TEST REPORT N°: APTV-19JU1564LTSHPB-A1

Supplement "A1" to test report No.: APTV-19JU1564LTSHPB dated on 2019-08-27.

EMC TEST REPORT

To :		Fax :	--
Attn :	--	Email :	--
Address :			
Cc :	--	Fax/Email	--
Attn :	--		
This document includes : 17 pages		Test date :	May.14 to Jun.29, 2020

FACTORY NAME :	
ADDRESS :	
PRODUCT :	LED Lighting chain
TYPE REFERENCE :	See model list
RATED VOLTAGE :	AC 220-240V, 50/60Hz
RATED INPUT POWER :	Max. 230W
PROTECTION CLASS :	II
TESTS REALISED :	On one sample of FT-230IPEC-500LED with max powered interconnection

STANDARDS USED(DATE) :	EN 55015:2013+A1:2015 EN 61547:2009 EN 61000-3-2:2014 EN 61000-3-3:2013
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 : Leo ZHANG Date : Jun.29, 2020	Approved by: Name : Yi XU Date : Jun.29, 2020

1 TESTING PROGRAM

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

Emission standard EN 55015:2013+A1:2015

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

Immunity standard 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 power frequency magnetic field- publication IEC 61000-4-8.
- 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.

Emission standard EN 61000-3-2:2014

- Measurement of the harmonic currents.

Emission standard EN 61000-3-3:2013

- Measurement of the voltage fluctuations.

Special Comment : This report is updated report based on history report APTV-19JU1564LTSHPB for adding new models and updating model list. The max power of the models is from 54W to 230W. Therefore, we chose the max powered model FT-230IPEC-500LED with max powered interconnection to perform all EMC tests.

2 HISTORY OF FAILURE

None.

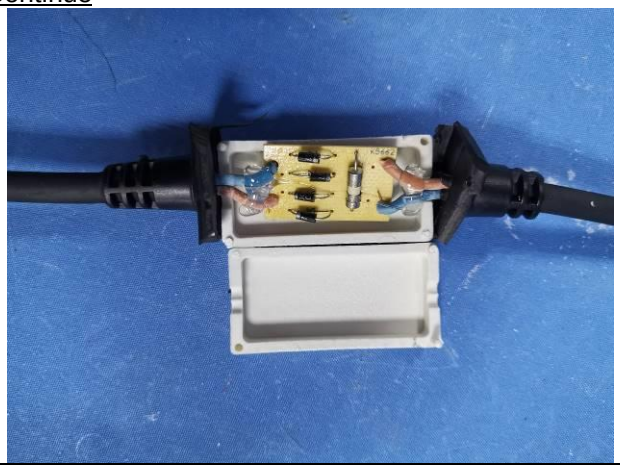
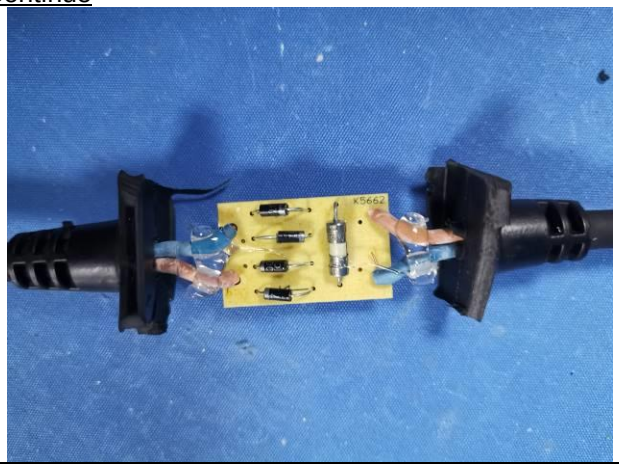
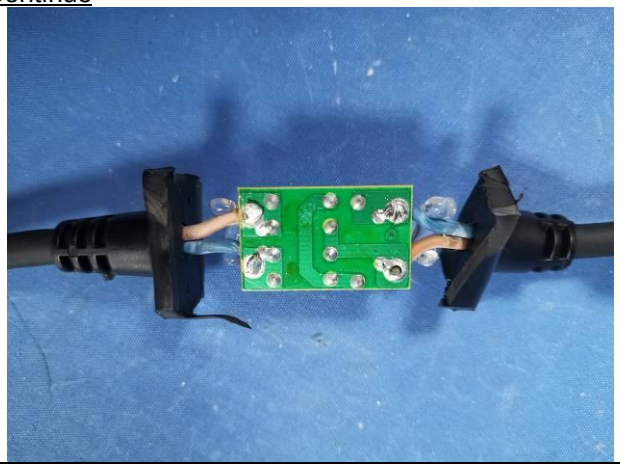
3 EQUIPMENT CHARACTERISTICS

3.1 Model list

FT-230IPE.-.LED series
220-240V~, 50/60Hz,10---500LEDs per 2---3.2v/20mAA, Class II, IP 44 non-replaceable LEDs, non-rewireable, serial and serial/parallel connected, with rectifier unit, , optional with decoration.
The first dot "." in the model name stands for different technical data of LED bulb, it can be "A" (Red and yellow 2V/20mAA),"B" (Warm White ,Blue, Green ,White, Pink, Purple,3V/20mA) or "C" (2V/20mA,3V/20mA mixed)
The second dot "." in the model name stands for LED numbers, it can be any number from 10 to 500.

Value (number of Lamps)	"F" can be blank (means without controller), or F (means with controller).	the color "A", "B", "C" of LED	Max. power consumption per circuit (W)	Interconnected MAX. Power (W)
10-50	With/without	Yellow **(2V/20mA)** Red **(2V/20mA)** Blue **(3V/20mA)** Green **(3V/20mA)** White **(3V/20mA)** Warm white**(3V/20mA)** pink **(3V/20mA)** Purple **(3V/20mA)** Red **(3V/20mA)** Yellow **(3V/20mA)**	3.6	220
51-100	With/without		7.2	230
101-150	With/without		10.8	230
151-200	With/without		14.4	230
201-300	With/without		18	230
301-400	With/without		22	230
401-500	With/without		24	230

3.2 Pictures of the samples

Over view 	Plug 
Rectifier unit 	Continue 
Continue 	Continue 

4 OPERATING CONDITIONS

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

Ambient conditions :	Temperature	:	22-23 °C
	Relative humidity	:	48-53 %
	Atmospheric pressure	:	101-101.3 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 55015:2013+A1:2015

Article	TEST	TEST SPECIFICATION	RESULTS			
			P	F	NA	Rem
4.3	**Disturbance Voltage**	Operating conditions : according to the article 6				
4.3.1	Mains terminals Frequency range: 0,009 to 30 MHz	Port(s) : • AC mains port Diagram(s) No. <1>	[X]	[ ]	[ ]	[ ]
4.3.2	Load and control terminals Frequency range : 0,009 to 30 MHz	• Load and control terminals Diagram(s) No. <>	[ ]	[ ]	[X]	[1]
4.4	**Radiated Electromagnetic Disturbance**	Operating conditions : according to the article 6				
4.4.1	Frequency range : 0,009 to 30 MHz	• 2 m Loop antenna Diagram (s) No. <2>	[X]	[ ]	[ ]	[ ]
4.4.2	**Radiated disturbance limit**	Operating conditions : according to the article 6				
	Frequency range: 30 to 300 MHz	Port(s) : Enclosure Measurement distance: 3 m Antenna Position • Vertical • Horizontal Diagram(s) No. <3>	[X] [X]	[ ] [ ]	[ ] [ ]	[ ] [ ]

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

6.2 IMMUNITY STANDARD 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	 [X] [X]	 [ ] [ ]	 [ ] [ ]	 [2] [2]
	Performance criteria B	Air discharges Level : ± 8 kV Application points : • enclosure	 [X]	 [ ]	 [ ]	 [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 : 2s 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]	 [ ]	 [ ]	 [2]

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]	[ ]	[ ]	[2]
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, ± 1 kV Port(s) : • power input, between lines and neutral	[X]	[ ]	[ ]	[2]
	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]	[ ]	[ ]	[2]
	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]	[ ]	[ ]	[2]

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

6.3 EMISSION STANDARD EN 61000-3-2:2014

TEST	TEST SPECIFICATION	RESULTS			
		P	F	NA	Rem
Limits for harmonic currents emission	Frequency range: 0 to 2 kHz Class of the apparatus : C Rated input power : ☐ ≤ 25W ☒ > 25W Table(s) No. <1>	[X]	[ ]	[ ]	[ ]

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

6.4 EMISSION STANDARD EN 61000-3-3:2013

TEST	TEST SPECIFICATION	RESULTS			
		P	F	NA	Rem
Limitation of voltage fluctuations and flicker in low-voltage supply systems	Frequency range: 0 to 2 kHz Table(s) No. < >	[X]	[ ]	[ ]	[3]

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

Remark(s) :

1 : There is no load and control terminals.
2 : During test, no change of operation state.
3 : The inrush current of this EUT does not exceed 20A, and the supply current after inrush is within a variation band of 1,5A. So according to 6.1 of this standard, the EUT is deemed to comply with this standard without further testing.

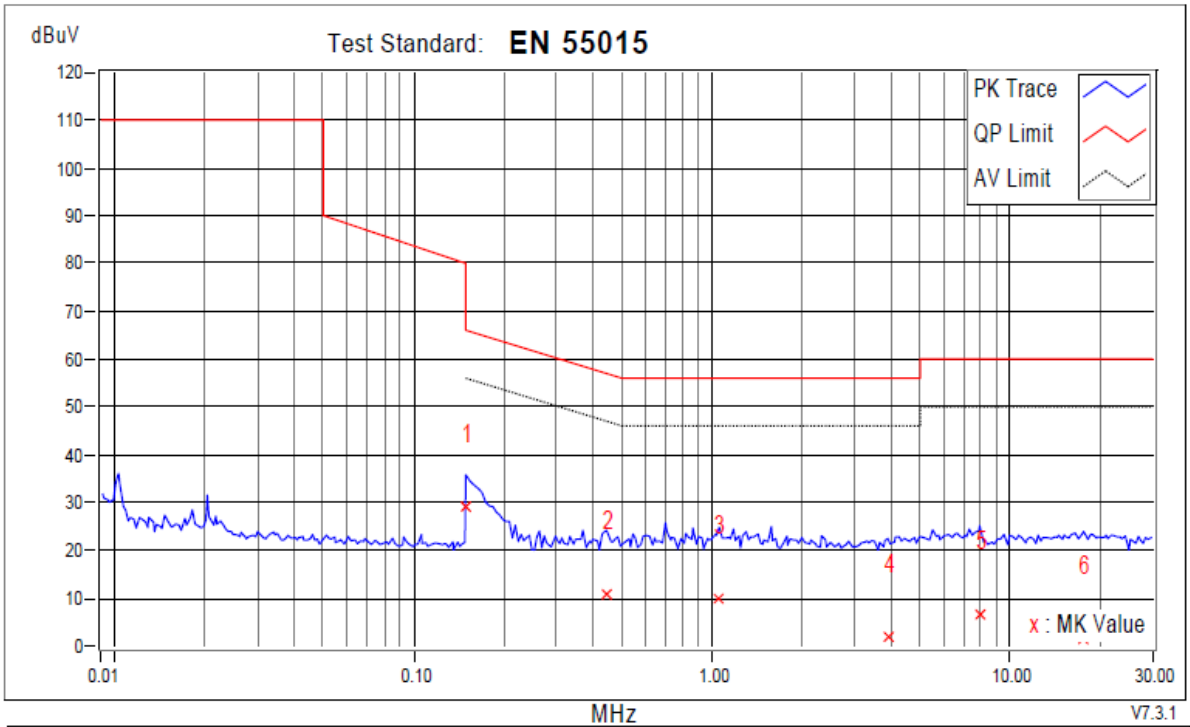
7 CONCLUSION

The apparatuses LED Lighting chain and models See model list are in compliance with the requirements of the standards EN 55015:2013+A1:2015, EN 61547:2009, EN 61000-3-2:2014 and EN 61000-3-3:2013.

Diagram No. 1

Location: Conduction 1 Date: 5/19/2020 Time: 4:54:44 PM Phase L1

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

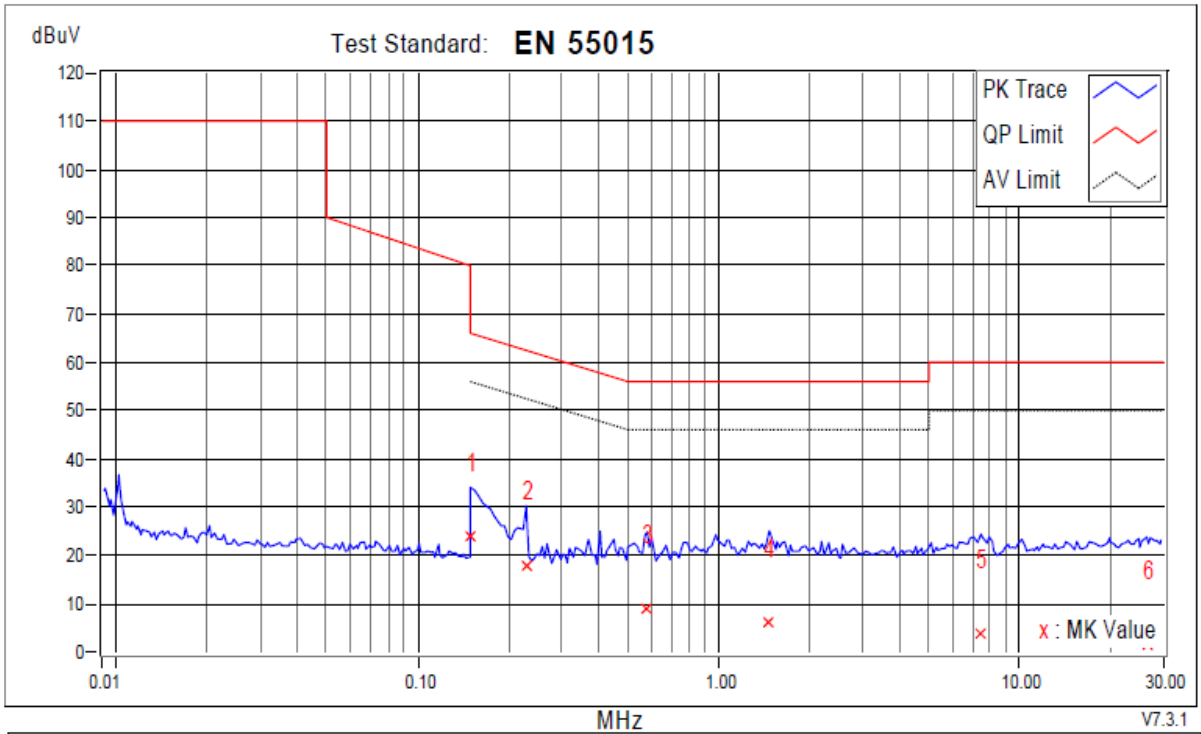


	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
No.	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
+1	0.15000	9.84	19.14	-4.75	28.98	5.09	66.00	56.00	-37.02	-50.91	
2	0.44500	9.72	0.86	-12.97	10.58	-3.25	56.97	46.97	-46.39	-50.22	
3	1.06000	9.60	0.28	-13.32	9.88	-3.72	56.00	46.00	-46.12	-49.72	
4	3.89500	9.95	-7.96	-13.62	1.99	-3.67	56.00	46.00	-54.01	-49.67	
5	7.90500	10.24	-3.56	-9.47	6.68	0.77	60.00	50.00	-53.32	-49.23	
6	17.63000	10.29	-8.99	-14.01	1.30	-3.72	60.00	50.00	-58.70	-53.72	

Continued

Location: Conduction 1 Date: 5/19/2020 Time: 5:05:11 PM Phase N

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

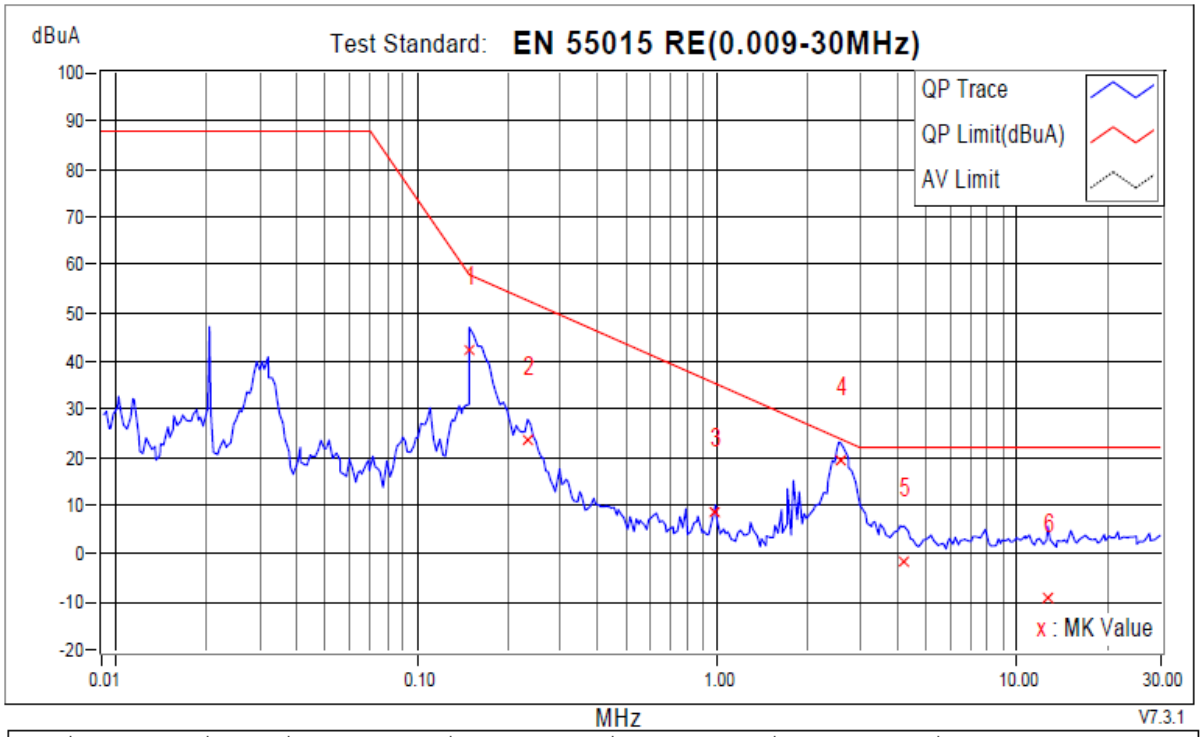


	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
No.	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
+1	0.15000	9.85	14.08	-6.71	23.93	3.14	66.00	56.00	-42.07	-52.86	
2	0.23000	9.82	8.09	-11.15	17.91	-1.33	62.45	52.45	-44.54	-53.78	
3	0.58000	9.83	-1.11	-13.88	8.72	-4.05	56.00	46.00	-47.28	-50.05	
4	1.47500	9.91	-3.65	-13.82	6.26	-3.91	56.00	46.00	-49.74	-49.91	
5	7.44500	10.20	-6.36	-11.64	3.84	-1.44	60.00	50.00	-56.16	-51.44	
6	26.45000	10.37	-8.90	-13.94	1.47	-3.57	60.00	50.00	-58.53	-53.57	

Diagram No. 2

Location: Conduction 1 Date: 5/19/2020 Time: 5:15:52 PM Phase X

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

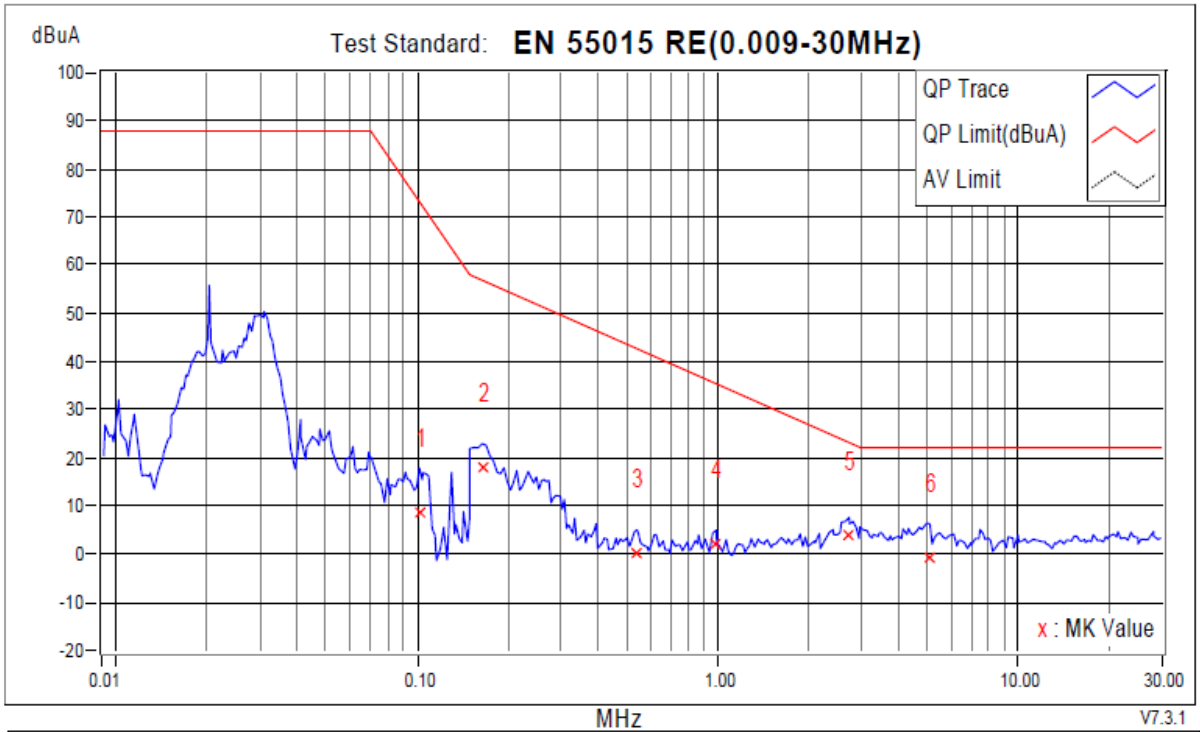


No.	Frequency MHz	Corr. Factor dB	Reading dBuA QP	Emission dBuA QP	Limit dBuA QP	Margins dB QP	Notes
1	0.15000	0.00	42.47	42.47	58.00	-15.53	
2	0.23500	0.00	23.61	23.61	52.60	-28.99	
3	0.99000	0.00	8.60	8.60	35.32	-26.72	
+4	2.58000	0.00	19.28	19.28	23.81	-4.53	
5	4.20000	0.00	-1.84	-1.84	22.00	-23.84	
6	12.65000	0.00	-9.22	-9.22	22.00	-31.22	

Continued

Location: Conduction 1 Date: 5/19/2020 Time: 5:21:36 PM Phase Y

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

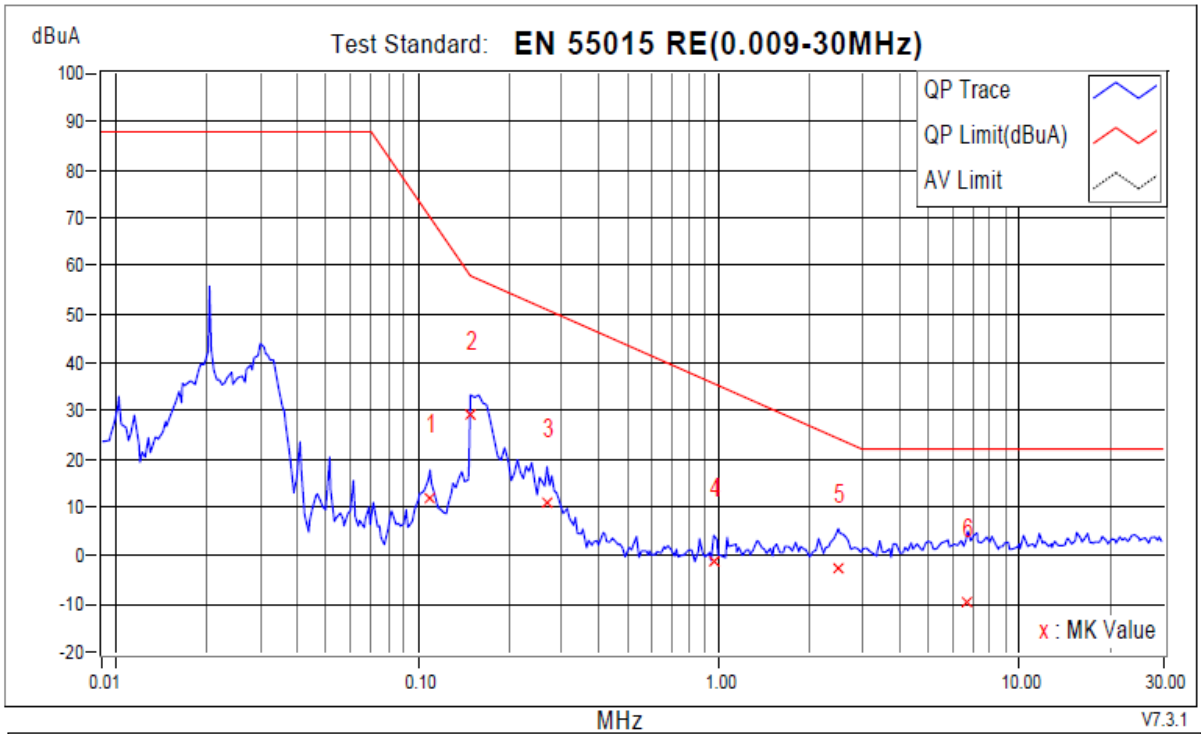


No.	Frequency MHz	Corr. Factor dB	Reading dBuA QP	Emission dBuA QP	Limit dBuA QP	Margins dB QP	Notes
1	0.10200	0.00	8.65	8.65	73.18	-64.53	
2	0.16500	0.00	17.99	17.99	56.85	-38.86	
3	0.54000	0.00	0.32	0.32	42.61	-42.29	
4	0.99000	0.00	2.11	2.11	35.32	-33.21	
+5	2.74000	0.00	3.75	3.75	23.09	-19.34	
6	5.08000	0.00	-0.70	-0.70	22.00	-22.70	

Continued

Location: Conduction 1 Date: 5/19/2020 Time: 5:30:27 PM Phase Z

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	0.11040	0.00	11.98	11.98	70.07	-58.09	
2	0.15000	0.00	29.02	29.02	58.00	-28.98	
3	0.27000	0.00	11.05	11.05	50.94	-39.89	
4	0.96500	0.00	-1.24	-1.24	35.63	-36.87	
+5	2.50000	0.00	-2.80	-2.80	24.19	-26.99	
6	6.73500	0.00	-9.52	-9.52	22.00	-31.52	

Diagram No. 3

Continued

Table No. 1

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	0.006	21.5	0.002	0.009	0.00	Pass
3	0.078	0.084	93.5	0.080	0.126	63.48	Pass
4	0.001						
5	0.024	0.029	83.2	0.024	0.043	56.03	Pass
6	0.001						
7	0.003	0.020	16.5	0.004	0.030	0.00	Pass
8	0.000						
9	0.004	0.015	30.1	0.004	0.022	0.00	Pass
10	0.000						
11	0.005	0.009	56.8	0.005	0.013	38.49	Pass
12	0.000						
13	0.003	0.009	31.5	0.003	0.013	0.00	Pass
14	0.000						
15	0.000	0.009	3.4	0.000	0.013	0.00	Pass
16	0.000						
17	0.001	0.009	15.5	0.001	0.013	0.00	Pass
18	0.000						
19	0.002	0.009	17.7	0.002	0.013	0.00	Pass
20	0.000						
21	0.001	0.009	10.2	0.001	0.013	0.00	Pass
22	0.000						
23	0.000	0.009	2.0	0.000	0.013	0.00	Pass
24	0.000						
25	0.001	0.009	7.7	0.001	0.013	0.00	Pass
26	0.000						
27	0.001	0.009	8.1	0.001	0.013	0.00	Pass
28	0.000						
29	0.000	0.009	4.6	0.000	0.013	0.00	Pass
30	0.000						
31	0.000	0.009	1.6	0.000	0.013	0.00	Pass
32	0.000						
33	0.000	0.009	4.5	0.000	0.013	0.00	Pass
34	0.000						
35	0.000	0.009	4.5	0.000	0.013	0.00	Pass
36	0.000						
37	0.000	0.009	2.6	0.000	0.013	0.00	Pass
38	0.000						
39	0.000	0.009	1.6	0.000	0.013	0.00	Pass
40	0.000						