Intertek

Report No.: 140604036GZU-001
Issued: 05 June 2014

TEST REPORT

Applicant Name & Address	:	Polygroup Limited(Macao Commercial Offshore) Avenida Xian Xing Hai,Centro Golden Dragon,11 Andar Macau
Sample Description		
Product	:	Christmas Tree Lighting
Model No.	:	LxGxYxS (the first x=30-120; the second x=0-5; the third x=0100-2300) Note: "L" means that the low voltage. The first "x" indicates the size of the tree, said the use of height from3ft-12ft. "Gx" number of lines, G0 represents 0 drag line G5 on behalf of 5 drag line. "Y" means tree stand. M means the tree is to use ordinary tree foot. R which means that the tree is to use rotating tree foot. The third "x" represents the number of lamp, from 100 to 2300 lamp. "S" means that the tree pin.
Electrical Rating	:	Christmas Tree Lighting powered by Adapter .(Details in page 4 and 5)
FCC ID		2AABT-CW003
Date Received	:	22 April 2013 & 21 April 2014
Date Test Conducted	:	25 April 2013-13 May 2013 & 21 April 2014-30 April 2014
Test standards	:	**FCC Part 15: 2013 Subpart B**
Test Result	:	Pass
Conclusion	:	The submitted samples complied with the above rules/standards.
Remark	:	None.

**********End of Page**********

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05 June 2014 ***Date***

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1 TEST RESULTS SUMMARY

Classification of EUT: Class B

Test Item	Standard	Result
Conducted disturbance voltage at mains ports	**FCC Part 15: 2013, Subpart B**	**Pass**
Radiated emission (30 MHz–1 GHz)	**FCC Part 15: 2013, Subpart B**	**Pass**
Radiated emission (Above 1 GHz)	**FCC Part 15: 2013, Subpart B**	**Pass**
Remark: Reference publication is used for methods of measurement: ANSI C63.4:2009		

Remark: 1. When determining the test results, measurement uncertainty of tests has been considered.

2 Test Results Conclusion
(with Justification)

RE: EMC Testing Pursuant to FCC Part 15, Subpart B Performed On the Christmas Tree Lighting, Model: LxGxYxS(the first x=30-120, means the height of the tree; the second x=0-5 ,means the number of the cord set; the third x=0100-2300, means the number of LED).

We tested the Christmas Tree Lighting, Model: L12G5R1400S, L12G5R2000S, L12G5R2300S, to determine if they were in compliance with the relevant FCC rules as marked on the Test Results Summary. We found that the units met the requirement of FCC Part 15, Subpart B when tested as received. The worst case's test data was presented in this test report.

The Equipment Under Test (EUT) is controlled by a controller, the controller is an intentional radiator using 433.92MHz frequency.

Antenna Type: PCB antenna.

The controller option of this receiver is subject to Certification procedure.

Model：LxGxYxS (Thirdly X=0100-0300) use the Adapter model XY-2900100UO
Model：LxGxYxS (Thirdly X=0100-0600) use the Adapter model XY-2900200UO
Model：LxGxYxS (Thirdly X=0100-0900) use the Adapter model XY-2900300U
Model：LxGxYxS (Thirdly X=0100-0900) use the Adapter model XY-2900300UO
Model：LxGxYxS (Thirdly X=0100-1100) use the Adapter model XY-2900400U
Model：LxGxYxS (Thirdly X=0100-1100) use the Adapter model XY-2900400UO
Model：LxGxYxS (Thirdly X=0100-1400) use the Adapter model XY-2900500-U
Model：LxGxYxS (Thirdly X=0100-1400) use the Adapter model XY-2900500-UO
Model：LxGxYxS (Thirdly X=0100-1600) use the Adapter model XY-2900600-U
Model：LxGxYxS (Thirdly X=0100-1600) use the Adapter model XY-2900600-UO
Model：LxGxYxS (Thirdly X=0100-1800) use the Adapter model XY-2900700-U
Model：LxGxYxS (Thirdly X=0100-1800) use the Adapter model XY-2900700-UO
Model：LxGxYxS (Thirdly X=0100-2000) use the Adapter model XY-2900800-U
Model：LxGxYxS (Thirdly X=0100-2000) use the Adapter model XY-2900800-UO
Model：LxGxYxS (Thirdly X=0100-0800) use the Adapter model TS-8W29V
Model：LxGxYxS (Thirdly X=0100-1300) use the Adapter model TS-13W29V
Model：LxGxYxS (Thirdly X=0100-2300) use the Adapter model TS-29V0.9A
Model：LxGxYxS (Thirdly X=0100-0300) use the Adapter model TS-3W28V
Model：LxGxYxS (Thirdly X=0100-1400) use the Adapter mode MTS810-29V
Model：LxGxYxS (Thirdly X=0100-1400) use the Adapter mode MTS-810-29V

Adapter model XY-2900100UO, input 120V, 60Hz, output DC 29V 0.1A 2.9W
Adapter model XY-2900200UO, input 120V, 60Hz, output DC 29V 0.2A 5.8W
Adapter model XY-2900300U, input 100-240V, 50/60Hz, output DC 29V 0.3A 8.7W
Adapter model XY-2900300UO, input 120V, 60Hz, output DC 29V 0.3A 8.7W
Adapter model XY-2900400U, input 100-240V, 50/60Hz, output DC 29V 0.4A 11.4W
Adapter model XY-2900400UO, input 120V, 60Hz, output DC 29V 0.4A 11.4W
Adapter model XY-2900500-U, input 100-240V, 50/60Hz, output DC 29V 0.5A 14.5W
Adapter model XY-2900500-UO, input 120V, 60Hz, output DC 29V 0.5A 14.5W
Adapter model XY-2900600-U, input 100-240V, 50/60Hz, output DC 29V 0.6A 17.4W
Adapter model XY-2900600-UO, input 120V, 60Hz, output DC 29V 0.6A 17.4W
Adapter model XY-2900700-U, input 100-240V, 50/60Hz, output DC 29V 0.7A 20.3W
Adapter model XY-2900700-UO, input 120V, 60Hz, output DC 29V 0.7A 20.3W
Adapter model XY-2900800-U, input 100-240V, 50/60Hz, output DC29V 0.8A 23.2W
Adapter model XY-2900800-UO, input 120V, 60Hz, output DC29V 0.8A 23.2W
Adapter model TS-3W28V, input 120V, 60Hz, output DC28V0.1A 3W
Adapter model TS-8W29V, input 120V, 60Hz, output DC29V0.28A 8W
Adapter model TS-13W29V, input 120V, 60Hz, output DC29V0.45A 13W
Adapter model TS-29V0.9A, input 120V, 60Hz, output DC29V0.9A 26.1W
Adapter model MTS810-29V, input 120V, 60Hz, output DC29V 15W
Adapter model MTS-810-29V, input 120V, 60Hz, output DC29V 15W

All models can use adapter and the controller PDR-001-29V series, PDR-002-29V series, PDR-003-29V series and with Remote Control PDT-001-29V.

The controllers PDR-001-29V, PDR-002-29V, PDR-003-29V are identical except the model number.

Adapter XY-2900100UO and XY-2900200UO they have the same circuit and mechanical design, their difference is that the output current and output electronic components parameters.

Adapter XY-2900300U, XY-2900300UO, XY-2900400U and XY-2900400UO they have the same circuit and mechanical design, their different is that the output current and output electronic components parameters.

Adapter XY-2900500-U, XY-2900600-U, XY-2900700-U, XY-2900800-U, XY-2900500-UO, XY-2900600-UO, XY-2900700-UO, XY-2900800-UO they have the same circuit and mechanical design, their different is that the output current and output electronic components parameters.

Adapter TS-8W29V, TS-13W29V, TS-3W28V they have the same circuit and mechanical design, their different is that the output current and output electronic components parameters.

Adapter MTS810-29V and MTS-810-29V are all identical except the model number.

All models are declared to be identical in terms of electrical design, their difference lies in the number of LED. All models have been pre-tested and found L12G5R2000S+XY-2900800-U, L12G5R2300S+TS-29V0.9A, L12G5R1400S + MTS-810-29V were the worst case in all models.

The data on the below test result table lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

According 15.107, the worst case conducted emission at 0.452MHz

Judgement: Passed by -4.0 dB

According 15.109, the worst case radiated emission at 57.16 MHz
Judgement: Passed by -3.06 dB

The production units are required to conform to the initial sample as received when the units are placed on the market.

3 LABORATORY MEASUREMENTS

Configuration Information

Equipment Under Test (EUT):	Christmas Tree Lighting
Model:	L12G5R1400S, L12G5R2000S, L12G5R2300S
Serial No.	Not Labeled
Support Equipment:	N/A
Rated Voltage:	120V, 60Hz
Condition of Environment:	Temperature : 22~28°C Relative Humidity: 35~60% Atmosphere Pressure 86~106kPa

Notes:
The EMI measurements had been made in the operating mode producing the largest emission in the frequency band being investigated consistent with normal applications.
An attempt had been made to maximize the emission by varying the configuration of the EUT.

4 TEST RESULTS

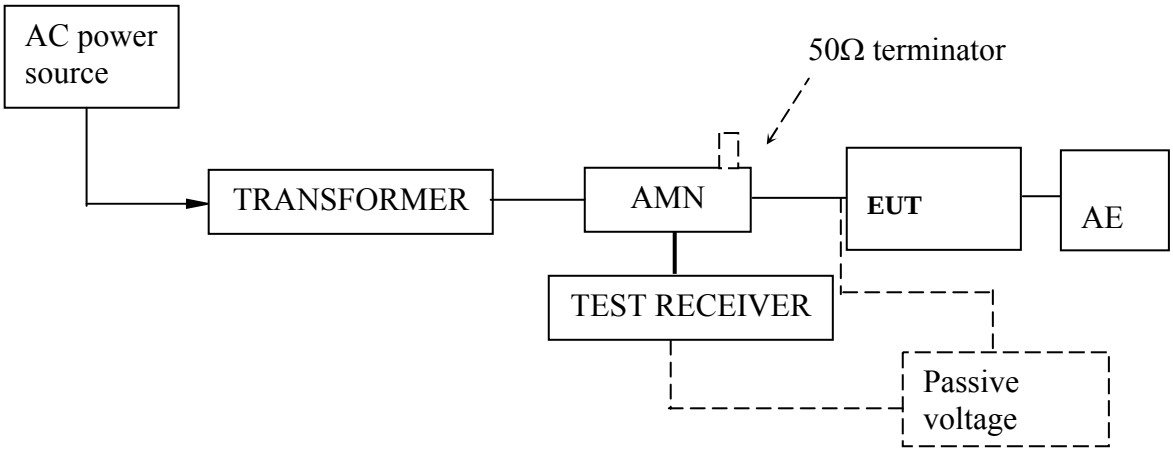
4.1 Conducted Disturbance Voltage at mains ports

Test Result: Pass

4.1.1 Used Test Equipment

Equipment No.	Equipment	Model	Manufacturer
EM004-04	EMC shield Room	8m×3m×3m	Zhongyu
EM080-05	EMI receiver	ESCI	R&S
EM006-05	LISN	ENV216	R&S

4.1.2 Block Diagram of Test Setup



4.1.3 Test Setup and Procedure

Test was performed according to ANSI C63.4: 2009. The EUT was set to achieve the maximum emission level. The mains terminal disturbance voltage was measured with the EUT in a shielded room. The EUT was connected to AC power source through an Artificial Mains Network which provides a 50Ω linear impedance Artificial hand is used if appropriate (for handheld apparatus). The load/control terminal disturbance voltage was measured with passive voltage probe if appropriate.

The table-top EUT was placed on a 0.8m high non-metallic table above earthed ground plane(Ground Reference Plane).And for floor standing EUT, was placed on a 0.1m high non-metallic supported on GRP. The EUT keeps a distance of at least 0.8m from any other of the metallic surface. The Artificial Mains Network is situated at a distance of 0.8m from the EUT.

During the test, mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m.

The bandwidth of test receiver was set at 9 kHz. The frequency range from 150 kHz to 30MHz was checked.

4.1.4 Limit

Class B

Frequency range MHz	**AC mains terminals** dB (uV)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56	56 to 46
0.5 to 5	56	46
5 to 30	60	50
Note 1: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz. Note 2: The lower limit is applicable at the transition frequency.		

4.1.5 Test Data

At main terminal: Pass

Test Voltage: AC120V, 60Hz **Model: L12G5R2000S+XY-2900800-U**

Tested Wire: Live **Operation Mode: LED light on**

Frequency	**Quasi-Peak**		**Average**	
[MHz]	Disturbance level [dB(μV)]	Permitted limit [dB(μV)]	Disturbance level [dB(μV)]	Permitted limit [dB(μV)]
0.166	51.1	65.2	34.0	55.2
0.422	43.6	57.4	41.2	47.4
0.554	33.5	56.0	28.0	46.0
0.662	32.5	56.0	27.2	46.0
0.678	33.1	56.0	28.2	46.0
4.970	31.8	56.0	23.8	46.0

Tested Wire: Neutral **Operation Mode: LED light on**

Frequency	Quasi-Peak		Average	
[MHz]	Disturbance level [dB(μV)]	Permitted limit [dB(μV)]	Disturbance level [dB(μV)]	Permitted limit [dB(μV)]
0.166	48.8	65.2	34.0	55.2
0.418	44.1	57.5	40.2	47.5
0.554	32.9	56.0	28.5	46.0
0.886	32.4	56.0	27.5	46.0
2.842	29.3	56.0	24.5	46.0
4.366	31.2	56.0	25.1	46.0

At main terminal: Pass

Test Voltage: AC120V, 60Hz **Model: L12G5R2300S+TS29V0.9A**

Tested Wire: Live **Operation Mode: LED light on**

Frequency	Quasi-Peak		Average	
[MHz]	Disturbance level [dB(μV)]	Permitted limit [dB(μV)]	Disturbance level [dB(μV)]	Permitted limit [dB(μV)]
0.150	54.8	66.0	47.2	56.0
0.246	52.5	61.9	48.3	51.9
0.294	48.3	60.4	44.4	50.4
0.342	48.8	59.2	44.1	49.2
0.634	43.1	56.0	34.9	46.0
1.022	41.7	56.0	34.8	46.0

Tested Wire: Neutral **Operation Mode: LED light on**

Frequency	Quasi-Peak		Average	
[MHz]	Disturbance level [dB(μV)]	Permitted limit [dB(μV)]	Disturbance level [dB(μV)]	Permitted limit [dB(μV)]
0.150	53.7	66.0	45.1	56.0
0.246	49.9	61.9	44.5	51.9
0.294	45.8	60.4	42.2	50.4
0.342	46.6	59.2	42.9	49.2
0.634	43.1	56.0	36.0	46.0
1.022	42.7	56.0	34.4	46.0

At main terminal: Pass

Test Voltage: AC120V, 60Hz **Model: L12G5R1400S + MTS-810-29V**

Tested Wire: Live **Operation Mode: LED light on**

Frequency	Quasi-Peak		Average	
[MHz]	Disturbance level [dB(μV)]	Permitted limit [dB(μV)]	Disturbance level [dB(μV)]	Permitted limit [dB(μV)]
0.154	51.0	65.8	35.8	55.8
0.452	43.0	56.8	39.5	46.8
1.077	39.7	56.0	28.8	46.0
3.454	43.7	56.0	30.5	46.0
6.523	45.0	60.0	34.6	50.0
13.127	44.6	60.0	31.3	50.0

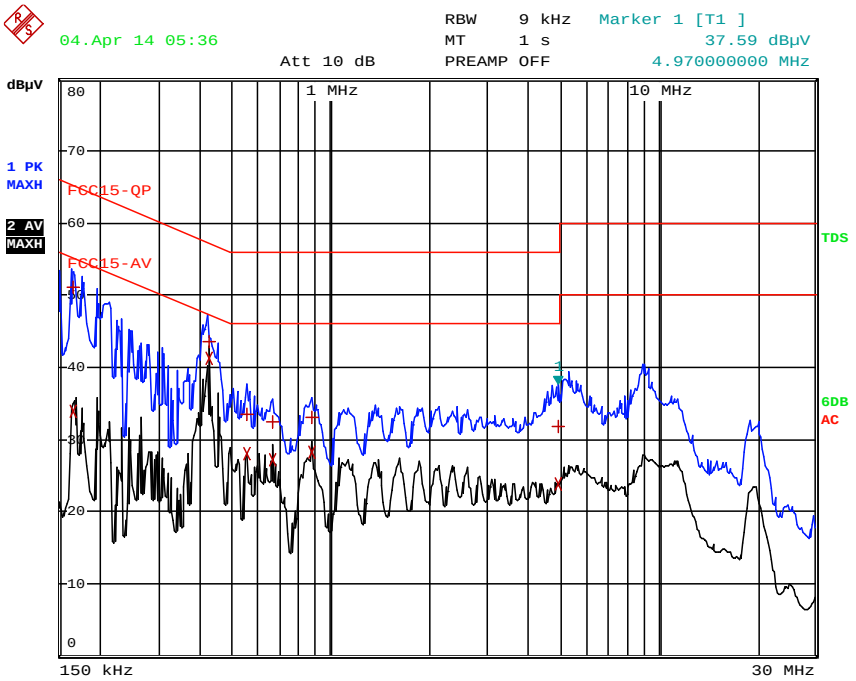
Tested Wire: Neutral **Operation Mode: LED light on**

Frequency	Quasi-Peak		Average	
[MHz]	Disturbance level [dB(µV)]	Permitted limit [dB(µV)]	Disturbance level [dB(µV)]	Permitted limit [dB(µV)]
0.182	46.6	64.4	32.3	54.4
0.452	45.5	56.8	42.8	46.8
1.077	43.7	56.0	31.6	46.0
3.346	44.6	56.0	32.2	46.0
6.592	46.7	60.0	35.4	50.0
12.988	46.7	60.0	32.7	50.0

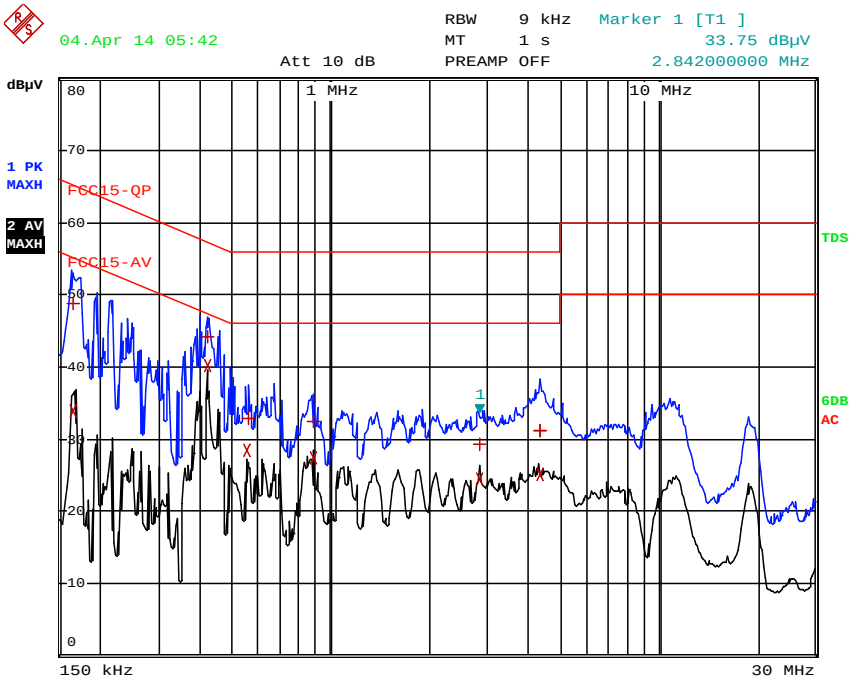
4.1.6 Emission Curve

Test Voltage: AC120V, 60Hz **Model: L12G5R2000S+XY2900800-U**

Tested Wire: Live

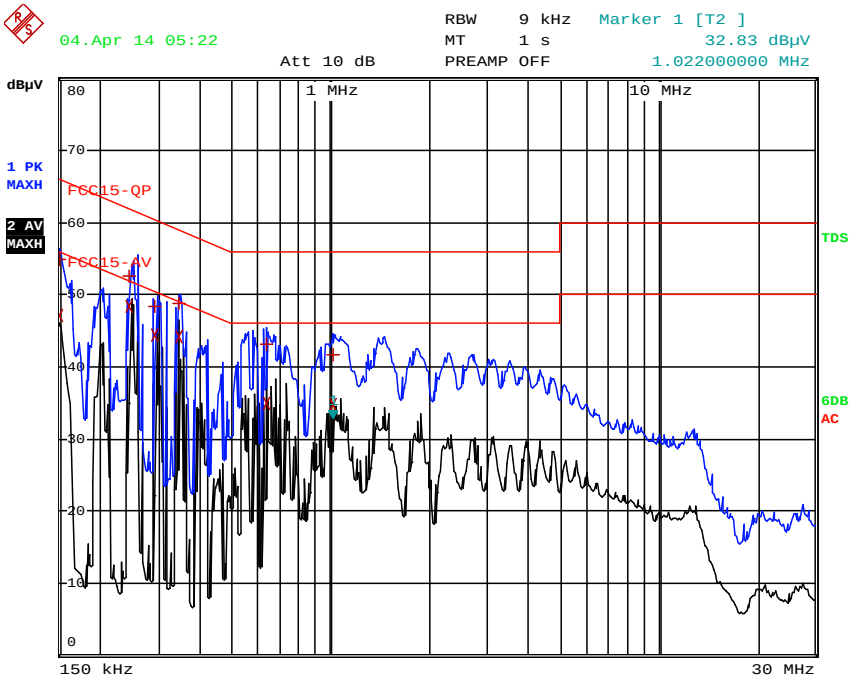


Tested Wire: Neutral

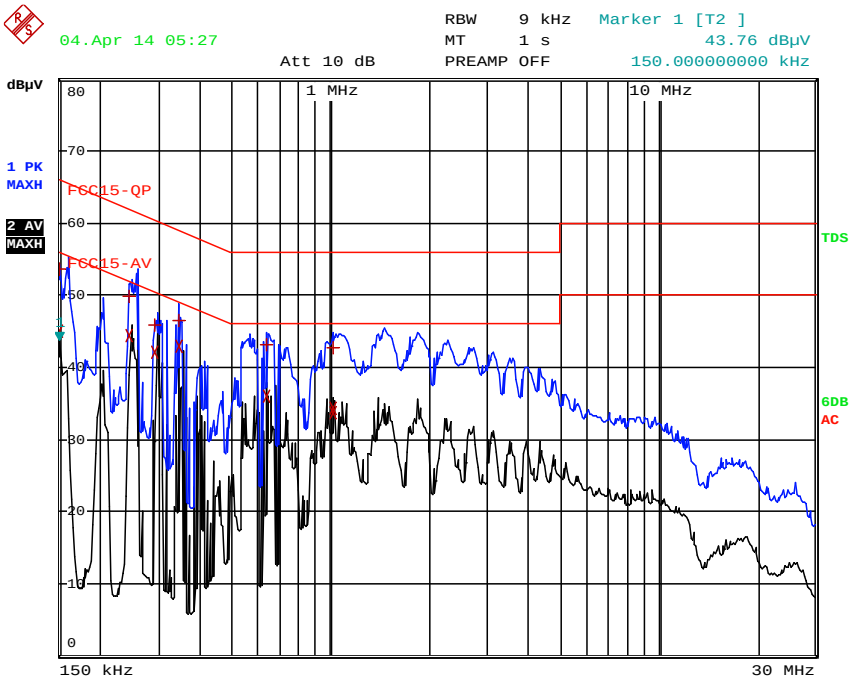


Test Voltage: AC120V, 60Hz **Model: L12G5R2300S+TS29V0.9A**

Tested Wire: Live

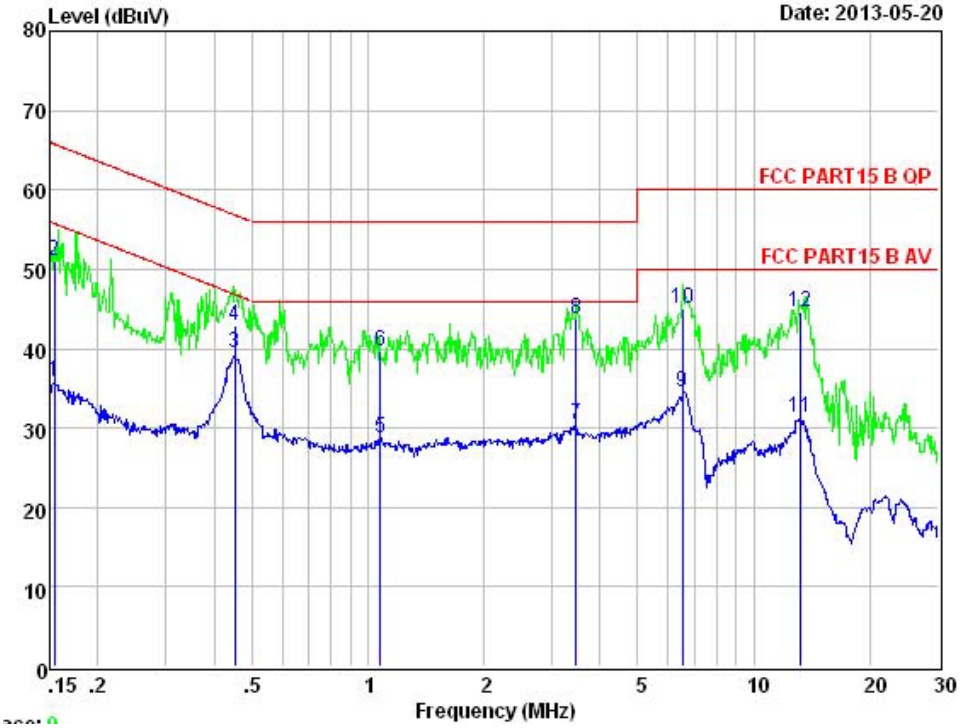


Tested Wire: Neutral

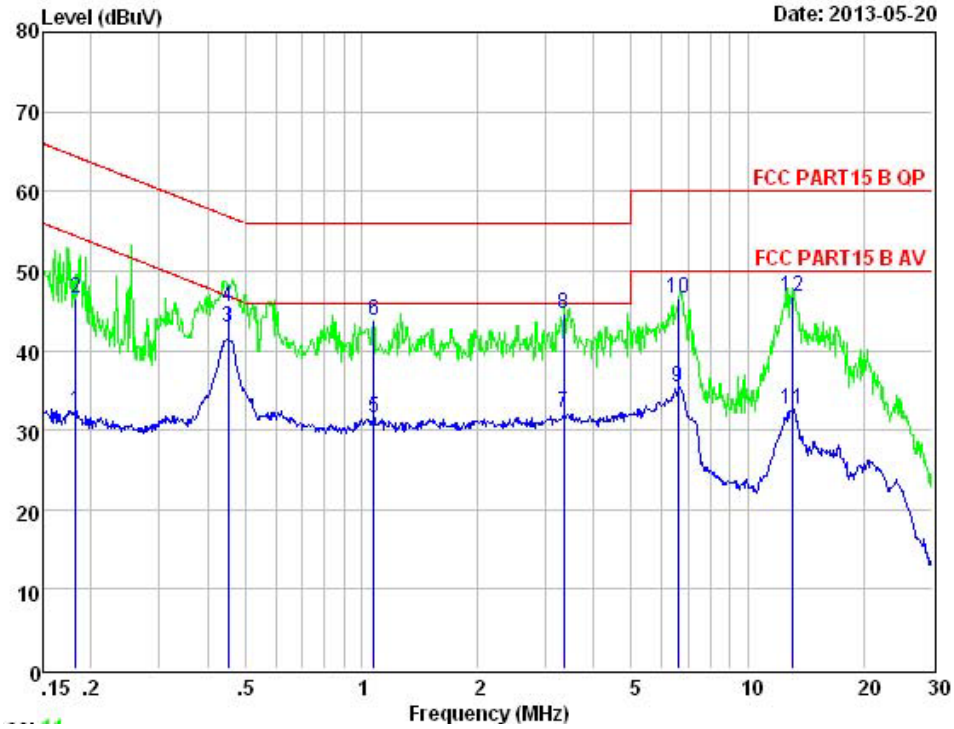


Test Voltage: AC120V, 60Hz **Model: L12G5R1400S+ MTS-810-29V**

Tested Wire: Live



Tested Wire: Neutral



4.1.7 Measurement Uncertainty

Uncertainty: 2.3 dB at a level of confidence of 95%

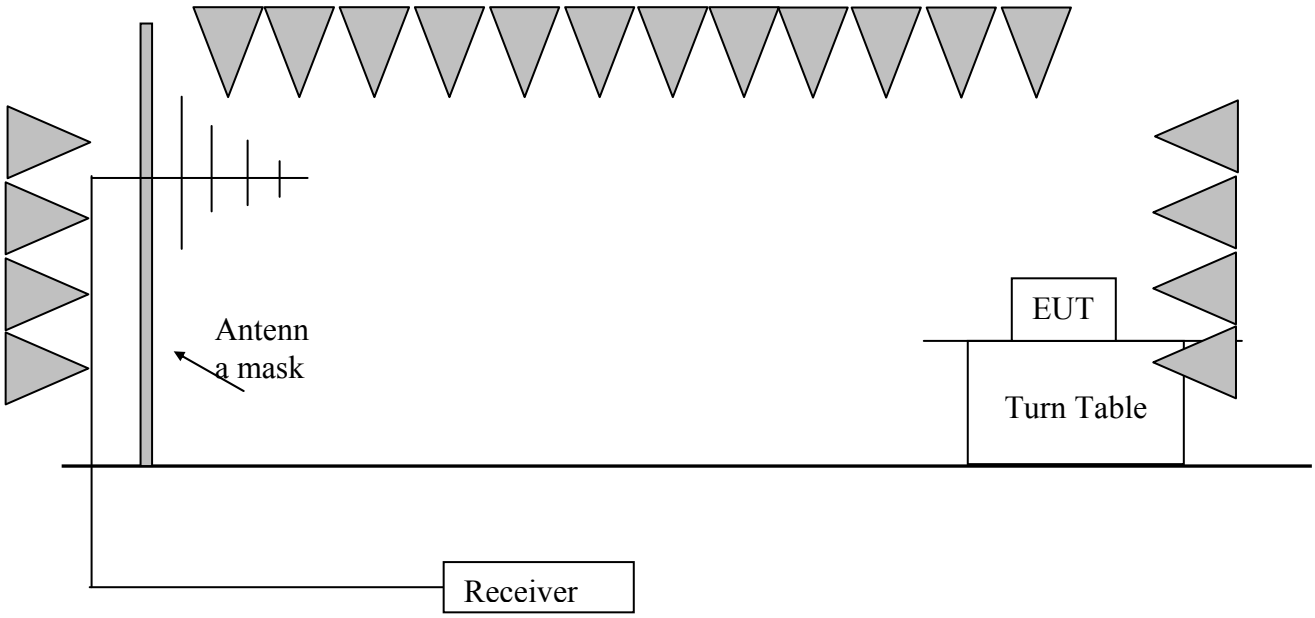
4.2 Radiated Emission (30 MHz -2000 MHz)

Test Result: Pass

4.2.1 Used Test Equipment

Equip. No.	Equipment	Model	Manufacturer
EM030-01	3m Semi-Anechoic Chamber	9×6×6 m3	ETS·LINDGREN
EM030-02	Control room for 3m Semi-Anechoic Chamber	4×4×3 m3	ETS·LINDGREN
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S
EM061-03	TRILOG Super Broadband test Antenna（30 MHz-1.5 GHz）	VULB 9161	SCHWARZBECK
EM031-02-01	Coaxial cable	/	R&S
EM031-03	Signal and Spectrum Analyzer (10 Hz~40 GHz)	R&S FSV40	R&S
EM033-02	Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)	R&S HF907	R&S
EM033-02-02	Coaxial cable	/	R&S

4.2.2 Block Diagram of Test Setup



4.2.3 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG

→ FS = RA + Correct Factor

where FS = Field Strength in dBμV/m

RA = Receiver Amplitude (including preamplifier) in dBμV

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

Correct Factor = AF + CF – AG

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

FS = RA + Correct Factor

4.2.4 Test Setup and Procedure

The measurement was applied in a 3 m semi-anechoic chamber. The EUT and simulators were placed on a 0.8m high wooden turntable above the horizontal metal ground plane. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mask. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

Broadband antenna was used as receiving antenna. Both horizontal and vertical polarization of the antenna was set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2009 requirement during radiated test. The bandwidth setting on R&S Test Receiver was 120 kHz for 30MHz-1GHz. The bandwidth setting on R&S Test Receiver was 1 MHz for above 1GHz.

Radiated emissions from an ITE shall be measured from the lowest frequency generated, or used, in the device or 30 MHz, whichever is higher, up to the frequency determined in accordance with Table following:

Frequency Range of Measurement

Highest Frequency Generated or Used in Device	**Upper Frequency of Radiated Measurement**
Below 1.705 MHz	30
1.705 MHz – 108 MHz	1 GHz
108 MHz – 500 MHz	2 GHz
500 MHz – 1 GHz	5 GHz
Above 1 GHz	5th harmonic of the highest frequency or 40 GHz, whichever is lower.
At transitional frequencies the lower limit applies.	

The frequency range from 30MHz to 2000MHz was checked.

4.2.5 Limit

Radiated emissions from an unintentional radiator, including a digital device shall be measured from the lowest frequency generated, or used, in the device or 30 MHz, whichever is higher, up to the frequency determined in accordance with Table following:

Class B limit at 3m test distance:

Frequency range MHz	**Field strength** dB (μV/m)
30 to 88	40.0
88 to 216	43.5
216 to 960	46.0
Above 960	54.0
At transitional frequencies the lower limit applies.	

4.2.6 Test Data

Radiated Emissions
Pursuant to FCC 15.109: Emissions Requirement: 30MHz-2GHz

Test Voltage: AC120V, 60Hz **Model: L12G5R2000S+XY-2900800-U**

Polarization	Frequency (MHz)	QP Reading (dBµV)	Correction factor (dB/m)	QP Net at 3m (dBµV/m)	QP Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	51.16	34.20	13.20	21.00	40.00	-19.00
Horizontal	58.20	32.70	12.50	20.20	40.00	-19.80
Horizontal	845.96	58.90	25.80	33.10	46.00	-12.90
Vertical	58.22	39.00	12.50	26.50	40.00	-13.50
Vertical	63.36	36.10	10.80	25.30	40.00	-14.70
Vertical	873.75	55.60	21.50	34.10	46.00	-11.90

Test Voltage: AC120V, 60Hz **Model: L12G5R2300S+TS29V0.9A**

Polarization	Frequency (MHz)	QP Reading (dBµV)	Correction factor (dB/m)	QP Net at 3m (dBµV/m)	QP Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	35.44	34.30	13.00	21.30	40.00	-18.70
Horizontal	46.92	35.00	13.90	21.10	40.00	-18.90
Horizontal	848.04	59.10	25.90	33.20	46.00	-12.80
Vertical	35.72	39.90	13.10	26.80	40.00	-13.20
Vertical	53.36	32.90	13.00	19.90	40.00	-20.10
Vertical	960.48	61.20	26.90	34.30	54.00	-19.70

Test Voltage: AC120V, 60Hz **Model: L12G5R1400S+ MTS-810-29V**

Polarization	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	63.95	55.50	-23.19	32.31	40.00	-7.69
Horizontal	105.66	49.61	-20.87	28.74	43.50	-14.76
Horizontal	144.46	38.06	-21.34	16.72	43.50	-26.78
Vertical	57.16	59.82	-22.88	36.94	40.00	-3.06
Vertical	63.95	58.80	-23.19	35.61	40.00	-4.39
Vertical	117.30	60.84	21.50	39.34	43.50	-4.16

Notes: 1. Quasi-peak detector was used at below 1GHz, peak detector was used at above 1GHz.

2. All measurements were made at 3 meter.

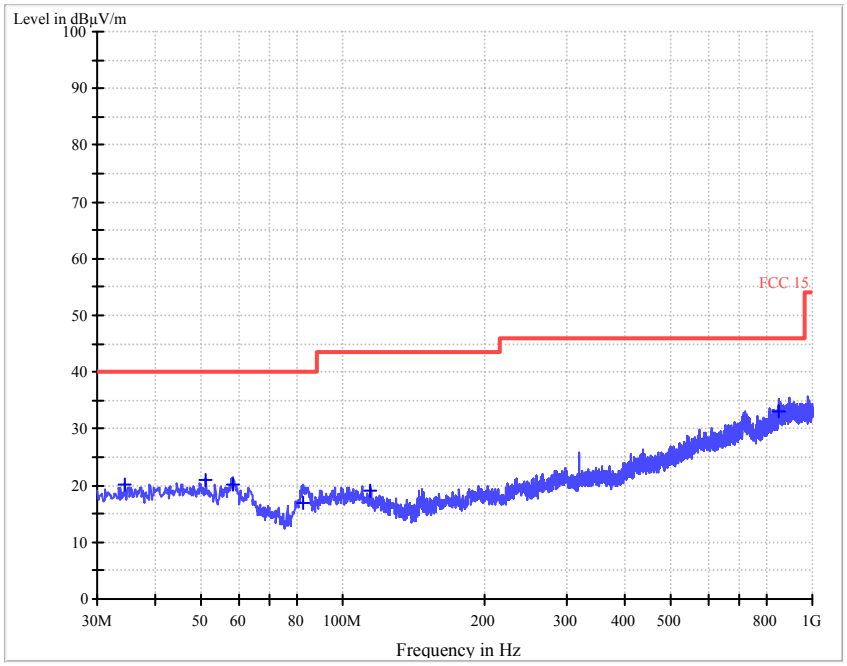
3. Negative value in the margin column shows emission below limit.

4. When tested above 1GHz, the emissions found were at least 20 dB below the limit.

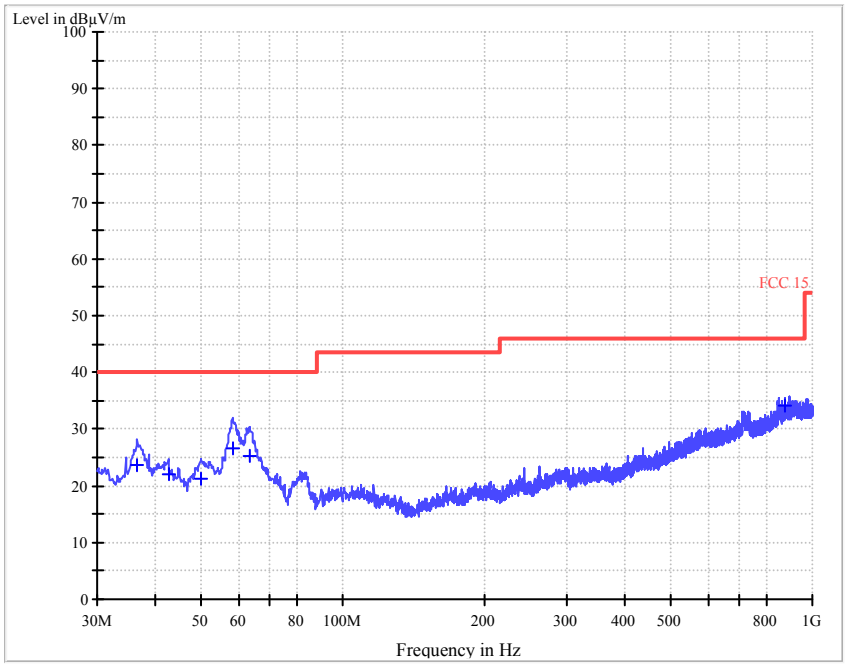
4.2.7 Test Curve

Model: L12G5R2000S+XY2900800-U

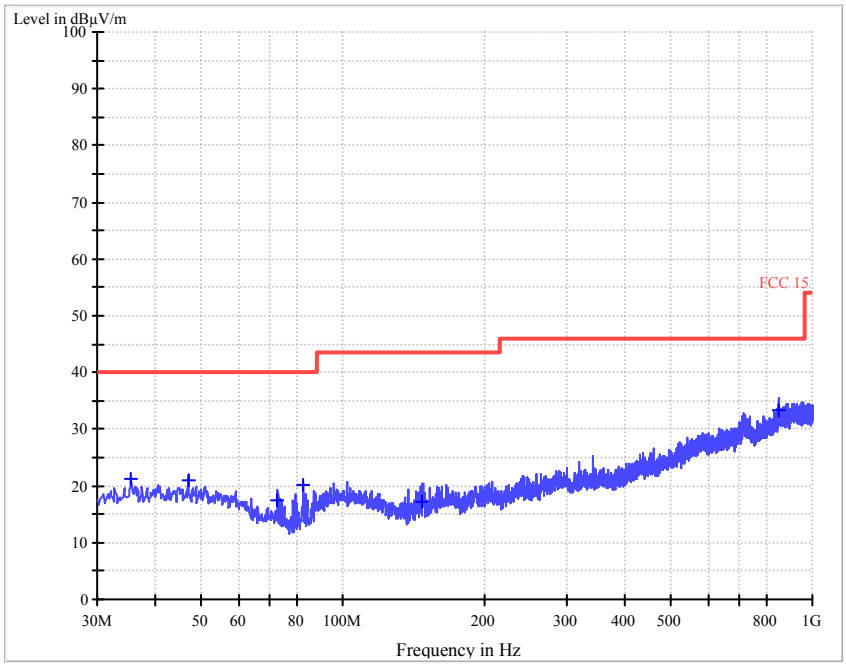
Horizontal:



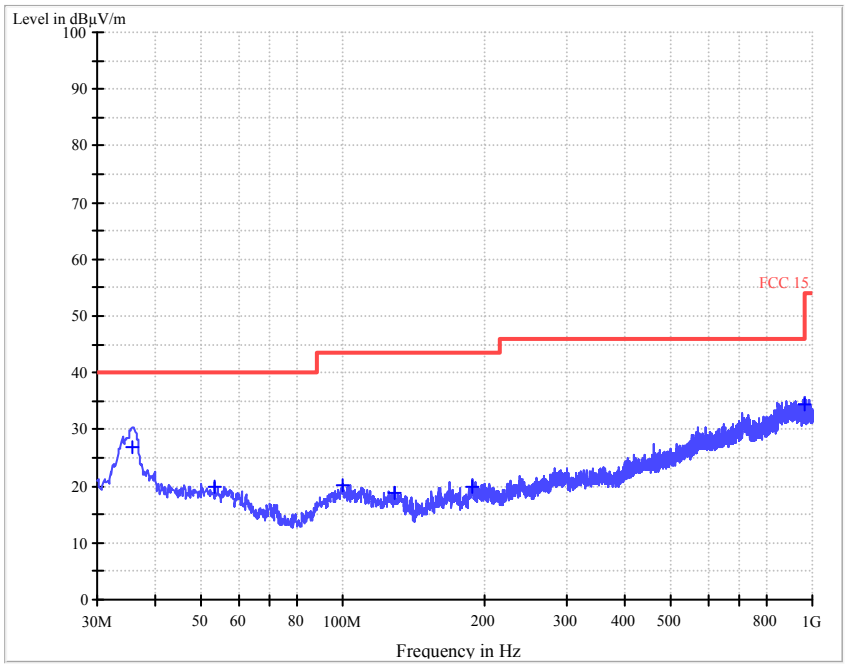
Vertical:



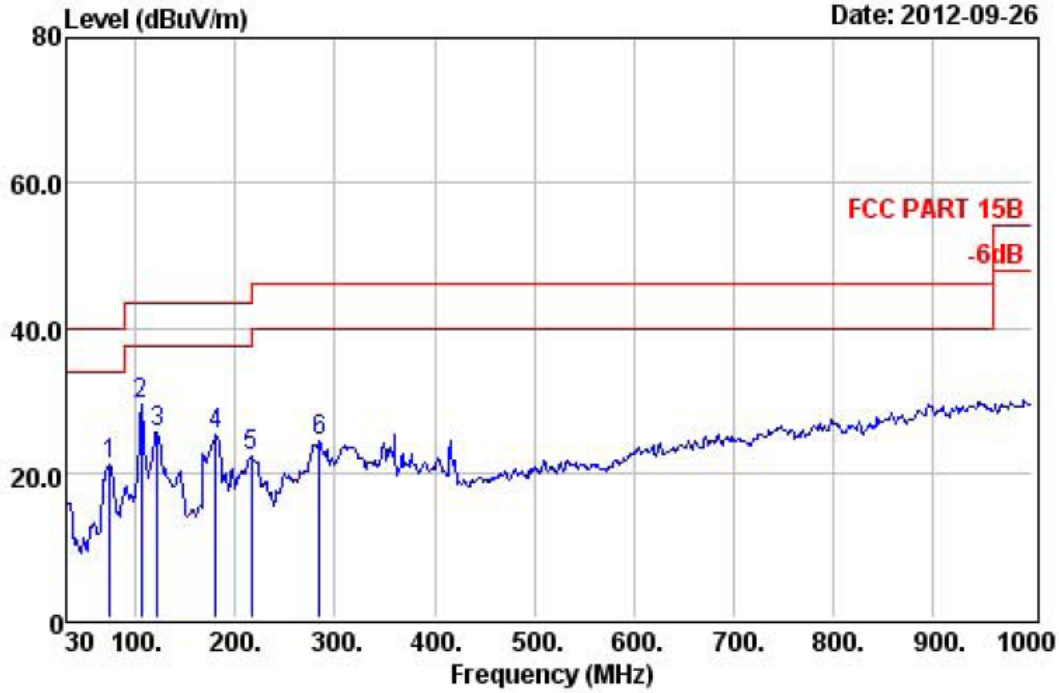
Model: L12G5R2300S+TS29V0.9A
Horizontal:



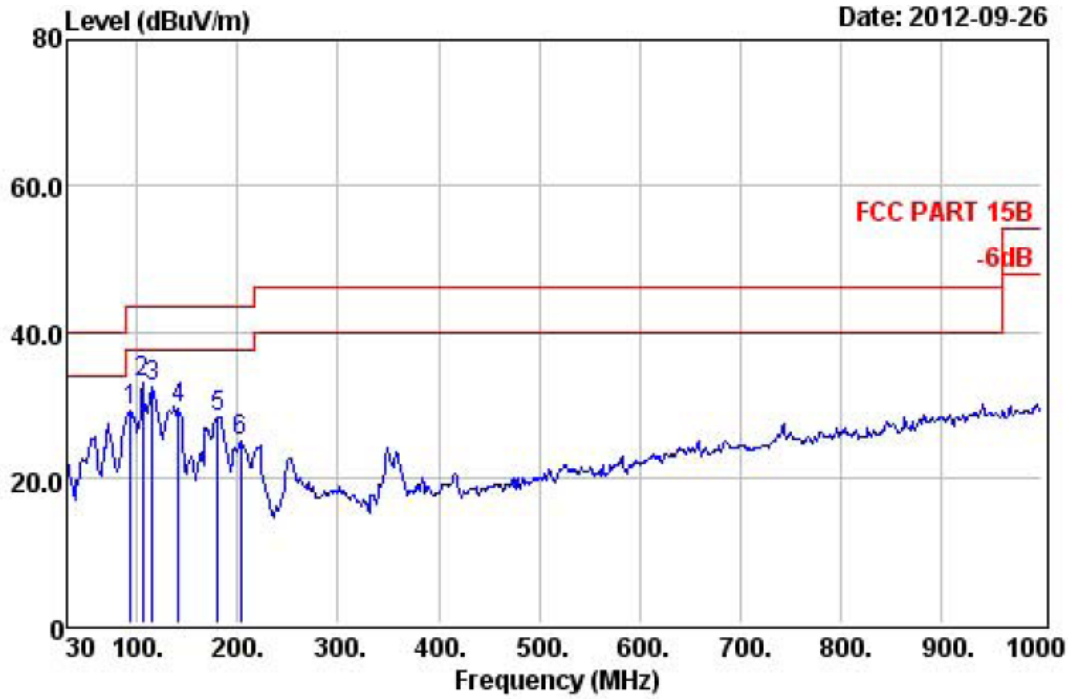
Vertical:



Model: L12G5R1400S+ MTS-810-29V
Horizontal:



Vertical:



4.2.8 Measurement uncertainty

Uncertainty: 4.48 dB in the frequency range of 30-1000 MHz at a level of confidence of 95%