FCC Test Report

Report No.:	RF130313C09C
FCC ID:	A8JESR600
Test Model:	ESR600
Series Model:	ESR600S
Received Date:	Mar. 19, 2015
Test Date:	Mar. 19 ~ Apr. 30, 2015
Issued Date:	May 04, 2015
Applicant:	EnGenius Technologies
Address:	1580 Scenic Avenue, Costa Mesa, CA92626
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

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Release Control Record

Issue No.	Description	Date Issued
RF130313C09C	Original release.	May 04, 2015

1 Certificate of Conformity

Product:	Wireless Device
Brand:	EnGenius
Test Model:	ESR600
Series Model:	ESR600S
Sample Status:	Engineering sample
Applicant:	EnGenius Technologies
Test Date:	Mar. 19 ~ Apr. 30, 2015
Standard:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10:2009

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:** May 04, 2015

Ivy Lin / Specialist

Approved by :  , **Date:** May 04, 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 -9.99dB at 0.47062MHz.
15.407(b) (1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.1dB at 39.62MHz.
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 IPEX not a standard connector.

2.1 Measurement Uncertainty

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

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

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wireless Device
Brand	EnGenius
Test Model	ESR600
Series Model	ESR600S
Model Difference	Refer to Note
Status of EUT	Engineering sample
Power Supply Rating	12Vdc from adapter
Modulation Type	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 300Mbps
Operating Frequency	5180 ~ 5240MHz & 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40)
Output Power	5180 ~ 5240MHz: 106.056mW 5745 ~ 5825MHz: 66.527mW
Antenna Type	PIFA antenna with 2dBi gain
Antenna Connector	IPEX
Accessory Device	Adapter
Data Cable Supplied	NA

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report of BV ADT report no.: RF130313C09-1. The differences compared with the original report are adding new adapter, changing model numbers and updating U-NII band to new rule. Therefore, all test items are re-tested in the test report.
2. The models listed as below are electrically identical, different model numbers are for marketing purpose. (New model is marked in boldface)

Brand	Model	Remark
EnGenius	ESR600	Main test model
	ESR600S	-

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

Modulation Mode	TX FUNCTION
802.11a	1TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX

4. The EUT uses following adapters. (Adapter 2 is new adapter)

Adapter 1	
Brand	Shenzhen
Model	S24B17-120A125-04
Input Power	100-240Vac, 50/60Hz, Max 0.7A
Output Power	12Vdc, 1.25A
Power Line	DC: 1.4m cable without core attached on adapter

Adapter 2	
Brand	Powertron Electronics Corp.
Model	PA1015-120DUB150
Input Power	100-240Vac, 50-60Hz, 0.4A
Output Power	12Vdc, 1.5A, 18W Max
Power Line	DC: 1.6m cable without core attached on adapter

5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

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

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

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

FOR 5745 ~ 5825MHz:

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

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

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

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

Radiated Emission Test (Above 1GHz):

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
-	802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	15.0
-	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

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)	5180-5320	36 to 64	36	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)	5180-5320	36 to 64	36	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
-	802.11a	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

Test Condition:

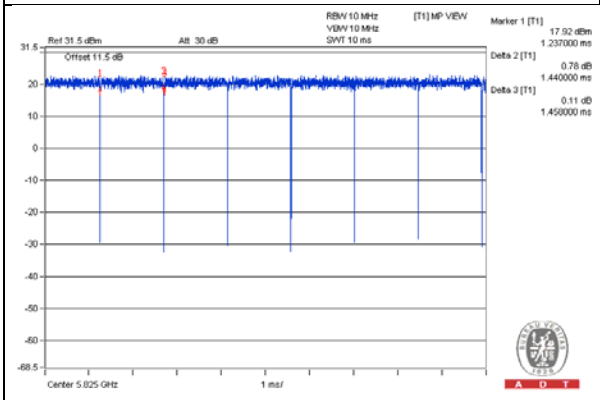
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	18deg. C, 70%RH	120Vac, 60Hz	Nick Hsu
RE<1G	18deg. C, 70%RH	120Vac, 60Hz	Nick Hsu
PLC	24deg. C, 64%RH	120Vac, 60Hz	Jones Chang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Leo Tsai

3.3 Duty Cycle of Test Signal

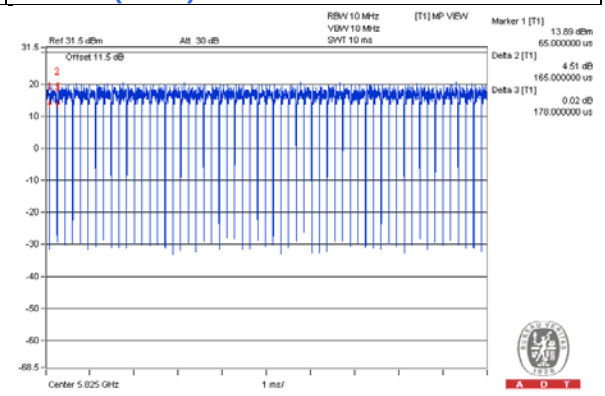
Duty cycle of test signal is > 98 %, duty factor is not required.
802.11a: Duty cycle = 1.440/1.458 = 0.988
802.11n (HT40): Duty cycle = 0.664/0.674 = 0.985

Duty cycle of test signal is < 98 %, duty factor is required.
802.11n (HT20): Duty cycle = 0.165/0.178 = 0.927, Duty factor = 10 * log(1/0.927) = 0.33

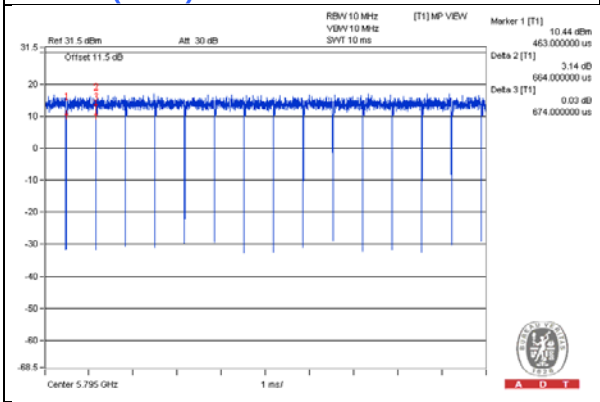
802.11a



802.11n (HT20)



802.11n (HT40)



3.4 Description of Support Units

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

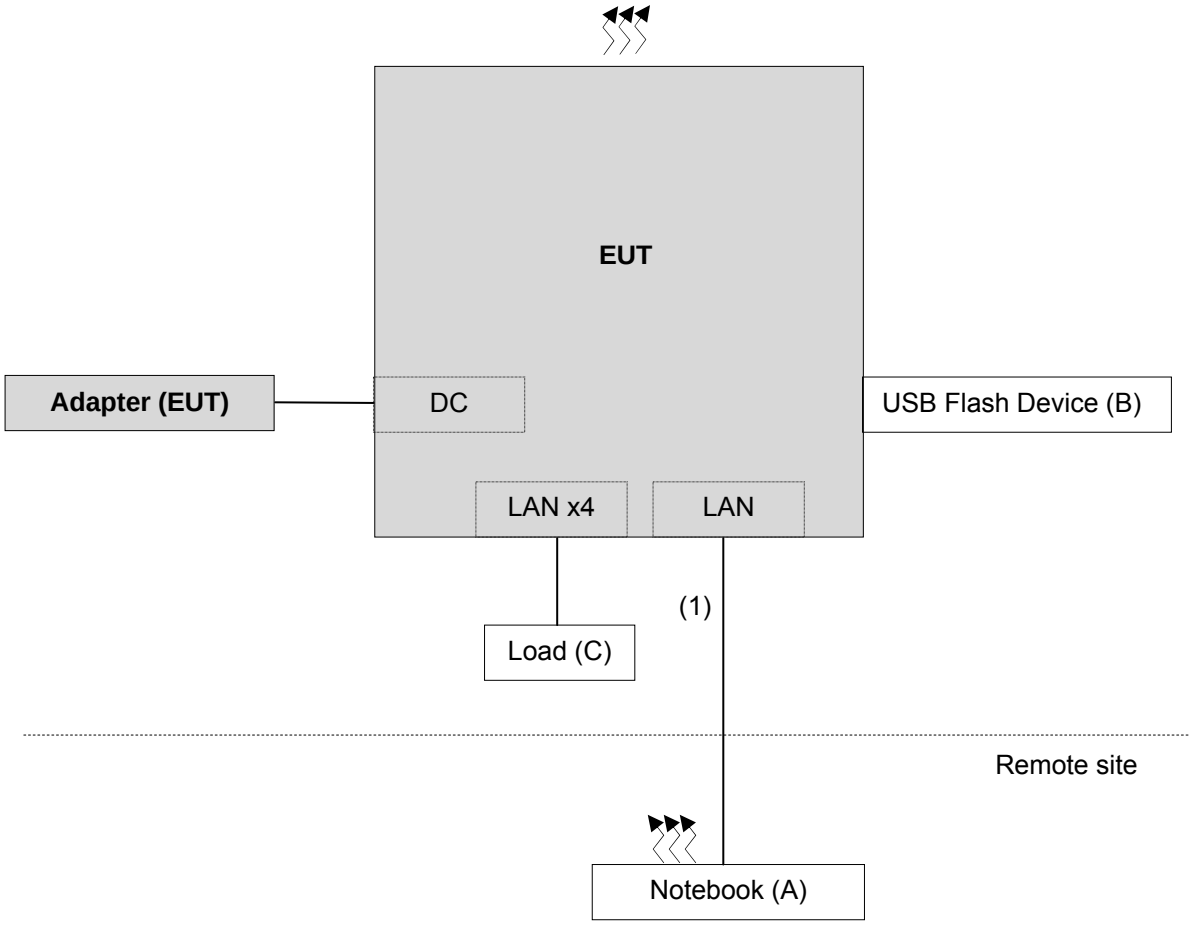
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5410	1HC2XM1	FCC DoC Approved	-
B.	USB Flash Device	Transcend	V85	538455 4489	FCC DoC Approved	-
C.	Load	N/A	N/A	N/A	N/A	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	3	N	0	-
2.	DC cable	1	1.6	N	0	Accessory
3.	LAN cable	4	1.5	N	0	-

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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

FCC Part 15, Subpart E (15.407)
789033 D02 General UNII Test Procedure New Rules v01
662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2009

All test items have been performed and recorded as per the above standards.

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	**LIMIT**	
789033 D02 General UNII Test Procedure New Rules v01	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)	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:

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 06, 2014	Oct. 05, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Aug. 29, 2014	Aug. 28, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Feb. 05, 2015	Feb. 04, 2016
HORN Antenna SCHWARZBECK	9120D	209	Feb. 09, 2015	Feb. 08, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 09, 2015	Feb. 08, 2016
Preamplifier Agilent	8447D	2944A10738	Oct.18, 2014	Oct. 17, 2015
Preamplifier Agilent	8449B	3008A01964	Aug. 22, 2014	Aug. 21, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	214378/4	Aug. 22, 2014	Aug. 21, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6 +309224/4	Aug. 22, 2014	Aug. 21, 2015
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2014	Oct. 17, 2015
High Speed Peak Power Meter	ML2495A	0824011	Jul. 26, 2014	Jul. 25, 2015
Power Sensor	MA2411B	0738171	Jul. 26, 2014	Jul. 25, 2015
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 09, 2014	Jun. 08, 2015

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

2. The test was performed in HwaYa Chamber 3.

3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 988962.

5. The IC Site Registration No. is IC 7450F-3.

4.1.3 Test Procedure

a. The EUT was placed on the top of a rotating table 0.8 meters 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:

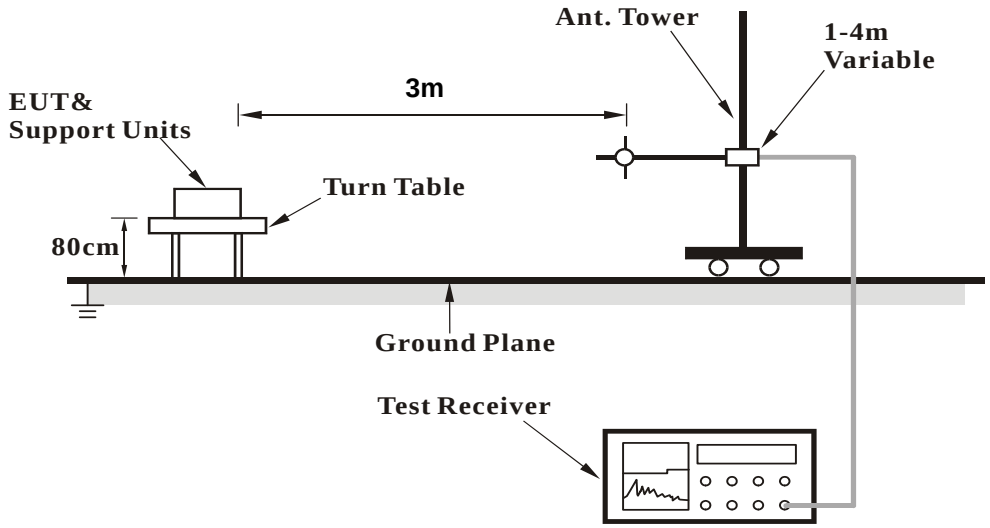
1. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (10 log(1/duty cycle)).
5. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
6. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

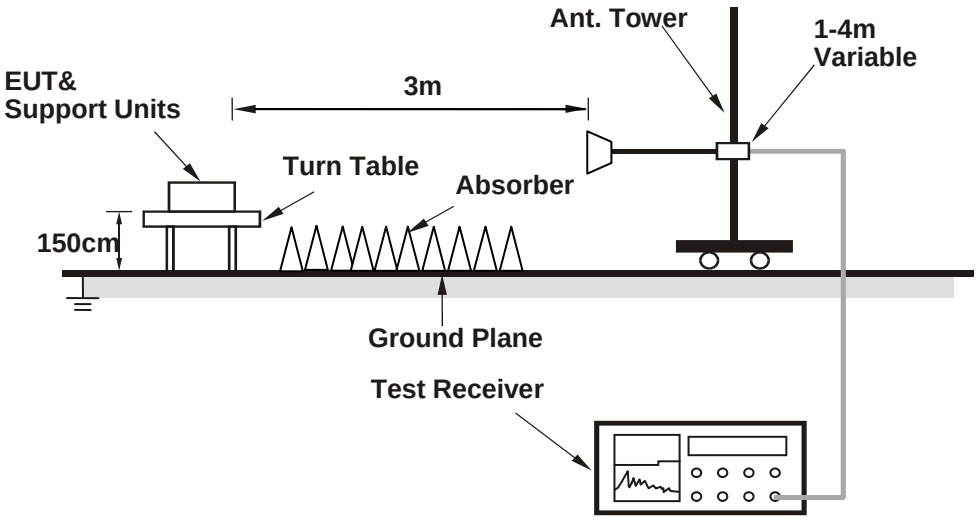
No deviation.

4.1.5 Test Setup

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Condition

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

4.1.7 Test Results

Above 1GHz Data

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.1 PK	74.0	-10.9	1.00 H	261	57.10	6.00
2	5150.00	47.9 AV	54.0	-6.1	1.00 H	261	41.90	6.00
3	*5180.00	104.4 PK			1.07 H	261	64.90	39.50
4	*5180.00	95.0 AV			1.07 H	261	55.50	39.50
5	#10360.00	60.2 PK	74.0	-13.8	1.08 H	61	41.80	18.40
6	#10360.00	47.6 AV	54.0	-6.4	1.08 H	61	29.20	18.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.4 PK	74.0	-15.6	1.57 V	305	52.40	6.00
2	5150.00	52.2 AV	54.0	-1.8	1.57 V	305	46.20	6.00
3	*5180.00	106.5 PK			1.00 V	305	67.00	39.50
4	*5180.00	96.7 AV			1.00 V	305	57.20	39.50
5	#10360.00	63.8 PK	74.0	-10.2	1.00 V	300	45.40	18.40
6	#10360.00	51.1 AV	54.0	-2.9	1.00 V	300	32.70	18.40

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	105.1 PK			1.07 H	260	65.50	39.60
2	*5200.00	95.5 AV			1.07 H	260	55.90	39.60
3	#10400.00	60.6 PK	74.0	-13.4	1.22 H	139	42.10	18.50
4	#10400.00	46.8 AV	54.0	-7.2	1.22 H	139	28.30	18.50
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	*5200.00	111.3 PK			1.62 V	303	71.70	39.60
2	*5200.00	102.1 AV			1.62 V	303	62.50	39.60
3	#10400.00	64.4 PK	74.0	-9.6	1.25 V	300	45.90	18.50
4	#10400.00	50.8 AV	54.0	-3.2	1.25 V	300	32.30	18.50

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.3 PK	74.0	-16.7	1.31 H	270	51.30	6.00
2	5150.00	44.4 AV	54.0	-9.6	1.31 H	270	38.40	6.00
3	*5240.00	105.4 PK			1.50 H	265	65.80	39.60
4	*5240.00	96.1 AV			1.50 H	265	56.50	39.60
5	#10480.00	60.7 PK	74.0	-13.3	1.51 H	292	41.70	19.00
6	#10480.00	48.0 AV	54.0	-6.0	1.51 H	292	29.00	19.00
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	5150.00	58.4 PK	74.0	-15.6	1.64 V	303	52.40	6.00
2	5150.00	46.5 AV	54.0	-7.5	1.64 V	303	40.50	6.00
3	*5240.00	111.6 PK			1.87 V	302	72.00	39.60
4	*5240.00	102.1 AV			1.87 V	302	62.50	39.60
5	#10480.00	65.5 PK	74.0	-8.5	1.37 V	301	46.50	19.00
6	#10480.00	51.9 AV	54.0	-2.1	1.37 V	301	32.90	19.00

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

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.4 PK	74.0	-7.6	1.00 H	258	60.40	6.00
2	5150.00	50.0 AV	54.0	-4.0	1.00 H	258	44.00	6.00
3	*5180.00	105.3 PK			1.00 H	259	65.80	39.50
4	*5180.00	95.9 AV			1.00 H	259	56.40	39.50
5	#10420.00	59.4 PK	74.0	-14.6	1.53 H	21	40.80	18.60
6	#10420.00	46.8 AV	54.0	-7.2	1.53 H	21	28.20	18.60
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	5150.00	69.0 PK	74.0	-5.0	1.34 V	255	63.00	6.00
2	5150.00	52.3 AV	54.0	-1.7	1.34 V	255	46.30	6.00
3	*5180.00	110.8 PK			2.09 V	301	71.30	39.50
4	*5180.00	101.0 AV			2.09 V	301	61.50	39.50
5	#10360.00	65.6 PK	74.0	-8.4	2.07 V	281	47.20	18.40
6	#10360.00	50.8 AV	54.0	-3.2	2.07 V	281	32.40	18.40

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	104.9 PK			1.07 H	258	65.30	39.60
2	*5200.00	95.4 AV			1.07 H	258	55.80	39.60
3	#10400.00	60.0 PK	74.0	-14.0	1.09 H	316	41.50	18.50
4	#10400.00	47.3 AV	54.0	-6.7	1.09 H	316	28.80	18.50
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	*5200.00	110.8 PK			1.63 V	306	71.20	39.60
2	*5200.00	101.0 AV			1.63 V	306	61.40	39.60
3	#10400.00	65.1 PK	74.0	-8.9	1.00 V	9	46.60	18.50
4	#10400.00	51.1 AV	54.0	-2.9	1.00 V	9	32.60	18.50

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.2 PK	74.0	-16.8	1.57 H	259	51.20	6.00
2	5150.00	44.4 AV	54.0	-9.6	1.57 H	259	38.40	6.00
3	*5240.00	105.3 PK			1.39 H	258	65.70	39.60
4	*5240.00	95.6 AV			1.39 H	258	56.00	39.60
5	#10480.00	60.5 PK	74.0	-13.5	1.44 H	110	41.50	19.00
6	#10480.00	47.6 AV	54.0	-6.4	1.44 H	110	28.60	19.00
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	5150.00	58.4 PK	74.0	-15.6	1.68 V	298	52.40	6.00
2	5150.00	45.7 AV	54.0	-8.3	1.68 V	298	39.70	6.00
3	*5240.00	111.2 PK			1.70 V	306	71.60	39.60
4	*5240.00	101.6 AV			1.70 V	306	62.00	39.60
5	#10480.00	64.7 PK	74.0	-9.3	1.02 V	303	45.70	19.00
6	#10480.00	51.4 AV	54.0	-2.6	1.02 V	303	32.40	19.00

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

802.11n (HT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	62.2 PK	74.0	-11.8	1.00 H	257	56.20	6.00
2	5150.00	47.7 AV	54.0	-6.3	1.00 H	257	41.70	6.00
3	*5190.00	95.5 PK			1.00 H	258	56.00	39.50
4	*5190.00	86.1 AV			1.00 H	258	46.60	39.50
5	#10380.00	59.5 PK	74.0	-14.5	1.23 H	72	41.00	18.50
6	#10380.00	46.5 AV	54.0	-7.5	1.23 H	72	28.00	18.50
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	5150.00	66.2 PK	74.0	-7.8	1.82 V	295	60.20	6.00
2	5150.00	52.2 AV	54.0	-1.8	1.82 V	295	46.20	6.00
3	*5190.00	100.9 PK			2.17 V	292	61.40	39.50
4	*5190.00	91.2 AV			2.17 V	292	51.70	39.50
5	#10380.00	59.4 PK	74.0	-14.6	1.72 V	316	40.90	18.50
6	#10380.00	46.2 AV	54.0	-7.8	1.72 V	316	27.70	18.50

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.0 PK	74.0	-16.0	1.17 H	259	52.00	6.00
2	5150.00	45.8 AV	54.0	-8.2	1.17 H	259	39.80	6.00
3	*5230.00	102.0 PK			1.00 H	258	62.40	39.60
4	*5230.00	92.6 AV			1.00 H	258	53.00	39.60
5	#10460.00	59.7 PK	74.0	-14.3	1.25 H	134	40.80	18.90
6	#10460.00	46.7 AV	54.0	-7.3	1.25 H	134	27.80	18.90
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	60.6 PK	74.0	-13.4	1.91 V	299	54.60	6.00
2	5150.00	47.9 AV	54.0	-6.1	1.91 V	299	41.90	6.00
3	*5230.00	108.6 PK			1.70 V	303	69.00	39.60
4	*5230.00	99.1 AV			1.70 V	303	59.50	39.60
5	#10460.00	61.4 PK	74.0	-12.6	1.08 V	73	42.50	18.90
6	#10460.00	50.0 AV	54.0	-4.0	1.08 V	73	31.10	18.90

REMARKS:

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

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	66.7 PK	74.0	-7.3	1.02 H	255	59.90	6.80
2	#5714.00	49.3 AV	54.0	-4.7	1.02 H	255	42.50	6.80
3	#5722.00	69.5 PK	78.2	-8.7	1.12 H	254	62.70	6.80
4	#5725.00	59.3 PK	78.2	-18.9	1.09 H	254	52.50	6.80
5	*5745.00	105.3 PK			1.03 H	254	64.90	40.40
6	*5745.00	96.0 AV			1.03 H	254	55.60	40.40
7	11490.00	58.1 PK	74.0	-15.9	1.15 H	4	39.70	18.40
8	11490.00	45.2 AV	54.0	-8.8	1.15 H	4	26.80	18.40
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	70.0 PK	74.0	-4.0	1.00 V	274	63.20	6.80
2	#5714.00	52.0 AV	54.0	-2.0	1.00 V	274	45.20	6.80
3	#5722.00	72.3 PK	78.2	-5.9	1.00 V	270	65.50	6.80
4	#5725.00	62.3 PK	78.2	-15.9	1.00 V	273	55.50	6.80
5	*5745.00	108.3 PK			1.00 V	272	67.90	40.40
6	*5745.00	99.5 AV			1.00 V	272	59.10	40.40
7	11490.00	62.2 PK	74.0	-11.8	1.00 V	7	43.80	18.40
8	11490.00	49.6 AV	54.0	-4.4	1.00 V	7	31.20	18.40

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	104.8 PK			1.14 H	254	64.30	40.50
2	*5785.00	95.6 AV			1.14 H	254	55.10	40.50
3	11570.00	59.4 PK	74.0	-14.6	1.19 H	288	41.00	18.40
4	11570.00	46.3 AV	54.0	-7.7	1.19 H	288	27.90	18.40
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	*5785.00	108.8 PK			1.67 V	358	68.30	40.50
2	*5785.00	99.3 AV			1.67 V	358	58.80	40.50
3	11570.00	62.1 PK	74.0	-11.9	1.06 V	18	43.70	18.40
4	11570.00	49.6 AV	54.0	-4.4	1.06 V	18	31.20	18.40

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	104.4 PK			1.00 H	253	63.90	40.50
2	*5825.00	95.3 AV			1.00 H	253	54.80	40.50
3	#5850.00	46.6 PK	78.2	-31.6	1.00 H	272	39.70	6.90
4	#5853.00	59.9 PK	78.2	-18.3	1.12 H	260	52.90	7.00
5	#5861.00	58.2 PK	74.0	-15.8	1.18 H	261	51.20	7.00
6	#5861.00	45.2 AV	54.0	-8.8	1.18 H	261	38.20	7.00
7	11650.00	59.4 PK	74.0	-14.6	1.07 H	182	40.50	18.90
8	11650.00	46.2 AV	54.0	-7.8	1.07 H	182	27.30	18.90
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	*5825.00	107.4 PK			1.65 V	357	66.90	40.50
2	*5825.00	98.0 AV			1.65 V	357	57.50	40.50
3	#5850.00	48.4 PK	78.2	-29.8	1.64 V	349	41.50	6.90
4	#5853.00	64.1 PK	78.2	-14.1	1.63 V	297	57.10	7.00
5	#5861.00	59.6 PK	74.0	-14.4	1.87 V	295	52.60	7.00
6	#5861.00	46.2 AV	54.0	-7.8	1.87 V	295	39.20	7.00
7	11650.00	62.8 PK	74.0	-11.2	1.05 V	19	43.90	18.90
8	11650.00	50.4 AV	54.0	-3.6	1.05 V	19	31.50	18.90

REMARKS:

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

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	63.4 PK	74.0	-10.6	1.05 H	254	56.60	6.80
2	#5714.00	47.1 AV	54.0	-6.9	1.05 H	254	40.30	6.80
3	#5722.00	68.7 PK	78.2	-9.5	1.14 H	256	61.90	6.80
4	#5725.00	57.1 PK	78.2	-21.1	1.08 H	255	50.30	6.80
5	*5745.00	103.7 PK			1.02 H	254	63.30	40.40
6	*5745.00	94.2 AV			1.02 H	254	53.80	40.40
7	11490.00	58.2 PK	74.0	-15.8	1.24 H	110	39.80	18.40
8	11490.00	44.8 AV	54.0	-9.2	1.24 H	110	26.40	18.40
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	67.2 PK	74.0	-6.8	1.00 V	254	60.40	6.80
2	#5714.00	49.4 AV	54.0	-4.6	1.00 V	254	42.60	6.80
3	#5722.00	73.2 PK	78.2	-5.0	1.00 V	251	66.40	6.80
4	#5725.00	61.6 PK	78.2	-16.6	1.00 V	252	54.80	6.80
5	*5745.00	107.3 PK			1.06 V	256	66.90	40.40
6	*5745.00	97.5 AV			1.06 V	256	57.10	40.40
7	11490.00	63.1 PK	74.0	-10.9	1.00 V	17	44.70	18.40
8	11490.00	49.4 AV	54.0	-4.6	1.00 V	17	31.00	18.40

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	103.0 PK			1.00 H	253	62.50	40.50
2	*5785.00	93.6 AV			1.00 H	253	53.10	40.50
3	11570.00	58.8 PK	74.0	-15.2	1.24 H	106	40.40	18.40
4	11570.00	46.1 AV	54.0	-7.9	1.24 H	106	27.70	18.40
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	*5785.00	107.0 PK			1.83 V	360	66.50	40.50
2	*5785.00	97.1 AV			1.83 V	360	56.60	40.50
3	11570.00	61.5 PK	74.0	-12.5	1.21 V	20	43.10	18.40
4	11570.00	48.6 AV	54.0	-5.4	1.21 V	20	30.20	18.40

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	102.4 PK			1.00 H	254	61.90	40.50
2	*5825.00	93.1 AV			1.00 H	254	52.60	40.50
3	#5850.00	44.6 PK	78.2	-33.6	1.07 H	249	37.70	6.90
4	#5853.00	58.2 PK	78.2	-20.0	1.04 H	241	51.20	7.00
5	#5861.00	57.3 PK	74.0	-16.7	1.22 H	223	50.30	7.00
6	#5861.00	44.6 AV	54.0	-9.4	1.22 H	223	37.60	7.00
7	11650.00	58.7 PK	74.0	-15.3	1.19 H	93	39.80	18.90
8	11650.00	46.2 AV	54.0	-7.8	1.19 H	93	27.30	18.90
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	*5825.00	105.5 PK			1.72 V	359	65.00	40.50
2	*5825.00	96.0 AV			1.72 V	359	55.50	40.50
3	#5850.00	46.5 PK	78.2	-31.7	1.50 V	351	39.60	6.90
4	#5853.00	58.5 PK	78.2	-19.7	1.30 V	345	51.50	7.00
5	#5861.00	57.6 PK	74.0	-16.4	1.09 V	334	50.60	7.00
6	#5861.00	45.0 AV	54.0	-9.0	1.09 V	334	38.00	7.00
7	11650.00	62.0 PK	74.0	-12.0	1.11 V	19	43.10	18.90
8	11650.00	48.6 AV	54.0	-5.4	1.11 V	19	29.70	18.90

REMARKS:

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

802.11n (HT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5714.00	63.7 PK	74.0	-10.3	1.15 H	254	56.90	6.80
2	#5714.00	49.8 AV	54.0	-4.2	1.15 H	254	43.00	6.80
3	#5722.00	68.9 PK	78.2	-9.3	1.13 H	254	62.10	6.80
4	#5725.00	54.3 PK	78.2	-23.9	1.08 H	253	47.50	6.80
5	*5755.00	97.3 PK			1.14 H	253	56.80	40.50
6	*5755.00	88.4 AV			1.14 H	253	47.90	40.50
7	11510.00	58.9 PK	74.0	-15.1	1.05 H	81	40.60	18.30
8	11510.00	45.9 AV	54.0	-8.1	1.05 H	81	27.60	18.30
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	#5714.00	66.4 PK	74.0	-7.6	1.00 V	273	59.60	6.80
2	#5714.00	52.8 AV	54.0	-1.2	1.00 V	273	46.00	6.80
3	#5722.00	71.0 PK	78.2	-7.2	1.00 V	275	64.20	6.80
4	#5725.00	56.4 PK	78.2	-21.8	1.05 V	273	49.60	6.80
5	*5755.00	100.9 PK			1.05 V	251	60.40	40.50
6	*5755.00	91.8 AV			1.05 V	251	51.30	40.50
7	11510.00	59.6 PK	74.0	-14.4	1.03 V	16	41.30	18.30
8	11510.00	46.2 AV	54.0	-7.8	1.03 V	16	27.90	18.30

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5795.00	100.2 PK			1.15 H	254	59.70	40.50
2	*5795.00	90.9 AV			1.15 H	254	50.40	40.50
3	#5850.00	56.7 PK	78.2	-21.5	1.26 H	234	49.80	6.90
4	#5853.00	59.9 PK	78.2	-18.3	1.26 H	234	52.90	7.00
5	#5861.00	59.0 PK	74.0	-15.0	1.15 H	254	52.00	7.00
6	#5861.00	45.2 AV	54.0	-8.8	1.15 H	254	38.20	7.00
7	11590.00	59.5 PK	74.0	-14.5	1.00 H	96	41.00	18.50
8	11590.00	46.6 AV	54.0	-7.4	1.00 H	96	28.10	18.50
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	*5795.00	104.3 PK			1.51 V	299	63.80	40.50
2	*5795.00	94.8 AV			1.51 V	299	54.30	40.50
3	#5850.00	57.0 PK	78.2	-21.2	1.66 V	302	50.10	6.90
4	#5853.00	61.5 PK	78.2	-16.7	1.66 V	302	54.50	7.00
5	#5861.00	59.3 PK	74.0	-14.7	1.54 V	289	52.30	7.00
6	#5861.00	45.7 AV	54.0	-8.3	1.54 V	289	38.70	7.00
7	11590.00	60.1 PK	74.0	-13.9	1.10 V	19	41.60	18.50
8	11590.00	47.0 AV	54.0	-7.0	1.10 V	19	28.50	18.50

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

Below 1GHz Worst-Case Data

802.11n (HT20)

CHANNEL	TX Channel 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	57.12	33.2 QP	40.0	-6.8	1.99 H	6	47.80	-14.60
2	125.17	39.2 QP	43.5	-4.3	1.49 H	109	55.30	-16.10
3	375.98	41.1 QP	46.0	-4.9	1.00 H	117	52.10	-11.00
4	624.85	41.6 QP	46.0	-4.4	1.49 H	209	47.20	-5.60
5	714.29	41.0 QP	46.0	-5.0	1.99 H	295	45.30	-4.30
6	875.67	41.7 QP	46.0	-4.3	1.00 H	132	42.80	-1.10
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	**39.62**	**38.9 QP**	**40.0**	**-1.1**	**1.49 V**	**336**	**53.90**	**-15.00**
2	125.17	42.1 QP	43.5	-1.4	1.00 V	348	58.20	-16.10
3	375.98	35.5 QP	46.0	-10.5	1.99 V	79	46.50	-11.00
4	500.42	36.5 QP	46.0	-9.5	1.00 V	90	44.90	-8.40
5	624.85	42.1 QP	46.0	-3.9	1.49 V	167	47.70	-5.60
6	716.23	44.0 QP	46.0	-2.0	1.00 V	332	48.20	-4.20

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)– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 11, 2014	Nov. 10, 2015
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 26, 2014	Dec. 25, 2015
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 02, 2015	Mar. 01, 2016
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 21, 2014	Jul. 20, 2015
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 Procedure

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

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

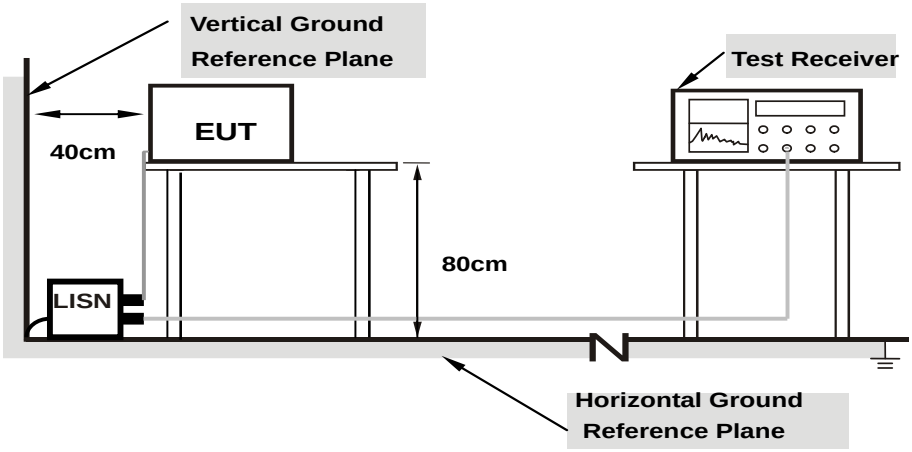
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

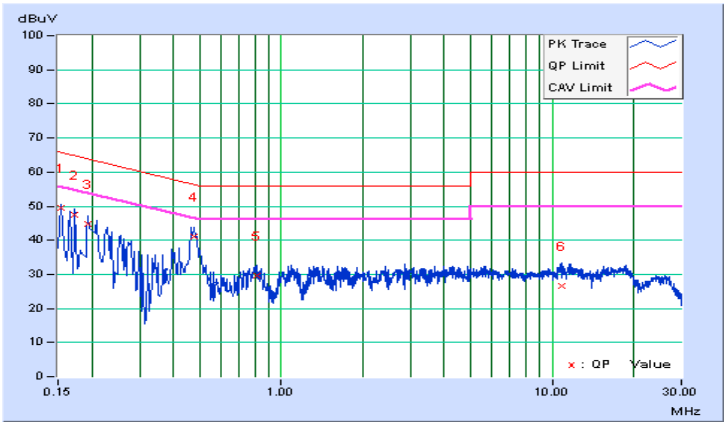
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.08	49.38	37.48	49.46	37.56	65.79	55.79	-16.33	-18.23
2	0.17346	0.11	47.41	32.18	47.52	32.29	64.79	54.79	-17.28	-22.51
3	0.19305	0.14	44.71	28.82	44.85	28.96	63.90	53.90	-19.06	-24.95
4	0.47453	0.09	41.13	32.24	41.22	32.33	56.43	46.43	-15.21	-14.10
5	0.81470	0.15	29.41	20.22	29.56	20.37	56.00	46.00	-26.44	-25.63
6	10.82821	0.52	26.24	17.88	26.76	18.40	60.00	50.00	-33.24	-31.60

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.

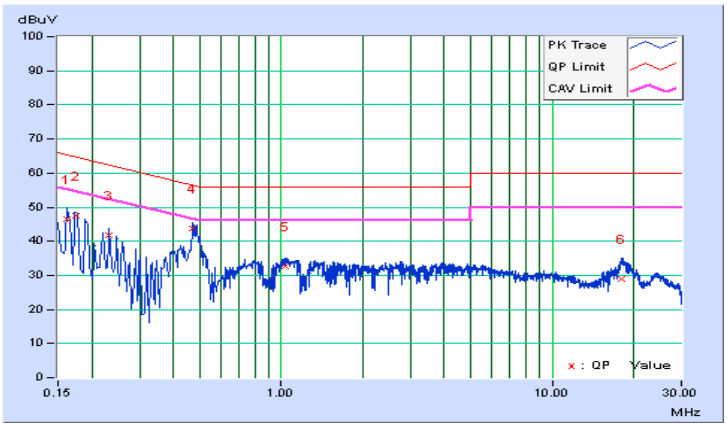


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16173	0.15	46.24	28.68	46.39	28.83	65.37	55.37	-18.98	-26.54
2	0.17374	0.18	47.21	32.15	47.39	32.33	64.78	54.78	-17.39	-22.45
3	0.23211	0.24	41.35	29.89	41.59	30.13	62.37	52.37	-20.79	-22.25
4	**0.47062**	**0.17**	**43.63**	**36.34**	**43.80**	**36.51**	**56.50**	**46.50**	**-12.70**	**-9.99**
5	1.03757	0.18	32.46	25.40	32.64	25.58	56.00	46.00	-23.36	-20.42
6	17.94050	0.79	28.19	16.17	28.98	16.96	60.00	50.00	-31.02	-33.04

REMARKS:

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



4.3 Transmit Power Measurment

4.3.1 Limits of Transmit Power Measurement

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

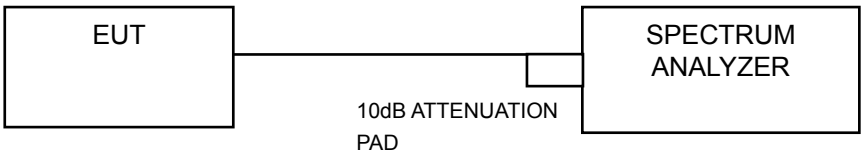
*B is the 26 dB emission bandwidth in megahertz

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

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

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

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

FOR AVERAGE POWER MEASUREMENT

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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

4.3.7 Test Result

POWER OUTPUT:

802.11a

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	64.863	18.12	30	Pass
40	5200	85.704	19.33	30	Pass
48	5240	80.910	19.08	30	Pass
149	5745	**66.527**	18.23	30	Pass
157	5785	56.624	17.53	30	Pass
165	5825	49.774	16.97	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	17.27	17.22	**106.056**	20.26	30	Pass
40	5200	17.21	17.12	104.125	20.18	30	Pass
48	5240	17.20	16.89	101.346	20.06	30	Pass
149	5745	14.49	14.45	55.98	17.48	30	Pass
157	5785	13.55	13.67	45.927	16.62	30	Pass
165	5825	13.00	12.86	39.273	15.94	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	10.04	10.48	21.262	13.28	30	Pass
46	5230	17.12	16.98	101.411	20.06	30	Pass
151	5755	10.62	10.73	23.365	13.69	30	Pass
159	5795	13.82	13.94	48.873	16.89	30	Pass

26dB BANDWIDTH:

802.11a

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	Pass / Fail
36	5180	30.71	Pass
40	5200	32.32	Pass
48	5240	30.93	Pass

802.11n (HT20)

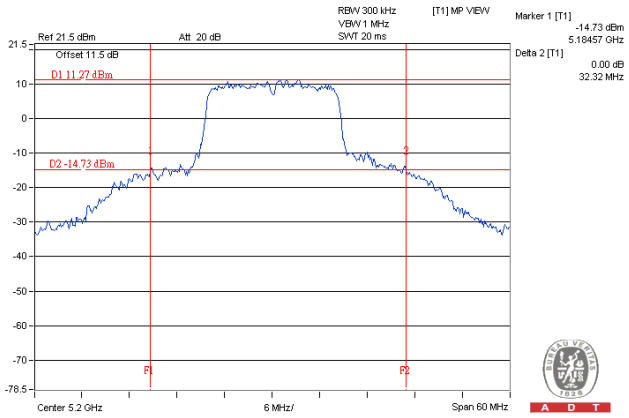
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
36	5180	25.47	30.39	Pass
40	5200	20.82	29.82	Pass
48	5240	26.14	35.83	Pass

802.11n (HT40)

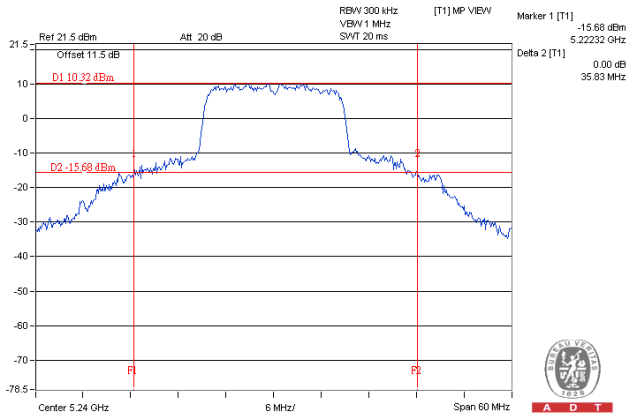
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
38	5190	41.90	41.99	Pass
46	5230	51.28	74.38	Pass

SPECTRUM PLOT OF WORST VALUE

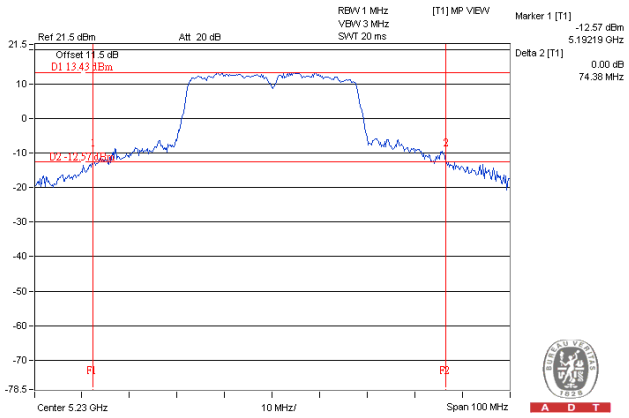
802.11a



802.11n (HT20)



802.11n (HT40)



FOR OCCUPIED BANDWIDTH:

802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
36	5180	16.92	Pass
40	5200	16.68	Pass
48	5240	16.80	Pass

802.11n (HT20)

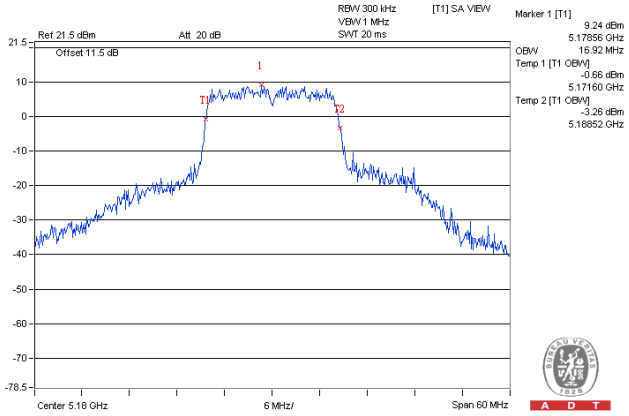
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
36	5180	17.64	17.76	Pass
40	5200	17.52	17.76	Pass
48	5240	17.52	17.88	Pass

802.11n (HT40)

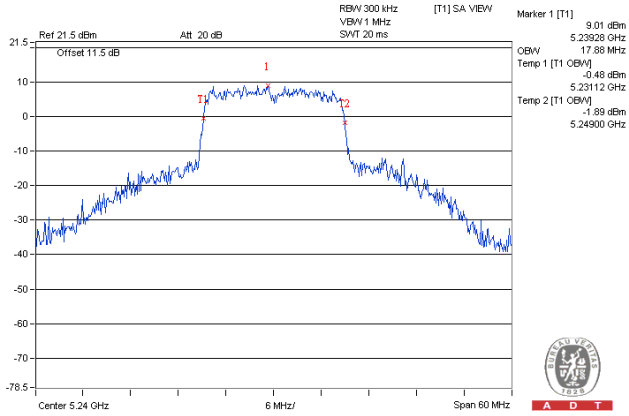
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
38	5190	36.24	36.24	Pass
46	5230	36.48	36.60	Pass

SPECTRUM PLOT OF WORST VALUE

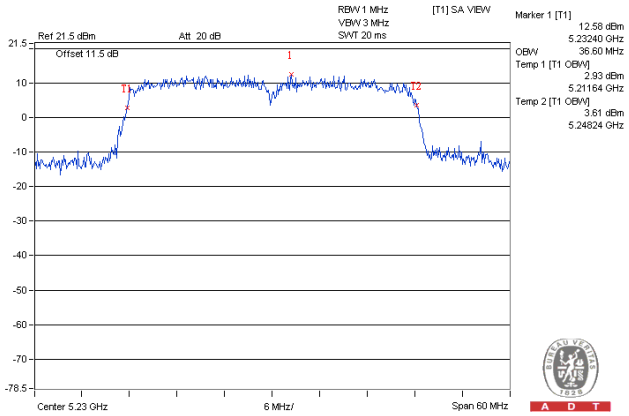
802.11a



802.11n (HT20)



802.11n (HT40)

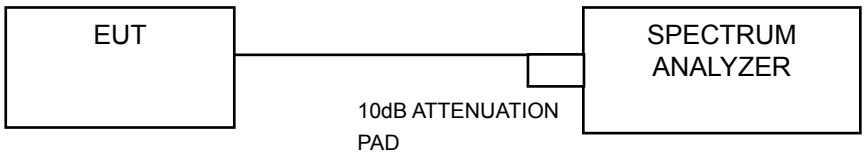


4.4 Peak Power Spectral Density Measurement

4.4.1 Limits of Peak Power Spectral Density Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedure

For U-NII-1 band:

Using method SA-2

1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 30 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3) Set Channel power measure = 1MHz
4) Sweep time = 20 ms
5) Trace average at least 100 traces in power averaging mode.
6) Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:

1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 300 kHz, Set VBW ≥ 3 RBW, Detector = RMS
3) Sweep time = 100 ms
4) Trace average at least 100 traces in power averaging mode.
5) Record the max value and add 10 log (1/duty cycle)
6) Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500kHz/300kHz)

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Condition

Same as Item 4.3.6.

4.4.7 Test Results

For U-NII-1 Band

802.11a

Channel	Frequency (MHz)	PSD (dBm)	Max. Limit (dBm)	Pass / Fail
36	5180	3.29	17	Pass
40	5200	4.23	17	Pass
48	5240	4.30	17	Pass

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

802.11n (HT20)

Channel	Frequency (MHz)	PSD (dBm)		Total PSD w/o Duty Factor (dBm)	Duty Factor	Total PSD with Duty Factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
36	5180	2.20	2.09	5.15	0.33	5.48	17	Pass
40	5200	2.01	2.48	5.26	0.33	5.59	17	Pass
48	5240	2.19	3.75	6.05	0.33	6.38	17	Pass

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

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

Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi , so the power density limit shall not be reduced.

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

802.11n (HT40)

Channel	Frequency (MHz)	PSD (dBm)		Total PSD w/o Duty Factor (dBm)	Duty Factor	Total PSD with Duty Factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
38	5190	-7.82	-5.21	-3.31	0	-3.31	17	Pass
46	5230	-1.22	0.19	2.55	0	2.55	17	Pass

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

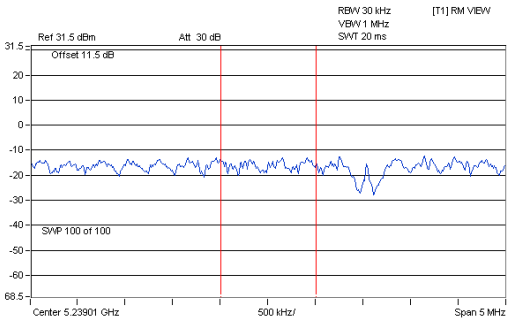
2. **For U-NII-1 Band:**

Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi , so the power density limit shall not be reduced.

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

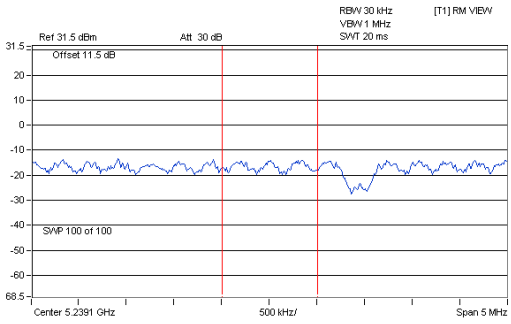
SPECTRUM PLOT OF WORST VALUE

802.11a



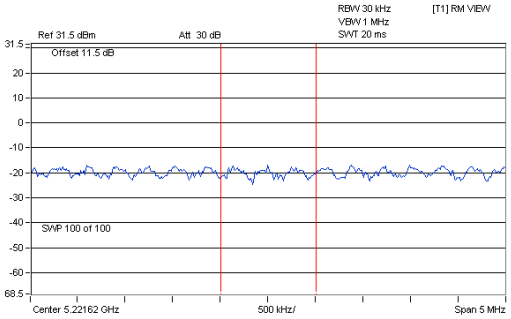
TX Channel Bandwidth 1 MHz Power 4.3 dBm

802.11n (HT20)



TX Channel Bandwidth 1 MHz Power 3.75 dBm

802.11n (HT40)



TX Channel Bandwidth 1 MHz Power 0.19 dBm

For U-NII-3 Band

802.11a

Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS/ FAIL
149	5745	-2.63	-0.41	30	PASS
157	5785	-2.98	-0.76	30	PASS
165	5825	-4.20	-1.98	30	PASS

802.11n (HT20)

TX chain	Chan.	Freq. (MHz)	PSD (dBm /300kHz)	PSD (dBm /500kHz)	10 log (N=2) dB	Duty Factor	Total PSD (dBm /500kHz)	Limit (dBm /500kHz)	Pass /Fail
0	149	5745	-5.34	-3.12	3.01	0.33	0.22	30	Pass
	157	5785	-6.57	-4.35	3.01	0.33	-1.01	30	Pass
	165	5825	-7.18	-4.96	3.01	0.33	-1.62	30	Pass
1	149	5745	-7.42	-5.20	3.01	0.33	-1.86	30	Pass
	157	5785	-7.90	-5.68	3.01	0.33	-2.34	30	Pass
	165	5825	-9.21	-6.99	3.01	0.33	-3.65	30	Pass

NOTE:

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

802.11n (HT40)

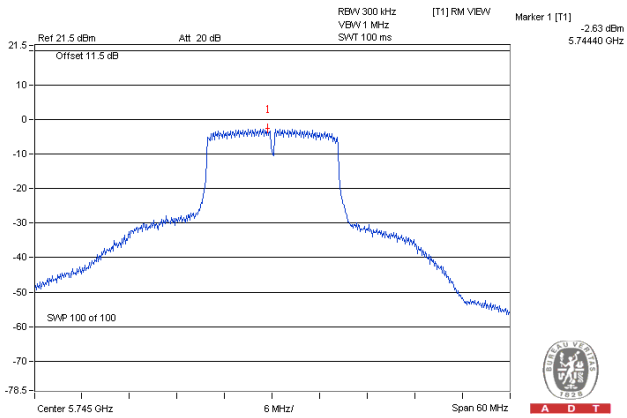
TX chain	Chan.	Freq. (MHz)	PSD (dBm /300kHz)	PSD (dBm /500kHz)	10 log (N=2) dB	Duty Factor	Total PSD (dBm /500kHz)	Limit (dBm /500kHz)	Pass /Fail
0	151	5755	-14.14	-11.92	3.01	0	-8.91	30	Pass
	159	5795	-11.18	-8.96	3.01	0	-5.95	30	Pass
1	151	5755	-13.53	-11.31	3.01	0	-8.30	30	Pass
	159	5795	-10.76	-8.54	3.01	0	-5.53	30	Pass

NOTE:

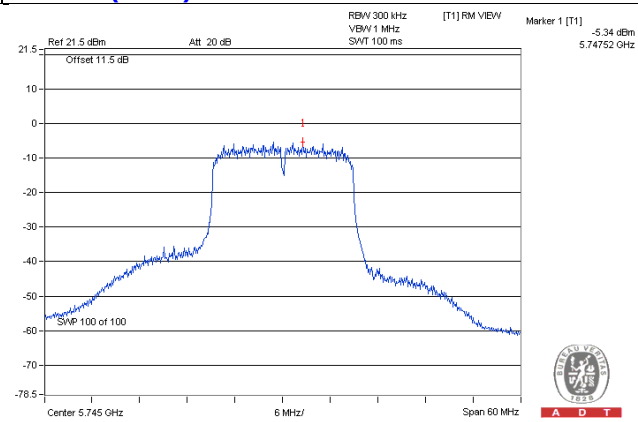
1. Directional gain = 2dBi + 10log(2) = 5.01dBi < 6dBi , so the power density limit shall not be reduced.
2. Refer to section 3.3 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE

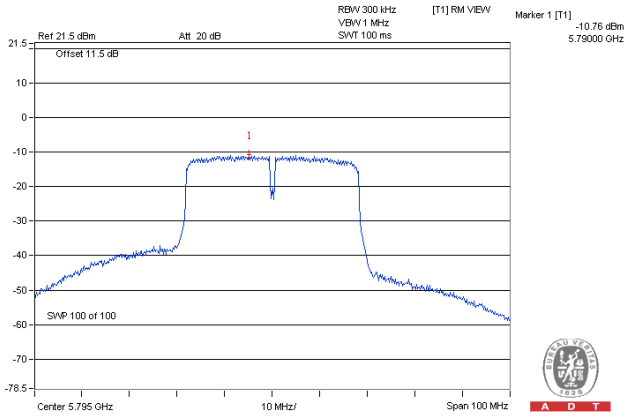
802.11a



802.11n (HT20)



802.11n (HT40)

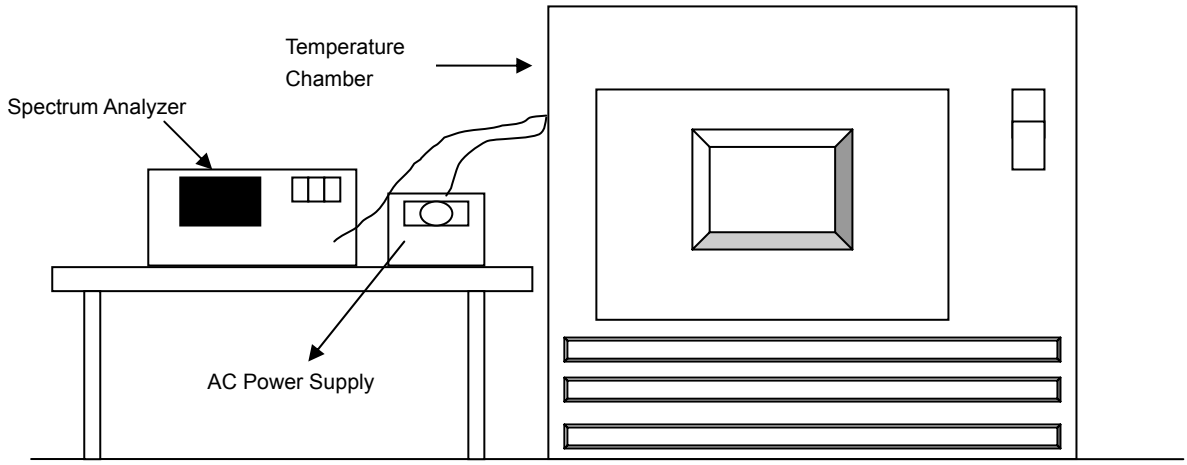


4.5 Frequency Stability Measurement

4.5.1 Limits of Frequency Stability Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

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

4.5.7 Test Results

FREQUEMCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5180MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5180.0035	0.00007	5180.0025	0.00005	5180.0006	0.00001	5180.0004	0.00001
40	120	5180.0249	0.00048	5180.0221	0.00043	5180.0235	0.00045	5180.0255	0.00049
30	120	5180.0093	0.00018	5180.0118	0.00023	5180.0071	0.00014	5180.0096	0.00019
20	120	5180.0075	0.00014	5180.0057	0.00011	5180.0063	0.00012	5180.0068	0.00013
10	120	5180.0099	0.00019	5180.0115	0.00022	5180.0094	0.00018	5180.0079	0.00015
0	120	5180.0063	0.00012	5180.0038	0.00007	5180.0058	0.00011	5180.0074	0.00014
-10	120	5180.0158	0.00031	5180.0173	0.00033	5180.0170	0.00033	5180.0180	0.00035
-20	120	5179.9780	-0.00042	5179.9762	-0.00046	5179.9782	-0.00042	5179.9754	-0.00047
-30	120	5180.0191	0.00037	5180.0177	0.00034	5180.0191	0.00037	5180.0182	0.00035

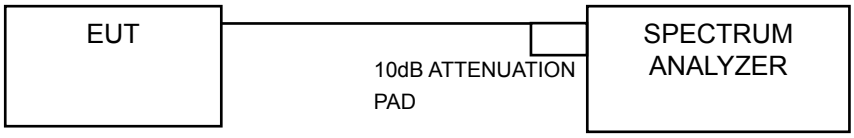
FREQUEMCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5180MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5180.0065	0.00013	5180.0066	0.00013	5180.0066	0.00013	5180.0068	0.00013
	120	5180.0075	0.00014	5180.0057	0.00011	5180.0063	0.00012	5180.0068	0.00013
	102	5180.0065	0.00013	5180.0058	0.00011	5180.0053	0.00010	5180.0062	0.00012

4.6 6dB Bandwidth Measurment

4.6.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	15.84	0.5	Pass
157	5785	16.46	0.5	Pass
165	5825	16.08	0.5	Pass

802.11n (HT20)

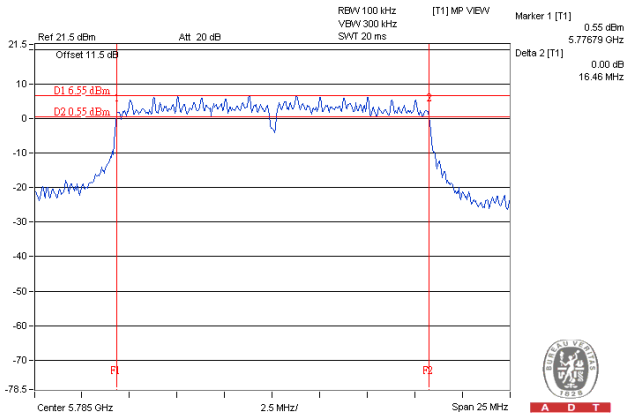
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.04	16.53	0.5	Pass
157	5785	17.04	16.19	0.5	Pass
165	5825	17.05	16.14	0.5	Pass

802.11n (HT40)

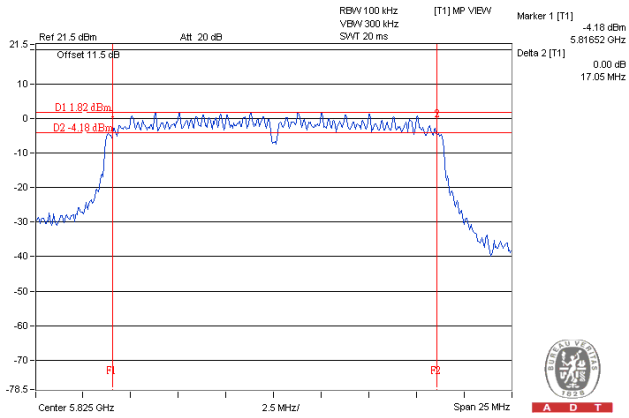
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.26	35.33	0.5	Pass
159	5795	35.32	35.33	0.5	Pass

SPECTRUM PLOT OF WORST VALUE

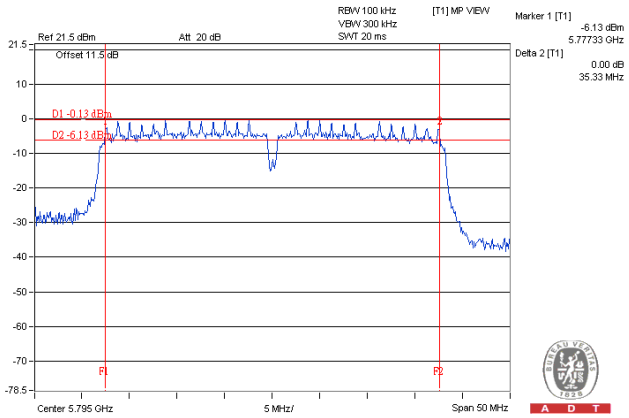
802.11a



802.11n (HT20)



802.11n (HT40)



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:

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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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