

Partial FCC Test Report

(Spot Check)

Report No.: RF200428C03E-4

FCC ID: PZWBHTM80QW

Test Model: BHT-M80-QW

Received Date: Aug. 25, 2020

Test Date: Sep. 05 ~ Oct. 24, 2020

Issued Date: Oct. 27, 2020

Applicant: DENSO WAVE INCORPORATED

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

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FCC Registration / Designation Number: 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RF200428C03E-4	Original release	Oct. 27, 2020

1 Certificate of Conformity

Product: 2D Code Handy Terminal

Brand: DENSO

Test Model: BHT-M80-QW

Sample Status: Engineering sample

Applicant: DENSO WAVE INCORPORATED

Test Date: Sep. 05 ~ Oct. 24, 2020

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.225)

47 CFR FCC Part 15, Subpart C (Section 15.215)

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 RF characteristics under the conditions specified in this report.

Prepared by : Polly Chien, **Date:** Oct. 27, 2020

Polly Chien / Specialist

Approved by : Bruce Chen, **Date:** Oct. 27, 2020

Bruce Chen / Senior Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.225, 15.215)			
FCC Clause	Test Item	Result	Remarks
15.207	Conducted emission test	Pass	Meet the requirement of limit. Minimum passing margin is -4.19dB at 13.56130MHz.
15.225 (a)	The field strength of any emissions within the band 13.553-13.567 MHz	N/A	Refer to note 1
15.225 (b)	The field strength of any emissions within the bands 13.410-13.553 MHz and 13.567-13.710 MHz	N/A	Refer to note 1
15.225 (c)	The field strength of any emissions within the bands 13.110-13.410 MHz and 13.710-14.010 MHz	N/A	Refer to note 1
15.225 (d)	The field strength of any emissions appearing outside of the 13.110-14.010 MHz band	Pass	Meet the requirement of limit. Minimum passing margin is -2.6dB at 932.19MHz.
15.225 (e)	The frequency tolerance	N/A	Refer to note 1
15.215 (c)	20dB Bandwidth	N/A	Refer to note 1

Note:

1. This report is a partial report. Therefore, only, Conducted Emission and Radiated Emissions were verified and recorded in this report. Other testing data please refer to the original BV CPS report no.: RF200428C03-8.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.79 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	2D Code Handy Terminal
Brand	DENSO
Test Model	BHT-M80-QW
Sample Status	Engineering sample
Power Supply Rating	3.85Vdc (Battery) 5.0Vdc / 9.0Vdc / 12.0Vdc (from adapter)
Modulation Type	ASK
Operating Frequency	13.56MHz
Data Rate	Type A: 106 kbit/s Type B: 106 kbit/s Type F: 424 kbit/s
Antenna Type	Loop antenna
Antenna Connector	NA
Accessory Device	Refer to note
Cable Supplied	Refer to note

Note:

1. This report is a supplementary report to the original BV CPS report no.: RF200428C03-8. Exhibit prepared for FCC Spot Check Verification report, the format, test items and amount of spot-check test data are decided by applicant's engineering judgment, for more details please refer to declaration letter exhibit. Therefore, only Conducted Emission and Radiated Emissions were verified and recorded in this report. AC Power Conducted Emission and Radiated Emission tests according to original report radiated emission worst channel.
2. The EUT contains following accessory devices.

Battery 1	
Brand	DENSO
Model	BT1
Rating	3.85Vdc, 4020mAh, 15.47Wh

Battery 2	
Brand	DENSO
Model	BT1S
Rating	3.85Vdc, 2900mAh, 11.16Wh

Adapter	
Brand	CHANNEL WELL TECHNOLOGY
Model	2ACP0183C
Input Power	100-240Vac~0.5A , 50/60Hz
Output Power	5.0Vdc / 3.0A, 15.0W 9.0Vdc / 2.0A, 18.0W 12.0Vdc / 1.5A, 18.0W
Data Cable	1.45 m shielded USB cable without core

Cradle 1: QC3.0 charge single Cradle (Option)

Brand	DENSO
Model	CU-M80UQ
Adapter	
Brand	CHANNEL WELL TECHNOLOGY
Model	2ACP0183C
Input Power	100-240Vac, 50/60Hz, 0.5A
Output Power	5.0Vdc / 3.0A, 15.0W 9.0Vdc / 2.0A, 18.0W 12.0Vdc / 1.5A, 18.0W
Data Cable	1.45 m shielded USB cable without core

Cradle 2: USB Cradle with spare battery charge (Option)

Brand	DENSO
Model	CU-M80U
Adapter	
Brand	Sunny
Model	SYS1548-5012-T3
Input Power	100-240Vac, 1.5A MAX, 50-60Hz
Output Power	+12.0Vdc, 4.16A
Power cable	DC: 1.16m cable with one core AC: 1.71m non-shielded cable without core
Data Cable	1.45 m shielded USB cable without core

3. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3.2 Description of Test Modes

1 channel is provided to this EUT

Channel	Freq. (MHz)
1	13.56

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to		Description
	RE	PLC	
A	√	√	NFC: Tag Type F + Adapter
B	√	√	NFC: Tag Type F + Cradle 1
C	√	√	NFC: Tag Type F + Cradle 2

Where RE: Radiated Emission

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 Y-plane for mode A.
2. The EUT had been pre-tested on Type A, Type B, Type F. The worst case was found when data rate was Type F, Type F was chosen for final test.

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.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
A, B, C	1	1	ASK

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.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
A, B, C	1	1	ASK

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE	22 deg. C, 66% RH 25 deg. C, 70% RH	120Vac, 60Hz	Greg Lin, Noah Chang
PLC	25 deg. C, 75% RH 26 deg. C, 69% RH	120Vac, 60Hz	Greg Lin, Willy Cheng

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.

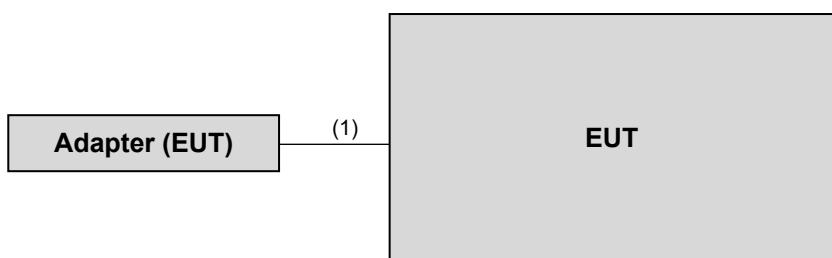
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Cradle 1	DENSO	CU-M80UQ	NA	NA	Provided by manufacturer
B.	Adapter	CHANNEL WELL TECHNOLOGY	2ACP0183C	NA	NA	Provided by manufacturer
C.	Cradle 2	DENSO	CU-M80U	NA	NA	Provided by manufacturer
D.	Adapter	Sunny	SYS1548-5012-T3	NA	NA	Provided by manufacturer

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB cable	1	1.45	Y	0	Accessory of EUT
2.	USB cable	1	1.45	Y	0	Provided by manufacturer
3.	USB cable	1	1.45	Y	0	Provided by manufacturer
4.	Power cable	1	1.16	-	1	Provided by manufacturer

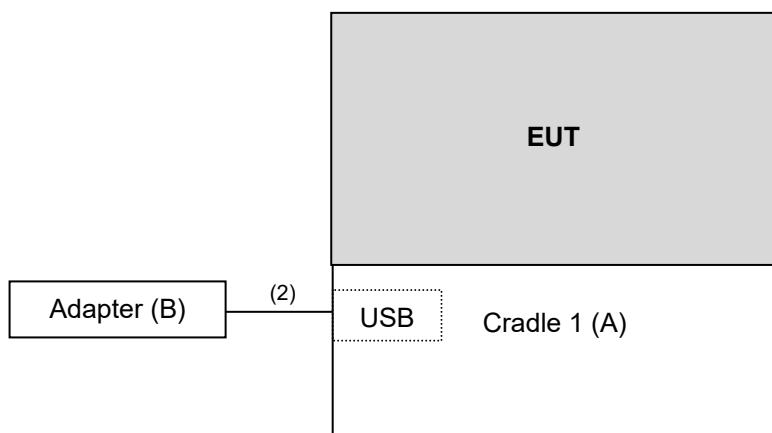
Note: The core(s) is(are) originally attached to the cable(s).

3.3.1 Configuration of System under Test

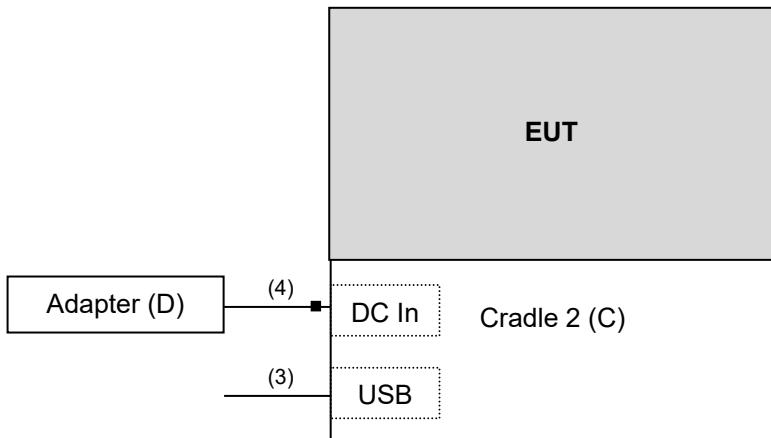
Mode A



Mode B



Mode C



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 (15.225)

FCC Part 15, Subpart C (15.215)

ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission Measurement

4.1.1 Limits of Radiated Emission Measurement

The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

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.	Cal. Date	Cal. Due
Spectrum Analyzer ROHDE & SCHWARZ	ESR3	102579	Jul. 07, 2020	Jul. 06, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jun. 09, 2020	Jun. 08, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Nov. 11, 2019	Nov. 10, 2020
Loop Antenna TESEQ	HLA 6121	45745	Jul. 06, 2020	Jul. 05, 2021
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 16, 2020	Aug. 15, 2021
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH3-01	Aug. 16, 2020	Aug. 15, 2021
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	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 HwaYa Chamber 3.

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. Parallel, perpendicular, and ground-parallel orientations 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:

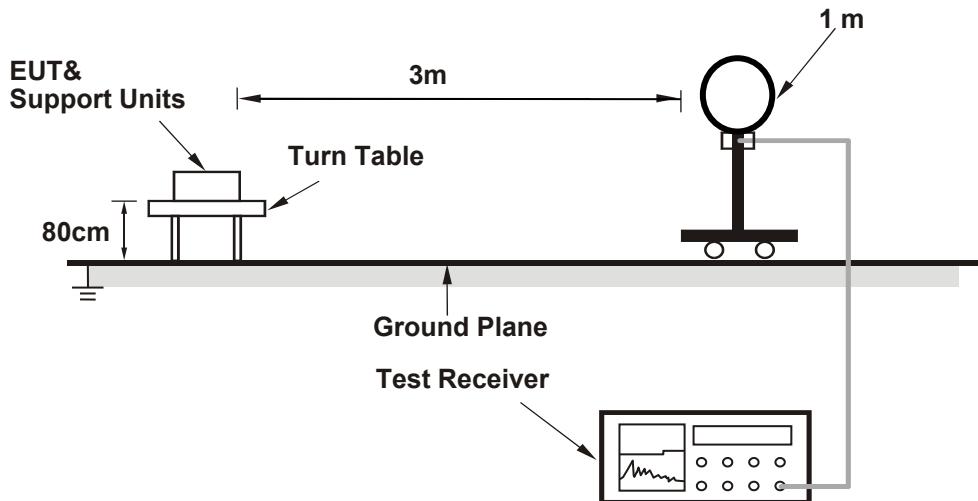
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

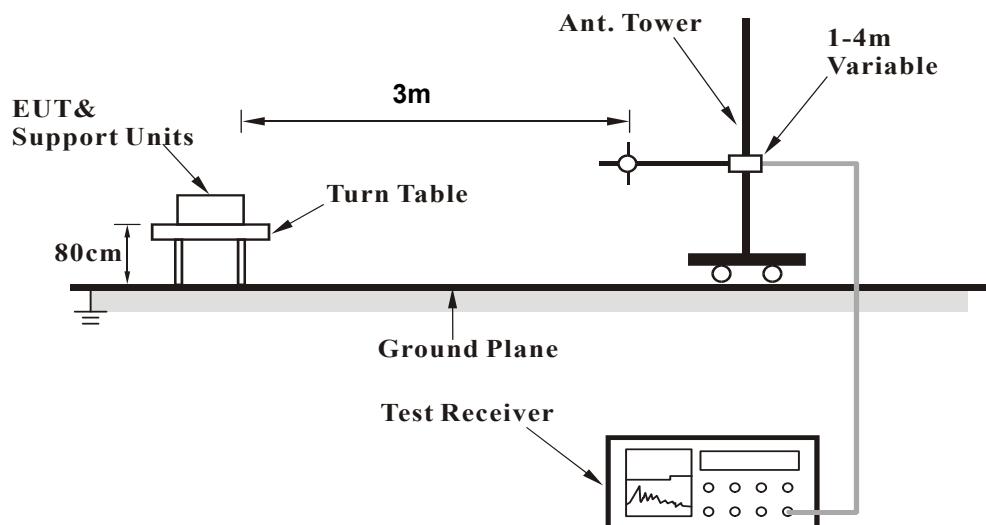
No deviation.

4.1.5 Test Set Up

For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



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

4.1.6 EUT Operating Conditions

- Placed the EUT on the testing table.
- The EUT under transmission condition continuously at specific channel frequency.

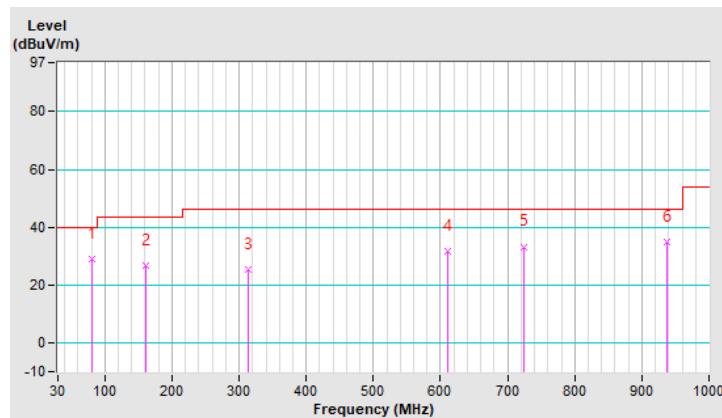
4.1.7 Test Results

EUT Test Condition		Measurement Detail		
Channel		Frequency Range		Below 1000MHz
Input Power		Detector Function		Quasi-Peak
Environmental Conditions		Tested By		Greg Lin
Test Mode		A		

Antenna Polarity & Test Distance: Horizontal At 3m								
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	81.41	29.0 QP	40.0	-11.0	1.00 H	200	42.8	-13.8
2	161.92	26.8 QP	43.5	-16.7	1.50 H	121	35.3	-8.5
3	314.21	25.2 QP	46.0	-20.8	1.00 H	274	31.8	-6.6
4	611.03	31.5 QP	46.0	-14.5	1.25 H	279	32.0	-0.5
5	723.55	33.3 QP	46.0	-12.7	1.00 H	7	32.2	1.1
6	936.95	35.0 QP	46.0	-11.0	1.25 H	179	29.6	5.4

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

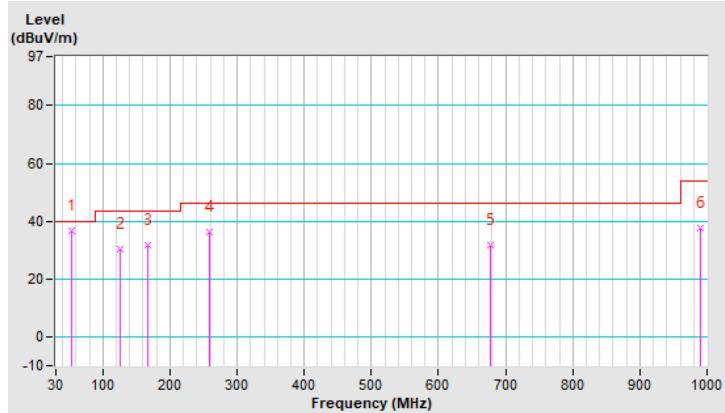


EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 1000MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	23 deg. C, 67% RH	Tested By	Greg Lin
Test Mode	A		

Antenna Polarity & Test Distance: Vertical At 3m								
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	53.28	36.8 QP	40.0	-3.2	1.25 V	90	46.0	-9.2
2	125.06	30.5 QP	43.5	-13.0	1.00 V	128	41.1	-10.6
3	166.77	31.7 QP	43.5	-11.8	1.00 V	106	40.5	-8.8
4	258.92	36.3 QP	46.0	-9.7	1.25 V	128	44.8	-8.5
5	677.96	31.5 QP	46.0	-14.5	1.00 V	229	31.1	0.4
6	990.30	37.4 QP	54.0	-16.6	1.25 V	7	31.6	5.8

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

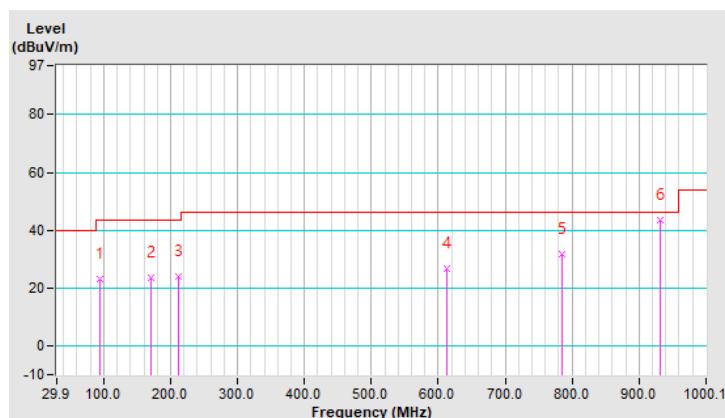


EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 1000MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	25 deg. C, 70% RH	Tested By	Noah Chang
Test Mode	B		

Antenna Polarity & Test Distance: Horizontal At 3m								
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	93.93	23.2 QP	43.5	-20.3	1.00 H	324	37.3	-14.1
2	171.55	23.6 QP	43.5	-19.9	2.00 H	309	32.9	-9.3
3	212.30	24.2 QP	43.5	-19.3	1.50 H	93	35.7	-11.5
4	612.02	26.6 QP	46.0	-19.4	2.00 H	6	27.2	-0.6
5	784.72	31.6 QP	46.0	-14.4	1.00 H	21	27.7	3.9
6	932.19	43.4 QP	46.0	-2.6	1.00 H	160	36.4	7.0

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

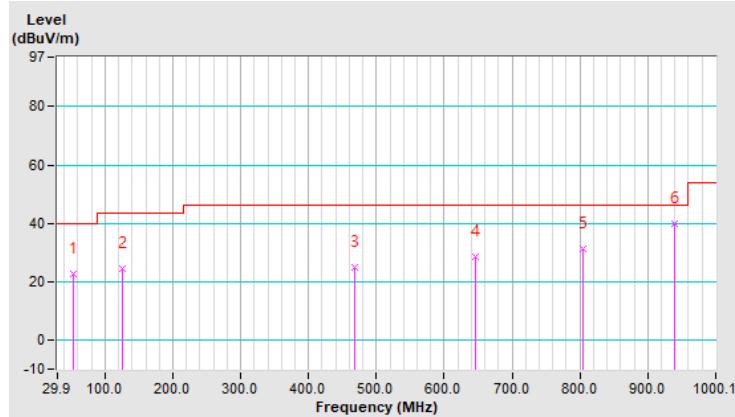


EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 1000MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	25 deg. C, 70% RH	Tested By	Noah Chang
Test Mode	B		

Antenna Polarity & Test Distance: Vertical At 3m								
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	53.18	22.6 QP	40.0	-17.4	1.00 V	89	31.4	-8.8
2	124.98	24.3 QP	43.5	-19.2	1.00 V	10	34.8	-10.5
3	468.43	24.9 QP	46.0	-21.1	1.49 V	319	29.2	-4.3
4	646.95	28.6 QP	46.0	-17.4	1.49 V	15	28.7	-0.1
5	804.12	31.1 QP	46.0	-14.9	1.00 V	258	26.9	4.2
6	939.95	39.9 QP	46.0	-6.1	1.00 V	42	32.7	7.2

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

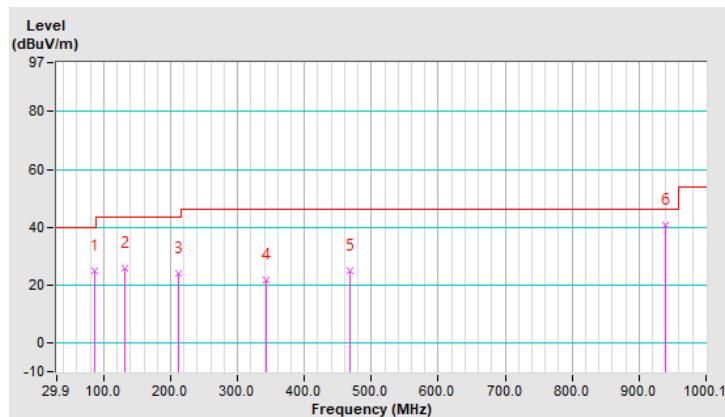


EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 1000MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	25 deg. C, 70% RH	Tested By	Noah Chang
Test Mode	C		

Antenna Polarity & Test Distance: Horizontal At 3m								
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	86.17	25.0 QP	40.0	-15.0	1.00 H	324	39.3	-14.3
2	130.80	25.7 QP	43.5	-17.8	2.00 H	264	35.7	-10.0
3	212.30	24.2 QP	43.5	-19.3	1.50 H	93	35.7	-11.5
4	342.30	21.9 QP	46.0	-24.1	1.50 H	114	28.8	-6.9
5	468.43	24.9 QP	46.0	-21.1	2.00 H	103	29.2	-4.3
6	939.95	40.9 QP	46.0	-5.1	2.00 H	6	33.7	7.2

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

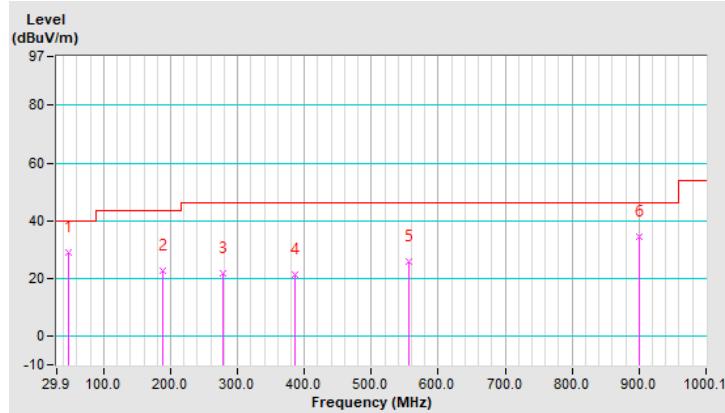


EUT Test Condition		Measurement Detail		
Channel		Channel 1		Frequency Range
Input Power		120Vac, 60Hz		Detector Function
Environmental Conditions		25 deg. C, 70% RH		Tested By
Test Mode		C		

Antenna Polarity & Test Distance: Vertical At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	47.36	29.0 QP	40.0	-11.0	1.99 V	13	37.8	-8.8
2	189.01	22.6 QP	43.5	-20.9	1.00 V	108	33.9	-11.3
3	278.27	21.6 QP	46.0	-24.4	1.99 V	170	29.8	-8.2
4	384.99	21.3 QP	46.0	-24.7	1.49 V	239	27.4	-6.1
5	555.75	25.8 QP	46.0	-20.2	1.00 V	117	28.5	-2.7
6	901.14	34.6 QP	46.0	-11.4	1.49 V	340	28.5	6.1

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

Tested date: Sep. 05 ~ Oct. 24, 2020

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 11, 2019	Dec. 10, 2020
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 04, 2020	Sep. 03, 2021
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 20, 2020	Feb. 19, 2021
V-LISN ROHDE & SCHWARZ (Peripheral)	NNBL 8226-2	8226-142	Jul. 31, 2020	Jul. 30, 2021
Software ADT	BV ADT_Cond_ V7.3.7.4	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 HwaYa Shielded Room 1 (Conduction 1).

3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

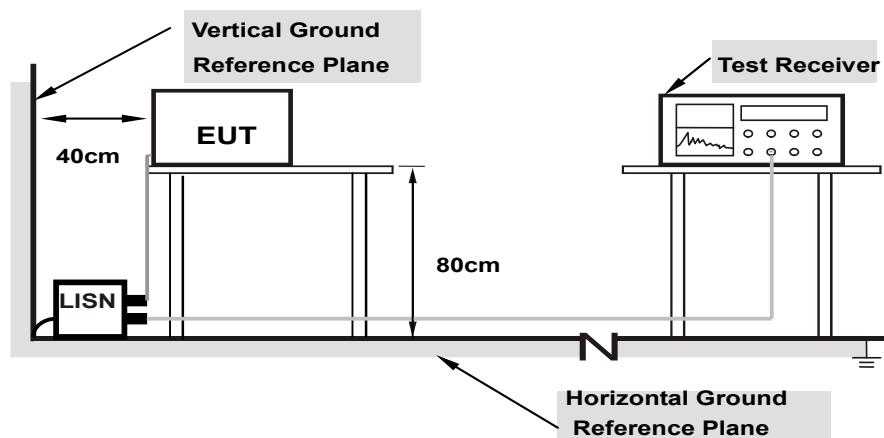
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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



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

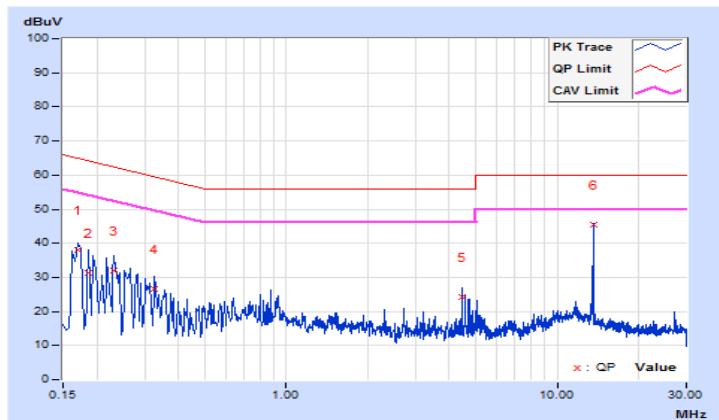
Type F

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17000	9.65	28.42	12.93	38.07	22.58	64.96	54.96	-26.89	-32.38
2	0.18600	9.66	21.79	9.80	31.45	19.46	64.21	54.21	-32.76	-34.75
3	0.23000	9.66	22.40	6.80	32.06	16.46	62.45	52.45	-30.39	-35.99
4	0.32600	9.66	16.78	3.28	26.44	12.94	59.55	49.55	-33.11	-36.61
5	4.47400	9.74	14.64	4.56	24.38	14.30	56.00	46.00	-31.62	-31.70
6	13.56200	9.83	35.59	33.57	45.42	43.40	60.00	50.00	-14.58	-6.60

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.

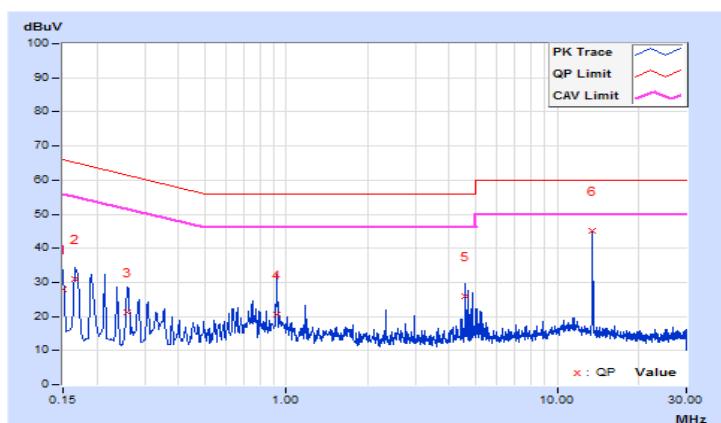


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.68	18.17	11.37	27.85	21.05	66.00	56.00	-38.15	-34.95
2	0.16600	9.68	21.13	15.12	30.81	24.80	65.16	55.16	-34.35	-30.36
3	0.25800	9.68	11.40	4.43	21.08	14.11	61.50	51.50	-40.42	-37.39
4	0.92600	9.69	10.97	3.00	20.66	12.69	56.00	46.00	-35.34	-33.31
5	4.57800	9.78	16.02	6.18	25.80	15.96	56.00	46.00	-30.20	-30.04
6	13.54600	9.90	35.36	33.16	45.26	43.06	60.00	50.00	-14.74	-6.94

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.

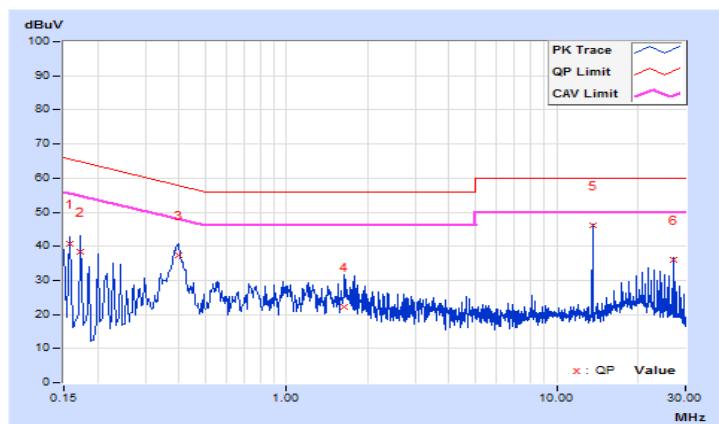


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	9.58	31.14	13.32	40.72	22.90	65.58	55.58	-24.86	-32.68
2	0.17346	9.58	28.79	11.44	38.37	21.02	64.79	54.79	-26.42	-33.77
3	0.40024	9.58	27.70	22.36	37.28	31.94	57.85	47.85	-20.57	-15.91
4	1.63189	9.62	12.58	6.45	22.20	16.07	56.00	46.00	-33.80	-29.93
5	13.56130	9.75	36.43	36.06	46.18	45.81	60.00	50.00	-13.82	-4.19
6	27.12118	9.76	26.24	26.09	36.00	35.85	60.00	50.00	-24.00	-14.15

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.

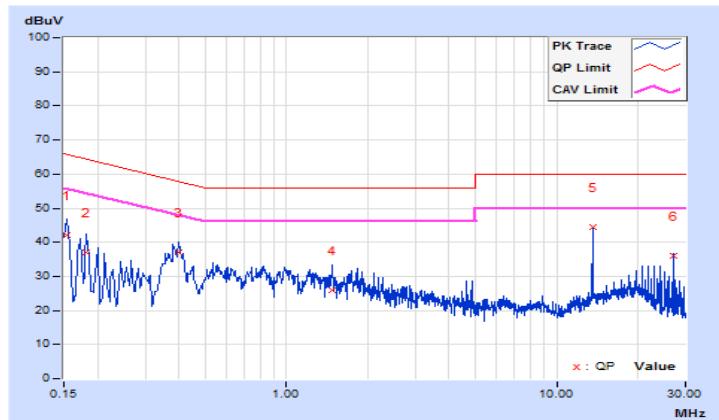


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	0.15391	9.56	32.47	16.33	42.03	25.89	65.79	55.79	-23.76	-29.90
2	0.18122	9.57	27.45	12.90	37.02	22.47	64.43	54.43	-27.41	-31.96
3	0.40024	9.56	27.40	21.71	36.96	31.27	57.85	47.85	-20.89	-16.58
4	1.47940	9.59	16.43	9.57	26.02	19.16	56.00	46.00	-29.98	-26.84
5	13.56130	9.77	34.72	34.13	44.49	43.90	60.00	50.00	-15.51	-6.10
6	27.12118	9.84	26.29	26.17	36.13	36.01	60.00	50.00	-23.87	-13.99

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.

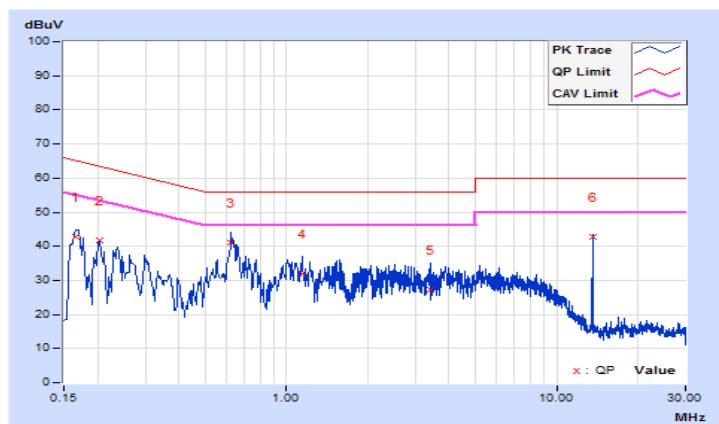


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	C		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value	Emission Level		Limit		Margin		
			[dB (uV)]	[dB (uV)]		[dB (uV)]	(dB)			
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	
1	0.16564	9.65	33.23	20.51	42.88	30.16	65.18	55.18	-22.30	-25.02
2	0.20243	9.66	32.17	22.23	41.83	31.89	63.51	53.51	-21.68	-21.62
3	0.62311	9.66	31.26	19.80	40.92	29.46	56.00	46.00	-15.08	-16.54
4	1.13923	9.67	22.18	12.21	31.85	21.88	56.00	46.00	-24.15	-24.12
5	3.39530	9.73	17.71	9.32	27.44	19.05	56.00	46.00	-28.56	-26.95
6	13.56130	9.83	32.86	31.64	42.69	41.47	60.00	50.00	-17.31	-8.53

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.

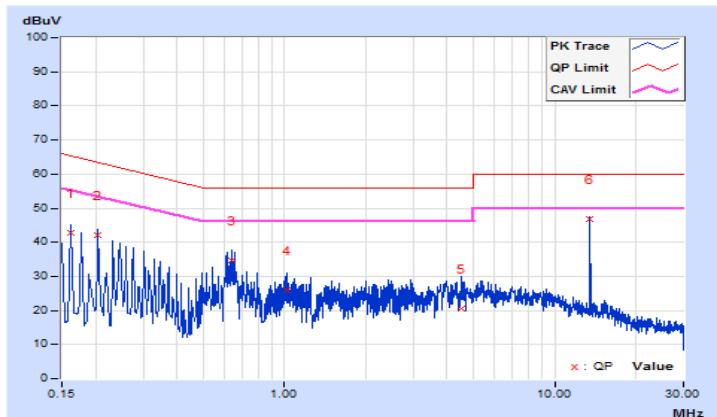


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	C		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value	Emission Level		Limit		Margin		
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16173	9.68	33.13	17.72	42.81	27.40	65.37	55.37	-22.56	-27.97
2	0.20474	9.68	32.38	19.59	42.06	29.27	63.42	53.42	-21.36	-24.15
3	0.63875	9.68	24.97	13.35	34.65	23.03	56.00	46.00	-21.35	-22.97
4	1.01799	9.69	16.40	4.24	26.09	13.93	56.00	46.00	-29.91	-32.07
5	4.54484	9.78	10.83	2.86	20.61	12.64	56.00	46.00	-35.39	-33.36
6	13.55739	9.90	37.06	31.48	46.96	41.38	60.00	50.00	-13.04	-8.62

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 of 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 FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

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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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