



**FCC PART 15 SUBPART B and C  
TEST REPORT***for***DECODER SYSTEM****Model: ICD-HP**

Prepared for

HUNTER INDUSTRIES  
1940 DIAMOND STREET  
SAN MARCOS, CALIFORNIA 92078Prepared by:   
\_\_\_\_\_

ALEX BENITEZ

Approved by:   
\_\_\_\_\_

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DATE: APRIL 14, 2009

	REPORT BODY	APPENDICES					TOTAL
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## GENERAL REPORT SUMMARY

Compatible Electronics Inc. generates this electromagnetic emission test report, which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product endorsement by NVLAP, NIST or any other agency of the U.S. Government.

Device Tested: Hunter Industries  
Model: ICD-HP  
S/N: N/A

Product Description: The EUT is a 125 kHz transceiver.

Modifications: The EUT was not modified in order to meet the specifications.

Customer: Hunter Industries  
1940 Diamond Street  
San Marcos, California 92078

Test Date(s): April 2, and 3, 2009

Test Specifications: EMI requirements  
CFR Title 47, Part 15 Subpart B; and Subpart C, Sections 15.205 and 15.209

Test Procedure: ANSI C63.4

Test Deviations: The test procedure was not deviated from during the testing.

## SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions 150 kHz to 30 MHz	The EUT does not directly or indirectly connect to the AC mains, thus this test was not performed.
2	Radiated RF Emissions 9 kHz – 1000 MHz	Complies with the <b>Class B</b> limits of CFR Title 47, Part 15, Subpart B; and Subpart C Sections 15.205 and 15.209. Highest reading in relation to spec limit: 44.19 dBuV/m @ 298.622 MHz (*U <sub>c</sub> = 1.75 dB)

\*U<sub>c</sub> = combined standard uncertainty

**1. PURPOSE**

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Decoder System, Model: ICD-HP. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the **Class B** specification limits defined by CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205 and 15.209.



## 2. ADMINISTRATIVE DATA

### 2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California.

### 2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

### 2.3 Cognizant Personnel

Hunter Industries

Pete Woytowitz                      Engineering Manager, Controllers

Compatible Electronics Inc.

Alex Benitez                      Test Technician

Kyle Fujimoto                    Test Engineer

Michael Christensen          Lab Manager, Brea Division

### 2.4 Date Test Sample was Received

The test sample was received prior to the date of testing.

### 2.5 Disposition of the Test Sample

The test sample has not yet been returned as of the date of this report.

### 2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

FCC	Federal Communications Commission
RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
ITE	Information Technology Equipment
LISN	Line Impedance Stabilization Network
NVLAP	National Voluntary Laboratory Accreditation Program
CFR	Code of Federal Regulations
N/A	Not Applicable
Ltd.	Limited
Inc.	Incorporated
IR	Infrared
RP	Reverse Polarity

### 3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

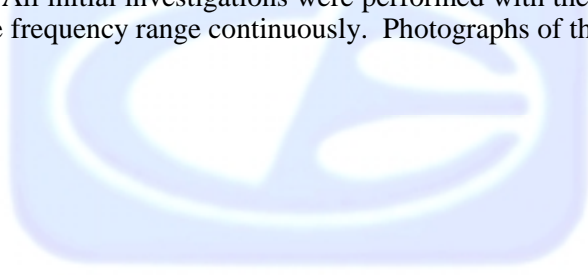
<b>SPEC</b>	<b>TITLE</b>
CFR Title 47, Part 15	FCC Rules – Radio frequency devices (including digital devices)
ANSI C63.4: 2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

#### **4. DESCRIPTION OF TEST CONFIGURATION**

##### **4.1 Description of Test Configuration – EMI**

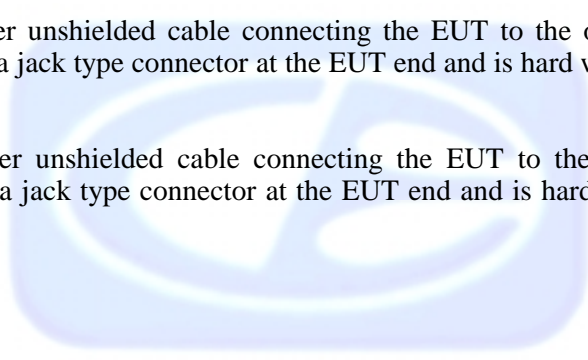
During the test, the Decoder System, Model: ICD-HP (EUT) was continuously scanning to establish a decoder connection.

It was determined that the emissions were at their highest level when the EUT was operating in the above configuration. The final emissions data was taken in this mode of operation and any cables were maximized. All initial investigations were performed with the measurement receiver in manual mode scanning the frequency range continuously. Photographs of the test setup are in Appendix D of this report.





#### **4.1.1 Cable Construction and Termination**

- Cable 1** This is a 0.3-meter braid shielded cable connecting the EUT to the decoder base station. The cable contained a RP-BNC type connector at the EUT end and a RP-BNC type connector at the decoder base station end.
- Cable 2** This is a 0.5-meter unshielded cable connecting the EUT to the orange mini grabber. The cable contained a banana jack type connector at the EUT end and is hard wired to the orange mini grabber end.
- Cable 3** This is a 0.5-meter unshielded cable connecting the EUT to the blue mini grabber. The cable contained a banana jack type connector at the EUT end and is hard wired at the blue mini grabber end.
- 

**5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT****5.1 EUT and Accessory List**

<b>EQUIPMENT</b>	<b>MANUFACTURER</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>FCC ID</b>
DECODER SYSTEM (EUT)	HUNTER INDUSTRIES	ICD-HP	N/A	M3UICDHP
DECODER STATION	HUNTER INDUSTRIES	N/A	N/A	N/A

**5.2 EMI Test Equipment**

<b>EQUIPMENT TYPE</b>	<b>MANU-FACTURER</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>CAL. DATE</b>	<b>CAL. CYCLE</b>
<b>GENERAL TEST EQUIPMENT USED FOR ALL RF EMISSIONS TESTS</b>					
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	3638A08784	June 2, 2008	1 Year
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	2648A14530	June 2, 2008	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650A	2430A00424	June 2, 2008	1 Year
EMI Receiver	Rohde & Schwarz	ESIB40	100194	September 17, 2008	2 Year
Computer	Hewlett Packard	4530	US91912319	N/A	N/A
<b>RF RADIATED EMISSIONS TEST EQUIPMENT</b>					
Radiated Emissions Data Capture Program	Compatible Electronics	2.0	N/A	N/A	N/A
Loop Antenna	Com Power	AL-130	17089	September 29, 2008	1 Year
Biconical Antenna	Com Power	AB-900	15182	February 23, 2009	1 Year
Log Periodic Antenna	Com Power	AL-100	16252	June 27, 2008	1 Year
Preamplifier	Com-Power	PA-103	1582	January 12, 2009	1 Year
Turntable	Com Power	TT-100	N/A	N/A	N/A
Antenna-Mast	Com Power	AM-100	N/A	N/A	N/A

**6. TEST SITE DESCRIPTION****6.1 Test Facility Description**

Please refer to section 2.1 and 7.1.2 of this report for EMI test location.

**6.2 EUT Mounting, Bonding and Grounding**

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded.

**6.3 Facility Environmental Characteristics**

When applicable refer to the data sheets in Appendix E for the relative humidity, air temperature, and barometric pressure.

## 7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

### 7.1 RF Emissions

#### 7.1.1 Radiated Emissions (Spurious, Fundamental, and Harmonics) Test

The spectrum analyzer was used as a measuring meter along with the quasi-peak adapter. A preamplifier was used to increase the sensitivity of the instrument. The spectrum analyzer was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer records the highest measured reading over all the sweeps.

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
9 kHz to 150 kHz	200 Hz	Active Loop Antenna
150 kHz to 30 MHz	9 kHz	Active Loop Antenna
30 MHz to 300 MHz	120 kHz	Biconical Antenna
300 MHz to 1 GHz	120 kHz	Log Periodic Antenna

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The loop antenna was also rotated in the horizontal and vertical axis in order to ensure accurate results.

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance to obtain the final test data for the spurious emissions. The EUT was tested at a 10 meter test distance to obtain the final test data for the fundamental and the harmonic emissions. The final qualification data sheets are located in Appendix E.

#### Test Results:

The EUT Complies with the **Class B** limits of **CFR** Title 47, Part 15, Subpart B; and Subpart C Sections 15.205 and 15.209.

**8. CONCLUSIONS**

The Decoder System, Model: ICD-HP, as tested, meets all of the **Class B** specification limits defined in CFR Title 47, Part 15, Subpart B for the digital portion; and the limits defined in Subpart C, sections 15.205 and 15.209 for the transmitter portion.



**APPENDIX A**

***LABORATORY RECOGNITIONS***

## ***LABORATORY RECOGNITIONS***

**Compatible Electronics has the following agency accreditations:**

National Voluntary Laboratory Accreditation Program - Lab Code: 200528-0

Voluntary Control Council for Interference - Registration Numbers: R-983, C-1026, R-984 and C-1027

Bureau of Standards and Metrology Inspection - Reference Number: SL2-IN-E-1031

Conformity Assessment Body for the EMC Directive Under the US/EU MRA Appointed by NIST

**Compatible Electronics is recognized or on file with the following agencies:**

Federal Communications Commission

Industry Canada





**APPENDIX B**

***MODIFICATIONS TO THE EUT***

## **MODIFICATIONS TO THE EUT**

The modifications listed below were made to the EUT to pass FCC 15.209 and/or FCC **Class B** specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

There were no modifications made to the EUT.



**APPENDIX C**

***ADDITIONAL MODELS COVERED  
UNDER THIS REPORT***

## **ADDITIONAL MODELS COVERED UNDER THIS REPORT**

USED FOR THE PRIMARY TEST

Decoder System  
Model: ICD-HP  
S/N: N/A

ALSO APPROVED UNDER THIS REPORT:

There were no additional models covered under this report.



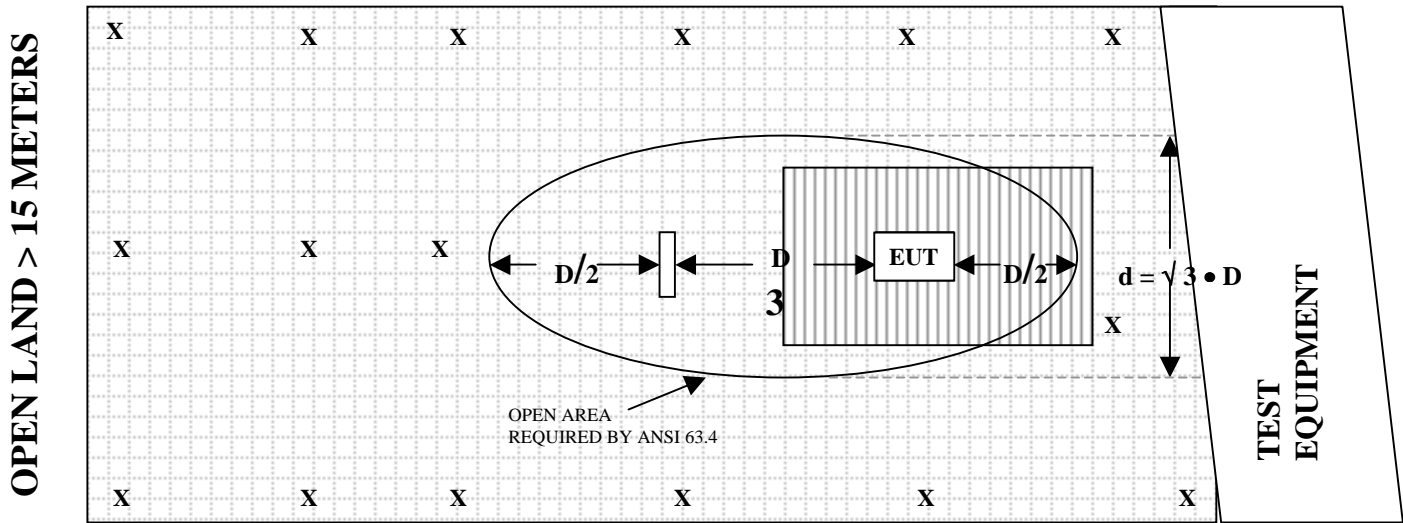


**APPENDIX D**

***DIAGRAMS, CHARTS, AND PHOTOS***

**FIGURE 1: PLOT MAP AND LAYOUT OF 3 METER RADIATED TEST SITE**

**OPEN LAND > 15 METERS**

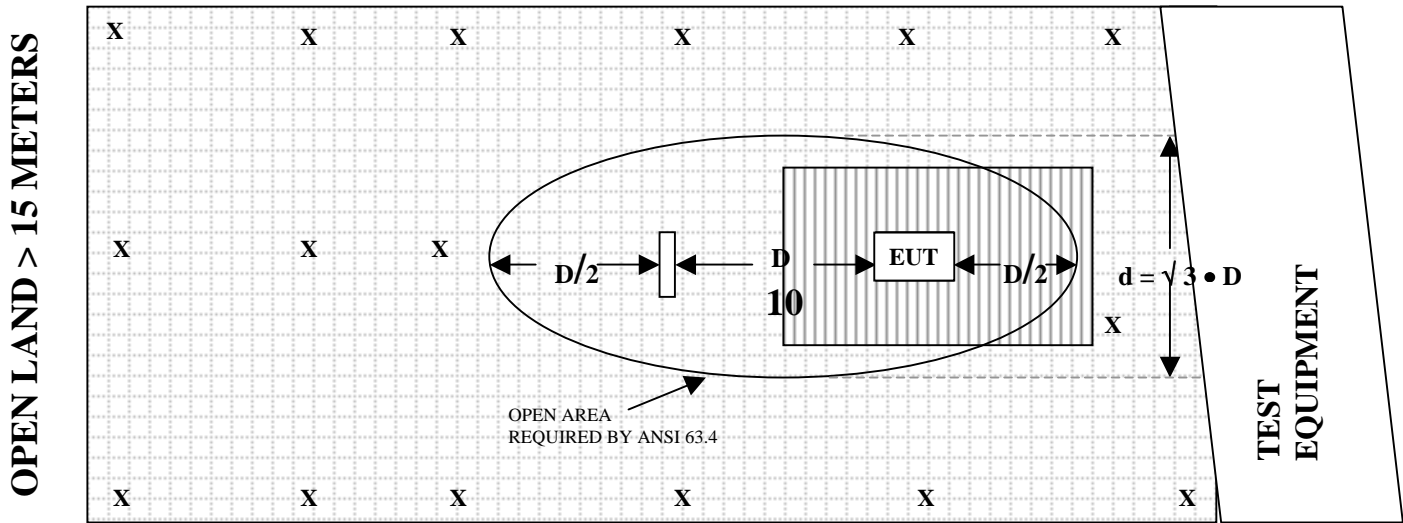


**OPEN LAND > 15 METERS**

- |          |                          |  |                 |
|----------|--------------------------|--|-----------------|
| <b>X</b> | = GROUND RODS            |  | = GROUND SCREEN |
| <b>D</b> | = TEST DISTANCE (meters) |  | = WOOD COVER    |

**FIGURE 2: PLOT MAP AND LAYOUT OF 10 METER RADIATED TEST SITE**

**OPEN LAND > 15 METERS**



**OPEN LAND > 15 METERS**

- X = GROUND RODS
- D = TEST DISTANCE (meters)
- = GROUND SCREEN
- = WOOD COVER

**COM-POWER AL-130****LOOP ANTENNA****S/N: 17089****CALIBRATION DATE: SEPTEMBER 29, 2008**

<b>FREQUENCY (MHz)</b>	<b>MAGNETIC (dB/m)</b>	<b>ELECTRIC (dB/m)</b>
0.009	-41.57	9.93
0.01	-42.06	9.44
0.02	-42.43	9.07
0.05	-42.50	9.00
0.07	-42.10	9.40
0.1	-42.03	9.47
0.2	-44.50	7.00
0.3	-41.93	9.57
0.5	-41.90	9.60
0.7	-41.73	9.77
1	-41.23	10.27
2	-40.90	10.60
3	-41.20	10.30
4	-41.30	10.20
5	-40.70	10.80
10	-41.10	10.40
15	-42.17	9.33
20	-42.00	9.50
25	-42.20	9.30
30	-43.10	8.40



**COM-POWER AB-900****BICONICAL ANTENNA**

S/N: 15182

CALIBRATION DATE: FEBRUARY 23, 2009

<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>	<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>
30	13.1	100	10.6
35	10.1	120	12.7
40	9.5	140	11.7
45	10.9	160	12.6
50	11.3	180	15.7
60	8.4	200	16.8
70	8.1	250	15.0
80	5.7	275	17.5
90	7.3	300	19.2

**COM-POWER AL-100****LOG PERIODIC ANTENNA**

S/N: 16252

CALIBRATION DATE: JUNE 27, 2008

<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>	<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>
300	13.5	700	19.3
400	14.8	800	21.3
500	16.7	900	22.0
600	18.8	1000	22.8

**COM-POWER PA-103****PREAMPLIFIER**

S/N: 1582

CALIBRATION DATE: JANUARY 12, 2009

<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>	<b>FREQUENCY (MHz)</b>	<b>FACTOR (dB)</b>
30	33.6	300	33.4
40	33.7	350	33.2
50	33.6	400	33.2
60	33.5	450	33.1
70	33.6	500	32.9
80	33.6	550	33.0
90	33.7	600	32.8
100	33.7	650	33.0
125	33.5	700	32.7
150	33.6	750	32.9
175	33.7	800	32.6
200	33.4	850	32.6
225	33.4	900	32.6
250	33.4	950	32.4
275	33.3	1000	32.7



**FRONT VIEW**

HUNTER INDUSTRIES  
DECODER SYSTEM  
MODEL: ICD-HP

FCC SUBPART B AND C – RADIATED EMISSIONS - 04/03/2009

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**

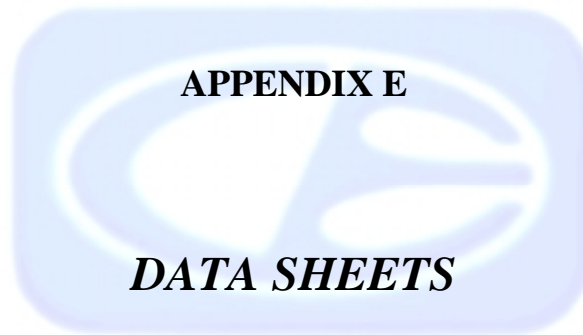


**REAR VIEW**

HUNTER INDUSTRIES  
DECODER SYSTEM  
MODEL: ICD-HP

FCC SUBPART B AND C – RADIATED EMISSIONS - 04/03/2009

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**





Test Location : Compatible Electronics  
 Customer : Hunter Industries, Inc.  
 Manufacturer : Hunter Industries, Inc.  
 Eut name : Decoder System  
 Model : ICD-HP  
 Serial # : N/A  
 Specification : FCC B  
 Distance correction factor (20 \* log(test/spec) : 0.00  
 Test Mode : Horizontal/ Vertical Polarization  
 30 MHz - 1000 MHz

Page : 1/1  
 Date : 4/03/2009  
 Time : 9:41:37  
 Lab : A  
 Test Distance : 3.0

Tested by: Alex Benitez

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	Li mit = L dBuV/m	Del ta R-L dB
1V	312.300	46.10	4.40	13.68	33.35	30.84	46.00	-15.16
2V	333.550	48.30	4.58	13.98	33.26	33.59	46.00	-12.41
3V	328.750	49.20	4.54	13.91	33.28	34.37	46.00	-11.63
4V	355.864	47.10	4.76	14.27	33.20	32.93	46.00	-13.07
5V	456.824	41.40	5.59	15.93	33.07	29.85	46.00	-16.15
6V	461.658	40.20	5.65	16.02	33.05	28.81	46.00	-17.19
7V	561.804	43.30	6.42	18.04	32.95	34.81	46.00	-11.19
Above readings were taken in the X-Axis. (Broadband Signals)								
8H	309.510	57.90	4.38	13.64	33.36	42.56	46.00	-3.44
9H	326.622	48.50	4.52	13.88	33.29	33.62	46.00	-12.38
10H	412.951	43.90	5.28	15.07	33.17	31.08	46.00	-14.92
11H	460.548	43.00	5.63	16.00	33.06	31.58	46.00	-14.42
12H	303.514	61.30	4.33	13.55	33.38	45.80	46.00	-0.20
13H	303.518Qp	57.79	4.33	13.55	33.38	42.29	46.00	-3.71
Above readings were taken in the X-Axis. (Broadband Signals)								
14V	299.742	48.80	4.30	19.18	33.40	38.88	46.00	-7.12
Above reading was taken in the Y-Axis. (Broadband Signal)								
15H	298.574	53.40	4.28	19.11	33.39	43.39	46.00	-2.61
Above reading was taken in the Z-Axis. (Broadband Signal)								
16H	298.622	54.20	4.28	19.11	33.39	44.19	46.00	-1.81
Above reading was taken in the X-Axis. (Broadband Signal)								
17H	84.078	52.10	1.98	6.38	33.64	26.82	40.00	-13.18
Above reading was taken in the X-Axis.								
18V	299.648	47.40	4.29	19.18	33.40	37.47	46.00	-8.53
Above reading was taken in the Y-Axis. (Broadband Signal)								
19V	84.094	53.30	1.98	6.38	33.64	28.02	40.00	-11.98
Above reading was taken in the Y-Axis.								