Test Report
FCC Part 15.231
RSS 210

for
Pacific Neo-Tek
on the
Omni Remote Spring Board Module
Model: OSB4
FCC ID: P4A0005-8327-53

Test Report #: 20540461
Date of Report: June 6, 2002

Job #: J20054046
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NVLAP Laboratory Code: 200201-0

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Review Date: _____

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1.0 Summary of Tests

MODEL: OSB4
FCC ID: P4A0005-8327-53

TEST	REFERENCE	RESULTS	REPORT SECTION
Field Strength of fundamental	15.231(b)	Complies	4.1
Field Strength of spurious emissions	15.231(b)	Complies	4.1
Field Strength of emissions in restricted bands	15.231(b), 15.205	Complies	4.1
AC Conducted Emission	15.207	Not Applicable	-
20 dB Bandwidth	15.231(c)	Complies	4.3
Periodic Operation Requirement	15.231(a)	Complies	4.4
Frequency Tolerance	15.231(d)	Not Applicable	-
Antenna Requirement	15.203	Complies	5.0

2.0 General Description

2.1 Product Description

Overview of the EUT

Applicant	Pacific Neo-Tek 2-1500 East Cliff Drive Suite B, Santa Cruz, CA 95062, USA
Trade Name & Model No.	Pacific Neo –Tek, OSB4
FCC Identifier	P4A0005-8327-53
Use of product	This is an expansion module which can be installed in an “off the shelf” handled organized (Handling Visor). The module mimics the RF signal which would be generated by an X-10 hand held remote, thus allowing the user to control their X-10 devices with their Visor hand held organizer.
Transmitter activation	[X] Manual and automatically deactivate within 5 seconds of being released [ ] Periodic transmissions
Frequency Range	310 MHz
Antenna Requirement	The EUT uses a permanently connected antenna.
Manufacturer name & address	Pacific Neo-Tek 2-1500 East Cliff Drive Suite B, Santa Cruz, CA 95062, USA

2.2 Related Submittal(s) Grants

This is an Application for Certification of a low power transmitter. One transmitter is included in this Application.

2.3 Test Methodology

Both AC mains line-conducted and radiated emissions measurements were performed according to the procedures in ANSI C63.4 (1992). Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Data Sheet"** of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

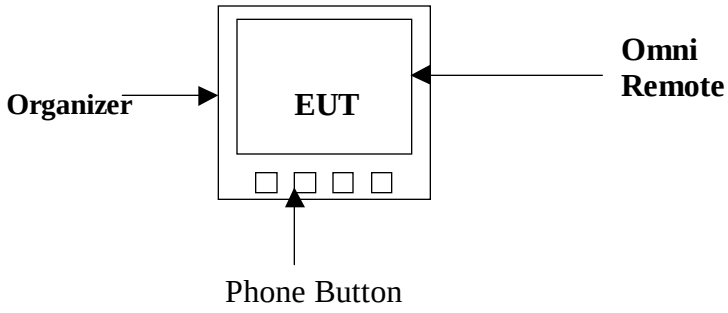
The open area test site and conducted measurement facility used to collect the radiated data is located at Menlo Park, California, Site 2. This test facility and site measurement data have been fully placed on file with the FCC.

3.0 System Test Configuration

3.1 Support Equipment

The EUT is a stand alone unit.

3.2 Block Diagram of Test Setup



* = EUT ** = No ferrites on video cable	**S** = Shielded; **U** = Unshielded	**F** = With Ferrite

3.3 Justification

For emission testing, the equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). During testing, all cables were manipulated to produce worst case emissions.

For radiated emission measurements, the EUT is attached to a cardboard box or a non-conductive platform (if necessary) and placed on the wooden turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). The EUT is wired to transmit full power.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

New batteries were inserted into the EUT during testing.

3.4 Software Exercise Program

The EUT exercise program used during radiated and conducted testing intends to exercise the various system components in a manner similar to a typical use.

For emissions testing, the units were setup to transmit continuously to simplify the measurement methodology.

3.5 Mode of Operation during Test

Transmitting continuously with the preset code.

3.6 Modifications Required for Compliance

The following modifications were installed during compliance testing in order to bring the product into compliance (Please note that this does not include changes made specifically by Pacific Neo-Tek prior to compliance testing).

4.0 Measurement Results

4.1 Radiated emission

FCC Rule 15.231

Radiated emission measurements were performed from 30 MHz to 3500 MHz. Analyzer resolution is 100 kHz or greater for frequencies 30 MHz to 1000 MHz, 1 MHz for frequencies above 1000 MHz.

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

4.1.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
where FS = Field Strength in dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

FS = RR + LF
where FS = Field Strength in dBµV/m
RR = RA - AG in dBµV
LF = CF + AF in dB

Assume a receiver reading of 52.0 dBµV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 52.0 dBµV
AF = 7.4 dB RR = 23.0 dBµV
CF = 1.6 dB LF = 9.0 dB
AG = 29.0 dB
FS = RR + LF
FS = 23 + 9 = 32 dBµV/m
Level in µV/m = Common Antilogarithm [(32 dBµV/m)/20] = 39.8 µV/m

4.1.2 Radiated Emission test results

The limit specified in section 15.231(b) was used.
Below 1 GHz the Quasi-peak values were measured. Above 1 GHz the Peak values are below the average limit, so the Duty Cycle Correction was not used.

All radiated emission from digital part and receiver is at least 20 dB below the limit.

Radiated Emissions Test Data

Company:	Pacific Neo-Tek	**Model #:**	OSB4	**Standard**	**FCC § 15.231**	
EUT:	Omni Remote	**S/N #:**		**Limits**	3	
Project #:	J20054046	**Test Date:**	July 3,2001	**Test Distance**	3	Meters
Test Mode:	Tx continuously	**Engineer:**	Marcos	**Duty Relaxation**	**0**	dB

	Antenna Used			Pre-Amp Used			Cable Used			Transducer Used
Number:	7	14	10	5	8	0	12	0	0	0
Model:	EM LPA-25	EMCO 3115	EMCO 3104	CDI P950	CDI P1000	None	NPS366	None	None	None

Frequency	Reading	Detector	Ant	Amp	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	Duty Factor	Net	Limit @3m	Margin
MHz	dB(µV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB	dB(µV/m)	dB(µV/m)	dB
310.0	73.9	QP	7	5	V	16.7	18.1	1.1	0.0	73.6	75.3	-1.7
620.0	38.4	QP	7	5	V	19.2	15.0	1.4	0.0	44.0	55.3	-11.3
930.0	25.7	QP	7	5	V	23.0	8.2	2.0	0.0	42.5	55.3	-12.8
1240.0 *	36.9	Peak	14	8	V	26.2	30.0	2.1	0.0	35.2	54.0	-18.8
1550.0 *	35.6	Peak	14	8	V	26.6	29.6	2.3	0.0	34.9	54.0	-19.1
1860.0	37.8	Peak	14	8	V	26.6	29.3	2.6	0.0	37.7	55.3	-17.6
2170.0	38.7	Peak	14	8	V	30.1	29.1	3.0	0.0	42.7	55.3	-12.6
2480.0	36.7	Peak	14	8	V	30.1	28.5	3.0	0.0	41.3	55.3	-14.0
2790.0 *	37.3	Peak	14	8	V	30.4	28.4	3.4	0.0	42.7	54.0	-11.3
3100.0	36.6	Peak	14	8	V	31.3	28.0	3.7	0.0	43.6	55.3	-11.7
3410.0	34.4	Peak	14	8	V	31.3	27.8	3.7	0.0	41.6	55.3	-13.7

Notes:

a) Average value can be calculated as Peak minus Duty Factor. As the Peak Value is below the Limit, Average was not calculated

b) Insert. Loss (dB) = Cable A + Cable B + Cable C .

c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss - Duty Relaxation

d) Negative signs (-) in Margin column signify levels below the limits.

e) All other emissions not reported are below the equipment noise floor which is at least 10 dB below the limits.

f) * Frequencies in restricted bands

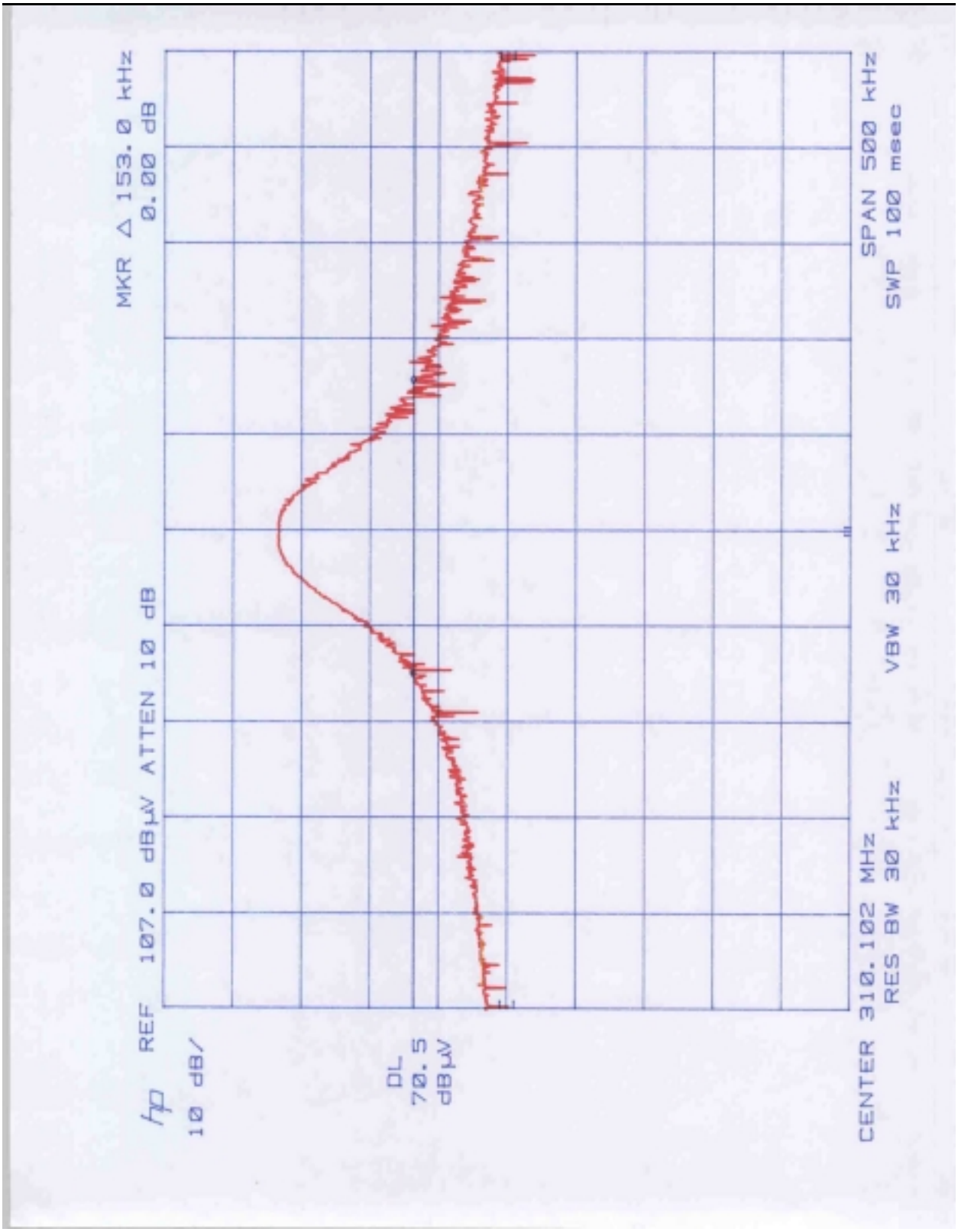
4.2 AC Line Conducted Emission test results
FCC Rule 15.207

Not required; battery operation only

4.3 Occupied Bandwidth
FCC Rule 15.231

The following plot show the occupied bandwidth the transmitter. The worst case (widest) occupied bandwidth at 20 dB down from the modulated carrier is 153 kHz, which is 0.05% of the fundamental frequency.

See plot on the next page.


MKR Δ 153.0 kHz
0.00 dB
SPAN 500 kHz
SWP 100 msec
REF 107.0 dBµV ATTEN 10 dB
VBW 30 kHz
10 dB/
DL
70.5
dBµV
CENTER 310.102 MHz
RES BW 30 kHz

4.4 Transmitter Duty Cycle Calculation and Measurements

The following plots show the duty cycle of the transmission signal. The worst case duty cycle is 3.6 dB.

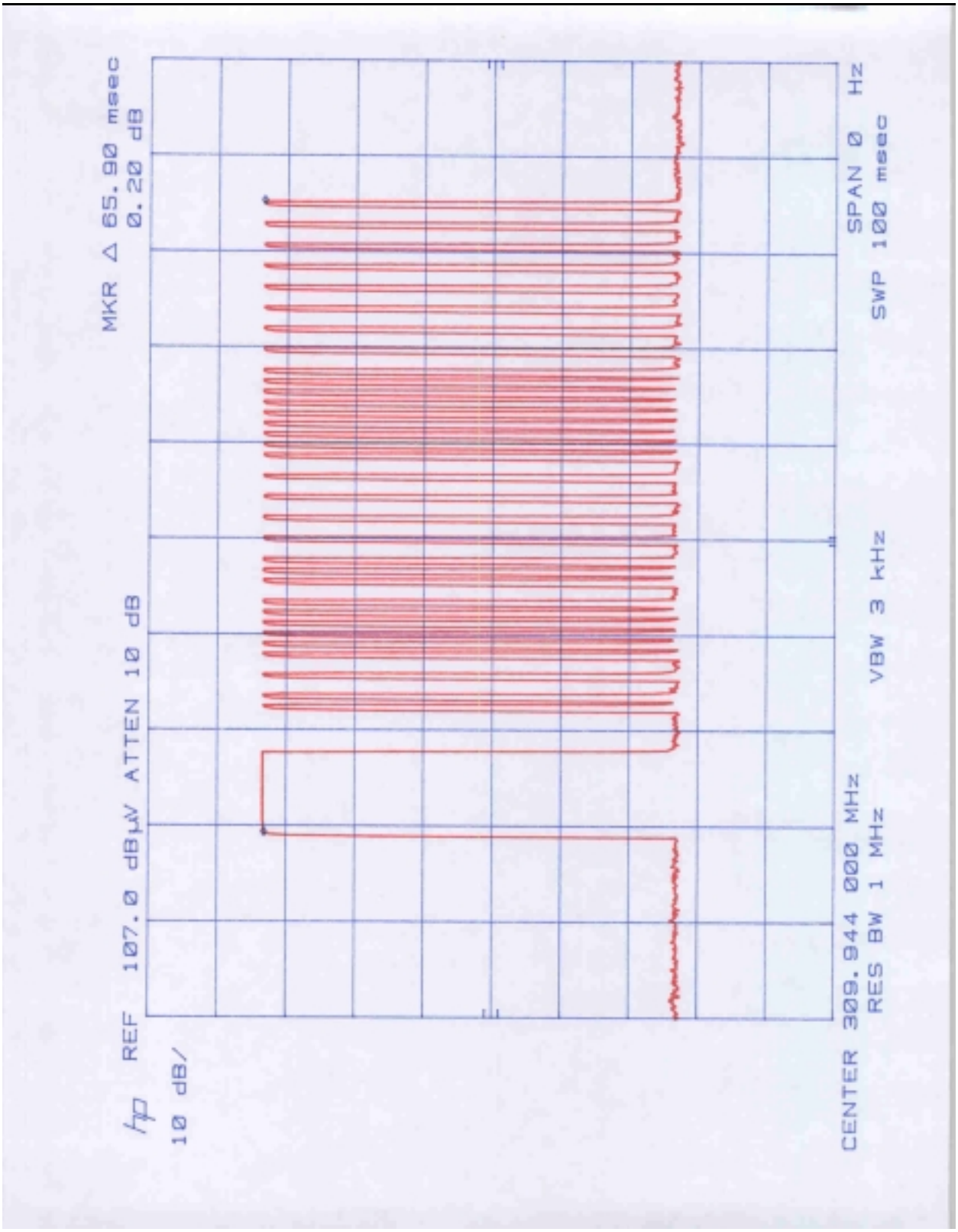
Duty cycle = Maximum ON time in 100 msec/100

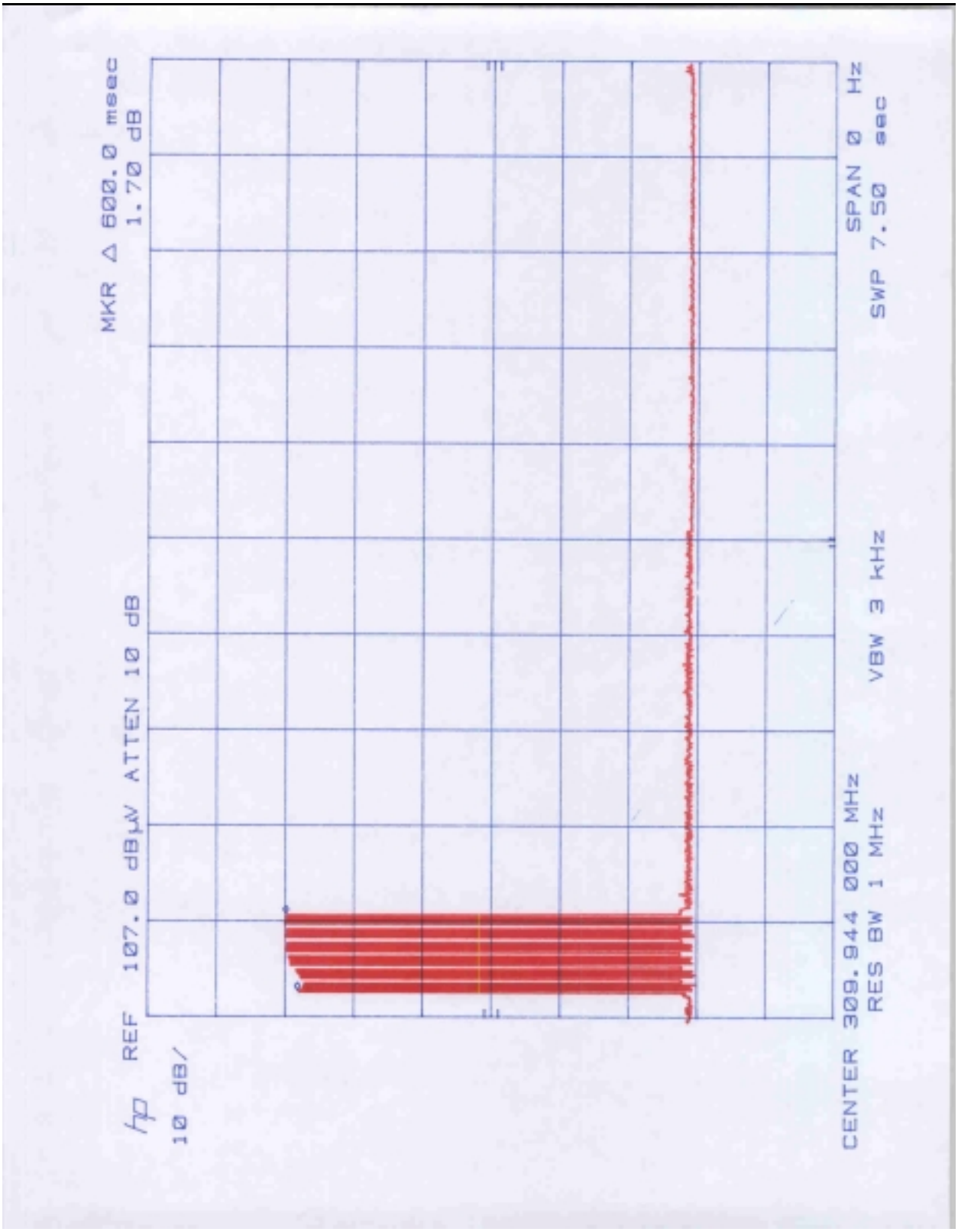
Duty cycle correction, dB = 20 * log(DC)

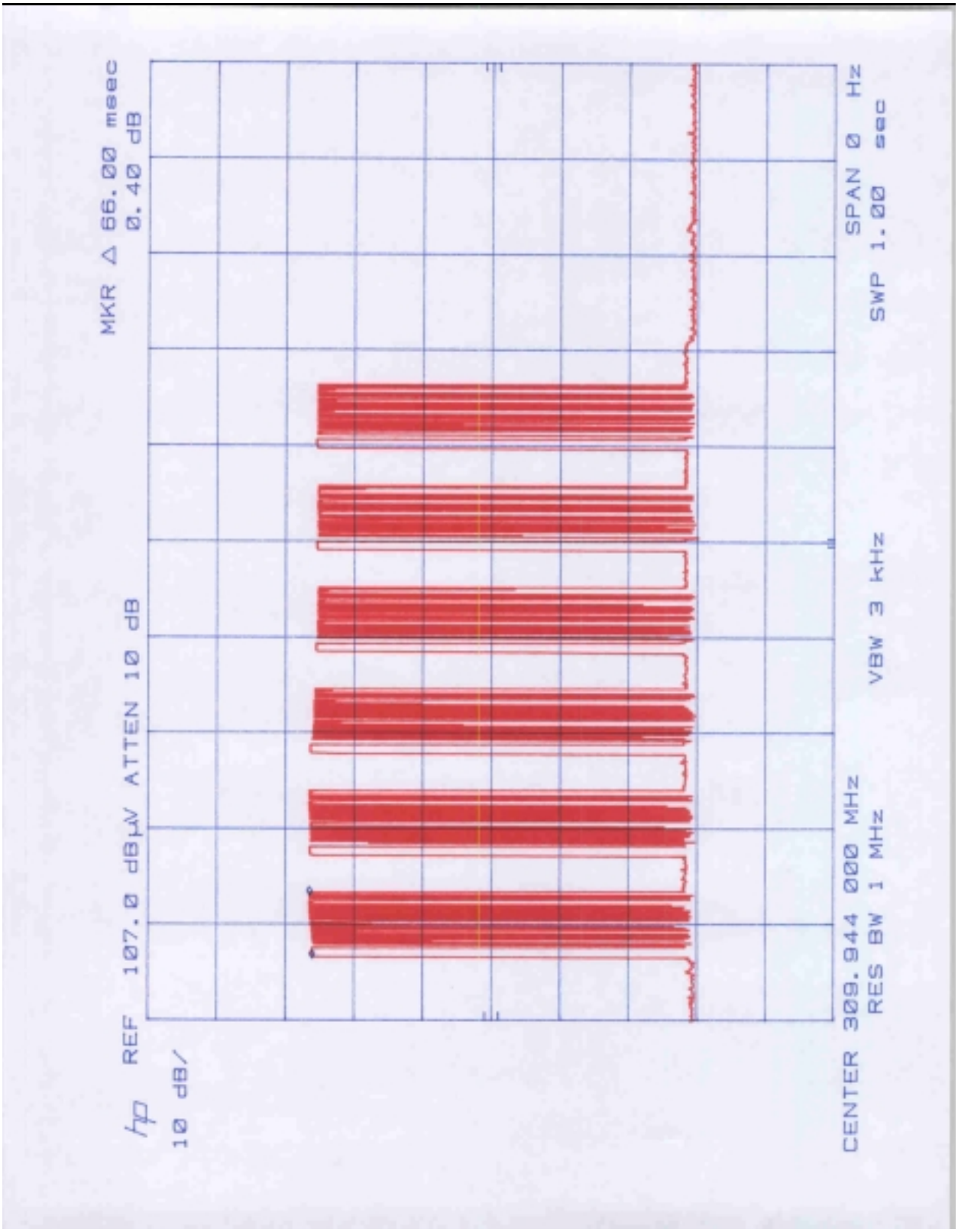
= 20 * log (65.9/100) = -3.6 dB

See attached spectrum analyzer chart(s) for transmitter timing,

The EUT automatically ceases transmission within 5 s after activation (see plot on page 16).


MKR Δ 65.90 msec
0.20 dB
SPAN 0 Hz
SWP 100 msec
REF 107.0 dBµV ATTEN 10 dB
10 dB/
VBW 3 kHz
CENTER 309.944 000 MHz
RES BW 1 MHz


MKR Δ 600.0 msec
1.70 dB
SPAN 0 Hz
SWP 7.50 sec
REF 107.0 dBµV ATTEN 10 dB
VBW 3 kHz
10 dB/
CENTER 309.944 000 MHz
RES BW 1 MHz


MKR Δ 66.00 msec
0.40 dB
SPAN 0 Hz
SWP 1.00 sec
REF 107.0 dBµV ATTEN 10 dB
10 dB/
VBW 3 kHz
CENTER 309.944 000 MHz
RES BW 1 MHz

5.0 Antenna Requirement

FCC Rule 15.203

The transmitter uses a permanently connected antenna.

6.0 List of Test Equipment

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. INTERVAL	CAL. DUE
Spectrum Analyzer w/85650 QP Adapter	Hewlett Packard	8566B	2416A00317 2043A00251	12	4/6/02
Biconical Antenna	EMCO	3104	3794	12	4/12/02
Log Periodic Antenna	EMCO	LPA-25	1079	12	5/05/02
Double-ridged Horn Antenna	EMCO	3115	9107-3712	12	3/17/02
Pre-Amplifier	CDI	P950	ITS009	12	10/6/01
Pre-Amplifier	CDI	P1000	N/A	12	10/6/01