

FCC Test Report

Report No.: RF160218C04-1

FCC ID: TE7WR902AC

Test Model: TL-WR902AC

Received Date: Feb. 18, 2016

Test Date: Mar. 07 ~ Apr. 20, 2016

Issued Date: Apr. 25, 2016

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Release Control Record

Issue No.	Description	Date Issued
RF160218C04-1	Original release	Apr. 25, 2016

1 Certificate of Conformity

Product: AC750 Wireless Travel Router

Brand: TP-LINK

Test Model: TL-WR902AC

Sample Status: Prototype

Applicant: TP-LINK TECHNOLOGIES CO., LTD.

Test Date: Mar. 07 ~ Apr. 20, 2016

Standards: 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 : Celine Chou , **Date:** Apr. 25, 2016
Celine Chou / Specialist

Approved by : Ken Liu , **Date:** Apr. 25, 2016
Ken Liu / Senior Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -6.99dB at 0.28741MHz.
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 10360.00MHz, 10400.00MHz, 10480.00MHz and 11490.00MHz.
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 Weld not a standard connector.

*For U-NII-3 band compliance with rule part 15.407(b)(i), the OOB 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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.63 dB
	200MHz ~ 1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AC750 Wireless Travel Router
Brand	TP-LINK
Test Model	TL-WR902AC
Status of EUT	Prototype
Power Supply Rating	5Vdc (Adapter)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 150.0Mbps 802.11ac: up to 433.3Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (20MHz), 802.11ac (20MHz) 2 for 802.11n (40MHz), 802.11ac (40MHz) 1 for 802.11ac (80MHz) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (20MHz), 802.11ac (20MHz) 2 for 802.11n (40MHz), 802.11ac (40MHz) 1 for 802.11ac (80MHz)
Output Power	5180 ~ 5240MHz: 57.412mW 5745 ~ 5825MHz: 65.917mW
Antenna Type	5180 ~ 5240MHz: Monopole antenna with 3.75dBi gain 5745 ~ 5825MHz: Monopole antenna with 2.98dBi gain
Antenna Connector	Weld
Accessory Device	Adapter
Data Cable Supplied	0.75m non-shielded USB cable without core

Note:

- The EUT provides 1 completed transmitter and 1 receiver.

Modulation Mode	TX Function
802.11a	1TX
802.11n (20MHz)	1TX
802.11n (40MHz)	1TX
802.11ac (20MHz)	1TX
802.11ac (40MHz)	1TX
802.11ac (80MHz)	1TX

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

- The EUT consumes power from the following adapter.

Brand	AMIGO
Model	AMS135-0502000FU
Input Power	100-240Vac, 50/60Hz, 0.5A
Output Power	5Vdc, 2A

3.2 Description of Test Modes

For 5180 ~ 5240MHz

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

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

2 channels are provided for 802.11n (40MHz), 802.11ac (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 & Bandedge Measurement
RE<1G: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission
APCM: Antenna Port Conducted Measurement

Note:

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

Radiated Emission Test (Above 1GHz):

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	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	13.5
-	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	13.5
-	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
	802.11a	5745-5825	149 to 165		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
	802.11a	5745-5825	149 to 165		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	13.5
-	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	13.5
-	802.11ac (80MHz)		155	155	OFDM	BPSK	29.3

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	22deg. C, 66%RH	120Vac, 60Hz	Tank Wu
RE<1G	22deg. C, 66%RH	120Vac, 60Hz	Bayu Chen
PLC	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui
APCM	25deg. C, 60%RH	120Vac, 60Hz	Leo Tsai

3.3 Duty Cycle of Test Signal

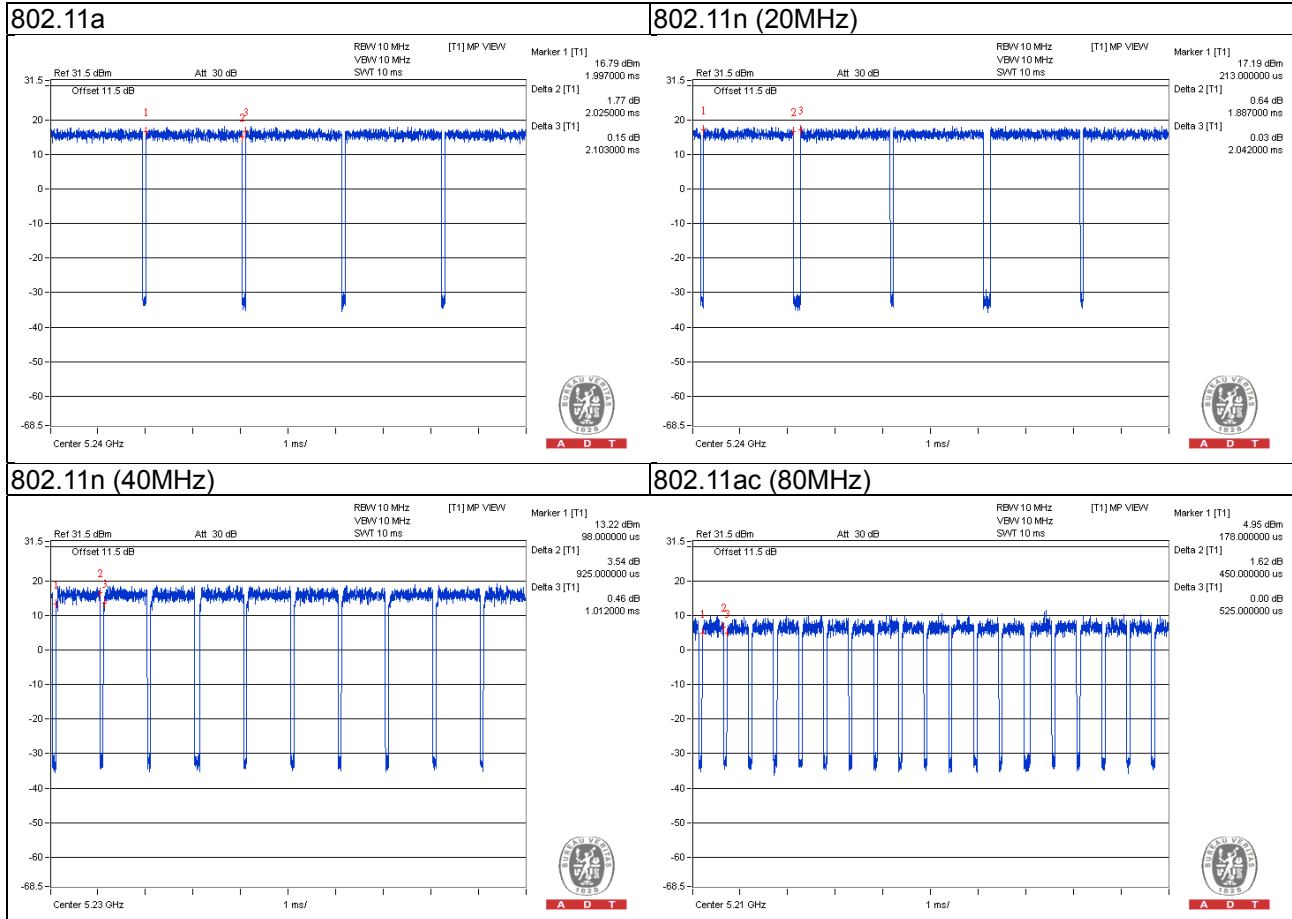
Duty cycle of test signal is < 98 %, duty factor is required.

802.11a: Duty cycle = 2.025/2.103 = 0.963, Duty factor = $10 * \log(1/0.963) = 0.16$

802.11n (20MHz): Duty cycle = 1.887/2.042 = 0.924, Duty factor = $10 * \log(1/0.924) = 0.34$

802.11n (40MHz): Duty cycle = 0.925/1.012 = 0.914, Duty factor = $10 * \log(1/0.914) = 0.39$

802.11ac (80MHz): Duty cycle = 0.450/0.525 = 0.857, Duty factor = $10 * \log(1/0.857) = 0.67$



3.4 Description of Support Units

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

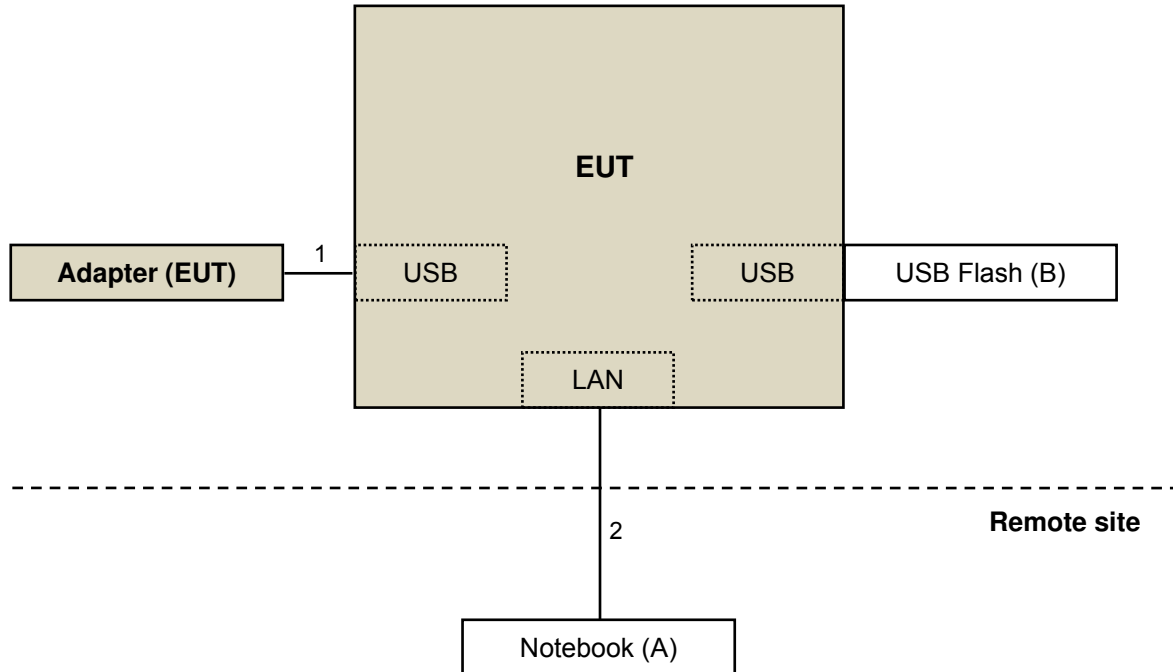
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	V3560D	HGZ5RX1	FCC DoC Approved	-
B.	USB Flash	HP	v250W	01	FCC DoC Approved	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB cable	1	0.75	N	0	Accessory of EUT
2.	RJ45 cable	1	3	N	0	Cat5e

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart E (15.407)

789033 D02 General UNII Test Procedures New Rules v01r02

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 Procedures 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:

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



4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Dec. 23, 2015	Dec. 22, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Apr. 19, 2015	Apr. 18, 2016
			Apr. 19, 2016	Apr. 18, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Jan. 18, 2016	Jan. 17, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Jan. 08, 2016	Jan. 07, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Jan. 18, 2016	Jan. 17, 2017
Preamplifier Agilent	8449B	3008A01911	Aug. 09, 2015	Aug. 08, 2016
Preamplifier Agilent	8447D	2944A10638	Aug. 09, 2015	Aug. 08, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-02(309222 +248780)	Aug. 09, 2015	Aug. 08, 2016
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-03(274092)	Aug. 09, 2015	Aug. 08, 2016
RF signal cable Woken	8D-FB	Cable-CH9-01	Aug. 11, 2015	Aug. 10, 2016
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2015	Oct. 17, 2016
High Speed Peak Power Meter	ML2495A	0824011	Jul. 09, 2015	Jul. 08, 2016
Power Sensor	MA2411B	0738171	Jul. 09, 2015	Jul. 08, 2016
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 08, 2015	Jun. 07, 2016

- Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 9.
 3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Site Registration No. is 215374.
 5. The IC Site Registration No. is IC 7450F-9.

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

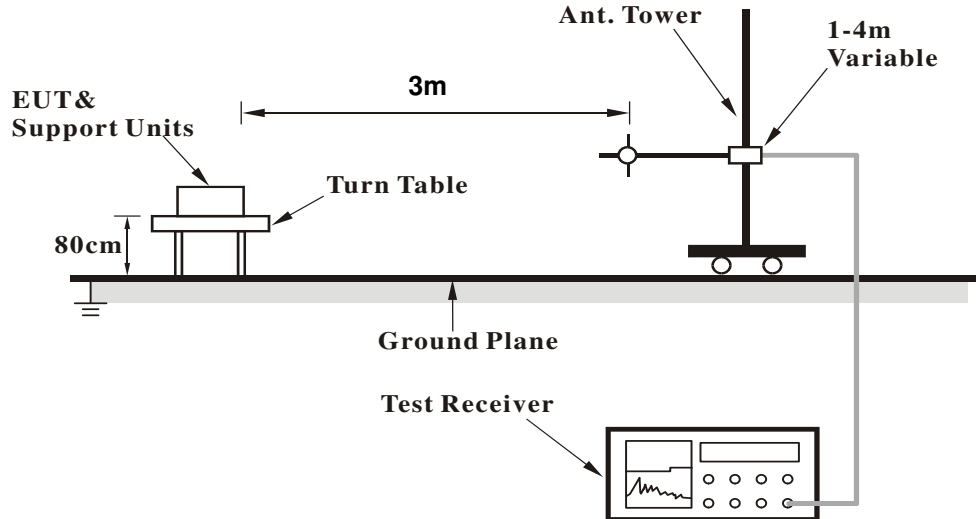
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

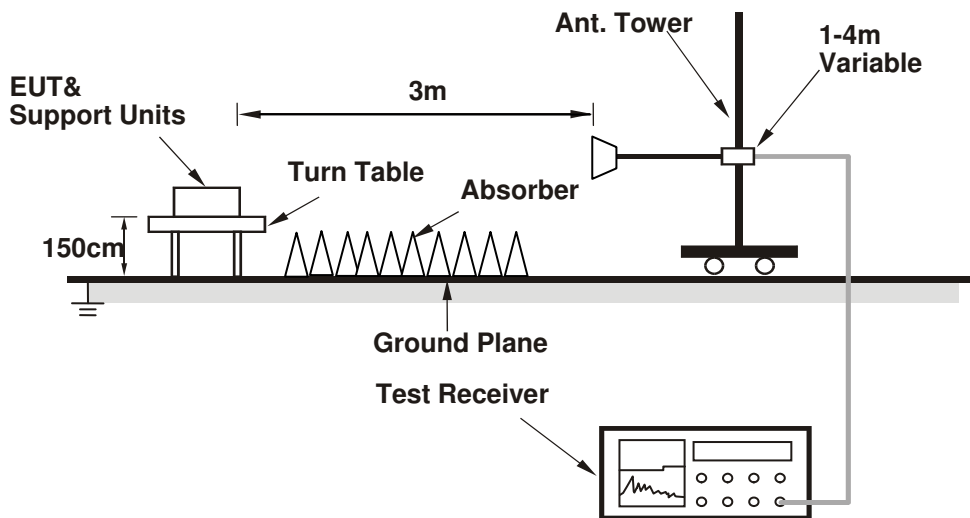
No deviation.

4.1.5 Test Set Up

<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 Conditions

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

4.1.7 Test Results

Above 1GHz Worst-Case Data:

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#3453.00	48.4 PK	74.0	-25.6	1.01 H	188	47.20	1.20
2	#3453.00	40.0 AV	54.0	-14.0	1.01 H	188	38.80	1.20
3	5150.00	58.9 PK	74.0	-15.1	1.32 H	332	54.30	4.60
4	5150.00	45.8 AV	54.0	-8.2	1.32 H	332	41.20	4.60
5	*5180.00	103.9 PK			1.32 H	332	61.70	42.20
6	*5180.00	93.4 AV			1.32 H	332	51.20	42.20
7	#10360.00	64.1 PK	68.2	-4.1	1.00 H	247	48.30	15.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#3453.00	48.3 PK	74.0	-25.7	1.26 V	185	47.10	1.20
2	#3453.00	38.9 AV	54.0	-15.1	1.26 V	185	37.70	1.20
3	5150.00	60.0 PK	74.0	-14.0	2.24 V	304	55.40	4.60
4	5150.00	45.9 AV	54.0	-8.1	2.24 V	304	41.30	4.60
5	*5180.00	99.2 PK			2.24 V	304	57.00	42.20
6	*5180.00	88.9 AV			2.24 V	304	46.70	42.20
7	#10360.00	67.9 PK	68.2	-0.3	1.13 V	166	52.10	15.80

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#3466.00	48.8 PK	74.0	-25.2	1.15 H	189	47.60	1.20
2	#3466.00	39.5 AV	54.0	-14.5	1.15 H	189	38.30	1.20
3	*5200.00	105.1 PK			1.32 H	306	62.90	42.20
4	*5200.00	94.8 AV			1.32 H	306	52.60	42.20
5	#10400.00	62.9 PK	74.0	-11.1	1.00 H	202	47.00	15.90
6	#10400.00	50.1 AV	54.0	-3.9	1.00 H	202	34.20	15.90

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#3466.00	48.2 PK	74.0	-25.8	1.37 V	185	47.00	1.20
2	#3466.00	39.2 AV	54.0	-14.8	1.37 V	185	38.00	1.20
3	*5200.00	102.3 PK			1.02 V	191	60.10	42.20
4	*5200.00	92.2 AV			1.02 V	191	50.00	42.20
5	#10400.00	68.2 PK	74.0	-5.8	1.02 V	161	52.30	15.90
6	#10400.00	53.6 AV	54.0	-0.4	1.02 V	161	37.70	15.90

Remarks:

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

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#3493.00	48.0 PK	74.0	-26.0	1.44 H	189	46.90	1.10
2	#3493.00	39.1 AV	54.0	-14.9	1.44 H	189	38.00	1.10
3	*5240.00	106.8 PK			1.72 H	329	64.50	42.30
4	*5240.00	96.5 AV			1.72 H	329	54.20	42.30
5	5350.00	59.0 PK	74.0	-15.0	1.72 H	329	54.20	4.80
6	5350.00	46.1 AV	54.0	-7.9	1.72 H	329	41.30	4.80
7	#10480.00	63.4 PK	74.0	-10.6	1.15 H	202	47.20	16.20
8	#10480.00	49.4 AV	54.0	-4.6	1.15 H	202	33.20	16.20

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#3493.00	47.9 PK	74.0	-26.1	1.46 V	189	46.80	1.10
2	#3493.00	39.3 AV	54.0	-14.7	1.46 V	189	38.20	1.10
3	*5240.00	102.8 PK			1.12 V	191	60.50	42.30
4	*5240.00	92.8 AV			1.12 V	191	50.50	42.30
5	5350.00	59.4 PK	74.0	-14.6	1.12 V	191	54.60	4.80
6	5350.00	46.0 AV	54.0	-8.0	1.12 V	191	41.20	4.80
7	#10480.00	68.5 PK	74.0	-5.5	1.04 V	164	52.30	16.20
8	#10480.00	53.8 AV	54.0	-0.2	1.04 V	164	37.60	16.20

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5640.00	59.4 PK	68.2	-8.8	1.00 H	300	54.40	5.00
2	*5745.00	103.3 PK			1.00 H	300	60.50	42.80
3	*5745.00	92.6 AV			1.00 H	300	49.80	42.80
4	#5982.40	60.7 PK	68.2	-7.5	1.00 H	300	55.50	5.20
5	11490.00	65.8 PK	74.0	-8.2	1.00 H	223	50.00	15.80
6	11490.00	52.4 AV	54.0	-1.6	1.00 H	223	36.60	15.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5636.80	59.7 PK	68.2	-8.5	1.25 V	330	54.70	5.00
2	*5745.00	102.2 PK			1.25 V	330	59.40	42.80
3	*5745.00	91.8 AV			1.25 V	330	49.00	42.80
4	#5932.00	61.0 PK	68.2	-7.2	1.25 V	330	55.80	5.20
5	11490.00	67.5 PK	74.0	-6.5	2.31 V	142	51.70	15.80
6	11490.00	53.8 AV	54.0	-0.2	2.31 V	142	38.00	15.80

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	3856.00	50.1 PK	74.0	-23.9	1.27 H	173	48.10	2.00
2	3856.00	42.0 AV	54.0	-12.0	1.27 H	173	40.00	2.00
3	*5785.00	105.9 PK			1.19 H	302	63.10	42.80
4	*5785.00	95.1 AV			1.19 H	302	52.30	42.80
5	11570.00	64.2 PK	74.0	-9.8	1.28 H	228	48.70	15.50
6	11570.00	51.5 AV	54.0	-2.5	1.28 H	228	36.00	15.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	3856.00	48.5 PK	74.0	-25.5	1.45 V	182	46.50	2.00
2	3856.00	39.1 AV	54.0	-14.9	1.45 V	182	37.10	2.00
3	*5785.00	102.7 PK			1.24 V	331	59.90	42.80
4	*5785.00	92.0 AV			1.24 V	331	49.20	42.80
5	11570.00	65.9 PK	74.0	-8.1	2.25 V	142	50.40	15.50
6	11570.00	53.5 AV	54.0	-0.5	2.25 V	142	38.00	15.50

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5643.20	58.7 PK	68.2	-9.5	1.26 H	80	53.70	5.00
2	*5825.00	106.8 PK			1.26 H	80	64.00	42.80
3	*5825.00	96.2 AV			1.26 H	80	53.40	42.80
4	#5992.00	59.6 PK	68.2	-8.6	1.26 H	80	54.40	5.20
5	11650.00	66.7 PK	74.0	-7.3	1.12 H	218	50.90	15.80
6	11650.00	53.0 AV	54.0	-1.0	1.12 H	218	37.20	15.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.80	59.8 PK	68.2	-8.4	1.23 V	340	54.80	5.00
2	*5825.00	102.8 PK			1.23 V	340	60.00	42.80
3	*5825.00	92.3 AV			1.23 V	340	49.50	42.80
4	#5931.20	60.2 PK	68.2	-8.0	1.23 V	340	55.00	5.20
5	11650.00	67.7 PK	74.0	-6.3	2.19 V	141	51.90	15.80
6	11650.00	53.6 AV	54.0	-0.4	2.19 V	141	37.80	15.80

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	60.2 PK	74.0	-13.8	3.21 H	85	55.60	4.60
2	5150.00	47.0 AV	54.0	-7.0	3.21 H	85	42.40	4.60
3	*5180.00	103.7 PK			3.21 H	85	61.50	42.20
4	*5180.00	92.8 AV			3.21 H	85	50.60	42.20
5	#10360.00	65.8 PK	74.0	-8.2	2.83 H	312	50.00	15.80
6	#10360.00	51.6 AV	54.0	-2.4	2.83 H	312	35.80	15.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	59.4 PK	74.0	-14.6	1.13 V	260	54.80	4.60
2	5150.00	46.6 AV	54.0	-7.4	1.13 V	260	42.00	4.60
3	*5180.00	100.6 PK			1.13 V	260	58.40	42.20
4	*5180.00	90.0 AV			1.13 V	260	47.80	42.20
5	#10360.00	68.3 PK	74.0	-5.7	1.00 V	146	52.50	15.80
6	#10360.00	53.8 AV	54.0	-0.2	1.00 V	146	38.00	15.80

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz	FUNCTION	Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	105.0 PK			2.89 H	62	62.80	42.20
2	*5200.00	94.8 AV			2.89 H	62	52.60	42.20
3	#10400.00	64.9 PK	74.0	-9.1	3.12 H	285	49.00	15.90
4	#10400.00	51.3 AV	54.0	-2.7	3.12 H	285	35.40	15.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	101.5 PK			1.01 V	261	59.30	42.20
2	*5200.00	91.4 AV			1.01 V	261	49.20	42.20
3	#10400.00	68.5 PK	74.0	-5.5	1.02 V	149	52.60	15.90
4	#10400.00	53.8 AV	54.0	-0.2	1.02 V	149	37.90	15.90

Remarks:

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

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#3493.00	49.3 PK	74.0	-24.7	1.22 H	183	48.20	1.10
2	#3493.00	40.1 AV	54.0	-13.9	1.22 H	183	39.00	1.10
3	5150.00	59.4 PK	74.0	-14.6	3.06 H	59	54.80	4.60
4	5150.00	46.9 AV	54.0	-7.1	3.06 H	59	42.30	4.60
5	*5240.00	106.8 PK			3.06 H	59	64.50	42.30
6	*5240.00	96.4 AV			3.06 H	59	54.10	42.30
7	#10480.00	65.0 PK	74.0	-9.0	3.14 H	217	48.80	16.20
8	#10480.00	51.1 AV	54.0	-2.9	3.14 H	217	34.90	16.20

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#3493.00	49.7 PK	74.0	-24.3	2.85 V	216	48.60	1.10
2	#3493.00	41.9 AV	54.0	-12.1	2.85 V	216	40.80	1.10
3	5150.00	59.9 PK	74.0	-14.1	1.17 V	258	55.30	4.60
4	5150.00	46.8 AV	54.0	-7.2	1.17 V	258	42.20	4.60
5	*5240.00	103.4 PK			1.17 V	258	61.10	42.30
6	*5240.00	92.9 AV			1.17 V	258	50.60	42.30
7	#10480.00	67.9 PK	74.0	-6.1	1.16 V	146	51.70	16.20
8	#10480.00	53.5 AV	54.0	-0.5	1.16 V	146	37.30	16.20

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5631.20	58.5 PK	68.2	-9.7	1.27 H	99	53.50	5.00
2	*5745.00	107.4 PK			1.27 H	99	64.60	42.80
3	*5745.00	96.7 AV			1.27 H	99	53.90	42.80
4	#5969.60	59.2 PK	68.2	-9.0	1.27 H	99	54.00	5.20
5	11490.00	66.0 PK	74.0	-8.0	1.55 H	232	50.20	15.80
6	11490.00	52.5 AV	54.0	-1.5	1.55 H	232	36.70	15.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.00	59.3 PK	68.2	-8.9	1.02 V	322	54.30	5.00
2	*5745.00	106.0 PK			1.02 V	322	63.20	42.80
3	*5745.00	95.8 AV			1.02 V	322	53.00	42.80
4	#5988.80	60.4 PK	68.2	-7.8	1.02 V	322	55.20	5.20
5	11490.00	67.0 PK	74.0	-7.0	2.24 V	196	51.20	15.80
6	11490.00	53.5 AV	54.0	-0.5	2.24 V	196	37.70	15.80

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	3856.00	50.4 PK	74.0	-23.6	2.06 H	177	48.40	2.00
2	3856.00	43.2 AV	54.0	-10.8	2.06 H	177	41.20	2.00
3	*5785.00	108.4 PK			1.79 H	311	65.60	42.80
4	*5785.00	98.2 AV			1.79 H	311	55.40	42.80
5	11570.00	64.8 PK	74.0	-9.2	1.00 H	248	49.30	15.50
6	11570.00	51.5 AV	54.0	-2.5	1.00 H	248	36.00	15.50
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	3856.00	49.8 PK	74.0	-24.2	2.70 V	185	47.80	2.00
2	3856.00	42.2 AV	54.0	-11.8	2.70 V	185	40.20	2.00
3	*5785.00	106.8 PK			1.15 V	331	64.00	42.80
4	*5785.00	96.1 AV			1.15 V	331	53.30	42.80
5	11570.00	66.9 PK	74.0	-7.1	1.00 V	184	51.40	15.50
6	11570.00	53.6 AV	54.0	-0.4	1.00 V	184	38.10	15.50

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5608.80	58.3 PK	68.2	-9.9	1.08 H	85	53.40	4.90
2	*5825.00	107.1 PK			1.08 H	85	64.30	42.80
3	*5825.00	96.5 AV			1.08 H	85	53.70	42.80
4	#5993.60	59.3 PK	68.2	-8.9	1.08 H	85	54.10	5.20
5	11650.00	65.2 PK	74.0	-8.8	1.01 H	228	49.40	15.80
6	11650.00	52.1 AV	54.0	-1.9	1.01 H	228	36.30	15.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5606.40	58.7 PK	68.2	-9.5	1.10 V	299	53.80	4.90
2	*5825.00	105.6 PK			1.02 V	330	62.80	42.80
3	*5825.00	94.8 AV			1.02 V	330	52.00	42.80
4	#5981.60	60.3 PK	68.2	-7.9	1.10 V	299	55.10	5.20
5	11650.00	66.2 PK	74.0	-7.8	3.33 V	192	50.40	15.80
6	11650.00	53.6 AV	54.0	-0.4	3.33 V	192	37.80	15.80

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	67.5 PK	74.0	-6.5	1.13 H	320	62.90	4.60
2	5150.00	53.6 AV	54.0	-0.4	1.13 H	320	49.00	4.60
3	*5190.00	100.5 PK			1.13 H	320	58.30	42.20
4	*5190.00	89.5 AV			1.13 H	320	47.30	42.20
5	#10380.00	60.7 PK	74.0	-13.3	1.00 H	219	44.80	15.90
6	#10380.00	47.9 AV	54.0	-6.1	1.00 H	219	32.00	15.90

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.3 PK	74.0	-10.7	1.00 V	262	58.70	4.60
2	5150.00	49.6 AV	54.0	-4.4	1.00 V	262	45.00	4.60
3	*5190.00	96.9 PK			1.00 V	262	54.70	42.20
4	*5190.00	86.7 AV			1.00 V	262	44.50	42.20
5	#10380.00	64.1 PK	74.0	-9.9	2.19 V	146	48.20	15.90
6	#10380.00	50.6 AV	54.0	-3.4	2.19 V	146	34.70	15.90

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#3486.00	48.8 PK	74.0	-25.2	1.22 H	192	47.60	1.20
2	#3486.00	39.7 AV	54.0	-14.3	1.22 H	192	38.50	1.20
3	5150.00	59.5 PK	74.0	-14.5	1.17 H	71	54.90	4.60
4	5150.00	46.8 AV	54.0	-7.2	1.17 H	71	42.20	4.60
5	*5230.00	104.9 PK			1.17 H	71	62.60	42.30
6	*5230.00	93.9 AV			1.17 H	71	51.60	42.30
7	#10460.00	63.4 PK	68.2	-4.8	1.34 H	201	47.50	15.90

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#3486.00	48.3 PK	74.0	-25.7	1.48 V	189	47.10	1.20
2	#3486.00	39.0 AV	54.0	-15.0	1.48 V	189	37.80	1.20
3	5150.00	59.6 PK	74.0	-14.4	1.51 V	89	55.00	4.60
4	5150.00	47.1 AV	54.0	-6.9	1.51 V	89	42.50	4.60
5	*5230.00	101.5 PK			1.51 V	89	59.20	42.30
6	*5230.00	90.5 AV			1.51 V	89	48.20	42.30
7	#10460.00	67.7 PK	68.2	-0.5	1.00 V	169	51.80	15.90

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5625.60	59.2 PK	68.2	-9.0	1.10 H	299	54.30	4.90
2	*5755.00	104.5 PK			1.10 H	299	61.70	42.80
3	*5755.00	93.3 AV			1.10 H	299	50.50	42.80
4	#5965.60	59.6 PK	68.2	-8.6	1.10 H	299	54.40	5.20
5	11510.00	66.5 PK	74.0	-7.5	1.00 H	223	50.90	15.60
6	11510.00	52.9 AV	54.0	-1.1	1.00 H	223	37.30	15.60

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	#5642.40	59.2 PK	68.2	-9.0	1.24 V	206	54.20	5.00
2	*5755.00	100.5 PK			1.24 V	207	57.70	42.80
3	*5755.00	89.7 AV			1.24 V	207	46.90	42.80
4	#5958.40	59.5 PK	68.2	-8.7	1.24 V	206	54.30	5.20
5	11510.00	66.3 PK	74.0	-7.7	1.38 V	175	50.70	15.60
6	11510.00	53.6 AV	54.0	-0.4	1.38 V	175	38.00	15.60

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	3863.00	51.3 PK	74.0	-22.7	1.38 H	340	49.30	2.00
2	3863.00	45.7 AV	54.0	-8.3	1.38 H	340	43.70	2.00
3	#5641.60	58.7 PK	68.2	-9.5	1.10 H	261	53.70	5.00
4	*5795.00	106.9 PK			1.10 H	261	64.10	42.80
5	*5795.00	95.8 AV			1.10 H	261	53.00	42.80
6	#5964.00	59.3 PK	68.2	-8.9	1.10 H	261	54.10	5.20
7	11590.00	64.7 PK	74.0	-9.3	1.29 H	37	49.20	15.50
8	11590.00	51.8 AV	54.0	-2.2	1.29 H	37	36.30	15.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	3863.00	52.8 PK	74.0	-21.2	1.25 V	349	50.80	2.00
2	3863.00	41.9 AV	54.0	-12.1	1.25 V	349	39.90	2.00
3	#5647.20	58.8 PK	68.2	-9.4	1.30 V	258	53.80	5.00
4	*5795.00	102.1 PK			1.30 V	258	59.30	42.80
5	*5795.00	91.3 AV			1.30 V	258	48.50	42.80
6	#5951.20	59.5 PK	68.2	-8.7	1.30 V	258	54.30	5.20
7	11590.00	66.2 PK	74.0	-7.8	1.00 V	324	50.70	15.50
8	11590.00	53.5 AV	54.0	-0.5	1.00 V	324	38.00	15.50

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	#3473.00	49.0 PK	74.0	-25.0	1.12 H	190	47.80	1.20
2	#3473.00	40.3 AV	54.0	-13.7	1.12 H	190	39.10	1.20
3	5150.00	66.0 PK	74.0	-8.0	1.06 H	318	61.40	4.60
4	5150.00	53.6 AV	54.0	-0.4	1.06 H	318	49.00	4.60
5	*5210.00	97.5 PK			1.06 H	318	55.20	42.30
6	*5210.00	86.2 AV			1.06 H	318	43.90	42.30
7	#10420.00	60.1 PK	74.0	-13.9	1.06 H	241	44.10	16.00
8	#10420.00	47.4 AV	54.0	-6.6	1.06 H	241	31.40	16.00

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#3473.00	48.3 PK	74.0	-25.7	1.12 V	185	47.10	1.20
2	#3473.00	39.5 AV	54.0	-14.5	1.12 V	185	38.30	1.20
3	5150.00	62.7 PK	74.0	-11.3	1.00 V	189	58.10	4.60
4	5150.00	48.7 AV	54.0	-5.3	1.00 V	189	44.10	4.60
5	*5210.00	94.4 PK			1.00 V	189	52.10	42.30
6	*5210.00	83.3 AV			1.00 V	189	41.00	42.30
7	#10420.00	62.1 PK	74.0	-11.9	1.07 V	164	46.10	16.00
8	#10420.00	48.3 AV	54.0	-5.7	1.07 V	164	32.30	16.00

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	3850.00	52.0 PK	74.0	-22.0	1.00 H	129	50.10	1.90
2	3850.00	44.0 AV	54.0	-10.0	1.00 H	129	42.10	1.90
3	#5648.00	66.7 PK	68.2	-1.5	1.00 H	300	61.70	5.00
4	*5775.00	103.0 PK			1.00 H	300	60.20	42.80
5	*5775.00	90.5 AV			1.00 H	300	47.70	42.80
6	#5947.20	60.2 PK	68.2	-8.0	1.00 H	300	55.00	5.20
7	11550.00	65.9 PK	74.0	-8.1	1.02 H	223	50.30	15.60
8	11550.00	52.7 AV	54.0	-1.3	1.02 H	223	37.10	15.60

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	3850.00	50.8 PK	74.0	-23.2	1.17 V	329	48.90	1.90
2	3850.00	43.5 AV	54.0	-10.5	1.17 V	329	41.60	1.90
3	#5644.80	64.8 PK	68.2	-3.4	1.00 V	41	59.80	5.00
4	*5775.00	99.3 PK			1.00 V	42	56.50	42.80
5	*5775.00	88.4 AV			1.00 V	42	45.60	42.80
6	#5994.40	59.2 PK	68.2	-9.0	1.00 V	41	54.00	5.20
7	11550.00	66.3 PK	74.0	-7.7	1.01 V	222	50.80	15.50
8	11550.00	53.6 AV	54.0	-0.4	1.01 V	222	38.10	15.50

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	31.94	27.7 QP	40.0	-12.3	1.99 H	289	43.60	-15.90
2	107.60	32.4 QP	43.5	-11.1	1.49 H	219	50.10	-17.70
3	132.82	26.5 QP	43.5	-17.0	1.99 H	117	41.60	-15.10
4	249.22	31.6 QP	46.0	-14.4	1.00 H	241	46.00	-14.40
5	722.58	32.4 QP	46.0	-13.6	1.99 H	171	36.70	-4.30
6	961.20	37.2 QP	54.0	-16.8	1.49 H	302	36.80	0.40
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	43.80	30.9 QP	40.0	-9.1	1.00 V	10	45.20	-14.30
2	107.60	26.1 QP	43.5	-17.4	1.50 V	29	43.80	-17.70
3	183.26	25.5 QP	43.5	-18.0	1.00 V	306	41.00	-15.50
4	235.64	30.1 QP	46.0	-15.9	1.00 V	74	45.30	-15.20
5	295.78	29.6 QP	46.0	-16.4	1.00 V	72	42.10	-12.50
6	375.32	27.6 QP	46.0	-18.4	1.00 V	190	38.30	-10.70

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2015	Dec. 25, 2016
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 24, 2015	Jul. 23, 2016
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

- Note:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 1.
 3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

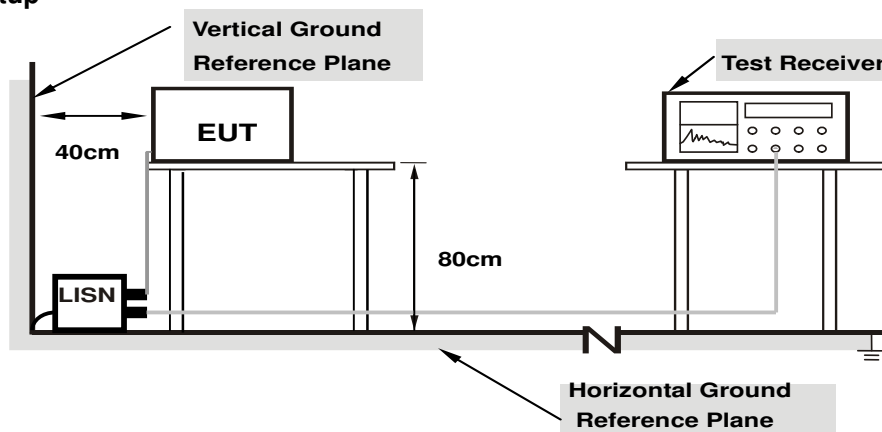
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) 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

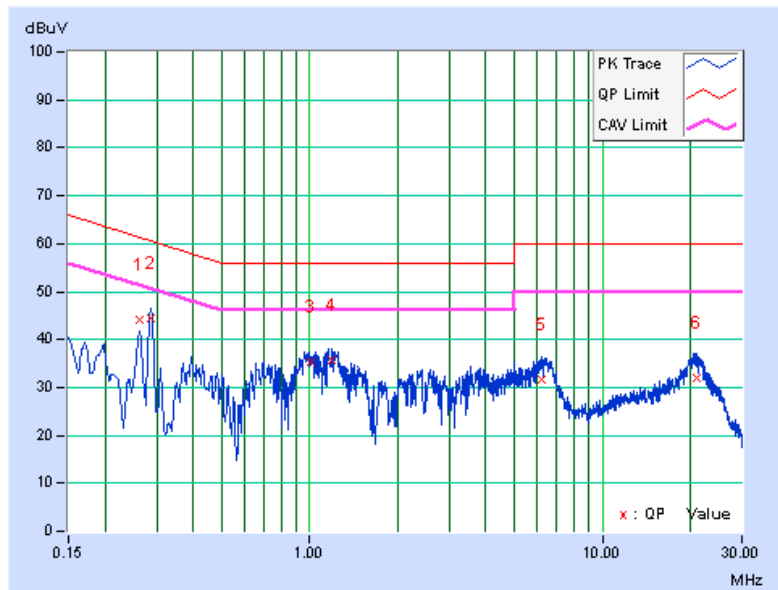
Worst-Case Data: 802.11a

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.26350	10.06	34.14	32.54	44.20	42.60	61.32
2	0.28741	10.07	34.34	33.54	44.41	43.61	60.60	50.60	-16.19	-6.99
3	1.00310	10.20	25.00	23.04	35.20	33.24	56.00	46.00	-20.80	-12.76
4	1.19569	10.21	25.54	20.64	35.75	30.85	56.00	46.00	-20.25	-15.15
5	6.20650	10.53	21.14	14.54	31.67	25.07	60.00	50.00	-28.33	-24.93
6	20.88748	11.42	20.47	11.58	31.89	23.00	60.00	50.00	-28.11	-27.00

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.

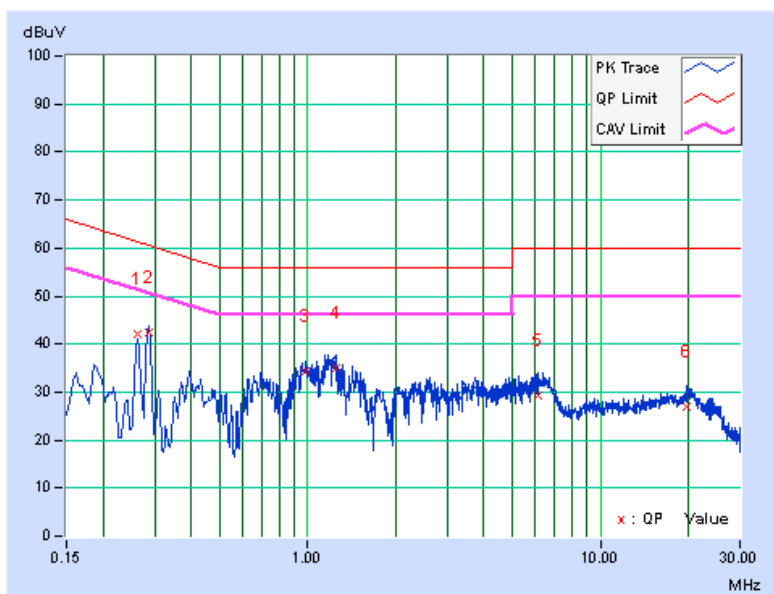


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.26250	10.07	32.11	31.54	42.18	41.61	61.35
2	0.28745	10.08	32.24	32.00	42.32	42.08	60.60	50.60	-18.28	-8.52
3	0.98506	10.21	24.24	21.54	34.45	31.75	56.00	46.00	-21.55	-14.25
4	1.24668	10.23	24.70	20.89	34.93	31.12	56.00	46.00	-21.07	-14.88
5	6.15885	10.56	18.78	13.21	29.34	23.77	60.00	50.00	-30.66	-26.23
6	19.75560	11.46	15.54	8.87	27.00	20.33	60.00	50.00	-33.00	-29.67

Remarks:

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



4.3 Transmit Power Measurement

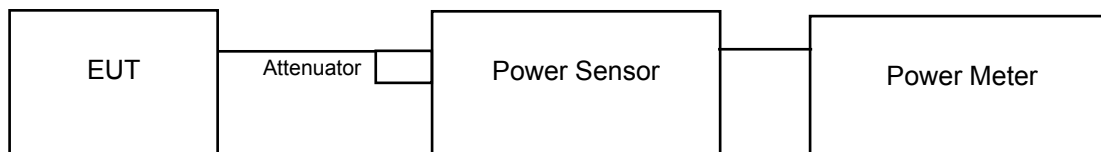
4.3.1 Limits of Transmit Power Measurement

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

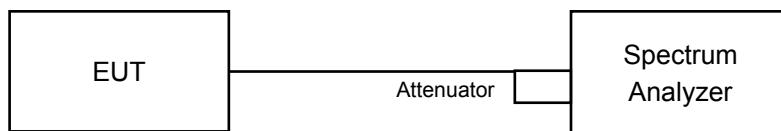
*B is the 26 dB emission bandwidth in megahertz

4.3.2 Test Setup

For 802.11a, 802.11n (20MHz), 802.11n (40MHz), 802.11ac (20MHz), 802.11ac (40MHz)



For 802.11ac (80MHz)



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

For 802.11a, 802.11n (20MHz), 802.11n (40MHz)

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

For 802.11ac (80MHz)

- a. Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- b. Set sweep trigger to “free run”.
- c. Set RBW = 1 MHz.
- d. Set VBW \geq 3 MHz
- e. Number of points in sweep \geq 2 Span / RBW.
- f. Sweep time \leq (number of points in sweep) * T
- g. Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
- h. Detector = RMS.
- i. Trace mode = max hold.
- j. Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
- k. Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’ s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

Power Output:

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	18.793	12.74	30	Pass
40	5200	25.882	14.13	30	Pass
48	5240	25.410	14.05	30	Pass
149	5745	47.863	16.80	30	Pass
157	5785	56.494	17.52	30	Pass
165	5825	58.749	17.69	30	Pass

802.11n (20MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	18.197	12.60	30	Pass
40	5200	20.417	13.10	30	Pass
48	5240	26.792	14.28	30	Pass
149	5745	36.475	15.62	30	Pass
157	5785	58.614	17.68	30	Pass
165	5825	59.293	17.73	30	Pass

802.11n (40MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
38	5190	17.378	12.40	30	Pass
46	5230	57.412	17.59	30	Pass
151	5755	35.563	15.51	30	Pass
159	5795	65.917	18.19	30	Pass

802.11ac (80MHz)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
42	5210	13.740	11.38	30	Pass
155	5775	48.641	16.87	30	Pass

26dB Bandwidth:

802.11a

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	Pass / Fail
36	5180	26.69	Pass
40	5200	28.77	Pass
48	5240	27.15	Pass

802.11n (20MHz)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	Pass / Fail
36	5180	28.23	Pass
40	5200	27.74	Pass
48	5240	28.08	Pass

802.11n (40MHz)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	Pass / Fail
38	5190	52.67	Pass
46	5230	78.66	Pass

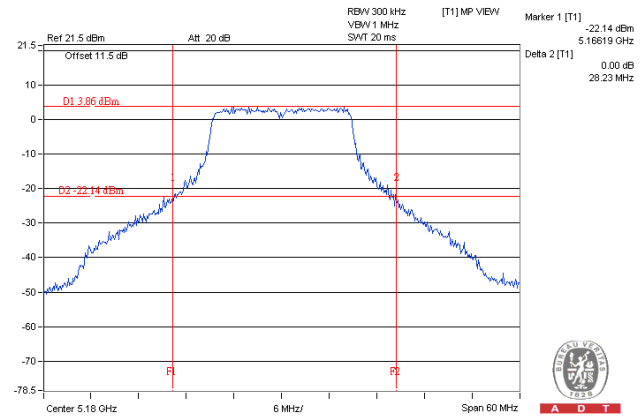
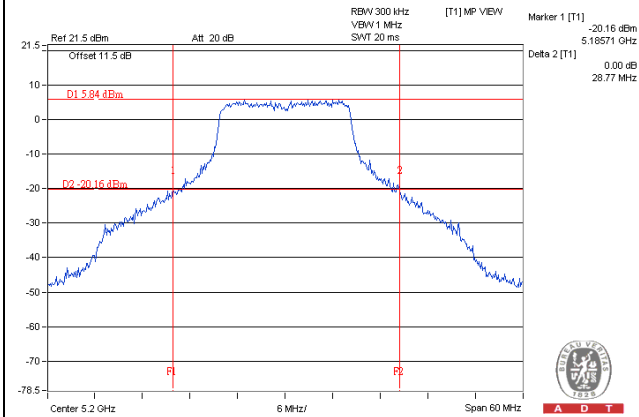
802.11ac (80MHz)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	Pass / Fail
42	5210	98.39	Pass

Spectrum Plot of Worst Value

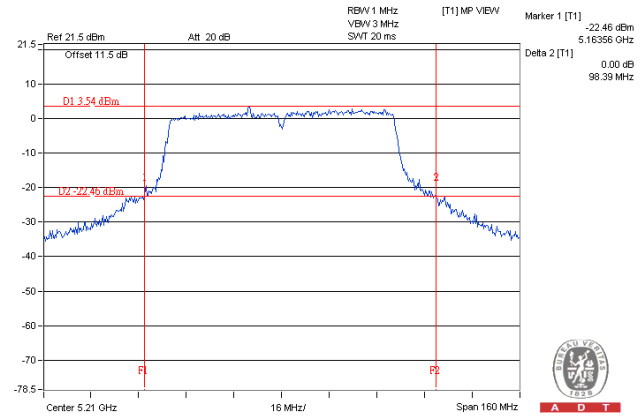
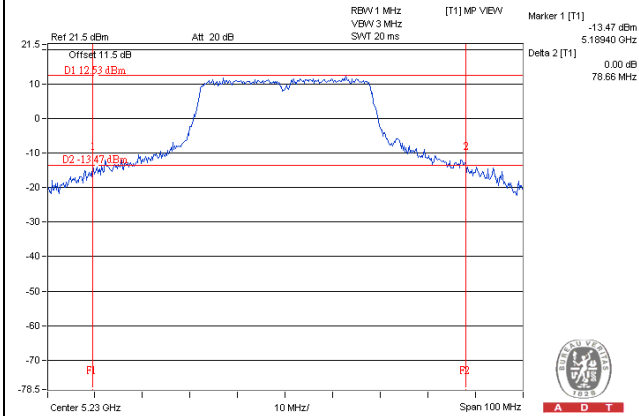
802.11a

802.11n (20MHz)



802.11n (40MHz)

802.11ac (80MHz)



Occupied Bandwidth:
802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
36	5180	17.16
40	5200	17.28
48	5240	17.16
149	5745	20.40
157	5785	21.00
165	5825	21.48

802.11n (20MHz)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
36	5180	18.24
40	5200	18.12
48	5240	18.12
149	5745	20.04
157	5785	23.04
165	5825	22.20

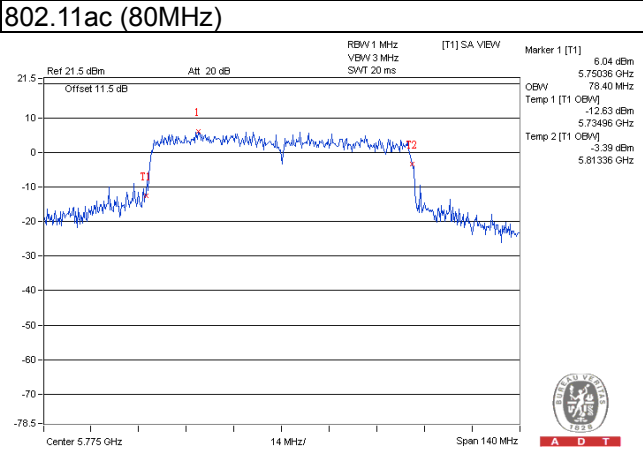
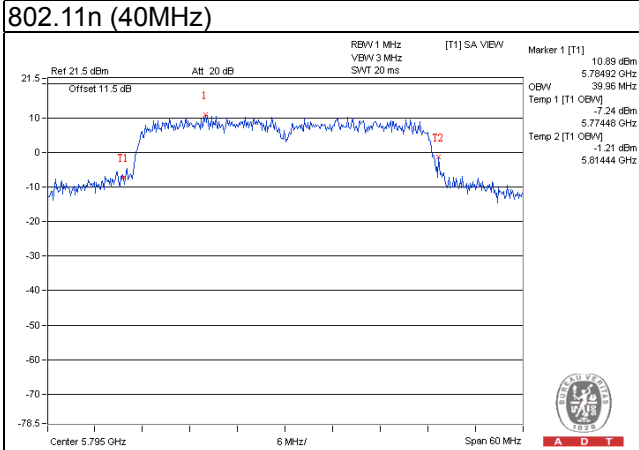
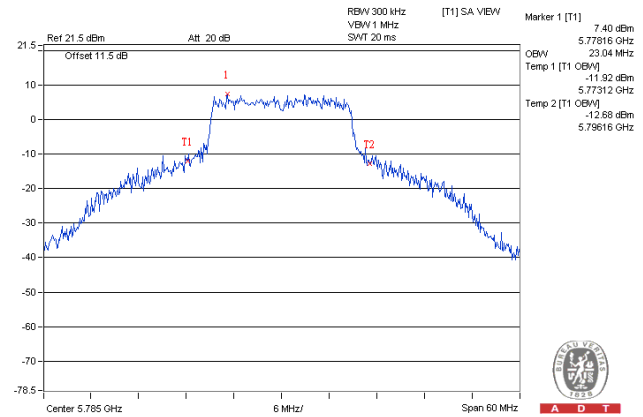
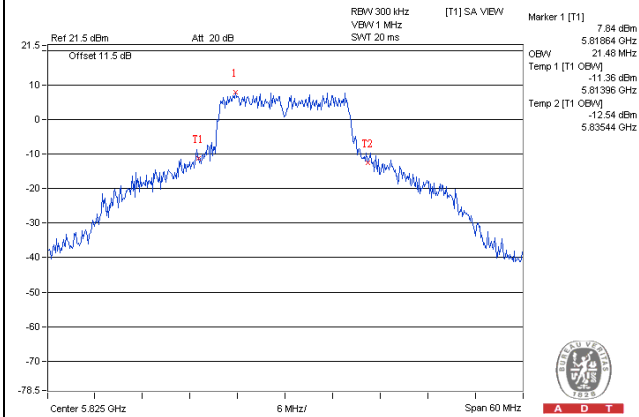
802.11n (40MHz)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
38	5190	36.96
46	5230	37.80
151	5755	37.20
159	5795	39.96

802.11ac (80MHz)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)
42	5210	76.16
155	5775	78.40

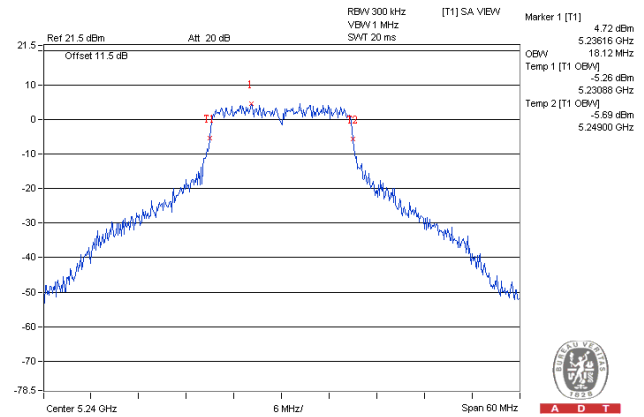
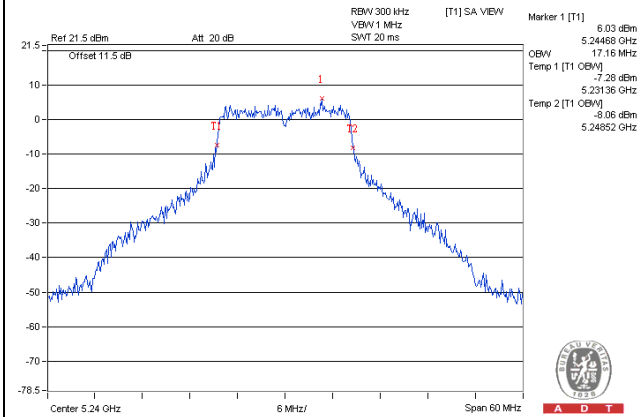
Spectrum Plot of Worst Value



Spectrum Plot

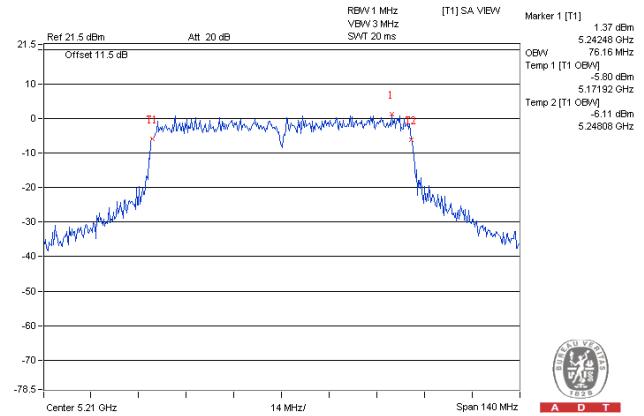
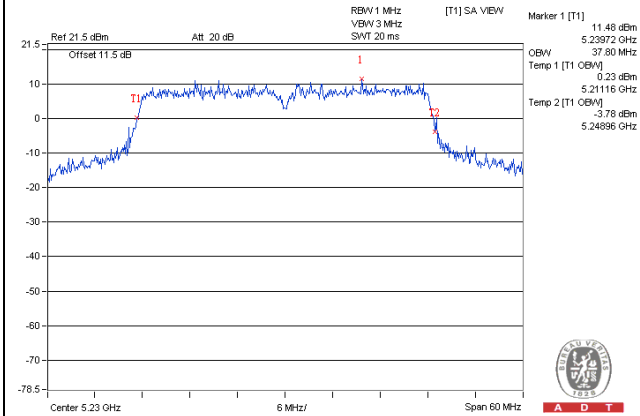
802.11a / CH 48

802.11n (20MHz) / CH 48



802.11n (40MHz) / CH 46

802.11ac (80MHz) / CH 42

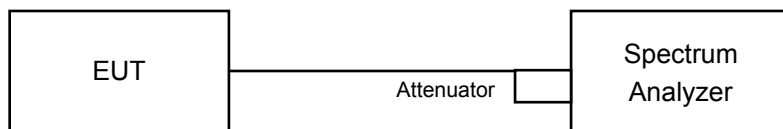


4.4 Peak Power Spectral Density Measurement

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	11dBm/ MHz
		Mobile and Portable client device	
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 Procedures

For U-NII-1 band:

Using method SA-2

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

For U-NII-3 band:

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

Same as Item 4.3.6.

4.4.7 Test Results

For U-NII-1 Band

802.11a

Chan.	Freq. (MHz)	PSD w/o duty factor (dBm)	Duty factor	PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
36	5180	-1.15	0.16	-0.99	17.00	Pass
40	5200	0.23	0.16	0.39	17.00	Pass
48	5240	0.36	0.16	0.52	17.00	Pass

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

802.11n (20MHz)

Chan.	Freq. (MHz)	PSD w/o duty factor (dBm)	Duty factor	PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
36	5180	-1.60	0.34	-1.26	17.00	Pass
40	5200	-1.08	0.34	-0.74	17.00	Pass
48	5240	0.34	0.34	0.68	17.00	Pass

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

802.11n (40MHz)

Chan.	Freq. (MHz)	PSD w/o duty factor (dBm)	Duty factor	PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
38	5190	-4.86	0.39	-4.47	17.00	Pass
46	5230	0.45	0.39	0.84	17.00	Pass

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

802.11ac (80MHz)

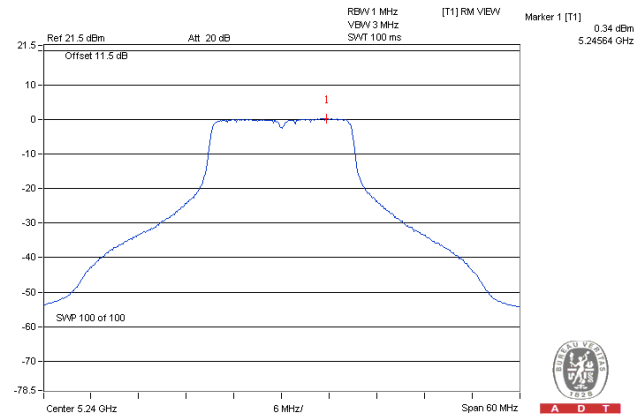
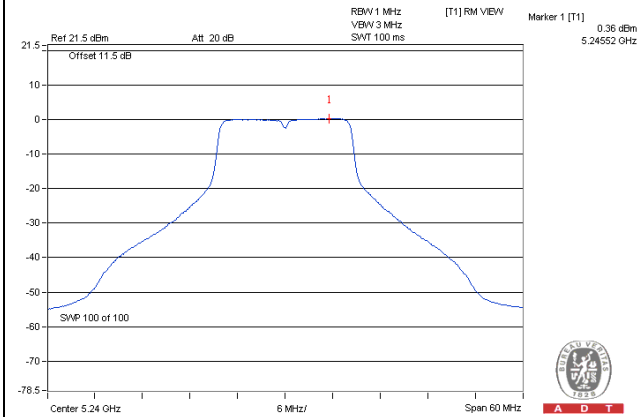
Chan.	Freq. (MHz)	PSD w/o duty factor (dBm)	Duty factor	PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
42	5210	-9.11	0.67	-8.44	17.00	Pass

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

Spectrum Plot of Worst Value

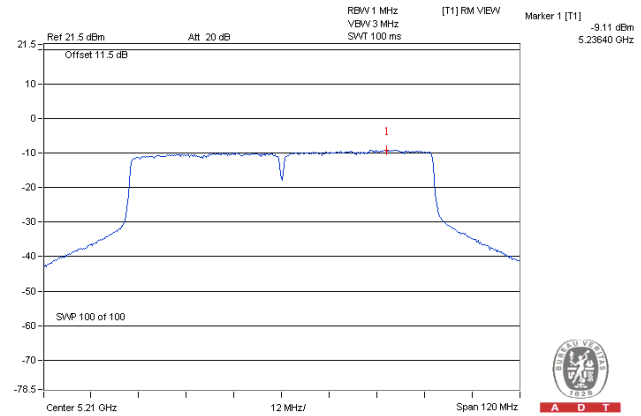
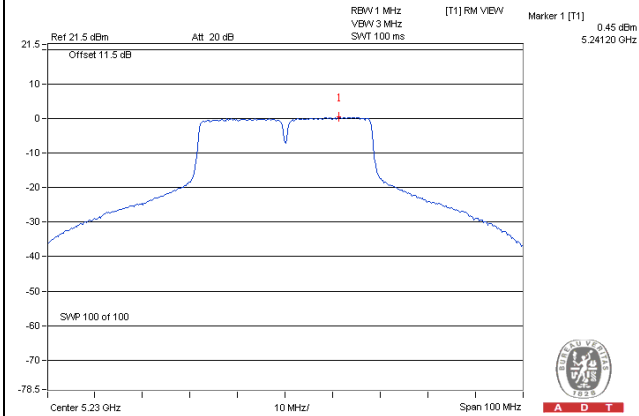
802.11a

802.11n (20MHz)



802.11n (40MHz)

802.11ac (80MHz)



For U-NII-3 Band
802.11a

Chan.	Freq. (MHz)	PSD (dBm/300k Hz)	PSD (dBm/500k Hz)	Duty factor	Total PSD (dBm/500k Hz)	Limit (dBm/500k Hz)	Pass / Fail
149	5745	-4.56	-2.34	0.16	-2.18	30.00	Pass
157	5785	-4.35	-2.13	0.16	-1.97	30.00	Pass
165	5825	-4.17	-1.95	0.16	-1.79	30.00	Pass

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

802.11n (20MHz)

Chan.	Freq. (MHz)	PSD (dBm/300k Hz)	PSD (dBm/500k Hz)	Duty factor	Total PSD (dBm/500k Hz)	Limit (dBm/500k Hz)	Pass / Fail
149	5745	-5.20	-2.98	0.34	-2.64	30.00	Pass
157	5785	-4.46	-2.24	0.34	-1.90	30.00	Pass
165	5825	-4.64	-2.42	0.34	-2.08	30.00	Pass

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

802.11n (40MHz)

Chan.	Freq. (MHz)	PSD (dBm/300k Hz)	PSD (dBm/500k Hz)	Duty factor	Total PSD (dBm/500k Hz)	Limit (dBm/500k Hz)	Pass / Fail
151	5755	-8.89	-6.67	0.39	-6.28	30.00	Pass
159	5795	-7.46	-5.24	0.39	-4.85	30.00	Pass

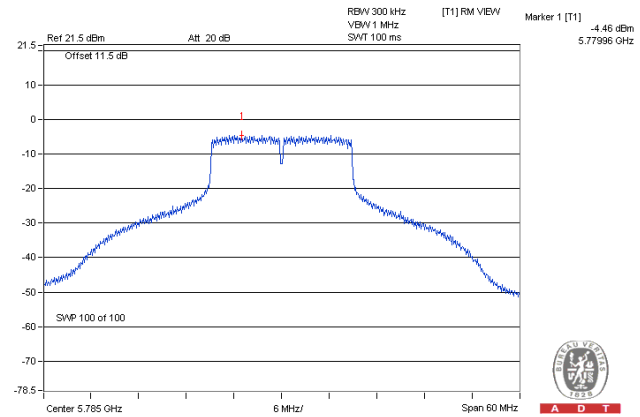
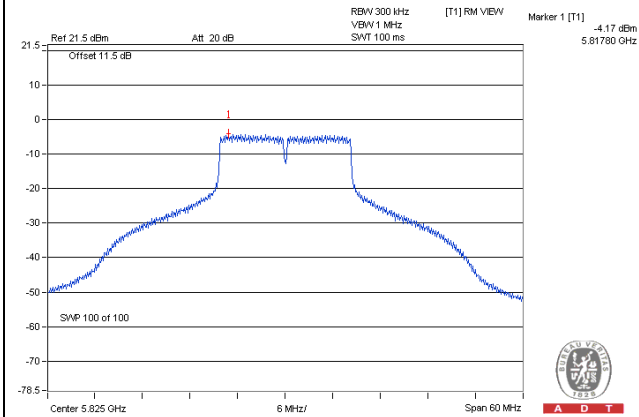
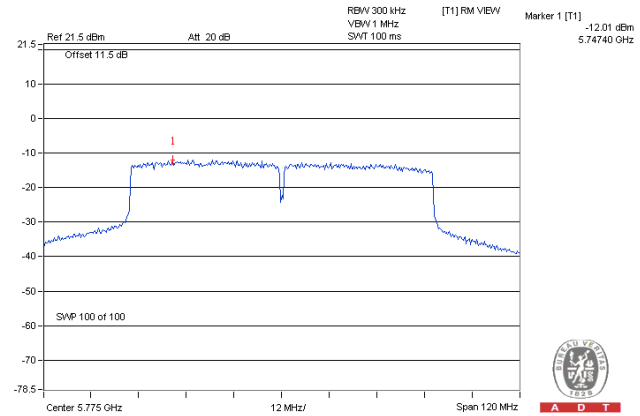
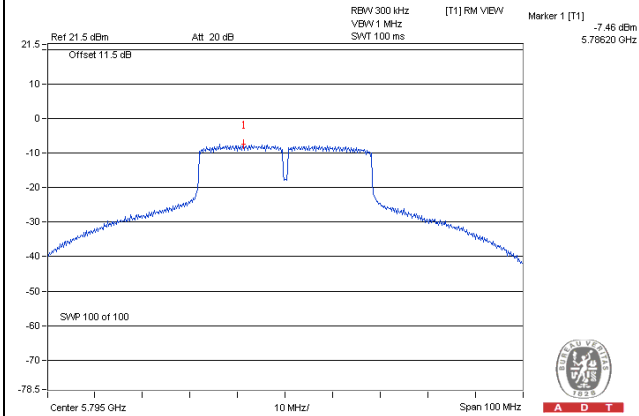
Note: Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (80MHz)

Chan.	Freq. (MHz)	PSD (dBm/300k Hz)	PSD (dBm/500k Hz)	Duty factor	Total PSD (dBm/500k Hz)	Limit (dBm/500k Hz)	Pass / Fail
155	5775	-12.01	-9.79	0.67	-9.12	30.00	Pass

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

Spectrum Plot of Worst Value

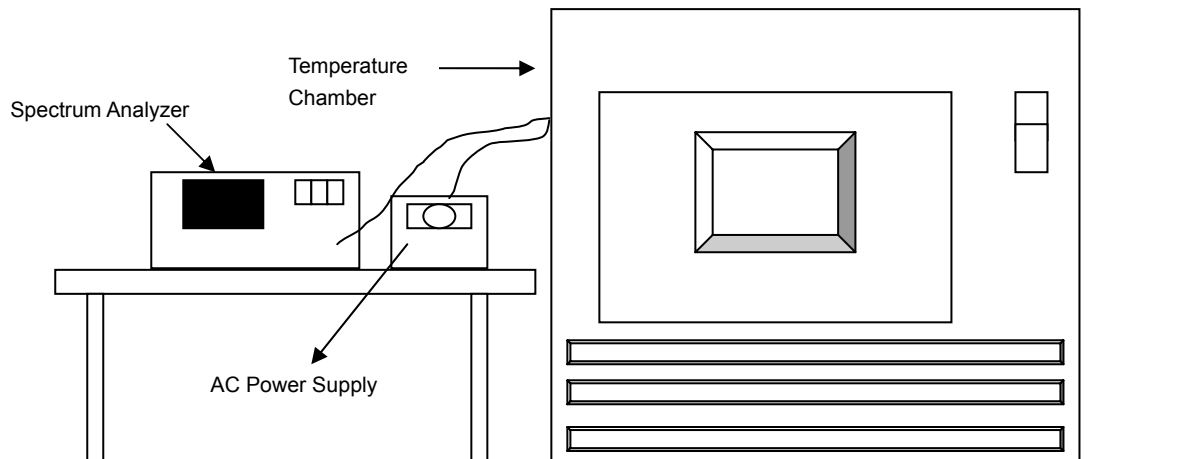
802.11a**802.11n (20MHz)****802.11n (40MHz)****802.11ac (80MHz)**

4.5 Frequency Stability

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

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5179.9765	-0.00045	5179.9744	-0.00049	5179.975	-0.00048	5179.973	-0.00052
40	120	5179.9922	-0.00015	5179.992	-0.00015	5179.9931	-0.00013	5179.9931	-0.00013
30	120	5179.9757	-0.00047	5179.9753	-0.00048	5179.9756	-0.00047	5179.9781	-0.00042
20	120	5180.0219	0.00042	5180.0234	0.00045	5180.0228	0.00044	5180.0204	0.00039
10	120	5180.0222	0.00043	5180.0208	0.00040	5180.0223	0.00043	5180.0245	0.00047
0	120	5180.0084	0.00016	5180.0057	0.00011	5180.006	0.00012	5180.0074	0.00014
-10	120	5179.9971	-0.00006	5179.9977	-0.00004	5179.9974	-0.00005	5179.9952	-0.00009
-20	120	5180.0249	0.00048	5180.0215	0.00042	5180.0237	0.00046	5180.0229	0.00044
-30	120	5179.9866	-0.00026	5179.9867	-0.00026	5179.9888	-0.00022	5179.9898	-0.00020

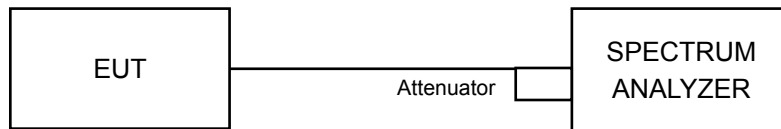
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5180.0228	0.00044	5180.0243	0.00047	5180.0228	0.00044	5180.0209	0.00040
	120	5180.0219	0.00042	5180.0234	0.00045	5180.0228	0.00044	5180.0204	0.00039
	102	5180.0215	0.00042	5180.0234	0.00045	5180.0225	0.00043	5180.0204	0.00039

4.6 6dB Bandwidth Measurement

4.6.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.6.5 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
149	5745	16.38	0.5	Pass
157	5785	16.37	0.5	Pass
165	5825	16.37	0.5	Pass

802.11n (20MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	16.93	0.5	Pass
157	5785	17.22	0.5	Pass
165	5825	17.58	0.5	Pass

802.11n (40MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
151	5755	36.13	0.5	Pass
159	5795	36.06	0.5	Pass

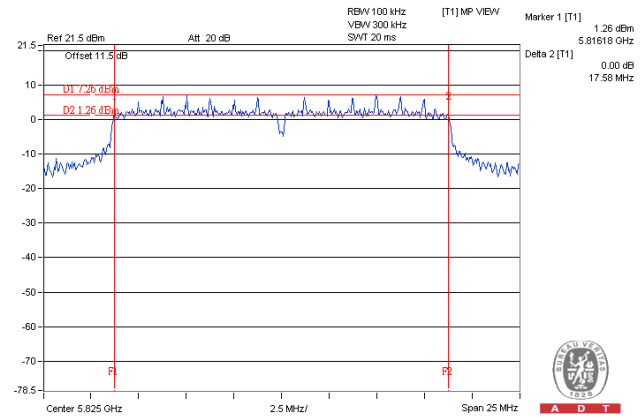
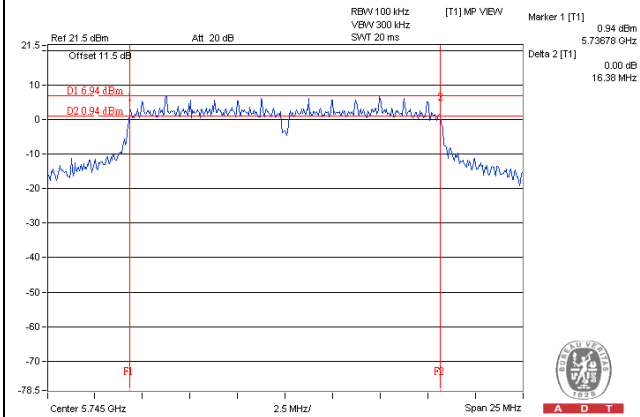
802.11ac (80MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
155	5775	72.68	0.5	Pass

Spectrum Plot of Worst Value

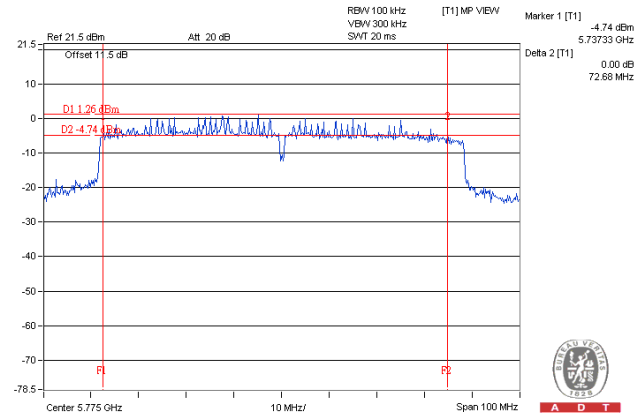
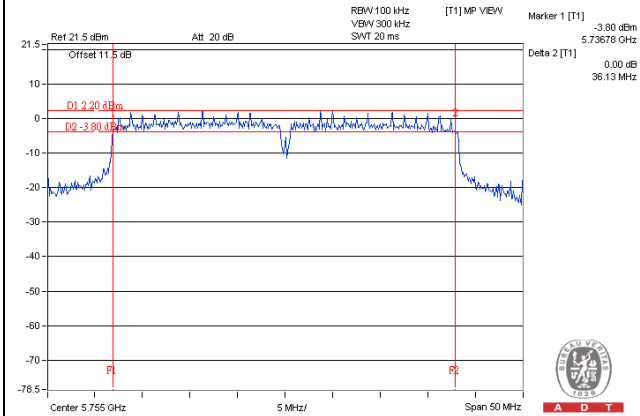
802.11a

802.11n (20MHz)



802.11n (40MHz)

802.11ac (80MHz)

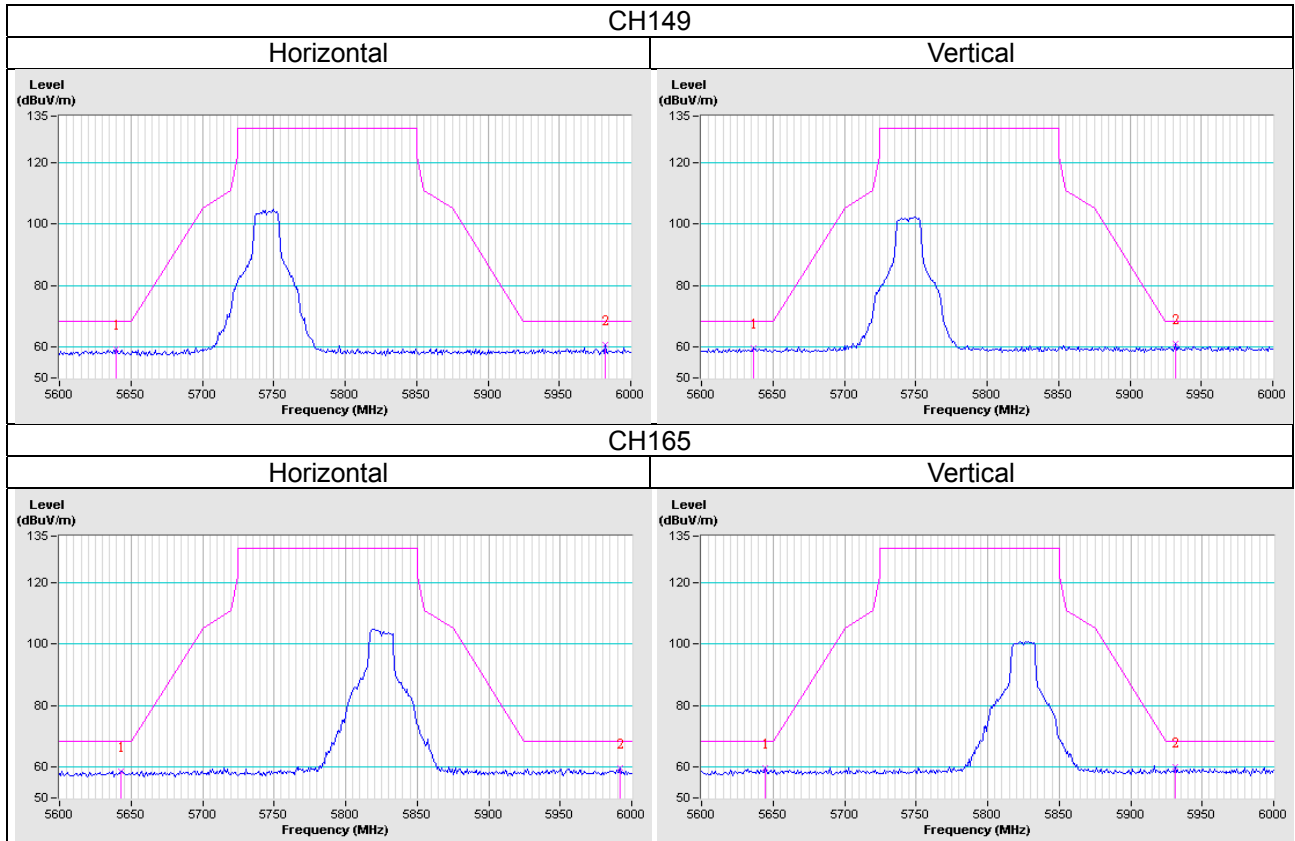


5 Pictures of Test Arrangements

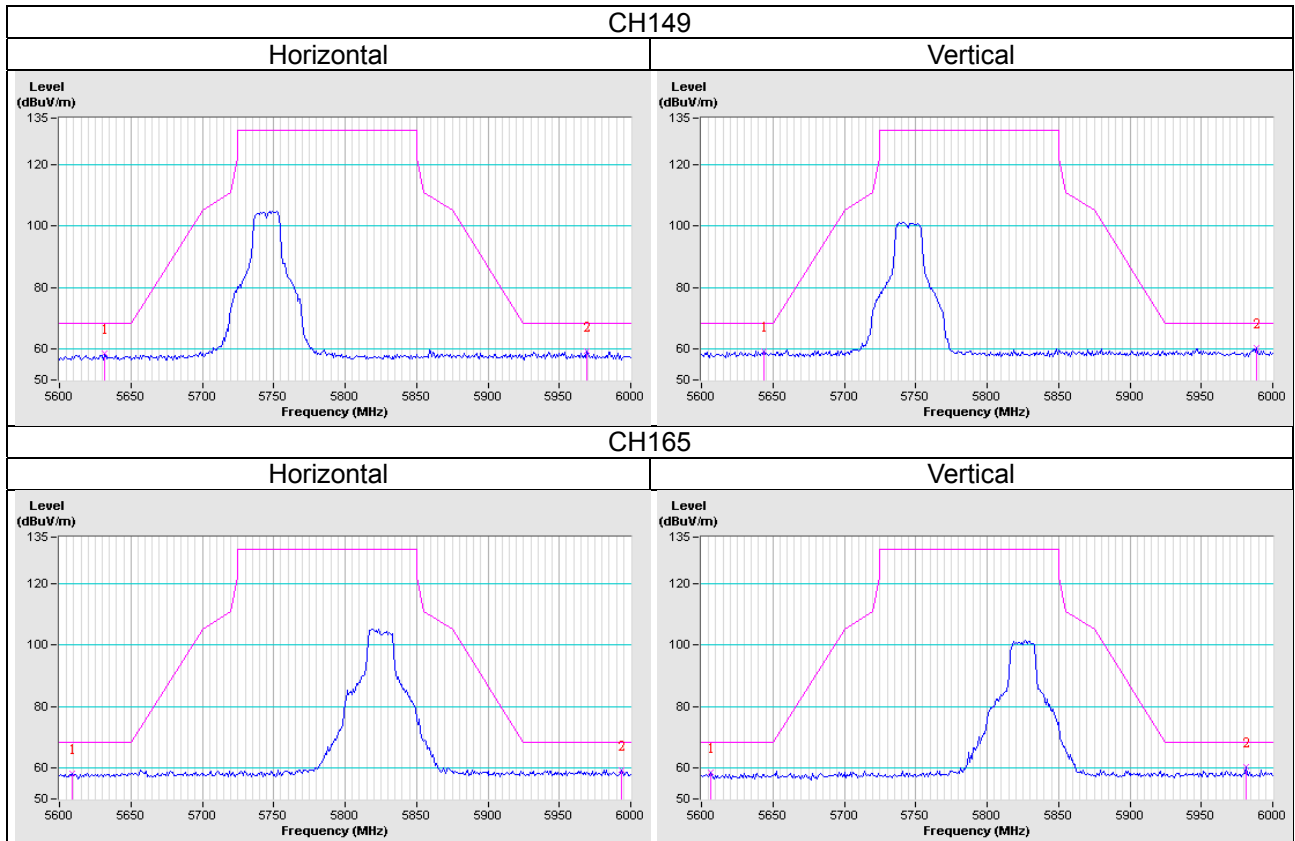
Please refer to the attached file (Test Setup Photo).

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

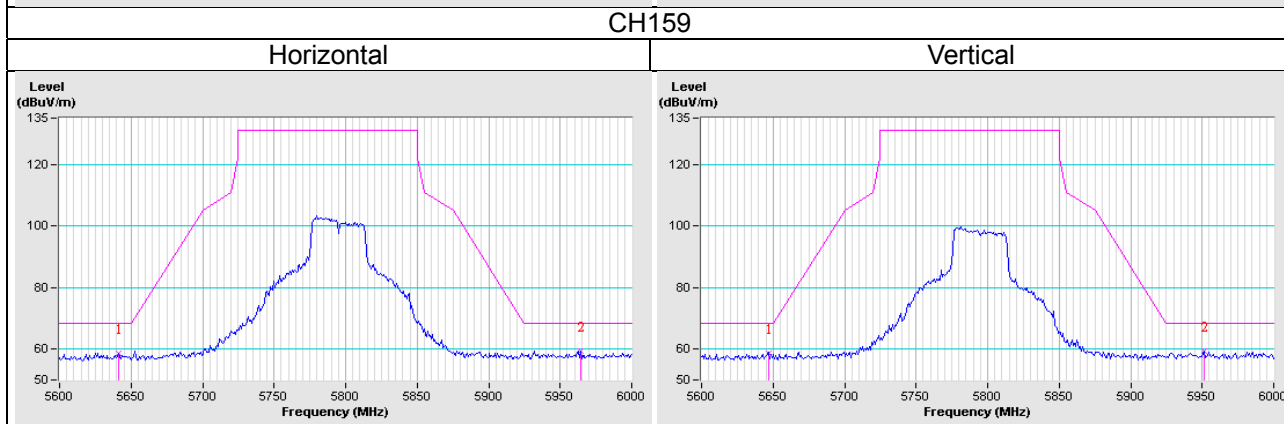
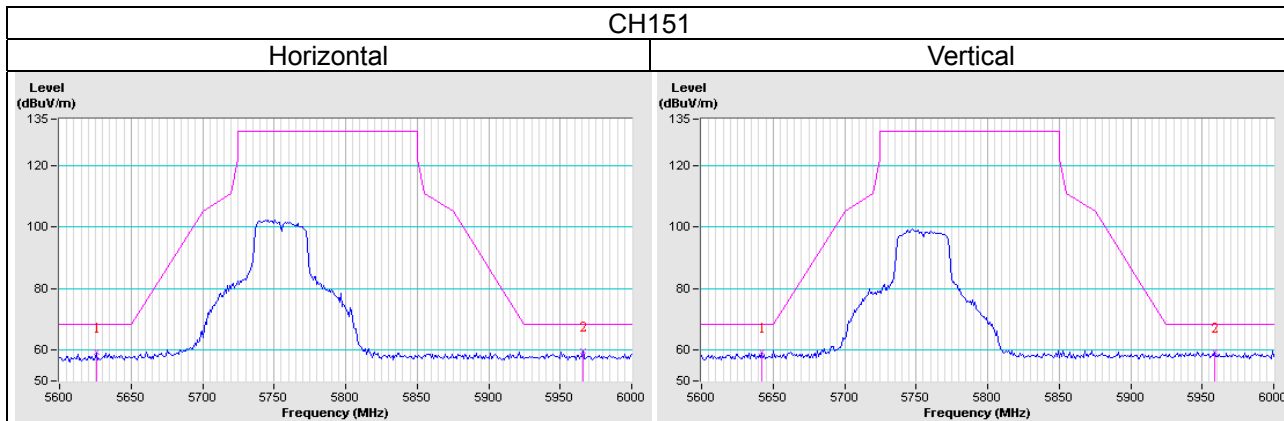
802.11a



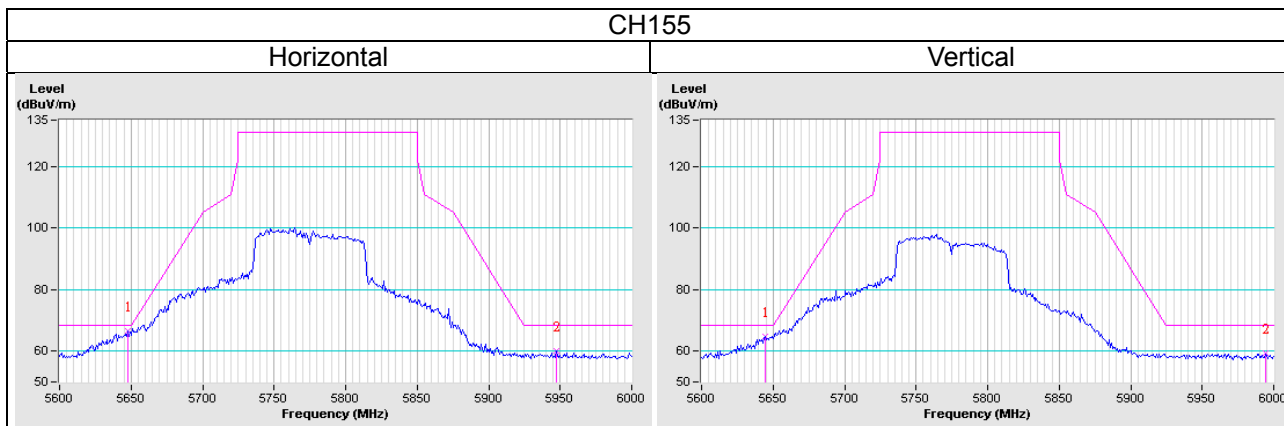
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)



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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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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