FCC Test Report

Report No.:	RF150318C33G-1
FCC ID:	UCC-A22221000
Test Model:	A2-2221-000
Received Date:	Mar. 18, 2015
Test Date:	Mar. 19 ~ Apr. 07, 2015
Issued Date:	Nov. 03, 2016
Applicant:	Altai Technologies Limited
Address:	Unit 209, 2/F, Lakeside 2, 10 Science Park West Avenue, HK Science Park, Shatin, Hong Kong
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
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RF150318C33G-1	Original release.	Nov. 03, 2016

1 Certificate of Conformity

Product:	A2c Indoor Dual-Band 2X2 802.11ac AP
Brand:	ALTAI
Test Model:	A2-2221-000
Sample Status:	Engineering sample
Applicant:	Altai Technologies Limited
Test Date:	Mar. 19 ~ Apr. 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 : _____ , **Date:** Nov. 03, 2016

Pettie Chen / Senior Specialist

Approved by : _____ , **Date:** Nov. 03, 2016

Ken Liu / Senior Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (SECTION 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -7.41dB at 0.15000MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 5150.00MHz.
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	No antenna connector is used.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.86 dB
	200MHz ~1000MHz	3.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	A2c Indoor Dual-Band 2X2 802.11ac AP
Brand	ALTAI
Test Model	A2-2221-000
Status of EUT	Engineering sample
Power Supply Rating	12Vdc from adapter 48Vdc from PoE
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.6Mbps
Operating Frequency	5180 ~ 5240MHz & 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (HT20), 802.11n (VHT20) 2 for 802.11n (HT40), 802.11n (VHT40) 1 for 802.11ac (VHT80) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (HT20), 802.11n (VHT20) 2 for 802.11n (HT40), 802.11n (VHT40) 1 for 802.11ac (VHT80)
Output Power	5180 ~ 5240MHz: 684.831mW 5745 ~ 5825MHz: 357.022mW
Antenna Type	Refer to Note
Antenna Connector	NA
Accessory Device	Adapter
Data Cable Supplied	0.5m RJ45 non-shielded cable without core

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	TX FUNCTION
802.11a	2TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX
802.11ac (VHT20)	2TX
802.11ac (VHT40)	2TX
802.11ac (VHT80)	2TX

* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for VHT20 / VHT40, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

2. The EUT uses following adapter and PoE.

Adapter	
Brand	Powertron Electronics Corp.
Model	PA1024-2HUB PA1024-120HUB200
Input Power	100-240Vac~50-60Hz 0.6A
Output Power	12Vdc / 2.0A 24W Max
Power Line	1.5m cable with 1 core

PoE (Support unit)	
Brand	EnGenius
Model	EPE-48GR
Rating	48Vdc / 0.38A 18.24W

Adapter of PoE (Support unit)	
Brand	Powertron Electronics Corp.
Model	PA1040-480IB080
Input Power	100-240Vac~50-60Hz 1.5A
Output Power	48Vdc / 0.8A 38.4W Max
Power Line	1.6m cable with 1 core

3. The following antennas were provided to the EUT.

Antenna Type	Printed							
Antenna Connector	NA							
Gain (dBi)	Frequency (MHz)							
	5150	5250	5350	5450	5550	5650	5750	5850
Ant. 3	5.30	5.40	5.54	5.98	5.89	5.57	5.02	5.23
Ant. 4	3.98	4.08	4.63	4.93	5.63	5.58	5.68	5.66

4. 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≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Powered by adapter
B	-	√	√	-	Powered by POE

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

NOTE:
1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.
2. "-" means no effect.

Radiated Emission Test (Above 1GHz):

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

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
A	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	15.0
A	802.11ac (VHT80)		42	42	OFDM	BPSK	65.0
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
A	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	15.0
A	802.11ac (VHT80)		155	155	OFDM	BPSK	65.0

Radiated Emission Test (Below 1GHz):

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

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B	802.11n (HT20)	5180-5320	36 to 64	40	OFDM	BPSK	7.2
A, B	802.11n (HT20)	5745-5825	149 to 165		OFDM	BPSK	7.2

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)
A, B	802.11n (HT20)	5180-5320	36 to 64	40	OFDM	BPSK	7.2
A, B	802.11n (HT20)	5745-5825	149 to 165		OFDM	BPSK	7.2

Antenna Port Conducted Measurement:

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
A	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	15.0
A	802.11ac (VHT80)		42	42	OFDM	BPSK	65.0
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
A	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	15.0
A	802.11ac (VHT80)		155	155	OFDM	BPSK	65.0

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	18deg. C, 70%RH	120Vac, 60Hz	Nick Hsu
RE<1G	18deg. C, 70%RH	120Vac, 60Hz 48Vdc	Nick Hsu
PLC	17deg. C, 69%RH	120Vac, 60Hz 48Vdc	Nick Hsu
APCM	25deg. C, 60%RH	120Vac, 60Hz	Nick Chen

3.3 Duty Cycle of Test Signal

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

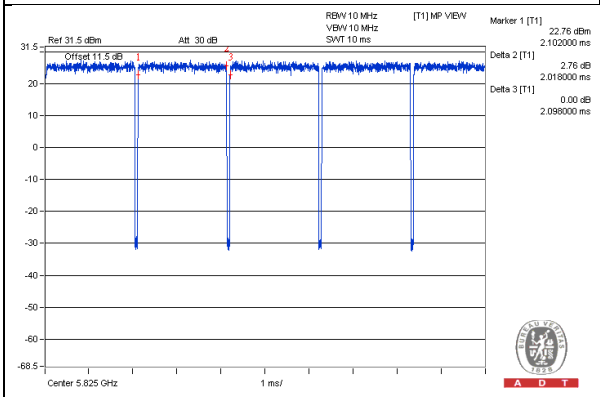
802.11a: Duty cycle = 2.018/2.098 = 0.962, Duty factor = 10 * log(1/0.962) = 0.17

802.11n (HT20): Duty cycle = 1.874/1.964 = 0.954, Duty factor = 10 * log(1/0.954) = 0.20

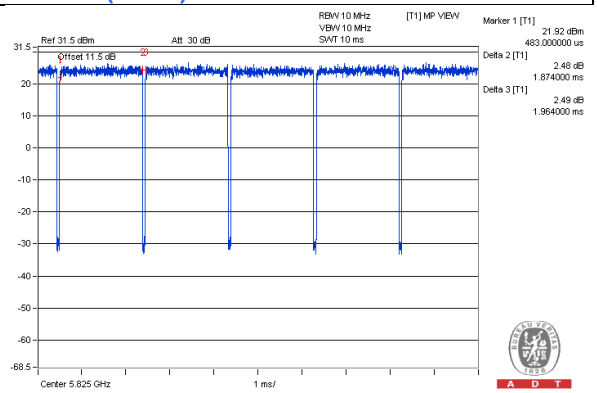
802.11n (HT40): Duty cycle = 0.917/1.005 = 0.912, Duty factor = 10 * log(1/0.912) = 0.40

802.11ac (VHT80): Duty cycle = 0.455/0.517 = 0.88, Duty factor = 10 * log(1/0.88) = 0.55

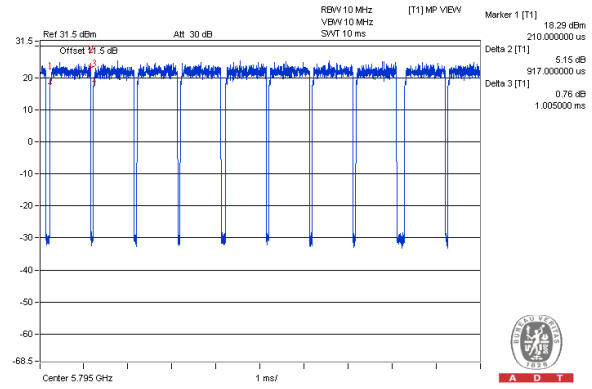
802.11a



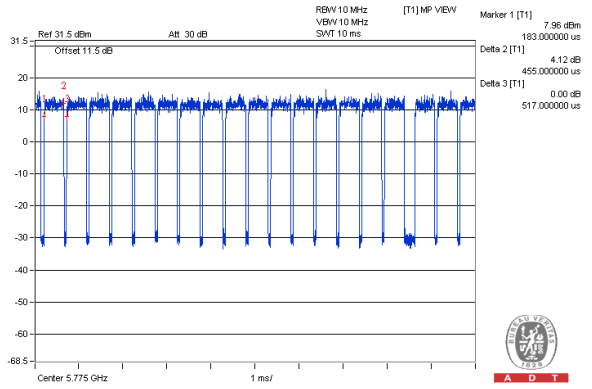
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5410	1HC2XM1	FCC DoC Approved	-
B.	PoE	EnGenius	EPE-48GR	-	-	Provided by client
C.	Adapter of PoE	Powertron Electronics Corp.	PA1040-480IB080	-	-	Provided by client

Note:

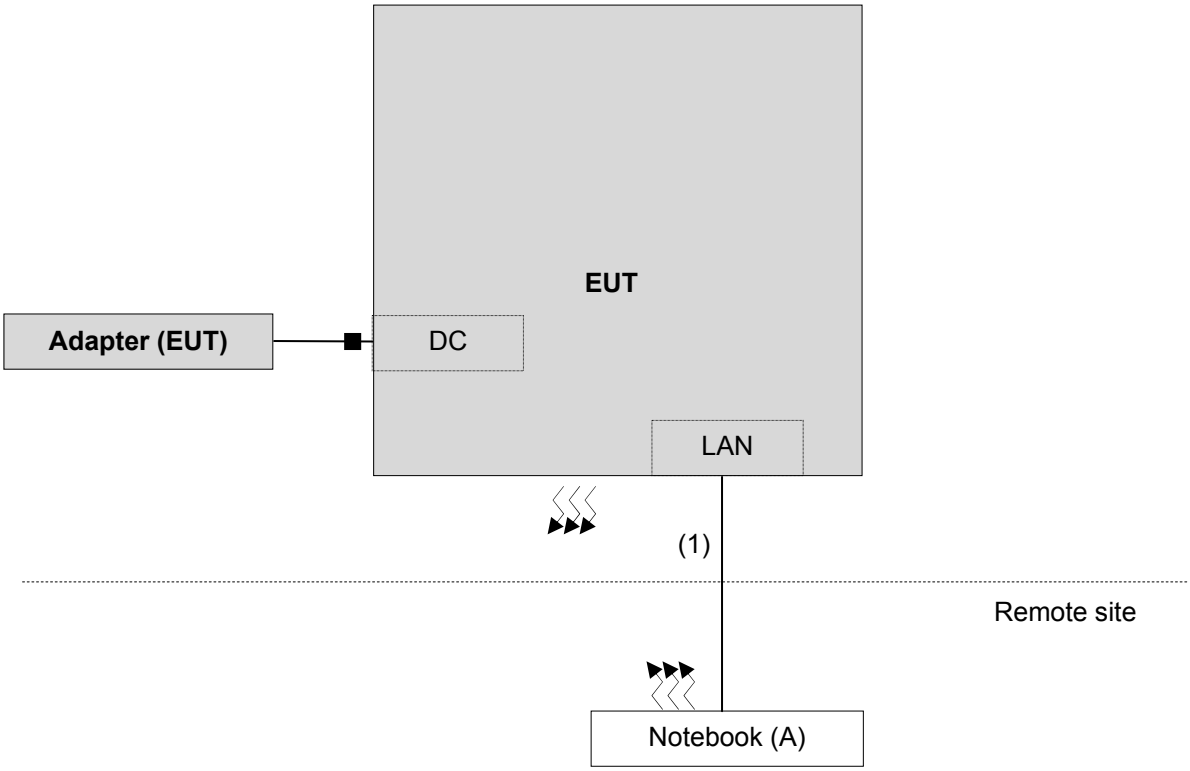
1. All power cords of the above support units are non-shielded (1.8m).
2. Items A~C acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	3	N	0	-
2.	DC cable	1	1.6	N	1	Provided by client
3.	LAN cable	1	0.5	N	0	-

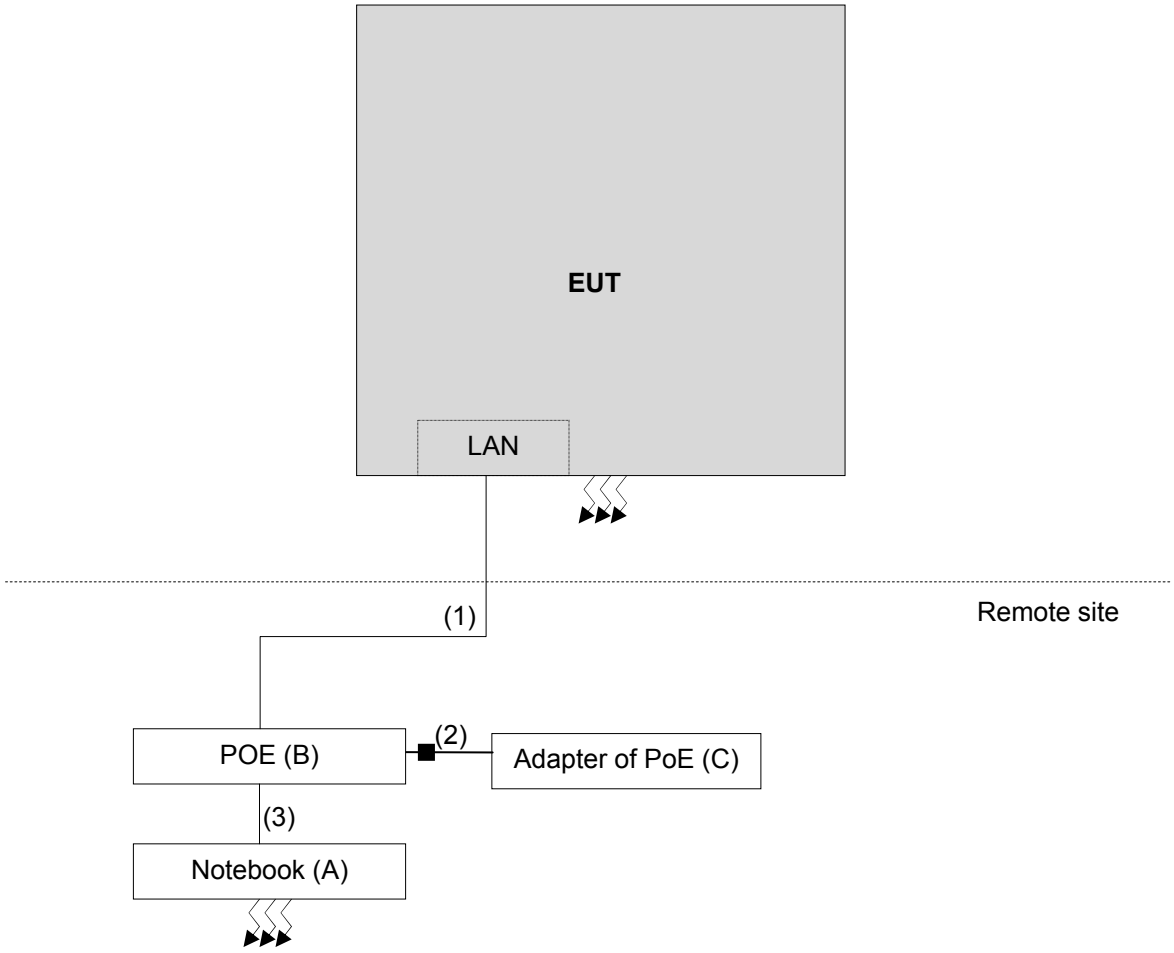
Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test

Test Mode A



Test Mode B



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)
KDB 789033 D02 General UNII Test Procedure New Rules v01r03
KDB 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:

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

Limits of Unwanted Emission Out of the Restricted Bands

Applicable To			Limit	
789033 D02 General UNII Test Procedure New Rules v01r03			Field Strength at 3m	
			PK:74 (dBμV/m)	AV:54 (dBμV/m)
Frequency Band	Applicable To		EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)		PK:-27 (dBm/MHz)	PK:68.2(dBμV/m)
5250~5350 MHz	15.407(b)(2)			
5470~5725 MHz	15.407(b)(3)			
5725~5850 MHz	☒	15.407(b)(4)(i)	PK:-27 (dBm/MHz) *1 PK:10 (dBm/MHz) *2 PK:15.6 (dBm/MHz) *3 PK:27 (dBm/MHz) *4	PK: 68.2 (dBμV/m) *1 PK:105.2 (dBμV/m) *2 PK: 110.8 (dBμV/m) *3 PK:122.2 (dBμV/m) *4
	☐	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	

*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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

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

4.1.2 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	100040	Jul. 25, 2014	Jul. 24, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Feb. 05, 2015	Feb. 04, 2016
HORN Antenna SCHWARZBECK	9120D	209	Feb. 09, 2015	Feb. 08, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 09, 2015	Feb. 08, 2016
Loop Antenna	EM-6879	269	Jun. 24, 2014	Jun. 23, 2015
Preamplifier Agilent	8447D	2944A10738	Oct. 18, 2014	Oct. 17, 2015
Preamplifier Agilent	8449B	3008A01964	Aug. 22, 2014	Aug. 21, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	214378/4	Aug. 22, 2014	Aug. 21, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6 +309224/4	Aug. 22, 2014	Aug. 21, 2015
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
High Speed Peak Power Meter	ML2495A	0824011	Jul. 26, 2014	Jul. 25, 2015
Power Sensor	MA2411B	0738171	Jul. 26, 2014	Jul. 25, 2015
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2014	Oct. 17, 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.

4.1.3 Test Procedure

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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. Both X and Y axes of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case 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.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 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:

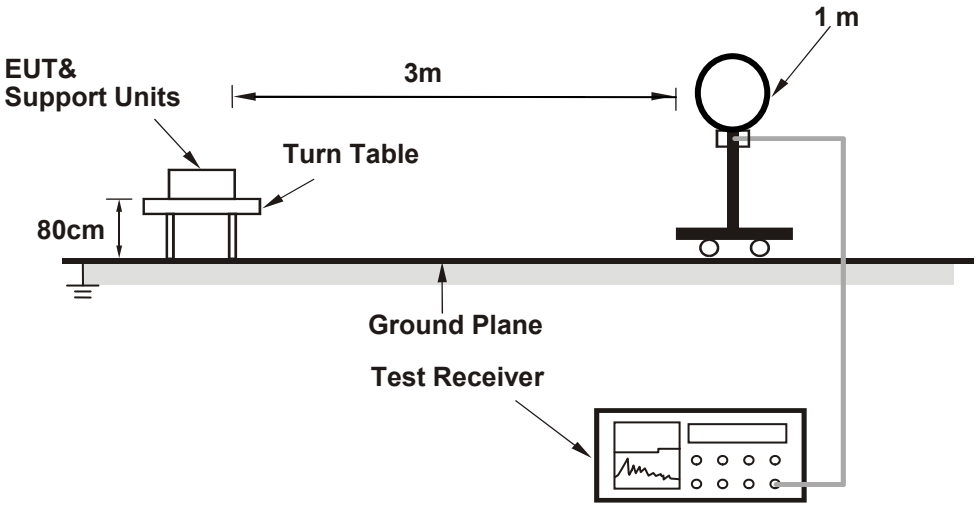
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 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.

4.1.4 Deviation from Test Standard

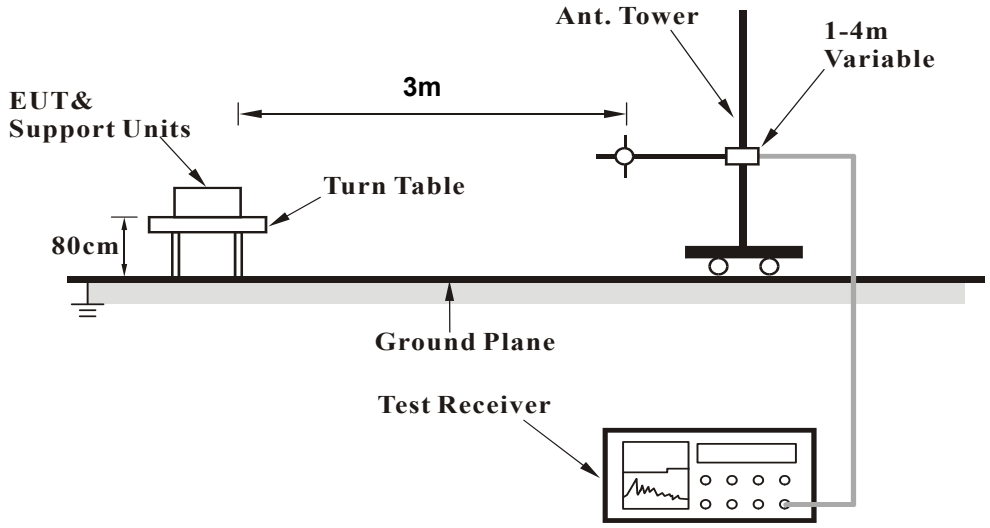
No deviation.

4.1.5 Test Setup

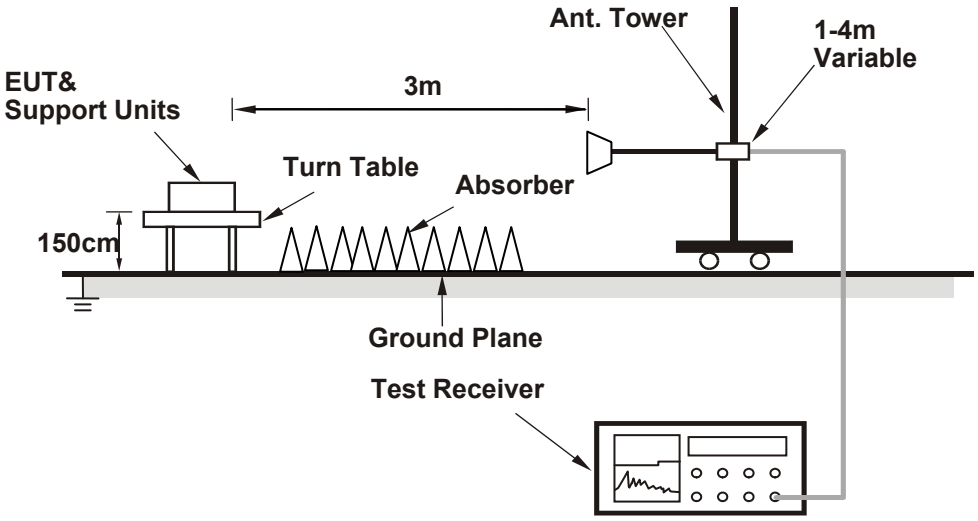
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

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

4.1.7 Test Results

ABOVE 1GHz DATA

802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.0 PK	74.0	-6.0	1.14 H	288	62.00	6.00
2	5150.00	52.7 AV	54.0	-1.3	1.14 H	288	46.70	6.00
3	*5180.00	118.9 PK			1.67 H	295	79.40	39.50
4	*5180.00	108.5 AV			1.67 H	295	69.00	39.50
5	#10360.00	59.5 PK	74.0	-14.5	1.36 H	97	41.80	17.70
6	#10360.00	46.7 AV	54.0	-7.3	1.36 H	97	29.00	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	5150.00	59.1 PK	74.0	-14.9	1.45 V	144	53.10	6.00
2	5150.00	48.5 AV	54.0	-5.5	1.45 V	144	42.50	6.00
3	*5180.00	113.2 PK			1.06 V	308	73.70	39.50
4	*5180.00	103.5 AV			1.06 V	308	64.00	39.50
5	#10360.00	59.7 PK	74.0	-14.3	1.55 V	301	42.00	17.70
6	#10360.00	46.4 AV	54.0	-7.6	1.55 V	301	28.70	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.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.6 PK	74.0	-5.4	1.54 H	292	62.60	6.00
2	5150.00	52.8 AV	54.0	-1.2	1.54 H	292	46.80	6.00
3	*5200.00	122.1 PK			1.13 H	283	82.50	39.60
4	*5200.00	112.4 AV			1.13 H	283	72.80	39.60
5	#10360.00	61.1 PK	74.0	-12.9	1.33 H	161	43.40	17.70
6	#10360.00	49.0 AV	54.0	-5.0	1.33 H	161	31.30	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	5150.00	61.8 PK	74.0	-12.2	1.00 V	309	55.80	6.00
2	5150.00	49.1 AV	54.0	-4.9	1.00 V	309	43.10	6.00
3	*5200.00	117.3 PK			1.00 V	310	77.70	39.60
4	*5200.00	108.2 AV			1.00 V	310	68.60	39.60
5	#10400.00	59.6 PK	74.0	-14.4	1.54 V	78	41.70	17.90
6	#10400.00	46.3 AV	54.0	-7.7	1.54 V	78	28.40	17.90

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	125.0 PK			1.52 H	286	85.40	39.60
2	*5240.00	114.4 AV			1.52 H	286	74.80	39.60
3	5350.00	60.6 PK	74.0	-13.4	1.97 H	297	54.50	6.10
4	5350.00	49.0 AV	54.0	-5.0	1.97 H	297	42.90	6.10
5	#10480.00	62.4 PK	74.0	-11.6	1.07 H	104	44.70	17.70
6	#10480.00	50.7 AV	54.0	-3.3	1.07 H	104	33.00	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	118.8 PK			1.05 V	6	79.20	39.60
2	*5240.00	108.5 AV			1.05 V	6	68.90	39.60
3	5350.00	58.1 PK	74.0	-15.9	1.15 V	302	52.00	6.10
4	5350.00	46.7 AV	54.0	-7.3	1.15 V	302	40.60	6.10
5	#10480.00	58.9 PK	74.0	-15.1	1.59 V	201	41.20	17.70
6	#10480.00	48.1 AV	54.0	-5.9	1.59 V	201	30.40	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	67.8 PK	74.0	-6.2	1.68 H	294	61.80	6.00
2	**5150.00**	**53.0 AV**	**54.0**	**-1.0**	**1.68 H**	**294**	**47.00**	**6.00**
3	*5180.00	117.7 PK			1.14 H	280	78.20	39.50
4	*5180.00	107.7 AV			1.14 H	280	68.20	39.50
5	#10360.00	60.4 PK	74.0	-13.6	1.55 H	321	42.70	17.70
6	#10360.00	48.3 AV	54.0	-5.7	1.55 H	321	30.60	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	5150.00	61.1 PK	74.0	-12.9	1.76 V	0	55.10	6.00
2	5150.00	49.2 AV	54.0	-4.8	1.76 V	0	43.20	6.00
3	*5180.00	114.0 PK			1.08 V	308	74.50	39.50
4	*5180.00	103.9 AV			1.08 V	308	64.40	39.50
5	#10360.00	59.3 PK	74.0	-14.7	1.32 V	147	41.60	17.70
6	#10360.00	47.8 AV	54.0	-6.2	1.32 V	147	30.10	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.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.0 PK	74.0	-6.0	1.58 H	299	62.00	6.00
2	5150.00	52.6 AV	54.0	-1.4	1.58 H	299	46.60	6.00
3	*5200.00	122.5 PK			1.67 H	289	82.90	39.60
4	*5200.00	112.5 AV			1.67 H	289	72.90	39.60
5	#10400.00	59.4 PK	74.0	-14.6	1.23 H	360	41.50	17.90
6	#10400.00	48.1 AV	54.0	-5.9	1.23 H	360	30.20	17.90
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	61.4 PK	74.0	-12.6	1.44 V	151	55.40	6.00
2	5150.00	49.3 AV	54.0	-4.7	1.44 V	151	43.30	6.00
3	*5200.00	119.5 PK			1.14 V	310	79.90	39.60
4	*5200.00	108.5 AV			1.14 V	310	68.90	39.60
5	#10400.00	59.6 PK	74.0	-14.4	1.35 V	78	41.70	17.90
6	#10400.00	48.5 AV	54.0	-5.5	1.35 V	78	30.60	17.90

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	124.8 PK			1.95 H	289	85.20	39.60
2	*5240.00	114.4 AV			1.95 H	289	74.80	39.60
3	5350.00	60.7 PK	74.0	-13.3	1.67 H	300	54.60	6.10
4	5350.00	48.5 AV	54.0	-5.5	1.67 H	300	42.40	6.10
5	#10480.00	61.3 PK	74.0	-12.7	1.52 H	308	43.60	17.70
6	#10480.00	50.8 AV	54.0	-3.2	1.52 H	308	33.10	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	119.3 PK			1.11 V	4	79.70	39.60
2	*5240.00	108.9 AV			1.11 V	4	69.30	39.60
3	5350.00	58.2 PK	74.0	-15.8	2.01 V	355	52.10	6.10
4	5350.00	46.4 AV	54.0	-7.6	2.01 V	355	40.30	6.10
5	#10480.00	59.5 PK	74.0	-14.5	1.25 V	97	41.80	17.70
6	#10480.00	48.0 AV	54.0	-6.0	1.25 V	97	30.30	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.8 PK	74.0	-8.2	1.13 H	294	59.80	6.00
2	5150.00	52.3 AV	54.0	-1.7	1.13 H	294	46.30	6.00
3	*5190.00	111.7 PK			1.08 H	291	72.20	39.50
4	*5190.00	101.9 AV			1.08 H	291	62.40	39.50
5	#10380.00	59.8 PK	74.0	-14.2	1.23 H	88	42.00	17.80
6	#10380.00	46.5 AV	54.0	-7.5	1.23 H	88	28.70	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	5150.00	60.7 PK	74.0	-13.3	1.35 V	151	54.70	6.00
2	5150.00	50.0 AV	54.0	-4.0	1.35 V	151	44.00	6.00
3	*5190.00	106.9 PK			1.28 V	304	67.40	39.50
4	*5190.00	96.9 AV			1.28 V	304	57.40	39.50
5	#10380.00	59.5 PK	74.0	-14.5	1.28 V	45	41.70	17.80
6	#10380.00	46.8 AV	54.0	-7.2	1.28 V	45	29.00	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.

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	67.5 PK	74.0	-6.5	1.47 H	61	61.50	6.00
2	5150.00	52.7 AV	54.0	-1.3	1.47 H	61	46.70	6.00
3	*5230.00	118.8 PK			1.91 H	64	79.20	39.60
4	*5230.00	108.7 AV			1.91 H	64	69.10	39.60
5	5350.00	58.5 PK	74.0	-15.5	1.89 H	36	52.40	6.10
6	5350.00	46.6 AV	54.0	-7.4	1.89 H	36	40.50	6.10
7	#10460.00	59.4 PK	74.0	-14.6	1.22 H	56	41.60	17.80
8	#10460.00	46.4 AV	54.0	-7.6	1.22 H	56	28.60	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	5150.00	61.0 PK	74.0	-13.0	1.07 V	146	55.00	6.00
2	5150.00	47.3 AV	54.0	-6.7	1.07 V	146	41.30	6.00
3	*5230.00	113.1 PK			1.00 V	309	73.50	39.60
4	*5230.00	103.7 AV			1.00 V	309	64.10	39.60
5	5350.00	57.3 PK	74.0	-16.7	1.40 V	343	51.20	6.10
6	5350.00	45.1 AV	54.0	-8.9	1.40 V	343	39.00	6.10
7	#10460.00	59.7 PK	74.0	-14.3	1.62 V	47	41.90	17.80
8	#10460.00	47.7 AV	54.0	-6.3	1.62 V	47	29.90	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) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.0 PK	74.0	-8.0	1.15 H	294	60.00	6.00
2	5150.00	52.5 AV	54.0	-1.5	1.15 H	294	46.50	6.00
3	*5210.00	107.8 PK			1.18 H	282	68.20	39.60
4	*5210.00	97.2 AV			1.18 H	282	57.60	39.60
5	#10420.00	59.3 PK	74.0	-14.7	1.36 H	97	41.50	17.80
6	#10420.00	46.4 AV	54.0	-7.6	1.36 H	97	28.60	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	5150.00	63.0 PK	74.0	-11.0	1.00 V	308	57.00	6.00
2	5150.00	50.9 AV	54.0	-3.1	1.00 V	308	44.90	6.00
3	*5210.00	106.3 PK			1.07 V	309	66.70	39.60
4	*5210.00	92.7 AV			1.07 V	309	53.10	39.60
5	#10420.00	59.4 PK	74.0	-14.6	1.28 V	74	41.60	17.80
6	#10420.00	46.8 AV	54.0	-7.2	1.28 V	74	29.00	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.

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	66.9 PK	109.1	-42.2	1.65 H	294	60.1	6.8
2	#5722.00	71.1 PK	115.4	-44.3	2.02 H	296	64.3	6.8
3	#5725.00	60.1 PK	122.2	-62.1	1.53 H	306	53.3	6.8
4	*5745.00	118.8 PK			1.83 H	295	78.4	40.4
5	*5745.00	109.0 AV			1.83 H	295	68.6	40.4
6	11490.00	63.2 PK	74.0	-10.8	1.01 H	334	44.8	18.4
7	11490.00	50.4 AV	54.0	-3.6	1.01 H	334	32.0	18.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	62.2 PK	109.1	-46.9	1.61 V	0	55.4	6.8
2	#5722.00	65.7 PK	115.4	-49.7	1.60 V	15	58.9	6.8
3	#5725.00	55.5 PK	122.2	-66.7	1.67 V	12	48.7	6.8
4	*5745.00	112.1 PK			1.37 V	4	71.7	40.4
5	*5745.00	102.3 AV			1.37 V	4	61.9	40.4
6	11490.00	59.9 PK	74.0	-14.1	1.06 V	201	41.5	18.4
7	11490.00	47.6 AV	54.0	-6.4	1.06 V	201	29.2	18.4

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	119.8 PK			1.62 H	303	79.3	40.5
2	*5785.00	109.8 AV			1.62 H	303	69.3	40.5
3	11570.00	65.3 PK	74.0	-8.7	1.00 H	283	46.9	18.4
4	11570.00	52.5 AV	54.0	-1.5	1.00 H	283	34.1	18.4
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	114.0 PK			1.12 V	2	73.5	40.5
2	*5785.00	103.9 AV			1.12 V	2	63.4	40.5
3	11570.00	60.0 PK	74.0	-14.0	1.00 V	202	41.6	18.4
4	11570.00	48.0 AV	54.0	-6.0	1.00 V	202	29.6	18.4

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	119.3 PK			1.74 H	295	78.8	40.5
2	*5825.00	109.3 AV			1.74 H	295	68.8	40.5
3	#5850.00	56.6 PK	122.2	-65.6	1.77 H	60	49.7	6.9
4	#5853.00	71.5 PK	115.4	-43.9	1.60 H	73	64.5	7.0
5	#5861.00	64.9 PK	109.1	-44.2	2.24 H	49	57.9	7.0
6	11650.00	65.8 PK	74.0	-8.2	1.01 H	285	46.9	18.9
7	11650.00	52.6 AV	54.0	-1.4	1.01 H	285	33.7	18.9
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	112.7 PK			1.11 V	2	72.2	40.5
2	*5825.00	103.0 AV			1.11 V	2	62.5	40.5
3	#5850.00	53.4 PK	122.2	-68.8	1.09 V	5	46.5	6.9
4	#5853.00	69.9 PK	115.4	-45.5	1.16 V	358	62.9	7.0
5	#5861.00	62.5 PK	109.1	-46.6	1.02 V	6	55.5	7.0
6	11650.00	62.3 PK	74.0	-11.7	1.83 V	31	43.4	18.9
7	11650.00	49.7 AV	54.0	-4.3	1.83 V	31	30.8	18.9

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	67.5 PK	109.1	-41.6	1.59 H	303	60.7	6.8
2	#5722.00	72.4 PK	115.4	-43.0	1.75 H	282	65.6	6.8
3	#5725.00	62.7 PK	122.2	-59.5	1.92 H	291	55.9	6.8
4	*5745.00	119.0 PK			1.82 H	295	78.6	40.4
5	*5745.00	108.7 AV			1.82 H	295	68.3	40.4
6	11490.00	63.3 PK	74.0	-10.7	1.00 H	285	44.9	18.4
7	11490.00	50.1 AV	54.0	-3.9	1.00 H	285	31.7	18.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	61.8 PK	109.1	-47.3	1.45 V	16	55.0	6.8
2	#5722.00	69.1 PK	115.4	-46.3	1.53 V	3	62.3	6.8
3	#5725.00	56.8 PK	122.2	-65.4	1.68 V	12	50.0	6.8
4	*5745.00	112.1 PK			1.53 V	2	71.7	40.4
5	*5745.00	102.2 AV			1.53 V	2	61.8	40.4
6	11490.00	58.9 PK	74.0	-15.1	1.83 V	26	40.5	18.4
7	11490.00	46.3 AV	54.0	-7.7	1.83 V	26	27.9	18.4

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	119.6 PK			1.76 H	303	79.1	40.5
2	*5785.00	109.7 AV			1.76 H	303	69.2	40.5
3	11570.00	64.8 PK	74.0	-9.2	1.01 H	285	46.4	18.4
4	11570.00	52.6 AV	54.0	-1.4	1.01 H	285	34.2	18.4
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	112.6 PK			1.00 V	287	72.1	40.5
2	*5785.00	102.2 AV			1.00 V	287	61.7	40.5
3	11570.00	60.9 PK	74.0	-13.1	1.00 V	197	42.5	18.4
4	11570.00	48.2 AV	54.0	-5.8	1.00 V	197	29.8	18.4

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	118.4 PK			1.94 H	304	77.9	40.5
2	*5825.00	108.3 AV			1.94 H	304	67.8	40.5
3	#5850.00	55.7 PK	122.2	-66.5	2.14 H	312	48.8	6.9
4	#5853.00	73.8 PK	115.4	-41.6	2.43 H	298	66.8	7.0
5	#5861.00	67.1 PK	109.1	-42.0	2.23 H	298	60.1	7.0
6	11650.00	64.2 PK	74.0	-9.8	1.00 H	281	45.3	18.9
7	11650.00	52.0 AV	54.0	-2.0	1.00 H	281	33.1	18.9
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	110.9 PK			1.00 V	287	70.4	40.5
2	*5825.00	100.9 AV			1.00 V	287	60.4	40.5
3	#5850.00	48.3 PK	122.2	-73.9	1.10 V	286	41.4	6.9
4	#5853.00	63.0 PK	115.4	-52.4	1.10 V	285	56.0	7.0
5	#5861.00	60.1 PK	109.1	-49.0	1.02 V	9	53.1	7.0
6	11650.00	61.1 PK	74.0	-12.9	1.18 V	10	42.2	18.9
7	11650.00	48.9 AV	54.0	-5.1	1.18 V	10	30.0	18.9

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	65.7 PK	109.1	-43.4	1.49 H	42	58.9	6.8
2	#5722.00	70.2 PK	115.4	-45.2	2.00 H	286	63.4	6.8
3	#5725.00	59.0 PK	122.2	-63.2	1.87 H	297	52.2	6.8
4	*5755.00	111.6 PK			1.88 H	300	71.1	40.5
5	*5755.00	101.9 AV			1.88 H	300	61.4	40.5
6	11510.00	59.0 PK	74.0	-15.0	1.24 H	262	40.7	18.3
7	11510.00	46.9 AV	54.0	-7.1	1.24 H	262	28.6	18.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	60.9 PK	109.1	-48.2	1.61 V	7	54.1	6.8
2	#5722.00	63.4 PK	115.4	-52.0	1.61 V	21	56.6	6.8
3	#5725.00	51.3 PK	122.2	-70.9	2.02 V	0	44.5	6.8
4	*5755.00	105.3 PK			1.76 V	8	64.8	40.5
5	*5755.00	96.4 AV			1.76 V	8	55.9	40.5
6	11510.00	59.1 PK	74.0	-14.9	1.31 V	164	40.8	18.3
7	11510.00	46.9 AV	54.0	-7.1	1.31 V	164	28.6	18.3

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	115.8 PK			1.88 H	293	75.3	40.5
2	*5795.00	106.7 AV			1.88 H	293	66.2	40.5
3	#5850.00	54.2 PK	122.2	-68.0	1.68 H	321	47.3	6.9
4	#5853.00	69.9 PK	115.4	-45.5	1.77 H	303	62.9	7.0
5	#5861.00	66.2 PK	109.1	-42.9	1.91 H	300	59.2	7.0
6	11590.00	61.6 PK	74.0	-12.4	1.13 H	333	43.1	18.5
7	11590.00	50.3 AV	54.0	-3.7	1.13 H	333	31.8	18.5
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			1.18 V	0	68.2	40.5
2	*5795.00	99.5 AV			1.18 V	0	59.0	40.5
3	#5850.00	50.0 PK	122.2	-72.2	1.15 V	3	43.1	6.9
4	#5853.00	64.5 PK	115.4	-50.9	1.02 V	0	57.5	7.0
5	#5861.00	59.6 PK	109.1	-49.5	1.16 V	10	52.6	7.0
6	11590.00	60.3 PK	74.0	-13.7	1.46 V	14	41.8	18.5
7	11590.00	48.8 AV	54.0	-5.2	1.46 V	14	30.3	18.5

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	66.7 PK	109.1	-42.4	1.75 H	280	59.9	6.8
2	#5722.00	73.8 PK	115.4	-41.6	1.73 H	304	67.0	6.8
3	#5725.00	57.4 PK	122.2	-64.8	1.72 H	321	50.6	6.8
4	*5775.00	107.1 PK			1.92 H	300	66.6	40.5
5	*5775.00	97.3 AV			1.92 H	300	56.8	40.5
6	#5850.00	46.8 PK	122.2	-75.4	1.77 H	292	39.9	6.9
7	#5853.00	59.4 PK	115.4	-56.0	1.56 H	292	52.4	7.0
8	#5861.00	59.0 PK	109.1	-50.1	1.87 H	291	52.0	7.0
9	11550.00	59.3 PK	74.0	-14.7	1.34 H	241	40.9	18.4
10	11550.00	46.2 AV	54.0	-7.8	1.34 H	241	27.8	18.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	61.8 PK	109.1	-47.3	1.47 V	357	55.0	6.8
2	#5722.00	68.7 PK	115.4	-46.7	1.39 V	4	61.9	6.8
3	#5725.00	54.9 PK	122.2	-67.3	1.40 V	8	48.1	6.8
4	*5775.00	101.0 PK			1.60 V	4	60.5	40.5
5	*5775.00	90.6 AV			1.60 V	4	50.1	40.5
6	#5850.00	44.8 PK	122.2	-77.4	1.24 V	20	37.9	6.9
7	#5853.00	57.9 PK	115.4	-57.5	1.33 V	335	50.9	7.0
8	#5861.00	57.9 PK	109.1	-51.2	1.03 V	320	50.9	7.0
9	11550.00	59.6 PK	74.0	-14.4	1.14 V	242	41.2	18.4
10	11550.00	47.0 AV	54.0	-7.0	1.14 V	242	28.6	18.4

REMARKS:

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

BELOW 1GHz WORST-CASE DATA

802.11n (HT20)

CHANNEL	TX Channel 40	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	**TEST MODE**	A

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	389.59	43.4 QP	46.0	-2.6	1.00 H	117	54.00	-10.60
2	654.02	41.5 QP	46.0	-4.5	1.00 H	101	46.80	-5.30
3	689.01	42.2 QP	46.0	-3.8	1.00 H	119	46.90	-4.70
4	708.46	44.8 QP	46.0	-1.2	1.00 H	119	49.10	-4.30
5	731.79	44.3 QP	46.0	-1.7	1.00 H	136	48.00	-3.70
6	753.18	44.1 QP	46.0	-1.9	1.00 H	211	47.20	-3.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	197.11	33.6 QP	43.5	-9.9	1.00 V	38	50.50	-16.90
2	389.59	40.4 QP	46.0	-5.6	1.00 V	170	51.00	-10.60
3	591.80	35.5 QP	46.0	-10.5	1.00 V	346	41.90	-6.40
4	681.24	39.7 QP	46.0	-6.3	1.00 V	243	44.60	-4.90
5	700.68	40.5 QP	46.0	-5.5	1.51 V	140	44.90	-4.40
6	735.68	39.5 QP	46.0	-6.5	1.51 V	14	43.10	-3.60

REMARKS:

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

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	B

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	57.12	31.9 QP	40.0	-8.1	2.00 H	7	46.50	-14.60
2	125.17	28.5 QP	43.5	-15.0	1.50 H	250	44.60	-16.10
3	500.42	30.2 QP	46.0	-15.8	1.50 H	125	38.60	-8.40
4	624.85	31.1 QP	46.0	-14.9	1.00 H	130	36.70	-5.60
5	727.90	31.7 QP	46.0	-14.3	1.00 H	130	35.50	-3.80
6	751.23	36.5 QP	46.0	-9.5	1.00 H	135	39.70	-3.20
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	39.62	28.4 QP	40.0	-11.6	2.00 V	143	43.40	-15.00
2	119.34	21.0 QP	43.5	-22.5	2.00 V	40	37.70	-16.70
3	201.00	20.7 QP	43.5	-22.8	1.00 V	38	37.50	-16.80
4	624.85	32.1 QP	46.0	-13.9	1.49 V	175	37.70	-5.60
5	751.23	30.8 QP	46.0	-15.2	2.00 V	163	34.00	-3.20
6	904.83	32.7 QP	46.0	-13.3	1.49 V	65	33.10	-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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. 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.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 11, 2014	Nov. 10, 2015
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 02, 2015	Mar. 01, 2016
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 21, 2014	Jul. 20, 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 Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedure

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

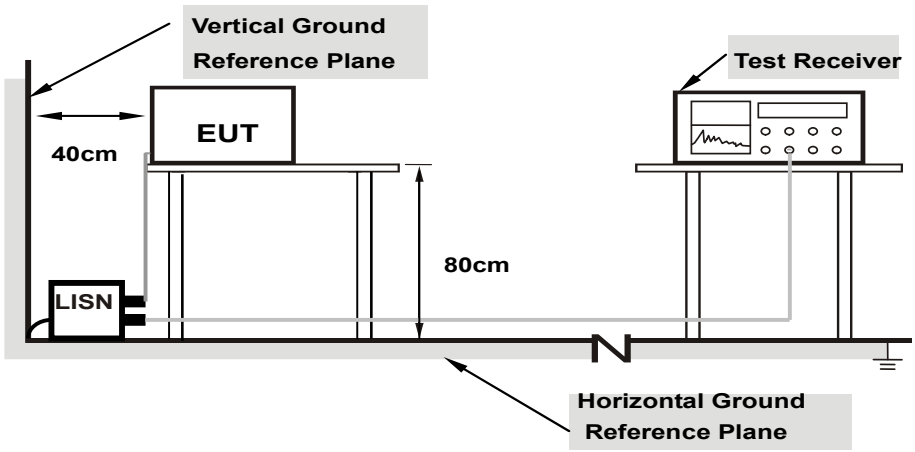
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

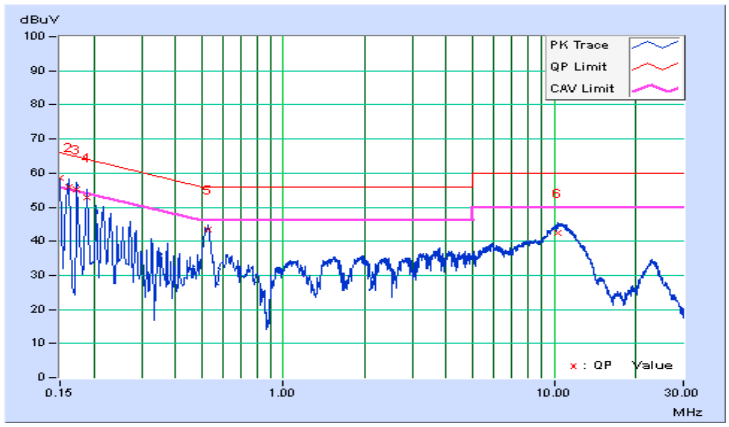
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15000**	**0.07**	**58.52**	**42.19**	**58.59**	**42.26**	**66.00**	**56.00**	**-7.41**	**-13.74**
2	0.16173	0.09	55.93	37.75	56.02	37.84	65.37	55.37	-9.36	-17.54
3	0.17346	0.11	55.14	37.89	55.25	38.00	64.79	54.79	-9.55	-16.80
4	0.18910	0.13	52.89	36.13	53.02	36.26	64.08	54.08	-11.05	-17.81
5	0.52927	0.10	43.27	36.66	43.37	36.76	56.00	46.00	-12.63	-9.24
6	10.34337	0.50	42.07	37.19	42.57	37.69	60.00	50.00	-17.43	-12.31

REMARKS:

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

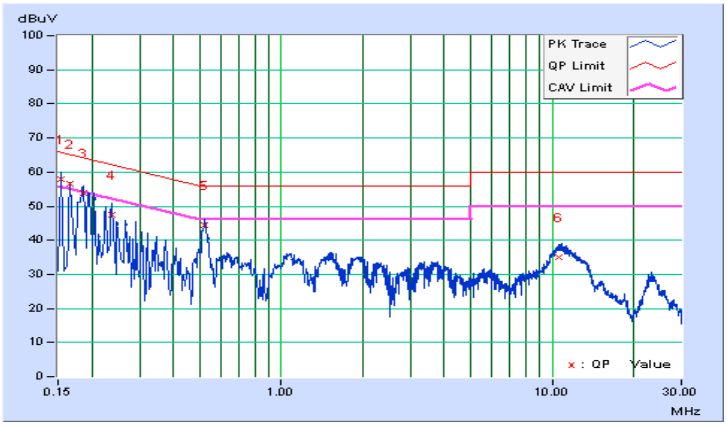


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.13	57.91	41.40	58.04	41.53	65.79	55.79	-7.75	-14.26
2	0.16564	0.16	56.25	38.06	56.41	38.22	65.18	55.18	-8.77	-16.96
3	0.18508	0.21	53.80	36.83	54.01	37.04	64.25	54.25	-10.24	-17.21
4	0.23602	0.24	47.27	32.06	47.51	32.30	62.24	52.24	-14.73	-19.94
5	0.52145	0.17	44.37	38.15	44.54	38.32	56.00	46.00	-11.46	-7.68
6	10.52714	0.55	34.56	30.05	35.11	30.60	60.00	50.00	-24.89	-19.40

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.

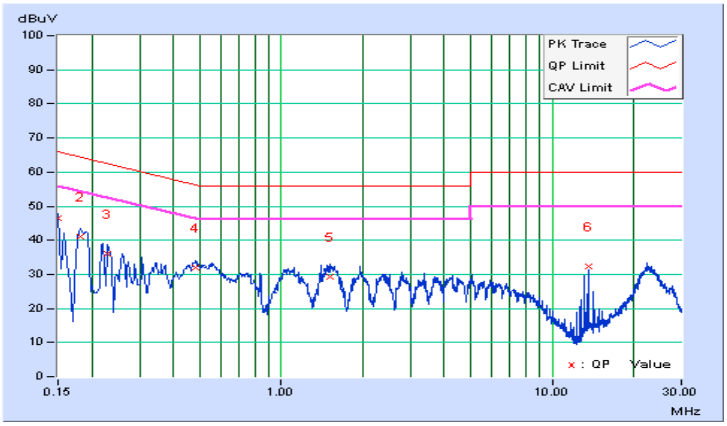


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	46.45	34.53	46.52	34.60	66.00	56.00	-19.48	-21.40
2	0.18122	0.12	40.93	25.34	41.05	25.46	64.43	54.43	-23.38	-28.97
3	0.22851	0.14	35.99	23.62	36.13	23.76	62.50	52.50	-26.37	-28.74
4	0.48168	0.09	31.75	24.50	31.84	24.59	56.31	46.31	-24.47	-21.72
5	1.50677	0.20	28.93	24.14	29.13	24.34	56.00	46.00	-26.87	-21.66
6	13.70597	0.66	31.59	29.68	32.25	30.34	60.00	50.00	-27.75	-19.66

REMARKS:

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

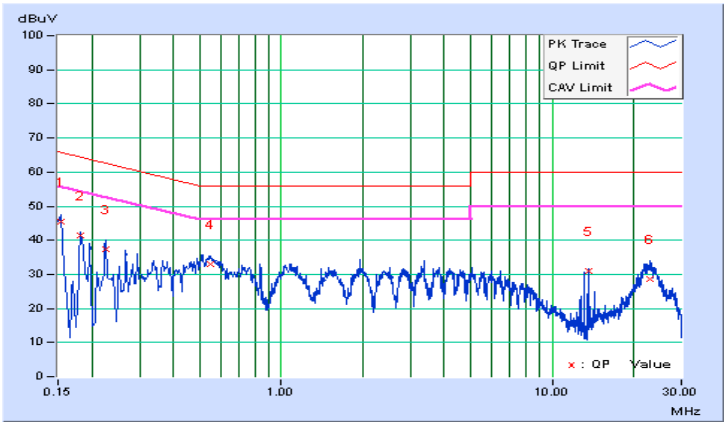


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.13	45.35	32.54	45.48	32.67	65.79	55.79	-20.31	-23.12
2	0.18128	0.20	41.08	27.06	41.28	27.26	64.43	54.43	-23.15	-27.17
3	0.22434	0.24	37.10	27.05	37.34	27.29	62.66	52.66	-25.32	-25.37
4	0.54882	0.17	32.79	25.12	32.96	25.29	56.00	46.00	-23.04	-20.71
5	13.70988	0.65	30.34	30.26	30.99	30.91	60.00	50.00	-29.01	-19.09
6	22.97658	0.90	27.63	19.86	28.53	20.76	60.00	50.00	-31.47	-29.24

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 Measurment

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 ≦ 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)

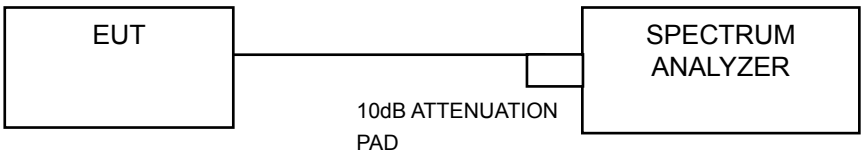
*B is the 26 dB emission bandwidth in megahertz

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.

4.3.2 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 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 ≥ 3 MHz
5) Number of points in sweep ≥ 2 Span / RBW.
6) Sweep time ≤ (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 Condition

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

4.3.7 Test Result

POWER OUTPUT:

802.11a

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	22.33	20.46	282.175	24.51	30	Pass
40	5200	24.73	23.69	531.051	27.25	30	Pass
48	5240	24.89	23.81	548.755	27.39	30	Pass
149	5745	21.63	19.67	238.229	23.77	30	Pass
157	5785	22.36	21.52	314.093	24.97	30	Pass
165	5825	22.27	21.06	296.299	24.72	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	21.98	20.43	268.169	24.28	30	Pass
40	5200	25.93	24.67	**684.831**	28.36	30	Pass
48	5240	25.78	24.38	652.600	28.15	30	Pass
149	5745	21.65	19.70	239.543	23.79	30	Pass
157	5785	23.01	21.96	**357.022**	25.53	30	Pass
165	5825	20.94	19.88	221.440	23.45	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	19.60	17.39	146.029	21.64	30	Pass
46	5230	23.88	22.29	413.777	26.17	30	Pass
151	5755	17.94	16.46	106.489	20.27	30	Pass
159	5795	21.41	20.56	252.120	24.02	30	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	17.70	15.59	95.108	19.78	30	Pass
155	5775	14.96	13.45	53.464	17.28	30	Pass

26dB BANDWIDTH:

802.11a

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
36	5180	22.49	21.80	Pass
40	5200	31.41	23.70	Pass
48	5240	29.93	24.30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
36	5180	23.40	24.23	Pass
40	5200	34.86	29.03	Pass
48	5240	39.09	30.21	Pass

802.11n (HT40)

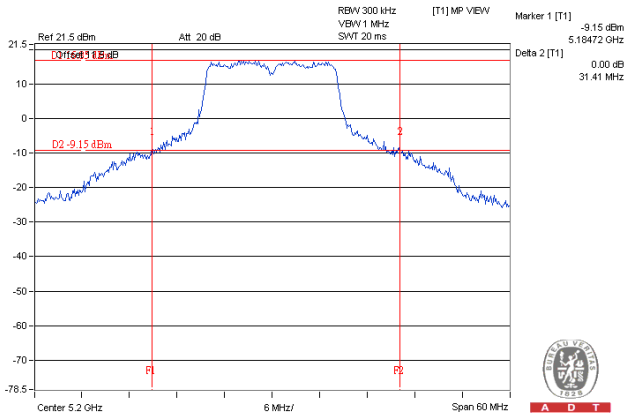
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
38	5190	45.47	46.06	Pass
46	5230	49.08	47.05	Pass

802.11ac (VHT80)

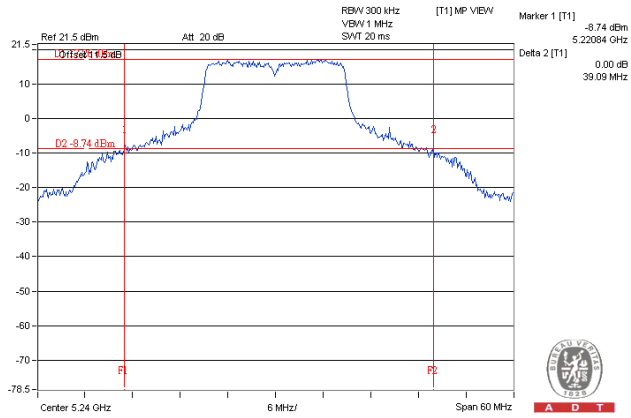
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
42	5210	88.07	87.76	Pass

SPECTRUM PLOT OF WORST VALUE

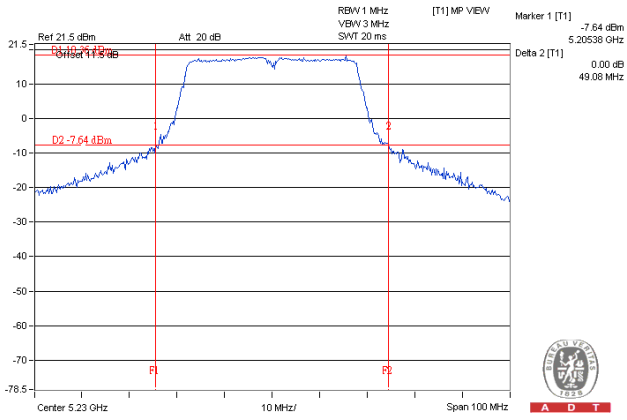
802.11a



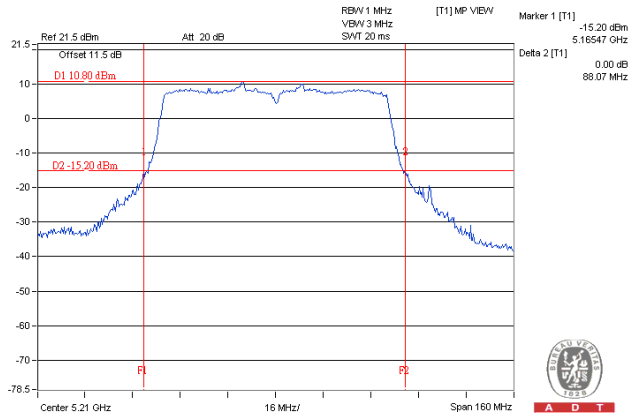
802.11n (HT20)



802.11n (HT40)

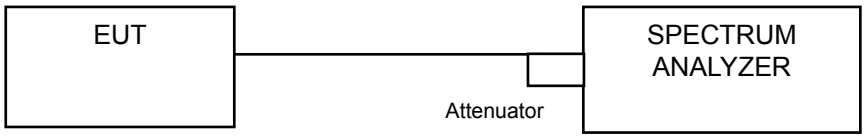


802.11ac (VHT80)



4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to SAMPLE. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

4.4.4 Test Results

802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.92	16.68
40	5200	17.28	16.80
48	5240	17.28	16.80
149	5745	16.78	16.70
157	5785	16.80	16.80
165	5825	16.80	16.68

802.11n (HT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.76	18.00
40	5200	18.60	18.24
48	5240	19.80	18.24
149	5745	18.00	18.00
157	5785	18.00	18.00
165	5825	18.00	17.88

802.11n (HT40)

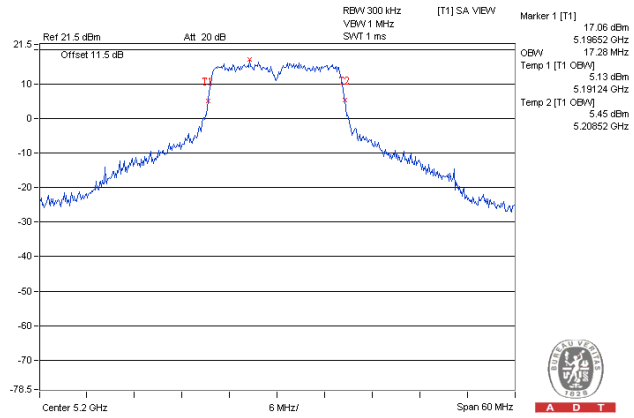
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.72	36.84
46	5230	37.08	37.08
151	5755	37.08	37.08
159	5795	37.08	37.08

802.11ac (VHT80)

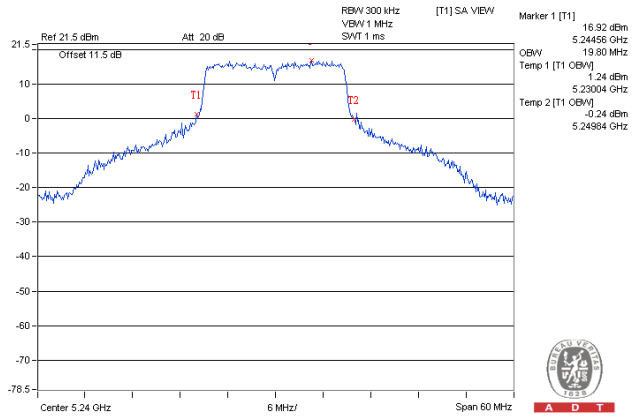
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	76.08	75.60
155	5775	76.08	76.08

SPECTRUM PLOT OF WORST VALUE

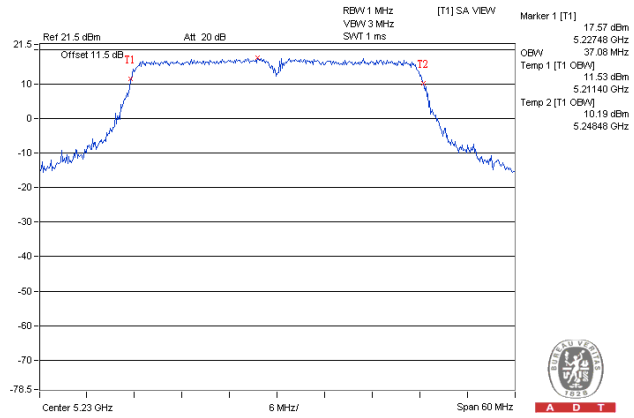
802.11a



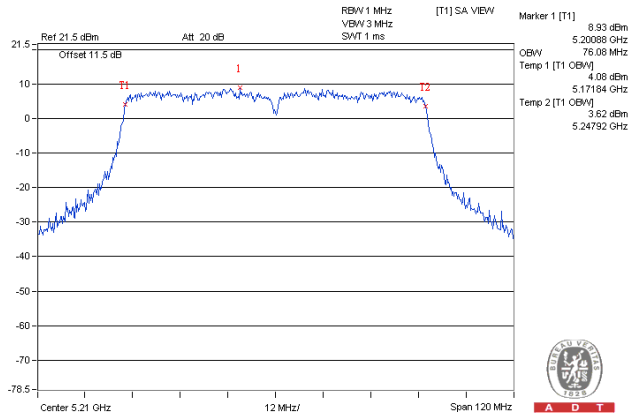
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

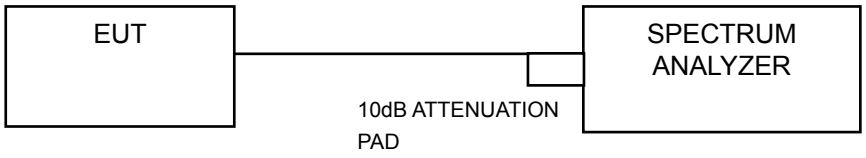


4.5 Peak Power Spectral Density Measurement

4.5.1 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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For U-NII-1, U-NII-2A, U-NII-2C band:

Using method SA-2

1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 30 kHz, Set VBW ≥ 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/duty cycle)

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 ≥ 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/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 BWCF = 10log(500kHz/300kHz)

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

For U-NII-1 Band

802.11a

Channel	Frequency (MHz)	PSD (dBm)		Duty Factor	Total PSD with Duty Factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	7.96	6.14	0.17	10.32	15.22	Pass
40	5200	11.27	10.11	0.17	13.91	15.22	Pass
48	5240	11.41	10.12	0.17	13.99	15.22	Pass

NOTE: 1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. **For U-NII-1 Band:**

Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$]= 7.78 dBi > 6dBi , so the power density limit shall be reduced to 17-(7.78-6) = 15.22dBm.

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

802.11n (HT20)

Channel	Frequency (MHz)	PSD (dBm)		Duty Factor	Total PSD with Duty Factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	8.63	5.77	0.20	10.65	15.22	Pass
40	5200	10.80	8.35	0.20	12.96	15.22	Pass
48	5240	11.57	9.31	0.20	13.80	15.22	Pass

NOTE: 1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. **For U-NII-1 Band:**

Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$]= 7.78 dBi > 6dBi , so the power density limit shall be reduced to 17-(7.78-6) = 15.22dBm.

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

802.11n (HT40)

Channel	Frequency (MHz)	PSD (dBm)		Duty Factor	Total PSD with Duty Factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	3.95	-1.17	0.40	5.51	15.22	Pass
46	5230	6.10	5.09	0.40	9.03	15.22	Pass

NOTE: 1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. **For U-NII-1 Band:**

Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$]= 7.78 dBi > 6dBi , so the power density limit shall be reduced to 17-(7.78-6) = 15.22dBm.

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

802.11ac (VHT80)

Channel	Frequency (MHz)	PSD (dBm)		Duty Factor	Total PSD with Duty Factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-3.37	-6.23	0.55	-1.00	15.22	Pass

NOTE: 1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

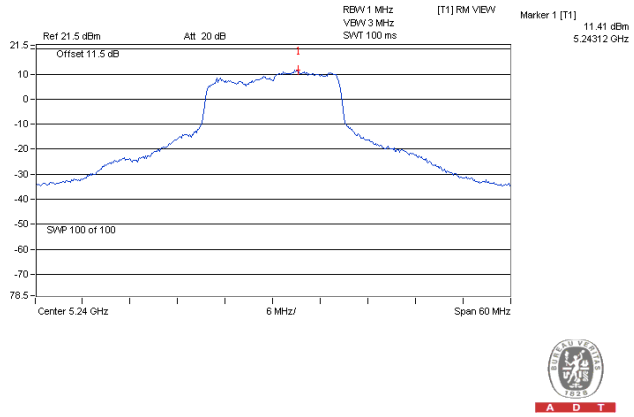
2. **For U-NII-1 Band:**

Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$]= 7.78 dBi > 6dBi , so the power density limit shall be reduced to 17-(7.78-6) = 15.22dBm.

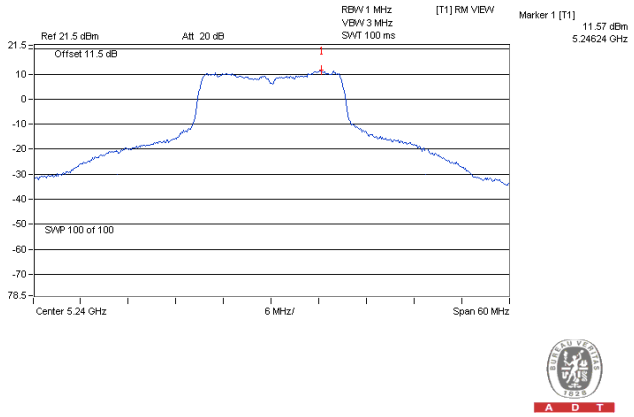
3. Refer to section 3.3 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE

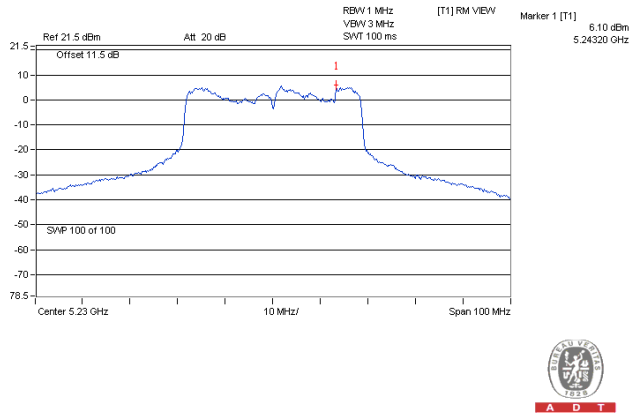
802.11a



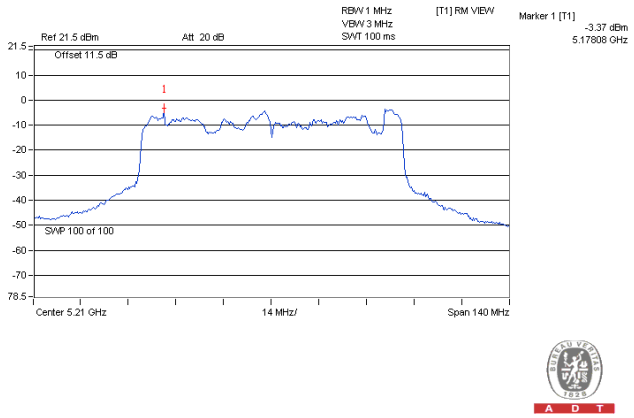
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



For U-NII-3 Band

802.11a

TX chain	Chan.	Freq. (MHz)	PSD (dBm /300kHz)	PSD (dBm /500kHz)	10 log (N=2) dB	Duty Factor	Total PSD (dBm /500kHz)	Limit (dBm /500kHz)	Pass /Fail
0	149	5745	-0.37	1.85	3.01	0.17	5.03	27.53	Pass
	157	5785	0.63	2.85	3.01	0.17	6.03	27.53	Pass
	165	5825	0.50	2.72	3.01	0.17	5.90	27.53	Pass
1	149	5745	-1.25	0.97	3.01	0.17	4.15	27.53	Pass
	157	5785	0.09	2.31	3.01	0.17	5.49	27.53	Pass
	165	5825	-0.62	1.60	3.01	0.17	4.78	27.53	Pass

NOTE:

1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$]= 8.47 dBi > 6dBi, so the power density limit shall be reduced to 30-(8.47-6) = 27.53dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Chan.	Freq. (MHz)	PSD (dBm /300kHz)	PSD (dBm /500kHz)	10 log (N=2) dB	Duty Factor	Total PSD (dBm /500kHz)	Limit (dBm /500kHz)	Pass /Fail
0	149	5745	-0.52	1.70	3.01	0.20	4.91	27.53	Pass
	157	5785	0.83	3.05	3.01	0.20	6.26	27.53	Pass
	165	5825	-0.87	1.35	3.01	0.20	4.56	27.53	Pass
1	149	5745	-1.58	0.64	3.01	0.20	3.85	27.53	Pass
	157	5785	-0.09	2.13	3.01	0.20	5.34	27.53	Pass
	165	5825	-1.93	0.29	3.01	0.20	3.50	27.53	Pass

NOTE:

1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$]= 8.47 dBi > 6dBi, so the power density limit shall be reduced to 30-(8.47-6) = 27.53dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX chain	Chan.	Freq. (MHz)	PSD (dBm /300kHz)	PSD (dBm /500kHz)	10 log (N=2) dB	Duty Factor	Total PSD (dBm /500kHz)	Limit (dBm /500kHz)	Pass /Fail
0	151	5755	-7.28	-5.06	3.01	0.40	-1.65	27.53	Pass
	159	5795	-3.70	-1.48	3.01	0.40	1.93	27.53	Pass
1	151	5755	-8.63	-6.41	3.01	0.40	-3.00	27.53	Pass
	159	5795	-4.43	-2.21	3.01	0.40	1.20	27.53	Pass

NOTE:

1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$]= 8.47 dBi > 6dBi, so the power density limit shall be reduced to 30-(8.47-6) = 27.53dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

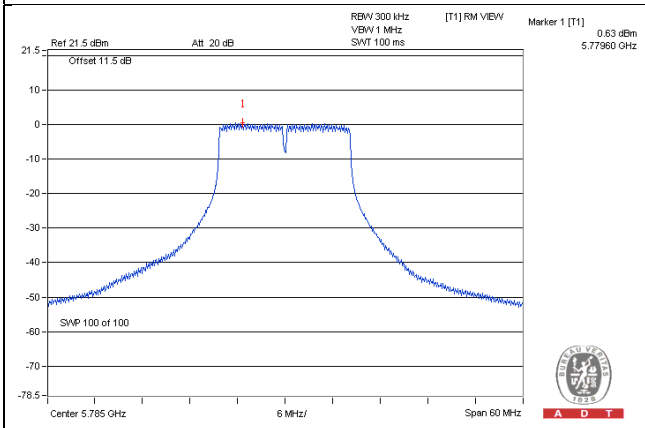
TX chain	Chan.	Freq. (MHz)	PSD (dBm /300kHz)	PSD (dBm /500kHz)	10 log (N=2) dB	Duty Factor	Total PSD (dBm /500kHz)	Limit (dBm /500kHz)	Pass /Fail
0	155	5775	-13.55	-11.33	3.01	0.55	-7.77	27.53	Pass
1	155	5775	-14.96	-12.74	3.01	0.55	-9.18	27.53	Pass

NOTE:

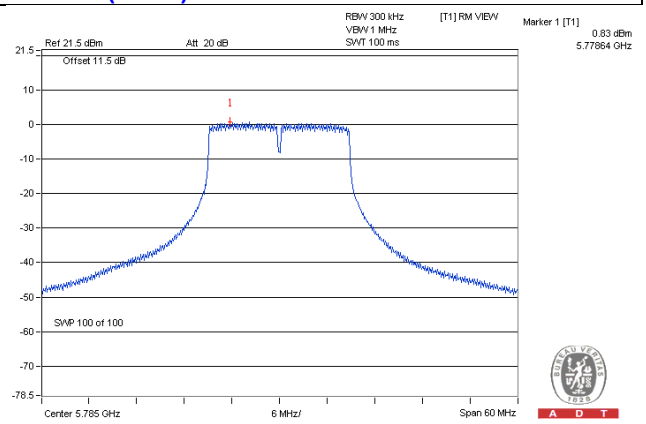
1. Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + ... + $10^{GN/20}$)^2/2]= 8.47 dBi > 6dBi, so the power density limit shall be reduced to 30-(8.47-6) = 27.53dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE

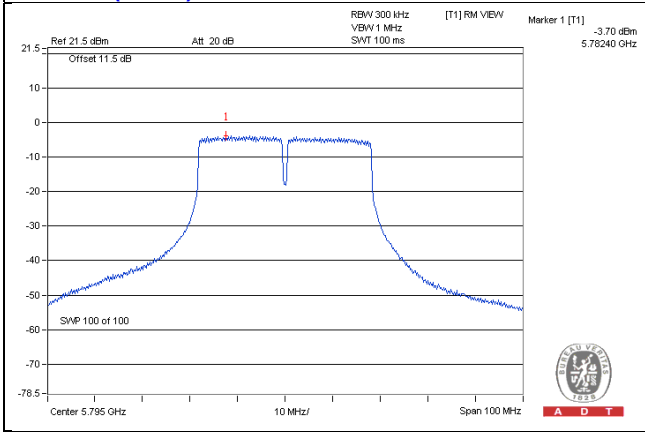
802.11a



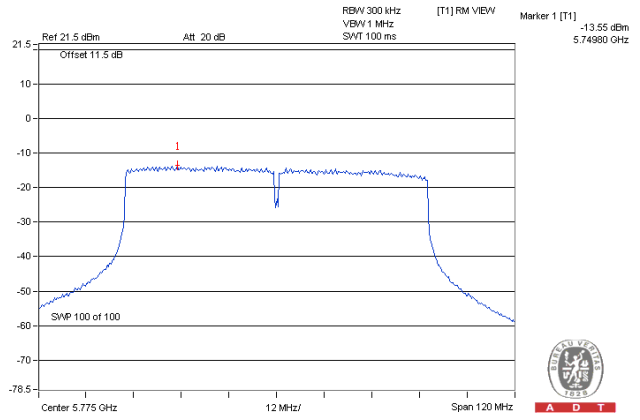
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

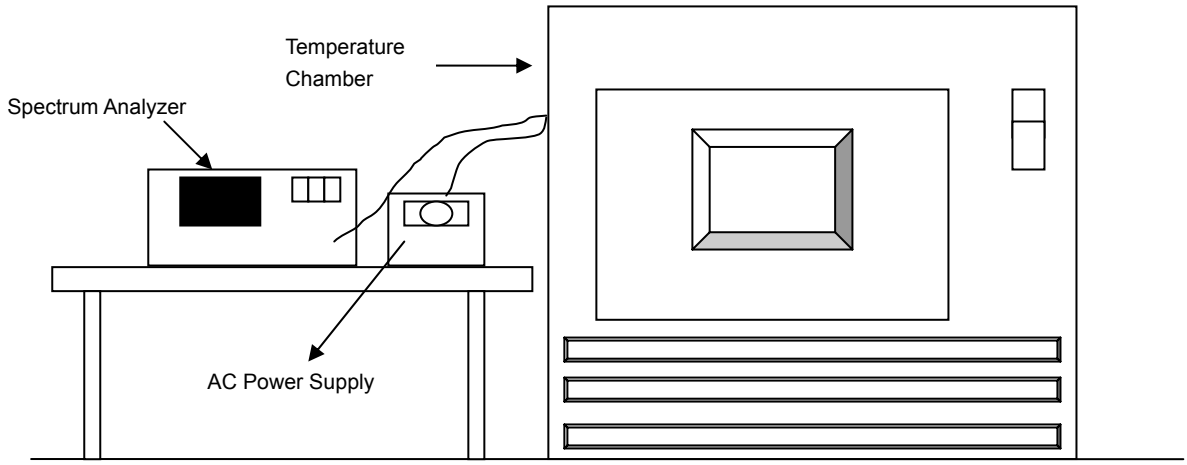


4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 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.
.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5240MHz									
TEMP. (℃)	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	5239.9971	-0.00006	5239.9983	-0.00003	5239.9991	-0.00002	5239.9975	-0.00005
40	120	5240.0101	0.00019	5240.0111	0.00021	5240.0097	0.00019	5240.0141	0.00027
30	120	5239.9952	-0.00009	5239.9960	-0.00008	5239.9953	-0.00009	5239.9941	-0.00011
20	120	5239.9766	-0.00045	5239.9773	-0.00043	5239.9777	-0.00043	5239.9769	-0.00044
10	120	5240.0033	0.00006	5240.0005	0.00001	5240.0004	0.00001	5240.0033	0.00006
0	120	5239.9975	-0.00005	5240.0000	0.00000	5240.0016	0.00003	5240.0013	0.00002
-10	120	5240.0006	0.00001	5239.9977	-0.00004	5239.9995	-0.00001	5240.0001	0.00000
-20	120	5240.0040	0.00008	5240.0052	0.00010	5240.0023	0.00004	5240.0009	0.00002
-30	120	5239.9917	-0.00016	5239.9910	-0.00017	5239.9951	-0.00009	5239.9912	-0.00017

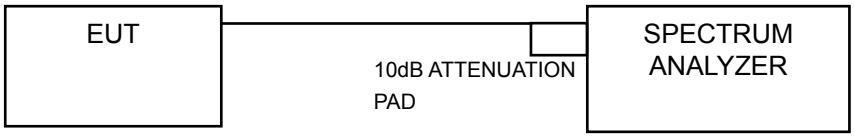
FREQUENCY STABILITY VERSUS VOLTAGE.									
OPERATING FREQUENCY: 5240MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5239.9767	-0.00044	5239.9781	-0.00042	5239.9782	-0.00042	5239.9773	-0.00043
	120	5239.9766	-0.00045	5239.9773	-0.00043	5239.9777	-0.00043	5239.9769	-0.00044
	102	5239.9771	-0.00044	5239.9764	-0.00045	5239.9770	-0.00044	5239.9765	-0.00045

4.7 6dB Bandwidth Measurment

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

a. Set resolution bandwidth (RBW) = 100kHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.40	16.39	0.5	Pass
157	5785	16.40	16.43	0.5	Pass
165	5825	16.42	16.44	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.63	17.66	0.5	Pass
157	5785	17.64	17.65	0.5	Pass
165	5825	17.65	17.65	0.5	Pass

802.11n (HT40)

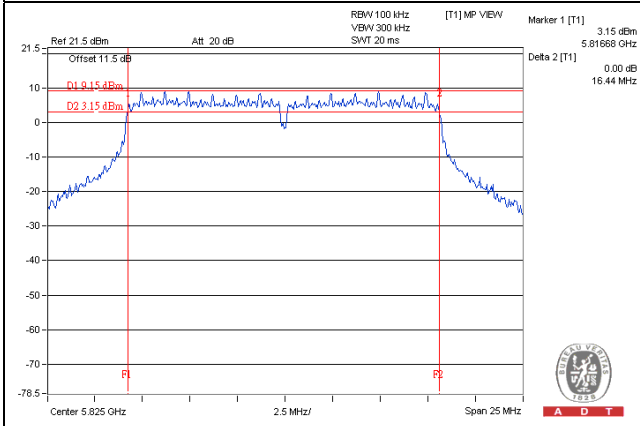
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	36.44	36.46	0.5	Pass
159	5795	36.45	36.46	0.5	Pass

802.11ac (VHT80)

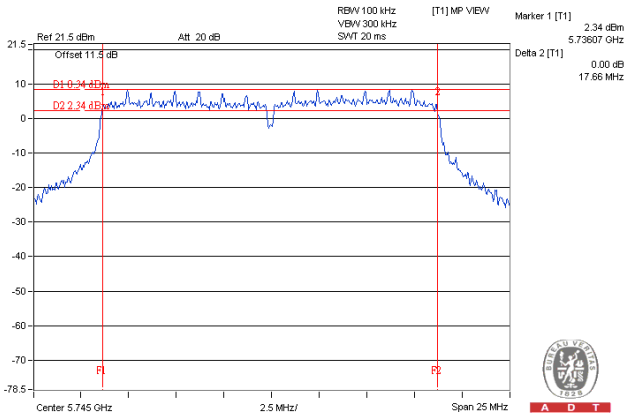
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	75.13	75.92	0.5	Pass

SPECTRUM PLOT OF WORST VALUE

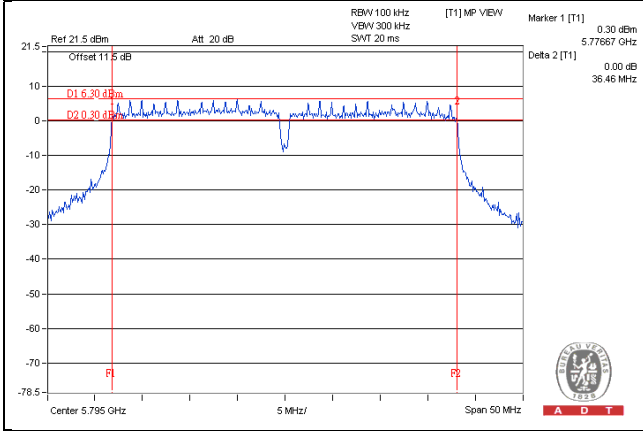
802.11a



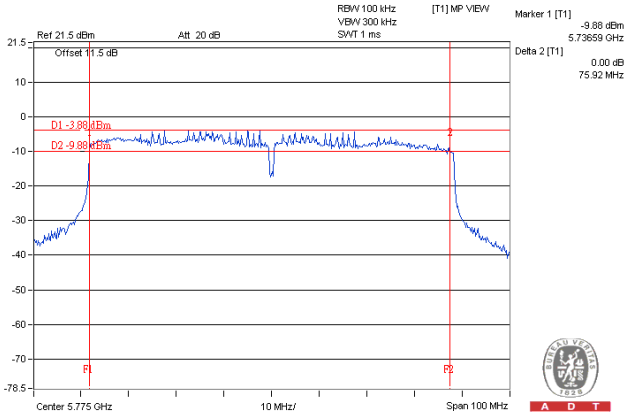
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

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

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

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

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

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

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