

TEST REPORT

Report Number: 3135963ATL-005

June 18, 2009

Product Designation: Jetstream

Standard: FCC 15.249 - Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz.

Tested by:

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

Client:

Centralite Systems Inc.
6420 Wall Street
Mobile, AL 36695
Contact: James B. Busby
Phone: 251.607.9119
Fax: 251.607.9117

Tests performed by:



Richard C. Bianco
EMC Project Engineer

Report reviewed by:



David J. Schramm
Assistant Chief Engineer - EMC

All services undertaken are subject to the following general policy: This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to copy or distribute this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program. This report must not be used to claim product endorsement by A2LA, NIST, or any agency of the US Government.

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)	06/12/2009	PASS
6.0	Conducted emissions on AC power lines (Conducted Emissions)	06/12/2009	PASS
7.0	Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)	06/12/2009	PASS
8.0	Revision History (Revision History)		
NA	15.249(b): Requirements for fixed, point-to-point operation (FCC 15C - 15.249(b)) was waived due to is not required for this frequency range.		
NA	Additional provisions to the general radiated emission limitations. (FCC 15C - 15.215) was waived due to there are no additional provisions required for this device.		

3.0 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Dimmer Switch	CentraLite Systems Inc.	Jetstream	NA

EUT receive date:	10/15/2007
EUT receive condition:	Good

Description of EUT provided by Client:

The EUT in this report is the 3-button wall-mounted dimmer. The Jetstream can operate individually or as part of a complete System. If the controller is disabled, the Dimmers will operate in local mode. The Dimmers communicate via a 2.48 GHz transmission. They are capable of directly controlling incandescent lighting, fluorescent ballasts, and low voltage magnetic transformers.

Description of EUT exercising:

The EUT is powered with 120 Vac/ 60 Hz only and loaded with a 60 Watt light bulb. The EUT's transmitting functions were enabled during testing.

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

Method:

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

Data:

EUT Cabling						
ID	Description	Length	Shielding	Ferrites	Connection	
					From	To
A	Power Cord	1.5m	No	No	EUT	Lamp
B	Power Cord	1.5m	No	No	Lamp	AC Mains

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Lamp	NA	NA	NA

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.

Results: The sample tested was found to Comply.

Data:

Applicant	CentraLite Systems Inc.
	6420 Wall Street
	Mobile AL 36695
Trade Name & Model No.	Jetstream
FCC Identifier	
Frequency Range (MHz)	2404-2480.5
Antenna Type (15.203)	Intergral
Manufacturer name & address	CentraLite Systems Inc.
	6420 Wall Street
	Mobile AL 36695

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 Conducted emissions on AC power lines (Conducted Emissions)

Method:

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

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 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.

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 TT1, 6ft, N(Male) to N(Male)	Mini-Circuits	CBL-6FT-NMNM	TT1	05/04/2009	05/04/2010
Cable TT4	Andrews	Cable TT4	TT4 211404	05/04/2009	05/04/2010
EMI Receiver	Hewlett Packard	8546A	213109	09/29/2008	09/29/2009
EMI Receiver, Preselector section	Hewlett Packard	85460A	213108	09/29/2008	09/29/2009
Excel spreadsheet for conducted emissions tests	Software	Excel - CE Worksh	SW002	12/08/2008	12/08/2009
LISN (TT4)	Fischer Custom Comm	FCC-LISN-50-50-M	211406	10/18/2008	10/18/2009
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	10/10/2008	10/10/2009
Tile - software profile for radiated and conducted emissions testing.	Software	Tile - Emissions	SW006	12/08/2008	12/08/2009
Transient Limiter	Hewlett Packard	11947A	213100	08/05/2008	08/05/2009

Results: The sample tested was found to Comply.

6.0 Conducted emissions on AC power lines (Conducted Emissions)

Photo:



Test Setup - Front View

6.0 Conducted emissions on AC power lines (Conducted Emissions)

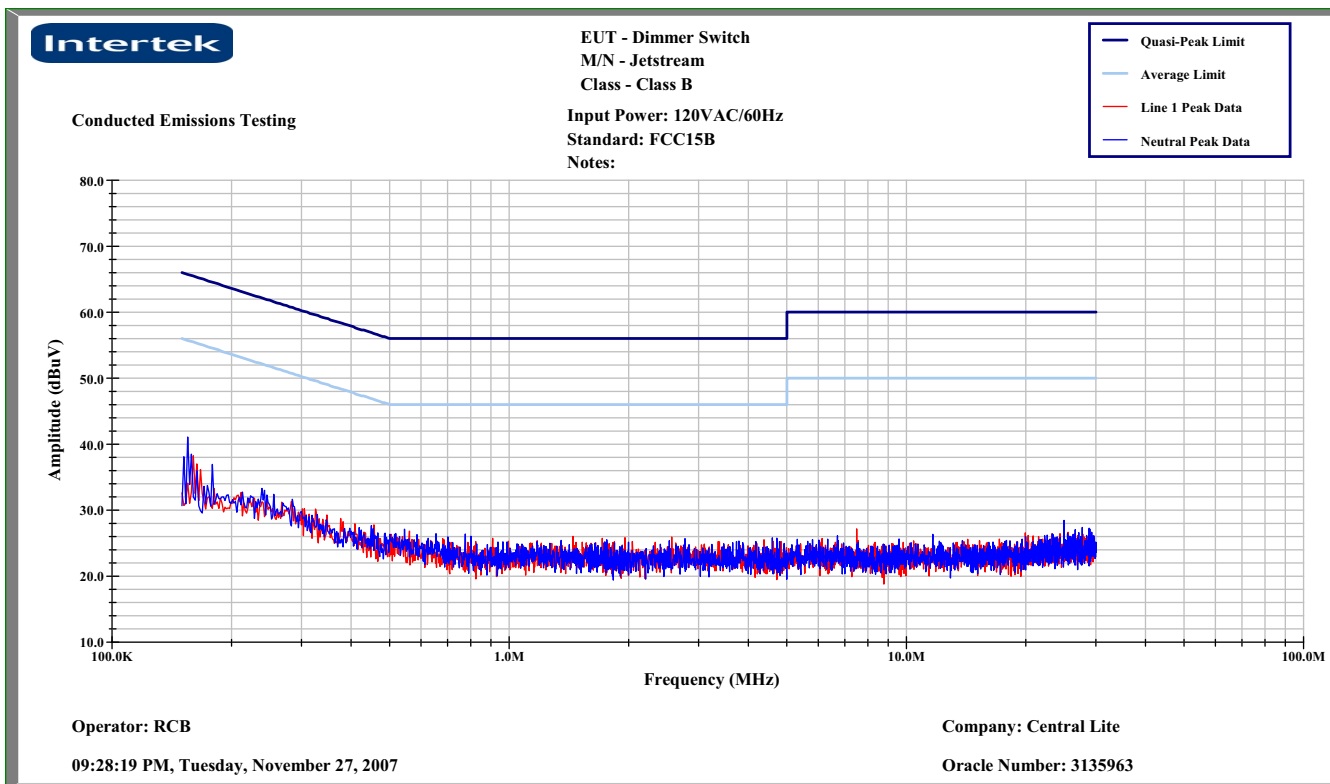
Photo:



Test Setup - Rear View

6.0 Conducted emissions on AC power lines (Conducted Emissions)

Plot:



Conducted Emissions @ 120VAC/60Hz

6.0 Conducted emissions on AC power lines (Conducted Emissions)

Data:

Peak emissions were more than 10dB below the average limit. Refer to peak plot for data.

7.0 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	CBL6112B	211386	09/26/2008	09/26/2009

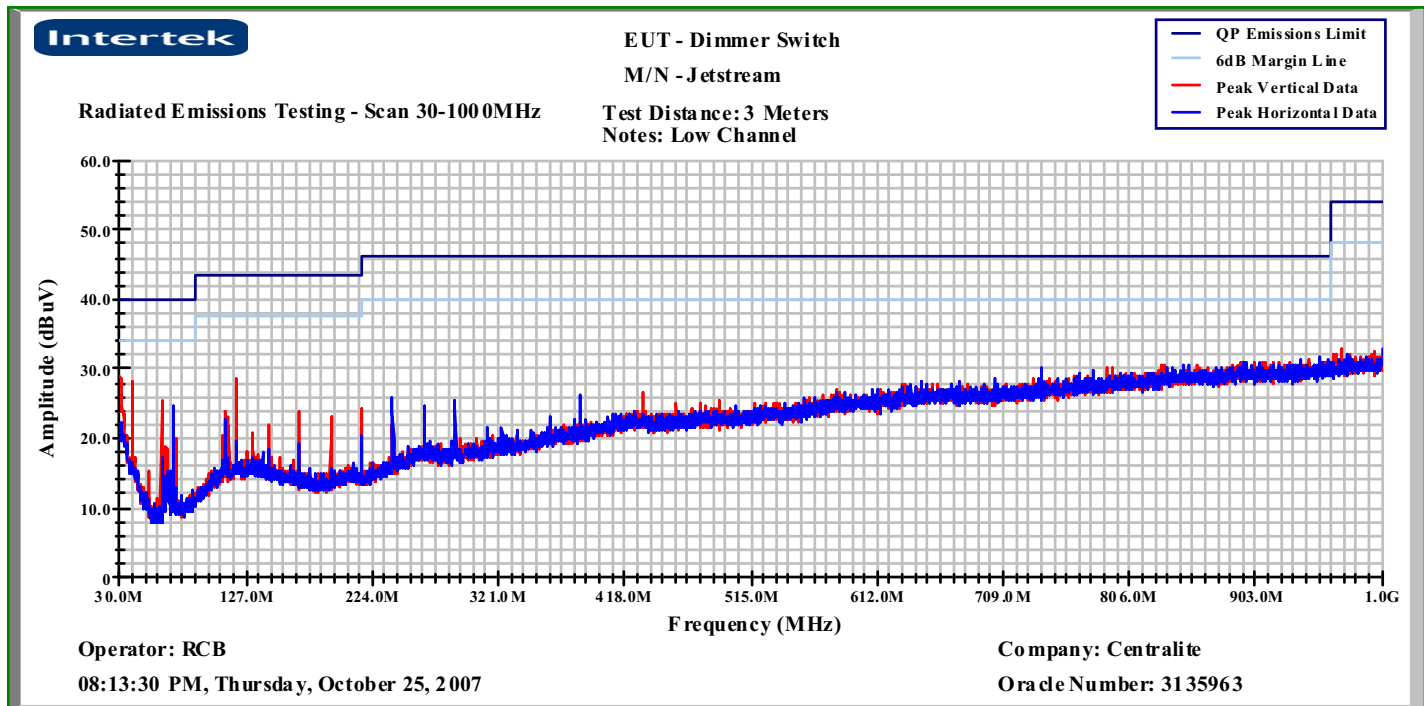
7.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Antenna, Horn, <18 GHz	EMCO	3115	213061	04/30/2009	04/30/2010
Antenna, Horn, 18-40 GHz	EMCO	3116	213023	04/29/2009	04/29/2010
Cable E01, <18GHz	Pasternack	RG214/U	E01	05/04/2009	05/04/2010
Cable E201, 18 GHz, N, 3m	Megaphase	TM18 NKNK 118	E201	01/29/2009	01/29/2010
Cable E402, 40 GHz, 2.9, 9"	Megaphase	TM40 K1K1 9	E402	06/08/2009	06/08/2010
Cable E404, 40 GHz, 2.9, 2m	Megaphase	TM40 K1K1 80	E404	06/08/2009	06/08/2010
Cable E405, 40 GHz, 2.9, 2m	Megaphase	TM40 K1K1 80	E405	06/08/2009	06/08/2010
Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/04/2009	05/04/2010
Cable ST1, 7m, N-N, 18 GHz	Storm Products Co.	PR90-206-7MTR	ST1	01/23/2009	01/23/2010
EMI Receiver	Hewlett Packard	8546A	213109	09/29/2008	09/29/2009
EMI Receiver, Preselector section	Hewlett Packard	85460A	213108	09/29/2008	09/29/2009
Excel spreadsheet for radiated emissions	Software	Excel - RE Worksh	SW004	12/08/2008	12/08/2009
Preamplifier, 10 MHz to 2000 MHz, 27 dB gain	Mini-Circuits	ZKL-2	200074	10/20/2008	10/20/2009
Preamplifier, 18-40GHz, 29 dB Gain	Miteq	JS41800400-30-5P	200080	03/06/2009	03/06/2010
Preamplifier, 18-40GHz, 29 dB Gain	Miteq	JS41800400-30-5P	200106	09/02/2008	09/02/2009
Preamplifier, 20 MHz to 18 GHz, 40 dB	A.H. Systems	PAM-0118	200108	04/07/2009	04/07/2010
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	10/10/2008	10/10/2009

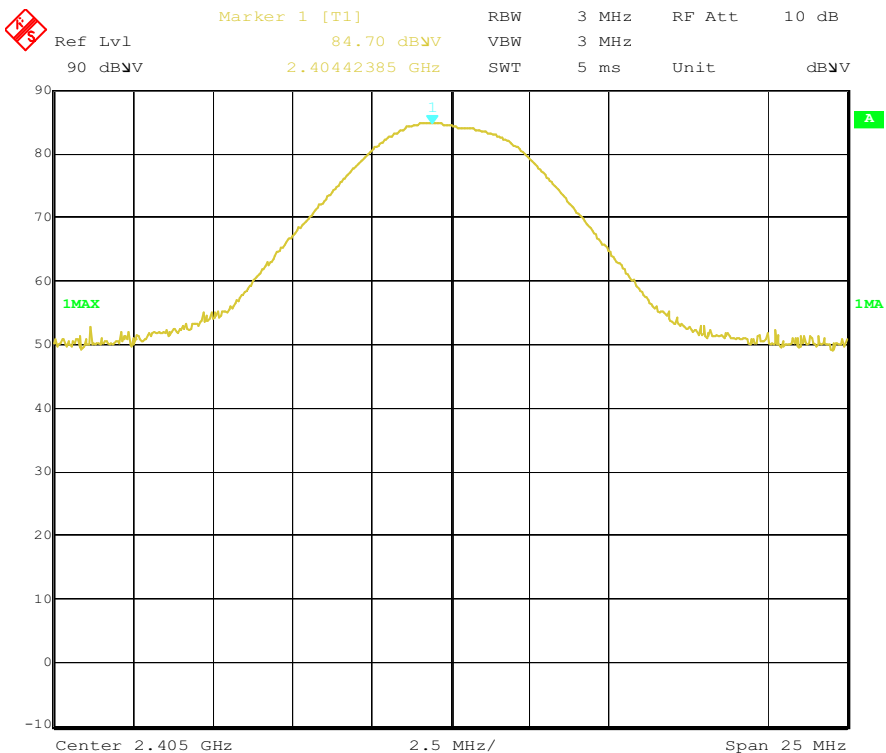
Results: The sample tested was found to Comply.

Plot:



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

Plot:

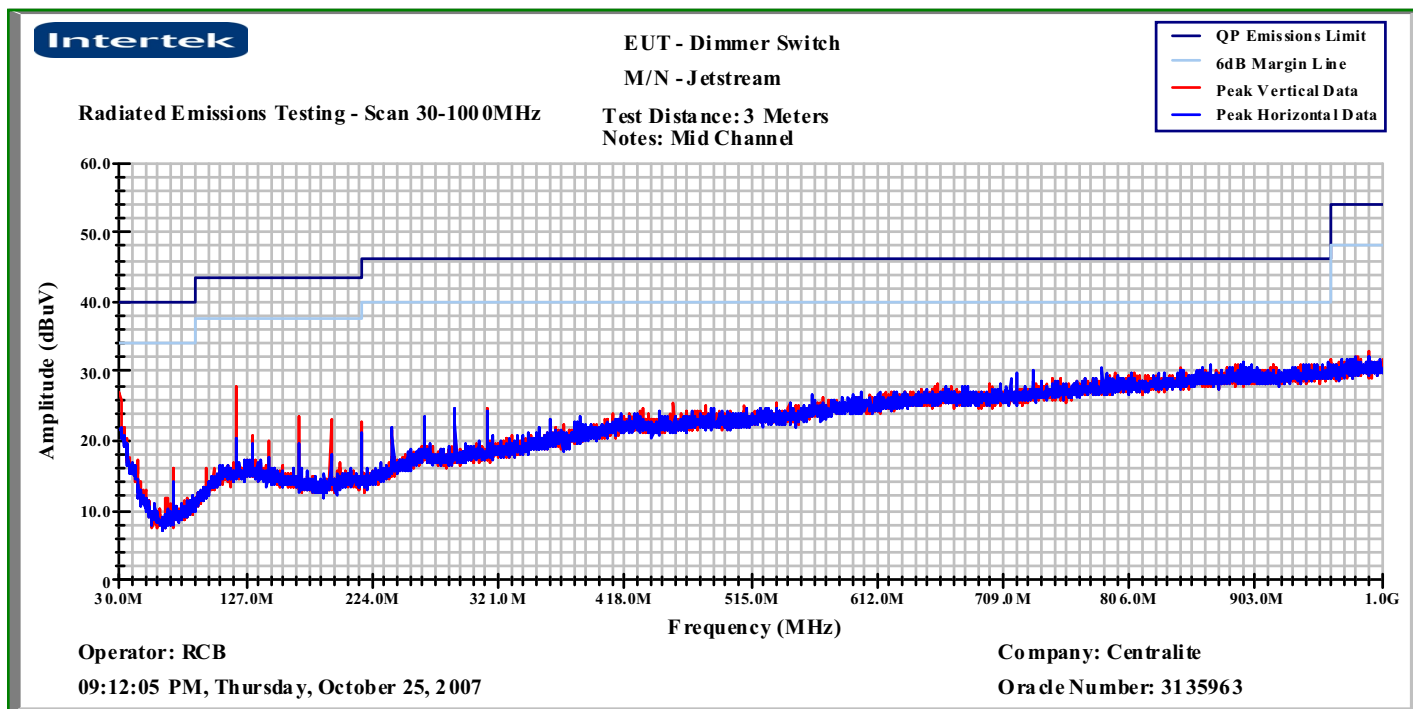


Date: 30.OCT.2007 21:35:05

Peak Output Power - Low Channel

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

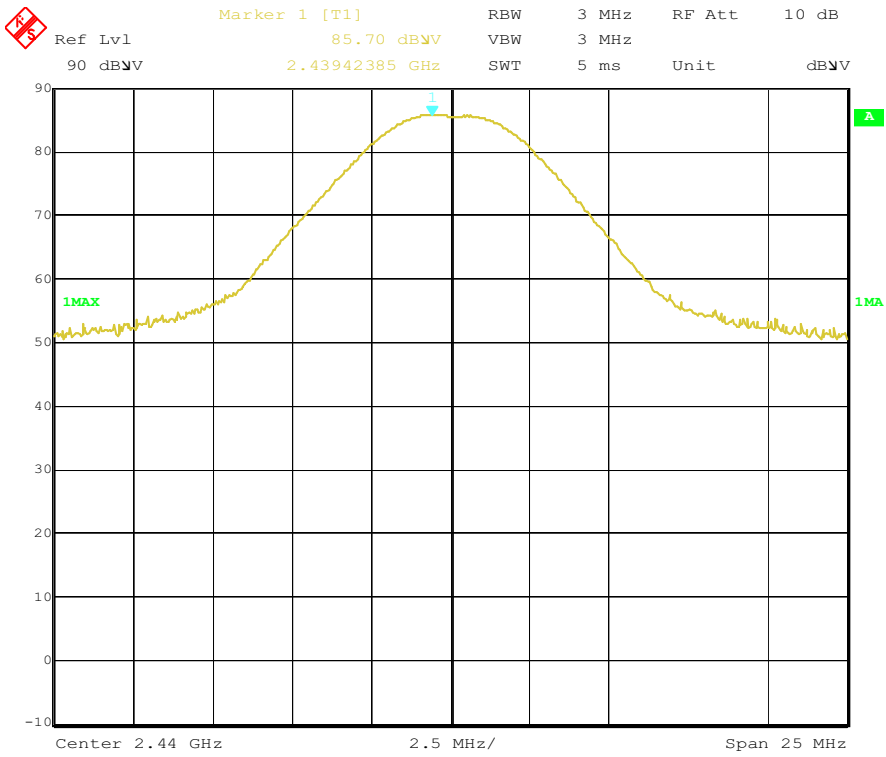
Plot:



Radiated Emissions from 30-1000MHz @ Mid Channel

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

Plot:

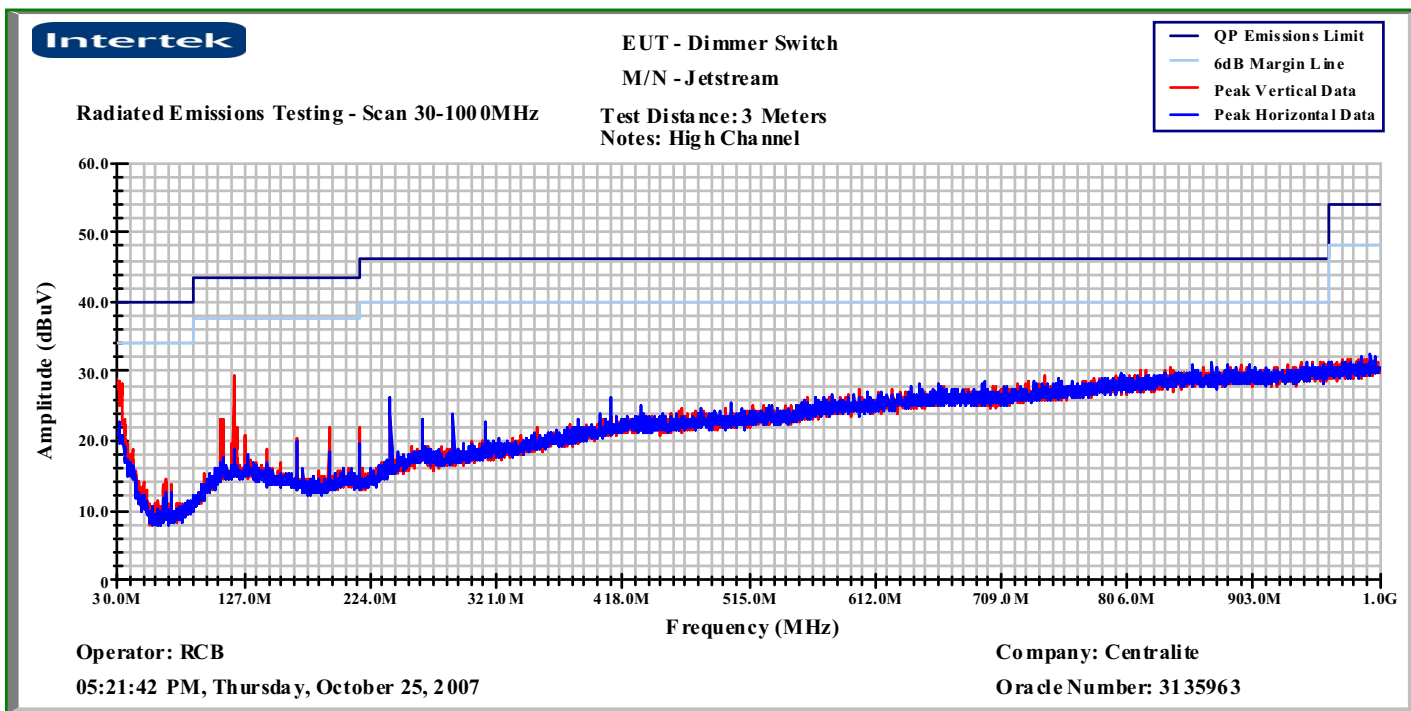


Date: 30.OCT.2007 20:48:13

Peak Output Power - Mid Channel

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

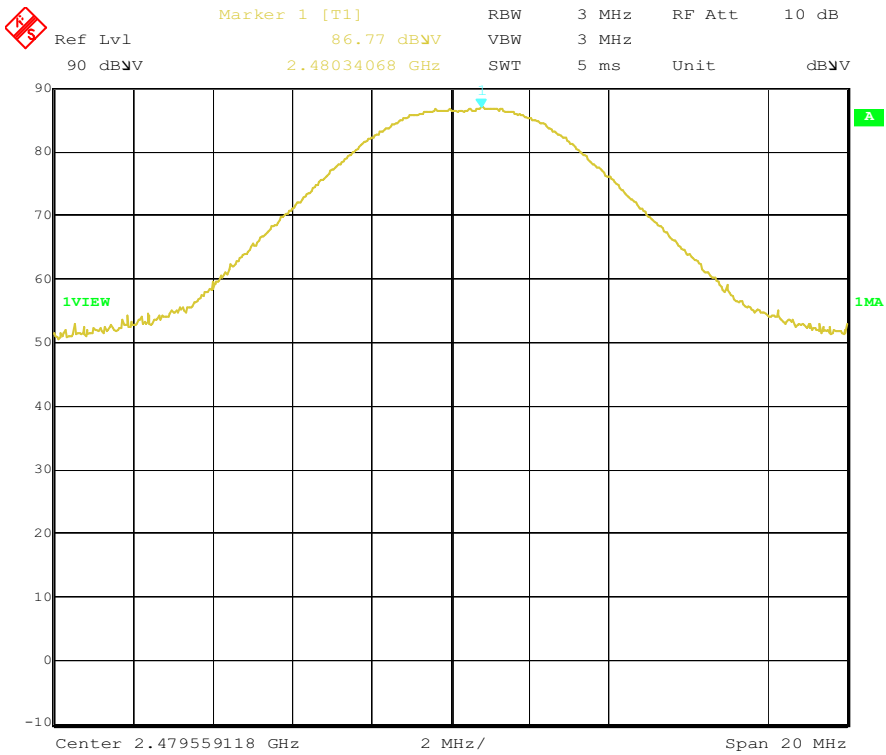
Plot:



Radiated Emissions from 30-1000MHz @ High Channel

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

Plot:

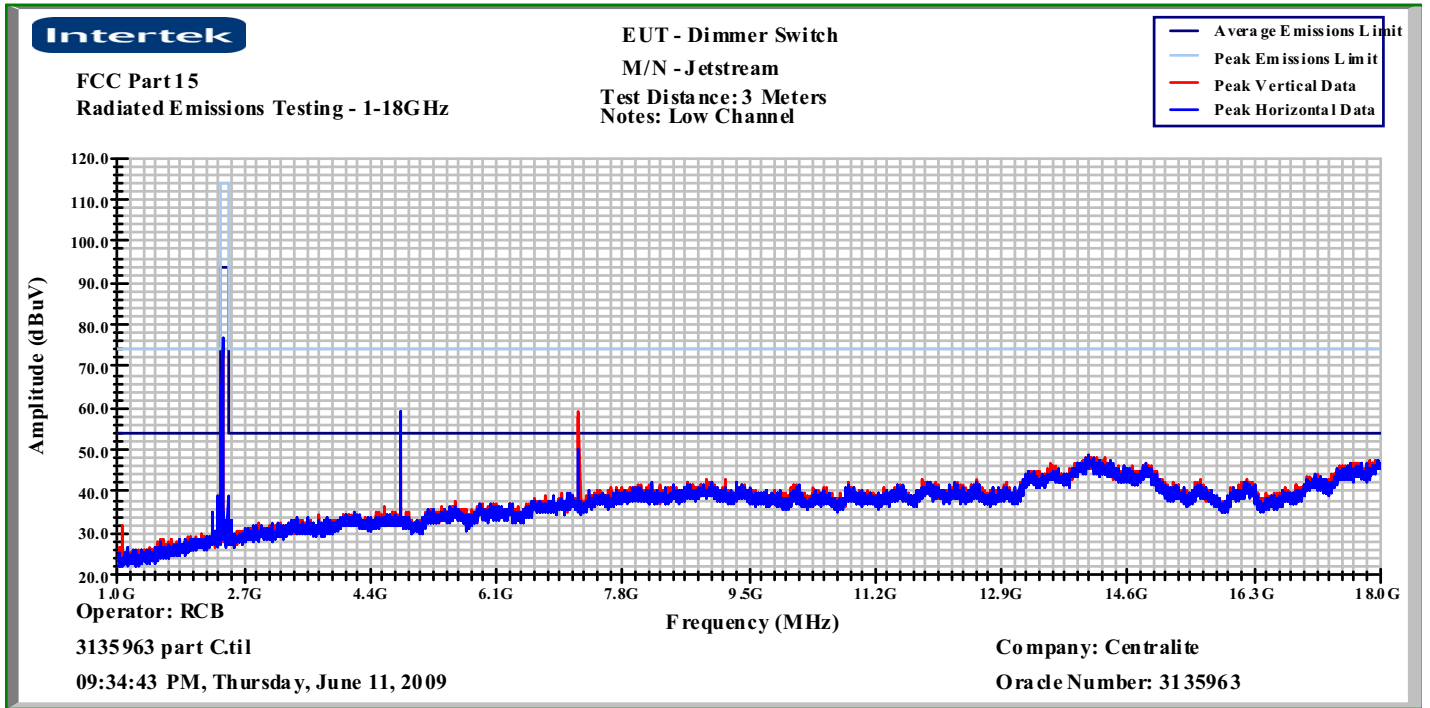


Date: 30.OCT.2007 20:05:11

Peak Output Power - High Channel

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

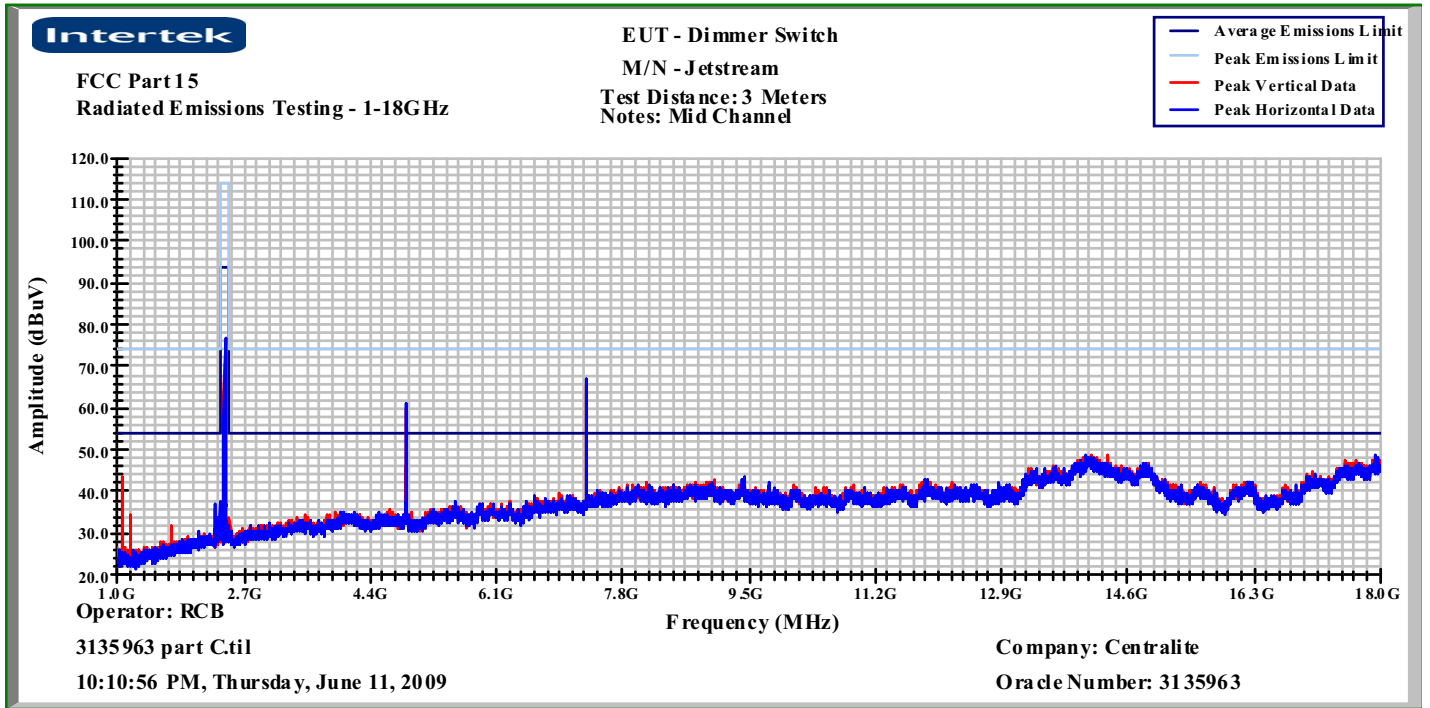
Plot:



Radiated Emissions from 1-18GHz @ Low Channel

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

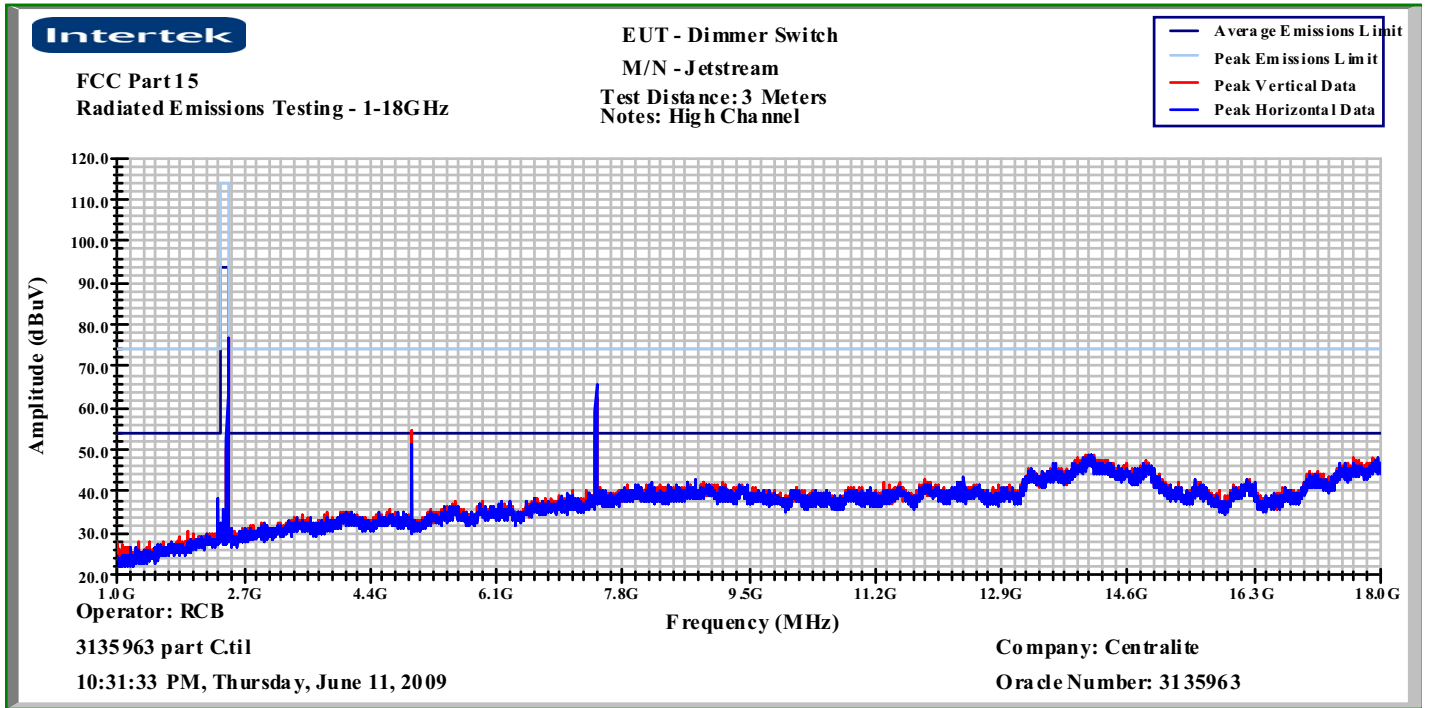
Plot:



Radiated Emissions from 1-18GHz @ Mid Channel

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

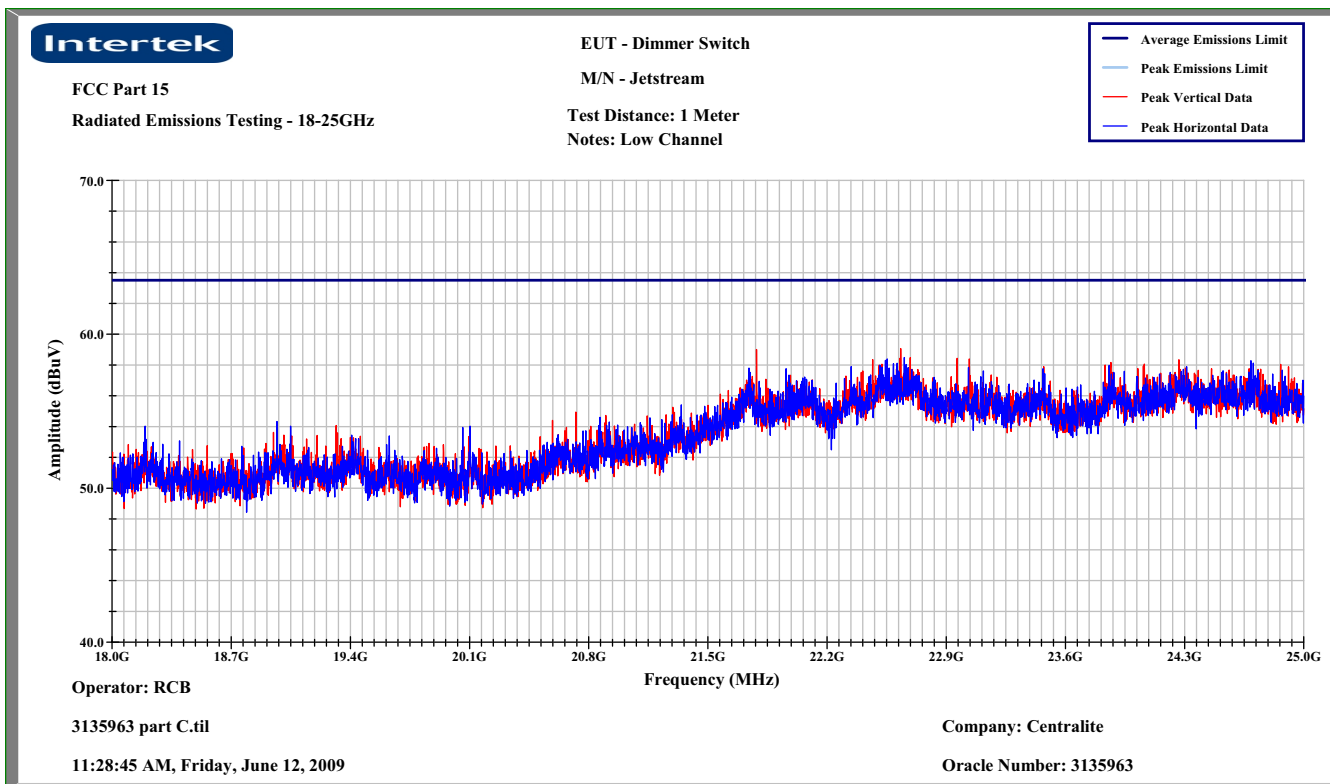
Plot:



Radiated Emissions from 1-18GHz @ High Channel

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

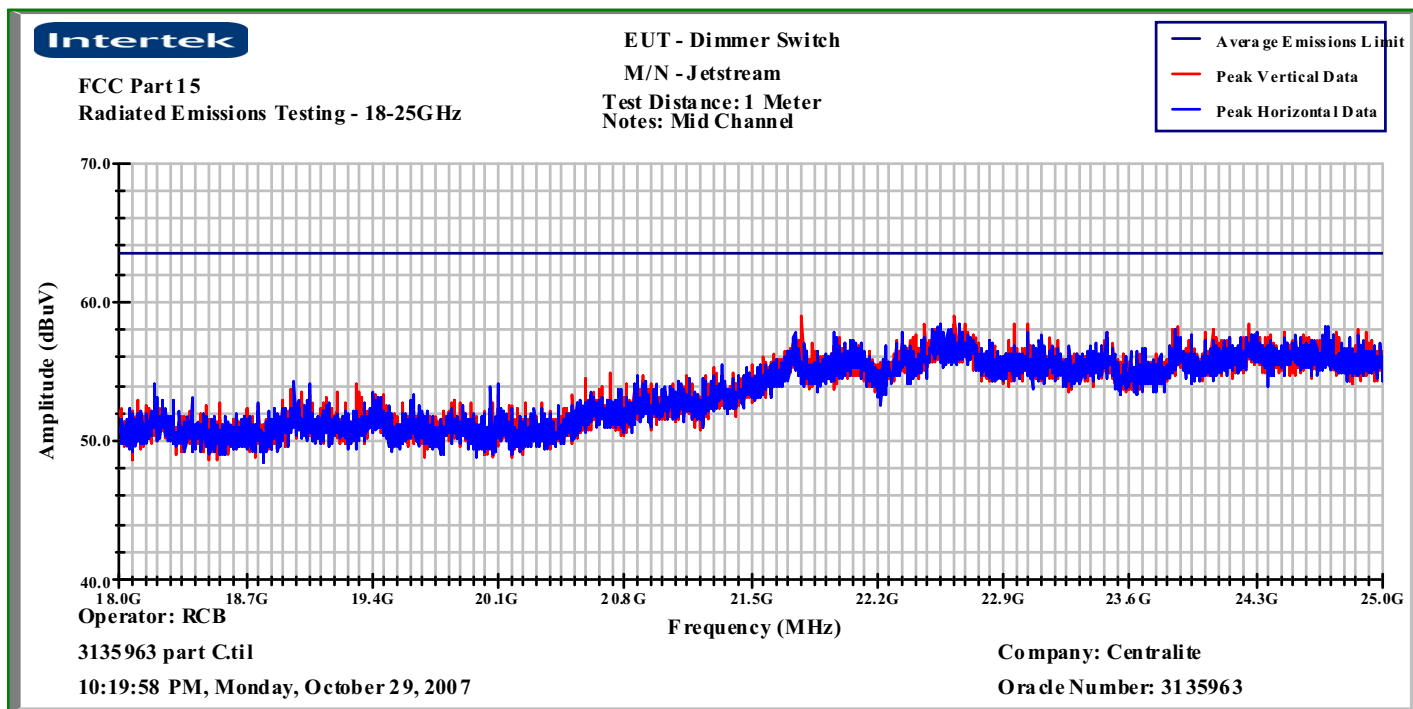
Plot:



Radiated Emissions from 18-25GHz @ Low Channel

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

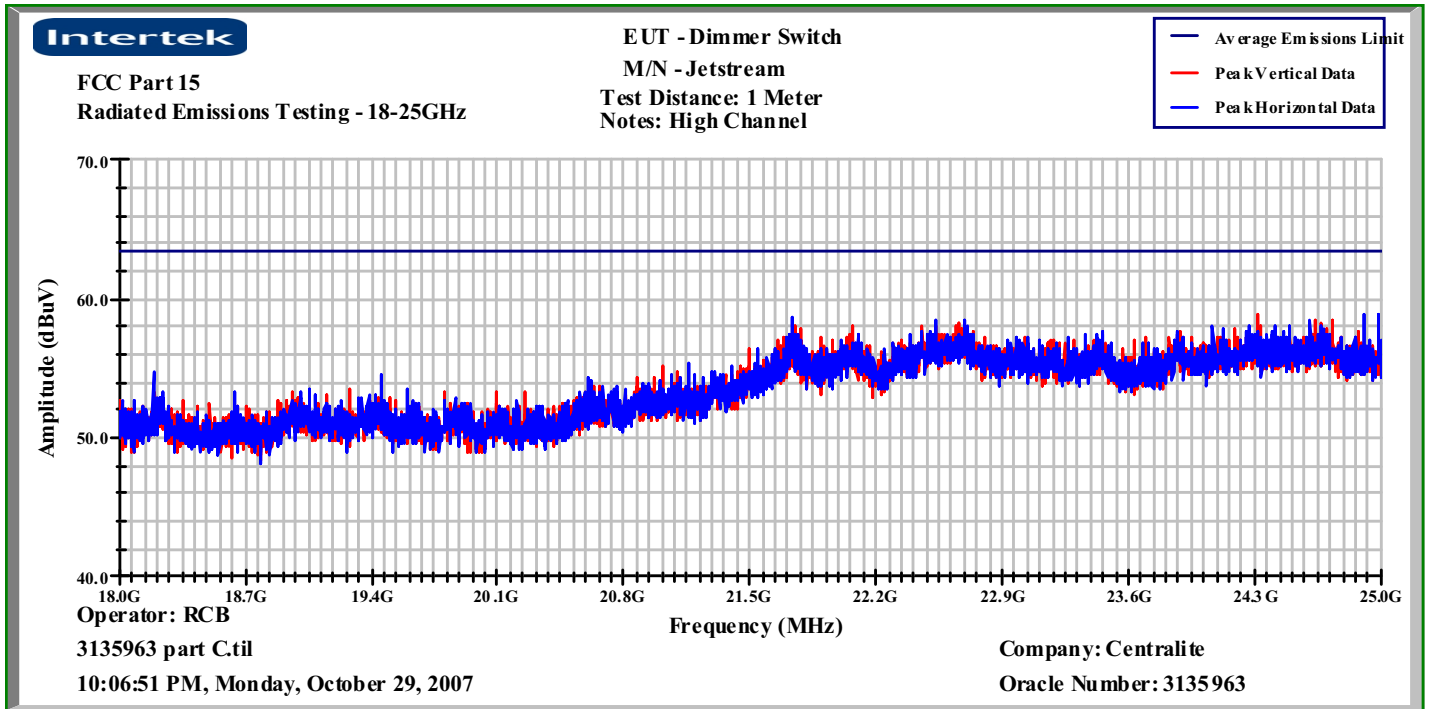
Plot:



Radiated Emissions from 18-25GHz @ Mid Channel

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

Plot:



Radiated Emissions from 18-25GHz @ High Channel

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

Data:

Date: 10/30/2007

Test Distance (m): 3

Frequency Range (MHz): 1000-25000

Limit: 15_249_2400-2483

Input power: 120VAC/60Hz

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)	2483 Limit dB(uV/m)	Margin dB	Detectors / Bandwidths Det/RBW/VBW
Low Channel									
H	4809.000	56.9	33.2	11.4	41.0	60.4	74.0	-13.6	Pk/1M/3M
H	4809.000	40.8	33.2	11.4	41.0	44.3	54.0	-9.7	Pk/1M/2Hz
V	7216.000	49.7	35.2	14.3	38.9	60.3	74.0	-13.7	Pk/1M/3M
V	7216.000	33.9	35.2	14.3	38.9	44.5	54.0	-9.5	Pk/1M/2Hz
Mid Channel									
H	4879.000	56.8	33.2	11.5	41.1	60.4	74.0	-13.6	Pk/1M/3M
H	4879.000	40.7	33.2	11.5	41.1	44.3	54.0	-9.7	Pk/1M/2Hz
H	7318.000	57.2	35.3	14.4	39.1	67.9	74.0	-6.1	Pk/1M/3M
H	7318.000	41.3	35.3	14.4	39.1	52.0	54.0	-2.0	Pk/1M/2Hz
High Channel									
V	4959.000	51.4	33.2	11.6	41.1	55.1	74.0	-18.9	Pk/1M/3M
V	4959.000	36.5	33.2	11.6	41.1	40.2	54.0	-13.8	Pk/1M/2Hz
H	7439.000	55.1	35.5	14.6	39.0	66.2	74.0	-7.8	Pk/1M/3M
H	7439.000	40.2	35.5	14.6	39.0	51.3	54.0	-2.7	Pk/1M/2Hz
Calculations		G=C+D+E-F			I=G-H				

Radiated Spurious Emissions from 1-25GHz

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

Data:

Frequency Range (MHz): 2400-2483.5

Test Distance (m): 3

Input power: 120VAC/60Hz

Limit: 15_249-3m

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
Low Channel									
H	2404.423	89.8	27.8	7.6	40.6	84.7	94.0	-9.3	Pk/3M/3M
Mid Channel									
H	2439.423	90.8	27.8	7.7	40.6	85.7	94.0	-8.3	Pk/3M/3M
High Channel									
H	2480.340	91.8	27.9	7.7	40.7	86.8	94.0	-7.2	Pk/3M/3M
Calculations		G=C+D+E-F			I=G-H				

Peak Output Power @ Fundamental

8.0 Revision History (Revision History)

Method:

Document the history of the report.

Data:

Revision Level	Date	Report Number	Notes
Original issue	June 18, 2009	3135963-005	--