TEST REPORT

Test Report No.:	**SKTRFC-111208-025**		
Applicant:	**LS Cable & System Ltd.**		
Applicant Address:	555, Hogye-dong, Dongan-gu, Anyang-si, Gyeonggi-do, Korea		
Manufacturer:	**LS Cable & System Ltd.**		
Manufacturer Address:	555, Hogye-dong, Dongan-gu, Anyang-si, Gyeonggi-do, Korea		
Device Under Test:	**LS Wireless Charger**		
FCC ID:	**ZH3TBW22M**	**Model Name:**	**LSWC-TBW22-M**
Variant Model Name:	**LSWC-TW22-M, LSWC-TGW22-M, LSWC-TPW22-M, LSWC-TAW22-M, LSWC-TOW22-M**		
Brand/Trade Name:	-		
Receipt No.:	SKTEU11-1145	**Date of receipt:**	October 05, 2011
Date of Issue:	December 8, 2011		
Location of Testing:	**SK TECH CO., LTD.** #820-2, Wolmoon-ri, Wabu-up, Namyangju-si, Kyunggi-do, 472-905 South Korea		
Test Procedure:	**ANSI C63.4-2003**		
Test Specification:	**47CFR, FCC Part 15 Rules**		
FCC Equipment Class:	**DCD - Part 15 Low Power Transmitter Below 1705kHz**		
Test Result:	The above-mentioned device has been tested and passed.		

Tested & Reported by: *Jungtae Kim* — *December 8, 2011*
Signature Date

Approved by: *Jongsoo Yoon* — *December 8, 2011*
Signature Date

Other Aspects:	-
Abbreviations:	· **OK, Pass = passed** · **Fail = failed** · **N/A = not applicable**

☞
- **This test report is not permitted to copy partly and entirely without our permission.**
- **This test result is dependent on only equipment to be used.**
- **This test result is based on a single evaluation of submitted samples of the above mentioned.**

>> CONTENTS <<

1. GENERAL

These tests were performed using the test procedure outlined in ANSI C63.4-2003 for intentional radiators, and in accordance with the limits set forth in FCC Part 15.209 and 15.207. The EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards.

We attest to the accuracy of data. All measurements reported herein were performed by SK TECH CO., LTD. and were made under Chief Engineer's supervision.
We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. TEST SITE

SK TECH Co., Ltd.

2.1 Location

#820-2, Wolmoon-ri, Wabu-up, Namyangju-si, Kyunggi-do, 472-905 South Korea

(FCC Registered Test Site Number: 938639)

(OPEN AREA TEST SITE INDUSTRY CANADA NUMBER: IC 5429A-1)

This laboratory is also notified to FCC by RRA as a Conformity Assessment Body, and designated to perform compliance testing on equipment subject to Declaration of Conformity (DOC) and Certification under Parts 15 and 18 of the FCC Rules. Designation number: KR0007

2.2 List of Test and Measurement Instruments

No.	Description	Manufacturer	Model No.	Serial No.	Calibrated until	Used
1	Spectrum Analyzer	Agilent	E4405B	US40520856	2012.03	
2	Spectrum Analyzer	Agilent	E4440A	MY46186322	2012.05	☒
3	EMC Spectrum Analyzer	Agilent	E7405A	US40240203	2012.03	☒
4	EMI Test Receiver	Rohde&Schwarz	ESPI7	101206	2012.07	☒
5	EMI Test Receiver	Rohde&Schwarz	ESIB40	100277	2012.03	
6	EMI Test Receiver	Rohde&Schwarz	ESHS10	862970/019	2012.07	☒
7	Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	836679/018	2012.07	☒
8	Pre-amplifier	HP	8447F	3113A05153	2012.07	☒
9	Pre-amplifier	MITEQ	AFS44	1116321	2011.12	
10	Pre-amplifier	MITEQ	AFS44	1116322	2012.07	
11	Power Meter	Agilent	E4417A	MY45100426	2012.07	
12	Power Meter	Agilent	E4418B	US39402176	2012.07	
13	Power Sensor	Agilent	E9327A	MY44420696	2012.07	
14	Power Sensor	Agilent	8482A	MY41094094	2012.07	
15	Power Sensor	Agilent	8485A	3318A13916	2012.07	
16	Attenuator (10dB)	HP	8491B	38067	2012.07	
17	Attenuator (20dB)	Weinschel	44	AH6967	2012.07	
18	High Pass Filter	Wainwright	WHKX3.0/18G	8	2012.07	
19	VHF Precision Dipole Antenna (TX/RX)	Schwarzbeck	VHAP	1014 / 1015	2012.05	
20	UHF Precision Dipole Antenna (TX/RX)	Schwarzbeck	UHAP	989 / 990	2012.05	
21	Loop Antenna	Schwarzbeck	HFH2-Z2	863048/019	2012.11	☒
22	TRILOG Broadband Antenna	Schwarzbeck	VULB9168	230	2012.07	☒
23	TRILOG Broadband Antenna	Schwarzbeck	VULB9168	189	2012.05	
24	Horn Antenna	AH Systems	SAS-200/571	304	N/A	
25	Horn Antenna	EMCO	3115	00040723	2012.04	
26	Horn Antenna	EMCO	3115	00056768	2012.10	
27	Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170318	2013.09	
28	Vector Signal Generator	Agilent	E4438C	MY42080359	2012.07	
29	PSG analog signal generator	Agilent	E8257D-520	MY45141255	2012.07	
30	DC Power Supply	HP	6633A	3325A04972	2012.07	
31	DC Power Supply	HP	6622A	3348A03223	2012.07	
32	Temperature/Humidity Chamber	All Three	ATM-50M	20030425	2012.03	
33	Hygro/Thermo Graph	SATO	PC-5000TRH-II	-	2012.07	☒

2.3 Test Date

Date of Test: November 16, 2011 ~ November 25, 2011

2.4 Test Environment

See each test item's description.

3. DESCRIPTION OF THE EQUIPMENT UNDER TEST

The product specification described herein was obtained from the product data sheet or user's manual.

3.1 Rating and Physical Characteristics

Power source	AC 100 V ~ 240V, 50/60 Hz (output: DC 19 V / 850 mA)
Local Oscillator or X-Tal	-
Transmit Frequency	110 kHz ~ 205 kHz
Antenna Type	Integral loop antenna
Type of Modulation	-
RF Output power	83.74 dBμV/m(PEAK) (measured @ 3m)
External Ports	DC INPUT

3.2 Equipment Modifications

None

3.3 Submitted Documents

Block diagram

Schematic diagram

Part List

User manual

4. MEASUREMENT CONDITIONS

4.1 Description of test configuration

The measurements were taken in normal operating/charging mode; continuously transmitting mode. The operating frequency was adjusted by placing the Receiver unit (wireless charging battery cover) on the Transmitter, according to the coil coupling efficiencies of both the charging and receiving loops in the Transmitter unit and Receiver unit.

4.2 List of Peripherals

Equipment Type	Manufacturer	Model	S/N
Receiver unit	LS Cable & System Ltd.	LSWC-RB21-I4	-
-	-	-	-
-	-	-	-

4.3 Type of Used Cables

#	START		END		CABLE	
	NAME	I/O PORT	NAME	I/O PORT	LENGTH(m)	SHIELDED
1	EUT	DC Input	Adaptor	DC Output	1.45	-
2	Adaptor	AC Input	AC mains	-	-	-

4.4 Uncertainty

Measurement Item	Combined Standard Uncertainty Uc	Expanded Uncertainty $U = k \times Uc$ ($k = 2$)
Radiated disturbance	± 2.30 dB	± 4.60 dB
Conducted disturbance	± 1.96 dB	± 3.92 dB

5. TEST AND MEASUREMENTS

Summary of Test Results

Requirement	FCC, 47CFR15	Report Section	Test Result
Antenna Requirement	15.203	5.1	PASS
Radiated Spurious Emissions	15.209	5.2	PASS
AC Power Line Conducted Emissions	15.207	5.3	PASS

5.1 ANTENNA REQUIREMENT

5.1.1 Regulation

FCC section 15.203, An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of Part 15C. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31 (d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

5.1.2 Result: PASS

The EUT has an integral loop coil antenna, and meets the requirements of this section.

5.2 RADIATED EMISSIONS

5.2.1 Regulation

FCC 47CFR15 – 15.209

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength limit (μV/m)	Field strength limit (dBμV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F (kHz) = 266.7 – 4.9	48.5 – 13.8	300
0.490 – 1.705	24000/F (kHz) = 49.0 – 14.1	33.8 – 23.0	30
1.705 – 30.0	30	29.5	30
30 – 88	100	40.0	3
88 – 216	150	43.5	3
216 – 960	200	46.0	3
Above 960	500	54.0	3

* The emission limits shown in the above table are based on measurement instrumentation employing a CISPR quasi-peak detector. For the frequency bands 9 – 90 kHz, 110 – 490 kHz and above 1000 MHz, the radiated emission limits are based on measurements employing an average detector.

* The lower limit shall apply at the transition frequencies.

5.2.2 Measurement Procedure

Radiated Emissions Test, 9 kHz to 30 MHz (Magnetic Field Test)

1. The preliminary radiated measurements were performed to determine the frequency producing the maximum emissions at a distance of 1 meter or 3 meters according to Section 15.31(f)(2).
2. The EUT was placed on the top of the 0.8-meter height, 1 × 1.5 meter non-metallic table.
3. Emissions from the EUT are maximized by adjusting the orientation of the Loop antenna and rotating the EUT on the turntable. Manipulating the system cables also maximizes EUT emissions if applicable.
4. To obtain the final measurement data, each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.

Radiated Emissions Test, above 30 MHz

1. The preliminary radiated measurements were performed to determine the frequency producing the maximum emissions in an anechoic chamber at a distance of 3 meters.
2. The EUT was placed on the top of the 0.8-meter height, 1 × 1.5 meter non-metallic table. To find the maximum emission levels, the height of a measuring antenna was changed and the turntable was rotated 360˚.
3. The antenna polarization was also changed from vertical to horizontal. The spectrum was scanned from 30 to 1000 MHz using the TRILOG broadband antenna.
4. To obtain the final measurement data, the EUT was arranged on a turntable situated on a 4 × 4 meter at the Open Area Test Site. The EUT was tested at a distance 3 meters.

5. Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.
6. The EUT is situated in three orthogonal planes (if appropriate)
7. The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT.

5.2.3 Calculation of the field strength limits below 30 MHz

1. No special calculation for obtaining the field strength in dBμV/m is necessary, because the EMI receiver and the active loop antenna operate as a system, where the reading gives directly the field strength result (dBμV/m). The antenna factors and cable losses are already taken into consideration.
2. For test distance other than what is specified, but fulfilling the requirements of section 15.31 (f) (2) the field strength is calculated by adding additionally an extrapolation factor of 40dB/decade (inverse linear distance for field strength measurements).
3. All following emission measurements were performed using the test receiver's average, peak, and quasi-peak detector function with specified bandwidth.
4. The basic equation is as follows;

FS= RA + DF

Where

FS = Field strength in dBμV/m

RA = Receiver Amplitude in dBμV/m

DF = Distance Extrapolation Factor in dB

Where DF = 40log(D_{TEST} / D_{SPEC}) where D_{TEST} = Test Distance and D_{SPEC} = Specified Distance

DF = 40log(3m/300m) = -80dB, for frequency band: 0.009 to 0.490MHz

DF = 40log(3m/30m) = -40dB, for frequency band: 0.490 to 30MHz

5.2.4 Test Results: PASS

Table 1: Field strength below 30 MHz

Frequency [kHz]	RBW [kHz]	Reading [dB(μV/m)]	Cable Loss [dB]	Actual [dB(μV/m)]	Limit (at 3m) [dB(μV/m)]	Margin [dB]	
Emissions (Average Detector)							
112.34	0.2	69.84	0.3	70.14	106.6	36.46	Operating at 112.34 kHz
220.92	9	46.05	0.3	46.35	100.7	54.35	
332.84	9	50.21	0.3	50.51	97.2	46.69	
174.01	9	80.41	0.3	80.71	102.8	22.09	Operating at 174.01 kHz
347.11	9	58.26	0.3	58.56	96.8	38.24	
202.34	9	70.69	0.3	70.99	101.5	30.51	Operating at 202.34 kHz
403.65	9	53.42	0.3	53.72	95.5	41.78	
Emissions (Peak Detector)							
112.34	0.2	83.74	0.3	84.04	126.6	42.56	Operating at 112.34 kHz
220.92	9	46.94	0.3	47.24	120.7	73.46	
332.84	9	51.06	0.3	51.36	117.2	65.84	
174.01	9	81.83	0.3	82.13	122.8	40.67	Operating at 174.01 kHz
347.11	9	50.82	0.3	51.12	116.8	65.68	
202.34	9	76.90	0.3	77.20	121.5	44.30	Operating at 202.34 kHz
403.65	9	58.13	0.3	58.43	115.5	57.07	
Emissions (Quasi-peak Detector); Frequency within 90 kHz ~ 110 kHz and above 490 kHz							
553.53	9	41.85	0.3	42.15	72.7	30.55	Operating at 112.34 kHz
775.92	9	36.99	0.3	37.29	69.8	32.51	
522.72	9	52.73	0.3	53.03	73.2	20.17	Operating at 174.01 kHz
602.27	9	60.14	0.3	60.44	72.0	11.56	Operating at 202.34 kHz

Actual (dBμV/m) = Reading + Cable Loss
Margin (dB) = Limit – Actual
NOTE: These test results were measured at the 3 m distance.

Table 2: Measured values of the Field strength (above 30 MHz)

Frequency [MHz]	RBW [kHz]	POL [V/H]	ANT [m]	Reading [dBμV]	AMP [dB]	AF [dB/m]	CL [dB]	Actual [dBμV/m]	Limit [dBμV/m]	Margin [dB]
58.74	120	V	1.05	50.96	28.53	12.16	0.76	35.35	40.00	4.65
154.26	120	V	1.02	51.22	28.18	12.74	1.22	37.00	43.50	6.50
216.67	120	H	1.57	43.98	27.89	9.98	1.44	27.51	46.00	18.49
278.61	120	H	1.08	41.54	27.73	12.50	1.64	27.95	46.00	18.05
309.53	120	H	1.03	45.11	27.75	13.50	1.73	32.59	46.00	13.41
340.55	120	H	1.00	41.02	27.96	14.20	1.81	29.07	46.00	16.93

Margin (dB) = Limit – Actual
[Actual = Reading + AF + CL]
1. H = Horizontal, V = Vertical Polarization
2. AF/CL = Antenna Factor and Cable Loss

NOTE: 1. All emissions not reported were more than 20 dB below the specified limit or in the noise floor.
2. These test results measured at the 3 m distance.

5.3 AC POWER LINE CONDUCTED EMISSIONS

5.3.1 Regulation

FCC 47CFR15 – 15.207(a)

According to §15.207(a), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Qausi-peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50

* Decreases with the logarithm of the frequency.

5.3.2 Test Procedure

1. The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 cm in which is located 40 cm away from the vertical wall and 1.5m away from the side wall of the shielded room.
2. Each current-carrying conductor of the EUT power cord was individually connected through a 50Ω/50μH LISN, which is an input transducer to a Spectrum Analyzer or an EMI/Field Intensity Meter, to the input power source.
3. Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
4. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 MHz to 30 MHz.
5. The measurements were made with the detector set to PEAK amplitude within a bandwidth of 10 kHz or to QUASI-PEAK and AVERAGE within a bandwidth of 9 kHz. The EUT was in transmitting mode during the measurements.

5.3.3 Test Results: PASS

Table 3: Measured values of the Conducted Emissions

Frequency [MHz]	Reading [dBµV]	L / N	CF [dB]	CL [dB]	Actual [dBµV]	Limit [dBµV]	Margin [dB]
QUASI-PEAK DATA(Operating at 112.34 kHz)							
0.1550	35.96	N	0.10	0.02	36.08	65.73	29.65
0.3100	30.58	L	0.12	0.02	30.72	59.97	29.25
0.4000	31.14	L	0.11	0.02	31.27	57.85	26.58
0.6050	34.54	L	0.12	0.04	34.70	56.00	21.30
1.2050	30.10	L	0.14	0.07	30.31	56.00	25.69
1.4200	30.62	N	0.15	0.07	30.84	56.00	25.16
1.6200	35.72	L	0.16	0.07	35.95	56.00	20.05
2.4100	36.36	L	0.20	0.11	36.67	56.00	19.33
3.2150	31.92	L	0.25	0.15	32.32	56.00	23.68
5.4600	29.80	L	0.35	0.19	30.34	60.00	29.66
AVERAGE DATA(Operating at 112.34 kHz)							
0.1550	22.11	L	0.14	0.02	22.27	55.73	33.46
0.3100	22.91	L	0.12	0.02	23.05	49.97	26.92
0.4000	24.59	L	0.11	0.02	24.72	47.85	23.13
0.6050	27.91	L	0.12	0.04	28.07	46.00	17.93
1.2050	22.99	L	0.14	0.07	23.20	46.00	22.80
1.6200	24.59	L	0.16	0.07	24.82	46.00	21.18
2.4100	23.75	L	0.20	0.11	24.06	46.00	21.94
3.2150	24.11	L	0.25	0.15	24.51	46.00	21.49
5.4600	21.56	L	0.35	0.19	22.10	50.00	27.90

Margin (dB) = Limit – Actual
[Actual = Reading + CF + CL]
L/N = LINE / NEUTRAL
CF/CL = Correction Factor and Cable Loss

NOTE: All emissions not reported were more than 20 dB below the specified limit.

Table 3: Measured values of the Conducted Emissions

Frequency [MHz]	Reading [dBμV]	L / N	CF [dB]	CL [dB]	Actual [dBμV]	Limit [dBμV]	Margin [dB]
QUASI-PEAK DATA(Operating at 174.01 kHz)							
0.1550	34.36	L	0.14	0.02	34.52	65.73	31.21
0.3100	30.18	L	0.12	0.02	30.32	59.97	29.65
0.4000	32.18	L	0.11	0.02	32.31	57.85	25.54
0.6050	38.90	L	0.12	0.04	39.06	56.00	16.94
0.8100	35.04	L	0.13	0.05	35.22	56.00	20.78
1.2050	32.92	L	0.14	0.07	33.13	56.00	22.87
1.4200	31.68	L	0.15	0.07	31.90	56.00	24.10
2.2250	31.82	L	0.19	0.10	32.11	56.00	23.89
2.4100	37.40	L	0.20	0.11	37.71	56.00	18.29
5.0200	29.46	N	0.25	0.19	29.90	60.00	30.10
AVERAGE DATA(Operating at 174.01 kHz)							
0.1550	21.33	L	0.14	0.02	21.49	55.73	34.24
0.3100	22.75	L	0.12	0.02	22.89	49.97	27.08
0.4000	25.22	L	0.11	0.02	25.35	47.85	22.50
0.6050	32.24	L	0.12	0.04	32.40	46.00	13.60
0.8100	27.49	L	0.13	0.05	27.67	46.00	18.33
1.2050	22.50	L	0.14	0.07	22.71	46.00	23.29
1.4200	22.15	L	0.15	0.07	22.37	46.00	23.63
2.2250	23.82	N	0.15	0.10	24.07	46.00	21.93
2.4100	26.32	L	0.20	0.11	26.63	46.00	19.37
5.0200	19.80	N	0.25	0.19	20.24	50.00	29.76

Margin (dB) = Limit – Actual
[Actual = Reading + CF + CL]
L/N = LINE / NEUTRAL
CF/CL = Correction Factor and Cable Loss

NOTE: All emissions not reported were more than 20 dB below the specified limit.

Table 3: Measured values of the Conducted Emissions

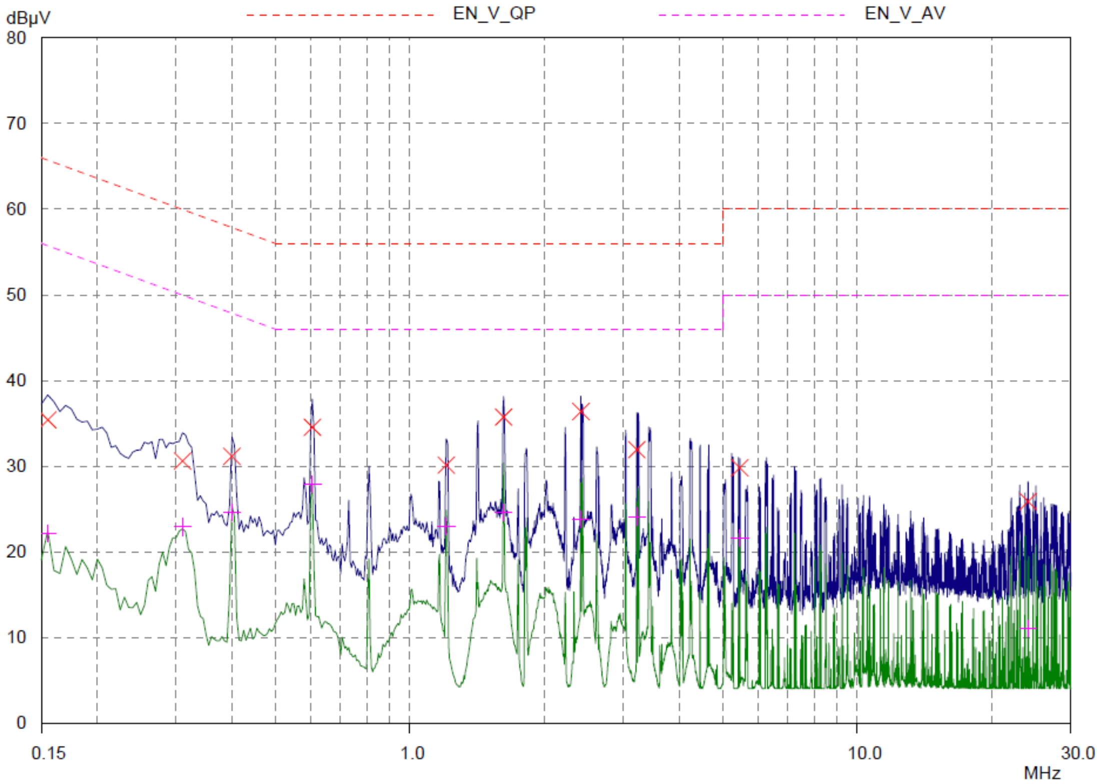
Frequency [MHz]	Reading [dBμV]	L / N	CF [dB]	CL [dB]	Actual [dBμV]	Limit [dBμV]	Margin [dB]
QUASI-PEAK DATA(Operating at 202.34 kHz)							
0.3100	30.30	L	0.12	0.02	30.44	59.97	29.53
0.4000	33.42	L	0.11	0.02	33.55	57.85	24.30
0.6050	38.94	L	0.12	0.04	39.10	56.00	16.90
0.8050	35.90	L	0.13	0.05	36.08	56.00	19.92
1.4100	36.76	L	0.15	0.07	36.98	56.00	19.02
1.6100	36.76	L	0.16	0.07	36.99	56.00	19.01
2.4250	38.18	L	0.21	0.11	38.50	56.00	17.50
2.6300	37.16	L	0.22	0.12	37.50	56.00	18.50
3.4400	29.72	N	0.20	0.15	30.07	56.00	25.93
AVERAGE DATA(Operating at 202.34 kHz)							
0.3100	22.66	L	0.12	0.02	22.80	49.97	27.17
0.4000	25.59	L	0.11	0.02	25.72	47.85	22.13
0.6050	32.91	L	0.12	0.04	33.07	46.00	12.93
0.8050	29.62	L	0.13	0.05	29.80	46.00	16.20
1.4100	26.38	L	0.15	0.07	26.60	46.00	19.40
1.6100	26.48	L	0.16	0.07	26.71	46.00	19.29
2.4250	27.54	L	0.21	0.11	27.86	46.00	18.14
2.6300	25.76	L	0.22	0.12	26.10	46.00	19.90
3.4400	23.38	N	0.20	0.15	23.73	46.00	22.27

Margin (dB) = Limit – Actual
[Actual = Reading + CF + CL]
L/N = LINE / NEUTRAL
CF/CL = Correction Factor and Cable Loss

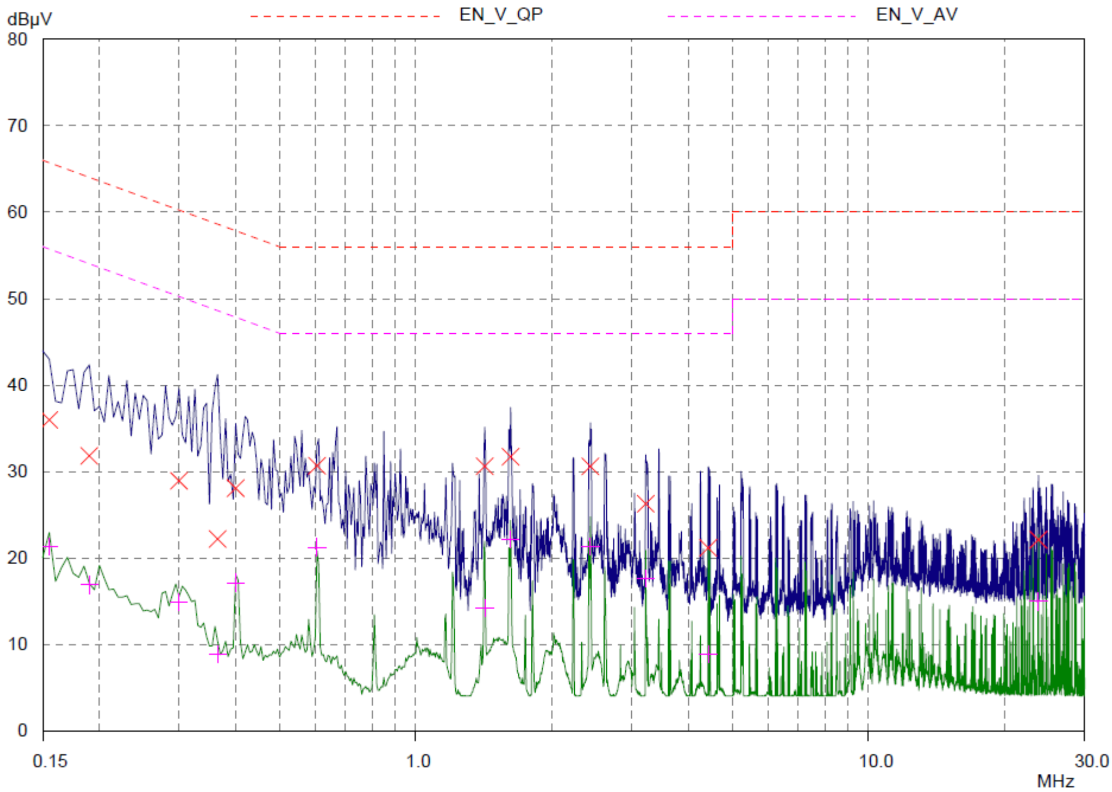
NOTE: All emissions not reported were more than 20 dB below the specified limit.

Figure 1. Plot of the Conducted Emissions

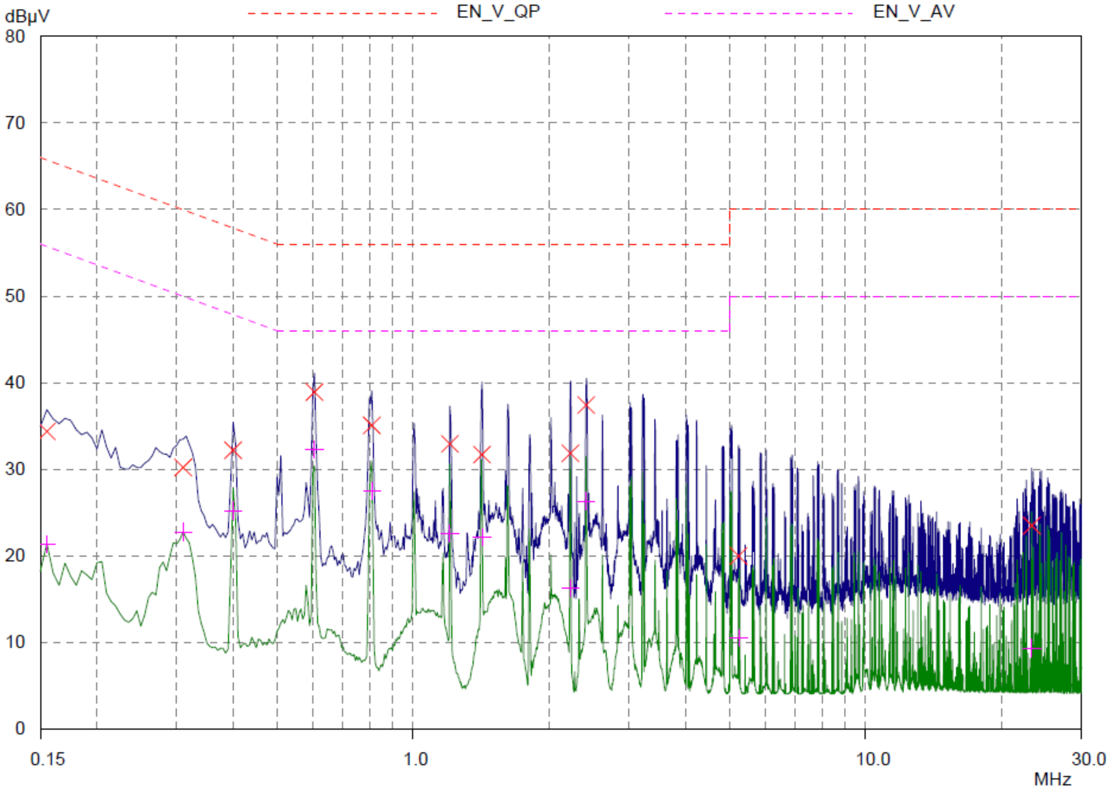
Line – PE (Peak and Average detector used)(Operating at 112.34 kHz)



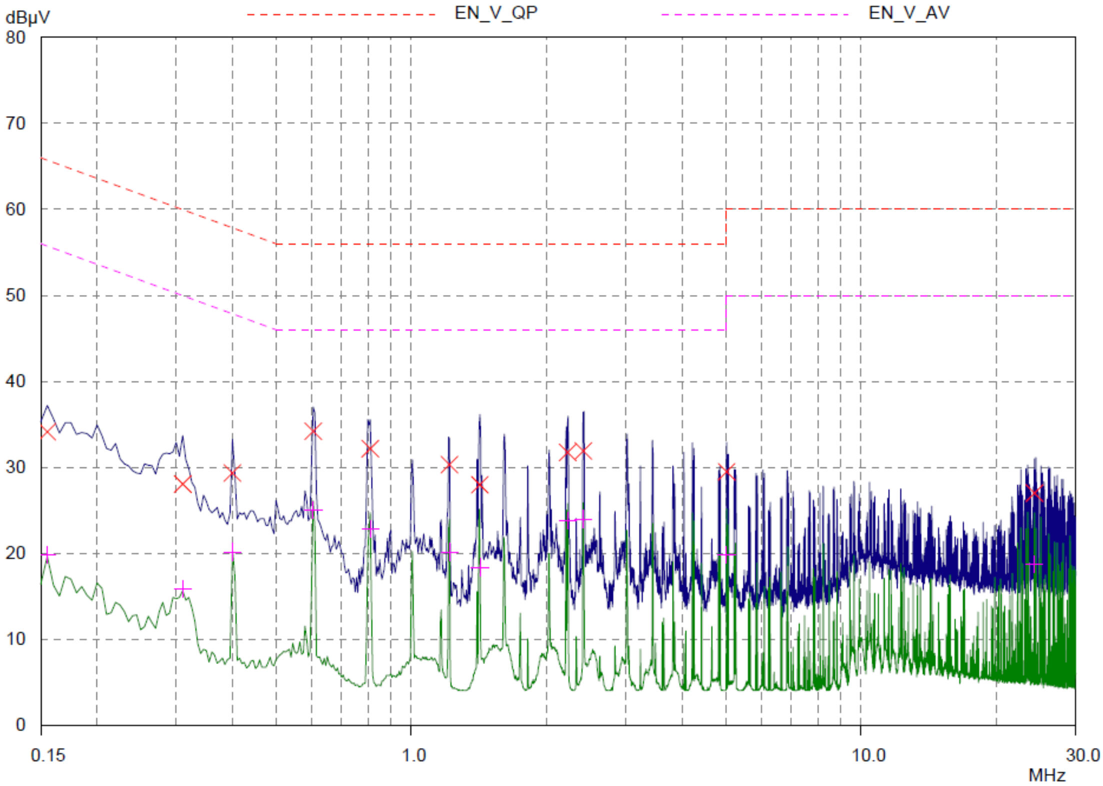
Neutral – PE (Peak and Average detector used)(Operating at 112.34 kHz)



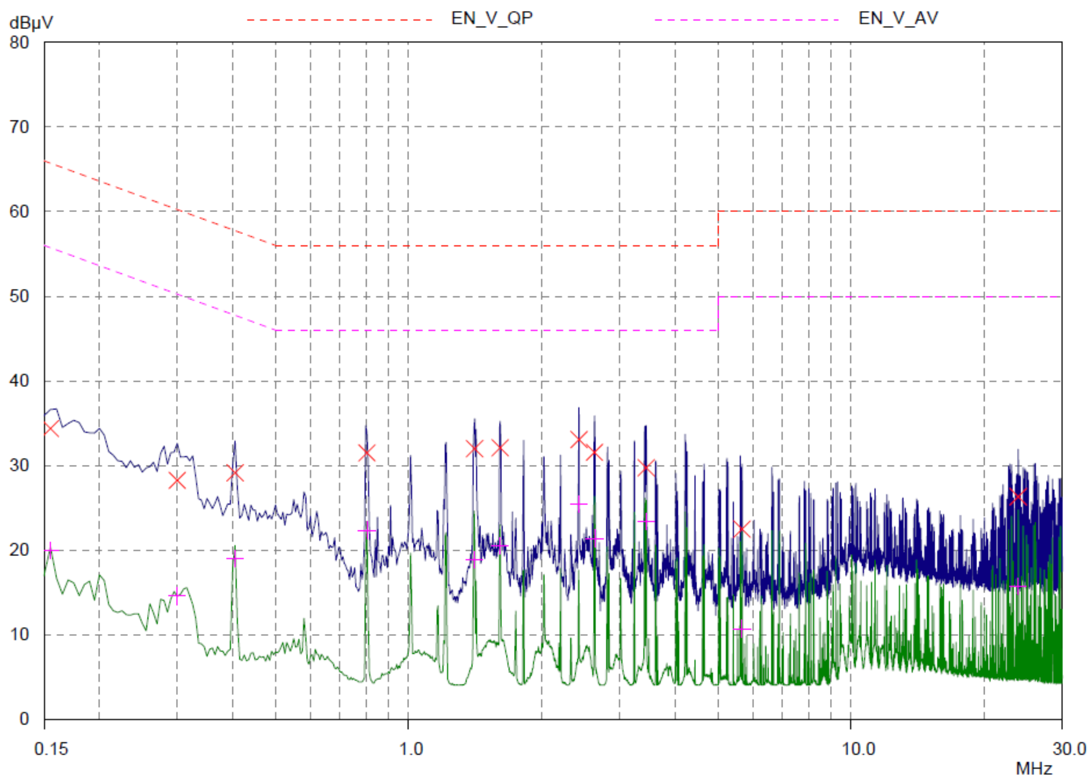
Line – PE (Peak and Average detector used)(Operating at 174.01 kHz)



Neutral – PE (Peak and Average detector used)(Operating at 174.01 kHz)



Line – PE (Peak and Average detector used)(Operating at 202.34 kHz)



Neutral – PE (Peak and Average detector used)(Operating at 202.34 kHz)