

Variant FCC Test Report

Report No.: RF170327C09A-1

FCC ID: UK7-DW5A

Received Date: Oct. 03, 2017

Test Date: Oct. 12, 2017 ~ Oct. 19, 2017

Issued Date: Oct. 26, 2017

Applicant: Fossil Group, Inc.

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

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Release Control Record

Issue No.	Description	Date Issued
RF170327C09A-1	Original Release	Oct. 26, 2017

1 Certificate of Conformity

Product: Smart Watch

Sample Status: Production Unit

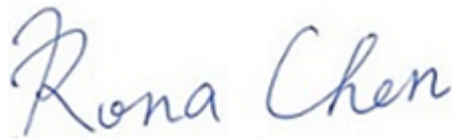
Applicant: Fossil Group, Inc.

Test Date: Oct. 12, 2017 ~ Oct. 19, 2017

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10:2013

This report is issued as a supplementary report to BV CPS report no.: RF170327C09-1. This report shall be used by combining with its original report.

Prepared by :

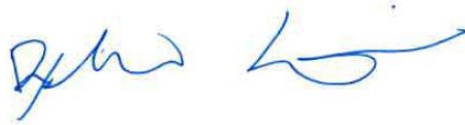


Date:

Oct. 26, 2017

Rona Chen / Specialist

Approved by :



Date:

Oct. 26, 2017

Dylan Chiou / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -0.57 dB at 0.49766 MHz.
15.205 & 209	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -11.87 dB at 47.55 MHz.
15.247(d)	Band Edge Measurement	N/A	Refer to Note
15.247(d)	Antenna Port Emission	N/A	Refer to Note
15.247(a)(2)	6 dB Bandwidth	N/A	Refer to Note
15.247(b)	Conducted power	N/A	Refer to Note
15.247(e)	Power Spectral Density	N/A	Refer to Note
15.203	Antenna Requirement	Pass	No antenna connector is used.

Note: Only Radiated Emissions and AC Power Conducted Emission tests had been performed for the addendum. Refer to original report for other test data.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Frequency	Expanded Uncertainty (k=2) (\pm)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Smart Watch
Status of EUT	Production Unit
Power Supply Rating	5.0 Vdc (Wireless Charger) 3.8 Vdc (Li-ion battery)
Modulation Type	GFSK
Transfer Rate	1 Mbps
Operating Frequency	2402 ~ 2480 MHz
Number of Channel	40
Antenna Type	Loop antenna
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

1. This report is issued as a supplementary report to BV CPS report no.: RF170327C09-1. The difference compared with original report is changing antenna and appearance. Therefore, only Radiated Emissions and AC Power Conducted Emission tests had been performed in this report.
2. There are 2 configurations for the EUT which listed as below.

Sample	Antenna Gain (dBi)	Difference
A	-2.34	The models are different in the appearance and antenna only.
B	-4.91	

3. 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

40 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To			Description
	RE \geq 1G	RE $<$ 1G	PLC	
A	√	√	√	Sample A
B	√	√	√	Sample B

Where **RE \geq 1G**: Radiated Emission above 1 GHz **RE $<$ 1G**: Radiated Emission below 1 GHz
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 **Z-plane**.

Radiated Emission Test (Above 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	Modulation Type	Data Rate (Mbps)
A, B	0 to 39	0, 19, 39	GFSK	1

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	Modulation Type	Data Rate (Mbps)
A, B	0 to 39	19	GFSK	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	Available Channel	Tested Channel	Modulation Type	Data Rate (Mbps)
A, B	0 to 39	19	GFSK	1

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE \geq 1G	25 deg. C, 65 % RH	5 Vdc	Karl Lee
RE $<$ 1G	25 deg. C, 65 % RH	5 Vdc	Karl Lee
PLC	25 deg. C, 65 % RH	5 Vdc	Getaz Yang

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.

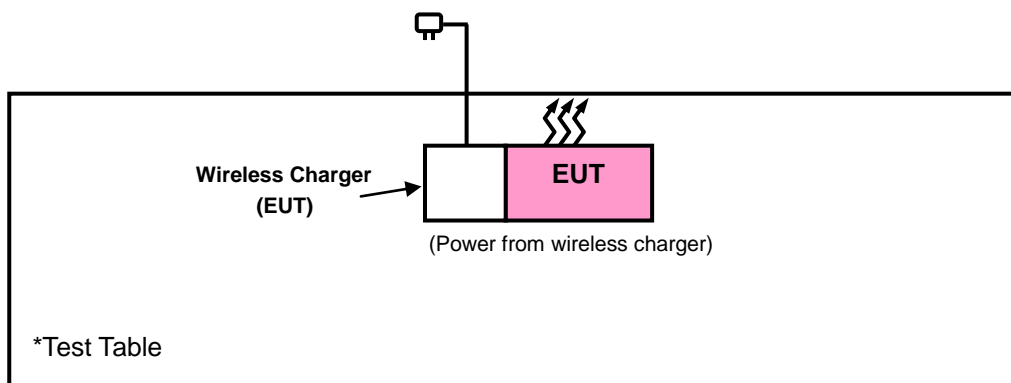
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Adapter	N/A	N/A	N/A	N/A

No.	Signal Cable Description Of The Above Support Units
1.	N/A

Note:

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

3.3.1 Configuration of System under Test



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 (15.247)

558074 D01 DTS Meas Guidance v04

ANSI C63.10-2013

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

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 Agilent Technologies	N9038A	MY52260177	Jul. 05, 2017	Jul. 04, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 13, 2016	Dec. 12, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Dec. 16, 2016	Dec. 15, 2017
HORN Antenna ETS-Lindgren	3117	00143293	Dec. 29, 2016	Dec. 28, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 14, 2016	Dec. 13, 2017
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 17, 2017	Apr. 16, 2018
Bluetooth Tester	CBT	100980	Jun. 28, 2017	Jun. 27, 2019
Loop Antenna	HLA 6121	45745	May 19, 2017	May 18, 2018
Preamplifier Agilent	310N	187226	Jun. 23, 2017	Jun. 22, 2018
Preamplifier Agilent	83017A	MY39501357	Jun. 23, 2017	Jun. 22, 2018
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(R FC-SMS-100-SM S-120+RFC-SMS -100-SMS-400)	Jun. 23, 2017	Jun. 22, 2018
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(R FC-SMS-100-SM S-24)	Jun. 23, 2017	Jun. 22, 2018
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	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 HsinTien Chamber 1.
3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Designation Number is TW0011. The number will be varied with the Lab location and scope as attached.
5. The IC Site Registration No. is IC7450I-1.

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1 GHz) / 1.5 meters (for above 1 GHz) 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:

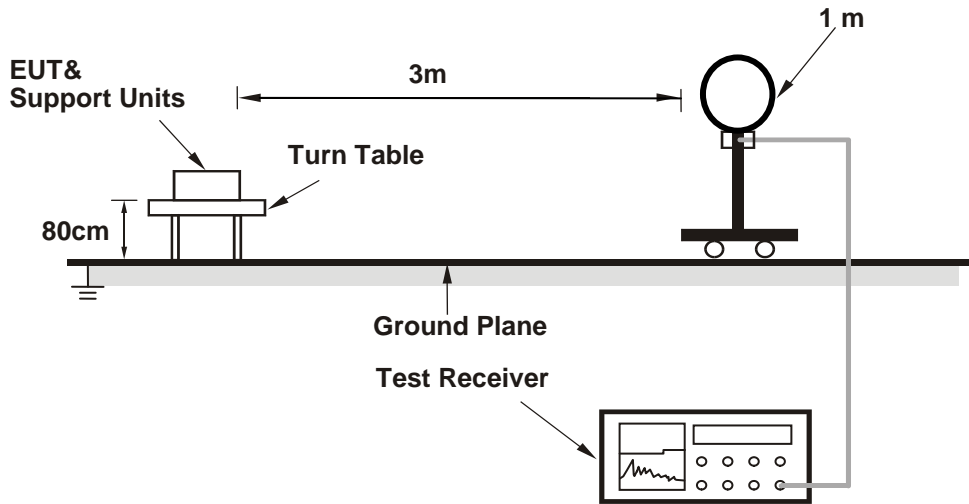
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1/T for Average (Duty cycle < 98 %) detection at frequency above 1 GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz (Duty cycle \geq 98 %) for Average detection (AV) at frequency above 1 GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

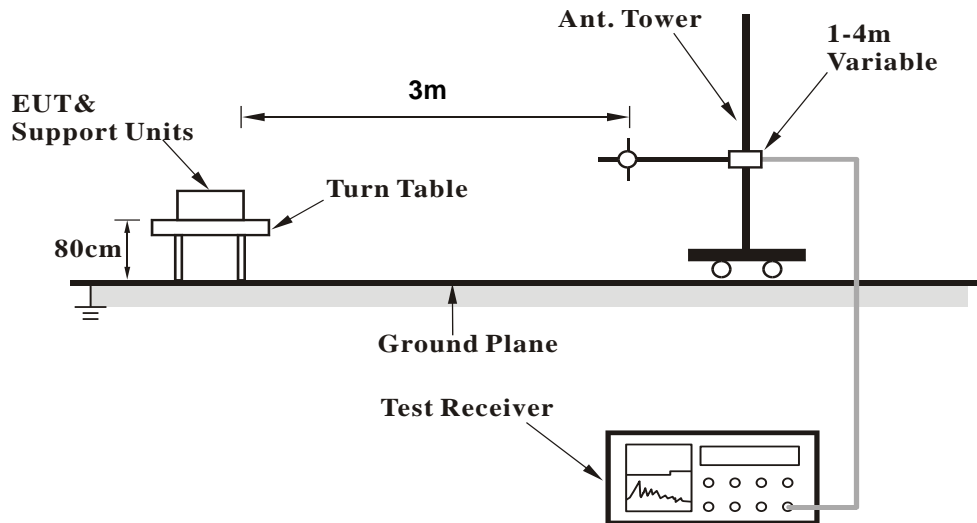
No deviation.

4.1.5 Test Set Up

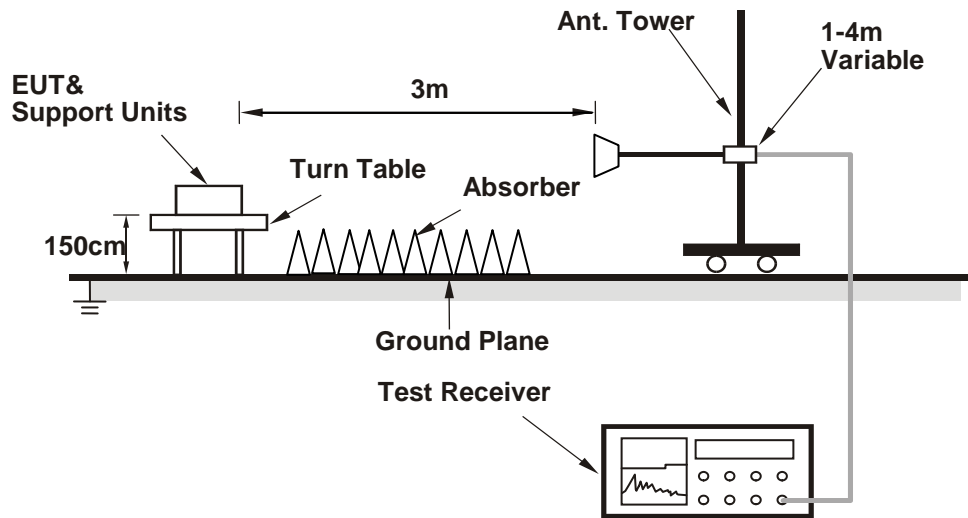
<Radiated emission below 30 MHz>



<Frequency Range below 1 GHz>



<Frequency Range above 1 GHz>



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

4.1.6 EUT Operating Conditions

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

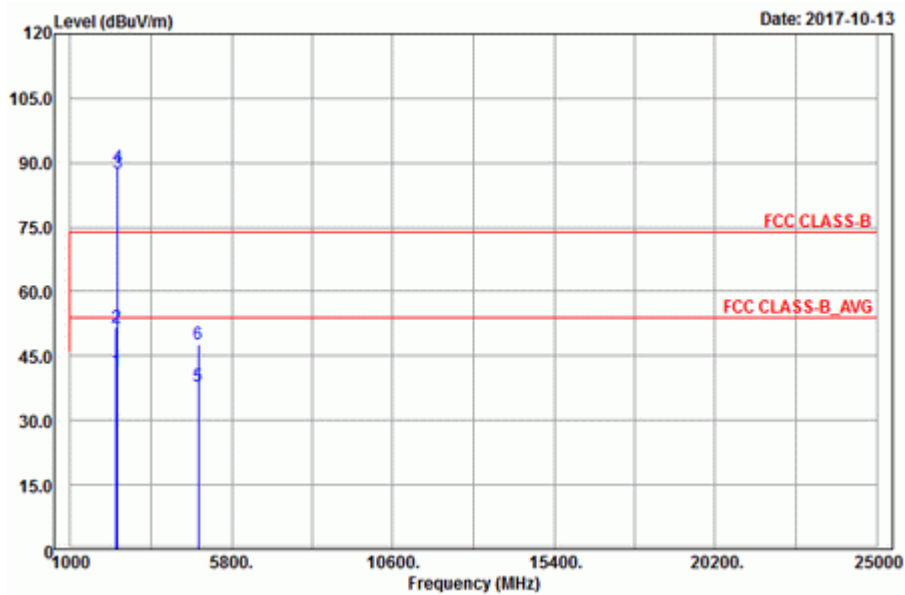
4.1.7 Test Results

Above 1 GHz Data:

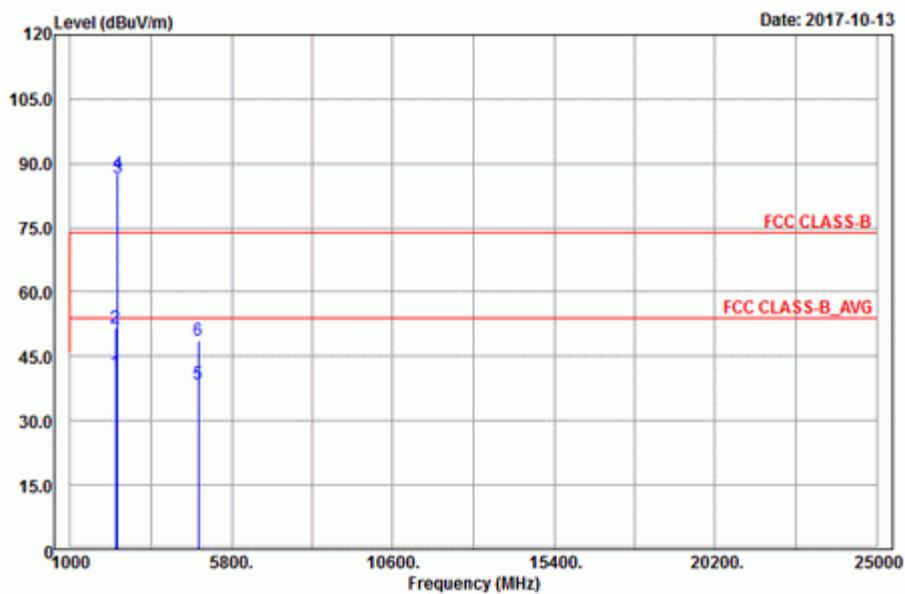
Mode A

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



Antennal Polarity & Test Distance: Horizontal at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2365.62	41.55	39.91	54	-12.45	31.76	5.37	35.49	166	347	Average
2365.62	51.74	50.1	74	-22.26	31.76	5.37	35.49	166	347	Peak
2402	87.78	86.05			31.8	5.4	35.47	166	347	Average
2402	88.89	87.16			31.8	5.4	35.47	166	347	Peak
4804	37.85	29.76	54	-16.15	33.96	8.25	34.12	190	18	Average
4804	47.7	39.61	74	-26.3	33.96	8.25	34.12	190	18	Peak

Antennal Polarity & Test Distance: Vertical at 3 m

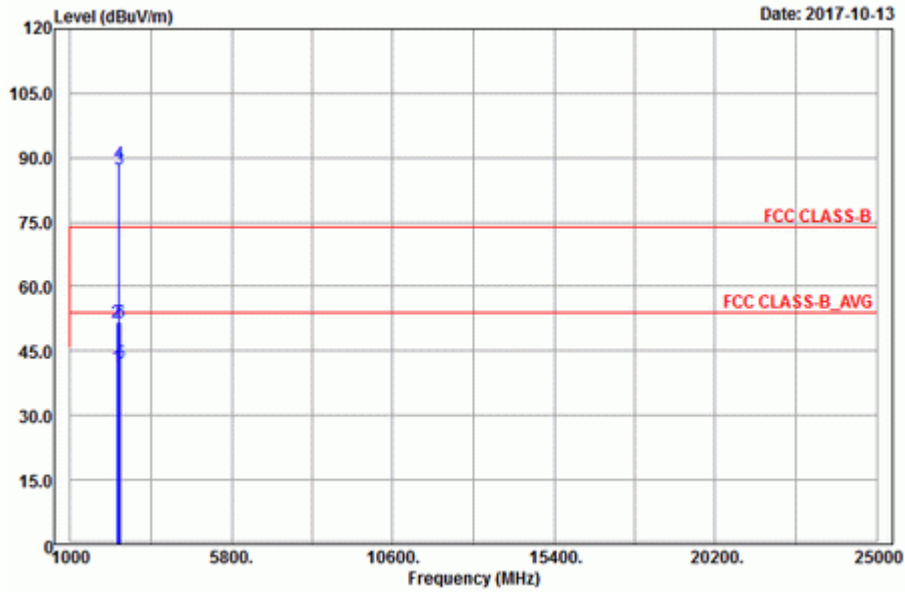
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2344.29	41.17	39.6	54	-12.83	31.74	5.33	35.5	107	356	Average
2344.29	51.78	50.21	74	-22.22	31.74	5.33	35.5	107	356	Peak
2402	86.52	84.79			31.8	5.4	35.47	107	356	Average
2402	87.68	85.95			31.8	5.4	35.47	107	356	Peak
4804	38.63	30.54	54	-15.37	33.96	8.25	34.12	162	77	Average
4804	48.77	40.68	74	-25.23	33.96	8.25	34.12	162	77	Peak

Remarks:

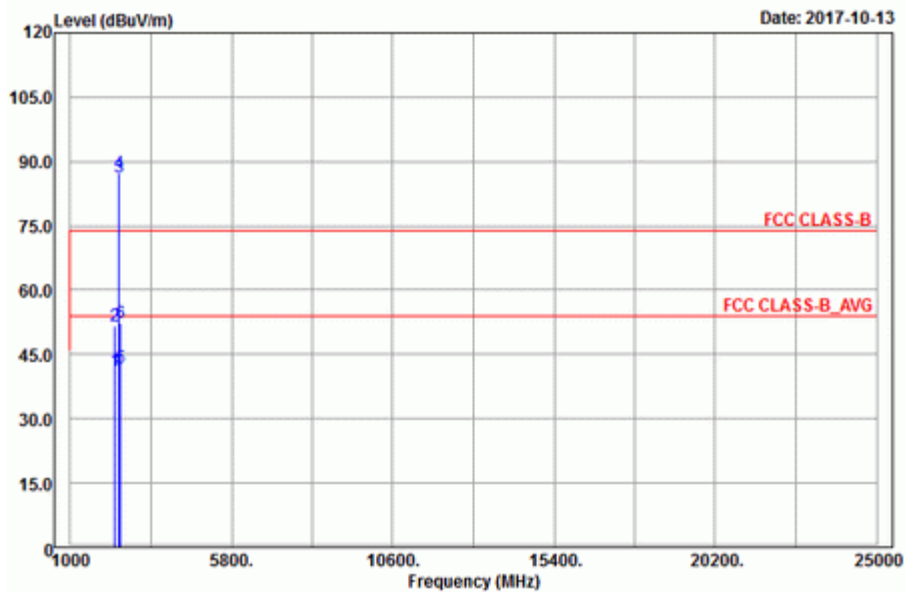
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2402 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 19	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



Antennal Polarity & Test Distance: Horizontal at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2381.82	41.36	39.67	54	-12.64	31.78	5.4	35.49	166	347	Average
2381.82	51.68	49.99	74	-22.32	31.78	5.4	35.49	166	347	Peak
2440	87.41	85.56			31.85	5.46	35.46	166	347	Average
2440	88.67	86.82			31.85	5.46	35.46	166	347	Peak
2486.76	42.07	40.08	54	-11.93	31.88	5.53	35.42	166	347	Average
2486.76	51.61	49.62	74	-22.39	31.88	5.53	35.42	166	347	Peak

Antennal Polarity & Test Distance: Vertical at 3 m

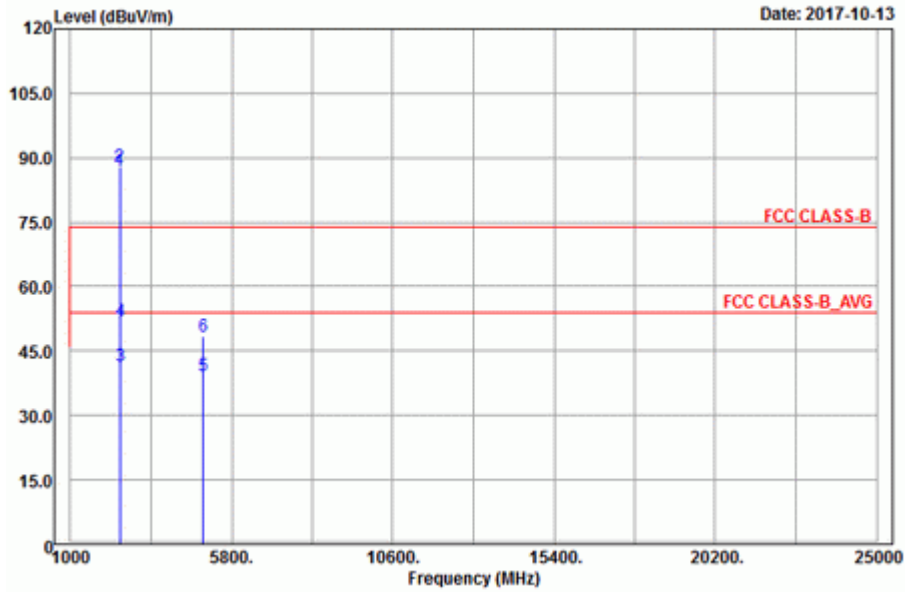
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2335.29	41.1	39.55	54	-12.9	31.74	5.33	35.52	107	356	Average
2335.29	51.71	50.16	74	-22.29	31.74	5.33	35.52	107	356	Peak
2440	86.41	84.56			31.85	5.46	35.46	107	356	Average
2440	87.36	85.51			31.85	5.46	35.46	107	356	Peak
2484.4	41.71	39.72	54	-12.29	31.88	5.53	35.42	107	356	Average
2484.4	52.44	50.45	74	-21.56	31.88	5.53	35.42	107	356	Peak

Remarks:

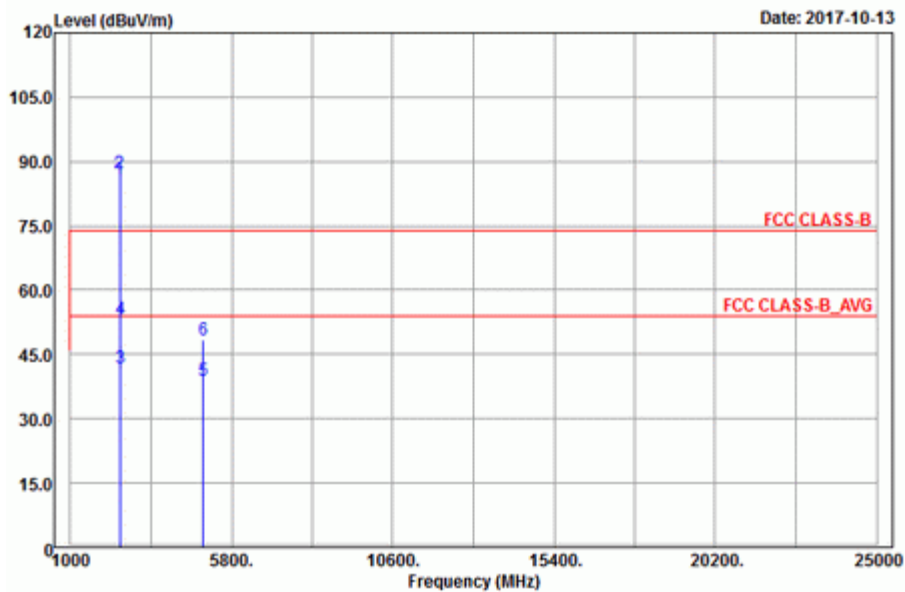
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2440 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



Antennal Polarity & Test Distance: Horizontal at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	86.95	84.99			31.88	5.5	35.42	166	347	Average
2480	87.99	86.03			31.88	5.5	35.42	166	347	Peak
2497.12	41.65	39.63	54	-12.35	31.9	5.53	35.41	166	347	Average
2497.12	51.84	49.82	74	-22.16	31.9	5.53	35.41	166	347	Peak
4960	39.28	31.01	54	-14.72	33.99	8.29	34.01	125	107	Average
4960	48.3	40.03	74	-25.7	33.99	8.29	34.01	125	107	Peak

Antennal Polarity & Test Distance: Vertical at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	86.1	84.14			31.88	5.5	35.42	107	356	Average
2480	87.24	85.28			31.88	5.5	35.42	107	356	Peak
2497.44	41.85	39.83	54	-12.15	31.9	5.53	35.41	107	356	Average
2497.44	53.17	51.15	74	-20.83	31.9	5.53	35.41	107	356	Peak
4960	38.92	30.65	54	-15.08	33.99	8.29	34.01	131	273	Average
4960	48.26	39.99	74	-25.74	33.99	8.29	34.01	131	273	Peak

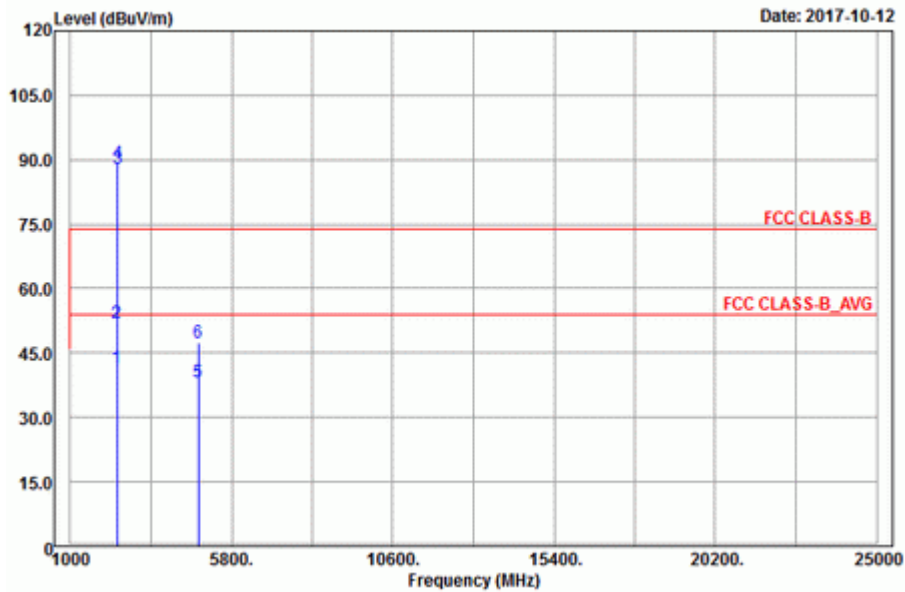
Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2480 MHz: Fundamental frequency.

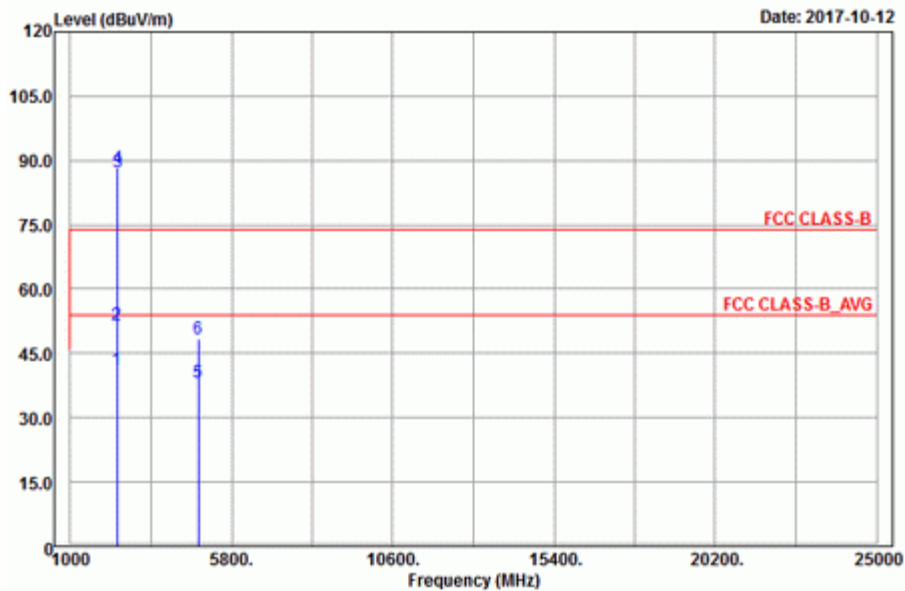
Mode B

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



Antennal Polarity & Test Distance: Horizontal at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.75	41.36	39.65	54	-12.64	31.8	5.4	35.49	269	338	Average
2388.75	51.96	50.25	74	-22.04	31.8	5.4	35.49	269	338	Peak
2402	88.09	86.36			31.8	5.4	35.47	269	338	Average
2402	89.18	87.45			31.8	5.4	35.47	269	338	Peak
4804	38.17	30.08	54	-15.83	33.96	8.25	34.12	192	305	Average
4804	47.46	39.37	74	-26.54	33.96	8.25	34.12	192	305	Peak

Antennal Polarity & Test Distance: Vertical at 3 m

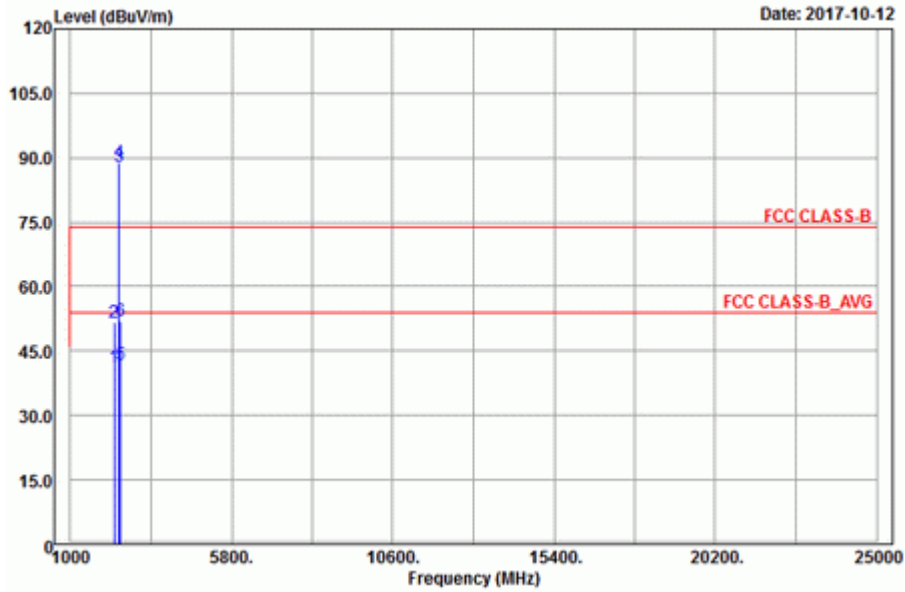
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2384.43	41.15	39.46	54	-12.85	31.78	5.4	35.49	174	2	Average
2384.43	51.6	49.91	74	-22.4	31.78	5.4	35.49	174	2	Peak
2402	87.16	85.43			31.8	5.4	35.47	174	2	Average
2402	88.22	86.49			31.8	5.4	35.47	174	2	Peak
4804	38.38	30.29	54	-15.62	33.96	8.25	34.12	143	152	Average
4804	48.26	40.17	74	-25.74	33.96	8.25	34.12	143	152	Peak

Remarks:

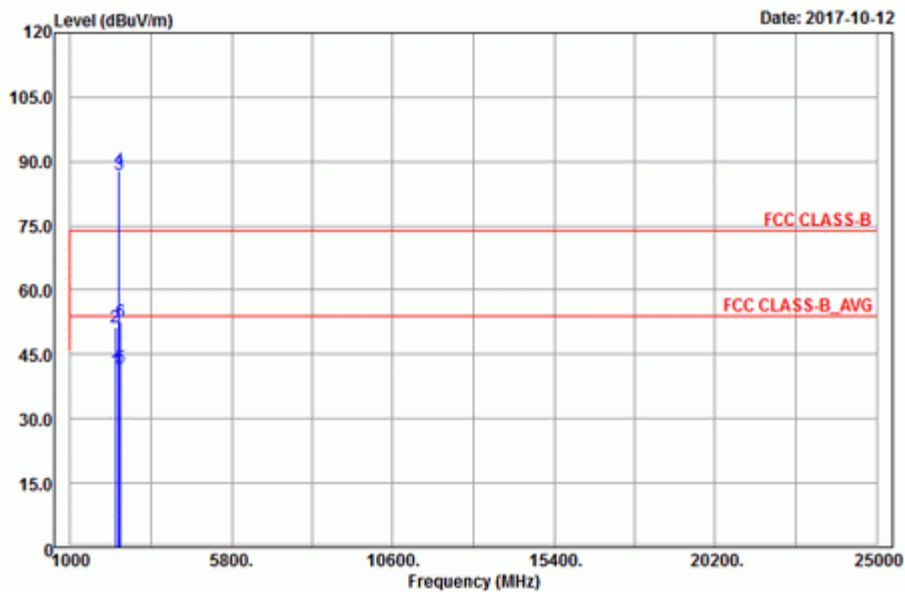
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2402 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 19	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



Antennal Polarity & Test Distance: Horizontal at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2310.9	41.16	39.68	54	-12.84	31.71	5.3	35.53	269	338	Average
2310.9	51.52	50.04	74	-22.48	31.71	5.3	35.53	269	338	Peak
2440	87.96	86.11			31.85	5.46	35.46	269	338	Average
2440	89.05	87.2			31.85	5.46	35.46	269	338	Peak
2490.48	42.01	40	54	-11.99	31.9	5.53	35.42	269	338	Average
2490.48	51.87	49.86	74	-22.13	31.9	5.53	35.42	269	338	Peak

Antennal Polarity & Test Distance: Vertical at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2342.85	41.35	39.78	54	-12.65	31.74	5.33	35.5	174	2	Average
2342.85	51.36	49.79	74	-22.64	31.74	5.33	35.5	174	2	Peak
2440	87.03	85.18			31.85	5.46	35.46	174	2	Average
2440	88.1	86.25			31.85	5.46	35.46	174	2	Peak
2497.92	41.86	39.84	54	-12.14	31.9	5.53	35.41	174	2	Average
2497.92	52.62	50.6	74	-21.38	31.9	5.53	35.41	174	2	Peak

Remarks:

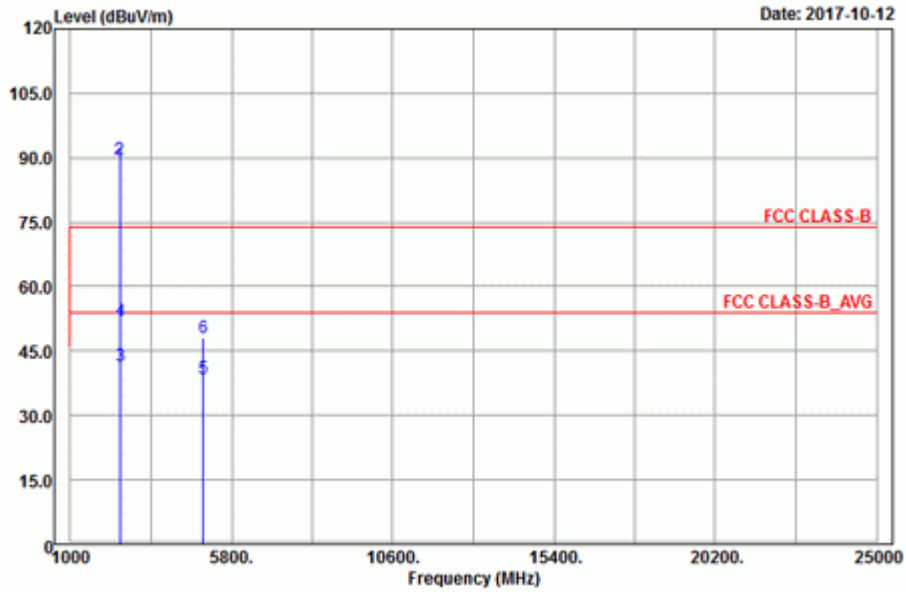
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

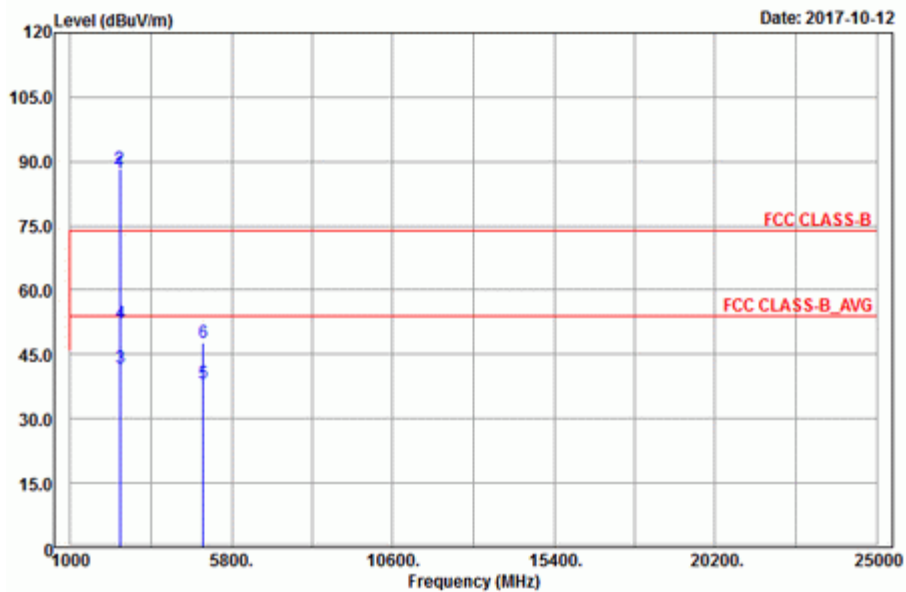
2. 2440 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



Antennal Polarity & Test Distance: Horizontal at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	88.36	86.4			31.88	5.5	35.42	269	338	Average
2480	89.52	87.56			31.88	5.5	35.42	269	338	Peak
2498.64	41.57	39.55	54	-12.43	31.9	5.53	35.41	269	338	Average
2498.64	52.09	50.07	74	-21.91	31.9	5.53	35.41	269	338	Peak
4960	38.57	30.3	54	-15.43	33.99	8.29	34.01	169	320	Average
4960	48.04	39.77	74	-25.96	33.99	8.29	34.01	169	320	Peak

Antennal Polarity & Test Distance: Vertical at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	87.41	85.45			31.88	5.5	35.42	174	2	Average
2480	88.4	86.44			31.88	5.5	35.42	174	2	Peak
2494.28	41.83	39.81	54	-12.17	31.9	5.53	35.41	174	2	Average
2494.28	52.39	50.37	74	-21.61	31.9	5.53	35.41	174	2	Peak
4960	38.25	29.98	54	-15.75	33.99	8.29	34.01	105	74	Average
4960	47.87	39.6	74	-26.13	33.99	8.29	34.01	105	74	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2480 MHz: Fundamental frequency.

9 kHz ~ 30 MHz Data:

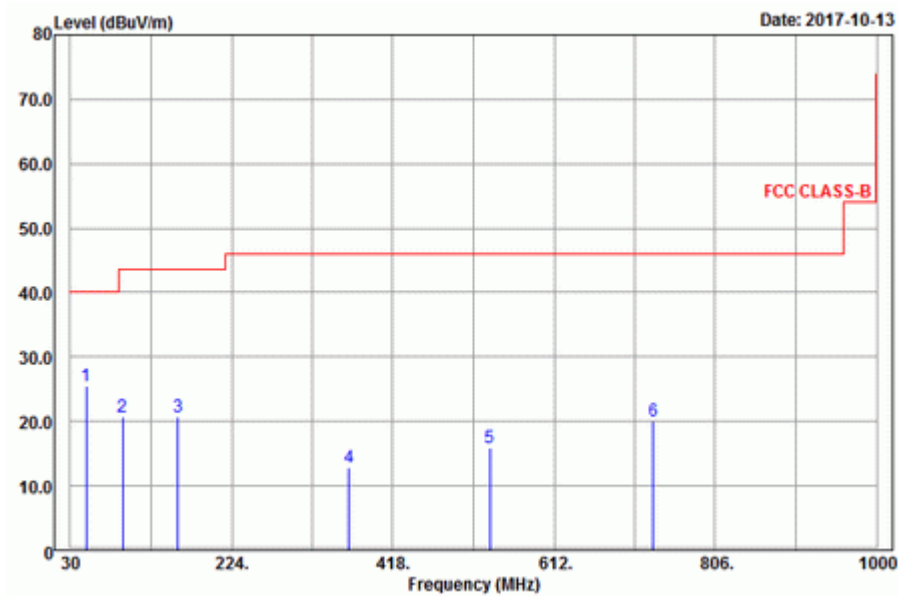
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Worst-Case Data:

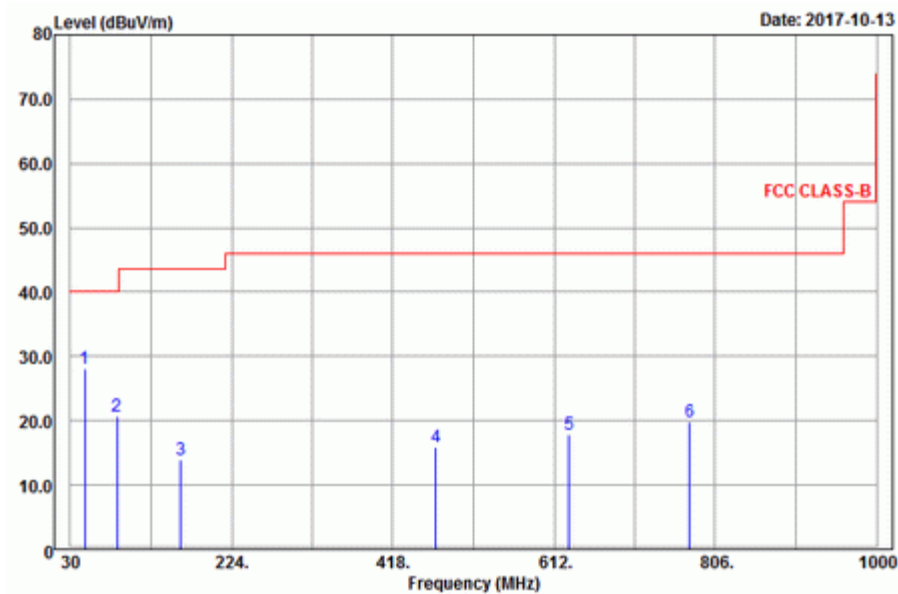
Mode A

EUT Test Condition		Measurement Detail	
Channel	Channel 19	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



Antennal Polarity & Test Distance: Horizontal at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
49.17	25.54	42.31	40	-14.46	14.55	0.9	32.22	124	236	Peak
92.64	20.72	40.33	43.5	-22.78	11.16	1.11	31.88	197	265	Peak
159.87	20.8	42.8	43.5	-22.7	8.75	1.52	32.27	175	241	Peak
365.1	12.78	28.22	46	-33.22	14.41	2.26	32.11	160	283	Peak
535.2	15.93	28.59	46	-30.07	16.81	2.7	32.17	148	213	Peak
731.2	20.13	29.47	46	-25.87	19.62	3.16	32.12	196	125	Peak

Antennal Polarity & Test Distance: Vertical at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
47.55	28.13	44.94	40	-11.87	14.51	0.9	32.22	160	128	Peak
86.16	20.71	42.07	40	-19.29	9.44	1.11	31.91	169	134	Peak
162.57	13.87	35.76	43.5	-29.63	8.85	1.52	32.26	124	186	Peak
470.1	15.94	29.61	46	-30.06	15.9	2.56	32.13	123	158	Peak
630.4	17.89	28.92	46	-28.11	18.21	2.93	32.17	138	162	Peak
775.3	19.89	28.64	46	-26.11	20.08	3.27	32.1	190	127	Peak

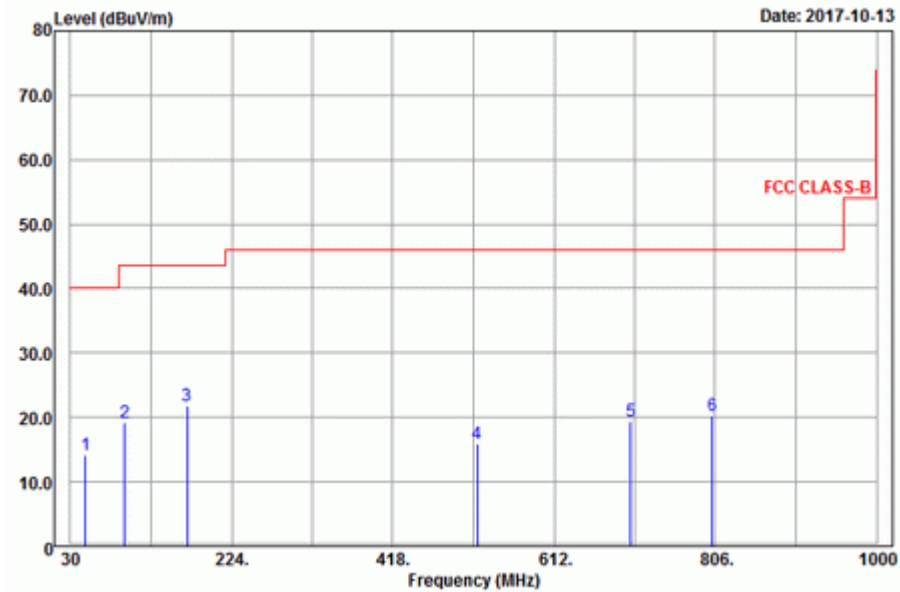
Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value

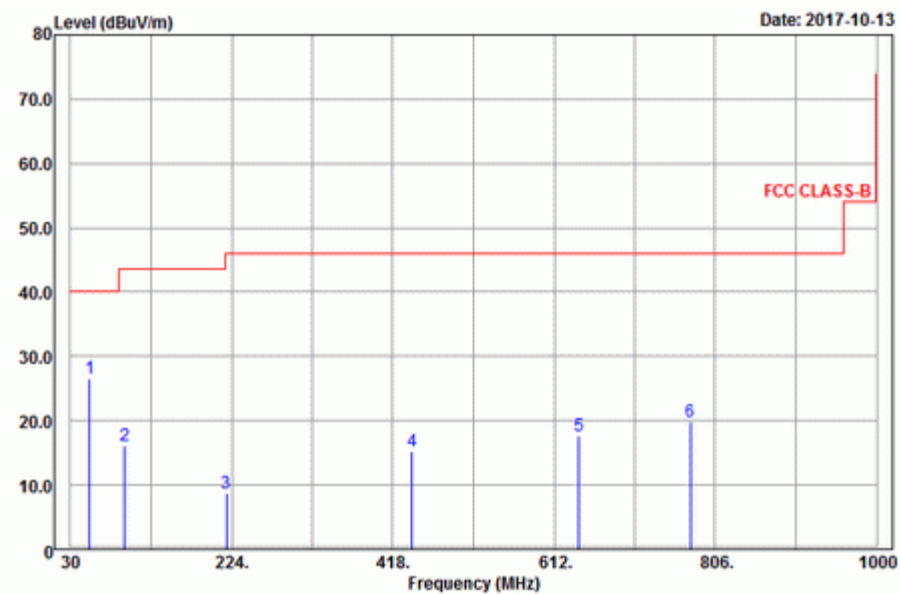
Mode B

EUT Test Condition		Measurement Detail	
Channel	Channel 19	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Horizontal



Vertical



Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
48.09	14.06	30.82	40	-25.94	14.56	0.9	32.22	157	241	Peak
95.34	19.1	38.19	43.5	-24.4	11.62	1.28	31.99	138	225	Peak
170.13	21.81	43.44	43.5	-21.69	9.09	1.52	32.24	190	163	Peak
519.8	15.82	28.66	46	-30.18	16.6	2.7	32.14	151	284	Peak
704.6	19.42	29.11	46	-26.58	19.29	3.11	32.09	106	329	Peak
802.6	20.29	28.66	46	-25.71	20.36	3.32	32.05	100	130	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
53.49	26.53	43.56	40	-13.47	14.3	0.9	32.23	165	152	Peak
95.61	16.19	35.2	43.5	-27.31	11.75	1.28	32.04	138	204	Peak
217.38	8.64	27.93	46	-37.36	11.29	1.65	32.23	127	29	Peak
441.4	15.31	29.55	46	-30.69	15.43	2.49	32.16	198	236	Peak
641.6	17.72	28.57	46	-28.28	18.32	2.99	32.16	171	241	Peak
776	19.86	28.6	46	-26.14	20.09	3.27	32.1	160	235	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
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 0.50 MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCS 30	100288	Aug. 17, 2017	Aug. 16, 2018
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 08, 2017	Sep. 07, 2018
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 17, 2017	Jan. 16, 2018
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 02, 2017	Aug. 01, 2018
Software ADT	BV ADT_Cond_ V7.3.7.3	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 2.
 3. The VCCI Site Registration No. is C-2047.

4.2.3 Test Procedures

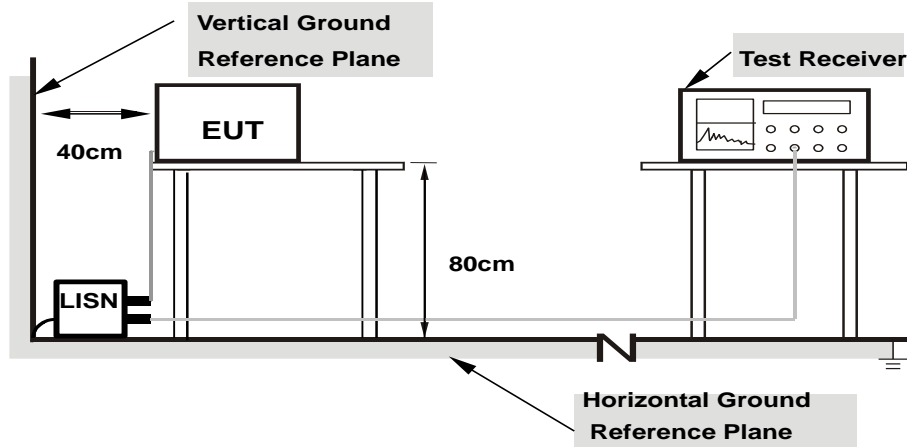
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling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

Note: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 TEST SETUP



- Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

4.2.6 EUT Operating Conditions

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

4.2.7 Test Results

CONDUCTED WORST-CASE DATA

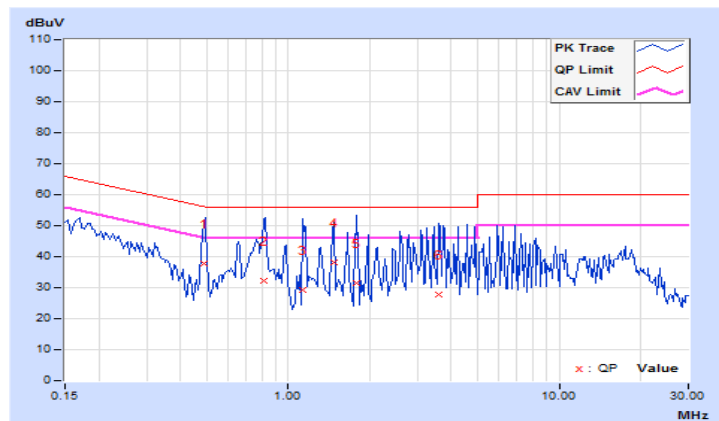
Mode A

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Getaz Yang	Test Date	2017/10/19

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	0.48594	10.31	27.57	11.71	37.88	22.02	56.24	46.24	-18.36	-24.22
2	0.81016	10.37	21.70	10.14	32.07	20.51	56.00	46.00	-23.93	-25.49
3	1.13281	10.41	18.87	9.14	29.28	19.55	56.00	46.00	-26.72	-26.45
4	1.48047	10.39	27.84	32.59	38.23	42.98	56.00	46.00	-17.77	-3.02
5	1.78125	10.38	21.14	12.29	31.52	22.67	56.00	46.00	-24.48	-23.33
6	3.57422	10.45	17.42	8.32	27.87	18.77	56.00	46.00	-28.13	-27.23

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

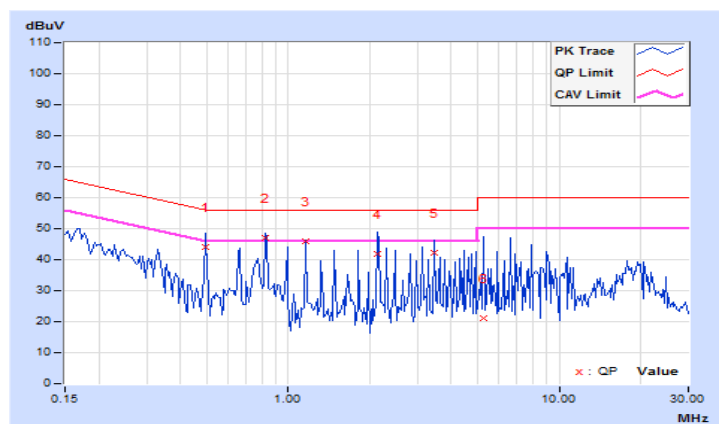


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Getaz Yang	Test Date	2017/10/19

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	0.49375	10.33	33.74	31.36	44.07	41.69	56.10	46.10	-12.03	-4.41
2	0.82578	10.33	36.59	31.01	46.92	41.34	56.00	46.00	-9.08	-4.66
3	1.16016	10.34	35.69	30.51	46.03	40.85	56.00	46.00	-9.97	-5.15
4	2.14844	10.42	31.58	24.22	42.00	34.64	56.00	46.00	-14.00	-11.36
5	3.47266	10.55	31.65	2.71	42.20	13.26	56.00	46.00	-13.80	-32.74
6	5.27344	10.58	10.45	17.85	21.03	28.43	60.00	50.00	-38.97	-21.57

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



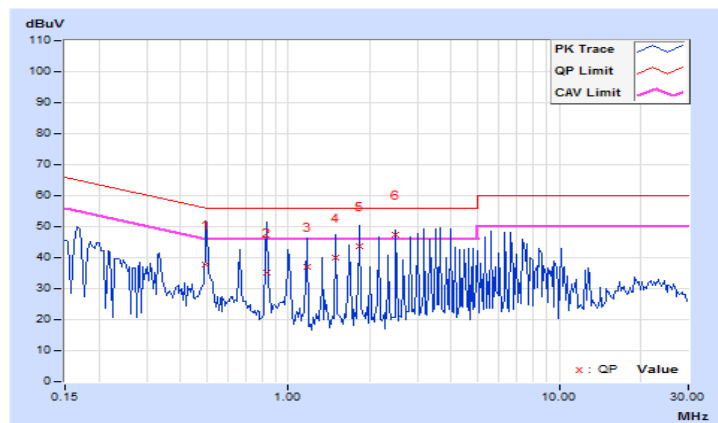
Mode B

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Getaz Yang	Test Date	2017/10/19

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	0.49766	10.31	27.48	35.16	37.79	45.47	56.04	46.04	-18.25	-0.57
2	0.83359	10.38	24.79	34.10	35.17	44.48	56.00	46.00	-20.83	-1.52
3	1.17188	10.41	26.80	24.44	37.21	34.85	56.00	46.00	-18.79	-11.15
4	1.50391	10.39	29.58	26.37	39.97	36.76	56.00	46.00	-16.03	-9.24
5	1.83594	10.38	33.47	29.18	43.85	39.56	56.00	46.00	-12.15	-6.44
6	2.50000	10.39	36.87	4.68	47.26	15.07	56.00	46.00	-8.74	-30.93

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

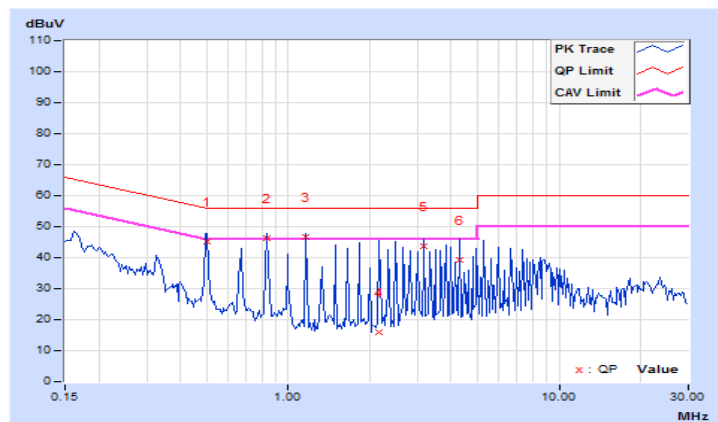


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Getaz Yang	Test Date	2017/10/19

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	0.50156	10.33	35.02	32.62	45.35	42.95	56.00	46.00	-10.65	-3.05
2	0.83359	10.33	36.02	29.05	46.35	39.38	56.00	46.00	-9.65	-6.62
3	1.16406	10.34	36.34	33.60	46.68	43.94	56.00	46.00	-9.32	-2.06
4	2.16406	10.42	5.57	18.87	15.99	29.29	56.00	46.00	-40.01	-16.71
5	3.16016	10.52	33.26	1.02	43.78	11.54	56.00	46.00	-12.22	-34.46
6	4.31250	10.60	28.50	0.59	39.10	11.19	56.00	46.00	-16.90	-34.81

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:

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety

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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