

FCC TEST REPORT (15.407)

REPORT NO.: RF141223C35-1

MODEL NO.: Archer C20

FCC ID: TE7C20

RECEIVED: Dec. 23, 2014

TESTED: Jan. 05 ~ Jan. 22, 2015

ISSUED: Jan. 23, 2015

APPLICANT: TP-LINK TECHNOLOGIES CO., LTD.

ADDRESS: Building 24 (floors 1,3,4,5) and 28 (floors1-4)
Central Science and Technology Park, Shennan
Rd, Nanshan, Shenzhen, China

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.)

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF141223C35-1	Original release.	Jan. 23, 2015

1. CERTIFICATION

PRODUCT: AC750 Wireless Dual Band Router

MODEL: Archer C20

BRAND: TP-LINK

APPLICANT: TP-LINK TECHNOLOGIES CO., LTD.

TESTED: Jan. 05 ~ Jan. 22, 2015

TEST SAMPLE: PROTOTYPE

STANDARDS: **FCC Part 15, Subpart E (Section 15.407)**
ANSI C63.10-2009

The above equipment (model: Archer C20) 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 : Polly Chien , **DATE :** Jan. 23, 2015
Polly Chien / Specialist

APPROVED BY : Ken Liu , **DATE :** Jan. 23, 2015
Ken Liu / Senior Manager

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407) UNDER NEW RULE			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.407(b)(6)	AC Power Conducted Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -14.13dB at 0.52500MHz.
15.407(b)(1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5852.10MHz.
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 IPEX 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	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 dB
	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

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

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	AC750 Wireless Dual Band Router
MODEL NO.	Archer C20
POWER SUPPLY	12Vdc (adapter)
MODULATION TYPE	256QAM, 64QAM, 16QAM, QPSK, BPSK
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 150.0Mbps 802.11ac: up to 433Mbps
OPERATING FREQUENCY	5180 ~ 5240MHz & 5745 ~ 5825MHz
NUMBER OF CHANNEL	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)
OUTPUT POWER	5180 ~ 5240MHz: 92.897mW 5745 ~ 5825MHz: 88.716mW
ANTENNA TYPE	5180 ~ 5240MHz: Omni directional antenna with 1.33dBi gain 5745 ~ 5825MHz: Omni directional antenna with 2.31dBi gain
ANTENNA CONNECTOR	IPEX
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Adapter

NOTE:

1. The EUT provides 1 completed transmitter & 1 receiver for 5GHz.

MODULATION MODE	TX FUNCTION
802.11a	1TX
802.11n (HT20) (5GHz)	1TX
802.11n (HT40) (5GHz)	1TX
802.11ac (VHT80)	1TX

* 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)

2. The EUT consumes power from following adapter.

Brand	TP-LINK TECHNOLOGIES CO.,LTD.
Model	T120100-2B1
Input Power	100-240Vac, 50/60Hz, 0.3A
Output Power	12Vdc, 1A
Power Line	DC 1.5m power cable without core attached on adapter

3. The above EUT information is declared by 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 5180 ~ 5240MHz

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

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

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

CHANNEL	FREQUENCY
42	5210MHz

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	PLC	APCM	
-	√	√	√	√	-

Where RE $\geq$ 1G: Radiated Emission above 1GHz RE<1G: Radiated Emission below 1GHz
 PLC: Power Line Conducted Emission APCM: Antenna Port Conducted Measurement

RADIATED EMISSION TEST (ABOVE 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	13.5
-	802.11ac (VHT80)		42	42	OFDM	BPSK	32.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	13.5
-	802.11ac (VHT80)		155	155	OFDM	BPSK	32.5

RADIATED EMISSION TEST (BELOW 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5320, 5745-5825	36 to 48, 149 to 165	48	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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5320, 5745-5825	36 to 64, 149 to 165	48	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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	13.5
-	802.11ac (VHT80)		42	42	OFDM	BPSK	32.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	13.5
-	802.11ac (VHT80)		155	155	OFDM	BPSK	32.5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	24 deg. C, 62% RH	120Vac, 60Hz	Alan Wu, Chris Lin
RE $<$ 1G	27 deg. C, 62% RH	120Vac, 60Hz	Alan Wu
PLC	19 deg. C, 70% RH	120Vac, 60Hz	Nick Hsu
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Ted Chang

3.3 DUTY CYCLE OF TEST SIGNAL

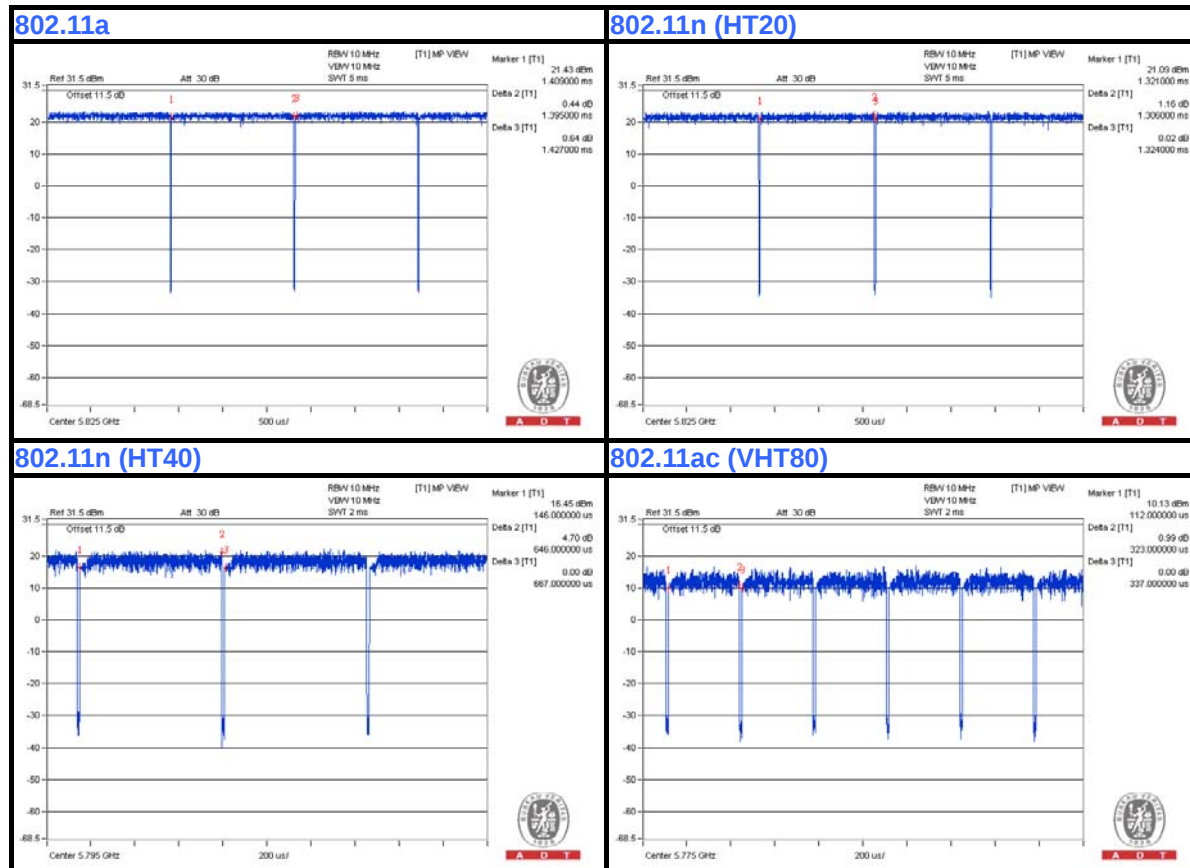
Duty cycle of test signal is < 98 %, duty factor is required.

802.11a: Duty cycle = $1.395/1.427 = 0.978$, Duty factor = $10 * \log(1/0.978) = 0.10$

802.11n (HT20): Duty cycle = $1.306/1.324 = 0.986 > 98 \%$, duty factor is not required.

802.11n (HT40): Duty cycle = $0.646/0.667 = 0.969$, Duty factor = $10 * \log(1/0.969) = 0.14$

802.11ac (VHT80): Duty cycle = $0.323/0.337 = 0.958$, Duty factor = $10 * \log(1/0.958) = 0.19$



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.

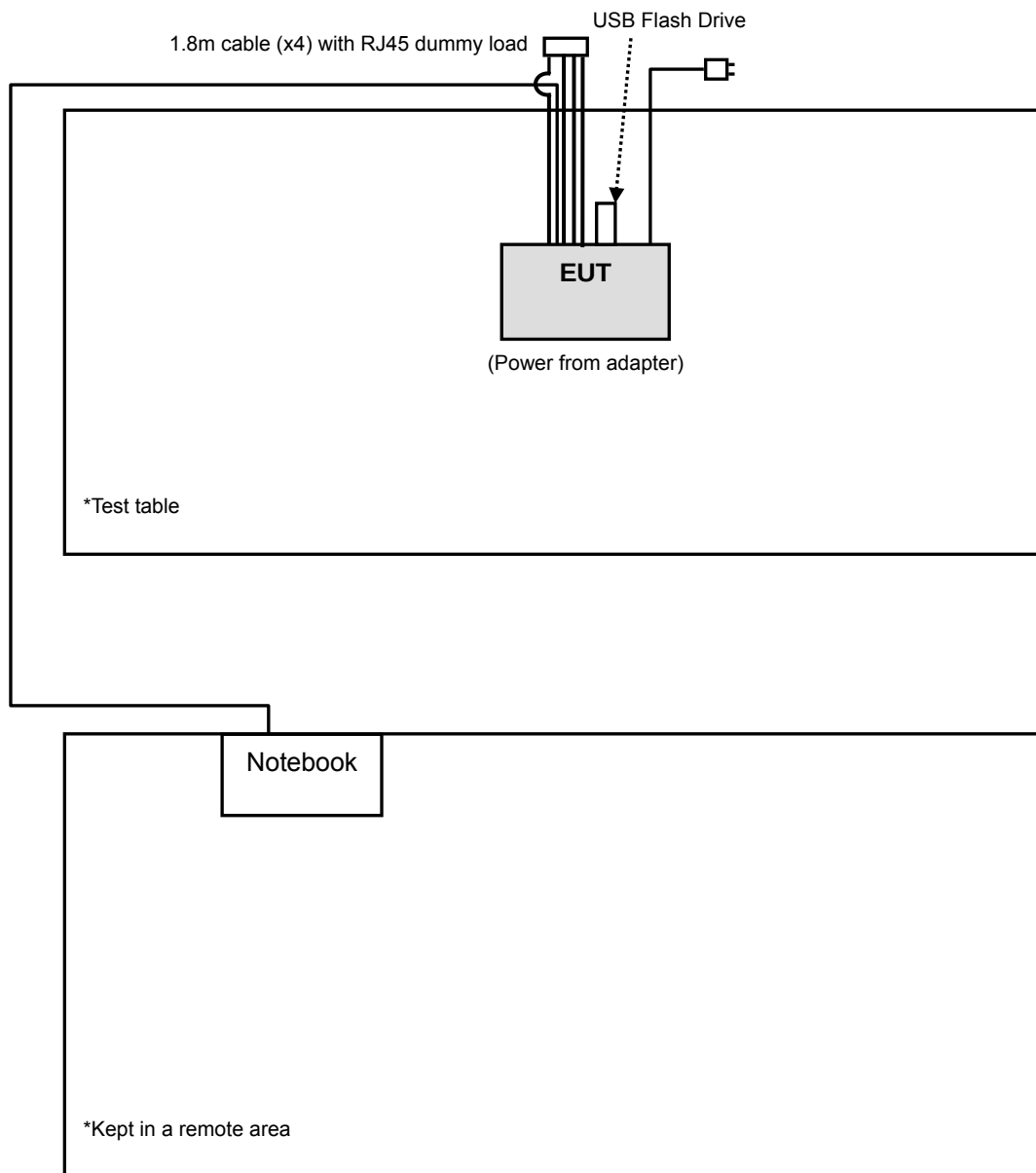
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	E5430	FKKCYW1	FCC DoC Approved
2	USB Flash Drive	Transcend	V85	569992-8209	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	3m RJ45 UTP cable
2	NA

NOTE:

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

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST



3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specification of the EUT declared by 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 v01

ANSI C63.10-2009

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

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

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

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

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

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

4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedures 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:

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

4.1.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 06, 2014	Oct. 05, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Mar. 03, 2014	Mar. 02, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Feb. 26, 2014	Feb. 25, 2015
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Aug. 26, 2014	Aug. 25, 2015
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 17, 2014	Feb. 16, 2015
Preamplifier Agilent	8449B	3008A01961	Oct. 18, 2014	Oct. 17, 2015
Preamplifier Agilent	8447D	2944A10738	Oct. 18, 2014	Oct. 17, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 09, 2014	Aug. 08, 2015
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 inn-co GmbH	CO2000	019303	NA	NA
Turn Table BV ADT	TT100.	TT93021704	NA	NA
Turn Table Controller BV ADT	SC100.	SC93021704	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2014	Oct. 17, 2015
High Speed Peak Power Meter	ML2495A	0824011	Jul. 26, 2014	Jul. 25, 2015
Power Sensor	MA2411B	0738171	Jul. 26, 2014	Jul. 25, 2015
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 09, 2014	Jun. 08, 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 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.

4.1.4 TEST PROCEDURES

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

NOTE:

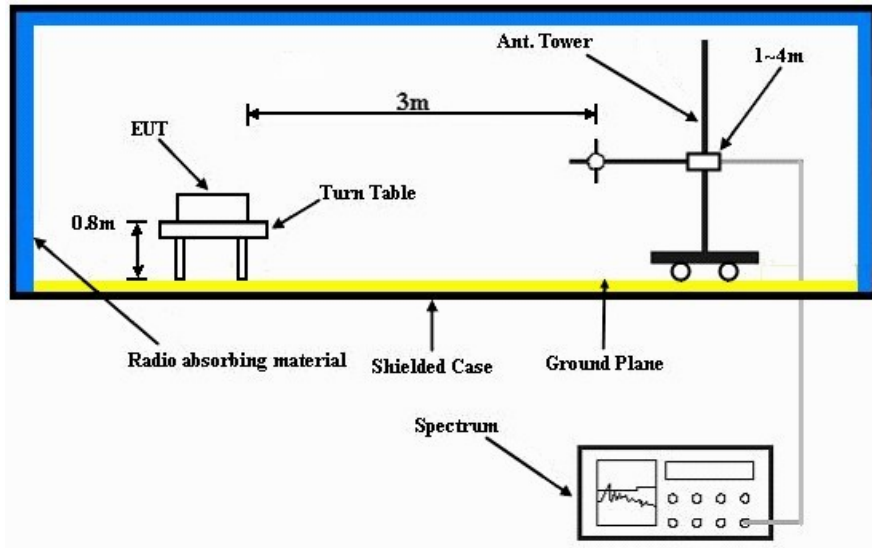
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

4.1.5 DEVIATION FROM TEST STANDARD

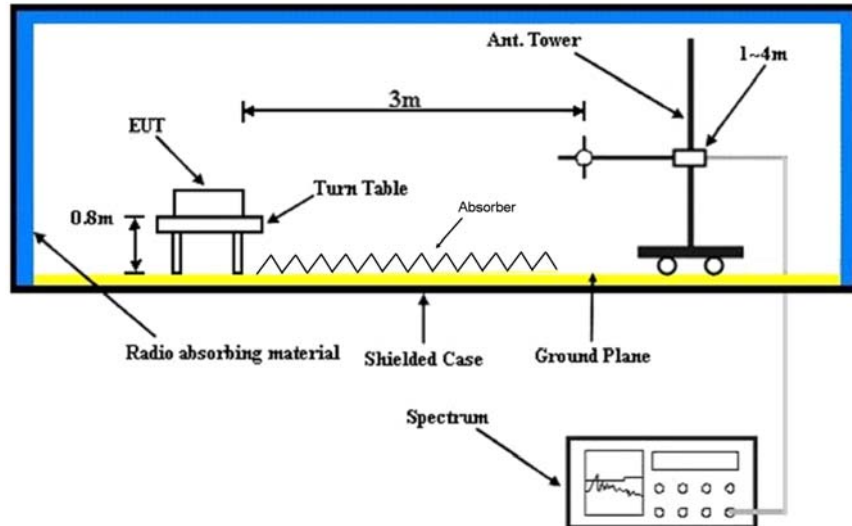
No deviation.

4.1.6 TEST SETUP

Frequency range 30MHz~1GHz



Frequency range above 1GHz



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

4.1.7 EUT OPERATING CONDITION

- 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 run 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.

4.1.8 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA:

802.11a

CHANNEL	TX Channel 36	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	5150.00	66.6 PK	74.0	-7.4	1.05 H	35	60.90	5.70
2	5150.00	48.7 AV	54.0	-5.3	1.05 H	35	43.00	5.70
3	*5180.00	104.5 PK			1.00 H	30	65.00	39.50
4	*5180.00	94.9 AV			1.00 H	30	55.40	39.50
5	#10360.00	57.9 PK	74.0	-16.1	1.11 H	12	39.40	18.50
6	#10360.00	45.6 AV	54.0	-8.4	1.11 H	12	27.10	18.50
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	5150.00	69.7 PK	74.0	-4.3	1.53 V	4	64.00	5.70
2	5150.00	53.6 AV	54.0	-0.4	1.53 V	4	47.90	5.70
3	*5180.00	109.9 PK			1.51 V	360	70.40	39.50
4	*5180.00	99.3 AV			1.51 V	360	59.80	39.50
5	#10360.00	64.6 PK	74.0	-9.4	1.94 V	13	46.10	18.50
6	#10360.00	51.0 AV	54.0	-3.0	1.94 V	13	32.50	18.50

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

CHANNEL	TX Channel 40	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	*5200.00	104.0 PK			1.00 H	30	64.40	39.60
2	*5200.00	94.6 AV			1.00 H	30	55.00	39.60
3	#10400.00	59.3 PK	74.0	-14.7	1.71 H	46	41.00	18.30
4	#10400.00	46.5 AV	54.0	-7.5	1.71 H	46	28.20	18.30
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	*5200.00	108.3 PK			1.64 V	1	68.70	39.60
2	*5200.00	98.2 AV			1.64 V	1	58.60	39.60
3	#10400.00	66.4 PK	74.0	-7.6	1.38 V	117	48.10	18.30
4	#10400.00	53.1 AV	54.0	-0.9	1.38 V	117	34.80	18.30

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 48	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	*5240.00	102.8 PK			1.00 H	180	63.20	39.60
2	*5240.00	93.2 AV			1.00 H	180	53.60	39.60
3	5350.00	56.1 PK	74.0	-17.9	1.10 H	185	50.30	5.80
4	5350.00	42.5 AV	54.0	-11.5	1.10 H	185	36.70	5.80
5	#10480.00	58.8 PK	74.0	-15.2	1.78 H	12	41.10	17.70
6	#10480.00	46.0 AV	54.0	-8.0	1.78 H	12	28.30	17.70
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	*5240.00	110.2 PK			1.49 V	354	70.60	39.60
2	*5240.00	99.7 AV			1.49 V	354	60.10	39.60
3	5350.00	56.4 PK	74.0	-17.6	1.24 V	11	50.60	5.80
4	5350.00	43.5 AV	54.0	-10.5	1.24 V	11	37.70	5.80
5	#10480.00	63.8 PK	74.0	-10.2	1.95 V	352	46.10	17.70
6	#10480.00	49.7 AV	54.0	-4.3	1.95 V	352	32.00	17.70

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 (HT20)

CHANNEL	TX Channel 36	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	5150.00	63.1 PK	74.0	-10.9	1.00 H	32	57.40	5.70
2	5150.00	47.5 AV	54.0	-6.5	1.00 H	32	41.80	5.70
3	*5180.00	104.6 PK			1.00 H	32	65.10	39.50
4	*5180.00	94.2 AV			1.00 H	32	54.70	39.50
5	#10360.00	56.4 PK	74.0	-17.6	1.58 H	12	37.90	18.50
6	#10360.00	45.6 AV	54.0	-8.4	1.58 H	12	27.10	18.50
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	5150.00	69.9 PK	74.0	-4.1	1.67 V	6	64.20	5.70
2	5150.00	52.8 AV	54.0	-1.2	1.67 V	6	47.10	5.70
3	*5180.00	110.1 PK			1.50 V	0	70.60	39.50
4	*5180.00	99.8 AV			1.50 V	0	60.30	39.50
5	#10360.00	66.9 PK	74.0	-7.1	1.99 V	26	48.40	18.50
6	#10360.00	51.7 AV	54.0	-2.3	1.99 V	26	33.20	18.50

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

CHANNEL	TX Channel 40	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	*5200.00	104.7 PK			1.05 H	123	65.10	39.60
2	*5200.00	94.9 AV			1.05 H	123	55.30	39.60
3	#10400.00	60.0 PK	74.0	-14.0	1.70 H	50	41.70	18.30
4	#10400.00	47.3 AV	54.0	-6.7	1.70 H	50	29.00	18.30
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	*5200.00	108.0 PK			1.05 V	35	68.40	39.60
2	*5200.00	98.9 AV			1.05 V	35	59.30	39.60
3	#10400.00	67.2 PK	74.0	-6.8	1.40 V	126	48.90	18.30
4	#10400.00	53.0 AV	54.0	-1.0	1.40 V	126	34.70	18.30

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 48	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	*5240.00	103.2 PK			1.02 H	185	63.60	39.60
2	*5240.00	92.7 AV			1.02 H	185	53.10	39.60
3	5350.00	56.1 PK	74.0	-17.9	1.15 H	190	50.30	5.80
4	5350.00	42.3 AV	54.0	-11.7	1.15 H	190	36.50	5.80
5	#10480.00	60.0 PK	74.0	-14.0	1.80 H	23	42.30	17.70
6	#10480.00	45.8 AV	54.0	-8.2	1.80 H	23	28.10	17.70
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	*5240.00	110.0 PK			1.50 V	360	70.40	39.60
2	*5240.00	99.9 AV			1.50 V	360	60.30	39.60
3	5350.00	57.1 PK	74.0	-16.9	1.50 V	23	51.30	5.80
4	5350.00	43.0 AV	54.0	-11.0	1.50 V	23	37.20	5.80
5	#10480.00	64.7 PK	74.0	-9.3	1.54 V	340	47.00	17.70
6	#10480.00	50.6 AV	54.0	-3.4	1.54 V	340	32.90	17.70

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 (HT40)

CHANNEL	TX Channel 38	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	*5190.00	98.4 PK			1.00 H	32	58.90	39.50
2	*5190.00	87.5 AV			1.00 H	32	48.00	39.50
3	5350.00	56.2 PK	74.0	-17.8	1.05 H	40	50.40	5.80
4	5350.00	43.8 AV	54.0	-10.2	1.05 H	40	38.00	5.80
5	#10380.00	55.4 PK	74.0	-18.6	1.15 H	306	37.00	18.40
6	#10380.00	45.6 AV	54.0	-8.4	1.15 H	306	27.20	18.40
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	5150.00	70.3 PK	74.0	-3.7	1.84 V	0	64.60	5.70
2	5150.00	53.7 AV	54.0	-0.3	1.84 V	0	48.00	5.70
3	*5190.00	102.5 PK			1.64 V	1	63.00	39.50
4	*5190.00	92.0 AV			1.64 V	1	52.50	39.50
5	#10380.00	58.6 PK	74.0	-15.4	1.59 V	31	40.20	18.40
6	#10380.00	45.5 AV	54.0	-8.5	1.59 V	31	27.10	18.40

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 46	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	*5230.00	66.8 PK			1.34 H	30	61.10	5.70
2	*5230.00	56.5 AV			1.34 H	30	50.80	5.70
3	5350.00	56.1 PK	74.0	-17.9	1.40 H	35	50.30	5.80
4	5350.00	43.7 AV	54.0	-10.3	1.40 H	35	37.90	5.80
5	#10460.00	53.5 PK	74.0	-20.5	1.18 H	284	35.70	17.80
6	#10460.00	45.1 AV	54.0	-8.9	1.18 H	284	27.30	17.80
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	*5230.00	105.1 PK			1.79 V	0	65.50	39.60
2	*5230.00	94.2 AV			1.79 V	0	54.60	39.60
3	5350.00	56.7 PK	74.0	-17.3	1.44 V	14	50.90	5.80
4	5350.00	44.0 AV	54.0	-10.0	1.44 V	14	38.20	5.80
5	#10460.00	56.2 PK	74.0	-17.8	1.12 V	56	38.40	17.80
6	#10460.00	45.6 AV	54.0	-8.4	1.12 V	56	27.80	17.80

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 (VHT80)

CHANNEL	TX Channel 42	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	5150.00	64.1 PK	74.0	-9.9	1.41 H	19	58.40	5.70
2	5150.00	49.2 AV	54.0	-4.8	1.41 H	19	43.50	5.70
3	*5210.00	95.1 PK			1.00 H	30	55.50	39.60
4	*5210.00	84.4 AV			1.00 H	30	44.80	39.60
5	#10420.00	56.2 PK	74.0	-17.8	1.13 H	25	38.00	18.20
6	#10420.00	46.2 AV	54.0	-7.8	1.13 H	25	28.00	18.20
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	70.5 PK	74.0	-3.5	1.52 V	4	64.80	5.70
2	5150.00	53.8 AV	54.0	-0.2	1.52 V	4	48.10	5.70
3	*5210.00	99.1 PK			1.64 V	360	59.50	39.60
4	*5210.00	88.1 AV			1.64 V	360	48.50	39.60
5	#10420.00	57.1 PK	74.0	-16.9	1.11 V	13	38.90	18.20
6	#10420.00	46.1 AV	54.0	-7.9	1.11 V	13	27.90	18.20

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.

802.11a

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	#5714.90	58.0 PK	74.0	-16.0	1.00 H	25	51.50	6.50
2	#5714.90	44.3 AV	54.0	-9.7	1.00 H	25	37.80	6.50
3	#5722.90	65.2 PK	78.2	-13.0	1.00 H	25	58.70	6.50
4	*5745.00	96.7 PK			1.00 H	27	56.30	40.40
5	*5745.00	86.7 AV			1.00 H	27	46.30	40.40
6	11490.00	58.1 PK	74.0	-15.9	1.84 H	34	40.60	17.50
7	11490.00	45.1 AV	54.0	-8.9	1.84 H	34	27.60	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	#5714.90	66.4 PK	74.0	-7.6	1.34 V	333	59.90	6.50
2	#5714.90	47.8 AV	54.0	-6.2	1.34 V	333	41.30	6.50
3	#5722.90	77.7 PK	78.2	-0.5	1.34 V	333	71.20	6.50
4	*5745.00	108.8 PK			1.32 V	336	68.40	40.40
5	*5745.00	98.3 AV			1.32 V	336	57.90	40.40
6	11490.00	59.8 PK	74.0	-14.2	1.33 V	135	42.30	17.50
7	11490.00	46.5 AV	54.0	-7.5	1.33 V	135	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.
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	*5785.00	98.8 PK			1.00 H	24	58.20	40.60
2	*5785.00	88.7 AV			1.00 H	24	48.10	40.60
3	11570.00	60.3 PK	74.0	-13.7	1.82 H	38	42.80	17.50
4	11570.00	47.3 AV	54.0	-6.7	1.82 H	38	29.80	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	111.3 PK			1.31 V	334	70.70	40.60
2	*5785.00	101.7 AV			1.31 V	334	61.10	40.60
3	11570.00	64.2 PK	74.0	-9.8	1.34 V	112	46.70	17.50
4	11570.00	51.6 AV	54.0	-2.4	1.34 V	112	34.10	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)
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	*5825.00	97.8 PK			1.00 H	29	57.10	40.70
2	*5825.00	87.8 AV			1.00 H	29	47.10	40.70
3	#5852.10	59.9 PK	78.2	-18.3	1.00 H	26	53.10	6.80
4	#5860.10	57.8 PK	74.0	-16.2	1.00 H	26	51.00	6.80
5	#5860.10	44.4 AV	54.0	-9.6	1.00 H	26	37.60	6.80
6	11650.00	60.4 PK	74.0	-13.6	1.82 H	34	42.40	18.00
7	11650.00	47.6 AV	54.0	-6.4	1.82 H	34	29.60	18.00
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	*5825.00	111.1 PK			1.43 V	335	70.40	40.70
2	*5825.00	100.6 AV			1.43 V	335	59.90	40.70
3	#5852.10	78.1 PK	78.2	-0.1	1.44 V	4	71.30	6.80
4	#5860.10	68.1 PK	74.0	-5.9	1.44 V	4	61.30	6.80
5	#5860.10	51.3 AV	54.0	-2.7	1.44 V	4	44.50	6.80
6	11650.00	66.6 PK	74.0	-7.4	1.26 V	123	48.60	18.00
7	11650.00	52.2 AV	54.0	-1.8	1.26 V	123	34.20	18.00

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.

802.11n (HT20)

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	#5714.90	56.8 PK	74.0	-17.2	1.22 H	22	50.30	6.50
2	#5714.90	44.3 AV	54.0	-9.7	1.22 H	22	37.80	6.50
3	#5722.90	65.7 PK	78.2	-12.5	1.22 H	22	59.20	6.50
4	*5745.00	97.2 PK			1.22 H	28	56.80	40.40
5	*5745.00	86.4 AV			1.22 H	28	46.00	40.40
6	11490.00	57.8 PK	74.0	-16.2	1.80 H	34	40.30	17.50
7	11490.00	44.9 AV	54.0	-9.1	1.80 H	34	27.40	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	#5714.90	65.0 PK	74.0	-9.0	1.47 V	336	58.50	6.50
2	#5714.90	46.7 AV	54.0	-7.3	1.47 V	336	40.20	6.50
3	#5722.90	77.5 PK	78.2	-0.7	1.47 V	336	71.00	6.50
4	*5745.00	107.2 PK			1.60 V	353	66.80	40.40
5	*5745.00	96.7 AV			1.60 V	353	56.30	40.40
6	11490.00	59.3 PK	74.0	-14.7	1.33 V	127	41.80	17.50
7	11490.00	46.4 AV	54.0	-7.6	1.33 V	127	28.90	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.
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	*5785.00	99.2 PK			1.00 H	21	58.60	40.60
2	*5785.00	88.5 AV			1.00 H	21	47.90	40.60
3	11570.00	60.0 PK	74.0	-14.0	1.83 H	35	42.50	17.50
4	11570.00	46.7 AV	54.0	-7.3	1.83 H	35	29.20	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	111.1 PK			1.31 V	336	70.50	40.60
2	*5785.00	101.0 AV			1.31 V	336	60.40	40.60
3	11570.00	64.6 PK	74.0	-9.4	1.61 V	115	47.10	17.50
4	11570.00	50.6 AV	54.0	-3.4	1.61 V	115	33.10	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)
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	*5825.00	97.5 PK			1.00 H	23	56.80	40.70
2	*5825.00	87.3 AV			1.00 H	23	46.60	40.70
3	#5852.10	63.3 PK	78.2	-14.9	1.00 H	21	56.50	6.80
4	#5860.10	57.9 PK	74.0	-16.1	1.00 H	21	51.10	6.80
5	#5860.10	44.9 AV	54.0	-9.1	1.00 H	21	38.10	6.80
6	11650.00	60.8 PK	74.0	-13.2	1.81 H	31	42.80	18.00
7	11650.00	47.7 AV	54.0	-6.3	1.81 H	31	29.70	18.00
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	*5825.00	110.4 PK			1.42 V	334	69.70	40.70
2	*5825.00	100.4 AV			1.42 V	334	59.70	40.70
3	#5852.10	78.0 PK	78.2	-0.2	1.40 V	301	71.20	6.80
4	#5860.10	70.0 PK	74.0	-4.0	1.40 V	301	63.20	6.80
5	#5860.10	51.7 AV	54.0	-2.3	1.40 V	301	44.90	6.80
6	11650.00	66.2 PK	74.0	-7.8	1.32 V	124	48.20	18.00
7	11650.00	52.3 AV	54.0	-1.7	1.32 V	124	34.30	18.00

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.

802.11n (HT40)

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	#5714.90	60.2 PK	74.0	-13.8	1.24 H	31	53.70	6.50
2	#5714.90	45.6 AV	54.0	-8.4	1.24 H	31	39.10	6.50
3	#5722.90	66.0 PK	78.2	-12.2	1.24 H	31	59.50	6.50
4	*5755.00	93.4 PK			1.22 H	30	52.90	40.50
5	*5755.00	83.3 AV			1.22 H	30	42.80	40.50
6	11510.00	57.0 PK	74.0	-17.0	1.83 H	35	39.60	17.40
7	11510.00	44.4 AV	54.0	-9.6	1.83 H	35	27.00	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	#5714.90	73.7 PK	74.0	-0.3	1.46 V	337	67.20	6.50
2	#5714.90	53.0 AV	54.0	-1.0	1.46 V	337	46.50	6.50
3	#5722.90	77.8 PK	78.2	-0.4	1.46 V	337	71.30	6.50
4	*5755.00	104.1 PK			1.46 V	351	63.60	40.50
5	*5755.00	93.8 AV			1.46 V	351	53.30	40.50
6	11510.00	59.1 PK	74.0	-14.9	1.30 V	116	41.70	17.40
7	11510.00	45.9 AV	54.0	-8.1	1.30 V	116	28.50	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)
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	*5795.00	95.3 PK			1.00 H	22	54.70	40.60
2	*5795.00	84.8 AV			1.00 H	22	44.20	40.60
3	#5852.10	62.1 PK	78.2	-16.1	1.00 H	22	55.30	6.80
4	#5860.10	57.5 PK	74.0	-16.5	1.00 H	22	50.70	6.80
5	#5860.10	45.1 AV	54.0	-8.9	1.00 H	22	38.30	6.80
6	11590.00	59.9 PK	74.0	-14.1	1.81 H	37	42.40	17.50
7	11590.00	47.1 AV	54.0	-6.9	1.81 H	37	29.60	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	*5795.00	108.7 PK			1.41 V	301	68.10	40.60
2	*5795.00	98.2 AV			1.41 V	301	57.60	40.60
3	#5852.10	70.9 PK	78.2	-7.3	1.56 V	349	64.10	6.80
4	#5860.10	67.4 PK	74.0	-6.6	1.56 V	349	60.60	6.80
5	#5860.10	50.3 AV	54.0	-3.7	1.56 V	349	43.50	6.80
6	11590.00	60.9 PK	74.0	-13.1	1.25 V	115	43.40	17.50
7	11590.00	47.8 AV	54.0	-6.2	1.25 V	115	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.
6. " # ": 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	#5714.90	59.8 PK	74.0	-14.2	1.00 H	25	53.30	6.50
2	#5714.90	45.5 AV	54.0	-8.5	1.00 H	25	39.00	6.50
3	#5722.90	63.5 PK	78.2	-14.7	1.00 H	25	57.00	6.50
4	*5775.00	88.6 PK			1.00 H	23	48.00	40.60
5	*5775.00	78.5 AV			1.00 H	23	37.90	40.60
6	11550.00	56.6 PK	74.0	-17.4	1.84 H	34	39.20	17.40
7	11550.00	43.9 AV	54.0	-10.1	1.84 H	34	26.50	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	#5714.90	71.5 PK	74.0	-2.5	1.35 V	351	65.00	6.50
2	#5714.90	53.3 AV	54.0	-0.7	1.35 V	351	46.80	6.50
3	#5722.90	76.7 PK	78.2	-1.5	1.35 V	351	70.20	6.50
4	*5775.00	100.4 PK			1.34 V	1	59.80	40.60
5	*5775.00	89.6 AV			1.34 V	1	49.00	40.60
6	11550.00	58.5 PK	74.0	-15.5	1.36 V	110	41.10	17.40
7	11550.00	45.4 AV	54.0	-8.6	1.36 V	110	28.00	17.40

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.

BELOW 1GHz WORST-CASE DATA:

802.11a

CHANNEL	TX Channel 48	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	101.69	40.8 QP	43.5	-2.7	2.00 H	120	49.20	-8.40
2	138.56	39.2 QP	43.5	-4.3	2.00 H	267	47.60	-8.40
3	249.17	42.2 QP	46.0	-3.8	1.00 H	108	50.60	-8.40
4	293.79	39.5 QP	46.0	-6.5	1.26 H	203	47.90	-8.40
5	359.77	31.7 QP	46.0	-14.3	1.00 H	278	40.10	-8.40
6	961.29	44.4 QP	54.0	-9.6	1.51 H	227	52.80	-8.40
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	29.90	37.7 QP	40.0	-2.3	1.00 V	104	53.20	-15.50
2	55.13	38.8 QP	40.0	-1.2	1.24 V	8	52.90	-14.10
3	76.47	34.4 QP	40.0	-5.6	1.00 V	90	51.60	-17.20
4	140.50	36.1 QP	43.5	-7.4	1.00 V	155	50.30	-14.20
5	249.17	37.0 QP	46.0	-9.0	1.24 V	153	51.40	-14.40
6	802.18	32.2 QP	46.0	-13.8	1.24 V	303	35.20	-3.00
7	961.29	50.3 QP	54.0	-3.7	1.00 V	251	50.70	-0.40

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.

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Apr. 24, 2014	Apr. 23, 2015
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 30, 2014	Dec. 29, 2015
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 10, 2014	Jul. 09, 2015
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 2.
3. The VCCI Site Registration No. is C-2047.

4.2.3 TEST PROCEDURES

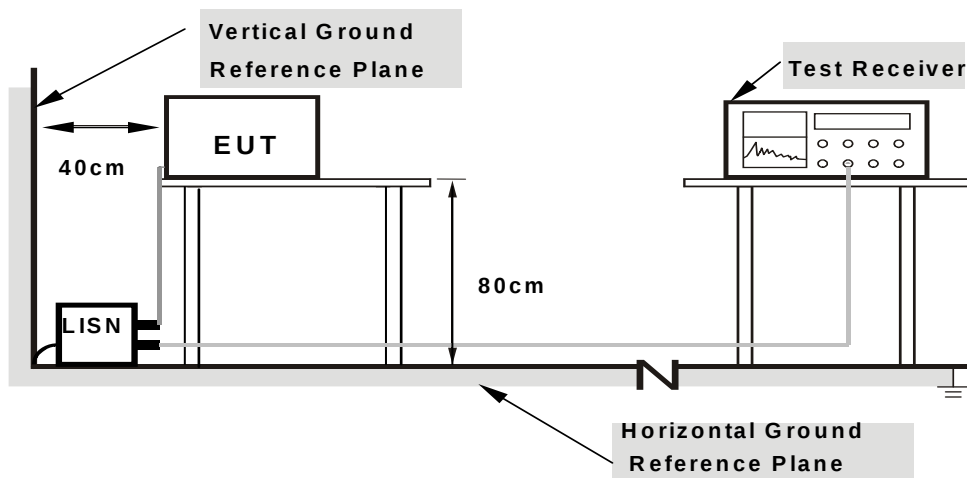
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



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

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

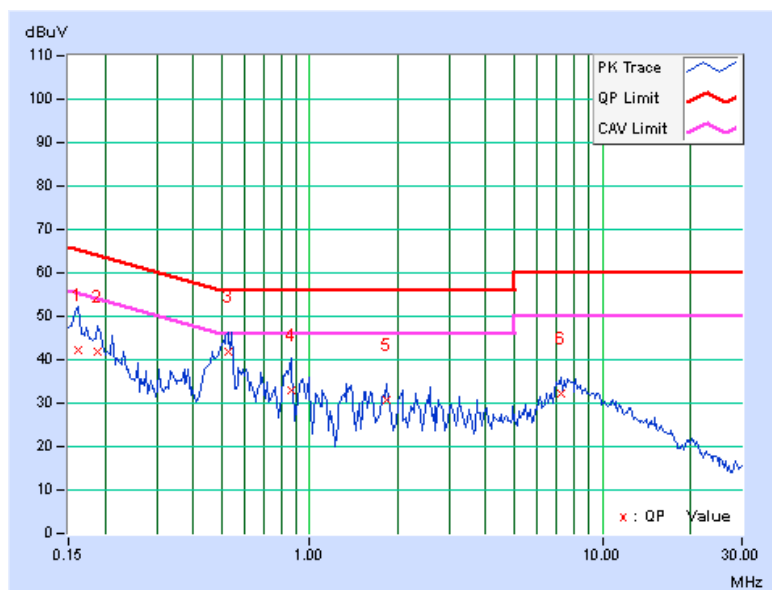
CONDUCTED WORST-CASE DATA: 802.11a

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	0.20	42.15	25.25	42.35	25.45	65.38	55.38	-23.03	-29.93
2	0.18906	0.20	41.67	33.68	41.87	33.88	64.08	54.08	-22.21	-20.20
3	0.52500	0.22	41.65	31.43	41.87	31.65	56.00	46.00	-14.13	-14.35
4	0.86094	0.28	32.79	24.89	33.07	25.17	56.00	46.00	-22.93	-20.83
5	1.83594	0.35	30.47	22.16	30.82	22.51	56.00	46.00	-25.18	-23.49
6	7.19141	0.47	31.83	23.92	32.30	24.39	60.00	50.00	-27.70	-25.61

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

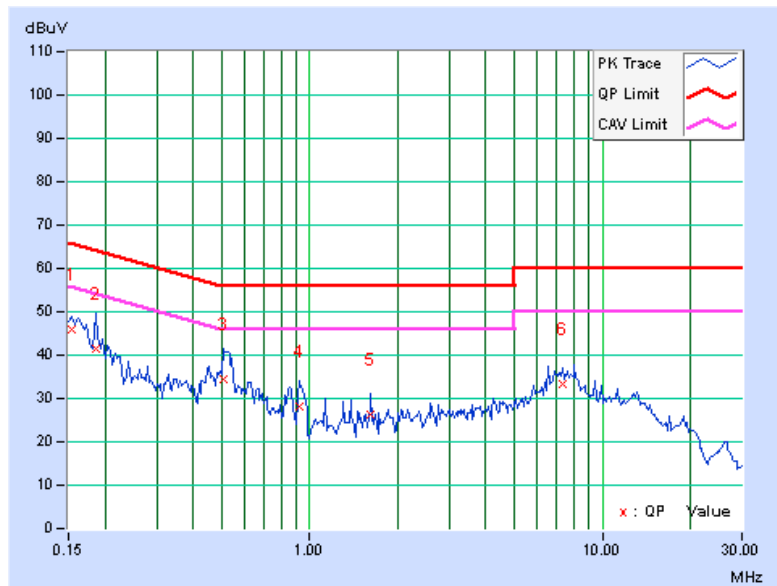


PHASE	Line 2	6dB BANDWIDTH	9kHz
-------	--------	---------------	------

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.21	45.88	34.68	46.09	34.89	65.79	55.79	-19.70	-20.90
2	0.18516	0.22	41.30	31.03	41.52	31.25	64.25	54.25	-22.74	-23.01
3	0.50938	0.26	34.21	27.95	34.47	28.21	56.00	46.00	-21.53	-17.79
4	0.92734	0.30	27.77	20.36	28.07	20.66	56.00	46.00	-27.93	-25.34
5	1.61328	0.37	25.84	17.70	26.21	18.07	56.00	46.00	-29.79	-27.93
6	7.36719	0.52	32.80	26.29	33.32	26.81	60.00	50.00	-26.68	-23.19

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



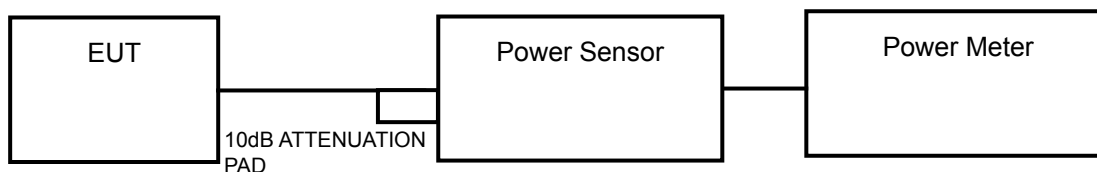
4.3 TRANSMIT POWER MEASUREMENT

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 $\leq$ 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

4.3.2 TEST SETUP



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.3.4 TEST PROCEDURE

789033 D02 General UNII Test Procedures New Rules v01 E/3/b

FOR AVERAGE POWER MEASUREMENT

For 802.11a, 802.11n (HT20), 802.11n (HT40)

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 (VHT80)

- 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 $\geq$ 3 MHz
- 5) Number of points in sweep $\geq$ 2 Span / RBW.
- 6) Sweep time $\leq$ (number of points in sweep) * T
- 7) Detector = RMS.
- 8) Trace mode = max hold.
- 9) Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

POWER OUTPUT:

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	MAXIMUM CONDUCTED POWER (mW)	MAXIMUM CONDUCTED POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
36	5180	87.498	19.42	30	PASS
40	5200	86.896	19.39	30	PASS
48	5240	92.897	19.68	30	PASS
149	5745	50.350	17.02	30	PASS
157	5785	88.716	19.48	30	PASS
165	5825	85.310	19.31	30	PASS

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	MAXIMUM CONDUCTED POWER (mW)	MAXIMUM CONDUCTED POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
36	5180	82.985	19.19	30	PASS
40	5200	84.918	19.29	30	PASS
48	5240	92.683	19.67	30	PASS
149	5745	41.591	16.19	30	PASS
157	5785	83.560	19.22	30	PASS
165	5825	74.473	18.72	30	PASS

802.11n (HT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	MAXIMUM CONDUCTED POWER (mW)	MAXIMUM CONDUCTED POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
38	5190	45.290	16.56	30	PASS
46	5230	85.901	19.34	30	PASS
151	5755	36.559	15.63	30	PASS
159	5795	82.985	19.19	30	PASS

802.11ac (VHT80)

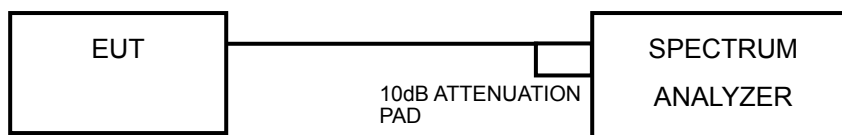
CHANNEL	CHANNEL FREQUENCY (MHz)	MAXIMUM CONDUCTED POWER (mW)	MAXIMUM CONDUCTED POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
42	5210	39.537	15.97	30	PASS
155	5775	35.810	15.54	30	PASS

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 4.1.3 to get information of above instrument.

4.4.4 TEST PROCEDURES

789033 D02 General UNII Test Procedures New Rules v01 E/2/b

For U-NII-1 band:

Without duty factor:

Using method SA-2

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 30 kHz, Set VBW $\geq$ 1 MHz, Detector = RMS
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = auto, trigger set to “free run”.
- 5) Trace average at least 100 traces in power averaging mode.
- 6) Record the max value

With duty factor:

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 30 kHz, Set VBW $\geq$ 1 MHz, Detector = RMS
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = auto, trigger set to “free run”.
- 5) Trace average at least 100 traces in power averaging mode.
- 6) Record the max value and add $10 \log (1/\text{duty cycle})$

789033 D02 General UNII Test Procedures New Rules v01 F/5

For U-NII-3 band:

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 500 kHz, Set VBW $\geq$ 3 RBW, 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 $10 \log (1/\text{duty cycle})$
- 6) 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 $\text{BWCF} = 10\log(500 \text{ kHz}/300\text{kHz})$

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6.

4.4.7 TEST RESULTS

For U-NII-1 Band

802.11a

CHANNEL	FREQUENCY (MHz)	PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	PSD WITH DUTY FACTOR (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
36	5180	6.79	0.10	6.89	17	PASS
40	5200	6.96	0.10	7.06	17	PASS
48	5240	7.31	0.10	7.41	17	PASS

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

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PSD (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
36	5180	6.85	17	PASS
40	5200	6.84	17	PASS
48	5240	7.07	17	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	PSD WITH DUTY FACTOR (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
38	5190	1.19	0.14	1.33	17	PASS
46	5230	3.68	0.14	3.82	17	PASS

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

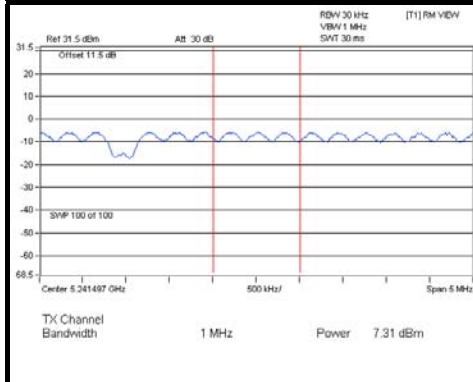
802.11n (VHT80)

CHANNEL	FREQUENCY (MHz)	PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	PSD WITH DUTY FACTOR (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
42	5210	-2.51	0.19	-2.32	17	PASS

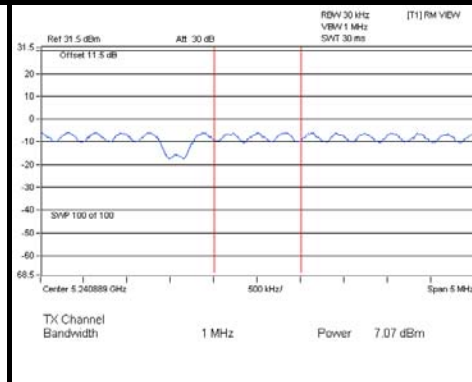
NOTE: Refer to section 3.3 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE

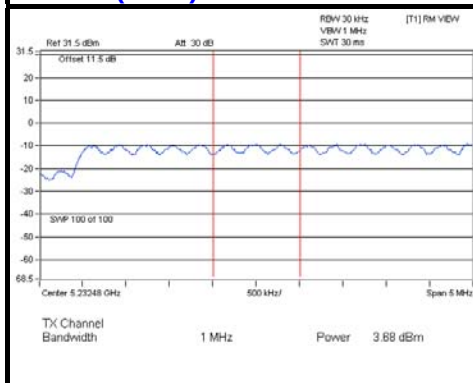
802.11a



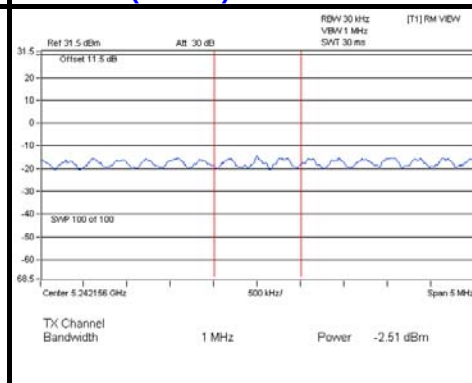
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



For U-NII-3 Band

802.11a

Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
149	5745	-2.92	-0.70	0.10	-0.60	30	PASS
157	5785	-1.05	1.17	0.10	1.27	30	PASS
165	5825	-1.13	1.09	0.10	1.19	30	PASS

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

802.11n (HT20)

Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
149	5745	-3.69	-1.47	-1.47	30	PASS
157	5785	-0.91	1.31	1.31	30	PASS
165	5825	-1.42	0.80	0.80	30	PASS

802.11n (HT40)

Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
151	5755	-7.95	-5.73	0.14	-5.59	30	PASS
159	5795	-4.96	-2.74	0.14	-2.60	30	PASS

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

802.11ac (VHT80)

Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
155	5775	-11.38	-9.16	0.19	-8.97	30	PASS

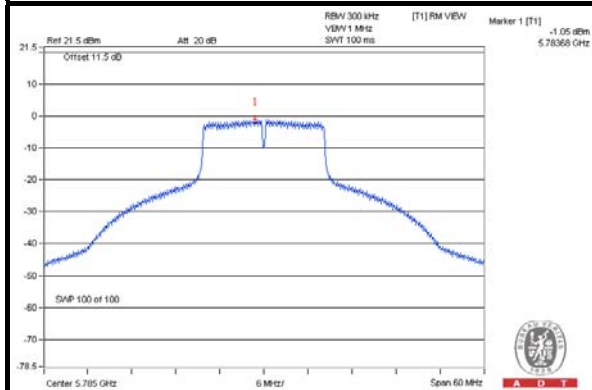
NOTE: Refer to section 3.3 for duty cycle spectrum plot.



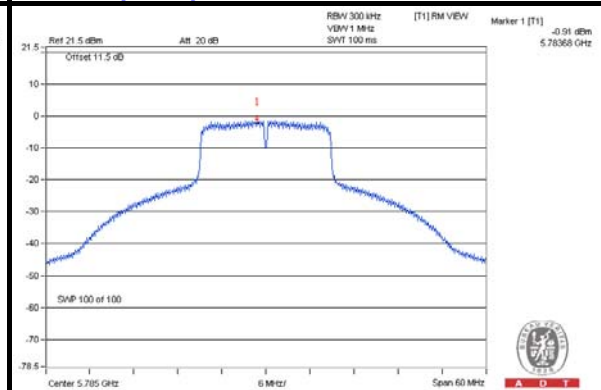
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SPECTRUM PLOT OF WORST VALUE

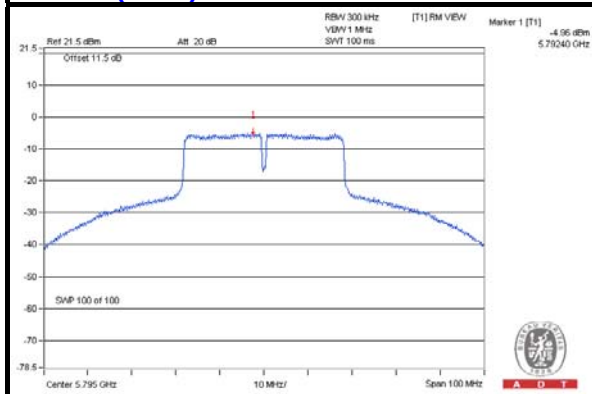
802.11a



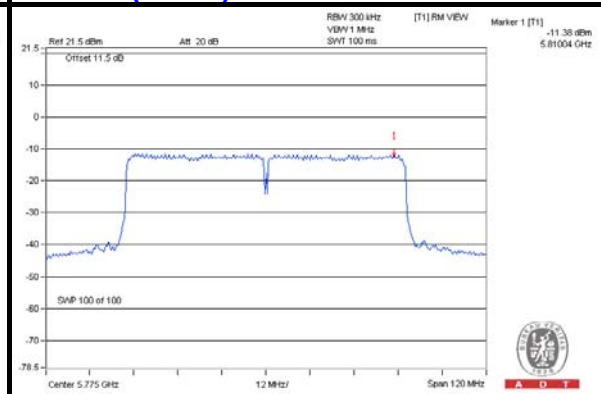
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

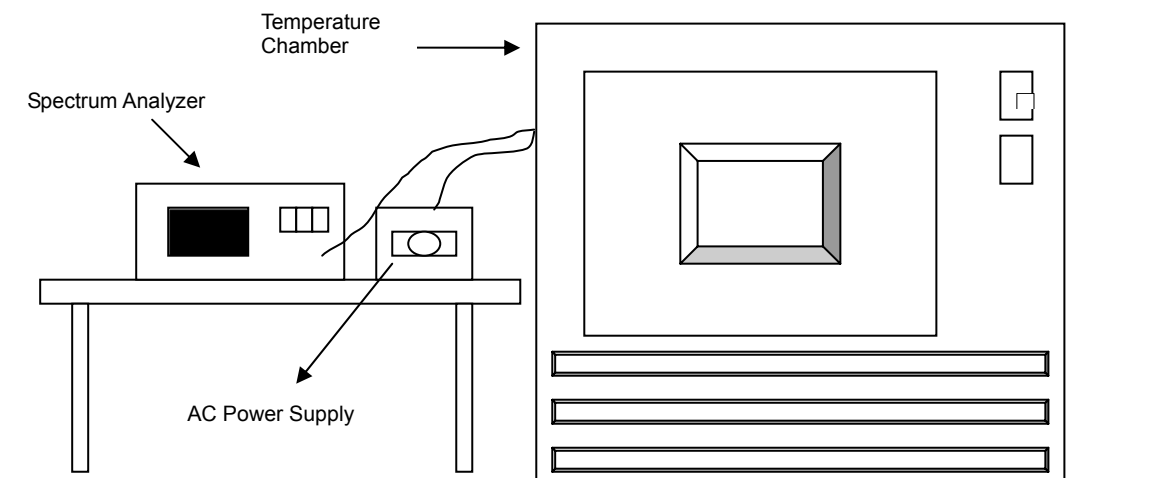


4.5 FREQUENCY STABILITY

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 4.1.3 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: 5240MHz									
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	5239.97720	-0.00044	5239.97640	-0.00045	5239.97560	-0.00047	5239.97510	-0.00048
40	120	5239.98960	-0.00020	5239.99180	-0.00016	5239.99370	-0.00012	5239.99380	-0.00012
30	120	5240.01490	0.00028	5240.01670	0.00032	5240.01840	0.00035	5240.01410	0.00027
20	120	5240.00210	0.00004	5240.00070	0.00001	5240.00120	0.00002	5240.00310	0.00006
10	120	5239.97690	-0.00044	5239.98150	-0.00035	5239.97800	-0.00042	5239.97700	-0.00044
0	120	5239.98450	-0.00030	5239.98250	-0.00033	5239.98340	-0.00032	5239.98550	-0.00028
-10	120	5240.02170	0.00041	5240.02350	0.00045	5240.02210	0.00042	5240.02090	0.00040
-20	120	5240.00780	0.00015	5240.01110	0.00021	5240.00620	0.00012	5240.00860	0.00016
-30	120	5240.02000	0.00038	5240.02230	0.00043	5240.02030	0.00039	5240.02050	0.00039

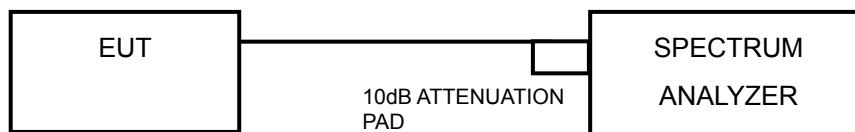
FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5240MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5240.0025	0.00005	5240.0017	0.00003	5240.0004	0.00001	5240.0032	0.00006
	120	5240.0021	0.00004	5240.0007	0.00001	5240.0012	0.00002	5240.0031	0.00006
	102	5240.0025	0.00005	5239.9997	-0.00001	5240.0004	0.00001	5240.0037	0.00007

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

789033 D02 General UNII Test Procedures New Rules v01 (C)

- 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

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITIONS

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

4.6.7 TEST RESULTS

802.11a

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	16.35	0.5	PASS
157	5785	16.36	0.5	PASS
165	5825	16.38	0.5	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	17.05	0.5	PASS
157	5785	17.11	0.5	PASS
165	5825	16.87	0.5	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
151	5755	36.13	0.5	PASS
159	5795	36.15	0.5	PASS

802.11ac (VHT80)

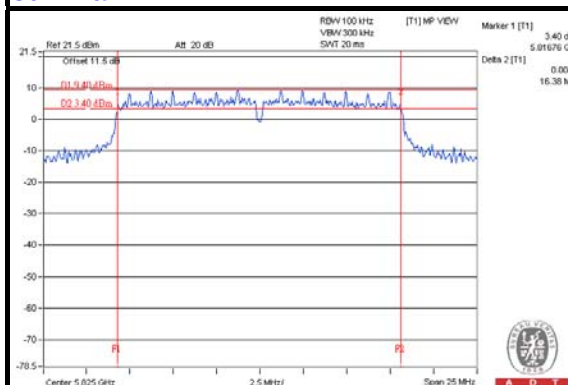
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
155	5775	75.61	0.5	PASS



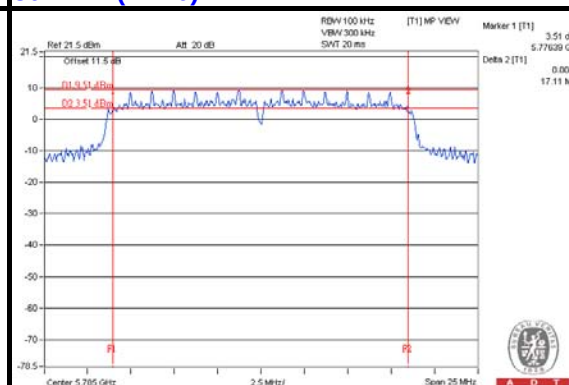
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SPECTRUM PLOT OF WORST VALUE

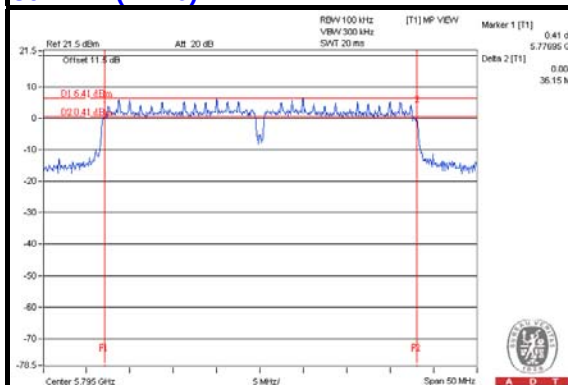
802.11a



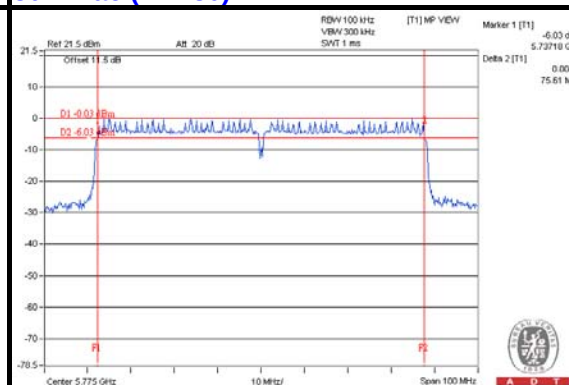
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

6. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

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.

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

No modifications were made to the EUT by the lab during the test.

---END---