FCC TEST REPORT(Z-Wave)

REPORT NO.:	RF131022E08-1
MODEL NO.:	HA1000
FCC ID:	Q87-HA1000
RECEIVED:	Oct. 22, 2013
TESTED:	Oct. 16 to Nov. 01, 2013
ISSUED:	Nov. 08, 2013

APPLICANT:	Linksys LLC
ADDRESS:	131 Theory Drive Irvine California 92617 United States

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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.

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF131022E08-1	Original release	Nov. 08, 2013

1. CERTIFICATION

PRODUCT :	Staples Connect Hub
BRAND NAME :	Linksys
MODEL NO. :	HA1000
TEST SAMPLE :	ENGINEERING SAMPLE
APPLICANT :	Linksys LLC
TESTED :	Oct. 16 to Nov. 01, 2013
STANDARDS :	**FCC Part 15, Subpart C (Section 15.249)** ANSI C63.10-2009

The above equipment (Model: HA1000) 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. 08, 2013
(Midoli Peng, Specialist)

APPROVED BY : _____ , **DATE:** Nov. 08, 2013
(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 15.249)			
STANDARD PARAGRAPH	**TEST TYPE**	**RESULT**	**REMARK**
15.207	Conducted Emission Test	PASS	Meet the requirement of limit. Minimum passing margin is -11.06dB at 21.66406MHz.
15.209 15.249 15.249 (d)	Radiated Emission Test Band Edge Measurement Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -2.1dB at 908.42MHz

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	FREQUENCY	UNCERTAINTY
Conducted emissions	150kHz ~ 30MHz	2.98dB
Radiated emission	30MHz ~ 1GHz	5.46 dB
	1GHz ~6GHz	3.73 dB
	6GHz ~ 18GHz	3.90 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Staples Connect Hub
MODEL NO.	HA1000
POWER SUPPLY	DC 5V from power adapter
MODULATION TYPE	FSK
CARRIER FREQUENCY OF EACH CHANNEL	908.4MHz ~ 916.0MHz
NUMBER OF CHANNEL	2
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter x 1

NOTE:

1. The EUT is a WLAN, Z-Wave and CC Radio device.

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

Brand	Model No.	Spec.
Ktec	KSAS0120500200HU	Input: 100-240V, 0.4A, 50-60Hz Output: 5V, 2.0A DC output cable (1.6m unshielded)

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

WLAN Antenna Spec.					
Brand	Model No.	Antenna Type	Antenna Connector	Gain(dBi)	Frequency range (MHz)
WNC	EAAH-N26	PIFA	UFL	2.14	2400 - 2500
Z-Wave Antenna Spec.					
Brand	Model No.	Antenna Type	Antenna Connector	Gain(dBi)	Frequency range (MHz)
WNC	3ASHM1L01S2-111	PIFA	NA	-0.88	908.40 - 916
Clear Connect radio Antenna Spec.					
Brand	Model No.	Antenna Type	Antenna Connector	Gain(dBi)	Frequency range (MHz)
WNC	3ASHM1L01S1-111	PIFA	NA	2.24	431 – 437

4. Spurious emission of the simultaneous operation (WLAN, Z-Wave & CC Radio) has been evaluated and no non-compliance was found.

5. 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

2 channels are provided in this EUT.

Channel	Freq. (MHz)
1	908.4
2	916.0

3.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

Where **RE<1G:** Radiated Emission below 1GHz **RE≥1G:** Radiated Emission above 1GHz

PLC: Power Line Conducted Emission

NOTE: The EUT's antenna had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **X-plane**.

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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 2	2	FSK

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations axis and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 2	1, 2	FSK

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations axis and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 2	1, 2	FSK

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	25deg. C, 67%RH	120Vac, 60Hz	Sean Huang
RE≥1G	30deg. C, 70%RH	120Vac, 60Hz	Tim Ho
RE<1G	25deg. C, 67%RH	120Vac, 60Hz	Andy Ho

3.4 DESCRIPTION OF SUPPORT UNITS

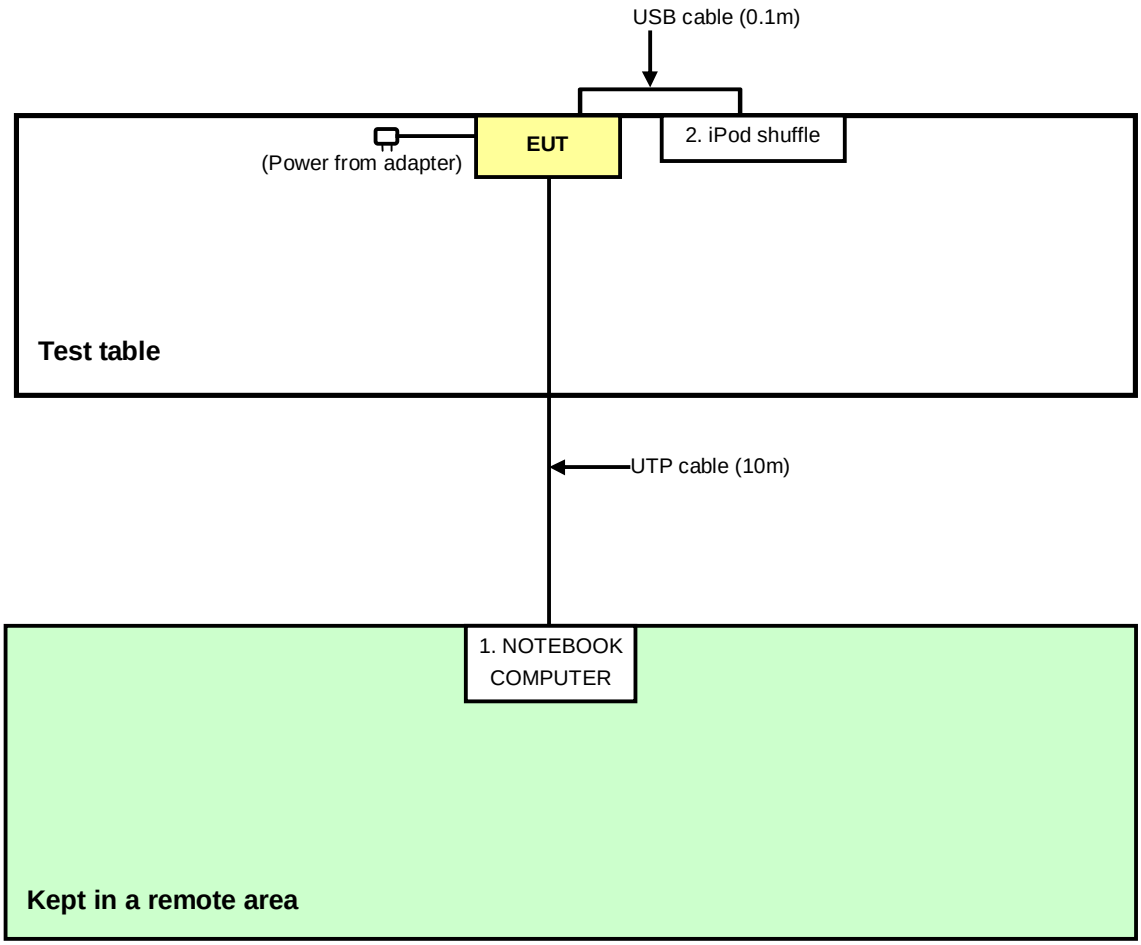
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
2	iPod shuffle	Apple	MC749TA/A	CC4DMFJUDFDM	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP cable(10m)
2	USB cable(0.1m)

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

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST



3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (Section 15.249)

ANSI C63.10-2009

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 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5 0.5-5 5-30	66 to 56 56 60	56 to 46 46 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: Oct. 25, 2013

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. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

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

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

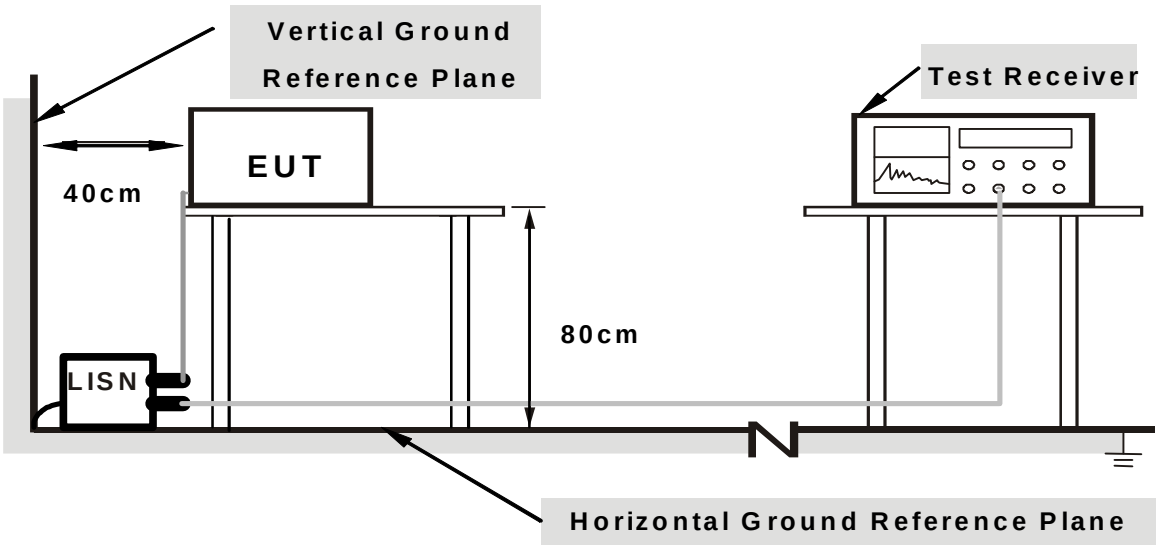
NOTE:

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. Placed the EUT on testing table.
2. Prepared computer system (support units 1) to act as communication partner.
3. The communication partner ran test program “webpage command” to enable EUT under transmission/receiving condition continuously.

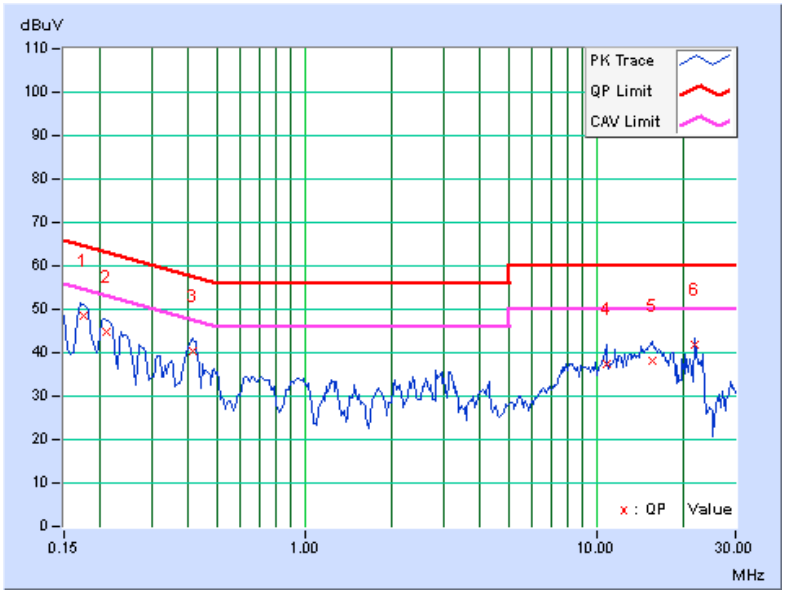
4.1.7 TEST RESULTS

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17541	0.09	48.59	37.31	48.68	37.40	64.70	54.70	-16.02	-17.30
2	0.20994	0.10	44.61	33.16	44.71	33.26	63.21	53.21	-18.50	-19.95
3	0.41172	0.14	40.30	35.29	40.44	35.43	57.61	47.61	-17.17	-12.18
4	10.79297	0.49	36.80	29.84	37.29	30.33	60.00	50.00	-22.71	-19.67
5	15.50391	0.63	37.47	30.28	38.10	30.91	60.00	50.00	-21.90	-19.09
6	**21.66406**	**0.76**	**41.21**	**38.18**	**41.97**	**38.94**	**60.00**	**50.00**	**-18.03**	**-11.06**

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

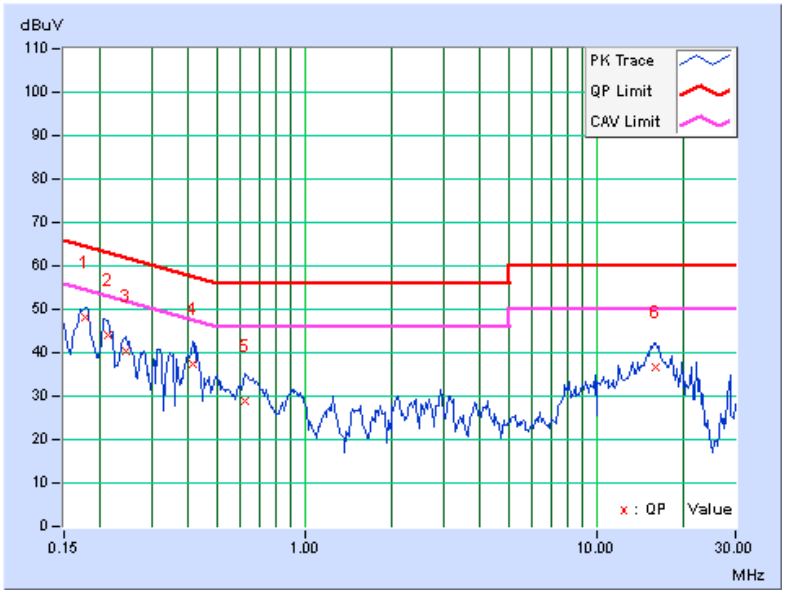


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17734	0.10	47.99	34.32	48.09	34.42	64.61	54.61	-16.52	-20.19
2	0.21250	0.10	44.14	29.86	44.24	29.96	63.11	53.11	-18.86	-23.14
3	0.24375	0.11	40.17	23.89	40.28	24.00	61.97	51.97	-21.69	-27.97
4	0.41563	0.14	37.33	31.70	37.47	31.84	57.54	47.54	-20.06	-15.69
5	0.62656	0.15	28.86	21.24	29.01	21.39	56.00	46.00	-26.99	-24.61
6	15.96094	0.63	35.95	24.84	36.58	25.47	60.00	50.00	-23.42	-24.53

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 BAND EDGE MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION AND BAND EDGE MEASUREMENT

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 ~ 928 MHz	50	500
2400 ~ 2483.5 MHz	50	500
5725 ~ 5875 MHz	50	500
24 ~ 24.25 GHz	250	2500

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits as below table, whichever is the lesser attenuation

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

For Below 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Jan. 16, 2013	Jan. 15, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 14, 2012	Nov. 13, 2013
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
Horn_Antenna AISI	AIH.8018	0000220091110	Nov. 27, 2012	Nov. 26, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 25, 2013	June 24, 2014
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 26, 2012	Dec. 25, 2013
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
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: Oct. 16 to Nov. 01, 2013

For Above 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 29,2013	Jan. 28,2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 14, 2012	Nov. 13, 2013
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
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 19, 2012	Nov. 18, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 25, 2013	June 24, 2014
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 25, 2012	Dec. 24, 2013
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
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: Nov. 01, 2013

4.2.3 TEST PROCEDURES

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

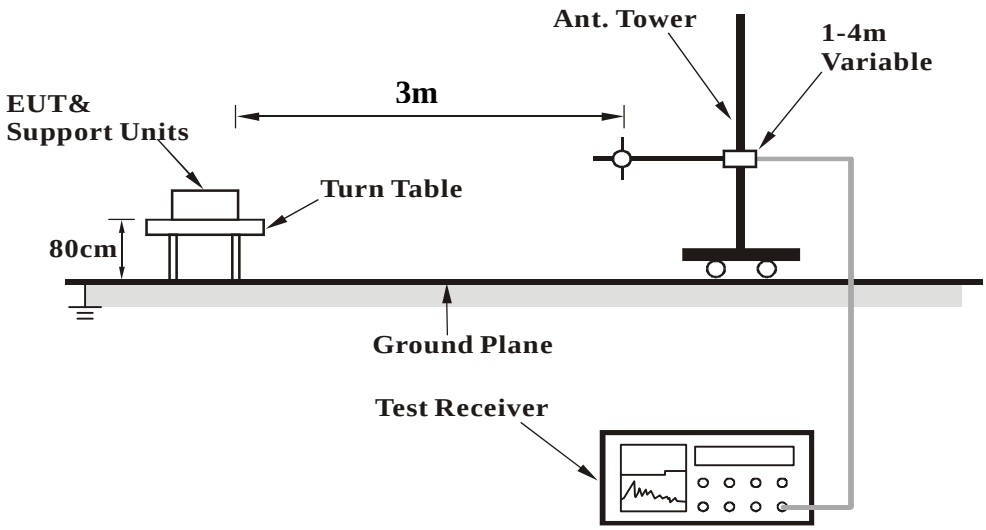
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

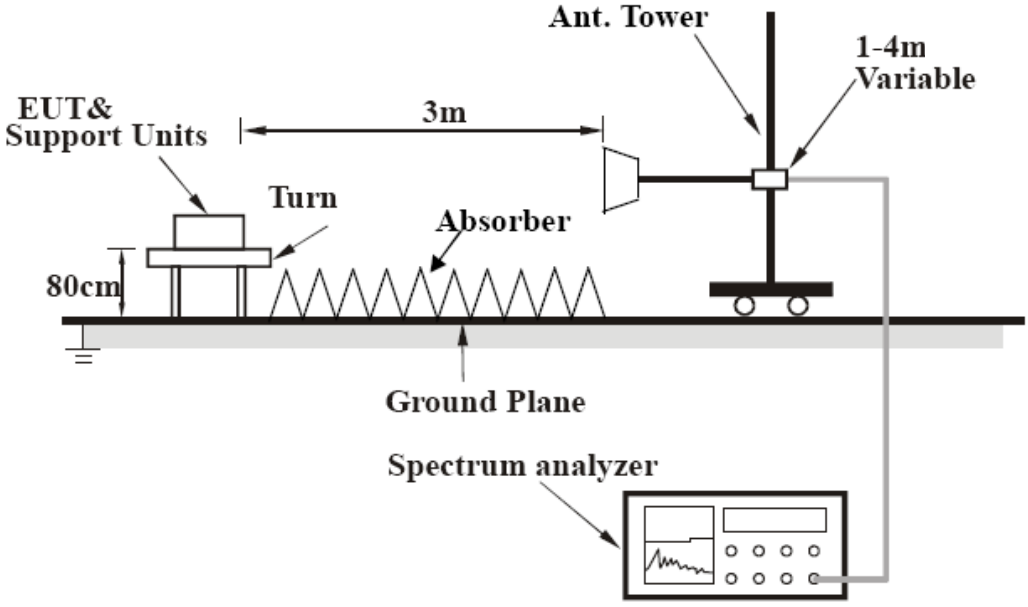
No deviation.

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

Set the EUT under transmission condition continuously at specific channel frequency.

4.2.7 TEST RESULTS

BELOW 1GHz DATA

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	69.67	23.0 QP	40.0	-17.0	2.00 H	299	37.90	-14.94
2	125.01	28.9 QP	43.5	-14.6	2.00 H	269	43.26	-14.33
3	250.00	37.9 QP	46.0	-8.1	1.50 H	67	51.69	-13.76
4	442.01	32.2 QP	46.0	-13.9	2.00 H	119	40.18	-8.03
5	749.98	32.9 QP	46.0	-13.1	1.00 H	360	34.75	-1.84
6	849.99	41.8 QP	46.0	-4.2	1.00 H	16	42.32	-0.49
7	902.00	42.5 QP	46.0	-3.5	1.00 H	179	41.97	0.49
8	***908.42**	**91.9 QP**	**94.0**	**-2.1**	**1.00 H**	**179**	**91.26**	**0.67**
9	928.00	43.1 QP	46.0	-2.9	1.00 H	179	41.89	1.18
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	55.85	34.2 QP	40.0	-5.8	2.00 V	360	47.19	-12.95
2	69.19	30.8 QP	40.0	-9.2	1.00 V	322	45.81	-14.99
3	250.00	31.8 QP	46.0	-14.2	2.00 V	360	45.52	-13.76
4	330.02	25.2 QP	46.0	-20.8	1.50 V	133	35.84	-10.65
5	442.01	32.2 QP	46.0	-13.8	1.50 V	66	40.24	-8.03
6	950.00	34.3 QP	46.0	-11.7	1.00 V	4	32.91	1.40
7	902.00	42.0 QP	46.0	-4.1	1.18 V	107	41.46	0.49
8	*908.42	82.2 QP	94.0	-11.8	1.18 V	107	81.57	0.67
9	928.00	42.3 QP	46.0	-3.7	1.18 V	107	41.14	1.18

REMARKS:

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

CHANNEL	TX Channel 2	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	69.67	22.9 QP	40.0	-17.1	2.00 H	299	37.80	-14.94
2	125.01	28.8 QP	43.5	-14.7	2.00 H	269	43.17	-14.33
3	250.00	37.9 QP	46.0	-8.2	1.50 H	67	51.61	-13.76
4	442.01	32.2 QP	46.0	-13.8	2.00 H	119	40.27	-8.03
5	749.98	32.9 QP	46.0	-13.2	1.00 H	360	34.69	-1.84
6	849.99	41.8 QP	46.0	-4.3	1.00 H	16	42.24	-0.49
7	902.00	42.0 QP	46.0	-4.0	1.00 H	178	41.48	0.49
8	*916.00	90.1 QP	94.0	-3.9	1.00 H	178	89.24	0.85
9	928.00	43.1 QP	46.0	-2.9	1.00 H	178	41.88	1.18
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	55.85	34.1 QP	40.0	-5.9	2.00 V	360	47.07	-12.95
2	69.19	30.8 QP	40.0	-9.3	1.50 V	322	45.74	-14.99
3	249.99	31.7 QP	46.0	-14.4	1.50 V	360	45.41	-13.76
4	330.02	25.1 QP	46.0	-20.9	1.00 V	133	35.79	-10.65
5	442.02	32.2 QP	46.0	-13.8	2.00 V	66	40.20	-8.03
6	902.00	40.7 QP	46.0	-5.3	1.59 V	360	40.25	0.49
7	*916.00	83.9 QP	94.0	-10.1	1.59 V	360	83.09	0.85
8	928.00	42.8 QP	46.0	-3.2	1.00 V	360	41.66	1.18
9	949.99	34.2 QP	46.0	-11.8	1.50 V	4	32.82	1.40

REMARKS:

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

ABOVE 1GHz DATA

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK)
FREQUENCY RANGE	1GHz ~ 10GHz		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	1816.80	38.7 PK	74.0	-35.3	1.00 H	28	43.26	-4.56
2	1816.80	25.5 AV	54.0	-28.5	1.00 H	28	30.06	-4.56
3	2725.20	45.0 PK	74.0	-29.0	1.30 H	211	45.91	-0.91
4	2725.20	38.0 AV	54.0	-16.0	1.30 H	211	38.91	-0.91
5	3633.60	43.1 PK	74.0	-30.9	1.00 H	205	41.25	1.85
6	3633.60	30.8 AV	54.0	-23.2	1.00 H	205	28.95	1.85
7	4542.00	45.7 PK	74.0	-28.3	1.00 H	210	40.22	5.48
8	4542.00	33.2 AV	54.0	-20.8	1.00 H	210	27.72	5.48
9	5450.40	47.5 PK	74.0	-26.5	1.00 H	208	38.69	8.81
10	5450.40	35.3 AV	54.0	-18.7	1.00 H	208	26.49	8.81
11	6358.80	50.6 PK	74.0	-23.4	1.00 H	189	39.27	11.33
12	6358.80	37.4 AV	54.0	-16.6	1.00 H	189	26.07	11.33
13	7267.20	53.6 PK	74.0	-20.4	1.00 H	221	38.95	14.65
14	7267.20	41.1 AV	54.0	-12.9	1.00 H	221	26.45	14.65
15	8175.60	53.7 PK	74.0	-20.3	1.00 H	218	39.86	13.84
16	8175.60	42.0 AV	54.0	-12.0	1.00 H	218	28.16	13.84
17	9084.00	54.4 PK	74.0	-19.6	1.00 H	202	40.64	13.76
18	9084.00	42.4 AV	54.0	-11.6	1.00 H	202	28.64	13.76

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 10GHz		

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	1816.80	38.8 PK	74.0	-35.2	1.00 V	302	43.36	-4.56
2	1816.80	25.6 AV	54.0	-28.4	1.00 V	302	30.16	-4.56
3	2725.20	45.8 PK	74.0	-28.2	1.00 V	268	46.71	-0.91
4	2725.20	40.8 AV	54.0	-13.2	1.00 V	268	41.71	-0.91
5	3633.60	42.9 PK	74.0	-31.1	1.00 V	105	41.05	1.85
6	3633.60	30.2 AV	54.0	-23.8	1.00 V	105	28.35	1.85
7	4542.00	46.4 PK	74.0	-27.6	1.21 V	274	40.92	5.48
8	4542.00	36.5 AV	54.0	-17.5	1.21 V	274	31.02	5.48
9	5450.40	48.5 PK	74.0	-25.5	1.00 V	202	39.69	8.81
10	5450.40	36.0 AV	54.0	-18.0	1.00 V	202	27.19	8.81
11	6358.80	51.5 PK	74.0	-22.5	1.00 V	311	40.17	11.33
12	6358.80	38.8 AV	54.0	-15.2	1.00 V	311	27.47	11.33
13	7267.20	52.8 PK	74.0	-21.2	1.00 V	202	38.15	14.65
14	7267.20	41.3 AV	54.0	-12.7	1.00 V	202	26.65	14.65
15	8175.60	50.2 PK	74.0	-23.8	1.00 V	184	36.36	13.84
16	8175.60	41.5 AV	54.0	-12.5	1.00 V	184	27.66	13.84
17	9084.00	54.4 PK	74.0	-19.6	1.00 V	105	40.64	13.76
18	9084.00	42.4 AV	54.0	-11.6	1.00 V	105	28.64	13.76

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

CHANNEL	TX Channel 2	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 10GHz		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	1832.00	37.8 PK	74.0	-36.2	1.00 H	102	42.26	-4.46
2	1832.00	25.4 AV	54.0	-28.6	1.00 H	102	29.86	-4.46
3	2748.00	45.6 PK	74.0	-28.4	1.28 H	207	46.48	-0.88
4	2748.00	39.8 AV	54.0	-14.2	1.28 H	207	40.68	-0.88
5	3664.00	42.2 PK	74.0	-31.8	1.00 H	205	40.20	2.00
6	3664.00	30.5 AV	54.0	-23.5	1.00 H	205	28.50	2.00
7	4580.00	45.5 PK	74.0	-28.5	1.00 H	108	39.88	5.62
8	4580.00	33.3 AV	54.0	-20.7	1.00 H	108	27.68	5.62
9	5496.00	47.7 PK	74.0	-26.3	1.00 H	201	38.74	8.96
10	5496.00	35.4 AV	54.0	-18.6	1.00 H	201	26.44	8.96
11	6412.00	51.0 PK	74.0	-23.0	1.00 H	115	39.48	11.52
12	6412.00	37.9 AV	54.0	-16.1	1.00 H	115	26.38	11.52
13	7328.00	53.9 PK	74.0	-20.1	1.00 H	226	39.33	14.57
14	7328.00	41.2 AV	54.0	-12.8	1.00 H	226	26.63	14.57
15	8244.00	54.2 PK	74.0	-19.8	1.00 H	215	40.42	13.78
16	8244.00	41.9 AV	54.0	-12.1	1.00 H	215	28.12	13.78
17	9160.00	54.7 PK	74.0	-19.3	1.00 H	202	40.93	13.77
18	9160.00	42.7 AV	54.0	-11.3	1.00 H	202	28.93	13.77

CHANNEL	TX Channel 2	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 10GHz		

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	1832.00	39.8 PK	74.0	-34.2	1.00 V	211	44.26	-4.46
2	1832.00	26.1 AV	54.0	-27.9	1.00 V	211	30.56	-4.46
3	2748.00	46.2 PK	74.0	-27.8	1.02 V	324	47.08	-0.88
4	2748.00	41.2 AV	54.0	-12.8	1.02 V	324	42.08	-0.88
5	3664.00	42.7 PK	74.0	-31.3	1.00 V	205	40.70	2.00
6	3664.00	30.9 AV	54.0	-23.1	1.00 V	205	28.90	2.00
7	4580.00	46.2 PK	74.0	-27.8	1.00 V	201	40.58	5.62
8	4580.00	35.2 AV	54.0	-18.8	1.00 V	201	29.58	5.62
9	5496.00	49.1 PK	74.0	-24.9	1.00 V	115	40.14	8.96
10	5496.00	36.7 AV	54.0	-17.3	1.00 V	115	27.74	8.96
11	6412.00	52.5 PK	74.0	-21.5	1.00 V	122	40.98	11.52
12	6412.00	39.7 AV	54.0	-14.3	1.00 V	122	28.18	11.52
13	7328.00	54.8 PK	74.0	-19.2	1.00 V	202	40.23	14.57
14	7328.00	42.4 AV	54.0	-11.6	1.00 V	202	27.83	14.57
15	8244.00	55.3 PK	74.0	-18.7	1.03 V	251	41.52	13.78
16	8244.00	43.6 AV	54.0	-10.4	1.03 V	251	29.82	13.78
17	9160.00	54.5 PK	74.0	-19.5	1.00 V	209	40.73	13.77
18	9160.00	42.5 AV	54.0	-11.5	1.00 V	209	28.73	13.77

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

7. APPENDIX A – MODIFICATION 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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