

1) Testing is required to the 10th harmonic. You only tested to 5000 MHz. Please provide the additional test measurements and data.

Reply to question 1

**Part 15.247 Field Strength of Radiated Spurious Emissions
From 5 to 10 GHz**

Grantee: Itron, Inc. 02/22/00
FCC ID: EO9PET

Worst case peak field strength reported for two channels observed
 Low Channel 903.7 MHz High Channel 926.1 MHz

Freq. Hz	Vert. dBuV	Horz. dBuV	Ant-F	Cable Loss	Amp. Gain	dBuV/m	uV/m
5.4187*	44.33	45.83	34.24	2.15	25.12	57.1	716
6.4839	45.5	42.33	35.19	2.37	26.75	56.31	653
7.4102*	45.0	42.17	36.77	2.58	26.71	57.64	762
8.3365*	45.5	40.67	37.14	2.78	26.15	59.27	919
9.0312*	45.5	40.17	37.14	2.87	25.98	59.53	947

41 % Duty Cycle Averaging Applied to Peak Readings

Freq. GHz	Peak uV/m	Averaged uV/m	Limit 500 uV/m
5.4187*	716	293.56	complies
6.4839	653	267.73	complies
7.4102*	762	312.42	complies
8.3365*	919	376.79	complies
9.0312*	947	388.27	complies

* Restricted Bands

2) The output power was measured at 40 mw, 250 mw was requested. The grant will reflect 40 mw, the actual output power measurement.

A grant reflecting 40 mw would be fine. The 250 mw was requested as the maximum permissible under Part 15.247(b)(2).

3) What is the center frequency of the lowest channel and the center frequency of the highest channel?

Lowest	Highest	Notes
903.7 MHz	926.1 MHz	First frequency set
903.9 MHz	926.3 MHz	Second frequency set

4) Provide bandwidth plots of a single channel only.

A Plot of a single channel occupied bandwidth follows on Page 5 of this reply:

5) The transmitter cannot coordinate its hopping sequence with the hopping sequence of other transmitters, or vice versa, for the purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters. Provide a description on how the device complies with this rule.

There is no method employed, or even possible with the design, to in any way "coordinate" transmissions in order to minimize collisions.

Each device begins cycling through its hop table after the first data pulse is received from the meter it is monitoring (see number 6 below for more information on the hop and channel tables). This occurs at a random time after the device is installed.

There is no facility in the PET to receive commands from the device it is transmitting to (the Concentrator), so there is no way that the Concentrator can coordinate PET transmissions in a manner that avoids collisions with other PET devices. Collisions do, in fact, occur. Having 256 different hop sequences, as mentioned in number 6 below, drastically reduces the probability of a collision occurring simultaneously in both time and frequency. That is to say: it is very unlikely that two PETs will transmit at the same time and on the same frequency, but it does occasionally happen.

Finally, each PET is timed from a free-running crystal oscillator. Since all the oscillators operate at a slightly different frequency, the time that one PET transmits relative to another is continuously changing.

6) The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo-randomly ordered list of hopping frequencies. Indicate how the pseudo-random hopping sequence is derived. Provide a list of channel frequencies and a sample of a few sequences. The complete hop tables for both the first and second frequency sets is shown below.

The list of frequencies in the first group was selected randomly from the available group of frequencies. The second frequency group is orthogonal to the first frequency group (they do not share any frequencies).

All devices are programmed to use frequencies from either the first or second frequency set listed below, but not from both groups simultaneously. The order that any particular device cycles through the frequencies is determined by the last eight bits of its serial number. There are therefore 256 different hop sequences used for each of the two frequency sets. Each frequency is used only once per sequence (all frequencies are used before any frequency is reused).

Listed below are the two frequency sets. The acquisition channels are channels that the receiving device (Concentrator) listens on to find new PET units when it is not tuned to receive a specific PET from its list of PETs.

903.7	911.1 *
904.1 * (* indicates acquisition channel)	919.1 *
904.9	919.9

905.5	920.5
906.1	921.1
906.7	921.7
907.1 *	922.5 *
907.9	922.9
908.5	923.5
909.1	924.1
909.7	924.7
910.3	925.3
	926.1 *

Listed below is the second frequency set, which is orthogonal to the first frequency set.

903.9	918.9 *
904.5 * (* indicates acquisition channel)	919.5
905.1	920.1
905.7	920.7
906.3	921.3
906.9	922.1
907.5 *	922.7 *
908.1	923.1
908.7	923.7
909.3	924.3
909.9	924.9
910.7 *	925.5
	926.3 *

Please note Table 5, Hop Sequence Table follows at the end of this reply:

7) Each frequency must be used equally on the average by each transmitter. Except for voice systems, each new transmission must start at a different point in the sequence so that on average the full sequence is used. Therefore, Describe where the next transmission starts when all frequencies are not used for a previous message. This is required because some transmissions may need only a few frequency hops to be completed. i.e. If the transmission started on the same frequency each time, this frequency would be used more than the others if many short transmissions were sent.

*Each transmission **ALWAYS** uses a single frequency. Transmissions are **ALWAYS** less than 400 ms. Each transmission advances one position through the hop table from the previous transmission. After all twenty-five frequencies have been used, the process repeats beginning at the first frequency in the hop table. See number six above for further information on the hop tables.*

8) Section 15.247(a)1 indicates that the system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals. Please explain how the device complies with this rule when a packet is repeated or when multiple packets are sent. What is the receiver input bandwidth? How does the receiver shift frequencies and determine which frequency to shift to in order to synchronize with this transmitter?

When a packet is repeated, the repeater repeats the packet on the same frequency that it received the original message on at a time that immediately (within 50 ms) follows the original message.

*Multiple packets are **NEVER** sent. Each message is **ALWAYS** contained in one packet that is less than 400 ms in length.*

The receiver channel bandwidth is 380 KHz at the 3dB point set by the ceramic filter in the IF amplifier. This bandwidth matches the transmitted signal occupied bandwidth plus frequency error and aging.

The receiving system has a database that contains a list of all the devices (PETs) that are currently being tracked, along with the time and frequency each will next transmit. Just prior to the expected time that a PET in the list is to transmit, the receiver local oscillator frequency synthesizer is commanded to the appropriate frequency for the upcoming PET transmission. After the message is received, the receiver local oscillator frequency synthesizer is commanded back to one of the acquisition channels to listen for new PETs. This process repeats when the next PET message is expected.

9) Indicate compliance with Section 15.247(g). How is the system designed to comply with the rules should a continuous data stream be presented. For example, if the data stream were continuous rather than in bursts; How would the channels be used equally on average? Would all the channels be used before repeating a channel? What would be the total number of channels used? How would the receiver shift frequencies with the transmitter?

*This question does not apply to this system because there **NEVER** is a continuous stream of data. The data is always a short burst. In fact, the transmitter is not even capable of transmitting a continuous stream of data because the power supply cannot support continuous operation. The transmitter is powered by a capacitor that only has enough charge to support a single message burst.*

14:38:00 FEB 05, 2000

REF 20.0 dBm AT 30 dB

MKR Δ 130.0 kHz

-19.86 dB

PEAK
LOG

10
dB/

MARKER

MARKER

MARKER Δ

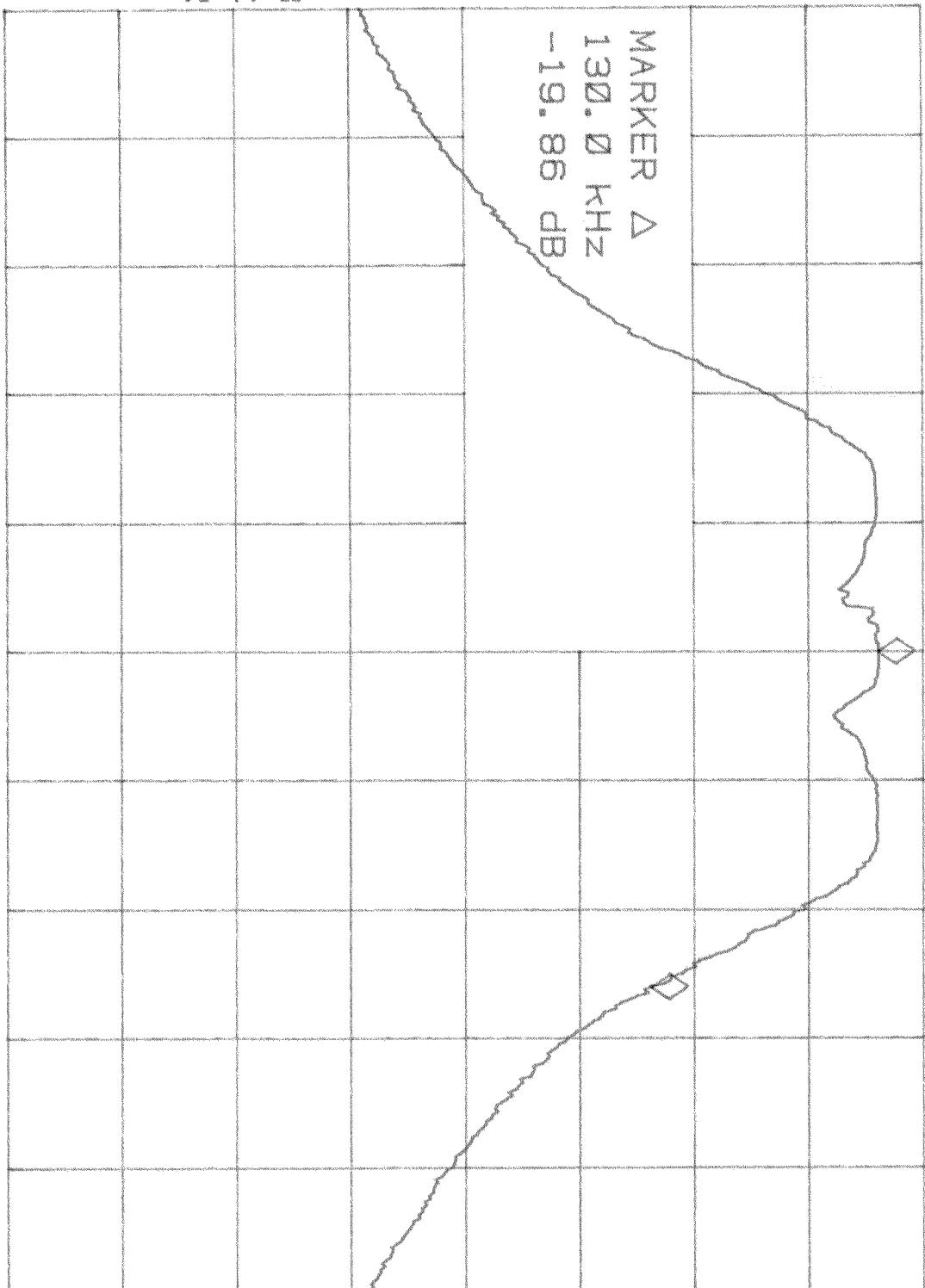
130.0 kHz

-19.86 dB

MARKER
AMPTD

SELECT
1 2 3 4

MARKER 1
ON OFF



CENTER 915.1075 MHz

#RES BW 30 kHz

#VBW 30 kHz

SPAN 500.0 kHz

SWP 20.0 msec

More
1 of 2

Deviation ±65 kHz

Table 5 - Hop Sequence Table

Sequence 0,0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24
Sequence 1,0,1,3,2,5,4,7,6,9,8,11,10,13,12,15,14,17,16,19,18,21,20,23,22,24
Sequence 2,0,1,4,24,6,3,8,5,10,7,12,9,14,11,16,13,18,15,20,17,22,19,2,21,23
Sequence 3,0,1,5,23,7,2,9,4,11,6,13,8,15,10,17,12,19,14,21,16,24,18,3,20,22
Sequence 4,0,1,6,22,8,24,10,3,12,5,14,7,16,9,18,11,20,13,23,15,2,17,4,19,21
Sequence 5,0,1,7,21,9,23,11,2,13,4,15,6,17,8,19,10,22,12,24,14,3,16,5,18,20
Sequence 6,0,1,8,20,10,22,12,24,14,3,16,5,18,7,21,9,23,11,2,13,4,15,6,17,19
Sequence 7,0,1,9,19,11,21,13,23,15,2,17,4,20,6,22,8,24,10,3,12,5,14,7,16,18
Sequence 8,0,1,10,18,12,20,14,22,16,24,19,3,21,5,23,7,2,9,4,11,6,13,8,15,17
Sequence 9,0,1,11,17,13,19,15,21,18,23,20,2,22,4,24,6,3,8,5,10,7,12,9,14,16
Sequence 10,0,1,12,16,14,18,17,20,19,22,21,24,23,3,2,5,4,7,6,9,8,11,10,13,15
Sequence 11,0,2,13,15,16,17,18,19,20,21,22,23,24,1,3,4,5,6,7,8,9,10,11,12,14
Sequence 12,0,2,14,13,17,16,19,18,21,20,23,22,1,24,4,3,6,5,8,7,10,9,12,11,15
Sequence 13,0,2,15,12,18,14,20,17,22,19,24,21,3,23,5,1,7,4,9,6,11,8,13,10,16
Sequence 14,0,2,16,11,19,13,21,15,23,18,1,20,4,22,6,24,8,3,10,5,12,7,14,9,17
Sequence 15,0,2,17,10,20,12,22,14,24,16,3,19,5,21,7,23,9,1,11,4,13,6,15,8,18
Sequence 16,0,2,18,9,21,11,23,13,1,15,4,17,6,20,8,22,10,24,12,3,14,5,16,7,19
Sequence 17,0,2,19,8,22,10,24,12,3,14,5,16,7,18,9,21,11,23,13,1,15,4,17,6,20
Sequence 18,0,2,20,7,23,9,1,11,4,13,6,15,8,17,10,19,12,22,14,24,16,3,18,5,21
Sequence 19,0,2,21,6,24,8,3,10,5,12,7,14,9,16,11,18,13,20,15,23,17,1,19,4,22
Sequence 20,0,2,22,5,1,7,4,9,6,11,8,13,10,15,12,17,14,19,16,21,18,24,20,3,23
Sequence 21,0,2,23,4,3,6,5,8,7,10,9,12,11,14,13,16,15,18,17,20,19,22,21,1,24
Sequence 22,0,3,24,2,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,1
Sequence 23,0,3,1,24,5,4,7,6,9,8,11,10,13,12,15,14,17,16,19,18,21,20,23,22,2
Sequence 24,0,3,2,23,6,1,8,5,10,7,12,9,14,11,16,13,18,15,20,17,22,19,24,21,4
Sequence 25,0,3,4,22,7,24,9,2,11,6,13,8,15,10,17,12,19,14,21,16,23,18,1,20,5
Sequence 26,0,3,5,21,8,23,10,1,12,4,14,7,16,9,18,11,20,13,22,15,24,17,2,19,6
Sequence 27,0,3,6,20,9,22,11,24,13,2,15,5,17,8,19,10,21,12,23,14,1,16,4,18,7
Sequence 28,0,3,7,19,10,21,12,23,14,1,16,4,18,6,20,9,22,11,24,13,2,15,5,17,8
Sequence 29,0,3,8,18,11,20,13,22,15,24,17,2,19,5,21,7,23,10,1,12,4,14,6,16,9
Sequence 30,0,3,9,17,12,19,14,21,16,23,18,1,20,4,22,6,24,8,2,11,5,13,7,15,10
Sequence 31,0,3,10,16,13,18,15,20,17,22,19,24,21,2,23,5,1,7,4,9,6,12,8,14,11
Sequence 32,0,3,11,15,14,17,16,19,18,21,20,23,22,1,24,4,2,6,5,8,7,10,9,13,12
Sequence 33,0,4,12,14,15,16,17,18,19,20,21,22,23,24,1,3,5,2,6,7,8,9,10,11,13
Sequence 34,0,4,13,12,16,15,18,17,20,19,22,21,24,23,2,1,6,14,7,5,9,8,11,10,3
Sequence 35,0,4,14,11,17,13,19,16,21,18,23,20,1,22,3,24,7,12,8,2,10,6,15,9,5
Sequence 36,0,4,15,10,18,12,20,14,22,17,24,19,2,21,5,23,8,11,9,1,13,3,16,7,6
Sequence 37,0,4,16,9,19,11,21,13,23,15,1,18,3,20,6,22,10,8,12,24,14,2,17,5,7
Sequence 38,0,4,17,8,20,10,22,12,24,14,2,16,5,19,7,21,11,6,13,23,15,1,18,3,9
Sequence 39,0,4,18,7,21,9,23,11,1,13,3,15,6,17,8,20,12,5,14,22,16,24,19,2,10
Sequence 40,0,4,19,6,22,8,24,10,2,12,5,14,7,16,9,18,13,3,15,21,17,23,20,1,11
Sequence 41,0,4,20,5,23,7,1,9,3,11,6,13,8,15,10,17,14,2,16,19,18,22,21,24,12
Sequence 42,0,4,21,3,24,6,2,8,5,10,7,12,9,14,11,16,15,1,17,18,19,20,22,23,13
Sequence 43,0,4,22,2,1,5,3,7,6,9,8,11,10,13,12,15,16,24,18,17,20,19,23,21,14

Sequence 44,0,5,23,1,2,4,6,3,7,8,9,10,11,12,13,14,17,22,19,16,21,18,24,20,15
Sequence 45,0,5,24,23,3,2,7,1,8,6,10,9,12,11,14,13,18,21,20,15,22,17,4,19,16
Sequence 46,0,5,1,22,4,24,8,23,9,3,11,7,13,10,15,12,19,20,21,14,2,16,6,18,17
Sequence 47,0,5,2,21,6,23,9,22,10,1,12,4,14,8,16,11,20,19,24,13,3,15,7,17,18
Sequence 48,0,5,3,20,7,22,10,21,11,24,13,2,15,6,17,9,23,18,1,12,4,14,8,16,19
Sequence 49,0,5,4,19,8,21,11,20,12,23,14,1,16,3,18,7,24,17,2,10,6,13,9,15,22
Sequence 50,0,5,6,18,9,20,12,19,13,22,15,24,17,2,21,4,1,16,3,8,7,11,10,14,23
Sequence 51,0,5,7,17,10,19,13,18,14,21,16,23,20,1,22,3,2,15,4,6,8,9,11,12,24
Sequence 52,0,5,8,16,11,18,14,17,15,20,19,22,21,24,23,2,3,13,6,4,9,7,12,10,1
Sequence 53,0,5,9,15,12,17,16,14,18,19,20,21,22,23,24,1,4,11,7,3,10,6,13,8,2
Sequence 54,0,5,10,14,13,16,17,12,19,18,21,20,23,22,1,24,6,9,8,2,11,4,15,7,3
Sequence 55,0,6,11,13,14,15,18,10,20,17,22,19,24,21,2,23,7,8,9,1,12,3,16,5,4
Sequence 56,0,6,12,11,15,14,19,9,21,16,23,18,1,20,3,22,8,7,10,24,13,2,17,4,5
Sequence 57,0,6,13,10,16,12,20,8,22,15,24,17,2,19,4,21,9,5,11,23,14,1,18,3,7
Sequence 58,0,6,14,9,17,11,21,7,23,13,1,16,3,18,5,20,10,4,12,22,15,24,19,2,8
Sequence 59,0,6,15,8,18,10,22,5,24,12,2,14,4,17,7,19,11,3,13,21,16,23,20,1,9
Sequence 60,0,6,16,7,19,9,23,4,1,11,3,13,5,15,8,18,12,2,14,20,17,22,21,24,10
Sequence 61,0,6,17,5,20,8,24,3,2,10,4,12,7,14,9,16,13,1,15,19,18,21,22,23,11
Sequence 62,0,6,18,4,21,7,1,2,3,9,5,11,8,13,10,15,14,24,16,17,19,20,23,22,12
Sequence 63,0,6,19,3,22,5,2,1,4,8,7,10,9,12,11,14,15,23,17,16,20,18,24,21,13
Sequence 64,0,6,20,2,23,4,3,24,5,7,8,9,10,11,12,13,16,22,18,15,21,17,1,19,14
Sequence 65,0,6,21,1,24,3,4,23,7,5,9,8,11,10,13,12,17,20,19,14,22,16,2,18,15
Sequence 66,0,7,22,24,1,2,5,21,8,4,10,6,12,9,14,11,18,19,20,13,23,15,3,17,16
Sequence 67,0,7,23,22,2,1,6,20,9,3,11,5,13,8,15,10,19,18,21,12,24,14,4,16,17
Sequence 68,0,7,24,21,3,23,8,19,10,2,12,4,14,6,16,9,20,17,22,11,1,13,5,15,18
Sequence 69,0,7,1,20,4,22,9,18,11,24,13,3,15,5,17,8,21,16,23,10,2,12,6,14,19
Sequence 70,0,7,2,19,5,21,10,17,12,23,14,1,16,4,18,6,22,15,24,9,3,11,8,13,20
Sequence 71,0,7,3,18,6,20,11,16,13,22,15,24,17,2,19,5,23,14,1,8,4,10,9,12,21
Sequence 72,0,7,4,17,8,19,12,15,14,21,16,23,18,1,20,3,24,13,2,6,5,9,10,11,22
Sequence 73,0,7,5,16,9,18,13,14,15,20,17,22,19,24,21,2,1,12,3,4,6,8,11,10,23
Sequence 74,0,7,6,15,10,17,14,13,16,19,18,21,20,23,22,1,2,11,4,3,8,5,12,9,24
Sequence 75,0,7,8,14,11,16,15,12,17,18,19,20,21,22,23,24,3,10,5,2,9,4,13,6,1
Sequence 76,0,7,9,13,12,15,16,11,18,17,20,19,22,21,24,23,4,8,6,1,10,3,14,5,2
Sequence 77,0,8,10,12,13,14,17,9,19,16,21,18,23,20,1,22,5,7,11,24,15,2,3,4,6
Sequence 78,0,8,11,10,14,13,18,7,20,15,22,17,24,19,2,21,6,5,12,23,16,1,4,3,9
Sequence 79,0,8,12,9,15,11,19,6,21,14,23,16,1,18,3,20,7,4,13,22,17,24,5,2,10
Sequence 80,0,8,13,7,16,10,20,5,22,12,24,15,2,17,4,19,9,3,14,21,18,23,6,1,11
Sequence 81,0,8,14,6,17,9,21,4,23,11,1,13,3,16,5,18,10,2,15,20,19,22,7,24,12
Sequence 82,0,8,15,5,18,7,22,3,24,10,2,12,4,14,6,17,11,1,16,19,20,21,9,23,13
Sequence 83,0,8,16,4,19,6,23,2,1,9,3,11,5,13,7,15,12,24,17,18,21,20,10,22,14
Sequence 84,0,8,17,3,20,5,24,1,2,7,4,10,6,12,9,14,13,23,18,16,22,19,11,21,15
Sequence 85,0,8,18,2,21,4,1,24,3,6,5,9,7,11,10,13,14,22,19,15,23,17,12,20,16
Sequence 86,0,8,19,1,22,3,2,23,4,5,6,7,9,10,11,12,15,21,20,14,24,16,13,18,17
Sequence 87,0,8,20,24,23,2,3,22,5,4,7,6,10,9,12,11,16,19,21,13,1,15,14,17,18
Sequence 88,0,9,21,23,24,1,4,20,6,3,8,5,11,7,13,10,17,18,22,12,2,14,15,16,19
Sequence 89,0,9,22,21,1,24,5,19,7,2,10,4,12,6,14,8,18,17,23,11,3,13,16,15,20

Sequence 90,0,9,23,20,2,22,6,18,8,1,11,3,13,5,15,7,19,16,24,10,4,12,17,14,21
Sequence 91,0,9,24,19,3,21,7,17,10,23,12,2,14,4,16,6,20,15,1,8,5,11,18,13,22
Sequence 92,0,9,1,18,4,20,8,16,11,22,13,24,15,3,17,5,21,14,2,7,6,10,19,12,23
Sequence 93,0,9,2,17,5,19,10,15,12,21,14,23,16,1,18,4,22,13,3,6,7,8,20,11,24
Sequence 94,0,9,3,16,6,18,11,14,13,20,15,22,17,24,19,2,23,12,4,5,8,7,21,10,1
Sequence 95,0,9,4,15,7,17,12,13,14,19,16,21,18,23,20,1,24,11,5,3,10,6,22,8,2
Sequence 96,0,9,5,14,8,16,13,12,15,18,17,20,19,22,21,24,1,10,6,2,11,4,23,7,3
Sequence 97,0,9,6,13,10,15,14,11,16,17,18,19,20,21,22,23,2,8,7,1,12,3,24,5,4
Sequence 98,0,9,7,12,11,14,15,10,17,16,19,18,21,20,23,22,3,6,8,24,13,2,1,4,5
Sequence 99,0,10,8,11,12,13,16,9,18,15,20,17,22,19,24,21,4,5,14,23,1,7,2,3,6
Sequence 100,0,10,9,8,13,12,17,7,19,14,21,16,23,18,1,20,5,4,15,22,2,6,3,24,11
Sequence 101,0,10,11,7,14,9,18,6,20,13,22,15,24,17,2,19,8,3,16,21,4,5,12,23,1
Sequence 102,0,10,12,6,15,8,19,5,21,11,23,14,1,16,3,18,9,2,17,20,7,4,13,22,24
Sequence 103,0,10,13,5,16,7,20,4,22,9,24,12,2,15,6,17,11,1,18,19,8,3,14,21,23
Sequence 104,0,10,14,4,17,6,21,3,23,8,1,11,5,13,7,16,12,24,19,18,9,2,15,20,22
Sequence 105,0,10,15,3,18,5,22,2,24,7,4,9,6,12,8,14,13,23,20,17,11,1,16,19,21
Sequence 106,0,10,16,2,19,4,23,1,3,6,5,8,7,11,9,13,14,22,21,15,12,24,17,18,20
Sequence 107,0,10,17,1,20,3,24,23,4,5,6,7,8,9,11,12,15,21,22,14,13,19,18,16,2
Sequence 108,0,10,18,24,21,2,1,22,5,4,7,6,9,8,12,11,16,20,23,13,14,17,19,15,3
Sequence 109,0,10,19,23,22,1,2,21,6,3,8,5,11,7,13,9,17,18,24,12,15,16,20,14,4
Sequence 110,0,11,20,22,23,24,3,19,7,2,9,4,12,6,14,8,18,17,1,10,16,15,21,13,5
Sequence 111,0,11,21,20,24,23,4,18,8,1,10,3,13,5,15,7,19,16,2,9,17,14,22,12,6
Sequence 112,0,11,22,19,1,21,5,17,9,24,12,2,14,4,16,6,20,15,3,8,18,13,23,10,7
Sequence 113,0,11,23,18,2,20,6,16,10,22,13,1,15,3,17,5,21,14,4,7,19,12,24,9,8
Sequence 114,0,11,24,17,3,19,7,15,12,21,14,23,16,2,18,4,22,13,5,6,20,10,1,8,9
Sequence 115,0,11,1,16,4,18,8,14,13,20,15,22,17,24,19,3,23,12,6,5,21,9,2,7,10
Sequence 116,0,11,2,15,5,17,9,13,14,19,16,21,18,23,20,1,24,10,7,4,22,8,3,6,12
Sequence 117,0,11,3,14,6,16,10,12,15,18,17,20,19,22,21,24,1,9,8,2,23,7,4,5,13
Sequence 118,0,11,4,13,7,15,12,10,16,17,18,19,20,21,22,23,2,8,9,1,24,6,5,3,14
Sequence 119,0,11,5,12,8,14,13,9,17,16,19,18,21,20,23,22,3,7,10,24,1,4,6,2,15
Sequence 120,0,11,6,10,9,13,14,8,18,15,20,17,22,19,24,21,4,5,12,23,2,3,7,1,16
Sequence 121,0,12,7,9,10,11,15,6,19,14,21,16,23,18,1,20,5,4,13,22,3,2,8,24,17
Sequence 122,0,12,8,7,11,10,16,5,20,13,22,15,24,17,2,19,6,3,14,21,4,1,9,23,18
Sequence 123,0,12,9,6,13,8,17,4,21,11,23,14,1,16,3,18,7,2,15,20,5,24,10,22,19
Sequence 124,0,12,10,5,14,7,18,3,22,9,24,13,2,15,4,17,8,1,16,19,6,23,11,21,20
Sequence 125,0,12,11,4,15,6,19,2,23,8,1,10,3,14,5,16,9,24,17,18,7,22,13,20,21
Sequence 126,0,12,13,3,16,5,20,1,24,7,2,9,4,11,6,15,10,23,18,17,8,21,14,19,22
Sequence 127,0,12,14,2,17,4,21,24,1,6,3,8,5,10,7,13,11,22,19,16,9,20,15,18,23
Sequence 128,0,12,15,1,18,3,22,23,2,5,4,7,6,9,8,11,13,21,20,14,10,19,16,17,24
Sequence 129,0,12,16,24,19,2,23,22,3,4,5,6,7,8,9,10,14,20,21,13,11,18,17,15,1
Sequence 130,0,12,17,23,20,1,24,21,4,3,6,5,8,7,10,9,15,19,22,11,13,16,18,14,2
Sequence 131,0,12,18,22,21,24,1,20,5,2,7,4,9,6,11,8,16,17,23,10,14,15,19,13,3
Sequence 132,0,13,19,21,22,23,2,18,6,1,8,3,10,5,12,7,17,16,24,9,15,14,20,11,4
Sequence 133,0,13,20,19,23,22,3,17,7,24,9,2,11,4,14,6,18,15,1,8,16,12,21,10,5
Sequence 134,0,13,21,18,24,20,4,16,8,23,10,1,12,3,15,5,19,14,2,7,17,11,22,9,6
Sequence 135,0,13,22,17,1,19,5,15,9,21,11,24,14,2,16,4,20,12,3,6,18,10,23,8,7

Sequence 136,0,13,23,16,2,18,6,14,10,20,12,22,15,1,17,3,21,11,4,5,19,9,24,7,8
Sequence 137,0,13,24,15,3,17,7,12,11,19,14,21,16,23,18,2,22,10,5,4,20,8,1,6,9
Sequence 138,0,13,1,14,4,16,8,11,12,18,15,20,17,22,19,24,23,9,6,3,21,7,2,5,10
Sequence 139,0,13,2,12,5,15,9,10,14,17,16,19,18,21,20,23,24,8,7,1,22,6,3,4,11
Sequence 140,0,13,3,11,6,14,10,9,15,16,17,18,19,20,21,22,1,7,8,24,23,5,4,2,12
Sequence 141,0,13,4,10,7,12,11,8,16,15,18,17,20,19,22,21,2,6,9,23,24,3,5,1,14
Sequence 142,0,13,5,9,8,11,12,7,17,14,19,16,21,18,23,20,3,4,10,22,1,2,6,24,15
Sequence 143,0,14,6,8,9,10,13,5,18,12,20,15,22,17,24,19,4,3,11,21,2,1,7,23,16
Sequence 144,0,14,7,6,10,9,15,4,19,11,21,13,23,16,1,18,5,2,12,20,3,24,8,22,17
Sequence 145,0,14,8,5,11,7,16,3,20,10,22,12,24,15,2,17,6,1,13,19,4,23,9,21,18
Sequence 146,0,14,9,4,12,6,17,2,21,8,23,11,1,13,3,16,7,24,15,18,5,22,10,20,19
Sequence 147,0,14,10,3,13,5,18,1,22,7,24,9,2,12,4,15,8,23,16,17,6,21,11,19,20
Sequence 148,0,14,11,2,15,4,19,24,23,6,1,8,3,10,5,13,9,22,17,16,7,20,12,18,21
Sequence 149,0,14,12,1,16,3,20,23,24,5,2,7,4,9,6,11,10,21,18,15,8,19,13,17,22
Sequence 150,0,14,13,24,17,2,21,22,1,4,3,6,5,8,7,10,11,20,19,12,9,18,15,16,23
Sequence 151,0,14,15,23,18,1,22,21,2,3,4,5,6,7,8,9,12,19,20,11,10,17,16,13,24
Sequence 152,0,14,16,22,19,24,23,20,3,2,5,4,7,6,9,8,13,18,21,10,11,15,17,12,1
Sequence 153,0,14,17,21,20,23,24,19,4,1,6,3,8,5,10,7,15,16,22,9,12,13,18,11,2
Sequence 154,0,15,18,20,21,22,1,17,5,24,7,2,9,4,11,6,16,14,23,8,13,12,19,10,3
Sequence 155,0,15,19,18,22,21,2,16,6,23,8,1,10,3,12,5,17,13,24,7,14,11,20,9,4
Sequence 156,0,15,20,17,23,19,3,14,7,22,9,24,11,2,13,4,18,12,1,6,16,10,21,8,5
Sequence 157,0,15,21,16,24,18,4,13,8,20,10,23,12,1,14,3,19,11,2,5,17,9,22,7,6
Sequence 158,0,15,22,14,1,17,5,12,9,19,11,21,13,24,16,2,20,10,3,4,18,8,23,6,7
Sequence 159,0,15,23,13,2,16,6,11,10,18,12,20,14,22,17,1,21,9,4,3,19,7,24,5,8
Sequence 160,0,15,24,12,3,14,7,10,11,17,13,19,16,21,18,23,22,8,5,2,20,6,1,4,9
Sequence 161,0,15,1,11,4,13,8,9,12,16,14,18,17,20,19,22,23,7,6,24,21,5,2,3,10
Sequence 162,0,15,2,10,5,12,9,8,13,14,16,17,18,19,20,21,24,6,7,23,22,4,3,1,11
Sequence 163,0,15,3,9,6,11,10,7,14,13,17,16,19,18,21,20,1,5,8,22,23,2,4,24,12
Sequence 164,0,15,4,8,7,10,11,6,16,12,18,14,20,17,22,19,2,3,9,21,24,1,5,23,13
Sequence 165,0,16,5,7,8,9,12,4,17,11,19,13,21,15,23,18,3,2,10,20,1,24,6,22,14
Sequence 166,0,16,6,5,9,8,13,3,18,10,20,12,22,14,24,17,4,1,11,19,2,23,7,21,15
Sequence 167,0,16,7,4,10,6,14,2,19,9,21,11,23,13,1,15,5,24,12,18,3,22,8,20,17
Sequence 168,0,16,8,3,11,5,15,1,20,7,22,10,24,12,2,14,6,23,13,17,4,21,9,19,18
Sequence 169,0,16,9,2,12,4,17,24,21,6,23,8,1,11,3,13,7,22,14,15,5,20,10,18,19
Sequence 170,0,16,10,1,13,3,18,23,22,5,24,7,2,9,4,12,8,21,15,14,6,19,11,17,20
Sequence 171,0,16,11,24,14,2,19,22,23,4,1,6,3,8,5,10,9,20,17,13,7,18,12,15,21
Sequence 172,0,16,12,23,15,1,20,21,24,3,2,5,4,7,6,9,10,19,18,11,8,17,13,14,22
Sequence 173,0,16,13,22,17,24,21,20,1,2,3,4,5,6,7,8,11,18,19,10,9,15,14,12,23
Sequence 174,0,16,14,21,18,23,22,19,2,1,4,3,6,5,8,7,12,17,20,9,10,13,15,11,24
Sequence 175,0,16,15,20,19,22,23,18,3,24,5,2,7,4,9,6,13,14,21,8,11,12,17,10,1
Sequence 176,0,17,16,19,20,21,24,15,4,23,6,1,8,3,10,5,14,13,22,7,12,11,18,9,2
Sequence 177,0,17,18,16,21,20,1,14,5,22,7,24,9,2,11,4,15,12,23,6,13,10,19,8,3
Sequence 178,0,17,19,15,22,18,2,13,6,21,8,23,10,1,12,3,16,11,24,5,14,9,20,7,4
Sequence 179,0,17,20,14,23,16,3,12,7,19,9,22,11,24,13,2,18,10,1,4,15,8,21,6,5
Sequence 180,0,17,21,13,24,15,4,11,8,18,10,20,12,23,14,1,19,9,2,3,16,7,22,5,6
Sequence 181,0,17,22,12,1,14,5,10,9,16,11,19,13,21,15,24,20,8,3,2,18,6,23,4,7

Sequence 182,0,17,23,11,2,13,6,9,10,15,12,18,14,20,16,22,21,7,4,1,19,5,24,3,8
Sequence 183,0,17,24,10,3,12,7,8,11,14,13,16,15,19,18,21,22,6,5,23,20,4,1,2,9
Sequence 184,0,17,1,9,4,11,8,7,12,13,14,15,16,18,19,20,23,5,6,22,21,3,2,24,10
Sequence 185,0,17,2,8,5,10,9,6,13,12,15,14,18,16,20,19,24,4,7,21,22,1,3,23,11
Sequence 186,0,17,3,7,6,9,10,5,14,11,16,13,19,15,21,18,1,2,8,20,23,24,4,22,12
Sequence 187,0,18,4,6,7,8,11,3,15,10,17,12,20,14,22,16,2,1,9,19,24,23,5,21,13
Sequence 188,0,18,5,4,8,7,12,2,16,9,19,11,21,13,23,15,3,24,10,17,1,22,6,20,14
Sequence 189,0,18,6,3,9,5,13,1,17,8,20,10,22,12,24,14,4,23,11,16,2,21,7,19,15
Sequence 190,0,18,7,2,10,4,14,24,19,6,21,9,23,11,1,13,5,22,12,15,3,20,8,17,16
Sequence 191,0,18,8,1,11,3,15,23,20,5,22,7,24,10,2,12,6,21,13,14,4,19,9,16,17
Sequence 192,0,18,9,24,12,2,16,22,21,4,23,6,1,8,3,11,7,20,14,13,5,17,10,15,19
Sequence 193,0,18,10,23,13,1,17,21,22,3,24,5,2,7,4,9,8,19,15,12,6,16,11,14,20
Sequence 194,0,18,11,22,14,24,19,20,23,2,1,4,3,6,5,8,9,17,16,10,7,15,12,13,21
Sequence 195,0,18,12,21,15,23,20,19,24,1,2,3,4,5,6,7,10,16,17,9,8,14,13,11,22
Sequence 196,0,18,13,20,16,22,21,17,1,24,3,2,5,4,7,6,11,15,19,8,9,12,14,10,23
Sequence 197,0,18,14,19,17,21,22,16,2,23,4,1,6,3,8,5,12,13,20,7,10,11,15,9,24
Sequence 198,0,19,15,18,20,17,23,14,3,22,5,24,7,2,9,4,13,12,21,6,11,10,16,8,1
Sequence 199,0,19,16,17,21,15,24,13,4,20,6,23,8,1,10,3,14,11,22,5,12,9,18,7,2
Sequence 200,0,19,17,16,22,14,1,12,5,18,7,21,9,24,11,2,15,10,23,4,13,8,20,6,3
Sequence 201,0,19,18,15,23,13,2,11,6,17,8,20,10,22,12,1,16,9,24,3,14,7,21,5,4
Sequence 202,0,19,20,14,24,12,3,10,7,16,9,18,11,21,13,23,17,8,1,2,15,6,22,4,5
Sequence 203,0,19,21,13,1,11,4,9,8,15,10,17,12,20,14,22,18,7,2,24,16,5,23,3,6
Sequence 204,0,19,22,12,2,10,5,8,9,14,11,16,13,18,15,21,20,6,3,23,17,4,24,1,7
Sequence 205,0,19,23,11,3,9,6,7,10,13,12,15,14,17,16,20,21,5,4,22,18,2,1,24,8
Sequence 206,0,19,24,10,4,8,7,6,11,12,13,14,15,16,17,18,22,3,5,21,20,1,2,23,9
Sequence 207,0,19,1,9,5,7,8,4,12,11,14,13,16,15,18,17,23,2,6,20,21,24,3,22,10
Sequence 208,0,19,2,8,6,5,9,3,13,10,15,12,17,14,20,16,24,1,7,18,22,23,4,21,11
Sequence 209,0,20,3,7,8,4,10,2,14,9,16,11,18,13,21,15,1,24,12,17,23,22,5,19,6
Sequence 210,0,20,4,6,9,3,11,1,15,8,17,10,19,12,22,14,2,23,13,16,24,21,7,18,5
Sequence 211,0,20,5,4,10,2,12,24,16,7,18,9,21,11,23,13,3,22,14,15,1,19,8,17,6
Sequence 212,0,20,6,3,11,1,13,23,17,5,19,8,22,10,24,12,4,21,15,14,2,18,9,16,7
Sequence 213,0,20,7,2,12,24,14,22,18,4,21,6,23,9,1,11,5,19,16,13,3,17,10,15,8
Sequence 214,0,20,8,1,13,23,15,21,19,3,22,5,24,7,2,10,6,18,17,12,4,16,11,14,9
Sequence 215,0,20,9,24,14,22,16,19,21,2,23,4,1,6,3,8,7,17,18,11,5,15,12,13,10
Sequence 216,0,20,10,23,15,21,17,18,22,1,24,3,2,5,4,7,8,16,19,9,6,14,13,12,11
Sequence 217,0,20,11,22,16,19,18,17,23,24,1,2,3,4,5,6,9,15,21,8,7,13,14,10,12
Sequence 218,0,20,12,21,17,18,19,16,24,23,2,1,4,3,6,5,10,14,22,7,8,11,15,9,13
Sequence 219,0,20,13,19,18,17,21,15,1,22,3,24,5,2,7,4,11,12,23,6,9,10,16,8,14
Sequence 220,0,21,14,18,19,16,22,13,2,20,4,23,6,1,8,3,12,11,24,5,10,9,17,7,15
Sequence 221,0,21,15,17,20,14,23,12,3,19,5,22,7,24,9,2,13,10,1,4,11,8,18,6,16
Sequence 222,0,21,16,15,22,13,24,11,4,18,6,20,8,23,10,1,14,9,2,3,12,7,19,5,17
Sequence 223,0,21,17,14,23,12,1,10,5,16,7,19,9,22,11,24,15,8,3,2,13,6,20,4,18
Sequence 224,0,21,18,13,24,11,2,9,6,15,8,17,10,20,12,23,16,7,4,1,14,5,22,3,19
Sequence 225,0,21,19,12,1,10,3,8,7,14,9,16,11,18,13,22,17,6,5,24,15,4,23,2,20
Sequence 226,0,21,20,11,2,9,4,7,8,13,10,15,12,17,14,19,18,5,6,23,16,3,24,1,22
Sequence 227,0,21,22,10,3,8,5,6,9,12,11,14,13,16,15,18,19,4,7,20,17,2,1,24,23

Sequence 228,0,21,23,9,4,7,6,5,10,11,12,13,14,15,16,17,20,3,8,19,18,1,2,22,24
Sequence 229,0,21,24,8,5,6,7,4,11,10,13,12,15,14,17,16,22,2,9,18,19,23,3,20,1
Sequence 230,0,21,1,7,6,5,8,3,12,9,14,11,16,13,18,15,23,24,10,17,20,22,4,19,2
Sequence 231,0,22,2,6,7,4,9,1,13,8,15,10,17,12,19,14,24,23,11,16,21,20,5,18,3
Sequence 232,0,22,3,5,8,2,10,24,14,7,16,9,18,11,20,13,1,21,12,15,23,19,6,17,4
Sequence 233,0,22,4,3,9,1,11,23,15,6,17,8,19,10,21,12,2,20,13,14,24,18,7,16,5
Sequence 234,0,22,5,2,10,24,12,21,16,4,18,7,20,9,23,11,3,19,14,13,1,17,8,15,6
Sequence 235,0,22,6,1,11,23,13,20,17,3,19,5,21,8,24,10,4,18,15,12,2,16,9,14,7
Sequence 236,0,22,7,24,12,21,14,19,18,2,20,4,23,6,1,9,5,17,16,11,3,15,10,13,8
Sequence 237,0,22,8,23,13,20,15,18,19,1,21,3,24,5,2,7,6,16,17,10,4,14,11,12,9
Sequence 238,0,22,9,21,14,19,16,17,20,24,23,2,1,4,3,6,7,15,18,8,5,13,12,11,10
Sequence 239,0,22,10,20,15,18,17,16,21,23,24,1,2,3,4,5,8,14,19,7,6,12,13,9,11
Sequence 240,0,22,11,19,16,17,18,15,23,21,1,24,3,2,5,4,9,13,20,6,7,10,14,8,12
Sequence 241,0,22,12,18,17,16,19,14,24,20,2,23,4,1,6,3,10,11,21,5,8,9,15,7,13
Sequence 242,0,23,13,17,18,15,20,12,1,19,3,22,5,24,7,2,11,10,4,21,9,8,16,6,14
Sequence 243,0,23,14,16,19,13,21,11,2,18,4,20,6,22,8,1,12,9,5,17,10,7,24,3,15
Sequence 244,0,23,15,14,20,12,22,10,3,17,5,19,7,21,9,24,13,8,6,16,11,4,1,2,18
Sequence 245,0,23,16,13,21,11,24,9,4,15,6,18,8,20,10,22,14,7,12,5,17,3,2,1,19
Sequence 246,0,23,17,12,22,10,1,8,5,14,7,16,9,19,11,21,15,6,13,4,18,2,3,24,20
Sequence 247,0,23,18,11,24,9,2,7,6,13,8,15,10,17,12,20,16,5,14,3,19,1,4,22,21
Sequence 248,0,23,19,10,1,8,3,6,7,12,9,14,11,16,13,18,17,4,15,2,20,24,5,21,22
Sequence 249,0,23,20,9,2,7,4,5,8,11,10,13,12,15,14,17,18,3,16,1,21,22,6,19,24
Sequence 250,0,23,21,8,3,6,5,4,9,10,11,12,13,14,15,16,19,2,17,24,22,20,7,18,1
Sequence 251,0,23,22,7,4,5,6,3,10,9,12,11,14,13,16,15,20,1,18,21,24,19,8,17,2
Sequence 252,0,23,24,6,5,4,7,2,11,8,13,10,15,12,17,14,21,22,19,20,1,18,9,16,3
Sequence 253,0,24,1,5,6,3,8,23,12,7,14,9,16,11,18,13,22,21,20,19,2,17,10,15,4
Sequence 254,0,24,2,4,7,1,9,22,13,6,15,8,17,10,19,12,23,20,21,18,3,16,11,14,5
Sequence 255,0,24,3,2,8,23,10,21,14,5,16,7,18,9,20,11,1,19,22,17,4,15,12,13,6