



Certificate #4312.01

FCC & ISED TEST REPORT

Product Name: Module
Trade Mark: CINTERION
Model No. / HVIN: PLS83-W
Add. Model No. / HVIN: N/A
Report Number: 2303164458EMC-1
Test Standards: FCC 47 CFR Part 15 Subpart B
ICES-003 Issue 7
FCC ID: QIPPLS83-W
IC: 7830A-PLS83W
Test Result: PASS
Date of Issue: August 30, 2023

Prepared for:

Telit Cinterion Deutschland GmbH
Siemensdamm 50, 13629 Berlin, Germany

Prepared by:

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August 30, 2023

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Version

Version No.	Date	Description
V1.0	August 30, 2023	Original

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Telit Cinterion Deutschland GmbH
Address of Applicant:	Siemensdamm 50, 13629 Berlin, Germany
Manufacturer:	Telit Cinterion Deutschland GmbH
Address of Manufacturer:	Werinherstr.81, 81541 Munich, Germany

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Module
Model No. / HVIN:	PLS83-W
Add. Model No. / HVIN:	N/A
Trade Mark:	CINTERION
DUT Stage:	Production Unit
Power Supply:	☒ 3.8VDC from Module Test Suite
Classification of digital devices:	Class B
Highest Internal Frequency:	2.6 GHz
Software Version:	02.110 (Provided by the customer)
Hardware Version:	Rev 4.2 (Provided by the customer)
Sample Received Date:	March 13, 2023
Sample Tested Date:	March 22, 2023 to March 29, 2023
Note: There are two SIM types of configurations for this model: one is configured with both SIM and eSIM, and the other is configured with only SIM.	
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

None.

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
Adaptor	N/A	CD139	20359	Applicant
50 ohm terminal	N/A	N/A	N/A	UnionTrust
PCB board	N/A	DSB75	--	Applicant
PCB board	N/A	AH8	--	Applicant

2) Support Cable

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

1.4 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Telephone: +86 (0) 755 2823 0888

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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-26GHz	± 4.6 dB
7	Radiated emission 26GHz-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 ICES-003 Issue 7 Section 3.2.1	ANSI C63.4-2014	PASS
Radiated Emission	FCC 47 CFR Part 15.109 ICES-003 Issue 7 Section 3.2.2	ANSI C63.4-2014	PASS

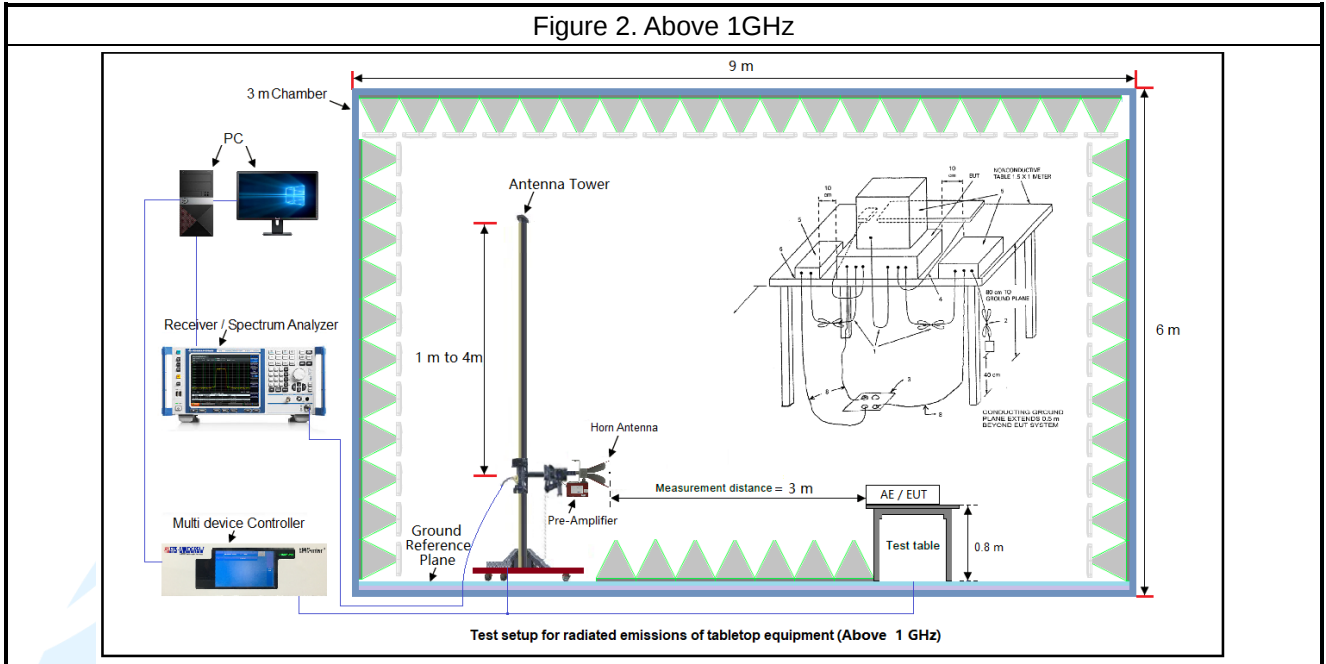


3. EQUIPMENT LIST

Radiated Emission Test - 3M Chamber						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
☒	3m Chamber & Accessory Equipment	ETS-Lindgren	3m	Euroshiedpn-CT001270-1317	22-Jan-2021	21-Jan-2024
☒	Receiver	ROHDE & SCHWARZ	ESIB26	100114	3-Nov-2022	2-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
☒	Pre-amplifier	HP	8447F	2805A02960	1-Nov-2022	31-Oct-2023
☒	Double-Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	00164202	11-Nov-2021	10-Nov-2023
☒	Pre-amplifier	ETS-Lindgren	118385	00201874	1-Nov-2022	31-Oct-2023
☒	Horn Antenna	ETS-LINDGREN	3116C	00200180	17-Apr-2022	16-Apr-2024
☒	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		

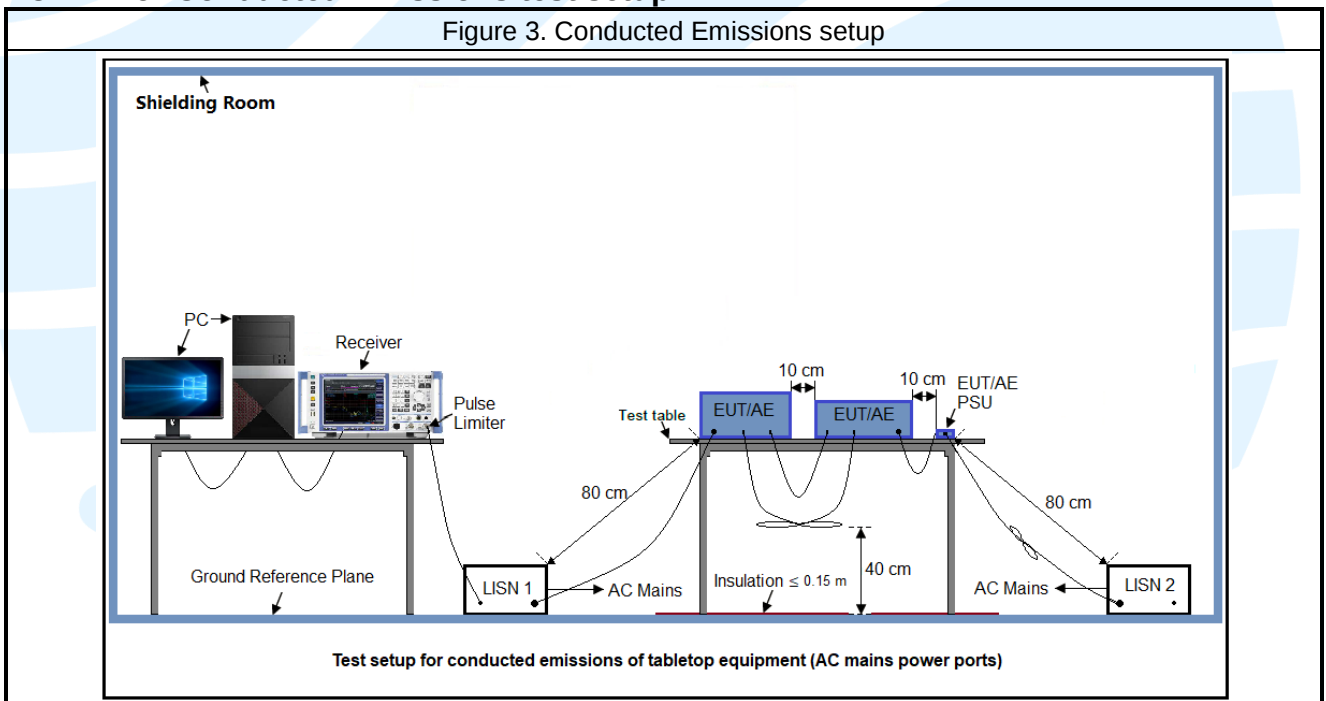
Conducted Emission Test						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
☒	LISN	R&S	ESH2-Z5	860014/024	1-Nov-2022	31-Oct-2023
☒	LISN	ETS-Lindgren	3816/2SH	00201088	1-Nov-2022	31-Oct-2023
☒	Receiver	R&S	ESR7	101181	1-Nov-2022	31-Oct-2023
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	1-Nov-2022	31-Oct-2023
☒	Shielding room	ETS-Lindgren	843	Euroshiedpn-CT001270-1246	5-Nov-2021	4-Nov-2024
☒	Test Software	Audix	e3	Software Version: 9 20151119i		

Figure 2. Above 1GHz



4.3.2 For Conducted Emissions test setup

Figure 3. Conducted Emissions setup



4.4 SYSTEM TEST CONFIGURATION

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000MHz. The resolution is 1 MHz or greater for frequencies above 1000MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic (according to KDB 896810 D02 SDoC FAQ v01r01) of the highest fundamental frequency or to 40 GHz, whichever is lower.

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5. REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part15 Subpart B	Unintentional Radiators
2	ICES-003 Issue 7	Information Technology Equipment (Including Digital Apparatus)
3	ANSI C63.4-2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
4	KDB 174176 D01 Line Conducted FAQ v01r01	AC power-line conducted emission frequency asked questions
5	KDB 896810 D02 SDoC FAQ v01r02	Supplier's Declaration of Conformity frequency asked questions

6. EMC REQUIREMENTS SPECIFICATION

6.1 RADIATED EMISSION

Test Requirement: FCC 47 CFR Part 15.109
ICES-003 Issue 7 Clause 3.2.2

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

FCC 47 CFR Part 15 Subpart B

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

ICES-003 Issue 7

Frequency (MHz)	limits at 3m (dBμV/m)		
	QP Detector	PK Detector	AV Detector
30 – 88	40.0	--	--
88 – 216	43.5	--	--
216 – 230	46.0		

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230 – 960	47.0	--	--
960 – 1000	54.0	--	--
Above 1000	--	74.0	54.0

Remark:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dB μ V/m) = 20 log Emission level (μ V/m).
3. 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:

- 1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
- 2) 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.
- 3) 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:

- 1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
- 2) 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 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

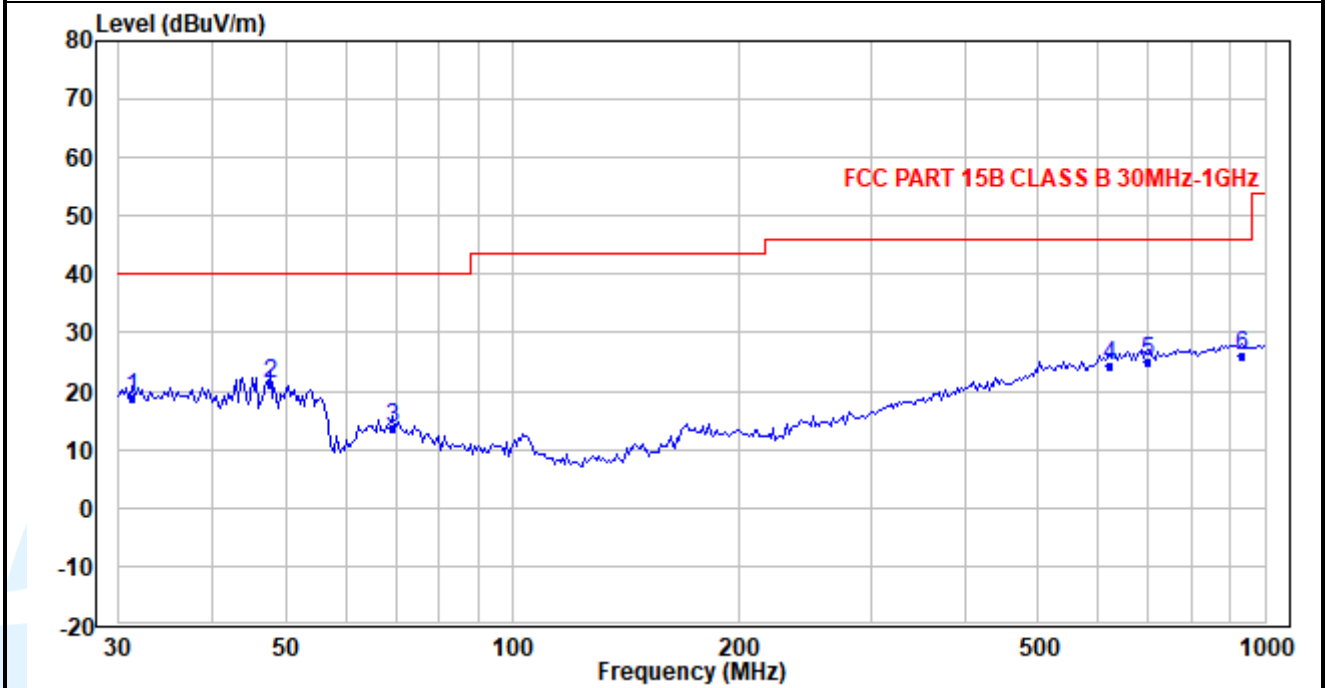
The measurement data as follows:

The measurement data for FCC 47 CFR Part 15 Subpart B as follows:

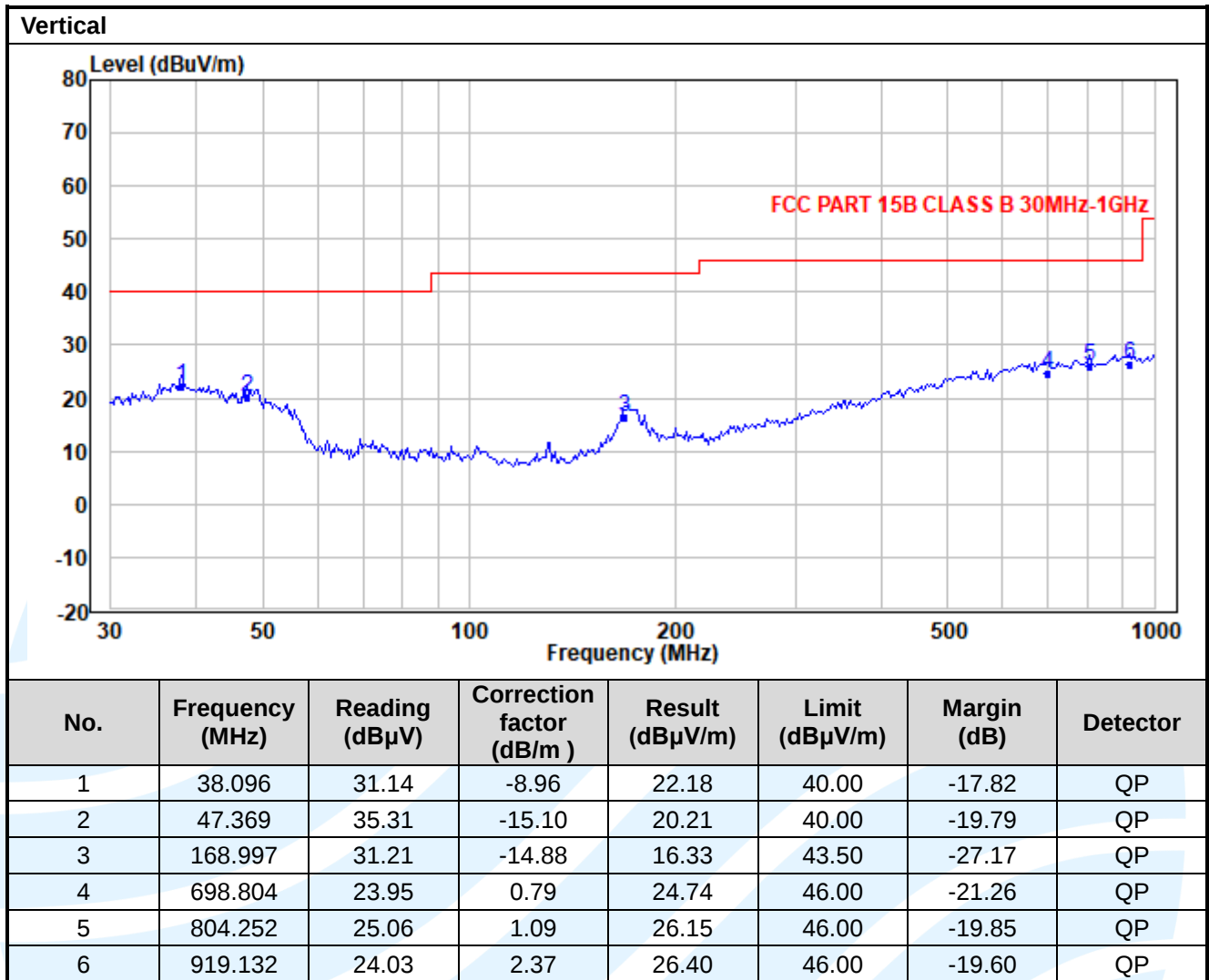
Below 1GHz (Quasi Peak):

Mode1

Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	31.292	26.51	-7.65	18.86	40.00	-21.14	QP
2	47.703	36.66	-15.49	21.17	40.00	-18.83	QP
3	69.230	32.86	-19.22	13.64	40.00	-26.36	QP
4	620.117	24.70	-0.45	24.25	46.00	-21.75	QP
5	698.804	24.40	0.79	25.19	46.00	-20.81	QP
6	932.141	23.46	2.66	26.12	46.00	-19.88	QP

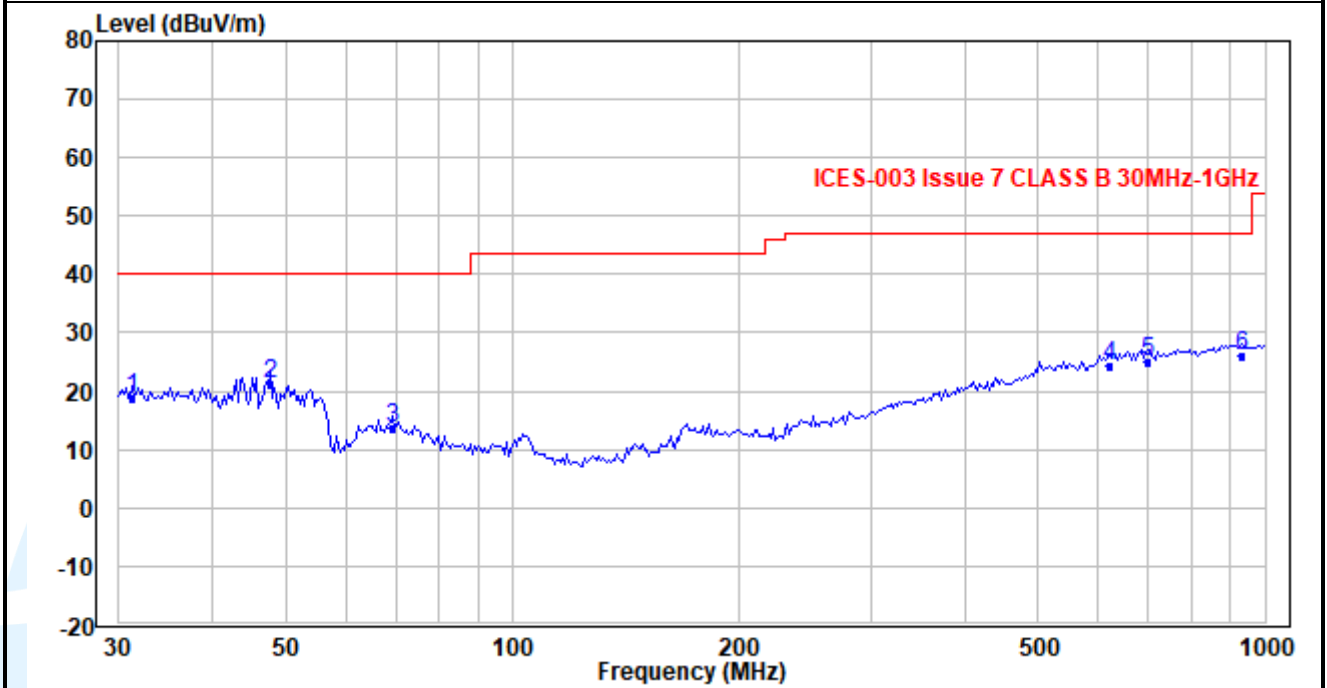


The measurement data for ICES-003 Issue 7 as follows:

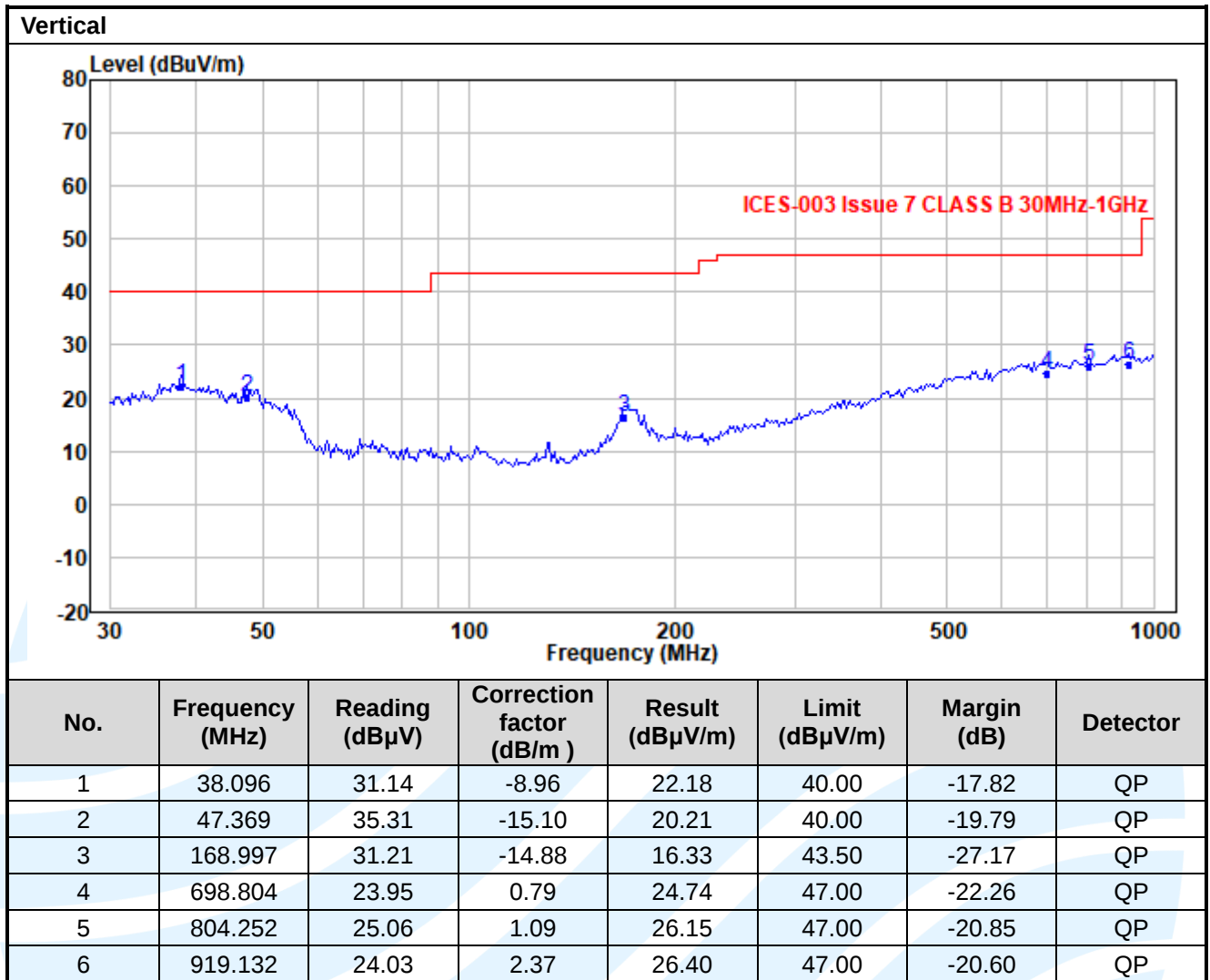
Below 1GHz (Quasi Peak):

Mode1

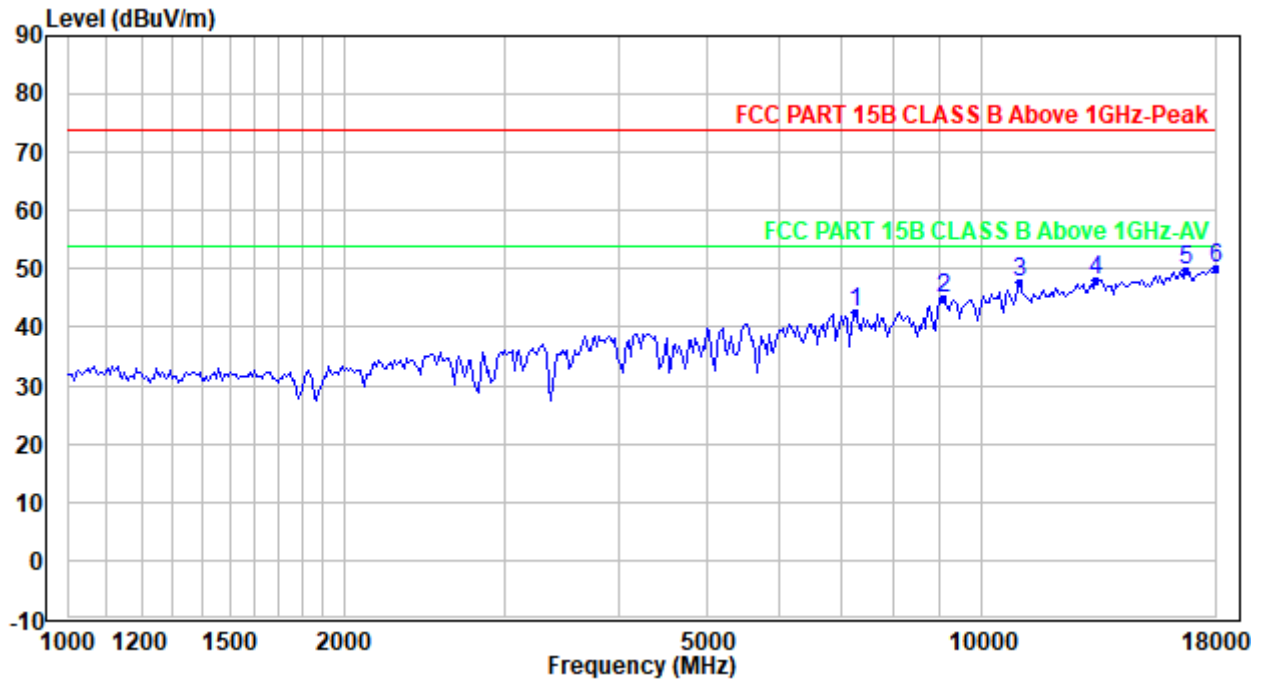
Horizontal



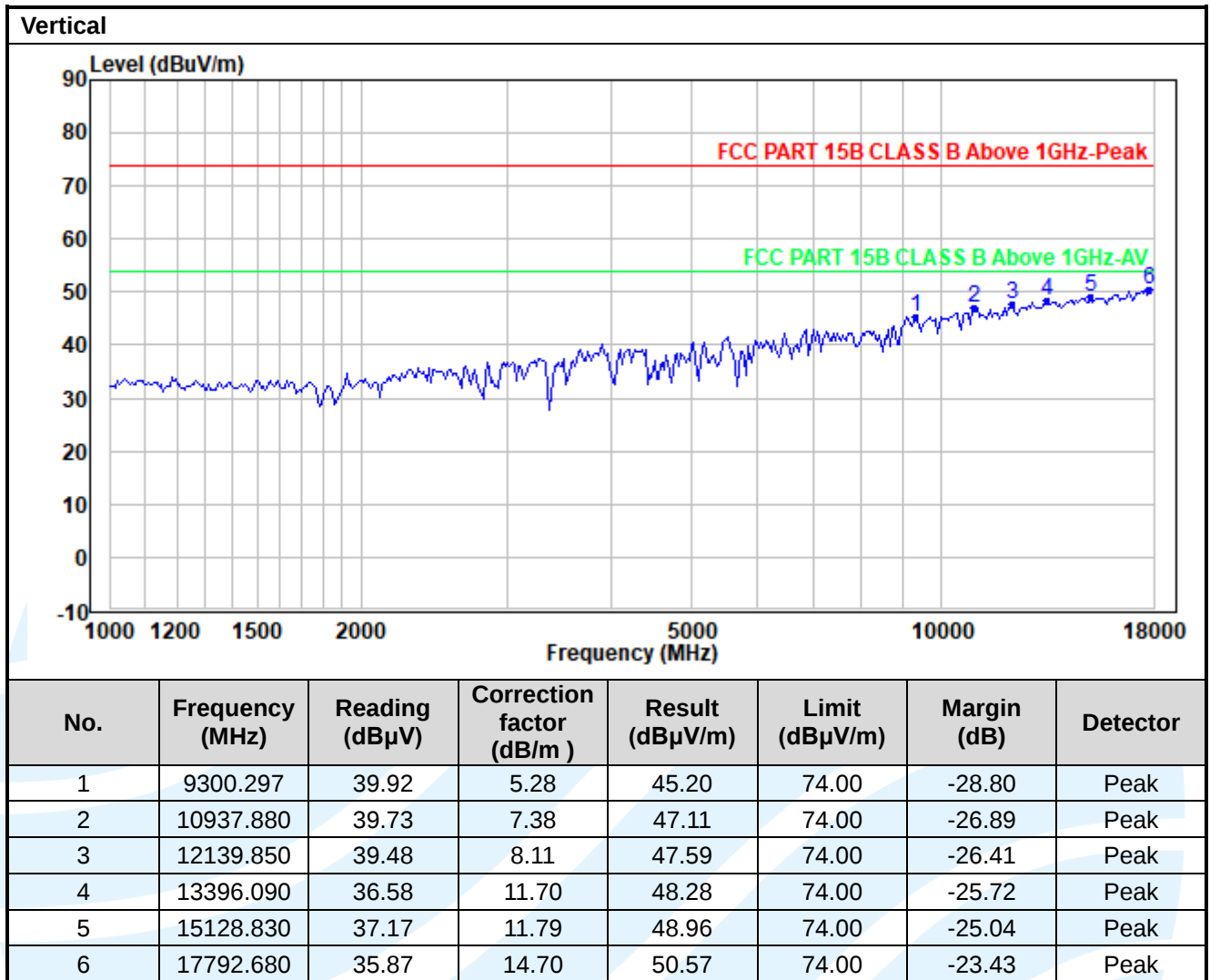
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	31.292	26.51	-7.65	18.86	40.00	-21.14	QP
2	47.703	36.66	-15.49	21.17	40.00	-18.83	QP
3	69.230	32.86	-19.22	13.64	40.00	-26.36	QP
4	620.117	24.70	-0.45	24.25	47.00	-22.75	QP
5	698.804	24.40	0.79	25.19	47.00	-21.81	QP
6	932.141	23.46	2.66	26.12	47.00	-20.88	QP



Above 1GHz (Peak & Average)
Mode4
Horizontal



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	7249.817	41.05	1.64	42.69	74.00	-31.31	Peak
2	9087.293	39.82	5.11	44.93	74.00	-29.07	Peak
3	11001.420	40.10	7.52	47.62	74.00	-26.38	Peak
4	13318.720	36.65	11.47	48.12	74.00	-25.88	Peak
5	16694.370	37.30	12.42	49.72	74.00	-24.28	Peak
6	18000.000	34.78	15.41	50.19	74.00	-23.81	Peak



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, 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
ICES-003 Issue 7 Section 3.2.1

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.

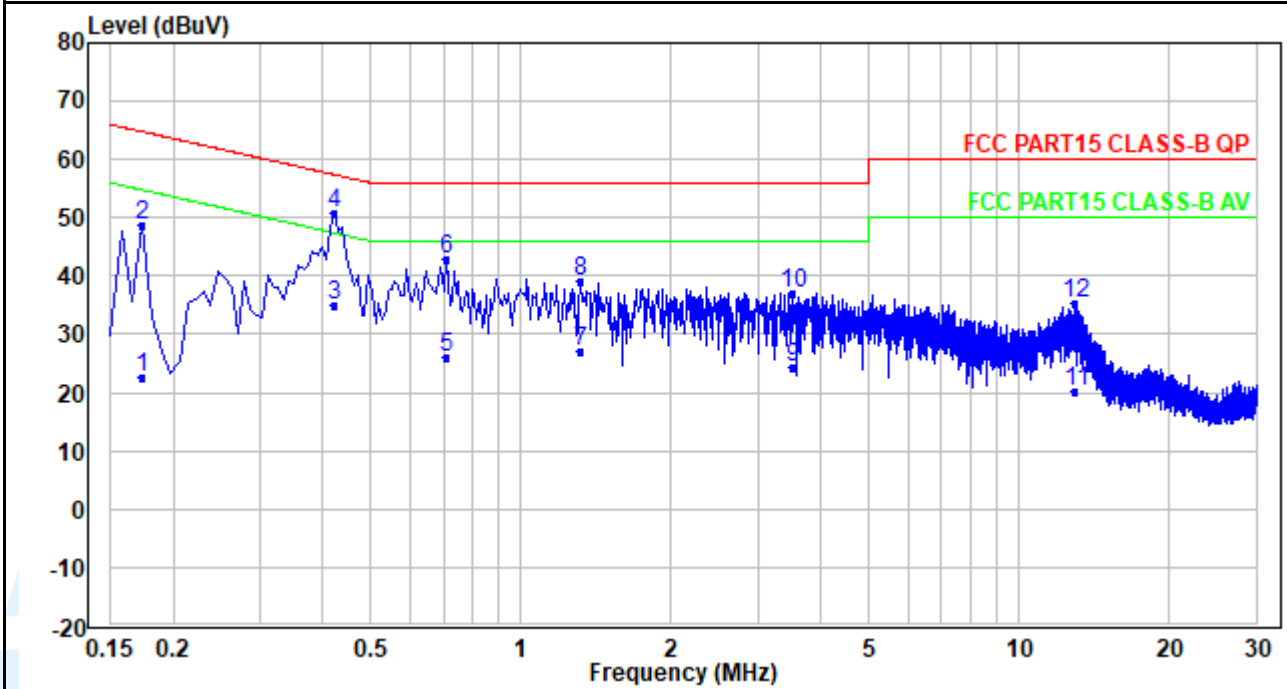
Test Result: Pass

The measurement data as follows:

Quasi Peak and Average:

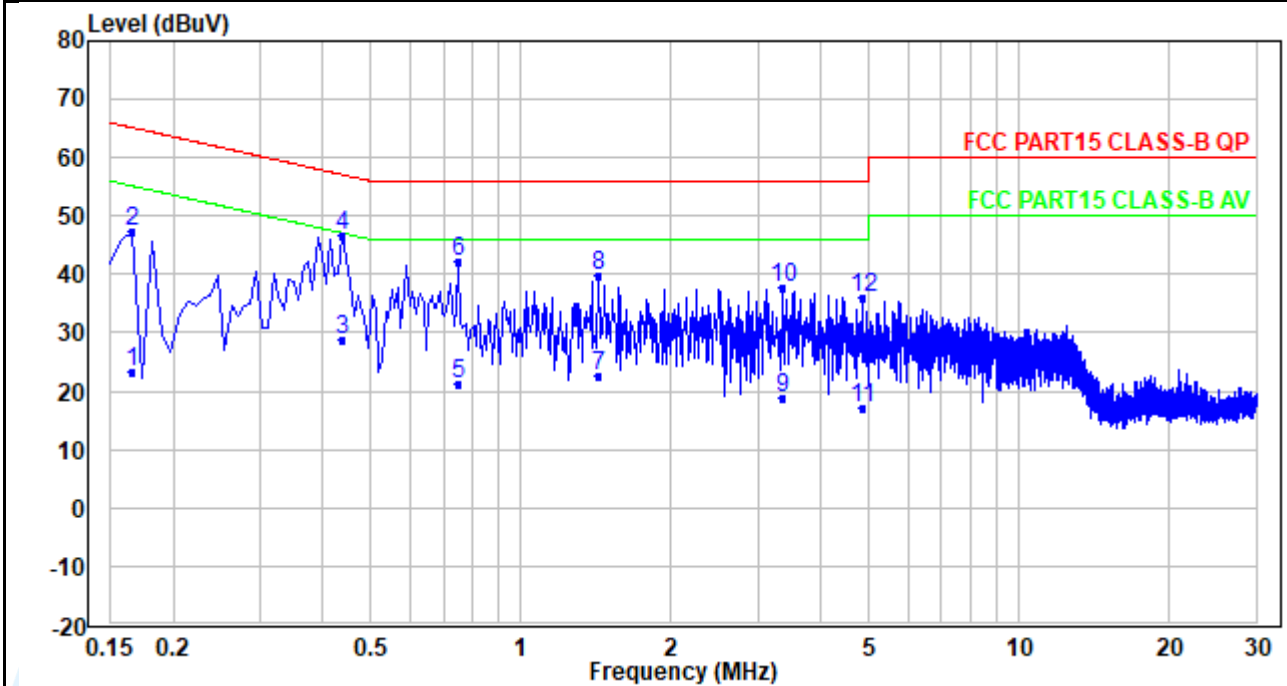
Mode 4

Live Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.174	12.64	10.03	22.67	54.77	-32.10	Average
2	0.174	38.64	10.03	48.67	64.77	-16.10	QP
3	0.422	24.79	10.04	34.83	47.41	-12.58	Average
4	0.422	40.79	10.04	50.83	57.41	-6.58	QP
5	0.710	15.91	10.05	25.96	46.00	-20.04	Average
6	0.710	32.91	10.05	42.96	56.00	-13.04	QP
7	1.318	17.01	10.09	27.10	46.00	-18.90	Average
8	1.318	29.01	10.09	39.10	56.00	-16.90	QP
9	3.525	13.96	10.24	24.20	46.00	-21.80	Average
10	3.525	26.96	10.24	37.20	56.00	-18.80	QP
11	13.027	9.57	10.71	20.28	50.00	-29.72	Average
12	13.027	24.57	10.71	35.28	60.00	-24.72	QP

Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.166	13.32	10.02	23.34	55.16	-31.82	Average
2	0.166	37.32	10.02	47.34	65.16	-17.82	QP
3	0.438	18.64	10.02	28.66	47.10	-18.44	Average
4	0.438	36.64	10.02	46.66	57.10	-10.44	QP
5	0.750	11.25	10.04	21.29	46.00	-24.71	Average
6	0.750	32.25	10.04	42.29	56.00	-13.71	QP
7	1.438	12.55	10.07	22.62	46.00	-23.38	Average
8	1.438	29.55	10.07	39.62	56.00	-16.38	QP
9	3.365	8.57	10.21	18.78	46.00	-27.22	Average
10	3.365	27.57	10.21	37.78	56.00	-18.22	QP
11	4.861	6.72	10.32	17.04	46.00	-28.96	Average
12	4.861	25.72	10.32	36.04	56.00	-19.96	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, 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.
