EMC TEST REPORT

Test Report No.	**WC909748**	Date of issue: 15 January 2010
Model / Serial No(s) Tested	EZPULL – iPULL / 2	
Product Description	EZPULL – iPULL Remote control	
Manufacturer	SoundGate Incorporated	
	5730 Dumas Avenue	
	Minnetonka MN 55345	

Test Result ■ **Positive** ☐ **Negative**

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REVISION RECORD

REVISION	TOTAL NUMBER OF PAGES	DATE	DESCRIPTION
	37	15 January 2010	Initial Release

TEST REPORT CONTENTS **Page(s)**

EMC TEST REGULATIONS:
The tests were performed according to the following regulations:
- FCC Part 15 Subpart C Section 15.231
- Industry Canada RSS-210 Issue 7 Annex 1

ENVIRONMENTAL CONDITIONS IN THE LAB

	Actual
Temperature:	: 19 ℃
Relative Humidity	: 17 %
Atmospheric pressure	: 100 kPa

POWER SUPPLY UTILIZED

Power supply system	: 3.3 VDC

TEST EQUIPMENT

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

SIGN EXPLANATIONS

☐ - not applicable
■ - applicable

Activation time
FCC 15.231(a)(1) - IC RSS 210 A1.1.1(1)

Test summary
The requirements are: ■ - MET ☐ - NOT MET
The manually operated device automatically deactivates the transmitter within 90ms of button release

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

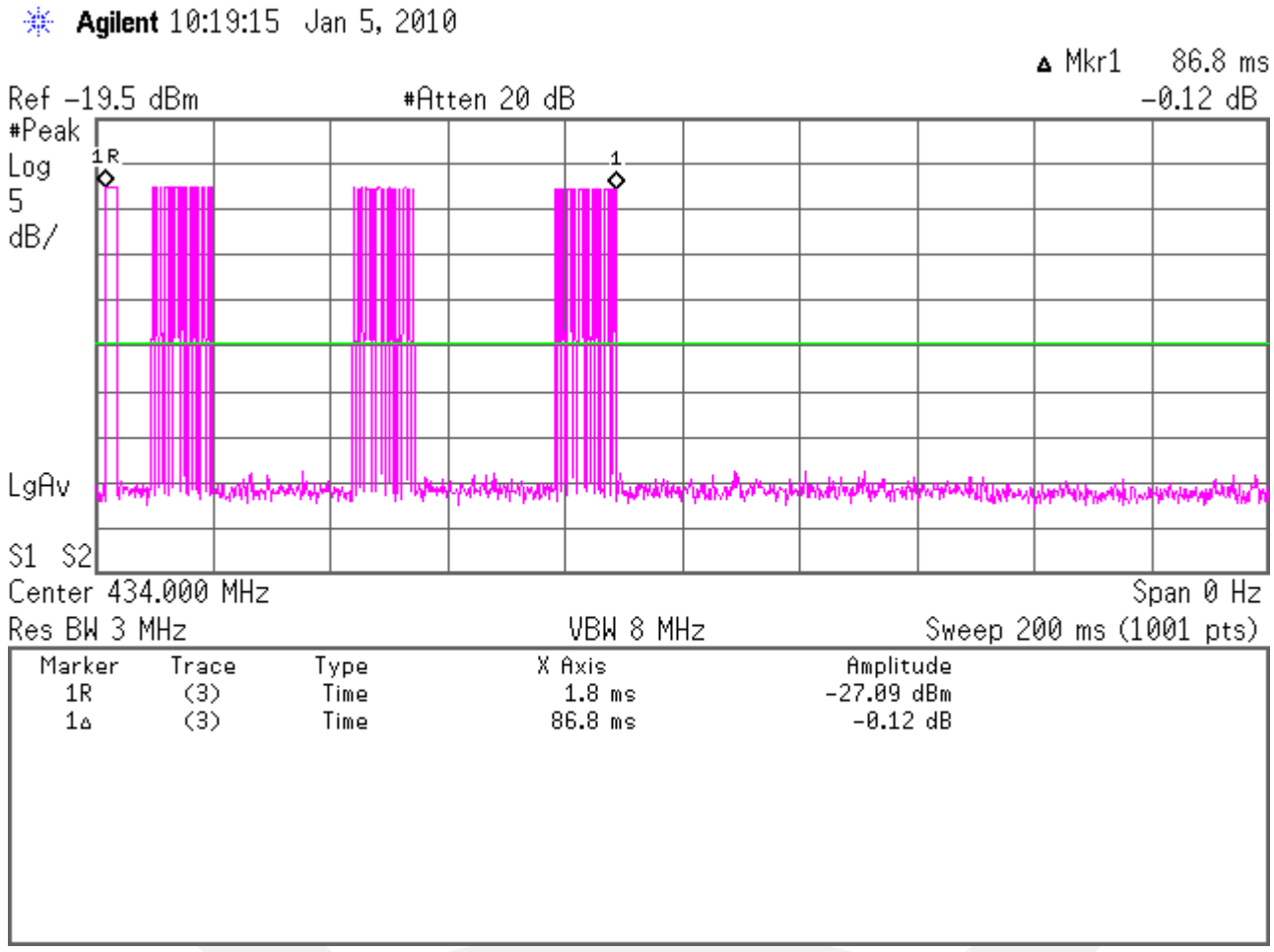
Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE03203	EM-6917B	Electro-Metrics	Biconicalog Periodic	106	04-Jun-10
WRLE10616	ZHL-1042J	Mini-Circuits	Preamplifier 10 - 3000 MHz	QA0746005	Code B 23-Oct-10
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	11-Aug-10

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

Test limit
A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

Test data
See following pages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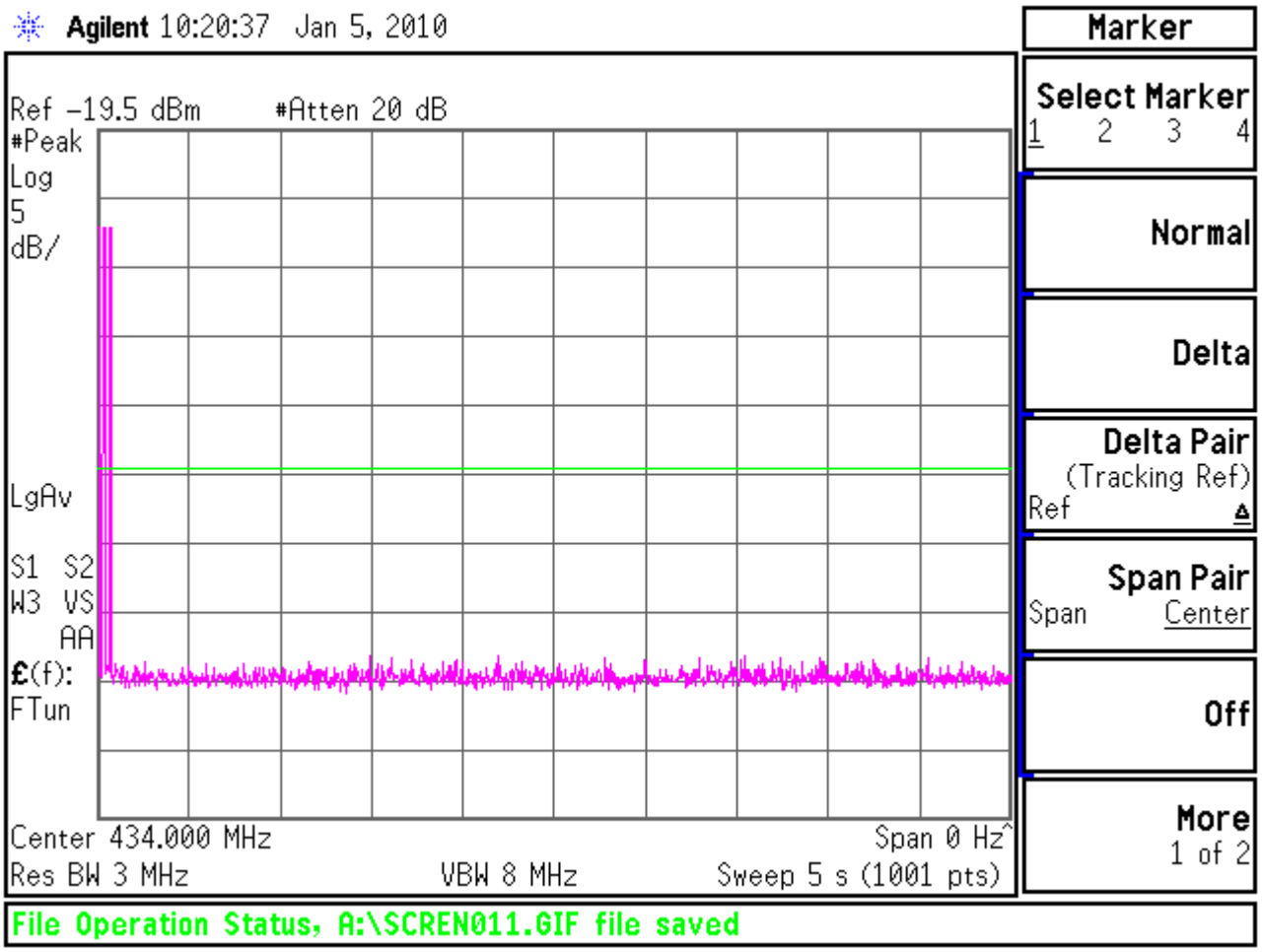
Mkr1 86.8 ms
Ref -19.5 dBm
#Atten 20 dB
-0.12 dB
#Peak
Log
5
dB/
1R
1
LgAv
S1 S2
Center 434.000 MHz
Span 0 Hz
Res BW 3 MHz
VBW 8 MHz
Sweep 200 ms (1001 pts)
Marker Trace Type X Axis Amplitude
1R (3) Time 1.8 ms -27.09 dBm
1Δ (3) Time 86.8 ms -0.12 dB


Agilent 10:20:37 Jan 5, 2010
Ref -19.5 dBm
#Atten 20 dB
#Peak
Log
5
dB/
LgAv
S1 S2
W3 VS
AA
£(f):
FTun
Center 434.000 MHz
Span 0 Hz
Res BW 3 MHz
VBW 8 MHz
Sweep 5 s (1001 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
File Operation Status, A:\SCREN011.GIF file saved

Field strength of fundamental
FCC 15.231(b) - IC RSS 210 A1.1.2

Test summary
The requirements are: ■ - MET ☐ - NOT MET
Measured with a typical transmit signal in a continuous loop.
Maximum field strength of the fundamental carrier at 3 meters is;
- Average detector, 79.03 dBμV/m or 8943 μV/m
- Peak detector, 98.88 dBμV/m or 87902 μV/m

Minimum margins of compliance are;
- Average, 1.77 dB
- Peak, 1.92 dB

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	Manufacturer	Description	Serial	Cal Due
WRLE03203	EM-6917B	Electro-Metrics	Biconicalog Periodic	106	04-Jun-10
WRLE02535	ESVS-20	Rohde & Schwarz	EMI Receiver	830350/004	09-Jul-10
WRLE02673	85662A	Hewlett-Packard	Analyzer Display	2152A03687	19-Mar-10
WRLE03294	8566B	Hewlett-Packard	Spectrum Analyzer	2349A03098	19-Mar-10

Test limit

Average field strength		Peak field strength	
(dBμV/m)	(μV/m)	(dBμV/m)	(mV/m)
80.8	11000	100.8	110

Test data
See following page

RADIATED EMISSIONS

Test Report #:	WC909748 Run 3	Test Area:	LTS		
EUT Model #:	SPCV2	Date:	1/5/2010		
EUT Serial #:	2	EUT Power:	3.3 VDC	Temperature:	19.0 °C
Test Method:	FCC 15.231			Air Pressure:	100.0 kPa
Customer:	SoundGate Inc.			Rel. Humidity:	17.0 %
EUT Description:	Remote Control				
Notes:					
Data File Name:	9748.dat			Page:	1 of 3

List of measurements for run #: 3

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.231 433.92MHz carrier 3m avg	DELTA2 FCC 15.231 433.92MHz carrier 3m pk
4.8 kBs						
Fundamental Carrier Emission Maximized						
Tx signal full on to determine worst case orthogonal position						
EUT upright						
434.004 MHz	80.15 Pk	1.4 / 16.63 / 0.0 / 0.0	98.18	V / 1.18 / 115	n/a	-2.62
EUT on its side						
434.016 MHz	79.65 Pk	1.4 / 16.63 / 0.0 / 0.0	97.68	H / 1.00 / 0	n/a	-3.12
EUT on its back						
434.01 MHz	80.85 Pk	1.4 / 16.63 / 0.0 / 0.0	98.88	H / 1.00 / 61	n/a	-1.92
Normal pulse train, continuous loop						
434.01 MHz	61.0 Av	1.4 / 16.63 / 0.0 / 0.0	79.03	H / 1.00 / 61	-1.77	n/a
434.01 MHz	32.9 Pk	1.4 / 16.63 / 0.0 / 0.0	50.93	H / 1.00 / 61	n/a	-49.87

Tested by: Robert J Behringer (Printed) — (Signature)

Reviewed by: Joel T Schneider (Printed) — (Signature)

RADIATED EMISSIONS

Test Report #:	WC909748 Run 3	Test Area:	LTS		
EUT Model #:	SPCV2	Date:	1/5/2010		
EUT Serial #:	2	EUT Power:	3.3 VDC	Temperature:	19.0 °C
Test Method:	FCC 15.231			Air Pressure:	100.0 kPa
Customer:	SoundGate Inc.			Rel. Humidity:	17.0 %
EUT Description:	Remote Control				
Notes:					
Data File Name:	9748.dat			Page:	2 of 3

Measurement summary for limit1: FCC 15.231 433.92MHz carrier 3m avg (Av)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.231 433.92MHz carrier 3m avg
434.01 MHz	61.0 Av	1.4 / 16.63 / 0.0 / 0.0	79.03	H / 1.00 / 61	-1.77

Measurement summary for limit2: FCC 15.231 433.92MHz carrier 3m pk (Pk)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA2 FCC 15.231 433.92MHz carrier 3m pk
434.01 MHz	80.85 Pk	1.4 / 16.63 / 0.0 / 0.0	98.88	H / 1.00 / 61	-1.92

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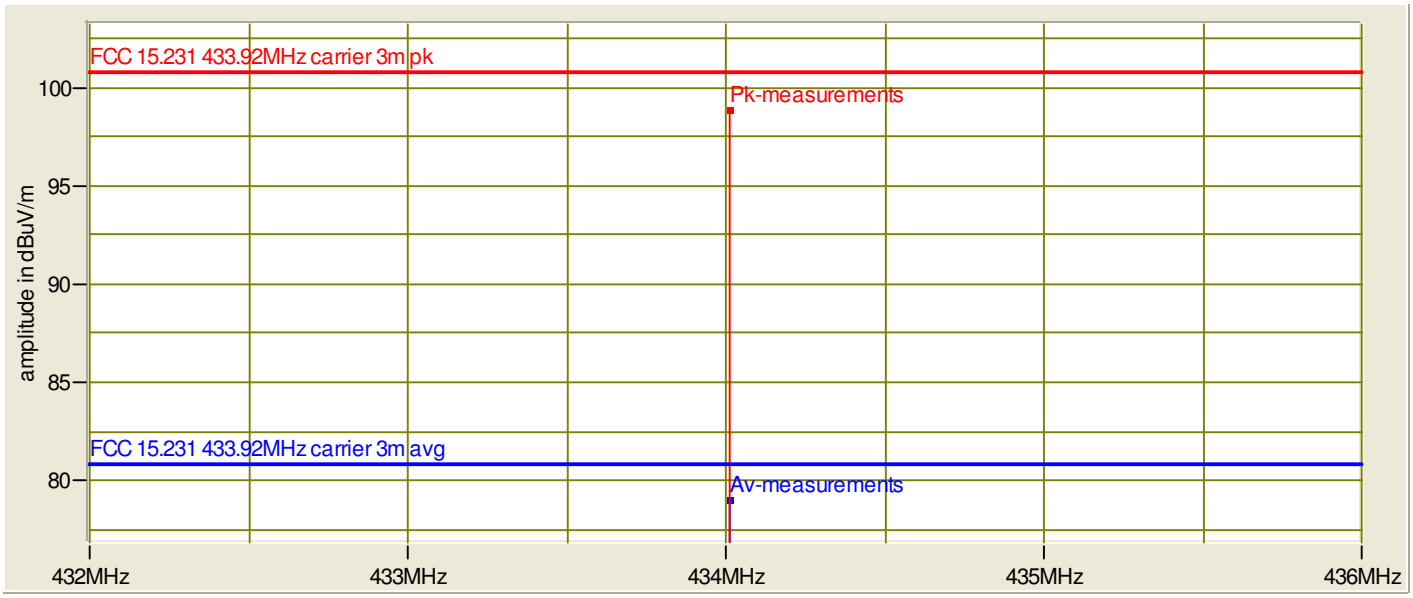
RADIATED EMISSIONS

Test Report #:	WC909748 Run 3	Test Area:	LTS		
EUT Model #:	SPCV2	Date:	1/5/2010		
EUT Serial #:	2	EUT Power:	3.3 VDC	Temperature:	19.0 °C
Test Method:	FCC 15.231			Air Pressure:	100.0 kPa
Customer:	SoundGate Inc.			Rel. Humidity:	17.0 %
EUT Description:	Remote Control				
Notes:					
Data File Name:	9748.dat			Page:	3 of 3

Graph:



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Field strength of spurious emissions
FCC 15.231(b) - IC RSS 210 A1.1.2

Test summary
The requirements are: ■ - MET ☐ - NOT MET
Maximum field strength of spurious emissions relative to the limit is 56.11 dBμV/m or 640 μV/m average at 3 meters at 2.17 GHz.
Minimum margin of compliance is 4.69 dB

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	Manufacturer	Description	Serial	Cal Due
WRLE03203	EM-6917B	Electro-Metrics	Biconicalog Periodic	106	04-Jun-10
WRLE02535	ESVS-20	Rohde & Schwarz	EMI Receiver	830350/004	09-Jul-10
NBLE02683	85650A	Hewlett-Packard	Quasi-peak Adapter	2430A00495	23-Feb-10
WRLE02673	85662A	Hewlett-Packard	Analyzer Display	2152A03687	19-Mar-10
WRLE03294	8566B	Hewlett-Packard	Spectrum Analyzer	2349A03098	19-Mar-10
WRLE10616	ZHL-1042J	Mini-Circuits	Preamplifier 10 - 3000 MHz	QA0746005	Code B 23-Oct-10
WRLE10527	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0001	Code B 28-Sep-10
WRLE02075	3115	EMCO	Ridge Guide Ant. 1-18 GHz	9001-3275	13-Jan-10
WRLE03935	F548B-1	Acronetics	1 – 2 GHz Bandpass Filter	010	Code B 25-Sep-10
WRLE03934	F549B-1	Acronetics	2 – 4 GHz Bandpass Filter	010	Code B 30-Sep-10
WRLE02003	F550B1	Acronetics	4 – 8 GHz Bandpass Filter	010	Code B 02-Nov-10

Test limit outside restricted bands at 3 meters

Average field strength		Peak field strength	
(dBμV/m)	(μV/m)	(dBμV/m)	(mV/m)
60.8	1100	80.8	11000

Test limit within restricted bands at 3 meters

Frequency (MHz)	Quasi peak field strength	
	(dBμV/m)	(μV/m)
30-88	40	100
88-216	43.5	150
216-960	46	200
Above 960	54	500

Test data
See following pages

RADIATED EMISSIONS

Test Report #:	WC909748 Run 4	Test Area:	LTS		
EUT Model #:	SPCV2	Date:	1/5/2010		
EUT Serial #:	2	EUT Power:	3.3 VDC	Temperature:	19.0 °C
Test Method:	FCC 15.231			Air Pressure:	100.0 kPa
Customer:	SoundGate Inc.			Rel. Humidity:	17.0 %
EUT Description:	Remote Control				
Notes:					
Data File Name:	9748.dat			Page:	1 of 3

List of measurements for run #: 4

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.231 Spurs Pk 30 - 1000 MHz.	DELTA2 FCC 15.231 Spurs Avg 30 - 1000 MHz.
Start of Spurious Scan 30 - 1000 MHz.						
Start of Vertical Scan						
868.114 MHz	54.6 Pk	2.38 / 22.45 / 29.27 / 0.0	50.16	V / 1.00 / 0	-30.64	n/a
Maxed.						
868.114 MHz	60.2 Pk	2.38 / 22.45 / 29.27 / 0.0	55.76	V / 1.70 / 300	-25.04	n/a
868.114 MHz	70.95 Pk	2.38 / 22.45 / 29.27 / 0.0	66.51	H / 1.00 / 238	-14.29	n/a
868.114 MHz	49.1 Av	2.38 / 22.45 / 29.27 / 0.0	44.66	H / 1.00 / 238	n/a	-16.14
End of Spurious Scan 30 - 1000 MHz.						

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RADIATED EMISSIONS

Test Report #:	WC909748 Run 4	Test Area:	LTS		
EUT Model #:	SPCV2	Date:	1/5/2010		
EUT Serial #:	2	EUT Power:	3.3 VDC	Temperature:	19.0 °C
Test Method:	FCC 15.231			Air Pressure:	100.0 kPa
Customer:	SoundGate Inc.			Rel. Humidity:	17.0 %
EUT Description:	Remote Control				
Notes:					
Data File Name:	9748.dat			Page:	2 of 3

Measurement summary for limit1: FCC 15.231 Spurs Pk 30 - 1000 MHz. (Pk)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.231 Spurs Pk 30 - 1000 MHz.
868.114 MHz	70.95 Pk	2.38 / 22.45 / 29.27 / 0.0	66.51	H / 1.00 / 238	-14.29

Measurement summary for limit2: FCC 15.231 Spurs Avg 30 - 1000 MHz. (Av)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA2 FCC 15.231 Spurs Avg 30 - 1000 MHz.
868.114 MHz	49.1 Av	2.38 / 22.45 / 29.27 / 0.0	44.66	H / 1.00 / 238	-16.14

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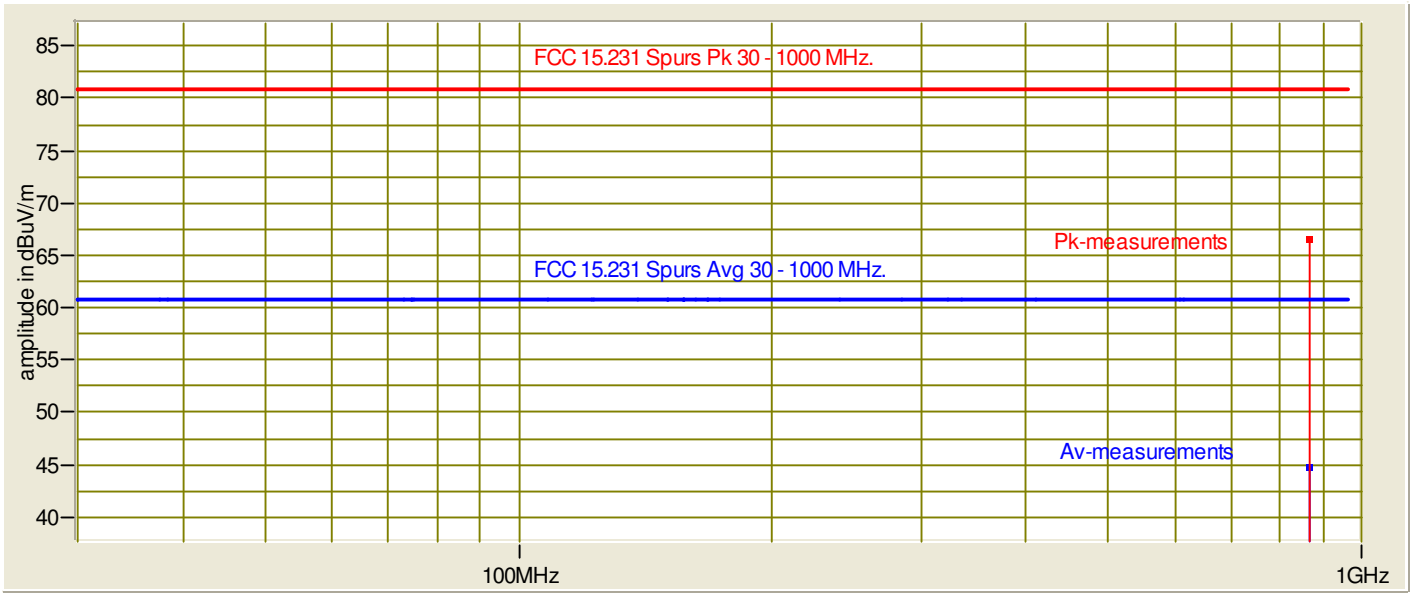
Reviewed by: Joel T Schneider (Printed) _____ (Signature)

RADIATED EMISSIONS

Test Report #:	WC909748 Run 4	Test Area:	LTS		
EUT Model #:	SPCV2	Date:	1/5/2010		
EUT Serial #:	2	EUT Power:	3.3 VDC	Temperature:	19.0 °C
Test Method:	FCC 15.231			Air Pressure:	100.0 kPa
Customer:	SoundGate Inc.			Rel. Humidity:	17.0 %
EUT Description:	Remote Control				
Notes:					
Data File Name:	9748.dat			Page:	3 of 3

Graph:



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Reviewed by: Joel T Schneider (Printed) _____ (Signature)

RADIATED EMISSIONS

Test Report #:	WC909748 Run 5	Test Area:	LTS		
EUT Model #:	SPCV2	Date:	1/5/2010		
EUT Serial #:	2	EUT Power:	3.3 VDC	Temperature:	19.0 °C
Test Method:	FCC 15.231			Air Pressure:	100.0 kPa
Customer:	SoundGate Inc.			Rel. Humidity:	17.0 %
EUT Description:	Remote Control				
Notes:					
Data File Name:	9748.dat			Page:	1 of 5

List of measurements for run #: 5

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.231 Avg >1GHz	DELTA2 FCC 15.231 Pk >1GHz
Start of Spurious Scan 1000 - 4400 MHz.						
Start of Scan 1 - 2 GHz.						
1.302 GHz	59.85 Pk	3.39 / 25.14 / 41.57 / 0.55	47.36	V / 1.00 / 0	n/a	-26.64
1.302 GHz	45.27 Av	3.39 / 25.14 / 41.57 / 0.55	32.78	V / 1.00 / 0	-21.22	n/a
1.736 GHz	51.25 Pk	3.7 / 26.38 / 42.67 / 0.55	39.21	V / 1.00 / 0	n/a	-41.59
1.736 GHz	40.64 Av	3.7 / 26.38 / 42.67 / 0.55	28.6	V / 1.00 / 0	-32.2	n/a
1.62 GHz	51.75 Pk	3.62 / 25.75 / 42.2 / 0.57	39.48	V / 1.00 / 0	n/a	-34.52
1.62 GHz	39.65 Av	3.62 / 25.75 / 42.2 / 0.57	27.38	V / 1.00 / 0	-26.62	n/a
1.952 GHz	53.4 Pk	3.86 / 27.54 / 43.18 / 0.75	42.37	V / 1.00 / 0	n/a	-38.43
1.952 GHz	44.28 Av	3.86 / 27.54 / 43.18 / 0.75	33.25	V / 1.00 / 0	-27.55	n/a
1.302 GHz	68.05 Pk	3.39 / 25.14 / 41.57 / 0.55	55.56	V / 1.00 / 90	n/a	-18.44
1.302 GHz	45.7 Av	3.39 / 25.14 / 41.57 / 0.55	33.21	V / 1.00 / 90	-20.79	n/a
1.736 GHz	55.25 Pk	3.7 / 26.38 / 42.67 / 0.55	43.21	V / 1.00 / 90	n/a	-37.59
1.736 GHz	40.3 Av	3.7 / 26.38 / 42.67 / 0.55	28.26	V / 1.00 / 90	-32.54	n/a
Maxed.						
1.302 GHz	70.4 Pk	3.39 / 25.14 / 41.57 / 0.55	57.91	V / 1.07 / 189	n/a	-16.09
1.302 GHz	47.7 Av	3.39 / 25.14 / 41.57 / 0.55	35.21	V / 1.07 / 189	-18.79	n/a
1.302 GHz	74.1 Pk	3.39 / 25.14 / 41.57 / 0.55	61.61	H / 1.00 / 44	n/a	-12.39
1.302 GHz	46.85 Pk	3.39 / 25.14 / 41.57 / 0.55	34.36	H / 1.00 / 44	n/a	-39.64
1.736 GHz	65.9 Pk	3.7 / 26.38 / 42.67 / 0.55	53.86	H / 1.22 / 161	n/a	-26.94
1.736 GHz	43.5 Av	3.7 / 26.38 / 42.67 / 0.55	31.46	H / 1.22 / 161	-29.34	n/a
1.736 GHz	58.15 Pk	3.7 / 26.38 / 42.67 / 0.55	46.11	V / 1.00 / 197	n/a	-34.69
1.736 GHz	41.7 Av	3.7 / 26.38 / 42.67 / 0.55	29.66	V / 1.00 / 197	-31.14	n/a

Tested by: Robert J Behringer (Printed) _____ (Signature)

Reviewed by: Joel T Schneider (Printed) _____ (Signature)

RADIATED EMISSIONS

Test Report #:	WC909748 Run 5	Test Area:	LTS		
EUT Model #:	SPCV2	Date:	1/5/2010		
EUT Serial #:	2	EUT Power:	3.3 VDC	Temperature:	19.0 °C
Test Method:	FCC 15.231			Air Pressure:	100.0 kPa
Customer:	SoundGate Inc.			Rel. Humidity:	17.0 %
EUT Description:	Remote Control				
Notes:					
Data File Name:	9748.dat			Page:	2 of 5

List of measurements for run #: 5

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.231 Avg >1GHz	DELTA2 FCC 15.231 Pk >1GHz
Start of Scan 2 - 4 GHz.						
2.17 GHz	68.8 Pk	4.02 / 28.18 / 43.37 / 0.18	57.81	V / 1.00 / 0	n/a	-22.99
2.17 GHz	53.05 Av	4.02 / 28.18 / 43.37 / 0.18	42.06	V / 1.00 / 0	-18.74	n/a
2.604 GHz	60.35 Pk	4.34 / 29.16 / 43.54 / 0.3	50.61	V / 1.00 / 0	n/a	-30.19
2.604 GHz	41.85 Av	4.34 / 29.16 / 43.54 / 0.3	32.11	V / 1.00 / 0	-28.69	n/a
3.038 GHz	57.95 Pk	4.77 / 30.14 / 43.7 / 0.33	49.48	V / 1.00 / 0	n/a	-31.32
3.038 GHz	46.65 Av	4.77 / 30.14 / 43.7 / 0.33	38.18	V / 1.00 / 0	-22.62	n/a
3.472 GHz	51.7 Pk	5.19 / 31.11 / 43.7 / 0.4	44.7	V / 1.00 / 0	n/a	-36.1
3.472 GHz	38.05 Av	5.19 / 31.11 / 43.7 / 0.4	31.05	V / 1.00 / 0	-29.75	n/a
3.906 GHz	48.8 Pk	5.62 / 32.09 / 43.7 / 0.72	43.53	V / 1.00 / 0	n/a	-30.47
3.906 GHz	38.84 Av	5.62 / 32.09 / 43.7 / 0.72	33.57	V / 1.00 / 0	-20.43	n/a
2.194 GHz	51.4 Pk	4.04 / 28.24 / 43.38 / 0.2	40.49	V / 1.00 / 0	n/a	-40.31
2.194 GHz	41.86 Av	4.04 / 28.24 / 43.38 / 0.2	30.95	V / 1.00 / 0	-29.85	n/a
Maxed.						
2.17 GHz	72.0 Pk	4.02 / 28.18 / 43.37 / 0.18	61.01	V / 1.00 / 197	n/a	-19.79
2.17 GHz	62.75 Av	4.02 / 28.18 / 43.37 / 0.18	51.76	V / 1.00 / 197	-9.04	n/a
2.17 GHz	72.9 Pk	4.02 / 28.18 / 43.37 / 0.18	61.91	H / 1.00 / 228	n/a	-18.89
2.17 GHz	67.1 Av	4.02 / 28.18 / 43.37 / 0.18	56.11	H / 1.00 / 228	-4.69	n/a
2.604 GHz	57.85 Pk	4.34 / 29.16 / 43.54 / 0.3	48.11	H / 1.18 / 221	n/a	-32.69
2.604 GHz	41.45 Av	4.34 / 29.16 / 43.54 / 0.3	31.71	H / 1.18 / 221	-29.09	n/a
2.604 GHz	62.25 Pk	4.34 / 29.16 / 43.54 / 0.3	52.51	V / 1.22 / 334	n/a	-28.29
2.604 GHz	42.15 Av	4.34 / 29.16 / 43.54 / 0.3	32.41	V / 1.22 / 334	-28.39	n/a
3.038 GHz	59.7 Pk	4.77 / 30.14 / 43.7 / 0.33	51.23	V / 1.00 / 173	n/a	-29.57
3.038 GHz	42.95 Av	4.77 / 30.14 / 43.7 / 0.33	34.48	V / 1.00 / 173	-26.32	n/a
3.038 GHz	56.25 Pk	4.77 / 30.14 / 43.7 / 0.33	47.78	H / 1.00 / 313	n/a	-33.02

Tested by: Robert J Behringer (Printed) _____ (Signature)

Reviewed by: Joel T Schneider (Printed) _____ (Signature)

RADIATED EMISSIONS

Test Report #:	WC909748 Run 5	Test Area:	LTS		
EUT Model #:	SPCV2	Date:	1/5/2010		
EUT Serial #:	2	EUT Power:	3.3 VDC	Temperature:	19.0 °C
Test Method:	FCC 15.231			Air Pressure:	100.0 kPa
Customer:	SoundGate Inc.			Rel. Humidity:	17.0 %
EUT Description:	Remote Control				
Notes:					
Data File Name:	9748.dat			Page:	3 of 5

List of measurements for run #: 5

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.231 Avg >1GHz	DELTA2 FCC 15.231 Pk >1GHz
3.038 GHz	49.75 Av	4.77 / 30.14 / 43.7 / 0.33	41.28	H / 1.00 / 313	-19.52	n/a
3.472 GHz	56.1 Pk	5.19 / 31.11 / 43.7 / 0.4	49.1	H / 1.02 / 129	n/a	-31.7
3.472 GHz	39.5 Av	5.19 / 31.11 / 43.7 / 0.4	32.5	H / 1.02 / 129	-28.3	n/a
3.472 GHz	56.7 Pk	5.19 / 31.11 / 43.7 / 0.4	49.7	V / 1.00 / 331	n/a	-31.1
3.472 GHz	42.05 Pk	5.19 / 31.11 / 43.7 / 0.4	35.05	V / 1.00 / 331	n/a	-45.75
3.906 GHz	53.1 Pk	5.62 / 32.09 / 43.7 / 0.72	47.83	V / 1.00 / 100	n/a	-26.17
3.906 GHz	48.38 Av	5.62 / 32.09 / 43.7 / 0.72	43.11	V / 1.00 / 100	-10.89	n/a
3.906 GHz	50.05 Pk	5.62 / 32.09 / 43.7 / 0.72	44.78	H / 1.00 / 354	n/a	-29.22
3.906 GHz	43.89 Av	5.62 / 32.09 / 43.7 / 0.72	38.62	H / 1.00 / 354	-15.38	n/a
Start of Scan 4 - 4.4 GHz.						
Maxed.						
4.341 GHz	53.15 Pk	6.04 / 32.23 / 43.5 / 0.33	48.26	V / 1.10 / 87	n/a	-25.74
4.34 GHz	38.55 Av	6.04 / 32.23 / 43.5 / 0.33	33.66	V / 1.10 / 87	-20.34	n/a
4.34 GHz	46.25 Pk	6.04 / 32.23 / 43.5 / 0.33	41.36	H / 1.10 / 293	n/a	-32.64
4.34 GHz	37.1 Av	6.04 / 32.23 / 43.5 / 0.33	32.21	H / 1.10 / 293	-21.79	n/a
End of Spurious Scan 1 - 4.4 GHz.						

Tested by: Robert J Behringer (Printed) _____ (Signature)

Reviewed by: Joel T Schneider (Printed) _____ (Signature)

RADIATED EMISSIONS

Test Report #:	WC909748 Run 5	Test Area:	LTS		
EUT Model #:	SPCV2	Date:	1/5/2010		
EUT Serial #:	2	EUT Power:	3.3 VDC	Temperature:	19.0 °C
Test Method:	FCC 15.231			Air Pressure:	100.0 kPa
Customer:	SoundGate Inc.			Rel. Humidity:	17.0 %
EUT Description:	Remote Control				
Notes:					
Data File Name:	9748.dat			Page:	4 of 5

Measurement summary for limit1: FCC 15.231 Avg >1GHz (Av)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.231 Avg >1GHz
2.17 GHz	67.1 Av	4.02 / 28.18 / 43.37 / 0.18	56.11	H / 1.00 / 228	-4.69
3.906 GHz	48.38 Av	5.62 / 32.09 / 43.7 / 0.72	43.11	V / 1.00 / 100	-10.89
1.302 GHz	47.7 Av	3.39 / 25.14 / 41.57 / 0.55	35.21	V / 1.07 / 189	-18.79
3.038 GHz	49.75 Av	4.77 / 30.14 / 43.7 / 0.33	41.28	H / 1.00 / 313	-19.52
4.34 GHz	38.55 Av	6.04 / 32.23 / 43.5 / 0.33	33.66	V / 1.10 / 87	-20.34
1.62 GHz	39.65 Av	3.62 / 25.75 / 42.2 / 0.57	27.38	V / 1.00 / 0	-26.62
1.952 GHz	44.28 Av	3.86 / 27.54 / 43.18 / 0.75	33.25	V / 1.00 / 0	-27.55
3.472 GHz	39.5 Av	5.19 / 31.11 / 43.7 / 0.4	32.5	H / 1.02 / 129	-28.3
2.604 GHz	42.15 Av	4.34 / 29.16 / 43.54 / 0.3	32.41	V / 1.22 / 334	-28.39
1.736 GHz	43.5 Av	3.7 / 26.38 / 42.67 / 0.55	31.46	H / 1.22 / 161	-29.34
2.194 GHz	41.86 Av	4.04 / 28.24 / 43.38 / 0.2	30.95	V / 1.00 / 0	-29.85

Measurement summary for limit2: FCC 15.231 Pk >1GHz (Pk)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA2 FCC 15.231 Pk >1GHz
1.302 GHz	74.1 Pk	3.39 / 25.14 / 41.57 / 0.55	61.61	H / 1.00 / 44	-12.39
2.17 GHz	72.9 Pk	4.02 / 28.18 / 43.37 / 0.18	61.91	H / 1.00 / 228	-18.89
4.341 GHz	53.15 Pk	6.04 / 32.23 / 43.5 / 0.33	48.26	V / 1.10 / 87	-25.74
3.906 GHz	53.1 Pk	5.62 / 32.09 / 43.7 / 0.72	47.83	V / 1.00 / 100	-26.17
1.736 GHz	65.9 Pk	3.7 / 26.38 / 42.67 / 0.55	53.86	H / 1.22 / 161	-26.94
2.604 GHz	62.25 Pk	4.34 / 29.16 / 43.54 / 0.3	52.51	V / 1.22 / 334	-28.29
3.038 GHz	59.7 Pk	4.77 / 30.14 / 43.7 / 0.33	51.23	V / 1.00 / 173	-29.57
3.472 GHz	56.7 Pk	5.19 / 31.11 / 43.7 / 0.4	49.7	V / 1.00 / 331	-31.1
1.62 GHz	51.75 Pk	3.62 / 25.75 / 42.2 / 0.57	39.48	V / 1.00 / 0	-34.52
1.952 GHz	53.4 Pk	3.86 / 27.54 / 43.18 / 0.75	42.37	V / 1.00 / 0	-38.43
2.194 GHz	51.4 Pk	4.04 / 28.24 / 43.38 / 0.2	40.49	V / 1.00 / 0	-40.31

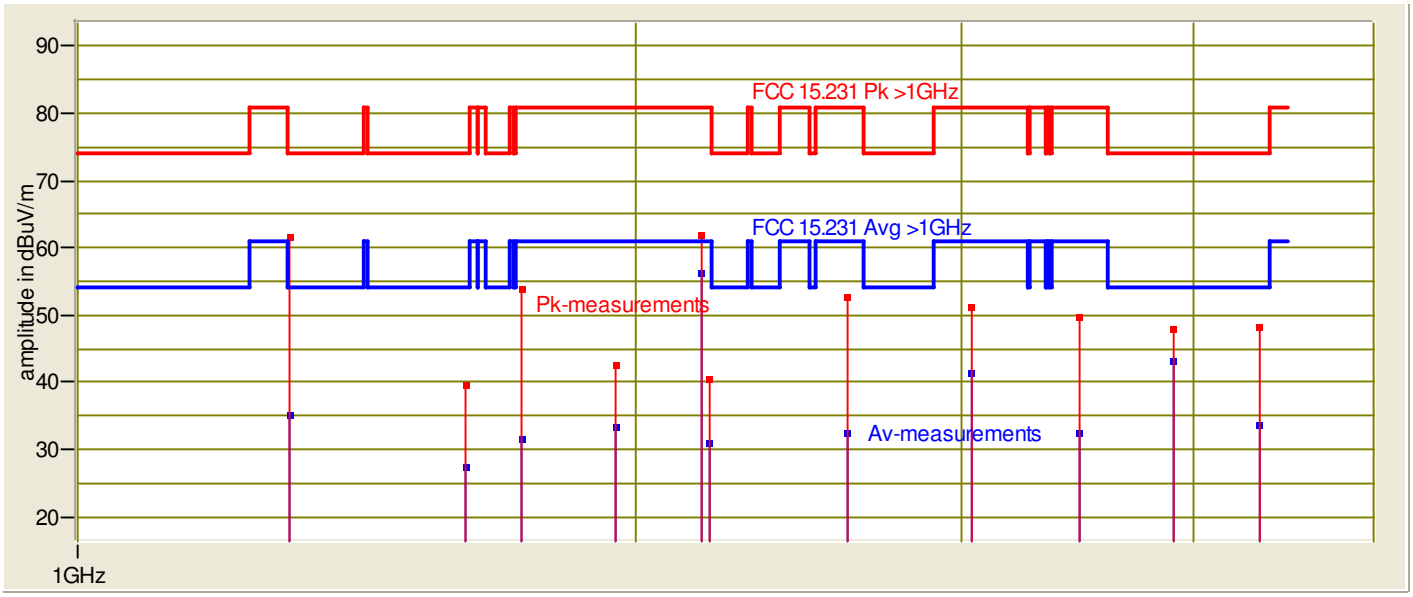
Tested by: Robert J Behringer (Printed) _____ (Signature)

Reviewed by: Joel T Schneider (Printed) _____ (Signature)

RADIATED EMISSIONS

Test Report #:	WC909748 Run 5	Test Area:	LTS		
EUT Model #:	SPCV2	Date:	1/5/2010		
EUT Serial #:	2	EUT Power:	3.3 VDC	Temperature:	19.0 °C
Test Method:	FCC 15.231			Air Pressure:	100.0 kPa
Customer:	SoundGate Inc.			Rel. Humidity:	17.0 %
EUT Description:	Remote Control				
Notes:					
Data File Name:	9748.dat			Page:	5 of 5

Graph:



Tested by: Robert J Behringer (Printed) _____ (Signature)

Reviewed by: Joel T Schneider (Printed) _____ (Signature)

Bandwidth of emission
FCC 15.231(c) - IC RSS 210 A1.1.3

Test summary
The requirements are: ■ - MET ☐ - NOT MET
The bandwidth of the emission is 590 kHz

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

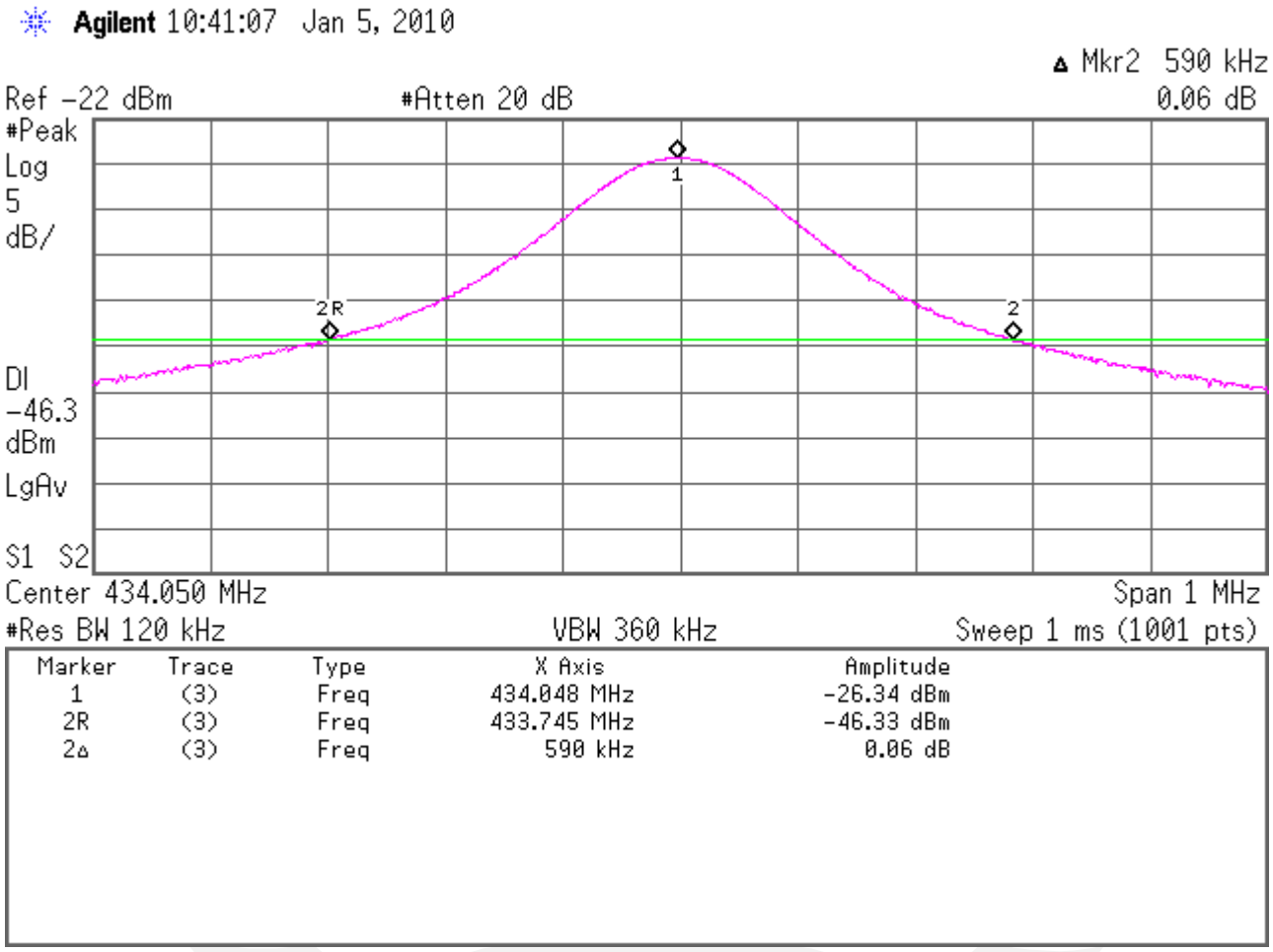
Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE03203	EM-6917B	Electro-Metrics	Biconicalog Periodic	106	04-Jun-10
WRLE10616	ZHL-1042J	Mini-Circuits	Preamplifier 10 - 3000 MHz	QA0746005	Code B 23-Oct-10
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	11-Aug-10

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

Test limit
The bandwidth of the emission shall be no wider than 0.25% of the center frequency at the points 20 dB down from the modulated carrier. The bandwidth of the emission shall be no wider than 1.085 MHz

Test data
See following page


Agilent 10:41:07 Jan 5, 2010
Mkr2 590 kHz
0.06 dB
Ref -22 dBm
#Atten 20 dB
#Peak
Log
5
dB/
DI
-46.3
dBm
LgAv
S1 S2
1
2R
2
Center 434.050 MHz
Span 1 MHz
#Res BW 120 kHz
VBW 360 kHz
Sweep 1 ms (1001 pts)
Marker Trace Type X Axis Amplitude
1 (3) Freq 434.048 MHz -26.34 dBm
2R (3) Freq 433.745 MHz -46.33 dBm
2Δ (3) Freq 590 kHz 0.06 dB

Test Setup Photo - Field strength of emissions
FCC 15.231(b) - IC RSS 210 A1.1.2

Test Setup Photo - Field strength of emissions
FCC 15.231(b) - IC RSS 210 A1.1.2

Equipment Under Test (EUT) Test Operation Mode:

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

☐ - Standby

☐ - Test program (H - Pattern)

☐ - Test program (color bar)

☐ - Test program (customer specific)

☐ - Practice operation

☐ - Normal Operating Mode

■ - See Software and/or Operating Modes in Appendix A

Configuration of the device under test:

■ - See Constructional Data Form and Block Diagram in Appendix A

☐ - See Product Information Form in Appendix B

GENERAL REMARKS:

None

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

EUT Received Date:	05 January 2010
Condition of EUT:	Normal
Testing Start Date:	05 January 2010
Testing End Date:	05 January 2010

TÜV SÜD AMERICA INC

Tested by:

Greg Jakubowski
Senior EMC Technician

Approved by:

Joel T Schneider
Senior EMC Engineer

Appendix A

Constructional Data Form

and

Block Diagram

Form

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: SoundGate, Inc.
Address: 5730 Dumas Ave.
Minnetonka, MN 55345

Contact: Barak Dar Position: CEO
Phone: 952-906-0015 Fax:
E-mail Address: barak@soundgatehearing.com

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

EUT Description: Remote control
EUT Name: EZPULL - iPULL
Model No.: SPCV2 Serial No.:
Product Options:
Configurations to be tested: Wireless

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:

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

- ☐ EMC Directive 2004/108/EC (EMC) Std:
- ☐ Machinery Directive 89/392/EEC (EMC) Std:
- ☐ Medical Device Directive 93/42/EEC (EMC) Std:
- ☐ Vehicle Directive: ☐ 2001/3/EC (EMC) ☐ 2004/104/EC (EMC) ☐ Other Vehicle Std:
- ☐ FDA Reviewers Guidance for Premarket Notification Submissions (EMC)

- ☒ FCC: Class ☐ A ☐ B Part 15
- ☐ VCCI: Class ☐ A ☐ B
- ☐ BSMI: Class ☐ A ☐ B (Separate Report)
- ☐ Canada: Class ☐ A ☐ B
- ☐ Australia: Class ☐ A ☐ B
- ☒ Other: FCC 15.231 and 15B Class A

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

- ☐ Attestation of Conformity (AoC)*
- ☐ Statement of Compliance (previously CoC)*
- ☐ EMC Certification (used with Octagon Mark)*
- ☐ Compliance Document*
- 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
- ☐ Industry Canada / FCB Certification
- ☐ Taiwan Certification

EMC Test Plan and Constructional Data Form

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): 952-393-2304

☐ Continue testing to complete test series.

☐ Continue testing to define corrective action.

☐ Stop testing.

EUT Specifications and Requirements

Length: _____ Width: _____ Height: _____ Weight: _____

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: 3.3Vdc (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: N/A

Current (Amps/phase(max)): 0.02 Current (Amps/phase(nominal)): _____

Other Operation from 2 x AA batteries

Other Special Requirements

Typical Installation and/or Operating Environment

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

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

Type	Analog	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*	☒	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
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	☐	☐	☐	☐		☐	☐						☐	☐
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	☐	☐	☐	☐		☐	☐						☐	☐

EMC Test Plan and Constructional Data Form

EUT Software.

Revision Level: 2.5.5

Description: micro controller firmware

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. Manual - the normal operating mode Pushing a button Transmits one control comand during less than 100mS

2. Continuoes - this mode is not available on product and is prepared only for the FCC testing

3. unintentional

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 #
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 #*
N/A			

Oscillator Frequencies

Manufacturer	*Frequency*	*Derived Frequency*	*Component # / Location*	*Description of Use*
MICROCHIP	16MHz (Crystal)	64MHz	MCU top layer	MCU clock
SAW	433.92	433.92	TX	TX OSC

Power Supply

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

Power Line Filters

Manufacturer	*Model #*	*Location in EUT*

EMC Test Plan and Constructional Data Form

Critical EMI Components (Capacitors, ferrites, etc.)

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

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

copper pour layers on PCB and shielded components

PLEASE ENTER NAMES BELOW (INSERT ELECTRONIC SIGNATURE IF POSSIBLE)

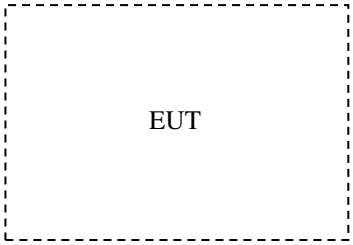
Authorization (Signature Required if a Third Party Certification is checked on pg 1)

Customer authorization to perform tests according to this test plan. — Date

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

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 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.

Radiated Emissions

Radiated emissions from the EUT are measured in the frequency range of 30 to 1000 MHz using a spectrum analyzer or receiver and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak or average detection. Measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth, and peak and average detection. The antenna is positioned 3 meters horizontally from the EUT. The antenna height is positioned 1-4 meters above the ground plane. Measurement scans are made with both horizontal and vertical antenna polarizations. Average measurements above 1 GHz are achieved using a peak detector with 1 MHz RBW and 10 Hz VBW.

The final level, in dBμV/m, equals the reading from the spectrum analyzer or receiver (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. Intentional radiators are rotated through 3 orthogonal axes to determine the maximum emission test position.

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.

FCC ID: X4USPC
Exhibit 7: Test Report

See attached TUV EMC Test Report No. WC909748