

TEST REPORT

Report Number: 100278403ATL-015a

December 31, 2010

Product Designation: Wave 2 - Printer

Standard: FCC 15.249 - Operation within the bands 902-928 MHz, 2400-2483.5 MHz,
5725-5875 MHZ, and 24.0-24.25 GHz.
RSS-210, Issue 7, 2007

Tested by:
Intertek Testing Services NA Inc.
1950 Evergreen Blvd., Suite 100
Duluth, GA 30096

Client:
Scientific Games LLC
1500 Bluegrass Lakes Parkway
Alpharetta, GA 30004
Contact: Tony Crumpton
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Tests performed by:



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1.0 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complies with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

2.0 Test Summary

Section	Test Full Name	Test Date	Result
4.0	System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)		
5.0	Overview of EUT (Low Power Transmitters) (FCC 15C - EUT Overview)	12/07/2010	
6.0	Duty Cycle Determination (FCC 15A - 15.35(c))	12/08/2010	PASS
7.0	Conducted emissions on AC power lines (Conducted Emissions)	11/30/2010	PASS
8.0	Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)	12/07/2010	PASS
9.0	Occupied Bandwidth (FCC Part 2.1049)	12/08/2010	PASS
10.0	Additional provisions to the general radiated emission limitations. (FCC 15C - 15.215)	12/09/2010	PASS

3.0 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Point of Sale Console	Scientific Games LLC	Wave 2	EVT 1L
Printer	Cognitive	Wave 2	0024556

EUT receive date:	November 30 th 2010
EUT receive condition:	Good

Description of EUT provided by Client:

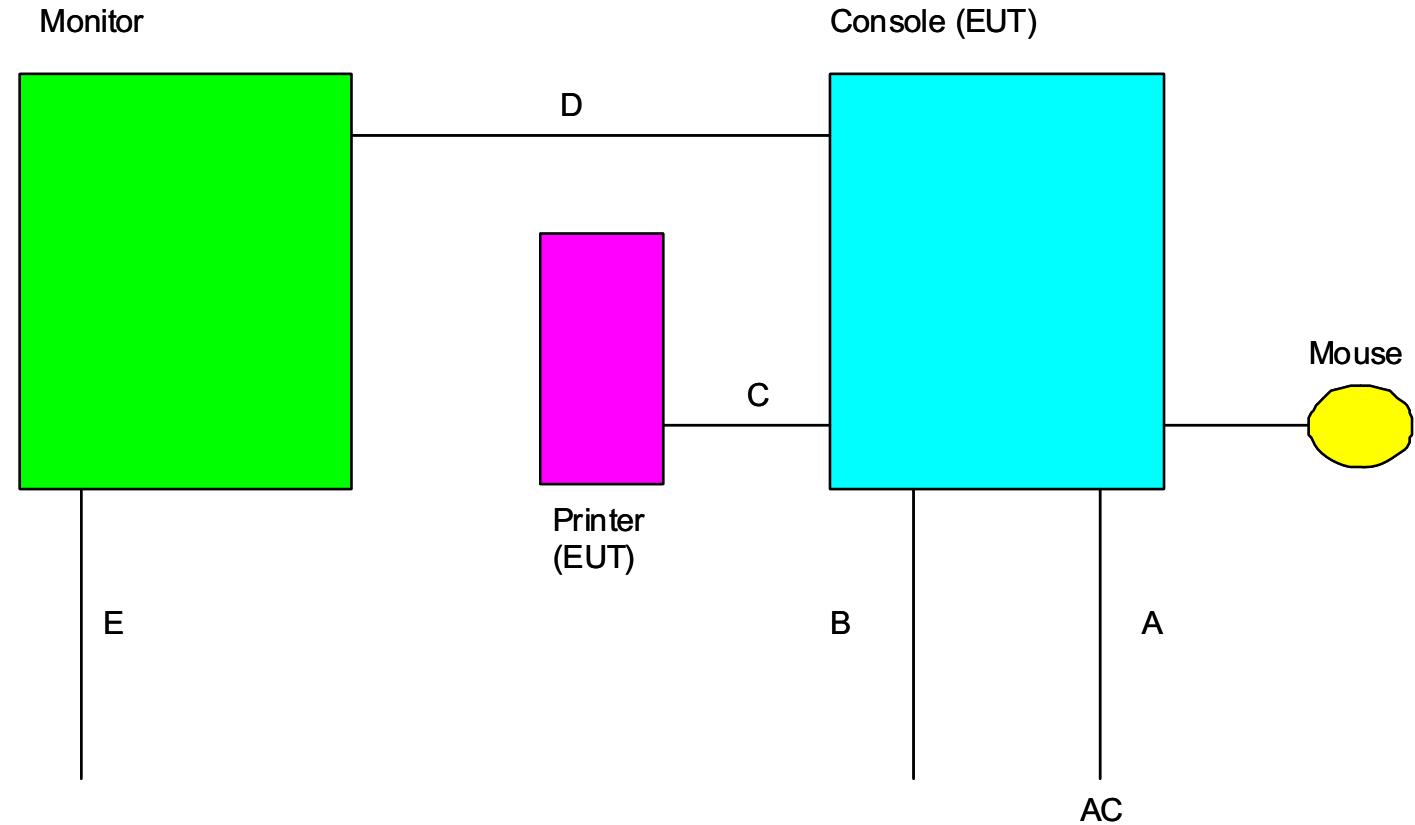
The Wave 2 is an wireless RF lottery ticket point of sale station consisting of a console, and a printer. The EUT was configured with a Saw -touch single CPU and Solid State drive, & Cognitive printer. Steward Ferrite 28A2029-0A2 on Printer cable only close to display connector.

Description of EUT exercising:

The Wave 2 system was placed in a continuous transmit state and normal modulation was applied during testing.

4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)**Method:**

Record the details of EUTcabling, document the support equipment, and show the interconnections in a block diagram.

Drawing:

Simplified Block Diagram

Data:

4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

EUT Cabling						
ID	Description	Length	Shielding	Ferrites	Connection	
					From	To
A	AC Power Line	1.5m	no	no	AC Source	EUT Console
B	Ethernet Line	2.0m	no	no	EUT Console	Unterminated
C	Printer Cable	0.3m	yes	yes	EUT Console	EUT Printer
D	Monitor Cable	1.4m	yes	yes	EUT Console	Monitor
E	AC Power Line	1.5m	no	no	AC Source	Monitor

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Monitor	HP	SH 249	3CQ93601YW
Mouse	Logitech	M-UAE-96	LZ952AC0TXN

5.0 Overview of EUT (Low Power Transmitters) (FCC 15C - EUT Overview)

Method:

Complete the overview spreadsheet.

Related Submittal(s) Grants: This report is for use with an application for certification of a low power transmitter. One transmitter is included in the application.

Data:

Applicant	Scientific Games International 1055 Windward Ridge Pkwy Suite 100 Alpharetta GA 30004
Trade Name & Model No.	Wave II Printer
FCC Identifier	TBD
Frequency Range (MHz)	902.5-927.5
Antenna Type (15.203)	Integral - Internal
Manufacturer name & address	Scientific Games International 1055 Windward Ridge Pkwy Suite 100 Alpharetta GA 30004

Related Submittals and Grants:	This report is for use with an application for certification of a low power transmitter. One transmitter is included in the application.
Additions, deviations and exclusions from standards	None

6.0 Duty Cycle Determination (FCC 15A - 15.35(c))

Method:

(c) Unless otherwise specified, e.g. §15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

Determine the period of the pulse train, T, in mSec and record the results. T is defined as the time from the beginning of one pulse train to the beginning of the next pulse train.

Count the number of different types of pulses, N and record the results.

For each of the different types of pulses, count the number of occurrences within one pulse train.

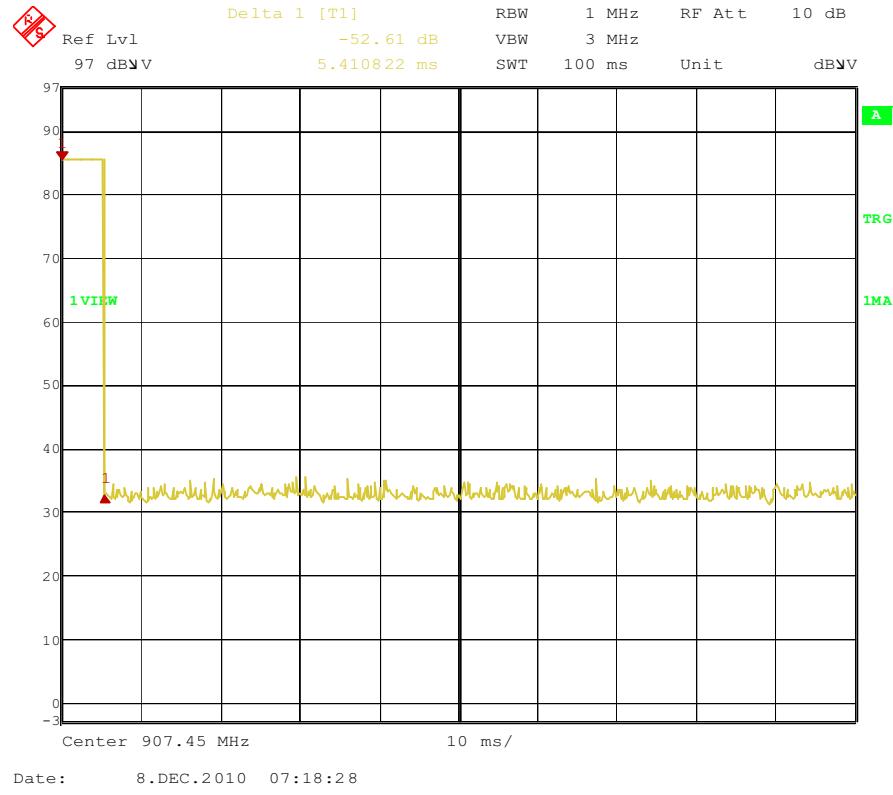
Use the Duty Cycle Correction Factor, DCCF, from the results table and use it to adjust the field strength measurements recorded for radiated emissions.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Cable E201, 18 GHz, N, 3m	Megaphase	TM18 NKNK 118	E201	02/02/2010	02/02/2011
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	10/22/2010	10/22/2011

Results: The sample tested was found to Comply.

Plot:



Data:

6.0 Duty Cycle Determination (FCC 15A - 15.35(c))

Duration of Pulse Train, T (mSec): 100
 Averaging Interval, A_I (mSec): 100
 Number of different Pulses, N: 1

	Number (#P _x)	Pulse Width, mSec (PW _x)	Product (#P _x)*(PW _x)
Pulse Width 1	1	5.4108	5.4108
Pulse Width 2			
Pulse Width 3			
Pulse Width 4			
Pulse Width 5			
Pulse Width 6			
Pulse Width 7			
Pulse Width 8			
Pulse Width 9			
Pulse Width 10			

Duty Cycle: 0.054108
 Duty Cycle Correction Factor, dB: -25.3

$$T_{on} = (PW_1 * \#P)_1 + (PW_2 * \#P_2) + \dots + (PW_n * \#P_n)$$

$$DutyCycle = T_{on} \div A_I$$

$$DCCF = 20 * \log_{10}(DutyCycle)$$

7.0 Conducted emissions on AC power lines (Conducted Emissions)

Method:

Equipment setup for conducted disturbance tests shall follow the guidelines of ANSI C63.4:2003, EN 55022:1998 +A1:2000 +A2:2003, AS/NZS CISPR22: 2002 and VCCI V-3 / 2007.04.

Measurements in the frequency range of 150kHz to 30 MHz shall be performed with a quasi-peak or average detector instrument that meets the requirements of Section One of CISPR 16. An AMN shall be used to provide a defined impedance at high frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. An AMN defined in CISPR 16 shall be used.

In the frequency range of 150 kHz to 30 MHz, a resolution/video bandwidth of 9kHz/30kHz or greater shall be used.

The EUT shall be located so that the distance between the boundary of the EUT and the closest surface of the AMN is 0.8m.

If a flexible mains cord is provided by the manufacturer that is in excess of 1m, the excess cable shall be folded back and forth as far as possible to form a bundle not exceeding 0.4m in length.

The EUT shall be arranged and connected with cables terminated in accordance with the product specification.

Conducted disturbance shall be measured between each current carrying conductor and the reference ground. Each measured values shall be reported.

If EUT is intended for tabletop use, the EUT shall be placed on a table whose top is 0.8m above the ground plane. A vertical, metal reference plane is be placed 0.4m from the EUT. The vertical metal reference-plane is at least 2m by 2m. The EUT shall be kept at least 0.8m from any other metal surface or other ground plane not being part of the EUT. The table shall be constructed of non-conductive materials. Its dimensions are at least 1m by 1.5m, but may be extended for larger EUT.

If EUT is floor standing, the floor standing EUT shall be placed on a horizontal metal ground plane and isolated from the ground plane by up to 12 mm of insulating material. The metal ground plane shall extend at least 0.5m beyond the boundaries of the EUT and had minimum dimensions of 2m by 2m.

TEST SITE

The test site for conducted emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. The VCCI Registration Number for this site is C-2818.

MEASUREMENT UNCERTAINTY

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes. The values given are the measurement uncertainty values with an expanded uncertainty of k=2.

150 kHz to 30 MHz: +/- 2.8 dB

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Cable TT5	Andrews	Cable TT5	TT5 211405	05/04/2010	05/04/2011
Cable, N-N, 3 meters, 18GHz	Megaphase	TM18-NKNK-118	E206	05/04/2010	05/04/2011
Cable, N-N, 3 meters, 18GHz	Megaphase	TM18-NKNK-118	E204	05/04/2010	05/04/2011
EMI Receiver	Hewlett Packard	8546A	211505	02/02/2010	02/02/2011
EMI Receiver, Preselector section	Hewlett Packard	85460A	015762	02/02/2010	02/02/2011
LISN (TT5)	Fischer Custom Comm	FCC-LISN-50-50-M	211407	09/27/2010	09/27/2011
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	10/22/2010	10/22/2011
Transient Limiter	Hewlett Packard	11947A	213100	09/17/2010	09/17/2011

Results: The sample tested was found to Comply.

Photo:

7.0 Conducted emissions on AC power lines (Conducted Emissions)



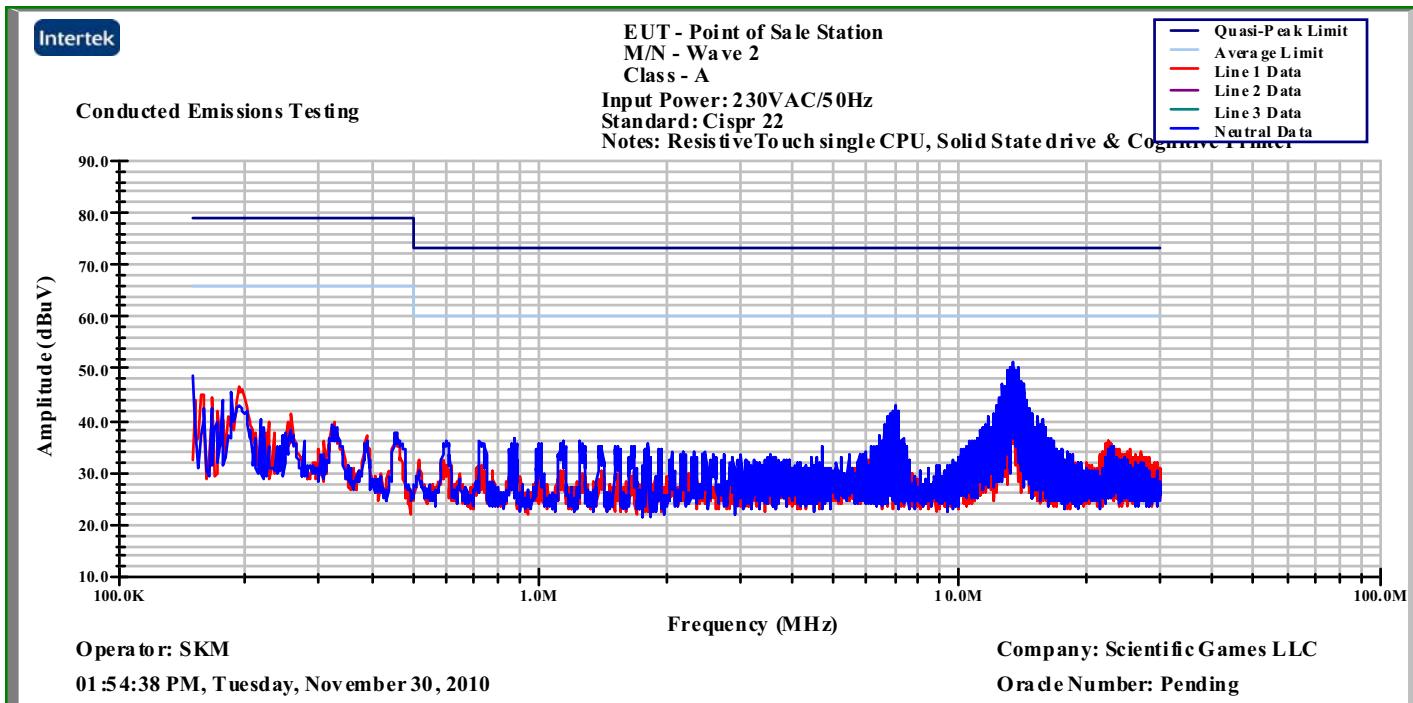
Test setup - Front view

7.0 Conducted emissions on AC power lines (Conducted Emissions)**Photo:**

Test setup - rear view

Plot:

7.0 Conducted emissions on AC power lines (Conducted Emissions)



230Vac/50Hz

Data:

7.0 Conducted emissions on AC power lines (Conducted Emissions)

Client: Scientific Games LLC**Model Number:** Wave 2**Project Number:****Tested By:** SKM**Date:** 11-31-2010**Frequency Range (MHz):** .150 to 30**Input power:** 230VAC/50Hz**Receiver:** HP 8546A**Cables:** TT5+E-206+E-204**LISN 1:** TT5 LISN Line 1**LISN 2:** TT5 LISN Line 2**Limit:** CISPR Class A**Modifications for compliance (y/n):** n

A	B	C	D	E	F	G	H	I
LISN Number 1,2	Detector (P,QP,A)	Frequency MHz	Reading dBuV	Cable Loss dB	LISN Ins. Loss dB	Net dBuV	Limit dBuV	Margin dB
1	P	0.192	36.6	0.1	7.3	44.0	66.0	-22.1
1	P	0.400	34.7	0.1	6.4	41.2	66.0	-24.9
1	P	0.742	36.0	0.1	6.4	42.5	60.0	-17.6
1	P	1.297	31.7	0.1	6.4	38.2	60.0	-21.9
1	P	7.030	33.6	0.1	6.2	39.9	60.0	-20.2
1	P	13.480	42.2	0.3	6.2	48.7	60.0	-11.3
2	P	0.289	35.8	0.1	6.7	42.6	66.0	-23.5
2	P	0.529	35.5	0.1	6.3	41.9	60.0	-18.2
2	P	1.015	28.4	0.1	6.3	34.8	60.0	-25.3
2	P	1.565	27.4	0.1	6.3	33.8	60.0	-26.3
2	P	7.030	35.9	0.1	6.3	42.3	60.0	-17.8
2	P	13.480	43.8	0.3	6.3	50.4	60.0	-9.6
Calculations		$G=D+E+F$			$I=G-H$			

Note: Peak measurements are compared to the average limit.

8.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

Method:

Measurements shall be performed with a quasi-peak detector instrument that meets the requirements of Section One of CISPR 16.

Bandwidths:

30 MHz to 1000 MHz: 120 kHz RBW and 1 MHz VBW

Above 1000 MHz: 1 MHz RBW and 3 MHz VBW

Detectors:

Equal to or less than 1000 MHz: CISPR quasi-peak detector (alternative: peak detector)

Above 1000 MHz: Average detector (applies to average limit)

Above 1000 MHz: Peak detector (applies to peak limit)

Limits:

Equal to or less than 1000 MHz, the limits are specified as quasi-peak. If a peak detector is used, the limit does not change.

Above 1000 MHz, the limits are specified as average. The peak limit is 20 dB above the average limit. Both peak and average measurements are required to be reported.

Frequency range of radiated measurements

For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in this paragraph:

- (1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
- (2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
- (3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.
- (4) If the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to the range specified in paragraphs (a)(1) through (a)(3) of this section or the range applicable to the digital device, as shown in paragraph (b)(1) of this section, whichever is the higher frequency range of investigation.

Measurement antenna requirements:

Below 30 MHz - Loop antenna

30 to 1000 MHz - Biconical, Log Periodic, or equivalent

Above 1000 MHz - Horn or equivalent

Measurements of the radiated field are made with the antenna located at a distance of 3 or 10 meters from the EUT. The limit applied to the measurement shall be appropriate for the test distance. The test distance shall be indicated in the results section.

The EUT shall be arranged and connected with cables terminated in accordance with the product specification.

Exploratory tests should be carried out while varying the cable positions to determine the maximum or near-maximum emission level. During manipulation, cables shall not be placed under or on top of the system test components unless such placement is required by the inherent equipment design.

The antenna shall be adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.

The antenna-to-EUT azimuth shall be varied during the measurement to find the maximum field-strength readings.

The antenna-to-EUT polarization (horizontal and vertical) shall be varied during the measurements to find the maximum field-strength readings.

If the EUT is handheld, it shall be oriented in each of its orthogonal axes.

If the EUT is intended for tabletop use, it shall be placed on a table whose top is 0.8m above the ground plane. The table shall be constructed of non-conductive materials. Its dimensions are at least 1m by 1.5m, but may be extended for larger EUT.

If EUT is floor standing, the EUT was placed on a horizontal metal ground plane and isolated from the ground plane by up to 12 mm of insulating material.

Equipment setup for radiated disturbance tests shall follow the guidelines of ANSI C63.4:2003.

TEST SITE

The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Antenna, BiLog, 20-2000MHz	Chase	CBL6112A	211518	01/13/2010	01/13/2011

8.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)**Test Equipment Used:**

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Antenna, Horn, <18 GHz	EMCO	3115	213061	05/07/2010	05/07/2011
Cable E201, 18 GHz, N, 3m	Megaphase	TM18 NKNK 118	E201	02/02/2010	02/02/2011
Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/04/2010	05/04/2011
Cable, 7 meters, 1-18GHz	Storm Products Co.	PR90-241-7MTR	ST-2	08/19/2010	08/19/2011
Cable, 7 meters, 1-18GHz	Storm Products Co.	PR90-195-7MTR	ST-3	08/19/2010	08/19/2011
Cable, N-N 3 meters, 18GHz	Megaphase	TM18 NKNK 118	E203	05/04/2010	05/04/2011
EMI Receiver	Hewlett Packard	8546A	211505	02/02/2010	02/02/2011
EMI Receiver, Preselector section	Hewlett Packard	85460A	015762	02/02/2010	02/02/2011
Filter, 1 GHz High Pass	Filtek	HP12/1000-5AB	213156a	04/21/2010	04/21/2011
Preamplifier, 10 MHz to 2000 MHz, 30 dB gain	Mini-Circuits	ZKL-2	200069	04/20/2010	04/20/2011
Preamplifier, 20 MHz to 18 GHz, 40 dB	A.H. Systems	PAM-0118	200108	04/21/2010	04/21/2011
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	10/22/2010	10/22/2011

Results: The sample tested was found to Comply.**Photo:**

8.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)



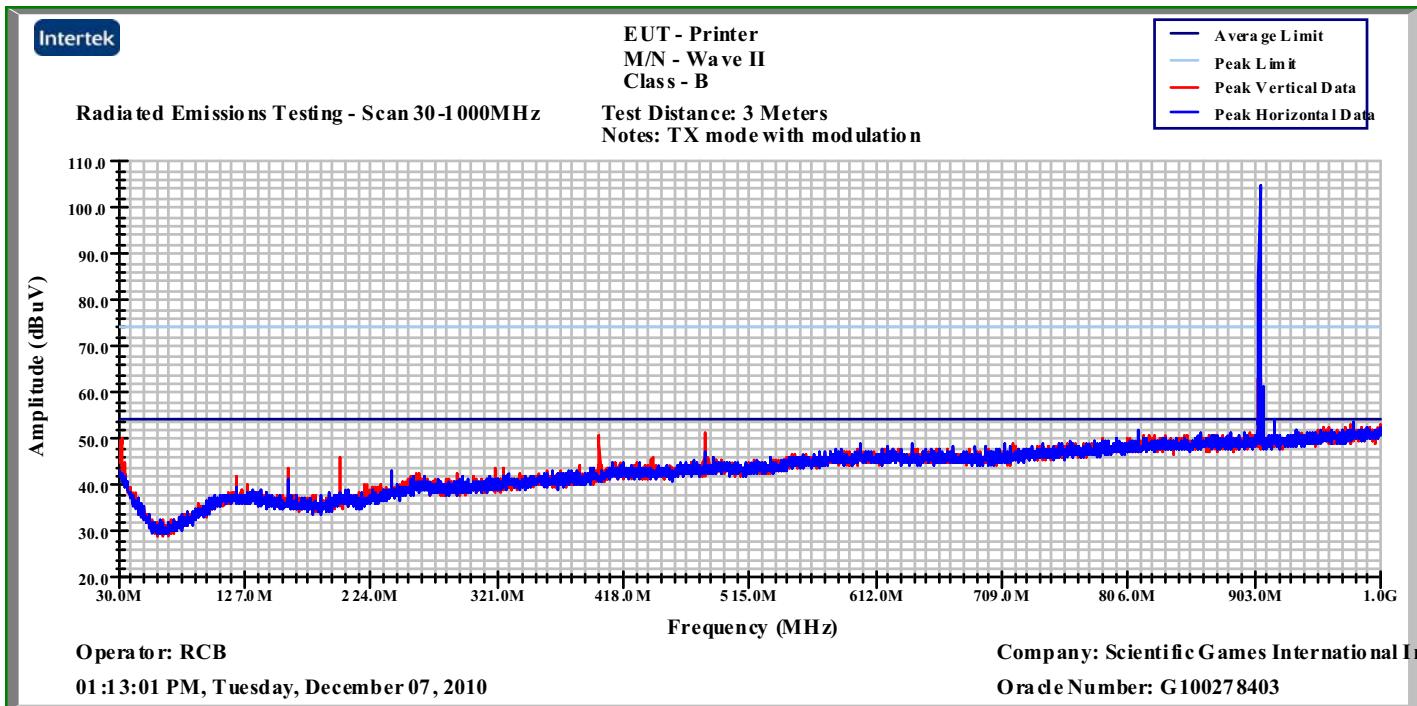
Test setup - Front view

8.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)**Photo:**

Test setup - rear view

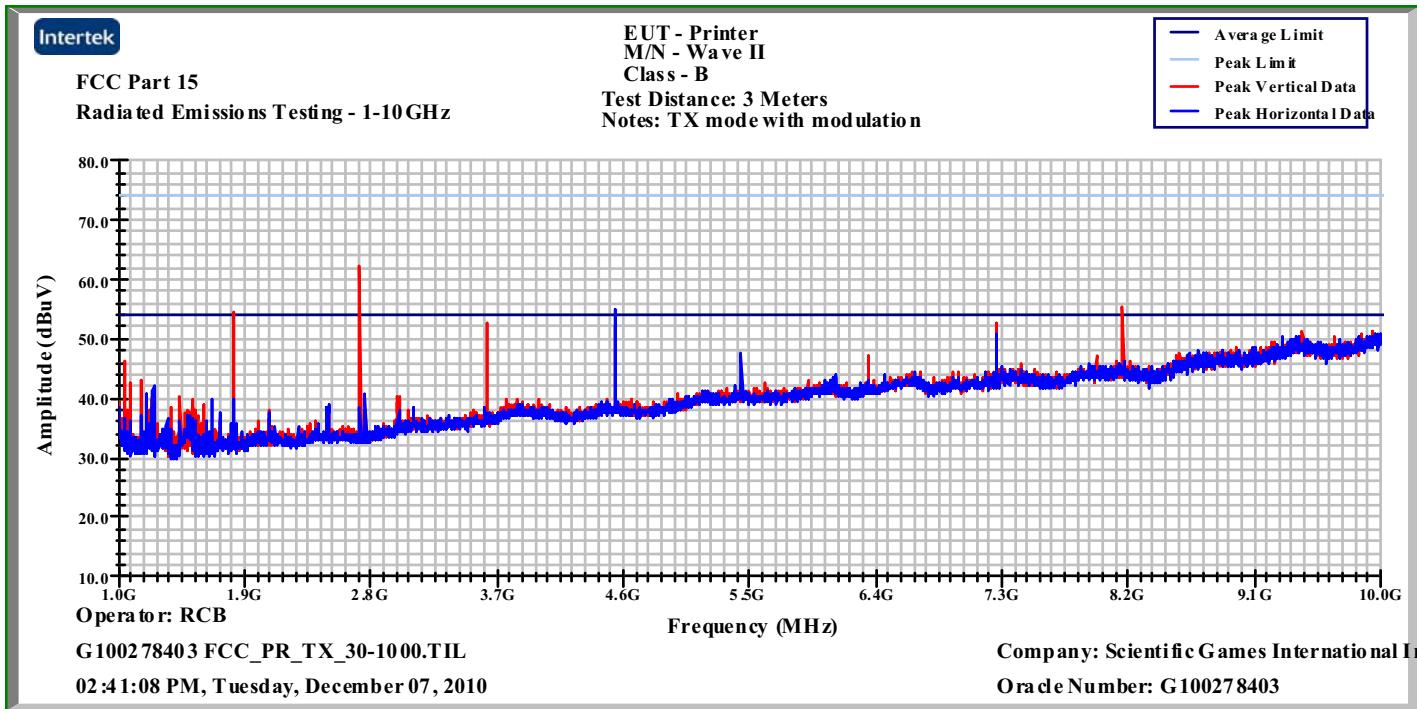
Plot:

8.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)



8.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

Plot:



1-10GHz

Data:

8.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

Frequency Range (MHz): 902-928

Test Distance (m): 3

Input power: 230Vac/50Hz

Limit: FCC15.249

Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Duty cycle Factor dB	Net dB(uV/m)	3m Limit dB(uV/m)	Margin dB	Detectors / Bandwidths Det/RBW/VBW
H	902.433	80.5	20.6	5.3	0.0	106.4	114.0	-7.6	Pk/100k/300k
H	902.433	80.5	20.6	5.3	25.3	81.1	94.0	-12.9	Pk/100k/300k
V	902.433	77.9	21.7	5.3	0.0	104.9	114.0	-9.1	Pk/100k/300k
V	902.433	77.9	21.7	5.3	25.3	79.6	94.0	-14.4	Pk/100k/300k
H	907.461	82.1	20.6	5.3	0.0	108.1	114.0	-5.9	Pk/100k/300k
H	907.461	82.1	20.6	5.3	25.3	82.8	94.0	-11.2	Pk/100k/300k
V	907.435	78.9	21.7	5.3	0.0	106.0	114.0	-8.0	Pk/100k/300k
V	907.435	78.9	21.7	5.3	25.3	80.7	94.0	-13.3	Pk/100k/300k
H	927.428	76.7	20.8	5.4	0.0	102.8	114.0	-11.2	Pk/100k/300k
H	927.428	76.7	20.8	5.4	25.3	77.5	94.0	-16.5	Pk/100k/300k
V	927.428	76.4	21.9	5.4	0.0	103.7	114.0	-10.3	Pk/100k/300k
V	927.428	76.4	21.9	5.4	25.3	78.4	94.0	-15.6	Pk/100k/300k
Calculations		$G=C+D+E-F$			$I=G-H$				

902-928MHz

8.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

Data:

Frequency Range (MHz): 30-1000

Test Distance (m): 3

Input power: 230Vac/50Hz

Limit: FCC15.249

Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Net dB(uV/m)	3m Limit dB(uV/m)	Margin dB	Detectors / Bandwidths Det/RBW/VBW
V	902.000	25.5	21.7	5.3	0.0	52.5	54.0	-1.5	QP/120k/300k
H	902.000	24.9	20.6	5.3	0.0	50.8	54.0	-3.2	QP/120k/300k
V	928.000	24.6	21.9	5.4	0.0	51.9	54.0	-2.1	QP/120k/300k
H	928.000	25.3	20.8	5.4	0.0	51.5	54.0	-2.5	QP/120k/300k
Calculations		G=C+D+E-F			I=G-H				

30-1000MHz transmitter spurs

8.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

Data:

Frequency Range (MHz): 1000-10000

Test Distance (m): 3

Input power: 230Vac/50Hz

Modifications for compliance (y/n): n

Notes:

A	B	C	D	E	F	G	H	I	J	K
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Duty Cycle Factor dB	Net dB(uV/m)	3m Limit dB(uV/m)	Margin dB	BW / Detector
902.5MHz										
V	2707.281	62.3	26.9	9.4	37.2	0.0	61.4	74.0	-12.7	1/3MHz/Pk
V	2707.281	62.3	26.9	9.4	37.2	16.1	45.3	54.0	-8.8	1/3MHz/Pk
H	4512.034	59.7	28.5	12.2	37.2	0.0	63.2	74.0	-10.9	1/3MHz/Pk
H	4512.034	59.7	28.5	12.2	37.2	16.1	47.1	54.0	-6.9	1/3MHz/Pk
V	8121.804	51.2	26.9	17.2	35.4	0.0	59.9	74.0	-14.1	1/3MHz/Pk
V	8121.804	51.2	26.9	17.2	35.4	16.1	43.8	54.0	-10.2	1/3MHz/Pk
907.5MHz										
V	2722.302	62.3	26.9	9.4	37.9	0.0	60.7	74.0	-13.3	1/3MHz/Pk
V	2722.302	62.3	26.9	9.4	37.9	16.1	44.6	54.0	-9.4	1/3MHz/Pk
H	4537.255	61.6	28.5	12.2	37.2	0.0	65.1	74.0	-8.9	1/3MHz/Pk
H	4537.255	61.6	28.5	12.2	37.2	16.1	49.0	54.0	-5.0	1/3MHz/Pk
V	8166.522	50.2	26.9	17.2	35.4	0.0	58.9	74.0	-15.1	1/3MHz/Pk
V	8166.522	50.2	26.9	17.2	35.4	16.1	42.8	54.0	-11.2	1/3MHz/Pk
927.5MHz										
V	2782.340	61.8	26.9	9.4	37.9	0.0	60.2	74.0	-13.8	1/3MHz/Pk
V	2782.340	61.8	26.9	9.4	37.9	16.1	44.1	54.0	-9.9	1/3MHz/Pk
H	4637.558	60.5	28.5	12.2	37.2	0.0	64.0	74.0	-10.0	1/3MHz/Pk
H	4637.558	60.5	28.5	12.2	37.2	16.1	47.9	54.0	-6.1	1/3MHz/Pk
V	8346.914	51.2	26.9	17.2	35.4	0.0	59.9	74.0	-14.1	1/3MHz/Pk
V	8346.914	51.2	26.9	17.2	35.4	16.1	43.8	54.0	-10.2	1/3MHz/Pk
Calculations	G=C+D+E-F			I=G-H						

1-10GHz transmitter spurs

9.0 Occupied Bandwidth (FCC Part 2.1049)

Method:

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Connect the antenna port of the EUT to a spectrum analyzer using a calibrated coaxial cable and attenuator. Set the EUT to transmit at its highest power setting. The 99% bandwidth function of the analyzer was used to automatically generate the occupied bandwidth plots.

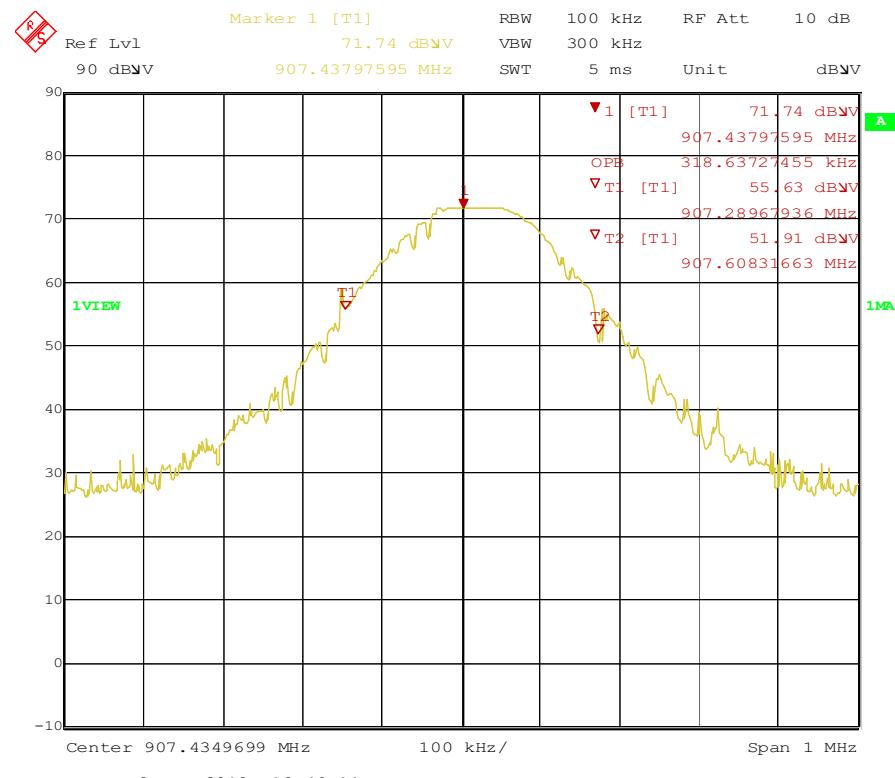
For amplifiers, the output bandwidth shall be less than or equal to the input bandwidth.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Cable, N-N, 3 meters, 18GHz	Megaphase	TM18-NKNK-118	E204	05/04/2010	05/04/2011
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	10/22/2010	10/22/2011

Results: The sample tested was found to Comply.

Plot:



Occupied Bandwidth - 99%

Data:

9.0 Occupied Bandwidth (FCC Part 2.1049)

Mode	Frequency MHz	Resolution Bandwidth (1)	Video Bandwidth	Sweep time Seconds	Output Measured Bandwidth MHz	Input Measured Bandwidth MHz
Normal	907.434	100 kHz	300 kHz	0.005	0.318	NA

Note (1): Greater or equal to 1% of emission bandwidth.

10.0 Additional provisions to the general radiated emission limitations. (FCC 15C - 15.215)

Method:

§ 15.215 Additional provisions to the general radiated emission limitations.

(a) The regulations in §§15.217 through 15.257 provide alternatives to the general radiated emission limits for intentional radiators operating in specified frequency bands. Unless otherwise stated, there are no restrictions as to the types of operation permitted under these sections.

(b) In most cases, unwanted emissions outside of the frequency bands shown in these alternative provisions must be attenuated to the emission limits shown in §15.209. In no case shall the level of the unwanted emissions from an intentional radiator operating under these additional provisions exceed the field strength of the fundamental emission.

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Antenna, BiLog, 20-2000MHz	Chase	CBL6112A	211518	01/13/2010	01/13/2011
Cable E201, 18 GHz, N, 3m	Megaphase	TM18 NKNK 118	E201	02/02/2010	02/02/2011
Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/04/2010	05/04/2011
Cable, N-N, 3 meters, 18GHz	Megaphase	TM18-NKNK-118	E204	05/04/2010	05/04/2011
EMI Receiver	Hewlett Packard	8546A	211505	02/02/2010	02/02/2011
EMI Receiver, Preselector section	Hewlett Packard	85460A	015762	02/02/2010	02/02/2011
Preamplifier, 10 MHz to 2000 MHz, 30 dB gain	Mini-Circuits	ZKL-2	200069	04/20/2010	04/20/2011
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	10/22/2010	10/22/2011

Results: The sample tested was found to Comply.

Data:

10.0 Additional provisions to the general radiated emission limitations. (FCC 15C - 15.215)

Note: The Transmitter frequency range was changed to 902.5MHz-927.5MHz in order to comply with the out of band emissions and the frequency stability requirements.