

## FCC Test Report (Z-Wave)

**Report No.:** RF160705E11A-1

**FCC ID:** N5C90172201

**Test Model:** IC722

**Received Date:** Sep. 14, 2016

**Test Date:** Sep. 29 to Oct. 11, 2016

**Issued Date:** Oct. 20, 2016

**Applicant:** StarVedia Technology Inc.

**Address:** 5F.-6, No.38, Taiyuan St., Zhubei City, Hsinchu County 302, Taiwan R.O.C

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

**Lab Address:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan R.O.C.

**Test Location (1):** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
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 is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

## Table of Contents

<b>Release Control Record</b> .....	<b>3</b>
<b>1 Certificate of Conformity</b> .....	<b>4</b>
<b>2 Summary of Test Results</b> .....	<b>5</b>
2.1 Measurement Uncertainty .....	5
2.2 Modification Record .....	5
<b>3 General Information</b> .....	<b>6</b>
3.1 General Description of EUT (Z-Wave) .....	6
3.2 Description of Test Modes .....	7
3.2.1 Test Mode Applicability and Tested Channel Detail .....	8
3.3 Description of Support Units .....	9
3.3.1 Configuration of System under Test .....	10
3.4 General Description of Applied Standards .....	12
<b>4 Test Types and Results</b> .....	<b>13</b>
4.1 Radiated Emission and Bandedge Measurement .....	13
4.1.1 Limits of Radiated Emission and Bandedge Measurement .....	13
4.1.2 Test Instruments .....	14
4.1.3 Test Procedures .....	15
4.1.4 Deviation from Test Standard .....	15
4.1.5 Test Setup .....	16
4.1.6 EUT Operating Conditions .....	17
4.1.7 Test Results .....	18
4.2 Conducted Emission Measurement .....	23
4.2.1 Limits of Conducted Emission Measurement .....	23
4.2.2 Test Instruments .....	23
4.2.3 Test Procedures .....	24
4.2.4 Deviation from Test Standard .....	24
4.2.5 Test Setup .....	24
4.2.6 EUT Operating Conditions .....	24
4.2.7 Test Results .....	25
<b>5 Pictures of Test Arrangements</b> .....	<b>27</b>
<b>Appendix – Information on the Testing Laboratories</b> .....	<b>28</b>

### Release Control Record

Issue No.	Description	Date Issued
RF160705E11A-1	Original release.	Oct. 20, 2016

## 1 Certificate of Conformity

**Product:** Full HD IP CAM

**Brand:** StarVedia

**Test Model:** IC722

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** StarVedia Technology Inc.

**Test Date:** Sep. 29 to Oct. 11, 2016

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.249)  
ANSI C63.10: 2013

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

**Prepared by :** Midoli Peng , **Date:** Oct. 20, 2016  
Midoli Peng / Specialist

**Approved by :** May Chen , **Date:** Oct. 20, 2016  
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 -4.00dB at 0.44297MHz.
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 -1.8dB at 400.03MHz.

### 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	Expanded Uncertainty (k=2) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.83 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.19 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.43 dB
	6GHz ~ 18GHz	3.49 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 (Z-Wave)

Product	Full HD IP CAM
Brand	StarVedia
Test Model	IC722
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 5V from adapter
Modulation Type	FSK
Transfer Rate	9.6/40/100Kbit/s
Operating Frequency	908.4 ~ 916MHz
Number of Channel	2
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. The EUT incorporate WLAN and Z-Wave wireless function in device.
2. Simultaneously transmission condition.

Condition	Technology	
	1	WLAN

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

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

Brand	Model No.	Spec.
MASS POWER	NBS12E050150UV	Input: 100-240V, 0.3A, 50/60Hz Output: 5V, 1.5A DC power cable (unshielded, 3.0m)

4. When LAN port is connected to Host unit, the EUT WiFi function will be disabled.

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

WLAN Antenna					
Brand	Model	Gain (dBi)	Antenna Type	Connector Type	Frequency range (MHz to MHz)
NA	NA	2.2	Dipole	NA	2400~2483.5

Z-Wave Antenna					
Brand	Model	Gain (dBi)	Antenna Type	Connector Type	Frequency range (MHz)
NA	NA	-20.41	Helical	NA	868~928

6. 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

2 channels are provided to this EUT:

Channel	Frequency	Channel	Frequency
1	908.4	2	916

### 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:** The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-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 2	1, 2	FSK

#### **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 2	1, 2	FSK

#### **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	1	FSK

#### **Test Condition:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	25deg. C, 62%RH	120Vac, 60Hz	Robert Cheng
RE<1G	25deg. C, 62%RH	120Vac, 60Hz	Robert Cheng
PLC	25deg. C, 75%RH	120Vac, 60Hz	Barry Lee



### 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.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
B	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab
C	microSD	Sandisk 16GB	NA	NA	NA	Provided by Lab

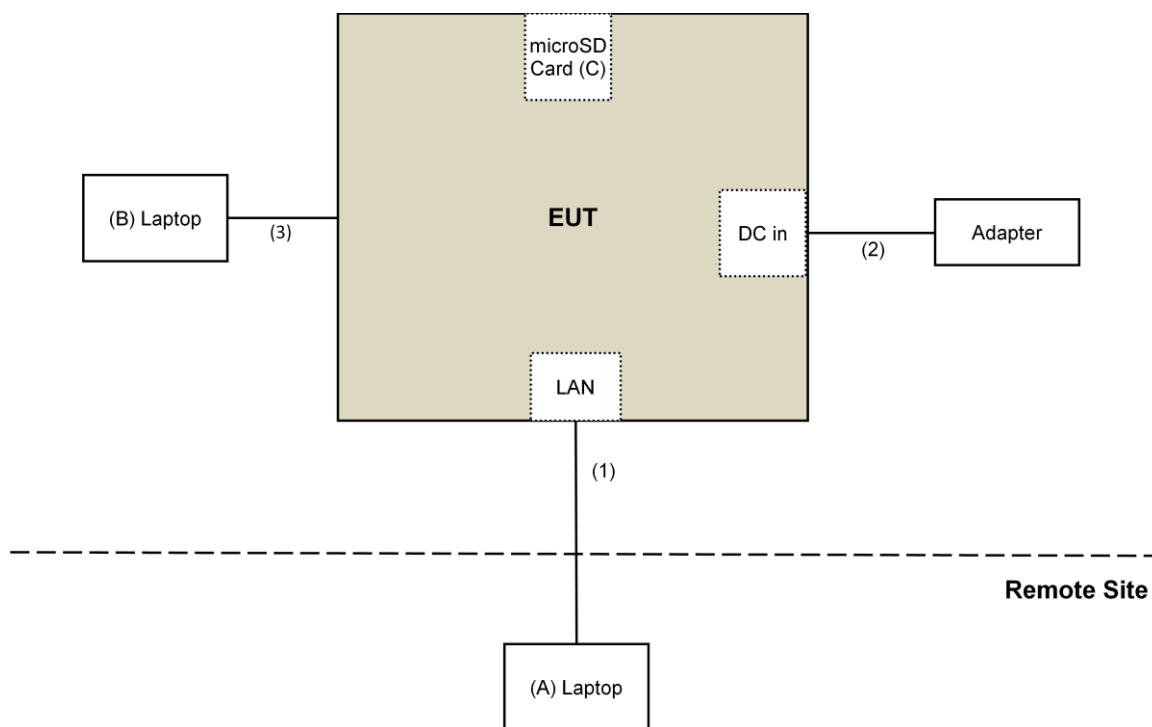
Note:

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

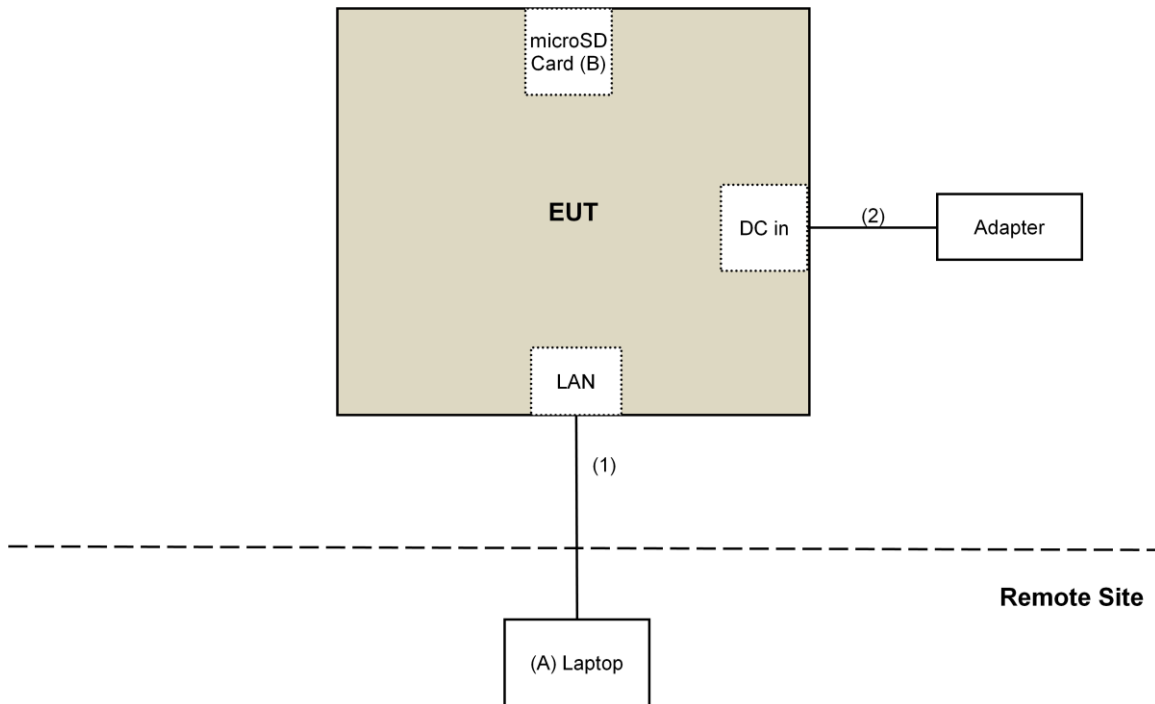
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	1.8	No	0	Provided by Lab
2.	DC Cable	1	3.0	No	0	Supplied by client
3.	Console Cable	1	0.6	No	0	Supplied by client (For RF setup)

### 3.3.1 Configuration of System under Test

#### For Radiated emission (above 1GHz)



**For Conducted emission & Radiated emission (below 1GHz)**



### 3.4 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 (15.249)**

ANSI C63.10-2013

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

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

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

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

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.

## 4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 20, 2016	July 19, 2017
Pre-Amplifier <sup>(*)</sup> EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna <sup>(*)</sup> Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-01	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 02, 2016	Apr. 01, 2017
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Jan. 19, 2016	Jan. 18, 2017
Pre-Amplifier Agilent	8449B	3008A01922	Sep. 18, 2016	Sep. 17, 2017
RF Cable	EMC104-SM- SM-2000 EMC104-SM- SM-5000 EMC104-SM- SM-5000	150318 150323 150324	Mar. 30, 2016	Mar. 29, 2017
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2016	Jan. 14, 2017
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Jan. 08, 2016	Jan. 07, 2017
RF Cable	SUCOFLEX 102	36432/2 36441/2	Jan. 16, 2016	Jan. 15, 2017
Software	ADT_Radiated _V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. \*The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Loop antenna was used for all emissions below 30 MHz.
4. The test was performed in 966 Chamber No. 4.
5. The FCC Site Registration No. is 292998
6. The CANADA Site Registration No. is 20331-2
7. Tested Date: Oct. 07 to 11, 2016

#### 4.1.3 Test Procedures

##### **For Radiated emission below 30MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter 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. Both X and Y axes of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case 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.

##### **NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

##### **For Radiated emission above 30MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

##### **Note:**

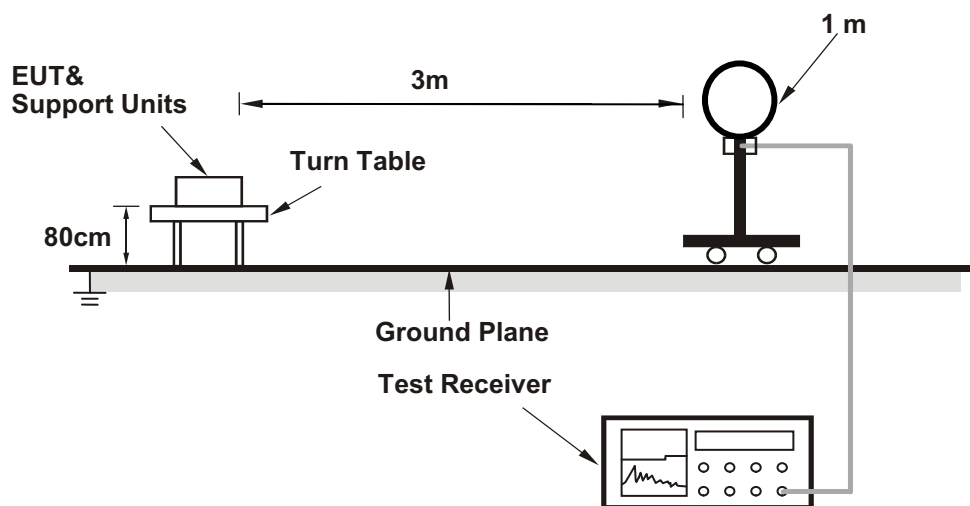
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz 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

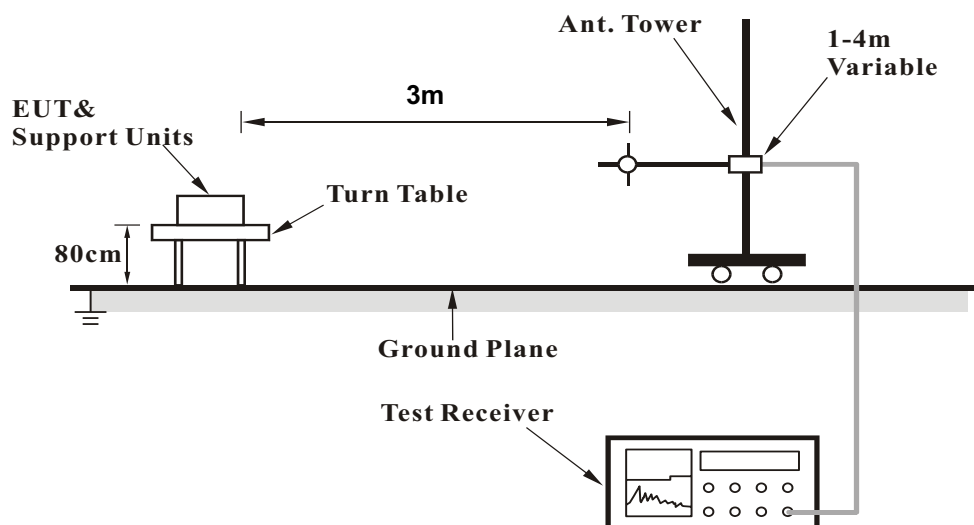
No deviation.

#### 4.1.5 Test Setup

##### For Radiated emission below 30MHz

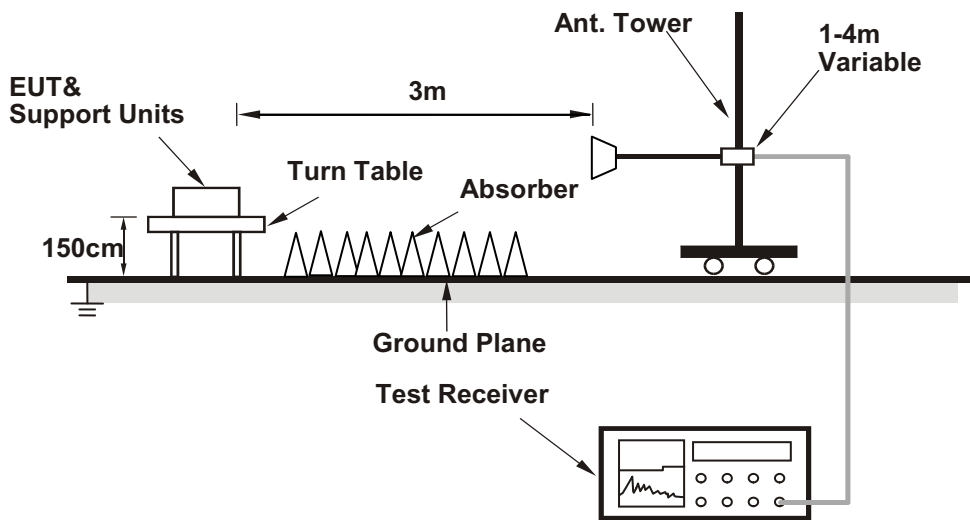


##### For Radiated emission 30MHz to 1GHz





### For Radiated emission above 1GHz



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

#### 4.1.6 EUT Operating Conditions

1. Connect the EUT with the support unit A (Laptop) which is placed on remote site.
2. Controlling software (telnet[key "resetP" command]) has been activated to set the EUT on specific status.

## 4.1.7 Test Results

## Above 1GHz Data :

<b>CHANNEL</b>	TX Channel 1	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	45.5 PK	74.0	-28.5	1.40 H	348	53.2	-7.7
2	1816.80	31.7 AV	54.0	-22.3	1.40 H	348	39.4	-7.7
3	2725.20	45.3 PK	74.0	-28.7	1.38 H	337	49.8	-4.5
4	2725.20	31.6 AV	54.0	-22.4	1.38 H	337	36.1	-4.5
5	3633.60	47.2 PK	74.0	-26.8	1.40 H	67	50.1	-2.9
6	3633.60	34.2 AV	54.0	-19.8	1.40 H	67	37.1	-2.9
7	4542.00	50.0 PK	74.0	-24.0	1.51 H	105	50.1	-0.1
8	4542.00	38.7 AV	54.0	-15.3	1.51 H	105	38.8	-0.1
9	5450.40	55.8 PK	74.0	-18.2	1.91 H	174	53.7	2.1
10	5450.40	45.3 AV	54.0	-8.7	1.91 H	174	43.2	2.1
11	6358.80	57.7 PK	74.0	-16.3	2.27 H	270	53.5	4.2
12	6358.80	46.6 AV	54.0	-7.4	2.27 H	270	42.4	4.2
13	7267.20	55.4 PK	74.0	-18.6	1.95 H	186	47.9	7.5
14	7267.20	45.1 AV	54.0	-8.9	1.95 H	186	37.6	7.5
15	8175.60	57.4 PK	74.0	-16.6	2.25 H	273	48.8	8.6
16	8175.60	46.6 AV	54.0	-7.4	2.25 H	273	38.0	8.6
17	9084.00	59.6 PK	74.0	-14.4	1.74 H	107	50.7	8.9
18	9084.00	47.3 AV	54.0	-6.7	1.74 H	107	38.4	8.9

**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	45.8 PK	74.0	-28.2	1.51 V	247	53.5	-7.7
2	1816.80	32.6 AV	54.0	-21.4	1.51 V	247	40.3	-7.7
3	2725.20	45.4 PK	74.0	-28.6	1.57 V	240	49.9	-4.5
4	2725.20	32.1 AV	54.0	-21.9	1.57 V	240	36.6	-4.5
5	3633.60	45.8 PK	74.0	-28.2	1.28 V	360	48.7	-2.9
6	3633.60	33.2 AV	54.0	-20.8	1.28 V	360	36.1	-2.9
7	4542.00	53.1 PK	74.0	-20.9	1.56 V	360	53.2	-0.1
8	4542.00	40.0 AV	54.0	-14.0	1.56 V	360	40.1	-0.1
9	5450.40	55.7 PK	74.0	-18.3	1.27 V	213	53.6	2.1
10	5450.40	43.7 AV	54.0	-10.3	1.27 V	213	41.6	2.1
11	6358.80	59.0 PK	74.0	-15.0	1.91 V	118	54.8	4.2
12	6358.80	45.7 AV	54.0	-8.3	1.91 V	118	41.5	4.2
13	7267.20	55.7 PK	74.0	-18.3	1.21 V	214	48.2	7.5
14	7267.20	44.0 AV	54.0	-10.0	1.21 V	214	36.5	7.5
15	8175.60	58.8 PK	74.0	-15.2	1.90 V	114	50.2	8.6
16	8175.60	45.6 AV	54.0	-8.4	1.90 V	114	37.0	8.6
17	9084.00	58.1 PK	74.0	-15.9	1.64 V	350	49.2	8.9
18	9084.00	46.3 AV	54.0	-7.7	1.64 V	350	37.4	8.9

**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

<b>CHANNEL</b>	TX Channel 2	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	45.6 PK	74.0	-28.4	1.44 H	337	53.3	-7.7
2	1832.00	32.1 AV	54.0	-21.9	1.44 H	337	39.8	-7.7
3	2748.00	45.7 PK	74.0	-28.3	1.42 H	324	50.3	-4.6
4	2748.00	31.8 AV	54.0	-22.2	1.42 H	324	36.4	-4.6
5	3664.00	46.4 PK	74.0	-27.6	1.37 H	65	49.1	-2.7
6	3664.00	33.6 AV	54.0	-20.4	1.37 H	65	36.3	-2.7
7	4580.00	50.1 PK	74.0	-23.9	1.60 H	0	50.1	0.0
8	4580.00	38.9 AV	54.0	-15.1	1.60 H	0	38.9	0.0
9	5496.00	54.9 PK	74.0	-19.1	1.99 H	186	52.8	2.1
10	5496.00	44.8 AV	54.0	-9.2	1.99 H	186	42.7	2.1
11	6412.00	57.5 PK	74.0	-16.5	2.24 H	281	53.1	4.4
12	6412.00	46.4 AV	54.0	-7.6	2.24 H	281	42.0	4.4
13	7328.00	55.9 PK	74.0	-18.1	1.94 H	194	48.4	7.5
14	7328.00	45.7 AV	54.0	-8.3	1.94 H	194	38.2	7.5
15	8244.00	57.6 PK	74.0	-16.4	2.16 H	274	49.0	8.6
16	8244.00	46.7 AV	54.0	-7.3	2.16 H	274	38.1	8.6
17	9160.00	58.6 PK	74.0	-15.4	1.77 H	100	49.7	8.9
18	9160.00	46.3 AV	54.0	-7.7	1.77 H	100	37.4	8.9

**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	45.3 PK	74.0	-28.7	1.54 V	241	53.0	-7.7
2	1832.00	32.2 AV	54.0	-21.8	1.54 V	241	39.9	-7.7
3	2748.00	45.7 PK	74.0	-28.3	1.56 V	236	50.3	-4.6
4	2748.00	32.2 AV	54.0	-21.8	1.56 V	236	36.8	-4.6
5	3664.00	46.5 PK	74.0	-27.5	1.37 V	348	49.2	-2.7
6	3664.00	33.6 AV	54.0	-20.4	1.37 V	348	36.3	-2.7
7	4580.00	52.7 PK	74.0	-21.3	1.55 V	360	52.7	0.0
8	4580.00	39.9 AV	54.0	-14.1	1.55 V	360	39.9	0.0
9	5496.00	56.0 PK	74.0	-18.0	1.17 V	227	53.9	2.1
10	5496.00	44.5 AV	54.0	-9.5	1.17 V	227	42.4	2.1
11	6412.00	58.6 PK	74.0	-15.4	1.84 V	112	54.2	4.4
12	6412.00	45.5 AV	54.0	-8.5	1.84 V	112	41.1	4.4
13	7328.00	56.2 PK	74.0	-17.8	1.14 V	198	48.7	7.5
14	7328.00	44.7 AV	54.0	-9.3	1.14 V	198	37.2	7.5
15	8244.00	57.9 PK	74.0	-16.1	1.82 V	113	49.3	8.6
16	8244.00	45.1 AV	54.0	-8.9	1.82 V	113	36.5	8.6
17	9160.00	58.5 PK	74.0	-15.5	1.60 V	360	49.6	8.9
18	9160.00	46.2 AV	54.0	-7.8	1.60 V	360	37.3	8.9

**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

**Below 1GHz Data:**

<b>CHANNEL</b>	TX Channel 1	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9kHz ~ 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	37.62	29.4 QP	40.0	-10.6	1.50 H	224	38.7	-9.3
2	172.11	35.4 QP	43.5	-8.1	1.50 H	143	44.7	-9.3
3	245.00	38.3 QP	46.0	-7.7	1.00 H	224	48.4	-10.1
4	323.45	36.4 QP	46.0	-9.6	1.24 H	281	43.6	-7.2
<b>5</b>	<b>400.03</b>	<b>44.2 QP</b>	<b>46.0</b>	<b>-1.8</b>	<b>1.00 H</b>	<b>193</b>	<b>49.6</b>	<b>-5.4</b>
6	610.11	37.2 QP	46.0	-8.8	1.00 H	143	37.4	-0.2
7	*908.40	72.7 QP	94.0	-21.3	1.53 H	123	68.7	4.0

**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	37.55	33.6 QP	40.0	-6.4	1.50 V	143	42.9	-9.3
2	73.33	36.5 QP	40.0	-3.5	1.00 V	302	48.2	-11.7
3	323.11	37.4 QP	46.0	-8.6	1.00 V	248	44.6	-7.2
4	400.01	40.6 QP	46.0	-5.4	1.00 V	229	46.0	-5.4
5	609.80	41.0 QP	46.0	-5.0	1.50 V	287	41.2	-0.2
6	*908.40	78.2 QP	94.0	-15.8	1.08 V	291	74.2	4.0
7	960.11	45.2 QP	54.0	-8.8	1.00 V	226	40.6	4.6

**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.

<b>CHANNEL</b>	TX Channel 2	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9kHz ~ 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	37.88	30.1 QP	40.0	-9.9	1.24 H	64	39.3	-9.2
2	170.21	36.1 QP	43.5	-7.4	1.42 H	214	45.2	-9.1
3	246.55	39.7 QP	46.0	-6.3	1.42 H	302	49.7	-10.0
4	331.14	36.7 QP	46.0	-9.3	1.65 H	142	43.8	-7.1
5	400.11	44.0 QP	46.0	-2.0	1.54 H	301	49.4	-5.4
6	611.02	38.1 QP	46.0	-7.9	1.65 H	153	38.3	-0.2
7	*916.00	72.5 QP	94.0	-21.5	1.42 H	301	68.3	4.2

**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	38.01	33.1 QP	40.0	-6.9	1.35 V	200	42.3	-9.2
2	74.02	36.1 QP	40.0	-3.9	1.24 V	245	47.8	-11.7
3	331.22	36.5 QP	46.0	-9.5	1.14 V	201	43.6	-7.1
4	400.11	40.2 QP	46.0	-5.8	1.23 V	301	45.6	-5.4
5	610.11	40.6 QP	46.0	-5.4	1.32 V	301	40.8	-0.2
6	*916.00	77.9 QP	94.0	-16.1	1.34 V	302	73.7	4.2
7	960.13	45.0 QP	54.0	-9.0	1.65 V	302	40.4	4.6

**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.

## 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 09, 2016	May 08, 2017
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Aug. 31, 2016	Aug. 30, 2017
Line-Impedance Stabilization Network (for Peripheral ) R&S	ENV216	100072	June 13, 2016	June 12, 2017
RF Cable	5D-FB	COACAB-002	Mar. 04, 2016	Mar. 03, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-003	Sep. 13, 2016	Sep. 12, 2017
50 ohms Terminator	N/A	04	Nov. 18, 2015	Nov. 17, 2016
50 ohms Terminator	50	3	Oct. 21, 2015	Oct. 20, 2016
Software BVADT	BVADT_Cond_ V7.3.7.4	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: Sep. 29, 2016

#### 4.2.3 Test Procedures

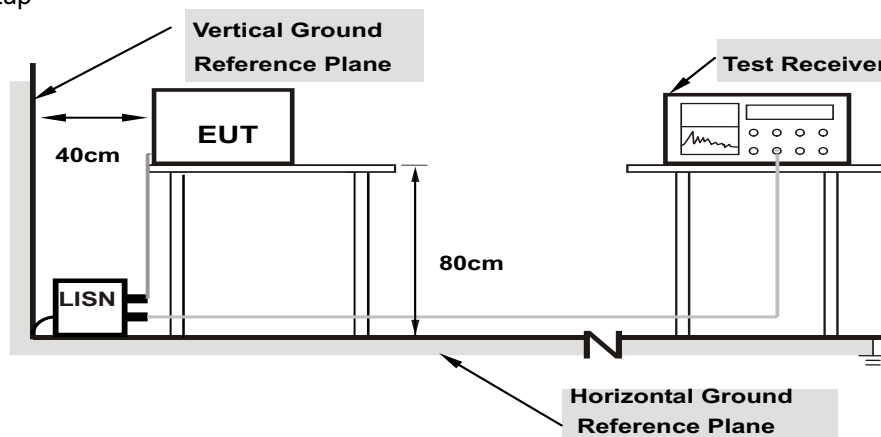
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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 Conditions

Same as 4.1.6.



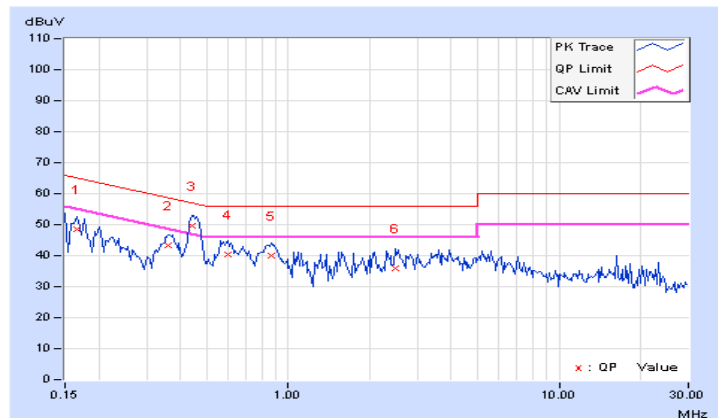
#### 4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	10.13	38.56	25.58	48.69	35.71	65.18	55.18	-16.49	-19.47
2	0.36094	10.11	33.34	25.61	43.45	35.72	58.71	48.71	-15.26	-12.99
<b>3</b>	<b>0.44297</b>	<b>10.11</b>	<b>39.65</b>	<b>32.90</b>	<b>49.76</b>	<b>43.01</b>	<b>57.01</b>	<b>47.01</b>	<b>-7.25</b>	<b>-4.00</b>
4	0.59922	10.11	30.28	23.49	40.39	33.60	56.00	46.00	-15.61	-12.40
5	0.86875	10.12	29.70	23.64	39.82	33.76	56.00	46.00	-16.18	-12.24
6	2.47656	10.26	25.63	18.62	35.89	28.88	56.00	46.00	-20.11	-17.12

#### 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

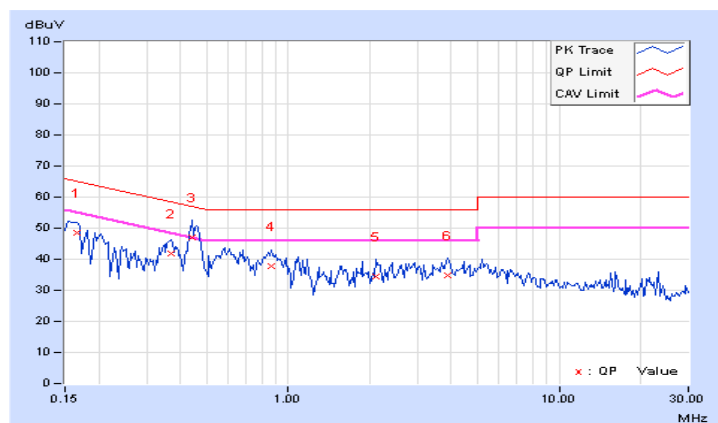


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	10.15	38.34	23.75	48.49	33.90	65.18	55.18	-16.69	-21.28
2	0.36875	10.09	31.91	24.34	42.00	34.43	58.53	48.53	-16.53	-14.10
3	0.44297	10.10	36.92	30.07	47.02	40.17	57.01	47.01	-9.99	-6.84
4	0.86484	10.18	27.57	21.48	37.75	31.66	56.00	46.00	-18.25	-14.34
5	2.11328	10.17	24.15	18.20	34.32	28.37	56.00	46.00	-21.68	-17.63
6	3.86328	10.31	24.52	17.85	34.83	28.16	56.00	46.00	-21.17	-17.84

**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:

**Linko EMC/RF Lab**

Tel: 886-2-26052180

Fax: 886-2-26051924

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

Tel: 886-3-6668565

Fax: 886-3-6668323

**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.

--- END ---