



1250 Peterson Dr., Wheeling, IL 60090

Company:	Chief Automotive Technologies, Inc.
Model Tested:	IT0408
Report Number:	14080

FCC Rules and Regulations / Intentional Radiators

Operational in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz, Bands

Part 15, Subpart C, Section 15.247

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

Formal Name:	Intellitape
Kind of Equipment:	Hand Held Measuring Device
Frequency Range:	2405 - 2480 MHz
Test Configuration:	Measuring device has a RF link to a receiver. The receiver is connected to the CPU by a USB cable. (Tested at 6.5 vdc)
Model Number(s):	IT0408
Model(s) Tested:	IT0408
Serial Number(s):	IT0100
Date of Tests:	March 26 & 27 & April 4 & 8, 2008
Test Conducted For:	Chief Automotive Technologies, Inc. 1924 East 4th Grand Island, NE 68801

NOTICE: "This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government". Please see the "Additional Description of Equipment Under Test" page listed inside of this report.

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SIGNATURE PAGE

Report By:

Arnom C. Rowe
Test Engineer
EMC-001375-NE

Reviewed By:

William Stumpf
OATS Manager

Approved By:

Brian Mattson
General Manager



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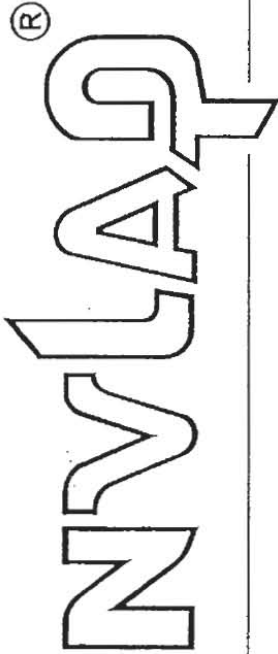


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United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 100276-0

D.L.S. Electronic Systems, Inc.
Wheeling, IL

is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 18 June 2005).



2007-10-01 through 2008-09-30

Effective dates

Dolly S. Buser
For the National Institute of Standards and Technology

NV/AP-01C (REV. 2006-09-13)



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Company:
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Report Number:

Chief Automotive Technologies, Inc.
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1.0 SUMMARY OF TEST REPORT

It was found that the Intellitape, Model Number(s) IT0408, **meets** the radio interference radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Section 15.247 for operational in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz, Bands. The AC Power Line conducted emissions test was not required because the Intellitape is powered from a D.C. power source. It does not have a line cord to plug into the A.C. power line.

2.0 INTRODUCTION

On March 26 & 27 & April 4 & 8, 2008, a series of radio frequency interference measurements was performed on Intellitape, Model Number(s) IT0408, Serial Number: IT0100. The tests were performed according to the procedures of the FCC as stated in the "Methods of Measurement of Radio-Noise Emissions for Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" found in the American National Standards Institute, ANSI C63.4-2003. Tests were performed by personnel of D.L.S. Electronic Systems, Inc. who are responsible to Donald L. Sweeney, Senior EMC Engineer.

D.L.S. Electronic Systems, Inc. is a full service EMC/Safety Testing Laboratory accredited to ISO 17025. NVLAP Certificate and Scope can be viewed at <http://www.dlsemc.com/certificate>. Our facilities are registered with the FCC, Industry Canada, and VCCI.

Main Test Facility:

D.L.S. Electronic Systems, Inc.
1250 Peterson Drive
Wheeling, Illinois 60090

O.A.T.S. Test Facility:

D.L.S. Electronic Systems, Inc.
166 S. Carter Street
Genoa City, Wisconsin 53128

3.0 OBJECT

The purpose of this series of tests was to determine if the test sample could meet the radio frequency interference emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Sections 15.205, 15.209 & 15.247 for Intentional Radiators operating in the Bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.



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4.0 TEST SET-UP

All emission tests were performed at D.L.S. Electronic Systems, Inc. and set up according to the ANSI C63.4-2003, Annex H.

All radiated emissions tests were performed with the test item placed on a 80 cm high rotating non-conductive table, located in the test room. Equipment normally operated on the floor was placed on a metal covered turntable which is flush with the surrounding conducting ground plane. The ground plane has an electrical isolation layer over its surface approximately 7 mm thick. The EUT is separated from the turntable ground plane by a non-conductive layer. The equipment under test was set up according to ANSI C63.4-2003, Sections 6 and 8.

5.0 TEST EQUIPMENT (Bandwidths and Detector Function)

All preliminary data below 1000 MHz was automatically plotted using the ESI 26/40 Fixed Tuned Receiver. The data was taken using Peak, Quasi-Peak or the Average Detector Functions as required. This information was then used to determine the frequencies of maximum emissions. Above 1000 MHz, final data was taken using the Average Detector.

Below 1000 MHz, final data was taken using the ESI 26/40 Fixed Tuned Receiver. These plots were made using the Peak or Quasi-Peak Detector functions, with manual measurements performed on the questionable frequencies using the Quasi-Peak or the Average Detector Function of the ESI 26/40 Fixed Tuned Receiver as required. Above 1000 MHz, final data was taken using the Average Detector on the Spectrum Analyzer.

The bandwidths shown below are specified by ANSI C63.4-2003, Section 4.2.

Frequency Range	Bandwidth (-6 dB)
10 to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz
30 MHz to 1 GHz	120 kHz
Above 1 GHz	1 MHz

A list of the equipment used can be found in Table 1. All primary equipment was calibrated against known reference standards with a verified traceable path to NIST.



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6.0 AMBIENT MEASUREMENTS

For emissions measurements, broadband antennas and an EMI Test Receiver with a panoramic spectrum display are used. First the frequency range is scanned and displayed on the test receiver display. Next the scanned frequency range is divided into smaller ranges, and then it is manually tuned through to determine the emissions from the EUT. A headset or loudspeaker is connected to the test receiver's AM/FM demodulated output as an aid in detecting ambient signals and finding frequencies of significant emission from the EUT. If there is any doubt as to the source of the emission, it is further investigated by rotating the EUT, or by disconnecting the power from the EUT.

The EUT is set up in its typical configuration and operated in its various modes. For tabletop systems, cables are manipulated within the range of likely configurations. For floor-standing equipment, the cables are located in the same manner as the user would install them and no further manipulation is made. If the manner of cable installation is not known, or if it changes with each installation, cables or wires for floor-standing equipment shall be manipulated to the extent possible to produce the maximum level of emissions. For each mode of operation, the frequency spectrum is monitored. Variations in antenna height, antenna polarization, EUT azimuth, and cable or wire placement (each variable within bounds specified elsewhere) are explored to produce the emissions that have the highest amplitude relative to the limit. These methods are performed to the specifications in ANSI C63.4-2003.



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7.0 DESCRIPTION OF TEST SAMPLE: (See also Paragraph 8.0)

7.1 Description:

The test sample is a hand held measuring device that transmits the measurement information to a spread sheet format comparing specification data to actual measurement data. The measurement information is transmitted via an RF link to a receiver that is connected to a computer using a USB cable. The hand held measuring device uses a spooled cable and a rotary encoder to gather the measurements. The device is operated by 4 "AA" batteries.

7.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

Length:9.0" x Width:3.0" x Height:2.0"

7.3 LINE FILTER USED:

NA

7.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

NA

Clock Frequencies:

32.768KHz, 16 MHz, 8MHz

7.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

- | | |
|---------------------------------|-------------------|
| 1. PROCESSOR BOARD, INTELLITAPE | PN: 787021 REV. 1 |
| 2. USB RECEIVER PCB - ZB | PN: 788887 REV. 1 |



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8.0 ADDITIONAL DESCRIPTION OF TEST SAMPLE:
(See also Paragraph 7.0)

1: There were no additional descriptions noted at the time of test.

NOTE:

Intellitape was tested in the continuous transmit and receive modes on the low, mid, and high channels.

9.0 PHOTO INFORMATION AND TEST SET-UP

Item 0 Intellitape
Model Number: IT0408; Serial Number: IT0100



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10.0 RADIATED PHOTOS TAKEN DURING TESTING



RADIATED “X”



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10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)



RADIATED “Y”



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Company:	Chief Automotive Technologies, Inc.
Model Tested:	IT0408
Report Number:	14080

10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)



RADIATED “Z”



Company: Chief Automotive Technologies, Inc.
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11.0 RESULTS OF TESTS

The radio interference emission charts can be seen on the pages at the end of this report. Data sheets indicating the test measurements taken during testing can also be found at the end of this report.

12.0 CONCLUSION

It was found that the Intellitape, Model Number(s) IT0408 **meets** the radio interference radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Section 15.247 for operational in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz, Bands. The conducted emissions test was not required because the Intellitape is powered from a D.C. power source. It does not have a line cord to plug into the A.C. power line.



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TABLE 1 – EQUIPMENT LIST

Test Equipment	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz – 40 GHz	1/09
Preamp	R&S	TS-PR10	032001/004	30 MHz-1 GHz	1/09
Preamp	Ciao	CA118-4010	-----	1 GHz-18 GHz	1/09
Preamp	Miteq	AMF-6F-100200-50-10P	668382	10 GHz-18 GHz	1/09
Preamp	Miteq	AMF-8B-180265-40-10P-H/S		18 GHz-26 GHz	9/08
Signal Generator	R&S	SMR-40	100092	1 – 40 GHz	9/08
Attenuator-20dB fixed	Aeroflex/weinschel	75A-20-12	1071	DC-40 GHz	7/08
Filter- High-Pass	Q-Microwave	100462	-----	4.2 GHz	5/09
Antenna	EMCO	3104C	00054892	20 MHz – 200 MHz	3/10
Antenna	Electrometrics	3146	1205	200 MHz – 1 GHz	3/10
Horn Antenna	EMCO	3115	6204	1-18 GHz	5/08
Horn Antenna	EMCO	3115	4451	1-18 GHz	5/08
Horn Antenna	EMCO	3116	2549	18 – 40 GHz	5/08

All primary equipment is calibrated against known reference standards with a verified traceable path to NIST.



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APPENDIX A

TEST PROCEDURE

Part 15, Subpart C, Section 15.247 (a-h)

OPERATION WITHIN THE BAND 902-928 MHz,

2400-2483.5 MHz AND 5725-5857 MHz



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APPENDIX A

1.0 AC POWER LINE CONDUCTED EMISSION MEASUREMENTS

If applicable, the conducted emissions were measured over the frequency range from 150 kHz to 30 MHz in accordance with the power line measurements as specified in the American National Standards Institute, ANSI C63.4-2003, Section 12. Since the device is operated from the public utility lines, the 115 Vac 60 Hz power leads, high and low sides, were to be measured by connecting the measuring equipment to the appropriate meter terminal of the LISN. All signals were then recorded. The allowed levels for Intentional Radiators cannot exceed the following:

Frequency of Emissions (MHz)	Conducted Limits (dBuV)	
	Quasi Peak	Average
.15 to .5	66 to 56	56 to 46
.5 to 5	56	46
5 to 30	60	50

NOTE:

The conducted emissions test was not required because the Intellitape is powered from a D.C. power source. It does not have a line cord to plug into the A.C. power line.



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APPENDIX A

2.0 SPURIOUS EMISSIONS AT ANTENNA TERMINALS – PART 15.247(c)

Spurious conducted emissions were measured at the antenna terminals. Plots were made showing the amplitude of each harmonic emission with the equipment operated. As shown by the radiated charts there was no reason to believe that there were any spurious emissions other than the harmonics that were than individually investigated when doing the conducted test at the antenna terminals. Measurements were made up to the 10th harmonic of the fundamental.

The allowed emissions for transmitters operating in the 2400 MHz - 2483.5 MHz bands for Intellitape equipment are found under Part 15, Section 15.247(c). This paragraph states that in any 100 kHz bandwidth outside the frequency band which the spread spectrum intentional radiator is operating, the radio frequency power produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

NOTE: See the following pages for the data and graphs of the actual measurements made:



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APPENDIX A

CONDUCTED EMISSION DATA AND GRAPH(S)

TAKEN FOR

SPURIOUS EMISSION MEASUREMENTS MADE

AT THE ANTENNA TERMINALS

PART 15.247(c)



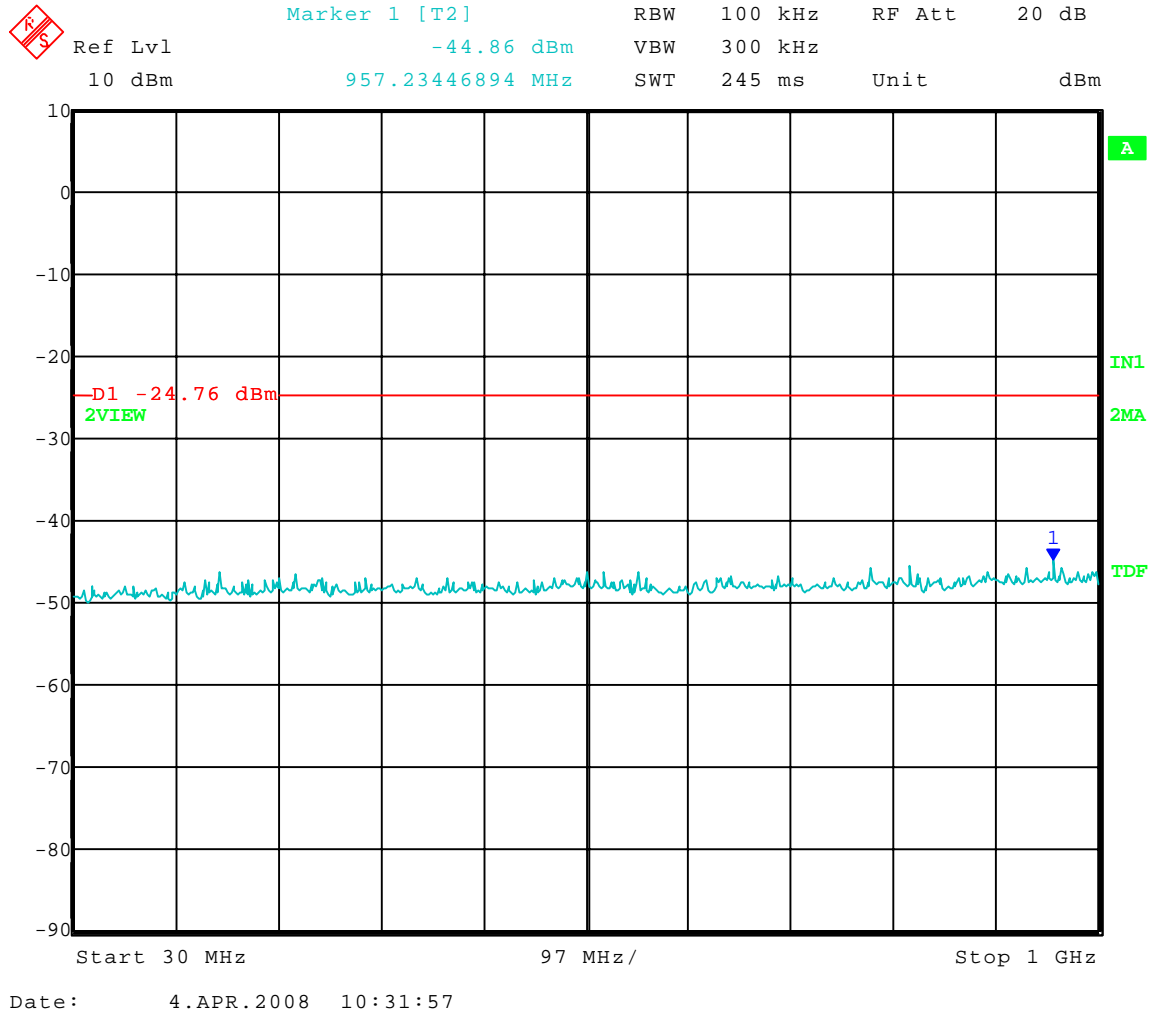
Company: Chief Automotive Technologies, Inc.
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APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Spurious Emissions - Conducted
Operator: Jason L
Comment: Low Channel Transmit = 2.405 GHz
Frequency Range: 30 to 1000 MHz
Limit = -24.76 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





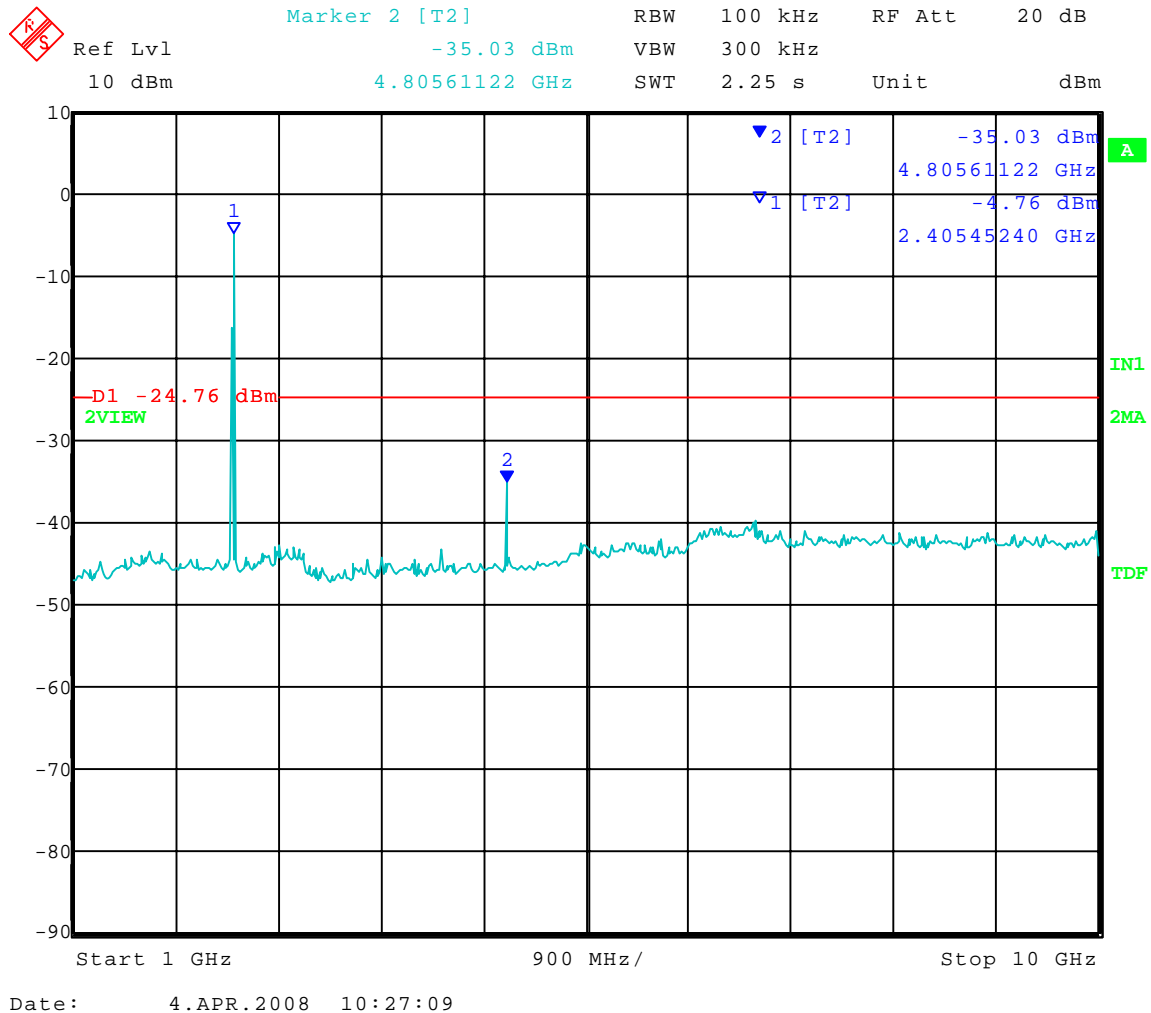
Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

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APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Spurious Emissions - Conducted
Operator: Jason L
Comment: Low Channel Transmit = 2.405 GHz
Frequency Range: 1 to 10 GHz
Limit = -24.76 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





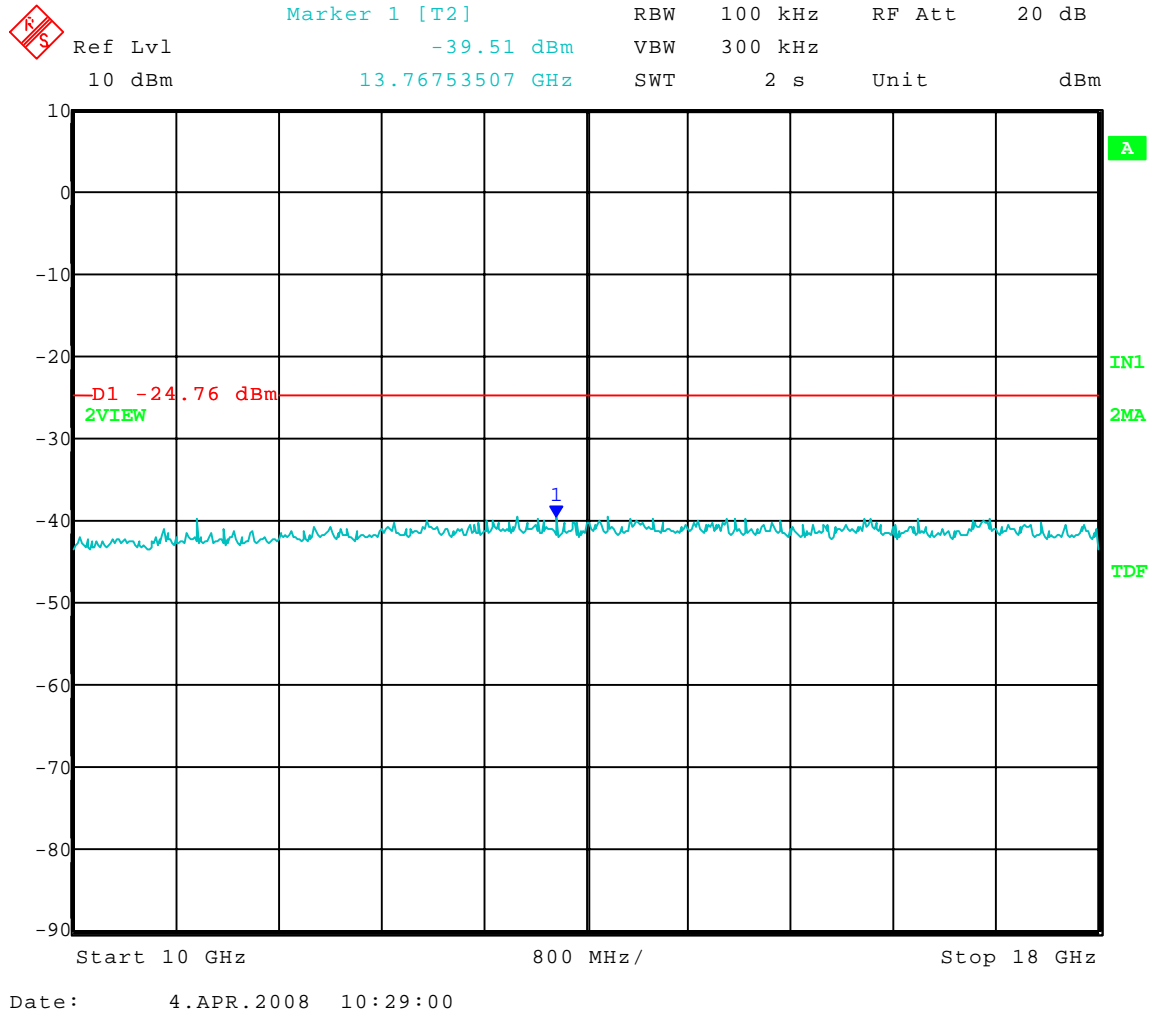
Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

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APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Spurious Emissions - Conducted
Operator: Jason L
Comment: Low Channel Transmit = 2.405 GHz
Frequency Range: 10 to 18 GHz
Limit = -24.76 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





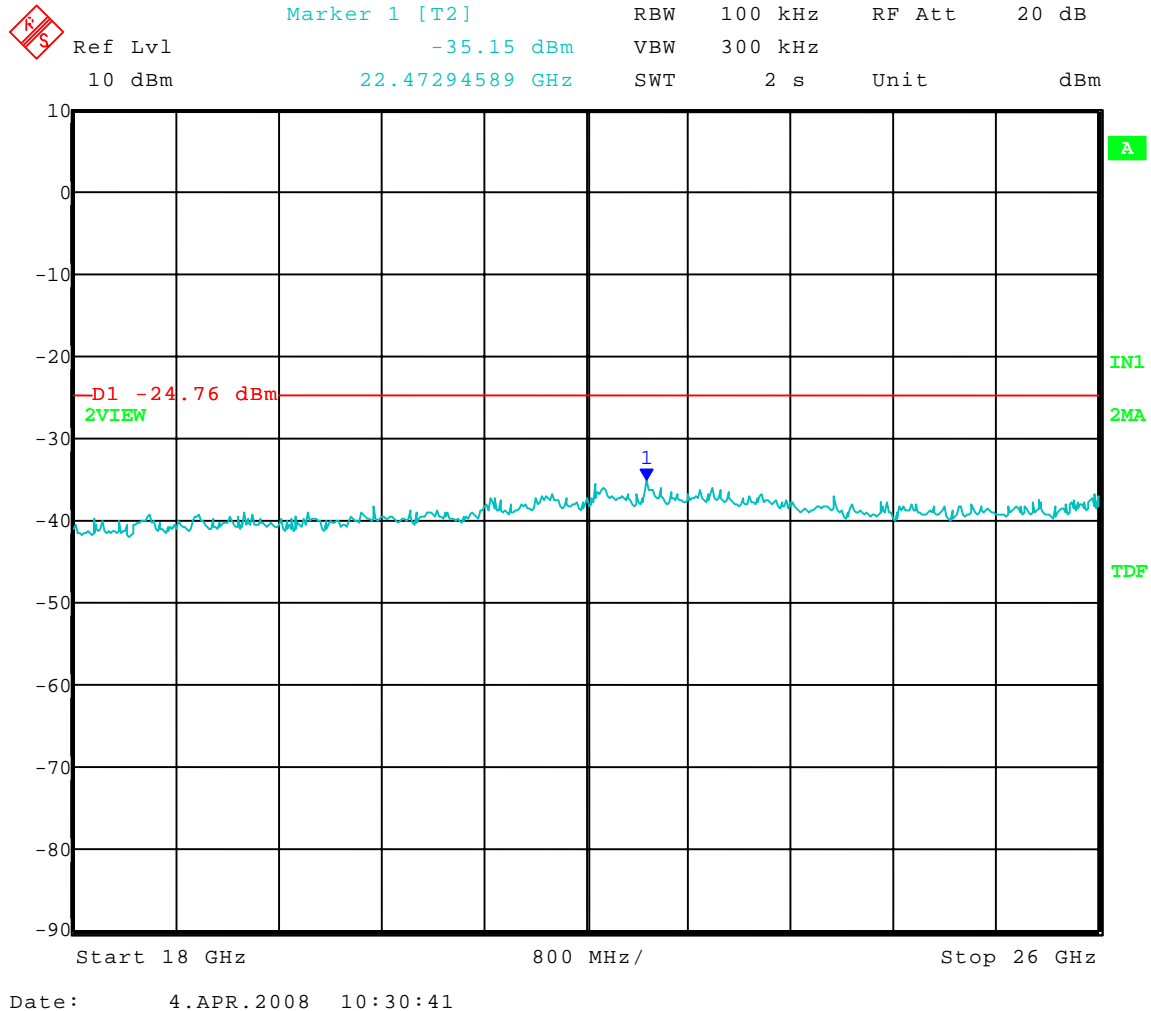
Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
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APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Spurious Emissions - Conducted
Operator: Jason L
Comment: Low Channel Transmit = 2.405 GHz
Frequency Range: 18 to 26 GHz
Limit = -24.76 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





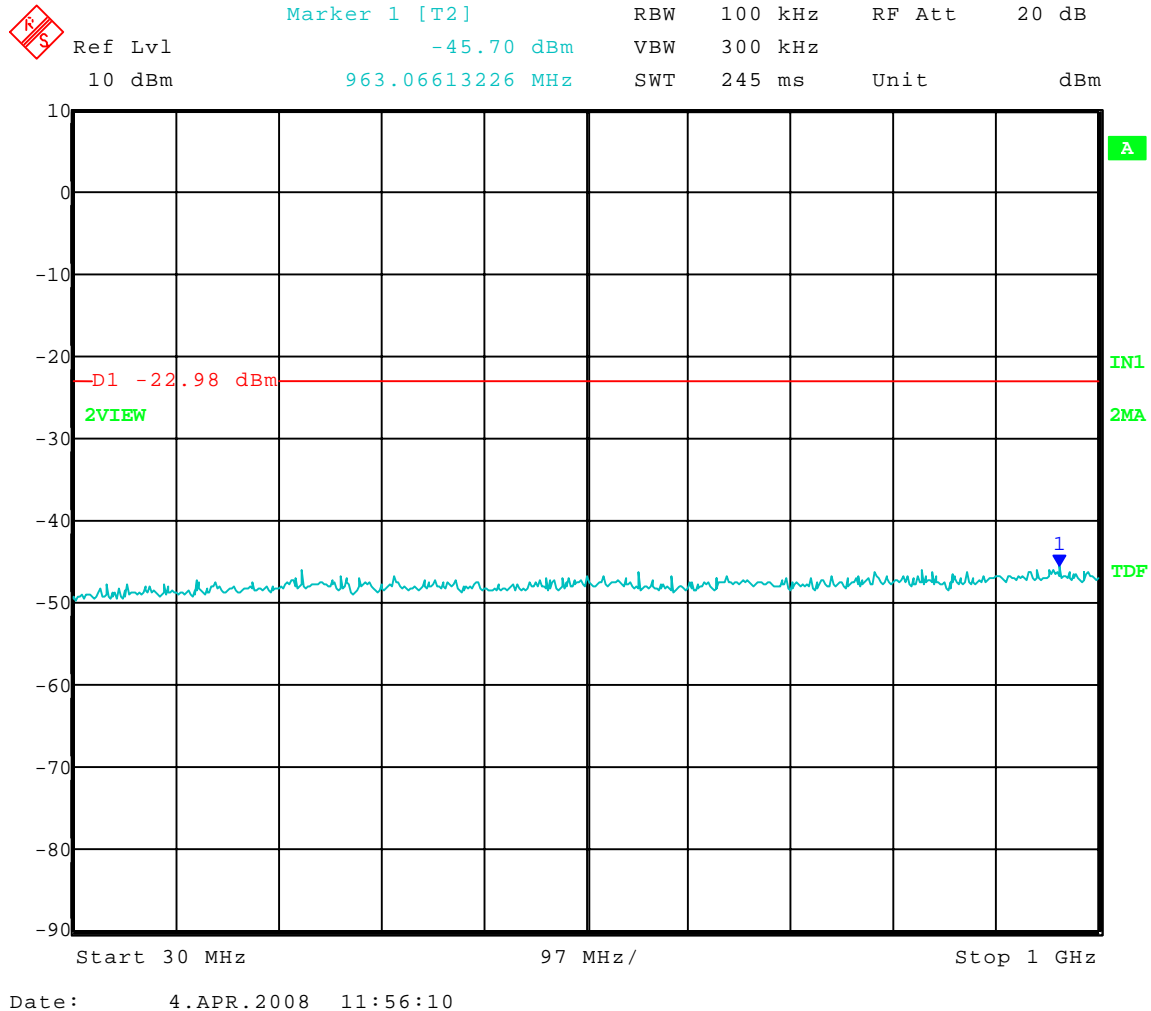
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APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Spurious Emissions - Conducted
Operator: Jason L
Comment: Middle Channel Transmit = 2.445 GHz
Frequency Range: 30 to 1000 MHz
Limit = -22.98 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





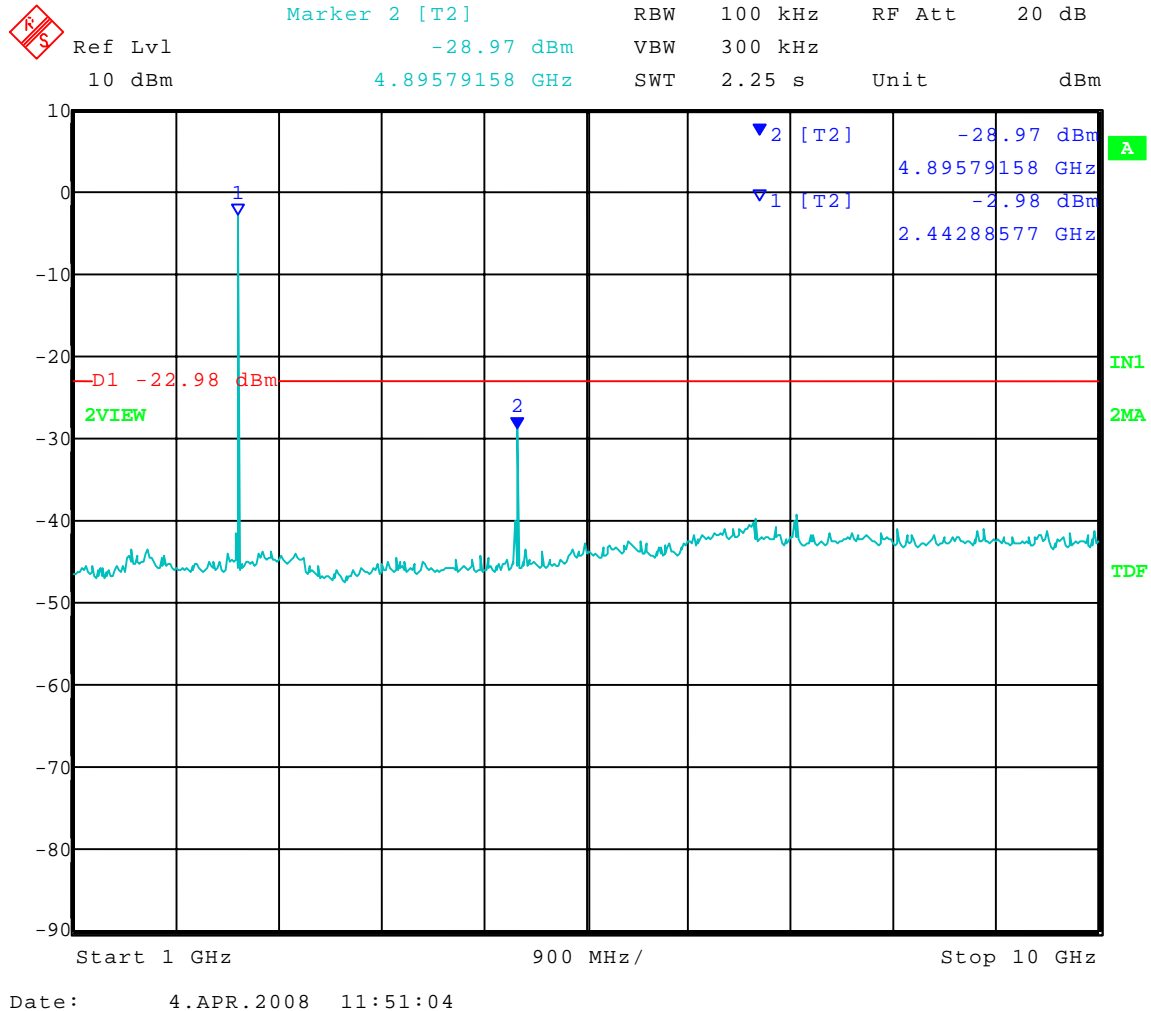
Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
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APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Spurious Emissions - Conducted
Operator: Jason L
Comment: Middle Channel Transmit = 2.445 GHz
Frequency Range: 1 to 10 GHz
Limit = -22.98 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





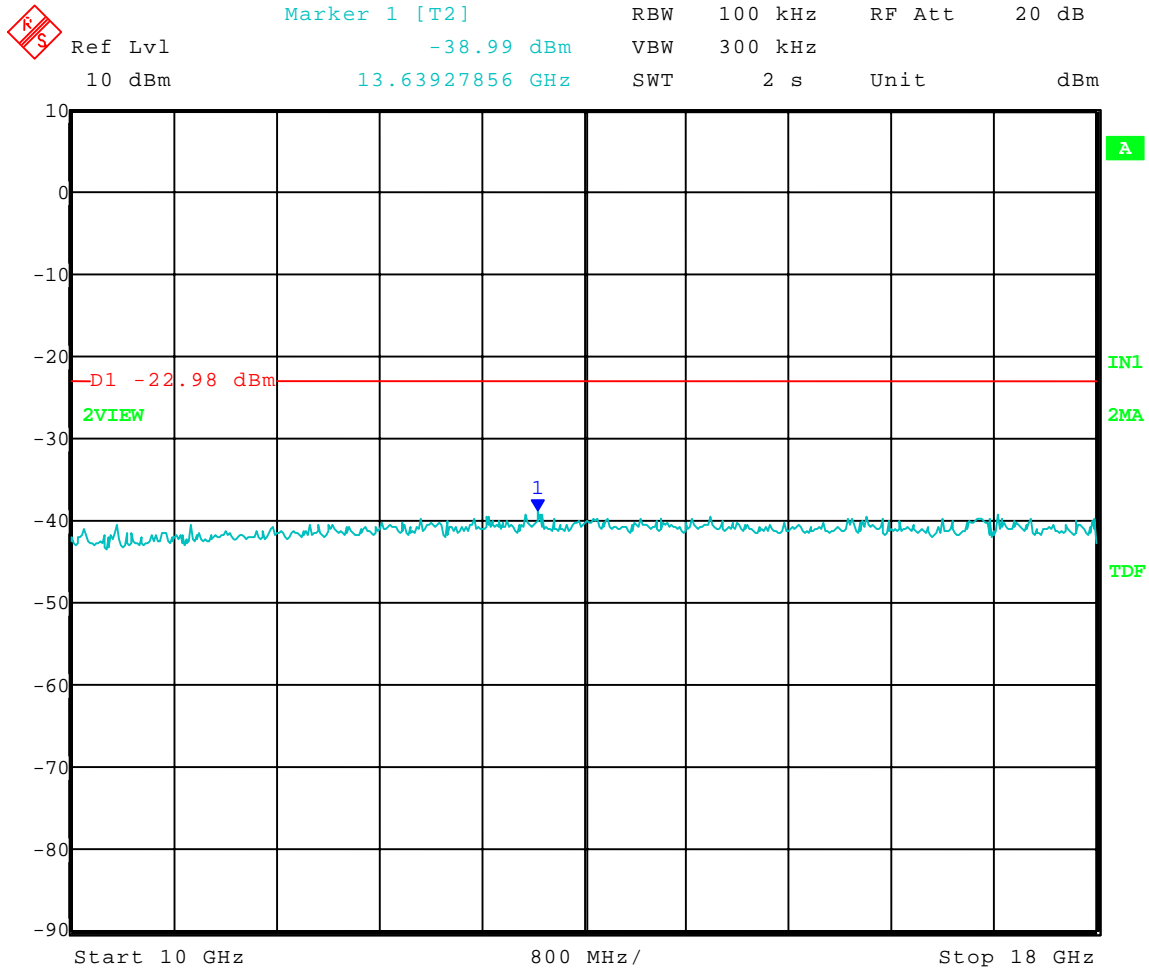
Company: Chief Automotive Technologies, Inc.
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APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Spurious Emissions - Conducted
Operator: Jason L
Comment: Middle Channel Transmit = 2.445 GHz
Frequency Range: 10 to 18 GHz
Limit = -22.98 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



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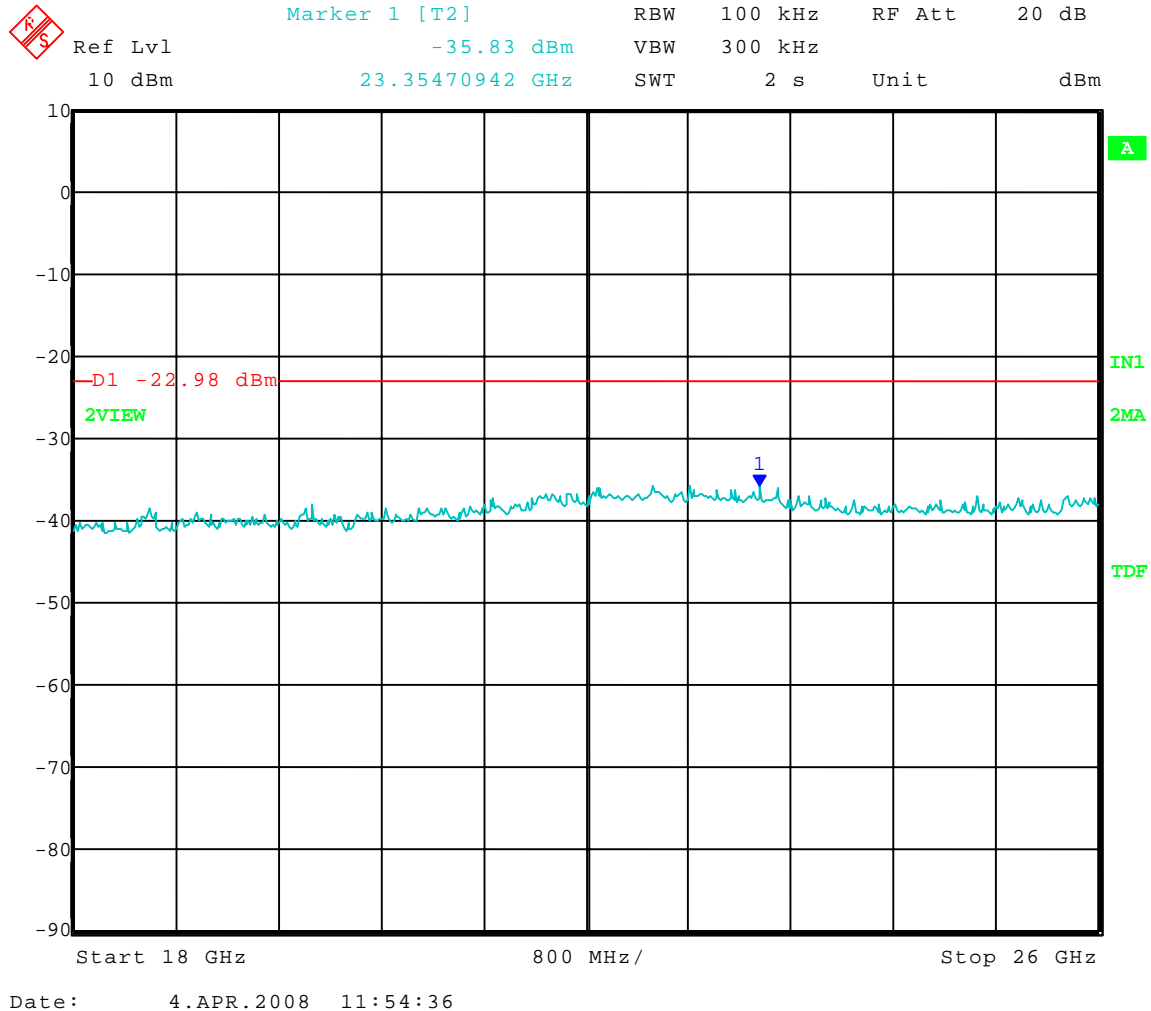
Company: Chief Automotive Technologies, Inc.
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APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Spurious Emissions - Conducted
Operator: Jason L
Comment: Middle Channel Transmit = 2.445 GHz
Frequency Range: 18 to 26 GHz
Limit = -22.98 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





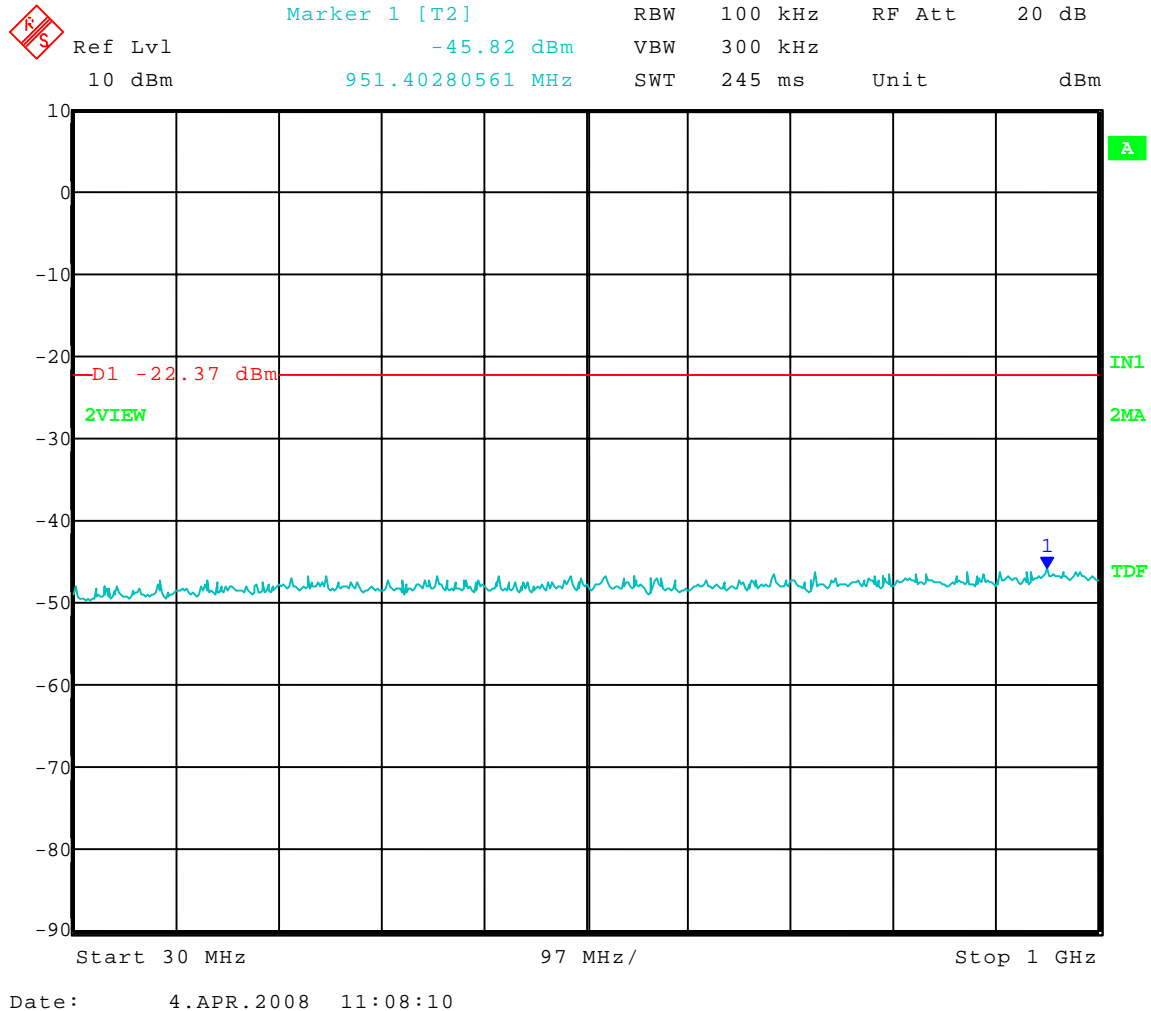
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APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Spurious Emissions - Conducted
Operator: Jason L
Comment: High Channel Transmit = 2.48 GHz
Frequency Range: 30 to 1000 MHz
Limit = -22.37 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





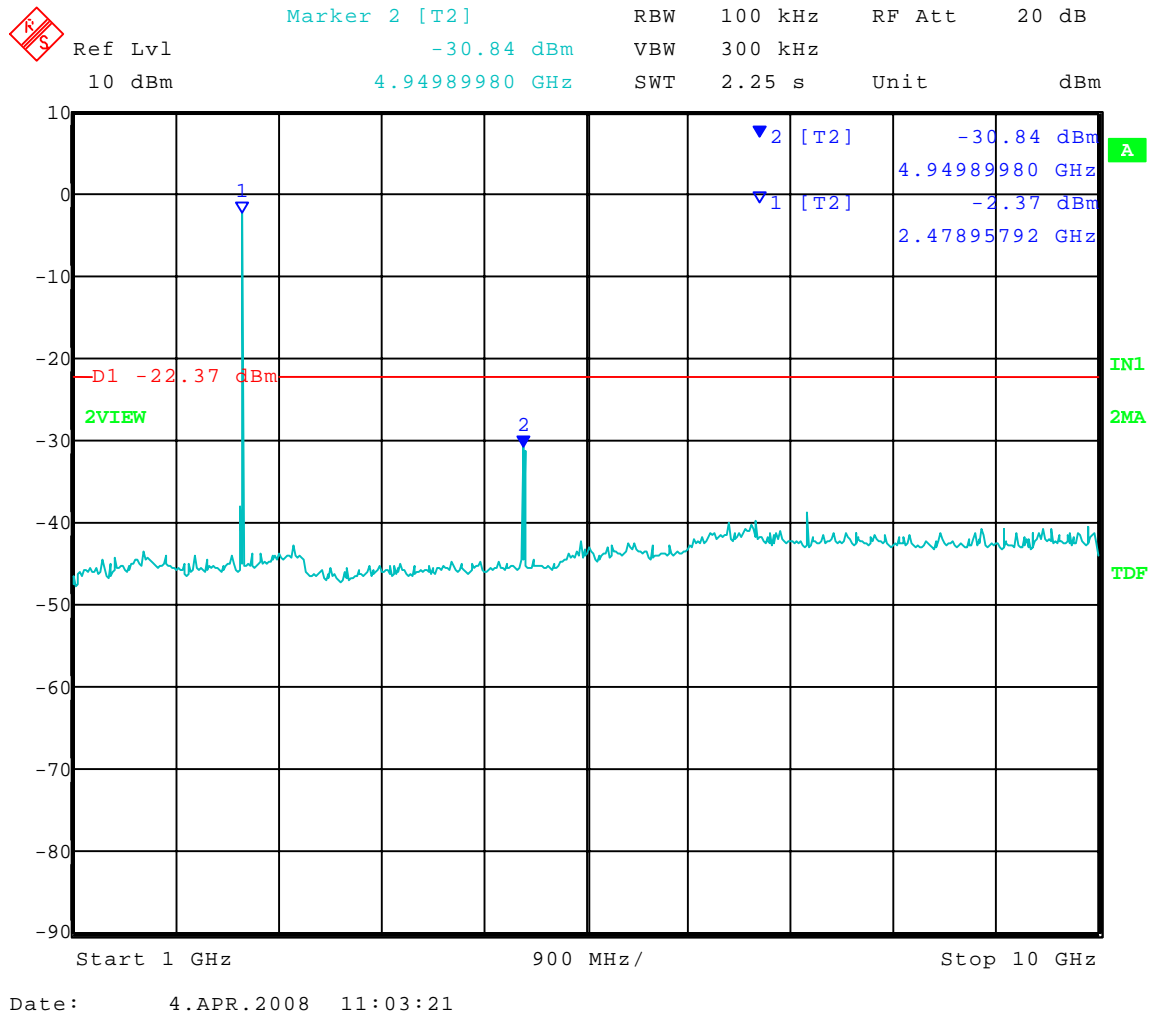
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Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Spurious Emissions - Conducted
Operator: Jason L
Comment: High Channel Transmit = 2.48 GHz
Frequency Range: 1 to 10 GHz
Limit = -22.37 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





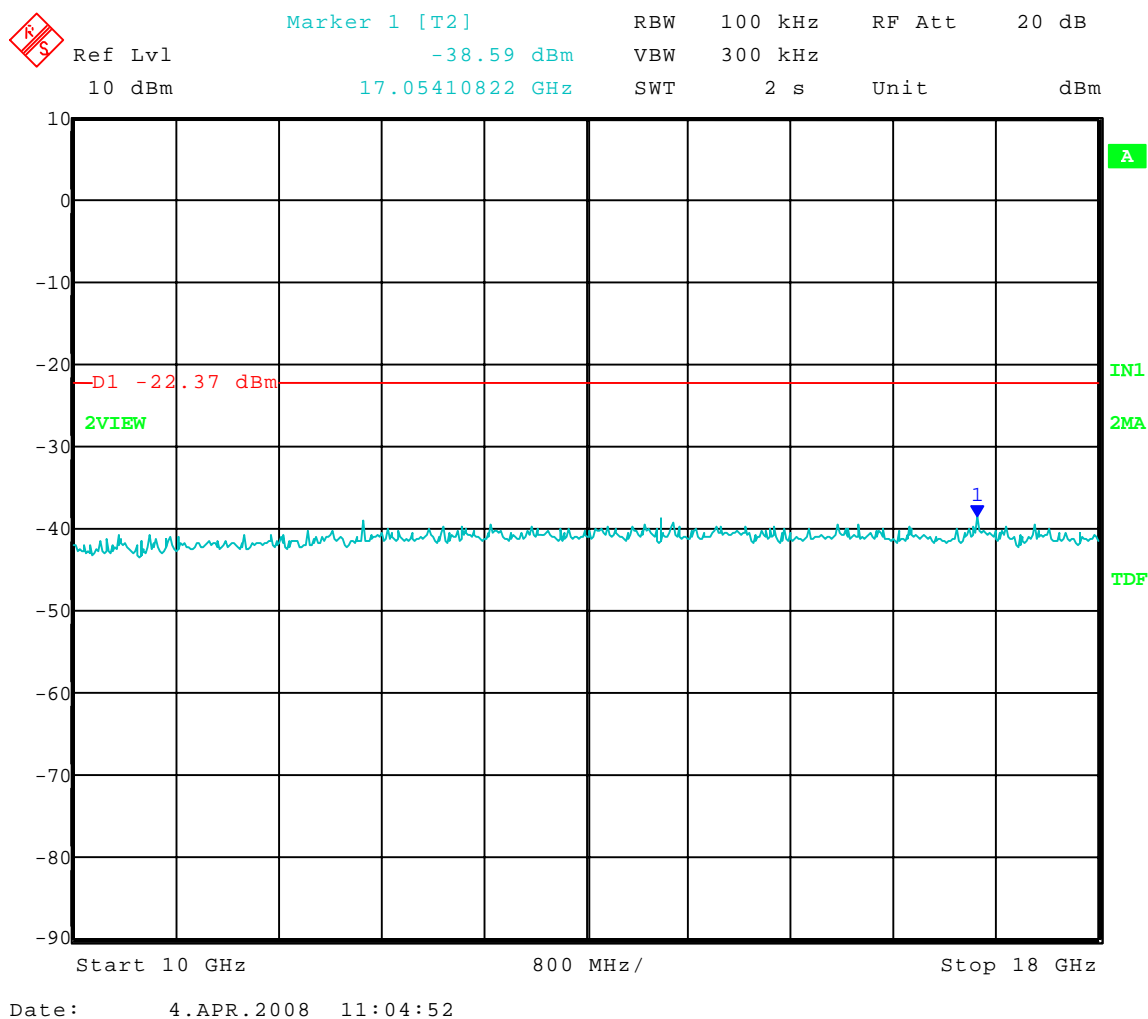
Company: Chief Automotive Technologies, Inc.
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Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Spurious Emissions - Conducted
Operator: Jason L
Comment: High Channel Transmit = 2.48 GHz
Frequency Range: 10 to 18 GHz
Limit = -22.37 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





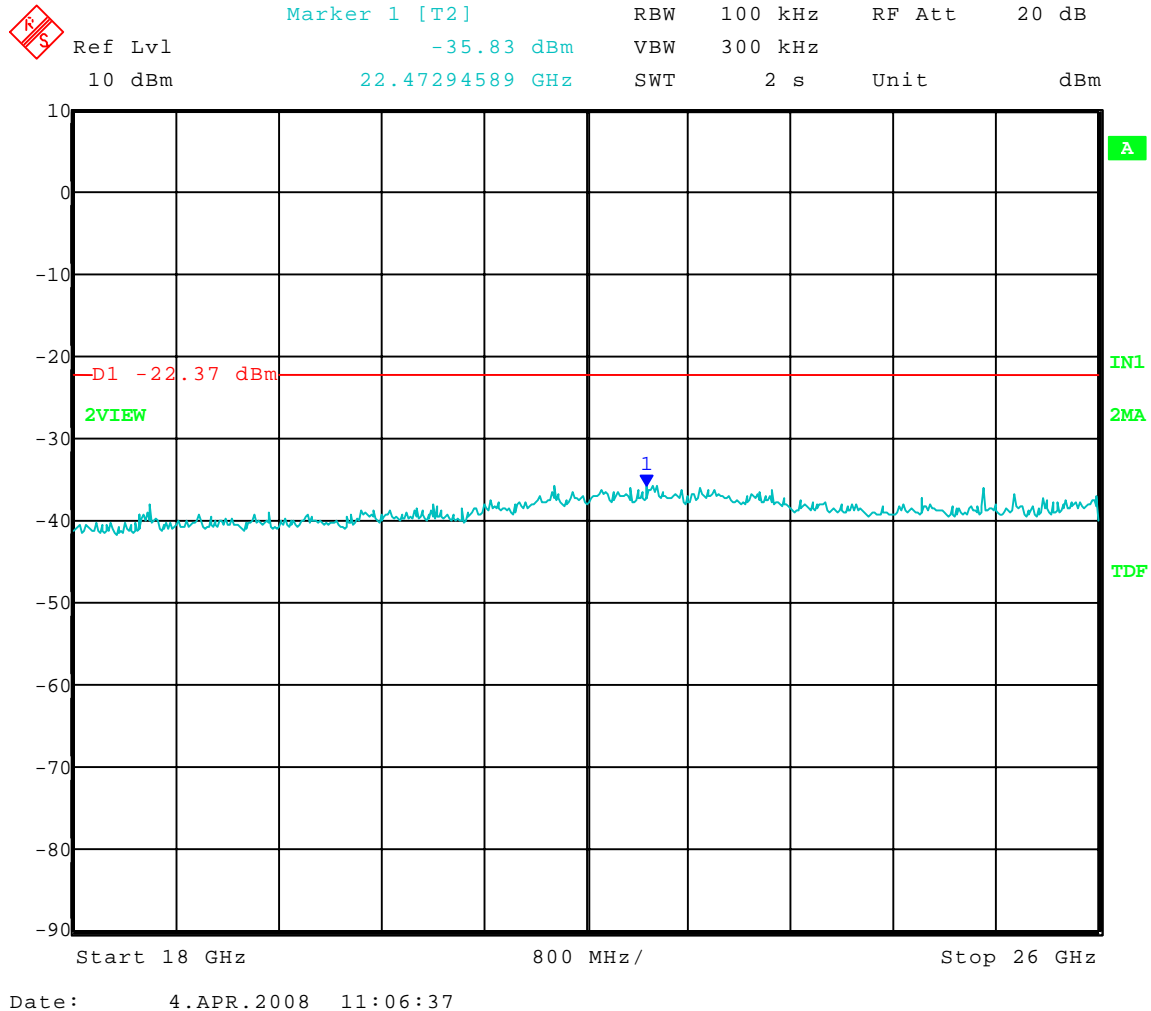
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APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Spurious Emissions - Conducted
Operator: Jason L
Comment: High Channel Transmit = 2.48 GHz
Frequency Range: 18 to 26 GHz
Limit = -22.37 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



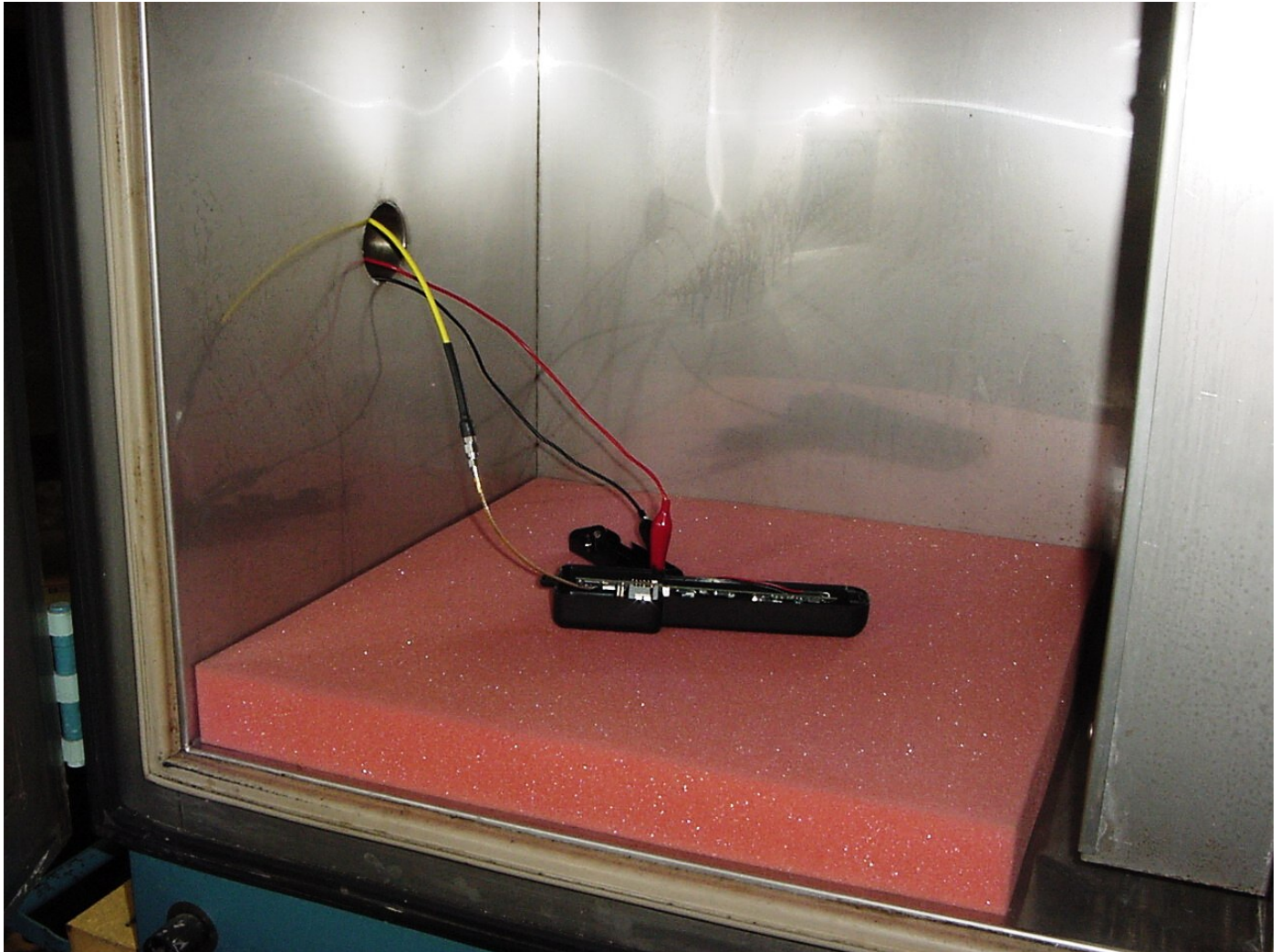


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APPENDIX A

3.0 CONDUCTED EMISSIONS (ANTENNA TERMINAL) PHOTOS TAKEN DURING TESTING





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APPENDIX A

4.0 RESTRICTED BANDS

As stated in Section 15.205a, the fundamental emission from the Intellitape shall not fall within any of the bands listed below:

Frequency in MHz	Frequency in MHz	Frequency in MHz	Frequency in GHz
.0900 to .1100	162.0125 to 167.17	2310.0 to 2390	9.30 to 9.50
.4900 to .5100	167.7200 to 173.20	2483.5 to 2500	10.60 to 12.70
2.1735 to 2.1905	240.000 to 285.00	2655.0 to 2900	13.25 to 13.40
8.362 to 8.3660	322.200 to 335.40	3260.0 to 3267	14.47 to 14.50
13.36 to 13.410	399.900 to 410.00	3332.0 to 3339	15.35 to 16.20
25.50 to 25.670	608.000 to 614.00	3345.8 to 3358	17.70 to 21.40
37.50 to 38.250	960.000 to 1240.00	3600.0 to 4400	22.01 to 23.13
73.00 to 75.500	1300.000 to 1427.00	4500.0 to 5250	23.60 to 24.00
108.00 to 121.94	1435.000 to 1626.50	5350.0 to 5450	31.20 to 31.80
123.00 to 138.00	1660.000 to 1710.00	7250.0 to 7750	36.43 to 36.50
149.90 to 150.00	1718.800 to 1722.20	8025.0 to 8500	ABOVE 38.60
156.70 to 156.90	2200.000 to 2300.00	9000.0 to 9200	

NOTE:

The noise floor within the Restricted Bands for the EMC Receiver will typically lay 20 dB below the limit.

5.0 RESTRICTED BAND AND BAND EDGE COMPLIANCE

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the attenuation below the general limits specified in 15.209 is not required.

The field strength of any **radiated emissions** which fall within the restricted bands shall not exceed the general radiated emissions limits as stated Section 15.209.

NOTE: See the following page(s) for the graph(s) made showing compliance for Restricted Band and Band Edge Compliance:



1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

APPENDIX A

DATA AND GRAPH(S) TAKEN SHOWING

THE RESTRICTED BAND COMPLIANCE

PART 15.247(c)



Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Radiated Spurious Emissions in Restricted Bands 1GHz – 25 GHz Tested at a 3 Meter Distance

EUT: Intellitape Model: IT0408
Manufacturer: Chief Automotive
Operating Condition: 70 deg F; 31% R.H.
Test Site: Site 2
Operator: Craig B
Test Specification: FCC Part 15.247(d) and FCC Part 15.205
Comment: Continuous transmit.
Date: 03/27/2008

Notes: (1) Peak measurements were taken with RBW = 1 MHz, VBW = 3 MHz
(2) Average measurements were taken with RBW = 1 MHz, VBW = 10 Hz
(3) All other restricted band emissions at least 20 dB under the limit.

Channel 11:

Frequency (GHz)	Measurement Type	Ant. Pol.	Level (dBuV)	Antenna Factor (dB/m)	System Loss (dB)	Total Level (dBuV/m)	Duty Cycle Correction (dB)	Final Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comment
4.81	Average	Vert	56.28	32.90	-33.5	55.7	-24.3	31.4	54	22.6	Res. Band
4.81	Max Peak	Vert	61.96	32.90	-33.5	61.4	---	61.4	74	12.6	Res. Band
4.81	Average	Horz	55.44	32.90	-33.5	54.8	-24.3	30.5	54	23.5	Res. Band
4.81	Max Peak	Horz	62.10	32.90	-33.5	61.5	---	61.5	74	12.5	Res. Band



Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Radiated Spurious Emissions in Restricted Bands 1GHz – 25 GHz Tested at a 3 Meter Distance

EUT: Intellitape Model: IT0408
Manufacturer: Chief Automotive
Operating Condition: 70 deg F; 31% R.H.
Test Site: Site 2
Operator: Craig B
Test Specification: FCC Part 15.247(d) and FCC Part 15.205
Comment: Continuous transmit.
Date: 03/27/2008

Notes: (1) Peak measurements were taken with RBW = 1 MHz, VBW = 3 MHz
(2) Average measurements were taken with RBW = 1 MHz, VBW = 10 Hz
(3) All other restricted band emissions at least 20 dB under the limit.

Channel 19:

Frequency (GHz)	Measurement Type	Ant. Pol.	Level (dBuV)	Antenna Factor (dB/m)	System Loss (dB)	Total Level (dBuV/m)	Duty Cycle Correction (dB)	Final Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comment
4.89	Average	Vert	55.36	33.01	-33.5	54.9	-24.3	30.6	54	23.4	Res. Band
4.89	Max Peak	Vert	60.42	33.01	-33.5	59.9	---	59.9	74	14.1	Res. Band
4.89	Average	Horz	55.32	33.01	-33.5	54.8	-24.3	30.5	54	23.5	Res. Band
4.89	Max Peak	Horz	60.76	33.01	-33.5	60.3	---	60.3	74	13.7	Res. Band



Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Radiated Spurious Emissions in Restricted Bands 1GHz – 25 GHz Tested at a 3 Meter Distance

EUT: Intellitape Model: IT0408
Manufacturer: Chief Automotive
Operating Condition: 70 deg F; 31% R.H.
Test Site: Site 2
Operator: Craig B
Test Specification: FCC Part 15.247(d) and FCC Part 15.205
Comment: Continuous transmit.
Date: 03/27/2008

Notes: (1) Peak measurements were taken with RBW = 1 MHz, VBW = 3 MHz
(2) Average measurements were taken with RBW = 1 MHz, VBW = 10 Hz
(3) All other restricted band emissions at least 20 dB under the limit.

Channel 26:

Frequency (GHz)	Measurement Type	Ant. Pol.	Level (dBuV)	Antenna Factor (dB/m)	System Loss (dB)	Total Level (dBuV/m)	Duty Cycle Correction (dB)	Final Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comment
4.96	Average	Vert	54.99	33.12	-33.5	54.6	-24.3	30.3	54	23.7	Res. Band
4.96	Max Peak	Vert	60.17	33.12	-33.5	59.8	---	59.8	74	14.2	Res. Band
4.96	Average	Horz	54.13	33.12	-33.5	53.8	-24.3	29.5	54	24.6	Res. Band
4.96	Max Peak	Horz	59.49	33.12	-33.5	59.1	---	59.1	74	14.9	Res. Band



1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

APPENDIX A

DATA AND GRAPH(S) TAKEN SHOWING THE BAND EDGE CONDUCTED COMPLIANCE PART 15.247(c)



1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

APPENDIX A

Radiated Upper Band-Edge measurement

Test Procedure: "Measurement of Digital Transmission Systems Operating under Section 15.247 (March 23, 2005)

The EUT was investigated at the low and high channels of operation to determine band-edge compliance. Because the upper band-edge coincides with a restricted band, bandedge compliance for the upper band-edge was determined using the radiated mark-delta method. The radiated field strength of the fundamental emission was first determined and then the mark-delta method was used to determine the field strength of the band-edge emissions. The lower band-edge compliance was determined using the marker-delta method in which the radio frequency power that is produced by the EUT is at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power.

Upper Band-Edge Marker Delta Method

Frequency (MHz)	Antenna Polarity (H/V)	Fundamental Field Strength (dB μ V/m)	Duty Cycle Correction (dB)	Delta-Marker (dB)	Band-Edge Field Strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
2480 (Peak)	H	98.65	N/A	30.22	68.43	74	5.6
2480 (Avg)	H	94.80	24.3	30.22	40.28	54	13.7

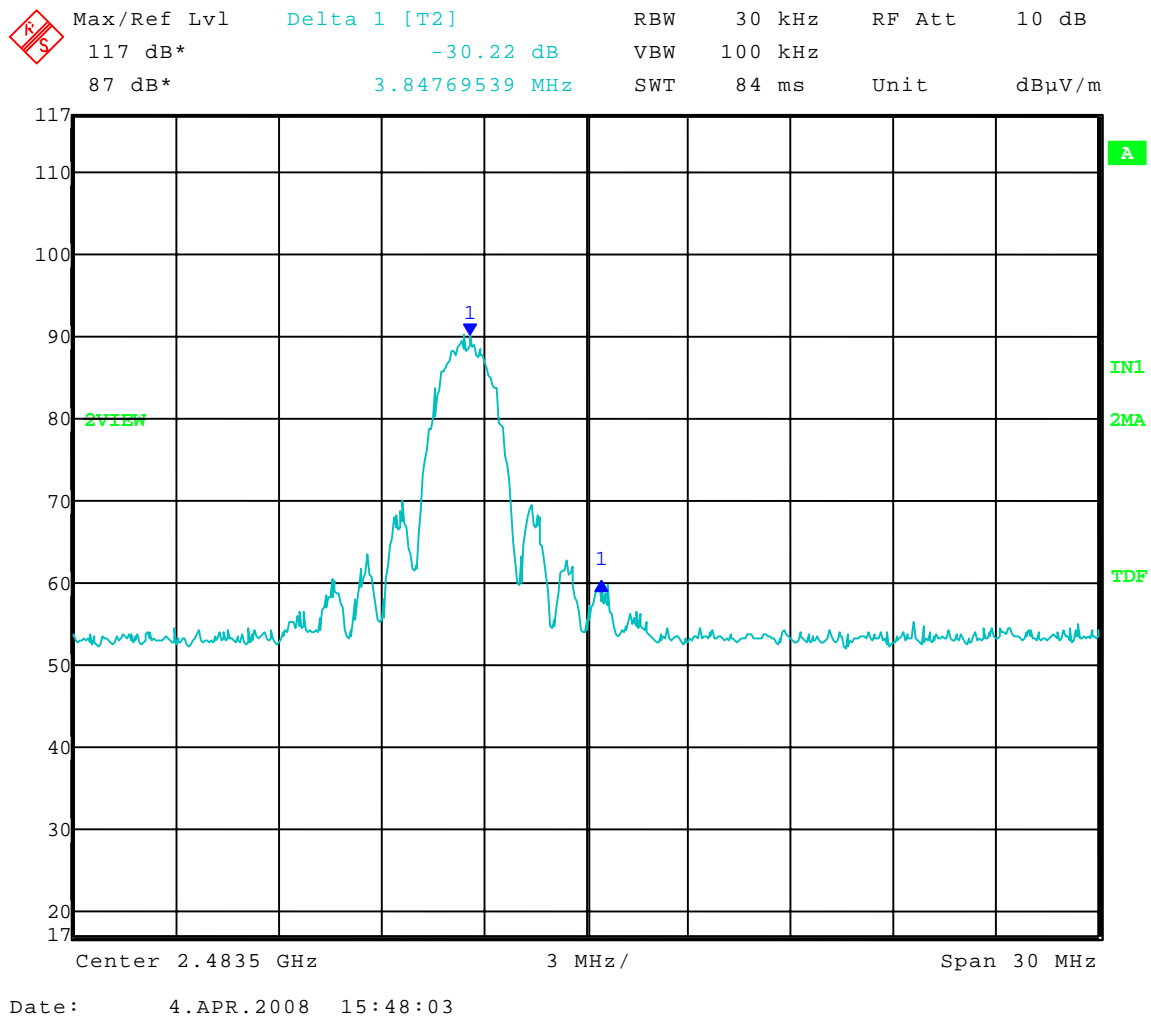


Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Upper Band-Edge Radiated – Marker Delta Method
Operator: Jason L
Comment: High Channel: Frequency – 2.48 GHz





1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

APPENDIX A

6.0 FIELD STRENGTH OF FUNDAMENTAL AND SPURIOUS EMISSION MEASUREMENTS

The radiated measurements made at D.L.S. Electronic Systems, Inc., for the Intellitape, Model Number: IT0408, are shown in tabulated and graph form. Preliminary radiation measurements were performed at a 3 meter test distance with the limits adjusted linearly when required. The frequency range from 30 MHz to over 960 MHz, depending upon the fundamental frequency as stated in Part 15.33a, was automatically scanned and plotted at various angles.

Measurements for the Intellitape were made up to 13000 MHz, in accordance with Section 15.33a for Intentional Radiators with a fundamental frequency of 2405 - 2480 MHz. For intentional radiators, the frequency range to be investigated is determined by the lowest radio frequency generated by the device without going below 30 MHz, up to at least the tenth harmonic of the highest fundamental frequency or 10 GHz, whichever is lower. At those frequencies where significant signals were detected, measurements were made over the entire frequency range specified in FCC Part 15, Subpart C, Section 15.247 at the open field test site, located at Genoa City, Wisconsin, FCC file number **31040/SIT**. When required, limits were extrapolated using a linear extrapolation.

All signals in the frequency range of 30 MHz to 2000 MHz were measured with a Biconical Antenna or tuned dipoles and from 200 MHz to 1000 MHz, a Log Periodic or Tuned Dipoles were used. From 1000 MHz to 25 GHz Horn Antennas were used. During the test the equipment was rotated and the antenna was raised and lowered from 1 meter to 4 meters to find the maximum level of emissions. In order to find maximum emissions, the cables were moved through all the positions the equipment would be expected to experience in the field. The EUT, peripheral equipment and cables were configured to meet the conditions in ANSI C63.4-2003, Clauses 6 & 8. Tests were made with the receive antenna(s) in both the horizontal and vertical planes of polarization. In each case, the table was rotated to find the maximum emissions.



1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

APPENDIX A

6.0 FIELD STRENGTH OF FUNDAMENTAL AND SPURIOUS EMISSION MEASUREMENTS (CON'T)

As stated in Section 15.247(b) the allowed maximum peak output power of the transmitter shall not exceed 1 Watt. In any 100 kHz bandwidth outside these frequency bands (the power that is produced by the modulation products of the spreading sequence), the information sequence and the carrier frequency shall be either at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Attenuation below the general limits specified in 15.209 is not required.

Field strength limits are at a distance of 3 meters. The emission limits shown are based on measurement instrumentation employing an average detector.

Emissions radiated outside of the specified frequency bands, except for harmonics are attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Preliminary radiated emission measurements were performed at a 3 meter test distance. The frequency range from 30 MHz to 1000 MHz was automatically scanned and plotted at various angles.

NOTE:

All radiated emissions measurements were made at a test room temperature of **66°F** at **29%** relative humidity.



1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

APPENDIX A

RADIATED DATA AND GRAPH(S) TAKEN FOR FIELD STRENGTH OF FUNDAMENTAL AND SPURIOUS EMISSION MEASUREMENTS

PART 15.247

30 MHz – 1000 MHz

FCC Part 15 Class B

Electric Field Strength

EUT: Intellitape Model: IT0408
Manufacturer: Chief Automotive
Operating Condition: 66 degF; 29% R.H.
Test Site: D.L.S. O.F. Site 2
Operator: Jason L
Test Specification: 6 VDC
Comment: Tx and Rx modes; Low, Mid and High channels
Date: 03/26/2008

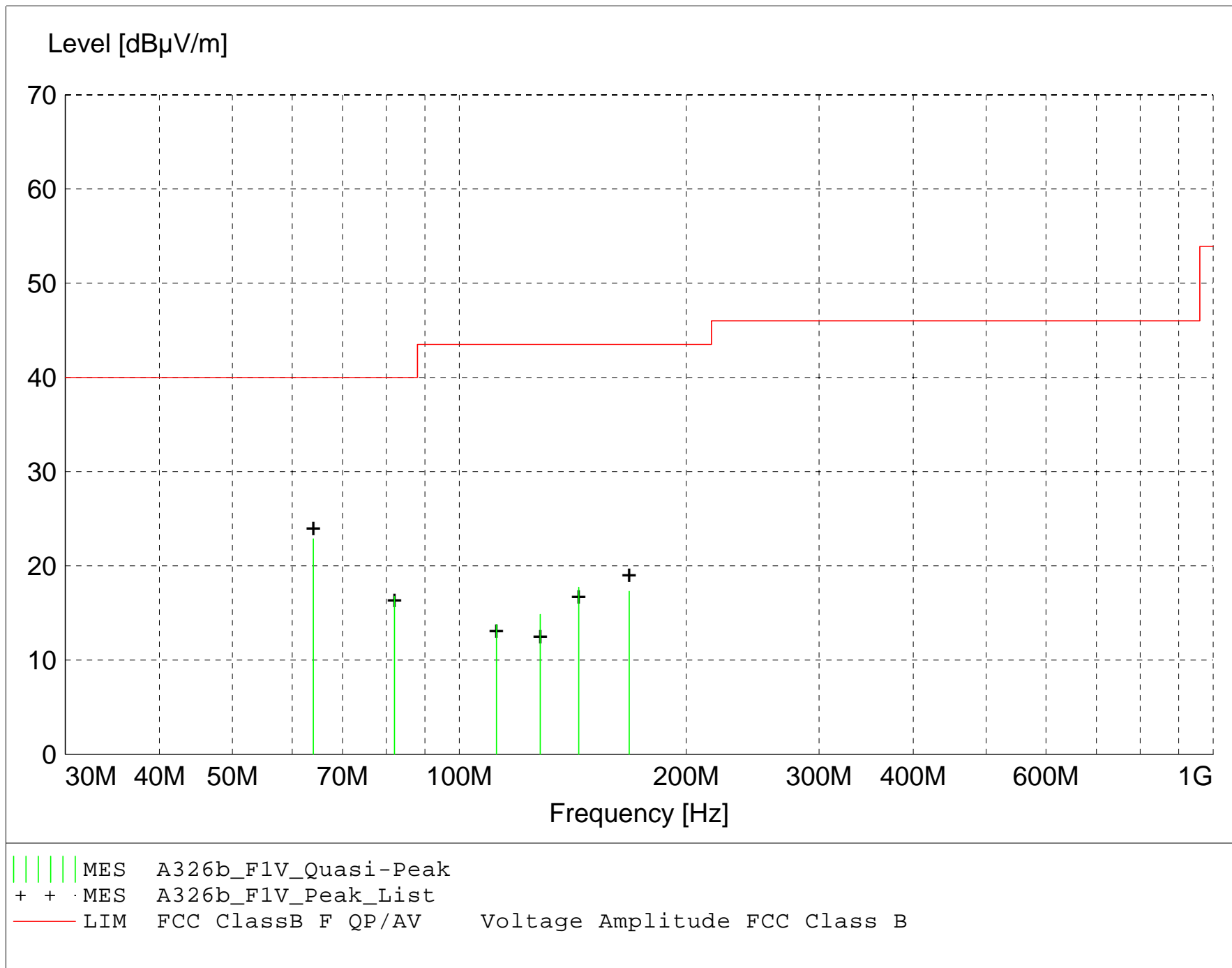
TEXT: "Site 2 MidV 3M"

Short Description: Test Set-up Vert30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 26 SN: 837460/002

Antennas ---
Biconical -- EMCO 3104C SN: 0005-4892
Log Periodic -- Electro Metrics LPA-25 SN: 1205

Pre-Amp --- Rohde&Schwarz TS-PR10 SN: 032001/004

TEST SET-UP: EUT Measured at 3 Meters with VERTICAL Antenna Polarization



MEASUREMENT RESULT: "A326b_F1V_Final"

3/26/2008 1:19PM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
64.000000	38.45	8.42	-24.0	22.9	40.0	17.1	1.00	270	QUASI-PEAK	None
82.000000	33.87	6.61	-23.7	16.8	40.0	23.2	1.00	180	QUASI-PEAK	None
144.000000	28.95	12.09	-23.3	17.7	43.5	25.8	1.00	180	QUASI-PEAK	None
168.000000	26.68	13.71	-23.1	17.3	43.5	26.2	1.00	180	QUASI-PEAK	None
128.000000	26.71	11.37	-23.2	14.8	43.5	28.7	1.00	160	QUASI-PEAK	None
112.000000	24.52	12.59	-23.4	13.8	43.5	29.7	1.00	0	QUASI-PEAK	None

FCC Part 15 Class B

Electric Field Strength

EUT: Intellitape Model: IT0408
Manufacturer: Chief Automotive
Operating Condition: 66 degF; 29% R.H.
Test Site: D.L.S. O.F. Site 2
Operator: Jason L
Test Specification: 6 VDC
Comment: Tx and Rx modes; Low, Mid and High channels
Date: 03/26/2008

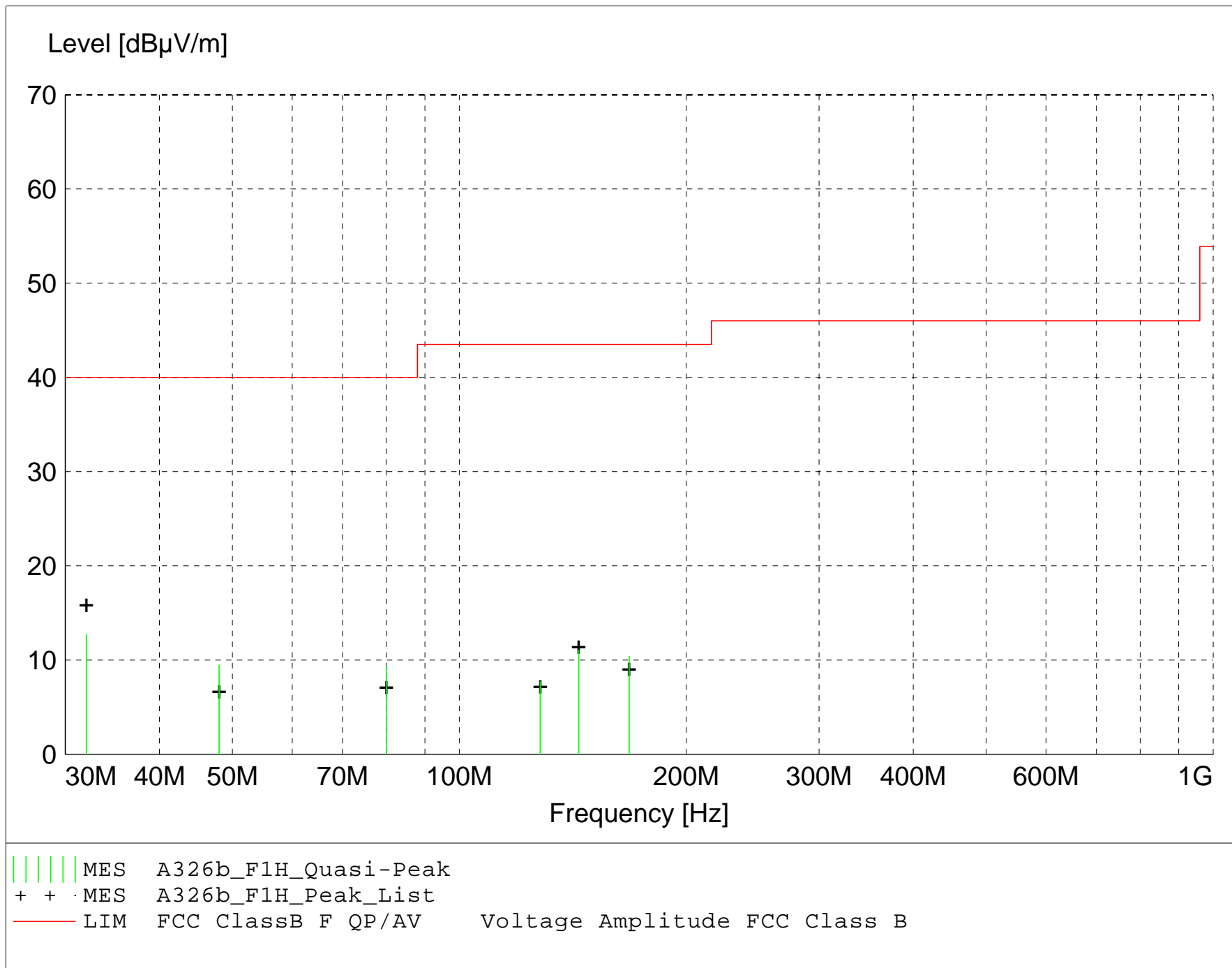
TEXT: "Site 2 MidH 3M"

Short Description: Test Set-up Horz30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 26 SN: 837460/002

Antennas ---
Biconical -- EMCO 3104C SN: 0005-4892
Log Periodic -- Electro Metrics LPA-25 SN: 1205

Pre-Amp --- Rohde&Schwarz TS-PR10 SN: 032001/004

TEST SET-UP: EUT Measured at 3 Meters with HORIZONTAL Antenna Polarization



MEASUREMENT RESULT: "A326b_F1H_Final"

3/26/2008 1:08PM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
32.000000	26.78	10.30	-24.3	12.7	40.0	27.3	2.00	270	QUASI-PEAK	None
48.000000	22.62	10.95	-24.1	9.5	40.0	30.5	2.00	325	QUASI-PEAK	None
80.000000	26.50	6.53	-23.7	9.3	40.0	30.7	2.00	90	QUASI-PEAK	None
144.000000	22.29	12.09	-23.3	11.1	43.5	32.4	2.00	270	QUASI-PEAK	None
168.000000	19.78	13.71	-23.1	10.4	43.5	33.1	2.20	325	QUASI-PEAK	None
128.000000	19.55	11.37	-23.2	7.7	43.5	35.8	2.00	90	QUASI-PEAK	None



1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

APPENDIX A

RADIATED DATA AND GRAPH(S) TAKEN FOR E.I.R.P. OF FUNDAMENTAL EMISSION MEASUREMENTS

PART 15.247



1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
 Model Tested: IT0408
 Report Number: 14080

APPENDIX A

DLS Electronic Systems, Inc.

Company: Chief Automotive
 Operator: Jason L
 Date of test: 04-04-2008
 Temperature: 70 deg. F
 Humidity: 33% R.H.

EIRP - Substitution Method

Model: Intellitape Model: IT0408								
Channel: 11								
Frequency and Polarization (MHz)	Max. Field Strength of EUT @ 3 meters (dBuV/m)	Output of Signal Generator when field strength equals that of EUT (dBm)	Correction factor for cable between Signal Gen. and subst. antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [EIRP] (dBm)	Limit (dBm)	Margin (dB)	Strength of emission [EIRP] (mW)
2405 vertical	96.65	-7.59	1.72	9.59	0.28	30.00	29.72	1.07
2405 horizontal	98.89	-7.86	1.72	9.59	0.01	30.00	29.99	1.00

EIRP = Signal generator output - cable loss + antenna gain

ERP_(ref. to 1/2λ dipole) = Signal generator output - cable loss + antenna gain - 2.15



1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

APPENDIX A

DLS Electronic Systems, Inc.

Company: Chief Automotive
Operator: Jason L
Date of test: 04-04-2008
Temperature: 70 deg. F
Humidity: 33% R.H.

EIRP - Substitution Method

Model: Intellitape Model: IT0408								
Channel: 19								
Frequency and Polarization (MHz)	Max. Field Strength of EUT @ 3 meters (dBuV/m)	Output of Signal Generator when field strength equals that of EUT (dBm)	Correction factor for cable between Signal Gen. and subst. antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [EIRP] (dBm)	Limit (dBm)	Margin (dB)	Strength of emission [EIRP] (mW)
2445 vertical	97.89	-6.56	1.74	9.63	1.33	30.00	28.67	1.36
2445 horizontal	99.04	-7.52	1.74	9.63	0.37	30.00	29.63	1.09

EIRP = Signal generator output - cable loss + antenna gain

ERP_(ref. to 1/2λ dipole) = Signal generator output - cable loss + antenna gain - 2.15



1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

APPENDIX A

DLS Electronic Systems, Inc.

Company: Chief Automotive
Operator: Jason L
Date of test: 04-04-2008
Temperature: 70 deg. F
Humidity: 33% R.H.

EIRP - Substitution Method

Model: Intellitape Model: IT0408								
Channel: 26								
Frequency and Polarization (MHz)	Max. Field Strength of EUT @ 3 meters (dBuV/m)	Output of Signal Generator when field strength equals that of EUT (dBm)	Correction factor for cable between Signal Gen. and subst. antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [EIRP] (dBm)	Limit (dBm)	Margin (dB)	Strength of emission [EIRP] (mW)
2480 vertical	98.65	-5.80	1.76	9.67	2.11	30.00	27.89	1.63
2480 horizontal	98.65	-6.31	1.76	9.67	1.60	30.00	28.40	1.45

EIRP = Signal generator output - cable loss + antenna gain

ERP_(ref. to ½λ dipole) = Signal generator output - cable loss + antenna gain - 2.15



1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

APPENDIX A

6 dB BANDWIDTH GRAPHS

PART 15.247



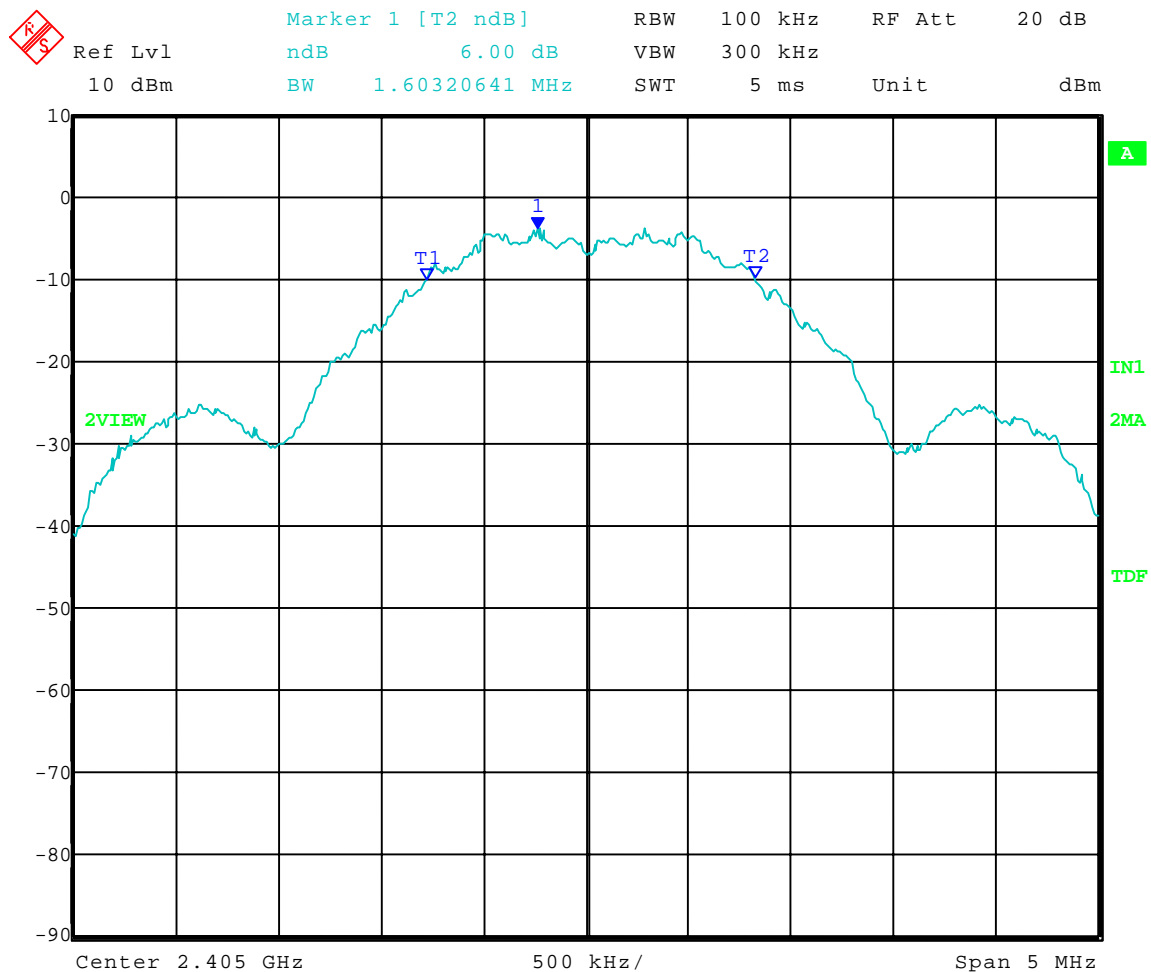
Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: 6 dB Bandwidth - Conducted
Operator: Jason L
Comment: Low Channel: Frequency – 2.405 GHz

6 dB Bandwidth = 1.603 MHz



Date: 4.APR.2008 10:10:24



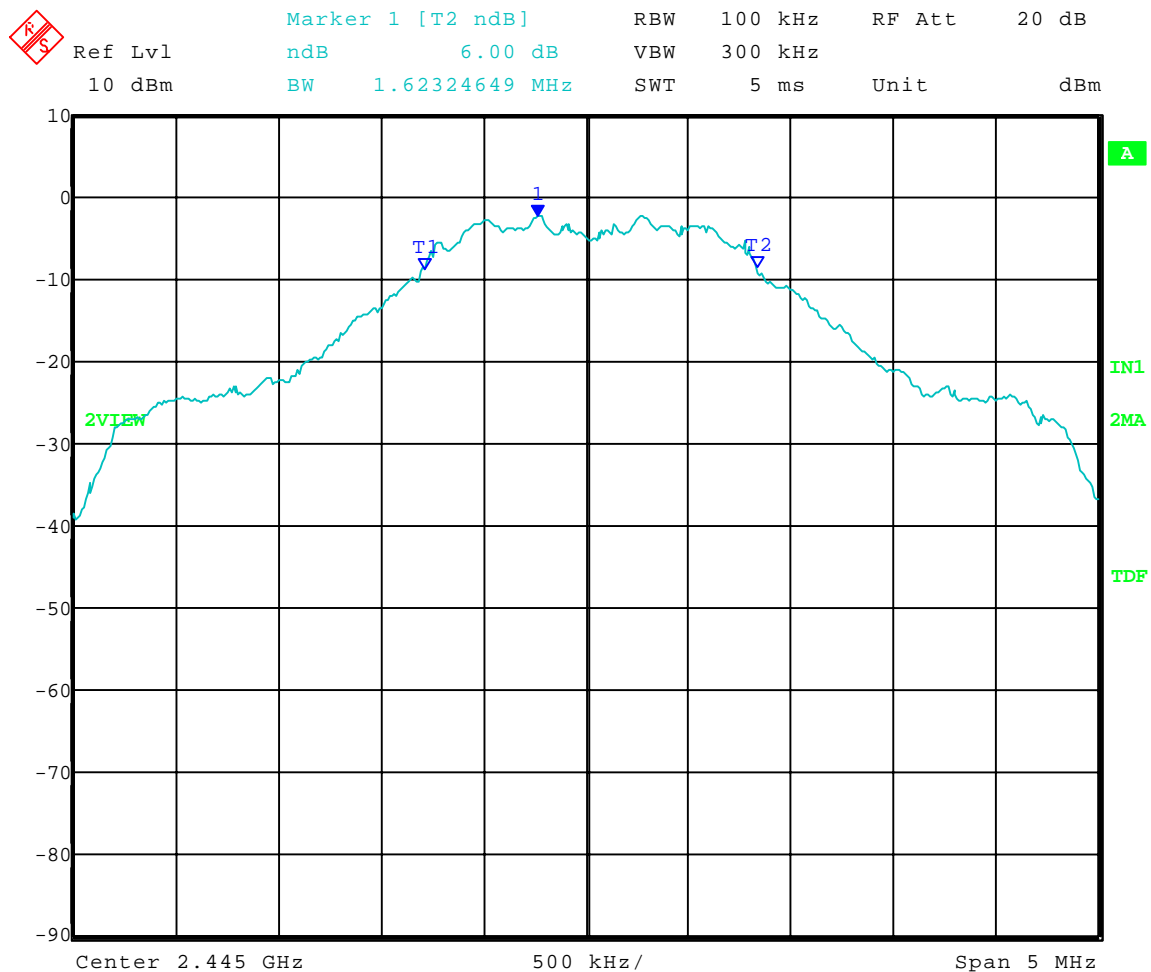
Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: 6 dB Bandwidth - Conducted
Operator: Jason L
Comment: Middle Channel: Frequency – 2.445 GHz

6 dB Bandwidth = 1.623 MHz



Date: 4.APR.2008 11:47:52



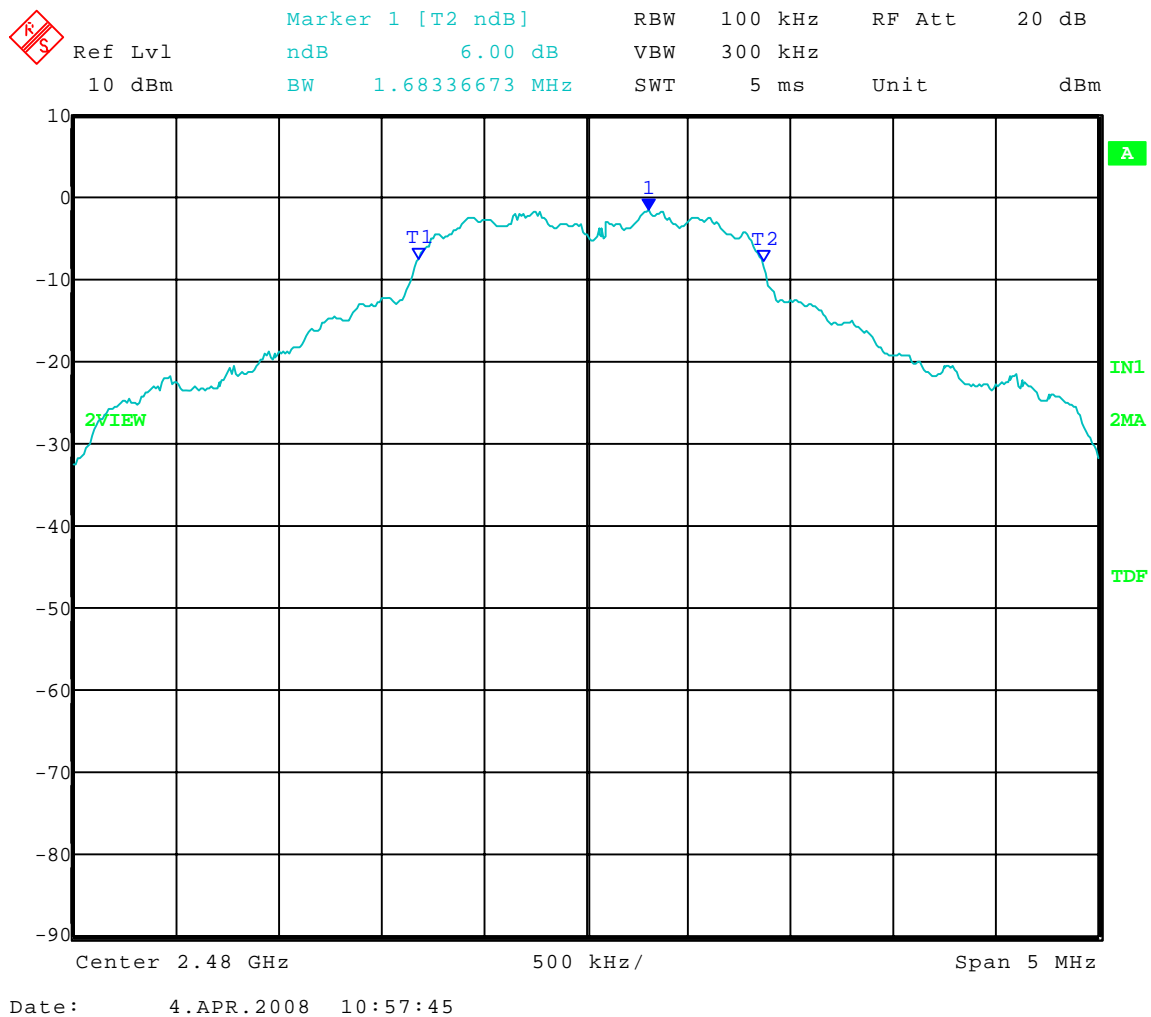
Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: 6 dB Bandwidth - Conducted
Operator: Jason L
Comment: High Channel: Frequency – 2.48 GHz

6 dB Bandwidth = 1.683 MHz





1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

APPENDIX A

NUMBER OF HOPPING FREQUENCIES GRAPH(S)

PART 15.247



1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

APPENDIX A

List of the hopping frequencies for the Intellitape.

Ch 11	2405 MHz
Ch 12	2410 MHz
Ch 13	2415 MHz
Ch 14	2420 MHz
Ch 15	2425 MHz
Ch 16	2430 MHz
Ch 17	2435 MHz
Ch 18	2440 MHz
Ch 19	2445 MHz
Ch 20	2450 MHz
Ch 21	2455 MHz
Ch 22	2460 MHz
Ch 23	2465 MHz
Ch 24	2470 MHz
Ch 25	2475 MHz
Ch 26	2480 MHz



1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

APPENDIX A

DUTY CYCLE GRAPHS

PART 15.247



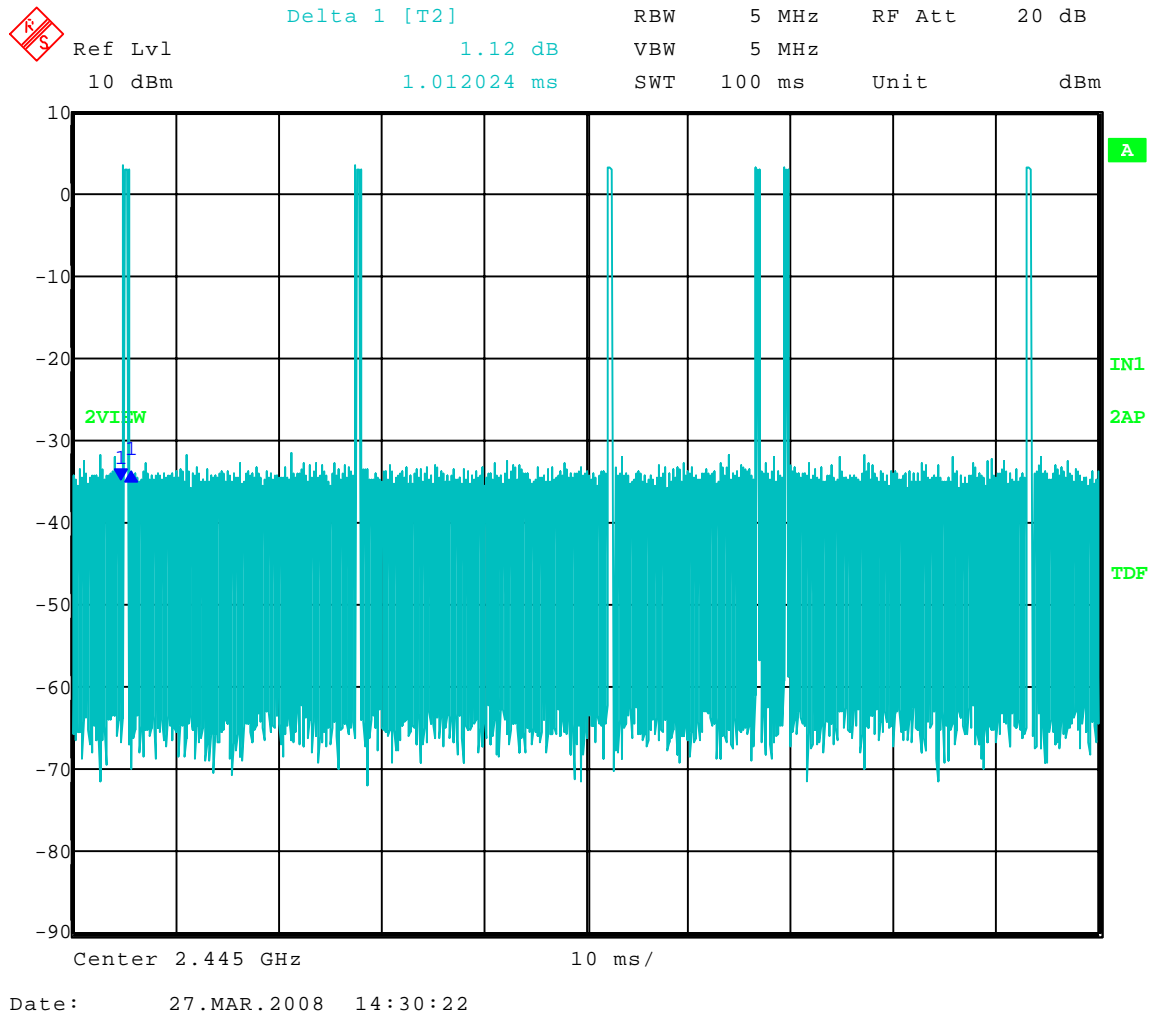
Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 03-27-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Duty Cycle – **worst-case duty cycle** during normal operation
Operator: Jason L

Comment: Total on Time = $6 \times 1.012 \text{ ms} = 6.072 \text{ ms}$ during 100 ms Sweep
Duty cycle correction = $20 \log (6.072 \text{ ms} / 100 \text{ ms}) = \mathbf{24.3 \text{ dB}}$





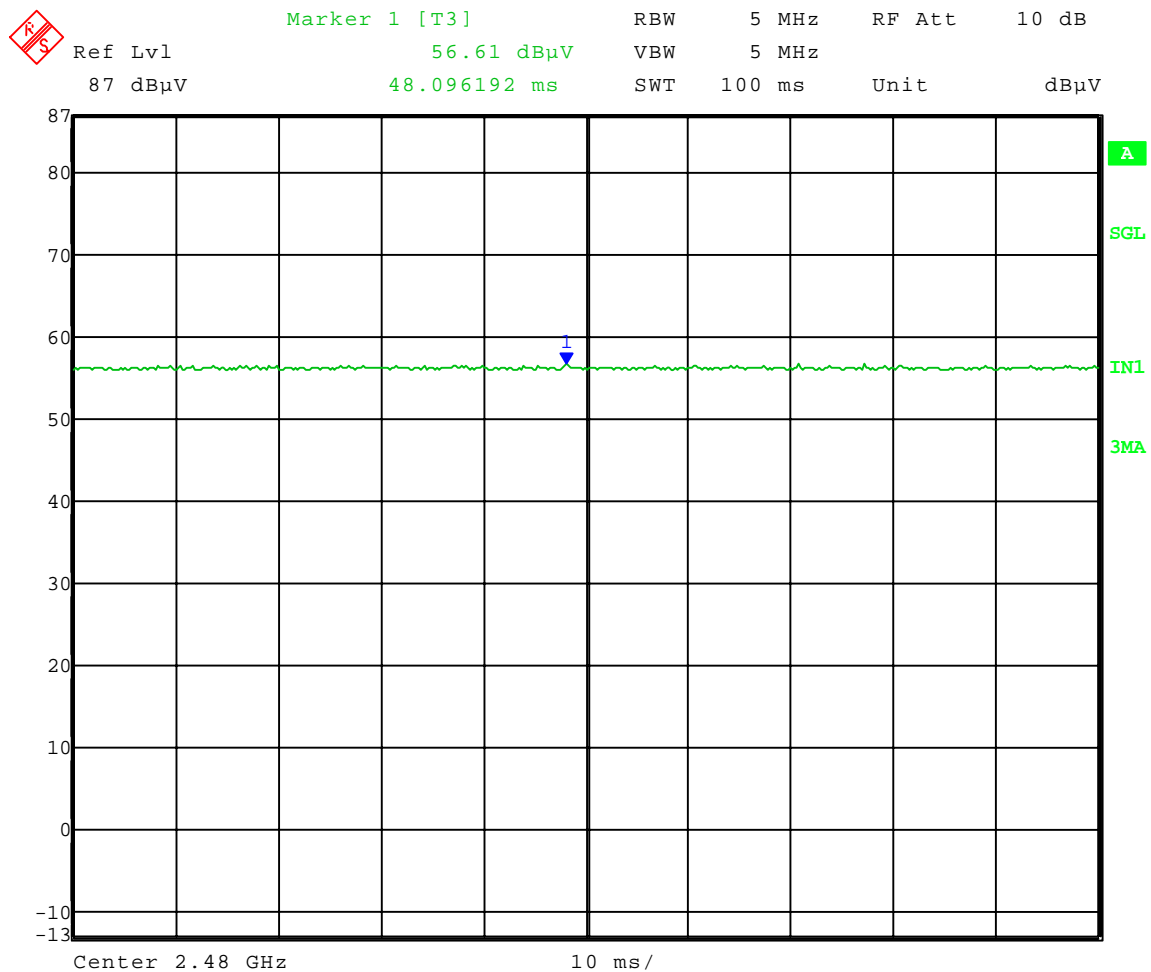
Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 04-08-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Duty Cycle – duty cycle used during testing
Operator: Jason L

Comment: Continuous transmit; 100 ms sweep:



Date: 8.APR.2008 14:58:53



1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

APPENDIX A

CONDUCTED PEAK OUTPUT POWER GRAPHS

PART 15.247



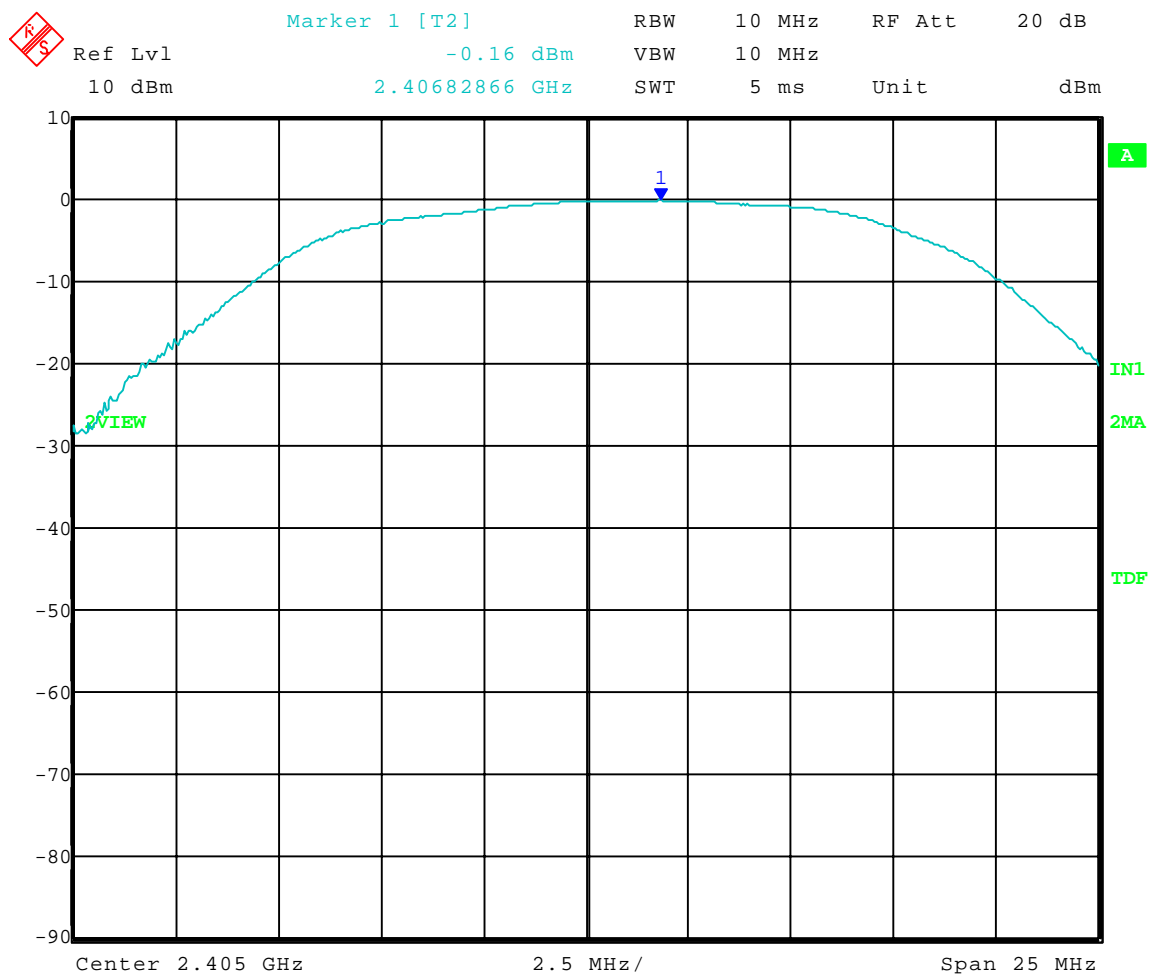
Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Peak Power Output - Conducted
Operator: Jason L
Comment: Low Channel: Frequency – 2.405 GHz

Peak Output Power = -0.16 dBm = **0.96 mW**



Date: 4.APR.2008 10:00:00



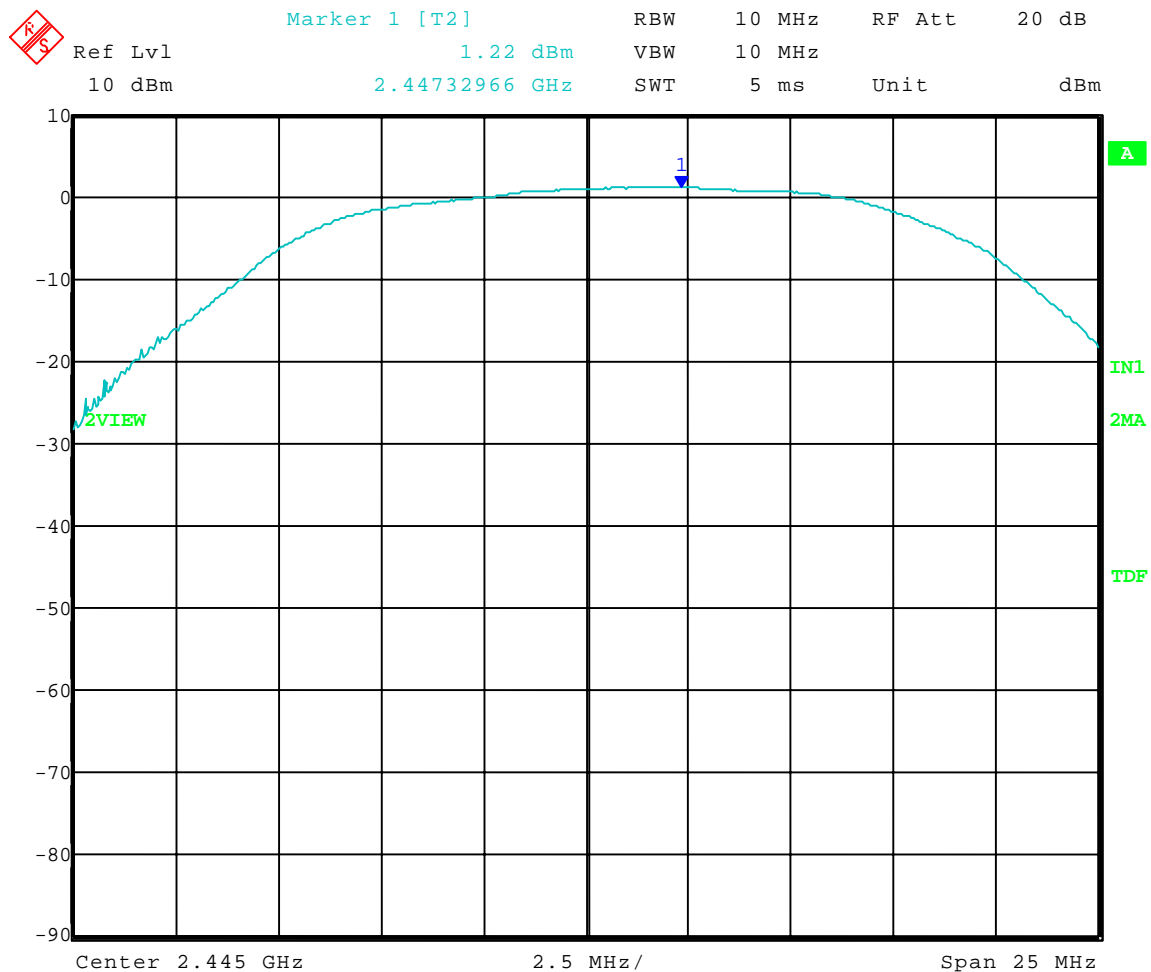
Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Peak Power Output - Conducted
Operator: Jason L
Comment: Middle Channel: Frequency – 2.445 GHz

Peak Output Power = 1.22 dBm = **1.32 mW**



Date: 4.APR.2008 11:45:30



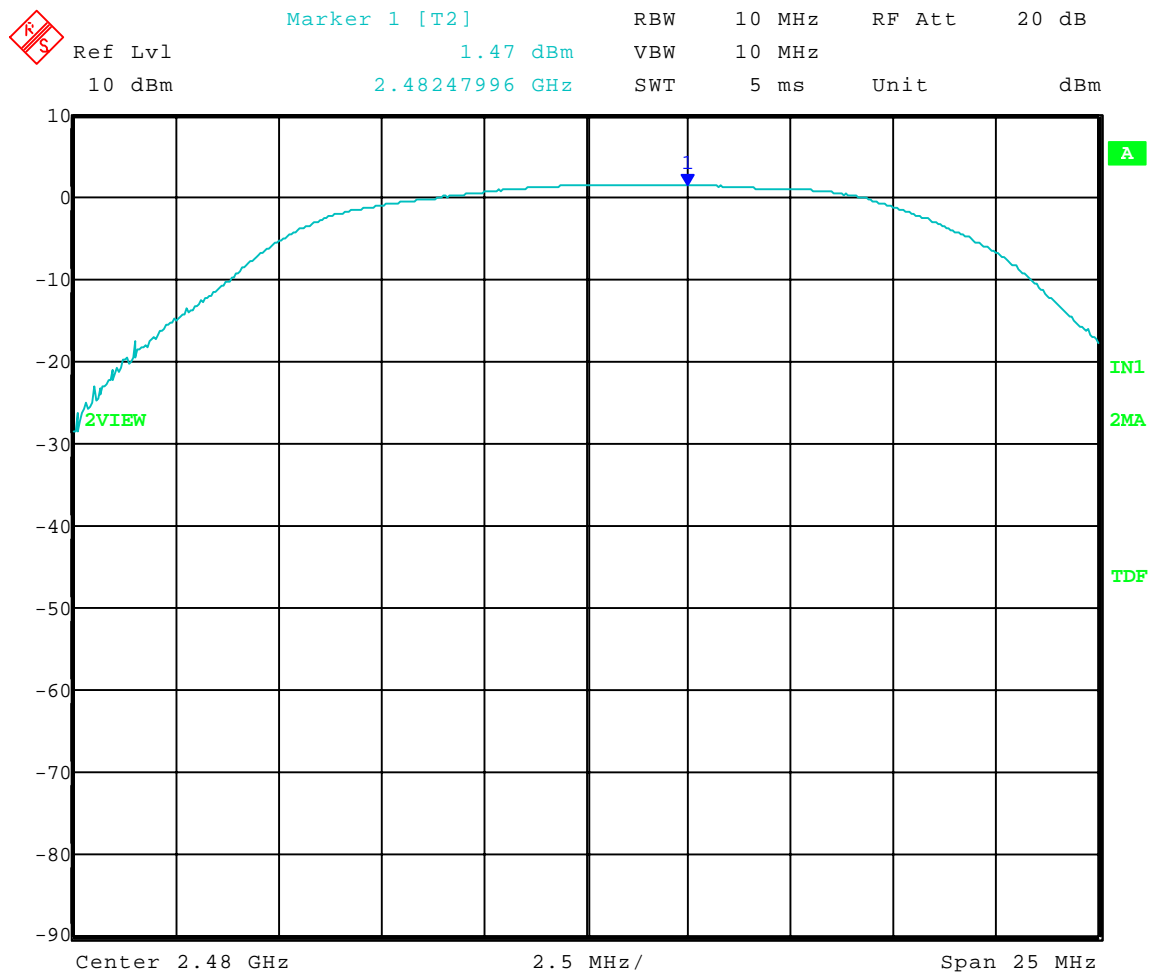
Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Peak Power Output - Conducted
Operator: Jason L
Comment: High Channel: Frequency – 2.48 GHz

Peak Output Power = 1.47 dBm = **1.40 mW**



Date: 4.APR.2008 10:54:45



1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

PEAK POWER SPECTRAL DENSITY GRAPHS

PART 15.247

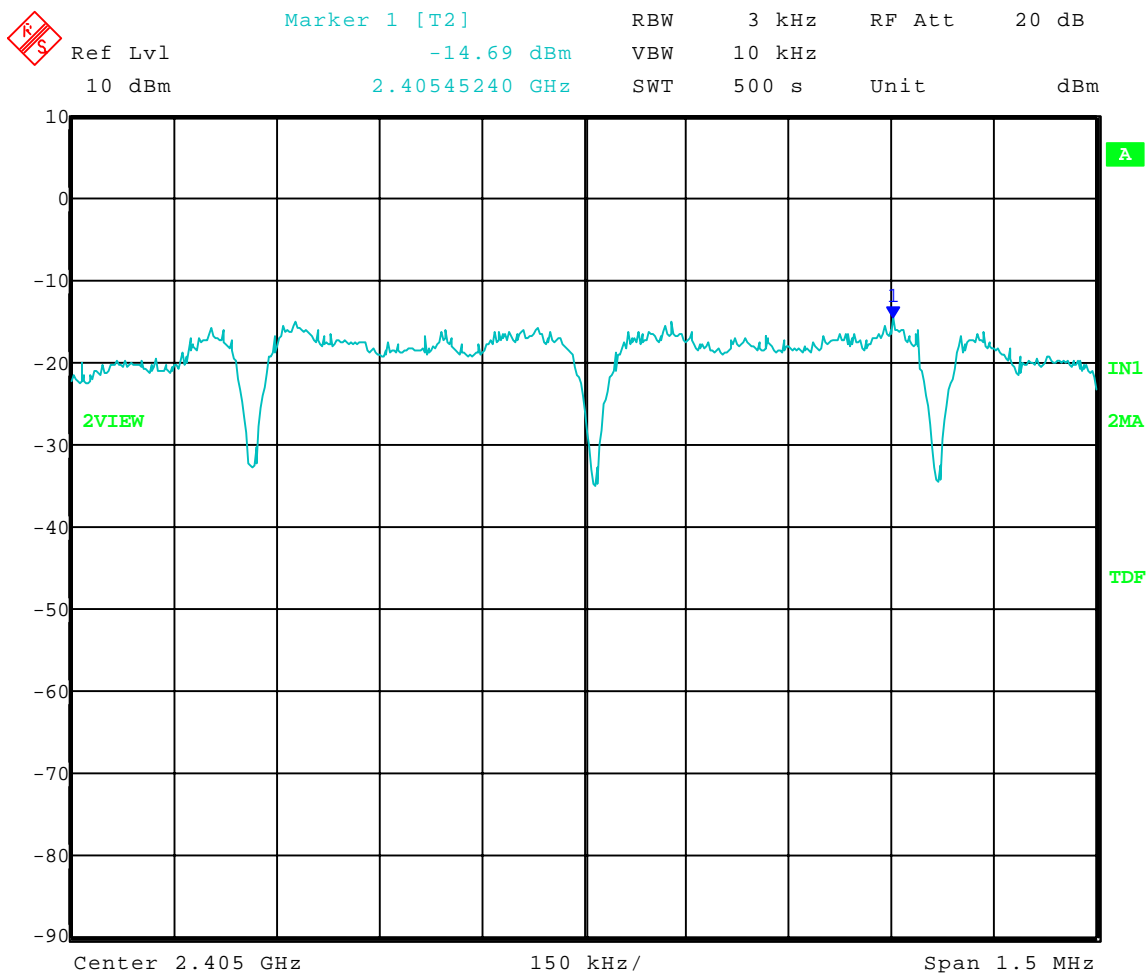


1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Peak Power Spectral Density - Conducted
Operator: Jason L
Comment: Low Channel: Frequency – 2.405 GHz
Limit: 8 dBm

3 kHz Bandwidth = -14.69 dBm



Date: 4.APR.2008 10:20:50

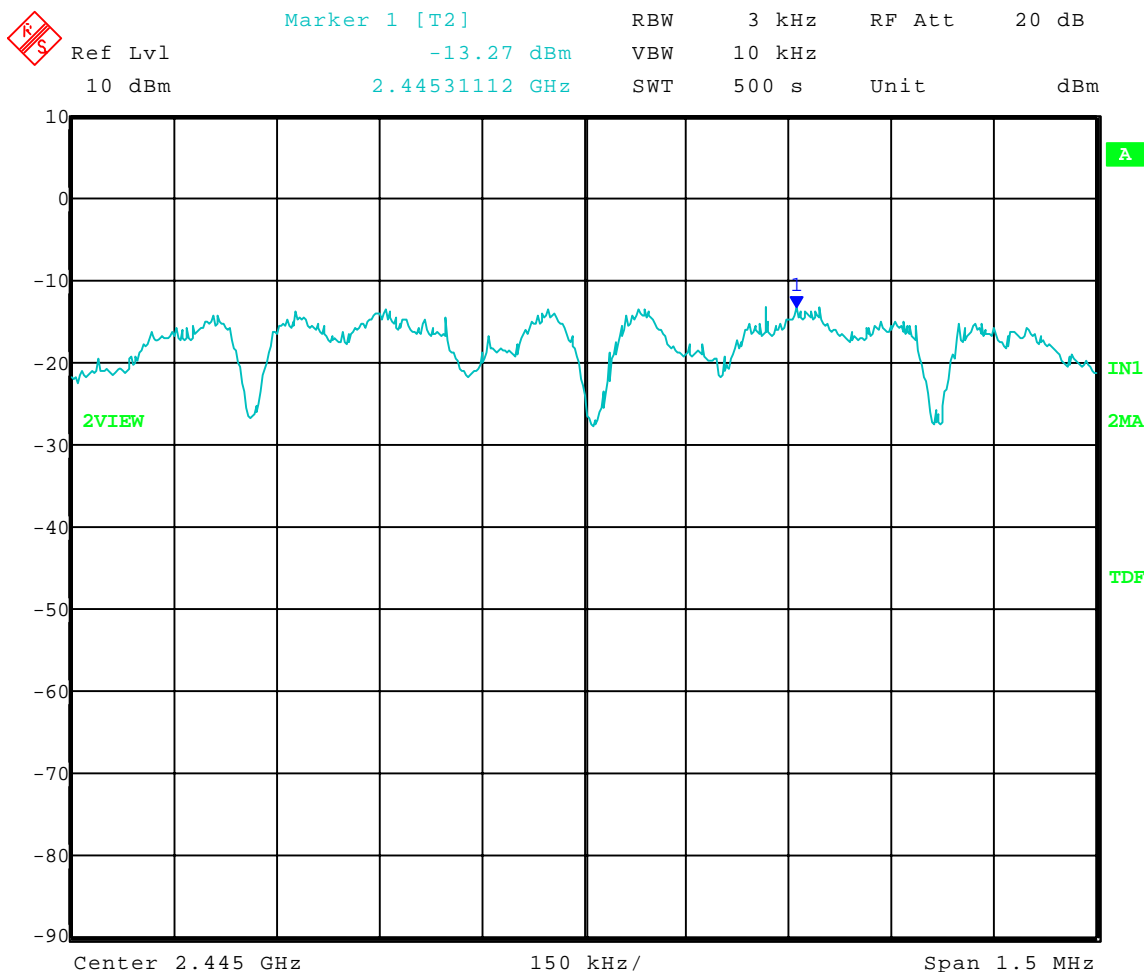


1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Peak Power Spectral Density - Conducted
Operator: Jason L
Comment: Middle Channel: Frequency – 2.445 GHz
Limit: 8 dBm

3 kHz Bandwidth = -13.27 dBm



Date: 4.APR.2008 12:06:33

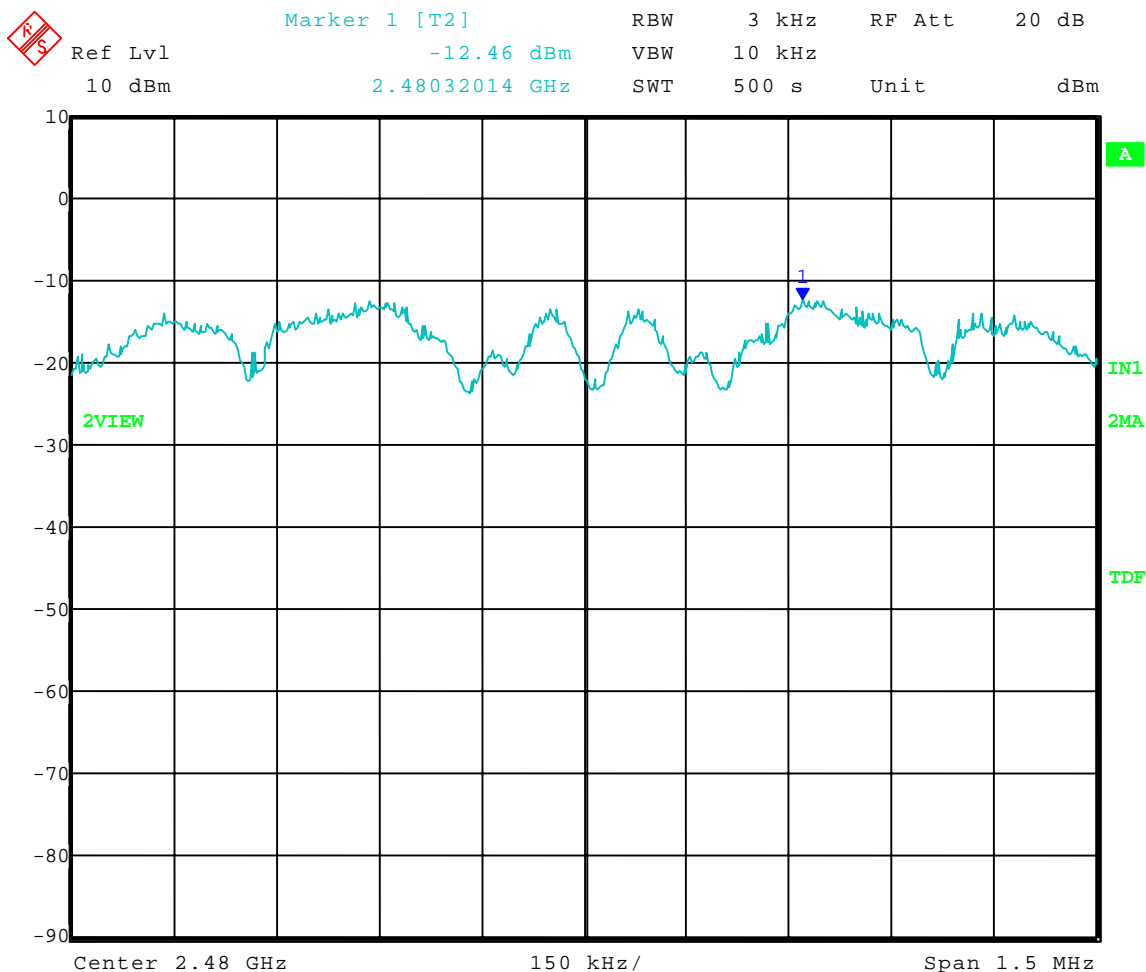


1250 Peterson Dr., Wheeling, IL 60090

Company: Chief Automotive Technologies, Inc.
Model Tested: IT0408
Report Number: 14080

Test Date: 04-04-2008
Company: Chief Automotive
EUT: Intellitape Model: IT0408
Test: Peak Power Spectral Density - Conducted
Operator: Jason L
Comment: High Channel: Frequency – 2.48 GHz
Limit: 8 dBm

3 kHz Bandwidth = -12.46 dBm



Date: 4.APR.2008 11:18:36