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DEKRA

ACCREDITED
Test Lab
Cert 2764.01

FCC LISTED, REGISTRATION NUMBER: 2764.01

ISED LISTED REGISTRATION NUMBER: 23595-1

Test report No:
3447ERM.003

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-19 Edition) & ICES-003 ISSUE 7 – Update October (2020)

Identification of item tested	EV Charging Station
Trademark	EVBox
Model and /or type reference	EVBox Iqon
Other identification of the product	Charging station with RF Technologies: RFID, LTE, WiFi, Bluetooth , RFComm (902-928MHz)
Features	N/A
Manufacturer	EVBox BV Kabelweg 47, 1014 BA, Amsterdam, The Netherlands
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-19 Edition) ICES-003 Issue 7 – October (2020)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager Digitally signed by Domingo Galvez DN: cn=Domingo Galvez, o=DEKRA Certification Inc., ou=Regulatory Lab, email=dgalvez@dekra.com, c=US Date: 2021.10.04 20:27:06 -04'00'
Date of issue	09-17-2021
Report template No	FDT08_23 (*) "Data provided by the client"

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Competences and guarantees

DEKRA Certification Inc. is a testing laboratory accredited by A2LA (The American Association for Laboratory Accreditation), to perform the tests indicated in the Certificate 2764.01

DEKRA Certification Inc. is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Certification Inc. has a calibration and maintenance program for its measurement equipment.

DEKRA Certification Inc. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Certification at the time of performance of the test.

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The results presented in this Test Report apply only to the particular item under test established in this document.

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General conditions

1. This report is only referred to the item that has undergone the test.
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4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Certification Inc. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Certification internal document PODT000.

	Frequency (MHz)	U(k=2)	Units
Conducted emission	0,009 - 30	2.69	dB
Radiated emission	30-180	3.82	dB
	180-1000	2.61	dB
	1000-18000	2.92	dB
	18000-40000	2.15	dB

Data provided by the client

The device under evaluation consists of a EVBox Iqon which is a charging station with RF technologies RFID, LTE, WiFi, Bluetooth, RFComm(902-928MHz).

DEKRA declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: The client.

Sample S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
3447/01	Charging Station	EVBox Iqon	EVB-P20390006	28/09/2020

Sample S/01 is composed of the following accessories

Control Nº	Description	Model	Serial Nº	Date of reception
3447/02	Loadbox	Phillips1000W	1001	-

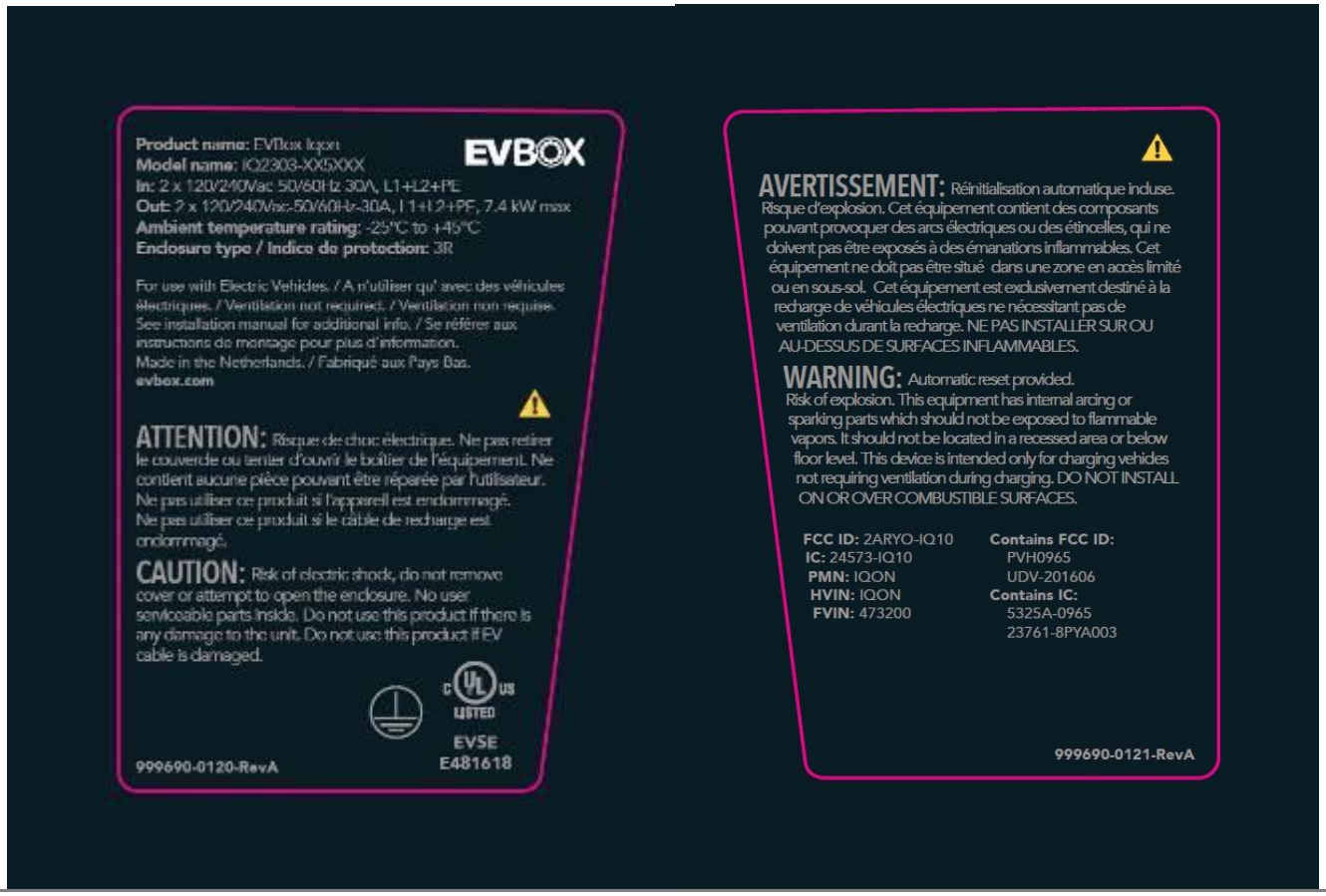
Sample S/01 was used in following testing: Radiated Emission and Conducted Emission

Test sample description

Ports…….. :	Port name and description		Cable			
			Specified length [m]	Attached during test	Shielded	
	No Data Provided			☒	☐	
				☐	☐	
Supplementary information to the ports	*No data Provided*					
Rated power supply:	Voltage and Frequency		Reference poles			
			L1	L2	L3	N	PE
	☒	AC: 120 / 240 Vac 50/60Hz (External power supply)	☒	☒	☐	☐	☒
Rated Power ……:	2x7.2 kW						
Clock frequencies ……:	Main MCU (PIC18F67K40) (Chargerbox): 16 MHz CCID MCU (PIC32MM0016GPL28) (Chargerbox): Internal oscillator RFComm MCU (PIC32MM0064GPM028) (Chargerbox): 27.12 MHz Main MCU (PIC32MZ2048EFG064) (Chargepoint): 24 MHz BT+WiFi module (ODIN-W262): 26 MHz and 24 MHz 4G module (SIM7500A): 19.2 MHz RFID MCU (CLRC663): 27.12 MHz						
Other parameters……:	*No data Provided*						
Software version ……:	G4 P0419 BQ419 v13						
Hardware version……:	190321						
Dimensions in cm (L x W x D) ….:	*420 mm x 1843 mm x 290 mm*						
Mounting position……:	☐	Table top equipment					
	☐	Wall/Ceiling mounted equipment					
	☒	Floor standing equipment					
	☐	Hand-held equipment					
	☐	Other:					
Modules/parts ……:	Module/parts of test item		Type		Manufacturer	
	No Data Provided					

Accessories (not part of the test item) .....:	Description	Type	Manufacturer
	No data Provided		
Documents as provided by the applicant.....:	Description	File name	Issue date
	Equipment declaration Data	FDT30_14 Declaration Equipment Data_NA	-

Copy of marking plate:



Identification of the client

EVBox BV
Kabelweg 47, 1014 BA, Amsterdam, The Netherlands

Testing period and place

Test Location	DEKRA Certification, Inc
Date (start)	28-09-2020
Date (finish)	04-02-2021

Document history

Report number	Date	Description
3447ERM.003	09-17-2021	First release

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The tests have been performed by the technical personnel: Koji Nishimoto and Nasir Khan

Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

Summary

Emission Test			
Report Section	**Requirement – Test case**	**Verdict**	**Remark**
A.1.	Radiated emission electromagnetic field test (30 MHz – 1000 MHz)	P	N/A
A.1.	Radiated emission electromagnetic field test (1 GHz – 18 GHz)	P	N/A
A.1.	Radiated emission electromagnetic field test (18 GHz – 40 GHz)	N/A	Refer 1
A.2.	Conducted emission test (150 kHz to 30 MHz)	P	N/A

Supplementary information and remarks:

1) As per standard 47 CFR §15.33 due to the highest frequency generated or used in the device is above 1000MHz the upper frequency of measurement range is up to 5th harmonic of the highest frequency or 40GHz, whichever is lower.

List of equipment used during the test

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
1039	Biconical Log antenna	ETS LINDGREN	3142E	2020/09	2022/09
1058	Double-ridge Waveguide Horn antenna 1-18 GHz	ETS LINDGREN	3115	2020/05	2023/05
1012	EMI Test Receiver	Rohde & Schwarz	ESR26	2019/12	2021/12
1039	Biconical Log antenna	ETS LINDGREN	3142E	2020/09	2022/09
1058	Double-ridge Waveguide Horn antenna 1-18 GHz	ETS LINDGREN	3115	2020/05	2023/05
1012	EMI Test Receiver	Rohde & Schwarz	ESR26	2019/12	2021/12
0997	LISN	Narda	PMM L3-32	2019/08	2021/08
1110	Ethernet SNMP Thermometer-Monitoring room	HW GROUP	HWg-STE Plain	2020/08	2021/08
1111	Ethernet SNMP Thermometer- SAC	HW GROUP	HWg-STE Plain	2020/08	2021/08

Appendix A: Test results

Appendix A Content

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DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. Every operation mode takes failure criteria for the immunity test that they were applying to it and a monitoring to guarantee performance of the same ones.

The operation modes used by the samples to which the present report refers, are shown in the following table:

OPERATION MODE*	DESCRIPTION
OM#01	EUT ON. Powered by 240Vac 50Hz, Charger in Waiting mode NFC Idle Mode Wi-Fi 2.4GHz + 5 GHz Idle Mode BT Idle Mode Cellular Idle mode RFID Idle mode
OM#02	EUT ON. Powered by 240Vac 50Hz, Charger in Charging mode NFC Idle Mode Wi-Fi 2.4GHz + 5 GHz Idle Mode BT Idle Mode Cellular Idle mode RFID Idle mode

*Worst configurations detected

A.1.RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE

LIMITS:	Reference standard:	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Secs. 15.109 & ICES-003 Issue 7 – October (2020)
	Test standard:	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Secs. 15.109 & ICES-003 Issue 7 – October (2020)

Limits of interference Class A
The applied limit for radiated emissions, 3 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-01-18 Edition), Secs. 15.109 & ICES-003 Issue 6 – Update April (2017) in the frequency range 30 MHz to 40 GHz for class A equipment.

Frequency range (MHz)	QP Limit for 3 m	
	(μV/m)	(dBμV/m)
30 to 88	90	49.5
88 to 216	150	54
216 to 960	210	56.9
Above 960	300	60

Frequency range (MHz)	AVG Limit for 3 m		PK Limit for 3 m (1)
	(μV/m)	(dBμV/m)	(dBμV/m)
Above 1000	500	60	69.5

(1) Frequencies above 1 GHz, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test, as per §15.35(b)

TEST SETUP	

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency ranges of 30-1000 MHz (Bilog antenna) and of 1 GHz-18 GHz (Double ridge horn antenna).

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

TEST SETUP (Cont.)	

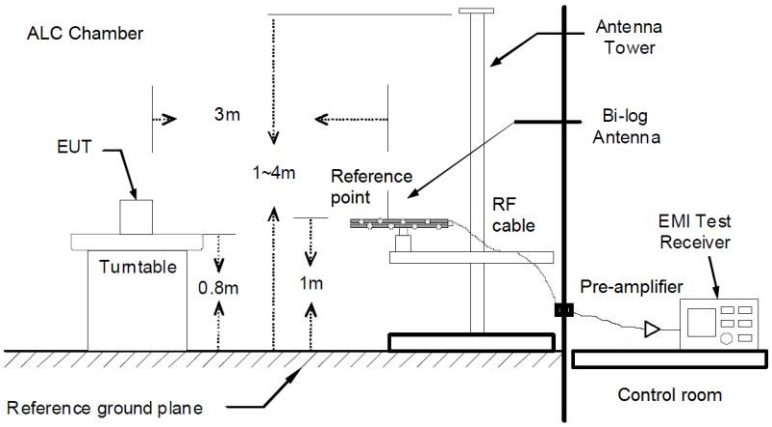


Fig A1: Generic setup for measurements from 30 to 1000MHz

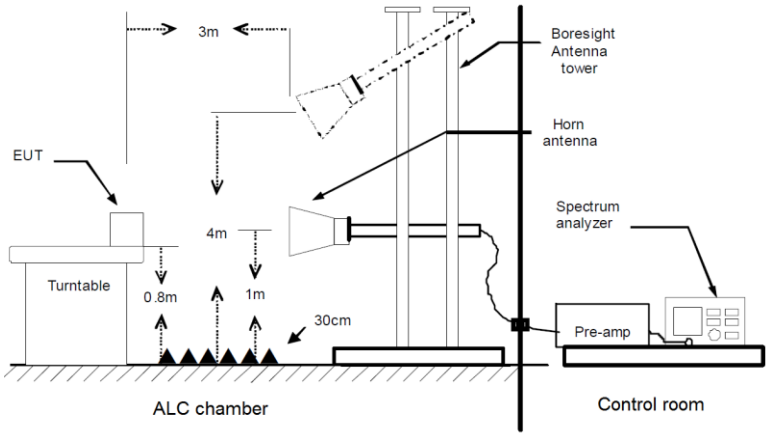


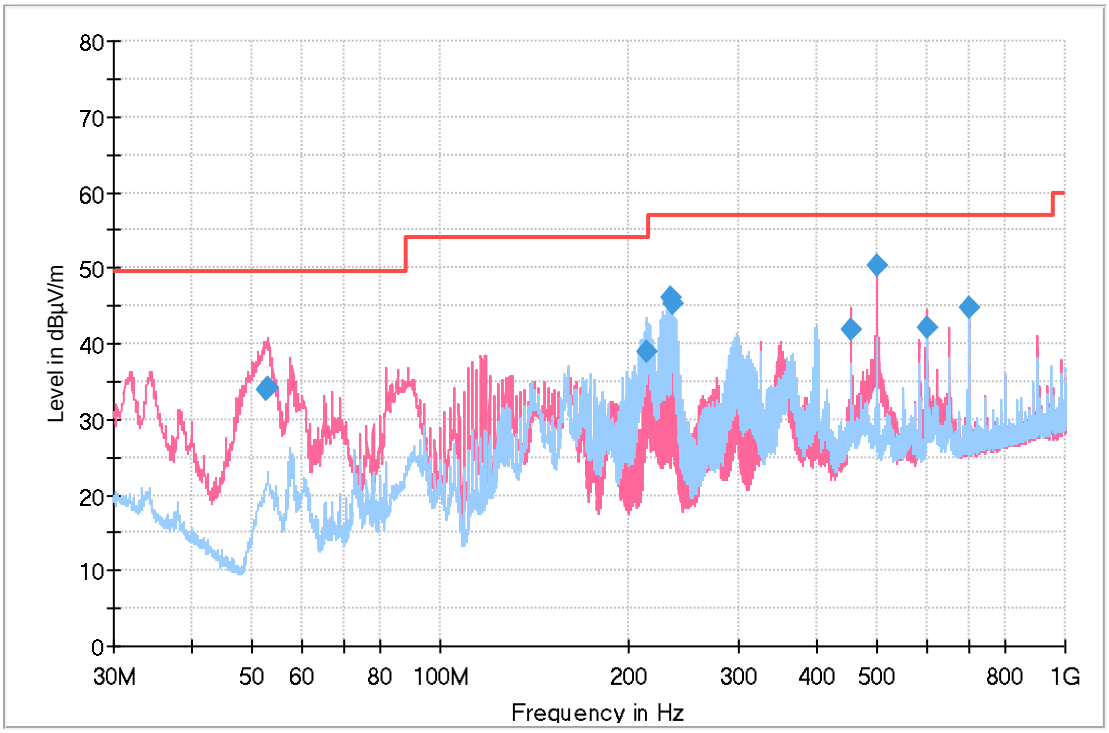
Fig A2: Generic setup for measurements from 1 to 18GHz (Analyzer outside the chamber)

TESTED SAMPLES:	S/01
TESTED OPERATION MODES:	OM#01/ OM#2
TEST RESULTS:	**CR**mmnnxx: CR, Radiation Condition; mm: Sample number; nn: Operation mode.,xx:Range,

CRmmnnxx	Description	Result
CR0101LR	Range: 30 MHz - 1000 MHz Horizontal Polarization	P
CR0101LR	Range: 30 MHz - 1000 MHz Vertical Polarization	P
CR0101HR1	Range: 1-18 GHz Horizontal Polarization	P
CR0101HR1	Range: 1-18 GHz Vertical Polarization	P
CR0102LR	Range: 30 MHz - 1000 MHz Horizontal Polarization	P
CR0102LR	Range: 30 MHz - 1000 MHz Vertical Polarization	P
CR0102HR1	Range: 1-18 GHz Horizontal Polarization	P
CR0102HR1	Range: 1-18 GHz Vertical Polarization	P

Radiated Emission. CR0101LR

Project:	03447ERM001
Company:	EVBox
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. IDLE. Powered by 240 VAC. Both polarizations.



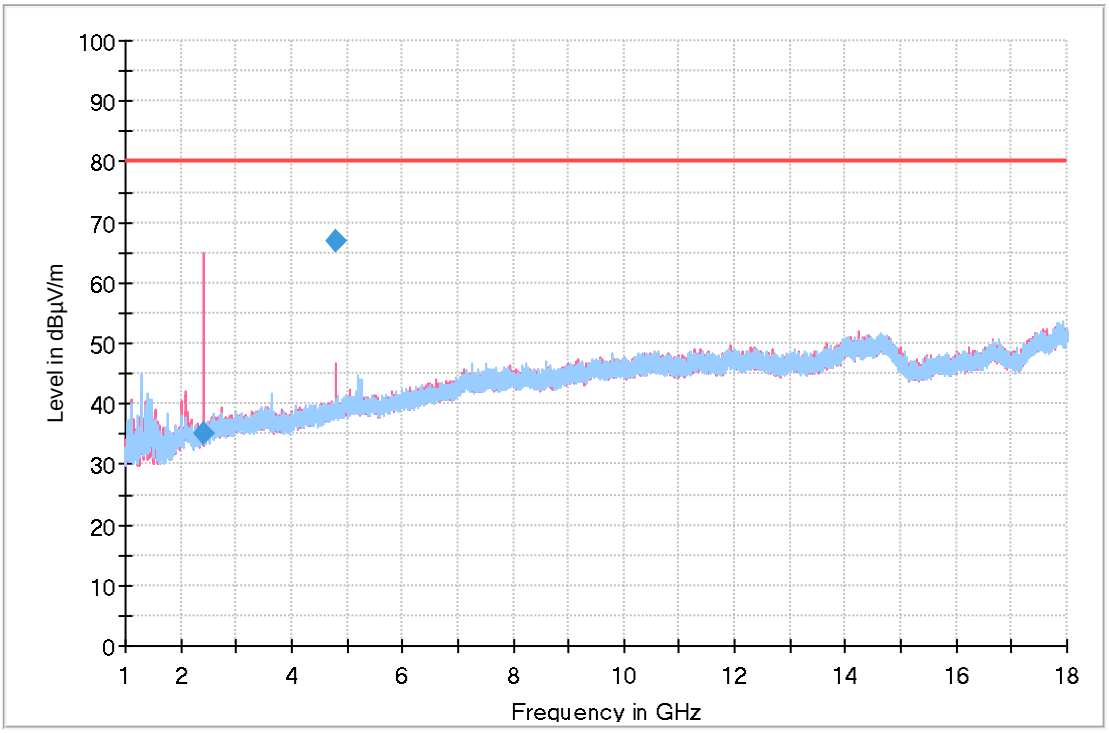
Preview Result 1 V-PK+
Preview Result 1 H-PK+
02-1_FCC Part 15 Class A E-Field_QP@3m_30M1G
Final_Result QPK

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
52.710	33.97	49.54	15.58	1000	120	100.0	V	327.0	4.8
52.860	34.21	49.54	15.33	1000	120	144.0	V	331.0	4.8
214.170	39.06	53.98	14.92	1000	120	100.0	H	67.0	10.1
234.180	46.00	56.90	10.90	1000	120	100.0	H	2.0	10.8
236.070	45.28	56.90	11.62	1000	120	105.0	H	5.0	10.8
455.010	41.97	56.90	14.93	1000	120	187.0	V	0.0	17.5
499.950	50.41	56.90	6.49	1000	120	130.0	V	0.0	18.2
599.970	42.08	56.90	14.82	1000	120	146.0	V	12.0	19.6
699.990	44.80	56.90	12.11	1000	120	128.0	V	341.0	21.1

Radiated Emission. CR0101HR1

Project:	03447ERM001
Company:	EVBox
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. IDLE. Powered by 240 VAC. Both polarizations



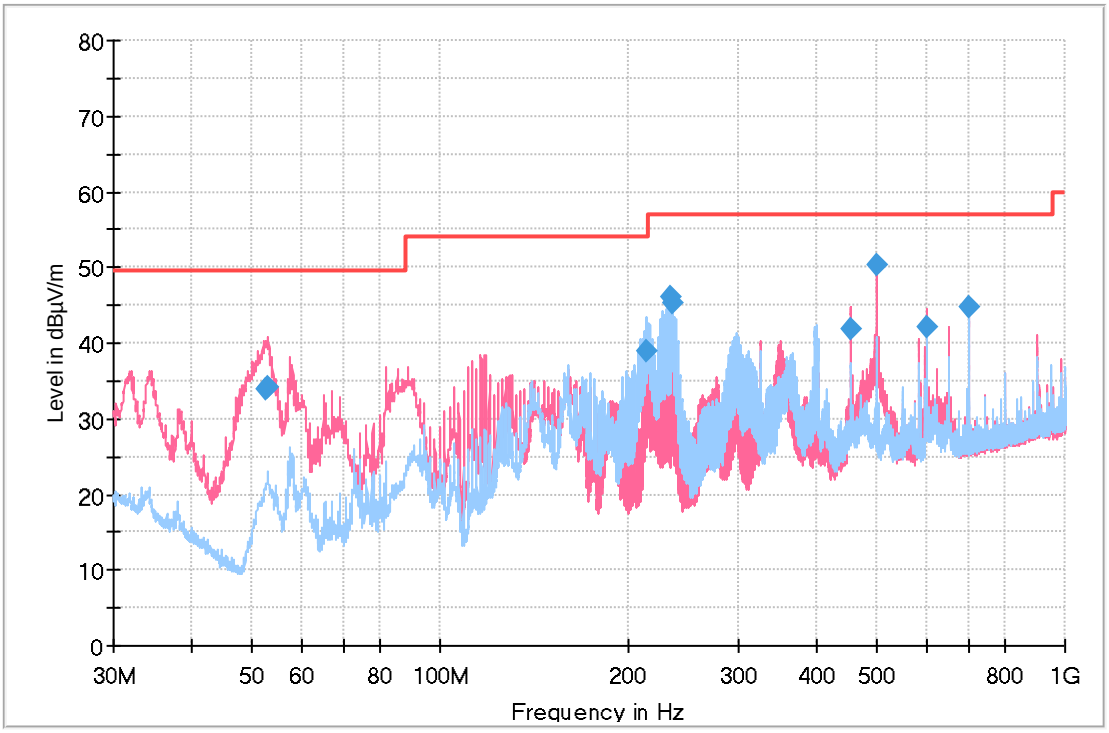
Preview Result 1 V-PK+
Preview Result 1 H-PK+
01-1_FCC Part 15 Class A E-Field_PK@3m_1G40G
Final_Result PK+

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2415.750	34.97	80.00	45.03	1000	1000	100.0	V	173.0	-16.8
4803.250	66.95	80.00	13.05	1000	1000	100.0	V	27.0	-9.8

Radiated Emission. CR0102LR

Project:	03447ERM001
Company:	EVBox
Sample:	S/01
Operation mode:	OM#02
Description:	EUT ON. IDLE. Powered by 240 VAC. Both polarizations.



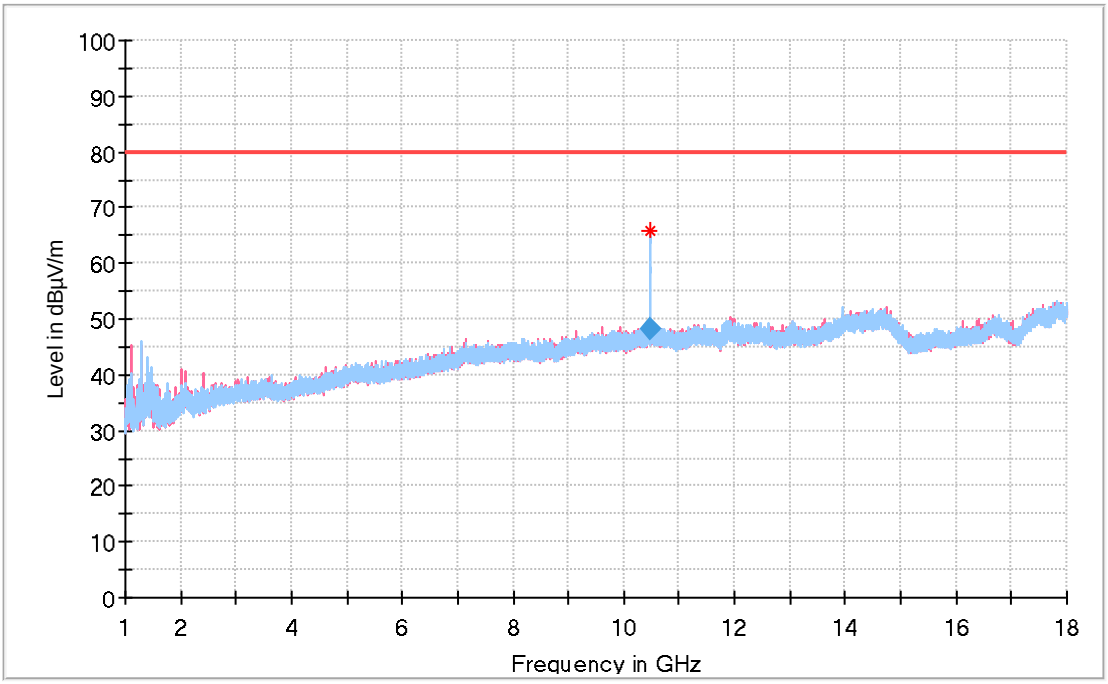
Preview Result 1 V-PK+
Preview Result 1 H-PK+
02-1_FCC Part 15 Class A E-Field_QP@3m_30M1G
Final_Result QPK

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
90.660	37.39	53.98	16.59	1000	120	100.0	V	221.0	9.8
300.000	44.10	56.90	12.80	1000	120	106.0	H	342.0	13.0
499.980	43.19	56.90	13.71	1000	120	113.0	V	29.0	18.2
600.000	39.05	56.90	17.85	1000	120	232.0	H	0.0	19.6
699.990	43.65	56.90	13.25	1000	120	113.0	H	21.0	21.1
899.940	46.33	56.90	10.57	1000	120	103.0	H	4.0	23.5

Radiated Emission. CR0102HR1

Project:	03447ERM001
Company:	EVBox
Sample:	S/01
Operation mode:	OM#02
Description:	EUT ON. IDLE. Powered by 240 VAC. Both polarizations.



Preview Result 1 V-PK+
Preview Result 1 H-PK+
Critical_Freqs PK+
01-1_FCC Part 15 Class A E-Field_PK@3m_1G40G
Final_Result PK+
MaxPeak-PK+ (Single)

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
10490.000	48.18	80.00	31.82	1000	1000	385.0	H	166.0	-0.4

A.2. CONTINOUS CONDUCTED EMISSION ON POWER LEADS

LIMITS:	Product standard:	FCC CFR 47, Part 15, Subpart B (10-1-18 Edition), Secs. 15.107 & ICES-003 Issue 6 – Update April (2017)
	Test standard:	FCC CFR 47, Part 15, Subpart B (10-1-18 Edition), Secs. 15.107 & ICES-003 Issue 6 – Update April (2017); ANSI C63.4 (2014)

The applied limit for continuous conducted emissions in power leads, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-01-18 Edition), Secs. 15.107 & ICES Issue 6 (2017), in the frequency range 0,15 to 30 MHz, for Class A equipment was:

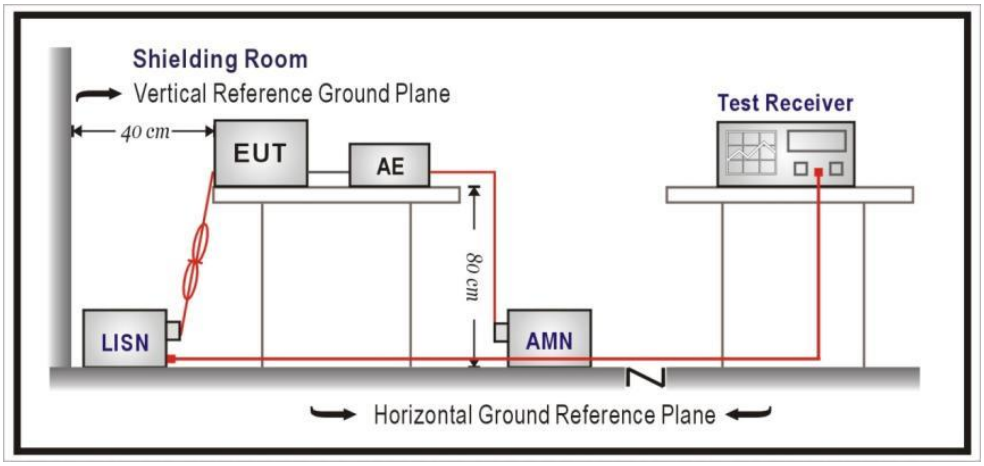
Frequency range (MHz)	**Limit**	
	Quasi-peak [dB(μV)[1)]]	**Average [dB(μV)[1)]]**
0,15 to 0,5	79 [2)]	66[2)]
0,5 to 5	79	66
5 to 30	73	66

[1)] At the transition frequency, the lower limit applies.
[2)] The limit decreases linearly with the logarithm of the frequency.

TEST SETUP	

The EUT is placed on the test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the reat of the EUT.

The EUT is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 ohms LISN port.

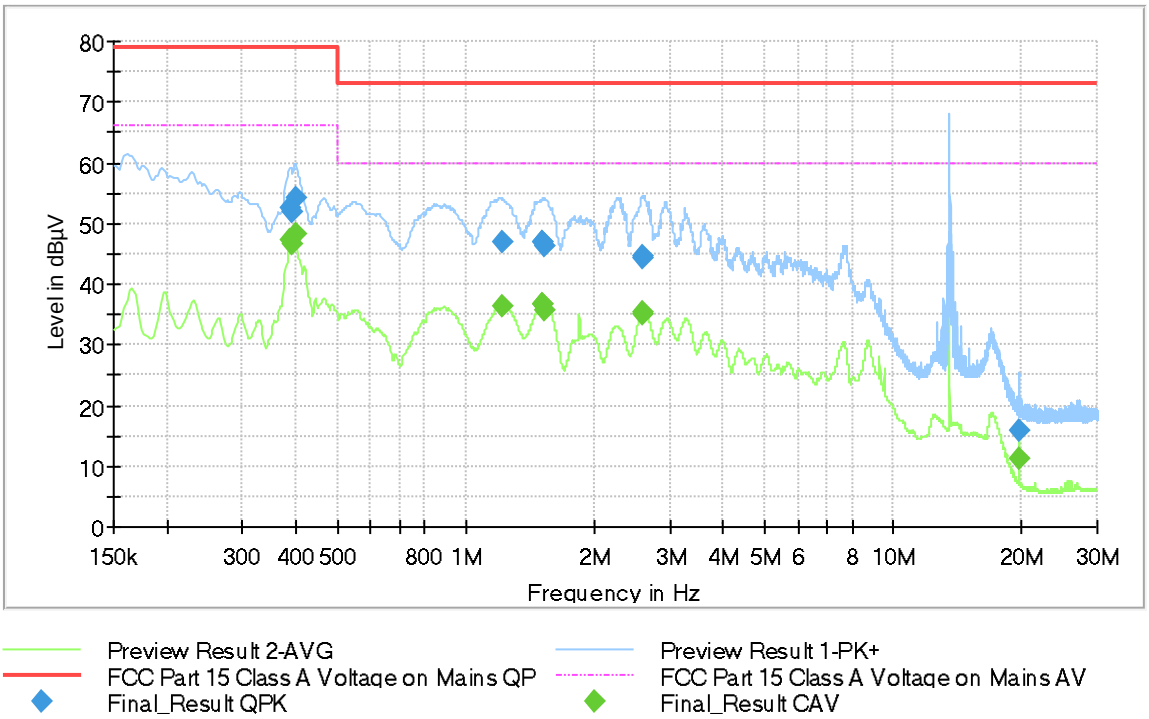


TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	OM#01
TEST RESULTS:	CCmmnnhh: CC, Conducted Condition; mm: Sample number; nn: Test condition mode; hh: wire

CRmmnnhh	**DESCRIPTION**	**RESULT**
CC0101L1	Neutral wire noise.	P
CC01010N	Phase wire noise.	P

TEST RESULTS (Cont.):	CC0101L1

Project: 3447ERM003
Company: EVBox
Sample: S/01
Operation mode: OM#01
Description: EUT ON. IDLE. Powered by 240 VAC L1 Wire measurements.

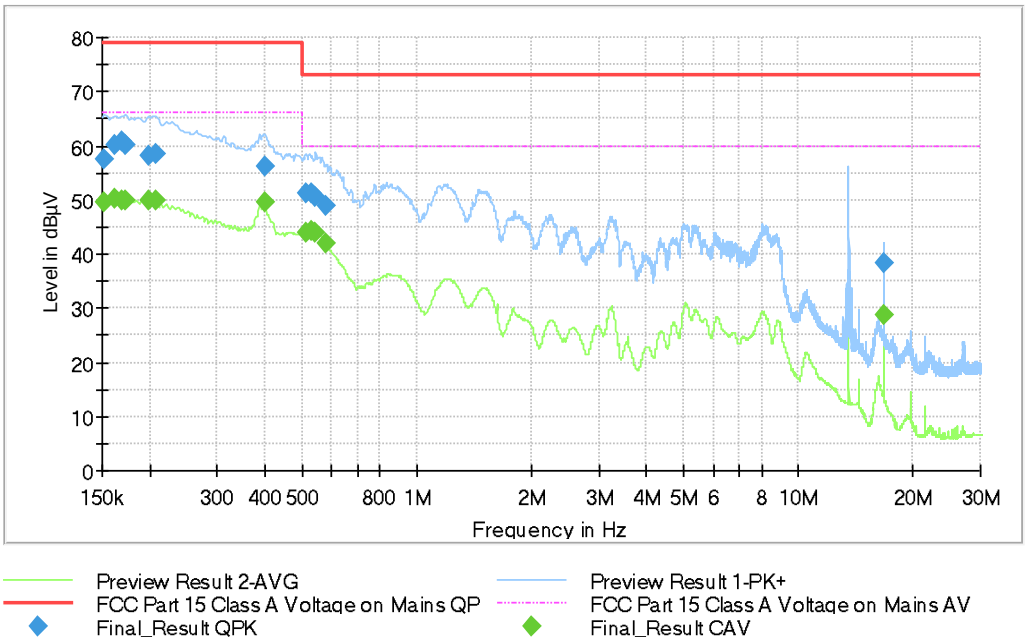


Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.389	---	47.33	66.00	18.67	1000	9.000	L1	GND	10
0.389	52.60	---	79.00	26.40	1000	9.000	L1	GND	10
0.391	---	46.63	66.00	19.37	1000	9.000	L1	GND	10
0.391	52.00	---	79.00	27.00	1000	9.000	L1	GND	10
0.400	---	48.22	66.00	17.78	1000	9.000	N	GND	10
0.400	54.34	---	79.00	24.66	1000	9.000	N	GND	10
1.217	---	36.51	60.00	23.49	1000	9.000	N	GND	10
1.217	47.04	---	73.00	25.96	1000	9.000	N	GND	10
1.507	---	36.65	60.00	23.35	1000	9.000	N	GND	10
1.507	46.86	---	73.00	26.14	1000	9.000	N	GND	10
1.514	---	36.53	60.00	23.47	1000	9.000	N	GND	10
1.514	46.82	---	73.00	26.18	1000	9.000	N	GND	10
1.520	---	35.81	60.00	24.19	1000	9.000	L1	GND	10
1.520	46.25	---	73.00	26.75	1000	9.000	L1	GND	10
2.580	---	35.17	60.00	24.83	1000	9.000	L1	GND	10
2.580	44.30	---	73.00	28.70	1000	9.000	L1	GND	10
2.603	---	35.42	60.00	24.58	1000	9.000	L1	GND	10
2.603	44.49	---	73.00	28.51	1000	9.000	L1	GND	10
19.649	---	11.38	60.00	48.62	1000	9.000	L1	GND	11
19.649	15.77	---	73.00	57.23	1000	9.000	L1	GND	11

TEST RESULTS (Cont.):	CC01010N

Project: 3447ERM003
Company: EVBox
Sample: S/01
Operation mode: OM#02
Description: EUT ON. IDLE. Powered by 240 VAC N Wire measurements



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.152	---	49.56	66.00	16.44	1000	9.000	N	GND	10
0.152	57.55	---	79.00	21.45	1000	9.000	N	GND	10
0.161	---	50.39	66.00	15.61	1000	9.000	L1	GND	10
0.161	60.17	---	79.00	18.83	1000	9.000	L1	GND	10
0.168	---	49.94	66.00	16.06	1000	9.000	L1	GND	10
0.168	60.87	---	79.00	18.13	1000	9.000	L1	GND	10
0.173	---	49.79	66.00	16.21	1000	9.000	L1	GND	10
0.173	60.25	---	79.00	18.75	1000	9.000	L1	GND	10
0.200	---	50.06	66.00	15.94	1000	9.000	L1	GND	10
0.200	58.06	---	79.00	20.94	1000	9.000	L1	GND	10
0.206	---	50.00	66.00	16.00	1000	9.000	L1	GND	10
0.206	58.49	---	79.00	20.51	1000	9.000	L1	GND	10
0.400	---	49.71	66.00	16.29	1000	9.000	L1	GND	10
0.400	56.07	---	79.00	22.93	1000	9.000	L1	GND	10
0.515	---	43.96	60.00	16.04	1000	9.000	L1	GND	10
0.515	51.10	---	73.00	21.90	1000	9.000	L1	GND	10
0.530	---	44.45	60.00	15.55	1000	9.000	L1	GND	10
0.530	51.08	---	73.00	21.92	1000	9.000	L1	GND	10
0.544	---	44.12	60.00	15.88	1000	9.000	N	GND	10
0.544	50.56	---	73.00	22.44	1000	9.000	N	GND	10
0.580	---	42.03	60.00	17.97	1000	9.000	L1	GND	10
0.580	48.85	---	73.00	24.15	1000	9.000	L1	GND	10
16.737	---	28.89	60.00	31.11	1000	9.000	N	GND	11
16.737	38.39	---	73.00	34.61	1000	9.000	N	GND	11