

FCC Test Report

Report No.: RF150805C24-1

FCC ID: TE7RE450

Test Model: RE450

Received Date: Aug. 05, 2015

Test Date: Aug. 10 ~ Oct. 05, 2015

Issued Date: Oct. 07, 2015

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Release Control Record

Issue No.	Description	Date Issued
RF150805C24-1	Original release	Oct. 07, 2015

1 Certificate of Conformity

Product: AC1750 Wi-Fi Range Extender

Brand: TP-LINK

Test Model: RE450


Sample Status: Prototype

Applicant: TP-LINK TECHNOLOGIES CO., LTD.

Test Date: Aug. 10 ~ Oct. 05, 2015

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 :  , **Date:** Oct. 07, 2015
Pettie Chen / Senior Specialist

Approved by :  , **Date:** Oct. 07, 2015
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 -24.60dB at 0.37678MHz.
15.407(b)(1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5861.00, 10400.00MHz.
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 & IPEX not a standard connector.
15.215	Channel Bandwidth	Pass	Meet the requirement of limit. Minimum passing 99% OBW Highest frequency 5249.44MHz is not overlap 5250MHz.

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) (\pm)
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	AC1750 Wi-Fi Range Extender
Brand	TP-LINK
Test Model	RE450
Status of EUT	Prototype
Power Supply Rating	100~240Vac, 50/60Hz, 0.3A
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 450.0Mbps 802.11ac: up to 1300Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)
Output Power	5180 ~ 5240MHz: 370.547mW 5745 ~ 5825MHz: 335.643mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

- The EUT incorporates a MIMO function. Physically, the EUT provides 3 completed transmitters and 3 receivers.

Modulation Mode	TX Function
802.11a	3TX
802.11n(HT20)	3TX
802.11n(HT40)	3TX
802.11ac(VHT20)	3TX
802.11ac(VHT40)	3TX
802.11ac(VHT80)	3TX

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

- The following antennas are for the EUT.

Type	Brand	P/N	Connector	Gain (dBi)	
				2.4GHz	5GHz
Omni-Directional	TP-Link	3101500588	IPEX	2	3
		3101500589	IPEX		
		3101500590	IPEX		

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210 MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

Radiated Emission Test (Above 1GHz):

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
-	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	15.0
-	802.11ac (VHT80)		42	42	OFDM	BPSK	97.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (VHT80)		155	155	OFDM	BPSK	97.5

Radiated Emission Test (Below 1GHz):

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (HT20)	5180-5240	36 to 48	40	OFDM	BPSK	7.2
-	802.11n (HT20)	5745-5825	149 to 165		OFDM	BPSK	7.2

Power Line Conducted Emission Test:

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (HT20)	5180-5240	36 to 48	40	OFDM	BPSK	7.2
-	802.11n (HT20)	5745-5825	149 to 165		OFDM	BPSK	7.2

Antenna Port Conducted Measurement:

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
-	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	15.0
-	802.11ac (VHT80)		42	42	OFDM	BPSK	97.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	15.0
-	802.11ac (VHT80)		155	155	OFDM	BPSK	97.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE\geq1G	25deg. C, 65%RH	120Vac, 60Hz	Tank Chang
RE$<$1G	25deg. C, 60%RH	120Vac, 60Hz	Tank Chang
PLC	25deg. C, 60%RH	120Vac, 60Hz	Chris Lin
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 = 2.688/2.8 = 0.96, Duty factor = $10 * \log(1/0.96) = 0.18$

802.11n (HT20): Duty cycle = 2.499/2.599 = 0.962, Duty factor = $10 * \log(1/0.962) = 0.17$

802.11n (HT40): Duty cycle = 1.137/1.312 = 0.867, Duty factor = $10 * \log(1/0.867) = 0.62$

802.11ac (VHT80): Duty cycle = 0.576/0.676 = 0.852, Duty factor = $10 * \log(1/0.852) = 0.70$



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.

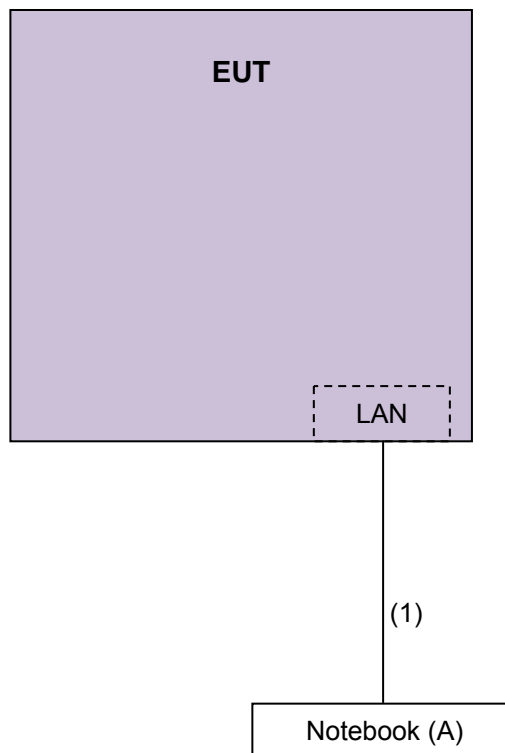
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	D531	CN-0XM006-48643-81U-2786	QDS-BRCM1020	-

Note: 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.	LAN cable	1	10	N	0	Cat5e

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

3.4.1 Configuration of System under Test



3.5 General Description of Applied 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 v01

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. Other emissions shall be at least 20dB below the highest level of the desired power:

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 v01	FIELD STRENGTH AT 3m	
	PK:74 (dBuV/m)	AV:54 (dBuV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK:-27 (dBm/MHz) ^{*1} PK:-17 (dBm/MHz) ^{*2}	PK: 68.2(dBμV/m) ^{*1} PK: 78.2 (dBμV/m) ^{*2}

NOTE: ^{*1} beyond 10MHz of the band edge ^{*2} within 10 MHz of band edge

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

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



4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Dec. 01, 2014	Nov. 30, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Mar. 30, 2015	Mar. 29, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-156	Feb. 06, 2015	Feb. 05, 2016
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Feb. 09, 2015	Feb. 08, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 09, 2015	Feb. 08, 2016
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, 2014 Aug. 11, 2015	Aug. 10, 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, 2014	Oct. 17, 2015
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:

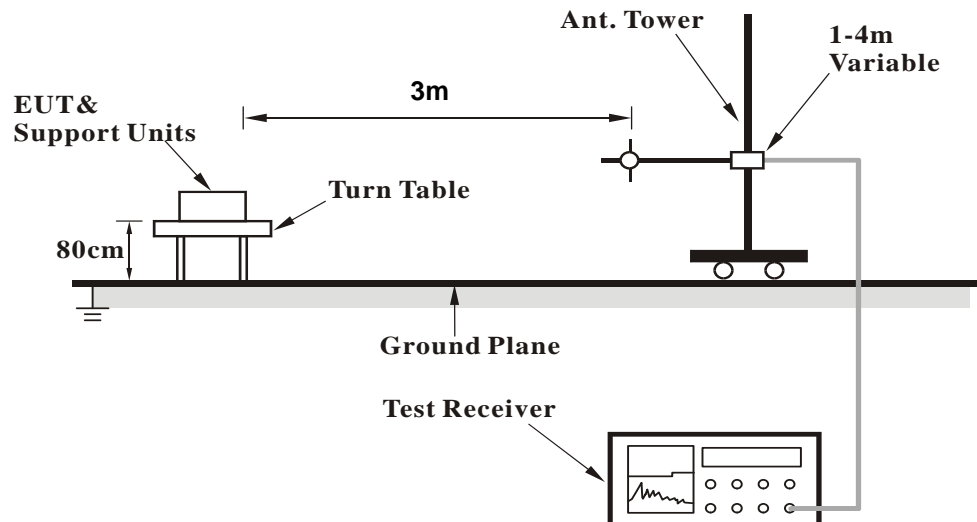
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

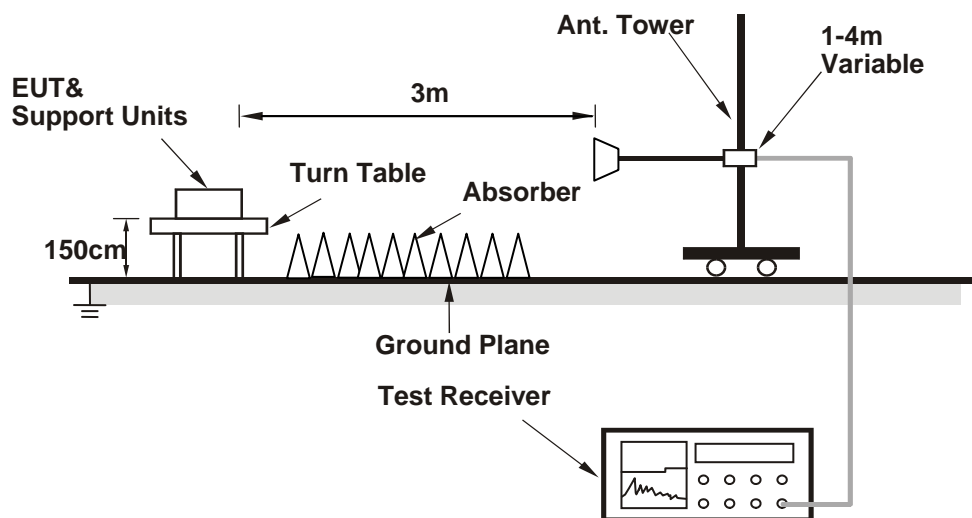
No deviation.

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

- Placed the EUT on the testing table.
- Prepared notebook to act as communication partner and placed it outside of testing area.
- 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.
- The communication partner sent data to EUT by command "PING".
- The necessary accessories enable the system in full functions.

4.1.7 Test Results

Above 1GHz data:

802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK)
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	62.9 PK	74.0	-11.1	2.26 H	113	57.90	5.00
2	5150.00	47.9 AV	54.0	-6.1	2.26 H	113	42.90	5.00
3	*5180.00	107.1 PK			2.41 H	337	68.00	39.10
4	*5180.00	96.1 AV			2.41 H	337	57.00	39.10
5	#10360.00	62.6 PK	74.0	-11.4	1.16 H	55	45.50	17.10
6	#10360.00	50.9 AV	54.0	-3.1	1.16 H	55	33.80	17.10
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	5150.00	68.8 PK	74.0	-5.2	1.72 V	78	63.80	5.00
2	5150.00	53.8 AV	54.0	-0.2	1.72 V	78	48.80	5.00
3	*5180.00	114.2 PK			2.28 V	55	75.10	39.10
4	*5180.00	103.9 AV			2.28 V	55	64.80	39.10
5	#10360.00	64.7 PK	74.0	-9.3	1.17 V	181	47.60	17.10
6	#10360.00	53.0 AV	54.0	-1.0	1.17 V	181	35.90	17.10

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)
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	5150.00	56.0 PK	74.0	-18.0	1.12 H	30	51.00	5.00
2	5150.00	46.5 AV	54.0	-7.5	1.12 H	30	41.50	5.00
3	*5200.00	110.5 PK			2.17 H	114	71.30	39.20
4	*5200.00	100.2 AV			2.17 H	114	61.00	39.20
5	#10400.00	63.6 PK	74.0	-10.4	1.09 H	138	46.30	17.30
6	#10400.00	51.6 AV	54.0	-2.4	1.09 H	138	34.30	17.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	64.8 PK	74.0	-9.2	2.13 V	336	59.80	5.00
2	5150.00	51.6 AV	54.0	-2.4	2.13 V	336	46.60	5.00
3	*5200.00	115.5 PK			2.26 V	54	76.30	39.20
4	*5200.00	105.1 AV			2.26 V	54	65.90	39.20
5	#10400.00	64.9 PK	74.0	-9.1	1.00 V	115	47.60	17.30
6	#10400.00	53.6 AV	54.0	-0.4	1.00 V	115	36.30	17.30

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	109.5 PK			2.37 H	121	70.30	39.20
2	*5240.00	100.0 AV			2.37 H	121	60.80	39.20
3	5350.00	55.8 PK	74.0	-18.2	2.20 H	130	50.40	5.40
4	5350.00	45.1 AV	54.0	-8.9	2.20 H	130	39.70	5.40
5	#10480.00	61.4 PK	74.0	-12.6	1.17 H	137	44.10	17.30
6	#10480.00	49.9 AV	54.0	-4.1	1.17 H	137	32.60	17.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	116.3 PK			2.22 V	150	77.10	39.20
2	*5240.00	106.1 AV			2.22 V	150	66.90	39.20
3	5350.00	59.0 PK	74.0	-15.0	2.10 V	160	53.60	5.40
4	5350.00	48.0 AV	54.0	-6.0	2.10 V	160	42.60	5.40
5	#10480.00	64.3 PK	74.0	-9.7	1.21 V	183	47.00	17.30
6	#10480.00	53.5 AV	54.0	-0.5	1.21 V	183	36.20	17.30

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	#5714.00	60.0 PK	74.0	-14.0	1.83 H	145	54.00	6.00
2	#5714.00	46.5 AV	54.0	-7.5	1.83 H	145	40.50	6.00
3	#5722.00	64.0 PK	78.2	-14.2	1.90 H	165	57.90	6.10
4	#5725.00	60.7 PK	78.2	-17.5	1.78 H	46	54.60	6.10
5	*5745.00	107.6 PK			1.75 H	110	67.30	40.30
6	*5745.00	97.2 AV			1.75 H	110	56.90	40.30
7	11490.00	58.2 PK	74.0	-15.8	1.55 H	224	40.60	17.60
8	11490.00	47.5 AV	54.0	-6.5	1.55 H	224	29.90	17.60

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	#5714.00	70.2 PK	74.0	-3.8	2.10 V	97	64.20	6.00
2	#5714.00	53.5 AV	54.0	-0.5	2.10 V	97	47.50	6.00
3	#5722.00	72.0 PK	78.2	-6.2	2.07 V	112	65.90	6.10
4	#5725.00	66.6 PK	78.2	-11.6	1.59 V	295	60.50	6.10
5	*5745.00	116.3 PK			2.04 V	123	76.00	40.30
6	*5745.00	105.5 AV			2.04 V	123	65.20	40.30
7	11490.00	58.5 PK	74.0	-15.5	1.16 V	82	40.90	17.60
8	11490.00	47.9 AV	54.0	-6.1	1.16 V	82	30.30	17.60

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	111.1 PK			1.04 H	140	70.80	40.30
2	*5785.00	100.8 AV			1.04 H	140	60.50	40.30
3	11570.00	59.5 PK	74.0	-14.5	1.88 H	356	42.00	17.50
4	11570.00	46.5 AV	54.0	-7.5	1.88 H	356	29.00	17.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	117.0 PK			1.78 V	300	76.70	40.30
2	*5785.00	107.1 AV			1.78 V	300	66.80	40.30
3	11570.00	62.6 PK	74.0	-11.4	1.46 V	196	45.10	17.50
4	11570.00	49.6 AV	54.0	-4.4	1.46 V	196	32.10	17.50

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	110.6 PK			1.67 H	107	70.20	40.40
2	*5825.00	98.8 AV			1.67 H	107	58.40	40.40
3	#5850.00	61.0 PK	78.2	-17.2	1.68 H	137	54.60	6.40
4	#5853.00	67.1 PK	78.2	-11.1	1.21 H	112	60.70	6.40
5	#5861.00	64.4 PK	74.0	-9.6	1.44 H	109	58.00	6.40
6	#5861.00	47.8 AV	54.0	-6.2	1.44 H	109	41.40	6.40
7	11650.00	58.3 PK	74.0	-15.7	1.55 H	22	41.00	17.30
8	11650.00	46.0 AV	54.0	-8.0	1.55 H	22	28.70	17.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	115.6 PK			2.10 V	123	75.20	40.40
2	*5825.00	104.9 AV			2.10 V	123	64.50	40.40
3	#5850.00	66.8 PK	78.2	-11.4	1.58 V	97	60.40	6.40
4	#5853.00	71.9 PK	78.2	-6.3	2.03 V	108	65.50	6.40
5	#5861.00	71.2 PK	74.0	-2.8	1.89 V	50	64.80	6.40
6	#5861.00	53.5 AV	54.0	-0.5	1.89 V	50	47.10	6.40
7	11650.00	59.9 PK	74.0	-14.1	1.36 V	97	42.60	17.30
8	11650.00	48.9 AV	54.0	-5.1	1.36 V	97	31.60	17.30

REMARKS:

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

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.7 PK	74.0	-10.3	2.11 H	112	58.70	5.00
2	5150.00	49.3 AV	54.0	-4.7	2.11 H	112	44.30	5.00
3	*5180.00	108.0 PK			2.54 H	274	68.90	39.10
4	*5180.00	97.1 AV			2.54 H	274	58.00	39.10
5	#10360.00	65.8 PK	74.0	-8.2	1.18 H	52	48.70	17.10
6	#10360.00	52.3 AV	54.0	-1.7	1.18 H	52	35.20	17.10

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	5150.00	67.8 PK	74.0	-6.2	2.20 V	63	62.80	5.00
2	5150.00	53.7 AV	54.0	-0.3	2.20 V	63	48.70	5.00
3	*5180.00	115.3 PK			1.74 V	253	76.20	39.10
4	*5180.00	105.2 AV			1.74 V	253	66.10	39.10
5	#10360.00	65.3 PK	74.0	-8.7	1.06 V	162	48.20	17.10
6	#10360.00	53.3 AV	54.0	-0.7	1.06 V	162	36.20	17.10

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	111.3 PK			1.72 H	115	72.10	39.20
2	*5200.00	101.3 AV			1.72 H	115	62.10	39.20
3	#10400.00	63.1 PK	74.0	-10.9	1.19 H	86	45.80	17.30
4	#10400.00	51.1 AV	54.0	-2.9	1.19 H	86	33.80	17.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	116.2 PK			1.95 V	314	77.00	39.20
2	*5200.00	106.0 AV			1.95 V	314	66.80	39.20
3	#10400.00	67.0 PK	74.0	-7.0	1.19 V	166	49.70	17.30
4	#10400.00	53.9 AV	54.0	-0.1	1.19 V	166	36.60	17.30

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	111.1 PK			1.72 H	119	71.90	39.20
2	*5240.00	100.7 AV			1.72 H	119	61.50	39.20
3	5350.00	56.0 PK	74.0	-18.0	1.55 H	229	50.60	5.40
4	5350.00	44.2 AV	54.0	-9.8	1.55 H	229	38.80	5.40
5	#10480.00	61.6 PK	74.0	-12.4	1.10 H	142	44.30	17.30
6	#10480.00	50.2 AV	54.0	-3.8	1.10 H	142	32.90	17.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	116.5 PK			1.82 V	298	77.30	39.20
2	*5240.00	106.7 AV			1.82 V	298	67.50	39.20
3	5350.00	58.0 PK	74.0	-16.0	1.18 V	74	52.60	5.40
4	5350.00	46.7 AV	54.0	-7.3	1.18 V	74	41.30	5.40
5	#10480.00	64.5 PK	74.0	-9.5	1.05 V	163	47.20	17.30
6	#10480.00	53.5 AV	54.0	-0.5	1.05 V	163	36.20	17.30

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	#5714.00	61.0 PK	74.0	-13.0	1.45 H	208	55.00	6.00
2	#5714.00	47.5 AV	54.0	-6.5	1.45 H	208	41.50	6.00
3	#5722.00	64.8 PK	78.2	-13.4	1.35 H	152	58.70	6.10
4	#5725.00	60.7 PK	78.2	-17.5	1.55 H	321	54.60	6.10
5	*5745.00	108.0 PK			1.69 H	109	67.70	40.30
6	*5745.00	96.7 AV			1.69 H	109	56.40	40.30
7	11490.00	57.9 PK	74.0	-16.1	1.06 H	87	40.30	17.60
8	11490.00	47.3 AV	54.0	-6.7	1.06 H	87	29.70	17.60

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	#5714.00	71.9 PK	74.0	-2.1	2.17 V	96	65.90	6.00
2	#5714.00	53.7 AV	54.0	-0.3	2.17 V	96	47.70	6.00
3	#5722.00	73.3 PK	78.2	-4.9	1.85 V	80	67.20	6.10
4	#5725.00	66.5 PK	78.2	-11.7	2.00 V	314	60.40	6.10
5	*5745.00	113.8 PK			1.87 V	116	73.50	40.30
6	*5745.00	103.5 AV			1.87 V	116	63.20	40.30
7	11490.00	60.2 PK	74.0	-13.8	1.52 V	96	42.60	17.60
8	11490.00	48.8 AV	54.0	-5.2	1.52 V	96	31.20	17.60

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	110.8 PK			1.17 H	134	70.50	40.30
2	*5785.00	100.5 AV			1.17 H	134	60.20	40.30
3	11570.00	57.8 PK	74.0	-16.2	1.26 H	45	40.30	17.50
4	11570.00	46.5 AV	54.0	-7.5	1.26 H	45	29.00	17.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	115.0 PK			1.83 V	78	74.70	40.30
2	*5785.00	104.1 AV			1.83 V	78	63.80	40.30
3	11570.00	60.5 PK	74.0	-13.5	1.36 V	97	43.00	17.50
4	11570.00	49.5 AV	54.0	-4.5	1.36 V	97	32.00	17.50

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	109.2 PK			1.66 H	108	68.80	40.40
2	*5825.00	98.5 AV			1.66 H	108	58.10	40.40
3	#5850.00	61.0 PK	78.2	-17.2	1.71 H	225	54.60	6.40
4	#5853.00	65.4 PK	78.2	-12.8	1.92 H	123	59.00	6.40
5	#5861.00	66.9 PK	74.0	-7.1	1.79 H	96	60.50	6.40
6	#5861.00	50.3 AV	54.0	-3.7	1.79 H	96	43.90	6.40
7	11650.00	57.6 PK	74.0	-16.4	1.47 H	87	40.30	17.30
8	11650.00	45.7 AV	54.0	-8.3	1.47 H	87	28.40	17.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	114.1 PK			2.18 V	106	73.70	40.40
2	*5825.00	103.9 AV			2.18 V	106	63.50	40.40
3	#5850.00	66.8 PK	78.2	-11.4	1.36 V	254	60.40	6.40
4	#5853.00	70.9 PK	78.2	-7.3	1.66 V	310	64.50	6.40
5	#5861.00	71.2 PK	74.0	-2.8	1.59 V	284	64.80	6.40
6	#5861.00	53.5 AV	54.0	-0.5	1.59 V	284	47.10	6.40
7	11650.00	59.9 PK	74.0	-14.1	1.33 V	64	42.60	17.30
8	11650.00	49.0 AV	54.0	-5.0	1.33 V	64	31.70	17.30

REMARKS:

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

802.11n (HT40)

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	61.1 PK	74.0	-12.9	1.80 H	105	56.10	5.00
2	5150.00	47.6 AV	54.0	-6.4	1.80 H	105	42.60	5.00
3	*5190.00	104.5 PK			2.17 H	275	65.40	39.10
4	*5190.00	93.0 AV			2.17 H	275	53.90	39.10
5	#10380.00	58.8 PK	74.0	-15.2	1.15 H	97	41.60	17.20
6	#10380.00	47.1 AV	54.0	-6.9	1.15 H	97	29.90	17.20

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.5 PK	74.0	-7.5	1.86 V	286	61.50	5.00
2	5150.00	53.7 AV	54.0	-0.3	1.86 V	286	48.70	5.00
3	*5190.00	106.3 PK			2.13 V	316	67.20	39.10
4	*5190.00	95.9 AV			2.13 V	316	56.80	39.10
5	#10380.00	59.8 PK	74.0	-14.2	1.10 V	230	42.60	17.20
6	#10380.00	47.8 AV	54.0	-6.2	1.10 V	230	30.60	17.20

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 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	5150.00	57.0 PK	74.0	-17.0	1.00 H	203	52.00	5.00
2	5150.00	46.5 AV	54.0	-7.5	1.00 H	203	41.50	5.00
3	*5230.00	108.6 PK			1.92 H	109	69.40	39.20
4	*5230.00	98.4 AV			1.92 H	109	59.20	39.20
5	5350.00	56.0 PK	74.0	-18.0	1.57 H	48	50.60	5.40
6	5350.00	45.1 AV	54.0	-8.9	1.57 H	48	39.70	5.40
7	#10460.00	61.1 PK	74.0	-12.9	2.48 H	141	43.90	17.20
8	#10460.00	48.9 AV	54.0	-5.1	2.48 H	141	31.70	17.20

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	67.0 PK	74.0	-7.0	1.96 V	312	62.00	5.00
2	5150.00	53.5 AV	54.0	-0.5	1.96 V	312	48.50	5.00
3	*5230.00	112.5 PK			2.02 V	200	73.30	39.20
4	*5230.00	102.2 AV			2.02 V	200	63.00	39.20
5	5350.00	57.0 PK	74.0	-17.0	1.15 V	123	51.60	5.40
6	5350.00	45.7 AV	54.0	-8.3	1.15 V	123	40.30	5.40
7	#10460.00	61.0 PK	74.0	-13.0	1.03 V	133	43.80	17.20
8	#10460.00	49.5 AV	54.0	-4.5	1.03 V	133	32.30	17.20

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 151	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	63.3 PK	74.0	-10.7	1.88 H	96	57.30	6.00
2	#5714.00	49.6 AV	54.0	-4.4	1.88 H	96	43.60	6.00
3	#5722.00	65.8 PK	78.2	-12.4	2.10 H	113	59.70	6.10
4	#5725.00	64.5 PK	78.2	-13.7	1.55 H	224	58.40	6.10
5	*5755.00	102.3 PK			1.16 H	111	62.00	40.30
6	*5755.00	92.4 AV			1.16 H	111	52.10	40.30
7	11510.00	57.7 PK	74.0	-16.3	1.56 H	97	40.30	17.40
8	11510.00	47.1 AV	54.0	-6.9	1.56 H	97	29.70	17.40

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	69.0 PK	74.0	-5.0	1.71 V	94	63.00	6.00
2	#5714.00	53.6 AV	54.0	-0.4	1.71 V	94	47.60	6.00
3	#5722.00	69.5 PK	78.2	-8.7	1.88 V	78	63.40	6.10
4	#5725.00	66.5 PK	78.2	-11.7	1.74 V	115	60.40	6.10
5	*5755.00	108.5 PK			1.83 V	112	68.20	40.30
6	*5755.00	98.9 AV			1.83 V	112	58.60	40.30
7	11510.00	58.9 PK	74.0	-15.1	1.36 V	97	41.50	17.40
8	11510.00	48.5 AV	54.0	-5.5	1.36 V	97	31.10	17.40

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	104.7 PK			1.05 H	135	64.40	40.30
2	*5795.00	95.3 AV			1.05 H	135	55.00	40.30
3	#5850.00	59.0 PK	78.2	-19.2	1.33 H	47	52.60	6.40
4	#5853.00	62.8 PK	78.2	-15.4	1.59 H	78	56.40	6.40
5	#5861.00	63.0 PK	74.0	-11.0	2.35 H	109	56.60	6.40
6	#5861.00	47.7 AV	54.0	-6.3	2.35 H	109	41.30	6.40
7	11590.00	57.6 PK	74.0	-16.4	1.47 H	85	40.30	17.30
8	11590.00	46.0 AV	54.0	-8.0	1.47 H	85	28.70	17.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	110.1 PK			1.90 V	106	69.80	40.30
2	*5795.00	99.9 AV			1.90 V	106	59.60	40.30
3	#5850.00	63.1 PK	78.2	-15.1	1.47 V	89	56.70	6.40
4	#5853.00	65.2 PK	78.2	-13.0	1.73 V	351	58.80	6.40
5	#5861.00	68.8 PK	74.0	-5.2	1.79 V	300	62.40	6.40
6	#5861.00	53.9 AV	54.0	-0.1	1.79 V	300	47.50	6.40
7	11590.00	59.1 PK	74.0	-14.9	1.23 V	64	41.80	17.30
8	11590.00	47.9 AV	54.0	-6.1	1.23 V	64	30.60	17.30

REMARKS:

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

802.11ac (VHT80)

CHANNEL	TX Channel 42	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	61.0 PK	74.0	-13.0	1.90 H	113	56.00	5.00
2	5150.00	47.5 AV	54.0	-6.5	1.90 H	113	42.50	5.00
3	*5210.00	100.1 PK			1.86 H	110	60.90	39.20
4	*5210.00	88.5 AV			1.86 H	110	49.30	39.20
5	#10420.00	57.6 PK	74.0	-16.4	1.65 H	87	40.30	17.30
6	#10420.00	47.2 AV	54.0	-6.8	1.65 H	87	29.90	17.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.9 PK	74.0	-8.1	1.79 V	287	60.90	5.00
2	5150.00	53.6 AV	54.0	-0.4	1.79 V	287	48.60	5.00
3	*5210.00	103.8 PK			2.16 V	67	64.60	39.20
4	*5210.00	92.9 AV			2.16 V	67	53.70	39.20
5	#10420.00	60.2 PK	74.0	-13.8	1.65 V	87	42.90	17.30
6	#10420.00	48.9 AV	54.0	-5.1	1.65 V	87	31.60	17.30

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
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	#5714.00	62.0 PK	74.0	-12.0	1.25 H	146	56.00	6.00
2	#5714.00	48.9 AV	54.0	-5.1	1.25 H	146	42.90	6.00
3	#5722.00	61.8 PK	78.2	-16.4	1.55 H	229	55.70	6.10
4	#5725.00	56.1 PK	78.2	-22.1	1.63 H	97	50.00	6.10
5	*5775.00	98.3 PK			1.00 H	214	58.00	40.30
6	*5775.00	87.4 AV			1.00 H	214	47.10	40.30
7	11550.00	57.7 PK	74.0	-16.3	1.57 H	41	40.30	17.40
8	11550.00	46.1 AV	54.0	-7.9	1.57 H	41	28.70	17.40

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	67.0 PK	74.0	-7.0	1.73 V	288	61.00	6.00
2	#5714.00	53.5 AV	54.0	-0.5	1.73 V	288	47.50	6.00
3	#5722.00	71.9 PK	78.2	-6.3	2.07 V	68	65.80	6.10
4	#5725.00	61.7 PK	78.2	-16.5	2.21 V	68	55.60	6.10
5	*5775.00	104.8 PK			2.08 V	298	64.50	40.30
6	*5775.00	93.9 AV			2.08 V	298	53.60	40.30
7	11550.00	58.9 PK	74.0	-15.1	1.36 V	97	41.50	17.40
8	11550.00	47.4 AV	54.0	-6.6	1.36 V	97	30.00	17.40

REMARKS:

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

Below 1GHz worst-case data:

802.11n (HT20)

CHANNEL	TX Channel 40	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	53.18	25.7 QP	40.0	-14.3	2.00 H	84	39.50	-13.80
2	210.36	25.0 QP	43.5	-18.5	1.26 H	287	41.50	-16.50
3	375.29	36.9 QP	46.0	-9.1	1.01 H	135	48.30	-11.40
4	499.48	31.3 QP	46.0	-14.7	1.51 H	141	40.60	-9.30
5	625.60	28.2 QP	46.0	-17.8	1.26 H	131	34.70	-6.50
6	901.14	33.0 QP	46.0	-13.0	1.51 H	12	34.40	-1.40

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	35.72	36.8 QP	40.0	-3.2	1.49 V	165	51.70	-14.90
2	169.61	26.9 QP	43.5	-16.6	1.24 V	12	41.00	-14.10
3	375.29	36.0 QP	46.0	-10.0	1.24 V	67	47.40	-11.40
4	499.48	27.8 QP	46.0	-18.2	1.99 V	167	37.10	-9.30
5	794.42	26.6 QP	46.0	-19.4	1.00 V	154	29.70	-3.10
6	875.91	29.4 QP	46.0	-16.6	1.00 V	208	31.50	-2.10

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 11, 2014	Nov. 10, 2015
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2015	Feb. 25, 2016
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

Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 1.

3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

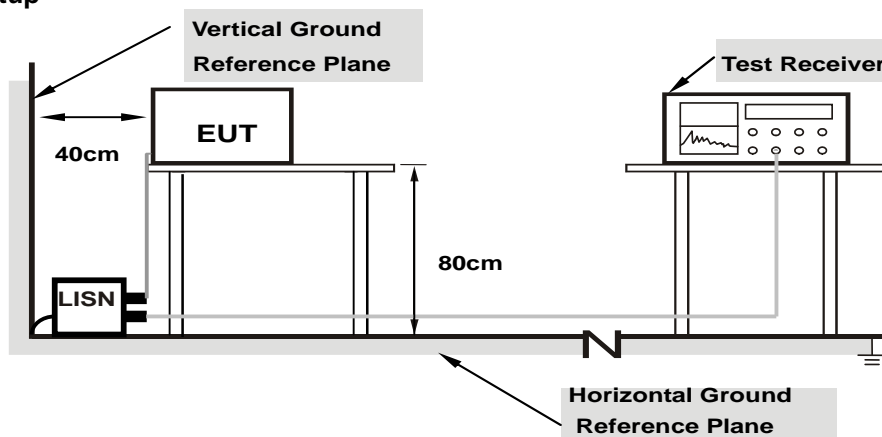
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

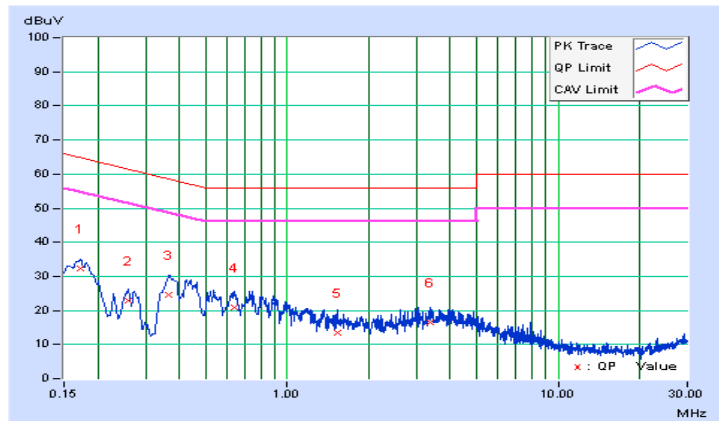
4.2.7 Test Results

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	0.17283	0.11	32.09	26.93	32.20	27.04	64.82
2	0.25948	0.13	22.67	16.22	22.80	16.35	61.45	51.45	-38.65	-35.10
3	0.36719	0.09	24.54	19.28	24.63	19.37	58.56	48.56	-33.93	-29.19
4	0.63856	0.12	20.62	16.62	20.74	16.74	56.00	46.00	-35.26	-29.26
5	1.52632	0.20	13.41	7.90	13.61	8.10	56.00	46.00	-42.39	-37.90
6	3.36011	0.24	16.23	8.73	16.47	8.97	56.00	46.00	-39.53	-37.03

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.

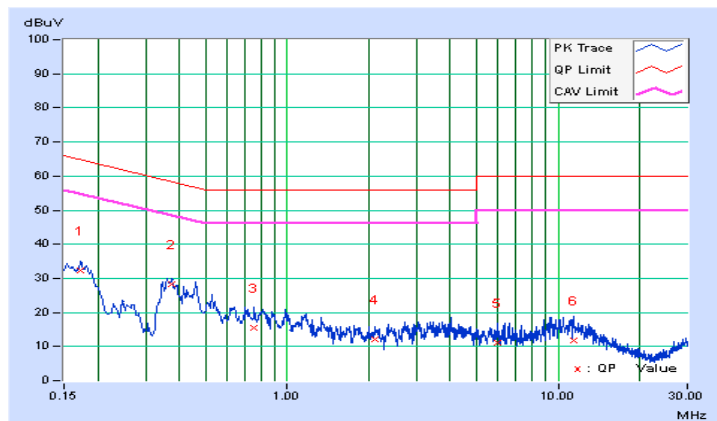


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

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	0.17328	0.18	32.25	27.18	32.43	27.36	64.80
2	0.37678	0.18	27.96	23.57	28.14	23.75	58.35	48.35	-30.21	-24.60
3	0.75585	0.18	15.29	9.11	15.47	9.29	56.00	46.00	-40.53	-36.71
4	2.09718	0.22	11.83	4.48	12.05	4.70	56.00	46.00	-43.95	-41.30
5	5.97199	0.44	10.65	3.37	11.09	3.81	60.00	50.00	-48.91	-46.19
6	11.41471	0.58	11.20	4.99	11.78	5.57	60.00	50.00	-48.22	-44.43

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

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

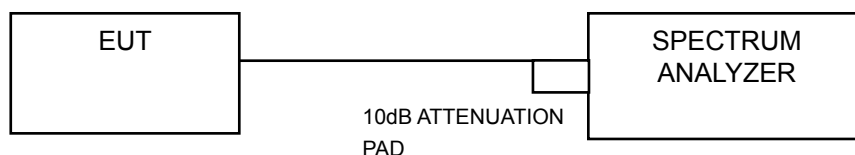
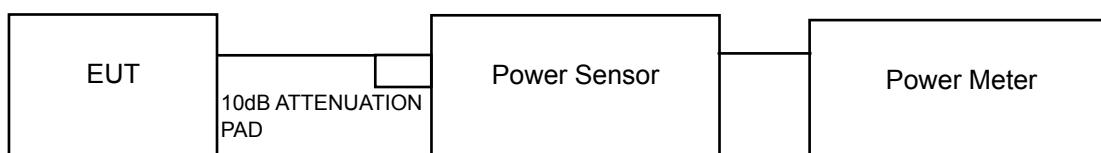
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

FOR AVERAGE POWER MEASUREMENT

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

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

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

For 802.11ac (VHT80)

789033 D02 General UNII Test Procedure New Rules v01

- 1) Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- 2) Set sweep trigger to "free run".
- 3) Set RBW = 1 MHz.
- 4) Set VBW \geq 3 MHz
- 5) Number of points in sweep \geq 2 Span / RBW.
- 6) Sweep time \leq (number of points in sweep) * T
- 7) Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
- 8) Detector = RMS.
- 9) Trace mode = max hold.
- 10) Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

POWER OUTPUT:

802.11a

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)			Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
36	5180	19.58	19.56	19.77	275.989	24.41	30	Pass
40	5200	20.96	20.88	20.15	350.714	25.45	30	Pass
48	5240	21.05	20.61	20.82	363.211	25.60	30	Pass
149	5745	17.32	17.58	17.96	173.748	22.40	30	Pass
157	5785	20.25	20.72	20.48	335.643	25.26	30	Pass
165	5825	18.35	18.85	18.93	223.290	23.49	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)			Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
36	5180	18.90	18.26	18.92	222.596	23.48	30	Pass
40	5200	21.18	20.39	20.98	365.930	25.63	30	Pass
48	5240	19.88	19.16	19.63	271.522	24.34	30	Pass
149	5745	17.29	17.53	17.91	172.006	22.36	30	Pass
157	5785	19.36	20.64	20.37	311.069	24.93	30	Pass
165	5825	18.34	19.32	19.36	240.039	23.80	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)			Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
38	5190	15.92	15.40	15.31	107.721	20.32	30	Pass
46	5230	21.14	20.69	20.91	370.547	25.69	30	Pass
151	5755	15.21	15.79	16.04	111.299	20.46	30	Pass
159	5795	17.92	18.35	18.57	202.280	23.06	30	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)			Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
42	5210	14.93	14.11	14.21	83.243	19.20	30	Pass
155	5775	14.13	15.01	15.22	90.844	19.58	30	Pass

26dB BANDWIDTH:
802.11a

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			Pass / Fail
		Chain 0	Chain 1	Chain 2	
36	5180	30.14	26.06	27.01	Pass
40	5200	33.32	38.80	37.24	Pass
48	5240	37.46	37.71	39.76	Pass

802.11n (HT20)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			Pass / Fail
		Chain 0	Chain 1	Chain 2	
36	5180	25.93	27.04	27.81	Pass
40	5200	40.02	40.46	41.28	Pass
48	5240	39.65	39.11	40.18	Pass

802.11n (HT40)

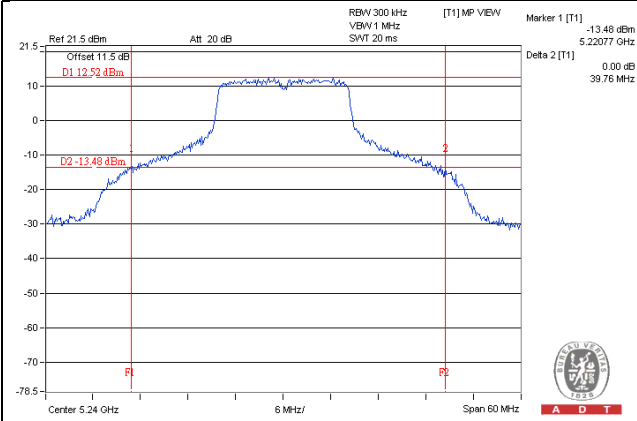
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			Pass / Fail
		Chain 0	Chain 1	Chain 2	
38	5190	46.07	47.20	45.84	Pass
46	5230	85.78	83.86	87.18	Pass

802.11ac (VHT80)

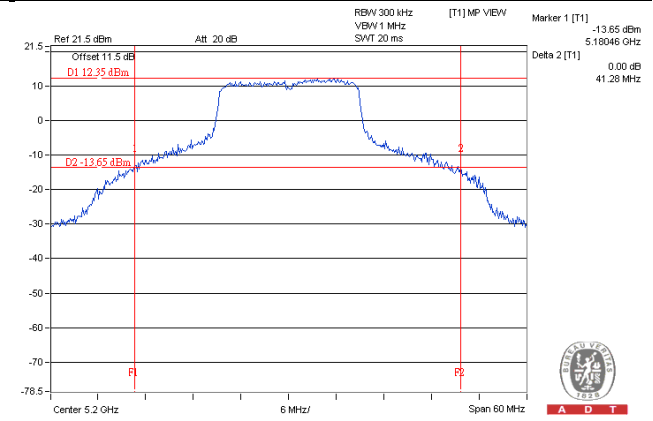
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			Pass / Fail
		Chain 0	Chain 1	Chain 2	
42	5210	87.38	89.62	87.48	Pass

SPECTRUM PLOT OF WORST VALUE

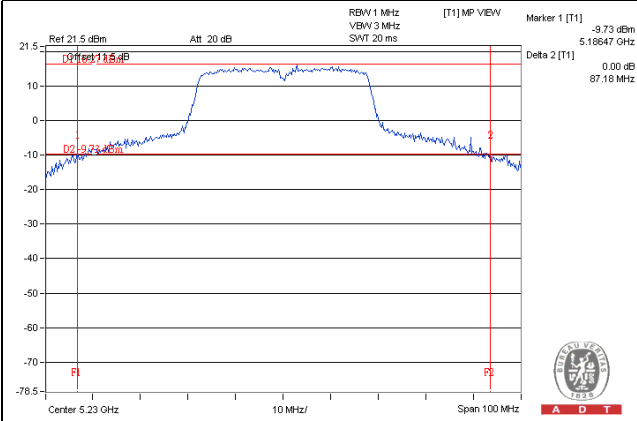
802.11a



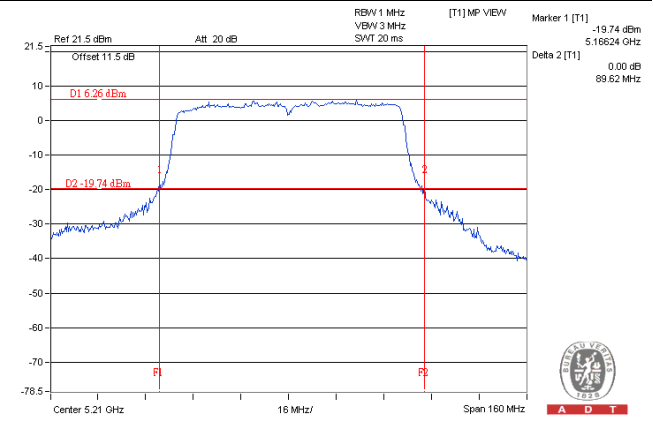
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



OCCUPIED BANDWIDTH:
802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
36	5180	17.16	17.04	17.04
40	5200	17.76	19.80	19.20
48	5240	19.68	18.26	19.80
149	5745	17.04	17.28	17.16
157	5785	28.80	29.76	29.16
165	5825	19.80	21.24	19.44

802.11n (HT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
36	5180	18.12	18.12	18.00
40	5200	20.76	20.52	20.88
48	5240	18.87	18.61	18.96
149	5745	18.00	18.24	18.24
157	5785	29.04	31.20	30.48
165	5825	21.24	24.48	24.36

802.11n (HT40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
38	5190	36.96	36.84	36.84
46	5230	37.92	37.92	38.52
151	5755	36.96	37.08	37.08
159	5795	37.44	37.80	37.56

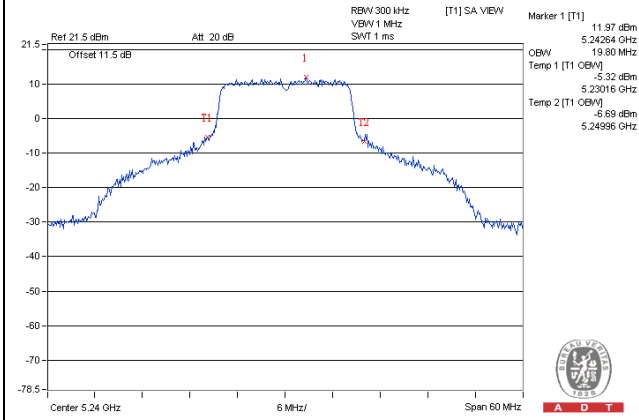
802.11ac (VHT80)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
42	5210	76.08	76.08	76.08
155	5775	76.08	76.08	76.08

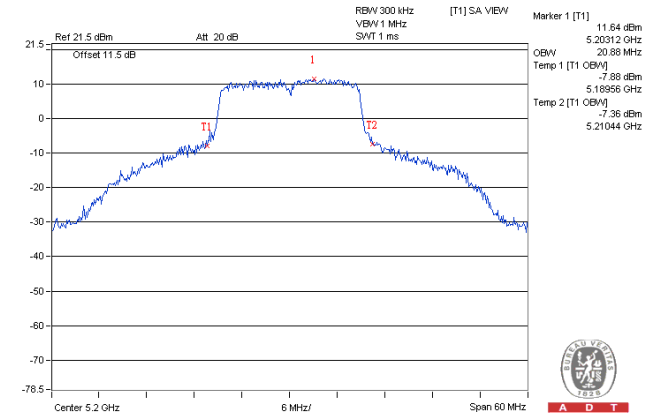
For U-NII-1 band:

SPECTRUM PLOT OF WORST VALUE

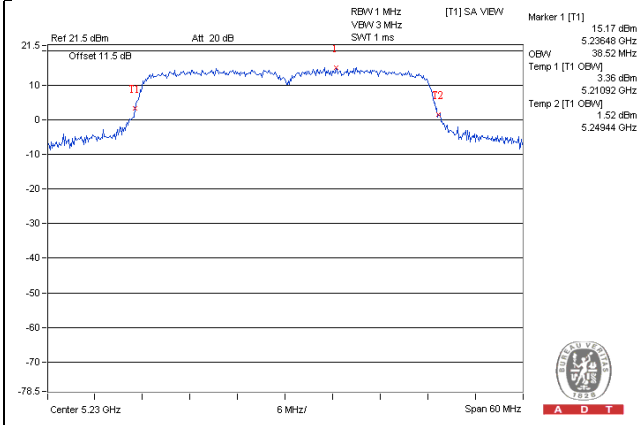
802.11a



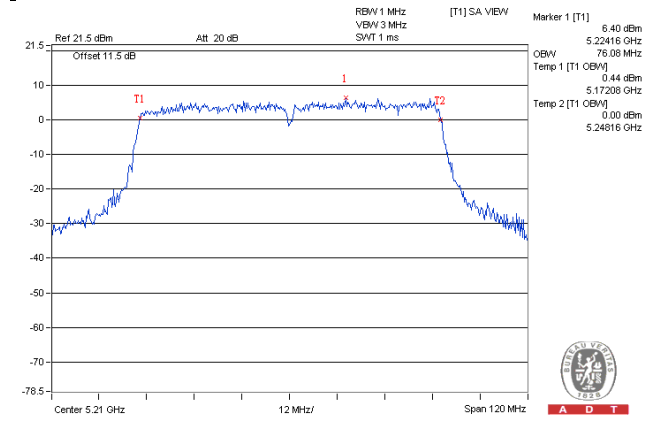
802.11n (HT20)



802.11n (HT40)



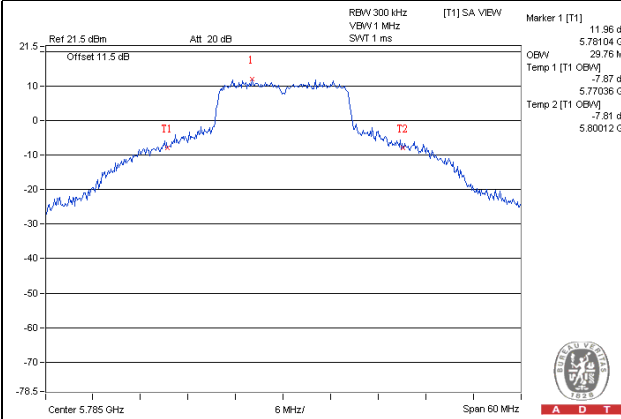
802.11ac (VHT80)



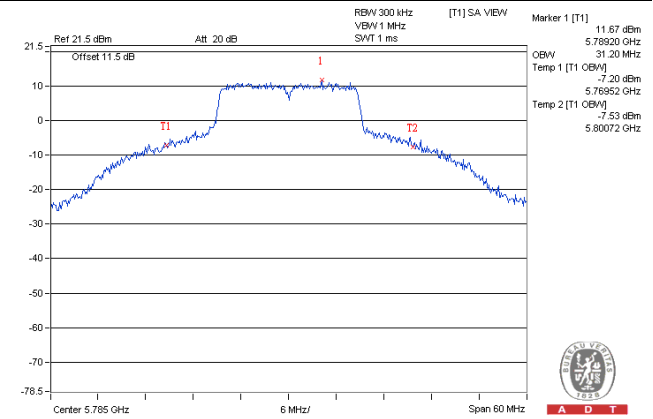
For U-NII-3 band:

SPECTRUM PLOT OF WORST VALUE

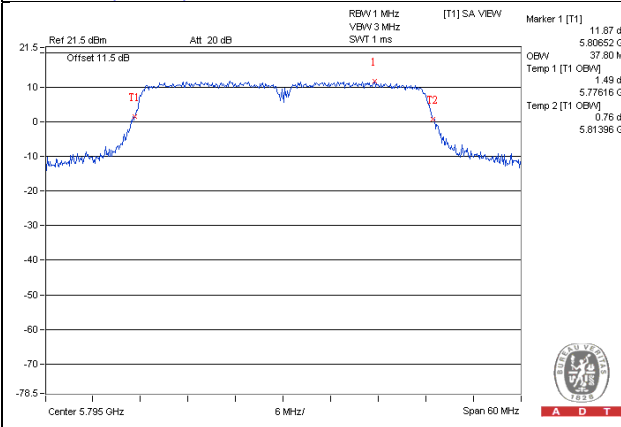
802.11a



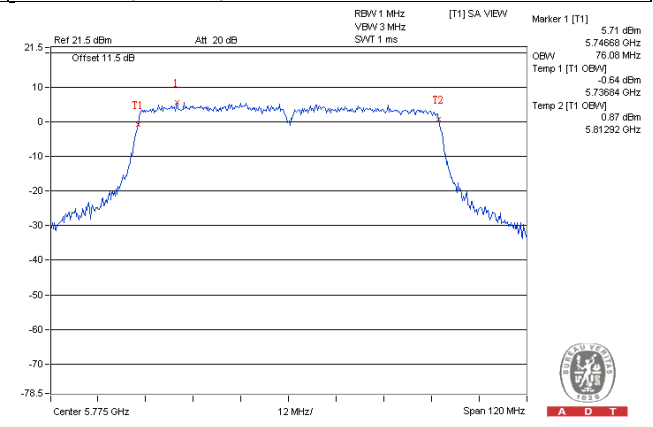
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

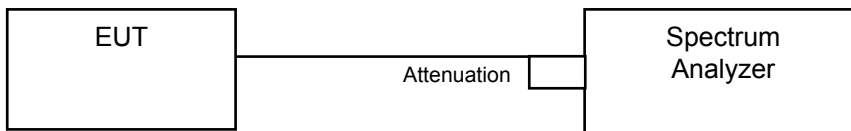


4.4 Peak Power Spectral Density Measurement

4.4.1 Limits of Peak Power Spectral Density Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

For U-NII-1 band:

Using method SA-2

- a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
- b. Set RBW = 1MHz, Set VBW \geq 3 MHz, Detector = RMS
- c. Set Channel power measure = 1MHz
- d. Sweep time = auto, trigger set to "free run".
- e. Trace average at least 100 traces in power averaging mode.
- f. Record the max value and add 10 log (1/duty cycle)

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

For U-NII-3 band:

- a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
- b. Set RBW = 300 kHz, Set VBW \geq 3 RBW, Detector = RMS
- c. Sweep time = auto, trigger set to "free run".
- d. Trace average at least 100 traces in power averaging mode.
- e. Record the max value and add 10 log (1/duty cycle)
- f. 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 $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$

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.	Frequency (MHz)	PSD (dBm/MHz)			Total PSD W/O Duty Factor (dBm/MHz)	Duty Factor	Total PSD With Duty Factor (dBm/MHz)	Maximum Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2					
36	5180	6.58	5.97	6.19	10.99	0.21	11.20	15.23	Pass
40	5200	6.73	7.21	7.88	12.04	0.21	12.25	15.23	Pass
48	5240	7.55	7.05	7.17	12.00	0.21	12.21	15.23	Pass

Note:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1:** Directional gain = 3dBi + 10log(3) = 7.77dBi > 6dBi, so the power density limit shall be reduced to 17-(7.77-6) = 15.23dBm.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Frequency (MHz)	PSD (dBm/MHz)			Total PSD W/O Duty Factor (dBm/MHz)	Duty Factor	Total PSD With Duty Factor (dBm/MHz)	Maximum Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2					
36	5180	5.64	4.69	4.71	9.81	0.17	9.98	15.23	Pass
40	5200	7.51	6.71	7.68	12.09	0.17	12.26	15.23	Pass
48	5240	6.62	6.81	7.60	11.80	0.17	11.97	15.23	Pass

Note:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1:** Directional gain = 3dBi + 10log(3) = 7.77dBi > 6dBi, so the power density limit shall be reduced to 17-(7.77-6) = 15.23dBm.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

Chan.	Frequency (MHz)	PSD (dBm/MHz)			Total PSD W/O Duty Factor (dBm/MHz)	Duty Factor	Total PSD With Duty Factor (dBm/MHz)	Maximum Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2					
38	5190	-0.19	-0.89	-0.50	4.25	0.62	4.87	15.23	Pass
46	5230	4.42	3.64	4.30	8.90	0.62	9.52	15.23	Pass

Note:

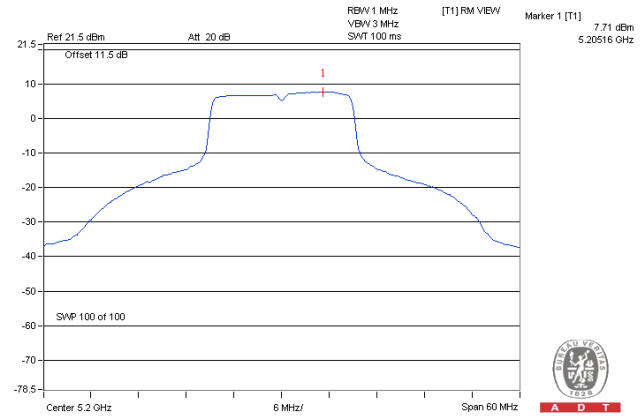
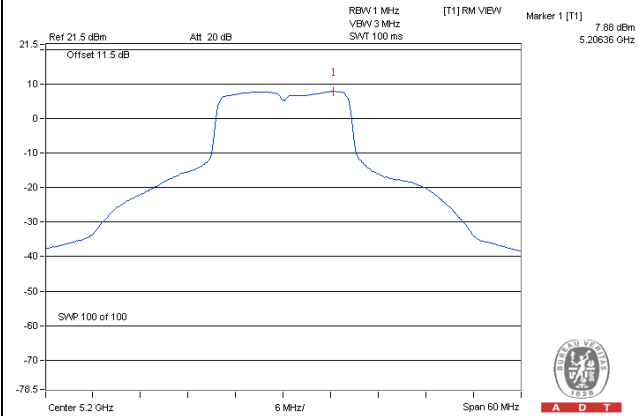
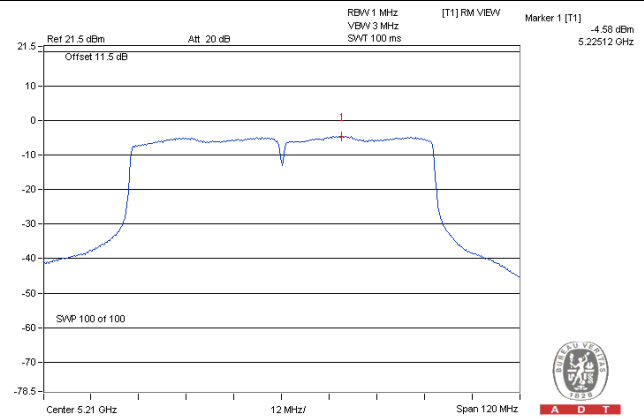
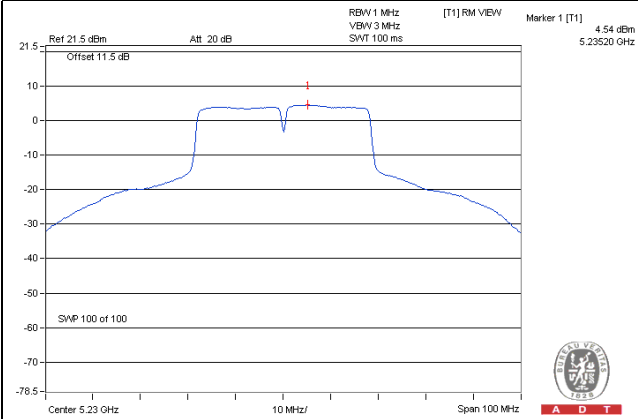
- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1:** Directional gain = $3\text{dBi} + 10\log(3) = 7.77\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (7.77 - 6) = 15.23\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Frequency (MHz)	PSD (dBm/MHz)			Total PSD W/O Duty Factor (dBm/MHz)	Duty Factor	Total PSD With Duty Factor (dBm/MHz)	Maximum Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2					
42	5210	-4.90	-5.30	-4.73	-0.20	0.70	0.50	15.23	Pass

Note:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1:** Directional gain = $3\text{dBi} + 10\log(3) = 7.77\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (7.77 - 6) = 15.23\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE**802.11a / Ch 40 / Chain 2****802.11n (HT20) / Ch 40 / Chain 2****802.11n (HT40) / Ch 46 / Chain 0****802.11ac (VHT80) / Ch 42 / Chain 0**

For U-NII-3 Band

802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	-4.51	-2.29	4.77	0.18	2.66	28.23	Pass
	157	5785	-1.72	0.50	4.77	0.18	5.45	28.23	Pass
	165	5825	-3.60	-1.38	4.77	0.18	3.57	28.23	Pass
1	149	5745	-4.19	-1.97	4.77	0.18	2.98	28.23	Pass
	157	5785	-1.48	0.74	4.77	0.18	5.69	28.23	Pass
	165	5825	-3.08	-0.86	4.77	0.18	4.09	28.23	Pass
2	149	5745	-5.60	-3.38	4.77	0.18	1.57	28.23	Pass
	157	5785	-1.98	0.24	4.77	0.18	5.19	28.23	Pass
	165	5825	-3.59	-1.37	4.77	0.18	3.58	28.23	Pass

Note:

1. Directional gain = $3\text{dBi} + 10\log(3) = 7.77\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (7.77 - 6) = 28.23\text{dBm}$.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	-4.96	-2.74	4.77	0.17	2.20	28.23	Pass
	157	5785	-2.43	-0.21	4.77	0.17	4.73	28.23	Pass
	165	5825	-3.57	-1.35	4.77	0.17	3.59	28.23	Pass
1	149	5745	-4.40	-2.18	4.77	0.17	2.76	28.23	Pass
	157	5785	-1.82	0.40	4.77	0.17	5.34	28.23	Pass
	165	5825	-3.06	-0.84	4.77	0.17	4.10	28.23	Pass
2	149	5745	-4.54	-2.32	4.77	0.17	2.62	28.23	Pass
	157	5785	-2.19	0.03	4.77	0.17	4.97	28.23	Pass
	165	5825	-3.16	-0.94	4.77	0.17	4.00	28.23	Pass

Note:

1. Directional gain = $3\text{dBi} + 10\log(3) = 7.77\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (7.77 - 6) = 28.23\text{dBm}$.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	151	5755	-10.25	-8.03	4.77	0.62	-2.64	28.23	Pass
	159	5795	-7.88	-5.66	4.77	0.62	-0.27	28.23	Pass
1	151	5755	-9.73	-7.51	4.77	0.62	-2.12	28.23	Pass
	159	5795	-7.29	-5.07	4.77	0.62	0.32	28.23	Pass
2	151	5755	-9.86	-7.64	4.77	0.62	-2.25	28.23	Pass
	159	5795	-7.29	-5.07	4.77	0.62	0.32	28.23	Pass

Note:

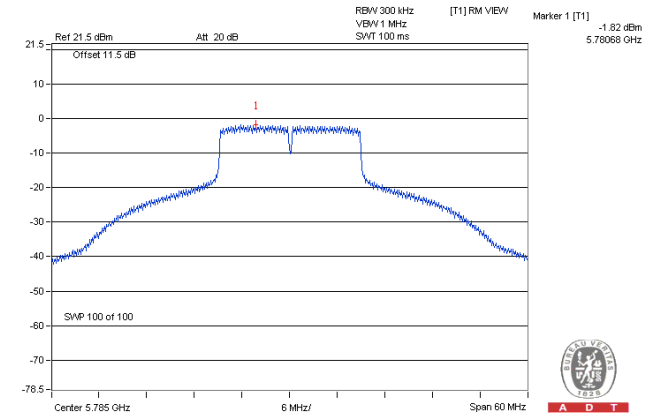
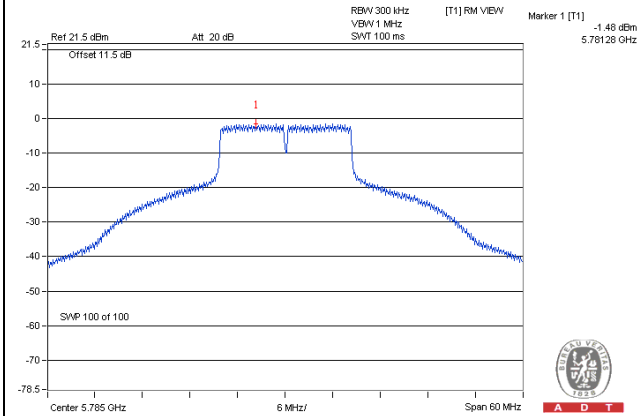
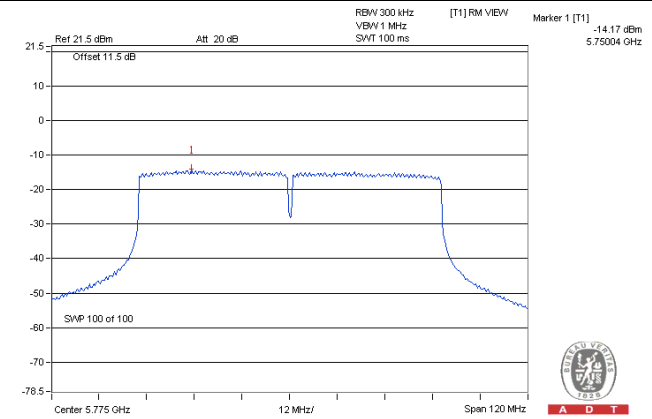
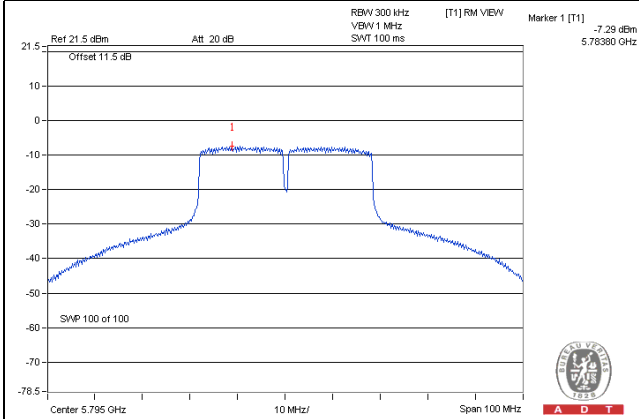
- Directional gain = $3\text{dBi} + 10\log(3) = 7.77\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (7.77 - 6) = 28.23\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	Duty Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	155	5775	-14.64	-12.42	4.77	0.70	-6.95	28.23	Pass
1	155	5775	-14.42	-12.20	4.77	0.70	-6.73	28.23	Pass
2	155	5775	-14.17	-11.95	4.77	0.70	-6.48	28.23	Pass

Note:

- Directional gain = $3\text{dBi} + 10\log(3) = 7.77\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (7.77 - 6) = 28.23\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

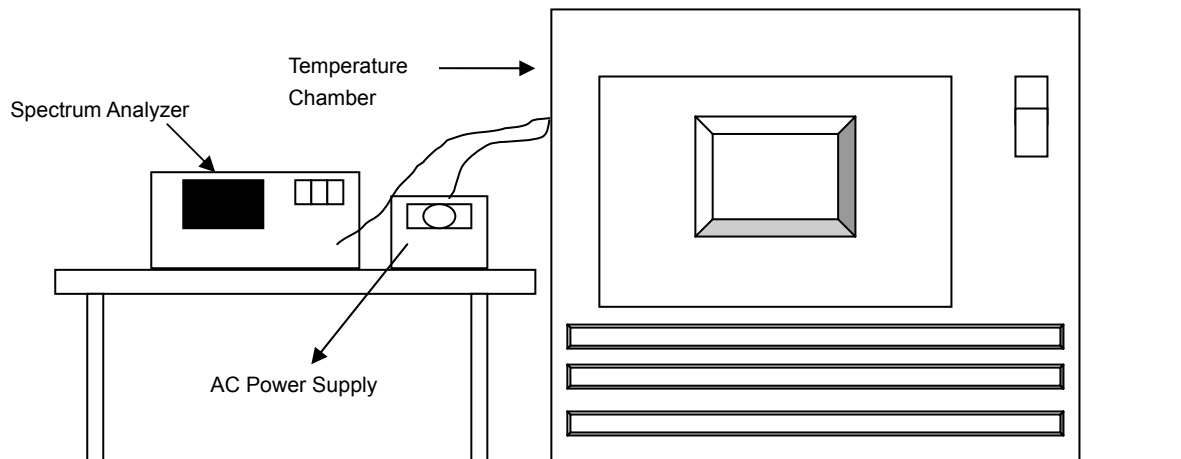
SPECTRUM PLOT OF WORST VALUE**802.11a****802.11n (HT20)****802.11n (HT40)****802.11ac (VHT80)**

4.5 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

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- 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.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- 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 (%)
40	120	5180.0203	0.00039	5180.0213	0.00041	5180.0187	0.00036	5180.0181	0.00035
30	120	5179.9933	-0.00013	5179.9981	-0.00004	5179.9970	-0.00006	5179.9966	-0.00007
20	120	5179.9800	-0.00039	5179.9805	-0.00038	5179.9815	-0.00036	5179.9818	-0.00035
10	120	5179.9834	-0.00032	5179.9808	-0.00037	5179.9820	-0.00035	5179.9800	-0.00039
0	120	5180.0203	0.00039	5180.0208	0.00040	5180.0226	0.00044	5180.0210	0.00041

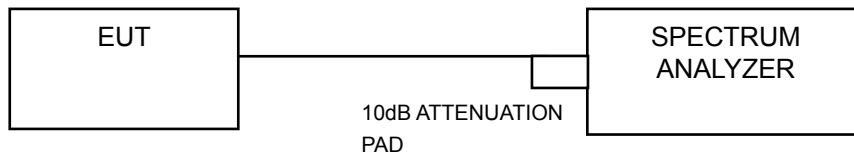
Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5179.9791	-0.00040	5179.9795	-0.00040	5179.9823	-0.00034	5179.9826	-0.00034
	120	5179.9800	-0.00039	5179.9805	-0.00038	5179.9815	-0.00036	5179.9818	-0.00035
	102	5179.9794	-0.00040	5179.9807	-0.00037	5179.9823	-0.00034	5179.9826	-0.00034

4.6 20dB Bandwidth Measurement

4.6.1 Limits of Peak Transmit Power Measurement

Must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates.

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

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

Emission bandwidth

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

4.6.5 Test Result

802.11a

Channel	Frequency (MHz)	20dB Bandwidth (MHz)			Pass / Fail
		Chain 0	Chain 1	Chain 2	
36	5180	20.57	20.83	20.25	Pass
40	5200	21.70	24.77	23.55	Pass
48	5240	23.92	24.45	24.15	Pass
149	5745	20.00	20.50	20.11	Pass
157	5785	33.87	35.84	36.08	Pass
165	5825	24.53	27.47	24.05	Pass

802.11n (HT20)

Channel	Frequency (MHz)	20dB Bandwidth (MHz)			Pass / Fail
		Chain 0	Chain 1	Chain 2	
36	5180	20.98	20.59	20.77	Pass
40	5200	25.78	27.50	26.79	Pass
48	5240	25.76	25.07	27.18	Pass
149	5745	21.19	21.41	21.55	Pass
157	5785	34.15	38.12	36.85	Pass
165	5825	30.25	30.11	31.40	Pass

802.11n (HT40)

Channel	Frequency (MHz)	20dB Bandwidth (MHz)			Pass / Fail
		Chain 0	Chain 1	Chain 2	
38	5190	39.69	39.60	39.48	Pass
46	5230	47.33	46.11	60.67	Pass
151	5755	39.65	40.35	40.69	Pass
159	5795	41.33	44.29	42.17	Pass

802.11ac (VHT80)

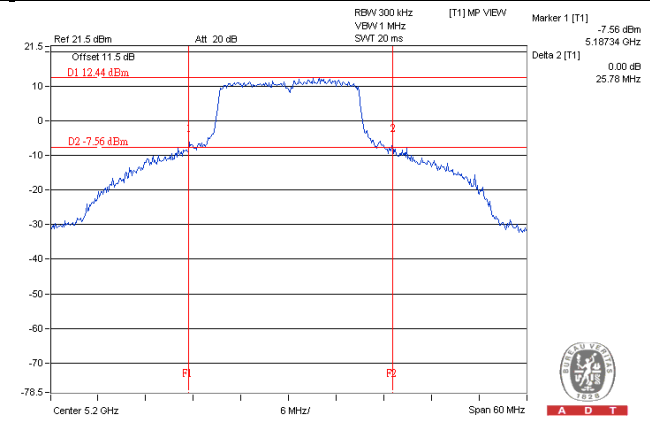
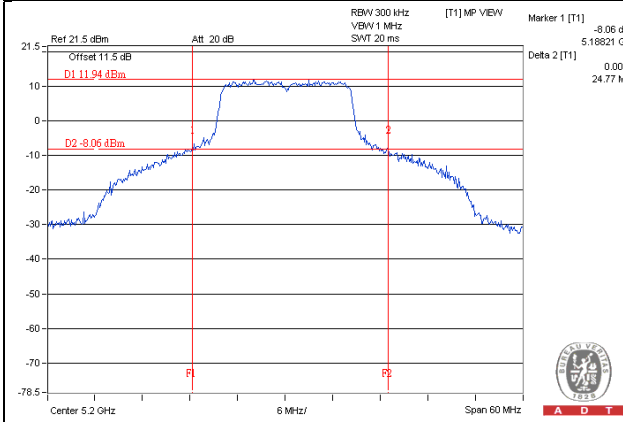
Channel	Frequency (MHz)	20dB Bandwidth (MHz)			Pass / Fail
		Chain 0	Chain 1	Chain 2	
42	5210	79.54	79.44	79.18	Pass
155	5775	79.89	80.70	79.35	Pass

For U-NII-1 Band

SPECTRUM PLOT OF WORST VALUE

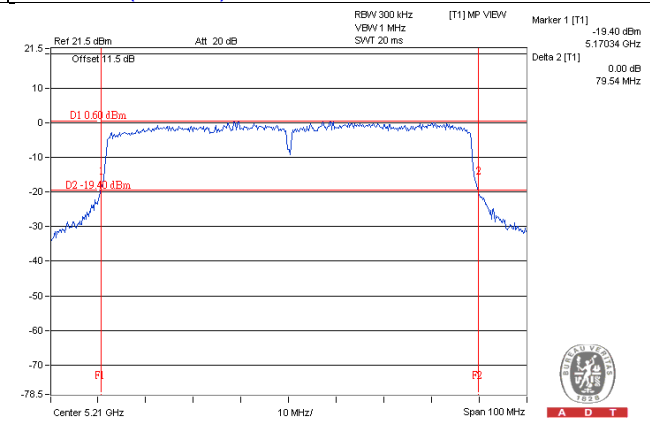
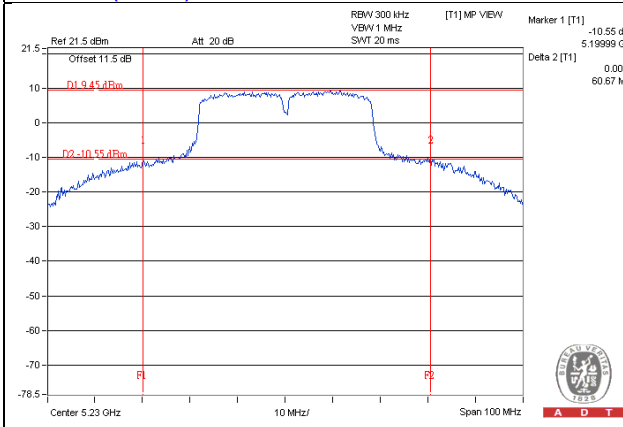
802.11a

802.11n (HT20)



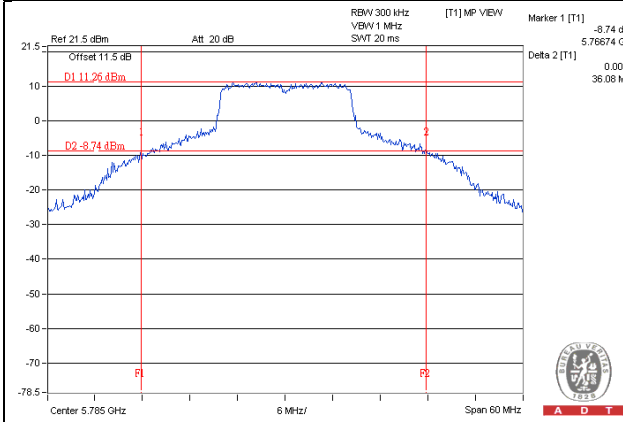
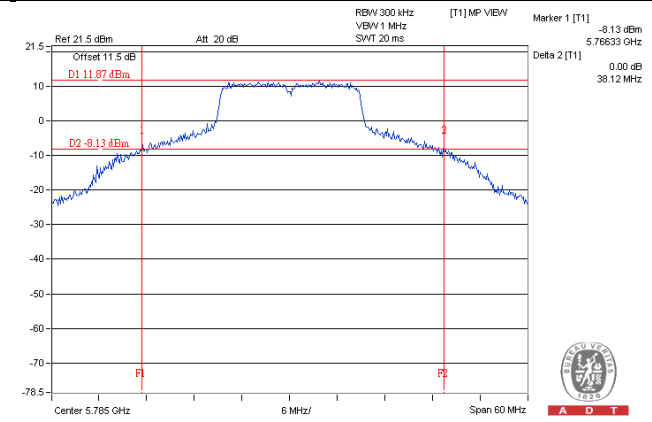
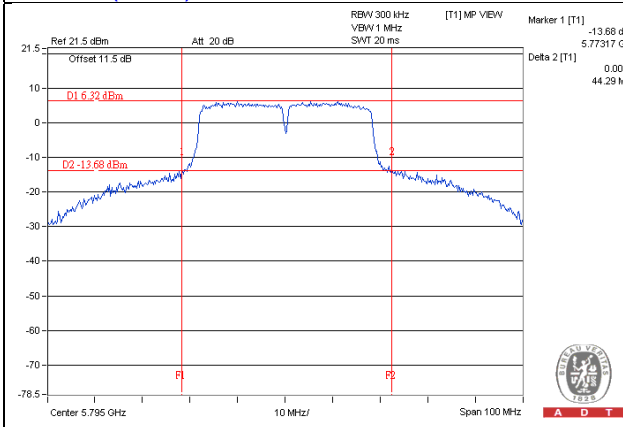
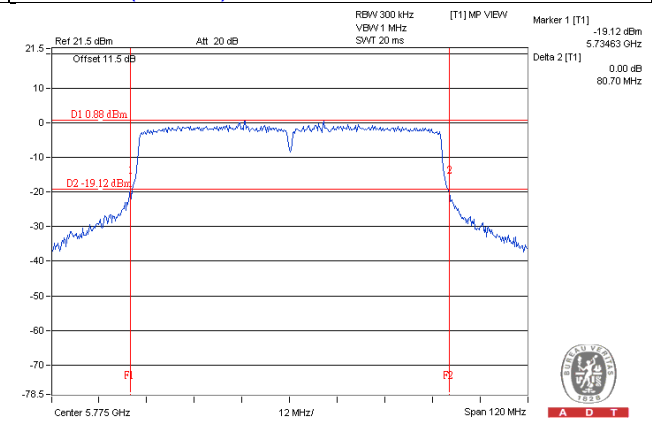
802.11n (HT40)

802.11ac (VHT80)



For U-NII-3 Band

SPECTRUM PLOT OF WORST VALUE

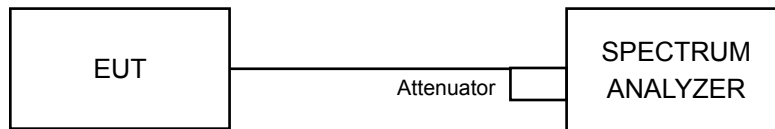
802.11a**802.11n (HT20)****802.11n (HT40)****802.11ac (VHT80)**

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

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

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
149	5745	16.41	16.40	16.39	0.5	Pass
157	5785	16.39	16.38	16.40	0.5	Pass
165	5825	16.39	16.43	16.39	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
149	5745	17.62	17.62	17.60	0.5	Pass
157	5785	17.62	17.60	17.60	0.5	Pass
165	5825	17.62	17.61	17.57	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
151	5755	36.46	36.33	36.43	0.5	Pass
159	5795	35.78	36.33	36.02	0.5	Pass

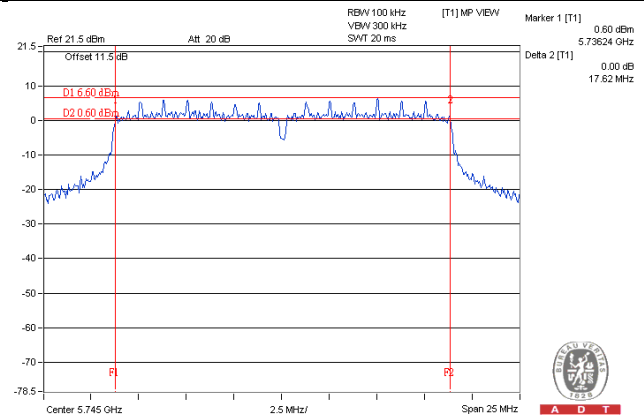
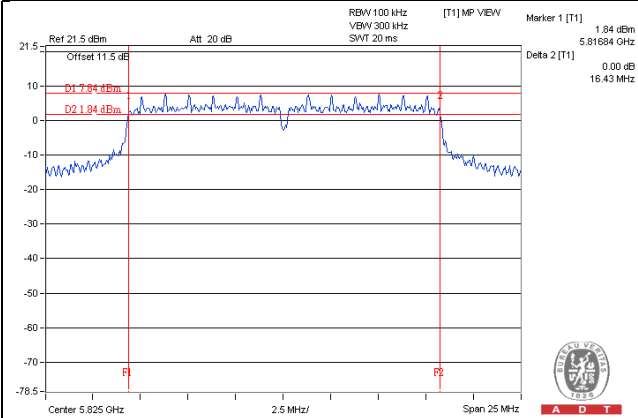
802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
155	5775	76.48	76.43	76.29	0.5	Pass

SPECTRUM PLOT OF WORST VALUE

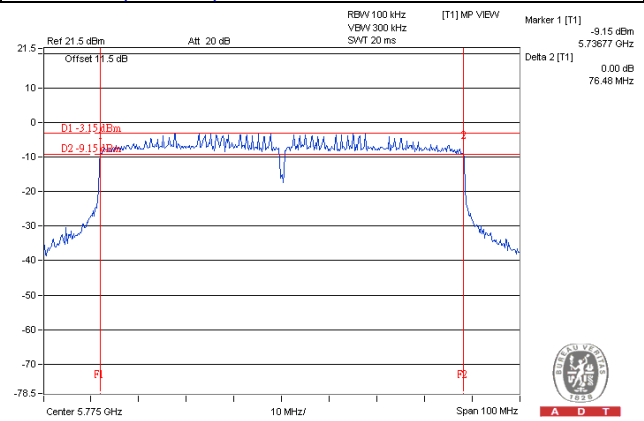
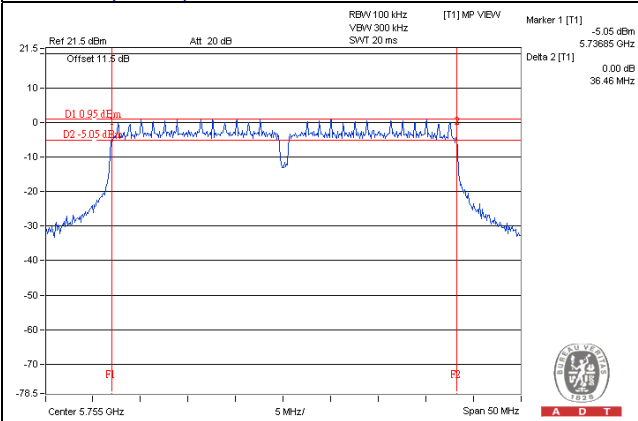
802.11a

802.11n (HT20)



802.11n (HT40)

802.11ac (VHT80)



5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF Lab/Telecom Lab

Tel: 886-3-5935343

Fax: 886-3-5935342

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Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

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