Testing Tomorrow's Technology

TRN Atlanta
FCC Part 15 Fundamental and Spur Signal Strength Testing on Marta Passenger Train

UST Project: 06-0235

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1. About US Tech

US Tech, Located at 3505 Francis Circle, Alpharetta, Georgia 30004 is an Independent EMC, safety and telecom compliance testing laboratory. Founded in 1984, US Tech has over 20 years history in performance of compliance testing services and is an FCC recognized and NVLAP accredited laboratory. Our NVLAP code is 200162-0.

2. Test and Measurements

US Tech conducted a test on December 6, 2006 for TRN Atlanta ("TRN") at the Marta maintenance terminal located at 2126 W Point Ave. College Park, GA 30337. The test measured radiated emissions on an operating Marta train equipped with TRN's infrastructure broadcasting on 6 FM frequencies between 88-108Mhz at a power level of 87 dBuVm.

US Tech tested the following three (3) frequencies, over a six (6) hour period, which TRN currently provides audio programming on to the Marta rail passengers:

1. 88.3
2. 90.5
3. 93.3

2.1 Configuration of Tested System

The test was conducted under the following conditions.

a. The train was in an operating position with all doors open on the side of the train where the measurements were taken. The doors were closed on the opposite side of the train.
b. Radiated emissions data was taken by a spectrum analyzer with resolution bandwidth adjusted to 120 kHz.
c. All measurements indicated on the test results attached hereto are peak.
d. The video filter associated with the spectrum analyzer was off throughout the evaluation process.
e. The unit was tested at 75 ft. from the doors, with an antenna height of 70" which is 2 ft above the floor of the railcar.
f. Ambient values were taken at 88.3 MHz +/- 200 kHz and 400 kHz, 90.5 MHz +/- 200 kHz and 400 kHz, and 93.3 MHz +/- 200kHz and 400 kHz. The train was then turned on and signal strength was measured at the same distance, with the same settings.

2.2 Conclusion

Based upon the test results, the radiated emissions transmitted by TRN's infrastructure at these frequencies were indiscriminate from ambient FM station strengths at a distance of 75 ft. It is our opinion that TRN's emissions at a distance greater than 75 ft will not be identifiable and not cause interference to broadcaster operations.

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I certify that I am authorized to sign for the manufacturer and that all of the statements in this report and in the Exhibits attached hereto are true and correct to the best of my knowledge and belief:

UNITED STATES TECHNOLOGIES, INC. (AGENT RESPONSIBLE FOR TEST):

By: _____

Name: Louis A. Feudi

Title: Operations Manager

Date: December 7, 2006

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Conducted Emissions

Test By: LF	**Test:**	Emissions vs Ambient at 75 ft Frequency: 88.3 1st and 2nd Adjacent				**Client:**	TRN Atlanta				
	Project:	06-0235		**Class:**		**Model:**	Marta Passenger Train				
Frequency Range		**Table**	**Model**		**S/N**		**Valid**	**Calibrated:**			
87.9-88.7 MHz		1Bi10mV	Model: 3110B		S/N 9307-1431		Yes	Oct 11, 2006			
Frequency	**Test Data**	**AF**	**Test Data**	**AF+CA-AMP**	**Results**	**Limits**	**Distance /**	**Margin**	**PK = n**	**EUT Position**	**EUT Height**
(MHz)	**(dBm)**	**Table**	**(dBuV)**	**(dB)**	**(dBuV)**	**(dBuV)**	**Polarity**	**(dB)**	**/ QP**	**degrees**	**meters**
87.90	-63.7	1BI10mV	43.3	-15.3	28.0		10m./VERT	**28.0**	**Ambient**		
87.9	-62.2	1BI10mV	44.8	-15.3	29.5	28.0	10m./VERT	**1.5**	**PK Over**	**Ambient**	**Transmitting**
88.1	-36.8	1BI10mV	70.2	-15.3	54.9		10m./VERT	**54.9**	**Ambient**		
88.1	-36.7	1BI10mV	70.3	-15.3	55.0	54.9	10m./VERT	**0.1**	**PK Over**	**Ambient**	**Transmitting**
88.3	-30.4	1BI10mV	76.6	-15.2	61.4		10m./VERT	**61.4**	**Ambient**		
88.3	-30.5	1BI10mV	76.5	-15.2	61.3	61.4	10m./VERT	**0.1**	**PK Under**	**Ambient**	**Transmitting**
88.5	-30.2	1BI10mV	76.8	-15.2	61.6		10m./VERT	**61.6**	**Ambient**		
88.5	-31.0	1BI10mV	76.0	-15.2	60.8	61.6	10m./VERT	**0.8**	**PK Under**	**Ambient**	**Transmitting**
88.7	-28.9	1BI10mV	78.2	-15.2	62.9		10m./VERT	**62.9**	**Ambient**		
88.7	-27.9	1BI10mV	79.1	-15.2	63.9	62.9	10m./VERT	**1.0**	**PK Over**	**Ambient**	**Transmitting**

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Conducted Emissions

Test By: LF	**Test:**	Emissions vs Ambient at 75 ft Frequency: 90.5 1st and 2nd Adjacent				**Client:**	TRN Atlanta				
	Project:	06-0235		**Class:**		**Model:**	Marta Passenger Train				
Frequency Range		**Table**	**Model**		**S/N**		**Valid**	**Calibrated:**			
87.9-88.7 MHz		1Bi10mV	Model: 3110B		S/N 9307-1431		Yes	Oct 11, 2006			
Frequency	**Test Data**	**AF**	**Test Data**	**AF+CA-AMP**	**Results**	**Limits**	**Distance /**	**Margin**	**PK = n**	**EUT Position**	**EUT Height**
(MHz)	**(dBm)**	**Table**	**(dBuV)**	**(dB)**	**(dBuV)**	**(dBuV)**	**Polarity**	**(dB)**	**/ QP**	**degrees**	**meters**
90.10	-28.9	1Bi10mV	78.2	-15.1	63.0		10m./VERT	**63.0**	**Ambient**		
90.1	-27.9	1Bi10mV	79.1	-15.1	64.0	63.0	10m./VERT	**1.0**	**PK Over**	**Ambient**	**Transmitting**
90.3	-50.6	1Bi10mV	56.4	-15.1	41.3		10m./VERT	**41.3**	**Ambient**		
90.3	-51.0	1Bi10mV	56.0	-15.1	40.9	41.3	10m./VERT	**0.4**	**PK Under**	**Ambient**	**Transmitting**
90.5	-43.2	1Bi10mV	63.8	-15.1	48.7		10m./VERT	**48.7**	**Ambient**		
90.5	-46.9	1Bi10mV	60.1	-15.1	45.0	48.7	10m./VERT	**3.7**	**PK Under**	**Ambient**	**Transmitting**
90.7	-46.9	1Bi10mV	60.1	-15.1	45.0		10m./VERT	**45.0**	**Ambient**		
90.7	-47.5	1Bi10mV	59.5	-15.1	44.4	45.0	10m./VERT	**0.6**	**PK Under**	**Ambient**	**Transmitting**
90.9	-58.0	1Bi10mV	49.0	-15.1	33.9		10m./VERT	**33.9**	**Ambient**		
90.9	-57.4	1Bi10mV	49.6	-15.1	34.5	33.9	10m./VERT	**0.6**	**PK Over**	**Ambient**	**Transmitting**

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Conducted Emissions

Test By: LF	**Test:**	Emissions vs Ambient at 75 ft Frequency: 93.3 1st and 2nd Adjacent				**Client:**	TRN Atlanta				
	Project:	06-0235		**Class:**		**Model:**	Marta Passenger Train				
Frequency Range		**Table**	**Model**		**S/N**		**Valid**	**Calibrated:**			
87.9-88.7 MHz		1Bi10mV	Model: 3110B		S/N 9307-1431		Yes	Oct 11, 2006			
Frequency	**Test Data**	**AF**	**Test Data**	**AF+CA-AMP**	**Results**	**Limits**	**Distance /**	**Margin**	**PK = n**	**EUT Position**	**EUT Height**
(MHz)	**(dBm)**	**Table**	**(dBuV)**	**(dB)**	**(dBuV)**	**(dBuV/m)**	**Polarity**	**(dB)**	**/ QP**	**degrees**	**meters**
92.90	-7.1	1Bi10mV	99.9	-15.2	84.8		10m./VERT	**84.8**	**Ambient**		
92.9	-6.4	1Bi10mV	100.6	-15.2	85.5	84.8	10m./VERT	**0.7**	**PK Over**	**Ambient**	**Transmitting**
93.1	-34.3	1Bi10mV	72.7	-15.2	57.5		10m./VERT	**57.5**	**Ambient**		
93.1	-34.5	1Bi10mV	72.5	-15.2	57.3	57.5	10m./VERT	**0.2**	**PK Under**	**Ambient**	**Transmitting**
93.3	-30.5	1Bi10mV	76.5	-15.2	61.3		10m./VERT	**61.3**	**Ambient**		
93.3	-30.9	1Bi10mV	76.1	-15.2	60.9	61.3	10m./VERT	**0.4**	**PK Under**	**Ambient**	**Transmitting**
93.5	-51.3	1Bi10mV	55.7	-15.2	40.5		10m./VERT	**40.5**	**Ambient**		
93.5	-51.0	1Bi10mV	56.0	-15.2	40.9	40.5	10m./VERT	**0.4**	**PK Over**	**Ambient**	**Transmitting**
93.7	-55.3	1Bi10mV	51.7	-15.2	36.5		10m./VERT	**36.5**	**Ambient**		
93.7	-54.1	1Bi10mV	52.9	-15.2	37.8	36.5	10m./VERT	**1.3**	**PK Over**	**Ambient**	**Transmitting**