TEST REPORT N°: ERA-ESH-P21123938B

EMC TEST REPORT

To :	**ZHEJIANG ERA SOLAR TECHNOLOGY CO., LTD.**	Fax :	--
Attn :	--	Email :	--
Address :	Sihai road, Huangyan Economic Development Zone, Taizhou, Zhejiang, China		
Cc :		Fax/Email	
Attn :			
This document includes : 22 pages		Test date :	Dec.15 to Dec.18, 2021

FACTORY NAME :	ZHEJIANG ERA SOLAR TECHNOLOGY CO., LTD.
ADDRESS :	Sihai road, Huangyan Economic Development Zone, Taizhou, Zhejiang, China
PRODUCT :	solar light
TYPE REFERENCE :	Refer to the model list
TRADE MARK :	--
RATED VOLTAGE :	Powered by battery
RATED INPUT POWER :	--
PROTECTION CLASS :	III
TESTS REALISED :	On one sample of 2322012

STANDARDS USED(DATE) :	EN IEC 55015:2019+A11:2020/ BS EN IEC 55015:2019+A11:2020 EN 61547:2009 / BS EN 61547:2009
CLAUSES EXAMINED :	All Clauses Relevant

Test Location: Building C, No. 829, Xin Zhuan Road, Shanghai, CHINA

CONCLUSION :	**The samples do satisfy the clauses examined .**
Test done by, Name : Morgan Yang Date : Jan.10, 2022	**Approved by,** Name : Yi XU Date : Jan.10, 2022

1 TESTING PROGRAM

The tests have been carried out according to the requirements of the following standards :

Emission standard EN IEC 55015:2019+A11:2020 / BS EN IEC 55015:2019+A11:2020

- Measurement of the continuous conducted emission levels.
- Measurement of the radiated emission levels.

Immunity standard EN 61547:2009 / BS EN 61547:2009

- Immunity to electrostatic discharges - publication IEC 61000-4-2.
- Immunity to fast transients/bursts - publication IEC 61000-4-4.
- Immunity to conducted disturbances induced by radio-frequency fields - publication IEC 61000-4-6.
- Immunity to radiated radio-frequency electromagnetic field with amplitude modulation - publication IEC 61000-4-3.
- Immunity to surges - publication IEC 61000-4-5.
- Immunity to voltage dips -publication IEC 61000-4-11.
- Immunity to voltage interruptions - publication IEC 61000-4-11.

Special Comment : All the samples were the same except for the model name and appearance. We chose model 2322012 as the representative model for comprehensive testing.

2 HISTORY OF FAILURE

None.

3 EQUIPMENT CHARACTERISTICS

3.1 Model List

Test model：2322012

Series model： EC2355, EC11014, EC11037, EC11044, EC11045, EC11045-1, EC11046, EC11047, EC11048, EC11050, EC11052, EC11053, EC11055, EC11056, EC11058, EC11060, EC11060-3, EC11062, EC11069, EC11070, EC11085, EC11088, EC11095, EC11103-D1, EC11103-D2, EC11111, EC11115, EC11116, EC11117, EC11118, EC11119, EC11120, EC11122, EC11123, EC11124, EC11125, EC11126, EC11127, EC11128, EC11129-1, EC11129-5, EC11132, EC11135, EC11136, EC11137, EC11146, EC11149, EC14011, EC21156, EC21229, EC23133-B1, EC23435, EC41057, EC41075, EC23133-C1, EC23134, EC23134-B1, EC23134-D1, EC23137, EC23184, EC23184-D1, EC23185, EC23201, EC23204, EC23211, EC23211-1, EC23216, EC23216-B1, EC23216-C1, EC23216-D1, EC23217, EC23221, EC23230, EC23230-D1, EC23230-D2, EC23234, EC23235, EC23236, EC23241, EC23242, EC23245, EC23245-C1, EC23252, EC23262, EC23276-1, EC23280, EC23288, EC23289, EC23291-1, EC23291-2, EC23291-5, EC23291-6, EC23291-D2, EC23291-D3, EC23310, EC23311, EC23322, EC23329, EC23330, EC23331, EC23333, EC23334, EC23335, EC23336, EC23341, EC23342, EC23343, EC23344, EC23345, EC23346, EC23346-1, EC23348, EC23351, EC23352, EC23353, EC23357, EC23357-C1, EC23359, EC23366, EC23374, EC23379, EC23379-C1, EC23386, EC23387, EC25219, EC25226, EC41012, EC41013, EC41015, EC41018, EC41025, EC23347, EC23388, EC23401, EC41026, EC41028, EC41037, EC61012, EC61013, EC61015-D1, EC61015-D4, EC61015-D5, EC61015-D6, EC61016-D1, EC61016-D2, EC61017, EC61018-D1, EC61018-D2, EC61018-D3, EC61019-D1, EC61019-D2, EC41046, EC41053, EC41052, EC41051, EC41055, EC11155, EC61026-1, EC61026-2 EC23400, EC23402, EC23405, EC23403, EC23413, EC23433, EC23428, EC23423, EC41073, EC23429, EC23432, EC11153, EC11150, EC61029, EC61030, EC61013-1, EC61013-2, EC61023, EC11075, EC11157, EC11017, EC11103-2, EC23211C, EC41029, EG1001, EG1002, EG1003, EG1004, EG1005, EG1006, EG1007, EG1008, EC23451, EC23438, EC23453, EC23445, EC11165, EC11163, EC11166, EC11167, EG1009, EG1010, EG1011, EG1012, EC23452, EC23439, EC23439-1, EG1015, EG1016, EG1017, EC23404, EC32101, EC23443, EG1014, EC41059, EG1013, EG1018, EG1019, EG1020, EG1021, EG1022, EG1023, EG1024, EG1025, EG1026, EG23442, EG11168, EC23446, EC23441, EC23456, EC23440, EC23465, EC23379-C2, EC23467, EC23457, EC23449, EC23458-1, EC23459, EC11171, EC41069, EC41070, EC41071, EC41072, EC23461, EC41027, EC41028, EC41040, EC23437, EC11103-2ORB, EC2306, EC61039, EC61040, EC11129-5BRONE, EC11132BRONZE, EC41049-D1, EC11151, EC11103-2, EC23418, EC23460-1, EC23443-1, EC23455, EC23436, EC23133-D1, EG1028, EG1033, EG1034, EG1032, EC11088-B1, EC11115-2, EC11187, EC11188, EC11189, EC23356, EC23356-1, EC23375, EC23389, EC23466, EC23482, EC23482-1, EC23483, EC23489, EC23490, EC23493, EC23495, EC23496, EC23496-C1, EC11190, EC23486, EC23487, EC23498, EC41089, EC41090, EC41090-C1, **EC41060 (2322012)**, EC41087 (2322013), EC41088 (1594087), EC41089 (2322017), EC41091 (1605155), 1600217 (8535264), 2010500 (8541159), 8541156, EC11173, EC11172, EC11175, EC11176, EC11176G, EC11176ORB

3.2 Pictures of the samples


EC11146
EC11149
EC14011
EC21156
EC21229
EC23133-B1
EC23435
EC41057
EC41075
EC23133-C1
EC23134
EC23134-B1
EC23134-D1
EC23137
EC23184
EC23184-D1
EC23185
EC23201
EC23204
EC23211
EC23211-1
EC23216
EC23216-B1
EC23216-C1
EC23216-D1
EC23217
EC23221
EC23230
EC23230-D1
EC23230-D2
EC23234
EC23235
EC23236
EC23241
EC23242
EC23245


EC23245-C1
EC23252
EC23262
EC23291-5
EC23291-6
EC23291-D2
EC23276-1
EC23280
EC23288
EC23291-D3
EC23310
EC23311
EC23289
EC23291-1
EC23291-2
EC23322
EC23329
EC23330
EC23331
EC23333
EC23334
EC23345
EC23346
EC23346-1
EC23335
EC23336
EC23341
EC23348
EC23351
EC23352
EC23342
EC23343
EC23344
EC23353
EC23357
EC23357-C1
EC23359
EC23366
EC23374
EC25226
EC41012
EC41013
EC23379
EC23379-C1
EC23386
EC41015
EC41018
EC41025
EC23387
EC25216
EC23133-D1
EC23347
EC23388
EC23401


EC41026
EC41028
EC41037
EC61012
EC61013
EC61015-D1
EC61015-D4
EC61015-D5
EC61015-D6
EC61016-D1
EC61016-D2
EC61017
EC61018-D1
EC61018-D2
EC61018-D3
EC61019-D1
EC61019-D2
EC41046
EC41053
EC41052
EC41051
EC41055
EC11155
EC61026-1
EC61026-2
EC23400
EC23402
EC23405
EC23403
EC23413
EC23433
EC23423
EC41073
EC23428-1
EC23429
EC23432


EC11153
EC11150
EC61029
EC11017
EC11103-2
EC23211C
EC61030
EC61013-1
EC61013-2
EC41029
EG1001
EG1002
EC61023
EC11075
EC11157
EG1003
EG1004
EG1005
EG1006
EG1007
EG1008
EC11166
EC11167
EG1009
EC23451
EC23438
EC23453
EG1010
EG1011
EG1012
EC23445
EC11165
EC11163
EC23452
EC23439
EC23439-1

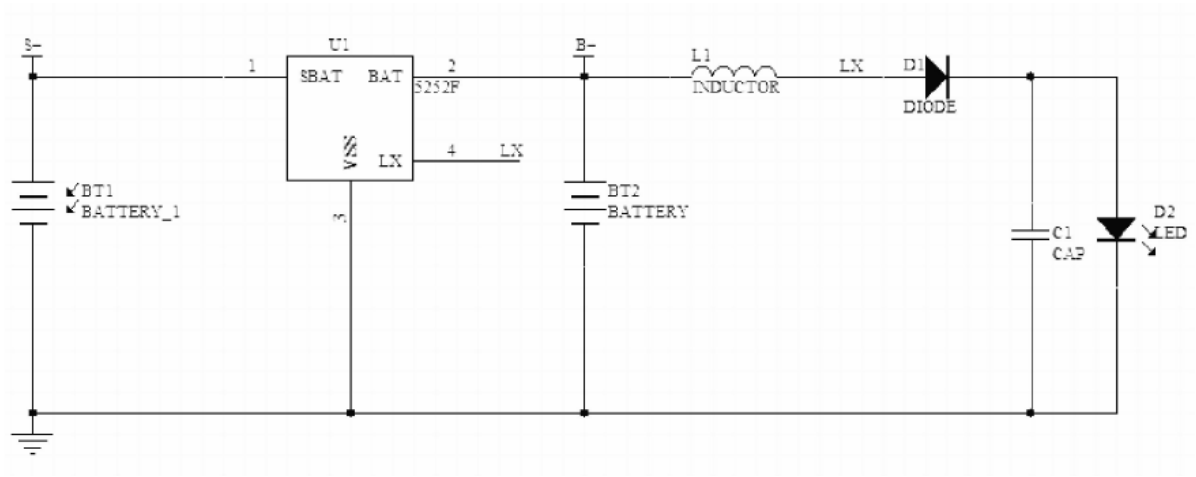

EG1015
EG1016
EG1017
EG1018
EG1019
EG1020
EC23404
EC32101
EC23443
EG1021
EG1022
EG1023
EG1014
EC41059
EG1013
EG1024
EG1025
EG1026
EC23442
EC11168
EC23446
EC23457
EC23449
EC23458-1
EC23441
EC23456
EC23440
EC23459
EC11171
EC41069
EC23465
EC23379-C2
EC23467
EC41070
EC41071
EC41072


EC23461
EC41027
EC41028
EC11129-5 BRONZE
EC11132 BRONZE
EC41049-D1
EC41040
EC23437
EC11103-2 ORB
EC11151
EC11103-2
EC23418
EC2306
EC61039
EC61040
EC23460-1
EC23443-1
EC23455
EC23436
EG1028
EG1033
EC11189
EC23356
EC23356-1
EG1034
EG1032
EC11088-B1
EC23375
EC23389
EC23466
EC11115-2
EC11187
EC11188
EC23482
EC23482-1
EC23483

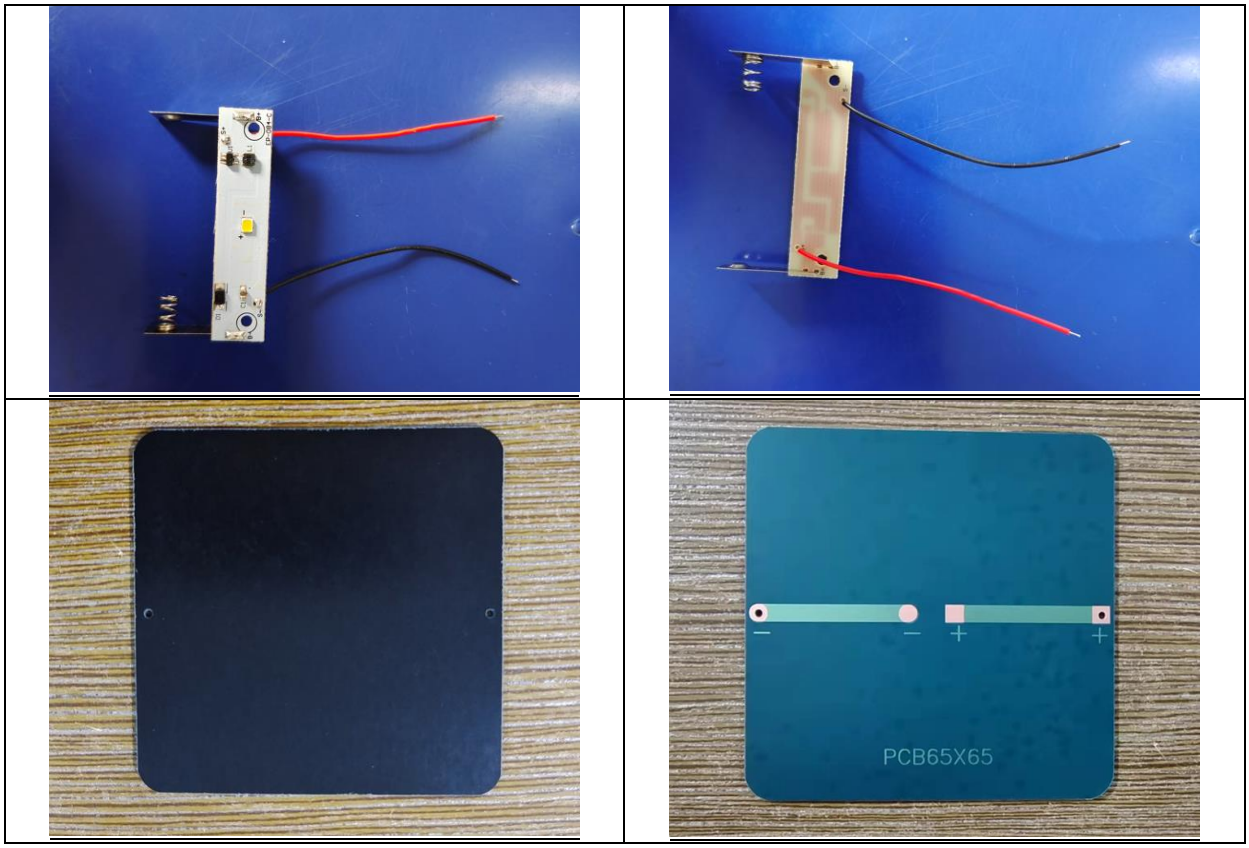
 EC23489 EC23490 EC23493  EC23495 EC23496 EC23496-C1  EC11190 EC23486 EC23487	 EC23498 EC41089 EC 41090  EC41090-C1 EC41060(2322012) EC41087(2322013)  EC41088 (1594087) EC41089(2322017) 8541156
 2010500 (8541159) 1600217 (8535264)  EC11172 EC11173 EC11175  EC11176 EC11176G EC11176ORB	None

3.3 Circuit diagram and PCB layout

Circuit diagram:



PCB layout:



4 OPERATING CONDITIONS

The apparatuses were placed in a shielded room, full or semi anechoic chamber, and were powered with an alternative current source through filters mounted on the shielded room wall. The apparatuses were worked continuously.

Ambient conditions :	Temperature	:	20.0-23.0 °C
	Relative humidity	:	52.0-53.0 %
	Atmospheric pressure	:	101.1-101.3 kPa

5 PERFORMANCE CRITERIA

Criterion A : During the test no change of the luminous intensity shall be observed, if any, shall operate during the test as intended.

Criterion B : During the test the luminous intensity may change to any value. After the test the luminous intensity shall be restored to its initial value within 1 min.

Criterion C : During and after the test any change of the luminous intensity is allowed and the lamp may be extinguished. After the test, within 30 min, all functions shall return to normal if necessary by temporary interruption of the mains supply.

6 TEST RESULTS

6.1 EMISSION STANDARD EN IEC 55015:2019+A11:2020 / BS EN IEC 55015:2019+A11:2020

Article	TEST	TEST SPECIFICATION	RESULTS			
			P	F	NA	Rem
4.3 **4.3.1**	**Disturbance Voltage of wired network ports** Mains terminals Frequency range: 0,009 to 30 MHz	Operating conditions : according to the article 7 Port(s) : • AC mains port Diagram(s) No. < >	[ ]	[ ]	[X]	[1]
4.4	**Disturbance Voltage of local wired ports** Frequency range : 0,009 to 30 MHz	• Load and control terminals Diagram(s) No. < >	[ ]	[ ]	[X]	[1]
4.5 **4.5.2**	**Radiated Electromagnetic Disturbance** Frequency range : 0,009 to 30 MHz	Operating conditions : according to the article 7 • 2 m Loop antenna Diagram (s) No. <1>	[X]	[ ]	[ ]	[ ]
4.5.3	**Radiated disturbance limit** Frequency range: 30 to 1000 MHz	Operating conditions : according to the article 7 Port(s) : Enclosure Measurement distance: 3 m Antenna Position • Vertical • Horizontal Diagram(s) No. <2>	[X] [X]	[ ] [ ]	[ ] [ ]	[ ] [ ]

P : pass - F : Fail - NA : not applicable - Rem : remark

6.2 IMMUNITY STANDARD EN 61547:2009 / BS EN 61547:2009

☒ For lighting equipment containing active electronic components which e.g. convert or regulate the operating voltage and/or the frequency of the light source.

Article	TEST	TEST SPECIFICATION	RESULTS			
			P	F	NA	Rem
5.2	**Electrostatic discharges** Table 1 Enclosure Performance criteria B	Contact discharges Level : ± 4 kV Application points : • horizontal coupling plane • vertical coupling plane • screw and metal part	 [X] [X] [X]	 [ ] [ ] [ ]	 [ ] [ ] [ ]	 [2] [2] [2]
	Performance criteria B	Air discharges Level : ± 8 kV Application points : • plastic enclosure • gap	 [X] [X]	 [ ] [ ]	 [ ] [ ]	 [2] [2]
5.3	**Radio-frequency electromagnetic fields 80 to 1000 MHz** Table 2 Enclosure Performance criteria A	Test field strength : 3 V/m (unmodulated signal) Modulation frequency : 1 kHz Modulation depth : 80 % Frequency Step : 1% Dwell Time : 2 s Logperiodic antenna : - horizontal position - vertical position	 [X] [X]	 [ ] [ ]	 [ ] [ ]	 [2] [2]
5.4	**Power Frequency Magnetic Field** Table 1 Enclosure Performance criteria A	Field frequency : 50/60 Hz Level : 3 A/m	 [ ]	 [ ]	 [X]	 [ ]
5.5	**Fast transients/bursts** Table 6 Alternative current power input and output ports Performance criteria B	Level : ± 1 kV Rise time/hold time : 5/50 ns Repetition rate : 5 kHz Testing time : 2 min Port(s) : • AC mains	 [ ]	 [ ]	 [X]	 [1]

P : pass - F : Fail - NA : not applicable - Rem : remark

Article	TEST	TEST SPECIFICATION	RESULTS			
			P	F	NA	Rem
5.6	**Injected current 0,15 to 80 MHz** Table 9 Alternative current power input and output ports Performance criterion A	Voltage level : 3 V (unmodulated signal) Modulation frequency : 1 kHz Modulation depth : 80 % Frequency Step : 1% Dwell Time: 2 s Application with CND-M2/M3 Port(s) : • AC mains	[ ]	[ ]	[X]	[1]
5.7	**Surges** Table 10 Alternative current power input and output ports Performance criterion C	Tr/Th(µs) : 1.2/50 (8/20) Number of surges : 5 positive and 5 negative Phase angles : 90° and 270° Level : ± 0.5 kV Port(s) : • power input, between lines and neutral	[ ]	[ ]	[X]	[1]
	Performance criterion C	Level : ± 1 kV Port(s) : • power input, between lines and earth • power input, between neutral and earth	[ ] [ ]	[ ] [ ]	[X] [X]	[ ] [ ]
5.8	**Voltage dips and voltage interruptions** Table 12 Alternative current power input and output port(s) Performance criterion B	Voltage interruptions Test level : 0 % Ut-> 0 V Duration : 10 ms Phase angles : 0° and 180° Port(s) : • AC mains	[ ]	[ ]	[X]	[1]
	Table 11 Alternative current power input and output port (s) Performance criterion C	Voltage dips Test level : 70 % Ut-> 161 V Duration : 200 ms Phase angles : 0° Port(s) : • AC mains	[ ]	[ ]	[X]	[1]

P : pass - F : Fail - NA : not applicable - Rem : remark

Remark(s) :

1 : The EUT is powered by battery.
2 : During test, no change of operation state.

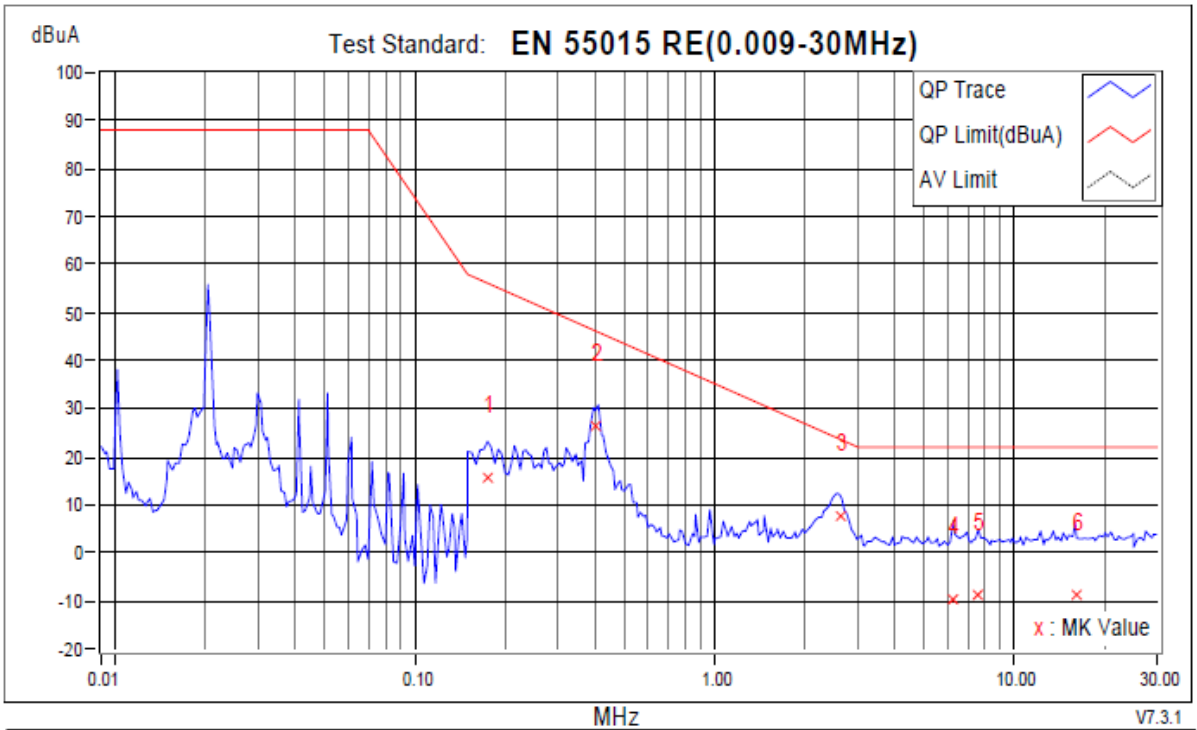
7 CONCLUSION

The apparatuses solar light and models Refer to the model list are in compliance with the requirements of the standards EN IEC 55015:2019+A11:2020 / BS EN IEC 55015:2019+A11:2020 and EN 61547:2009 / BS EN 61547:2009.

Diagram No. 1

Location: Conduction 1 Date: 12/17/2021 Time: 9:23:59 AM Phase X

Temperatuer (C): 23 Humidity (%): 53 Approved by:

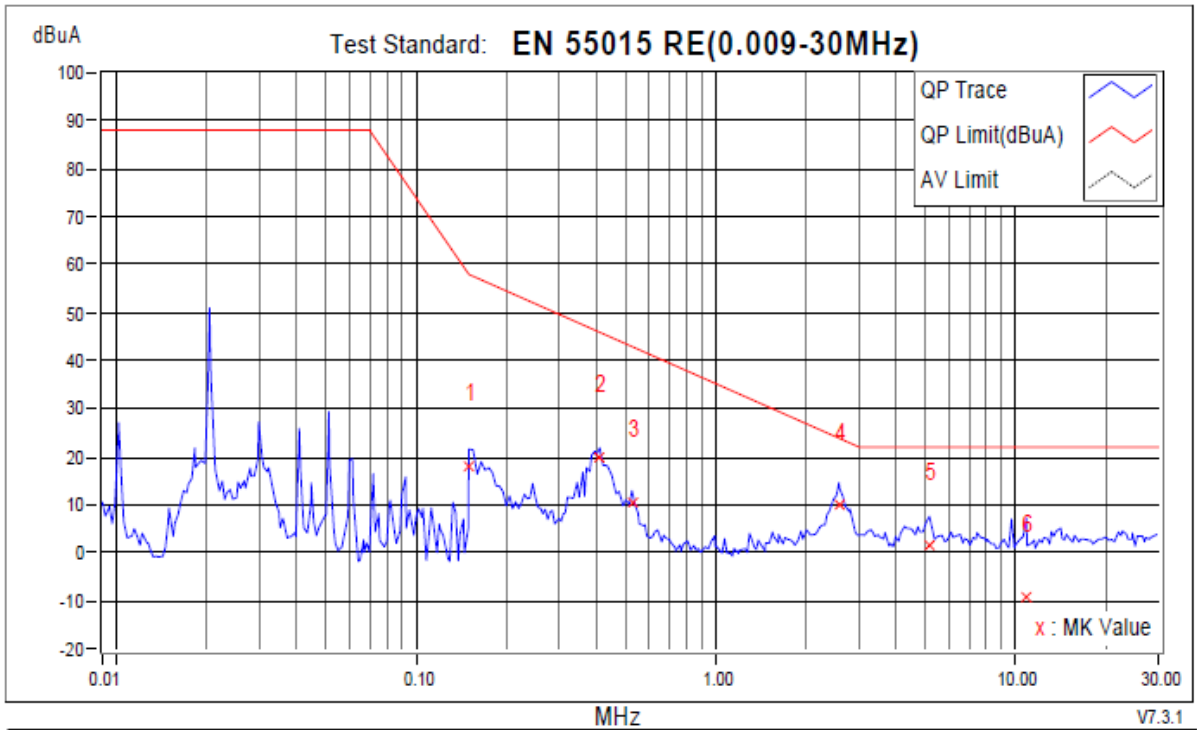


No.	Frequency MHz	Corr. Factor dB	Reading dBuA QP	Emission dBuA QP	Limit dBuA QP	Margins dB QP	Notes
1	0.17500	0.00	15.63	15.63	56.15	-40.52	
2	0.40000	0.00	26.18	26.18	46.21	-20.03	
+3	2.61000	0.00	7.84	7.84	23.67	-15.83	
4	6.25000	0.00	-9.76	-9.76	22.00	-31.76	
5	7.58500	0.00	-8.66	-8.66	22.00	-30.66	
6	15.98500	0.00	-8.97	-8.97	22.00	-30.97	

Continued

Location: Conduction 1 Date: 12/17/2021 Time: 9:30:46 AM Phase Y

Temperatuer (C): 23 Humidity (%): 53 Approved by:

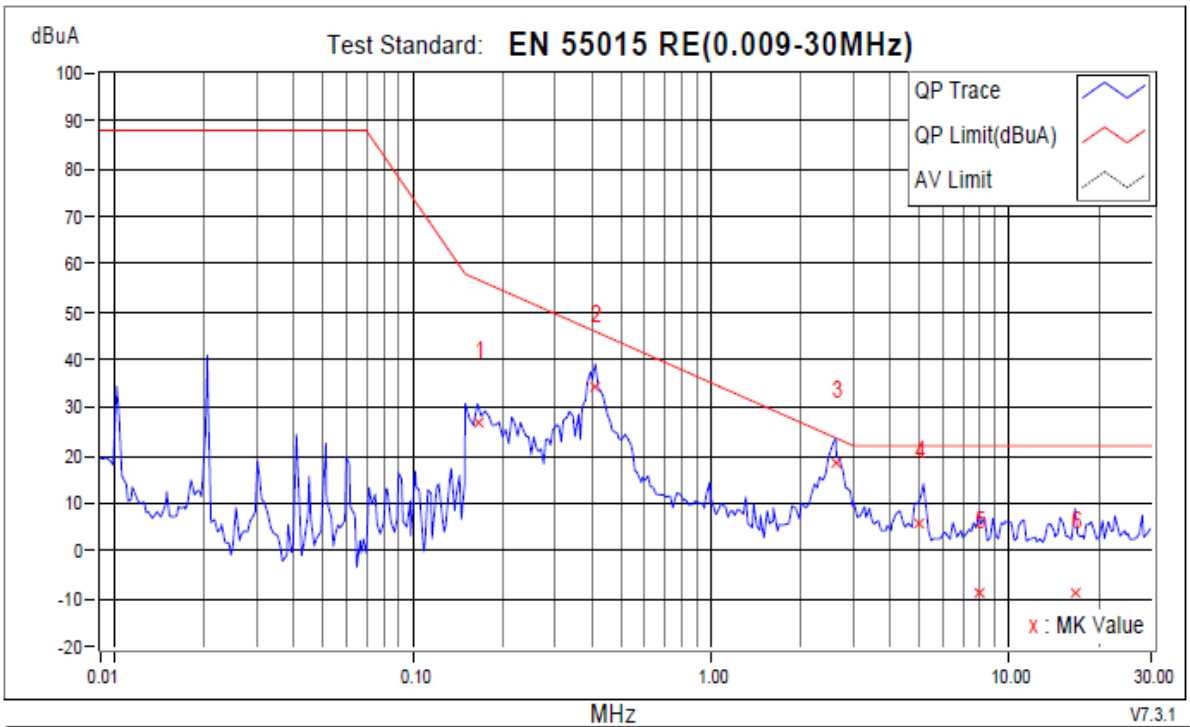


	Frequency	Corr. Factor	Reading dBuA	Emission dBuA	Limit dBuA	Margins dB	Notes
No.	MHz	dB	QP	QP	QP	QP	
1	0.15000	0.00	17.85	17.85	58.00	-40.15	
2	0.41000	0.00	19.70	19.70	45.92	-26.22	
3	0.52500	0.00	10.50	10.50	42.95	-32.45	
+4	2.57500	0.00	9.98	9.98	23.84	-13.86	
5	5.16000	0.00	1.34	1.34	22.00	-20.66	
6	10.86000	0.00	-9.27	-9.27	22.00	-31.27	

Continued

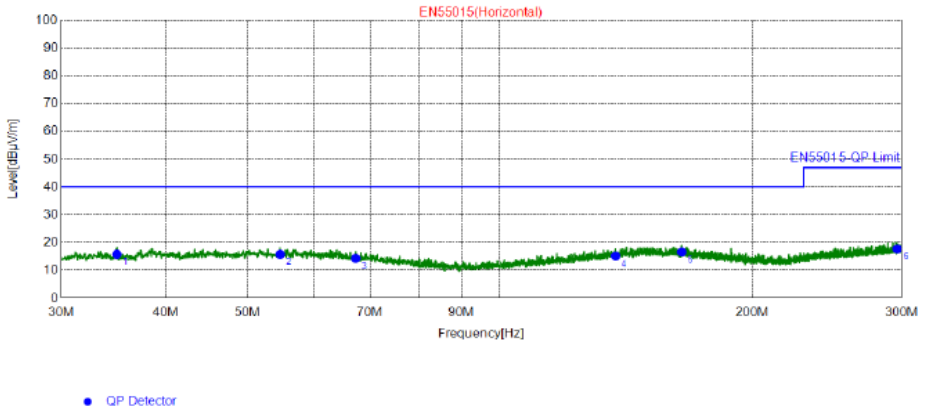
Location: Conduction 1 Date: 12/17/2021 Time: 9:36:51 AM Phase Z

Temperatuer (C): 23 Humidity (%): 53 Approved by:



	Frequency	Corr. Factor	Reading dBuA	Emission dBuA	Limit dBuA	Margins dB	Notes
No.	MHz	dB	QP	QP	QP	QP	
1	0.16500	0.00	26.91	26.91	56.85	-29.94	
2	0.41000	0.00	34.55	34.55	45.92	-11.37	
+3	2.62000	0.00	18.45	18.45	23.63	-5.18	
4	5.01500	0.00	5.87	5.87	22.00	-16.13	
5	7.93500	0.00	-8.61	-8.61	22.00	-30.61	
6	16.60000	0.00	-8.63	-8.63	22.00	-30.63	

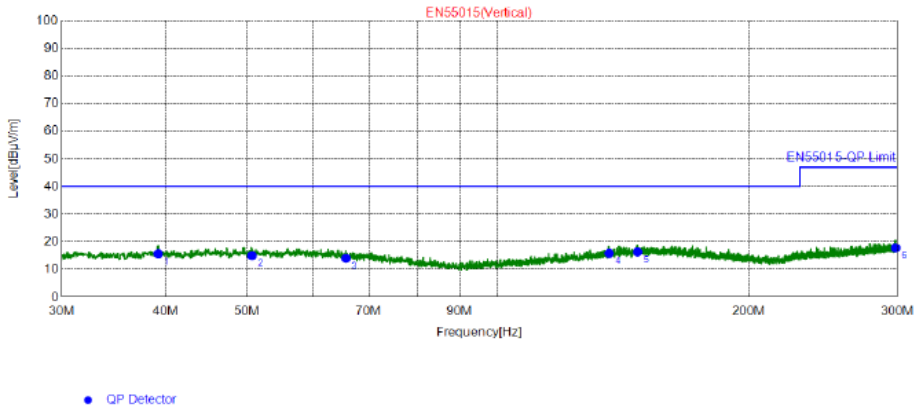
Diagram No. 2



Final Data List

NO.	Freq. [MHz]	QP Reading [dBµV/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	34.96	27.34	-11.51	15.83	40.00	24.17	200	2	Horizontal
2	54.73	26.46	-10.64	15.82	40.00	24.18	200	20	Horizontal
3	67.31	26.06	-11.74	14.32	40.00	25.68	100	19	Horizontal
4	137.3	25.99	-10.74	15.25	40.00	24.75	200	323	Horizontal
5	164.6	26.82	-10.21	16.61	40.00	23.39	200	253	Horizontal
6	296.2	26.28	-8.47	17.81	47.00	29.19	100	184	Horizontal

Continued



Final Data List

NO.	Freq. [MHz]	QP Reading [dBµV/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	39.18	26.91	-11.16	15.75	40.00	24.25	200	309	Vertical
2	50.73	25.61	-10.56	15.05	40.00	24.95	200	51	Vertical
3	65.74	25.58	-11.53	14.05	40.00	25.95	100	43	Vertical
4	135.9	26.78	-10.89	15.89	40.00	24.11	200	340	Vertical
5	146.9	26.37	-10.00	16.37	40.00	23.63	200	130	Vertical
6	298.4	26.31	-8.41	17.90	47.00	29.10	100	278	Vertical