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October 31, 2002

ATCB
6731 Whittier Ave
Suite C110
McLean, Va. 22101

Gentlemen:

The enclosed documents constitute a formal submittal and application for a Grant of Equipment Authorization pursuant to Subpart C of Part 15 of FCC Rules (CFR 47) regarding intentional radiators. Data within this report demonstrates that the equipment tested complies with the FCC limits for intentional radiators.

Elliott Laboratories, as duly authorized agent prepared this submittal. A copy of the letter of our appointment as agent is enclosed.

If there are any questions or if further information is needed, please contact Elliott Laboratories for assistance.

Sincerely,

A handwritten signature in black ink that reads "Juan Martinez".

Juan Martinez
Sr. EMC Engineer

JM/bab

Enclosures: Application Fee
 FCC Form 731
 Agent Authorization Letter
 Emissions Test Report with Exhibits

***Electromagnetic Emissions Test Report
and
Application for Grant of Equipment Authorization
pursuant to
FCC Part 15, Subpart C Specifications for an
Intentional Radiator on the
ActionTec Electronics, Inc.
Model: BMDC200***

FCC ID: LNQ-BMDC200

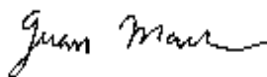
GRANTEE: ActionTec Electronics, Inc.
760 North Mary Ave.
Sunnyvale, CA 94087

TEST SITE: Elliott Laboratories, Inc.
684 W. Maude Avenue
Sunnyvale, CA 94086

REPORT DATE: October 31, 2002

FINAL TEST DATE: October 28, 2002

AUTHORIZED SIGNATORY: _____



Juan Martinez
Sr. EMC Engineer

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SCOPE

An electromagnetic emissions test has been performed on the ActionTec Electronics, Inc. model BMDC200 pursuant to Subpart C of Part 15 of FCC Rules for intentional radiators. Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in ANSI C63.4-1992 as outlined in Elliott Laboratories test procedures.

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on a single type test of the ActionTec Electronics, Inc. model BMDC200 and therefore apply only to the tested sample. The sample was selected and prepared by Angela Yao of ActionTec Electronics, Inc.

OBJECTIVE

The primary objective of the manufacturer is compliance with Subpart C of Part 15 of FCC Rules for the radiated and conducted emissions of intentional radiators. Certification of these devices is required as a prerequisite to marketing as defined in Part 2 the FCC Rules.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to the FCC. The FCC issues a grant of equipment authorization upon successful completion of their review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

STATEMENT OF COMPLIANCE

The tested sample of ActionTec Electronics, Inc. model BMDC200 complied with the requirements of Subpart C of Part 15 of the FCC Rules for low power intentional radiators.

Maintenance of FCC compliance is the responsibility of the manufacturer. Any modification of the product, which may result in increased emissions, should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

EMISSION TEST RESULTS

The following emissions tests were performed on the ActionTec Electronics, Inc. model BMDC200. The actual test results are contained in an exhibit of this report.

LIMITS OF CONDUCTED INTERFERENCE VOLTAGE

The EUT tested complied with the limits detailed in FCC Rules Part 15 Section 15.207.

The following measurement was extracted from the data recorded during the conducted emissions scan and represents the highest amplitude emission relative to the specification limit. The actual test data and any correction factors are contained in an exhibit of this report.

120V, 60Hz

Frequency MHz	Level dBuV	Power Lead	EN55022 B		Detector QP/Ave	Comments
			Limit	Margin		
0.150	54.0	Line	66.0	-12.0	QP	

LIMITS OF ANTENNA CONDUCTED POWER

The EUT tested complied with the limits detailed in FCC Rules Part 15 Section 15.247.

The highest out-of-band (Un-restricted) emission recorded in any 100 kHz band was -50 dB below the in-band level at 1000 MHz. The actual test data and any correction factors are contained an exhibit of this report.

LIMITS OF RADIATED INTERFERENCE FIELD STRENGTH

The EUT tested complied with the limits detailed in FCC Rules Part 15 Section 15.247 and 15.209 in the case of emissions falling within the frequency bands specified in Section 15.205.

The following measurement was extracted from the data recorded during the radiated electric field emissions scan and represents the highest amplitude emission relative to the specification limit. The actual test data and any correction factors are contained in an exhibit of this report.

Frequency MHz	Level dBuV/m	Pol v/h	15.247(c)		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4803.975	46.2	V	54.0	-7.8	Avg	0	1.0	

LIMITS OF POWER AND BANDWIDTH

The EUT tested complied with the limits detailed in FCC Rules Part 15 Section 15.247.

The maximum power output was 3.74dBm on 2441 MHz. The minimum 20-dB bandwidth was .825 Megahertz on 2480. The actual test data and any correction factors are contained in an exhibit of this report.

MEASUREMENT UNCERTAINTIES

ISO Guide 25 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with NAMAS document NIS 81.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	30 to 1000	± 3.2

EQUIPMENT UNDER TEST (EUT) DETAILS**GENERAL**

The ActionTec Electronics, Inc. model BMDC200 is a Bluetooth FHSS transmitter, which is designed to provide wireless networking for home or office environment use.

The sample was received on October 28, 2002 and tested on October 28, 2002.

The EUT consisted of the following component(s):

Manufacturer/Model/Description	Serial Number
ActionTec/BMDC200/Bluetooth Module	N/A

ENCLOSURE

The EUT has no enclosure. It is designed to be installed within the enclosure of a host computer.

MODIFICATIONS

N/A

SUPPORT EQUIPMENT

The following equipment was used as local support equipment for emissions testing:

Manufacturer/Model/Description	Serial Number	FCC ID Number
IBM/Model ThinkPad R40/Laptop	FX-00412	DoC
Logitec/N/A/Mouse	LNA20956436	DoC
HP/2225C/Printer	2714S40166	

No support equipment was used during emissions testing.

EXTERNAL I/O CABLING

The I/O cabling configuration during emissions testing was as follows:

Cable Description	Length (m)	From Unit/Port	To Unit/Port
Parallel	2	Printer	Laptop
USB	3	Mouse	Laptop

TEST SOFTWARE

During testing the EUT was continuously transmitting at full power on the channel(s) specified in the test data log.

TEST SITE**GENERAL INFORMATION**

Final test measurements were taken on October 28, 2002 at the Elliott Laboratories Open Area Test Site #4 located at 684 West Maude Avenue, Sunnyvale, California. The test site contains separate areas for radiated and conducted emissions testing. Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data has been filed with the Commission.

The FCC recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent FCC requirements.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions' testing is performed in conformance with ANSI C63.4-1992. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment. The test site is maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines.

MEASUREMENT INSTRUMENTATION**RECEIVER SYSTEM**

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection program, which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

POWER METER

A power meter and thermister mount are used for all direct output power measurements from transmitters as they provide a broadband indication of the power output.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the entire 30 to 1000 MHz ranges for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors programmed into the test receivers.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height.

ANSI C63.4 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES**EUT AND CABLE PLACEMENT**

The FCC requires that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4, and the worst-case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.

RADIATED EMISSIONS

Radiated emissions measurements are performed in two phases as well. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed from 30 MHz up to the frequency required by the regulation specified on page 1. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters. The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain. Emissions, which have values close to the specification limit, may also be measured with a tuned dipole antenna to determine compliance.

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements are performed with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

CONDUCTED EMISSIONS SPECIFICATION LIMITS, SECTION 15.207

Frequency Range (MHz)	Limit (QP) (dBuV)	Limit (Avg) (dBuV)
.150 to .500	66 – 56	56 - 46
.500 to 5	56	46
5 to 30	60	50

RADIATED EMISSIONS SPECIFICATION LIMITS, SECTION 15.209

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{\text{KHz}} @ 300\text{m}$	$67.6-20*\log_{10}(F_{\text{KHz}}) @ 300\text{m}$
0.490-1.705	$24000/F_{\text{KHz}} @ 30\text{m}$	$87.6-20*\log_{10}(F_{\text{KHz}}) @ 30\text{m}$
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_T - B = C$$

and

$$C - S = M$$

where:

R_T = Receiver Reading in dBuV

B = Broadband Correction Factor*

C = Corrected Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

* Broadband Level - Per ANSI C63.4, 13 dB may be subtracted from the quasi-peak level if it is determined that the emission is broadband in nature. If the signal level in the average mode is six dB or more below the signal level in the peak mode, the emission is classified as broadband.

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements. A distance factor, when used for electric field measurements, is calculated by using the following formula:

$$F_d = 20 * \log_{10} (D_m/D_s)$$

where:

$$F_d = \text{Distance Factor in dB}$$

$$D_m = \text{Measurement Distance in meters}$$

$$D_s = \text{Specification Distance in meters}$$

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

$$R_r = \text{Receiver Reading in dBuV/m}$$

$$F_d = \text{Distance Factor in dB}$$

$$R_c = \text{Corrected Reading in dBuV/m}$$

$$L_s = \text{Specification Limit in dBuV/m}$$

$$M = \text{Margin in dB Relative to Spec}$$

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Radiated Emissions, 1000 - 25,000 MHz, 29-Oct-02**Engineer: jmartinez**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Assett #</u>	<u>Cal interval</u>	<u>Last Calibrated</u>	<u>Cal Due</u>
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	786	12	3/2/2002	3/2/2003
Hewlett Packard	Microwave EMI test system (SA40, 9Hz - 40GHz), system 2	84125C	1410	12	4/2/2002	4/2/2003
Miteq	Preamplifier, 1-18GHz	AFS44	1346	12	1/7/2002	1/7/2003

Antenna Conducted Emissions, 29-Oct-02**Engineer: jmartinez**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Assett #</u>	<u>Cal interval</u>	<u>Last Calibrated</u>	<u>Cal Due</u>
Hewlett Packard	Microwave EMI test system (SA40, 9Hz - 40GHz), system 2	84125C	1410	12	4/2/2002	4/2/2003

Conducted and Radiated Emissions, 30-Oct-02**Engineer: Vishal**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Assett #</u>	<u>Cal interval</u>	<u>Last Calibrated</u>	<u>Cal Due</u>
Elliott Laboratories	Biconical Antenna, 30-300 MHz	EL30.300	54	12	1/4/2002	1/4/2003
Hewlett Packard	EMC Spectrum Analyzer, Opt. 026 , 9 KHz -26.5GHz	8593EM	1141	12	3/11/2002	3/11/2003
Filtek	High Pass Filter, 1GHz	HP12/1000-5BA	957	12	3/25/2002	3/25/2003
EMCO	LISN, 10kHz-100MHz	3825/2	1293	12	6/2/2002	6/2/2003
EMCO	Log Periodic Antenna, 0.3-1 GHz	3146A	364	12	9/12/2002	9/12/2003
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	12	1/15/2002	1/15/2003
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1398	12	2/7/2002	2/7/2003
Solar Electronics	Support Equipment LISN, 0.150-30.0 MHz	8012-50-R-24-BNC	305	12	8/20/2002	8/20/2003
Rohde & Schwarz	Test Receiver, 9kHz-2750MHz	ESCS 30	1337	12	12/26/2001	12/26/2002

Output Power, 15-Nov-02**Engineer: Mark**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Assett #</u>	<u>Cal interval</u>	<u>Last Calibrated</u>	<u>Cal Due</u>
Rohde & Schwarz	Power Meter	NRVS	1422	12	9/6/2002	9/6/2003
Rohde & Schwarz	Power Sensor 100uW - 2 Watts	NRV-Z32	1423	12	9/6/2002	9/6/2003

EXHIBIT 2: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T49181_Radio 26 Pages



EMC Test Data

Client:	ActionTec	Job Number:	J49140
Model:	BMDC200	T-Log Number:	T49181
		Proj Eng:	Mark Briggs
Contact:	Angela Yao		
Emissions Spec:	FCC15.247(FHSS), 15.109	Class:	-
Immunity Spec:	-	Environment:	-

EMC Test Data

For The

ActionTec

Model

BMDC200



EMC Test Data

Client:	ActionTec	Job Number:	J49140
Model:	BMDC200	T-Log Number:	T49181
		Proj Eng:	Mark Briggs
Contact:	Angela Yao		
Emissions Spec:	FCC15.247(FHSS), 15.109	Class:	-
Immunity Spec:	-	Environment:	-

EUT INFORMATION

General Description

The EUT is a Bluetooth FHSS transmitter, which is designed to provide wireless networking environment for home or office use. The device is designed to be installed into a laptop PC and connected to the internal USB interface bus. The USB bus of the host laptop provides both power and data/control signals to the EUT. The EUT's antenna is integrated into the enclosure for the laptop screen. For testing purposes the EUT was installed into an IBM laptop. Normally, the host system would be placed on a table top during operation. The host IBM laptop was, therefore, treated as table-top equipment during testing to simulate the end user environment. The electrical rating of the host system's external AC-DC adapter was 120/240 V, 50/60 Hz, 1 Amp.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Actiontec	BMDC200	MPCI card	N/A	LNQ-BMDC200
Actiontec	BMDC200	MPCI card	N/A	2496A-BMDC200

Antenna

The maximum gain of the antenna is approximately 1.5 dBi.

EUT Enclosure

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer.

Modification History

Mod. #	Test	Date	Modification
1	-	-	None



EMC Test Data

Client:	ActionTec	Job Number:	J49140
Model:	BMDC200	T-Log Number:	T49181
		Proj Eng:	Mark Briggs
Contact:	Angela Yao		
Emissions Spec:	FCC15.247(FHSS), 15.109	Class:	-
Immunity Spec:	-	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
IBM	IBM ThinkPad R40	Laptop	FX-00412	DoC
Logitech	N/A	Mouse	LNA20956436	DoC
HP	2225C	Printer	2714S40166	

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Interface Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Parallel	Printer	Parallel Cable	Shielded	2
USB	Mouse	USB Cable	Shielded	3

Note: No external connections accessible.

EUT Operation During Emissions

The EUT was in a continuous transmit mode on the frequency specified in the 2400-2483.5 MHz band or set to hopping as required.



EMC Test Data

Client: ActionTec	Job Number: J49140
Model: BMDC200	T-Log Number: T49181
	Proj Eng: Mark Briggs
Contact: Angela Yao	
Spec: FCC15.247(FHSS), 15.109	Class: -

Conducted Emissions - Power Ports

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 10/29/2002
Test Engineer: Vishal
Test Location: SVOATS #1

Config. Used: 1
Config Change: None
EUT Voltage: 230V/50Hz and 120V/60Hz

General Test Configuration

For tabletop equipment, the EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment.

Ambient Conditions:

Temperature: 12°C
Rel. Humidity: 75%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power 230V/50Hz	EN 301 489-1	Pass	-10.0dB @ 0.150MHz
2	CE, AC Power 120V/60Hz	FCC B	Pass	-12.0dB @ 0.150MHz

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.



EMC Test Data

Client: ActionTec	Job Number: J49140
Model: BMDC200	T-Log Number: T49181
Contact: Angela Yao	Proj Eng: Mark Briggs
Spec: FCC15.247(FHSS), 15.109	Class: -

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz

Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBμV	Line	Limit	Margin	QP/Ave	
0.150	56.0	Neutral	66.0	-10.0	QP	
0.327	38.7	Neutral	49.5	-10.8	Average	
0.150	52.6	Line	66.0	-13.4	QP	
0.327	43.9	Neutral	59.5	-15.6	QP	
8.650	39.5	Line	60.0	-20.5	QP	
8.6600	37.4	Neutral	60.0	-22.6	QP	
0.740	29.1	Line	56.0	-26.9	QP	
0.740	16.5	Line	46.0	-29.5	Average	
0.150	26.4	Neutral	56.0	-29.6	Average	
0.150	24.2	Line	56.0	-31.8	Average	
8.650	16.2	Line	50.0	-33.8	Average	
8.6600	13.5	Neutral	50.0	-36.5	Average	

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz

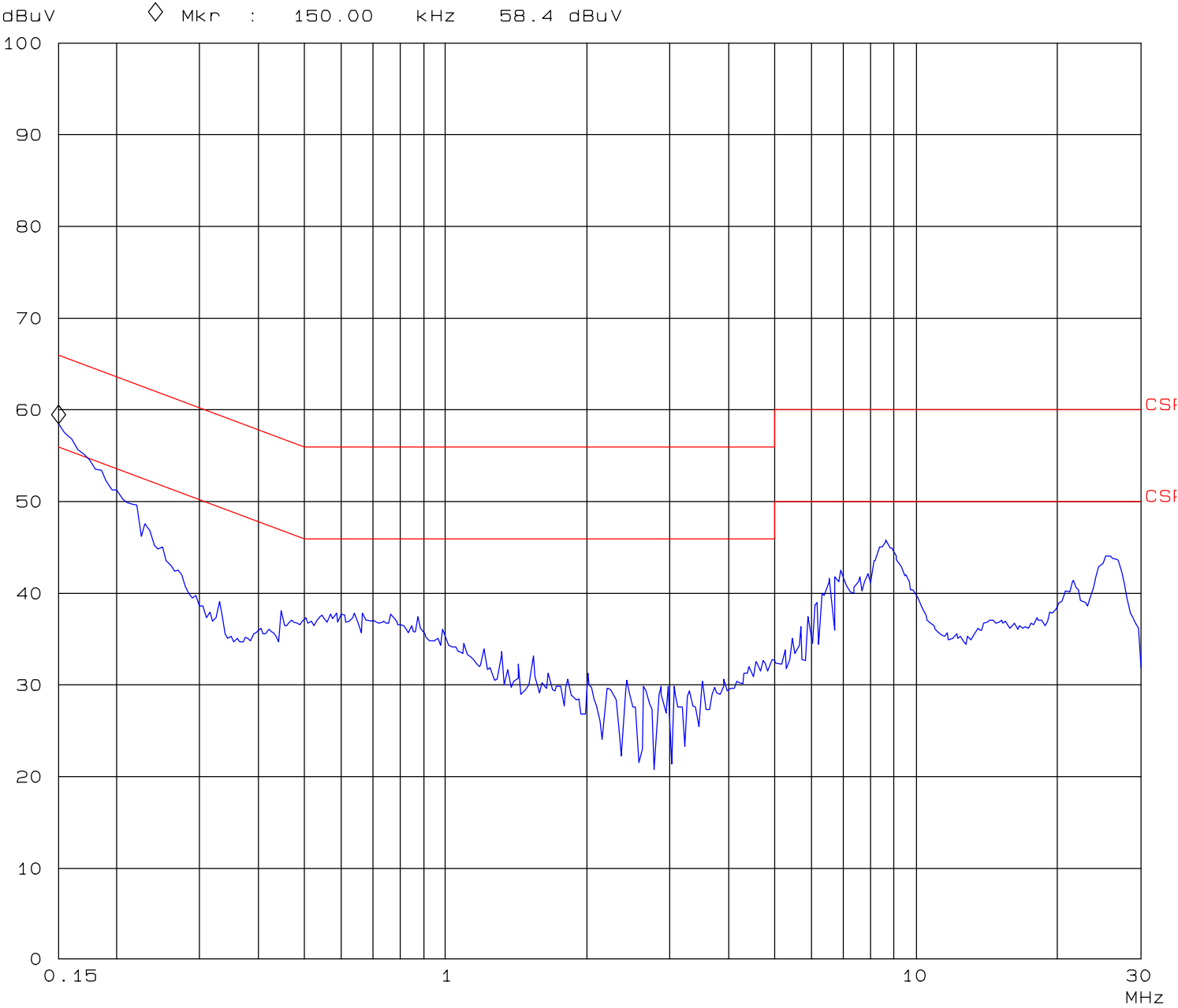
Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBμV	Line	Limit	Margin	QP/Ave	
0.150	54.0	Line	66.0	-12.0	QP	
0.190	50.0	Line	64.0	-14.0	QP	
0.190	33.9	Line	54.0	-20.1	Average	
0.190	33.7	Neutral	54.0	-20.3	Average	
0.190	43.4	Neutral	64.0	-20.6	QP	
8.2450	36.8	Neutral	60.0	-23.2	QP	
0.585	30.6	Neutral	56.0	-25.4	QP	
8.320	34.0	Line	60.0	-26.0	QP	
0.585	16.5	Neutral	46.0	-29.5	Average	
0.150	24.0	Line	56.0	-32.0	Average	
8.2450	16.3	Neutral	50.0	-33.7	Average	
8.320	12.6	Line	50.0	-37.4	Average	

Eliott Laboratories

Conducted Emissions

30. Oct 02 01:39

EUT: BMD C200
Manuf: Action Tec
Op Cond: Run 1 230V/50Hz Line
Operator: Vishal Narayan
Test Spec: EN55022 Class B
Comment: J49140 / T49181
File name: 120line.RES

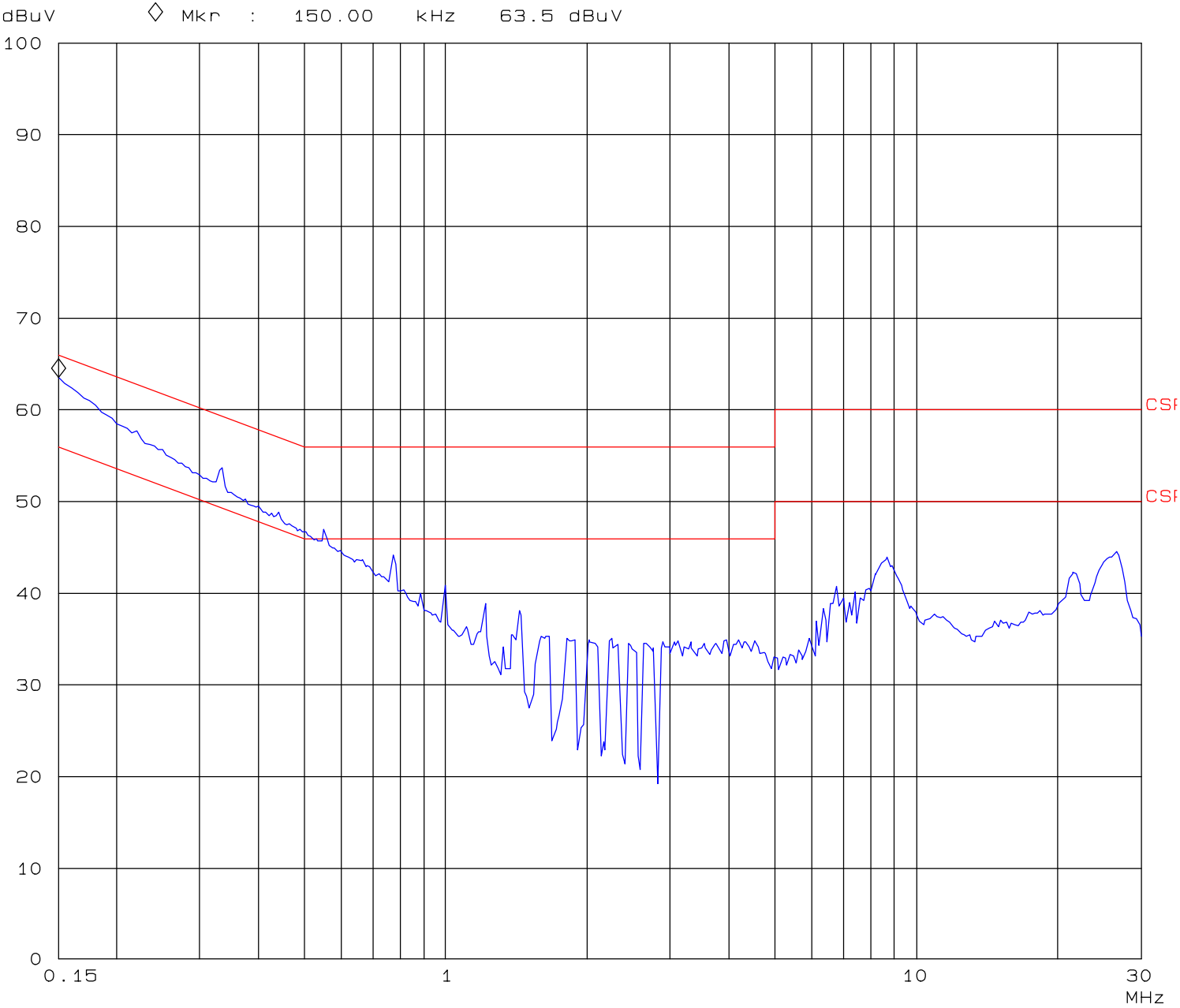


Eliott Laboratories

Conducted Emissions

30. Oct 02 01:55

EUT: BMD C200
Manuf: Action Tec
Op Cond: Run 1 230V/50Hz Neutral
Operator: Vishal Narayan
Test Spec: EN55022 Class B
Comment: J49140 / T49181
File name: 120line.RES

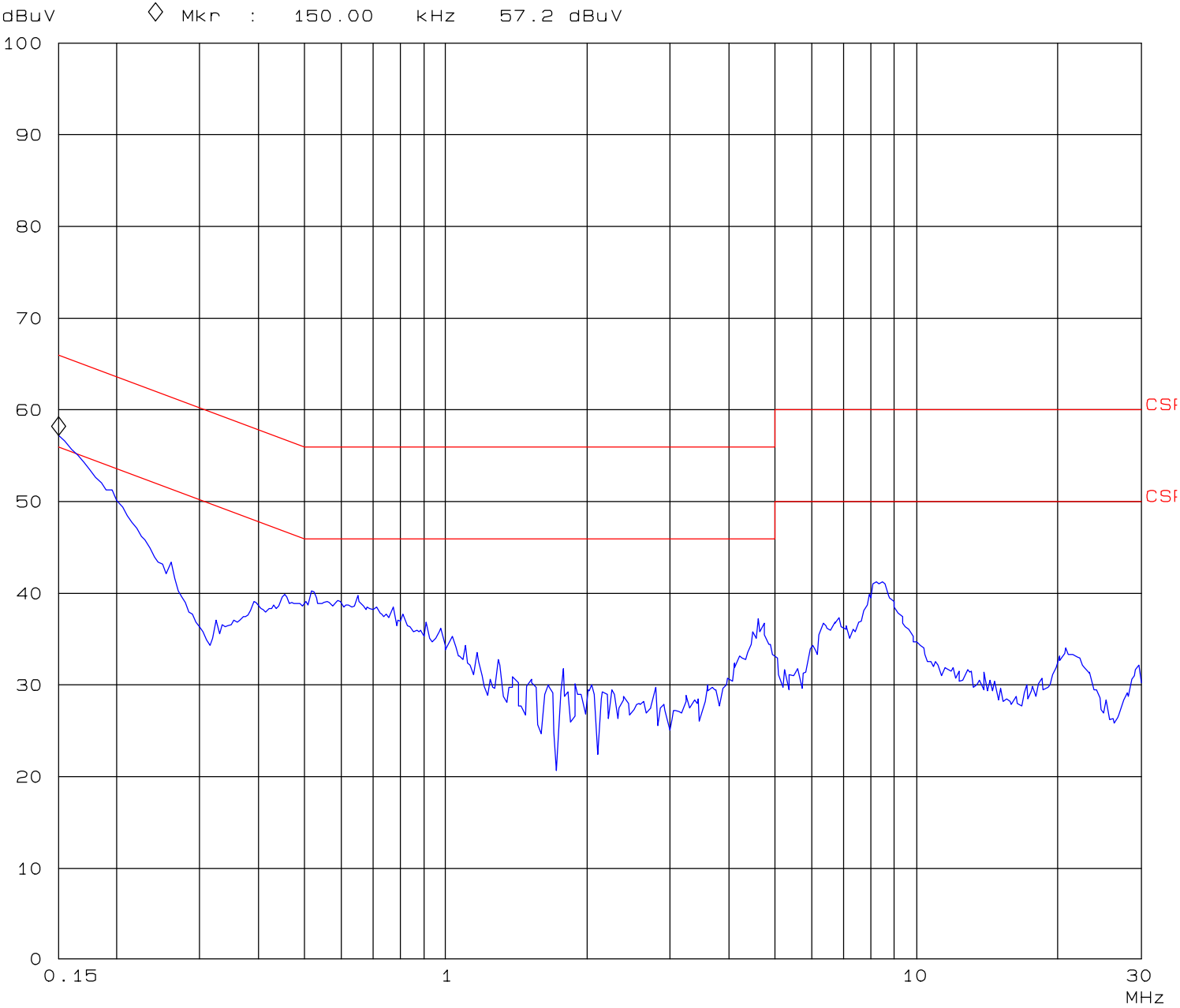


Eliott Laboratories

Conducted Emissions

30. Oct 02 02:23

EUT: BMD C200
Manuf: Action Tec
Op Cond: Run 2 120V/60Hz Line
Operator: Vishal Narayan
Test Spec: EN55022 Class B
Comment: J49140 / T49181
File name: 120line.RES

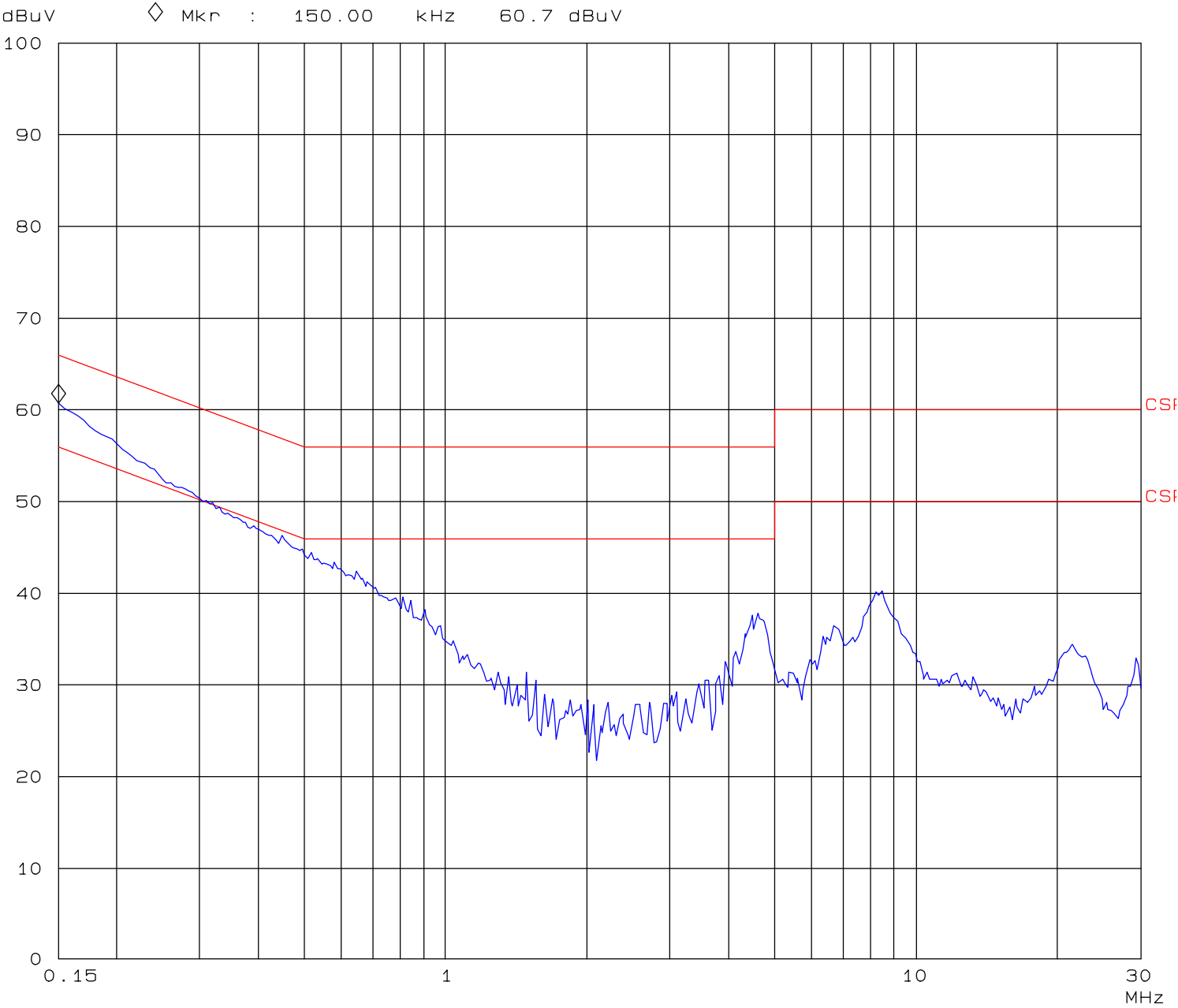


Eliott Laboratories

Conducted Emissions

30. Oct 02 02: 12

EUT: BMD C200
Manuf: Action Tec
Op Cond: Run 2 120V/60Hz Neutral
Operator: Vishal Narayan
Test Spec: EN55022 Class B
Comment: J49140 / T49181
File name: 120line.RES





EMC Test Data

Client: ActionTec	Job Number: J49140
Model: BMDC200	T-Log Number: T49181
	Proj Eng: Mark Briggs
Contact: Angela Yao	
Spec: FCC15.247(FHSS), 15.109	Class: -

Radiated Emissions

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 10/29/2002

Test Engineer: Vishal

Test Location: SVOATS #1

Config. Used: 1

Config Change: None

EUT Voltage: 230V/50Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing.

On the OATS, the measurement antenna was located 10 meters from the EUT for the measurement range 30 - 1000 MHz and 3m from the EUT for the frequency range 1 - 2 GHz.

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Note, for testing above 1 GHz, the FCC specifies the limit as an average measurement. In addition, the FCC states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.

Ambient Conditions:

Temperature: 12°C

Rel. Humidity: 75%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, Preliminary Scan 30 - 1000 MHz	EN 55022 / FCC Class B	Pass	-2.9dB @ 190.470MHz
2	RE, 30 - 1000MHz - Maximized Emissions	EN 55022 / FCC Class B	Pass	-2.7dB @ 150.490MHz
3	RE, 1000 - 2000MHz Maximized Emissions	FCC B	Pass	-18.3dB @ 1195.0MHz

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.



EMC Test Data

Client: ActionTec	Job Number: J49140
Model: BMDC200	T-Log Number: T49181
	Proj Eng: Mark Briggs
Contact: Angela Yao	
Spec: FCC15.247(FHSS), 15.109	Class: -

Run #1: Preliminary Radiated Emissions, 30-1000 MHz

Frequency	Level	Pol	EN 55022 B / FCC B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h		Margin	Pk/QP/Avg	degrees	meters	
190.470	27.1	V	30.0	-2.9	QP	190	1.0	
150.490	26.7	V	30.0	-3.3	QP	30	1.0	
256.000	33.1	V	37.0	-3.9	QP	40	1.0	
299.010	33.1	V	37.0	-3.9	QP	200	1.0	
223.240	25.6	H	30.0	-4.4	QP	120	3.5	
215.040	25.4	H	30.0	-4.6	QP	110	4.0	
210.000	25.3	V	30.0	-4.7	QP	80	1.0	
256.000	32.2	H	37.0	-4.8	QP	120	3.5	
198.660	25.2	V	30.0	-4.8	QP	180	1.0	
150.490	24.5	H	30.0	-5.5	QP	130	4.0	
432.070	31.1	H	37.0	-5.9	QP	220	1.6	
223.240	24.0	V	30.0	-6.0	QP	180	1.0	
198.660	24.0	H	30.0	-6.0	QP	240	3.2	
215.040	23.7	V	30.0	-6.3	QP	180	1.3	
364.325	30.1	V	37.0	-6.9	QP	180	1.0	
364.325	29.6	H	37.0	-7.4	QP	230	3.5	
243.720	29.5	H	37.0	-7.5	QP	120	4.0	
243.720	29.3	V	37.0	-7.7	QP	190	1.0	
165.140	21.9	V	30.0	-8.1	QP	360	1.0	
36.920	21.5	V	30.0	-8.5	QP	280	1.0	
299.010	28.3	H	37.0	-8.7	QP	200	3.0	
227.330	21.2	V	30.0	-8.8	QP	330	1.0	
162.530	20.7	V	30.0	-9.3	QP	260	2.1	Signal Sub
432.070	27.2	V	37.0	-9.8	QP	320	1.0	
210.000	20.0	H	30.0	-10.0	QP	360	3.0	Signal Sub
528.100	26.1	H	37.0	-10.9	QP	320	1.8	
528.100	25.5	V	37.0	-11.5	QP	20	1.0	
326.695	24.5	V	37.0	-12.5	QP	260	1.0	
380.755	24.4	V	37.0	-12.6	QP	20	1.0	
272.390	24.0	V	37.0	-13.0	QP	360	1.0	



EMC Test Data

Client: ActionTec

Job Number: J49140

Model: BMDC200

T-Log Number: T49181

Proj Eng: Mark Briggs

Contact: Angela Yao

Spec: FCC15.247(FHSS), 15.109

Class: -

Run #2: Maximized Readings From Run #1

Frequency	Level	Pol	EN55022 B		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
150.490	27.3	V	30.0	-2.7	QP	30	1.0	
190.470	27.1	V	30.0	-2.9	QP	190	1.0	
256.000	33.1	V	37.0	-3.9	QP	40	1.0	
299.010	33.1	V	37.0	-3.9	QP	200	1.0	
223.240	25.6	H	30.0	-4.4	QP	120	3.5	
215.040	25.4	H	30.0	-4.6	QP	110	4.0	

Run #3: Maximized readings, 1000 - 2000 MHz

Measurements made at 3m per FCC requirements.

Frequency	Level	Pol	FCC B	FCC B	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1195.000	55.7	V	74.0	-18.3	Pk	210	1.0	
1097.000	33.0	V	54.0	-21.0	Avg	230	1.0	
1195.000	32.7	V	54.0	-21.3	Avg	210	1.0	
1198.000	30.7	H	54.0	-23.3	Avg	360	3.5	
1097.000	45.5	V	74.0	-28.5	Pk	230	1.0	
1198.000	44.4	H	74.0	-29.6	Pk	360	3.5	



EMC Test Data

Client: ActionTec	Job Number: J49140
Model: BMDC200	T-Log Number: T49181
	Proj Eng: Mark Briggs
Contact: Angela Yao	
Spec: FCC15.247(FHSS), 15.109	Class: N/A

Radiated Emissions

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 10/28/2002	Config. Used: 1
Test Engineer: jmartinez	Config Change: None
Test Location: SVOATS #4	Host Unit Voltage 120V/60Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators used.

Unless stated otherwise the EUT was operating such that it constantly hopped on either the low, center or high channels.

Ambient Conditions:

Temperature: 13°C
Rel. Humidity: 72%



EMC Test Data

Client: ActionTec

Job Number: J49140

Model: BMDC200

T-Log Number: T49181

Proj Eng: Mark Briggs

Contact: Angela Yao

Spec: FCC15.247(FHSS), 15.109

Class: N/A

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1a	RE, 30 - 25,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	-7.8dB @ 4804.0MHz
1b	RE, 30 - 25,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	-15.3dB @ 9764.0MHz
1c	RE, 30 - 25,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	-10.9dB @ 7439.9MHz
2	20dB Bandwidth	15.247(a)	Pass	.825 MHz
3	Output Power	15.247(b)	Pass	3.7 dBm
4	Channel Occupancy	15.247(a)	Pass	0.127 Sec
5	Channel Separation	15.247(a)	Pass	1.008 MHz
6	Number of Channels	15.247(a)	Pass	79 Channels
7	Out-of-Band	15.247(a)	Pass	Refer to Plots
8	Bandages	15.247(a)	Pass	Refer to run

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.



EMC Test Data

Client: ActionTec	Job Number: J49140
Model: BMDC200	T-Log Number: T49181
Contact: Angela Yao	Proj Eng: Mark Briggs
Spec: FCC15.247(FHSS), 15.109	Class: N/A

Run #1a: Radiated Spurious Emissions, 30-12,000 MHz. Low Channel @ 2402 MHz

	H	V
Fundamental emission level @ 3m in 1 MHz RBW:	91.4	99.6
Limit for emissions outside of restricted bands:	79.6 dBμV/m	

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4803.975	46.2	V	54.0	-7.8	Avg	0	1.0	
7205.979	45.8	V	54.0	-8.2	Avg	0	1.2	
12010.24	43.2	V	54.0	-10.8	Avg	90	1.2	
7439.399	41.2	H	54.0	-12.8	Avg	0	1.0	
12010.24	41.2	H	54.0	-12.8	Avg	360	1.1	
9608.491	41.1	V	54.0	-12.9	Avg	319	1.2	
9919.685	40.2	H	54.0	-13.8	Avg	0	1.0	
9919.081	39.5	H	54.0	-14.5	Avg	0	1.0	
7439.275	58.7	H	74.0	-15.3	Pk	0	1.0	
12010.49	57.2	H	74.0	-16.8	Pk	360	1.1	
12010.49	56.5	V	74.0	-17.5	Pk	90	1.2	
7205.952	55.8	V	74.0	-18.2	Pk	0	1.2	
9608.719	55.2	V	74.0	-18.8	Pk	319	1.2	
9919.330	53.8	H	74.0	-20.2	Pk	0	1.0	
9919.935	53.4	H	74.0	-20.6	Pk	0	1.0	
4959.968	33.1	H	54.0	-20.9	Avg	0	1.3	
4803.876	50.7	V	74.0	-23.3	Pk	0	1.0	
4960.188	46.2	H	74.0	-27.8	Pk	0	1.3	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.



EMC Test Data

Client: ActionTec

Job Number: J49140

Model: BMDC200

T-Log Number: T49181

Proj Eng: Mark Briggs

Contact: Angela Yao

Spec: FCC15.247(FHSS), 15.109

Class: N/A

Run #1b: Radiated Spurious Emissions, 30-25,000 MHz. Center Channel @ 2441 MHz

	H	V
Fundamental emission level @ 3m in 1 MHz RBW:	100	102
Limit for emissions outside of restricted bands:	82 dB μ V/m	

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
9764.000	38.7	H	54.0	-15.3	Avg	360	1.0	
12205.00	42.2	V	54.0	-11.8	Avg	0	1.2	
12205.00	42.1	H	54.0	-11.9	Avg	293	1.0	
7323.000	41.8	H	54.0	-12.2	Avg	258	1.0	
7323.000	41.8	V	54.0	-12.2	Avg	130	1.0	
9764.000	40.2	V	54.0	-13.8	Avg	0	1.1	
4882.000	36.2	V	54.0	-17.8	Avg	0	1.0	
7323.000	55.9	V	74.0	-18.1	Pk	130	1.0	
12205.00	55.7	H	74.0	-18.3	Pk	293	1.0	
12205.00	55.5	V	74.0	-18.5	Pk	0	1.2	
9764.000	54.7	H	74.0	-19.3	Pk	360	1.0	
7323.000	54.5	H	74.0	-19.5	Pk	258	1.0	
9764.000	54.3	V	74.0	-19.7	Pk	0	1.1	
4882.000	31.4	H	54.0	-22.6	Avg	121	1.0	
4882.000	46.2	V	74.0	-27.8	Pk	0	1.0	
4882.000	45.7	H	74.0	-28.3	Pk	121	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.



EMC Test Data

Client: ActionTec	Job Number: J49140
Model: BMDC200	T-Log Number: T49181
Contact: Angela Yao	Proj Eng: Mark Briggs
Spec: FCC15.247(FHSS), 15.109	Class: N/A

Run #1c: Radiated Spurious Emissions, 30-25,000 MHz. High Channel @ 2480 MHz

	H	V
Fundamental emission level @ 3m in 1 MHz RBW:	94.7	99
Limit for emissions outside of restricted bands:	79 dBμV/m	

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7439.915	43.1	V	54.0	-10.9	Avg	239	1.2	
7439.399	43.1	H	54.0	-10.9	Avg	0	1.0	
12399.65	42.3	V	54.0	-11.7	Avg	360	1.2	
9919.772	40.5	V	54.0	-13.5	Avg	125	1.0	
9919.081	40.4	H	54.0	-13.6	Avg	0	1.0	
12399.65	40.4	H	54.0	-13.6	Avg	0	1.1	
4959.933	39.8	V	54.0	-14.2	Avg	242	1.4	
7439.845	56.5	V	74.0	-17.5	Pk	239	1.2	
12399.89	55.8	V	74.0	-18.2	Pk	360	1.2	
7439.275	55.7	H	74.0	-18.3	Pk	0	1.0	
12399.89	54.8	H	74.0	-19.2	Pk	0	1.1	
9919.977	54.4	V	74.0	-19.6	Pk	125	1.0	
9919.330	54.3	H	74.0	-19.7	Pk	0	1.0	
4959.968	32.7	H	54.0	-21.3	Avg	0	1.3	
4959.707	48.2	V	74.0	-25.8	Pk	242	1.4	
4960.188	45.7	H	74.0	-28.3	Pk	0	1.3	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.



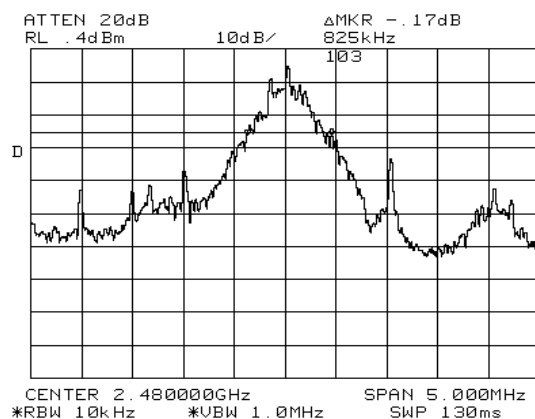
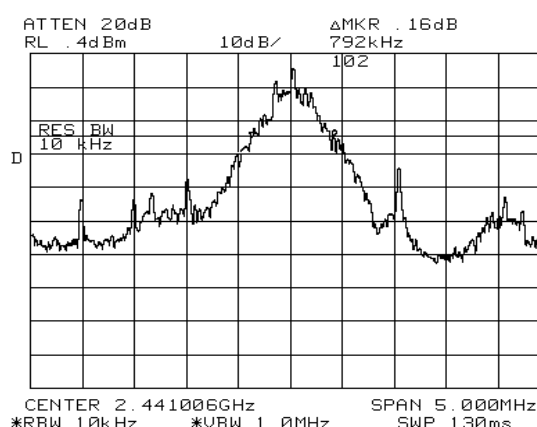
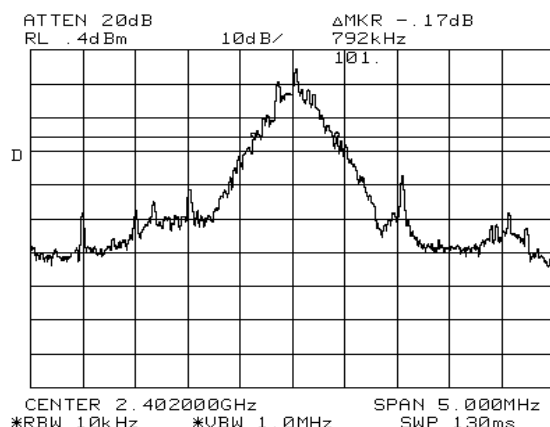
EMC Test Data

Client: ActionTec	Job Number: J49140
Model: BMDC200	T-Log Number: T49181
Contact: Angela Yao	Proj Eng: Mark Briggs
Spec: FCC15.247(FHSS), 15.109	Class: N/A

Run #2: Signal Bandwidth

Bandwidth on all channels was less than 1MHz.

Channel	Frequency (MHz)	Resolution Bandwidth	20dB Signal Bandwidth	Graph reference #
Low	2402	30kHz	.792 MHz	101
Mid	2441	30kHz	.792 MHz	102
High	2480	30kHz	.825 MHz	103





EMC Test Data

Client: ActionTec

Job Number: J49140

Model: BMDC200

T-Log Number: T49181

Proj Eng: Mark Briggs

Contact: Angela Yao

Spec: FCC15.247(FHSS), 15.109

Class: N/A

Run #3: Output Power (Peak Power Meter)

Channel	Frequency (MHz)	Measured power	Cable Loss	Power Output (dBm)
Low	2402	2.4	0.6	3.0
Mid	2441	3.1	0.6	3.7
High	2480	2.5	0.6	3.1

Note 1: Measured power was made using a peak power meter. Output power is measured power plus cable loss.

Note 2: 3.7dBm is equivalent to an output power of 2.34mW. The antenna gain is approximately 2dBi. Maximum output power permitted under 15.247 is 1 Watt.



EMC Test Data

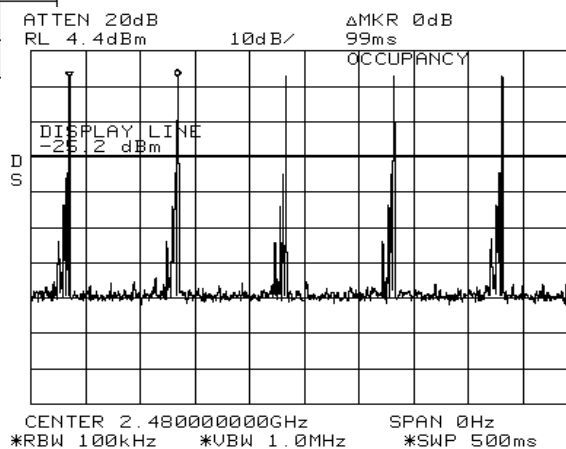
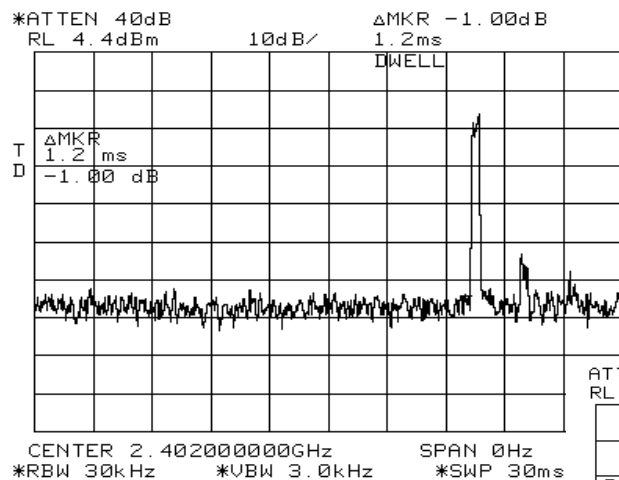
Client: ActionTec	Job Number: J49140
Model: BMDC200	T-Log Number: T49181
	Proj Eng: Mark Briggs
Contact: Angela Yao	
Spec: FCC15.247(FHSS), 15.109	Class: N/A

Run #4: Channel Occupancy

The channel occupancy was measured with the radio transmitting normally (i.e. In hopping mode)

The channel spacing was:	<u>1000</u> kHz	
The minimum channel separation permitted is:	<u>1000</u> kHz	
The total number of channels (N) was:	<u>79</u> channels	
The dwell time (Dt) on the center channel was:	<u>0.0012</u> Seconds	
Time between successive occupancy of a channel (Ot):	<u>0.099</u> Seconds	
Time between successive occupancy of a channel:	<u>0.095</u> Seconds	Calculated (Dt * N)
Dwell time calculated :	<u>0.0013</u> Seconds	Calculated (Ot / * N)
Average time per 10 seconds:	<u>0.127</u> Seconds	Calculated (10 / N)
Average time per 10 seconds:	<u>0.121</u> Seconds	Measured (10/Ot * Dt)

The maximum permitted dwell time in a 10 second period for FCC
Part 15.247/RSS 210(o), based on a signal bandwidth >250kHz: 0.4 Seconds



Note - theory of operations more fully discusses how the device, as a Bluetooth device, meets All occupancy requirements of 15.247 and RSS 210.



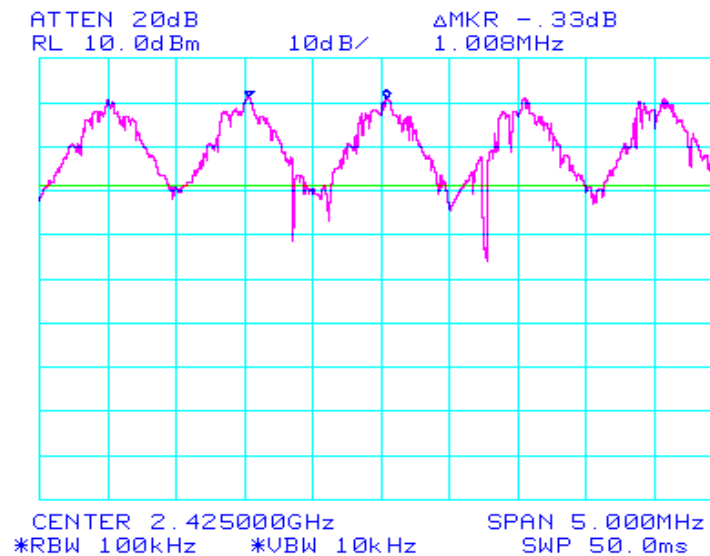
EMC Test Data

Client: ActionTec	Job Number: J49140
Model: BMDC200	T-Log Number: T49181
Contact: Angela Yao	Proj Eng: Mark Briggs
Spec: FCC15.247(FHSS), 15.109	Class: N/A

Run #5: Channel Spacing

Ch.	Frequency (MHz)	Resolution Bandwidth	Channel Separation
Middle	2441	100 kHz	1.008 MHz

Channel Spacing





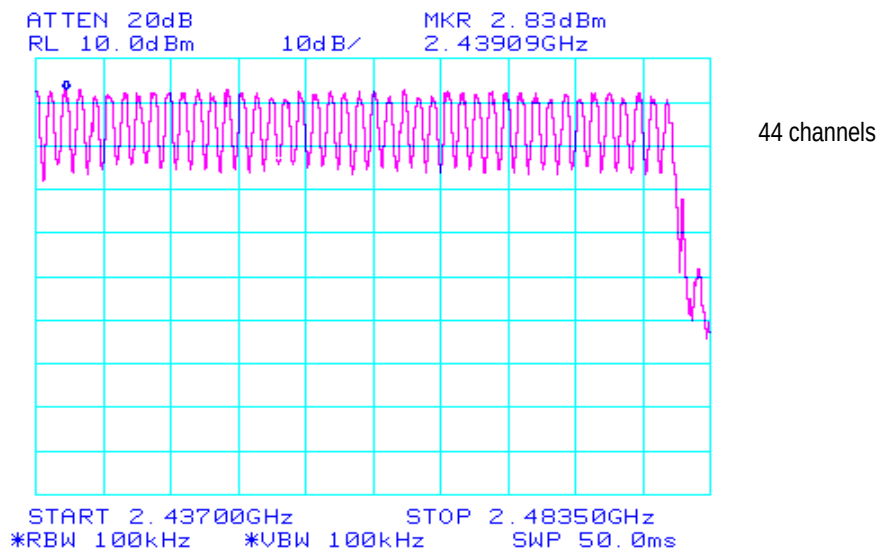
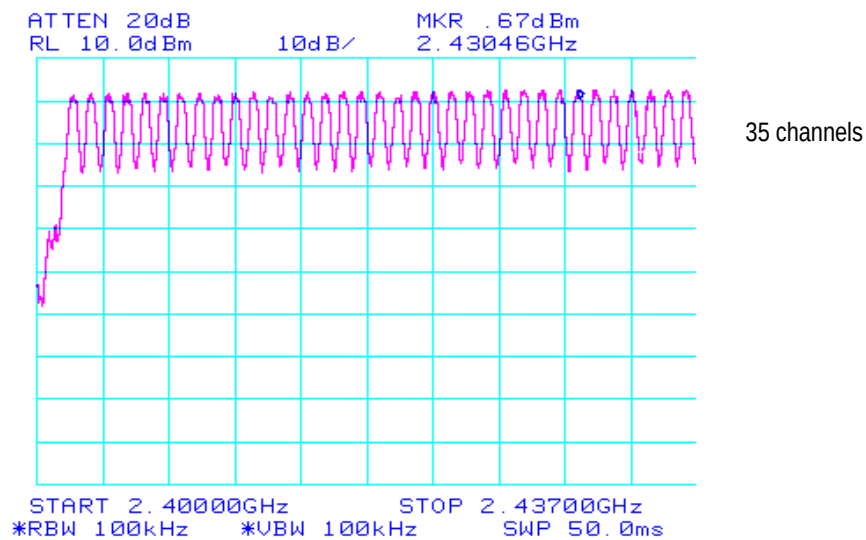
EMC Test Data

Client: ActionTec	Job Number: J49140
Model: BMDC200	T-Log Number: T49181
Contact: Angela Yao	Proj Eng: Mark Briggs
Spec: FCC15.247(FHSS), 15.109	Class: N/A

Run #6: Number of Channels

The number of channels was verified with the radio transmitting normally (i.e. In hopping mode)

The number of channels was: 79



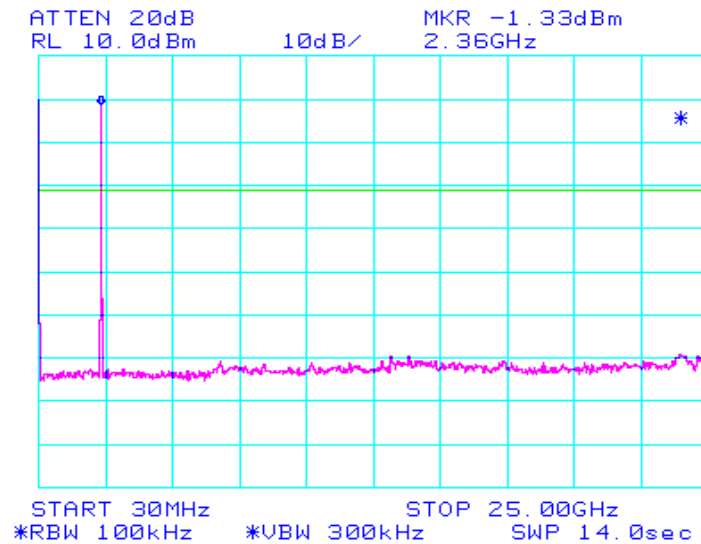


EMC Test Data

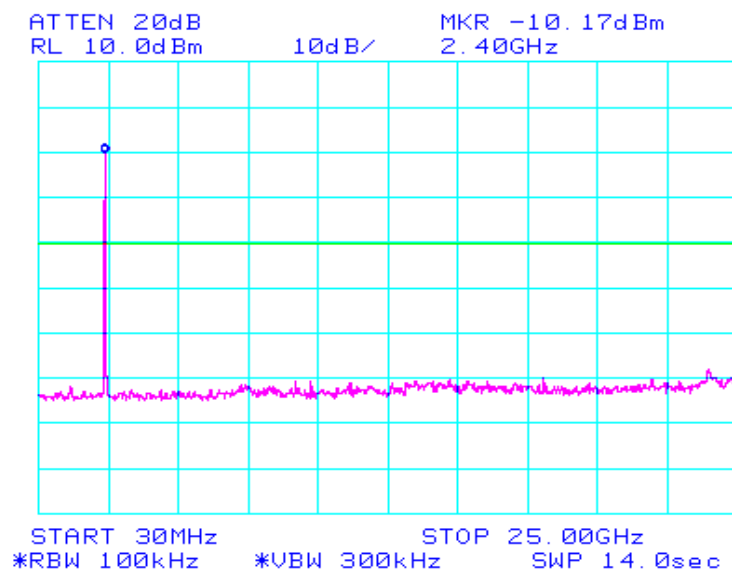
Client: ActionTec	Job Number: J49140
Model: BMDC200	T-Log Number: T49181
Contact: Angela Yao	Proj Eng: Mark Briggs
Spec: FCC15.247(FHSS), 15.109	Class: N/A

Run #7: Out of Band

2402 MHz



2441 MHz

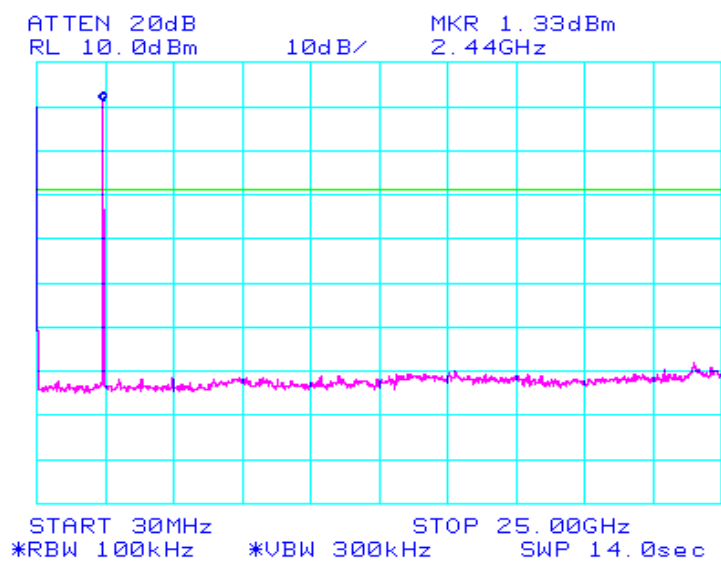




EMC Test Data

Client: ActionTec	Job Number: J49140
Model: BMDC200	T-Log Number: T49181
Contact: Angela Yao	Proj Eng: Mark Briggs
Spec: FCC15.247(FHSS), 15.109	Class: N/A

2480 MHz

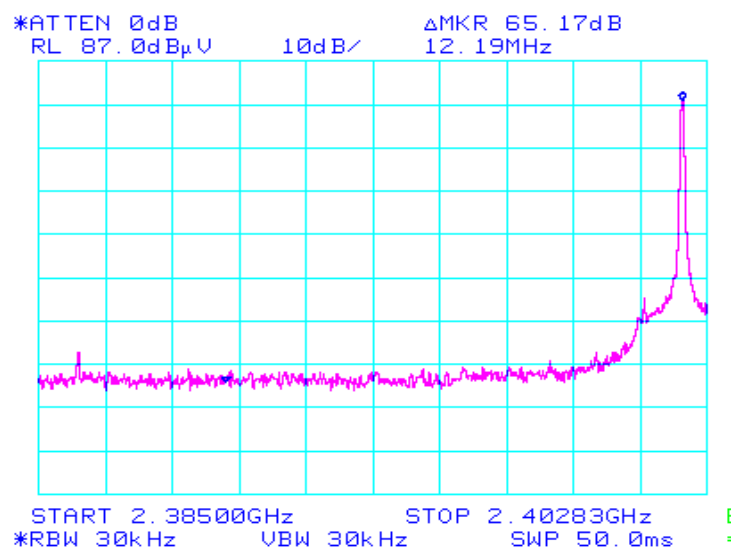
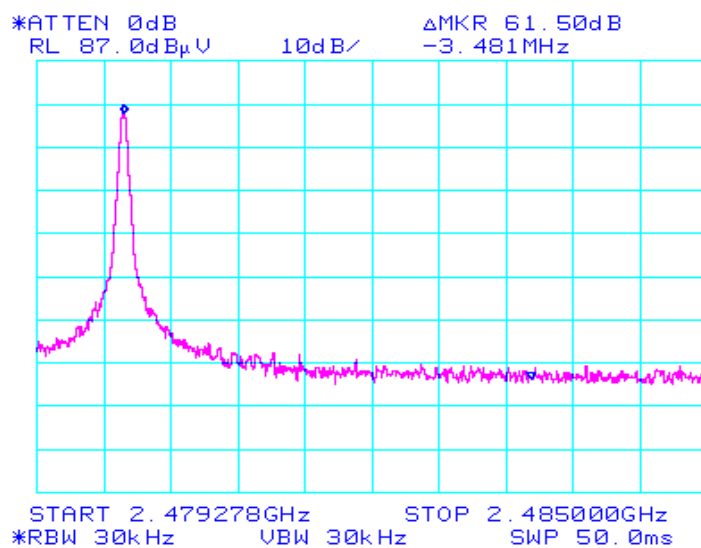




EMC Test Data

Client: ActionTec	Job Number: J49140
Model: BMDC200	T-Log Number: T49181
Contact: Angela Yao	Proj Eng: Mark Briggs
Spec: FCC15.247(FHSS), 15.109	Class: N/A

Run #8: Bandedges





EMC Test Data

Client: ActionTec	Job Number: J49140
Model: BMDC200	T-Log Number: T49181
Contact: Angela Yao	Proj Eng: Mark Briggs
Spec: FCC15.247(FHSS), 15.109	Class: N/A

Fundamental Frequency Measurements:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2401.945	99.6	V	-	-	Pk	277	1.4	
2401.999	99.4	V	-	-	Avg	277	1.4	
2401.960	91.4	H	-	-	Pk	158	1.4	
2401.965	90.3	H	-	-	Avg	158	1.4	
2479.972	99.0	V	-	-	Pk	266	1.3	
2479.989	98.4	V	-	-	Avg	266	1.3	
2479.968	94.7	H	-	-	Pk	354	1.3	
2479.992	94.0	H	-	-	Avg	354	1.3	

Bandedge Measurements

Spurious Signal	Fundamental Level	Detector	Spurious Level		Limit	Margin	Polarization
MHz	(dBuV/m @3m)	Pk/Avg	-dBc	dBuV/m	dBuV/m	dB	
2385.98	99.6	Pk	61.5	38.1	74.0	-35.9	v
2385.98	99.4	Avg	61.5	37.9	54.0	-16.1	v
2385.98	91.4	Pk	61.5	29.9	74.0	-44.1	h
2385.98	90.3	Avg	61.5	28.8	54.0	-25.2	h
2484.04	99.0	Pk	65.2	33.8	74.0	-40.2	v
2484.04	98.4	Avg	65.2	33.2	54.0	-20.8	v
2484.04	94.7	Pk	65.2	29.5	74.0	-44.5	h
2484.04	94.0	Avg	65.2	28.8	54.0	-25.2	h

Note 1:	EUT operating on the lowest channel available in the 2390 - 2412 MHz band. Signal level calculated using the relative measurements in run #8, of CE spreadsheet (61.5 dBc) applied to the highest peak and average field strength measurements of the fundamental signal level.
Note 2:	EUT operating on highest channel available in the 2462 - 2483.5 MHz band. Signal level calculated using the relative measurements in run #8, of CE spreadsheet (65.2 dBc) applied to the highest peak and average field strength measurements of the fundamental signal level.

EXHIBIT 3: Photographs of Test Configurations

Uploaded as a Separate File

**EXHIBIT 4: Detailed Photographs of ActionTec Electronics, Inc.
Model BMDC200 Construction**

Uploaded as a Separate File

EXHIBIT 5: Block Diagram of ActionTec Electronics, Inc. Model BMDC200

Uploaded as a Separate File

EXHIBIT 6: Schematic Diagrams of ActionTec Electronics, Inc. Model BMDC200

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EXHIBIT 7: Theory of Operation for ActionTec Electronics, Inc. Model BMDC200

Uploaded as a Separate File

EXHIBIT 8: Operator's Manual

Uploaded as a Separate File