FCC Test Report

Report No.:	RF180718D12-1
FCC ID:	PPQ-RPT01
Test Model:	RPT01
Received Date:	July 18, 2018
Test Date:	Aug. 05 to Oct. 17, 2018
Issued Date:	Oct. 26, 2018
Applicant:	LITE-ON Technology Corp.
Address:	Bldg. C, 90, Chien 1 Rd., Chung-Ho,New Taipei City,23585,Taiwan
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:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF180718D12-1	Original release.	Oct. 26, 2018

1 Certificate of Conformity

Product:	Repeater
Brand:	NORMAN®
Test Model:	RPT01
Sample Status:	ENGINEERING SAMPLE
Applicant:	LITE-ON Technology Corp.
Test Date:	Aug. 05 to Oct. 17, 2018
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 : _____ , **Date:** Oct. 26, 2018

Claire Kuan / Specialist

Approved by : _____ , **Date:** Oct. 26, 2018

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 -15.62dB at 0.15000MHz.
15.209 15.249 15.249 (d)	Radiated Emission Test Band Edge Measurement Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -2.8dB at 2311.00MHz & 2439.00MHz.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.33 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.10 dB
	6GHz ~ 18GHz	4.85 dB
	18GHz ~ 40GHz	5.24 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Repeater
Brand	NORMAN®
Test Model	RPT01
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	5Vdc from power adapter
Modulation Type	GFSK
Transfer Rate	1Mbps
Operating Frequency	2415~2459MHz
Number of Channel	3
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. The EUT could be supplied with a power adapter as the following table:

No.	Brand	Model No.	Spec.	Plug
1	Shenzhen Keyu Power Supply Technology Co., Ltd.	KA0601A-0501000BSU	Input: 100-240V, 50/60Hz, 0.2A Max Output: 5V, 1000mA DC output cable: Unshielded, 1.0m	UK
2	Shenzhen Keyu Power Supply Technology Co., Ltd.	KA0601A-0501000EUU	Input: 100-240V, 50/60Hz, 0.2A Max Output: 5V, 1000mA DC output cable: Unshielded, 1.0m	EU
3	Shenzhen Keyu Power Supply Technology Co., Ltd.	KA0601A-0501000USU	Input: 100-240V, 50/60Hz, 0.2A Max Output: 5V, 1000mA DC output cable: Unshielded, 1.0m	FCC

Note:
1. The adapter 1, 2 is as same as adapter 3; except for plug shape is different.
2. From the above adapters, Adapter 3 was selected as representative adapter for the test and its data was recorded in this report.

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

Brand	Model	Antenna Gain (dBi)	Frequency range(GHz)	Antenna Type	Connecter Type
Unictron	AA055A	2.5	2.4-2.4835	Chip Antenna	NA

3. The EUT was pre-tested under the following modes:

Test Mode	Description
Mode A	Power from USB interface (Adapter)
Mode B	**Power from USB interface (Laptop)**

Note: From the above modes, the conducted emission worst case was found in **Mode B**. Therefore only the test data of the mode was recorded in this report.

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

3.2 Description of Test Modes

3 channels are provided to this EUT:

Channel	Frequency	Channel	Frequency
15	2415 MHz	39	2439 MHz
59	2459 MHz		

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where **RE≥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 **X-plane for below 1GHz and Z-plane for above 1GHz.**

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
15 to 59	15, 39, 59	GFSK

Radiated Emission Test (Below 1GHz):

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

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
15 to 59	59	GFSK

Power Line Conducted Emission Test:

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

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
15 to 59	59	GFSK

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Steven Chiang
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Steven Chiang
PLC	24deg. C, 73%RH	120Vac, 60Hz	Andy Ho

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	E6420	B92T3R1	FCC DoC	Provided by Lab

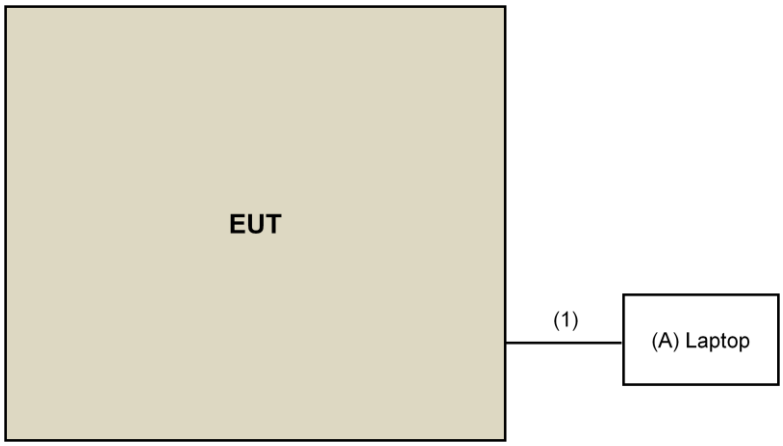
Note:

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

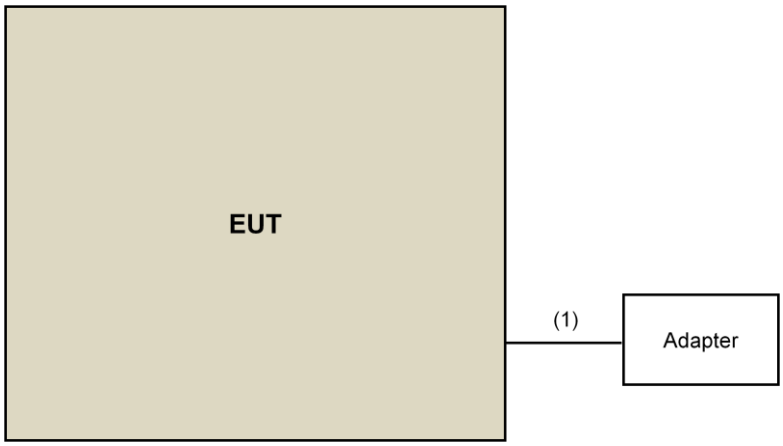
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB To USB Cable	1	1.5	Yes	0	Provided by Lab

3.3.1 Configuration of System under Test

For Conducted emission test:



For other test items:



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.

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

For below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 05, 2018	July 04, 2019
Pre-Amplifier EMCI	EMC001340	980142	Feb. 09, 2018	Feb. 08, 2019
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001	Jan. 15, 2018	Jan. 14, 2019
RF Cable	NA	LOOPCAB-002	Jan. 15, 2018	Jan. 14, 2019
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 09, 2017	Nov. 08, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-4-1	Mar. 21, 2018	Mar. 20, 2019
RF Cable	8D	966-4-2	Mar. 21, 2018	Mar. 20, 2019
RF Cable	8D	966-4-3	Mar. 21, 2018	Mar. 20, 2019
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 03, 2017	Oct. 02, 2018
Software	ADT_Radiated_V8.7.08	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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 4.
4. The CANADA Site Registration No. is 20331-2
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Sep. 07, 2018

For above 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 05, 2018	July 04, 2019
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier Mini-Circuits	ZVA-183-S+	AMP-ZVA-03	May 10, 2018	May 09, 2019
RF Cable	EMC104-SM-SM-1200	160923	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-2000	150318	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-5000	150321	Jan. 29, 2018	Jan. 28, 2019
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160925	Jan. 29, 2018	Jan. 28, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. The CANADA Site Registration No. is 20331-2
4. Loop antenna was used for all emissions below 30 MHz.
5. Tested Date: Oct. 17, 2018

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:

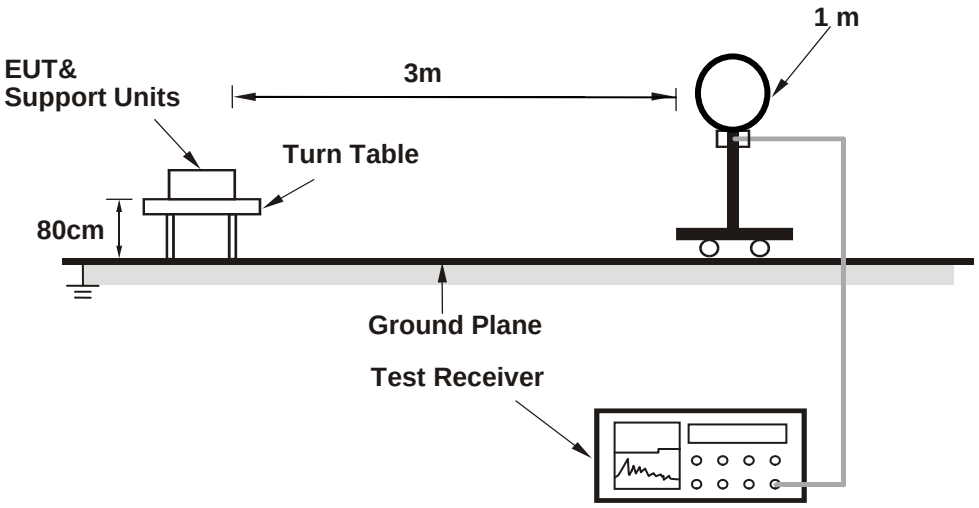
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

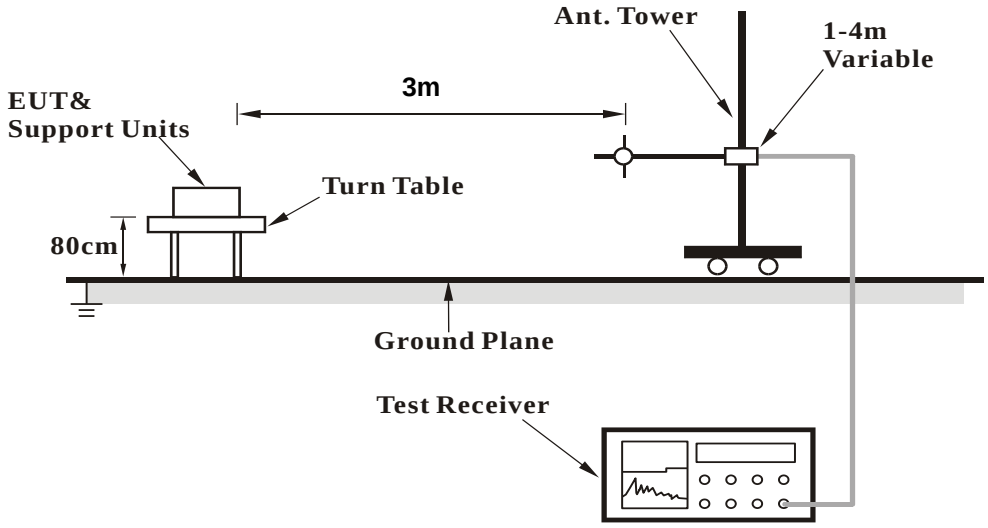
No deviation.

4.1.5 Test Setup

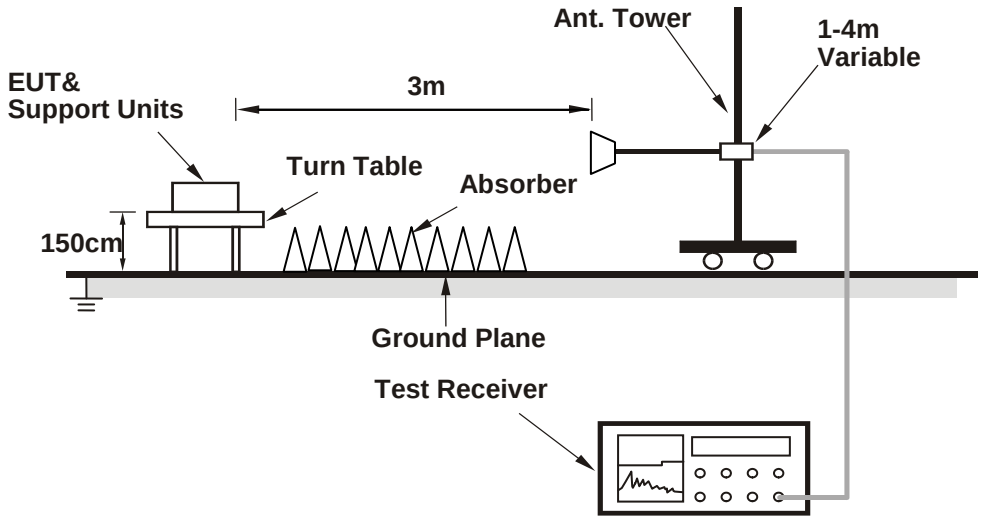
For Radiated emission below 30MHz



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

Controlling software (Console Port use”Test command”) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data：

CHANNEL	TX Channel 15	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	2369.00	57.7 PK	74.0	-16.3	1.00 H	285	59.8	-2.1
2	2369.00	49.8 AV	54.0	-4.2	1.00 H	285	51.9	-2.1
3	2390.00	56.8 PK	74.0	-17.2	1.00 H	285	59.0	-2.2
4	2390.00	44.6 AV	54.0	-9.4	1.00 H	285	46.8	-2.2
5	*2415.00	91.5 PK	114.0	-22.5	1.00 H	285	93.9	-2.4
6	*2415.00	70.9 AV	94.0	-23.1	1.00 H	285	73.3	-2.4
7	4830.00	46.2 PK	74.0	-27.8	1.63 H	219	44.4	1.8
8	4830.00	35.6 AV	54.0	-18.4	1.63 H	219	33.8	1.8
9	7245.00	49.3 PK	74.0	-24.7	2.23 H	258	41.3	8.0
10	7245.00	38.6 AV	54.0	-15.4	2.23 H	258	30.6	8.0
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	2369.00	56.8 PK	74.0	-17.2	1.25 V	315	58.9	-2.1
2	2369.00	48.8 AV	54.0	-5.2	1.25 V	315	50.9	-2.1
3	2390.00	56.1 PK	74.0	-17.9	1.25 V	315	58.3	-2.2
4	2390.00	44.1 AV	54.0	-9.9	1.25 V	315	46.3	-2.2
5	*2415.00	89.0 PK	114.0	-25.0	1.25 V	315	91.4	-2.4
6	*2415.00	68.1 AV	94.0	-25.9	1.25 V	315	70.5	-2.4
7	4830.00	45.9 PK	74.0	-28.1	1.91 V	106	44.1	1.8
8	4830.00	35.3 AV	54.0	-18.7	1.91 V	106	33.5	1.8
9	7245.00	48.5 PK	74.0	-25.5	1.89 V	206	40.5	8.0
10	7245.00	37.4 AV	54.0	-16.6	1.89 V	206	29.4	8.0

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
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	2311.00	58.1 PK	74.0	-15.9	1.00 H	291	60.1	-2.0
2	2311.00	51.0 AV	54.0	-3.0	1.00 H	291	53.0	-2.0
3	2400.00	54.8 PK	74.0	-19.2	1.00 H	291	57.0	-2.2
4	2400.00	44.5 AV	54.0	-9.5	1.00 H	291	46.7	-2.2
5	*2439.00	92.0 PK	114.0	-22.0	1.00 H	291	94.6	-2.6
6	*2439.00	71.1 AV	94.0	-22.9	1.00 H	291	73.7	-2.6
7	2483.50	55.6 PK	74.0	-18.4	1.00 H	291	58.0	-2.4
8	2483.50	44.6 AV	54.0	-9.4	1.00 H	291	47.0	-2.4
9	2484.00	58.4 PK	74.0	-15.6	1.00 H	291	60.8	-2.4
10	2484.00	49.4 AV	54.0	-4.6	1.00 H	291	51.8	-2.4
11	4878.00	46.4 PK	74.0	-27.6	1.67 H	230	44.4	2.0
12	4878.00	35.9 AV	54.0	-18.1	1.67 H	230	33.9	2.0
13	7317.00	50.0 PK	74.0	-24.0	1.83 H	260	41.6	8.4
14	7317.00	39.4 AV	54.0	-14.6	1.83 H	260	31.0	8.4
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	2311.00	58.7 PK	74.0	-15.3	1.33 V	334	60.7	-2.0
2	**2311.00**	**51.2 AV**	**54.0**	**-2.8**	**1.33 V**	**334**	**53.2**	**-2.0**
3	2400.00	55.3 PK	74.0	-18.7	1.33 V	334	57.5	-2.2
4	2400.00	44.5 AV	54.0	-9.5	1.33 V	334	46.7	-2.2
5	*2439.00	88.7 PK	114.0	-25.3	1.33 V	334	91.3	-2.6
6	*2439.00	67.8 AV	94.0	-26.2	1.33 V	334	70.4	-2.6
7	2483.50	55.2 PK	74.0	-18.8	1.33 V	334	57.6	-2.4
8	2483.50	44.5 AV	54.0	-9.5	1.33 V	334	46.9	-2.4
9	2484.00	56.6 PK	74.0	-17.4	1.33 V	334	59.0	-2.4
10	2484.00	48.7 AV	54.0	-5.3	1.33 V	334	51.1	-2.4
11	4878.00	45.4 PK	74.0	-28.6	1.83 V	111	43.4	2.0
12	4878.00	34.2 AV	54.0	-19.8	1.83 V	111	32.2	2.0
13	7317.00	49.3 PK	74.0	-24.7	1.51 V	312	40.9	8.4
14	7317.00	38.7 AV	54.0	-15.3	1.51 V	312	30.3	8.4

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
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 59	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	2349.00	57.8 PK	74.0	-16.2	1.01 H	289	59.7	-1.9
2	**2349.00**	**51.2 AV**	**54.0**	**-2.8**	**1.01 H**	**289**	**53.1**	**-1.9**
3	2400.00	56.1 PK	74.0	-17.9	1.01 H	289	58.3	-2.2
4	2400.00	44.8 AV	54.0	-9.2	1.01 H	289	47.0	-2.2
5	*2459.00	91.0 PK	114.0	-23.0	1.01 H	289	93.6	-2.6
6	*2459.00	70.2 AV	94.0	-23.8	1.01 H	289	72.8	-2.6
7	2483.50	57.1 PK	74.0	-16.9	1.01 H	289	59.5	-2.4
8	2483.50	43.9 AV	54.0	-10.1	1.01 H	289	46.3	-2.4
9	4918.00	46.4 PK	74.0	-27.6	1.64 H	222	44.4	2.0
10	4918.00	35.3 AV	54.0	-18.7	1.64 H	222	33.3	2.0
11	7377.00	50.7 PK	74.0	-23.3	1.87 H	258	42.1	8.6
12	7377.00	39.7 AV	54.0	-14.3	1.87 H	258	31.1	8.6

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	2349.00	57.1 PK	74.0	-16.9	1.27 V	326	59.0	-1.9
2	2349.00	50.3 AV	54.0	-3.7	1.27 V	326	52.2	-1.9
3	2400.00	55.4 PK	74.0	-18.6	1.27 V	326	57.6	-2.2
4	2400.00	44.2 AV	54.0	-9.8	1.27 V	326	46.4	-2.2
5	*2459.00	89.2 PK	114.0	-24.8	1.27 V	326	91.8	-2.6
6	*2459.00	68.5 AV	94.0	-25.5	1.27 V	326	71.1	-2.6
7	2483.50	55.7 PK	74.0	-18.3	1.27 V	326	58.1	-2.4
8	2483.50	43.6 AV	54.0	-10.4	1.27 V	326	46.0	-2.4
9	4918.00	45.7 PK	74.0	-28.3	1.88 V	112	43.7	2.0
10	4918.00	34.8 AV	54.0	-19.2	1.88 V	112	32.8	2.0
11	7377.00	49.8 PK	74.0	-24.2	1.52 V	306	41.2	8.6
12	7377.00	39.3 AV	54.0	-14.7	1.52 V	306	30.7	8.6

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.

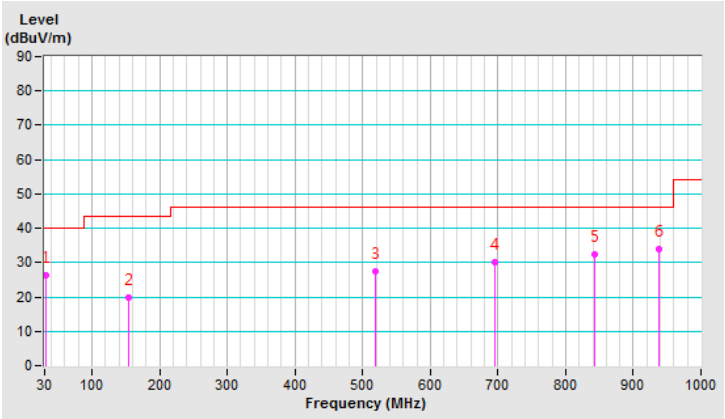
Below 1GHz Data:

CHANNEL	TX Channel 59	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	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	31.02	26.4 QP	40.0	-13.6	1.00 H	242	35.4	-9.0
2	153.99	19.9 QP	43.5	-23.6	1.00 H	160	27.6	-7.7
3	519.15	27.3 QP	46.0	-18.7	1.50 H	0	28.6	-1.3
4	695.69	30.1 QP	46.0	-15.9	1.50 H	116	28.2	1.9
5	843.08	32.3 QP	46.0	-13.7	1.50 H	42	27.8	4.5
6	937.29	34.0 QP	46.0	-12.0	1.00 H	307	27.9	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. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

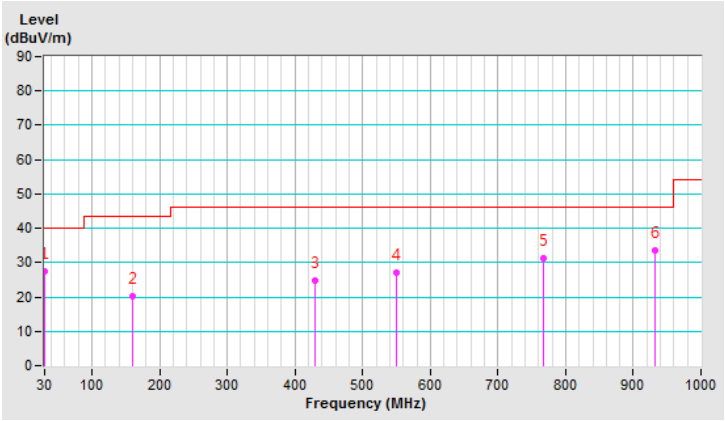


CHANNEL	TX Channel 59	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	30.68	27.3 QP	40.0	-12.7	1.50 V	360	36.2	-8.9
2	160.44	20.3 QP	43.5	-23.2	2.00 V	286	28.0	-7.7
3	429.76	24.7 QP	46.0	-21.3	2.00 V	150	27.9	-3.2
4	549.07	27.1 QP	46.0	-18.9	1.00 V	253	27.9	-0.8
5	766.33	31.3 QP	46.0	-14.7	2.00 V	120	27.9	3.4
6	932.61	33.7 QP	46.0	-12.3	1.00 V	125	27.7	6.0

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. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



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	847124/029	Nov. 01, 2017	Oct. 31, 2018
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Nov. 15, 2017	Nov. 14, 2018
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 04, 2018	June 03, 2019
50 ohms Terminator	N/A	EMC-04	Nov. 01, 2017	Oct. 31, 2018
RF Cable	5D-FB	COCCAB-001	Sep. 29, 2017	Sep. 28, 2018
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 16, 2018	Mar. 15, 2019
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 Conduction 1.
3. Tested Date: Aug. 05, 2018

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.

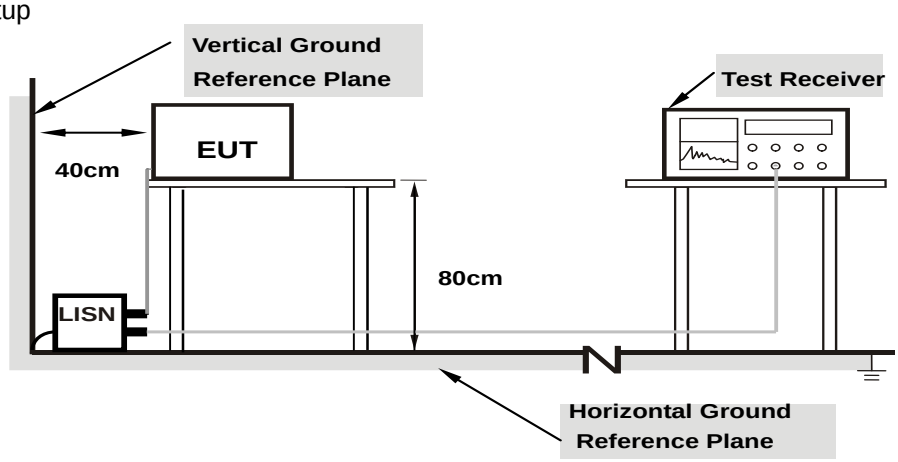
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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



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.

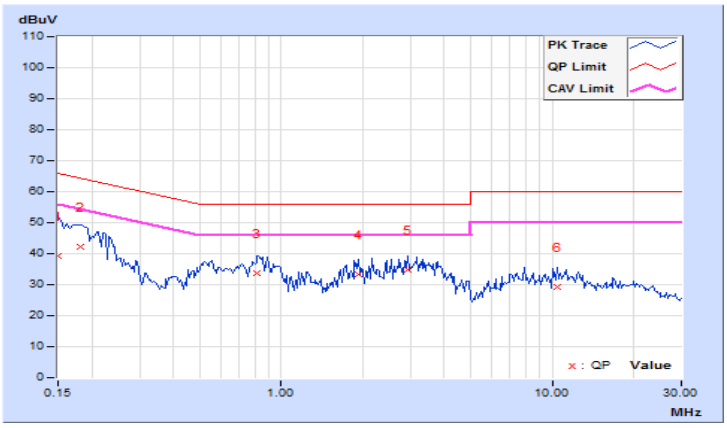
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.03	29.25	15.53	39.28	25.56	66.00	56.00	-26.72	-30.44
2	0.18125	10.05	32.22	8.67	42.27	18.72	64.43	54.43	-22.16	-35.71
3	0.81797	10.14	23.61	6.75	33.75	16.89	56.00	46.00	-22.25	-29.11
4	1.92578	10.19	23.11	11.72	33.30	21.91	56.00	46.00	-22.70	-24.09
5	2.94141	10.23	24.69	14.27	34.92	24.50	56.00	46.00	-21.08	-21.50
6	10.50000	10.57	18.54	11.88	29.11	22.45	60.00	50.00	-30.89	-27.55

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.

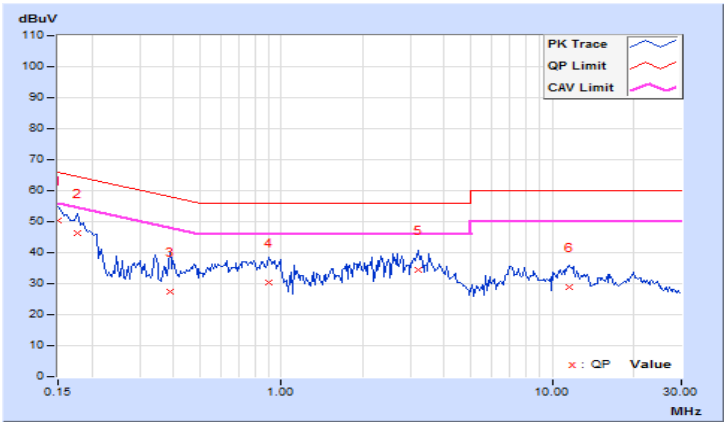


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15000**	**9.94**	**40.44**	**16.46**	**50.38**	**26.40**	**66.00**	**56.00**	**-15.62**	**-29.60**
2	0.17734	9.95	36.37	18.31	46.32	28.26	64.61	54.61	-18.29	-26.35
3	0.38828	10.00	17.24	2.65	27.24	12.65	58.10	48.10	-30.86	-35.45
4	0.90391	10.03	20.43	6.93	30.46	16.96	56.00	46.00	-25.54	-29.04
5	3.19141	10.11	24.44	14.47	34.55	24.58	56.00	46.00	-21.45	-21.42
6	11.51953	10.47	18.39	11.06	28.86	21.53	60.00	50.00	-31.14	-28.47

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.



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 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:

Linkou 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.

--- END ---