

EMC EMISSIONS - TEST REPORT (In Part)

Test Report No. **3152607DEN-002** Issue Date: Wednesday 21/May/2008
 Model / Serial No. MN: 20 /SN: 43
 Product Type 2 way IR/RF Remote Control
 Client Echostar
 Manufacturer Echostar
 License holder Echostar
 Address 94 Inverness Drive East

Englewood, CO 80112

Test Criteria Applied	FCC 47 CFR Part 15.231	Title 47 CFR 15: RADIO FREQUENCY DEVICES
Test Result	IC RSS-210	
	PASS	
Test Project Number	3150483	Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category 1 Equipment.
References		
Total Pages Including Appendices:	25	

Tested By : Ty Orosco Reviewed By : Michael Spataro

REVISION SUMMARY - The following changes have been made to this Report:

Rev.	Revision Statement	Author	Revision Date
	Initial Release of Document	See above	See above

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STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The measurement uncertainty for Conducted Emissions in the frequency range of 150kHz – 30MHz is calculated to be $\pm 2.30\text{dB}$ and for Radiated Emissions is calculated to be $\pm 3.60\text{dB}$ in the frequency range of 30MHz – 200MHz and $\pm 3.38\text{dB}$ in the frequency range of 200MHz – 1000MHz.

EUT Received Date: 9-May-2008

Testing Start Date: 9-May-2008

Testing End Date: 9-May-2008

The tests were performed according to following regulations :

1. FCC CFR47 Part 15 subpart C
2. IC RSS-210 Issue 7:2007

Emission Test Results:

Field Strength of the Fundamental 15.231 (b) - PASS

Test Result

Minimum limit margin -5.2 dB at 388.31 MHz

Remarks: Mid 2 Channel

Field Strength of Spurious emissions 15.231(b) - PASS

Test Result

Minimum limit margin -16.5 dB at 1847.6/ MHz
1876.3

Remarks: Low Channel and Mid 1 Channel

Restricted Bands of Operation 15.205 - PASS

Test Result

Minimum limit margin -17.2 dB at 1125.7 MHz

Remarks: Mid 1 Channel

GENERAL REMARKS:

The following remarks are to be considered as “where applicable” and are taken into account while completing any FCC/IC/ETSI radio tests at Intertek.

Testing was performed in 3 different orthogonal axis to determine the worst case emissions from the device. The worst case emissions measurements are shown in this report.

FCC CFR47 Part 15.31: Measurement Standards: In any case where the device is powered off a battery, a fresh battery was used during test. In cases where the device is powered off an AC supply, voltage was varied per Part 15.31 to find worst case emissions.

FCC CFR47 Part 15.35: Measurement Detector Functions and Bandwidths: FCC Part 15.35 was utilized when performing the measurements within this report.

EUT is battery powered.

Only the fundamental and harmonics of the fundamental are covered in this report, as requested by the customer.

Sample:

Production Prototype See RFQ

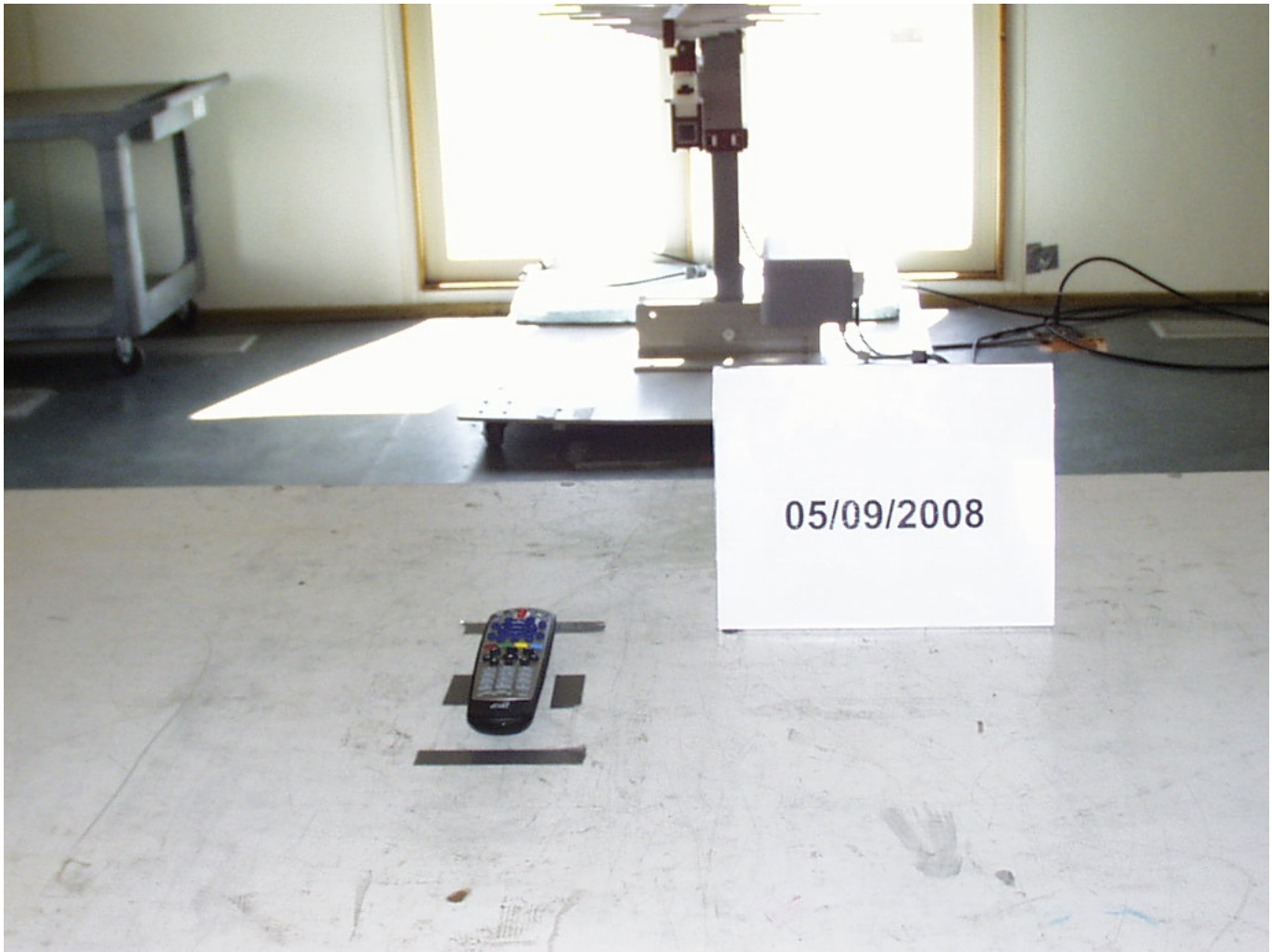
Modifications required to pass: None

Test Specification Deviations: Additions to or Exclusions from: None

Test-setup photo(s):
Radiated Emissions:



Test-setup photo(s):
Radiated Emissions:



Appendix A

Test Data Sheets
and
Test Equipment Used

**Fundamental field strength
And
Harmonics of the Fundamental**

15.231(b)/15.205

Field Strength Measurements Fundamental and Spurious of the Transmitter

Test Report #: _____	Test Area: <u>PW 1 (3M)</u>	Temperature: <u>22.4</u> °C
Test Method: <u>FCC 47 CFR part 15 subpart C</u>	Test Date: <u>09-May-2008</u>	Relative Humidity: <u>27.2</u> %
EUT Model #: <u>20</u>	EUT Power: <u>3VDC</u>	Air Pressure: <u>101</u> kPa
EUT Serial #: <u>43</u>		
Manufacturer: <u>Echostar</u>		
EUT Description: <u>Remote Control</u>		
Notes: <u>2 way remote IR/RF</u>		

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	Duty Cycle Correction	Final Corrected	Limit	DELTA
(MHz)	(dBuV)	(dB) (dBm) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV/m)	(dBuV/m)	(dB)

The following duty cycle was declared by the manufacturer.

38.5mS

Averaging method for pulsed signals and calculation in accordance to FCC CFR47 Part 15.35 utilized to calculate field strength emissions.

The testing performed in accordance to FCC CFR47 Part 15.205 (restricted bands of operation) and 15.231 emissions and delta limits were calculated as follows:

Final Corrected Peak Measurement – Duty Cycle Correction Factor* = Final Calculated Emission

The Final Calculated Emission was then compared to the Limits in CFR47 Part 15.209 and 15.231 and the emission/limit delta was calculated. the DTCF is calculated as follows $20 \cdot \log_{10}(\text{duty cycle in 100mS})$ "not to exceed 20dB"

Part 15.231 and 15.205 Respectively

Axis 1 EUT is flat on the table

Hi Channel

394.27	56.2 Pk	2.2 / 15.2 / 0.0	73.6	V / 1.7 / 194.4	-8.3	65.3	79.4	-14.1
394.31	64.8 Pk	2.2 / 15.2 / 0.0	82.2	H / 1.0 / 93.1	-8.3	73.9	79.4	-5.5

Mid 2 Channel

388.31	67.2 Pk	2.2 / 15.1 / 0.0	84.5	H / 1.0 / 89.0	-8.3	76.2	79.2	-3.0
388.23	57.3 Pk	2.2 / 15.1 / 0.0	74.5	V / 1.6 / 153.0	-8.3	66.2	79.2	-13.0

Mid 1 Channel

375.31	53.0 Pk	2.1 / 15.2 / 0.0	70.3	V / 2.1 / 54.0	-8.3	62.0	78.6	-16.6
375.31	64.0 Pk	2.1 / 15.2 / 0.0	81.3	H / 1.0 / 258.0	-8.3	73.0	78.6	-5.6

Low Channel

369.51	62.8 Pk	2.1 / 16.5 / 0.0	81.5	H / 1.0 / 271.4	-8.3	73.2	78.3	-5.1
369.51	50.6 Pk	2.1 / 16.5 / 0.0	69.2	V / 2.7 / 52.6	-8.3	60.9	78.3	-17.4

Axis 2 EUT is standing straight up

Low Channel

369.51	54.8 Pk	2.1 / 16.5 / 0.0	73.4	V / 1.3 / 167.3	-8.3	65.1	78.3	-13.2
369.43	39.4 Pk	2.1 / 16.6 / 0.0	58.1	H / 2.1 / 111.0	-8.3	49.8	78.3	-28.5

Mid 1 Channel

375.31	44.6 Pk	2.1 / 15.2 / 0.0	62	H / 1.9 / 94.5	-8.3	53.7	78.6	-24.9
375.31	56.0 Pk	2.1 / 15.2 / 0.0	73.4	V / 1.4 / 28.7	-8.3	65.1	78.6	-13.5

Hi Channel

394.32	63.8 Pk	2.2 / 15.2 / 0.0	81.2	V / 1.2 / 308.7	-8.3	72.9	79.4	-6.5
394.31	50.5 Pk	2.2 / 15.2 / 0.0	67.9	H / 2.0 / 87.9	-8.3	59.6	79.4	-19.8

Mid 2 Channel

388.32	50.6 Pk	2.2 / 15.1 / 0.0	67.9	H / 1.0 / 87.5	-8.3	59.6	79.2	-19.6
388.31	65.0 Pk	2.2 / 15.1 / 0.0	82.3	V / 1.2 / 312.7	-8.3	74.0	79.2	-5.2

Axis 3 laying on the right side

Mid 2 Channel

388.31	57.2 Pk	2.2 / 15.1 / 0.0	74.5	V / 2.5 / 196.1	-8.3	66.2	79.2	-13.0
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FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	Duty Cycle Correction	Final Corrected	Limit	DELTA
(MHz)	(dBuV)	(dB) (dBm) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
388.23	64.8 Pk	2.2 / 15.1 / 0.0	82.1	H / 1.0 / 271.3	-8.3	73.8	79.2	-5.4
Hi Channel								
394.31	63.4 Pk	2.2 / 15.2 / 0.0	80.8	H / 1.0 / 271.3	-8.3	72.5	79.4	-6.9
394.23	55.4 Pk	2.2 / 15.2 / 0.0	72.8	V / 2.9 / 193.1	-8.3	64.5	79.4	-14.9
Mid 1 Channel								
375.31	49.3 Pk	2.1 / 15.2 / 0.0	66.6	V / 2.4 / 19.2	-8.3	58.3	78.6	-20.3
375.31	59.8 Pk	2.1 / 15.2 / 0.0	77.1	H / 1.0 / 117.0	-8.3	68.8	78.6	-9.8
Low Channel								
369.5	56.2 Pk	2.1 / 16.5 / 0.0	74.9	H / 1.0 / 277.8	-8.3	66.6	78.3	-11.7
369.51	45.0 Pk	2.1 / 16.5 / 0.0	63.6	V / 2.3 / 9.2	-8.3	55.3	78.3	-23.0
Axis 1 was found to be the worst case.								
Low Channel								
739.02	37.2 Pk	3.2 / 20.9 / 28.1	33.2	V / 2.3 / 169.3	-8.3	24.9	58.3	-33.4
739.06	44.6 Pk	3.2 / 20.9 / 28.1	40.6	H / 1.0 / 241.3	-8.3	32.3	58.3	-26.0
1108.34	55.6 Pk	2.1 / 24.3 / 37.4	44.6	V / 1.2 / 188.2	-8.3	36.3	54	-17.7
1108.59	53.8 Pk	2.1 / 24.3 / 37.4	42.8	H / 1.0 / 240.1	-8.3	34.5	54	-19.5
1478.09	41.7 Pk	2.5 / 25.0 / 36.9	32.3	H / 1.1 / 140.7	-8.3	24.0	54	-30.0
1847.61	56.2 Pk	2.8 / 26.5 / 37.4	48.2	H / 1.0 / 166.3	-8.3	39.9	58.3	-18.4
1847.64	58.1 Pk	2.8 / 26.5 / 37.4	50.1	V / 1.2 / 10.6	-8.3	41.8	58.3	-16.5
2217.17	45.7 Pk	3.1 / 27.9 / 37.8	38.9	V / 1.0 / 326.7	-8.3	30.6	54	-23.4
2217.19	44.3 Pk	3.1 / 27.9 / 37.8	37.5	H / 1.0 / 7.0	-8.3	29.2	54	-24.8
2586.18	47.0 Pk	3.3 / 29.2 / 38.0	41.5	H / 1.0 / 6.7	-8.3	33.2	58.3	-25.1
2586.19	47.4 Pk	3.3 / 29.2 / 38.0	41.9	V / 1.0 / 0.0	-8.3	33.6	58.3	-24.7
2956.22	43.3 Pk	3.7 / 30.7 / 37.9	39.8	H / 1.0 / 353.6	-8.3	31.5	58.3	-26.8
2956.24	43.5 Pk	3.7 / 30.7 / 37.9	40	V / 1.0 / 269.9	-8.3	31.7	58.3	-26.6
3325.75	44.5 Pk	4.2 / 31.3 / 37.2	42.7	V / 1.0 / 271.9	-8.3	34.4	58.3	-23.9
Harmonics not listed were not seen above the noise floor.								
Mid 1 Channel								
750.62	45.7 Pk	3.2 / 21.0 / 28.1	41.8	H / 1.0 / 103.8	-8.3	33.5	58.6	-25.1
750.62	41.5 Pk	3.2 / 21.0 / 28.1	37.7	V / 1.4 / 276.0	-8.3	29.4	58.6	-29.2
1125.74	56.1 Pk	2.1 / 24.3 / 37.4	45.1	V / 1.2 / 180.3	-8.3	36.8	54	-17.2
1125.75	53.0 Pk	2.1 / 24.3 / 37.4	42	H / 1.0 / 233.1	-8.3	33.7	54	-20.3
1501.28	42.0 Pk	2.5 / 25.1 / 36.9	32.6	H / 1.1 / 120.3	-8.3	24.3	54	-29.7
1501.33	41.1 Pk	2.5 / 25.1 / 36.9	31.7	V / 1.4 / 212.0	-8.3	23.4	54	-30.6
1876.27	58.4 Pk	2.9 / 26.6 / 37.4	50.4	V / 1.0 / 277.3	-8.3	42.1	58.6	-16.5
1876.28	55.0 Pk	2.9 / 26.6 / 37.4	47	H / 1.3 / 164.5	-8.3	38.7	58.6	-19.9
2251.52	44.4 Pk	3.1 / 28.0 / 37.8	37.7	V / 1.0 / 326.5	-8.3	29.4	54	-24.6
2251.99	44.8 Pk	3.1 / 28.0 / 37.8	38.1	H / 1.0 / 0.0	-8.3	29.8	54	-24.2
2626.82	48.1 Pk	3.4 / 29.3 / 38.0	42.9	H / 1.5 / 0.0	-8.3	34.6	58.6	-24.0
2627.29	47.4 Pk	3.4 / 29.3 / 38.0	42.1	V / 1.0 / 0.0	-8.3	33.8	58.6	-24.8
3377.33	44.9 Pk	4.2 / 31.4 / 37.4	43	V / 1.0 / 288.6	-8.3	34.7	58.6	-23.9
3752.61	43.1 Pk	4.6 / 31.9 / 38.3	41.4	H / 1.0 / 7.9	-8.3	33.1	54	-20.9
3753.31	43.0 Pk	4.6 / 31.9 / 38.3	41.3	V / 1.0 / 304.5	-8.3	33.0	54	-21.0
Harmonics not listed were not seen above the noise floor.								
Mid 2 Channel								
776.48	43.4 Pk	3.2 / 21.3 / 28.1	39.8	H / 1.0 / 250.3	-8.3	31.5	59.2	-27.7
776.63	36.5 Pk	3.2 / 21.3 / 28.1	32.9	V / 1.8 / 89.8	-8.3	24.6	59.2	-34.6
1164.75	55.9 Pk	2.2 / 24.4 / 37.4	45	V / 1.2 / 199.5	-8.3	36.7	54	-17.3
1164.79	53.0 Pk	2.2 / 24.4 / 37.4	42.1	H / 1.0 / 233.8	-8.3	33.8	54	-20.2
1553.03	44.1 Pk	2.6 / 25.3 / 37.0	35	H / 1.0 / 143.8	-8.3	26.7	54	-27.3
1553.32	44.1 Pk	2.6 / 25.3 / 37.0	35	V / 1.0 / 15.7	-8.3	26.7	54	-27.3
1941.28	53.6 Pk	2.9 / 26.9 / 37.6	45.9	V / 1.0 / 115.7	-8.3	37.6	59.2	-21.6
1941.62	47.4 Pk	2.9 / 26.9 / 37.6	39.7	H / 1.0 / 161.2	-8.3	31.4	59.2	-27.8
2329.96	46.4 Pk	3.2 / 28.2 / 37.9	39.9	V / 1.0 / 326.3	-8.3	31.6	54	-22.4
2329.99	44.6 Pk	3.2 / 28.2 / 37.9	38.1	H / 1.0 / 357.0	-8.3	29.8	54	-24.2
2718.33	47.0 Pk	3.5 / 29.7 / 37.9	42.3	V / 1.0 / 176.8	-8.3	34.0	54	-20.0
2718.33	43.2 Pk	3.5 / 29.7 / 37.9	38.5	H / 1.0 / 88.6	-8.3	30.2	54	-23.8
3106.1	43.5 Pk	3.9 / 31.0 / 37.7	40.7	V / 1.0 / 297.6	-8.3	32.4	59.2	-26.8
3494.34	46.4 Pk	4.4 / 31.5 / 37.9	44.3	V / 1.0 / 285.8	-8.3	36.0	59.2	-23.2
3494.96	42.4 Pk	4.4 / 31.5 / 37.9	40.3	H / 1.0 / 2.8	-8.3	32.0	59.2	-27.2
3882.61	43.5 Pk	4.7 / 32.2 / 37.7	42.7	V / 1.1 / 39.4	-8.3	34.4	54	-19.6
3883.33	44.2 Pk	4.7 / 32.2 / 37.7	43.4	H / 1.0 / 6.3	-8.3	35.1	54	-18.9
Harmonics not listed were not seen above the noise floor.								
Hi Channel								

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	Duty Cycle Correction	Final Corrected	Limit	DELTA
(MHz)	(dBuV)	(dB) (dBm) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
788.48	42.8 Pk	3.3 / 21.5 / 28.1	39.5	H / 1.0 / 88.0	-8.3	31.2	59.4	-28.2
788.66	36.1 Pk	3.3 / 21.5 / 28.1	32.9	V / 1.5 / 89.5	-8.3	24.6	59.4	-34.8
1182.73	52.0 Pk	2.2 / 24.4 / 37.4	41.3	H / 1.0 / 233.9	-8.3	33.0	54	-21.0
1182.97	53.2 Pk	2.2 / 24.4 / 37.4	42.5	V / 1.0 / 199.8	-8.3	34.2	54	-19.8
1577.02	47.2 Pk	2.6 / 25.4 / 37.0	38.2	H / 1.0 / 125.2	-8.3	29.9	54	-24.1
1577.04	47.0 Pk	2.6 / 25.4 / 37.0	38	V / 1.0 / 0.0	-8.3	29.7	54	-24.3
1971.66	56.1 Pk	3.0 / 27.0 / 37.6	48.5	V / 1.0 / 130.5	-8.3	40.2	59.4	-19.2
2365.94	43.3 Pk	3.2 / 28.4 / 37.9	37	H / 1.0 / 7.6	-8.3	28.7	54	-25.3
2365.99	45.5 Pk	3.2 / 28.4 / 37.9	39.2	V / 1.0 / 302.5	-8.3	30.9	54	-23.1
2759.8	44.4 Pk	3.5 / 29.9 / 37.9	39.9	H / 1.0 / 185.6	-8.3	31.6	54	-22.4
2760.29	46.4 Pk	3.5 / 29.9 / 37.9	41.9	V / 1.0 / 232.5	-8.3	33.6	54	-20.4
3548.96	44.7 Pk	4.4 / 31.6 / 38.2	42.5	H / 1.0 / 0.0	-8.3	34.2	59.4	-25.2
3548.99	44.4 Pk	4.4 / 31.6 / 38.2	42.2	V / 1.0 / 308.1	-8.3	33.9	59.4	-25.5
3942.62	43.0 Pk	4.7 / 32.3 / 37.3	42.6	H / 1.0 / 354.4	-8.3	34.3	54	-19.7
3942.64	42.0 Pk	4.7 / 32.3 / 37.3	41.7	V / 1.0 / 40.0	-8.3	33.4	54	-20.6
Harmonics not listed were not seen above the noise floor.								

List of Equipment Utilized for Final Test

Project Report

Begin Date: 5/9/2008

End Date: 5/9/2008

Technician Ty Orosco

Project

Capital Asset ID	Manufacturer	Model #	Serial #	Description	Test Performed	Service Type	Service Date	Service Due
18808	EMCO	3146	9203-3376	Log Periodic Antenna	R Radiated Emissions	For Cal	10/12/2007	10/12/2008
18880	Hewlett-Packard	85650A	2811A01300	Q.P Adapter	R Radiated Emissions	For Cal	11/15/2007	11/15/2008
18882	Hewlett-Packard	8566B	2410A00154	Spectrum Analyzer (dc-22 GHz)	R Radiated Emissions	For Cal	11/13/2007	11/13/2008
18887	EMCO	3115	9205-3886	Horn Antenna 1-18GHz	R Radiated Emissions	For Cal	3/6/2008	3/6/2009
18906	Mini-Circuits Lab	ZHL-42	N052792-2	Amplifier	R Radiated Emissions	For Ver	5/2/2008	5/2/2009
18912	Hewlett-Packard	8447F	3113A05545	9 kHz- 1.3GHz Pre Amp	R Radiated Emissions	For Ver	5/2/2008	5/2/2009

Appendix B

Test Plan
and
Constructional Data Form

Request for Estimate & Test Plan

Please contact with any questions:

Contact:	Charles Grasso
Title:	Compliance Engineer
Phone Number:	303-706-5467
Email Address:	Charles.grasso@echostar.com

Client Information:

License Holder:	Echostar Communications
Address:	94 Inverness Circle East Englewood Colorado
Contact:	Charles Grasso
Title:	Compliance Engineer
Phone Number:	303-706-5467
Fax Number:	N/A
Email Address:	Charles.grasso@echostar.com

Please fill out the pertinent pages within this document and email this Form to Bryant and Amy at Bryant.Hart@Intertek.com and Amy.Baumberger@Intertek.com for a quotation. Other pages that do not pertain to your device can be left blank.

I.E. EMC Quote – Pages 1,2 & 3, Add Safety – add Page 4, If a radio is part of the device add page 5 etc.

This document is compiled as a WORD FORM. To enable the FORM tool, right click on the tool bar and select FORMS. You will then be able to add attachments, drawings etc by clicking on the “Lock” Graphic to unlock the FORM document. To make all the check boxes work within the FORM, the “Lock” graphic must be selected. Thank you for all your time and effort on this matter.

Estimates Requested: (Required for all devices)

EMC Testing/Services	
<input checked="" type="checkbox"/> Requesting Estimate	<input type="checkbox"/> On-site/In-Situ Testing
<input type="checkbox"/> Pre-Compliance Scans / Engineering test	<input type="checkbox"/> TCF Compilation/Review Service

Radio Device Testing and Certification	
<input checked="" type="checkbox"/> FCC Certification	<input checked="" type="checkbox"/> Industry Canada Certification (Receivers required)
<input type="checkbox"/> Class 2 Notification Under the R&TTED	<input type="checkbox"/> TCF Compilation/Review Service

Safety Testing and Certification	
<input type="checkbox"/> NRTL Listing	<input type="checkbox"/> 1 Day Pre-Assessment (conducted at your facility)
<input type="checkbox"/> Letter of Findings	<input type="checkbox"/> CB Report Covering all country Deviations
<input type="checkbox"/> CE Report to Cover the LVD/MDD	<input type="checkbox"/> CB Report Covering - Specify Countries:

Any Additional Interest(s)	
<input type="checkbox"/> ISO Certification (Another RFQ is required)	<input type="checkbox"/> Energy Star Compliance
<input type="checkbox"/> FDA 510K Services (Another RFQ is required)	<input type="checkbox"/> NEBS
<input type="checkbox"/> International Approvals Management	<input type="checkbox"/> Wire and Cable
<input type="checkbox"/> Product Verification and Integrity Testing	<input type="checkbox"/> Other:

General Product Information: (Required for all Devices)

Product/Model Number(s):	20.0			
Description of product(s):	Remote Control			
Intended Use:	<input checked="" type="checkbox"/> Household/Office <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Hospital <input type="checkbox"/> Life Supporting			
Intended Location:	<input checked="" type="checkbox"/> Dry <input type="checkbox"/> Damp <input type="checkbox"/> Wet <input type="checkbox"/> Hazardous Location			
Product Type:	<input type="checkbox"/> Prototype <input type="checkbox"/> Production Sample <input checked="" type="checkbox"/> Manufacturing Design Change: Please Describe: New Plastics and keyboard electronics			
Is it a stand-alone device or part of a system?	<input type="checkbox"/> Stand Alone Device <input checked="" type="checkbox"/> Component of a System			
If part of a system, please describe system parts and accessories: Set Top Box				
If there is more than one product/model what are the differences?				
Is the Product Enclosure:	<input type="checkbox"/> Metal <input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Both			
Size:	Length:	Width:	Height:	Weight:
What Voltages/Current does the EUT run at? (AC/DC etc.) – if the unit runs off of DC though it is supplied with an AC/DC converter, please state the operating parameters of the converter.	Rated Voltage: 6V Rated Current: DC (Batteries) # of Phases/Conductors: # of Power Cords:			
Are their multiple suppliers of power supplies?	<input type="checkbox"/> Yes <input type="checkbox"/> No If Yes Please Describe:			
Are there Multiple Modes of Operation? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes Please Describe: Unit can be set to transmit on 4 channels seperately				
Is there programmable software? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
Can all modes of operation be operated simultaneously? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Explain: Each channel will be set by switch selection.				
In which countries will you be selling the product? USA/Canada				
When can you supply samples of the device and all pertinent documentation (where applicable) to Intertek for testing? Immediate.				

EMC Information: (Required only if EMC work is requested)

What EMC certifications are desired?	
<input checked="" type="checkbox"/> FCC/ICES (US & Canada) <input type="checkbox"/> CE / EMC / MDD <input type="checkbox"/> BSMI (Taiwan) <input type="checkbox"/> VCCI (Japan)	<input type="checkbox"/> SII (Israel) <input type="checkbox"/> AS/NZS (Australia/New Zealand) <input type="checkbox"/> Korea MIC Certification / RRL <input type="checkbox"/> Other: Please Specify
Highest frequency utilized for device operation: N/A (Intentional Emissions only)	
List of Clock Frequencies: N/A	
What is the time that it takes for the device to complete a full cycle of operation? (time required to identify any degradation in performance) (please list per mode of operation) N/A	
Total Number of I/O Cables: # Greater than 3m (9.75 feet) in Length # Greater than 30m (97.5 feet) in Length # of cables at a longer length (specify)	N/A
Number of Dedicated Earth Equalization Ports N/A	
Number of Ethernet and/or Telecommunications Ports N/A	
When the device is a compilation of subsystems (in separate chassis) how many interconnecting I/O's are greater than 1 meter in length between the Subsystem chassis? N/A	
CISPR11/EN 55011 Specific Devices: 1. Does the EUT use RF Energy to affect a material? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, state frequency of energy:	

General Safety Information: (Required only if Safety Listing/Certification/Testing is requested)

What Safety certifications are desired?

- | | |
|--|---|
| <input type="checkbox"/> NRTL Listing US/Canada | <input type="checkbox"/> Limited Production Certification/Listing |
| <input type="checkbox"/> CB Certification (Worldwide – Outside US/Can) | <input type="checkbox"/> S Mark |
| <input type="checkbox"/> EU Investigation (EU – LVD/MDD) | <input type="checkbox"/> GS Mark |
| <input type="checkbox"/> Field Label (Onsite Inspection) | <input type="checkbox"/> Other: Please Specify |

Please list all applicable safety standards that you would like your device certified under:

Has the device been tested and certified for product safety before?

- Yes No

A. If it has been previously tested, to which standard and by which organization?

Standard tested to:

B. Can you provide the test report?

Organization tested by:

- Yes No

Do manuals and installation instructions exist? (Not always a necessity for quoting but most useful for complex products)

- Yes No

Power Supply Safety Information:

- Yes No

A. Is the power supply an approved “off-the-shelf” supply?

Standard tested to:

B. Can you provide the test report/CB Report?

Organization tested by:

- Yes No

Does the device contain batteries?

- Yes No

What Type?
How Many?

What technology is used? (i.e., lasers, X Ray, etc.)

If Laser:	Class:	Output Power:	Beam Divergence Angle:	Wavelength:
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Preferred testing location:

- Intertek Lab Customer site
 Intertek Local Lab (May increase turn around time and expense)

Radio Information: (Required only if the device contains an intentional transmitter)

What Radio certifications are desired?	
<input checked="" type="checkbox"/> FCC (USA) <input checked="" type="checkbox"/> Industry Canada <input type="checkbox"/> ETSI (R&TTE)	<input type="checkbox"/> Notified or Competent Body TCF Review <input type="checkbox"/> Other: Please Specify
Please list the particular radio standards that apply. 15.231 /RSS210	
Operating Frequency:	395.9 MHz (One of four)
RF Output Power:	87.7 dBuV max. (incl. 8.3 dB duty cycle Corr. Factor)
Is there an RF Conducted Port?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Description:
Number of Antennas & Description: (Internal, External, Known Gain, etc.)	Internal , fractional wavelength bent monopole
Modulation Technique:	FSK
Number of Channels/Number of Discrete frequencies per Channel:	4/1
Can the device be operated in CW Mode?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
What is the lowest utilized frequency within the device?	8MHz (ceramic resonator)

Notes: Please ensure to bring a notch filter covering your fundamental operating frequency.

Additional Information:

This information is required to be filled in to act as a test plan and constructional data form required to be supplied as part of the test report in accordance to the required standards. This information is not required to obtain a quote but should be filled out to show a completed report under the applicable standards for EMC etc. Thank you for your time in effort in completing this section of the RFQ/Test Plan.

Support Equipment:

Intertek requires our customers provide all support equipment necessary to fully operate the device undergoing testing. This includes any filters required for testing radio devices, computer equipment, etc.

Item

Description

Manufacturer

Model No.

Cabling Information:

Cable

Function*

Type of Shield

Length

Connectors

Connection**

* Function examples (Ethernet, RS232, USB, Analog, physiological parameter, etc.)

** Connection examples (Outside Plant, Patient Coupled, Ring Voltage, etc.)

Monitoring the EUT:

Please provide instructions below on how to observe the EUT to verify proper operation in all modes. (including software revision)

Any other information required: (Notes, Photos, Block Diagrams, Drawings, etc.)

A minimum of a block diagram showing the equipment under test and its support equipment.

Appendix C

Measurement Protocol

And

Test Procedures

MEASUREMENT PROTOCOL

GENERAL INFORMATION

Test Methodology

Conducted and radiated emission testing is performed according to the procedures in ANSI C63.4 & CNS13438.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into its characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

CONDUCTED EMISSIONS

The final level, expressed in dB μ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the applicable limit.

To convert between dB μ V and μ V, the following conversions apply:

- dB μ V = 20(log μ V)
- μ V = Inverse log(dB μ V/20)

RADIATED EMISSIONS

The final level, expressed in dB μ V/m, is arrived at by taking the reading from the spectrum analyzer (Level dB μ V) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This result then has the applicable limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets in Attachment B. The amplifier gain is automatically accounted for by using an analyzer offset.

Example: At a Test Frequency of 30 MHz, with a peak reading on the spectrum analyzer or measuring receiver of 14 dB μ V:

Measured Level	+	Transducer & Cable Loss factor	=	Corrected Reading	Specification Limit	-	Corrected Reading	=	Delta Specification
(dB μ V)		(dB)		(dB μ V/m)	(dB μ V/m)		(dB μ V/m)		
14.0		14.9		28.9	40.0		28.9		-11.1

DETAILS OF TEST PROCEDURES

General Standard Information

The test methods used comply with ANSI C63.4-2003 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

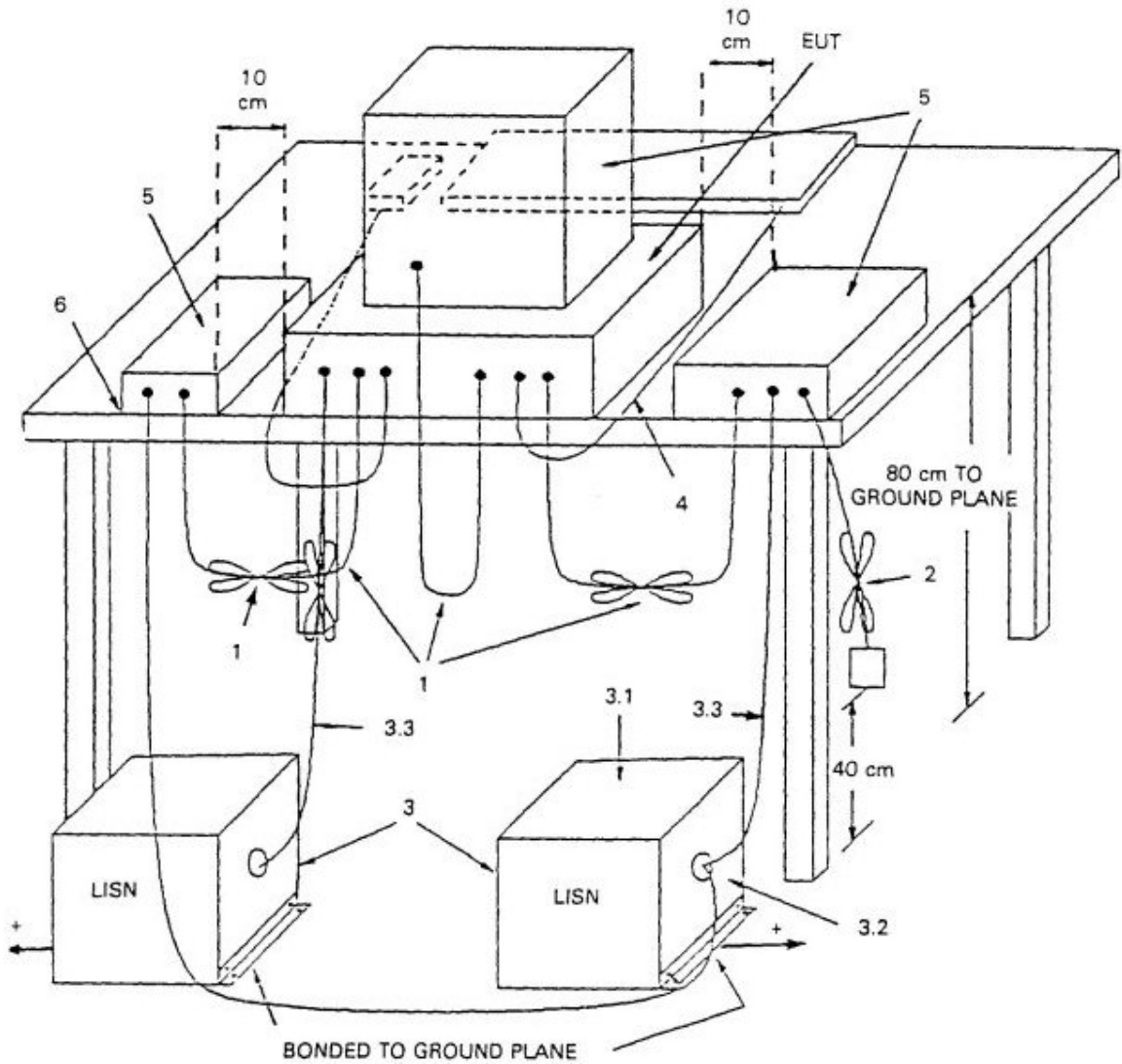
Conducted Emissions

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω /50 μ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. In some cases, a pre-scan using a spectrum analyzer is initially performed on the units comprising the system under test to locate the highest emissions. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver or spectrum analyzer with quasi-peak and average detection and recorded on the data sheets.

Radiated Emissions

Radiated emissions from the EUT are measured in the frequency range of 30 to 22GHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees.

Conducted Emissions Diagram:



Radiated Emissions Diagram:

