

**Measurement Data:**

Reading listed by margin.

Test Lead: L2-Neutral

#	Freq MHz	Rdng dB $\mu$ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB $\mu$ V	Spec dB $\mu$ V	Margin dB	Polar Ant
1	166.725k	40.5	+5.8 +0.0	+0.0	+0.0	+0.4	+0.0	46.7	55.1	-8.4	L2-Ne
2	189.996k	35.2	+5.8 +0.0	+0.0	+0.0	+0.2	+0.0	41.2	54.0	-12.8	L2-Ne
3	474.333k	26.0	+5.8 +0.0	+0.0	+0.0	+0.3	+0.0	32.1	46.4	-14.3	L2-Ne
4	249.627k	31.5	+5.8 +0.0	+0.0	+0.0	+0.1	+0.0	37.4	51.8	-14.4	L2-Ne
5	540.509k	23.8	+5.8 +0.0	+0.0	+0.0	+0.3	+0.0	29.9	46.0	-16.1	L2-Ne
6	741.945k	22.1	+5.8 +0.0	+0.1	+0.0	+0.3	+0.0	28.3	46.0	-17.7	L2-Ne
7	1.013M	22.0	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	28.2	46.0	-17.8	L2-Ne
8	605.958k	21.7	+5.8 +0.0	+0.1	+0.0	+0.3	+0.0	27.9	46.0	-18.1	L2-Ne
9	1.217M	21.5	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	27.7	46.0	-18.3	L2-Ne
10	1.758M	21.5	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	27.7	46.0	-18.3	L2-Ne
11	1.285M	21.4	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	27.6	46.0	-18.4	L2-Ne
12	1.553M	21.1	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	27.3	46.0	-18.7	L2-Ne
13	945.248k	20.5	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	26.7	46.0	-19.3	L2-Ne
14	13.013M	23.4	+5.8 +0.8	+0.3	+0.2	+0.2	+0.0	30.7	50.0	-19.3	L2-Ne
15	1.485M	20.4	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	26.6	46.0	-19.4	L2-Ne
16	2.298M	20.4	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	26.6	46.0	-19.4	L2-Ne
17	1.826M	20.3	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	26.5	46.0	-19.5	L2-Ne
18	3.378M	20.0	+5.8 +0.2	+0.1	+0.1	+0.1	+0.0	26.3	46.0	-19.7	L2-Ne
19	18.490M	22.6	+5.8 +1.0	+0.4	+0.2	+0.2	+0.0	30.2	50.0	-19.8	L2-Ne
20	2.502M	19.8	+5.8 +0.1	+0.1	+0.1	+0.2	+0.0	26.1	46.0	-19.9	L2-Ne
21	1.689M	19.8	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	26.0	46.0	-20.0	L2-Ne
22	1.962M	19.7	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	25.9	46.0	-20.1	L2-Ne
23	2.093M	19.7	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	25.9	46.0	-20.1	L2-Ne
24	1.081M	19.5	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	25.7	46.0	-20.3	L2-Ne

25	2.366M	19.5	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	25.7	46.0	-20.3	L2-Ne
26	2.634M	19.3	+5.8 +0.1	+0.1	+0.1	+0.2	+0.0	25.6	46.0	-20.4	L2-Ne
27	1.145M	19.3	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	25.5	46.0	-20.5	L2-Ne
28	1.621M	19.3	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	25.5	46.0	-20.5	L2-Ne
29	2.838M	19.1	+5.8 +0.2	+0.1	+0.1	+0.2	+0.0	25.5	46.0	-20.5	L2-Ne
30	1.349M	19.2	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	25.4	46.0	-20.6	L2-Ne
31	1.889M	19.2	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	25.4	46.0	-20.6	L2-Ne
32	298.350k	23.7	+5.8 +0.0	+0.0	+0.0	+0.1	+0.0	29.6	50.3	-20.7	L2-Ne
33	675.042k	19.1	+5.8 +0.0	+0.1	+0.0	+0.3	+0.0	25.3	46.0	-20.7	L2-Ne
34	2.025M	19.0	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	25.2	46.0	-20.8	L2-Ne
35	3.174M	18.9	+5.8 +0.2	+0.1	+0.1	+0.1	+0.0	25.2	46.0	-20.8	L2-Ne
36	3.646M	18.9	+5.8 +0.2	+0.1	+0.1	+0.1	+0.0	25.2	46.0	-20.8	L2-Ne
37	811.030k	18.9	+5.8 +0.0	+0.1	+0.0	+0.3	+0.0	25.1	46.0	-20.9	L2-Ne
38	2.230M	18.8	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	25.0	46.0	-21.0	L2-Ne
39	2.166M	18.7	+5.8 +0.1	+0.1	+0.0	+0.2	+0.0	24.9	46.0	-21.1	L2-Ne
40	2.706M	18.6	+5.8 +0.1	+0.1	+0.1	+0.2	+0.0	24.9	46.0	-21.1	L2-Ne
41	13.697M	21.6	+5.8 +0.8	+0.3	+0.2	+0.2	+0.0	28.9	50.0	-21.1	L2-Ne
42	2.566M	18.5	+5.8 +0.1	+0.1	+0.1	+0.2	+0.0	24.8	46.0	-21.2	L2-Ne
43	3.042M	18.4	+5.8 +0.2	+0.1	+0.1	+0.2	+0.0	24.8	46.0	-21.2	L2-Ne
44	2.906M	18.3	+5.8 +0.2	+0.1	+0.1	+0.2	+0.0	24.7	46.0	-21.3	L2-Ne
45	2.770M	18.2	+5.8 +0.2	+0.1	+0.1	+0.2	+0.0	24.6	46.0	-21.4	L2-Ne
46	12.067M	21.4	+5.8 +0.7	+0.3	+0.2	+0.2	+0.0	28.6	50.0	-21.4	L2-Ne
47	16.346M	21.2	+5.8 +0.9	+0.3	+0.2	+0.2	+0.0	28.6	50.0	-21.4	L2-Ne
48	405.976k	20.2	+5.8 +0.0	+0.0	+0.0	+0.2	+0.0	26.2	47.7	-21.5	L2-Ne
49	15.337M	21.1	+5.8 +0.9	+0.3	+0.2	+0.2	+0.0	28.5	50.0	-21.5	L2-Ne
50	3.850M	18.1	+5.8 +0.2	+0.1	+0.1	+0.1	+0.0	24.4	46.0	-21.6	L2-Ne

**Test Setup Photo(s)**



# SUPPLEMENTAL INFORMATION

## Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

Uncertainties reported are worst case for all CKC Laboratories’ sites and represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

## Emissions Test Details

**TESTING PARAMETERS**

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

**CORRECTION FACTORS**

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on subtracting the limit value from the corrected measurement value; a positive margin represents a measurement exceeding the limit, while a negative margin represents a measurement less than the limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB/m)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

**TEST INSTRUMENTATION AND ANALYZER SETTINGS**

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

**SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS**

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or caret ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

**Peak**

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

**Quasi-Peak**

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

**Average**

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point, the measuring device is set into the linear mode and the scan time is reduced.