FCC Test Report

Report No.:	RF190115D09
FCC ID:	K7SF7U070
Test Model:	F7U070
Series Model:	F7U069
Received Date:	Jan. 15, 2019
Test Date:	Jan. 16 ~ 28, 2019
Issued Date:	Feb. 20, 2019
Applicant:	Belkin International., Inc
Address:	12045 East Waterfront Drive, Playa Vista, CA. 90094, USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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

Testing Laboratory
2021

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Report Issue History Record

Issue No.	Description	Date Issued
RF190115D09	Original release.	Feb. 20, 2019

Release Control Record

Issue No.	Description	Date Issued
RF190115D09	Original release	Feb. 20, 2019

1 Certificate of Conformity

Product:	BOOST↑UP™ Wireless Charging Stand 5W
Brand:	belkin
Test Model:	F7U070
Series Model:	F7U069
Sample Status:	Engineering sample
Applicant:	Belkin International., Inc
Test Date:	Jan. 16 ~ 28, 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:** Feb. 20, 2019

Celia Chen / Supervisor

Approved by : _____ , **Date:** Feb. 20, 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 -10.10dB at 0.49247MHz.
15.215	Channel Bandwidth Measurement		
15.209	Radiated Emission Test	Pass	Meet the requirement of limit. Minimum passing margin is -6.15dB at 80.10MHz

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.77 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.38 dB
	30MHz ~ 1000MHz	5.54 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	BOOST↑UP™ Wireless Charging Stand 5W
Brand	belkin
Test Model	F7U070
Series Model	F7U069
Model Difference	Refer to table as below
Sample Status	Engineering sample
Rating	Input: 5Vdc, 2A, Output: 5W
Modulation Type	FSK
Operating Frequency	111-148kHz
Antenna Type	Coil antenna
Field Strength	84.73dBuV/m
Dimensions	18.76 cm^2 (39.5mm x 47.5mm) (rectangle)
Accessory Device	Adapter
Data Cable Supplied	1.2m shielded USB cable
Maximum Power Output from the Charging Coil	5W

Note:

1. The EUT is a wireless inductive charging coil.
2. The EUT has two configuration could be chosen as the following.

Model	Configuration	Difference
F7U069	Wireless charging pad + USB cable + AC power supply	Marketing purpose
F7U070	Wireless charging pad + USB cable	

3. The EUT consumes power from a switching power adapter, as the following:

Brand	Model	Specification
belkin	DSA-10PFL-05 FUS 050200 a	Input: 100-240Vac, 50/60Hz, 0.3A (AC 2 Pin) Output: +5Vdc, 2A

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 frequencies are provided to this EUT:

Operating Frequency (kHz)	Tested Frequency (kHz)	Mode
111-148	133	Charging Mode with Full Load
111-148	146	Standby Mode

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To			Description
	RE<1G	PLC	CBW	
A	√	√	√	Charging Mode with Full Load
B	√	√	√	Standby Mode

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

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.

EUT Configure Mode	Operating Frequency (kHz)	Tested Frequency (kHz)
A	111-148	133
B	111-148	146

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)
A	111-148	133
B	111-148	146

Channel Bandwidth 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)
A	111-148	133
B	111-148	146

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE<1G	28 deg. C, 76% RH	120Vac, 60Hz	Ian Chang
PLC	23 deg. C, 75% RH	120Vac, 60Hz	Justin Liu
CBW	25 deg. C, 76% RH	120Vac, 60Hz	Saxon Lee

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.	Load	N/A	N/A	N/A	N/A	Supplied by client (5W max load)

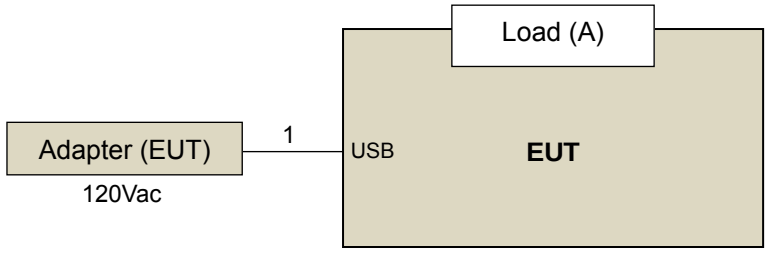
Note: All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB cable	1	1.2	Y	0	Supplied by client

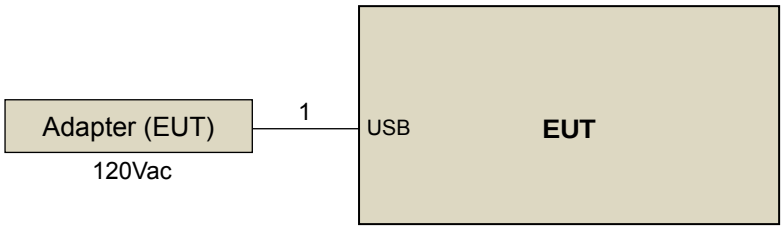
Note: The core(s) is(are) originally attached to the cable(s).

3.3.1 Configuration of System under Test

For Mode A:



For 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. 21, 2018	Feb. 20, 2019
HP Preamplifier	8449B	3008A01201	Feb. 22, 2018	Feb. 21, 2019
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 21, 2018	Feb. 20, 2019
Agilent TEST RECEIVER	N9038A	MY51210129	Feb. 6, 2018	Feb. 5, 2019
Schwarzbeck Antenna	VULB 9168	139	Nov. 26, 2018	Nov. 25, 2019
Schwarzbeck Antenna	VHBA 9123	480	May 19, 2017	May 18, 2019
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. 4, 2018	Jun. 3, 2019
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Aug. 3, 2018	Aug. 2, 2019
Loop Antenna EMCI	LPA600	270	Aug. 11, 2017	Aug. 10, 2019
EMCO Horn Antenna	3115	00028257	Nov. 25, 2018	Nov. 24, 2019
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 27, 2018	Sep. 26, 2019
Anritsu Power Sensor	MA2411B	0738404	Apr. 26, 2018	Apr. 25, 2019
Anritsu Power Meter	ML2495A	0842014	Apr. 26, 2018	Apr. 25, 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. The Industry Canada Reference No. IC 7450E-6.

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 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:

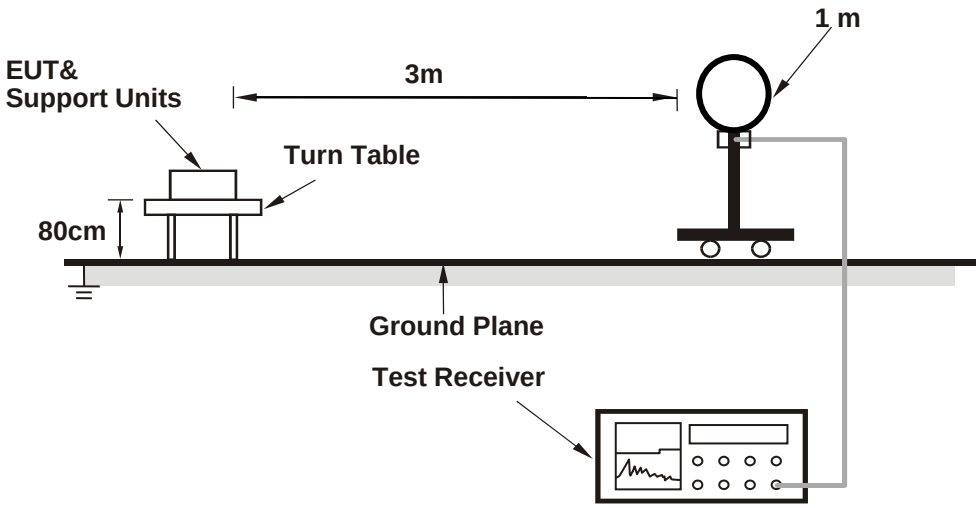
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 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

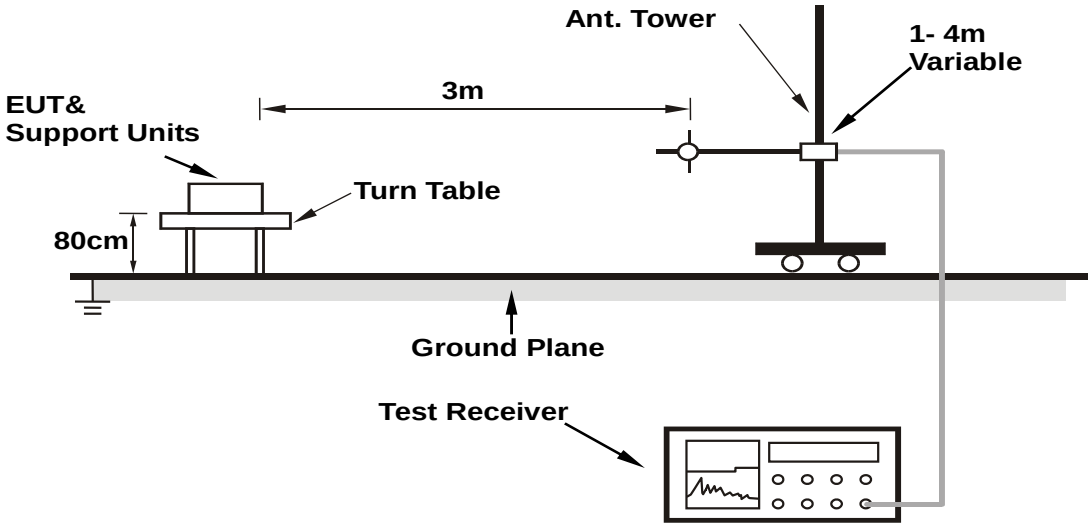
No deviation.

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:

a. The EUT powered by adapter.
b. Put the Load on the EUT (wireless charging) during the test.

Test Mode B:

a. The EUT powered by adapter.
b. Set the EUT under standby condition.

4.1.7 Test Results

Below 30MHz Data:

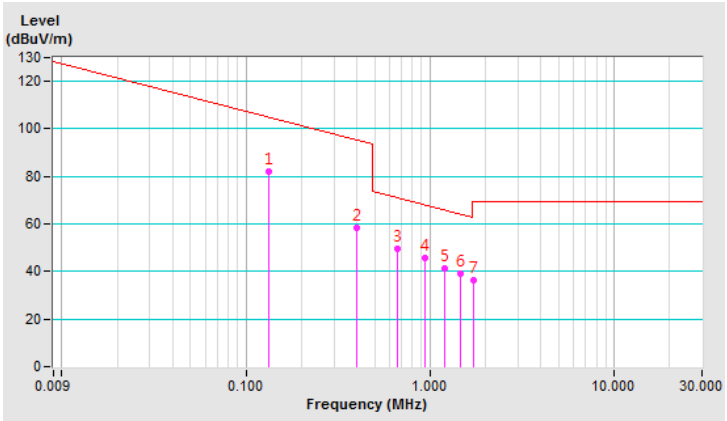
Charging Mode

Test Frequency	133kHz	Detector Function	Quasi-Peak
Frequency Range	9 kHz ~ 30 MHz		
Test Mode	A		

Antenna Polarity & Test Distance: Loop Antenna Open At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*0.133	81.93 QP	105.13	-23.20	1.00	103	62.34	19.59
2	0.399	58.23 QP	95.58	-37.35	1.00	38	47.74	10.49
3	0.665	49.63 QP	71.15	-21.52	1.00	115	42.23	7.40
4	0.931	45.73 QP	68.23	-22.50	1.00	276	40.39	5.34
5	1.197	41.04 QP	66.04	-25.00	1.00	163	36.35	4.69
6	1.463	39.16 QP	64.30	-25.14	1.00	220	35.07	4.09
7	1.729	36.42 QP	69.54	-33.12	1.00	250	32.94	3.48

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.
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

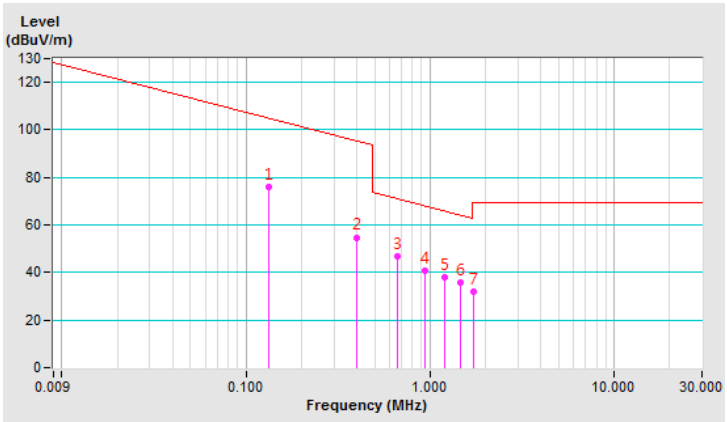


Test Frequency	133kHz	Detector Function	Quasi-Peak
Frequency Range	9 kHz ~ 30 MHz		
Test Mode	A		

Antenna Polarity & Test Distance: Loop Antenna Close At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*0.133	75.86 QP	105.13	-29.27	1.00	232	56.27	19.59
2	0.399	54.80 QP	95.58	-40.78	1.00	146	44.31	10.49
3	0.665	46.89 QP	71.15	-24.26	1.00	203	39.49	7.40
4	0.931	40.84 QP	68.23	-27.39	1.00	276	35.50	5.34
5	1.197	37.76 QP	66.04	-28.28	1.00	354	33.07	4.69
6	1.463	35.87 QP	64.30	-28.43	1.00	360	31.78	4.09
7	1.729	31.93 QP	69.54	-37.61	1.00	360	28.45	3.48

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.
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

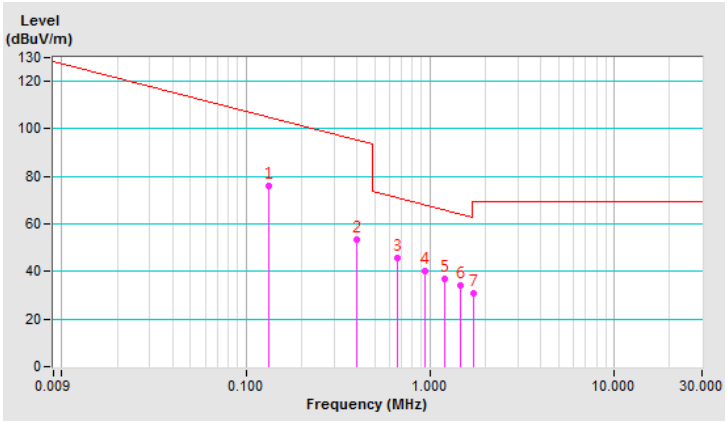


Test Frequency	133kHz	Detector Function	Quasi-Peak
Frequency Range	9 kHz ~ 30 MHz		
Test Mode	A		

Antenna Polarity & Test Distance: Loop Antenna Ground-parallel At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*0.133	75.99 QP	105.13	-29.14	1.00	338	56.40	19.59
2	0.399	53.62 QP	95.58	-41.96	1.00	125	43.13	10.49
3	0.665	45.72 QP	71.15	-25.43	1.00	176	38.32	7.40
4	0.931	40.02 QP	68.23	-28.21	1.00	61	34.68	5.34
5	1.197	36.95 QP	66.04	-29.09	1.00	3	32.26	4.69
6	1.463	33.89 QP	64.30	-30.41	1.00	29	29.80	4.09
7	1.729	30.80 QP	69.54	-38.74	1.00	0	27.32	3.48

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.
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



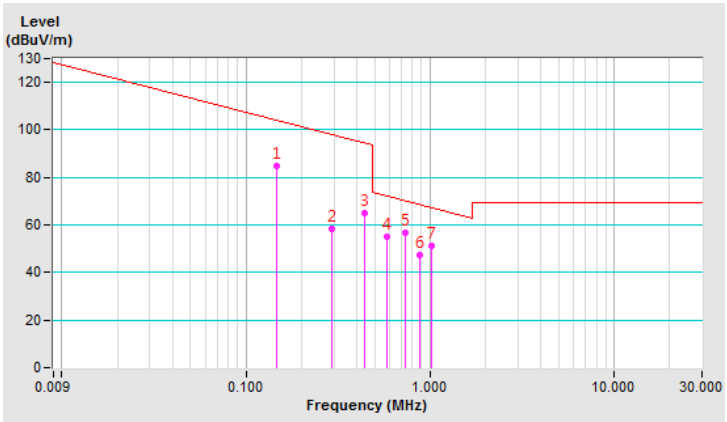
Standby Mode

Test Frequency	146kHz	Detector Function	Quasi-Peak
Frequency Range	9 kHz ~ 30 MHz		
Test Mode	B		

Antenna Polarity & Test Distance: Loop Antenna Open At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*0.146	84.73 QP	104.32	-19.59	1.00	308	65.89	18.84
2	0.292	58.56 QP	98.30	-39.74	1.00	153	45.76	12.80
3	0.438	64.84 QP	94.77	-29.93	1.00	220	54.86	9.98
4	0.584	55.28 QP	72.28	-17.00	1.00	249	47.10	8.18
5	0.730	56.68 QP	70.34	-13.66	1.00	272	49.81	6.87
6	0.876	47.49 QP	68.75	-21.26	1.00	298	41.85	5.64
7	1.022	51.07 QP	67.42	-16.35	1.00	332	45.98	5.09

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.
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

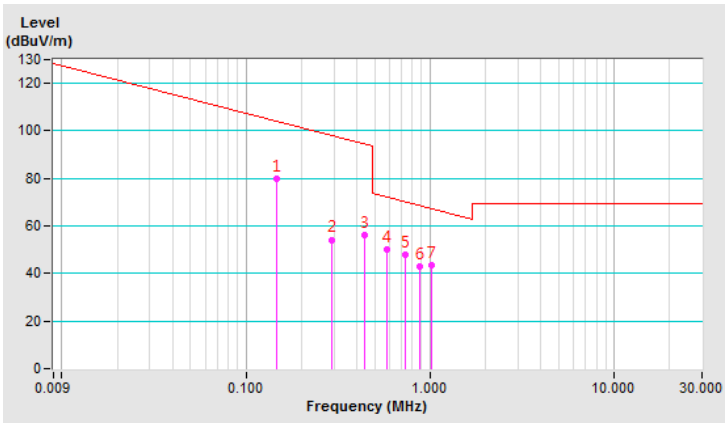


Test Frequency	146kHz	Detector Function	Quasi-Peak
Frequency Range	9 kHz ~ 30 MHz		
Test Mode	B		

Antenna Polarity & Test Distance: Loop Antenna Close At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*0.146	79.70 QP	104.32	-24.62	1.00	68	60.86	18.84
2	0.292	54.22 QP	98.30	-44.08	1.00	199	41.42	12.80
3	0.438	56.17 QP	94.77	-38.60	1.00	148	46.19	9.98
4	0.584	50.05 QP	72.28	-22.23	1.00	216	41.87	8.18
5	0.730	47.93 QP	70.34	-22.41	1.00	233	41.06	6.87
6	0.876	42.80 QP	68.75	-25.95	1.00	335	37.16	5.64
7	1.022	43.44 QP	67.42	-23.98	1.00	306	38.35	5.09

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.
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

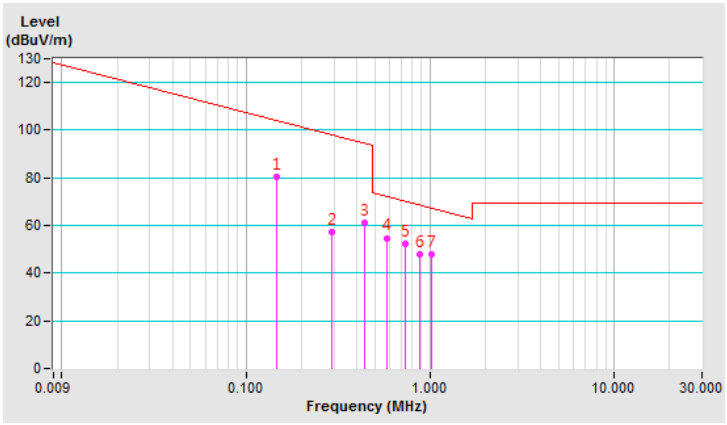


Test Frequency	146kHz	Detector Function	Quasi-Peak
Frequency Range	9 kHz ~ 30 MHz		
Test Mode	B		

Antenna Polarity & Test Distance: Loop Antenna Ground-parallel At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*0.146	80.36 QP	104.32	-23.96	1.00	295	61.52	18.84
2	0.292	57.05 QP	98.30	-41.25	1.00	0	44.25	12.80
3	0.438	60.90 QP	94.77	-33.87	1.00	13	50.92	9.98
4	0.584	54.80 QP	72.28	-17.48	1.00	32	46.62	8.18
5	0.730	52.35 QP	70.34	-17.99	1.00	54	45.48	6.87
6	0.876	47.98 QP	68.75	-20.77	1.00	82	42.34	5.64
7	1.022	47.68 QP	67.42	-19.74	1.00	112	42.59	5.09

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.
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



Below 1GHz Data:

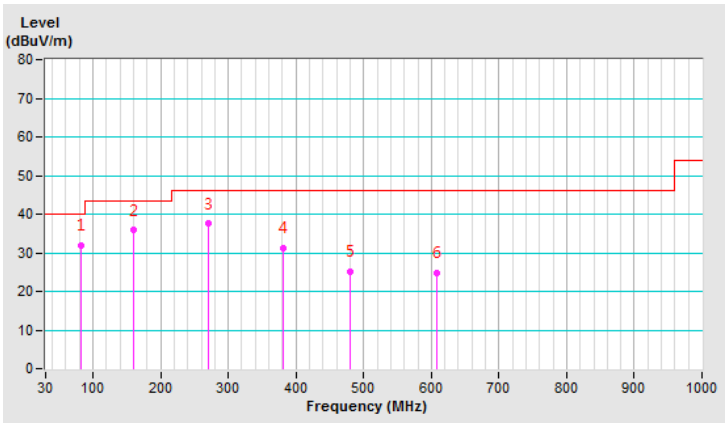
Charging Mode

Test Frequency	133kHz	Detector Function	Quasi-Peak
Frequency Range	30 MHz ~ 1GHz		
Test Mode	A		

Antenna Polarity & Test Distance: Horizontal At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	82.57	31.90 QP	40.00	-8.10	1.63 H	228	44.14	-12.24
2	159.30	35.84 QP	43.50	-7.66	2.05 H	107	42.73	-6.89
3	271.29	37.54 QP	46.00	-8.46	1.44 H	174	43.73	-6.19
4	381.77	31.31 QP	46.00	-14.69	1.87 H	252	35.13	-3.82
5	480.52	25.09 QP	46.00	-20.91	2.69 H	230	26.80	-1.71
6	608.80	24.74 QP	46.00	-21.26	1.57 H	121	23.82	0.92

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

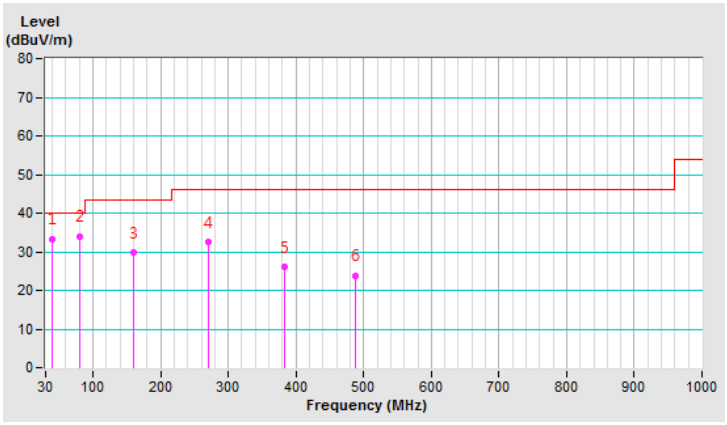


Test Frequency	133kHz	Detector Function	Quasi-Peak
Frequency Range	30 MHz ~ 1GHz		
Test Mode	A		

Antenna Polarity & Test Distance: Vertical At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	40.19	33.35 QP	40.00	-6.65	1.06 V	29	41.39	-8.04
2	**80.10**	**33.85 QP**	**40.00**	**-6.15**	**1.24 V**	**229**	**45.67**	**-11.82**
3	159.35	29.67 QP	43.50	-13.83	1.52 V	166	36.57	-6.90
4	270.80	32.41 QP	46.00	-13.59	1.27 V	148	38.62	-6.21
5	383.08	25.96 QP	46.00	-20.04	1.82 V	221	29.75	-3.79
6	488.57	23.74 QP	46.00	-22.26	1.44 V	261	25.29	-1.55

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



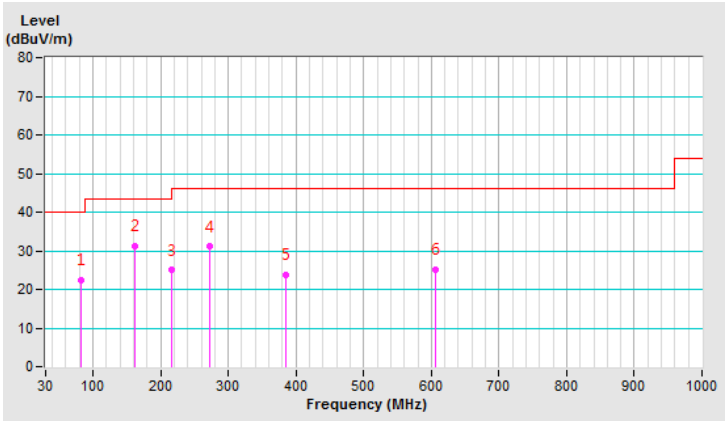
Standby Mode

Test Frequency	146kHz	Detector Function	Quasi-Peak
Frequency Range	30 MHz ~ 1GHz		
Test Mode	B		

Antenna Polarity & Test Distance: Horizontal At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	82.38	22.44 QP	40.00	-17.56	1.64 H	247	34.65	-12.21
2	161.14	31.21 QP	43.50	-12.29	2.06 H	281	38.11	-6.90
3	216.97	24.98 QP	46.00	-21.02	1.88 H	140	33.89	-8.91
4	272.79	31.03 QP	46.00	-14.97	2.43 H	163	37.14	-6.11
5	385.02	23.78 QP	46.00	-22.22	1.55 H	247	27.52	-3.74
6	606.18	25.13 QP	46.00	-20.87	2.11 H	360	24.26	0.87

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

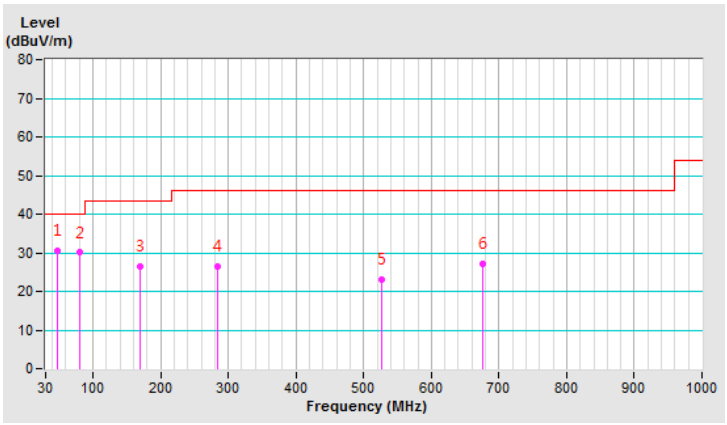


Test Frequency	146kHz	Detector Function	Quasi-Peak
Frequency Range	30 MHz ~ 1GHz		
Test Mode	B		

Antenna Polarity & Test Distance: Vertical At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	47.95	30.53 QP	40.00	-9.47	1.59 V	17	37.80	-7.27
2	79.81	30.07 QP	40.00	-9.93	1.22 V	271	41.81	-11.74
3	169.00	26.59 QP	43.50	-16.91	1.87 V	230	33.94	-7.35
4	283.65	26.39 QP	46.00	-19.61	2.66 V	230	32.10	-5.71
5	525.86	23.18 QP	46.00	-22.82	2.08 V	235	24.15	-0.97
6	675.39	27.08 QP	46.00	-18.92	1.73 V	219	25.13	1.95

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



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

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 2, 2018	May 1, 2019
LISN With Adapter (for EUT)	AD10	C03Ada-002	May 2, 2018	May 1, 2019
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 3, 2018	May 2, 2019
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	E1-011284	Sep. 12, 2018	Sep. 11, 2019
LYNICS Terminator (For EMCO LISN)	0900510	E1-011285	Sep. 12, 2018	Sep. 11, 2019
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

Notes: 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.

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.

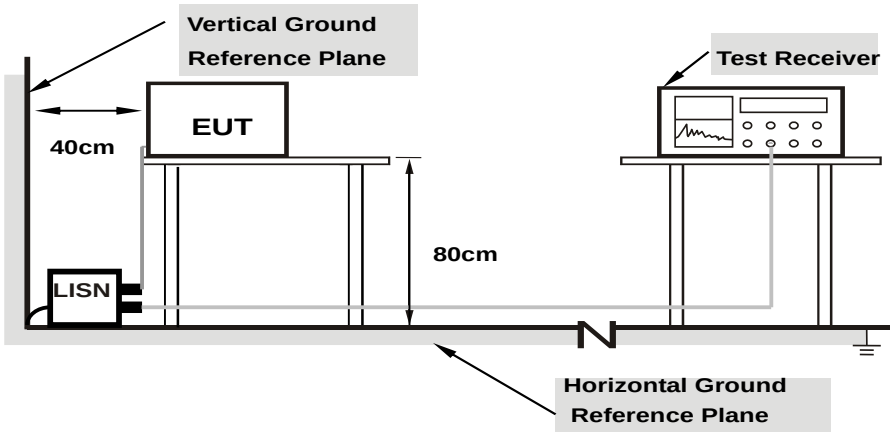
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

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

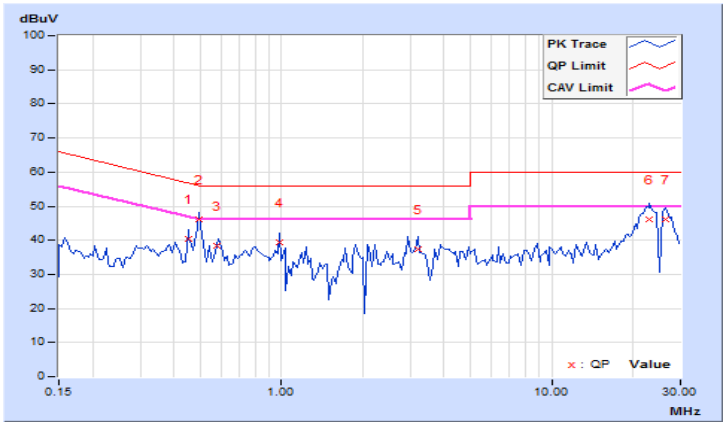
Charging Mode

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

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	0.45078	9.76	30.77	20.19	40.53	29.95	56.86	46.86	-16.33	-16.91
2	**0.49247**	**9.76**	**36.27**	**25.32**	**46.03**	**35.08**	**56.13**	**46.13**	**-10.10**	**-11.05**
3	0.57988	9.77	28.49	18.10	38.26	27.87	56.00	46.00	-17.74	-18.13
4	0.98339	9.83	29.49	19.31	39.32	29.14	56.00	46.00	-16.68	-16.86
5	3.19786	9.98	27.36	20.32	37.34	30.30	56.00	46.00	-18.66	-15.70
6	23.11719	10.31	35.78	25.81	46.09	36.12	60.00	50.00	-13.91	-13.88
7	26.31759	10.34	35.68	22.38	46.02	32.72	60.00	50.00	-13.98	-17.28

Remarks:

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

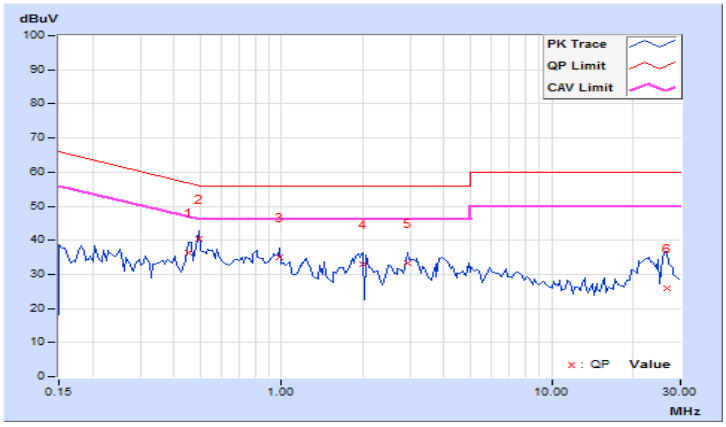


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	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	0.45078	9.78	26.55	15.82	36.33	25.60	56.86	46.86	-20.53	-21.26
2	0.49375	9.78	30.52	21.10	40.30	30.88	56.10	46.10	-15.80	-15.22
3	0.98203	9.84	25.09	17.09	34.93	26.93	56.00	46.00	-21.07	-19.07
4	2.00781	9.92	23.05	13.09	32.97	23.01	56.00	46.00	-23.03	-22.99
5	2.94531	9.97	23.26	10.50	33.23	20.47	56.00	46.00	-22.77	-25.53
6	26.62109	10.40	15.68	6.04	26.08	16.44	60.00	50.00	-33.92	-33.56

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



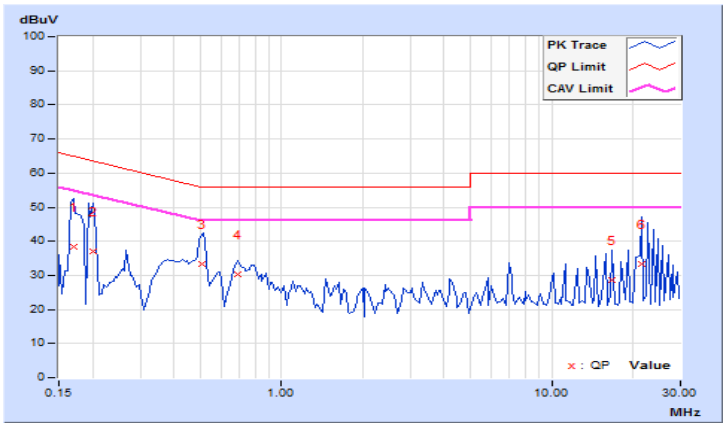
Standby Mode

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

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	0.16953	9.71	28.72	5.08	38.43	14.79	64.98	54.98	-26.55	-40.19
2	0.20078	9.71	27.26	4.83	36.97	14.54	63.58	53.58	-26.61	-39.04
3	0.50956	9.76	23.71	11.67	33.47	21.43	56.00	46.00	-22.53	-24.57
4	0.68515	9.79	20.36	10.69	30.15	20.48	56.00	46.00	-25.85	-25.52
5	16.80859	10.25	18.44	4.95	28.69	15.20	60.00	50.00	-31.31	-34.80
6	21.45313	10.30	23.13	9.57	33.43	19.87	60.00	50.00	-26.57	-30.13

Remarks:

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

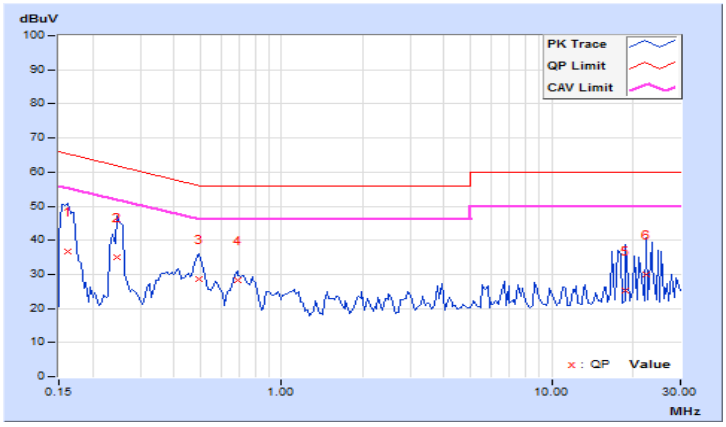


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	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	0.16172	9.72	26.93	5.22	36.65	14.94	65.38	55.38	-28.73	-40.44
2	0.24766	9.73	25.26	4.98	34.99	14.71	61.84	51.84	-26.85	-37.13
3	0.49375	9.78	18.93	9.68	28.71	19.46	56.10	46.10	-27.39	-26.64
4	0.68516	9.80	18.63	6.90	28.43	16.70	56.00	46.00	-27.57	-29.30
5	18.82813	10.28	15.02	4.60	25.30	14.88	60.00	50.00	-34.70	-35.12
6	22.32958	10.33	19.69	6.65	30.02	16.98	60.00	50.00	-29.98	-33.02

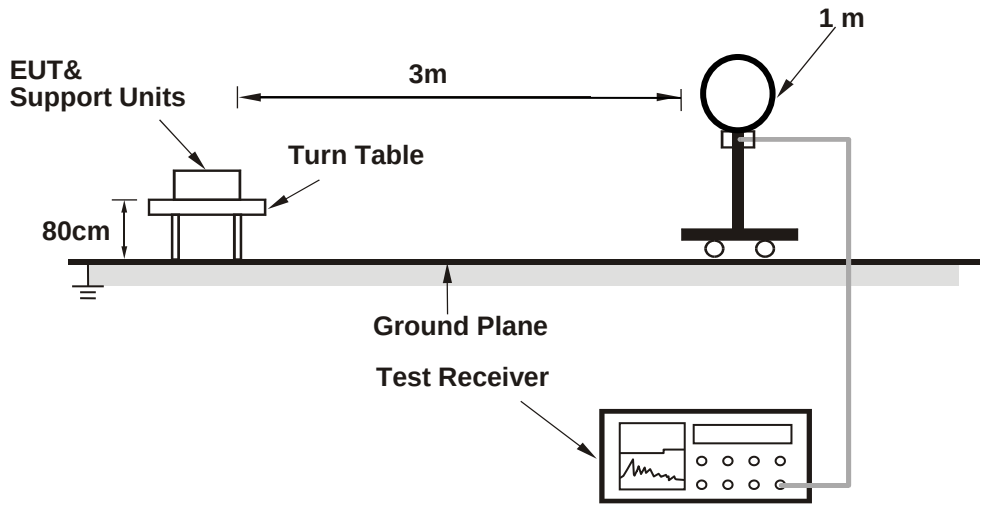
Remarks:

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



4.3 Channel Bandwidth

4.3.1 Test SetUp



4.3.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.3 Test Procedure

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter Semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation. Then the Loop antenna was rotated 360 degrees to determine the position of the highest radiation.

b. The antenna is a broadband loop antenna, which is fixed of a 1m height above the ground, and set away from 3m to the EUT to find the disturbance reading on each frequency.

c. The test-receiver system was set to Quasi-peak detect function and specified bandwidth.

4.3.4 Deviation from Test Standard

No deviation.

4.3.5 EUT Operating Conditions

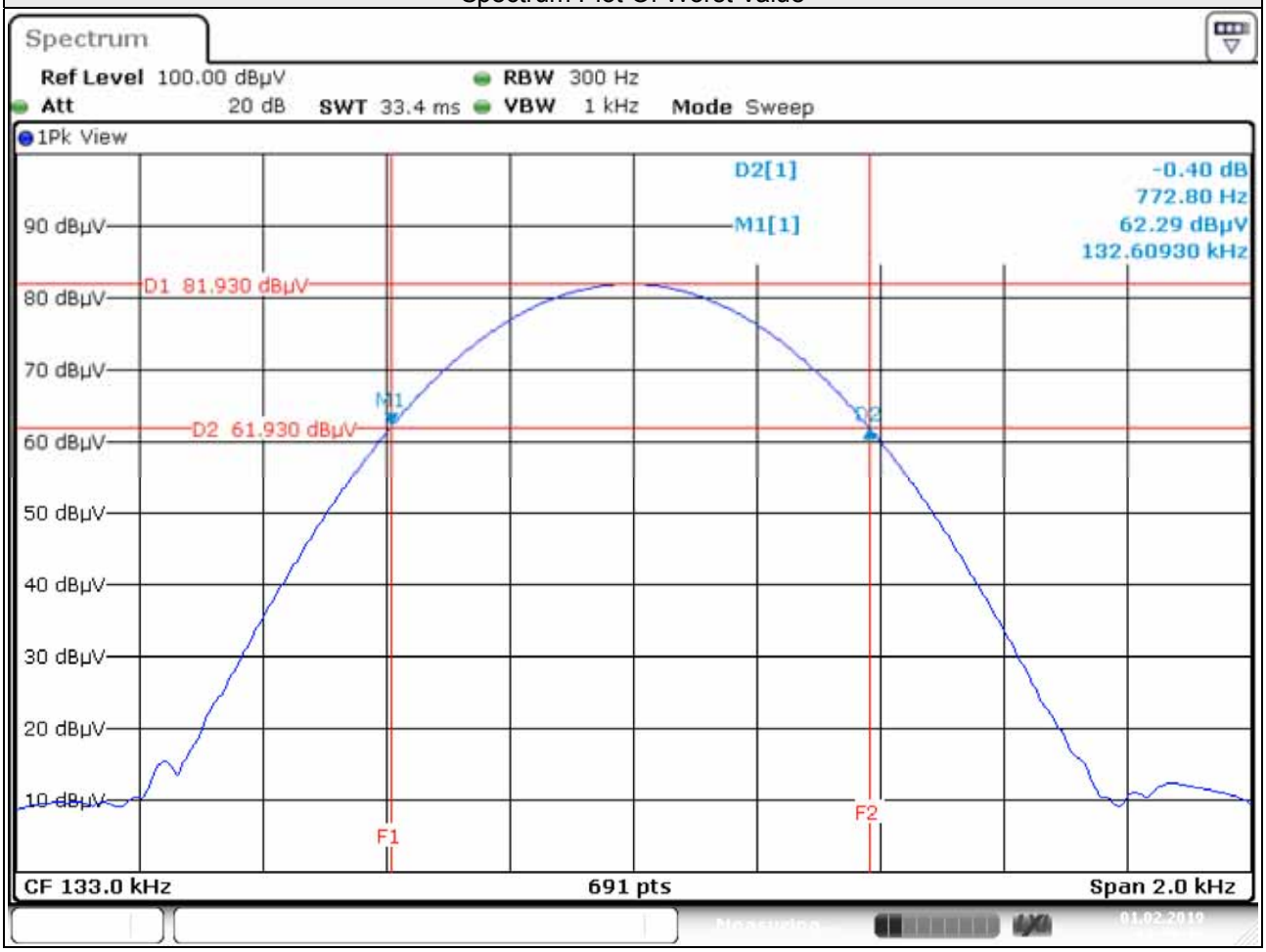
The software provided by client to enable the EUT under transmission condition continuously.

4.3.6 Test Results

Mode A:

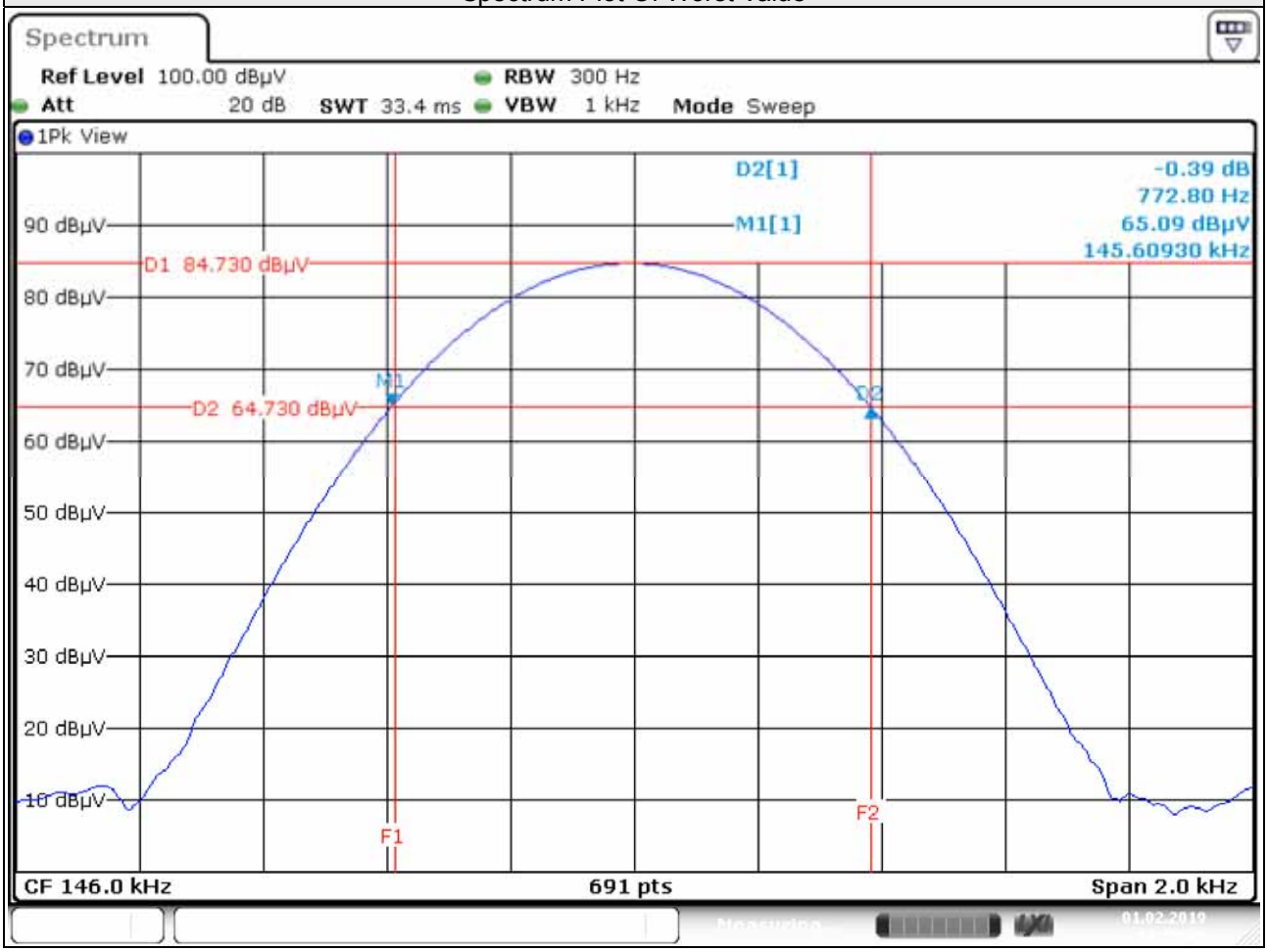
Frequency (kHz)	20dB Bandwidth (kHz)
133	0.7728

Spectrum Plot Of Worst Value



Mode B:

Frequency (kHz)	20dB Bandwidth (kHz)
146	0.7728

Spectrum Plot Of Worst 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
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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
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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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