



ENGINEERING AND TEST DIVISION
CHURCH STREET, BOHEMIA, LONG ISLAND, NEW YORK 11716 (631) 589-6300

TEST REPORT NO.: DTB01R04-0960

DAYTON T. BROWN, INC. JOB NO.: 401219-01-000

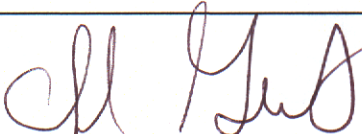
CUSTOMER: CRESTRON ELECTRONICS, INC.
15 VOLVO DRIVE
ROCKLEIGH, NJ 07647

SUBJECT: FCC CODE OF FEDERAL REGULATIONS, 47 CFR, PART 15,
SUB-PART C TESTING PERFORMED ON TWO WATERPROOF
REMOTES, MODEL NO. WPR-48, SERIAL NOS. X100419 AND
1468551 AND ONE WATERPROOF REMOTE DOCKING STATION,
MODEL NO. WPR-DS, SERIAL NO. X100385

PURCHASE ORDER NO.: 17519

ATTENTION: MR. SAM YOGASUNTHARAM

THIS REPORT CONTAINS: FOUR PAGES AND FOUR ENCLOSURES

TEST ENGINEER	 R. MONTICELLO
DEPARTMENT SUPERVISOR	 T. ARCATI
QUALITY DEPARTMENT	
DATE	22 DECEMBER 2004

INFORMATION CONTAINED HEREIN MAY BE SUBJECT TO EXPORT CONTROL LAWS. REFER TO
INTERNATIONAL TRAFFIC IN ARMS REGULATION (ITAR) OR THE EXPORT ADMINISTRATION REGULATION (EAR) OF 1979

THE DATA CONTAINED IN THIS REPORT WAS OBTAINED BY TESTING IN
COMPLIANCE WITH THE APPLICABLE TEST SPECIFICATION AS NOTED

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1.0 ABSTRACT

This report details the results of the FCC Code of Federal Regulations, 47 CFR, Part 15, Sub-Part C testing on two Waterproof Remotes, Model No. WPR-48, Serial Nos. X100419 and 1468551 and one Waterproof Remote Docking Station, Model No. WPR-DS, Serial No. X100385, manufactured by Crestron Electronics, Incorporated.

The conducted emission test was performed using two separate Waterproof Remotes, Serial No. X100419 (programmed for 418 MHz operation) and Serial No. 1468551 (programmed for 433 MHz operation).

The radiated emission and occupied bandwidth tests were performed using one Waterproof Remote, Serial No. X100419. When using only one Waterproof Remote, Serial No. X100419, the Remote was programmed for 418 MHz operation and then reprogrammed for 433 MHz operation.

The Waterproof Remote and the Waterproof Remote Docking Station were found to be in compliance with the Conducted Emission, Radiated Emission, and Occupied Bandwidth portions of the FCC Code of Federal Regulations, 47 CFR, Part 15, Sub-Part C, specification limits.

Detailed test results can be observed in Enclosures 2, 3, and 4 of this report.

The test results recorded in this report relate only to those items tested.

This report shall not be reproduced, except in full, without the written approval of Dayton T. Brown, Inc.

2.0 REFERENCES

- (a) Customer Purchase Order No.: 17519
- (b) Dayton T. Brown, Inc. Job No.: 401219-01-000
- (c) Test Specification: Code of Federal Regulations, 47 CFR, Part 15, Sub-Part C
- (d) Test Procedure: American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz, ANSI C63.4-2003

3.0 ADMINISTRATIVE INFORMATION

<u>Customer</u>		Crestron Electronics, Inc. 15 Volvo Drive Rockleigh, NJ 07647	
Test Item Description	Quantity Received	Model No.	Serial No.
Waterproof Remote	One One	WPR-48 WPR-48	X100419 1468551
Waterproof Remote Docking Station	One	WPR-DS	X100385
Date Received		1 December 2004	
Dates Tested		1 and 2 December 2004	
Date Shipped		2 December 2004	
Customer Representative Present During Testing			
Name Mr. Sam Yogasuntharam		Affiliation Crestron Electronics, Inc.	

4.0 TEST PROGRAM OUTLINE

Test Description	Results
Conducted Emission, 150 kHz to 30 MHz	Met the specification requirements.
Radiated Emission, Intentional Radiator, 30 MHz to 5 GHz	Met the specification requirements.
Occupied Bandwidth	Met the specification requirements.

5.0 GENERAL TEST INFORMATION

Setup

For the conducted emission test in the frequency range of 150 kHz to 30 MHz, the test samples were set up in a GTEM Cell. The Waterproof Remotes were mounted in the Waterproof Remote Docking Station and were operated in the Charge/Transmit mode.

For the radiated emission test in the frequency range of 30 MHz to 1 GHz, the test samples were set up in a climate controlled open field site that measures 44 feet long by 24 feet wide by 24 feet high. The Waterproof Remote was mounted in the Waterproof Remote Docking Station and was operated in the Charge/Transmit mode at 418.0 MHz and then at 433.95 MHz.



For the radiated emission test in the frequency range of 1 to 5 GHz, the test samples were set up in an anechoic chamber that measures 20 feet wide by 20 feet long by 10 feet high. The Waterproof Remote was mounted in the Waterproof Remote Docking Station and was operated in the Charge/Transmit mode at 418.0 MHz and then at 433.95 MHz.

For the occupied bandwidth test, the test samples were set up in a GTEM Cell. The Waterproof Remote was mounted in the Waterproof Remote Docking Station and was operated in the Charge/Transmit mode at 418.0 MHz and then at 433.95 MHz.



Enclosure 1

Physical Inspection Forms



PHYSICAL INSPECTION FORM

JOB NUMBER 401219-01-000 DATE 1 December 2004
CUSTOMER Crestron Electronics, Inc. TECHNICIAN M, Sheehy
TEST EMI SPECIFICATION FCC Rules and Regulations, Part 15
ITEM Waterproof Remote SERIAL NO. X100419

A PRE-TEST INSPECTION REVEALED:

- ☒ NO ANOMALIES
☐ NO ANOMALIES DUE TO TESTING
☐ THE FOLLOWING

Photograph Taken? No If Yes, Photo Number N/A



PHYSICAL INSPECTION FORM

JOB NUMBER 401219-01-000 DATE 1 December 2004
CUSTOMER Crestron Electronics, Inc. TECHNICIAN M, Sheehy
TEST EMI SPECIFICATION FCC Rules and Regulations, Part 15
ITEM Waterproof Remote SERIAL NO. 1468551

A PRE-TEST INSPECTION REVEALED:

- ☒ NO ANOMALIES
☐ NO ANOMALIES DUE TO TESTING
☐ THE FOLLOWING

Photograph Taken? No If Yes, Photo Number N/A



PHYSICAL INSPECTION FORM

JOB NUMBER 401219-01-000 DATE 1 December 2004
CUSTOMER Crestron Electronics, Inc. TECHNICIAN M, Sheehy
TEST EMI SPECIFICATION FCC Rules and Regulations, Part 15
Waterproof Remote Docking
ITEM Station SERIAL NO. X100385

A PRE-TEST INSPECTION REVEALED:

- ☒ NO ANOMALIES
☐ NO ANOMALIES DUE TO TESTING
☐ THE FOLLOWING

Photograph Taken? No If Yes, Photo Number N/A



PHYSICAL INSPECTION FORM

JOB NUMBER 401219-01-000 DATE 2 December 2004
CUSTOMER Crestron Electronics, Inc. TECHNICIAN M, Sheehy
TEST EMI SPECIFICATION FCC Rules and Regulations, Part 15
ITEM Waterproof Remote SERIAL NO. X100419

A POST-TEST INSPECTION REVEALED:

- ☒ NO ANOMALIES
☐ NO ANOMALIES DUE TO TESTING
☐ THE FOLLOWING

Photograph Taken? No If Yes, Photo Number N/A



PHYSICAL INSPECTION FORM

JOB NUMBER 401219-01-000 DATE 2 December 2004
CUSTOMER Crestron Electronics, Inc. TECHNICIAN M, Sheehy
TEST EMI SPECIFICATION FCC Rules and Regulations, Part 15
ITEM Waterproof Remote SERIAL NO. 1468551

A POST-TEST INSPECTION REVEALED:

- ☒ NO ANOMALIES
☐ NO ANOMALIES DUE TO TESTING
☐ THE FOLLOWING

Photograph Taken? No If Yes, Photo Number N/A



PHYSICAL INSPECTION FORM

JOB NUMBER 401219-01-000 DATE 2 December 2004
CUSTOMER Crestron Electronics, Inc. TECHNICIAN M, Sheehy
TEST EMI SPECIFICATION FCC Rules and Regulations, Part 15
Waterproof Remote Docking
ITEM Station SERIAL NO. X100385

A POST-TEST INSPECTION REVEALED:

- ☒ NO ANOMALIES
☐ NO ANOMALIES DUE TO TESTING
☐ THE FOLLOWING

Photograph Taken? No If Yes, Photo Number N/A



Enclosure 2

Conducted Emission,
150 kHz to 30 MHz



CONDUCTED EMISSION, 150 kHz to 30 MHz

Test Procedure

A conducted emission test, in the frequency range of 150 kHz to 30 MHz, was performed on the Waterproof Remote and Waterproof Remote Docking Station, while mounted on a non-conductive table.

Power was supplied to the Waterproof Remote and Waterproof Remote Docking Station, via LISNs which were bonded to the ground plane below and to the side of the nonconductive table. The unused 50 Ω connector on the LISN was terminated in 50 Ω .

Measurements were made utilizing the following bandwidth and detector function:

Frequency Range	CISPR Bandwidth	Detector Function
150 kHz to 30 MHz	9 kHz	Quasi-Peak

The test setup employed is depicted in the photograph contained in this enclosure.

Test Results

No emission levels above the conducted emission specification limits were observed.

Detailed test results for the conducted emission test can be observed on pages 2 through 5 of this enclosure.



Test Title: Conducted Emissions

Test Procedure: FCC R & R Part 15 Sub. Part C, Conducted Emissions

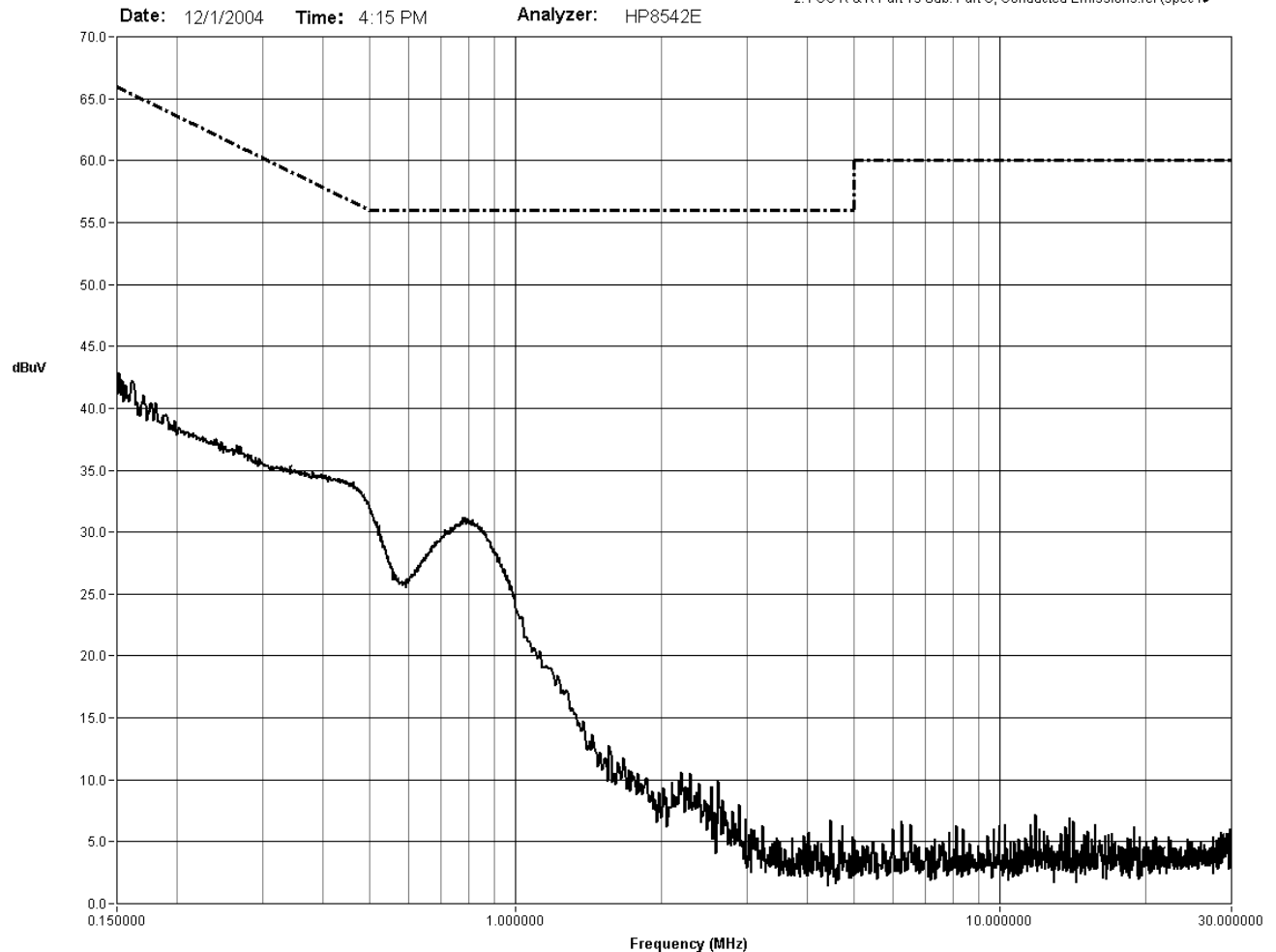
Customer: Crestron Electronics, Inc.
Test Item: Waterproof Remote and Docking Station
Model Num.: WPR-48 and WPR-DS
Part Num.: -
Serial Num.: X100419 & X100385
Mode of Op.: Charge/Transmit Mode

Job Num.: 401219-01-000
Project Eng.: R. Monticello
Tested By: M. Sheehy
Sensor Loc.: LISN
Sensor Pol.: Highline
Test Num.: 401219-01-004

File Name: 401219-01-004.red

1. RE Data

2. FCC R & R Part 15 Sub. Part C, Conducted Emissions.rel (spec I)



Comment: 418 MHz Remote Control

BW Table	
Frequency	BW
0.150000 MHz	9000 Hz
30.000000 MHz	

Correction Factors	
Sensor Factor Files	Pre-Amp Files
lisn 73-92 max.rea (0.150000 MHz)	zero.rep (0.150000 MHz) (pre-amp)
Cable Files	Attenuator Files
7-10 (dc-1g).rec (0.150000 MHz) (cbl)	65-19.ret (0.150000 MHz) (atten)
zero.rec (0.150000 MHz) (2nd cbl)	
zero.rec (0.150000 MHz) (3rd cbl)	



Test Title: Conducted Emissions

Test Procedure: FCC R & R Part 15 Sub. Part C, Conducted Emissions

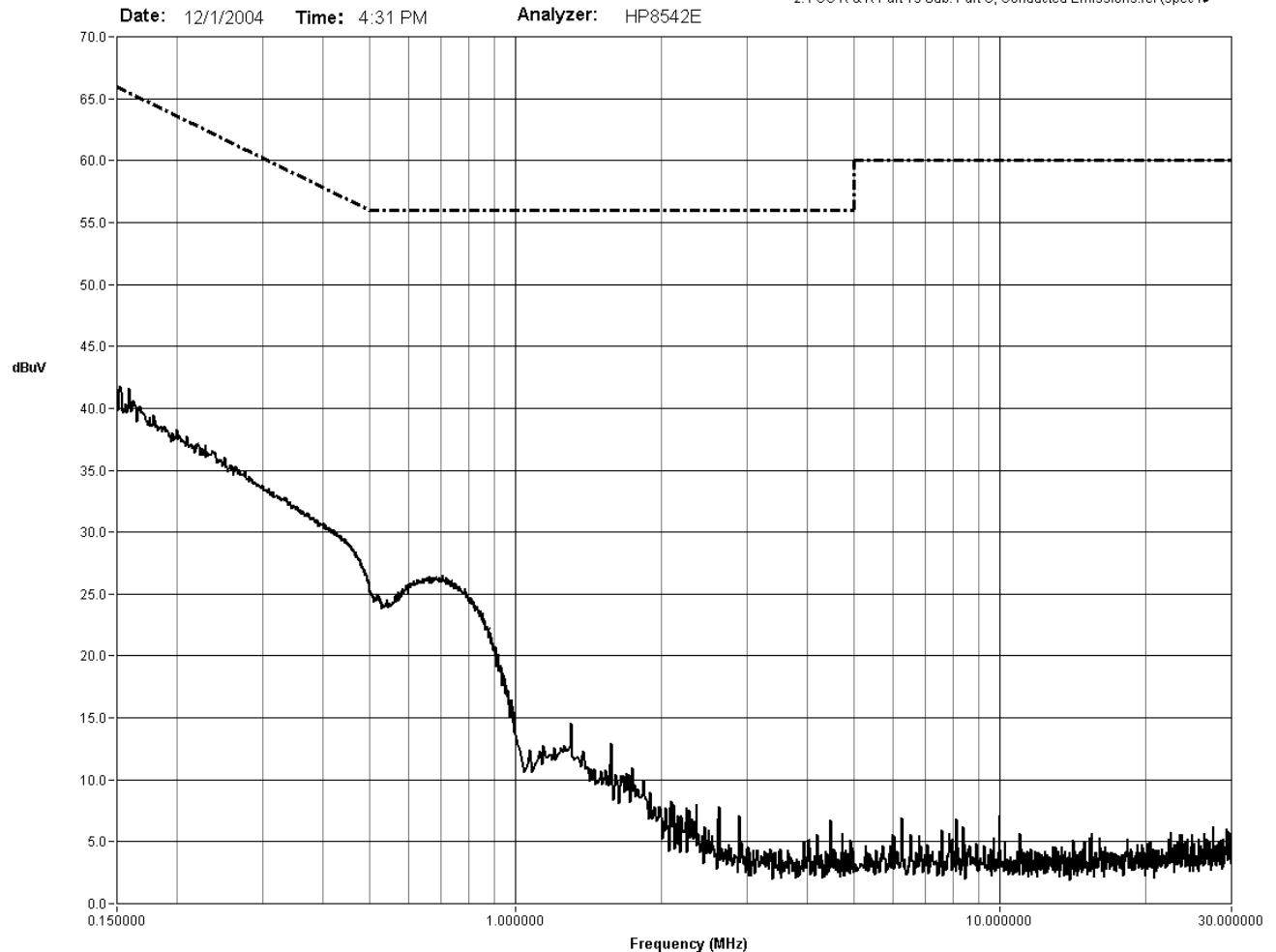
Customer: Crestron Electronics, Inc.
Test Item: Waterproof Remote and Docking Station
Model Num.: WPR-48 and WPR-DS
Part Num.: -
Serial Num.: X100419 & X100385
Mode of Op.: Charge/Transmit Mode

Job Num.: 401219-01-000
Project Eng.: R. Monticello
Tested By: M. Sheehy
Sensor Loc.: LISN
Sensor Pol.: Neutral
Test Num.: 401219-01-005

File Name: 401219-01-005.red

1. RE Data

2. FCC R & R Part 15 Sub. Part C, Conducted Emissions.rel (spec I)



Comment: 418 MHz Remote Control

BW Table	
Frequency	BW
0.150000 MHz	9000 Hz
30.000000 MHz	

Correction Factors	
Sensor Factor Files	Pre-Amp Files
lisn 73-92 max.rea (0.150000 MHz)	zero.rep (0.150000 MHz) (pre-amp)
Cable Files	Attenuator Files
7-10 (dc-1g).rec (0.150000 MHz) (cbl)	65-19.ret (0.150000 MHz) (atten)
zero.rec (0.150000 MHz) (2nd cbl)	
zero.rec (0.150000 MHz) (3rd cbl)	



Test Title: Conducted Emissions

Test Procedure: FCC R & R Part 15 Sub. Part C, Conducted Emissions

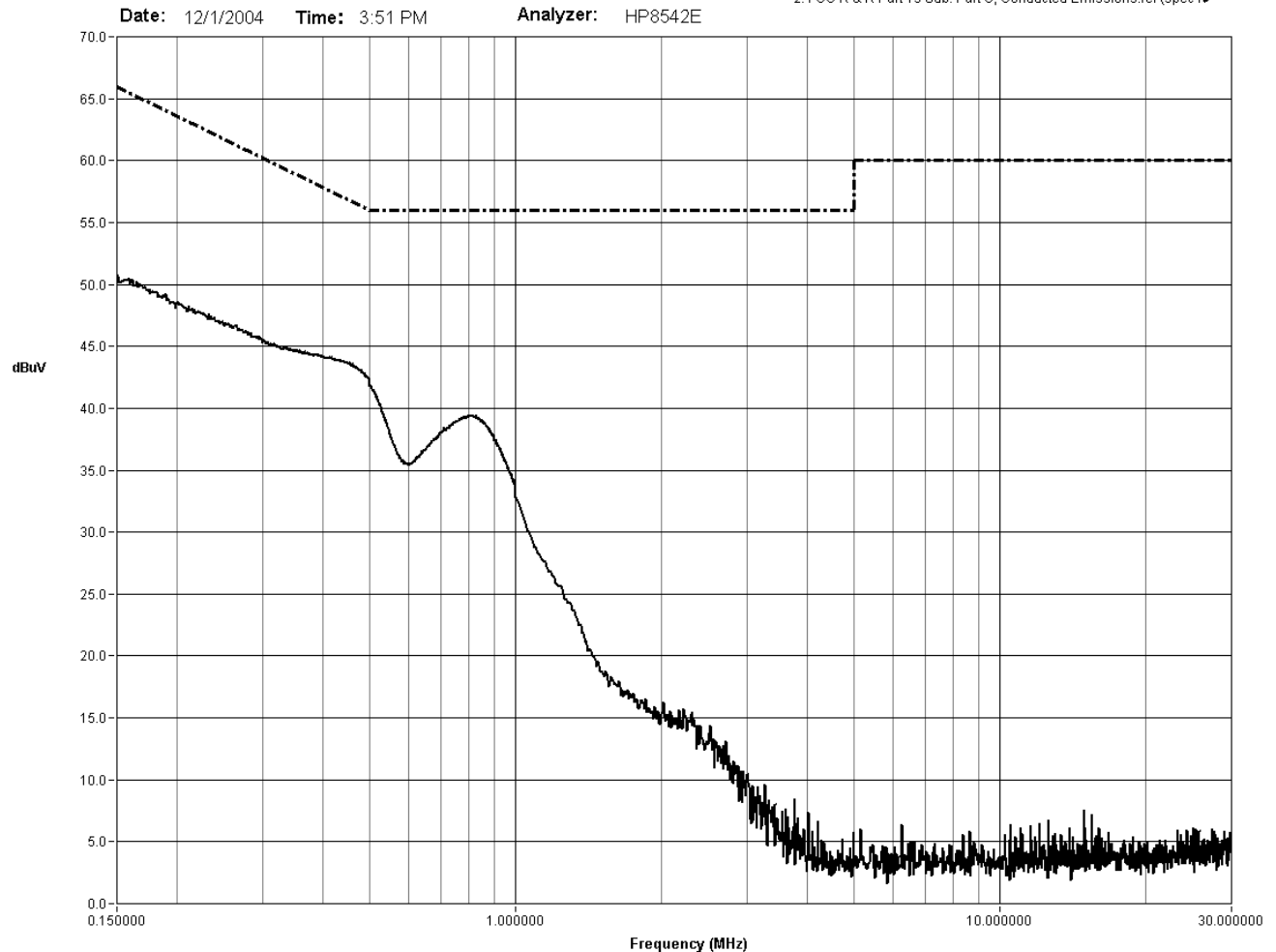
Customer: Crestron Electronics, Inc.
Test Item: Waterproof Remote and Docking Station
Model Num.: WPR-48 and WPR-DS
Part Num.: -
Serial Num.: 1468551 & X100385
Mode of Op.: Charge/Transmit Mode

Job Num.: 401219-01-000
Project Eng.: R. Monticello
Tested By: M. Sheehy
Sensor Loc.: LISN
Sensor Pol.: Highline
Test Num.: 401219-01-001

File Name: 401219-01-001.red

1. RE Data

2. FCC R & R Part 15 Sub. Part C, Conducted Emissions.rel (spec I)



Comment: 433 MHz Remote Control

BW Table	
Frequency	BW
0.150000 MHz	9000 Hz
30.000000 MHz	

Correction Factors	
Sensor Factor Files	Pre-Amp Files
lisn 73-92 max.rea (0.150000 MHz)	zero.rep (0.150000 MHz) (pre-amp)
Cable Files	Attenuator Files
7-10 (dc-1g).rec (0.150000 MHz) (cbl)	65-19.ret (0.150000 MHz) (atten)
zero.rec (0.150000 MHz) (2nd cbl)	
zero.rec (0.150000 MHz) (3rd cbl)	



Test Title: Conducted Emissions

Test Procedure: FCC R & R Part 15 Sub. Part C, Conducted Emissions

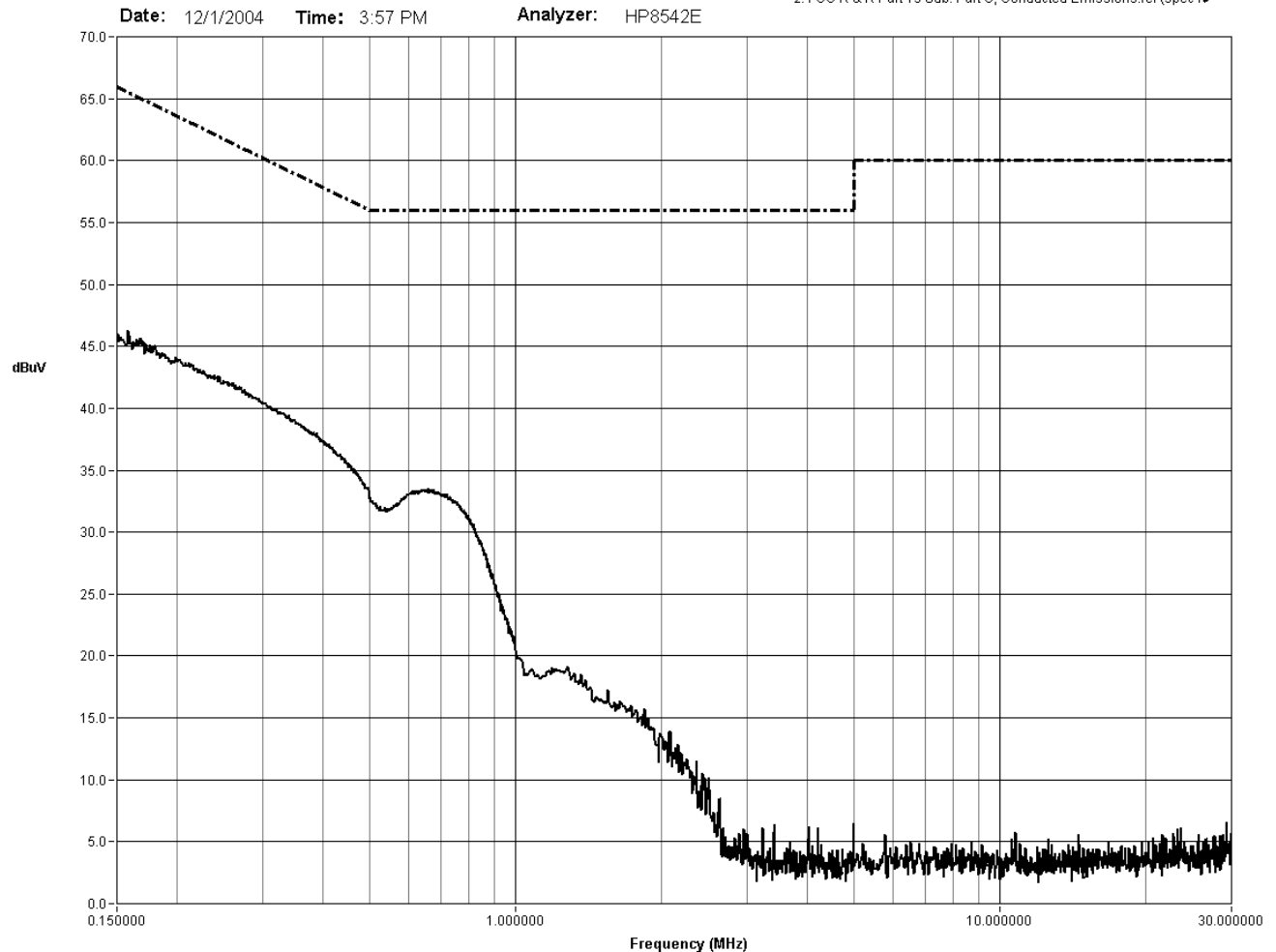
Customer: Crestron Electronics, Inc.
Test Item: Waterproof Remote and Docking Station
Model Num.: WPR-48 and WPR-DS
Part Num.: -
Serial Num.: 1468551 & X100385
Mode of Op.: Charge/Transmit Mode

Job Num.: 401219-01-000
Project Eng.: R. Monticello
Tested By: M. Sheehy
Sensor Loc.: LISN
Sensor Pol.: Neutral
Test Num.: 401219-01-002

File Name: 401219-01-002.red

1. RE Data

2. FCC R & R Part 15 Sub. Part C, Conducted Emissions.rel (spec I)



Comment: 433 MHz Remote Control

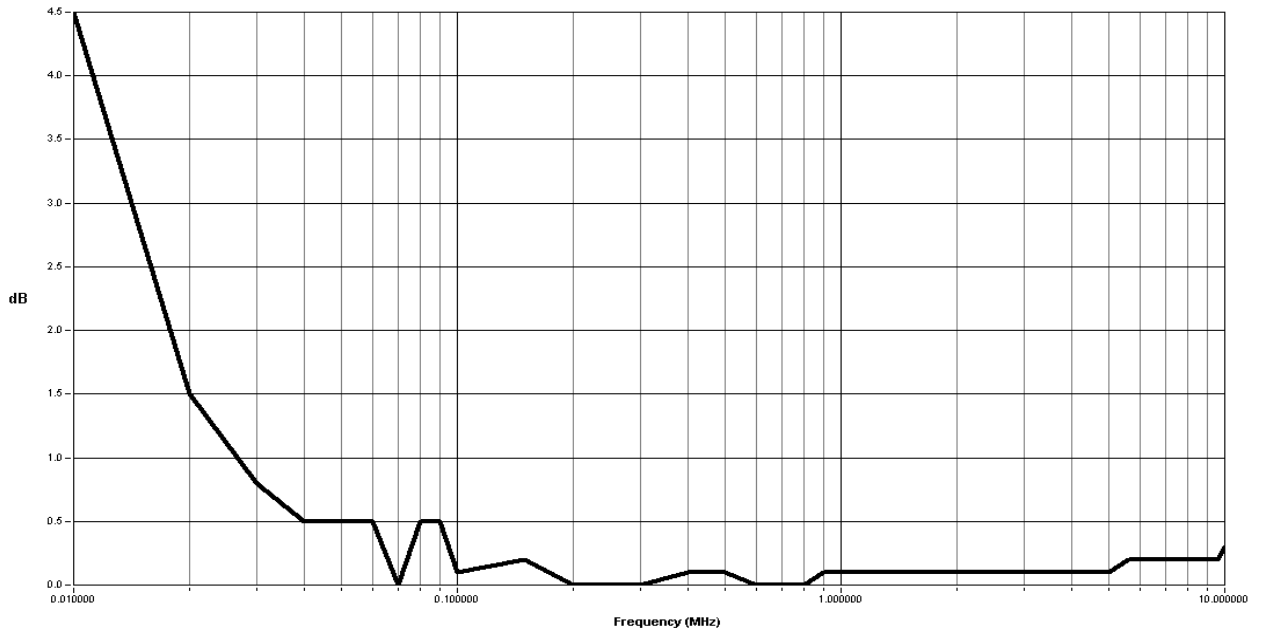
BW Table	
Frequency	BW
0.150000 MHz	9000 Hz
30.000000 MHz	

Correction Factors	
Sensor Factor Files	Pre-Amp Files
lisn 73-92 max.rea (0.150000 MHz)	zero.rep (0.150000 MHz) (pre-amp)
Cable Files	Attenuator Files
7-10 (dc-1g).rec (0.150000 MHz) (cbl)	65-19.ret (0.150000 MHz) (atten)
zero.rec (0.150000 MHz) (2nd cbl)	
zero.rec (0.150000 MHz) (3rd cbl)	

CORRECTION FACTOR

Factor File Name: llsn 73-92 Line 1 Cap Correction Factor.rea
Factor Description: "L.I.S.N., 10 KHZ - 30 MHZ 50 μ H 24 AMPS
DUAL" Line 1 Cap Correction Factors

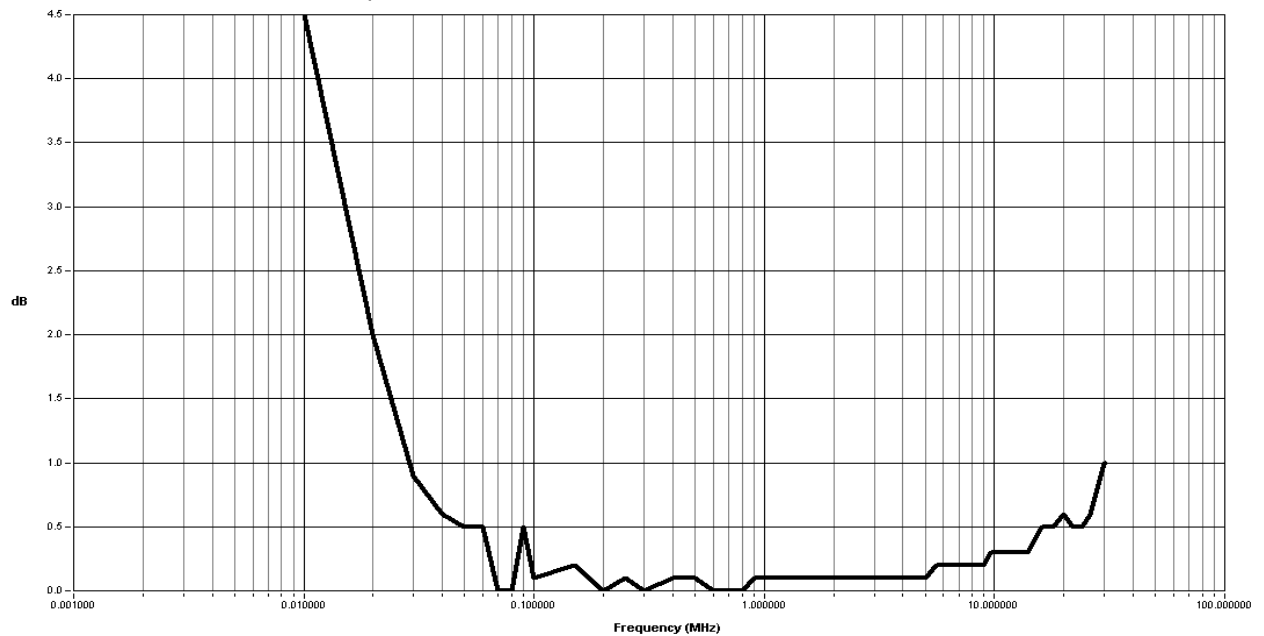
DTB Number: 73-92
Cal Due Date: 06/05/05



CORRECTION FACTOR

Factor File Name: llsn 73-92 Line 2 Cap Correction Factor.rea
Factor Description: "L.I.S.N., 10 KHZ - 30 MHZ 50 μ H 24 AMPS
DUAL" Line 2 Cap Correction Factors

DTB Number: 73-92
Cal Due Date: 06/05/05





Job Sub : 401219-01

TEST: Conducted Emissions

<u>ITEM</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>DTB NO.</u>	<u>CAL DUE DATE</u>
GTEM CELL, 1.75 METERS	MESSELEKTRONIK BERLIN	MEB G TEM 1750	27-368	10/23/2005
RECEIVER, EMI	HEWLETT-PACKARD	8542E	65-177	04/10/2005
LIMITER, TRANSIENT	HEWLETT-PACKARD	11947A	65-19	04/24/2005
ANALYZER, SPECTRUM	HEWLETT-PACKARD	8562A	65-219	12/19/2004
ANALYZER, SPECTRUM 10 KHz - 26.5 GHz	HEWLETT-PACKARD	8563A	65-247	05/01/2005
CABLE, TYPE "N" MALE TO MALE	PASTERNAK	PE3062	7-43	10/23/2005
CABLE, 18" TYPE N MALE TO MALE TEST	DAYTON T. BROWN	RG 393	7-66	05/15/2005
CABLE, RF SMA 36" 18 GHz	GORE	PHASEFLEX EJRO1RO1036.	7-67	10/16/2005
CABLE, RF SMA 36" 18GHZ	GORE	PHASEFLEX EJRO1RO1036.	7-68	10/16/2005
CABLE, RF SMA 36" 18GHZ	GORE	PHASEFLEX EJRO1RO1036.	7-68	10/16/2005
PREAMPLIFIER, 1-26.5 GHz	HEWLETT-PACKARD	8449B	71-11	10/22/2006
AMPLIFIER, 10.0 KHz – 1.0 GHz APPROX. 50 DB	MITEQ	AM-1309	71-22	03/06/2005
AMPLIFIER, 10.0 KHz – 1.0 GHz APPROX. 50 DB	MITEQ	AM-1309	71-22	03/06/2005
L.I.S.N., 10 KHz - 30 MHz 50μH 24 AMPS DUAL	SOLAR	9252-50-R-24BNC	73-92	06/05/2005



TESTED FOR: CRESTRON ELECTRONICS, INC.

ITEM: WATERPROOF REMOTE AND DOCKING STATION

CONDUCTED EMISSION, 150 kHz TO 30 MHz

S/N: X100419, 1468551, AND X100385

M/N: WPR-48 AND WPR-DS

JOB NO.: 401219-01-000
DTB01R04-0960

FILE NO.: DSC02194
ENCLOSURE 2

2 DECEMBER 2004
PHOTO 1





Enclosure 3

Radiated Emission,
Intentional Radiator, 30 MHz to 5 GHz



RADIATED EMISSION, INTENTIONAL RADIATOR, 30 MHz to 5 GHz

Test Procedure

A radiated emission test, in the frequency range of 30 to 1000 MHz, was performed on the Waterproof Remote and Waterproof Remote Docking Station, while they were mounted on a wooden table that was standing on a conductive turntable.

For the frequency range of 30 to 1000 MHz, measurements were made utilizing a manually tuned interference measurement receiver, which was located in the instrumentation room below the ground plane.

The receiver was connected to the measurement antenna, which was located 3 meters from the turntable for the frequency range of 30 to 1000 MHz.

A linear polarized antenna was utilized for the measurements. The antenna height was varied between 1 and 4 meters and the test sample was rotated 360° to ensure maximum pickup from the test sample.

A radiated emission test, in the frequency range of 1 to 5 GHz, was performed on the Waterproof Remote and Waterproof Remote Docking Station, while they were mounted on a non-conductive table in an anechoic chamber.

For the frequency range of 1 to 5 GHz, measurements were made utilizing a spectrum analyzer located in a shielded enclosure, which was attached to the anechoic enclosure.

The receiver was connected to the measurement antenna, which was located 3 meters from the table for the frequency range of 1 to 5 GHz, with a length of 50Ω coaxial cable.

The Waterproof Remote utilizes pulse modulation with a 50% duty cycle.

Any emissions not reported were at least 20 dB below the specification limits.

Measurements were made utilizing the following bandwidth and detector function:

Frequency Range	CISPR Bandwidth	Detector Function
30 to 1000 MHz	120 kHz	Quasi-Peak
1 to 5 GHz	100 kHz	Peak

The antenna per meter factors of the antennas utilized are depicted in the figures contained in this enclosure.

The test setups employed are depicted in the photographs contained in this enclosure.



Test Results

No emission levels above the FCC Code of Federal Regulations, 47 CFR, Part 15, Sub-Part C, specification limits were observed.

Detailed test results for the radiated emission test for Intentional Radiators can be observed on pages 3 through 10 of this enclosure.



Test Item: Waterproof Remote and Waterproof Docking Station
Customer: Crestron Electronics, Inc.
Test Mode: 418 MHz Radiator with active charge base
Specification: FCC R & R, Part 15, Sub-Part C
Detector Function: Quasi Peak **Units:** DBμV/m
Bandwidth: 120 kHz (CISPR)

Date: 2 December 2004
Serial No.: X100419 and X100385
Job No.: 401219-01-000
Distance: 3 Meters
Antenna Polarization: Vertical
Technician: M. Sheehy

Radiated Field Strength Measurements

Met Requirement Yes ☒ No ☐

Frequency (MHz)	Meter Indicated (DbμV)	Antenna Factor (Db)	Cable Loss (Db)	Total Emission (DbμV/m)	Spec. Limit (DbμV/m)		Level Above Spec. Limit	Notes
30	17	17.9	0.3	35.2	40.0			Ambient
416	20	17.1	1.4	38.5	46.0			Ambient
418	50	17.2	1.4	68.6	80.6 *			Fundamental
419	19	17.2	1.4	37.6	46.0			Ambient
836	19	20.9	2.2	42.1	46.0			Second harmonic
1000	12	21.7	3.6	37.3	54.0			Ambient

Remarks: * The specification limit from para. 15.231 was used for the fundamental frequency of 418 MHz.



Test Title: Radiated Emissions

Test Procedure: FCC R & R Part 15 Sub. Part C Radiated Emissions

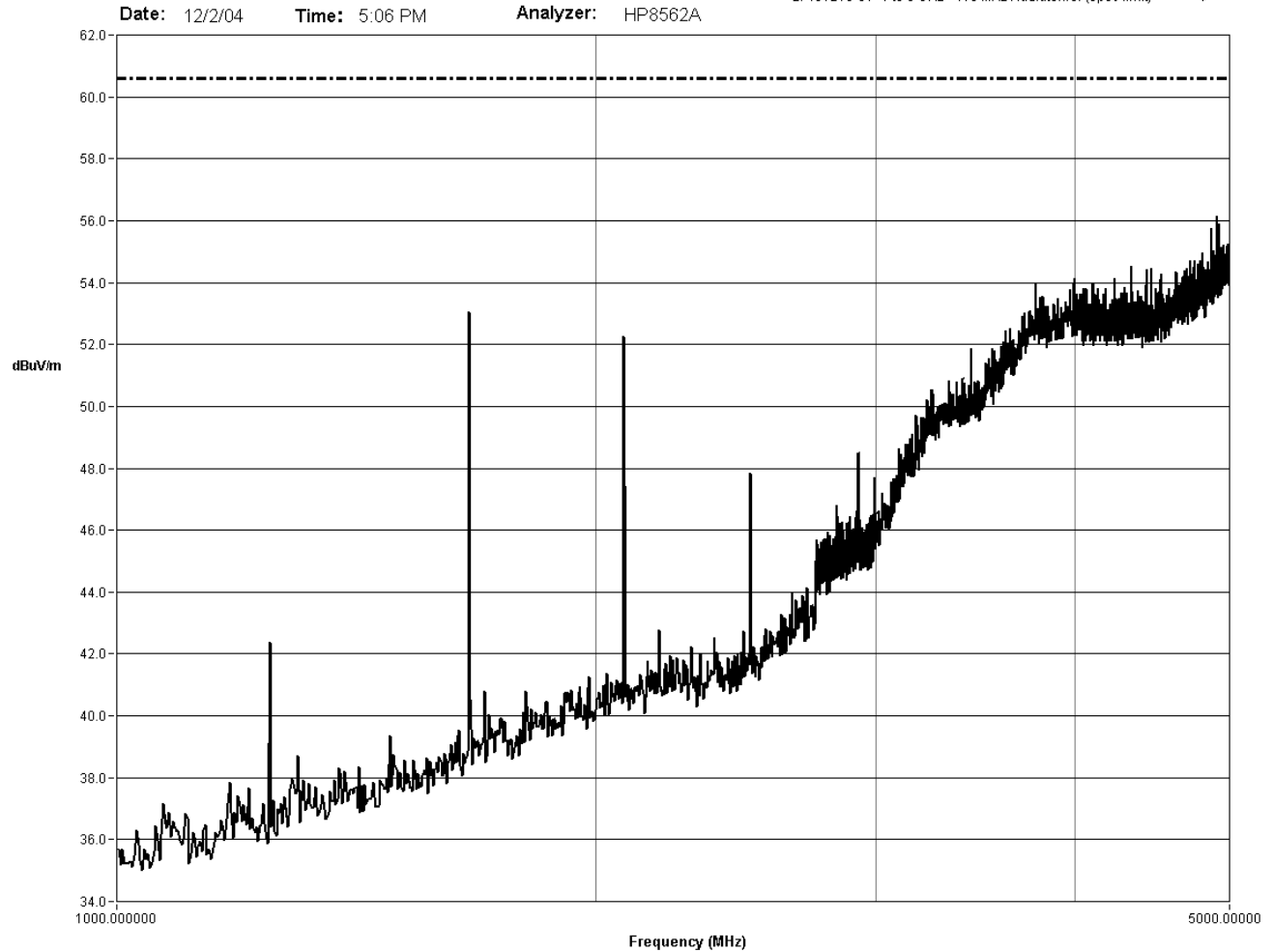
Customer: Crestron Electronics, Inc.
Test Item: Waterproof Remote and Docking Station
Model Num.: WPR-48 and WPR-DS
Part Num.: -
Serial Num.: X100419 & X100385
Mode of Op.: Charge/Transmit Mode

Job Num.: 401219-01-000
Project Eng.: R. Monticello
Tested By: M. Sheehy
Sensor Loc.: Three meters from UUT
Sensor Pol.: Vertical
Test Num.: 401219-01-017

File Name: 401219-01-017.red

1. RE Data

2. 401219-01- 1 to 5 GHz - 418 MHz Radiator.rel (spec limit)



Comment: 418 Remote Control and Charger

BW Table	
Frequency	BW
1000.000000 MHz	1000000 Hz
5000.000000 MHz	

Correction Factors	
Sensor Factor Files	Pre-Amp Files
27-55 (max).rea (1000.000000 MHz)	71-11.rep (1000.000000 MHz)
Cable Files	Attenuator Files
7-67 (dc-40g).rec (1000.000000 MHz)	zero.ret (1000.000000 MHz) (atten)
7-56.rec (1000.000000 MHz) (2nd cbl)	
7-08.rec (1000.000000 MHz) (3rd cbl)	



Test Item: Waterproof Remote and Waterproof Docking Station
Customer: Crestron Electronics, Inc.
Test Mode: 418 MHz Radiator with active charge base
Specification: FCC R & R, Part 15, Sub-Part C
Detector Function: Quasi Peak **Units:** DB μ V/m
Bandwidth: 120 kHz (CISPR)

Date: 2 December 2004
Serial No.: X100419 and X100385
Job No.: 401219-01-000
Distance: 3 Meters
Antenna Polarization: Horizontal
Technician: M. Sheehy

Radiated Field Strength Measurements

Met Requirement Yes ☒ No ☐

Frequency (MHz)	Meter Indicated (Db μ V)	Antenna Factor (Db)	Cable Loss (Db)	Total Emission (Db μ V/m)	Spec. Limit (Db μ V/m)		Level Above Spec. Limit	Notes
30	9	19.5	0.3	28.8	40.0			Ambient
416	20	17.7	1.4	39.1	46.0			Ambient
418	49	17.8	1.4	68.2	80.6 *			Fundamental
419	19	17.8	1.4	38.2	46.0			Ambient
836	22	21.5	2.2	45.7	46.0			Second harmonic
1000	14	22.8	3.6	40.4	54.0			Ambient

Remarks: * The specification limit from para. 15.231 was used for the fundamental frequency of 418 MHz.



Test Title: Radiated Emissions

Test Procedure: FCC R & R Part 15 Sub. Part C Radiated Emissions

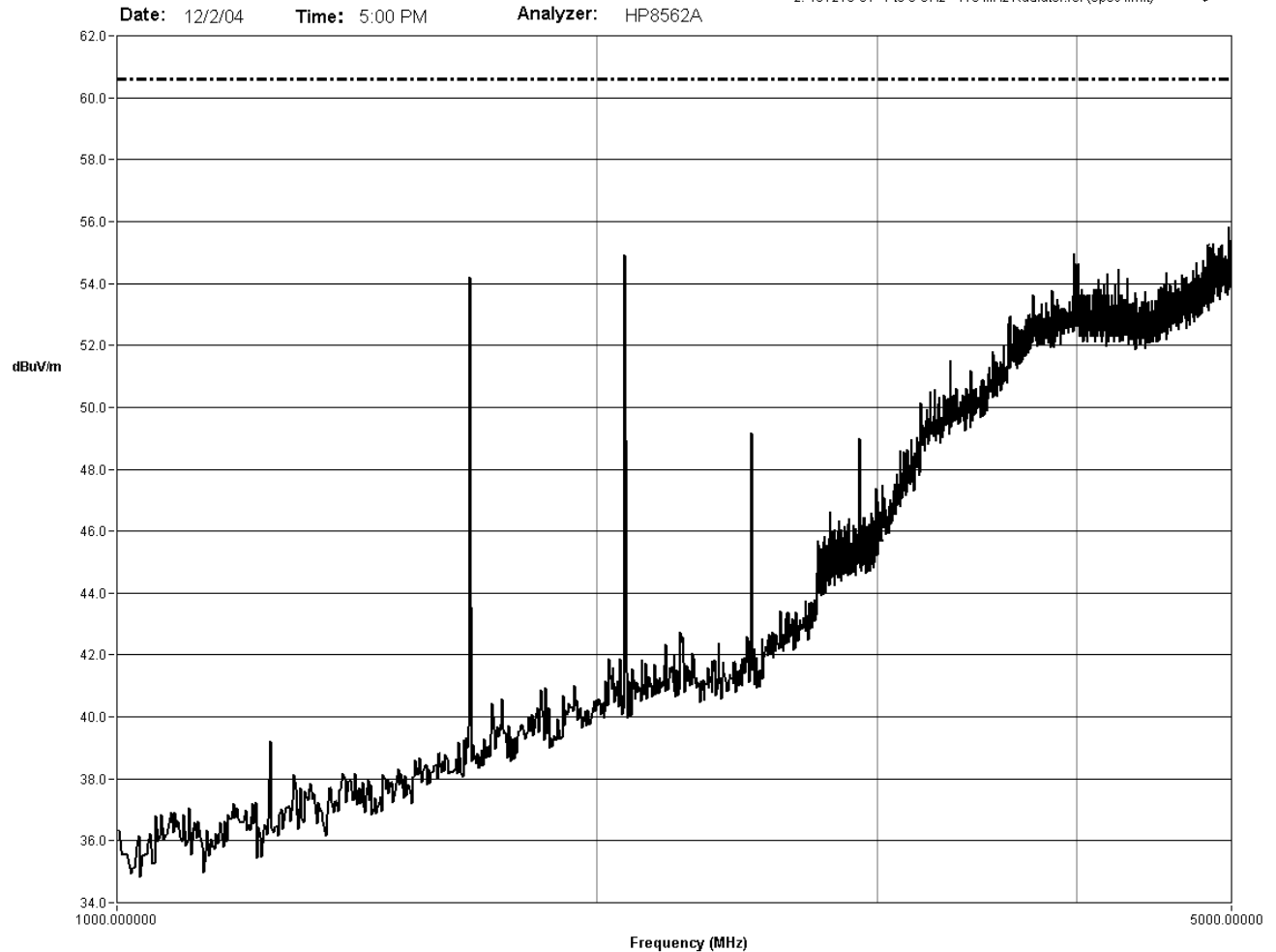
Customer: Crestron Electronics, Inc.
Test Item: Waterproof Remote and Docking Station
Model Num.: WPR-48 and WPR-DS
Part Num.: -
Serial Num.: X100419 & X100385
Mode of Op.: Charge/Transmit Mode

Job Num.: 401219-01-000
Project Eng.: R. Monticello
Tested By: M. Sheehy
Sensor Loc.: Three meters from UUT
Sensor Pol.: Horizontal
Test Num.: 401219-01-016

File Name: 401219-01-016.red

1. RE Data

2. 401219-01- 1 to 5 GHz - 418 MHz Radiator.rel (spec limit)



Comment: 418 Remote Control and Charger

BW Table	
Frequency	BW
1000.000000 MHz	1000000 Hz
5000.000000 MHz	

Correction Factors	
Sensor Factor Files	Pre-Amp Files
27-55 (max).rea (1000.000000 MHz)	71-11.rep (1000.000000 MHz)
Cable Files	Attenuator Files
7-67 (dc-40g).rec (1000.000000 MHz)	zero.ret (1000.000000 MHz) (atten)
7-56.rec (1000.000000 MHz) (2nd cbl)	
7-08.rec (1000.000000 MHz) (3rd cbl)	



Test Item: Waterproof Remote and Waterproof Docking Station
Customer: Crestron Electronics, Inc.
Test Mode: 433 MHz Radiator with active charge base
Specification: FCC R & R, Part 15, Sub-Part C
Detector Function: Quasi Peak **Units:** DBμV/m
Bandwidth: 120 kHz (CISPR)

Date: 2 December 2004
Serial No.: X100419 and X100385
Job No.: 401219-01-000
Distance: 3 Meters
Antenna Polarization: Vertical
Technician: M. Sheehy

Radiated Field Strength Measurements

Met Requirement Yes ☒ No ☐

Frequency (MHz)	Meter Indicated (DbμV)	Antenna Factor (Db)	Cable Loss (Db)	Total Emission (DbμV/m)	Spec. Limit (DbμV/m)		Level Above Spec. Limit	Notes
30	12	17.9	0.3	30.2	40.0			Ambient
416	17	17.1	1.4	35.5	46.0			Ambient
418	17	17.2	1.4	35.6	46.0			Ambient
419	17	17.2	1.4	35.6	46.0			Ambient
433.95	42	17.3	1.4	61.1	81.1 *			Fundamental
1000	2	21.7	3.6	27.3	54.0			Ambient

Remarks: * The specification limit from para. 15.231 was used for the fundamental frequency of 433.95 MHz.



Test Title: Radiated Emissions

Test Procedure: FCC R & R Part 15 Sub. Part Radiated Emissions

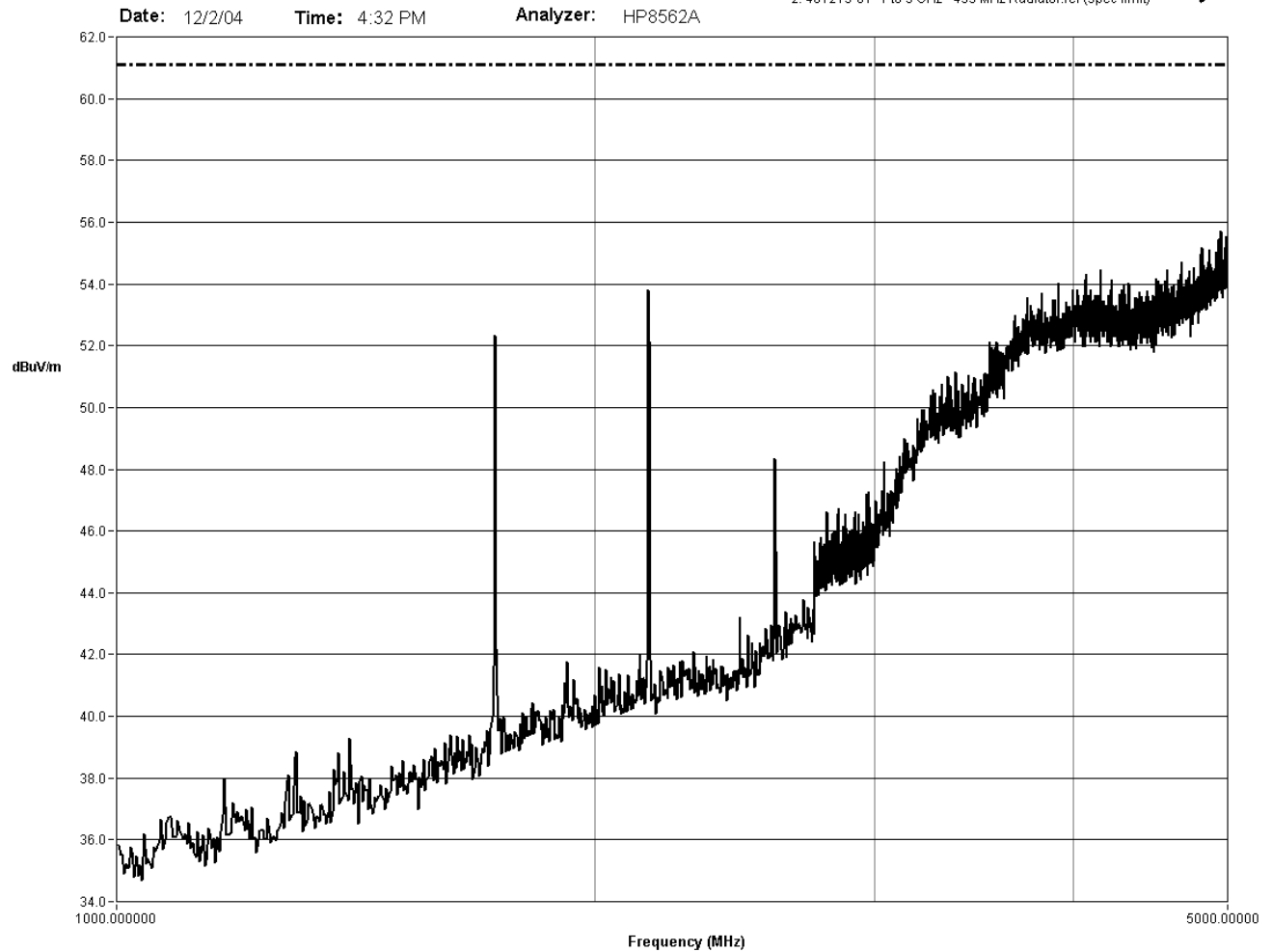
Customer: Crestron Electronics, Inc.
Test Item: Waterproof Remote and Docking Station
Model Num.: WPR-48 and WPR-DS
Part Num.: -
Serial Num.: X100419 & X100385
Mode of Op.: Charge/Transmit Mode

Job Num.: 401219-01-000
Project Eng.: R. Monticello
Tested By: M. Sheehy
Sensor Loc.: Three meters from UUT
Sensor Pol.: Vertical
Test Num.: 401219-01-013

File Name: 401219-01-013.red

1. RE Data

2. 401219-01- 1 to 5 GHz - 433 MHz Radiator.rel (spec limit)



Comment: 433 Remote Control and Charger

BW Table	
Frequency	BW
1000.000000 MHz	1000000 Hz
5000.000000 MHz	

Correction Factors	
Sensor Factor Files	Pre-Amp Files
27-55 (max).rea (1000.000000 MHz)	71-11.rep (1000.000000 MHz)
Cable Files	Attenuator Files
7-67 (dc-40g).rec (1000.000000 MHz)	zero.ret (1000.000000 MHz) (atten)
7-56.rec (1000.000000 MHz) (2nd cbl)	
7-08.rec (1000.000000 MHz) (3rd cbl)	



Test Item: Waterproof Remote and Waterproof Docking Station
Customer: Crestron Electronics, Inc.
Test Mode: 433 MHz Radiator with active charge base
Specification: FCC R & R, Part 15, Sub-Part C
Detector Function: Quasi Peak **Units:** DBμV/m
Bandwidth: 120 kHz (CISPR)

Date: 2 December 2004
Serial No.: X100419 and X100385
Job No.: 401219-01-000
Distance: 3 Meters
Antenna Polarization: Horizontal
Technician: M. Sheehy

Radiated Field Strength Measurements

Met Requirement Yes ☒ No ☐

Frequency (MHz)	Meter Indicated (DbμV)	Antenna Factor (Db)	Cable Loss (Db)	Total Emission (DbμV/m)	Spec. Limit (DbμV/m)		Level Above Spec. Limit	Notes
30	9	19.5	0.3	28.8	40.0			Ambient
416	18	17.7	1.4	37.1	46.0			Ambient
418	19	17.8	1.4	38.2	46.0			Ambient
419	19	17.8	1.4	38.2	46.0			Ambient
433.95	43	17.5	1.4	61.1	81.1 *			Fundamental
1000	14	22.8	3.6	40.4	54.0			Ambient

Remarks: * The specification limit from para. 15.231 was used for the fundamental frequency of 433.95 MHz.



Test Title: Radiated Emissions

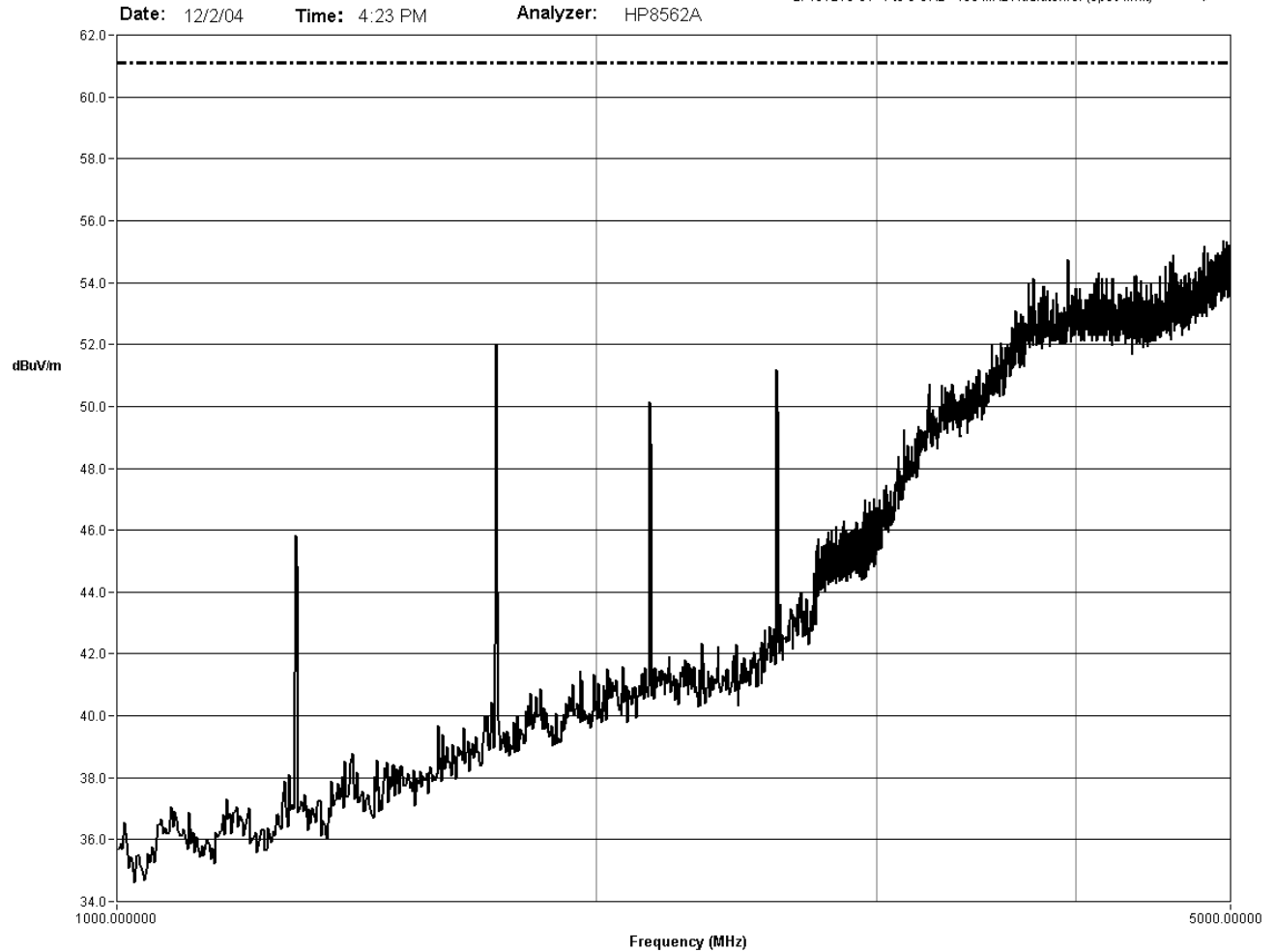
Test Procedure: FCC R & R Part 15 Sub. Part Radiated Emissions

Customer: Crestron Electronics, Inc.
Test Item: Waterproof Remote and Docking Station
Model Num.: WPR-48 and WPR-DS
Part Num.: -
Serial Num.: X100419 & X100385
Mode of Op.: Charge/Transmit Mode

Job Num.: 401219-01-000
Project Eng.: R. Monticello
Tested By: M. Sheehy
Sensor Loc.: Three meters from UUT
Sensor Pol.: Horizontal
Test Num.: 401219-01-012

File Name: 401219-01-012.red

1. RE Data
2. 401219-01- 1 to 5 GHz - 433 MHz Radiator.rel (spec limit)



Comment: 433 Remote Control and Charger

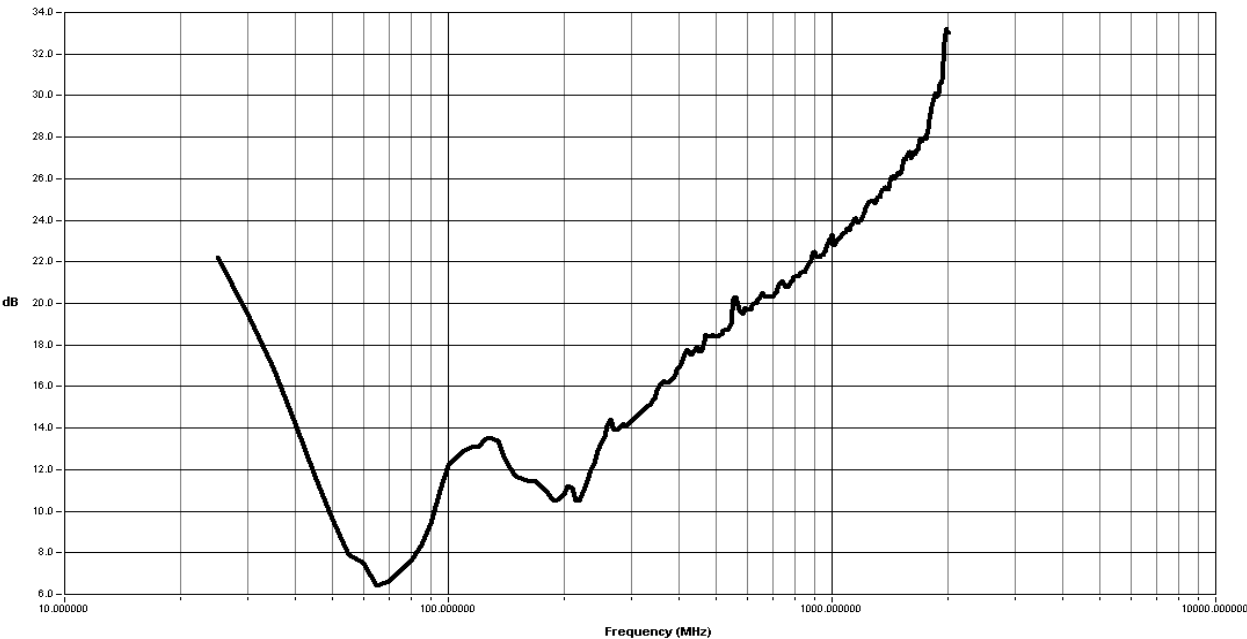
BW Table	
Frequency	BW
1000.000000 MHz	1000000 Hz
5000.000000 MHz	

Correction Factors	
Sensor Factor Files	Pre-Amp Files
27-55 (max).rea (1000.000000 MHz)	71-11.rep (1000.000000 MHz)
Cable Files	Attenuator Files
7-67 (dc-40g).rec (1000.000000 MHz)	zero.ret (1000.000000 MHz) (atten)
7-56.rec (1000.000000 MHz) (2nd cbl)	
7-08.rec (1000.000000 MHz) (3rd cbl)	

CORRECTION FACTOR

Factor File Name: 27-1 3 M Factor (Max).rea
Factor Description: Bi-Log Antenna 3 Meter Factor (Max)

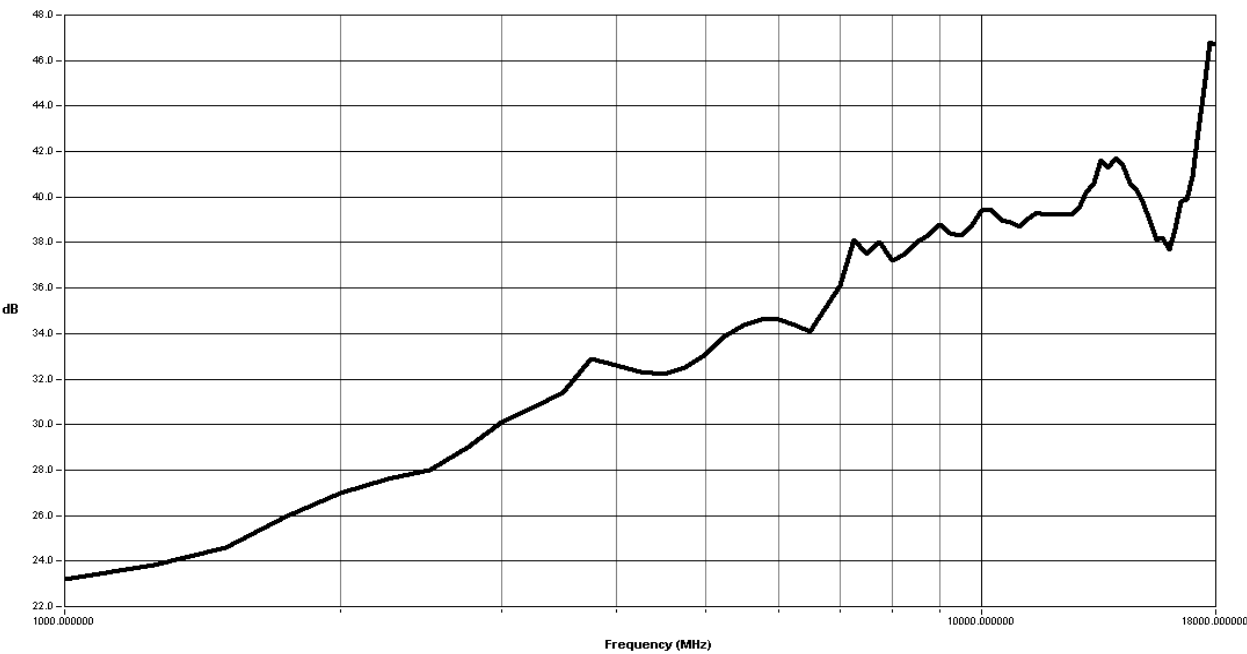
DTB Number: 27-1
Cal Due Date: 03/13/05



CORRECTION FACTOR

Factor File Name: 27-55 (max).rea
Factor Description: Double Ridged Guide Antenna (max)

DTB Number: 27-55
Cal Due Date: 12/05/04





Job Sub : 401219-01

**TEST: Radiated
Emission**

<u>ITEM</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>DTB NO.</u>	<u>CAL DUE DATE</u>
ANECHOIC CHAMBER, #4 20' X 20' X 10'	DAYTON T. BROWN	BEAM BLOCKER	01E-030	No Cal Required
FCC FACILITY	DAYTON T. BROWN	N/A	01E-032	No Cal Required
ANTENNA, BI-LOG	CHASE EMC	CBL6112	27-1	03/13/2005
ANTENNA, DOUBLE RIDGED GUIDE	EMCO	3115	27-55	12/05/2004
ANALYZER, INTERFERENCE	ELECTRO-METRICS	EMC-30	65-206	12/28/2004
ANALYZER, SPECTRUM	HEWLETT-PACKARD	8562A	65-219	12/19/2004
CABLE, TYPE N MALE ~20 FT.	DAYTON T. BROWN	NA	7-19	4/03/2005
CABLE, TYPE "N" MALE TO MALE DC – 10 GHz 24'	PASTERNAK	RG214/U	7-56	10/23/2005
CABLE, RF SMA 36" 18 GHz	GORE	PHASEFLEX EJRO1RO1036.	7-67	10/16/2005
CABLE, TYPE "N" MALE TO MALE TEST	PASTERNAK	RG214/U	7-8	4/17/2005
PREAMPLIFIER, 1-26.5 GHz	HEWLETT-PACKARD	8449B	71-11	10/22/2006



TESTED FOR: CRESTRON ELECTRONICS, INC.
ITEM: WATERPROOF REMOTE AND DOCKING STATION

RADIATED EMISSION,

30 MHz to 1 GHz

JOB NO.: 401219-01-000

DTB01R04-0960

S/N: X100419, 1468551, AND X100385
M/N: WPR-48 AND WPR-DS

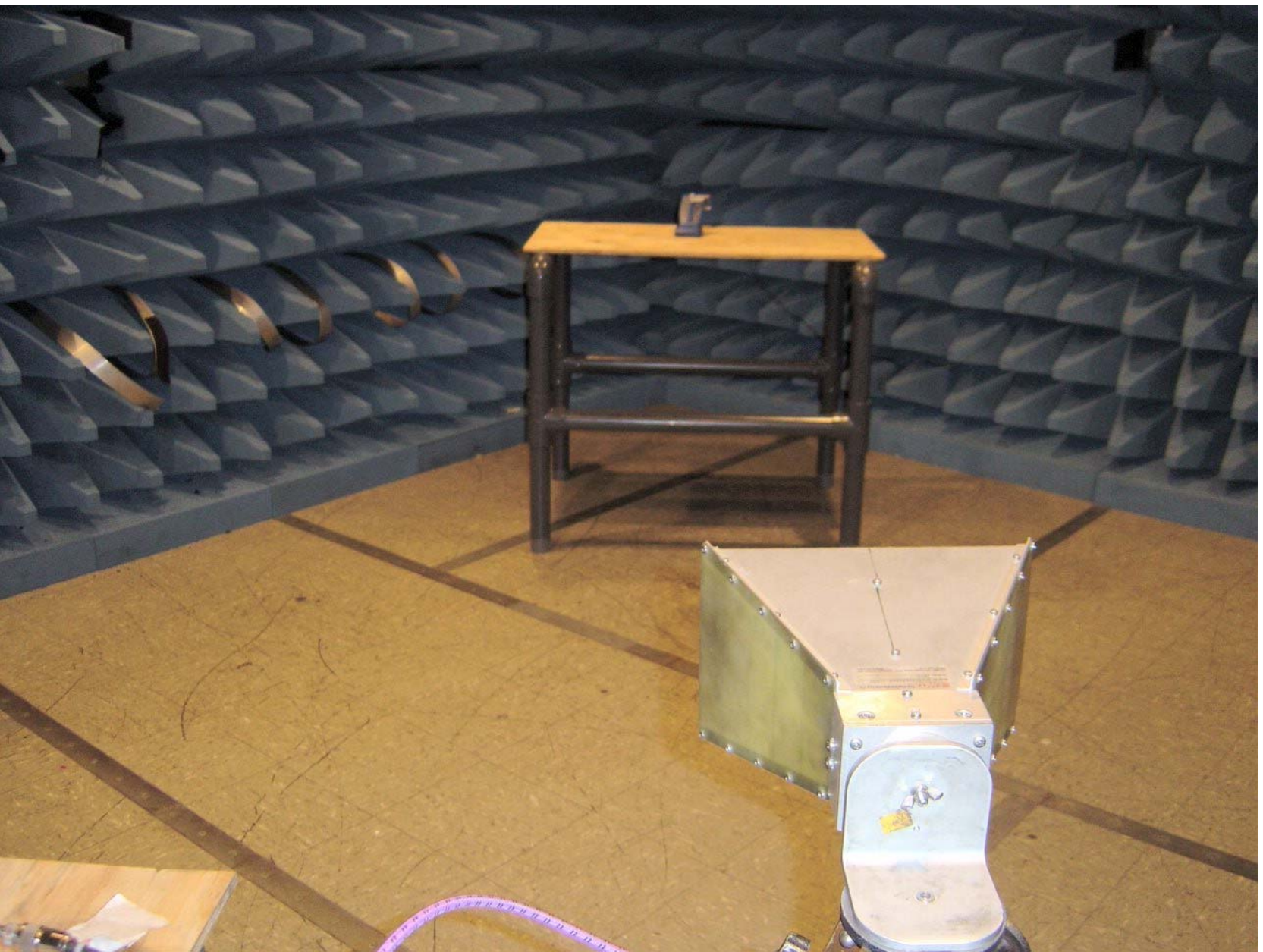
FILE NO.: DSC02197

ENCLOSURE 3

2 DECEMBER 2004

PHOTO 1





TESTED FOR: CRESTRON ELECTRONICS, INC.
ITEM: WATERPROOF REMOTE AND DOCKING STATION

S/N: X100419, 1468551, AND X100385
M/N: WPR-48 AND WPR-DS

RADIATED EMISSION,
1 TO 5 GHz

JOB NO.: 401219-01-000
DTB01R04-0960

FILE NO.: DSC02205
ENCLOSURE 3

2 DECEMBER 2004
PHOTO 2





TESTED FOR: CRESTRON ELECTRONICS, INC.

ITEM: WATERPROOF REMOTE AND DOCKING STATION

S/N: X100419, 1468551, AND X100385
M/N: WPR-48 AND WPR-JS

CLOSE UP OF WATERPROOF REMOTE AND

WATERPROOF REMOTE DOCKING STATION

JOB NO.: 401219-01-000
DTB01R04-0960

FILE NO.: DSC02201
ENCLOSURE 3

2 DECEMBER 2004
PHOTO 3





Enclosure 4

Occupied Bandwidth



OCCUPIED BANDWIDTH

Test Procedure

The occupied bandwidth, of the Waterproof Remote, was measured using a spectrum analyzer with a bandwidth setting of 100 kHz. The spectrum analyzer was operated in the "Max Hold" mode.

The Waterproof Remote has an operating frequency of 418.0 MHz and 433.95 MHz. The maximum allowed bandwidth for devices operating above 70 MHz and below 900 MHz is 0.25% of the center frequency.

The maximum allowed bandwidth is calculated as follows:

$$418.0 \text{ MHz} \times 0.0025 = 1.0450 \text{ MHz}$$

$$433.95 \text{ MHz} \times 0.0025 = 1.084875 \text{ MHz}$$

The occupied bandwidth was determined at the points 20 dB down from the carrier.

Test Results

The test sample met the requirements of the occupied bandwidth test. The measured occupied bandwidth, from the Waterproof Remote at 418.0 MHz was 480.0 kHz and at 433.95 MHz was 790.0 kHz, at the 20 dB down point.

Detailed test results for the occupied bandwidth test can be observed on pages 2 and 3 of this enclosure.



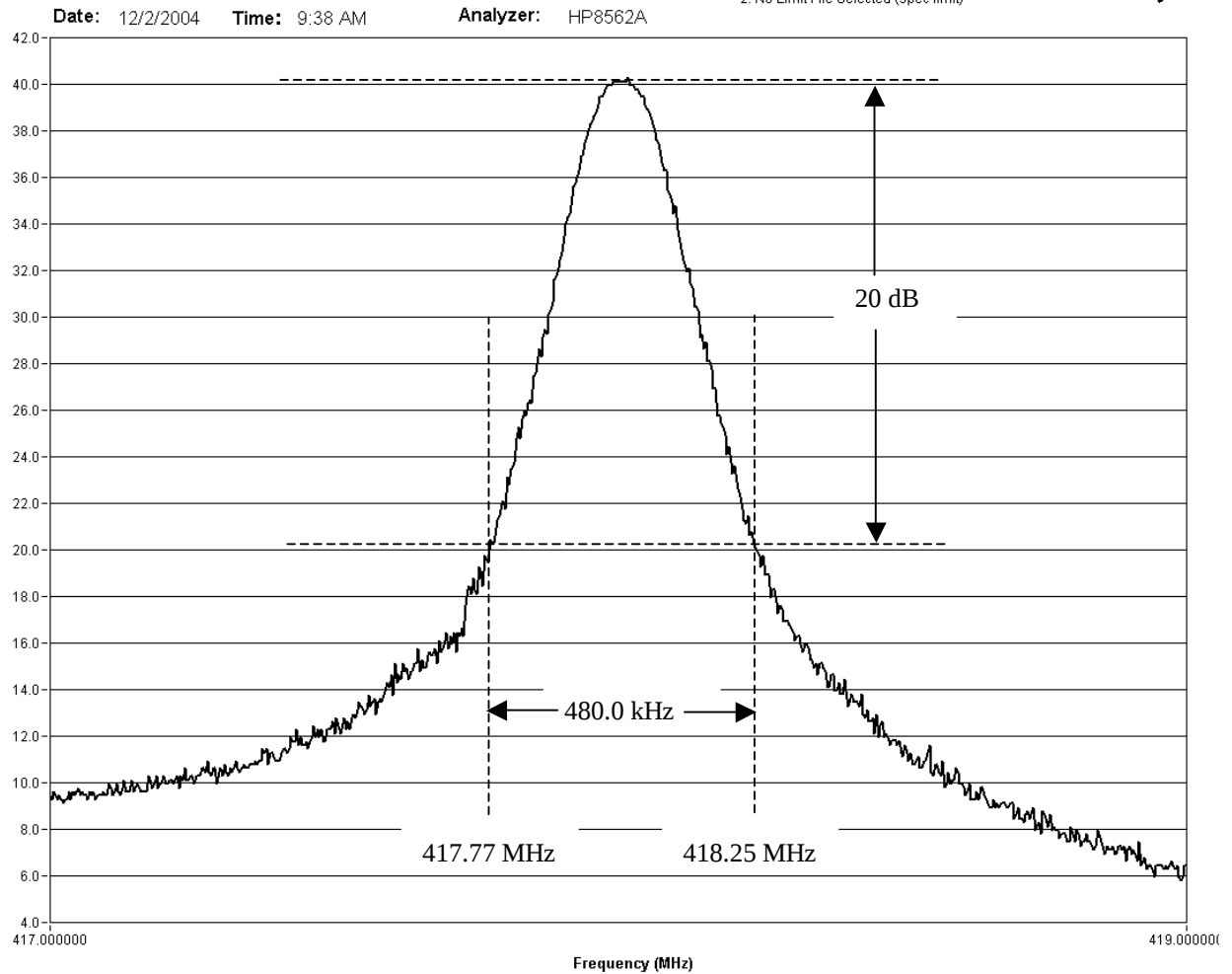
Test Title: Occupied Bandwidth

Test Procedure: FCC R & R Part 15 Sub. Part C, Conducted Emissions

Customer: Crestron Electronics, Inc.
Test Item: Waterproof Remote and Docking Station
Model Num.: WPR-48 and WPR-DS
Part Num.: -
Serial Num.: X100419 & X100385
Mode of Op.: Charge Mode

Job Num.: 401219-01-000
Project Eng.: R. Monticello
Tested By: M. Sheehy
Sensor Loc.: N/A
Sensor Pol.: -
Test Num.: 401219-01-007

File Name: 401219-01-007.red
1. RE Data
2. No Limit File Selected (spec limit)



Comment: 418 Remote Control and Charger

BW Table	
Frequency	BW
417.000000 MHz	100000 Hz
419.000000 MHz	

Correction Factors	
Sensor Factor Files	Pre-Amp Files
zero.rea (417.000000 MHz)	71-22.rep (417.000000 MHz) (pre-amp)
Cable Files	Attenuator Files
7-43.rec (417.000000 MHz) (cbl)	zero.ret (417.000000 MHz) (atten)
7-66.rec (417.000000 MHz) (2nd cbl)	
zero.rec (417.000000 MHz) (3rd cbl)	



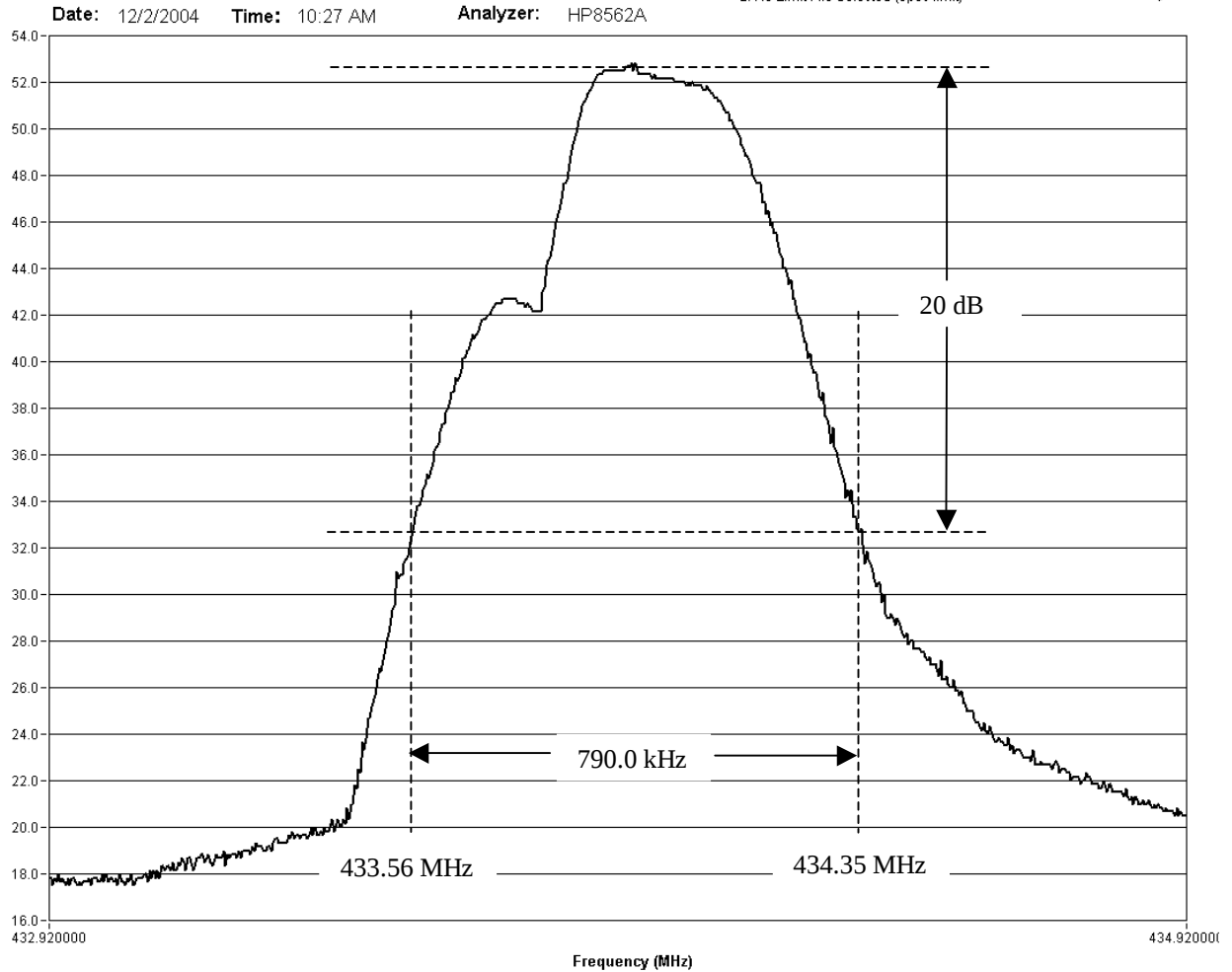
Test Title: Occupied Bandwidth

Test Procedure: FCC R & R Part 15 Sub. Part C, Conducted Emissions

Customer: Crestron Electronics, Inc.
Test Item: Waterproof Remote and Docking Station
Model Num.: WPR-48 and WPR-DS
Part Num.: -
Serial Num.: X100419 & X100385
Mode of Op.: Charge Mode

Job Num.: 401219-01-000
Project Eng.: R. Monticello
Tested By: M. Sheehy
Sensor Loc.: N/A
Sensor Pol.: -
Test Num.: 401219-01-009

File Name: 401219-01-009.red
1. RE Data
2. No Limit File Selected (spec limit)



Comment: 433 Remote Control and Charger

BW Table	
Frequency	BW
432.920000 MHz	100000 Hz
434.920000 MHz	

Correction Factors	
Sensor Factor Files	Pre-Amp Files
zero.rea (432.920000 MHz)	71-22.rep (432.920000 MHz) (pre-amp)
Cable Files	Attenuator Files
7-43.rec (432.920000 MHz) (cbl)	zero.ret (432.920000 MHz) (atten)
7-66.rec (432.920000 MHz) (2nd cbl)	
zero.rec (432.920000 MHz) (3rd cbl)	



Job Sub : 401219-01

**TEST: Occupied
Bandwidth**

<u>ITEM</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>DTB NO.</u>	<u>CAL DUE DATE</u>
GTEM CELL, 1.75 METERS	MESSELEKTRONIK BERLIN	MEB G TEM 1750	27-368	10/23/2005
ANALYZER, SPECTRUM	HEWLETT-PACKARD	8562A	65-219	12/19/2004
CABLE, TYPE "N" MALE TO MALE	PASTERNAK	PE3062	7-43	10/23/2005
CABLE, 18" TYPE N MALE TO MALE TEST	DAYTON T. BROWN	RG 393	7-66	05/15/2005
AMPLIFIER, 10.0 KHz – 1.0 GHz APPROX. 50 DB	MITEQ	AM-1309	71-22	03/06/2005
L.I.S.N., 10 KHz - 30 MHz 50μH 24 AMPS DUAL	SOLAR	9252-50-R-24BNC	73-92	06/05/2005