FCC TEST REPORT

For

Unitech Sales LLC

LumiCharge

Test Model: LD

Additional Model No.: N/A

Prepared for : Unitech Sales LLC

Address : 92 corporate 200 Irvine, CA 92620 United States

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.

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Date of receipt of test sample : January 07, 2020

Number of tested samples : 1

Serial number : Prototype

Date of Test : February 25, 2020~ March 16 , 2020

Date of Report : March 17, 2020

FCC TEST REPORT FCC CFR 47 PART 18: 2017

Report Reference No.....: LCS200106044AEC

Date of Issue.....: March 17, 2020

Testing Laboratory Name.....: Shenzhen LCS Compliance Testing Laboratory Ltd.

Full application of Harmonised standards

Testing Location/ Procedure....: Partial application of Harmonised standards

Other standard testing method \square

Applicant's Name.....: Unitech Sales LLC

Address...... 92 corporate 200 Irvine, CA 92620 United States

Test Specification

Standard..... : FCC CFR 47 PART 18: 2017

Test Report Form No.....: LCSEMC-1.0

TRF Originator.....: Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF.....: Dated 2011-03

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Test Item Description.....: LumiCharge

Trade Mark....: N/A

Test Model....: LD

Adapter parameter:

Ratings.....: Input: AC 100-240V, 50/60Hz, 0.8A Max

Output: DC 12V/2A

Result: Positive

Compiled by:

Supervised by:

Jack Liu / File administrators

Aking Jin/ Technique principal

Gavin Liang/ Manager

FCC -- TEST REPORT

Test Report No. : LCS200106044AEC March 17, 2020

Date of issue

Test Model..... : LD EUT..... : LumiCharge : Unitech Sales LLC Applicant..... : 92 corporate 200 Irvine, CA 92620 United States Address..... Telephone..... : / : / Fax..... : Unitech Sales LLC Manufacturer..... : 92 corporate 200 Irvine, CA 92620 United States Address..... Telephone..... : / Fax..... : / Factory..... : 1 Address..... : / Telephone..... : / Fax..... : /

Test Result	Positive

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Revision	Issue Date	Revisions	Revised By
000	March 17 , 2020	Initial Issue	Gavin Liang

TABLE OF CONTENTS

1. GENERAL INFORMATION	•••••	6
1.1 Description of Device (EUT)	错误!未定义书签	5 ۰
1.2 Support equipment List		6
1.3 External I/O Cable		7
1.4 Description of Test Facility		7
1.5 Statement of the Measurement Uncertainty		7
1.6 Measurement Uncertainty		7
1.7 Description of Test Modes		
2. TEST METHODOLOGY		
2.1 EUT Configuration		
2.2 EUT Exercise		
2.3.1 Conducted Emissions		
2.3.2 Radiated Emissions		
3. SYSTEM TEST CONFIGURATION	•••••	10
3.1 Justification		
3.2 EUT Exercise Software		
3.3 Special Accessories		
3.4 Block Diagram/Schematics		.10
3.5 Equipment Modifications		
3.6 Test Setup		
5. SUMMARY OF TEST RESULT		
6. POWER LINE CONDUCTED MEASUREMENT		
7. RADIATED EMISSION MEASUREMENT		
7.1. Block Diagram of Test Setup		
7.2. Radiated Emission Limit		
7.4. Operating Condition of EUT		
7.5. Measuring Setting		
7.6. Test Procedure		
7.7. Test Results		. 18
8. PHOTOGRAPHS OF TEST SETUP	错误!未定义书签	-
9. EXTERNAL PHOTOGRAPHS OF THE EUT	错误!未定义书签	-
10 INTERNAL PHOTOGRAPHS OF THE FIIT	错误! 未 定义 4.2	5 0

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT LumiCharge

Test Model : LD List Model No. : N/A

Model Declaration : PCB board, structure and internal of these model(s) are the same,

So no additional models were tested.

Adapter parameter:

Power Supply : Input: AC 100-240V, 50/60Hz, 0.8A Max

Output: DC 12V/2A

Hardware Version : V1 Software Version : V1

Bluetooth

Frequency Range : 2402MHz-2480MHz

Version : V5.0

Channel Number : 79 Channels for Bluetooth V5.0 (BDR/EDR)

Channel Spacing : 1MHz for Bluetooth V5.0 (BDR/EDR)

Modulation Type : GFSK, $\pi/4$ -DQPSK for Bluetooth V5.0(BDR/EDR)

WLAN

Frequency Range : 2412MHz-2462MHz

Channel Number : 11 Channels for b/g/n20

Channel Spacing : 5MHz for b/g/n20

Modulation Type

IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK)

: IEEE 802.41a (a) OFDM(C40AM, 400AM, ODS

IEEE 802.11g/n: OFDM(64QAM, 16QAM, QPSK, BPSK)

Wireless Charging

Frequency Range : 110.0~205.0KHz Modulation Type : Continuous Wave

BT:PCB Antenna, 1.20dBi(Max.)

Antenna Type : WIFI:PCB Antenna, 2.00dBi(Max.)

WPC:Coil Antenna

1.2 Support equipment List

Manufacturer	Description	Model	Serial Number	Certificate
Apple	iPhone 8 plus	iPhone 8 plus		FCC ID
Shenzhen Boyaxuan Technology Development Co., Ltd.	AC/DC ADAPTER	BYX-1202000		CE

1.3 External I/O Cable

I/O Port Description	Quantity	Cable
SD Card Slot	1	N/A
AUX Port	1	N/A
DC12V IN Port	1	N/A

1.4 Description of Test Facility

FCCRegistrationNumber is 254912.

IndustryCanadaRegistrationNumberis9642A-1.

EMSDRegistrationNumberisARCB0108.

ULRegistrationNumberis100571-492.

TUVSUDRegistrationNumberisSCN1081.

TUVRHRegistrationNumberisUA50296516-001.

NVLAPAccreditationCodeis600167-0.

FCCDesignationNumberisCN5024

CAB identifier: CN0071

The 3m Semi Anechoic Chamber and 3m Fully Anechoic Chamber test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 VSWR requirement for radiated emission above 1GHz.

1.5 Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16-4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.6 Measurement Uncertainty

Test Item		FrequencyRange	Uncertainty	Note
		9KHz~30MHz	3.10dB	(1)
		30MHz~200MHz	2.96dB	(1)
Radiation Uncertainty	:	200MHz~1000MHz	3.10dB	(1)
		1GHz~26.5GHz	3.80dB	(1)
		26.5GHz~40GHz	3.90dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	1.63dB	(1)
Power disturbance	:	30MHz~300MHz	1.60dB	(1)

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.7 Description of Test Modes

Equipment under test was operated during the measurement under the following conditions:

Modulation Type: CW (Continuous Wave)

Test Modes:				
Mode 1	AC/DC Adapter (12V) + EUT(BT+ Wireless Charging+WIFI) + MobilePhone (Battery Status: <1%)	Record		
Mode 2	AC/DC Adapter (12V) + EUT(BT+ Wireless Charging+WIFI) + MobilePhone (Battery Status: <50%)	Pre-tested		
Mode 3	AC/DC Adapter (12V) + EUT(BT+ Wireless Charging+WIFI) + MobilePhone (Battery Status: 100%)	Pre-tested		
Mode 7	AC/DC Adapter (12V) + EUT(WIFI)	Pre-tested		
Mode 4	AC/DC Adapter (12V) + EUT+ MobilePhone (Battery Status: <1%)	Pre-tested		
Mode 5	AC/DC Adapter (12V) + EUT + MobilePhone (Battery Status: <50%)	Pre-tested		
Mode 6	AC/DC Adapter (12V) + EUT + MobilePhone (Battery Status: 100%)	Pre-tested		
Mode 7	AC/DC Adapter (12V) + EUT(BT)	Pre-tested		
Note: All t	est modes were pre-tested, but we only recorded the worst case in this report			

For AC conducted emission, pre-test at both AC 120V/60Hz and AC 240V/50Hz, recorded worst case; For AC conducted emission, pre-test at both AC charge from power adapter and PC modes, recorded worst case.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with MP-5, and FCC CFR PART 18.

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT was operated in the charging and compunction mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 18.305 and 18.307 under the FCC Rules Part 18.

2.3 General Test Procedures

2.3.1Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in FCC MP-5 forConducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in FCC MP-5 for radiated emission.

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a normal condition.

3.2 EUT Exercise Software

N/A.

3.3 Special Accessories

No.	Equipment	Manufacturer	Model No.	Serial No.	Length	shielded/ unshielded	Notes
1							
2							

3.4 Block Diagram/Schematics

Please refer to the related document.

3.5 Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

3.6 Test Setup

Please refer to the test setup photo.

4. SUMMARY OF TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	MXA Signal Analyzer	Agilent	N9020A	MY4910004 0	2019-06-11	2020-06-10
2	SPECTRUM ANALYZER	R&S	FSP40	100503	2019-11-26	2020-11-25
3	3m Fully Anechoic Chamber	MRDIANZI	FAC-3M	MR009	2019-09-27	2020-09-26
4	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2019-06-12	2020-06-11
5	Positioning Controller	MF	MF-7082	/	2019-06-12	2020-06-11
6	EMI Test Software	AUDIX	E3	/	N/A	N/A
7	EMI Test Receiver	R&S	ESR 7	101181	2019-06-12	2020-06-11
8	Active Loop Antenna	SCHWARZBE CK	FMZB 1519B	00005	2019-07-25	2020-07-24
9	By-log Antenna	SCHWARZBE CK	VULB916 3	9163-470	2019-07-25	2020-07-24
10	Horn Antenna	SCHWARZBE CK	BBHA 9120D	9120D-1925	2019-07-01	2020-06-30
11	RF Cable-R03m	Jye Bao	RG142	CB021	2019-06-12	2020-06-11
12	RF Cable-HIGH	SUHNER	SUCOFLE X 106	03CH03-HY	2019-06-12	2020-06-11
13	EMI Test Receiver	R&S	ESPI	101840	2019-06-11	2020-06-10
14	Artificial Mains	R&S	ENV216	101288	2019-06-12	2020-06-11
15	10dB Attenuator	SCHWARZBE CK	MTS-IMP- 136	261115-001- 0032	2019-06-11	2020-06-10

Note: All equipment is calibrated through CHINA CEPREI LABORATORY and GUANGZHOU LISAI CALIBRATION AND TEST CO., LTD.

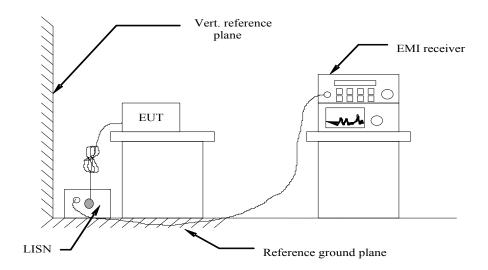
5. SUMMARY OF TEST RESULT

Test Item	FCC Rule No.	Temperature conditions	Power source conditions	С	NC	NA	NP	Remark
Radiated Emission	§18.305 (b)	Nominal	Nominal	\boxtimes				-/-
AC conducted emission	§18.307 (b)	Nominal	Nominal	\boxtimes				-/-

Remark: The measurement uncertainty is not included in the test result.

6. POWER LINE CONDUCTED MEASUREMENT

6.1. Block Diagram of Test Setup



6.2. Standard Applicable

According to §18.307 (b): For all other part 18 consumer devices which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Frequency Range	Limits (d	IBμV)
(MHz)	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

^{*} Decreasing linearly with the logarithm of the frequency

6.3 Test Results

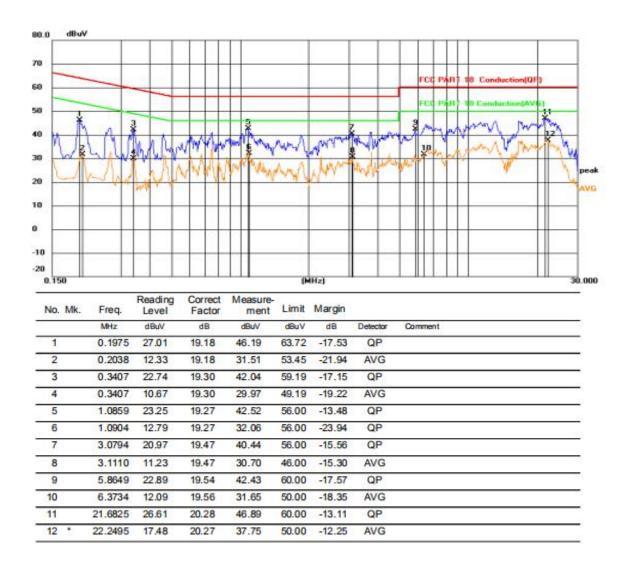
PASS.

Only report the worst test data (Mode 1) in test report;

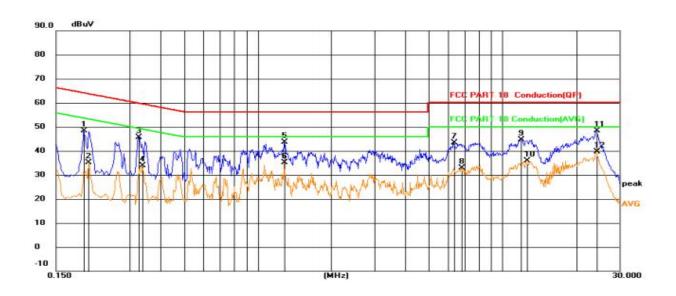
The test data please refer to following page.

AC Conducted Emission of power adapter @ AC 120V/60Hz

Line



Neutral



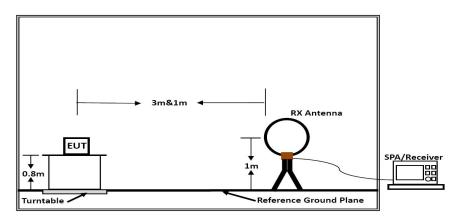
SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD. FCC ID: 2AV28HZ-LD Report No.: LCS200106044AEC

No. Mk.	Freq.	Reading Level	Correct	Measure- ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1949	29.22	19.17	48.39	63.83	-15.44	QP	
2	0.2038	15.96	19.18	35.14	53.45	-18.31	AVG	
3	0.3255	26.35	19.29	45.64	59.57	-13.93	QP	
4	0.3390	14.67	19.30	33.97	49.23	-15.26	AVG	
5	1.2839	24.22	19.30	43.52	56.00	-12.48	QP	
6	1.2839	15.80	19.30	35.10	46.00	-10.90	AVG	
7	6.3464	23.73	19.56	43.29	60.00	-16.71	QP	
8	6.7919	13.30	19.58	32.88	50.00	-17.12	AVG	
9	11.9130	24.83	19.85	44.68	60.00	-15.32	QP	
10	12.5609	15.84	19.92	35.76	50.00	-14.24	AVG	
11	24.1483	28.17	20.23	48.40	60.00	-11.60	QP	
12 *	24.3240	19.30	20.24	39.54	50.00	-10.46	AVG	

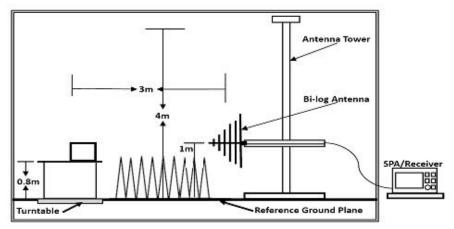
^{***}Note: Pre-scan all modes and recorded the worst case results in this report.

7. RADIATED EMISSION MEASUREMENT

7.1. Block Diagram of Test Setup



Below 30MHz



Below 1GHz

7.2. Radiated Emission Limit

Except as provided elsewhere in this Subpart 18.305 (b), the field strength levels of emissions which lie outside the bands specified in §18.301, unless otherwise indicated, shall not exceed the following table:

Frequency	Distance	Field Stre	ngths Limit	
MHz	Meters	dBμV/m	Remark	
0.009~30MHz	3	103.5	Quasi-peak	
30~88	3	40.0	Quasi-peak	
88~216	3	43.5	Quasi-peak	
216~960	3	46.0	Quasi-peak	
960~1000	3	54.0	Quasi-peak	

Remark:

- (1) Emission level $dB_{\mu}V/m$ for $0.009\sim30MHz = 20log~(15) + 40log~(300/3)~dB_{\mu}V/m$;
- (2) Calculated according FCC 18.305.
- (3) The smaller limit shall apply at the cross point between two frequency bands.
- (4) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

7.3. EUT Configuration on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.4. Operating Condition of EUT

- (1) Setup the EUT as shown in Section 4.1.
- (2) Let the EUT work in worst test mode (Mode 1) and measure it.

7.5. Measuring Setting

The following table is the setting of spectrumanalyzer and receiver.

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 120Hz for QP/Average
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP/Average
Start ~ Stop Frequency	30MHz~1000MHz / RB 100kHz for QP

7.6. Test Procedure

1) Sequence of testing 9 kHz to 30 MHz

Setup:

- --- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- --- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
- --- If the EUT is a floor standing device, it is placed on the ground.
- --- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
- --- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- --- The measurement distance is 3 meter.
- --- The EUT was set into operation.

Premeasurement:

- --- The turntable rotates from 0° to 315° using 45° steps.
- --- The antenna height is 0.8 meter.
- --- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

- --- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).
- --- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QP detector.
- --- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

- --- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- --- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- --- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- --- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- --- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- --- The measurement distance is 3 meter.
- --- The EUT was set into operation.

Premeasurement:

- --- The turntable rotates from 0° to 315° using 45° steps.
- --- The antenna is polarized vertical and horizontal.
- --- The antenna height changes from 1 to 3 meter.
- --- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

- --- The final measurement will be performed with minimum the six highest peaks.
- --- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.
- --- The final measurement will be done with QP detector with an EMI receiver.
- --- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

7.7. Test Results

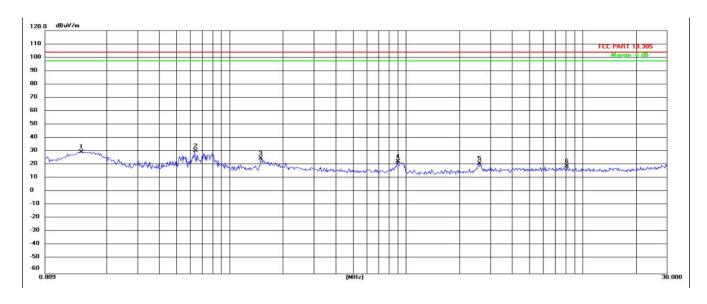
PASS.

Only report the worst test data (Mode 1) in test report;

The test data please refer to following page:

SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD. FCC ID: 2AV28HZ-LD Report No.: LCS200106044AEC

0.009 MHz - 30 MHz



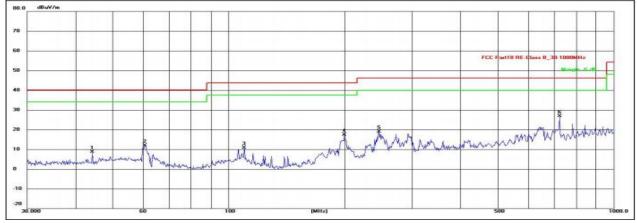
No.	Frequency	Reading	Factor	Level	Limit	Margin	Det.	Height	Azimuth	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)		(cm)	(deg)	
1	0.0145	30.00	0.24	30.24	103.50	-73.26	QP			
2 *	0.0636	30.67	0.24	30.91	103.50	-72.59	QP			
3	0.1502	25.08	0.24	25.32	103.50	-78.18	QP			
4	0.8948	22.64	0.26	22.90	103.50	-80.60	QP			
5	2.5895	21.49	0.27	21.76	103.50	-81.74	QP			
6	8.1932	19.26	0.28	19.54	103.50	-83.96	QP			

Remark:

Measured at 0 degree and 90 degree, recorded worst case at 90 degree.

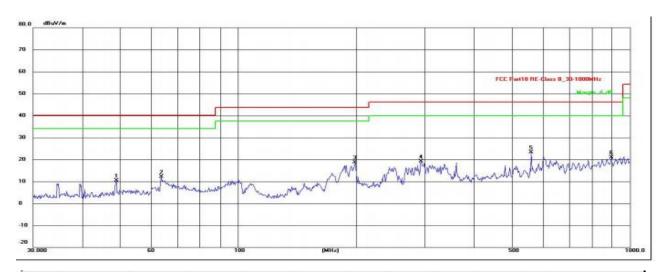
30 MHz - 1000 MHz

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	44.2751	25.41	-16.59	8.82	40.00	-31.18	QP				
2	60.7043	30.15	-18.15	12.00	40.00	-28.00	QP	8			
3	109.7959	29.22	-18.37	10.85	43.50	-32.65	QP				
4	199.9855	35.64	-18.10	17.54	43.50	-25.96	QP				
5	245.9508	35.84	-16.85	18.99	46.00	-27.01	QP				
6	724.2609	34.97	-8.01	26.96	46.00	-19.04	QP				

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	49.0144	26.84	-16.40	10.44	40.00	-29.56	QP			П	
2	63.7588	31.11	-18.92	12.19	40.00	-27.81	QP				
3	198.5878	37.10	-18.25	18.85	43.50	-24.65	QP				
4	293.0842	35.00	-15.81	19.19	46.00	-26.81	QP				
5	560.6928	33.39	-10.11	23.28	46.00	-22.72	QP				
6	896.9964	26.65	-5.68	20.97	46.00	-25.03	QP				

1).	Pre-scan all modes and recorded the	worst case results in this re	port.
2).	Emission level (dBuV/m) = 20 log Em	ission level (uV/m).	
3).	Corrected Reading: Antenna Factor +	- Cable Loss + Read Level =	= Level.

8. TEST SETUP PHOTOGRAPHS OF EUT

Test Setup Photo(s) of Radiated Emissions Measurement

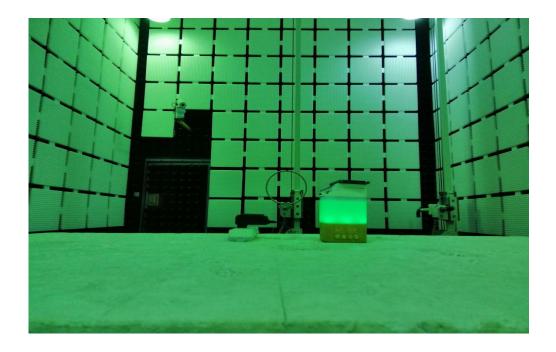


Fig. 1

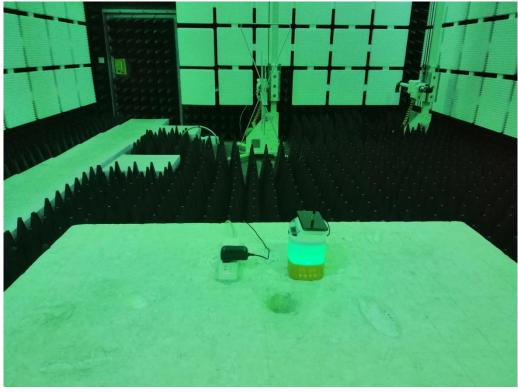


Fig. 2

Test Setup Photo(s) of Power Line Conducted Emissions Measurement

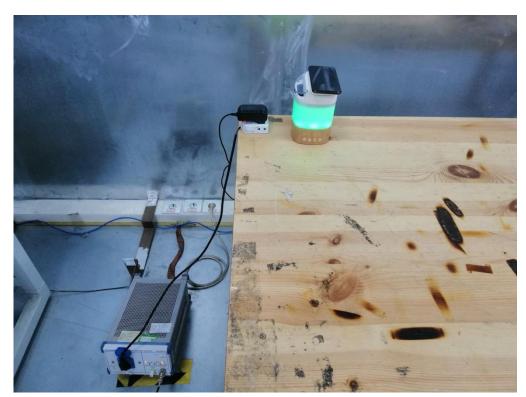


Fig. 3

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THE END	OF REPORT	