



Test Report

Electromagnetic Compatibility


Product	DECT Handset
Name and address of the applicant	Panasonic Corporation of North America Two Riverfront Plaza, 9th Floor Newark, 07102-5490, NJ, USA
Name and address of the manufacturer	Panasonic Entertainment & Communication Co., Ltd. 1-10-12 Yagumo-higashi-machi, Moriguchi City Osaka 570-0021, Japan
Model	KX-TGDA86 / KX-TGDA83 / KX-TGDA50 / KX-TGDA51 / KX-TGDA52 / KX-TGFA85 KX-TGDA87AC / KX-TGDA85AC / KX-TGDA59AC / KX-TGDA58AC / KX-TGDA57AC / KX-TGFA87AC
Rating	2.4VDC (2x AAA NiMH cells)
Trademark	Panasonic
Additional information	DECT 6.0
Tested according to	FCC CFR 47 Subpart 15B ISED Canada ICES-003, Issue 7
Order number	484032
Tested in period	2022-10-06 to 2022-10-07
Issue date	2023-01-11
Name and address of the testing laboratory	Nemko Scandinavia AS Philip Pedersens vei 11, 1366 Lysaker, Norway

An accredited technical test executed under the Norwegian accreditation scheme



Prepared by [Kristian Osvoll]



Approved by [Frode Sveinsen]

REPORT REVISIONS

Revision #	Date	Order #	Description
00	2023-01-11	484032	First issued



THIS REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATION(S) TESTED.

It is the manufacturer's responsibility to assure the additional production units of this product are manufactured with identical electrical and mechanical components. The manufacturer is responsible to the authorities for any modifications made to the product, which result in non-compliance to the relevant regulations.

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Opinions expressed within this report regarding general assessments and qualifications for PASS or FAIL to the standards limits and requirements, are not part of the current accreditation. Neither is opinions expressed regarding model variants covered by the testing performed in this report.

Deviations from, additions to, or exclusions from the test specifications are described in "Test Report Summary".

This report was originally distributed electronically with digital signatures. For more information contact Nemko.

DESCRIPTION OF TESTED ITEM(S)

Product description..... :	DECT Handset with desktop charger. Both handsets are identical.
Model/type..... :	KX-TGDA86
Serial number..... :	4840320009
Identical models..... :	KX-TGDA86 / KX-TGDA83 / KX-TGDA50 / KX-TGDA51 / KX-TGDA52 / KX-TGFA85 KX-TGDA87AC / KX-TGDA85AC / KX-TGDA59AC / KX-TGDA58AC / KX-TGDA57AC / KX-TGFA87AC
Operating voltage..... :	2.4VDC (2x AAA NiMH cells)
Maximum power/current..... :	/
Insulation class..... :	III
Highest clock frequency..... :	/
Hardware version..... :	/
Software version..... :	/
Mounting position..... :	<input checked="" type="checkbox"/> Table top equipment <input type="checkbox"/> Wall/ceiling mounted equipment <input type="checkbox"/> Floor standing equipment <input type="checkbox"/> Handheld equipment <input type="checkbox"/> Rack mounted equipment <input type="checkbox"/> Console equipment <input type="checkbox"/> Other:

ACCESSORIES USED DURING TEST

Description	Manufacturer	Type
Desktop charger	Panasonic	KX-TGD860
Desktop charger	Panasonic	PNLC1077
Adapter (KX-TGD860)	Panasonic	PNLV226 UC
Adapter (PNLC1077)	Panasonic	PNLV233 UC
Adapter (PNLC1077)	Panasonic	PNLV233 YJ
Adapter (PNLC1077)	Panasonic	PNLV233 ZC
Adapter (PNLC1077)	Panasonic	PNLV233 2A

INPUT/OUTPUT PORTS

Port name and description	Cable		
	Longer than 3m	Attached during test	Shielded
AC mains supply	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

OPERATING MODES

OP no.	Description	Applied for testing	
		Emissions	Immunity
OP1	Charging	<input checked="" type="checkbox"/>	<input type="checkbox"/>

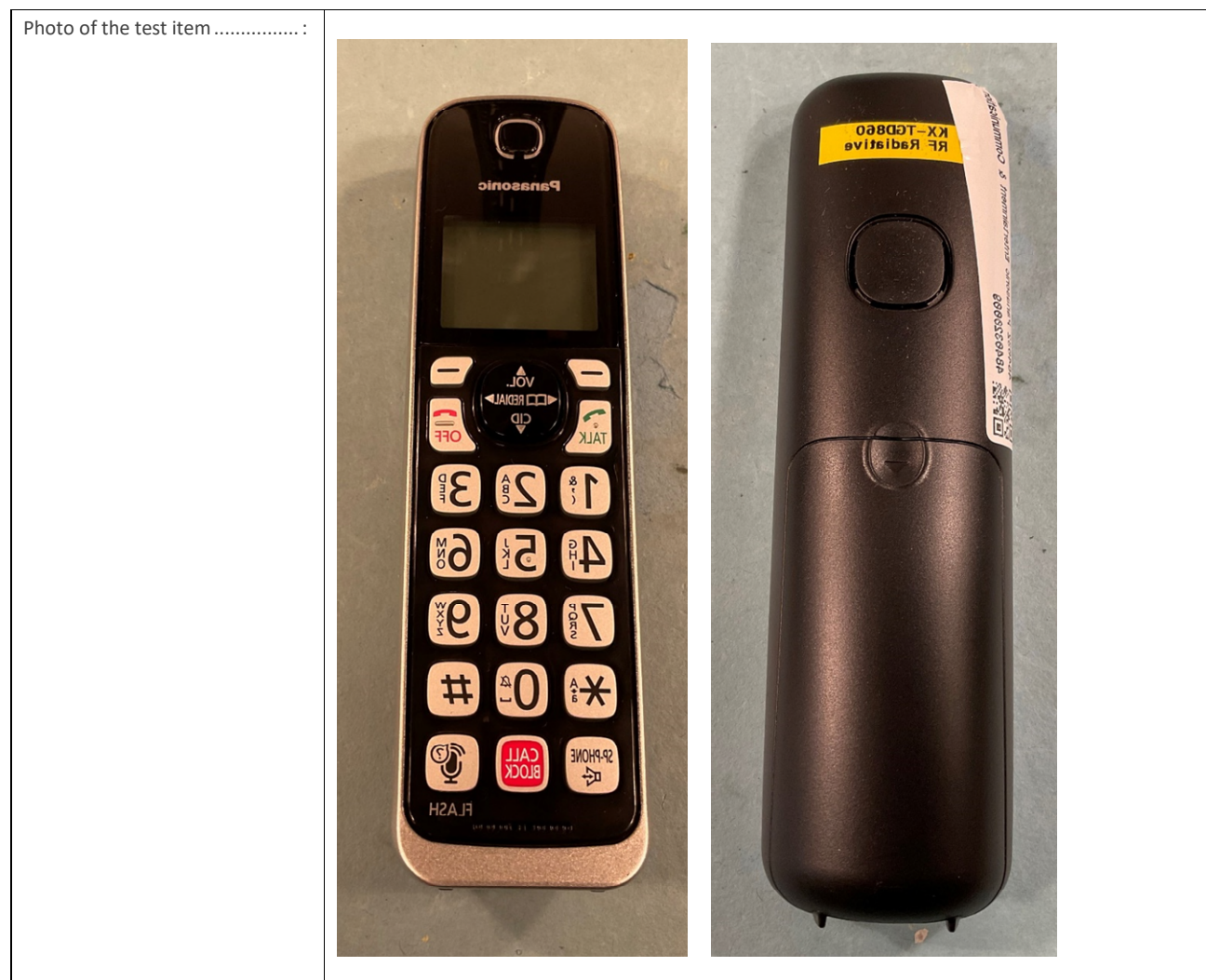
POWER SUPPLY CONDITIONS

The following nominal power supply conditions have been tested:

PC no.	Voltage	Frequency	Type	Ground terminal
PC1	120 V	<input type="checkbox"/> AC 50Hz / <input checked="" type="checkbox"/> AC 60Hz / <input type="checkbox"/> DC	<input type="checkbox"/> 3AC / <input type="checkbox"/> 3ACN / <input type="checkbox"/> PoE	<input type="checkbox"/> PE / <input type="checkbox"/> GND / <input checked="" type="checkbox"/> None

- ☐ The power supply voltage has been selected after a maximum disturbance investigation over the product's rated voltage range.
- ☐ Additional chassis grounding was applied.

PHOTOS AND DRAWINGS




OTHER INFORMATION

Modifications	None
Additional information	None

Note: This equipment has been tested with certain cable types and cable configurations. Any changes to these parameters when installed may influence on the EMC properties of this equipment.

TEST ENVIRONMENT

Test laboratory	<input checked="" type="checkbox"/> KJELLER (Instituttveien 6, N-2007 Kjeller, Norway) <input type="checkbox"/> LYSAKER (Philip Pedersens vei 11, N-1366 Lysaker, Norway)						
Laboratory accreditation	 Norsk Akkreditering – TEST 033 P06 – Electromagnetic Compatibility						
Environmental conditions	<p>The climatic conditions during the tests are within limits specified by the manufacturer for the operation of the product and the test equipment.</p> <p>The climatic conditions during tests are within the following limits:</p> <table> <tr> <td>Ambient temperature:</td><td>15 – 35 °C</td></tr> <tr> <td>Relative humidity:</td><td>25 – 75 %RH</td></tr> <tr> <td>Atmospheric pressure:</td><td>86 – 106 kPa</td></tr> </table> <p>If explicitly required by the test standard, or the requirements are tighter than the above; the climatic conditions are recorded and documented separately in this test report.</p>	Ambient temperature:	15 – 35 °C	Relative humidity:	25 – 75 %RH	Atmospheric pressure:	86 – 106 kPa
Ambient temperature:	15 – 35 °C						
Relative humidity:	25 – 75 %RH						
Atmospheric pressure:	86 – 106 kPa						
Calibration	<p>All instruments used in the tests of this test report are calibrated and traceable to national or international standards. Between calibrations test set-ups are controlled and verified on a regular basis by intermediate checks to ensure, with 95% confidence that the instruments remain within their calibrated levels.</p> <p>The instrumentation accuracy is within limits agreed by the IECEE/CTL and defined by Nemko.</p>						
Measurement uncertainties	<p>Uncertainty in EMC emission measurements stated in this report are calculated from the standard measurement uncertainties multiplied by the coverage factor $k=2$. It was determined in accordance with CISPR 16-4-2. The true value is in the corresponding interval with a probability of 95%.</p> <p>Uncertainties for continuous immunity tests are calculated based on the same principles as for EMC emission uncertainties.</p> <p>For Harmonics and Flicker measurements the measurement uncertainty is calculated based on the same principles as for EMC emission uncertainties.</p> <p>Uncertainties for transient immunity are kept within the requirements of the relevant basic standard.</p> <p><i>Further information about measurement uncertainties is provided on request.</i></p>						
Decision rules	<p>As specified by CISPR 16-4-2; if our measurement uncertainty U_{LAB} is less than or equal to U_{CISPR}, compliance is deemed to occur if no measured disturbance level exceeds the limit hence "PASS" is indicated, and non-compliance is deemed to occur if any measured disturbance level exceeds the limits hence "FAIL" is indicated.</p> <p>For continuous immunity tests, uncertainties are not considered when applying the calibrated test levels. Tests are performed at the test levels specified by the test standard. PASS and FAIL decisions are based on behaviour observations of the specimen.</p> <p>For transient immunity tests, uncertainties are not considered if the test equipment is kept within the requirements of the relevant basic standard. Tests are performed at the test levels specified by the test standard. PASS and FAIL decisions are based on behaviour observations of the specimen.</p> <p>For Harmonics and Flicker measurements the measurement uncertainty is considered, and measurements are marked if necessary. In doing so, the associated uncertainty of measurement has been considered.</p> <p><i>Further information about decision rules is provided on request.</i></p>						

TEST REPORT SUMMARY

APPLIED STANDARDS

Standards	Titles
FCC CFR 47 Subpart 15B	<i>Digital devices - Unintentional radiators, Class B Digital Device</i>
ISED Canada ICES-003, Issue 7	<i>Spectrum Management and Telecommunications Policy. Interference-Causing Equipment Standard. Information Technology Equipment (Including Digital Apparatus - Limits and Methods of Measurement (Issue 7, June 2020)</i>

TEST SUMMARY

Requirements – Tests	Reference standards	Verdict
Conducted Emissions	FCC CFR 47 Subpart 15B ISED Canada ICES-003, Issue 7:0 FCC Part 12.107 per ANSI C63.4-2014	PASS
Radiated Emissions (Below 1GHz)	FCC CFR 47 Subpart 15B ISED Canada ICES-003, Issue 7:0 FCC Part 12.109 per ANSI C63.4-2014	PASS
Radiated Emissions (Above 1GHz)	FCC CFR 47 Subpart 15B ISED Canada ICES-003, Issue 7:0 FCC Part 12.109 per ANSI C63.4-2014	N/A

- PASS : Tested and complied with the requirements
 FAIL : Tested and failed the requirements
 N/A : Test not relevant to this specimen (evaluated by the test laboratory)
 – : Test not performed (instructed by the applicant)
 * : An asterisk (*) placed after the verdict in the Result column indicates test items that are not within Nemko's scope of accreditation
 # : A grid (#) placed after the verdict in the Result column indicates test items that are only partly covered by Nemko's scope of accreditation. Further information is detailed in the test section

NOTES

Note 1: Product standards with dated references to basic standards may have been performed by Nemko AS according to the newest edition of the basic standard. This may impact the compliance criteria or technical performance of the test, still this is adequate as long as the test is expected to confirm compliance to the intention of the product standard. The table above lists the actual editions of the basic standards which have been used during testing.

Note 2: The choice of immunity test levels could be higher than those specified by the reference standards when we consider the nature of the specimen and its intended use or based on customer requests.

Test Results

CONDUCTED EMISSIONS

TEST DESCRIPTION

Method

The reference method for this test is listed in the table under clause TEST SUMMARY.

Set-up

The measurement was performed at the power supply terminal of the specimen. Nominal supply voltage was provided. The specimen was energized and in normal operating mode during the measurement.

- ☐ The specimen and its cables were elevated 10 cm above a ground plane.
- ☐ The specimen and its cables were elevated 40 cm above a ground plane.
- ☒ The specimen and its cables were placed 40 cm from a vertical ground plane, 80 cm over ground plane.
- ☐ The specimen was mounted directly on, and bonded to a ground plane. Cables and auxiliary equipment were elevated by 1 cm

- ☒ The specimen was connected to an Artificial Mains Network (AMN) by a power supply cable, which was adjusted to 100cm.
- ☐ The specimen was connected to an Artificial Mains Network (AMN) by a 0.8 m shielded power supply cable directly connected to the AMN

Conditions

- ☐ Frequency range was 9kHz – 30MHz.
- ☐ Frequency range was 10kHz – 30MHz.
- ☒ Frequency range was 150kHz – 30MHz.

The measuring bandwidth is 200Hz in the frequency range 9 kHz – 150 kHz. Measurement was made with a 100 Hz step size and 100 ms dwell time.

The measuring bandwidth is 9 kHz in the frequency range 150 kHz – 30 MHz. Measurement was made with a 4.5 kHz step size and 20 ms dwell time.

Measurement uncertainty: ± 3.7 dB (9 kHz – 150 kHz); ± 3.3 dB (150 kHz – 30 MHz)

Instruments used during measurement

Instrument list: [AMN: R&S / ENV216 \(LR-1665\) \(11/2023\)](#)
[EMI Receiver: R&S / ESCI 3 \(N-4259\) \(10/2023\)](#)

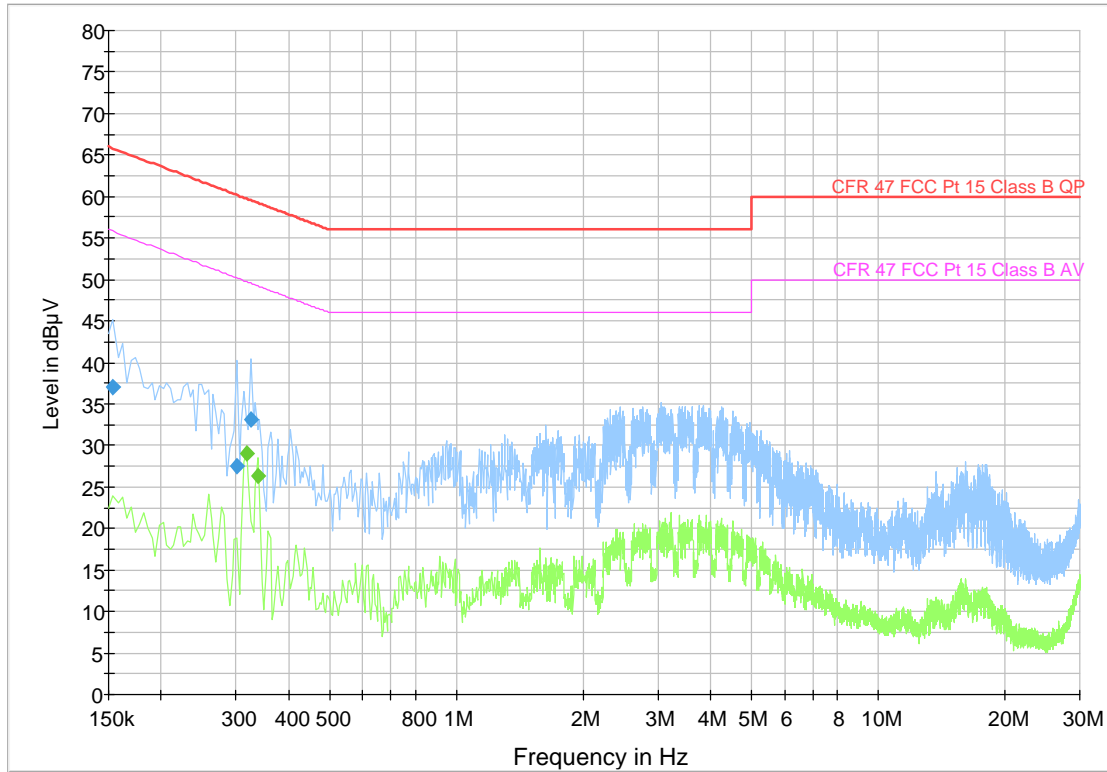
Conformity

Verdict: **PASS**

Test engineer: **K Osvoll**

EMISSION SPECTRUM – BASE KXTGD860 AND ADAPTOR PNLV226 UC

Full Spectrum

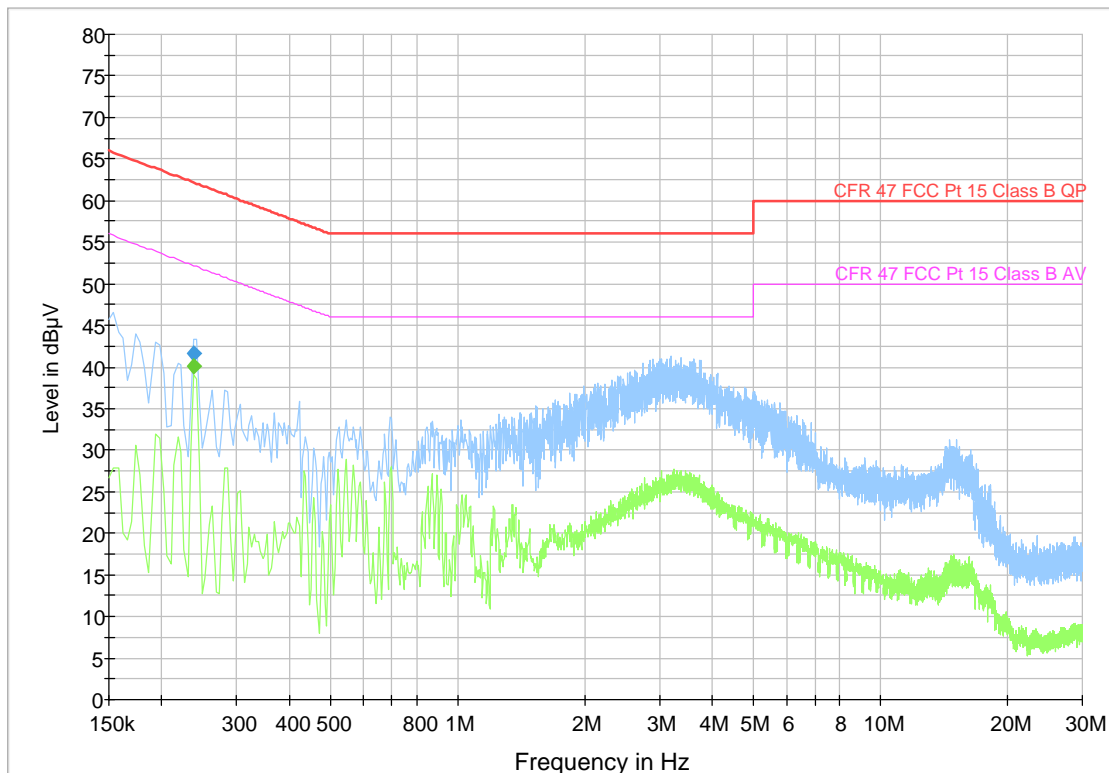


MEASUREMENT DATA

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.154000	37.01	---	65.78	28.77	15000.0	9.000	L1	9.7
0.302000	27.48	---	60.19	32.71	15000.0	9.000	N	9.7
0.318000	---	29.10	49.76	20.66	15000.0	9.000	N	9.7
0.326000	33.21	---	59.55	26.35	15000.0	9.000	N	9.7
0.338000	---	26.32	49.25	22.93	15000.0	9.000	N	9.6

EMISSION SPECTRUM – BASE PNLC1077 AND ADAPTOR PNLV233 UC

Full Spectrum

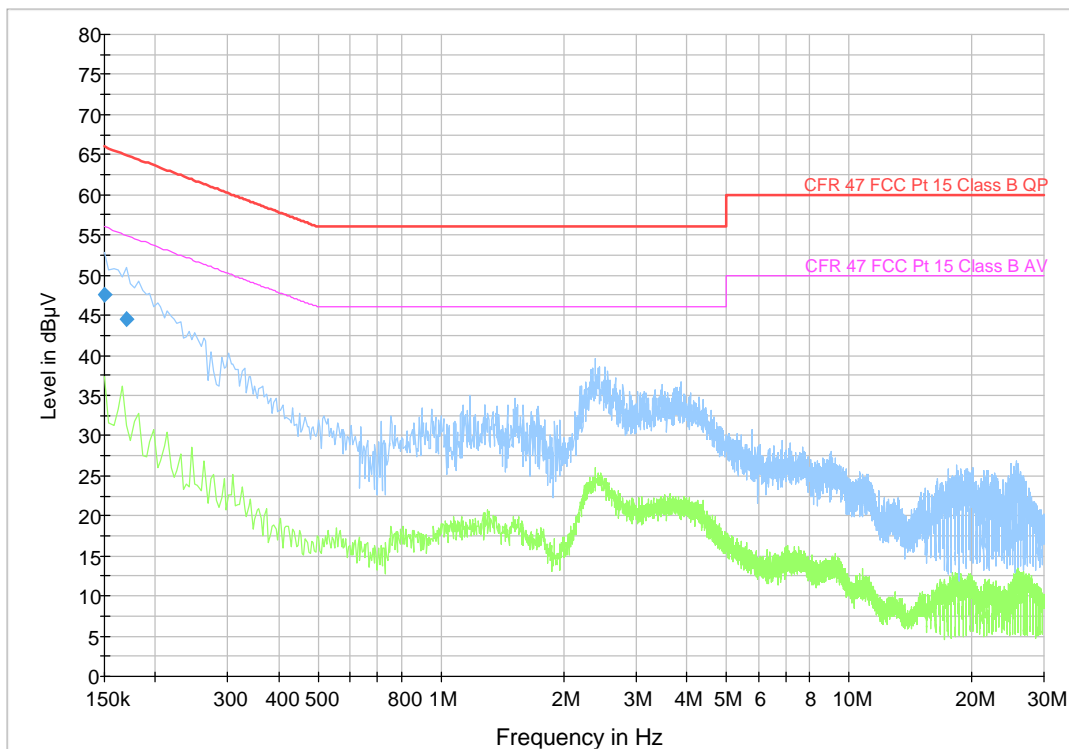


MEASUREMENT DATA

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.238000	---	40.07	52.17	12.09	15000.0	9.000	L1	9.7
0.238000	41.54	---	62.17	20.62	15000.0	9.000	L1	9.7

EMISSION SPECTRUM – BASE PNLC1077 AND ADAPTOR PNLV233 YJ

Full Spectrum

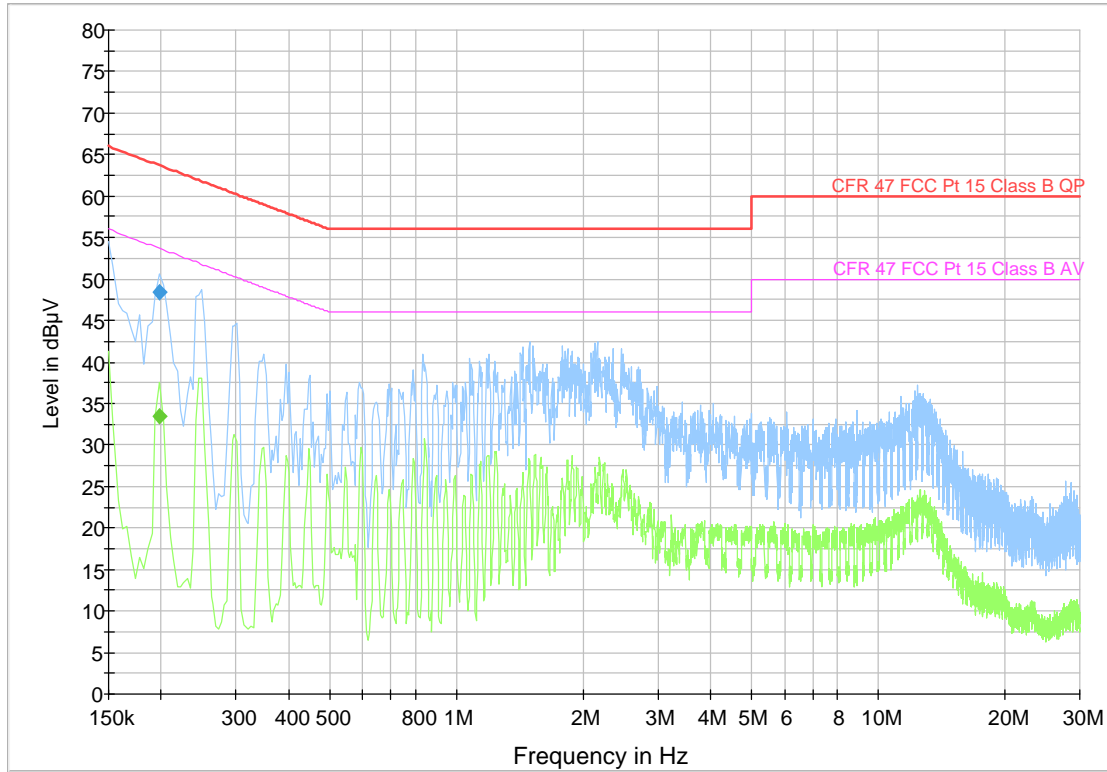


MEASUREMENT DATA

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	47.64	---	66.00	18.36	15000.0	9.000	N	9.7
0.170000	44.58	---	64.96	20.38	15000.0	9.000	L1	9.7

EMISSION SPECTRUM – BASE PNLC1077 AND ADAPTOR PNLV233 ZC

Full Spectrum

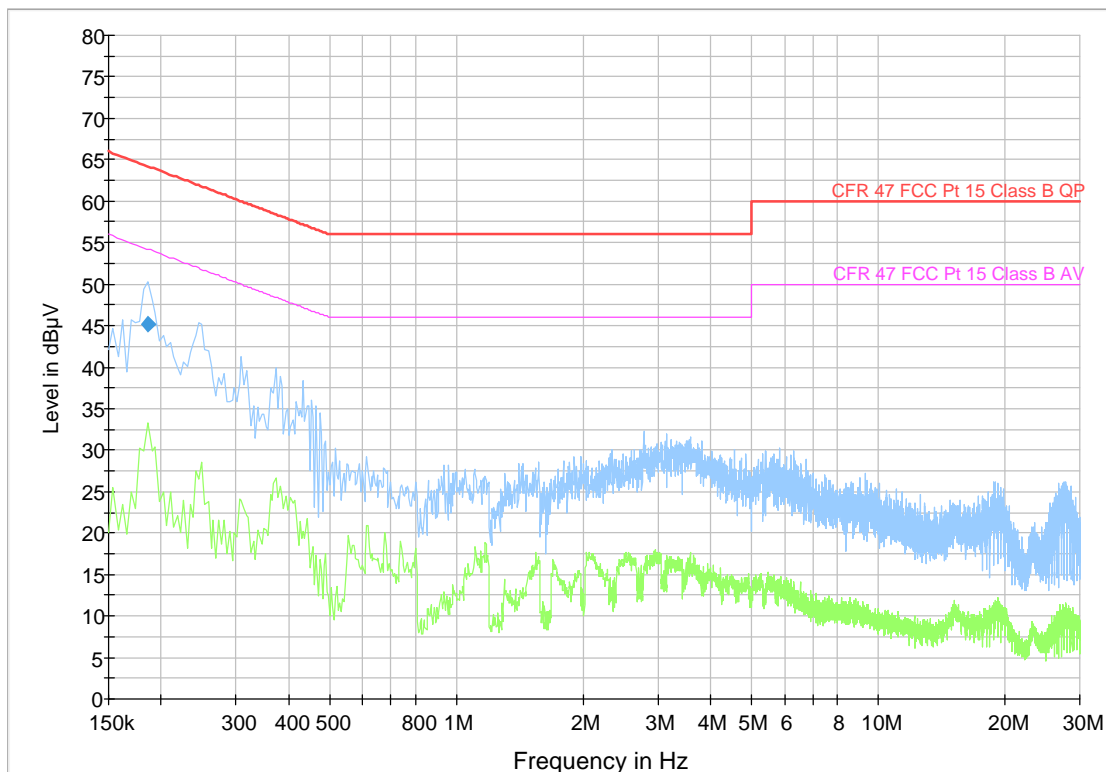


MEASUREMENT DATA

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.198000	---	33.47	53.69	20.22	15000.0	9.000	N	9.7
0.198000	48.44	---	63.69	15.26	15000.0	9.000	L1	9.7

EMISSION SPECTRUM – BASE PNLC1077 AND ADAPTOR PNLV233 2A

Full Spectrum



MEASUREMENT DATA

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.186000	45.23	---	64.21	18.99	15000.0	9.000	L1	9.7

RADIATED EMISSIONS (BELOW 1GHZ)

TEST DESCRIPTION

Method

The reference method for this test is listed in the table under clause TEST SUMMARY.

Set-up

The measurements were performed in a semi-anechoic chamber (SAC). Nominal supply voltage was provided.

The specimen was energized and in normal operating mode during the measurement.

- ☐ The specimen and its cables were elevated 10 cm above the site ground plane and placed in the centre of the turntable.
- ☒ The specimen and its cables were placed on a table 80 cm above the site ground plane and placed in the centre of the turntable.
- ☐ Ferrite clamps type CMAD were applied to cables leaving the test volume.
- ☐ A CDNE was applied to the power supply cable.

Antenna type = Hybrid bilog antenna

Antenna elevation = 100-400 cm above the ground reference plane.

Specimen rotation = 0-360°.

Frequency range:

☐ 30-300MHz

☒ 30-1000MHz

☐ Other:

Measurement distance:

☒ 3m

☐ 5m

☐ 10m

Conditions

The measuring bandwidth is 120 kHz in the frequency range 30 MHz – 1000 MHz. Frequency sweeps with RBW = 120 kHz and VBW = 1 MHz was applied with a sweep time of 20 ms (step size resolution < 60 kHz).

Measurement uncertainty: ± 4.9 dB (3m distance in SAC10); ± 4.6 dB (3m distance in SAC3); ± 4.6 dB (10m distance in SAC10)

Instruments used during measurement

Instrument list: [Antenna, bilog: Schwarzbeck / VULB 9163 \(LR-1616\) \(05/2023\)](#)
 [EMI Receiver: R&S / ESU40 \(LR-1639\) \(01/2023\)](#)
 [Preamplifier: Sonoma / 310N \(LR-1686\) \(08/2023\)](#)

Conformity

Verdict:

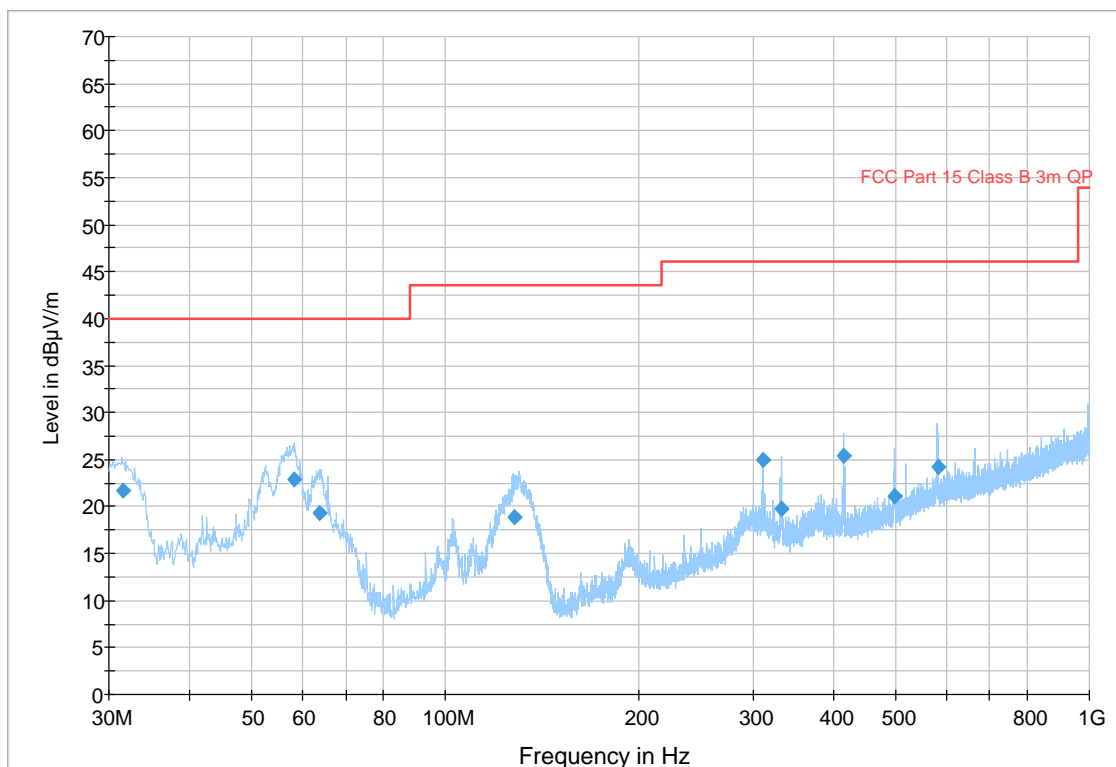
PASS

Test engineer:

K Osvoll

EMISSION SPECTRUM – BASE KXTGD860 AND ADAPTOR PNLV226 UC

Full Spectrum

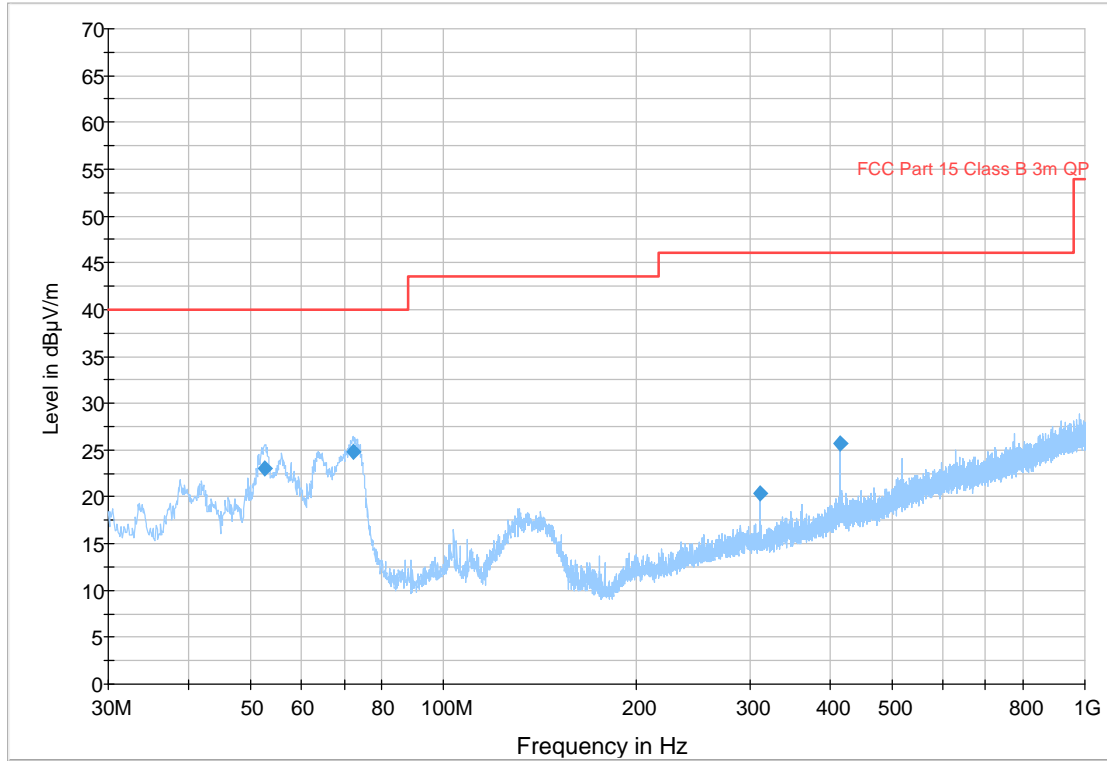


MEASUREMENT DATA

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
31.501944	21.63	40.00	18.37	15000.0	120.000	109.0	V	150.0	-15.6
58.243884	22.89	40.00	17.11	15000.0	120.000	103.0	V	219.0	-13.5
63.629050	19.31	40.00	20.69	15000.0	120.000	106.0	V	314.0	-14.6
127.881982	18.93	43.50	24.57	15000.0	120.000	104.0	V	120.0	-16.5
311.043632	24.93	46.00	21.07	15000.0	120.000	266.0	V	1.0	-10.2
332.143356	19.84	46.00	26.16	15000.0	120.000	200.0	V	43.0	-9.5
414.724446	25.37	46.00	20.63	15000.0	120.000	120.0	V	142.0	-7.6
497.380486	21.05	46.00	24.95	15000.0	120.000	212.0	H	273.0	-5.9
580.940238	24.16	46.00	21.84	15000.0	120.000	410.0	H	129.0	-3.9

EMISSION SPECTRUM – BASE PNLC1077 AND ADAPTOR PNLV233 UC

Full Spectrum

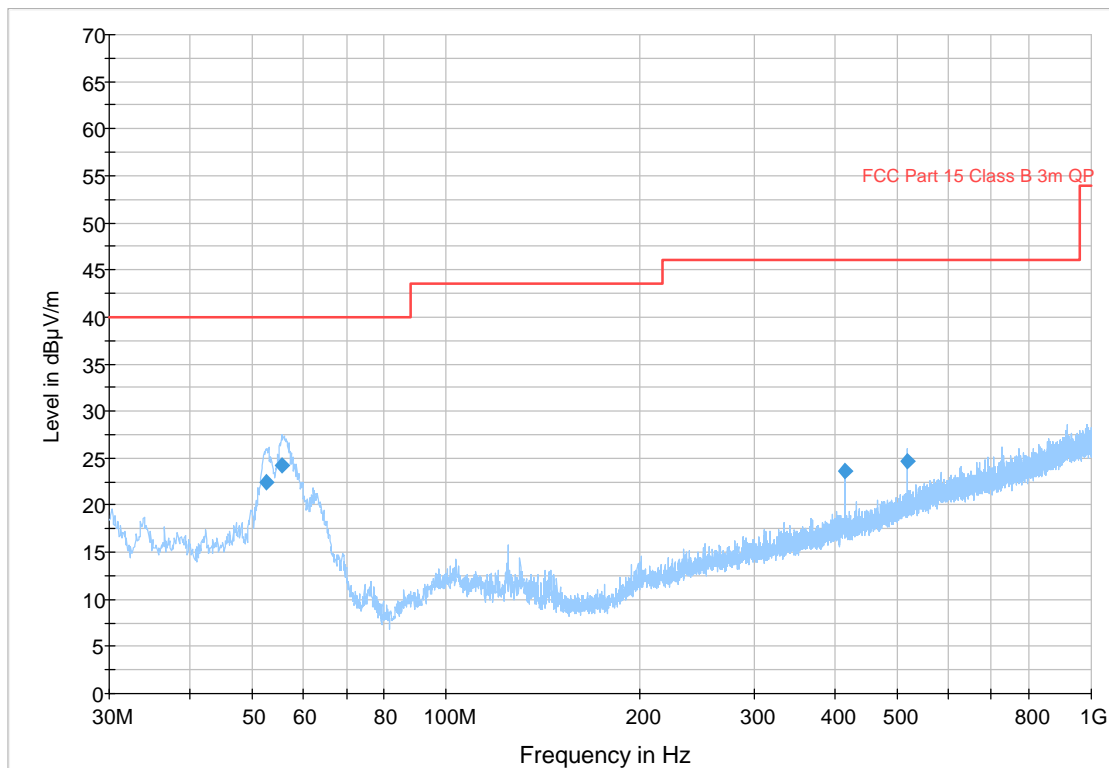


MEASUREMENT DATA

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
52.550996	22.99	40.00	17.01	15000.0	120.000	150.0	V	236.0	-13.5
72.314912	24.85	40.00	15.15	15000.0	120.000	101.0	V	269.0	-16.9
311.036396	20.34	46.00	25.66	15000.0	120.000	100.0	H	260.0	-10.2
414.715068	25.78	46.00	20.22	15000.0	120.000	119.0	V	164.0	-7.6

EMISSION SPECTRUM – BASE PNLC1077 AND ADAPTOR PNLV233 YJ

Full Spectrum

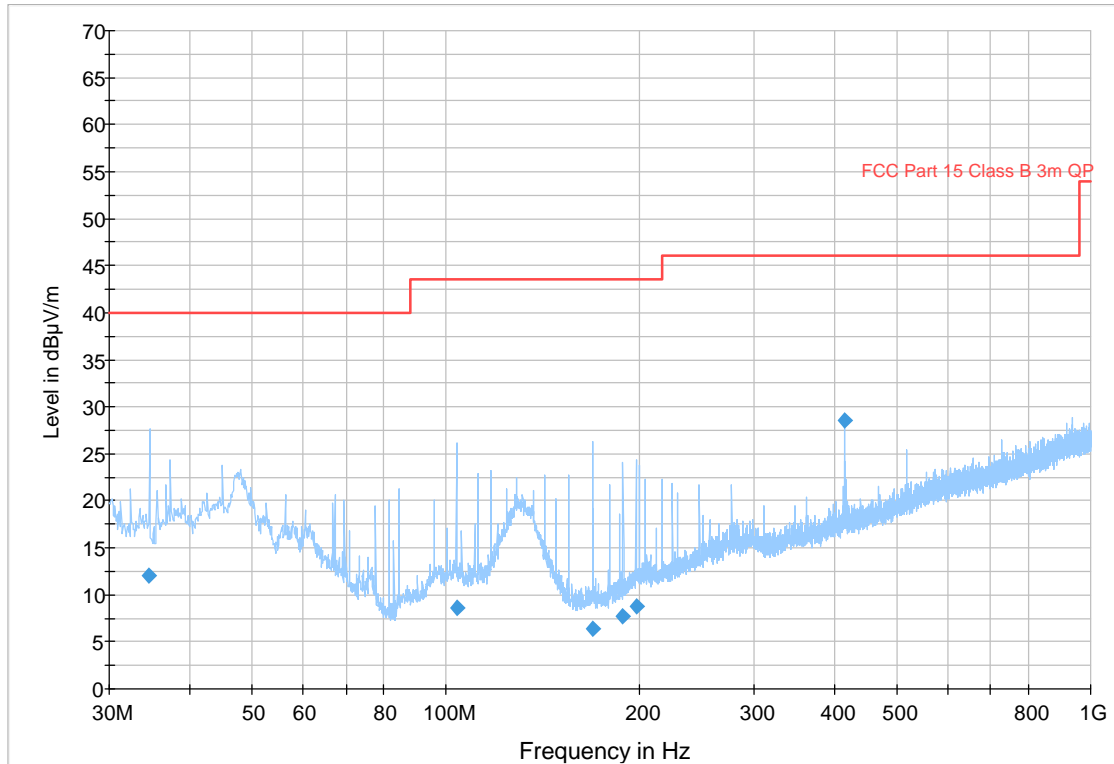


MEASUREMENT DATA

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
52.503748	22.39	40.00	17.61	15000.0	120.000	106.0	V	156.0	-13.5
55.628610	24.24	40.00	15.76	15000.0	120.000	102.0	V	287.0	-13.5
414.716490	23.57	46.00	22.43	15000.0	120.000	126.0	V	108.0	-7.6
518.398204	24.61	46.00	21.39	15000.0	120.000	272.0	V	179.0	-5.4

EMISSION SPECTRUM – BASE PNLC1077 AND ADAPTOR PNLV233 ZC

Full Spectrum

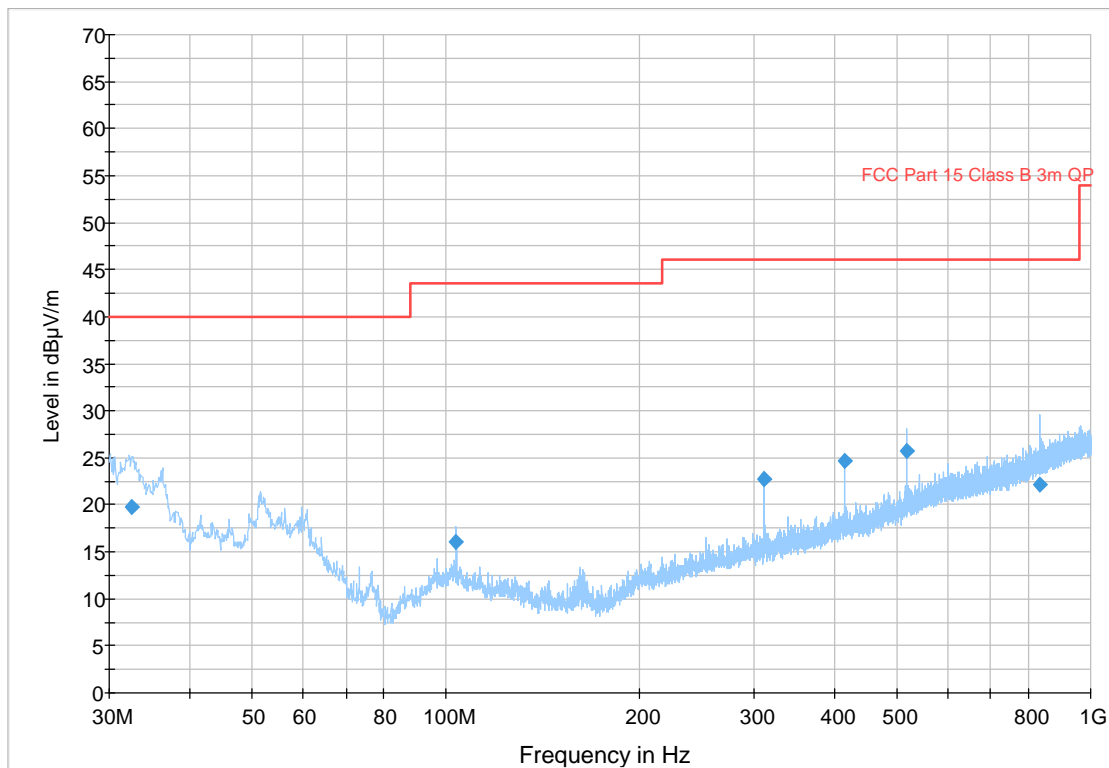


MEASUREMENT DATA

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
34.618092	11.99	40.00	28.01	15000.0	120.000	224.0	V	300.0	-14.7
103.787716	8.69	43.50	34.81	15000.0	120.000	106.0	H	311.0	-14.4
168.716390	6.46	43.50	37.04	15000.0	120.000	393.0	H	328.0	-16.5
188.223326	7.66	43.50	35.84	15000.0	120.000	410.0	H	0.0	-15.1
197.038374	8.76	43.50	34.74	15000.0	120.000	141.0	H	315.0	-14.1
414.720918	28.60	46.00	17.40	15000.0	120.000	108.0	V	195.0	-7.6

EMISSION SPECTRUM – BASE PNLC1077 AND ADAPTOR PNLV233 2A

Full Spectrum



MEASUREMENT DATA

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
32.450882	19.75	40.00	20.25	15000.0	120.000	145.0	V	355.0	-15.3
103.672860	16.00	43.50	27.50	15000.0	120.000	117.0	V	48.0	-14.4
311.038736	22.79	46.00	23.21	15000.0	120.000	150.0	H	149.0	-10.2
414.719658	24.68	46.00	21.32	15000.0	120.000	130.0	V	166.0	-7.6
518.402200	25.75	46.00	20.25	15000.0	120.000	102.0	V	176.0	-5.4
832.515702	22.13	46.00	23.87	15000.0	120.000	265.0	V	321.0	-0.4

Annexes

PHOTOS

Test set-up for EMC emissions measurements

