

FCC TEST REPORT

Product Name: Smart Camera
Trade Mark: SKYWORTH
Model No.: LC2203
Report Number: 2307216148EMC-1
Test Standards: FCC 47 CFR Part 15 Subpart B
FCC ID: WNA-LSG00
Test Result: PASS
Date of Issue: September 21, 2023

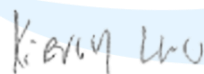
Prepared for:

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Version

Version No.	Date	Description
V1.0	September 21, 2023	Original



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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Shenzhen Skyworth Digital Technology Co., LTD.
Address of Applicant:	14/F, Unit A, Skyworth Building, Gaoxin Ave.1.S., Nanshan District, Shenzhen, China
Manufacturer:	Shenzhen Skyworth Digital Technology Co., LTD.
Address of Manufacturer:	14/F, Unit A, Skyworth Building, Gaoxin Ave.1.S., Nanshan District, Shenzhen, China

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Smart Camera
Model No.:	LC2203
Trade Mark:	SKYWORTH
DUT Stage:	Identical Prototype
Rated Voltage:	5 V $\equiv$ 2.0 A
Classification of digital devices:	Class B
Highest Internal Frequency:	5825 MHz
Software Version:	1.00.32 (Provided by the customer)
Hardware Version:	5800-2ALSG00-3101 (Provided by the customer)
Sample Received Date:	July 20, 2023
Sample Tested Date:	July 31, 2023 to August 2, 2023
Remark:	The above EUT's information was provided by customer. Please refer to the specifications or user's manual for more detailed description.

1.2.2 Description of Accessories

Adapter	
Model No.:	UT-681A-5200ZCY
Input:	100-240 V~50/60 Hz 0.35 A
Output:	5.0 V $\equiv$ 2.0 A 10.0 W

Cable	
Connector:	USB Cable
Cable Type:	Unshielded without ferrite
Length:	3.0 Meter

1.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
TF Card	Kingston	8G	N/A	UnionTrust
Mobile Phone	MI	MDG1	461cceed7d24	UnionTrust
Wireless Router	ASUA	RT-AC2200	2019AJ4850	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
--	--	--	--	--

1.4 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

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1.5 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories

CAB identifier: CN0032

FCC Accredited Lab.

Designation Number: CN1194

Test Firm Registration Number: 259480

1.6 DEVIATION FROM STANDARDS

None.

1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.9 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9kHz-150kHz	±3.2 dB
2	Conducted emission 150kHz-30MHz	±2.7 dB
3	Radiated emission 9kHz-30MHz	±4.7 dB
4	Radiated emission 30MHz-1GHz	±4.6 dB
5	Radiated emission 1GHz-18GHz	±4.4 dB
6	Radiated emission 18GHz-40GHz	±4.6 dB

2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart B Test Cases			
Test Item	Test Requirement	Test Method	Result
Conducted Emission	FCC 47 CFR Part 15.107	ANSI C63.4-2014	PASS
Radiated Emission	FCC 47 CFR Part 15.109	ANSI C63.4-2014	PASS



3. EQUIPMENT LIST

Radiated Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
☒	3m SAC	ETS-LINDGREN	3M	Euroshiedpn-CT001270-1317	22-Jan-2021	21-Jan-2024
☒	Receiver	R&S	ESIB26	100114	3-Nov-2022	2-Nov-2023
☐	Loop Antenna	ETS-LINDGREN	6502	00202525	21-Nov-2022	20-Nov-2023
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	13-Dec-2022	12-Dec-2023
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	13-Dec-2022	12-Dec-2023
☒	Preamplifier	HP	8447F	2805A02960	1-Nov-2022	31-Oct-2023
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201541	16-Apr-2023	15-Apr-2025
☒	Pre-amplifier	ETS-LINDGREN	00118385	00201874	1-Nov-2022	31-Oct-2023
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	21-Nov-2022	20-Nov-2023
☒	Pre-amplifier	ETS-LINDGREN	00118384	00202652	21-Nov-2022	20-Nov-2023
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160323		

Conducted Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
☒	Receiver	R&S	ESR7	101181	1-Nov-2022	31-Oct-2023
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	1-Nov-2022	31-Oct-2023
☒	LISN	R&S	ESH2-Z5	860014/024	1-Nov-2022	31-Oct-2023
☒	LISN	ETS-Lindgren	3816/2SH	00201088	1-Nov-2022	31-Oct-2023
☒	Test Software	Audix	e3	Software Version: 9 20151119i		

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Environment Parameter	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
NT/NV	+15 to +35	120V~60 Hz/ 240V~50 Hz	20 to 75
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2 Record of Normal Environment and Test Sample

Test Item	Temp. (°C)	Relative Humidity (%)	Pressure (kPa)	Sample No.	Tested by
Radiated Emission	25.6	64	99.1	S202305191506-ZJD07/7	Yana Zeng
Conducted Emission	25.2	57.0	98.9		Lucas Ouyang

4.2 TEST MODES

Test Item	EMI Test Modes
Radiated Emission	Test Mode 1: AC120V/60Hz (Adaptor) + Micro SD + Smart Camera ON Test Mode 2: AC240V/50Hz (Adaptor) + Micro SD + Smart Camera ON
Conducted Emission	Test Mode 1: AC120V/60Hz (Adaptor) + Micro SD + Smart Camera ON Test Mode 2: AC240V/50Hz (Adaptor) + Micro SD + Smart Camera ON
Remark: The above test modes in boldface were the worst cases, only the test data of these modes were reported.	

4.3 TEST SETUP

4.3.1 For Radiated Emissions test setup

Figure 1. 30MHz to 1GHz

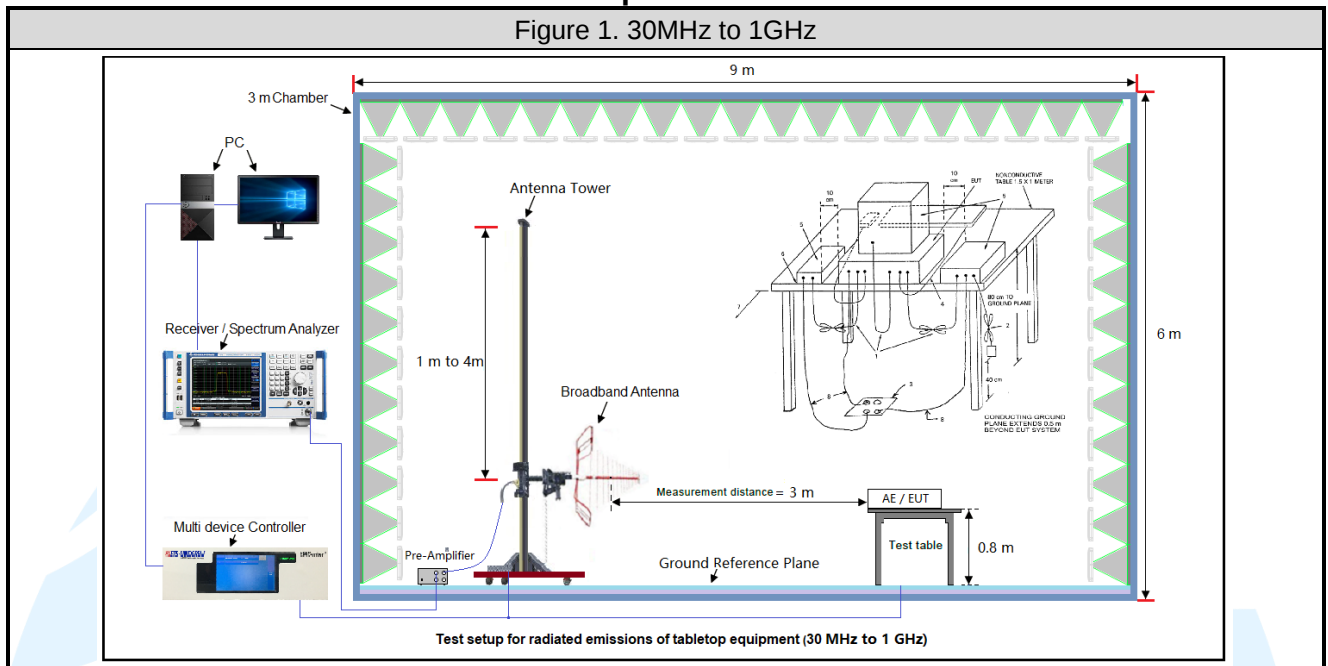
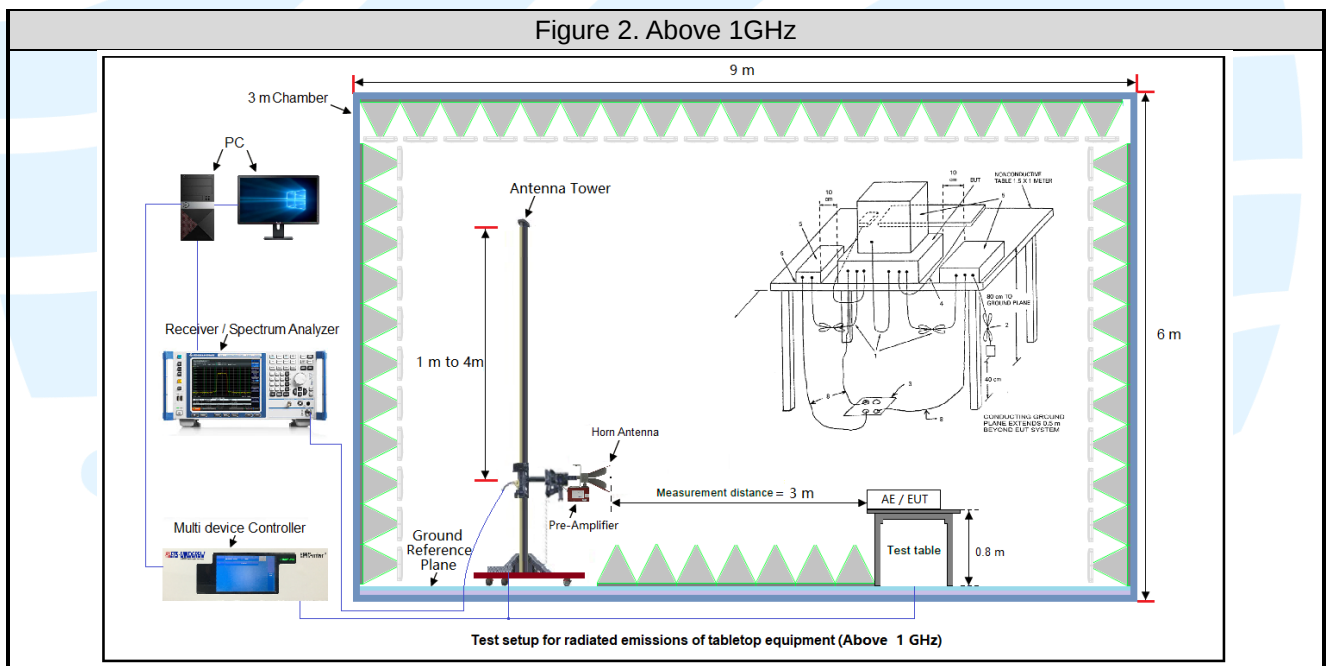


Figure 2. Above 1GHz



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6. EMC REQUIREMENTS SPECIFICATION

6.1 RADIATED EMISSION

Test Requirement: FCC 47 CFR Part 15.109

Test Method: ANSI C63.4-2014

Receiver Setup:

Frequency: (f) (MHz)	Detector type	Measurement receiver bandwidth	
		RBW	VBW
$30 \leq f \leq 1\,000$	Quasi Peak	120 kHz	300 kHz
$f \geq 1000$	Peak	1 MHz	3 MHz
	Average	1 MHz	3 MHz

Measured frequency range

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705-108	1000.
108-500	2000.
500-1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

Limits:

Limits for Class B devices

Frequency (MHz)	limits at 3m (dB μ V/m)		
	QP Detector	PK Detector	AV Detector
30-88	40.0	--	--
88-216	43.5	--	--
216-960	46.0	--	--
960 to 1000	54.0	--	--
Above 1000	--	74.0	54.0

Remark:

- The lower limit shall apply at the transition frequencies.
- Emission level (dB μ V/m) = 20 log Emission level (μ V/m).
- For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

Test Setup: Refer to section 4.3.1 for details.

Test Procedures:

1. From 30 MHz to 1GHz test procedure as below:

- The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
- Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

2. Above 1GHz test procedure as below:

- The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
- Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both

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horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.

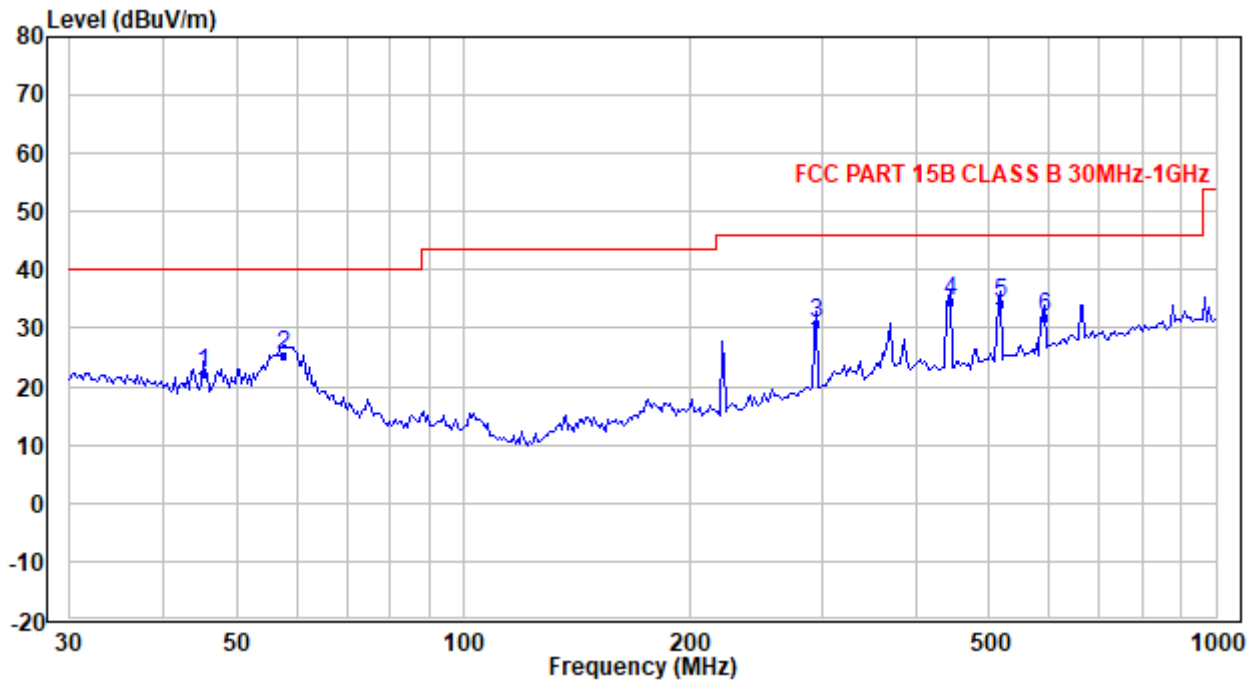
- 3) For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

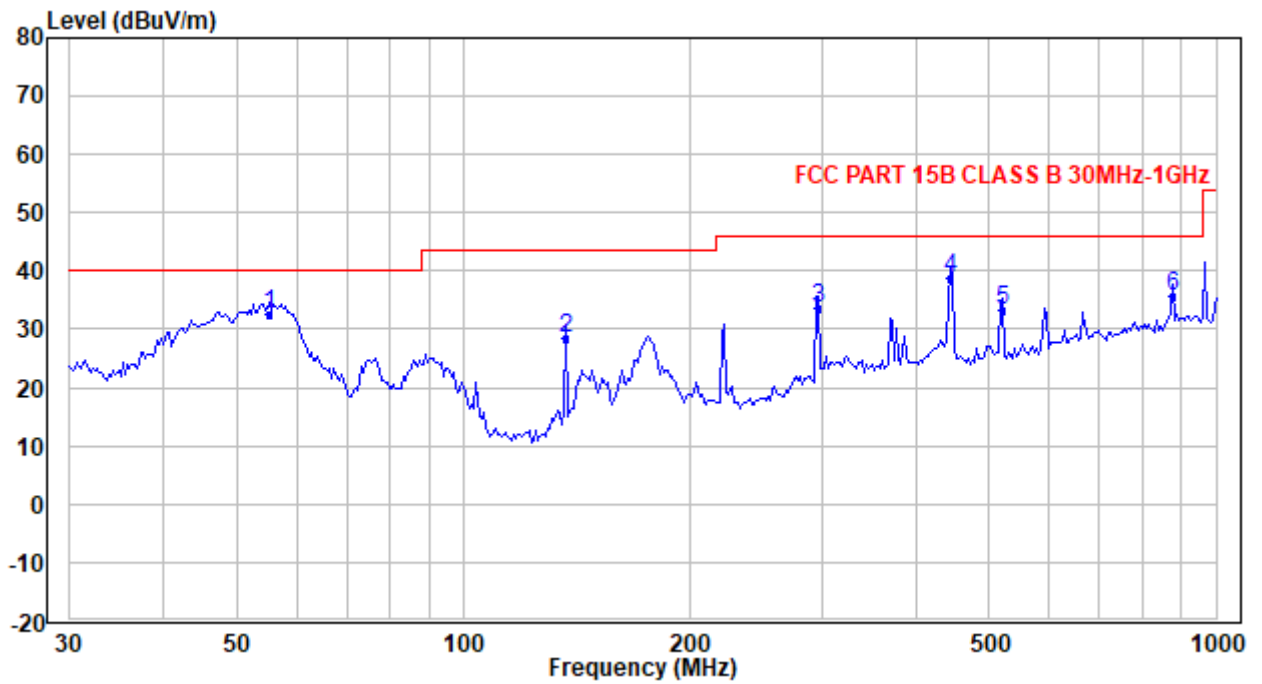
The worst measurement data as follows:

Below 1GHz (Quasi Peak):
Test Mode2
Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	45.095	33.84	-11.47	22.37	40.00	-17.63	QP
2	57.669	42.52	-17.29	25.23	40.00	-14.77	QP
3	294.426	37.74	-6.84	30.90	46.00	-15.10	QP
4	442.572	37.99	-3.44	34.55	46.00	-11.45	QP
5	516.565	35.95	-1.61	34.34	46.00	-11.66	QP
6	590.351	32.50	-0.49	32.01	46.00	-13.99	QP

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	55.288	49.37	-16.77	32.60	40.00	-7.40	QP
2	136.875	43.87	-15.51	28.36	43.50	-15.14	QP
3	296.502	40.45	-6.71	33.74	46.00	-12.26	QP
4	442.572	42.26	-3.44	38.82	46.00	-7.18	QP
5	520.208	34.89	-1.67	33.22	46.00	-12.78	QP
6	875.013	31.16	4.42	35.58	46.00	-10.42	QP

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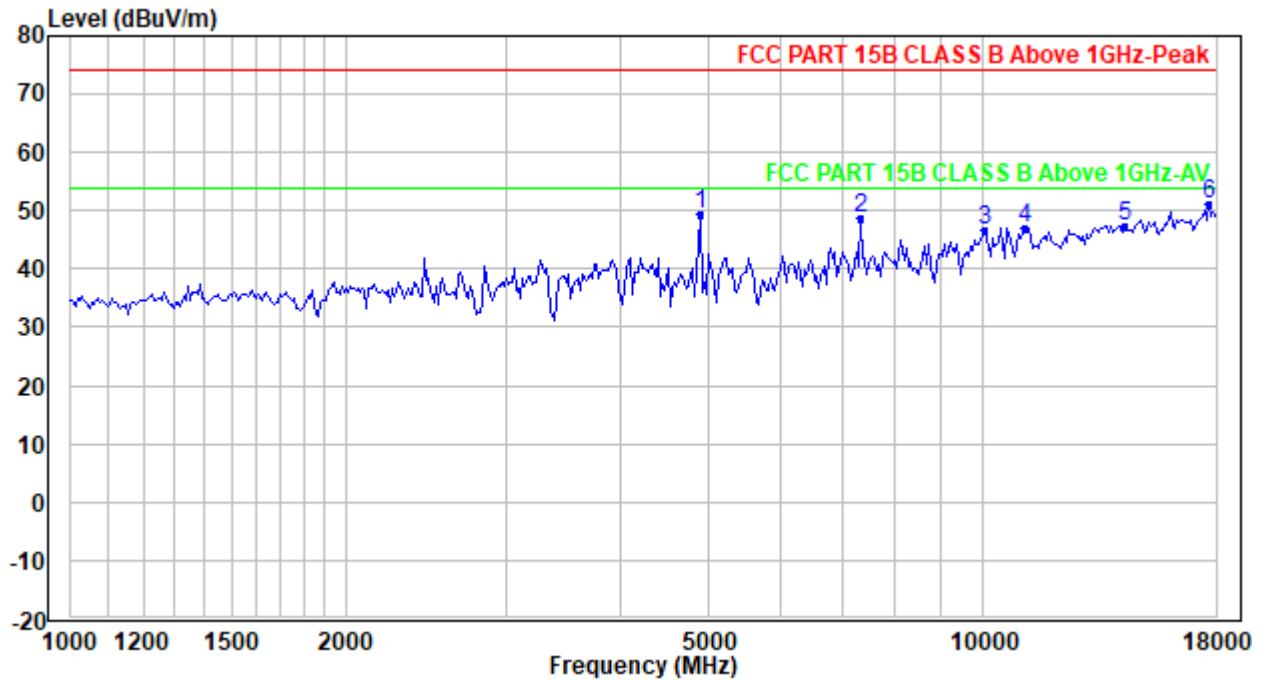
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Above 1GHz (Peak & Average)
Test Mode2
Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4889.539	50.73	-1.46	49.27	74.00	-24.73	Peak
2	7334.292	46.32	2.33	48.65	74.00	-25.35	Peak
3	10027.650	39.43	7.08	46.51	74.00	-27.49	Peak
4	11129.600	39.05	8.07	47.12	74.00	-26.88	Peak
5	14277.410	34.57	12.79	47.36	74.00	-26.64	Peak
6	17689.920	35.86	15.15	51.01	74.00	-22.99	Peak

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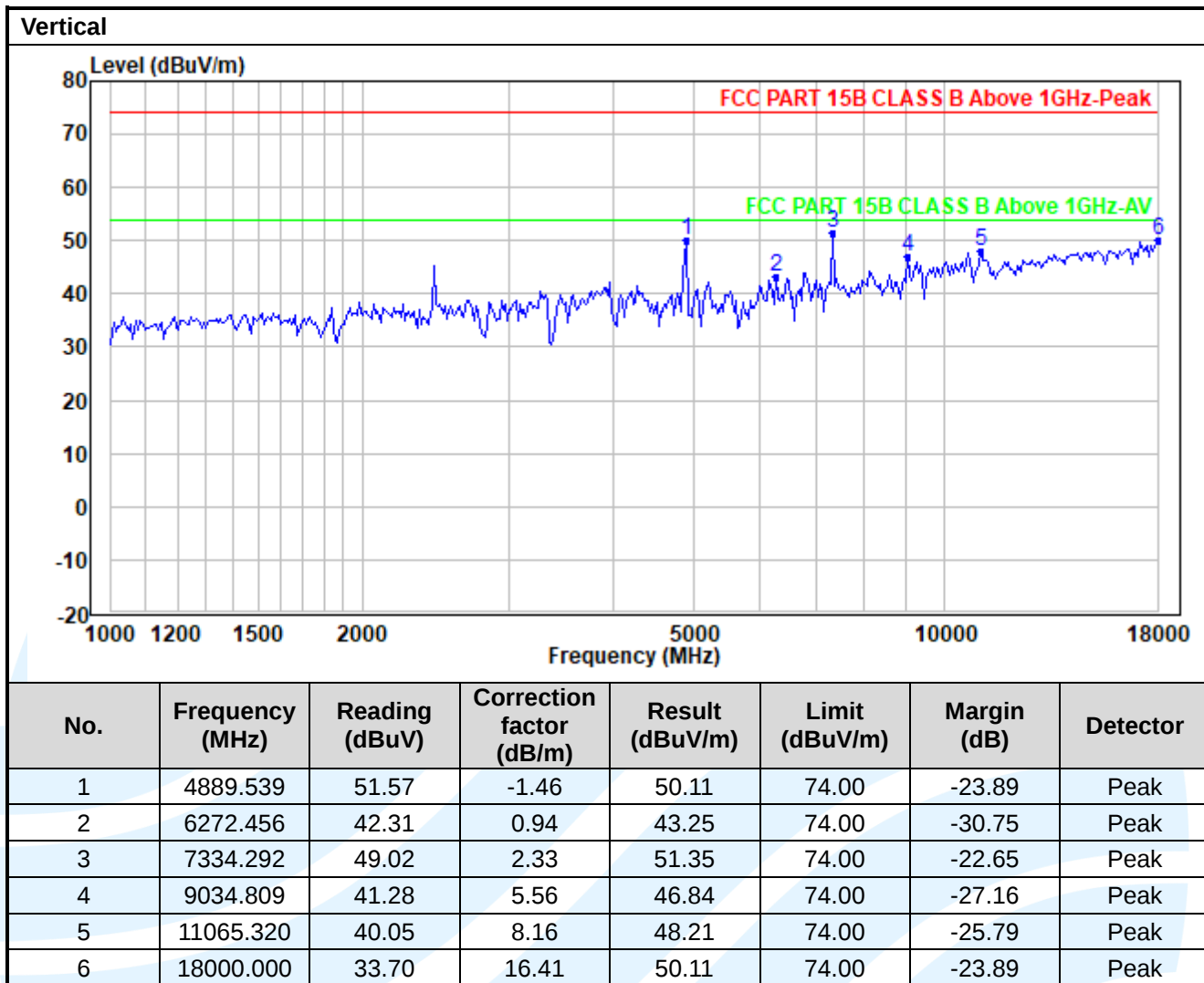
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Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit
4. All possible modes of operation were investigated, and testing at two nominal voltages of 240V~50Hz and 120V~60Hz, only the worst case emissions reported.
5. For Radiated Emission above 18GHz, there was not any unwanted emission detected.
6. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

6.2 CONDUCTED EMISSION

Test Requirement: FCC 47 CFR Part 15.107

Test Method: ANSI C63.4-2014

Limits:

Limits for Class B devices

Frequency range (MHz)	Limits (dB(μV))	
	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

Remark:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

Test Setup: Refer to section 4.3.2 for details.

Test Procedures:

- 1) The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
- 2) The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.
- 3) For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

Equipment Used: Refer to section 3 for details.

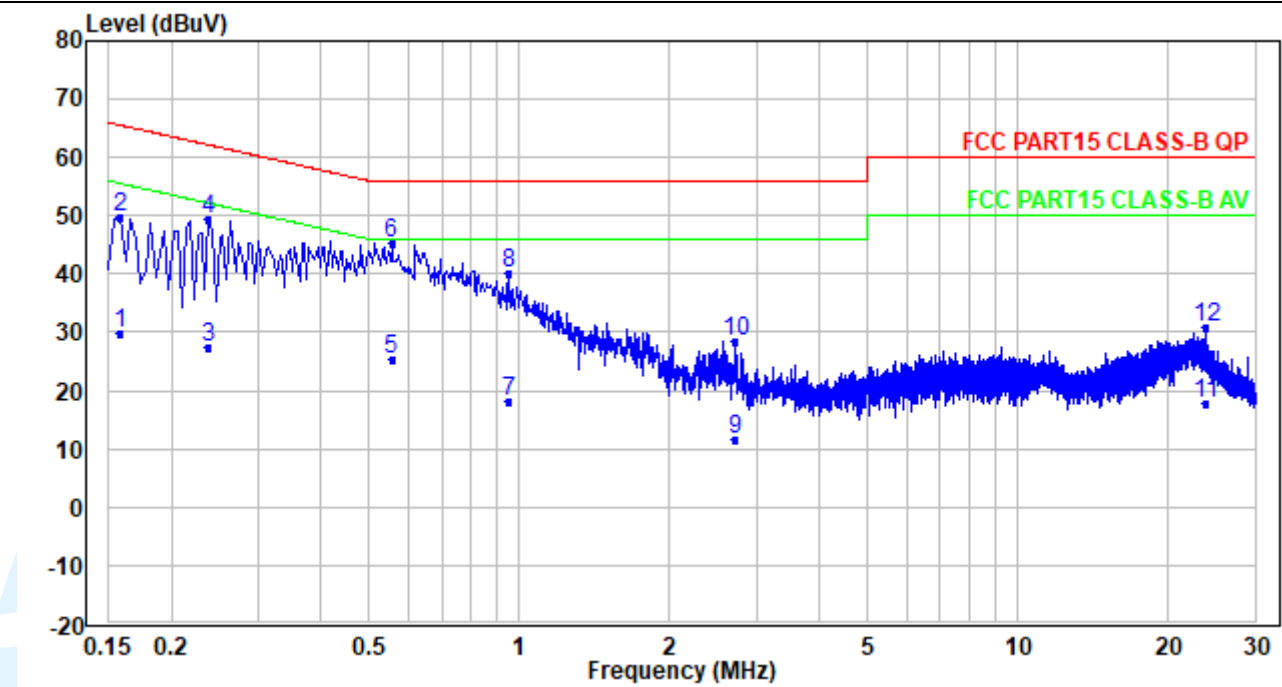
Test Result: Pass

The worst measurement data as follows:

Quasi Peak and Average:

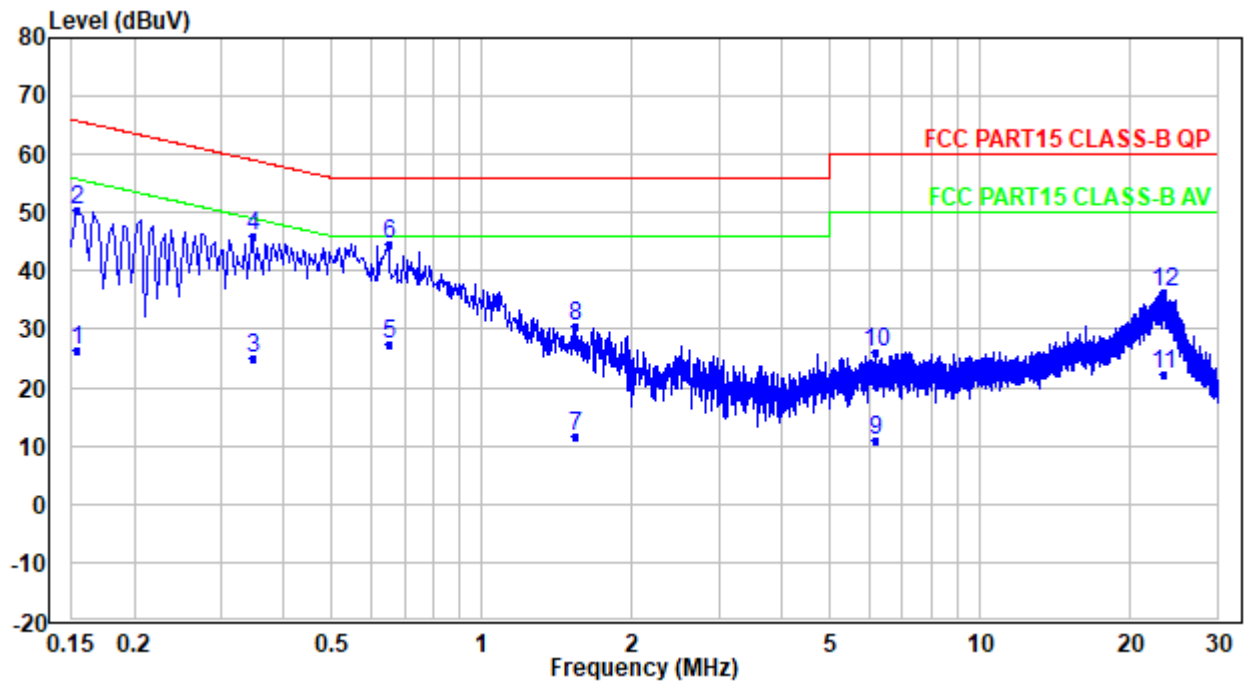
Test Mode1

Live Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.158	19.83	10.04	29.87	55.57	-25.70	Average
2	0.158	39.83	10.04	49.87	65.57	-15.70	QP
3	0.238	17.27	10.03	27.30	52.17	-24.87	Average
4	0.238	39.27	10.03	49.30	62.17	-12.87	QP
5	0.554	15.26	10.05	25.31	46.00	-20.69	Average
6	0.554	35.26	10.05	45.31	56.00	-10.69	QP
7	0.950	8.23	10.06	18.29	46.00	-27.71	Average
8	0.950	30.23	10.06	40.29	56.00	-15.71	QP
9	2.722	1.40	10.14	11.54	46.00	-34.46	Average
10	2.722	18.40	10.14	28.54	56.00	-27.46	QP
11	23.872	6.45	11.29	17.74	50.00	-32.26	Average
12	23.872	19.45	11.29	30.74	60.00	-29.26	QP

Neutral Line



No.	Frequency (MHz)	Reading (dBUV)	Correction factor (dB)	Result (dBUV)	Limit (dBUV)	Margin (dB)	Detector
1	0.154	16.34	10.03	26.37	55.78	-29.41	Average
2	0.154	40.34	10.03	50.37	65.78	-15.41	QP
3	0.346	14.88	10.03	24.91	49.06	-24.15	Average
4	0.346	35.88	10.03	45.91	59.06	-13.15	QP
5	0.650	17.50	10.04	27.54	46.00	-18.46	Average
6	0.650	34.50	10.04	44.54	56.00	-11.46	QP
7	1.538	1.45	10.06	11.51	46.00	-34.49	Average
8	1.538	20.45	10.06	30.51	56.00	-25.49	QP
9	6.166	0.76	10.28	11.04	50.00	-38.96	Average
10	6.166	15.76	10.28	26.04	60.00	-33.96	QP
11	23.480	11.03	11.19	22.22	50.00	-27.78	Average
12	23.480	25.03	11.19	36.22	60.00	-23.78	QP

Remark:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result - Limit
4. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.
5. All possible modes of operation were investigated, and testing at two nominal voltages of 240V~50Hz and 120V~60Hz, only the worst case emissions reported.

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APPENDIX 1 PHOTOS OF TEST SETUP

See test photos attached in Appendix 1 for the actual connections between Product and support equipment.

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

***** End of Report *****

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.
