TEST RESULT SUMMARY

FCC Part 15 Subpart C Section 15.247
Industry Canada RSS-210 Issue 7

MANUFACTURER'S NAME	Wallace Technologies, LLC.
NAME OF EQUIPMENT	Vu Qube, Mobile Satellite TV Antenna
MODEL NUMBER(S) TESTED	VQV10, VQV10P
MANUFACTURER'S ADDRESS	8300 89th Avenue North Brooklyn Park MN 55445
TEST REPORT NUMBER	WC703793
TEST DATE(S)	04 - 15 June 2007

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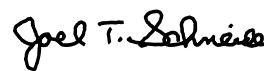
TÜV SÜD America Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the applicable EMC requirements of FCC Part 15 Subpart C Section 15.247 *"Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz; General requirements."* and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

Date:　　17 August 2007

Location:　Taylors Falls MN
　　　　　USA

Greg Jakubowski
Senior EMC Technician

Joel Schneider
Senior EMC Engineer

Not Transferable

EMC TEST REPORT

Test Report File No.	:	**WC703793**	Date of issue: 17 August 2007

Model / Serial No(s) Tested : VQV10, VQV10P / ---

Product Type : Vu Qube, Mobile Satellite TV Antenna

Applicant : Wallace Technologies, LLC

Manufacturer : Wallace Technologies, LLC

License holder : Wallace Technologies, LLC

Address : 8300 89th Avenue North
Brooklyn Park MN 55445

Test Result : ■ **Positive**　　□ **Negative**

Test Project Number
References : **WC703793**

Total pages including
Appendices : **46**

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.*

Test Report WC703793
TÜV SÜD AMERICA INC　　19333 Wild Mountain Road　　Taylors Falls MN 55084　　Tel: (651) 638-0297　Fax: (651) 638-0298

1 of 46
Rev. 121906

D I R E C T O R Y

Sign Explanations:
☐ - not applicable
■ - applicable

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 7
☐ - IC RSS-Gen Issue 1
☐ - IC RSS-Gen Issue 1

ENVIRONMENTAL CONDITIONS IN THE LAB

	Actual
Temperature:	: 23 - 24 °C
Atmospheric pressure	: 98 - 100 kPa
Relative Humidity	: 41 - 75 %

POWER SUPPLY UTILIZED
Power supply system : 13VDC

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 = 520 kHz

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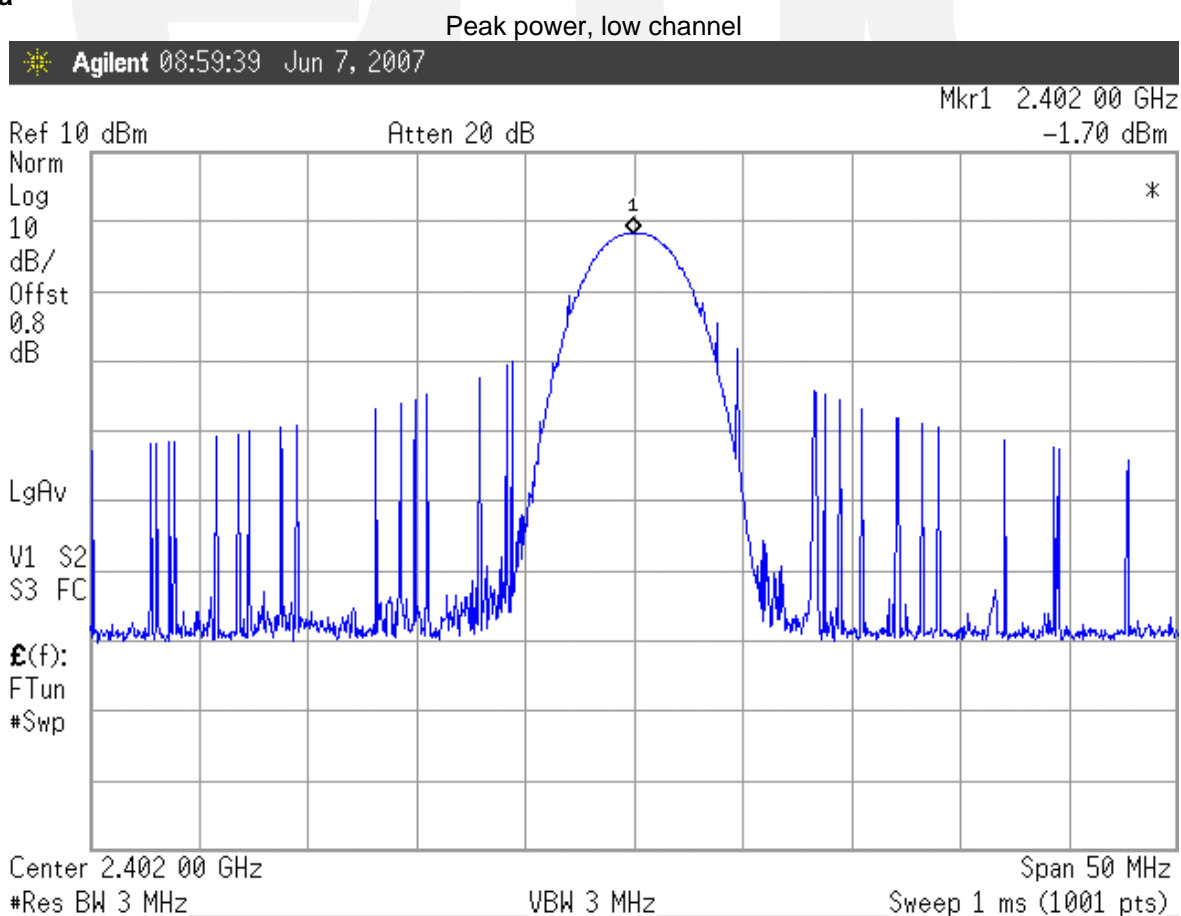□ - Wild River Lab Small Test Site (Open Area Test Site)

Test equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
3371	E4440A	Agilent	Spectrum Analyzer	MY43362222	29 Nov 07
3844	61697	---	High Frequency SMA cable	---	Code B

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

6 dB Bandwidth, Low channel
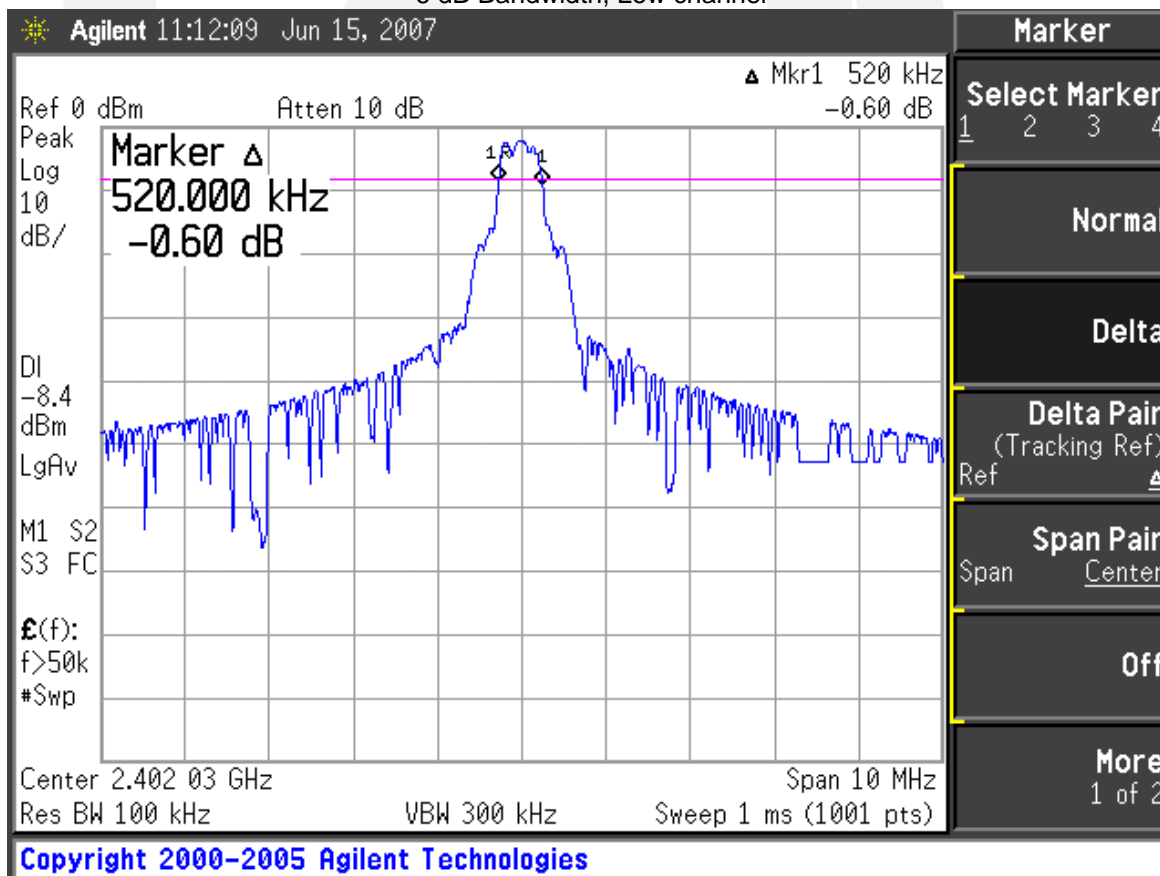
6 dB Bandwidth, mid channel
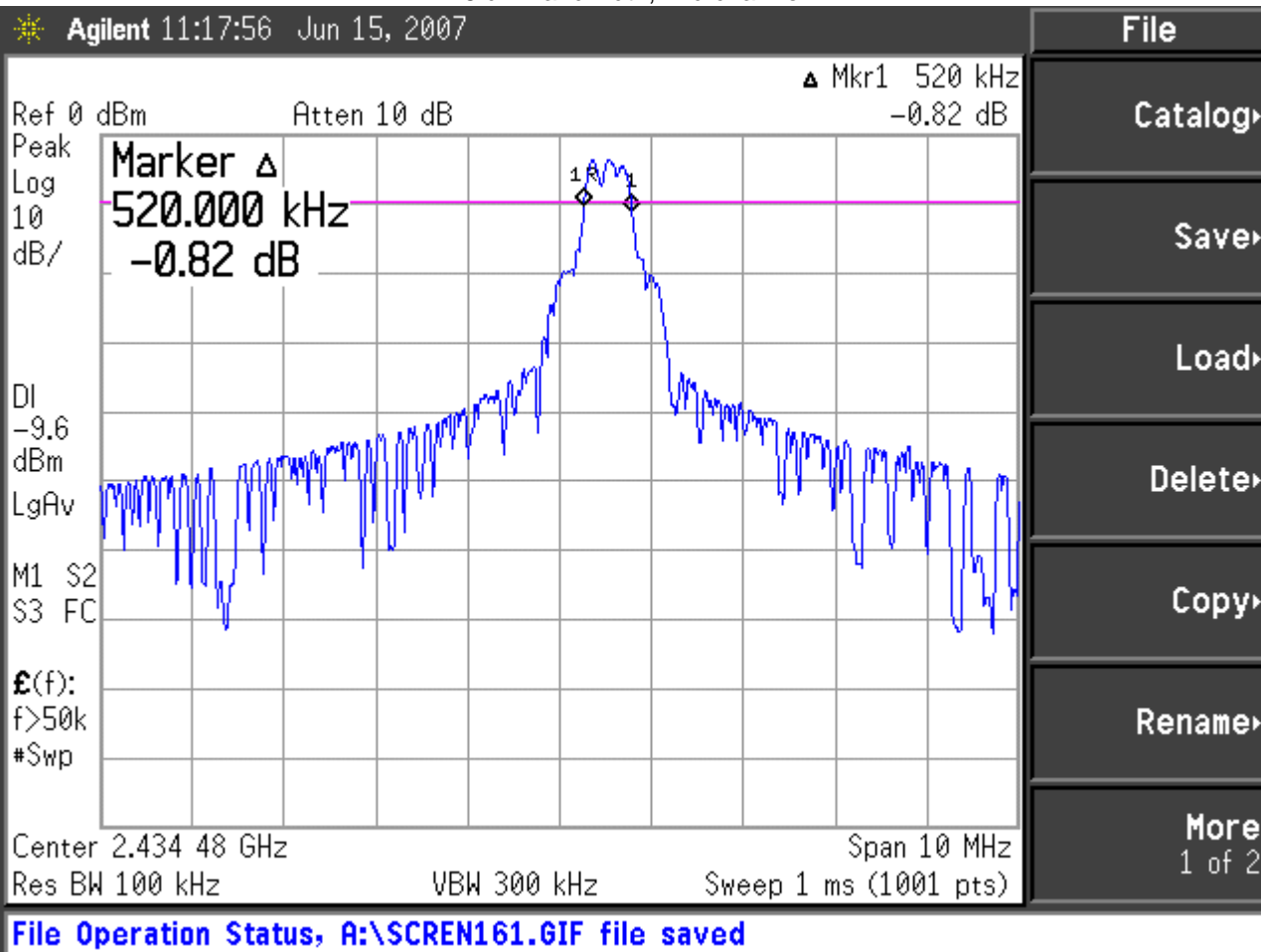
6 dB Bandwidth, high channel
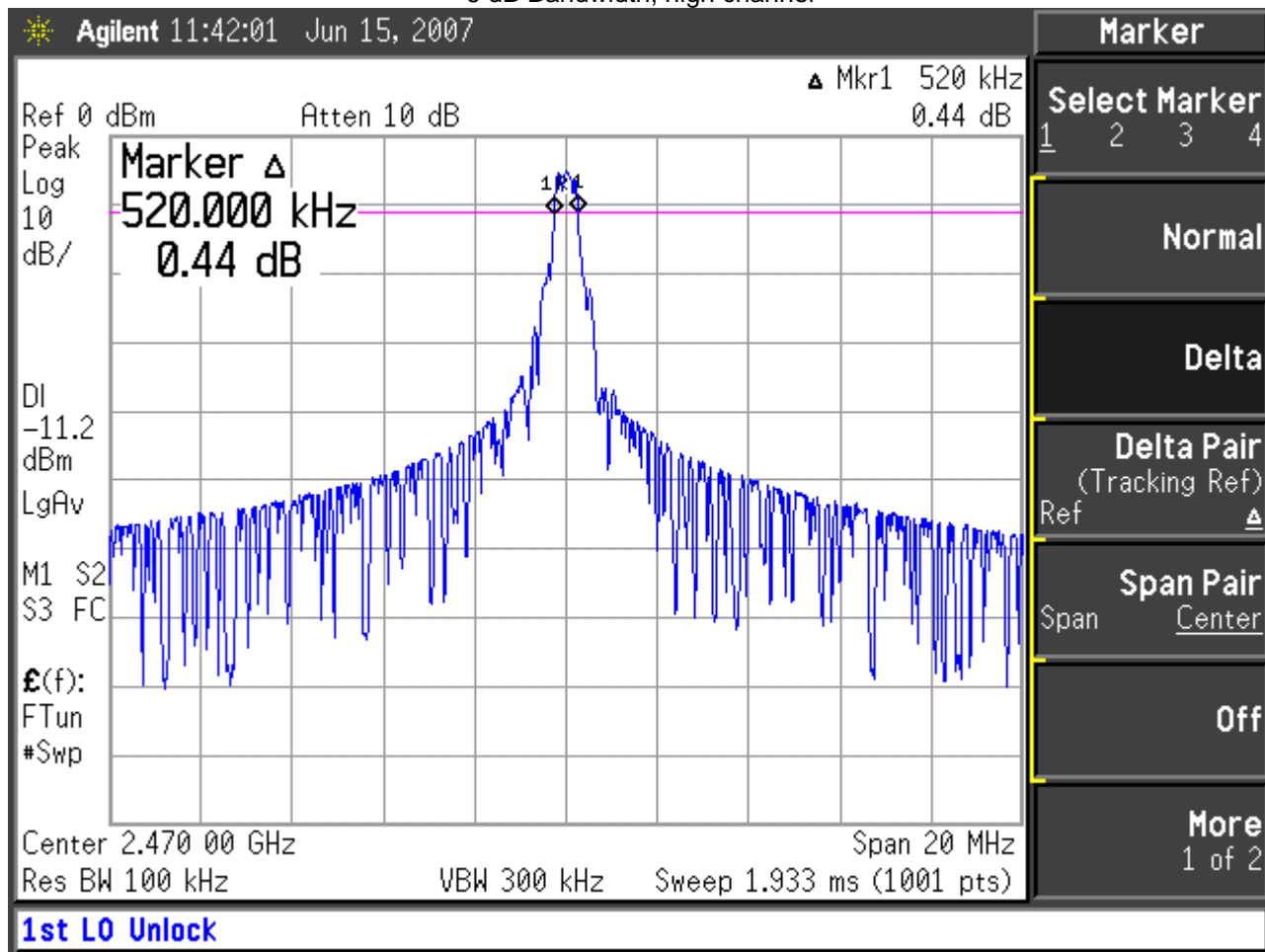
Maximum peak output power
FCC 15.247(b)(3), IC RSS-210 A8.4(4)

Test summary
The requirements are: ■ - MET   □ - NOT MET
Maximum peak output power = -1.70 dBm = 676 mW

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
3371	E4440A	Agilent	Spectrum Analyzer	MY43362222	29 Nov 07
3844	61697	---	High Frequency SMA cable	---	Code B

Cal Code B = Calibration verification performed internally.

Test limit
1 watt

Test data

Peak power, low channel

Peak power, mid channel

Mkr1 2.435 00 GHz

Ref 10 dBm   Atten 20 dB   −2.75 dBm

Norm
Log
10
dB/
Offst
0.8
dB

LgAv

V1 S2
S3 FC

£(f):
FTun
#Swp

Center 2.435 00 GHz   Span 50 MHz
#Res BW 3 MHz   VBW 3 MHz   Sweep 1 ms (1001 pts)

Peak power, high channel

Agilent 08:47:21 Jun 7, 2007

Mkr1 2.470 00 GHz
−4.11 dBm

Ref 10 dBm   Atten 20 dB

Norm
Log
10
dB/
Offst
0.8
dB

LgAv

V1 S2
S3 FC

£(f):
FTun
#Swp

Center 2.470 00 GHz   Span 50 MHz
#Res BW 3 MHz   VBW 3 MHz   Sweep 1 ms (1001 pts)
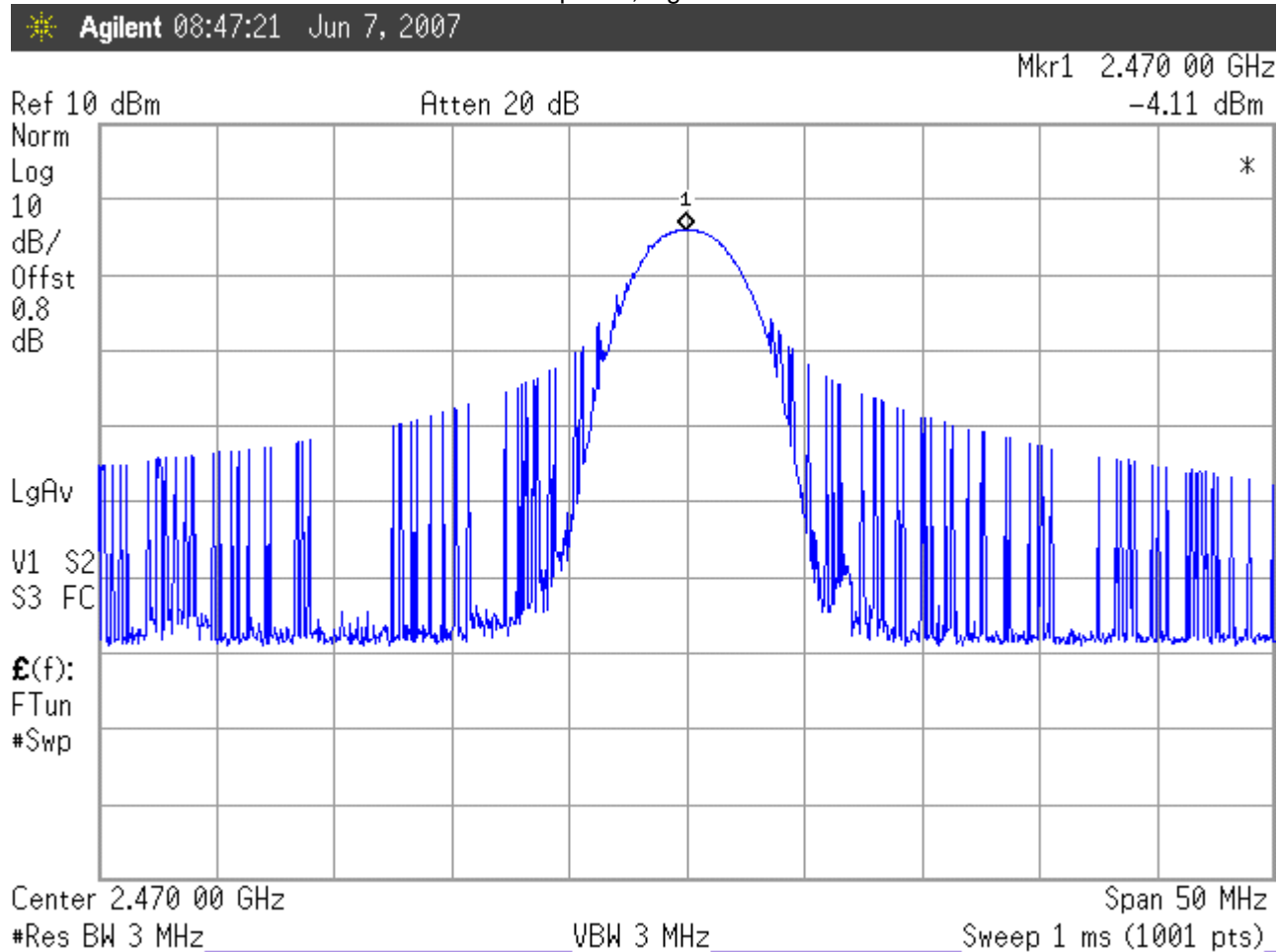
Spurious emissions
FCC 15.247(d), IC RSS-210 A8.5

Test summary
The requirements are: ■ - MET □ - NOT MET
Minimum margin of compliance is 10 dB at 2.334 GHz

Test location
■ - Wild River Lab Large Test Site (Open Area Test Site)
□ - Wild River Lab Small Test Site (Open Area Test Site)
■ - Wild River Shield Room 1 - Anechoic ferrite-lined shielded room (7.3m x 3.7m x 3.7m) or (24' x 12' x 12')

Test distance
■ - 3 meters
□ - 10 meters

Test Equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
3204	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	22-Nov-07
2665	ZHL-1042J	Mini-Circuits	Preamplifier 30 - 5000 MHz	32296	Code B
8052	8566B	Hewlett-Packard	Spectrum Analyzer	2115A00853	03-Apr-08
2075	3115	EMCO	Ridge Guide Ant. 1-18 GHz	9001-3275	12-Jan-08
3294	8566B	Hewlett-Packard	Spectrum Analyzer	2349A03098	16-May-08
3295	85662A	Hewlett-Packard	Analyzer Display	2349A06144	16-May-08
2681	85650A	Hewlett-Packard	Quasi-Peak Adapter	2430A00562	23-Mar-08
3371	E4440A	Agilent	Spectrum Analyzer	MY43362222	29-Nov-07
6717	3116	EMCO	Ridge Guide Ant 18-40 GHz	2005	05-Oct-07
3978	SL26-3010	Phase One Microwave	Amplifier 18-26.5 GHz	0005	26-Mar-08

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
see following pages

RADIATED EMISSIONS

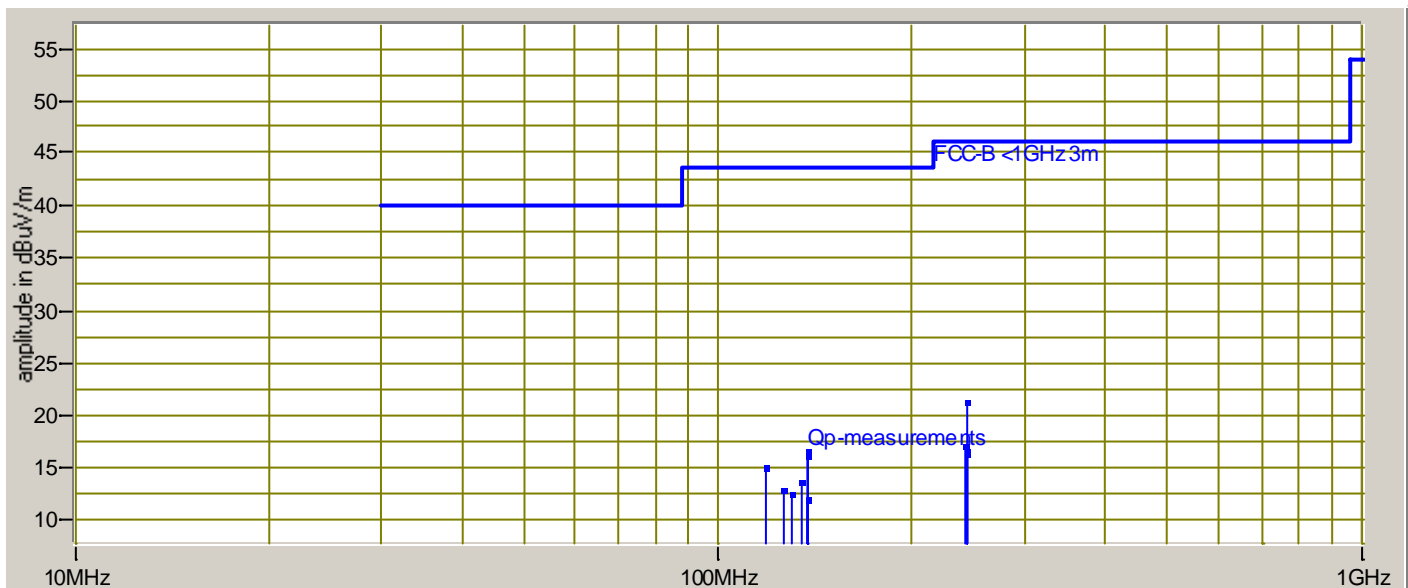|		
Test Report #: WC703793 Run 4	Test Area: STS	
EUT Model #: VQV10P	Date: 6/11/2007	
EUT Serial #:	EUT Power: 13 VDC	Temperature: 24.0 °C
Test Method: FCC 15.247		Air Pressure: 98.0 kPa
Customer: Wallace Technologies		Rel. Humidity: 75.0 %

EUT Description: Vu Qube mobile satellite antenna, Base Station

Notes:

Data File Name: 3793.dat

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
Begin spurious emissions scan in restricted bands per FCC 15.205, 30 - 1000 MHz						
Base Station Low Channel.						
118.674 MHz	32.2 Qp	1.35 / 9.11 / 27.66 / 0.0	15.0	V / 1.00 / 0	-28.5	n/a
126.583 MHz	30.7 Qp	1.39 / 8.47 / 27.75 / 0.0	12.8	V / 1.00 / 0	-30.7	n/a
130.459 MHz	30.75 Qp	1.4 / 8.16 / 27.8 / 0.0	12.52	V / 1.00 / 0	-30.98	n/a
137.444 MHz	31.65 Qp	1.44 / 8.26 / 27.88 / 0.0	13.47	V / 1.00 / 0	-30.03	n/a
243.007 MHz	30.8 Qp	1.9 / 12.06 / 27.75 / 0.0	17.01	V / 1.00 / 0	-28.99	n/a
244.189 MHz	30.25 Qp	1.91 / 12.11 / 27.74 / 0.0	16.53	V / 1.00 / 180	-29.47	n/a
Start of Horizontal Scan						
243.733 MHz	32.55 Qp	1.91 / 12.09 / 27.74 / 0.0	18.8	V / 3.00 / 270	-27.2	n/a
243.733 MHz	33.15 Qp	1.91 / 12.09 / 27.74 / 0.0	19.4	H / 3.00 / 180	-26.6	n/a
End of Scan						
Start of Vertical Scan Mid. Channel						
137.444 MHz	34.3 Qp	1.44 / 8.26 / 27.88 / 0.0	16.12	V / 1.00 / 0	-27.38	n/a
135.006 MHz	31.05 Qp	1.43 / 7.8 / 27.85 / 0.0	12.43	V / 1.00 / 0	-31.07	n/a
137.917 MHz	29.9 Qp	1.44 / 8.35 / 27.89 / 0.0	11.81	V / 1.00 / 0	-31.69	n/a
243.006 MHz	30.1 Qp	1.9 / 12.06 / 27.75 / 0.0	16.31	V / 1.00 / 0	-29.69	n/a
135.006 MHz	32.2 Qp	1.43 / 7.8 / 27.85 / 0.0	13.58	V / 1.00 / 180	-29.92	n/a

Tested by: Robert Behringer

Printed   Signature

Reviewed by: G. S. Jakubowski

Printed   Signature

RADIATED EMISSIONS

Test Report #:	WC703793 Run 4	Test Area:	STS	
EUT Model #:	VQV10P	Date:	6/11/2007	
EUT Serial #:		EUT Power:	13 VDC	Temperature: 24.0 °C
Test Method:	FCC 15.247			Air Pressure: 98.0 kPa
Customer:	Wallace Technologies			Rel. Humidity: 75.0 %
EUT Description:	Vu Qube mobile satellite antenna, Base Station			
Notes:				
Data File Name:	3793.dat			Page: 2 of 4

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
Start of Horizontal Scan						
243.733 MHz	34.25 Qp	1.91 / 12.09 / 27.74 / 0.0	20.5	H / 3.00 / 270	-25.5	n/a
243.733 MHz	34.85 Qp	1.91 / 12.09 / 27.74 / 0.0	21.1	H / 3.00 / 0	-24.9	n/a
End of Scan 30 - 1000 MHz						
Start of Vertical Scan High Channel.						
126.606 MHz	29.6 Qp	1.39 / 8.47 / 27.76 / 0.0	11.7	V / 1.00 / 0	-31.8	n/a
243.937 MHz	30.0 Qp	1.91 / 12.1 / 27.74 / 0.0	16.27	V / 1.00 / 0	-29.73	n/a
Start of Horizontal Scan						
137.646 MHz	33.5 Qp	1.44 / 8.3 / 27.88 / 0.0	15.36	H / 3.00 / 180	-28.14	n/a
137.646 MHz	34.6 Qp	1.44 / 8.3 / 27.88 / 0.0	16.46	H / 3.00 / 90	-27.04	n/a
End of Scan 30 - 1000 MHz						

Tested by: Robert Behringer

_____   _____
Printed   Signature

Reviewed by: G. S. Jakubowski

_____   _____
Printed   Signature

RADIATED EMISSIONS

Test Report #:	WC703793 Run 4		Test Area:	STS	
EUT Model #:	VQV10P		Date:	6/11/2007	
EUT Serial #:			EUT Power:	13 VDC	Temperature: 24.0 °C
Test Method:	FCC 15.247				Air Pressure: 98.0 kPa
Customer:	Wallace Technologies				Rel. Humidity: 75.0 %
EUT Description:	Vu Qube mobile satellite antenna, Base Station				
Notes:					
Data File Name:	3793.dat				Page: 3 of 4

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
243.733 MHz	34.85 Qp	1.91 / 12.09 / 27.74 / 0.0	21.1	H / 3.00 / 0	-24.9
137.646 MHz	34.6 Qp	1.44 / 8.3 / 27.88 / 0.0	16.46	H / 3.00 / 90	-27.04
137.444 MHz	34.3 Qp	1.44 / 8.26 / 27.88 / 0.0	16.12	V / 1.00 / 0	-27.38
118.674 MHz	32.2 Qp	1.35 / 9.11 / 27.66 / 0.0	15.0	V / 1.00 / 0	-28.5
243.007 MHz	30.8 Qp	1.9 / 12.06 / 27.75 / 0.0	17.01	V / 1.00 / 0	-28.99
244.189 MHz	30.25 Qp	1.91 / 12.11 / 27.74 / 0.0	16.53	V / 1.00 / 180	-29.47
243.937 MHz	30.0 Qp	1.91 / 12.1 / 27.74 / 0.0	16.27	V / 1.00 / 0	-29.73
135.006 MHz	32.2 Qp	1.43 / 7.8 / 27.85 / 0.0	13.58	V / 1.00 / 180	-29.92
126.583 MHz	30.7 Qp	1.39 / 8.47 / 27.75 / 0.0	12.8	V / 1.00 / 0	-30.7
130.459 MHz	30.75 Qp	1.4 / 8.16 / 27.8 / 0.0	12.52	V / 1.00 / 0	-30.98
137.917 MHz	29.9 Qp	1.44 / 8.35 / 27.89 / 0.0	11.81	V / 1.00 / 0	-31.69

Tested by:	Robert Behringer		
	Printed		Signature
Reviewed by:	G. S. Jakubowski		
	Printed		Signature

RADIATED EMISSIONS

Test Report #:	WC703793 Run 4	Test Area:	STS
EUT Model #:	VQV10P	Date:	6/11/2007
EUT Serial #:		EUT Power:	13 VDC
Test Method:	FCC 15.247		
Customer:	Wallace Technologies		

Temperature: 24.0 °C
Air Pressure: 98.0 kPa
Rel. Humidity: 75.0 %

EUT Description: Vu Qube mobile satellite antenna, Base Station

Notes:

Data File Name: 3793.dat   Page: 4 of 4

Graph:

Tested by: Robert Behringer

Printed   Signature

Reviewed by: G. S. Jakubowski

Printed   Signature

RADIATED EMISSIONS

Test Report #:	WC703793 Run 6	Test Area:	LTS		
EUT Model #:	VQV10P	Date:	6/13/2007		
EUT Serial #:		EUT Power:	13 VDC	Temperature:	23.0 °C
Test Method:	FCC 15.247			Air Pressure:	100.0 kPa
Customer:	Wallace Technologies			Rel. Humidity:	41.0 %
EUT Description:	Vu Qube mobile satellite antenna				
Notes:					
Data File Name:	3793.dat			Page:	1 of 7

List of measurements for run #: 6

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC B >1GHz 3m	DELTA2 FCC B >1G 3 M
Long antenna						
Begin spurious emissions scan in restricted bands per FCC 15.205, 1 - 25GHz						
Measurements maximized						
High channel						
1.403 GHz	62.18 Av	3.83 / 25.04 / 50.73 / 0.07	40.39	V / 1.03 / 246	-13.61	n/a
1.403 GHz	70.9 Pk	3.83 / 25.04 / 50.73 / 0.07	49.11	V / 1.03 / 246	-4.89*	-24.89
2.334 GHz	59.27 Av	4.93 / 28.8 / 49.81 / 0.63	43.82	V / 1.09 / 168	-10.18	n/a
2.334 GHz	64.75 Pk	4.93 / 28.8 / 49.81 / 0.63	49.3	V / 1.09 / 168	-4.7*	-24.7
4.94 GHz	40.66 Av	7.65 / 33.08 / 46.25 / 0.29	35.42	V / 1.65 / 164	-18.58	n/a
4.94 GHz	64.25 Pk	7.65 / 33.08 / 46.25 / 0.29	59.01	V / 1.65 / 164	5.01*	-14.99
7.41 GHz	42.21 Av	9.86 / 36.28 / 46.67 / 1.3	42.99	V / 1.44 / 157	-11.01	n/a
7.41 GHz	66.2 Pk	9.86 / 36.28 / 46.67 / 1.3	66.98	V / 1.44 / 157	12.98*	-7.02
Mid channel						
7.305 GHz	40.47 Av	9.76 / 36.15 / 46.6 / 1.18	40.96	V / 1.30 / 169	-13.04	n/a
7.305 GHz	66.15 Pk	9.76 / 36.15 / 46.6 / 1.18	66.64	V / 1.30 / 169	12.64*	-7.36
4.87 GHz	40.31 Av	7.63 / 32.94 / 46.31 / 0.59	35.15	V / 1.70 / 165	-18.85	n/a
4.87 GHz	63.2 Pk	7.63 / 32.94 / 46.31 / 0.59	58.04	V / 1.70 / 165	4.04*	-15.96
Low channel						
4.804 GHz	41.73 Av	7.61 / 32.81 / 46.37 / 0.52	36.3	V / 1.00 / 170	-17.7	n/a
4.804 GHz	63.35 Pk	7.61 / 32.81 / 46.37 / 0.52	57.92	V / 1.00 / 170	3.92*	-16.08
7.206 GHz	41.15 Av	9.66 / 36.02 / 46.54 / 1.06	41.35	V / 1.27 / 170	-12.65	n/a
7.206 GHz	65.0 Pk	9.66 / 36.02 / 46.54 / 1.06	65.2	V / 1.27 / 170	11.2*	-8.8

Tested by: Greg Jakubowski

Printed   Signature

Reviewed by: J. T. Schneider

Printed   Signature

RADIATED EMISSIONS

Test Report #:	WC703793 Run 6	Test Area:	LTS	
EUT Model #:	VQV10P	Date:	6/13/2007	
EUT Serial #:		EUT Power:	13 VDC	Temperature: 23.0 °C
Test Method:	FCC 15.247			Air Pressure: 100.0 kPa
Customer:	Wallace Technologies			Rel. Humidity: 41.0 %
EUT Description:	Vu Qube mobile satellite antenna			
Notes:				
Data File Name:	3793.dat			Page: 2 of 7

List of measurements for run #: 6

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC B >1GHz 3m	DELTA2 FCC B >1G 3 M
End scan 1 - 25 GHz						

Tested by:	Greg Jakubowski	*G Jakubowski*
	Printed	Signature
Reviewed by:	J. T. Schneider	*Joel T. Schneider*
	Printed	Signature

RADIATED EMISSIONS

Test Report #:	WC703793 Run 6	Test Area:	LTS
EUT Model #:	VQV10P	Date:	6/13/2007
EUT Serial #:		EUT Power:	13 VDC
Test Method:	FCC 15.247		
Customer:	Wallace Technologies		
EUT Description:	Vu Qube mobile satellite antenna		
Notes:			
Data File Name:	3793.dat		

Temperature: 23.0 °C
Air Pressure: 100.0 kPa
Rel. Humidity: 41.0 %

Page: 3 of 7

Measurement summary for limit1: FCC B >1GHz 3m (Av)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC B >1GHz 3m
2.334 GHz	59.27 Av	4.93 / 28.8 / 49.81 / 0.63	43.82	V / 1.09 / 168	-10.18
7.41 GHz	42.21 Av	9.86 / 36.28 / 46.67 / 1.3	42.99	V / 1.44 / 157	-11.01
7.206 GHz	41.15 Av	9.66 / 36.02 / 46.54 / 1.06	41.35	V / 1.27 / 170	-12.65
7.305 GHz	40.47 Av	9.76 / 36.15 / 46.6 / 1.18	40.96	V / 1.30 / 169	-13.04
1.403 GHz	62.18 Av	3.83 / 25.04 / 50.73 / 0.07	40.39	V / 1.03 / 246	-13.61
4.804 GHz	41.73 Av	7.61 / 32.81 / 46.37 / 0.52	36.3	V / 1.00 / 170	-17.7
4.94 GHz	40.66 Av	7.65 / 33.08 / 46.25 / 0.29	35.42	V / 1.65 / 164	-18.58
4.87 GHz	40.31 Av	7.63 / 32.94 / 46.31 / 0.59	35.15	V / 1.70 / 165	-18.85
1.403 GHz	70.9 Pk	3.83 / 25.04 / 50.73 / 0.07	49.11	V / 1.03 / 246	-4.89*
2.334 GHz	64.75 Pk	4.93 / 28.8 / 49.81 / 0.63	49.3	V / 1.09 / 168	-4.7*
4.94 GHz	64.25 Pk	7.65 / 33.08 / 46.25 / 0.29	59.01	V / 1.65 / 164	5.01*
7.41 GHz	66.2 Pk	9.86 / 36.28 / 46.67 / 1.3	66.98	V / 1.44 / 157	12.98*
7.305 GHz	66.15 Pk	9.76 / 36.15 / 46.6 / 1.18	66.64	V / 1.30 / 169	12.64*
4.87 GHz	63.2 Pk	7.63 / 32.94 / 46.31 / 0.59	58.04	V / 1.70 / 165	4.04*
4.804 GHz	63.35 Pk	7.61 / 32.81 / 46.37 / 0.52	57.92	V / 1.00 / 170	3.92*
7.206 GHz	65.0 Pk	9.66 / 36.02 / 46.54 / 1.06	65.2	V / 1.27 / 170	11.2*

* Peak measurement against an average limit

Tested by:	Greg Jakubowski	
	Printed	Signature
Reviewed by:	J. T. Schneider	
	Printed	Signature

RADIATED EMISSIONS

Test Report #:	WC703793 Run 6	Test Area:	LTS
EUT Model #:	VQV10P	Date:	6/13/2007
EUT Serial #:		EUT Power:	13 VDC
Test Method:	FCC 15.247		
Customer:	Wallace Technologies		
EUT Description:	Vu Qube mobile satellite antenna		
Notes:			
Data File Name:	3793.dat		

Temperature: 23.0 °C
Air Pressure: 100.0 kPa
Rel. Humidity: 41.0 %

Page: 4 of 7

Measurement summary for limit2: FCC B >1G 3 M (Pk)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA2 FCC B >1G 3 M
7.41 GHz	66.2 Pk	9.86 / 36.28 / 46.67 / 1.3	66.98	V / 1.44 / 157	-7.02
7.305 GHz	66.15 Pk	9.76 / 36.15 / 46.6 / 1.18	66.64	V / 1.30 / 169	-7.36
7.206 GHz	65.0 Pk	9.66 / 36.02 / 46.54 / 1.06	65.2	V / 1.27 / 170	-8.8
4.94 GHz	64.25 Pk	7.65 / 33.08 / 46.25 / 0.29	59.01	V / 1.65 / 164	-14.99
4.87 GHz	63.2 Pk	7.63 / 32.94 / 46.31 / 0.59	58.04	V / 1.70 / 165	-15.96
4.804 GHz	63.35 Pk	7.61 / 32.81 / 46.37 / 0.52	57.92	V / 1.00 / 170	-16.08
2.334 GHz	64.75 Pk	4.93 / 28.8 / 49.81 / 0.63	49.3	V / 1.09 / 168	-24.7
1.403 GHz	70.9 Pk	3.83 / 25.04 / 50.73 / 0.07	49.11	V / 1.03 / 246	-24.89

Tested by: Greg Jakubowski

Printed   Signature

Reviewed by: J. T. Schneider

Printed   Signature

RADIATED EMISSIONS

Test Report #:	WC703793 Run 6	Test Area:	LTS	
EUT Model #:	VQV10P	Date:	6/13/2007	
EUT Serial #:		EUT Power:	13 VDC	Temperature: 23.0 °C
Test Method:	FCC 15.247			Air Pressure: 100.0 kPa
Customer:	Wallace Technologies			Rel. Humidity: 41.0 %
EUT Description:	Vu Qube mobile satellite antenna			
Notes:				
Data File Name:	3793.dat		Page:	5 of 7

Graph:
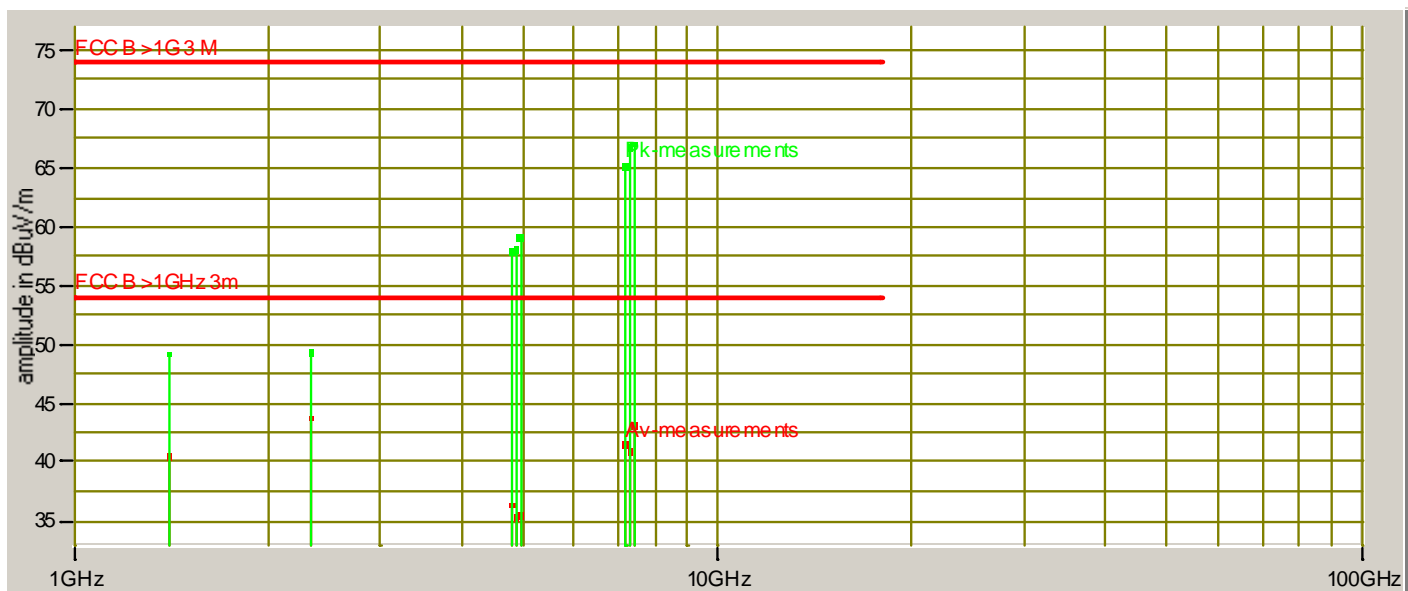
Tested by:	Greg Jakubowski		
	Printed		Signature
Reviewed by:	J. T. Schneider		
	Printed		Signature

RADIATED EMISSIONS

Test Report #:	WC703793 Run 6	Test Area:	LTS
EUT Model #:	VQV10P	Date:	6/13/2007
EUT Serial #:		EUT Power:	13 VDC

Temperature: 23.0 °C

Air Pressure: 100.0 kPa

Test Method:	FCC 15.247
Customer:	Wallace Technologies

Rel. Humidity: 41.0 %

EUT Description: Vu Qube mobile satellite antenna

Notes:

Data File Name: 3793.dat

Page: 6 of 7

Band edge radiated emissions plot, peak scan, max hold, low channel
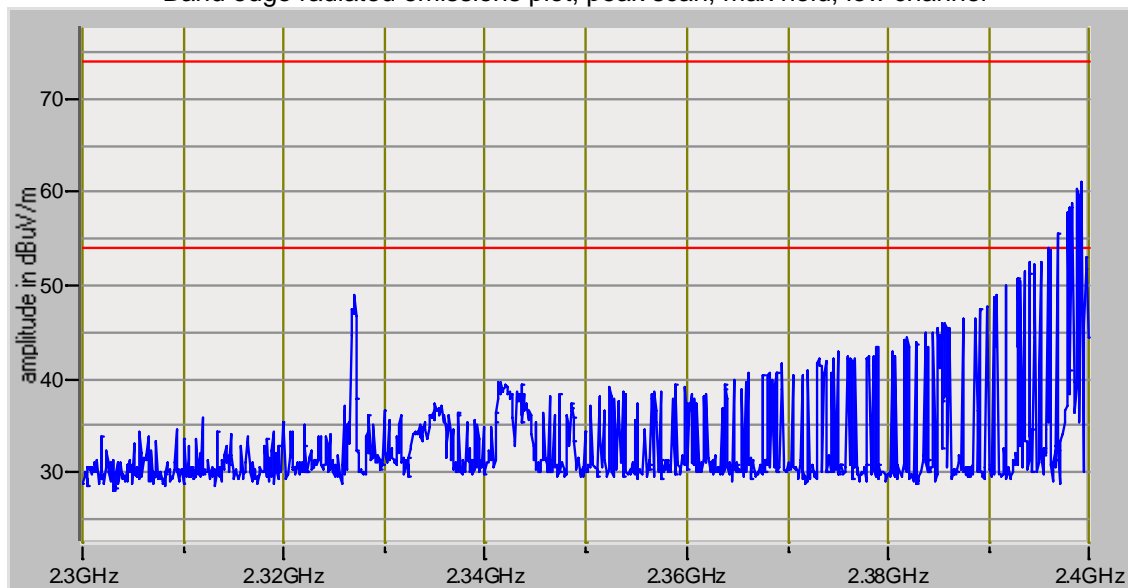
Tested by: Greg Jakubowski

Printed　　　　　　Signature

Reviewed by: J. T. Schneider

Printed　　　　　　Signature

RADIATED EMISSIONS

Test Report #:	WC703793 Run 6	Test Area:	LTS		
EUT Model #:	VQV10P	Date:	6/13/2007		
EUT Serial #:		EUT Power:	13 VDC	Temperature:	23.0 °C
Test Method:	FCC 15.247			Air Pressure:	100.0 kPa
Customer:	Wallace Technologies			Rel. Humidity:	41.0 %
EUT Description:	Vu Qube mobile satellite antenna				
Notes:					
Data File Name:	3793.dat			Page:	7 of 7

Band edge radiated emissions plot, peak scan, max hold, high channel
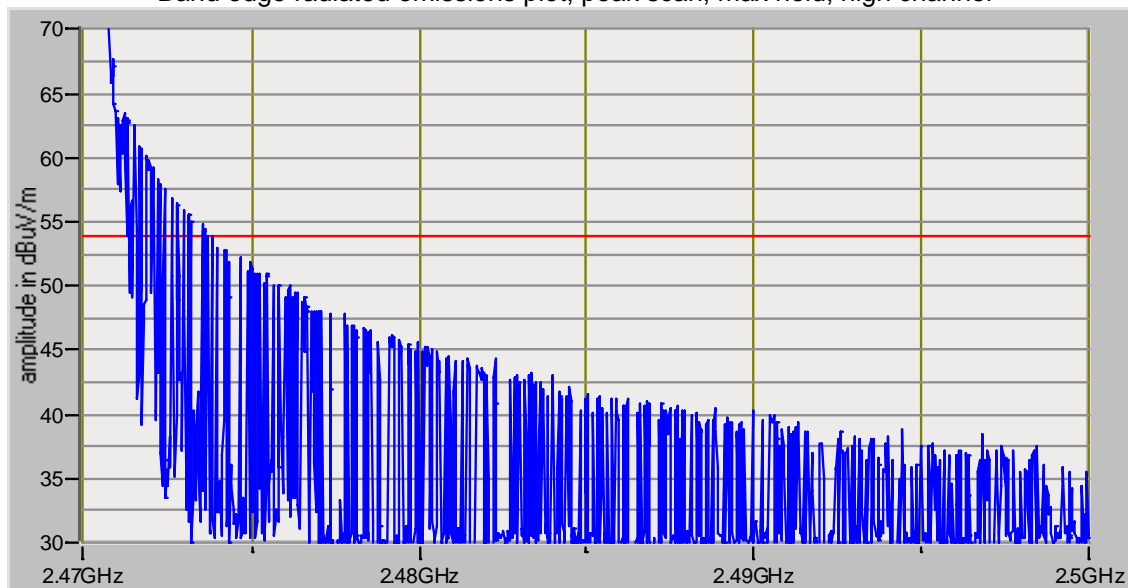
Tested by:	Greg Jakubowski	
	Printed	Signature
Reviewed by:	J. T. Schneider	
	Printed	Signature

Band edge, low channel
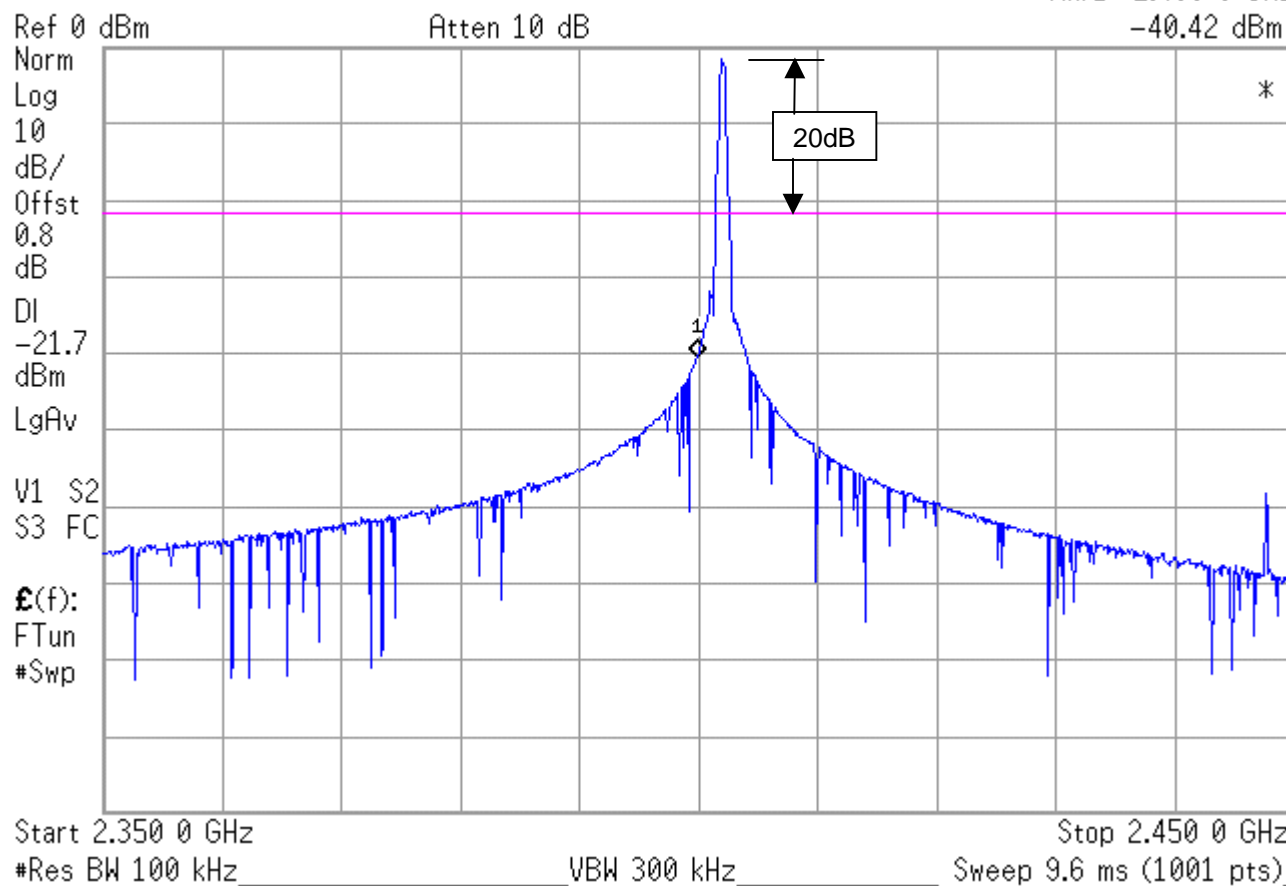
Test Report WC703793
TÜV SÜD AMERICA INC   19333 Wild Mountain Road   Taylors Falls MN 55084   Tel: (651) 638-0297   Fax: (651) 638-0298   Rev. 121906

Band edge, high channel
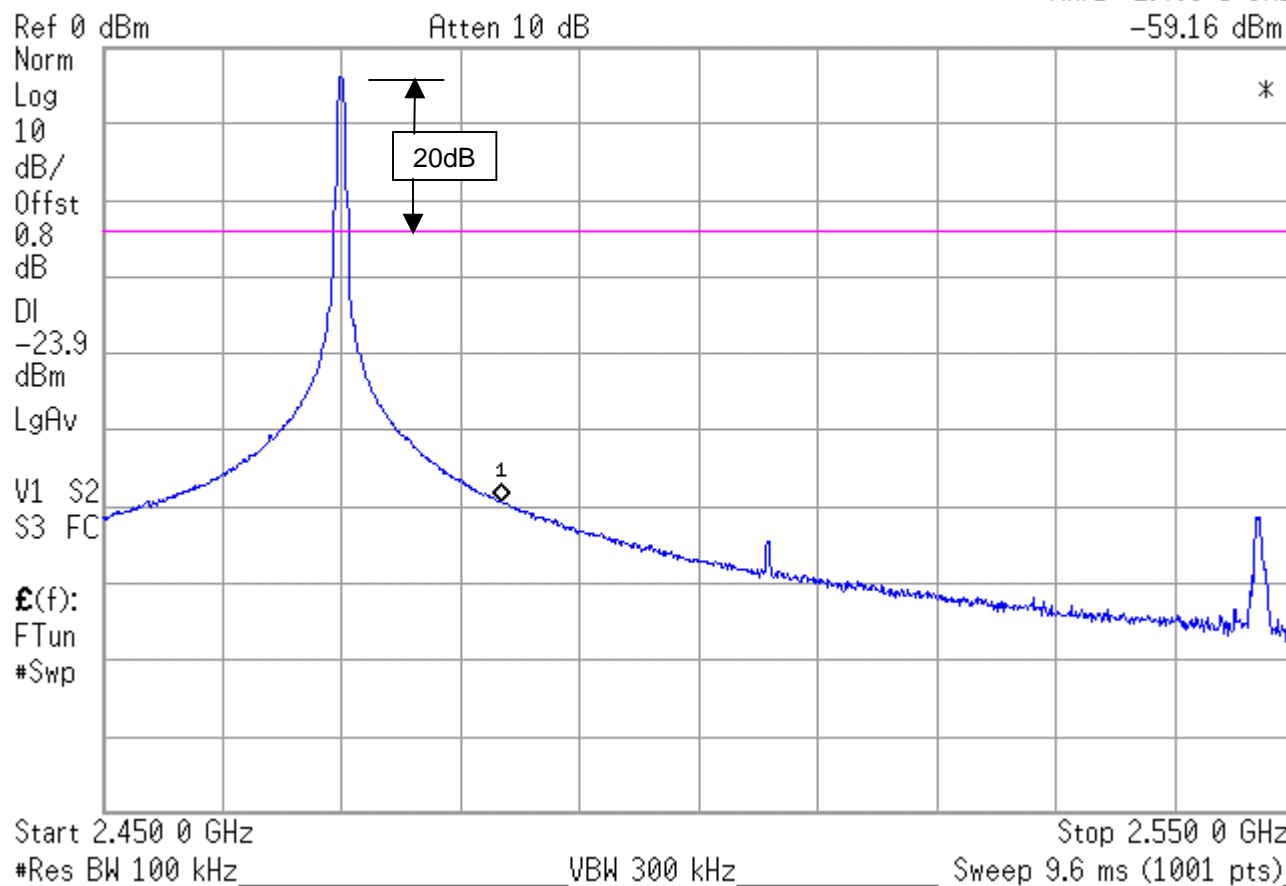
Conducted spurious, low channel
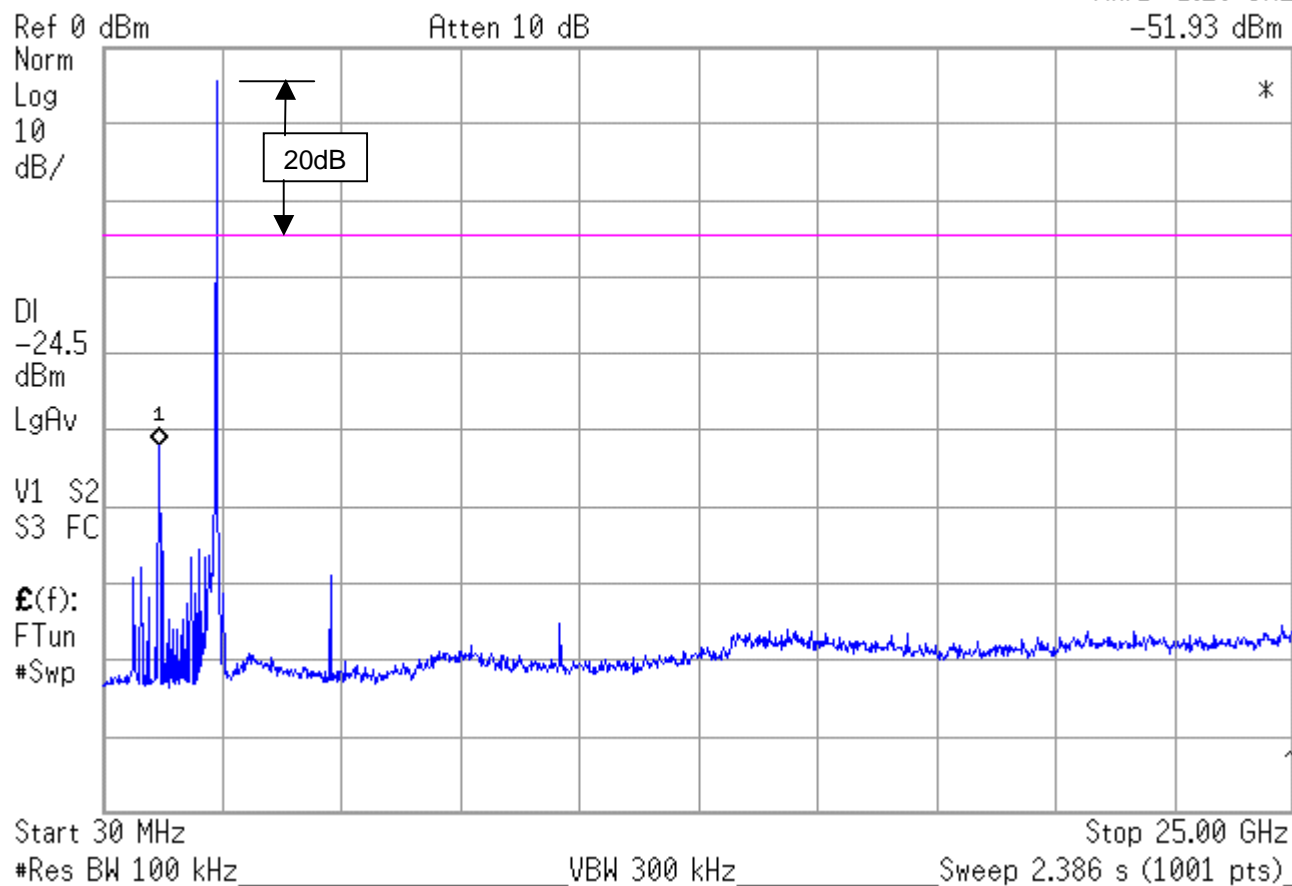
Conducted spurious, mid channel

Mkr1 4.87 GHz
-44.53 dBm

Ref 0 dBm   Atten 10 dB

Norm
Log
10
dB/

20dB

DI
-24.0
dBm
LgAv

V1 S2
S3 FC

£(f):
FTun
#Swp

1
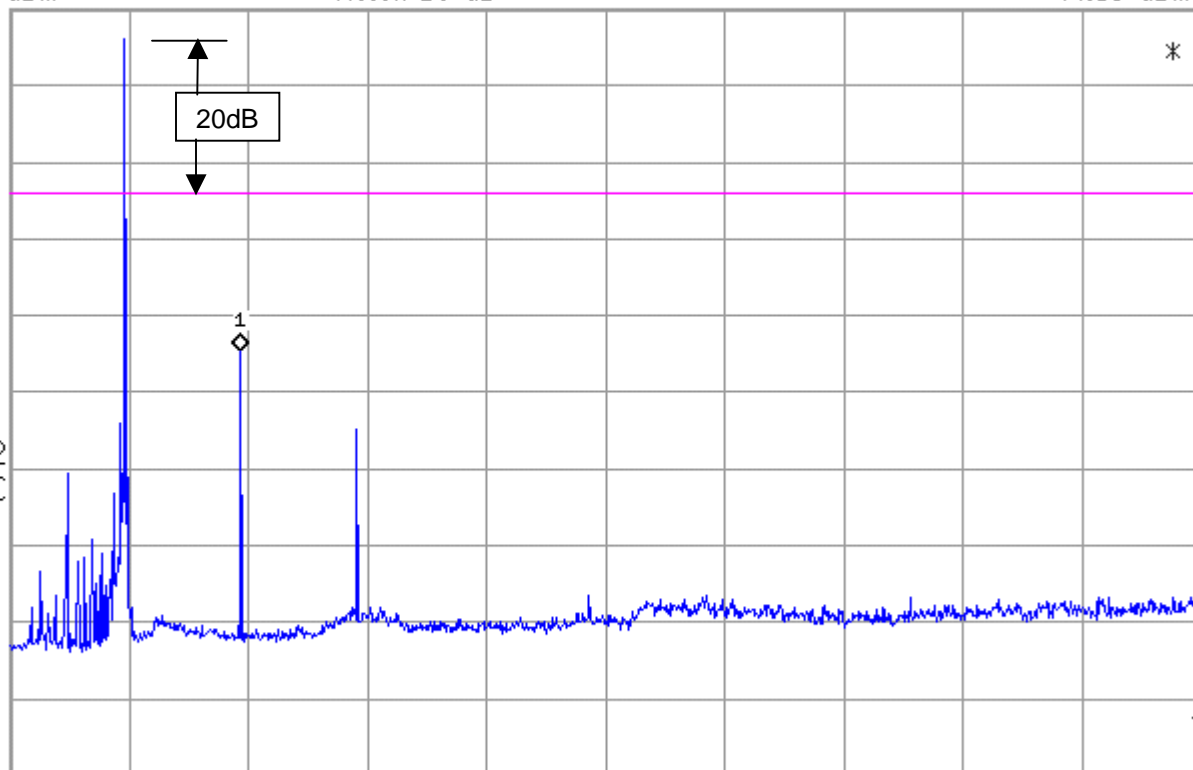
Start 30 MHz   Stop 25.00 GHz
#Res BW 100 kHz_____VBW 300 kHz_____#Sweep 600 s (1001 pts)_

Conducted spurious, high channel

Agilent 10:21:07 Jun 7, 2007

Mkr1 4.95 GHz
−49.57 dBm

Ref 0 dBm   Atten 10 dB

Norm
Log
10
dB/

20dB

DI
−25.9
dBm
LgAv

1

V1 S2
S3 FC

£(f):
FTun
#Swp

Start 30 MHz   Stop 25.00 GHz
#Res BW 100 kHz_____VBW 300 kHz_____Sweep 2.386 s (1001 pts)_
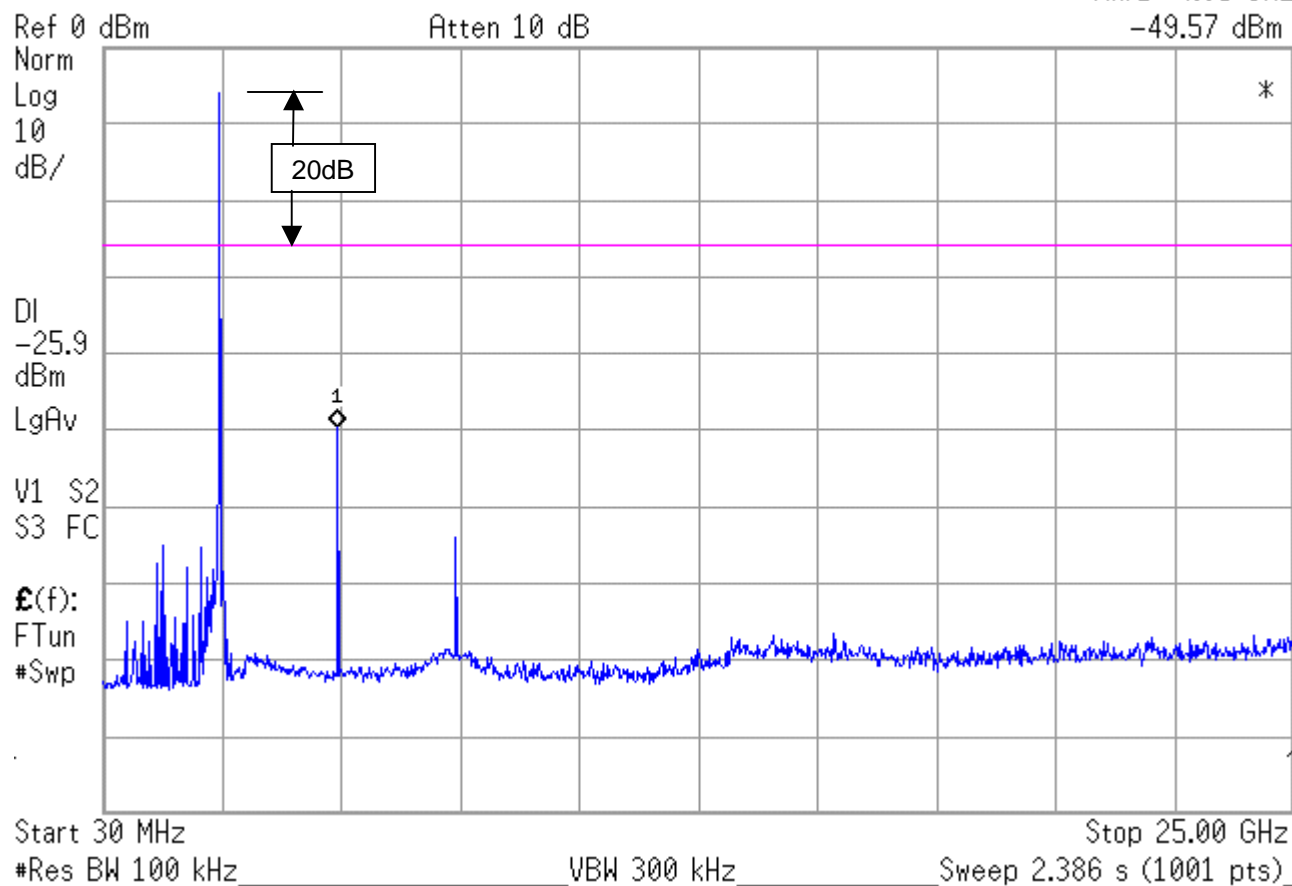
Power spectral density
FCC 15.247(e), IC RSS-210 A8.2(2)

Test summary
The requirements are: ■ - MET   □ - NOT MET
Maximum power spectral density = -14.51 dBm

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
3371	E4440A	Agilent	Spectrum Analyzer	MY43362222	29 Nov 07
3844	61697	---	High Frequency SMA cable	---	Code B

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

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

Test data

Power spectral density, low channel
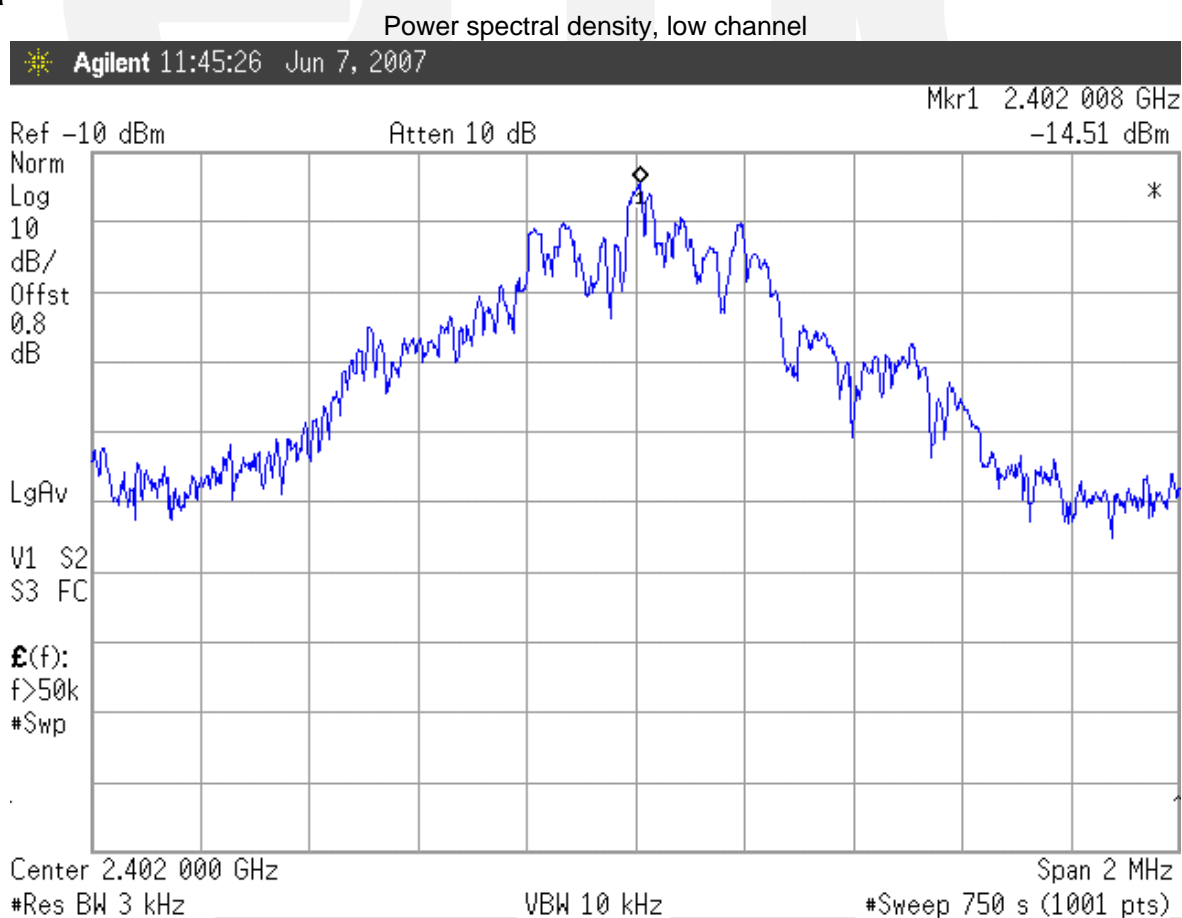
Power spectral density, mid channel

Agilent 12:01:25 Jun 7, 2007

Mkr1 2.435 008 GHz
-15.96 dBm

Ref -10 dBm   Atten 10 dB

Norm
Log
10
dB/
Offst
0.8
dB

LgAv

V1 S2
S3 FC

£(f):
f>50k
#Swp
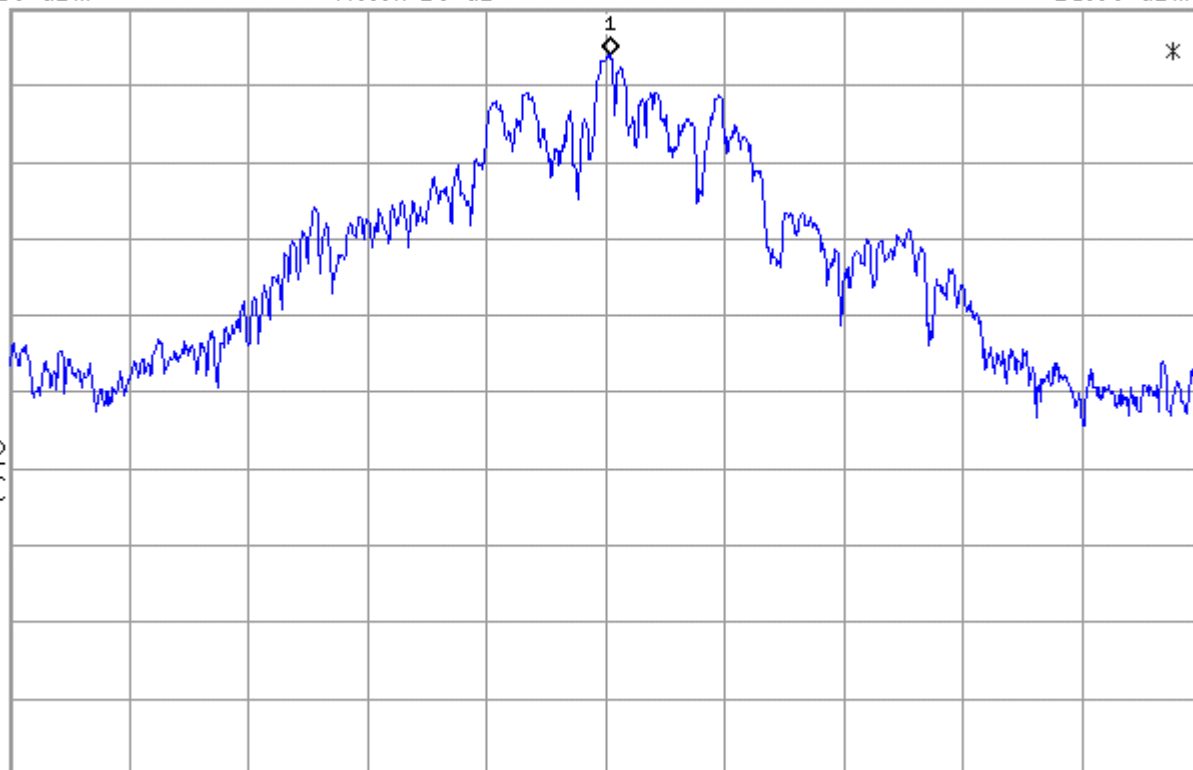
Center 2.435 000 GHz   Span 2 MHz
#Res BW 3 kHz   VBW 10 kHz   #Sweep 750 s (1001 pts)

Power spectral density, high channel

Agilent 15:55:51 Jun 11, 2007

Mkr1 2.470 000 GHz
−17.70 dBm

Ref −10 dBm   Atten 10 dB

Peak
Log
10
dB/
Offst
0.8
dB

LgAv

M1 S2
S3 FC

£(f):
f>50k
#Swp
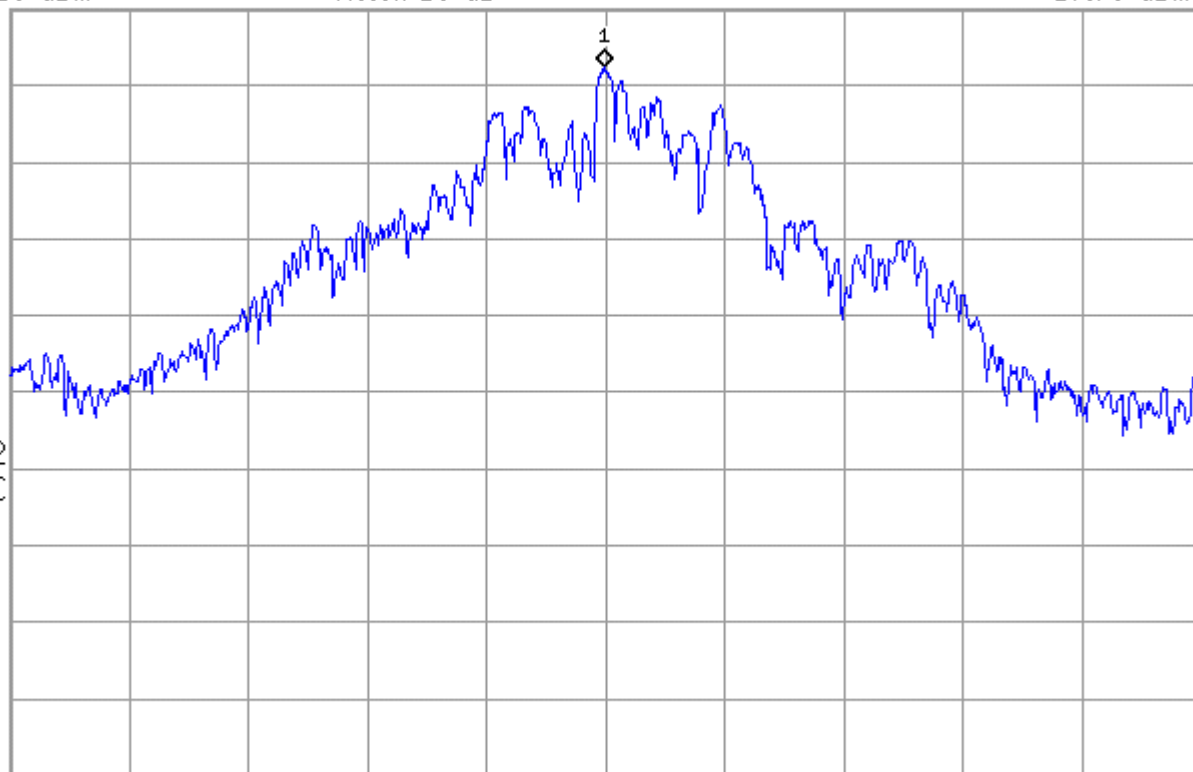
Center 2.470 000 GHz ^   Span 2 MHz
#Res BW 3 kHz   VBW 10 kHz   #Sweep 750 s (1001 pts)

TEST SETUP FOR EMISSIONS TESTING

WILD RIVER LAB
Large Test Site

Notes:
1. Items shown in dotted lines are located on the floor below the test area. It is 5 meters vertically from the ground floor to the test area.

2. 50 Hz, 60 Hz, and 400 Hz are power panels for alternating current.

3. The antenna may be positioned horizontally 3, 10 or 30 meters from the center of the turntable.

4. The circle is a 6.7 meter diameter turntable.

5. A ground plane is in the plane of this sheet.

6. The test sample is shown in the azimuthal position representing zero degrees.
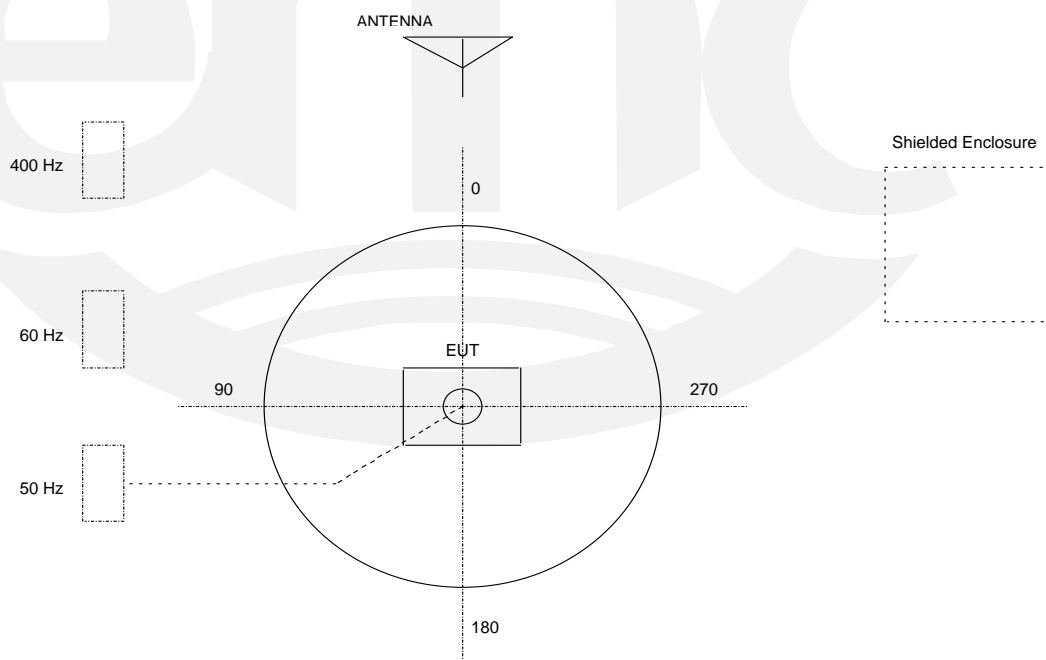
ANTENNA

400 Hz

Shielded Enclosure

0

60 Hz

EUT

90   270

50 Hz

180

Test-setup photo(s):
Radiated emissions
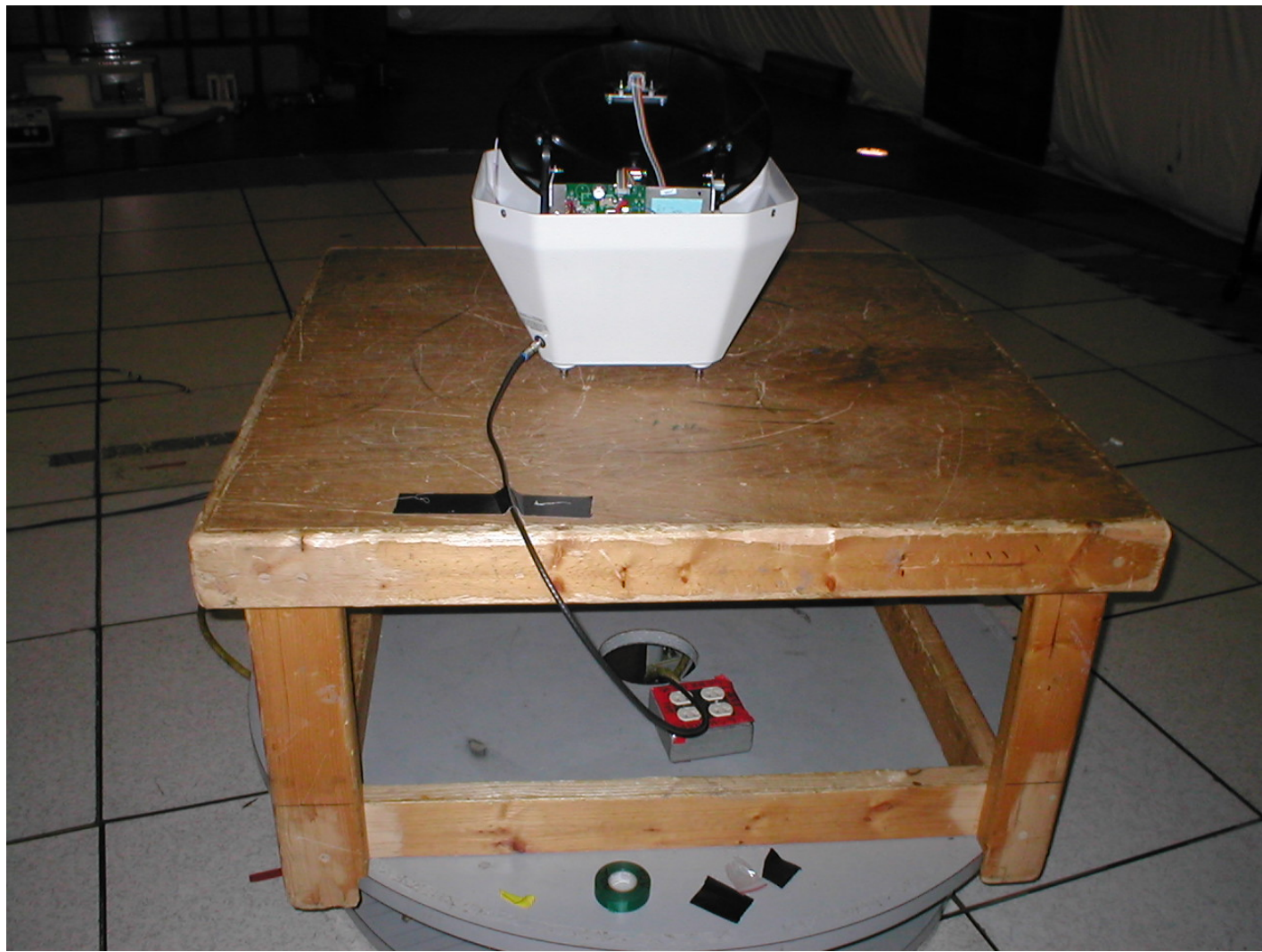
Test-setup photo(s):
<u>Radiated emissions</u>
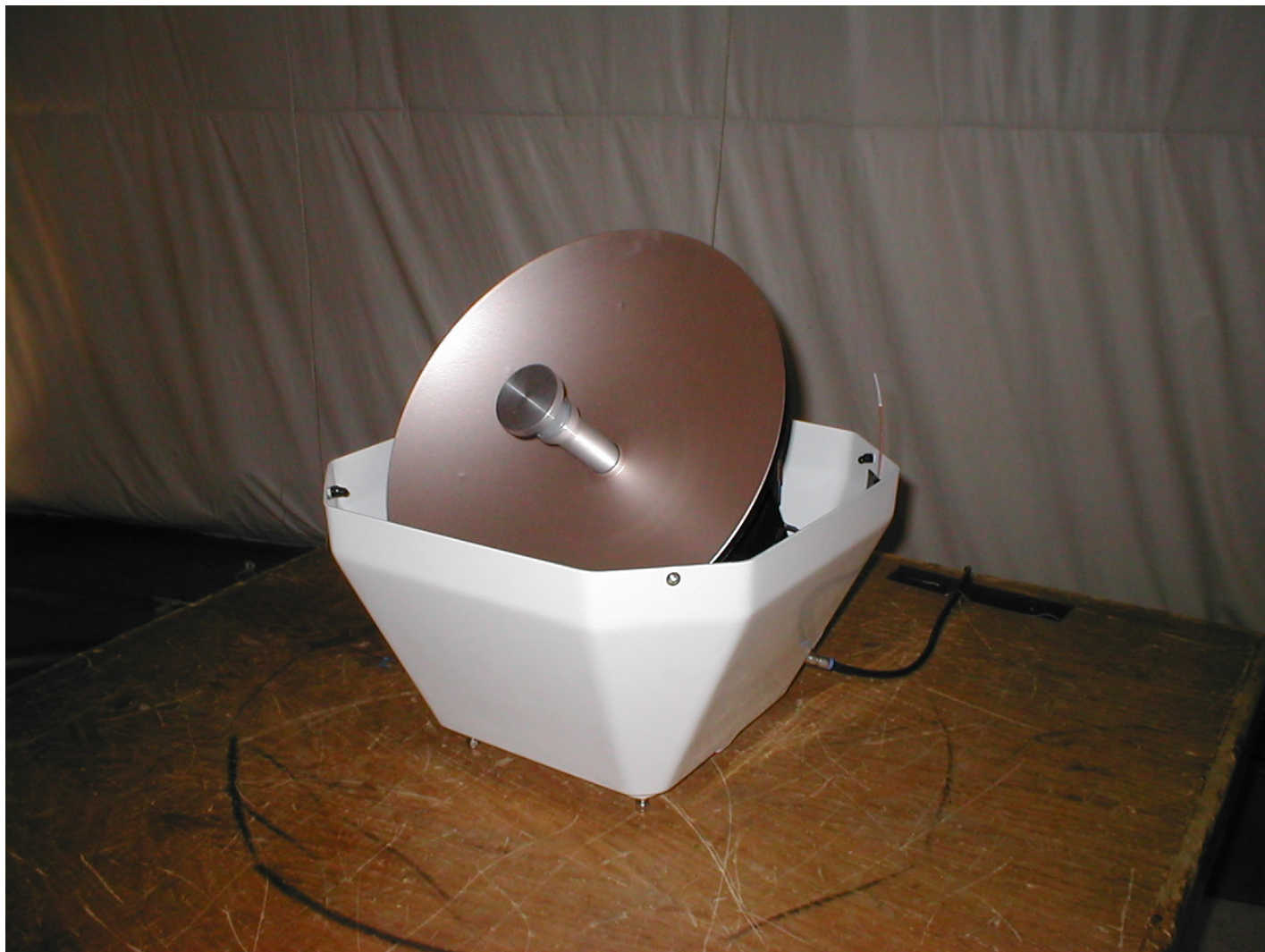
Test-setup photo(s):
Radiated emissions, 18 - 25 GHz

Test Report WC703793
TÜV SÜD AMERICA INC   19333 Wild Mountain Road   Taylors Falls MN 55084   Tel: (651) 638-0297   Fax: (651) 638-0298

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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 A and test setup photo(s)

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

DEVIATIONS FROM STANDARD:
None.

GENERAL REMARKS:
Radiated spurious emissions data states that the "long" antenna was used for measurements above 1 GHz. The long antenna has a higher gain than the actual Wallace coax antenna to be included in the final design.

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..
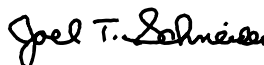
EUT Received Date:	04 June 2007
Condition of EUT:	Normal
Testing Start Date:	04 June 2007
Testing End Date:	15 June 2007

TÜV SÜD AMERICA INC

Greg Jakubowski
Senior EMC Technician

Joel Schneider
Senior EMC Engineer

Appendix A

Constructional Data Form

and

Block Diagram
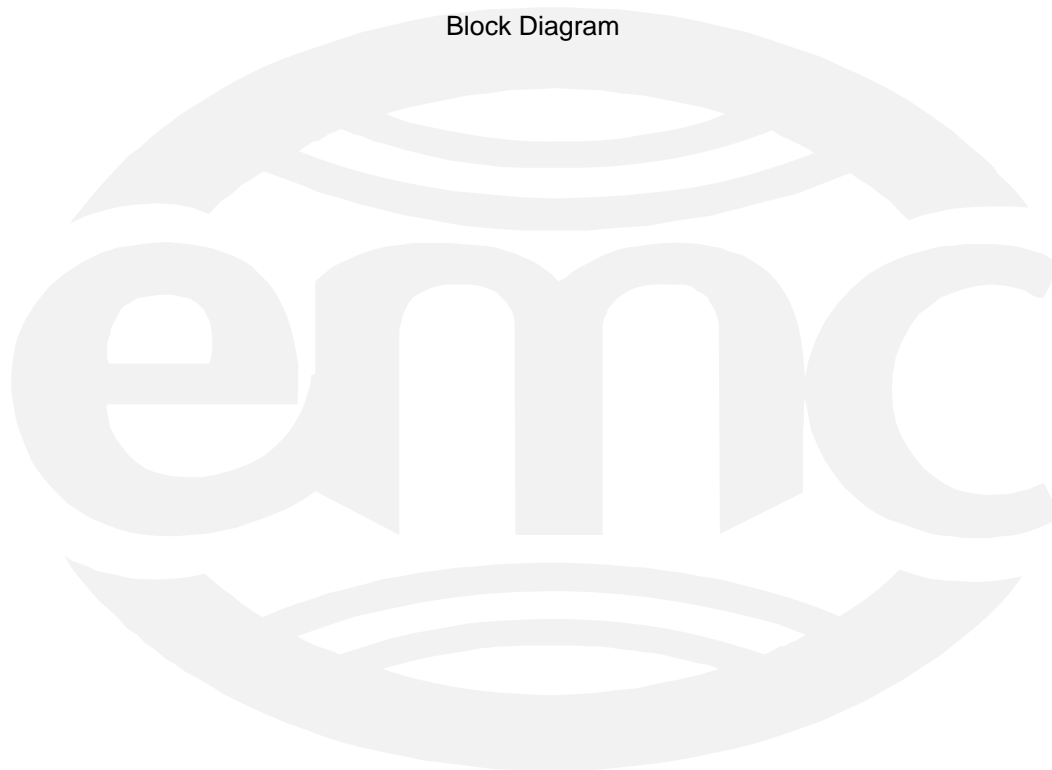
Form   *BASE STATION*

EMC Test Plan and Constructional Data Form

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: Wallace Technologies, LLC.

Address: 8300 89th Ave North

Brooklyn Park, MN 55445

Contact: Sam Shuster   Position: President

Phone: 763-416-5671   Fax: 763-416-5670

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.:   VQV10 and VQV10P   Serial No.:   n/a

Product Options:

Configurations to be tested: Using RF transceiver 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: Added SmA Connector so we can make conducted measurements

Modifications made during test:

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

☐ EMC Directive 89/336/EEC (EMC) Std:	☐ FCC: Class ☐ A ☒ B Part _____
☐ Machinery Directive 89/392/EEC (EMC) Std:	☐ VCCI: Class ☐ A ☐ B ☐ BSMI: Class ☐ A ☐ B
☐ Medical Device Directive 93/42/EEC (EMC) Std:	☐ Canada: Class ☐ A ☐ B ☐ Australia: Class ☐ A ☐ B
☐ Vehicle Directive 72/245/EEC (EMC) Std:	☐ Other: _____
☐ FDA Reviewers Guidance for Premarket Notification Submissions (EMC)	

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

☐ Attestation of Conformity (AoC)*

☐ Certificate of Conformity (CoC)*
   Protection Class   (N/A for vehicles)
   (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*
   ☐ Class I   ☐ Class II   ☐ Class III

☐ Industry Canada / FCB Certification

☐ Taiwan Certification

FILE: EMCU_F09.02E, REVISION 4, Effective: 19 Feb 2005   Page 1 of 7

Form

EMC Test Plan and Constructional Data Form

TÜV
SÜD
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 SÜD 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"_____

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

Other   _____

Other Special Requirements
The Vu Qube (P/N VQV10 and VQV10P) is powered through 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 operator using the handheld remote either from within the vehicle or next to the vehicle.

EUT Power Cable
☐ Permanent   OR   ☐ Removable   Length (in meters): _____
☒ Shielded   OR   ☐ Unshielded
☐ Not Applicable

Form

EMC Test Plan and Constructional Data Form

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

FILE: EMCU_F09.02E, REVISION 4, Effective: 19 Feb 2005

Form

EMC Test Plan and Constructional Data Form

TÜV SÜD America

EUT Software.

Revision Level: 19

Description: The software controls the communication bewteen 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 SÜD America Representative if additional assistance is required.

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

2.   The remote buttons (arrows) activated 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	VQV10, VQV10P	n/a	UUM10156V10
Vu Qube handheld remote	VQV10R	n/a	UUM10157V10

Form

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	A01Da5QC20145	n/a

Oscillator Frequencies

Frequency	Derived Frequency	Component # / Location	Description of Use
31kHz	n/a	U1; PCB for Vu Qube and Vu Qube handheld remote	USed to drive LCD and system clock
52 kHz	n/a	U2; PCB for Vu Qube and Vu Qube handheld remote	Switching power supply chip
8 MHz	n/a	U1; PCB for Vu Qube and Vu Qube handheld remote	System clock
16 MHz	Multi by U4 up to (MHz): 2402, 2405, 2408, 2411, 2432, 2435, 2439, 2441, 2462, 2465, 2468, 2470	Y1; PCB for Vu Qube and Vu Qube handheld remote	

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		

Page 5 of 7

FILE: EMCU_F09.02E, REVISION 4, Effective: 19 Feb 2005

Form

EMC Test Plan and Constructional Data Form

Power Line Filters

Manufacturer	Model #	Location in EUT
n/a		

Form

EMC Test Plan and Constructional Data Form

TÜV
SÜD
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)

_____   7/9/07
Customer authorization to perform tests   Date
according to this test plan.

_____   _____
Test Plan/CDF Prepared By (please print)   Date

Form

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.

SUPPORT EQUIPMENT

DBS RECEIVER

COAXIAL CABLE
- Used for Power and to transmit signal

TESTED EQUIPMENT

ANTENNA
(P/N VQV10 and VQV10P)

VꝴQube

HAND HELD REMOTE
(P/N VQV10R)

Authorization Signatures

Customer authorization to perform tests according to this test plan.

Date 7/5/07

Test Plan/CDF Prepared By (please print)

Date

Appendix B

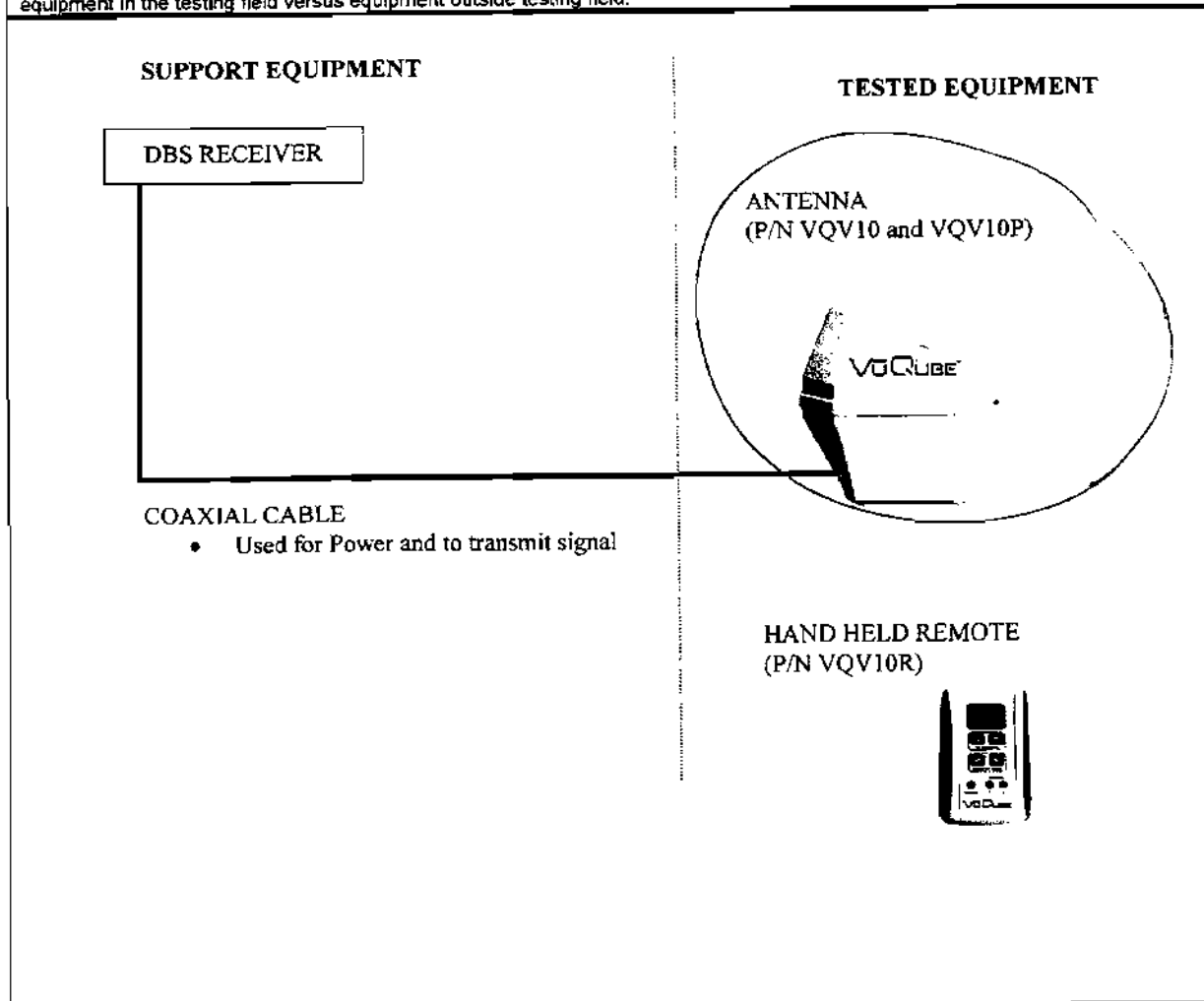Measurement Protocol

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/ANT/PREAMP (dB) (dB/m) (dB)	FINAL (dBuV/m)	POL/HGT/AZ (m) (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.