FCC Test Report (15.407)

Report No.:	RF150826C05B
FCC ID:	PY315100319
Test Model:	R7800
Received Date:	Aug. 21, 2015
Test Date:	Sep. 30, 2015 ~ Jan. 07, 2016
Issued Date:	Jan. 07, 2016
Applicant:	NETGEAR INC.
Address:	350 East Plumeria Drive, San Jose, CA 95134, USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 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 Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.
The report must 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.	Description	Date Issued
RF150826C05B	Original release	Jan. 07, 2016

1 Certificate of Conformity

Product:	Nighthawk X4S AC2600 Smart WiFi Router
Brand:	NETGEAR
Test Model:	R7800
Sample Status:	Engineering sample
Applicant:	NETGEAR INC.
Test Date:	Sep. 30, 2015 ~ Jan. 07, 2016
Standards:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10:2013

The above equipment 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 : _____ , **Date:** Jan. 07, 2016

Polly Chien / Specialist

Approved by : _____ , **Date:** Jan. 07, 2016

Ken Liu / Senior Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.207 15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -11.63dB at 0.15000MHz.
15.407(b) (1/2/3/4/6)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5714.00MHz
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is RSMA not a standard connector.

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	Expended Uncertainty (k=2) (

3 General Information

3.1 General Description of EUT

Product	Nighthawk X4S AC2600 Smart WiFi Router
Brand	NETGEAR
Test Model	R7800
Status of EUT	Engineering sample
Power Supply Rating	12Vdc from adapter
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
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 600.0Mbps 802.11ac: up to 1300.0Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 802.11ac (80MHz+80MHz) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (20MHz) , 802.11ac (20MHz) 2 for 802.11n (40MHz), 802.11ac (40MHz) 1 for 802.11ac (80MHz), 802.11ac (80MHz+80MHz)
Output Power	CDD Mode: 968.841mW Beamforming_NSS1 Mode: 691.615mW Beamforming_NSS2 Mode: 883.211mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter
Data Cable Supplied	1.45m shielded RJ45 cable w/o core

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report to BV ADT report no. RF150826C05-1. The difference compared with the original report is updating U-NII 3 band standard to new rule version. Due to devices where no increase in authorized power level in U-NII-1 band an attestation with description of software security must be provided, the EUT was tested under U-NII-3 band with extra band 1 for 802.11ac (80MHz+80MHz).
2. The EUT incorporates a MIMO function. Physically, the EUT provides 4 completed transmitters and 4 receivers.

Band	Modulation Mode	Beamforming Mode	TX Function	Available Channel
5GHz	802.11a	Not Support Beamforming (Support CDD only)	4TX	149 ~ 165
	802.11n (20MHz)	Support (CDD / Nss=1 / Nss=2)	4TX	149 ~ 165
	802.11n (40MHz)	Support (CDD / Nss=1 / Nss=2)	4TX	151 ~ 159
	802.11ac (80MHz)	Support (CDD / Nss=1 / Nss=2)	4TX	155
	802.11ac (80MHz+80MHz)	Support (CDD / Nss=1)	2TX+2TX	42 + 155

* For 802.11a, the EUT doesn't support Beamforming mode.

* The modulation and bandwidth are similar for 802.11n mode for 20MHz / 40MHz and 802.11ac mode for V20MHz / V40MHz, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)
* For 5GHz band 802.11n and 802.11ac, after pre-tested two modes (with beamforming mode Nss=1 / 2 and CDD mode) found CDD mode was the worst, therefore chosen for final test for radiated emission and power line conducted emission test and presented in the test report.

3. The EUT uses following antennas.

Ant. Type	Connecter Type	Antenna Gain (dBi)						
		5210MHz	5745MHz	5755MHz	5775MHz	5785MHz	5795MHz	5825MHz
Dipole	RSMA	0.81	1.61	1.51	1.51	1.51	1.61	1.61

4. The EUT consumes power from the following adapters.

Adapter 1	
Brand	NETGEAR (LEI)
Model	MU42-3120350-A1
Part No.	332-10762-01
Input Power	100-240Vac, 50/60Hz, 1.5A
Output Power	12Vdc, 3.5A
Power Line	1.8m cable without core attached on adapter

Adapter 2	
Brand	NETGEAR (CWT)
Model	2ABN042F NA
Part No.	332-10761-01
Input Power	100-240Vac, 50/60Hz, 1.3A
Output Power	12Vdc, 3.5A
Power Line	1.85m cable without core attached on adapter

**After pre-tested two of adapters found adapter 2 was the worst case, therefore chosen for final tests and presented in the test report.

5. The Channel 42 in 802.11ac(80MHz+80MHz) mode has been decreased RF authorized power level via software change due to Channel 155 in 802.11ac(80MHz+80MHz) mode update to new rule, the other modulation type and channels are the same as original authorized power level, therefore only conducted output power and PSD for Channel 42 in 802.11ac(80MHz+80MHz) mode has been retested, other items still can meet U-NII-1 band new rule due to no increased in authorized power level.

3.2 Description of Test Modes

For 5180 ~ 5240MHz

802.11ac (80MHz+80MHz):

Channel	Frequency
42	5210MHz

For 5745 ~ 5825MHz:

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

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

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

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE≥1G:** Radiated Emission above 1GHz & Bandedge Measurement **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 **X-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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (80MHz)	155	155	OFDM	BPSK	130.0
-	802.11ac (80MHz+80MHz)	42+155	42+155	OFDM	BPSK	130.0

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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	157	OFDM	BPSK	6.0

Power Line Conducted Emission Test:

☒ 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	157	OFDM	BPSK	6.0

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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (80MHz)	155	155	OFDM	BPSK	130.0
-	802.11ac (80MHz+80MHz)	42+155	42+155	OFDM	BPSK	130.0

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	26 deg. C, 65% RH	120 Vac, 60 Hz	Chris Lin
RE<1G	23 deg. C, 66% RH	120 Vac, 60 Hz	Alan Wu
PLC	25 deg. C, 65% RH	120 Vac, 60 Hz	Chris Lin
APCM	25 deg. C, 60% RH	120 Vac, 60 Hz	Leo Tsai

3.3 Duty Cycle of Test Signal

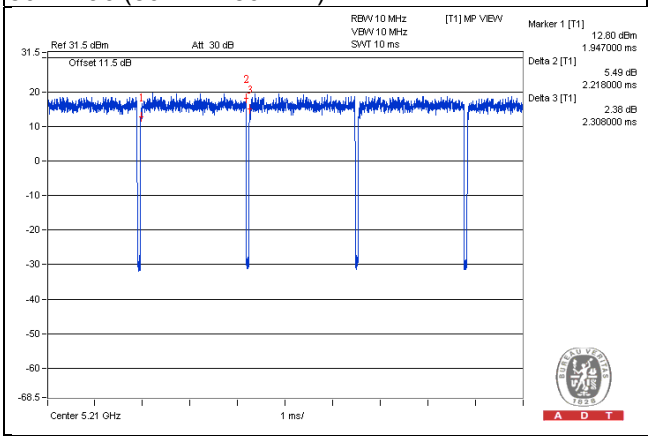
If duty cycle of test signal is ≥ 98%, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

For 5180 ~ 5240MHz

CDD Mode

802.11ac (80MHz+80MHz): Duty cycle = 2.218/2.308 = 0.961, Duty factor = 10 * log(1/0.961) = 0.17

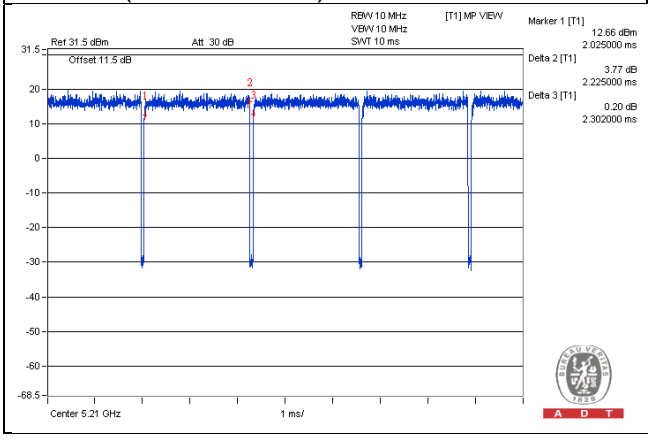
802.11ac (80MHz+80MHz)



Beamforming_NSS1 Mode

802.11ac (80MHz+80MHz): Duty cycle = 2.225/2.302 = 0.967, Duty factor = 10 * log(1/0.967) = 0.15

802.11ac (80MHz+80MHz)



For 5745 ~ 5825MHz:

CDD Mode

802.11a: Duty cycle = 2.047/2.135 = 0.959, Duty factor = 10 * log(1/0.959) = 0.18

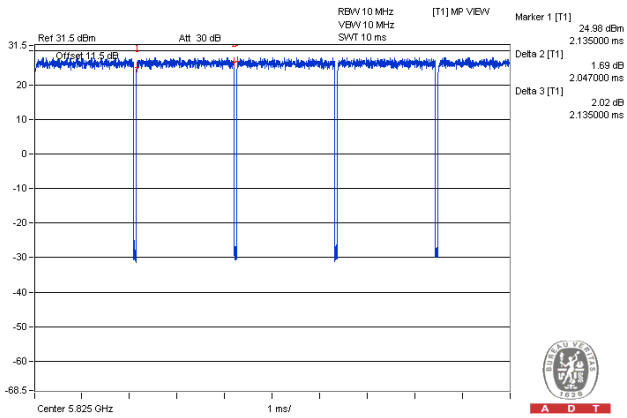
802.11n (20MHz): Duty cycle = 4.985/5.070 = 0.983

802.11n (40MHz): Duty cycle = 2.417/2.487 = 0.972, Duty factor = 10 * log(1/0.972) = 0.12

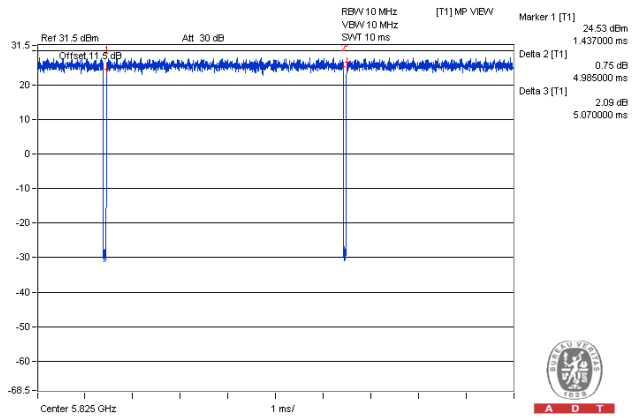
802.11ac (80MHz): Duty cycle = 1.124/1.214 = 0.926, Duty factor = 10 * log(1/0.926) = 0.33

802.11ac (80MHz+80MHz): Duty cycle = 2.209/2.314 = 0.955, Duty factor = 10 * log(1/0.955) = 0.20

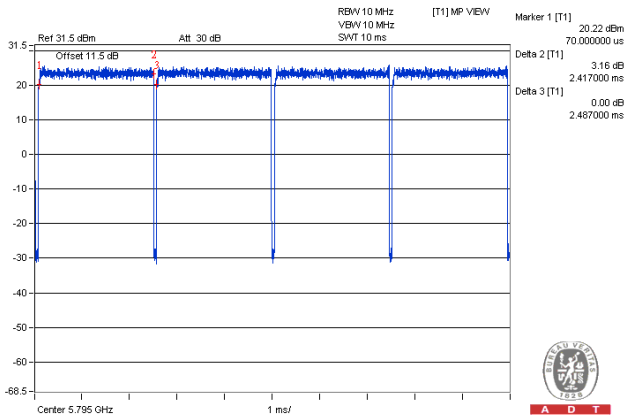
802.11a



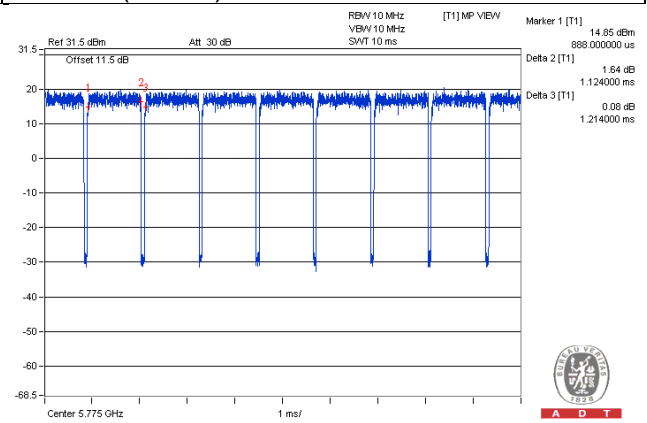
802.11n (20MHz)



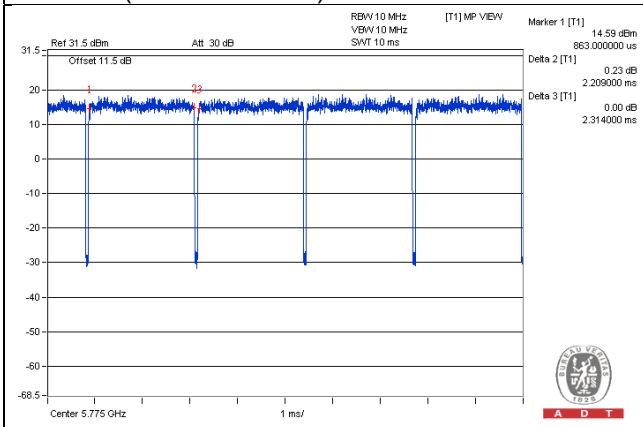
802.11n (40MHz)



802.11ac (80MHz)

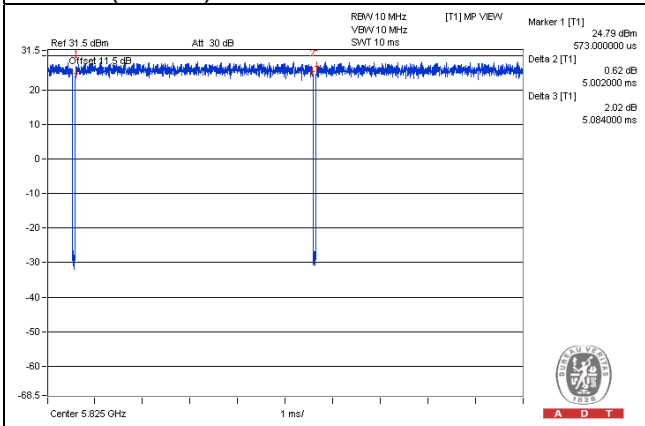
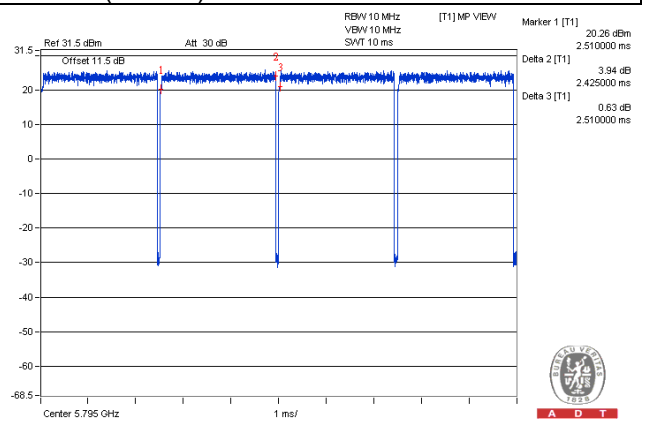
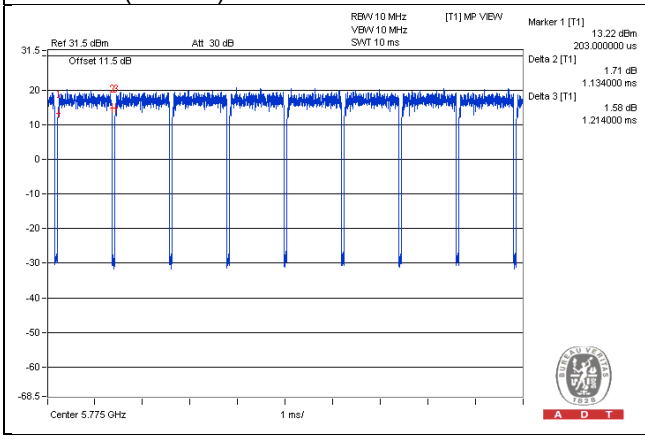
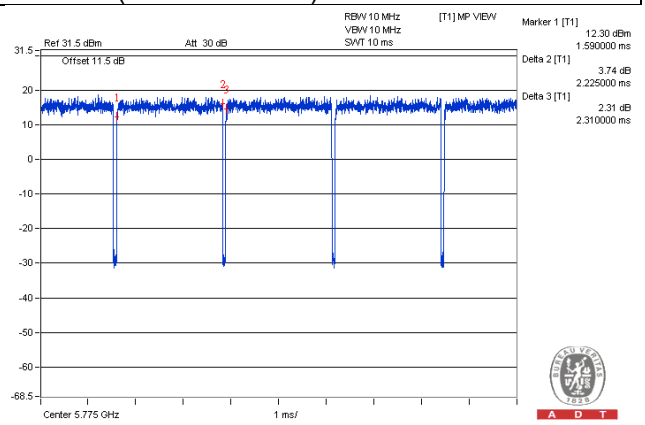


802.11ac (80MHz+80MHz)



Beamforming_NSS1 Mode

802.11n (20MHz): Duty cycle = 5.002/5.084 = 0.984
802.11n (40MHz): Duty cycle = 2.425/2.510 = 0.966, Duty factor = 10 * log(1/0.966) = 0.15
802.11ac (80MHz): Duty cycle = 1.134/1.214 = 0.934, Duty factor = 10 * log(1/0.934) = 0.30
802.11ac (80MHz+80MHz): Duty cycle = 2.225/2.310 = 0.963, Duty factor = 10 * log(1/0.963) = 0.16

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

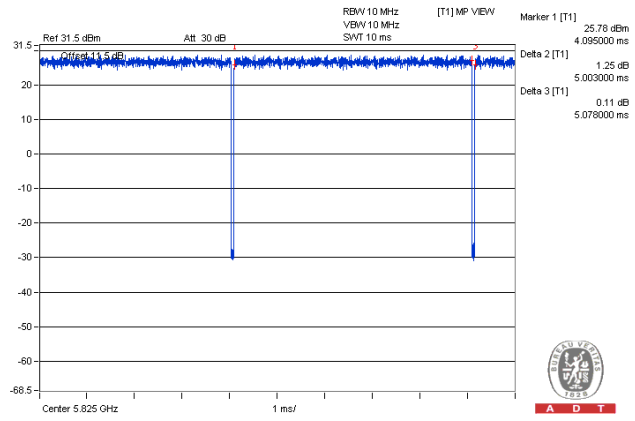
Beamforming_NSS2 Mode

802.11n (20MHz): Duty cycle = 4.951/5.063 = 0.978, Duty factor = 10 * log(1/0.978) = 0.10

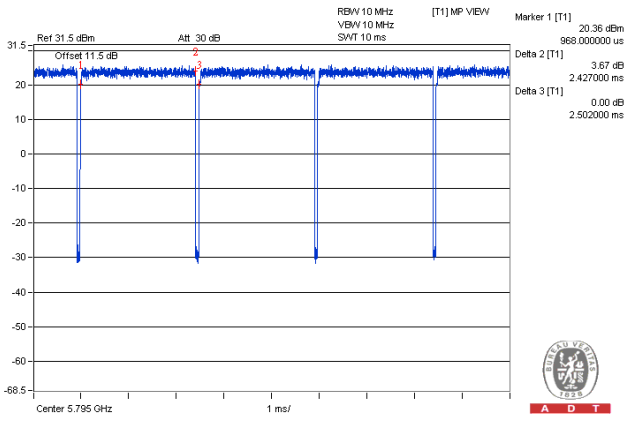
802.11n (40MHz): Duty cycle = 2.427/2.502 = 0.970, Duty factor = 10 * log(1/0.970) = 0.13

802.11ac (80MHz): Duty cycle = 1.137/1.217 = 0.934, Duty factor = 10 * log(1/0.934) = 0.30

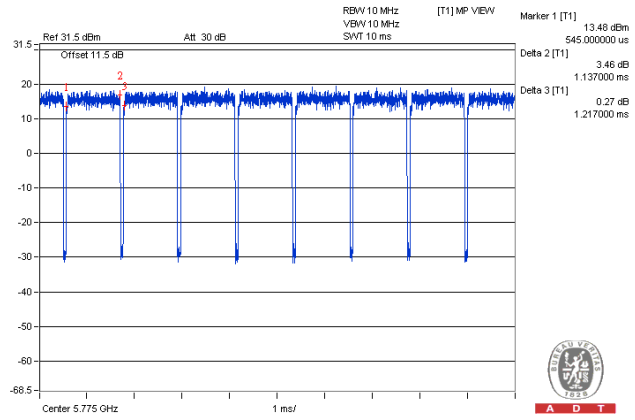
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)



3.4 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.

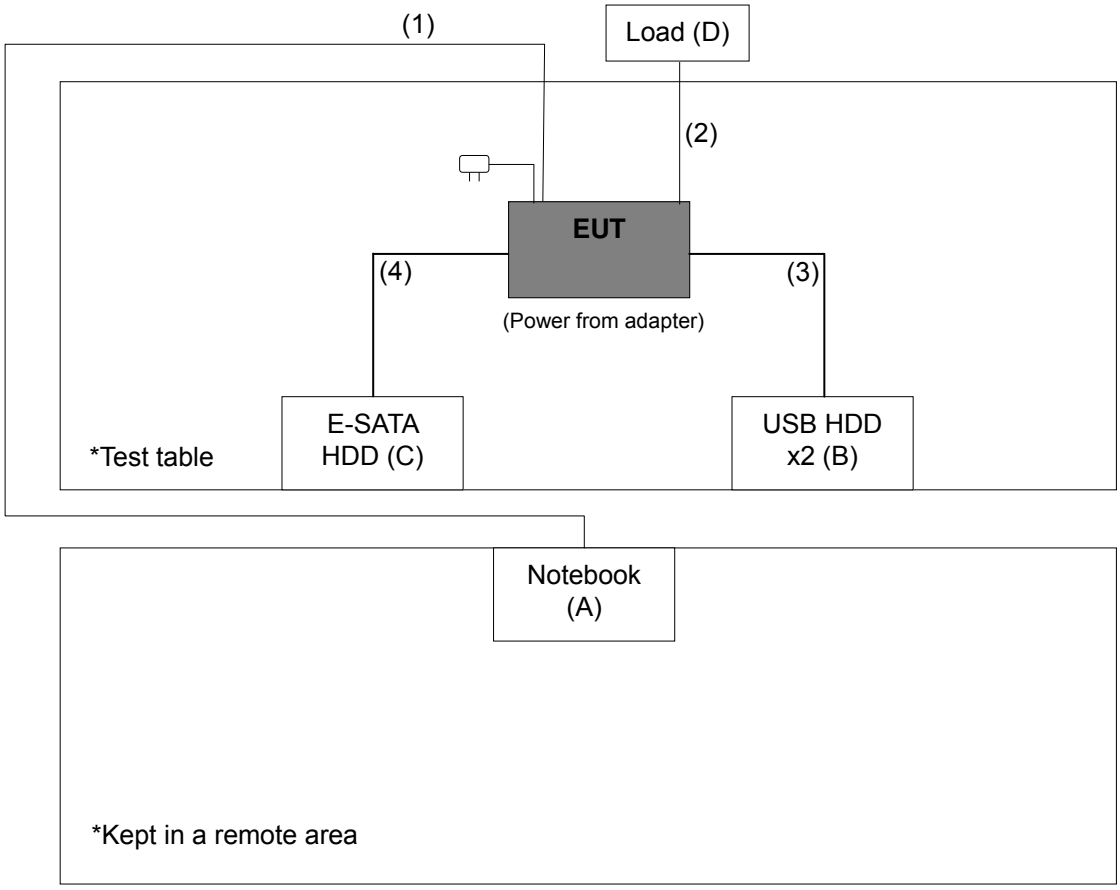
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5420	BPQ7MQ1	FCC DoC Approved	-
B.	USB HDD x 2	TOSHIBA	v63700-G-1.5G	13GUTE2ZTTV2	FCC DoC Approved	-
		TOSHIBA	v63700-G-1.5G	3F8PBV6ZTTV2	FCC DoC Approved	-
C.	E-SATA HDD	Sarotech	FHD-354US	E80P048380919	FCC DoC Approved	-
D.	Load	NA	NA	NA	NA	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as a communication partner to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ 45	1	3	N	0	-
2.	RJ 45	4	1.8	N	0	-
3.	USB	2	1.8	Y	0	-
4.	E-SATA	1	0.5	Y	0	-

3.4.1 Configuration of System under Test



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)
789033 D02 General UNII Test Procedures New Rules v01r01
662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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.

Limits of Unwanted Emission Out of The Restricted Bands

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedures New Rules v01	FIELD STRENGTH AT 3m	
	PK:74 (dBμV/m)	AV:54 (dBμV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK:-27 (dBm/MHz) [*1] PK:-17 (dBm/MHz) [*2]	PK: 68.2 (dBμV/m) [*1] PK:78.2 (dBμV/m) [*2]

NOTE: [*1] beyond 10MHz of the band edge [*2] within 10 MHz of band edge

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).

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 06, 2014	Oct. 05, 2015
			Oct. 12, 2015	Oct. 11, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Jul. 08, 2015	Jul. 07, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Feb. 06, 2015	Feb. 05, 2016
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Feb. 05, 2015	Feb. 04, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 09, 2015	Feb. 08, 2016
Preamplifier Agilent	8449B	3008A01960	Aug. 09, 2015	Aug. 08, 2016
Preamplifier Agilent	8449B	3008A01960	Aug. 09, 2015	Aug. 08, 2016
Preamplifier Agilent	8447D	2944A10631	Aug. 09, 2015	Aug. 08, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-02(295012+ 309220)	Aug. 09, 2015	Aug. 08, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03(250724)	Aug. 09, 2015	Aug. 08, 2016
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100.	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2014	Oct. 17, 2015
			Oct. 18, 2015	Oct. 17, 2016
High Speed Peak Power Meter	ML2495A	0824011	Jul. 09, 2015	Jul. 08, 2016
Power Sensor	MA2411B	0738171	Jul. 09, 2015	Jul. 08, 2016

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 Chamber 4.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 460141.
5. The IC Site Registration No. is IC7450F-4.

4.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. 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 height of antenna 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

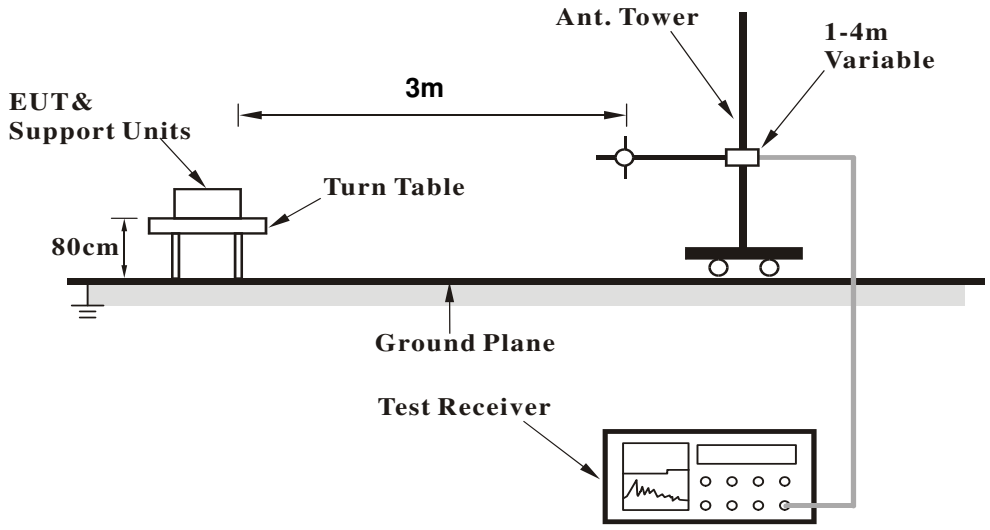
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (10 log(1/duty cycle)).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

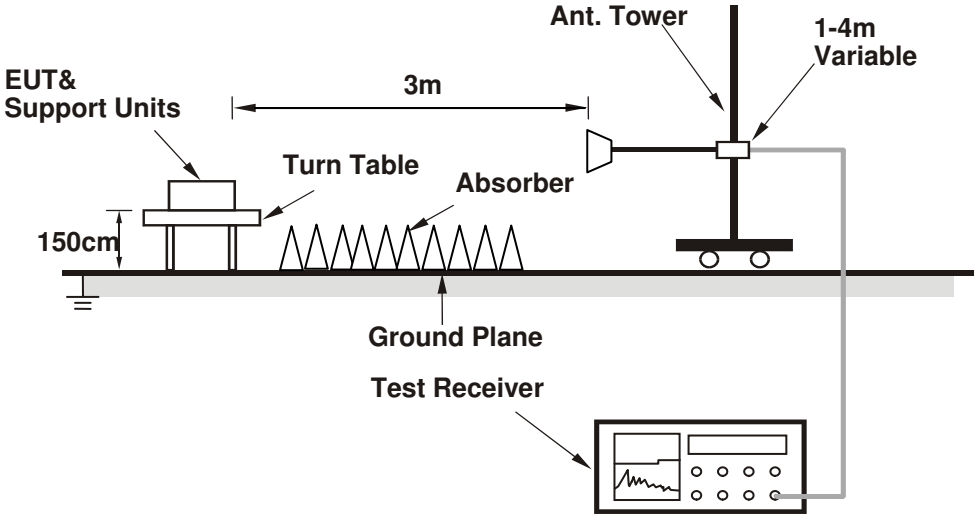
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Conditions

a. Placed the EUT on the testing table.
b. Prepared a notebook to act as communication partner and placed it outside of testing area.
c. The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
d. The communication partner sent data to EUT by command "PING".
e. The necessary accessories enable the system in full functions.

4.1.7 Test Results

Above 1GHz Data:

802.11a

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	56.6 PK	74.0	-17.4	1.00 H	150	50.60	6.00
2	#5714.00	44.0 AV	54.0	-10.0	1.00 H	150	38.00	6.00
3	#5722.00	57.0 PK	78.2	-21.2	1.00 H	150	50.90	6.10
4	#5725.00	61.9 PK	78.2	-16.3	1.00 H	150	55.80	6.10
5	*5745.00	105.8 PK			1.00 H	150	65.50	40.30
6	*5745.00	96.2 AV			1.00 H	150	55.90	40.30
7	11490.00	57.6 PK	74.0	-16.4	1.39 H	87	40.00	17.60
8	11490.00	46.2 AV	54.0	-7.8	1.39 H	87	28.60	17.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5708.00	68.6 PK	74.0	-5.4	1.74 V	341	62.60	6.00
2	#5708.00	53.6 AV	54.0	-0.4	1.74 V	341	47.60	6.00
3	#5722.00	65.5 PK	78.2	-12.7	1.74 V	341	59.40	6.10
4	#5725.00	65.9 PK	78.2	-12.3	1.74 V	341	59.80	6.10
5	*5745.00	122.4 PK			1.74 V	341	82.10	40.30
6	*5745.00	112.6 AV			1.74 V	341	72.30	40.30
7	11490.00	59.5 PK	74.0	-14.5	1.13 V	85	41.90	17.60
8	11490.00	46.3 AV	54.0	-7.7	1.13 V	85	28.70	17.60

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	109.6 PK			1.10 H	73	69.30	40.30
2	*5785.00	99.9 AV			1.10 H	73	59.60	40.30
3	11570.00	59.0 PK	74.0	-15.0	1.23 H	9	41.50	17.50
4	11570.00	45.6 AV	54.0	-8.4	1.23 H	9	28.10	17.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	126.8 PK			1.71 V	342	86.50	40.30
2	*5785.00	116.4 AV			1.71 V	342	76.10	40.30
3	11570.00	69.2 PK	74.0	-4.8	2.06 V	13	51.70	17.50
4	11570.00	47.8 AV	54.0	-6.2	2.06 V	13	30.30	17.50

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	107.3 PK			1.00 H	132	66.90	40.40
2	*5825.00	97.3 AV			1.00 H	132	56.90	40.40
3	#5850.00	59.1 PK	78.2	-19.1	1.00 H	132	52.70	6.40
4	#5853.00	57.7 PK	78.2	-20.5	1.00 H	132	51.30	6.40
5	#5861.00	57.5 PK	74.0	-16.5	1.00 H	132	51.10	6.40
6	#5861.00	45.0 AV	54.0	-9.0	1.00 H	132	38.60	6.40
7	11650.00	58.1 PK	74.0	-15.9	1.47 H	84	40.80	17.30
8	11650.00	45.7 AV	54.0	-8.3	1.47 H	84	28.40	17.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	123.1 PK			1.76 V	341	82.70	40.40
2	*5825.00	112.6 AV			1.76 V	341	72.20	40.40
3	#5850.00	63.3 PK	78.2	-14.9	1.76 V	341	56.90	6.40
4	#5853.00	66.6 PK	78.2	-11.6	1.76 V	341	60.20	6.40
5	#5868.00	68.0 PK	74.0	-6.0	1.76 V	341	61.60	6.40
6	#5868.00	53.6 AV	54.0	-0.4	1.76 V	341	47.20	6.40
7	11650.00	58.9 PK	74.0	-15.1	1.28 V	74	41.60	17.30
8	11650.00	45.7 AV	54.0	-8.3	1.28 V	74	28.40	17.30

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11n (20MHz)

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	56.1 PK	74.0	-17.9	1.00 H	149	50.10	6.00
2	#5714.00	44.7 AV	54.0	-9.3	1.00 H	149	38.70	6.00
3	#5722.00	58.0 PK	78.2	-20.2	1.00 H	149	51.90	6.10
4	#5725.00	60.4 PK	78.2	-17.8	1.00 H	149	54.30	6.10
5	*5745.00	104.8 PK			1.00 H	149	64.50	40.30
6	*5745.00	95.2 AV			1.00 H	149	54.90	40.30
7	11490.00	57.9 PK	74.0	-16.1	1.36 H	124	40.30	17.60
8	11490.00	45.7 AV	54.0	-8.3	1.36 H	124	28.10	17.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5708.00	68.5 PK	74.0	-5.5	1.66 V	341	62.50	6.00
2	#5708.00	53.8 AV	54.0	-0.2	1.66 V	341	47.80	6.00
3	#5722.00	68.6 PK	78.2	-9.6	1.66 V	341	62.50	6.10
4	#5725.00	64.6 PK	78.2	-13.6	1.66 V	341	58.50	6.10
5	*5745.00	122.8 PK			1.66 V	341	82.50	40.30
6	*5745.00	112.4 AV			1.66 V	341	72.10	40.30
7	11490.00	58.8 PK	74.0	-15.2	1.06 V	3	41.20	17.60
8	11490.00	46.2 AV	54.0	-7.8	1.06 V	3	28.60	17.60

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	109.8 PK			1.02 H	147	69.50	40.30
2	*5785.00	100.3 AV			1.02 H	147	60.00	40.30
3	11570.00	57.8 PK	74.0	-16.2	1.55 H	224	40.30	17.50
4	11570.00	45.6 AV	54.0	-8.4	1.55 H	224	28.10	17.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	126.9 PK			1.75 V	345	86.60	40.30
2	*5785.00	116.0 AV			1.75 V	345	75.70	40.30
3	11570.00	59.0 PK	74.0	-15.0	1.06 V	84	41.50	17.50
4	11570.00	46.5 AV	54.0	-7.5	1.06 V	84	29.00	17.50

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	105.9 PK			1.00 H	148	65.50	40.40
2	*5825.00	96.7 AV			1.00 H	148	56.30	40.40
3	#5850.00	61.0 PK	78.2	-17.2	1.00 H	148	54.60	6.40
4	#5853.00	60.0 PK	78.2	-18.2	1.00 H	148	53.60	6.40
5	#5861.00	57.8 PK	74.0	-16.2	1.00 H	148	51.40	6.40
6	#5861.00	46.6 AV	54.0	-7.4	1.00 H	148	40.20	6.40
7	11650.00	57.3 PK	74.0	-16.7	1.08 H	224	40.00	17.30
8	11650.00	45.9 AV	54.0	-8.1	1.08 H	224	28.60	17.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	123.9 PK			1.83 V	346	83.50	40.40
2	*5825.00	112.6 AV			1.83 V	346	72.20	40.40
3	#5850.00	64.2 PK	78.2	-14.0	1.83 V	346	57.80	6.40
4	#5853.00	68.4 PK	78.2	-9.8	1.83 V	346	62.00	6.40
5	#5865.00	68.6 PK	74.0	-5.4	1.83 V	346	62.20	6.40
6	#5865.00	53.7 AV	54.0	-0.3	1.83 V	346	47.30	6.40
7	11650.00	58.8 PK	74.0	-15.2	1.39 V	87	41.50	17.30
8	11650.00	45.4 AV	54.0	-8.6	1.39 V	87	28.10	17.30

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11n (40MHz)

CHANNEL	TX Channel 151	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	57.7 PK	74.0	-16.3	1.01 H	147	51.70	6.00
2	#5714.00	46.0 AV	54.0	-8.0	1.01 H	147	40.00	6.00
3	#5722.00	61.2 PK	78.2	-17.0	1.01 H	147	55.10	6.10
4	#5725.00	60.4 PK	78.2	-17.8	1.01 H	147	54.30	6.10
5	*5755.00	103.2 PK			1.01 H	147	62.90	40.30
6	*5755.00	94.0 AV			1.01 H	147	53.70	40.30
7	11510.00	57.4 PK	74.0	-16.6	1.36 H	97	40.00	17.40
8	11510.00	44.9 AV	54.0	-9.1	1.36 H	97	27.50	17.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5705.00	68.0 PK	74.0	-6.0	1.90 V	11	62.00	6.00
2	#5705.00	53.6 AV	54.0	-0.4	1.90 V	11	47.60	6.00
3	#5722.00	72.3 PK	78.2	-5.9	1.90 V	11	66.20	6.10
4	#5725.00	63.8 PK	78.2	-14.4	1.90 V	11	57.70	6.10
5	*5755.00	119.4 PK			1.90 V	11	79.10	40.30
6	*5755.00	109.1 AV			1.90 V	11	68.80	40.30
7	11510.00	58.6 PK	74.0	-15.4	1.32 V	64	41.20	17.40
8	11510.00	45.5 AV	54.0	-8.5	1.32 V	64	28.10	17.40

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	104.9 PK			1.06 H	146	64.60	40.30
2	*5795.00	94.6 AV			1.06 H	146	54.30	40.30
3	#5850.00	58.7 PK	78.2	-19.5	1.06 H	146	52.30	6.40
4	#5860.00	57.9 PK	78.2	-20.3	1.06 H	146	51.50	6.40
5	#5861.00	57.7 PK	74.0	-16.3	1.06 H	146	51.30	6.40
6	#5861.00	46.4 AV	54.0	-7.6	1.06 H	146	40.00	6.40
7	11590.00	57.3 PK	74.0	-16.7	1.30 H	52	40.00	17.30
8	11590.00	44.5 AV	54.0	-9.5	1.30 H	52	27.20	17.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	119.1 PK			2.03 V	331	78.80	40.30
2	*5795.00	108.8 AV			2.03 V	331	68.50	40.30
3	#5850.00	63.1 PK	78.2	-15.1	2.03 V	331	56.70	6.40
4	#5853.00	65.4 PK	78.2	-12.8	2.03 V	331	59.00	6.40
5	#5861.00	68.1 PK	74.0	-5.9	2.03 V	331	61.70	6.40
6	#5861.00	53.6 AV	54.0	-0.4	2.03 V	331	47.20	6.40
7	11590.00	58.8 PK	74.0	-15.2	1.23 V	84	41.50	17.30
8	11590.00	45.4 AV	54.0	-8.6	1.23 V	84	28.10	17.30

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (80MHz)

CHANNEL	TX Channel 155	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	48.5 PK	74.0	-25.5	1.00 H	145	42.50	6.00
2	#5714.00	34.6 AV	54.0	-19.4	1.00 H	145	28.60	6.00
3	#5722.00	59.0 PK	78.2	-19.2	1.00 H	145	52.90	6.10
4	#5725.00	60.7 PK	78.2	-17.5	1.00 H	145	54.60	6.10
5	*5775.00	94.7 PK			1.00 H	145	54.40	40.30
6	*5775.00	85.5 AV			1.00 H	145	45.20	40.30
7	11550.00	57.7 PK	74.0	-16.3	1.32 H	64	40.30	17.40
8	11550.00	44.6 AV	54.0	-9.4	1.32 H	64	27.20	17.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	71.2 PK	74.0	-2.8	1.76 V	19	65.20	6.00
2	#5714.00	53.8 AV	54.0	-0.2	1.76 V	19	47.80	6.00
3	#5722.00	72.8 PK	78.2	-5.4	1.76 V	19	66.70	6.10
4	#5725.00	63.0 PK	78.2	-15.2	1.76 V	19	56.90	6.10
5	*5775.00	112.3 PK			1.76 V	19	72.00	40.30
6	*5775.00	102.3 AV			1.76 V	19	62.00	40.30
7	11550.00	58.7 PK	74.0	-15.3	1.23 V	98	41.30	17.40
8	11550.00	46.1 AV	54.0	-7.9	1.23 V	98	28.70	17.40

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (80MHz+80MHz)

CHANNEL	TX Channel 42	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.9 PK	74.0	-17.1	2.06 H	141	51.90	5.00
2	5150.00	45.6 AV	54.0	-8.4	2.06 H	141	40.60	5.00
3	*5210.00	94.2 PK			2.06 H	141	55.00	39.20
4	*5210.00	83.8 AV			2.06 H	141	44.60	39.20
5	#10420.00	57.3 PK	74.0	-16.7	1.28 H	155	40.00	17.30
6	#10420.00	44.9 AV	54.0	-9.1	1.28 H	155	27.60	17.30
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	64.6 PK	74.0	-9.4	2.42 V	168	59.60	5.00
2	5150.00	48.8 AV	54.0	-5.2	2.42 V	168	43.80	5.00
3	*5210.00	104.4 PK			2.42 V	168	65.20	39.20
4	*5210.00	94.2 AV			2.42 V	168	55.00	39.20
5	#10420.00	58.8 PK	74.0	-15.2	1.36 V	98	41.50	17.30
6	#10420.00	45.8 AV	54.0	-8.2	1.36 V	98	28.50	17.30

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 155	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	48.8 PK	74.0	-25.2	1.05 H	150	42.80	6.00
2	#5714.00	34.8 AV	54.0	-19.2	1.05 H	150	28.80	6.00
3	#5722.00	59.5 PK	78.2	-18.7	1.05 H	150	53.40	6.10
4	#5725.00	60.9 PK	78.2	-17.3	1.05 H	150	54.80	6.10
5	*5775.00	92.8 PK			1.05 H	150	52.50	40.30
6	*5775.00	82.8 AV			1.05 H	150	42.50	40.30
7	11550.00	57.6 PK	74.0	-16.4	1.40 H	70	40.20	17.40
8	11550.00	44.9 AV	54.0	-9.1	1.40 H	70	27.50	17.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	71.1 PK	74.0	-2.9	1.80 V	21	65.10	6.00
2	**#5714.00**	**53.9 AV**	**54.0**	**-0.1**	**1.80 V**	**21**	**47.90**	**6.00**
3	#5722.00	72.7 PK	78.2	-5.5	1.80 V	21	66.60	6.10
4	#5725.00	63.2 PK	78.2	-15.0	1.80 V	21	57.10	6.10
5	*5775.00	104.8 PK			1.80 V	21	64.50	40.30
6	*5775.00	94.4 AV			1.80 V	21	54.10	40.30
7	11550.00	58.8 PK	74.0	-15.2	1.47 V	112	41.40	17.40
8	11550.00	46.5 AV	54.0	-7.5	1.47 V	112	29.10	17.40

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Worst-Case Data: 802.11a

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	154.33	34.4 QP	43.5	-9.1	1.49 H	227	48.00	-13.60
2	237.94	36.4 QP	46.0	-9.6	1.00 H	276	51.60	-15.20
3	317.65	35.1 QP	46.0	-10.9	1.00 H	0	47.30	-12.20
4	459.59	29.1 QP	46.0	-16.9	1.99 H	184	39.00	-9.90
5	624.85	33.3 QP	46.0	-12.7	1.26 H	204	39.80	-6.50
6	875.67	33.0 QP	46.0	-13.0	1.00 H	102	35.10	-2.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	125.17	30.5 QP	43.5	-13.0	1.00 V	309	46.40	-15.90
2	204.89	30.3 QP	43.5	-13.2	1.00 V	258	46.80	-16.50
3	375.98	37.0 QP	46.0	-9.0	1.00 V	119	48.40	-11.40
4	418.76	34.6 QP	46.0	-11.4	1.99 V	261	45.30	-10.70
5	624.85	32.4 QP	46.0	-13.6	1.00 V	153	38.90	-6.50
6	795.95	31.0 QP	46.0	-15.0	1.00 V	7	34.00	-3.00

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1.

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: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup

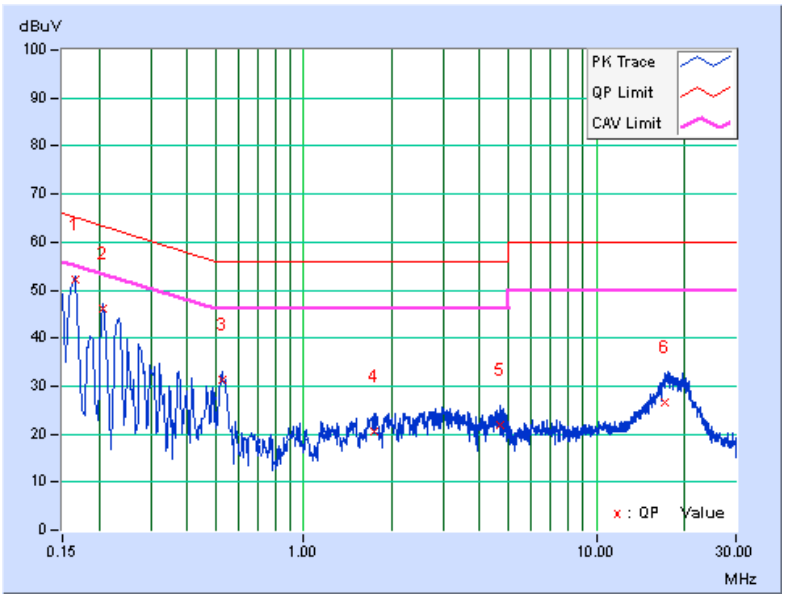
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16535	9.98	42.15	25.67	52.13	35.65	65.19	55.19	-13.06	-19.54
2	0.20631	10.06	36.13	21.57	46.19	31.63	63.35	53.35	-17.16	-21.72
3	0.52600	10.09	21.26	13.61	31.35	23.70	56.00	46.00	-24.65	-22.30
4	1.73391	10.21	10.32	4.31	20.53	14.52	56.00	46.00	-35.47	-31.48
5	4.69000	10.39	11.38	2.07	21.77	12.46	56.00	46.00	-34.23	-33.54
6	17.16200	10.96	15.69	8.77	26.65	19.73	60.00	50.00	-33.35	-30.27

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.

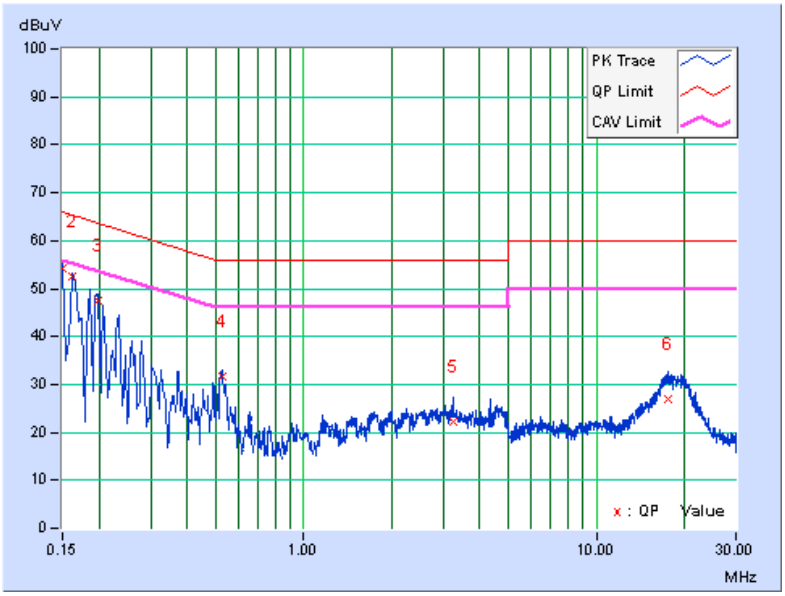


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15000**	**9.97**	**44.40**	**27.87**	**54.37**	**37.84**	**66.00**	**56.00**	**-11.63**	**-18.16**
2	0.16190	9.97	42.71	26.65	52.68	36.62	65.37	55.37	-12.68	-18.74
3	0.19780	10.00	37.39	19.16	47.39	29.16	63.70	53.70	-16.31	-24.54
4	0.52567	10.13	21.57	13.92	31.70	24.05	56.00	46.00	-24.30	-21.95
5	3.23800	10.37	11.86	4.98	22.23	15.35	56.00	46.00	-33.77	-30.65
6	17.65000	10.90	16.13	8.76	27.03	19.66	60.00	50.00	-32.97	-30.34

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 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

Operation Band	EUT Category	LIMIT
U-NII-1	- Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p

*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

For Power Output Measurement
For 802.11a, 802.11n (20MHz), 802.11n (40MHz), 802.11ac (20MHz), 802.11ac (40MHz)

For 802.11ac (80MHz)

For Occupied Bandwidth

4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

FOR AVERAGE POWER MEASUREMENT

For 802.11a, 802.11n (20MHz), 802.11n (40MHz), 802.11ac (20MHz), 802.11ac (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.

For 802.11ac (80MHz)
1) Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
2) Set sweep trigger to “free run”.
3) Set RBW = 1 MHz.
4) Set VBW ≥ 3 MHz
5) Number of points in sweep ≥ 2 Span / RBW.
6) Sweep time ≤ (number of points in sweep) * T
7) Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
8) Detector = RMS.
9) Trace mode = max hold.
10) Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.

FOR OCCUPIED BANDWIDTH
The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 300 kHz RBW and 1MHz VBW. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission

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 lowest, middle and highest channel frequencies individually.

4.3.7 Test Result

Power Output:

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	21.15	20.99	21.11	21.23	517.781	27.14	30	Pass
157	5785	24.21	24.20	23.74	23.13	**968.841**	29.86	30	Pass
165	5825	22.48	22.03	22.65	22.87	714.318	28.54	30	Pass

802.11n (20MHz)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	21.32	20.97	21.09	21.24	522.119	27.18	30	Pass
157	5785	23.97	23.86	23.69	22.48	903.574	29.56	30	Pass
165	5825	21.98	21.51	21.86	22.24	620.296	27.93	30	Pass

802.11n (40MHz)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	19.83	19.61	19.57	19.83	374.306	25.73	30	Pass
159	5795	21.87	21.79	21.88	22.06	619.687	27.92	30	Pass

802.11ac (80MHz)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	17.45	17.38	17.39	17.62	222.93	23.48	30	Pass

802.11ac (80MHz+80MHz)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	17.51	17.63	114.307	20.58	30	Pass
Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 2	Chain 3				
155	5775	17.45	17.38	110.292	20.43	30	Pass

Beamforming_NSS1 Mode

802.11n (20MHz)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	20.67	20.55	20.57	20.98	469.521	26.72	28.37	Pass
157	5785	22.51	22.37	22.51	22.11	**691.615**	28.40	28.47	Pass
165	5825	21.92	21.88	21.67	21.99	614.785	27.89	28.37	Pass

Note:

5745MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power limit shall be reduced to 30-(7.63-6) = 28.37dBm.

5785MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power limit shall be reduced to 30-(7.53-6) = 28.47dBm.

5825MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power limit shall be reduced to 30-(7.63-6) = 28.37dBm.

802.11n (40MHz)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	19.80	19.51	19.45	19.96	372.018	25.71	28.47	Pass
159	5795	21.75	21.84	21.86	22.08	617.279	27.90	28.37	Pass

Note:

5755MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power limit shall be reduced to 30-(7.53-6) = 28.47dBm.

5795MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power limit shall be reduced to 30-(7.63-6) = 28.37dBm.

802.11ac (80MHz)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	17.30	17.04	17.22	17.56	214.024	23.30	28.47	Pass

Note:

5775MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power limit shall be reduced to 30-(7.53-6) = 28.47dBm.

802.11ac (80MHz+80MHz)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	17.08	17.19	103.41	20.15	30	Pass
Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 2	Chain 3				
155	5775	17.14	17.35	106.086	20.26	30	Pass

Note: Directional gain = 1.51dBi + 10log(2) = 4.52dBi < 6dBi, so the power limit no need to reduced.

Beamforming_NSS2 Mode

802.11n (20MHz)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
149	5745	22.35	22.17	22.22	22.04	663.288	28.22	30	Pass
157	5785	23.21	23.41	23.52	23.61	**883.211**	29.46	30	Pass
165	5825	22.74	22.35	22.63	22.50	720.782	28.58	30	Pass

Note:

5745MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi < 6dBi, so the power limit no need to reduced.

5785MHz: Directional gain = 1.51dBi + 10log(4/2) = 4.52dBi < 6dBi, so the power limit no need to reduced.

5825MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi < 6dBi, so the power limit no need to reduced.

802.11n (40MHz)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
151	5755	19.81	19.67	19.52	19.81	373.657	25.72	30	Pass
159	5795	21.86	21.75	21.89	22.05	617.936	27.91	30	Pass

Note:

5755MHz: Directional gain = 1.51dBi + 10log(4/2) = 4.52dBi < 6dBi, so the power limit no need to reduced.

5795MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi < 6dBi, so the power limit no need to reduced.

802.11ac (80MHz)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
155	5775	17.35	17.08	17.07	17.76	216.012	23.34	30	Pass

Note:

5775MHz: Directional gain = 1.51dBi + 10log(4/2) = 4.52dBi < 6dBi, so the power limit no need to reduced.

26dB Bandwidth:

CDD Mode

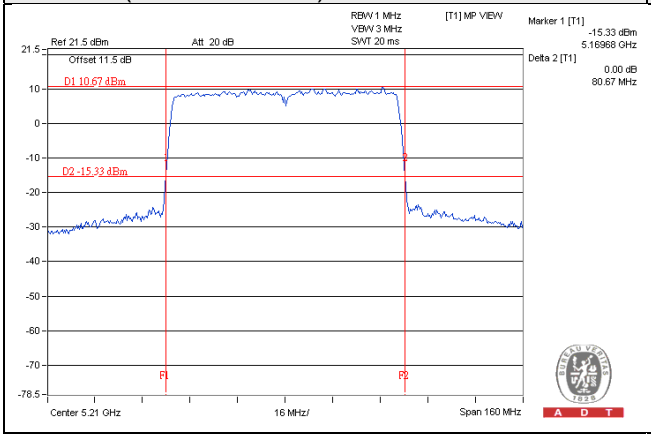
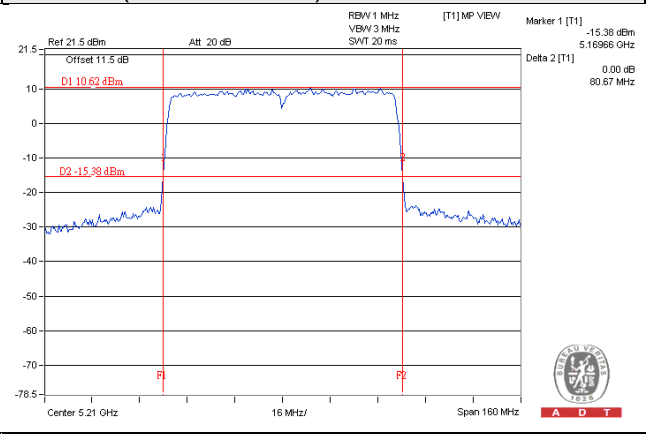
802.11ac (80MHz+80MHz)

Channel	Channel Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
42	5210	80.62	80.67	Pass

Beamforming_NSS1 Mode

802.11ac (80MHz+80MHz)

Channel	Channel Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
42	5210	80.63	80.67	Pass

Spectrum Plot of Worst Value	
CDD Mode	Beamforming_NSS1 Mode
802.11ac (80MHz+80MHz)	802.11ac (80MHz+80MHz)
	

Occupied Bandwidth:

CDD Mode

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
149	5745	16.43	16.43	16.43	16.43
157	5785	16.56	16.68	17.64	16.44
165	5825	16.44	16.44	16.44	16.44

802.11n (20MHz)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
149	5745	17.64	17.64	17.64	17.64
157	5785	17.64	17.64	17.64	17.64
165	5825	17.64	17.64	17.64	17.64

802.11n (40MHz)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
151	5755	36.48	36.24	36.24	36.48
159	5795	36.36	36.24	36.36	36.36

802.11ac (80MHz)

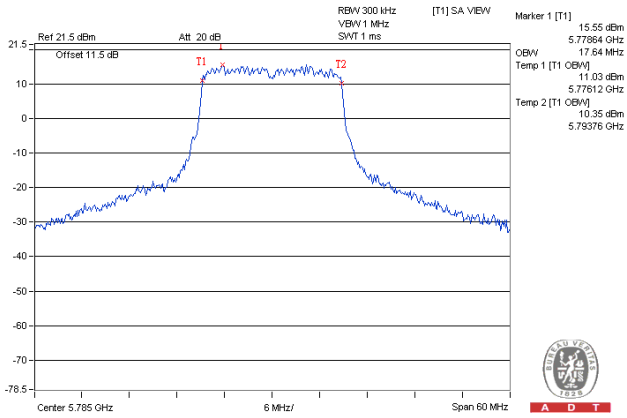
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
155	5775	75.60	75.60	75.60	75.88

802.11ac (80MHz+80MHz)

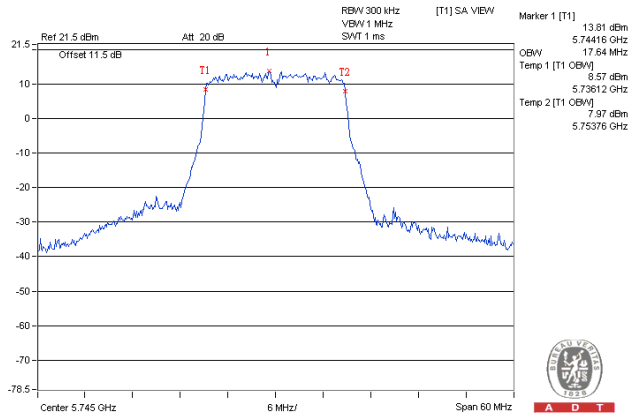
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	75.60	75.88		
155	5775	-	-	75.68	75.68

Spectrum Plot of Worst Value

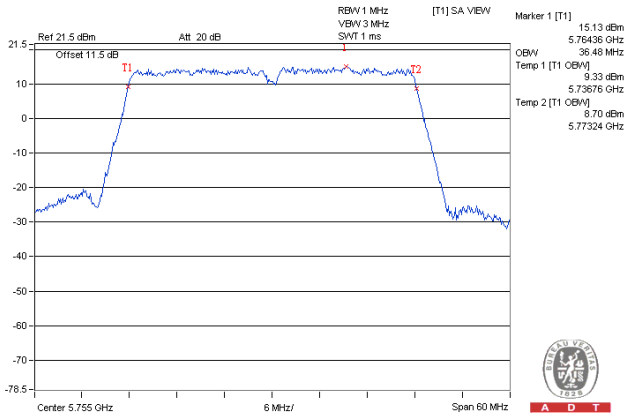
802.11a



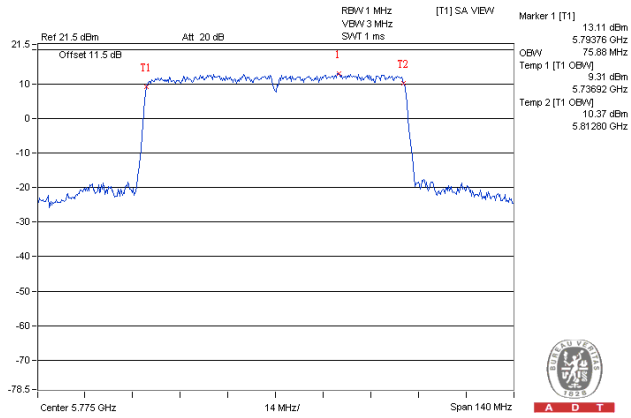
802.11n (20MHz)



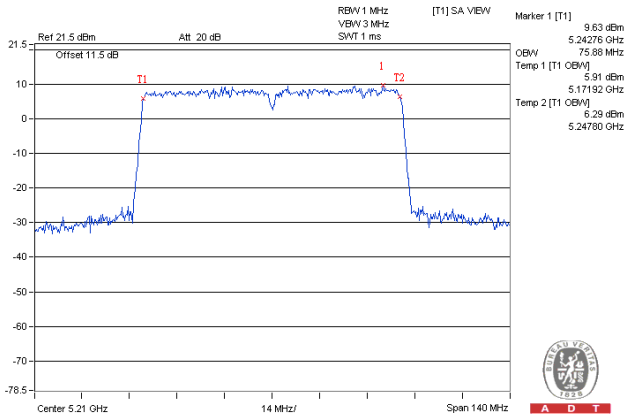
802.11n (40MHz)



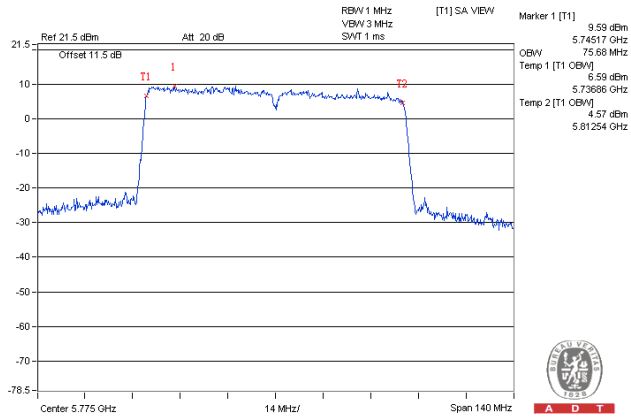
802.11ac (80MHz)



802.11ac (80MHz+80MHz)_CH 42



802.11ac (80MHz+80MHz)_CH 155



Beamforming_NSS1 Mode

802.11n (20MHz)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
149	5745	17.65	17.65	17.65	17.65
157	5785	17.64	17.64	17.64	17.65
165	5825	17.64	17.64	17.64	17.64

802.11n (40MHz)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
151	5755	36.48	36.36	36.36	36.48
159	5795	36.36	36.36	36.24	36.36

802.11ac (80MHz)

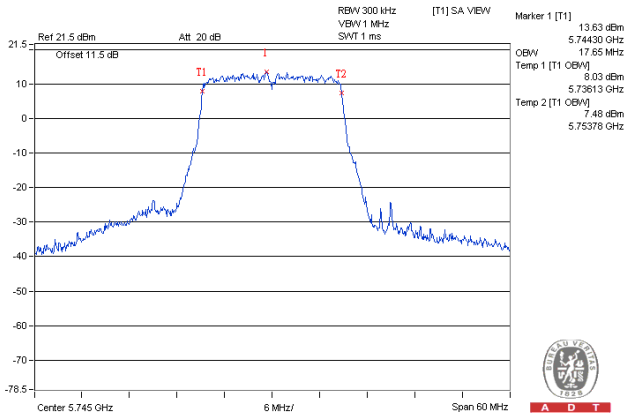
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
155	5775	75.60	75.88	75.60	75.88

802.11ac (80MHz+80MHz)

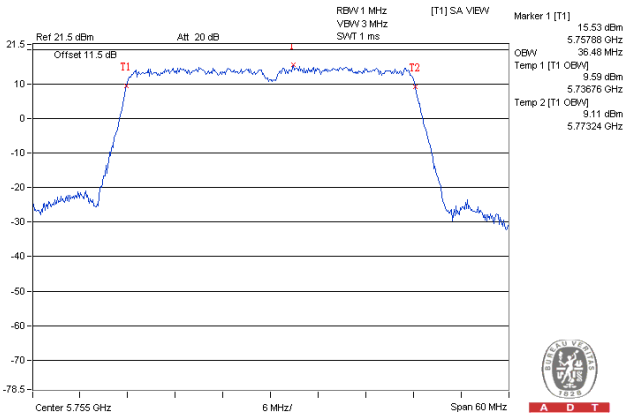
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	75.60	75.88		
155	5775	-	-	75.68	75.68

Spectrum Plot of Worst Value

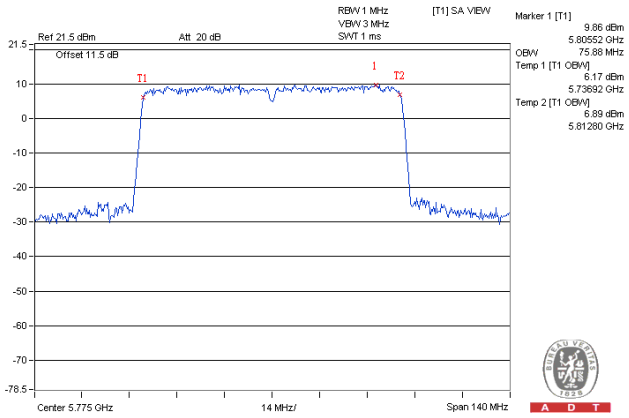
802.11n (20MHz)



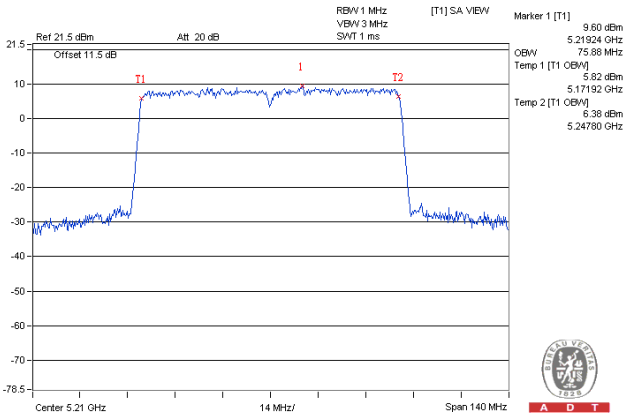
802.11n (40MHz)



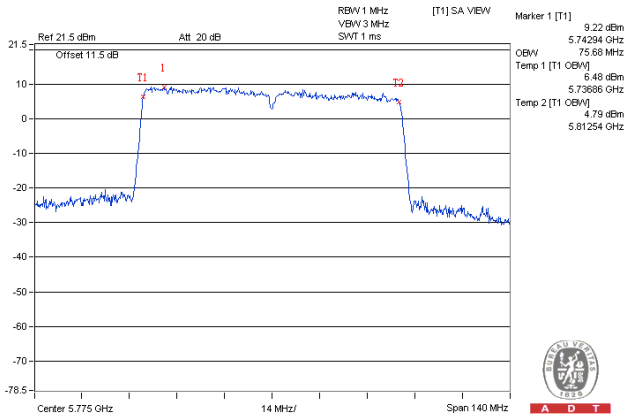
802.11ac (80MHz)



802.11ac (80MHz+80MHz)_CH 42



802.11ac (80MHz+80MHz)_CH 155



Beamforming_NSS2 Mode

802.11n (20MHz)

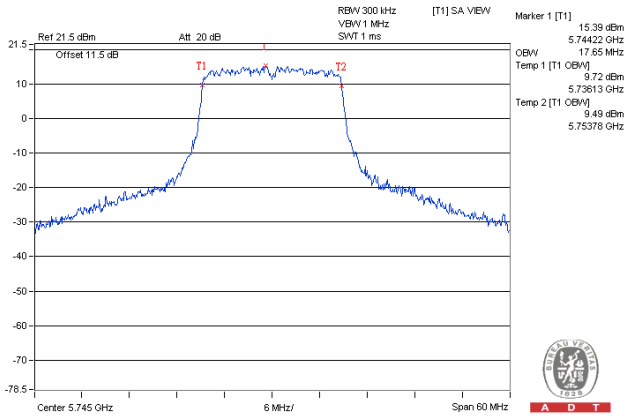
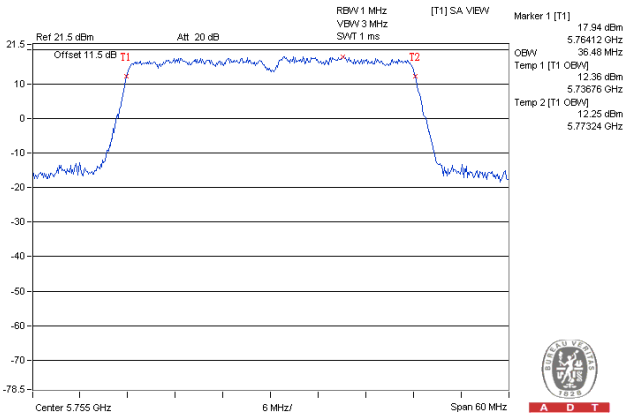
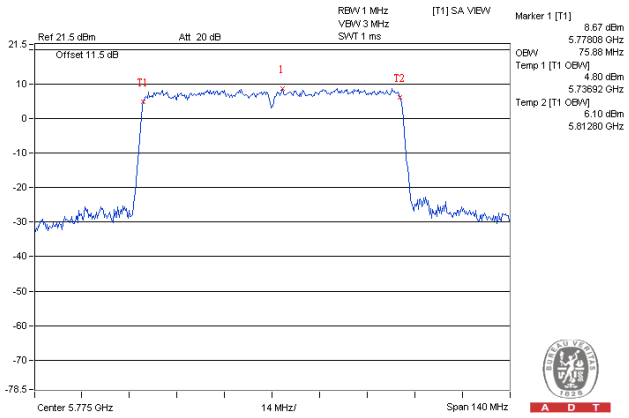
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
149	5745	17.65	17.65	17.65	17.65
157	5785	17.64	17.64	17.64	17.64
165	5825	17.64	17.64	17.64	17.64

802.11n (40MHz)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
151	5755	36.48	36.24	36.36	36.48
159	5795	36.36	36.24	36.36	36.36

802.11ac (80MHz)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
155	5775	75.60	75.60	75.60	75.88

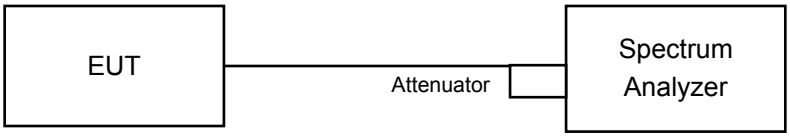
Spectrum Plot of Worst Value	
802.11n (20MHz)	802.11n (40MHz)
	
802.11ac (80MHz)	
	

4.4 Peak Power Spectral Density Measurement

4.4.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		LIMIT
U-NII-1	-	Outdoor Access Point	17dBm/ MHz
	-	Fixed point-to-point Access Point	
	√	Indoor Access Point	
	-	Mobile and Portable client device	11dBm/ MHz
U-NII-2A	---		11dBm/ MHz
U-NII-2C	---		11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

For U-NII-1 band:

Using method SA-2

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 = auto, trigger set to “free run”.
4) Trace average at least 100 traces in power averaging mode.
5) Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:

Duty cycle >98%

1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3) Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.

4) Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz/300kHz)
5) Sweep time = auto, trigger set to “free run”.
6) Trace average at least 100 traces in power averaging mode.
7) Record the max value

Duty cycle <98%

1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3) Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4) Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500kHz/300kHz)
5) Sweep time = auto, trigger set to “free run”.
6) Trace average at least 100 traces in power averaging mode.
7) Record the max value and add 10 log (1/duty cycle)

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

For U-NII-1 Band

CDD Mode

802.11ac (80MHz+80MHz)

Chan.	Chan. Freq. (MHz)	PSD (dBm)		Total PSD (dBm)	Max. Limit (dBm)	Pass/Fail
		Chain 0	Chain 1			
42	5210	-0.09	-0.92	2.70	17	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. 5210MHz: Directional gain = 0.81dBi + 10log(2) = 3.82dBi < 6dBi, so the power density limit no need to reduced.

Beamforming_NSS1 Mode

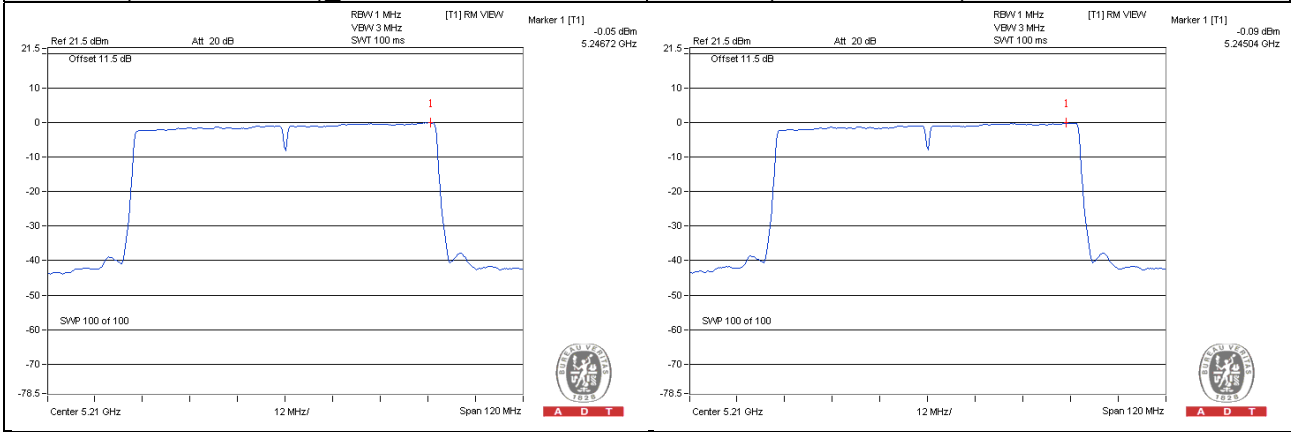
802.11ac (80MHz+80MHz)

Chan.	Chan. Freq. (MHz)	PSD (dBm)		Total PSD (dBm)	Max. Limit (dBm)	Pass/Fail
		Chain 0	Chain 1			
42	5210	-0.09	-0.90	2.68	17	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. 5210MHz: Directional gain = 0.81dBi + 10log(2) = 3.82dBi < 6dBi, so the power density limit no need to reduced.

Spectrum Plot of Worst Value	
CDD Mode	Beamforming_NSS1 Mode
802.11ac (80MHz+80MHz)_CH 42/ Chain 0	802.11ac (80MHz+80MHz)



For U-NII-3 Band

CDD Mode

802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	149	5745	1.23	3.45	6.02	0.18	9.65	28.37	Pass
	157	5785	3.50	5.72	6.02	0.18	11.92	28.47	Pass
	165	5825	2.22	4.44	6.02	0.18	10.64	28.37	Pass
1	149	5745	-0.05	2.17	6.02	0.18	8.37	28.37	Pass
	157	5785	2.68	4.90	6.02	0.18	11.10	28.47	Pass
	165	5825	1.46	3.68	6.02	0.18	9.88	28.37	Pass
2	149	5745	0.56	2.78	6.02	0.18	8.98	28.37	Pass
	157	5785	2.87	5.09	6.02	0.18	11.29	28.47	Pass
	165	5825	1.38	3.60	6.02	0.18	9.80	28.37	Pass
3	149	5745	0.17	2.39	6.02	0.18	8.59	28.37	Pass
	157	5785	2.71	4.93	6.02	0.18	11.13	28.47	Pass
	165	5825	1.70	3.92	6.02	0.18	10.12	28.37	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. 5745MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 30-(7.63-6) = 28.37dBm.

   5785MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power density limit shall be reduced to 30-(7.53-6) = 28.47dBm.

   5825MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 30-(7.63-6) = 28.37dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	149	5745	1.05	3.27	6.02	9.29	28.37	Pass
	157	5785	3.37	5.59	6.02	11.61	28.47	Pass
	165	5825	1.23	3.45	6.02	9.47	28.37	Pass
1	149	5745	-0.35	1.87	6.02	7.89	28.37	Pass
	157	5785	2.14	4.36	6.02	10.38	28.47	Pass
	165	5825	0.68	2.90	6.02	8.92	28.37	Pass
2	149	5745	0.31	2.53	6.02	8.55	28.37	Pass
	157	5785	2.84	5.06	6.02	11.08	28.47	Pass
	165	5825	2.59	4.81	6.02	10.83	28.37	Pass
3	149	5745	0.01	2.23	6.02	8.25	28.37	Pass
	157	5785	2.50	4.72	6.02	10.74	28.47	Pass
	165	5825	0.92	3.14	6.02	9.16	28.37	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. 5745MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 30-(7.63-6) = 28.37dBm.

   5785MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power density limit shall be reduced to 30-(7.53-6) = 28.47dBm.

   5825MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 30-(7.63-6) = 28.37dBm.

802.11n (40MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	151	5755	-3.99	-1.77	6.02	0.12	4.37	28.47	Pass
	159	5795	-1.50	0.72	6.02	0.12	6.86	28.37	Pass
1	151	5755	-4.93	-2.71	6.02	0.12	3.43	28.47	Pass
	159	5795	-2.26	-0.04	6.02	0.12	6.10	28.37	Pass
2	151	5755	-4.93	-2.71	6.02	0.12	3.43	28.47	Pass
	159	5795	-2.27	-0.05	6.02	0.12	6.09	28.37	Pass
3	151	5755	-5.44	-3.22	6.02	0.12	2.92	28.47	Pass
	159	5795	-2.37	-0.15	6.02	0.12	5.99	28.37	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. 5755MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power density limit shall be reduced to 30-(7.53-6) = 28.47dBm.

   5795MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 30-(7.63-6) = 28.37dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (80MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	155	5775	-9.50	-7.28	6.02	0.33	-0.93	28.47	Pass
1	155	5775	-10.33	-8.11	6.02	0.33	-1.76	28.47	Pass
2	155	5775	-10.54	-8.32	6.02	0.33	-1.97	28.47	Pass
3	155	5775	-6.28	-4.06	6.02	0.33	2.29	28.47	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. 5775MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power density limit shall be reduced to 30-(7.53-6) = 28.47dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (80MHz+80MHz)

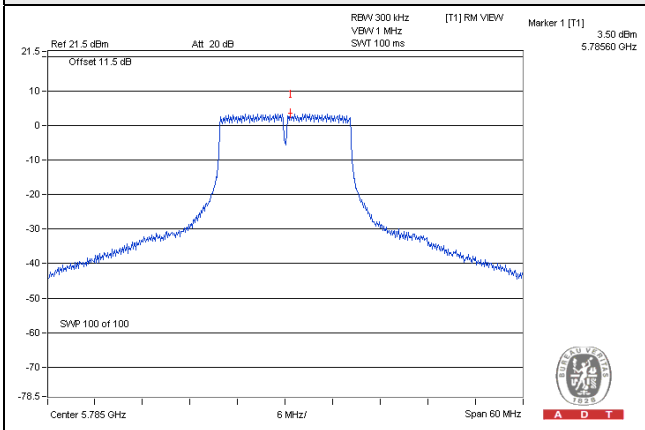
TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
2	155	5775	-9.58	-7.36	6.02	0.20	-4.15	30.00	Pass
3	155	5775	-9.47	-7.25	6.02	0.20	-4.04	30.00	Pass

Note:

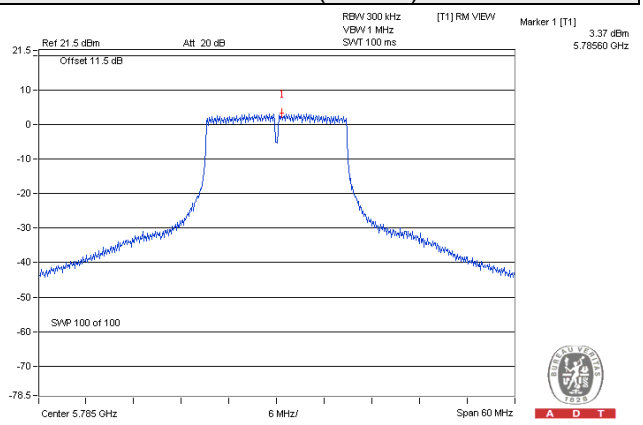
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. 5775MHz: Directional gain = 1.51dBi + 10log(2) = 4.52dBi < 6dBi, so the power density limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

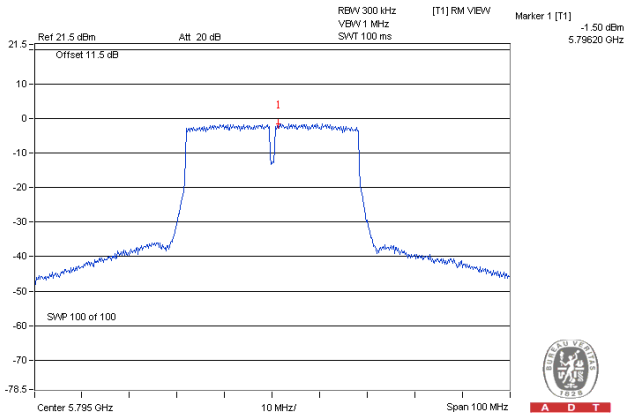
802.11a



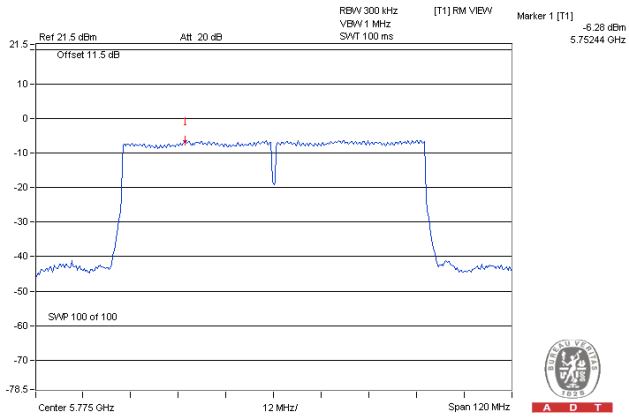
802.11n (20MHz)



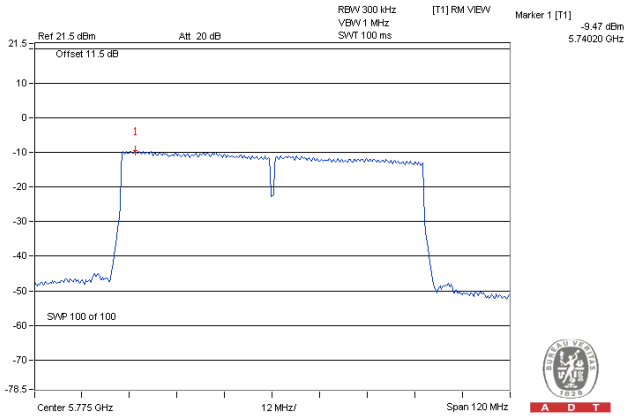
802.11n (40MHz)



802.11ac (80MHz)



802.11ac (80MHz+80MHz)



Beamforming_NSS1 Mode

802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	149	5745	0.73	2.95	6.02	8.97	28.37	Pass
	157	5785	2.62	4.84	6.02	10.86	28.47	Pass
	165	5825	1.38	3.60	6.02	9.62	28.37	Pass
1	149	5745	0.54	2.76	6.02	8.78	28.37	Pass
	157	5785	2.48	4.70	6.02	10.72	28.47	Pass
	165	5825	1.34	3.56	6.02	9.58	28.37	Pass
2	149	5745	-0.12	2.10	6.02	8.12	28.37	Pass
	157	5785	1.84	4.06	6.02	10.08	28.47	Pass
	165	5825	0.59	2.81	6.02	8.83	28.37	Pass
3	149	5745	-0.36	1.86	6.02	7.88	28.37	Pass
	157	5785	1.71	3.93	6.02	9.95	28.47	Pass
	165	5825	1.10	3.32	6.02	9.34	28.37	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. 5745MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 30-(7.63-6) = 28.37dBm.

   5785MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power density limit shall be reduced to 30-(7.53-6) = 28.47dBm.

   5825MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 30-(7.63-6) = 28.37dBm.

802.11n (40MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	151	5755	-3.96	-1.74	6.02	0.15	4.43	28.47	Pass
	159	5795	-1.34	0.88	6.02	0.15	7.05	28.37	Pass
1	151	5755	-4.01	-1.79	6.02	0.15	4.38	28.47	Pass
	159	5795	-1.50	0.72	6.02	0.15	6.89	28.37	Pass
2	151	5755	-4.93	-2.71	6.02	0.15	3.46	28.47	Pass
	159	5795	-2.10	0.12	6.02	0.15	6.29	28.37	Pass
3	151	5755	-5.41	-3.19	6.02	0.15	2.98	28.47	Pass
	159	5795	-2.32	-0.10	6.02	0.15	6.07	28.37	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. 5755MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power density limit shall be reduced to 30-(7.53-6) = 28.47dBm.

   5795MHz: Directional gain = 1.61dBi + 10log(4) = 7.63dBi > 6dBi, so the power density limit shall be reduced to 30-(7.63-6) = 28.37dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (80MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	155	5775	-9.34	-7.12	6.02	0.30	-0.80	28.47	Pass
1	155	5775	-9.39	-7.17	6.02	0.30	-0.85	28.47	Pass
2	155	5775	-10.38	-8.16	6.02	0.30	-1.84	28.47	Pass
3	155	5775	-10.65	-8.43	6.02	0.30	-2.11	28.47	Pass

Note:

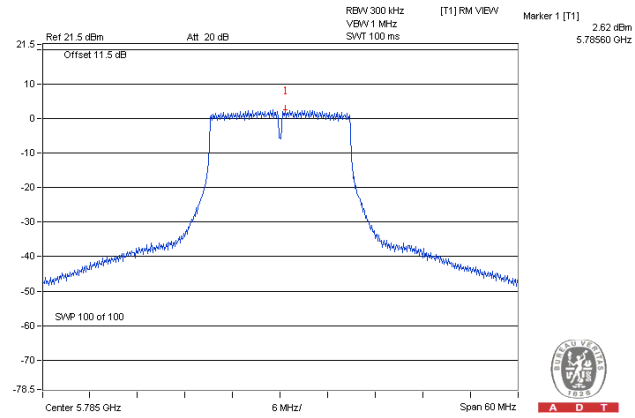
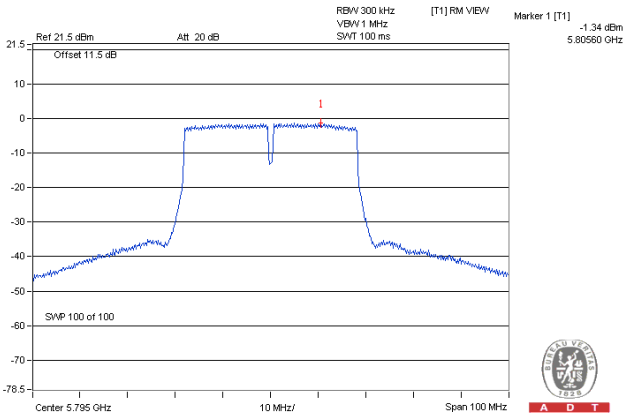
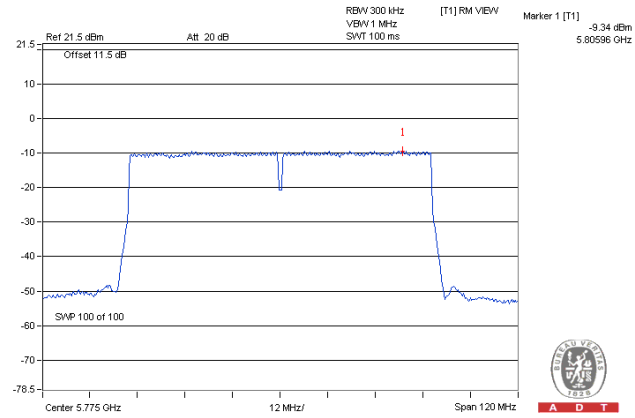
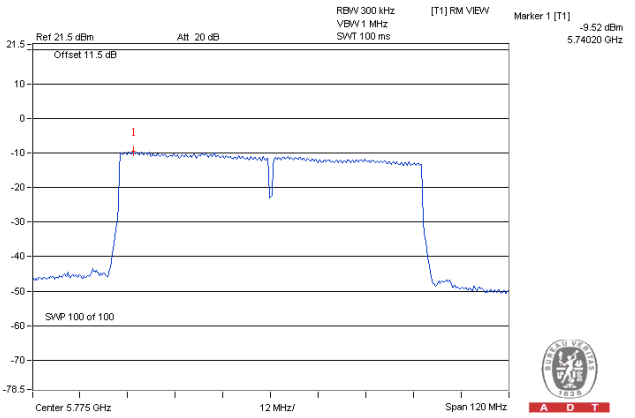
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. 5775MHz: Directional gain = 1.51dBi + 10log(4) = 7.53dBi > 6dBi, so the power density limit shall be reduced to 30-(7.53-6) = 28.47dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (80MHz+80MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
2	155	5775	-9.60	-7.38	6.02	0.16	-4.21	30.00	Pass
3	155	5775	-9.52	-7.30	6.02	0.16	-4.13	30.00	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. 5775MHz: Directional gain = 1.51dBi + 10log(2) = 4.52dBi < 6dBi, so the power density limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11n (20MHz)	802.11n (40MHz)
	
802.11ac (80MHz)	802.11ac (80MHz+80MHz)
	

Beamforming_NSS2 Mode

802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	149	5745	2.65	4.87	6.02	10.89	30	Pass
	157	5785	3.47	5.69	6.02	11.71	30	Pass
	165	5825	2.50	4.72	6.02	10.74	30	Pass
1	149	5745	1.21	3.43	6.02	9.45	30	Pass
	157	5785	2.29	4.51	6.02	10.53	30	Pass
	165	5825	1.68	3.90	6.02	9.92	30	Pass
2	149	5745	1.92	4.14	6.02	10.16	30	Pass
	157	5785	2.81	5.03	6.02	11.05	30	Pass
	165	5825	1.64	3.86	6.02	9.88	30	Pass
3	149	5745	1.50	3.72	6.02	9.74	30	Pass
	157	5785	2.58	4.80	6.02	10.82	30	Pass
	165	5825	1.92	4.14	6.02	10.16	30	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. 5745MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi < 6dBi, so the power density limit no need to reduced.

   5785MHz: Directional gain = 1.51dBi + 10log(4/2) = 4.52dBi < 6dBi, so the power density limit no need to reduced.

   5825MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi < 6dBi, so the power density limit no need to reduced.

802.11n (40MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	151	5755	-1.04	1.18	6.02	0.13	7.33	30	Pass
	159	5795	-1.40	0.82	6.02	0.13	6.97	30	Pass
1	151	5755	-4.92	-2.70	6.02	0.13	3.45	30	Pass
	159	5795	-2.21	0.01	6.02	0.13	6.16	30	Pass
2	151	5755	-4.92	-2.70	6.02	0.13	3.45	30	Pass
	159	5795	-2.28	-0.06	6.02	0.13	6.09	30	Pass
3	151	5755	-5.31	-3.09	6.02	0.13	3.06	30	Pass
	159	5795	-3.04	-0.82	6.02	0.13	5.33	30	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. 5755MHz: Directional gain = 1.51dBi + 10log(4/2) = 4.52dBi < 6dBi, so the power density limit no need to reduced.

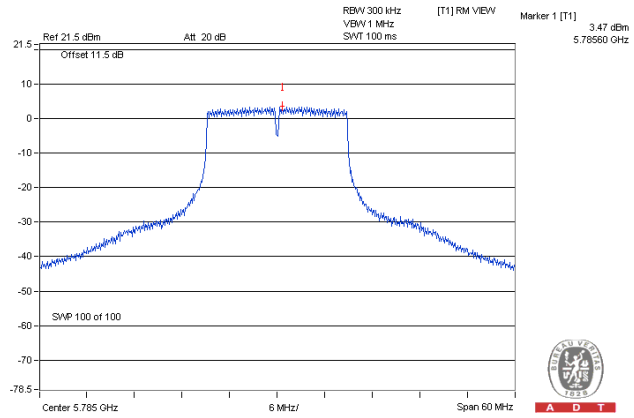
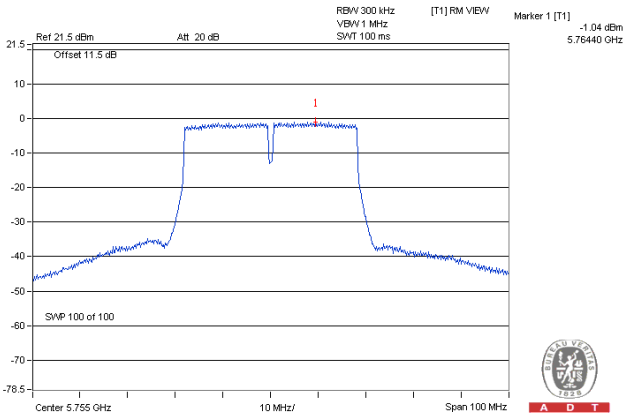
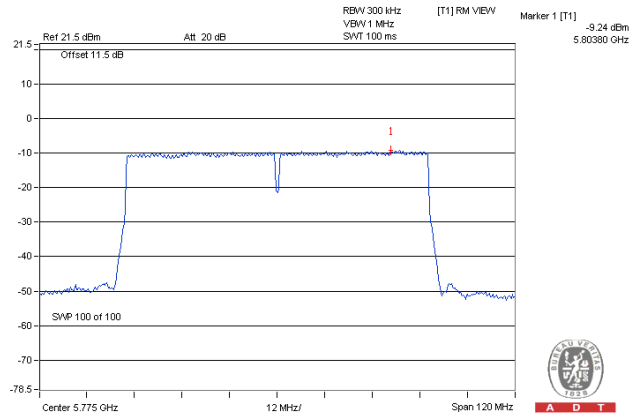
   5795MHz: Directional gain = 1.61dBi + 10log(4/2) = 4.62dBi < 6dBi, so the power density limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (80MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
0	155	5775	-9.24	-7.02	6.02	0.30	-0.70	30	Pass
1	155	5775	-10.25	-8.03	6.02	0.30	-1.71	30	Pass
2	155	5775	-10.41	-8.19	6.02	0.30	-1.87	30	Pass
3	155	5775	-10.72	-8.50	6.02	0.30	-2.18	30	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. 5775MHz: Directional gain = 1.51dBi + 10log(4/2) = 4.52dBi < 6dBi, so the power density limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

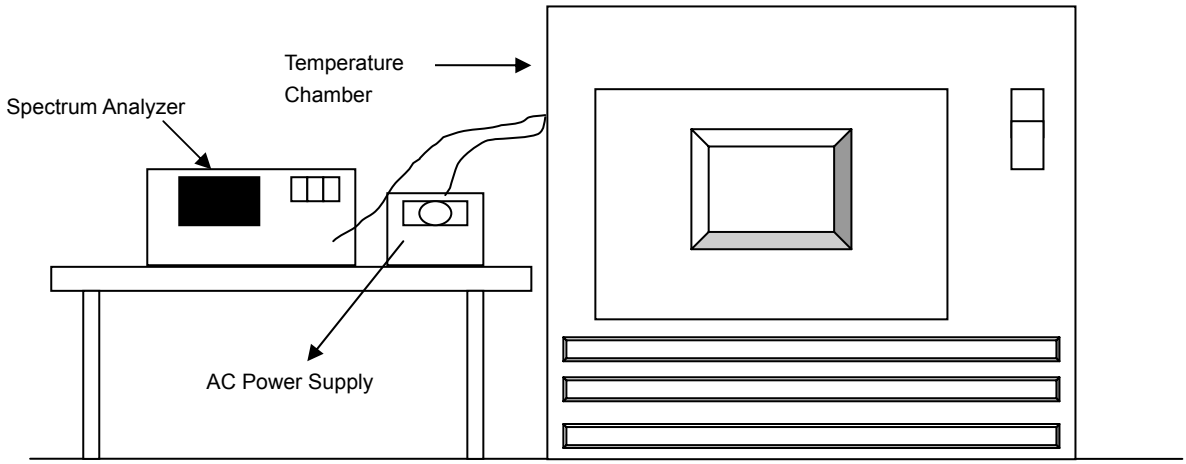
Spectrum Plot of Worst Value	
802.11n (20MHz)	802.11n (40MHz)
	
802.11ac (80MHz)	
	

4.5 Frequency Stability

4.5.1 Limits of Frequency Stability Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.

b. Turn the EUT on and couple its output to a spectrum analyzer.

c. Turn the EUT off and set the chamber to the highest temperature specified.

d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5 and 10 minutes.

e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.

f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

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

4.5.7 Test Results

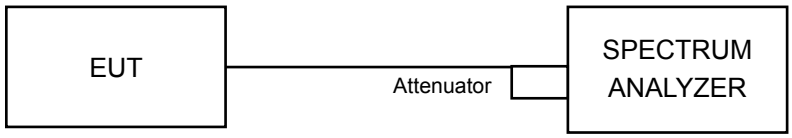
Frequency Stability Versus Temp.	
Operating Frequency: 5745MHz	
Temp. (	

4.6 6dB Bandwidth Measurement

4.6.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

a. Set resolution bandwidth (RBW) = 100kHz

b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.

c. Trace mode = max hold.

d. Sweep = auto couple.

e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.6.7 Test Results

CDD Mode

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.37	16.39	16.38	16.36	0.5	Pass
157	5785	16.37	16.37	17.59	16.37	0.5	Pass
165	5825	16.38	16.37	16.39	16.37	0.5	Pass

802.11n (20MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.59	17.62	17.62	17.57	0.5	Pass
157	5785	17.61	17.60	17.60	17.20	0.5	Pass
165	5825	17.61	16.98	17.61	17.57	0.5	Pass

802.11n (40MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	36.42	35.80	36.35	36.42	0.5	Pass
159	5795	36.43	35.50	36.36	36.41	0.5	Pass

802.11ac (80MHz)

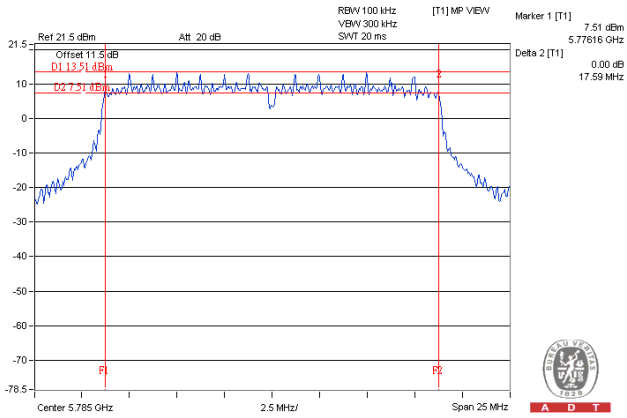
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	76.47	76.09	76.09	76.05	0.5	Pass

802.11ac (80MHz+80MHz)

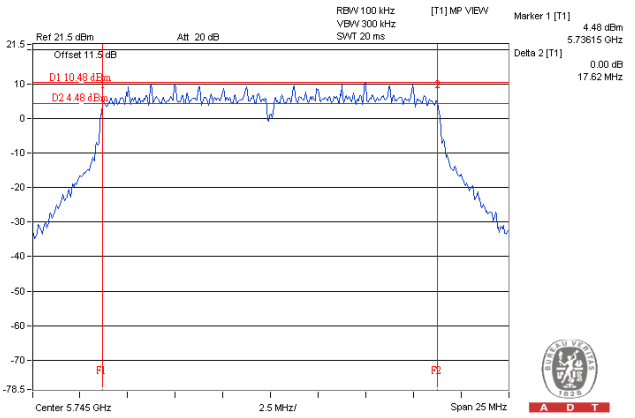
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 2	Chain 3		
155	5775	75.96	75.90	0.5	PASS

Spectrum Plot of Worst Value

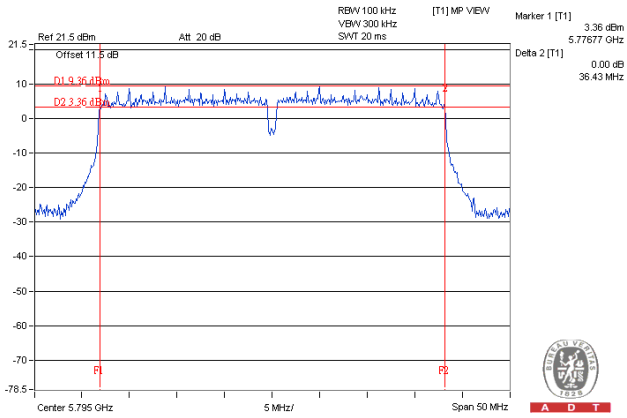
802.11a



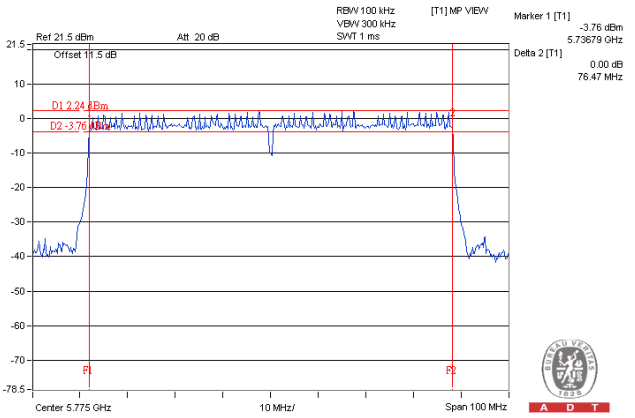
802.11n (20MHz)



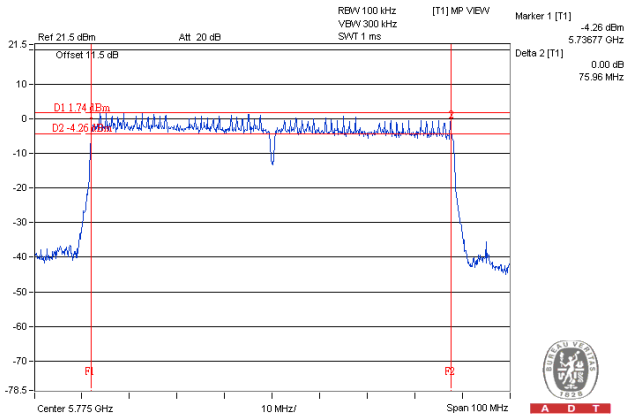
802.11n (40MHz)



802.11ac (80MHz)



802.11ac (80MHz+80MHz)



Beamforming_NSS1 Mode

802.11n (20MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.57	17.59	17.60	17.18	0.5	Pass
157	5785	17.62	17.58	17.59	17.56	0.5	Pass
165	5825	17.61	17.59	17.60	17.59	0.5	Pass

802.11n (40MHz)

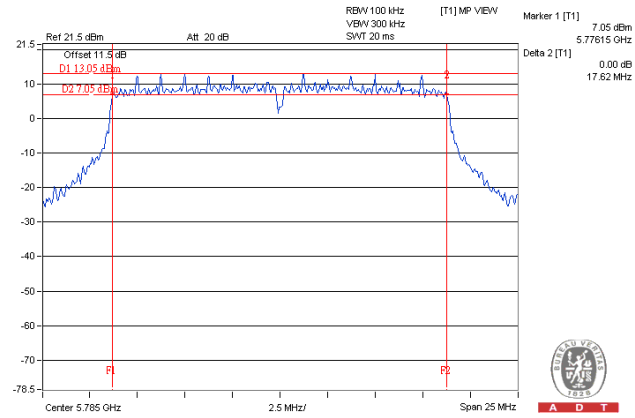
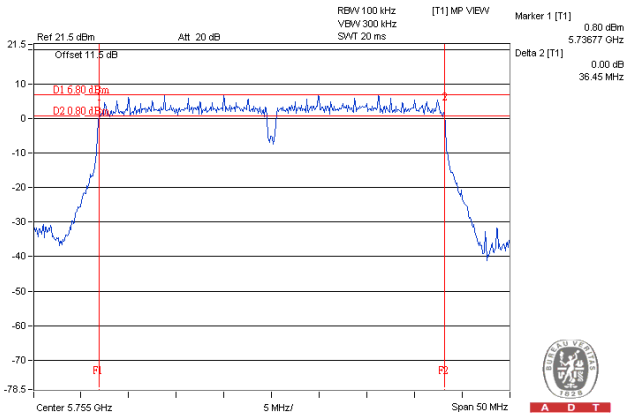
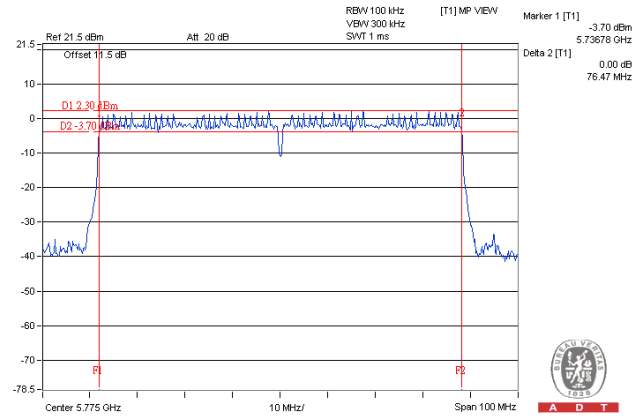
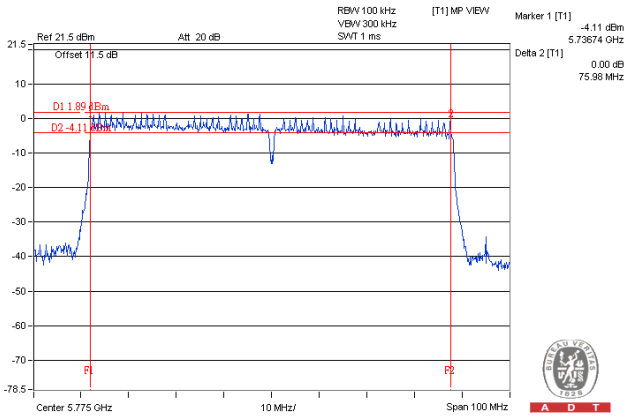
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	36.45	36.42	35.96	36.44	0.5	Pass
159	5795	36.38	36.37	35.46	36.41	0.5	Pass

802.11ac (80MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	76.46	76.47	76.08	76.47	0.5	Pass

802.11ac (80MHz+80MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 2	Chain 3		
155	5775	75.98	75.91	0.5	PASS

Spectrum Plot of Worst Value	
802.11n (20MHz)	802.11n (40MHz)
	
802.11ac (80MHz)	802.11ac (80MHz+80MHz)
	

Beamforming_NSS2 Mode

802.11n (20MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.57	17.60	17.60	17.16	0.5	Pass
157	5785	17.58	17.62	17.59	17.19	0.5	Pass
165	5825	17.60	17.60	17.61	17.21	0.5	Pass

802.11n (40MHz)

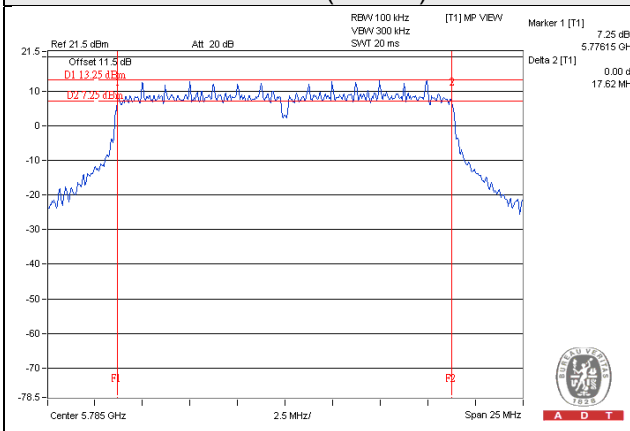
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	36.44	35.29	35.95	36.45	0.5	Pass
159	5795	36.41	35.43	35.41	36.37	0.5	Pass

802.11ac (80MHz)

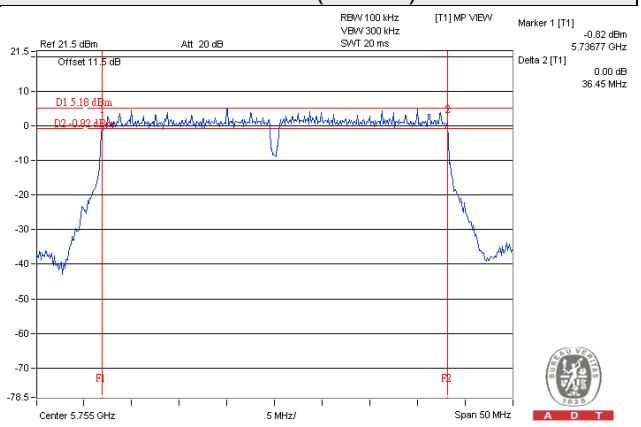
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	76.46	76.09	76.07	76.08	0.5	Pass

Spectrum Plot of Worst Value

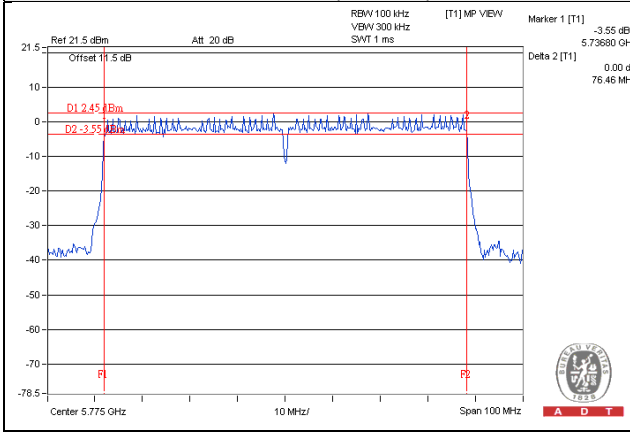
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)



5 Pictures of Test Arrangements

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

Appendix – 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/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety 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.

--- END ---