

## FCC Test Report

**Report No.:** RF190709C07 R1

**FCC ID:** K7SF8J183V2

**Test Model:** F8J183V2

**Received Date:** Jul. 9, 2019

**Test Date:** Jul. 11 to Aug. 6, 2019

**Issued Date:** Sep. 4, 2019

**Applicant:** Belkin International, Inc.

**Address:** 12045 East Waterfront Drive, Playa Vista, CA 90094

**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,  
R.O.C.

**FCC Registration /  
Designation Number:** 198487 / TW2021



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**Report Issue History Record**

Issue No.	Description	Date Issued
RF190709C07	Original release.	Aug. 6, 2019
RF190709C07 R1	Modify product name.	Sep. 4, 2019

**Release Control Record**

Issue No.	Description	Date Issued
RF190709C07	Original release.	Aug. 6, 2019
RF190709C07 R1	Modify product name.	Sep. 4, 2019

## 1 Certificate of Conformity

**Product:** Charge Dock for Apple Watch + iPhone

**Brand:** belkin

**Test Model:** F8J183V2

**Sample Status:** Engineering sample

**Applicant:** Belkin International, Inc.

**Test Date:** Jul. 11 to Aug. 6, 2019

**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 :**



**Date:**

Sep. 4, 2019

Celia Chen / Supervisor

**Approved by :**



**Date:**

Sep. 4, 2019

Rex Lai / Associate Technical Manager

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.209)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -10.05dB at 0.18516MHz.
15.209	Radiated Emission Test	Pass	Meet the requirement of limit. Minimum passing margin is -4.94dB at 39.45MHz

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) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.77 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.38 dB
	30MHz ~ 1000MHz	5.43 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

Product	Charge Dock for Apple Watch + iPhone
Brand	belkin
Test Model	F8J183V2
Sample Status	Engineering sample
Rating	12Vdc (Adapter)
Modulation Type	FSK
Operating Frequency	326.5 kHz
Antenna Type	Coil antenna
Field Strength	52.86dBuV/m
Dimensions	3.80cm <sup>2</sup> (diameter = 22mm)
Accessory Device	Adapter
Data Cable Supplied	N/A
Maximum Power Output from the Charging Coil	5W

Note:

1. The EUT has a wireless inductive charging coil for charging Apple Watch.
2. The EUT uses following adapter.

Brand	HOIOTO
Model	ADS-25SGP-12 12019E
Input Power	100-240Vac, 50/60Hz, 0.7A Max.
Output Power	12Vdc, 1.6A
Power Line	1.45m non-shielded DC cable without core attached on adapter

3. After the evaluation of the metal and plastic band on Apple Watch, the metal band was the worst case for final test and therefore only its test data 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

The following test frequency is provided to this EUT:

Operating Frequency (kHz)	Test Mode
326.5	Charging Mode with Apple Watch
326.5	Standby Mode

### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To		Description
	RE<1G	PLC	
A	√	√	Charging Mode with Apple Watch
B	√	√	Standby Mode

Where **RE<1G**: Radiated Emission below 1GHz **PLC**: Power Line Conducted Emission

#### 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.

For Frequency below 30MHz			
EUT Configure Mode	Operating Frequency (kHz)	Tested Frequency (kHz)	Test Sample
A	326.5	326.5	01
B	326.5	326.5	01
For Frequency between 30-1000MHz			
EUT Configure Mode	Operating Frequency (kHz)	Tested Frequency (kHz)	Test Sample
A	326.5	326.5	01 & 02
B	326.5	326.5	01

Note: Two samples are electrically identical, different samples are verified only.

#### 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	Operating Frequency (kHz)	Tested Frequency (kHz)	Test Sample
A	326.5	326.5	01
B	326.5	326.5	01

#### Test Condition:

Applicable To	Test Sample	Environmental Conditions	Input Power	Tested by
RE<1G	01	25 deg. C, 76% RH	120Vac, 60Hz	Ian Chang
	02	25 deg. C, 76% RH	120Vac, 60Hz	Dalen Dai
PLC	01	25 deg. C, 75% RH	120Vac, 60Hz	StarItaly Wu

### 3.3 Description of Support Units

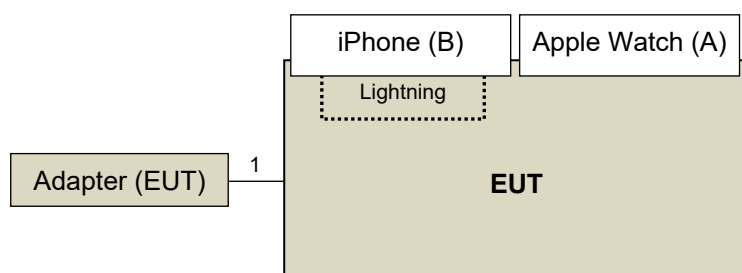
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Apple Watch	Apple	A1554	NA	NA	Supplied by client
B.	iPhone XS Max	Apple	A2101	NA	NA	Supplied by client

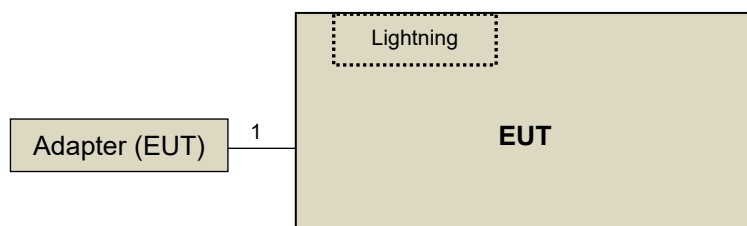
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC cable	1	1.45	N	0	Supplied by client

#### 3.3.1 Configuration of System under Test

Test Mode A:



Test Mode B:



### **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:

#### **47 CFR FCC Part 15, Subpart C (Section 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

##### For Frequency Below 30MHz

Frequency (MHz)	Field Strength (dBuV/m)		Measurement Distance (meters)
	uV/m	dBuV/m	
0.009 – 0.490	2400 / F (kHz)	48.52-13.80	300
0.490 – 1.705	24000 / F (kHz)	33.80-22.97	30
1.705 – 30.0	30	29.54	30

##### For Frequency Between 30-1000MHz

Frequency (MHz)	Class A (at 10m)		Class B (at 3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
30-88	90	39.1	100	40.0
88-216	150	43.5	150	43.5
216-960	210	46.4	200	46.0
Above 960	300	49.5	500	54.0

#### 4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 20, 2019	Feb. 19, 2020
HP Preamplifier	8449B	3008A01201	Feb. 21, 2019	Feb. 20, 2020
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 20, 2019	Feb. 19, 2020
Agilent TEST RECEIVER	N9038A	MY51210129	Mar. 05, 2019	Mar. 04, 2020
Schwarzbeck Antenna	VULB 9168	139	Nov. 26, 2018	Nov. 25, 2019
Schwarzbeck Antenna	VHBA 9123	480	Jun. 3, 2019	Jun. 2, 2021
Schwarzbeck Horn Antenna	BBHA-9170	212	Nov. 25, 2018	Nov. 24, 2019
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Nov. 25, 2018	Nov. 24, 2019
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15.9.5	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF102	Cable-CH6-01	Aug. 13, 2018	Aug. 12, 2019
SUHNER RF cable With 3/4dB PAD	SF102	Cable-CH8-3.6m	Aug. 13, 2018	Aug. 12, 2019
KEYSIGHT MIMO Powermeasurement Test set	U2021XA	U2021XA-001	Jun. 11, 2019	Jun. 10, 2020
Loop Antenna EMCI	LPA600	270	Aug. 11, 2017	Aug. 10, 2019

- NOTE:** 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.
4. Tested Date: Jul. 11 to Aug. 6, 2019

#### 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 200Hz at frequency range 9kHz to 150kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency range 150kHz to 30MHz.

##### For Radiated emission above 30MHz

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

Note:

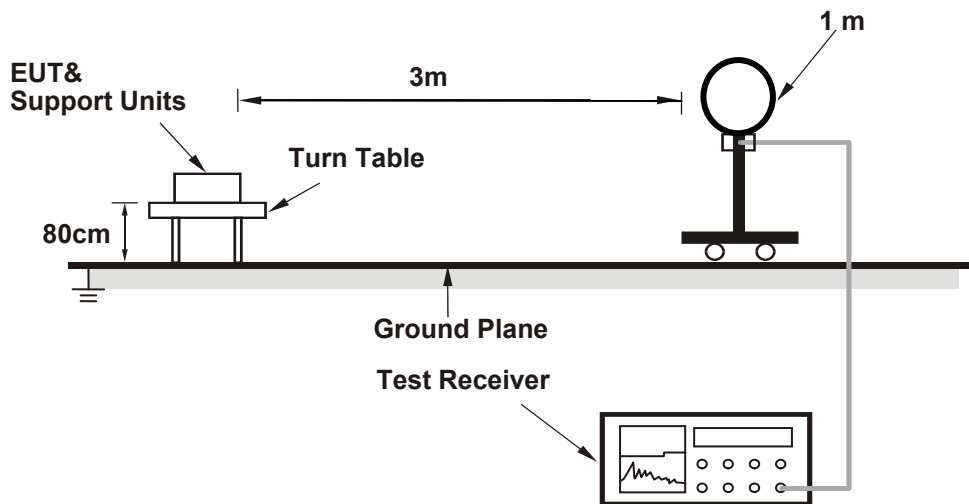
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

#### 4.1.4 Deviation from Test Standard

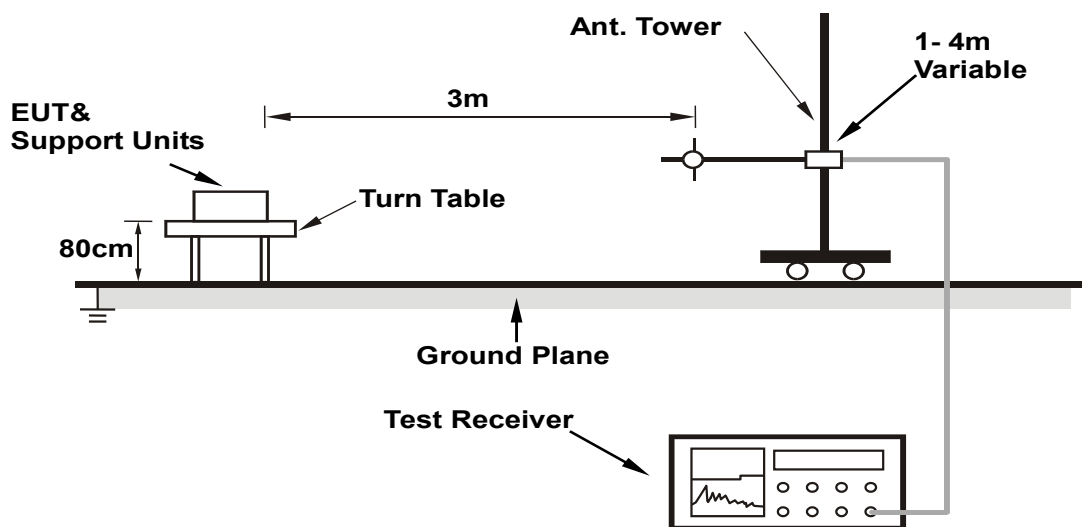
No deviation.

#### 4.1.5 Test Set Up

##### For Radiated emission below 30MHz



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



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

#### 4.1.6 EUT Operating Conditions

Test Mode A:

- The EUT powered by adapter.
- Put the Apple Watch on the EUT (wireless charging) during the test.
- Connect the iPhone with the Lightning connector of EUT (charging) during the test.

Test Mode B:

- The EUT powered by adapter.
- Set the EUT under standby condition.

#### 4.1.7 Test Results

Below 30MHz Data:

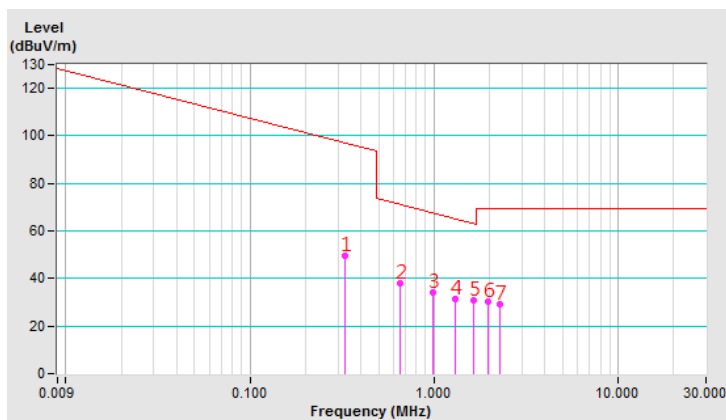
Charging Mode

TEST FREQUENCY	326.5kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 30MHz		
TEST MODE	A		
TEST SAMPLE	01		

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	*0.3265	49.38 QP	97.33	-47.95	1.00	335	37.37	12.01
2	0.6530	38.12 QP	71.31	-33.19	1.00	253	30.55	7.57
3	0.9795	34.36 QP	67.78	-33.42	1.00	204	29.10	5.26
4	1.3060	31.44 QP	65.29	-33.85	1.00	168	26.94	4.50
5	1.6325	30.77 QP	63.35	-32.58	1.00	143	27.01	3.76
6	1.9590	30.37 QP	69.54	-39.17	1.00	109	27.37	3.00
7	2.2855	29.40 QP	69.54	-40.14	1.00	89	26.74	2.66

#### 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

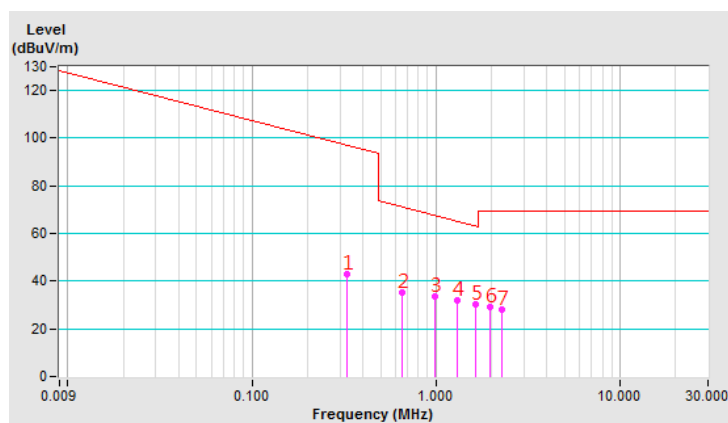


TEST FREQUENCY	326.5kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 30MHz		
TEST MODE	A		
TEST SAMPLE	01		

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	*0.3265	43.14 QP	97.33	-54.19	1.00	148	31.13	12.01
2	0.6530	35.33 QP	71.31	-35.98	1.00	27	27.76	7.57
3	0.9795	33.51 QP	67.78	-34.27	1.00	88	28.25	5.26
4	1.3060	32.16 QP	65.29	-33.13	1.00	160	27.66	4.50
5	1.6325	30.31 QP	63.35	-33.04	1.00	195	26.55	3.76
6	1.9590	29.25 QP	69.54	-40.29	1.00	226	26.25	3.00
7	2.2855	27.97 QP	69.54	-41.57	1.00	248	25.31	2.66

#### 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

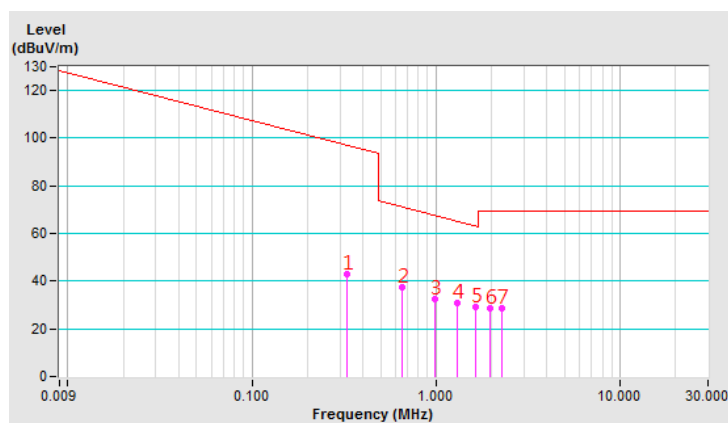


TEST FREQUENCY	326.5kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 30MHz		
TEST MODE	A		
TEST SAMPLE	01		

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	*0.3265	42.96 QP	97.33	-54.37	1.00	296	30.95	12.01
2	0.6530	37.30 QP	71.31	-34.01	1.00	66	29.73	7.57
3	0.9795	32.73 QP	67.78	-35.05	1.00	93	27.47	5.26
4	1.3060	30.76 QP	65.29	-34.53	1.00	140	26.26	4.50
5	1.6325	29.06 QP	63.35	-34.29	1.00	161	25.30	3.76
6	1.9590	28.47 QP	69.54	-41.07	1.00	181	25.47	3.00
7	2.2855	28.77 QP	69.54	-40.77	1.00	200	26.11	2.66

#### 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



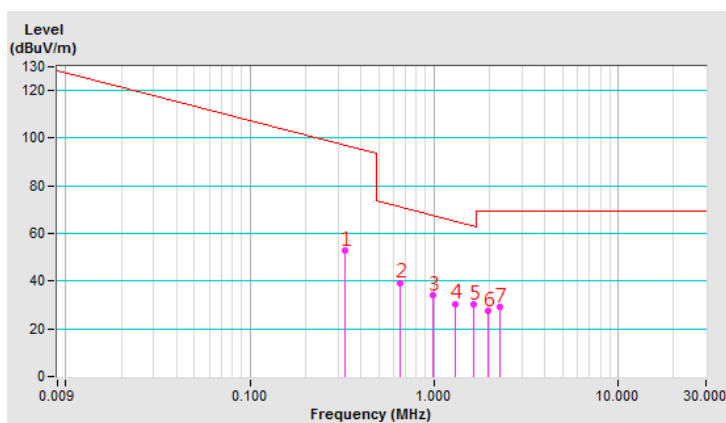
# Standby Mode

TEST FREQUENCY	326.5kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 30MHz		
TEST MODE	B		
TEST SAMPLE	01		

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	*0.3265	52.86 QP	97.33	-44.47	1.00	184	40.85	12.01
2	0.6530	39.35 QP	71.31	-31.96	1.00	44	31.78	7.57
3	0.9795	34.20 QP	67.78	-33.58	1.00	79	28.94	5.26
4	1.3060	30.53 QP	65.29	-34.76	1.00	107	26.03	4.50
5	1.6325	30.28 QP	63.35	-33.07	1.00	138	26.52	3.76
6	1.9590	27.48 QP	69.54	-42.06	1.00	158	24.48	3.00
7	2.2855	29.16 QP	69.54	-40.38	1.00	180	26.50	2.66

## 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

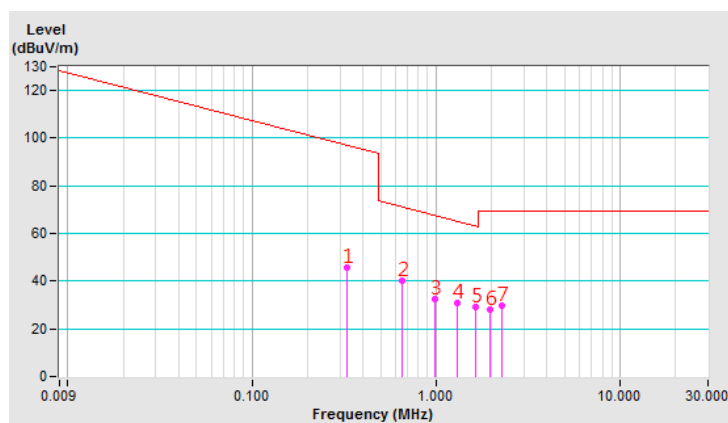


TEST FREQUENCY	326.5kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 30MHz		
TEST MODE	B		
TEST SAMPLE	01		

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	*0.3265	45.57 QP	97.33	-51.76	1.00	147	33.56	12.01
2	0.6530	39.97 QP	71.31	-31.34	1.00	4	32.40	7.57
3	0.9795	32.25 QP	67.78	-35.53	1.00	42	26.99	5.26
4	1.3060	30.75 QP	65.29	-34.54	1.00	65	26.25	4.50
5	1.6325	28.95 QP	63.35	-34.40	1.00	82	25.19	3.76
6	1.9590	28.27 QP	69.54	-41.27	1.00	96	25.27	3.00
7	2.2855	29.58 QP	69.54	-39.96	1.00	109	26.92	2.66

#### 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

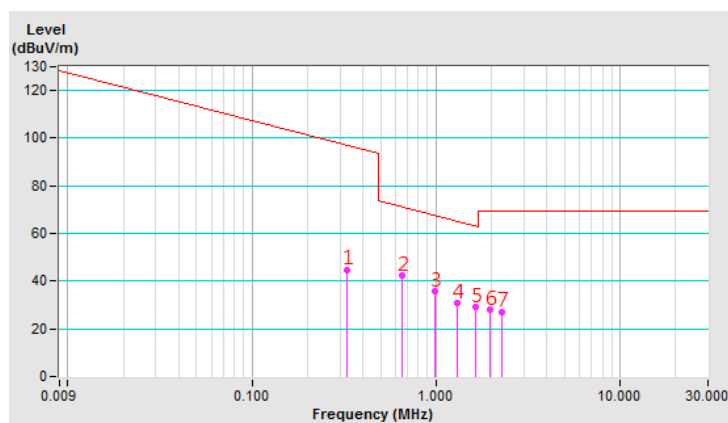


TEST FREQUENCY	326.5kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 30MHz		
TEST MODE	B		
TEST SAMPLE	01		

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	*0.3265	44.86 QP	97.33	-52.47	1.00	236	32.85	12.01
2	0.6530	42.49 QP	71.31	-28.82	1.00	202	34.92	7.57
3	0.9795	35.57 QP	67.78	-32.21	1.00	227	30.31	5.26
4	1.3060	31.08 QP	65.29	-34.21	1.00	248	26.58	4.50
5	1.6325	29.33 QP	63.35	-34.02	1.00	273	25.57	3.76
6	1.9590	28.04 QP	69.54	-41.50	1.00	302	25.04	3.00
7	2.2855	27.23 QP	69.54	-42.31	1.00	340	24.57	2.66

#### 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



Above 30MHz Data:

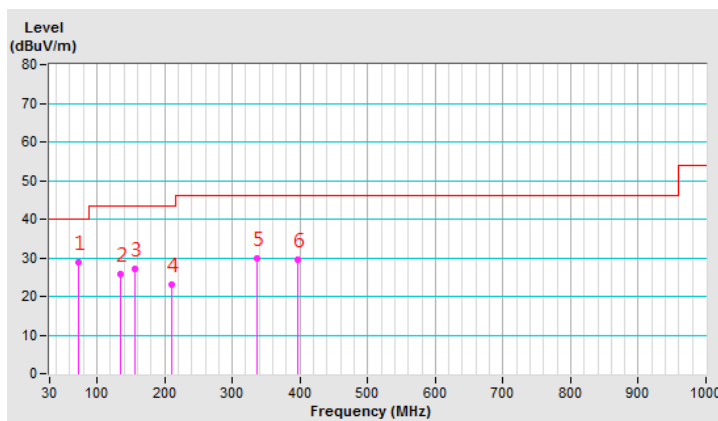
Charging Mode

TEST FREQUENCY	326.5kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		
TEST MODE	A		
TEST SAMPLE	01		

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	72.05	28.95 QP	40.00	-11.05	1.15 H	241	38.67	-9.72
2	134.37	25.69 QP	43.50	-17.81	1.93 H	119	33.37	-7.68
3	155.37	27.08 QP	43.50	-16.42	1.86 H	248	33.89	-6.81
4	211.20	23.13 QP	43.50	-20.37	1.84 H	234	31.87	-8.74
5	335.70	29.98 QP	46.00	-16.02	1.77 H	131	34.35	-4.37
6	395.98	29.51 QP	46.00	-16.49	1.24 H	265	32.83	-3.32

**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 of frequency range 30MHz~1000MHz.

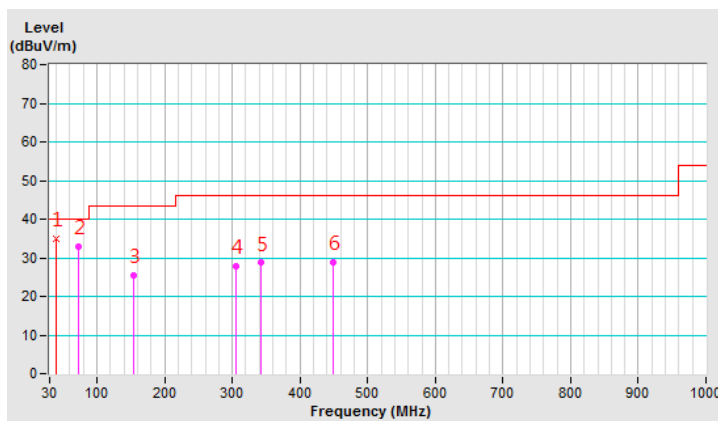


TEST FREQUENCY	326.5kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		
TEST MODE	A		
TEST SAMPLE	01		

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	39.45	35.06 QP	40.00	-4.94	1.16 V	188	42.89	-7.83
2	73.55	32.97 QP	40.00	-7.03	1.09 V	257	43.05	-10.08
3	154.55	25.59 QP	43.50	-17.91	1.48 V	360	32.34	-6.75
4	306.11	27.73 QP	46.00	-18.27	1.46 V	228	32.56	-4.83
5	341.86	28.72 QP	46.00	-17.28	1.20 V	181	33.09	-4.37
6	448.07	28.91 QP	46.00	-17.09	1.79 V	248	30.96	-2.05

#### 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 of frequency range 30MHz~1000MHz.

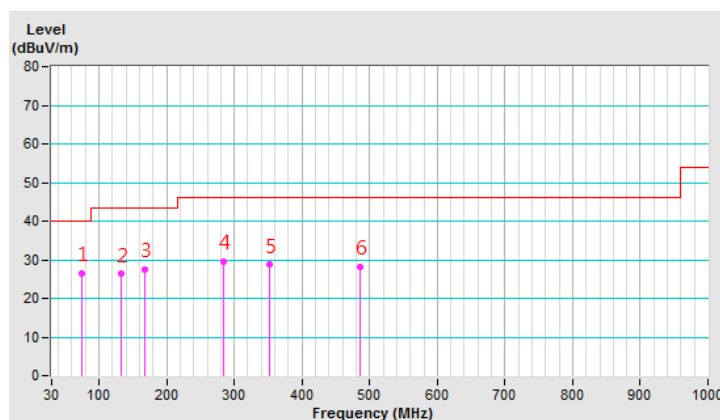


TEST FREQUENCY	326.5kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		
TEST MODE	A		
TEST SAMPLE	02		

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	75.20	26.45 QP	40.00	-13.55	1.58 H	298	36.86	-10.41
2	133.64	26.28 QP	43.50	-17.22	2.03 H	83	34.00	-7.72
3	168.66	27.40 QP	43.50	-16.10	1.34 H	112	34.30	-6.90
4	284.67	29.44 QP	46.00	-16.56	1.92 H	133	34.78	-5.34
5	351.99	28.69 QP	46.00	-17.31	1.77 H	224	32.82	-4.13
6	486.24	28.09 QP	46.00	-17.91	1.49 H	131	29.00	-0.91

#### 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 of frequency range 30MHz~1000MHz.

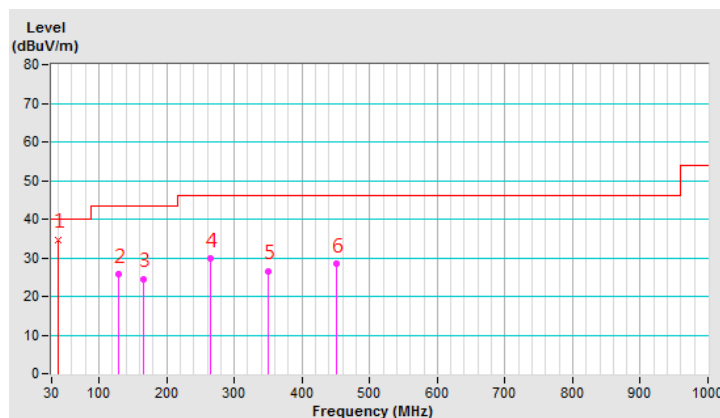


TEST FREQUENCY	326.5kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		
TEST MODE	A		
TEST SAMPLE	02		

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	39.35	34.70 QP	40.00	-5.30	1.00 V	221	42.57	-7.87
2	128.36	25.66 QP	43.50	-17.84	1.63 V	244	33.93	-8.27
3	164.88	24.47 QP	43.50	-19.03	1.45 V	352	31.28	-6.81
4	264.79	29.74 QP	46.00	-16.26	1.79 V	210	35.93	-6.19
5	349.52	26.51 QP	46.00	-19.49	1.33 V	315	30.71	-4.20
6	451.66	28.33 QP	46.00	-17.67	1.06 V	280	29.83	-1.50

#### 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 of frequency range 30MHz~1000MHz.



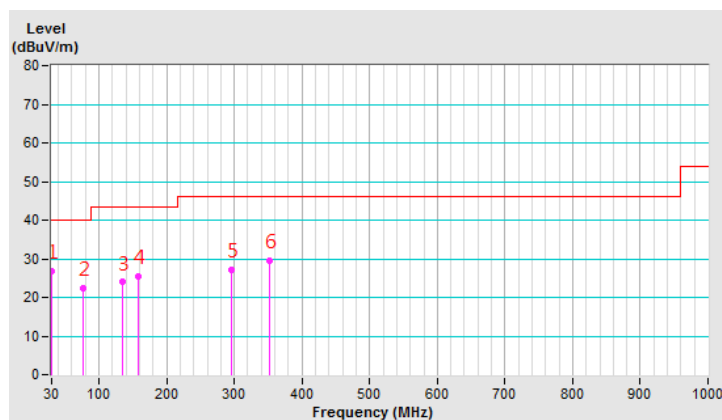
### Standby Mode

TEST FREQUENCY	326.5kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		
TEST MODE	B		
TEST SAMPLE	01		

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	30.24	26.85 QP	40.00	-13.15	1.81 H	351	35.68	-8.83
2	75.69	22.30 QP	40.00	-17.70	1.54 H	251	32.91	-10.61
3	134.37	23.98 QP	43.50	-19.52	1.23 H	97	31.66	-7.68
4	157.07	25.41 QP	43.50	-18.09	1.89 H	261	32.18	-6.77
5	296.36	27.26 QP	46.00	-18.74	1.62 H	360	32.40	-5.14
6	352.57	29.60 QP	46.00	-16.40	1.08 H	225	33.82	-4.22

### 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 of frequency range 30MHz~1000MHz.

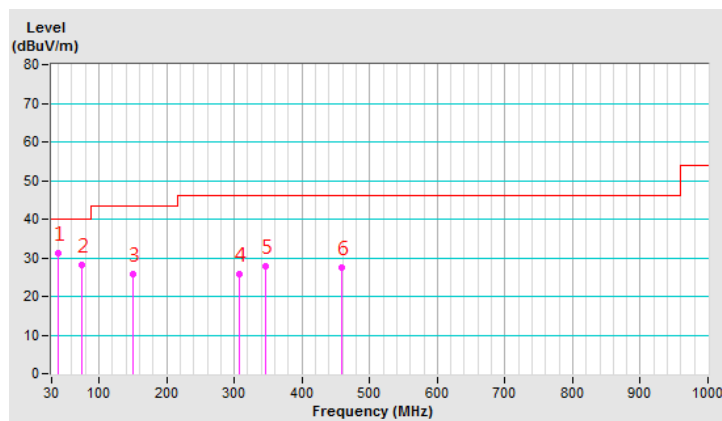


TEST FREQUENCY	326.5kHz	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		
TEST MODE	B		
TEST SAMPLE	01		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	38.83	31.16 QP	40.00	-8.84	1.23 V	200	38.99	-7.83
2	74.62	28.14 QP	40.00	-11.86	1.42 V	246	38.41	-10.27
3	151.01	25.76 QP	43.50	-17.74	1.95 V	29	32.58	-6.82
4	307.42	25.80 QP	46.00	-20.20	1.74 V	220	30.61	-4.81
5	345.59	27.87 QP	46.00	-18.13	1.11 V	193	32.24	-4.37
6	457.92	27.45 QP	46.00	-18.55	1.63 V	188	29.36	-1.91

#### 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 of frequency range 30MHz~1000MHz.



## 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.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	838251/021	Nov. 1, 2018	Oct. 31, 2019
ROHDE & SCHWARZ Artificial Mains Network (For EUT)	ENV216	101195	May 9, 2019	May 8, 2020
LISN With Adapter (for EUT)	101195	N/A	May 9, 2019	May 8, 2020
EMCO L.I.S.N. (For peripherals)	3825/2	9504-2359	Jul. 26, 2018	Jul. 25, 2019
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 14, 2019	May 13, 2020
Software	Cond_V7.3.7.4	NA	NA	NA
RF cable (JYEBAO) With10dB PAD	5D-FB	Cable-C03.01	Sep. 18, 2018	Sep. 17, 2019
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-300	Jan. 25, 2019	Jan. 24, 2020
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-301	Jan. 25, 2019	Jan. 24, 2020
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 21, 2018	Nov. 20, 2019
LISN With Adapter (for TV EUT)	100220	N/A	Nov. 21, 2018	Nov. 20, 2019

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 Shielded Room No. 3.

3. Tested Date: Jul. 18, 2019

#### 4.2.3 Test Procedures

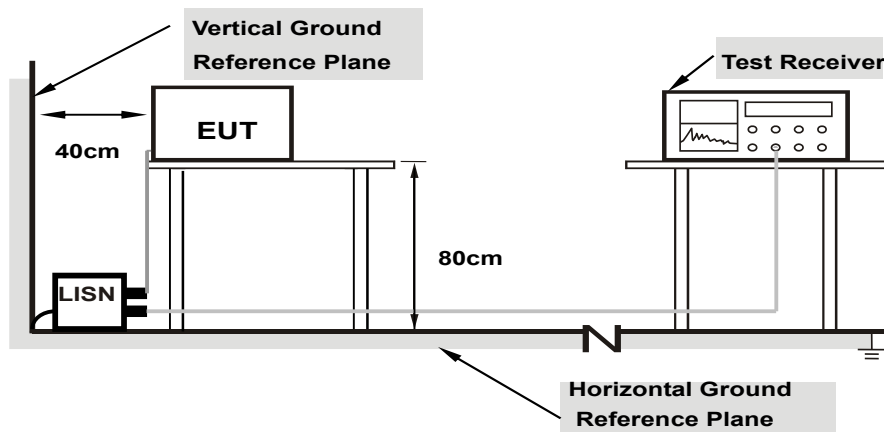
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were 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: 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 item 4.1.6.

#### 4.2.7 Test Results

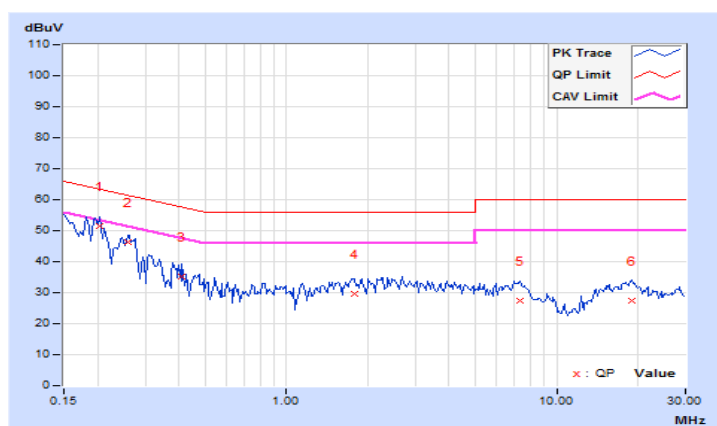
##### Charging Mode

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Test Mode	A		
Test Sample	01		

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	0.20469	9.65	41.98	27.22	51.63	36.87	63.42	53.42	-11.79	-16.55
2	0.25938	9.66	36.65	22.21	46.31	31.87	61.45	51.45	-15.14	-19.58
3	0.41172	9.69	25.37	6.67	35.06	16.36	57.61	47.61	-22.55	-31.25
4	1.77734	9.86	19.88	7.73	29.74	17.59	56.00	46.00	-26.26	-28.41
5	7.33984	10.05	17.49	9.57	27.54	19.62	60.00	50.00	-32.46	-30.38
6	18.93359	10.23	17.12	11.91	27.35	22.14	60.00	50.00	-32.65	-27.86

##### 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

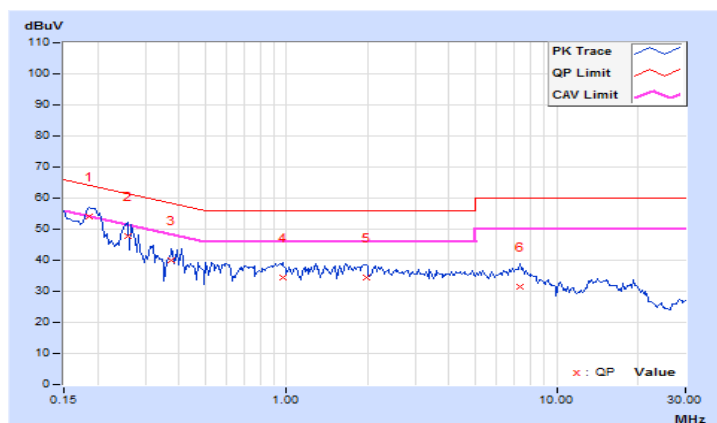


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Test Mode	A		
Test Sample	01		

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	0.18516	9.65	44.55	27.77	54.20	37.42	64.25	54.25	-10.05	-16.83
2	0.25938	9.66	38.23	25.90	47.89	35.56	61.45	51.45	-13.56	-15.89
3	0.37656	9.69	30.26	16.13	39.95	25.82	58.35	48.35	-18.40	-22.53
4	0.97031	9.77	24.62	9.80	34.39	19.57	56.00	46.00	-21.61	-26.43
5	1.98047	9.85	24.61	13.02	34.46	22.87	56.00	46.00	-21.54	-23.13
6	7.27734	10.02	21.62	14.83	31.64	24.85	60.00	50.00	-28.36	-25.15

#### Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



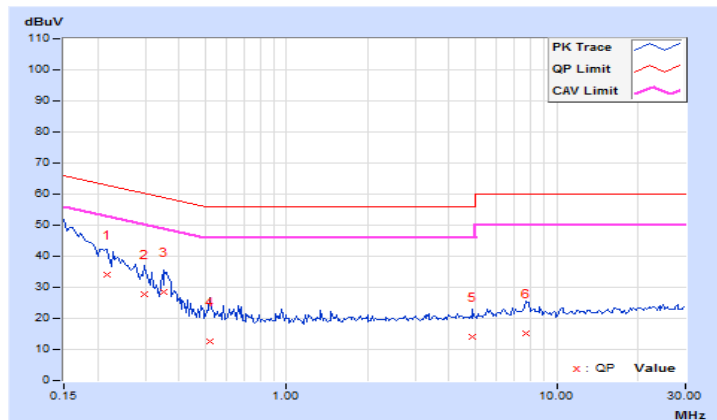
# Standby Mode

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Test Mode	B		
Test Sample	01		

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	0.21641	9.65	24.57	2.08	34.22	11.73	62.96	52.96	-28.74	-41.23
2	0.29844	9.67	18.03	0.19	27.70	9.86	60.29	50.29	-32.59	-40.43
3	0.35313	9.68	18.84	5.09	28.52	14.77	58.89	48.89	-30.37	-34.12
4	0.52109	9.71	2.88	1.19	12.59	10.90	56.00	46.00	-43.41	-35.10
5	4.90234	9.99	3.93	2.72	13.92	12.71	56.00	46.00	-42.08	-33.29
6	7.69922	10.06	5.13	1.38	15.19	11.44	60.00	50.00	-44.81	-38.56

## 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

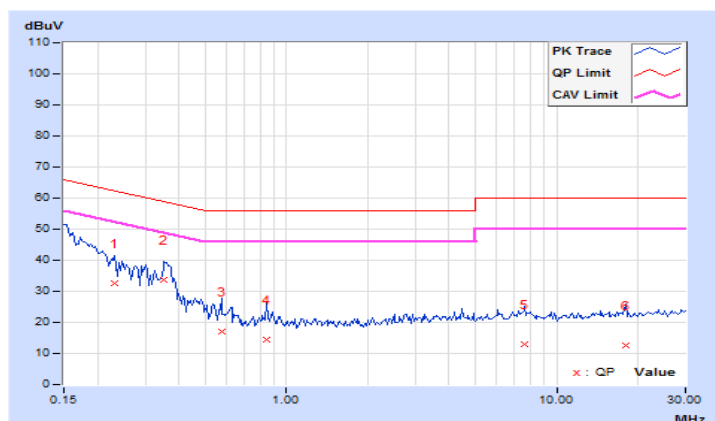


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Test Mode	B		
Test Sample	01		

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	0.23203	9.66	22.91	5.09	32.57	14.75	62.38	52.38	-29.81	-37.63
2	0.35313	9.68	23.88	11.20	33.56	20.88	58.89	48.89	-25.33	-28.01
3	0.57716	9.71	7.45	3.97	17.16	13.68	56.00	46.00	-38.84	-32.32
4	0.84141	9.75	4.84	2.63	14.59	12.38	56.00	46.00	-41.41	-33.62
5	7.60938	10.02	3.06	1.13	13.08	11.15	60.00	50.00	-46.92	-38.85
6	17.97266	10.21	2.32	1.37	12.53	11.58	60.00	50.00	-47.47	-38.42

**Remarks:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

## Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

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](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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

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