

TEST RESULT SUMMARY

FCC Part 15 Subpart C Section 15.207

FCC Part 15 Subpart C Section 15.249

Industry Canada RSS-210 Issue 6 Section A2.9

Industry Canada RSS-Gen Issue 1 Sections 4.4.1 and 7.2.2

MANUFACTURER	Hunt Technologies, Inc
NAME OF EQUIPMENT	AirPoint GE I-210 Integrated Low Power Automatic Meter Reading Transmitter
MODEL NUMBER	FASY-0654-0001
MANUFACTURER'S ADDRESS	6436 County Road 11 Pequot Lakes, MN 56472
TEST REPORT NUMBER	WC600137

TEST DATES 10, 26, 30 January 2006

According to testing performed at TÜV America Inc, the above-mentioned unit is in compliance with the electromagnetic compatibility (EMC) portions of the requirements defined in FCC Part 15 Subpart C Section 15.249 and IC RSS-210 Issue 6 Section A2.9

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.

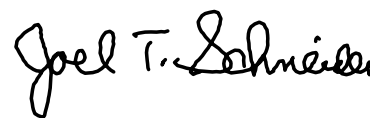
TÜV America Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the EMC requirements of FCC Part 15 Subpart C "Intentional radiators" Sections 15.249 "Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz." and 15.207 "Conducted limits" and IC RSS-210 Issue 6 "Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment" Section A2.9 "902-928, 2400-2483.5 and 5725-5875 MHz" and RSS-Gen Issue 1 "General Requirements and Information for the Certification of Radiocommunication Equipment" Sections 4.4.1 "Occupied Bandwidth" and 7.2.2 "Transmitter and Receiver AC Power Lines Conducted Emission Limits".

Date: 31 January 2006 Tested By



Joe Sausen
Senior EMC Technician

Reviewed By



J. T. Schneider
Senior EMC Engineer

Not Transferable

EMC Emission - TEST REPORT

Test Report File No. : **WC600137** Date of issue: 31 January 2006

Model / Serial No. : FASY-0654-0001 / 53006782

Product Name : AirPoint GE I-210 Integrated Low Power Automatic Meter Reading Transmitter

Product Type : Low power automatic meter reading transmitter

Applicant : Hunt Technologies, Inc

Manufacturer : Hunt Technologies, Inc

Address : 6436 County Road 11
Pequot Lakes, MN 56472

Test Result : ☒ **Positive** ☐ **Negative**

Test Project Number :
Reference(s) : **WC600137**

Total pages including
Appendices : **38**

TÜV 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 America Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV America Inc issued reports.

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Test Results	FCC	IC	
Field strength of fundamental	15.249(a)	RSS-210 A2.9	<u>4</u>
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Measurement protocol	<u>C1 – C3</u>

Sign Explanations:

- ☐ - not applicable
- ☒ - applicable

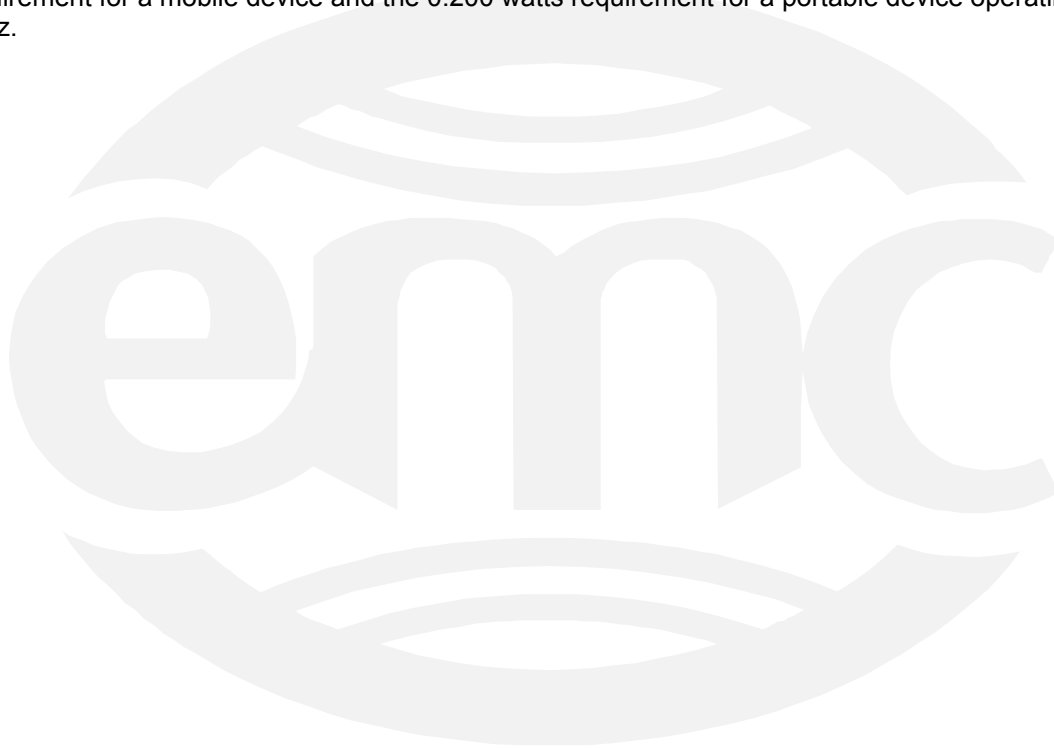
EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to following regulations:

- - FCC Part 15 Subpart C
- - IC RSS-210 Issue 6
- - IC RSS-Gen Issue 1

RF Exposure

The transmitter complies with the RF exposure limits for humans as called out in FCC 2.1091 (mobile >20 cm) and RSS-102 Section 4.3. The transmitter is used to send data to meter readers. It is exempt from RF Evaluation based on its operating frequency 902 - 928 MHz, and ERP of 0.000452 watts based on: $ERP (dBk) = E (dBuV/m) - 106.92 + 20 \log D (km) = 93.92 - 106.92 + (-50.45) = -63.45 \text{ dBk} = 0.000452 \text{ watts}$. This would be less than the 1.5 watts requirement for a mobile device and the 0.200 watts requirement for a portable device operating at 902 - 928 MHz.



Field strength of fundamental FCC 15.249(a), IC RSS-210 A2.9

Test summary

The requirements are: ■ - MET □ - NOT MET

Maximum field strength (quasi-peak) measured at a 3 meter distance = 49.6 mV/m (93.92 dB μ V/m) at 918.877 MHz

Minimum margin of compliance is 0.08 dB

Measurements were made on the lowest and highest channel, per Section 15.31, cw mode.

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
3203	EM-6917B	Electro-Metrics	Biconicalog Periodic	106	01-Apr-06
2681	85650A	Hewlett-Packard	Quasi-Peak Adapter	2430A00562	03-Feb-06
8052	8566B	Hewlett-Packard	Spectrum Analyzer	2115A00853	24-Mar-06
8051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	24-Mar-06

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

Test limits at 3 meters

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

The limit at 918.877 MHz = 50 mV/m (94 dB μ V/m) – quasi-peak

Test data

See appendix A, page A2

Field strength of harmonics

FCC 15.249(a), IC RSS-210 A2.9

Test summary

The requirements are: ☒ - MET ☐ - NOT MET

Minimum margin of compliance to the average limit is 5.1 dB at 1838 MHz.

The EUT employs pulsed operation with a duty cycle of 6%. Therefore, the peak field strength measurement of 4623 $\mu\text{V/m}$ (73.3 dB $\mu\text{V/m}$) is reduced by 24.4 dB (20 log 6/100) to provide an average level of 278 $\mu\text{V/m}$ (48.9 dB $\mu\text{V/m}$).

Minimum margin of compliance to the peak limit is 0.7 dB at 1838 MHz.

The peak field strength measurement is 4623 $\mu\text{V/m}$ (73.3 dB $\mu\text{V/m}$).

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
2075	3115	Electro-Mechanics (EMCO)	Ridge Guide Ant. 1-18 GHz	9001-3275	08-Dec-06
2665	ZHL-1042J	Mini-Circuits	Preamplifier	32296	Code B
3958	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0002	Code B
2684	85650A	Hewlett-Packard	Quasi-Peak Adapter	2521A01006	03-Feb-06
2690	8566B	Hewlett-Packard	Spectrum Analyzer	2430A00930	28-Mar-06
2673	85662A	Hewlett-Packard	Analyzer Display	2152A03687	28-Mar-06

Cal Code B = Calibration verification performed internally.

Test limits

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

The average limit at 1838 MHz = 500 $\mu\text{V/m}$ (54 dB $\mu\text{V/m}$)

The peak limit at 1838 MHz = 5 mV/m (74 dB $\mu\text{V/m}$)

Test data

See run 2 data on pages A2 – A3, duty cycle plots on A7 – A8.

Emissions outside of the specified frequency bands other than harmonics

FCC 15.249(d), IC RSS-210 A2.9

Test summary

The requirements are: ■ - MET □ - NOT MET

Minimum margin of compliance is 10.4 dB at 240.8 MHz – quasi-peak

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
3204	EM-6917B	Electro-Metrics	Biconicallog Periodic	102	19-Oct-06
2075	3115	Electro-Mechanics (EMCO)	Ridge Guide Ant. 1-18 GHz	9001-3275	08-Dec-06
3961	ZHL-1042J	Mini-Circuits	Preamplifier	D120403-1	Code B
3958	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0002	Code B
2681	85650A	Hewlett-Packard	Quasi-Peak Adapter	2430A00562	03-Feb-06
8052	8566B	Hewlett-Packard	Spectrum Analyzer	2115A00853	24-Mar-06
8051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	24-Mar-06

Cal Code B = Calibration verification performed internally.

Test limits

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100 **	3
88–216	150 **	3
216–960	200 **	3
Above 960	500	3

Test data

See run 3 data on pages A3 – A4

Band edge compliance

FCC 15.249(d), IC RSS-210 A2.9

Test summary

The requirements are: ☒ - MET ☐ - NOT MET

The fundamental emissions are within 902 – 928 MHz

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
3204	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	19-Oct-06
3961	ZHL-1042J	Mini-Circuits	Preamplifier	D120403-1	Code B
2681	85650A	Hewlett-Packard	Quasi-Peak Adapter	2430A00562	03-Feb-06
8052	8566B	Hewlett-Packard	Spectrum Analyzer	2115A00853	24-Mar-06
8051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	24-Mar-06

Cal Code B = Calibration verification performed internally.

Test data

See plot on page A5



Occupied Bandwidth

RSS-Gen 4.4.1

Test summary

The requirements are: ☒ - MET ☐ - NOT MET

The 20 dB (99%) bandwidth is 41.9 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
3204	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	19-Oct-06
3961	ZHL-1042J	Mini-Circuits	Preamplifier	D120403-1	Code B
2681	85650A	Hewlett-Packard	Quasi-Peak Adapter	2430A00562	03-Feb-06
8052	8566B	Hewlett-Packard	Spectrum Analyzer	2115A00853	24-Mar-06
8051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	24-Mar-06

Cal Code B = Calibration verification performed internally.

Test data

See plots on page A6

AC line conducted emissions

FCC 15.207, IC RSS-Gen 7.2.2

Test summary

The requirements are: ☒ - MET ☐ - NOT MET

Minimum quasi-peak margin of compliance is 23 dB at 4.9 MHz

Minimum average margin of compliance is 13 dB at 4.9 MHz

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
2417	3825/2	Electro-Mechanics (EMCO)	50 Ω LISN	8812-1439	Code B
3800	ESCS 30	Rhode & Schwarz	EMI Receiver	100312	18-Jan-06

Cal Code B = Calibration verification performed internally.

Test limits

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

*Decreases with the logarithm of the frequency.

Test data

See run 4 data on pages A9 – A12

I

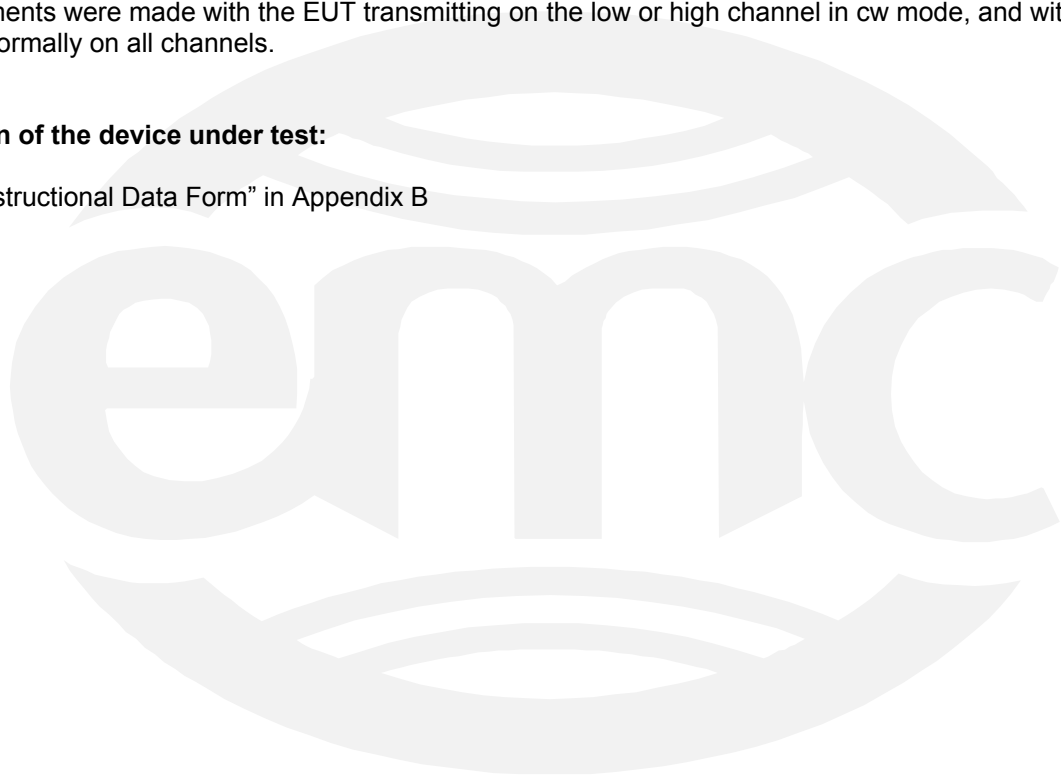
Test Operation Mode:

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
- ☒ - Measurements were made with the EUT transmitting on the low or high channel in cw mode, and with the EUT transmitting normally on all channels.

Configuration of the device under test:

- ☒ - See "Constructional Data Form" in Appendix B



DEVIATIONS FROM STANDARD:

None.

GENERAL REMARKS:

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
- ☐ - **not** met.

The device under test does

- ☒ - fulfill the general approval requirements mentioned on page 3.
- ☐ - **not** fulfill the general approval requirements mentioned on page 3.

EUT Received Date:	<u>20 January 2006</u>
Condition of EUT:	<u>Normal</u>
Testing Start Date:	<u>20 January 2006</u>
Testing End Date:	<u>30 January 2006</u>

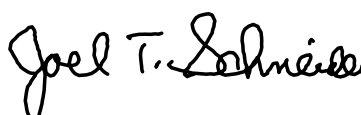
- TÜV AMERICA INC -

Tested By:



J. C. Sausen
Senior EMC Technician

Reviewed By:



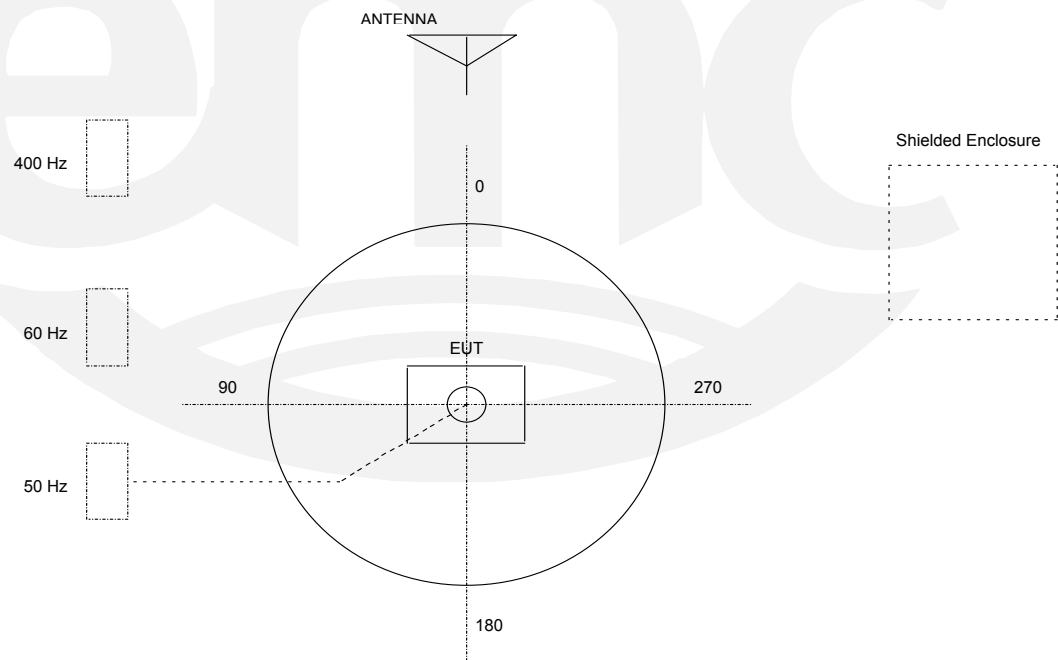
J. T. Schneider
Senior EMC Engineer

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.



Test-setup photo, radiated emissions



Test-setup photo, radiated emissions



Test-setup photo, AC line conducted emissions



Appendix A

Test Data



RADIATED EMISSIONS



Test Report #: WC600137 Run 2 Test Area: LTS

EUT Model #: FASY-0654-0001 Date: 1/10/2006

EUT Serial #: 53006782 EUT Power: 60 Hz / 120 VAC Temperature: 22.0 °C

Test Method: FCC Part 15 / C / 15.249 Air Pressure: 99.0 kPa

Customer: Hunt Technologies Rel. Humidity: 20.0 %

EUT Description: 0654 AirPoint GE I 210

Notes:

Data File Name: 0137.dat

Page: 1 of 3

List of measurements for run #: 2

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / duty cycle correction (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	FINAL μV/m	LIMIT FCC 15.249 μV/m (dBμV/m)
Each measurement maximized with respect to orientation and antenna ht.						
918.877 MHz	69.0 Qp	2.52 / 22.4 / 0.0 / 0.0	93.92	V / 1.00 / 0	49659	50000 (94)
918.9 MHz	58.9 Qp	2.52 / 22.4 / 0.0 / 0.0	83.82	H / 1.00 / 0		50000 (94)
916.461 MHz	56.35 Qp	2.52 / 22.4 / 0.0 / 0.0	81.27	H / 1.00 / 0		50000 (94)
916.461 MHz	68.9 Qp	2.52 / 22.4 / 0.0 / 0.0	93.82	V / 1.00 / 0	49090	50000 (94)
1.833 GHz	41.95 Pk	4.04 / 27.19 / 0.0 / 0.0	73.18	V / 1.00 / 0	4560	5000 (74)
1.833 GHz	41.95 Av	4.04 / 27.19 / 0.0 / -24.4	48.78	V / 1.00 / 0	274	500 (54)
2.75 GHz	27.7 Av	4.61 / 29.36 / 0.0 / -24.4	37.26	H / 1.00 / 0	72	500 (54)
2.75 GHz	27.7 Pk	4.61 / 29.36 / 0.0 / 0.0	61.66	H / 1.00 / 0	1210	5000 (74)
1.838 GHz	42.1 Pk	4.04 / 27.22 / 0.0 / 0.0	73.36	V / 1.00 / 0	4655	5000 (74)
1.838 GHz	42.1 Av	4.04 / 27.22 / 0.0 / -24.4	48.96	V / 1.00 / 0	280	500 (54)
2.757 GHz	27.65 Pk	4.62 / 29.38 / 0.0 / 0.0	61.64	H / 1.00 / 0	1207	5000 (74)
2.757 GHz	27.65 Av	4.62 / 29.38 / 0.0 / -24.4	37.24	H / 1.00 / 0	72	500 (54)
2.757 GHz	73.35 Pk	4.62 / 29.38 / 48.26 / 0.0	59.09	V / 1.00 / 0		
3.676 GHz	66.3 Av	5.41 / 31.63 / 46.96 / -24.4	31.98	H / 1.00 / 0	39	500 (54)
3.676 GHz	66.3 Pk	5.41 / 31.63 / 46.96 / 0.0	56.38	H / 1.00 / 0	659	5000 (74)
4.595 GHz	42.54 Pk	6.02 / 32.5 / 45.12 / 0.0	35.94	H / 1.00 / 0		
Noise floor only, no EUT emission detected:						
4.595 GHz	39.98 Pk	6.02 / 32.5 / 45.12 / 0.0	33.38	V / 1.00 / 0		
5.511 GHz	38.82 Pk	6.86 / 34.09 / 44.7 / 0.0	35.07	H / 1.00 / 0		
6.43 GHz	40.41 Pk	7.59 / 34.5 / 45.72 / 0.0	36.78	H / 1.00 / 0		
7.349 GHz	41.02 Pk	8.08 / 36.22 / 45.6 / 0.0	39.72	H / 1.00 / 0		
8.268 GHz	40.99 Pk	8.87 / 37.15 / 45.48 / 0.0	41.53	H / 1.00 / 0		
9.187 GHz	40.28 Pk	9.71 / 37.45 / 44.11 / 0.0	43.33	H / 1.00 / 0		
Eut emission:						
3.666 GHz	61.34 Pk	5.41 / 31.61 / 46.97 / 0.0	51.39	H / 1.00 / 0		

Tested by: J. C. Sausen

Printed

J C Sausen

Signature

Reviewed by: J. T. Schneider

Printed

Joel T. Schneider

Signature

RADIATED EMISSIONS



Test Report #: WC600137 Run 2 Test Area: LTS

EUT Model #: FASY-0654-0001 Date: 1/10/2006

EUT Serial #: 53006782 EUT Power: 60 Hz / 120 VAC Temperature: 22.0 °C

Test Method: FCC Part 15 / C / 15.249 Air Pressure: 99.0 kPa

Customer: Hunt Technologies Rel. Humidity: 20.0 %

EUT Description: 0654 AirPoint GE I 210

Notes: _____

Data File Name: 0137.dat

Page: 2 of 3

List of measurements for run #: 2

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / duty cycle correction (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	FINAL μV/m	LIMIT FCC 15.249 μV/m (dBμV/m)
3.666 GHz	55.19 Pk	5.41 / 31.61 / 46.97 / 0.0	45.24	V / 1.00 / 0		
Noise floor:						
4.583 GHz	39.98 Pk	6.02 / 32.5 / 45.12 / 0.0	33.38	V / 1.00 / 0		
5.499 GHz	38.96 Pk	6.85 / 34.08 / 44.61 / 0.0	35.28	V / 1.00 / 0		
6.416 GHz	40.25 Pk	7.58 / 34.49 / 45.7 / 0.0	36.62	V / 1.00 / 0		
7.332 GHz	40.54 Pk	8.07 / 36.18 / 45.74 / 0.0	39.05	V / 1.00 / 0		
8.249 GHz	40.27 Pk	8.85 / 37.14 / 45.55 / 0.0	40.71	V / 1.00 / 0		
9.165 GHz	39.86 Pk	9.7 / 37.44 / 44.32 / 0.0	42.68	V / 1.00 / 0		
spurious emissions						
226.123 MHz	33.44 Qp	1.25 / 10.84 / 27.2 / 0.0	18.33	V / 1.00 / 350		
235.943 MHz	36.2 Qp	1.28 / 11.12 / 27.2 / 0.0	21.4	V / 1.30 / 350		
245.763 MHz	39.65 Qp	1.31 / 11.49 / 27.2 / 0.0	25.25	V / 1.30 / 350		
255.583 MHz	38.55 Qp	1.34 / 12.09 / 27.2 / 0.0	24.78	V / 1.30 / 350		
265.427 MHz	37.35 Qp	1.36 / 12.29 / 27.26 / 0.0	23.75	V / 1.30 / 350		
275.247 MHz	36.45 Qp	1.39 / 12.3 / 27.36 / 0.0	22.78	V / 1.30 / 350		
285.103 MHz	35.05 Qp	1.41 / 12.6 / 27.43 / 0.0	21.63	V / 1.30 / 350		
294.923 MHz	34.3 Qp	1.43 / 13.0 / 27.48 / 0.0	21.24	V / 1.30 / 350		
334.245 MHz	36.05 Qp	1.49 / 14.05 / 27.56 / 0.0	24.03	V / 1.30 / 350		
206.447 MHz	36.25 Qp	1.19 / 10.57 / 27.1 / 0.0	20.91	V / 1.30 / 350		
176.963 MHz	36.95 Qp	1.11 / 8.96 / 27.04 / 0.0	19.98	V / 1.30 / 350		
167.143 MHz	34.3 Qp	1.08 / 8.7 / 27.0 / 0.0	17.08	V / 1.30 / 350		
137.647 MHz	35.4 Qp	0.96 / 8.48 / 27.0 / 0.0	17.83	V / 1.30 / 350		

Tested by: J. C. Sausen

Printed

J C Sausen

Signature

Reviewed by: J. T. Schneider

Printed

Joel T. Schneider

Signature

RADIATED EMISSIONS



Test Report #: WC600137 Run 2 Test Area: LTS

EUT Model #: FASY-0654-0001 Date: 1/10/2006

EUT Serial #: 53006782 EUT Power: 60 Hz / 120 VAC Temperature: 22.0 °C

Test Method: FCC Part 15 / C / 15.249 Air Pressure: 99.0 kPa

Customer: Hunt Technologies Rel. Humidity: 20.0 %

EUT Description: 0654 AirPoint GE I 210

Notes:

Data File Name: 0137.dat

Page: 3 of 3

List of measurements for run #: 2

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / duty cycle correction (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	FINAL μV/m	LIMIT FCC 15.249 μV/m (dBμV/m)
245 MHz maxed:						
245.763 MHz	38.03 Qp	1.31 / 11.49 / 27.2 / 0.0	23.63	V / 1.20 / 13		
245.763 MHz	37.7 Qp	1.31 / 11.49 / 27.2 / 0.0	23.3	V / 1.20 / 13		
265 MHz maxed:						
265.427 MHz	40.75 Qp	1.36 / 12.29 / 27.26 / 0.0	27.15	H / 1.20 / 13		
275.247 MHz	40.0 Qp	1.39 / 12.3 / 27.36 / 0.0	26.33	H / 1.20 / 13		
265 MHz maxed:						
265.427 MHz	44.24 Qp	1.36 / 12.29 / 27.26 / 0.0	30.64	H / 1.00 / 61		
226.123 MHz	37.95 Qp	1.25 / 10.84 / 27.2 / 0.0	22.84	H / 1.00 / 61		
235.943 MHz	41.9 Qp	1.28 / 11.12 / 27.2 / 0.0	27.1	H / 1.00 / 61	22	200 (46)
245.763 MHz	43.7 Qp	1.31 / 11.49 / 27.2 / 0.0	29.3	H / 1.00 / 61	29	200 (46)
255.583 MHz	45.05 Qp	1.34 / 12.09 / 27.2 / 0.0	31.28	H / 1.00 / 61	36	200 (46)
265.427 MHz	46.05 Qp	1.36 / 12.29 / 27.26 / 0.0	32.45	H / 1.00 / 61	41	200 (46)
275.247 MHz	46.25 Qp	1.39 / 12.3 / 27.36 / 0.0	32.58	H / 1.00 / 61	42	200 (46)
285.103 MHz	41.25 Qp	1.41 / 12.6 / 27.43 / 0.0	27.83	H / 1.00 / 61	24	200 (46)
294.923 MHz	36.1 Qp	1.43 / 13.0 / 27.48 / 0.0	23.04	H / 1.00 / 61		
240.833 MHz	50.2 Qp	1.29 / 11.24 / 27.2 / 0.0	35.54	H / 1.00 / 61	59	200 (46)
240 MHz maxed:						
240.833 MHz	48.44 Qp	1.29 / 11.24 / 27.2 / 0.0	33.78	H / 1.00 / 62		
No further spurious emissions detected, 30 MHz to 9.2 GHz, vert and hor ant.						

Tested by: J. C. Sausen

Printed

J C Sausen

Signature

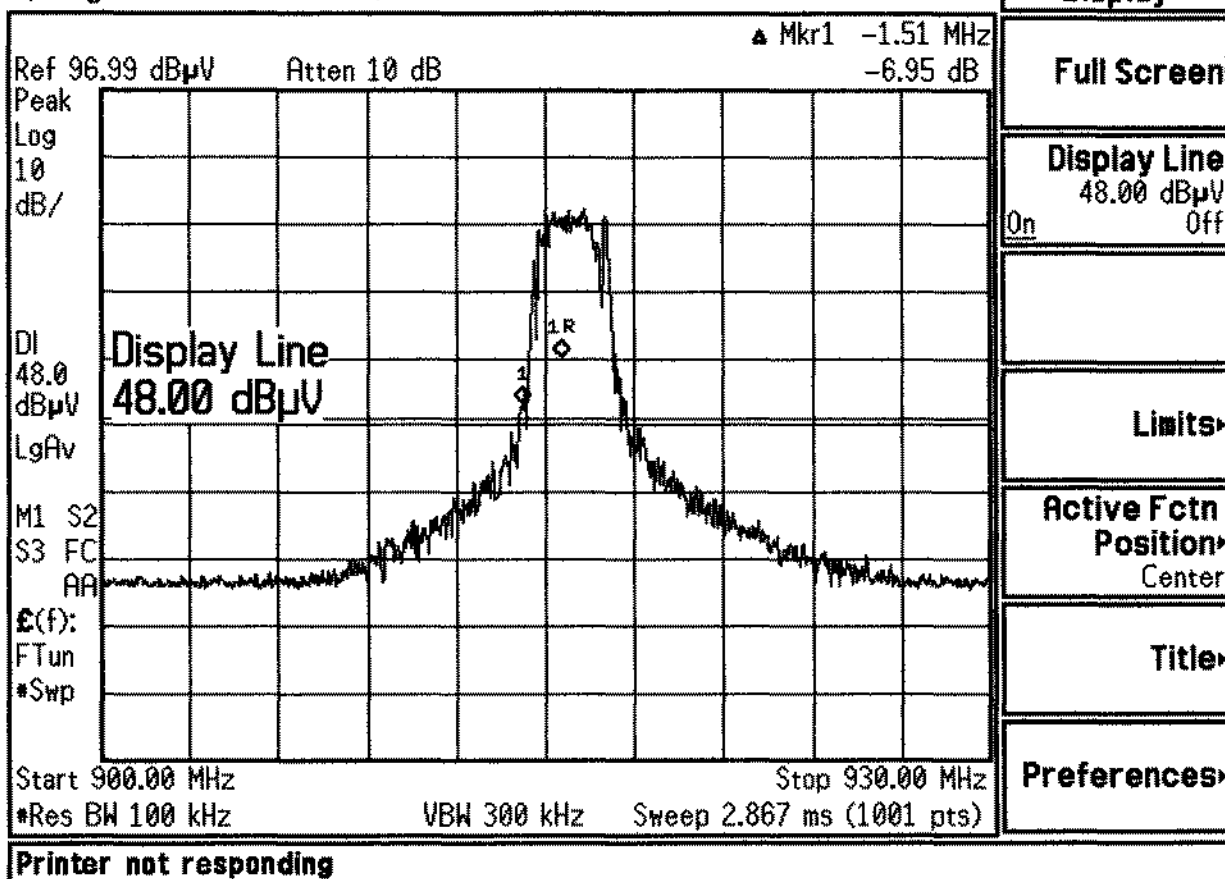
Reviewed by: J. T. Schneider

Printed

Joel T. Schneider

Signature

* Agilent 18:44:31 Jan 26, 2006

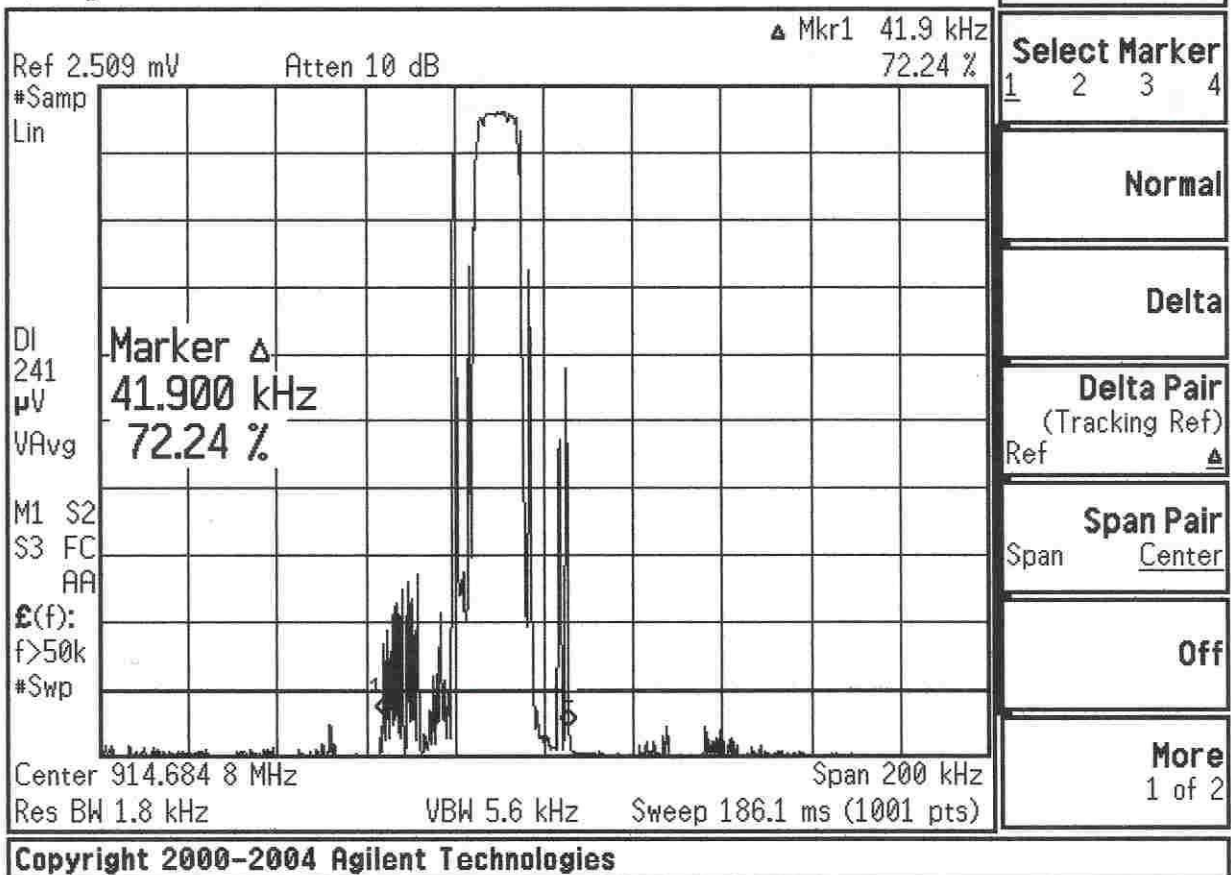


Report 0137

Band edge compliance

display line = 15.209 limit

FT2

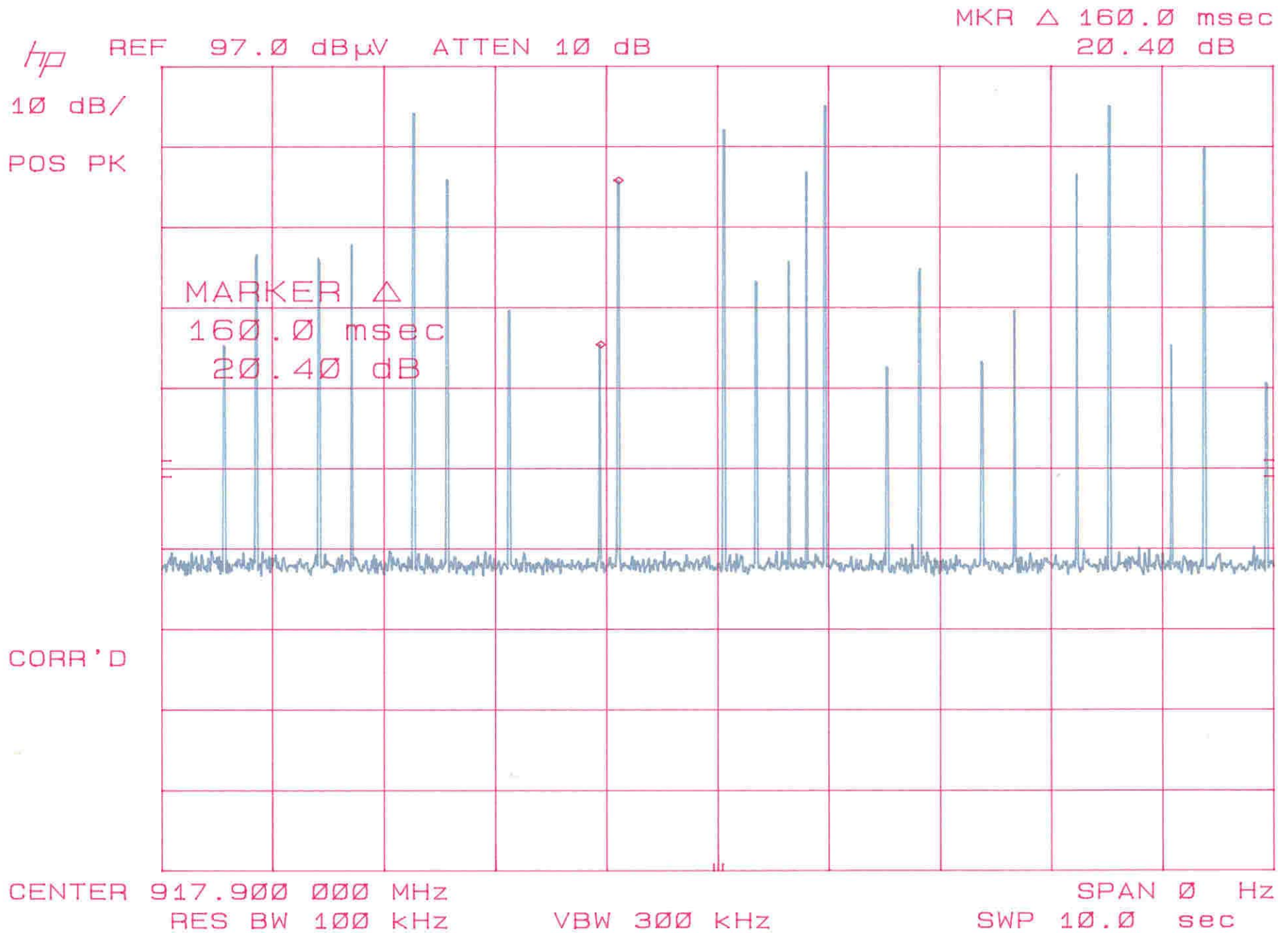


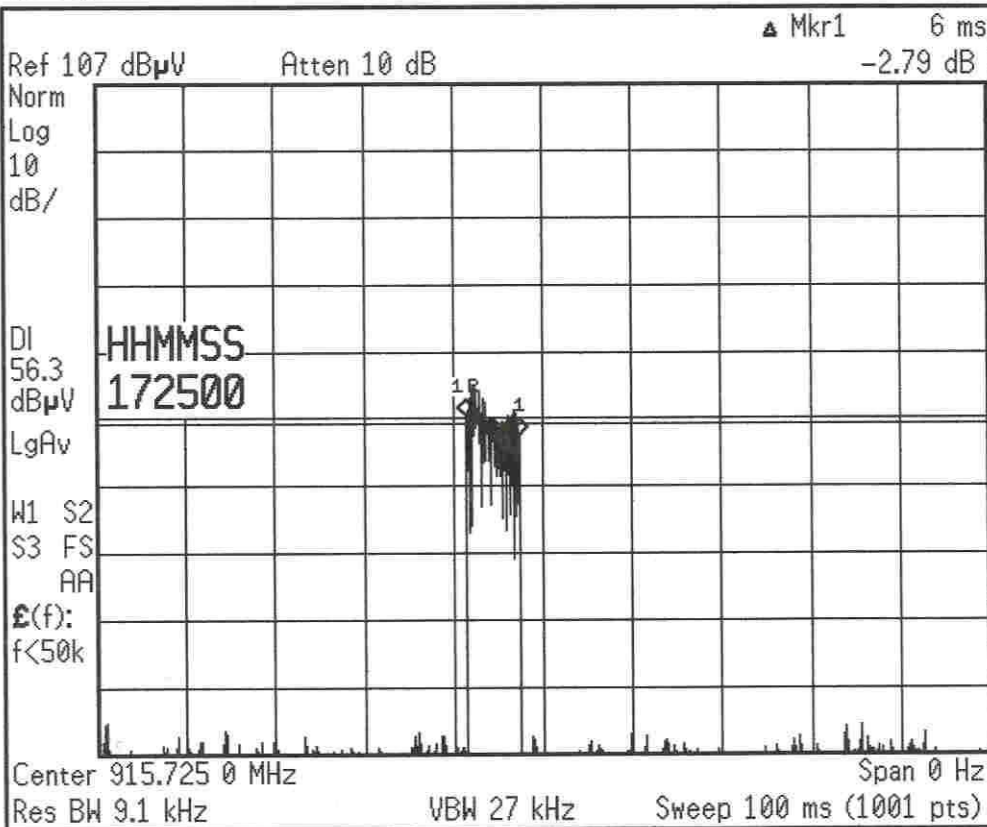
0137

99% BW

GT-2

duty cycle correction - only 1 pulse occurs in 100 msec





Time/Date
On Off

Date Format
MDY DMY

Set Time
172500

Set Date
20060126

Printer not responding

Report 0137
pulse duration for duty cycle
6msec / 100 msec
JTS

CONDUCTED EMISSIONS



Test Report #: WC600137 Run 3 Test Area: LTS

EUT Model #: FASY-0654-0001 Date: 1/10/2006

EUT Serial #: 53006782 EUT Power: 60 Hz / 240 VAC Temperature: 22.0 °C

Test Method: FCC Part 15 / C / 15.249 Air Pressure: 99.0 kPa

Customer: Hunt Technologies Rel. Humidity: 20.0 %

EUT Description: 0654 AirPoint GE I-210 / Integrated

Notes: LISN between 240 volts power supply and EUT

Data File Name: 0137.dat

Page: 1 of 4

List of measurements for run #: 3

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	EUT Lead	DELTA1 EN55022 B Qp	DELTA2 EN55022 B Avg
4.916 MHz	31.66 Qp	0.5 / 0.03 / 0.0 / 0.0	32.19	L1	-23.81	n/a
2.458 MHz	19.8 Qp	0.3 / 0.01 / 0.0 / 0.0	20.11	L1	-35.89	n/a
2.458 MHz	19.51 Av	0.3 / 0.01 / 0.0 / 0.0	19.82	L1	n/a	-26.18
4.916 MHz	31.67 Av	0.5 / 0.03 / 0.0 / 0.0	32.2	L1	n/a	-13.8
6.145 MHz	25.98 Qp	0.5 / 0.03 / 0.0 / 0.0	26.51	L1	-33.49	n/a
6.145 MHz	25.16 Av	0.5 / 0.03 / 0.0 / 0.0	25.69	L1	n/a	-24.31
7.373 MHz	27.32 Qp	0.52 / 0.04 / 0.0 / 0.0	27.88	L1	-32.12	n/a
7.373 MHz	27.15 Av	0.52 / 0.04 / 0.0 / 0.0	27.71	L1	n/a	-22.29
9.83 MHz	21.92 Qp	0.7 / 0.06 / 0.0 / 0.0	22.68	L1	-37.32	n/a
9.83 MHz	21.61 Av	0.7 / 0.06 / 0.0 / 0.0	22.37	L1	n/a	-27.63
24.58 MHz	19.36 Qp	1.16 / 0.18 / 0.0 / 0.0	20.7	L1	-39.3	n/a
24.58 MHz	17.73 Av	1.16 / 0.18 / 0.0 / 0.0	19.07	L1	n/a	-30.93
2.458 MHz	19.88 Qp	0.3 / 0.01 / 0.0 / 0.0	20.19	N	-35.81	n/a
2.458 MHz	19.14 Av	0.3 / 0.01 / 0.0 / 0.0	19.45	N	n/a	-26.55
4.916 MHz	31.36 Qp	0.5 / 0.03 / 0.0 / 0.0	31.89	N	-24.11	n/a
4.916 MHz	31.37 Av	0.5 / 0.03 / 0.0 / 0.0	31.9	N	n/a	-14.1
6.145 MHz	26.0 Qp	0.5 / 0.03 / 0.0 / 0.0	26.53	N	-33.47	n/a
6.145 MHz	25.53 Av	0.5 / 0.03 / 0.0 / 0.0	26.06	N	n/a	-23.94
7.373 MHz	27.24 Qp	0.52 / 0.04 / 0.0 / 0.0	27.8	N	-32.2	n/a
7.373 MHz	26.75 Av	0.52 / 0.04 / 0.0 / 0.0	27.31	N	n/a	-22.69
9.83 MHz	21.1 Qp	0.7 / 0.06 / 0.0 / 0.0	21.86	N	-38.14	n/a
9.83 MHz	20.83 Av	0.7 / 0.06 / 0.0 / 0.0	21.59	N	n/a	-28.41
24.58 MHz	21.52 Qp	1.16 / 0.18 / 0.0 / 0.0	22.86	N	-37.14	n/a
24.58 MHz	20.52 Av	1.16 / 0.18 / 0.0 / 0.0	21.86	N	n/a	-28.14

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Signature

Reviewed by: J. T. Schneider

Printed

Signature

CONDUCTED EMISSIONS



Test Report #: WC600137 Run 3 Test Area: LTS

EUT Model #: FASY-0654-0001 Date: 1/10/2006

EUT Serial #: 53006782 EUT Power: 60 Hz / 240 VAC Temperature: 22.0 °C

Test Method: FCC Part 15 / C / 15.249 Air Pressure: 99.0 kPa

Customer: Hunt Technologies Rel. Humidity: 20.0 %

EUT Description: 0654 AirPoint GE I-210 / Integrated

Notes: LISN between 240 volts power supply and EUT

Data File Name: 0137.dat

Page: 2 of 4

Measurement summary for limit1: EN55022 B Qp (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	EUT Lead	DELTA1 EN55022 B Qp
4.916 MHz	31.66 Qp	0.5 / 0.03 / 0.0 / 0.0	32.19	L1	-23.81
7.373 MHz	27.32 Qp	0.52 / 0.04 / 0.0 / 0.0	27.88	L1	-32.12
6.145 MHz	26.0 Qp	0.5 / 0.03 / 0.0 / 0.0	26.53	N	-33.47
2.458 MHz	19.88 Qp	0.3 / 0.01 / 0.0 / 0.0	20.19	N	-35.81
24.58 MHz	21.52 Qp	1.16 / 0.18 / 0.0 / 0.0	22.86	N	-37.14
9.83 MHz	21.92 Qp	0.7 / 0.06 / 0.0 / 0.0	22.68	L1	-37.32

Tested by: J. C. Sausen

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Signature

Reviewed by: J. T. Schneider

by:

Printed

Signature

CONDUCTED EMISSIONS



Test Report #: WC600137 Run 3 Test Area: LTS

EUT Model #: FASY-0654-0001 Date: 1/10/2006

EUT Serial #: 53006782 EUT Power: 60 Hz / 240 VAC Temperature: 22.0 °C

Test Method: FCC Part 15 / C / 15.249 Air Pressure: 99.0 kPa

Customer: Hunt Technologies Rel. Humidity: 20.0 %

EUT Description: 0654 AirPoint GE I-210 / Integrated

Notes: LISN between 240 volts power supply and EUT

Data File Name: 0137.dat Page: 3 of 4

Measurement summary for limit2: EN55022 B Avg (Av)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	EUT Lead	DELTA2 EN55022 B Avg
4.916 MHz	31.67 Av	0.5 / 0.03 / 0.0 / 0.0	32.2	L1	-13.8
7.373 MHz	27.15 Av	0.52 / 0.04 / 0.0 / 0.0	27.71	L1	-22.29
6.145 MHz	25.53 Av	0.5 / 0.03 / 0.0 / 0.0	26.06	N	-23.94
2.458 MHz	19.51 Av	0.3 / 0.01 / 0.0 / 0.0	19.82	L1	-26.18
9.83 MHz	21.61 Av	0.7 / 0.06 / 0.0 / 0.0	22.37	L1	-27.63
24.58 MHz	20.52 Av	1.16 / 0.18 / 0.0 / 0.0	21.86	N	-28.14

Tested by: J. C. Sausen

Printed

Signature

Reviewed by: J. T. Schneider

by:

Printed

Signature

CONDUCTED EMISSIONS



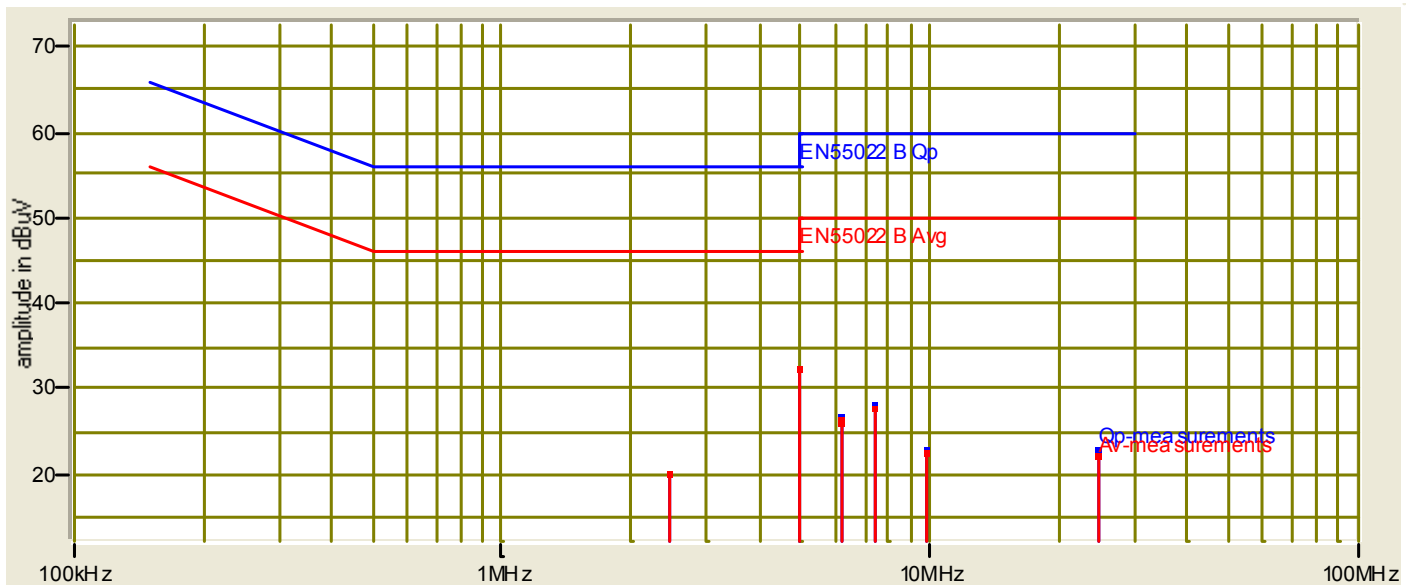
Test Report #: WC600137 Run 3 Test Area: LTS
EUT Model #: FASY-0654-0001 Date: 1/10/2006
EUT Serial #: 53006782 EUT Power: 60 Hz / 240 VAC Temperature: 22.0 °C
Test Method: FCC Part 15 / C / 15.249 Air Pressure: 99.0 kPa
Customer: Hunt Technologies Rel. Humidity: 20.0 %
EUT Description: 0654 AirPoint GE I-210 / Integrated

Notes: LISN between 240 volts power supply and EUT

Data File Name: 0137.dat

Page: 4 of 4

Graph:



Tested by: J. C. Sausen

Printed

Signature

Reviewed by: J. T. Schneider

by:

Printed

Signature

Appendix B

Constructional Data Form



EMC Test Plan and Constructional Data Form

PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE.

Applicant -- 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: Hunt Technologies, Inc.

Address: 6436 County Road 11
Pequot Lakes, MN 56472
U. S. A

Contact: Yuting Feng Position: RF/Hardware Engineer

Phone: 218-562-5568 Fax: 218-562-5530

E-mail Address: yuting.feng@hunttechnologies.co
m

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

EUT Description Low power automatic meter reading transmitter

EUT Name AirPoint GE I-210 Integrated Low Power

Model No.: FASY-0654-0001 Serial No.: 53006782

Product Options: N/A

Configurations to be tested: Installed in a GE I-210 240V 2S CL200 Electric Meter

Test Objective

- | | |
|--|--|
| ☐ EMC Directive 89/336/EEC (EMC) | ☒ FCC: Class ☐ A ☐ B Part <u>15C</u> |
| Std: _____ | ☐ VCCI: Class ☐ A ☐ B |
| ☐ Machinery Directive 89/392/EEC (EMC) | ☐ BSMI: Class ☐ A ☐ B |
| Std: _____ | ☒ Canada: Class ☐ A ☐ B |
| ☐ Medical Device Directive 93/42/EEC (EMC) | ☐ Australia: Class ☐ A ☐ B |
| Std: _____ | ☐ Other: _____ |
| ☐ Vehicle Directive 72/245/EEC (EMC) | |
| Std: _____ | |
| ☐ FDA Reviewers Guidance for Premarket Notification Submissions (EMC) | |

TÜV Product Service Certification Requested

- | | |
|--|---|
| ☐ Attestation of Conformity (AoC) | ☐ EMC Certification (used with Octagon Mark) |
| ☐ Certificate of Conformity (CoC) | ☐ 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.)

Attendance

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

EMC Test Plan and Constructional Data Form**Failure - Complete this section if testing will not be attended by the customer.**

If a failure occurs, TÜV Product Service 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 RequirementsLength: 4.2 inch Width: 4.0 inch Height: 1.2 inch Weight: ~2.6 oz**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: 240VAC (If battery powered, make sure battery life is sufficient to complete testing.)# of Phases: 1Current (Amps/phase(max)): ~0.13A Current (Amps/phase(nominal)): ~0.08A

Other _____

Other Special Requirements**Typical Installation and/or Operating Environment**(ie. Hospital, Small Business, Industrial/Factory, etc.)
Residential Area**EUT Power Cable**

- ☐ Permanent OR ☒ Removable Length (in meters): 0.1
- ☐ Shielded OR ☒ Unshielded
- ☐ Not Applicable

EMC Test Plan and Constructional Data Form

EUT Interface Ports and Cables														
Type	Analog	Digital	During Test		Qty	Shielding		Termination	Connector Type	Port Termination	Length tested (in meters)	Removable	Permanent	
			Active	Passive		Yes	No							Type
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: V4.0

Description:

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. Transmit continuous wave in the lowest frequency
2. Transmit continuous wave in the highest frequency
3. Transmit in normal mode (frequency hopping between the lowest and highest frequency)

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 #

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 #
GE Electric Meter	I-210	32005199	N/A

Oscillator Frequencies

Frequency	Derived Frequency	Component # / Location	Description of Use

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.)**

<i>Description</i>	<i>Manufacturer</i>	<i>Part # or Value</i>	<i>Qty</i>	<i>Component # / Location</i>

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

(PLEASE INSERT "ELECTRONIC SIGNATURE" BELOW IF POSSIBLE)

Authorization SignaturesCustomer authorization to perform tests
according to this test plan.

Yuting Feng

Test Plan/CDF Prepared By (please print)

01-10-2006

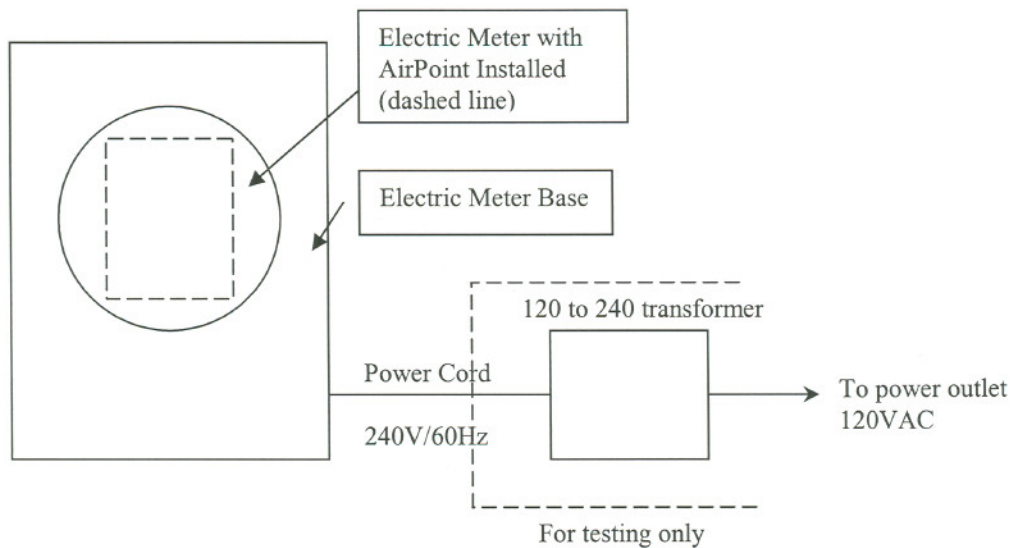
Date

01-10-2006

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.

Yuting Feng

Test Plan/CDF Prepared By (please print)

01-10-2006

Date

01-10-2006

Date

Appendix C

Measurement Protocol



MEASUREMENT PROTOCOL

GENERAL INFORMATION

Measurement Uncertainty

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. This 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. This 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, expressed in dB μ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the CISPR limit.

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

$$\text{dB}\mu\text{V} = 20(\log \mu\text{V})$$

$$\mu\text{V} = \text{Inverse log}(\text{dB}\mu\text{V}/20)$$

RADIATED EMISSIONS

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

Example:

FREQ (MHz)	LEVEL (dB μ V)	CABLE/ANT/PREAMP (dB) (dB/m) (dB)				FINAL (dB μ V/m)	POL/HGT/AZ (m) (deg)			DELTA1 EN 55022
60.80	42.5Qp	+	1.2	+	10.9	- 25.5 = 29.1	V	1.0	0.0	-10.9

DETAILS OF TEST PROCEDURES

General Standard Information

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

Conducted Emissions

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

Radiated Emissions

Radiated emissions from the EUT are measured in the frequency range of 30 to 2000 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 detection. Tabletop equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees. Intentional radiators are rotated through orthogonal axes to determine the attitude that maximizes the emissions.