

Test Report

of an Intentional Radiator for Certification under Part 15 of the FCC rules

DUT: Alarm Transmitter
FCC ID Q3USBA-2000
Section 15.231(e)
Date: 14-April-2003

Manufacturer: Securitas America, Inc.
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A. DEVICE UNDER TEST

The product is a transmitter used as a security device to monitor the location of infant children in hospital environments. This device is designed to be attached to the infant's body and is inactive until placed on the child. The product is designed to operate under the provisions of Part 15.231(e) of the FCC rules in the United States and RSS-210 in Canada.

The device is self contained in a plastic enclosure and is powered by an internal 3 volt lithium coin cell. The frequency of operation is 418.00 MHz. nominal. The modulation mode is on/off keying using a proprietary pulse position scheme. In normal operation, this device is programmed to transmit two identification packets every 10 – 11 seconds. During an emergency condition, the device transmits two packets every 2 seconds.

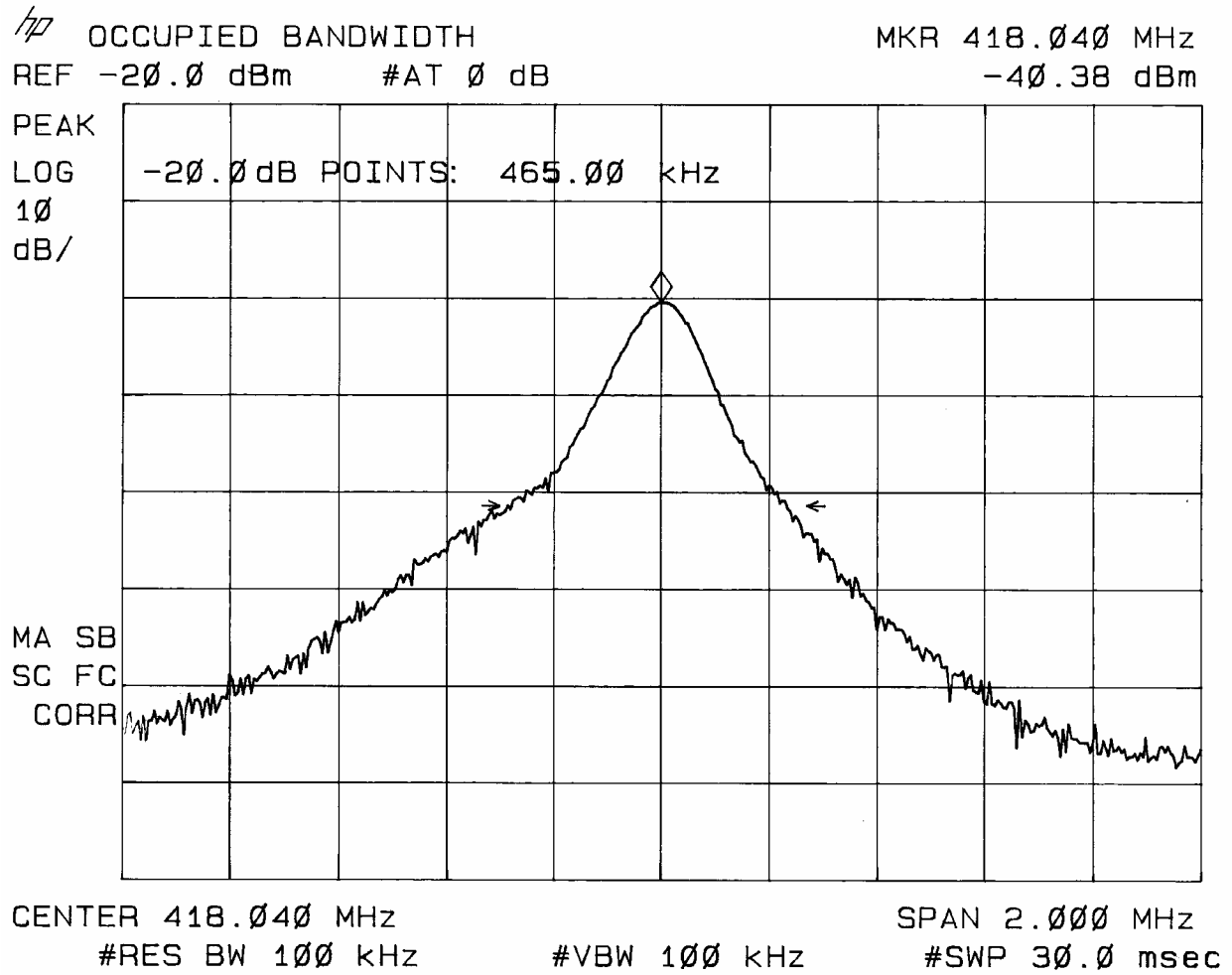
The test samples are in a prototype plastic enclosures. The FCC ID will be printed on the cover label as shown in the external photographs.

B. MEASUREMENT PROCEDURE: RADIATED EMISSIONS

Radiated emissions testing of this device was conducted at the Carl T. Jones test facility located in Springfield, Virginia. FCC Site #90490

The field strength measurements were conducted according to the procedures set forth in ANSI C63.4 (1992). The device under test was placed on a rotating turntable 0.8 meters high, centered at 3 meters distant from the measurement antenna. Two sets of measurements were taken: 1) with the strap/antenna configured for maximum length and, 2) with the strap drawn into a tight circle. For each configuration, the device was placed in the center of the turntable and tested in two positions as shown in the test setup photographs.

For the purpose of radiated emissions testing, one of the test samples was specially programmed to transmit a continuous pulse stream. The occupied bandwidth plot below (Plot 1) was captured using this signal.

Plot 1

The field strength measurements were taken using an HP8596E spectrum analyzer, an EMCO 3121C dipole set, an EMCO 3115 double ridge guide horn and an Avantek UJ210 preamp. The device was scanned from 30 MHz. to 5 GHz. and all emissions were noted. In this case, the only emissions detected were those harmonically related to the fundamental transmit frequency.

At each detected emission frequency, the device was measured by rotating the turntable and adjusting the antenna height over a range of 1 to 4 meters to obtain the maximum output level. This procedure was performed with both horizontal and vertical antenna polarizations for each of the test positions shown in the test setup photos. The peak reading for each frequency was recorded in the fourth column in the tables below.

Measurements taken for weak emissions were performed by reducing the distance from the measurement antenna to 1 meter and factoring -9.54dB into the calculation. This method was used for the 4th and 5th harmonics.

Two separate sets of measurements were made for this device. One with the strap/antenna in the normal position and a second set where the strap was extended to have the greatest length. Data is shown for both test conditions.

Table 1 Strap Position 1

RADIATED EMISSIONS DATA							
CLIENT: SECURITAS				FCC ID: Q3USBA-2000			
ANTENNA: DIPOLES/DRG HORN				EUT: ALARM TRANSMITTER			
PART 15.231(e)				DATE: 11-MAR-03			
Frequency In MHz.	Ant. Polar. H/V	Ant. Factor dB	Peak reading dBm	Duty Cycle -dB	Peak Power uV/m@3m	Corrected Power uV/m@3m	FCC Limit uV/m@3m
418.041	H	22.7	-54.84	20.0	5534	553	4133
836.082	H	30.2	-94.01	20.0	144	14	413
1254.123	H	27.6	-103.65	20.0	35	4	413
1672.164	V	29.3	-115.21	20.0	11	1	413
3344.328	H	30.1	-118.73	20.0	8	1	413

Table 2 Strap Position 2

RADIATED EMISSIONS DATA							
CLIENT: SECURITAS				FCC ID: Q3USBA-2000			
ANTENNA: DIPOLES/DRG HORN				EUT: ALARM TRANSMITTER			
PART 15.231(e)				DATE: 11-MAR-03			
Frequency In MHz.	Ant. Polar. H/V	Ant. Factor dB	Peak reading dBm	Duty Cycle -dB	Peak Power uV/m@3m	Corrected Power uV/m@3m	FCC Limit uV/m@3m
418.041	H	22.7	-56.73	20.0	4451	445	4133
836.082	H	30.2	-96.38	20.0	110	11	413
1254.123	H	27.6	-109.22	20.0	19	2	413
1672.164	V	29.3	-116.30	20.0	10	1	413
3344.328	H	30.1	-121.69	20.0	6	1	413

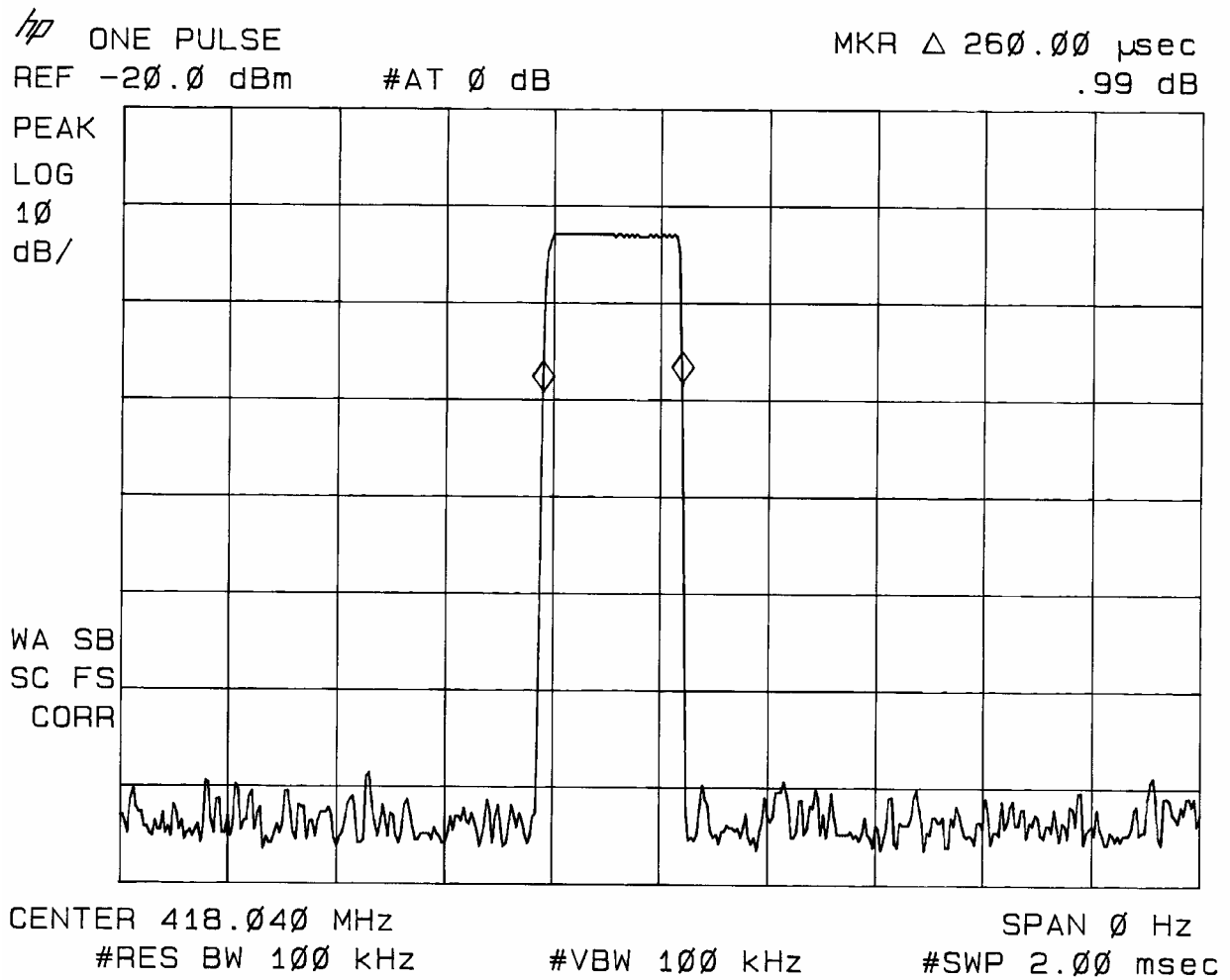
C. DUTY CYCLE AND INTERVAL CALCULATIONS

The occupied bandwidth and duty cycle measurements were made using an HP8594E spectrum analyzer and plotted with an HP7475A pen plotter. The computation for the duty cycle correction factor in column five in Table 1 is derived from the manufacture's description of the data scheme and is verified by plots 2 through 5.

Each packet is composed of 14 pulses spaced over 31ms. Each pulse is 2.5ms wide yielding a 3.5ms. on time per packet. The packets are spaced 200ms apart so that only one packet can occur in any 100 ms. period. The correction factor is given by:

$$20\log(3.5\text{ms.}/100\text{ms.}) = -29 \text{ dB.}$$

As provided in Part 15.35 of the FCC rules, a correction factor of -20 dB is used for the calculations on the data sheet.

Plot 2

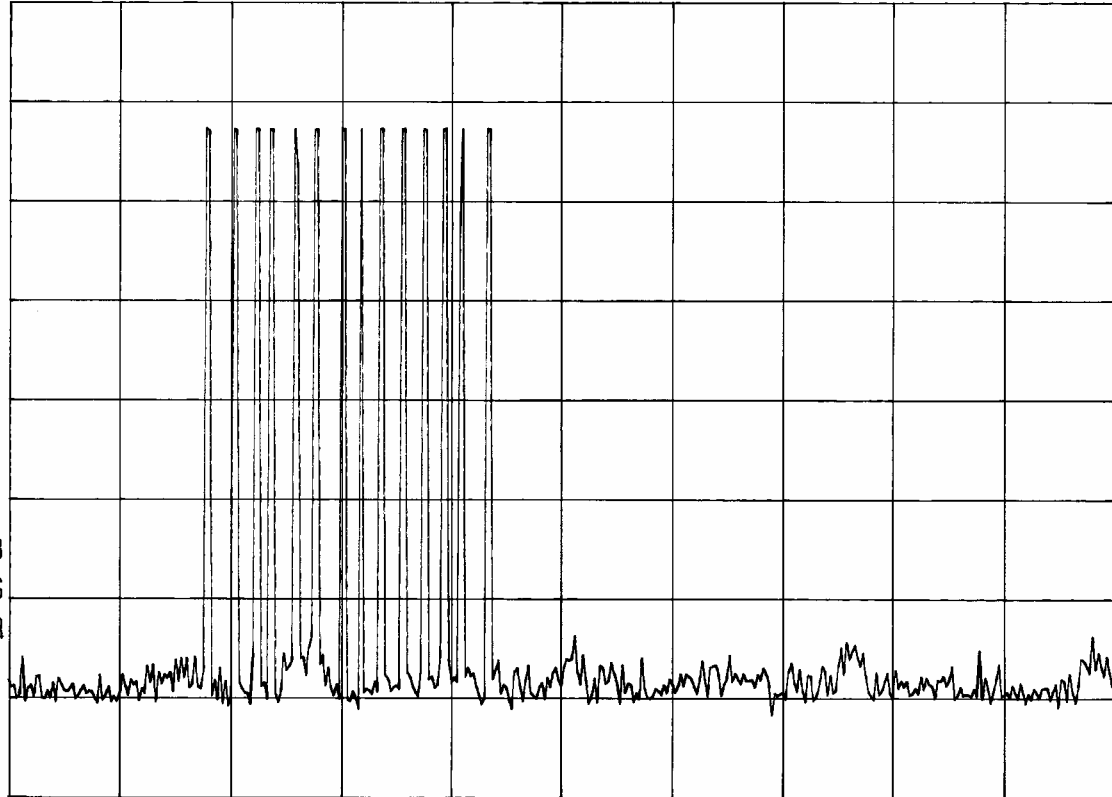
Plot 3

μ ONE PULSE TRAIN

REF -20.0 dBm #AT 0 dB

PEAK
LOG
10
dB/

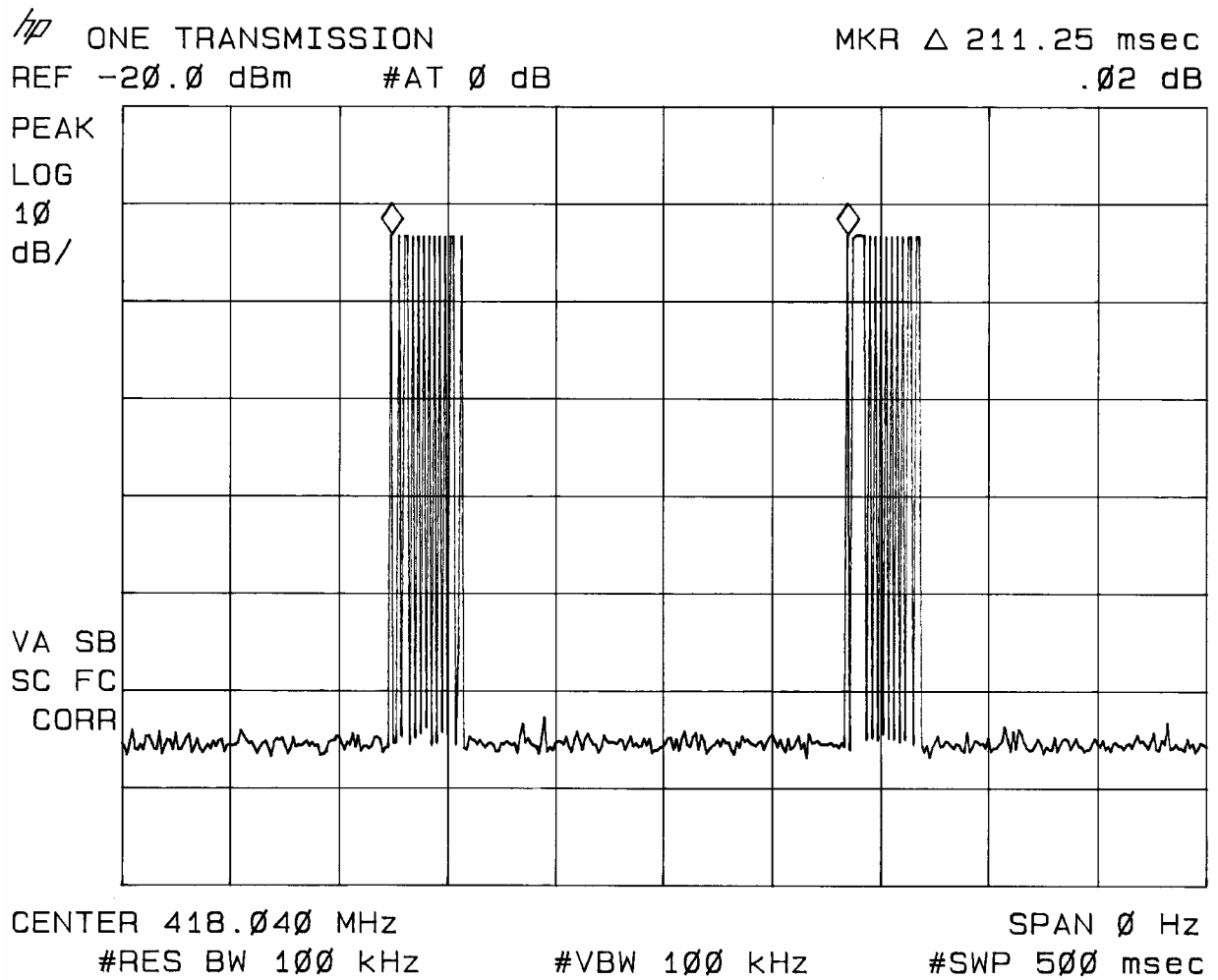
WA SB
SC FS
CORR



CENTER 418.040 MHz
#RES BW 100 kHz

#VBW 100 kHz

SPAN 0 Hz
#SWP 125 msec

Plot 4

Plot 5

