

FCC Test Report

Report No.: RF110304C12J-1

FCC ID: PY311100154

Test Model: WNDAP360

Received Date: Mar. 04, 2011

Test Date: Mar. 07 ~ Mar. 31, 2011 (Band 1)
Jul. 24 ~ Aug. 01, 2015 (Band 4)

Issued Date: Aug. 04, 2015

Applicant: NETGEAR, INC.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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A D T

Release Control Record

Issue No.	Description	Date Issued
RF110304C12J-1	Original release	Aug. 04, 2015



1 Certificate of Conformity

Product: ProSafe Dual Band Wireless-N Access Point
Brand: NETGEAR
Test Model: WNDAP360
Sample Status: Engineering sample
Applicant: NETGEAR, INC.
Test Date: Mar. 07 ~ Mar. 31, 2011 (Band 1)
Jul. 24 ~ Aug. 01, 2015 (Band 4)
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 : *Suntee Liu* , **Date:** Aug. 04, 2015
Suntee Liu / Specialist

Approved by : *Ken Liu* , **Date:** Aug. 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
15.207 15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -8.45dB at 12.38200MHz.
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 5852.10MHz.
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	Internal Antenna: Antenna connector is UFL not a standard connector. External Antenna: Antenna connector is R-SMA 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	Expanded Uncertainty (k=2) (\pm)
Conducted Emissions at mains ports0	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.19 dB
	200MHz ~1000MHz	3.21 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	ProSafe Dual Band Wireless-N Access Point
Brand	NETGEAR
Test Model	WNDAP360
Status of EUT	Engineering sample
Power Supply Rating	12Vdc (adapter) 48Vdc (POE)
Modulation Type	64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 802.11a, 802.11n (HT20): 4 802.11n (HT40): 2 5745 ~ 5825MHz: 802.11a, 802.11n (HT20): 5 802.11n (HT40): 2
Output Power	5180 ~ 5240MHz: 44.6mW 5745 ~ 5825MHz: 338.871mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter
Data Cable Supplied	NA

Note:

1. This report is issued as a supplementary report of BV ADT report No.: RF110304C12I-1. This report is prepared for FCC class II permissive change. The difference compared with original report is updating new NII rule. All test items of U-NII-1 and U-NII-3 band are retested in this report.
2. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

Modulation Mode	TX Function
802.11a	2TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX

3. The EUT uses following adapters.

Adapter 1	
Brand	NETGEAR
Model	T012LF1209 16100-2LF
P/N	332-10166-01
Input Power	100-120Vac, 50/60Hz, 0.5A
Output Power	12Vdc, 1A
Power Line	1.8m non-shielded cable without core

Adapter 2	
Brand	NETGEAR
Model	MT12-Y120100-A1
P/N	332-10190-01
Input Power	100-120Vac, 60Hz, 0.3A
Output Power	12Vdc, 1.0A
Power Line	1.8m non-shielded cable without core

Adapter 3	
Brand	NETGEAR
Model	AD2025F10
P/N	332-10740-01
Input Power	100-120V, 50/60Hz, 0.3A
Output Power	12Vdc, 0.5A
Power Line	1.8m DC cable without core attached on adapter

Adapter 4	
Brand	NETGEAR
Model	2AAJ012F 1 NA
P/N	332-10742-01
Input Power	100-120Vac, 50/60Hz, 0.35A
Output Power	12Vdc, 1.0A
Power Line	1.8m DC cable without core attached on adapter

4. The following antennas are used in this EUT. External antenna is for option.

No.	Antenna Type	Gain (dBi)		Antenna Connector
		2.4GHz	5GHz	
1. Internal	Monopole	5.59	6.29	UFL
2. External	Omni	5	-	R-SMA

*Internal antenna is chosen for final test.

3.2 Description of Test Modes

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

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 \geq 1G	RE<1G	PLC	APCM	
-	√	√	√	√	Power from POE

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

NOTE:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane.
2. Only POE mode is presented in this report according to original worst case mode.

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	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Date 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	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Date Rate (Mbps)
-	802.11a	5180-5240	36 to 48	157	OFDM	BPSK	6.0
-	802.11a	5745-5825	149 to 165		OFDM	BPSK	6.0

Power Line Conducted Emission Test:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Date Rate (Mbps)
-	802.11a	5180-5240	36 to 48	157	OFDM	BPSK	6.0
-	802.11a	5745-5825	149 to 165		OFDM	BPSK	6.0

**Antenna Port Conducted Measurement:**

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Date 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 \geq 1G	25 deg. C, 65% RH	120Vac, 60Hz	David Huang
	24 deg. C, 63% RH		Alan Wu
RE $<$ 1G	25 deg. C, 62% RH	120Vac, 60Hz	Alan Wu
PLC	25 deg. C, 65% RH	120Vac, 60Hz	Chris Lin
APCM	23 deg. C, 62% RH	120Vac, 60Hz	David Huang
	25 deg. C, 60% RH		Frank Liu

3.3 Duty Cycle of Test Signal

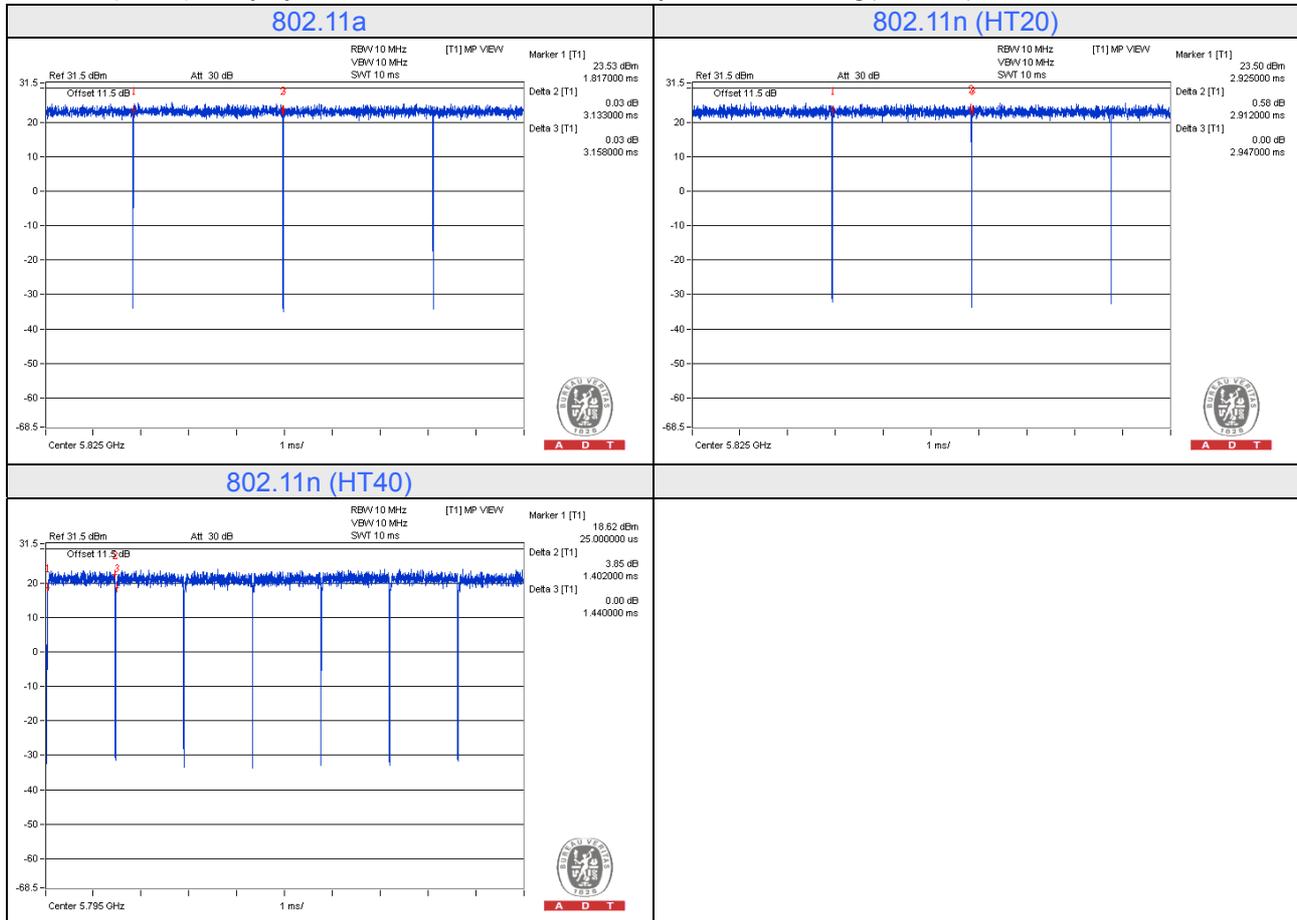
Duty cycle of test signal is > 98 %, duty factor is not required.

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

802.11a: Duty cycle = $3.133/3.158 = 0.992$

802.11n (HT20): Duty cycle = $2.912/2.947 = 0.988$

802.11n (HT40): Duty cycle = $1.402/1.440 = 0.974$, Duty factor = $10 * \log(1/0.974) = 0.12$



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.

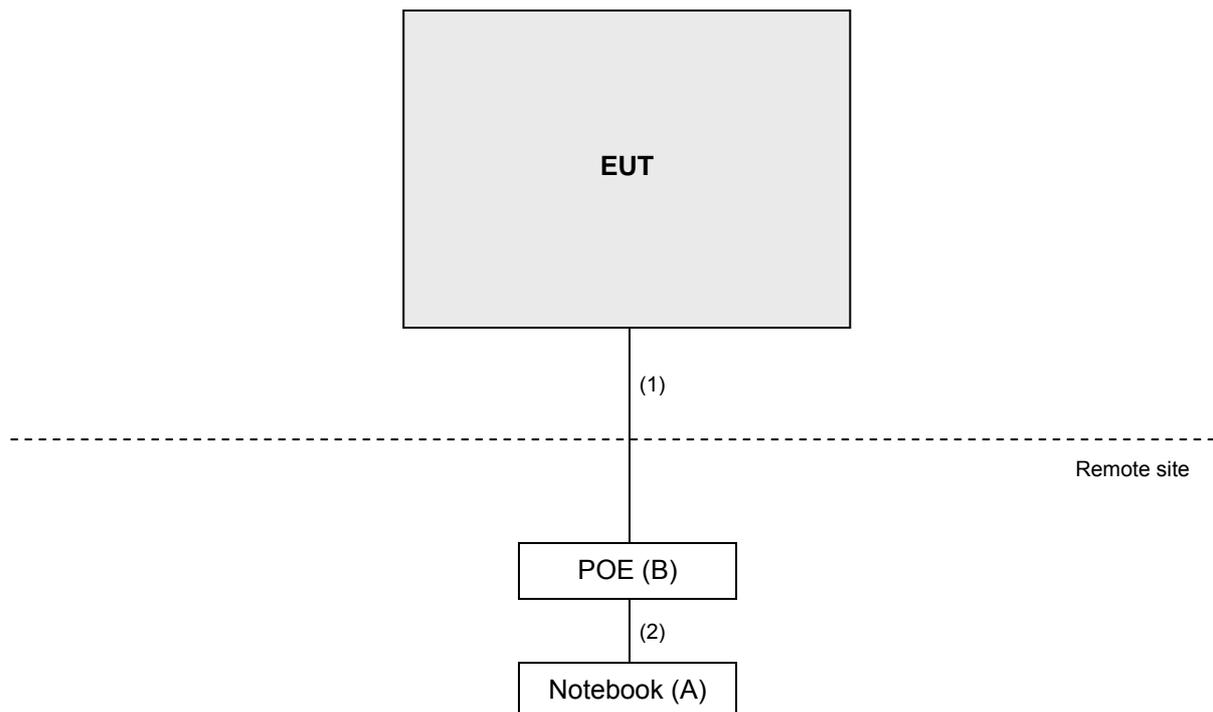
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	D531	CN-0XM006-4864 3-81U-2610	QDS-BRCM1020	-
B.	POE	CISCO	DPSN-35FBA	NA	NA	Provided by Manufacturer

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45 , Cat5e	1	3	N	0	-
2.	RJ45 , Cat5e	1	3	N	0	-

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedures New Rules 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:

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



4.1.2 Test Instruments

5180 ~ 5240MHz:

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Dec. 27, 2010	Dec. 26, 2011
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	100115	Aug. 02, 2010	Aug. 01, 2011
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Apr. 28, 2010	Apr. 27, 2011
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-408	Jan. 06, 2011	Jan. 05, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8449B	3008A01961	Nov. 02, 2010	Nov. 01, 2011
Preamplifier Agilent	8447D	2944A10738	Nov. 02, 2010	Nov. 01, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	274041/4	Aug. 21, 2010	Aug. 20, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	283397/4	Aug. 21, 2010	Aug. 20, 2011
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table ADT.	TT100.	TT93021704	NA	NA
Turn Table Controller ADT.	SC100.	SC93021704	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	07026401	Aug. 25, 2010	Aug. 24, 2011
High Speed Peak Power Meter	ML2495A	0824011	Jul. 09, 2010	Jul. 08, 2011
Power Sensor	MA2411B	0738171	Jul. 09, 2010	Jul. 08, 2011

- 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 4.
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 460141.
5. The IC Site Registration No. is IC7450F-4.

**5745 ~ 5825MHz:**

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 06, 2014	Oct. 05, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Jul. 08, 2015	Jul. 07, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Feb. 06, 2015	Feb. 05, 2016
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Feb. 05, 2015	Feb. 04, 2016
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 09, 2015	Feb. 08, 2016
Preamplifier Agilent	8449B	3008A01960	Aug. 09, 2014	Aug. 08, 2015
Preamplifier Agilent	8447D	2944A10631	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 09, 2014	Aug. 08, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 09, 2014	Aug. 08, 2015
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100.	SC93021703	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

- 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 4.
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 460141.
5. The IC Site Registration No. is IC7450F-4.

4.1.3 Test Procedures

- 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:

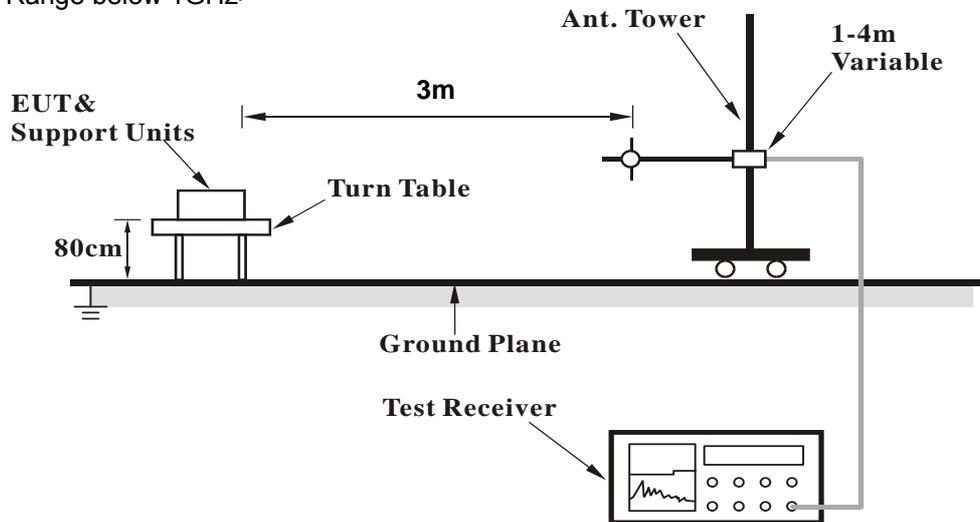
1. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
3. The resolution 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 ($10 \log(1/\text{duty cycle})$).
5. 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.
6. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

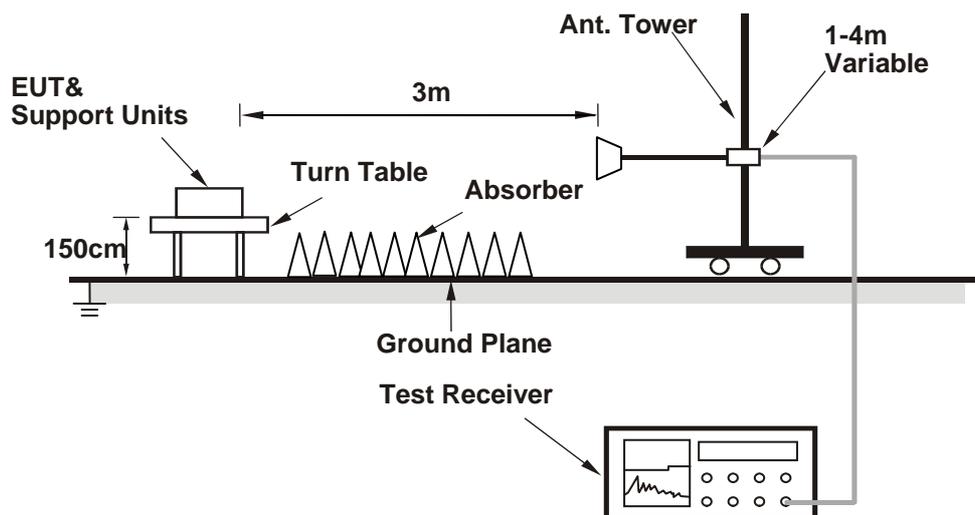
No deviation.

4.1.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Conditions

- a. Placed the EUT on the testing table.
- b. Prepared notebook to act as communication partner and placed it outside of testing area.
- c. The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- d. The communication partner sent data to EUT by command "PING".
- 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)
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	63.4 PK	74.0	-10.6	1.21 H	307	25.60	37.80
2	5150.00	46.3 AV	54.0	-7.7	1.21 H	307	8.50	37.80
3	*5180.00	111.9 PK			1.21 H	307	74.10	37.80
4	*5180.00	99.8 AV			1.21 H	307	62.00	37.80
5	#10360.00	59.1 PK	68.2	-9.1	1.00 H	6	10.40	48.70
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	57.8 PK	74.0	-16.2	1.00 V	36	20.00	37.80
2	5150.00	41.4 AV	54.0	-12.6	1.00 V	36	3.60	37.80
3	*5180.00	104.3 PK			1.00 V	36	66.50	37.80
4	*5180.00	92.0 AV			1.00 V	36	54.20	37.80
5	#10360.00	56.4 PK	68.2	-11.8	1.00 V	157	7.70	48.70

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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)
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	61.4 PK	74.0	-12.6	1.29 H	302	23.60	37.80
2	5150.00	42.3 AV	54.0	-11.7	1.29 H	302	4.50	37.80
3	*5200.00	111.7 PK			1.29 H	302	73.90	37.80
4	*5200.00	99.5 AV			1.29 H	302	61.70	37.80
5	#10400.00	62.7 PK	68.2	-5.5	1.00 H	104	13.90	48.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	53.3 PK	74.0	-20.7	1.00 V	31	15.50	37.80
2	5150.00	37.8 AV	54.0	-16.2	1.00 V	31	0.00	37.80
3	*5200.00	104.5 PK			1.00 V	31	66.70	37.80
4	*5200.00	93.2 AV			1.00 V	31	55.40	37.80
5	#10400.00	62.7 PK	68.2	-5.5	1.00 V	104	13.90	48.80

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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)
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	111.0 PK			1.30 H	302	73.10	37.90
2	*5240.00	99.0 AV			1.30 H	302	61.10	37.90
3	5350.00	57.1 PK	74.0	-16.9	1.30 H	302	19.10	38.00
4	5350.00	43.1 AV	54.0	-10.9	1.30 H	302	5.10	38.00
5	#10480.00	63.4 PK	68.2	-4.8	1.00 H	224	14.30	49.10

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	*5240.00	104.3 PK			1.00 V	33	66.40	37.90
2	*5240.00	93.0 AV			1.00 V	33	55.10	37.90
3	5350.00	52.5 PK	74.0	-21.5	1.00 V	33	14.50	38.00
4	5350.00	40.7 AV	54.0	-13.3	1.00 V	33	2.70	38.00
5	#10400.00	62.1 PK	68.2	-6.1	1.00 V	139	13.30	48.80

Remarks:

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



CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
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	#5714.90	66.1 PK	74.0	-7.9	1.48 H	353	59.80	6.30
2	#5714.90	49.0 AV	54.0	-5.0	1.48 H	353	42.70	6.30
3	#5722.90	75.9 PK	78.2	-2.3	1.48 H	353	69.60	6.30
4	#5725.00	56.2 PK	78.2	-22.0	1.48 H	353	49.90	6.30
5	*5745.00	110.7 PK			1.48 H	353	70.40	40.30
6	*5745.00	100.8 AV			1.48 H	353	60.50	40.30
7	11490.00	61.1 PK	74.0	-12.9	1.00 H	175	43.90	17.20
8	11490.00	47.3 AV	54.0	-6.7	1.00 H	175	30.10	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	#5714.90	67.8 PK	74.0	-6.2	1.03 V	4	61.50	6.30
2	#5714.90	50.9 AV	54.0	-3.1	1.03 V	4	44.60	6.30
3	#5722.90	78.0 PK	78.2	-0.2	1.03 V	4	71.70	6.30
4	#5725.00	61.3 PK	78.2	-16.9	1.03 V	4	55.00	6.30
5	*5745.00	113.2 PK			1.03 V	4	72.90	40.30
6	*5745.00	103.5 AV			1.03 V	4	63.20	40.30
7	11490.00	62.1 PK	74.0	-11.9	1.02 V	352	44.90	17.20
8	11490.00	47.5 AV	54.0	-6.5	1.02 V	352	30.30	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)
– 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)
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	115.9 PK			1.46 H	352	75.50	40.40
2	*5785.00	105.5 AV			1.46 H	352	65.10	40.40
3	11570.00	63.3 PK	74.0	-10.7	1.00 H	178	46.00	17.30
4	11570.00	49.6 AV	54.0	-4.4	1.00 H	178	32.30	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	*5785.00	117.3 PK			1.10 V	5	76.90	40.40
2	*5785.00	107.1 AV			1.10 V	5	66.70	40.40
3	11570.00	64.2 PK	74.0	-9.8	1.04 V	351	46.90	17.30
4	11570.00	49.9 AV	54.0	-4.1	1.04 V	351	32.60	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)
– 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)
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	111.8 PK			1.00 H	343	71.30	40.50
2	*5825.00	102.0 AV			1.00 H	343	61.50	40.50
3	#5850.00	58.1 PK	78.2	-20.1	1.00 H	343	51.50	6.60
4	#5852.10	75.0 PK	78.2	-3.2	1.00 H	343	68.40	6.60
5	#5860.10	64.5 PK	74.0	-9.5	1.00 H	343	57.90	6.60
6	#5860.10	47.5 AV	54.0	-6.5	1.00 H	343	40.90	6.60
7	11650.00	62.9 PK	74.0	-11.1	1.00 H	172	45.20	17.70
8	11650.00	49.2 AV	54.0	-4.8	1.00 H	172	31.50	17.70

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	115.0 PK			1.09 V	7	74.50	40.50
2	*5825.00	105.0 AV			1.09 V	7	64.50	40.50
3	#5850.00	64.4 PK	78.2	-13.8	1.09 V	7	57.80	6.60
4	#5852.10	78.1 PK	78.2	-0.1	1.09 V	7	71.50	6.60
5	#5860.10	66.8 PK	74.0	-7.2	1.09 V	7	60.20	6.60
6	#5860.10	50.4 AV	54.0	-3.6	1.09 V	7	43.80	6.60
7	11650.00	63.9 PK	74.0	-10.1	1.08 V	354	46.20	17.70
8	11650.00	49.5 AV	54.0	-4.5	1.08 V	354	31.80	17.70

Remarks:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.
- " # ": 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	67.3 PK	74.0	-6.7	1.19 H	64	29.50	37.80
2	5150.00	50.7 AV	54.0	-3.3	1.19 H	64	12.90	37.80
3	*5180.00	114.5 PK			1.19 H	64	76.70	37.80
4	*5180.00	102.5 AV			1.19 H	64	64.70	37.80
5	#10360.00	60.9 PK	68.2	-7.3	1.00 H	154	12.20	48.70

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	62.0 PK	74.0	-12.0	1.00 V	36	24.20	37.80
2	5150.00	46.9 AV	54.0	-7.1	1.00 V	36	9.10	37.80
3	*5180.00	106.5 PK			1.00 V	33	68.70	37.80
4	*5180.00	94.9 AV			1.00 V	33	57.10	37.80
5	#10400.00	60.0 PK	68.2	-8.2	1.00 V	141	11.20	48.80

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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)
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	114.6 PK			1.30 H	63	76.80	37.80
2	*5200.00	102.9 AV			1.30 H	63	65.10	37.80
3	5350.00	62.2 PK	74.0	-11.8	1.30 H	63	24.20	38.00
4	5350.00	49.5 AV	54.0	-4.5	1.30 H	63	11.50	38.00
5	#10400.00	60.3 PK	68.2	-7.9	1.00 H	141	11.50	48.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	107.0 PK			1.00 V	32	69.20	37.80
2	*5200.00	95.7 AV			1.00 V	32	57.90	37.80
3	5350.00	57.1 PK	74.0	-16.9	1.00 V	32	19.10	38.00
4	5350.00	43.7 AV	54.0	-10.3	1.00 V	32	5.70	38.00
5	#10400.00	57.3 PK	68.2	-10.9	1.00 V	26	8.50	48.80

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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)
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	114.0 PK			1.18 H	66	76.10	37.90
2	*5240.00	102.4 AV			1.18 H	66	64.50	37.90
3	5350.00	64.6 PK	74.0	-9.4	1.18 H	66	26.60	38.00
4	5350.00	49.8 AV	54.0	-4.2	1.18 H	66	11.80	38.00
5	#10480.00	59.2 PK	68.2	-9.0	1.00 H	124	10.10	49.10

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	*5240.00	106.7 PK			1.00 V	32	68.80	37.90
2	*5240.00	95.5 AV			1.00 V	32	57.60	37.90
3	5350.00	56.0 PK	74.0	-18.0	1.00 V	32	18.00	38.00
4	5350.00	44.6 AV	54.0	-9.4	1.00 V	32	6.60	38.00
5	#10480.00	57.0 PK	68.2	-11.2	1.00 V	190	7.90	49.10

Remarks:

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



CHANNEL	TX Channel 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	#5714.90	63.9 PK	74.0	-10.1	1.56 H	354	57.60	6.30
2	#5714.90	47.3 AV	54.0	-6.7	1.56 H	354	41.00	6.30
3	#5722.90	76.3 PK	78.2	-1.9	1.56 H	354	70.00	6.30
4	#5725.00	52.3 PK	78.2	-25.9	1.56 H	354	46.00	6.30
5	*5745.00	110.5 PK			1.56 H	354	70.20	40.30
6	*5745.00	100.2 AV			1.56 H	354	59.90	40.30
7	11490.00	60.7 PK	74.0	-13.3	1.00 H	170	43.50	17.20
8	11490.00	46.8 AV	54.0	-7.2	1.00 H	170	29.60	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	#5714.90	64.7 PK	74.0	-9.3	1.03 V	6	58.40	6.30
2	#5714.90	48.7 AV	54.0	-5.3	1.03 V	6	42.40	6.30
3	#5722.90	77.9 PK	78.2	-0.3	1.03 V	6	71.60	6.30
4	#5725.00	54.9 PK	78.2	-23.3	1.03 V	6	48.60	6.30
5	*5745.00	111.6 PK			1.03 V	6	71.30	40.30
6	*5745.00	101.8 AV			1.03 V	6	61.50	40.30
7	11490.00	61.9 PK	74.0	-12.1	1.06 V	352	44.70	17.20
8	11490.00	47.3 AV	54.0	-6.7	1.06 V	352	30.10	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)
– 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)
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	114.7 PK			1.39 H	355	74.30	40.40
2	*5785.00	104.5 AV			1.39 H	355	64.10	40.40
3	11570.00	63.1 PK	74.0	-10.9	1.00 H	174	45.80	17.30
4	11570.00	48.9 AV	54.0	-5.1	1.00 H	174	31.60	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	*5785.00	116.8 PK			1.10 V	8	76.40	40.40
2	*5785.00	106.7 AV			1.10 V	8	66.30	40.40
3	11570.00	64.0 PK	74.0	-10.0	1.00 V	358	46.70	17.30
4	11570.00	49.3 AV	54.0	-4.7	1.00 V	358	32.00	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)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
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	112.0 PK			1.43 H	353	71.50	40.50
2	*5825.00	102.4 AV			1.43 H	353	61.90	40.50
3	#5850.00	59.5 PK	78.2	-18.7	1.43 H	353	52.90	6.60
4	#5852.10	74.3 PK	78.2	-3.9	1.43 H	353	67.70	6.60
5	#5860.10	66.7 PK	74.0	-7.3	1.43 H	353	60.10	6.60
6	#5860.10	47.7 AV	54.0	-6.3	1.43 H	353	41.10	6.60
7	11650.00	62.6 PK	74.0	-11.4	1.00 H	178	44.90	17.70
8	11650.00	48.6 AV	54.0	-5.4	1.00 H	178	30.90	17.70

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	114.7 PK			1.09 V	8	74.20	40.50
2	*5825.00	104.6 AV			1.09 V	8	64.10	40.50
3	#5850.00	63.8 PK	78.2	-14.4	1.09 V	8	57.20	6.60
4	#5852.10	77.8 PK	78.2	-0.4	1.09 V	8	71.20	6.60
5	#5860.10	69.0 PK	74.0	-5.0	1.09 V	8	62.40	6.60
6	#5860.10	49.6 AV	54.0	-4.4	1.09 V	8	43.00	6.60
7	11650.00	63.6 PK	74.0	-10.4	1.03 V	355	45.90	17.70
8	11650.00	49.0 AV	54.0	-5.0	1.03 V	355	31.30	17.70

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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	67.2 PK	74.0	-6.8	1.32 H	64	29.40	37.80
2	5150.00	52.3 AV	54.0	-1.7	1.32 H	64	14.50	37.80
3	*5190.00	109.7 PK			1.32 H	64	71.90	37.80
4	*5190.00	96.3 AV			1.32 H	64	58.50	37.80
5	#10380.00	61.7 PK	68.2	-6.5	1.00 H	197	12.90	48.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	59.7 PK	74.0	-14.3	1.00 V	30	21.90	37.80
2	5150.00	48.1 AV	54.0	-5.9	1.00 V	30	10.30	37.80
3	*5190.00	103.0 PK			1.00 V	30	65.20	37.80
4	*5190.00	89.5 AV			1.00 V	30	51.70	37.80
5	#10380.00	60.4 PK	68.2	-7.8	1.00 V	133	11.60	48.80

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– 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)
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	*5230.00	110.6 PK			1.28 H	70	72.80	37.80
2	*5230.00	97.6 AV			1.28 H	70	59.80	37.80
3	5350.00	64.0 PK	74.0	-10.0	1.28 H	70	26.00	38.00
4	5350.00	50.4 AV	54.0	-3.6	1.28 H	70	12.40	38.00
5	#10460.00	58.9 PK	68.2	-9.3	1.00 H	190	9.90	49.00

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	*5230.00	104.9 PK			1.00 V	34	67.10	37.80
2	*5230.00	92.0 AV			1.00 V	34	54.20	37.80
3	5350.00	55.8 PK	74.0	-18.2	1.00 V	34	17.80	38.00
4	5350.00	44.7 AV	54.0	-9.3	1.00 V	34	6.70	38.00
5	#10460.00	56.1 PK	68.2	-12.1	1.00 V	334	7.10	49.00

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.



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	#5714.90	66.7 PK	74.0	-7.3	1.45 H	354	60.40	6.30
2	#5714.90	48.3 AV	54.0	-5.7	1.45 H	354	42.00	6.30
3	#5722.90	74.9 PK	78.2	-3.3	1.45 H	354	68.60	6.30
4	#5725.00	50.6 PK	78.2	-27.6	1.45 H	354	44.30	6.30
5	*5755.00	104.4 PK			1.45 H	354	64.10	40.30
6	*5755.00	94.2 AV			1.45 H	354	53.90	40.30
7	11550.00	60.5 PK	74.0	-13.5	1.00 H	176	43.40	17.10
8	11550.00	46.1 AV	54.0	-7.9	1.00 H	176	29.00	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	#5714.90	71.5 PK	74.0	-2.5	1.11 V	8	65.20	6.30
2	#5714.90	50.9 AV	54.0	-3.1	1.11 V	8	44.60	6.30
3	#5722.90	77.7 PK	78.2	-0.5	1.11 V	8	71.40	6.30
4	#5725.00	53.2 PK	78.2	-25.0	1.11 V	8	46.90	6.30
5	*5755.00	106.0 PK			1.11 V	8	65.70	40.30
6	*5755.00	96.5 AV			1.11 V	8	56.20	40.30
7	11550.00	61.2 PK	74.0	-12.8	1.03 V	353	44.10	17.10
8	11550.00	46.7 AV	54.0	-7.3	1.03 V	353	29.60	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)
– 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)
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	111.5 PK			1.39 H	354	71.10	40.40
2	*5795.00	101.1 AV			1.39 H	354	60.70	40.40
3	#5850.00	53.1 PK	78.2	-25.1	1.39 H	354	46.50	6.60
4	#5852.10	75.2 PK	78.2	-3.0	1.39 H	354	68.60	6.60
5	#5860.10	67.8 PK	74.0	-6.2	1.39 H	354	61.20	6.60
6	#5860.10	50.2 AV	54.0	-3.8	1.39 H	354	43.60	6.60
7	11590.00	62.2 PK	74.0	-11.8	1.00 H	172	45.00	17.20
8	11590.00	48.2 AV	54.0	-5.8	1.00 H	172	31.00	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	*5795.00	113.5 PK			1.09 V	9	73.10	40.40
2	*5795.00	103.6 AV			1.09 V	9	63.20	40.40
3	#5850.00	55.9 PK	78.2	-22.3	1.09 V	9	49.30	6.60
4	#5852.10	78.1 PK	78.2	-0.1	1.09 V	9	71.50	6.60
5	#5860.10	70.8 PK	74.0	-3.2	1.09 V	9	64.20	6.60
6	#5860.10	52.4 AV	54.0	-1.6	1.09 V	9	45.80	6.60
7	11590.00	62.8 PK	74.0	-11.2	1.02 V	358	45.60	17.20
8	11590.00	48.5 AV	54.0	-5.5	1.02 V	358	31.30	17.20

Remarks:

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

Below 1GHz Data

802.11a

CHANNEL	TX Channel 157	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	66.77	32.9 QP	40.0	-7.1	1.49 H	19	48.50	-15.60
2	93.93	33.9 QP	43.5	-9.6	1.99 H	111	53.20	-19.30
3	511.12	40.6 QP	46.0	-5.4	1.99 H	160	49.30	-8.70
4	534.40	43.8 QP	46.0	-2.2	1.49 H	189	52.30	-8.50
5	679.93	38.0 QP	46.0	-8.0	1.25 H	12	43.60	-5.60
6	734.27	38.5 QP	46.0	-7.5	1.99 H	205	42.80	-4.30

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	33.78	38.6 QP	40.0	-1.4	1.00 V	184	54.00	-15.40
2	68.71	38.2 QP	40.0	-1.8	1.49 V	329	54.10	-15.90
3	156.03	32.7 QP	43.5	-10.8	1.00 V	202	46.50	-13.80
4	499.48	38.9 QP	46.0	-7.1	1.00 V	171	47.80	-8.90
5	534.40	35.0 QP	46.0	-11.0	1.00 V	318	43.50	-8.50
6	749.79	37.9 QP	46.0	-8.1	1.24 V	149	41.50	-3.60

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)
– 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	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

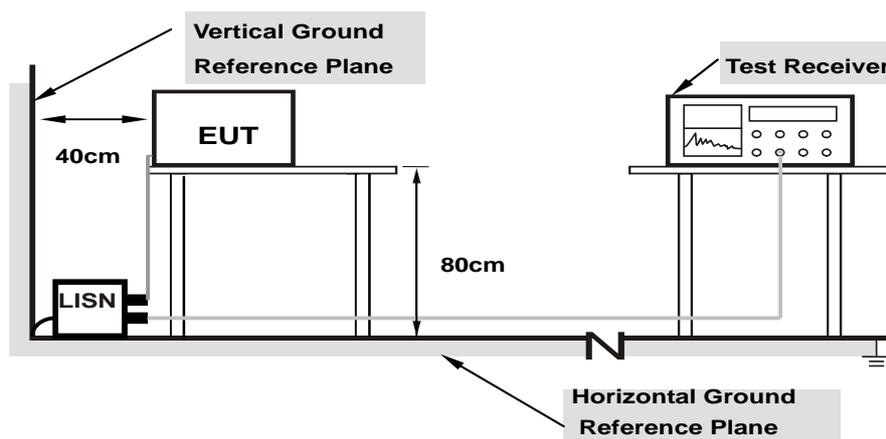
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

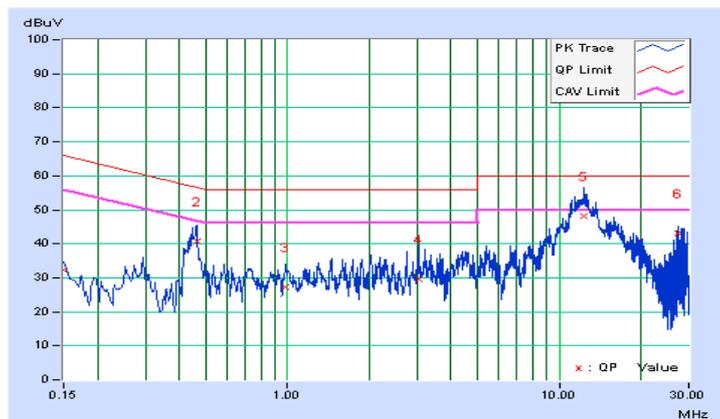
4.2.7 Test Results

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	0.15000	0.07	32.18	27.80	32.25	27.87	66.00
2	0.46200	0.09	40.66	32.05	40.75	32.14	56.66	46.66	-15.91	-14.52
3	0.98600	0.18	27.08	21.70	27.26	21.88	56.00	46.00	-28.74	-24.12
4	3.05800	0.24	29.30	21.98	29.54	22.22	56.00	46.00	-26.46	-23.78
5	12.38200	0.59	47.59	40.96	48.18	41.55	60.00	50.00	-11.82	-8.45
6	27.54600	1.18	42.01	36.20	43.19	37.38	60.00	50.00	-16.81	-12.62

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.

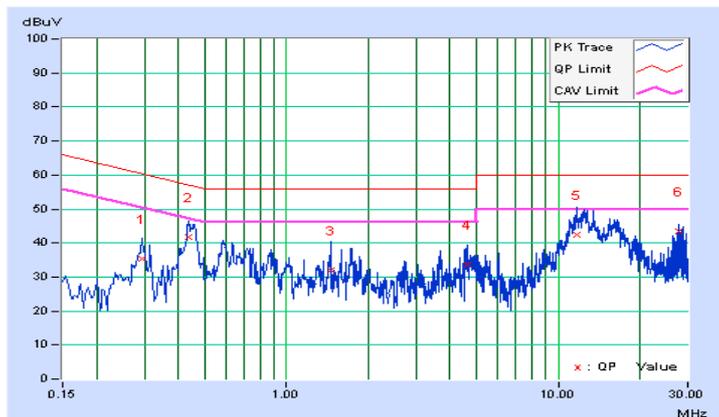


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.29400	0.21	35.21	30.27	35.42	30.48	60.41
2	0.43400	0.17	41.59	36.62	41.76	36.79	57.18	47.18	-15.42	-10.39
3	1.45000	0.19	31.85	25.96	32.04	26.15	56.00	46.00	-23.96	-19.85
4	4.63800	0.40	33.28	21.76	33.68	22.16	56.00	46.00	-22.32	-23.84
5	11.66600	0.58	41.74	35.05	42.32	35.63	60.00	50.00	-17.68	-14.37
6	27.79000	0.96	42.56	37.30	43.52	38.26	60.00	50.00	-16.48	-11.74

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

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 Conditions

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

4.3.7 Test Result

Power Output:

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	10.3	10.5	21.9	13.4	30	Pass
40	5200	10.4	10.6	22.4	13.5	30	Pass
48	5240	10.2	10.7	22.1	13.5	30	Pass
149	5745	16.70	16.83	94.969	19.78	30	Pass
157	5785	22.31	22.27	338.871	25.30	30	Pass
165	5825	20.58	21.26	247.948	23.94	30	Pass

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Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	13.3	13.5	43.8	16.4	30	Pass
40	5200	13.2	13.4	42.7	16.3	30	Pass
48	5240	13.1	13.5	42.8	16.3	30	Pass
149	5745	15.43	15.66	71.727	18.56	30	Pass
157	5785	22.29	22.23	336.543	25.27	30	Pass
165	5825	20.53	21.05	240.33	23.81	30	Pass

802.11n (HT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	11.4	12.0	29.6	14.7	30	Pass
46	5230	13.4	13.6	44.6	16.5	30	Pass
151	5755	13.58	13.85	47.069	16.73	30	Pass
159	5795	21.20	21.62	277.037	24.43	30	Pass

26dB Bandwidth:
802.11a

Channel	Channel Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
36	5180	24.46	24.33	Pass
40	5200	25.38	24.64	Pass
48	5240	24.92	25.25	Pass

802.11n (HT20)

Channel	Channel Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
36	5180	25.64	25.51	Pass
40	5200	25.65	26.28	Pass
48	5240	25.13	25.45	Pass

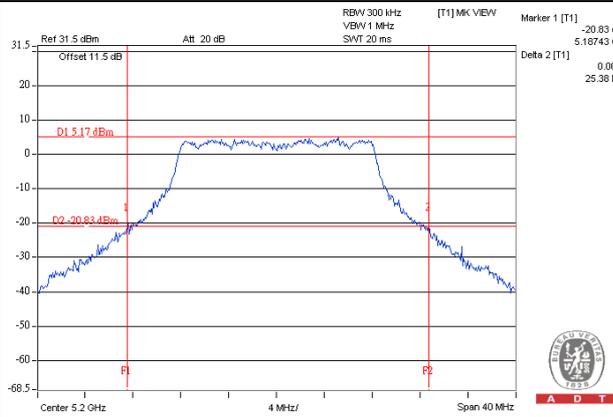
802.11n (HT40)

Channel	Channel Frequency (MHz)	26dBc Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
38	5190	47.64	47.34	Pass
46	5230	47.08	47.93	Pass

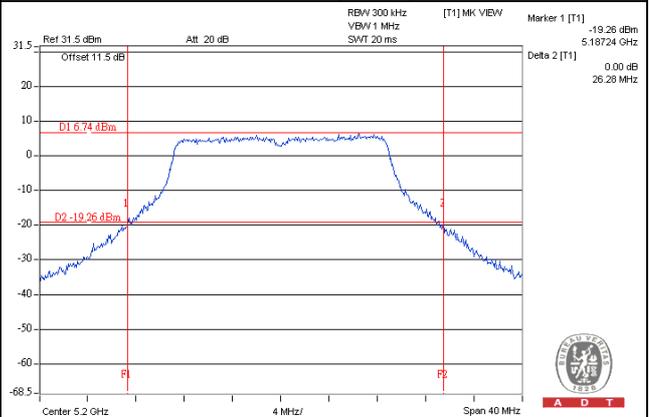


Spectrum Plot of Worst Value

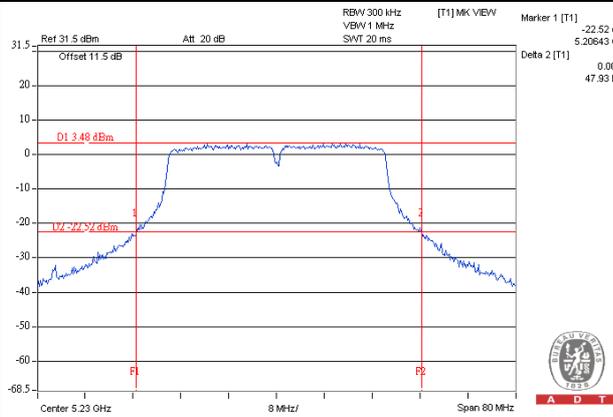
802.11a



802.11n (HT20)



802.11n (HT40)



Occupied Bandwidth:
802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.36	17.28
40	5200	17.44	17.28
48	5240	17.36	17.28
149	5745	17.16	17.04
157	5785	30.48	30.48
165	5825	18.84	21.12

802.11n (HT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	18.64	18.64
40	5200	18.56	18.48
48	5240	18.48	18.56
149	5745	18.36	17.04
157	5785	29.16	28.20
165	5825	20.16	21.00

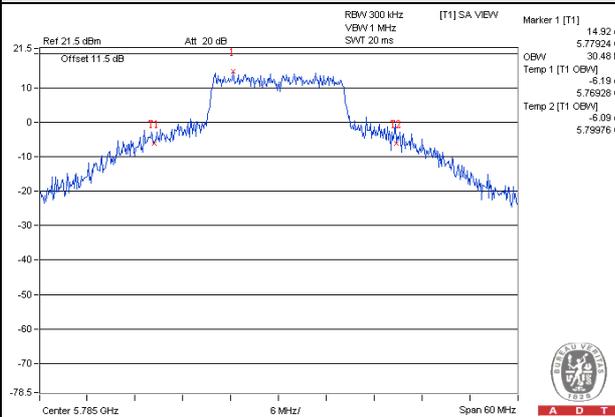
802.11n (HT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.80	36.64
46	5230	36.48	36.64
151	5755	37.08	37.32
159	5795	38.40	39.24

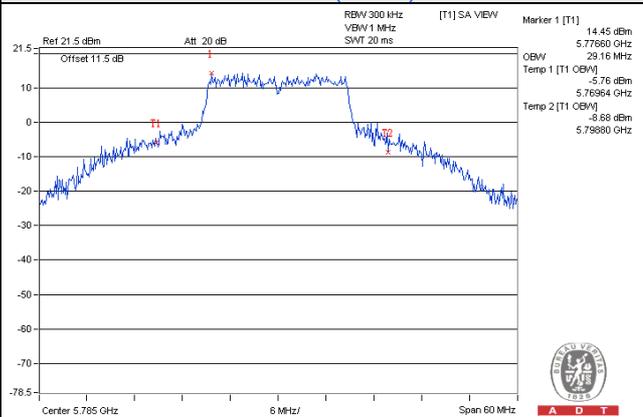


Spectrum Plot of Worst Value

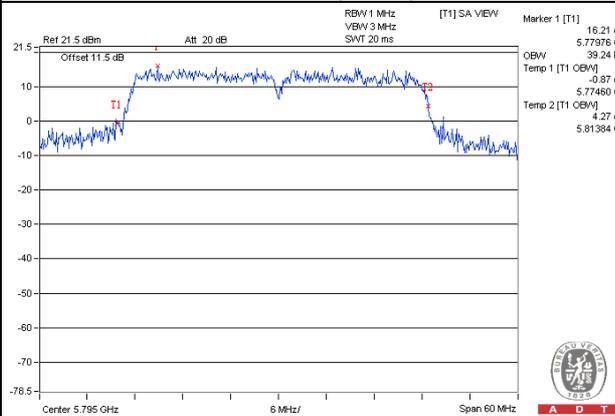
802.11a



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	11dBm/ MHz
		Mobile and Portable client device	
U-NII-2A	---		11dBm/ MHz
U-NII-2C	---		11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

For U-NII-1 band:

Using method SA-2

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

For U-NII-3 band:

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

For U-NII-1 Band

802.11a

Chan.	Freq. (MHz)	PSD (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	-2.4	-2.4	0.6	-	0.6	13.70	Pass
40	5200	-2.4	-2.4	0.6	-	0.6	13.70	Pass
48	5240	-2.5	-2.4	0.6	-	0.6	13.70	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.
- Directional gain = $6.29\text{dBi} + 10\log(2) = 9.30\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (9.30 - 6) = 13.70\text{dBm}$.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD (dBm)		Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
36	5180	0.6	0.4	3.5	-	3.5	13.70	Pass
40	5200	0.5	0.3	3.4	-	3.4	13.70	Pass
48	5240	0.6	0.3	3.5	-	3.5	13.70	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.
- Directional gain = $6.29\text{dBi} + 10\log(2) = 9.30\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (9.30 - 6) = 13.70\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

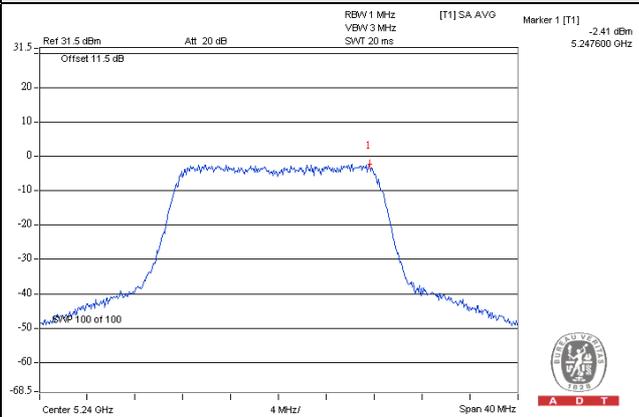
Chan.	Freq. (MHz)	PSD (dBm)		Total PSD w/o duty factor (dBm)	Duty factor	Total PSD with duty factor (dBm)	Max. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1					
38	5190	-5.0	-5.3	-2.1	0.12	-1.98	13.70	Pass
46	5230	-2.7	-3.6	-0.1	0.12	0.02	13.70	Pass

Note:

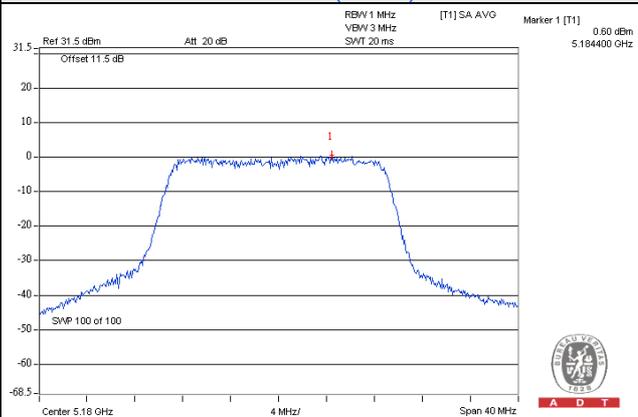
- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = $6.29\text{dBi} + 10\log(2) = 9.30\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (9.30 - 6) = 13.70\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

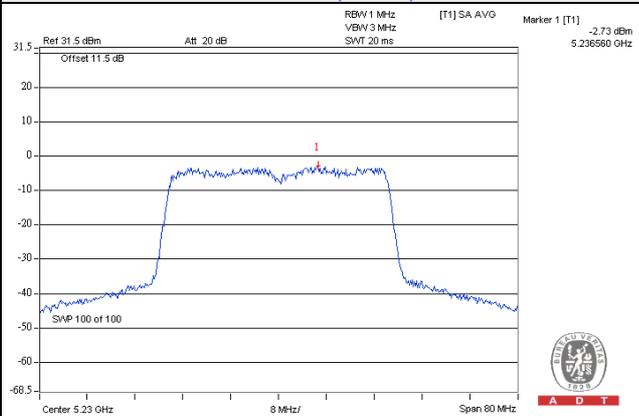
802.11a



802.11n (HT20)



802.11n (HT40)



For U-NII-3 Band
802.11a

TX chain	Channel	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	-3.54	-1.32	3.01	-	1.69	26.70	Pass
	157	5785	2.45	4.67	3.01	-	7.68	26.70	Pass
	165	5825	-0.04	2.18	3.01	-	5.19	26.70	Pass
1	149	5745	-3.81	-1.59	3.01	-	1.42	26.70	Pass
	157	5785	2.00	4.22	3.01	-	7.23	26.70	Pass
	165	5825	0.13	2.35	3.01	-	5.36	26.70	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.
- Directional gain = $6.29\text{dBi} + 10\log(2) = 9.30\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30-(9.30-6) = 26.70\text{dBm}$.

802.11n (HT20)

TX chain	Channel	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	-4.75	-2.53	3.01	-	1.69	26.70	Pass
	157	5785	1.96	4.18	3.01	-	7.68	26.70	Pass
	165	5825	-0.18	2.04	3.01	-	5.19	26.70	Pass
1	149	5745	-4.75	-2.53	3.01	-	1.42	26.70	Pass
	157	5785	1.88	4.10	3.01	-	7.23	26.70	Pass
	165	5825	0.18	2.40	3.01	-	5.36	26.70	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.
- Directional gain = $6.29\text{dBi} + 10\log(2) = 9.30\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30-(9.30-6) = 26.70\text{dBm}$.

802.11n (HT40)

TX chain	Channel	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	-10.29	-8.07	3.01	0.12	-4.94	26.70	Pass
	159	5795	-2.84	-0.62	3.01	0.12	2.51	26.70	Pass
1	151	5755	-10.47	-8.25	3.01	0.12	-5.12	26.70	Pass
	159	5795	-2.79	-0.57	3.01	0.12	2.56	26.70	Pass

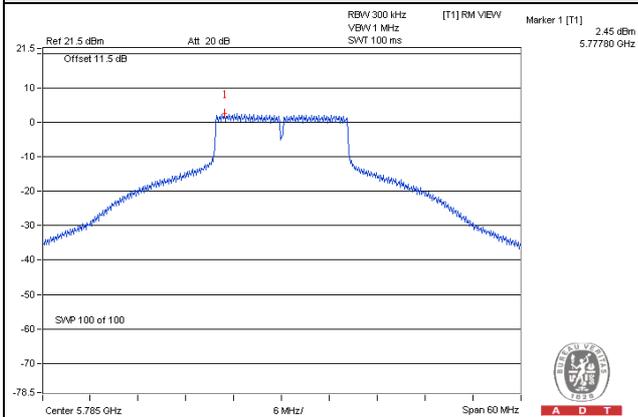
Note:

- 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.
- Directional gain = $6.29\text{dBi} + 10\log(2) = 9.30\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30-(9.30-6) = 26.70\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

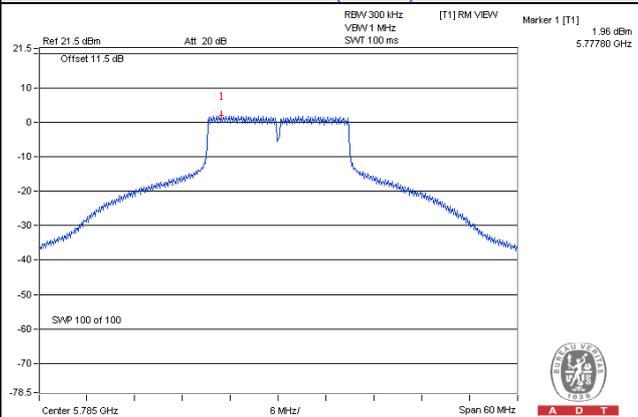


Spectrum Plot of Worst Value

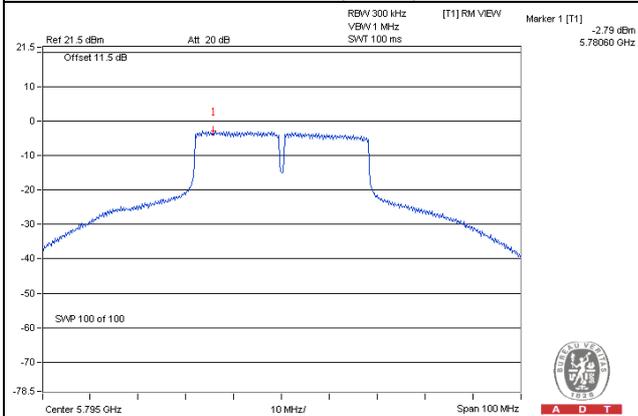
802.11a



802.11n (HT20)



802.11n (HT40)

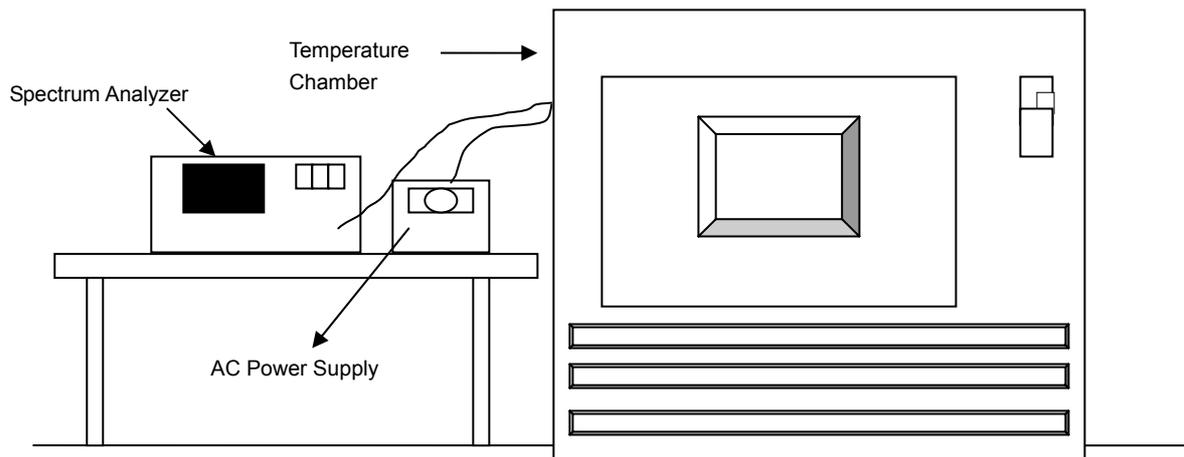


4.5 Frequency Stability

4.5.1 Limits of Frequency Stability Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

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

**4.5.7 Test Results**

Frequency Stability Versus Temp.									
Operating Frequency: 5745MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)						
50	120	5744.9755	-0.00043	5744.9737	-0.00046	5744.9761	-0.00042	5744.9761	-0.00042
40	120	5745.0251	0.00044	5745.0251	0.00044	5745.0275	0.00048	5745.0242	0.00042
30	120	5744.9721	-0.00049	5744.9741	-0.00045	5744.9733	-0.00046	5744.9727	-0.00048
20	120	5745.0214	0.00037	5745.0189	0.00033	5745.0184	0.00032	5745.0182	0.00032
10	120	5745.0211	0.00037	5745.0235	0.00041	5745.0222	0.00039	5745.0239	0.00042
0	120	5744.9772	-0.00040	5744.9784	-0.00038	5744.9796	-0.00036	5744.9788	-0.00037
-10	120	5745.0291	0.00051	5745.0244	0.00042	5745.029	0.00050	5745.028	0.00049
-20	120	5745.0247	0.00043	5745.0235	0.00041	5745.0229	0.00040	5745.0229	0.00040
-30	120	5744.9718	-0.00049	5744.9715	-0.00050	5744.9722	-0.00048	5744.9742	-0.00045

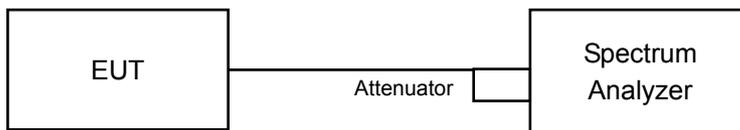
Frequency Stability Versus Temp.									
Operating Frequency: 5745MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)						
20	138	5745.0219	0.00038	5745.0186	0.00032	5745.0191	0.00033	5745.0175	0.00030
	120	5745.0214	0.00037	5745.0189	0.00033	5745.0184	0.00032	5745.0182	0.00032
	102	5745.0204	0.00036	5745.018	0.00031	5745.018	0.00031	5745.0192	0.00033

4.6 6dB Bandwidth Measurement

4.6.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.43	16.39	0.5	Pass
157	5785	16.42	16.38	0.5	Pass
165	5825	16.44	16.38	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.70	16.41	0.5	Pass
157	5785	17.69	16.37	0.5	Pass
165	5825	17.59	16.39	0.5	Pass

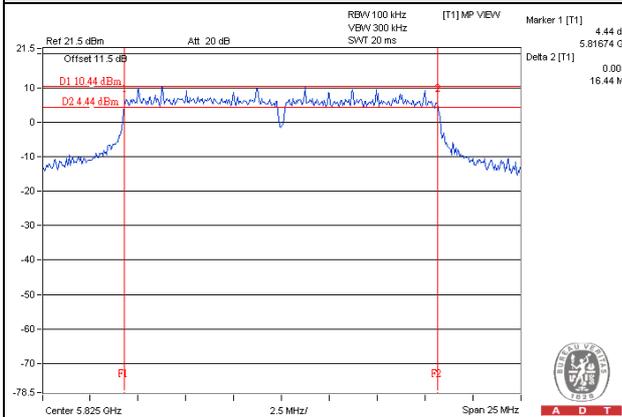
802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.81	35.84	0.5	Pass
159	5795	35.83	36.06	0.5	Pass

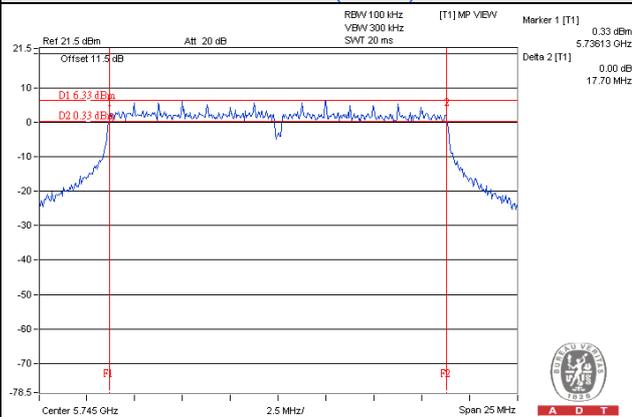


Spectrum Plot of Worst Value

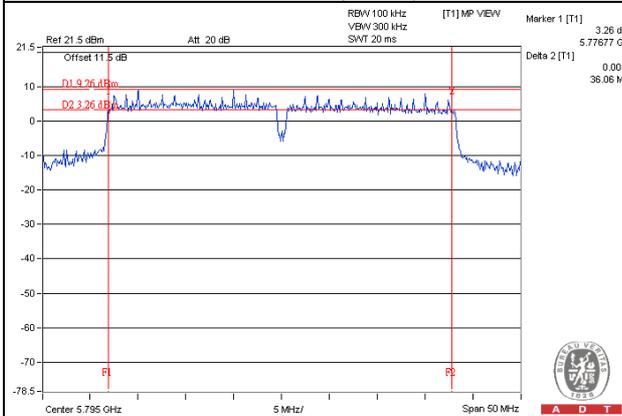
802.11a



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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