

FCC Test Report

Report No.: RF141013E03E-1

FCC ID: PY314300285

Test Model: C7000

Received Date: Nov. 03, 2014

Test Date: Nov. 03 to Dec. 01, 2014 & Aug. 07, 2015

Issued Date: Sep. 22, 2015

Applicant: NETGEAR, Inc.

Address: 350 East Plumeria Drive San Jose, CA 95134

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

Lab Address: No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin
Chu Hsien 307, Taiwan R.O.C.

Test Location (1): No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin
Chu Hsien 307, Taiwan R.O.C.

Test Location (2): No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin
Chu Hsien 307, Taiwan R.O.C.

Test Location (3): E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
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	4
1 Certificate of Conformity	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Modification Record	6
3 General Information	7
3.1 General Description of EUT	7
3.2 Description of Test Modes	10
3.2.1 Test Mode Applicability and Tested Channel Detail	11
3.3 Duty Cycle of Test Signal	13
3.4 Description of Support Units	14
3.4.1 Configuration of System under Test	15
3.5 General Description of Applied Standard	16
4 Test Types and Results	17
4.1 Radiated Emission and Bandedge Measurement	17
4.1.1 Limits of Radiated Emission and Bandedge Measurement	17
4.1.2 Test Instruments	18
4.1.3 Test Procedure	20
4.1.4 Deviation from Test Standard	20
4.1.5 Test Setup	21
4.1.6 EUT Operating Condition	21
4.1.7 Test Results	22
4.2 Transmit Power Measurement	32
4.2.1 Limits of Transmit Power Measurement	32
4.2.2 Test Setup	32
4.2.3 Test Instruments	32
4.2.4 Test Procedure	32
4.2.5 Deviation from Test Standard	32
4.2.6 EUT Operating Condition	32
4.2.7 Test Result	33
4.3 Peak Power Spectral Density Measurement	34
4.3.1 Limits of Peak Power Spectral Density Measurement	34
4.3.2 Test Setup	34
4.3.3 Test Instruments	34
4.3.4 Test Procedure	34
4.3.5 Deviation from Test Standard	35
4.3.6 EUT Operating Condition	35
4.3.7 Test Results	36
4.4 Frequency Stability Measurement	41
4.4.1 Limits of Frequency Stability Measurement	41
4.4.2 Test Setup	41
4.4.3 Test Instruments	41
4.4.4 Test Procedure	41
4.4.5 Deviation from Test Standard	41
4.4.6 EUT Operating Condition	41
4.4.7 Test Results	42
4.5 6dB Bandwidth Measurement	43
4.5.1 Limits of 6dB Bandwidth Measurement	43
4.5.2 Test Setup	43
4.5.3 Test Instruments	43
4.5.4 Test Procedure	43
4.5.5 Deviation from Test Standard	43
4.5.6 EUT Operating Condition	43



4.5.7 Test Results	44
5 Pictures of Test Arrangements	48
Appendix – Information on the Testing Laboratories	49



A D T

Release Control Record

Issue No.	Description	Date Issued
RF141013E03E-1	Original release.	Sep. 22, 2015



A D T

1 Certificate of Conformity

Product: AC1900 WiFi Cable Modem Router

Brand: NETGEAR

Test Model: C7000

Sample Status: ENGINEERING SAMPLE

Applicant: NETGEAR, Inc.

Test Date: Nov. 03 to Dec. 01, 2014 & Aug. 07, 2015

Standard: 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 :

Midoli Peng / Specialist

Date:

Sep. 22, 2015

Approved by :

May Chen / Manager

Date:

Sep. 22, 2015

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (SECTION 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b) (1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.2dB at 5672.90MHz, 5850.00MHz & 5715.00MHz
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 i-Pex not a standard connector.

Note: This report is prepared for FCC Class II change. (U-NII-3 band: upgrade the standard to section 15.407)

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) (±)
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.43 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.65 dB
	6GHz ~ 18GHz	3.88 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AC1900 WiFi Cable Modem Router
Brand	NETGEAR
Test Model	C7000
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 12V from adapter power
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a: up to 54Mbps 802.11n: up to 450Mbps 802.11ac: up to 1300Mbps
Operating Frequency	For 15.407 5.18 ~ 5.24GHz, 5.26 ~ 5.32GHz, 5.5~5.7GHz, 5.745 ~ 5.825GHz For 15.247 2.412 ~ 2.462GHz
Number of Channel	For 15.407 24 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 11 for 802.11n (HT40), 802.11ac (VHT40) 6 for 802.11ac (VHT80) For 15.247 11 for 802.11b, 802.11g, 802.11n (HT20), VHT20 7 for 802.11n (HT40), VHT40
Output Power	For 15.407 (U-NII-3 band) CDD Mode: 802.11a: 930.141mW 802.11ac (VHT20): 909.567mW 802.11ac (VHT40): 542.199mW 802.11ac (VHT80): 95.174mW Beamforming Mode: 802.11ac (VHT20): 675.716mW 802.11ac (VHT40): 542.199mW 802.11ac (VHT80): 95.174mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	RJ-45 cable (Unshielded or Shielded, 1.5m) Coaxial cable (Shielded, 3m)

Note:

1. This report is prepared for FCC Class II change. The difference compared with the original report design is as the following:
 - ◆ Upgrade the standard to section 15.407 under new rule for U-NII-3 band
2. According to above conditions, all test items of U-NII-3 band need to be performed, except for AC power conducted emission test item. And all data was verified to meet the requirements.
3. 2.4GHz and 5GHz technology can transmit at same time.
4. The emission of the simultaneous operation (2.4GHz & 5GHz) has been evaluated and no non-compliance was found.
5. The EUT must be supplied with a adapter, there are four different models could be chosen as following table:

No	Brand	Model No.	P/N No.	Spec.
1	NETGEAR	AD898F20	332-10613-01	Input: 100-240V, 1.0A, 50-60Hz Output:12V, 3.5A DC output cable (Unshielded, 1.8m)
2	NETGEAR	2AAF042F NA	332-10618-01	Input: 100-240V, 1.5A, 50-60Hz Output:12V, 3.5A DC output cable (Unshielded, 1.8m)
3	NETGEAR	2ABN042F NA	332-10761-01	Input: 100-240V, 1.3A, 50/60Hz Output:12V, 3.5A DC output cable (Unshielded, 1.8m)
4	NETGEAR	MU42-3120350-A1	332-10762-01	Input: 100-240V, 1.5A, 50/60Hz Output:12V, 3.5A DC output cable (Unshielded, 1.8m)

Note:

Adapters 3&4 have been tested separately and demonstrate the compliance in separate PC1 test report (Report No.: RF141013E03D R1).

6. The antennas provided to the EUT, please refer to the following table:

PCB Chain No.	Brand	Model	Antenna Gain(dBi) < including cable loss>	Frequency range (MHz ~ MHz)	Antenna Type	Connector Type
Chain 0	Netgear	NA	2.0 2.8	2400~2483.5 5150~5850	Dipole	i-Pex
Chain 1	Netgear	NA	2.0 2.8	2400~2483.5 5150~5850	Dipole	i-Pex
Chain 2	Netgear	NA	2.0 2.8	2400~2483.5 5150~5850	Dipole	i-Pex

7. The EUT incorporates a MIMO function with beamforming.(Except for 802.11a/b/g)

For 2.4GHz Band

MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	3TX	3RX
802.11g	1 ~ 11Mbps	3TX	3RX
802.11n (HT20)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
VHT20	MCS0~8 Nss=1	3TX	3RX
	MCS0~8 Nss=2	3TX	3RX
	MCS0~9 Nss=3	3TX	3RX
VHT40	MCS0~9 Nss=1	3TX	3RX
	MCS0~9 Nss=2	3TX	3RX
	MCS0~9 Nss=3	3TX	3RX

For 5GHz Band

MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	3TX	3RX
802.11n (HT20)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS 16~23	3TX	3RX
802.11ac (VHT20)	MCS 0~8, Nss=1	3TX	3RX
	MCS 0~8, Nss=2	3TX	3RX
	MCS 0~9, Nss=3	3TX	3RX
802.11ac (VHT40)	MCS 0~9, Nss=1	3TX	3RX
	MCS 0~9, Nss=2	3TX	3RX
	MCS 0~9, Nss=3	3TX	3RX
	MCS 0~9, Nss=4	3TX	3RX
802.11ac (VHT80)	MCS 0~9, Nss=1	3TX	3RX
	MCS 0~9, Nss=2	3TX	3RX
	MCS 0~9, Nss=3	3TX	3RX

Note: The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

8. The above EUT information was 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

FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

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

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE $\geq$ 1G	RE<1G	APCM	
-	√	√	√	With adapter 1

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz

APCM: Antenna Port Conducted Measurement

NOTE:

1. "-" means no effect.
2. The test mode was reference to the worst case in the original test report.

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.

CDD Mode						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

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.

CDD Mode						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5745-5825	149 to 165	157	OFDM	BPSK	6

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.

CDD Mode						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3
Beamforming Mode						
MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11ac (VHT20)	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	27deg. C, 75%RH	120Vac, 60Hz	Andy Ho
RE<1G	23deg. C, 68%RH	120Vac, 60Hz	Tim Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

If duty cycle of test signal is $\geq 98\%$, duty factor is not required.

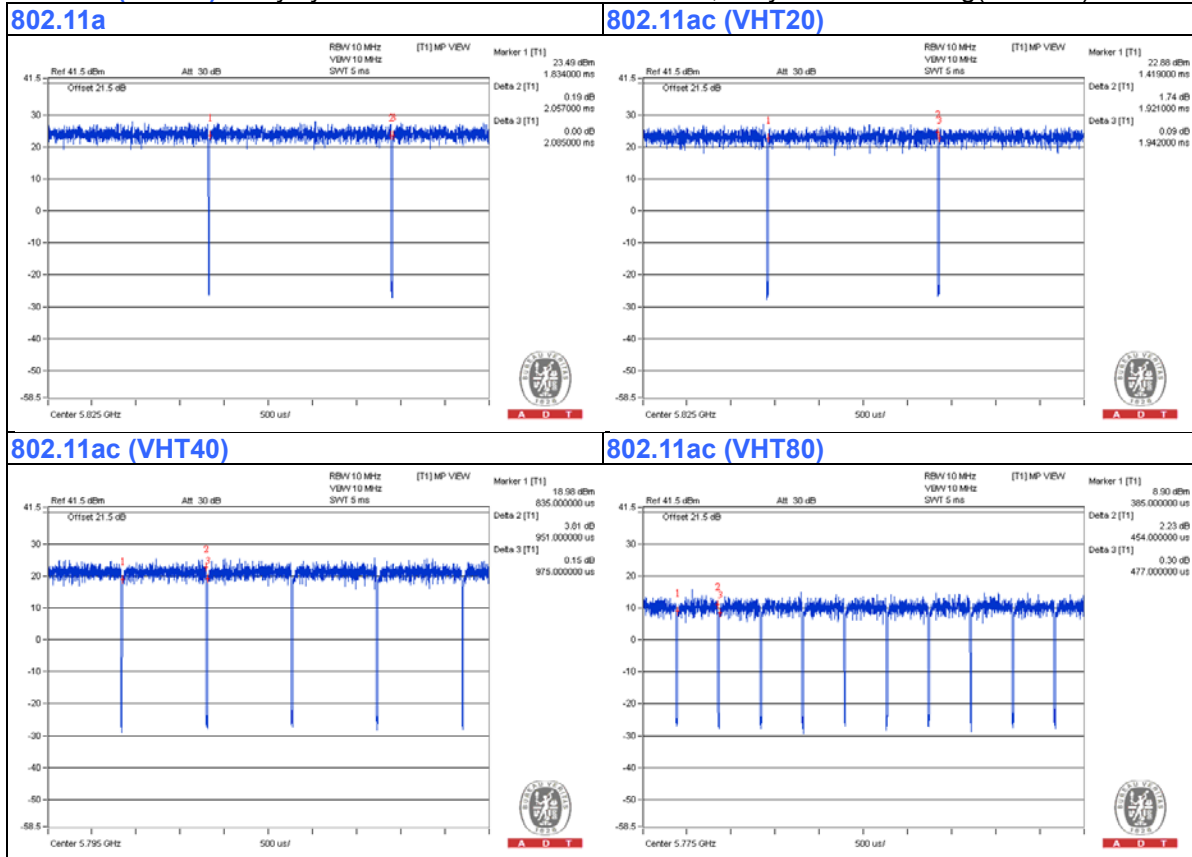
If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11a: Duty cycle = 2.057 ms/2.085 ms = 0.987

802.11ac(VHT20): Duty cycle = 1.921 ms/1.942 ms = 0.989

802.11ac(VHT40): Duty cycle = 0.951 ms/0.975 ms = 0.975, Duty factor = $10 \cdot \log(1/0.975) = 0.11$

802.11ac(VHT80): Duty cycle = 0.454 ms/0.477 ms = 0.952, Duty factor = $10 \cdot \log(1/0.952) = 0.21$



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.

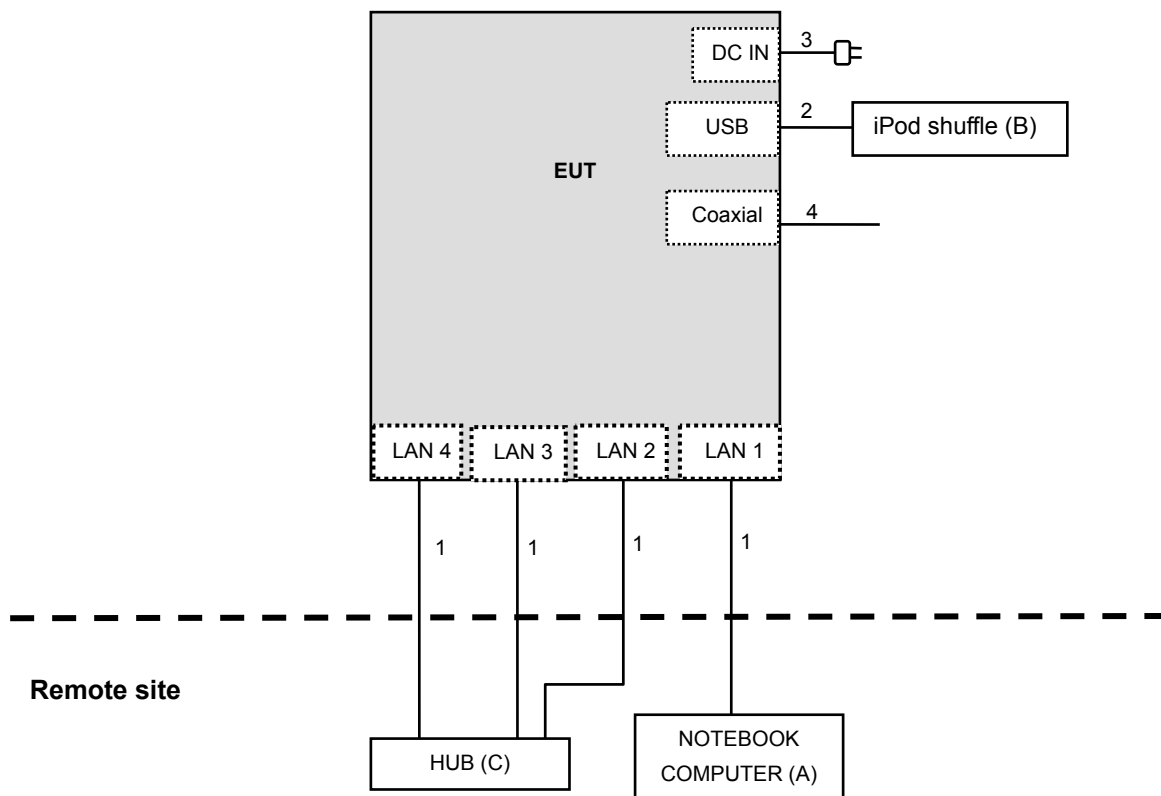
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	NOTEBOOK COMPUTER	DELL	E6400	D814C A00 APCC	NA	Provided by Lab
B	iPod shuffle	Apple	MD778TA/A	CC4JMCMXF4T1	NA	Provided by Lab
C	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab

NOTE:

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

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1	RJ-45	1	10	No	0	Provided by Lab
2	USB	1	0.1	No	0	Provided by Lab
3	DC	1	1.8	No	0	Supplied by client
4	Coaxial	1	10	No	0	Provided by Lab

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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 Procedure New Rules v01

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 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:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 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 Procedure New Rules v01	FIELD STRENGTH AT 3m	
	PK:74 (dBuV/m)	AV:54 (dBuV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/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(dBuV/m) ^{*1} PK:78.2 (dBuV/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:

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

4.1.2 Test Instruments

For Below 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATE D DATE	CALIBRATE D UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 12, 2014	Dec. 11, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 09, 2015	Feb. 08, 2016
RF Cable	8D-FB	CHHCAB-001-1 CHHCAB-001-2	Oct. 05, 2014	Oct. 04, 2015
	RF-141	CHHCAB-004	Oct. 05, 2014	Oct. 04, 2015
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	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 966 Chamber No. H.
3. The FCC Site Registration No. is 797305.
4. The CANADA Site Registration No. is IC 7450H-3.
5. Tested Date: Aug. 07, 2015

For Above 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	July 21,2014	July 20,2015
Horn_Antenna AISI	AIH.8018	0000320091110	Aug. 27, 2014	Aug. 26, 2015
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	131205 131214 SNMY23684/4	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Antenna Tower & Turn Table CT	NA	NA	NA	NA
Temperature & Humidity Chamber GIANTFORCE	GTH-150-40-S P-AR	MAA0812-008	Jan. 13, 2014	Jan. 12, 2015
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 2015
Power Meter Anritsu	ML2495A	1014008	Apr. 30, 2014	Apr. 29, 2015
Power Sensor Anritsu	MA2411B	0917122	Apr. 30, 2014	Apr. 29, 2015

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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: Nov. 03 to Dec. 01, 2014

4.1.3 Test Procedure

- 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:

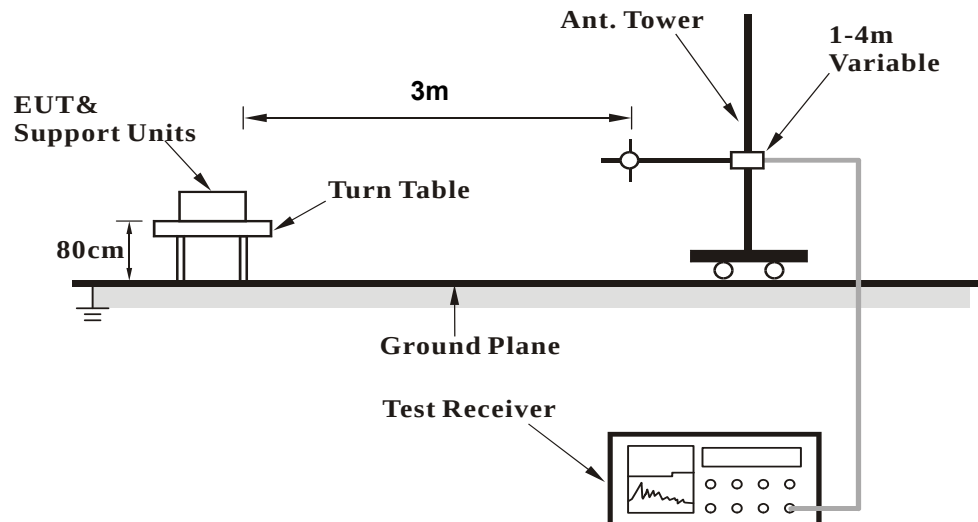
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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 ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) 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

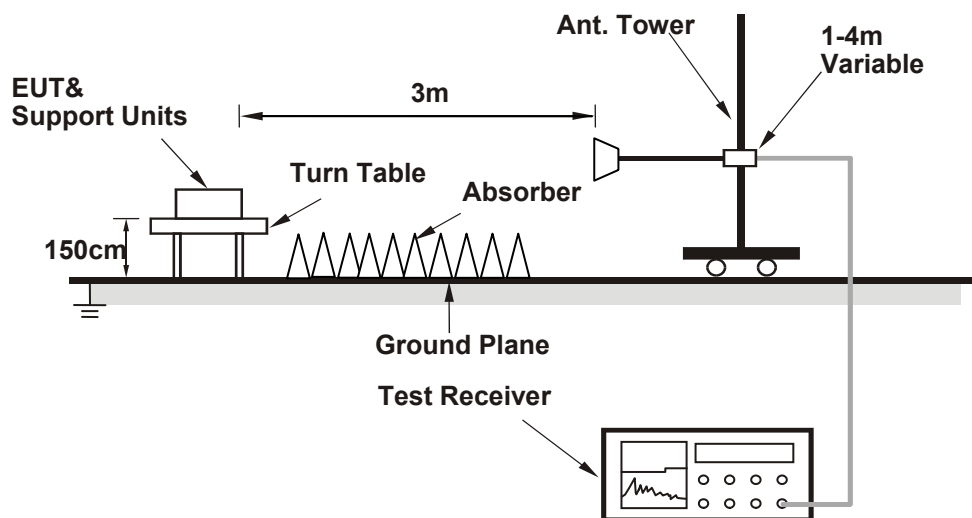
No deviation.

4.1.5 Test Setup

<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 Condition

1. Placed the EUT on testing table.
2. Prepared computer system (support unit A) to act as communication partner.
3. The communication partner ran test program "(MTool.exe [2.0.1.0])" to enable EUT under transmission/receiving condition continuously.

4.1.7 Test Results

Above 1GHz Data

CDD Mode

802.11a

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

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	#5267.50	54.4 PK	74.0	-19.6	1.26 H	90	47.19	7.21
2	#5267.50	46.5 AV	54.0	-7.5	1.26 H	90	39.29	7.21
3	#5587.20	60.9 PK	74.0	-13.1	1.00 H	84	52.71	8.19
4	#5587.20	50.6 AV	54.0	-3.4	1.00 H	84	42.41	8.19
5	#5725.00	77.2 PK	78.2	-1.0	1.17 H	70	68.81	8.39
6	*5745.00	114.5 PK			1.17 H	70	106.08	8.42
7	*5745.00	105.4 AV			1.17 H	70	96.98	8.42
8	#5984.30	57.4 PK	74.0	-16.6	1.49 H	290	48.29	9.11
9	#5984.30	49.5 AV	54.0	-4.5	1.49 H	290	40.39	9.11
10	11490.00	54.9 PK	74.0	-19.1	1.17 H	91	40.55	14.35
11	11490.00	42.8 AV	54.0	-11.2	1.17 H	91	28.45	14.35
12	#17235.00	60.1 PK	74.0	-13.9	1.03 H	79	37.66	22.44
13	#17235.00	48.1 AV	54.0	-5.9	1.03 H	79	25.66	22.44

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	#5267.50	57.8 PK	74.0	-16.2	1.00 V	249	50.59	7.21
2	#5267.50	48.0 AV	54.0	-6.0	1.00 V	249	40.79	7.21
3	#5587.20	62.2 PK	74.0	-11.8	1.03 V	249	54.01	8.19
4	#5587.20	53.2 AV	54.0	-0.8	1.03 V	249	45.01	8.19
5	#5725.00	77.8 PK	78.2	-0.4	1.00 V	247	69.41	8.39
6	*5745.00	116.3 PK			1.00 V	247	107.88	8.42
7	*5745.00	107.3 AV			1.00 V	247	98.88	8.42
8	#5904.20	59.8 PK	74.0	-14.2	1.16 V	74	50.93	8.87
9	#5904.20	50.4 AV	54.0	-3.6	1.16 V	74	41.53	8.87
10	11490.00	53.4 PK	74.0	-20.6	1.08 V	62	39.05	14.35
11	11490.00	41.6 AV	54.0	-12.4	1.08 V	62	27.25	14.35
12	#17235.00	59.3 PK	74.0	-14.7	1.03 V	134	36.86	22.44
13	#17235.00	47.8 AV	54.0	-6.2	1.03 V	134	25.36	22.44

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)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	#5302.10	62.0 PK	68.2	-6.2	1.00 H	144	54.70	7.30
2	#5626.00	63.5 PK	68.2	-4.7	1.56 H	289	55.26	8.24
3	#5725.00	63.2 PK	78.2	-15.0	1.17 H	70	54.81	8.39
4	*5785.00	119.6 PK			1.17 H	70	111.11	8.49
5	*5785.00	110.3 AV			1.17 H	70	101.81	8.49
6	#5850.00	62.4 PK	78.2	-15.8	1.17 H	70	53.73	8.67
7	#5943.00	64.3 PK	68.2	-3.9	1.21 H	132	55.31	8.99
8	#6025.90	57.6 PK	68.2	-10.6	1.14 H	10	48.36	9.24
9	11570.00	55.2 PK	74.0	-18.8	1.00 H	223	40.89	14.31
10	11570.00	42.0 AV	54.0	-12.0	1.00 H	223	27.69	14.31
11	#17355.00	64.0 PK	68.2	-4.2	1.00 H	125	41.00	23.00

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	#5302.10	64.2 PK	68.2	-4.0	1.09 V	73	56.90	7.30
2	#5626.00	67.8 PK	68.2	-0.4	1.54 V	66	59.56	8.24
3	#5725.00	65.4 PK	78.2	-12.8	1.00 V	247	57.01	8.39
4	*5785.00	121.4 PK			1.00 V	247	112.91	8.49
5	*5785.00	112.3 AV			1.00 V	247	103.81	8.49
6	#5850.00	64.3 PK	78.2	-13.9	1.00 V	247	55.63	8.67
7	#5943.00	66.2 PK	68.2	-2.0	1.15 V	70	57.21	8.99
8	#6025.90	59.1 PK	68.2	-9.1	1.33 V	69	49.86	9.24
9	11570.00	55.1 PK	74.0	-18.9	1.00 V	203	40.79	14.31
10	11570.00	41.7 AV	54.0	-12.3	1.00 V	203	27.39	14.31
11	#17355.00	63.5 PK	68.2	-4.7	1.00 V	165	40.50	23.00

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
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

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	#5338.10	58.6 PK	68.2	-9.6	1.03 H	90	51.15	7.45
2	#5666.70	63.0 PK	68.2	-5.2	1.18 H	71	54.70	8.30
3	*5825.00	115.9 PK			1.13 H	96	107.31	8.59
4	*5825.00	106.5 AV			1.13 H	96	97.91	8.59
5	#5850.00	72.9 PK	78.2	-5.3	1.13 H	96	64.23	8.67
6	#5860.00	66.8 PK	68.2	-1.4	1.13 H	96	58.09	8.71
7	#5982.68	60.7 PK	68.2	-7.5	1.48 H	93	51.58	9.12
8	#6067.50	56.2 PK	68.2	-12.0	1.45 H	100	46.83	9.37
9	11650.00	55.3 PK	74.0	-18.7	1.07 H	93	40.92	14.38
10	11650.00	43.2 AV	54.0	-10.8	1.07 H	93	28.82	14.38
11	#17475.00	60.8 PK	68.2	-7.4	1.00 H	83	37.50	23.30
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	#5338.10	59.6 PK	68.2	-8.6	1.00 V	74	52.15	7.45
2	#5666.70	63.8 PK	68.2	-4.4	1.00 V	249	55.50	8.30
3	*5825.00	116.8 PK			1.00 V	245	108.21	8.59
4	*5825.00	107.4 AV			1.00 V	245	98.81	8.59
5	#5850.00	71.9 PK	78.2	-6.3	1.00 V	245	63.23	8.67
6	#5860.00	67.5 PK	68.2	-0.7	1.00 V	245	58.79	8.71
7	#5982.68	63.5 PK	68.2	-4.7	1.13 V	69	54.38	9.12
8	#6067.50	57.9 PK	68.2	-10.3	1.12 V	107	48.53	9.37
9	11650.00	52.9 PK	74.0	-21.1	1.12 V	67	38.52	14.38
10	11650.00	41.3 AV	54.0	-12.7	1.12 V	67	26.92	14.38
11	#17475.00	59.1 PK	68.2	-9.1	1.00 V	125	35.80	23.30

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 (VHT20)

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

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	#5725.00	75.8 PK	78.2	-2.4	1.17 H	76	67.41	8.39
2	*5745.00	114.3 PK			1.17 H	70	105.88	8.42
3	*5745.00	104.3 AV			1.17 H	70	95.88	8.42
4	11490.00	54.1 PK	74.0	-19.9	1.14 H	86	39.75	14.35
5	11490.00	42.4 AV	54.0	-11.6	1.14 H	86	28.05	14.35
6	#17235.00	59.7 PK	74.0	-14.3	1.00 H	88	37.26	22.44
7	#17235.00	47.7 AV	54.0	-6.3	1.00 H	88	25.26	22.44
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	#5725.00	77.9 PK	78.2	-0.3	1.00 V	251	69.51	8.39
2	*5745.00	116.0 PK			1.00 V	251	107.58	8.42
3	*5745.00	106.5 AV			1.00 V	251	98.08	8.42
4	11490.00	53.8 PK	74.0	-20.2	1.07 V	71	39.45	14.35
5	11490.00	41.8 AV	54.0	-12.2	1.07 V	71	27.45	14.35
6	#17235.00	59.9 PK	74.0	-14.1	1.00 V	136	37.46	22.44
7	#17235.00	48.2 AV	54.0	-5.8	1.00 V	136	25.76	22.44

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)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	#5304.50	59.3 PK	68.2	-8.9	1.32 H	151	52.00	7.30
2	#5623.00	64.3 PK	68.2	-3.9	1.37 H	75	56.06	8.24
3	#5725.00	68.4 PK	78.2	-9.8	1.14 H	72	60.01	8.39
4	*5785.00	119.7 PK			1.14 H	72	111.21	8.49
5	*5785.00	110.4 AV			1.14 H	72	101.91	8.49
6	#5850.00	66.4 PK	78.2	-11.8	1.14 H	72	57.73	8.67
7	#5946.20	64.2 PK	68.2	-4.0	1.14 H	70	55.21	8.99
8	#6025.90	56.3 PK	68.2	-11.9	1.00 H	145	47.06	9.24
9	11570.00	55.2 PK	74.0	-18.8	1.14 H	102	40.89	14.31
10	11570.00	43.2 AV	54.0	-10.8	1.14 H	102	28.89	14.31
11	#17355.00	59.9 PK	68.2	-8.3	1.00 H	108	36.90	23.00

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	#5304.50	61.4 PK	68.2	-6.8	1.29 V	273	54.10	7.30
2	#5623.00	67.5 PK	68.2	-0.7	1.21 V	252	59.26	8.24
3	#5725.00	71.5 PK	78.2	-6.7	1.00 V	251	63.11	8.39
4	*5785.00	123.2 PK			1.00 V	251	114.71	8.49
5	*5785.00	112.7 AV			1.00 V	251	104.21	8.49
6	#5850.00	68.6 PK	78.2	-9.6	1.00 V	251	59.93	8.67
7	#5946.20	66.3 PK	68.2	-1.9	1.15 V	270	57.31	8.99
8	#6025.90	57.9 PK	68.2	-10.3	1.42 V	237	48.66	9.24
9	11570.00	53.3 PK	74.0	-20.7	1.05 V	71	38.99	14.31
10	11570.00	41.3 AV	54.0	-12.7	1.05 V	71	26.99	14.31
11	#17355.00	59.8 PK	68.2	-8.4	1.01 V	126	36.80	23.00

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
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

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	#5672.90	61.5 PK	74.0	-12.5	1.32 H	141	53.18	8.32
2	#5672.90	51.6 AV	54.0	-2.4	1.32 H	141	43.28	8.32
3	*5825.00	115.7 PK			1.07 H	97	107.11	8.59
4	*5825.00	106.5 AV			1.07 H	97	97.91	8.59
5	#5850.00	74.3 PK	78.2	-3.9	1.07 H	97	65.63	8.67
6	#5860.00	68.9 PK	74.0	-5.1	1.00 H	165	60.19	8.71
7	#5860.00	46.5 AV	54.0	-7.5	1.00 H	165	37.79	8.71
8	#5982.40	62.3 PK	74.0	-11.7	1.00 H	141	53.19	9.11
9	#5982.40	51.6 AV	54.0	-2.4	1.00 H	141	42.49	9.11
10	#6067.60	57.6 PK	74.0	-16.4	1.00 H	123	48.23	9.37
11	#6067.60	50.4 AV	54.0	-3.6	1.00 H	123	41.03	9.37
12	11650.00	55.0 PK	74.0	-19.0	1.06 H	111	40.62	14.38
13	11650.00	43.1 AV	54.0	-10.9	1.06 H	111	28.72	14.38
14	#17475.00	59.7 PK	74.0	-14.3	1.06 H	79	36.40	23.30
15	#17475.00	47.8 AV	54.0	-6.2	1.06 H	79	24.50	23.30

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	#5672.90	63.6 PK	74.0	-10.4	1.21 V	256	55.28	8.32
2	#5672.90	53.8 AV	54.0	-0.2	1.21 V	256	45.48	8.32
3	*5825.00	118.5 PK			1.00 V	253	109.91	8.59
4	*5825.00	108.2 AV			1.00 V	253	99.61	8.59
5	#5850.00	78.0 PK	78.2	-0.2	1.00 V	253	69.33	8.67
6	#5860.00	68.3 PK	74.0	-5.7	1.00 V	254	59.59	8.71
7	#5860.00	47.0 AV	54.0	-7.0	1.00 V	254	38.29	8.71
8	#5982.40	63.6 PK	74.0	-10.4	1.33 V	67	54.49	9.11
9	#5982.40	53.7 AV	54.0	-0.3	1.33 V	67	44.59	9.11
10	#6067.60	59.8 PK	74.0	-14.2	1.13 V	71	50.43	9.37
11	#6067.60	52.8 AV	54.0	-1.2	1.13 V	71	43.43	9.37
12	11650.00	53.1 PK	74.0	-20.9	1.05 V	62	38.72	14.38
13	11650.00	41.3 AV	54.0	-12.7	1.05 V	62	26.92	14.38
14	#17475.00	58.8 PK	74.0	-15.2	1.07 V	123	35.50	23.30
15	#17475.00	47.6 AV	54.0	-6.4	1.07 V	123	24.30	23.30

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 (VHT40)

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

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	#5715.00	67.6 PK	74.0	-6.4	1.00 H	250	59.23	8.37
2	#5715.00	51.4 AV	54.0	-2.6	1.00 H	250	43.03	8.37
3	#5725.00	73.2 PK	78.2	-5.0	1.00 H	250	64.81	8.39
4	*5755.00	110.3 PK			1.00 H	250	101.86	8.44
5	*5755.00	100.4 AV			1.00 H	250	91.96	8.44
6	#6234.00	54.3 PK	74.0	-19.7	1.00 H	132	44.52	9.78
7	#6234.00	46.6 AV	54.0	-7.4	1.00 H	132	36.82	9.78
8	11510.00	54.6 PK	74.0	-19.4	1.09 H	93	40.26	14.34
9	11510.00	42.9 AV	54.0	-11.1	1.09 H	93	28.56	14.34
10	#17265.00	59.4 PK	74.0	-14.6	1.00 H	89	36.72	22.68
11	#17265.00	47.5 AV	54.0	-6.5	1.00 H	89	24.82	22.68
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	#5715.00	68.6 PK	74.0	-5.4	1.00 V	251	60.23	8.37
2	#5715.00	53.8 AV	54.0	-0.2	1.00 V	251	45.43	8.37
3	#5725.00	75.0 PK	78.2	-3.2	1.00 V	251	66.61	8.39
4	*5755.00	112.9 PK			1.00 V	251	104.46	8.44
5	*5755.00	102.5 AV			1.00 V	251	94.06	8.44
6	#6234.00	55.7 PK	74.0	-18.3	1.09 V	248	45.92	9.78
7	#6234.00	47.8 AV	54.0	-6.2	1.09 V	248	38.02	9.78
8	11510.00	53.0 PK	74.0	-21.0	1.10 V	53	38.66	14.34
9	11510.00	41.4 AV	54.0	-12.6	1.10 V	53	27.06	14.34
10	#17265.00	59.0 PK	74.0	-15.0	1.06 V	123	36.32	22.68
11	#17265.00	47.8 AV	54.0	-6.2	1.06 V	123	25.12	22.68

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)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	#5637.70	63.6 PK	74.0	-10.4	1.06 H	135	55.33	8.27
2	#5637.70	52.4 AV	54.0	-1.6	1.06 H	135	44.13	8.27
3	*5795.00	116.3 PK			1.00 H	261	107.80	8.50
4	*5795.00	105.4 AV			1.00 H	261	96.90	8.50
5	#5850.00	73.6 PK	78.2	-4.6	1.00 H	261	64.93	8.67
6	#5860.00	66.3 PK	74.0	-7.7	1.02 H	70	57.59	8.71
7	#5860.00	51.4 AV	54.0	-2.6	1.02 H	70	42.69	8.71
8	11590.00	55.4 PK	74.0	-18.6	1.17 H	100	41.10	14.30
9	11590.00	43.1 AV	54.0	-10.9	1.17 H	100	28.80	14.30
10	#17385.00	59.9 PK	74.0	-14.1	1.02 H	85	36.87	23.03
11	#17385.00	47.6 AV	54.0	-6.4	1.02 H	85	24.57	23.03
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	#5637.70	64.5 PK	74.0	-9.5	1.01 V	65	56.23	8.27
2	#5637.70	53.5 AV	54.0	-0.5	1.01 V	65	45.23	8.27
3	*5795.00	117.0 PK			1.00 V	250	108.50	8.50
4	*5795.00	107.4 AV			1.00 V	250	98.90	8.50
5	#5850.00	74.2 PK	78.2	-4.0	1.00 V	250	65.53	8.67
6	#5860.00	68.8 PK	74.0	-5.2	1.00 V	250	60.09	8.71
7	#5860.00	53.6 AV	54.0	-0.4	1.00 V	250	44.89	8.71
8	11590.00	53.3 PK	74.0	-20.7	1.04 V	60	39.00	14.30
9	11590.00	41.2 AV	54.0	-12.8	1.04 V	60	26.90	14.30
10	#17385.00	59.4 PK	74.0	-14.6	1.05 V	135	36.37	23.03
11	#17385.00	48.0 AV	54.0	-6.0	1.05 V	135	24.97	23.03

REMARKS:

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

802.11ac (VHT80)

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

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	5133.00	53.4 PK	74.0	-20.6	1.21 H	135	46.68	6.72
2	5133.00	49.3 AV	54.0	-4.7	1.21 H	135	42.58	6.72
3	#5715.00	69.6 PK	74.0	-4.4	1.00 H	70	61.23	8.37
4	#5715.00	51.4 AV	54.0	-2.6	1.00 H	70	43.03	8.37
5	#5725.00	70.3 PK	78.2	-7.9	1.00 H	251	61.91	8.39
6	*5775.00	108.3 PK			1.00 H	251	99.83	8.47
7	*5775.00	96.4 AV			1.00 H	251	87.93	8.47
8	#5850.00	69.4 PK	78.2	-8.8	1.00 H	251	60.73	8.67
9	11550.00	54.4 PK	74.0	-19.6	1.15 H	103	40.08	14.32
10	11550.00	42.5 AV	54.0	-11.5	1.15 H	103	28.18	14.32
11	#17325.00	59.8 PK	74.0	-14.2	1.05 H	85	36.82	22.98
12	#17325.00	47.9 AV	54.0	-6.1	1.05 H	85	24.92	22.98

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	5133.00	55.2 PK	74.0	-18.8	1.13 V	257	48.48	6.72
2	5133.00	51.3 AV	54.0	-2.7	1.13 V	257	44.58	6.72
3	#5715.00	71.8 PK	74.0	-2.2	1.01 V	256	63.43	8.37
4	#5715.00	53.8 AV	54.0	-0.2	1.01 V	256	45.43	8.37
5	#5725.00	72.2 PK	78.2	-6.0	1.01 V	256	63.81	8.39
6	*5775.00	110.2 PK			1.01 V	256	101.73	8.47
7	*5775.00	98.3 AV			1.01 V	256	89.83	8.47
8	#5850.00	61.4 PK	78.2	-16.8	1.01 V	256	52.73	8.67
9	11550.00	53.3 PK	74.0	-20.7	1.11 V	66	38.98	14.32
10	11550.00	41.5 AV	54.0	-12.5	1.11 V	66	27.18	14.32
11	#17325.00	58.6 PK	74.0	-15.4	1.02 V	120	35.62	22.98
12	#17325.00	47.4 AV	54.0	-6.6	1.02 V	120	24.42	22.98

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 Data

CDD Mode

802.11a

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	Below 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	375.02	36.4 QP	46.0	-9.6	1.00 H	117	46.51	-10.15
2	500.02	36.5 QP	46.0	-9.5	1.50 H	43	43.66	-7.19
3	625.02	41.1 QP	46.0	-4.9	1.50 H	87	45.41	-4.30
4	750.00	39.4 QP	46.0	-6.6	2.00 H	83	41.41	-1.97
5	875.02	41.7 QP	46.0	-4.3	1.50 H	155	42.03	-0.36
6	1000.00	40.6 QP	54.0	-13.4	2.00 H	90	38.94	1.65
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	34.02	33.7 QP	40.0	-6.3	1.00 V	321	33.68	0.00
2	51.20	32.7 QP	40.0	-7.3	1.60 V	89	32.71	0.00
3	375.00	37.5 QP	46.0	-8.5	1.00 V	113	37.48	0.00
4	500.00	37.5 QP	46.0	-8.5	1.50 V	80	37.48	0.00
5	625.00	39.5 QP	46.0	-6.6	2.00 V	171	39.45	0.00
6	875.00	40.6 QP	46.0	-5.4	1.50 V	44	40.56	0.00

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 Transmit Power Measurement

4.2.1 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 $\leq$ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
		Mobile and Portable client device	250mW (24 dBm)
U-NII-2A			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3		√	1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

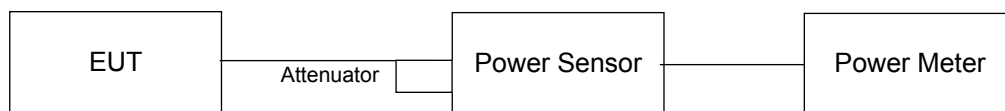
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

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.

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

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.

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Condition

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

4.2.7 Test Result

CDD Mode

POWER OUTPUT:

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
802.11a								
149	5745	20.36	18.90	18.80	262.126	24.19	30	Pass
157	5785	25.80	24.55	24.23	930.141	29.69	30	Pass
165	5825	22.60	21.14	21.26	445.647	26.49	30	Pass
802.11ac (VHT20)								
149	5745	18.94	17.78	17.13	189.964	22.79	30	Pass
157	5785	25.70	24.55	24.03	909.567	29.59	30	Pass
165	5825	22.97	21.56	21.65	487.59	26.88	30	Pass
802.11ac (VHT40)								
151	5755	17.54	15.96	15.44	131.195	21.18	30	Pass
159	5795	23.22	22.18	22.23	542.199	27.34	30	Pass
802.11ac (VHT80)								
155	5775	15.89	14.69	14.30	95.174	19.79	30	Pass

Beamforming Mode

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
802.11ac (VHT20)								
149	5745	18.94	17.78	17.13	189.964	22.79	28.43	Pass
157	5785	24.39	23.31	22.71	675.716	28.30	28.43	Pass
165	5825	22.97	21.56	21.65	487.59	26.88	28.43	Pass
802.11ac (VHT40)								
151	5755	17.54	15.96	15.44	131.195	21.18	28.43	Pass
159	5795	23.22	22.18	22.23	542.199	27.34	28.43	Pass
802.11ac (VHT80)								
155	5775	15.89	14.69	14.30	95.174	19.79	28.43	Pass

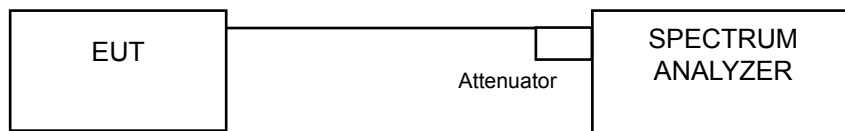
Note: 1. Directional gain = 2.8dBi + 10log(3) = 7.57dBi > 6dBi , so the power limit shall be reduced to 30-(7.57-6) = 28.43dBm.

4.3 Peak Power Spectral Density Measurement

4.3.1 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

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For AVG. power (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 $BWCF = 10\log(500\text{kHz}/300\text{kHz})$
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

For AVG. power (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 $BWCF = 10\log(500\text{kHz}/300\text{kHz})$
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 $10 \log (1/\text{duty cycle})$

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

Same as Item 4.2.6.

4.3.7 Test Results

CDD Mode

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
802.11a								
0	149	5745	-0.86	1.36	4.77	6.13	28.43	Pass
	157	5785	4.57	6.79	4.77	11.56	28.43	Pass
	165	5825	1.37	3.59	4.77	8.36	28.43	Pass
1	149	5745	-2.36	-0.14	4.77	4.63	28.43	Pass
	157	5785	3.30	5.52	4.77	10.29	28.43	Pass
	165	5825	-0.06	2.16	4.77	6.93	28.43	Pass
2	149	5745	-2.22	0.00	4.77	4.77	28.43	Pass
	157	5785	3.25	5.47	4.77	10.24	28.43	Pass
	165	5825	-0.08	2.14	4.77	6.91	28.43	Pass
802.11ac (VHT20)								
0	149	5745	-2.42	-0.20	4.77	4.57	28.43	Pass
	157	5785	4.31	6.53	4.77	11.30	28.43	Pass
	165	5825	0.54	2.76	4.77	7.53	28.43	Pass
1	149	5745	-3.90	-1.68	4.77	3.09	28.43	Pass
	157	5785	2.70	4.92	4.77	9.69	28.43	Pass
	165	5825	-1.07	1.15	4.77	5.92	28.43	Pass
2	149	5745	-4.20	-1.98	4.77	2.79	28.43	Pass
	157	5785	2.85	5.07	4.77	9.84	28.43	Pass
	165	5825	-1.02	1.20	4.77	5.97	28.43	Pass

Note: 1. Directional gain = 2.8dBi + 10log(3) = 7.57dBi > 6dBi, so the power density limit shall be reduced to 30-(7.57-6) = 28.43dBm.

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=3) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
802.11ac (VHT40)									
0	151	5755	-7.19	-4.97	4.77	0.11	-0.09	28.43	Pass
	159	5795	-1.56	0.66	4.77	0.11	5.54	28.43	Pass
1	151	5755	-8.97	-6.75	4.77	0.11	-1.87	28.43	Pass
	159	5795	-2.89	-0.67	4.77	0.11	4.21	28.43	Pass
2	151	5755	-9.25	-7.03	4.77	0.11	-2.15	28.43	Pass
	159	5795	-2.68	-0.46	4.77	0.11	4.42	28.43	Pass
802.11ac (VHT80)									
0	155	5775	-11.88	-9.66	4.77	0.21	-4.68	28.43	Pass
1	155	5775	-13.70	-11.48	4.77	0.21	-6.50	28.43	Pass
2	155	5775	-14.18	-11.96	4.77	0.21	-6.98	28.43	Pass

Note: 1. Directional gain = 2.8dBi + 10log(3) = 7.57dBi > 6dBi, so the power density limit shall be reduced to 30-(7.57-6) = 28.43dBm.

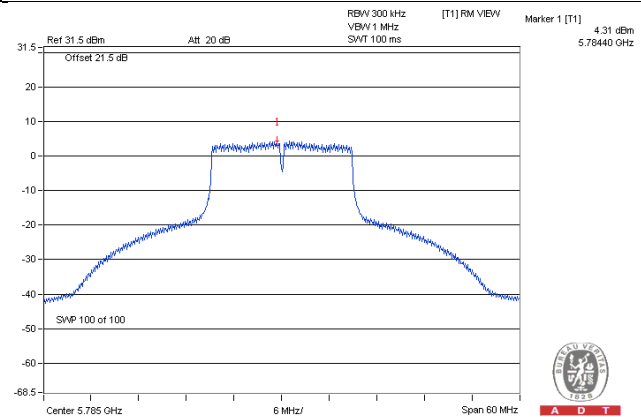
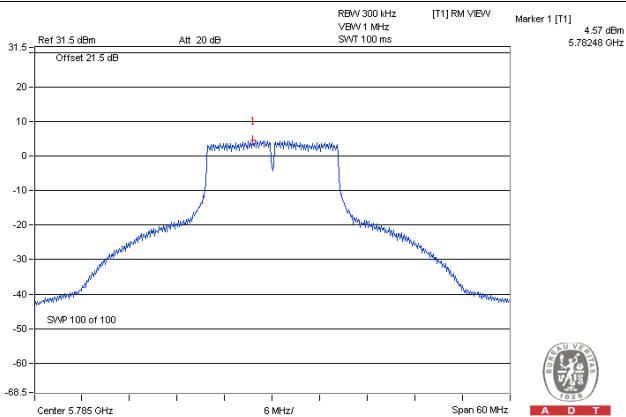
2. Refer to section 3.3 for duty cycle spectrum plot.

CDD Mode

Spectrum Plot of Worst Value

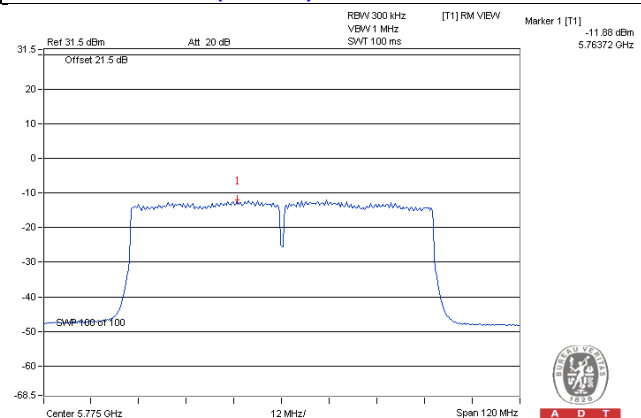
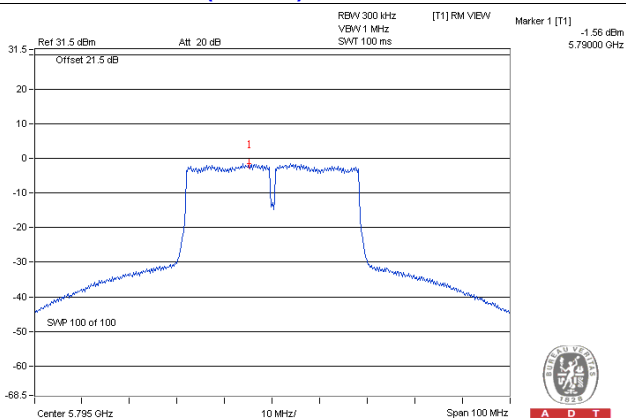
802.11a – Chain 0: CH 157

802.11ac (VHT20) – Chain 0: CH 157



802.11ac (VHT40) – Chain 0: CH 159

802.11ac (VHT80) – Chain 0: CH 155



Beamforming Mode

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
802.11ac (VHT20)								
0	149	5745	-2.42	-0.20	4.77	4.57	28.43	Pass
	157	5785	2.97	5.19	4.77	9.96	28.43	Pass
	165	5825	0.54	2.76	4.77	7.53	28.43	Pass
1	149	5745	-3.90	-1.68	4.77	3.09	28.43	Pass
	157	5785	1.42	3.64	4.77	8.41	28.43	Pass
	165	5825	-1.07	1.15	4.77	5.92	28.43	Pass
2	149	5745	-4.20	-1.98	4.77	2.79	28.43	Pass
	157	5785	1.53	3.75	4.77	8.52	28.43	Pass
	165	5825	-1.02	1.20	4.77	5.97	28.43	Pass

Note: 1. Directional gain = 2.8dBi + 10log(3) = 7.57dBi > 6dBi, so the power density limit shall be reduced to 30-(7.57-6) = 28.43dBm.

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=3) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
802.11ac (VHT40)									
0	151	5755	-7.19	-4.97	4.77	0.11	-0.09	28.43	Pass
	159	5795	-1.56	0.66	4.77	0.11	5.54	28.43	Pass
1	151	5755	-8.97	-6.75	4.77	0.11	-1.87	28.43	Pass
	159	5795	-2.89	-0.67	4.77	0.11	4.21	28.43	Pass
2	151	5755	-9.25	-7.03	4.77	0.11	-2.15	28.43	Pass
	159	5795	-2.68	-0.46	4.77	0.11	4.42	28.43	Pass
802.11ac (VHT80)									
0	155	5775	-11.88	-9.66	4.77	0.21	-4.68	28.43	Pass
1	155	5775	-13.70	-11.48	4.77	0.21	-6.50	28.43	Pass
2	155	5775	-14.18	-11.96	4.77	0.21	-6.98	28.43	Pass

Note: 1. Directional gain = 2.8dBi + 10log(3) = 7.57dBi > 6dBi, so the power density limit shall be reduced to 30-(7.57-6) = 28.43dBm.

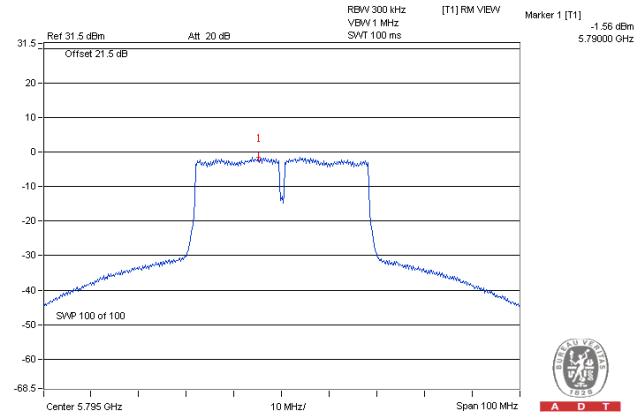
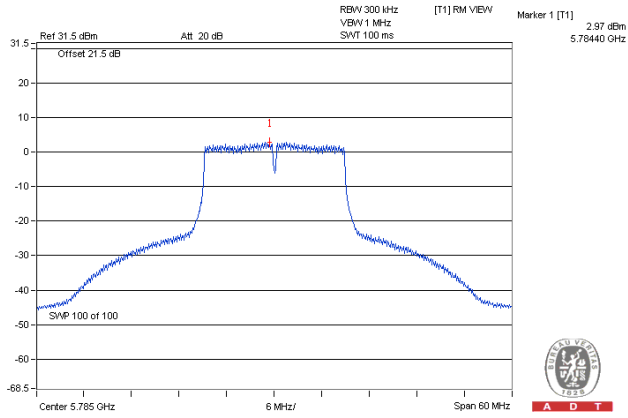
2. Refer to section 3.3 for duty cycle spectrum plot.

Beamforming Mode

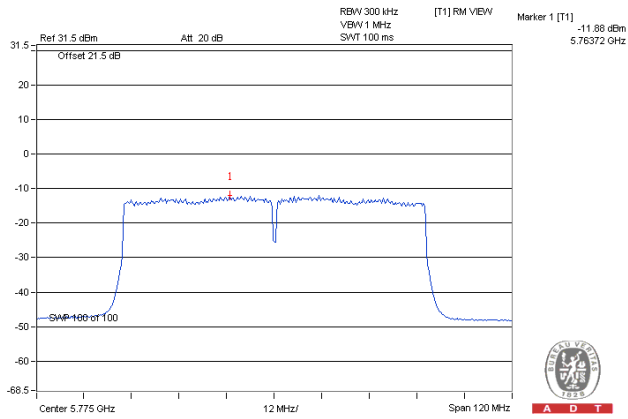
Spectrum Plot of Worst Value

802.11ac (VHT20) – Chain 0: CH 157

802.11ac (VHT40) – Chain 0: CH 159



802.11ac (VHT80) – Chain 0: CH 155

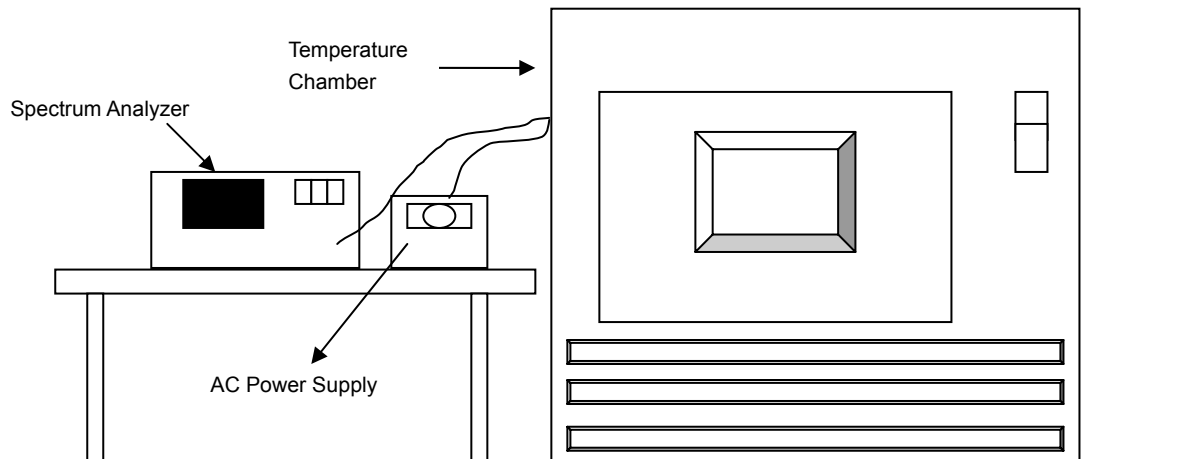


4.4 Frequency Stability Measurement

4.4.1 Limits of Frequency Stability Measurement

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

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 Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- 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.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- 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.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Condition

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

4.4.7 Test Results

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5825MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5825.0208	0.00036	5825.0189	0.00032	5825.0223	0.00038	5825.0174	0.00030
40	120	5825.0256	0.00044	5825.0254	0.00044	5825.0204	0.00035	5825.0227	0.00039
30	120	5824.9739	-0.00045	5824.9747	-0.00043	5824.9722	-0.00048	5824.9747	-0.00043
20	120	5824.9939	-0.00010	5824.9933	-0.00012	5824.9963	-0.00006	5824.9924	-0.00013
10	120	5824.9828	-0.00030	5824.982	-0.00031	5824.9852	-0.00025	5824.9827	-0.00030
0	120	5825.0127	0.00022	5825.0103	0.00018	5825.0085	0.00015	5825.0118	0.00020
-10	120	5824.9845	-0.00027	5824.9839	-0.00028	5824.9826	-0.00030	5824.9856	-0.00025
-20	120	5824.9836	-0.00028	5824.9861	-0.00024	5824.9836	-0.00028	5824.9842	-0.00027
-30	120	5825.0008	0.00001	5825.0001	0.00000	5825.0028	0.00005	5825.0027	0.00005

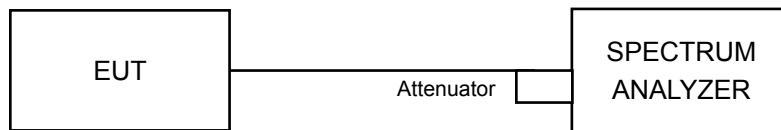
FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5825MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5824.9941	-0.00010	5824.9932	-0.00012	5824.9974	-0.00004	5824.9933	-0.00012
	120	5824.9939	-0.00010	5824.9933	-0.00012	5824.9963	-0.00006	5824.9924	-0.00013
	102	5824.9949	-0.00009	5824.9925	-0.00013	5824.997	-0.00005	5824.9925	-0.00013

4.5 6dB Bandwidth Measurement

4.5.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

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

MEASUREMENT PROCEDURE REF

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- 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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

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

4.5.7 Test Results

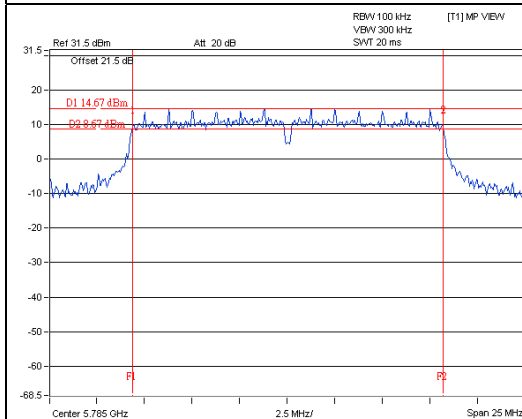
CDD Mode

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
802.11a						
149	5745	16.41	16.42	16.45	0.5	Pass
157	5785	16.40	16.41	16.41	0.5	Pass
165	5825	16.41	16.42	16.42	0.5	Pass
802.11ac (VHT20)						
149	5745	17.68	17.69	17.69	0.5	Pass
157	5785	17.65	17.69	17.65	0.5	Pass
165	5825	17.66	17.67	17.67	0.5	Pass
802.11ac (VHT40)						
151	5755	36.43	36.47	36.44	0.5	Pass
159	5795	36.44	36.46	36.43	0.5	Pass
802.11ac (VHT80)						
155	5775	76.04	76.45	76.21	0.5	Pass

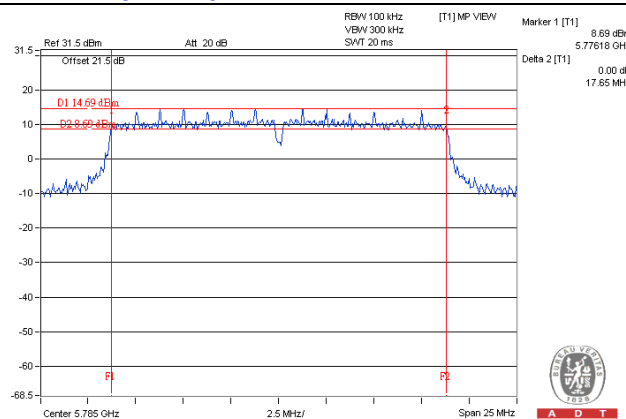
SPECTRUM PLOT OF WORST VALUE

802.11a – Chain 0: CH 157

802.11ac (VHT20) – Chain 0: CH157



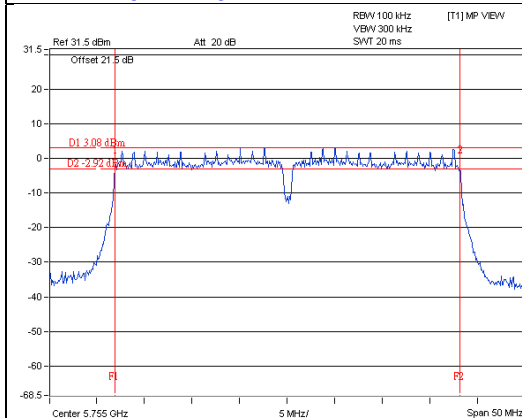
A D T



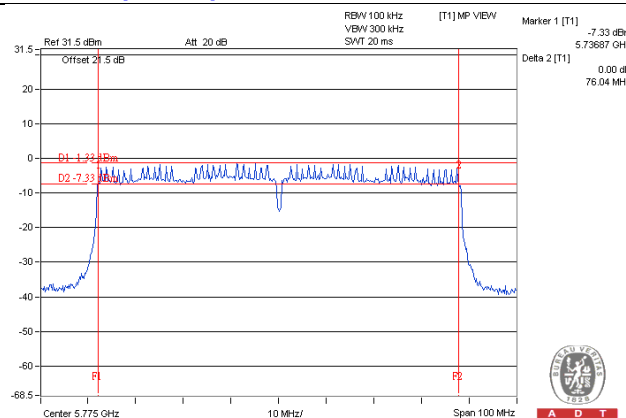
A D T

802.11ac (VHT40) – Chain 0: CH151

802.11ac (VHT80) – Chain 0: CH155



A D T



A D T

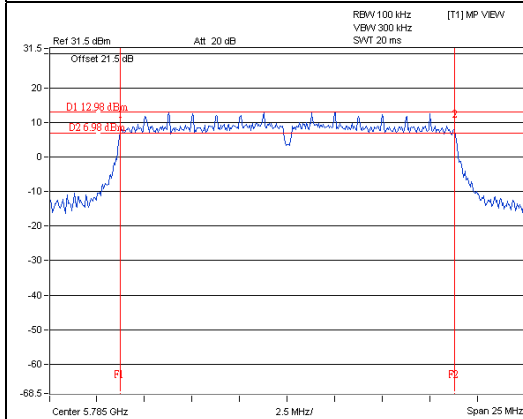
Beamforming Mode

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
802.11ac (VHT20)						
149	5745	17.68	17.69	17.69	0.5	Pass
157	5785	17.64	17.66	17.66	0.5	Pass
165	5825	17.66	17.67	17.67	0.5	Pass
802.11ac (VHT40)						
151	5755	36.43	36.47	36.44	0.5	Pass
159	5795	36.44	36.46	36.43	0.5	Pass
802.11ac (VHT80)						
155	5775	76.04	76.45	76.21	0.5	Pass

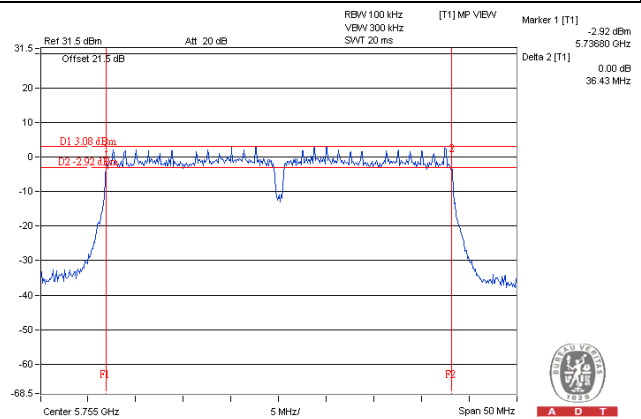
SPECTRUM PLOT OF WORST VALUE

802.11ac (VHT20) – Chain 0: CH157

802.11ac (VHT40) – Chain 0: CH151

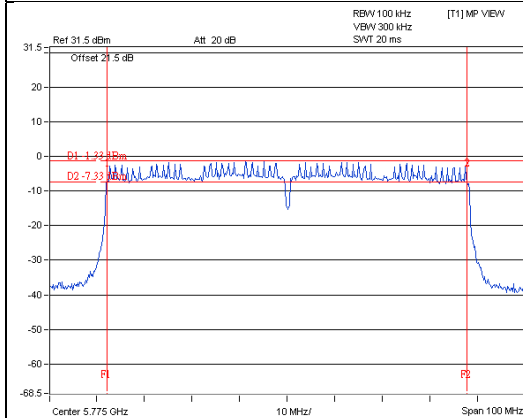


A D T



A D T

802.11ac (VHT80) – Chain 0: CH155



A D T

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 Lab/Telecom Lab

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety

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 ---