

## FCC Test Report (15.249)

**Report No.:** RF150529E01

**FCC ID:** JNZNR0010

**Test Model:** N-R0010

**Received Date:** May 29, 2015

**Test Date:** June 04 to 08, 2015

**Issued Date:** June 16, 2015

**Applicant:** LOGITECH FAR EAST LTD.

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

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

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

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



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### Release Control Record

Issue No.	Description	Date Issued
RF150529E01	Original release.	June 16, 2015

## 1 Certificate of Conformity

**Product:** Remote Controller

**Brand:** Logitech

**Test Model:** N-R0010

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** LOGITECH FAR EAST LTD.

**Test Date:** June 04 to 08, 2015

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.249)  
ANSI C63.10:2009

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

Prepared by :  , Date: June 16, 2015  
Elsie Hsu / Specialist

Approved by :  , Date: June 16, 2015  
May Chen / Manager

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.249)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -26.98dB at 0.31797MHz
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 -0.4dB at 2405.00MHz.

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expended Uncertainty (k=2) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.86 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1000MHz	5.37 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.65 dB
	6GHz ~ 18GHz	3.88 dB
	18GHz ~ 40GHz	4.11 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

Product	Remote Controller
Brand	Logitech
Test Model	N-R0010
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	5.1Vdc from power adapter or 3.7Vdc from battery
Modulation Type	GFSK
Transfer Rate	2 Mbit/sec
Operating Frequency	2405MHz ~ 2474MHz
Number of Channel	24
Antenna Type	Ceramic Chip Antenna with 3.68 dBi gain
Antenna Connector	NA
Accessory Device	Battery x 1, Cradle x 1 (Brand: Logitech / Model No.: NA), HUB x 1 (Brand: Logitech / Model No.: O-R0004), IR mini blaster x 2 (Brand: Logitech / Model No.: NA), Adapter x 1 (Brand: Logitech / Model No.: KSAS0050510100VUD)
Data Cable Supplied	USB cable x 1 (0.6m, shielded)

Note:

1. When USB port is connected to host unit, the EUT wireless and charging function will be disabled, the EUT is only for update software.
2. The device WiFi function will be disabled automatically when the device is under charging mode.
3. The EUT must be supplied with a rechargeable battery and adapter, please refer to the following table:

Rechargeable battery		
Brand	Model No.	Spec.
Logitech	M/N:623158 L/N:1504	3.7Vdc, 1320mAh
Adapter		
Brand	Model No.	Spec.
Logitech	KSAS0050510100VUD	Input :100-240Vac, 50/60MHz, 0.18A Output:5.1Vdc, 1.0A

4. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

### 3.2 Description of Test Modes

24 channels are provided to EUT:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2405	13	2441
2	2408	14	2444
3	2411	15	2447
4	2414	16	2450
5	2417	17	2453
6	2420	18	2456
7	2423	19	2459
8	2426	20	2462
9	2429	21	2465
10	2432	22	2468
11	2435	23	2471
12	2438	24	2474

### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	
-	√	√	√	-

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz & Bandedge Measurement

**RE<1G**: Radiated Emission below 1GHz

**PLC**: Power Line Conducted Emission

**NOTE:** 1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

#### Radiated Emission Test (Above 1GHz):

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 24	1, 14, 24	GFSK

#### Radiated Emission Test (Below 1GHz):

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1 to 24	1	GFSK

#### 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
Charging

#### Test Condition:

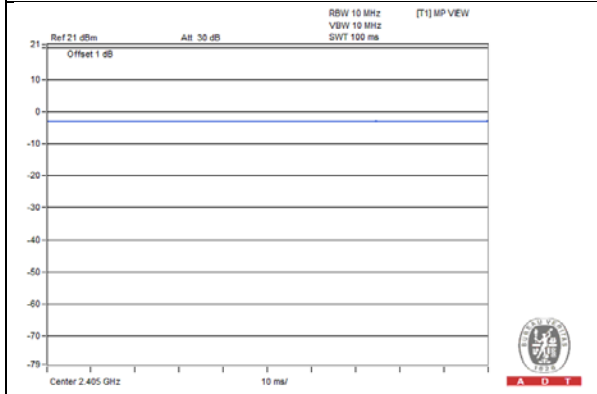
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	26deg. C, 68%RH	3.7Vdc	Robert Cheng
RE<1G	23deg. C, 69%RH	3.7Vdc	Weiwei Lo
PLC	25deg. C, 54%RH	120Vac, 60Hz	Jyunchun Lin



### 3.3 Duty Cycle of Test Signal

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

**GFSK**

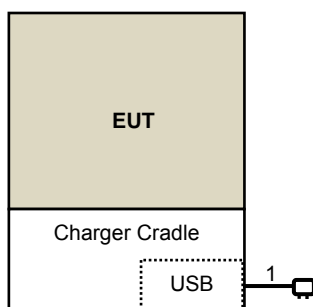


### 3.4 Description of Support Units

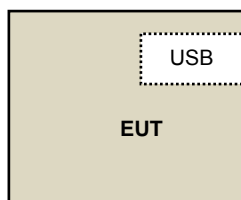
No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1	USB	1	0.6	Yes	0	Supplied by Client

#### 3.4.1 Configuration of System under Test

##### For conducted emission



##### For other tests



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

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

#### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

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	$2400/F(\text{kHz})$	300
0.490 ~ 1.705	$24000/F(\text{kHz})$	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

#### NOTE:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) =  $20 \log$  Emission level (uV/m).
- 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.

#### 4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210105	July 21, 2014	July 20, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-03	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 06, 2015	Feb. 05, 2016
RF Cable	8D-FB	CHGCAB-001-1 CHGCAB-001-2	Oct. 04, 2014	Oct. 03, 2015
	RF-141	CHGCAB-004	Oct. 04, 2014	Oct. 03, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Feb. 09, 2015	Feb. 08, 2016
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	131205 131216 131217 SNMY23684/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Feb. 05, 2015	Feb. 04, 2016
RF Cable	NA	329751/4 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

#### Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. G.
3. The FCC Site Registration No. is 966073.
4. The VCCI Site Registration No. is G-137.
5. The CANADA Site Registration No. is IC 7450H-2.
6. Tested Date: June 04 to 05, 2015

#### 4.1.3 Test Procedures

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

**Note:**

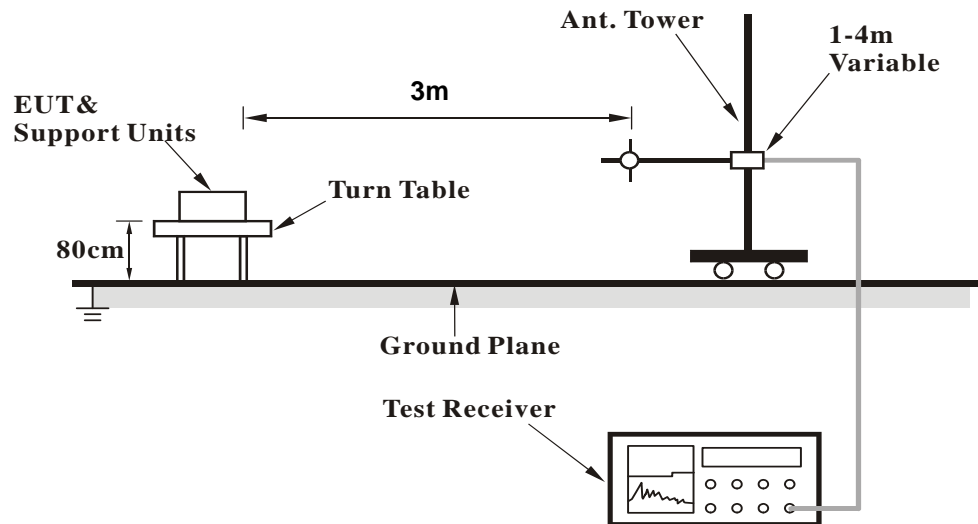
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle  $< 98\%$ ) or 10Hz (Duty cycle  $\geq 98\%$ ) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 Deviation from Test Standard

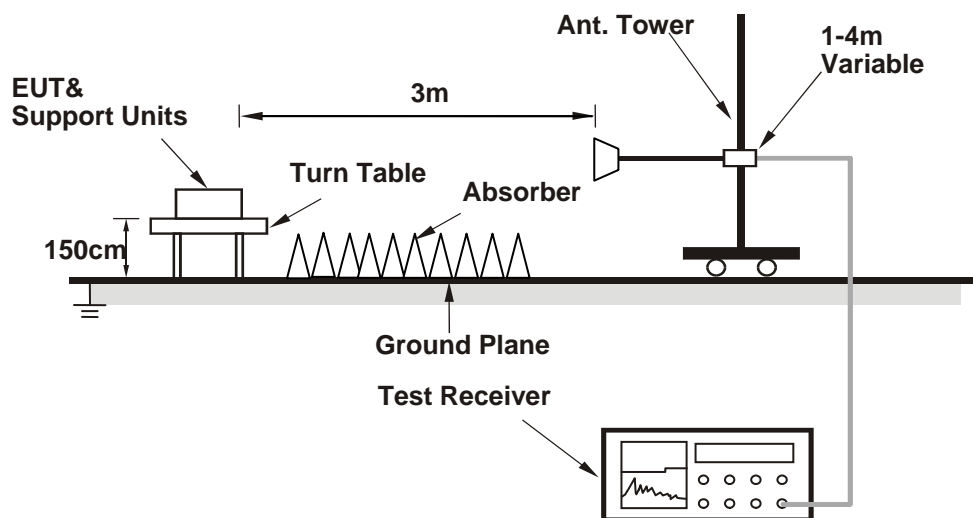
No deviation.

#### 4.1.5 Test Setup

##### <Frequency Range below 1GHz>



##### <Frequency Range above 1GHz>



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

#### 4.1.6 EUT Operating Conditions

1. Placed the EUT on testing table.
2. Controlling software (Radio Test Suite (eRTS). exe [C48.00\_B00.03]) has been activated to set the EUT under transmission/receiving condition continuously.



#### 4.1.7 Test Results

#### ABOVE 1GHz DATA

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	2400.00	53.5 PK	74.0	-20.5	1.83 H	360	53.64	-0.14
2	2400.00	43.4 AV	54.0	-10.6	1.83 H	360	43.54	-0.14
3	*2405.00	97.7 PK	114.0	-16.3	1.83 H	360	97.82	-0.12
4	*2405.00	93.6 AV	94.0	-0.4	1.83 H	360	93.72	-0.12
5	4810.00	55.1 PK	74.0	-18.9	1.49 H	194	46.38	8.72
6	4810.00	47.3 AV	54.0	-6.7	1.49 H	194	38.58	8.72
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	2400.00	49.4 PK	74.0	-24.6	1.00 V	210	49.54	-0.14
2	2400.00	38.4 AV	54.0	-15.6	1.00 V	210	38.54	-0.14
3	*2405.00	90.2 PK	114.0	-23.8	1.00 V	210	90.32	-0.12
4	*2405.00	85.6 AV	94.0	-8.4	1.00 V	210	85.72	-0.12
5	4810.00	50.2 PK	74.0	-23.8	1.53 V	92	41.48	8.72
6	4810.00	40.5 AV	54.0	-13.5	1.53 V	92	31.78	8.72

#### 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 14	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	*2444.00	96.0 PK	114.0	-18.0	1.79 H	352	96.00	0.00
2	*2444.00	92.5 AV	94.0	-1.5	1.79 H	352	92.50	0.00
3	4888.00	55.0 PK	74.0	-19.0	1.49 H	183	46.06	8.94
4	4888.00	47.4 AV	54.0	-6.6	1.49 H	183	38.46	8.94
5	7332.00	56.5 PK	74.0	-17.5	1.34 H	78	40.00	16.50
6	7332.00	44.6 AV	54.0	-9.4	1.34 H	78	28.10	16.50

#### 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	*2444.00	88.4 PK	114.0	-25.6	1.09 V	188	88.40	0.00
2	*2444.00	83.9 AV	94.0	-10.1	1.09 V	188	83.90	0.00
3	4888.00	50.6 PK	74.0	-23.4	1.51 V	108	41.66	8.94
4	4888.00	40.8 AV	54.0	-13.2	1.51 V	108	31.86	8.94
5	7332.00	55.5 PK	74.0	-18.5	1.05 V	197	39.00	16.50
6	7332.00	43.6 AV	54.0	-10.4	1.05 V	197	27.10	16.50

#### 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 24	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	*2474.00	95.8 PK	114.0	-18.2	1.78 H	352	95.72	0.08
2	*2474.00	92.1 AV	94.0	-1.9	1.78 H	352	92.02	0.08
3	2483.50	49.2 PK	74.0	-24.8	1.78 H	352	49.09	0.11
4	2483.50	37.1 AV	54.0	-16.9	1.78 H	352	36.99	0.11
5	4948.00	55.2 PK	74.0	-18.8	1.45 H	184	45.99	9.21
6	4948.00	47.5 AV	54.0	-6.5	1.45 H	184	38.29	9.21
7	7422.00	56.3 PK	74.0	-17.7	1.40 H	65	39.69	16.61
8	7422.00	44.6 AV	54.0	-9.4	1.40 H	65	27.99	16.61
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	*2474.00	88.6 PK	114.0	-25.4	1.06 V	200	88.52	0.08
2	*2474.00	84.1 AV	94.0	-9.9	1.06 V	200	84.02	0.08
3	2483.50	49.2 PK	74.0	-24.8	1.04 V	201	49.09	0.11
4	2483.50	38.2 AV	54.0	-15.8	1.04 V	201	38.09	0.11
5	4948.00	50.3 PK	74.0	-23.7	1.58 V	91	41.09	9.21
6	4948.00	40.3 AV	54.0	-13.7	1.58 V	91	31.09	9.21
7	7422.00	56.1 PK	74.0	-17.9	1.00 V	210	39.49	16.61
8	7422.00	44.0 AV	54.0	-10.0	1.00 V	210	27.39	16.61

#### 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.

# BELOW 1GHz WORST-CASE 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	152.66	13.6 QP	43.5	-29.9	1.50 H	214	26.49	-12.86
2	286.32	15.7 QP	46.0	-30.3	2.00 H	205	28.13	-12.46
3	498.36	29.6 QP	46.0	-16.4	1.50 H	15	36.45	-6.87
4	517.23	27.1 QP	46.0	-19.0	1.50 H	279	33.44	-6.39
5	940.30	37.7 QP	46.0	-8.3	1.00 H	5	36.25	1.47
6	956.54	29.9 QP	46.0	-16.1	1.00 H	360	28.28	1.64
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	43.34	14.7 QP	40.0	-25.4	1.00 V	360	27.88	-13.23
2	141.55	13.6 QP	43.5	-30.0	2.00 V	180	26.90	-13.35
3	494.63	29.2 QP	46.0	-16.8	2.00 V	250	36.09	-6.93
4	594.01	25.7 QP	46.0	-20.3	1.50 V	213	30.19	-4.51
5	940.25	40.2 QP	46.0	-5.8	1.50 V	237	38.75	1.47
6	956.64	30.9 QP	46.0	-15.1	1.50 V	328	29.30	1.64

## REMARKS:

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

## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### 4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	100375	May 06, 2015	May 05, 2016
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100071	Nov. 10, 2014	Nov. 09, 2015
RF Cable	5D-FB	COCCAB-001	Mar. 09, 2015	Mar. 08, 2016
50 ohms Terminator	N/A	EMC-03	Sep. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 2015
Software BVADT	BVADT_Cond_ V7.3.7.3	NA	NA	NA

**Note:**

1. The calibration interval of the above test instruments are 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: June 04, 2015

#### 4.2.3 Test Procedures

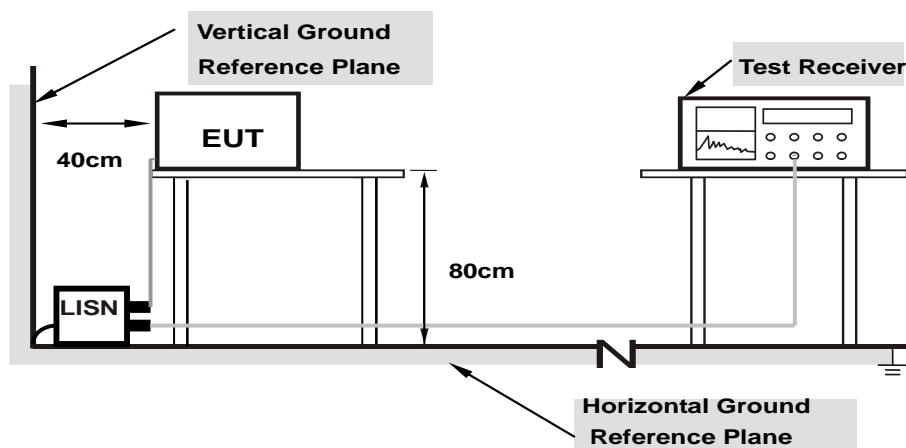
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

**NOTE:** The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

#### 4.2.4 Deviation from Test Standard

No deviation.

#### 4.2.5 Test Setup



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

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

#### 4.2.6 EUT Operating Condition

Observe the charged condition continuously.

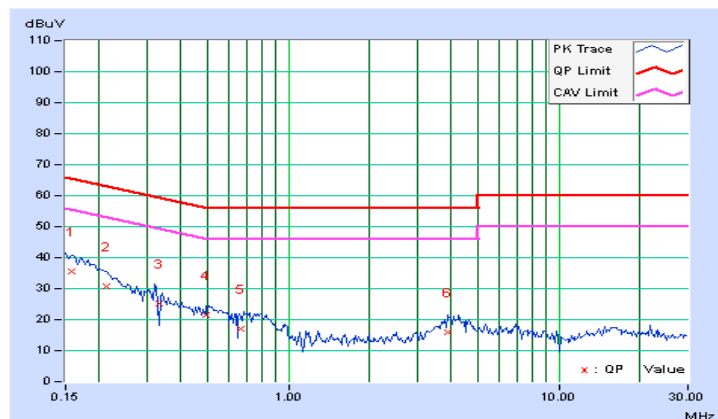
#### 4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.14	35.51	19.68	35.65	19.82	65.58	55.58	-29.93	-35.76
2	0.21250	0.15	30.59	13.55	30.74	13.70	63.11	53.11	-32.37	-39.41
3	0.33463	0.16	25.04	18.73	25.20	18.89	59.34	49.34	-34.13	-30.44
4	0.49766	0.17	21.16	5.31	21.33	5.48	56.04	46.04	-34.70	-40.55
5	0.67000	0.18	16.73	7.46	16.91	7.64	56.00	46.00	-39.09	-38.36
6	3.87891	0.37	15.67	9.50	16.04	9.87	56.00	46.00	-39.96	-36.13

#### REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

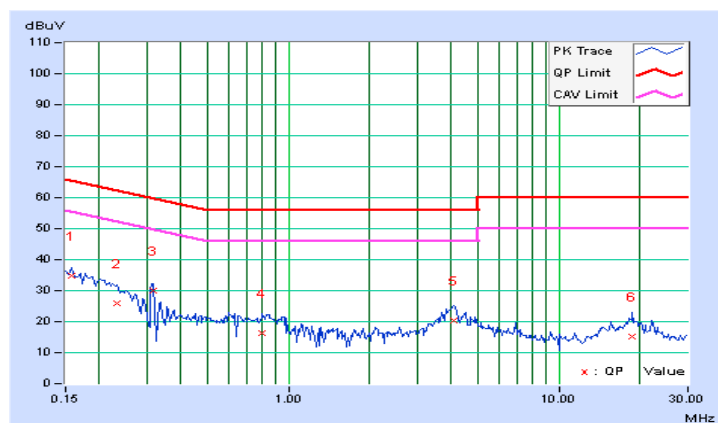


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.14	34.72	18.59	34.86	18.73	65.58	55.58	-30.72	-36.85
2	0.23203	0.16	25.80	12.93	25.96	13.09	62.38	52.38	-36.42	-39.29
<b>3</b>	<b>0.31797</b>	<b>0.17</b>	<b>29.69</b>	<b>22.61</b>	<b>29.86</b>	<b>22.78</b>	<b>59.76</b>	<b>49.76</b>	<b>-29.90</b>	<b>-26.98</b>
4	0.80234	0.22	16.22	9.67	16.44	9.89	56.00	46.00	-39.56	-36.11
5	4.09766	0.43	20.08	13.54	20.51	13.97	56.00	46.00	-35.49	-32.03
6	18.72266	1.17	13.94	5.89	15.11	7.06	60.00	50.00	-44.89	-42.94

#### 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





## 5 Pictures of Test Arrangements

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

## Appendix – Information on the Testing Laboratories

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

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

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

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