

MRT Technology (Taiwan) Co., Ltd Phone: +886-3-3288388 Web: www.mrt-cert.com Report No.:1812TW0101-U1Report Version:V01Issue Date:03-26-2019

MEASUREMENT REPORT

FCC PART 15 Subpart C WLAN 802.11b/g/n/VHT

FCC ID: TE7T3U **APPLICANT:** TP-Link Technologies Co., Ltd. **Application Type:** Certification **Product:** AC1300 Mini Wireless MU-MIMO USB Adapter Model No.: Archer T3U **Brand Name:** tp-link FCC Classification: Part15 Subpart C (Section 15.247) ANSI C63.10-2013, KDB 558074 D01v05r01 FCC Rule Part(s): KDB 662911 D01v02r01 **Test Procedure(s):** ANSI C63.10-2013 October 26, 2018 ~ March 10, 2019 Test Date:

Reviewed By:

Approved By:

addy Chen (Paddy Chen) **Testing Laboratory** 3261 (Chenz Ker)

The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Taiwan) Co., Ltd.



Revision History

Report No.	Version	Description	Issue Date	Note
1812TW0101-U1	Rev. 01	Initial report	03-26-2019	Valid

CONTENTS

Des	scriptio	n Pa	age
§2. 1	1033 Ge	eneral Information	5
1.	INTRO	DDUCTION	6
	1.1.	Scope	6
	1.2.	MRT Test Location	
2.	PROD	DUCT INFORMATION	7
	2.1.	Feature of Equipment under Test	7
	2.2.	Product Specification Subjective to this Report	
	2.3.	Working Frequencies for this report	
	2.4.	Description of Available Antennas	
	2.5.	Description of Antenna RF Port	
	2.6.	Test Mode	
	2.7.	Description of Test Software	10
	2.8.	Configuration of Test System	11
	2.9.	Test System Details	11
	2.10.	Device Capabilities	. 12
	2.11.	Test Configuration	14
	2.12.	EMI Suppression Device(s)/Modifications	14
	2.13.	Labeling Requirements	. 14
3.	DESC	RIPTION of TEST	15
	3.1.	Evaluation Procedure	15
	3.2.	AC Line Conducted Emissions	15
	3.3.	Radiated Emissions	16
4.	ANTE	NNA REQUIREMENTS	17
5.	TEST	EQUIPMENT CALIBRATION DATE	18
6.		SUREMENT UNCERTAINTY	
7.		RESULT	
••	7.1.	Summary	
	7.1. 7.2.	6dB Bandwidth Measurement	
	7.2. 7.2.1.	Test Limit	
	7.2.1.	Test Procedure used	
	7.2.2.	Test Setting	
	7.2.3.	Test Setup	
	7.2.4.	Test Result	
	1.2.0.		



	7.3.	Output Power Measurement	29
	7.3.1.	Test Limit	29
	7.3.2.	Test Procedure Used	29
	7.3.3.	Test Setting	. 29
	7.3.4.	Test Setup	. 29
	7.3.5.	Test Result	30
	7.4.	Power Spectral Density Measurement	32
	7.4.1.	Test Limit	32
	7.4.2.	Test Procedure Used	32
	7.4.3.	Test Setting	32
	7.4.4.	Test Setup	33
	7.4.5.	Test Result	34
	7.5.	Conducted Band Edge and Out-of-Band Emissions	45
	7.5.1.	Test Limit	45
	7.5.2.	Test Procedure Used	45
	7.5.3.	Test Setting	45
	7.5.4.	Test Setup	46
	7.5.5.	Test Result	47
	7.6.	Radiated Spurious Emission Measurement	. 60
	7.6.1.	Test Limit	60
	7.6.2.	Test Procedure Used	60
	7.6.3.	Test Setting	60
	7.6.4.	Test Setup	62
	7.6.5.	Test Result	. 63
	7.7.	Radiated Restricted Band Edge Measurement	83
	7.7.1.	Test Limit	83
	7.7.2.	Test Procedure Used	84
	7.7.3.	Test Setting	84
	7.7.4.	Test Setup	. 85
	7.7.5.	Test Result	. 86
	7.8.	AC Conducted Emissions Measurement	222
	7.8.1.	Test Limit	222
	7.8.2.	Test Setup	222
	7.8.3.	Test Result	223
8.	CONC	LUSION	.225
Арр	endix A	A - Test Setup Photograph	.226
Арр	endix E	3 - EUT Photograph	.227



Applicant:	TP-Link Technologies Co., Ltd.				
Applicant Address	Building 24 (floors 1,3,4,5) and 28 (floors1-4), Central Science and				
Applicant Address:	Technology Park, Nanshan Shenzhen, 518057 China				
Manufacturer:	TP-Link Technologies Co., Ltd.				
Manufacturer Address:	Building 24 (floors 1,3,4,5) and 28 (floors1-4), Central Science and				
Manufacturer Address:	Technology Park, Nanshan Shenzhen, 518057 China				
Test Site:	MRT Technology (Taiwan) Co., Ltd				
Test Site Address:	No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333,				
	Taiwan (R.O.C)				
FCC Registration No.:	291082				
Test Device Serial No.:	N/A Droduction Pre-Production Engineering				

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Fuxing Rd., Taoyuan, Taiwan (R.O.C)

- •MRT facility is a FCC registered (Reg. No. 153292 and 291082) test facility with the site description report on file and is designated by the FCC as an Accredited Test Firm.
- MRT facility is an IC registered (MRT Reg. No. 21723-1) test laboratory with the site description on file at Industry Canada.
- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (TAF) under the American Association for Laboratory Accreditation Program (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC, Industry Taiwan, EU and TELEC Rules.



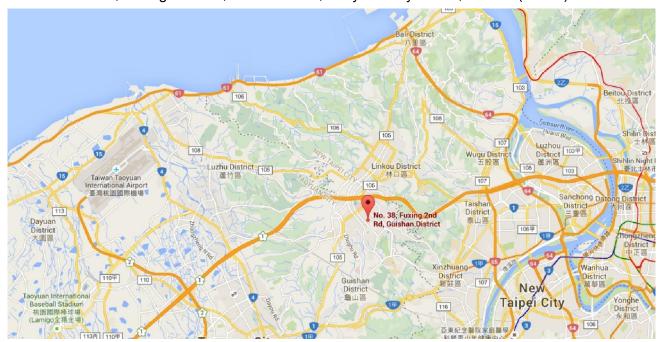
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taoyuan City. These measurement tests were conducted at the MRT Technology (Taiwan) Co., Ltd. Facility located at No.38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).





2. PRODUCT INFORMATION

2.1. Feature of Equipment under Test

Product Name:	AC1300 Mini Wireless MU-MIMO USB Adapter
Model No.:	Archer T3U
Brand Name:	tp-link
Wi-Fi Specification:	802.11a/b/g/n/ac

2.2. Product Specification Subjective to this Report

Part of the second s	
Frequency Range:	802.11b/g/n-HT20/VHT20: 2412 ~ 2462MHz
	802.11n-HT40/VHT40: 2422 ~ 2452MHz
Channel Number:	802.11b/g/n-HT20/VHT20: 11
	802.11n-HT40/VHT40: 7
Type of Modulation:	802.11b: DSSS
	802.11g/n/VHT: OFDM
Data Rate:	802.11b: 1/2/5.5/11Mbps
	802.11g: 6/9/12/18/24/36/48/54Mbps
	802.11n: up to 300Mbps
	VHT: up to 400Mbps

Note: For other features of this EUT, test report will be issued separately.



2.3. Working Frequencies for this report

802.11b/g/n-HT20/VHT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz
04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 MHz
10	2457 MHz	11	2462 MHz		

802.11n-HT40/VHT40

Channel	Frequency	Channel	Frequency	Channel	Frequency
03	2422 MHz	04	2427 MHz	05	2432 MHz
06	2437 MHz	07	2442 MHz	08	2447 MHz
09	2452 MHz				

2.4. Description of Available Antennas

Antenna Type	Frequency	ТХ	Max Antenna Gain (dBi)		TX Max Antenna Gain (dBi) Directional		Gain (dBi)
	Band (MHz)	Paths	Ant 0	Ant 1	For Power	For PSD	
PIFA Antenna	2400 ~ 2500	2	1.94	1.76	1.94	4.95	
FIFA Antenna	5150 ~ 5850	2	1.99	1.93	1.99	5.00	

Note:

- 1. 802.11a, 802.11b, 802.11g support single transmission at Ant 0 port only.
- The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.
 For CDD transmissions, directional gain is calculated as follows, N_{ANT} = 2, N_{SS} = 1.
 If all antennas have the same gain, G_{ANT}, Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.
 - For power spectral density (PSD) measurements on all devices, Array Gain = 10 log (N_{ANT}/ N_{SS}) dB = 3.01;
 - For power measurements on IEEE 802.11 devices,
 Array Gain = 0 dB for NANT ≤ 4;

If antenna gains are not equal and each transmit antenna is driven by only one spatial stream, Directional gain = GANT + Array Gain,

- For power spectral density (PSD) measurements on all devices, Array Gain = 10 log (N_{ANT}/ N_{SS}) dB = 3.01;
- For power measurements on IEEE 802.11 devices, Array Gain = 0 dB for NANT ≤ 4;





		Antenna RF Port		
Software	2.4GHz RF Port		5GHz RF Port	
Control Port	Ant 0	Ant 1	Ant 0	Ant 1

2.5. Description of Antenna RF Port

2.6. Test Mode

Test Mode	Mode 1: Transmit by 802.11b (1Mbps)
	Mode 2: Transmit by 802.11g (6Mbps)
	Mode 3: Transmit by 802.11n-HT20 (MCS8)
	Mode 4: Transmit by 802.11n-HT40 (MCS8)
	Mode 5: Transmit by VHT20 (MCS0)
	Mode 6: Transmit by VHT40 (MCS0)



2.7. Description of Test Software

The test utility software used during testing was "REALTEK 11ac 8822BU_USB", and the version was "v5.05".

Test Mode	Test Frequency		arameter lue	Test Mode	Test Frequency		arameter lue
	(MHz)	Ant 0	Ant 1		(MHz)	Ant 0	Ant 1
	2412	44.0			2412	44.0	
11b	2437	44.0		11g	2437	51.0	
	2462	44.0			2462	47.0	
	2412	45.0	47.0		2422	38.0	40.0
11n-HT20	2437	47.0	49.0	11n-HT40	2437	46.0	47.0
	2462	45.0	47.0		2452	39.0	41.0
	2412 46.0	47.0		2422	40.0	41.0	
VHT20	2437	47.0	49.0	VHT40	2437	45.0	47.0
	2462	44.0	46.0		2452	39.0	41.0

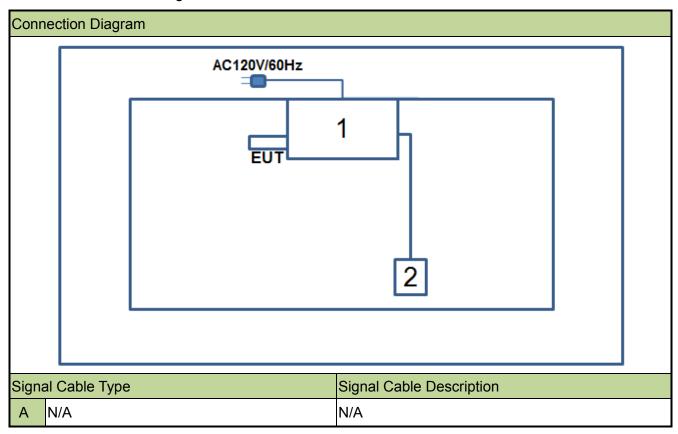
Power Parameter Value



2.8. Configuration of Test System

The AC1300 Mini Wireless MU-MIMO USB Adapter was tested per the guidance ANSI C63.10:

2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.



2.9. Test System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		uct	Manufacturer	acturer Model No. Serial No.		Power Cord
1 Notebook		Notebook	Lenovo	E431	PF-10ZRN 13/12	Non-Shielded, 1.8m
	2	Mouse	DELL	MS111-T	N/A	Shielded, 1.8m



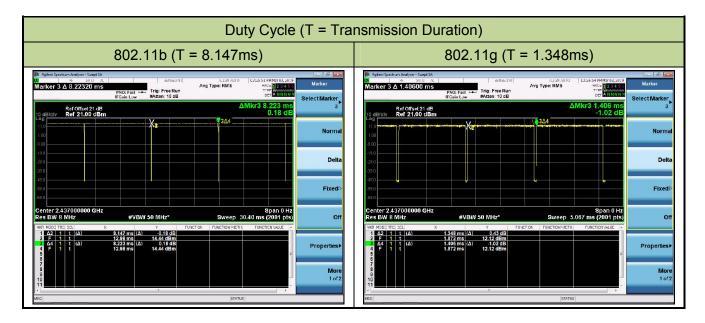
2.10. Device Capabilities

This device contains the following capabilities:

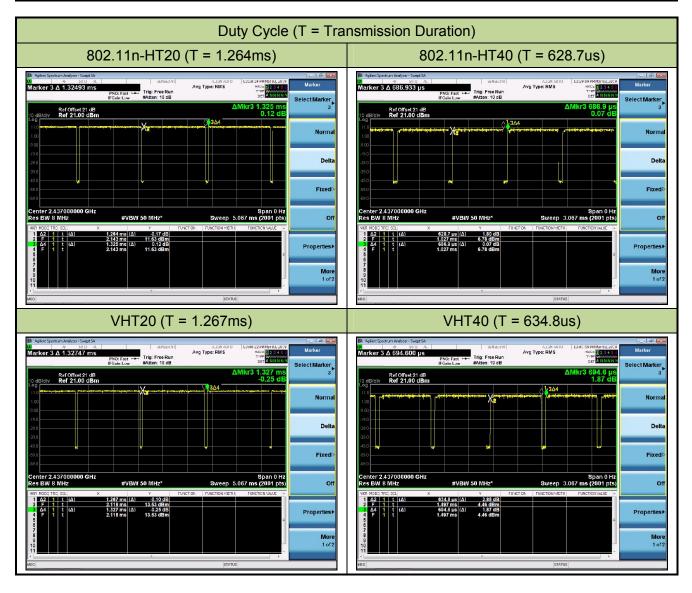
2.4GHz WLAN (DTS), 5GHz WLAN (UNII)

Note: 2.4GHz WLAN (DTS) operation is possible in 20MHz and 40MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Model No.	Test Mode	Duty Cycle
	802.11b	99.08%
	802.11g	95.87%
Archar T211	802.11n-HT20	95.40%
Archer T3U	802.11n-HT40	91.53%
	VHT20	95.48%
	VHT40	91.39%









2.11. Test Configuration

The **AC1300 Mini Wireless MU-MIMO USB Adapter** was tested per the guidance of ANSI C63.10-2013. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.12. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.13. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.



3. DESCRIPTION of TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013), and the guidance was used in the measurement of the **AC1300 Mini Wireless MU-MIMO USB Adapter. Deviation from measurement procedure.**

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, $50\Omega/50$ uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10-2013.



3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable. For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-40GHz was placed on top of the 1.5 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.



4. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

- The antenna of the AC1300 Mini Wireless MU-MIMO USB Adapter is permanently attached.
- There are no provisions for connection to an external antenna.

Conclusion:

The unit complies with the requirement of §15.203.



5. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Two-Line V-Network	R&S	ENV216	MRTTWA00019	1 year	2019/3/20
Two-Line V-Network	R&S	ENV216	MRTTWA00020	1 year	2019/3/20
8-Wire ISN (T8)	R&S	ENY81	MRTTWA00018	1 year	2019/4/24
EMI Test Receiver	R&S	ESR3	MRTTWA00045	1 year	2019/5/14
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00033	1 year	2019/5/21

Radiated Emissions

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Acitve Loop Antenna	SCHWARZBECK	FMZB 1519B	MRTTWA00002	1 year	2019/4/24
Broadband TRILOG Antenna	SCHWARZBECK	VULB 9162	MRTTWA00001	1 year	2019/5/22
Broadband Hornantenna	SCHWARZBECK	BBHA 9120D	MRTTWA00003	1 year	2019/4/24
Breitband Hornantenna	SCHWARZBECK	BBHA 9170	MRTTWA00004	1 year	2019/4/23
Broadband Preamplifier	SCHWARZBECK	BBV 9718	MRTTWA00005	1 year	2019/4/23
Broadband Amplifier	SCHWARZBECK	BBV 9721	MRTTWA00006	1 year	2019/4/23
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2019/3/19
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2019/7/30
Antenna Cable	HUBERSUHNER	SF106	MRTTWE00010	1 year	2019/5/18
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00032	1 year	2019/5/21

Conducted Test Equipment

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2019/7/30
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTSUE06457	1 year	2019/7/19
X-Series USB Peak and	KEVOLOUT			1	2010/4/24
Average Power Sensor	KEYSIGHT	U2021XA	MRTTWA00014	1 year	2019/4/24
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00032	1 year	2019/5/21

Software	Version	Function
e3	9.160520a	EMI Test Software



6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

AC Conducted Emission Measurement - SR2
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)):
150kHz~30MHz: 2.53dB
Radiated Emission Measurement - AC1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)):
9kHz ~ 1GHz: 4.25dB
1GHz ~ 25GHz: 4.45dB
Spurious Emissions, Conducted - SR1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)):
2.65dB
Output Power - SR1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)):
0.84dB
Power Spectrum Density - SR1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)):
2.65dB
Occupied Bandwidth - SR1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)):
3.3%



7. TEST RESULT

7.1. Summary

Product Name:	AC1300 Mini Wireless MU-MIMO USB Adapter
FCC ID:	TE7T3U

FCC Section(s)	Test	Test Limit	Test Condition	Test Result	Reference
15.247(a)(2)	Description 6dB Bandwidth	≥ 500kHz	Condition	Pass	Section 7.2
15.247(b)(3)	Output Power	≤ 30dBm		Pass	Section 7.3
15.247(e)	Power Spectral	≤ 8dBm/3kHz		Pass	Section 7.4
	Density		Conducted		
15.247(d)	Band Edge / Out-of-Band Emissions	≥ 30dBc(Average)		Pass	Section 7.5
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	Pass	Section 7.6 & 7.7
15.207 AC Conduct Emissions 150kHz - 30MHz		< FCC 15.207 limits	Line Conducted	Pass	Section 7.8

Notes:

- The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 2) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.
- Test Items "6dB Bandwidth" & "Band Edge / Out-of-Band Emissions" have been assessed MIMO transmission, and showed the worst test data in this report.



7.2. 6dB Bandwidth Measurement

7.2.1.Test Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

7.2.2.Test Procedure used

ANSI C63.10 Section 11.8

7.2.3.Test Setting

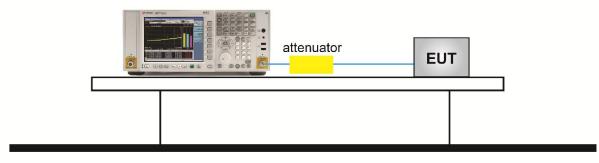
 The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 6. The bandwidth

measurement was not influenced by any intermediate power nulls in the fundamental emission.

- 2. Set RBW = 100 kHz
- 3. VBW \geq 3 × RBW
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep = auto couple
- 7. Allow the trace was allowed to stabilize

7.2.4.Test Setup

Spectrum Analyzer



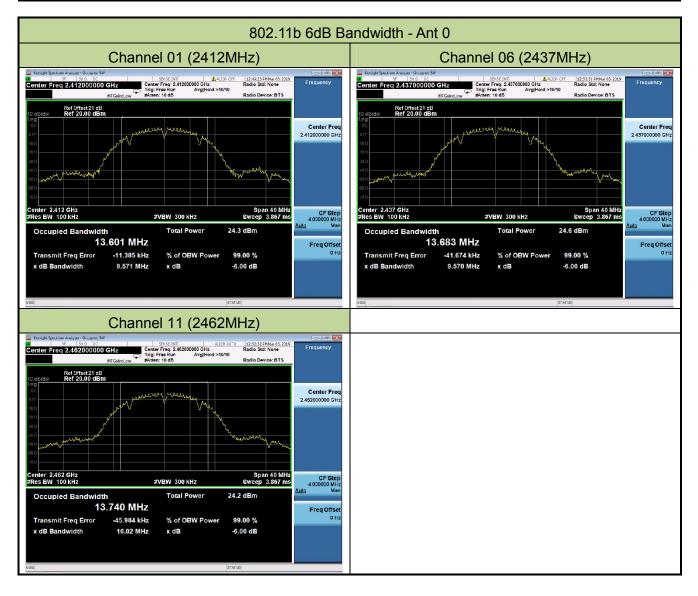


7.2.5.Test Result

Product	AC1300 Mini Wireless MU-MIMO USB Adapter	Temperature	23°C
Test Engineer	Kevin Ker	Relative Humidity	54%
Test Site	SR2	Test Date	2019/03/03

Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.11b	1Mbps	01	2412	9.57	≥ 0.5	Pass
802.11b	1Mbps	06	2437	9.57	≥ 0.5	Pass
802.11b	1Mbps	11	2462	10.02	≥ 0.5	Pass
802.11g	6Mbps	01	2412	16.37	≥ 0.5	Pass
802.11g	6Mbps	06	2437	16.35	≥ 0.5	Pass
802.11g	6Mbps	11	2462	16.36	≥ 0.5	Pass
802.11n-HT20	MCS8	01	2412	17.11	≥ 0.5	Pass
802.11n-HT20	MCS8	06	2437	17.15	≥ 0.5	Pass
802.11n-HT20	MCS8	11	2462	17.16	≥ 0.5	Pass
802.11n-HT40	MCS8	03	2422	36.37	≥ 0.5	Pass
802.11n-HT40	MCS8	06	2437	36.36	≥ 0.5	Pass
802.11n-HT40	MCS8	09	2452	36.37	≥ 0.5	Pass
VHT20	MCS0	01	2412	17.07	≥ 0.5	Pass
VHT20	MCS0	06	2437	17.15	≥ 0.5	Pass
VHT20	MCS0	11	2462	17.08	≥ 0.5	Pass
VHT40	MCS0	03	2422	36.37	≥ 0.5	Pass
VHT40	MCS0	06	2437	36.34	≥ 0.5	Pass
VHT40	MCS0	09	2452	36.13	≥ 0.5	Pass







802.11g 6dB	Bandwidth - Ant 0
Channel 01 (2412MHz)	Channel 06 (2437MHz)
Center Freq 2.412000000 GHz Sensemi ALION AUTO 12.3337 FMMe /03.2319 Frequencies Center Freq 2.412000000 GHz Center Freq 2.412000000 GHz Center Freq 2.41200000 GHz Radio Stat. None Frequency #FG0react #FG0react Center Freq 2.41200000 GHz Radio Stat. None Frequency #FG0react #FG0react Arrent 10 dS Arrent 10 dS Radio Device: BTS Igl cellidity Kef 2010 dBm Arrent 10 dS Arrent 10 dS Radio Device: BTS	Image: State
Log Center Fl 100 Judgedie all water all wa	
Center 2.412 GHz Span 40 MHz CF:st #Res BW 100 kHz #VBW 300 kHz Sweep 3.867 ms Auto	ep #2 #Res BW 100 kH2 CF Step #2 #Res BW 100 kH2 #VBW 300 kH2 Sweep 3.867 ms 40,00000 MH2 A00000 MH2 A00000 MH2
Occupied Bandwidth Total Power 21.1 dBm Freq Off	Occupied Bandwidth Total Power 24.2 dBm
Transmit Freq Error 5.170 kHz % of OBW Power 99.00 %	HZ Transmit Freq Error 4.980 kHz % of OBW Power 99.00 %
x dB Bandwidth 16.37 MHz x dB -6.00 dB	x dB Bandwidth 16.35 MHz x dB -6.00 dB
07ATA0	V30 STATLO
Channel 11 (2462MHz)	
Keyi Ji Spectrum Avgare - Oxupre 3// SESSE.01 ALER A/7 123355 FMM 48 2219 Center Freq 2.4562000000 GHz Geneter Freq: 2.46200000 GHz Radio Std: None #/FGalet.cv #/FGalet.cv Trg: Freq Run AvgHiold:>1010 Radio Std: None	<u>22</u>
Ref Offisst21 dB 10 dG/div Ref 20.00 dBm Log	
100 Center Fr กกา	
Center 2.462 GHz Span 40 MHz CF5t #Res EW 100 kHz ∓VEW 300 kHz Sweep 3.867 ms 4000000	ep
	172 an
16.426 MHz Freq Offs	
Transmit Freq Error -1.176 KHZ % OF OBW Fower \$95.00 %	Hz
x dB Bandwidth 16.36 MHz x dB -6.00 dB	
V30 S7AT/0	



	802.	11n-HT20 6dB B	andwidth - Ant () / Ant 0 + 1	
	Channel 01 (2412	MHz)		Channel 06 (243	7MHz)
Ref Offset 21 dB	HZ Center Freg: 2.41200000 GHz Freg: Trig: Free Run Avg Hoid.>10 FGsintLow #Atten: 10 dB	N AUTO 12.54.38 FM Net 93, 2319 Radio Std: None Radio Device: BTS		BENSENTI O GHz Trig: Free Run Avg Hold:> #/FGein:Low	ICR AUTO 1225513 FM Ard 83, 2219 Radio Stat: None Radio Device: BTS
10 dBdW Ref 20.00 dBm 00 00 00 00 00 00 00 00 00 0	national restoration front and a start of and a start of a	Center 2.412000000	req 10.0		2.43700000 GHz
Center 2.412 GHz #Res BW 100 kHz	#VBW 300 kHz	Span 40 MHz CFS	Center 2.437 GHz #Res BW 100 kHz	#VBW 300 kHz	Span 40 MHz CF Step Sweep 3.867 ms
Occupied Bandwidth	Total Power	20.7 dBm	Occupied Bandwid	th Total Power	22.2 dBm
17. Transmit Freg Error	2.127 kHz % of OBW Power	Freq Of	set 1 ^{Hz} Transmit Freg Error	7.604 MHz -5.920 kHz % of OBW Power	Freq Offset
x dB Bandwidth	2.127 kHz % of OBW Power 17.11 MHz x dB	99.00 % -6.00 dB	x dB Bandwidth	-5.920 kHz % of OBW Power 17.15 MHz x dB	r 99.00 % 0 H≥ -6.00 dB
vsa		STATUS	voa		STATUS
	Channel 11 (2462	MHz)			
E Keysight Spectrum Analyzes - Occupieu 3W XF 50 Ω DC Center Freq 2.4622000000 G	FGain:Low Sense:INT Alig Center Freq: 2.462000000 GHz Trig: Free Run Avg Hold:>10	N AUTO 12:55:50 FM Atl 03, 2319 Radio Std: None Radio Device: BTS			
Ref Offset 21 dB Ref 20.00 dBm 10 dB/div Ref 20.00 dBm 00	ng handred a drawl out on the advection of an advection of the set	Center 2.45200000			
المالي من المراجع المالي مالي		Span 40 MHz			
#Res BW 100 kHz	#VBW 300 kHz	Sweep 3.867 ms 4.000000	tep //Hz /lan		
Occupied Bandwidth 17	Total Power 592 MHz	21.8 dBm			
Transmit Freq Error	-4.689 kHz % of OBW Power	Freq 01 99.00 %	set Hz		
x dB Bandwidth	17.16 MHz x dB	-6.00 dB			
VSG		STATUS			



	802.1	1n-HT40 6dB Ba	ndwidth - Ant 0	/ Ant 0 + 1	
CI	hannel 03 (2422N	ЛHz)		Channel 06 (243	37MHz)
Keyidit Spectrum Anayae - Occupied 3// V V F 59.0 pC Center Freq 2.422000000 GHz //FGein Ref Offset 21 dB 10 dB/dly Ref 20.00 dBm	Center Freq: 2.42200000 GHz Trig: Freq: 2.42200000 GHz Trig: Freq: 2.42200000 GHz Atten: 10 d5	TO 12:55:25 FH Nat 03:2219 Radio Std: None Radio Device: BTS	Keyidit Spectrum Anayzer - Occupied 3// M	GHz Center Freq: 2.437000000 GHz #FGein:Low #Atten: 10 dB	ALICN AUTO 12:37:00 FRINAr 03:239 Radio Std: None Radio Device: BTS
10.C	hadin ta shiring perhadon for burbler	Center Fre 2.42200000 GH	10.C	fallen frisker och star frisk fri	Center Free 2.437000000 GHz
Center 2.422 GHz #Res BW 100 kHz	#VBW 300 kHz	Span 80 MHz CF Ste Sweep 7.667 ms 8.00000 MH	Center 2.437 GHz #Res BW 100 kHz	#VBW 300 kHz	Span 80 MHz CF Step Sweep 7.667 ms 8.00000 MH
Transmit Freq Error 6	3 MHz 5.149 kHz % of OBW Power	8.7 dBm Auto Ma 99.00 % -6.00 dB	Occupied Bandwidt t 36	n Total Power .221 MHz -7.270 kHz % of OBW Pow 36.36 MHz x dB	21.3 dBm
V50	\$T	TATUS	VSG		STATUS
Keyid Spectrum Ansver - Occupes 3// See Do Center Freq 2.452000000 GHz JFGair Ref Offset 21 dB to dB/div Ref 20.00 dBm for	hannel 09 (2452N	, 	4		
Center 2452 GHz #Res BW 100 kHz Occupied Bandwidth 36.20	#VBW 300 kHz Total Power 1 5 MHz	Span 80 MHz CF Stee Sweep 7.667 ms 8.00000 MHz 17.6 dBm Auto	2		
Transmit Freq Error -13	3.783 kHz % of OBW Power	99.00 % 01+ -6.00 dB			
V00	\$T	TATUS			



	VHT20 6dB	Bandwid	idth - Ant 0 / Ant 0 + 1
	Channel 01 (2412MHz)		Channel 06 (2437MHz)
Keysight Spectrum Anayzer - Occupred B// F S0 S2 D2 Center Freq 2.412000000	SBASEINTI ALICA NUTO 01.24-00 FMHar 03.2119 CHIZ Center Frez 241200000 CHIZ Radio Std: None Trig: Free Run Avg Hold:>10/10 #FGaintLow Radio Device: BTS Radio Device: BTS	Frequency	Center Freq 2.437000000 GHz Trg:Free Run Avginol > 10 B Freq 2.437000000 GHz Trg:Free Run Avginol > 10 B Freq 2.437000000 GHz Trg:Free Run Avginol > 10 B Freq 2.437000000 GHz Trg:Free Run Avginol > 10 B
Ref 0783421 aB 10 al5/div Ref 20.00 dBm Log Ref 20.00 dBm .00	a tradical and a factor of the	Center Freq 2.41200000 GHz	Note Performation Center Freq CenteFreq Center Freq C
Center 2.412 GHz #Res BW 100 kHz	Span 40 MHz #VBW 300 kHz Sweep 3.867 ms	CF Step 4.000000 MHz	200 Center 2.437 GHz Span 40 MHz CF Step #Res BW 100 kHz #VBW 300 kHz Sweep 3.867 ms 4.000000 MHz
Occupied Bandwidt 17 Transmit Freq Error x dB Bandwidth	h Total Power 21.5 dBm 7.601 MHz 1.348 kHz % of OBW Power 99.00 % 17.07 MHz x dB -6.00 dB	Auto Man Freq Offset 0 Hz	Occupied Bandwidth Total Power 21.9 dBm 17.601 MHz Transmit Freq Error -5.513 kHz % of OBW Power 99.00 % x dB Bandwidth 17.15 MHz x dB -6.00 dB
v50	37ATUS		1000 (p1000 1000
Center Freq 2.46200000 Ref Office 21 of 10 cEnter Freq 2.462000000 Center Freq 2.46200000 dBn 10 cEnter Ref 20.00 dBn	SBSEINTI ALICNUTO 01.24-57 FMMar 03.2119 CHTz Center Frez 246200000 CHz Radio Std: None Trig: Free Run Avg Hold:>10/10 #FGsintLow Radio Device: BTS Radio Device: BTS	Center Freq 2.45200000 GHz	
Center 2.462 GHz #Res BW 100 kHz Occupied Bandwidt 17 Transmit Freg Error	Span 40 MHz Span 40 MHz #VBW 300 kHz Sweep 3.867 ms h Total Power 21.1 dBm 7.606 MHz -2.718 kHz % of OBW Power 99.00 %	CF Step 4.00000 MHz Man Freq Offset 0 Hz	
x dB Bandwidth	17.08 MHz x dB -6.00 dB		



	V	HT40 6dB B	Bandwid	dth - Ant 0 / An	nt 0 + 1				
С	hannel 03 (2422	MHz)		Channel 06 (2437MHz)					
Ref Offset 21 dB	Center Fras 2.42200000 GHz Trig: Fras Run Avg Hold>10/ ntLow	AUTO 01:33:25 FMMar 03, 2319 Radio Std: None 10 Radio Device: BTS	Frequency	Ref Offset 21 dB	SHz //FGsin:Low SHZ //FGsin:Low	eq: 2.437000000 GHz Run Avg Hold:>10	IN AUTO (01:92:50 FM Nat 03: 2315 Radio Std: None M0 Radio Device: BTS	Frequency	
10.C	AAA U AAAAAA , AAAAAA AAAAAAAAAAAAAAAAA	2.	Center Freq 422000000 GHz	10 disidiv Ref 20.00 dBm	///	production of the state of the	- mark libric mark having	Center Freq 2.437000000 GHz	
Center 2.422 GHz #Res BW 100 kHz	#VBW 300 kHz	Span 80 MHz Sweep 7.667 ms	CF Step 8.000000 MHz	Center 2.437 GHz #Res BW 100 kHz	#VB	W 300 kHz	Span 80 MH: Sweep 7.667 ms	CF Step 8.000000 MHz	
Transmit Freq Error	Total Power 9 MHz 7.830 kHz % of OBW Power 6.37 MHz x dB	19.8 dBm Auto 99.00 % -6.00 dB		Occupied Bandwidth	201 MHz 12.199 kHz	Total Power % of OBW Power x dB	21.7 dBm 99.00 % -6.00 dB	Auto Man Freq Offset 0 Hz	
vaa Cossi yli Spectium Awyzer- Occupieci SW	hannel 09 (2452	status MHz)		N90			\$TAT8		
Center Freq 2.452000000 GHz	SENSE INTI ALICH Center Freig 2.45200000 GHz Frei Run AvgiHoid>10/ #Atten: 10 dB		Frequency						
	head half an public and the a	2.	Center Freq 452000000 GHz						
Center 2.452 GHz #Res BW 100 kHz	#VBW 300 kHz	Span 80 MHz Sweep 7.667 ms	CF Step 8.000000 MHz						
Transmit Freq Error -1	Total Power 8 MHz 0.731 kHz % of OBW Power 66.13 MHz x dB	19.5 dBm Auto 99.00 % -6.00 dB	o Man Freq Offset 0 Hz						



7.3. Output Power Measurement

7.3.1.Test Limit

The maximum output power shall be less 1 Watt (30dBm).

The conducted output power limit specified in paragraph FCC Part 15.247(b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. 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 FCC Part 15.247(b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

7.3.2.Test Procedure Used

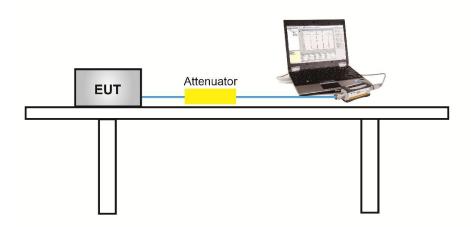
ANSI C63.10 Section 11.9.2.3.2

7.3.3.Test Setting

Average Power Measurement

Average power measurements were perform only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

7.3.4.Test Setup





7.3.5.Test Result

Power output test was verified over all data rates of each mode shown as below table, and then

choose the maximum power output (gray marker) for final test of each channel.

Output power at various data rates:

Ant 0 - 802.11b - Channel 06 (2437MHz)									
Date Rate(Mbps) 1 2 5.5 11									
Power (dBm) 18.36 18.28 18.20 18.02									

Ant 0 - 802.11g - Channel 06 (2437MHz)										
Date Rate(Mbps) 6 9 12 18 24 36 48 54										
Power (dBm) 18.51 18.46 18.38 18.36 18.32 18.28 18.29 18.13										

Ant 0 / Ant 0+1 - 802.11n-HT20 - Channel 06 (2437MHz)									
Date Rate(Mbps) MCS8 MCS9 MCS10 MCS11 MCS12 MCS13 MCS14 MCS15									
Power (dBm) 16.21 16.17 16.10 16.04 15.97 15.93 15.87 15.83									

Ant 0 / Ant 0+1 - 802.11n-HT40 - Channel 06 (2437MHz)										
Date Rate(Mbps) MCS8 MCS9 MCS10 MCS11 MCS12 MCS13 MCS14 MCS15										
Power (dBm) 15.53 15.48 15.41 15.35 15.29 15.23 15.16 15.06										

Ant 0 / Ant 0+1 - VHT20 - Channel 06 (2437MHz)									
Date Rate(Mbps)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
Power (dBm)	16.18	16.15	16.08	16.04	15.98	15.92	15.89	15.83	15.74

Ant 0 / Ant 0+1 - VHT40 - Channel 06 (2437MHz)										
Date Rate(Mbps) MCS0 MCS1 MCS2 MCS3 MCS4 MCS5 MCS6 MCS7 MCS8 MCS9										
Power (dBm)	15.32	15.29	15.23	15.17	15.12	15.07	15.03	15.00	14.96	14.93



Product	AC1300 Mini Wireless MU-MIMO USB Adapter	Temperature	25°C
Test Engineer	Kevin Ker	Relative Humidity	56%
Test Site	SR1	Test Date	2019/02/25

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 Average Power (dBm)	Ant 1 Average Power (dBm)	Total Average Power (dBm)	Limit (dBm)	Result
802.11b	1Mbps	01	2412	18.38	-	18.38	≤ 30.00	Pass
802.11b	1Mbps	06	2437	18.36	-	18.36	≤ 30.00	Pass
802.11b	1Mbps	11	2462	18.23	-	18.23	≤ 30.00	Pass
802.11g	6Mbps	01	2412	15.25	-	15.25	≤ 30.00	Pass
802.11g	6Mbps	06	2437	18.51	-	18.51	≤ 30.00	Pass
802.11g	6Mbps	11	2462	16.47	-	16.47	≤ 30.00	Pass
802.11n-HT20	MCS8	01	2412	14.47	14.96	17.73	≤ 30.00	Pass
802.11n-HT20	MCS8	06	2437	16.21	16.25	19.24	≤ 30.00	Pass
802.11n-HT20	MCS8	11	2462	14.59	14.47	17.54	≤ 30.00	Pass
802.11n-HT40	MCS8	03	2422	12.33	12.06	15.21	≤ 30.00	Pass
802.11n-HT40	MCS8	06	2437	15.53	15.35	18.45	≤ 30.00	Pass
802.11n-HT40	MCS8	09	2452	12.47	12.34	15.42	≤ 30.00	Pass
VHT20	MCS0	01	2412	15.54	15.16	18.36	≤ 30.00	Pass
VHT20	MCS0	06	2437	16.18	16.23	19.22	≤ 30.00	Pass
VHT20	MCS0	11	2462	14.22	14.17	17.21	≤ 30.00	Pass
VHT40	MCS0	03	2422	13.08	12.51	15.81	≤ 30.00	Pass
VHT40	MCS0	06	2437	15.32	15.29	18.32	≤ 30.00	Pass
VHT40	MCS0	09	2452	12.43	12.49	15.47	≤ 30.00	Pass

Note 1:

For 802.11b/g

Total Average Power (dBm) = Ant 0 Average Power (dBm)

For 802.11n-HT20/n-HT40/VHT20/VHT40

Total Average Power (dBm) = 10*log {10^(Ant 0 Average Power /10)+10^(Ant 1 Average Power /10)}

Note 2: Average Power Limit (dBm) = 30dBm.



7.4. Power Spectral Density Measurement

7.4.1.Test Limit

The maximum permissible power spectral density is 8dBm in any 3 kHz band.

The same method of determining the conducted output power shall be used to determine the power

spectral density.

7.4.2.Test Procedure Used

ANSI C63.10 Section 11.10.5

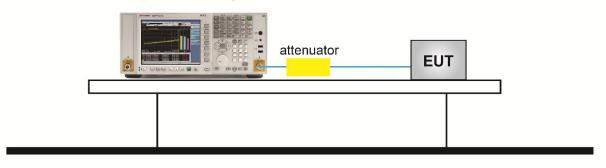
7.4.3.Test Setting

- 1. Measure the duty cycle (x) of the transmitter output signal.
- 2. Set instrument center frequency to DTS channel center frequency.
- 3. Set span to at least 1.5 times the OBW.
- 4. RBW = 10 kHz.
- 5. VBW = 30 kHz.
- 6. Detector = RMS.
- 7. Ensure that the number of measurement points in the sweep $\ge 2 \times \text{span/RBW}$.
- 8. Sweep time = auto couple.
- 9. Don't use sweep triggering. Allow sweep to "free run".
- 10. Employ trace averaging (RMS) mode over a minimum of 100 traces.
- 11. Use the peak marker function to determine the maximum amplitude level.
- 12. 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.
- 13. Add Constant Factor = 10*log(3kHz / 10kHz) = -5.23.



7.4.4.Test Setup

Spectrum Analyzer





7.4.5.Test Result

Product	AC1300 Mini Wireless MU-MIMO USB Adapter	Temperature	23°C		
Test Engineer	Kevin Ker	Relative Humidity	54%		
Test Site	SR1	Test Date	2019/03/03		

Test Mode	Data Rate/	Channel	Freq.	Ant 0 PSD	Ant 1 PSD	Duty	Constant	Total PSD	Limit	Result
	MCS	No.	(MHz)	(dBm/	(dBm/	Cycle	Factor	(dBm/	(dBm/	
				10kHz)	10kHz)	(%)	(dBm)	3kHz)	3kHz)	
802.11b	1Mbps	01	2412	-9.56	N/A	99.08	-5.23	-14.79	≤ 8.00	Pass
802.11b	1Mbps	06	2437	-9.17	N/A	99.08	-5.23	-14.40	≤ 8.00	Pass
802.11b	1Mbps	11	2462	-9.84	N/A	99.08	-5.23	-15.07	≤ 8.00	Pass
802.11g	6Mbps	01	2412	-13.55	N/A	95.87	-5.23	-18.78	≤ 8.00	Pass
802.11g	6Mbps	06	2437	-10.43	N/A	95.87	-5.23	-15.66	≤ 8.00	Pass
802.11g	6Mbps	11	2462	-12.59	N/A	95.87	-5.23	-17.82	≤ 8.00	Pass
802.11n-HT20	MCS8	01	2412	-13.74	-13.04	95.40	-5.23	-15.39	≤ 8.00	Pass
802.11n-HT20	MCS8	06	2437	-13.03	-12.81	95.40	-5.23	-14.93	≤ 8.00	Pass
802.11n-HT20	MCS8	11	2462	-14.44	-13.92	95.40	-5.23	-16.19	≤ 8.00	Pass
802.11n-HT40	MCS8	03	2422	-18.40	-18.59	91.53	-5.23	-20.33	≤ 8.00	Pass
802.11n-HT40	MCS8	06	2437	-14.71	-17.37	91.53	-5.23	-17.67	≤ 8.00	Pass
802.11n-HT40	MCS8	09	2452	-19.02	-18.77	91.53	-5.23	-20.73	≤ 8.00	Pass
VHT20	MCS0	01	2412	-12.23	-12.97	95.48	-5.23	-14.60	≤ 8.00	Pass
VHT20	MCS0	06	2437	-12.67	-12.60	95.48	-5.23	-14.65	≤ 8.00	Pass
VHT20	MCS0	11	2462	-13.88	-14.73	95.48	-5.23	-16.30	≤ 8.00	Pass
VHT40	MCS0	03	2422	-19.08	-18.16	91.39	-5.23	-20.42	≤ 8.00	Pass
VHT40	MCS0	06	2437	-17.51	-16.37	91.39	-5.23	-18.73	≤ 8.00	Pass
VHT40	MCS0	09	2452	-19.07	-18.08	91.39	-5.23	-20.38	≤ 8.00	Pass

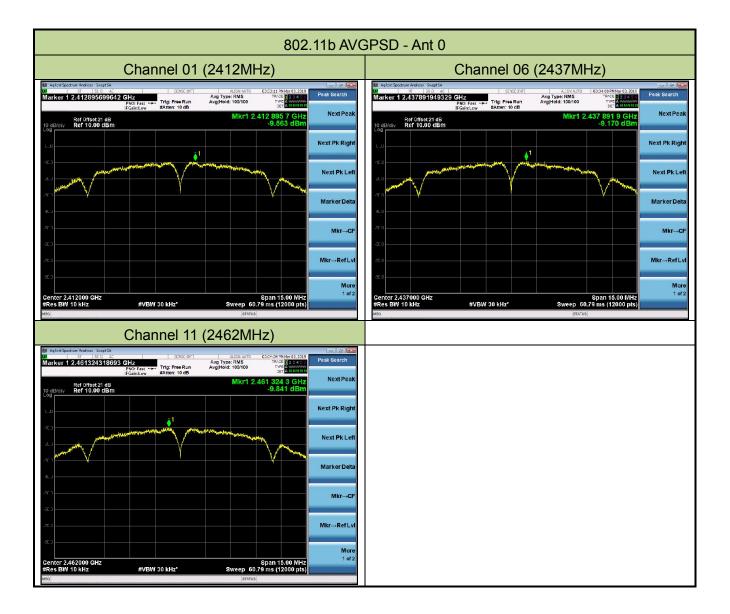
Note 1: When EUT duty cycle \geq 98%, Total AVGPSD = 10*log {10^(Ant 0 AVGPSD/10) + 10^(Ant 1 AVGPSD/10)} + Constant Factor. Note 2: When EUT duty cycle < 98%, Total AVGPSD = 10*log {10^(Ant 0 AVGPSD/10) + 10^(Ant 1 AVGPSD/10)} + 10*log (1/duty

cycle) + Constant Factor.

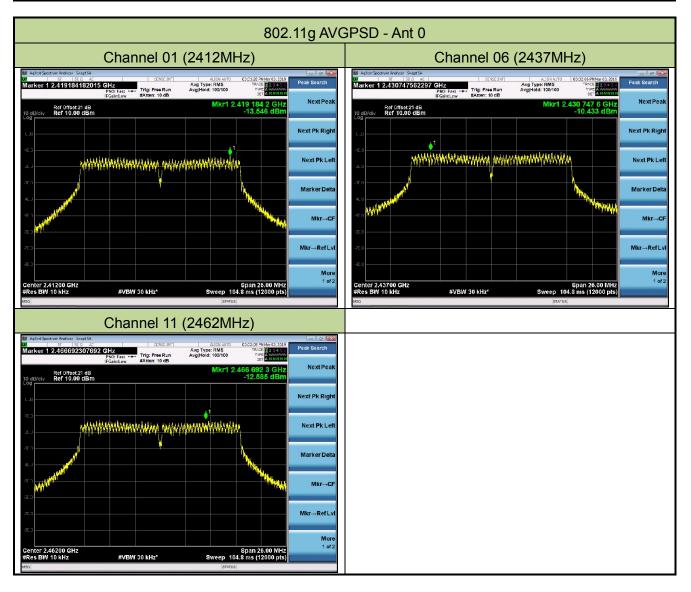
Note 3: PSD Limit = 8 dBm/3kHz.



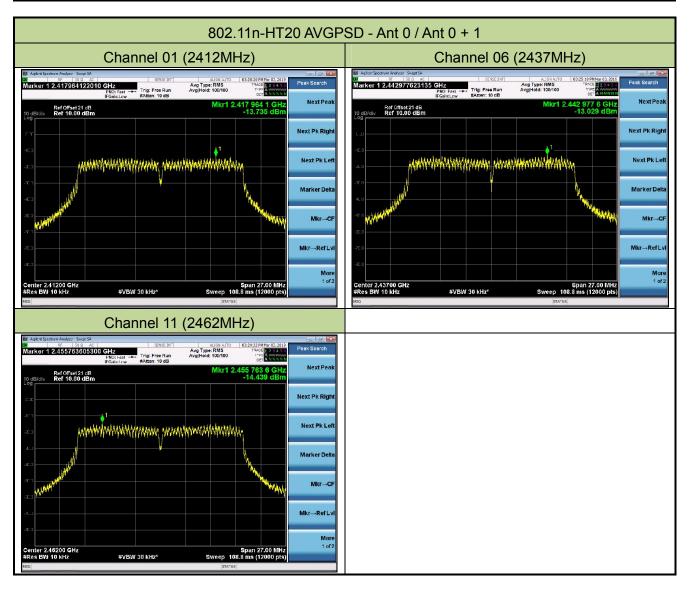




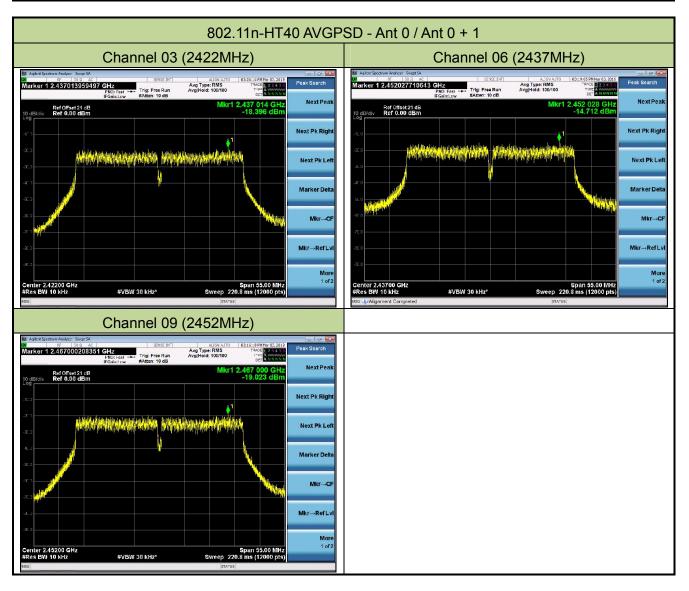




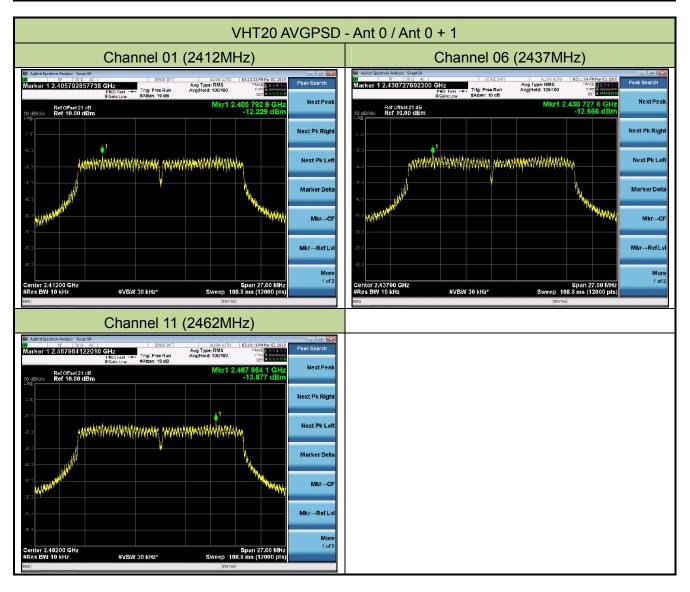




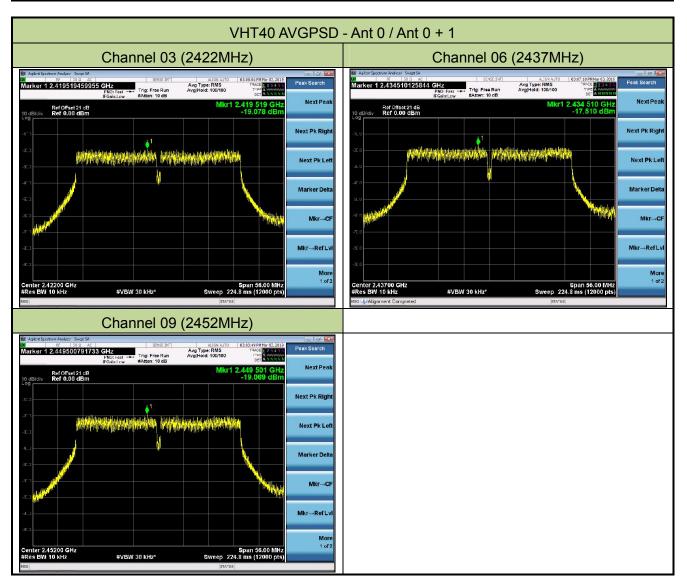




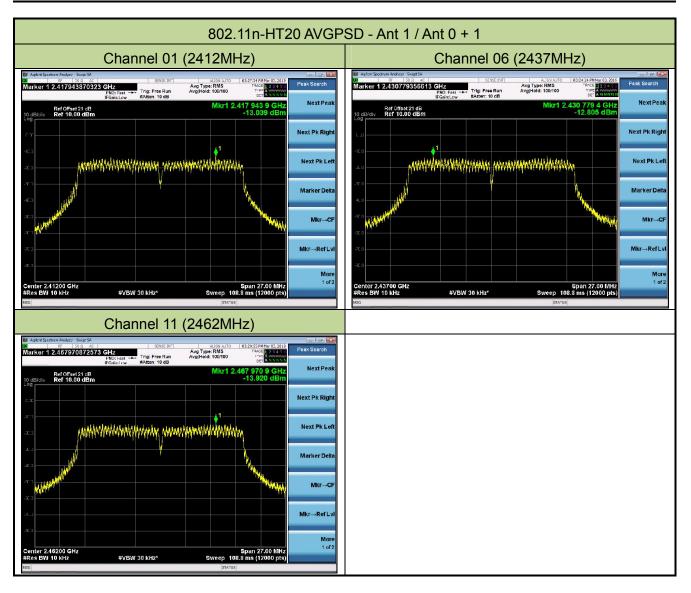






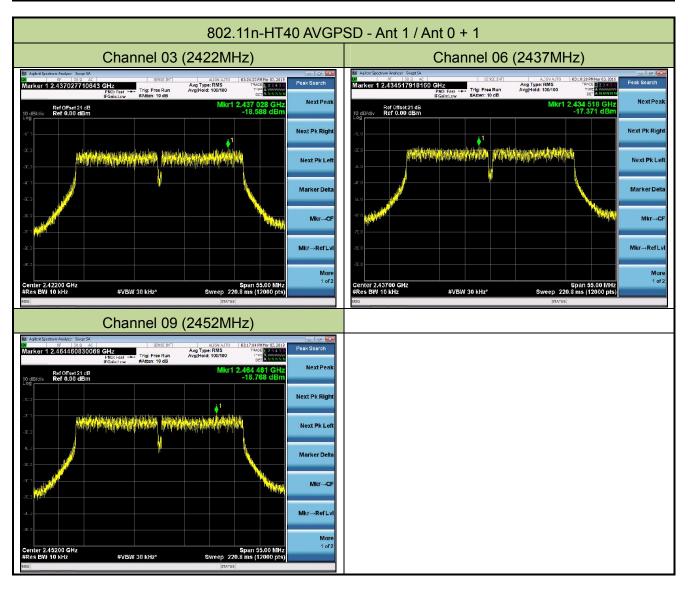




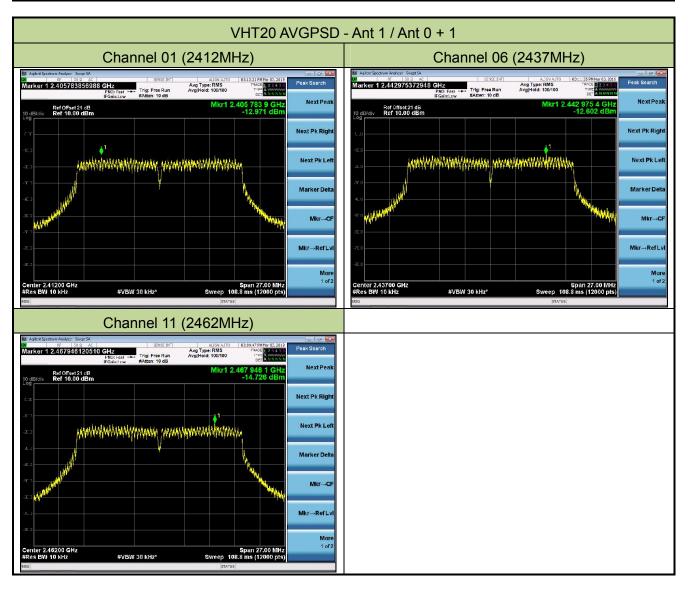




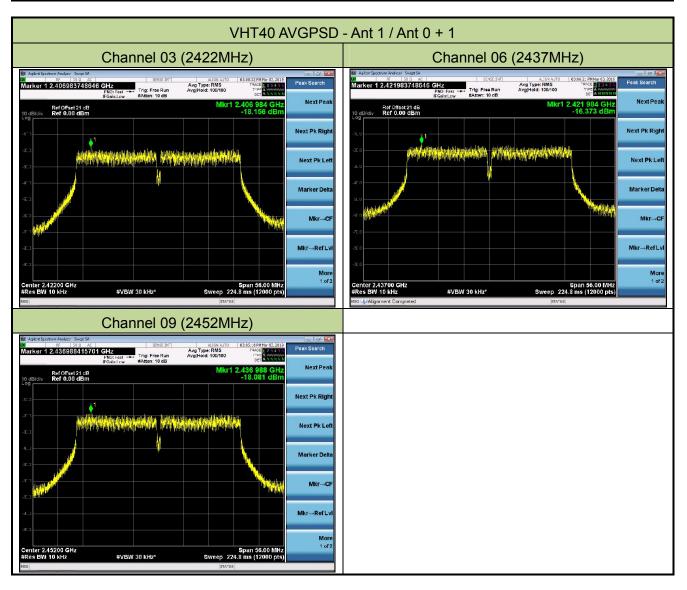














7.5. Conducted Band Edge and Out-of-Band Emissions

7.5.1.Test Limit

The limit for out-of-band spurious emissions at the band edge is 30dB below the fundamental

emission level, as determined from the in-band power measurement of the DTS channel performed

in a 100 kHz bandwidth per the PSD procedure.

7.5.2.Test Procedure Used

ANSI C63.10 Section 11.11

7.5.3.Test Setting

Reference level measurement

- 1. Set instrument center frequency to DTS channel center frequency
- 2. Set the span to \geq 1.5 times the DTS bandwidth
- 3. Set the RBW = 100 kHz
- 4. Set the VBW \geq 3 x RBW
- 5. Detector = peak
- 6. Sweep time = auto couple
- 7. Trace mode = max hold
- 8. Allow trace to fully stabilize

Emission level measurement

- 1. Set the center frequency and span to encompass frequency range to be measured
- 2. RBW = 1.3MHz
- 3. VBW = 4MHz
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep time = auto couple
- 7. The trace was allowed to stabilize

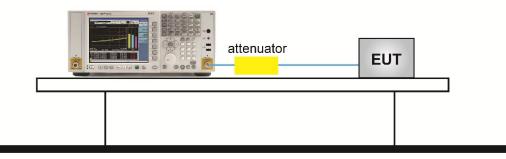


Test Notes

- 1. RBW was set to 1.3MHz rather than 100 kHz in order to increase the measurement speed.
- 2. The display line shown in the following plots denotes the limit at 30dB below the fundamental emission level measured in a 100 kHz bandwidth. However, since the traces in the following plots are measured with a 1.3MHz RBW, the display line may not necessarily appear to be 30dB below the level of the fundamental in a 1.3MHz bandwidth.
- 3. For plots showing conducted spurious emissions near the limit, the frequencies were investigated with a reduced RBW to ensure that no emissions were present.

7.5.4.Test Setup

Spectrum Analyzer





7.5.5.Test Result

Product	AC1300 Mini Wireless MU-MIMO USB Adapter	Temperature	23°C
Test Engineer	Kevin Ker	Relative Humidity	54%
Test Site	SR1	Test Date	2019/03/03

Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	Limit (dBc)	Result
802.11b	1Mbps	01	2412	30	Pass
802.11b	1Mbps	06	2437	30	Pass
802.11b	1Mbps	11	2462	30	Pass
802.11g	6Mbps	01	2412	30	Pass
802.11g	6Mbps	06	2437	30	Pass
802.11g	6Mbps	11	2462	30	Pass
802.11n-HT20	MCS8	01	2412	30	Pass
802.11n-HT20	MCS8	06	2437	30	Pass
802.11n-HT20	MCS8	11	2462	30	Pass
802.11n-HT40	MCS8	03	2422	30	Pass
802.11n-HT40	MCS8	06	2437	30	Pass
802.11n-HT40	MCS8	09	2452	30	Pass
VHT20	MCS0	01	2412	30	Pass
VHT20	MCS0	06	2437	30	Pass
VHT20	MCS0	11	2462	30	Pass
VHT40	MCS0	03	2422	30	Pass
VHT40	MCS0	06	2437	30	Pass
VHT40	MCS0	09	2452	30	Pass



