

Technical Construction File: CQM II

This technical construction file and the associated documents contain the information supporting the Declaration of Conformity for the CQM II.

The CQM II Non-Saleable Host Module TEPN is: 2359600-1.

For complete list of CQM II kit TEPN's, refer to <http://at-wiki.us.tycoelectronics.com/wiki/index.php/CQM> or Declaration of Conformance file.

Refer to the associated files available in DMTEC:

- 1) 2161269 – Declaration of Conformance
- 2) 2359600_TETF_1.pdf – Technical Construction File (this document)
- 3) 2359600_TETF_2.pdf – EMC Test report

Additional prints, bills-of-material, and instructions for this product can be readily obtained from DMTEC.

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NAME 2359600 CQM II Technical Construction File

DOCUMENT NO 2359600_TETF_1

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REV A

EMC TEST REPORT

ENR 435/20

Commitment: TE Connectivity
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Waynesboro, PA 17268- 8643 USA

Equipment Under Test : CQM II
Date of Measurement : 23rd April, 2020
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EMC Test Report

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3 SCOPE

The purpose of this document is to describe the tests applied by Enerdoor to demonstrate compliance of the CQM II to the applicable Electromagnetic Compatibility (EMC) standards as described in the appendices.

The fully equipped configuration was tested at Enerdoor's testing Laboratory in Portland, ME.

EMC Test Report

4 ABBREVIATIONS AND DEFINITIONS

4.1 Abbreviation Explanation

AV	Average Detector
CDN	Coupling Decoupling Network
dB	Decibel
EMC	Electromagnetic Compatibility
E.U.T.	Equipment Under Test
GHz	Gigahertz
Hz	Hertz
IEC	International Electrotechnical Commission
L.I.S.N.	Line Impedance Stabilization Network
MHz	Megahertz
NA	Not Applicable
PK	Peak Detector
PK/QP	Peak/ Quasi-Peak Detector
PK/QP/ AV	Peak/ Quasi-Peak / average detector
PO	Procedure
QP	Quasi-Peak Detector
RF	Radio Frequency
VFD	Variable Frequency Drive

4.2 Definitions:

Equipment Under Test (E.U.T.): Representative Industrial equipment, which includes one or more host units and is used for evaluation purposes.

Electromagnetic compatibility: EMC (abbreviation): The ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to that environment.

The CQM II is an Industrial Machines: Generic Standards for Industrial Equipment were applied.

IEC 61000-6-2: Immunity for Industrial Equipment

IEC 61000-6-4: Emissions for Industrial Equipment

EMC Test Report**5 STANDARDS - SUMMARY****5.1 Standards Reference**

(1) EN 55011-1

Electromagnetic compatibility – Requirements for Industrial, Scientific and Medical radio-frequency equipment

Part 1: Emission

(2) EN 61000-6-2

Electromagnetic compatibility - generic Immunity standard

Part 2: industrial environment

(3) EN 61000-6-4

Electromagnetic compatibility - generic Emissions standard

Part 4: industrial environment

(4) EN 61000-4-4

Electromagnetic compatibility (EMC)

Part 4: Testing and measurement techniques

Section 4: Electrical fast transient/burst immunity test

(5) EN 61000-4-2

Electromagnetic compatibility (EMC)

Part 4: Testing and measurement techniques

Section 2: Electrostatic discharge immunity test

(6) EN 61000-4-6

Electromagnetic compatibility (EMC)

Part 4: Testing and measurement techniques

Section 6: Immunity to conducted disturbances, induced by radio-frequency fields

(7) EN 61000-4-5

Electromagnetic compatibility (EMC)

Part 4: Testing and measurement techniques

Section 5: Surge immunity test

(8) EN 61000-4-11

Electromagnetic compatibility (EMC)

Part 4: Testing and measurement techniques

Section 11: Voltage dips, short interruptions and voltage variations immunity test

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5.2 Summary

Table 1: Standards Summary and E.U.T. Condition

Appendix	Standards		Description & Range	Pass/Fail	Criteria	Note
	Base	Test basic				
	EN 61000-6-4: 2006 CFR 47 FCC Part 15 ICES-003 EN 301 489-1 V1.8.1	ANSI C63.4: 2003 CISPR 11: 2015	Conducted Emissions 150 kHz – 30 MHz	PASS	A	NA
	EN 61000-6-4: 2006 EN 301 489-1 V1.8.1	ANSI C63.4: 2003 CISPR 11: 2015	Radiated Emissions 30 MHz – 1000 MHz	PASS	A	NA
	EN 61000-6-2: 2005 EN 301 489-1 V1.8.1	EN 61000-4-6: 2006	Conducted Immunity Voltage 150 kHz – 80 MHz	PASS	A	Test has been performed up to 230 MHz
	EN 61000-6-2: 2005 EN 301 489-1 V1.8.1	EN 61000-4-4: 2004	Electrical Fast Transient/Burst Immunity	PASS	B	NA
	EN 61000-6-2: 2005 EN 301 489-1 V1.8.1	EN 61000-4-5: 2006	Surge Immunity	PASS	B	NA
	EN 61000-6-2: 2005 EN 301 489-1 V1.8.1	EN 61000-4-2: 2001	Electrostatic Discharge Immunity	PASS	B	NA
	EN 61000-6-2: 2005 EN 301 489-1 V1.8.1	EN 61000-4-11:2004	Voltage Dips and Short Interruptions	PASS	B/C	NA

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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5.3 Immunity Test / Fail Criteria

5.3.1 Pass / Fail Criteria as defined by the EN 61000-6-4 Standard

The performance criteria are defined as follows:

Performance Criterion A: The equipment shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance Criterion B: The equipment shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however, allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance Criterion C: Temporary loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls.

5.3.1 Not Applicable Criteria for IEC 61000-4-3

The IEC 61000-4-3 test was not performed because the machine was not located inside an anechoic chamber as required per the standard.

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6 EQUIPMENT UNDER TEST

6.1 Description

Equipment Under Test : CQM II

Model : 0235960010C

Serial : 4452608190005

6.2 E.U.T. Power

Table 2: E.U.T. Power Requirements

Voltage	230 Vac
Number of Feeds	Single Phase
Current Draw	1.5A at 230Vac 60Hz
Special Requirements	None

6.3 E.U.T. Condition

The CQM II was operated in standard operating mode.

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7 TEST RESULTS

7.1 Conducted Emissions 150 KHz - 30 MHz AC Ports

Procedure : PR EC-05
Standard : EN61000-6-4, CISPR 11
Detector : Peak, Quasi-peak, Average
Uncertainty of test : +2.08 / -0.62 dB μ V

7.1.1 Test Description

During the test the E.U.T. was supplied power by the public network (230Vac Single Phase) at 60 Hz using a Line Impedance Stabilization Network compliant to C.I.S.P.R. 16.

The E.U.T and the LISN were connected with a flexible cable not exceeding 1-meter in Length.

The automated test performs a scan on the frequency band 150 kHz-30MHz; the peak and average detectors are always switched on, while the quasi-peak detector analysis performed only when the peak detector exceeds the quasi-peak limit.

7.1.2 Results

Table 3: Conducted Emission Test Results

Frequency MHz	Main Port	Main Line	Description	Graph	Detector	Result	Note
0.15-30	L1	230Vac	Ambient Noise (machine off)	1	PK/AV	-	
0.15-30	L2	230Vac	Ambient Noise (machine off)	2	PK/AV	-	
0.15-30	L1	230Vac	Machine Cycling (Rev A)	3	PK/AV	C	
0.15-30	L2	230Vac	Machine Cycling (Rev A)	4	PK/AV	C	
0.15-30	L1	230Vac	Machine Cycling (Rev C)	5	PK/AV	C	
0.15-30	L2	230Vac	Machine Cycling (Rev C)	6	PK/AV	C	

Legend:

Compliance : (C)
Non-Compliant : (NC)
Compliance with reserve : (CR)
Not applicable : (NA)

7.1.3 Instrumentation, next calibration date

Instrument	Model	Serial number	Next calibration date
Receiver	Rhode & Schwarz ESP 3GH2	10077	Jan-21
LISN	PMM LISN L2-16	000WX20821	Jan-21

EMC Test Report**7.2 Radiated Emissions**

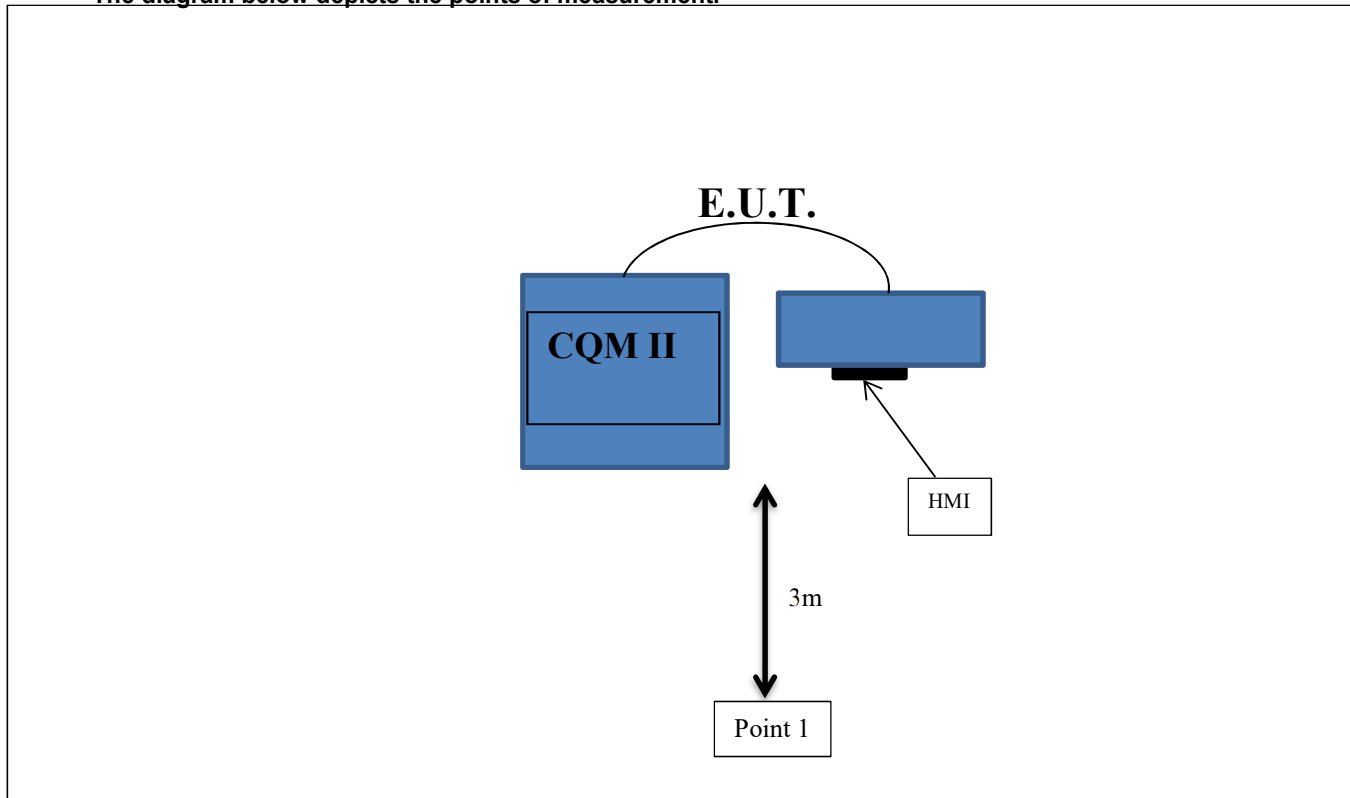
Procedure : PR EI-01
Standard : EN61000-6-4, CISPR 11
Uncertainty of test : +3.01 / -3.4 dB μ V/m

Quasi-peak Limit at 3m EN 55011 (Class A)	
30 - 230 MHz	50 dB μ V/m
230 - 1000 MHz	57 dB μ V/m

7.2.1 Test Description

During the test, the E.U.T. was supplied power from the public network (230Vac, Single Phase) at 60 Hz. Tests were performed in the frequency band 30 – 1000 MHz using Biconic and Log-periodic antennas at 3m from the E.U.T. considering horizontal and vertical polarization with front view measure. For the Biconic and Log periodic antenna, the peak detector is always switched on, while the quasi-peak detector analysis is performed only when the peak detector exceeds the quasi-peak limit.

The diagram below depicts the points of measurement.



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7.2.2 Results

Table 4: Radiated Emission Test Results

Frequency MHz	Polarization H/V	Graph	Position Antenna	Detector	Standard	Result
30-200	H	7	-	PK	EN55011	-
30-200	V	8	-	PK	EN55011	-
30-200	H	9	1	PK	EN55011	C
30-200	V	10	1	PK	EN55011	C
30-200	H	11	1	PK	EN55011	C
30-200	V	12	1	PK	EN55011	C
200-1000	H	13	-	PK	EN55011	-
200-1000	V	14	-	PK	EN55011	-
200-1000	H	15	1	PK	EN55011	C
200-1000	V	16	1	PK	EN55011	C
200-1000	H	17	1	PK	EN55011	C
200-1000	V	18	1	PK	EN55011	C

Legend: **Compliance (C)**; **Non-Compliant (NC)**; **Compliance with reserve (CR)**; Not applicable (NA)

7.2.3 Instrumentation, next calibration date

Instrument	Model	Serial number	Next calibration date
Receiver	Rhode & Schwarz ESP 3GH2	10077	Jan-21
Biconic antenna	PMM BC01	0011X90404	Jan-21
Log periodic antenna	PMM LP01	0011X90404	Jan-21

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7.2.4 Testing Setup

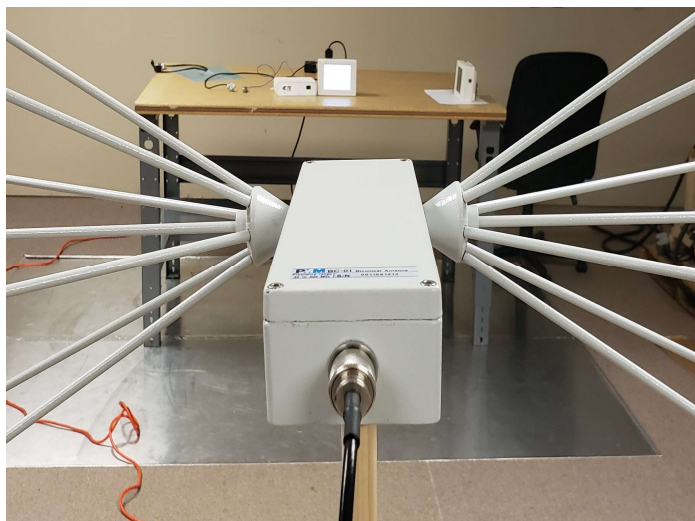


Photo 1: Machine Cycling. Radiated Emissions. Biconic Antenna. Horizontal Polarization. Position 1.

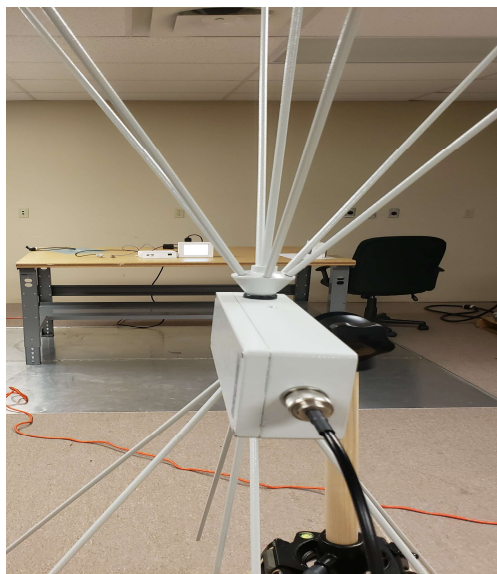


Photo 2: Machine Cycling. Radiated Emissions. Biconical Antenna. Vertical Polarization. Position 1.

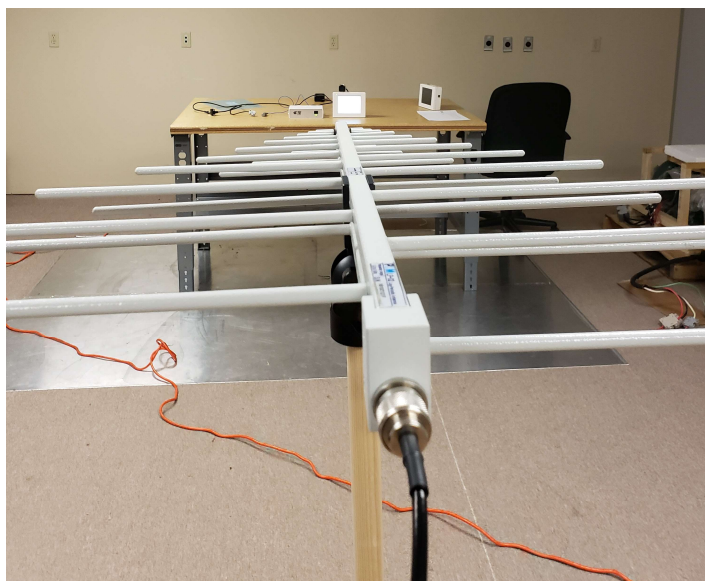


Photo 3: Machine Cycling. Radiated Emissions. Log Periodic Antenna. Horizontal Polarization. Position 1.

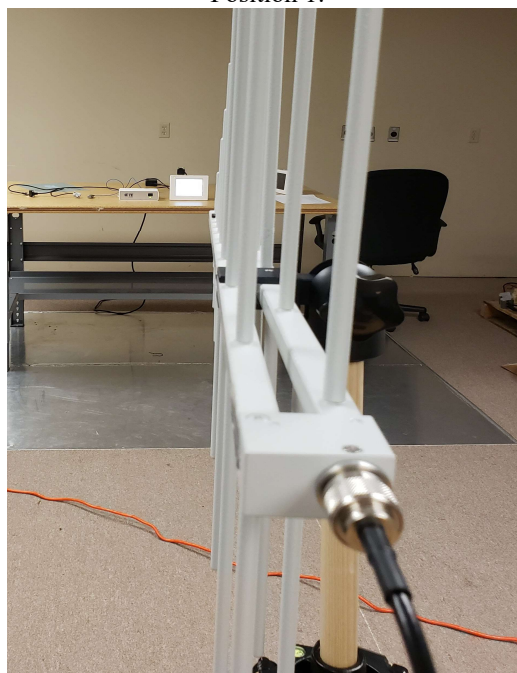


Photo 4: Machine Cycling. Radiated Emissions. Log Periodic Antenna. Vertical Polarization. Position 1.

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7.3 Fast Transient Immunity Test (BURST)

Procedure	: PR IB-01
Standard	: EN 61000-4-4
Level	: ± 2 kV
Performance Criteria	: B – Minor Loss in Performance, E.U.T. Continues to Operate After Test
Uncertainty of test	: $\pm 6\%$

7.3.1 Test Description

The immunity test was performed considering the E.U.T. in normal working condition, and supplied by the public network (230Vac, Single Phase) at 60 Hz.

The E.U.T and CDN were connected with flexible cable not exceeding 0.5 meters in length. The E.U.T. was located above a ground reference surface. The test generator and coupling/decoupling network were bonded to the ground reference surface. The ground reference surface was connected to the protective earth.

The disturbance was injected on the power supply lines and protective earth line (to ground reference) with level ± 2 kV, and a repetition frequency of 5 kHz as indicated in the EN 61000-4-4 standard.

7.3.2 Results

Table 5: Fast Transient Immunity Test Results

Point	Level	Result during test	Result after test	Result
L1	-2kV, +2kV	No malfunction	No malfunction	C
L2				
PE				

Legend:

Compliance	: (C)
Non-Compliant	: (NC)
Compliance with reserve	: (CR)
Not applicable	: (NA)

7.3.3 Instrumentation, next calibration date

Instrument	Model	Serial number	Next calibration date
Transient Immunity Test Station	USC500N	P1330120731	Jan-21
EM Test CDN	P1347126009	CNI1503A	Jan-21

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7.4 Surge Immunity Test

Procedure	: PR OP 07
Standard	: EN 61000-4-5
Level	: $\pm 2\text{kV}$ Common Mode and $\pm 1\text{kV}$ Differential Mode
Performance Criteria	: B – Minor Loss in Performance, E.U.T. Continues to Operate After Test
Uncertainty of test	: $\pm 7\%$

7.4.1 Test Description

The immunity test was performed considering the E.U.T. in normal working condition, and supplied by the public network (230Vac, Single Phase) at 60 Hz.

The disturbance was injected between individual phase lines and the protective earth line (to ground reference) with level $\pm 2\text{kV}$, and a repetition frequency of once per minute or less as indicated in the EN 61000-4-5 standard.

The disturbance was also injected between two individual phase lines with level $\pm 1\text{kV}$, and $\pm 0.5\text{kV}$ and a repetition frequency of once per minute or less as indicated in the EN 61000-4-5 standard. For each combination, the phase angle was adjusted to 0° , 90° , 180° , & 270° .

7.4.2 Results

Table 6: Surge Immunity Test Results

Port	Level	Phase Angle ($^\circ$)	Condition during the test	Condition after the test	Result
L1-L2	$\pm 0.5\text{kV}$ $\pm 1\text{kV}$	0° - 90° - 180° - 270°	No malfunction	No malfunction	C
L1-PE	$\pm 0.5\text{kV}$ $\pm 1\text{kV}$	0° - 90° - 180° - 270°	No malfunction	No malfunction	C
L2-PE	$\pm 1\text{kV}$ $\pm 2\text{kV}$				

Legend:

Compliance	: (C)
Non-Compliant	: (NC)
Compliance with reserve	: (CR)
Not applicable	: (NA)

7.4.3 Instrumentation, next calibration date

Instrument	Model	Serial number	Next calibration date
Transient Immunity Test Station	USC500N	P1330120731	Jan-21
EM Test CDN	P1347126009	CNI1503A	Jan-21

EMC Test Report**7.5 RF Conducted Immunity Test**

Procedure	: PR IRFI-01
Standard	: EN 61000-4-6
Level	: 10Vrms
Performance Criteria	: A – E.U.T. Continues to Operate During Test
Uncertainty of test	: $\pm 3\%$

7.5.1 Test Description

The immunity test was performed considering the E.U.T. in normal working condition, and supplied by the public network (230Vac, Single Phase) at 60 Hz.

The E.U.T and the CDN were connected with flexible cable not exceeding 0.5 meters in length.

The E.U.T. was located above a ground reference surface. The coupling/ decoupling network was bonded to the ground reference surface.

The ground reference surface was connected to the protective earth.

The cables of E.U.T. were placed on the insulation support above the ground reference Surface.

The RF generator injected RF current onto the power supply lines (150 kHz – 230 MHz, AM 80%), through RF power generator and 6dB RF attenuator directly to the CDN device. The level considering an open circuit is always more than 10Vrms as indicated in the EN 61000-4-6 standard.

7.5.2 Results**Table 7: RF Conducted Immunity Test Results**

Point	Level	Result during test	Result after test	Result
PHASE L1	10Vrms	No malfunction	No malfunction	C
PHASE L2				
PE				

Legend:

Compliance	: (C)
Non-Compliant	: (NC)
Compliance with reserve	: (CR)
Not applicable	: (NA)

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7.5.3 Instrumentation, next calibration date

Instrument	Model	Serial number	Next calibration date
RF Generator	SMY03	841069/013	Jan-21
RF Amplifier	ENI 411LA	734	Jan-21
CDN	M525	511751	Jan-21

EMC Test Report**7.6 Dips and Voltage Interruption**

Procedure : PR IV-01
Standard : EN 61000-4-11
Level : Interruptions 0% (5 s)
Variations 0% (16.7ms), 40% (200ms), 70% (500ms)
Performance Criteria : B – Minor Loss in Performance, E.U.T. recovers after test
C – E.U.T. recovers after test
Uncertainty of test : $\pm 4\%$

7.6.1 Test description

The immunity test was performed considering the E.U.T. in normal working condition, and supplied by the public network (230Vac, Single Phase) at 60 Hz. The dips and interruption were injected on the power supply lines as indicated in EN 61000-4-11 standard.

7.6.2 Results**Table 8: Dips and Voltage Interruption Tests Results**

Port	Level	Condition during the test	Condition after the test	Result
230V AC	0% for 5s	E.U.T. powered down	No malfunction	C
	0% for 16.7ms	No malfunction	No malfunction	C
	40% for 200ms	No malfunction	No malfunction	C
	70% for 500ms	No malfunction	No malfunction	C

Note:

Compliance : (C)

Not compliance : (NC)

Compliance with reserve : (CR)

Not applicable : (NA)

7.6.3 Instrumentation, next calibration date

Instrument	Model	Serial number	Next calibration date
Transient Immunity Test Station	USC500N	P1330120731	Jan-21

EMC Test Report**7.7 Electrostatic Discharge Immunity Test (ESD)**

Procedure	: PR IESD-01
Standard	: EN 61000-4-2
Level	: ± 4 kV (Contact), ± 8 kV (Air)
Performance Criteria	: B – Minor Loss in Performance, E.U.T. Continues to Operate After Test
Uncertainty of test	: $\pm 4\%$

7.7.1 Test Description

The immunity test was performed considering the E.U.T. in normal working condition, and supplied by the public network (230Vac, Single Phase) at 60 Hz.

The E.U.T. was located above the ground reference surface. The ESD generator was bonded to the ground reference surface with a return cable not exceeding 2 meters.

The discharge was applied at different points on the E.U.T. considering contact (± 4 kV) and air (± 8 kV) discharge as indicted in EN 61000-4-2 standard.

Each point tested with 10 repetitions positive and 10 repetitions negative.

7.7.2 Results**Table 9: Electrostatic Discharge Immunity Test Results**

Discharge	Level	Repetition	Point	Result
Contact	± 4 kV	10 single positive and negative	C1	C
Contact	± 4 kV	10 single positive and negative	C2	C
Contact	± 4 kV	10 single positive and negative	C3	C
Air	± 8 kV	10 single positive and negative	A1	C

Legend:

Compliance	: (C)
Non Compliant	: (NC)
Compliance with reserve	: (CR)
Not applicable	: (NA)

7.7.3 Instrumentation, next calibration date

Instrument	Model	Serial number	Next calibration date
ESD electrostatic discharge	NSG 435	000505	Jan-21

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7.7.4

Testing Setup

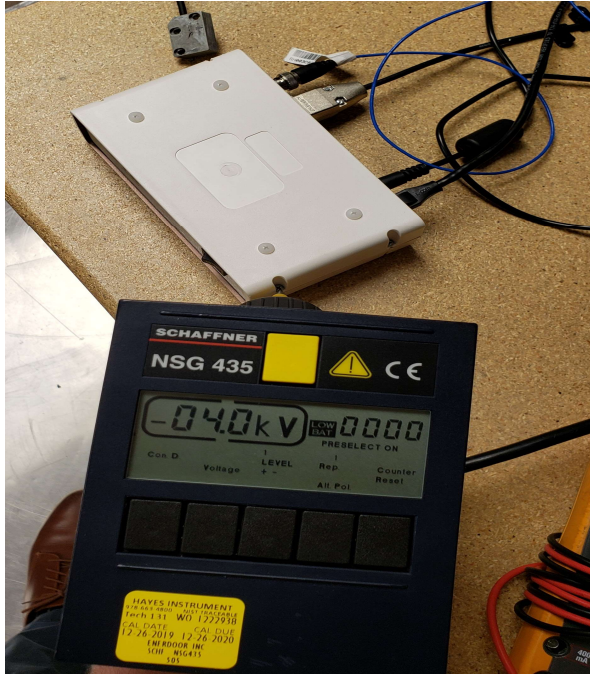


Photo 5: Electrostatic Discharge Immunity. Contact Discharge Test Point C1.



Photo 6: Electrostatic Discharge Immunity. Contact Discharge Test Point C2.

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Photo 7: Electrostatic Discharge Immunity. Contact Discharge Test Point C3.



Photo 8: Electrostatic Discharge Immunity. Air Discharge Test Point A1.

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8 SUMMARY OF TESTS

8.1 Results of Emission Tests

Table 10: Emission Test Results

Emission	Standard	Result
Generic	EN61000-6-4	C

Type of test required from the generic standard:

Table 11: Individual Emission Test Results

Emission	Frequency Range	Result
Conducted	0.15-30 MHz	C
Radiated	30-1000 MHz	C

Legend:

Compliance : (**C**)
Non-Compliant : (**NC**)
Compliance with reserve : (**CR**)
Not applicable : (**NA**)

EMC Test Report**8.2 Results of Immunity Tests****Table 12: Immunity Tests Results**

Immunity	Standard	Result
Generic	EN61000-6-2	C

Type of test required from the generic standard (immunity part):

Table 13: Individual Immunity Tests Results

Immunity	Frequency Range/Level	Result
Fast Transients (Burst)	2 kV (1Ph+ PE)	C
Surge Test	± 2kV; ± 1kV; ± .5kV	C
RF Conducted	10Vrms (1Ph+PE)	C
ESD	±4 kV (Contact), ±8 kV (Air)	C
Dips and Voltage Interruption	0% for 5s 0% for 16.7ms 40% for 200ms 70% for 500ms	C

Legend:

Compliance : (**C**)
Non-Compliant : (**NC**)
Compliance with reserve : (**CR**)
Not applicable : (**NA**)

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9 FINAL CONSIDERATION

9.1 Conducted Emission Test

Graphs 1 and 2 indicates the ambient noise level with E.U.T. switched off.

Graphs 3 through 6 indicates the equipment considered in original configuration operating at 230Vac, 60 Hz does meet the EN61000-6-4 requirements.

9.2 Radiated Emission Test

Graphs 7, 8, 13, and 14 indicate the ambient noise level with E.U.T. switched off.

Graphs 9-12 and 15-18, indicates that the equipment considered in working cycle operating at 230Vac, 60 Hz, does meet the EN61000-6-4 requirements with exception of background areas obscured by:

- Irregular broadcasts from unknown source operating from 31MHz to 36MHz
- Radio stations operating in band 88-108MHz
- Irregular broadcasts from unknown source operating from 180MHz to 185MHz
- TV broadcasting frequencies operating in band 510MHz to 960MHz

NOTE: Any peak detectors over the quasi peak limit outside of the regions as described above were either observed to be under the limit in quasi peak during independent event review, or plotted within the graphics below.

9.3 Fast Transients Immunity Test

Test results allow for declaration that the E.U.T. does meet the EN 61000-4-4 requirements.

9.4 Surge Immunity Test

Test results allow for declaration that the E.U.T. does meet the EN 61000-4-5 requirements.

9.5 RF Conducted Immunity Test

Test results allow for declaration that the E.U.T. does meet the EN 61000-4-6 requirements.

9.6 Electrostatic Discharge Immunity Test

Test results allow for declaration that the E.U.T. does meet the EN 61000-4-2 requirements.

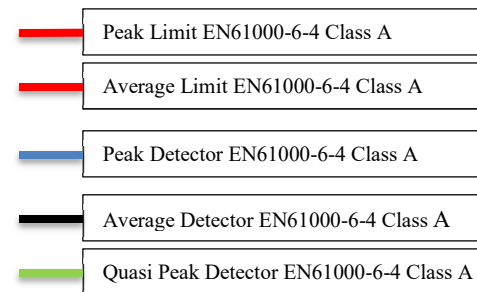
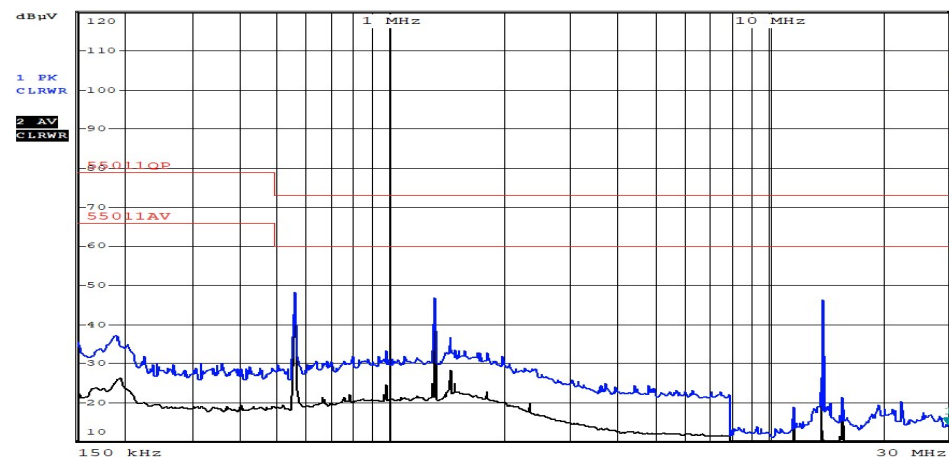
9.7 Dips and Voltage Interruption Immunity Test

Test results allow for declaration that the E.U.T. does meet the EN 61000-4-11 requirements.

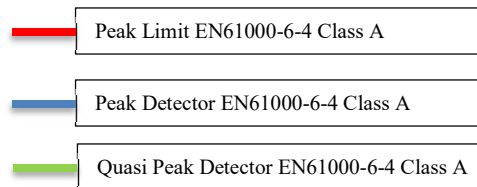
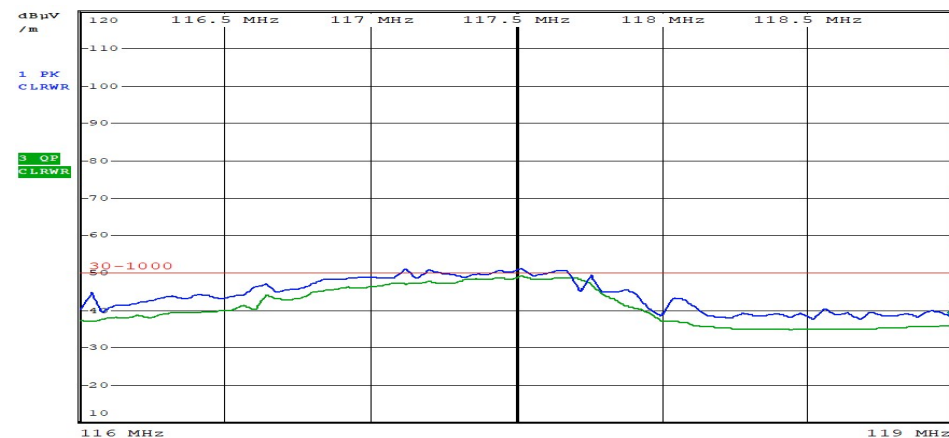
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10 Graphs

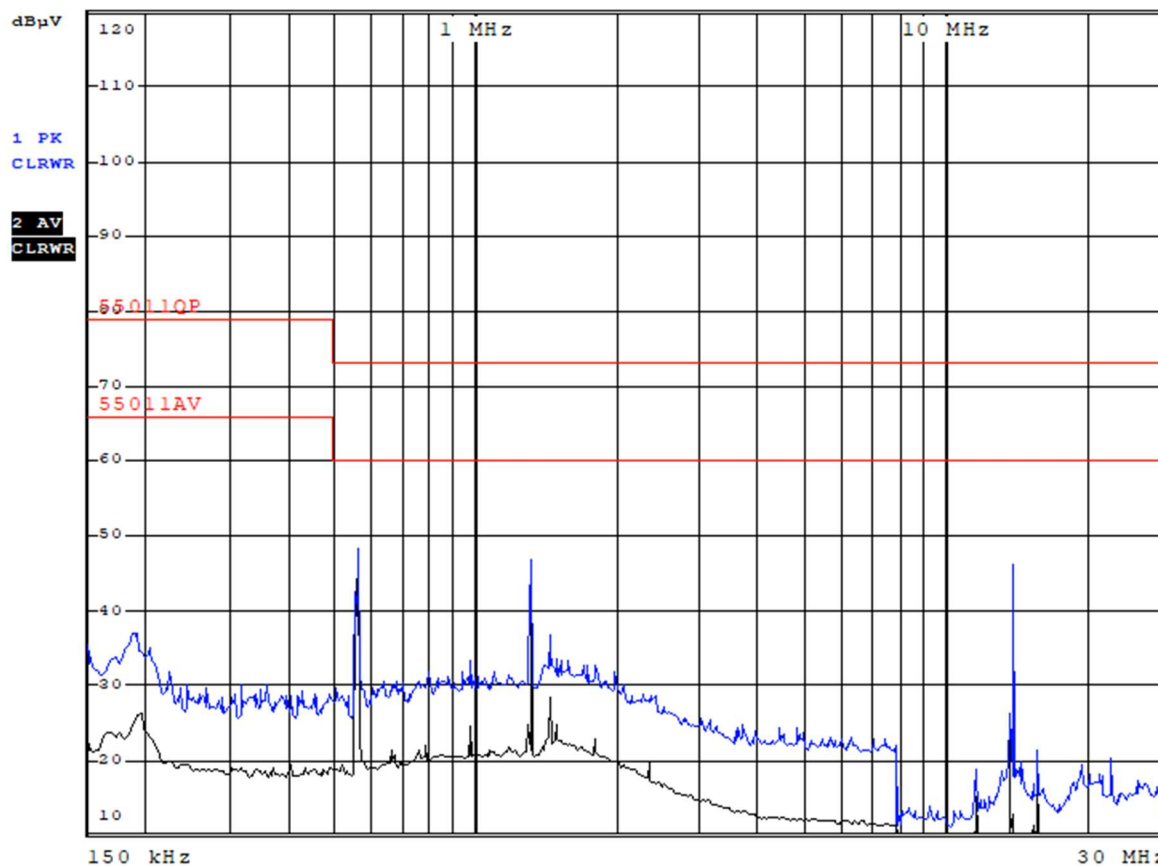
Legend: Conducted Emission



Radiated Emission

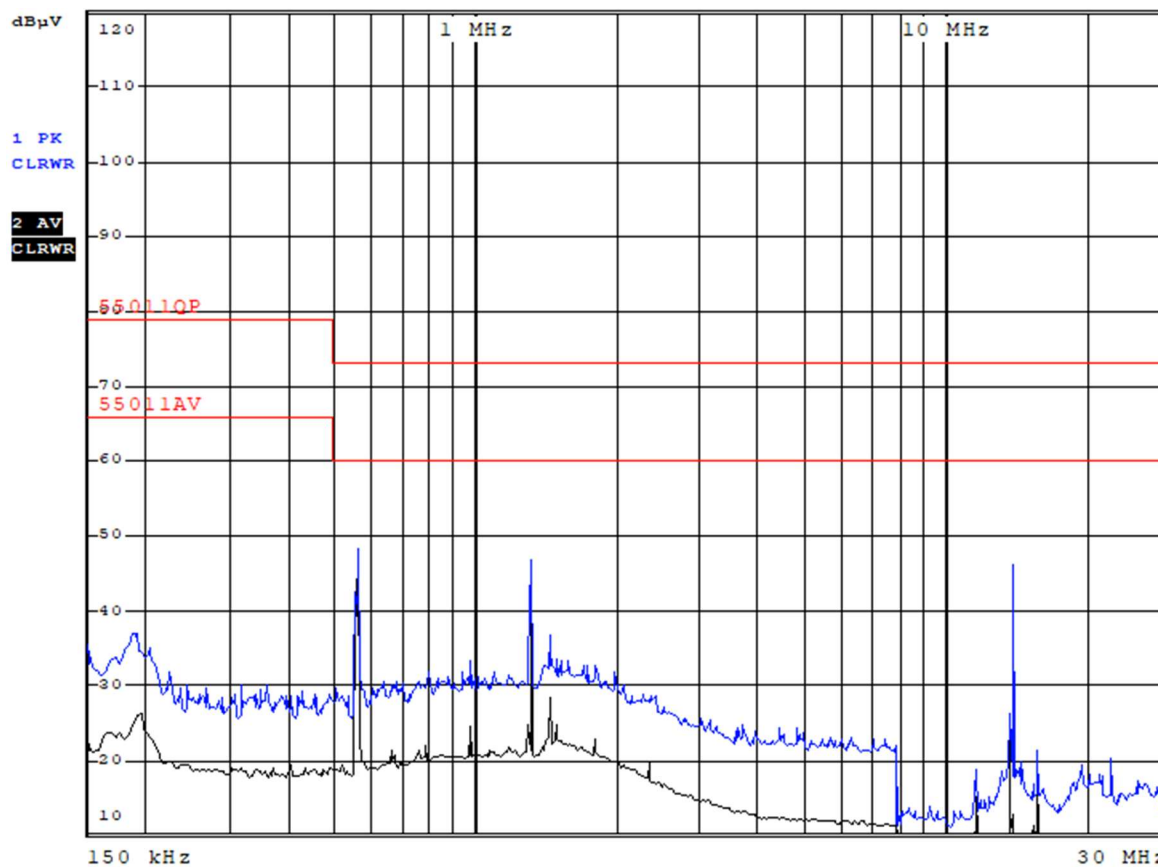


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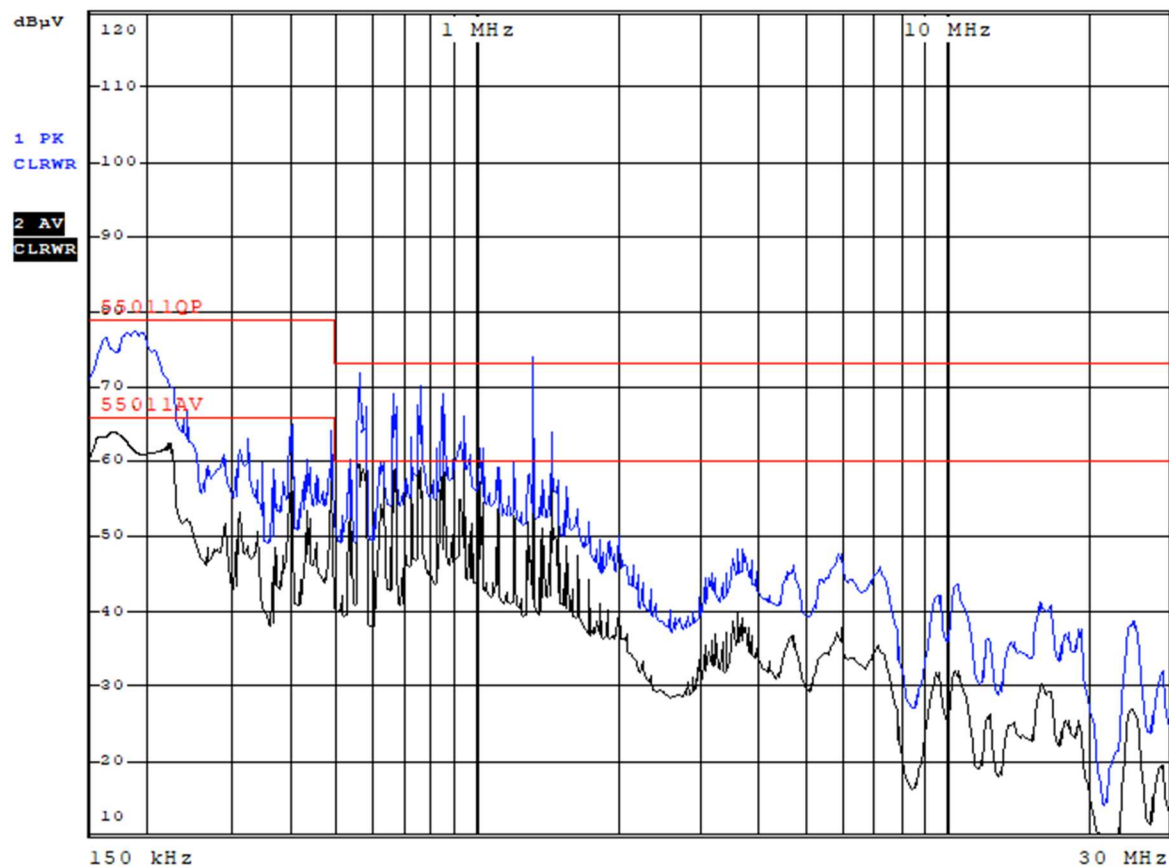
Graph 1: Machine Off. Ambient Noise. Conducted Emission. Measure on L1.

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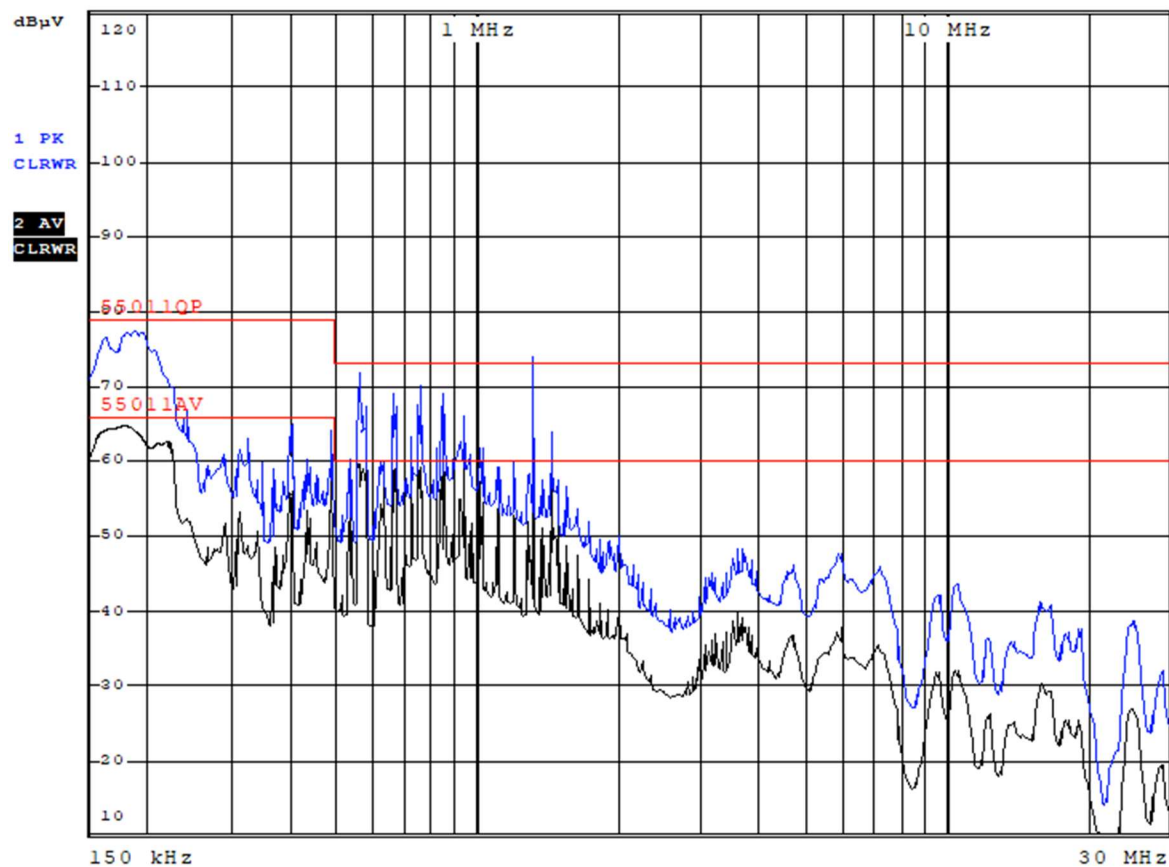
Graph 2: Machine Off. Ambient Noise. Conducted Emission. Measure on L2.

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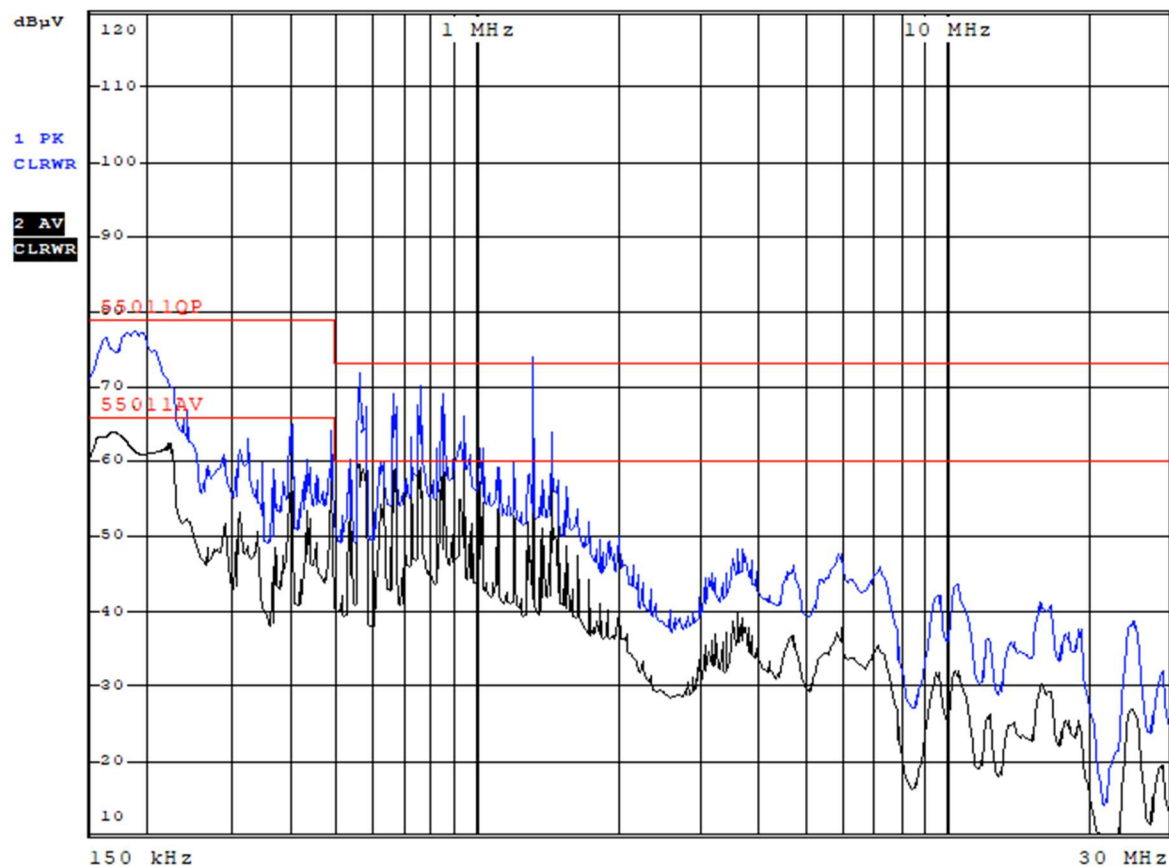
Graph 3: Machine Cycling in Original Configuration. Conducted Emission. Measure on L1. Revision A.

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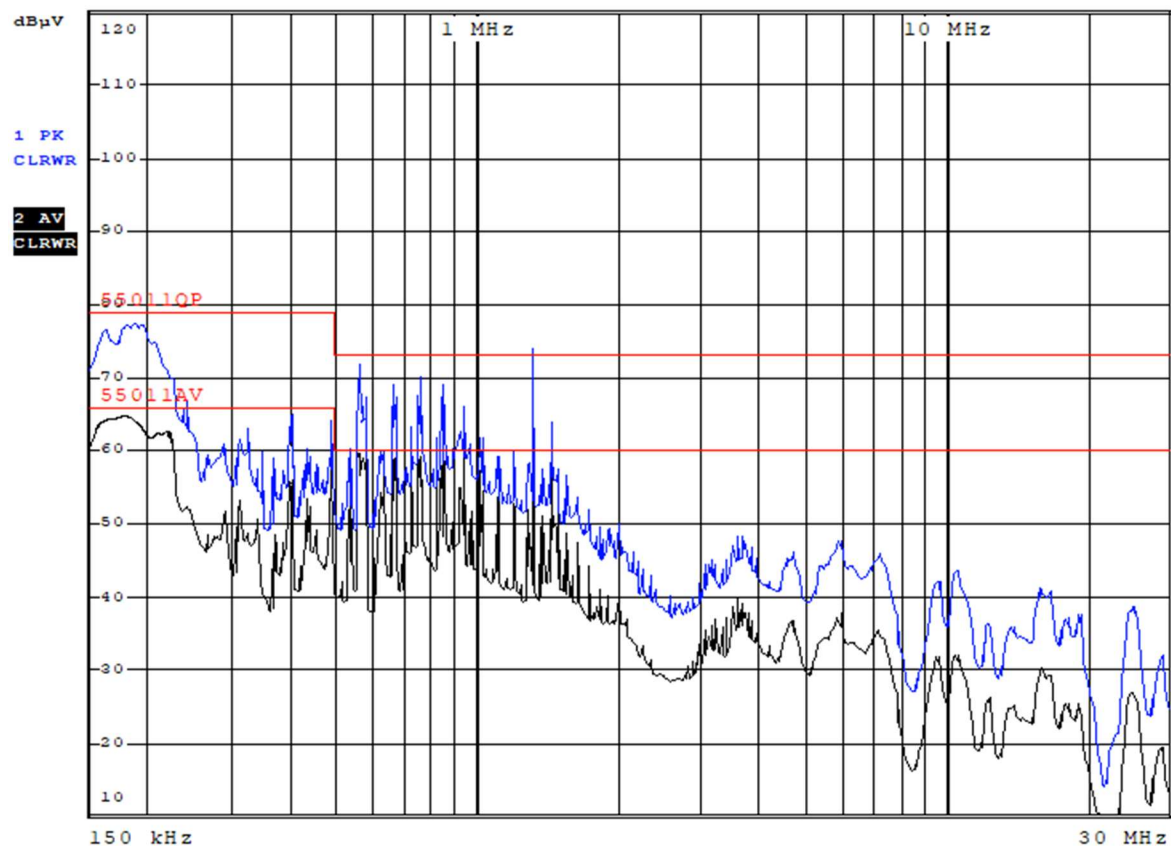
Graph 4: Machine Cycling in Original Configuration. Conducted Emission. Measure on L2. Revision A.

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Graph 5: Machine Cycling in Original Configuration. Conducted Emission. Measure on L1. Revision C.

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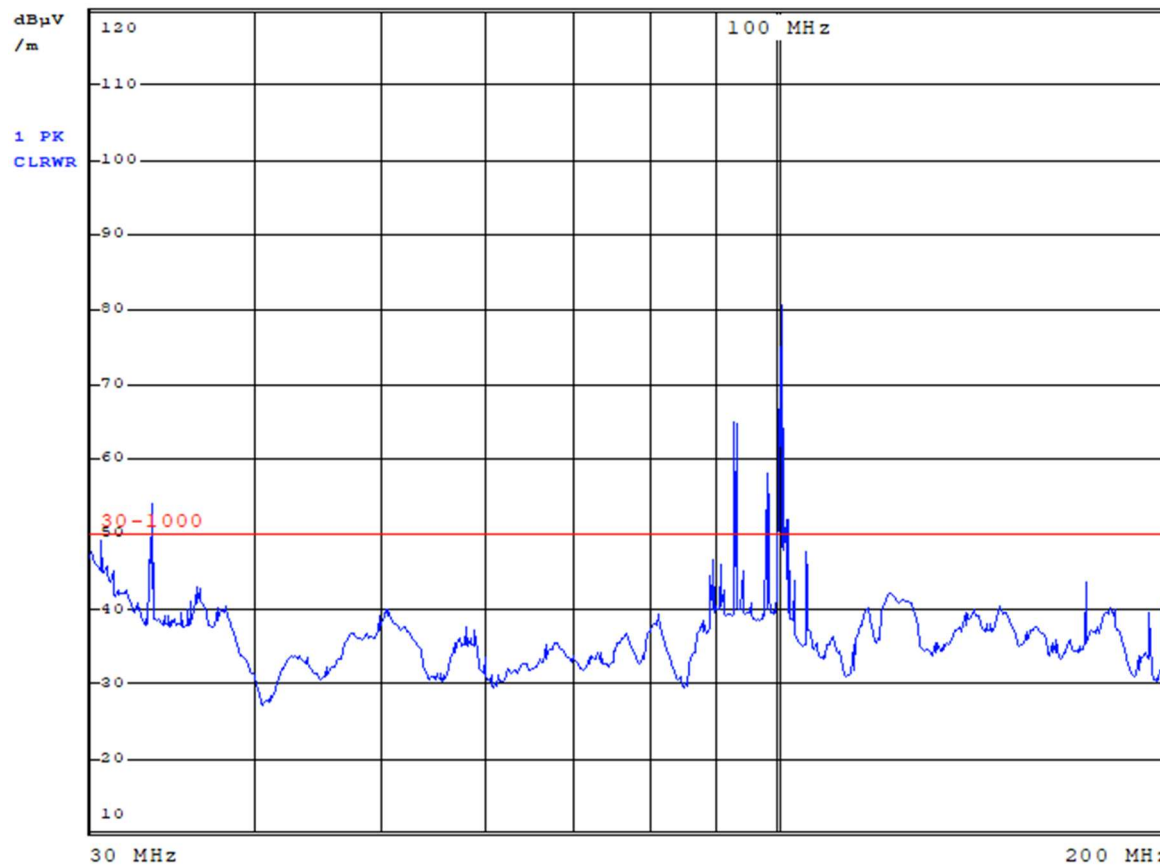
Graph 6: Machine Cycling in Original Configuration. Conducted Emission. Measure on L2. Revision C.

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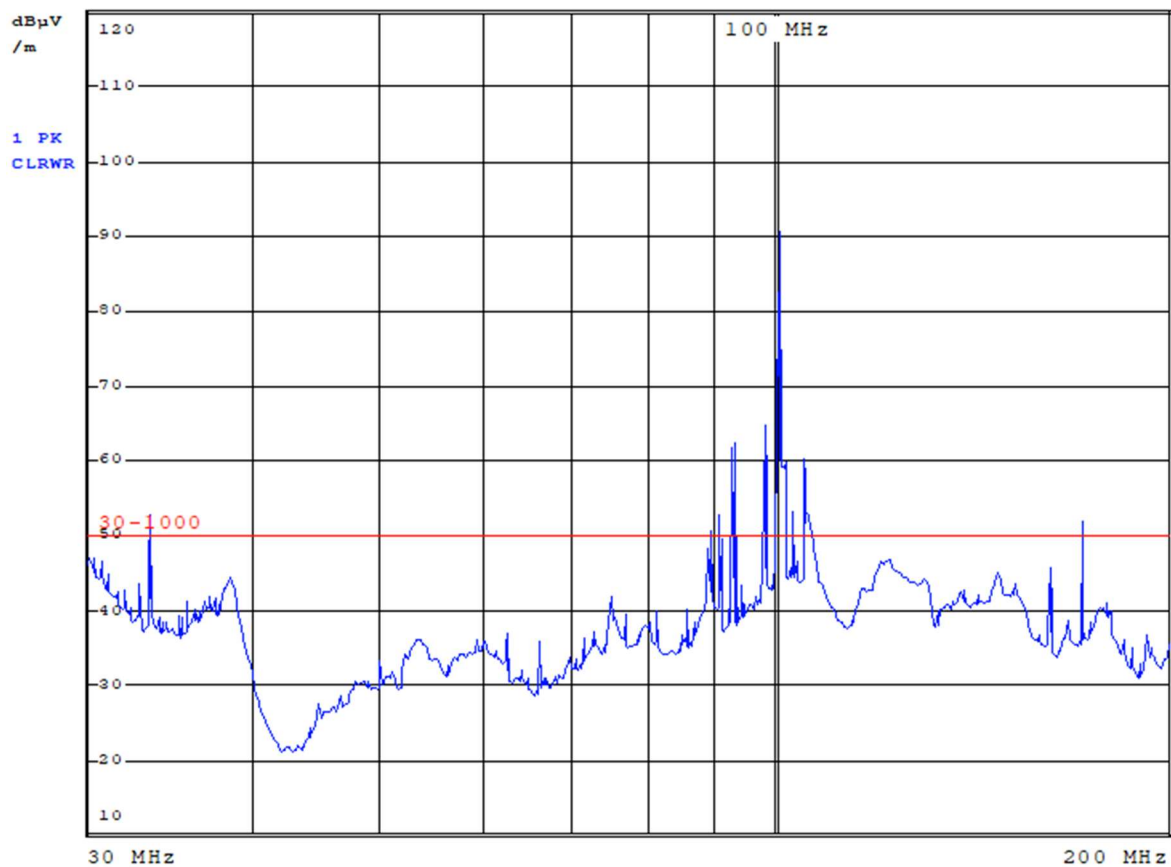
Graph 7: Machine Off. Ambient Noise. Radiated Emissions. Biconic Antenna. Horizontal Polarization. Revision A.

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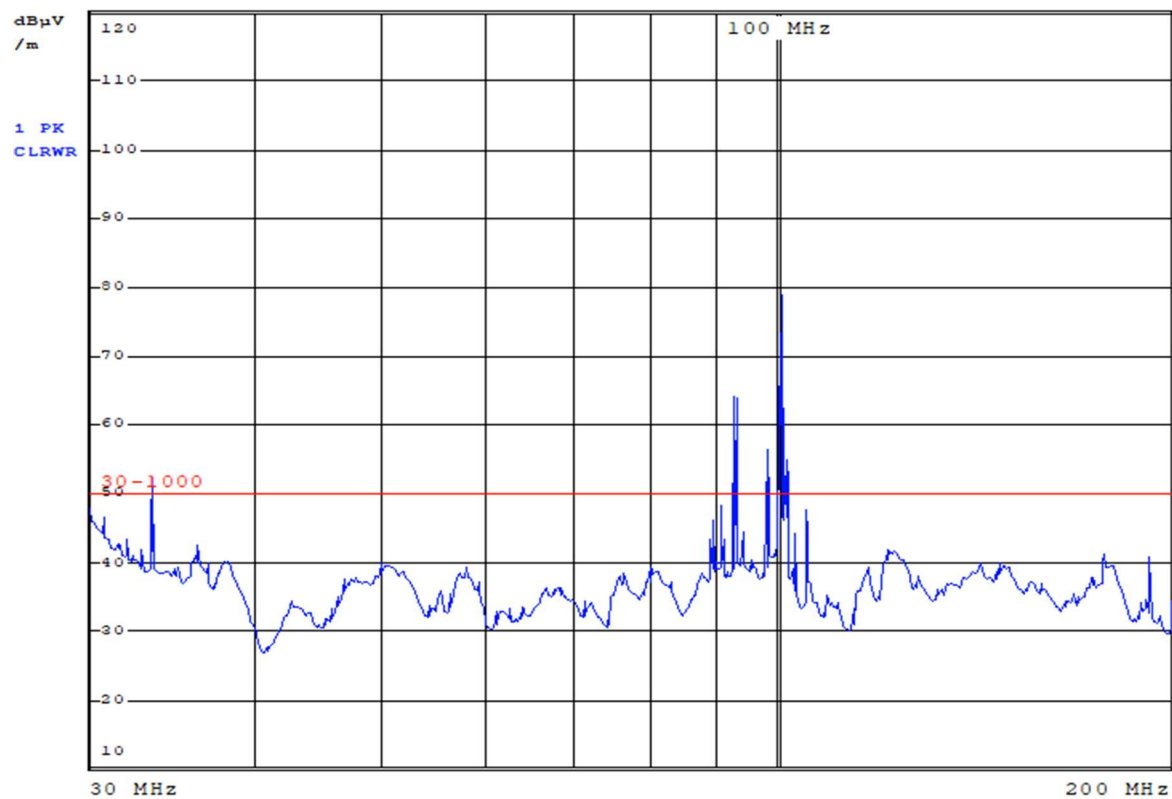
Graph 8: Machine Off. Ambient Noise. Radiated Emissions. Biconic Antenna. Vertical Polarization. Revision A.

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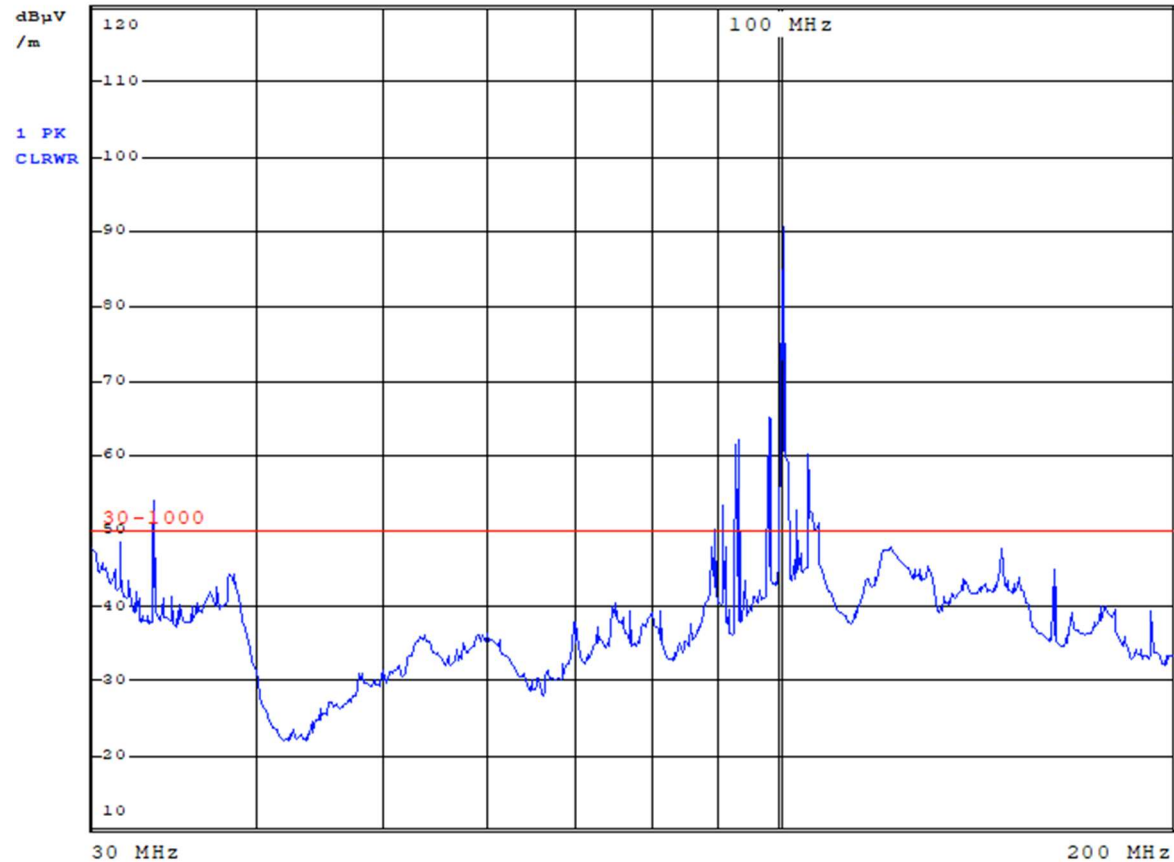
Graph 9: Machine Cycling. Radiated Emissions. Biconic Antenna. Horizontal Polarization. Revision A.

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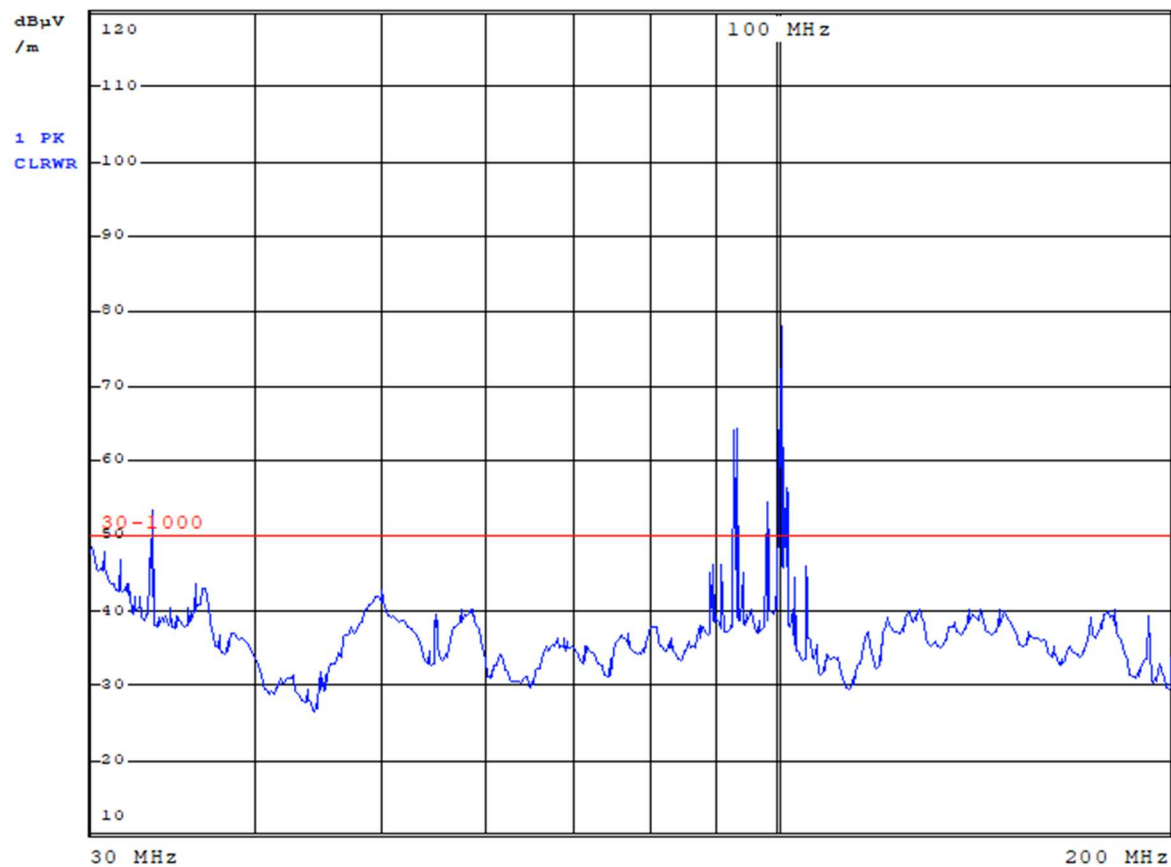
Graph 10: Machine Cycling. Radiated Emissions. Biconic Antenna. Vertical Polarization. Revision A.

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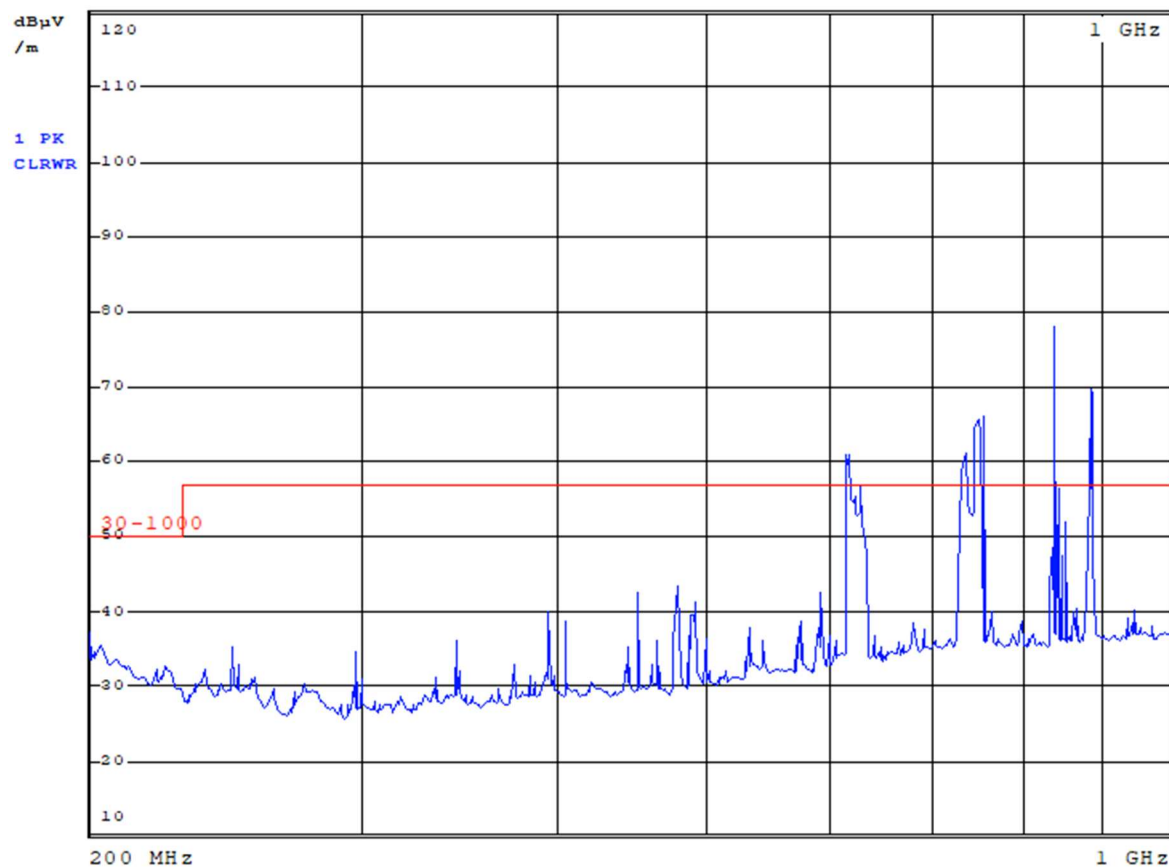
Graph 11: Machine Cycling. Radiated Emissions. Biconic Antenna. Horizontal Polarization. Revision C.

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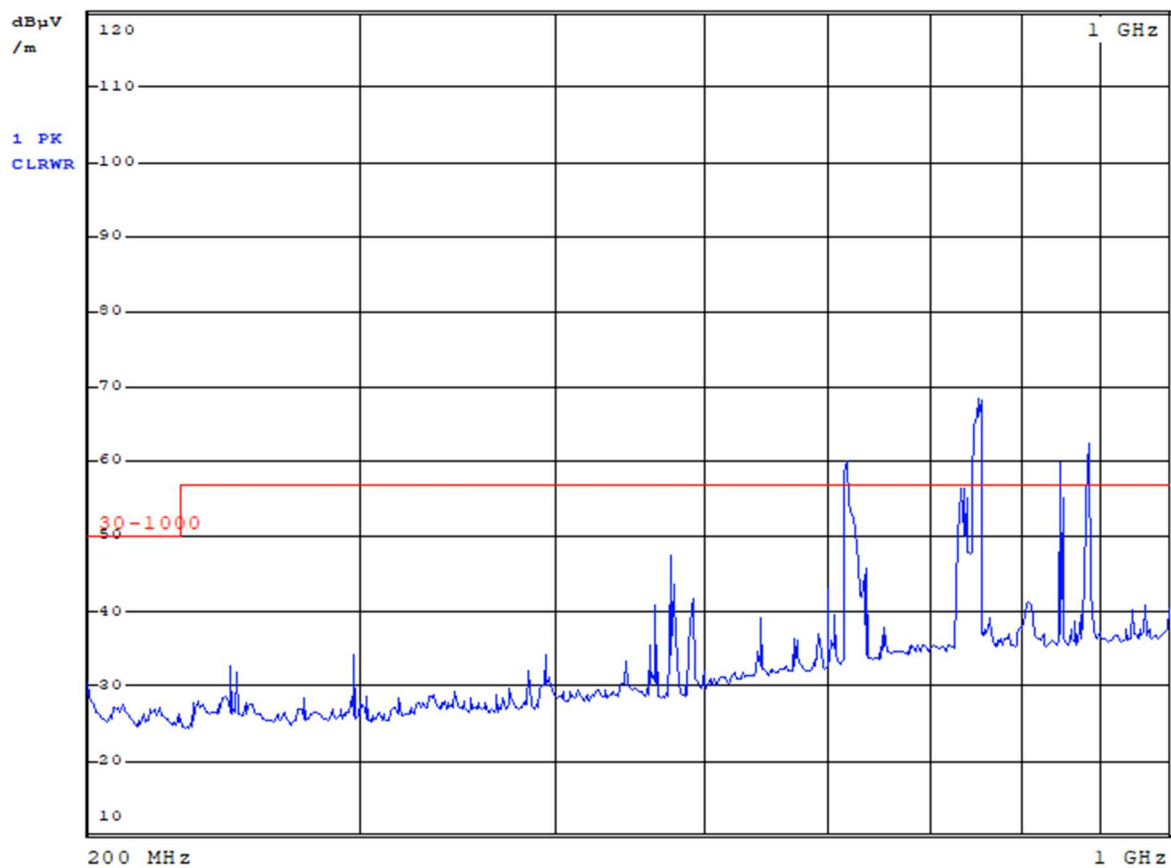
Graph 12: Machine Cycling. Radiated Emissions. Biconic Antenna. Vertical Polarization. Revision C.

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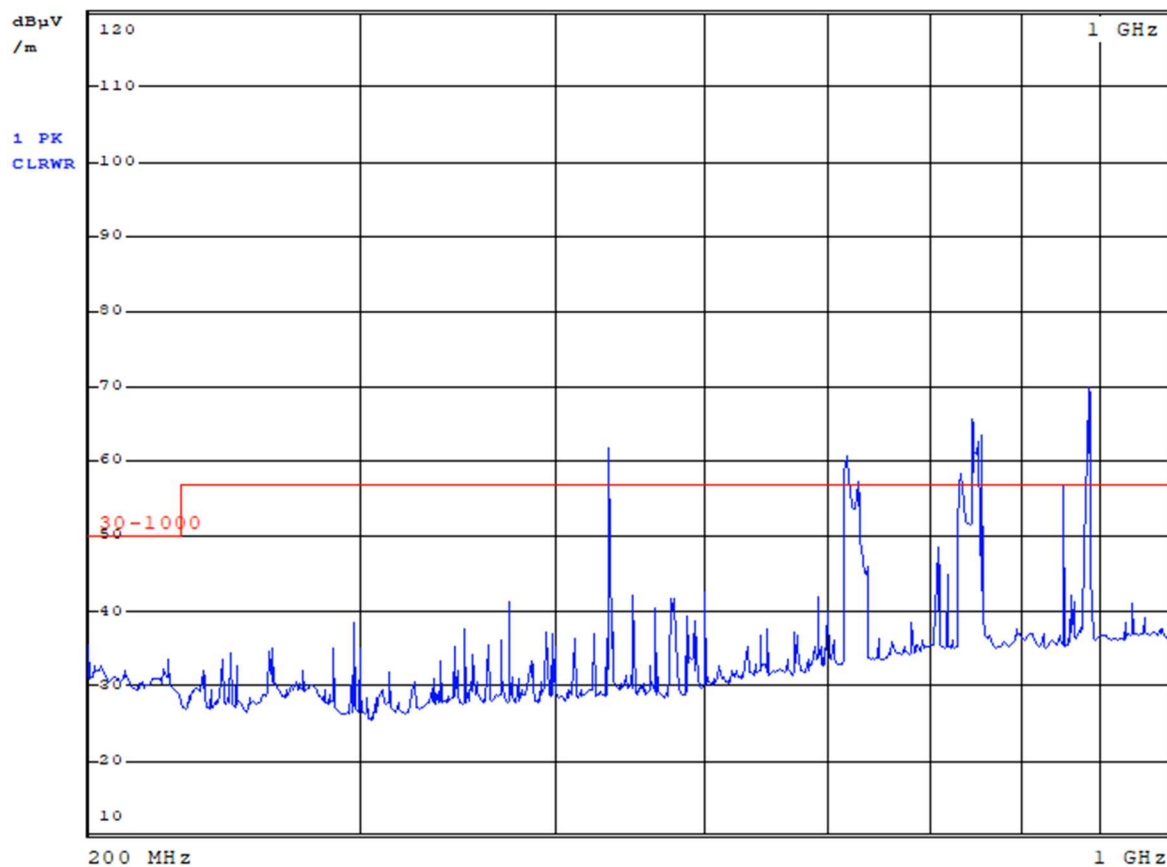
Graph 13: Machine Off. Ambient Noise. Radiated Emissions. Log Periodic Antenna. Horizontal Polarization.

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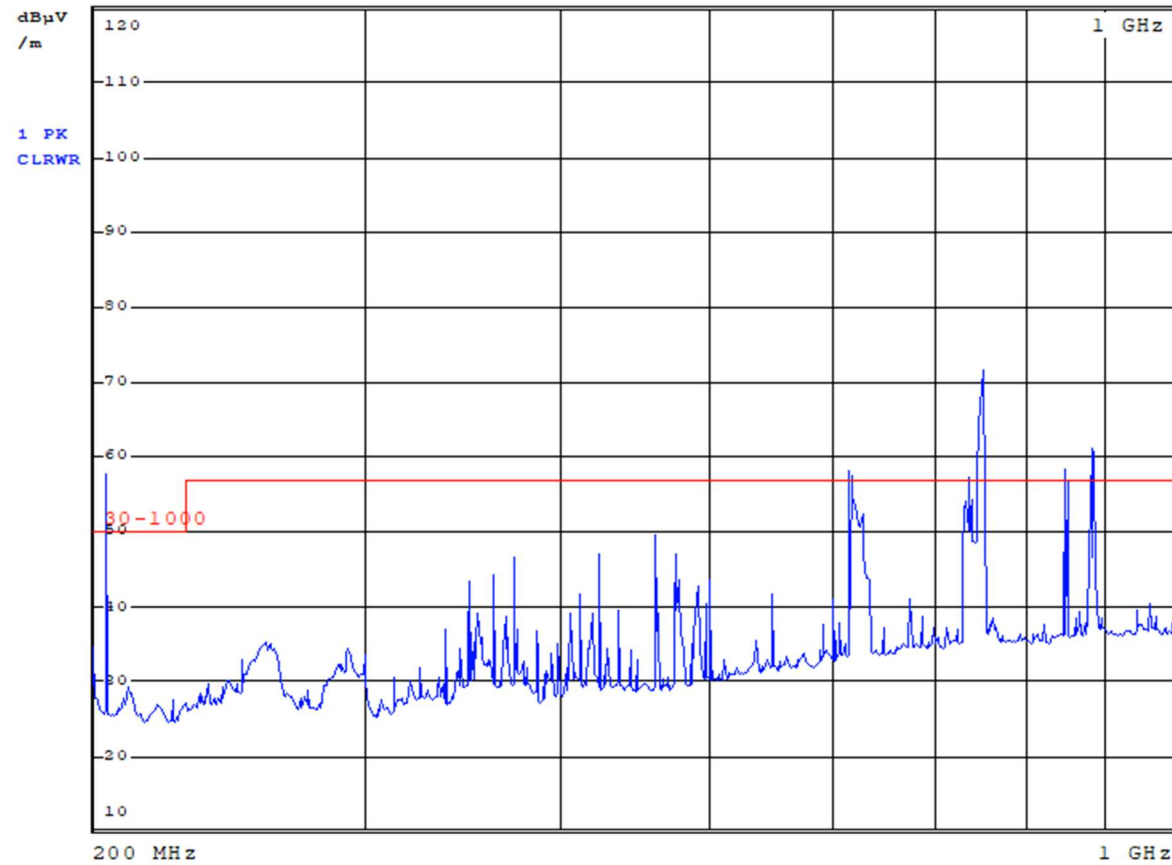
Graph 14: Machine Off. Ambient Noise. Radiated Emissions. Log Periodic Antenna. Vertical Polarization.

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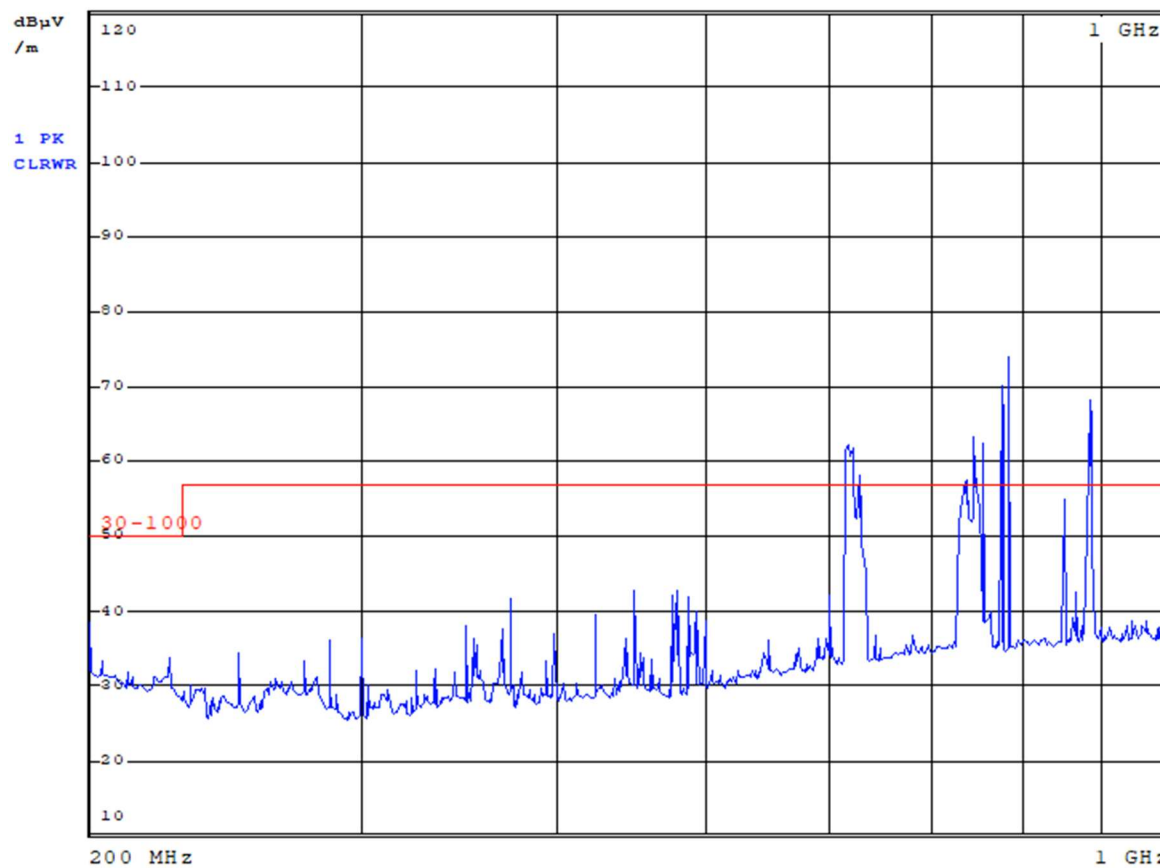
Graph 15: Machine Cycling. Radiated Emissions. Log Periodic Antenna. Horizontal Polarization. Revision A.

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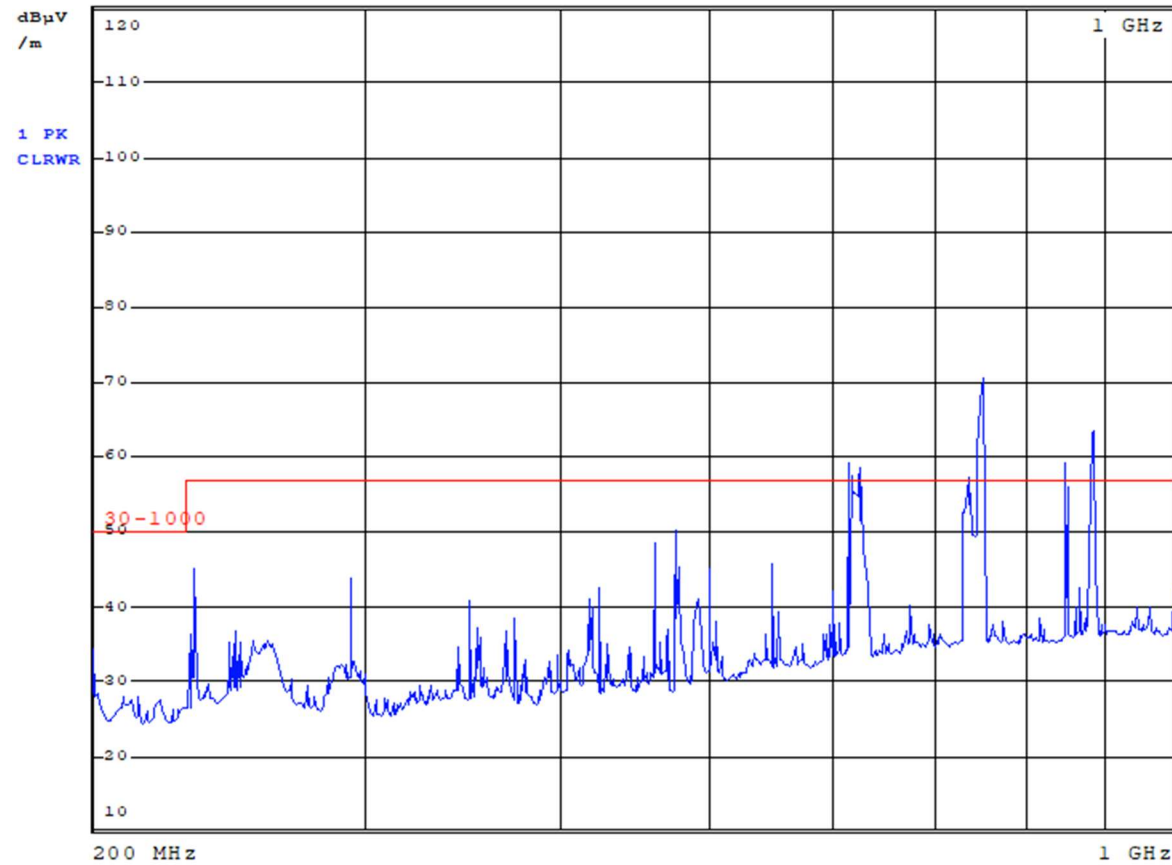
Graph 16: Machine Cycling. Radiated Emissions. Log Periodic Antenna. Vertical Polarization. Revision A.

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Graph 17: Machine Cycling, Radiated Emissions. Log Periodic Antenna. Horizontal Polarization. Revision C.

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Graph 18: Machine Cycling. Radiated Emissions. Log Periodic Antenna. Vertical Polarization. Revision C.