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PART 15.247, SUBPART C, AND

PART 15, SUBPART B, CLASS 'A'

VERIFICATION TEST REPORT

For The **Hand Held Scanner**

Model: **iConnect**

PREPARED FOR:

IntelliDOT
100 East San Marcos Blvd.
San Marcos, CA 92069

PREPARED ON 7-8-04

REPORT NUMBER 2004 070139 FCC

PROJECT NUMBER: 24-139-INT

DOCUMENT HISTORY

REVISION	DATE	COMMENTS
-	7-8-04	Prepared By: Mike Krumweide
-	7-8-04	Initial Release: R. L. Hill

NOTE: Nemko USA, Inc. hereby makes the following statements so as to conform to Chapter 10 (Test Reports) Requirements of ANSI C63.4 (2001) "Methods and Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz":

- The unit described in this report was received at Nemko USA, Inc.'s facilities on June 4, 2004. Testing was performed on the unit described in this report on June 7, 2004 to June 19, 2004.
- The Test Results reported herein apply only to the Unit actually tested, and to substantially identical Units.
- This report does not imply the endorsement of the Federal Communications Commission (FCC), NVLAP or any other government agency.

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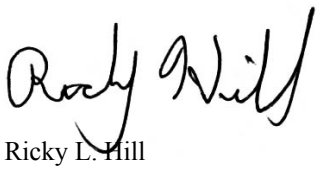
CERTIFICATION

The Radio Frequency Interference (RFI) testing, data evaluation and this report have been prepared by Nemko USA, Inc., an independent electromagnetic compatibility consulting and test laboratory.

The testing and data collection were accomplished in accordance with the requirements of the ANSI, C63.4-2001 standard and the applicable sections of FCC, Part 15, Subpart B and C. The testing was also accomplished in accordance with Industry Canada's ICES-003 standard for unintentional radiating device per EMCAB-3, Issue 3 (May 1998). Refer to the Administrative Summary for a description of the test sample.

I certify the data, data evaluation and equipment configuration herein to be a true and accurate representation of the sample's radio frequency interference emission characteristics, as of the test date(s), and for the design of the test sample used to compile this report.



Ricky L. Hill
Manager of EMC Operations

1. ADMINISTRATIVE DATA AND TEST SUMMARY

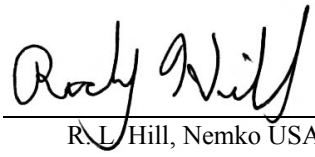
1.1. Administrative Data

CLIENT:	IntelliDOT 100 East San Marcos Blvd. San Marcos, CA 92069 760-510-5970 760-510-5971- fax
CONTACT:	Trace Funderburk
DATE (S) OF TEST:	June 7, 2004 to June 19, 2004
EQUIPMENT UNDER TEST (EUT):	Hand Held Scanner
Model	iConnect
Condition Upon Receipt	Suitable for Test
TEST SPECIFICATION:	FCC, Part 15, Subpart B, Class "A" FCC,Part15.247,Subpart.C

Test Summary

Specification	*Limit Factors*	*Compliance Status*
FCC, CFR 47, Section 15.107 Class "B" Conducted Emissions	0.15 MHz - 30.00 MHz	**PASS**
FCC, CFR 47, Section 15.109 Class "A" Radiated Emissions *	30 MHz - 18000 MHz	**PASS**
FCC, CFR 47, Section 15.247 Occupied Bandwidth	Minimum of 500kHz @ 6dB down (RBW = 100kHz, VBW $\geq$ 100kHz)	**PASS**
FCC, CFR 47, Section 15. 247 Power Output	< 125.2dBuV Peak (Fundamental Frequencies) < 78.5dBuV Avg. (Harmonics) < 54.0dBuV Avg. (Restricted Band Harmonics)	**PASS**
FCC, CFR 47, Section 15. 247 Spurious Emissions and Band Edge	< 54.0 dBuV (Avg.) at Band Edge Frequencies	**PASS**
FCC, CFR 47, Section 15. 247 Peak Power Spectral Density	< 103dBuv (Span = 300kHz, RBW = 3kHz, VBW = $\geq$3kHz)	**PASS**

- All non-transmitter emission generated from the digital device sections of the EUT were tested to FCC Part 15:109 Class A. The device will be used in office/medical environments and is non-residential. However, all transmitter related emissions were evaluated to the limits in Part 15:247 or 15:209 (as would be directed by those emissions in the restricted bands)
- All radiated spurious and power output measurements where performed in 3orthogonal axis. This report only shows the worst case data. During prescans measurements were made and the emissions levels with the device in the charger or outside the charger were the same so testing proceeded with the EUT in the charger and batteries fully charged.
- Testing of all spurious emissions were performed upto and including the 10th Harmonic of the highest frequency. The table on page 26 include the required bandedge results.

Test Supervisor: 

R. L. Hill, Nemko USA, Inc.

Refer to the test results section for further details.

2.SYSTEM CONFIGURATION

2.1. Description and Method of Exercising the EUT

The iConnect is a Hand Held Scanner. Its function is to scan Dot and Barcode information and transfer data via wireless communications. The EUT was placed into a continuous transmit mode while also charging in the charging base. Wireless communications was monitored by a spectrum analyzer and charging modes were observed by status LEDs.

2.2. System Components and Power Cables

DEVICE	MANUFACTURER MODEL # SERIAL #	POWER CABLE
EUT - Hand Held Scanner	IntelliDOT iConnect 103	N/A
EUT – Battery Charger	IntelliDOT P/N: 080000-01 Rev. A CH10007	80cm, unshield, 18AWG, 3 wire, hardwired

2.3. Device Interconnection and I/O Cables

CONNECTION	I/O CABLE
None	

2.4. Design Modifications for Compliance

Device: **Hand Held Scanner**

Model: **iConnect**

The following design modifications were made to the EUT during testing.

No design modifications were made to the EUT during testing.

3. DESCRIPTION OF TEST SITE AND EQUIPMENT

3.1. Description of Test Site

The test site is located at 11696 Sorrento Valley Road, Suite F, San Diego, CA 92121. The site is physically located 18 miles Northwest of downtown San Diego. The general area is a valley 1.5 miles east of the Pacific Ocean. This particular part of the valley tends to minimize ambient levels, i.e. radio and TV broadcast stations and land mobile communications. The three and ten-meter Open Area Test Site (OATS) is located behind the office/lab building. It conforms to the normalized site attenuation limits and construction specifications as set in the EN 55022 (1998)A1, CISPR 16 (2003) and ANSI C63.4 (2001) documents. The OATS normalized site attenuation characteristics are verified for compliance every.

4. DESCRIPTION OF TESTING METHODS

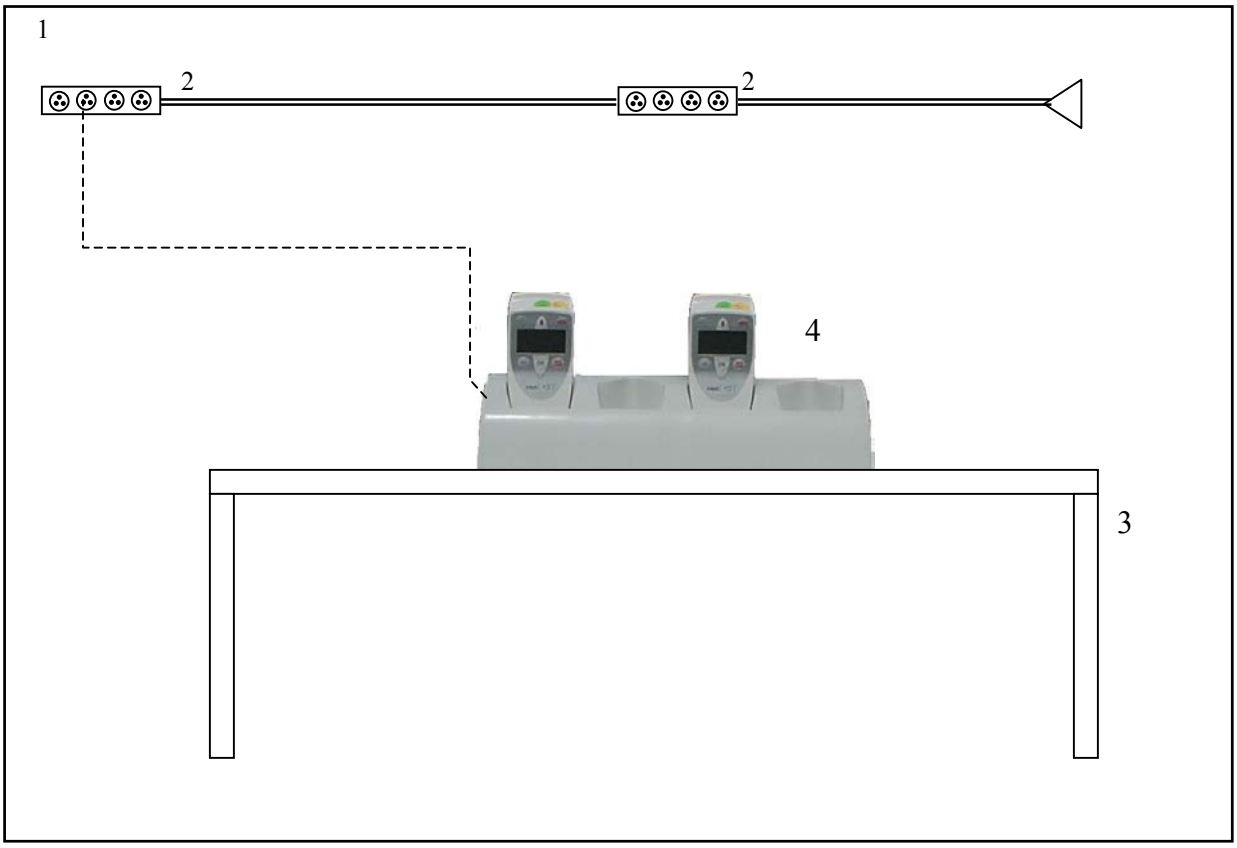
4.1. Introduction

As required in 47 CFR, Parts 2 and 15, the methods employed to test the radiated and conducted emissions (as applicable) of the EUT are those contained within the American National Standards Institute (ANSI) document C63.4-2001, titled "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz." All applicable FCC Rule Sections that provide further guidance for performance of such testing are also observed.

For General Test Configuration please refer to Figure 1 on the following page.

Digital devices sold in Canada are required to comply with the Interference Causing Equipment Standard for Digital Apparatus, ICES-003. These test methods and limits are specified in the Canadian Standards Association's (CSA) Standard C108.8-M1983 (1-1-94 version) and are "essentially equivalent" with FCC, Part 15 and CISPR 22 (EN55022) rules for unintentional radiators per EMCAB-3, Issue 3 (May 1998). No further testing is required for compliance to ICES-003.

Figure 1. General EUT Test Setup Diagram



NOT TO SCALE

CONFIGURATION LEGEND

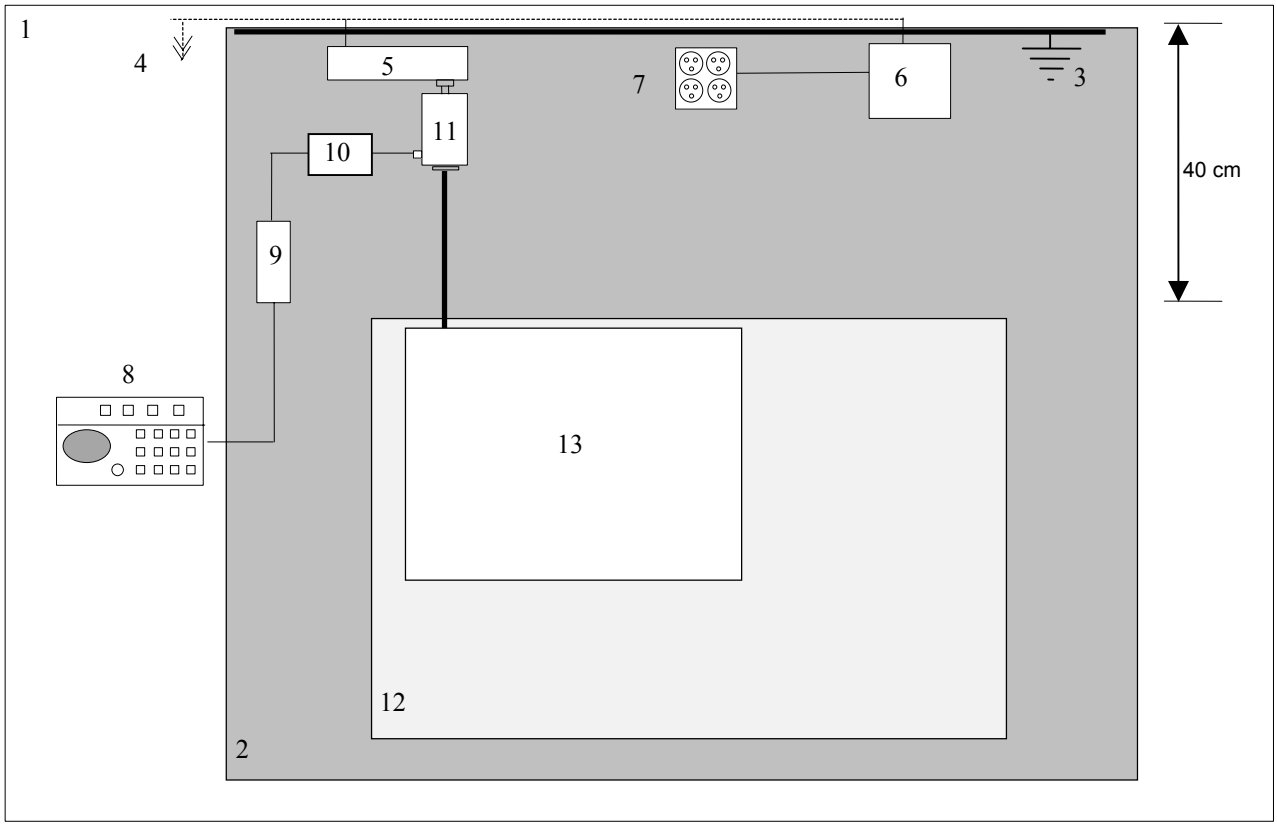
1. Test Laboratory
2. AC Power for Peripheral Devices (120V, 60 cycles, single phase)
3. Non-Conducting tables 80 cm above ground plane
4. EUT: Hand Held Scanners and charging station

4.2. Configuration and Methods of Measurements for Conducted Emissions

Section 7 of ANSI C63.4 determines the general configuration of the EUT and associated equipment, as well as the test platform for conducted emissions testing. Tabletop devices are placed on a non-conducting surface 80 centimeters above the ground plane floor and 40 centimeters from the ground plane wall. The EUT and associated system are configured to operate continuously, representing a "normally operating" mode. The EUT is powered via a Line Impedance Stabilization Network (LISN). The emissions are recorded using the required bandwidth of 9 kHz in the quasi-peak mode. The average amplitude is also observed employing a 10 kHz bandwidth to determine the presence of broadband RFI. When such interference is caused by broadband sources (as defined by the FCC and ANSI Rules), the deviation guidelines contained in Section 11.3.1 of ANSI C63.4 are employed, which allows a correction factor of 13 dB to be subtracted from the quasi-peak reading. The emission levels are then compared to the applicable FCC limits to determine compliance.

For Conducted Emissions Test Configuration please refer to Figure 2 on the following page.

Figure 2. Conducted Emissions Test Setup Diagram



NOT TO SCALE

CONFIGURATION LEGEND

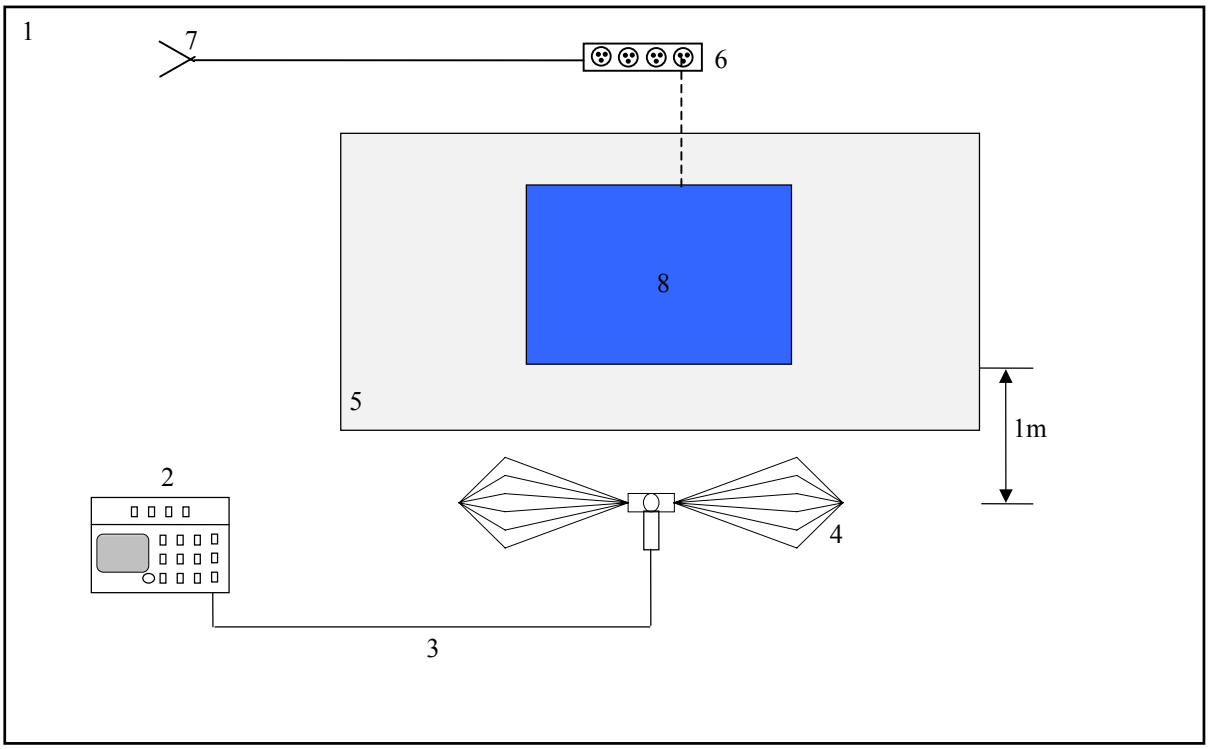
1. Test Laboratory (6 X 6 meters)
2. Ground Plane (15 square meters)
3. Vertical Conducting Wall (Grounded through Ground Plane via 10' ground rod)
4. AC Power for Devices
5. Power Line Filter, Lindgren, 120 dB, 30 amp
6. Line Impedance Stabilization Network (LISN) for peripheral devices
7. Power Distribution Box for peripheral devices
8. Spectrum Analyzer with Quasi-Peak Adapter
9. High Pass Filter
10. Transient Limiter
11. LISN for EUT
12. Non-Conducting table 80 cm above ground plane
13. EUT: Hand Held Scanners and charging station

4.3. Configuration and Methods of Measurements for Frequency Identification

When performing all testing of equipment, the actual emissions of the EUT are segregated from ambient signals present within the laboratory or the open-field test range. Preliminary testing is performed to ensure that ambient signals are sufficiently low to allow for proper observation of the emissions from the EUT. Incoming power lines are filtered using a 120 dB, 30-ampere; 115/208-volt filter to assist in reducing ambient signals for tests of levels of conducted emissions. Ambients within the laboratory are compared to those noted at the nearby open-field site to discriminate between signals produced from the EUT and ambient signals. In the event that a significant emission is produced by the EUT at a frequency which is also demonstrating significant ambient signals, the spectrum analyzer is placed in the peak mode, the bandwidth is narrowed, the EUT's signal is centered on the analyzer, the scan width is expanded to 50 kHz while monitoring the audio to ensure that only the EUT signal is present, the analyzer is switched to quasi-peak mode, and the level of the EUT signal is recorded.

For Frequency ID Test Configuration please refer to Figure 3 on the following page.

Figure 3. Frequency ID of Radiated Emissions Test Setup Diagram



NOT TO SCALE

CONFIGURATION LEGEND

1. Test Laboratory
2. Spectrum Analyzer with Quasi-Peak Adapter
3. Coax interconnect from Antenna to Spectrum Analyzer
4. Receive Antenna (basic relative position)
5. Non-Conducting table 80 cm above ground plane
6. Power strip for EUT and peripherals
7. AC power for devices
8. EUT: Hand Held Scanners and charging station

4.4. Configuration and Methods of Measurements for Radiated Emissions

Section 8 of ANSI C63.4 determines the general configuration and procedures for measuring the radiated emissions of equipment under test. Initially, the primary emission frequencies are identified inside the test lab by positioning a broadband receive antenna one meter from the EUT to locate frequencies of significant radiation. Next, the EUT and associated system are placed on a turntable on a ten meter open area test site (registered with the FCC in accord with its Rules and ANSI C63.4) and the receive antenna is located at a distance of ten meters from the EUT.

The EUT and associated system are configured to operate continuously, representing a "normally operating" mode. All significant radiated emissions are recorded when maximum radiation on each frequency is observed, in accordance with part 8 of ANSI C63.4-2001 and Section 15.33 of the FCC Rules. To ensure that the maximum emission at each discrete frequency of interest is observed, the receive antenna is varied in height from one to four meters and rotated to horizontal and vertical polarities, and the turntable is also rotated to determine the worst emitting configuration. The numerical results of the test are included herein to demonstrate compliance.

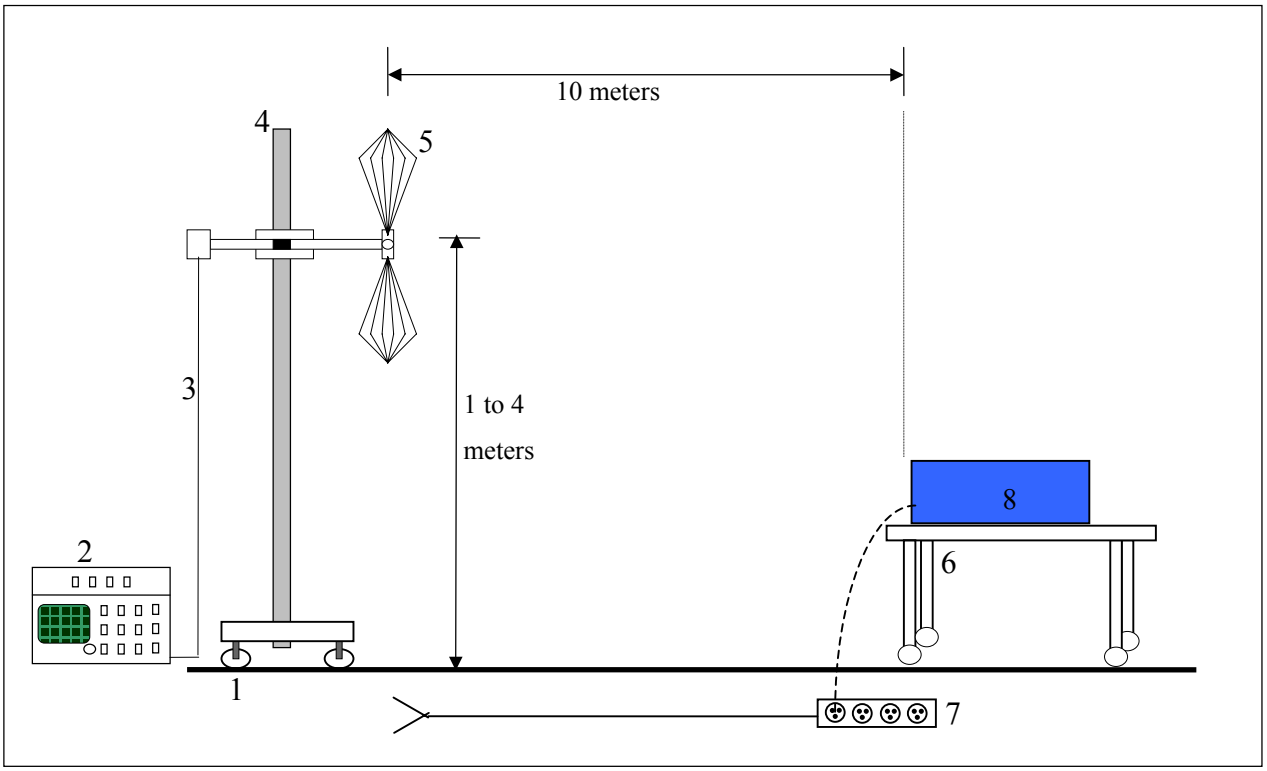
The numerical results that are applied to the emissions limits are arrived at by the following method:
Example: A=RR+CL+AF
A = Amplitude dBuV/M
RR = Receiver Reading dBuV
CL = cable loss dB
AF = antenna factor dBm-1

Example Frequency = 110MHz
18.5 dBuV (spectrum analyzer reading)
+3.0 dB (cable loss @ frequency)
21.5 dBuV
+15.4 dBm-1 (antenna factor @ frequency)
36.9 dBuV/M Final adjusted value

The final adjusted value is then compared to the appropriate emission limit to determine compliance.

For Radiated Emissions Test Configuration please refer to Figure 4 on the following page.

Figure 4. Radiated Emissions Test Setup Diagram



NOT TO SCALE

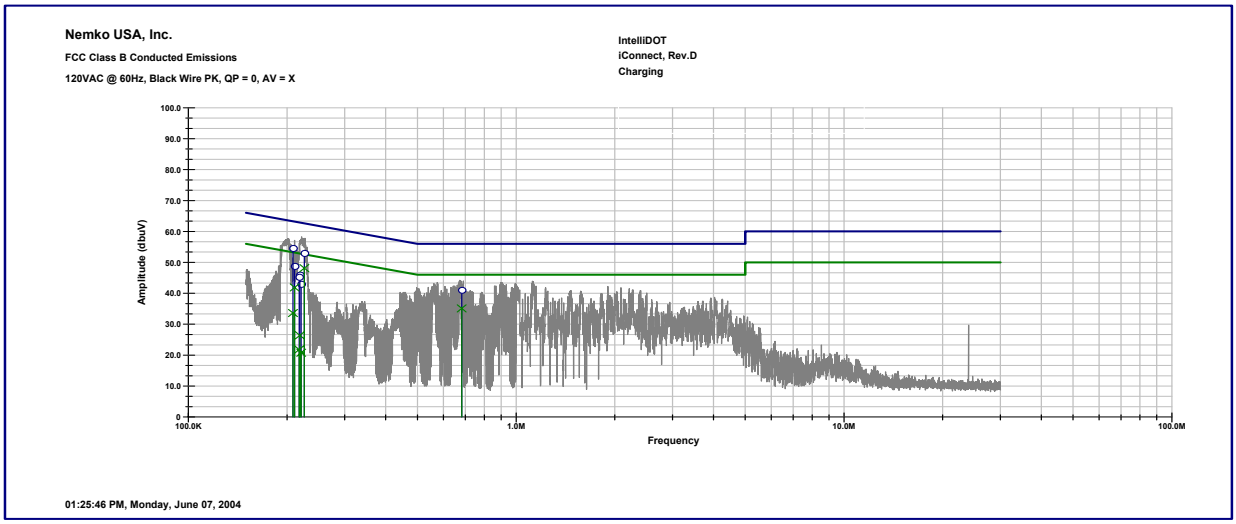
CONFIGURATION LEGEND

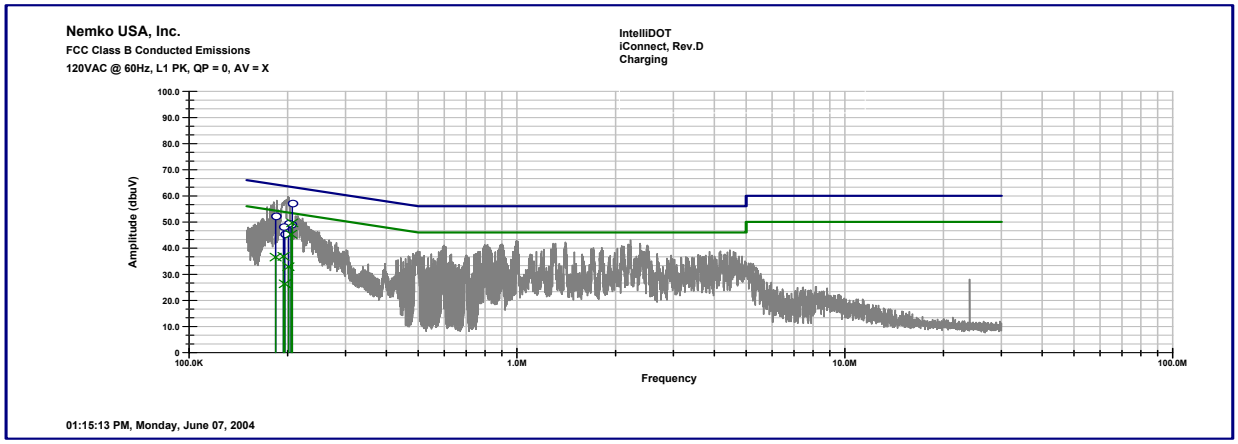
1. Ground plane (11 X 17 meters)
2. Spectrum Analyzer with Quasi-Peak Adapter
3. Coax interconnect from Receive Antenna to Spectrum Analyzer
4. Antenna Mast with motorized mounting assembly
5. Receive Antenna (basic relative position)
6. Non-Conducting table 80 cm above ground plane
7. AC power for devices
8. EUT: Hand Held Scanner and Associated System

5. TEST RESULTS

5.1. Conducted Emissions Test Data

Client	IntelliDOT	Temperature	73	deg F
PAN #	24-139-INT	Relative Humidity	55	%
EUT Name	Hand Held Scanner	Barometric Pressure	30.22	Hg
EUT Model	iConnect	Test Location	Enclosure 2	
Governing Doc	CFR 47, Part 15B	Test Engineer	Mike Krumweide	
Basic Standard	ANSI C63.4	Date	6/7/04	





Frequency MHz	QP dB	QP Limit	QP Result	Ave. reading dB	Average Limit	Ave. Result	RESULT
.1837	52.3	64	-11.7	36.6	54	-17.7	PASS
.194	48.24	63	-14.76	36.8	53	-16.2	PASS
.1959	45.44	63	-17.56	26.3	53	-26.7	PASS
.2012	49.5	63	-13.5	32.9	53	-20.1	PASS
.2048	49.13	63	-13.87	45.3	53	-7.7	PASS
.2066	49.6	63	-13.4	49.6	53	-3.4	PASS

Plots above – 0 – indicated QP level / x – indicated average levels

Conducted Emissions Test Equipment

Client	IntelliDOT	EUT Name	Hand Held Scanner
PAN #	24-139-INT	EUT Model	iConnect

Device Type	*Model #*	*Asset #*	*Used*	*Cal Done*	*Cal Due*
Pre-Amplifier					
Amplifier, HP	8447A	342	X	2/27/04	2/27/05
Amplifier, HP	8447F	242			
Amplifier, HP	8447A	166			
Amplifier, HP	8447A	603			
Filter / Limiter					
High Pass Filter, Solar	7801-50	574	X	2/27/04	2/27/05
Transient Limiter, HP	11947A	682	X	8/6/03	8/6/04
Transducer					
LISN, EMCO	3825/2 – FCC	147			
LISN, Electro-Metrics	LISN – VDE	425			
V-Network LISN, Solar	9348-50-R-24-BNC	384			
V-Network LISN, Solar	9348-50-R-24-BNC	395	X	9/16/03	9/16/04
Voltage Line Probe, EMCO	3701	471			
LISN, Solar	8602-50-TS-50-N	424			
LISN, Solar	8602-50-TS-50-N	423			
Spectrum Analyzer / Receiver					
Quasi-Peak Adapter, HP Spectrum Analyzer Display, HP Spectrum Analyzer, HP	85650A 85662A 8566B	533 404 104			
RF Preselector, HP	85650A	673			
Quasi-Peak Adapter, HP Spectrum Analyzer Display, HP Spectrum Analyzer, HP	85650A 85662A 8568B	438 534 107	X	4/22/04	10/22/04
Quasi-Peak Adapter, HP Spectrum Analyzer Display, HP Spectrum Analyzer, HP	85650A 85662A 8568B	676 675 674			
RF Preselector, HP	85685A	403			
Spectrum Analyzer, Advantest	R3261	523			

5.2. Radiated Emissions Test Data

NEMKO USA, Inc.

San Diego Headquarters:
11696 Sorrento Valley Rd.
San Diego, CA 92121
Tel: (858) 755-5525
Fax: (858) 452-1810

Radiated Emissions Data

Complete _____ Job # : 24-139-INT Test # : _____
Preliminary _____ Page 1 of 1

Client Name : IntelliDOT
EUT Name : Wireless Scanner
EUT Model # : iConnect
EUT Part # :
EUT Serial # :
EUT Config. : 1 unit charging

Specification : CFR47 Part 15, Subpart B, Class A Reference :

Rod. Ant. #:	NA	Temp. (deg. C) :		Date :	6/8/2004
Bicon Ant.#:	116	Humidity (%) :		Time :	
Log Ant.#:	112	EUT Voltage :	120	Staff :	Mike Krumweide
DRG Ant. #	NA	EUT Frequency :	60	Photo ID:	
Dipole Ant.#:	NA	Phase:	1	Peak Bandwidth:	
Cable#:	SOATS2	Location:	SOATS	Video Bandwidth	
Preamp#:	NA	Distance:	10m		
Spec An.#:	711				
QP #:	538				
PreSelect#:	NA				

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail Unc.	Comment
216	V		19.7	11.1	1.8	0.0	32.6	46.4	-13.8	Pass	
264	V		23.2	12.1	1.8	0.0	37.1	46.4	-9.3	Pass	
288	V		15.2	13.1	1.8	0.0	30.1	46.4	-16.3	Pass	
312	V		23.4	14.9	1.8	0.0	40.1	46.4	-6.3	Pass	
360	V		19.5	14.2	1.8	0.0	35.5	46.4	-10.9	Pass	
456	V		8.5	15.9	1.8	0.0	26.2	46.4	-20.2	Pass	

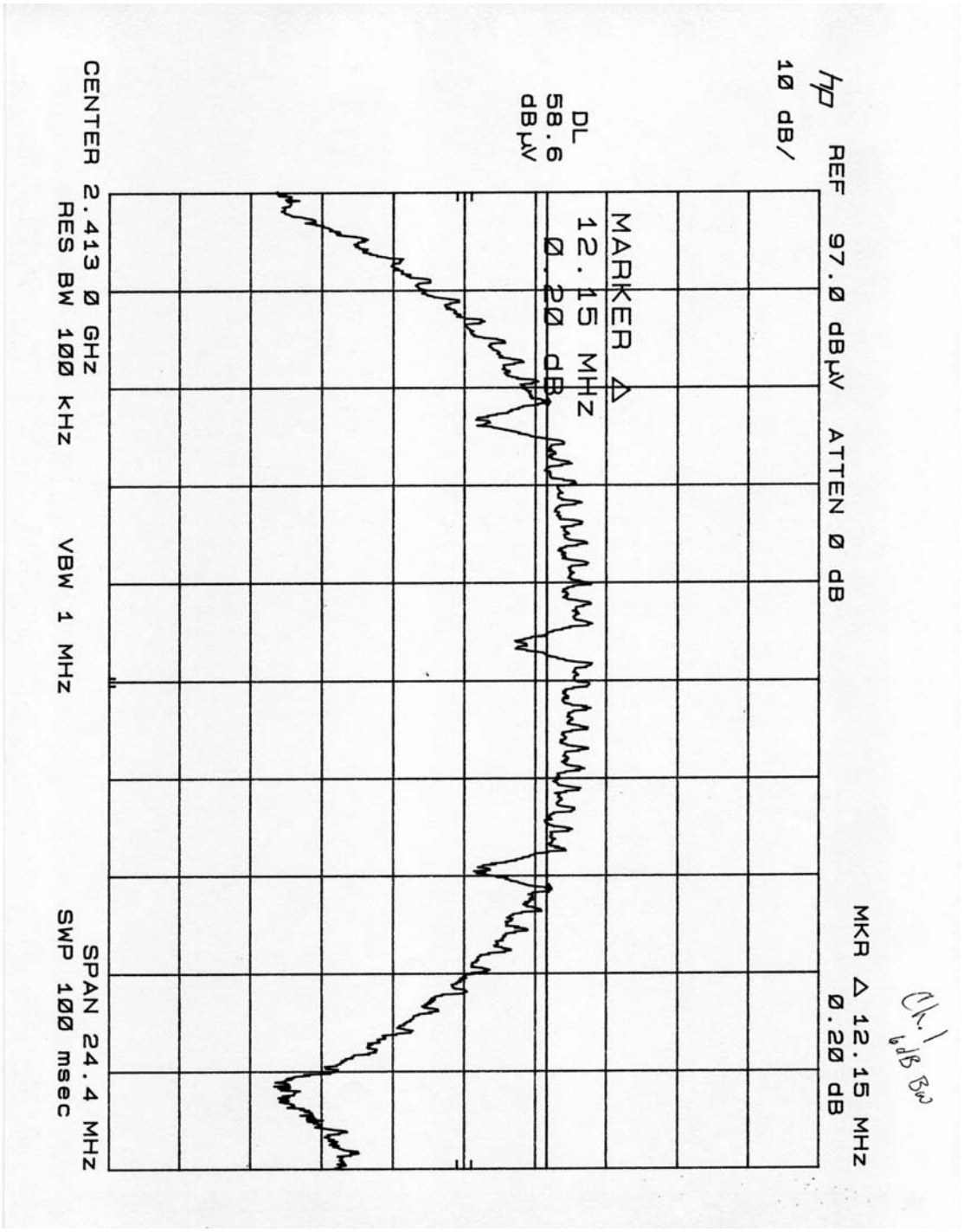
Radiated Emissions Test Equipment

Client	IntelliDOT	EUT Name	Hand Held Scanner
PAN #	24-139-INT	EUT Model	iConnect

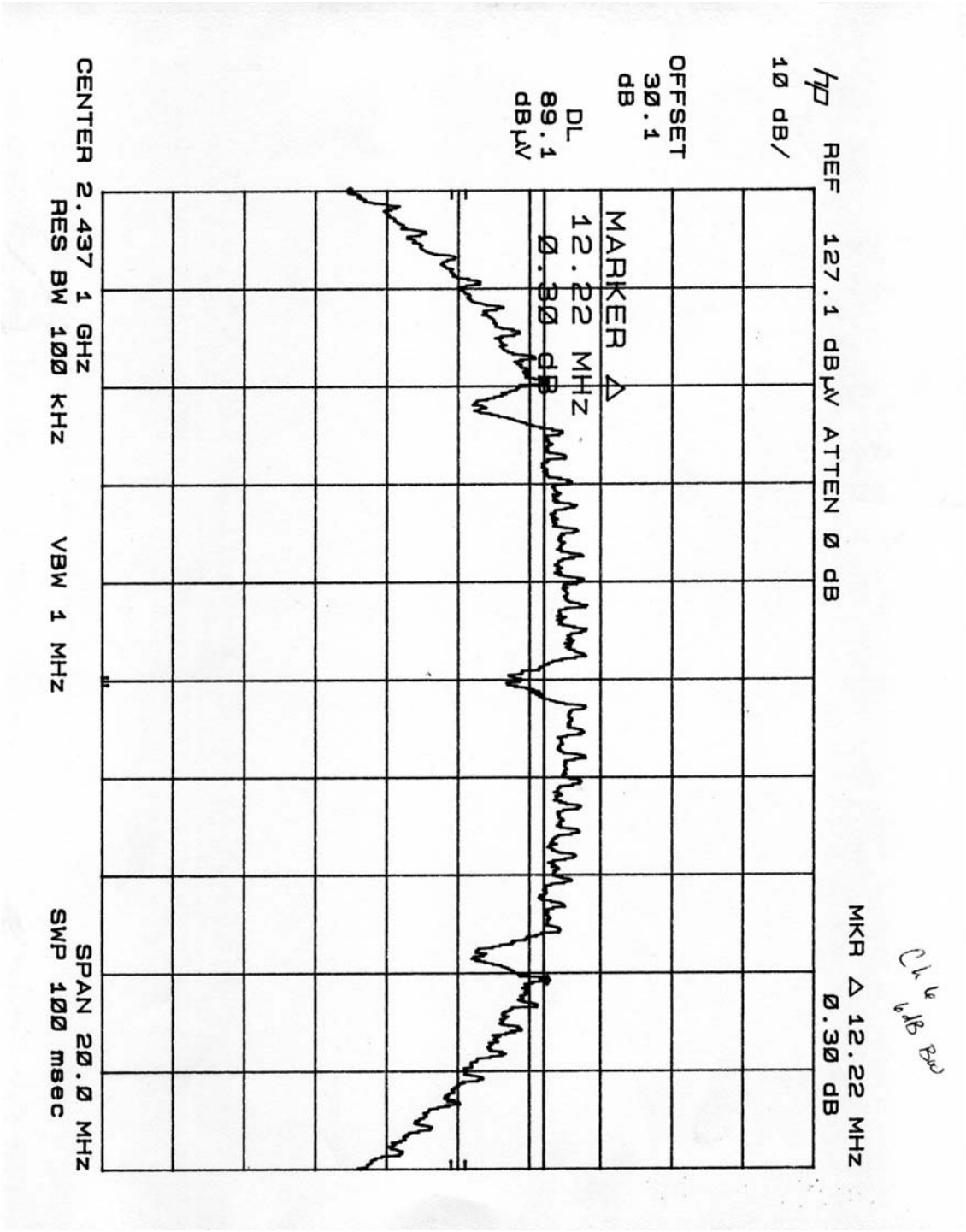
Device Type	*Model #*	*Asset #*	*Used*	*Cal Done*	*Cal Due*
Pre-Amplifier					
Amplifier, HP	8447A	342			
Amplifier, HP	8447F	242			
Amplifier, HP	8447A	166			
Amplifier, HP	8447A	603			
Amplifier, HP	8449A	317	X	10/16/03	10/16/04
Amplifier, Mini-Circuits	ZHL-1042J	831	X	5/13/04	5/13/05
Amplifier, Mini-Circuits	ZHL-2	635			
Amplifier, Mini-Circuits					
Antenna OATS #1 (North)					
Antenna, Biconical	EMCO				
Antenna, Log Periodic					
Antenna, Ridged Guide	3115				
Antenna, Loop	ALR-25M				
Antenna, Rod	RVR-25M				
Antenna OATS #1 (South)					
Antenna, Biconical	3110	116	X	7/22/03	7/22/04
Antenna, Log Periodic	3146	112	X	9/19/03	9/19/04
Antenna, Ridged Guide	3115	529	X	3/30/04	3/30/05
Antenna, Loop	ALR-25M				
Antenna, Rod	RVR-25M				
Spectrum Analyzer / Receiver					
Quasi-Peak Adapter, HP Spectrum Analyzer Display, HP Spectrum Analyzer, HP	85650A 85662A 8566B	533 404 104			
RF Preselector, HP	85650A	673			
Quasi-Peak Adapter, HP Spectrum Analyzer Display, HP Spectrum Analyzer, HP	85650A 85662A 8568B	438 534 107			
Quasi-Peak Adapter, HP Spectrum Analyzer Display, HP Spectrum Analyzer, HP	85650A 85662A 8566B	538 537 711	X X X	12/9/03 4/13/04 4/13/04	6/9/04 10/13/04 10/13/04
RF Preselector, HP	85685A	403			
Spectrum Analyzer, Advantest	R3261	523			

5.3. Occupied Bandwidth Test Data

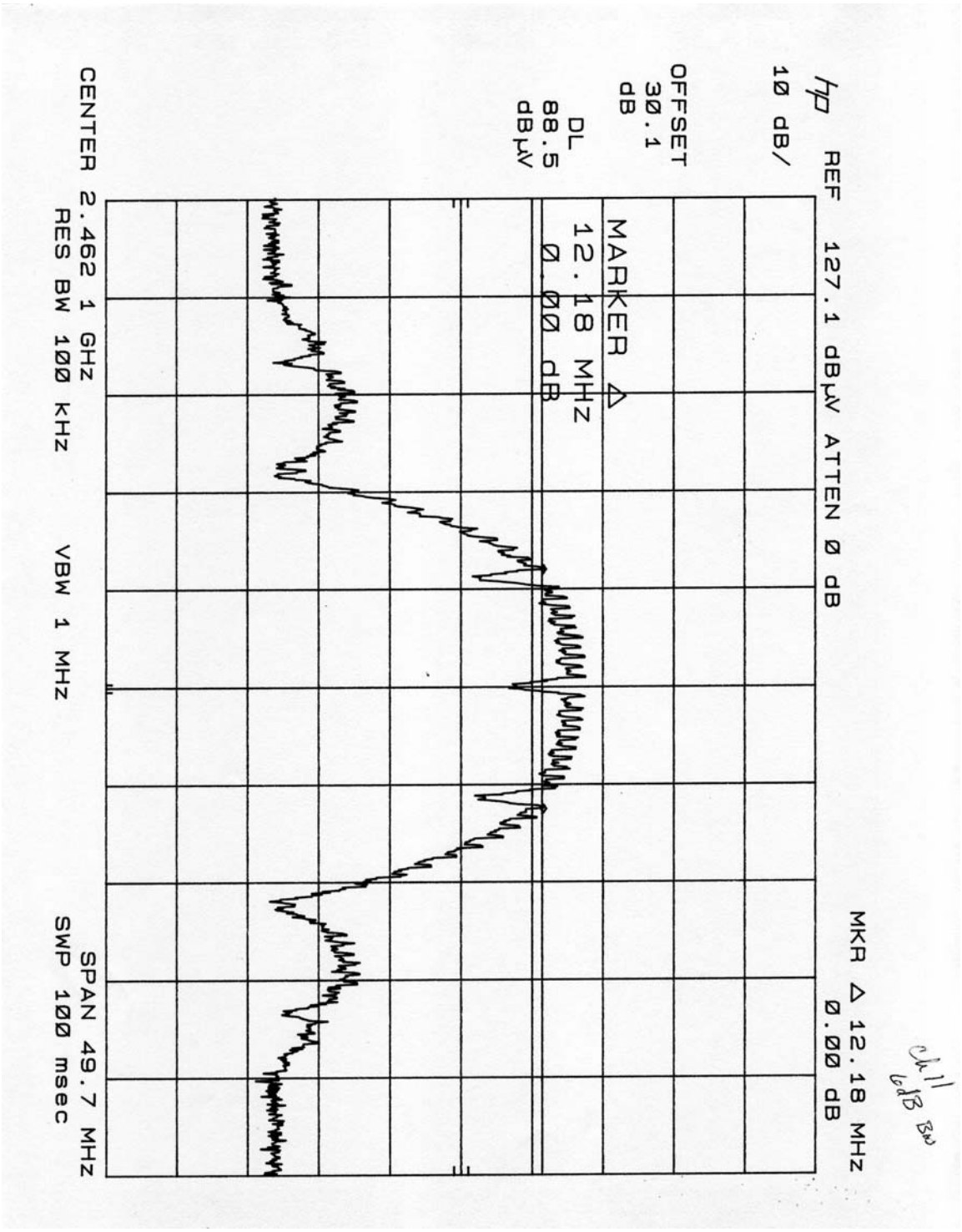
Channel 1



Channel 6


hp
REF 127.1 dBµV ATTEN Ø dB
10 dB/
OFFSET
30.1
dB
DL
89.1
dBµV
MARKER Δ
12.22 MHz
Ø.30 dB
MKR Δ 12.22 MHz
Ø.30 dB
CENTER 2.437 1 GHz
RES BW 100 kHz
VBW 1 MHz
SPAN 20.Ø MHz
SWP 100 msec

Channel 11


hp
REF 127.1 dBµV ATTEN 0 dB
10 dB/
OFFSET
30.1
dB
DL
88.5
dBµV
MARKER Δ
12.18 MHz
0.00 dB
MKR Δ 12.18 MHz
0.00 dB
CENTER 2.462 1 GHz
RES BW 100 kHz
VBW 1 MHz
SPAN 49.7 MHz
SWP 100 msec
ch 11
6dB BW

5.4. Power Output Test Data and Radiated Spurious data

Intellidot – Power output The levels in the table below were calculated from the Radiated Emissions measurements.

The antenna is integral to the device so it was not feasible to perform conducted power measurements.

Frequency	dBµV/m	dBµV/m Correction	E (V/M)	Pr	Pt mW	Power in dBm
2411	98.9	109.8	.309	2.53E-4	28.5	14.57
2436	99	109.9	.3126	2.59E-4	29.3	14.67
2461.1	98.5	109.4	.2951	2.3E-4	26.1	14.17

BW correction is 20 Log (BW/RES BW) ….. ---- 20 Log (12.2/1) = 10.9dB

Pr = power received ….. Pr = E^2/377

Pt = power transmitted ….. Pt = Pr * 4 * π * (d^2)

d = distance between EUT and measurement antenna

NEMKO USA, Inc.

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San Diego, CA 92121
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Fax: (858) 452-1810

Radiated Emissions Data

Complete _____ Job # : _____ Test # : _____
Preliminary _____ Page 1 of 1

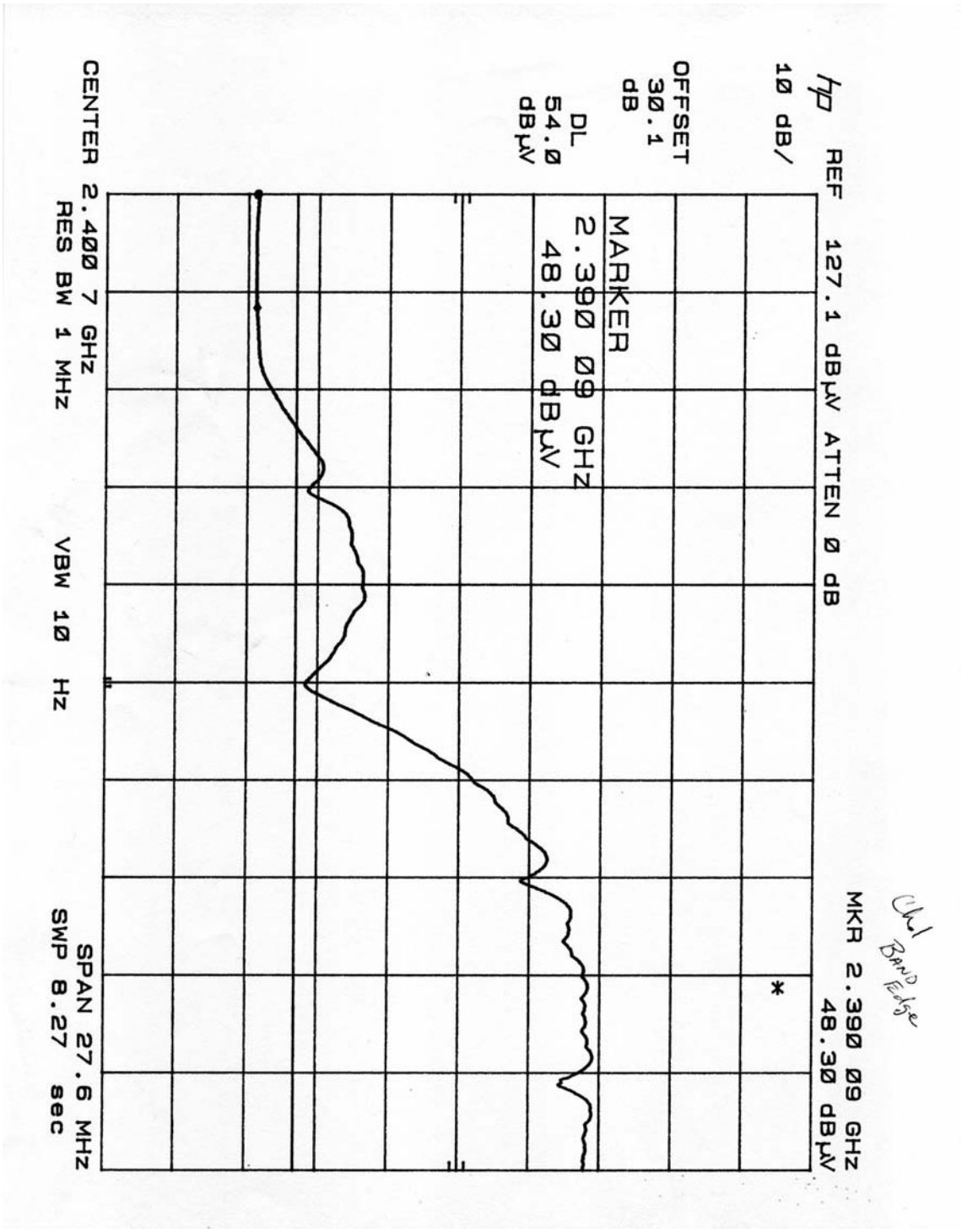
Client Name : IntelliDOT
EUT Name : Wireless Scanner
EUT Model # : iConnect, rev.D
EUT Part # :
EUT Serial # :
EUT Config. : Continuous transmit

Specification : FCC Part 15.247 Reference :
Rod. Ant. #: NA Temp. (deg. C) : Date : 6/19/2004
Bicon Ant.#: NA Humidity (%) : Time :
Log Ant.#: NA EUT Voltage : Staff : M.Krumweide - C.Fleury
DRG Ant. # 529 EUT Frequency : Photo ID:
Dipole Ant.#: NA Phase: Peak Bandwidth: 1 MHz/1MHz
Cable#: Wireless Location: SOATS Ave. Bandwidth 1 MHz/10Hz
Preamp#: NA Distance: 3m
Spec An.#: NA
QP #: NA
PreSelect#: NA

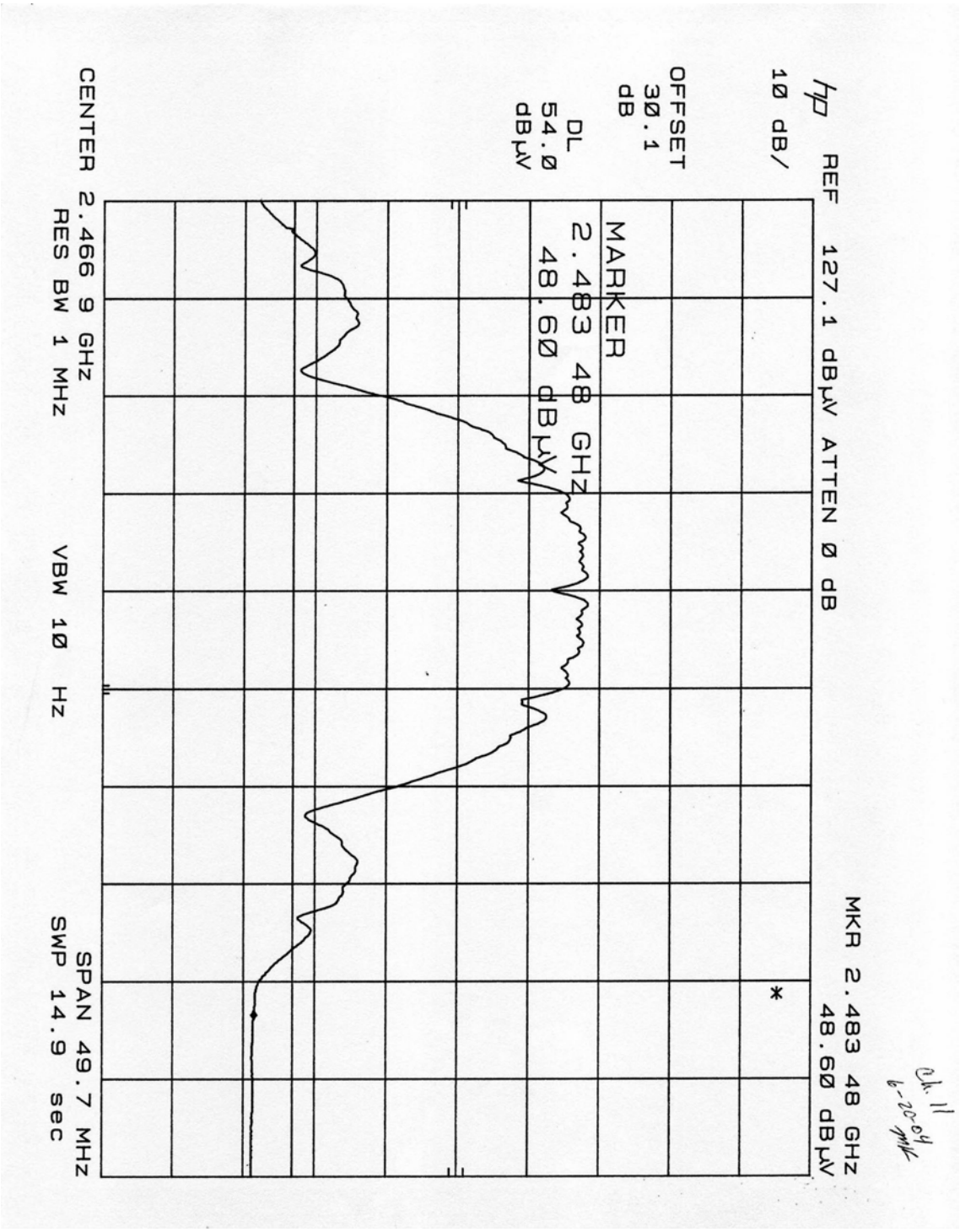
Meas. Freq. (MHz)	Ant. Pol. (H/V)	Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail Unc.	Comment
2462.1	V		68.4	28.1	2.0	0.0	98.5	125.2	-26.7	Pass	Fund Power ch 11
2483.5	V		24.9	28.1	2.0	0.0	55.0	74.0	-19.0	Pass	Peak bandedge ch11
2483.5	V		18.5	28.1	2.0	0.0	48.6	54.0	-5.4	Pass	Average bandedge ch11
2411	V		68.8	28.1	2.0	0.0	98.9	125.2	-26.3	Pass	Fund Power ch 1
2390	V		25	28.1	2.0	0.0	55.1	74.0	18.9	Pass	Peak bandedge ch 1
2390	V		18.8	28.1	2.0	0.0	49.0	54.0	-5.0	Pass	Average bandedge ch 1
2397.2	V		33.8	28.1	2.0	0.0	64.0	78.9	-10.0	Pass	20dB below fundamental
2436	V		68.9	28.1	2.0	0.0	99.0	125.2	-26.2	Pass	Fund Power ch 6
4872	V		6.3	32.8	3.0	0.0	42.1	54.0	-11.9	Pass	avg
4872			16.2	32.8	3.0	0.0	52.0	74.0	-22.0	Pass	pk
9744	V		6.8	38	5.3	0.0	50.1	78.5	-28.4	Pass	20dB of fund
4822	V		13.7	32.8	3.0	0.0	49.5	74.0	-24.5	Pass	pk
4822	V		4.1	32.8	3.0	0.0	39.9	54.0	-14.1	Pass	avg
9644	V		10.9	38	5.3	0.0	54.2	78.5	-24.3	Pass	20dB of fund
4924	V		13.3	32.8	3.0	0.0	49.1	74.0	-24.9	Pass	pk
4924	V		3.6	32.8	3.0	0.0	39.4	54.0	-14.6	Pass	avg
9848	V		11.4	38	5.3	0.0	54.7	78.5	-23.8	Pass	20dB of fund

5.5. Spurious Emission and Band Edge Data

Channel 1

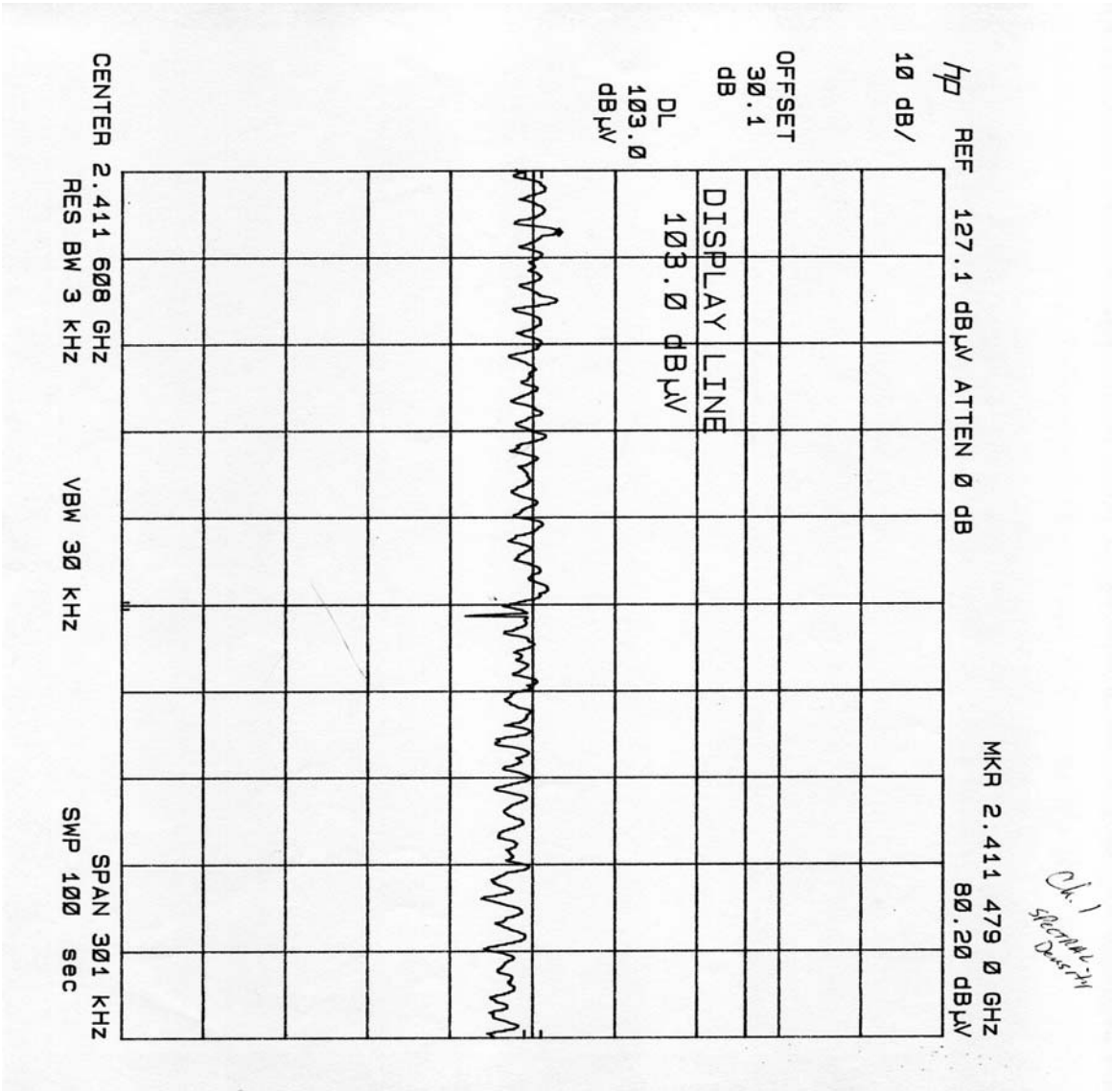


Channel 11


hp
REF 127.1 dBµV ATTEN 0 dB
10 dB/
OFFSET
30.1
dB
DL
54.0
dBµV
MARKER
2.483 48 GHz
48.60 dBµV
MKR 2.483 48 GHz
48.60 dBµV
CENTER 2.466 9 GHz
RES BW 1 MHz
VBW 10 Hz
SPAN 49.7 MHz
SWP 14.9 sec
Ch. 11
6-20-04

5.6. Peak Power Spectral Density Data

Channel 1



Since conducted measurements were unable to be made the power density readings were taken on the OATS.

The Correction factor is the typical free space calculation

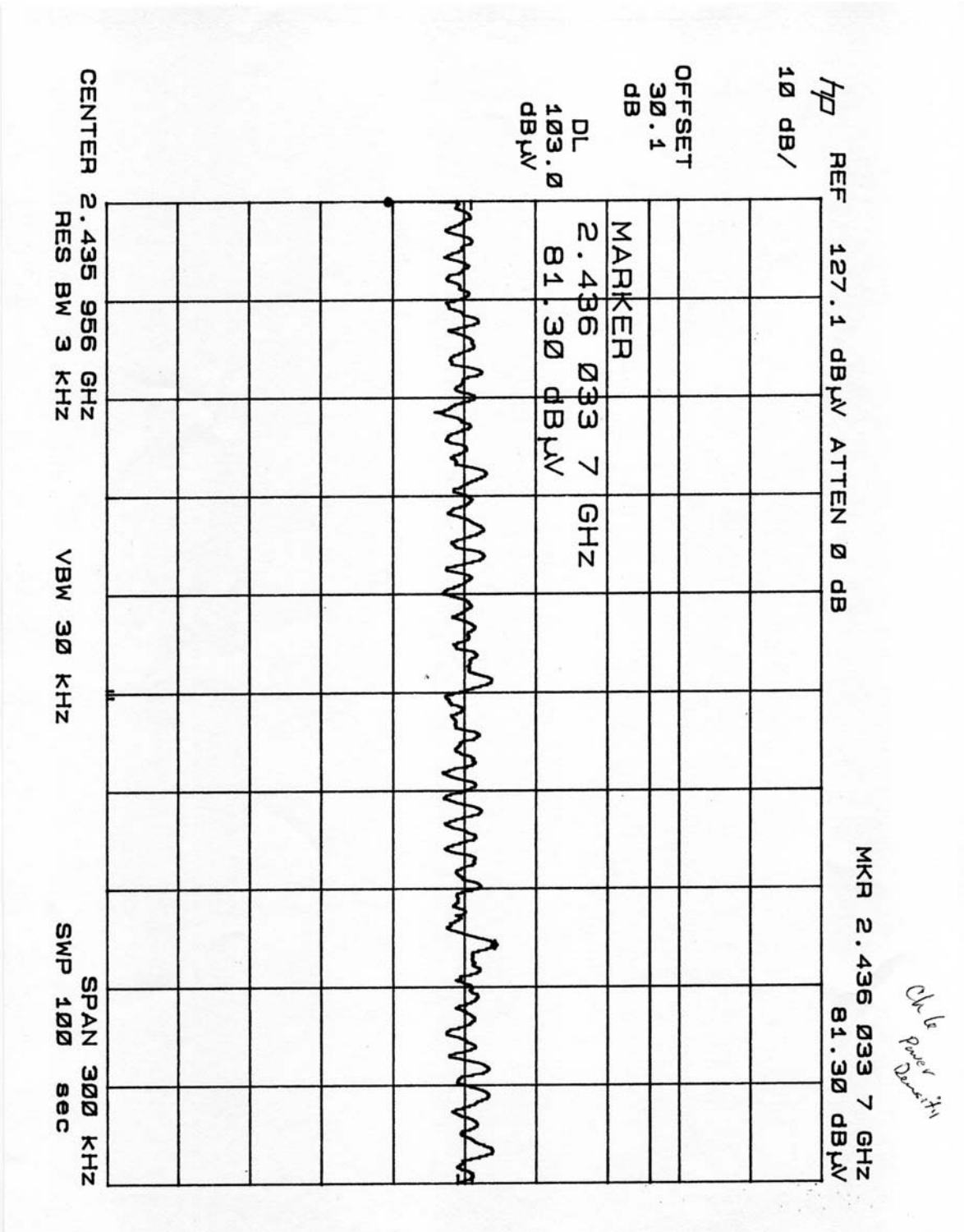
$10^{(103.23dB\mu V/m/20)}=1.45E5$

Pr = ((1.45E5 * 1E-6)^2)/377

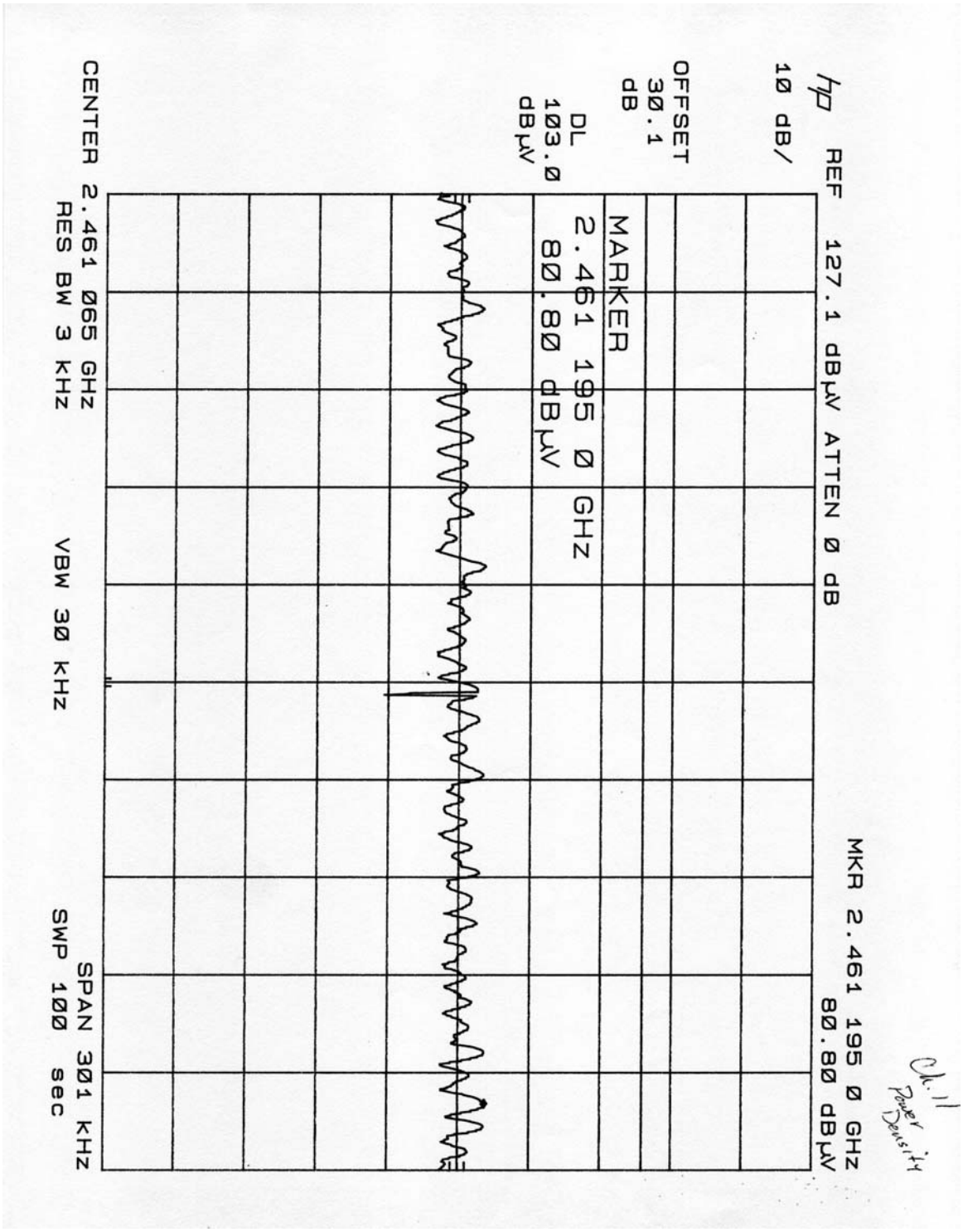
Pt = 5.58E-5 *4*PI*9

Pt = 10 Log (6.31E-3 / 1E-3) = 8dBm

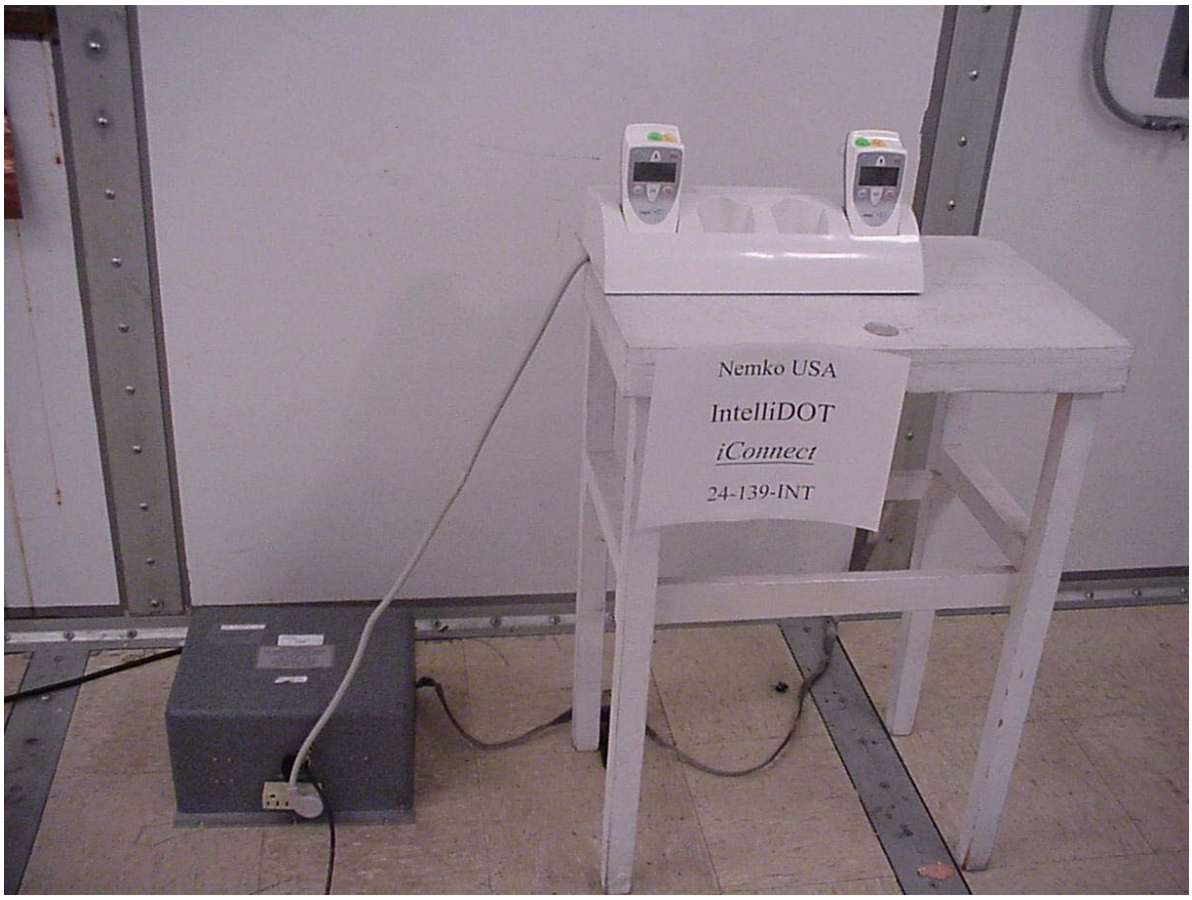
Channel 6


hp
REF 127.1 dBµV ATTEN Ø dB
10 dB/
OFFSET
30.1
dB
DL
103.Ø
dBµV
MARKER
2.436 Ø33 7 GHz
81.3Ø dBµV
MKR 2.436 Ø33 7 GHz
81.3Ø dBµV
CENTER 2.435 956 GHz
RES BW 3 kHz
VBW 3Ø kHz
SPAN 3ØØ kHz
SWP 1ØØ sec

Channel 11


REF 127.1 dBµV ATTEN Ø dB
10 dB/
OFFSET
30.1
dB
DL
103.Ø
dBµV
MARKER
2.461 195 Ø GHz
8Ø.8Ø dBµV
MKR 2.461 195 Ø GHz
8Ø.8Ø dBµV
CENTER 2.461 Ø65 GHz
RES BW 3 kHz
VBW 3Ø kHz
SPAN 3Ø1 kHz
SWP 1ØØ sec
Ch. 11
Power Density

Photograph 1. Conducted Emissions Test Configuration



Photograph 2. Radiated Emissions Test Configuration

Photograph 3. Intentional RF Emissions Test Configuration

APPENDIX A
A. Conducted & Radiated Emissions Measurement Uncertainties

1. Introduction

ISO Standard 17025 and ANSI/NCSL Z540-1(1994) require that all measurements contained in a test report be "traceable". "Traceability" is defined in the *International Vocabulary of Basic and General Terms in Metrology* (ISO: 1993) as: "the property of the result of a measurement... whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons, *all having stated uncertainties*".

The purposes of this Appendix are to "state the *Measurement Uncertainties*" of the conducted emissions and radiated emissions measurements contained in Section 5 of this Test Report, and to provide a practical explanation of the meaning of these measurement uncertainties.

2. Statement of the Worst-Case Measurement Uncertainties for the Conducted and Radiated Emissions Measurements Contained in This Test Report

Table 1: Worst-Case Expanded Uncertainty "U" of Measurement for a k=2 Coverage Factor

Conducted Emissions Measurement Detection Systems	**Applicable Frequency Range**	**"U" for a k=2 Coverage Factor**
HP8568B Spectrum Analyzer with QPA and HP8447F Preamplifier	150 kHz - 30 MHz	+/- 3.0 dB
HP8566B Spectrum Analyzer with QPA and Preselector	9 kHz - 30 MHz	+/- 2.9 dB
Radiated Emissions Measurement Detection Systems	**Applicable Frequency Range**	**"U" for a k=2 Coverage Factor**
HP8568B Spectrum Analyzer with QPA & HP8447F Preamplifier	30 MHz - 200 MHz	+4.0 dB, -4.1 dB
HP8568B Spectrum Analyzer with QPA & HP8447F Preamplifier	200 MHz-1000 MHz	+/- 3.5 dB
HP8566B Spectrum Analyzer with QPA & Preselector	30 MHz - 200 MHz	+3.9 dB, -4.0 dB
HP8566B Spectrum Analyzer with QPA & Preselector	200 MHz-1000 MHz	+/- 3.4 dB
HP8566B Spectrum Analyzer with QPA & HP 8449A Preamplifier	1 GHz - 18 GHz	+2.5 dB, -2.6 dB
HP8566B Spectrum Analyzer with QPA & HP8449A Preamplifier	18 GHz - 40 GHz	+/- 3.4 dB

NOTES:
1. Applies to 3 and 10 meter measurement distances
2. Applies to all valid combinations of Transducers (i.e. LISNs, Line Voltage Probes, and Antennas, as appropriate)
3. Excludes the Repeatability of the EUT

3. Practical Explanation of the Meaning of the Conducted and Radiated Emissions Measurement Uncertainties

In general, a "Statement of Measurement Uncertainty" means that with a certain (specified) confidence level, the "true" value of a measurand will be between a (stated) upper bound and a (stated) lower bound.

In the specific case of EMC Measurements in this test report, the measurement uncertainties of the conducted emissions measurements and the radiated emissions measurements have been calculated in accordance with the method detailed in the following documents:

- *ISO Guide to the Expression of Uncertainty in Measurement* (ISO, 1993)
- NIS 81:1994, *The Treatment of Uncertainty in EMC Measurements* (NAMAS, 1994)
- NIST Technical Note 1297(1994), *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results* (NIST, 1994)

The calculation method used in these documents requires that the stated uncertainty of the measurements be expressed as *an "expanded uncertainty", U, with a k=2 coverage factor*. The practical interpretation of this method of expressing measurement uncertainty is shown in the following example:

EXAMPLE: Assume that at 39.51 MHz, the (measured) radiated emissions level was equal to +26.5 dBuV/m, and that the +/- 2 standard deviations (i.e. 95% confidence level) measurement uncertainty was +/- 3.4 dB.

In the example above, the phrase "k = 2 Coverage Factor" simply means that the measurement uncertainty is stated to cover +/-2 standard deviations (i.e. a 95% confidence interval) about the measurand. The measurand is the radiated emissions measurement of +26.5 dBuV/m at 39.51 MHz, and the 95% bounds for the uncertainty are –3.4 dB to + 3.4 dB. One can thus be 95% confident that the "true" value of the radiated emissions measurement is between +23.1 dBuV/m and +29.5 dBuV/m. *In effect, this means that in the above example there is only a 2.5% chance that the "true" radiated emissions value exceeds +29.5 dBuV/m.*

APPENDIX B
B. Nemko USA, Inc.'s Test Equipment & Facilities Calibration Program

Nemko USA, Inc. operates a comprehensive Periodic Calibration Program in order to ensure the validity of all test data. Nemko USA's Periodic Calibration Program is fully compliant to the requirements of NVLAP Policy Guide PG-1-1988, ANSI/NCSL Z540-1 (1994), ISO 10012-1 (1993-05-01), ISO Standard 17025, ISO-9000 and EN 45001. Nemko USA, Inc.'s calibrations program therefore meets or exceed the US national commercial and military requirements [N.B. ANSI/NCSL Z540-1 (1994) replaces MIL-STD-45662A].

Specifically, all of Nemko USA's *primary reference standard devices* (e.g. vector voltmeters, multimeters, attenuators and terminations, RF power meters and their detector heads, oscilloscope mainframes and plug-ins, spectrum analyzers, RF preselectors, quasi-peak adapters, interference analyzers, impulse generators, signal generators and pulse/function generators, field-strength meters and their detector heads, etc.) and certain *secondary standard devices* (e.g. RF Preamplifiers used in CISPR 11/22 and FCC Part 15/18 tests) are periodically recalibrated by:

- A Nemko USA-approved independent (third party) metrology laboratory that uses NIST-traceable standards and that is ISO Guide 25-accredited as a calibration laboratories by NIST; or,
- A Nemko USA-approved independent (third party) metrology laboratory that uses NIST-traceable standards and that is ISO Guide 25-accredited as a calibration laboratory by another accreditation body (such as A2LA) that is mutually recognized by NIST; or,
- A manufacturer of Measurement and Test Equipment (M&TE), if the manufacturer uses NIST-traceable standards and is ISO Guide 25-accredited as calibration laboratory either by NIST or by another accreditation body (such as A2LA) that is mutually recognized by NIST; or
- A manufacturer of M&TE (or by a Nemko USA-approved independent third party metrology laboratory) that is not ISO Guide 25-accredited. (In these cases, Nemko USA conducts an annual audit of the manufacturer or metrology laboratory for the purposes of proving traceabilty to NIST, ensuring that adequate and repeatable calibration procedures are being applied, and verifying conformity with the other requirements of ISO Guide 25).

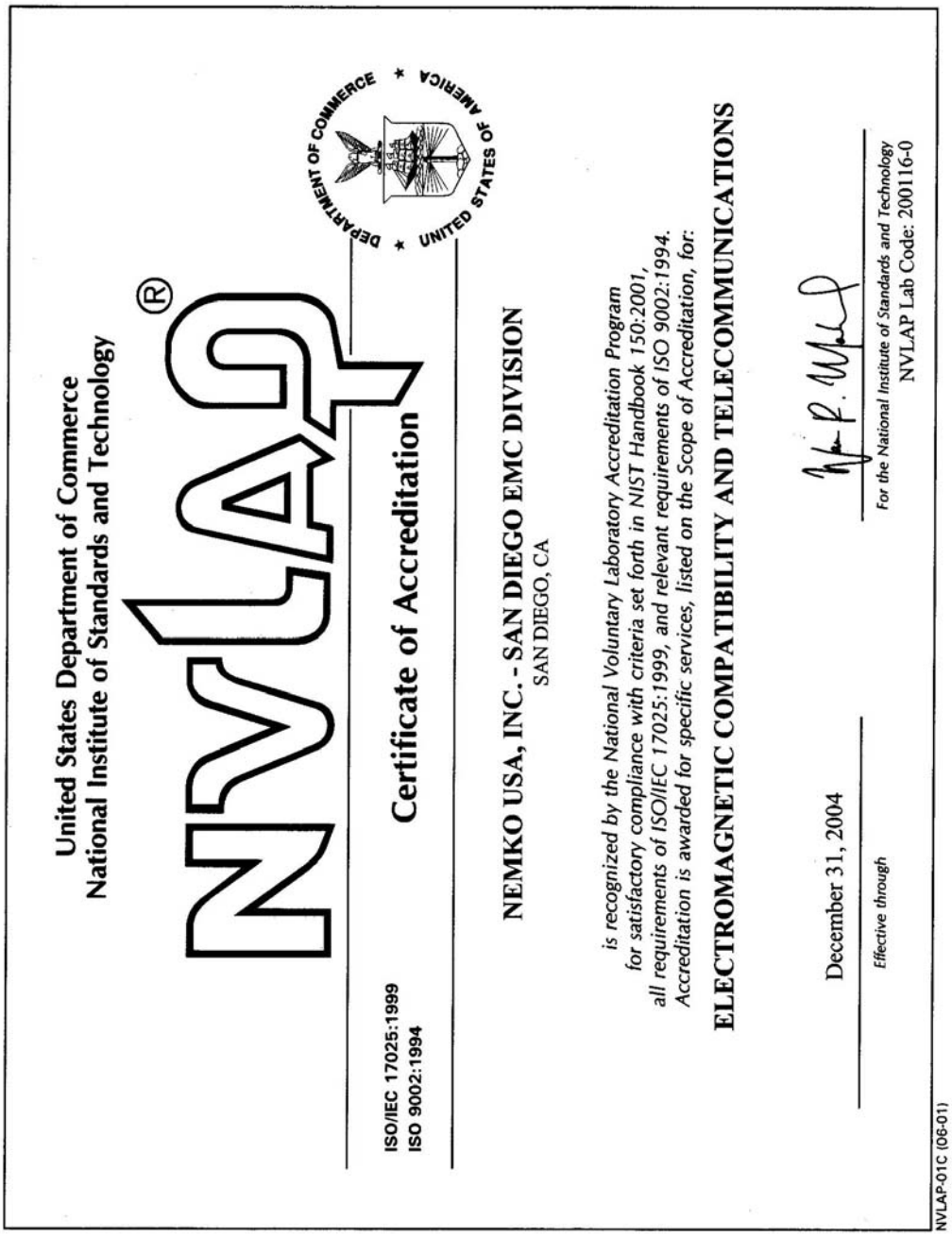
In all cases, the entity performing the Calibration is required to furnish Nemko USA with a calibration test report and/or certificate of calibration, and a "calibration sticker" on each item of M&TE that is successfully calibrated.

Calibration intervals are normally one year, except when the manufacture advises a shorter interval (e.g. the HP 8568B Spectrum Analyzer is recalibrated every six months) or if US Government directives or client requirements demand a shorter interval. Items of instrumentation/related equipment which fail during routine use, or which suffer visible mechanical damage (during use or while in transit), are sidelined pending repair and recalibration. (Repairs are carried out either in-house [if minor] or by a Nemko USA-approved independent [third party] metrology laboratory, or by the manufacturer of the item of M&TE).

Each antenna used for CISPR 11 and CISPR 22 and FCC Part 15 and Part 18 radiated emissions testing (and for testing to the equivalent European Norms) is calibrated annually by either a NIST (or A2LA) ISO Standard 17025-Accredited third-party Antenna Calibration Laboratory or by the antenna's OEM if the OEM is NIST or A2LA ISO Standard 17025-accredited as an antenna calibration laboratory. The antenna calibrations are performed using the methods specified in Annex G.5 of CISPR 16-1(1993) or ANSI C63.5-1991, including the "Three-Antenna Method". Certain other kinds of antennas (e.g. magnetic-shielded loop antennas) are calibrated annually by either a NIST (or A2LA) ISO Standard 17025-accredited third-party antenna calibration laboratory, or by the antenna's OEM if the OEM is NIST or A2LA ISO Standard 17025-accredited as an antenna calibration laboratory using the procedures specified in the latest version of SAE ARP-958.

In accordance with FCC and other regulations, Nemko USA recalibrates its suite of antennas used for radiated emissions tests on an annual basis. These calibrations are performed as a precursor to the FCC-required annual revalidation of the Normalized Site Attenuation properties of Nemko USA's Open Area Test Site. Nemko USA, Inc. uses the procedures given in both Subclause 16.6 and Annex G.2 of CISPR 16-1 (1993), and, ANSI C63.4-1992 when performing the normalized site attenuation measurements.

APPENDIX C
C. NVLAP Accreditation



United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation

ISO/IEC 17025:1999
ISO 9002:1994

NEMKO USA, INC. - SAN DIEGO EMC DIVISION
SAN DIEGO, CA

is recognized by the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria set forth in NIST Handbook 150:2001, all requirements of ISO/IEC 17025:1999, and relevant requirements of ISO 9002:1994. Accreditation is awarded for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

December 31, 2004
Effective through

For the National Institute of Standards and Technology
NVLAP Lab Code: 200116-0

NVLAP-01C (06-01)

National Institute of Standards and Technology **NVLAP®** National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
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Scope of Accreditation

Page: 1 of 3

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

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11696 Sorrento Valley Road, Suite F
San Diego, CA 92121
Mr. Ricky Hill
Phone: 858-755-5525 x207 Fax: 858-793-9914
E-Mail: rick.hill@nemko.com
URL: http://www.nemko.com

NVLAP Code	*Designation / Description*
Emissions Test Methods:	
12/CIS14	CISPR 14-1 (March 30, 2000): Limits and Methods of Measurement of Radio interference Characteristics of Household Electrical Appliances, Portable Tools and Similiar Electrical Apparatus - Part 1: Emissions
12/CIS14a	EN 55014-1 (1993) with Amendments A1 (1997) & A2 (1999)
12/CIS14b	AS/NZS 1044 (1995)
12/CIS14c	CNS 13783-1
12/CIS22	IEC/CISPR 22 (1997) and EN 55022 (1998): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12/CIS22a	IEC/CISPR 22 (1993): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1 (1995) and Amendment 2 (1996)

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ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

Page: 2 of 3

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS **NVLAP LAB CODE 200116-0**

NEMKO USA, INC. - SAN DIEGO EMC DIVISION

NVLAP Code	*Designation / Description*
12/CIS22b	CNS 13438 (1997): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
12/EM02a	IEC 61000-3-2, Edition 2.1 (2001-10), EN 61000-3-2 (2000), and AS/NZS 2279.1 (2000): Electromagnetic compatibility (EMC) Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A)
12/EM03b	IEC 61000-3-3 (2002-03), edition 1.1: EMC - Part 3-3: Limits - Limitations of voltage changes, voltage flucuations and flicker, in public low-voltage supply-systems, for equipment with rated current <=16 A per phase and not subject to conditional connections
12/F18	FCC OST/MP-5 (1986): FCC Methods of Measurement of Radio Noise Emissions for ISM Equipment (cited in FCC Method 47 CFR Part 18 - Industrial, Scientific, and Medical Equipment)
12/FCC15b	ANSI C63.4 (2001) with FCC Method - 47 CFR Part 15, Subpart B: Unintentional Radiators
12/T51	AS/NZS CISPR 22 (2002) and AS/NZS 3548 (1997): Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment

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ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS — **NVLAP LAB CODE 200116-0**

NEMKO USA, INC. - SAN DIEGO EMC DIVISION

NVLAP Code	*Designation / Description*
Immunity Test Methods:	
12/I01	IEC 61000-4-2, Edition 2.1 (2001) including Amds. 1 & 2 and EN 61000-4-2: Electrostatic Discharge Immunity Test
12/I02	IEC 61000-4-3 (2002) and EN 61000-4-3: Radiated Radio-Frequency Electromagnetic Field Immunity Test
12/I03	IEC 61000-4-4 (1995) + Amd. 1 (2000) & Amd. 2 (2001) and EN 61000-4-4: Electrical Fast Transient/Burst Immunity Test
12/I04	IEC 61000-4-5 (1995) + Amd. 1 (2000) and EN 61000-4-5: Surge Immunity Test
12/I05	IEC 61000-4-6, Edition 2.0 (2003) and EN 61000-4-6: Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields
12/I06	IEC 61000-4-8, Edition 1.1 (2001) and EN 61000-4-8: Power Frequency Magnetic Field Immunity Test
12/I07	IEC 61000-4-11 (1994) + Amd. 1 (2000) and EN 61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests

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