Test Report
for
Sensor iCam, LLC
FCC ID: RVLSICSAW916

DUT:	Wireless Sensor model SICSAW916
Test Date:	05-Feb-2004
Manufacturer:	Sensor iCam, LLC 3600 K Avenue Plano, Texas (972) 234-5000
Conducted by:	Control Design & Testing, Inc. 6010 Red Fox Drive Spotsylvania, VA 22553 (540) 582-2826

CD&T FCC ID: RVLSICSAW916

A. DEVICE UNDER TEST

The product is a transmitter used to activate remote video equipment. Transmissions are iniated when motion is detected from various sensor inputs. This product is designed to operate under the provisions of Part 15.249 of the FCC rules.

The transmit frequency is 916.500 MHz., nominal. The modulation mode is on/off keying using a proprietary 50% Manchester pulse coding scheme. The device is powered from either of two internal 6 volt battery packs.

The rf section consists of a modified Colpitts SAW oscillator, a two element matching network and a 4 ⅝ inch steel wire antenna. The antenna is hard soldered to the printed circuit board. There is no provision to connect an external antenna.

The ciruit is housed in cylindrical plastic housing and the entire assembly will be weather sealed.

B. MEASUREMENT PROCEDURE: RADIATED EMISSIONS

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

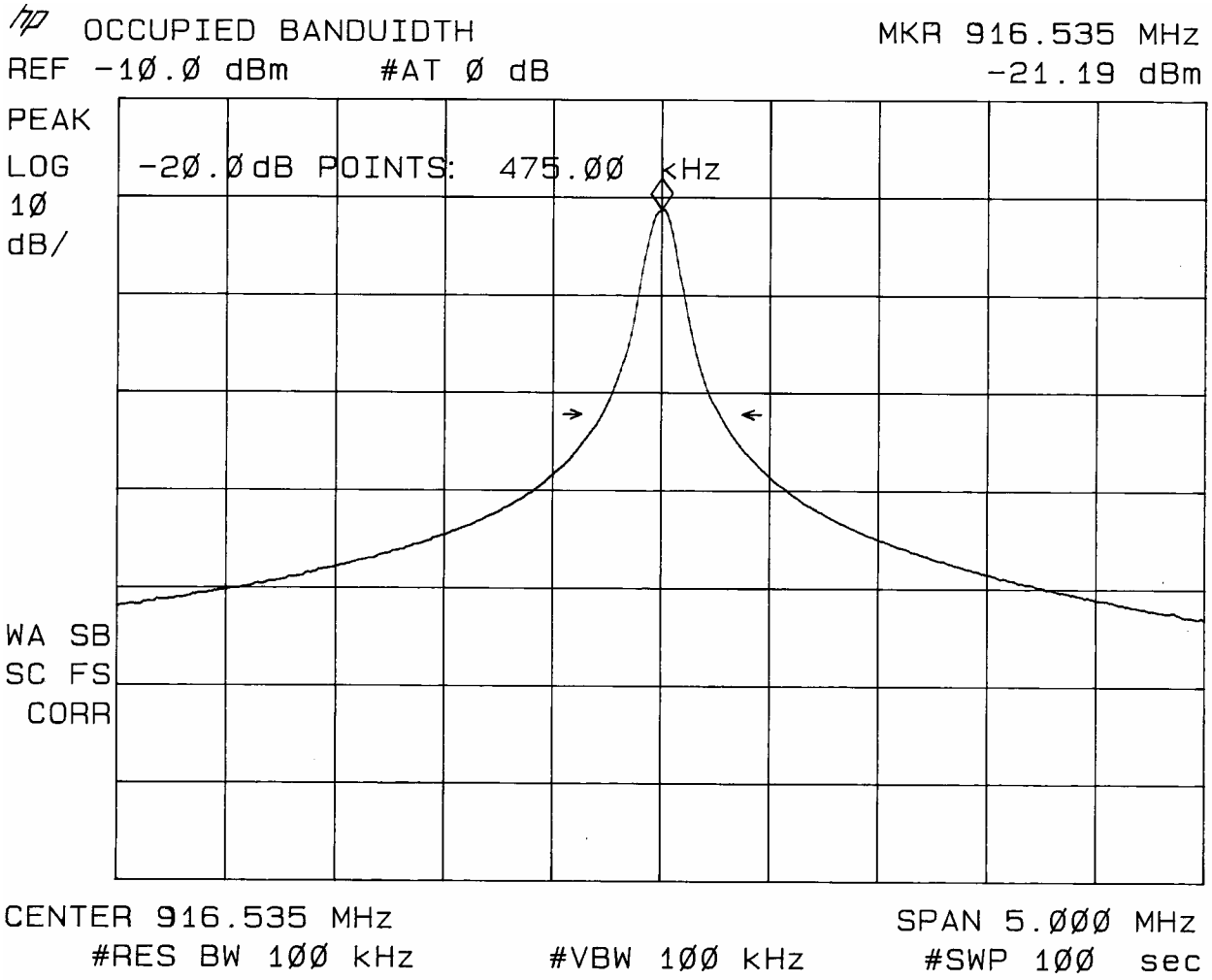
The digital section of this device has a single R/C clock at approximately 172 KHz. During the test neither the clock frequency nor any of its harmonic components was detected.

Transmitter field strength measurements were conducted according to the procedures set forth in ANSI C63.4 (1992). Testing was conducted with a fresh batteries and monitored periodically to insure that the battery voltage (under load) was maintained at 90% of nominal or greater.

The device under test was placed on a rotating turntable 0.8 meters high, centered at 3 meters distant from the measurement antenna. The device was placed in the center of the turntable and tested in the four positions shown in the test setup photographs.

For the purpose of radiated emissions testing, the sample was programmed to transmit its control code continuously. The occupied bandwidth plot below (Plot 1) was captured from this code transmission.

Plot 1



The field strength measurements for radiated emissions were taken using an HP8596E spectrum analyzer, an EMCO 3121C dipole set, an EMCO 3115 double ridge guide horn and an Avantek UJ210 preamp. Investigation of the clock frequencies used a Compliance Design B100 biconical antenna. The device was scanned from 30 MHz. to 10 GHz. and all emissions were noted. In this case, the only emissions detected were those harmonically related to the fundamental frequency of transmission.

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 all of the setup positions shown in the test setup photos. The readings for each frequency are recorded in Table 1 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 8^{th}, 9^{th} and 10^{th} harmonics.

Table 1

RADIATED EMISSIONS DATA

CLIENT: SENSOR ICAM FCC ID:

ANTENNA: DIPOLES/DRG HORN EUT: DATA TRANSMITTER

PART 15.249 TEST DATE: 05-FEB-04

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
916.535	V	30.8	-44.02	0.0	48865	48865	50000
1833.070	V	30.2	-76.53	13.8	1080	221	500
2749.605	V	33.4	-80.53	13.8	985	201	500
3666.140	V	35.7	-91.66	13.8	356	73	500
4582.675	H	36.6	-94.10	13.8	299	61	500
5499.210	H	38.6	-93.88	13.8	385	79	500
6415.745	V	39.2	-93.28	13.8	443	90	500
7332.280	V	41.0	-99.26	13.8	274	56	500
8248.815	H	42.5	-99.81	13.8	305	62	500
9165.350	H	43.4	-102.27	13.8	255	52	500

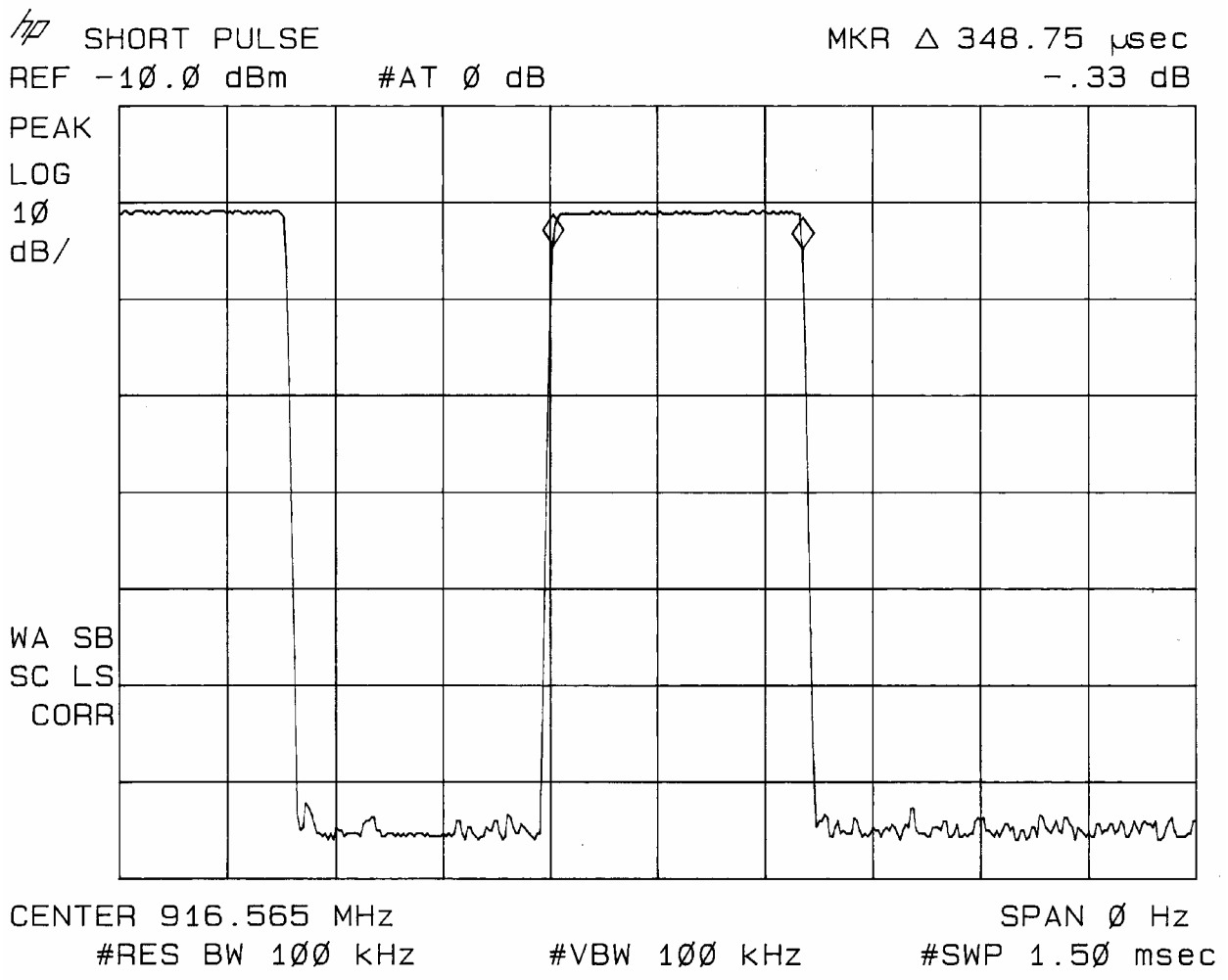
C. DUTY CYCLE AND INTERVAL CALCULATIONS

As provided in Part 15.35, the pulse code format used by this device results in a duty cycle correction factor of approximately -13.8 dB This factor was calculated from data supplied by the manufacture and verified with time domain measurements of the data modulation (plots 2 through 5). This correction factor was applied to the calculations for the harmonic emissions.

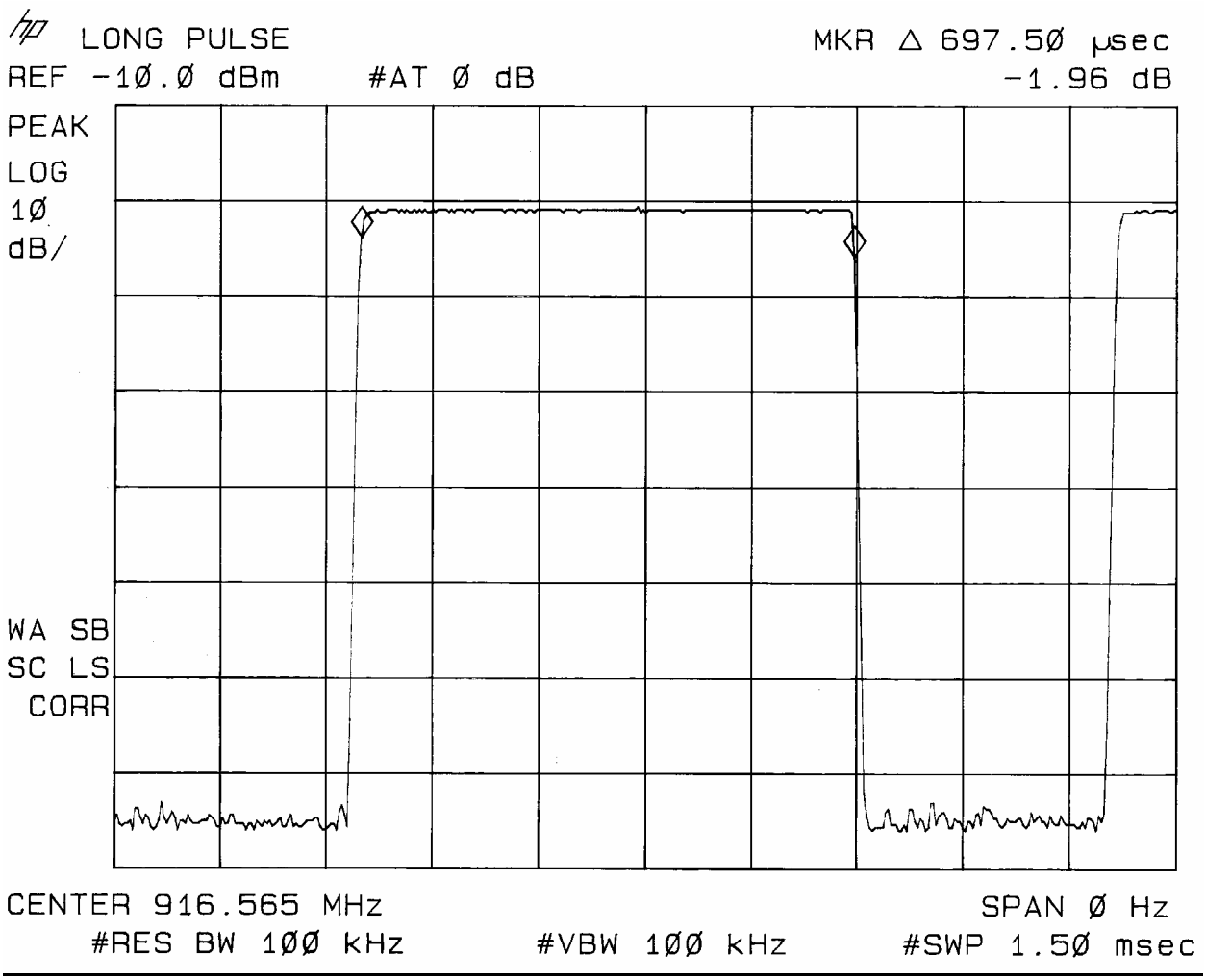
From Plots 2 – 5:

Bit frame = 50%
Packet length = 40.80ms.
Packet repeat = 130ms.
20log (20.4ms./100ms.) = 13.807dB

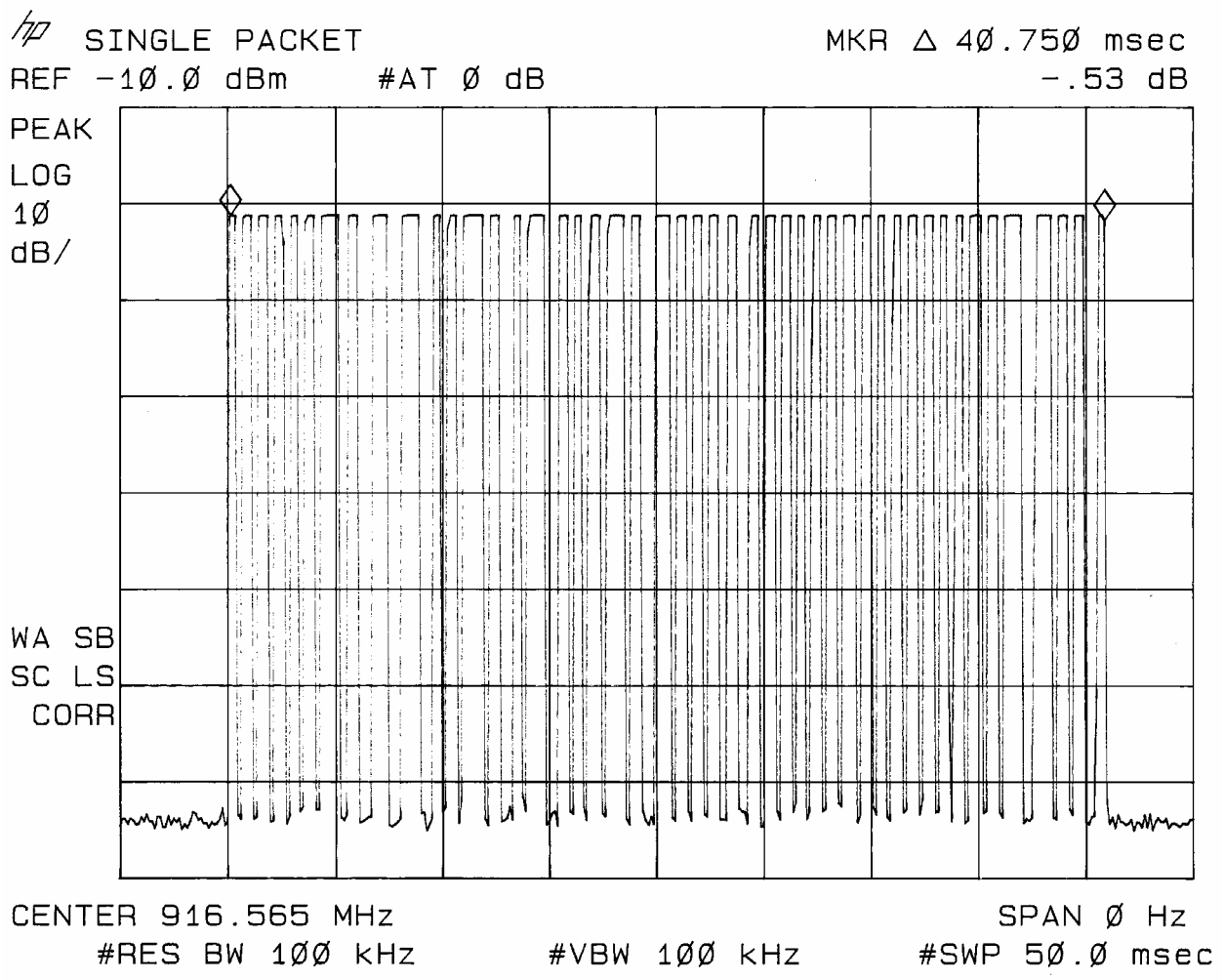
Plot 2



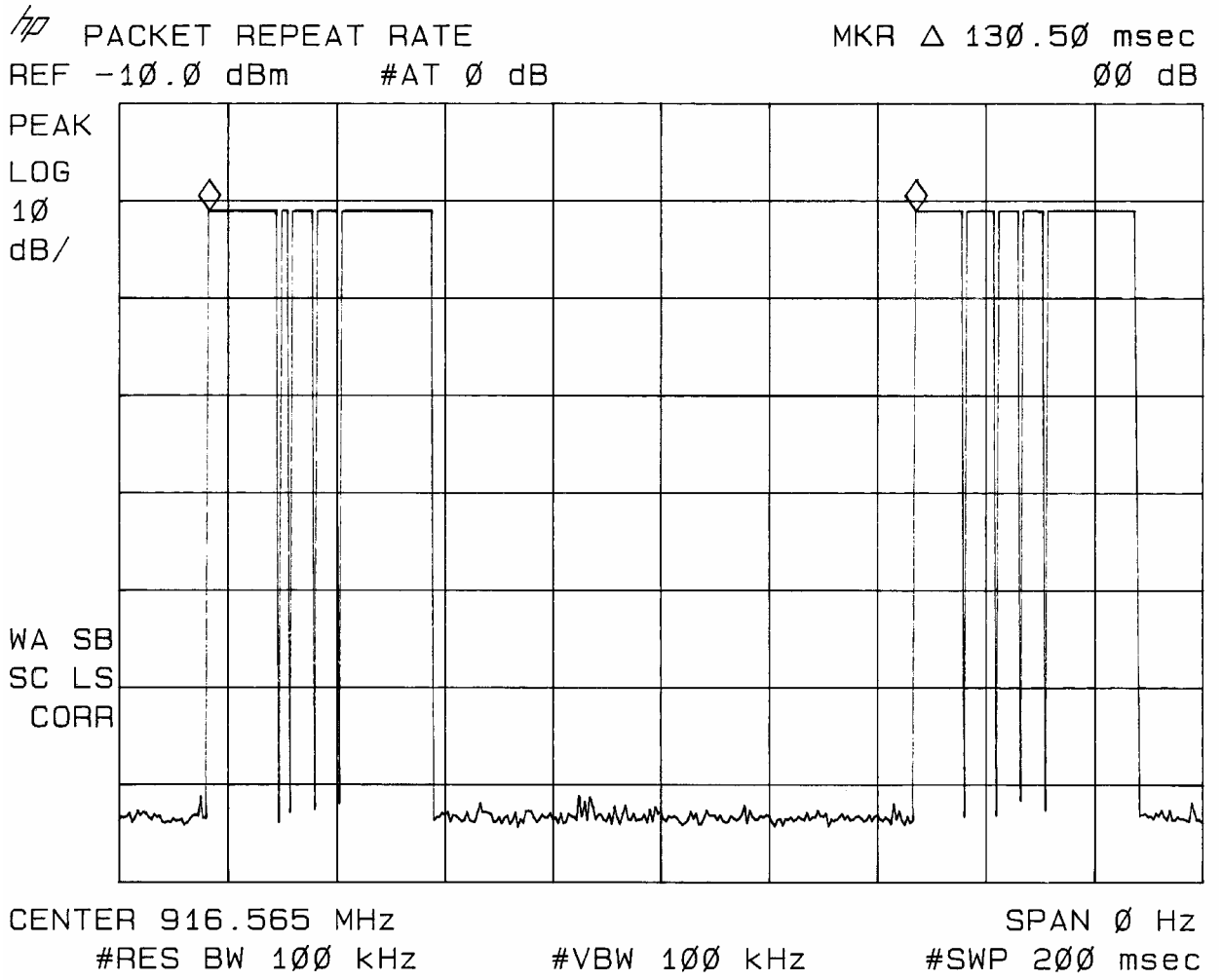
Plot 3


LONG PULSE
MKR Δ 697.5Ø µsec
REF -1Ø.Ø dBm
#AT Ø dB
-1.96 dB
PEAK
LOG
1Ø
dB/
WA SB
SC LS
CORR
CENTER 916.565 MHz
SPAN Ø Hz
#RES BW 1ØØ kHz
#VBW 1ØØ kHz
#SWP 1.5Ø msec

Plot 4


SINGLE PACKET
MKR Δ 4Ø.75Ø msec
REF −1Ø.Ø dBm
#AT Ø dB
−.53 dB
PEAK
LOG
1Ø
dB/
WA SB
SC LS
CORR
CENTER 916.565 MHz
SPAN Ø Hz
#RES BW 1ØØ kHz
#VBW 1ØØ kHz
#SWP 5Ø.Ø msec

Plot 5


PACKET REPEAT RATE
MKR Δ 13Ø.5Ø msec
REF −1Ø.Ø dBm
#AT Ø dB
ØØ dB
PEAK
LOG
1Ø
dB/
WA SB
SC LS
CORR
CENTER 916.565 MHz
SPAN Ø Hz
#RES BW 1ØØ kHz
#VBW 1ØØ kHz
#SWP 2ØØ msec