



DIGITAL EMC CO., LTD.

683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080

Tel: +82-31-321-2664 Fax: +82-31-321-1664

<http://www.digitalemcc.com>

**CERTIFICATE OF COMPLIANCE
FCC Part 2, 22, 74, & 90 Certification**

UNIMO Technology Co., Ltd.
479-12 Bangbae-3Dong, Seocho-Gu,
Seoul, KOREA 137-820

Dates of Tests: Feb 10, 2004 ~ Feb 21, 2004
Test Report S/N: DR501104021
Test Site : DIGITAL EMC CO., LTD.

FCC ID:

O25PJ-100NW

APPLICANT

UNIMO Technology Co., Ltd.

Device Category : **VHF FM Handheld Transceiver**
Device name : **VHF FM TRANSCEIVER**
Manufacturer : UNIMO Technology Co., Ltd.
Trade mark : UNIMO
Model name : PJ-100NW
Serial number : Identical prototype
FCC Rule Part(s) : §2, §22, §74, §90
Frequency Range : 136 ~ 174MHz
RF Output Power : 5W / 1W
Channel Separation : 12.5kHz / 25.0kHz
Emission Designators: : 11K0F3E, 16K0F3E
Data of issue : February 21, 2004

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



NVLAP LAB CODE 200559-0

TABLE OF CONTENTS

1. GENERAL INFORMATION'S	3
2. INFORMATION'S ABOUT TEST ITEM	4
2.1 EQUIPMENT INFORMATION	4
2.2 TESTED FREQUENCY	4
2.3 TEST CONDITION	4
3. TEST REPORT	5
3.1 SUMMARY OF TESTS	5
3.2 REQUIREMENTS	6
3.2.1 CARRIER OUTPUT POWER (CONDUCTED)	6
3.2.2 UNWANTED EMISSIONS (TRANSMITTER CONDUCTED) (CONDUCTED)	7
3.2.3 FIELD STRENGTH OF SPURIOUS RADIATION	11
3.2.4 EMISSION MASKS (OCCUPIED BANDWIDTH)	14
3.2.5 TRANSIENT FREQUENCY BEHAVIOR	15
3.2.6 AUDIO FREQUENCY RESPONSE	16
3.2.7 MODULATION LIMITING	17
3.2.8 FREQUENCY STABILITY (TEMPERATURE VARIATION)	18
3.2.9 FREQUENCY STABILITY (VOLTAGE VARIATION)	19
3.2.10 NECESSARY BANDWIDTH AND EMISSION BANDWIDTH	20
APPENDIX	
APPENDIX I TEST EQUIPMENT USED FOR TESTS	21
APPENDIX II TEST PLOTS	24

1. General information's

This report contains the result of tests performed by:

DIGITAL EMC CO., LTD.

Address : 683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080

<http://www.digitalemc.com> E-mail : demc@unitel.co.kr

Tel: +82-31-321-2664 Fax: +82-31-321-1664

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competents of calibration and testing laboratory".

This laboratory is accredited by NVLAP for NVLAP Lab. Code : 200559-0.

Test operator: engineer

February 21, 2004

Kyung-Taek LEE



Data

Name

Signature

Report Reviewed By: manager

February 21, 2004

Dong-Min JUNG



Data

Name

Signature

Ordering party:

Company name : UNIMO Technology Co., Ltd.
 Address : 479-12 Bangbae-3Dong, Seocho-Gu,
 Zipcode : 137-820
 City/town : Seoul
 Country : Korea
 Date of order : January 19, 2004

2. Information's about test item

O25PJ-100NW

2.1 Equipment information

Equipment model no.	PJ-100NW
Equipment serial no.	Identical prototype
Type of equipment	VHF FM Handheld Transceiver
Frequency Range	136 ~ 174 MHz
Channel Separation	12.5kHz / 25.0kHz
Rated RF output power	5W (High Power) / 1W(Low Power)
Duty cycle TX power	5(Tx) : 5(Rx) : 90(Stand-by)
Type of antenna	$\lambda/4$ Helical Antenna
Battery type	7.5V DC rechargeable Li-NH battery
Speaker Impedance	16 ohm
Audio Output Power	1.0Watt across an 16-ohm load
Intermediate Frequencies	1 st : 21.4 MHz 2 st: 455 kHz

2.2 Tested frequency

Frequency	TX	RX
Low frequency	136.050 MHz	136.050 MHz
Middle frequency	155.050 MHz	155.050 MHz
High frequency	173.950 MHz	173.950 MHz

2.3 Test conditions

Test Conditions	Temperature(°C)
Low	-30
High	+60

3. Test Report

3.1 Summary of tests

Rule Reference	Parameter	Status (note 1)
2.1046 (a)	Carrier Output Power (Conducted)	C
2.1051	Unwanted Emissions (Transmitter Conducted)	C
2.1053 (a)	Field Strength of Spurious Radiation	C
2.1049 (c) (1)	Emission Masks (Occupied Bandwidth)	C
90.214	Transient Frequency Behavior	C
2.1047 (a)	Audio Low Pass Filter (Voice Input)	C
2.1047 (a)	Audio Frequency Response	C
2.1047 (b)	Modulation Limiting	C
2.1055 (a) (1)	Frequency Stability (Temperature Variation)	C
2.1055 (b) (1)	Frequency Stability (Voltage Variation)	C
2.202 (g)	Necessary Bandwidth and Emission Bandwidth	C
Note 1: C=Conform NC=Not Conform NT=Not Tested NA=Not Applicable		

The sample was tested according to the following specification:

FCC Rules and Regulations, Volume II; Part 2, Sub-part J, Sections 2.947, 2.1033(c), 2.1046, 2.1047, 2.1079, 2.1051, 2.1053, 2.1055, 2.1057 and Part 22, Part 74 Subpart H, Part 90.

3.2 Requirements

3.2.1 Carrier Output Power (Conducted)

Definition:

- The carrier power output for a transmitter for this service is the power available at the output terminals of the transmitter when the output terminals are connected to the standard transmitter load.

FCC ID : **O25PJ-100NW**
 Specification : 47 CFR 2.1046 (a)
 Test method : ANSI/TIA/EIA-603-2001, Paragraph 2.2.1

Measurement Procedure:

- The EUT was connected to a resistive coaxial attenuator of normal load impedance, and the unmodulated output power was measured by means of an R.F. Power Meter.

TEST CONDITIONS		Carrier power(W)		
Power level (W)	Channel Spacing (kHz)	136.050 MHz	155.050 MHz	173.950 MHz
1	12.5	1.03	1.09	1.04
5	12.5	4.46	4.61	4.55
1	25	1.05	1.08	1.04
5	25	4.47	4.60	4.55
Measurement uncertainty		± 0,45dB		

TEST EQUIPMENT USED: 11, 12, 19, 20, 32, 35

3.2.2 Unwanted Emissions (Transmitter Conducted)

Definition:

- Conducted spurious emissions are emissions at the antenna terminals on a frequency or frequencies which are outside a band sufficient to ensure transmission of information of required quality for the class of communication desired.

FCC ID : **O25PJ-100NW**
 Specification : 47 CFR 2.1051
 Test method : ANSI/TIA/EIA-603-2001, Paragraph 2.2.13

Measurement Procedure:

- The emissions were measured for the worst case as follows:
 - (1) Within a band of frequencies defined by the carrier frequency plus and minus one channel.
 - (2) From the lowest frequency generated in the EUT and to at least the 10th harmonic of the carrier frequency, or 40GHz, whichever is lower.
- The magnitude of spurious emissions that are attenuated more than 20dB below the permissible value need not be specified.

LIMIT

$= 43 + 10 \log_{10} (P) \text{ dBc (or -13 dBm)}$
--

TEST EQUIPMENT USED: 2, 19, 20, 35, 37

Measurement Data:

OPERATING FREQUENCY : 136.050 MHz
 POWER : Low Power
 MEASURED OUTPUT POWER: 30.37 dBm = 1.09 W
 MODULATION SIGNAL : FM
 LIMIT : $43 + 10 \log_{10} (W) = \underline{43.37}$ dBc

Freq. (MHz)	Level (dBm)	Level (dBc)	Freq. (MHz)	Level (dBm)	Level (dBc)
272.10	-37.21	67.58			
408.15	-37.79	68.16			
544.20	-52.12	82.49			
680.25	-54.41	84.78			

Remarks

No other emissions were detected at a level greater than 20dB below limit.

OPERATING FREQUENCY : 136.050 MHz
 POWER : High Power
 MEASURED OUTPUT POWER : 36.64 dBm = 4.61 W
 MODULATION SIGNAL : FM
 LIMIT : $43 + 10 \log_{10} (W) = \underline{49.64}$ dBc

Freq. (MHz)	Level (dBm)	Level (dBc)	Freq. (MHz)	Level (dBm)	Level (dBc)
272.10	-38.56	75.20			
408.15	-38.28	74.92			
544.20	-44.85	81.49			

Remarks

No other emissions were detected at a level greater than 20dB below limit.

Measurement Data:

OPERATING FREQUENCY : 155.050 MHz
 POWER : Low Power
 MEASURED OUTPUT POWER: 30.37 dBm = 1.09 W
 MODULATION SIGNAL : FM
 LIMIT : $43 + 10 \log_{10} (W) = \underline{43.37}$ dBc

Freq. (MHz)	Level (dBm)	Level (dBc)	Freq. (MHz)	Level (dBm)	Level (dBc)
310.10	-37.21	67.58			
465.15	-38.27	68.64			
620.20	-54.02	84.39			

Remarks

No other emissions were detected at a level greater than 20dB below limit.

OPERATING FREQUENCY : 155.050 MHz
 POWER : High Power
 MEASURED OUTPUT POWER : 36.64 dBm = 4.61 W
 MODULATION SIGNAL : FM
 LIMIT : $43 + 10 \log_{10} (W) = \underline{49.64}$ dBc

Freq. (MHz)	Level (dBm)	Level (dBc)	Freq. (MHz)	Level (dBm)	Level (dBc)
310.10	-36.84	73.48			
465.15	-37.92	74.56			

Remarks

No other emissions were detected at a level greater than 20dB below limit.

Measurement Data:

OPERATING FREQUENCY : 173.950 MHz
 POWER : Low Power
 MEASURED OUTPUT POWER: 30.37 dBm = 1.09 W
 MODULATION SIGNAL : FM
 LIMIT : $43 + 10 \log_{10} (W) = \underline{43.37}$ dBc

Freq. (MHz)	Level (dBm)	Level (dBc)	Freq. (MHz)	Level (dBm)	Level (dBc)
347.93	-37.55	67.92			
521.88	-42.33	72.70			

Remarks

No other emissions were detected at a level greater than 20dB below limit.

OPERATING FREQUENCY : 173.950 MHz
 POWER : High Power
 MEASURED OUTPUT POWER : 36.64 dBm = 4.61 W
 MODULATION SIGNAL : FM
 LIMIT : $43 + 10 \log_{10} (W) = \underline{49.64}$ dBc

Freq. (MHz)	Level (dBm)	Level (dBc)	Freq. (MHz)	Level (dBm)	Level (dBc)
347.93	-37.92	74.56			
521.88	-41.38	78.02			

Remarks

No other emissions were detected at a level greater than 20dB below limit.

3.2.3 Field Strength of Spurious Radiation

Definition:

- Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies which are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

FCC ID : **O25PJ-100NW**
 Specification : 47 CFR 2.1053(a)
 Test method : ANSI/TIA/EIA-603-2001, Paragraph 2.2.12

Measurement Procedure:

- The test sample was set up at a distance of three meters from the test instrument. Valid spurious signals were determined by switching the power on and off.
- In the field, the test sample was placed on a wooden turntable above ground at three meters away from the search antenna.
- The cables were oriented in order to obtain the maximum response. At each emission frequency, the turntable was rotated and the search antennas were raised and lowered vertically.
- The emission was observed with both a vertically polarized and a horizontally polarized search antenna and the worst case was used.
- The field strength of each emission within 20dB of the limit was recorded and corrected with the appropriate cable and transducer factors.
- From the lowest frequency generated in the EUT and to at least the 10th harmonic of the carrier frequency, or 40GHz, whichever is lower.
- The worst case for all channels is shown.

LIMIT

$= 43 + 10 \log_{10} (P) \text{ dBc (or -13 dBm)}$
--

TEST EQUIPMENT USED: 1, 8, 19, 22, 23, 33, 34, 35

Measurement Data: Attached for Worst Case

OPERATING FREQUENCY : 136.050 MHz
 POWER : Low Power
 MEASURED OUTPUT POWER: 30.37 dBm = 1.09 W
 MODULATION SIGNAL : FM
 LIMIT : $43 + 10 \log_{10} (W) =$ 43.37 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)

Remarks

No emissions were detected at a level greater than 20dB below limit.

Measurement Data: Attached for Worst Case

OPERATING FREQUENCY : 136.050 MHz
 POWER : High Power
 MEASURED OUTPUT POWER : 36.64 dBm = 49.64 W
 MODULATION SIGNAL : FM
 LIMIT : $43 + 10 \log_{10} (W) =$ 49.64 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)

Remarks

No emissions were detected at a level greater than 20dB below limit.

3.2.4 Emission Masks (Occupied Bandwidth)

Definition:

- The term transmitter Sideband Spectrum denotes the sideband energy produced at a discrete frequency separation from the carrier up to the test bandwidth due to all sources of unwanted noise within the transmitter in a modulated condition.

FCC ID	:	O25PJ-100NW
Specification	:	47 CFR 2.1049(c)(1)
Test method	:	ANSI/TIA/EIA-603-2001, Paragraph 2.2.11

Measurement Procedure:

- The EUT and test equipment were set up as shown on the following page, with the Spectrum Analyzer connected.
- For EUTs supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for $\pm 2.5 / \pm 1.25$ kHz deviation (or 50% modulation). With level constant, the signal level was increased 16dB.
- For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.
- The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

Measurement Data:

Refer to the Appendix II

TEST EQUIPMENT USED: 2, 19, 20, 35, 37
.....

3.2.5 Transient Frequency Behavior

Definition:

- The transient frequency behavior is a measure of the difference, as a function in time, of the actual transmitter frequency to the assigned transmitter frequency when the transmitted RF output power is switched on or off.

FCC ID	:	O25PJ-100NW
Specification	:	47 CFR 90.214
Test method	:	ANSI/TIA/EIA-603-2001, Paragraph 2.2.19

Measurement Procedure:

- The EUT was set up as shown on the attached page, following TIA/EIA-603 steps a, b, and c as a guide.
- The transmitter was turned on.
- Sufficient attenuation was provided so that the transmitter carrier level measured at the output of the combiner was 40 dB below the maximum input level of the test receiver. This level was recorded as step f.
- The transmitter was turned off.
- An RF signal generator (1) modulated with a 1 kHz tone at either 25, 12.5, or 6.25 kHz deviation, and set to the same frequency as the assigned transmitter frequency, (2) was adjusted to a level -20 dB below the level recorded for step f, as measured at the output of the combiner. This level was then fixed for the remainder of the test and is recorded at step h.
- The oscilloscope was set up using TIA/EIA-603 steps j and k as a guide, and to either 10 ms/div (UHF) or 5ms/div (VHF).
- The 30 dB attenuator was removed, the transmitter was turned on, and the level of the carrier at the output of the combiner was recorded as step l.
- The carrier on-time as referenced in TIA/EIA-603 steps m, n, and o was captured and plotted. The carrier off-time as referenced in TIA/EIA-603 steps p, q, r, and s was captured and plotted.
- For EUTs supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for $\pm 2.5 / \pm 1.25$ kHz deviation (or 50% modulation). With level constant, the signal level was increased 16dB.
- For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.
- The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

Measurement Data:

Refer to the Appendix II

TEST EQUIPMENT USED: 2, 19, 20, 35, 37

3.2.6 Audio Low Pass Filter (Voice Input)

Definition:

- The Audio Low Pass Filter Response is the frequency response of the post limiter low pass filter circuit above 3000Hz.

FCC ID : **O25PJ-100NW**
Specification : 47 CFR 2.1047(a)
Test method : ANSI/TIA/EIA-603-2001, Paragraph 2.2.15

Measurement Procedure:

- The EUT and test equipment were set up such that the audio input was connected at the input to the modulation limiter, and the modulated stage.
- The audio output was connected at the output to the modulated stage.

Measurement Data:

Refer to the Appendix II

TEST EQUIPMENT USED: 2, 19, 20, 35, 37
.....

3.2.7 Audio Frequency Response

Definition:

- The audio frequency response is the degree of closeness to which the frequency deviation of the transmitter follows a prescribed characteristic.

FCC ID	:	O25PJ-100NW
Specification	:	47 CFR 2.1047(a)
Test method	:	ANSI/TIA/EIA-603-2001, Paragraph 2.2.6

Measurement Procedure:

- The audio signal input was adjusted to obtain 20% modulation at 1kHz, and this point was taken as the 0dB reference level.
- With input levels held constant and below limiting at all frequencies, the audio signal generator was varied from 300 Hz to 30 kHz.
- The response in dB relative to 1 kHz was then measured, using the HP 8901A Modulation Analyzer.

Measurement Data:

Refer to the Appendix II

TEST EQUIPMENT USED: 2, 19, 20, 35, 37
.....

3.2.8 Modulation Limiting

Definition:

- Modulation limiting refers to the transmitter circuits ability to limit the transmitter from producing deviations due to modulation in excess of a rated system deviation.

FCC ID	:	O25PJ-100NW
Specification	:	47 CFR 2.1047(b)
Test method	:	ANSI/TIA/EIA-603-2001, Paragraph 2.2.3

Measurement Procedure:

- The signal generator was connected to the input of the EUT as for " Frequency Response of the Modulating Circuit."
- The modulation response was measured for each of three frequencies (one of which was the frequency of maximum response), and the input voltage was varied and was observed on an HP 8901A Modulation Analyzer.
- The input level was varied from 30% modulation (± 1.5 kHz deviation) to at least 20 dB higher than the saturation point.

Measurement Data:

Refer to the Appendix II

TEST EQUIPMENT USED: 2, 19, 20, 35, 37
.....

3.2.9 Frequency Stability

Definition:

- Modulation limiting refers to the transmitter circuits ability to limit the transmitter from producing deviations due to modulation in excess of a rated system deviation.

FCC ID	:	O25PJ-100NW
Specification	:	47 CFR 2.1055
Test method	:	ANSI/TIA/EIA-603-2001, Paragraph 2.2.2

Measurement Procedure:

The frequency stability of the transmitter is measured by:

- Temperature: The temperature is varied from -30°C to +60°C using an environmental chamber.
- Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification- The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025(\pm 2.5\text{ppm})$ of the center frequency.

Time Period and Procedure:

- The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (25°C to 27°C to provide a reference).
- The equipment is subjected to an overnight “soak” at -30°C without power applied.
- After the overnight “soak” at 30°C (usually 14-16 hours), the equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
- Frequency measurements are made at 10°C interval up to room temperature. At least a period of one and one half-hour is provided to allow stabilization of the equipment at each temperature level.
- Again the transmitter carrier frequency and the individual oscillators is measured at room temperature to begin measurement of the upper temperature levels.
- Frequency measurements are at 10 intervals starting at -30°C up to +60°C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after re-applying power to the transmitter.
- The artificial load is mounted external to the temperature chamber.

NOTE: The EUT is tested down to the battery endpoint.

Measurement Data:

Refer to the Appendix II

TEST EQUIPMENT USED: 2, 19, 20, 35, 37

3.2.10 Necessary Bandwidth and Emission Bandwidth

FCC ID : O25PJ-100NW
 Specification : 47 CFR 2.202 (g)

MODULATION = 16K0F3E

NECESSARY BANDWIDTH CALCULATION:

MAXIMUM MODULATION (M), kHz	= 3
MAXIMUM DEVIATION (D), kHz	= 5
CONSTANT FACTOR (K)	= 1
NECESSARY BANDWIDTH (BN), kHz	= (2 * M) + (2 * D * K)
	= 16.0

MODULATION = 11K0F3E

NECESSARY BANDWIDTH CALCULATION:

MAXIMUM MODULATION (M), kHz	= 3
MAXIMUM DEVIATION (D), kHz	= 2.5
CONSTANT FACTOR (K)	= 1
NECESSARY BANDWIDTH (BN), kHz	= (2 * M) + (2 * D * K)
	= 11.0

APPENDIX I

TEST EQUIPMENT USED FOR TESTS

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment.

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
01	Spectrum Analyzer	Agilent	E4404B	22/11/04	30601-01-6025569
02	Spectrum Analyzer	H.P	8563E	25/09/04	3551A04634
03	Power Meter	H.P	EPM-442A	15/03/04	GB37170413
04	Power Sensor	H.P	8481A	19/04/04	3318A96332
05	Frequency Counter	H.P	5342A	26/09/04	2119A04450
06	Multifunction Synthesizer	H.P	8904A	15/10/04	3633A08404
07	Signal Generator	H.P	8673D	26/09/04	2844A00753
08	Signal Generator	H.P	E4421A	29/04/04	US37230529
09	Signal Generator	H.P	8657A	05/06/04	3430U02049
10	Audio Analyzer	H.P	8903B	18/04/04	3011A0944B
11	Modulation Analyzer	H.P	8901B	21/04/04	3028A03029
12	Sensor Module	H.P	11722A	21/04/04	3111A04665
13	Oscilloscope	LeCroy	9314A	27/08/04	93144390
14	CDMA Mobile Station Test Set	H.P	8924C	09/09/04	US35360688
15	Power Splitter	WEINSCHEL	1593	23/04/04	332
16	BAND Reject Filter	Wainwright	WRCG824	19/08/04	SN1
17	BAND Reject Filter	Wainwright	WRCG1750	19/08/04	SN2
18	AC Power supply	DAEKWANG	5KVA	03/04/04	N/A
19	DC Power Supply	H.P	6622A	24/03/04	465487
20	Attenuator (30dB)	H.P	8498A	23/05/04	50101
21	Attenuator (10dB)	WEINSCHEL	23-10-34	15/10/04	BP4387
22	HORN ANT	EMCO	3115	22/02/04	6419
23	HORN ANT	EMCO	3115	01/10/04	21097
24	HORN ANT	A.H.Systems	SAS-574	27/11/04	154
25	HORN ANT	A.H.Systems	SAS-574	14/11/04	155
26	Dipole Antenna	Schwarzbeck	VHA9103	04/10/04	2116

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
27	Dipole Antenna	Schwarzbeck	VHA9103	04/10/04	2117
28	Dipole Antenna	Schwarzbeck	UHA9105	04/10/04	2261
29	Dipole Antenna	Schwarzbeck	UHA9105	04/10/04	2262
30	RFI/FIELD Intensity Meter	Kyorits	KNM-504D	25/07/04	SN-161-4
31	Frequency Converter	Kyorits	KCV-604C	05/07/04	4-230-3
32	TEMP & HUMIDITY Chamber	JISCO	J-RHC2	14/09/04	021031
33	Log Periodic Antenna	Schwarzbeck	UHALP9108A1	23/10/04	1098
34	Biconical Antenna	Schwarzbeck	VHA9103	23/10/04	VHA91031946
35	Digital Multimeter	H.P	34401A	15/10/04	3146A13475
36	Attenuator (10dB)	WEINSCHEL	23-10-34	15/10/04	BP4386
37	High-Pass Filter	ANRITSU	MP526	12/05/04	M27756
38	Attenuator (3dB)	Agilent	8491B	15/10/04	58177
39	Oscillo Scope	Tektronics	TDS644B	18/11/04	B010834

APPENDIX II

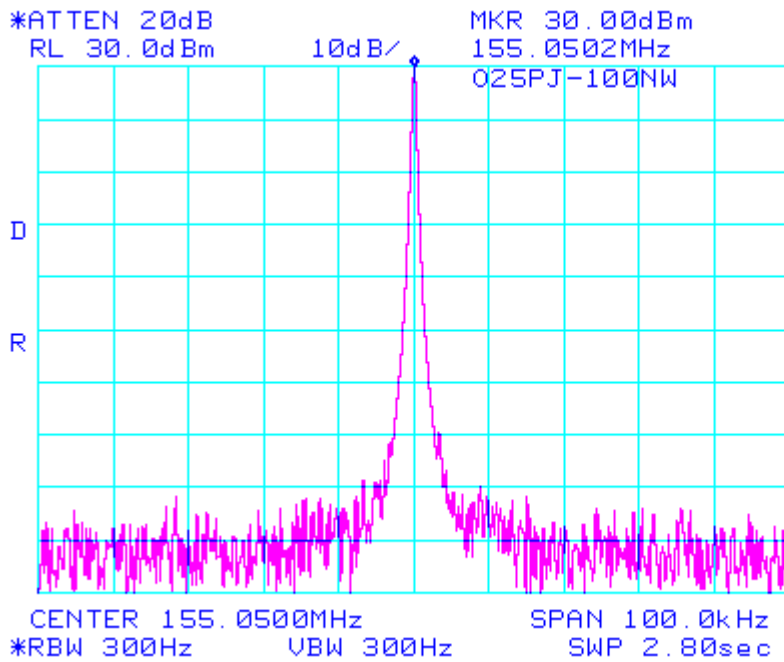
TEST PLOTS

Emission Masks Measurement Data:

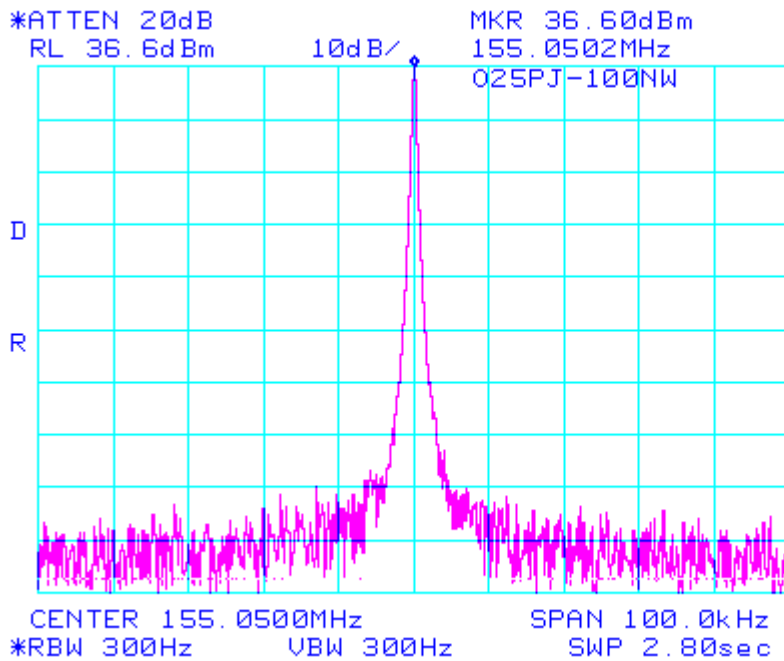
OPERATING FREQUENCY : 155.050 MHz

MODULATION : None

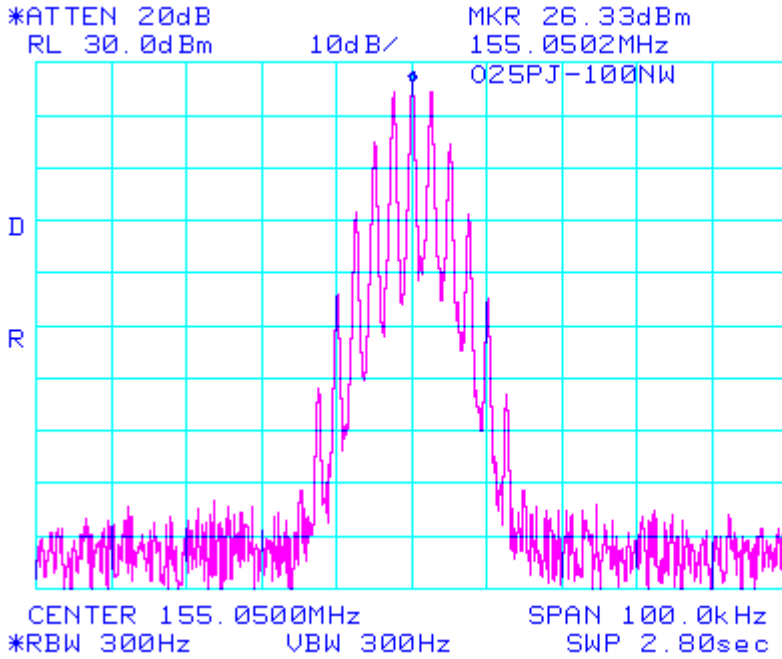
POWER : Low Power



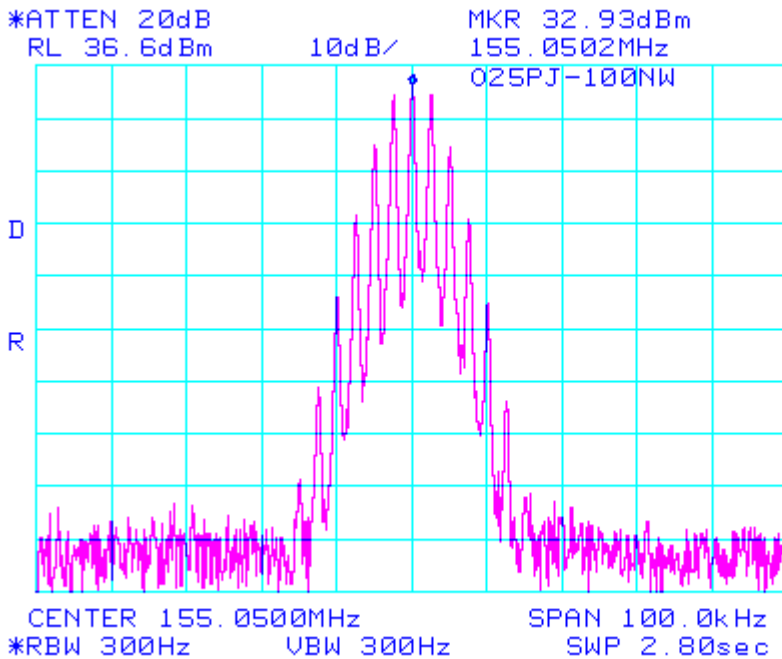
POWER : High Power



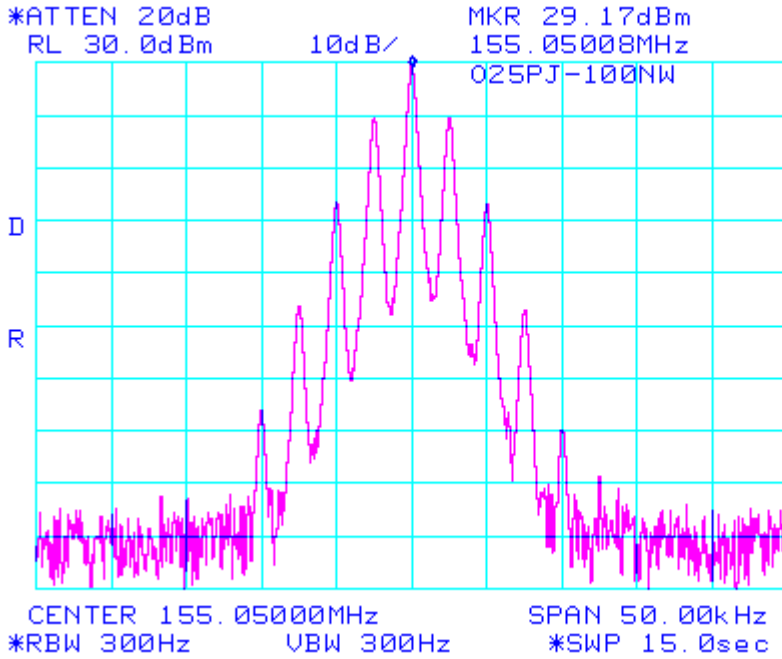
OPERATING FREQUENCY : 155.050 MHz
 MODULATION : Voice: 2500 Hz, Sine Wave
 MASK: B, VHF/UHF 25 kHz, w/LPF
 POWER : Low Power



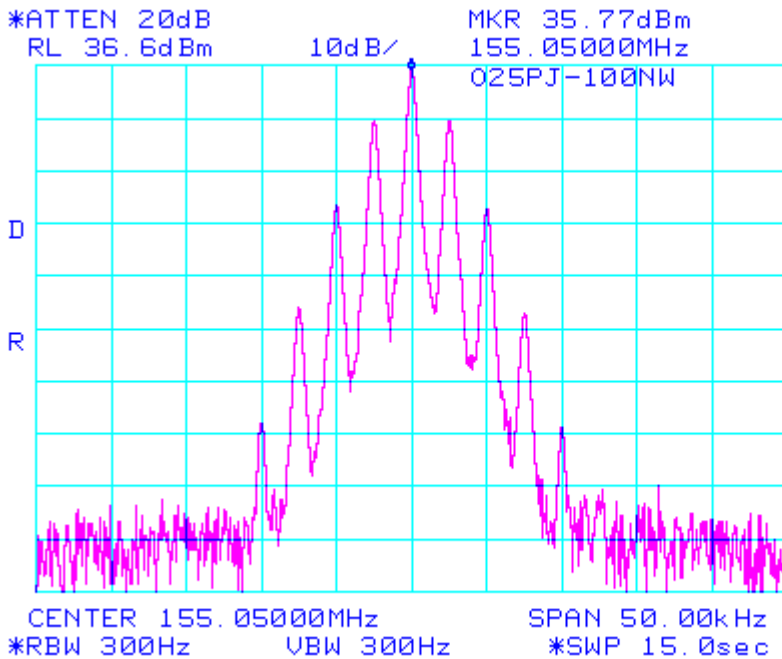
POWER : High Power



OPERATING FREQUENCY : 155.050 MHz
 MODULATION : Voice: 2500 Hz, Sine Wave
 MASK: D, VHF/UHF 12.5 kHz BW
 POWER : Low Power

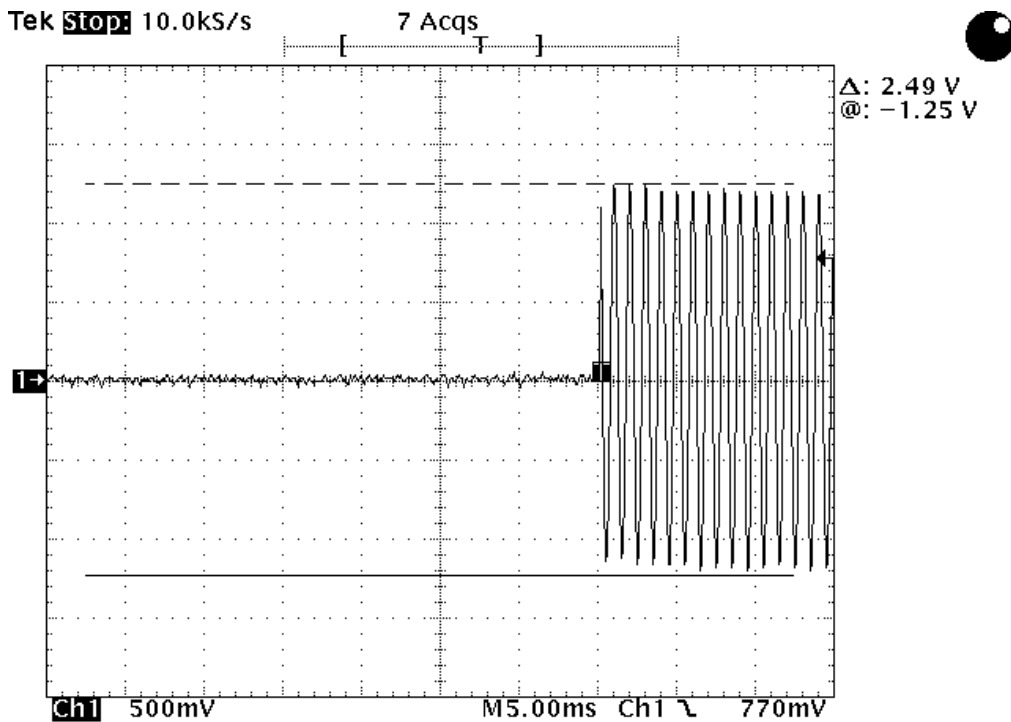
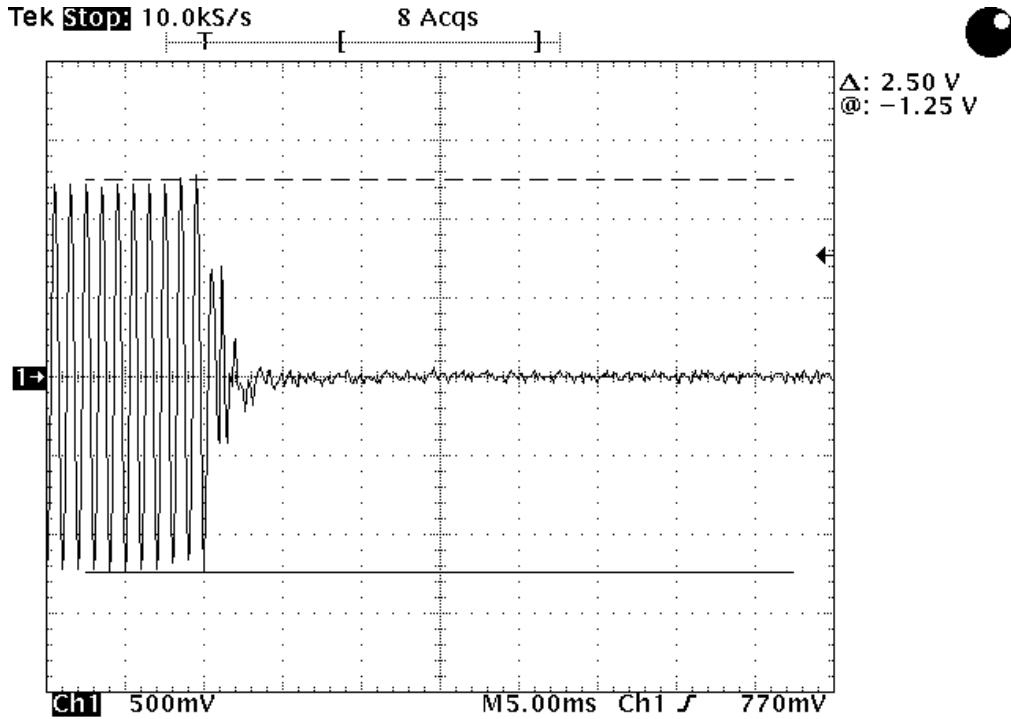


POWER : High Power

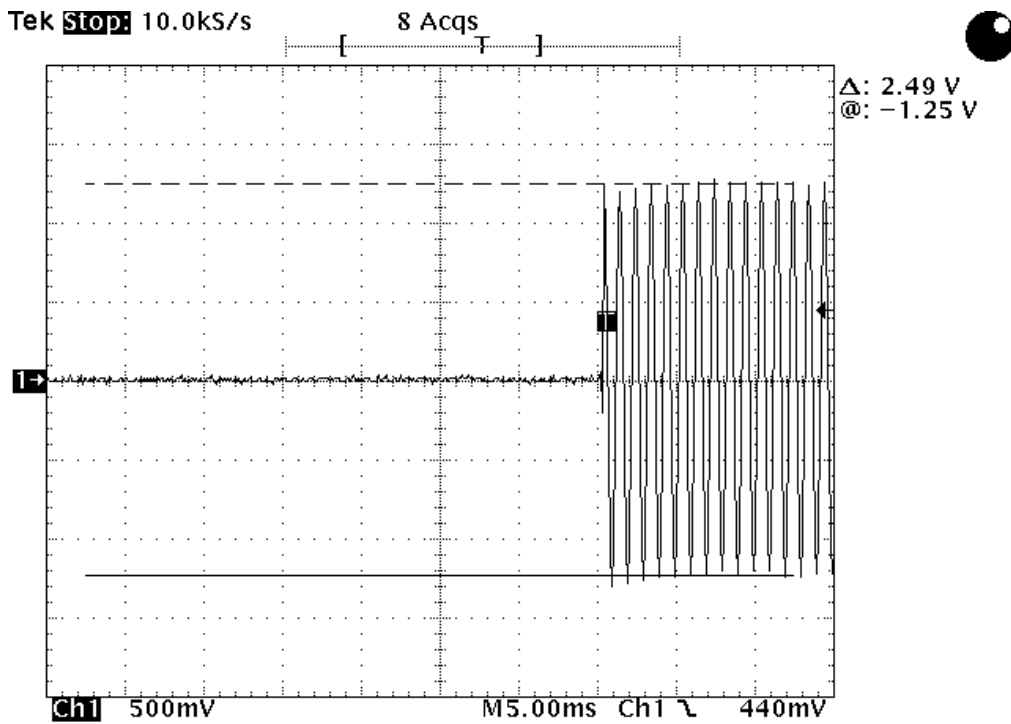
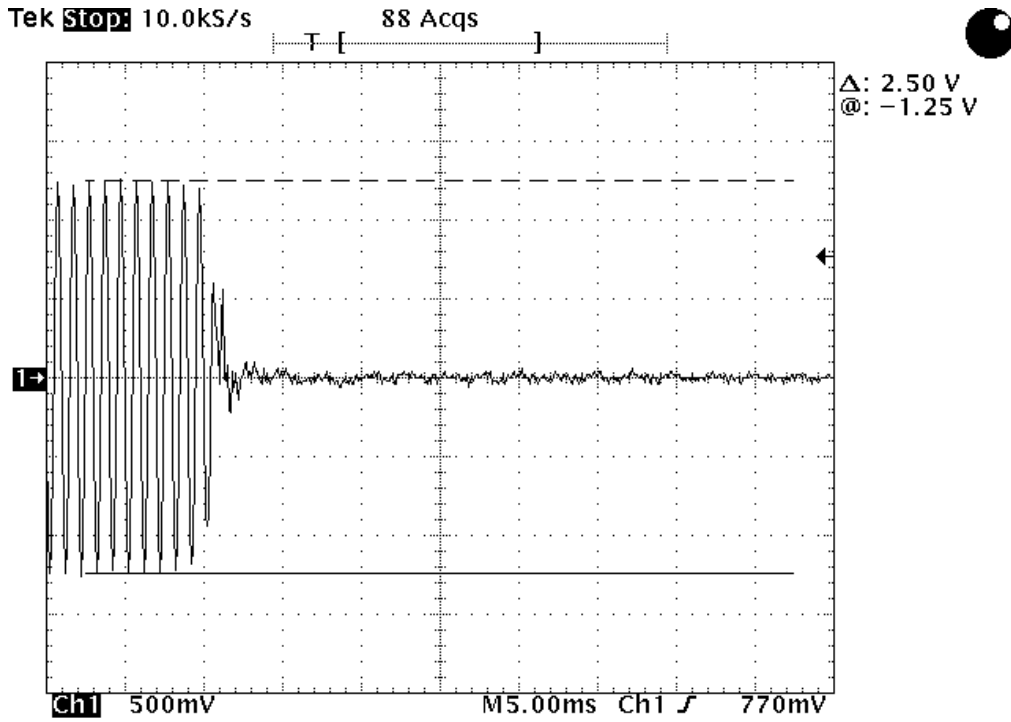


Transient Frequency Behavior Measurement Data:

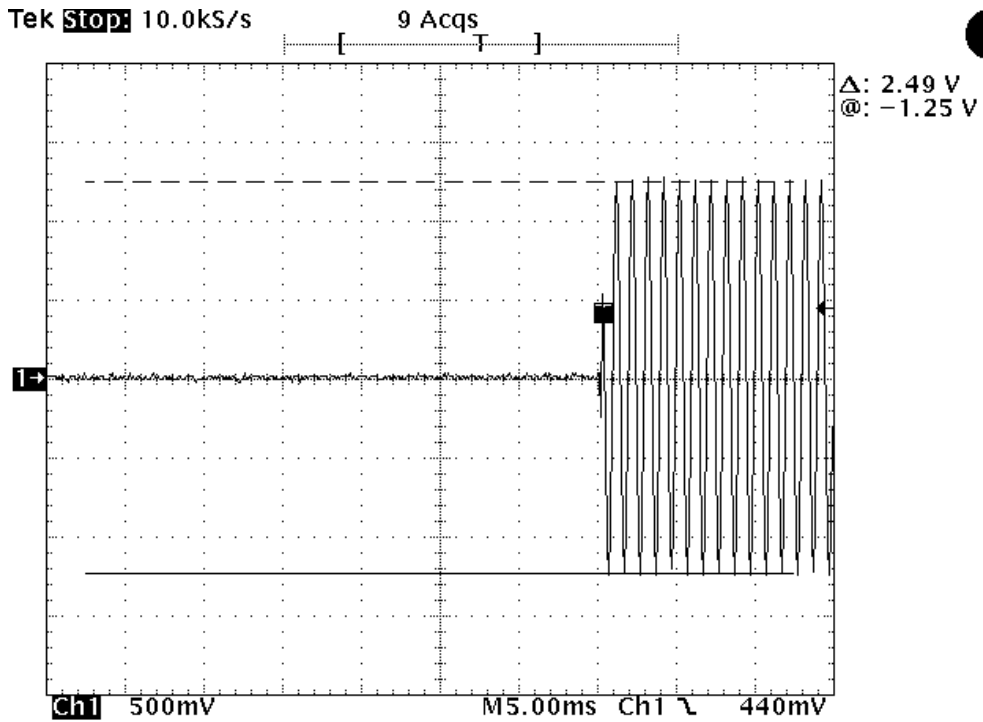
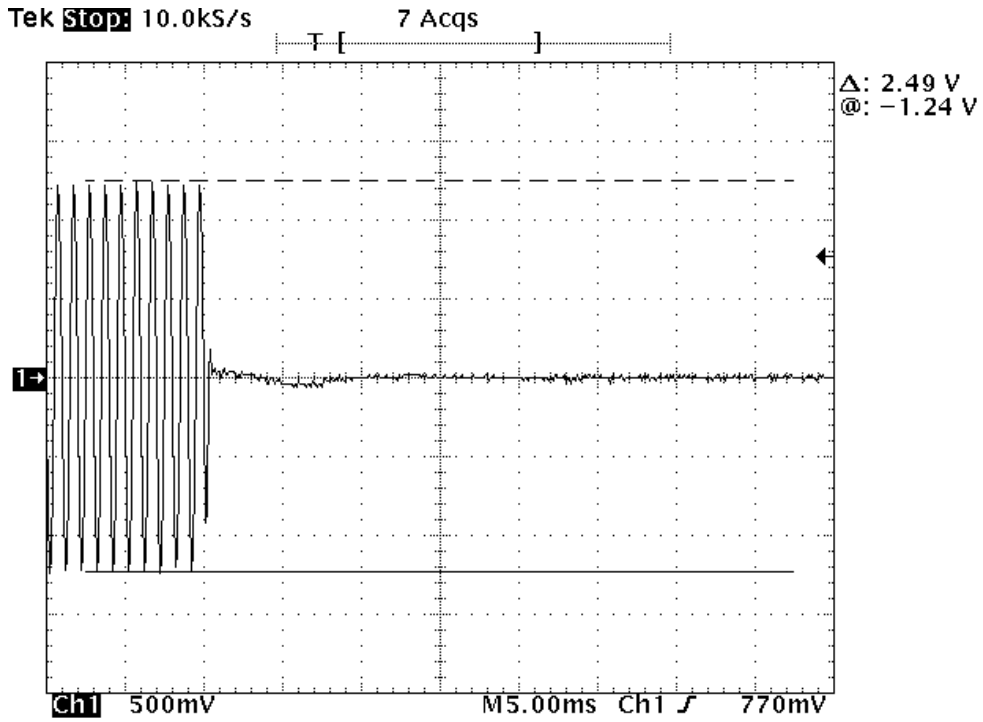
136.050 MHz Power Output Level = 5W 12.5 kHz Channel Spacing



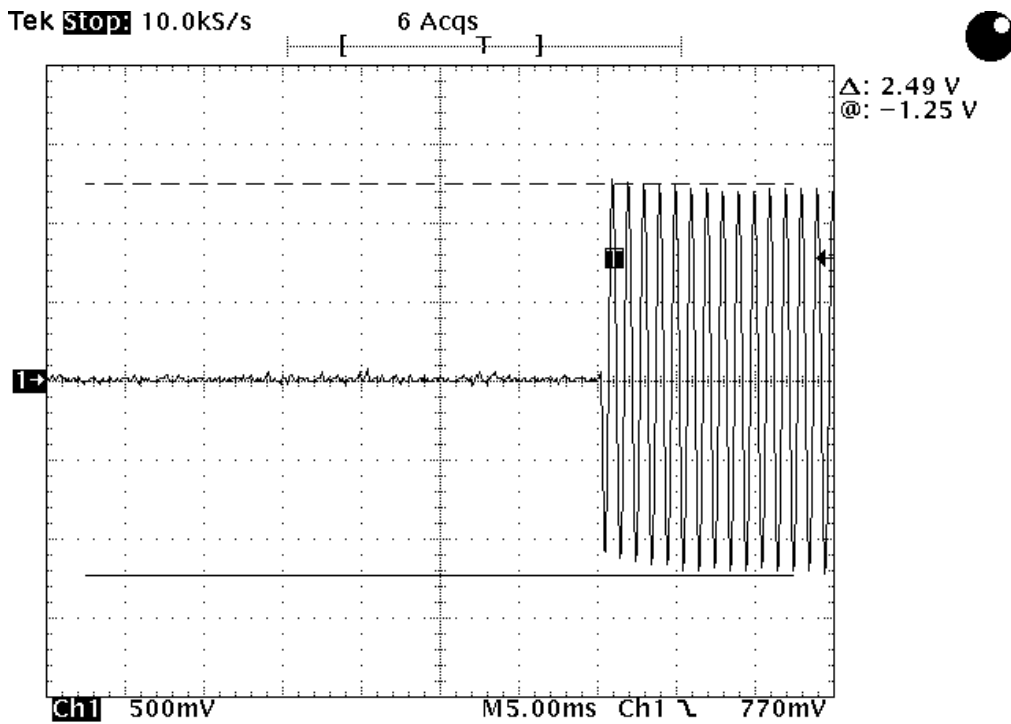
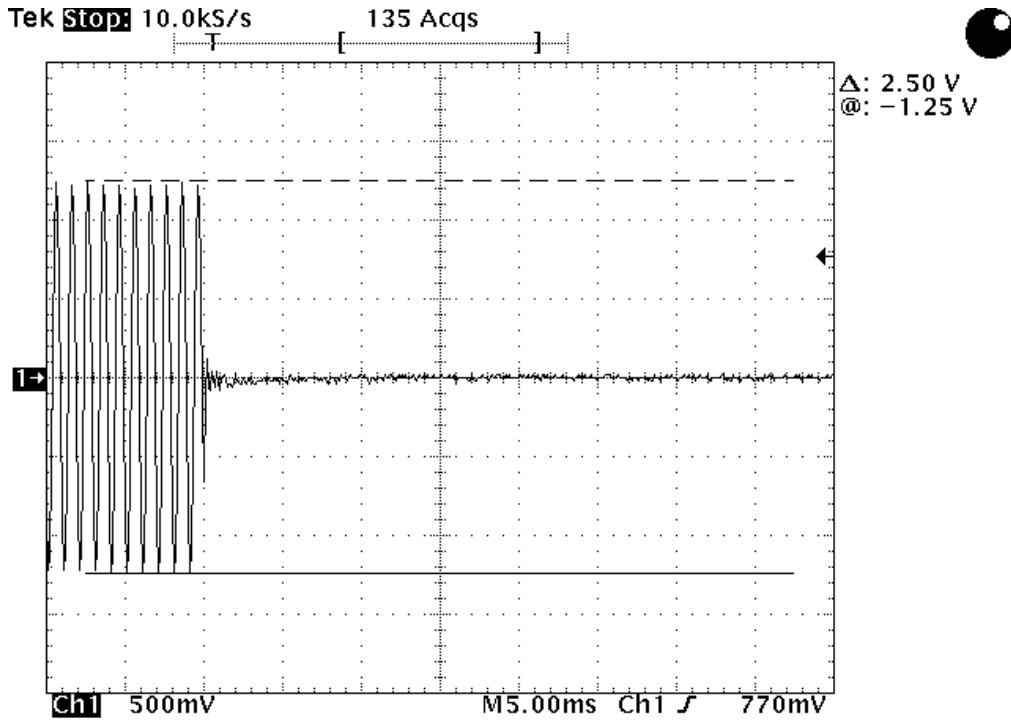
155.050 MHz Power Output Level = 5W 12.5 kHz Channel Spacing



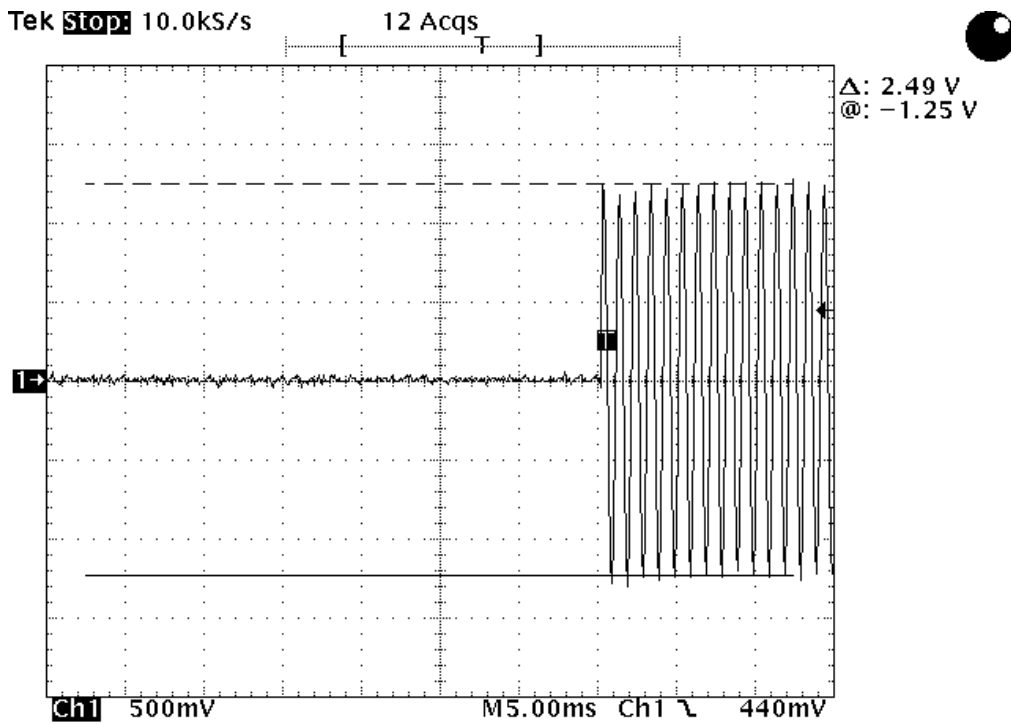
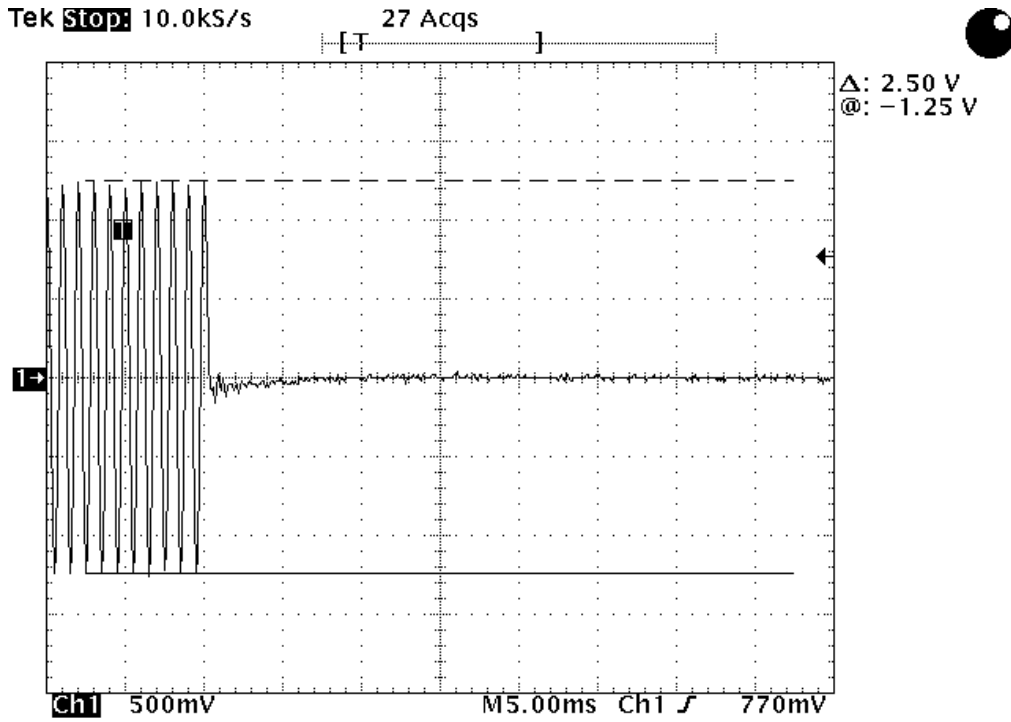
173.950 MHz Power Output Level = 5W 12.5 kHz Channel Spacing



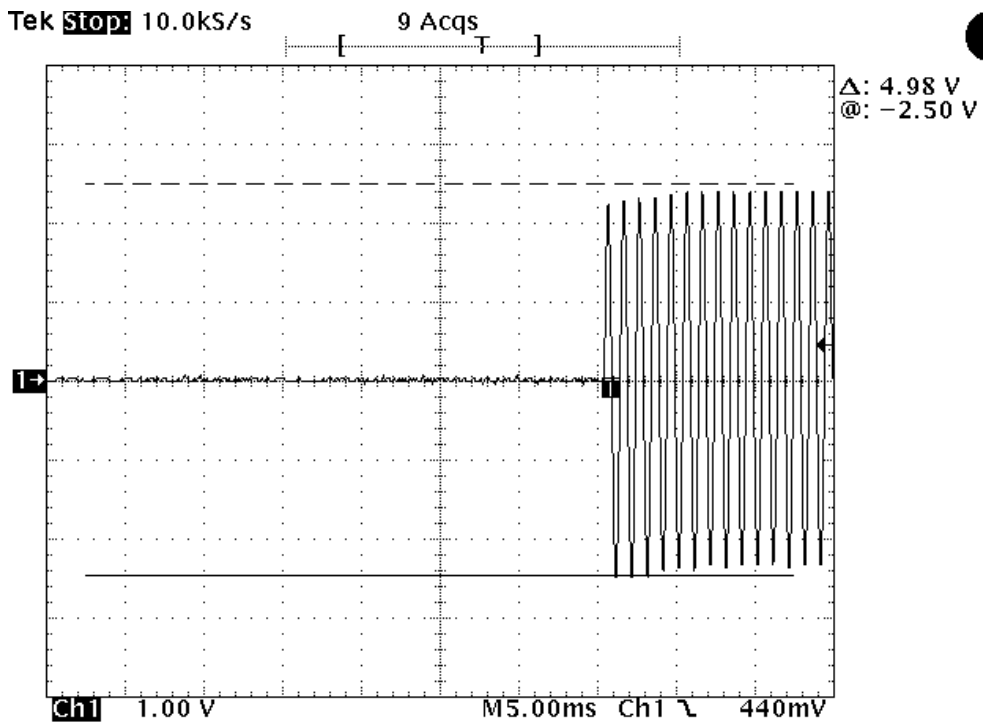
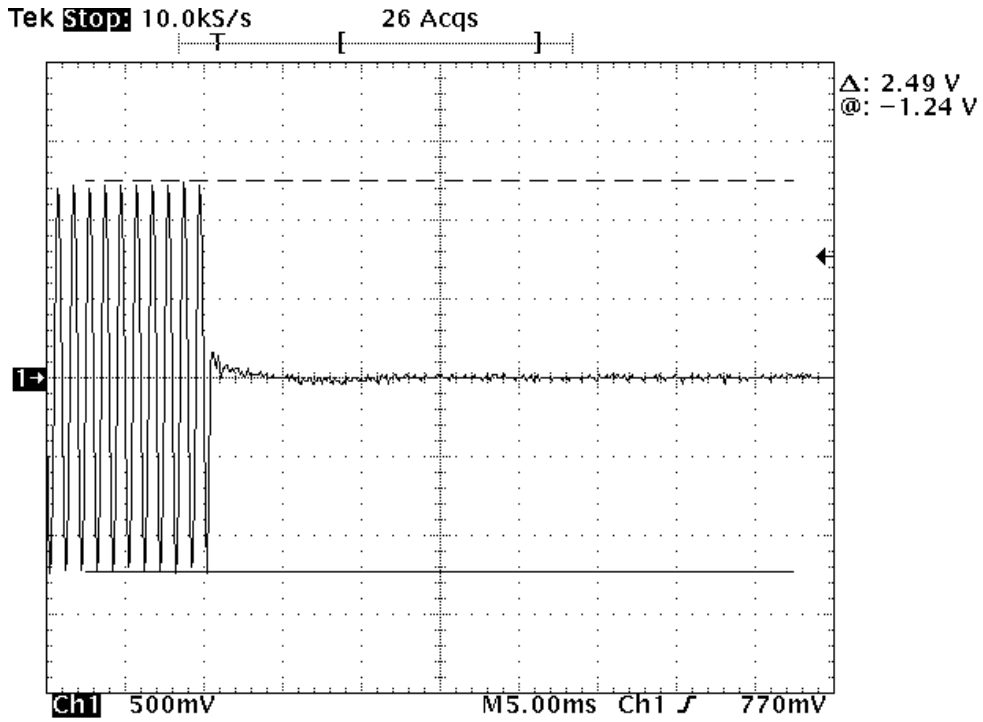
136.050 MHz Power Output Level = 1W 12.5 kHz Channel Spacing



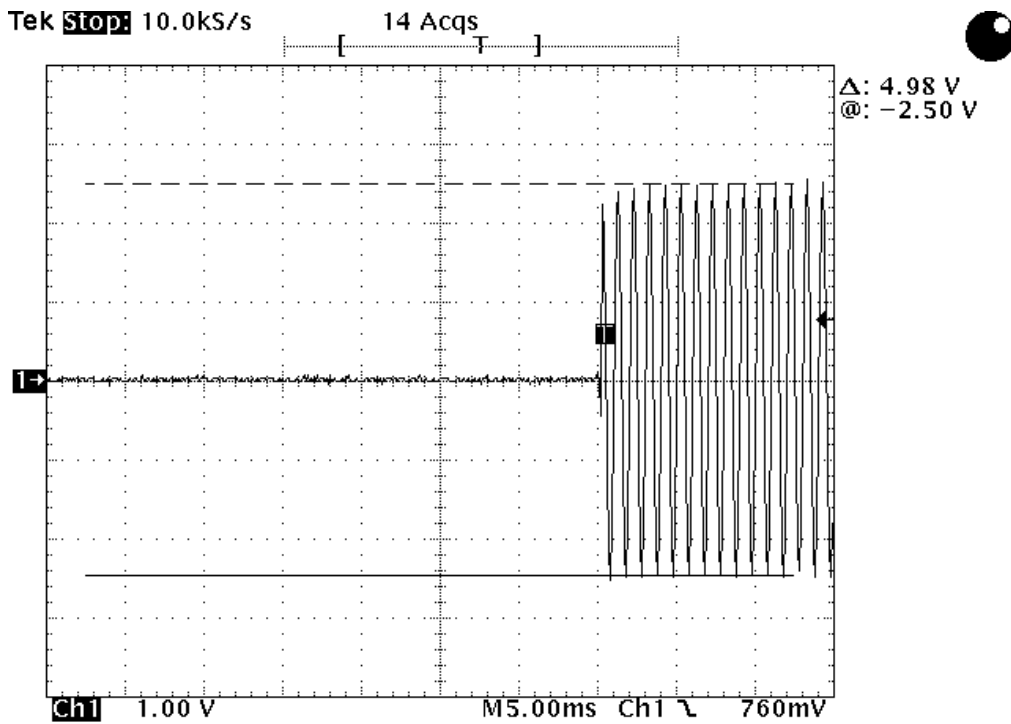
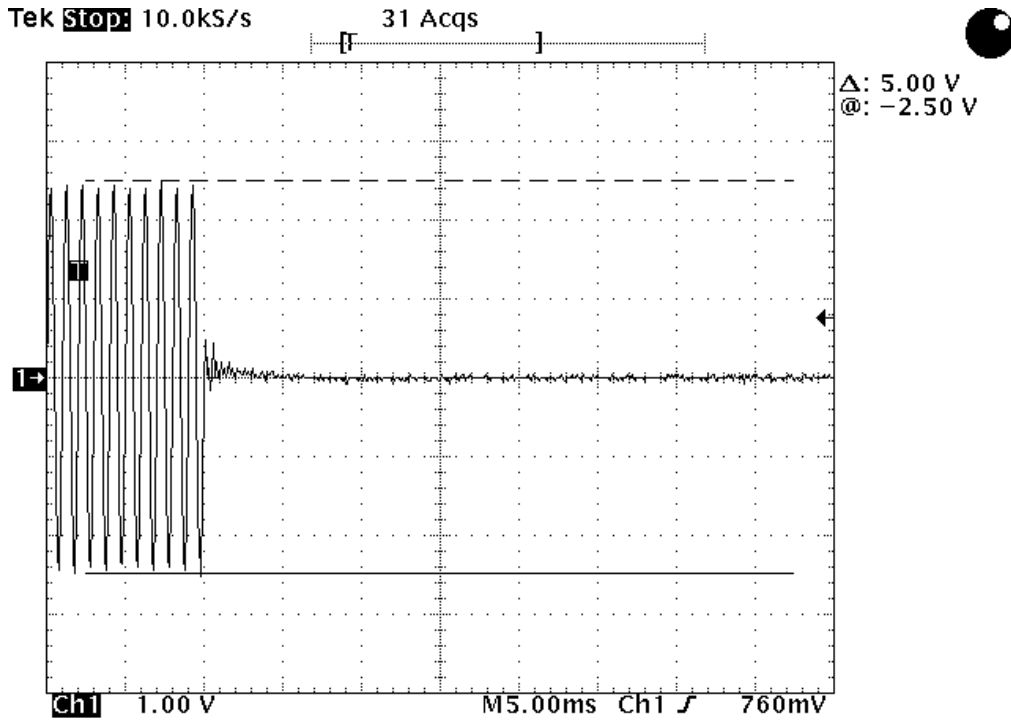
155.050 MHz Power Output Level = 1W 12.5 kHz Channel Spacing



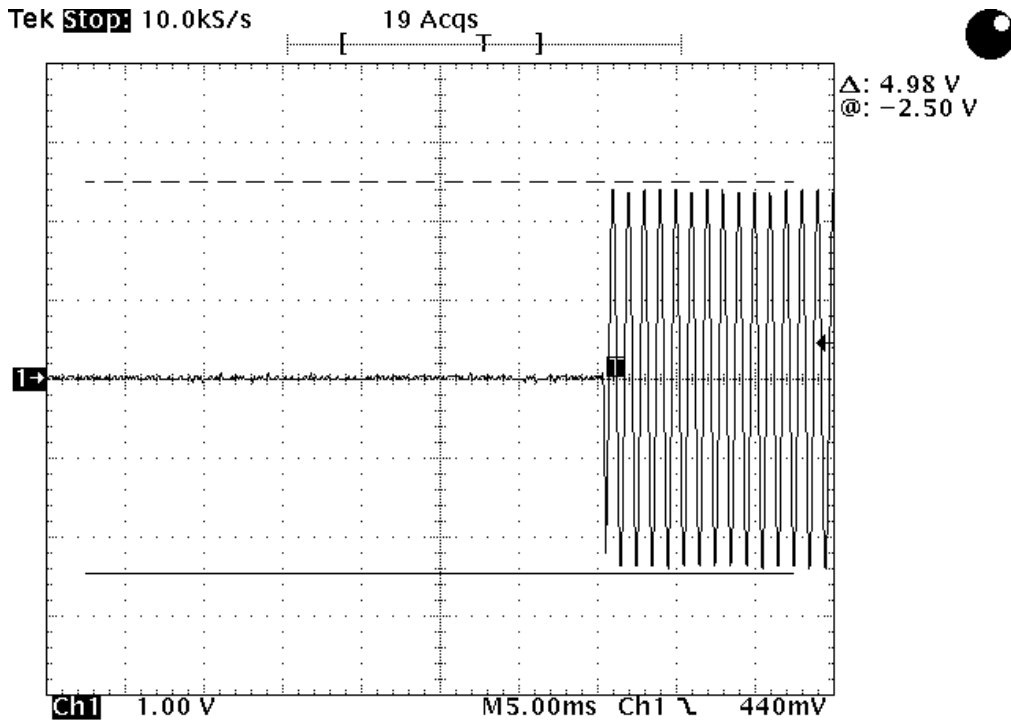
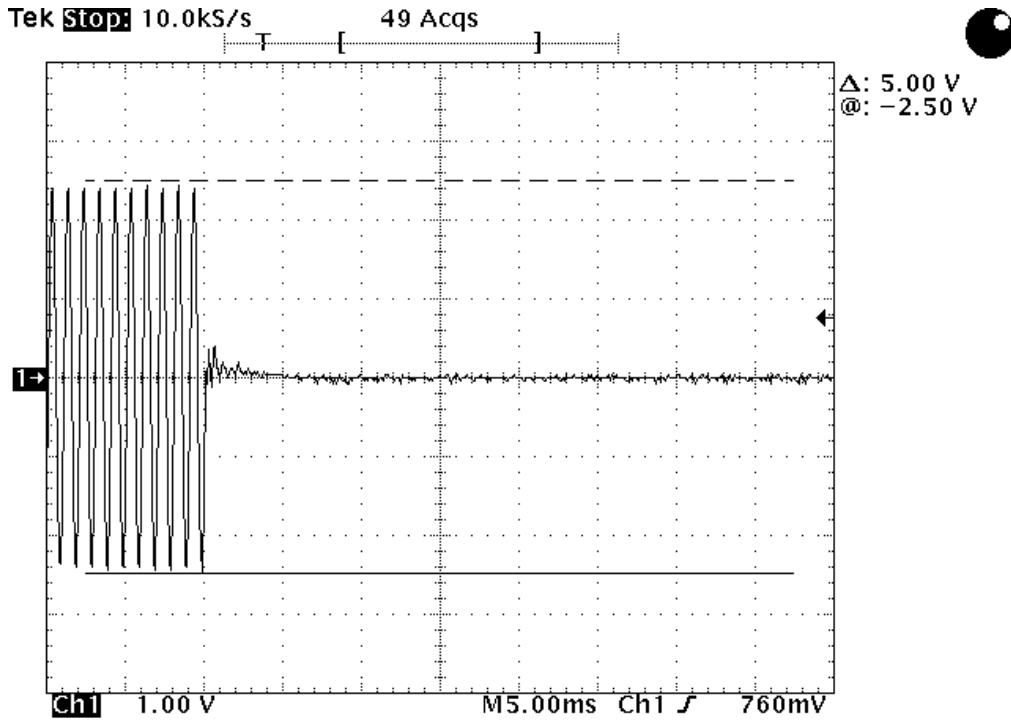
173.950 MHz Power Output Level = 1W 12.5 kHz Channel Spacing



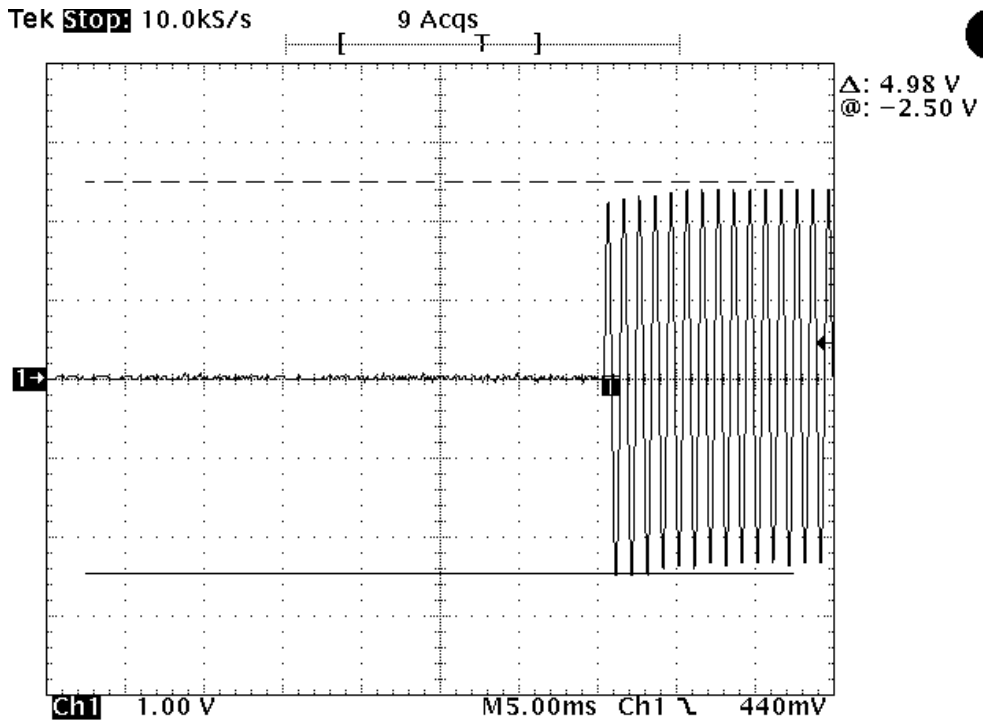
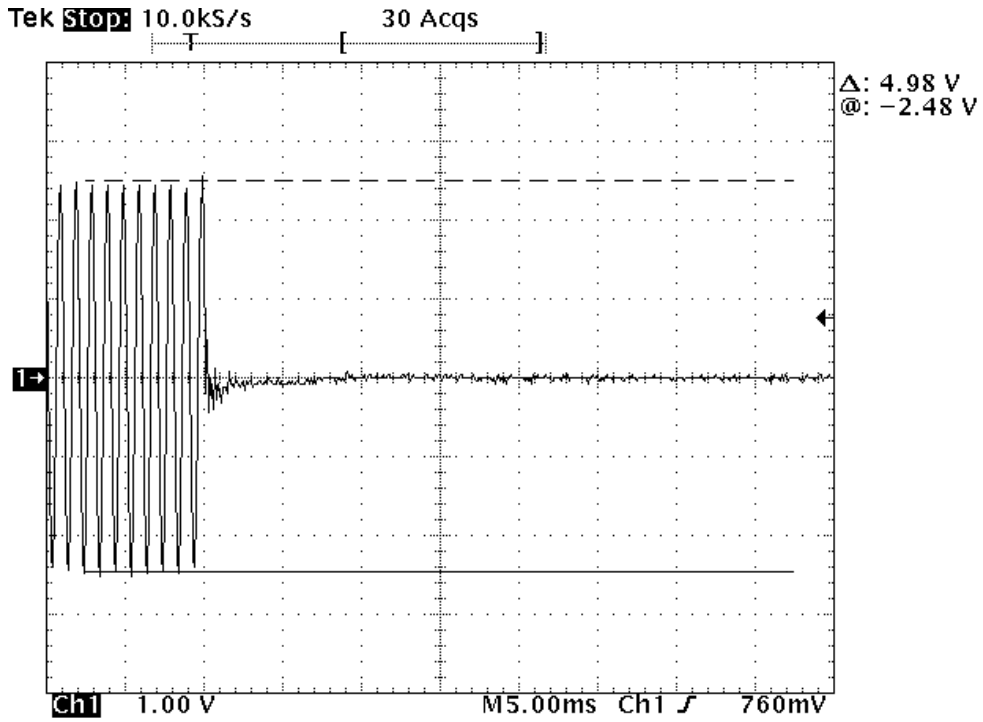
136.050 MHz Power Output Level = 5W 25 kHz Channel Spacing



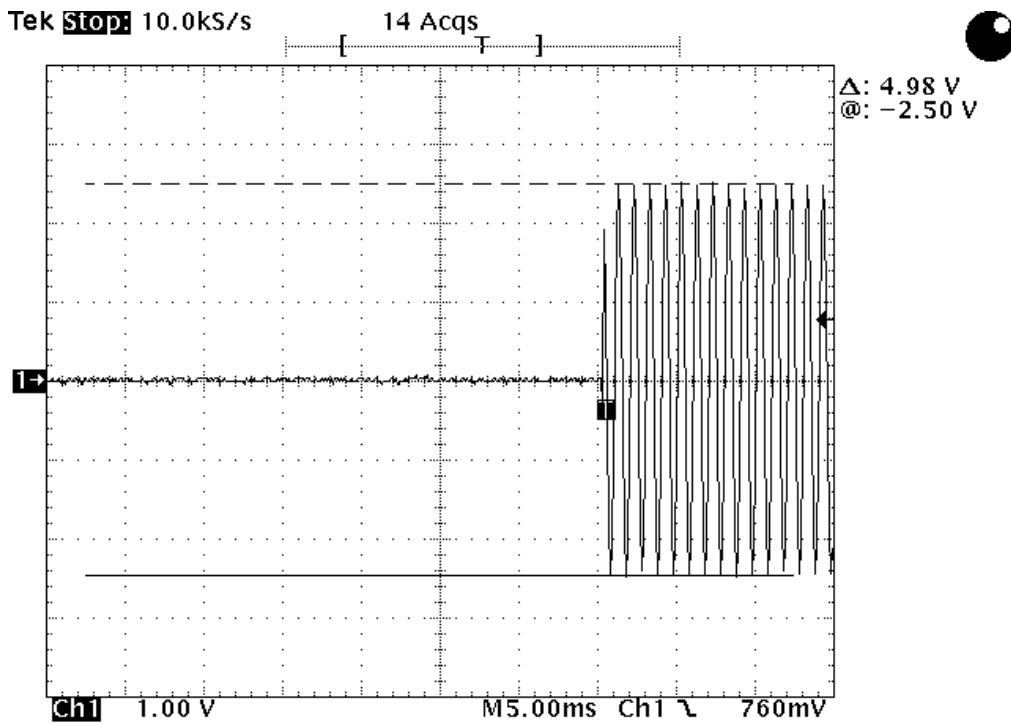
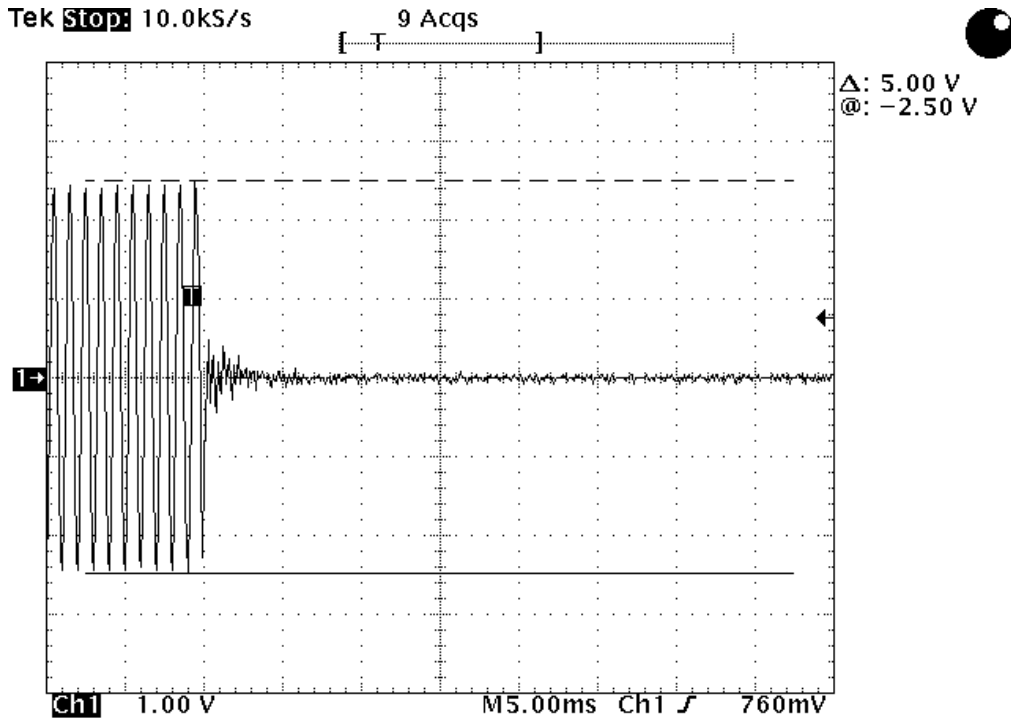
155.050 MHz Power Output Level = 5W 25 kHz Channel Spacing



173.950 MHz Power Output Level = 5W 25 kHz Channel Spacing



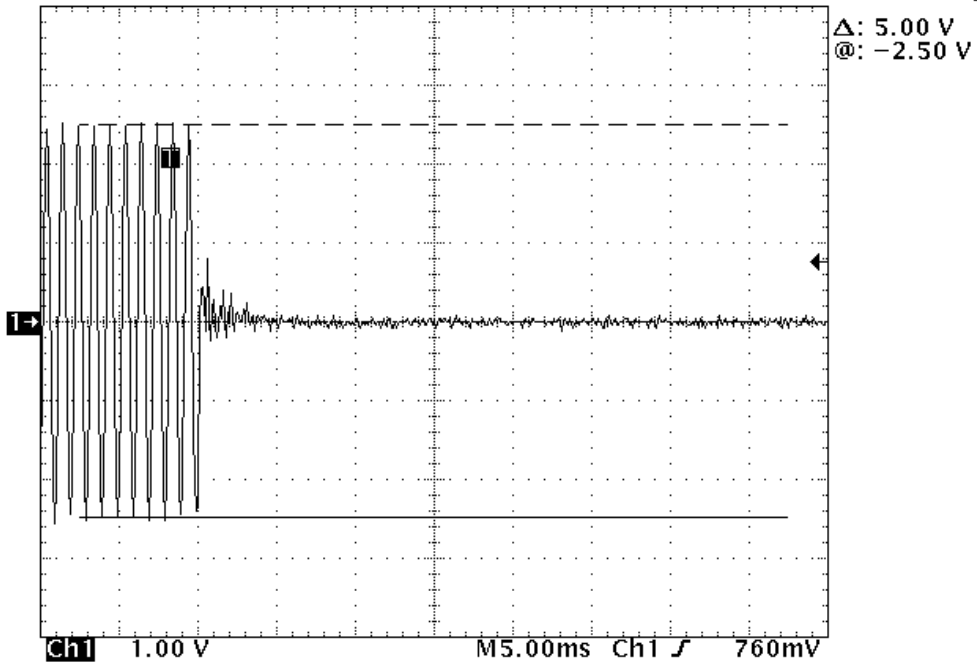
136.050 MHz Power Output Level = 1W 25 kHz Channel Spacing



155.050 MHz Power Output Level = 1W 25 kHz Channel Spacing

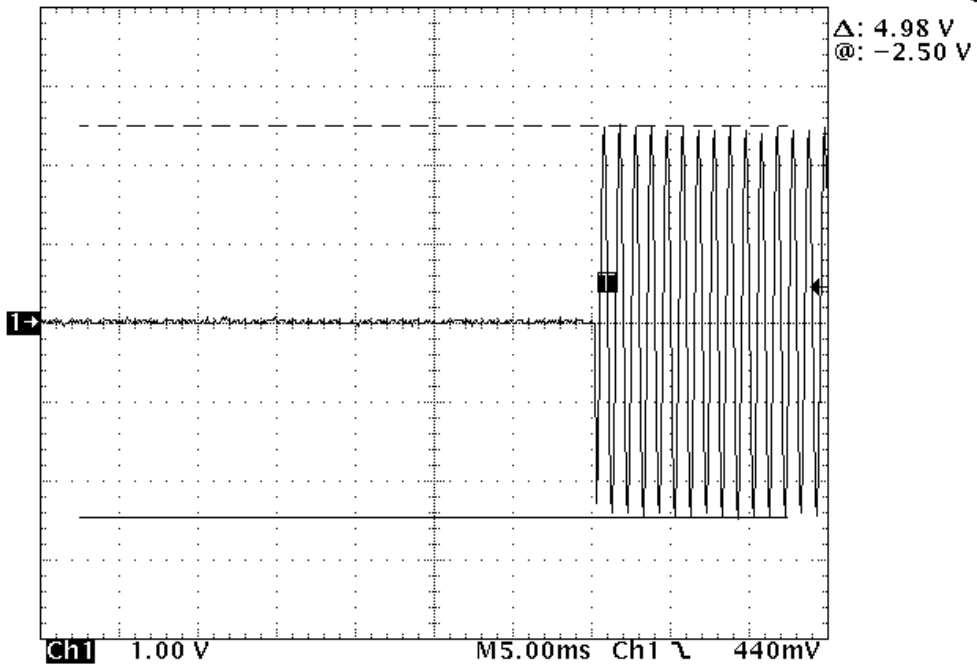
Tek **Stop:** 10.0kS/s

8 Acqs

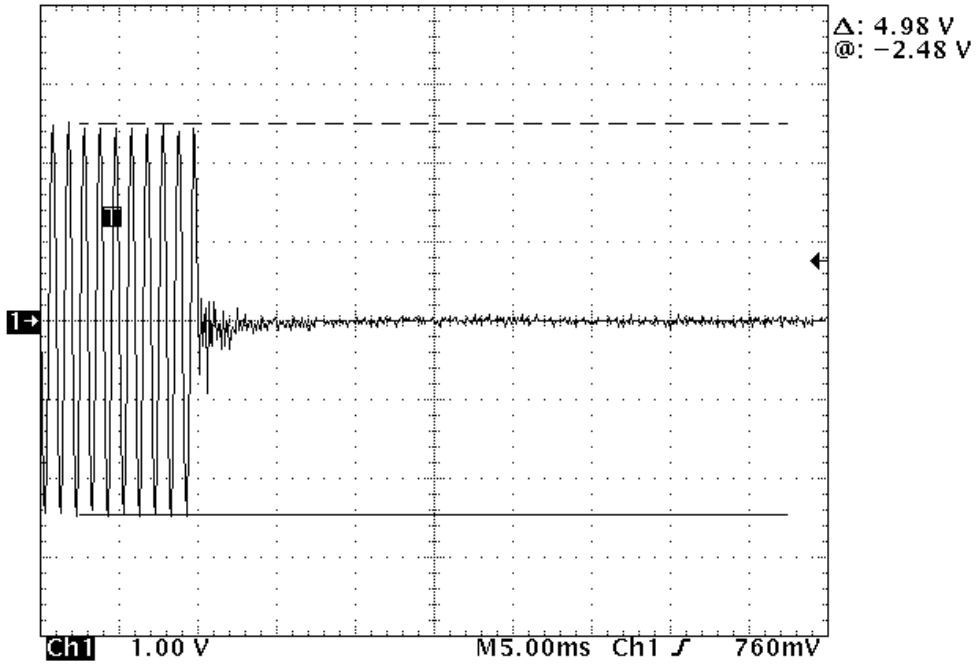


Tek **Stop:** 10.0kS/s

11 Acqs

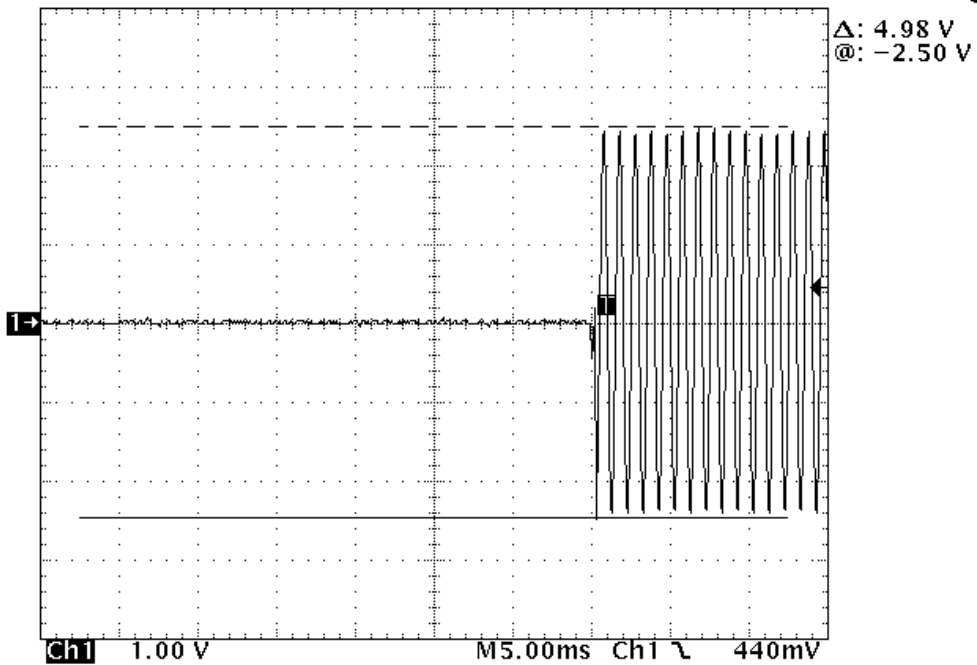


173.950 MHz Power Output Level = 1W 25 kHz Channel Spacing
Tek **Stop:** 10.0kS/s 11 Acqs



Tek **Stop:** 10.0kS/s

13 Acqs



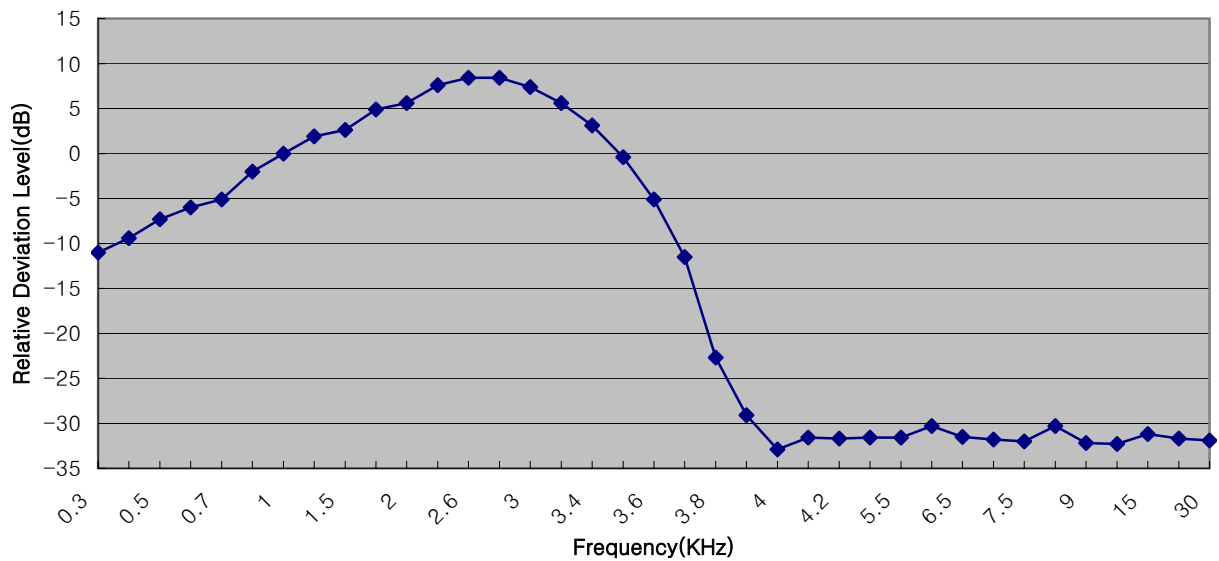
Audio Frequency Response Measurement Data:

OPERATING FREQUENCY : 155.050 MHz

REFERENCE LEVEL : 0dB @ 1kHz

Audio Frequency Response					
Freq., kHz	Level, dB	Freq., kHz	Level, dB	Freq., kHz	Level, dB
0.3	-11	2.8	8.4	5.5	-31.6
0.4	-9.4	3.0	7.4	6.0	-30.3
0.5	-7.3	3.3	5.6	6.5	-31.5
0.6	-6	3.4	3.1	7.0	-31.8
0.7	-5.1	3.5	-0.4	7.5	-32
0.8	-2.1	3.6	-5.1	8.0	-30.3
1.0	0	3.7	-11.5	9.0	-32.2
1.2	1.9	3.8	-22.7	10.0	-32.3
1.5	2.6	3.9	-29.1	15.0	-31.2
1.7	4.9	4.0	-32.9	20.0	-31.6
2.0	5.6	4.1	-31.6	30.0	-31.8
2.3	7.6	4.2	-31.7		
2.6	8.4	4.8	-31.6		

Audio Frequency Response

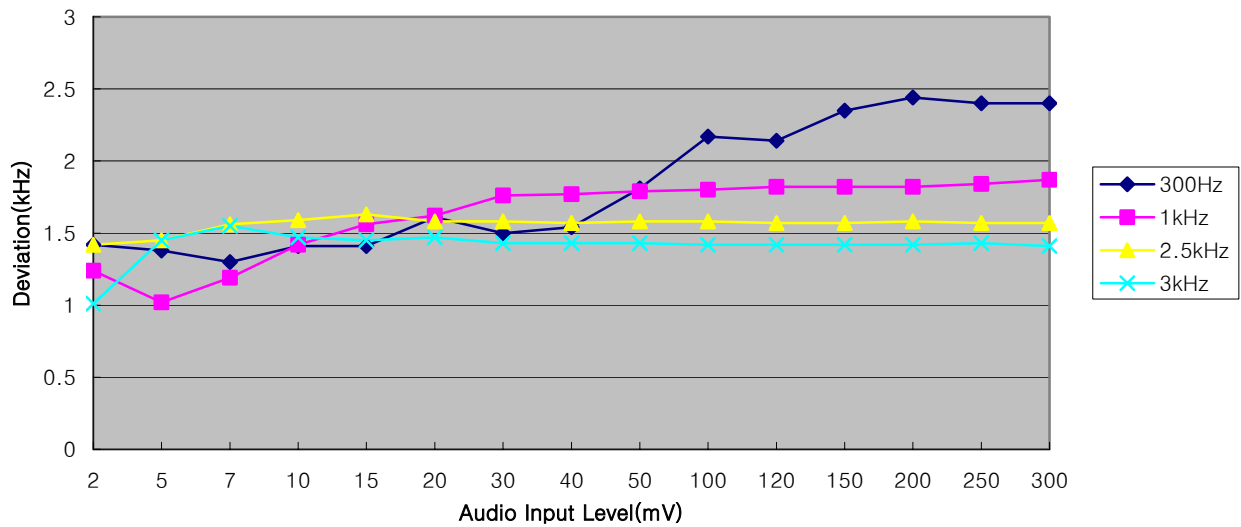


Modulation Limiting Measurement Data:

OPERATING FREQUENCY : 155.050 MHz
 CHANNEL SPACING : 12.5 kHz

Input Level (mV)	FM Deviation in kHz at Indicated Modulating Frequency			
	300Hz	1KHz	2.5KHz	3KHz
2	1.42	1.24	1.42	1.01
5	1.38	1.02	1.45	1.45
7	1.30	1.19	1.56	1.55
10	1.41	1.42	1.59	1.47
15	1.41	1.56	1.63	1.45
20	1.61	1.62	1.58	1.47
30	1.50	1.76	1.58	1.43
40	1.54	1.77	1.57	1.43
50	1.81	1.79	1.58	1.43
100	2.17	1.80	1.58	1.42
120	2.14	1.82	1.57	1.42
150	2.35	1.82	1.57	1.42
200	2.44	1.82	1.58	1.42
250	2.40	1.84	1.57	1.43
300	2.40	1.87	1.57	1.41

Deviation Limiting

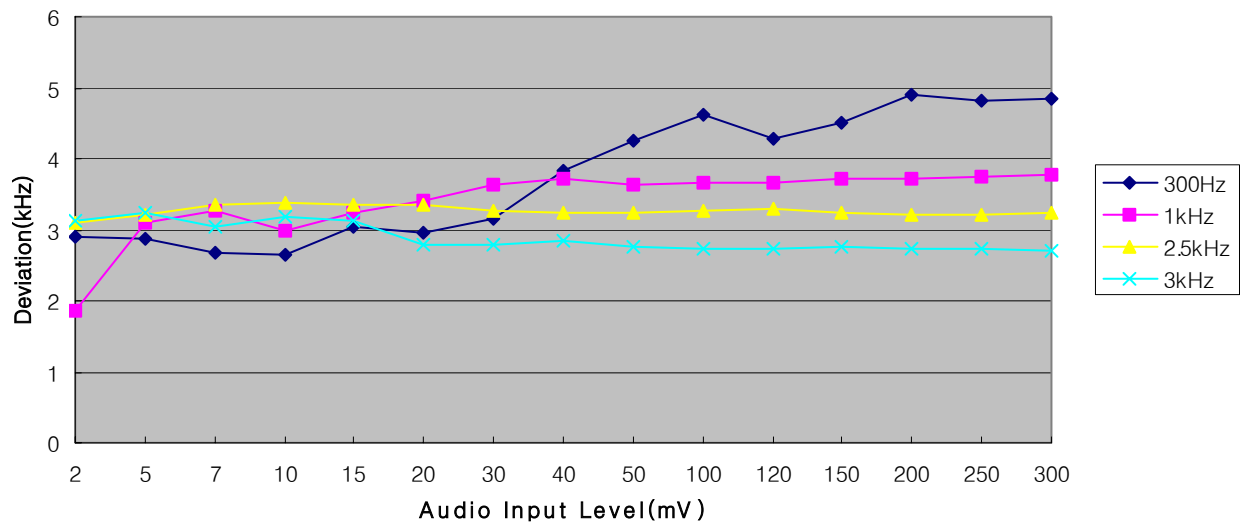


OPERATING FREQUENCY : 155.050 MHz

CHANNEL SPACING : 25.0 kHz

Input Level (mV)	FM Deviation in kHz at Indicated Modulating Frequency			
	300Hz	1KHz	2.5KHz	3KHz
2	2.91	1.87	3.09	3.12
5	2.87	3.09	3.21	3.23
7	2.69	3.26	3.34	3.05
10	2.65	3.00	3.37	3.17
15	3.03	3.23	3.34	3.12
20	2.97	3.41	3.35	2.80
30	3.16	3.64	3.26	2.78
40	3.82	3.72	3.24	2.85
50	4.26	3.63	3.23	2.77
100	4.62	3.65	3.26	2.73
120	4.27	3.67	3.30	2.72
150	4.50	3.71	3.24	2.77
200	4.90	3.73	3.22	2.74
250	4.82	3.75	3.22	2.72
300	4.84	3.78	3.23	2.70

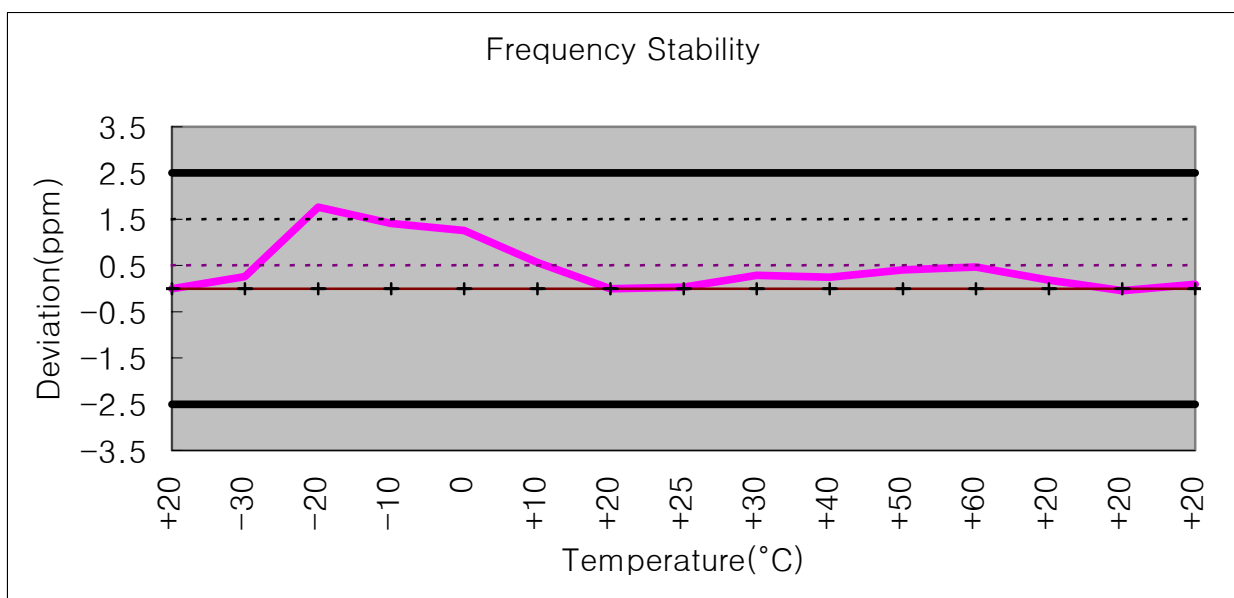
Deviation Limiting



Frequency Stability Measurement Data:

OPERATING FREQUENCY : 155.049978 MHz
 REFERENCE VOLTAGE: 7.5 VDC CHANNEL SPACING: 12.5 kHz
 DEVIATION LIMIT: ± 0.00025 % or 2.5ppm

VOLTAGE (%)	POWER (VDC)	TEMP (dB)	FREQ (Hz)	Deviation (%)
100%	7.5	+20(Ref)	155,049,978	0.000000
100%		-30	155,049,938	0.000026
100%		-20	155,049,705	0.000176
100%		-10	155,049,760	0.000141
100%		0	155,049,783	0.000126
100%		+10	155,049,891	0.000056
100%		+20	155,049,978	0.000000
100%		+25	155,049,973	0.000003
100%		+30	155,049,933	0.000029
100%		+40	155,049,940	0.000025
100%		+50	155,049,915	0.000041
100%		+60	155,049,906	0.000046
85%		6.38	+20	155,049,950
115%	8.63	+20	155,049,985	-0.000005
BATT.ENDPOINT	5.50	+20	155,049,963	0.000010



OPERATING FREQUENCY : 155.049975 MHz
 REFERENCE VOLTAGE: 7.5 VDC CHANNEL SPACING: 25.0 kHz
 DEVIATION LIMIT: ± 0.00025 % or 2.5ppm

VOLTAGE (%)	POWER (VDC)	TEMP (dB)	FREQ (Hz)	Deviation (%)
100%	7.5	+20(Ref)	155,049,975	0.000000
100%		-30	155,049,852	0.000079
100%		-20	155,049,698	0.000179
100%		-10	155,049,758	0.000140
100%		0	155,049,790	0.000119
100%		+10	155,049,831	0.000093
100%		+20	155,049,975	0.000000
100%		+25	155,049,977	-0.000001
100%		+30	155,049,978	-0.000002
100%		+40	155,049,930	0.000029
100%		+50	155,049,910	0.000042
100%		+60	155,049,903	0.000046
85%		6.38	+20	155,049,968
115%	8.63	+20	155,049,960	0.000010
BATT.ENDPOINT	5.50	+20	155,049,975	0.000000

