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Test Report Number:	**ETRA80432, Rev. D**
Reference Standard:	**CFR Title 47, FCC Part 15, Subpart C, Section 15.247**
Date of Test:	**25 April 2008**
Date of Report:	**27 August 2008**
Model Number:	**NRD1**
Serial Number:	**101**
FCC ID#:	**RXN408NRD1**
IC ID#	**6872A-408NRD1**
Manufacturer:	**Transparent Technologies**
Representative:	**Mark Shamley**
Report Type:	**Certification**
Test Result:	**Compliant**
Approved By:	

NVLAP LAB CODE 200737-0

Nemko ELA No. 215

FCC	BSMI	VCCI	MIC
319793 & 610588	SL2-IN-E-1134R	C-2697 R-2462	US0168

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Laboratory Manager

Revision	Description of Revision	Date:
Rev. -	Initial Release	12 May 2008
Rev. A	Changes based on NEMKO review	4 June 2008
Rev. B	Photos removed to make file < 2 MB	17 June 2008
Rev. C	Modified frequency range, per NEMKO request	28 July 2008
Rev. D	Incorporated additional information per NEMKO	27 August 2008

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LIST OF APPENDICES

1.0 SUMMARY OF TEST RESULTS

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15; Subpart C. Radiated tests were conducted is accordance with ANSI C63.4-2003. Radiated emissions are made in a 10-meter chamber which is NVLAP-accredited. This facility is also registered with the FCC.

The equipment under test complied with all applicable testing required for compliance with FCC Part 15, Subpart C for intentional radiators. A summary of test results is shown in Table 1-1.

Table 1-1

Test	Description	FCC Part	Appendix	Result
Conducted Emissions	Emissions on AC power mains, 150 kHz to 30 MHz, EUT in Rx mode	15.107	A	Compliant
	Emissions on AC power mains, 150 kHz to 30 MHz, EUT in Tx mode (low, mid & high)	15.207	A	Compliant
Radiated Emissions*	Electric field emissions, 30 MHz to 10 GHz, EUT in Rx mode	15.109	B	Compliant
	Electric field emissions, 30 MHz to 10 GHz, EUT in Tx mode (low, mid & high)	15.209	C	Compliant
6 dB Bandwidth	Conducted measurement on antenna output to confirm 6 dB bandwidth (low, mid & high)	15.247(a)(2)	D	Compliant
Peak Output Power	Conducted measurement on antenna output to confirm peak output power (low, mid & high)	15.247(b)(3)	E	Compliant
Power Spectral Density	Conducted measurement on antenna output to confirm power spectral density (low, mid & high)	15.247(e)	F	Compliant
20 dB Bandwidth	Conducted measurement on antenna output to confirm 20 dB bandwidth (low, mid & high)	2.1049	G	Measurement Completed
Spurious Emissions @ Antenna Terminals	Conducted measurement on antenna output from 30 MHz to 10 GHz (low, mid & high)	2.1051	H	Compliant
Band-Edge	Conducted measurement on antenna output to transmitter does not violate upper and lower band-edges (low, mid & high)	2.1051	I	Compliant

*all radiated emissions were performed at a distance of 10 meters; FCC Part 15, Class B limits specified at 3 meters are reduced by 10.45 dB (20 log (3/10)) to account for this.

2.0 EQUIPMENT UNDER TEST (EUT)

2.1 Product Identification

The product tested was an NRD1. The details of the components which comprised the EUT are listed in Table 2-1.

Table 2-1

Name	Model No.	Serial No.
NRD1	NRD1	101
Mobile Antenna	MA9-7-N	05540635

2.2 Samples Submitted for Assessment

A single sample was submitted for assessment. The components of this sample are shown in Table 2-1.

2.3 Sample Description

The NRD1 is a field repeater to be utilized within a Transparent Technologies meter reading system allowing for improved radio system performance. The NRD receives M2 or M1B radio signals in the 903 to 927 MHz band and re-transmits the signals. The NRD1 is elevation mounted (such as utility pole, tank or building) in order to be in range of as many endpoints as possible.

Special test functions are used to select test frequencies. These functions are not available to end-users. Transparent Technologies personnel would change the standard operating frequencies during installation and startup only if performance was impacted by the specific site.

RF power is regulated by the MCU which configures the RF IC settings in firmware.

The NRD1 will only be installed by trained installation professionals or trained water utility personnel. These systems are utilized by public (municipal) and private water distribution entities only, not by the general public.

The PAW-MA9-7N is utilized since the NRD1 will only be used by water utilities and installed by professionals and never by the general public. The chosen antenna is also required for mating to the required lightning protection in the NRD1 enclosure.

2.4 Theory of Operation

The NRD1 is a low powered, battery-operated transceiver assembly designed for the relaying (reception then re-transmission) of RF data packets from T2's M1B or M2 utility radio transmitters/transceivers.

The unit is housed in a waterproof enclosure and can be either AC or DC powered. The antenna used is a high gain whip antenna connected via a RP-SMA connector on the transceiver board.

The NRD1 has an infrared port for local communication.

2.5 Technical Specfications of EUT

Frequency:	903-927 MHz
FCC compliance:	Part 15.247 (unlicensed)
Temperature:	-40°F to 158°F (-40°C to +70°C)
Humidity:	100% / Fully Submersible
Power:	3.6V Battery Pack 120 Vac or 12Vdc
Dimensions:	7.87W x 5.5H x 1.69D in 200W x 140H x 43D mm
Weight:	2.1 lb (0.95 kg)

3.0 TEST CONDITIONS

3.1 Specifications

This apparatus was assessed against the following specifications:

CFR Title 47, FCC Part 15, Subpart C, Section 15.247 for operation of digitally modulated transmitters in the 902-928 MHz range.

3.2 Deviations from Laboratory Test Procedures

None.

3.3 Test Environment

Temperature:	21 degrees Celsius (=/- 2 degrees)
Relative Humidity:	19% (+/-3%)
Barometric Pressure:	837 mbars (+/-5%)
Voltage:	120 Vac/60 Hz (nominal)

3.4 Test Equipment

The test equipment used for each test is given as the last page of the test data sheet. All test data is contained in the appropriate appendix of this report.

4.0 OBSERVATIONS

4.1 Modifications Performed During Assessment

In order to comply with the conducted emissions requirements, an AC power line filter was added to the product. The filter used was a Corcom, MN 3VB3. Although not shown in this photograph, it should be noted that the body of the filter was bonded to the chassis with copper tape.

A photograph of this modification is contained in the EMI Test Log, found in Appendix J of this report.

4.2 Record of Technical Judgments

No technical judgments were made during the assessment.

4.3 EUT Parameters Affective Compliance

The user of the apparatus could not alter parameters that would affect compliance.

4.4 Test Deleted

No tests were deleted from this assessment.

4.5 Comments

There were no additional observations made during this assessment.

5.0 DESCRIPTION OF TEST METHODS

5.1 Conducted Emissions

Conducted emissions testing was performed on a 10' by 10' ground plane, which is bonded to the wall of the 10-meter chamber, using its wall as the vertical coupling plane. Line impedance stabilization networks (LISNs) was inserted in series with both the UUT and the support equipment. The LISNs used were standard 50 Ω/50 uH LISNs which complied with the requirements of ANSI C63.4. These LISNs are calibrated annually for both complex impedance and insertion loss. Measurement equipment used was an HP 8566B spectrum analyzer with an HP 85650A QP adapter. In addition, a transient limiter and a high-pass filter are used to protect the front-end of the receiver from transients and low-frequency noise, respectively.

5.2 Radiated E-field Emissions

Radiated emissions testing was performed at a distance of 10-meters in a semi-anechoic 10-meter chamber. This chamber is calibrated annually and meets the volumetric site attenuation requirements of ANSI C63.4: 2003. For measurements from 30 MHz to 2 GHz, a biconilog antenna is used in conjunction with a high-gain, low-noise preamplifier. This is connected to an HP 8566B spectrum analyzer with an HP 85650A Quasi-Peak (QP) Adapter, via an HP 85685 RF Preselector. A notch filter is used to notch out the transmitter for the Tx-low, -mid and –high measurements.

Radiated emissions testing is broken into two parts: pre-scan and QP/maximization. Pre-scanning a product from 30 MHz to 2 GHz consists of measuring peak emissions from eight radials (every 45 degrees), at four antenna heights (1 m, 2 m, 3 m and 4 m) for both antenna polarities. Data is recorded in a graph showing amplitude vs. frequency of the emissions, and frequencies for QP/maximization are chosen based on this graph. The procedure for maximizing emissions is as follows:

1. The analyzer is tuned to the frequency associated with the emissions having the least margin.
2. The turntable and antenna mast are moved to the location where the maximum emission was measured during the pre-scan.
3. Both are then oriented such that the maximum emission is obtained.
4. Cables on the UUT are manually manipulated to achieve the maximum emission.
5. The turntable and antenna mast are then re-adjusted to ensure a maximum reading.
6. If the signal in question is less than 1 GHz, quasi-peak detection is performed on the signal for a minimum of 10 seconds. For signals greater than 1 GHz, video averaging is performed.
7. Turntable/antenna mast maximization and QP detection are performed on all other signals within 6 dB of the limit. In the event that there are not six signals within 6 dB of the limit, the highest six signals are maximized. This ensures that a minimum of six signals are maximized and appear in the final data table.

For emission measurements above 2 GHz, the antenna is changed to a double-ridged horn equipped with a preamplifier and run directly into the spectrum analyzer. The QP adapter and RF preselector are not used above 2 GHz. A 2 GHz high pass filter is used to ensure the fundamental transmit frequency does not send the preamplifier into compression.

Pre-scanning a product from 2-10 GHz is performed similarly, except that 16 radials (every 22.5 degrees) and three antenna heights (1 m, 1.5 m and 2 m) are used. A similar maximization process is used as for the lower frequency range with two major exceptions. First, average measurements are performed, rather than QP measurements and second, a boresight fixture is installed to ensure the EUT is within the beamwidth of the horn antenna.

5.3 6 dB Bandwidth

For this measurement, the output of the EUT is connected directly to the input of the spectrum analyzer via a cable and attenuator whose loss as been pre-calibrated. This loss appear as the offset on the left-hand side of each plot. The basic setup is shown in Figure 5-1.

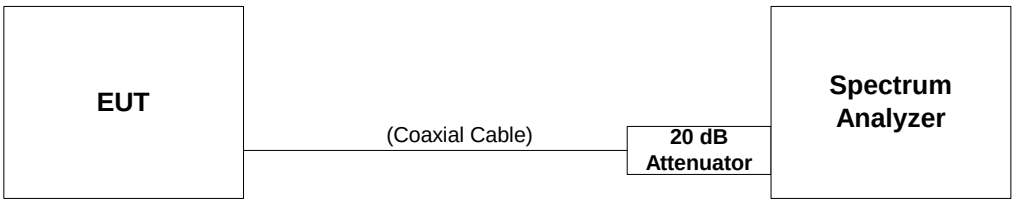

Figure 5-1. Configuration for Direct Antenna Port Measurements.

The analyzer settings are shown on each plot and the EUT is configured to transmit at its lowest frequency, its highest frequency and a frequency that is roughly in the middle of its transmit band. The analyzer is allowed to perform a minimum of fifty sweeps with the trace configured in “max hold” mode and the trace is then “viewed”. The peak of the waveform is identified using the “peak search” function and the “marker delta” function is then used to identify the 6 dB down points on either side of the waveform. The measured bandwidth is then compared against the requirement to determine compliance.

5.4 Peak Output Power

For this measurement, the output of the EUT is connected directly to the input of the spectrum analyzer via a cable and attenuator whose loss as been pre-calibrated. This loss appear as the offset on the left-hand side of each plot. The basic setup is shown in Figure 5-1.

The analyzer settings are shown on each plot and the EUT is configured to transmit at its lowest frequency, its highest frequency and a frequency that is roughly in the middle of its transmit band. The analyzer is allowed to perform a minimum of fifty sweeps with the trace configured in “max hold” mode and the trace is then “viewed”. The peak of the waveform is identified using the “peak search” function and this measurement is then compared against the requirement

to determine compliance. It should be noted that a 3 MHz bandwidth was used for this measurement, since the 20 dB bandwidth was 1.15 MHz.

5.5 Power Spectral Density

For this measurement, the output of the EUT is connected directly to the input of the spectrum analyzer via a cable and attenuator whose loss as been pre-calibrated. This loss appear as the offset on the left-hand side of each plot. The basic setup is shown in Figure 5-1.

The analyzer settings are shown on each plot and the EUT is configured to transmit at its lowest frequency, its highest frequency and a frequency that is roughly in the middle of its transmit band. The sweep time of the analyzer was calculated by dividing the span by the resolution bandwidth. (1 MHz / 3 kHz = 333 seconds) The analyzer was configured in "max hold" mode and the trace is then "viewed". The peak of the waveform is identified using the "peak search" function and this measurement is then compared against the requirement to determine compliance.

5.6 20 dB Bandwidth

For this measurement, the output of the EUT is connected directly to the input of the spectrum analyzer via a cable and attenuator whose loss as been pre-calibrated. This loss appear as the offset on the left-hand side of each plot. The basic setup is shown in Figure 5-1.

The analyzer settings are shown on each plot and the EUT is configured to transmit at its lowest frequency, its highest frequency and a frequency that is roughly in the middle of its transmit band. The peak of the signal is identified using the "peak search" function and this amplitude is noted. The "delta marker" function is then used as Marker 1 is tuned to the 20 dB down point on the low side of the waveform and Marker 2 is tuned to the 20 dB down point on the high side of the waveform. The 20 dB bandwidth is simply the distance between these two markers, and this number is then compared against the requirement to determine compliance.

5.7 Spurious Emissions @ Antenna Terminals

For this measurement, the output of the EUT is connected directly to the input of the spectrum analyzer via a cable and attenuator whose loss as been pre-calibrated. This loss appear as the offset on the left-hand side of each plot. The basic setup is shown in Figure 5-1.

The analyzer settings are shown on each plot and the EUT is configured to transmit at its lowest frequency, its highest frequency and a frequency that is roughly in the middle of its transmit band. Conducted emissions are then measured at the antenna terminals of the device across the frequency range from 30 MHz to 10 GHz and these emissions are then compared against the requirement to determine compliance.

5.8 Band-Edge Measurement

For this measurement, the output of the EUT is connected directly to the input of the spectrum analyzer via a cable and attenuator whose loss as been pre-calibrated. This loss appear as the offset on the left-hand side of each plot. The basic setup is shown in Figure 5-1.

The analyzer settings are shown on each plot and the EUT is configured to transmit at its lowest and highest frequency to determine whether or not the emissions at the boundary of the specific frequency band is within acceptable limits.

6.0 REPRESENTATIVE TEST SETUP PHOTOGRAPHS

Figure 6-1. Representative Test Setup – Conducted Emissions, AC Mains.

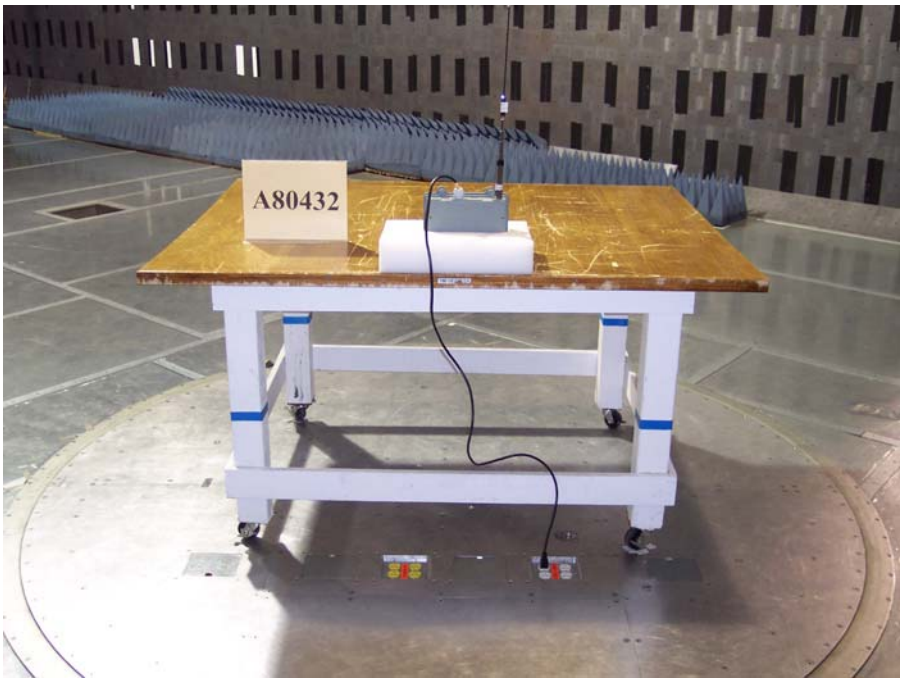

Figure 6-2. Representative Test Setup – Radiated Emissions.

Figure 6-3. Representative Test Setup – Conducted Emissions, Antenna Terminals.

7.0 STATEMENT OF MEASUREMENT UNCERTAINTY

7.1 Measurement Uncertainty

The measurement uncertainty for EMC Integrity's emissions test facility complies with the requirements defined in CISPR 16. The complete calculations of EMC Integrity's measurement uncertainty is contained in an EMCI memo, which is available upon request. However, a summary of EMCI's measurement uncertainty is given in Table 2-1.

Table 7-1

Test	Requirement	Actual
Conducted Emissions	3.60 dB	3.04 dB
Radiated Emissions – Horizontal Polarity	5.20 dB	4.67 dB
Radiated Emissions – Vertical Polarity	5.20 dB	5.01 dB

APPENDIX A

Conducted Emissions, Parts 15.107 & 15.207

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Conducted Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008
Temperature:	21˚C Humidity: 18%	Pressure:	837mb
Input Voltage:	120VAC / 60Hz		
Configuration of Unit:	Rx Mode – CE Modification Corcom 3VB3 Line filter added		
Test Engineer:	Donald Lighthart		

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Type	Frequency (MHz)	Level (dBuV)	Transducer (dB)	Gain / Loss (dB)	Final (dBuV)	Test Point	Margin: EN55022 Class B AV (dB)	Margin: EN55022 Class B QP (dB)
AV	0.303	30.9	2.0	10.1	43.0	Line 1	8.60	-
QP	0.303	31.3	2.0	10.1	43.4	Line 1	-	18.23
AV	0.373	11.2	1.8	10.1	23.0	Line 1	26.63	-
QP	0.373	30.4	1.8	10.1	42.2	Line 1	-	17.40
AV	0.449	12.5	1.6	10.1	24.2	Line 1	23.26	-
QP	0.449	33.8	1.6	10.1	45.5	Line 1	-	11.93
AV	0.519	12.8	1.5	10.1	24.4	Line 1	21.58	-
QP	0.519	34.2	1.5	10.1	45.8	Line 1	-	10.22
AV	0.588	16.2	1.4	10.2	27.8	Line 1	18.19	-
QP	0.588	26.9	1.4	10.2	38.5	Line 1	-	17.50
AV	0.665	7.5	1.4	10.2	19.2	Line 1	26.82	-
QP	0.665	23.3	1.4	10.2	35.0	Line 1	-	21.04
AV	0.202	26.0	3.4	10.1	39.5	Neutral	15.07	-
QP	0.202	26.5	3.4	10.1	40.0	Neutral	-	24.55
AV	0.302	31.4	2.0	10.1	43.5	Neutral	8.16	-
QP	0.302	31.3	2.0	10.1	43.4	Neutral	-	18.27
AV	0.403	28.1	1.7	10.1	39.9	Neutral	8.87	-
QP	0.403	28.6	1.7	10.1	40.4	Neutral	-	18.37
AV	0.504	25.4	1.5	10.1	37.0	Neutral	9.00	-
QP	0.504	25.9	1.5	10.1	37.5	Neutral	-	18.48
AV	0.731	4.9	1.5	10.2	16.6	Neutral	29.40	-
QP	0.731	19.2	1.5	10.2	30.9	Neutral	-	25.07
AV	0.805	15.3	1.4	10.2	26.9	Neutral	19.05	-
QP	0.805	19.0	1.4	10.2	30.6	Neutral	-	25.42

The highest emission measured was at **0.302 MHz,** which was **8.16 dB** below the limit.

- "Type" refers to the type of measurement performed. The type of measurement made is based on the requirements of the particular standard:
  - PK = Peak Measurement
  - QP = Quasi-Peak Measurement
  - AV = Video Average Measurement
- The "Final" emissions level is attained by taking the "Level" and adding the "Transducer" factor and the "Gain/Loss" factor.
- The "TestPoint" indicates which AC or DC input power line or which I/O cable the measurement was made on.
- The "Margin" is with reference to the emissions limit. A positive number indicates that the emission measurement is below the limit. A negative number indicates that the emission measurement exceeds the limit.
- **For final measurements, RBW is set by QP Adapter @ 9 kHz, VBW is dropped to 10 Hz.**

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Conducted Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008

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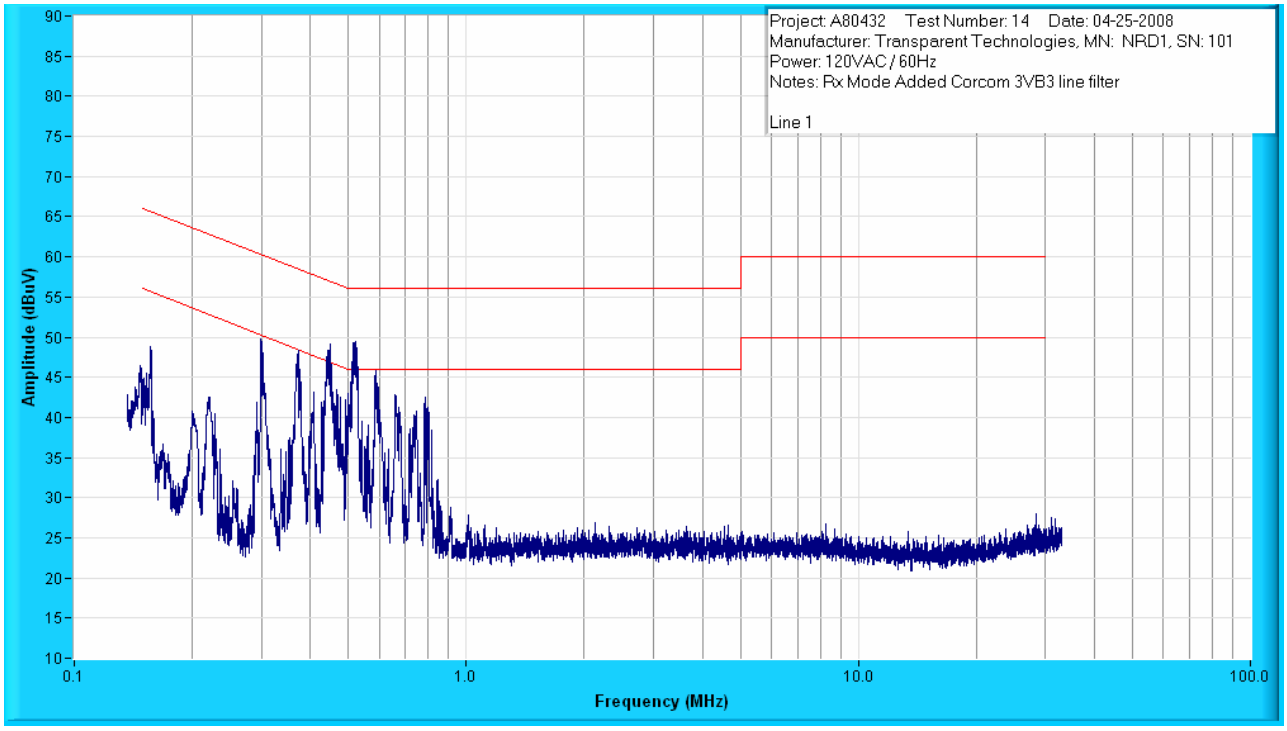

Figure A1: Conducted Emissions Prescan - Line 1.

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Conducted Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008

A80432-22-CE.doc FR0100

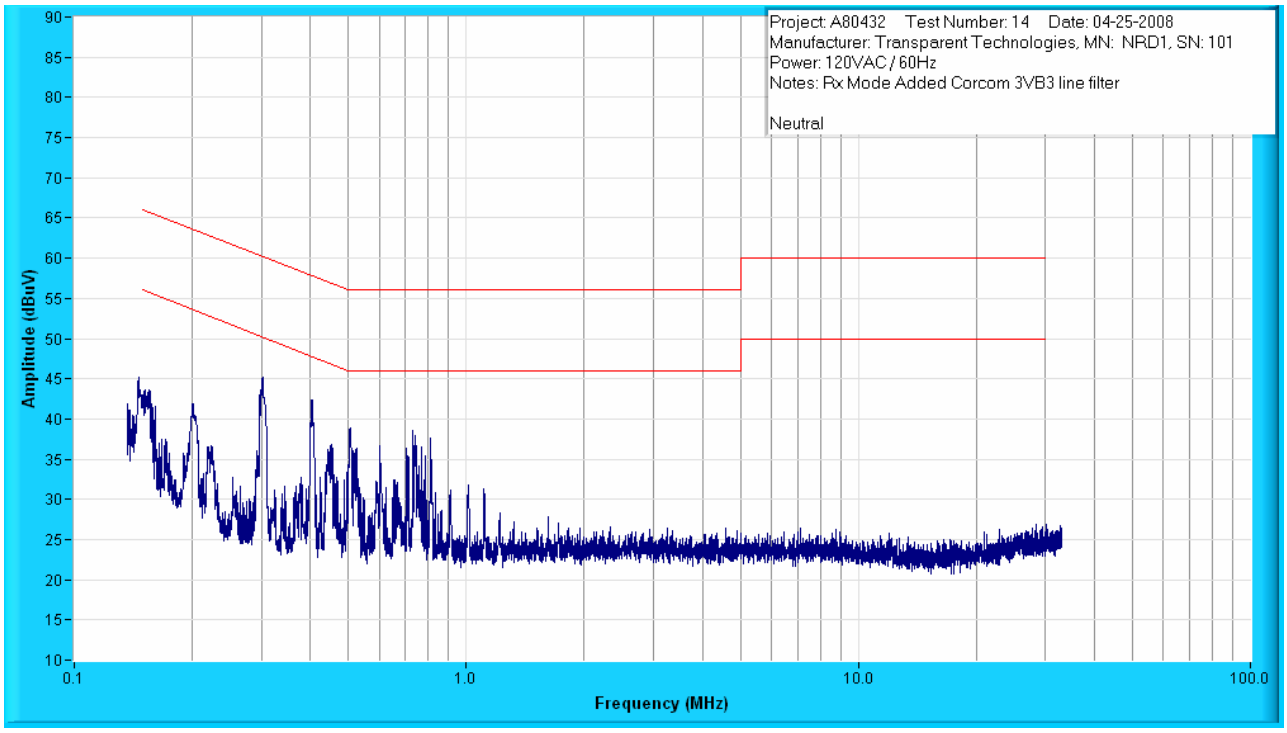

Figure A2: Conducted Emissions Prescan - Neutral.

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Conducted Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008
Temperature:	21˚C Humidity: 18%	Pressure:	837mb
Input Voltage:	120VAC / 60Hz		
Configuration of Unit:	Transmit low band – primary transmit frequency 902.97MHz – Corcom 3VB3 Line Filter Added		
Test Engineer:	Donald Lighthart		

A80432-22-CE.doc FR0100

Type	Frequency (MHz)	Level (dBuV)	Transducer (dB)	Gain / Loss (dB)	Final (dBuV)	Test Point	Margin: EN55022 Class B AV (dB)	Margin: EN55022 Class B QP (dB)
AV	0.521	11.8	1.5	10.1	23.4	Line 1	22.58	-
QP	0.521	33.3	1.5	10.1	44.9	Line 1	-	11.10
AV	0.455	11.6	1.6	10.1	23.3	Line 1	24.00	-
QP	0.455	32.5	1.6	10.1	44.2	Line 1	-	13.10
AV	0.374	11.2	1.8	10.1	23.1	Line 1	26.56	-
QP	0.374	30.6	1.8	10.1	42.4	Line 1	-	17.20
AV	0.301	22.1	2.0	10.1	34.2	Line 1	17.45	-
QP	0.301	28.3	2.0	10.1	40.4	Line 1	-	21.26
AV	0.606	8.8	1.4	10.2	20.4	Line 1	25.65	-
QP	0.606	26.2	1.4	10.2	37.8	Line 1	-	18.16
AV	0.671	9.4	1.4	10.2	21.0	Line 1	24.96	-
QP	0.671	27.8	1.4	10.2	39.5	Line 1	-	16.52
AV	0.154	15.4	3.9	10.1	29.4	Neutral	26.47	-
QP	0.154	33.3	3.9	10.1	47.3	Neutral	-	18.62
AV	0.201	28.9	3.4	10.1	42.4	Neutral	12.17	-
QP	0.201	29.8	3.4	10.1	43.3	Neutral	-	21.25
AV	0.301	22.0	2.0	10.1	34.1	Neutral	17.59	-
QP	0.301	28.0	2.0	10.1	40.1	Neutral	-	21.63
AV	0.402	30.6	1.7	10.1	42.5	Neutral	6.36	-
QP	0.402	30.9	1.7	10.1	42.7	Neutral	-	16.11
AV	0.458	12.8	1.6	10.1	24.5	Neutral	22.72	-
QP	0.458	32.2	1.6	10.1	43.9	Neutral	-	13.30
AV	0.499	22.6	1.5	10.1	34.2	Neutral	11.82	-
QP	0.499	25.3	1.5	10.1	36.9	Neutral	-	19.16

The highest emission measured was at **0.402 MHz,** which was **6.36 dB** below the limit.

- "Type" refers to the type of measurement performed. The type of measurement made is based on the requirements of the particular standard:
  - PK = Peak Measurement
  - QP = Quasi-Peak Measurement
  - AV = Video Average Measurement
- The "Final" emissions level is attained by taking the "Level" and adding the "Transducer" factor and the "Gain/Loss" factor.
- The "TestPoint" indicates which AC or DC input power line or which I/O cable the measurement was made on.
- The "Margin" is with reference to the emissions limit. A positive number indicates that the emission measurement is below the limit. A negative number indicates that the emission measurement exceeds the limit.
- **For final measurements, RBW is set by QP Adapter @ 9 kHz, VBW is dropped to 10 Hz.**

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Conducted Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008

A80432-22-CE.doc FR0100

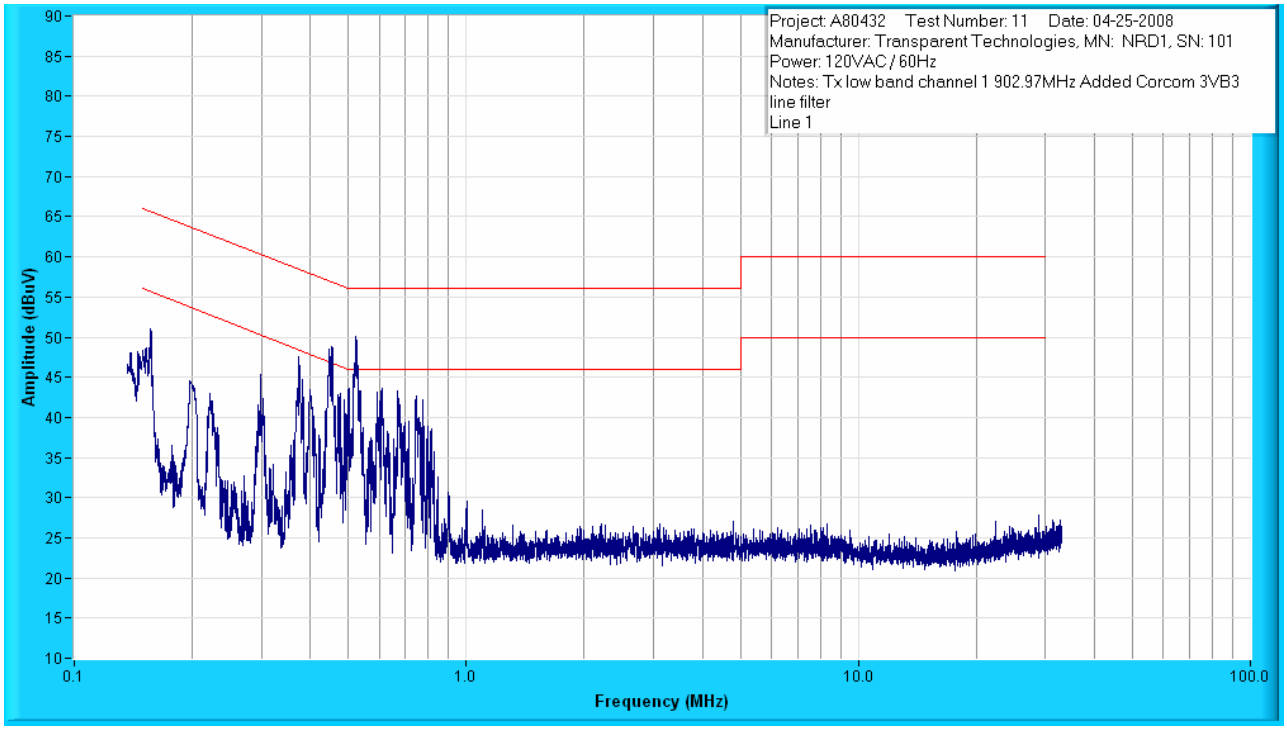

Figure A3: Conducted Emissions Prescan - Line 1.

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Conducted Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008

A80432-22-CE.doc FR0100

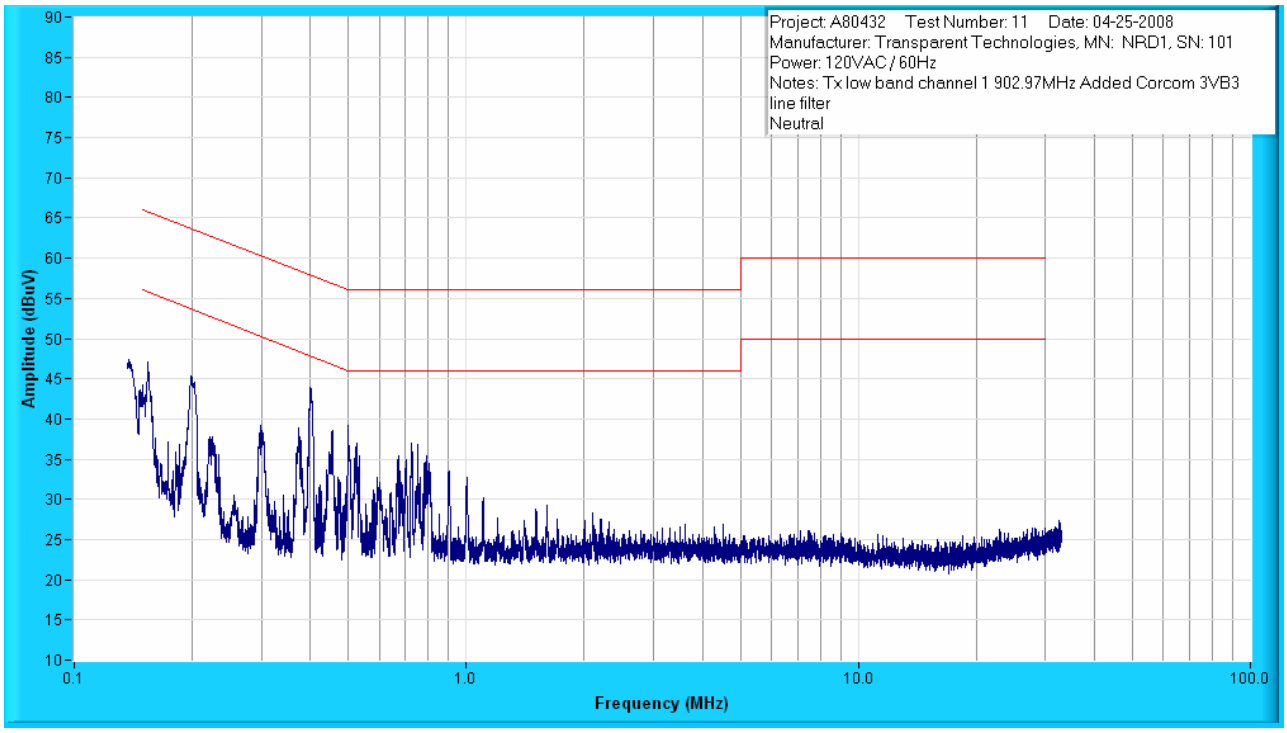

Figure A4: Conducted Emissions Prescan - Neutral.

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Conducted Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008
Temperature:	˚C Humidity: %	Pressure:	837mb
Input Voltage:	120VAC / 60Hz		
Configuration of Unit:	Transmit mid band – primary transmit frequency 916.85MHz – CE Modification Corcom 3VB3 Line Filter Added		
Test Engineer:	Donald Lighthart		

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Type	Frequency (MHz)	Level (dBuV)	Transducer (dB)	Gain / Loss (dB)	Final (dBuV)	Test Point	Margin: EN55022 Class B AV (dB)	Margin: EN55022 Class B QP (dB)
AV	0.153	16.1	3.9	10.1	30.1	Line 1	25.84	-
QP	0.153	33.8	3.9	10.1	47.8	Line 1	-	18.15
AV	0.375	11.1	1.8	10.1	22.9	Line 1	26.68	-
QP	0.375	30.2	1.8	10.1	42.0	Line 1	-	17.53
AV	0.453	11.7	1.6	10.1	23.3	Line 1	23.99	-
QP	0.453	33.6	1.6	10.1	45.3	Line 1	-	12.03
AV	0.525	11.4	1.5	10.1	23.1	Line 1	22.93	-
QP	0.525	32.3	1.5	10.1	43.9	Line 1	-	12.12
AV	0.602	11.9	1.4	10.2	23.6	Line 1	22.45	-
QP	0.602	23.9	1.4	10.2	35.5	Line 1	-	20.51
AV	0.655	9.6	1.4	10.2	21.2	Line 1	24.79	-
QP	0.655	28.0	1.4	10.2	39.6	Line 1	-	16.37
AV	0.152	14.9	3.9	10.1	28.9	Neutral	27.02	-
QP	0.152	28.1	3.9	10.1	42.1	Neutral	-	23.84
AV	0.202	29.3	3.4	10.1	42.8	Neutral	11.77	-
QP	0.202	30.4	3.4	10.1	43.9	Neutral	-	20.64
AV	0.302	20.6	2.0	10.1	32.7	Neutral	18.90	-
QP	0.302	22.4	2.0	10.1	34.5	Neutral	-	27.16
AV	0.403	30.7	1.7	10.1	42.5	Neutral	6.28	-
QP	0.403	31.3	1.7	10.1	43.1	Neutral	-	15.64
AV	0.443	7.3	1.6	10.1	19.0	Neutral	28.60	-
QP	0.443	23.4	1.6	10.1	35.1	Neutral	-	22.49
AV	0.512	7.7	1.5	10.1	19.3	Neutral	26.69	-
QP	0.512	23.5	1.5	10.1	35.1	Neutral	-	20.89

The highest emission measured was at **0.403 MHz,** which was **6.28 dB** below the limit.

- "Type" refers to the type of measurement performed. The type of measurement made is based on the requirements of the particular standard:
  - PK = Peak Measurement
  - QP = Quasi-Peak Measurement
  - AV = Video Average Measurement
- The "Final" emissions level is attained by taking the "Level" and adding the "Transducer" factor and the "Gain/Loss" factor.
- The "TestPoint" indicates which AC or DC input power line or which I/O cable the measurement was made on.
- The "Margin" is with reference to the emissions limit. A positive number indicates that the emission measurement is below the limit. A negative number indicates that the emission measurement exceeds the limit.
- **For final measurements, RBW is set by QP Adapter @ 9 kHz, VBW is dropped to 10 Hz.**

emc integrity incorporated

Conducted Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008

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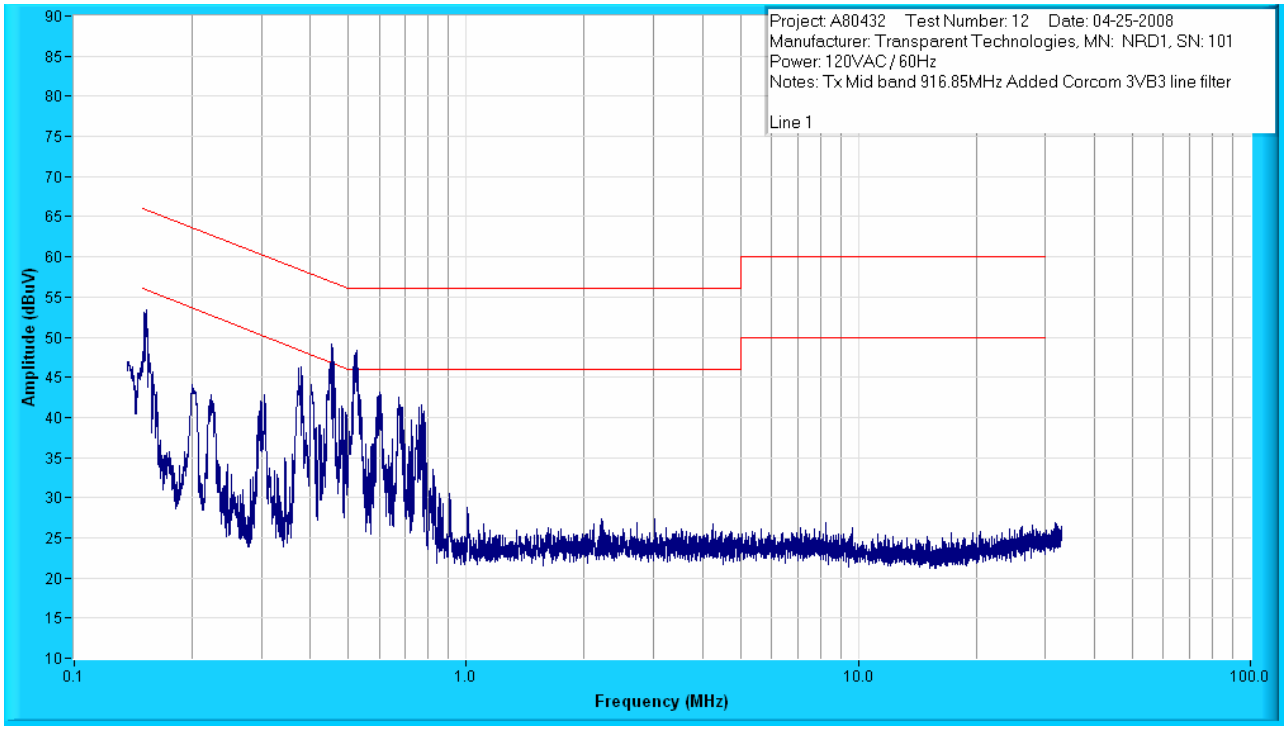

Figure A5: Conducted Emissions Prescan - Line 1.

emc integrity incorporated

Conducted Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008

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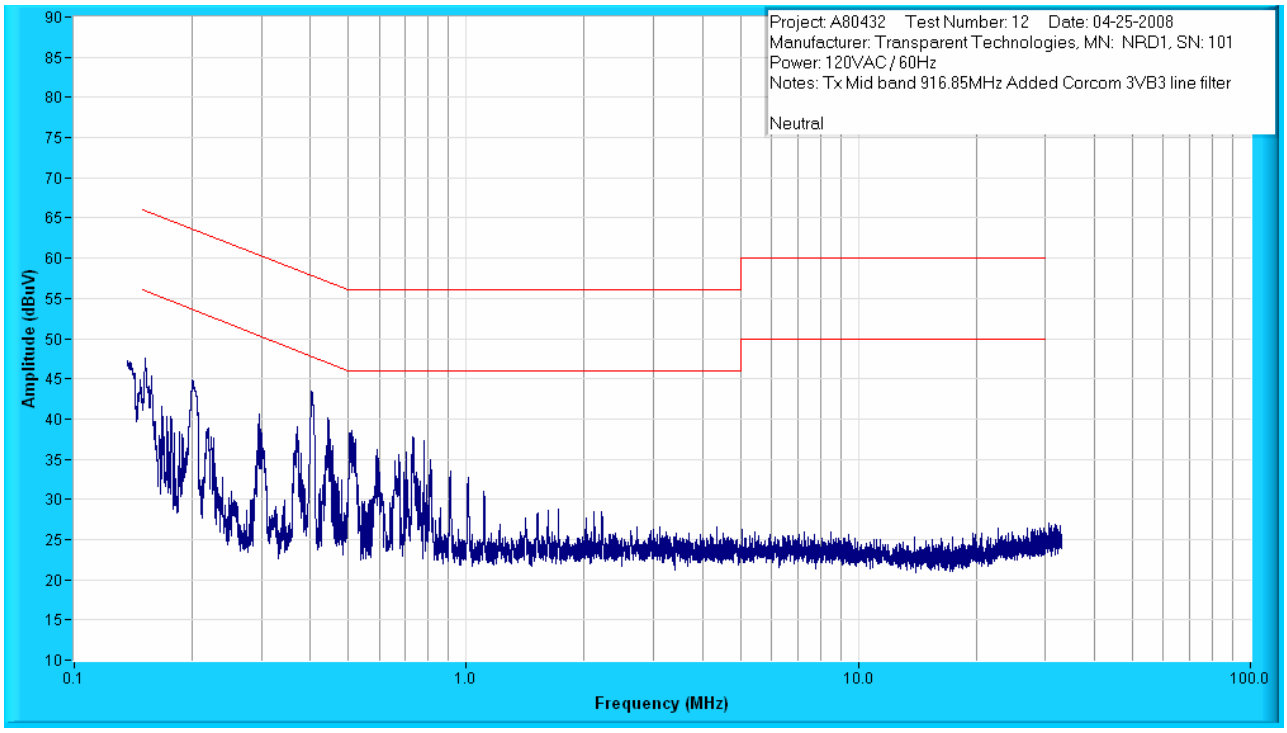

Figure A6: Conducted Emissions Prescan - Neutral.

emc integrity incorporated

Conducted Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008
Temperature:	21˚C Humidity: 18%	Pressure:	837mb
Input Voltage:	120VAC / 60Hz		
Configuration of Unit:	Transmit high band – primary transmit frequency 925.84MHz – CE Modification Corcom 3VB3 Line filter added		
Test Engineer:	Donald Lighthart		

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Type	Frequency (MHz)	Level (dBuV)	Transducer (dB)	Gain / Loss (dB)	Final (dBuV)	Test Point	Margin: EN55022 Class B AV (dB)	Margin: EN55022 Class B QP (dB)
AV	0.296	13.2	2.0	10.1	25.4	Line 1	26.47	-
QP	0.296	28.0	2.0	10.1	40.1	Line 1	-	21.69
AV	0.372	11.1	1.8	10.1	22.9	Line 1	26.74	-
QP	0.372	30.8	1.8	10.1	42.7	Line 1	-	16.96
AV	0.448	12.8	1.6	10.1	24.6	Line 1	22.94	-
QP	0.448	34.2	1.6	10.1	45.9	Line 1	-	11.56
AV	0.517	12.6	1.5	10.1	24.2	Line 1	21.78	-
QP	0.517	34.9	1.5	10.1	46.5	Line 1	-	9.46
AV	0.588	10.7	1.4	10.2	22.3	Line 1	23.69	-
QP	0.588	29.0	1.4	10.2	40.6	Line 1	-	15.35
AV	0.756	16.1	1.5	10.2	27.7	Line 1	18.26	-
QP	0.756	23.4	1.5	10.2	35.1	Line 1	-	20.91
AV	0.202	29.4	3.4	10.1	42.8	Neutral	11.72	-
QP	0.202	30.4	3.4	10.1	43.9	Neutral	-	20.67
AV	0.303	20.6	2.0	10.1	32.6	Neutral	19.00	-
QP	0.303	23.0	2.0	10.1	35.1	Neutral	-	26.55
AV	0.376	6.6	1.8	10.1	18.4	Neutral	31.11	-
QP	0.376	21.2	1.8	10.1	33.1	Neutral	-	26.47
AV	0.404	31.0	1.7	10.1	42.8	Neutral	5.96	-
QP	0.404	31.3	1.7	10.1	43.1	Neutral	-	15.68
AV	0.450	7.0	1.6	10.1	18.8	Neutral	28.68	-
QP	0.450	22.9	1.6	10.1	34.6	Neutral	-	22.81
AV	0.504	22.9	1.5	10.1	34.5	Neutral	11.45	-
QP	0.504	23.9	1.5	10.1	35.5	Neutral	-	20.55

The highest emission measured was at **0.404 MHz,** which was **5.96 dB** below the limit.

- "Type" refers to the type of measurement performed. The type of measurement made is based on the requirements of the particular standard:
  - PK = Peak Measurement
  - QP = Quasi-Peak Measurement
  - AV = Video Average Measurement
- The "Final" emissions level is attained by taking the "Level" and adding the "Transducer" factor and the "Gain/Loss" factor.
- The "TestPoint" indicates which AC or DC input power line or which I/O cable the measurement was made on.
- The "Margin" is with reference to the emissions limit. A positive number indicates that the emission measurement is below the limit. A negative number indicates that the emission measurement exceeds the limit.
- **For final measurements, RBW is set by QP Adapter @ 9 kHz, VBW is dropped to 10 Hz**.

emc integrity incorporated

Conducted Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008

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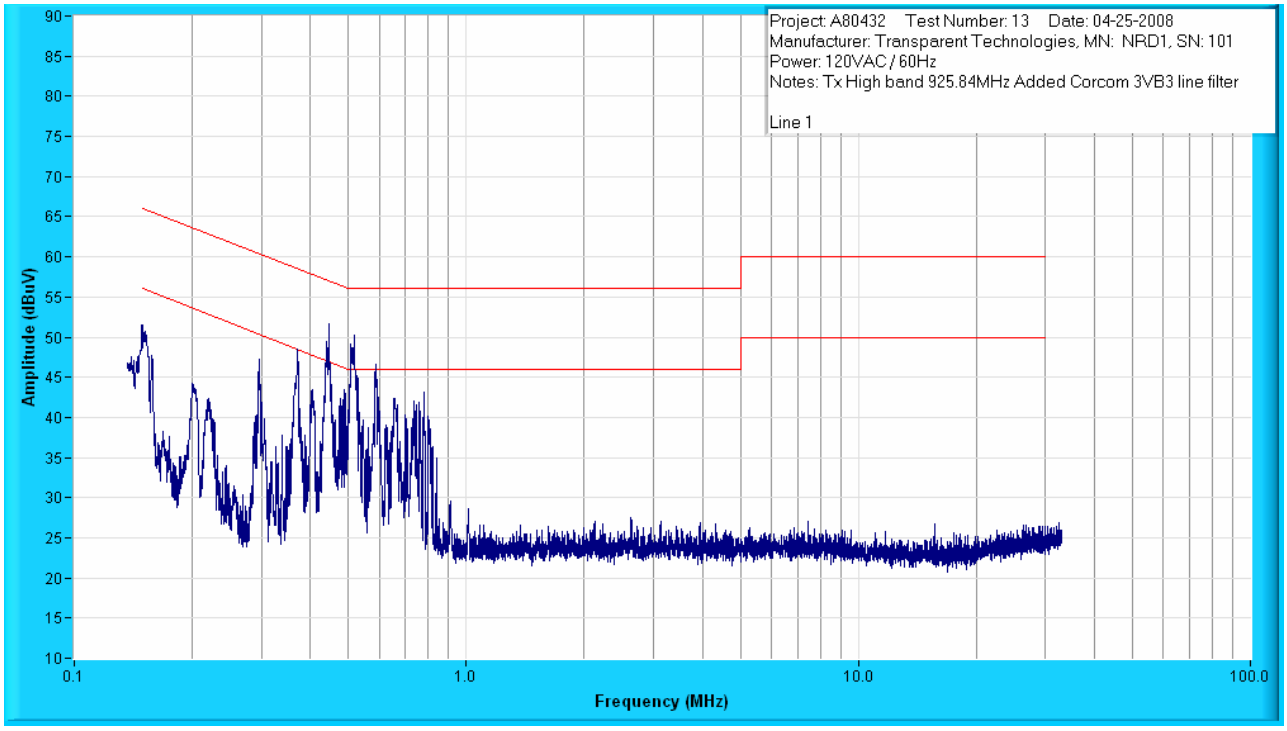

Figure A7: Conducted Emissions Prescan - Line 1.

emc integrity incorporated

Conducted Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008

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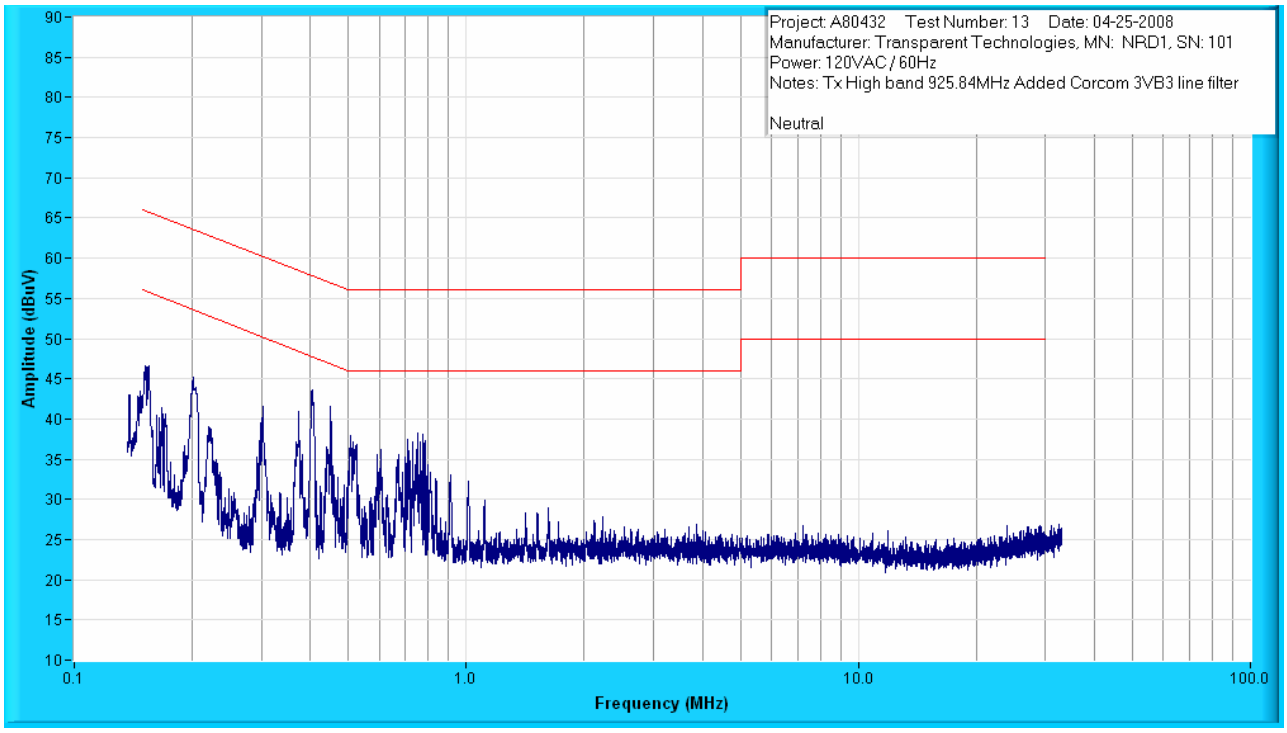

Figure A8: Conducted Emissions Prescan - Neutral.

emc integrity incorporated

Conducted Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1195	Solar	9252-50-R-24-BNC	042013	LISN	04/17/2008	04/17/2009
1201	Agilent Technology	11947A	3107A03807	Transient Limiter, 9 kHz to 200 MHz	01/03/2008	01/03/2009
1213	Solar	7930-100	885210	High Pass Filter, fc: 100kHz, -100dB @ 33kHz	04/20/2007	06/20/2008
1233	Sunol Sciences	SC104V	110305-1	Positioning Controller	NA	NA
1263	Hewlett Packard	8566B	3014A06873	Spectrum Analyzer, 100 Hz to 22 GHz	08/21/2007	08/21/2008
1264	Hewlett Packard	85662A	2848A18247	Spectrum Analyzer Display	08/21/2007	08/21/2008
1265	Hewlett Packard	85650A	2521A00641	Quasi-Peak Adapter	08/21/2007	08/21/2008

APPENDIX B

Radiated Emissions Rx Mode, Part 15.109

emc integrity incorporated

Radiated Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008
Temperature:	21˚C Humidity: 19%	Pressure:	837mb
Input Voltage:	120VAC / 60Hz		
Configuration of Unit:	Rx Mode		
Test Engineer:	Kevin Johnson		

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Type	Frequency (MHz)	Level (dBuV)	Transducer (dB/m)	Gain / Loss (dB)	Final (dBuV/m)	Azm(deg)/Pol /Hgt(m)	Margin: FCC Class B QP (dB)	FCC Class B QP Limit @ 10 meters
QP	30.148	24.4	20.9	-30.5	14.8	225/H-Pole/2.26	14.77	29.5
QP	200.921	28.9	12.8	-30.1	11.6	310/H-Pole/1.00	21.46	33.0
QP	201.193	32.6	12.7	-30.1	15.2	330/H-Pole/1.00	17.81	33.0
QP	295.488	24.7	13.2	-30.2	7.7	335/H-Pole/2.17	27.83	35.5
QP	865.543	27.5	21.6	-28.4	20.6	176/V-Pole/2.17	14.89	35.5
QP	**904.832**	**36.6**	**22.0**	**-28.1**	**30.5**	**294/H-Pole/1.00**	**5.01**	**35.5**

The highest emission measured was at **904.832 MHz,** which was **5.01 dB** below the limit.

- "Type" refers to the type of measurement performed. The type of measurement made is based on the requirements of the particular standard:
  - PK = Peak Measurement
  - QP = Quasi-Peak Measurement
  - AV = Video Average Measurement
- The "Final" emissions level is attained by taking the "Level" and adding the "Transducer" factor and the "Gain/Loss" factor. **(Sample: 36.6 dBuV + 22.0 dB/m – 28.1 = 30.5 dBuV/m)**
- Final measurements are made with the Azimuth, Polarity, Height, and EUT Cables positioned for maximum radiation. If applicable, cables positions are noted in the test log.
- The "Azm/Pol/Hgt" indicates the turn-table *azimuth*, the antenna *polarity*, and the antenna *height* where the maximum emissions level was measured.
- The "Margin" is with reference to the emissions limit. A positive number indicates that the emission measurement is below the limit. A negative number indicates that the emission measurement exceeds the limit.
- For making QP RE measurements, the bandwidth is 120 kHz and the QP detector is enabled.
- For making average RE measurements, the resolution bandwidth is 1 MHz and the video bandwidth is 10 Hz.

emc integrity incorporated

Radiated Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008

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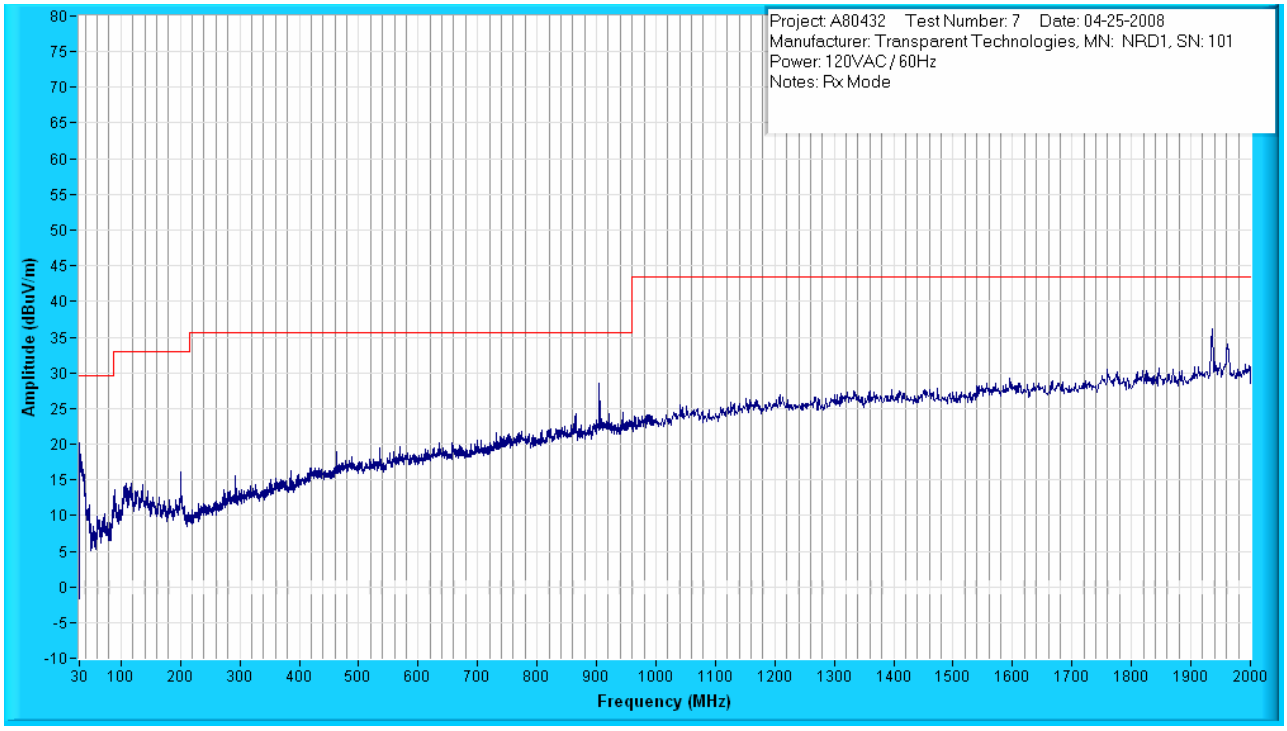

Figure B1: Radiated Emissions Prescan – 30MHz – 2GHz @ 10 meter spacing, Peak Measurement

Notes
For pre-scans from 30 MHz to 1 GHz, the settings are:
RBW is 120 kHz (set by the QP Adapter)
VBW is 3 MHz

For pre-scans >1 GHz, the settings are:
RBW is 1 MHz
VBW is 100 kHz

emc integrity incorporated

Radiated Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008

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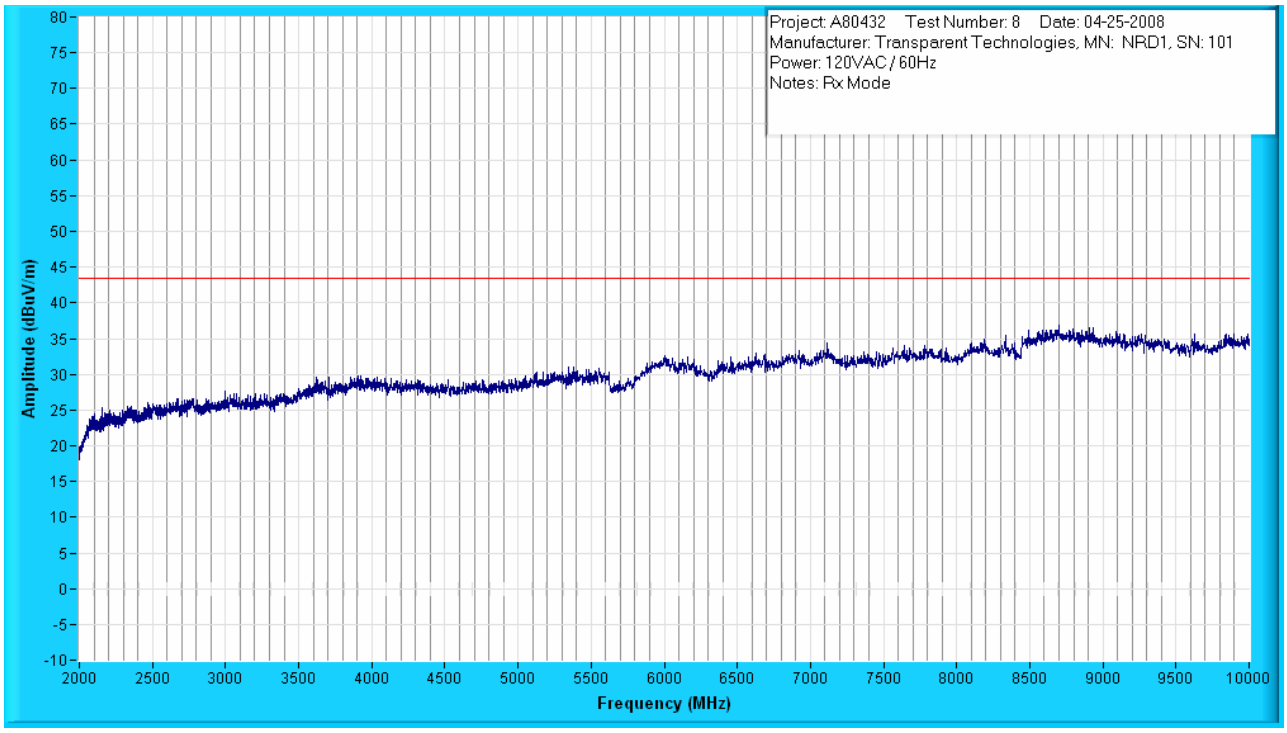

Figure B2: Radiated Emissions Prescan – 2GHz – 10GHz @ 10 meter spacing, Peak Measurement.

Notes
For pre-scans from 30 MHz to 1 GHz, the settings are:
RBW is 120 kHz (set by the QP Adapter)
VBW is 3 MHz

For pre-scans >1 GHz, the settings are:
RBW is 1 MHz
VBW is 100 kHz

emc integrity incorporated

Radiated Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1030	EMCO	3115	9906-5816	Double-ridged Horn (1 - 18 GHz)	03/12/2008	03/12/2009
1072	JCA	JCA118-513	101A101B102 A102B	Low Noise Preamplifer 1 - 18 GHz	02/19/2008	02/19/2009
1092	Hewlett Packard	8495B	2522A10285	0 - 70 dB Step Attenuator	07/23/2007	07/23/2008
1220	Mini-Circuits	ZKL-2	062906	Preamp, 10 - 2000 MHz, 30 dB	02/02/2008	02/02/2009
1229	Hewlett Packard	85685A	3010A01077	RF Preselector	06/12/2007	06/12/2008
1232	Sunol Sciences	JB1	A071605-2	Bilog Antenna, 30 MHz to 2.0 GHz	07/23/2007	07/23/2008
1233	Sunol Sciences	SC104V	110305-1	Positioning Controller	NA	NA
1234	CIR Enterprises	10m Chamber	001	10m Radiated Emissions Semi-Anechoic Chamber	04/02/2008	04/02/2009
1238	Sunol Sciences	TWR95-4	110305-3	Antenna Mast	NA	NA
1239	Sunol Sciences	FM2522VS	110305-2	Turn Table, 2.5m Diameter	NA	NA
1240	Eagle	240NFNF	1240	Tunable Notch Filter, 500 to 1300 MHz	NA	NA
1241	Eagle	240NFNF	1241	Tunable Notch Filter, 500 to 1300 MHz	NA	NA
1263	Hewlett Packard	8566B	3014A06873	Spectrum Analyzer, 100 Hz to 22 GHz	08/21/2007	08/21/2008
1264	Hewlett Packard	85662A	2848A18247	Spectrum Analyzer Display	08/21/2007	08/21/2008
1265	Hewlett Packard	85650A	2521A00641	Quasi-Peak Adapter	08/21/2007	08/21/2008

APPENDIX C

Radiated Emissions, Tx Mode, Part 15.209

emc integrity incorporated

Radiated Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008
Temperature:	21˚C Humidity: 19%	Pressure:	837mb
Input Voltage:	120VAC / 60Hz		
Configuration of Unit:	Transmit low band – Primary transmit frequency is 902.97		
Test Engineer:	Donald Lighthart		

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Type	Frequency (MHz)	Level (dBuV)	Transducer (dB/m)	Gain / Loss (dB)	Final (dBuV/m)	Azm(deg)/Pol /Hgt(m)	Margin: FCC Class B QP (dB)	FCC Class B QP Limit (dBuV/m)
QP	66.987	28.4	7.9	-27.6	8.6	84/V-Pole/1.90	20.90	29.5
QP	89.005	32.8	7.7	-27.6	13.0	62/V-Pole/2.96	20.08	33.0
QP	104.631	28.5	11.6	-27.4	12.8	340/V-Pole/1.98	20.25	33.0
QP	199.997	26.6	13.0	-27.1	12.5	179/V-Pole/2.01	20.52	33.0
QP	694.860	25.2	19.8	-26.4	18.6	225/V-Pole/3.00	16.99	35.5
QP	847.947	24.5	21.6	-25.6	20.5	225/V-Pole/4.00	15.01	35.5
Type	**Frequency (MHz)**	**Level (dBuV)**	**Transducer (dB/m)**	**Gain / Loss (dB)**	**Final (dBuV/m)**	**Azm(deg)/Pol /Hgt(m)**	**Margin: FCC Class B AV (dB)**	**FCC Class B AV Limit (dBuV/m)**
AV	**1933.471**	**37.6**	**28.8**	**-24.7**	**41.7**	**62/V-Pole/1.00**	**1.73**	**43.5**
AV	1963.141	31.4	29.0	-24.5	35.9	34/V-Pole/2.00	7.58	43.5
AV	2708.911	77.8	29.2	-70.2	30.9	24/V-Pole/1.00	12.58	43.5
AV	4514.851	77.7	32.2	-65.7	38.2	2/V-Pole/1.92	5.24	43.5

The highest emission measured was at **1933.471 MHz,** which was **1.73 dB** below the limit.

- "Type" refers to the type of measurement performed. The type of measurement made is based on the requirements of the particular standard:
  - PK = Peak Measurement
  - QP = Quasi-Peak Measurement
  - AV = Video Average Measurement
- The "Final" emissions level is attained by taking the "Level" and adding the "Transducer" factor and the "Gain/Loss" factor. **(Sample: 37.6 dBuV + 28.8 dB/m – 24.7 = 41.7 dBuV/m)**
- Final measurements are made with the Azimuth, Polarity, Height, and EUT Cables positioned for maximum radiation. If applicable, cables positions are noted in the test log.
- The "Azm/Pol/Hgt" indicates the turn-table *azimuth*, the antenna *polarity*, and the antenna *height* where the maximum emissions level was measured.
- The "Margin" is with reference to the emissions limit. A positive number indicates that the emission measurement is below the limit. A negative number indicates that the emission measurement exceeds the limit.
- For making QP RE measurements, the bandwidth is 120 kHz and the QP detector is enabled.
- For making average RE measurements, the resolution bandwidth is 1 MHz and the video bandwidth is 10 Hz.

emc integrity incorporated

Radiated Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

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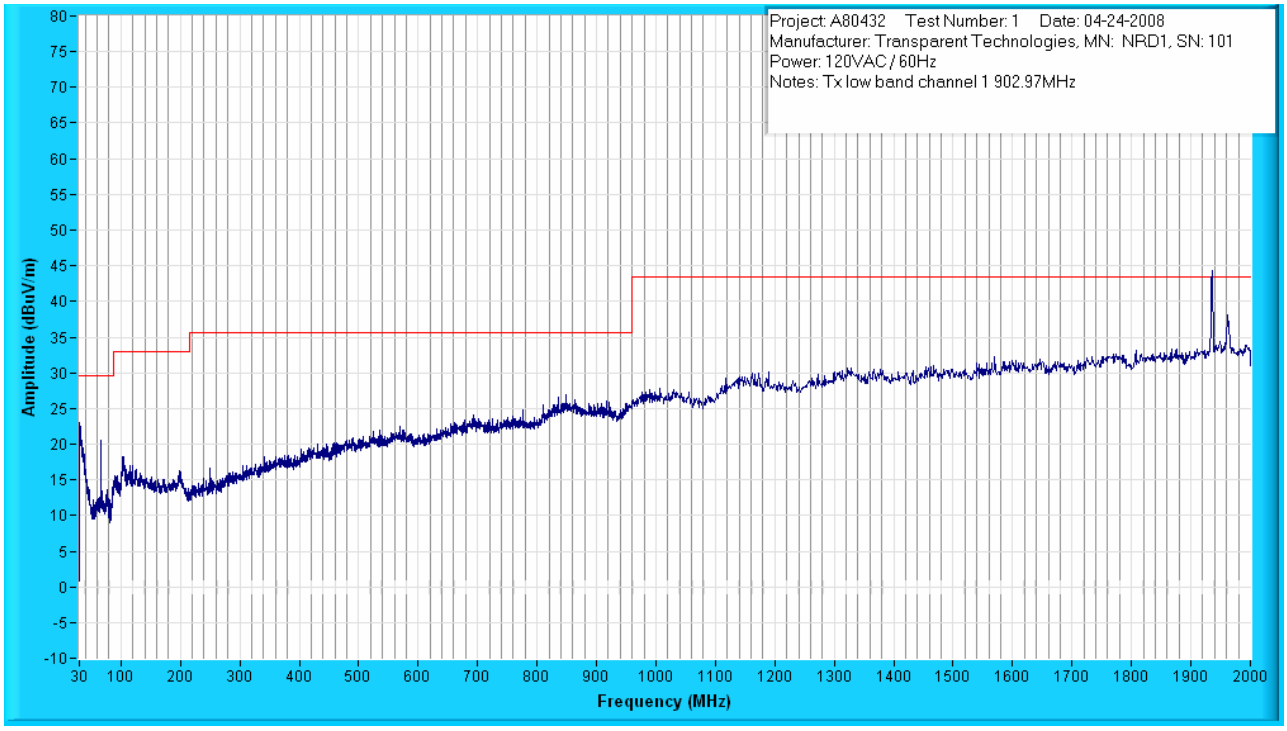

Figure C1: Radiated Emissions Prescan – 30MHz-2GHz @ 10 meter spacing Peak Measurement

Notes
For pre-scans from 30 MHz to 1 GHz, the settings are:
RBW is 120 kHz (set by the QP Adapter)
VBW is 3 MHz

For pre-scans >1 GHz, the settings are:
RBW is 1 MHz
VBW is 100 kHz

emc integrity incorporated

Radiated Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

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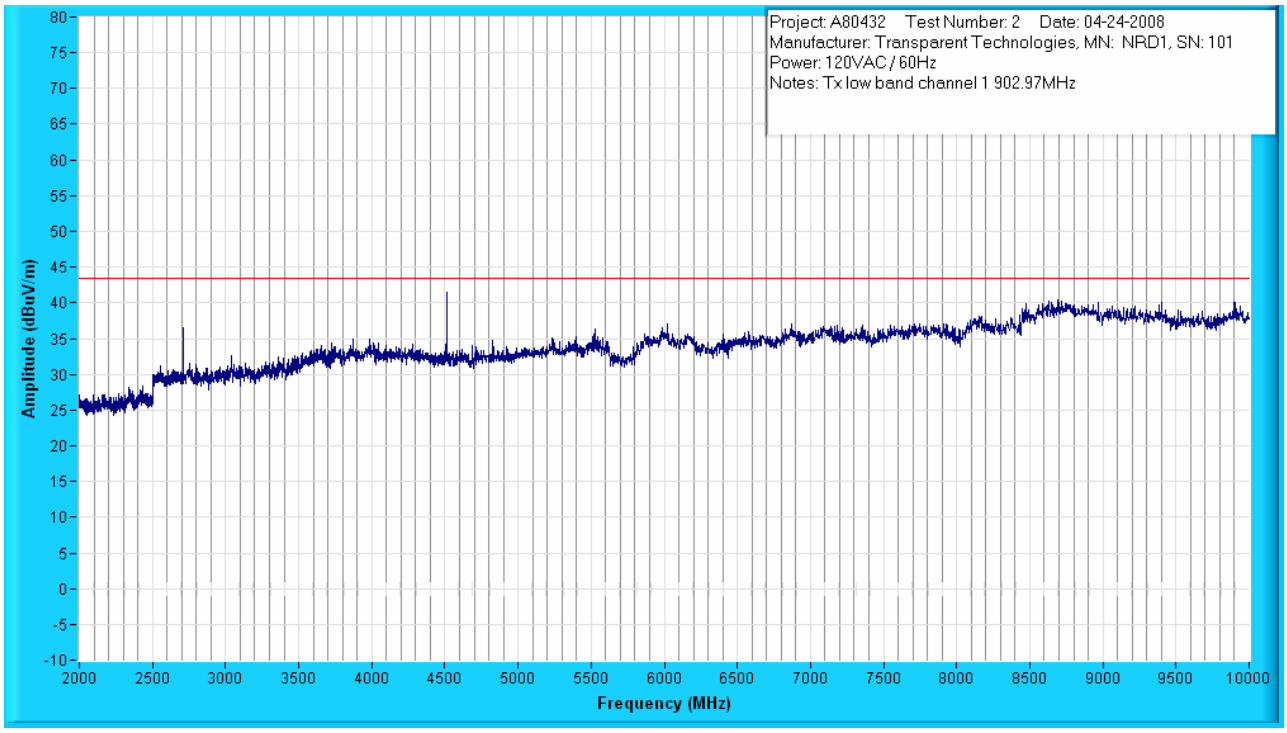

Figure C2: Radiated Emissions Prescan – 30MHz-2GHz @ 10 meter spacing Peak Measurement.

Notes
For pre-scans from 30 MHz to 1 GHz, the settings are:
RBW is 120 kHz (set by the QP Adapter)
VBW is 3 MHz

For pre-scans >1 GHz, the settings are:
RBW is 1 MHz
VBW is 100 kHz

emc integrity incorporated

Radiated Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008
Temperature:	21˚C Humidity: 19%	Pressure:	837mb
Input Voltage:	120VAC / 60Hz		
Configuration of Unit:	Transmit mid band – primary transmit frequency 916.85MHz		
Test Engineer:	Donald Lighthart		

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Type	Frequency (MHz)	Level (dBuV)	Transducer (dB/m)	Gain / Loss (dB)	Final (dBuV/m)	Azm(deg)/Pol /Hgt(m)	Margin: FCC Class B QP (dB)	FCC Class B QP Limit (dBuV/m)
QP	89.074	35.0	7.7	-27.6	15.2	67/V-Pole/1.00	17.88	33.0
QP	106.914	27.0	12.1	-27.4	11.7	340/V-Pole/3.00	21.30	33.0
QP	577.746	24.6	18.6	-26.6	16.6	135/V-Pole/4.00	18.97	35.5
QP	858.085	31.5	21.6	-25.5	27.6	252/V-Pole/1.00	7.97	35.5
QP	865.545	28.9	21.6	-25.4	25.0	327/V-Pole/1.55	10.53	35.5
QP	**916.843**	**35.4**	**22.3**	**-25.1**	**32.6**	**294/V-Pole/2.59**	**2.92**	**35.5**
Type	**Frequency (MHz)**	**Level (dBuV)**	**Transducer (dB/m)**	**Gain / Loss (dB)**	**Final (dBuV/m)**	**Azm(deg)/Pol /Hgt(m)**	**Margin: FCC Class B AV (dB)**	**FCC Class B AV Limit (dBuV/m)**
AV	2750.525	79.4	29.4	-76.1	32.7	156/V-Pole/1.00	10.79	43.5
AV	4584.209	69.8	32.4	-71.4	30.8	156/V-Pole/1.98	12.67	43.5
AV	5501.053	65.3	34.2	-67.3	32.2	156/H-Pole/1.00	11.24	43.5

The highest emission measured was at **916.843 MHz,** which was **2.92 dB** below the limit.

- "Type" refers to the type of measurement performed. The type of measurement made is based on the requirements of the particular standard:
  - PK = Peak Measurement
  - QP = Quasi-Peak Measurement
  - AV = Video Average Measurement
- The "Final" emissions level is attained by taking the "Level" and adding the "Transducer" factor and the "Gain/Loss" factor. **(Sample: 35.4 dBuV + 22.3 dB/m – 25.1 = 32.6 dBuV/m)**
- Final measurements are made with the Azimuth, Polarity, Height, and EUT Cables positioned for maximum radiation. If applicable, cables positions are noted in the test log.
- The "Azm/Pol/Hgt" indicates the turn-table *azimuth*, the antenna *polarity*, and the antenna *height* where the maximum emissions level was measured.
- The "Margin" is with reference to the emissions limit. A positive number indicates that the emission measurement is below the limit. A negative number indicates that the emission measurement exceeds the limit.
- For making QP RE measurements, the bandwidth is 120 kHz and the QP detector is enabled.
- For making average RE measurements, the resolution bandwidth is 1 MHz and the video bandwidth is 10 Hz.

emc integrity incorporated

Radiated Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

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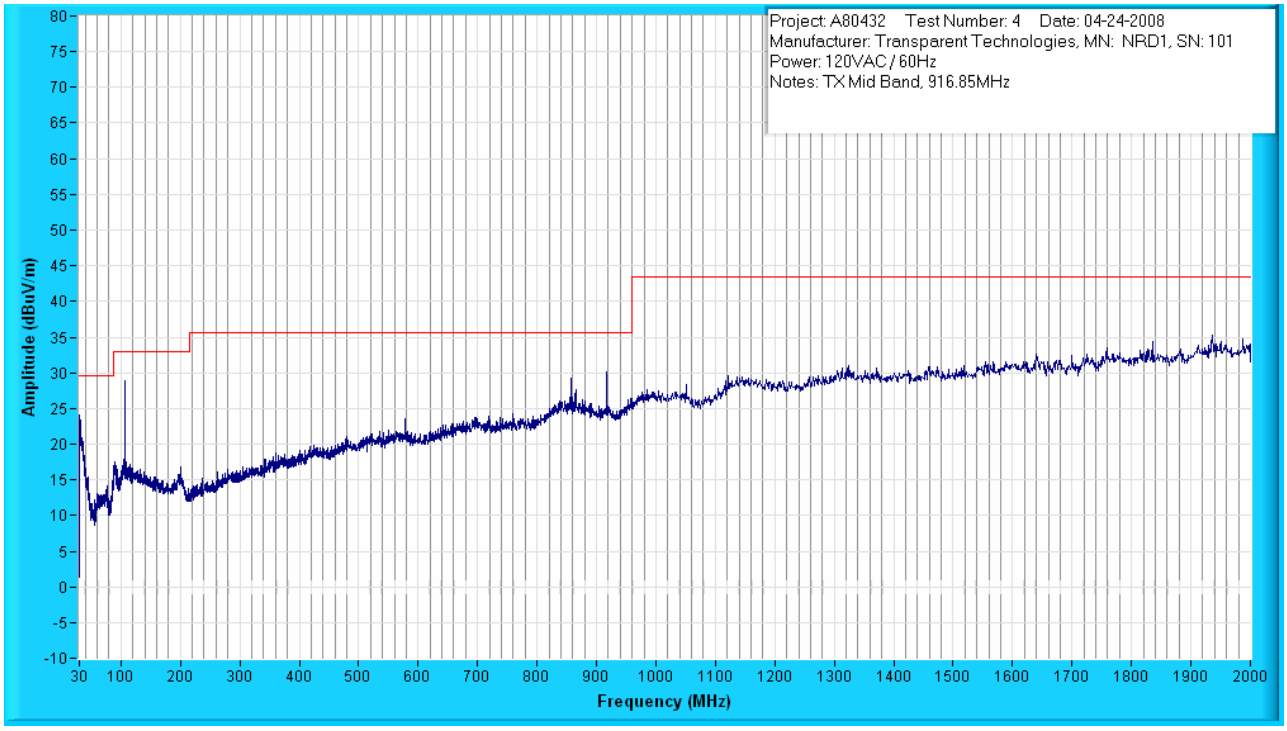

Figure C3: Radiated Emissions Prescan – 30MHz – 2 GHz @ 10 meter spacing, Peak Measurement

Notes
For pre-scans from 30 MHz to 1 GHz, the settings are:
RBW is 120 kHz (set by the QP Adapter)
VBW is 3 MHz

For pre-scans >1 GHz, the settings are:
RBW is 1 MHz
VBW is 100 kHz

emc integrity incorporated

Radiated Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

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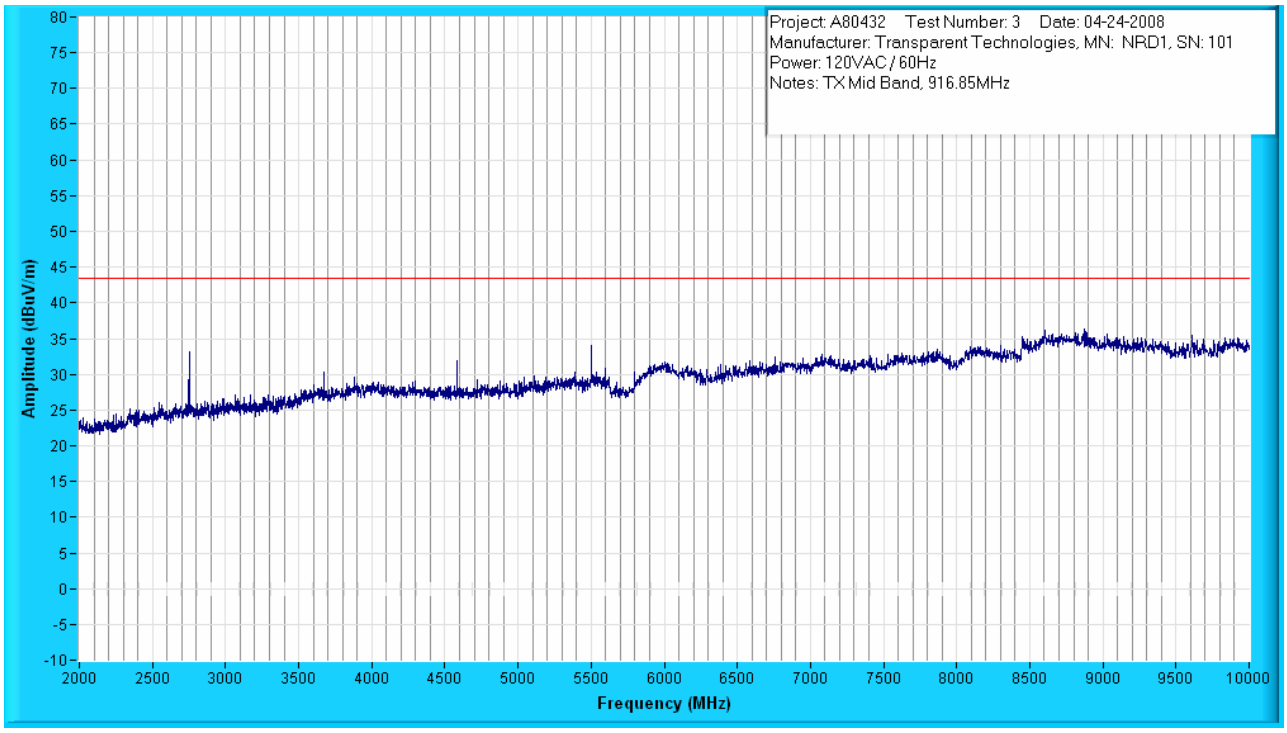

Figure C4: Radiated Emissions Prescan – 2 GHz – 10GHz @ 10 meter spacing, Peak Measurement

Notes
For pre-scans from 30 MHz to 1 GHz, the settings are:
RBW is 120 kHz (set by the QP Adapter)
VBW is 3 MHz

For pre-scans >1 GHz, the settings are:
RBW is 1 MHz
VBW is 100 kHz

emc integrity incorporated

Radiated Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008
Temperature:	21˚C Humidity: 19%	Pressure:	837mb
Input Voltage:	120VAC / 60Hz		
Configuration of Unit:	Transmit high band – primary transmit frequency 925.84MHz		
Test Engineer:	Kevin Johnson		

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Type	Frequency (MHz)	Level (dBuV)	Transducer (dB/m)	Gain / Loss (dB)	Final (dBuV/m)	Azm(deg)/Pol /Hgt(m)	Margin: FCC Class B QP (dB)	FCC Class B AV Limit (dBuV/m)
QP	30.062	24.2	20.9	-27.5	17.7	0/H-Pole/4.00	11.86	29.5
QP	88.825	35.5	7.7	-27.6	15.6	60/V-Pole/2.39	17.46	33.0
QP	105.498	29.5	11.8	-27.4	13.9	302/V-Pole/1.00	19.14	33.0
QP	202.210	31.0	12.4	-27.1	16.3	92/H-Pole/1.00	16.73	33.0
QP	854.393	28.7	21.6	-25.6	24.7	309/H-Pole/2.06	10.83	35.5
Type	**Frequency (MHz)**	**Level (dBuV)**	**Transducer (dB/m)**	**Gain / Loss (dB)**	**Final (dBuV/m)**	**Azm(deg)/Pol /Hgt(m)**	**Margin: FCC Class B AV (dB)**	**FCC Class B AV Limit (dBuV/m)**
AV	1851.684	32.5	28.6	-25.1	36.1	2/V-Pole/3.01	7.35	43.5
AV	2777.525	78.6	29.4	-76.0	32.0	141/V-Pole/1.14	11.43	43.5
AV	3703.366	81.4	31.8	-75.6	37.6	202/V-Pole/2.41	5.81	43.5
AV	**4629.208**	**76.3**	**32.5**	**-71.2**	**37.6**	**180/H-Pole/1.27**	**5.81**	43.5
AV	5555.049	67.9	34.2	-67.1	35.0	205/H-Pole/1.00	8.41	43.5
AV	7406.732	64.3	36.2	-63.6	37.0	136/H-Pole/2.68	6.42	43.5

The highest emission measured was at **4629.208 MHz,** which was **5.81 dB** below the limit.

- "Type" refers to the type of measurement performed. The type of measurement made is based on the requirements of the particular standard:
  - PK = Peak Measurement
  - QP = Quasi-Peak Measurement
  - AV = Video Average Measurement
- The "Final" emissions level is attained by taking the "Level" and adding the "Transducer" factor and the "Gain/Loss" factor. **(Sample: 76.3 dBuV + 32.5 dB/m – 71.2 = 37.6 dBuV/m)**
- Final measurements are made with the Azimuth, Polarity, Height, and EUT Cables positioned for maximum radiation. If applicable, cables positions are noted in the test log.
- The "Azm/Pol/Hgt" indicates the turn-table *azimuth*, the antenna *polarity*, and the antenna *height* where the maximum emissions level was measured.
- The "Margin" is with reference to the emissions limit. A positive number indicates that the emission measurement is below the limit. A negative number indicates that the emission measurement exceeds the limit.
- For making QP RE measurements, the bandwidth is 120 kHz and the QP detector is enabled.
- For making average RE measurements, the resolution bandwidth is 1 MHz and the video bandwidth is 10 Hz.

emc integrity incorporated

Radiated Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008

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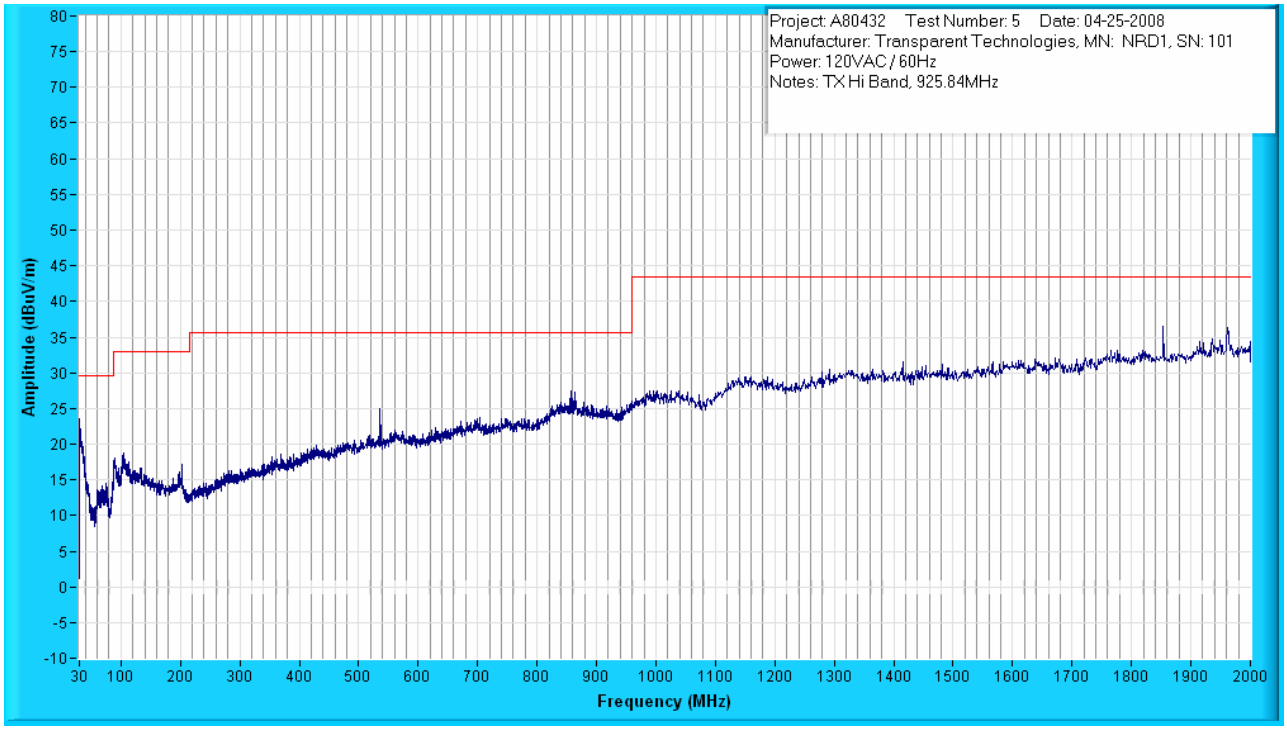

Figure C5: Radiated Emissions Prescan – 30Mhz – 2GHz @ 10 meter spacing, Peak Measurement

Notes
For pre-scans from 30 MHz to 1 GHz, the settings are:
RBW is 120 kHz (set by the QP Adapter)
VBW is 3 MHz

For pre-scans >1 GHz, the settings are:
RBW is 1 MHz
VBW is 100 kHz

emc integrity incorporated

Radiated Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008

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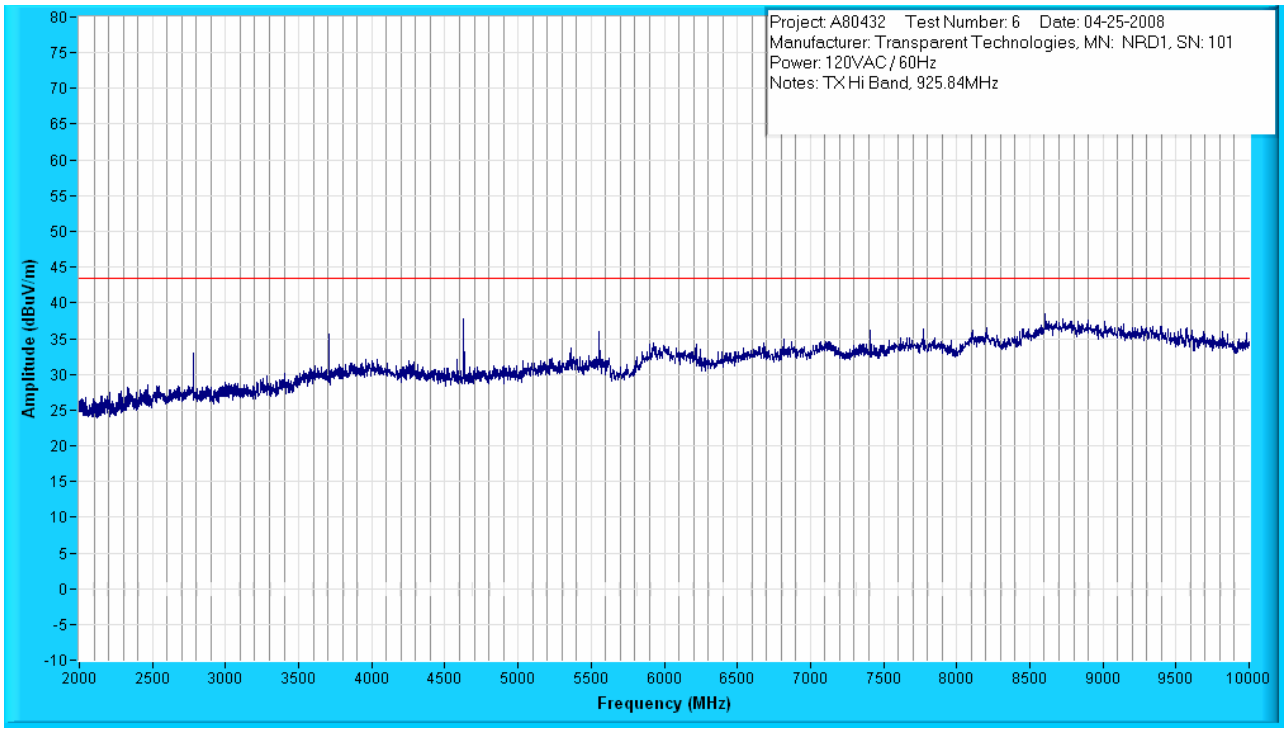

Figure C6: Radiated Emissions Prescan – 2GHz – 10GHz @ 10 meter spacing, Peak Measurement

Notes
For pre-scans from 30 MHz to 1 GHz, the settings are:
RBW is 120 kHz (set by the QP Adapter)
VBW is 3 MHz

For pre-scans >1 GHz, the settings are:
RBW is 1 MHz
VBW is 100 kHz

emc integrity incorporated

Radiated Emissions, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 25, 2008

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1030	EMCO	3115	9906-5816	Double-ridged Horn (1 - 18 GHz)	03/12/2008	03/12/2009
1072	JCA	JCA118-513	101A101B102 A102B	Low Noise Preamplifer 1 - 18 GHz	02/19/2008	02/19/2009
1092	Hewlett Packard	8495B	2522A10285	0 - 70 dB Step Attenuator	07/23/2007	07/23/2008
1220	Mini-Circuits	ZKL-2	062906	Preamp, 10 - 2000 MHz, 30 dB	02/02/2008	02/02/2009
1229	Hewlett Packard	85685A	3010A01077	RF Preselector	06/12/2007	06/12/2008
1232	Sunol Sciences	JB1	A071605-2	Bilog Antenna, 30 MHz to 2.0 GHz	07/23/2007	07/23/2008
1233	Sunol Sciences	SC104V	110305-1	Positioning Controller	NA	NA
1234	CIR Enterprises	10m Chamber	001	10m Radiated Emissions Semi-Anechoic Chamber	04/02/2008	04/02/2009
1238	Sunol Sciences	TWR95-4	110305-3	Antenna Mast	NA	NA
1239	Sunol Sciences	FM2522VS	110305-2	Turn Table, 2.5m Diameter	NA	NA
1240	Eagle	240NFNF	1240	Tunable Notch Filter, 500 to 1300 MHz	NA	NA
1241	Eagle	240NFNF	1241	Tunable Notch Filter, 500 to 1300 MHz	NA	NA
1263	Hewlett Packard	8566B	3014A06873	Spectrum Analyzer, 100 Hz to 22 GHz	08/21/2007	08/21/2008
1264	Hewlett Packard	85662A	2848A18247	Spectrum Analyzer Display	08/21/2007	08/21/2008
1265	Hewlett Packard	85650A	2521A00641	Quasi-Peak Adapter	08/21/2007	08/21/2008

APPENDIX D

6 dB Bandwidth, Part 15.247(a)(2)

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008
Temperature:	21˚C Humidity: 19%	Pressure:	837mb
Input Voltage:	120VAC / 60Hz		
Configuration of Unit:	Transmit at low-band, mid-band and high-band, respectively		
Test Engineer:	Donald Lighthart		

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Frequency Range	6 dB BW Measurement	Requirement	Result
Low-band	804 kHz	>500 kHz	**Pass**
Mid-band	822 kHz	>500 kHz	**Pass**
High-band	822 kHz	>500 kHz	**Pass**

Conclusion: Product **complies** with 6 dB bandwidth requirement of FCC Part 15.247(a)(2).

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

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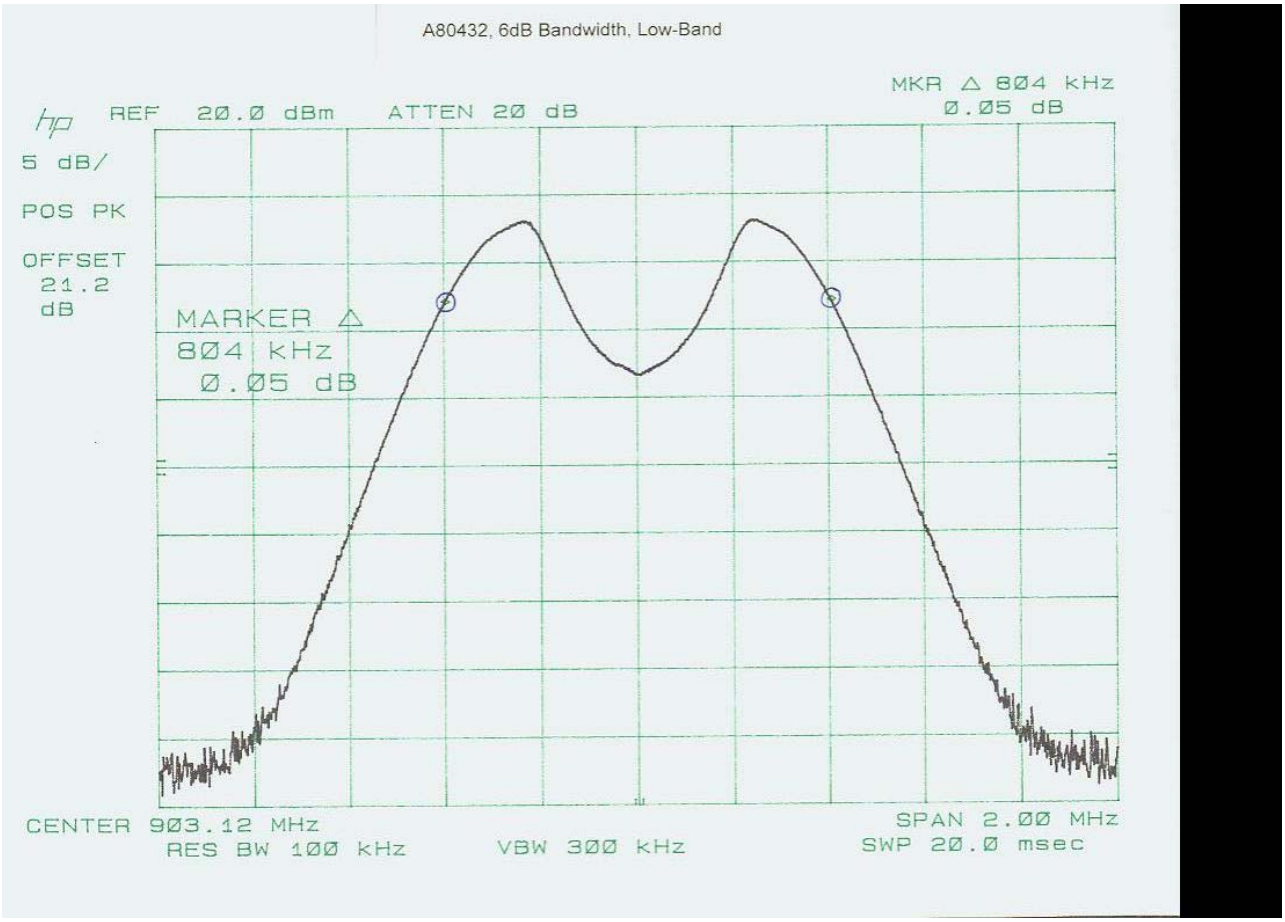

Figure D1. 6 dB Bandwidth Measurement, Low-band.

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

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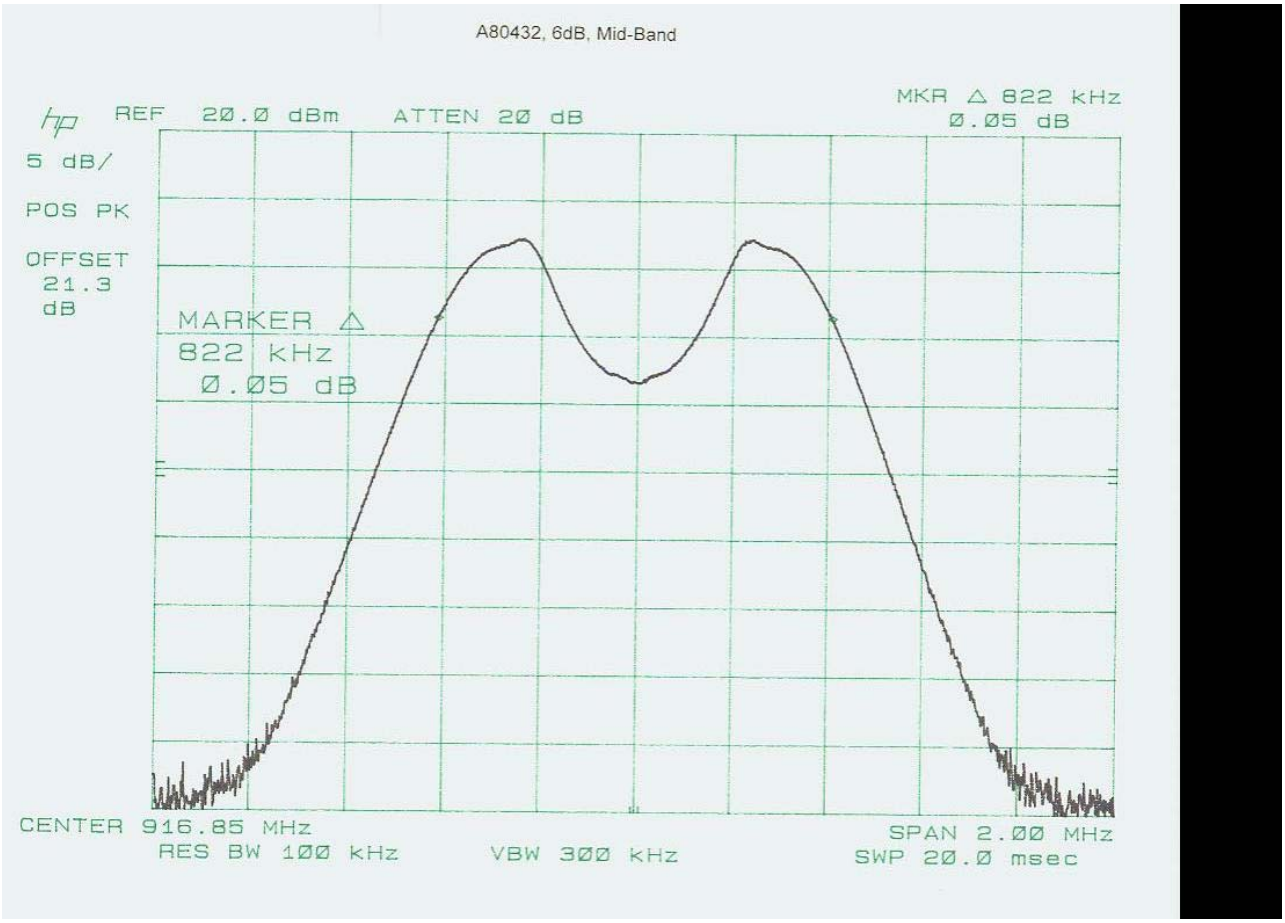

Figure D2. 6 dB Bandwidth Measurement, Mid-band.

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

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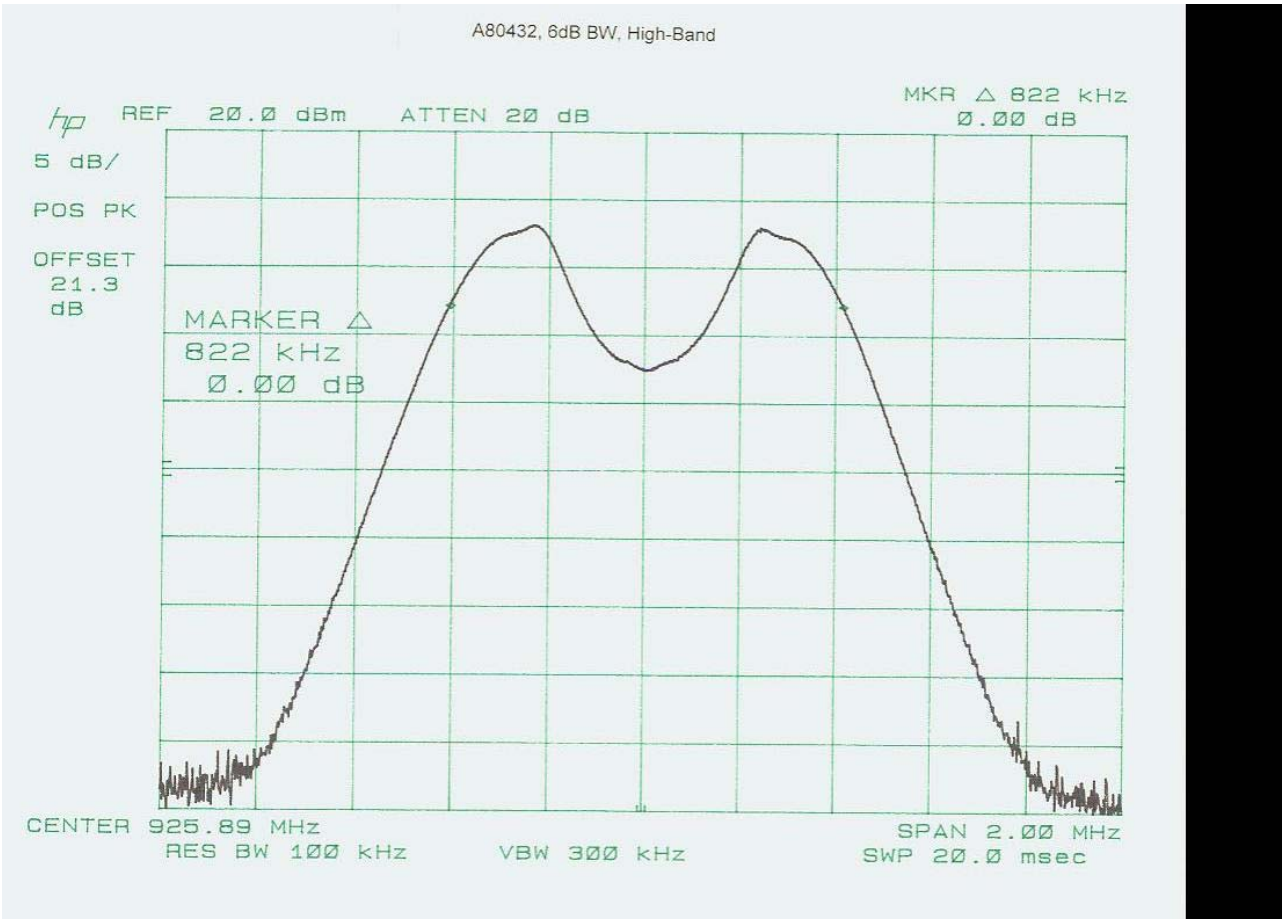

Figure D3. 6 dB Bandwidth Measurement, High-band.

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

A80432-22-RE.doc FR0100

Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1263	Hewlett Packard	8566B	3014A06873	Spectrum Analyzer, 100 Hz to 22 GHz	08/21/2007	08/21/2008
1264	Hewlett Packard	85662A	2848A18247	Spectrum Analyzer Display	08/21/2007	08/21/2008
1265	Hewlett Packard	85650A	2521A00641	Quasi-Peak Adapter	08/21/2007	08/21/2008
NA	Transparent Technologies	NA	NA	Coaxial Cable, N-type male connector, each end	NA	NA
NA	Pasternack	PE7004-10	NA	10 dB Attenuator, DC-18 GHz, 1 Watt	NA	NA
NA	Pasternack	PE7014-10	NA	10 dB Attenuator, DC-18 GHz, 2 Watt	NA	NA

APPENDIX E

Peak Output Power, Part 15.247(b)(3)

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008
Temperature:	21˚C Humidity: 19%	Pressure:	837mb
Input Voltage:	120VAC / 60Hz		
Configuration of Unit:	Transmit at low-band, mid-band and high-band, respectively		
Test Engineer:	Donald Lighthart		

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Frequency Range	Peak Power Measurement (dBm) (1,2)	Requirement (dBm) (3)	Result
Low-band (3 MHz BW)	13.50	< 29	**Pass**
Mid-band (3 MHz BW)	14.30	< 29	**Pass**
High-band (3 MHz BW)	14.80	< 29	**Pass**

(1) Measurement shown is with transmit signal modulated (as opposed to CW), which was verified as being worst-case.

(2) Input AC power was varied +/-15% and no change was seen on the peak power measurement. Thus, all measurements were taken using nominal AC input power.

(3) Peak power requirement for EUT is 1 Watt, or +30 dBm. However, this is reduced by the gain of the antenna which exceeds 6 dBi. Since the gain of the antenna used was 7 dBi, the limit must be reduced by 1 dB (7 dBi – 6 dBi).

Conclusion: Product **complies** with peak power requirement of FCC Part 15.247(b)(3).

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

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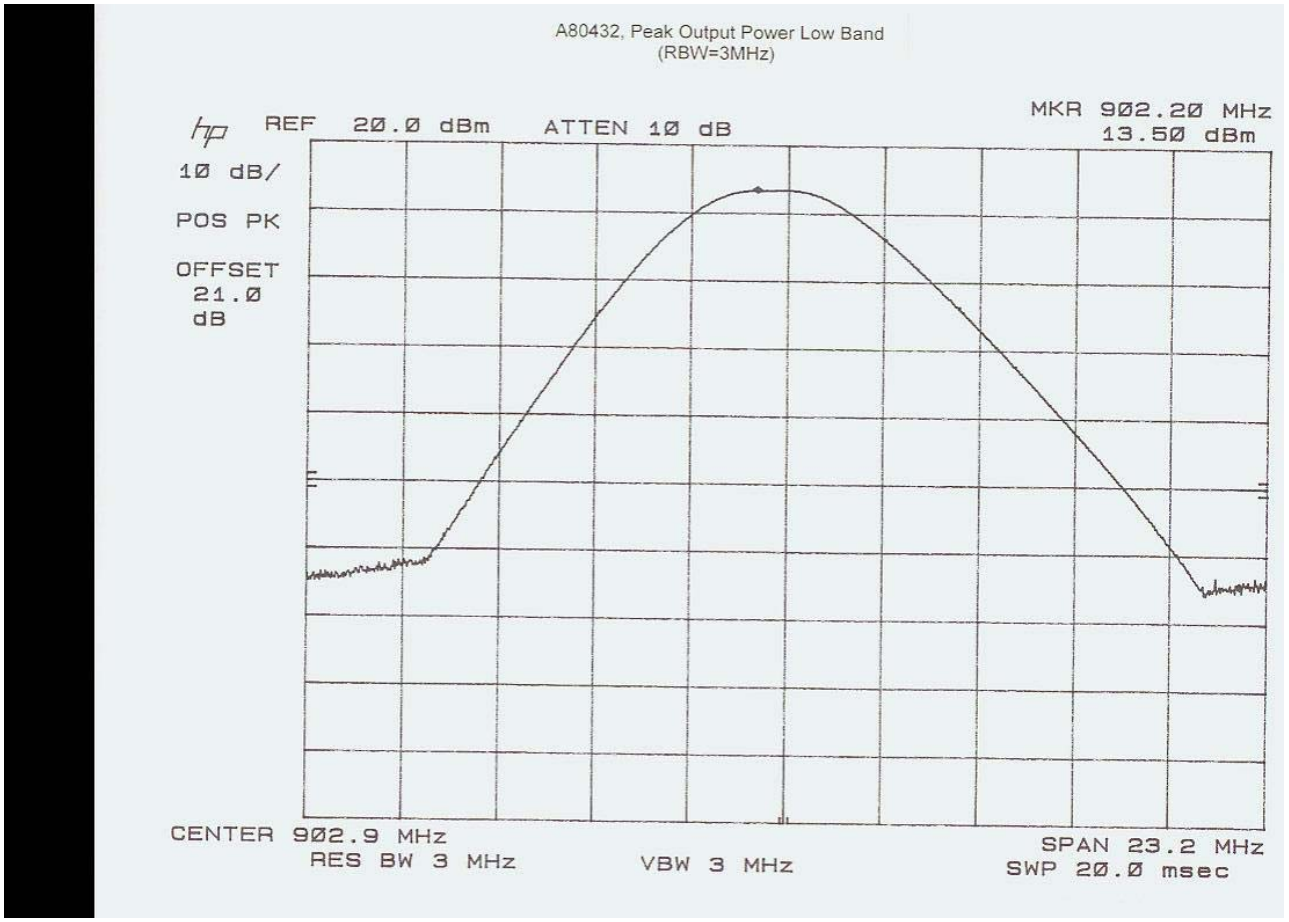

Figure E1. Peak Power Measurement, Low-band.

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

A80432-22-RE.doc FR0100

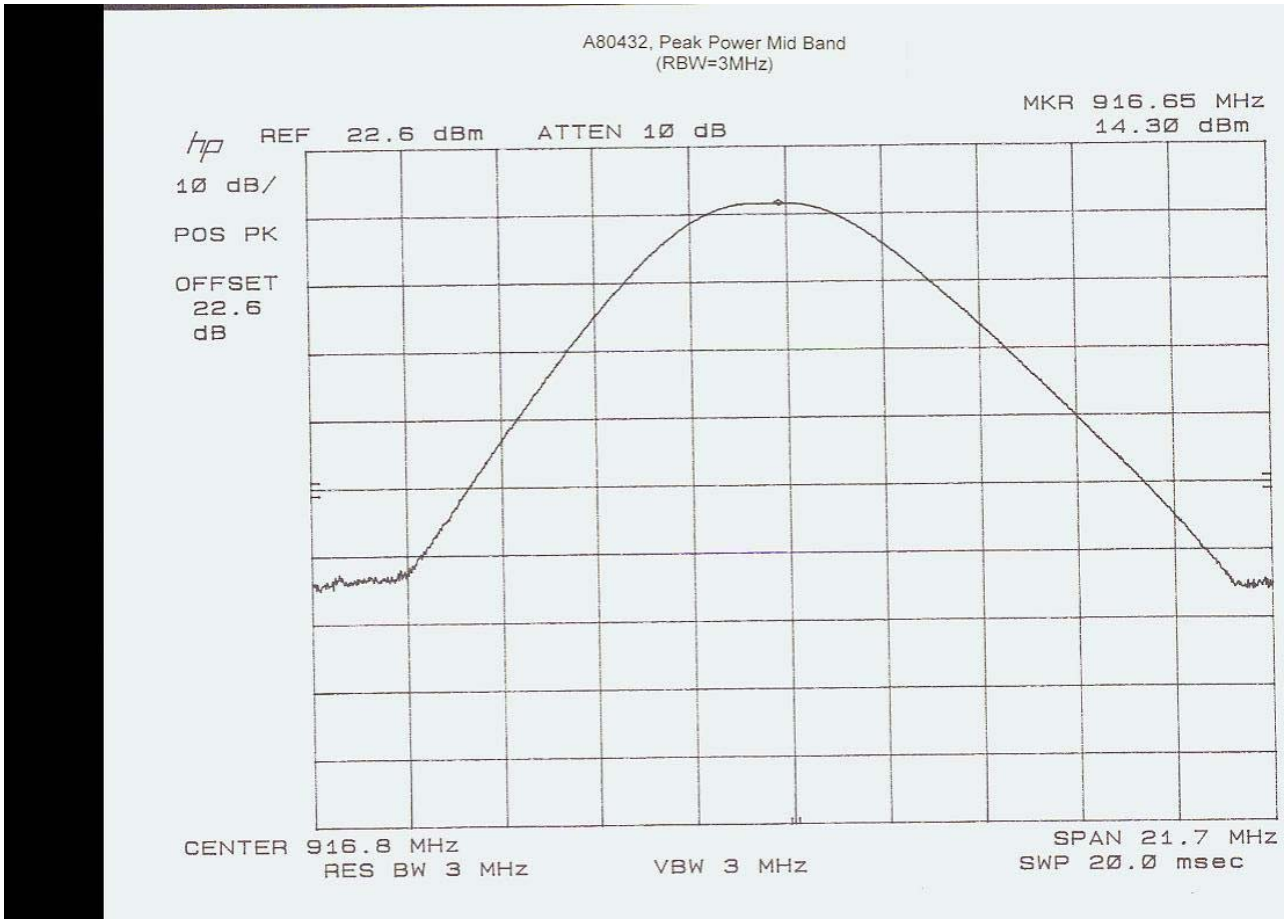

Figure E2. Peak Power Measurement, Mid-band.

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

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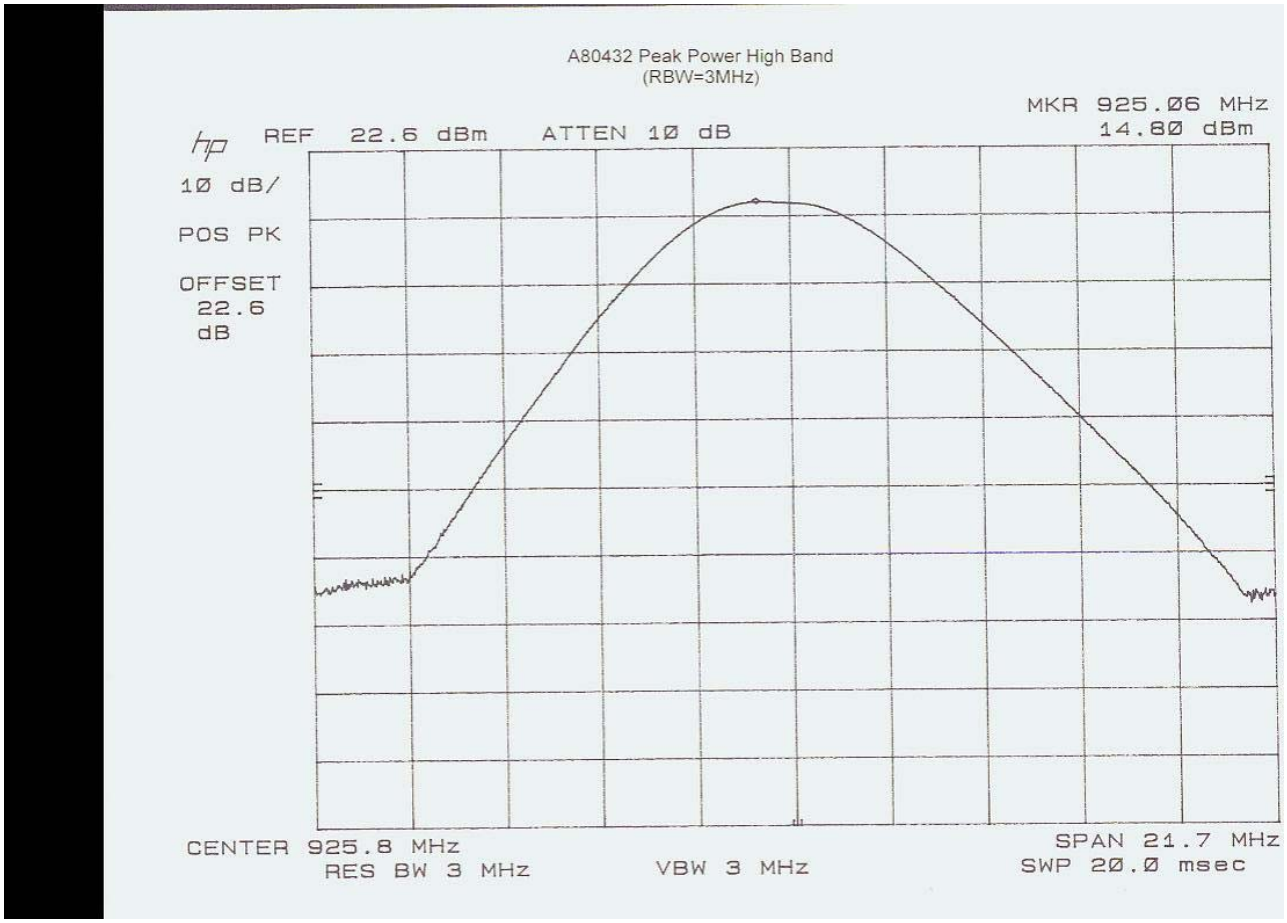

Figure E3. Peak Power Measurement, High-band.

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

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Figure E4. Test Setup, Peak Power Measurement.

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1263	Hewlett Packard	8566B	3014A06873	Spectrum Analyzer, 100 Hz to 22 GHz	08/21/2007	08/21/2008
1264	Hewlett Packard	85662A	2848A18247	Spectrum Analyzer Display	08/21/2007	08/21/2008
1265	Hewlett Packard	85650A	2521A00641	Quasi-Peak Adapter	08/21/2007	08/21/2008
NA	Transparent Technologies	NA	NA	Coaxial Cable, N-type male connector, each end	NA	NA
NA	Pasternack	PE7004-10	NA	10 dB Attenuator, DC-18 GHz, 1 Watt	NA	NA
NA	Pasternack	PE7014-10	NA	10 dB Attenuator, DC-18 GHz, 2 Watt	NA	NA

APPENDIX F

Power Spectral Density, Part 15.247(e)

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008
Temperature:	21˚C Humidity: 19%	Pressure:	837mb
Input Voltage:	120VAC / 60Hz		
Configuration of Unit:	Transmit at low-band, mid-band and high-band, respectively		
Test Engineer:	Donald Lighthart		

A80432-22-RE.doc FR0100

Frequency Range	Power Spectral Density Measurement (dBm)	Requirement (dBm)	Result
Low-band	5.40	8.0	**Pass**
Mid-band	4.20	8.0	**Pass**
High-band	5.00	8.0	**Pass**

Conclusion: Product **complies** with power spectral density requirement of FCC Part 15.247(e).

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

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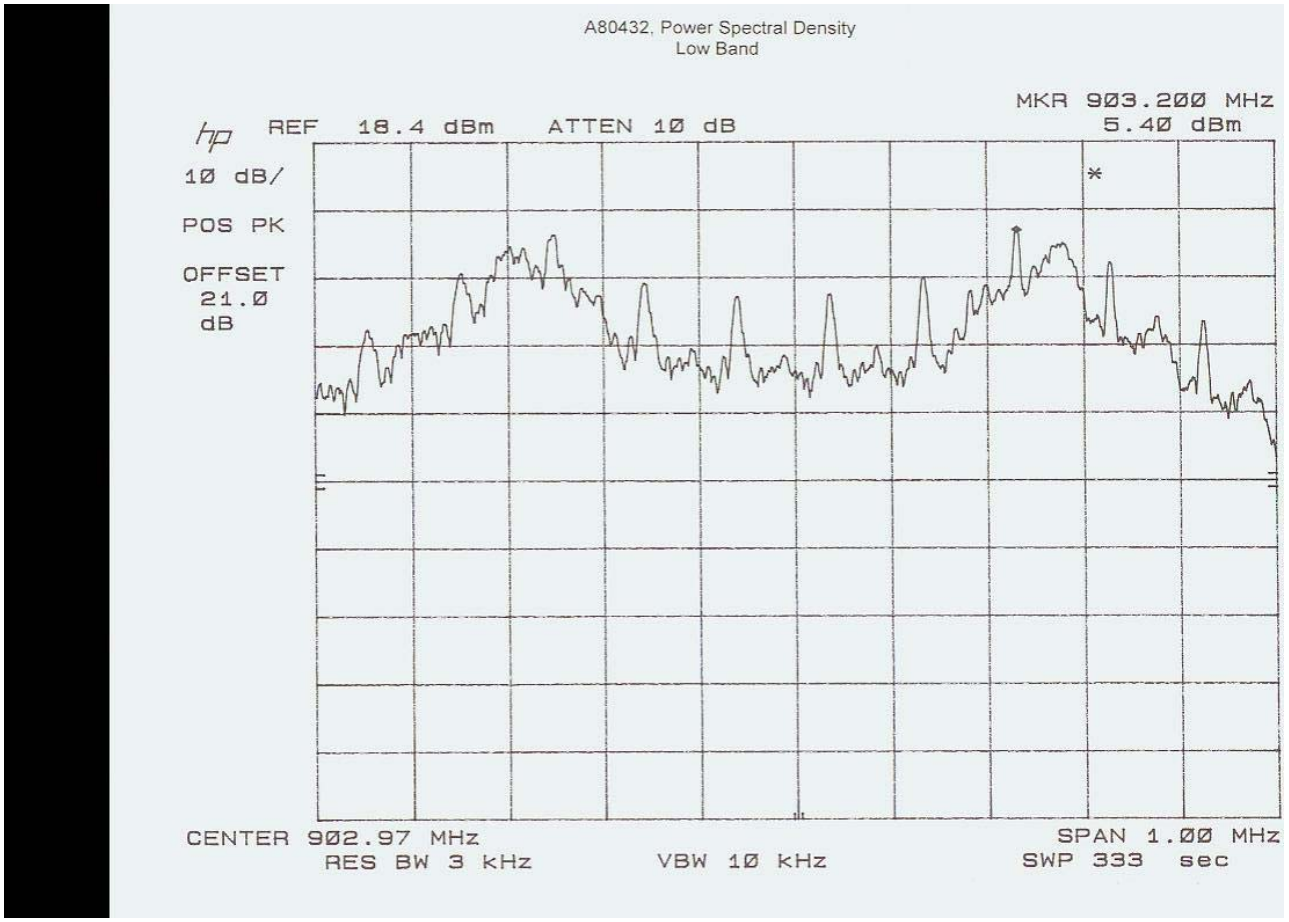

Figure F1. Power Spectral Density Measurement, Low-band.

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

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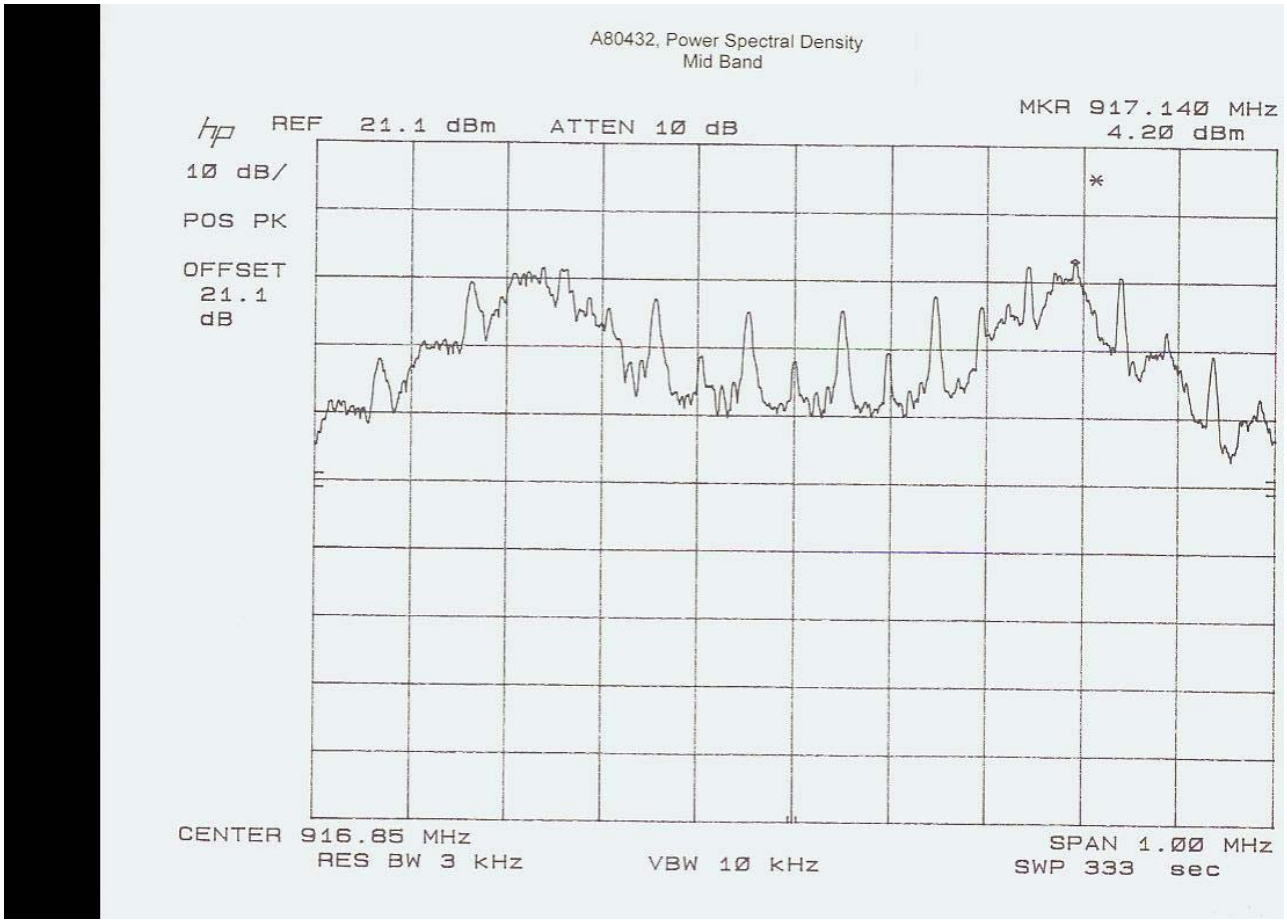

Figure F2. Power Spectral Density Measurement, Mid-band.

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

A80432-22-RE.doc FR0100

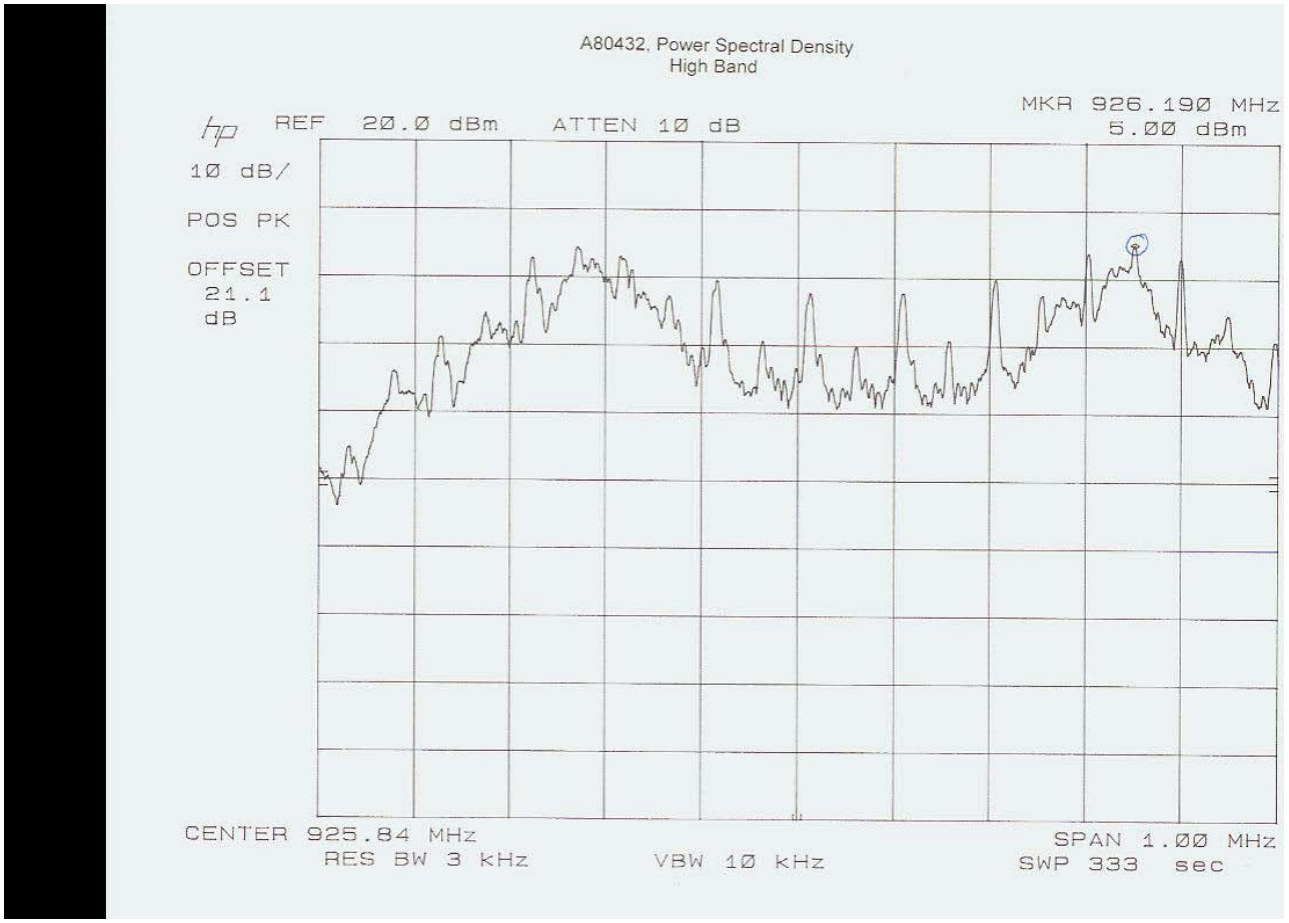

Figure F3. Power Spectral Density Measurement, High-band.

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

A80432-22-RE.doc FR0100

Figure F4. Test Setup, Power Spectral Density Measurement.

emc integrity incorporated

Radiated Emissions, CFR Title 47, FCC Part 15

Manufacturer:	Transparent Technologies	Project Number:	A80432
Customer Representative:	Mark Shamley	Test Area:	10m
Model:	NRD1	S/N:	101
Standard Referenced:	FCC Part 15 Class B	Date:	April 24, 2008

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1263	Hewlett Packard	8566B	3014A06873	Spectrum Analyzer, 100 Hz to 22 GHz	08/21/2007	08/21/2008
1264	Hewlett Packard	85662A	2848A18247	Spectrum Analyzer Display	08/21/2007	08/21/2008
1265	Hewlett Packard	85650A	2521A00641	Quasi-Peak Adapter	08/21/2007	08/21/2008
NA	Transparent Technologies	NA	NA	Coaxial Cable, N-type male connector, each end	NA	NA
NA	Pasternack	PE7004-10	NA	10 dB Attenuator, DC-18 GHz, 1 Watt	NA	NA
NA	Pasternack	PE7014-10	NA	10 dB Attenuator, DC-18 GHz, 2 Watt	NA	NA