ENGINEERING TEST REPORT

2-Way (Remote Control Engine Starter)
Model No.: RPN7251P / RPN7251V / RPN7251X
Brand Name: Python/Viper/Clifford

FCC ID: EZSDEI7251

Applicant:
DEI Headquarters Inc.
One Viper Way
Vista, CA
USA 92083-7853

In Accordance With

FEDERAL COMMUNICATIONS COMMISSION (FCC)
Part 15, Subpart C, Section 15.231
Momentarily Operation at 433.92 MHz

UltraTech's File No.: ATR-039F15C231

This Test report is Issued under the Authority of Tri M. Luu, Professional Engineer, Vice President of Engineering UltraTech Group of Labs Date: February 15, 2008	
Report Prepared by: Dharmajit Solanki, RFI Engineer Issued Date: February 15, 2008	Tested by: Hung Trinh, RFI Technician Test Dates: January 8, 9 & 10, 2008

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.*

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EXHIBIT 1. SUBMITTAL CHECK LIST

Annex No.	Exhibit Type	Description of Contents	Quality Check (OK)
--	Test Report	▪ Exhibit 1: Submittal check lists ▪ Exhibit 2: Introduction ▪ Exhibit 3: Performance Assessment ▪ Exhibit 4: EUT Operation and Configuration during Tests ▪ Exhibit 5: Summary of test Results ▪ Exhibit 6: Measurement Data ▪ Exhibit 7: Measurement Uncertainty	OK
1	Test Setup Photos	Radiated Emissions Test Setup Photos	OK
2	External Photos of EUT	External EUT Photos	OK
3	Internal Photos of EUT	Internal EUT Photos	OK
4	Cover Letters	▪ Letter from Ultratech for Certification Request ▪ Letter from the Applicant to appoint Ultratech to act as an agent ▪ Letter from the Applicant to request for Confidentiality Filing	OK
5	ID Label/Location Info	▪ ID Label ▪ Location of ID Label	OK
6	Block Diagrams	Block Diagram	OK
7	Schematic Diagrams	Schematics	OK
8	Parts List/Tune Up Info	Bill of Material	OK
9	Operational Description	Operational Description	OK
10	RF Exposure Info	--	n/a
11	Users Manual	User Manual	OK

EXHIBIT 2. INTRODUCTION

2.1. SCOPE

Reference:	FCC Part 15, Subpart C, Section 15.231
Title:	Telecommunication - Code of Federal Regulations, CFR 47, Part 15
Purpose of Test:	To gain FCC Certification Authorization for Section 15.231- Momentarily Operation at 433.92 MHz.
Test Procedures:	Both conducted and radiated emissions measurements were conducted in accordance with American National Standards Institute ANSI C63.4 - American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
Environmental Classification:	Residential

2.2. RELATED SUBMITTAL(S)/GRANT(S)

None.

2.3. NORMATIVE REFERENCES

Publication	**Year**	**Title**
FCC CFR Parts 0-15	2007	Code of Federal Regulations – Telecommunications
ANSI C63.4	2004	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40 GHz
CISPR 22 EN 55022	2006 2006	Information Technology Equipment - Radio Disturbance Characteristics – Limits and Methods of Measurement
CISPR 16-1-1	2003	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus
CISPR 16-2-1	2004	Specification for radio disturbance and immunity measuring apparatus and methods. Part 2-1: Conducted disturbance measurement

EXHIBIT 3. PERFORMANCE ASSESSMENT

3.1. CLIENT INFORMATION

APPLICANT	
Name:	DEI Headquarters Inc.
Address:	One Viper Way Vista, CA USA 92083-7853
Contact Person:	Mr. Rabie Chtioui Phone #: (819) 566-0280 Fax #: (819) 566-0298 Email Address: rchtioui@astroflex.com

MANUFACTURER	
Name:	Nutek Corporation
Address:	No.167, Lane 235, BauChiau Rd. ShinDian City Taipei County 231 Taiwan
Contact Person:	Mr. Crystal Chen Phone #: (02) 29189478 # 100 Email: crystal-c@nutek.com.tw

3.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

Brand Name:	Python/Viper/Clifford
Product Name:	2-Way (Remote Control Engine Starter)
Model Name or Number:	RPN7251P / RPN7251V/ RPN7251X
Serial Number:	Test Sample
Type of Equipment:	Low Power Transceiver
Power Input Source:	2 x 3V battery
Primary User Functions of EUT:	Car Engine Starter

3.3. EUT'S TEHNICAL SPECIFICATIONS

Transmitter @ 433.92 MHz	
Equipment Type:	Portable
Intended Operating Environment:	Residential
RF Output Power Rating:	79.0 dBµV/m Avg E-field @ 3 meters
Operating Frequency Range:	433.92 MHz
Duty Cycle:	11.2 %
20 dB Bandwidth:	19.84 kHz
Modulation Type:	ASK
Antenna Connector Type:	Integral antenna, housed inside the enclosure.
Antenna Description:	Type: Spring Antenna Frequency Range: 433.92 MHz

3.4. LIST OF EUT'S PORTS

None

3.5. ANCILLARY EQUIPMENT

None

3.6. GENERAL TEST SETUP

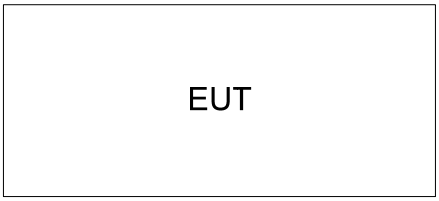


EXHIBIT 4. EUT OPERATION CONDITIONS AND CONFIGURATIONS DURING TESTS

4.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	21^{o}C
Humidity:	51%
Pressure:	102 kPa
Power Input Source:	2 x 3 V Battery

4.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

Operating Modes:	The EUT was set to transmit in burst mode continuously by means of special setting of jumpers on the printed circuit board for testing purpose only.
Special Test Software:	None
Special Hardware Used:	None
Transmitter Test Antenna:	The EUT is tested with the antenna fitted in a manner typical of normal intended use as integral antenna equipment.

Transmitter Test Signal	
Frequency	433.92 MHz

EXHIBIT 5. SUMMARY OF TEST RESULTS

5.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville 3-10 TDK Semi-Anechoic Chamber has been filed with FCC office (FCC File No.: 31040/SIT 1300B3) and Industry Canada office (Industry Canada File No.: IC2049A-3). Calibration site expiry date for IC is May 17, 2009.

5.2. APPLICABILITY & SUMMARY OF EMC EMISSIONS TEST RESULTS

FCC Sections	Test Requirements	Compliance (Yes/No)
15.203	Antenna requirement (Permanently attached antenna used with this device)	Yes
15.231(a)	Provisions of FCC 15.231	Yes
15.231(b)	Transmitter Radiated Emissions - Fundamental, Harmonic and Spurious	Yes
15.231(c)	20 dB Bandwidth	Yes
15.107(a)	AC Power Line Conducted Emissions Measurements (Transmit & Receive)	N/A (battery operated device)

5.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None.

EXHIBIT 6. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS

6.1. TEST PROCEDURES

This section contains test results only. Details of test methods and procedures can be found in Ultratech Test Procedures, File # ULTR P001-2004 and ANSI C63.4.

6.2. MEASUREMENT UNCERTAINTIES

The measurement uncertainties stated were calculated in accordance with requirements of UKAS Document NIS 81 with a confidence level of 95%. Please refer to Exhibit 7 for Measurement Uncertainties.

6.3. MEASUREMENT EQUIPMENT USED

The measurement equipment used complied with the requirements of the Standards referenced in the Methods & Procedures ANSI C64.3, FCC 15.209 and CISPR 16-1.

6.4. METHOD OF MEASUREMENTS

The measurements were performed in accordance with Ultratech Test Procedures, File # ULTR P001-2004 and ANSI C63.4.

6.5. ESSENTIAL/PRIMARY FUNCTIONS AS DECLARED BY THE MANUFACTURER

The essential function of the EUT is to remotely start a car engine via RF link.

6.6. PERIODIC OPERATION PROVISIONS [§15.231(a)]

6.6.1. Engineering Analysis

FCC PROVISIONS	ANALYSIS ON COMPLIANCE
The intentional radiator restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted.	Remote Control
A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.	Complies.
A transmitter activated automatically shall cease transmission within 5 seconds after activation.	No automatic activation.
Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions do not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed 2 seconds per hour.	N/A
Internal Radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.	N/A

6.7. TRANSMITTER RADIATED EMISSIONS @ 3 METERS – FUNDAMENTAL, HARMONIC & SPURIOUS EMISSIONS [§15.231(b), 15.209 & 15.205]

6.7.1. Limits

The RF radiated emissions measured at 3 Meters distance shall not exceed the field strength below:

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emission (microvolts/meter)
260 - 470	[1] 3,750 to 12,500	[1] 375 to 1,250

[1] Linear interpolation.

Field Strength of Fundamental Limit @ 433.92 MHz = 80.8 dBµV/m at 3 meters
Field Strength of Spurious Limit (outside restricted bands) = 60.8 dBµV/m

Emissions within the restricted bands specified in §15.205(a) shall not exceed the general radiated emission limits specified in §15.209(a).

47 CFR 15.205(a) - Restricted Frequency Bands

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	Above 38.6
13.36–13.41			

47 CFR 15.209(a) - Field Strength Limits within Restricted Frequency Bands

Frequency (MHz)	Field Strength Limits (microvolts/m)	Distance (Meters)
0.009 - 0.490	2,400 / F (KHz)	300
0.490 - 1.705	24,000 / 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

6.7.2. Method of Measurements

Refer to ULTRATECH Test Procedures, File # ULTR P001-2004 and ANSI C63.4.

Note: Because the EUT employs pulsed operation, the unit was modified for continuous operation and the readings were corrected by subtraction the peak-average correction factor derived from the appropriate duty cycle calculation. See §15.35 (c).

6.7.3. Test Equipment List

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer	Rohde & Schwarz	FSEK30	100077	20 Hz – 40 GHz
RF Amplifier	Hewlett Packard	8447F	2944A04098	0.1 MHz to 1300 MHz
RF Amplifier	Hewlett Packard	8449B	3008A00769	1 GHz to 26.5 GHz
Biconilog Antenna	EMCO	3142	1005	30 MHz to 2 GHz
Horn Antenna	EMCO	3115	6570	1 GHz – 18 GHz
High Pass Filter	Mini Circuit	SHP-800	10425	Cut off 433.92 MHz

6.7.4. Test Data

Frequency (MHz)	Peak E-Field @3m (dBµV/m)	Average E-Field @3m (dBµV/m)	Antenna Plane (V/H)	§15.231(b) Limits @3m (dBµV/m)	§15.209 (a) Limits @3m (dBµV/m)	Margin (dB)
433.92	96.55	**77.5**	V	80.8	--	-3.3
433.92	98.00	**79.0**	H	80.8	--	-1.8
867.84	34.89	**15.9**	V	60.8	46.0	-45.0
867.84	36.17	**17.2**	H	60.8	46.0	-43.7
1301.76*	46.53	**27.5**	V	60.8	54.0	-26.5
1301.76*	47.56	**28.5**	H	60.8	54.0	-25.5
1735.68	56.63	**37.6**	V	60.8	54.0	-23.2
1735.68	58.92	**39.9**	H	60.8	54.0	-20.9
2169.60	62.58	**43.6**	V	60.8	54.0	-17.3
2169.60	63.48	**44.5**	H	60.8	54.0	-16.4
2603.52	65.51	**46.5**	V	60.8	54.0	-14.3
2603.52	63.08	**44.1**	H	60.8	54.0	-16.8
3037.44	48.52	**29.5**	V	60.8	54.0	-31.3
3037.44	48.71	**29.7**	H	60.8	54.0	-31.1
3471.36	52.61	**33.6**	V	60.8	54.0	-27.2
3471.36	53.88	**34.9**	H	60.8	54.0	-26.0
3905.28*	57.58	**38.6**	V	60.8	54.0	-15.4
3905.28*	58.34	**39.3**	H	60.8	54.0	-14.7
4339.20*	49.45	**30.4**	V	60.8	54.0	-23.6
4339.20*	50.78	**31.8**	H	60.8	54.0	-22.2

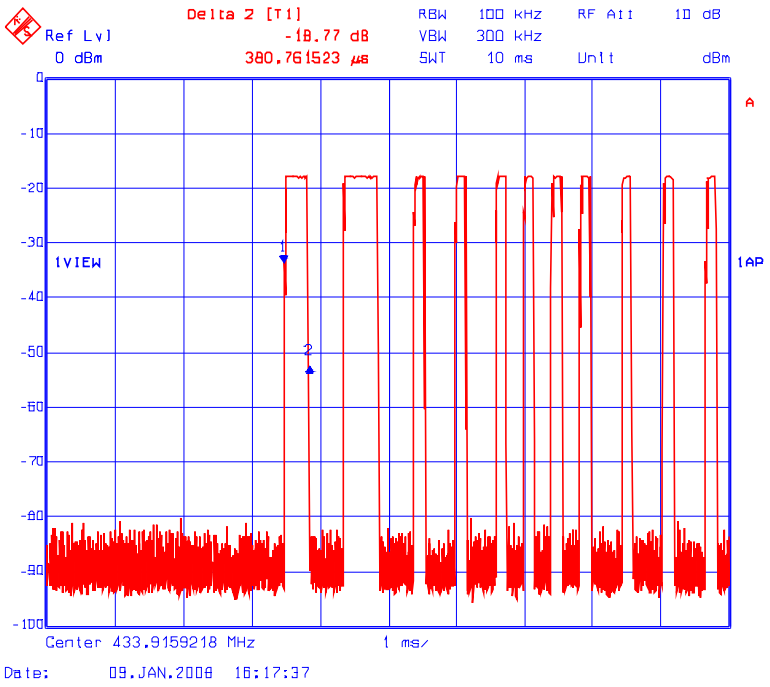
- The emissions were scanned from 30 MHz to 5 GHz at 3 meters distance and all spurious and harmonic emissions were recorded. The Average value of the measured emissions were compared with the limits as per Sec 15.231(b)(2).
- The transmitter was placed in three different orthogonal positions for searching maximum field strength level.
- The peak-average correction factor was obtained from the duty cycle calculation. See the Remarks below for details.

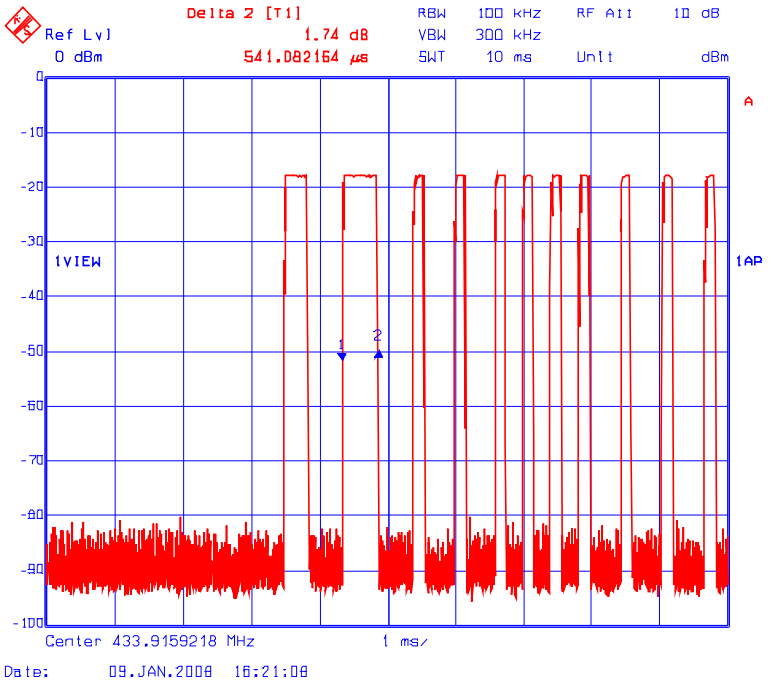
*Emissions within restricted band.

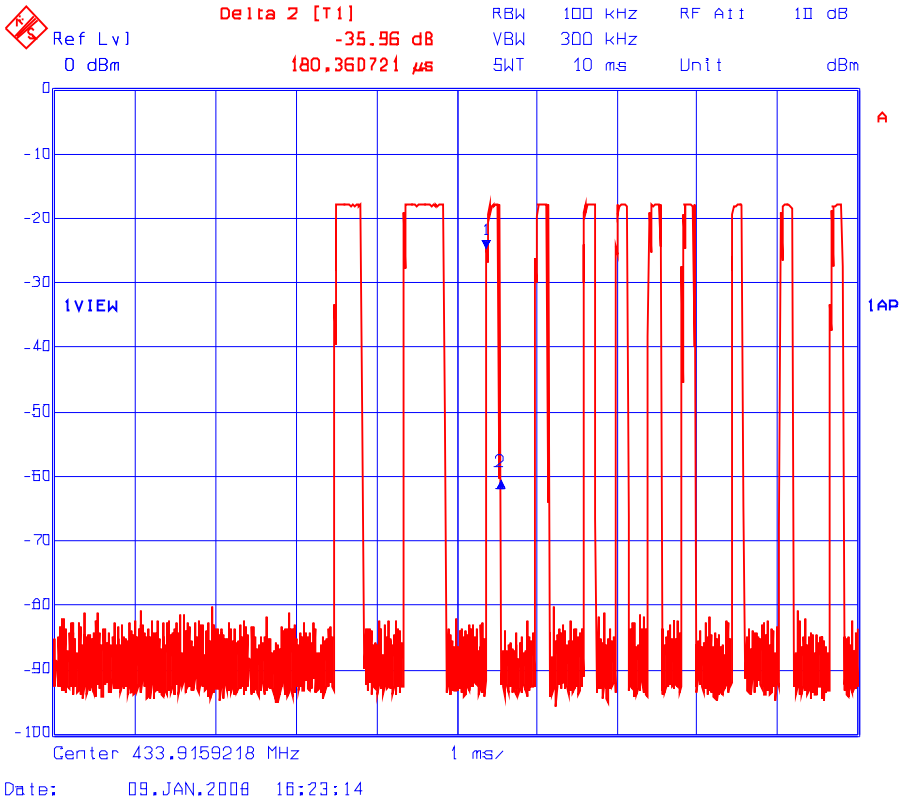
Remarks:

- Txon = 11.2 ms
- Duty cycle = Txon/100 = 0.112
- **Peak-to-Average Factor = 20*log (0.112) = -19.02dB**

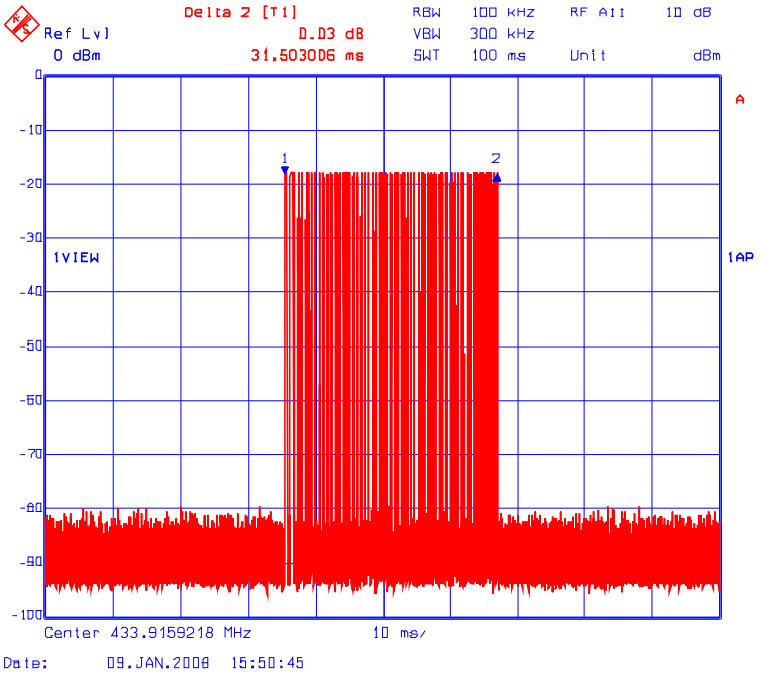
Pulse Widths = 380.76µs, 541.08µs & 180.36µs

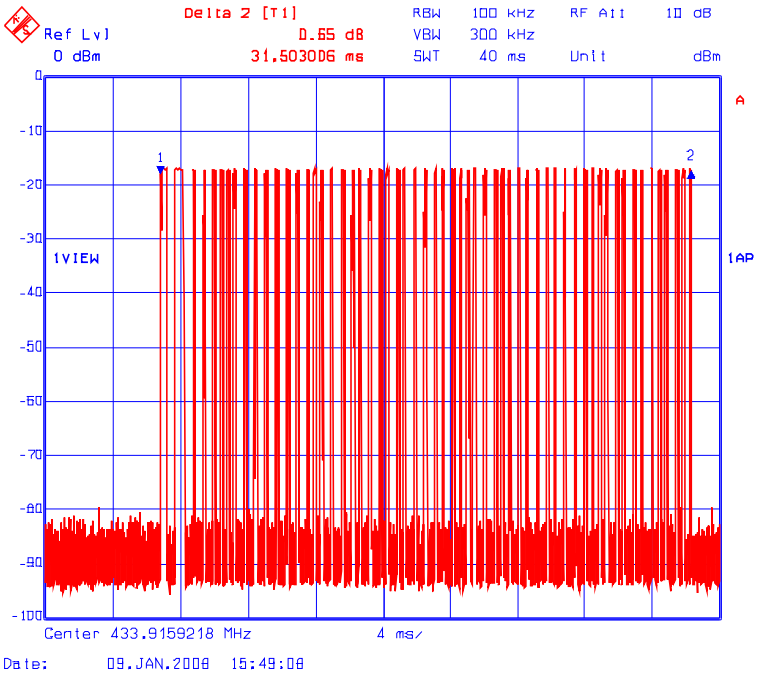





Delta 2 [T1]
-35.96 dB
180.360721 µs
Ref Lvl
0 dBm
RBW 100 kHz
VBW 300 kHz
SWT 10 ms
RF Att 10 dB
Unit dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1VIEW
1AP
A
Center 433.9159218 MHz
1 ms/
Date: 09.JAN.2008 16:23:14

Duty Cycle in 100ms: (1 x 380.76us)+(1 x 541.08us)+(57 x 180.36us)= 0.381+ 0.541 + 10.281ms= 11.20ms
Duty Cycle Factor = 20*log(0.1120)= -19.02dB





6.8. EMISSION BANDWIDTH [§15.231(c)]

6.8.1. Limits

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

6.8.2. Method of Measurements

Refer to ULTRATECH Test Procedures, File # ULTR P001-2004, §15.231(c) & ANSI C63.4.

The transmitter output was loosely coupled to the spectrum analyzer through a receiving antenna and the bandwidth of the fundamental frequency was measured with the spectrum analyzer with the resolution bandwidth of the spectrum analyzer set per ANSI C63.4.

6.8.3. Test Equipment List

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer	Rohde & Schwarz	FSEK30	100077	20 Hz – 40 GHz

6.8.4. Test Data

Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/Fail
433.92	19.84	1084	Pass

20 dB Bandwidth
Test Frequency: 433.92 MHz

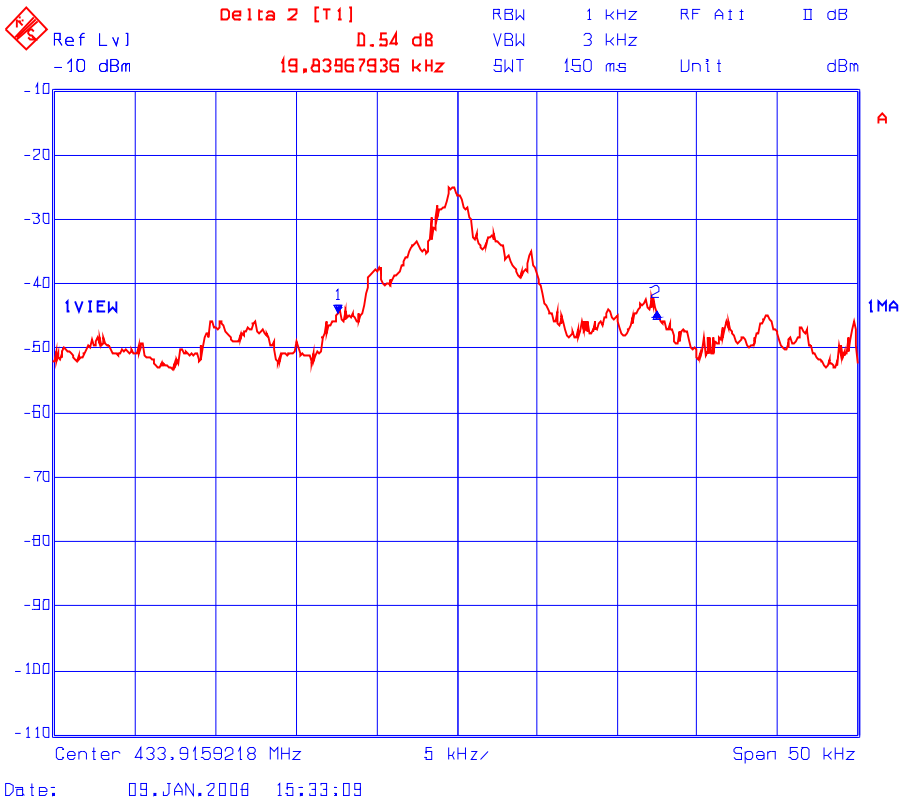


EXHIBIT 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 and NIS 81 (1994).

7.1. RADIATED EMISSION MEASUREMENT UNCERTAINTY

CONTRIBUTION (Radiated Emissions)	PROBABILITY DISTRIBUTION	UNCERTAINTY (± dB)	
		3 m	10 m
Antenna Factor Calibration	Normal (k=2)	±1.0	±1.0
Cable Loss Calibration	Normal (k=2)	±0.3	±0.5
EMI Receiver specification	Rectangular	±1.5	±1.5
Antenna Directivit	Rectangular	+0.5	+0.5
Antenna factor variation with height	Rectangular	±2.0	±0.5
Antenna phase center variation	Rectangular	0.0	±0.2
Antenna factor frequency interpolation	Rectangular	±0.25	±0.25
Measurement distance variation	Rectangular	±0.6	±0.4
Site imperfections	Rectangular	±2.0	±2.0
Mismatch: Receiver VRC Γ_1 = 0.2 Antenna VRC Γ_R = 0.67(Bi) 0.3 (Lp) Uncertainty limits 20Log(1±$\Gamma_1\Gamma_R$)	U-Shaped	+1.1 -1.25	±0.5
System repeatability	Std. Deviation	±0.5	±0.5
Repeatability of EUT		-	-
Combined standard uncertainty	Normal	+2.19 / -2.21	+1.74 / -1.72
Expanded uncertainty U	Normal (k=2)	+4.38 / -4.42	+3.48 / -3.44

Calculation for maximum uncertainty when 3m biconical antenna including a factor of k=2 is used:

$U = 2u_c(y) = 2x(+2.19) = +4.38$ dB And $U = 2u_c(y) = 2x(-2.21) = -4.42$ dB