FCC Test Report

Report No.:	RF140220D03D
FCC ID:	Q87-LAPAC1200
Test Model:	LAPAC1200
Received Date:	May 4, 2016
Test Date:	May 4 ~ 11, 2016
Issued Date:	May 19, 2016
Applicant:	Linksys LLC
Address:	121 Theory Drive Irvine California 92617 United States
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.)

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Report Issue History Record

Issue No.	Description	Date Issued
RF140220D03	Original	Apr. 15, 2014
RF140220D03C	Upgraded the standard to section 15.407 under new rule for U-NII-1 and U-NII-3 band.	May 4, 2016
RF140220D03D	Upgraded the standard to section 15.407 under new rule (16-24) for U-NII-1 and U-NII-3 band.	May 19, 2016

Release Control Record

Issue No.	Description	Date Issued
RF140220D03D	Original release	May 19, 2016

1 Certificate of Conformity

Product:	AC1200 Dual Band Access Point
Brand:	Linksys
Test Model:	LAPAC1200
Sample Status:	Engineering Sample
Applicant:	Linksys LLC
Test Date:	May 4 ~ 11, 2016
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 : Annie Chang , **Date:** May 19, 2016

Annie Chang / Senior Specialist

Approved by : Rex. Lai , **Date:** May 19, 2016

Rex Lai / Assistant 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 -20.85dB at -20.85 MHz.
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 -0.2dB at 5150.00 MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is I-PEX not a standard connector.

NOTE: This report is prepared for FCC Class II change. (Upgraded the standard to section 15.407 under new rule (16-24) for U-NII-1 and U-NII-3 band)

*For U-NII-3 band compliance with rule part 15.407(b)(i), the OOBE test plots were recorded in Annex A.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.78 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1000MHz	4.00 dB
Radiated Emissions above 1 GHz	1GHz ~ 40GHz	3.36 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AC1200 Dual Band Access Point
Brand	Linksys
Test Model	LAPAC1200
Driver Version	v1.1.00.005
Status of EUT	Engineering Sample
Power Supply Rating	12Vdc from AC Adapter or 48Vdc from PoE
Modulation Type	64QAM, 16QAM, QPSK, BPSK 256QAM for OFDM in 11ac mode only
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 866.7Mbps
Operating Frequency	5180 ~ 5240MHz 5745 ~ 5825MHz
Number of Channel	**5180 ~ 5240MHz** 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 1 for 802.11ac (80MHz) **5745 ~ 5825MHz** 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 1 for 802.11ac (80MHz)
Output Power	**5180 ~ 5240MHz:** 375.850 mW **5745 ~ 5825MHz:** 544.780mW
Antenna Type	PIFA antenna with 2dBi gain
Antenna Connector	N/A
Accessory Device	Adapter
Data Cable Supplied	N/A

Note:

1. This report is a supplementary report of RF140220D03 and RF140220D03-1. The differences between them are as below information:
   - ✧ Upgraded the standard to section 15.407 under new rule (16-24) for U-NII-1 and U-NII-3 band

2. According to above conditions, all test items of U-NII-1 and U-NII-3 band needs to be performed. And all data was verified to meet the requirements.

3. This report is prepared for FCC class II permissive change.

4. 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 (20MHz)	2TX
802.11n (40MHz)	2TX
802.11ac (20MHz)	2TX
802.11ac (40MHz)	2TX
802.11ac (80MHz)	2TX

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

5. The EUT was power supplied from the following power adapters or PoE:

Item	Brand	Model No.	Plug Type	Rating
Adapter 1	LEI	IU18-2120150-WP	US, EU, UK Plug	AC I/P: 100-240V, 50/60Hz 0.6A DC O/P: 12V 1.5A Non-shielded DC (1.5m)
Adapter 2	LEI	MU18-R120150-A1	US Plug	AC I/P: 100-240V, 50/60Hz 0.6A DC O/P: 12V 1.5A Non-shielded DC (1.5m)
	LEI	MU18-R120150-C5	EU Plug	
	LEI	MU18-R120150-B2	UK Plug	
	LEI	MU18-R120150-A3	AU Plug	
	Four adapters are identical with each other except for their plug type difference			
Adapter 3	DVE	DSA-20CA-12 120150	US, EU, UK Plug	AC I/P: 100-240V, 50/60Hz 0.8A DC O/P: 12V 1.5A Non-shielded DC (1.5m)
Adapter 4	DVE	DSA-18PFG-12 FUS 12015	US Plug	AC I/P:100-240V, 50/60Hz 0.6A DC O/P:12V 1.5A Non-shielded DC (1.5m)
	DVE	DSA-18PFG-12 FEU 120150	EU Plug	
	DVE	DSA-18PFG-12 FUK 120120	UK Plug	
	DVE	DSA-18PFG-12 FAU 120150	AU Plug	
	Four adapters are identical with each other except for their plug type difference			
PoE	-			48Vdc

Select the previous worse case **(Adapter 2)** for final test, therefore, only its test data was recorded in this report.

6. 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 (20MHz):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

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

Channel	Frequency
42	5210MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

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

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

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

Radiated Emission Test (Above 1GHz):

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

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

EUT CONFIGURE MODE	MODE	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 (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	13.0
	802.11ac (80MHz)		42	42	OFDM	BPSK	29.3
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	13.0
	802.11ac (80MHz)		155	155	OFDM	BPSK	29.3

Radiated Emission Test (Below 1GHz):

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

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

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	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	5180-5240	36 to 48	36	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 (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	13.0
	802.11ac (80MHz)		42	42	OFDM	BPSK	29.3
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	13.0
	802.11ac (80MHz)		155	155	OFDM	BPSK	29.3

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	16deg. C, 76%RH	120Vac, 60Hz	Dalen Dai
RE<1G	20deg. C, 66%RH	120Vac, 60Hz	Aaron You
PLC	23deg. C, 75%RH	120Vac, 60Hz	Aaron You
APCM	25deg. C, 60%RH	120Vac, 60Hz	Saxon Lee

3.3 Duty Cycle of Test Signal

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

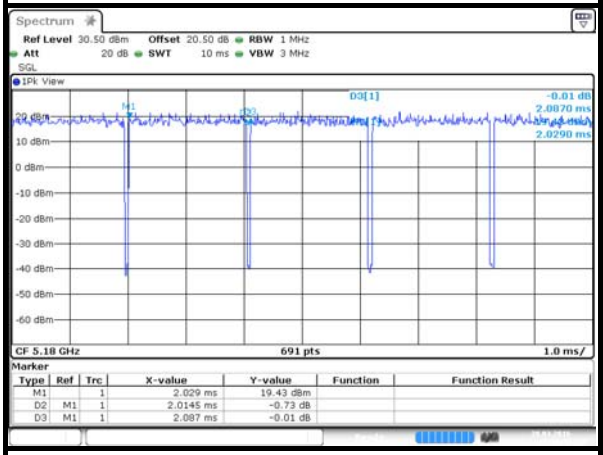
802.11a: Duty cycle = 2.014/2.087 = 0.965, Duty factor = 10 * log(1/0.965) = 0.15

802.11n (20MHz): Duty cycle = 1.855/1.942 = 0.955, Duty factor = 10 * log(1/0.955) = 0.20

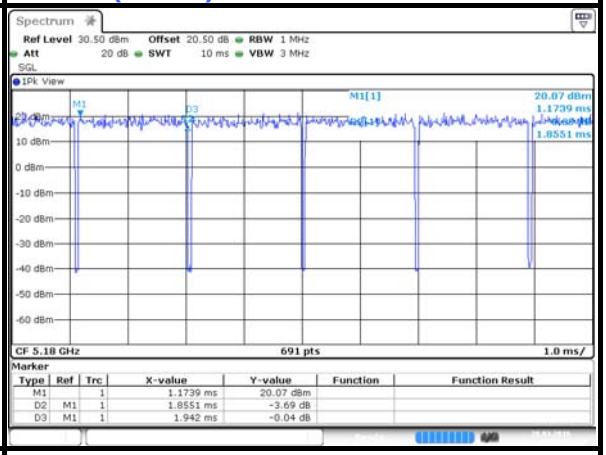
802.11n (40MHz): Duty cycle = 0.92/1 = 0.920, Duty factor = 10 * log(1/0.920) = 0.36

802.11ac (80MHz): Duty cycle = 0.413/0.543 = 0.761, Duty factor = 10 * log(1/0.761) = 1.19

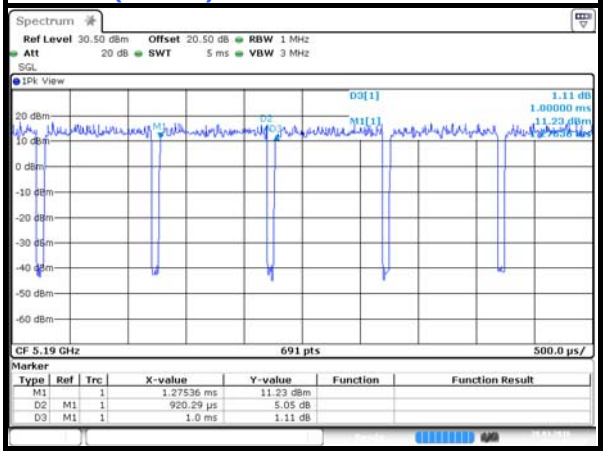
802.11a



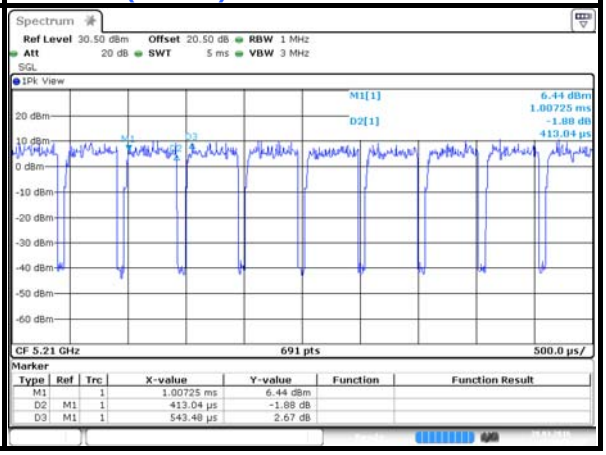
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook PC	DELL	PP27L	8SNZ12S	FCC DoC Approved	Provided by Lab

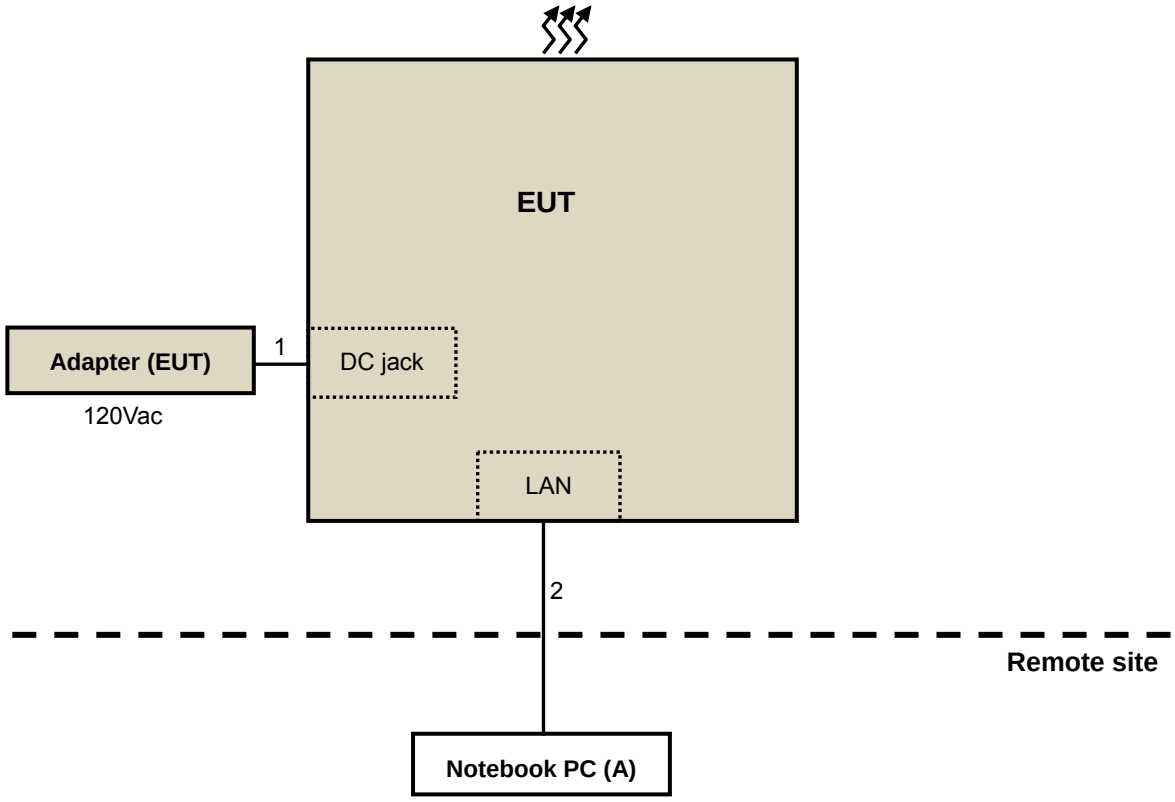
Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC cable	1	1.5	N	0	Supplied by client
2.	LAN cable	1	10	N	0	Provided by Lab

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

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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

FCC Part 15, Subpart E (15.407)
KDB 789033 D02 General UNII Test Procedure New Rules v01r02
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 is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

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

Limits Of Unwanted Emission Out Of The Restricted Bands

Applicable To	Limit	
789033 D02 General UNII Test Procedure New Rules v01r02	FIELD STRENGTH at 3m	
	PK:74 (dBμV/m)	AV:54 (dBμV/m)
Applicable To	EIRP Limit	Equivalent Field Strength at 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)(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)	FIELD STRENGTH at 3m / § 15.247(d),	
	PK:74 (dBμV/m)	AV:54 (dBμV/m)

*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.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 26, 2016	Feb. 25, 2017
HP Preamplifier	8449B	3008A01201	Feb. 26, 2016	Feb. 25, 2017
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Mar. 01, 2016	Feb. 28, 2017
Agilent TEST RECEIVER	N9038A	MY51210129	Feb. 02, 2016	Feb. 01, 2017
Schwarzbeck Antenna	VULB 9168	139	Jan. 04, 2016	Jan. 03, 2017
Schwarzbeck Antenna	VHBA 9123	480	May 29, 2015	May 28, 2017
Schwarzbeck Horn Antenna	BBHA-9170	212	Jan. 08, 2016	Jan. 07, 2017
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Jan. 21, 2016	Jan. 20, 2017
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15.9.4	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF104	CABLE-CH6	Aug. 15, 2015	Aug. 14, 2016
SUHNER RF cable With 3dB PAD	SF102	Cable-CH8-3.6m	Aug. 15, 2015	Aug. 14, 2016
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Jul. 14, 2015	Jul. 13, 2016
EMCO Horn Antenna	3115	00028257	Jan. 19, 2016	Jan. 18, 2017
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 23, 2015	Sep. 22, 2016
Anritsu Power Sensor	MA2411B	0738404	Apr. 28, 2016	Apr. 27, 2017
Anritsu Power Meter	ML2495A	0842014	Apr. 28, 2016	Apr. 27, 2017
Temperature & Humidity Chamber	MHU-225AU	920409	May 25, 2015	May 24, 2016

NOTE: 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.
4. The Industry Canada Reference No. IC 7450E-6.
5. The FCC Site Registration No. is 447212.

4.1.3 Test Procedure

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

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

Note:

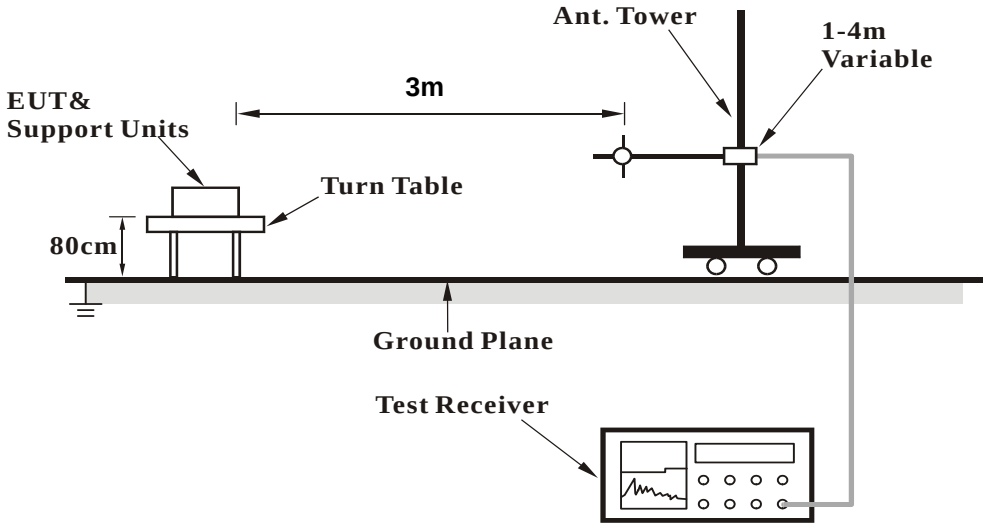
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

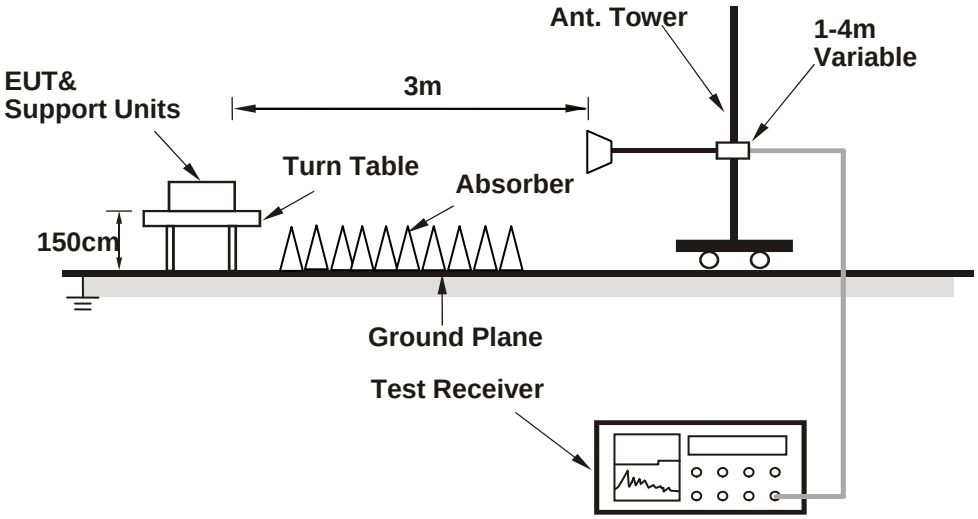
No deviation.

4.1.5 Test Setup

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Condition

The Notebook connected with EUT via a LAN cable and run a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.

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	73.1 PK	74.0	-0.9	1.14 H	13	64.56	8.53
2	5150.00	53.7 AV	54.0	-0.3	1.14 H	13	45.17	8.53
3	*5180.00	115.0 PK			1.14 H	13	106.28	8.71
4	*5180.00	104.7 AV			1.14 H	13	95.95	8.71
5	#10360.00	60.2 PK	74.0	-13.8	1.65 H	117	39.88	20.33
6	#10360.00	47.5 AV	54.0	-6.5	1.65 H	117	27.14	20.33
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	72.3 PK	74.0	-1.7	1.08 V	318	63.78	8.53
2	5150.00	53.3 AV	54.0	-0.7	1.08 V	318	44.79	8.53
3	*5180.00	114.1 PK			1.08 V	318	105.35	8.71
4	*5180.00	104.1 AV			1.08 V	318	95.34	8.71
5	#10360.00	61.2 PK	74.0	-12.9	1.41 V	229	40.82	20.33
6	#10360.00	48.7 AV	54.0	-5.3	1.41 V	229	28.35	20.33

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	66.1 PK	74.0	-7.9	1.32 H	1	59.24	6.85
2	5150.00	49.5 AV	54.0	-4.5	1.32 H	1	42.67	6.85
3	*5200.00	108.0 PK			1.32 H	1	100.94	7.01
4	*5200.00	97.6 AV			1.32 H	1	90.56	7.01
5	#10400.00	57.7 PK	74.0	-16.4	2.80 H	20	40.21	17.44
6	#10400.00	43.7 AV	54.0	-10.3	2.80 H	20	26.24	17.44
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	71.5 PK	74.0	-2.5	1.58 V	360	64.61	6.85
2	**5150.00**	**53.8 AV**	**54.0**	**-0.2**	**1.58 V**	**360**	**46.91**	**6.85**
3	*5200.00	110.6 PK			1.58 V	360	103.54	7.01
4	*5200.00	100.6 AV			1.58 V	360	93.57	7.01
5	#10400.00	56.8 PK	74.0	-17.2	1.64 V	178	39.35	17.44
6	#10400.00	43.1 AV	54.0	-10.9	1.64 V	178	25.64	17.44

REMARKS:

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

CHANNEL	TX Channel 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	113.7 PK			1.67 H	229	106.52	7.16
2	*5240.00	102.8 AV			1.67 H	229	95.63	7.16
3	5350.00	59.8 PK	74.0	-14.2	1.67 H	229	52.19	7.64
4	5350.00	49.6 AV	54.0	-4.5	1.67 H	229	41.91	7.64
5	#10480.00	57.5 PK	74.0	-16.5	1.87 H	115	39.64	17.87
6	#10480.00	43.5 AV	54.0	-10.5	1.87 H	115	25.61	17.87
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	113.3 PK			1.39 V	49	106.13	7.16
2	*5240.00	102.4 AV			1.39 V	49	95.19	7.16
3	5350.00	58.9 PK	74.0	-15.1	1.39 V	49	51.23	7.64
4	5350.00	45.4 AV	54.0	-8.6	1.39 V	49	37.76	7.64
5	#10480.00	58.4 PK	74.0	-15.6	1.97 V	231	40.52	17.87
6	#10480.00	44.6 AV	54.0	-9.4	1.97 V	231	26.71	17.87

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 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	#5649.99	62.9 PK	68.2	-5.3	1.09 H	4	52.36	10.50
2	*5745.00	113.4 PK			1.09 H	4	103.00	10.35
3	*5745.00	102.7 AV			1.09 H	4	92.39	10.35
4	11490.00	63.9 PK	74.0	-10.1	1.43 H	337	41.62	22.26
5	11490.00	50.1 AV	54.0	-3.9	1.43 H	337	27.88	22.26
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	#5649.99	63.9 PK	68.2	-4.3	1.12 V	250	53.39	10.50
2	*5745.00	115.1 PK			1.12 V	250	104.76	10.35
3	*5745.00	104.2 AV			1.12 V	250	93.85	10.35
4	11490.00	65.4 PK	74.0	-8.6	3.47 V	227	43.13	22.26
5	11490.00	51.7 AV	54.0	-2.3	3.47 V	227	29.40	22.26

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	113.7 PK			1.05 H	5	103.40	10.26
2	*5785.00	103.0 AV			1.05 H	5	92.69	10.26
3	11570.00	63.6 PK	74.0	-10.4	1.38 H	320	41.28	22.35
4	11570.00	50.0 AV	54.0	-4.0	1.38 H	320	27.69	22.35
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	114.4 PK			1.06 V	254	104.11	10.26
2	*5785.00	103.8 AV			1.06 V	254	93.57	10.26
3	11570.00	66.5 PK	74.0	-7.5	3.81 V	220	44.16	22.35
4	11570.00	52.4 AV	54.0	-1.6	3.81 V	220	30.03	22.35

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	113.5 PK			1.20 H	5	103.24	10.27
2	*5825.00	102.3 AV			1.20 H	5	92.04	10.27
3	#5925.01	66.4 PK	68.2	-1.8	1.20 H	5	55.93	10.50
4	11650.00	63.9 PK	74.0	-10.1	1.37 H	332	41.82	22.06
5	11650.00	49.9 AV	54.0	-4.1	1.37 H	332	27.80	22.06
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	113.7 PK			1.20 V	269	103.44	10.27
2	*5825.00	103.1 AV			1.20 V	269	92.78	10.27
3	#5925.01	67.2 PK	68.2	-1.1	1.20 V	269	56.65	10.50
4	11650.00	65.7 PK	74.0	-8.3	3.84 V	221	43.63	22.06
5	11650.00	51.8 AV	54.0	-2.2	3.84 V	221	29.72	22.06

REMARKS:

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

802.11n (20MHz)

CHANNEL	TX Channel 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	72.8 PK	74.0	-1.2	1.12 H	7	64.27	8.53
2	5150.00	53.7 AV	54.0	-0.3	1.12 H	7	45.14	8.53
3	*5180.00	114.7 PK			1.12 H	7	105.95	8.71
4	*5180.00	103.5 AV			1.12 H	7	94.77	8.71
5	#10360.00	60.0 PK	74.0	-14.0	1.51 H	94	39.71	20.33
6	#10360.00	47.6 AV	54.0	-6.4	1.51 H	94	27.28	20.33
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	71.9 PK	74.0	-2.1	1.03 V	324	63.41	8.53
2	5150.00	53.3 AV	54.0	-0.8	1.03 V	324	44.72	8.53
3	*5180.00	114.1 PK			1.03 V	324	105.36	8.71
4	*5180.00	102.8 AV			1.03 V	324	94.06	8.71
5	#10360.00	61.0 PK	74.0	-13.0	1.33 V	234	40.66	20.33
6	#10360.00	48.6 AV	54.0	-5.4	1.33 V	234	28.23	20.33

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	62.2 PK	74.0	-11.8	1.34 H	2	55.34	6.85
2	5150.00	48.5 AV	54.0	-5.5	1.34 H	2	41.62	6.85
3	*5200.00	103.4 PK			1.34 H	2	96.43	7.01
4	*5200.00	94.0 AV			1.34 H	2	87.00	7.01
5	#10400.00	58.1 PK	74.0	-16.0	2.09 H	147	40.61	17.44
6	#10400.00	42.6 AV	54.0	-11.4	2.09 H	147	25.16	17.44
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.6 PK	74.0	-5.4	1.01 V	360	61.77	6.85
2	5150.00	53.5 AV	54.0	-0.5	1.01 V	360	46.64	6.85
3	*5200.00	110.4 PK			1.01 V	360	103.37	7.01
4	*5200.00	101.8 AV			1.01 V	360	94.77	7.01
5	#10400.00	58.1 PK	74.0	-16.0	1.94 V	56	40.61	17.44
6	#10400.00	44.3 AV	54.0	-9.7	1.94 V	56	26.89	17.44

REMARKS:

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

CHANNEL	TX Channel 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	111.8 PK			1.18 H	167	104.68	7.16
2	*5240.00	100.5 AV			1.18 H	167	93.29	7.16
3	5350.00	56.3 PK	74.0	-17.7	1.18 H	167	48.63	7.64
4	5350.00	47.3 AV	54.0	-6.7	1.18 H	167	39.65	7.64
5	#10480.00	57.3 PK	74.0	-16.7	1.58 H	216	39.39	17.87
6	#10480.00	42.1 AV	54.0	-11.9	1.58 H	216	24.19	17.87
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	114.2 PK			1.00 V	7	107.07	7.16
2	*5240.00	103.8 AV			1.00 V	7	96.59	7.16
3	5350.00	59.0 PK	74.0	-15.0	1.00 V	7	51.32	7.64
4	5350.00	45.6 AV	54.0	-8.4	1.00 V	7	37.93	7.64
5	#10480.00	58.4 PK	74.0	-15.6	1.35 V	167	40.51	17.87
6	#10480.00	44.0 AV	54.0	-10.0	1.35 V	167	26.15	17.87

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 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	#5649.99	66.4 PK	68.2	-1.8	1.01 H	4	55.92	10.50
2	*5745.00	113.9 PK			1.01 H	4	103.54	10.35
3	*5745.00	102.6 AV			1.01 H	4	92.21	10.35
4	11490.00	62.6 PK	74.0	-11.4	1.52 H	308	40.38	22.26
5	11490.00	49.1 AV	54.0	-4.9	1.52 H	308	26.85	22.26
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	#5649.99	67.1 PK	68.2	-1.1	1.13 V	252	56.63	10.50
2	*5745.00	115.6 PK			1.13 V	252	105.21	10.35
3	*5745.00	104.4 AV			1.13 V	252	94.01	10.35
4	11490.00	64.7 PK	74.0	-9.3	3.46 V	227	42.47	22.26
5	11490.00	50.7 AV	54.0	-3.4	3.46 V	227	28.39	22.26

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	113.6 PK			1.22 H	3	103.29	10.26
2	*5785.00	102.5 AV			1.22 H	3	92.20	10.26
3	11570.00	62.9 PK	74.0	-11.1	1.44 H	330	40.51	22.35
4	11570.00	49.1 AV	54.0	-4.9	1.44 H	330	26.73	22.35
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	115.0 PK			1.12 V	252	104.69	10.26
2	*5785.00	103.8 AV			1.12 V	252	93.51	10.26
3	11570.00	64.9 PK	74.0	-9.1	3.58 V	226	42.55	22.35
4	11570.00	51.7 AV	54.0	-2.3	3.58 V	226	29.31	22.35

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	112.2 PK			1.43 H	7	101.89	10.27
2	*5825.00	101.5 AV			1.43 H	7	91.24	10.27
3	#5925.01	65.9 PK	68.2	-2.3	1.43 H	7	55.37	10.50
4	11650.00	62.9 PK	74.0	-11.1	1.37 H	325	40.82	22.06
5	11650.00	49.0 AV	54.0	-5.0	1.37 H	325	26.90	22.06
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	113.9 PK			1.14 V	268	103.62	10.27
2	*5825.00	102.8 AV			1.14 V	268	92.50	10.27
3	#5925.01	66.5 PK	68.2	-1.7	1.14 V	268	56.01	10.50
4	11650.00	64.5 PK	74.0	-9.5	3.81 V	225	42.43	22.06
5	11650.00	51.1 AV	54.0	-3.0	3.81 V	225	28.99	22.06

REMARKS:

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

802.11n (40MHz)

CHANNEL	TX Channel 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	71.1 PK	74.0	-2.9	1.25 H	8	62.54	8.53
2	5150.00	53.6 AV	54.0	-0.4	1.25 H	8	45.06	8.53
3	*5190.00	110.6 PK			1.25 H	8	101.84	8.77
4	*5190.00	97.4 AV			1.25 H	8	88.62	8.77
5	#10380.00	60.0 PK	74.0	-14.0	1.55 H	108	39.60	20.40
6	#10380.00	47.9 AV	54.0	-6.1	1.55 H	108	27.51	20.40
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	70.6 PK	74.0	-3.4	1.21 V	323	62.11	8.53
2	5150.00	53.3 AV	54.0	-0.8	1.21 V	323	44.72	8.53
3	*5190.00	110.1 PK			1.21 V	323	101.37	8.77
4	*5190.00	96.9 AV			1.21 V	323	88.13	8.77
5	#10380.00	60.9 PK	74.0	-13.1	1.28 V	227	40.53	20.40
6	#10380.00	48.6 AV	54.0	-5.4	1.28 V	227	28.16	20.40

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) 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	65.2 PK	74.0	-8.8	1.42 H	36	58.34	6.85
2	5150.00	48.5 AV	54.0	-5.5	1.42 H	36	41.69	6.85
3	*5230.00	100.4 PK			1.42 H	36	93.24	7.13
4	*5230.00	91.7 AV			1.42 H	36	84.61	7.13
5	5350.00	57.3 PK	74.0	-16.7	1.42 H	36	49.64	7.64
6	5350.00	40.9 AV	54.0	-13.1	1.42 H	36	33.28	7.64
7	#10460.00	57.1 PK	74.0	-16.9	1.18 H	64	39.30	17.77
8	#10460.00	42.9 AV	54.0	-11.1	1.18 H	64	25.14	17.77
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	69.5 PK	74.0	-4.5	1.17 V	3	62.63	6.85
2	5150.00	53.6 AV	54.0	-0.4	1.17 V	3	46.73	6.85
3	*5230.00	109.7 PK			1.17 V	3	102.61	7.13
4	*5230.00	99.9 AV			1.17 V	3	92.80	7.13
5	5350.00	61.3 PK	74.0	-12.7	1.17 V	3	53.64	7.64
6	5350.00	46.0 AV	54.0	-8.0	1.17 V	3	38.40	7.64
7	#10460.00	58.5 PK	74.0	-15.5	1.94 V	13	40.74	17.77
8	#10460.00	44.6 AV	54.0	-9.4	1.94 V	13	26.80	17.77

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 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	#5649.99	65.1 PK	68.2	-3.1	1.15 H	4	54.61	10.50
2	*5755.00	108.0 PK			1.15 H	4	97.67	10.34
3	*5755.00	97.8 AV			1.15 H	4	87.46	10.34
4	11510.00	61.0 PK	74.0	-13.0	1.50 H	330	38.69	22.29
5	11510.00	48.7 AV	54.0	-5.3	1.50 H	330	26.43	22.29
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	#5649.99	67.9 PK	68.2	-0.3	1.20 V	254	57.38	10.50
2	*5755.00	110.1 PK			1.20 V	254	99.72	10.34
3	*5755.00	99.9 AV			1.20 V	254	89.52	10.34
4	11510.00	63.1 PK	74.0	-10.9	3.16 V	230	40.78	22.29
5	11510.00	49.7 AV	54.0	-4.4	3.16 V	230	27.36	22.29

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	108.3 PK			1.09 H	7	98.02	10.24
2	*5795.00	98.5 AV			1.09 H	7	88.29	10.24
3	#5925.01	65.8 PK	68.2	-2.4	1.09 H	7	55.26	10.50
4	11590.00	61.1 PK	74.0	-12.9	1.43 H	305	38.71	22.37
5	11590.00	48.8 AV	54.0	-5.2	1.43 H	305	26.39	22.37
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	110.1 PK			1.05 V	255	99.88	10.24
2	*5795.00	99.1 AV			1.05 V	255	88.87	10.24
3	#5925.01	67.7 PK	68.2	-0.5	1.05 V	255	57.22	10.50
4	11590.00	63.1 PK	74.0	-11.0	3.23 V	227	40.68	22.37
5	11590.00	49.9 AV	54.0	-4.1	3.23 V	227	27.50	22.37

REMARKS:

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

802.11ac (80MHz)

CHANNEL	TX Channel 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	71.6 PK	74.0	-2.5	1.13 H	9	63.02	8.53
2	5150.00	53.7 AV	54.0	-0.3	1.13 H	9	45.13	8.53
3	*5210.00	111.8 PK			1.13 H	9	102.93	8.86
4	*5210.00	95.9 AV			1.13 H	9	87.04	8.86
5	5350.00	58.4 PK	74.0	-15.6	1.13 H	9	48.94	9.43
6	5350.00	46.5 AV	54.0	-7.5	1.13 H	9	37.11	9.43
7	#10420.00	60.2 PK	74.0	-13.8	1.66 H	120	39.65	20.58
8	#10420.00	47.9 AV	54.0	-6.1	1.66 H	120	27.34	20.58
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	70.8 PK	74.0	-3.2	1.20 V	325	62.25	8.53
2	5150.00	53.5 AV	54.0	-0.5	1.20 V	325	44.93	8.53
3	*5210.00	111.4 PK			1.20 V	325	102.55	8.86
4	*5210.00	95.6 AV			1.20 V	325	86.72	8.86
5	5350.00	58.2 PK	74.0	-15.8	1.20 V	325	48.76	9.43
6	5350.00	46.2 AV	54.0	-7.8	1.20 V	325	36.81	9.43
7	#10420.00	61.2 PK	74.0	-12.8	1.31 V	219	40.58	20.58
8	#10420.00	48.9 AV	54.0	-5.2	1.31 V	219	28.27	20.58

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5649.99	67.0 PK	68.2	-1.2	1.46 H	6	56.47	10.50
2	*5775.00	104.8 PK			1.46 H	6	94.52	10.29
3	*5775.00	93.2 AV			1.46 H	6	82.92	10.29
4	#5925.01	63.1 PK	68.2	-5.1	1.46 H	6	52.59	10.50
5	11550.00	60.6 PK	74.0	-13.4	1.45 H	317	38.26	22.33
6	11550.00	48.1 AV	54.0	-5.9	1.45 H	317	25.80	22.33
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	#5649.99	65.2 PK	68.2	-3.0	1.50 V	250	54.72	10.50
2	*5775.00	105.0 PK			1.50 V	250	94.68	10.29
3	*5775.00	93.7 AV			1.50 V	250	83.42	10.29
4	#5925.01	67.9 PK	68.2	-0.3	1.50 V	250	57.38	10.50
5	11550.00	62.2 PK	74.0	-11.8	3.00 V	239	39.88	22.33
6	11550.00	49.1 AV	54.0	-4.9	3.00 V	239	26.78	22.33

REMARKS:

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

BELOW 1GHz WORST-CASE DATA

802.11a

CHANNEL	TX Channel 36	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	32.47	32.6 QP	40.0	-7.4	4.00 H	73	43.89	-11.31
2	150.04	22.9 QP	43.5	-20.7	4.00 H	57	32.40	-9.55
3	275.02	28.1 QP	46.0	-17.9	3.58 H	112	36.28	-8.18
4	425.03	30.9 QP	46.0	-15.1	2.26 H	192	35.94	-5.06
5	690.04	29.9 QP	46.0	-16.1	1.37 H	188	30.14	-0.21
6	895.53	37.8 QP	46.0	-8.2	1.00 H	155	34.75	3.04
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	32.18	33.7 QP	40.0	-6.3	1.53 V	258	45.07	-11.39
2	157.12	22.4 QP	43.5	-21.1	1.00 V	308	31.70	-9.29
3	460.05	30.0 QP	46.0	-16.0	1.82 V	128	34.68	-4.65
4	690.04	33.9 QP	46.0	-12.2	2.03 V	230	34.06	-0.21
5	822.93	32.0 QP	46.0	-14.0	2.41 V	354	29.87	2.17
6	920.02	33.7 QP	46.0	-12.3	2.33 V	199	29.52	4.17

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.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100290	Dec. 24, 2015	Dec. 23, 2016
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	100104	Dec. 07, 2015	Dec. 06, 2016
LISN With Adapter (for EUT)	AD10	C09Ada-001	Dec. 07, 2015	Dec. 06, 2016
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	847265/023	Oct. 21, 2015	Oct. 20, 2016
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 04, 2016	May 03, 2017
Software	Cond_V7.3.7	NA	NA	NA
RF cable (JYEBAO) With 10dB PAD	5D-FB	Cable-C09.01	Feb. 23, 2016	Feb. 22, 2017
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010789	May 19, 2015	May 18, 2016
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 13, 2015	Nov. 12, 2016
LISN With Adapter (for TV EUT)	100220	N/A	Nov. 13, 2015	Nov. 12, 2016

Notes: 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 Shielded Room No. 9.
3. The VCCI Site Registration No. C-1312.

4.2.3 Test Procedures

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

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

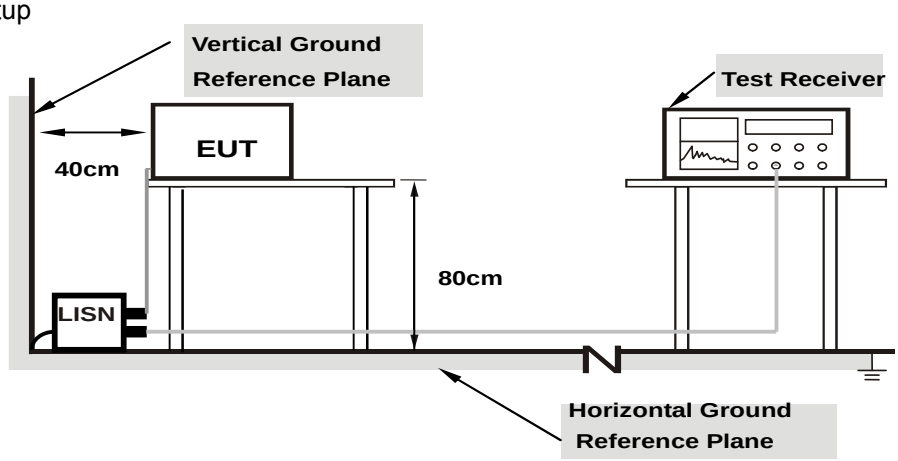
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

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

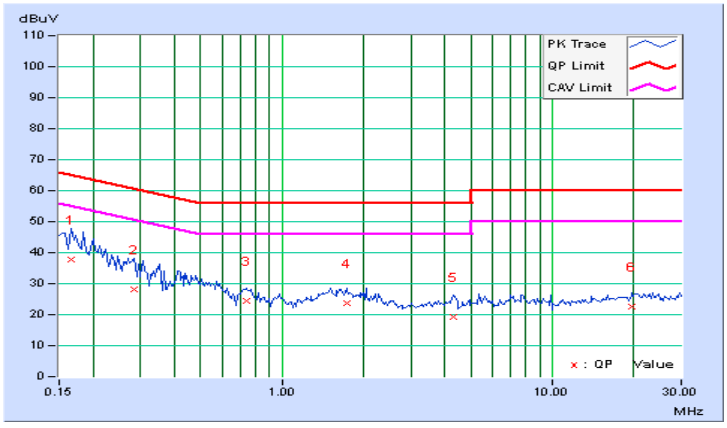
802.11a: CH 36

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

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	10.24	27.67	6.09	37.91	16.33	65.18	55.18	-27.27	-38.85
2	0.28281	10.27	17.81	1.58	28.08	11.85	60.73	50.73	-32.65	-38.88
3	0.73984	10.34	14.04	8.27	24.38	18.61	56.00	46.00	-31.62	-27.39
4	1.73828	10.48	13.10	10.14	23.58	20.62	56.00	46.00	-32.42	-25.38
5	4.33594	10.66	8.56	4.38	19.22	15.04	56.00	46.00	-36.78	-30.96
6	19.68359	11.43	11.26	6.08	22.69	17.51	60.00	50.00	-37.31	-32.49

Remarks:

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

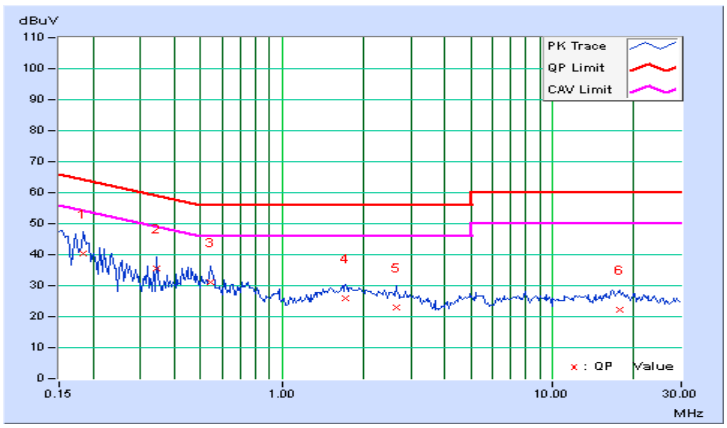


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18516	10.21	30.03	18.48	40.24	28.69	64.25	54.25	-24.01	-25.56
2	0.34531	10.24	25.33	17.35	35.57	27.59	59.07	49.07	-23.51	-21.49
3	**0.54453**	**10.27**	**20.69**	**14.88**	**30.96**	**25.15**	**56.00**	**46.00**	**-25.04**	**-20.85**
4	1.72266	10.47	15.56	12.17	26.03	22.64	56.00	46.00	-29.97	-23.36
5	2.63672	10.56	12.32	8.26	22.88	18.82	56.00	46.00	-33.12	-27.18
6	17.71094	11.11	11.20	7.02	22.31	18.13	60.00	50.00	-37.69	-31.87

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

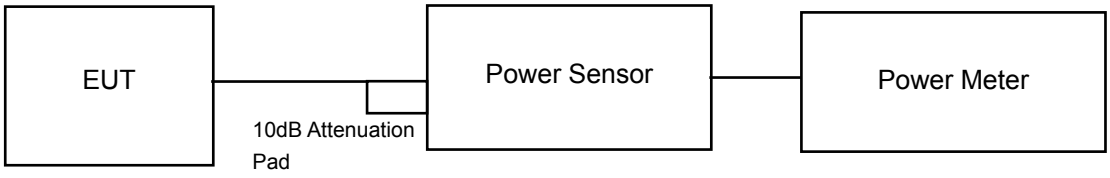
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

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 $N_{ANT} \geq 5$.

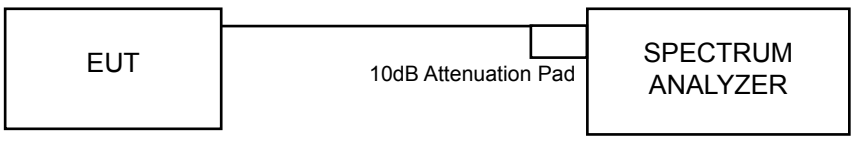
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

FOR POWER OUTPUT MEASUREMENT



FOR 26dB & OCCUPIED BANDWIDTH



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

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 26dB Bandwidth

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

For Occupied Bandwidth

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 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.

4.3.5 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

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	21.59	22.02	303.433	24.82	30	PASS
40	5200	22.94	22.53	**375.850**	25.75	30	PASS
48	5240	22.08	22.17	326.252	25.14	30	PASS
149	5745	24.10	24.59	**544.780**	27.36	30	PASS
157	5785	23.78	24.19	501.203	27.00	30	PASS
165	5825	22.84	23.32	407.092	26.10	30	PASS

802.11n (20MHz)

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	21.48	21.91	295.844	24.71	30	PASS
40	5200	22.66	22.31	354.718	25.50	30	PASS
48	5240	22.15	22.27	332.714	25.22	30	PASS
149	5745	23.98	24.52	533.174	27.27	30	PASS
157	5785	23.70	24.19	496.845	26.96	30	PASS
165	5825	23.18	23.49	431.327	26.35	30	PASS

802.11n (40MHz)

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
38	5190	18.69	18.82	150.169	21.77	30	PASS
46	5230	21.94	22.22	323.040	25.09	30	PASS
151	5755	22.19	22.67	350.504	25.45	30	PASS
159	5795	21.65	22.14	309.900	24.91	30	PASS

802.11ac (80MHz)

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
42	5210	16.61	17.06	96.630	19.85	30	PASS
155	5775	20.73	21.11	247.426	23.93	30	PASS

26dB BANDWIDTH:

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	25.52	25.74	PASS
40	5200	43.92	43.12	PASS
48	5240	27.53	27.66	PASS

802.11n (20MHz)

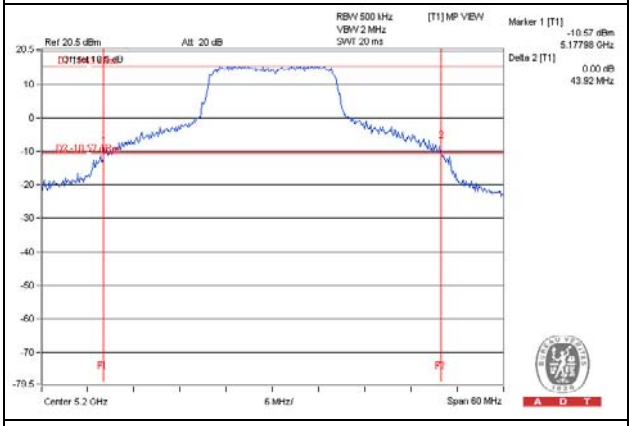
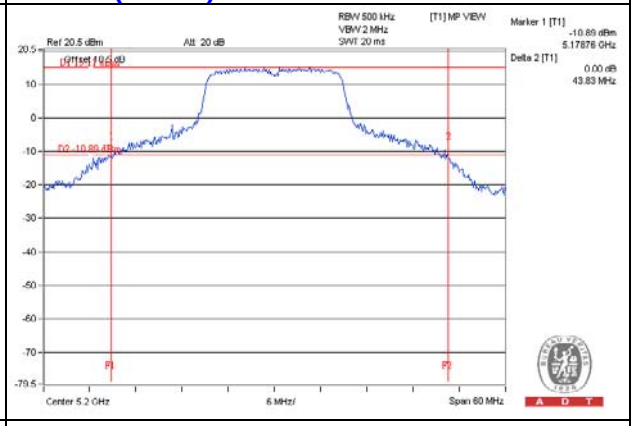
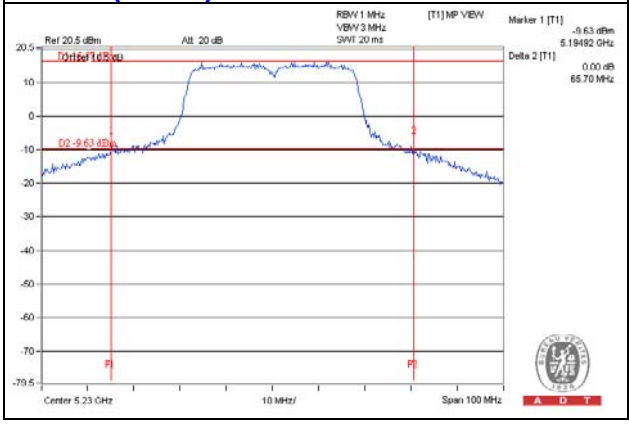
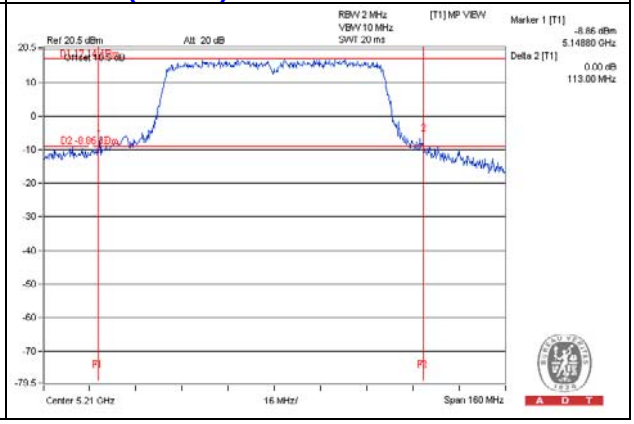
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	27.81	26.59	PASS
40	5200	43.83	43.64	PASS
48	5240	29.40	28.53	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
38	5190	45.32	46.04	PASS
46	5230	65.70	65.29	PASS

802.11ac (80MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
42	5210	113.00	110.94	PASS

SPECTRUM PLOT OF WORST VALUE	
802.11a	**802.11n (20MHz)**
	
802.11n (40MHz)	**802.11ac (80MHz)**
	

OCCUPIED BANDWIDTH:

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	16.92	16.92	PASS
40	5200	22.92	23.52	PASS
48	5240	17.16	17.04	PASS
149	5745	32.43	32.10	PASS
157	5785	32.30	32.60	PASS
165	5825	28.60	28.80	PASS

802.11n (20MHz)

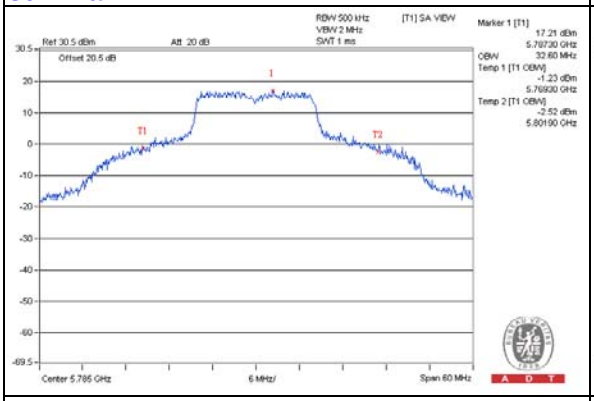
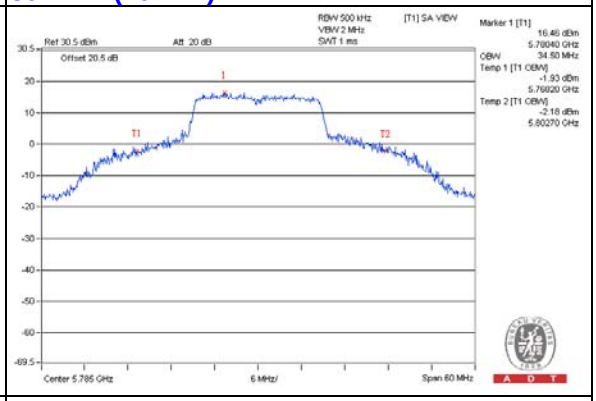
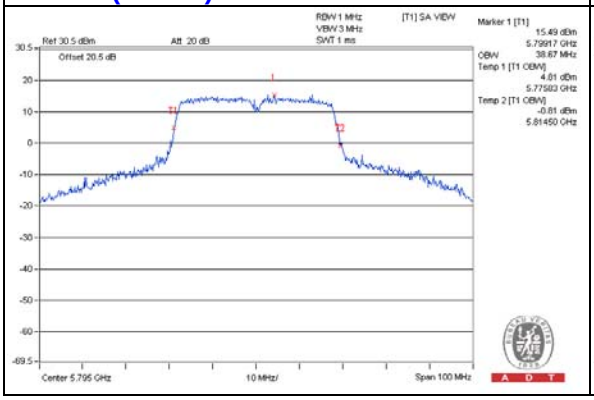
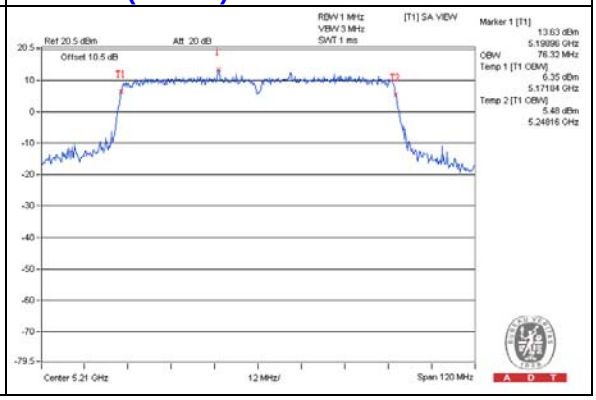
CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	18.12	18.12	PASS
40	5200	21.24	21.48	PASS
48	5240	18.24	18.24	PASS
149	5745	34.26	33.80	PASS
157	5785	34.20	34.50	PASS
165	5825	30.00	29.30	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
38	5190	36.80	36.80	PASS
46	5230	37.40	37.20	PASS
151	5755	38.26	38.67	PASS
159	5795	38.67	38.50	PASS

802.11ac (80MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
42	5210	76.08	76.32	PASS
155	5775	75.88	76.16	PASS

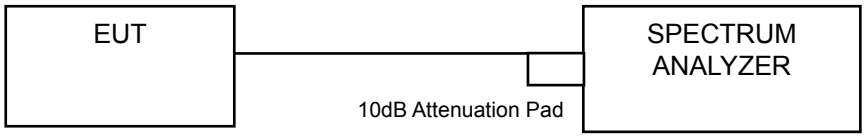
SPECTRUM PLOT OF WORST VALUE	
802.11a	**802.11n (20MHz)**
	
802.11n (40MHz)	**802.11ac (80MHz)**
	

4.4 Peak Power Spectral Density Measurement

4.4.1 Limits of Peak Power Spectral Density Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedure

For U-NII-1 band:

Using method SA-2

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

For U-NII-3 band:

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)

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Condition

Same as Item 4.3.6.

4.4.7 Test Results

For U-NII-1 Band

802.11a

Chan.	Freq. (MHz)	PSD (dBm)		TotaL PSD W/O Duty Factor (dBm)	Duty Factor	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
36	5180	7.52	7.52	10.54	0.15	10.69	17.00	Pass
40	5200	9.37	9.34	12.37	0.15	12.52	17.00	Pass
48	5240	7.86	7.79	11.14	0.15	10.99	17.00	Pass

NOTE:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the power spectral density limit is not reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (20MHz)

Chan.	Freq. (MHz)	PSD (dBm)		TotaL PSD W/O Duty Factor (dBm)	Duty Factor	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
36	5180	7.18	7.19	10.20	0.20	10.40	17.00	Pass
40	5200	8.76	8.84	11.81	0.20	12.01	17.00	Pass
48	5240	7.46	7.43	10.86	0.20	10.66	17.00	Pass

NOTE:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the power spectral density limit is not reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (40MHz)

Chan.	Freq. (MHz)	PSD (dBm)		TotaL PSD W/O Duty Factor (dBm)	Duty Factor	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
38	5190	1.03	0.96	4.01	0.36	4.37	17.00	Pass
46	5230	4.69	4.68	7.70	0.36	8.06	17.00	Pass

NOTE:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the power spectral density limit is not reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (80MHz)

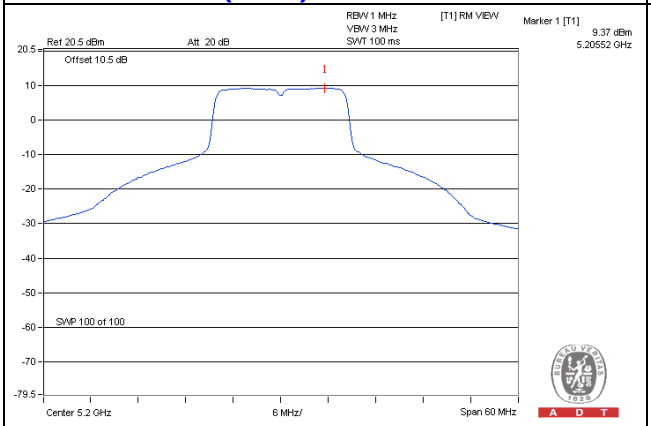
Chan.	Freq. (MHz)	PSD (dBm)		TotaL PSD W/O Duty Factor (dBm)	Duty Factor	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
42	5210	1.16	1.02	4.10	1.19	5.29	17.00	Pass

NOTE:

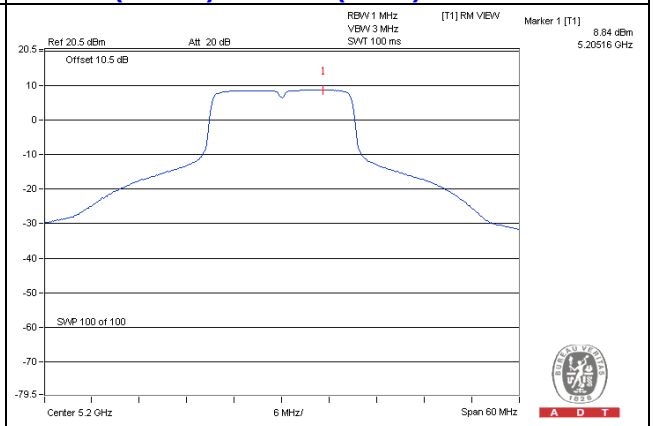
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the power spectral density limit is not reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE

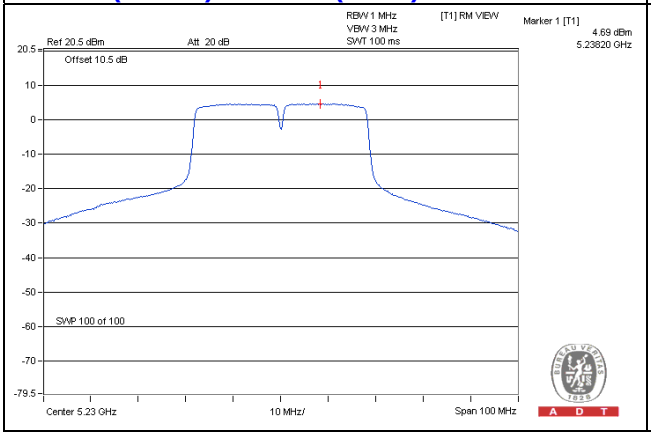
802.11a: Chian 0 (CH40)



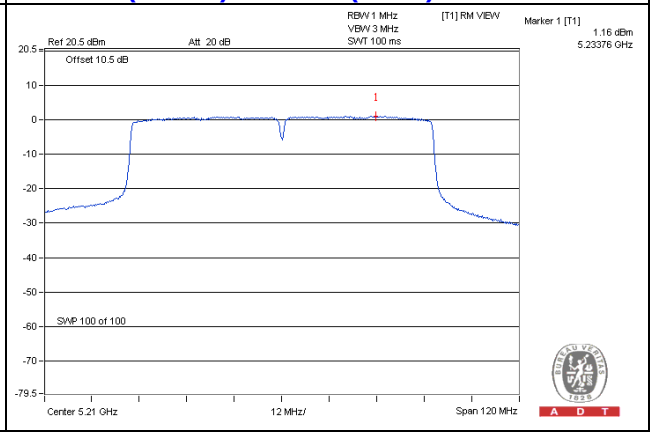
802.11n (20MHz): Chian 1 (CH40)



802.11n (40MHz): Chian 0 (CH46)



802.11ac (80MHz): Chian 0 (CH42)



For U-NII-3 Band

802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm/500kHz)	10 log (N=2) dB	DUTY FACTOR	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	149	5745	19.05	3.01	0.15	22.21	30.00	PASS
	157	5785	18.68	3.01	0.15	21.84	30.00	PASS
	165	5825	17.90	3.01	0.15	21.06	30.00	PASS
1	149	5745	18.49	3.01	0.15	21.65	30.00	PASS
	157	5785	18.50	3.01	0.15	21.66	30.00	PASS
	165	5825	18.09	3.01	0.15	21.25	30.00	PASS

NOTE:

1. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the power spectral density limit is not reduced.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/500kHz)	10 log (N=2) dB	DUTY FACTOR	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	149	5745	17.58	3.01	0.20	20.79	30.00	PASS
	157	5785	17.28	3.01	0.20	20.49	30.00	PASS
	165	5825	16.41	3.01	0.20	19.62	30.00	PASS
1	149	5745	17.42	3.01	0.20	20.63	30.00	PASS
	157	5785	17.32	3.01	0.20	20.53	30.00	PASS
	165	5825	16.53	3.01	0.20	19.74	30.00	PASS

NOTE:

1. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the power spectral density limit is not reduced.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (40MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/500kHz)	10 log (N=2) dB	DUTY FACTOR	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	151	5755	12.96	3.01	0.36	16.33	30.00	PASS
	159	5795	12.53	3.01	0.36	15.90	30.00	PASS
1	151	5755	12.37	3.01	0.36	15.74	30.00	PASS
	159	5795	12.26	3.01	0.36	15.63	30.00	PASS

NOTE:

1. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the power spectral density limit is not reduced.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (80MHz)

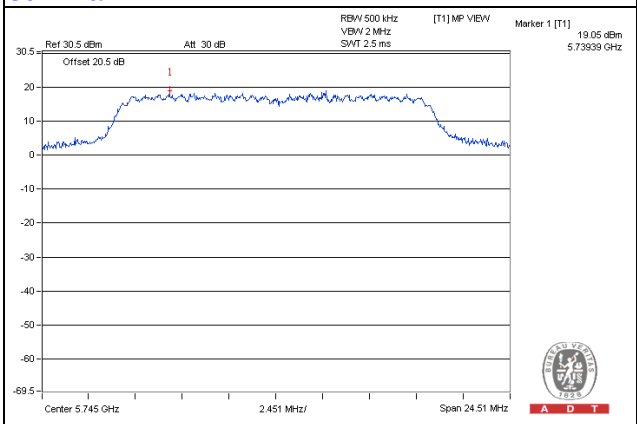
TX chain	Channel	Freq. (MHz)	PSD (dBm/500kHz)	10 log (N=2) dB	DUTY FACTOR	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	155	5775	9.21	3.01	0.36	13.41	30.00	PASS
1	155	5775	9.25	3.01	0.36	13.45	30.00	PASS

NOTE:

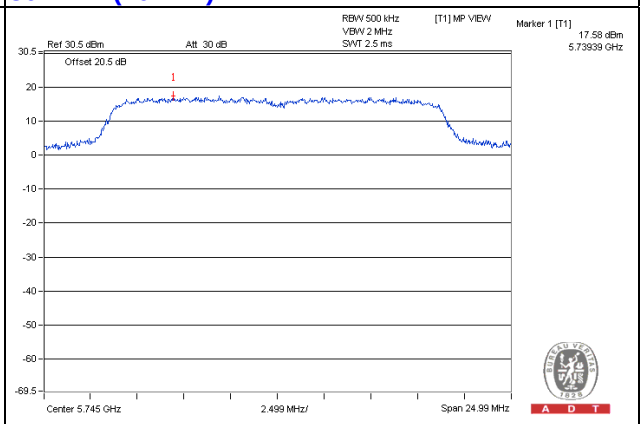
1. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi, so the power spectral density limit is not reduced.
2. Refer to section 3.3 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE

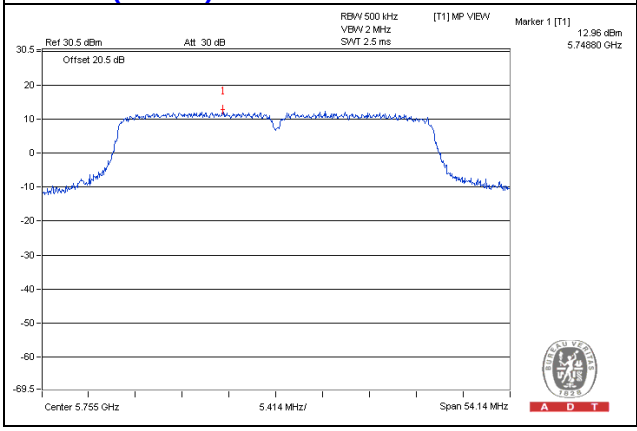
802.11a



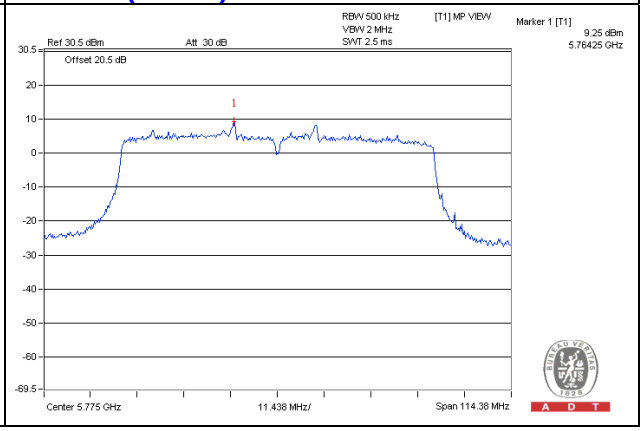
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)

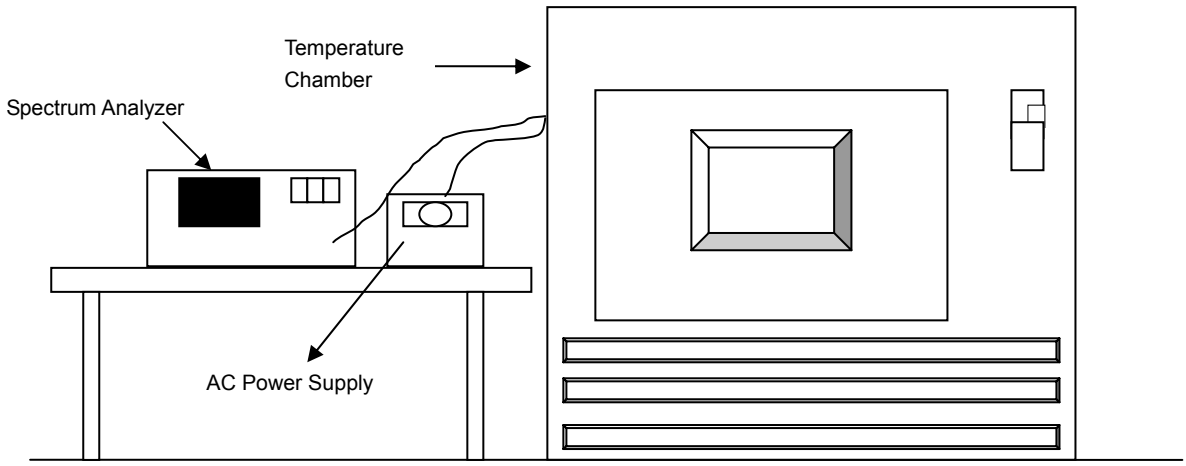


4.5 Frequency Stability Measurement

4.5.1 Limits of Frequency Stability Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
b. Turn the EUT on and couple its output to a spectrum analyzer.
c. Turn the EUT off and set the chamber to the highest temperature specified.
d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

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

4.5.7 Test Results

FREQUEMCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5180MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency(MHz)	Frequency Drift (ppm)	Measured Frequency(MHz)	Frequency Drift (ppm)	Measured Frequency(MHz)	Frequency Drift (ppm)	Measured Frequency(MHz)	Frequency Drift (ppm)
50	120	5180.042936	8.2887219	5180.043193	8.3384170	5180.043238	8.3470553	5180.042905	8.2828185
40	120	5180.043134	8.3271168	5180.043368	8.3722008	5180.043063	8.3133054	5180.043157	8.3314672
30	120	5180.043234	8.3463110	5180.043218	8.3432432	5180.043110	8.3223801	5180.043508	8.3992278
20	120	5180.042444	8.1937622	5180.042721	8.2472973	5180.042660	8.2355221	5180.042476	8.2000000
10	120	5180.04317	8.3340178	5180.043129	8.3260618	5180.043399	8.3781746	5180.043111	8.3225869
0	120	5180.043201	8.3398860	5180.04315	8.3301158	5180.043270	8.3533145	5180.043412	8.3806950
-10	120	5180.042603	8.2245210	5180.04242	8.1891892	5180.042333	8.1724718	5180.042431	8.1913127
-20	120	5180.043512	8.4000000	5180.043491	8.3959459	5180.042914	8.2845560	5180.043088	8.3181467

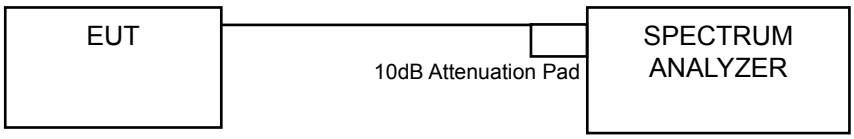
FREQUEMCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5180MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency(MHz)	Frequency Drift (ppm)	Measured Frequency(MHz)	Frequency Drift (ppm)	Measured Frequency(MHz)	Frequency Drift (ppm)	Measured Frequency(MHz)	Frequency Drift (ppm)
20	138	5180.043209	8.3415505	5180.043355	8.3696911	5180.043386	8.3756835	5180.043366	8.3718147
	120	5180.042444	8.1937622	5180.042721	8.2472973	5180.042660	8.2355221	5180.042476	8.2000000
	102	5180.043101	8.3207079	5180.04301	8.3030888	5180.042918	8.2853193	5180.042766	8.2559846

4.6 6dB Bandwidth Measurment

4.6.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.34	16.37	0.5	Pass
157	5785	16.41	16.40	0.5	Pass
165	5825	16.40	16.39	0.5	Pass

802.11n (20MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.67	17.56	0.5	Pass
157	5785	16.97	17.58	0.5	Pass
165	5825	17.62	17.61	0.5	Pass

802.11n (40MHz)

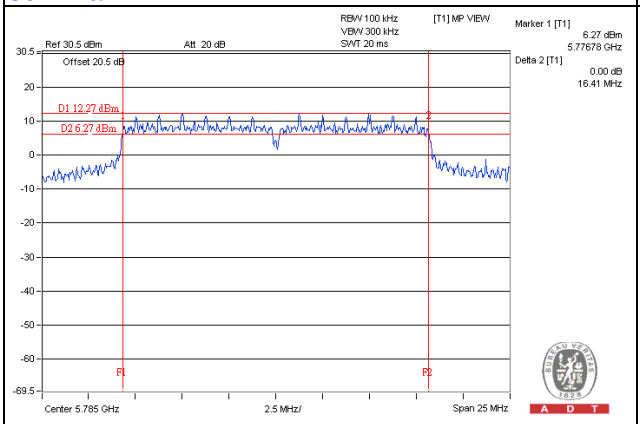
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	36.10	35.80	0.5	Pass
159	5795	36.13	36.38	0.5	Pass

802.11ac (80MHz)

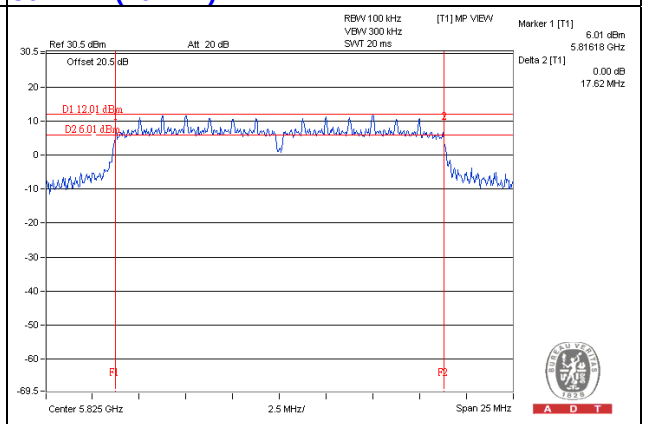
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	76.15	76.26	0.5	Pass

SPECTRUM PLOT OF WORST VALUE

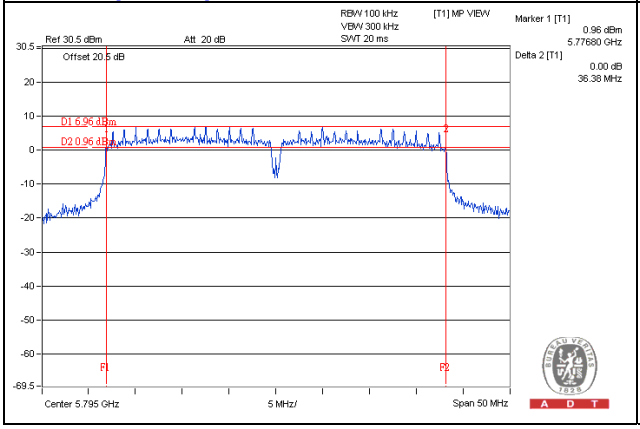
802.11a



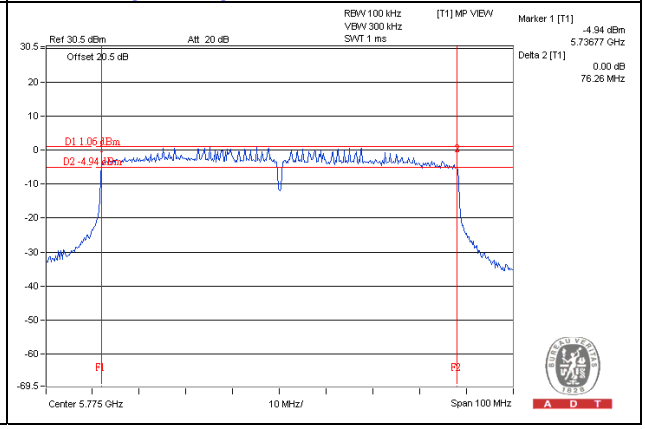
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)

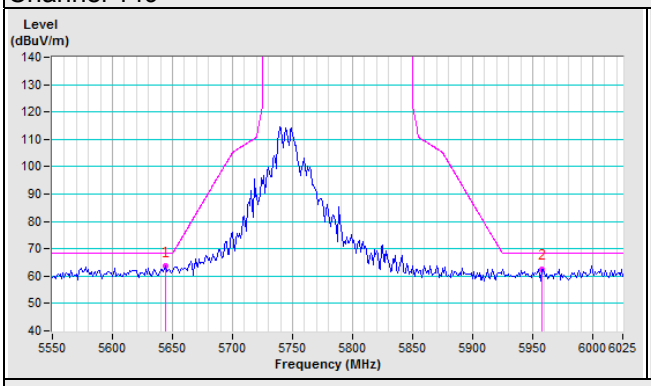
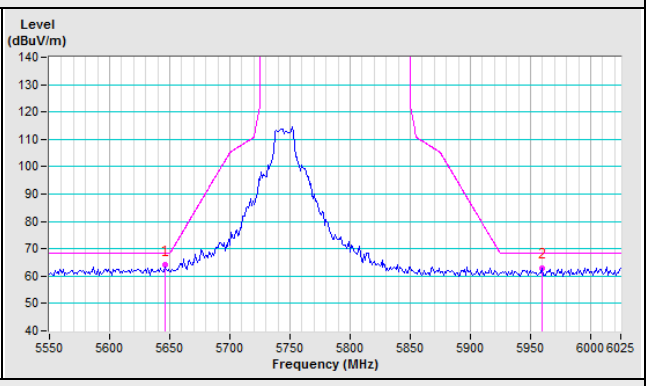
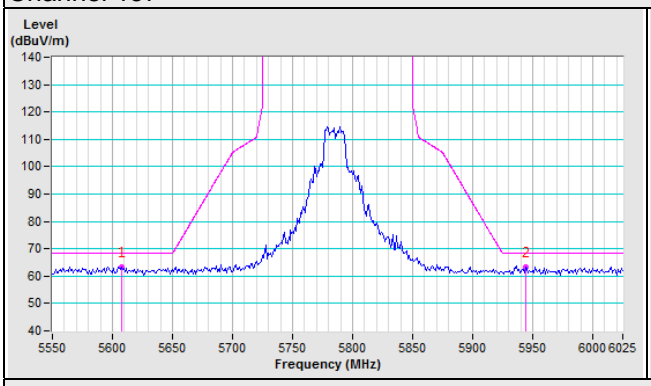
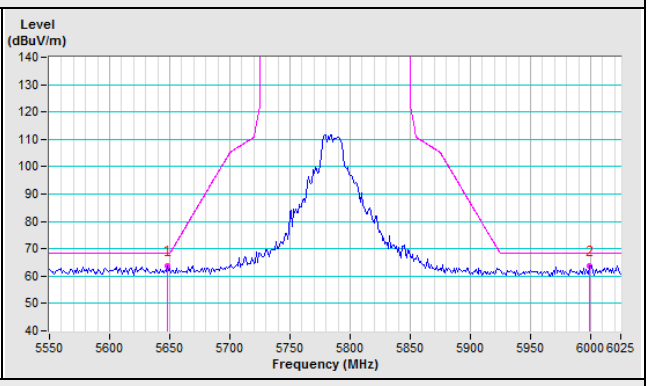
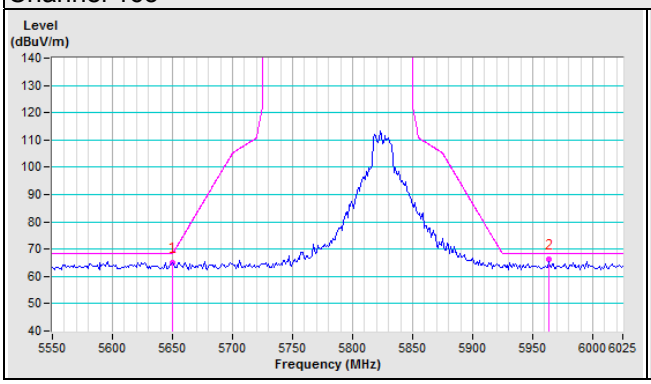
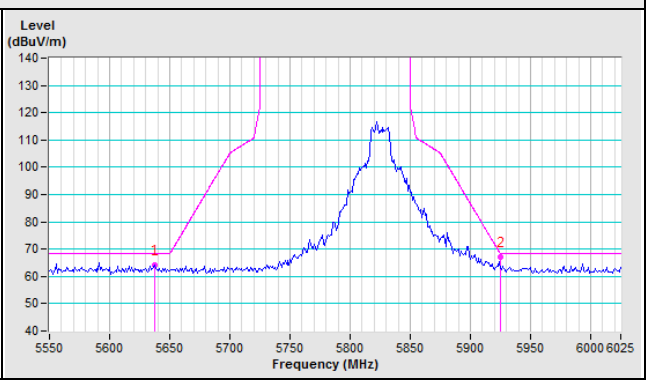


5 Pictures of Test Arrangements

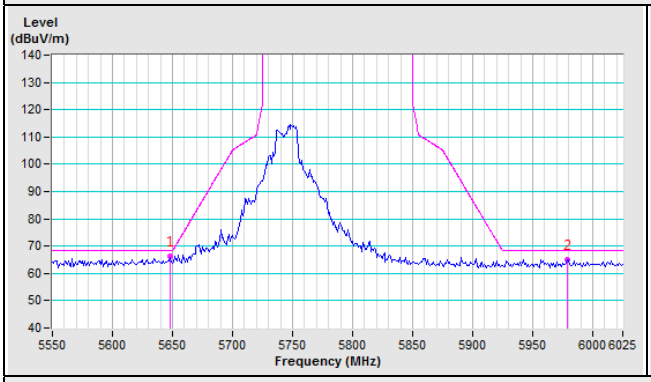
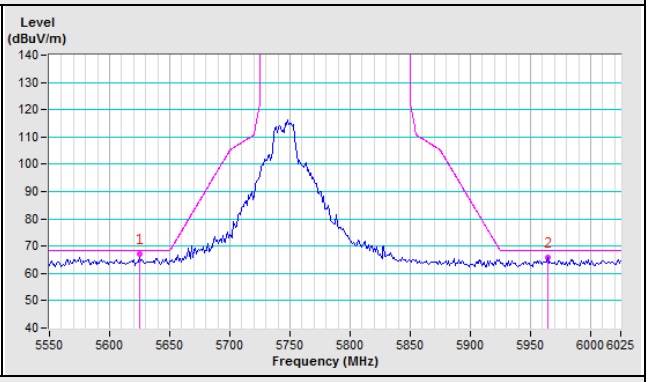
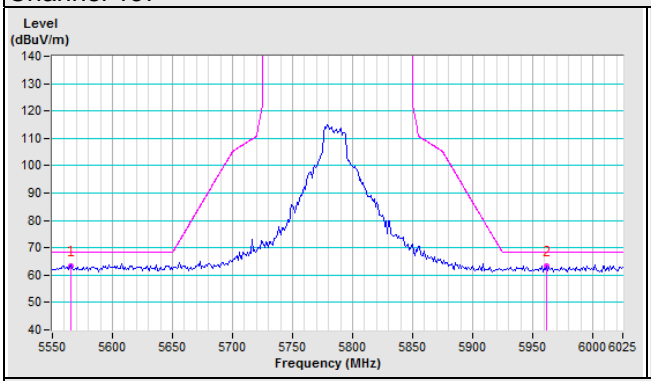
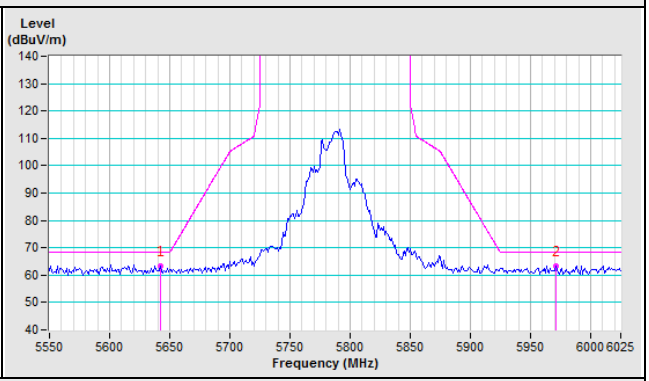
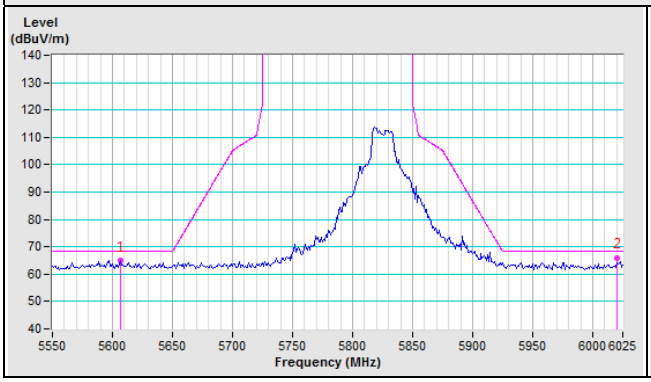
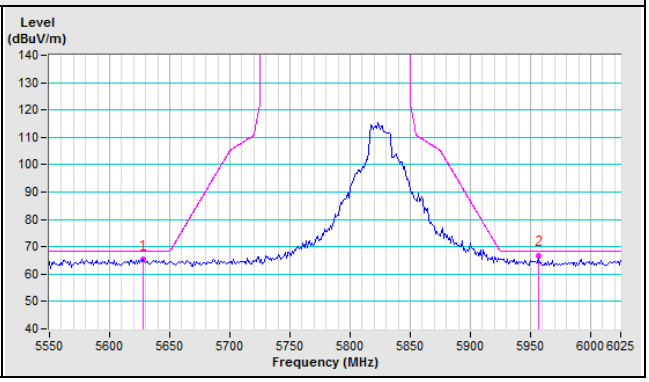
Please refer to the attached file (Test Setup Photo).

Annex A- Radiated Out of Band Emisison (OOBE) Measurement (For U-NII-3 band)

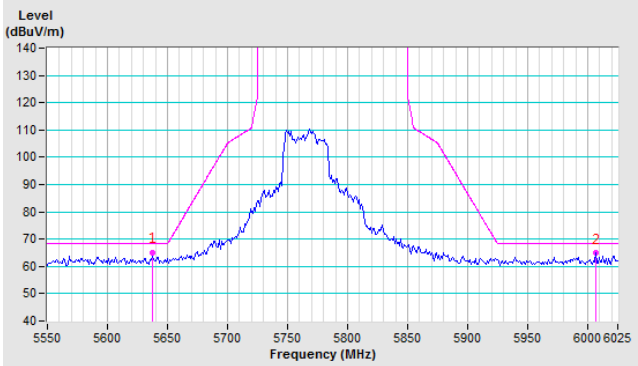
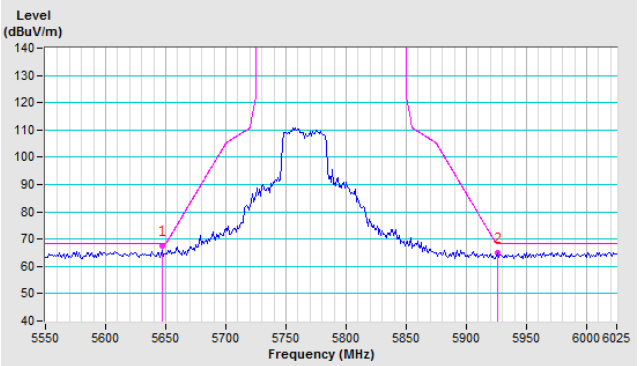
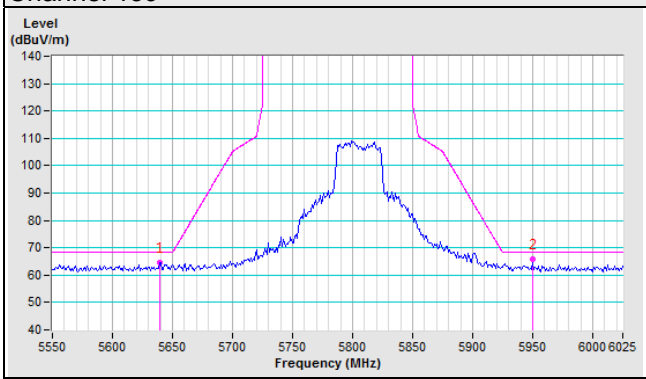
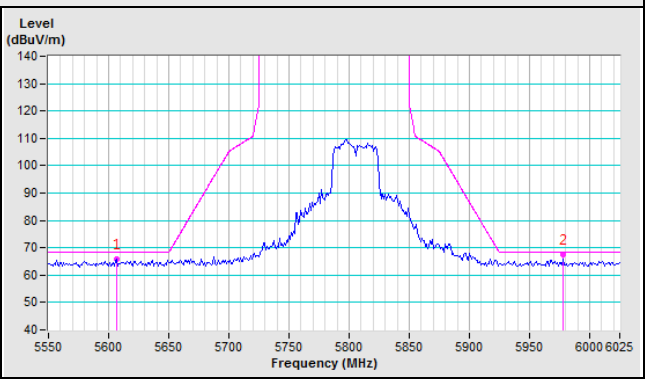
802.11a

Test Plots	
Horizontal	**Vertical**
Channel 149	
	
Channel 157	
	
Channel 165	
	

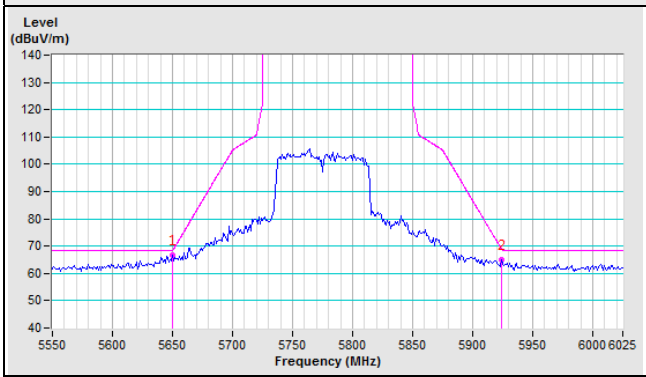
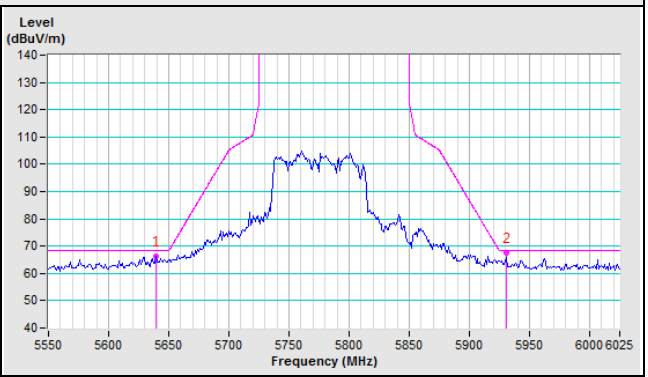
802.11n (20MHz)

Test Plots	
Horizontal	**Vertical**
Channel 149	
	
Channel 157	
	
Channel 165	
	

802.11n (40MHz)

Test Plots	
Horizontal	**Vertical**
Channel 151	
	
Channel 159	
	

802.11ac (80MHz)

Test Plots	
Horizontal	**Vertical**
Channel 155	
	

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:

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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
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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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