

FCC TEST REPORT

Product Name: 4K Android TV OTT Box
Trade Mark: Entel
Model No.: DIW585 UHD Entel
Add. Model No.: N/A
Report Number: 191023001EMC-1
Test Standards: FCC 47 CFR Part 15 Subpart B
Test Result: PASS
Date of Issue: December 4, 2019

Prepared for:

Shenzhen SDMC Technology Co.,Ltd.
7/F, W2-A, Hi-Tech, Industrial Park, Nanshan District, Shenzhen,
China

Prepared by:

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Version

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V1.0	December 4, 2019	Original



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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Shenzhen SDMC Technology Co.,Ltd.
Address of Applicant:	7/F, W2-A, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, China
Manufacturer:	Shenzhen SDMC Technology Co.,Ltd.
Address of Manufacturer:	7/F, W2-A, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, China

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	4K Android TV OTT Box
Model No.:	DIW585 UHD Entel
Add. Model No.:	N/A
Trade Mark:	Entel
DUT Stage:	Production Unit
Rated Voltage:	5V $\Rightarrow$ 2A (By Adaptor)
Classification of digital devices:	Class B
Highest Internal Frequency:	5825 MHz
Sample Received Date:	October 25, 2019
Sample Tested Date:	October 25, 2019 to November 20, 2019

1.2.2 Description of Accessories

Adaptor(1)	
Model No.:	NBS12F050200VE
Input:	100-240 V~50/60 Hz 0.3A
Output:	5V $\Rightarrow$ 2A
DC Cable:	1.80 Meter, Unshielded without ferrite

Cable (1)	
Description:	HDMI Cable
Cable Type:	Unshielded without ferrite
Length:	1.5 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
USB disk	Kingston	DTSE9	N/A	UnionTrust
Wireless Home Router	SAGEMCOM	FAST5280	VW3FAST5280	UnionTrust
Monitor	LG	U3202S	N/A	UnionTrust
Micro SD	Kingston	16GB	N/A	UnionTrust
DVD	GIEC	BDP-G4305	N/A	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Ethernet Cable	RJ45	1.5 Unshielded without ferrite	UnionTrust
2	AV	AV	1.2 Unshielded without ferrite	UnionTrust
3	SPDIF	SPDIF	1.5 Unshielded without ferrite	UnionTrust

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/EN 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: 2005 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.

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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	±3.8 dB
2	Conducted emission 150KHz-30MHz	±3.4 dB
3	Radiated emission 9KHz-30MHz	±4.9 dB
4	Radiated emission 30MHz-1GHz	±4.7 dB
5	Radiated emission 1GHz-18GHz	±5.1 dB
6	Radiated emission 18GHz-26GHz	±5.2 dB
7	Radiated emission 26GHz-40GHz	±5.2 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 (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 03, 2018	Dec. 03, 2021
☒	Receiver	R&S	ESIB26	100114	Nov. 24, 2019	Nov. 24, 2020
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec. 08, 2018	Dec. 08, 2019
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Dec. 08, 2018	Dec. 08, 2019
☒	Preamplifier	HP	8447F	2805A02960	Nov. 24, 2019	Nov. 24, 2020
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	May 18, 2019	May 18, 2020
☐	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Jan. 05, 2019	Jan. 05, 2020
☒	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 (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	Receiver	R&S	ESR7	1316.3003K07-101181-K3	Nov. 24, 2019	Nov. 24, 2020
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Nov. 24, 2019	Nov. 24, 2020
☒	LISN	R&S	ESH2-Z5	860014/024	Nov. 24, 2019	Nov. 24, 2020
☒	LISN	ETS-Lindgren	3816/2SH	00201088	Nov. 24, 2019	Nov. 24, 2020
☒	Test Software	Audix	e3	Software Version: 9.160323		

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	AC 120V/60Hz and AC 240V/50Hz	20 to 75
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2 Record of Normal Environment

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (kPa)	Tested by
Conducted Emission	23.0	60.0	99.7	Andy Lin
Radiated Emission	23.4	41.0	100.12	Bert Xiong

4.2 TEST MODES

Test Item	EMI Test Modes
Radiated Emission	TM1: USB Play +HDMI output TM2: TF Card play +HDMI output TM3: LAN Play +HDMI output TM4: AV output + worse case for TM1-TM3 TM5: AC 240V/50Hz for worse case TM1-TM4
Conducted Emission	TM1: USB Play +HDMI output TM2: TF Card play +HDMI output TM3: LAN Play +HDMI output TM4: AV output + worse case for TM1-TM3 TM5: AC 240V/50Hz for worse case TM1-TM4

4.3 TEST SETUP

4.3.1 For Radiated Emissions test setup

Figure 1. 30MHz to 1GHz

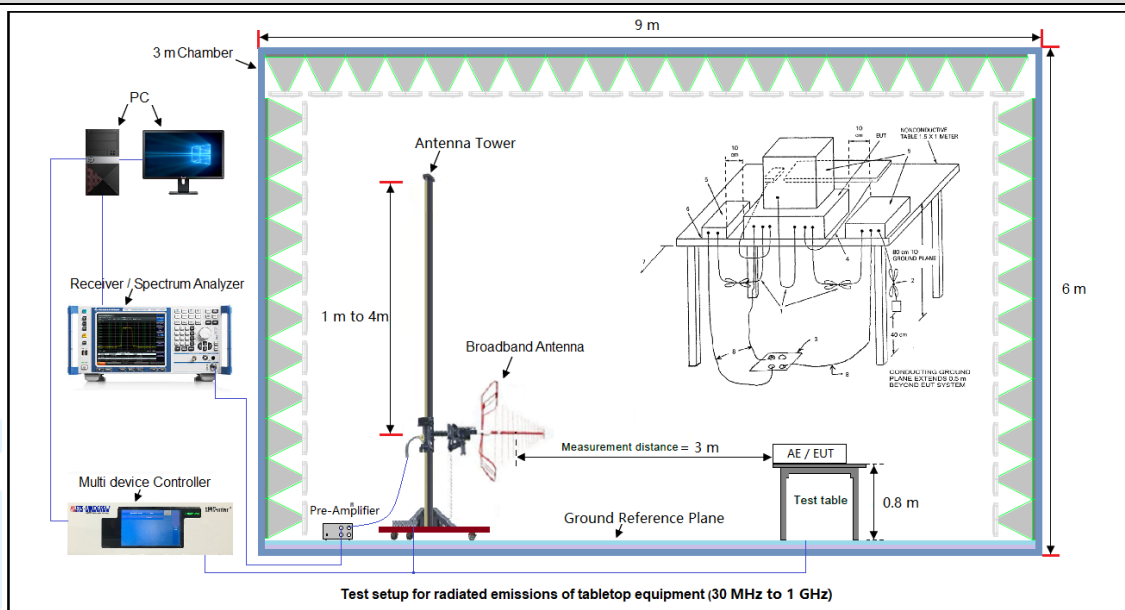
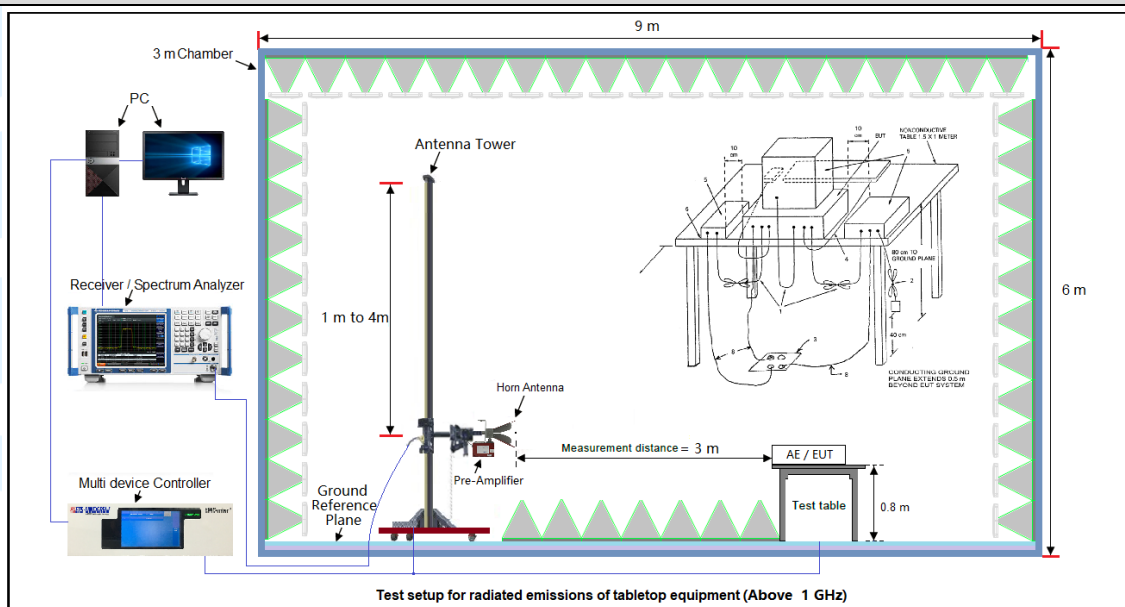


Figure 2. Above 1GHz



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:

- 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.
- 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.

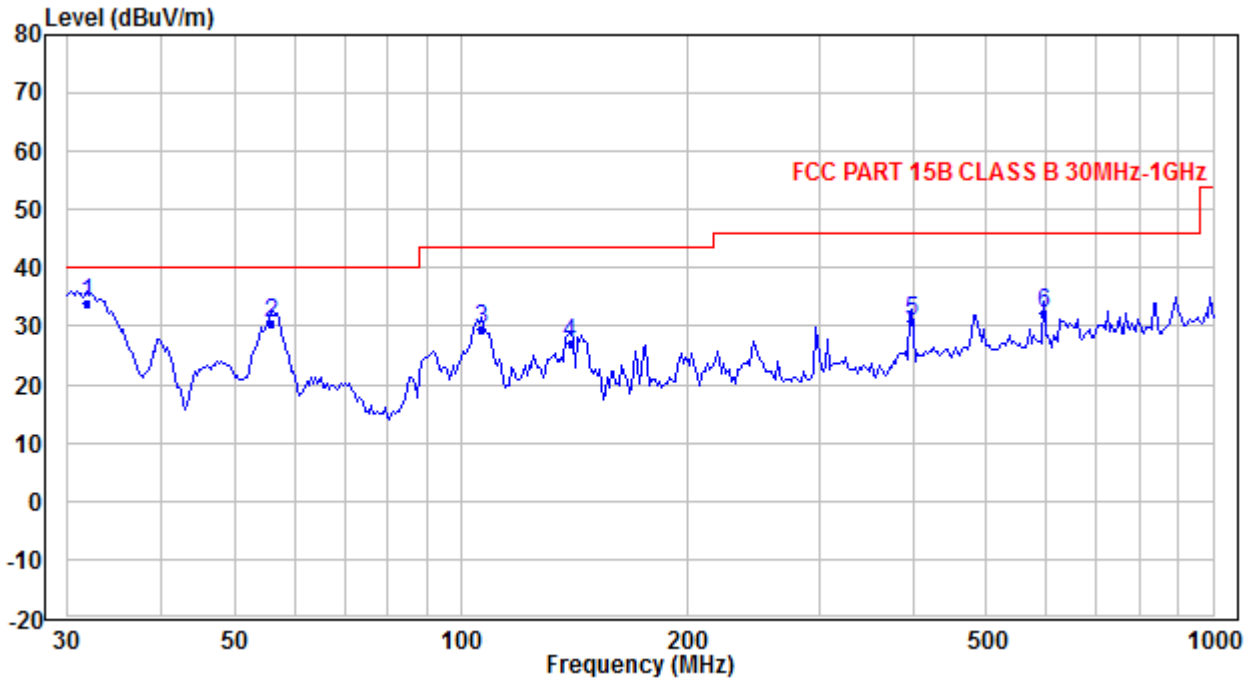
Test Result: Pass

The measurement data as follows:

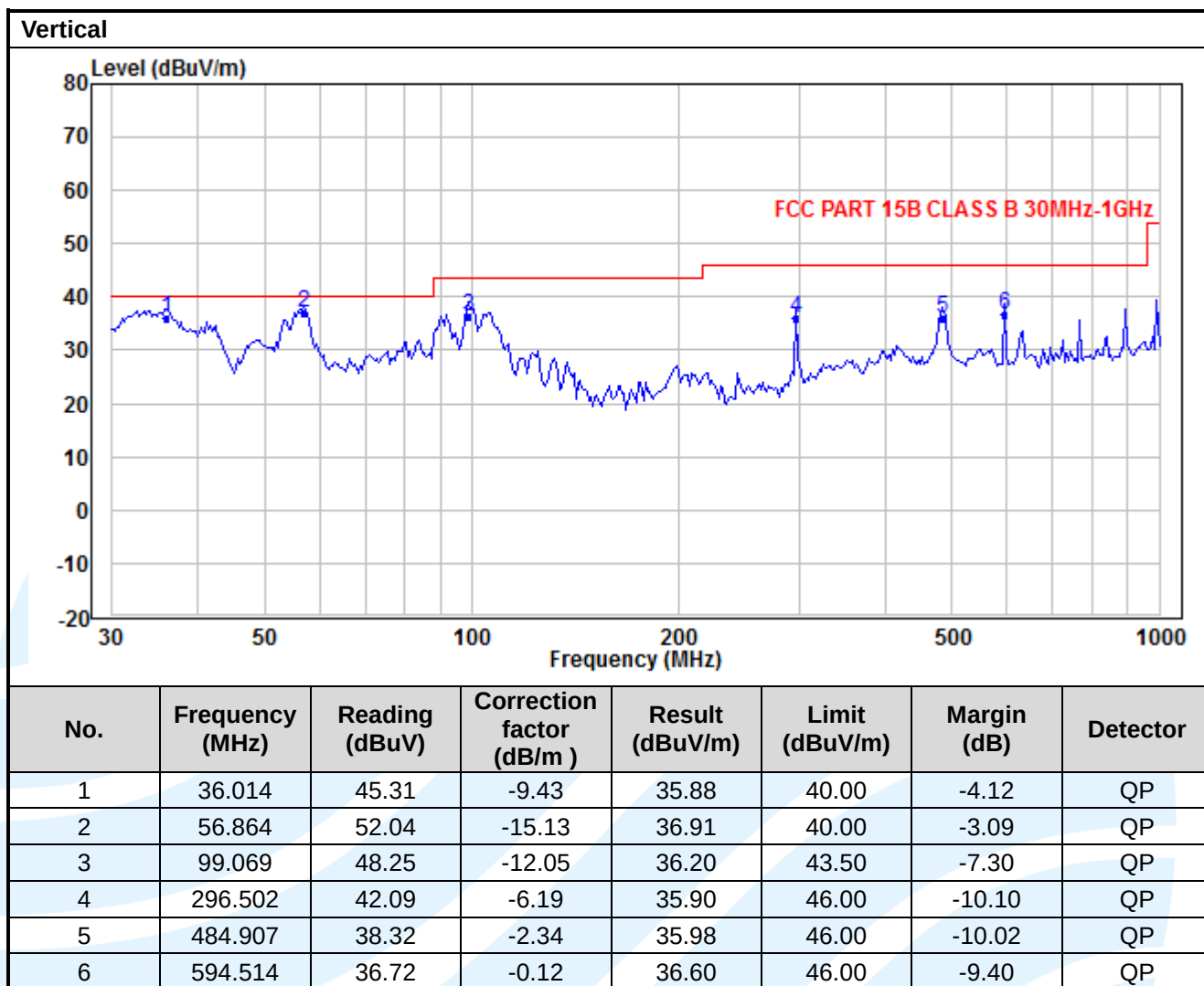
Below 1GHz(Quasi Peak):

TM1

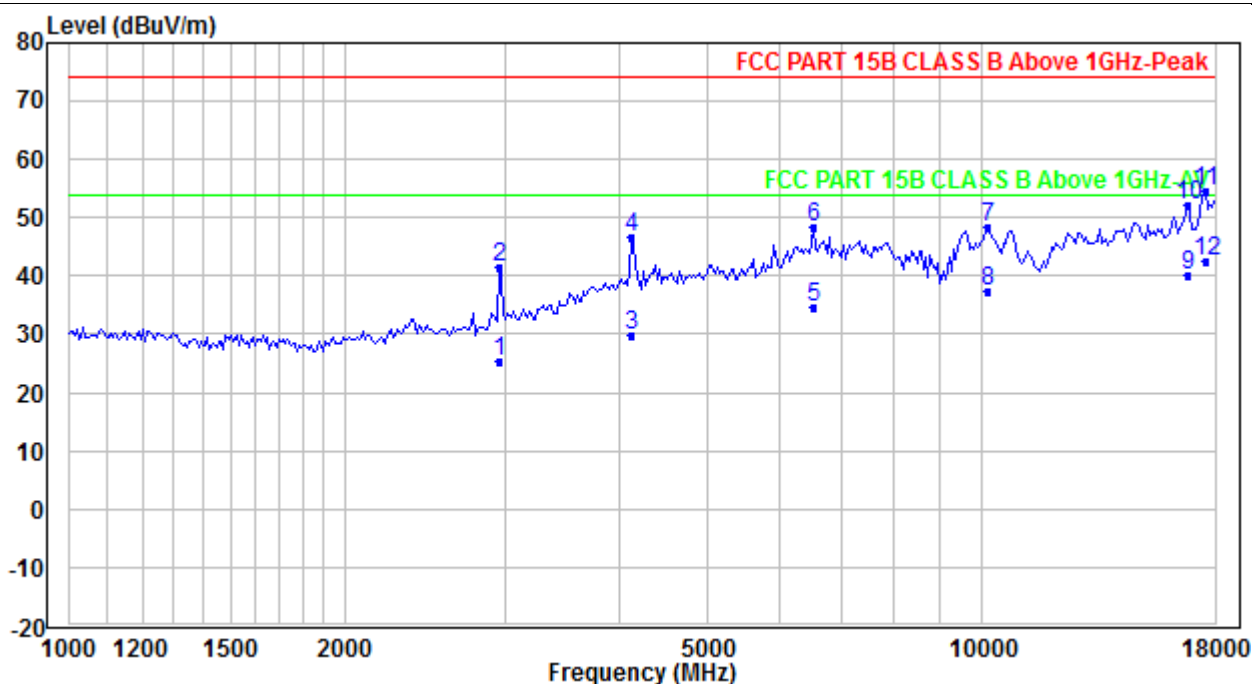
Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	31.735	41.46	-7.38	34.08	40.00	-5.92	QP
2	56.071	45.87	-15.26	30.61	40.00	-9.39	QP
3	106.281	41.18	-11.72	29.46	43.50	-14.04	QP
4	139.791	38.81	-11.71	27.10	43.50	-16.40	QP
5	398.296	34.61	-3.65	30.96	46.00	-15.04	QP
6	594.514	32.50	-0.12	32.38	46.00	-13.62	QP



Above 1GHz(Peak & Average)
TM3
Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2954.015	26.73	-1.39	25.34	54.00	-28.66	AV
2	2954.015	42.73	-1.39	41.34	74.00	-32.66	PK
3	4133.483	26.99	2.80	29.79	54.00	-24.21	AV
4	4133.483	43.99	2.80	46.79	74.00	-27.21	PK
5	6532.007	27.24	7.30	34.54	54.00	-19.46	AV
6	6532.007	41.24	7.30	48.54	74.00	-25.46	PK
7	10144.500	26.65	10.65	37.30	54.00	-16.70	AV
8	10144.500	37.65	10.65	48.30	74.00	-25.70	PK
9	16791.350	26.92	13.23	40.15	54.00	-13.85	AV
10	16791.350	38.92	13.23	52.15	74.00	-21.85	PK
11	17587.750	26.88	15.76	42.64	54.00	-11.36	AV
12	17587.750	38.88	15.76	54.64	74.00	-19.36	PK

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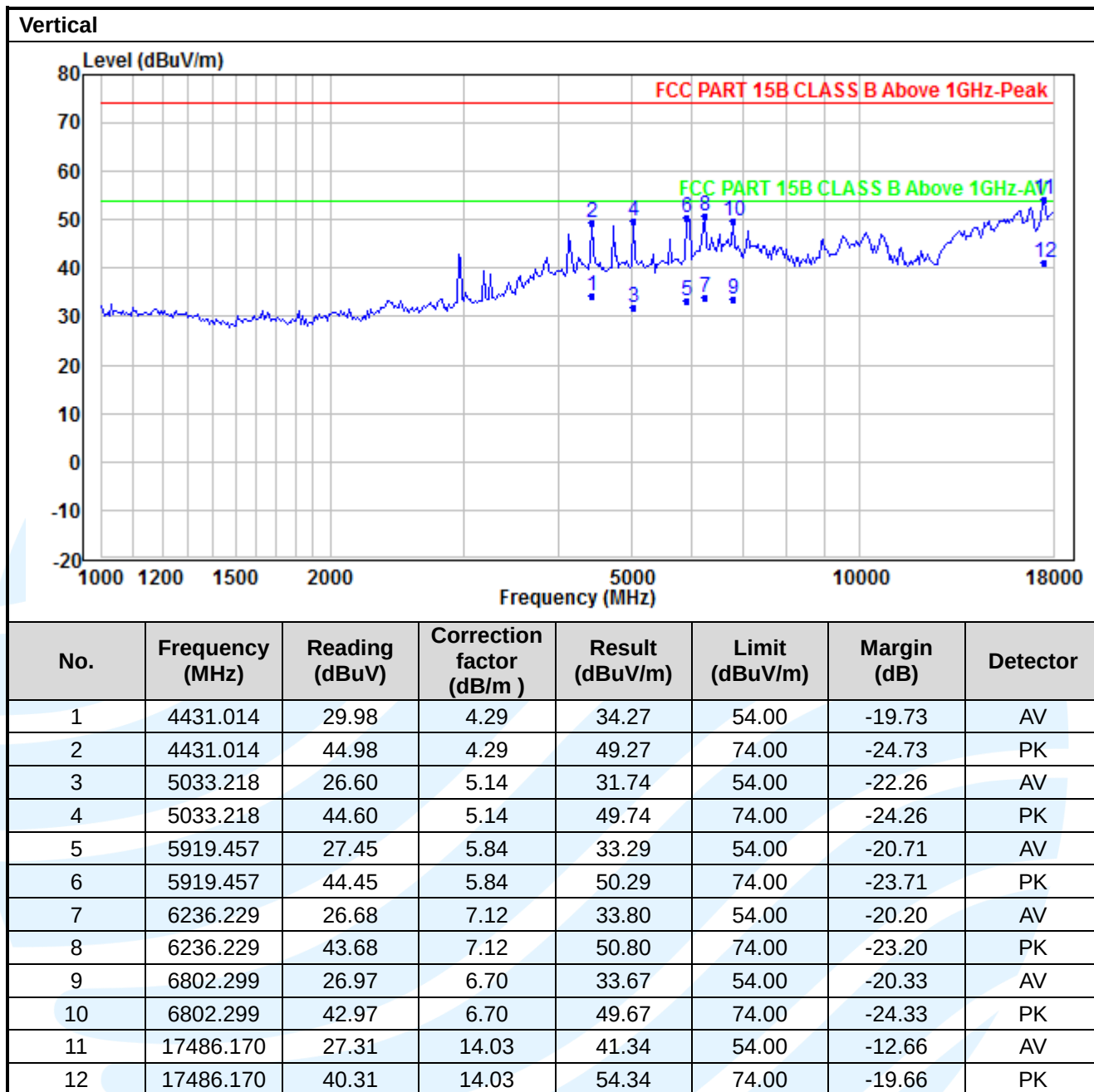
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Remark:

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.

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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.

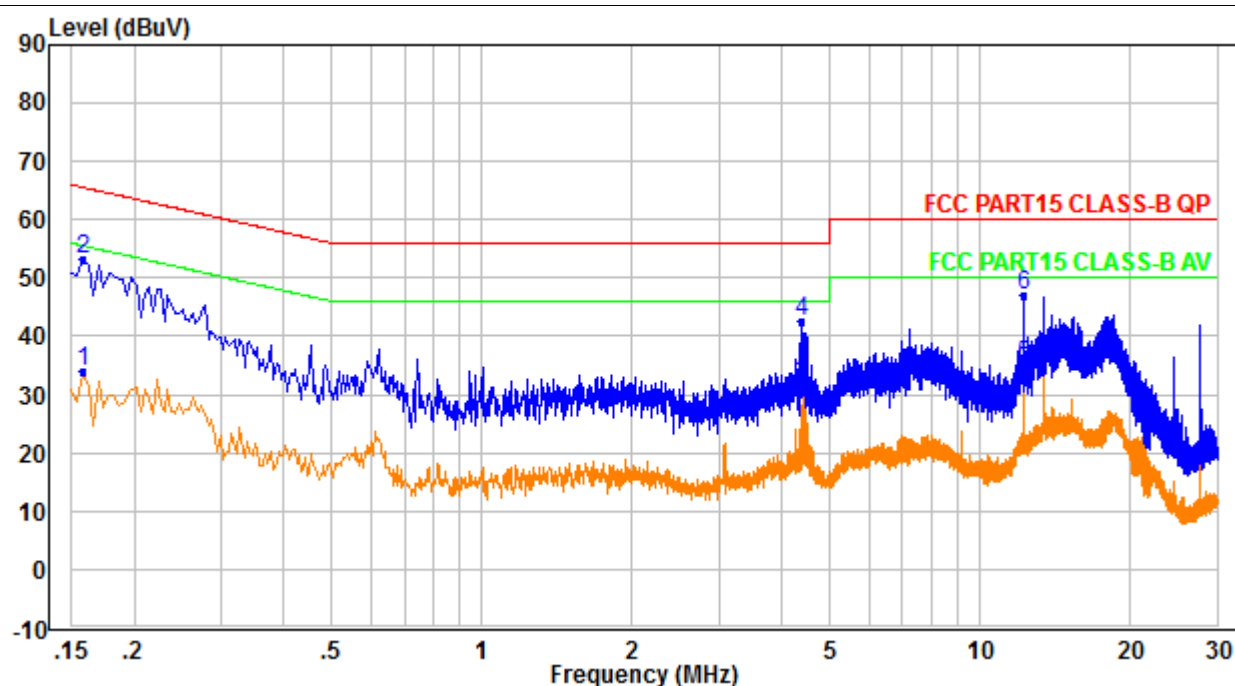
Test Result: Pass

The measurement data as follows:

Quasi Peak and Average:

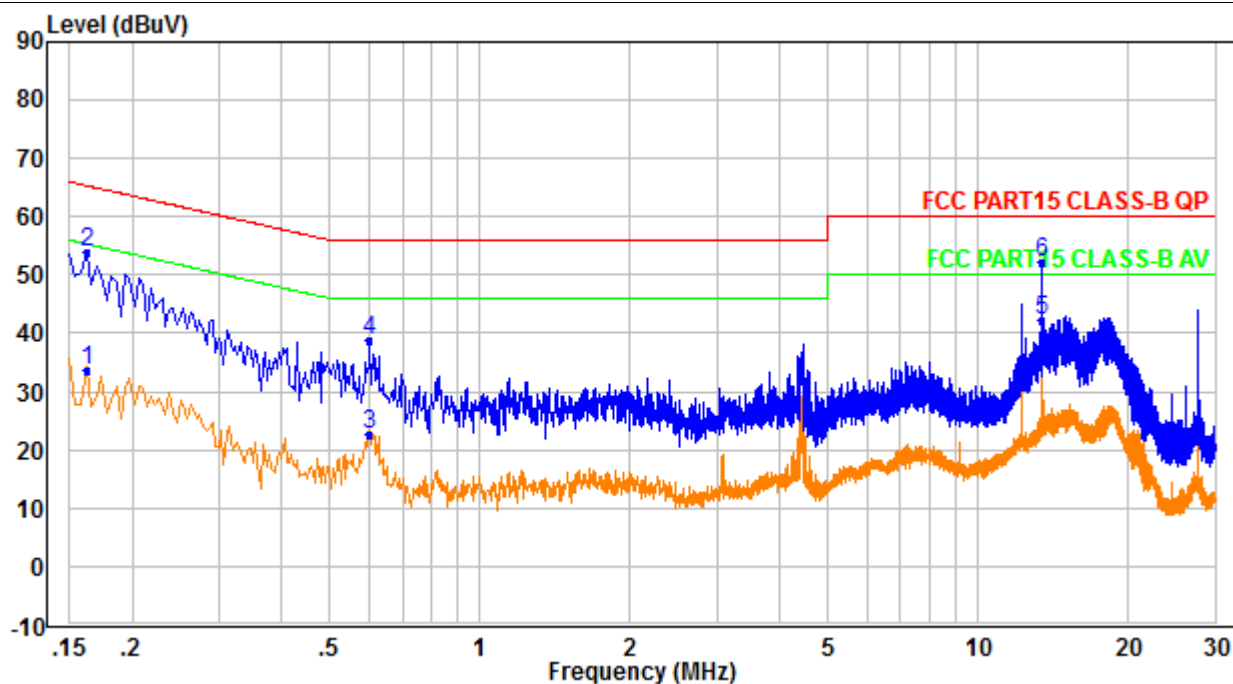
TM1

Live Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.158	24.00	10.03	34.03	55.57	-21.54	Average
2	0.158	43.09	10.03	53.12	65.57	-12.45	QP
3	4.406	21.07	10.56	31.63	46.00	-14.37	Average
4	4.406	32.07	10.56	42.63	56.00	-13.37	QP
5	12.289	22.90	12.18	35.08	50.00	-14.92	Average
6	12.289	34.99	12.18	47.17	60.00	-12.83	QP

Neutral Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.162	23.81	10.00	33.81	55.36	-21.55	Average
2	0.162	43.92	10.00	53.92	65.36	-11.44	QP
3	0.602	12.75	9.99	22.74	46.00	-23.26	Average
4	0.602	28.86	9.99	38.85	56.00	-17.15	QP
5	13.501	29.55	12.55	42.10	50.00	-7.90	Average
6	13.501	39.64	12.55	52.19	60.00	-7.81	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.

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 ***

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