

FCC Test Report (WLAN)

Report No.: RF120524E01G-1

FCC ID: PY312200202

Test Model: WNDAP620

Received Date: May 24, 2012

Test Date: May 28 to 29, 2012 and Sep. 10 to 21, 2015

Issued Date: Sep. 30, 2015

Applicant: Netgear Incorporated.

Address: 350 East Plumeria Drive San Jose California United States 95134

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

Lab Address: No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

Test Location (1): No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

Test Location (2): No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

Test Location (3): E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

Release Control Record	4
1 Certificate of Conformity	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Modification Record	6
3 General Information	7
3.1 General Description of EUT	7
3.2 Description of Test Modes	9
3.2.1 Test Mode Applicability and Tested Channel Detail	10
3.3 Duty Cycle of Test Signal	12
3.4 Description of Support Units	13
3.4.1 Configuration of System under Test	14
3.5 General Description of Applied Standard	15
4 Test Types and Results	16
4.1 Radiated Emission and Bandedge Measurement	16
4.1.1 Limits of Radiated Emission and Bandedge Measurement	16
4.1.2 Test Instruments	17
4.1.3 Test Procedures	20
4.1.4 Deviation from Test Standard	20
4.1.5 Test Setup	21
4.1.6 EUT Operating Conditions	21
4.1.7 Test Results	22
4.2 Transmit Power Measurement	39
4.2.1 Limits of Transmit Power Measurement	39
4.2.2 Test Setup	39
4.2.3 Test Instruments	39
4.2.4 Test Procedures	39
4.2.5 Deviation from Test Standard	40
4.2.6 EUT Operating Conditions	40
4.2.7 Test Results	41
4.3 Peak Power Spectral Density Measurement	42
4.3.1 Limits of Peak Power Spectral Density Measurement	42
4.3.2 Test Setup	42
4.3.3 Test Instruments	42
4.3.4 Test Procedures	42
4.3.5 Deviation from Test Standard	43
4.3.6 EUT Operating Conditions	43
4.3.7 Test Results	44
4.4 Frequency Stability Measurement	48
4.4.1 Limits of Frequency Stability Measurement	48
4.4.2 Test Setup	48
4.4.3 Test Instruments	48
4.4.4 Test Procedures	48
4.4.5 Deviation from Test Standard	48
4.4.6 EUT Operating Conditions	48
4.4.7 Test Results	49
4.5 6dB Bandwidth Measurement	50
4.5.1 Limits of 6dB Bandwidth Measurement	50
4.5.2 Test Setup	50
4.5.3 Test Instruments	50
4.5.4 Test Procedures	50
4.5.5 Deviation from Test Standard	50
4.5.6 EUT Operating Conditions	50



4.5.7 Test Results	51
5 Pictures of Test Arrangements.....	53
Appendix – Information on the Testing Laboratories	54



A D T

Release Control Record

Issue No.	Description	Date Issued
RF120524E01G-1	Original release.	Sep. 30, 2015

1 Certificate of Conformity

Product: ProSafe 3x3 Single Radio, Dual Band Wireless-N Access Point

Brand: Netgear

Test Model: WNDAP620

Sample Status: ENGINEERING SAMPLE

Applicant: Netgear Incorporated.

Test Date: May 28 to 29, 2012 and Sep. 10 to 21, 2015

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :  , **Date:** Sep. 30, 2015
Claire Kuan / Specialist

Approved by :  , **Date:** Sep. 30, 2015
May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (SECTION 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b) (1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5725.00MHz.
15.407(a)(1/2 /3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
15.407(a)(1/2 /3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is SMA Plug Reverse not a standard connector.

NOTE: 1. This report is prepared for FCC Class II change. (Upgrade the standard to section 15.407 under new rule for U-NII-1, U-NII-3 band)

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) (±)
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.43 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.65 dB
	6GHz ~ 18GHz	3.88 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	ProSafe 3x3 Single Radio, Dual Band Wireless-N Access Point
Brand	Netgear
Test Model	WNDAP620
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 12V from power adapter or DC 56V from POE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 450Mbps
Operating Frequency	2.4GHz: 2.412GHz ~ 2.462GHz 5GHz: 5.18GHz ~ 5.24GHz, 5.745GHz ~ 5.825GHz
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 5GHz: 802.11a, 802.11n (HT20): 9 802.11n (HT40): 4
Output Power	5GHz: (U-NII-1 & U-NII-3) 802.11a: 140.777 mW 802.11n (HT20): 132.676mW 802.11n (HT40): 133.257mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	Console cable (unshielded, 1.5m) x 1

Note:

- This report is prepared for FCC Class II change. The difference compared with the Report No.: RF120524E01-1 design is as the following:
 - ◆ Upgrade the standard to section 15.407 under new rule for U-NII-1, U-NII-3 band.
- According to above conditions, all test items of U-NII-3 band (except for Conducted Emission test item) need to be performed. And the other test data was copied from the original test report (Report No.: RF120524E01-1). And all data was verified to meet the requirements.

4. The EUT must be supplied with a POE or power adapter and following two different models could be chosen as following table:

Adapter				
No	P/N	Brand	Model No.	Spec.
1	332-10221-01	NETGEAR	MV18-9120150-A1	Input: 120V, 0.5A, 60Hz Output: 12V, 1.5A DC output cable (Unshielded, 1.8m)
2	332-10375-01	NETGEAR	SAL018F1 NA	Input: 100-120V, 0.6A, 47-63Hz Output: 12V, 1.5A DC output cable (Unshielded, 1.8m)

POE (test only not sale together)

Brand	Model No.	Spec.
PHIHONG	POE30U-560(G)	Input: 100-240V, 0.95A, 50-60Hz Output: 56V, 0.55A

From the above two adapters and POE were pre-tested in chamber, the worse case was found in **Adapter 1**. Therefore only the test data of the adapter was recorded in this report.

5. The antennas provided to the EUT, please refer to the following table:

Internal Antenna (For 2.4GHz / 5GHz)				
Transmitter Circuit	Antenna Type	Peak Gain (dBi)		
		2.4GHz	5GHz Band 1	5GHz Band 4
Chain (0)	Dipole	2.3	5.9	5.3
Chain (1)	Dipole	2.3	5.9	4.9
Chain (2)	Dipole	2.3	5	5.2

External Antenna (For 2.4GHz)

Model	Antenna Type	Gain (dBi) (Exclude cable loss)	Cable Loss (dB)	Net Gain (dBi) (Include cable loss)	Connector Type
ANT-32405	Dipole	5	3.68	1.32	SMA Plug Reverse

From the above antennas, internal antenna was selected for testing.

6. The EUT incorporates a MIMO function.

MODULATION MODE	TX/RX FUNCTION
802.11b	3TX/3RX
802.11g	3TX/3RX
802.11a	3TX/3RX
802.11n (HT20)	3TX/3RX
802.11n (HT40)	3TX/3RX

7. 2.4GHz and 5GHz technology cannot transmit at same time.
8. When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 23.
9. 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:

1. The test mode was reference to the worst case in the original test report.
2. "-" means no effect.

Radiated Emission Test (Above 1GHz):

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

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
802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	13.5

Radiated Emission Test (Below 1GHz):

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

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5240, 5745-5825	36 to 48, 149 to 165	157	OFDM	BPSK	6.5

Antenna Port Conducted Measurement:

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

MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11n (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11n (HT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	13.5

Test Condition:

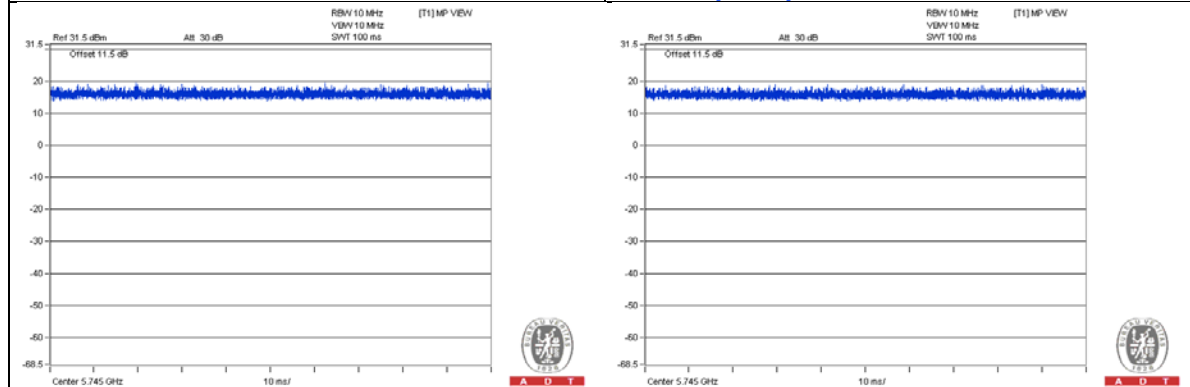
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	19deg. C, 63%RH	120Vac, 60Hz	Tim Ho
RE<1G	23deg. C, 69%RH	120Vac, 60Hz	Robert Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

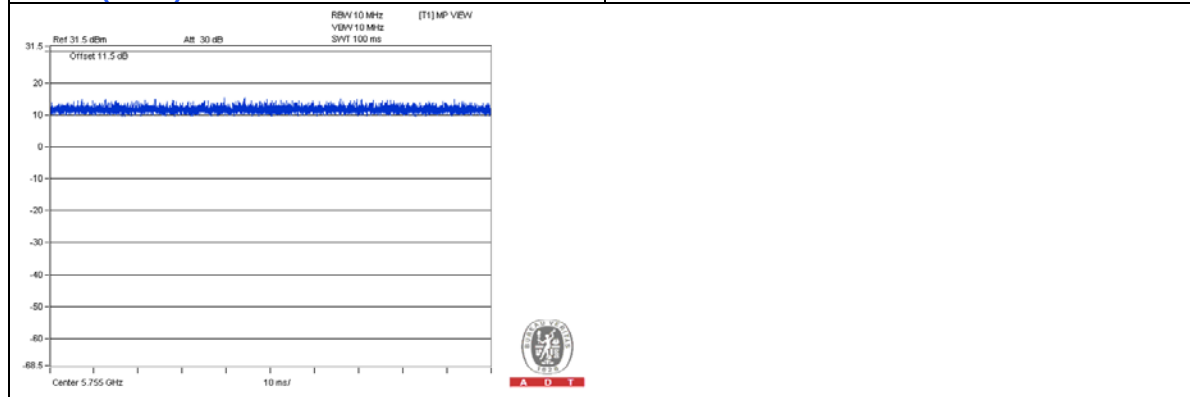
Duty cycle of test signal is 100 %, duty factor is not required.

802.11a

802.11n (HT20)



802.11 (HT40)



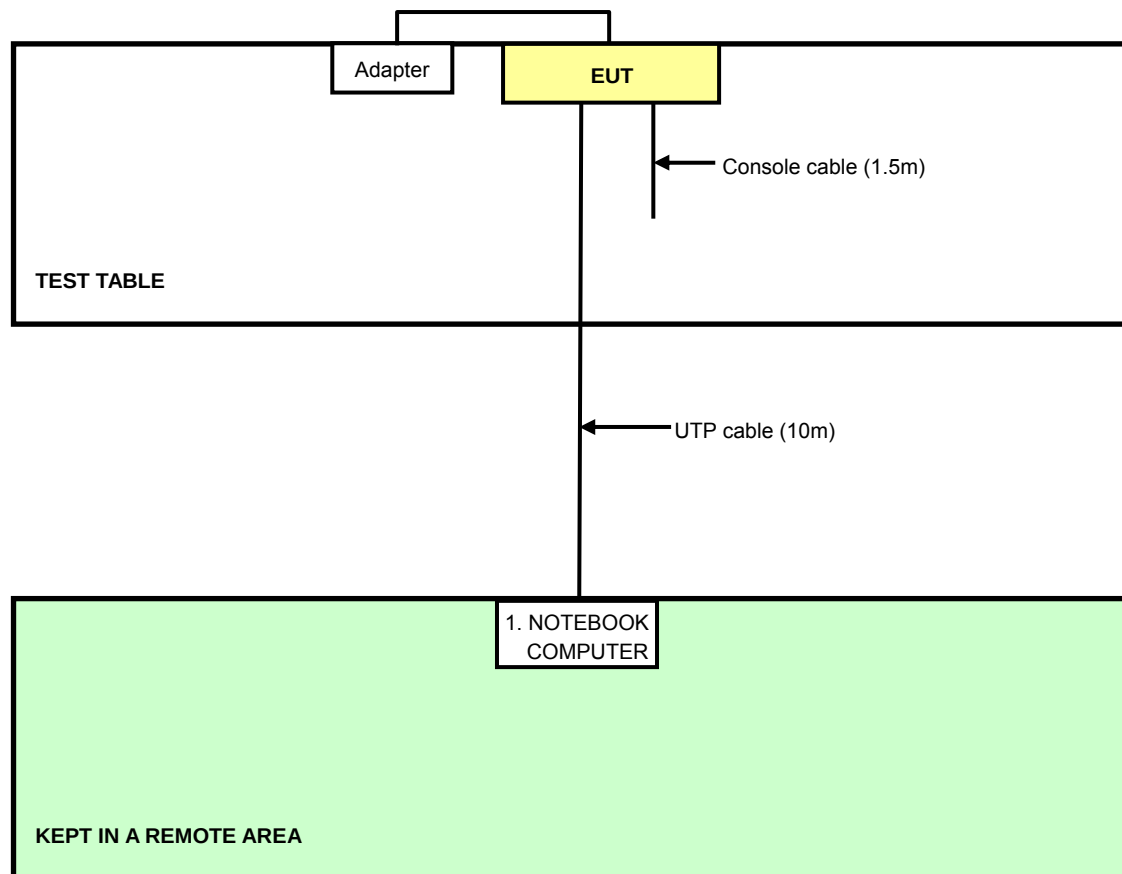
3.4 Description of Support Units

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.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP Cable (10m)

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 C63.10-2013

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

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedure New Rules v01	FIELD STRENGTH AT 3m	
	PK:74 (dBuV/m)	AV:54 (dBuV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/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 (dBuV/m) ^{*1} PK:78.2 (dBuV/m) ^{*2}

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

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

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

4.1.2 Test Instruments

For Above 1GHz (U-NII-1):

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum Analyzer	E4446A	MY48250253	Aug. 29, 2011	Aug. 28, 2012
Agilent Pre-Selector	N9039A	MY46520310	Aug. 29, 2011	Aug. 28, 2012
Agilent Signal Generator	N5181A	MY49060347	July 25, 2011	July 24, 2012
Mini-Circuits Pre-Amplifier	ZFL-1000VH2B	AMP-ZFL-04	Nov. 15, 2011	Nov. 14, 2012
Agilent Pre-Amplifier	8449B	3008A02465	Feb. 27, 2012	Feb. 26, 2013
SPACEK LABS	SLKKa-48-6	9K16	Nov. 15, 2011	Nov. 14, 2012
SCHWARZBECK Trilog Broadband Antenna	VULB 9168	9168-361	Apr. 06, 2012	Apr. 05, 2013
AISI Horn_Antenna	AIH.8018	0000220091110	Nov. 23, 2011	Nov. 22, 2012
SCHWARZBECK Horn_Antenna	BBHA 9170	9170-424	Oct. 07, 2011	Oct. 06, 2012
*R&S Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 27, 2011	Dec. 26, 2012
RF Cable	NA	CHHCAB_001	Oct. 08, 2011	Oct. 07, 2012
Software	ADT_Radiated_V8.7.05	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. * = The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The test was performed in 966 Chamber No. H.
5. The FCC Site Registration No. is 797305.
6. The CANADA Site Registration No. is IC 7450H-3.
7. Tested Date: May 28 to 29, 2012



A D T

For Above 1GHz (U-NII-3):

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210105	July 24, 2015	July 23, 2016
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-03	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 06, 2015	Feb. 05, 2016
RF Cable	8D-FB	CHGCAB-001-1 CHGCAB-001-2	Oct. 04, 2014	Oct. 03, 2015
	RF-141	CHGCAB-004	Oct. 04, 2014	Oct. 03, 2015
Horn_Antenna AISL	AIH.8018	0000320091110	Feb. 09, 2015	Feb. 08, 2016
Pre-Amplifier Agilent	8449B	3008A02578	June 23, 2015	June 22, 2016
RF Cable	NA	131205 131216 131217 SNMY23684/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	June 26, 2015	June 25, 2016
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Feb. 05, 2015	Feb. 04, 2016
RF Cable	NA	329751/4 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Software	ADT_Radiated_V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA
Spectrum Analyzer R&S	FSP 40	100060	May 08, 2015	May 07, 2016
Power meter Anritsu	ML2495A	1014008	Apr. 28, 2015	Apr. 27, 2016
Power sensor Anritsu	MA2411B	0917122	Apr. 28, 2015	Apr. 27, 2016
Temperature & Humidity Chamber GIANTFORCE	GTH-150-40-SP-AR	MAA0812-008	Jan. 12, 2015	Jan. 11, 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 966 Chamber No. G.
3. The FCC Site Registration No. is 966073.
4. The VCCI Site Registration No. is G-137.
5. The CANADA Site Registration No. is IC 7450H-2.
6. Tested Date: Sep. 18 to 21, 2015

For Below 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 12, 2014	Dec. 11, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 09, 2015	Feb. 08, 2016
RF Cable	8D-FB	CHHCAB-001-1 CHHCAB-001-2	Oct. 05, 2014	Oct. 04, 2015
	RF-141	CHHCAB-004	Oct. 05, 2014	Oct. 04, 2015
Software	ADT_Radiated_V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. H.
3. The FCC Site Registration No. is 797305.
4. The CANADA Site Registration No. is IC 7450H-3.
5. Tested Date: Sep. 10, 2015

4.1.3 Test Procedures

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

Note:

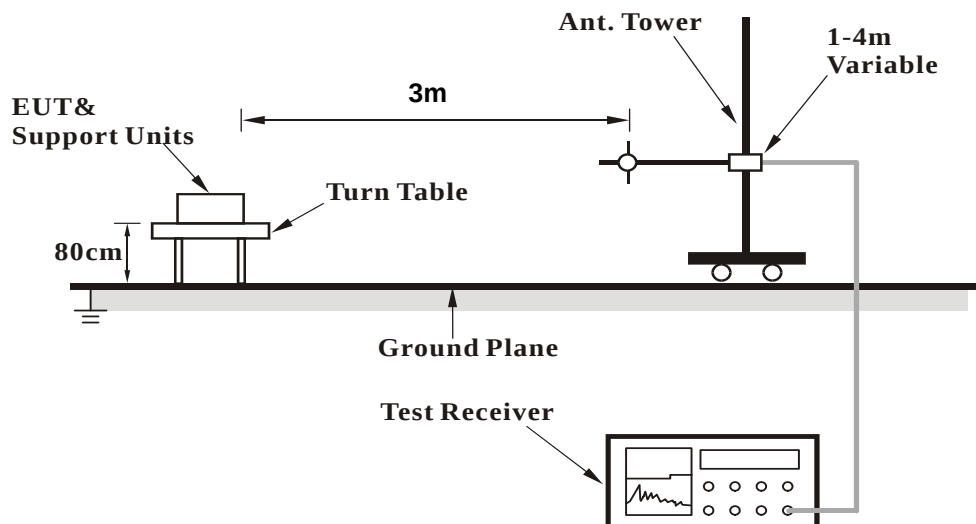
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

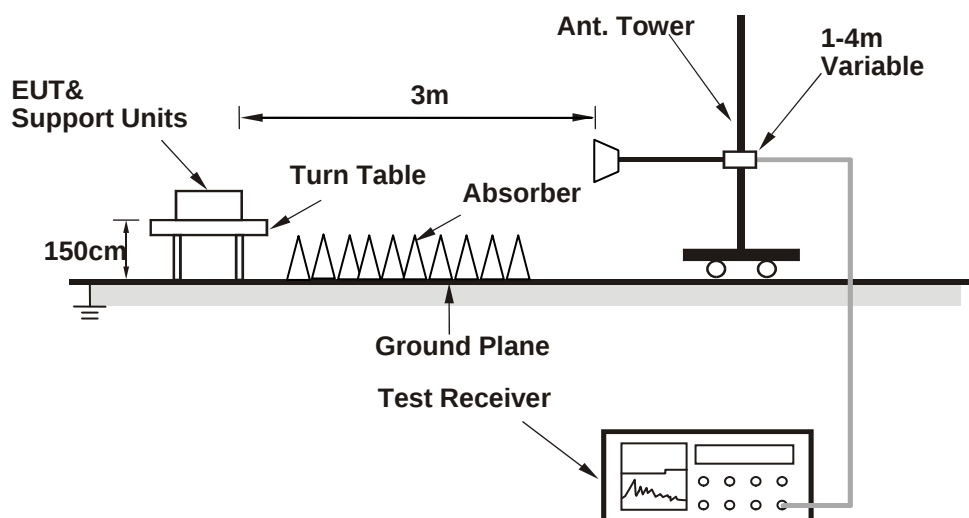
No deviation.

4.1.5 Test 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 Conditions

1. Placed the EUT on testing table.
2. Prepared other computer system (support unit 1) to act as communication partners and placed them outside of testing area.
3. The communication partners ran test program "art2_ver2_25BIN" to enable EUT under transmission/receiving condition continuously via one UTP cable transmission.

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	65.4 PK	74.0	-8.6	1.00 H	123	25.46	39.94
2	5150.00	49.4 AV	54.0	-4.6	1.00 H	123	9.46	39.94
3	*5180.00	112.4 PK			1.48 H	121	72.38	40.02
4	*5180.00	101.3 AV			1.48 H	121	61.28	40.02
5	#10360.00	56.3 PK	68.3	-12.0	1.12 H	76	9.77	46.53
6	15540.00	62.4 PK	74.0	-11.6	1.25 H	45	11.03	51.37
7	15540.00	50.5 AV	54.0	-3.5	1.25 H	45	-0.87	51.37
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	69.4 PK	74.0	-4.6	1.48 V	121	29.46	39.94
2	5150.00	53.5 AV	54.0	-0.5	1.48 V	121	13.56	39.94
3	*5180.00	113.1 PK			1.53 V	213	73.08	40.02
4	*5180.00	102.6 AV			1.53 V	213	62.58	40.02
5	#10360.00	57.7 PK	68.3	-10.6	1.12 V	353	11.17	46.53
6	15540.00	60.8 PK	74.0	-13.2	1.12 V	30	9.43	51.37
7	15540.00	48.9 AV	54.0	-5.1	1.12 V	30	-2.47	51.37

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	112.8 PK			1.20 H	113	72.73	40.07
2	*5200.00	102.3 AV			1.20 H	113	62.23	40.07
3	#10400.00	59.6 PK	68.3	-8.7	1.12 H	52	13.03	46.57
4	15600.00	64.9 PK	74.0	-9.1	1.27 H	50	13.43	51.47
5	15600.00	53.2 AV	54.0	-0.8	1.27 H	50	1.73	51.47
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	113.6 PK			1.09 V	221	73.53	40.07
2	*5200.00	102.7 AV			1.09 V	221	62.63	40.07
3	#10400.00	65.4 PK	68.3	-2.9	1.11 V	21	18.83	46.57
4	15600.00	66.0 PK	74.0	-8.0	1.20 V	43	14.53	51.47
5	15600.00	53.2 AV	54.0	-0.8	1.20 V	43	1.73	51.47

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	113.2 PK			1.22 H	115	73.03	40.17
2	*5240.00	102.9 AV			1.22 H	115	62.73	40.17
3	5350.00	59.0 PK	74.0	-15.0	1.20 H	116	18.53	40.47
4	5350.00	46.5 AV	54.0	-7.5	1.20 H	116	6.03	40.47
5	#10480.00	61.3 PK	68.3	-7.0	1.14 H	52	14.63	46.67
6	15720.00	66.1 PK	74.0	-7.9	1.14 H	57	14.59	51.51
7	15720.00	53.5 AV	54.0	-0.5	1.14 H	57	1.99	51.51
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	113.6 PK			1.09 V	221	73.43	40.17
2	*5240.00	103.1 AV			1.09 V	221	62.93	40.17
3	5350.00	59.0 PK	74.0	-15.0	1.09 V	221	18.53	40.47
4	5350.00	47.5 AV	54.0	-6.5	1.09 V	221	7.03	40.47
5	#10480.00	63.8 PK	68.3	-4.5	1.12 V	22	17.13	46.67
6	15720.00	65.8 PK	74.0	-8.2	1.10 V	44	14.29	51.51
7	15720.00	53.2 AV	54.0	-0.8	1.10 V	44	1.69	51.51

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	#5715.00	58.6 PK	74.0	-15.4	1.61 H	185	48.92	9.68
2	#5715.00	40.6 AV	54.0	-13.4	1.61 H	185	30.92	9.68
3	#5725.00	76.6 PK	78.2	-1.6	1.61 H	185	66.90	9.70
4	*5745.00	102.7 PK			1.61 H	185	92.94	9.76
5	*5745.00	92.9 AV			1.61 H	185	83.14	9.76
6	11490.00	60.4 PK	74.0	-13.6	1.14 H	15	45.54	14.86
7	11490.00	45.3 AV	54.0	-8.7	1.14 H	15	30.44	14.86
8	#17235.00	55.4 PK	74.0	-18.6	1.49 H	166	32.17	23.23
9	#17235.00	46.8 AV	54.0	-7.2	1.49 H	166	23.57	23.23

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	#5715.00	63.7 PK	74.0	-10.3	1.64 V	36	54.02	9.68
2	#5715.00	45.3 AV	54.0	-8.7	1.64 V	36	35.62	9.68
3	#5725.00	78.1 PK	78.2	-0.1	1.81 V	37	68.40	9.70
4	*5745.00	104.1 PK			1.81 V	183	94.34	9.76
5	*5745.00	94.0 AV			1.81 V	183	84.24	9.76
6	11490.00	61.9 PK	74.0	-12.1	2.09 V	314	47.04	14.86
7	11490.00	47.4 AV	54.0	-6.6	2.09 V	314	32.54	14.86
8	#17235.00	51.1 PK	74.0	-22.9	1.02 V	227	27.87	23.23
9	#17235.00	41.7 AV	54.0	-12.3	1.02 V	227	18.47	23.23

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	#5715.00	53.6 PK	74.0	-20.4	1.60 H	191	43.92	9.68
2	#5715.00	35.4 AV	54.0	-18.6	1.60 H	191	25.72	9.68
3	#5725.00	63.4 PK	78.2	-14.8	1.60 H	191	53.70	9.70
4	*5785.00	106.2 PK			1.60 H	191	96.35	9.85
5	*5785.00	96.4 AV			1.60 H	191	86.55	9.85
6	#5850.00	63.1 PK	78.2	-15.1	1.60 H	191	53.18	9.92
7	#5860.00	53.8 PK	74.0	-20.2	1.60 H	191	43.87	9.93
8	#5860.00	35.6 AV	54.0	-18.4	1.60 H	191	25.67	9.93
9	11570.00	65.7 PK	74.0	-8.3	1.09 H	16	50.50	15.20
10	11570.00	50.6 AV	54.0	-3.4	1.09 H	16	35.40	15.20
11	#17355.00	60.9 PK	74.0	-13.1	1.47 H	166	37.34	23.56
12	#17355.00	52.2 AV	54.0	-1.8	1.47 H	166	28.64	23.56

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	53.7 PK	74.0	-20.3	1.61 V	37	44.02	9.68
2	#5715.00	35.3 AV	54.0	-18.7	1.61 V	37	25.62	9.68
3	#5725.00	63.8 PK	78.2	-14.4	1.56 V	37	54.10	9.70
4	*5785.00	107.6 PK			1.61 V	41	97.75	9.85
5	*5785.00	97.5 AV			1.61 V	41	87.65	9.85
6	#5850.00	63.3 PK	78.2	-14.9	1.57 V	49	53.38	9.92
7	#5860.00	53.9 PK	74.0	-20.1	1.64 V	28	43.97	9.93
8	#5860.00	35.4 AV	54.0	-18.6	1.64 V	28	25.47	9.93
9	11570.00	68.0 PK	74.0	-6.0	2.11 V	315	52.80	15.20
10	11570.00	53.5 AV	54.0	-0.5	2.11 V	315	38.30	15.20
11	#17355.00	57.2 PK	74.0	-16.8	1.00 V	229	33.64	23.56
12	#17355.00	47.5 AV	54.0	-6.5	1.00 V	229	23.94	23.56

REMARKS:

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

CHANNEL	TX Channel 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	107.2 PK			1.63 H	202	97.29	9.91
2	*5825.00	95.4 AV			1.63 H	202	85.49	9.91
3	#5850.00	76.3 PK	78.2	-1.9	1.63 H	202	66.38	9.92
4	#5860.00	62.3 PK	74.0	-11.7	1.63 H	202	52.37	9.93
5	#5860.00	41.8 AV	54.0	-12.2	1.63 H	202	31.87	9.93
6	11650.00	62.4 PK	74.0	-11.6	1.10 H	30	47.00	15.40
7	11650.00	47.4 AV	54.0	-6.6	1.10 H	30	32.00	15.40
8	#17475.00	57.4 PK	74.0	-16.6	1.47 H	174	33.31	24.09
9	#17475.00	48.8 AV	54.0	-5.2	1.47 H	174	24.71	24.09
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	108.3 PK			2.10 V	180	98.39	9.91
2	*5825.00	96.6 AV			2.10 V	180	86.69	9.91
3	#5850.00	77.9 PK	78.2	-0.3	2.15 V	182	67.98	9.92
4	#5860.00	67.0 PK	74.0	-7.0	2.25 V	182	57.07	9.93
5	#5860.00	46.3 AV	54.0	-7.7	2.25 V	182	36.37	9.93
6	11650.00	65.2 PK	74.0	-8.8	2.10 V	316	49.80	15.40
7	11650.00	50.7 AV	54.0	-3.3	2.10 V	316	35.30	15.40
8	#17475.00	53.8 PK	74.0	-20.2	1.04 V	244	29.71	24.09
9	#17475.00	44.3 AV	54.0	-9.7	1.04 V	244	20.21	24.09

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)
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	65.8 PK	74.0	-8.2	1.24 H	120	25.86	39.94
2	5150.00	49.8 AV	54.0	-4.2	1.24 H	120	9.86	39.94
3	*5180.00	110.8 PK			1.24 H	120	70.78	40.02
4	*5180.00	100.1 AV			1.24 H	120	60.08	40.02
5	#10360.00	56.4 PK	68.3	-11.9	1.17 H	84	9.87	46.53
6	15540.00	62.4 PK	74.0	-11.6	1.28 H	30	11.03	51.37
7	15540.00	50.3 AV	54.0	-3.7	1.28 H	30	-1.07	51.37
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.5 PK	74.0	-5.5	1.48 V	121	28.56	39.94
2	5150.00	53.2 AV	54.0	-0.8	1.48 V	121	13.26	39.94
3	*5180.00	111.1 PK			1.48 V	122	71.08	40.02
4	*5180.00	100.5 AV			1.48 V	122	60.48	40.02
5	#10360.00	57.5 PK	68.3	-10.8	1.08 V	358	10.97	46.53
6	15540.00	60.7 PK	74.0	-13.3	1.15 V	18	9.33	51.37
7	15540.00	48.8 AV	54.0	-5.2	1.15 V	18	-2.57	51.37

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.

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	58.8 PK	74.0	-15.2	1.18 H	117	18.86	39.94
2	5150.00	46.4 AV	54.0	-7.6	1.18 H	117	6.46	39.94
3	*5200.00	114.6 PK			1.23 H	119	74.53	40.07
4	*5200.00	103.4 AV			1.23 H	119	63.33	40.07
5	#10400.00	60.9 PK	68.3	-7.4	1.11 H	55	14.33	46.57
6	15600.00	66.5 PK	74.0	-7.5	1.14 H	61	15.03	51.47
7	15600.00	53.5 AV	54.0	-0.5	1.14 H	61	2.03	51.47
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.3 PK	74.0	-8.7	1.20 V	43	25.36	39.94
2	5150.00	53.2 AV	54.0	-0.8	1.20 V	43	13.26	39.94
3	*5200.00	115.4 PK			1.03 V	221	75.33	40.07
4	*5200.00	104.2 AV			1.03 V	221	64.13	40.07
5	#10400.00	63.5 PK	68.3	-4.8	1.11 V	18	16.93	46.57
6	15600.00	63.7 PK	74.0	-10.3	1.24 V	36	12.23	51.47
7	15600.00	52.5 AV	54.0	-1.5	1.24 V	36	1.03	51.47

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	113.3 PK			1.22 H	116	73.13	40.17
2	*5240.00	101.3 AV			1.22 H	116	61.13	40.17
3	5350.00	58.3 PK	74.0	-15.7	1.18 H	101	17.83	40.47
4	5350.00	46.1 AV	54.0	-7.9	1.18 H	101	5.63	40.47
5	#10480.00	59.0 PK	68.3	-9.3	1.13 H	62	12.33	46.67
6	15720.00	63.6 PK	74.0	-10.4	1.14 H	57	12.09	51.51
7	15720.00	53.5 AV	54.0	-0.5	1.14 H	57	1.99	51.51
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	113.4 PK			1.07 V	207	73.23	40.17
2	*5240.00	102.6 AV			1.07 V	207	62.43	40.17
3	5350.00	58.5 PK	74.0	-15.5	1.11 V	208	18.03	40.47
4	5350.00	47.3 AV	54.0	-6.7	1.11 V	208	6.83	40.47
5	#10480.00	63.0 PK	68.3	-5.3	1.10 V	18	16.33	46.67
6	15720.00	65.9 PK	74.0	-8.1	1.24 V	32	14.39	51.51
7	15720.00	53.3 AV	54.0	-0.7	1.24 V	32	1.79	51.51

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	#5715.00	63.9 PK	74.0	-10.1	1.49 H	190	54.22	9.68
2	#5715.00	40.6 AV	54.0	-13.4	1.49 H	190	30.92	9.68
3	#5725.00	76.5 PK	78.2	-1.7	1.49 H	190	66.80	9.70
4	*5745.00	102.8 PK			1.49 H	190	93.04	9.76
5	*5745.00	92.8 AV			1.49 H	190	83.04	9.76
6	11490.00	60.9 PK	74.0	-13.1	1.09 H	23	46.04	14.86
7	11490.00	45.7 AV	54.0	-8.3	1.09 H	23	30.84	14.86
8	#17235.00	55.2 PK	74.0	-18.8	1.48 H	176	31.97	23.23
9	#17235.00	46.5 AV	54.0	-7.5	1.48 H	176	23.27	23.23
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	#5715.00	64.2 PK	74.0	-9.8	1.65 V	43	54.52	9.68
2	#5715.00	45.7 AV	54.0	-8.3	1.65 V	43	36.02	9.68
3	#5725.00	78.0 PK	78.2	-0.2	1.76 V	46	68.30	9.70
4	*5745.00	104.0 PK			1.77 V	169	94.24	9.76
5	*5745.00	93.9 AV			1.77 V	169	84.14	9.76
6	11490.00	61.2 PK	74.0	-12.8	2.06 V	308	46.34	14.86
7	11490.00	47.0 AV	54.0	-7.0	2.06 V	308	32.14	14.86
8	#17235.00	50.4 PK	74.0	-23.6	1.07 V	224	27.17	23.23
9	#17235.00	41.2 AV	54.0	-12.8	1.07 V	224	17.97	23.23

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	#5715.00	53.8 PK	74.0	-20.2	1.53 H	179	44.12	9.68
2	#5715.00	35.4 AV	54.0	-18.6	1.53 H	179	25.72	9.68
3	#5725.00	63.4 PK	78.2	-14.8	1.53 H	179	53.70	9.70
4	*5785.00	106.2 PK			1.53 H	179	96.35	9.85
5	*5785.00	96.0 AV			1.53 H	179	86.15	9.85
6	#5850.00	63.1 PK	78.2	-15.1	1.53 H	179	53.18	9.92
7	#5860.00	53.1 PK	74.0	-20.9	1.53 H	179	43.17	9.93
8	#5860.00	35.0 AV	54.0	-19.0	1.53 H	179	25.07	9.93
9	11570.00	65.9 PK	74.0	-8.1	1.12 H	31	50.70	15.20
10	11570.00	50.8 AV	54.0	-3.2	1.12 H	31	35.60	15.20
11	#17355.00	61.1 PK	74.0	-12.9	1.46 H	160	37.54	23.56
12	#17355.00	52.1 AV	54.0	-1.9	1.46 H	160	28.54	23.56

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5715.00	54.2 PK	74.0	-19.8	1.66 V	22	44.52	9.68
2	#5715.00	35.7 AV	54.0	-18.3	1.66 V	22	26.02	9.68
3	#5725.00	63.8 PK	78.2	-14.4	1.59 V	53	54.10	9.70
4	*5785.00	107.4 PK			1.63 V	43	97.55	9.85
5	*5785.00	97.1 AV			1.63 V	43	87.25	9.85
6	#5850.00	63.3 PK	78.2	-14.9	1.61 V	54	53.38	9.92
7	#5860.00	53.6 PK	74.0	-20.4	1.68 V	37	43.67	9.93
8	#5860.00	35.1 AV	54.0	-18.9	1.68 V	37	25.17	9.93
9	11570.00	68.2 PK	74.0	-5.8	2.07 V	304	53.00	15.20
10	11570.00	53.5 AV	54.0	-0.5	2.07 V	304	38.30	15.20
11	#17355.00	56.8 PK	74.0	-17.2	1.00 V	228	33.24	23.56
12	#17355.00	47.2 AV	54.0	-6.8	1.00 V	228	23.64	23.56

REMARKS:

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

CHANNEL	TX Channel 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	107.0 PK			1.52 H	179	97.09	9.91
2	*5825.00	95.5 AV			1.52 H	179	85.59	9.91
3	#5850.00	76.4 PK	78.2	-1.8	1.52 H	179	66.48	9.92
4	#5860.00	62.1 PK	74.0	-11.9	1.52 H	179	52.17	9.93
5	#5860.00	41.7 AV	54.0	-12.3	1.52 H	179	31.77	9.93
6	11650.00	62.4 PK	74.0	-11.6	1.12 H	36	47.00	15.40
7	11650.00	47.7 AV	54.0	-6.3	1.12 H	36	32.30	15.40
8	#17475.00	57.6 PK	74.0	-16.4	1.47 H	162	33.51	24.09
9	#17475.00	49.1 AV	54.0	-4.9	1.47 H	162	25.01	24.09
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	108.1 PK			2.07 V	179	98.19	9.91
2	*5825.00	96.7 AV			2.07 V	179	86.79	9.91
3	#5850.00	78.0 PK	78.2	-0.2	2.11 V	174	68.08	9.92
4	#5860.00	67.2 PK	74.0	-6.8	2.30 V	170	57.27	9.93
5	#5860.00	46.7 AV	54.0	-7.3	2.30 V	170	36.77	9.93
6	11650.00	65.9 PK	74.0	-8.1	2.08 V	320	50.50	15.40
7	11650.00	51.1 AV	54.0	-2.9	2.08 V	320	35.70	15.40
8	#17475.00	53.7 PK	74.0	-20.3	1.01 V	231	29.61	24.09
9	#17475.00	44.2 AV	54.0	-9.8	1.01 V	231	20.11	24.09

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)
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	65.8 PK	74.0	-8.2	1.20 H	113	25.86	39.94
2	5150.00	49.7 AV	54.0	-4.3	1.20 H	113	9.76	39.94
3	*5190.00	104.1 PK			1.29 H	129	64.06	40.04
4	*5190.00	92.8 AV			1.29 H	129	52.76	40.04
5	#10380.00	52.1 PK	68.3	-16.2	1.13 H	93	5.55	46.55
6	15570.00	58.7 PK	74.0	-15.3	1.33 H	26	7.28	51.42
7	15570.00	47.8 AV	54.0	-6.2	1.33 H	26	-3.62	51.42
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	73.1 PK	74.0	-0.9	1.48 V	121	33.16	39.94
2	5150.00	53.2 AV	54.0	-0.8	1.48 V	121	13.26	39.94
3	*5190.00	106.2 PK			1.08 V	198	66.16	40.04
4	*5190.00	94.8 AV			1.08 V	198	54.76	40.04
5	#10380.00	52.5 PK	68.3	-15.8	1.06 V	358	5.95	46.55
6	15570.00	60.2 PK	74.0	-13.8	1.14 V	26	8.78	51.42
7	15570.00	48.3 AV	54.0	-5.7	1.14 V	26	-3.12	51.42

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.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.0 PK	74.0	-16.0	1.15 H	100	18.06	39.94
2	5150.00	45.9 AV	54.0	-8.1	1.15 H	100	5.96	39.94
3	*5230.00	108.4 PK			1.20 H	115	68.25	40.15
4	*5230.00	97.2 AV			1.20 H	115	57.05	40.15
5	5350.00	58.8 PK	74.0	-15.2	1.14 H	102	18.33	40.47
6	5350.00	46.4 AV	54.0	-7.6	1.14 H	102	5.93	40.47
7	#10460.00	57.1 PK	68.3	-11.2	1.09 H	50	10.45	46.65
8	15690.00	63.4 PK	74.0	-10.6	1.19 H	69	11.91	51.49
9	15690.00	53.4 AV	54.0	-0.6	1.19 H	69	1.91	51.49
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	66.9 PK	74.0	-7.1	1.08 V	180	26.96	39.94
2	5150.00	53.5 AV	54.0	-0.5	1.08 V	180	13.56	39.94
3	*5230.00	110.4 PK			1.04 V	197	70.25	40.15
4	*5230.00	99.6 AV			1.04 V	197	59.45	40.15
5	5350.00	58.9 PK	74.0	-15.1	1.13 V	193	18.43	40.47
6	5350.00	47.8 AV	54.0	-6.2	1.13 V	193	7.33	40.47
7	#10460.00	59.5 PK	68.3	-8.8	1.07 V	346	12.85	46.65
8	15690.00	62.8 PK	74.0	-11.2	1.20 V	21	11.31	51.49
9	15690.00	50.2 AV	54.0	-3.8	1.20 V	21	-1.29	51.49

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	#5711.00	65.6 PK	74.0	-8.4	1.58 H	193	55.94	9.66
2	#5711.00	48.1 AV	54.0	-5.9	1.58 H	193	38.44	9.66
3	#5725.00	74.7 PK	78.2	-3.5	1.58 H	193	65.00	9.70
4	*5755.00	100.1 PK			1.58 H	193	90.33	9.77
5	*5755.00	88.7 AV			1.58 H	193	78.93	9.77
6	11510.00	60.8 PK	74.0	-13.2	1.14 H	15	45.95	14.85
7	11510.00	45.9 AV	54.0	-8.1	1.14 H	15	31.05	14.85
8	#17265.00	55.6 PK	74.0	-18.4	1.52 H	161	32.37	23.23
9	#17265.00	47.0 AV	54.0	-7.0	1.52 H	161	23.77	23.23
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	#5711.00	72.0 PK	74.0	-2.0	1.49 V	309	62.34	9.66
2	#5711.00	53.6 AV	54.0	-0.4	1.49 V	309	43.94	9.66
3	#5725.00	76.2 PK	78.2	-2.0	1.49 V	309	66.50	9.70
4	*5755.00	100.9 PK			1.49 V	309	91.13	9.77
5	*5755.00	89.7 AV			1.49 V	309	79.93	9.77
6	11510.00	60.6 PK	74.0	-13.4	2.11 V	299	45.75	14.85
7	11510.00	46.7 AV	54.0	-7.3	2.11 V	299	31.85	14.85
8	#17265.00	50.9 PK	74.0	-23.1	1.02 V	222	27.67	23.23
9	#17265.00	41.6 AV	54.0	-12.4	1.02 V	222	18.37	23.23

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	5400.00	54.7 PK	74.0	-19.3	1.53 H	164	45.77	8.93
2	5400.00	43.8 AV	54.0	-10.2	1.53 H	164	34.87	8.93
3	#5715.00	67.2 PK	74.0	-6.8	1.62 H	196	57.52	9.68
4	#5715.00	43.9 AV	54.0	-10.1	1.62 H	196	34.22	9.68
5	#5725.00	69.4 PK	78.2	-8.8	1.62 H	196	59.70	9.70
6	*5795.00	103.8 PK			1.62 H	196	93.92	9.88
7	*5795.00	92.6 AV			1.62 H	196	82.72	9.88
8	#5850.00	74.3 PK	78.2	-3.9	1.62 H	196	64.38	9.92
9	#5860.00	71.6 PK	74.0	-2.4	1.62 H	196	61.67	9.93
10	#5860.00	47.7 AV	54.0	-6.3	1.62 H	196	37.77	9.93
11	11590.00	62.8 PK	74.0	-11.2	1.07 H	47	47.49	15.31
12	11590.00	48.1 AV	54.0	-5.9	1.07 H	47	32.79	15.31
13	#17385.00	57.6 PK	74.0	-16.4	1.49 H	157	33.84	23.76
14	#17385.00	49.2 AV	54.0	-4.8	1.49 H	157	25.44	23.76

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	5400.00	55.6 PK	74.0	-18.4	1.69 V	203	46.67	8.93
2	5400.00	43.0 AV	54.0	-11.0	1.69 V	203	34.07	8.93
3	#5715.00	68.4 PK	74.0	-5.6	1.54 V	39	58.72	9.68
4	#5715.00	49.4 AV	54.0	-4.6	1.54 V	39	39.72	9.68
5	#5725.00	69.6 PK	78.2	-8.6	1.54 V	39	59.90	9.70
6	*5795.00	104.6 PK			1.54 V	39	94.72	9.88
7	*5795.00	93.6 AV			1.54 V	39	83.72	9.88
8	#5850.00	75.8 PK	78.2	-2.4	1.54 V	39	65.88	9.92
9	#5860.00	73.1 PK	74.0	-0.9	1.54 V	39	63.17	9.93
10	#5860.00	53.2 AV	54.0	-0.8	1.54 V	39	43.27	9.93
11	11590.00	65.8 PK	74.0	-8.2	2.13 V	326	50.49	15.31
12	11590.00	50.9 AV	54.0	-3.1	2.13 V	326	35.59	15.31
13	#17385.00	54.3 PK	74.0	-19.7	1.01 V	247	30.54	23.76
14	#17385.00	44.7 AV	54.0	-9.3	1.01 V	247	20.94	23.76

REMARKS:

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

Below 1GHz Data

802.11a

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	Below 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	125.01	31.5 QP	43.5	-12.0	1.50 H	288	46.15	-14.62
2	250.00	38.3 QP	46.0	-7.7	1.00 H	360	52.16	-13.87
3	374.98	34.9 QP	46.0	-11.2	1.00 H	242	45.07	-10.22
4	625.00	34.8 QP	46.0	-11.2	1.50 H	320	39.10	-4.33
5	749.98	35.4 QP	46.0	-10.6	1.00 H	334	37.40	-1.99
6	916.68	31.2 QP	46.0	-14.8	1.50 H	72	30.50	0.68
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	124.96	31.2 QP	43.5	-12.3	2.00 V	284	45.85	-14.61
2	170.12	32.3 QP	43.5	-11.2	2.00 V	264	45.74	-13.46
3	250.00	38.4 QP	46.0	-7.6	1.50 V	43	52.30	-13.87
4	374.98	34.2 QP	46.0	-11.8	1.00 V	241	44.46	-10.22
5	625.00	35.7 QP	46.0	-10.3	1.50 V	39	40.04	-4.33
6	749.98	35.6 QP	46.0	-10.4	1.00 V	328	37.63	-1.99

REMARKS:

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

4.2 Transmit Power Measurement

4.2.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p $\leq$ 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 D01 Multiple Transmitter Output v02r01 Method of conducted output power measurement on IEEE 802.11 devices,

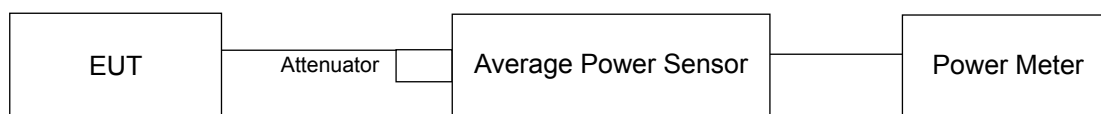
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

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

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

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

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedures

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

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Conditions

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

4.2.7 Test Results

802.11a

Chan.	Chan. Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
36	5180	4.80	7.90	7.30	14.556	11.63	24	Pass
40	5200	5.20	6.80	7.60	13.851	11.41	24	Pass
48	5240	5.50	7.50	7.20	14.419	11.59	24	Pass
149	5745	12.34	12.28	12.54	51.991	17.16	30	Pass
157	5785	17.18	16.55	16.37	140.777	21.49	30	Pass
165	5825	15.68	14.98	14.49	96.579	19.85	30	Pass

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
36	5180	9.70	11.90	11.10	37.703	15.76	24	Pass
40	5200	9.50	11.50	11.60	37.492	15.74	24	Pass
48	5240	9.90	11.60	11.30	37.716	15.77	24	Pass
149	5745	12.97	12.33	12.29	53.858	17.31	30	Pass
157	5785	16.97	16.23	16.12	132.676	21.23	30	Pass
165	5825	15.92	14.91	14.48	98.112	19.92	30	Pass

802.11n (HT40)

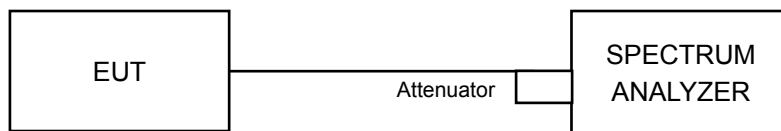
Chan.	Chan. Freq. (MHz)	Average Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
38	5190	8.30	10.30	9.60	26.596	14.25	24	Pass
46	5230	11.00	12.50	11.80	45.508	16.58	24	Pass
151	5755	12.27	11.59	11.88	46.704	16.69	30	Pass
159	5795	16.92	16.28	16.19	133.257	21.25	30	Pass

4.3 Peak Power Spectral Density Measurement

4.3.1 Limits of Peak Power Spectral Density Measurement

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

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedures

For U-NII-1

Using method SA-1

- 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

For U-NII-3:

- 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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

Same as Item 4.2.6.

4.3.7 Test Results

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm)			Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
36	5180	-6.79	-4.30	-5.55	-0.66	6.62	Pass
40	5200	-6.92	-4.43	-4.67	-0.43	6.62	Pass
48	5240	-6.39	-5.11	-4.40	-0.45	6.62	Pass

- Note:** 1. Method a) 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. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.38\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $11-(10.38-6) = 6.62\text{dBm}$.

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm)			Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
36	5180	-2.13	-0.12	-0.39	3.98	6.62	Pass
40	5200	-2.71	-0.07	-0.61	3.78	6.62	Pass
48	5240	-2.71	-0.52	-0.76	3.55	6.62	Pass

- Note:** 1. Method a) 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. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.38\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $11-(10.38-6) = 6.62\text{dBm}$.

802.11n (HT40)

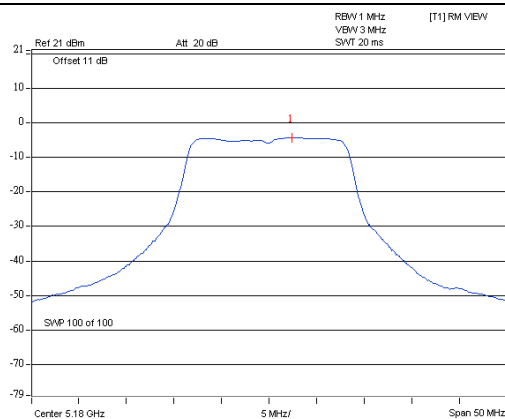
Chan.	Chan. Freq. (MHz)	PSD (dBm)			Total Power Density (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
38	5190	-7.02	-5.55	-6.97	-1.69	6.62	Pass
46	5230	-3.79	-2.75	-3.89	1.33	6.62	Pass

- Note:** 1. Method a) 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. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.38\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $11-(10.38-6) = 6.62\text{dBm}$.

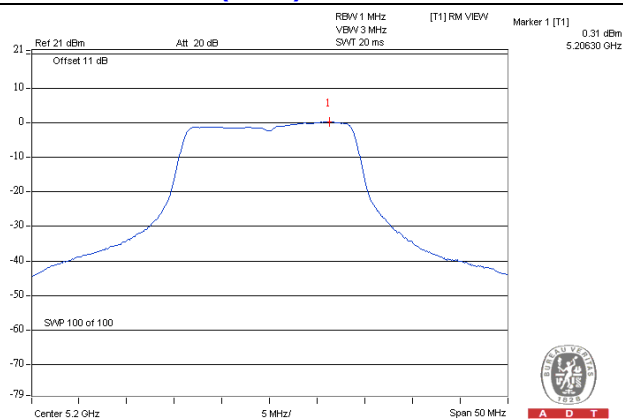
Spectrum Plot of Worst Value

802.11a_Chain 1 / CH36

802.11n (HT20)_Chain 1 / CH40

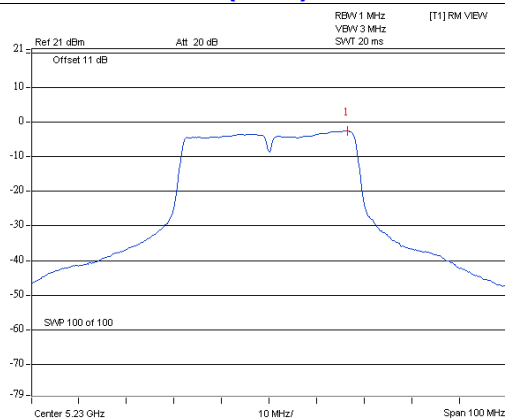


A D T



A D T

8802.11n (HT40)_Chain 1 / CH46



A D T

For U-NII-3:

802.11a

TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=3) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	149	5745	-9.23	-7.01	4.77	-2.24	26.09	Pass
	157	5785	-4.53	-2.31	4.77	2.46	26.09	Pass
	165	5825	-6.53	-4.31	4.77	0.46	26.09	Pass
1	149	5745	-9.22	-7.00	4.77	-2.23	26.09	Pass
	157	5785	-5.12	-2.90	4.77	1.87	26.09	Pass
	165	5825	-6.25	-4.03	4.77	0.74	26.09	Pass
2	149	5745	-8.92	-6.70	4.77	-1.93	26.09	Pass
	157	5785	-4.97	-2.75	4.77	2.02	26.09	Pass
	165	5825	-6.25	-4.03	4.77	0.74	26.09	Pass

Note: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.91\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (9.91 - 6) = 26.09\text{dBm}$.

802.11n (HT20)

TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=3) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	149	5745	-8.72	-6.50	4.77	-1.73	26.09	Pass
	157	5785	-5.64	-3.42	4.77	1.35	26.09	Pass
	165	5825	-6.56	-4.34	4.77	0.43	26.09	Pass
1	149	5745	-9.58	-7.36	4.77	-2.59	26.09	Pass
	157	5785	-5.83	-3.61	4.77	1.16	26.09	Pass
	165	5825	-6.90	-4.68	4.77	0.09	26.09	Pass
2	149	5745	-9.39	-7.17	4.77	-2.40	26.09	Pass
	157	5785	-5.73	-3.51	4.77	1.26	26.09	Pass
	165	5825	-6.31	-4.09	4.77	0.68	26.09	Pass

Note: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.91\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (9.91 - 6) = 26.09\text{dBm}$.

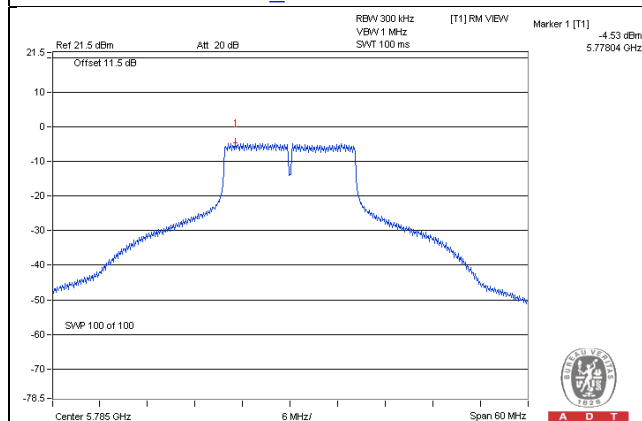
802.11n (HT40)

TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=3) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	151	5755	-12.68	-10.46	4.77	-5.69	26.09	Pass
	159	5795	-8.67	-6.45	4.77	-1.68	26.09	Pass
1	151	5755	-13.07	-10.85	4.77	-6.08	26.09	Pass
	159	5795	-8.81	-6.59	4.77	-1.82	26.09	Pass
2	151	5755	-13.03	-10.81	4.77	-6.04	26.09	Pass
	159	5795	-8.79	-6.57	4.77	-1.80	26.09	Pass

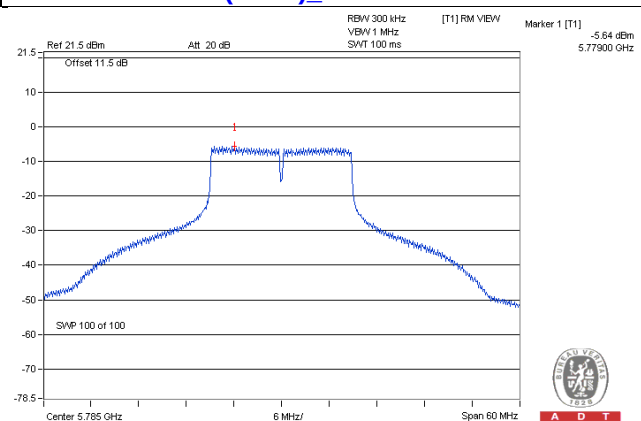
Note: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.91\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (9.91 - 6) = 26.09\text{dBm}$.

Spectrum Plot of Worst Value

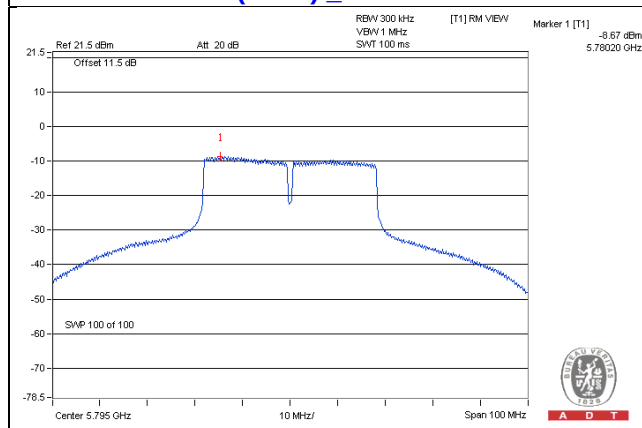
802.11a_Chain 0 / CH157



802.11n (HT20)_Chain 0 / CH157



8802.11n (HT40)_Chain 0 / CH159

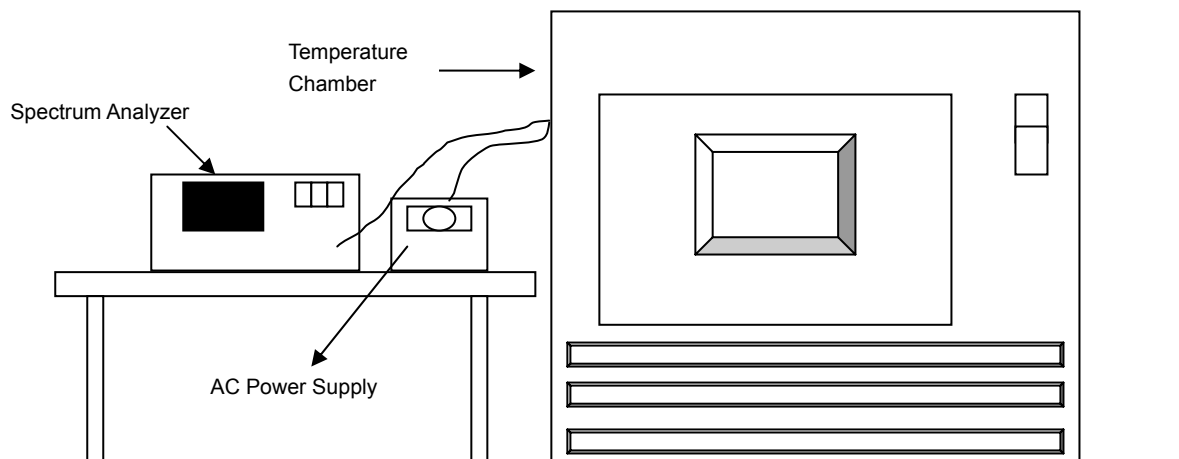


4.4 Frequency Stability Measurement

4.4.1 Limits of Frequency Stability Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

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

4.4.7 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 (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5745.0164	0.00029	5745.0154	0.00027	5745.0161	0.00028	5745.0192	0.00033
40	120	5744.9965	-0.00006	5744.9935	-0.00011	5744.9913	-0.00015	5744.991	-0.00016
30	120	5745.024	0.00042	5745.0253	0.00044	5745.0273	0.00048	5745.0279	0.00049
20	120	5745.0159	0.00028	5745.0124	0.00022	5745.0126	0.00022	5745.0169	0.00029
10	120	5745.0254	0.00044	5745.0239	0.00042	5745.0236	0.00041	5745.026	0.00045
0	120	5745.0075	0.00013	5745.01	0.00017	5745.0107	0.00019	5745.0063	0.00011
-10	120	5745.0203	0.00035	5745.0228	0.00040	5745.0236	0.00041	5745.0203	0.00035
-20	120	5745.0161	0.00028	5745.0162	0.00028	5745.0152	0.00026	5745.0173	0.00030
-30	120	5745.0056	0.00010	5745.0055	0.00010	5745.0065	0.00011	5745.0054	0.00009

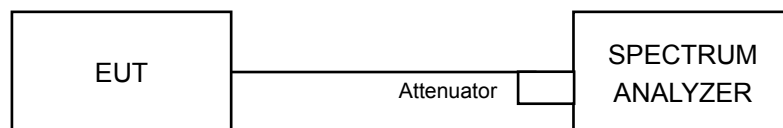
Frequency Stability Versus Temp.									
Operating Frequency: 5745MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5745.015	0.00026	5745.0115	0.00020	5745.0133	0.00023	5745.0161	0.00028
	120	5745.0159	0.00028	5745.0124	0.00022	5745.0126	0.00022	5745.0169	0.00029
	102	5745.0167	0.00029	5745.0129	0.00022	5745.0135	0.00023	5745.0165	0.00029

4.5 6dB Bandwidth Measurement

4.5.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

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

4.5.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
149	5745	16.59	16.61	16.62	0.5	Pass
157	5785	16.62	16.62	16.60	0.5	Pass
165	5825	16.57	16.59	16.62	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
149	5745	17.86	17.86	17.84	0.5	Pass
157	5785	17.83	17.86	17.85	0.5	Pass
165	5825	17.81	17.84	17.87	0.5	Pass

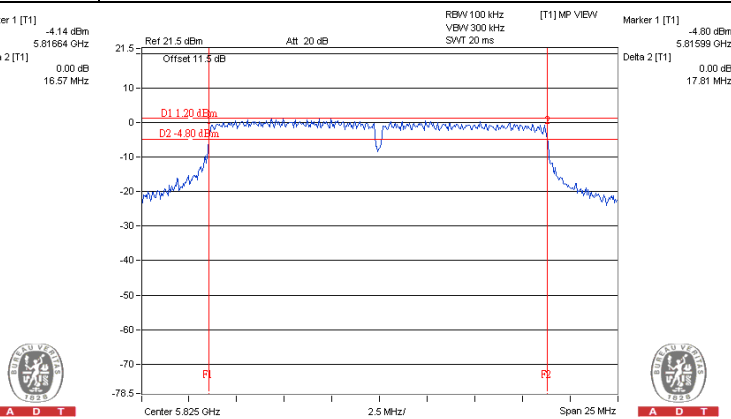
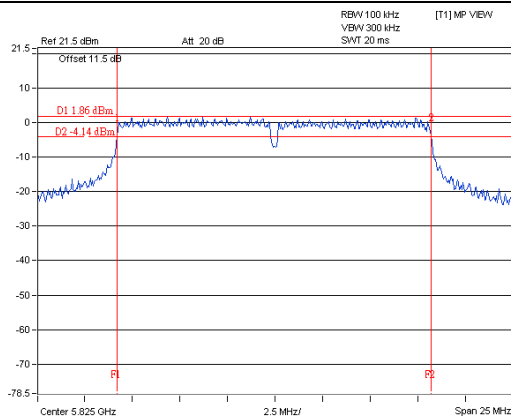
802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
151	5755	36.64	36.70	36.73	0.5	Pass
159	5795	36.65	36.64	36.66	0.5	Pass

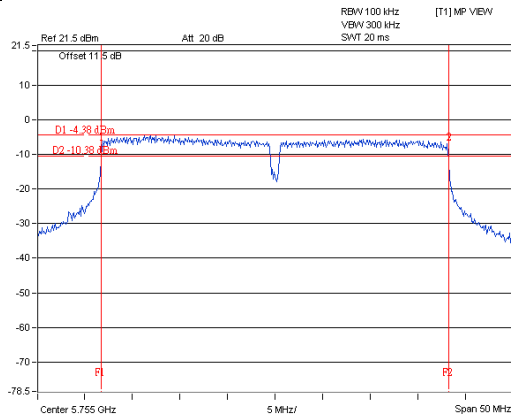
Spectrum Plot of Worst Value

802.11a_Chain 0 / CH165

802.11n (HT20)_Chain 0 / CH165



802.11n (HT40)_Chain 0 / CH151



5 Pictures of Test Arrangements

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

Appendix – Information on the Testing Laboratories

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

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

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF Lab/Telecom Lab

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

--- END ---