FCC Test Report

Report No.:	RF121015E01D-1
FCC ID:	Q87-WAP300N
Test Model:	WAP300N
Received Date:	Apr. 28, 2016
Test Date:	Apr. 28 to May 09, 2016
Issued Date:	July 28, 2016
Applicant:	LINKSYS LLC
Address:	121 Theory Drive, Irvine, CA 92617, USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.

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Report Issue History Record

Issue No.	Reason for Change	Date Issued
RF121015E01-1	Original	Aug. 09, 2013
RF121015E01C-1	Upgrade the standard to section 15.407 under new rule for U-NII-1, U-NII-3 band.	May 09, 2016
RF121015E01D-1	Upgrade the standard to section 15.407 under new rule (16-24) for U-NII-3 band.	July 28, 2016

Release Control Record

Issue No.	Description	Date Issued
RF121015E01D-1	Original release.	July 28, 2016

1 Certificate of Conformity

Product:	Selectable Dual-Band Wireless-N Access Point
Brand:	Linksys
Test Model:	WAP300N
Sample Status:	MASS-PRODUCTION
Applicant:	LINKSYS LLC
Test Date:	Apr. 28 to May 09, 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 : _____ , **Date:** July 28, 2016

Wendy Wu / Specialist

Approved by : _____ , **Date:** July 28, 2016

May Chen / 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) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -3.3dB at 11650.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is R-SMA not a standard connector.

*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	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.31 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.40 dB
	6GHz ~ 18GHz	3.73 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Selectable Dual-Band Wireless-N Access Point
Brand	Linksys
Test Model	WAP300N
Status of EUT	MASS-PRODUCTION
Driver version	4.0.1.0
Power Supply Rating	DC 12V from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a / g: up to 54Mbps 802.11n: up to 300Mbps
Operating Frequency	**2.4GHz:** 2.412GHz ~ 2.462GHz **5GHz:** 5.18GHz ~ 5.24GHz, 5.745GHz ~ 5.825GHz
Number of Channel	**2.4GHz:** 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40) **5GHz:** 9 for 802.11a, 802.11n (HT20) 4 for 802.11n (HT40)
Output Power	**2.4GHz:** 420.632mW **5GHz (5.18 ~ 5.24GHz):** 97.008mW **5GHz (5.745 ~ 5.825GHz):** 72.789mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x1
Data Cable Supplied	LAN cable (unshielded, 1.5m) x 1

Note:

1. This report is prepared for FCC Class II change. The difference compared with the Report No.: RF121015E01C-1 is as the following:
   - ◆ Upgrade the standard to section 15.407 under new rule (16-24) for U-NII-3 band.
2. According to above conditions, all test items of U-NII-3 band need to be performed, except for AC power conducted emission test item. And all data was verified to meet the requirements.
3. The EUT must be supplied with power adapter as following table:

Brand	Model No.	Spec.
HON-KWANG	HK-AP-120A050-US	Input: 100-240V, 0.2A, 50/60Hz Output: 12V, 0.5A DC output cable: unshielded, 1.5m

4. The antenna provided to the EUT, please refer to the following table:

Antenna Type	Gain (dBi) (Include cable loss)	Connector type	Frequency range (MHz to MHz)
Dipole	3.5	R-SMA	2400-2500 5150-5850

5. The EUT incorporates a MIMO function.

MODULATION MODE	Tx/Rx FUNCTION
802.11b	1Tx/2Rx
802.11g	1Tx/2Rx
802.11a	1Tx/2Rx
802.11n (HT20)	2Tx/2Rx
802.11n (HT40)	2Tx/2Rx

6. 2.4GHz and 5GHz technology cannot transmit at same time.
7. When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 15.
8. 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 5745 ~ 5825MHz:

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

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

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To			Description
	RE≥1G	RE<1G	APCM	
-	√	√	√	-

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

Radiated Emission Test (Above 1GHz):

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

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	13.5

Radiated Emission Test (Below 1GHz):

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

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (HT20)	5745-5825	149 to 165	149	OFDM	BPSK	6.5

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.

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	13.5

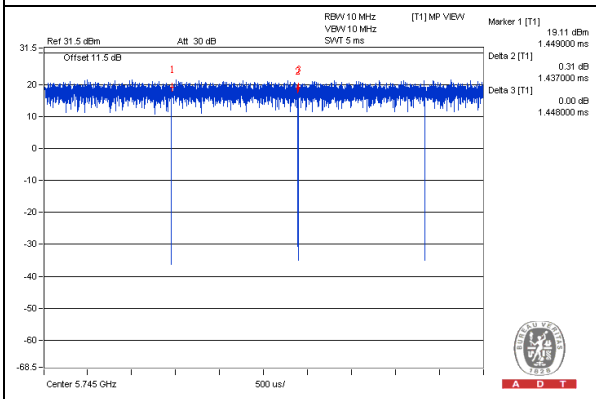
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	25deg. C, 64%RH	120Vac, 60Hz	Andy Ho
RE<1G	20deg. C, 67%RH	120Vac, 60Hz	Tim Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

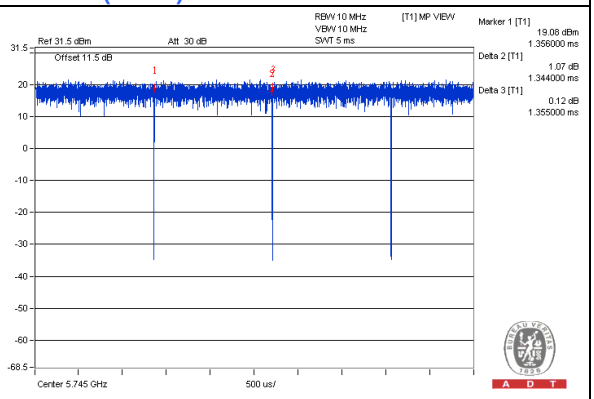
3.3 Duty Cycle of Test Signal

Duty cycle of test signal is ≥ 98 %, duty factor is not required.
802.11a: Duty cycle = 1.437 ms/1.448 ms = 0.992
802.11n (HT20): Duty cycle = 1.344 ms/1.355 ms = 0.992
802.11n (HT40): Duty cycle = 0.667 ms/0.674 ms = 0.99

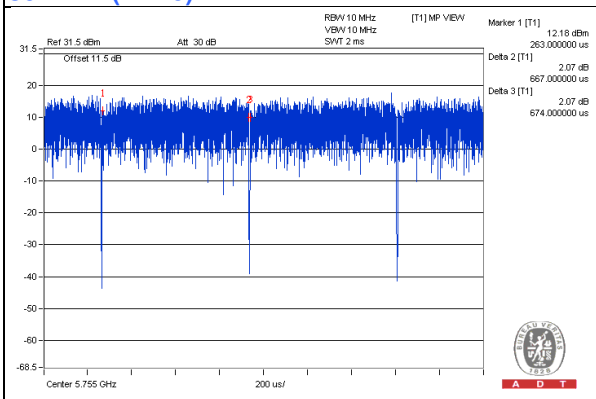
802.11a



802.11n (HT20)



802.11n (HT40)



3.4 Description of Support Units

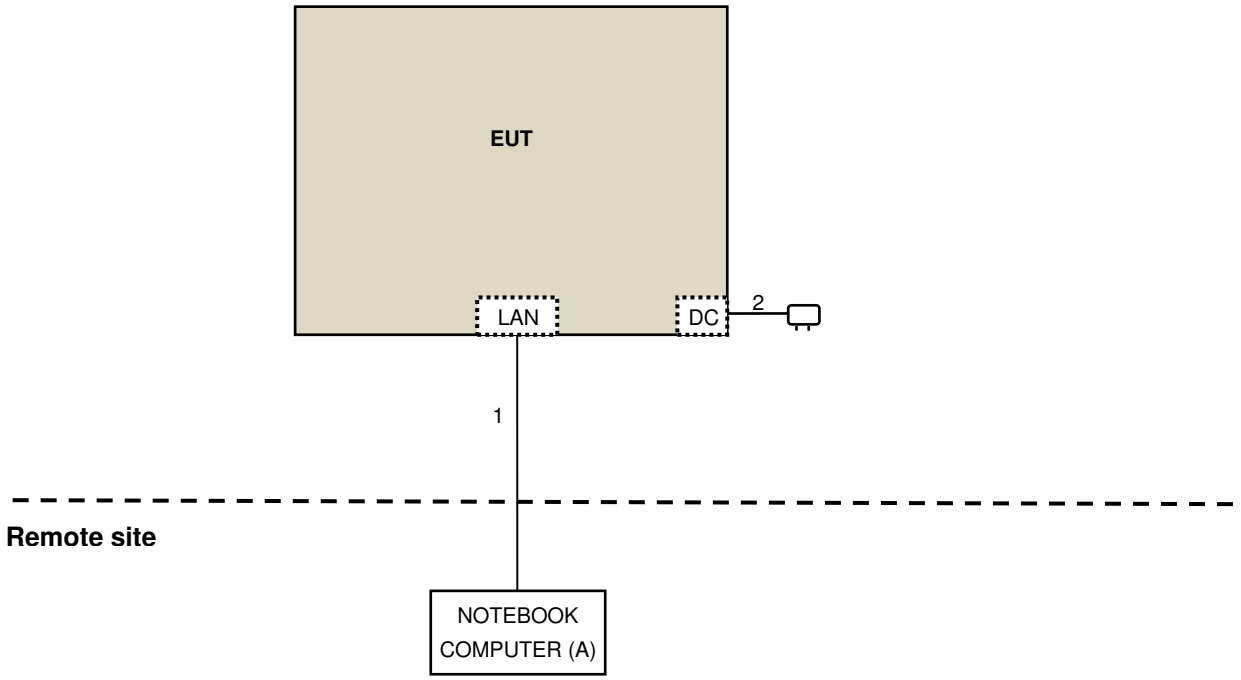
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	NOTEBOOK COMPUTER	DELL	E5430	4YV4VY1	FCC DoC	Provided by Lab

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 cable	1	10	No	0	Provided by Lab
2.	DC cable	1	1.5	No	0	Supplied by Client

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 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

<table>
<tr><td>Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td rowspan="2">789033 D02 General UNII Test Procedure New Rules v01r03</td><td colspan="2">FIELD STRENGTH at 3m</td></tr>
<tr><td>PK:74 (dBµV/m)</td><td>AV:54 (dBµV/m)</td></tr>
<tr><td>Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>15.407(b)(1)</td><td rowspan="3">PK:-27 (dBm/MHz)</td><td rowspan="3">PK:68.2(dBµV/m)</td></tr>
<tr><td>15.407(b)(2)</td></tr>
<tr><td>15.407(b)(3)</td></tr>
<tr><td>15.407(b)(4)(i)</td><td>PK:-27 (dBm/MHz) *1
PK:10 (dBm/MHz) *2
PK:15.6 (dBm/MHz) *3
PK:27 (dBm/MHz) *4</td><td>PK: 68.2(dBµV/m) *1
PK:105.2 (dBµV/m) *2
PK: 110.8(dBµV/m) *3
PK:122.2 (dBµV/m) *4</td></tr>
<tr><td rowspan="2">15.407(b)(4)(ii)</td><td colspan="2">FIELD STRENGTH at 3m / § 15.247(d),</td></tr>
<tr><td>PK:74 (dBµV/m)</td><td>AV:54 (dBµV/m)</td></tr>
<tr><td colspan="3">*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.</td></tr>
</table>

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
Test Receiver Agilent	N9038A	MY54450088	July 24, 2015	July 23, 2016
Pre-Amplifier(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 02, 2016	Apr. 01, 2017
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Jan. 19, 2016	Jan. 18, 2017
Pre-Amplifier Agilent	8449B	3008A01922	Sep. 19, 2015	Sep. 18, 2016
RF Cable	EMC104-SM-SM-2000 EMC104-SM-SM-5000 EMC104-SM-SM-5000	150318 150323 150324	Mar. 30, 2016	Mar. 29, 2017
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2016	Jan. 14, 2017
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Jan. 08, 2016	Jan. 07, 2017
RF Cable	SUCOFLEX 102	36432/2 36441/2	Jan. 16, 2016	Jan. 15, 2017
Software	ADT_Radiated_V8.7.07	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA
Spectrum Analyzer R&S	FSP40	100036	Jan. 27, 2016	Jan. 26, 2017
Power meter Anritsu	ML2495A	0824006	May 25, 2015	May 24, 2016
Power sensor Anritsu	MA2411B	0738172	May 25, 2015	May 24, 2016
Temperature & Humidity Chamber GIANTFORCE	GTH-150-40-SP-AR	MAA0812-008	Jan. 15, 2016	Jan. 14, 2017

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. 4.
4. The FCC Site Registration No. is 292998
5. The CANADA Site Registration No. is 20331-2
6. Tested Date: Apr. 28 to May 09, 2016

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:

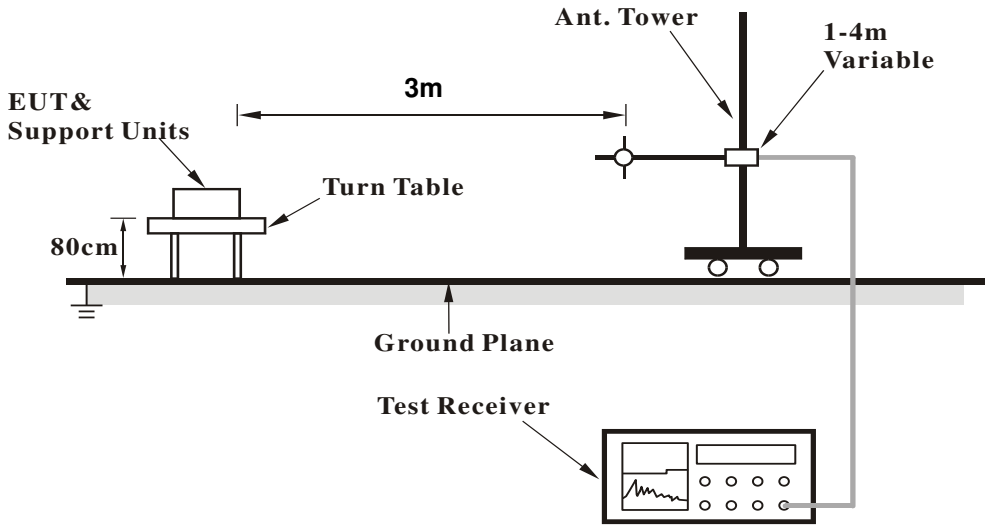
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

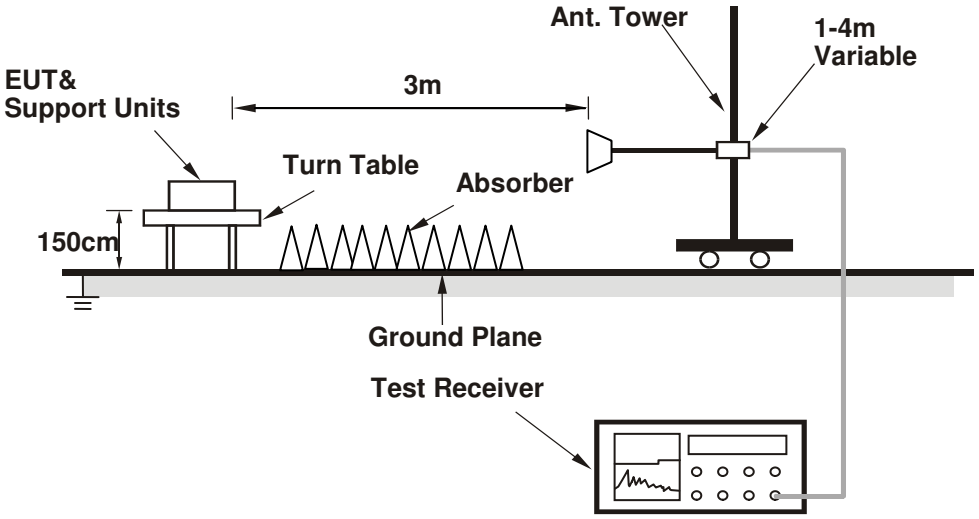
No deviation.

4.1.5 Test Setup

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Condition

1. Placed the EUT on testing table.
2. Connect the EUT with the support unit A (Notebook Computer) which is placed in a remote area.
3. The communication partner run test program “QA Tool[RT5x9xQA V1.0.7.6.exe]” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data:

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5655.19	58.6 PK	72.1	-13.5	1.45 H	214	54.47	4.08
2	*5745.00	106.0 PK			1.45 H	214	103.18	2.82
3	*5745.00	95.0 AV			1.45 H	214	92.18	2.82
4	#5911.65	57.1 PK	78.1	-20.9	1.45 H	214	52.82	4.32
5	11490.00	57.5 PK	74.0	-16.5	1.51 H	223	44.04	13.46
6	11490.00	43.4 AV	54.0	-10.6	1.51 H	223	29.94	13.46
7	#17235.00	55.4 PK	74.0	-18.6	1.56 H	302	36.95	18.45
8	#17235.00	42.2 AV	54.0	-11.8	1.56 H	302	23.75	18.45
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	#5678.32	61.9 PK	89.2	-27.3	1.93 V	189	57.75	4.13
2	*5745.00	110.4 PK			1.93 V	189	107.58	2.82
3	*5745.00	100.2 AV			1.93 V	189	97.38	2.82
4	#5905.13	59.2 PK	82.9	-23.7	1.93 V	189	54.84	4.31
5	11490.00	63.2 PK	74.0	-10.8	1.25 V	218	49.74	13.46
6	11490.00	49.4 AV	54.0	-4.6	1.25 V	218	35.94	13.46
7	#17235.00	61.0 PK	74.0	-13.0	2.14 V	311	42.55	18.45
8	#17235.00	46.5 AV	54.0	-7.5	2.14 V	311	28.05	18.45

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	#5653.48	58.9 PK	70.8	-11.9	1.41 H	209	54.79	4.08
2	*5785.00	105.5 PK			1.41 H	209	102.61	2.89
3	*5785.00	94.7 AV			1.41 H	209	91.81	2.89
4	#5917.96	57.1 PK	73.4	-16.3	1.41 H	209	52.78	4.33
5	11570.00	58.1 PK	74.0	-15.9	1.45 H	225	44.86	13.24
6	11570.00	44.8 AV	54.0	-9.2	1.45 H	225	31.56	13.24
7	#17355.00	56.8 PK	74.0	-17.2	1.58 H	316	37.70	19.10
8	#17355.00	43.2 AV	54.0	-10.8	1.58 H	316	24.10	19.10
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	#5657.04	59.7 PK	73.4	-13.7	1.96 V	208	55.63	4.08
2	*5785.00	111.2 PK			1.96 V	208	108.31	2.89
3	*5785.00	100.4 AV			1.96 V	208	97.51	2.89
4	#5925.30	58.4 PK	68.2	-9.8	1.96 V	208	54.04	4.35
5	11570.00	64.1 PK	74.0	-9.9	1.28 V	213	50.86	13.24
6	11570.00	50.5 AV	54.0	-3.5	1.28 V	213	37.26	13.24
7	#17355.00	61.8 PK	74.0	-12.2	2.09 V	324	42.70	19.10
8	#17355.00	47.8 AV	54.0	-6.2	2.09 V	324	28.70	19.10

REMARKS:

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

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK) 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	#5665.37	58.6 PK	79.6	-21.0	1.46 H	205	54.49	4.10
2	*5825.00	105.5 PK			1.46 H	205	102.56	2.94
3	*5825.00	94.7 AV			1.46 H	205	91.76	2.94
4	#5923.03	56.9 PK	69.7	-12.8	1.46 H	205	52.51	4.34
5	11650.00	57.7 PK	74.0	-16.3	1.44 H	216	44.49	13.21
6	11650.00	44.3 AV	54.0	-9.7	1.44 H	216	31.09	13.21
7	#17475.00	56.7 PK	74.0	-17.3	1.55 H	308	37.27	19.43
8	#17475.00	43.1 AV	54.0	-10.9	1.55 H	308	23.67	19.43
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5672.65	62.5 PK	85.0	-22.5	1.97 V	182	58.37	4.12
2	*5825.00	111.2 PK			1.97 V	182	108.26	2.94
3	*5825.00	100.4 AV			1.97 V	182	97.46	2.94
4	#5911.43	60.2 PK	78.2	-18.0	1.97 V	182	55.85	4.32
5	11650.00	64.5 PK	74.0	-9.5	1.25 V	222	51.29	13.21
6	**11650.00**	**50.7 AV**	**54.0**	**-3.3**	**1.25 V**	**222**	**37.49**	**13.21**
7	#17475.00	61.2 PK	74.0	-12.8	2.10 V	312	41.77	19.43
8	#17475.00	47.5 AV	54.0	-6.5	2.10 V	312	28.07	19.43

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	#5663.34	58.8 PK	78.1	-19.3	1.45 H	168	54.70	4.09
2	*5745.00	104.1 PK			1.45 H	168	101.28	2.82
3	*5745.00	94.4 AV			1.45 H	168	91.58	2.82
4	#5914.61	58.3 PK	75.9	-17.5	1.45 H	168	53.99	4.33
5	11490.00	57.2 PK	74.0	-16.8	1.35 H	188	43.74	13.46
6	11490.00	44.2 AV	54.0	-9.8	1.35 H	188	30.74	13.46
7	#17235.00	56.3 PK	74.0	-17.7	1.51 H	301	37.85	18.45
8	#17235.00	42.8 AV	54.0	-11.2	1.51 H	301	24.35	18.45
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	#5659.31	60.5 PK	75.1	-14.6	1.86 V	179	56.42	4.08
2	*5745.00	109.8 PK			1.86 V	179	106.98	2.82
3	*5745.00	100.1 AV			1.86 V	179	97.28	2.82
4	#5928.36	59.3 PK	68.2	-8.9	1.86 V	179	54.99	4.35
5	11490.00	62.0 PK	74.0	-12.0	3.18 V	266	48.54	13.46
6	11490.00	47.1 AV	54.0	-6.9	3.18 V	266	33.64	13.46
7	#17235.00	63.5 PK	74.0	-10.5	3.30 V	131	45.05	18.45
8	#17235.00	50.4 AV	54.0	-3.6	3.30 V	131	31.95	18.45

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	#5662.66	54.8 PK	77.6	-22.8	1.43 H	210	50.67	4.09
2	*5785.00	104.1 PK			1.43 H	210	101.21	2.89
3	*5785.00	93.9 AV			1.43 H	210	91.01	2.89
4	#5914.14	53.0 PK	76.2	-23.2	1.43 H	210	48.67	4.33
5	11570.00	57.9 PK	74.0	-16.1	1.41 H	193	44.66	13.24
6	11570.00	44.6 AV	54.0	-9.4	1.41 H	193	31.36	13.24
7	#17355.00	56.6 PK	74.0	-17.4	1.46 H	305	37.50	19.10
8	#17355.00	42.8 AV	54.0	-11.2	1.46 H	305	23.70	19.10
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	#5651.52	60.2 PK	69.3	-9.1	1.92 V	175	56.14	4.07
2	*5785.00	108.8 PK			1.92 V	175	105.91	2.89
3	*5785.00	99.5 AV			1.92 V	175	96.61	2.89
4	#5927.93	58.3 PK	68.2	-9.9	1.92 V	175	53.97	4.35
5	11570.00	61.9 PK	74.0	-12.1	3.13 V	260	48.66	13.24
6	11570.00	46.9 AV	54.0	-7.1	3.13 V	260	33.66	13.24
7	#17355.00	63.5 PK	74.0	-10.5	3.33 V	135	44.40	19.10
8	#17355.00	50.2 AV	54.0	-3.8	3.33 V	135	31.10	19.10

REMARKS:

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

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK) 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	#5665.00	55.6 PK	79.3	-23.7	1.49 H	204	51.51	4.10
2	*5825.00	103.2 PK			1.49 H	204	100.26	2.94
3	*5825.00	93.3 AV			1.49 H	204	90.36	2.94
4	#5914.47	52.4 PK	76.0	-23.6	1.49 H	204	48.04	4.33
5	11650.00	57.8 PK	74.0	-16.2	1.38 H	195	44.59	13.21
6	11650.00	44.5 AV	54.0	-9.5	1.38 H	195	31.29	13.21
7	#17475.00	56.9 PK	74.0	-17.1	1.52 H	303	37.47	19.43
8	#17475.00	43.3 AV	54.0	-10.7	1.52 H	303	23.87	19.43
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	#5671.09	61.7 PK	83.9	-22.1	1.92 V	175	57.63	4.11
2	*5825.00	108.9 PK			1.92 V	175	105.96	2.94
3	*5825.00	99.0 AV			1.92 V	175	96.06	2.94
4	#5916.01	58.4 PK	74.8	-16.5	1.92 V	175	54.05	4.33
5	11650.00	59.1 PK	74.0	-14.9	1.03 V	212	45.89	13.21
6	11650.00	46.2 AV	54.0	-7.8	1.03 V	212	32.99	13.21
7	#17475.00	56.4 PK	74.0	-17.6	1.38 V	149	36.97	19.43
8	#17475.00	44.2 AV	54.0	-9.8	1.38 V	149	24.77	19.43

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.

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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	#5671.81	59.0 PK	84.4	-25.4	1.50 H	219	54.90	4.11
2	*5755.00	100.2 PK			1.50 H	219	97.36	2.84
3	*5755.00	91.1 AV			1.50 H	219	88.26	2.84
4	#5916.01	54.3 PK	74.8	-20.5	1.50 H	219	50.01	4.33
5	11510.00	55.6 PK	74.0	-18.4	1.49 H	185	42.17	13.43
6	11510.00	41.6 AV	54.0	-12.4	1.49 H	185	28.17	13.43
7	#17265.00	53.7 PK	74.0	-20.3	1.46 H	297	35.14	18.56
8	#17265.00	40.1 AV	54.0	-13.9	1.46 H	297	21.54	18.56
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	#5653.36	61.8 PK	70.7	-8.9	1.94 V	169	57.76	4.08
2	#5672.87	63.4 PK	85.2	-21.8	1.94 V	169	59.24	4.12
3	*5755.00	105.9 PK			1.94 V	169	103.06	2.84
4	*5755.00	96.8 AV			1.94 V	169	93.96	2.84
5	#5907.94	58.4 PK	80.8	-22.4	1.94 V	169	54.06	4.32
6	11510.00	56.6 PK	74.0	-17.4	1.05 V	231	43.17	13.43
7	11510.00	43.2 AV	54.0	-10.8	1.05 V	231	29.77	13.43
8	#17265.00	53.6 PK	74.0	-20.4	1.42 V	153	35.04	18.56
9	#17265.00	41.4 AV	54.0	-12.6	1.42 V	153	22.84	18.56

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	#5659.33	57.8 PK	75.1	-17.3	1.50 H	219	53.74	4.08
2	*5795.00	99.1 PK			1.50 H	219	96.18	2.92
3	*5795.00	90.1 AV			1.50 H	219	87.18	2.92
4	#5909.60	54.7 PK	79.6	-24.9	1.50 H	219	50.39	4.32
5	11590.00	55.7 PK	74.0	-18.3	1.51 H	192	42.52	13.18
6	11590.00	42.2 AV	54.0	-11.8	1.51 H	192	29.02	13.18
7	#17385.00	54.6 PK	74.0	-19.4	1.48 H	311	35.28	19.32
8	#17385.00	41.0 AV	54.0	-13.0	1.48 H	311	21.68	19.32
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	#5664.33	61.1 PK	78.8	-17.8	1.79 V	183	56.98	4.10
2	*5795.00	104.8 PK			1.79 V	183	101.88	2.92
3	*5795.00	95.8 AV			1.79 V	183	92.88	2.92
4	#5902.65	59.8 PK	84.7	-24.9	1.79 V	183	55.45	4.31
5	11590.00	58.0 PK	74.0	-16.0	1.02 V	217	44.82	13.18
6	11590.00	44.7 AV	54.0	-9.3	1.02 V	217	31.52	13.18
7	#17385.00	54.6 PK	74.0	-19.4	1.39 V	131	35.28	19.32
8	#17385.00	42.4 AV	54.0	-11.6	1.39 V	131	23.08	19.32

REMARKS:

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

Below 1GHz Data:

802.11n (HT20)

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	below 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	106.63	26.5 QP	43.5	-17.0	2.45 H	273	43.46	-16.92
2	125.12	28.1 QP	43.5	-15.4	1.43 H	76	43.28	-15.17
3	186.11	30.6 QP	43.5	-12.9	1.91 H	242	45.97	-15.41
4	249.94	35.2 QP	46.0	-10.8	1.09 H	307	49.58	-14.42
5	320.13	34.8 QP	46.0	-11.2	1.11 H	53	46.67	-11.90
6	749.93	37.1 QP	46.0	-8.9	1.10 H	354	39.80	-2.67
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	51.73	34.8 QP	40.0	-5.2	1.00 V	167	43.76	-8.93
2	66.23	33.7 QP	40.0	-6.3	1.00 V	252	43.87	-10.15
3	82.83	26.1 QP	40.0	-13.9	1.50 V	352	40.32	-14.20
4	124.85	31.1 QP	43.5	-12.4	1.00 V	338	41.42	-10.30
5	250.11	33.2 QP	46.0	-12.8	2.00 V	312	43.06	-9.84
6	874.88	35.7 QP	46.0	-10.4	1.00 V	24	32.27	3.38

REMARKS:

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

4.2 Transmit Power Measurment

4.2.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p ≦ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
		Mobile and Portable client device	250mW (24 dBm)
U-NII-2A			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√		1 Watt (30 dBm)

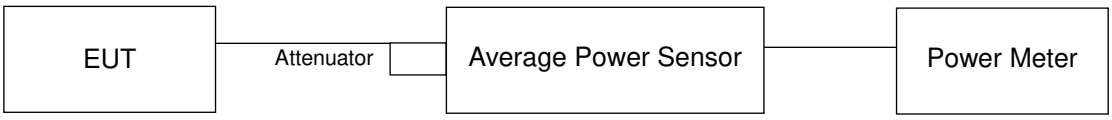
*B is the 26 dB emission bandwidth in megahertz

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

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Condition

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

4.2.7 Test Result

802.11a

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
149	5745	65.464	18.16	30	Pass
157	5785	67.764	18.31	30	Pass
165	5825	62.087	17.93	30	Pass

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Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	15.96	15.23	72.789	18.62	30	Pass
157	5785	15.73	15.41	72.165	18.58	30	Pass
165	5825	14.68	14.42	57.045	17.56	30	Pass

802.11n (HT40)

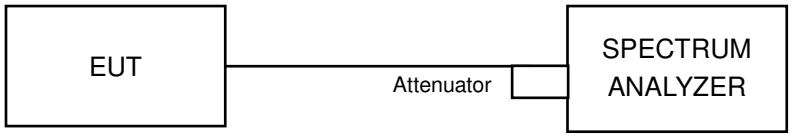
Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
151	5755	15.42	15.00	66.457	18.23	30	Pass
159	5795	15.38	14.92	65.56	18.17	30	Pass

4.3 Peak Power Spectral Density Measurement

4.3.1 Limits of Peak Power Spectral Density Measurement

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

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

Same as Item 4.3.6.

4.3.7 Test Results

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
149	5745	-2.69	-0.47	30	Pass
157	5785	-2.77	-0.55	30	Pass
165	5825	-2.73	-0.51	30	Pass

802.11n (HT20)

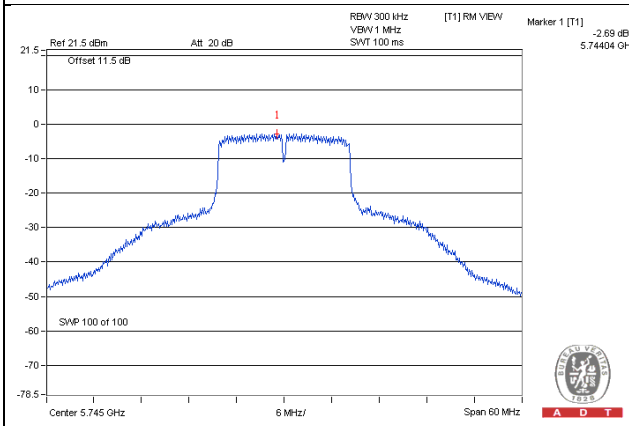
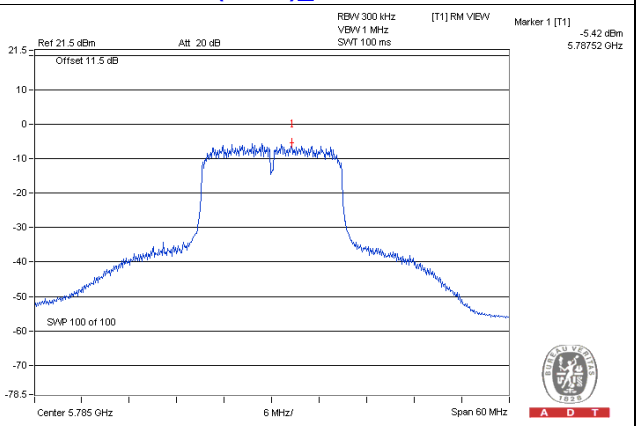
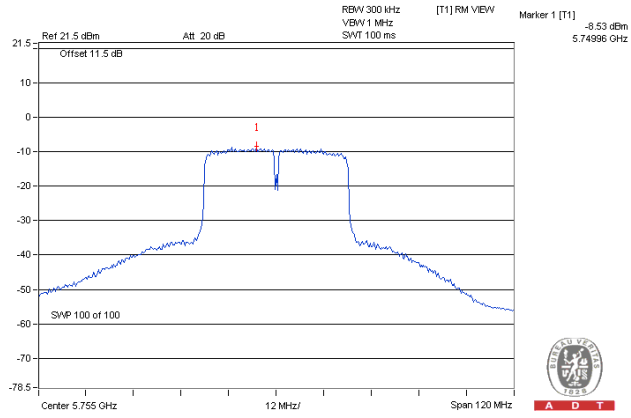
TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	149	5745	-5.65	-3.43	3.01	-0.42	29.49	Pass
	157	5785	-6.59	-4.37	3.01	-1.36	29.49	Pass
	165	5825	-7.34	-5.12	3.01	-2.11	29.49	Pass
1	149	5745	-5.45	-3.23	3.01	-0.22	29.49	Pass
	157	5785	-5.42	-3.20	3.01	-0.19	29.49	Pass
	165	5825	-7.36	-5.14	3.01	-2.13	29.49	Pass

Note: 1. Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi, therefore the limit needs to reduce, so the power density limit shall be reduced to 30-(6.51-6) = 29.49dBm.

802.11n (HT40)

TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	151	5755	-8.53	-6.31	3.01	-3.30	29.49	Pass
	159	5795	-9.41	-7.19	3.01	-4.18	29.49	Pass
1	151	5755	-9.13	-6.91	3.01	-3.90	29.49	Pass
	159	5795	-10.48	-8.26	3.01	-5.25	29.49	Pass

Note: 1. Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi, therefore the limit needs to reduce, so the power density limit shall be reduced to 30-(6.51-6) = 29.49dBm.

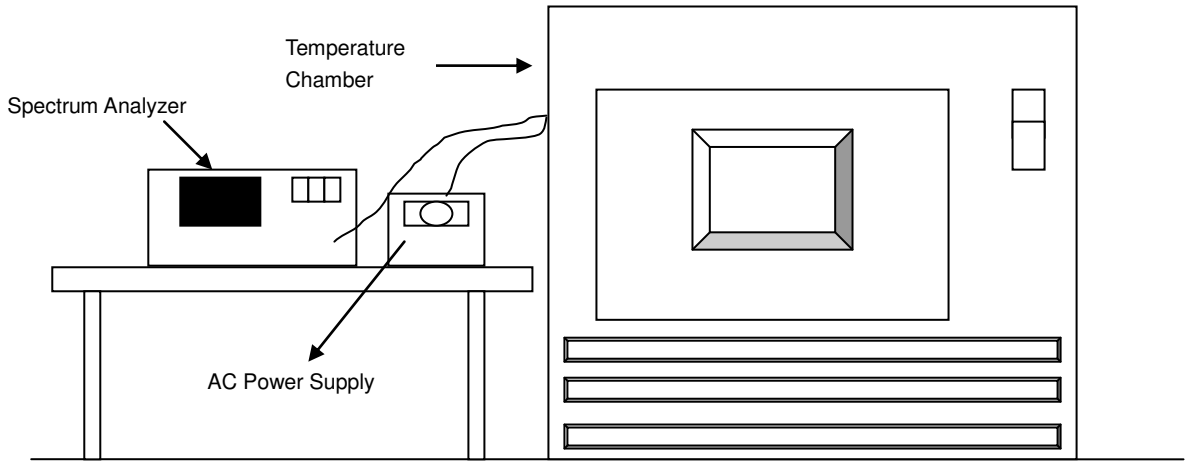
Spectrum Plot of Worst Value	
802.11a / CH149	**802.11n (HT20)_Chain 1 / CH157**
	
802.11n (HT40) _Chain 0 / CH151	
	

4.4 Frequency Stability Measurement

4.4.1 Limits of Frequency Stability Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedure

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.
.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Condition

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

4.4.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5745 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	120	5745.008	Pass	5745.0092	Pass	5745.0106	Pass	5745.0129	Pass
40	120	5744.9843	Pass	5744.9858	Pass	5744.9888	Pass	5744.9857	Pass
30	120	5745.0232	Pass	5745.0262	Pass	5745.0245	Pass	5745.026	Pass
20	120	5744.9875	Pass	5744.9856	Pass	5744.988	Pass	5744.987	Pass
10	120	5744.9822	Pass	5744.9831	Pass	5744.9827	Pass	5744.9869	Pass
0	120	5744.9841	Pass	5744.9833	Pass	5744.9837	Pass	5744.9875	Pass
-10	120	5744.9989	Pass	5745.0007	Pass	5744.9993	Pass	5744.9984	Pass
-20	120	5745.0178	Pass	5745.017	Pass	5745.02	Pass	5745.0173	Pass
-30	120	5744.9793	Pass	5744.978	Pass	5744.9784	Pass	5744.9806	Pass

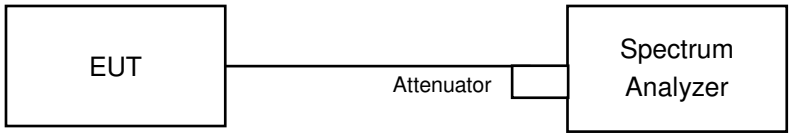
Frequency Stability Versus Voltage									
Operating Frequency: 5745 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5744.9878	Pass	5744.9855	Pass	5744.9888	Pass	5744.9873	Pass
	120	5744.9875	Pass	5744.9856	Pass	5744.988	Pass	5744.987	Pass
	102	5744.9865	Pass	5744.9864	Pass	5744.9877	Pass	5744.986	Pass

4.5 6dB Bandwidth Measurment

4.5.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

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

4.5.7 Test Results

802.11a

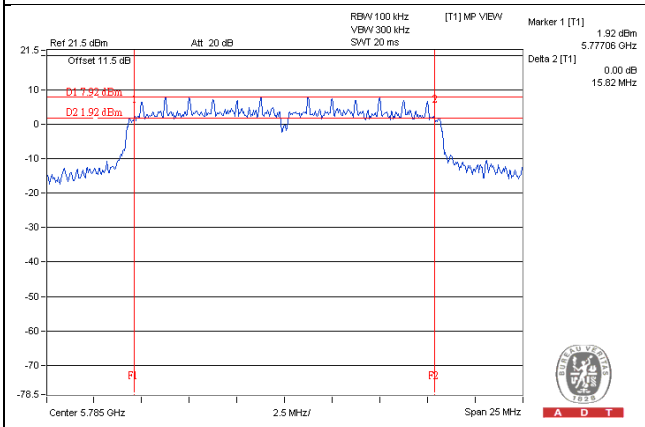
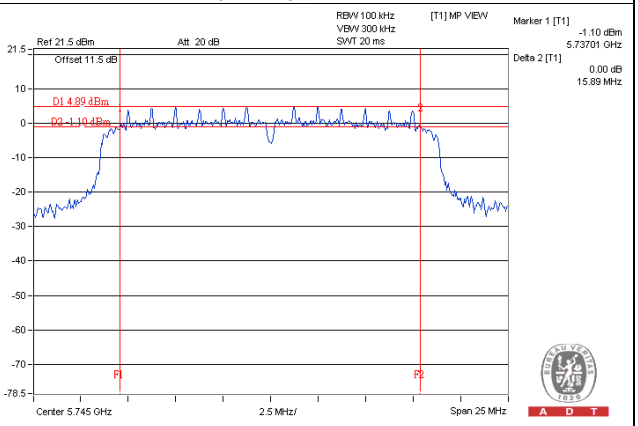
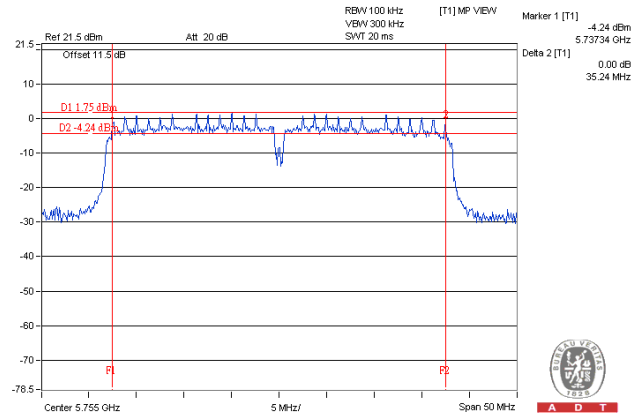
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	15.89	0.5	Pass
157	5785	15.82	0.5	Pass
165	5825	15.92	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.10	15.89	0.5	Pass
157	5785	16.17	17.24	0.5	Pass
165	5825	16.42	15.96	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.27	35.24	0.5	Pass
159	5795	35.26	35.24	0.5	Pass

Spectrum Plot of Worst Value	
802.11a / CH157	**802.11n (HT20)_Chain 1 / CH149**
	
802.11n (HT40) _Chain 1 / CH151	
	

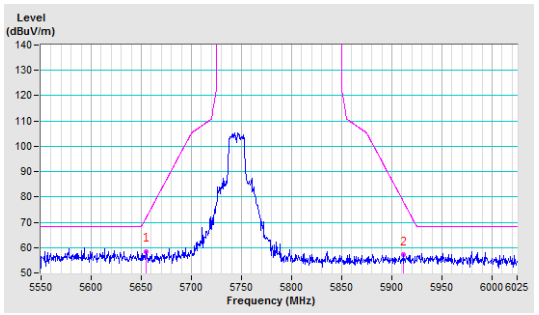
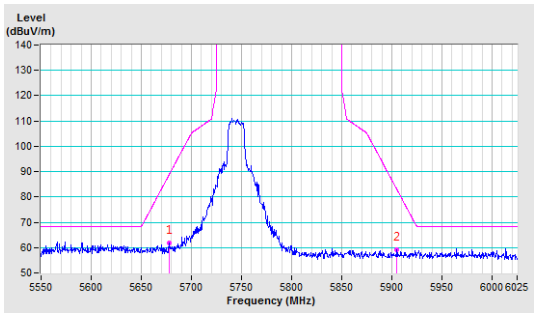
5 Pictures of Test Arrangements

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

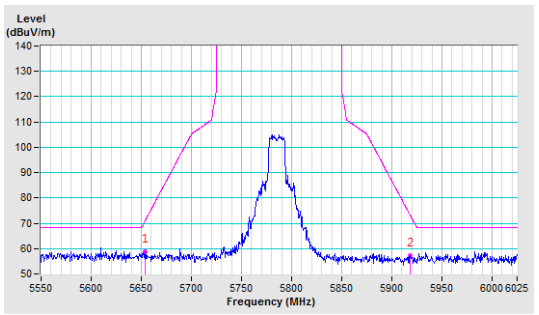
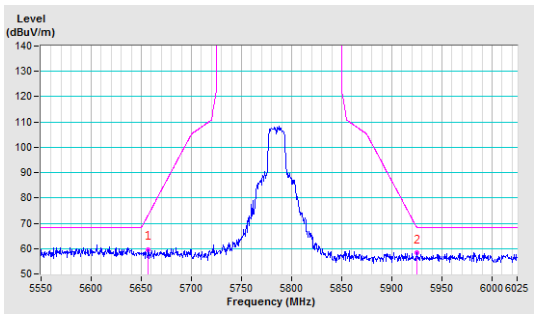
Annex A- Radiated Out of Band Emisison (OOBE) Measurement (For U-NII-3 band)

802.11a

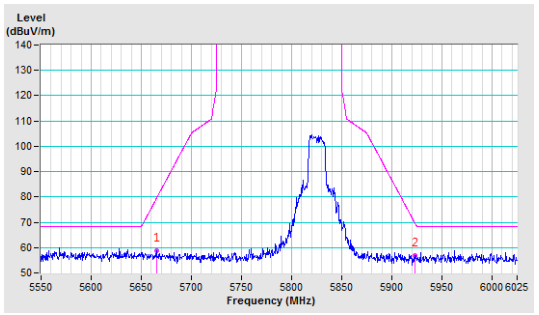
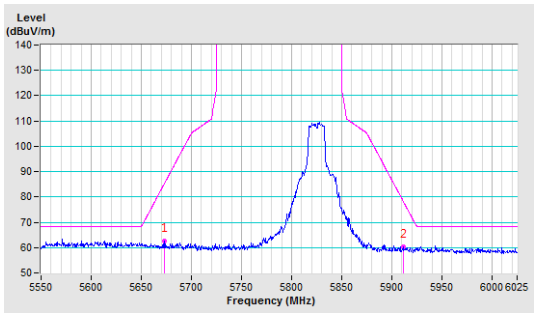
CH 149 5745 MHz

Horiontal	Vertical
	

CH 157 5785 MHz

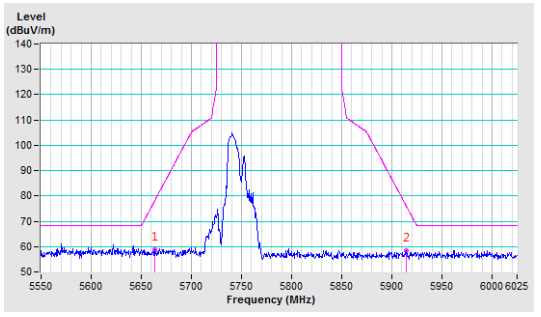
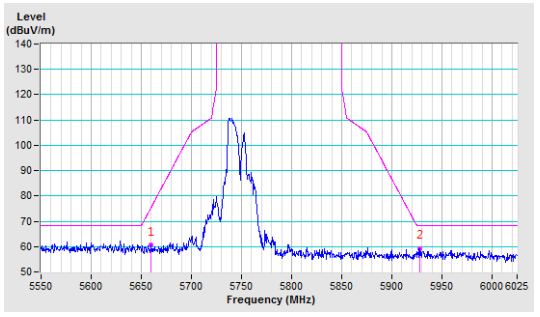
Horiontal	Vertical
	

CH 165 5825 MHz

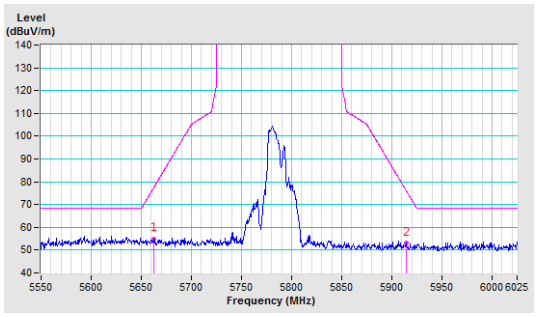
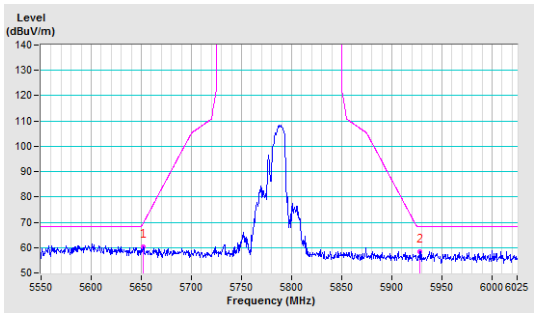
Horiontal	Vertical
	

802.11n (HT20)

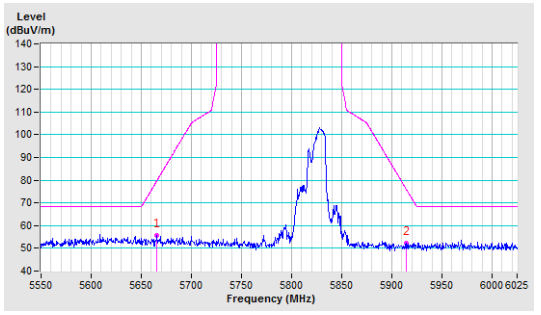
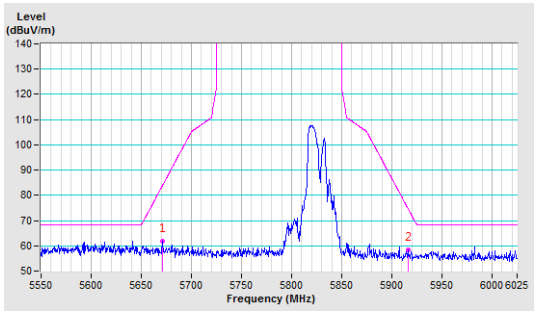
CH 149 5745 MHz

Horiontal	Vertical
	

CH 157 5785 MHz

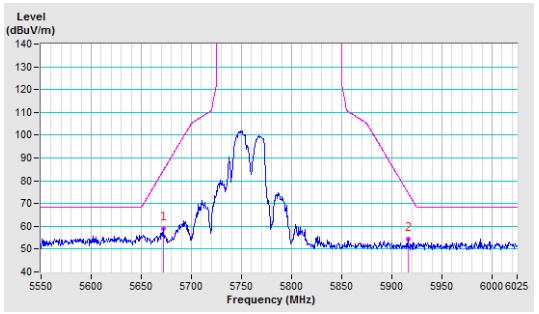
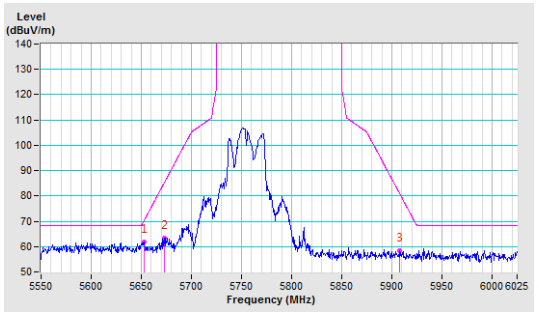
Horiontal	Vertical
	

CH 165 5825 MHz

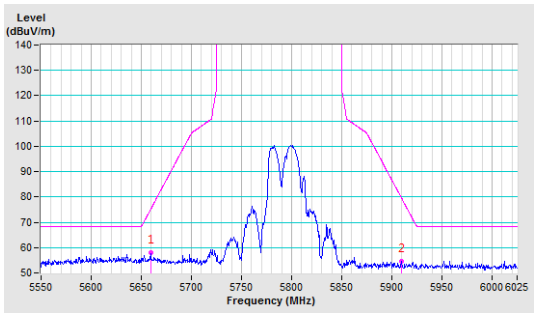
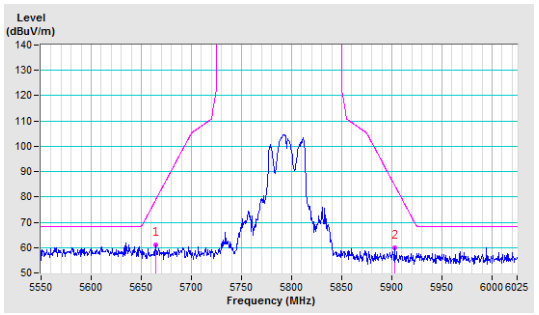
Horiontal	Vertical
	

802.11n (HT40)

CH 151 5755 MHz

Horiontal	Vertical
	

CH 159 5795 MHz

Horiontal	Vertical
	

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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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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