

FCC Test Report

Report No.: RF200117C14

FCC ID: 2AKMG00000NU318

Test Model: NU318

Received Date: Jan. 17, 2020

Test Date: Feb. 11, 2020 ~ Feb. 12, 2020

Issued Date: Feb. 21, 2020

Applicant: Nuheara Limited

Address: 190 Aberdeen St, Northbridge, Western Australia 6003

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

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Test Location: No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
33383, Taiwan

**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RF200117C14	Original Release	Feb. 21, 2020

1 Certificate of Conformity

Product: IQbuds² Max

Brand: Nuheara Limited

Test Model: NU318

Sample Status: Engineering Sample

Applicant: Nuheara Limited

Test Date: Feb. 11, 2020 ~ Feb. 12, 2020

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.209)
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 : Rona Chen, **Date:** Feb. 21, 2020
Rona Chen / Specialist

Approved by : Dylan Chiou, **Date:** Feb. 21, 2020
Dylan Chiou / Senior Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.209)			
FCC Clause	Test Item	Result	Remarks
15.207	Conducted emission test	Pass	Meet the requirement of limit. Minimum passing margin is -8.96 dB at 0.46200 MHz.
15.209	Radiated emission test	Pass	Meet the requirement of limit. Minimum passing margin is -14.2 dB at 575.45 MHz.

Note: 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	150 kHz ~ 30 MHz	2.79 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	3.59 dB
	200 MHz ~ 1000 MHz	3.60 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	IQbuds ² Max
Brand	Nuheara Limited
Test Model	NU318
Status of EUT	Engineering Sample
Power Supply Rating	3.7 Vdc (Li-ion battery) <For Buds> 5 Vdc (Adapter or Host equipment) <For Charger>
Operating Frequency	10.6 MHz
Antenna Connector	N/A
Accessory Device	N/A
Data Cable Supplied	0.28 m shielded USB cable w/o core

Note:

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

3.2 Description of Test Modes

1 channel is provided to this EUT:

Channel	Frequency (MHz)
1	10.6

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To		Description
	RE<1G	PLC	
A	√	-	Left and Right Buds
B	-	√	Left and Right Buds + Charge Case (Charging by Adapter)
C	-	√	Left and Right Buds + Charge Case (Charging by Notebook)

Where

RE<1G: Radiated Emission below 1 GHz

PLC: Power Line Conducted Emission

Radiated Emission Test (Below 1 GHz):

- ☒ 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
A	1	1

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	Test Mode
B	Left and Right Buds + Charge Case (Charging by Adapter)
C	Left and Right Buds + Charge Case (Charging by Notebook)

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE	25 deg. C, 65 % RH	3.7 Vdc	Titan Hsu
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Greg Lin

3.3 Description of Support Units

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

No.	Product	Brand	Model No.	Serial No.	FCC ID
A.	Adapter	LITEON	PA-1050-39	N/A	N/A
B.	Notebook	Lenovo	81A4	YD02TWDP	N/A

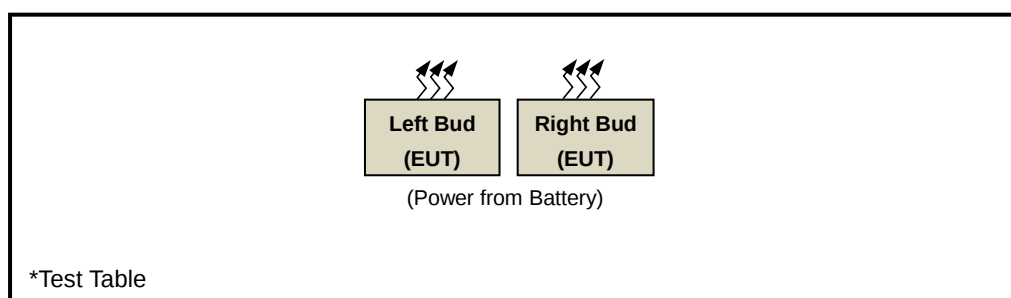
No.	Signal Cable Description Of The Above Support Units
1.	0.28 m shielded USB cable w/o core

Note:

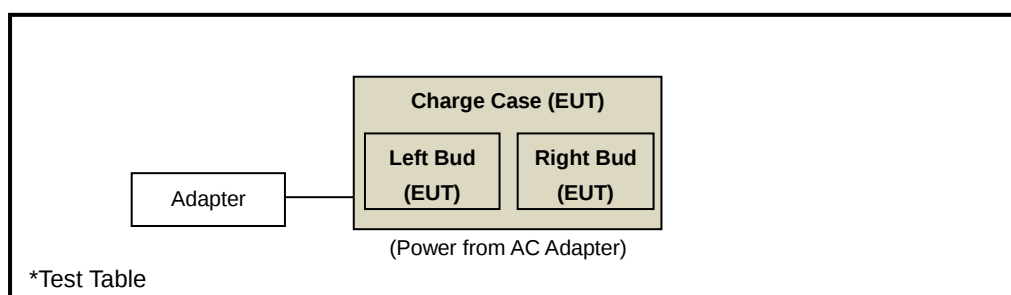
1. All power cords of the above support units are non-shielded (1.8m).

3.3.1 Configuration of System under Test

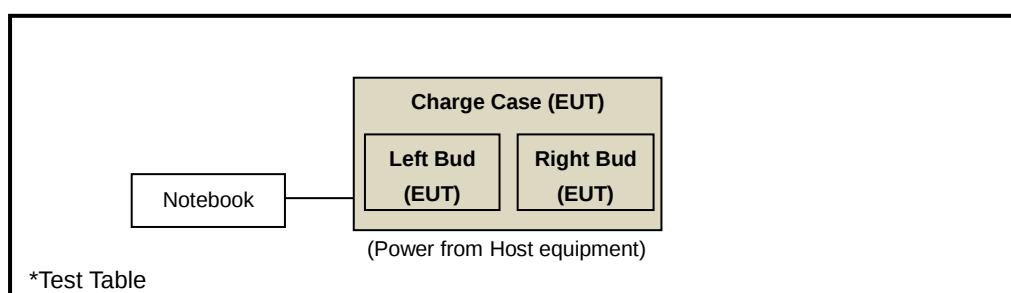
Mode A



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 (15.209)

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 and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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 1000 MHz, 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 20 dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 15, 2019	Apr. 14, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jun. 04, 2019	Jun. 03, 2020
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 07, 2019	Nov. 06, 2020
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 24, 2019	Nov. 23, 2020
Loop Antenna TESEQ	HLA 6121	45745	Jul. 01, 2019	Jun. 30, 2020
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jul. 11, 2019	Jul. 10, 2020
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 19, 2019	Feb. 18, 2020
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM800 0	CABLE-CH9-02 (248780+171006)	Jan. 18, 2020	Jan. 17, 2021
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250 795/4)	Jul. 11, 2019	Jul. 10, 2020
RF signal cable Woken	8D-FB	Cable-CH9-01	Jul. 30, 2019	Jul. 29, 2020
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY 55190004/MY551 90007/MY552100 05	Jul. 15, 2019	Jul. 14, 2020

- 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 9.

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

- 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 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

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

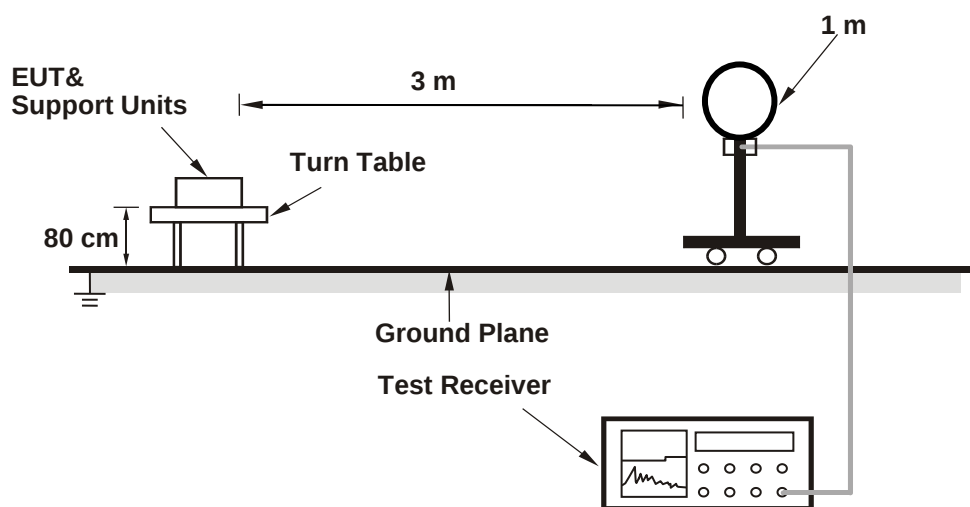
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.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

4.1.4 Deviation from Test Standard

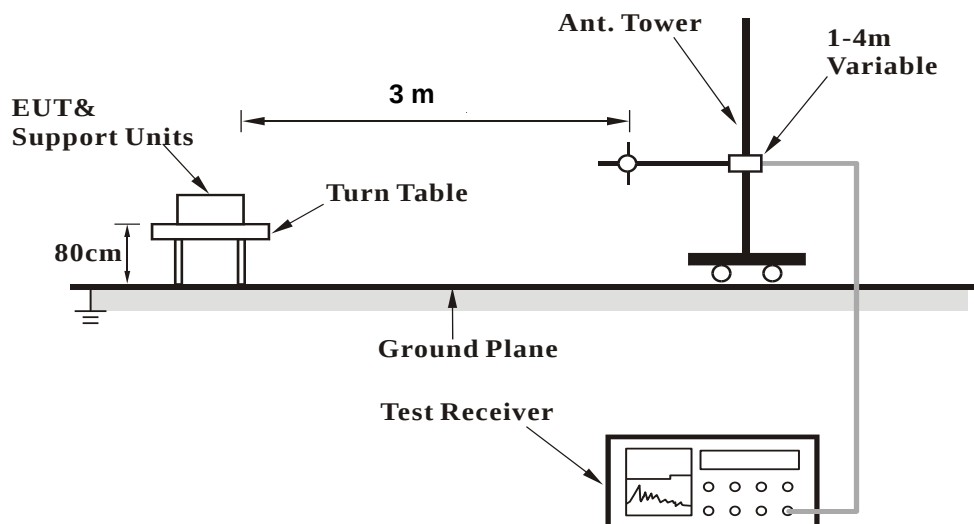
No deviation.

4.1.5 Test Setup

<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Below 30MHz Data:

Operating Mode

Channel	TX Channel 1	Detector Function	Average (AV)
Frequency Range	9 kHz ~ 30 MHz		

Antenna Polarity & Test Distance: Loop Antenna Parallel 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	*10.60	26.2 AV	69.5	-43.3	1.00	155	4.5	21.7
Antenna Polarity & Test Distance: Loop Antenna Perpendicular 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	*10.60	25.7 AV	69.5	-43.8	1.00	192	4.0	21.7
Antenna Polarity & Test Distance: Loop Antenna Ground-parallel 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	*10.60	24.3 AV	69.5	-45.2	1.00	223	2.6	21.7

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. “ * “: Fundamental frequency.
6. Loop antenna was used for all radiated emission below 30MHz.
7. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
8. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

Channel	TX Channel 1	Detector Function	Quasi-Peak (QP)
Frequency Range	9 kHz ~ 30 MHz		

Antenna Polarity & Test Distance: Loop Antenna Parallel 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	3.37	40.1 QP	69.5	-29.4	1.00	279	20.1	20.0
2	11.98	35.5 QP	69.5	-34.0	1.00	8	13.7	21.8
3	17.89	37.9 QP	69.5	-31.6	1.00	260	15.9	22.0
4	18.95	38.4 QP	69.5	-31.1	1.00	281	16.4	22.0
5	22.12	38.8 QP	69.5	-30.7	1.00	325	16.7	22.1
6	23.18	41.5 QP	69.5	-28.0	1.00	118	19.4	22.1

Antenna Polarity & Test Distance: Loop Antenna Perpendicular 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	3.13	36.9 QP	69.5	-32.6	1.00	337	17.0	19.9
2	10.49	36.3 QP	69.5	-33.2	1.00	128	14.6	21.7
3	13.75	34.1 QP	69.5	-35.4	1.00	337	12.3	21.8
4	17.50	34.7 QP	69.5	-34.8	1.00	219	12.7	22.0
5	20.58	36.6 QP	69.5	-32.9	1.00	213	14.5	22.1
6	23.18	40.7 QP	69.5	-28.8	1.00	160	18.6	22.1

Antenna Polarity & Test Distance: Loop Antenna Ground-parallel 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	3.57	42.6 QP	69.5	-26.9	1.00	201	22.6	20.0
2	13.66	38.5 QP	69.5	-31.0	1.00	87	16.7	21.8
3	17.89	41.5 QP	69.5	-28.0	1.00	295	19.5	22.0
4	18.95	44.4 QP	69.5	-25.1	1.00	308	22.4	22.0
5	20.00	45.6 QP	69.5	-23.9	1.00	153	23.5	22.1
6	23.18	43.4 QP	69.5	-26.1	1.00	92	21.3	22.1

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. Loop antenna was used for all radiated emission below 30MHz.
6. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
7. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

Standby Mode

Channel	TX Channel 1	Detector Function	Quasi-Peak (QP)
Frequency Range	9 kHz ~ 30 MHz		

Antenna Polarity & Test Distance: Loop Antenna Parallel 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	3.57	41.4 QP	69.5	-28.1	1.00	246	21.4	20.0
2	17.89	39.5 QP	69.5	-30.0	1.00	252	17.5	22.0
3	18.95	43.6 QP	69.5	-25.9	1.00	23	21.6	22.0
4	21.06	40.8 QP	69.5	-28.7	1.00	82	18.7	22.1
5	23.18	45.5 QP	69.5	-24.0	1.00	286	23.4	22.1
6	26.35	40.8 QP	69.5	-28.7	1.00	34	18.7	22.1
Antenna Polarity & Test Distance: Loop Antenna Perpendicular 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	3.13	38.3 QP	69.5	-31.2	1.00	155	18.4	19.9
2	7.46	34.5 QP	69.5	-35.0	1.00	215	13.6	20.9
3	13.56	38.4 QP	69.5	-31.1	1.00	291	16.6	21.8
4	18.95	37.9 QP	69.5	-31.6	1.00	127	15.9	22.0
5	21.06	37.8 QP	69.5	-31.7	1.00	280	15.7	22.1
6	23.18	40.7 QP	69.5	-28.8	1.00	58	18.6	22.1
Antenna Polarity & Test Distance: Loop Antenna Ground-parallel 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	3.57	41.4 QP	69.5	-28.1	1.00	276	21.4	20.0
2	18.95	39.1 QP	69.5	-30.4	1.00	114	17.1	22.0
3	20.00	42.2 QP	69.5	-27.3	1.00	161	20.1	22.1
4	22.12	41.5 QP	69.5	-28.0	1.00	56	19.4	22.1
5	25.29	42.6 QP	69.5	-26.9	1.00	333	20.5	22.1
6	26.35	38.5 QP	69.5	-31.0	1.00	320	16.4	22.1

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. Loop antenna was used for all radiated emission below 30MHz.
6. Limit @3m=Limit@300m+40log(300 / 3)=Limit@300m+80
7. Limit @3m=Limit@30m+40log(30 / 3)=Limit@30m+40

Below 1GHz Data:

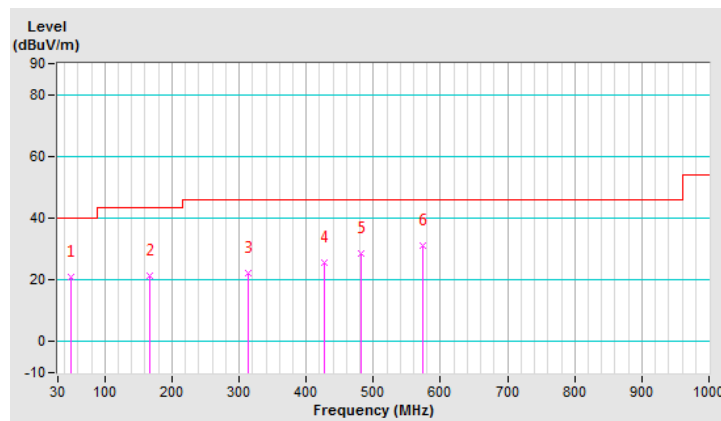
Operating Mode

Channel	TX Channel 1	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz		

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	49.68	21.1 QP	40.0	-18.9	1.51 H	16	29.9	-8.8
2	166.36	21.2 QP	43.5	-22.3	1.51 H	347	29.9	-8.7
3	313.97	22.0 QP	46.0	-24.0	1.51 H	263	28.9	-6.9
4	426.43	25.7 QP	46.0	-20.3	2.00 H	198	29.1	-3.4
5	482.67	28.4 QP	46.0	-17.6	1.00 H	175	30.3	-1.9
6	574.04	31.1 QP	46.0	-14.9	1.51 H	7	30.8	0.3

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.

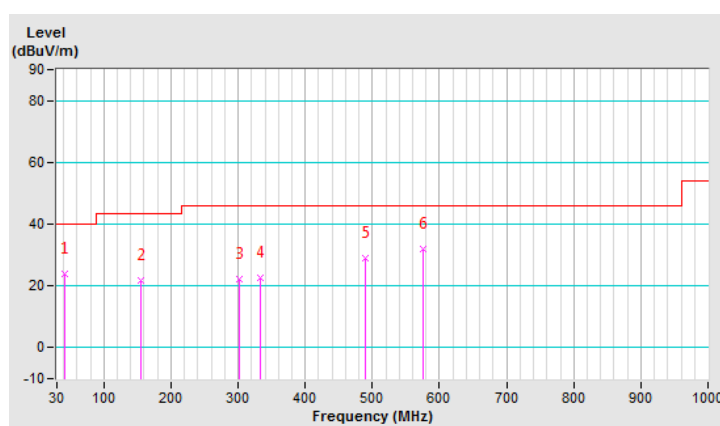


Channel	TX Channel 1	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz		

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	41.25	23.8 QP	40.0	-16.2	1.00 V	252	33.0	-9.2
2	155.12	21.7 QP	43.5	-21.8	1.00 V	2	30.3	-8.6
3	301.32	22.1 QP	46.0	-23.9	1.00 V	280	29.4	-7.3
4	333.65	22.6 QP	46.0	-23.4	1.99 V	16	28.9	-6.3
5	489.70	28.8 QP	46.0	-17.2	1.00 V	333	30.6	-1.8
6	575.45	31.8 QP	46.0	-14.2	1.99 V	150	31.4	0.4

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.



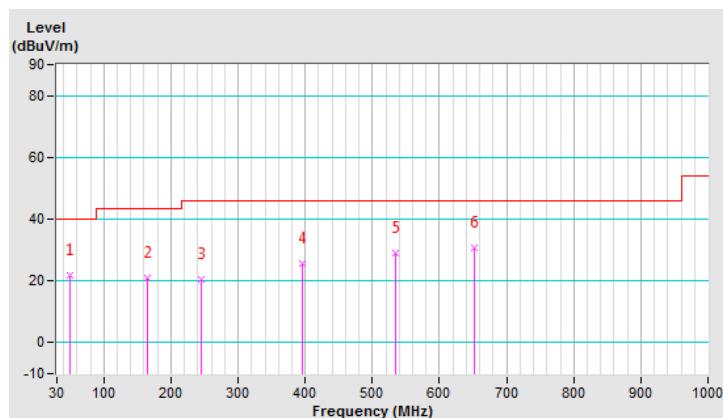
Standby Mode

Channel	TX Channel 1	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz		

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	49.68	21.9 QP	40.0	-18.1	1.00 H	146	30.7	-8.8
2	164.96	21.0 QP	43.5	-22.5	1.50 H	16	29.7	-8.7
3	245.09	20.6 QP	46.0	-25.4	1.50 H	197	30.2	-9.6
4	395.51	25.8 QP	46.0	-20.2	1.50 H	31	30.4	-4.6
5	534.68	28.9 QP	46.0	-17.1	1.00 H	159	29.7	-0.8
6	652.77	30.7 QP	46.0	-15.3	1.50 H	52	29.2	1.5

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.

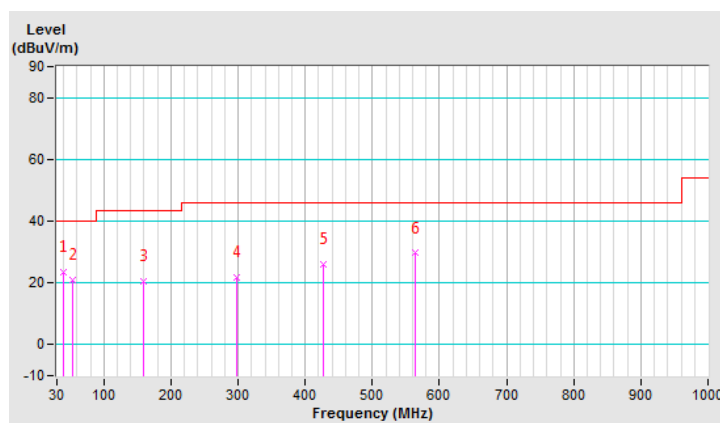


Channel	TX Channel 1	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz		

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	39.84	23.4 QP	40.0	-16.6	2.00 V	235	32.9	-9.5
2	52.49	21.0 QP	40.0	-19.0	1.50 V	304	29.8	-8.8
3	159.33	20.5 QP	43.5	-23.0	1.50 V	5	29.0	-8.5
4	298.51	21.9 QP	46.0	-24.1	1.50 V	153	29.4	-7.5
5	426.43	26.2 QP	46.0	-19.8	1.00 V	90	29.6	-3.4
6	564.20	29.6 QP	46.0	-16.4	1.50 V	226	29.7	-0.1

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.



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 0.50 MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 11, 2019	Dec. 10, 2020
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2019	Sep. 04, 2020
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 21, 2019	Feb. 20, 2020
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 22, 2019	Aug. 21, 2020
Software ADT	BV ADT_Conc_ 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.
 3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

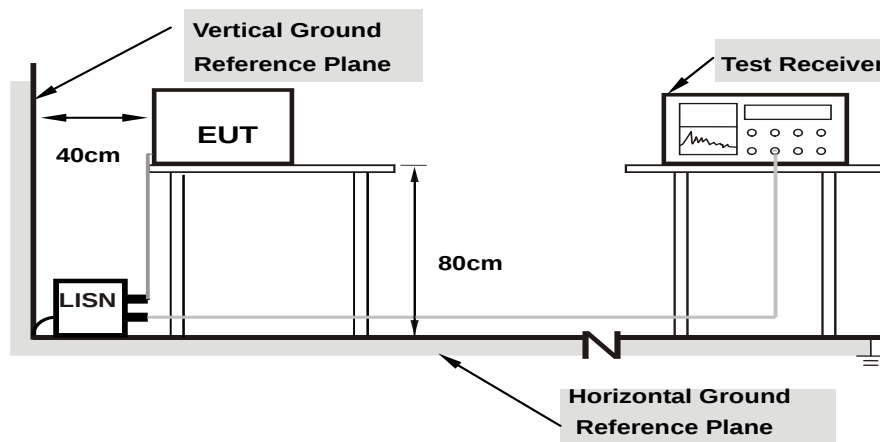
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50 uH of coupling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

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

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.

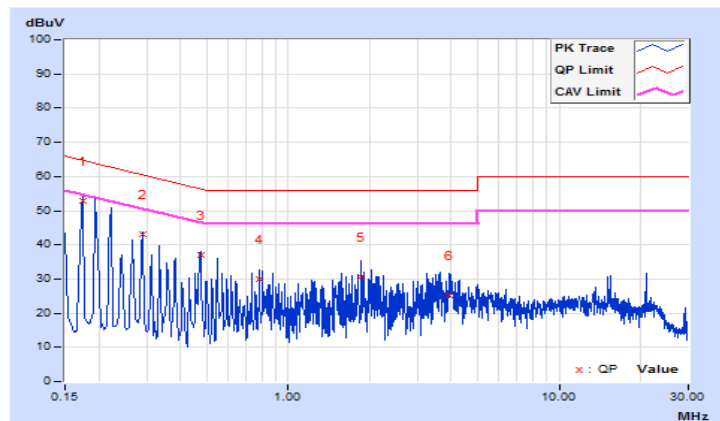
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH
Tested by	Greg Lin	Test Date	2020/2/12
Test Mode	Mode B : Left and Right Buds + Charge Case (Charging by Adapter)		

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	0.17400	9.67	43.03	30.45	52.70	40.12	64.77	54.77	-12.07	-14.65
2	0.29000	9.67	33.56	28.37	43.23	38.04	60.52	50.52	-17.29	-12.48
3	0.47400	9.69	27.35	19.90	37.04	29.59	56.44	46.44	-19.40	-16.85
4	0.78200	9.72	20.22	15.74	29.94	25.46	56.00	46.00	-26.06	-20.54
5	1.86200	9.77	20.75	12.07	30.52	21.84	56.00	46.00	-25.48	-24.16
6	3.92200	9.84	15.46	12.56	25.30	22.40	56.00	46.00	-30.70	-23.60

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

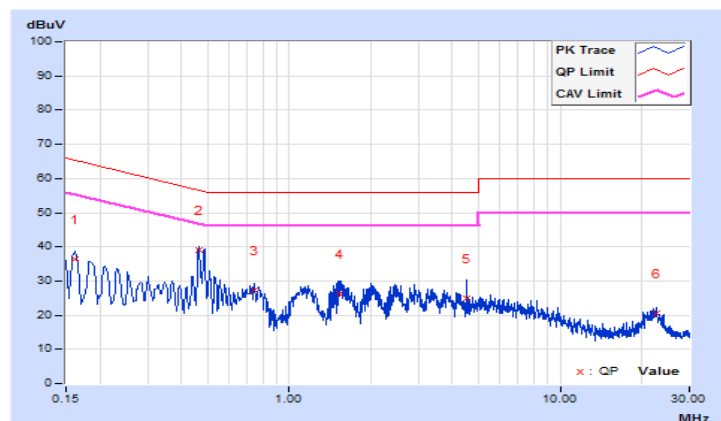


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH
Tested by	Greg Lin	Test Date	2020/2/12
Test Mode	Mode B : Left and Right Buds + Charge Case (Charging by Adapter)		

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	0.16200	9.64	26.71	16.30	36.35	25.94	65.36	55.36	-29.01	-29.42
2	0.46200	9.66	29.45	28.04	39.11	37.70	56.66	46.66	-17.55	-8.96
3	0.74200	9.68	17.55	11.33	27.23	21.01	56.00	46.00	-28.77	-24.99
4	1.52600	9.73	16.50	10.15	26.23	19.88	56.00	46.00	-29.77	-26.12
5	4.52600	9.82	15.11	5.70	24.93	15.52	56.00	46.00	-31.07	-30.48
6	22.56600	10.07	10.53	3.07	20.60	13.14	60.00	50.00	-39.40	-36.86

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

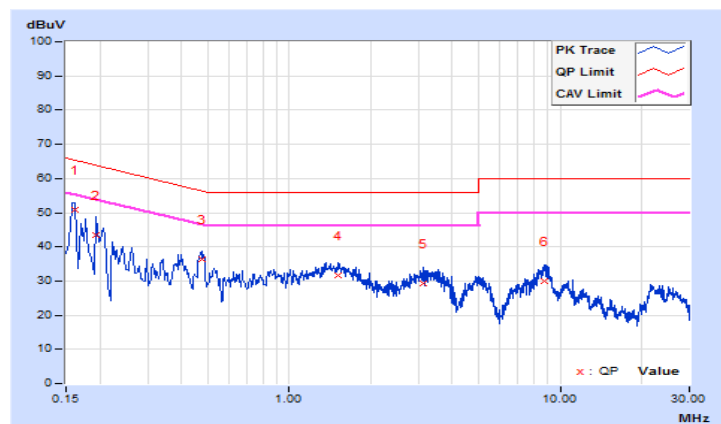


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH
Tested by	Greg Lin	Test Date	2020/2/12
Test Mode	Mode C : Left and Right Buds + Charge Case (Charging by Notebook)		

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	0.16105	9.67	41.14	28.05	50.81	37.72	65.41	55.41	-14.60	-17.69
2	0.19400	9.66	33.67	18.14	43.33	27.80	63.86	53.86	-20.53	-26.06
3	0.47400	9.69	26.83	18.79	36.52	28.48	56.44	46.44	-19.92	-17.96
4	1.51400	9.76	21.82	16.64	31.58	26.40	56.00	46.00	-24.42	-19.60
5	3.11400	9.81	19.64	14.52	29.45	24.33	56.00	46.00	-26.55	-21.67
6	8.80200	9.91	20.14	14.62	30.05	24.53	60.00	50.00	-29.95	-25.47

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

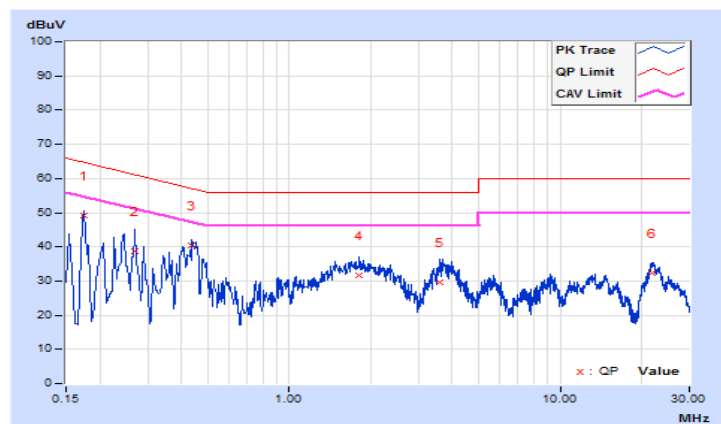


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH
Tested by	Greg Lin	Test Date	2020/2/12
Test Mode	Mode C : Left and Right Buds + Charge Case (Charging by Notebook)		

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	0.17400	9.64	39.55	24.32	49.19	33.96	64.77	54.77	-15.58	-20.81
2	0.26992	9.65	29.22	16.36	38.87	26.01	61.12	51.12	-22.25	-25.11
3	0.43800	9.66	30.88	23.86	40.54	33.52	57.10	47.10	-16.56	-13.58
4	1.81800	9.74	21.82	16.71	31.56	26.45	56.00	46.00	-24.44	-19.55
5	3.59400	9.80	19.79	13.89	29.59	23.69	56.00	46.00	-26.41	-22.31
6	21.85400	10.06	22.10	17.29	32.16	27.35	60.00	50.00	-27.84	-22.65

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 according to ISO/IEC 17025.

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

Lin Kou 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

Web Site: www.bureauveritas-adt.com

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

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