FCC TEST REPORT (15.407)

REPORT NO.:	RF140423C02-1
MODEL NO.:	EAP767
FCC ID:	VZ9140001
RECEIVED:	Apr. 23, 2014
TESTED:	May 06, 2014 ~ May 08, 2014
ISSUED:	May 21, 2014

APPLICANT:	4IPNET, INC.
ADDRESS:	3F-3, No. 369, Fusing N. Rd., Taipei 105, Taiwan, R.O.C.

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
LAB ADDRESS:	No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)
TEST LOCATION:	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

TABLE OF CONTENTS

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140423C02-1	Original release	May 21, 2014

1. CERTIFICATION

PRODUCT:	Enterprise Access Point
MODEL NO.:	EAP767
BRAND:	4ipnet
APPLICANT:	4IPNET, INC.
TESTED:	May 06, 2014 ~ May 08, 2014
TEST SAMPLE:	Production Unit
STANDARDS:	**FCC Part 15, Subpart E (Section 15.407)**
	ANSI C63.10-2009

The above equipment (model: EAP767) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch,** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Evonne Liu , **DATE :** May 21, 2014

Evonne Liu / Specialist

APPROVED BY : Sam chen , **DATE :** May 21, 2014

Sam Chen / Senior Project Engineer

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407)			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -7.35dB at 0.15781MHz.
15.407(b/1/2/3)(b)(6)	Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.55dB at 5150MHz.
15.407(a/1/2)	Peak Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a/1/2)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Enterprise Access Point
MODEL NO.	EAP767
POWER SUPPLY	12Vdc (adapter)
MODULATION TYPE	256QAM, 64QAM, 16QAM, QPSK, BPSK
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 135Mbps 802.11ac: up to V9
OPERATING FREQUENCY	5180 ~ 5240MHz
NUMBER OF CHANNEL	4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 1 for 802.11ac (80MHz)
OUTPUT POWER	40.89mW
ANTENNA CONNECTOR	NA
DATA CABLE	Refer to Note as below
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Refer to Note as below

NOTE:

1. The antenna information is listed as below.

Antenna Type	Antenna Model	Band	Frequency Band	Tx Antenna	Antenna Gain
PCB	AP331AI	sercomm	5180 ~ 5240	1	4.67
				2	4.1
				3	3.94

2. There're 2 configurations for the EUT listed as below.

Sample	Model	Power Supply
A	EAP767	from Adapter
B		from POE

3. The EUT contains following accessory devices.

ITEM	BRAND	MODEL	SPECIFICATION
Adapter	Asian	WA-30B12	I/P: 100-240Vac, 50-60Hz, 0.8A O/P: 12Vdc, 2.5A AC power code 1.5m

4. The EUT incorporates a MIMO function. Physically, the EUT provides 3 completed transmitters and 3 receivers.

MODULATION MODE	TX FUNCTION
802.11a	1TX
802.11n (20MHz)	1TX, 2TX, 3TX
802.11n (40MHz)	1TX, 2TX, 3TX
802.11ac (80MHz)	1TX, 2TX, 3TX

5. The above EUT information is declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

4 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY
42	5210 MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Sample A from Adapter
B	-	√	√	-	Sample B from POE

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane.**

RADIATED EMISSION TEST (ABOVE 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 44, 48	OFDM	BPSK	6.0
	802.11n (20MHz)		36 to 48	36, 44, 48	OFDM	BPSK	MCS0
	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	MCS0
	802.11ac (80MHz)		42	42	OFDM	BPSK	V0

RADIATED EMISSION TEST (BELOW 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B	802.11ac (80MHz)	5180-5240	42	42	OFDM	BPSK	V0

POWER LINE CONDUCTED EMISSION TEST:

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B	802.11ac (80MHz)	5180-5240	42	42	OFDM	BPSK	V0

BANDEDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 48	OFDM	BPSK	6.0
	802.11n (20MHz)		36 to 48	36, 48	OFDM	BPSK	MCS0
	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	MCS0
	802.11ac (80MHz)		42	42	OFDM	BPSK	V0

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 44, 48	OFDM	BPSK	6.0
	802.11n (20MHz)		36 to 48	36, 44, 48	OFDM	BPSK	MCS0
	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	MCS0
	802.11ac (80MHz)		42	42	OFDM	BPSK	V0

Test CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu
PLC	25deg. C, 65%RH	120Vac, 60Hz	Peter Weng
APCM	25deg. C, 65%RH	120Vac, 60Hz	David Huang

3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

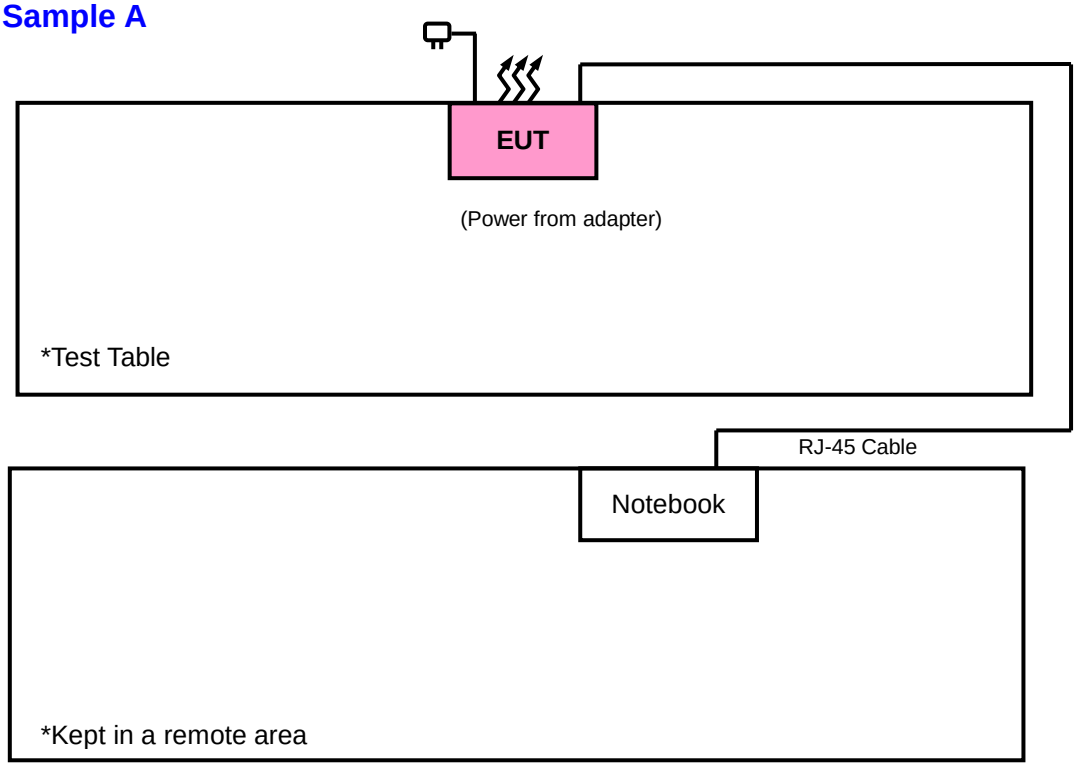
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	E6420	D3T96R1	N/A
2	POE	4ipnet	POE30G	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A
2	N/A

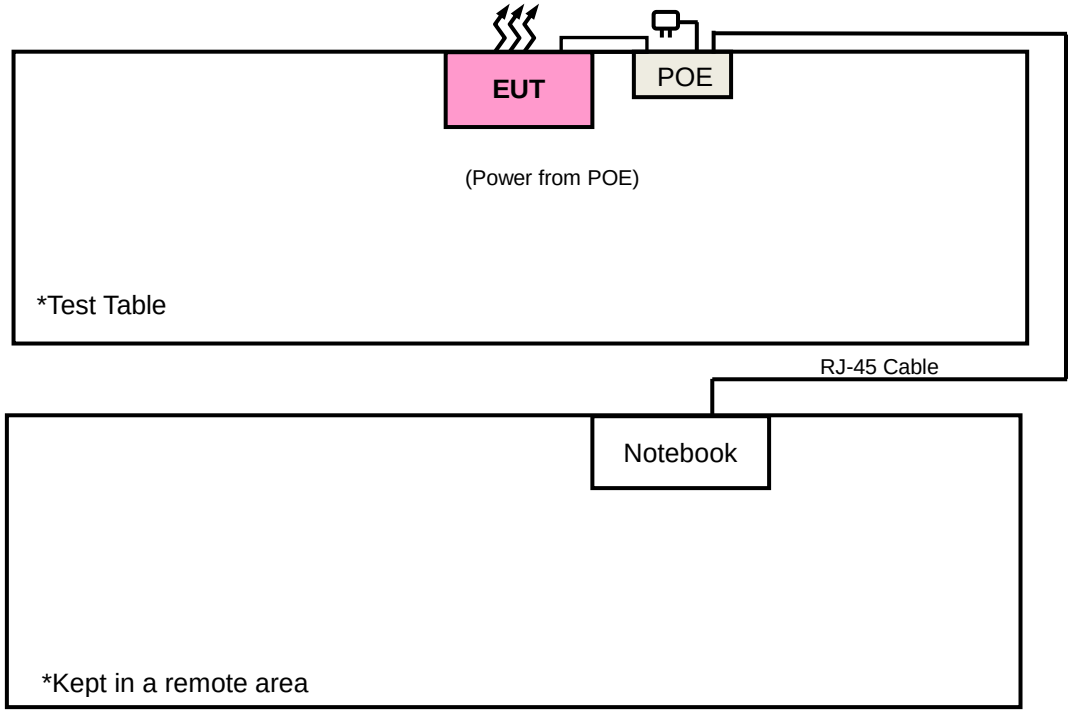
NOTE: 1. All power cords of the above support units are non shielded (1.8m).

3.3.1 CONFIGURATION OF SYSTEM UNDER TEST

For Sample A



For Sample B


EUT
POE
(Power from POE)
*Test Table
RJ-45 Cable
Notebook
*Kept in a remote area

3.4 DUTY CYCLE TEST SIGNAL

MODE A (1TX)

If duty cycle is < 98%, duty factor shall be considered.

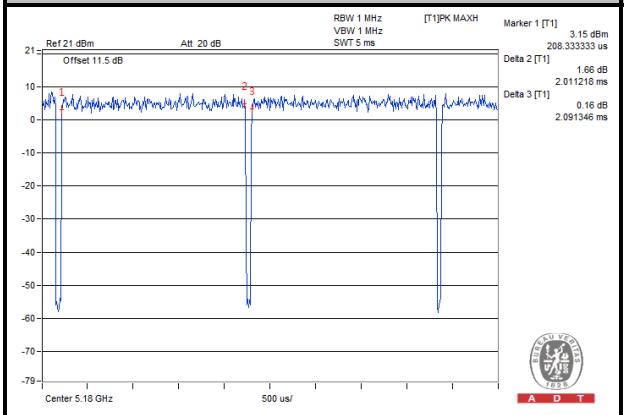
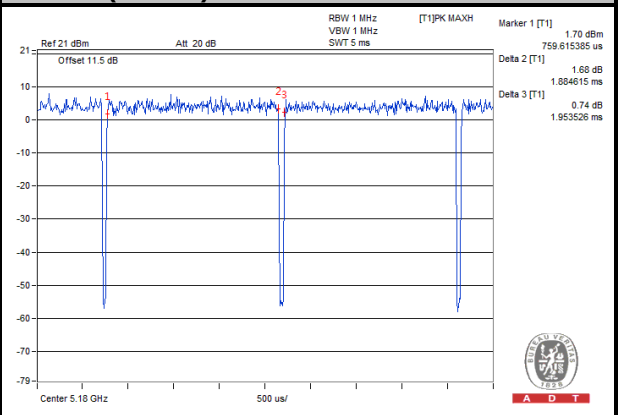
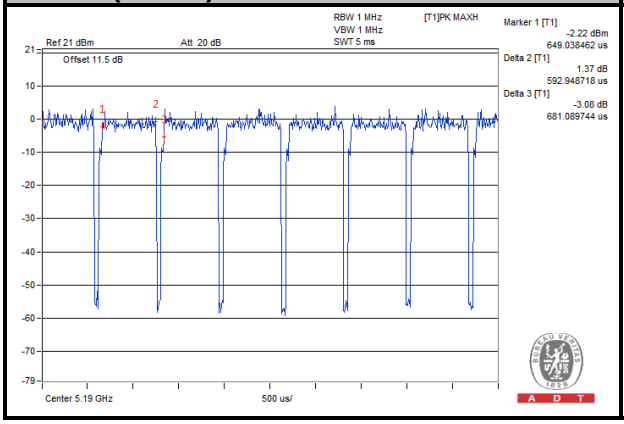
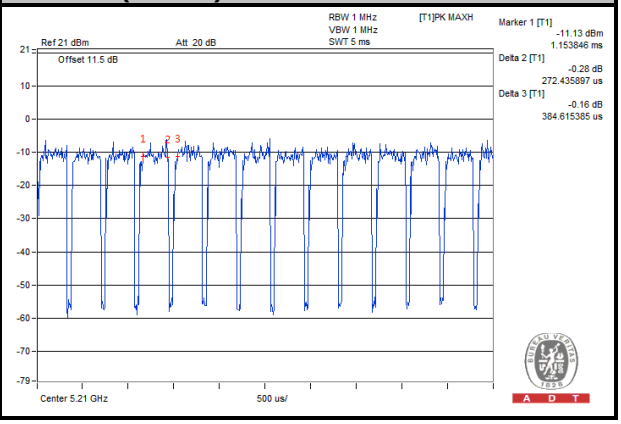
MODULATION TYPE: BPSK

802.11a: Duty cycle = 2.011/2.091 = 0.961, Duty factor = 10 * log(1/0.961) = 0.17

802.11n (20MHz): Duty cycle = 1.884/1.953 = 0.965, Duty factor = 10 * log(1/0.965) = 0.15

802.11n (40MHz): Duty cycle = 592/681 = 0.870, Duty factor = 10 * log(1/0.870) = 0.60

802.11ac (80MHz): Duty cycle = 272/384 = 0.708, Duty factor = 10 * log(1/0.708) = 1.50

802.11a	802.11n (20MHz)
	
802.11n (40MHz)	**802.11ac (80MHz)**
	

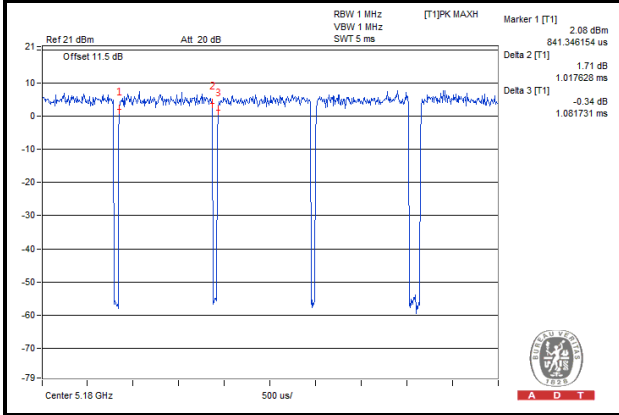
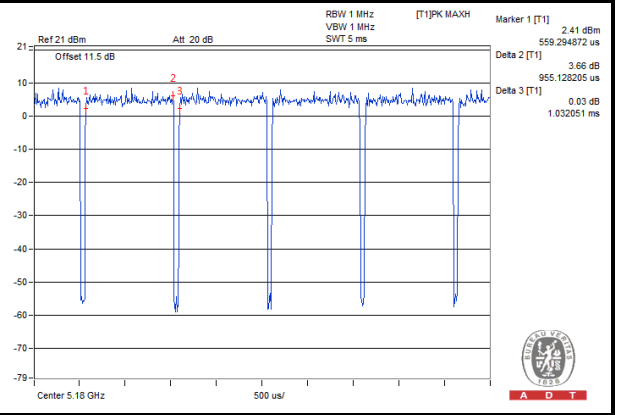
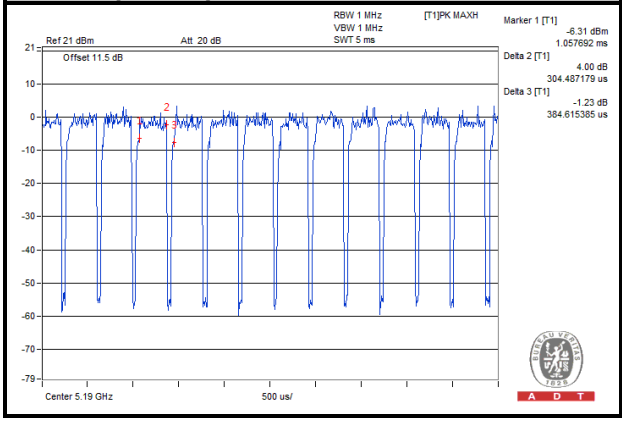
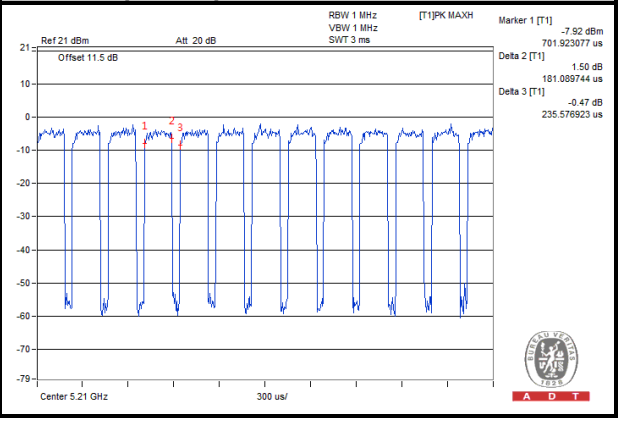
MODULATION TYPE: QPSK

802.11a: Duty cycle = 1.017/1.081 = 0.940, Duty factor = 10 * log(1/0.940) = 0.27

802.11n (20MHz): Duty cycle = 955/1032 = 0.925, Duty factor = 10 * log(1/0.925) = 0.34

802.11n (40MHz): Duty cycle = 304/384 = 0.791, Duty factor = 10 * log(1/0.791) = 1.01

802.11ac (80MHz): Duty cycle = 181/235 = 0.768, Duty factor = 10 * log(1/0.768) = 1.14

802.11a	802.11n (20MHz)
	
802.11n (40MHz)	**802.11ac (80MHz)**
	

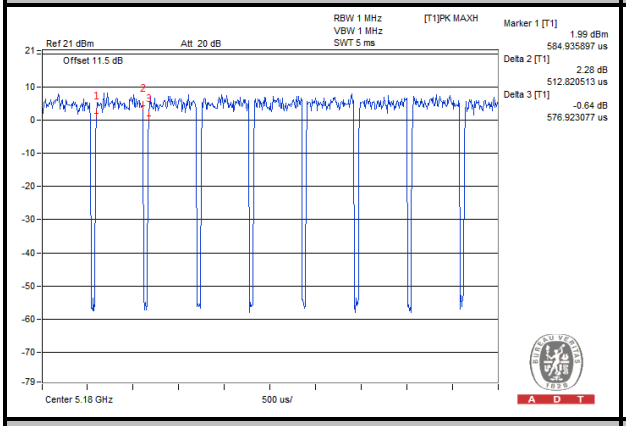
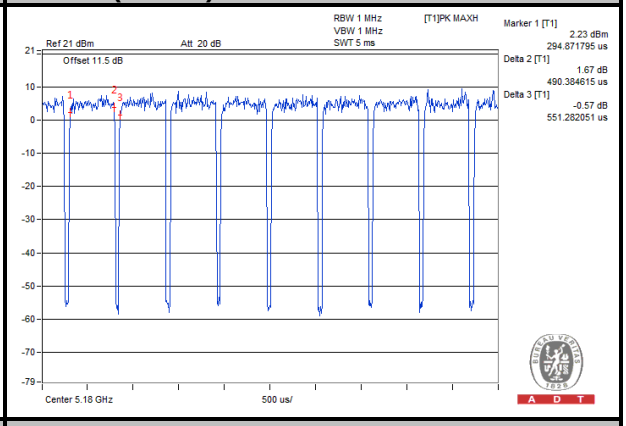
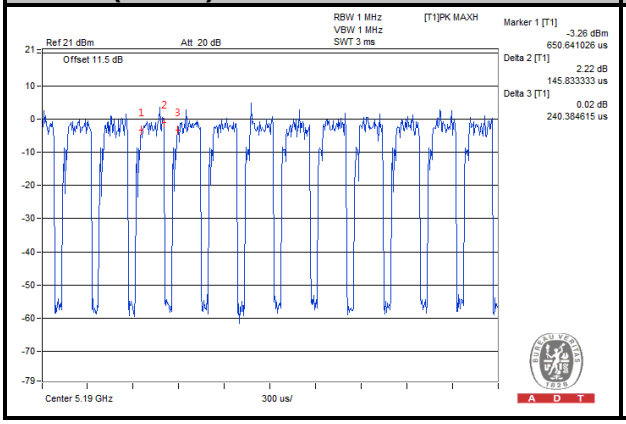
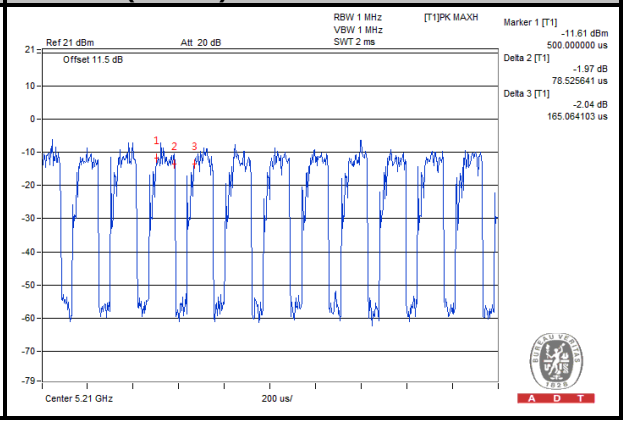
MODULATION TYPE: 16QAM

802.11a: Duty cycle = 512/576 = 0.888, Duty factor = 10 * log(1/0.888) = 0.51

802.11n (20MHz): Duty cycle = 490/551 = 0.889, Duty factor = 10 * log(1/0.889) = 0.51

802.11n (40MHz): Duty cycle = 145/240 = 0.606, Duty factor = 10 * log(1/0.606) = 2.17

802.11ac (80MHz): Duty cycle = 78/165 = 0.475, Duty factor = 10 * log(1/0.475) = 3.23

802.11a	802.11n (20MHz)
	
802.11n (40MHz)	**802.11ac (80MHz)**
	

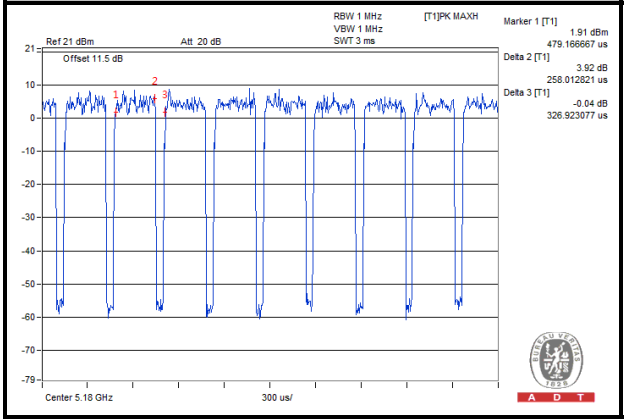
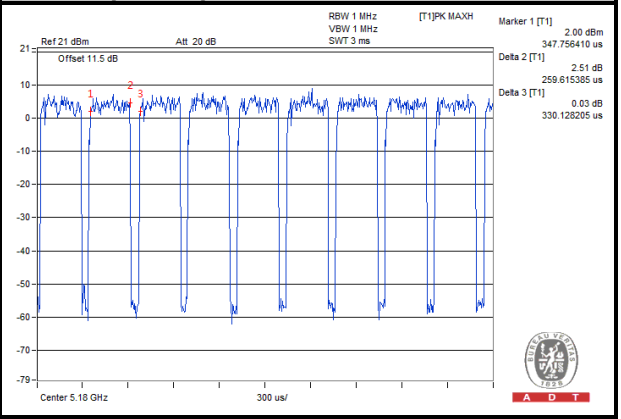
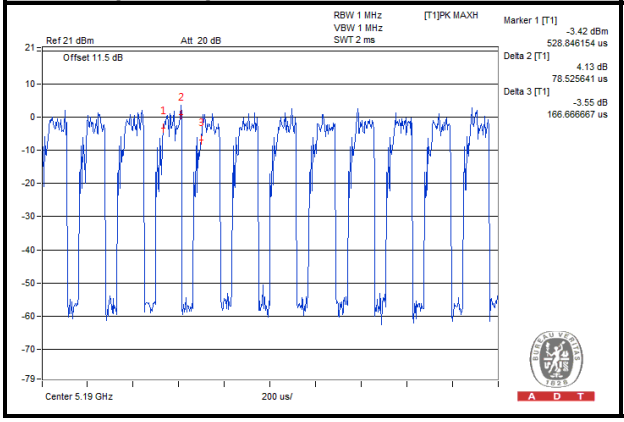
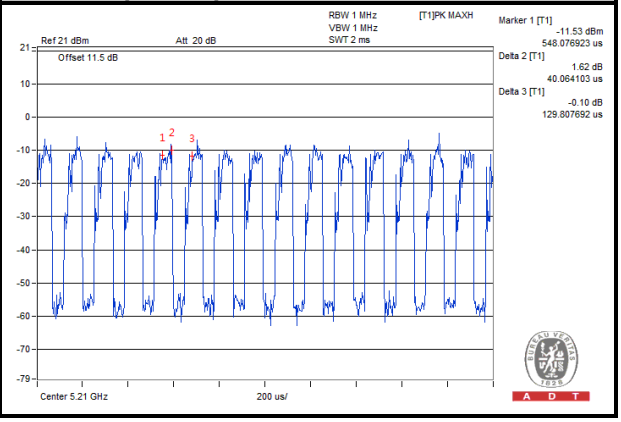
MODULATION TYPE: 64QAM

802.11a: Duty cycle = 258/326 = 0.789, Duty factor = 10 * log(1/0.789) = 1.03

802.11n (20MHz): Duty cycle = 259/330 = 0.786, Duty factor = 10 * log(1/0.786) = 1.04

802.11n (40MHz): Duty cycle = 78/166 = 0.471, Duty factor = 10 * log(1/0.471) = 3.27

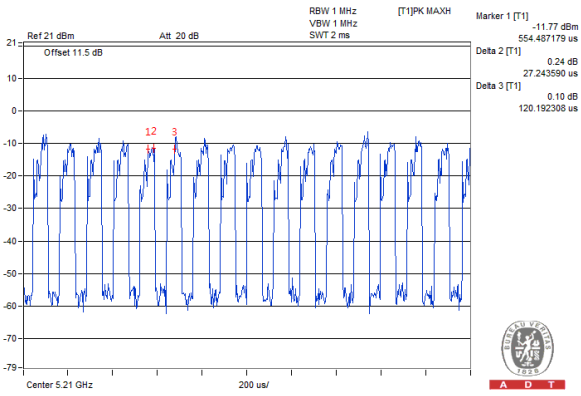
802.11ac (80MHz): Duty cycle = 40/129 = 0.308, Duty factor = 10 * log(1/0.308) = 5.11

802.11a	802.11n (20MHz)
	
802.11n (40MHz)	**802.11ac (80MHz)**
	

MODULATION TYPE: 256QAM

802.11ac (80MHz): Duty cycle = 27/120 = 0.226, Duty factor = 10 * log(1/0.226) = 6.45

802.11ac (80MHz)



MODE A (2TX)

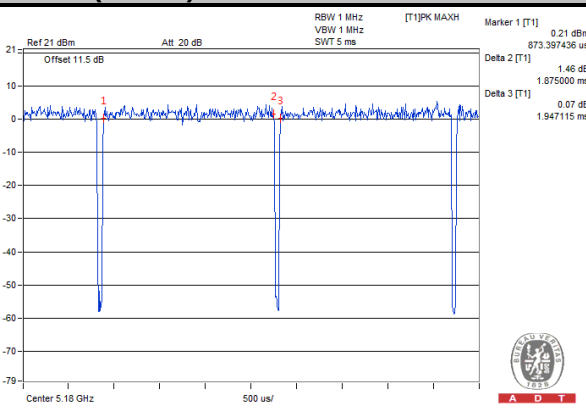
MODULATION TYPE: BPSK

802.11n (20MHz): Duty cycle = 1.875/1.947 = 0.963, Duty factor = 10 * log(1/0.963) = 0.16

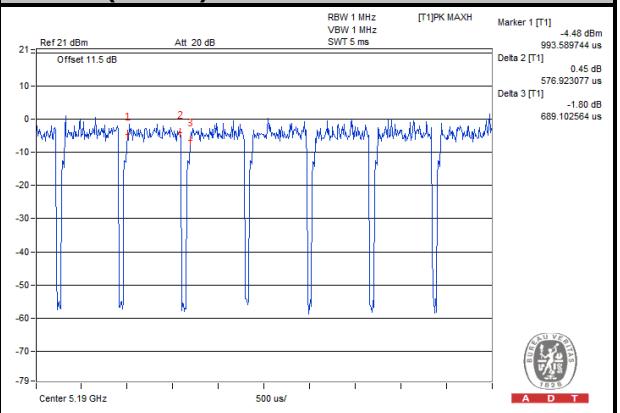
802.11n (40MHz): Duty cycle = 576/689 = 0.837, Duty factor = 10 * log(1/0.837) = 0.77

802.11ac (80MHz): Duty cycle = 278/375 = 0.743, Duty factor = 10 * log(1/0.743) = 1.29

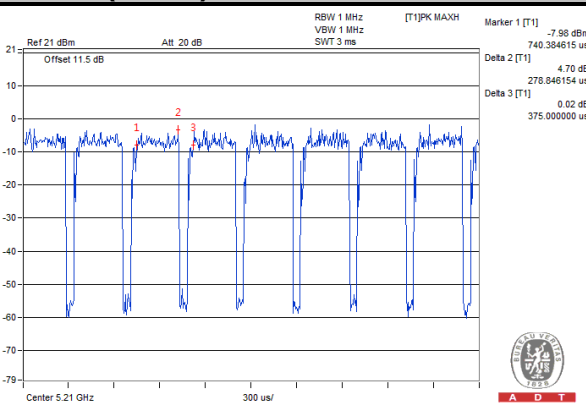
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)

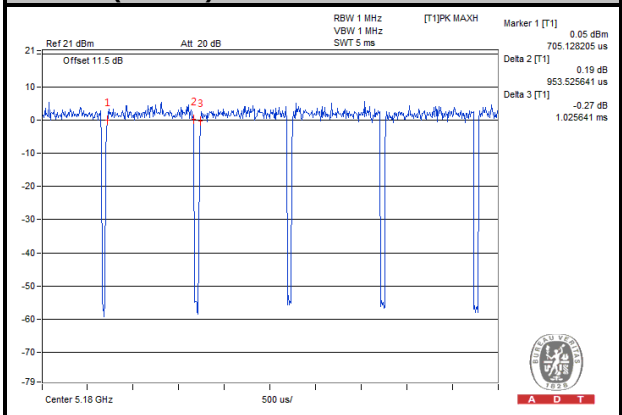
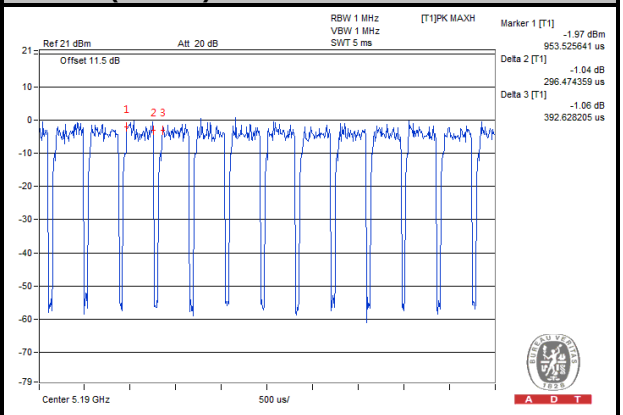
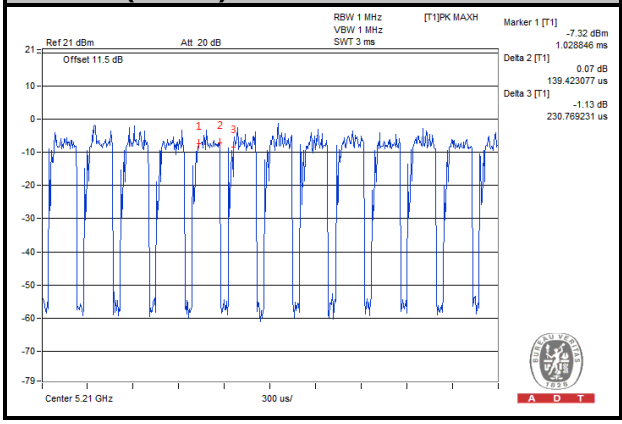


MODULATION TYPE: QPSK

802.11n (20MHz): Duty cycle = 953/1025 = 0.929, Duty factor = 10 * log(1/0.929) = 0.32

802.11n (40MHz): Duty cycle = 296/392 = 0.755, Duty factor = 10 * log(1/0.755) = 1.22

802.11ac (80MHz): Duty cycle = 139/230 = 0.604, Duty factor = 10 * log(1/0.604) = 2.19

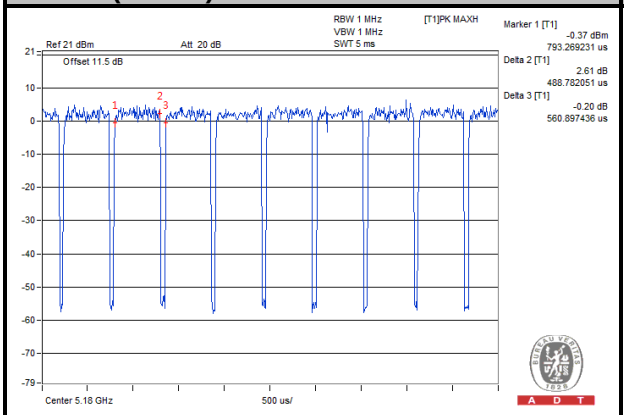
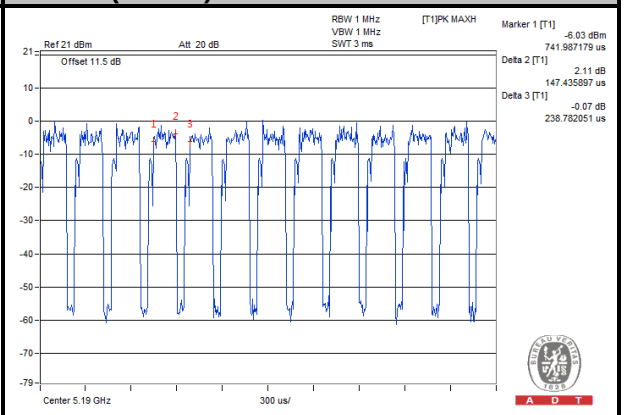
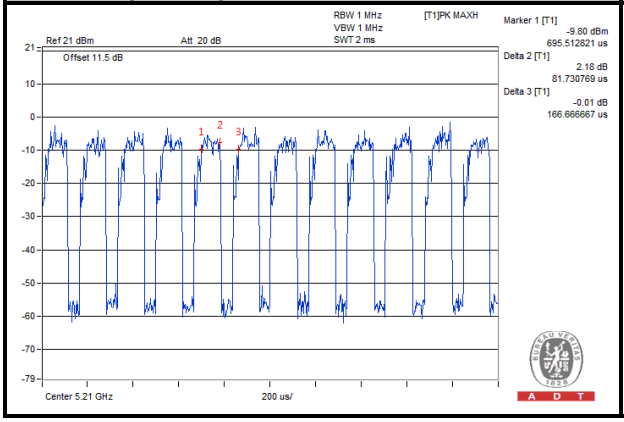
802.11n (20MHz)	802.11n (40MHz)
	
802.11ac (80MHz)	
	

MODULATION TYPE: 16QAM

802.11n (20MHz): Duty cycle = 488/560 = 0.871, Duty factor = 10 * log(1/0.871) = 0.60

802.11n (40MHz): Duty cycle = 147/238 = 0.617, Duty factor = 10 * log(1/0.617) = 2.09

802.11ac (80MHz): Duty cycle = 81/166 = 0.490, Duty factor = 10 * log(1/0.490) = 3.09

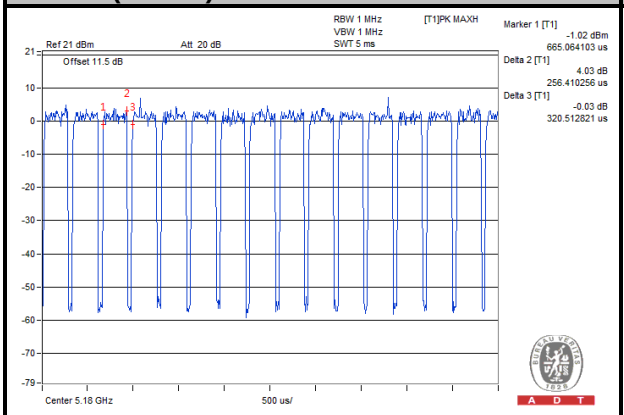
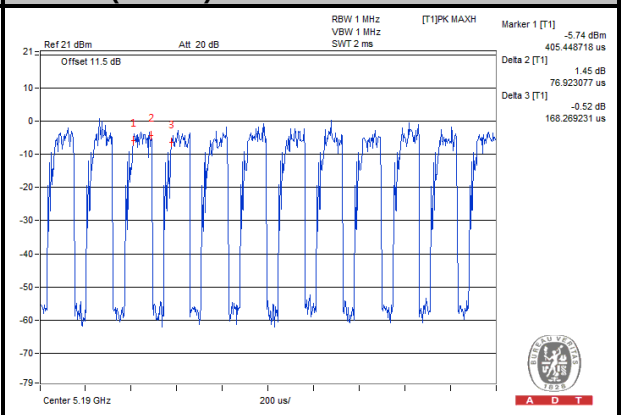
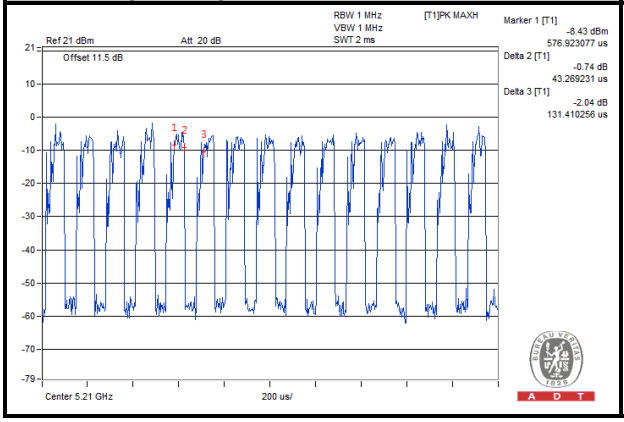
802.11n (20MHz)	802.11n (40MHz)
	
802.11ac (80MHz)	
	

MODULATION TYPE: 64QAM

802.11n (20MHz): Duty cycle = 256/320 = 0.800, Duty factor = 10 * log(1/0.800) = 0.97

802.11n (40MHz): Duty cycle = 76/168 = 0.457, Duty factor = 10 * log(1/0.457) = 3.40

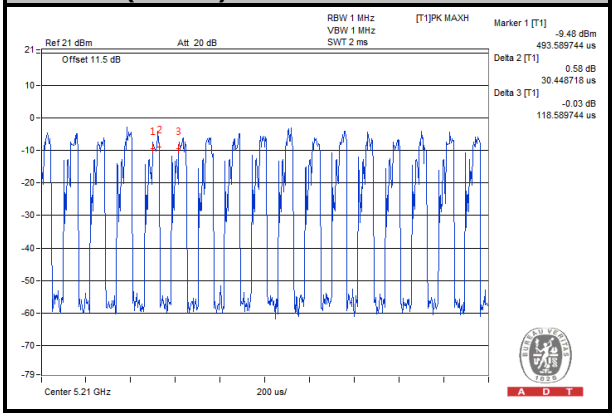
802.11ac (80MHz): Duty cycle = 43/131 = 0.329, Duty factor = 10 * log(1/0.329) = 4.82

802.11n (20MHz)	802.11n (40MHz)
	
802.11ac (80MHz)	
	

MODULATION TYPE: 256QAM

802.11ac (80MHz): Duty cycle = 30/118 = 0.256, Duty factor = 10 * log(1/0.256) = 5.9

802.11ac (80MHz)



MODE A (3TX)

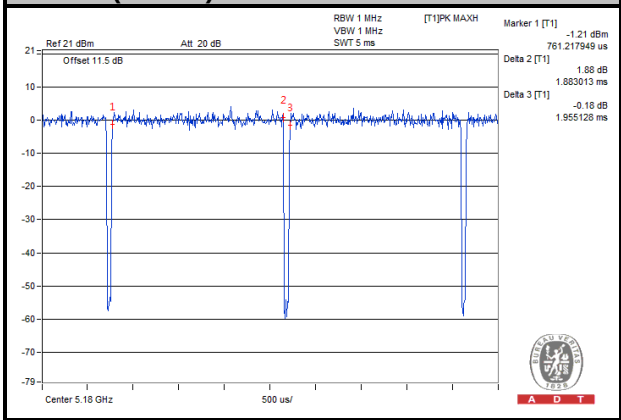
MODULATION TYPE: BPSK

802.11n (20MHz): Duty cycle = 1.883/1.955 = 0.963, Duty factor = 10 * log(1/0.963) = 0.16

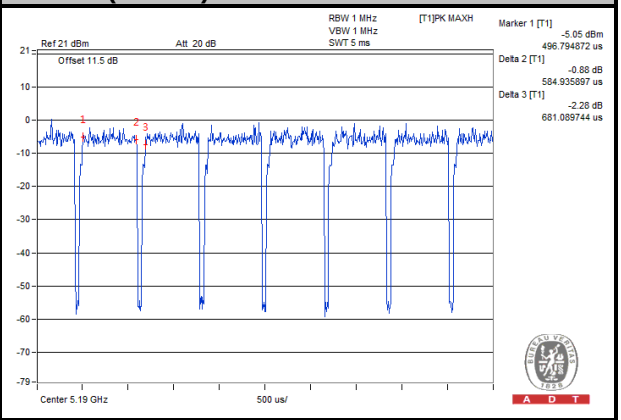
802.11n (40MHz): Duty cycle = 584/681 = 0.858, Duty factor = 10 * log(1/0.858) = 0.66

802.11ac (80MHz): Duty cycle = 288/384 = 0.750, Duty factor = 10 * log(1/0.750) = 1.25

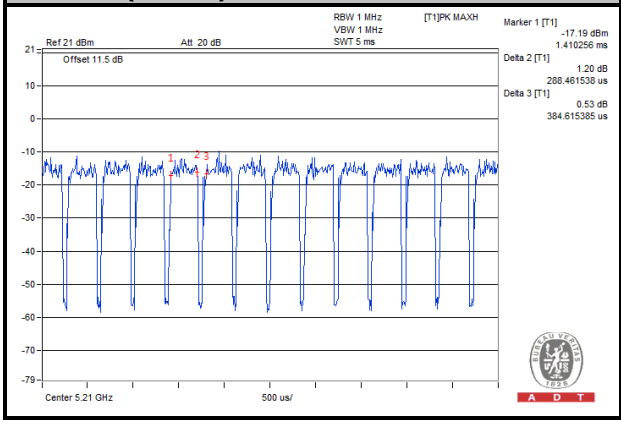
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)

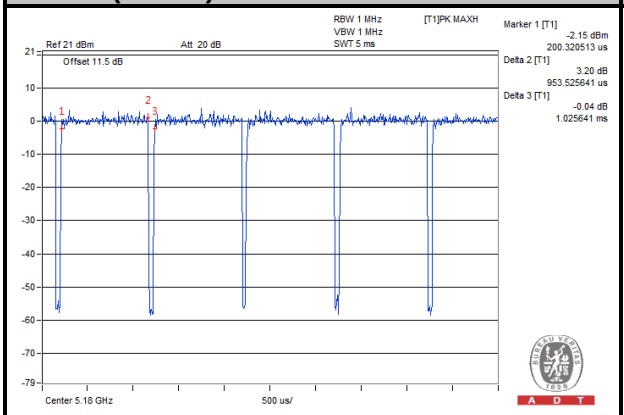
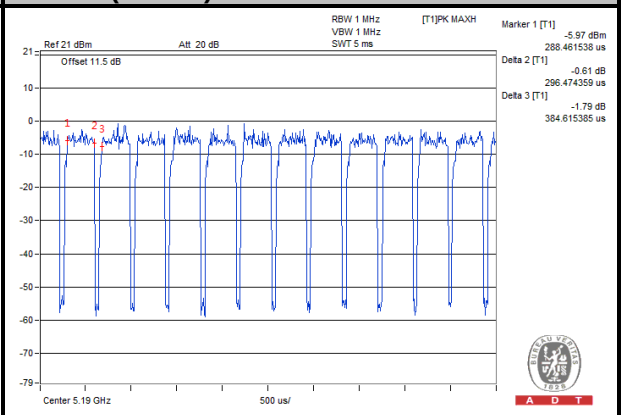
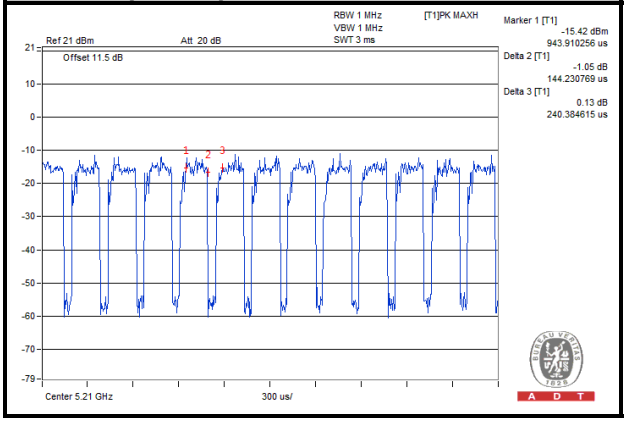


MODULATION TYPE: QPSK

802.11n (20MHz): Duty cycle = 953/1025 = 0.929, Duty factor = 10 * log(1/0.929) = 0.32

802.11n (40MHz): Duty cycle = 296/384 = 0.770, Duty factor = 10 * log(1/0.770) = 1.13

802.11ac (80MHz): Duty cycle = 144/240 = 0.600, Duty factor = 10 * log(1/0.600) = 2.22

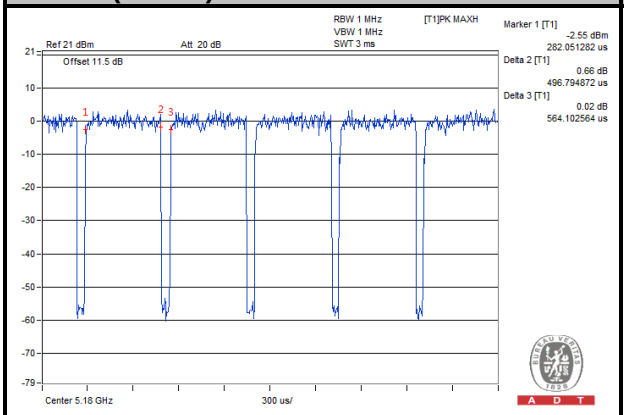
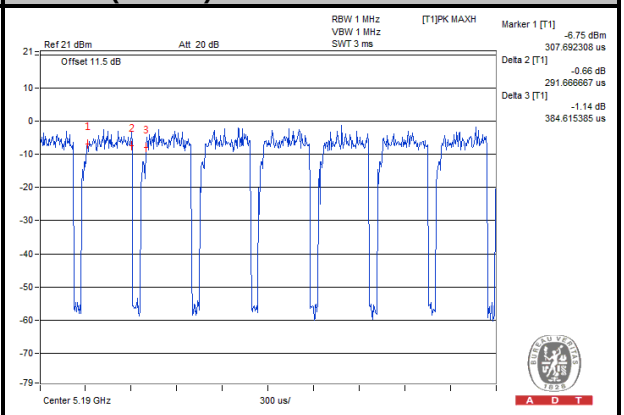
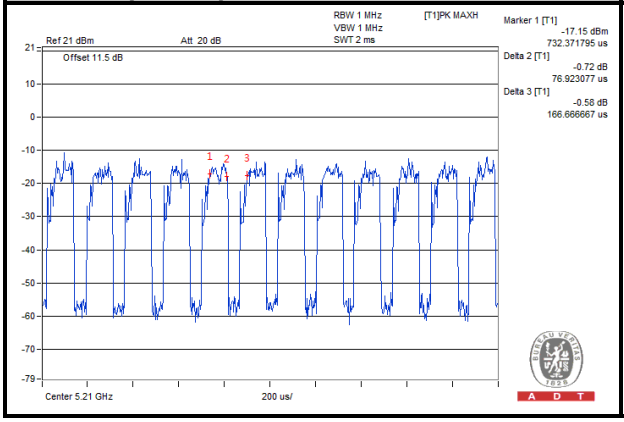
802.11n (20MHz)	802.11n (40MHz)
	
802.11ac (80MHz)	
	

MODULATION TYPE: 16QAM

802.11n (20MHz): Duty cycle = 496/564 = 0.880, Duty factor = 10 * log(1/0.880) = 0.55

802.11n (40MHz): Duty cycle = 291/384 = 0.758, Duty factor = 10 * log(1/0.758) = 1.20

802.11ac (80MHz): Duty cycle = 76/166 = 0.465, Duty factor = 10 * log(1/0.465) = 3.32

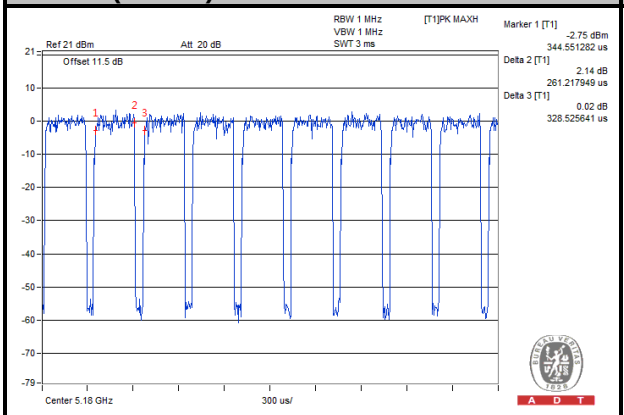
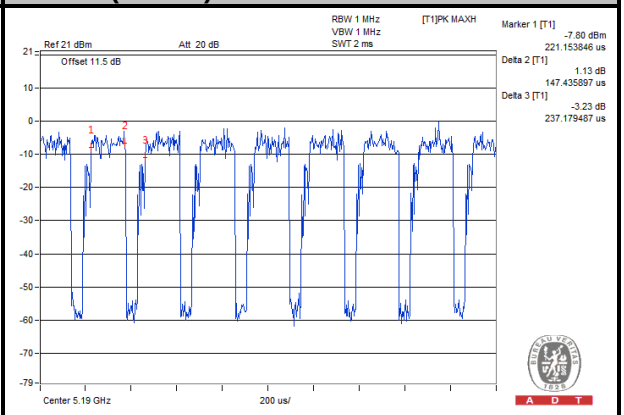
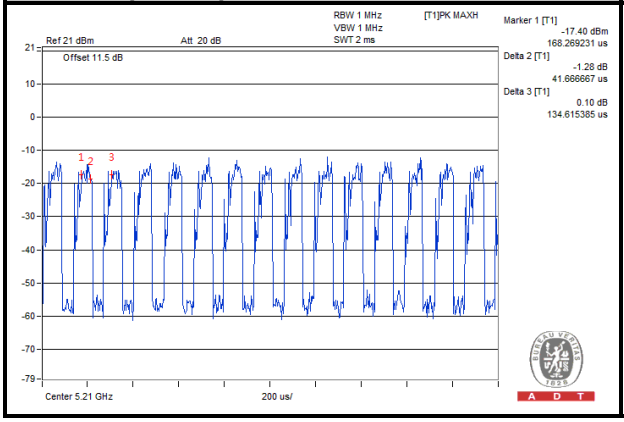
802.11n (20MHz)	802.11n (40MHz)
	
802.11ac (80MHz)	
	

MODULATION TYPE: 64QAM

802.11n (20MHz): Duty cycle = 261/328 = 0.795, Duty factor = 10 * log(1/0.795) = 1.00

802.11n (40MHz): Duty cycle = 147/237 = 0.622, Duty factor = 10 * log(1/0.622) = 2.06

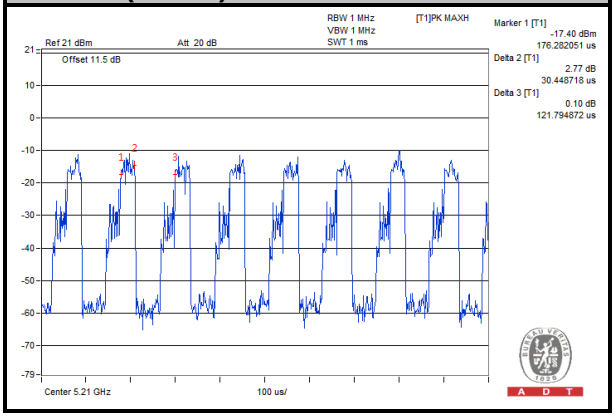
802.11ac (80MHz): Duty cycle = 41/134 = 0.309, Duty factor = 10 * log(1/0.309) = 5.09

802.11n (20MHz)	802.11n (40MHz)
	
802.11ac (80MHz)	
	

MODULATION TYPE: 256QAM

802.11ac (80MHz): Duty cycle = 30/121 = 0.250, Duty factor = 10 * log(1/0.250) = 6.02

802.11ac (80MHz)



3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)
KDB 789033 D01 General UNII Test Procedures v01r03
662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2009

All test items have been performed and recorded as per the above standards.

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
	FIELD STRENGTH AT 3m (dBµV/m)	
	PK	AV
	74	54
	EIRP LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBµV/m)
√	PK	PK
	-27	68.3

NOTE: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3}$$ µV/m, where P is the eirp (Watts).

4.1.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver Agilent	N9038A	MY51210203	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 21, 2013	Dec. 20, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Feb. 27. 2014	Feb. 26, 2015
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Feb. 19, 2014	Feb. 18, 2015
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 18, 2013	Dec. 17, 2014
Preamplifier EMCI	EMC 012645	980115	Dec. 26, 2013	Dec. 25, 2014
Preamplifier EMCI	EMC 184045	980116	Jan. 13, 2014	Jan. 12, 2015
Preamplifier EMCI	EMC 330H	980112	Dec. 27, 2013	Dec. 26, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 18, 2013	Oct. 17, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 18, 2013	Oct. 17, 2014
RF signal cable Worken	RG-213	NA	Nov. 07, 2013	Nov. 06, 2014
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Power Meter	ML2495A	1232002	Aug. 23, 2013	Aug. 22, 2014
Power Sensor	MA2411B	1207325	Aug. 23, 2013	Aug. 22, 2014

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in HwaYa Chamber 10.
4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
5. The FCC Site Registration No. is 690701.
6. The IC Site Registration No. is IC 7450F-10.

4.1.4 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

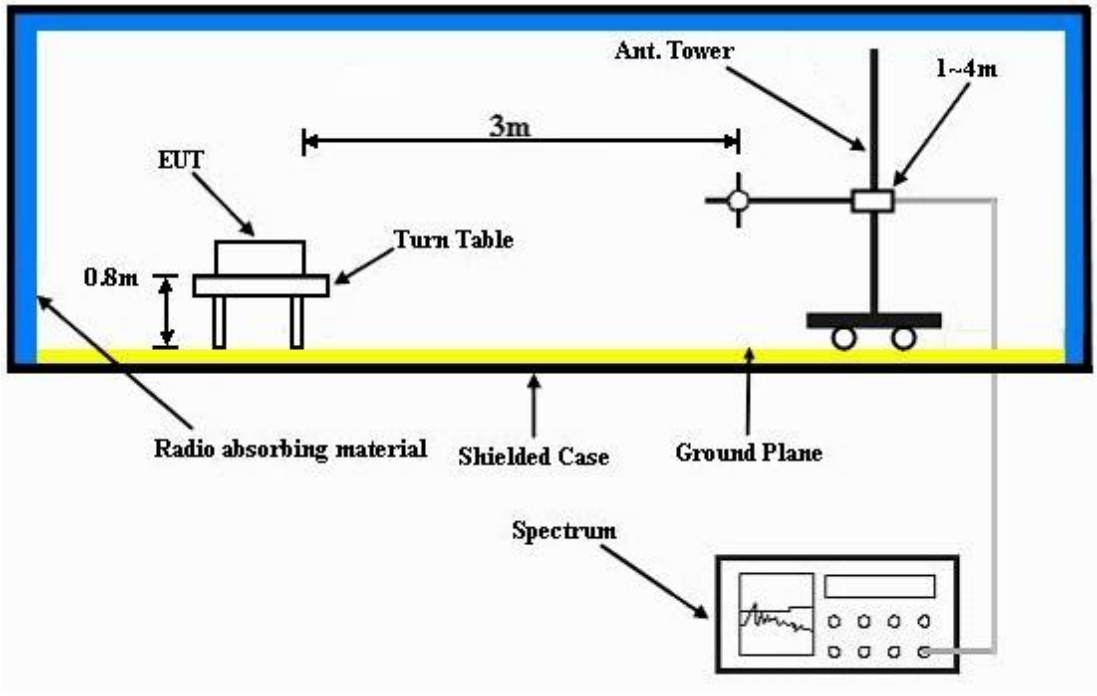
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 1kHz (Duty cycle < 98%) or 10Hz (Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 DEVIATION FROM TEST STANDARD

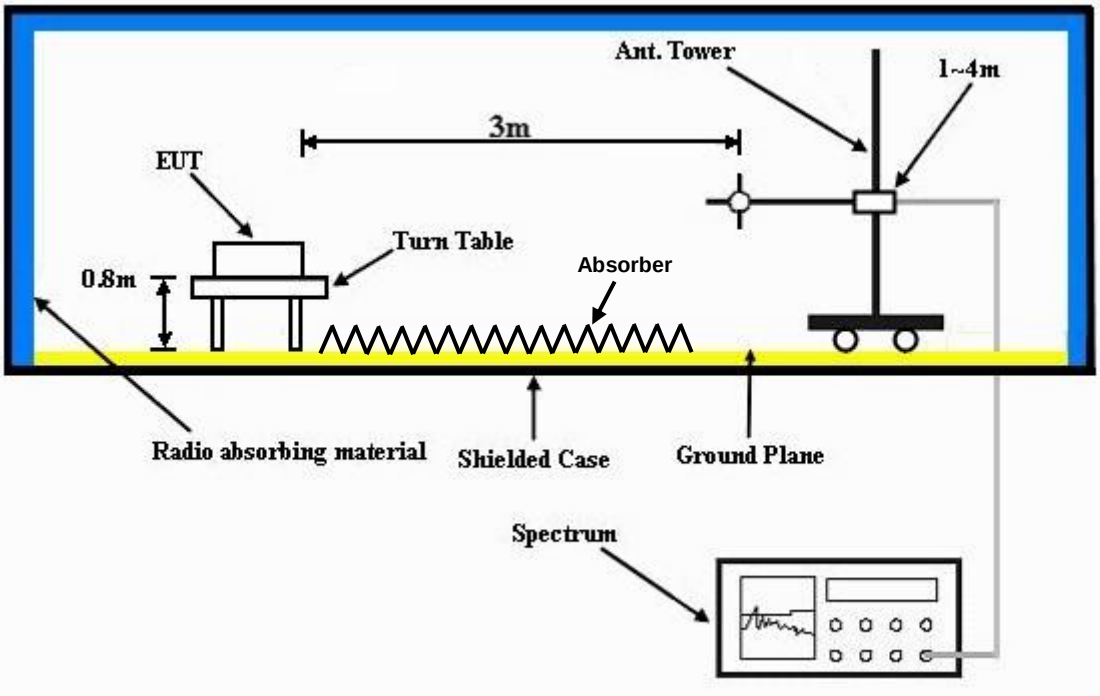
No deviation.

4.1.6 TEST SETUP

Frequency Range 30MHz ~ 1GHz



Frequency Range above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.7 EUT OPERATING CONDITIONS

a. Placed the EUT on a testing table.
b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.8 TEST RESULTS

MODE A (1TX)

ABOVE 1GHz WORST-CASE DATA

802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5148	43.77	35.52	54	-10.23	34.12	8.13	34	124	212	Average
5148	60.95	52.7	74	-13.05	34.12	8.13	34	124	212	Peak
5180	100.64	92.33			34.15	8.16	34	124	212	Average
5180	107.36	99.05			34.15	8.16	34	124	212	Peak
5450	45.39	36.57	54	-8.61	34.36	8.51	34.05	124	212	Average
5450	57.89	49.07	74	-16.11	34.36	8.51	34.05	124	212	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5146	45.77	37.52	54	-8.23	34.12	8.13	34	101	237	Average
5146	60.64	52.39	74	-13.36	34.12	8.13	34	101	237	Peak
5180	102.07	93.76			34.15	8.16	34	101	237	Average
5180	109.03	100.72			34.15	8.16	34	101	237	Peak
5396	45.28	36.56	54	-8.72	34.32	8.44	34.04	101	237	Average
5396	57.99	49.27	74	-16.01	34.32	8.44	34.04	101	237	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5180MHz: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 44	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5144	44.77	36.52	54	-9.23	34.12	8.13	34	124	211	Average
5144	56.98	48.73	74	-17.02	34.12	8.13	34	124	211	Peak
5220	99.6	91.21			34.17	8.22	34	124	211	Average
5220	107.53	99.14			34.17	8.22	34	124	211	Peak
5450	45.39	36.57	54	-8.61	34.36	8.51	34.05	124	211	Average
5450	56.4	47.58	74	-17.6	34.36	8.51	34.05	124	211	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5112	43.72	35.52	54	-10.28	34.09	8.1	33.99	100	233	Average
5112	56.38	48.18	74	-17.62	34.09	8.1	33.99	100	233	Peak
5220	101.96	93.57			34.17	8.22	34	100	233	Average
5220	108.74	100.35			34.17	8.22	34	100	233	Peak
5366	44.2	35.56	54	-9.8	34.29	8.38	34.03	100	233	Average
5366	57.81	49.17	74	-16.19	34.29	8.38	34.03	100	233	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5220MHz: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5146	44.76	36.51	54	-9.24	34.12	8.13	34	124	208	Average
5146	56.18	47.93	74	-17.82	34.12	8.13	34	124	208	Peak
5240	100.3	91.86			34.19	8.26	34.01	124	208	Average
5240	107.87	99.43			34.19	8.26	34.01	124	208	Peak
5450	45.39	36.57	54	-8.61	34.36	8.51	34.05	124	208	Average
5450	57.46	48.64	74	-16.54	34.36	8.51	34.05	124	208	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5050	44.57	36.51	54	-9.43	34.04	8	33.98	100	233	Average
5050	57.04	48.98	74	-16.96	34.04	8	33.98	100	233	Peak
5240	101.3	92.86			34.19	8.26	34.01	100	233	Average
5240	108.78	100.34			34.19	8.26	34.01	100	233	Peak
5436	45.35	36.56	54	-8.65	34.35	8.48	34.04	100	233	Average
5436	56.37	47.58	74	-17.63	34.35	8.48	34.04	100	233	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5240MHz: Fundamental frequency.

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	45.82	37.57	54	-8.18	34.12	8.13	34	124	211	Average
5150	57.74	49.49	74	-16.26	34.12	8.13	34	124	211	Peak
5180	99.82	91.51			34.15	8.16	34	124	211	Average
5180	106.07	97.76			34.15	8.16	34	124	211	Peak
5452	45.44	36.62	54	-8.56	34.36	8.51	34.05	124	211	Average
5452	58.26	49.44	74	-15.74	34.36	8.51	34.05	124	211	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5092	44.67	36.5	54	-9.33	34.08	8.07	33.98	101	235	Average
5092	55.84	47.67	74	-18.16	34.08	8.07	33.98	101	235	Peak
5180	100.69	92.38			34.15	8.16	34	101	235	Average
5180	107	98.69			34.15	8.16	34	101	235	Peak
5424	46.33	37.56	54	-7.67	34.33	8.48	34.04	101	235	Average
5424	57.38	48.61	74	-16.62	34.33	8.48	34.04	101	235	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5180MHz: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 44	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5082	44.66	36.5	54	-9.34	34.07	8.07	33.98	124	211	Average
5082	57	48.84	74	-17	34.07	8.07	33.98	124	211	Peak
5220	98.96	90.57			34.17	8.22	34	124	211	Average
5220	106.54	98.15			34.17	8.22	34	124	211	Peak
5428	44.33	35.56	54	-9.67	34.33	8.48	34.04	124	211	Average
5428	57.42	48.65	74	-16.58	34.33	8.48	34.04	124	211	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5040	43.57	35.5	54	-10.43	34.04	8	33.97	101	235	Average
5040	56.17	48.1	74	-17.83	34.04	8	33.97	101	235	Peak
5220	99.66	91.27			34.17	8.22	34	101	235	Average
5220	107.02	98.63			34.17	8.22	34	101	235	Peak
5458	45.28	36.46	54	-8.72	34.36	8.51	34.05	101	235	Average
5458	55.98	47.16	74	-18.02	34.36	8.51	34.05	101	235	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5220MHz: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5118	44.76	36.56	54	-9.24	34.09	8.1	33.99	124	211	Average
5118	55.9	47.7	74	-18.1	34.09	8.1	33.99	124	211	Peak
5240	99.01	90.57			34.19	8.26	34.01	124	211	Average
5240	106.28	97.84			34.19	8.26	34.01	124	211	Peak
5438	45.95	37.16	54	-8.05	34.35	8.48	34.04	124	211	Average
5438	58.16	49.37	74	-15.84	34.35	8.48	34.04	124	211	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5096	43.67	35.51	54	-10.33	34.08	8.07	33.99	100	237	Average
5096	56.33	48.17	74	-17.67	34.08	8.07	33.99	100	237	Peak
5240	99.45	91.01			34.19	8.26	34.01	100	237	Average
5240	107.88	99.44			34.19	8.26	34.01	100	237	Peak
5384	44.84	36.16	54	-9.16	34.31	8.41	34.04	100	237	Average
5384	56.79	48.11	74	-17.21	34.31	8.41	34.04	100	237	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5240MHz: Fundamental frequency.

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5148	50.77	42.52	54	-3.23	34.12	8.13	34	124	211	Average
5148	60.21	51.96	74	-13.79	34.12	8.13	34	124	211	Peak
5190	97.2	88.86			34.15	8.19	34	124	211	Average
5190	104.13	95.79			34.15	8.19	34	124	211	Peak
5446	45.44	36.61	54	-8.56	34.36	8.51	34.04	124	211	Average
5446	56.72	47.89	74	-17.28	34.36	8.51	34.04	124	211	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	52.48	44.23	54	-1.52	34.12	8.13	34	102	238	Average
5150	64.73	56.48	74	-9.27	34.12	8.13	34	102	238	Peak
5190	98.44	90.1			34.15	8.19	34	102	238	Average
5190	105.41	97.07			34.15	8.19	34	102	238	Peak
5442	45.39	36.6	54	-8.61	34.35	8.48	34.04	102	238	Average
5442	56.97	48.18	74	-17.03	34.35	8.48	34.04	102	238	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5190MHz: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 46	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5122	44.76	36.56	54	-9.24	34.09	8.1	33.99	123	211	Average
5122	56.59	48.39	74	-17.41	34.09	8.1	33.99	123	211	Peak
5230	97.8	89.4			34.19	8.22	34.01	123	211	Average
5230	104.85	96.45			34.19	8.22	34.01	123	211	Peak
5428	45.38	36.61	54	-8.62	34.33	8.48	34.04	123	211	Average
5428	58.16	49.39	74	-15.84	34.33	8.48	34.04	123	211	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5086	43.66	35.5	54	-10.34	34.07	8.07	33.98	102	234	Average
5086	56.75	48.59	74	-17.25	34.07	8.07	33.98	102	234	Peak
5230	99.94	91.54			34.19	8.22	34.01	102	234	Average
5230	106.39	97.99			34.19	8.22	34.01	102	234	Peak
5368	45.23	36.56	54	-8.77	34.29	8.41	34.03	102	234	Average
5368	56.98	48.31	74	-17.02	34.29	8.41	34.03	102	234	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5230MHz: Fundamental frequency.

802.11ac (80MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 42	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	52.13	43.88	54	-1.87	34.12	8.13	34	124	211	Average
5150	63.3	55.05	74	-10.7	34.12	8.13	34	124	211	Peak
5210	87.96	79.6			34.17	8.19	34	124	211	Average
5210	95.88	87.52			34.17	8.19	34	124	211	Peak
5434	46.35	37.56	54	-7.65	34.35	8.48	34.04	124	211	Average
5434	57.03	48.24	74	-16.97	34.35	8.48	34.04	124	211	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	53.45	45.2	54	-0.55	34.12	8.13	34	100	235	Average
5150	60.57	52.32	74	-13.43	34.12	8.13	34	100	235	Peak
5210	88.89	80.53			34.17	8.19	34	100	235	Average
5210	96.82	88.46			34.17	8.19	34	100	235	Peak
5456	45.85	37.03	54	-8.15	34.36	8.51	34.05	100	235	Average
5456	57.87	49.05	74	-16.13	34.36	8.51	34.05	100	235	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5210MHz: Fundamental frequency.

MODE A (2TX)

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5148	45.82	37.57	54	-8.18	34.12	8.13	34	101	205	Average
5148	56.57	48.32	74	-17.43	34.12	8.13	34	101	205	Peak
5180	100.71	92.4			34.15	8.16	34	101	205	Average
5180	107.09	98.78			34.15	8.16	34	101	205	Peak
5424	46.38	37.61	54	-7.62	34.33	8.48	34.04	101	205	Average
5424	57.12	48.35	74	-16.88	34.33	8.48	34.04	101	205	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5142	46.77	38.51	54	-7.23	34.12	8.13	33.99	110	173	Average
5142	61.58	53.32	74	-12.42	34.12	8.13	33.99	110	173	Peak
5180	103.67	95.36			34.15	8.16	34	110	173	Average
5180	110.1	101.79			34.15	8.16	34	110	173	Peak
5420	46.38	37.61	54	-7.62	34.33	8.48	34.04	110	173	Average
5420	57.33	48.56	74	-16.67	34.33	8.48	34.04	110	173	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5180MHz: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 44	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5082	45.69	37.53	54	-8.31	34.07	8.07	33.98	103	205	Average
5082	56.97	48.81	74	-17.03	34.07	8.07	33.98	103	205	Peak
5220	101.76	93.37			34.17	8.22	34	103	205	Average
5220	108.42	100.03			34.17	8.22	34	103	205	Peak
5446	46.44	37.61	54	-7.56	34.36	8.51	34.04	103	205	Average
5446	56.88	48.05	74	-17.12	34.36	8.51	34.04	103	205	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	45.82	37.57	54	-8.18	34.12	8.13	34	110	172	Average
5150	56.79	48.54	74	-17.21	34.12	8.13	34	110	172	Peak
5220	103.63	95.24			34.17	8.22	34	110	172	Average
5220	110.59	102.2			34.17	8.22	34	110	172	Peak
5420	45.38	36.61	54	-8.62	34.33	8.48	34.04	110	172	Average
5420	57.87	49.1	74	-16.13	34.33	8.48	34.04	110	172	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5220MHz: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5074	45.67	37.55	54	-8.33	34.07	8.03	33.98	101	205	Average
5074	56.54	48.42	74	-17.46	34.07	8.03	33.98	101	205	Peak
5240	100.68	92.24			34.19	8.26	34.01	101	205	Average
5240	107.77	99.33			34.19	8.26	34.01	101	205	Peak
5440	46.42	37.63	54	-7.58	34.35	8.48	34.04	101	205	Average
5440	58.43	49.64	74	-15.57	34.35	8.48	34.04	101	205	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5096	45.71	37.55	54	-8.29	34.08	8.07	33.99	110	172	Average
5096	56.69	48.53	74	-17.31	34.08	8.07	33.99	110	172	Peak
5240	104.01	95.57			34.19	8.26	34.01	110	172	Average
5240	110.39	101.95			34.19	8.26	34.01	110	172	Peak
5416	46.35	37.62	54	-7.65	34.33	8.44	34.04	110	172	Average
5416	58.07	49.34	74	-15.93	34.33	8.44	34.04	110	172	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5240MHz: Fundamental frequency.

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	46.82	38.57	54	-7.18	34.12	8.13	34	104	205	Average
5150	57.85	49.6	74	-16.15	34.12	8.13	34	104	205	Peak
5190	98.74	90.4			34.15	8.19	34	104	205	Average
5190	105.62	97.28			34.15	8.19	34	104	205	Peak
5432	46.39	37.6	54	-7.61	34.35	8.48	34.04	104	205	Average
5432	57.99	49.2	74	-16.01	34.35	8.48	34.04	104	205	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	49.91	41.66	54	-4.09	34.12	8.13	34	112	199	Average
5150	59.7	51.45	74	-14.3	34.12	8.13	34	112	199	Peak
5190	101.23	92.89			34.15	8.19	34	110	171	Average
5190	108.26	99.92			34.15	8.19	34	110	171	Peak
5430	46.39	37.6	54	-7.61	34.35	8.48	34.04	110	171	Average
5430	57.43	48.64	74	-16.57	34.35	8.48	34.04	110	171	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5190MHz: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 46	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5062	45.66	37.56	54	-8.34	34.05	8.03	33.98	104	205	Average
5062	56.48	48.38	74	-17.52	34.05	8.03	33.98	104	205	Peak
5230	99.78	91.38			34.19	8.22	34.01	104	205	Average
5230	106.12	97.72			34.19	8.22	34.01	104	205	Peak
5450	46.76	37.94	54	-7.24	34.36	8.51	34.05	104	205	Average
5450	56.95	48.13	74	-17.05	34.36	8.51	34.05	104	205	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	47.84	39.59	54	-6.16	34.12	8.13	34	106	208	Average
5150	60.65	52.4	74	-13.35	34.12	8.13	34	106	208	Peak
5230	101.38	92.98			34.19	8.22	34.01	106	208	Average
5230	108.09	99.69			34.19	8.22	34.01	106	208	Peak
5450	46.44	37.62	54	-7.56	34.36	8.51	34.05	106	208	Average
5450	58.82	50	74	-15.18	34.36	8.51	34.05	106	208	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5230MHz: Fundamental frequency.

802.11ac (80MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 42	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	52.82	44.57	54	-1.18	34.12	8.13	34	146	202	Average
5150	64.82	56.57	74	-9.18	34.12	8.13	34	146	202	Peak
5210	88.75	80.39			34.17	8.19	34	101	205	Average
5210	95.69	87.33			34.17	8.19	34	101	205	Peak
5366	45.2	36.56	54	-8.8	34.29	8.38	34.03	101	205	Average
5366	53.61	44.97	74	-20.39	34.29	8.38	34.03	101	205	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	52.64	44.39	54	-1.36	34.12	8.13	34	141	173	Average
5150	61.94	53.69	74	-12.06	34.12	8.13	34	141	173	Peak
5210	89.93	81.57			34.17	8.19	34	110	172	Average
5210	97.62	89.26			34.17	8.19	34	110	172	Peak
5458	46.39	37.57	54	-7.61	34.36	8.51	34.05	110	172	Average
5458	53.56	44.74	74	-20.44	34.36	8.51	34.05	110	172	Peak

REMARKS:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5210MHz: Fundamental frequency.

MODE A

BELOW 1GHz WORST-CASE DATA:

802.11ac (80MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 42	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
91.83	35.65	57.3	43.5	-7.85	9.06	1.11	31.82	102	312	Peak
168.24	32.78	53.35	43.5	-10.72	10.15	1.52	32.24	107	42	Peak
280.56	31.17	47.51	46	-14.83	13.75	2.03	32.12	132	285	Peak
339.9	39.26	53.26	46	-6.74	15.89	2.19	32.08	100	185	Peak
599.6	30.8	39.02	46	-15.2	21.1	2.87	32.19	100	320	Peak
624.8	35.18	42.32	46	-10.82	22.1	2.93	32.17	100	47	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
37.83	29.61	48.57	40	-10.39	12.53	0.74	32.23	108	52	Peak
94.26	36.21	57.77	43.5	-7.29	9.26	1.11	31.93	186	334	Peak
166.62	34.07	54.51	43.5	-9.43	10.29	1.52	32.25	134	49	Peak
337.8	36.09	50.18	46	-9.91	15.8	2.19	32.08	100	174	Peak
499.5	32.85	43.32	46	-13.15	19	2.63	32.1	100	332	Peak
825	38.21	43.25	46	-7.79	23.5	3.38	31.92	100	285	Peak

REMARKS: Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

MODE B

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 42	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Quasi-peak (QP)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Kay Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
91.29	38.18	59.82	43.5	-5.32	9.02	1.11	31.77	102	35	Peak
95.61	38.79	60.21	43.5	-4.71	9.34	1.28	32.04	105	21	Peak
203.61	36.67	56.26	43.5	-6.83	11.04	1.65	32.28	132	253	Peak
339.9	42.22	56.22	46	-3.78	15.89	2.19	32.08	100	0	Peak
624.8	35.83	42.97	46	-10.17	22.1	2.93	32.17	100	331	Peak
750.1	34.02	39.75	46	-11.98	23.2	3.22	32.15	100	152	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
73.74	39.24	62.13	40	-0.76	8.22	1.11	32.22	102	355	QP
90.21	38.77	60.43	43.5	-4.73	8.94	1.11	31.71	102	334	QP
126.66	32.78	54.61	43.5	-10.72	9.03	1.38	32.24	400	0	Peak
339.9	39.48	53.48	46	-6.52	15.89	2.19	32.08	100	185	Peak
599.6	33.86	42.08	46	-12.14	21.1	2.87	32.19	100	312	Peak
825	37.99	43.03	46	-8.01	23.5	3.38	31.92	100	125	Peak

REMARKS: Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Nov. 17, 2013	Nov. 16, 2014
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 23, 2013	Dec. 22, 2014
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 08, 2013	Jul. 07, 2014
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 2.
3. The VCCI Site Registration No. is C-2047.

4.2.3 TEST PROCEDURES

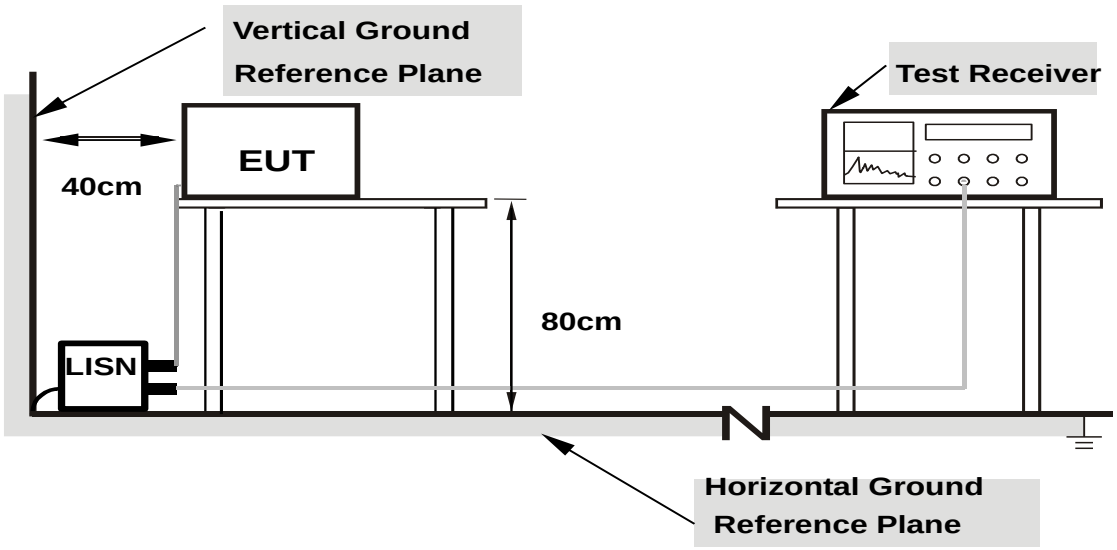
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT OPERATING CONDITIONS

Same as section 4.1.6.

4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA：

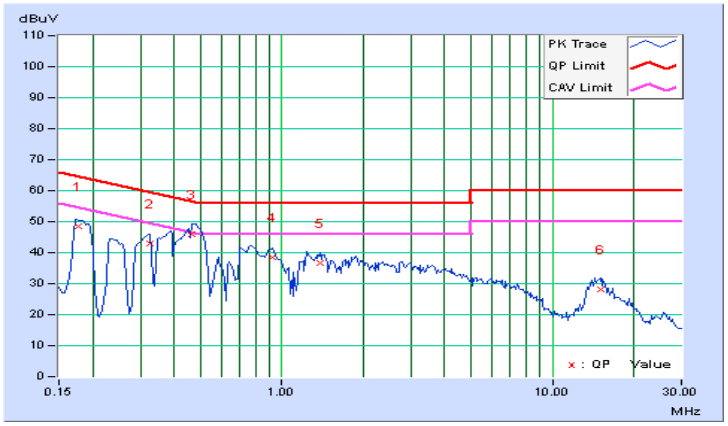
MODE A

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 9kHz Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
POWER SUPPLY	adapter		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17734	0.27	48.08	41.09	48.35	41.36	64.61	54.61	-16.26	-13.25
2	0.32578	0.29	42.55	26.45	42.84	26.74	59.56	49.56	-16.72	-22.82
3	0.46250	0.30	45.75	30.05	46.05	30.35	56.65	46.65	-10.59	-16.29
4	0.92344	0.33	38.07	26.36	38.40	26.69	56.00	46.00	-17.60	-19.31
5	1.38672	0.35	36.18	29.04	36.53	29.39	56.00	46.00	-19.47	-16.61
6	15.01172	0.53	27.76	20.67	28.29	21.20	60.00	50.00	-31.71	-28.80

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

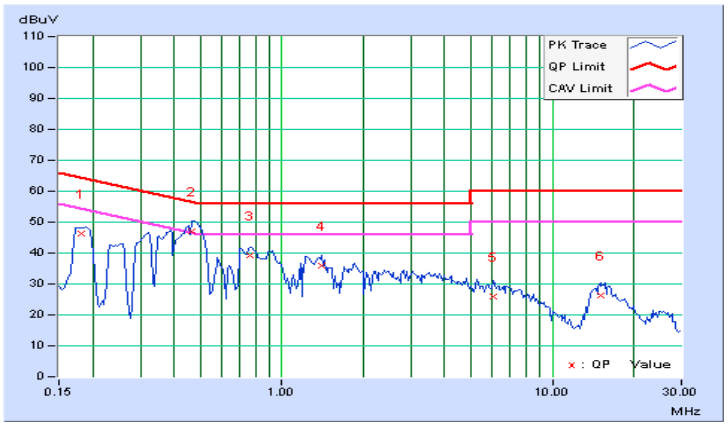


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 9kHz Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
POWER SUPPLY	adapter		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18125	0.27	45.98	39.87	46.25	40.14	64.43	54.43	-18.17	-14.28
2	0.46250	0.30	46.60	30.97	46.90	31.27	56.65	46.65	-9.74	-15.37
3	0.75938	0.32	38.95	28.97	39.27	29.29	56.00	46.00	-16.73	-16.71
4	1.39844	0.35	35.74	27.84	36.09	28.19	56.00	46.00	-19.91	-17.81
5	6.07422	0.47	25.41	20.28	25.88	20.75	60.00	50.00	-34.12	-29.25
6	15.01563	0.57	25.79	18.61	26.36	19.18	60.00	50.00	-33.64	-30.82

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



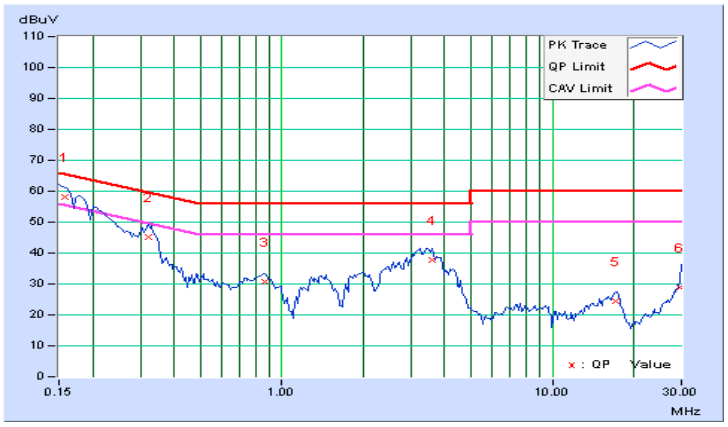
MODE B

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 9kHz Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
POWER SUPPLY	POE		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.27	57.74	42.99	58.01	43.26	65.58	55.58	-7.57	-12.32
2	0.32188	0.29	44.83	34.87	45.12	35.16	59.66	49.66	-14.54	-14.50
3	0.86094	0.33	30.32	22.25	30.65	22.58	56.00	46.00	-25.35	-23.42
4	3.61328	0.42	37.29	29.70	37.71	30.12	56.00	46.00	-18.29	-15.88
5	17.18750	0.56	23.77	19.96	24.33	20.52	60.00	50.00	-35.67	-29.48
6	29.46875	0.45	28.42	24.29	28.87	24.74	60.00	50.00	-31.13	-25.26

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

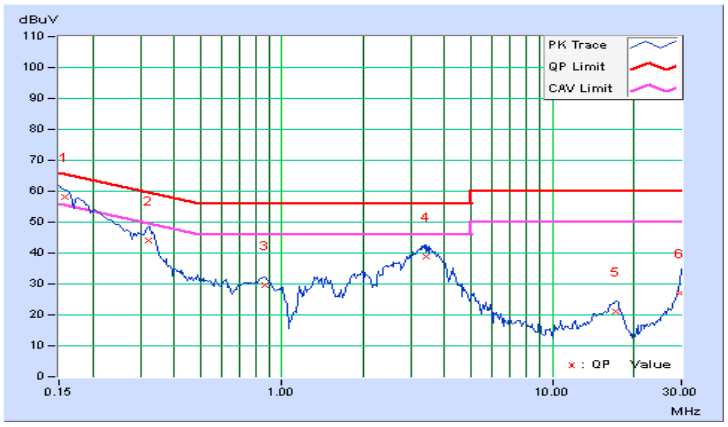


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 9kHz Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
POWER SUPPLY	POE		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.27	57.96	43.00	58.23	43.27	65.58	55.58	-7.35	-12.31
2	0.32188	0.29	43.85	33.10	44.14	33.39	59.66	49.66	-15.52	-16.27
3	0.86094	0.33	29.38	21.27	29.71	21.60	56.00	46.00	-26.29	-24.40
4	3.41797	0.42	38.64	31.80	39.06	32.22	56.00	46.00	-16.94	-13.78
5	17.15234	0.60	20.62	16.77	21.22	17.37	60.00	50.00	-38.78	-32.63
6	29.49219	0.46	26.60	22.61	27.06	23.07	60.00	50.00	-32.94	-26.93

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



4.3 PEAK TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

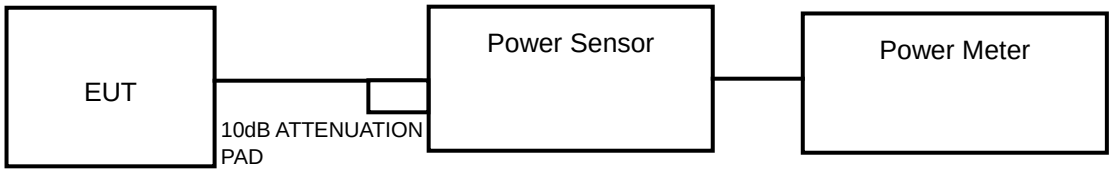
FREQUENCY BAND	LIMIT
5.150 ~ 5.250GHz	The lesser of 50mW (17dBm) or 4dBm + 10logB
5.250 ~ 5.350GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.470 ~ 5.725GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB

NOTE: Where B is the 26dB emission bandwidth in MHz.

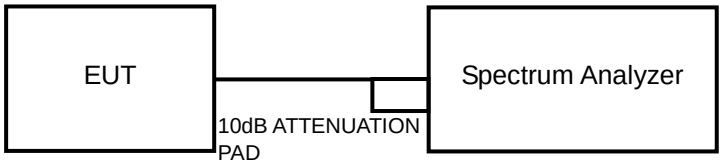
Per KDB 662911 D01 Multiple Transmitter Output v02r01 Method of conducted output power measurement on IEEE 802.11 devices,
Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;
Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT ≥ 5.
For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.

4.3.2 TEST SETUP

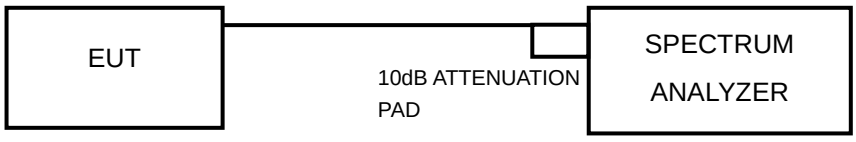
FOR POWER OUTPUT MEASUREMENT



or



FOR 26dB BANDWIDTH



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.3.4 TEST PROCEDURE

FOR AVERAGE POWER MEASUREMENT

<802.11a, 802.11n (20MHz), 802.11n (40MHz)>

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

<802.11ac (80MHz)>

Method SA-1 is used to perform output power measurement, trigger and gating function of spectrum analyzer is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

FOR 26dB BANDWIDTH

1) Set RBW = approximately 1% of the emission bandwidth.
2) Set the VBW > RBW.
3) Detector = Peak.
4) Trace mode = max hold.
5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

4.3.7 TEST RESULTS

POWER OUTPUT

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
36	5180	39.08	15.92	17	PASS
44	5220	39.63	15.98	17	PASS
48	5240	39.54	15.97	17	PASS

NOTE:
1. 4dBm + 10log(24.79) = 17.94dBm > 17dBm.
2. 4dBm + 10log(24.66) = 17.92dBm > 17dBm.
3. 4dBm + 10log(24.96) = 17.97dBm > 17dBm.

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
36	5180	38.82	15.89	17	PASS
44	5220	40.18	16.04	17	PASS
48	5240	37.41	15.73	17	PASS

NOTE:
1. 4dBm + 10log(25.67) = 18.09dBm > 17dBm.
2. 4dBm + 10log(25.60) = 18.08dBm > 17dBm.
3. 4dBm + 10log(25.41) = 18.05dBm > 17dBm.

FOR 2TX

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	11.87	12.13	31.71	15.01	17	PASS
40	5200	11.78	12.57	33.14	15.20	17	PASS
48	5240	11.89	12.34	32.59	15.13	17	PASS

NOTE:
CHAIN 0
1. 4dBm + 10log(24.08) = 17.82dBm > 17dBm.
2. 4dBm + 10log(25.12) = 18.00dBm > 17dBm.
3. 4dBm + 10log(25.01) = 17.98dBm > 17dBm.

CHAIN 1
1. 4dBm + 10log(25.20) = 18.01dBm > 17dBm.
2. 4dBm + 10log(25.20) = 18.01dBm > 17dBm.
3. 4dBm + 10log(25.75) = 18.11dBm > 17dBm.

FOR 3TX

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
36	5180	7.68	8.65	8.07	19.60	12.92	17	PASS
40	5200	7.89	8.43	8.46	20.13	13.04	17	PASS
48	5240	7.74	8.54	8.37	19.96	13.00	17	PASS

NOTE:
CHAIN 0
1. 4dBm + 10log(25.69) = 18.10dBm > 17dBm.
2. 4dBm + 10log(26.40) = 18.22dBm > 17dBm.
3. 4dBm + 10log(25.72) = 18.10dBm > 17dBm.

CHAIN 1
1. 4dBm + 10log(25.14) = 18.00dBm > 17dBm.
2. 4dBm + 10log(24.96) = 17.97dBm > 17dBm.
3. 4dBm + 10log(26.00) = 18.15dBm > 17dBm.

CHAIN 2
1. 4dBm + 10log(24.95) = 17.97dBm > 17dBm.
2. 4dBm + 10log(25.29) = 18.03dBm > 17dBm.
3. 4dBm + 10log(24.84) = 17.95dBm > 17dBm.

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
38	5190	36.56	15.63	17	PASS
46	5230	37.15	15.70	17	PASS

NOTE:
1. 4dBm + 10log(49.84) = 20.98dBm > 17dBm.
2. 4dBm + 10log(49.25) = 20.92dBm > 17dBm.

FOR 2TX

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
38	5190	12.42	13.52	39.95	16.02	17	PASS
46	5230	12.44	13.61	40.50	16.07	17	PASS

NOTE:
CHAIN 0
1. 4dBm + 10log(49.50) = 20.95dBm > 17dBm.
2. 4dBm + 10log(50.35) = 21.02dBm > 17dBm.

CHAIN 1
1. 4dBm + 10log(49.72) = 20.97dBm > 17dBm.
2. 4dBm + 10log(47.66) = 20.78dBm > 17dBm.

FOR 3TX

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
38	5190	10.21	10.87	10.29	33.40	15.24	17	PASS
46	5230	10.31	10.84	10.69	34.60	15.39	17	PASS

NOTE:
CHAIN 0
1. 4dBm + 10log(48.98) = 20.90dBm > 17dBm.
2. 4dBm + 10log(49.69) = 20.96dBm > 17dBm.

CHAIN 1
1. 4dBm + 10log(48.97) = 20.90dBm > 17dBm.
2. 4dBm + 10log(47.89) = 20.80dBm > 17dBm.

CHAIN 2
1. 4dBm + 10log(47.05) = 20.73dBm > 17dBm.
2. 4dBm + 10log(48.19) = 20.83dBm > 17dBm.

802.11ac (80MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
42	5210	23.77	13.76	17	PASS

NOTE:
1. 4dBm + 10log(97.80) = 23.90dBm > 17dBm.

FOR 2TX

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
42	5210	12.87	13.33	40.89	16.12	17	PASS

NOTE:
CHAIN 0
1. 4dBm + 10log(97.40) = 23.89dBm > 17dBm.
CHAIN 1
1. 4dBm + 10log(97.05) = 23.87dBm > 17dBm.

FOR 3TX

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
42	5210	4.14	4.59	3.73	7.83	8.94	17	PASS

NOTE:
CHAIN 0
1. 4dBm + 10log(101.01) = 24.04dBm > 17dBm.
CHAIN 1
1. 4dBm + 10log(100.82) = 24.04dBm > 17dBm.
CHAIN 2
1. 4dBm + 10log(101.12) = 24.05dBm > 17dBm.

26dB BANDWIDTH

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	PASS / FAIL
36	5180	24.79	PASS
44	5220	24.66	PASS
48	5240	24.96	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	PASS / FAIL
36	5180	25.67	PASS
44	5220	25.60	PASS
48	5240	25.41	PASS

FOR 2TX USE

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	24.08	25.20	PASS
40	5200	25.12	25.20	PASS
48	5240	25.01	25.75	PASS

FOR 3TX USE

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)			PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2	
36	5180	25.69	25.14	24.95	PASS
40	5200	26.40	24.96	25.29	PASS
48	5240	25.72	26.00	24.84	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	PASS / FAIL
38	5190	49.84	PASS
46	5230	49.25	PASS

FOR 2TX

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
38	5190	49.50	49.72	PASS
46	5230	50.35	47.66	PASS

FOR 3TX

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)			PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2	
38	5190	48.98	48.97	47.05	PASS
46	5230	49.69	47.89	48.19	PASS

802.11ac (80MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	PASS / FAIL
42	5210	97.80	PASS

FOR 2TX

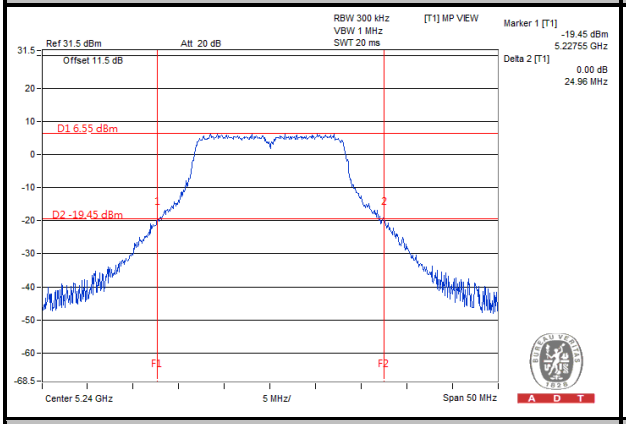
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
42	5210	97.40	97.05	PASS

FOR 3TX

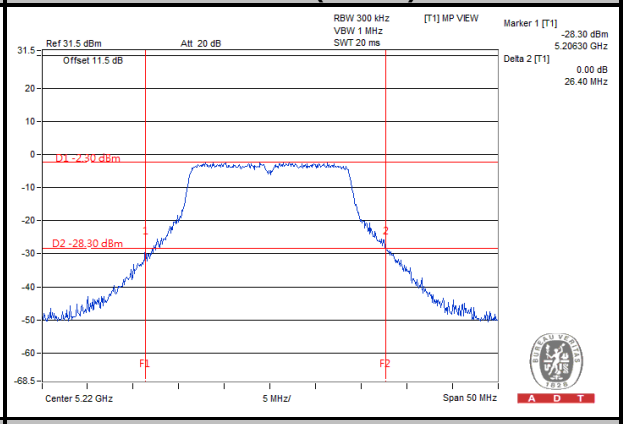
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)			PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2	
42	5210	101.01	100.82	101.12	PASS

SPECTRUM PLOT OF WORST VALUE

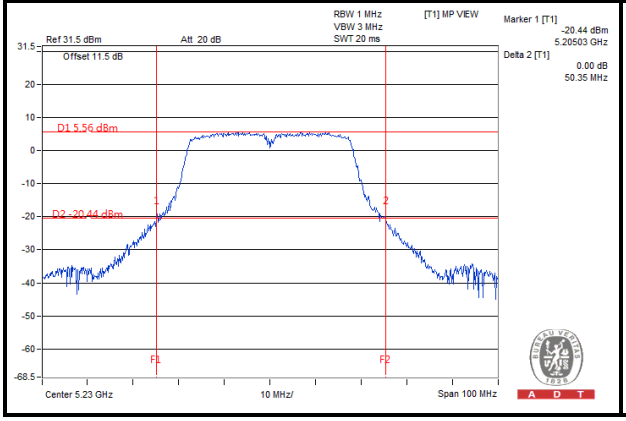
802.11a



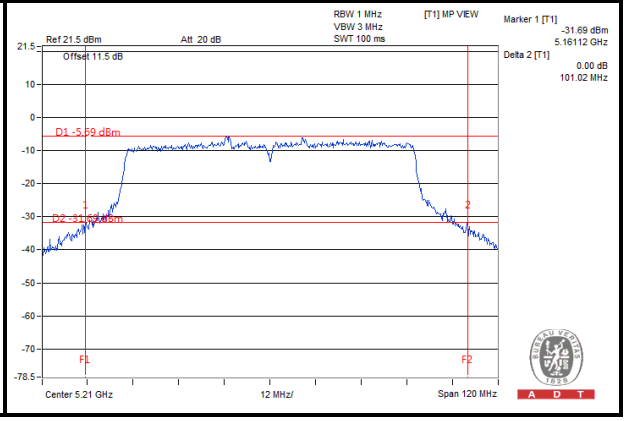
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)

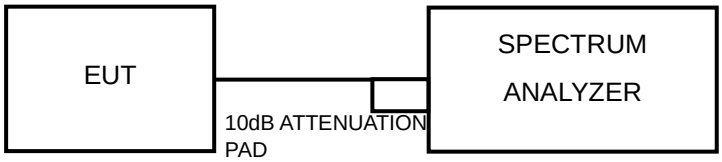


4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

FREQUENCY BAND	LIMIT
5.150 ~ 5.250GHz	4dBm
5.250 ~ 5.350GHz	11dBm
5.470 ~ 5.725GHz	11dBm

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.4.4 TEST PROCEDURES

<802.11a, 802.11n (20MHz), 802.11n (40MHz) >
Using method SA-2 alternative
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
3) Sweep time = 4second.
4) Perform a single sweep.
5) Record the max value and add 10 log (1/duty cycle)

<802.11ac (80MHz)>
Using method SA-1
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
3) Sweep time = 4second.
4) Perform a single sweep.

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

4.4.7 TEST RESULTS

802.11a

CHANNEL	FREQUENCY (MHz)	PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	PSD WITH DUTY FACTOR (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
36	5180	3.14	0.17	3.31	4	PASS
44	5220	3.04	0.17	3.21	4	PASS
48	5240	2.78	0.17	2.95	4	PASS

NOTE: Refer to section 3.3 for duty cycle spectrum plot.

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	PSD WITH DUTY FACTOR (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
36	5180	2.77	0.15	2.92	4	PASS
44	5220	2.69	0.15	2.84	4	PASS
48	5240	2.45	0.15	2.60	4	PASS

NOTE: Refer to section 3.3 for duty cycle spectrum plot.

FOR 2TX

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
36	5180	-2.05	-0.61	1.74	0.16	1.90	2.6	PASS
40	5200	-2.12	-0.33	1.88	0.16	2.04	2.6	PASS
48	5240	-2.52	-0.28	1.76	0.16	1.92	2.6	PASS

NOTE:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2 / N_{ANT}] = 7.4\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to 4-(7.4-6) = 2.6dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

FOR 3TX

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)			TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2					
36	5180	-5.72	-3.88	-4.16	0.26	0.16	0.42	0.99	PASS
40	5200	-5.81	-3.34	-4.42	0.37	0.16	0.53	0.99	PASS
48	5240	-5.91	-3.34	-4.59	0.29	0.16	0.45	0.99	PASS

NOTE:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2 / N_{ANT}$] = 9.01dBi > 6dBi , so the power density limit shall be reduced to 4-(9.01-6) = 0.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	PSD WITH DUTY FACTOR (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
38	5190	-0.10	0.6	0.50	4	PASS
46	5230	0.02	0.6	0.62	4	PASS

NOTE: Refer to section 3.3 for duty cycle spectrum plot.

FOR 2TX

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
38	5190	-3.44	-2.32	0.17	0.77	0.94	2.6	PASS
46	5230	-4.21	-1.85	0.14	0.77	0.91	2.6	PASS

NOTE:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2 / N_{ANT}$] = 7.4dBi > 6dBi , so the power density limit shall be reduced to 4-(7.4-6) = 2.6dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

FOR 3TX

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)			TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2					
38	5190	-6.38	-4.59	-4.46	-0.29	0.66	0.37	0.99	PASS
46	5230	-6.99	-4.35	-4.21	-0.24	0.66	0.42	0.99	PASS

NOTE:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2 / N_{ANT}$] = 9.01dBi > 6dBi , so the power density limit shall be reduced to 4-(9.01-6) = 0.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (80MHz)

CHANNEL	FREQUENCY (MHz)	PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	PSD WITH DUTY FACTOR (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
42	5210	-9.86	1.5	-8.36	4	PASS

NOTE: Refer to section 3.3 for duty cycle spectrum plot.

FOR 2TX

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
42	5210	-7.03	-5.25	-3.04	1.29	-1.75	2.6	PASS

NOTE:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2 / N_{ANT}$] = 7.4dBi > 6dBi , so the power density limit shall be reduced to 4-(7.4-6) = 2.6dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

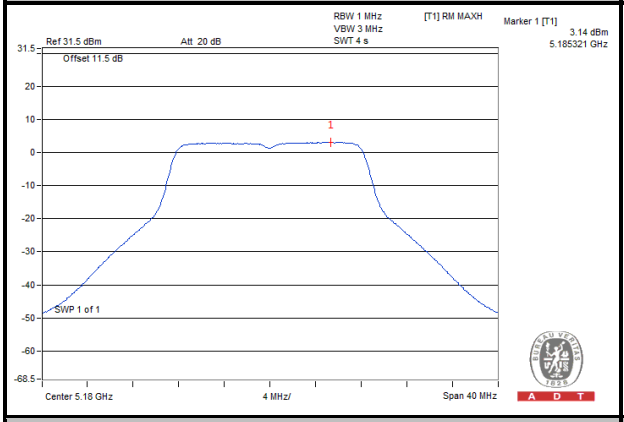
FOR 3TX

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)			TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2					
42	5210	-15.16	-14.25	-15.43	-10.15	1.25	-8.90	0.99	PASS

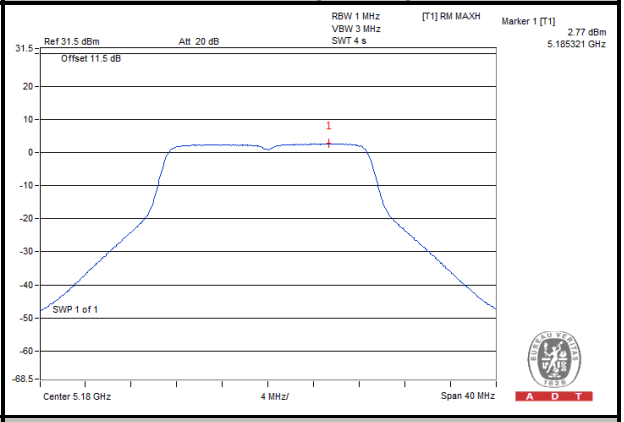
NOTE:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2 / N_{ANT}$] = 9.01dBi > 6dBi , so the power density limit shall be reduced to 4-(9.01-6) = 0.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE

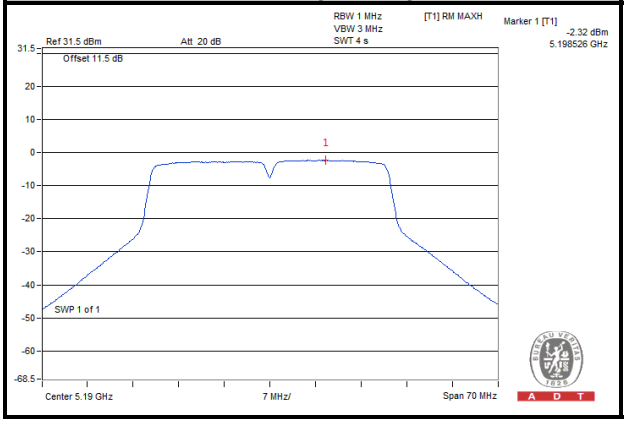
802.11a



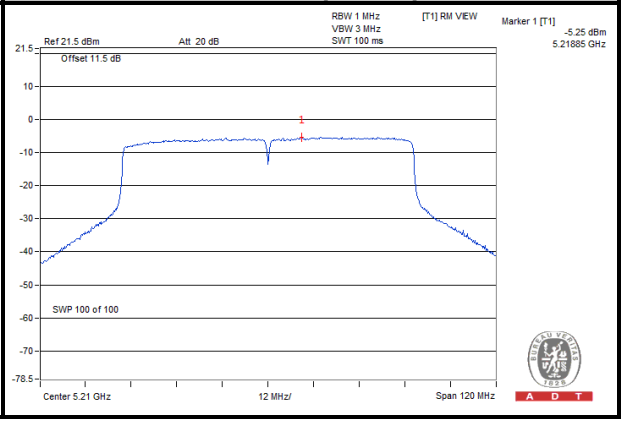
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)

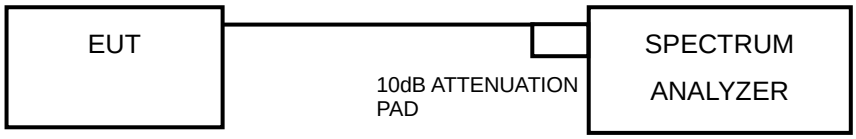


4.5 PEAK POWER EXCURSION MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

Shall not exceed 13 dB.

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.5.4 TEST PROCEDURE

a. Set the RBW = 1 kHz, VBW ≥ 3 MHz, Detector = peak.
b. Trace mode = max-hold. Allow the sweeps to continue until the trace stabilizes.
c. Use the peak search function to find the peak of the spectrum.
d. Measure the PPSD.
e. Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.
Find the worst channel and modulation mode as above test procedure, and follow KDB 789033 D01 General UNII Test Procedures v01r03 and repeat step 1 to 5 for final testing of each modulation mode on a single channel (all modulation types) in a single operating band to compliance with the peak excursion requirement.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6.

4.5.7 TEST RESULTS

MODULATION MODE	MODULATION TYPE	CHAN. FREQ. (MHz)	PEAK VALUE (dBm)	PPSD WITHOUT DUTY FACTOR (dBm)	PPSD WITH DUTY FACTOR (dBm)	PEAK EXCURSION (dB)	LIMIT (dB)	PASS/FAIL
802.11a	BPSK	5220	12.73	3.04	3.21	9.52	13	PASS
	QPSK		13.19	3.05	3.32	9.87	13	PASS
	16QAM		13.32	3.03	3.54	9.78	13	PASS
	64QAM		12.99	2.41	3.44	9.55	13	PASS
802.11n (20MHz)	BPSK	5220	12.01	2.69	2.84	9.17	13	PASS
	QPSK		12.51	2.72	3.06	9.45	13	PASS
	16QAM		14.08	2.72	3.23	10.85	13	PASS
	64QAM		12.59	2.10	3.14	9.45	13	PASS
802.11n (40MHz)	BPSK	5230	10.22	0.02	0.62	9.60	13	PASS
	QPSK		10.09	-0.18	0.83	9.26	13	PASS
	16QAM		10.26	-0.46	1.71	8.55	13	PASS
	64QAM		10.96	-0.72	2.55	8.41	13	PASS
802.11ac (80MHz)	BPSK	5210	-0.97	-9.86	-8.36	7.39	13	PASS
	QPSK		-0.64	-10.17	-9.03	8.39	13	PASS
	16QAM		0.24	-10.53	-7.30	7.54	13	PASS
	64QAM		-0.64	-10.24	-7.01	6.37	13	PASS
	256QAM		-0.36	-10.09	-4.98	4.62	13	PASS

NOTE: Refer to section 3.3 for duty cycle spectrum plot.

FOR 2TX

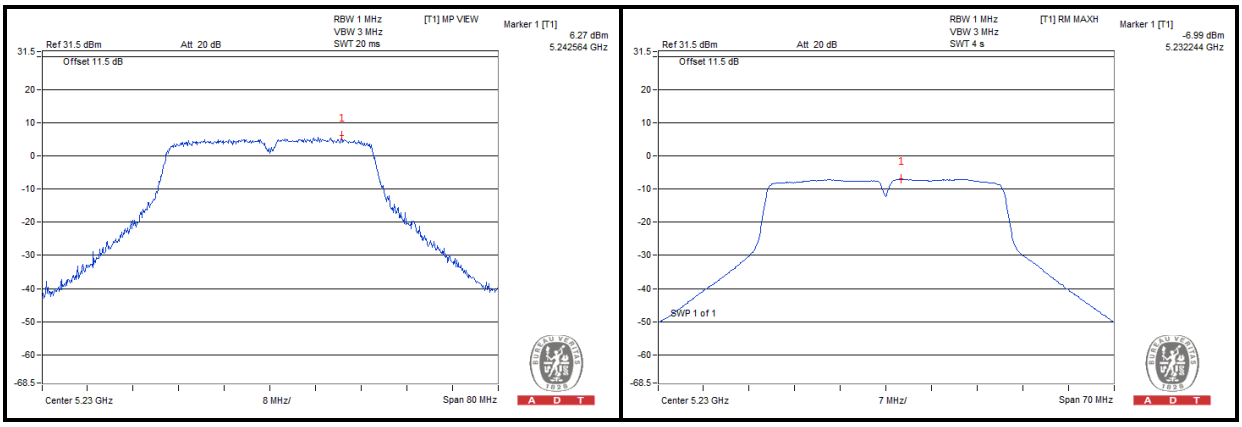
MODULATION MODE	MODULATION TYPE	CHAN. FREQ. (MHz)	PEAK VALUE (dBm)		PPSD WITHOUT DUTY FACTOR (dBm)		PPSD WITH DUTY FACTOR (dBm)		PEAK EXCURSION (dB)		LIMIT (dB)	PASS/FAIL
			CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
802.11n (20MHz)	BPSK	5220	7.21	9.33	-2.12	-0.33	-1.96	-0.17	9.17	9.50	13	PASS
	QPSK		6.94	9.65	-2.39	-0.26	-2.07	0.06	9.01	9.59	13	PASS
	16QAM		7.12	9.94	-2.40	-0.10	-1.80	0.50	8.92	9.44	13	PASS
	64QAM		7.93	9.65	-3.00	-0.65	-2.03	0.32	9.96	9.33	13	PASS
802.11n (40MHz)	BPSK	5230	5.72	8.12	-4.21	-1.85	-3.44	-1.08	9.16	9.20	13	PASS
	QPSK		6.28	8.20	-4.30	-1.99	-3.08	-0.77	9.36	8.97	13	PASS
	16QAM		6.51	8.83	-4.69	-2.34	-2.60	-0.25	9.11	9.08	13	PASS
	64QAM		6.62	8.88	-4.93	-2.68	-1.53	0.72	8.15	8.16	13	PASS
802.11ac (80MHz)	BPSK	5210	2.59	4.56	-7.03	-5.25	-5.74	-3.96	8.33	8.52	13	PASS
	QPSK		2.88	4.14	-6.82	-5.05	-4.63	-2.86	7.51	7.00	13	PASS
	16QAM		3.71	5.97	-6.87	-5.09	-3.78	-2.00	7.49	7.97	13	PASS
	64QAM		2.90	5.03	-7.05	-5.47	-2.23	-2.38	5.13	7.41	13	PASS
	256QAM		2.87	4.80	-7.19	-5.33	-1.29	0.57	4.16	4.23	13	PASS

NOTE: Refer to section 3.3 for duty cycle spectrum plot.

FOR 3TX

MODULATION MODE	MODULATION TYPE	CHAN. FREQ. (MHZ)	PEAK VALUE (dBm)			PPSD WITHOUT DUTY FACTOR (dBm)			PPSD WITH DUTY FACTOR (dBm)			PEAK EXCURSION (dB)			LIMIT (dB)	PASS/FAIL
			CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 0	CHAIN 1	CHAIN 2		
802.11n (20MHz)	BPSK	5220	3.66	6.46	5.19	-5.81	-3.34	-4.42	-5.65	-3.18	-4.26	9.31	9.64	9.45	13	PASS
	QPSK		4.12	6.45	5.42	-5.53	-3.43	-4.61	-5.21	-3.11	-4.29	9.33	9.56	9.71	13	PASS
	16QAM		4.60	7.38	6.59	-5.60	-3.20	-4.63	-5.05	-2.65	-4.08	9.65	10.03	10.67	13	PASS
	64QAM		4.45	7.03	5.74	-6.35	-4.03	-5.01	-5.35	-3.03	-4.01	9.80	10.06	9.75	13	PASS
802.11n (40MHz)	BPSK	5230	6.27	6.27	6.16	-6.99	-4.35	-4.21	-6.33	-3.69	-3.55	12.60	9.96	9.71	13	PASS
	QPSK		4.85	6.29	5.50	-5.59	-4.45	-4.51	-4.46	-3.32	-3.38	9.31	9.61	8.88	13	PASS
	16QAM		5.47	5.80	6.07	-5.84	-4.85	-4.93	-4.64	-3.65	-3.73	10.11	9.45	9.80	13	PASS
	64QAM		6.19	6.35	7.05	-6.16	-5.24	-5.24	-4.10	-3.18	-3.18	10.29	9.53	10.23	13	PASS
802.11ac (80MHz)	BPSK	5210	-6.08	-4.80	-5.75	-15.16	-14.25	-15.43	-13.91	-13.00	-14.18	7.83	8.20	8.43	13	PASS
	QPSK		-5.36	-4.67	-5.74	-14.89	-14.01	-15.50	-12.67	-11.79	-13.28	7.31	7.12	7.54	13	PASS
	16QAM		-4.88	-3.87	-4.56	-15.12	-14.32	-15.21	-11.80	-11.00	-11.89	6.92	7.13	7.33	13	PASS
	64QAM		-5.41	-4.29	-4.96	-15.75	-14.44	-15.62	-12.43	-11.12	-12.30	7.02	6.83	7.34	13	PASS
	256QAM		-5.73	-4.78	-5.65	-15.96	-14.80	-15.41	-10.87	-9.71	-10.32	5.14	4.93	4.67	13	PASS

NOTE: Refer to section 3.3 for duty cycle spectrum plot.

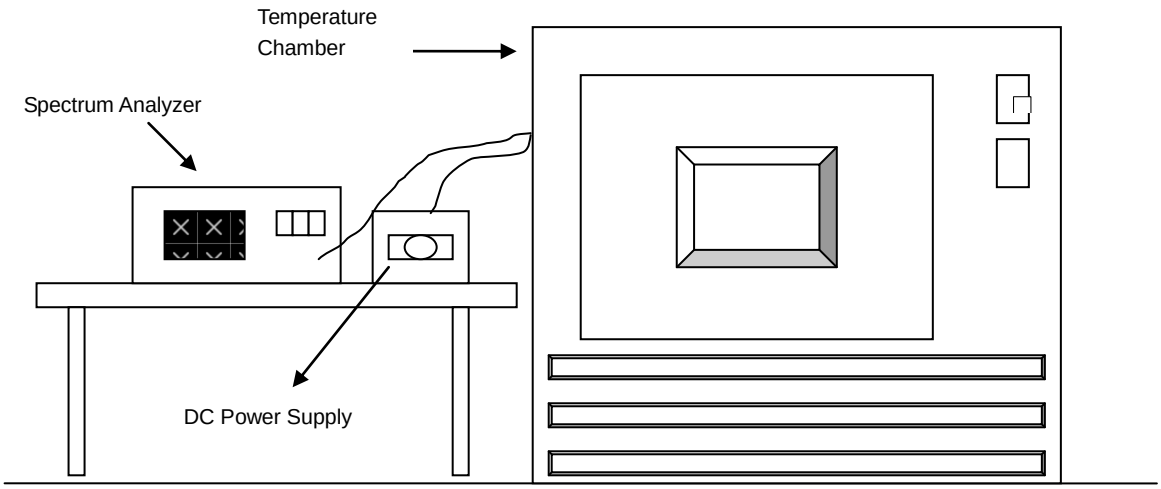

RBW 1 MHz
VBW 3 MHz
SWT 20 ms
[T1] MP VIEW
Marker 1 [T1]
6.27 dBm
5.242564 GHz
Ref 31.5 dBm
Att 20 dB
Offset 11.5 dB
Center 5.23 GHz
8 MHz/
Span 80 MHz
RBW 1 MHz
VBW 3 MHz
SWT 4 s
[T1] RM MAXH
Marker 1 [T1]
-6.99 dBm
5.232244 GHz
Ref 31.5 dBm
Att 20 dB
Offset 11.5 dB
SWP 1 of 1
Center 5.23 GHz
7 MHz/
Span 70 MHz

4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency of the carrier signal shall be maintained within band of operation.

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.6.4 TEST PROCEDURE

a. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
b. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
c. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

Set the EUT transmit at un-modulation mode to test frequency stability.

4.6.7 TEST RESULTS

FREQUEMCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5320MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
45	240.0	5320.015891	23079.979	5320.015562	23079.916	5320.016124	23080.024	5320.015756	23079.953
40	240.0	5320.016145	23080.028	5320.015952	23079.991	5320.016114	23080.022	5320.015920	23079.985
30	240.0	5320.017269	23080.244	5320.017370	23080.263	5320.016811	23080.156	5320.017495	23080.288
20	240.0	5320.017875	23080.361	5320.018198	23080.423	5320.018215	23080.426	5320.018012	23080.387
10	240.0	5320.019995	23080.768	5320.019658	23080.703	5320.019858	23080.742	5320.019716	23080.715
0	240.0	5320.017915	23080.368	5320.018422	23080.466	5320.018216	23080.426	5320.018114	23080.407
-10	240.0	5320.016566	23080.109	5320.016659	23080.127	5320.016780	23080.150	5320.016628	23080.121

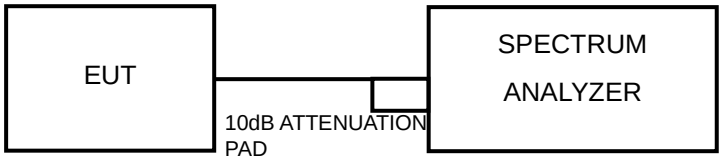
FREQUEMCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5320MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	216.0	5320.018035	23080.391	5320.017841	23080.354	5320.017640	23080.315	5320.017576	23080.303
	240.0	5320.018005	23080.386	5320.017922	23080.370	5320.018196	23080.422	5320.018250	23080.433
	264.00	5320.019285	23080.632	5320.019744	23080.720	5320.019482	23080.670	5320.019472	23080.668

4.7 20dBc BANDWIDTH MEASUREMENT

4.7.1 LIMITS OF 20dBc BANDWIDTH MEASUREMENT

20dBc point shall not overlap in 5150~5700MHz.

4.7.2 TEST SETUP



4.7.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.7.4 TEST PROCEDURES

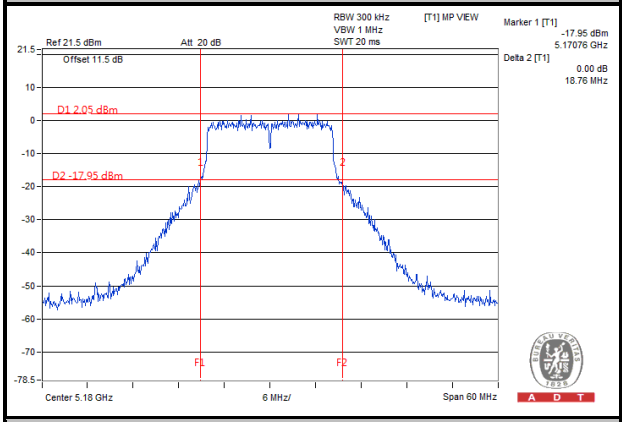
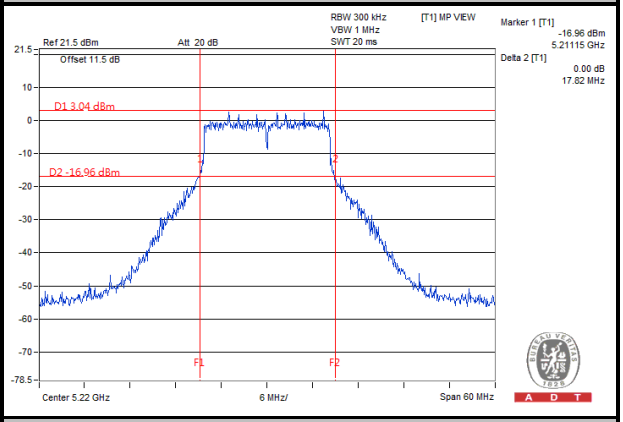
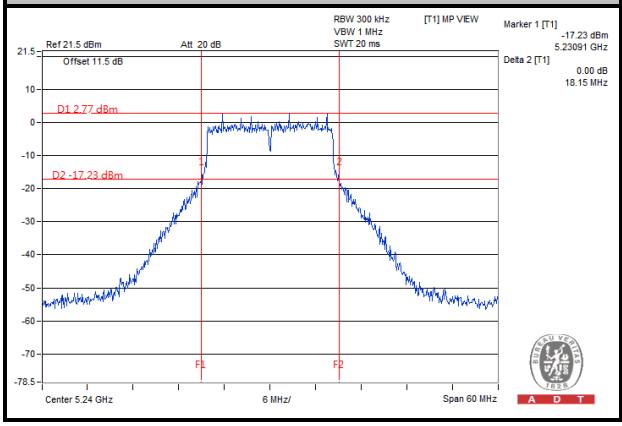
789033 D01 General UNII Test Procedures v01r03

Emission bandwidth

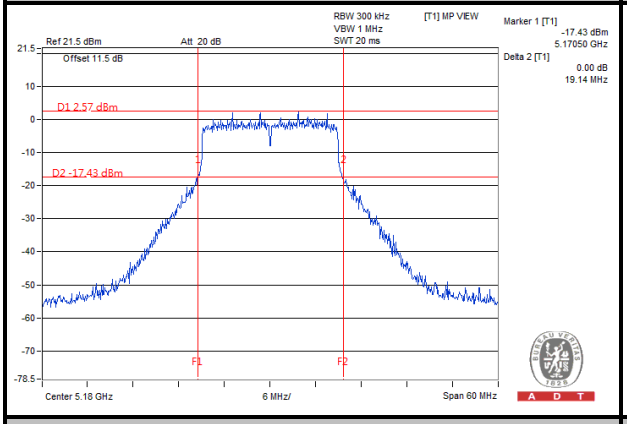
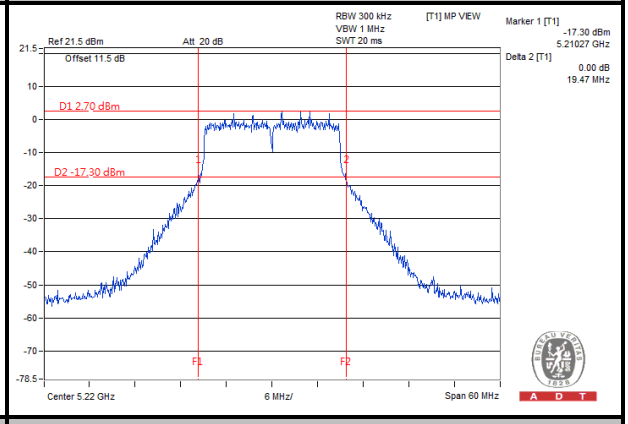
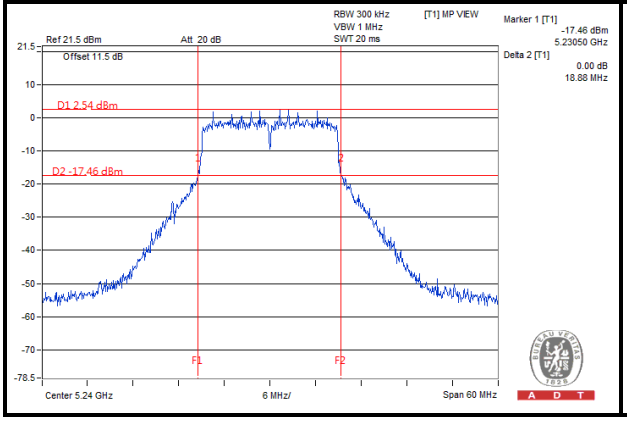
1) Set RBW = approximately 1% of the emission bandwidth.
2) Set the VBW > RBW.
3) Detector = Peak
4) Trace mode = max hold.
5) Measurement the maximum width of the emission that is 20dB down from the peak of the emission. Compare this with RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.7.5 TEST RESULTS

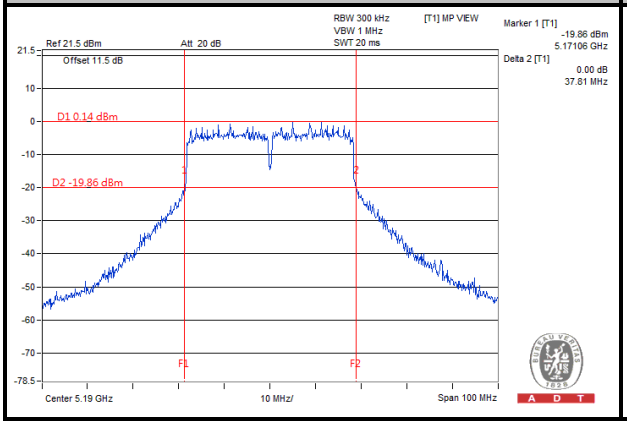
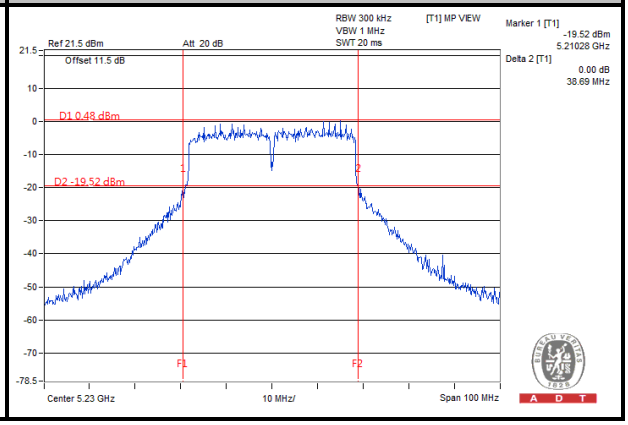
802.11a

5180MHz	5220MHz
	
5240MHz	
	

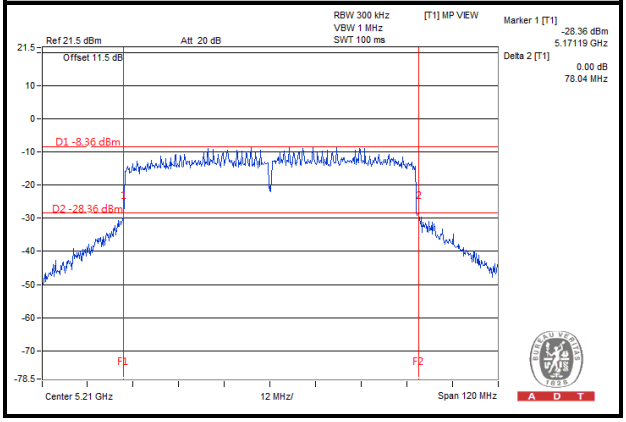
802.11n (20MHz)

5180MHz	5220MHz
	
5240MHz	
	

802.11n (40MHz)

5190MHz	5230MHz
	

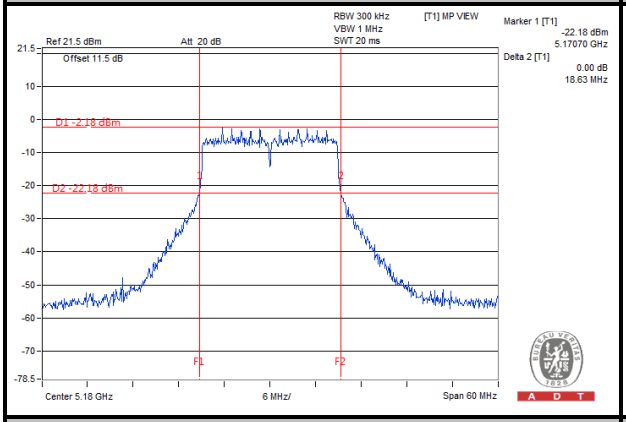
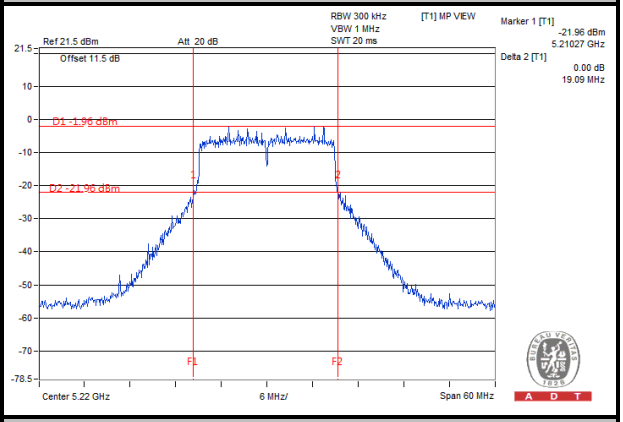
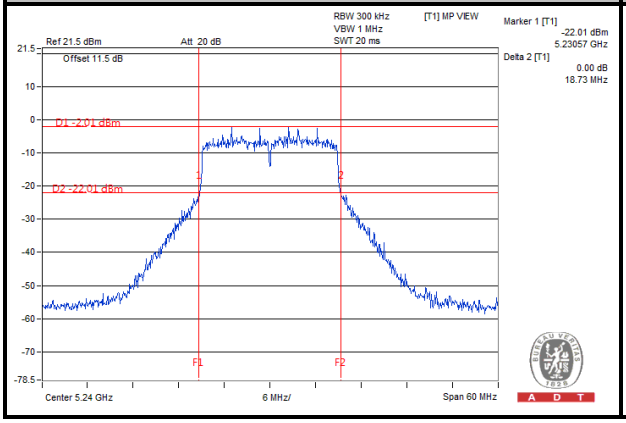
802.11ac (80MHz)

5210MHz


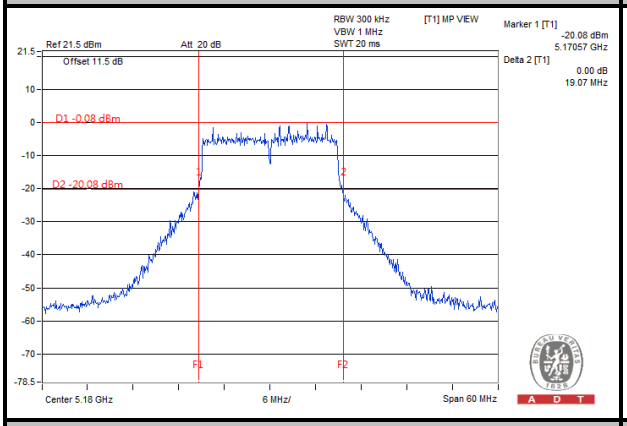
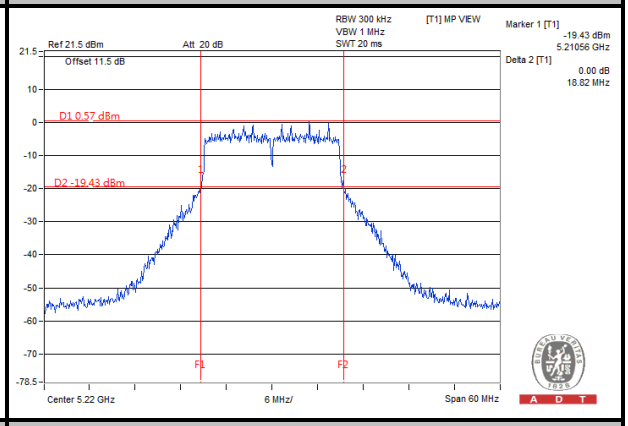
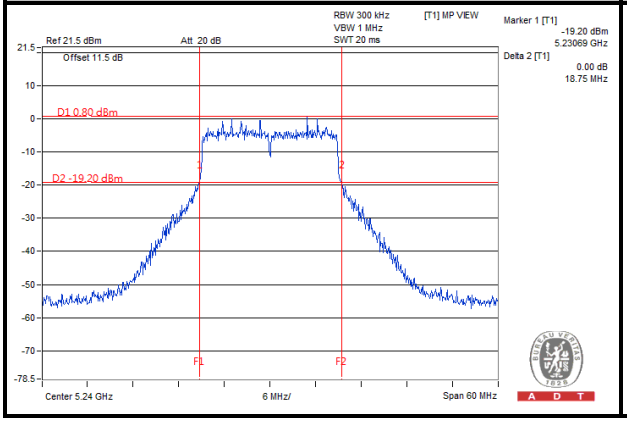
FOR 2TX

802.11n (20MHz)

CHAIN 0

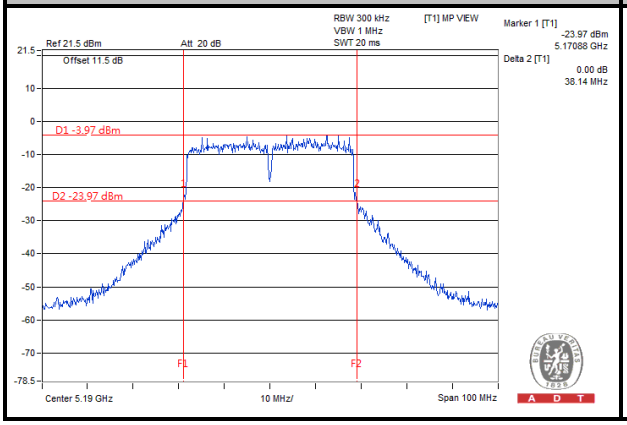
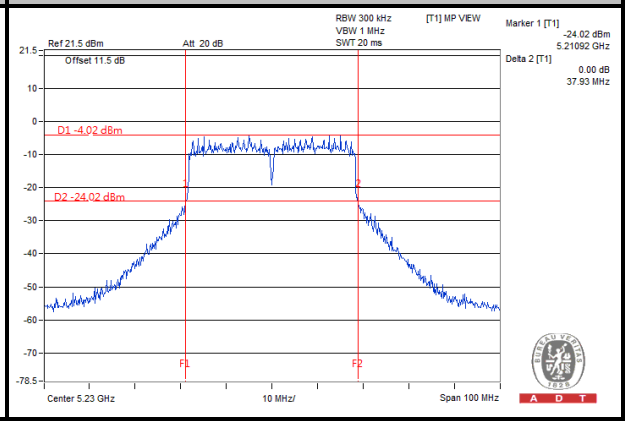
5180MHz	5220MHz
	
5240MHz	
	

CHAIN 1

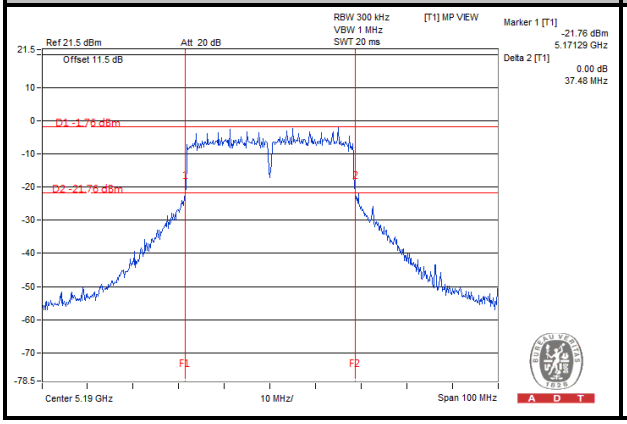
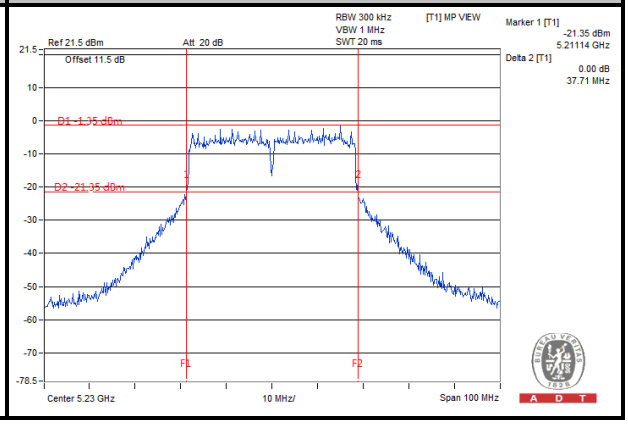
5180MHz	5220MHz
	
5240MHz	
	

802.11n (40MHz)

CHAIN 0

5190MHz	5230MHz
	

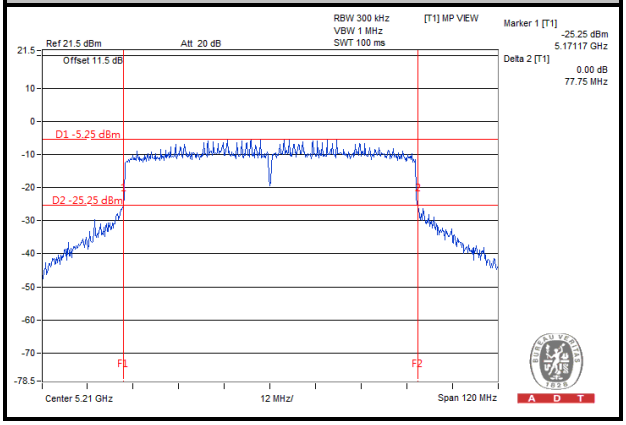
CHAIN 1

5190MHz	5230MHz
	

802.11ac (80MHz)

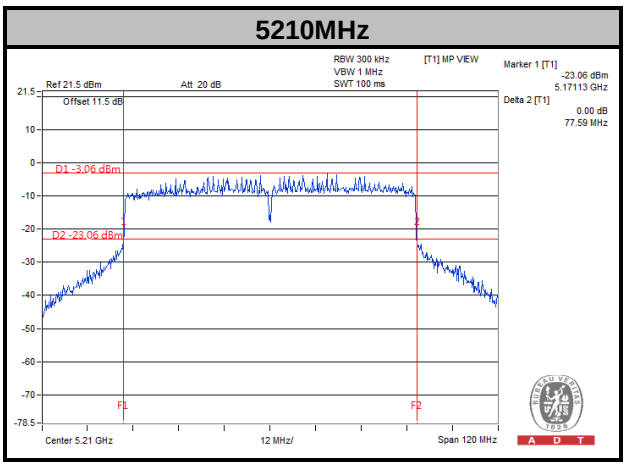
CHAIN 0

5210MHz



CHAIN 1

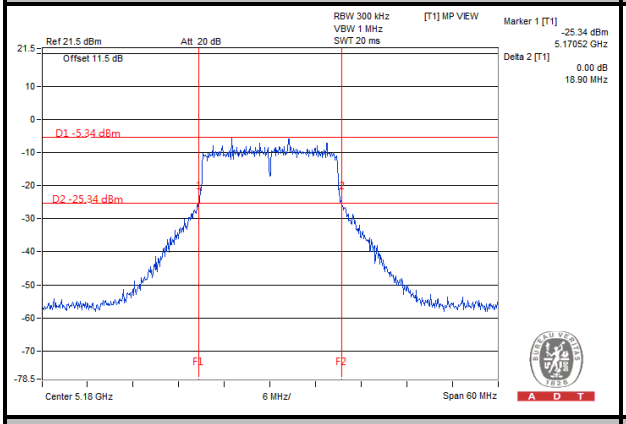
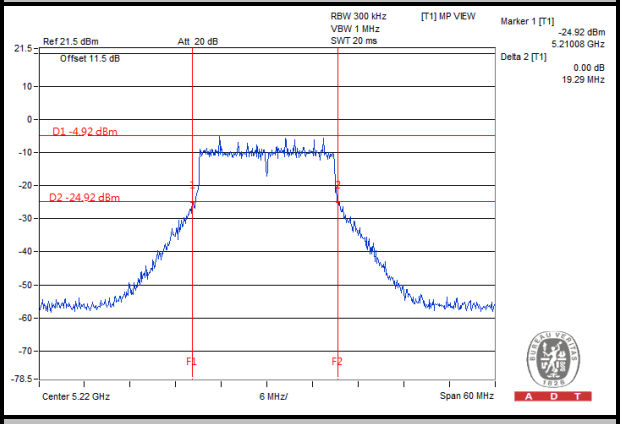
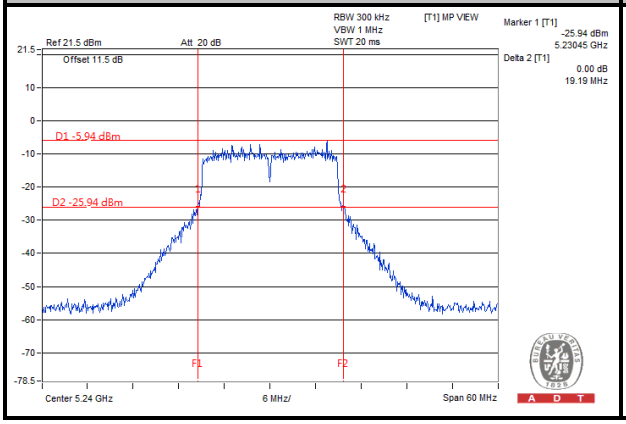
5210MHz



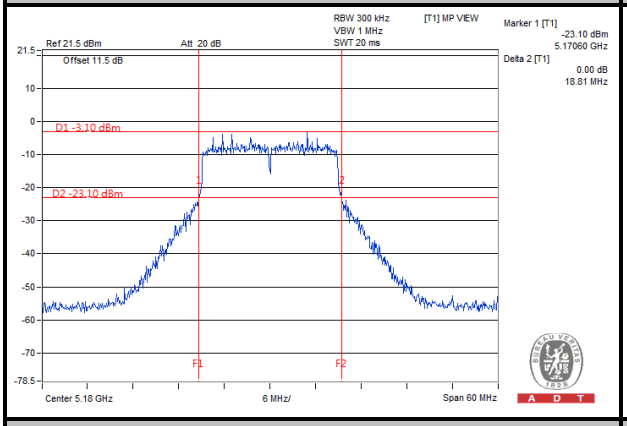
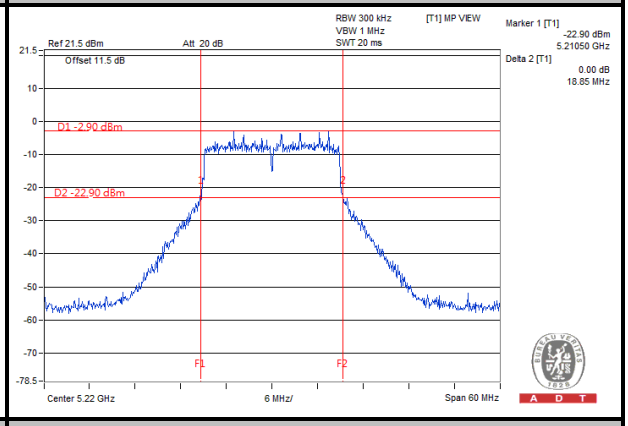
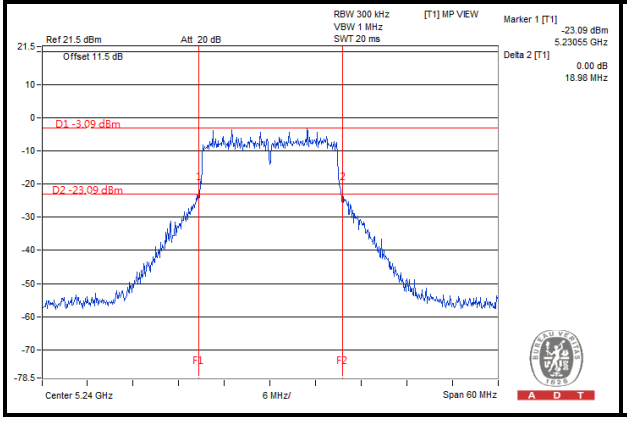
FOR 3TX

802.11n (20MHz)

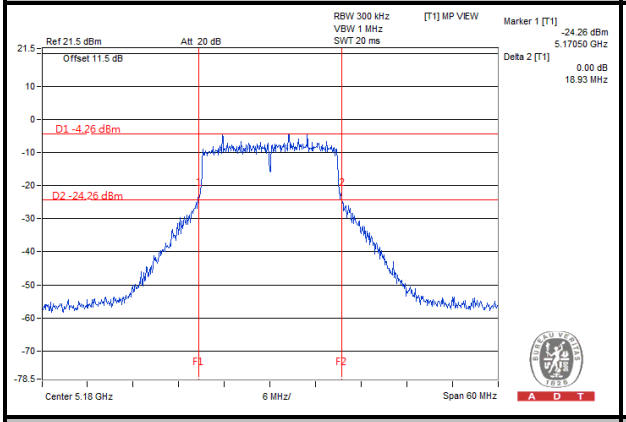
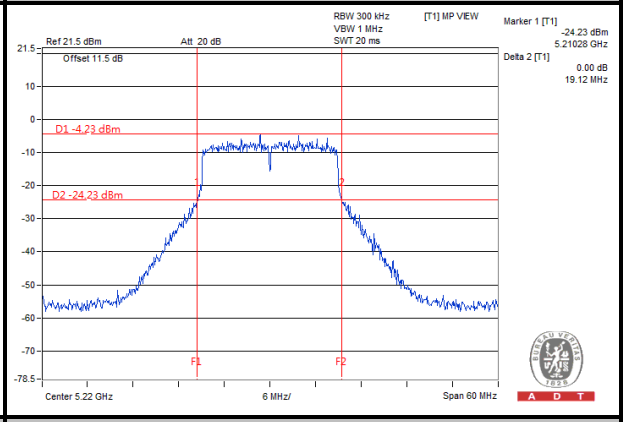
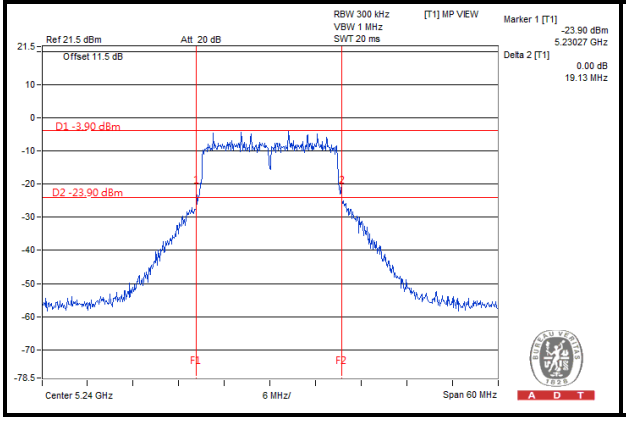
CHAIN 0

5180MHz	5220MHz
	
5240MHz	
	

CHAIN 1

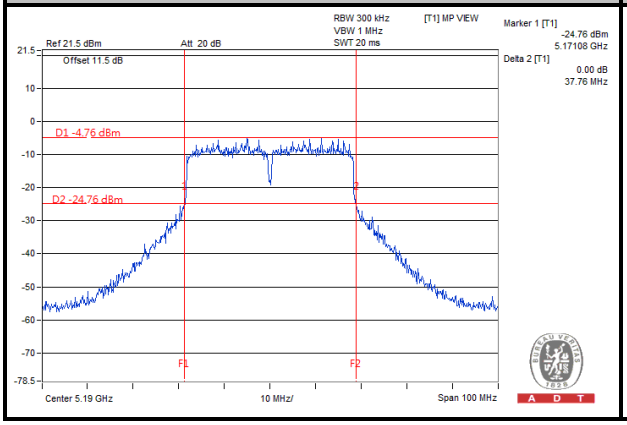
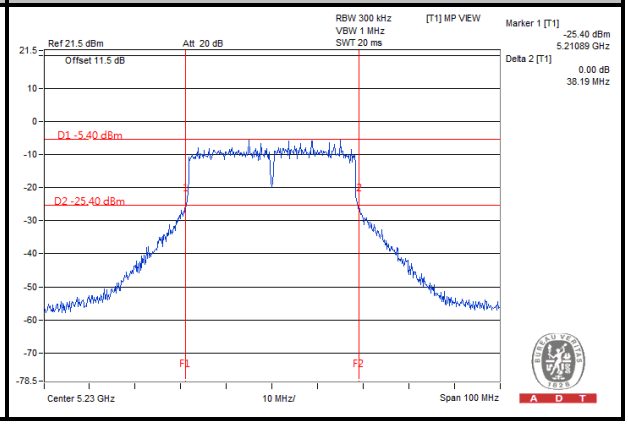
5180MHz	5220MHz
	
5240MHz	
	

CHAIN 2

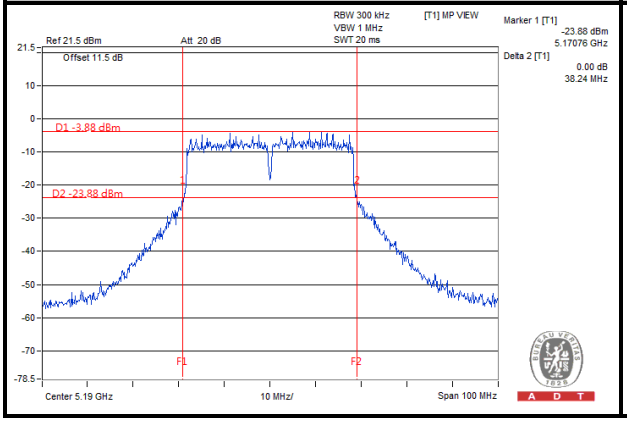
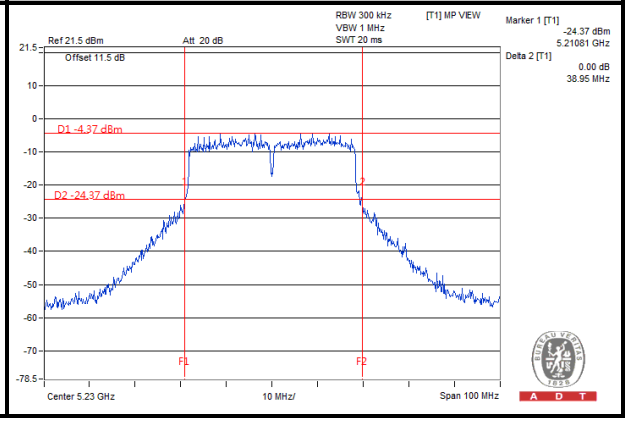
5180MHz	5220MHz
	
5240MHz	
	

802.11n (40MHz)

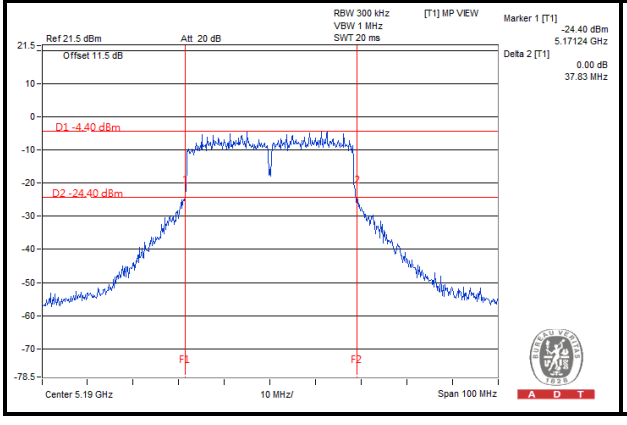
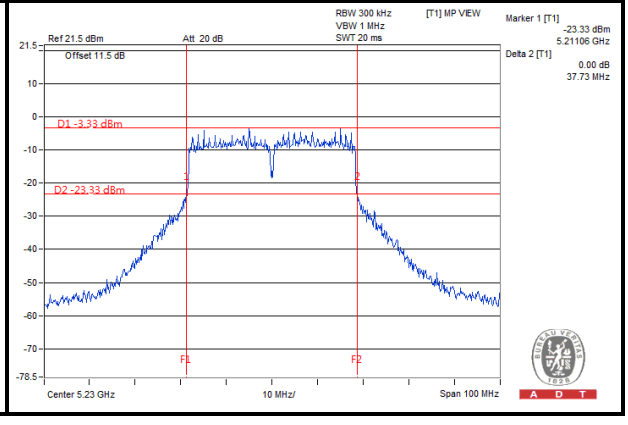
CHAIN 0

5190MHz	5230MHz
	

CHAIN 1

5190MHz	5230MHz
	

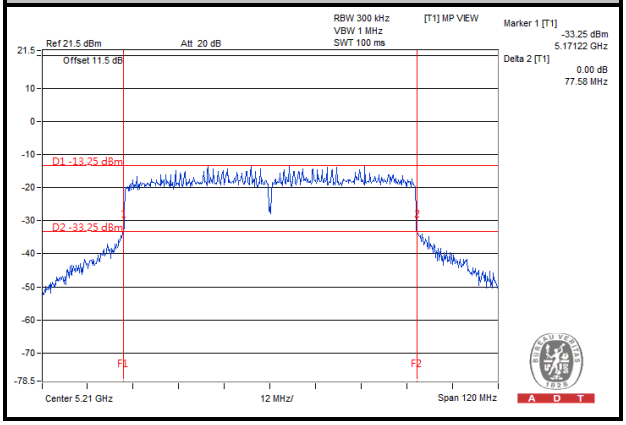
CHAIN 2

5190MHz	5230MHz
	

802.11ac (80MHz)

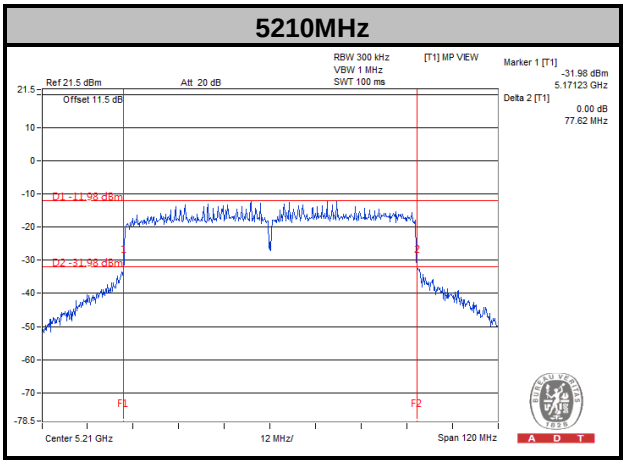
CHAIN 0

5210MHz



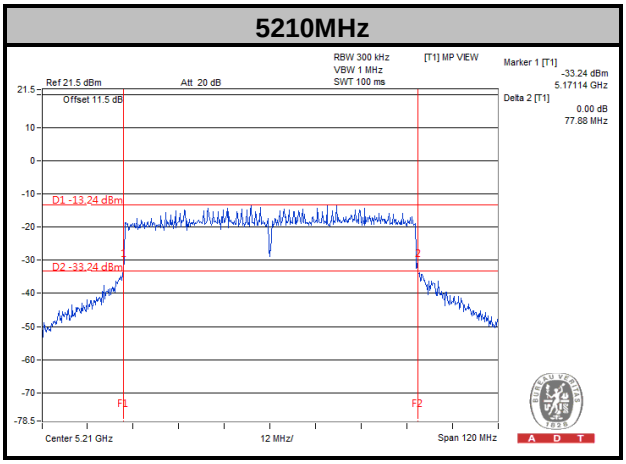
CHAIN 1

5210MHz



CHAIN 2

5210MHz



5. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

6. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.
If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---