TEST RESULT SUMMARY

FCC Part 15 Subpart C Section 15.247
Industry Canada RSS-210 Issue 6

MANUFACTURER'S NAME	Wallace Technologies
NAME OF EQUIPMENT	Vu Qube, Mobile Satellite TV Antenna
MODEL NUMBER(S) TESTED	VQV10
MANUFACTURER'S ADDRESS	PO Box 49128 Blaine MN 55449
TEST REPORT NUMBER	WC606426 Rev B
TEST DATE(S)	15 - 29 November 2006

According to testing performed at TÜV SÜD America Inc, the above mentioned unit is in compliance with the applicable electromagnetic compatibility (EMC) portions of the requirements defined in FCC Part 15 Subpart C Section 15.247 and IC RSS-210 Issue 6

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

TÜV SÜD America Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the applicable EMC requirements of FCC Part 15 Subpart C Section 15.247 *"Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz; General requirements."* and IC RSS-210 Issue 6 *"Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"*

Date: 18 January 2007

Location: Taylors Falls MN USA

Tom Swanson
EMC Technician

Joel Schneider
Sr. EMC Engineer

Not Transferable

EMC TEST REPORT

Test Report File No.	:	**WC606426 Rev B**	Date of issue:	18 January 2007

Model / Serial No(s) Tested	:	VQV10
Product Type	:	Vu Qube, mobile satellite TV antenna
Applicant	:	Wallace Technologies
Manufacturer	:	Wallace Technologies
License holder	:	Wallace Technologies
Address	:	PO Box 49128 Blaine MN 55449

Test Result	:	■ **Positive**	☐ **Negative**
Test Project Number References	:	**WC606426 Rev B**	
Total pages including Appendices	:	**38**	

TÜV SÜD AMERICA Inc reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. TÜV SÜD America Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD America Inc issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval. This report shall not be used by the client to claim product endorsement by NVLAP, NIST, or any agency of the US government.

TÜV SÜD AMERICA Inc and its professional staff hold government and professional organization certifications and are members of AAMI, ACIL, AEA, ANSI, IEEE, NARTE, and VCCI.

TÜV SÜD AMERICA INC 19333 Wild Mountain Road Taylors Falls MN 55084 Tel: (651) 638-0297 Fax: (651) 638-0298 Rev. 121906

REVISION RECORD

REVISION	TOTAL NUMBER OF PAGES	DATE	DESCRIPTION
	38	19 December 2006	Initial Release
A	38	17 January 2007	Revisions include: ▪ TRS and Page 1: Corrected Model Number. ▪ Page: 7: Updated Test Limits. ▪ Appendix C: .Revised Measurement Protocol. ▪ Page 24: Replaced.
B	38	18 January 2007	Revisions include: ▪ Page 5: Revised output power.

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Maximum peak output power	15.247(b)(3)	RSS-210 A8.4(4)	5
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Sign Explanations:
☐ - not applicable
■ - applicable

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EMC TEST REGULATIONS:

The tests were performed according to the following regulations :

☐ - EN 50081-1 / 1991
☐ - EN 55014-2: 1997 + Amendment A1: 2001 - Category __
☐ - EN 55024: 1998 + Amendments A1: 2001 + A2: 2003
☐ - EN 60601-1-2: 2001
☐ - EN 61000-6-1: 2001
☐ - EN 61000-6-2: 2001
☐ - EN 61326: 1997 + Amendments A1: 1998 + A2: 2001 + A3: 2003
☐ - EN 61800-3: 1996 + Amendment A11: 2000
☐ - ETS 300 683: 1997
☐ - ETS 300 683: 1997
☐ - ETSI EN 301 489-3 V1.4.1: 2002
☐ - EN 300 220-3 V1.1.1
☐ - EN 300 330-2 V1.1.1
☐ - FCC Part 15 Subpart C Section 15.207
☐ - FCC Part 15 Subpart C Section 15.209
■ - FCC Part 15 Subpart C Section 15.247
☐ - FCC Part 15 Subpart C Section 15.249
■ - IC RSS-210 Issue 6
☐ - IC RSS-Gen Issue 1
☐ - IC RSS-Gen Issue 1

ENVIRONMENTAL CONDITIONS IN THE LAB

	Actual
Temperature:	: 20 °C
Atmospheric pressure	: 97 kPa
Relative Humidity	: 24 - 45 %

POWER SUPPLY UTILIZED

Power supply system	: 13 VDC

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6 dB Bandwidth
FCC 15.247(a)(2), IC RSS-210 A8.1(2)

Test summary
The requirements are: ■ - MET ☐ - NOT MET
The minimum 6 dB bandwidth = 500 kHz on the high channel

Test location
☐ - Wild River Lab Large Test Site (Open Area Test Site)
■ - Wild River Lab Small Test Site (Open Area Test Site)

Test equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
3367	E4440A	Agilent	Spectrum Analyzer	MY42510439	14 Sep 07
	7405-901	EMCO	Near field probe	na	Code Y

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

Test limit
Minimum 500 kHz

Test data
Pages 14 - 16

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Maximum peak output power
FCC 15.247(b)(3), IC RSS-210 A8.4(4)

Test summary
The requirements are: ■ - MET ☐ - NOT MET
2.435 GHz (mid channel) – P (eirp in watts) = 0.3 E^2 (field strength in V/m)
= 0.3 (93.69 dBuV/m)^2
= 0.3 (0.048361 V/m)^2
= 0.000701 Watts

The device was tested at the maximum output power to be used.
The signal is either not a pulsed signal, or the pulse width is greater than 1 microsecond, so pulse desensitization is not a factor.
Radiated measurements performed instead of conducted measurements because the transmit antenna is integral
Antenna gain < 6 dBi

Test location
☐ - Wild River Lab Large Test Site (Open Area Test Site)
■ - Wild River Lab Small Test Site (Open Area Test Site)

Test distance
■ - 3 meters
☐ - 10 meters

Test Equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
3203	EM-6917B	Electro-Metrics	Biconicalog Periodic	106	02-May-07
2075	3115	EMCO	Ridge Guide Ant. 1-18 GHz	9001-3275	07-Dec-06
6717	3116	EMCO	Ridge Guide Ant 18-40 GHz	2005	05 Oct 07
8052	8566B	Hewlett-Packard	Spectrum Analyzer	2115A00853	28-Mar-07
8051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	28-Mar-07
2682	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	29-Nov-07
3367	E4440A	Agilent	Spectrum Analyzer	MY42510439	14 Sep 07
3847	ZHL-1042J	Mini-Circuits	Preamplifier 10 - 3000 MHz	0607	Code B
3958	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0002	Code B

Cal Code B = Calibration verification performed internally.

Test limits
1 watt EIRP or 125.2 dBμV/m at 3 meters based on OET 63: P (eirp in watts) = 0.3 E^2 (field strength in V/m) – using unity antenna gain and 3 meters distance. This measurement had to be made as a radiated measurement, attempts to attach rf connector to rf output were unsuccessful.

Test data
Pages 17 - 18

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Spurious emissions
FCC 15.247(d), IC RSS-210 A8.5

Test summary
The requirements are: ■ - MET ☐ - NOT MET
Minimum margin of compliance is 15 dB at 1.087 GHz (band edge plot, pg 23)

Test location
☐ - Wild River Lab Large Test Site (Open Area Test Site)
■ - Wild River Lab Small Test Site (Open Area Test Site)

Test distance
■ - 3 meters
☐ - 10 meters

Test Equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
3203	EM-6917B	Electro-Metrics	Biconicalog Periodic	106	02-May-07
2075	3115	EMCO	Ridge Guide Ant. 1-18 GHz	9001-3275	07-Dec-06
6717	3116	EMCO	Ridge Guide Ant 18-40 GHz	2005	05 Oct 07
8052	8566B	Hewlett-Packard	Spectrum Analyzer	2115A00853	28-Mar-07
8051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	28-Mar-07
2682	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	29-Nov-07
3367	E4440A	Agilent	Spectrum Analyzer	MY42510439	14 Sep 07
3847	ZHL-1042J	Mini-Circuits	Preamplifier 10 - 3000 MHz	0607	Code B
3958	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0002	Code B

Cal Code B = Calibration verification performed internally.

Test limit
-20 dBc and;
Test limit in restricted bands

Frequncy (MHz)	Field strength (μV/meter)	Field strength (dB μV/meter)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

Test data
Pages 17 - 25

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Power spectral density
FCC 15.247(e), IC RSS-210 A8.2(2)

Test summary
The requirements are: ■ - MET ☐ - NOT MET
Minimum margin of compliance is 22.2 dB at 2.47 GHz

Test location
☐ - Wild River Lab Large Test Site (Open Area Test Site)
■ - Wild River Lab Small Test Site (Open Area Test Site)

Test distance
■ - 3 meters
☐ - 10 meters

Test Equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
2075	3115	EMCO	Ridge Guide Ant. 1-18 GHz	9001-3275	07-Dec-06
3367	E4440A	Agilent	Spectrum Analyzer	MY42510439	14 Sep 07
3958	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0002	Code B

Cal Code B = Calibration verification performed internally.

Test limit
No greater than 8 dBm in any 3 kHz band

Test data
Pages 26 - 28

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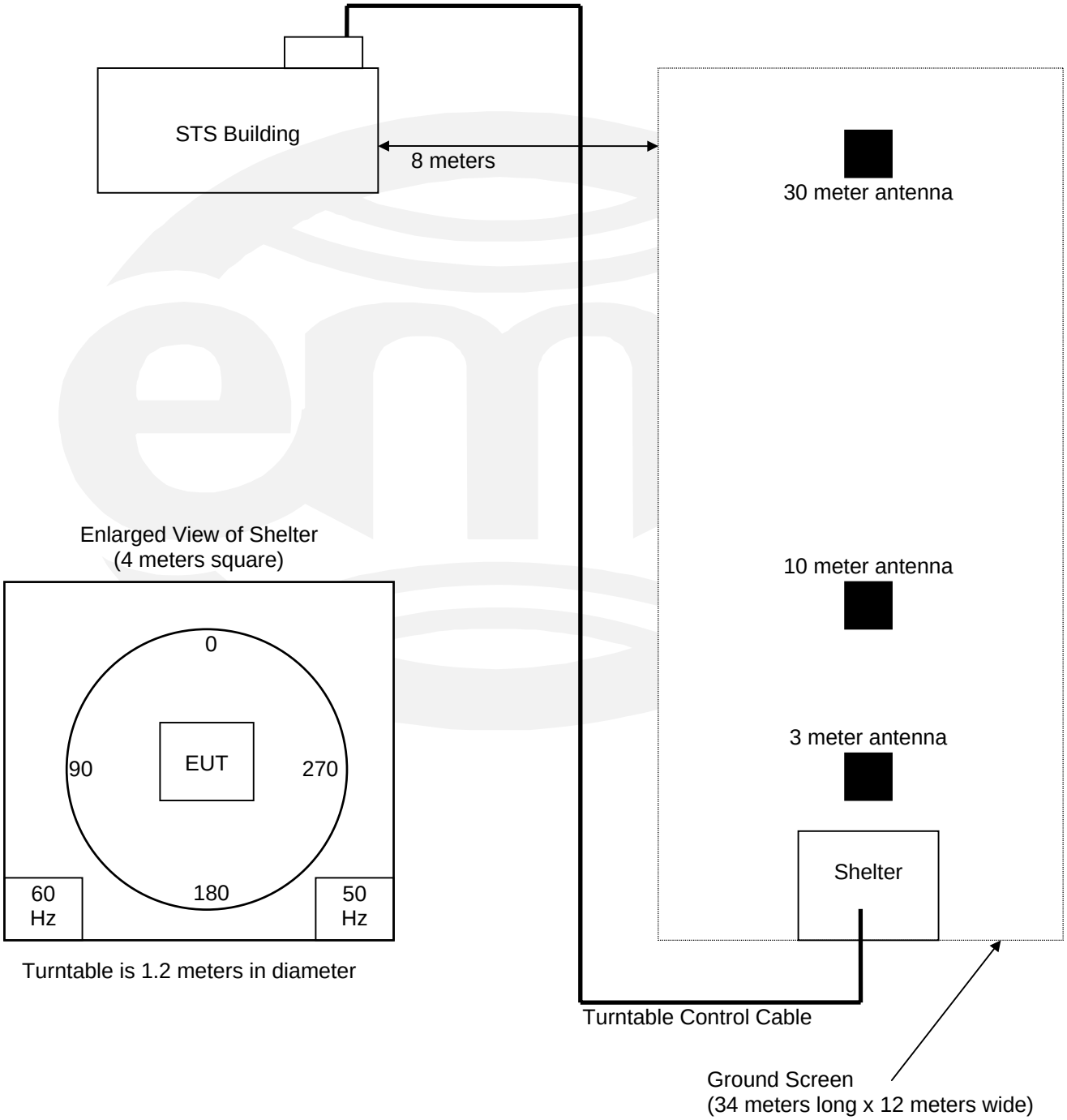
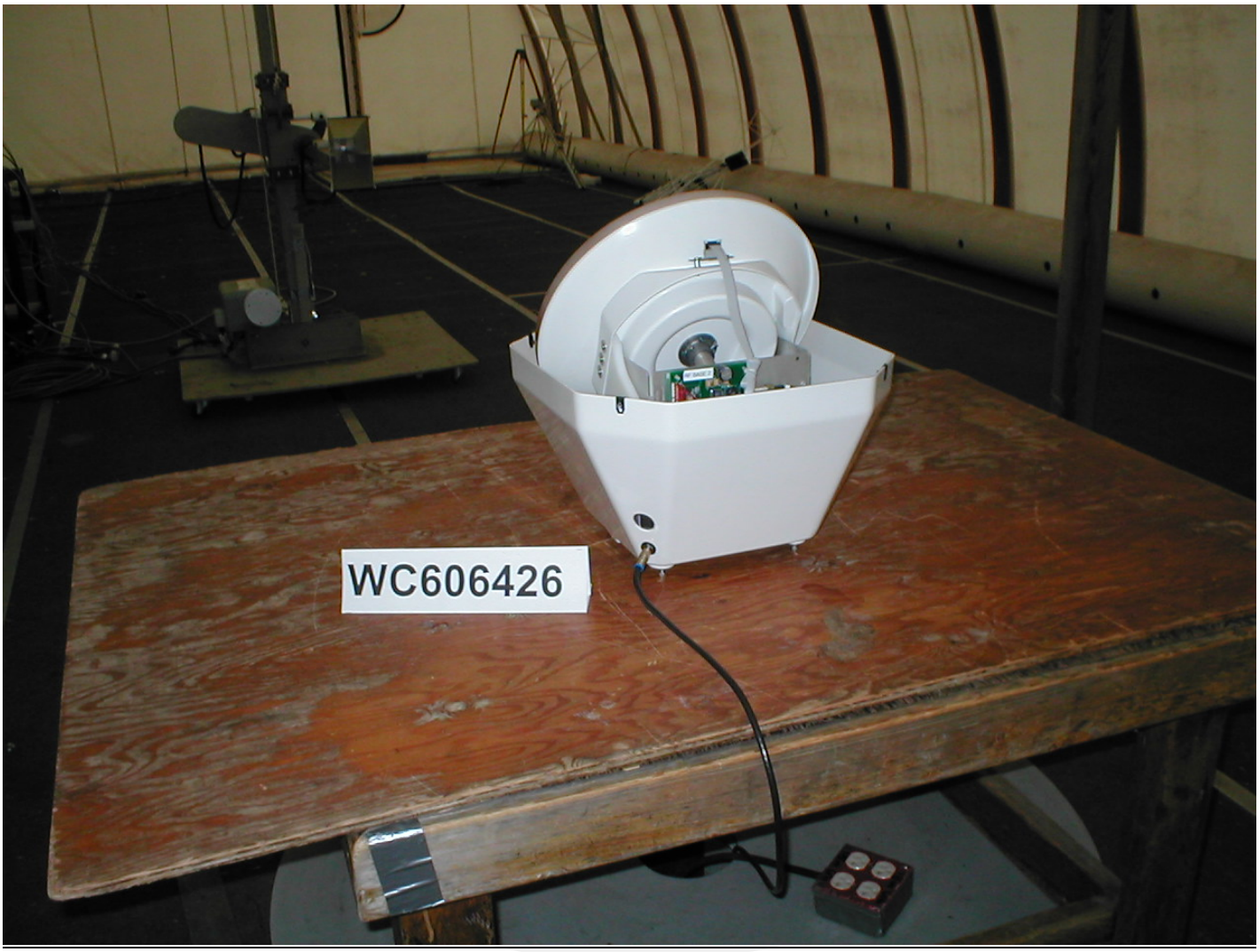
TEST SETUP FOR EMISSIONS TESTING

WILD RIVER LAB
Small Test Site (STS)



Test-setup photo(s):
Radiated emissions



TÜV SÜD AMERICA INC 19333 Wild Mountain Road Taylors Falls MN 55084 Tel: (651) 638-0297 Fax: (651) 638-0298 Rev. 121906

Equipment Under Test (EUT) Test Operation Mode:

The device under test was operated under the following conditions during immunity testing :

☐ - Standby

☐ - Test program (H - Pattern)

☐ - Test program (color bar)

☐ - Test program (customer specific)

☐ - Practice operation

☐ - Normal operating mode

■ - Transmit frequency locked at low, mid or high channel

Configuration of the device under test:

■ - See Appendix B and test setup photo(s)

☐ - See Product Information Form(s) in Appendix B

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DEVIATIONS FROM STANDARD:

None.

GENERAL REMARKS:

At the time of test, the EUT was identified as Model Number X100. Notification of a change in equipment identification to Model Number V10 was received from the manufacturer and is on file with TÜV America.

Modifications required to pass:

■ None
☐ As indicated on the data sheet(s)

Test Specification Deviations: Additions to or Exclusions from:

■ None
☐ As indicated in the Test Plan

SUMMARY:

The requirements according to the technical regulations are

■ - met and the device under test does fulfill the general approval requirements.
☐ - **not** met and the device under test does **not** fulfill the general approval requirements..

EUT Received Date:	10 November 2006
Condition of EUT:	Normal
Testing Start Date:	15 November 2006
Testing End Date:	29 November 2006

TÜV SÜD AMERICA INC

Thomas K. Swanson

Tom Swanson
EMC Technician

Joel T. Schneider

Joel Schneider
Sr. EMC Engineer

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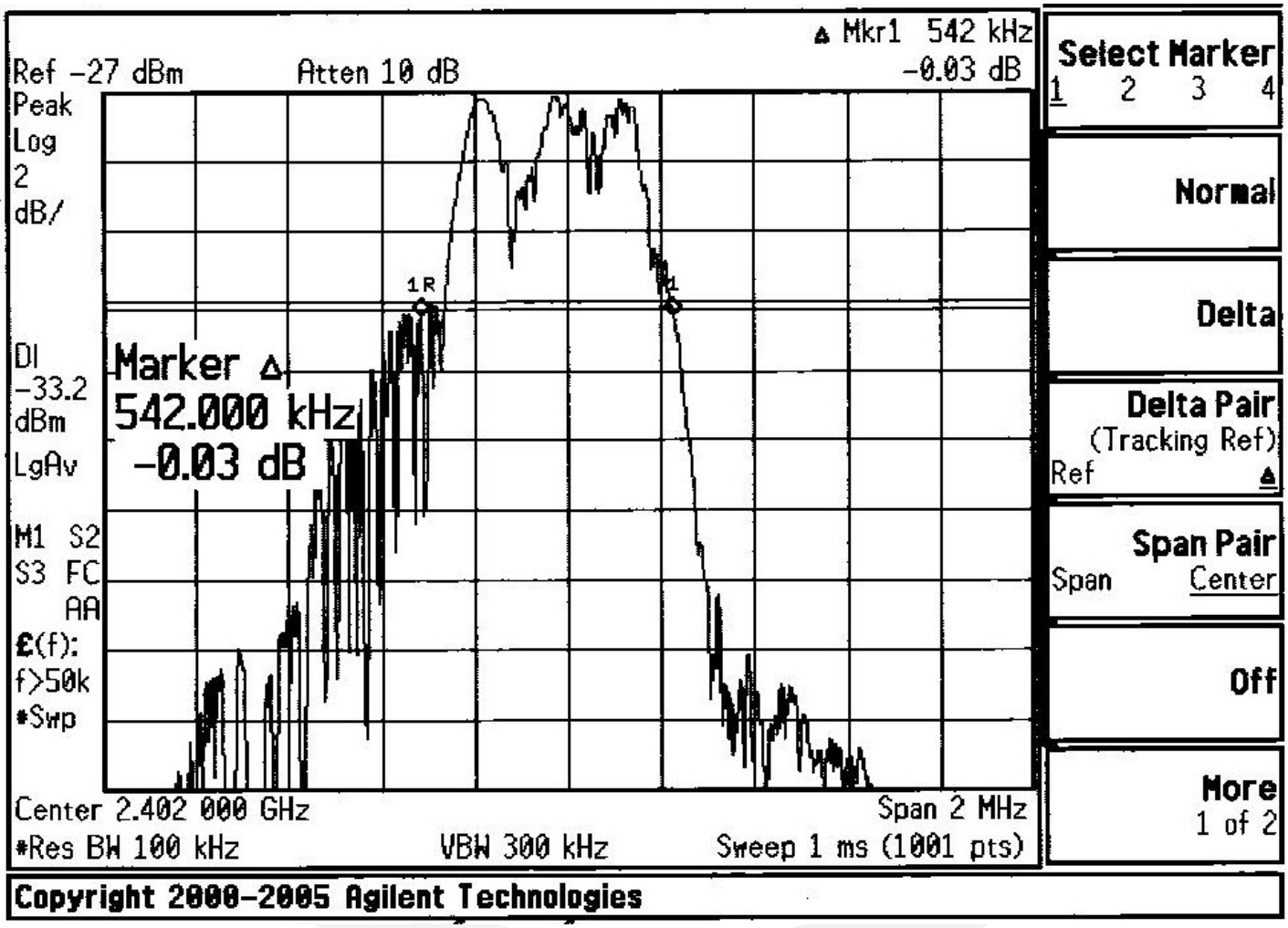
Appendix A

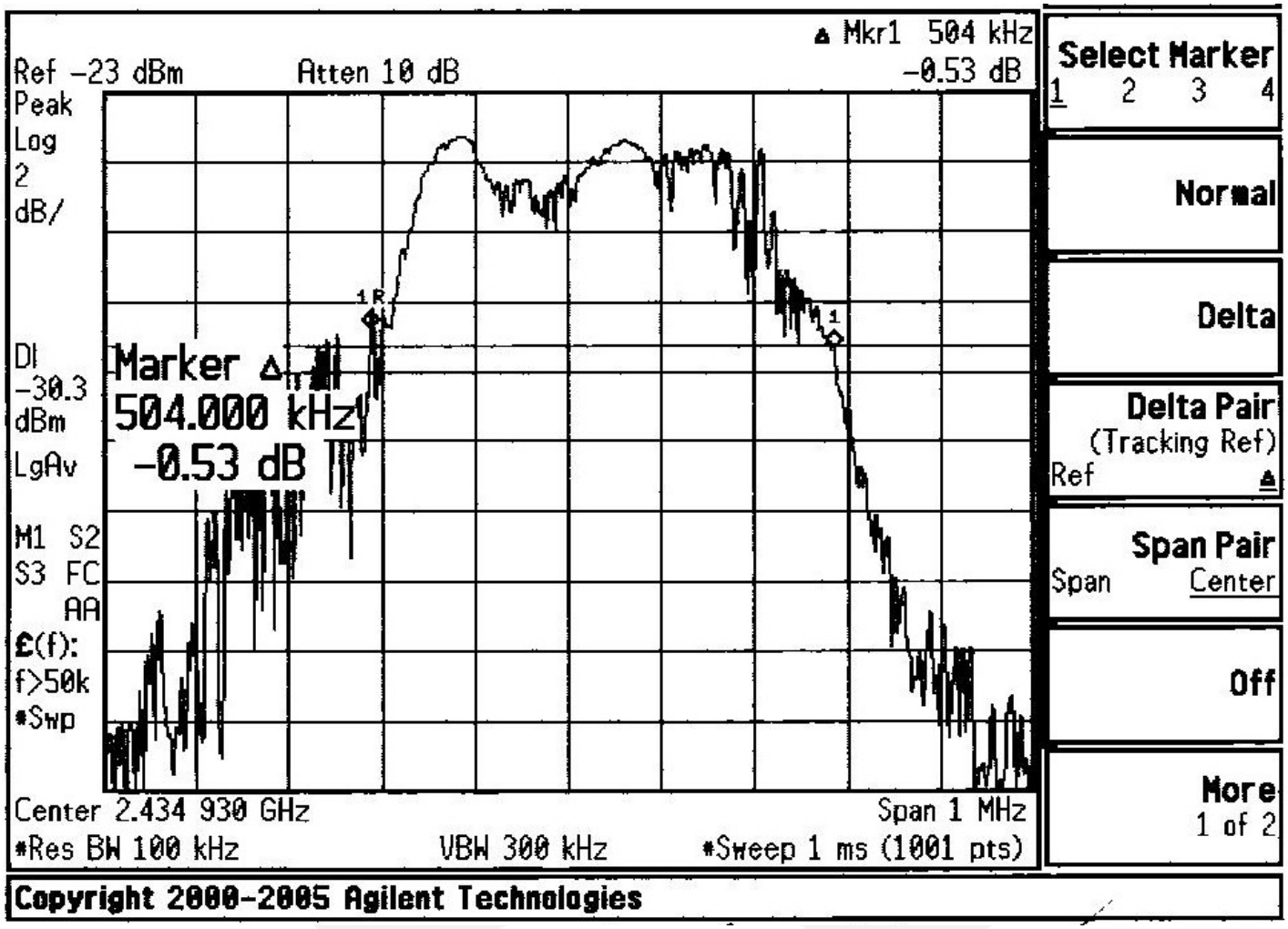
Test Data

TÜV SÜD AMERICA INC 19333 Wild Mountain Road Taylors Falls MN 55084 Tel: (651) 638-0297 Fax: (651) 638-0298 Rev. 121906

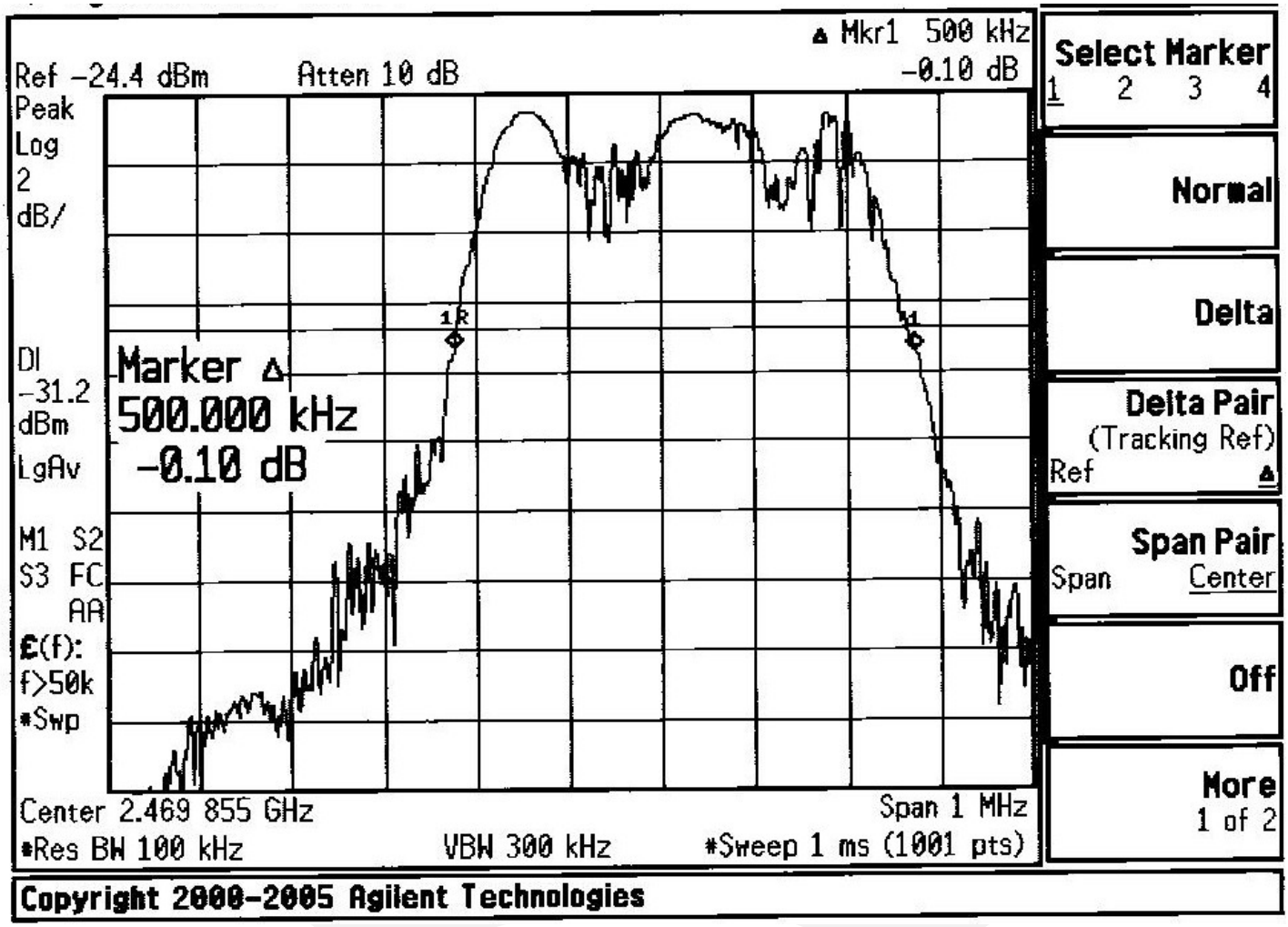
6 dB Bandwidth, Low channel



6 dB Bandwidth, Mid channel



6 dB Bandwidth, High channel



RADIATED EMISSIONS

Test Report #:	WC606426 Run 4	Test Area:	STS		
EUT Model #:	X100 (base), P/N VQV10	Date:	11/29/2006		
EUT Serial #:	N/A	EUT Power:	13 VDC	Temperature:	20.0 °C
Test Method:	FCC 15.247			Air Pressure:	97.0 kPa
Customer:	WALLACE TECHNOLOGIES			Rel. Humidity:	45.0 %
EUT Description:	MOBILE SATELITE TV ANTENNA (Vu Qube)				
Notes:					
Data File Name:	6426.dat			Page:	1 of 5

List of measurements for run #: 4

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m	DELTA2 FCC B >1GHz 3m
Base board in dish fixture						
low channel						
Maximized						
2.402 GHz	110.36 Pk	2.11 / 28.76 / 50.03 / 0.0	91.21	V / 1.22 / 270	n/a	37.21*
2.402 GHz	110.6 Pk	2.11 / 28.76 / 50.03 / 0.0	91.45	H / 1.13 / 269	n/a	37.45*
4.804 GHz	77.6 Pk	3.41 / 32.5 / 47.45 / 0.0	66.06	H / 1.13 / 269	n/a	12.06*
4.804 GHz	48.0 Av	3.41 / 32.5 / 47.45 / 0.0	36.46	H / 1.13 / 269	n/a	-17.54
4.804 GHz	82.9 Pk	3.41 / 32.5 / 47.45 / 0.0	71.36	V / 1.30 / 235	n/a	17.36*
4.804 GHz	43.6 Av	3.41 / 32.5 / 47.45 / 0.0	32.06	V / 1.30 / 235	n/a	-21.94
7.206 GHz	74.1 Pk	3.9 / 35.66 / 47.0 / 0.0	66.66	V / 1.30 / 169	n/a	12.66*
7.206 GHz	43.2 Av	3.9 / 35.66 / 47.0 / 0.0	35.76	V / 1.30 / 169	n/a	-18.24
7.206 GHz	67.8 Pk	3.9 / 35.66 / 47.0 / 0.0	60.36	H / 1.33 / 166	n/a	6.36*
7.206 GHz	42.5 Av	3.9 / 35.66 / 47.0 / 0.0	35.06	H / 1.33 / 166	n/a	-18.94
mid channel						
2.435 GHz	112.73 Pk	2.13 / 28.83 / 49.99 / 0.0	93.69	H / 1.05 / 216	n/a	39.69*
4.87 GHz	81.0 Pk	3.43 / 32.59 / 47.38 / 0.0	69.63	V / 1.34 / 237	n/a	15.63*
4.87 GHz	43.6 Av	3.43 / 32.59 / 47.38 / 0.0	32.23	V / 1.34 / 237	n/a	-21.77
7.305 GHz	73.1 Pk	3.92 / 35.79 / 47.07 / 0.0	65.74	V / 1.13 / 168	n/a	11.74*
7.305 GHz	43.1 Av	3.92 / 35.79 / 47.07 / 0.0	35.74	V / 1.13 / 168	n/a	-18.26
high channel						

Tested by: Rob Behringer & GSJ — Printed — Signature

Reviewed by: Greg Jakubowski — Printed — Signature

RADIATED EMISSIONS

Test Report #:	WC606426 Run 4	Test Area:	STS		
EUT Model #:	X100 (base), P/N VQV10	Date:	11/29/2006		
EUT Serial #:	N/A	EUT Power:	13 VDC	Temperature:	20.0 °C
Test Method:	FCC 15.247			Air Pressure:	97.0 kPa
Customer:	WALLACE TECHNOLOGIES			Rel. Humidity:	45.0 %
EUT Description:	MOBILE SATELITE TV ANTENNA (Vu Qube)				
Notes:					
Data File Name:	6426.dat			Page:	2 of 5

List of measurements for run #: 4

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m	DELTA2 FCC B >1GHz 3m
2.47 GHz	112.3 Pk	2.15 / 28.89 / 49.95 / 0.0	93.39	H / 1.02 / 221	n/a	39.39*
4.94 GHz	80.9 Pk	3.45 / 32.68 / 47.3 / 0.0	69.72	V / 1.34 / 239	n/a	15.72*
4.94 GHz	43.7 Av	3.45 / 32.68 / 47.3 / 0.0	32.52	V / 1.34 / 239	n/a	-21.48
7.41 GHz	71.6 Pk	3.97 / 35.92 / 47.16 / 0.0	64.33	V / 1.51 / 167	n/a	10.33*
7.41 GHz	42.9 Av	3.97 / 35.92 / 47.16 / 0.0	35.63	V / 1.51 / 167	n/a	-18.37
no other significant emissions detected						
end scan 1 - 18 GHz						
Begin spurious scan 30 - 1000 MHz						
189.001 MHz	37.02 Qp	1.98 / 10.71 / 27.94 / 0.0	21.76	V / 1.00 / 0	-21.74	n/a
Maximized						
189.001 MHz	38.81 Qp	1.98 / 10.71 / 27.94 / 0.0	23.55	V / 1.00 / 0	-19.95	n/a
End scan 30 - 1000 MHz						
Begin scan 18 - 25 GHz						
No emissions detected						
End base unit scan 30 MHz - 25 GHz						

Tested by: Rob Behringer & GSJ

Printed

Signature

Reviewed by: Greg Jakubowski

Printed

Signature

RADIATED EMISSIONS

Test Report #:	WC606426 Run 4	Test Area:	STS		
EUT Model #:	X100 (base), P/N VQV10	Date:	11/29/2006		
EUT Serial #:	N/A	EUT Power:	13 VDC	Temperature:	20.0 °C
Test Method:	FCC 15.247			Air Pressure:	97.0 kPa
Customer:	WALLACE TECHNOLOGIES			Rel. Humidity:	45.0 %
EUT Description:	MOBILE SATELITE TV ANTENNA (Vu Qube)				
Notes:					
Data File Name:	6426.dat			Page:	3 of 5

Measurement summary for limit1: FCC-B <1GHz 3m (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m
189.001 MHz	38.81 Qp	1.98 / 10.71 / 27.94 / 0.0	23.55	V / 1.00 / 0	-19.95

Tested by: Rob Behringer & GSJ — Printed — Signature

Reviewed by: Greg Jakubowski — Printed — Signature

RADIATED EMISSIONS

Test Report #:	WC606426 Run 4	Test Area:	STS		
EUT Model #:	X100 (base), P/N VQV10	Date:	11/29/2006		
EUT Serial #:	N/A	EUT Power:	13 VDC	Temperature:	20.0 °C
Test Method:	FCC 15.247			Air Pressure:	97.0 kPa
Customer:	WALLACE TECHNOLOGIES			Rel. Humidity:	45.0 %
EUT Description:	MOBILE SATELITE TV ANTENNA (Vu Qube)				
Notes:					
Data File Name:	6426.dat			Page:	4 of 5

Measurement summary for limit2: FCC B >1GHz 3m (Av)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA2 FCC B >1GHz 3m
4.804 GHz	48.0 Av	3.41 / 32.5 / 47.45 / 0.0	36.46	H / 1.13 / 269	-17.54
7.206 GHz	43.2 Av	3.9 / 35.66 / 47.0 / 0.0	35.76	V / 1.30 / 169	-18.24
7.305 GHz	43.1 Av	3.92 / 35.79 / 47.07 / 0.0	35.74	V / 1.13 / 168	-18.26
7.41 GHz	42.9 Av	3.97 / 35.92 / 47.16 / 0.0	35.63	V / 1.51 / 167	-18.37
4.94 GHz	43.7 Av	3.45 / 32.68 / 47.3 / 0.0	32.52	V / 1.34 / 239	-21.48
4.87 GHz	43.6 Av	3.43 / 32.59 / 47.38 / 0.0	32.23	V / 1.34 / 237	-21.77
2.402 GHz	110.6 Pk	2.11 / 28.76 / 50.03 / 0.0	91.45	H / 1.13 / 269	37.45*
4.804 GHz	82.9 Pk	3.41 / 32.5 / 47.45 / 0.0	71.36	V / 1.30 / 235	17.36*
7.206 GHz	74.1 Pk	3.9 / 35.66 / 47.0 / 0.0	66.66	V / 1.30 / 169	12.66*
2.435 GHz	112.73 Pk	2.13 / 28.83 / 49.99 / 0.0	93.69	H / 1.05 / 216	39.69*
4.87 GHz	81.0 Pk	3.43 / 32.59 / 47.38 / 0.0	69.63	V / 1.34 / 237	15.63*
7.305 GHz	73.1 Pk	3.92 / 35.79 / 47.07 / 0.0	65.74	V / 1.13 / 168	11.74*
2.47 GHz	112.3 Pk	2.15 / 28.89 / 49.95 / 0.0	93.39	H / 1.02 / 221	39.39*
4.94 GHz	80.9 Pk	3.45 / 32.68 / 47.3 / 0.0	69.72	V / 1.34 / 239	15.72*
7.41 GHz	71.6 Pk	3.97 / 35.92 / 47.16 / 0.0	64.33	V / 1.51 / 167	10.33*

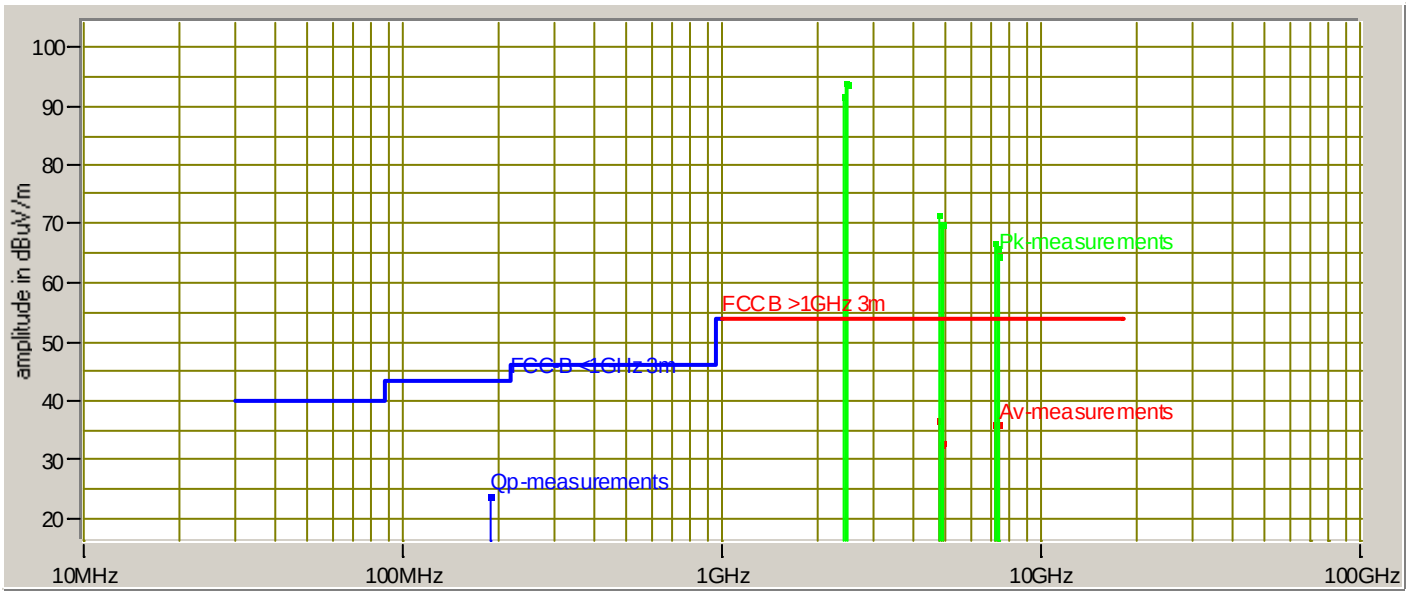
Tested by: Rob Behringer & GSJ — Printed — Signature

Reviewed by: Greg Jakubowski — Printed — Signature

RADIATED EMISSIONS

Test Report #:	WC606426 Run 4	Test Area:	STS		
EUT Model #:	X100 (base), P/N VQV10	Date:	11/29/2006		
EUT Serial #:	N/A	EUT Power:	13 VDC	Temperature:	20.0 °C
Test Method:	FCC 15.247			Air Pressure:	97.0 kPa
Customer:	WALLACE TECHNOLOGIES			Rel. Humidity:	45.0 %
EUT Description:	MOBILE SATELITE TV ANTENNA (Vu Qube)				
Notes:					
Data File Name:	6426.dat			Page:	5 of 5

Graph:



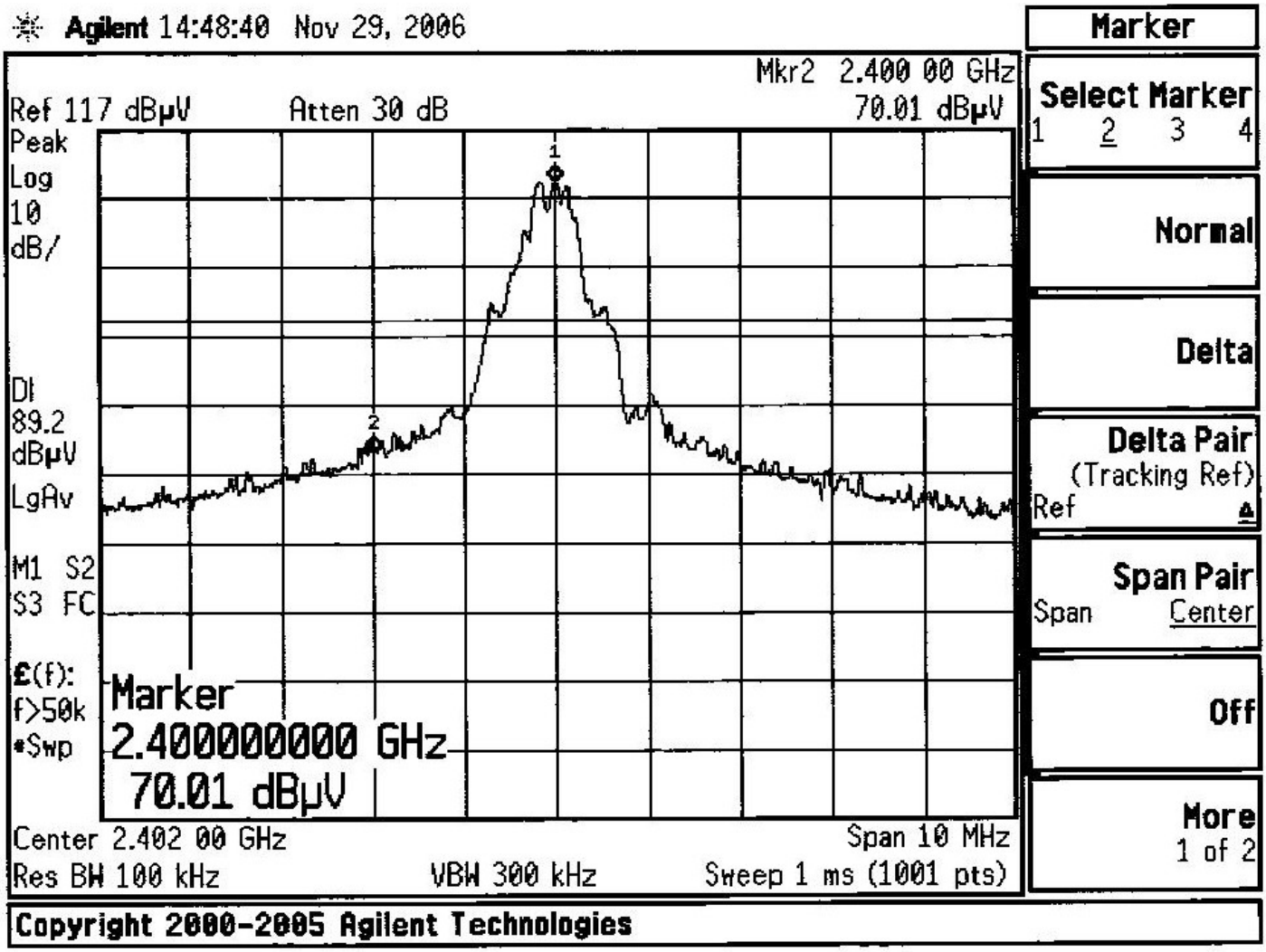
Tested by: Rob Behringer & GSJ

Printed | Signature

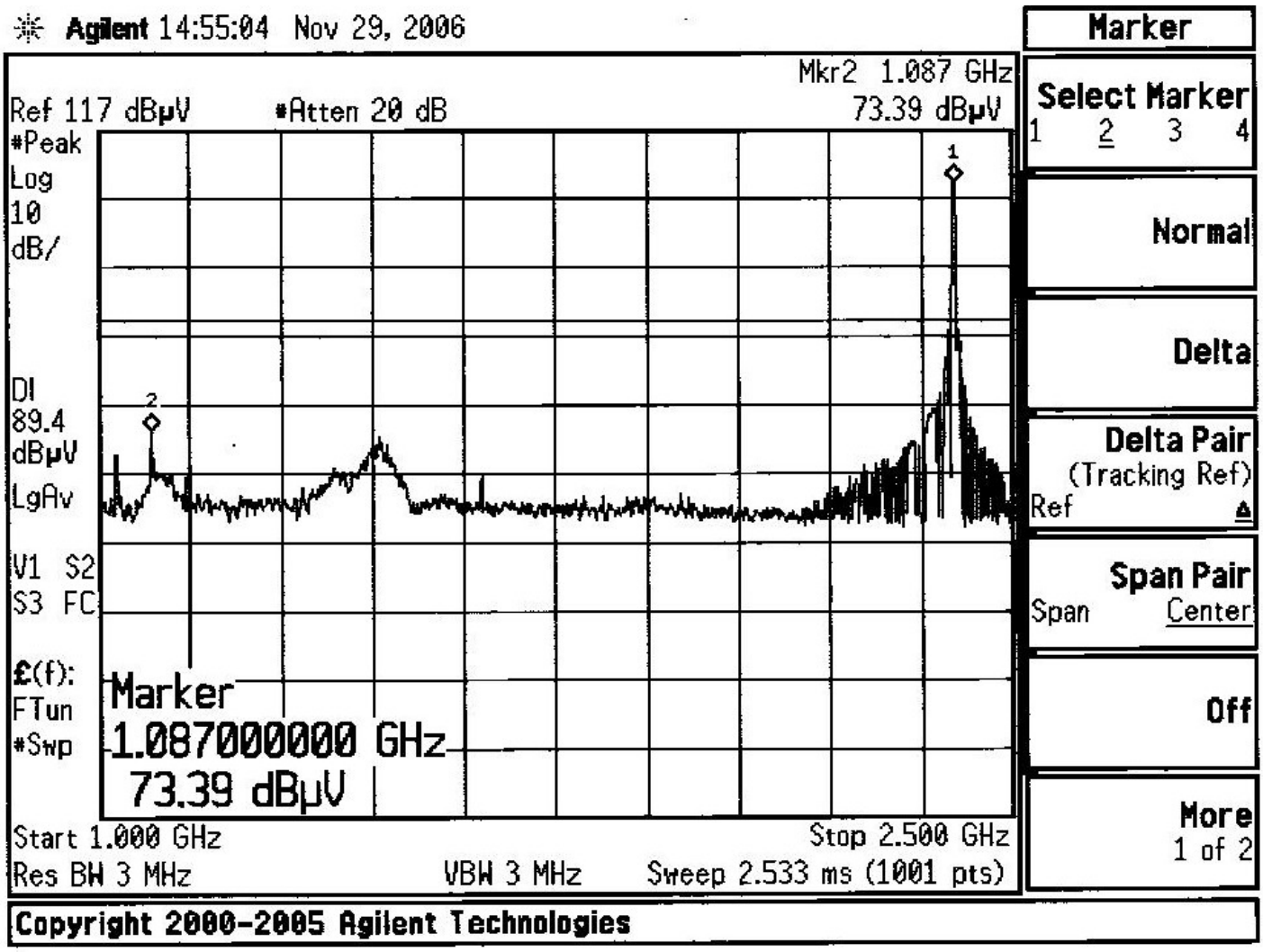
Reviewed by: Greg Jakubowski

Printed | Signature

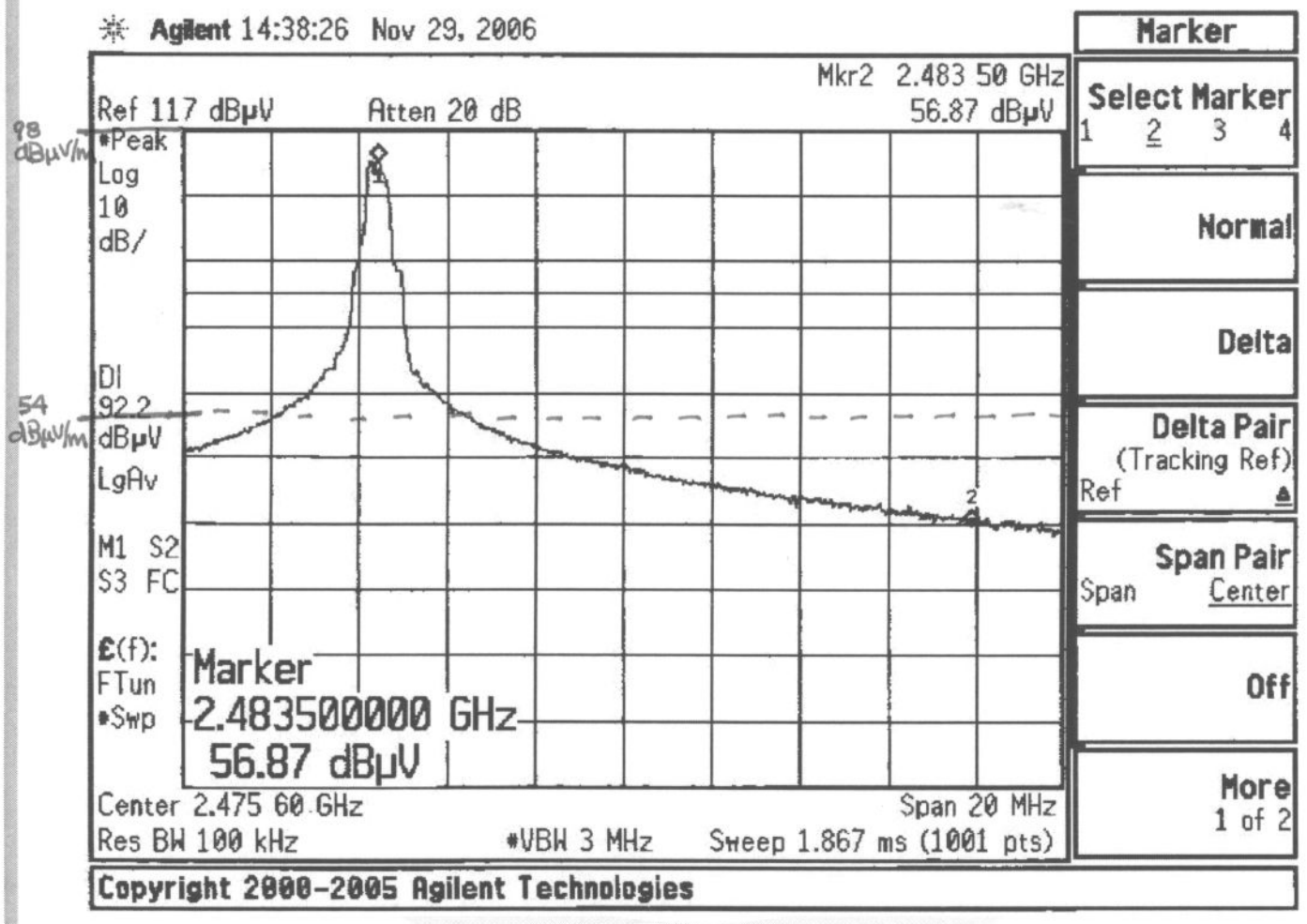
Band edge, low channel, 1 of 2



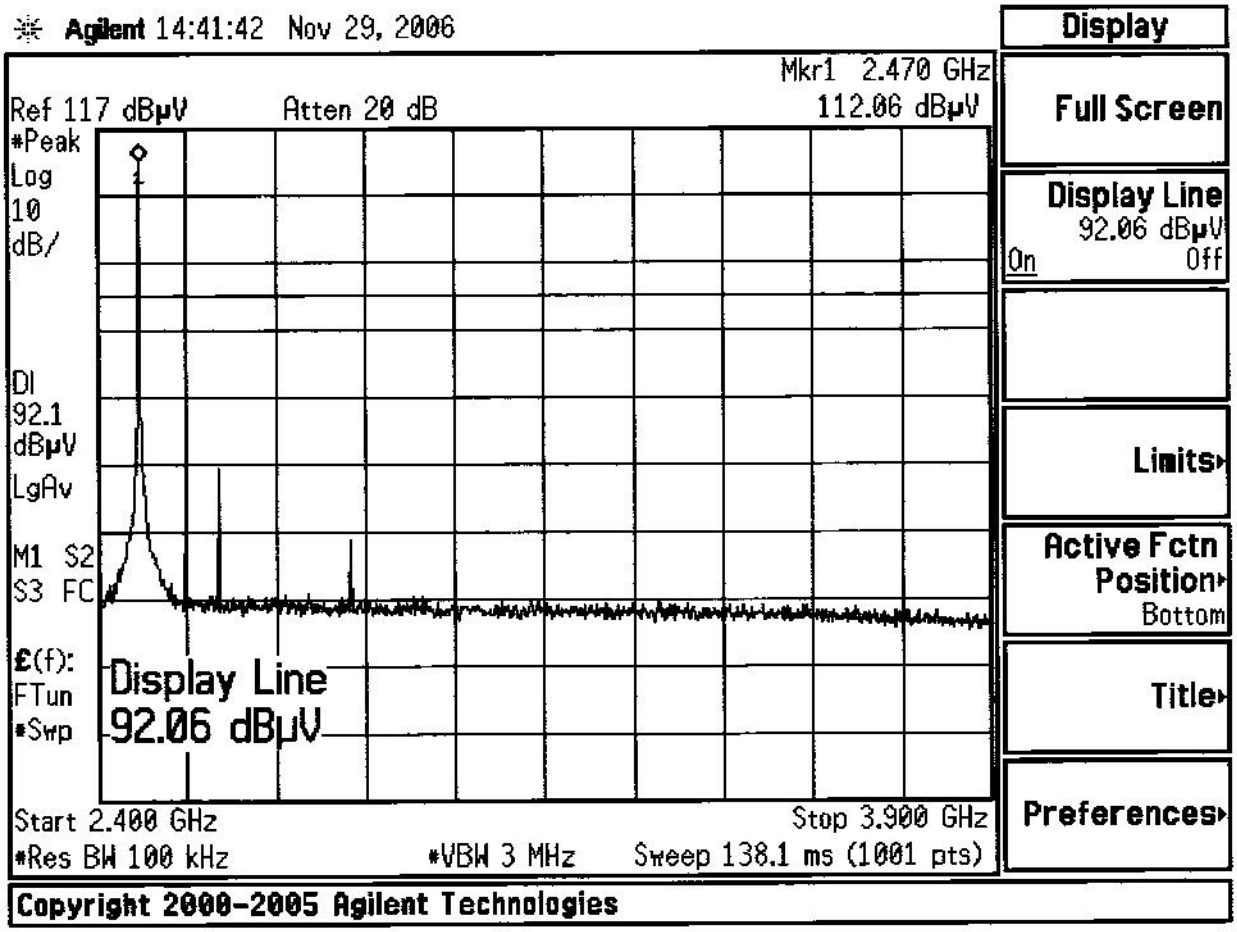
Band edge, low channel, 2 of 2



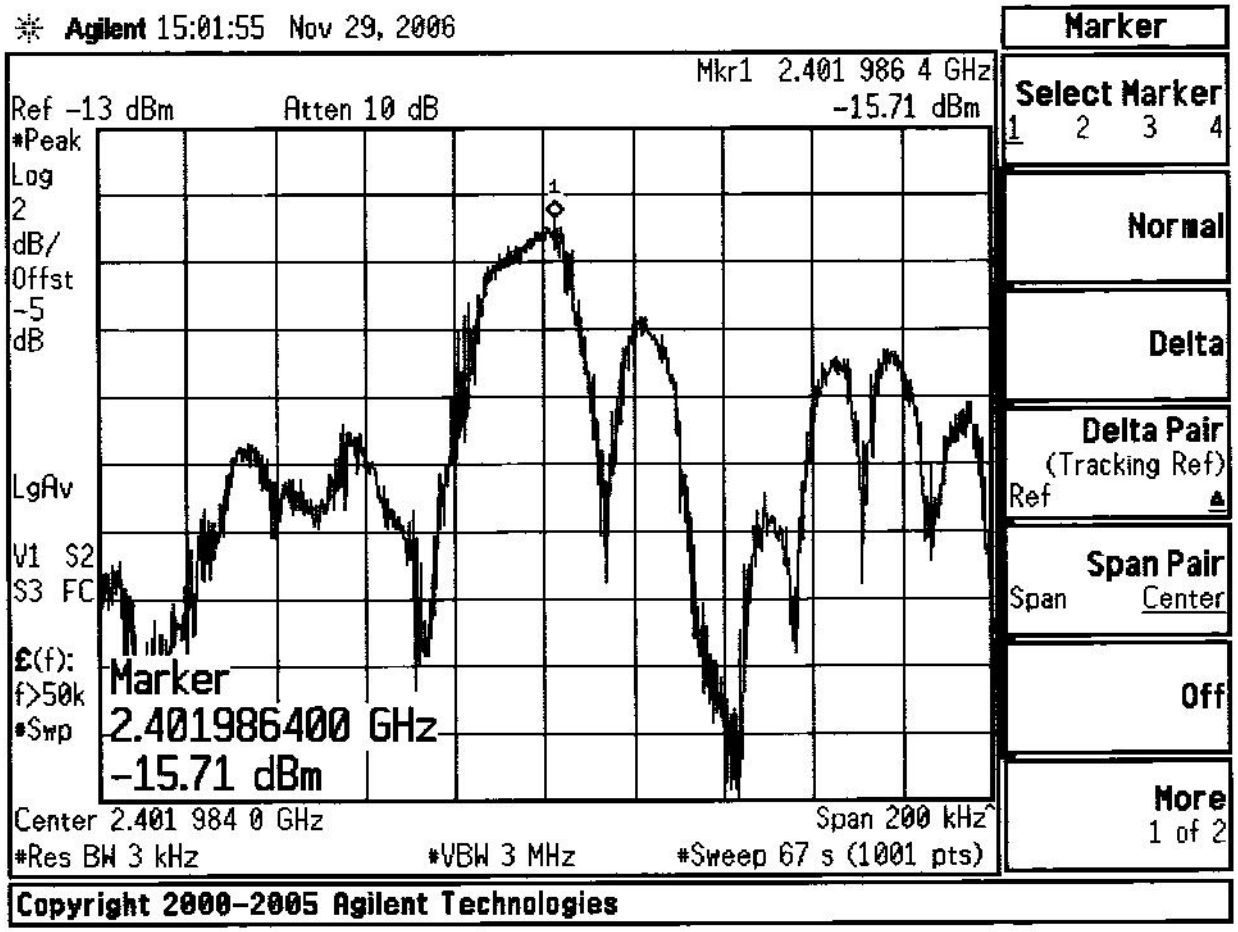
Band edge, high channel, 1 of 2



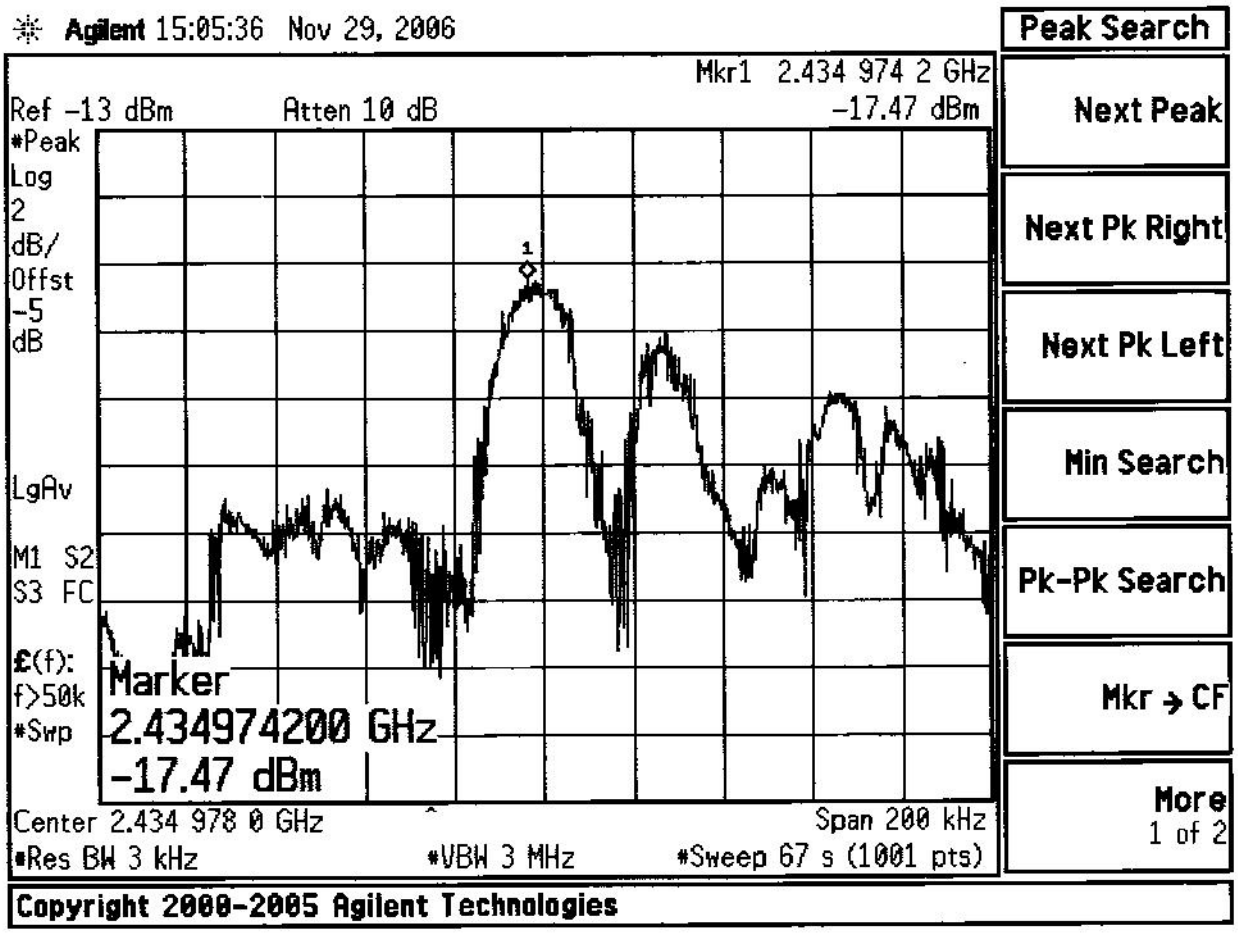
Band edge, high channel, 2 of 2



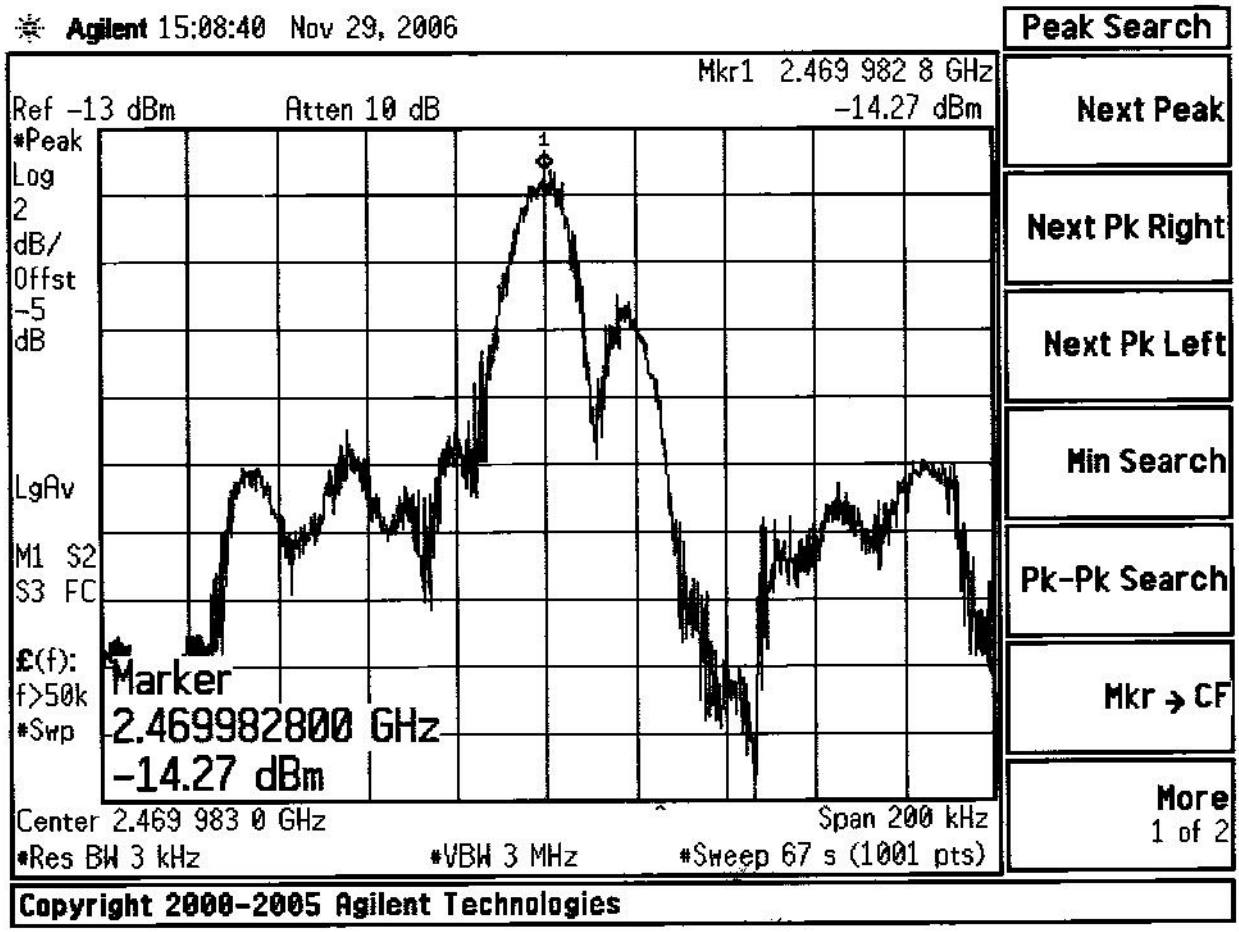
Power spectral density, low channel
Reference level offset corrected for EIRP



Power spectral density, mid channel
Reference level offset corrected for EIRP



Power spectral density, high channel
Reference level offset corrected for EIRP



Appendix B

Constructional Data Form

and

Block Diagram

TÜV SÜD AMERICA INC 19333 Wild Mountain Road Taylors Falls MN 55084 Tel: (651) 638-0297 Fax: (651) 638-0298 Rev. 121906

Form

EMC Test Plan and Constructional Data Form

TÜV SÜD America

PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE. IF TESTING RESULTS IN MODIFICATIONS TO THE EQUIPMENT, PLEASE SUBMIT A REVISED TP/CDF INDICATING THOSE MODIFICATIONS.
NOTE: This information will be input into your test report as shown below. Press the F1 key at any time to get HELP for the current field selected.

Company: Walalce Technologies
Address: PO Box 49128
Blaine, MN 55449

Contact: Sam Shuster Position: President
Phone: 612-964-8311 Fax: 952-487-5218
E-mail Address: sam.shuster@wallacet.com

General Equipment Description -- ***NOTE: This information will be input into your test report as shown below.***

EUT Description: Mobile Satellite TV Antenna
EUT Name: Vu Qube
Model No.: X100 Serial No.: n/a
Product Options:
Configurations to be tested: Using RF remote to position Elevation and Azimuth of Antenna

Equipment Modification (***If applicable, indicate modifications since EUT was last tested. If modifications are made during this testing, submit revised TP/CDF after testing is complete.)***

Modifications since last test: n/a
Modifications made during test: n/a

Test Objective(s): ***Please indicate the tests to be performed, entering the applicable standard(s) where noted.***

- ☐ EMC Directive 89/336/EEC (EMC) Std:
- ☐ Machinery Directive 89/392/EEC (EMC Std:
- ☐ Medical Device Directive 93/42/EEC (EMC) Std:
- ☐ Vehicle Directive 72/245/EEC (EMC) Std:
- ☐ FDA Reviewers Guidance for Premarket Notification Submissions (EMC)

- ☐ FCC: Class ☐ A ☒ B Part
- ☐ VCCI: Class ☐ A ☐ B
- ☐ BSMI: Class ☐ A ☐ B
- ☐ Canada: Class ☐ A ☐ B
- ☐ Australia: Class ☐ A ☐ B
- ☐ Other:

Third Party Certification, if applicable (*Signature on Page 6 Required)

- ☐ Attestation of Conformity (AoC)*
- ☐ Certificate of Conformity (CoC)*
- Protection Class (N/A for vehicles) ☐ Class I ☐ Class II ☐ Class III
  (Press F1 when field is selected to show additional information on Protection Class.)
- ☐ FCC / TCB Certification
- ☐ E-Mark Certification
- ☐ EMC Certification (used with Octagon Mark)*
- ☐ Compliance Document*
- ☐ Industry Canada / FCB Certification
- ☐ Taiwan Certification

EMC Test Plan and Constructional Data Form

America

Attendance

Test will be: ☐ Attended by the customer ☒ Unattended by the customer

Failure - *Complete this section if testing will not be attended by the customer.*

If a failure occurs, TÜV America should:

☒ Call contact listed above, if not available then stop testing. (After hrs phone): _____

☐ Continue testing to complete test series.

☐ Continue testing to define corrective action.

☐ Stop testing.

EUT Specifications and Requirements

Length: _____ Width: 18" Height: 17.5" Weight: 10.5 lbs

Power Requirements

Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

Voltage: 110 (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: _____

Current (Amps/phase(max)): _____ Current (Amps/phase(nominal)): _____

Other _____

Other Special Requirements

The Vu Qube antenna is powered from the coaxial cable attached to a Digital Broadcast Receiver.

Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)

The Vu Qube will be either mounted to a vehicle or set outside a vehicle with the operater using the handheld remote either in the vehicle or next to the vehicle

EUT Power Cable

☐ Permanent OR ☐ Removable Length (in meters): _____

☒ Shielded OR ☐ Unshielded

☐ Not Applicable

EMC Test Plan and Constructional Data Form

America

EUT Interface Ports and Cables

Type	During Test: Analog	During Test: Digital	During Test: Active	During Test: Passive	Qty	Shielding: Yes	Shielding: No	Shielding: Type	Termination	Connector Type	Port Termination	Length tested (in meters)	Removable	Permanent
EXAMPLE:														
RS232	☐	☒	☒	☐	*2*	☒	☐	*Foil over braid*	*Coaxial*	*Metallized 9-pin D-Sub*	*Characteristic Impedance*	*6*	☒	☐
Coaxial Cable	☐	☐	☐	☐	1	☒	☐		Coaxial	F-connector		3	☒	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
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	☐	☐	☐	☐		☐	☐						☐	☐

EMC Test Plan and Constructional Data Form

America

EUT Software.

Revision Level: 10

Description: The software controls the communication between the Vu Qube antenna and the hand held remote, the positioning of the motors, and power consummption

Equipment Under Test (EUT) Operating Modes to be Tested – list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing. Consult with your TÜV Product Service Representative if additional assistance is required.

1. The Remote buttons (arrows) actived to move the Antenna up and down.

2. The Remote buttons (arrows) actived to move the Antenna left and right.

3. The Remote buttons (1 & 2) to store and recall antenna positions.

Equipment Under Test (EUT) System Components – List and describe all components which are part of the EUT. For FCC & Taiwan testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc)

Description	Model #	Serial #	FCC ID #
Vu Qube Antenna	X100	n/a	n/a
Vu Qube handheld remote	X100	n/a	n/a

EMC Test Plan and Constructional Data Form

Support Equipment -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc) This information is required for FCC & Taiwan testing.

Description	*Model #*	*Serial #*	*FCC ID #*
DBS receiver	D11	A01DA5QC201455	

Oscillator Frequencies

Frequency	*Derived Frequency*	*Component # / Location*	*Description of Use*
31kHz	n/a	U1; Main and Remote Board	Used to drive LCD and sytem clock
52 kHz	n/a	U2; Main and Remote Board	Switching power supply chip
8 MHz	n/a	U1; Main and Remote Board	System clock
16 MHz	Multi. by U4 up to (MHz): 2402, 2405, 2408, 2411, 2432, 2435, 2439, 2441, 2462, 2465, 2468, 2470	Y1; Main and Remote Board	

Power Supply

Manufacturer	*Model #*	*Serial #*	*Type*
n/a			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____

Power Line Filters

Manufacturer	*Model #*	*Location in EUT*
n/a		

EMC Test Plan and Constructional Data Form

America

Critical EMI Components (Capacitors, ferrites, etc.)

Description	*Manufacturer*	*Part # or Value*	*Qty*	*Component # / Location*
n/a				

EMC Critical Detail -- Describe other EMC Design details used to reduce high frequency noise.

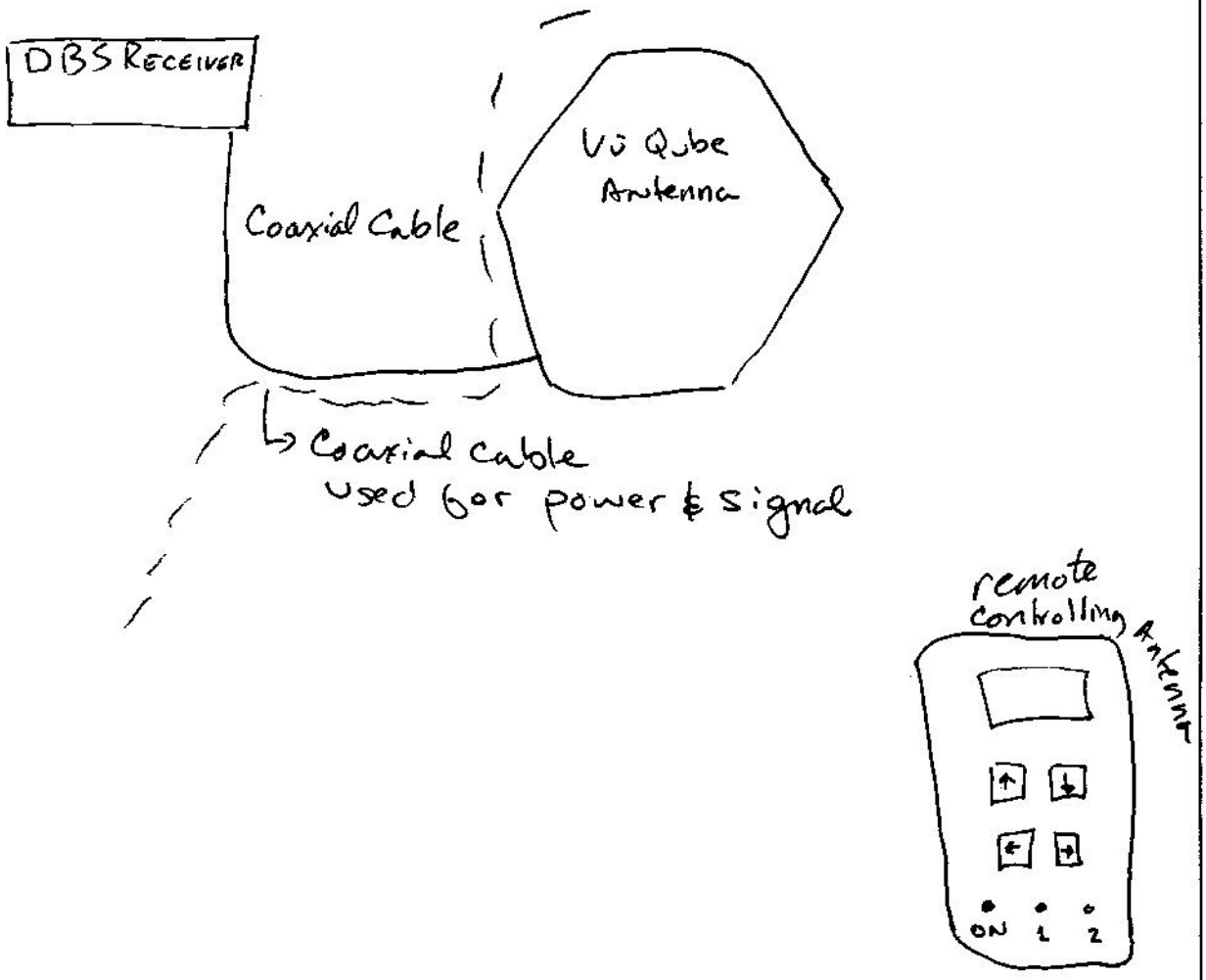
(PLEASE INSERT "**ELECTRONIC SIGNATURE**" BELOW IF POSSIBLE)

Authorization Signatures (Signature Required for Certifications checked on pg 1)

Customer authorization to perform tests according to this test plan.	Date 11/7/06
Test Plan/CDF Prepared By (please print)	Date

EMC Block Diagram Form

System Configuration Block Diagram – Provide a line drawing identifying the EUT, simulators, support equipment, I/O cables, power cables, and any other pertinent components to be used during testing. Use a dashed line to separate the equipment in the testing field versus equipment outside testing field.



Authorization Signatures

Customer authorization to perform tests according to this test plan.	Date 11/7/06
Test Plan/CDF Prepared By (please print)	Date

Appendix C

Measurement Protocol

TÜV SÜD AMERICA INC 19333 Wild Mountain Road Taylors Falls MN 55084 Tel: (651) 638-0297 Fax: (651) 638-0298 Rev. 121906

MEASUREMENT PROTOCOL

GENERAL INFORMATION

Test Methodology

Emissions testing is performed according to the procedures in ANSI C63.4-2003.

Measurement Uncertainty

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system has a measurement uncertainty of ±1.8 dB. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. The test system has a measurement uncertainty of ±4.8 dB. The equipment comprising the test systems is calibrated on an annual basis.

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, in dBμV, equals the EMI receiver level plus the cable loss and LISN factor.

Radiated Emissions

The final level, in dBμV/m, equals the reading from the spectrum analyzer (Level dBμV), adding the antenna correction factor and cable loss factor (Factor dB) to it, and subtracting the preamp gain (and duty cycle correction factor, if applicable). This result then has the limit subtracted from it to provide the Delta, which gives the tabular data as shown in the data sheets in Attachment A. Intentional radiators are rotated through 3 orthogonal axes to determine the test position yielding the maximum emission levels.

Radiated emissions from the EUT are measured in the frequency range of 30 to 1000 MHz 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/average detection. The average measurements are made using a 1 MHz resolution bandwidth and a 10 Hz video bandwidth per FCC guidelines. Tabletop equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the 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. 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.

Example:

FREQ (MHz)	LEVEL (dBuV)		CABLE (dB)	ANT (dB/m)	PREAMP (dB)		FINAL (dBuV/m)	POL	HGT (m)	AZ (deg)	DELTA1
60.80	42.5Qp	+	1.2	+ 10.9	- 25.5	=	29.1	V	1.0	0.0	-10.9

.

Test Equipment

All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.