

Test Report

Electromagnetic Compatibility (EMC)



TESTS ACCORDING TO FCC PART 15 B AND INDUSTRY CANADA REQUIREMENTS

Equipment Under Test: Lithium Iron Phosphate Battery Charger for sound source indicating camera

Brand name: **MASCOT**

Type: 2440

Manufacturer: Noiseless Acoustics Ltd
Sitratie 7
FI-00420 Helsinki
Finland

Customer: Noiseless Acoustics Ltd
Sitratie 7
FI-00420 Helsinki
Finland

FCC Rule Part: FCC CFR 47 Part 15 Subpart B (2019), Class B
IC Rule Part: ICES-003 Issue 6 (update 2019), Class B

Date: 12 March 2020

Issued by:

A handwritten signature in blue ink, appearing to read 'Jani Tuomela'.

Jani Tuomela
EMC/RF test engineer

Date: 12 March 2020

Checked by:

A handwritten signature in blue ink, appearing to read 'Rauno Repo'.

Rauno Repo
Senior EMC/RF Specialist

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Equipment Under Test (EUT)

Lithium Iron Phosphate Battery Charger for sound source indicating camera

Brand name: **MASCOT**

Type: 2440

Serial no: -

Highest internal operation frequency of the EUT

Less than 108 MHz.

General description

The EUT is a charger for handheld acoustic camera battery. Charging battery while using the camera is not allowed. The battery is carried in a shoulder back when the camera is used.

Type of the EUT

The EUT will be tested as a table-top unit.

Power requirements**Charger**

Type:	2440
Rated voltage:	100 - 240 VAC
Rated current:	1.6 A max
Rated frequency:	50 - 60 Hz
Output voltage:	14.0 – 14.6 VDC depending on charging status
Output current:	4.0 A

Battery pack

Model:	Tracer Power BP2607-II LiFePO ₄ , 7 Ah, size: 92x45x65 mm
Rated voltage:	12 VDC
Rated current:	1 A
Rated frequency:	DC

Cable lengths and types

No external cables.

Peripherals

No peripherals.

Disclaimer

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

EUT Test Conditions During EMC-Testing

The EUT was recharging an empty battery.

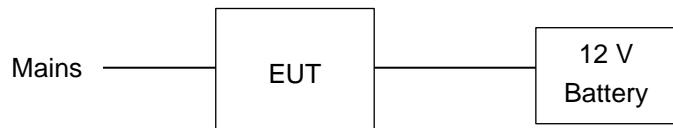


Figure 1. Block diagram of the test setup

Summary of Testing**Summary of Testing**

Test Specification	Description of Test	Result
FCC CFR 47 15/B §15.107, ICES-003 §6.1	Conducted Emissions, Class B	PASS
FCC CFR 47 15/B §15.109, ICES-003 §6.2	Radiated Emissions, Class B	PASS

Test Facility

Testing Laboratory / address: FCC designation number: FI0002 ISED CAB identifier: T004	SGS Fimko Ltd Takomotie 8 FI-00380, HELSINKI FINLAND
Test Site:	<input type="checkbox"/> K10LAB, ISED Canada registration number: 8708A-1 <input checked="" type="checkbox"/> K5LAB, ISED Canada registration number: 8708A-2 <input type="checkbox"/> T10LAB

TEST RESULTS**Conducted Emissions In The Frequency Range 150 kHz - 30 MHz**

Standard: ANSI C63.4 (2014)
Tested by: JAT
Date: 9 March 2020
Temperature: 23 ± 3 °C
Humidity: 20 - 75 % RH
Barometric pressure: 860 – 1 060 hPa

FCC Rule: 15.107**ICES-003: 6.1****Test plan**

Conducted disturbance voltage was measured with an artificial main network from 150 kHz to 30 MHz with 4.5 kHz steps and a resolution bandwidth of 9 kHz. Measurements were carried out with peak and average detectors. During the test the EUT was powered from the separate power supply (120 VAC / 60 Hz) through the LISN.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

Results

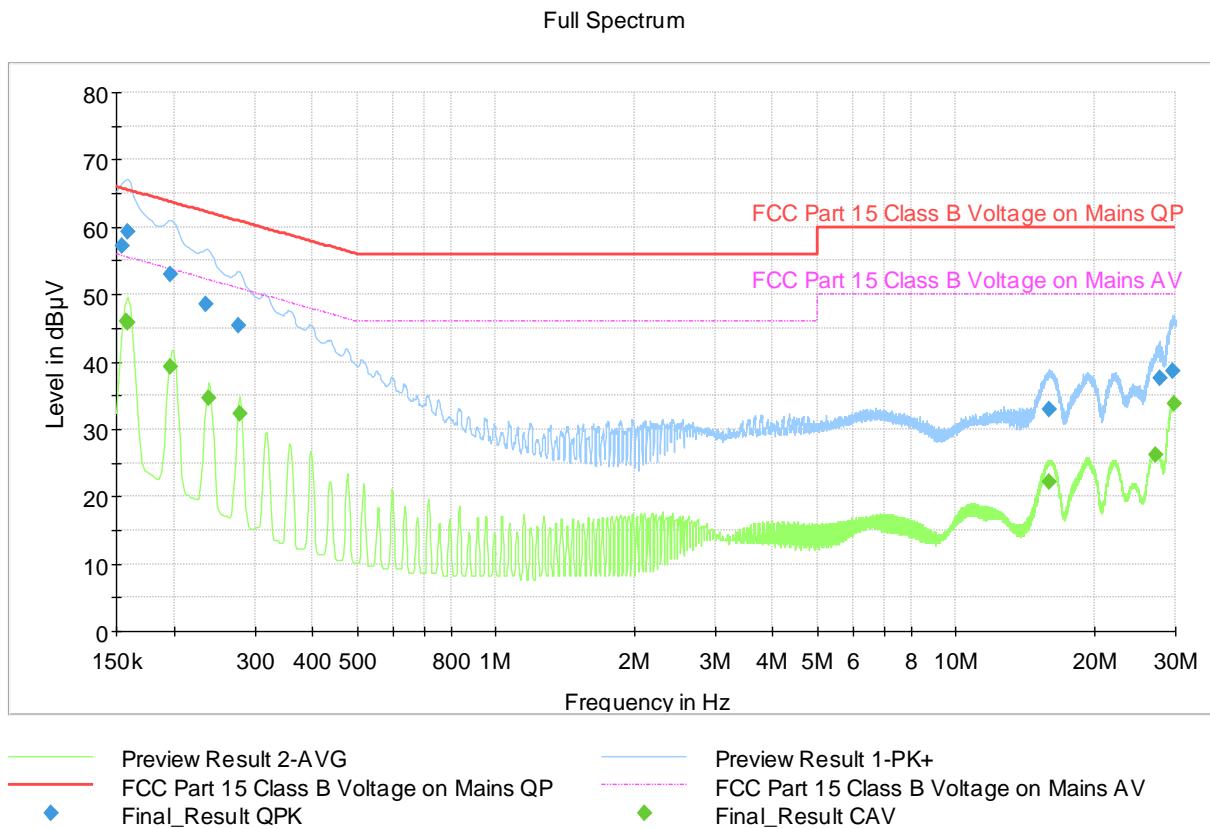


Figure 2. The measured results with peak- and average detectors.

Table 1. Results

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Limit (dB μ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.154000	57.28	---	65.78	8.50	1000.0	9.000	N	9.6
0.158000	---	45.92	55.57	9.65	1000.0	9.000	N	9.6
0.158500	59.32	---	65.54	6.22	1000.0	9.000	L1	9.6
0.158500	---	45.74	55.54	9.80	1000.0	9.000	N	9.6
0.196750	---	39.23	53.75	14.52	1000.0	9.000	L1	9.6
0.196750	52.90	---	63.75	10.85	1000.0	9.000	L1	9.6
0.235000	48.48	---	62.27	13.79	1000.0	9.000	L1	9.6
0.237250	---	34.54	52.19	17.65	1000.0	9.000	N	9.6
0.275500	45.35	---	60.95	15.60	1000.0	9.000	L1	9.6
0.277750	---	32.33	50.88	18.55	1000.0	9.000	N	9.6
15.899000	32.87	---	60.00	27.13	1000.0	9.000	L1	10.3
15.901500	---	22.10	50.00	27.90	1000.0	9.000	L1	10.3
27.076750	---	26.08	50.00	23.92	1000.0	9.000	L1	10.6
27.691500	37.49	---	60.00	22.51	1000.0	9.000	N	10.8
29.586500	38.58	---	60.00	21.42	1000.0	9.000	L1	10.7
29.766000	---	33.73	50.00	16.27	1000.0	9.000	N	10.9

Correction factor (dB) in the table contains the sum of the transducers (LISN + cables).

QuasiPeak and CAverage values are measured values corrected with the correction factor.

Radiated Emissions In The Frequency Range 30 MHz - 1 GHz.

Standard: ANSI C63.4 (2014)
Tested by: JAT
Date: 9 March 2020
Humidity: 30 – 60 % RH
Temperature: 22 ± 3 °C
Barometric pressure: 860 – 1 060 hPa

FCC Rule: 15.109
ICES-003: 6.2

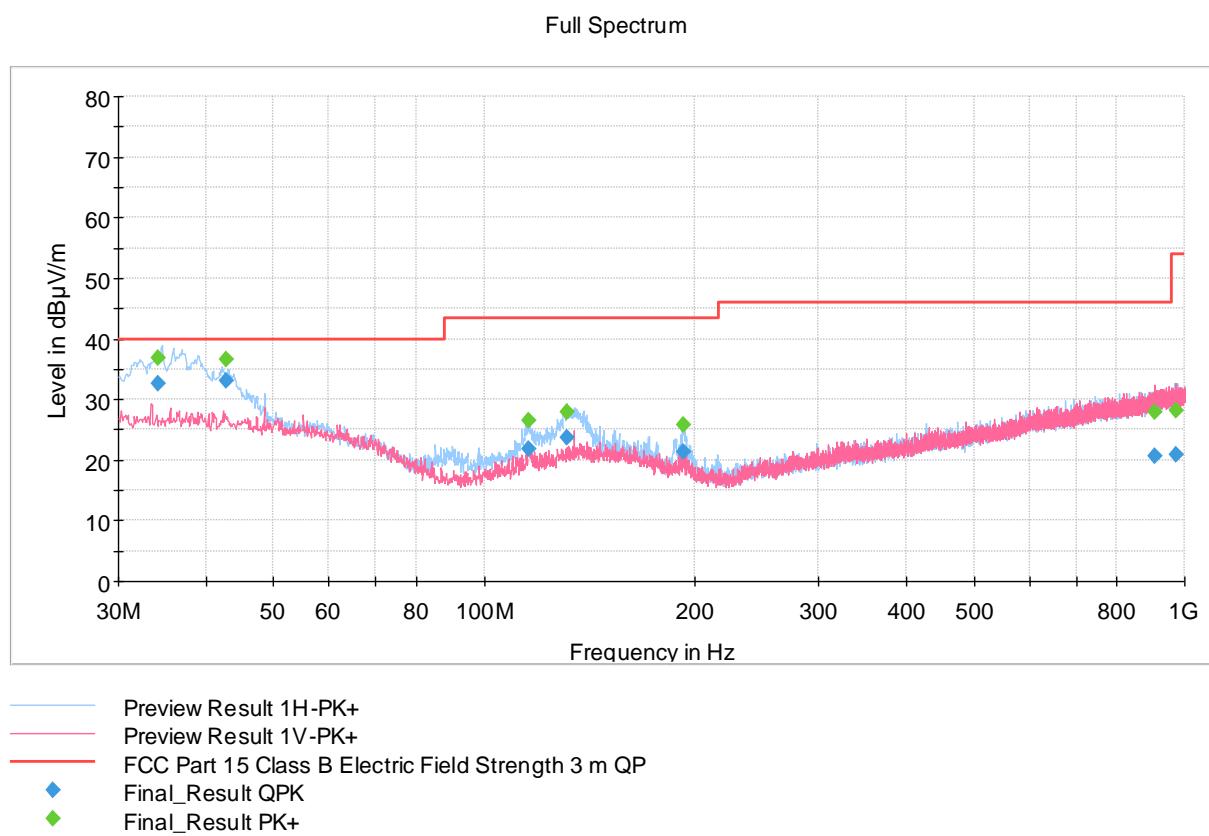
Test plan

The radiated emission measurements were done within a semi anechoic screened chamber. The EUT was placed on a table 0.8 m above the reflecting ground plane. The measurement distance was 3 meters. The worst interferences were determined during measurements by rotating the turntable and adjusting the antenna height. The measurements were done in horizontal and vertical antenna polarizations. The supply voltage to the turntable was fed through the filter.

Radiated measurement settings

Preliminary testing:
Turntable movement: Continuous
Turntable position: 0 ° to 360 °
Antenna movement: 1.5 m step
Antenna height: 1.0 m to 4.0 m
Antenna polarization: Vertical and horizontal

Final testing:
Turntable movement: Continuous
Turntable position: 0 ° to 360 °
Antenna movement: Continuous
Antenna height: 1.0 m to 4.0 m
Antenna polarization: Vertical and horizontal

Measured Quasi-Peak Values In The Frequency Range 30 MHz - 1000 MHz.**Figure 3. Results**

Final peak results are only informative.

Final measurements from the worst frequencies**Table 2. Final quasi-peak measurement from the worst frequencies**

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
34.176000	32.66	40.00	7.34	1000.0	120.000	109.0	H	89.0	16.6
42.718000	33.14	40.00	6.86	1000.0	120.000	100.0	H	60.0	17.6
115.522000	21.78	43.50	21.72	1000.0	120.000	109.0	H	319.0	14.8
131.242000	23.65	43.50	19.85	1000.0	120.000	109.0	H	81.0	16.2
191.978000	21.24	43.50	22.26	1000.0	120.000	109.0	H	205.0	14.2
904.489000	20.63	46.00	25.37	1000.0	120.000	172.0	V	5.0	27.2
970.661000	20.90	53.90	33.00	1000.0	120.000	198.0	V	308.0	27.9

Correction factor (dB) in the table contains the sum of the transducers (antenna + cables).

QuasiPeak values are measured values corrected with the correction factor.

TEST EQUIPMENT**Conducted Emissions**

Equipment	Manufacturer	Type	Inv or serial	Prev Calib	Next Calib
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	NCR	NCR
LISN	ROHDE & SCHWARZ	ENV216	inv:9611	2020-03-03	2021-03-03
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW26	inv:10679	2019-06-28	2020-06-27
POWER SUPPLY TEMPERATURE/ HUMIDITY SENSOR	CALIFORNIA INSTR. EDS	5001i-400 OW-ENV-TH, K5 SAC	inv:9487 inv:10517	NCR 2019-11-07	NCR 2020-11-07

Radiated Emissions

Equipment	Manufacturer	Type	Inv or serial	Prev Calib	Next Calib
POWER SUPPLY TEMPERATURE/ HUMIDITY SENSOR	CALIFORNIA INSTR. EDS	5001i-400 OW-ENV-TH, K5 SAC	inv:9487 inv:10517	NCR 2019-11-07	NCR 2020-11-07
TURNTABLE MAST & TURNTABLE CONTROLLER	MATURO	DS430 UPGRADED	inv:10182	NCR	NCR
ANTENNA MAST	MATURO	TAM 4.0E	inv:10183	NCR	NCR
ATTENUATOR	PASTERNACK	PE 7004-4 (4dB)	inv:10126	2019-04-01	2021-04-01
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	NCR	NCR
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW26	inv:10679	2019-06-28	2020-06-27
ANTENNA	SCHWARZBECK	VULB 9168, emi 30-1000MHz	inv:8911	2018-10-25	2020-10-25

NCR = No calibration required

END OF TEST REPORT