

FCC TEST REPORT

REPORT NO.: RF121015E03B

MODEL NO.: TD-W8961ND, TD-W8961N

FCC ID: TE7TDW8961NDV3

IC: 8853A-W8961NDV3

RECEIVED: Jan. 13, 2014

TESTED: Feb. 17 to 25, 2014

ISSUED: Mar. 05, 2014

APPLICANT: TP-LINK TECHNOLOGIES CO., LTD.

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ISSUED BY: Bureau Veritas Consumer Products Services
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RELEASE CONTROL RECORD

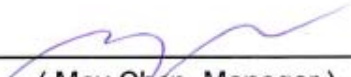
ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF121015E03B	Original release	Mar. 05, 2014

1. CERTIFICATION

PRODUCT: 300Mbps Wireless N ADSL2+ Modem Router
BRAND NAME: TP-LINK
MODEL NO.: TD-W8961ND, TD-W8961N
TEST SAMPLE: PROTOTYPE
APPLICANT: TP-LINK TECHNOLOGIES CO., LTD.
TESTED: Feb. 17 to 25, 2014
STANDARDS: FCC Part 15, Subpart C. (15.247)
ANSI C63.10-2009
Canada RSS-210 Issue 8 (2010-12)
Canada RSS-Gen Issue 3 (2010-12)

The above equipment (Model: TD-W8961ND) 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:** Mar. 05, 2014
(Claire Kuan, Specialist)

APPROVED BY :  , **DATE:** Mar. 05, 2014
(May Chen, Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247) ; RSS-210; RSS-Gen				
STANDARD SECTION		TEST TYPE	RESULT	REMARK
FCC Part 15	RSS-Gen			
15.207	RSS-Gen 7.2.4	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -14.33dB at 0.46837MHz
15.247(d) 15.209	RSS-210 A8.5	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.2dB at 2386.00MHz & 2483.50MHz & 4824.00MHz
15.247(b)	RSS-210 A8.2 (4)	Conducted power	PASS	Meet the requirement of limit.
15.203	-	Antenna Requirement	PASS	Antenna connector is SMA Male Reverse and Weld not a standard connector.

NOTE:

1. This report is prepared for FCC class II permissive change. Only conducted emission, radiated emission and maximum peak output power Measurement were presented in this test report.

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:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Measurement	Value
Conducted emissions	2.98 dB
Radiated emissions (30MHz-1GHz)	5.43 dB
Radiated emissions (1GHz -6GHz)	3.65 dB
Radiated emissions (6GHz -18GHz)	3.88 dB
Radiated emissions (18GHz -40GHz)	4.11 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	300Mbps Wireless N ADSL2+ Modem Router
MODEL NO.	TD-W8961ND, TD-W8961N
POWER SUPPLY	DC 9V from power adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 300Mbps
OPERATING FREQUENCY	2.412 ~ 2.462GHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n HT20 7 for 802.11n (HT40)
MAXIMUM OUTPUT POWER	802.11b: 49.204mW 802.11g: 187.068mW 802.11n (HT20): 322.535mW 802.11n (HT40): 141.516mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter x 1

NOTE:

1. This report is prepared for FCC class II permissive change. The difference compared with the Report No.: RF121015E03 design is as the following information:

The main changes are as the following information:

- ◆ Add a new model as following table:

Original		
Brand	Model name	Description
TP-LINK	TD-W8961ND	With removable antennas
Newly		
Brand	Model name	Description
TP-LINK	TD-W8961N	With immovable antennas

From the above models, model: **TD-W8961ND** was the worst case and it was selected as representative model for the test and its data was recorded in this report.

- ◆ Changed PCB version of adapter.
- ◆ Added new antennas as following table:

Original						
Removable antennas for TD-W8961ND						
Transmitter Circuit	Antenna Type	No.	Gain (dBi) (Exclude cable loss)	Connector type	Cable Loss(dB)	Frequency range (MHz to MHz)
Chain (0)	Dipole	3101500193	3	SMA Male Reverse	0.5	2400-2483.5
Chain (1)	Dipole	3101500193	3	SMA Male Reverse	0.5	2400~2483.5
Newly						
Removable antennas for TD-W8961ND						
Transmitter Circuit	Antenna Type	No.	Gain (dBi) (Exclude cable loss)	Connector type	Cable Loss(dB)	Frequency range (MHz to MHz)
Chain (0)	Dipole	3101500328	5	SMA Male Reverse	0.8	2400-2483.5
Chain (1)	Dipole	3101500328	5	SMA Male Reverse	0.96	2400-2483.5
Immovable antennas for TD-W8961N						
Transmitter Circuit	Antenna Type	No.	Gain (dBi) (Exclude cable loss)	Connector type	Cable Loss(dB)	Frequency range (MHz to MHz)
Chain (0)	Dipole	3101500229	5	Weld	0.8	2400-2483.5
Chain (1)	Dipole	3101500178	5	Weld	0.96	2400~2483.5

2. According to above conditions, only conducted emission, radiated emission and maximum peak output power Measurement need to be performed. And all data was verified to meet the requirements.

3. The EUT must be supplied with a power adapter as following table:

Brand	Model No.	Spec.
TP-LINK	T090085-2B1	Input: 100-240V, 0.3A, 50/60Hz Output: 9V, 0.85A

4. The EUT incorporates a MIMO function.

MODULATION MODE	Tx/Rx FUNCTION
802.11b	1Tx/2Rx
802.11g	1Tx/2Rx
802.11n (HT20)	2Tx/2Rx
802.11n (HT40)	2Tx/2Rx

5. When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 15.

6. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

Eleven channels are provided for 802.11b, 802.11g, 802.11n (HT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

Seven channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

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

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5

RADIATED EMISSION TEST (BELOW 1 GHz):

- ☒ 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5

RADIATED EMISSION TEST (ABOVE 1 GHz):

- ☒ 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

ANTENNA PORT CONDUCTED MEASUREMENT:

- ☒ 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	21deg. C, 68%RH	120Vac, 60Hz	Jason Huang
RE<1G	23deg. C, 67%RH	120Vac, 60Hz	Gary Cheng
RE≥1G	24deg. C, 67%RH	120Vac, 60Hz	Gary Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Gary Cheng

3.3 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 C (Section 15.247)
558074 D01 DTS Meas Guidance
662911 D01 Multiple Transmitter Output
ANSI C63.10-2009
Canada RSS-210 Issue 8 (2010-12)
Canada RSS-Gen Issue 3 (2010-12)

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



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3.4 DESCRIPTION OF SUPPORT UNITS

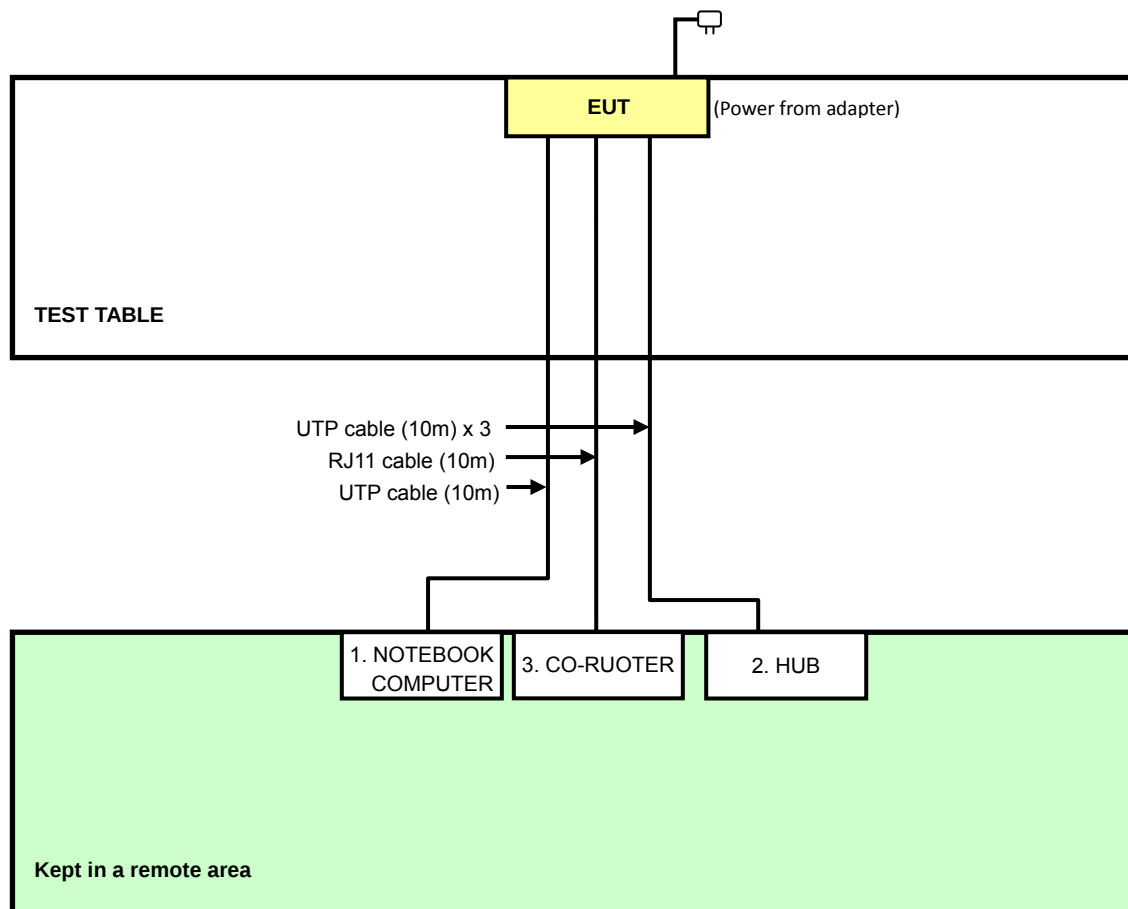
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	GSLB32S	FCC DoC
2	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC
3	CO-ROUTER	ZyXEL	IES-1000	S4Z3112558	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP cable (10m)
2	UTP cable (10m)
3	RJ11 cable (10m)

NOTE: All power cords of the above support units are non shielded (1.8m).

3.5 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	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 0.50 MHz.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Mar. 08, 2013	Mar. 07, 2014
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 05, 2013	Sep. 04, 2014
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 06, 2013	June 05, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 11, 2013	Mar. 10, 2014
50 ohms Terminator	50	EMC-03	Sep. 24, 2013	Sep. 23, 2014
Software ADT	BV ADT_Cond_V7.3.7. 3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Feb. 17, 2014

4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN.
- b. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- c. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- d. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

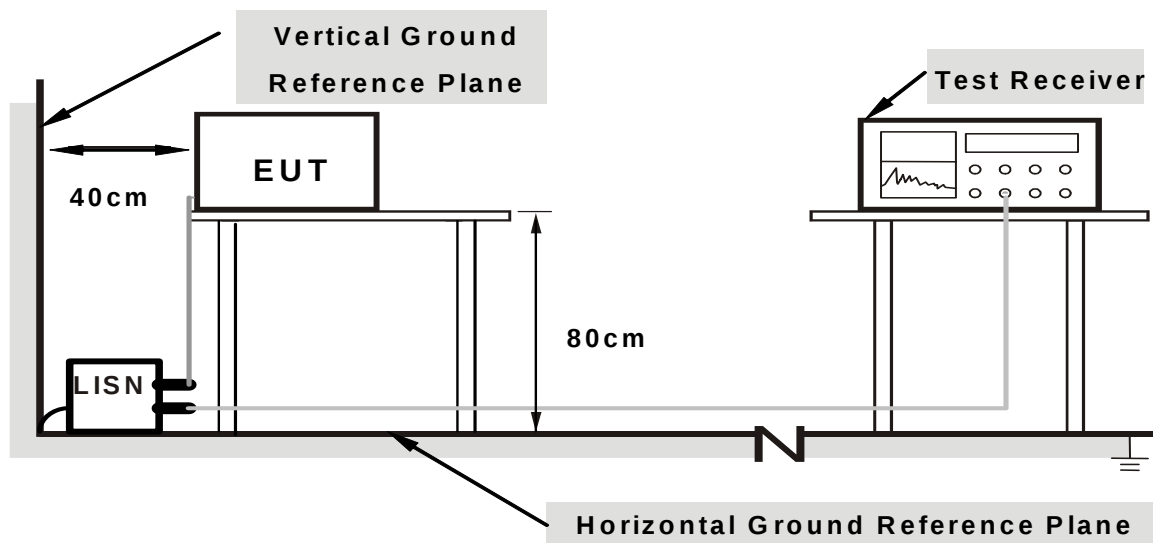
NOTE:

1. The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1. Support units were connected to second LISN.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit 1 (Notebook Computer).
2. The communication partner run test program “Telnet paste command” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

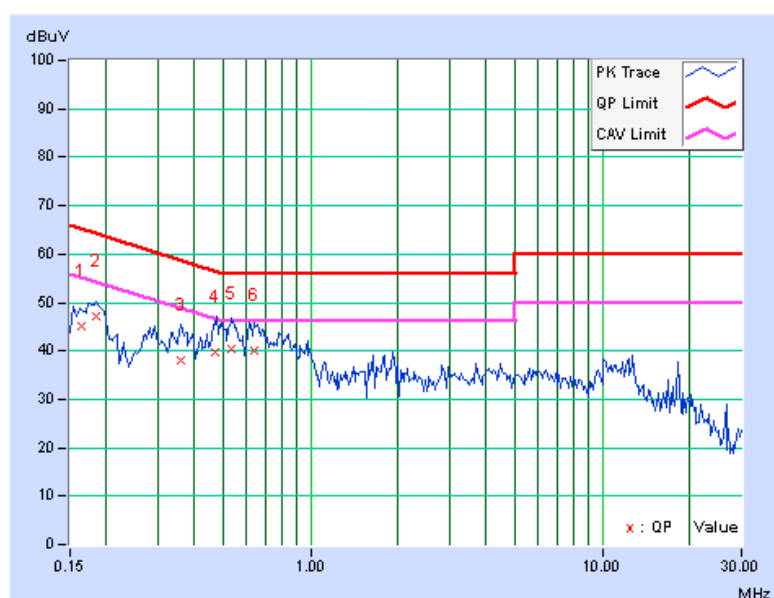
4.1.7 TEST RESULTS

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16491	0.10	45.13	38.85	45.23	38.95	65.21	55.21	-19.99	-16.27
2	0.18516	0.10	46.94	37.71	47.04	37.81	64.25	54.25	-17.21	-16.44
3	0.36094	0.15	37.86	30.47	38.01	30.62	58.71	48.71	-20.70	-18.09
4	0.46837	0.16	39.42	32.05	39.58	32.21	56.54	46.54	-16.96	-14.33
5	0.53672	0.17	40.29	31.16	40.46	31.33	56.00	46.00	-15.54	-14.67
6	0.63828	0.18	39.72	31.44	39.90	31.62	56.00	46.00	-16.10	-14.38

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

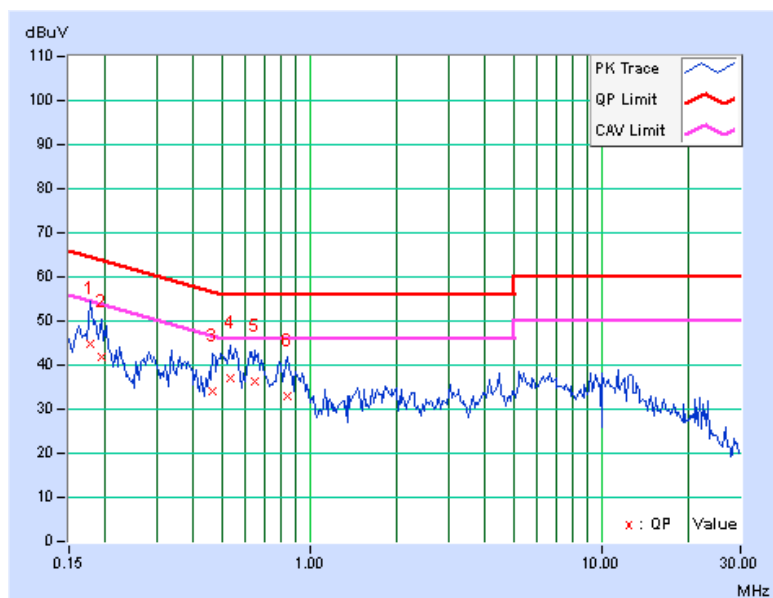


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17734	0.11	44.62	32.12	44.73	32.23	64.61	54.61	-19.88	-22.38
2	0.19297	0.11	41.68	32.02	41.79	32.13	63.91	53.91	-22.12	-21.78
3	0.46250	0.16	34.01	26.13	34.17	26.29	56.65	46.65	-22.47	-20.35
4	0.53281	0.17	37.05	27.75	37.22	27.92	56.00	46.00	-18.78	-18.08
5	0.65000	0.17	35.98	27.63	36.15	27.80	56.00	46.00	-19.85	-18.20
6	0.84141	0.18	32.93	24.04	33.11	24.22	56.00	46.00	-22.89	-21.78

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



4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

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

NOTE:

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



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4.2.2 TEST INSTRUMENTS

For below 1GHz

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Jan. 15, 2014	Jan. 14, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Mar. 25, 2013	Mar. 24, 2014
RF Cable	NA	CHHCAB_001	Oct. 06, 2013	Oct. 05, 2014
Spectrum Analyzer R&S	FSV40	100964	July 15, 2013	July 14, 2014
Horn_Antenna AISI	AIH.8018	0000220091110	Dec. 06, 2013	Dec. 05, 2014
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 29, 2013	Oct. 28, 2014
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 12, 2013	Dec. 11, 2014
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5. The CANADA Site Registration No. is IC 7450H-3.
6. Tested Date: Feb. 20, 2014



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For above 1GHz test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 21, 2014	Jan. 20, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Mar. 19, 2013	Mar. 18, 2014
RF Cable	NA	CHGCAB_001	Oct. 05, 2013	Oct. 04, 2014
Spectrum Analyzer R&S	FSV40	100964	July 15, 2013	July 14, 2014
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 18, 2013	Nov. 17, 2014
Pre-Amplifier Agilent	8449B	3008A02578	June 25, 2013	June 24, 2014
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: Feb. 25, 2014

4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber. 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:

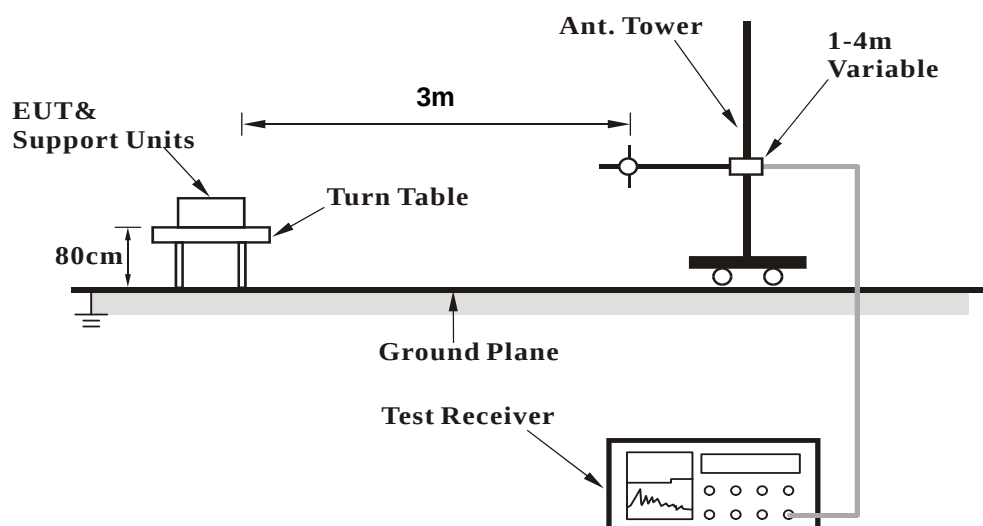
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

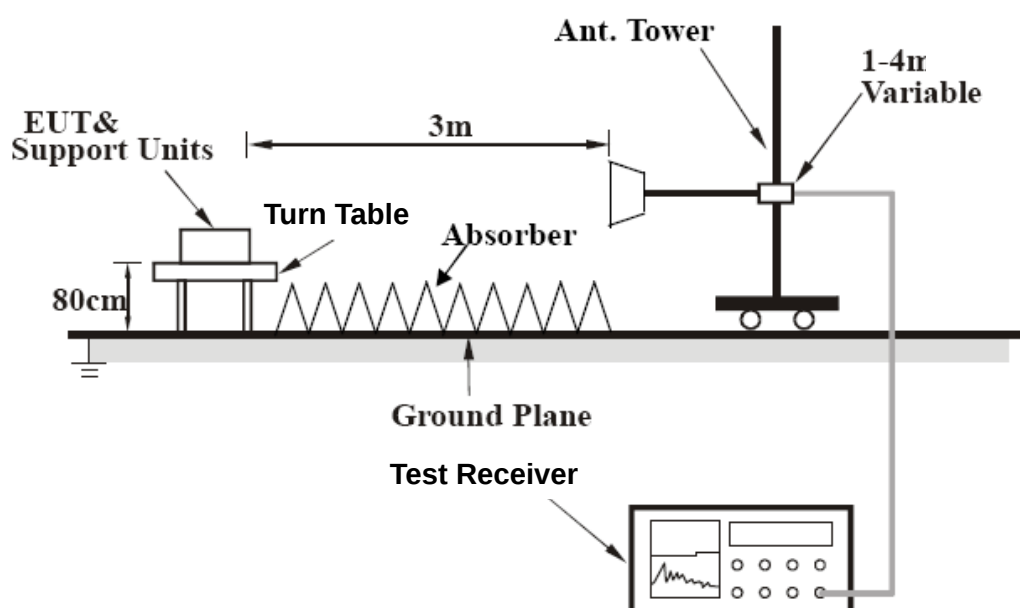
No deviation

4.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11n (HT20)

CHANNEL	TX Channel 6	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	108.81	34.4 QP	43.5	-9.2	1.50 H	78	49.88	-15.53
2	148.15	33.6 QP	43.5	-9.9	1.50 H	73	46.57	-12.99
3	308.97	35.6 QP	46.0	-10.4	1.00 H	324	46.90	-11.32
4	419.99	39.1 QP	46.0	-6.9	2.00 H	268	47.68	-8.58
5	699.98	38.0 QP	46.0	-8.0	1.00 H	323	41.14	-3.13
6	980.02	36.7 QP	54.0	-17.3	1.50 H	352	34.67	2.01
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	47.80	34.0 QP	40.0	-6.0	1.00 V	125	47.12	-13.13
2	308.73	37.1 QP	46.0	-8.9	1.50 V	360	48.44	-11.33
3	349.03	37.3 QP	46.0	-8.7	1.00 V	135	47.65	-10.37
4	419.99	41.0 QP	46.0	-5.0	1.00 V	111	49.60	-8.58
5	879.33	36.0 QP	46.0	-10.0	1.00 V	0	35.97	0.06
6	980.02	35.7 QP	54.0	-18.3	1.00 V	291	33.65	2.01

REMARKS:

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

ABOVE 1GHz DATA

802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2334.00	47.8 PK	74.0	-26.2	1.06 H	46	49.76	-1.96
2	2334.00	37.8 AV	54.0	-16.2	1.06 H	46	39.76	-1.96
3	2370.00	46.6 PK	74.0	-27.4	1.07 H	42	48.38	-1.78
4	2370.00	34.6 AV	54.0	-19.4	1.07 H	42	36.38	-1.78
5	*2412.00	95.6 PK			1.06 H	41	97.20	-1.60
6	*2412.00	92.6 AV			1.06 H	41	94.20	-1.60
7	4824.00	54.3 PK	74.0	-19.7	1.43 H	313	47.10	7.20
8	4824.00	51.2 AV	54.0	-2.8	1.43 H	313	44.00	7.20
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	2334.00	58.1 PK	74.0	-15.9	1.00 V	338	60.06	-1.96
2	2334.00	52.0 AV	54.0	-2.0	1.00 V	338	53.96	-1.96
3	2370.00	55.6 PK	74.0	-18.4	1.00 V	340	57.38	-1.78
4	2370.00	45.2 AV	54.0	-8.8	1.00 V	340	46.98	-1.78
5	*2412.00	109.6 PK			1.00 V	340	111.20	-1.60
6	*2412.00	106.5 AV			1.00 V	340	108.10	-1.60
7	4824.00	56.0 PK	74.0	-18.0	1.00 V	360	48.80	7.20
8	4824.00	53.8 AV	54.0	-0.2	1.00 V	360	46.60	7.20

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2320.00	48.2 PK	74.0	-25.8	1.22 H	118	50.23	-2.03
2	2320.00	37.4 AV	54.0	-16.6	1.22 H	118	39.43	-2.03
3	2359.00	49.8 PK	74.0	-24.2	1.29 H	113	51.64	-1.84
4	2359.00	41.4 AV	54.0	-12.6	1.29 H	113	43.24	-1.84
5	*2437.00	98.3 PK			1.21 H	221	99.79	-1.49
6	*2437.00	93.8 AV			1.21 H	221	95.29	-1.49
7	2500.00	48.2 PK	74.0	-25.8	1.00 H	310	49.41	-1.21
8	2500.00	40.0 AV	54.0	-14.0	1.00 H	310	41.21	-1.21
9	4874.00	51.4 PK	74.0	-22.6	1.38 H	321	44.07	7.33
10	4874.00	42.6 AV	54.0	-11.4	1.38 H	321	35.27	7.33
11	7311.00	52.3 PK	74.0	-21.7	1.55 H	38	37.34	14.96
12	7311.00	39.7 AV	54.0	-14.3	1.55 H	38	24.74	14.96
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	2320.00	56.9 PK	74.0	-17.1	1.00 V	336	58.93	-2.03
2	2320.00	48.7 AV	54.0	-5.3	1.00 V	336	50.73	-2.03
3	2359.00	59.0 PK	74.0	-15.0	1.00 V	338	60.84	-1.84
4	2359.00	53.4 AV	54.0	-0.6	1.00 V	338	55.24	-1.84
5	*2437.00	110.0 PK			1.00 V	341	111.49	-1.49
6	*2437.00	107.0 AV			1.00 V	341	108.49	-1.49
7	2500.00	51.7 PK	74.0	-22.3	1.00 V	341	52.91	-1.21
8	2500.00	40.6 AV	54.0	-13.4	1.00 V	341	41.81	-1.21
9	4874.00	53.0 PK	74.0	-21.0	1.05 V	24	45.67	7.33
10	4874.00	48.9 AV	54.0	-5.1	1.05 V	24	41.57	7.33
11	7311.00	52.3 PK	74.0	-21.7	1.04 V	21	37.34	14.96
12	7311.00	40.0 AV	54.0	-14.0	1.04 V	21	25.04	14.96

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2340.00	46.8 PK	74.0	-27.2	1.01 H	17	48.74	-1.94
2	2340.00	35.7 AV	54.0	-18.3	1.01 H	17	37.64	-1.94
3	2381.00	48.2 PK	74.0	-25.8	1.06 H	44	49.93	-1.73
4	2381.00	38.7 AV	54.0	-15.3	1.06 H	44	40.43	-1.73
5	*2462.00	96.7 PK			1.02 H	20	98.08	-1.38
6	*2462.00	93.8 AV			1.02 H	20	95.18	-1.38
7	2483.50	48.0 PK	74.0	-26.0	1.02 H	20	49.28	-1.28
8	2483.50	35.0 AV	54.0	-19.0	1.02 H	20	36.28	-1.28
9	4924.00	51.6 PK	74.0	-22.4	1.43 H	317	44.13	7.47
10	4924.00	42.9 AV	54.0	-11.1	1.43 H	317	35.43	7.47
11	7386.00	52.7 PK	74.0	-21.3	1.50 H	33	37.81	14.89
12	7386.00	40.0 AV	54.0	-14.0	1.50 H	33	25.11	14.89
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	2340.00	57.2 PK	74.0	-16.8	1.00 V	338	59.14	-1.94
2	2340.00	48.8 AV	54.0	-5.2	1.00 V	338	50.74	-1.94
3	2381.00	59.0 PK	74.0	-15.0	1.00 V	341	60.73	-1.73
4	2381.00	53.3 AV	54.0	-0.7	1.00 V	341	55.03	-1.73
5	*2462.00	108.8 PK			1.00 V	351	110.18	-1.38
6	*2462.00	105.7 AV			1.00 V	351	107.08	-1.38
7	2483.50	53.0 PK	74.0	-21.0	1.00 V	351	54.28	-1.28
8	2483.50	41.6 AV	54.0	-12.4	1.00 V	351	42.88	-1.28
9	4924.00	49.6 PK	74.0	-24.4	1.04 V	24	42.13	7.47
10	4924.00	43.7 AV	54.0	-10.3	1.04 V	24	36.23	7.47
11	7386.00	52.5 PK	74.0	-21.5	1.04 V	19	37.61	14.89
12	7386.00	39.4 AV	54.0	-14.6	1.04 V	19	24.51	14.89

REMARKS:

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

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2330.00	50.9 PK	74.0	-23.1	1.00 H	317	52.89	-1.99
2	2330.00	35.2 AV	54.0	-18.8	1.00 H	317	37.19	-1.99
3	2360.00	49.0 PK	74.0	-25.0	1.00 H	300	50.83	-1.83
4	2360.00	36.6 AV	54.0	-17.4	1.00 H	300	38.43	-1.83
5	2390.00	60.9 PK	74.0	-13.1	1.27 H	122	62.60	-1.70
6	2390.00	40.2 AV	54.0	-13.8	1.27 H	122	41.90	-1.70
7	*2412.00	98.3 PK			1.00 H	287	99.90	-1.60
8	*2412.00	88.5 AV			1.00 H	287	90.10	-1.60
9	4824.00	58.8 PK	74.0	-15.2	1.34 H	144	51.60	7.20
10	4824.00	44.5 AV	54.0	-9.5	1.34 H	144	37.30	7.20
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	2330.00	60.8 PK	74.0	-13.2	1.23 V	162	62.79	-1.99
2	2330.00	50.7 AV	54.0	-3.3	1.23 V	162	52.69	-1.99
3	2360.00	59.2 PK	74.0	-14.8	1.22 V	178	61.03	-1.83
4	2360.00	49.0 AV	54.0	-5.0	1.22 V	178	50.83	-1.83
5	2390.00	73.6 PK	74.0	-0.4	1.25 V	208	75.30	-1.70
6	2390.00	51.7 AV	54.0	-2.3	1.25 V	208	53.40	-1.70
7	*2412.00	112.8 PK			1.25 V	208	114.40	-1.60
8	*2412.00	103.8 AV			1.25 V	208	105.40	-1.60
9	4824.00	60.1 PK	74.0	-13.9	1.08 V	201	52.90	7.20
10	4824.00	45.7 AV	54.0	-8.3	1.08 V	201	38.50	7.20

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2320.00	51.4 PK	74.0	-22.6	1.02 H	244	53.43	-2.03
2	2320.00	39.8 AV	54.0	-14.2	1.02 H	244	41.83	-2.03
3	2360.00	49.1 PK	74.0	-24.9	1.02 H	49	50.93	-1.83
4	2360.00	37.5 AV	54.0	-16.5	1.02 H	49	39.33	-1.83
5	2385.00	62.0 PK	74.0	-12.0	1.00 H	255	63.72	-1.72
6	2385.00	41.0 AV	54.0	-13.0	1.00 H	255	42.72	-1.72
7	*2437.00	97.2 PK			1.00 H	299	98.69	-1.49
8	*2437.00	87.9 AV			1.00 H	299	89.39	-1.49
9	2490.00	50.8 PK	74.0	-23.2	1.00 H	220	52.06	-1.26
10	2490.00	41.0 AV	54.0	-13.0	1.00 H	220	42.26	-1.26
11	4874.00	51.1 PK	74.0	-22.9	1.06 H	221	43.77	7.33
12	4874.00	39.6 AV	54.0	-14.4	1.06 H	221	32.27	7.33
13	7311.00	53.2 PK	74.0	-20.8	1.00 H	213	38.24	14.96
14	7311.00	40.1 AV	54.0	-13.9	1.00 H	213	25.14	14.96
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	2320.00	57.0 PK	74.0	-17.0	1.24 V	161	59.03	-2.03
2	2320.00	46.3 AV	54.0	-7.7	1.24 V	161	48.33	-2.03
3	2360.00	61.7 PK	74.0	-12.3	1.24 V	160	63.53	-1.83
4	2360.00	53.0 AV	54.0	-1.0	1.24 V	160	54.83	-1.83
5	2385.00	60.5 PK	74.0	-13.5	1.26 V	205	62.22	-1.72
6	2385.00	50.1 AV	54.0	-3.9	1.26 V	205	51.82	-1.72
7	*2437.00	112.1 PK			1.20 V	206	113.59	-1.49
8	*2437.00	102.9 AV			1.20 V	206	104.39	-1.49
9	2490.00	62.6 PK	74.0	-11.4	1.16 V	239	63.86	-1.26
10	2490.00	48.4 AV	54.0	-5.6	1.16 V	239	49.66	-1.26
11	4874.00	53.1 PK	74.0	-20.9	1.23 V	224	45.77	7.33
12	4874.00	39.5 AV	54.0	-14.5	1.23 V	224	32.17	7.33
13	7311.00	52.1 PK	74.0	-21.9	1.02 V	112	37.14	14.96
14	7311.00	40.2 AV	54.0	-13.8	1.02 V	112	25.24	14.96

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2310.00	50.9 PK	74.0	-23.1	1.06 H	223	52.97	-2.07
2	2310.00	41.3 AV	54.0	-12.7	1.06 H	223	43.37	-2.07
3	2348.00	50.9 PK	74.0	-23.1	1.00 H	231	52.81	-1.91
4	2348.00	39.5 AV	54.0	-14.5	1.00 H	231	41.41	-1.91
5	2389.00	61.8 PK	74.0	-12.2	1.00 H	258	63.50	-1.70
6	2389.00	40.6 AV	54.0	-13.4	1.00 H	258	42.30	-1.70
7	*2462.00	95.8 PK			1.00 H	301	97.18	-1.38
8	*2462.00	86.7 AV			1.00 H	301	88.08	-1.38
9	2483.50	49.1 PK	74.0	-24.9	1.01 H	63	50.38	-1.28
10	2483.50	37.5 AV	54.0	-16.5	1.01 H	63	38.78	-1.28
11	4924.00	51.4 PK	74.0	-22.6	1.00 H	214	43.93	7.47
12	4924.00	39.7 AV	54.0	-14.3	1.00 H	214	32.23	7.47
13	7386.00	53.4 PK	74.0	-20.6	1.00 H	221	38.51	14.89
14	7386.00	40.5 AV	54.0	-13.5	1.00 H	221	25.61	14.89
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	2310.00	53.0 PK	74.0	-21.0	1.24 V	162	55.07	-2.07
2	2310.00	42.7 AV	54.0	-11.3	1.24 V	162	44.77	-2.07
3	2348.00	58.6 PK	74.0	-15.4	1.23 V	214	60.51	-1.91
4	2348.00	46.9 AV	54.0	-7.1	1.23 V	214	48.81	-1.91
5	2389.00	61.9 PK	74.0	-12.1	1.21 V	160	63.60	-1.70
6	2389.00	51.1 AV	54.0	-2.9	1.21 V	160	52.80	-1.70
7	*2462.00	111.1 PK			1.19 V	204	112.48	-1.38
8	*2462.00	101.9 AV			1.19 V	204	103.28	-1.38
9	2483.50	72.8 PK	74.0	-1.2	1.19 V	204	74.08	-1.28
10	2483.50	53.5 AV	54.0	-0.5	1.19 V	204	54.78	-1.28
11	4924.00	53.4 PK	74.0	-20.6	1.18 V	236	45.93	7.47
12	4924.00	39.9 AV	54.0	-14.1	1.18 V	236	32.43	7.47
13	7386.00	51.9 PK	74.0	-22.1	1.00 V	102	37.01	14.89
14	7386.00	39.9 AV	54.0	-14.1	1.00 V	102	25.01	14.89

REMARKS:

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

802.11n (HT20)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2330.00	57.0 PK	74.0	-17.0	1.00 H	344	58.99	-1.99
2	2330.00	46.4 AV	54.0	-7.6	1.00 H	344	48.39	-1.99
3	2361.00	55.3 PK	74.0	-18.7	1.00 H	343	57.13	-1.83
4	2361.00	44.9 AV	54.0	-9.1	1.00 H	343	46.73	-1.83
5	2390.00	63.0 PK	74.0	-11.0	1.00 H	346	64.70	-1.70
6	2390.00	45.5 AV	54.0	-8.5	1.00 H	346	47.20	-1.70
7	*2412.00	104.3 PK			1.00 H	346	105.90	-1.60
8	*2412.00	94.8 AV			1.00 H	346	96.40	-1.60
9	4824.00	51.9 PK	74.0	-22.1	1.03 H	212	44.70	7.20
10	4824.00	40.0 AV	54.0	-14.0	1.03 H	212	32.80	7.20
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	2330.00	61.4 PK	74.0	-12.6	1.00 V	202	63.39	-1.99
2	2330.00	51.5 AV	54.0	-2.5	1.00 V	202	53.49	-1.99
3	2361.00	63.4 PK	74.0	-10.6	1.01 V	332	65.23	-1.83
4	2361.00	53.6 AV	54.0	-0.4	1.01 V	332	55.43	-1.83
5	2390.00	70.9 PK	74.0	-3.1	1.00 V	340	72.60	-1.70
6	2390.00	49.2 AV	54.0	-4.8	1.00 V	340	50.90	-1.70
7	*2412.00	114.2 PK			1.00 V	340	115.80	-1.60
8	*2412.00	104.8 AV			1.00 V	340	106.40	-1.60
9	4824.00	53.7 PK	74.0	-20.3	1.12 V	236	46.50	7.20
10	4824.00	40.3 AV	54.0	-13.7	1.12 V	236	33.10	7.20

REMARKS:

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



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CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2311.00	49.4 PK	74.0	-24.6	1.04 H	360	51.47	-2.07
2	2311.00	36.5 AV	54.0	-17.5	1.04 H	360	38.57	-2.07
3	2360.00	49.0 PK	74.0	-25.0	1.00 H	208	50.83	-1.83
4	2360.00	36.2 AV	54.0	-17.8	1.00 H	208	38.03	-1.83
5	2386.00	50.4 PK	74.0	-23.6	1.00 H	170	52.12	-1.72
6	2386.00	38.4 AV	54.0	-15.6	1.00 H	170	40.12	-1.72
7	*2437.00	97.6 PK			1.03 H	305	99.09	-1.49
8	*2437.00	88.1 AV			1.03 H	305	89.59	-1.49
9	2500.00	48.8 PK	74.0	-25.2	1.04 H	358	50.01	-1.21
10	2500.00	36.2 AV	54.0	-17.8	1.04 H	358	37.41	-1.21
11	4874.00	51.5 PK	74.0	-22.5	1.00 H	208	44.17	7.33
12	4874.00	40.1 AV	54.0	-13.9	1.00 H	208	32.77	7.33
13	7311.00	53.6 PK	74.0	-20.4	1.02 H	215	38.64	14.96
14	7311.00	40.2 AV	54.0	-13.8	1.02 H	215	25.24	14.96

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	2311.00	60.0 PK	74.0	-14.0	1.00 V	358	62.07	-2.07
2	2311.00	49.6 AV	54.0	-4.4	1.00 V	358	51.67	-2.07
3	2360.00	64.0 PK	74.0	-10.0	1.04 V	335	65.83	-1.83
4	2360.00	53.5 AV	54.0	-0.5	1.04 V	335	55.33	-1.83
5	2386.00	63.0 PK	74.0	-11.0	1.00 V	350	64.72	-1.72
6	2386.00	53.8 AV	54.0	-0.2	1.00 V	350	55.52	-1.72
7	*2437.00	114.3 PK			1.00 V	343	115.79	-1.49
8	*2437.00	104.9 AV			1.00 V	343	106.39	-1.49
9	2500.00	60.3 PK	74.0	-13.7	1.00 V	343	61.51	-1.21
10	2500.00	45.4 AV	54.0	-8.6	1.00 V	343	46.61	-1.21
11	4874.00	52.8 PK	74.0	-21.2	1.27 V	228	45.47	7.33
12	4874.00	39.4 AV	54.0	-14.6	1.27 V	228	32.07	7.33
13	7311.00	52.2 PK	74.0	-21.8	1.00 V	116	37.24	14.96
14	7311.00	40.4 AV	54.0	-13.6	1.00 V	116	25.44	14.96

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2311.00	48.7 PK	74.0	-25.3	1.08 H	179	50.77	-2.07
2	2311.00	36.0 AV	54.0	-18.0	1.08 H	179	38.07	-2.07
3	2350.00	50.4 PK	74.0	-23.6	1.06 H	209	52.30	-1.90
4	2350.00	38.7 AV	54.0	-15.3	1.06 H	209	40.60	-1.90
5	2386.00	48.5 PK	74.0	-25.5	1.08 H	360	50.22	-1.72
6	2386.00	36.0 AV	54.0	-18.0	1.08 H	360	37.72	-1.72
7	*2462.00	95.9 PK			1.01 H	309	97.28	-1.38
8	*2462.00	86.7 AV			1.01 H	309	88.08	-1.38
9	2483.50	49.4 PK	74.0	-24.6	1.01 H	309	50.68	-1.28
10	2483.50	37.9 AV	54.0	-16.1	1.01 H	309	39.18	-1.28
11	4924.00	51.7 PK	74.0	-22.3	1.04 H	205	44.23	7.47
12	4924.00	40.1 AV	54.0	-13.9	1.04 H	205	32.63	7.47
13	7386.00	53.2 PK	74.0	-20.8	1.00 H	217	38.31	14.89
14	7386.00	40.1 AV	54.0	-13.9	1.00 H	217	25.21	14.89
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	2311.00	62.0 PK	74.0	-12.0	1.00 V	349	64.07	-2.07
2	2311.00	50.1 AV	54.0	-3.9	1.00 V	349	52.17	-2.07
3	2350.00	58.0 PK	74.0	-16.0	1.00 V	354	59.90	-1.90
4	2350.00	47.1 AV	54.0	-6.9	1.00 V	354	49.00	-1.90
5	2386.00	61.9 PK	74.0	-12.1	1.00 V	351	63.62	-1.72
6	2386.00	51.8 AV	54.0	-2.2	1.00 V	351	53.52	-1.72
7	*2462.00	111.4 PK			1.00 V	340	112.78	-1.38
8	*2462.00	101.7 AV			1.00 V	340	103.08	-1.38
9	2483.50	73.8 PK	74.0	-0.2	1.00 V	340	75.08	-1.28
10	2483.50	50.7 AV	54.0	-3.3	1.00 V	340	51.98	-1.28
11	4924.00	53.2 PK	74.0	-20.8	1.21 V	225	45.73	7.47
12	4924.00	39.5 AV	54.0	-14.5	1.21 V	225	32.03	7.47
13	7386.00	52.1 PK	74.0	-21.9	1.06 V	92	37.21	14.89
14	7386.00	40.0 AV	54.0	-14.0	1.06 V	92	25.11	14.89

REMARKS:

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

802.11n (HT40)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2384.00	55.9 PK	74.0	-18.1	1.04 H	357	57.62	-1.72
2	2384.00	45.2 AV	54.0	-8.8	1.04 H	357	46.92	-1.72
3	2389.00	63.4 PK	74.0	-10.6	1.00 H	332	65.10	-1.70
4	2389.00	45.6 AV	54.0	-8.4	1.00 H	332	47.30	-1.70
5	*2422.00	95.6 PK			1.06 H	313	97.15	-1.55
6	*2422.00	86.0 AV			1.06 H	313	87.55	-1.55
7	4844.00	51.9 PK	74.0	-22.1	1.03 H	195	44.66	7.24
8	4844.00	40.4 AV	54.0	-13.6	1.03 H	195	33.16	7.24
9	7266.00	53.8 PK	74.0	-20.2	1.03 H	214	38.78	15.02
10	7266.00	40.3 AV	54.0	-13.7	1.03 H	214	25.28	15.02
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	2384.00	69.8 PK	74.0	-4.2	1.00 V	335	71.52	-1.72
2	2384.00	52.2 AV	54.0	-1.8	1.00 V	335	53.92	-1.72
3	2389.00	72.0 PK	74.0	-2.0	1.00 V	349	73.70	-1.70
4	2389.00	53.6 AV	54.0	-0.4	1.00 V	349	55.30	-1.70
5	*2422.00	106.0 PK			1.00 V	345	107.55	-1.55
6	*2422.00	96.3 AV			1.00 V	345	97.85	-1.55
7	4844.00	52.8 PK	74.0	-21.2	1.18 V	223	45.56	7.24
8	4844.00	39.1 AV	54.0	-14.9	1.18 V	223	31.86	7.24
9	7266.00	51.6 PK	74.0	-22.4	1.00 V	104	36.58	15.02
10	7266.00	39.8 AV	54.0	-14.2	1.00 V	104	24.78	15.02

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2390.00	56.0 PK	74.0	-18.0	1.08 H	303	57.70	-1.70
2	2390.00	45.4 AV	54.0	-8.6	1.08 H	303	47.10	-1.70
3	*2437.00	98.4 PK			1.04 H	301	99.89	-1.49
4	*2437.00	89.1 AV			1.04 H	301	90.59	-1.49
5	2483.50	63.5 PK	74.0	-10.5	1.08 H	303	64.78	-1.28
6	2483.50	45.6 AV	54.0	-8.4	1.08 H	303	46.88	-1.28
7	4874.00	51.0 PK	74.0	-23.0	1.00 H	193	43.67	7.33
8	4874.00	39.8 AV	54.0	-14.2	1.00 H	193	32.47	7.33
9	7311.00	53.5 PK	74.0	-20.5	1.01 H	209	38.54	14.96
10	7311.00	40.0 AV	54.0	-14.0	1.01 H	209	25.04	14.96
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	2390.00	69.8 PK	74.0	-4.2	1.00 V	343	71.50	-1.70
2	2390.00	51.9 AV	54.0	-2.1	1.00 V	343	53.60	-1.70
3	*2437.00	110.6 PK			1.00 V	343	112.09	-1.49
4	*2437.00	100.6 AV			1.00 V	343	102.09	-1.49
5	2483.50	70.5 PK	74.0	-3.5	1.00 V	343	71.78	-1.28
6	2483.50	53.3 AV	54.0	-0.7	1.00 V	343	54.58	-1.28
7	4874.00	52.5 PK	74.0	-21.5	1.22 V	230	45.17	7.33
8	4874.00	39.1 AV	54.0	-14.9	1.22 V	230	31.77	7.33
9	7311.00	51.6 PK	74.0	-22.4	1.02 V	92	36.64	14.96
10	7311.00	39.8 AV	54.0	-14.2	1.02 V	92	24.84	14.96

REMARKS:

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

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	*2452.00	94.3 PK			1.09 H	305	95.72	-1.42
2	*2452.00	93.7 AV			1.09 H	305	95.12	-1.42
3	2483.50	63.8 PK	74.0	-10.2	1.04 H	336	65.08	-1.28
4	2483.50	45.9 AV	54.0	-8.1	1.04 H	336	47.18	-1.28
5	4904.00	52.2 PK	74.0	-21.8	1.04 H	193	44.79	7.41
6	4904.00	40.7 AV	54.0	-13.3	1.04 H	193	33.29	7.41
7	7356.00	53.6 PK	74.0	-20.4	1.07 H	202	38.69	14.91
8	7356.00	39.9 AV	54.0	-14.1	1.07 H	202	24.99	14.91
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	*2452.00	105.4 PK			1.00 V	343	106.82	-1.42
2	*2452.00	95.8 AV			1.00 V	343	97.22	-1.42
3	2483.50	71.1 PK	74.0	-2.9	1.00 V	343	72.38	-1.28
4	2483.50	53.4 AV	54.0	-0.6	1.00 V	343	54.68	-1.28
5	4904.00	53.4 PK	74.0	-20.6	1.17 V	220	45.99	7.41
6	4904.00	39.8 AV	54.0	-14.2	1.17 V	220	32.39	7.41
7	7356.00	51.8 PK	74.0	-22.2	1.02 V	105	36.89	14.91
8	7356.00	39.8 AV	54.0	-14.2	1.02 V	105	24.89	14.91

REMARKS:

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

4.3 CONDUCTED OUTPUT POWER MEASUREMENT

4.3.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output v01r02 Method of conducted output power measurement on IEEE 802.11 devices,

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

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

Array Gain = $5 \log(NANT/NSS)$ dB or 3 dB, whichever is less for 20-MHz channel widths with $NANT \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(NANT/NSS)$ dB.

4.3.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	0824006	May 20, 2013	May 19, 2014
Power Sensor	MA2411B	0738172	May 20, 2013	May 19, 2014

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. Tested date : Feb. 25, 2014

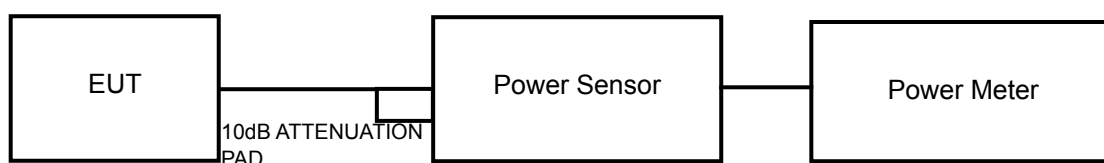
4.3.3 TEST PROCEDURES

A power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.3.7 TEST RESULTS

FOR PEAK POWER

802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	49.204	16.92	30	PASS
6	2437	39.446	15.96	30	PASS
11	2462	32.509	15.12	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	187.068	22.72	30	PASS
6	2437	159.588	22.03	30	PASS
11	2462	141.906	21.52	30	PASS

802.11n (HT20)

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	21.53	22.56	322.535	25.09	30	PASS
6	2437	21.59	21.97	301.610	24.79	30	PASS
11	2462	19.23	19.22	167.313	22.24	30	PASS

802.11n (HT40)

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	16.42	17.69	102.602	20.11	30	PASS
6	2437	18.34	18.65	141.516	21.51	30	PASS
9	2452	13.37	13.82	45.826	16.61	30	PASS

FOR AVERAGE POWER

802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	27.164	14.34
6	2437	21.528	13.33
11	2462	17.620	12.46

802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	30.549	14.85
6	2437	25.763	14.11
11	2462	20.941	13.21

802.11n (HT20)

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
1	2412	13.96	14.91	55.863	17.47
6	2437	14.16	14.10	51.766	17.14
11	2462	11.45	11.53	28.187	14.50

802.11n (HT40)

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
3	2422	8.47	9.58	16.109	12.07
6	2437	10.36	10.71	22.640	13.55
9	2452	6.62	6.39	8.947	9.52

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

6. 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.



A D T

7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

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