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# Supplemental “Transmit Simultaneously” Test Report

**REPORT NO.:** RF140626C16A-2 R1

**MODEL NO.:** C9

**FCC ID:** TE7C9

**RECEIVED:** Sep. 03, 2014

**TESTED:** Sep. 12 to 19, 2014

**ISSUED:** Nov. 04, 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
RF140626C16A-2	Original release	Oct. 15, 2014
RF140626C16A-2 R1	Modified section 3.1.	Nov. 04, 2014



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## 1. CERTIFICATION

**PRODUCT :** AC1900 Wireless Dual Band Gigabit Router

**BRAND NAME :** TP-LINK

**MODEL NO. :** C9

**TEST ITEM:** PROTOTYPE

**APPLICANT :** TP-LINK TECHNOLOGIES CO., LTD.

**TESTED:** Sep. 12 to 19, 2014

**STANDARDS:** FCC Part 15, Subpart C (Section 15.247)

ANSI C63.10-2009

The above equipment (Model: C9) 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:** Nov. 04, 2014  
( Elsie Hsu, Specialist )

**APPROVED BY** :  , **DATE:** Nov. 04, 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)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -8.83dB at 0.15000MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -6.9dB at 45.42MHz



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## 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	2.86 dB
Radiated emissions (30MHz-1GHz)	5.37 dB
Radiated emissions (1GHz -6GHz)	3.65 dB
Radiated emissions (6GHz -18GHz)	3.88 dB
Radiated emissions (18GHz -40GHz)	4.11 dB



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### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	AC1900 Wireless Dual Band Gigabit Router
MODEL NO.	C9
POWER SUPPLY	DC 12V from power adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
MODULATION TECHNOLOGY	DSSS,OFDM
TRANSFER RATE	802.11b: up to 11Mbps 802.11a / g: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1300Mbps
OPERATING FREQUENCY	<b>For 15.407</b> 5GHz: 5.18 ~ 5.24GHz  <b>For 15.247</b> 2.4GHz: 2.412 ~ 2.462GHz 5GHz: 5.745 ~ 5.825GHz
NUMBER OF CHANNEL	<b>For 15.407</b> 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)  <b>For 15.247 (2.4GHz)</b> 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40) <b>For 15.247 (5GHz)</b> 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)



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<b>MAXIMUM OUTPUT POWER</b>	<b>For 15.407</b> 802.11a: 183.92mW 802.11ac (VHT20): 178.434mW 802.11ac (VHT40): 108.435mW 802.11ac (VHT80): 91.922mW <b>For 15.247 (2.4GHz)</b> 802.11b: 563.777mW 802.11g: 980.641mW 802.11n (HT20): 880.076mW 802.11n (HT40): 352.236mW <b>For 15.247 (5GHz)</b> 802.11a: 894.156mW 802.11ac (VHT20): 888.31mW 802.11ac (VHT40): 866.479mW 802.11ac (VHT80): 426.245mW
<b>ANTENNA TYPE</b>	Please see NOTE
<b>DATA CABLE</b>	RJ45 cable x 1 (unshielded, 1.25m)
<b>I/O PORTS</b>	Refer to user's manual
<b>ASSOCIATED DEVICES</b>	Adapter x1

**NOTE:**

1. For WLAN, 2.4GHz and 5GHz technology can transmit at same time.

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

Brand	Model No.	Spec.
Ten Pao	S048CU1200330	Input: 100-240V, 1.5A, 47~63Hz Output: 12.0V, 5.5A DC output cable(1.5m, unshielded)

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

Transmitter Circuit	Peak Gain (dBi)	Frequency range (MHz to MHz)	Ant. Type	Connector Type
Chain 0	2.4GHz: 2.1 5GHz: 1.7	2400~2483.5	Omni directional	R-SMA
Chain 1		5150~5250		
Chain 2		5250~5350 5470~5725 5725~585		



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4. The EUT incorporates a MIMO function.

MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
<b>802.11a</b>	6 ~ 54Mbps	3TX CDD	3RX
<b>802.11b</b>	1 ~ 11Mbps	3TX CDD	3RX
<b>802.11g</b>	6 ~ 54Mbps	3TX CDD	3RX
<b>802.11n (HT20) (2.4GHz) &amp; 802.11n (HT40) (2.4GHz)</b>	MCS 0~7	3TX CDD	3RX
	MCS 8~15	3TX CDD	3RX
	MCS 16~23	3TX	3RX
<b>802.11n (HT20) (5GHz) &amp; 802.11n (HT40) (5GHz)</b>	MCS 0~7	3TX CDD / Beamforming	3RX
	MCS 8~15	3TX CDD / Beamforming	3RX
	MCS 16~23	3TX / Beamforming	3RX
<b>802.11ac (VHT20) (5GHz)</b>	MCS0~8 NSS= 1	3TX CDD / Beamforming	3RX
	MCS0~8 NSS= 2	3TX CDD / Beamforming	3RX
	MCS0~8 NSS= 3	3TX / Beamforming	3RX
<b>802.11ac (VHT40) (5GHz) &amp; 802.11ac (VHT80) (5GHz)</b>	MCS0~9 NSS= 1	3TX CDD / Beamforming	3RX
	MCS0~9 NSS= 2	3TX CDD / Beamforming	3RX
	MCS0~9 NSS= 3	3TX / Beamforming	3RX

**Note:** The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report.

5. The device that can be configured as a master and client mode, which can be switching by Web UI.
6. All of configured as a master and client which power level is no change and compliance.
7. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.



### 3.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE < 1G	RE <sup>3</sup> 1G	OB	
-	√	√	√	√	-

Where PLC: Power Line Conducted Emission

RE < 1G: Radiated Emission below 1GHz

RE <sup>3</sup> 1G: Radiated Emission above 1GHz

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)
802.11g + 802.11a	1 to 11	6	OFDM	BPSK	6
	149 to 165	165	OFDM	BPSK	6

#### RADIATED 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)
802.11g + 802.11a	1 to 11	6	OFDM	BPSK	6
	149 to 165	165	OFDM	BPSK	6



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**CONDUCTED OUT-BAND EMISSION 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)
802.11g + 802.11a	1 to 11	6	OFDM	BPSK	6
	149 to 165	165	OFDM	BPSK	6

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	30deg. C, 70%RH	120Vac, 60Hz	Mike Hsieh
RE<1G	25deg. C, 69%RH	120Vac, 60Hz	Tim Ho
RE <sup>3</sup> 1G	25deg. C, 68%RH	120Vac, 60Hz	Gary Cheng
OB	25deg. C, 60%RH	120Vac, 60Hz	Tim Ho



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### 3.3 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.

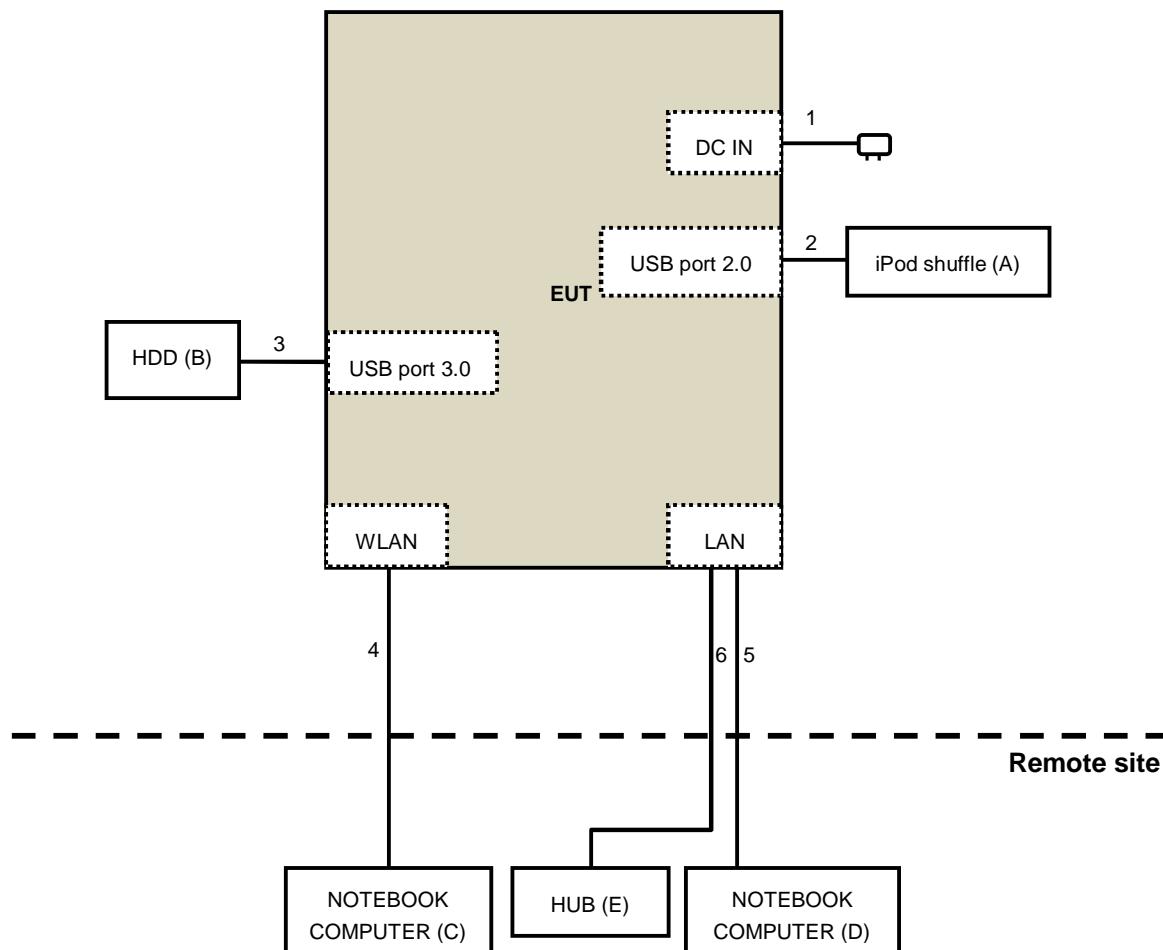
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	iPod shuffle	Apple	MD778TA/A	CC4JCMCMXF4T1	NA	Provided by Lab
B	HDD	WD	WDBACW00 10HBK-SES N	WCAZAL625787	FCC DoC	Provided by Lab
C	NOTEBOOK COMPUTER	DELL	PP32LA	GSLB32S	FCC DoC	Provided by Lab
D	NOTEBOOK COMPUTER	DELL	E5440	6FC7F12	FCC DoC	Provided by Lab
E	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab

**NOTE:**

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

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1.	DC	1	1.5	No	0	Supplied by client
2.	USB to Audio	1	0.1	No	0	Provided by Lab
3.	USB	1	0.5	No	0	Provided by Lab
4.	RJ45	1	10	No	0	Provided by Lab
5.	RJ45	1	10	No	0	Provided by Lab
6.	RJ45	3	10	No	0	Provided by Lab

### 3.4 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 $\mu$ 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	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100071	Nov. 13, 2013	Nov. 12, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10, 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 24, 2013	Sep. 23, 2014
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2013	Sep. 30, 2014
Software ADT 3	BV ADT_Cond_V7.3.7.	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: Sep. 19, 2014



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#### 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) were not recorded.

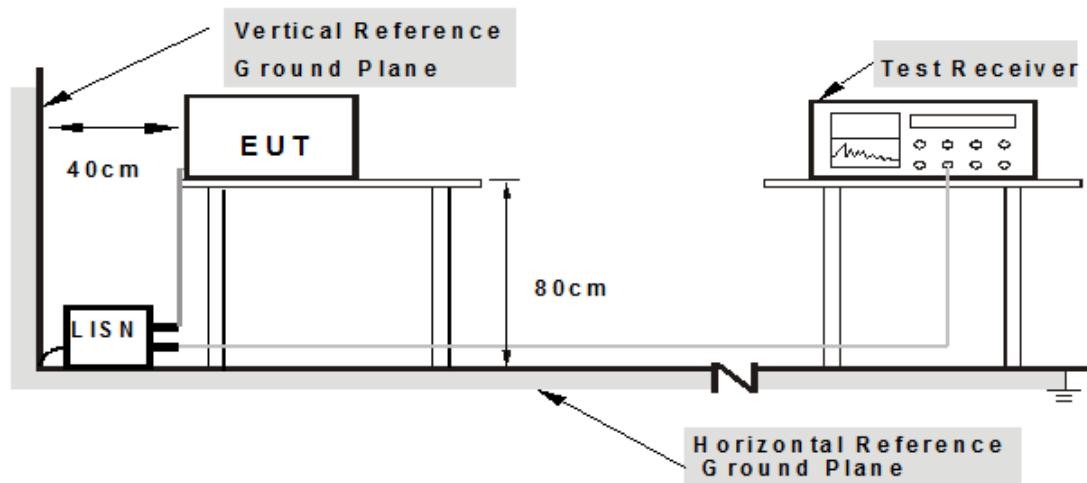
#### NOTE:

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 units C-D (Notebook Computer) which is placed on table in remote site.
2. The communication partner run test program “Mtool.exe[2.0.1.1]” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

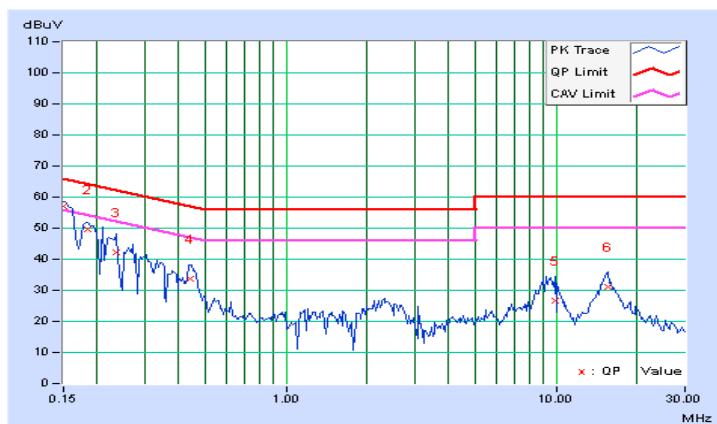
## 4.1.7 TEST RESULTS

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	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	56.81	44.56	56.88	44.63	66.00	56.00	-9.12	-11.37
2	0.18516	0.07	49.55	35.23	49.62	35.30	64.25	54.25	-14.63	-18.95
3	0.23594	0.07	42.00	25.68	42.07	25.75	62.24	52.24	-20.16	-26.48
4	0.44297	0.09	33.71	16.93	33.80	17.02	57.01	47.01	-23.20	-29.98
5	9.96094	0.45	26.07	18.24	26.52	18.69	60.00	50.00	-33.48	-31.31
6	15.47266	0.60	30.61	25.76	31.21	26.36	60.00	50.00	-28.79	-23.64

## 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



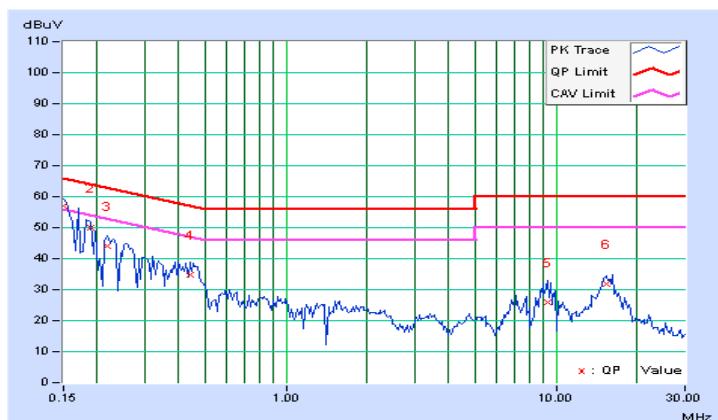


PHASE	Neutral (N)		DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)	
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor (dB)	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	(dB)	
1	0.15000	0.08	57.09	44.78	57.17	44.86	66.00	56.00	-8.83	-11.14
2	0.18906	0.07	49.77	37.17	49.84	37.24	64.08	54.08	-14.24	-16.84
3	0.21641	0.07	44.08	26.99	44.15	27.06	62.96	52.96	-18.80	-25.89
4	0.44297	0.09	34.84	20.45	34.93	20.54	57.01	47.01	-22.07	-26.46
5	9.34375	0.43	25.59	15.83	26.02	16.26	60.00	50.00	-33.98	-33.74
6	15.32422	0.59	31.44	26.48	32.03	27.07	60.00	50.00	-27.97	-22.93

#### 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 MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION 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.



#### 4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 21,2014	Jan. 20,2015
Loop Antenna <sup>(1)</sup> Electro-Metrics	EM-6879	264	Dec. 10, 2012	Dec. 09, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 05, 2013	Oct. 04, 2014
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 18, 2013	Nov. 17, 2014
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 12, 2013	Dec. 11, 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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
4. The test was performed in 966 Chamber No. G.
5. The FCC Site Registration No. is 966073.
6. The VCCI Site Registration No. is G-137.
7. The CANADA Site Registration No. is IC 7450H-2.
8. Tested Date: Sep. 12, 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 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:**

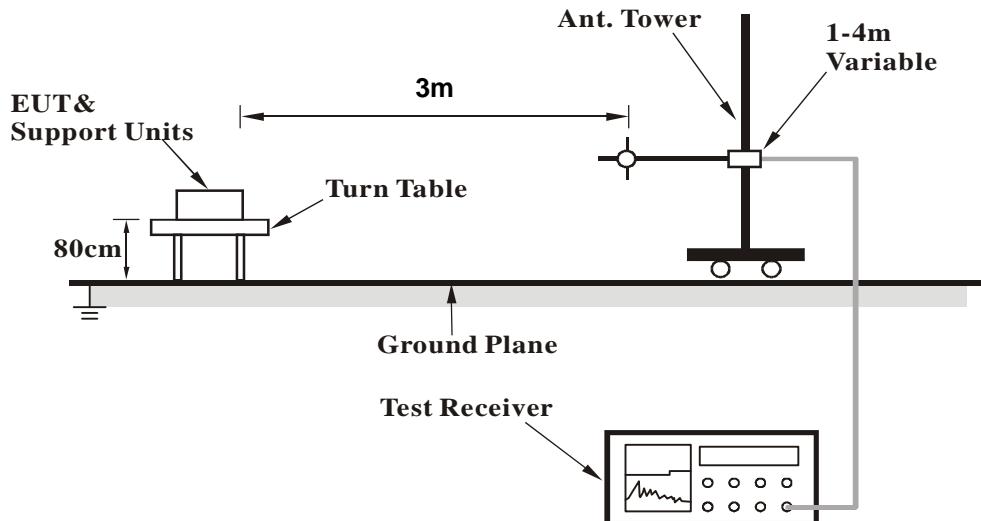
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.
4. If the EUT transiting at duty cycle is < 98%, the duty cycle correction is required that emission.
5. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.2.4 DEVIATION FROM TEST STANDARD

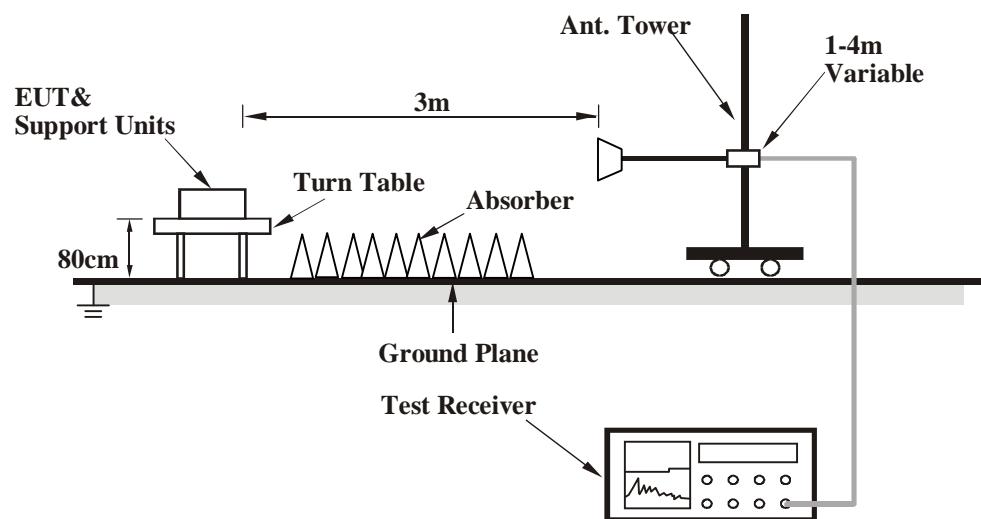
No deviation

#### 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



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#### 4.2.7 TEST RESULTS

**BELOW 1GHz DATA :**

FREQUENCY RANGE	9kHz ~ 1GHz	DETECTOR FUNCTION	Quasi-Peak (QP)
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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	123.36	29.7 QP	43.5	-13.8	1.50 H	47	44.66	-14.98
2	260.86	31.7 QP	46.0	-14.3	2.00 H	147	45.64	-13.90
3	280.31	31.7 QP	46.0	-14.3	1.00 H	307	44.70	-12.98
4	599.97	38.8 QP	46.0	-7.2	1.50 H	347	43.73	-4.89
5	857.07	35.2 QP	46.0	-10.8	1.50 H	260	35.98	-0.74
6	971.97	34.6 QP	54.0	-19.4	1.50 H	124	33.42	1.17

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	45.42	33.1 QP	40.0	-6.9	1.00 V	44	46.67	-13.58
2	101.88	29.3 QP	43.5	-14.2	1.50 V	360	46.77	-17.43
3	280.36	27.7 QP	46.0	-18.4	1.50 V	313	40.63	-12.98
4	599.97	32.2 QP	46.0	-13.8	1.00 V	65	37.06	-4.89
5	857.07	32.9 QP	46.0	-13.1	1.00 V	224	33.68	-0.74
6	912.41	31.7 QP	46.0	-14.3	1.00 V	240	31.33	0.38

**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



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## ABOVE 1GHz DATA

FREQUENCY RANGE		1GHz ~ 40GHz		DETECTOR FUNCTION		Peak (PK) Average (AV)	
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## ANTENNA POLARITY &amp; 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	4874.00	46.7 PK	74.0	-27.3	1.00 H	57	40.80	5.90
2	4874.00	34.5 AV	54.0	-19.5	1.00 H	57	28.60	5.90
3	7311.00	53.9 PK	74.0	-20.1	1.00 H	102	40.73	13.17
4	7311.00	41.2 AV	54.0	-12.8	1.00 H	102	28.03	13.17
5	11650.00	60.2 PK	74.0	-13.8	1.09 H	130	45.82	14.38
6	11650.00	46.6 AV	54.0	-7.4	1.09 H	130	32.22	14.38

## ANTENNA POLARITY &amp; 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	4874.00	45.4 PK	74.0	-28.6	1.00 V	113	39.50	5.90
2	4874.00	38.9 AV	54.0	-15.1	1.00 V	113	33.00	5.90
3	7311.00	50.5 PK	74.0	-23.5	1.00 V	116	37.33	13.17
4	7311.00	38.3 AV	54.0	-15.7	1.00 V	116	25.13	13.17
5	11650.00	59.6 PK	74.0	-14.4	1.00 V	328	45.22	14.38
6	11650.00	46.8 AV	54.0	-7.2	1.00 V	328	32.42	14.38

## 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



## 4.3 CONDUCTED OUT-BAND EMISSION MEASUREMENT

### 4.3.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

Below 30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSV 40	100964	July 05, 2014	July 04, 2015

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 18, 2014

### 4.3.3 TEST PROCEDURE

#### Measurement Procedure - Reference Level

1. Set the RBW = 100 kHz.
2. Set the VBW  $\geq$  300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

#### Measurement Procedure –Unwanted Emission Level

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

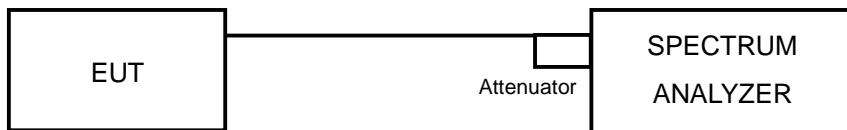


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#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.3.5 TEST SETUP



#### 4.3.6 EUT OPERATING CONDITION

Same as Item 4.3.6

#### 4.3.7 TEST RESULTS

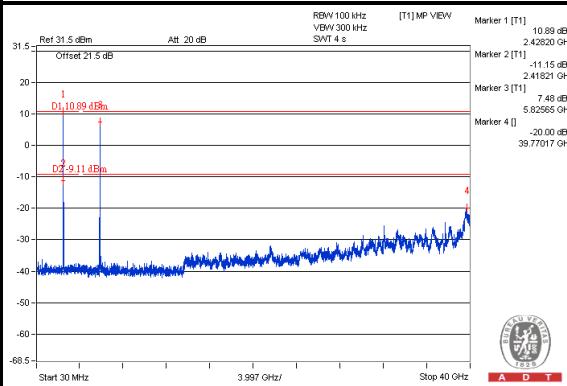
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.



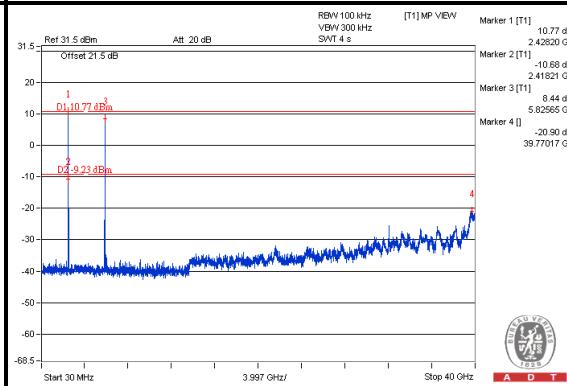
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## 802.11g + 802.11a

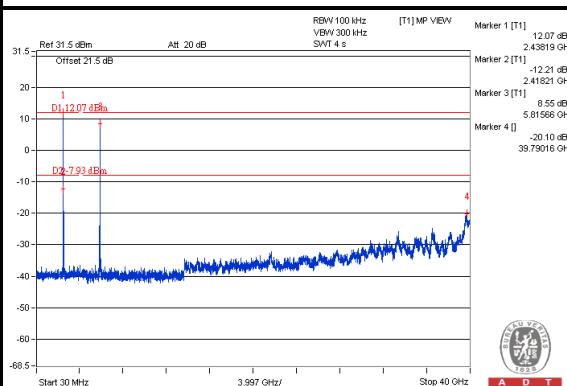
### CHAIN (0) CH6 + CH 165



### CHAIN (1) CH6 + CH 165



### CHAIN (2) CH6 + CH 165





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## 4. 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:**

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Fax: 886-2-26052943

**Hsin Chu EMC/RF/Telecom Lab:**

Tel: 886-3-5935343  
Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety Lab:**

Tel: 886-3-3183232  
Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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

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