

Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC164659 Page: 1 of 55

FCC Radio Test Report FCC ID: 2ARER-IPC100

Original Grant

Report No.	-	TB-FCC164659
Applicant	1.	Shenzhen Apeman Innovations Technology Co.,Ltd
Equipment Under	Fest	(EUT)
EUT Name	:	Nooie Cam 360
Model No.	:	IPC100
Series Model No.	-	N/A
Brand Name	÷	Apeman
Receipt Date		2019-03-21
Test Date	14	2019-03-21 to 2019-03-27
Issue Date	÷	2019-04-12
Standards	1	FCC Part 15, Subpart C (15.247:2016)
Test Method	:	ANSI C63.10: 2013
Conclusions	:	PASS

In the configuration tested, the EUT complied with the standards specified above, The EUT technically complies with the FCC and IC requirements

Test/Witness Engineer :

: INAN SU : fughi.

Approved& Authorized

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.



Contents

CO	NTENTS	2
1.	GENERAL INFORMATION ABOUT EUT	5
	1.1 Client Information	5
	1.2 General Description of EUT (Equipment Under Test)	5
	1.3 Block Diagram Showing the Configuration of System Tested	6
	1.4 Description of Support Units	6
	1.5 Description of Test Mode	6
	1.6 Description of Test Software Setting	8
	1.7 Measurement Uncertainty	8
	1.8 Test Facility	9
2.	TEST SUMMARY	
3.	TEST EQUIPMENT	11
4.	CONDUCTED EMISSION TEST	12
	4.1 Test Standard and Limit	
	4.2 Test Setup	
	4.3 Test Procedure	
	4.4 EUT Operating Mode	
	4.5 Test Data	13
5.	RADIATED EMISSION TEST	14
	5.1 Test Standard and Limit	
	5.2 Test Setup	
	5.3 Test Procedure	
	5.4 EUT Operating Condition	
	5.5 Test Data	17
6.	RESTRICTED BANDS REQUIREMENT	
	6.1 Test Standard and Limit	
	6.2 Test Setup	
	6.3 Test Procedure	
	6.4 EUT Operating Condition	
	6.5 Test Data	19
7.	BANDWIDTH TEST	20
	7.1 Test Standard and Limit	
	7.2 Test Setup	
	7.3 Test Procedure	
	7.4 EUT Operating Condition	20
	7.5 Test Data	20
8.	PEAK OUTPUT POWER TEST	21
	8.1 Test Standard and Limit	
	8.2 Test Setup	
	8.3 Test Procedure	



	8.4 EUT Operating Condition	21
	8.5 Test Data	
9.	POWER SPECTRAL DENSITY TEST	22
	9.1 Test Standard and Limit	22
	9.2 Test Setup	22
	9.3 Test Procedure	
	9.4 EUT Operating Condition	22
	9.5 Test Data	22
10.	ANTENNA REQUIREMENT	
	10.1 Standard Requirement	23
	10.2 Antenna Connected Construction	23
ATT	ACHMENT A CONDUCTED EMISSION TEST DATA	24
ATT	ACHMENT B RADIATED EMISSION AND RESTRICTED BANDS REQUIR	EMENT
TES	T DATA	
ATT	ACHMENT C CONDUCTED BAND EDGE TEST	
ATT	ACHMENT D CONDUCTED RF SPURIOUS EMISSION TEST DATA	
ATT	ACHMENT E BANDWIDTH TEST DATA	
ATT	ACHMENT F PEAK OUTPUT POWER TEST DATA	45
ATT	ACHMENT G POWER SPECTRAL DENSITY TEST DATA	48



Report No.: TB-FCC164659 Page: 4 of 55

Revision History

Report No.	Version	Description	Issued Date
TB-RF164659	Rev.01	Initial issue of report	2019-04-12
non		TOD A GULL TOTAL	TOB'S
DI -	1000	The second second	1 - 40
0000	0	THE ROAD	TODA -
		B RODI - E	000 00
The second	3	MODE - MULL	A DOLLAR
and the	(OB)	TUD TU	
and a		TOP TO TO TO TO	000
NUS -	ROD	A RULL AND	
TODA .		ELON LEON	TUR
		B COD L	
The second	B	TOBI TOBI	



1. General Information about EUT

1.1 Client Information

Applicant	1	Shenzhen Apeman Innovations Technology Co.,Ltd
Address	:	Building P11, Huanancheng, Longgang District, Shenzhen, China
Manufacturer	1	Shenzhen Apeman Innovations Technology Co.,Ltd
Address		Building P11, Huanancheng, Longgang District, Shenzhen, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Nooie Cam 360			
Models No. Model Difference		: IPC100			
		N/A	OF TO THE T		
and a		Operation Frequency:	802.11b/g/n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz		
	R	Number of Channel:	802.11b/g/n(HT20):11 channels see note(3) 802.11n(HT40):7 channels see note(3)		
		Max Output Power:	802.11b: 16.76 dBm		
Product		Antenna Gain:	0.63dBi PIFA Antenna		
Description		Modulation Type:	802.11b: DSSS(CCK, DQPSK, DBPSK) 802.11g/n: OFDM(BPSK,QPSK,16QAM, 64QAM)		
		Bit Rate of	802.11b:11/5.5/2/1 Mbps		
		Transmitter:	802.11g:54/48/36/24/18/12/9/6 Mbps 802.11n:up to 150Mbps		
Power Supply	:	DC Voltage supplied by AC/DC Adapter			
Power Rating		AC/DC Adapter (TPA-46B050100UU):			
		Input: AC 100~240V, 5 Output: DC 5V, 1000m			
Connecting I/O Port(S)	•	Please refer to the User's Manual			

Note:

- (1) This Test Report is FCC Part 15.247 for 802.11b/g/n, the test procedure follows the FCC KDB 558074 D01v05.
- (2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (3) Channel List:



Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)		
01	2412	05	2432	09	2452		
02	2417	06	2437	10	2457		
03	2422	07	2442	11	2462		
04	2427	08	2447				
Note:CH 01~CH 11 for 802.11b/g/n(HT20), CH 03~CH 09 for 802.11n(HT40)							

(4) The Antenna information about the equipment is provided by the applicant.

1.3 Block Diagram Showing the Configuration of System Tested

Adapter + TX Mode

	MIDS
TOBY	TOBY TOBY TOBY

1.4 Description of Support Units

	Equipment Information							
	NameModelFCC ID/VOCManufacturerUsed " $$ "							
3	S (0) /							
	Cable Information							
	Number	Shielded Type	Ferrite Core	Length	Note			
	i			40m				

1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test



system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned follow was evaluated respectively.

For Conducted Test			
Final Test Mode	Description		
Mode 1	Adapter + TX B Mode		

For Radiated Test					
Final Test Mode Description					
Mode 2 Adapter +TX Mode B Mode Channel 01/06/11					
Mode 3	Iode 3 Adapter +TX Mode G Mode Channel 01/06/11				
Mode 4	Adapter +TX Mode N(HT20) Mode Channel 01/06/11				
Mode 5	Adapter +TX Mode N(HT40) Mode Channe				

Note:

(1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate.

According to ANSI C63.10 standards, the measurements are performed at the highest, Middle, lowest available channels, and the worst case data rate as follows:

802.11b Mode: CCK (1 Mbps)

802.11g Mode: OFDM (6 Mbps)

802.11n (HT20) Mode: MCS 0 (6.5 Mbps)

802.11n (HT40) Mode: MCS 0 (13 Mbps)

- (2) During the testing procedure, the continuously transmitting with the maximum power mode was programmed by the customer.
- (3) The EUT is considered a portable unit; in normal use it was positioned on X-plane. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.



1.6 Description of Test Software Setting

During testing channel&Power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of WLAN.

Test Software Version	100	CMD.exe	
Channel	CH 01	CH 06	CH 11
IEEE 802.11b DSSS	DEF	DEF	DEF
IEEE 802.11g OFDM	DEF	DEF	DEF
IEEE 802.11n (HT20)	DEF	DEF	DEF
Channel	CH 03	CH 06	CH 09
IEEE 802.11n (HT40)	DEF	DEF	DEF

1.7 Measurement Uncertainty

The reported uncertainty of measurement y \pm U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

Test Item	Parameters	Expanded Uncertainty (U _{Lab})
	Level Accuracy:	
Conducted Emission	9kHz~150kHz	±3.42 dB
	150kHz to 30MHz	±3.42 dB
Radiated Emission	Level Accuracy:	
	9kHz to 30 MHz	±4.60 dB
Radiated Emission	Level Accuracy:	
	30MHz to 1000 MHz	±4.40 dB
Radiated Emission	Level Accuracy:	14.20 dP
	Above 1000MHz	±4.20 dB



Report No.: TB-FCC164659 Page: 9 of 55

1.8 Test Facility

The testing was performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at:1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China.

At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

FCC Accredited Test Site Number: 854351.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01.

IC Registration No.: (11950A-1)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A-1.

TOBY

2. Test Summary

	FCC Part	t 15 Subpart C(15.247)/ RSS 247	'Issue 1	
Standard Section			ludament	
FCC	IC	Test Item	Judgment	Remark
15.203	1	Antenna Requirement	PASS	N/A
15.207	RSS-GEN 7.2.4	Conducted Emission	PASS	N/A
15.205	RSS-GEN 7.2.2	Restricted Bands	PASS	N/A
15.247(a)(2)	RSS 247 5.2 (1)	6dB Bandwidth	PASS	N/A
15.247(b)	RSS 247 5.4 (4)	Peak Output Power	PASS	N/A
15.247(e)	RSS 247 5.2 (2)	Power Spectral Density	PASS	N/A
15.247(d)	RSS 247 5.5	Band Edge	PASS	N/A
15.247(d)& 15.209	RSS 247 5.5	Transmitter Radiated Spurious Emission	PASS	N/A

Note: "/" for no requirement for this test item.

N/A is an abbreviation for Not Applicable.



3. Test Equipment

Conducted Emiss	ion Test				
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul.18, 2018	Jul. 17, 2019
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jul.18, 2018	Jul. 17, 2019
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul.18, 2018	Jul. 17, 2019
LISN	Rohde & Schwarz	ENV216	101131	Jul.18, 2018	Jul. 17, 2019
Radiation Emissio	on Test	-	-	-	-
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul.18, 2018	Jul. 17, 2019
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul.18, 2018	Jul. 17, 2019
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Jan. 27, 2019	Jan. 26, 2020
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Jan. 27, 2019	Jan. 26, 2020
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar.03, 2019	Mar. 02, 2020
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar.03, 2019	Mar. 02, 2020
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jul. 14, 2018	Jul.13, 2019
Pre-amplifier	Sonoma	310N	185903	Mar.04, 2019	Mar. 03, 2020
Pre-amplifier	HP	8449B	3008A00849	Mar.03, 2019	Mar. 02, 2020
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar.03, 2019	Mar. 02, 2020
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna Conducte	ed Emission				
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul.18, 2018	Jul. 17, 2019
Spectrum Analyzer	Rohde & Schwarz	ESCI	100010/007	Jul.18, 2018	Jul. 17, 2019
MXA Signal Analyzer	Agilent	N9020A	MY49100060	Oct. 26, 2017	Oct. 25, 2018
Vector Signal Generator	Agilent	N5182A	MY50141294	Oct. 26, 2017	Oct. 25, 2018
Analog Signal Generator	Agilent	N5181A	MY50141953	Oct. 26, 2017	Oct. 25, 2018
	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO26	Oct. 26, 2017	Oct. 25, 2018
	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO29	Oct. 26, 2017	Oct. 25, 2018
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO31	Oct. 26, 2017	Oct. 25, 2018
	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO33	Oct. 26, 2017	Oct. 25, 2018



4. Conducted Emission Test

- 4.1 Test Standard and Limit
 - 4.1.1Test Standard FCC Part 15.207
 - 4.1.2 Test Limit

	Conducted	Emission	Test Limit	t
--	-----------	----------	-------------------	---

Eroqueney	Maximum RF Lin	e Voltage (dBµV)
Frequency	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

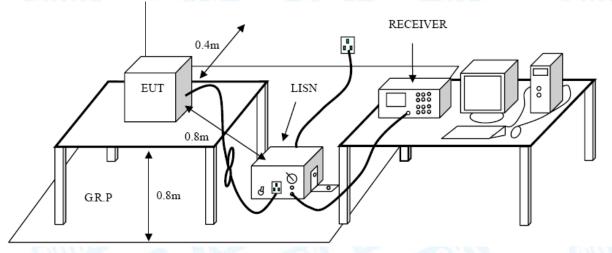
Notes:

(1) *Decreasing linearly with logarithm of the frequency.

(2) The lower limit shall apply at the transition frequencies.

(3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2 Test Setup



4.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.



I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis.

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

4.4 EUT Operating Mode

Please refer to the description of test mode.

4.5 Test Data

Please refer to the Attachment A.



5. Radiated Emission Test

- 5.1 Test Standard and Limit
 - 5.1.1 Test Standard
 - FCC Part 15.209
 - 5.1.2 Test Limit

Radiated Emission Limits (9 kHz~1000 MHz)

Frequency (MHz	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Radiated Em	hission Limit (Above 1000)MHz)
Frequency	Distance of 3m (dBuV/m)	
(MHz)	Peak	Average
Above 1000	74	54

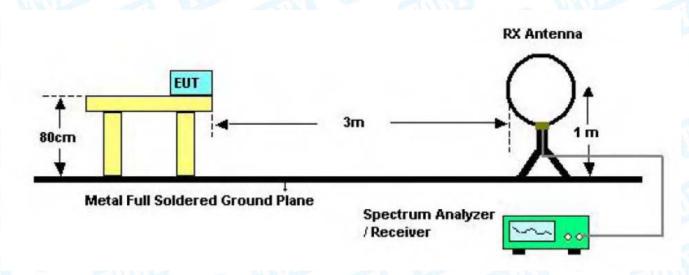
Note:

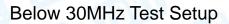
(1) The tighter limit applies at the band edges.

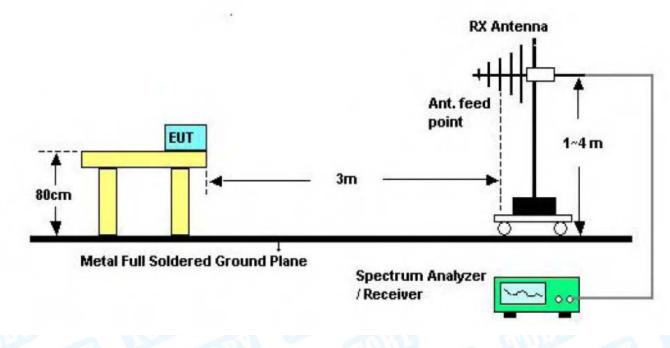
(2) Emission Level(dBuV/m)=20log Emission Level(uV/m)



5.2 Test Setup

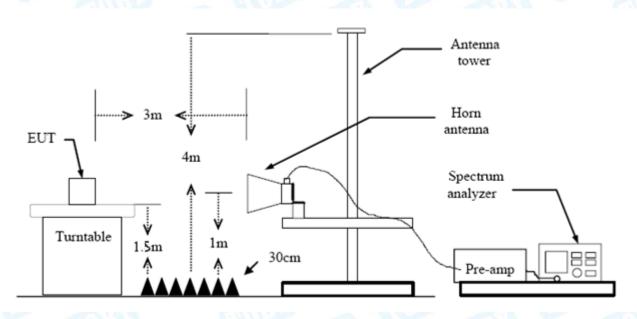






Below 1000MHz Test Setup





Above 1GHz Test Setup

5.3 Test Procedure

- (1) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (2) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (3) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (4) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (5) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (6) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (7) For the actual test configuration, please see the test setup photo.

5.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.



Report No.: TB-FCC164659 Page: 17 of 55

5.5 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values. Please refer to the Attachment B.

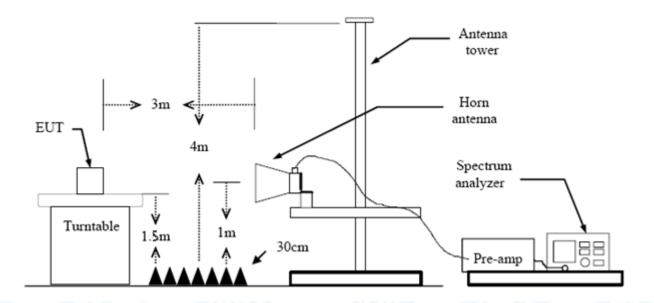


6. Restricted Bands Requirement

- 6.1 Test Standard and Limit
 - 6.1.1 Test Standard FCC Part 15.247(d) FCC Part 15.209 FCC Part 15.205 6.1.2 Test Limit

Restricted Frequency	Distance of 3m (dBuV/m)	
Band (MHz)	Peak	Average
2310 ~2390	74	54
2483.5 ~2500	74	54

6.2 Test Setup



6.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.



- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

6.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

6.5 Test Data

Please refer to the Attachment C.

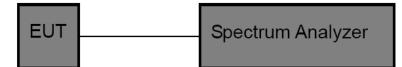


7. Bandwidth Test

- 7.1 Test Standard and Limit
 - 7.1.1 Test Standard
 - FCC Part 15.247 (a)(2)
 - 7.1.2 Test Limit

FCC	Part 15 Subpart C(15.247)	/RSS-210
Test Item	Limit	Frequency Range(MHz)
Bandwidth	>=500 KHz (6dB bandwidth)	2400~2483.5

7.2 Test Setup



7.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) The bandwidth is measured at an amplitude level reduced 6dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst –case (i.e the widest) bandwidth.
- (3)Measure the channel separation the spectrum analyzer was set to Resolution Bandwidth:100 kHz, and Video Bandwidth:300 kHz, Detector: Peak, Sweep Time set auto.

7.4 EUT Operating Condition

The EUT was set to continuously transmitting in each mode and low, Digital photo framesdle and high channel for the test.

7.5 Test Data

Please refer to the Attachment D.

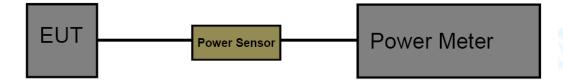


8. Peak Output Power Test

- 8.1 Test Standard and Limit
 - 8.1.1 Test Standard
 - FCC Part 15.247 (b)
 - 8.1.2 Test Limit

FCC Par	t 15 Subpart C(15.247)/RS	S-210
Test Item	Limit	Frequency Range(MHz)
Peak Output Power	1 Watt or 30 dBm	2400~2483.5

8.2 Test Setup



8.3 Test Procedure

The measurement is according to section 9.1.2 of KDB 558074 D01 15.247 Meas Guidance v05. The EUT was connected to RF power meter via a broadband power sensor as show the block above. The power sensor video bandwidth is greater than or equal to the DTS bandwidth of the equipment.

8.4 EUT Operating Condition

The EUT was set to continuously transmitting in the max power during the test.

8.5 Test Data

Please refer to the Attachment E.

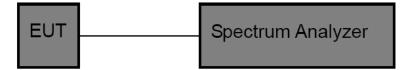


9. Power Spectral Density Test

- 9.1 Test Standard and Limit
 - 9.1.1 Test Standard
 - FCC Part 15.247 (e)
 - 9.1.2 Test Limit

FC	C Part 15 Subpart C(15.2	47)
Test Item	Limit	Frequency Range(MHz)
Power Spectral Density	8dBm(in any 3 kHz)	2400~2483.5

9.2 Test Setup



9.3 Test Procedure

The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 15.247 Meas Guidance v05.

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Set analyser center frequency to DTS channel center frequency.
- (3) Set the span to 1.5 times the DTS bandwidth.
- (4) Set the RBW to: 3 kHz
- (5) Set the VBW to: 10 kHz
- (6) Detector: peak
- (7) Sweep time: auto
- (8) Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

9.4 EUT Operating Condition

The EUT was set to continuously transmitting in each mode and low, Digital photo framesdle and high channel for the test.

9.5 Test Data

Please refer to the Attachment F.



10. Antenna Requirement

10.1 Standard Requirement

10.1.1 Standard

FCC Part 15.203

10.1.2 Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

10.2 Antenna Connected Construction

The directional gains of the antenna used for transmitting is 0.63dBi, and the antenna de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

Result

The EUT antenna is a PIFA Antenna. It complies with the standard requirement.

	Antenna Type
100	Permanent attached antenna
	Unique connector antenna
22	Professional installation antenna

Attachment A-- Conducted Emission Test Data

Temperature:	25 ℃		Relative Humi	dity:	55%	NIN
Test Voltage:	AC 120V	/60Hz			132	
Terminal:	Line		U.S.			
Test Mode:	Charging	with TX B Mode	e 2412Mhz			
Remark:	Only wor	se case is repor	ted	-	<u>N</u> 1	5
90.0 dBuV						
					QP: AVG:	
40 Mm	¥					×
1 ~ MM	MOW all ran	X MAR	"""MANNIMAN MANNING		Service MMM March	A
	- MANNET	. Mathematical Marph	lhutha.	humanapathy	Mhathroute, cuttor	A peak
mm	Λι IIInu	W WINNEY .	1 . March March Brand March		A LANNY PROVIDE	
- 00 *	. AN MANAMA	w mathematica and	1)// T 1 1/	Werman Market Market	NAMMINAN	AVG
		and the subligation of				
-10						
0.150	0.5	(MF	z) 5			30.000
	R	eading Corr	ect Measure	_		
No. Mk.	_	_evel Fac	tor ment	Limit	Over	
	MHz	dBuV dB	dBuV	dBuV	dB	Detector
1 * 0	.5100	30.64 9.6	60 40.24	56.00	-15.76	QP
2 0	.5100	18.77 9.6	60 28.37	46.00	-17.63	AVG
3 1	40.00					
	.1900	10.87 9.6	60 20.47	56.00	-35.53	QP
4 1		10.87 9.6 -1.50 9.6			-35.53 -37.90	QP AVG
			60 8.10	46.00		
5 1	.1900 .9980	-1.50 9.6	60 8.10 61 18.02	46.00 56.00	-37.90	AVG
5 1 6 1	.1900 .9980 .9980	-1.50 9.6 8.41 9.6	60 8.10 61 18.02 61 7.23	46.00 56.00 46.00	-37.90 -37.98	AVG QP
5 1 6 1 7 3	.1900 .9980 .9980 .0100	-1.50 9.6 8.41 9.6 -2.38 9.6	60 8.10 61 18.02 61 7.23 65 21.70	46.00 56.00 46.00 56.00	-37.90 -37.98 -38.77	AVG QP AVG
5 1 6 1 7 3 8 3	.1900 .9980 .9980 .0100 .0100	-1.50 9.6 8.41 9.6 -2.38 9.6 12.05 9.6	50 8.10 51 18.02 51 7.23 55 21.70 55 8.97	46.00 56.00 46.00 56.00 46.00	-37.90 -37.98 -38.77 -34.30	AVG QP AVG QP
5 1 6 1 7 3 8 3 9 5	.1900 .9980 .9980 .0100 .0100	-1.50 9.6 8.41 9.6 -2.38 9.6 12.05 9.6 -0.68 9.6	60 8.10 61 18.02 61 7.23 65 21.70 65 8.97 74 25.45	46.00 56.00 46.00 56.00 46.00 60.00	-37.90 -37.98 -38.77 -34.30 -37.03	AVG QP AVG QP AVG
5 1 6 1 7 3 8 3 9 5 10 5	.1900 .9980 .9980 .0100 .0100 .0380 .0380	-1.50 9.6 8.41 9.6 -2.38 9.6 12.05 9.6 -0.68 9.6 15.71 9.7	60 8.10 61 18.02 61 7.23 65 21.70 65 8.97 74 25.45 74 13.76	46.00 56.00 46.00 56.00 46.00 60.00 50.00	-37.90 -37.98 -38.77 -34.30 -37.03 -34.55	AVG QP AVG QP AVG QP

Emission Level= Read Level+ Correct Factor



					-
Temperature:	25 ℃	Relative H	umidity:	55%	A BU
Test Voltage:	AC 120V/60Hz		0.00		The second
Terminal:	Neutral		1	0.82	-
Test Mode:	Charging with TX B M	ode 2412Mhz		2	
Remark:	Only worse case is re	ported	00		00
90.0 dBuV			Market Market Market		peak
0.150	0.5	(MHz)	5	1I	30.000

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	0	.1700	29.12	9.64	38.76	64.96	-26.20	QP
2	0	.1700	15.23	9.64	24.87	54.96	-30.09	AVG
3	0	.5100	34.09	9.58	43.67	56.00	-12.33	QP
4	* 0	.5100	33.38	9.58	42.96	46.00	-3.04	AVG
5	1	.0500	25.01	9.59	34.60	56.00	-21.40	QP
6	1	.0500	20.40	9.59	29.99	46.00	-16.01	AVG
7	2	.5780	20.47	9.64	30.11	56.00	-25.89	QP
8	2	.5780	12.12	9.64	21.76	46.00	-24.24	AVG
9	15	.8820	15.52	10.62	26.14	60.00	-33.86	QP
10	15	.8820	5.95	10.62	16.57	50.00	-33.43	AVG
11	25	.7420	23.00	10.73	33.73	60.00	-26.27	QP
12	25	.7420	15.14	10.73	25.87	50.00	-24.13	AVG

Emission Level= Read Level+ Correct Factor

Remark: All modes and channels have been tested and only listed WiFi link mode that is worst data



Attachment B-- Radiated Emission and Restricted Bands

Requirement Test Data

9KHz~30MHz

From 9KHz to 30MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB Below the permissible value has no need to be reported.

30MHz~1GHz

Temperature:	25 ℃		Relative Humidit	y: 55%	
Test Voltage:	AC 120/60Hz			20	ett.
Ant. Pol.	Horizontal	NU.	10		
Test Mode:	TX B Mode 2462	MHz	100		
Remark:	Below 1GHz test TX IEEE 802.11b		port only shall the	worst case mo	ode for
80.0 dBuV/m		mm		FCC 15C 3M Radiation Margin -6 (
30.000 40 50	60 70 80	(MHz)	300 400	500 600 700	1000.000
No. Mk. F	Reading req. Le∨el	Correct Factor	Measure- ment Lim	it O∨er	
	MHz dBu∨	dB/m	dBuV/m dBu'		Detector
	.8304 60.27	-17.69	42.58 46.	00 -3.42	QP
	.8190 50.09	-16.91	33.18 46.		QP
	.1794 57.97	-15.80	42.17 46.		QP
	.7139 50.99	-14.04	36.95 46.		QP
	.0651 55.57	-12.07	43.50 46.		QP
6 482	.2156 44.55	-11.10	33.45 46.	00 -12.55	QP

*:Maximum data x:Over limit !:over margin



		<u>a</u> u				NON	
Temperatur	e: 25 °C		Re	elative Humid	ity: 55°	%	A B
Test Voltage	e: AC 1	20/60Hz		A RUL			
Ant. Pol.	Vertio	cal			1100	132	-
Test Mode:	TX B	Mode 2462	2MHz			1	
Remark:			t data. This i o 2462MHz.	report only sha	all the wor	st case n	node for
80.0 dBuV/m			·	3 X 4 X	FCC 150	C 3M Radiation Margin -6 c 6	
20	50 60 70	80	(MHz)	300	400 500	600 700	1000.000
No. Mk.	Freq.	Reading Le∨el	Correct Factor	Measure- ment	Limit	O∨er	
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detecto
1 *	30.2111	49.84	-13.16	36.68	40.00	-3.32	QP
2 !	33.0950	50.47	-15.33	35.14	40.00	-4.86	QP
3	240.8304	55.34	-17.69	37.65	46.00	-8.35	QP
4	312,1794	48.56	-15.80	32.76	46.00	-13.24	QP
5 !	434.0651	54.26	-12.07	42.19	46.00	-3.81	QP
6	603.5392	48.23	-8.50	39.73	46.00	-6.27	QP

*:Maximum data x:Over limit !:over margin

TOBY

Above 1GHz

Test Mode: IEEE 802.11b

Low channe	el: 241	2 MHz								
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Peak	on Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Peak Margin (dB)	AV Margin (dB)
2390	Н	50.59	37.23	11.37	61.96	48.6	74	54	-12.04	-5.4
4824	Н	43.88	31.28	14.55	58.43	45.83	74	54	-15.57	-8.17
16	Н			~					> =	
	<u> </u>			100	-	NUR	1		-	
2390	V	51.30	33.93	11.37	62.67	45.3	74	54	-11.33	-8.7
4824	V	45.55	34.02	14.55	60.1	48.57	74	54	-13.9	-5.43
	V				m n	10.2			<	

Middle char	nel: 2	437 MHz								
Frequency (MHz)	Ant. Pol. H/V	Peak reading	AV reading (dBuV)	Correction Factor	Peak	on Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Peak Margin	AV Margin
		(dBµV)		(dB/m)					(dB)	(dB)
4874	Н	43.23	29.44	14.85	58.08	44.29	74	54	-15.92	-9.71
	Н				· · · · ·	Ĩ				
	Н	3 2			(1	10 12		<
6	u_{i}								11.	
4874	V	43.49	29.36	14.85	58.34	44.21	74	54	-15.66	-9.79
	V			V				S >>		
	V		11	22	S V					

High chann	el: 246	62 MHz	-							
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Peak	on Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Peak Margin (dB)	AV Margir (dB)
2483.5	н	51.28	36.62	13.67	64.95	50.29	74	54	-9.05	-3.71
4924	Н	43.53	29.82	15.19	58.72	45.01	74	54	-15.28	-8.99
	Н		6	0177		10.777				
-					683		GUL			
2483.5	V	51.24	34.70	13.67	64.91	48.37	74	54	-9.09	-5.63
4924	V	43.20	29.84	15.19	58.39	45.03	74	54	-15.61	-8.97
	V	/			< N				A+4 \ 1	

Note:

1. Emission Level= Read Level+ Correct Factor

2. The emission levels of other frequencies are very lower than the limit and not show in test report.

3. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

							<u> </u>			
_ow channe	el: 241	2 MHz								
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Peak	on Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Peak Margin (dB)	AV Margir (dB)
2390	н	50.15	36.56	11.37	61.52	47.93	74	54	-12.48	-6.07
4824	Н	43.72	31.27	14.55	58.27	45.82	74	54	-15.73	-8.18
	Н		N	6			644.03			
CLIF		1977 .						CTU1		5
2390	V	46.41	33.68	11.37	57.78	45.05	74	54	-16.22	-8.95
4824	V	44.95	33.82	14.55	59.5	48.37	74	54	-14.5	-5.63
	V	())	9							

Test Mode: IEEE 802.11g

Ī	Middle chan	nel: 2	437 MHz								
	Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Peak	on Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Peak Margin (dB)	AV Margin (dB)
	4874	Н	43.00	29.38	14.85	57.85	44.23	74	54	-16.15	-9.77
		Н						077	····	🤇	
	1 m	Н		18-1			<1			S	
5	112	1	2 12		<u></u>		2011	2			
	4874	V	43.48	29.45	14.85	58.33	44.3	74	54	-15.67	-9.7
	<u> </u>	V		>				1 th 1			
	<u>}</u>	V	(at 1) i	\							

High chann	el: 246	62 MHz								
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Emissi Peak (dBµV/m)	on Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Peak Margin (dB)	AV Margir (dB)
2483.5	н	46.72	36.43	13.67	60.39	50.1	74	54	-13.61	-3.9
4924	Н	43.27	29.80	15.19	58.46	44.99	74	54	-15.54	-9.01
14 m	Н				11		<u> </u>		<u></u>	
2483.5	V	47.22	35.46	13.67	60.89	49.13	74	54	-13.11	-4.87
4924	V	42.53	29.78	15.19	57.72	44.97	74	54	-16.28	-9.03
10.2.	V			V	/			(<u>44</u> D	🗸	
				100 00	-					

Note:

5. Emission Level= Read Level+ Correct Factor

6. The emission levels of other frequencies are very lower than the limit and not show in test report.

7. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.

Low channe	el: 241	2 MHz								
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Peak	on Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Peak Margin (dB)	AV Margin (dB)
2390	Н	51.46	36.78	11.37	62.83	48.15	74	54	-11.17	-5.85
4824	Н	43.92	31.27	14.55	58.47	45.82	74	54	-15.53	-8.18
	Н		X	6	1 2					
132		199	L'ES							~ \
2390	V	47.84	35.51	11.37	59.21	46.88	74	54	-14.79	-7.12
4824	V	45.18	33.89	14.55	59.73	48.44	74	54	-14.27	-5.56
S	V	(A-A)								1

Test Mode: IEEE 802.11n TH20

Middle chan	nel: 2	437 MHz								
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Peak	on Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Peak Margin (dB)	AV Margin (dB)
4874	Н	43.74	29.45	14.85	58.59	44.3	74	54	-15.41	-9.7
	Η		~					T		· · · · ·
	Н						-			
	1					2003		(TU)		
4874	V	42.74	29.45	14.85	57.59	44.3	74	54	-16.41	-9.7
	V				Q		1			
	V	140				·		2 C + 2 2		

High channe	el: 246	62 MHz								
Frequency	Ant. Pol.	Peak reading	AV reading (dBuV)	Correction Factor	Peak	on Level AV (dBuV/m)	Peak limit (dBµV/m)	AV limit	Peak	AV
(MHz)	H/V	(dBµV)	(0.2.0.1)	(dB/m)	(((dBµV/m)	(dBµV/m)	Margin (dB)	Margin (dB)
2483.5	H	51.14	36.44	13.67	64.81	50.11	74	54	-9.19	-3.89
4924	Н	42.30	29.74	15.19	57.49	44.93	74	54	-16.51	-9.07
	н	V		-				1177	1	
	1	2.7	6	AUD D		MAR	-			
2483.5	V	46.28	35.35	13.67	59.95	49.02	74	54	-14.05	-4.98
4924	V	43.34	29.80	15.19	58.53	44.99	74	54	-15.47	-9.01
	V			2 J	5			1-1-9-5-		< \

Note:

9. Emission Level= Read Level+ Correct Factor

10. The emission levels of other frequencies are very lower than the limit and not show in test report.

11. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.



				100111100						
Low channe	el: 242	2 MHz								
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Peak	on Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Peak Margin (dB)	AV Margin (dB)
2390	н	50.51	42.38	0.77	51.28	43.15	74	54	-22.72	-10.85
4844	Н	48.64	38.08	13.68	62.32	51.76	74	54	-11.68	-2.24
	Н			6	11>		024015		N N	
132		100								
2390	V	49.17	42.85	0.77	49.94	43.62	74	54	-24.06	-10.38
4844	V	50.66	37.14	13.68	64.34	50.82	74	54	-9.66	-3.18
S	V	1				~				

Test Mode: IEEE 802.11n TH40

Middle chan	nel: 2	437 MHz								
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Peak	on Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Peak Margin (dB)	AV Margin (dB)
4874	Н	47.76	35.35	13.86	61.62	49.21	74	54	-12.38	-4.79
	Η		~					T		
	Н						-			
	1	3. 22			5	A A A		(The second sec		
4874	V	47.94	34.61	13.86	61.8	48.47	74	54	-12.2	-5.53
	V	100			10 <u>-</u>					
	V	120						2 th 2 s		

High channe	el: 245	52 MHz								
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBuV)	Correction Factor (dB/m)	Peak	on Level AV (dBµV/m)	Peak limit (dBµV/m)	AV limit (dBµV/m)	Peak Margin (dB)	AV Margin (dB)
2483.5	H	46.46	35.32	1.17	47.63	36.49	74	54	-26.37	-17.51
4904	Н	48.31	34.99	14.03	62.34	49.02	74	54	-11.66	-4.98
Carlos	Н	A VI	U				S	11777	<u> </u>	
0400.5		45.00	24.44	4.47	40.40	25.50	74	54	07.04	10.40
2483.5	Н	45.02	34.41	1.17	46.19	35.58	74	54	-27.81	-18.42
4904	V	48.47	35.6	14.03	62.5	49.63	74	54	-11.5	-4.37
	V			81	6	· ····				\

Note:

13. Emission Level= Read Level+ Correct Factor

14. The emission levels of other frequencies are very lower than the limit and not show in test report.

15. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.



Attachment C-- Conducted Band Edge Test

perature:	25 ℃	Re	lative Humidity:	55%
t Voltage:	AC 120/60Hz	180		133
t Mode:	TX B Mode 241	2MHz / TX B Mc	de 2462MHz	
nark:	The EUT is prog	ramed in contin	uously transmitting	mode
💓 Keysight Spectrum				
	RF 75 Ω AC CORREC 2.3770000000 GHz PNO: Fas IFGain:Lo	t 😱 Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	03:53:57 PM Mar 25, 2019 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N
Re	ef Offset 3.63 dB	W Atten 60 dB	Mkr1	2.412 5 GHz 5.533 dBm
10 dB/div Re Log 13.6	ef 23.63 dBm			1
3.63 -6.37				hanning
-16.4			لا مر الا مر	14.48 dBm
-26.4				
-46.4	Saudug shal, asa katagi wataka gara ang palang palang	abrook and a state	man 3 marty	hym Mar
-66.4				
Start 2.32700 #Res BW 100		#VBW 300 kHz		op 2.42700 GHz)0 ms (1001 pts)
MKR MODE TRC SC 1 N 1 f 2 N 1 f	2.412 5 GHz	Y FUNCTION FUN 5.533 dBm 12.790 dBm	ICTION WIDTH FUNCTION	VALUE
3 N 1 f 4 N 1 f 5	2.390 0 GHz -4 2.383 0 GHz -4	52.983 dBm 50.830 dBm		
6 7 8				
9 9 10 10 11 11 11 11 11 11 11 11 11 11 11				
MSG		m	STATUS	•
	n Analyzer - Swept SA			
Keysight Spectrum		SENSE:INT		
LXI R T R	2.497000000 GHz	T	Avg Type: Log-Pwr	04:07:29 PM Mar 25, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWW
Center Freq	2.497000000 GHz PNO: Fas IFGain:Lo	t 😱 Trig: Free Run	Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 123456 TYPE MWWWW DET PNNNNN
Center Freq	2.497000000 GHz	t 😱 Trig: Free Run	Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 1 2 3 4 5 6
Center Freq	2.497000000 GHz PNO: Fas IFGain:Lo	t 😱 Trig: Free Run	Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNNN 2.461 5 GHZ
Center Freq	2.497000000 GHz PNO: Fas IFGain:Lo	t 😱 Trig: Free Run	Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNNN 2.461 5 GHZ
(M) R T F Center Freq Center Freq R 10 dB/div R 13 S S 13.6 S S 13.6 S S -6.4 S S	2.497000000 GHz PNO: Fas IFGain:Lo	t 😱 Trig: Free Run	Avg Type: Log-Pwr Avg Hold:>100/100	2.3456 TYPE WWWWW DET PNNNNN 2.4615GHz 4.678dBm
M R T P Center Freq R R R R 10 dB/div R	2.497000000 GHz PNO: Fas IFGain:Lo ef Offset 3.6 dB ef 23.60 dBm	t Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100	2.3456 TYPE WWWWW DET PNNNNN 2.4615GHz 4.678dBm
M R T P Center Freq Re Re Re 10 dB/div R R R R 13.6 3.60 R	2.497000000 GHz PNO: Fas IFGain:Lo ef Offset 3.6 dB ef 23.60 dBm	t 😱 Trig: Free Run	Avg Type: Log-Pwr Avg Hold:>100/100	2.3456 TYPE WWWWW DET PNNNNN 2.4615GHz 4.678dBm
M R T B Center Freq R R R 10 dB/div R R R 13 6 3 80 R R 13 6 3 80 R R 13 6 3 80 R R 14 4 46 4 R R R -66 4 -66 4 R R R -66 4 -66 4 -66 4 R R Start 2.44700 -66 4<	2.497000000 GHz PNO: Fas IFGain:Lo ef Offset 3.6 dB ef 23.60 dBm	t Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100	2.461 5 GHz 4.678 dBm
Center Freq Center Freq 10 dB/div Re 13 6 3 60 -6 40 -66 4 -66 4 -66 4 Start 2.44700 #Res BW 100 MKR MODE TRCI SC	2.497000000 GHz PNO: Fas IFGain:Lo ef Offset 3.6 dB ef 23.60 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1	t Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100	2.461 5 GHz 4.678 dBm
MR R T F Center Freq Image: Center Freq Image: Center Freq Image: Center Freq 10 dB/div R Image: Center Freq Image: Center Freq 13 6 Image: Center Freq Image: Center Freq Image: Center Freq 13 6 Image: Center Freq Image: Center Freq Image: Center Freq 13 6 Image: Center Freq Image: Center Freq Image: Center Freq 13 6 Image: Center Freq Image: Center Freq Image: Center Freq 13 6 Image: Center Freq Image: Center Freq Image: Center Freq 13 6 Image: Center Freq Image: Center Freq Image: Center Freq 14 66 Image: Center Freq Image: Center Freq Image: Center Freq 14 66 Image: Center Freq Image: Center Freq Image: Center Freq 15 1 1 1 1 1 1	2.497000000 GHz PNO: Fas IFGain:Lo ef Offset 3.6 dB ef 23.60 dBm 0 GHz 0 GHz 0 KHz 2461 5 GHz	t Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100	2.461 5 GHz 4.678 dBm
M R T B Center Freq 10 dB/dlv 13 6 13 6 13 6 13 6 13 6 13 6 13 6 13 6 13 6 13 6 13 6 13 6 13 6 13 6 13 6 13 6 13 6 13 6 13 6 14 0 16 4 -66 4 -66 4 -66 4 -66 4 -66 4 -66 4 -67 10 Res BW 100 MRR MODE TRCI SC 1 N 1 1 f 3 N 1 1 f 6	2.497000000 GHz PNO: Fas IFGain:Lo ef Offset 3.6 dB ef 23.60 dBm 0 GHz 0 GHz 0 KHz 2.461 5 GHz 4.500 GHz 2.461 5 GHz 2.461 5 GHz 2.500 0 GHz 3.500 0 GHZ 3.5	t Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100	2.461 5 GHz 4.678 dBm
M R T F Center Freq Image: Center Freq Image: Center Freq Image: Center Freq 10 dB/div Re Image: Center Freq Image: Center Freq 13 6 Image: Center Freq Image: Center Freq Image: Center Freq 13 6 Image: Center Freq Image: Center Freq Image: Center Freq 13 6 Image: Center Freq Image: Center Freq Image: Center Freq 13 6 Image: Center Freq Image: Center Freq Image: Center Freq 16 4 Image: Center Freq Image: Center Freq Image: Center Freq Image: Center Freq 16 4 Image: Center Freq Image: Center Freq Image: Center Freq Image: Center Freq 16 4 Image: Center Freq Image: Center Freq Image: Center Freq Image: Center Freq 16 4 Image: Center Freq Image: Center Freq Image: Center Freq Image: Center Freq 16 4 Image: Center Freq Image: Center Freq Image: Center Freq <t< td=""><td>2.497000000 GHz PNO: Fas IFGain:Lo ef Offset 3.6 dB ef 23.60 dBm 0 GHz 0 GHz 0 KHz 2461 5 GHz</td><td>t Trig: Free Run Atten: 30 dB</td><td>Avg Type: Log-Pwr Avg Hold:>100/100</td><td>2.461 5 GHz 4.678 dBm</td></t<>	2.497000000 GHz PNO: Fas IFGain:Lo ef Offset 3.6 dB ef 23.60 dBm 0 GHz 0 GHz 0 KHz 2461 5 GHz	t Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100	2.461 5 GHz 4.678 dBm



Test Voltage: AC 120/60Hz Test Mode: TX G Mode 2412MHz / TX G Mode 2462MHz Remark: The EUT is programed in continuously transmitting mode Image: State of the state o	Temperature:	25 ℃	Relative Humidity:	55%
Test Mode: TX G Mode 2412MHz / TX G Mode 2462MHz Remark: The EUT is programed in continuously transmitting mode Image: State of the Stat			Relative frammarty	0070
<figure></figure>	-		G Mode 2462MHz	
				n mode
	LXI R T RF	75 Ω AC CORREC SENSE:INT	Avg Type: Log-Pwr	04:18:44 PM Mar 25, 2019
Image: Serie 23.65 dBm -3.376 dBm Image: Serie 23.65 dBm -3.376 dBm Image: Serie 23.67 dBm		PNO: Fast G Irig: Free H IFGain:Low Atten: 30 d	в — — — — — — — — — — — — — — — — — — —	DET PNNNN
	10 dB/div Ret	Offset 3.63 dB 23.63 dBm		
Image: service single service single service se	13.6			1
Image: second	-6.37		A CONTRACT OF	porturine and a second second
Image: second	-26.4		A2	-23.43 dBm
Image: start 2.32700 GHz Stop 2.42700 GHz Start 2.32700 GHz Stop 2.42700 GHz Res BW 100 kHz 2409 0 GHz Image: start 2.32700 GHz Stop 2.42700 GHz Stop 2.42700 GHz Stop 2.42700 GHz Image: start 2.3270 GHz Stop 2.42700 GHz Image: start 2.3370 GHz Stop 2.42700 GHz				two.
#Res BW 100 kHz #VEW 300 kHz Sweep 9.600 ms (1001 pts) INTERCETCS SLI 2.411 CHI 1 CHI 2.430 GHz 3.376 GHm PUNCTION FUNCTION WULLE 2 N 1 1 1 2.400 GHz 2.400 GHz 4.3776 GHm PUNCTION FUNCTION WULLE 3 N 1 1 2.400 GHz 4.32752 GHm Intercent 4.32772 GHm Intercent 4.32772 GHm 1 1 2.400 GHz 4.32752 GHm Intercent 4.32772 GHm Intercent 4.32772 GHm 1 1 2.400 GHz 4.32752 GHm Intercent 4.32772 GHm Intercent 4.32772 GHm 1 1 2.400 GHz For Chi 2.400 CHI For Chi 2.400 CHI Intercent 4.400 GHz 1 1 2.400 GHz For Chi 2.400 CHI And 1.400 GHZ Intercent 4.400 GHZ 1 1 2.400 GHZ For Chi 2.400 GHZ For Chi 2.400 GHZ For Chi 2.400 GHZ 1 1 2.400 GHZ For Chi 2.400 GHZ For Chi 2.400 GHZ For Chi 2.400 GHZ For Chi 2.400 GHZ 1 1 2.400 GHZ For Chi 2.400 GHZ 1 1 2.400 GHZ For Chi 2.400 GHZ 1 1 2.400 GHZ For Chi 2.400 GHZ For Chi 2.400 GHZ For C		สี่เวลาให้กระบุณณณณณณณณณณณณณณณณณณณณณณณณณณณณณณณณณณณณ		
Image: Node The Sci X Y Punction watching Function watching Image: Node The Sci 2.4417.6 Hz 2.430.0 Hz -43.777.6				
1 1 1 2.309.0.0Hz -32.033.dtm 1 1 2.309.0.0Hz -32.033.dtm -32.033.dtm 1 1 2.309.0.0Hz -32.033.dtm -32.033.dtm 1 1 1 2.309.0.0Hz -32.033.dtm -32.033.dtm 1 1 1 1 -32.033.dtm -32.033.dtm -32.033.dtm 1 1 1 1 -32.033.dtm -32.033.dtm -32.033.dtm -32.033.dtm 1 1 1 1 -32.033.dtm -32.033.dtm -32.033.dtm -32.037.dtm -32.037.dtm <th>MKR MODE TRC SCL</th> <th>X Y FUNC</th> <th></th> <th></th>	MKR MODE TRC SCL	X Y FUNC		
6 0	2 N 1 f 3 N 1 f	2.400 0 GHz -40.777 dBm 2.390 0 GHz -53.278 dBm		
Image: Start 2.44700 GHz FNOF FRE 54.0 Image: Start 2.4470 GHz FNOF FRE 54.0 Image: Start 2.4470 GHz FNOF FRE 54.0 Image: Start 2.4470 GHz FNOF FRE 54.0 Image: Start 2.4480 GHz FNOF FRE 54.0 <t< th=""><th>5</th><th>2.389 8 GHz -52.563 dBm</th><th></th><th>=</th></t<>	5	2.389 8 GHz -52.563 dBm		=
Image: Section Analyzer - Sweet SA	8			
Keyudit Spectrum Analyzer-Sweet SA COMPEC SENSE:INT ALION AUTO OH 284 HW 25, 2019 Center Freq 2.497000000 GHz FRO: Fast Trig: Free Run Avg Type: Log-Pwr Avg Type: Log-Pwr It of dB/ddr Ref Offset 3.6 dB State: 3.0 dB Mkr1 2.456 4 GHz 10 dB/ddr Ref Offset 3.6 dB				
Image: Note of the second s	MSG		STATUS	
Center Freq 2.497000000 GHz Avg Type: Log-Pwr Avg(Hold:>100/100 Trace pask 50 between the state of t			ALIGN AUTO	
Ref Offset 3.6 dB Mkr1 2.456 4 CHz 10 dB/div -3.657 dBm 136 -3.657 dBm 14 -3.657 dBm 154 -3.657 dBm 156 -3.657 dBm 164 -3.657 dBm 164 -3.657 dBm 164 -3.657 dBm 165 -3.657 dBm 164 -3.657 dBm 165 -3.657 dBm 165 -3.657 dBm 165 -3.657 dBm 166 -3.657 dBm 17 -3.657 dBm 18 -3.657 dBm 19 -3.657 dBm 10	Center Freq 2	2.497000000 GHz PNO: Fast 😱 Trig: Free R	Avg Type: Log-Pwr un Avg Hold:>100/100	TRACE 1 2 3 4 5 6
0 grow Hor 2000 UM 136 0 dr 164		Offset 3.6 dB		
6.40 16.40 20.4	Log			
10.4		1		
46.4 46.4 4 3 4 <t< th=""><th></th><th></th><th></th><th>-23.66 dBm</th></t<>				-23.66 dBm
66.4	-26.4			
Start 2.44700 GHz Stop 2.54700 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 9.600 ms (1001 pts) MRR MOBE THELSEL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE 1 N 1 f 2.456 4 GHz -3.657 dBm 3 N 1 f 2.456 4 GHz -53.657 dBm 3 N 1 f 2.486 5 GHz -53.457 dBm 4 N 1 f 2.486 5 GHz -54.484 dBm 4 N 1 f 2.486 9 GHz -52.968 dBm 6 - - - - 7 - - - - 8 - - - - 9 - - - - 10 - - - - 11 - - - -		2 4	3 	and rear and a construction
#Res BW 100 kHz #VBW 300 kHz Sweep 9.600 ms (1001 pts) MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE 1 f 2.456 4 GHz -3.657 dBm FUNCTION FUNCTION VALUE 2 N 1 f 2.456 4 GHz -3.657 dBm FUNCTION 3 N 1 f 2.456 4 GHz -3.671 dBm FUNCTION 4 N 1 f 2.456 9 GHz -53.671 dBm FUNCTION 5 G 2.857 dBm FUNCTION FUNCTION FUNCTION 4 N 1 f 2.458 9 GHz -52.968 dBm FUNCTION 8 8 8 8 8 FUNCTION FUNCTION 9 9 9 8 8 8 8 8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	-66.4			
1 N 1 f 2.456.4 GHz -3.657.dBm 2 N 1 f 2.488.5 GHz -53.671.dBm 3 N 1 f 2.480.0 GHz -54.448.dBm 4 N 1 f 2.486.9 GHz -52.968.dBm 5 6 6 6 6 6 9 0 0 0 0 0 10 1 1 1 1 1 11 11 11 11 11 11 11				
4 N 1 f 2.486 9 GHz -52.968 dBm 5 6 6 6 6 7 6 6 6 9 9 6 6 11 6 6 6	1 N 1 f	X Y FUNC 2.456 4 GHz -3.657 dBm 2.493 5 CHz 53.651 dBm	TION FUNCTION WIDTH FUNCTION	I VALUE
	3 N 1 f 4 N 1 f	2.500 0 GHz -54.448 dBm 2.486 9 GHz -52.968 dBm		
	6 7			
	9 10			
STATUS	MSG		STATUS	· · · · ·



Temperature:	25 °C Relative Humidity: 55%
Test Voltage:	AC 120/60Hz
Test Mode:	TX N(HT20) Mode 2412MHz / TX N(HT20) Mode 2462MHz
Remark:	The EUT is programed in continuously transmitting mode
Test Mode: Remark: Remark:	TX N(HT20) Mode 2412MHz / TX N(HT20) Mode 2462MHz The EUT is programed in continuously transmitting mode 2377000000 HT The first Num Anglyte Lip PW (1997 HT 1997 HT
46 4 46 4 47 0 47 005 47 1 5 6 7 7 8 8 9 9 10 10 10 10 10 10 10 10 10 10	X Y FUNCTION FUNCTION FUNCTION FUNCTION VALUE 2.456 6 GHz -51.028 dBm -51.028 dBm<



		<u>n 199</u>	
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120/60Hz	THUR A	
Test Mode:	TX N(HT40) Mode 2422MH	Hz / TX N(HT40) Mode 2	2452MHz
Remark:	The EUT is programed in c	ontinuously transmitting	j mode
	n Analyzer - Swept SA		- 6 -
	RF 75 Ω AC CORREC SENSE:INT 2.402000000 GHz Trig: Free		04:51:57 PM Mar 25, 2019 TRACE 1 2 3 4 5 6 TYPE M
B	IFGain:Low Atten: 30		r1 2.417 3 GHz
10 dB/div R	ef 23.63 dBm		-8.613 dBm
13.6 3.63			
-6.37		- American Anter free free free and a second and the second secon	~
-26.4		2	28.62.dBm
-36.4 -46.4			140 Action of the second
-56.4	Personal and the state of the constraint of the state of		
Start 2.3520	0 GHz		Stop 2.45200 GHz
#Res BW 10		•	600 ms (1001 pts)
1 N 1 2 N 1	f 2.417 3 GHz -8.613 dBm f 2.400 0 GHz -40.772 dBm		
3 N 1 4 N 1 5			E
6 7 8			
9 10 11			
MSG	· · · · · · · · · · · · · · · · · · ·	STATUS	•
LXI R T	m Analyzer - Swept SA RF 75 Ω AC CORREC SENSE:INT 2.452000000 GHz	ALIGN AUTO Avg Type: Log-Pwr	04:57:53 PM Mar 25, 2019 TRACE 1 2 3 4 5 6
	PNO: Fast Trig: Free IFGain:Low Atten: 30	Run Avg Hold:>100/100 dB	DET PNNNN
10 dB/div R	ef Offset 3.59 dB ef 23.59 dBm	Mkr	1 2.440 36 GHz -9.648 dBm
13.6			
-6.41	1		
-16.4	have been all a second a second of the secon	have how and how a proper and the second second	
-36.4	Nut And	K.	
-46.4 -56.4			we tolewand wante
-66.4			
Center 2.452 #Res BW 10		z Sweep 5.	Span 60.00 MHz 800 ms (1001 pts)
MKR MODE TRC S		CTION FUNCTION WIDTH FUNCTI	ON VALUE
2 3 4			
5			E
8			
MSG		STATUS	



Attachment D-- Conducted RF Spurious Emission Test Data

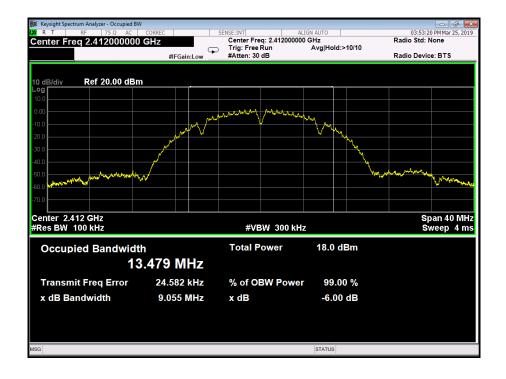
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120/60Hz		1023
Test Mode:	TX B Mode	Y A V	
Remark:	This report only shall the	worst case mode for TX I	EEE 802.11b.
	2412	MHz	
	0.03GHz-	26.5GHz	
Ref 13.63 dB 100 100 100 100 100 100 100 10	UNLING ALLA CALL AND	Center Freq 12.51500000 Trans and the second	All And The Log Part Ang The Log Part Ang The Log Part Ang The Log Part Met 1 2 2013 Met 1 2 2013 State 2 2013 Fall The Log Part Met 1 2 2013 State 2 2013 Fall The Log Part State 2 2013 Fall The Log Fall The Log Part State 2 2013 Fall The Log Fall The Log Part State 2 2013 Fall The Log Fall The Log
	2437 0.03GHz-		
Ref 0346 gt Ref 13.59 dt 100 Ref 13.59 dt 101 Ref 13.59 dt 102 Ref 13.59 dt 103 Ref 13.59 dt 104 Ref 13.59 dt 105 Ref 13.59 dt	Trig Free fun Anginezie 10 00 10 10 10 10 10 10 10 10 10 10 10	Center Freq 12.515000000 GHz IIIC.1	Avg Type Log-Per AvgHod: 1010 minutes for the second secon
	2462	MHz	
	0.03GHz-	26.5GHz	
Certer Free 2.46200000 GHz Month Control Contr	Und Mr. 1 Auf Ang Tige Software Tige The Bun Ang Tige Software Addm: 70 dB Mint 2.461 62 GHz 4.381 dBm Mint 2.461 62 GHz 4.381 dBm	Bit Supersystems Adapter: Super3 Bit Super3 Centrer Freq 12.315000000 GHz Bit Callstart Trig: Free Run Bit Callstart Trig: Free Run Bit Callstart Ref One+3.6 x8B Callstart Ref One+3.6 x8B Callstart Trig: Free Run Bit Callstart Trig: Free Run Bit Callstart Start 0.03 GHz Ref 3.03 GHz Ref 3.04 GHz Ref 3.04 GHz Ref 4.03 GHz Ref 4.04 GHz #VBW 300 MHz Start 0.03 GHz Ref 4.04 GHZ Ref 4	Augenous for the second
Center 2.46200 GHz #Res BW 100 kHz #VB	Span 30.00 MHz W 300 kHz Sweep 2.933 ms (1001 pts)	8	



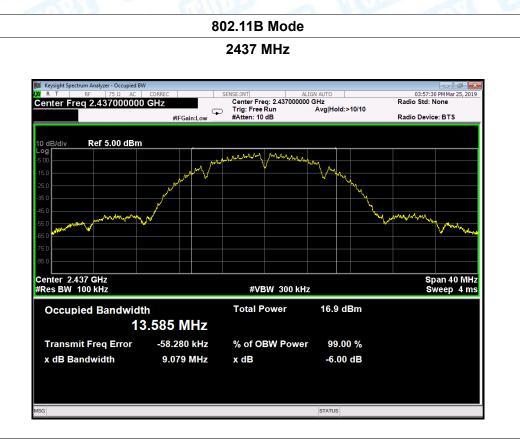
Attachment E-- Bandwidth Test Data

	Temperature: 25 °C		Relative Humidity:	55%			
5		AC 120/60Hz	C 120/60Hz				
		TX 802.11B Mode					
	Channel frequence	cy 6dB Bandwidt	th 99% Bandwidth	Limit			
	(MHz)	(MHz)	(MHz)	(MHz)			
	2412	9.055	13.479				
	2437	9.079	13.585	>=0.5			
	2462	9.065	13.573				
000.445							

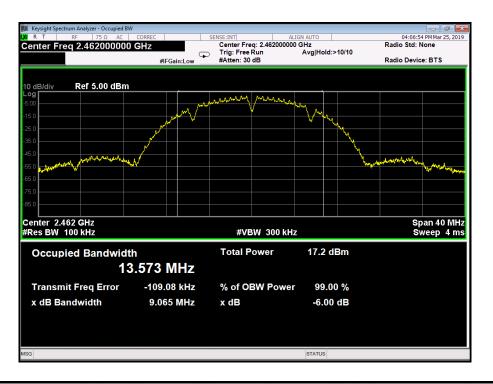
802.11B Mode





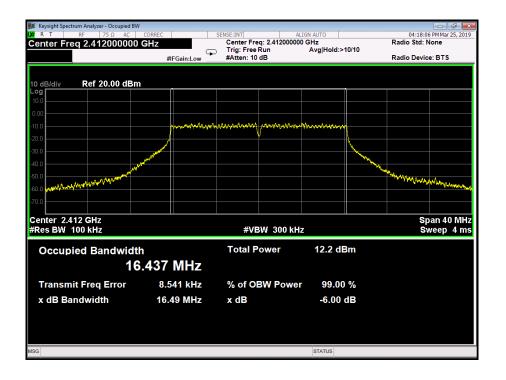


802.11B Mode

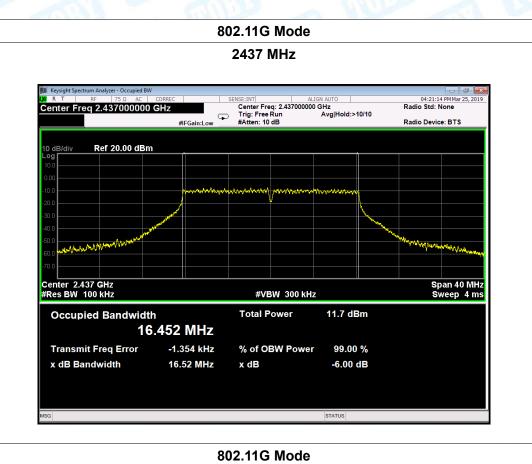


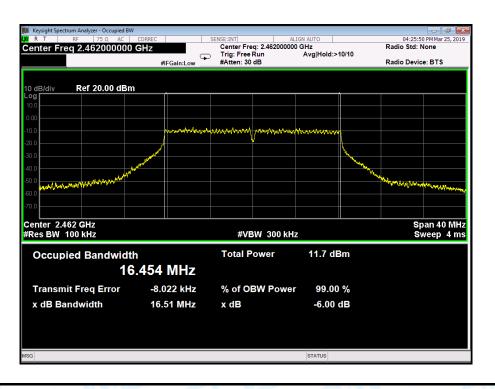


Temperature: 25		5 ℃ Relative Humidity:		55%	
Test Voltage:		120/60Hz	TUPP -		
Test Mode:	ТΧ	802.11G Mode		133	
Channel frequency (MHz)		6dB Bandwidth 99% Bandwidth		Limit	
		(MHz)	(MHz)	(MHz)	
2412		16.49	16.437		
2437		16.52	16.452	>=0.5	
2462		16.51	16.454	-	
802.11G Mode					





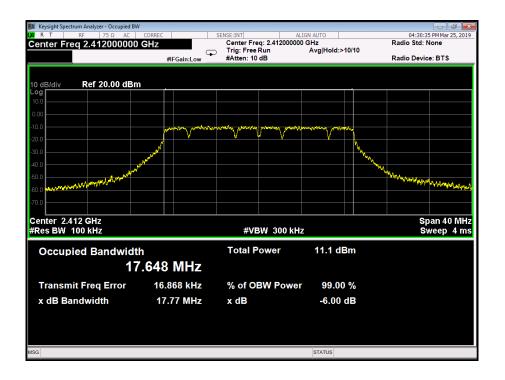




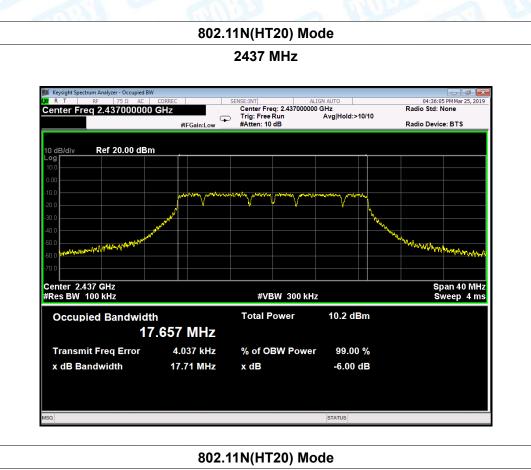


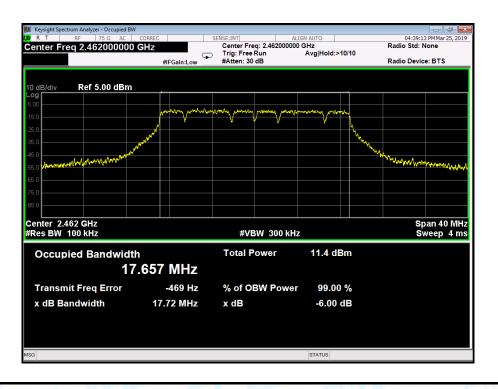
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	AC 120/60Hz	TUDA			
Test Mode:	TX 802.11N(HT20) Mode	V(HT20) Mode			
Channel frequen	cy 6dB Bandwidth	6dB Bandwidth 99% Bandwidth			
(MHz)	(MHz)	(MHz)	(MHz)		
2412	17.77	17.648			
2437	17.71	17.657	>=0.5		
2462	17.72	17.657			
	1		1		

802.11N(HT20) Mode





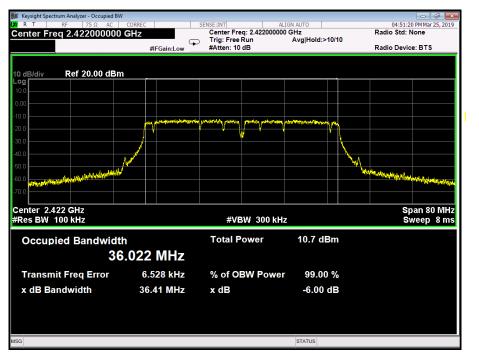






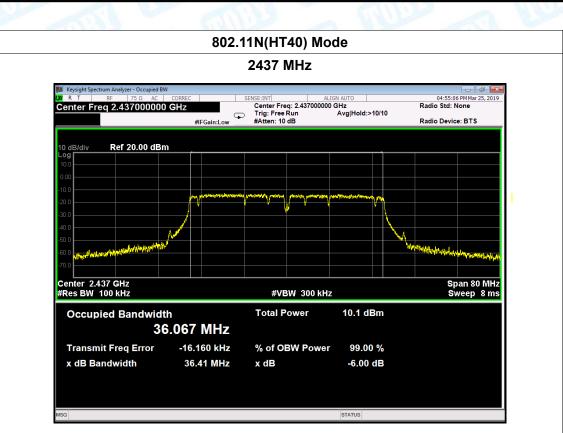
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120/60Hz	MUDY				
Test Mode:	TX 802.11N(HT40) Mode	X 802.11N(HT40) Mode				
Channel frequen	cy 6dB Bandwidth	99% Bandwidth	Limit			
(MHz)	(MHz)	(MHz)	(MHz)			
2422	36.41	36.022				
2437	36.41	36.067	>=0.5			
2452	36.41	36.043				
2452	50.41	00.040				

802.11N(HT40) Mode

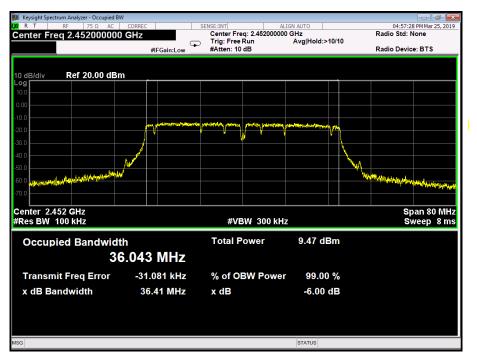




Report No.: TB-FCC164659 Page: 44 of 55



802.11N(HT40) Mode



Attachment F-- Peak Output Power Test Data

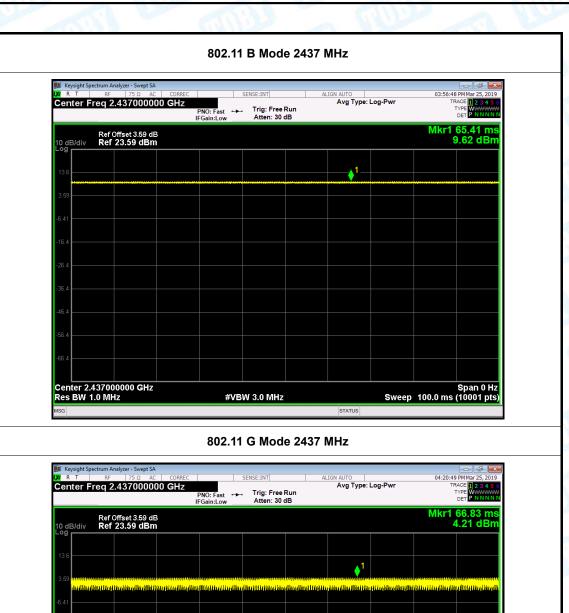
Test Condition	s: Continuous transm	itting Mode	
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120/60Hz		
Mode	Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)
	2412	16.76	
802.11b	2437	15.61	
	2462	15.76	
	2412	15.61	
802.11g	2437	15.08	
	2462	14.85	30
802.11n	2412	14.56	30
(HT20)	2437	13.55	
(11120)	2462	14.56	
802.11n	2422	14.18	
(HT40)	2437	13.48	
(1140)	2452	12.92	
	Res	ult: PASS	

	Duty Cycle	
Mode	Channel frequency (MHz)	Test Result
	2412	
802.11b	2437	
	2462	
	2412	
802.11g	2437	
-	2462	>000/
000 11-	2412	>98%
802.11n (HT20)	2437	
	2462	
000 44	2422	
802.11n (HT40)	2437	
(П140)	2452	



Center 2.437000000 GHz Res BW 1.0 MHz

Report No.: TB-FCC164659 Page: 46 of 55



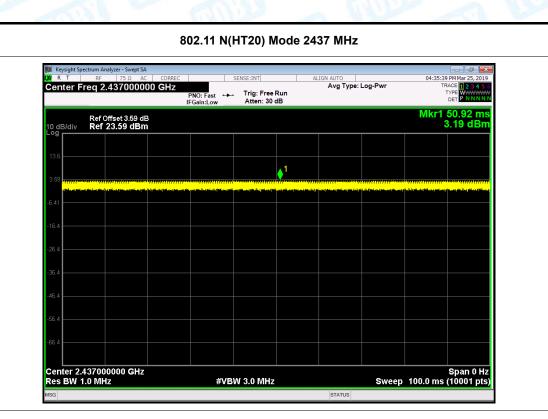
#VBW 3.0 MHz

STATUS

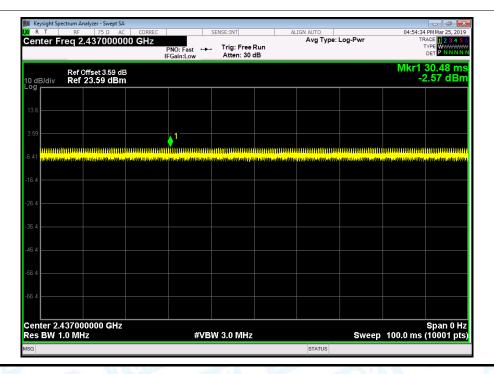
TB-RF-074-1.0

Span 0 Hz Sweep 100.0 ms (10001 pts)





802.11 N(HT40) Mode 2437 MHz



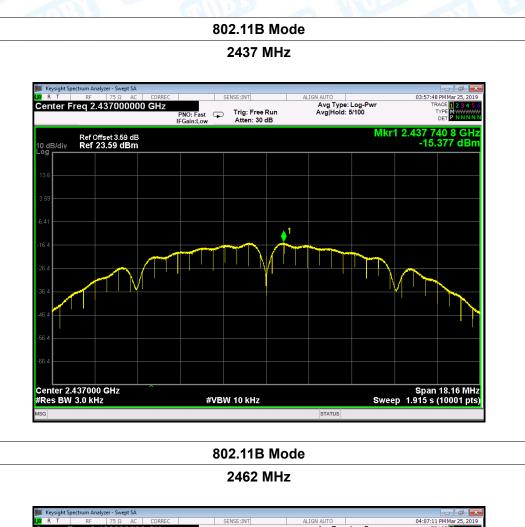
Attachment G-- Power Spectral Density Test Data

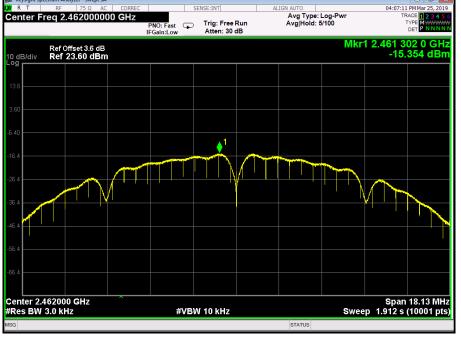
TOBY

Temperature:	25 ℃	Relative Humidity:		55%		
Test Voltage:	AC 120/6	20/60Hz				
Test Mode:	TX 802.1	2.11B Mode				
Channel Frequency (MHz)		Power Density (dBm/3 kHz)		Limit		
				(dBm)		
2412	2412		14.526			
2437 2462		-15.3	77	8		
		-15.3	54			
		802.11B	Mode			



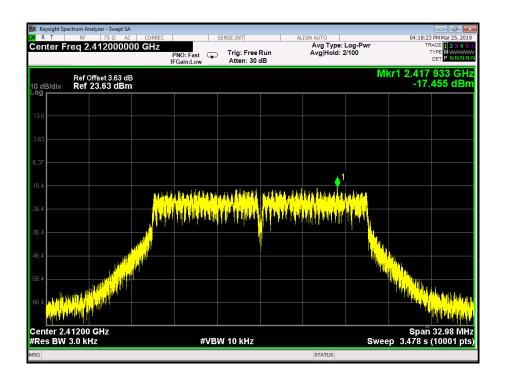


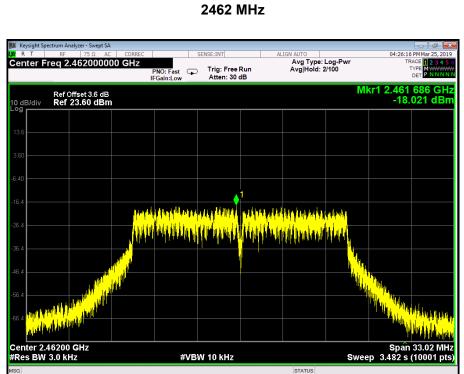




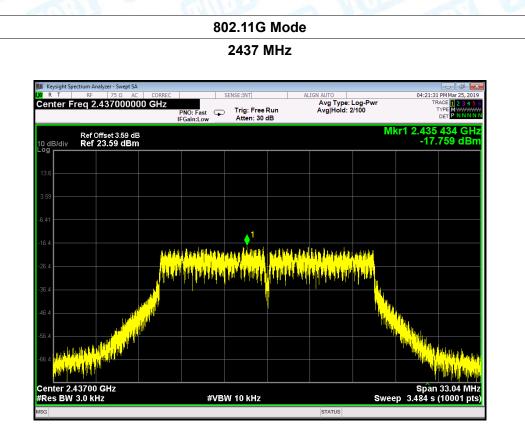


Temperature:25 °CTer		Tempera	rature: 25 ℃		- CR	
Test Voltage: AC 120/60Hz			1170	00		I.A.
Test Mode: TX 802.11 Channel Frequency (MHz)		1G Mode			Limit	
		Power	Power Density			
		(dBm/3 kHz)		(dBm)		
2412		-17.	455			
2437 2462		-17.	759	8		
		-18.	021			
802.11G Mode						





802.11G Mode



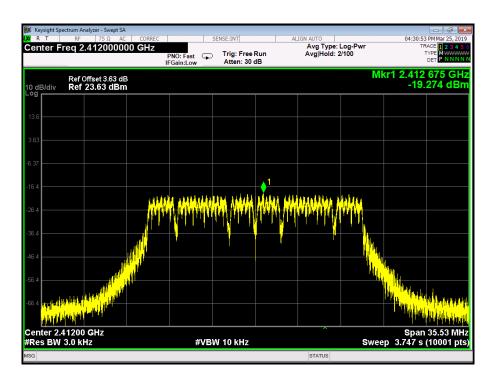


Report No.: TB-FCC164659 Page: 51 of 55

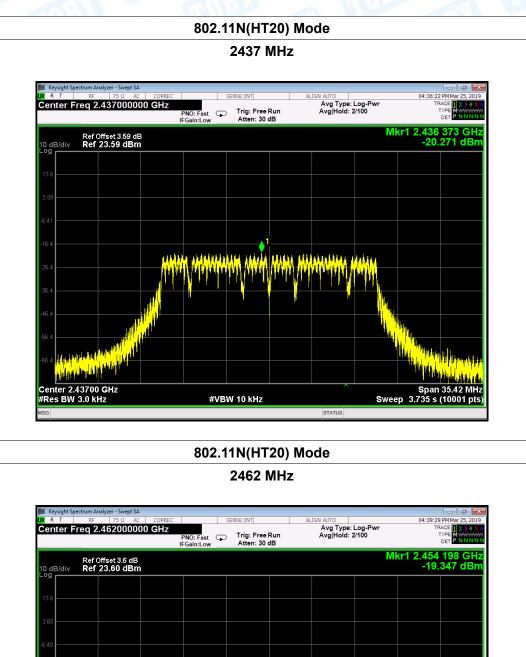


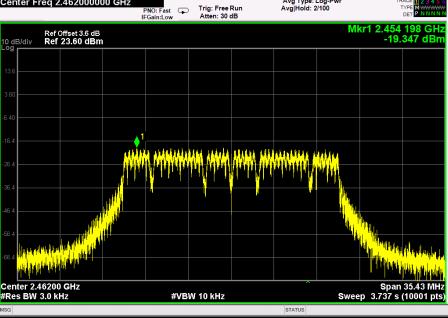
Temperature:25 °C			Temperature:			
Test Voltage:	AC 120/6	0Hz	and be		W	
Test Mode:TX 802.1Channel Frequency		1N(HT20) Mode				
		Power Density		Limit		
(MHz)		(dBm/3 kHz)		(dBm)		
2412		-19.27	4			
2437 2462		-20.27	1	8		
		-19.347				

802.11N(HT20) Mode





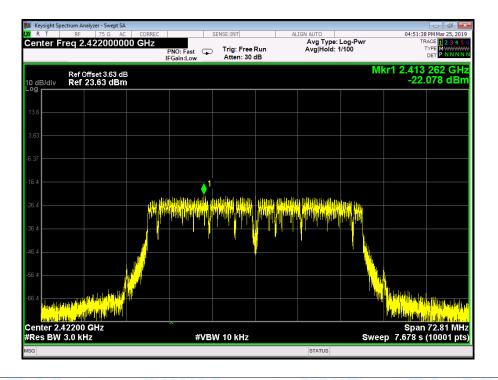




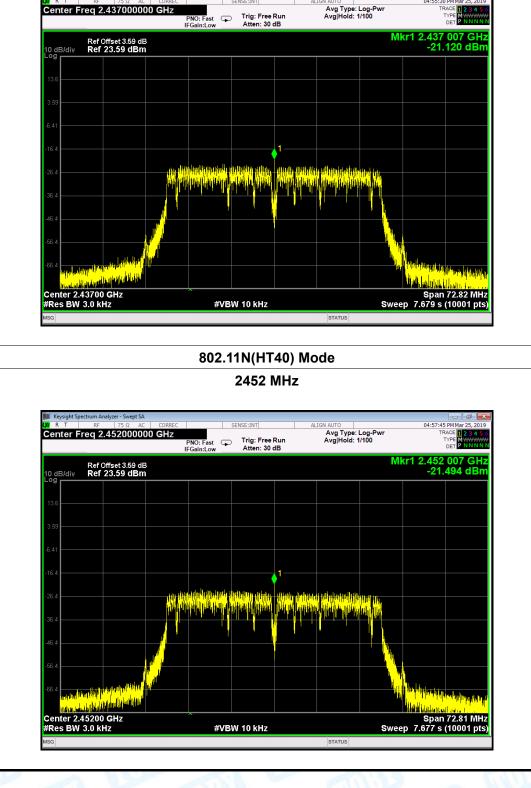


Temperature:	25 ℃		Temperature:	25 ℃	
Test Voltage: AC 120/60Hz					
Test Mode:	TX 802.1	11N(HT40) Mode		anis -	
Channel Frequency (MHz)		Power Density (dBm/3 kHz)		Limit (dBm)	
2437 2452		-21.120)	8	
		-21.494			

802.11N(HT40) Mode







802.11N(HT40) Mode 2437 MHz



Center Freq 2.437000000 GHz