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TEST REPORT

Report No.: 18051157HKG-001

Wai Hang Electronic Co Ltd

Application For Certification
(Original Grant)

FCC ID: KHKQI1110A

Transmitter

Prepared and Checked by:	**Approved by:**
Signed On File Lee Shui Tim, Tim Senior Lead Engineer	Digitally signed by Terry Chan Location: Intertek Testing Services Hong Kong Ltd. Chan Chi Hung, Terry Manager Date: July 13, 2018

TEST REPORT

GENERAL INFORMATION

Grantee:	Wai Hang Electronic Co Ltd
Grantee Address:	18/F, 1807-1808, New Trade Plaza, Blk B 6 On Ping Street, Siu Lek Yuen, Shatin, NT, Hong Kong.
Contact Person:	Michael Mok
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Fax:	(852)2649 6191
e-mail:	michael@waihang.com.hk
Manufacturer:	Weiliheng Electronics (Shenzhen) Co. Ltd.
Manufacturer Address:	No. 32 Chang Long East Road, Fuchengao Village, Pinghu Town, Longgang District, Shenzhen City, Guangdong Province, China. Postal Code : 518111
Brand Name:	WAI HANG / JENSEN
Model:	Qi-1110A
Additional Model:	QiCR-50, QiCR-50***** (Where ***** denote any printable characters in the ASCII Standard Character Table to represent variances in cosmetics or buyers)
Type of EUT:	Transmitter
Description of EUT:	Dual Alarm Clock Radio with Wireless Charging
Serial Number:	N/A
FCC ID:	KHKQI1110A
Date of Sample Submitted:	May 18, 2018
Date of Test:	May 18, 2018 to May 23, 2018
Report No.:	18051157HKG-001
Report Date:	July 13, 2018
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

TEST REPORT

SUMMARY OF TEST RESULT

Test Specification	Reference	Results
Transmitter Power Line Conducted Emissions	15.207	Pass
Radiated Emission Radiated Emission on the Bandedge	15.209	Pass

The equipment under test is found to be complying with the following standards:
FCC Part 15, October 1, 2016 Edition

TEST REPORT

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TEST REPORT

1.0 GENERAL DESCRIPTION

1.1 Product Description

The Equipment Under Test (EUT) is 112-205kHz Transmitter (Wireless Inductive battery Charger – WPT source). The EUT is powered by adaptor (Model: YeS12W-0500210US, Input: 100-240VAC 50/60Hz 0.35A, Output: 5.0VDC 2.1A).

All the models in QiCR-50 and the series QiCR-50***** are declared to be identical in hardware aspect. Where ***** represent any printable characters in the ASCII Standard Character Table to represent variances in cosmetics or buyers

The Model(s): QiCR-50 and QiCR-50***** are the same as the Model: Qi-1110A in hardware aspect. The difference in model number, brand name, color, cosmetic outlook and packing configuration serves as marketing strategy.

- Model: Qi-1110A: Brand Name: WAI HANG.
- Models: QiCR-50 and QiCR-50*****: Brand Name: JENSEN.

The representative model Qi-1110A was selected to test.

Antenna Type: Internal, Integral

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.2 Related Submittal(s) Grants

This is a single application for certification of a transmitter.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). All radiated measurements were performed in an 3m Chamber . Preliminary scans were performed in the 3m Chamber only to determine worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Justification Section"** of this Application.

1.4 Test Facility

The 3m Chamber and conducted measurement facility used to collect the radiated data is located at Shenzhen Union Trust Quality and Technology Co., Ltd. (Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shezhen, China. This test facility and site measurement data have been placed on file with the FCC.

TEST REPORT

2.0 SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.10 (2013).

The device was powered by 100-240VAC 50/60HZ 0.35A.

For maximizing emissions below 30 MHz, the EUT was rotated through 360°, the centre of the loop antenna was placed 1 meter above the ground, and the antenna polarization was changed. For maximizing emission at and above 30 MHz, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data report in Exhibit 3.0.

The rear of unit shall be flushed with the rear of the table.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the wooden turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered up, it transmits the RF signal continuously.

2.3 Special Accessories

There are no special accessories necessary for compliance of this product.

2.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

2.5 Support Equipment List and Description

1. Mobile Phone, M1803D5XA
   (Provided by UnionTrust)

TEST REPORT

3.0 EMISSION RESULTS

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG - AV

where FS = Field Strength in dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

FS = RR + LF

where FS = Field Strength in dBµV/m
RR = RA - AG - AV in dBµV
LF = CF + AF in dB

Assume a receiver reading of 52.0 dBµV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 32 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 52.0 dBµV/m
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
AV = 5.0 dB
FS = RR + LF
FS = 18 + 9 = 27 dBµV/m

RR = 18.0 dBµV
LF = 9.0 dB

Level in µV/m = Common Antilogarithm [(27 dBµV/m)/20] = 22.4 µV/m

TEST REPORT

3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 37.041 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Passed by 4.17 dB

3.4 Conducted Emission Configuration Photograph

The worst case in line-conducted emission was found at 174 kHz

For electronic filing, the worst case line-conducted configuration photographs are saved with filename: conducted photo.pdf.

3.5 Conducted Emission Data

For electronic filing, the graph and data table of conducted emission is saved with filename: conducted.pdf.

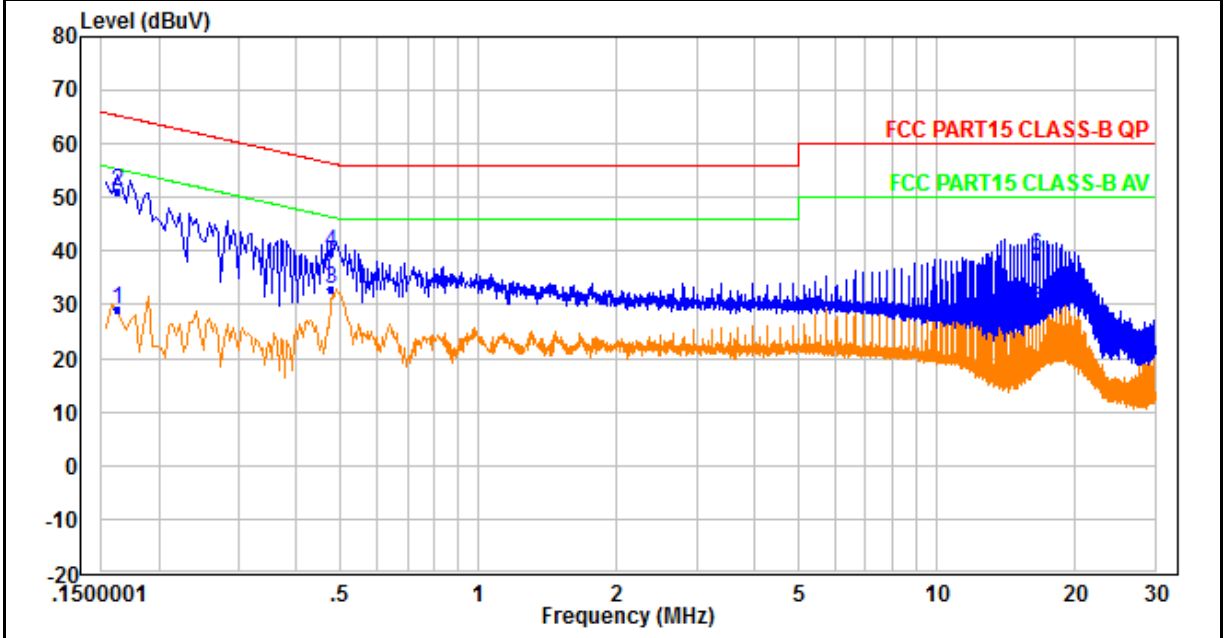
Judgment: Pass by 10.80 dB

TEST REPORT

CONDUCTED EMISSION

Model: Qi-1110A
Date of Test: May 23, 2018
Worst-Case Operating Mode: Charging

Live Line



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
1*	0.162	19.00	10.20	29.20	55.40	-26.20	Average
2	0.162	41.00	10.20	51.20	65.40	-14.20	QP
3	0.474	22.50	10.30	32.80	46.40	-13.60	Average
4	0.474	29.50	10.30	39.80	56.40	-16.60	QP
5	16.497	16.90	12.20	29.10	50.00	-20.90	Average
6	16.497	26.90	12.20	39.10	60.00	-20.90	QP

Note: Measurement Uncertainty is ±3.8dB at a level of confidence of 95%.

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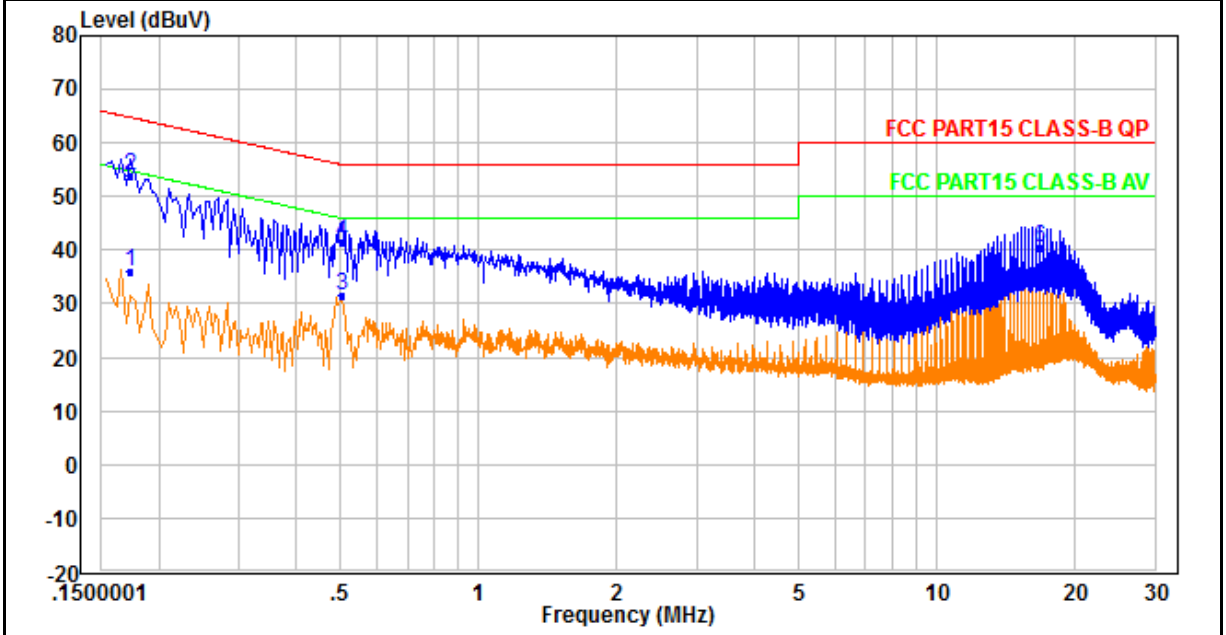
Model: Qi-1110A
Date of Test: May 23, 2018
Worst-Case Operating Mode: Charging

Neutral Line



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
1	0.174	25.80	10.20	36.00	54.80	-18.80	Average
2	0.174	43.80	10.20	54.00	64.80	-10.80	QP
3	0.502	21.00	10.40	31.40	46.00	-14.60	Average
4	0.502	31.00	10.40	41.40	56.00	-14.60	QP
5	16.809	21.00	12.40	33.40	50.00	-16.60	Average
6*	16.809	28.00	12.40	40.40	60.00	-19.60	QP

Note: Measurement Uncertainty is ±3.8dB at a level of confidence of 95%.

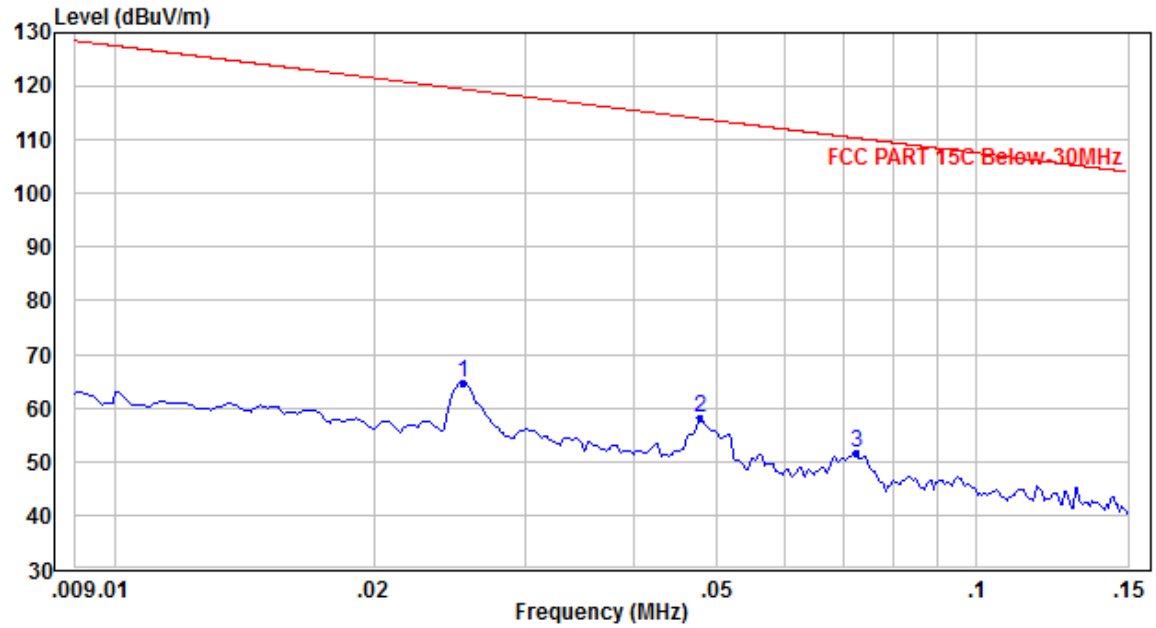
TEST REPORT

RADIATED EMISSIONS

Model: Qi-1110A
Date of Test: May 23, 2018
Worst-Case Operating Mode: Charging

Table 1

Radiated Emission Test Data (9 KHz ~ 150 KHz):



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
1	0.025	79.95	-15.29	64.66	119.49	-54.83	Peak
2	0.048	75.56	-17.41	58.15	114.01	-55.86	Peak
3*	0.072	69.51	-17.95	51.56	110.39	-58.83	Peak

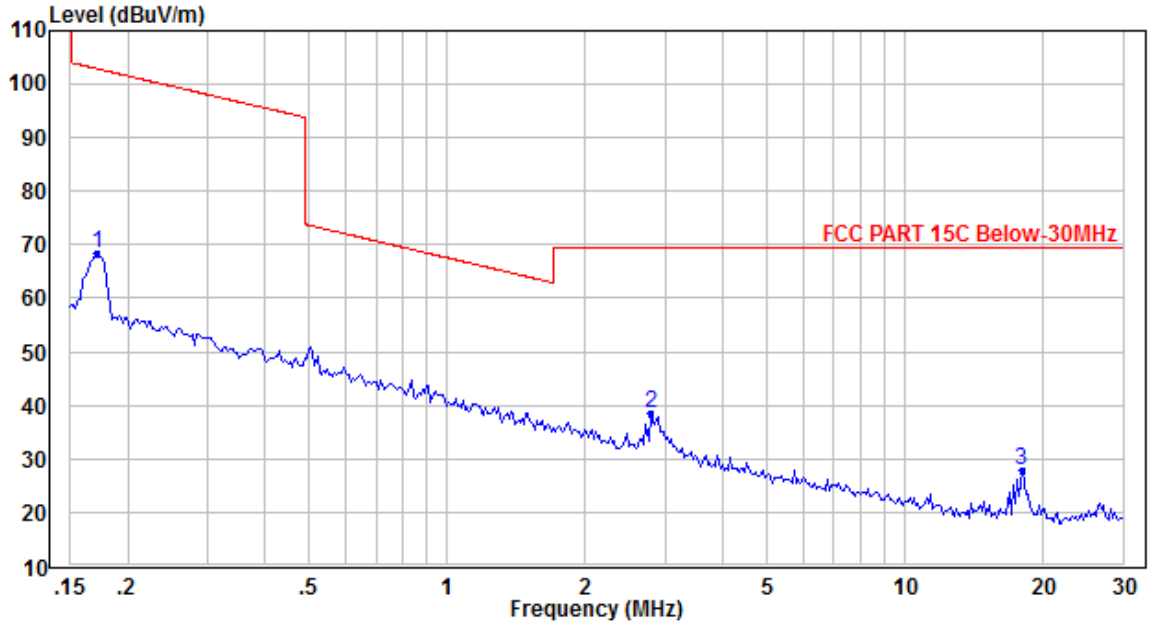
NOTES:
1. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
2. Negative sign in the column shows value below limit.
3. Loop antenna is used for the emissions below 30MHz.
4. Measurement Uncertainty is ±4.9dB at a level of confidence of 95%.

TEST REPORT

Model: Qi-1110A
Date of Test: May 23, 2018
Worst-Case Operating Mode: Charging

Table 2

Radiated Emission Test Data (150 KHz ~ 30 MHz):



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
1	0.172	86.37	-18.02	68.35	102.88	-34.53	Peak
2	2.781	56.44	-17.83	38.61	69.50	-30.89	Peak
3*	18.021	46.68	-18.77	27.91	69.50	-41.59	Peak

NOTES:
1. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
2. Negative sign in the column shows value below limit.
3. Loop antenna is used for the emissions below 30MHz.
4. Measurement Uncertainty is ±4.9dB at a level of confidence of 95%.

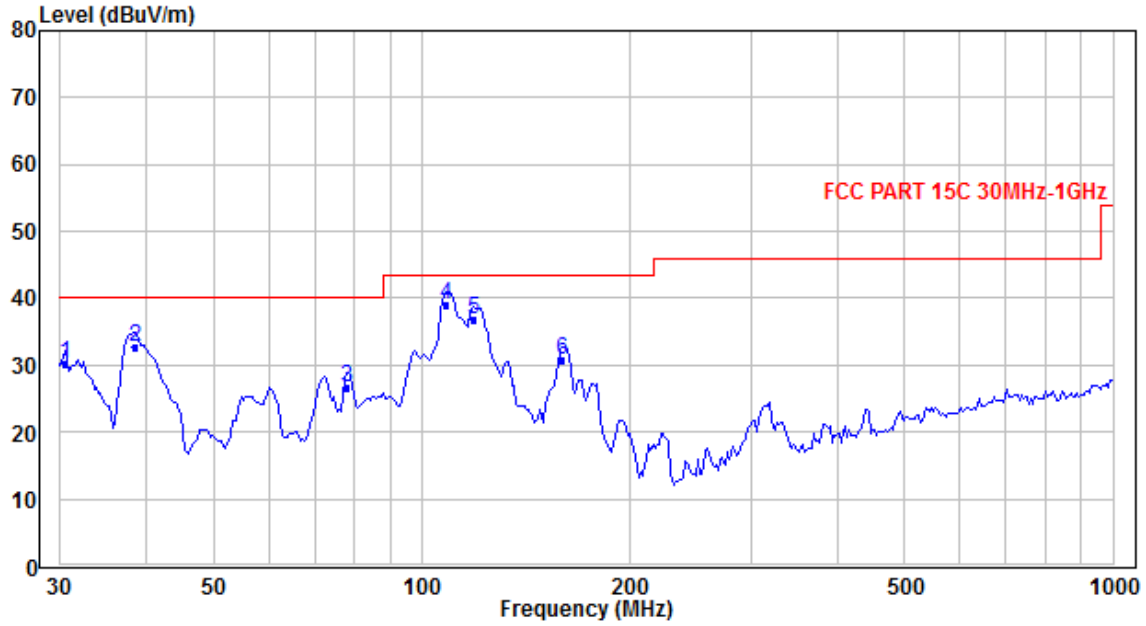
TEST REPORT

Model: Qi-1110A
Date of Test: May 23, 2018
Worst-Case Operating Mode: Charging

Table 3

Radiated Emission Test Data (30 MHz ~ 1 GHz):

Horizontal



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
1	30.425	41.33	-11.09	30.24	40.00	-9.76	QP
2	38.365	48.49	-15.65	32.84	40.00	-7.16	QP
3*	78.014	46.04	-19.30	26.74	40.00	-13.26	QP
4	108.546	56.40	-17.43	38.97	43.50	-4.53	QP
5	118.929	54.34	-17.44	36.90	43.50	-6.60	QP
6	159.759	46.56	-15.78	30.78	43.50	-12.72	QP

NOTES:
1. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

2. Negative sign in the column shows value below limit.

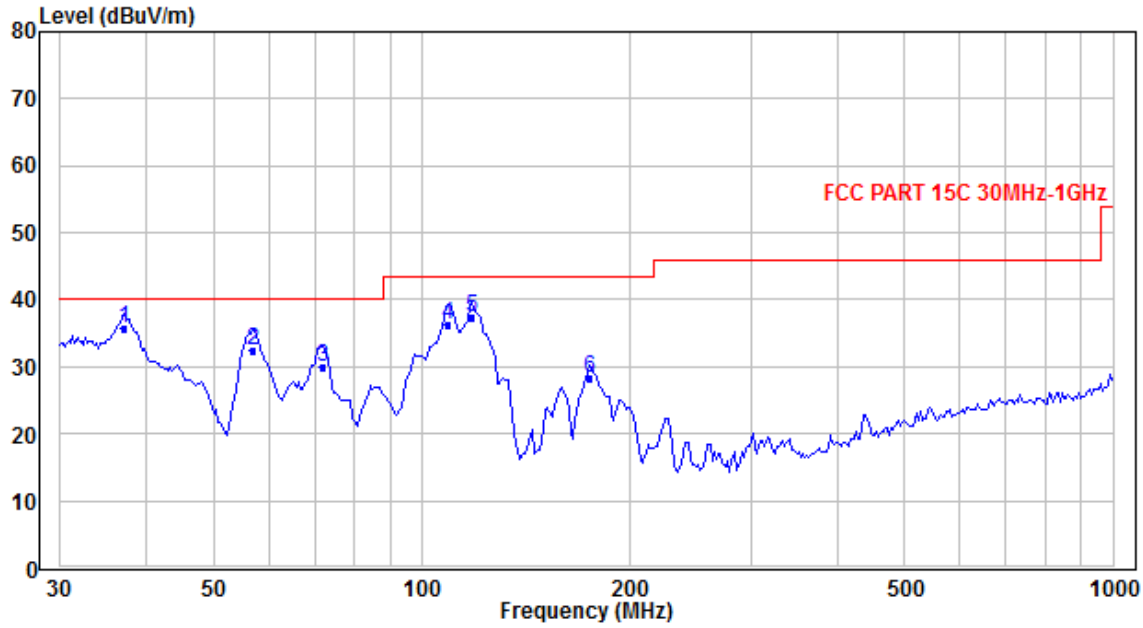
3. Measurement Uncertainty is ±4.9dB at a level of confidence of 95%.

TEST REPORT

Model: Qi-1110A
Date of Test: May 23, 2018
Worst-Case Operating Mode: Charging

Table 4

Vertical



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
1	37.041	50.71	-14.88	35.83	40.00	-4.17	QP
2	56.864	52.67	-20.31	32.36	40.00	-7.64	QP
3	71.705	49.59	-19.54	30.05	40.00	-9.95	QP
4	109.311	53.62	-17.42	36.20	43.50	-7.30	QP
5	118.096	54.96	-17.45	37.51	43.50	-5.99	QP
6*	175.040	44.05	-15.74	28.31	43.50	-15.19	QP

NOTES:
1. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

2. Negative sign in the column shows value below limit.

3. Measurement Uncertainty is ±4.9dB at a level of confidence of 95%.

TEST REPORT

4.0 EQUIPMENT PHOTOGRAPHS

For electronic filing, the photographs are saved with filename: external photos.pdf and internal photos.pdf.

5.0 PRODUCT LABELLING

For electronics filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

6.0 TECHNICAL SPECIFICATIONS

For electronic filing, the block diagram and schematic of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.

7.0 INSTRUCTION MANUAL

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

TEST REPORT

8.0 MISCELLANEOUS INFORMATION

The miscellaneous information includes details of the test procedure and measured bandwidth / calculation of factor such as pulse desensitization and averaging factor (calculation and timing diagram).

8.1 Measured Bandwidth

Pursuant to FCC Part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designed (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. Since the transmitter transmits the RF signal continuously.

8.3 Calculation of Average Factor

The average factor is not applicable for this device as the transmitted signal is a continuously signal.

TEST REPORT

8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of transmitter operating under the Part 15, Subpart C rules.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately 0.8m in height above the ground plane for emission measurement at or below 1GHz and 1.5m in height above the ground plane for emission measurement above 1GHz. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axis to obtain maximum emission levels. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower. For line conducted emissions, the range scanned is 150 kHz to 30 MHz.

TEST REPORT

8.4 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.10 (2013).

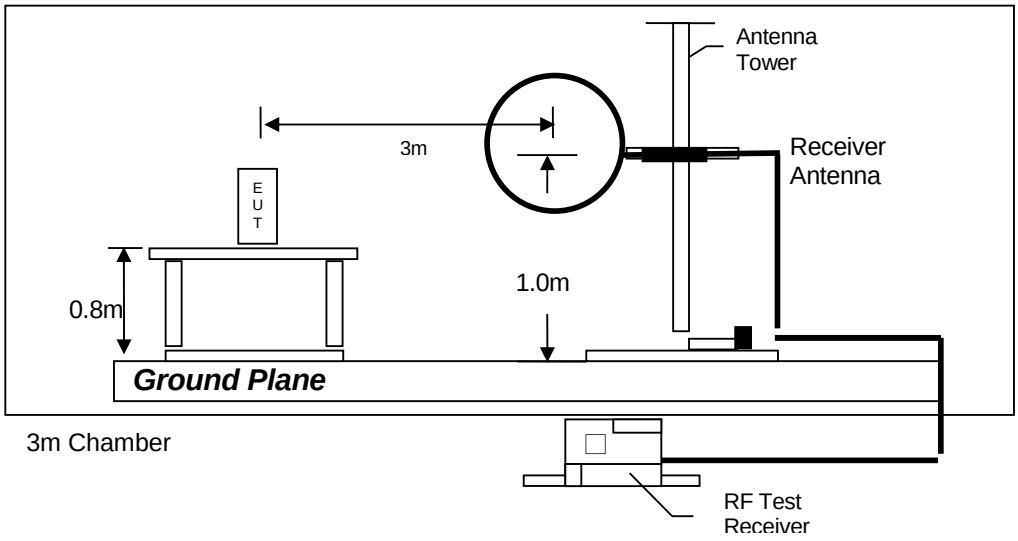
The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.1). Above 1000 MHz, a resolution bandwidth of 3 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

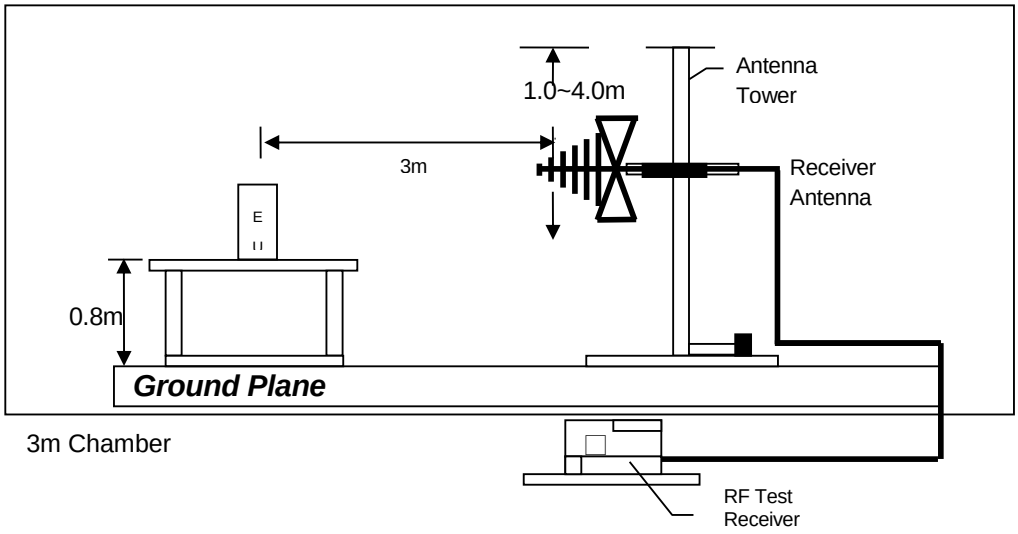
TEST REPORT

8.4.1 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



Test setup of radiated emissions up to 30MHz



Test setup of radiated emissions above 1GHz

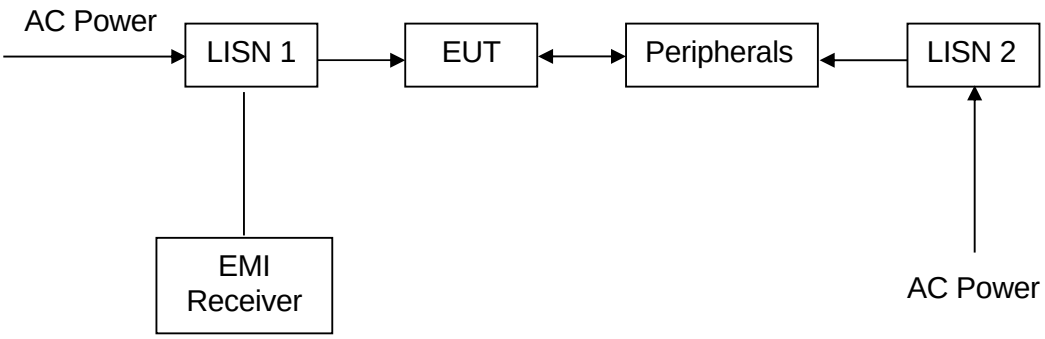
TEST REPORT

8.4.2 Conducted Emission Test Procedures

For tabletop equipment, the EUT along with its peripherals were placed on a 1.0m(W)×1.5m(L) and 0.8m in height wooden table. For floor-standing equipment, the EUT and all cables were insulated, if required, from the ground plane by up to 12 mm of insulating material. The EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were moved to find the maximum emission.

8.4.3 Conducted Emission Test Setup



TEST REPORT

9.0 CONFIDENTIALITY REQUEST

For electronic filing, a preliminary copy of the confidentiality request is saved with filename: request.pdf.

10.0 EQUIPMENT LIST

1) Radiated Emissions Test

Equipment No.	Equipment	Manufacturer	Calibration Date	Next Calibration Due Date
UTTL-010	3M Chamber & Accessory Equipment	ETS-LINDGREN	Dec. 20, 2015	Dec. 19, 2018
UTTL-026	Receiver	R&S	Dec. 22, 2017	Dec. 22, 2018
UTTL-015	Broadband Antenna	ETS-LINDGREN	Jul. 24, 2015	Jul. 23, 2018
UTTL-043	Preamplifier	HP	Dec. 22, 2017	Dec. 22, 2018
UTTL-EN002	Multi device Controller	ETS-Lindgren	N/A	N/A
UTTL－E013	Loop Antenna	ETS-Lindgren	Jun. 24, 2015	Jun. 23, 2018

2) Conducted Emissions Test

Equipment No.	Equipment	Manufacturer	Calibration Date	Next Calibration Due Date
UTTL-005	Receiver	R&S	Dec. 22, 2017	Dec. 22, 2018
UTTL-007	Pulse Limiter	R&S	Dec. 22, 2017	Dec. 22, 2018
UTTL-003	LISN	R&S	Dec. 22, 2017	Dec. 22, 2018
UTTL-004	LISN	ETS-Lindgren	Aug. 24, 2017	Aug. 23, 2018

END OF TEST REPORT