ADDENDUM TEST REPORT TO FC00-027

FOR THE

WIRELESS FENCE TRANSMITTER, WF-020

FCC PART 15 SUBPART C SECTIONS 15.227 & 15.209

COMPLIANCE

DATE OF ISSUE: NOVEMBER 16, 2000

PREPARED FOR:

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Garrett, IN 46738

P.O. No: 53264
W.O. No: 75596

Report No: FC00-027A

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Date of test: November 3, 2000

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CKC Laboratories, Inc. has Letters of Acceptance through an MRA for the following agencies:
ACA/NATA (Australia); SABS (South Africa); SWEDAC (Sweden); TUV Rheinland-Germany; TUV Rheinland-Korea; TUV Rheinland-Russia; Radio Communications Agency (RA); NEMKO (Norway).

ADMINISTRATIVE INFORMATION

DATE OF TEST:	November 3, 2000
DATE OF RECEIPT:	November 3, 2000
PURPOSE OF TEST:	To demonstrate the compliance of the Wireless Fence Transmitter, WF-020, with the requirements for FCC Part 15 Subpart C Sections 15.227 & 15.209 devices. This addendum is for a Permissive Change. Original testing was performed March 23 & 24, 2000 and granted April 26, 2000. FCC ID #KBS050238.
MANUFACTURER:	Innotek Pet Products Inc. One Innoway Garrett, IN 46738
REPRESENTATIVE:	Pete Johnson
TEST LOCATION:	CKC Laboratories, Inc. 22105 Wilson River Hwy Tillamook, OR 97141
TEST PERSONNEL:	Mike Wilkinson
TEST METHOD:	ANSI C63.4 1992
FREQUENCY RANGE TESTED:	9 kHz - 1000 MHz
EQUIPMENT UNDER TEST:	**Wireless Fence Transmitter** Manuf: Innotek Pet Products Inc. Model: WF-020 Serial: N/A FCC ID: KBS050238

SUMMARY OF RESULTS

The Innotek Pet Products Inc. Wireless Fence Transmitter, WF-020, was tested in accordance with ANSI C63.4 1992 for compliance with FCC Part 15 Subpart C Sections 15.227 & 15.209.

As received, the above equipment was found to be fully compliant with the limits of FCC Part 15 Subpart C Sections 15.227 & 15.209. The results in this report apply only to the items tested, as identified herein.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

Short range transmitter used to create a confinement field.

MEASUREMENT UNCERTAINTY

Associated with data in this report is a ±4dB measurement uncertainty.

PERIPHERAL DEVICES

The EUT was not tested with peripheral devices.

REPORT OF MEASUREMENTS

The following tables report the highest worst case levels recorded during the tests performed on the Wireless Fence Transmitter, WF-020. All readings taken are peak readings unless otherwise noted by a "Q" or "A". The data sheets from which these tables were compiled are contained in Appendix B.

Table 1: Fundamental Radiated Emission Levels

FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Mag dB	Amp dB	Cable dB	Dist dB	CORRECTED READING dBµV/m	SPEC LIMIT dBµV/m	MARGIN dB	NOTES
0.017	87.9	14.7		0.2		102.8	123.2	-20.4	N
27.138	65.8	9.2		0.5		75.5	80.0	-4.5	N

Test Method: ANSI C63.4 1992
Spec Limit: FCC Part 15.227(a)
Test Distance: 3 Meters

NOTES: N = No Polarization

COMMENTS: EUT is transmitting continuously at 27.141 MHz and 16.45 kHz. The transmitter was set to maximum (fully clockwise). EUT power is from integral solar cells. The test was performed with a fully charged EUT. EUT was placed on the test table in the vertical position with the solar panel facing up. The temperature was 65°F and the humidity was 51%.

Table 2: Six Highest Radiated Emission Levels - 9kHz-1000MHz									
	METER	CORRECTION FACTORS				CORRECTED	SPEC		
FREQUENCY	READING	Mag/ Bilog	Amp	Cable	Dist	READING	LIMIT	MARGIN	NOTES
MHz	dBµV	dB	dB	dB	dB	dBµV/m	dBµV/m	dB	
0.016	87.9	14.7	0.00	0.2		102.8	123.3	-20.5	N
54.293	48.8	7.5	-27.8	1.1		29.6	40.0	-10.4	V
81.436	38.2	8.0	-27.8	1.4		19.8	40.0	-20.2	V
135.714	34.0	12.0	-27.5	2.0		20.5	43.5	-23.0	V
271.312	32.0	13.2	-26.8	2.9		21.3	46.0	-24.7	V
302.400	30.8	13.8	-26.9	3.1		20.8	46.0	-25.2	V

Test Method: ANSI C63.4 1992
Spec Limit: FCC Part 15.227
Test Distance: 3 Meters

NOTES:
H = Horizontal Polarization
V = Vertical Polarization
N = No Polarization
Q = Quasi Peak Reading
A = Average Reading

COMMENTS: EUT is transmitting continuously at 27.141 MHz and 16.45 kHz. The transmitter was set to maximum (fully clockwise). EUT power is from integral solar cells. The test was performed with a fully charged EUT. EUT was placed on the test table in the vertical position with the solar panel facing up. The temperature was 65°F and the humidity was 51%.

TABLE A

LIST OF TEST EQUIPMENT

Tillamook Site C

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8568A Spectrum Analyzer	2235A02426	04/21/2000	04/21/2001	202
HP 85650A Quasi-Peak Adapter	2043A00433	04/21/2000	04/21/2001	29
HP 8447D Amplifier	2727A05432	06/01/2000	06/01/2001	282
Chase CBL6111C Bilog Antenna	2456	06/17/2000	06/17/2001	1991
EMCO 6502 Mag Loop Antenna	2156	01/26/2000	01/26/2001	52

EUT SETUP

The equipment under test (EUT) was set up in a manner that represented its normal use. Any special conditions required for the EUT to operate normally are identified in the comments that accompany Table 1 for fundamental radiated emissions and Table 2 for radiated emissions. Additionally, a complete description of the EUT is included on the information sheets contained in Appendix A.

During radiated emissions testing, the EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters. This configuration is typical for radiated emissions testing of table top devices.

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Table A were used to collect the radiated emissions data for the Wireless Fence Transmitter, WF-020. For measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. For radiated measurements from 30 MHz to 1000 MHz, the bilog antenna was used. All antennas were located at a distance of 3 meters from the edge of the EUT.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dBµV, and a vertical scale of 10 dB per division.

TABLE B: ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE

TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz

SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in Tables 1 and 2 indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the highest readings, this is indicated as a "Q" or an "A" in the appropriate table. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data for the Wireless Fence Transmitter, WF-020.

Peak

In this mode, the Spectrum Analyzer or test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the HP Quasi-Peak Adapter for the HP Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual were followed.

Average

When the frequencies were less than 30 MHz, average measurements may be made using the spectrum analyzer. To make these measurements, the test engineer reduces the video bandwidth on the analyzer until the modulation of the signal is filtered out. At this point the analyzer is set into the linear mode and the scan time is reduced.

TEST METHODS

The radiated emissions data of the Wireless Fence Transmitter, WF-020, was taken with the HP Spectrum Analyzer. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the "Sample Calculations". The corrected data was then compared to the FCC Part 15, Subpart C Sections 15.227 & 15.209 emissions limits to determine compliance.

Preliminary and final measurements were taken in order to better ensure that all emissions from the EUT were found and maximized.

Radiated Emissions Test (Electric Field)

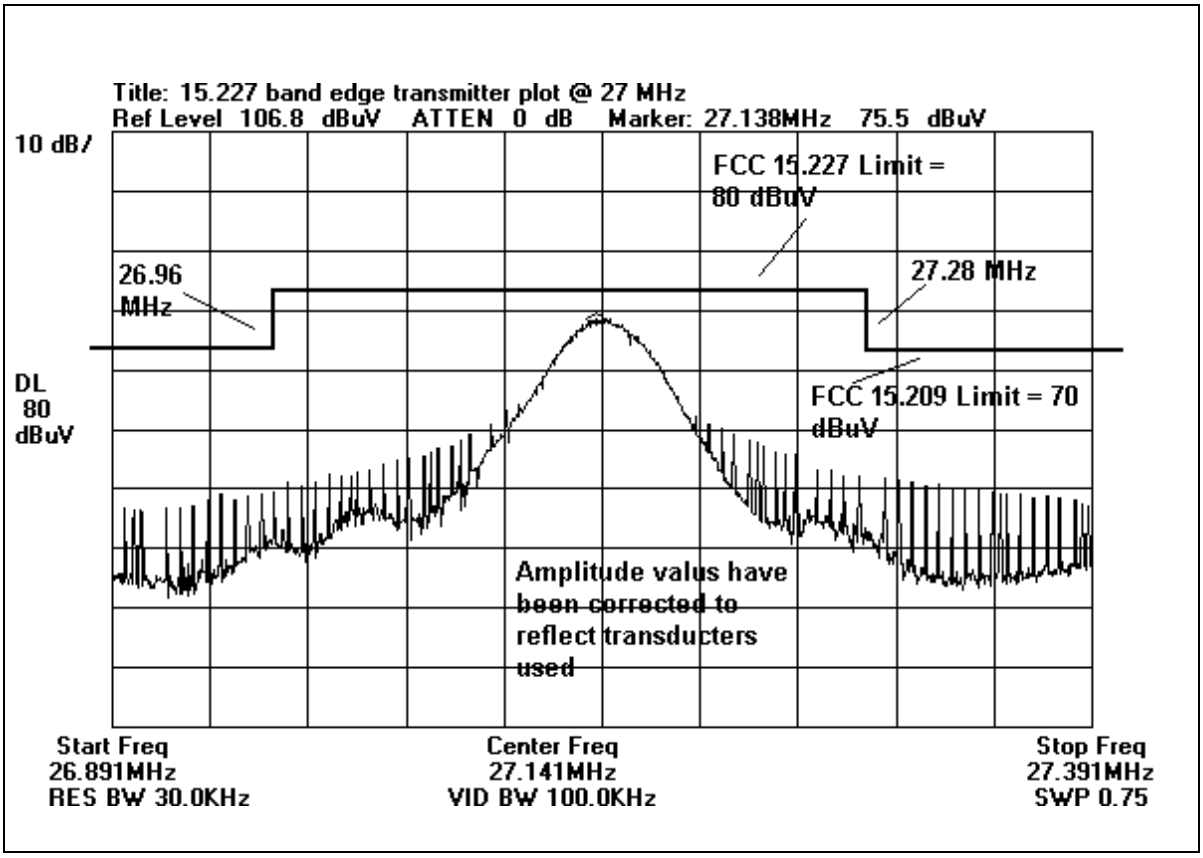
During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode, with the I/O cables and line cords facing the antenna. The magnetic loop antenna was used to scan the frequency range of 9 kHz to 30 MHz. The frequency range of 30 MHz - 1000 MHz was then scanned with the bilog antenna located about 1.5 meter above the ground plane in the vertical polarity. During this scan, the turntable was rotated and all peaks, which were at or near the limit, were recorded. Lastly, a scan of the FM band from 88 - 110 MHz was made, using a reduced resolution bandwidth and a reduced frequency span. The bilog antenna was changed to the horizontal polarity and the above steps were repeated. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

A thorough scan of all frequencies was made manually using a small frequency span, rotating the turntable as needed. The test engineer maximized the readings with respect to the table rotation, and configuration of the peripheral(s) and cables. Maximizing of the cables and peripheral locations was achieved by monitoring the spectrum analyzer on a closed circuit television monitor while the EUT components and cables were being moved and rearranged on the EUT table for maximum emissions. Photographs showing the final worst case configuration of the EUT are contained in Appendix A.

FCC Part 15.215(c) - Occupied Bandwidth Measurements

In accordance with Part 15.215(c), the fundamental frequency was kept within the central 80% of the permitted band in order to minimize the possibility of out-of-band operation. This is recommended for the bands of frequencies where alternative radiated emission limitations apply and for which a frequency stability is not specified.

Occupied Bandwidth Plot Part 15.215



FCC Part 15.35 - Measurement Detector Functions and Bandwidths

The parameters of section 15.35 were met in accordance with section 15.227.

SAMPLE CALCULATIONS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in Tables 1 and 2. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula:

Meter reading (dBµV)
+ Antenna Factor (dB)
+ Cable Loss (dB)
- Distance Correction (dB)
- Pre-amplifier Gain (dB)

= Corrected Reading (dBµV/m)

This reading was then compared to the applicable specification limit to determine compliance.

A typical data sheet will display the following in column format:

#	Freq MHz	Rdng dBuV	Cable	Amp	Bilog	Mag	Dist	Corr dBuV/m	Spec	Margin	Polar

means reading number
Freq MHz is the frequency in MHz of the obtained reading.
Rdng dBuV is the reading obtained on the spectrum analyzer in dBµV.
Amp is short for the preamplifier factor or gain in dB.
Bilog is the biconilog antenna factor in dB.
Mag is the mag loop antenna factor in dB.
Cable is the cable loss in dB of the coaxial cable on the OATS.
Dist is the distance factor (in dB). It is used when testing at a different test distance than the one stated in the spec.
Corr dBµV/m is the corrected reading which is now in dBµV/m (field strength).
Spec is the specification limit (dB) stated in the agency's regulations.
Margin is the closeness to the specified limit in dB; + is over and - is under the limit.
Polar is the Polarity of the antenna with respect to earth.

APPENDIX A

INFORMATION ABOUT THE EQUIPMENT UNDER TEST

INFORMATION ABOUT THE EQUIPMENT UNDER TEST	
Test Software/Firmware:	N/A
CRT was displaying:	N/A
Power Supply Manufacturer:	N/A
Power Supply Part Number:	N/A
AC Line Filter Manufacturer:	N/A
AC Line Filter Part Number:	N/A
Line voltage used during testing:	N/A

I/O PORTS	
Type	#
N/A	

CRYSTAL OSCILLATORS	
Type	Freq In MHz
Clock, uController	2.00 MHz
RF Transmitter	27.145 MHz

PRINTED CIRCUIT BOARDS				
Function	Model & Rev	Clocks, MHz	Layers	Location
Transmitter	A023802 Rev B	See above	2	

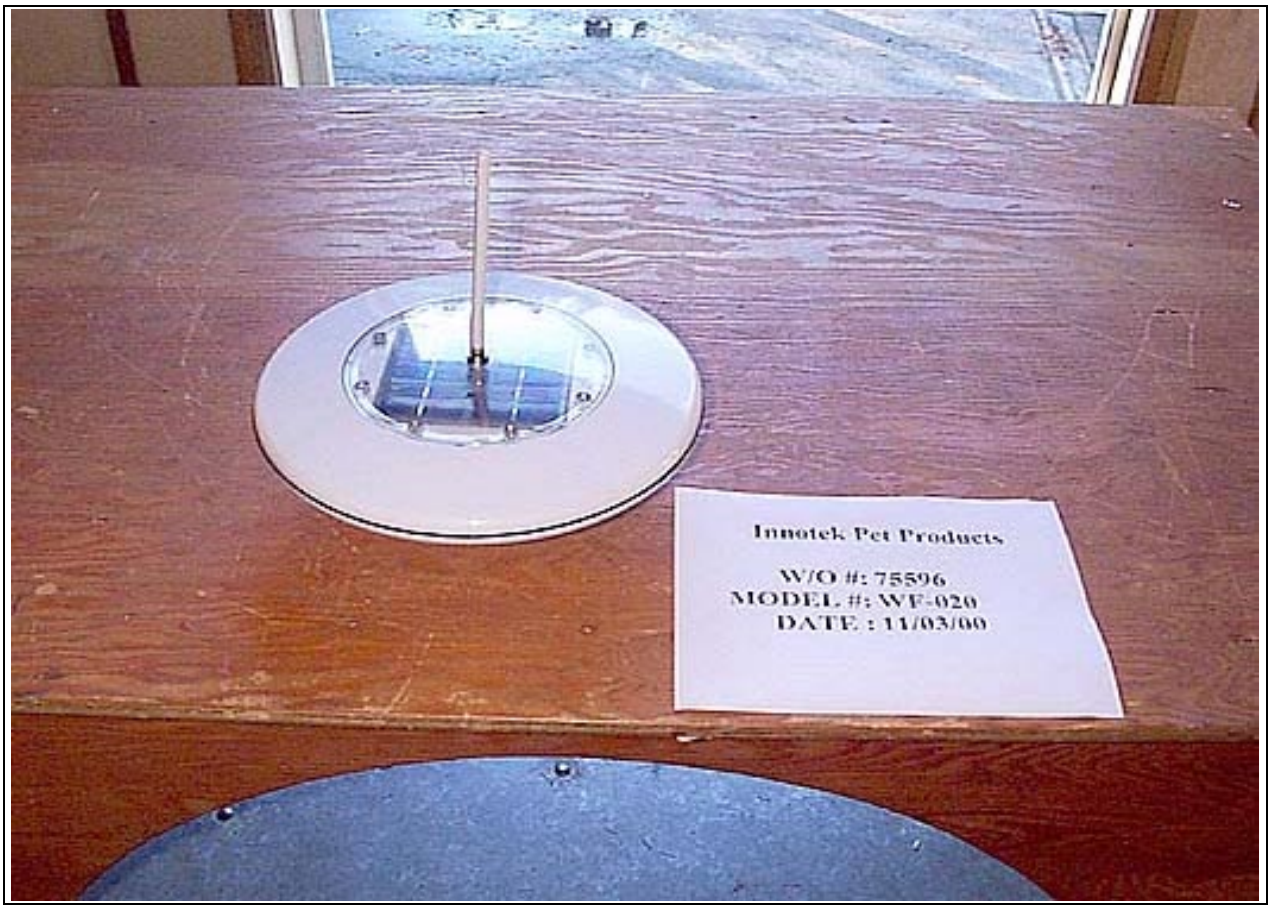
CABLE INFORMATION			
Cable #:	N/A	Cable(s) of this type:	
Cable Type:		Shield Type:	
Construction:		Length In Meters:	
Connected To End (1):		Connected To End (2):	
Connector At End (1):		Connector At End (2):	
Shield Grounded At (1):		Shield Grounded At (2):	
Part Number:		Number of Conductors:	
Notes and/or description:			

REQUIRED EUT CHANGES TO COMPLY:
None.

PHOTOGRAPH SHOWING RADIATED EMISSIONS

Radiated Emissions - Front View

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Back View

APPENDIX B

MEASUREMENT DATA SHEETS

Test Location: CKC Laboratories. Inc. • 22105 Wilson River Hwy • Tillamook, OR 97141 • 800 500-4EMC

Customer: **Innotek Pet Products, Inc.**
Specification: **FCC15.227B**
Work Order #: **73919** Date: 11/3/2000
Test Type: **Maximized Emissions** Time: 13:49:02
Equipment: **Wireless Fence Transmitter** Sequence#: 1
Manufacturer: Innotek Pet Products Tested By: Mike Wilkinson
Model: WF-020
S/N:

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Wireless Fence Transmitter*	Innotek Pet Products	WF-020	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

EUT is transmitting continuously at 27.141 MHz and 16.45 kHz. The transmitter was set to maximum (fully clockwise). EUT power is from integral solar cells. The test was performed with a fully charged EUT. EUT was placed on the test table in the vertical position with the solar panel facing up. The temperature was 65°F and the humidity was 51%.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Mag dB	Cable dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	27.138M	65.8	+9.2	+0.5			+0.0	75.5	80.0	-4.5	None
2	16.550k	87.9	+14.7	+0.2			+0.0	102.8	123.2	-20.4	None

Test Location: CKC Laboratories. Inc. • 22105 Wilson River Hwy • Tillamook, OR 97141 • 800 500-4EMC

Customer: **Innotek Pet Products, Inc.**
Specification: **FCC15.227B**
Work Order #: **73919** Date: 11/03/2000
Test Type: **Maximized Emissions** Time: 13:59:43
Equipment: **Wireless Fence Transmitter** Sequence#: 2
Manufacturer: Innotek Pet Products Tested By: Mike Wilkinson
Model: WF-020
S/N:

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Wireless Fence Transmitter*	Innotek Pet Products	WF-020	

Support Devices:

Function	Manufacturer	Model #	S/N

Test Conditions / Notes:

EUT is transmitting continuously at 27.141 MHz and 16.45 kHz. The transmitter was set to maximum (fully clockwise). EUT power is from integral solar cells. The test was performed with a fully charged EUT. EUT was placed on the test table in the vertical position with the solar panel facing up. The temperature was 65°F and the humidity was 51%.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Mag Bilog dB	Cable dB	Amp dB	Cable dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	54.293M	48.8	+0.0 +7.5	+0.0	-27.8	+1.1	+0.0	29.6	40.0	-10.4	Vert
2	81.436M	38.2	+0.0 +8.0	+0.0	-27.8	+1.4	+0.0	19.8	40.0	-20.2	Vert
3	16.380k	87.9	+14.7 +0.0	+0.2	+0.0	+0.0	+0.0	102.8	123.3 16.5 kHz Fundamental	-20.5	None
4	135.714M	34.0	+0.0 +12.0	+0.0	-27.5	+2.0	+0.0	20.5	43.5	-23.0	Vert
5	54.258M	35.0	+0.0 +7.5	+0.0	-27.8	+1.1	+0.0	15.8	40.0	-24.2	Horiz
6	271.312M	32.0	+0.0 +13.2	+0.0	-26.8	+2.9	+0.0	21.3	46.0	-24.7	Vert
7	302.400M	30.8	+0.0 +13.8	+0.0	-26.9	+3.1	+0.0	20.8	46.0	-25.2	Vert
8	99.440k	68.7	+10.1 +0.0	+0.1	+0.0	+0.0	+0.0	78.9	107.6	-28.7	None
9	46.760k	68.2	+10.9 +0.0	+0.1	+0.0	+0.0	+0.0	79.2	114.2	-35.0	None