam Forming, 6 to 54 Mbps	2	94.3	-37.83	3.87	-42.03	3.51	41.70	30	11.70
	HT/VHT20, M0 to M7	**1**	**98.1**	**-31.3**	**4.42**			**35.72**	**30**	**5.72**
	HT/VHT20, M0 to M7	2	98.1	-35.11	3.61	-43.35	2.76	38.72	30	8.72
	HT/VHT20 Beam Forming, M0 to M7	2	98.1	-32.32	4.17	-38.35	3.02	36.49	30	6.49
	HT/VHT20 Beam Forming, M8 to M15	2	98.1	-35.11	4.59	-38.72	4.81	39.70	30	9.70

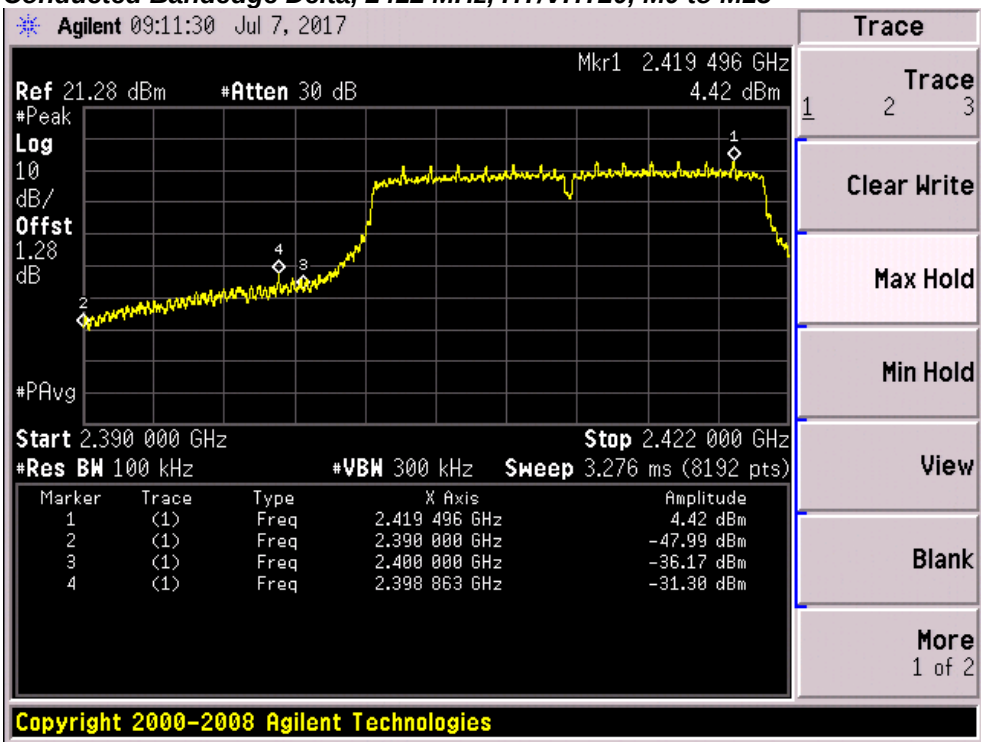
Conducted Bandedge Delta, 2412 MHz, CCK, 1 to 11 Mbps



Conducted Bandedge Delta, 2412 MHz, Non HT20, 6 to 54 Mbps



Conducted Bandedge Delta, 2412 MHz, HT/VHT20, M0 to M15



Appendix B: Emission Test Results

B.1 Radiated Spurious Emissions

15.205 / RSS-Gen: Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) and RSS-Gen 8.10, must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)) and RSS-Gen 8.9.

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)

Save 2 plots:1) Average Plot (Vertical and Horizontal), Limit= 54dBuV/m @3m
2) Peak plot (Vertical and Horizontal), Limit = 74dBuV/m @3m

This report represents the worst case data for all supported operating modes and antennas.

Ref. ANSI C63.10: 2013 Section 12.7.6 (Peak), Section 12.7.7.2 (Method AD), and Section 6.6

Radiated Spurious Emissions Test parameters	
Peak Span = 1-18GHz /18GHz-26.5GHz/26.5GHz-40GHz RBW = 1 MHz VBW ≥ 3 MHz Sweep = Auto couple Detector = Peak Trace = Max Hold.	**Average** Span = 1-18GHz /18GHz-26.5GHz/26.5GHz-40GHz RBW = 1 MHz VBW ≥ 3 MHz Sweep = Auto couple Detector = RMS Power Averaging

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
2	Radiated Testing: EUT + AC/DC Adapter	S02 and S03	☑	☐

Tested By :	**Date of testing:**
Johanna Knudsen	September 6th, 2017 - September 7th, 2017
Test Result : PASS	

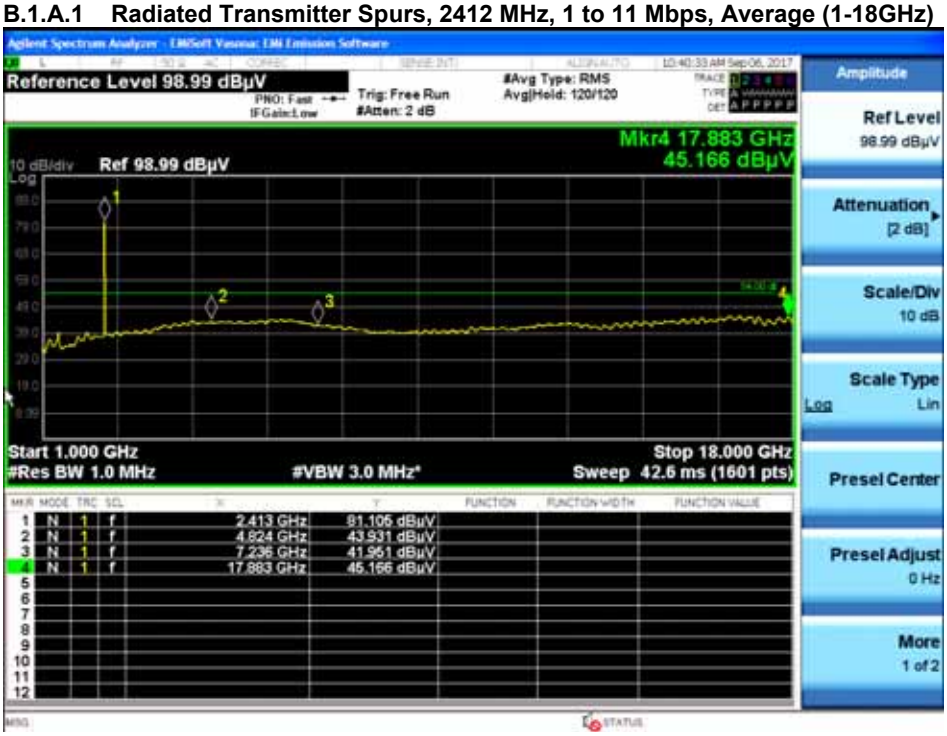
Test Equipment

See Appendix C for list of test equipment

B.1.A Transmitter Radiated Spurious Emissions-Average

Frequency (MHz)	Mode	Data Rate (Mbps)	Spurious Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2412	Legacy CCK, 1 to 11 Mbps	11	45.166	54	8.834
	nonHT20, 6-54Mbps	6	45.842	54	8.158
	HT-20 Beam Forming, M0-M7	M0	46.07	54	7.93
2437	Legacy CCK, 1 to 11 Mbps	11	45.551	54	8.449
	nonHT20, 6-54Mbps	6	46.104	54	7.896
	HT-20 Beam Forming, M0-M7	M0	46.035	54	7.965
2462	Legacy CCK, 1 to 11 Mbps	11	46.356	54	7.644
	nonHT20, 6-54Mbps	6	46.041	54	7.959
	HT-20 Beam Forming, M0-M7	M0	45.984	54	8.016

B.1.A.1 Radiated Transmitter Spurs, 2412 MHz, 1 to 11 Mbps, Average (1-18GHz)



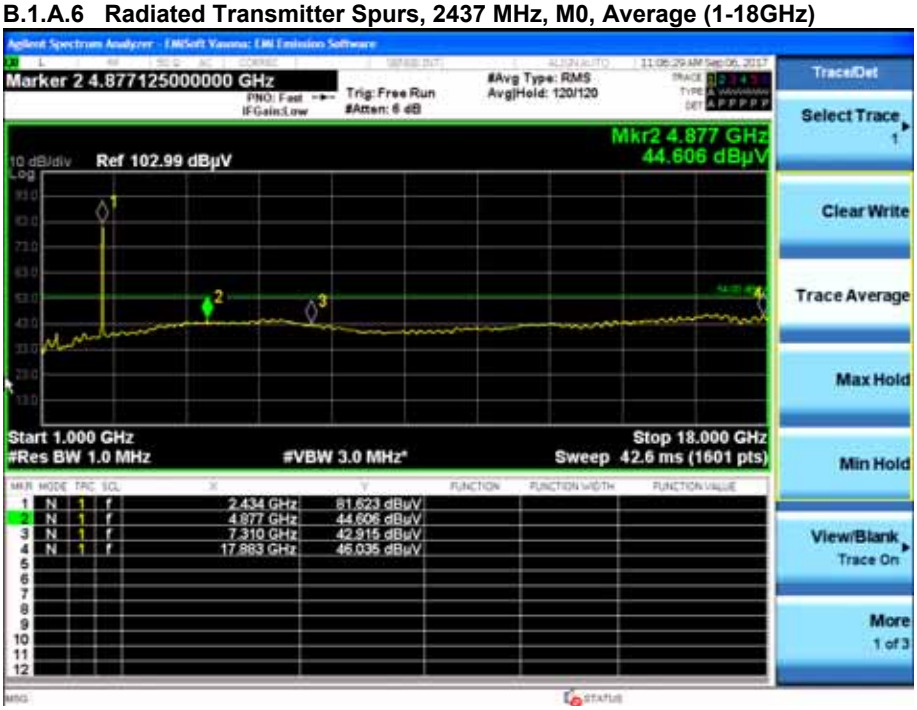
B.1.A.2 Radiated Transmitter Spurs, 2412 MHz, 6 to 54 Mbps, Average (1-18GHz)

B.1.A.3 Radiated Transmitter Spurs, 2412 MHz, M0, Average (1-18GHz)

B.1.A.4 Radiated Transmitter Spurs, 2437 MHz, 1 to 11 Mbps, Average (1-18GHz)

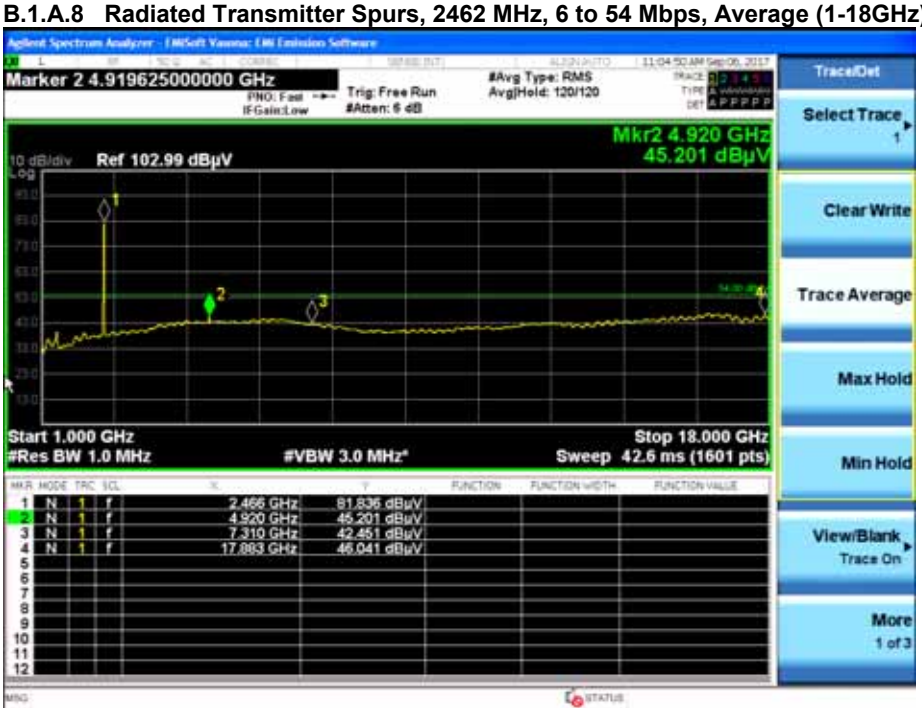
B.1.A.5 Radiated Transmitter Spurs, 2437 MHz, 6 to 54 Mbps, Average (1-18GHz)

B.1.A.6 Radiated Transmitter Spurs, 2437 MHz, M0, Average (1-18GHz)

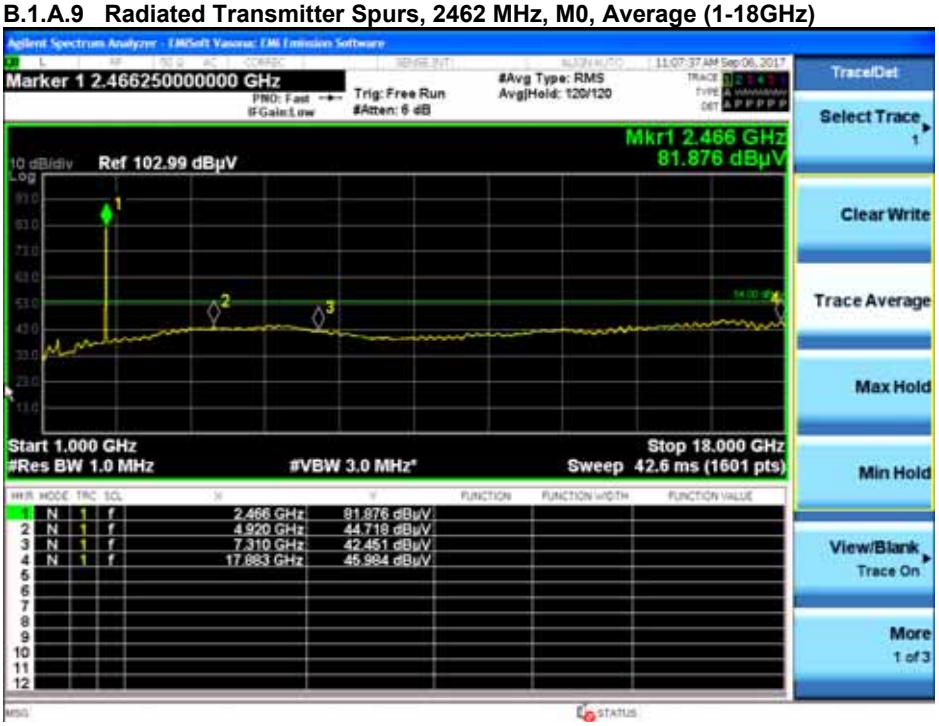


B.1.A.7 Radiated Transmitter Spurs, 2462 MHz, 1 to 11 Mbps, Average (1-18GHz)

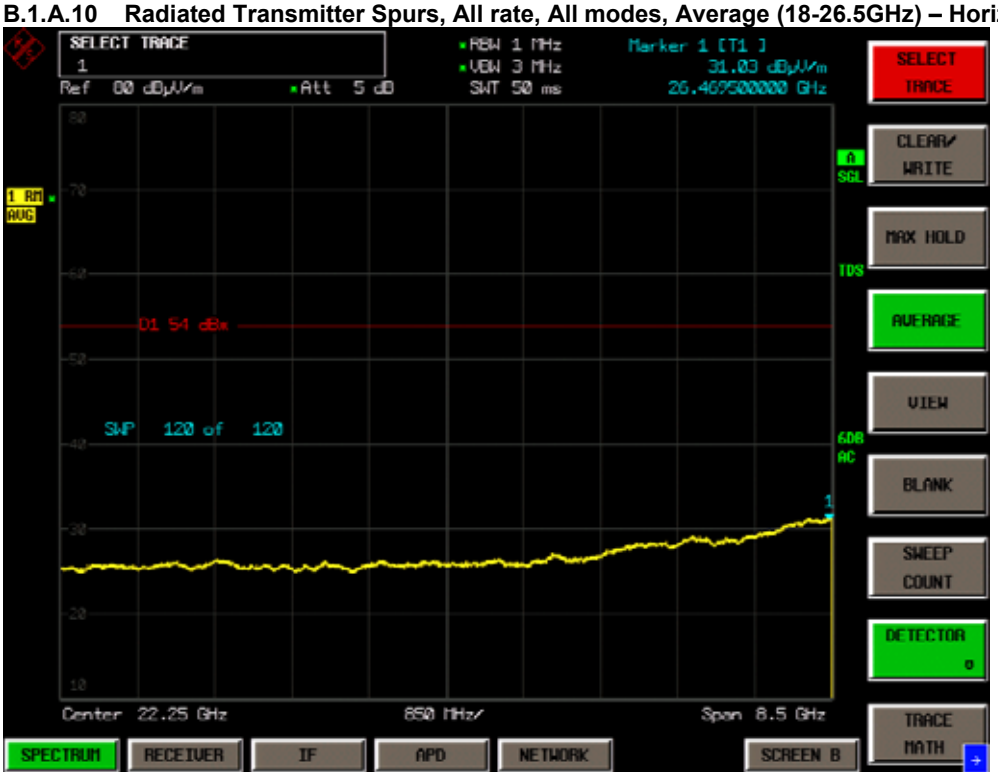
B.1.A.8 Radiated Transmitter Spurs, 2462 MHz, 6 to 54 Mbps, Average (1-18GHz)



B.1.A.9 Radiated Transmitter Spurs, 2462 MHz, M0, Average (1-18GHz)



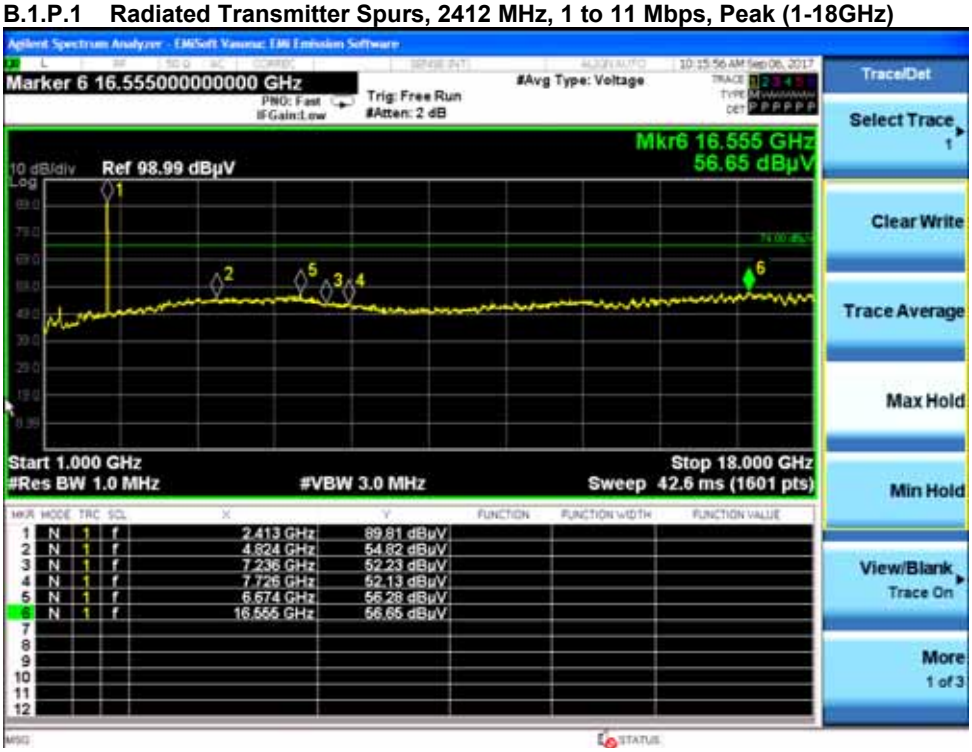
B.1.A.10 Radiated Transmitter Spurs, All rate, All modes, Average (18-26.5GHz) – Horizontal & Vertical



B.1.P Transmitter Radiated Spurious Emissions-Peak

Frequency (MHz)	Mode	Data Rate (Mbps)	Spurious Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2412	Legacy CCK, 1 to 11 Mbps	11	56.65	74	17.35
	nonHT20, 6-54Mbps	6	55.63	74	18.37
	HT-20 Beam Forming, M0-M7	M0	56.1	74	17.9
2437	Legacy CCK, 1 to 11 Mbps	11	58.42	74	15.58
	nonHT20, 6-54Mbps	6	56.29	74	17.71
	HT-20 Beam Forming, M0-M7	M0	56.21	74	17.79
2462	Legacy CCK, 1 to 11 Mbps	11	56.35	74	17.65
	nonHT20, 6-54Mbps	6	56.98	74	17.02
	HT-20 Beam Forming, M0-M7	M0	56.61	74	17.39

B.1.P.1 Radiated Transmitter Spurs, 2412 MHz, 1 to 11 Mbps, Peak (1-18GHz)

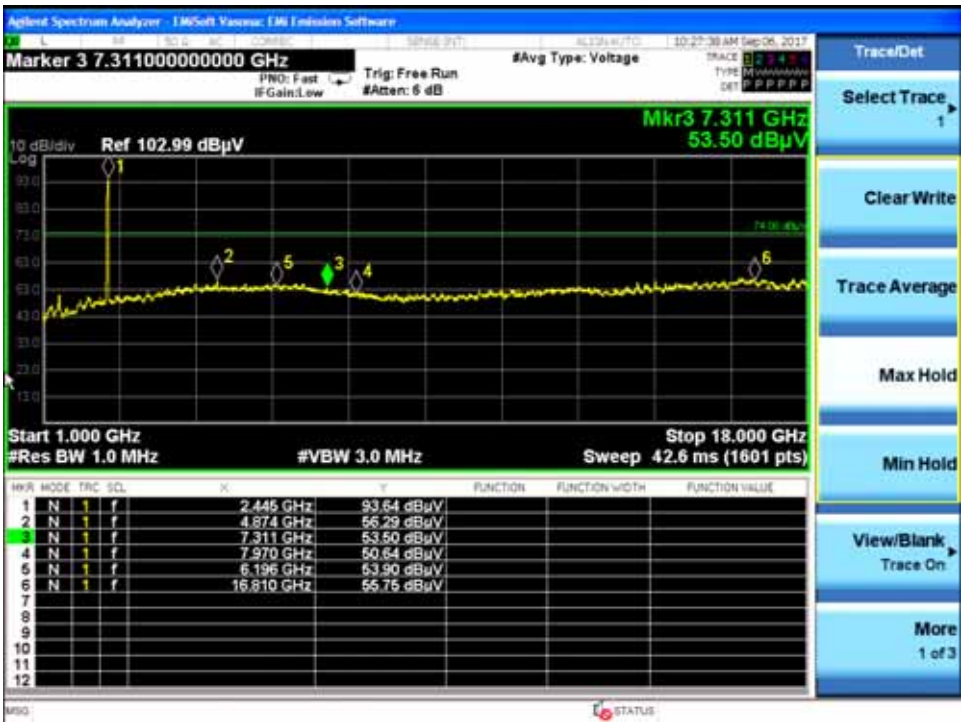


B.1.P.2 Radiated Transmitter Spurs, 2412 MHz, 6 to 54 Mbps, Peak (1-18GHz)

B.1.P.3 Radiated Transmitter Spurs, 2412 MHz, M0, Peak (1-18GHz)

B.1.P.4 Radiated Transmitter Spurs, 2437 MHz, 1 to 11 Mbps, Peak (1-18GHz)

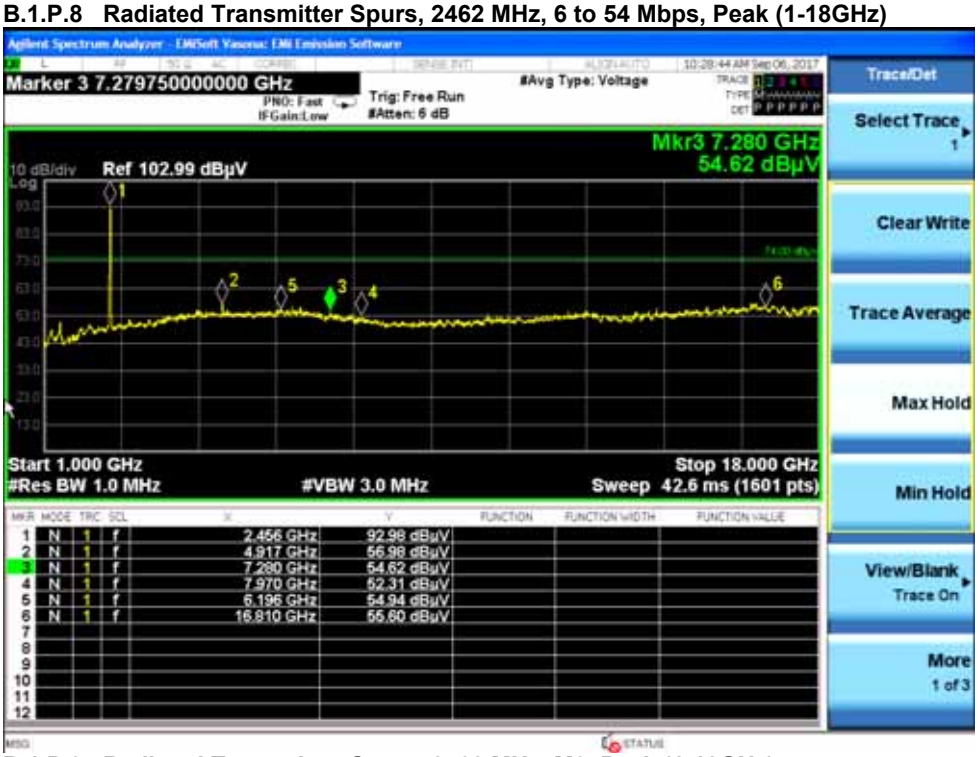
B.1.P.5 Radiated Transmitter Spurs, 2437 MHz, 6 to 54 Mbps, Peak (1-18GHz)



B.1.P.6 Radiated Transmitter Spurs, 2437 MHz, M0, Peak (1-18GHz)

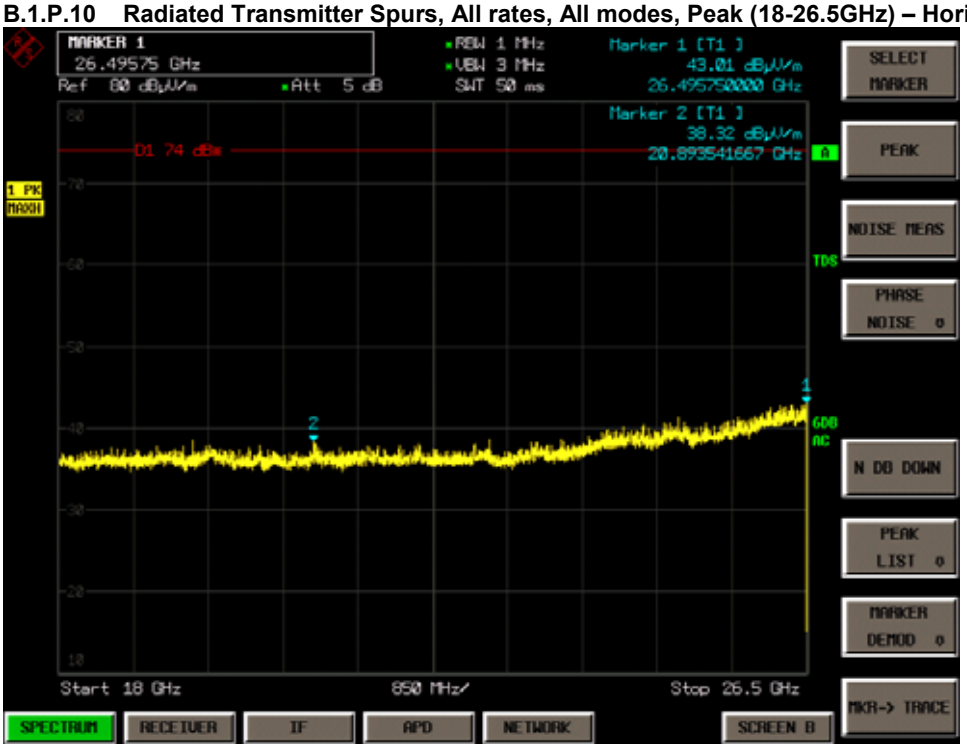
B.1.P.7 Radiated Transmitter Spurs, 2462 MHz, 1 to 11 Mbps, Peak (1-18GHz)

B.1.P.8 Radiated Transmitter Spurs, 2462 MHz, 6 to 54 Mbps, Peak (1-18GHz)



B.1.P.9 Radiated Transmitter Spurs, 2462 MHz, M0, Peak (1-18GHz)

B.1.P.10 Radiated Transmitter Spurs, All rates, All modes, Peak (18-26.5GHz) – Horizontal & Vertical



B.2 Receiver Spurious Emissions

RSS-GEN:
Receivers are required to comply with the limits of spurious emissions as set out in this section. Receiver emission measurements are to be performed as per the normative test method referenced in section 3.

Radiated emissions which fall in the restricted bands, as defined in RSS-Gen section 8.10, must also comply with the radiated emission limits specified in RSS-Gen section 8.9.

For emissions at frequencies below 1 GHz, measurements shall be performed using a CISPR quasi-peak detector and the related measurement bandwidth. At frequencies above 1 GHz, measurements shall be performed using a linear average detector with a minimum resolution bandwidth of 1 MHz.

Test Procedure

Using Vasona, configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer).

Radiated emission measurements shall be performed with the receiver antenna connected to the receiver antenna terminals. This report represents the worst case data for all supported operating modes and antennas

Maximize Turntable (find worst case table angle), Maximize Antenna (find worst case height)

Save plot: 1) Average Plot (Vertical and Horizontal), Limit= 54dBuV/m @3m
2) Peak Plot (Vertical and Horizontal), Limit= 74dBuV/m @3m

Ref. ANSI C63.10: 2013 Section 12.7.6 (Peak), Section 12.7.7.2 (Method AD), and Section 6.6
RSS-GEN sec 8.9 & 8.10

Radiated Spurious Emissions Test parameters	
Peak Span = 1-18GHz /18GHz-26.5GHz/26.5GHz-40GHz RBW = 1 MHz VBW ≥ 3 MHz Sweep = Auto couple Detector = Peak Trace = Max Hold.	**Average** Span = 1-18GHz /18GHz-26.5GHz/26.5GHz-40GHz RBW = 1 MHz VBW ≥ 3 MHz Sweep = Auto couple Detector = RMS Power Averaging

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
2	Radiated Testing: EUT + AC/DC Adapter	S02 and S03	☑	☐

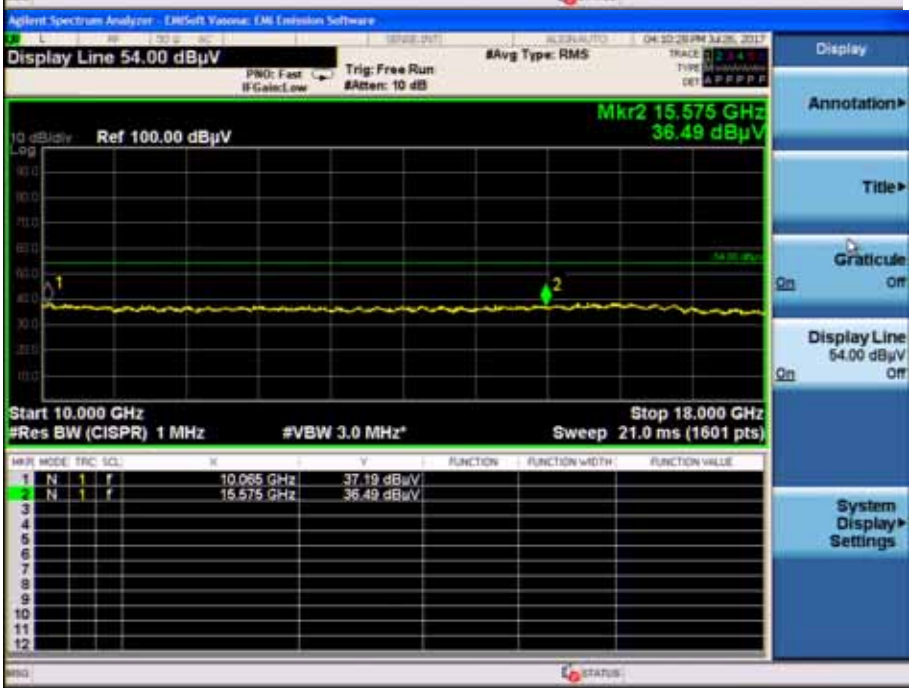
Tested By :	**Date of testing:**
Johanna Knudsen	July 26th, 2017 - July 27th, 2017
Test Result : PASS	

Test Equipment
See Appendix C for list of test equipment

B.2.A Receiver Radiated Spurious Emissions (Average Measurements)

This report represents the worst case data for all supported operating modes and antennas. There were no spurious emissions in the range 1-18GHz. Please note, the emission at 1.377GHz was investigated and was not caused by the radio. The emission was present when the radio was not transmitting. There were no significant emissions above 18GHz.

B.2.A.1 Radiated Receiver Spurs, All rates, All Mode, Average (1-18GHz) Horizontal & Vertical



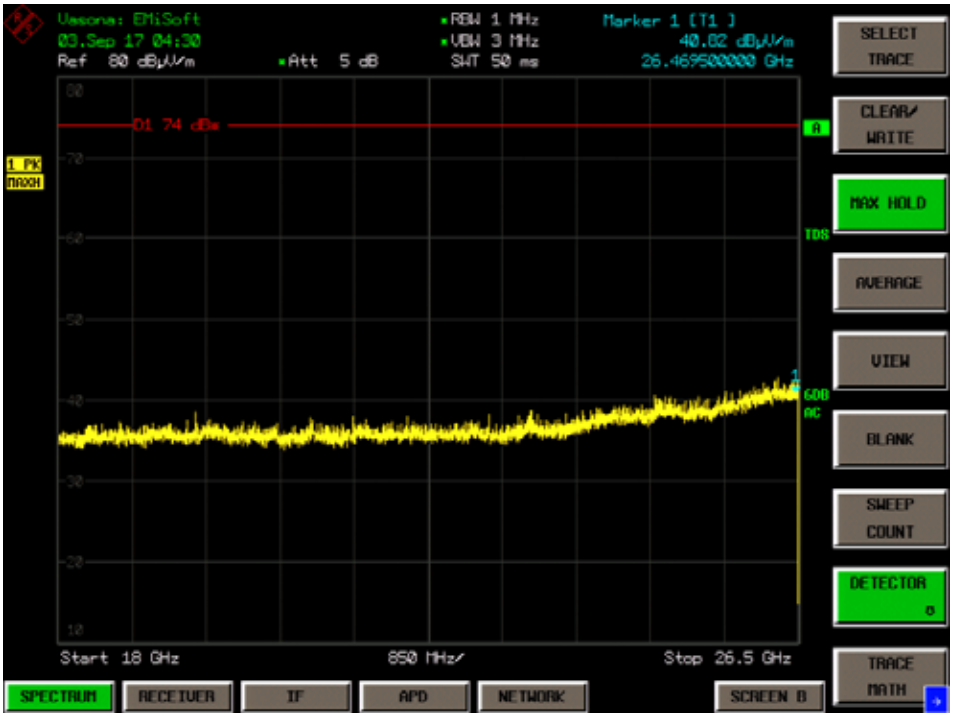
B.2.P.2 Radiated Receiver Spurs, All rates, All Mode, Average (18-26.5GHz) Vertical

B.2.P Receiver Radiated Spurious Emissions (Peak Measurements)

This report represents the worst case data for all supported operating modes and antennas. There were no spurious emissions in the range 1-18GHz. Please note, the emission at 1.377GHz was investigated and was not caused by the radio. The emission was present when the radio was not transmitting. There were no significant emissions above 18GHz.

B.2.P.1 Radiated Receiver Spurs, All rates, All Mode, Peak (1-18GHz)

B.2.P.2 Radiated Receiver Spurs, All rates, All Mode, Peak (18-26.5GHz)



B.3 Radiated Emissions 30MHz to 1GHz

15.205 / 15.209 / RSS-Gen:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) and RSS-GEN section 8.10, must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)) and RSS-Gen section 8.9.

Test Procedure

Ref. ANSI C63.10: 2013 section 6.5

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.

Span:	30MHz – 1GHz
Reference Level:	80 dBuV
Attenuation:	10 dB
Sweep Time:	Coupled
Resolution Bandwidth:	100kHz
Video Bandwidth:	300kHz
Detector:	Peak for Pre-scan, Quasi-Peak
	. Compliance shall be determined using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection.

Terminate the access Point RF ports with 50 ohm loads.

Maximize Turntable (find worst case table angle), Maximize Antenna (find worst case height)

This report represents the worst case data for all supported operating modes and antennas.

Samples, Systems, and Modes

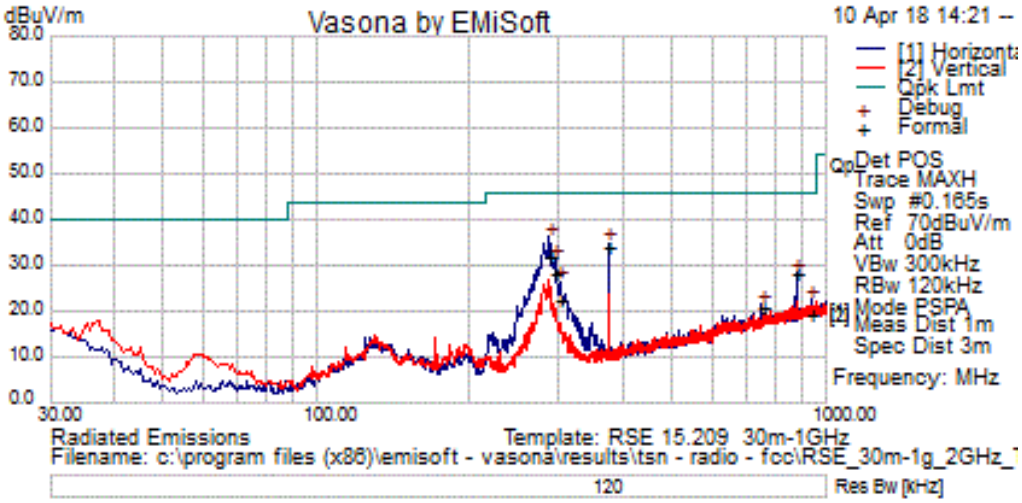
System Number	Description	Samples	System under test	Support equipment
2	Radiated Testing: EUT + AC/DC Adapter	S02 and S03	☑	☐

Tested By : Johanna Knudsen	**Date of testing:** April 10th, 2018- April 11th, 2018
Test Result : PASS	

Test Equipment

See Appendix C for list of test equipment

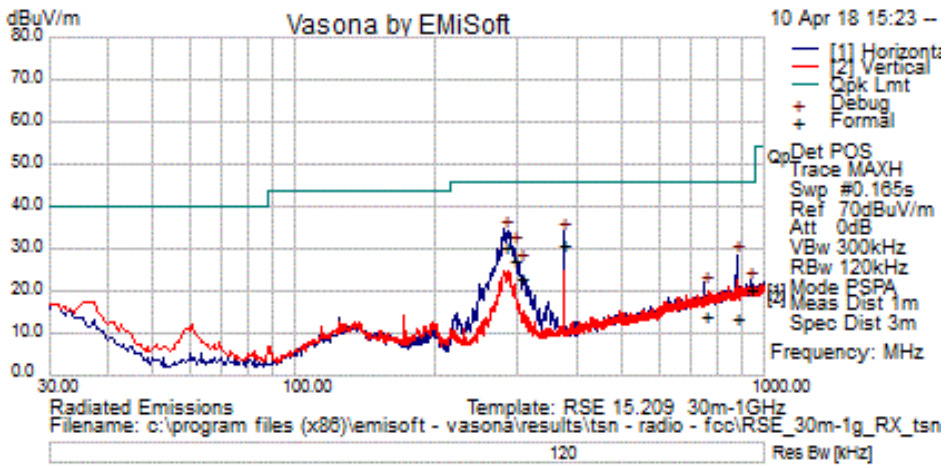
Transmitter Radiated Emission



Formal Data

No	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
1	286.754	26.6	1.4	3.8	31.8	Quasi Max	H	148	332	46.0	-14.2	Pass	
2	375.009	26.8	1.6	5.6	34.0	Quasi Max	H	111	105	46.0	-12.0	Pass	
3	293.769	23.0	1.4	3.8	28.3	Quasi Max	H	123	345	46.0	-17.7	Pass	
4	874.999	13.4	2.5	12.5	28.4	Quasi Max	H	104	298	46.0	-17.6	Pass	
5	301.237	17.2	1.4	3.9	22.5	Quasi Max	H	144	4	46.0	-23.5	Pass	
6	937.470	3.6	2.6	13.2	19.4	Quasi Max	H	190	322	46.0	-26.6	Pass	

Receiver Radiated Emission



Formal Data

No	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
1	280.436	25.0	1.4	3.9	30.2	Quasi Max	H	102	142	46.0	-15.8	Pass	
2	375.008	23.7	1.6	5.6	30.9	Quasi Max	H	102	112	46.0	-15.1	Pass	
3	293.386	21.9	1.4	3.8	27.1	Quasi Max	H	102	333	46.0	-18.9	Pass	
4	875.105	-1.6	2.5	12.5	13.4	Quasi Max	H	102	297	46.0	-32.6	Pass	
5	302.719	17.8	1.4	3.9	23.2	Quasi Max	H	102	339	46.0	-22.8	Pass	
6	937.490	4.4	2.6	13.2	20.2	Quasi Max	H	102	359	46.0	-25.8	Pass	

B.4 AC Conducted Emissions

FCC 15.207 (a) & RSS-Gen 8.8

Except when the requirements applicable to a given device state otherwise, for any radio apparatus equipped to operate from the public utility AC power supply, either directly or indirectly (such as with a battery charger), the radio frequency voltage of emissions conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the table in these sections. The more stringent limit applies at the frequency range boundaries.

Measurement Procedure
Accordance with ANSI C64.10:2013 section 6.2

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.

Span: 150 KHz – 30 MHz
Attenuation: 10 dB
Sweep Time: Coupled
Resolution Bandwidth: 9 KHz
Video Bandwidth: 30 KHz
Detector: Quasi-Peak / Average

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
3	AC Power Conducted Emissions: EUT + AC/DC Adapter	S04 and S05	☑	☐

Tested By :
Marie Higa

Date of testing:
April 19, 2017 - April 19, 2017

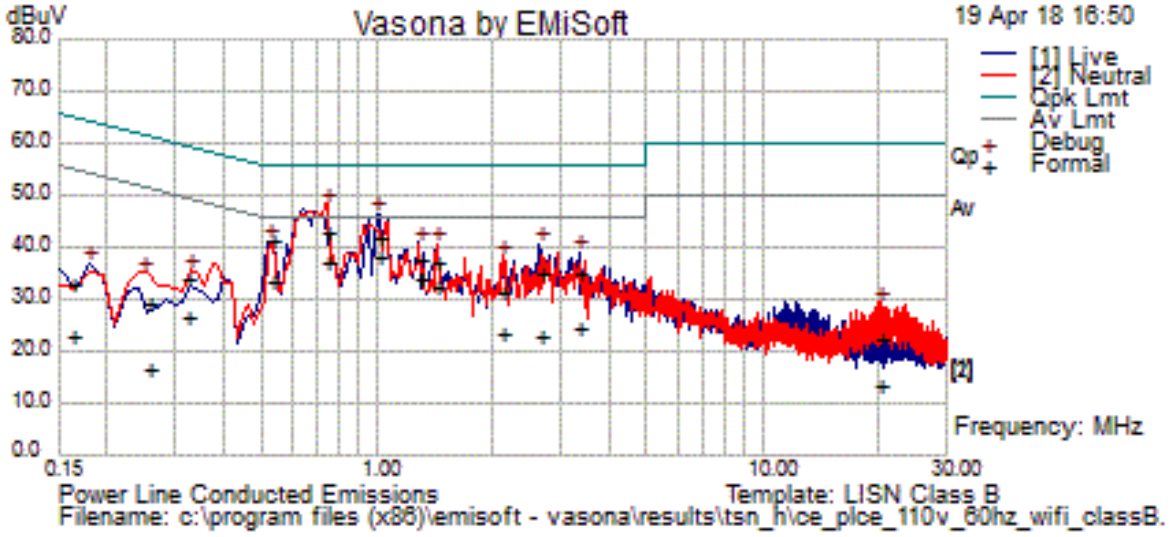
Test Result : PASS

Test Equipment
See Appendix C for list of test equipment

Environmental Conditions:	
Temperature: (59 to 95)F	70.8 deg F
Humidity: (10 to 75)%:	43.3%
Comments:	No further comments

Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



Wi-Fi TX mode

Test Results Table

No	Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
1	1.013	18.5	19.9	.0	38.4	Average	Live	46.0	-7.6	Pass	
2	.743	17.3	19.9	.0	37.3	Average	Neutral	46.0	-8.7	Pass	
3	1.284	13.9	19.9	.0	33.8	Average	Live	46.0	-12.2	Pass	
4	.539	13.6	19.9	.0	33.6	Average	Live	46.0	-12.4	Pass	
5	.743	22.9	19.9	.0	42.8	Quasi Peak	Neutral	56.0	-13.2	Pass	
6	1.434	12.3	19.9	.0	32.3	Average	Neutral	46.0	-13.7	Pass	
7	1.013	22.0	19.9	.0	42.0	Quasi Peak	Live	56.0	-14.0	Pass	
8	.539	21.4	19.9	.0	41.4	Quasi Peak	Live	56.0	-14.6	Pass	
9	1.284	17.7	19.9	.0	37.7	Quasi Peak	Live	56.0	-18.4	Pass	
10	1.434	17.4	19.9	.0	37.3	Quasi Peak	Neutral	56.0	-18.7	Pass	
11	2.652	15.1	20.0	.1	35.2	Quasi Peak	Live	56.0	-20.8	Pass	
12	3.363	15.0	20.0	.1	35.1	Quasi Peak	Live	56.0	-20.9	Pass	
13	3.363	4.3	20.0	.1	24.3	Average	Live	46.0	-21.7	Pass	
14	2.114	3.4	20.0	.1	23.4	Average	Neutral	46.0	-22.6	Pass	
15	.323	6.4	20.3	.1	26.7	Average	Neutral	49.6	-22.9	Pass	
16	2.652	2.9	20.0	.1	22.9	Average	Live	46.0	-23.1	Pass	
17	2.114	11.6	20.0	.1	31.6	Quasi Peak	Neutral	56.0	-24.4	Pass	
18	.323	13.9	20.3	.1	34.3	Quasi Peak	Neutral	59.6	-25.4	Pass	
19	.256	9.0	20.5	.1	29.6	Quasi Peak	Neutral	61.6	-32.0	Pass	

No	Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
20	.163	2.2	21.0	.1	23.2	Average	Live	55.3	-32.1	Pass	
21	.163	12.1	21.0	.1	33.2	Quasi Peak	Live	65.3	-32.2	Pass	
22	.256	-4.0	20.5	.1	16.6	Average	Neutral	51.6	-34.9	Pass	
23	20.118	-7.4	20.4	.2	13.2	Average	Neutral	50.0	-36.8	Pass	
24	20.118	2.0	20.4	.2	22.7	Quasi Peak	Neutral	60.0	-37.3	Pass	

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

Equipment used for Conducted Tests (99%/26dB Bandwidth, Maximum Conducted Output Power, and PSD)

Equip#	Manufacturer/ Model	Description	Last Cal	Next Due
55983	Keysight (Agilent/HP) / E8257D	PSG Analog Signal Generator	19-Oct-16	19-Oct-17
49527	Keysight (Agilent/HP) / N8990K-A38	2x4 Switch Matrix	13-Apr-17	13-Apr-18
40603	Keysight (Agilent/HP) / E4440A	Spectrum Analyzer 3Hz-26.5GHz	20-Oct-16	20-Oct-17
42629	Pasternack / PE6072	SMA 50 Ohm Termination	08 Mar 2017	08 Mar 2018
42624	Pasternack / PE6072	SMA 50 Ohm Termination	08 Mar 2017	08 Mar 2018
54016	HUBER + SUHNER / Sucoflex 102	RF Cable 2.4mm - N Type 18GHz	part of 49527	part of 49527
54015	HUBER + SUHNER / Sucoflex 102	RF Cable 2.4mm - N Type 18GHz	part of 49527	part of 49527
54014	HUBER + SUHNER / Sucoflex 102E	40GHz Cable K Connector	part of 49527	part of 49527

Equipment used for Conducted Tests (Conducted Spurious Emissions)

40603	Keysight (Agilent/HP) / E4440A	Spectrum Analyzer 3Hz-26.5GHz	20-Oct-16	20-Oct-17
55965	DYNAWAVE / N-Type 12 in/lbs	Pre-Set Torque Wrench, 12 in/lbs	29-Sep-16	29-Sep-17
54235	PASTERNACK / PE5011-1	PRESET TORQUE WRENCH, 8 IN/LBS	21-Feb-17	21-Feb-18
42624	PASTERNACK / PE6072	SMA 50 Ohm Termination	8-Mar-17	8-Mar-18
6335	LUFFT / 5063-33W	DIAL HYGROMETER	16 Aug 2017	16 Aug 2018

Equipment used for Radiated Tests

30MHz-1GHz

Equip#	Manufacturer/ Model	Description	Last Cal	Next Due
45050	ROHDE & SCHWARZ / ESCI	EMI Test Receiver	16 Nov 2017	16 Nov 2018
56154	HUBER + SUHNER / Sucoflex 104PEA	Sucoflex N Type blue 7ft cable	18 Jan 2018	18 Jan 2019
20975	MICRO-COAX / UFB311A-0-1344-520520	Coaxial Cable-18Ghz	19-Feb-18	19-Feb-19
55936	HUBER + SUHNER / Sucoflex 106PEA	RF Type N Antenna Cable 18 GHz 8.5m	19-Oct-17	19-Oct-18
32806	SUNOL SCIENCES / JB1	Combination Antenna, 30MHz-2GHz	7-Jun-17	7-Jun-18
41929	NEWPORT / iBTHP-5-DB9	5 inch Temp/RH/Press Sensor w/20ft cable	28 Dec 2017	28 Dec 2018
27233	York	CNE V / Comparison Noise Emitter	Cal not Req'd	Cal not Req'd
35235	LUFKIN / HY1035CME	Tape measure	Cal not Req'd	Cal not Req'd
56330	PASTERNACK / PE5011-1	PRESET TORQUE WRENCH, 8 IN/LBS	28 Feb 2018	28 Feb 2019
42630	PASTERNACK	PE6072 / SMA 50 Ohm Termination	8-Mar-18	8-Mar-19
56112	PASTERNACK	PE6072 / SMA 50 Ohm Termination	1-Dec-17	1-Dec-18
56129	PASTERNACK	PE6072 / SMA 50 Ohm Termination	1-Dec-17	1-Dec-18
56111	PASTERNACK	PE6072 / SMA 50 Ohm Termination	1-Dec-17	1-Dec-18

1GHz-18GHz

56052	MITEQ	TTA1800-30-HG / SMA 18GHz Pre Amplifier	9-Feb-17	9-Feb-18
35618	Micro-Tronics / HPM50112-02	Notch Filter	26-Jun-17	26-Jun-18
21117	MICRO-COAX / UFB311A-0-2484-520520	Coaxial Cable-18Ghz	16-Aug-17	16-Aug-18
49563	HUBER + SUHNER / Sucoflex 106A	Coaxial Cable, 8m	21-Aug-17	21-Aug-18
25662	Micro-COAX / UFB311A-1-0840-504504	Coaxial Cable, 84.0 in. to 18GHz	21 Feb 2017	21 Feb 2018
36716	CISCO / RF Coaxial Cable-SMA	Radio Test Cable, SMA-SMA	13-Jan-17	13-Jan-18
36717	CISCO / RF Coaxial Cable-SMA	Radio Test Cable, SMA-SMA	13-Jan-17	13-Jan-18
32544	ETS Lindgren / 3117	Double Ridged Horn Antenna	12-Jul-17	12-Jul-18
45166	Stanley	33-428 / 26' TAPE MEASURE	Cal Not Req'd	Cal Not Req'd
34075	SCHAFFNER	RSG 2000 / Reference Spectrum Generator, 1-18GHz	Cal Not Req'd	Cal Not Req'd
4883	EMCO	3115 / Horn Antenna	Cal Not Req'd	Cal Not Req'd
8171	Keysight (Agilent/HP)	8491B Opt 010 / ATTENUATOR	26-Apr-17	26-Apr-18
47300	Keysight (Agilent/HP)	N9038A / EMI Receiver	28-Mar-17	28-Mar-18
54230	Newport	iBTHP-5-DB9 / 5 inch Temp/RH/Press Sensor w/20ft cable	11-Feb-17	11-Feb-18
42629	PASTERNACK	PE6072 / SMA 50 Ohm Termination	8-Mar-17	8-Mar-18
42638	PASTERNACK	PE6072 / SMA 50 Ohm Termination	8-Mar-17	8-Mar-18
42634	PASTERNACK	PE6072 / SMA 50 Ohm Termination	8-Mar-17	8-Mar-18

42630	PASTERNACK	PE6072 / SMA 50 Ohm Termination	8-Mar-17	8-Mar-18
54235	PASTERNACK / PE5011-1	PRESET TORQUE WRENCH, 8 IN/LBS	21-Feb-17	21-Feb-18

18GHz-40GHz

41979	CISCO / 1840	18-40GHz EMI Test Head/Verification Fixture	30-Aug-17	30-Aug-18
44940	ROHDE & SCHWARZ / ESU40	EMI RECEIVER, 40GHZ	14-Nov-16	11/14/2017
37236	JFW / 50CB-015	Control Box, GPIB	Cal Not Req'd	Cal Not Req'd
54230	Newport	iBTHP-5-DB9 / 5 inch Temp/RH/Press Sensor w/20ft cable	11-Feb-17	11-Feb-18
42629	PASTERNACK	PE6072 / SMA 50 Ohm Termination	8-Mar-17	8-Mar-18
42638	PASTERNACK	PE6072 / SMA 50 Ohm Termination	8-Mar-17	8-Mar-18
42634	PASTERNACK	PE6072 / SMA 50 Ohm Termination	8-Mar-17	8-Mar-18
42630	PASTERNACK	PE6072 / SMA 50 Ohm Termination	8-Mar-17	8-Mar-18
54235	PASTERNACK / PE5011-1	PRESET TORQUE WRENCH, 8 IN/LBS	21-Feb-17	21-Feb-18
30486	Keysight (Agilent/HP)	E8257C / SIGNAL GENERATOR	15-Dec-16	15-Dec-17

Equipment used for AC Power Conducted Emissions

Equip#	Manufacturer/ Model	Description	Last Cal	Next Due
CIS008496	Fischer Custom Communications / FCC-450B-2.4-N	Instrumentation Limiter	16-MAY-17	16-MAY-18
CIS018963	York / CNE V	Comparison Noise Emitter, 30 - 1000MHz	Cal Not Required	N/A
CIS035235	Lufkin / HY1035CME	5 Meter Tape Measure	Cal Not Required	N/A
CIS037229	Coleman / RG-223	25ft BNC cable	13-APR-18	13-APR-19
CIS037239	Rohde & Schwarz / ESCI	ESCI EMI Test Receiver	02-MAY-17	02-MAY-18
CIS044023	Fischer Custom Communications / FCC-801-M2-32A	Power Line Coupling Decoupling Network	09-NOV-17	09-NOV-18
CIS045990	Fischer Custom Communications / F-090527-1009-1	Line Impedance Stabilization Network	15-JUN-17	15-JUN-18
CIS045991	Fischer Custom Communications / F-090527-1009-2	Lisn Adapter	15-JUN-17	15-JUN-18
CIS049479	Coleman / RG223	BNC 2ft Cable	05-MAR-18	05-MAR-19
CIS049531	TTE / H785-150K-50-21378	High Pass Filter	03-MAY-17	03-MAY-18
CIS049558	Bird / 5-T-MB	5W 50 Ohm BNC Termination 4GHz	10-AUG-17	10-AUG-18
CIS054231	Newport / iBTHP-5-DB9	5 inch Temp/RH/Press Sensor w/20ft cable	09-FEB-18	09-FEB-19

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 Emissions Configuration Photograph 30MHz-1GHz

Title: Radiated Emissions Configuration Photograph 1-18GHz

Title: Radiated Emissions Configuration Photograph 18-26.5GHz

Title: AC Power Conducted Emissions

Title: Conducted Setup (Bandwidth, Power, PSD)

Title: Conducted Setup (Conducted Spurious Emissions)

Appendix F: Software Used to Perform Testing

Radiated Spurious Emissions, Conducted Spurious Emissions, Software: EMIsoft Vasona, version 6.031

Appendix G:Test Procedures

Measurements were made in accordance with

- KDB 558074 - D01 DTS Meas Guidance v04
- KDB 662911 - MIMO
- ANSI C63.4 2014 Unintentional Radiators
- ANSI C63.10 2013 Intentional Radiators

Test procedures are summarized below

FCC 2.4GHz Test Procedures	EDCS # 1445042
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# 11811301

Target Power Tables EDCS# 11759869

Appendix J: Worst Case Justification

Test modes were determined from the Compliance Test Plan EDCS# 11811301.

All formal data can be found in EDCS# 11811303.