Exhibit J: Technical Report

FCC ID: HN2SB555-2

Spurious Radiated Emissions Test Report from NWEMC

Measurement/Technical Report

General Information

Applicant:	Intermec Corporation
Address:	6001 36th Avenue West
City, State, Zip	Everett, WA 98203-9280
Test Requested By:	Carl Turk
Model:	SB555 Radio in 700C
FCC ID:	HN2SB555-2
First Date of Test:	December 24, 2002
Last Date of Test:	January 2, 2002
Receipt Date of Samples:	December 20, 2002
Job Number	INMC0044

Scope

Regulatory Authority	Federal Communications Commission
Approval Type	Certification
Equipment Type	Part 24 Licensed Base Station
Rule Parts	47 CFR 22.917(e), 24.238(a)
Rule Exemptions	None
Related Submittals or Grants	None

Report Information

Prepared By	Vicki Albertson, Technical Report and Documentation Manager Northwest EMC, Inc.
Signature	
Issued By	Northwest EMC, Inc. 22975 NW Evergreen Parkway, Suite 400 Hillsboro, Oregon 97124 Ph. (503) 844-4066 Fax (503) 844-3826
Report Number	INMC0044
Date Issued	January 6, 2003

Test Facility

The measurement facility used to collect the radiated and conducted data is located at

Northwest EMC, Inc.
22975 NW Evergreen Parkway, Suite 400
Hillsboro, OR 97124
(503) 844-4066
Fax: 844-3826

This site has been fully described in a report filed with the FCC (Federal Communications Commission), and accepted by the FCC in a letter maintained in our files.

Laboratory Accreditation

A2LA has granted accreditation Northwest EMC, Inc. to perform the Electromagnetic Compatibility (EMC) tests described in the Scope of Accreditation. Assessment performed to ISO/IEC 17025.
Certificate Number: 1936-01, Certificate Number: 1936-02, Certificate Number 1936-03

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:
Low
Mid
High

Operating Modes Investigated:
PSC Mode
Cellular Mode
PSC Mode simultaneously transmitting with co-located 802.11(b) radio
Cellular Mode simultaneously transmitting with co-located 802.11(b) radio

Antennas Investigated:
PSTGO-1900SCI
PSTGO-900 / 1900SCI

Data Rates Investigated:
Maximum

Power Input Settings Investigated:
Battery

Frequency Range Investigated			
Start Frequency	30 MHz	Stop Frequency	25 GHz

Software\Firmware Applied During Test			
Exercise software	Sierra SMART	Version	V.046
Description			
The system was tested using special software developed to test all functions of the device during the test.			

Equipment Modifications

No EMI suppression devices were added or modified. The EUT was tested as delivered.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT-Radio	Intermec	SB555	6301FEOC
Host Device	Intermec	700C	E02093050443010
Antenna	Mobile Mark	PSTGO-1900SCI	N/A
Antenna	Mobile Mark	PSTGO-900 / 1900SCI	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
N/A	N/A	N/A	N/A	N/A	N/A

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	03/19/2002	12 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	12/03/2001	14 mo
Antenna, Biconilog	EMCO	3141	AXE	12/31/2001	36 mo
Antenna, Horn	EMCO	3115	AHJ	05/23/2002	12 mo
Pre-Amplifier	Miteq	AMF-4D-010120-30-10P	AOP	07/09/2002	12 mo
Spectrum Analyzer	Tektronix	2784	AAO	03/08/2001	24 mo
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	01/17/2000	36 mo
Antenna, Horn	EMCO	3160-09	AHG	01/15/2000	36 mo
DC Power Supply	Topward	TPS-2000	TPD	NCR	N/A
Signal Generator	Hewlett-Packard	8341B	TGM	01/09/02	12 mo
Antenna, Horn	EMCO	3115	AHF	03/03/02	12 mo

Test Description

Requirement: Per 2.1053, the field strength of spurious radiation was measured in the far-field at an FCC Listed semi-anechoic chamber up to 25 GHz. The applicable limits are 22.917(e) for the cellular band, and 24.238(a) for the PCS band.

Per 22.917(e), the mean power of out of band emissions must be attenuated below the mean power of the unmodulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least 43 + 10 log (P) dB. (-13 dBm).

Per 24.238(a), on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB. (-13 dBm).

Configuration: Spectrum analyzer, signal generator, and linearly polarized antennas were used to measure radiated harmonics and spurious emissions. The orientation of the EUT and measurement antenna were manipulated to maximize the level of emissions. The EUT was configured to transmit at the highest output at low, mid, and high channels. The EUT was tested with each antenna. Only one antenna can be used at a time.

The substitution method as described in TIA/EIA-603 Section 2.2.12 was used for the highest spurious emissions. The EUT was tested individually, then while simultaneously transmitting with a co-located radio.

Test Methodology: For licensed transmitters, the FCC references TIA/EIA-603 as the measurement procedure standard. TIA/EIA-603 Section 2.2.12 describes a method for measuring radiated spurious emissions that utilizes an antenna substitution method:

At an approved test site, the transmitter is place on a remotely controlled turntable, and the measurement antenna is placed 3 meters from the transmitter. The turntable azimuth is varied to maximize the level of

spurious emissions. The height of the measurement antenna is also varied from 1 to 4 meters. The amplitude and frequency of the highest emissions are noted. The transmitter is then replaced with a ½ wave dipole that is successively tuned to each of the highest spurious emissions. A signal generator is connected to the dipole (horn antenna for frequencies above 1 GHz), and its output is adjusted to match the level previously noted for each frequency. The output of the signal generator is recorded, and by factoring in the cable loss to the dipole antenna and its gain; the power (dBm) into an ideal ½ wave dipole antenna is determined for each radiated spurious emission.

For the purposes of preliminary measurements, the field strength of the spurious emissions can be measured and compared with a 3 meter limit. The final measurements must be made utilizing the substitution method described above. The 3 meter limit was calculated to be 84.3 dBuV/m at 3 meters. This was based upon an output power of 0.224 W.

Simultaneous Transmission: The EUT will be co-located with two other radios: FCC ID:HN22011B-2 (802.11(b) radio), and FCC ID:HN2ABTM3-3 (Bluetooth radio). Any two of the three radios can transmit simultaneously. All three radios cannot transmit simultaneously. Each radio transmits through its own antenna.

The following is an excerpt from the FCC / TCB Training Q & A, October 2002, Day 2, Question 7:

> **Assuming that the radios do not share an antenna, only radiated tests for simultaneous transmission is required. If the radios share an antenna, antenna conducted measurements would also be required. Only one set of worst case simultaneous transmission data is going to be requested to be submitted at this time. The test engineer should indicate the worst case condition and provide justification as to why the worst case condition was chosen. The grantee should be reminded that even if the FCC requests one set of data, they are responsible for compliance for all modes of simultaneous transmission.**

Since the Bluetooth radio has such a low EIRP (.001W) and is a frequency hopper, the worst case simultaneous transmission mode was determined to be the EUT transmitting simultaneously with the 802.11(b) radio (EIRP = 0.056 W & single channel operation). The EUT was tested in both cellular and PCS modes while simultaneously transmitting with the 802.11(b) radio. Simultaneous low, mid, and high transmit frequencies were investigated from 30 MHz to 25 GHz.

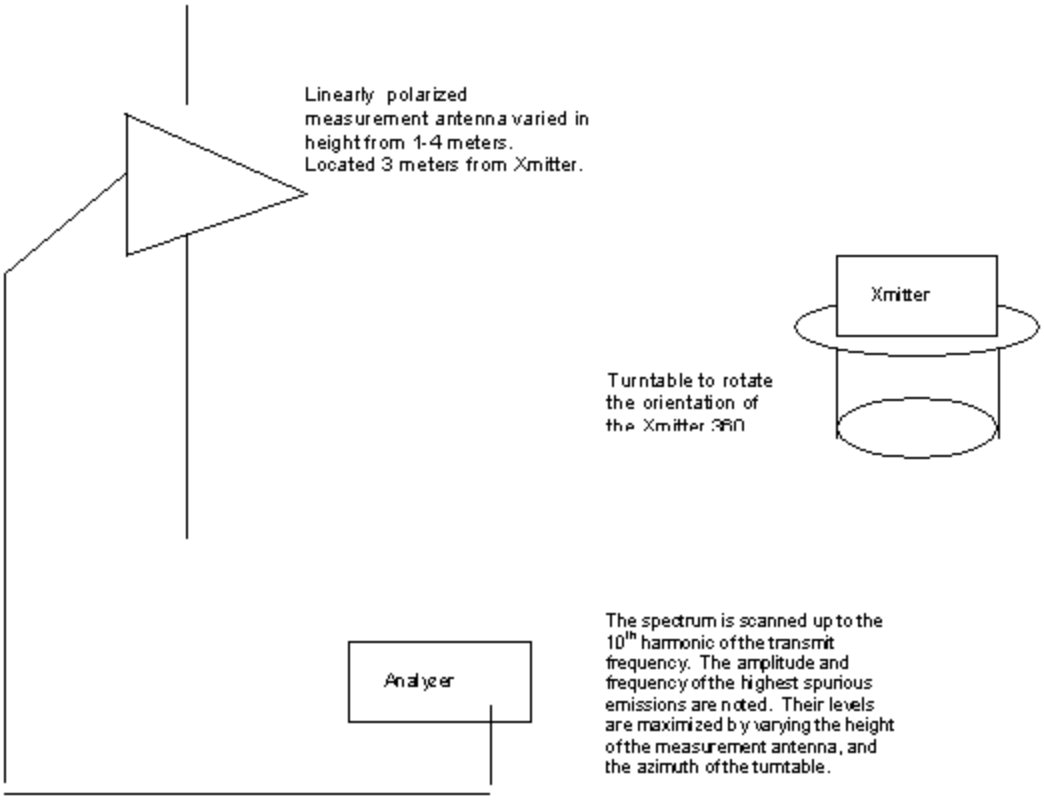
In addition, all the possible combinations of harmonic emissions from the EUT and the 802.11(b) radio were compared numerically. It was determined that only channels 526 (1876 MHz) and 930 (1896 MHz) in PCS mode could have harmonic emissions that coincide with the center frequency of harmonic emissions from the 802.11(b) radio (tuned to channels 1 (2412 MHz) and 6 (2437 MHz) respectively). The frequency range from 10 to 18 GHz was investigated for these channel combinations.

Bandwidths Used for Measurements

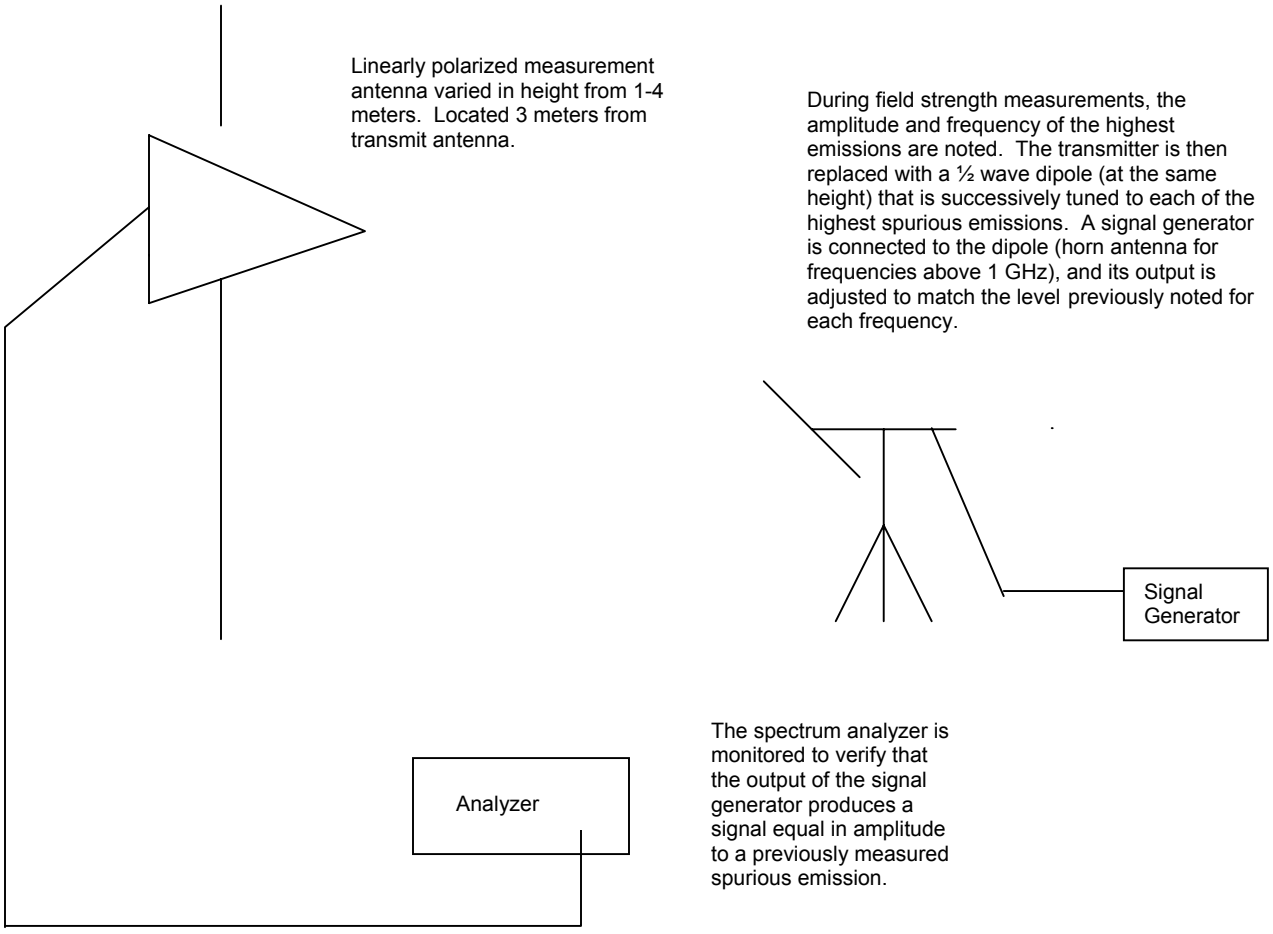
Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 – 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0
Measurements were made using the bandwidths and detectors specified. No video filter was used.			

Test Setup Diagram

Test Setup for Field Strength Measurements



Test Setup for Power Measurements Utilizing the Antenna Substitution Method



Completed by:

NORTHWEST EMC

Apparent Power Data Sheet

REV df3.02 10/23/2002

EUT:	SB555 Radio used in Model 700C			Work Order:	INMC0044
Serial Number:	6301FEOC			Date:	12/24/02
Customer:	INTERMEC Corporation			Temperature:	70
Attendees:	None			Humidity:	32%
Cust. Ref. No.:				Barometric Pressure	29.75
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC Part 24E	Year:	2002
Method:	TIA/EIA-603	Year:	1998

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Antenna PSTGO-900 / 1900SCI

EUT OPERATING MODES

Transmitting - PCS Band

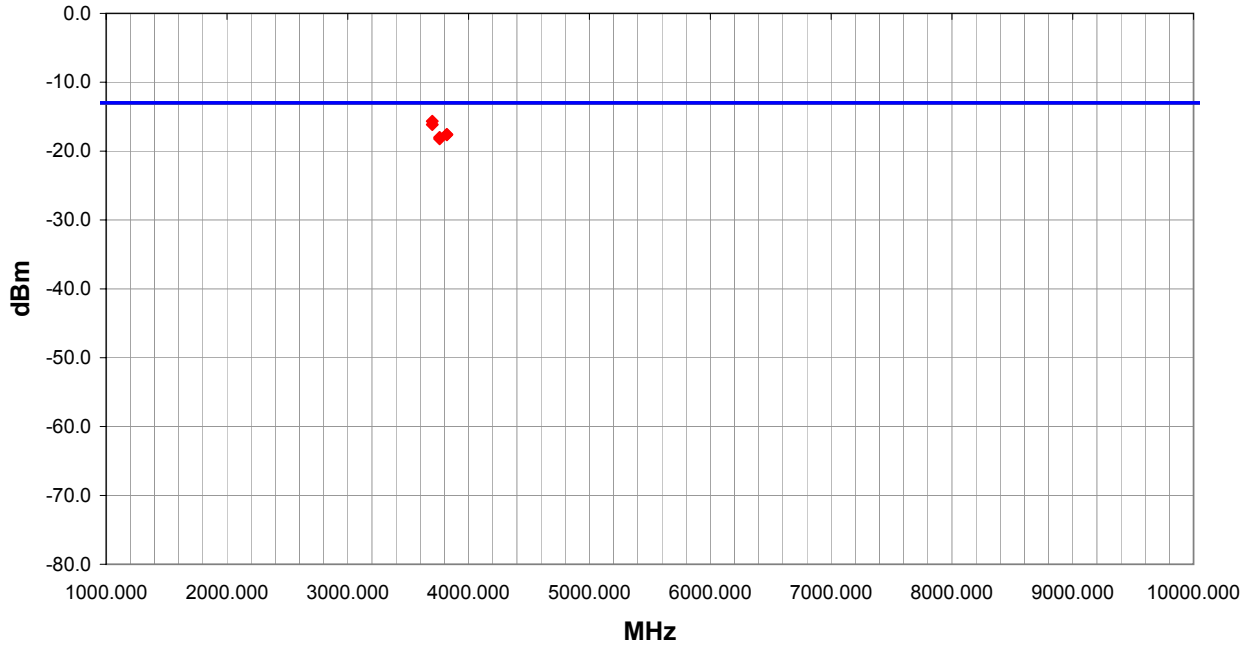
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Test Distance (m)	Run #
Pass	3	6

Other

Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
3699.354	307.0	1.1	H-Horn	PK	-15.7	-13.0	-2.7	Low Channel
3699.360	7.0	1.5	V-Horn	PK	-16.1	-13.0	-3.1	Low Channel
3819.400	156.0	1.2	V-Horn	PK	-17.6	-13.0	-4.6	High Channel
3819.400	69.0	1.3	H-Horn	PK	-17.6	-13.0	-4.6	High Channel
3759.400	347.0	1.2	V-Horn	PK	-18.0	-13.0	-5.0	Mid Channel
3759.400	107.0	1.3	H-Horn	PK	-18.2	-13.0	-5.2	Mid Channel

NORTHWEST EMC

Apparent Power Data Sheet

REV df3.02 10/23/2002

EUT:	SB555 Radio used in Model 700C			Work Order:	INMC0044
Serial Number:	6301FEOC			Date:	12/24/02
Customer:	INTERMEC Corporation			Temperature:	72
Attendees:	None			Humidity:	32%
Cust. Ref. No.:				Barometric Pressure	29.75
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC Part 24E	Year:	2002
Method:	TIA/EIA-603	Year:	1998

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Antenna PSTGO-1900SCI

EUT OPERATING MODES

Transmitting - PCS Band

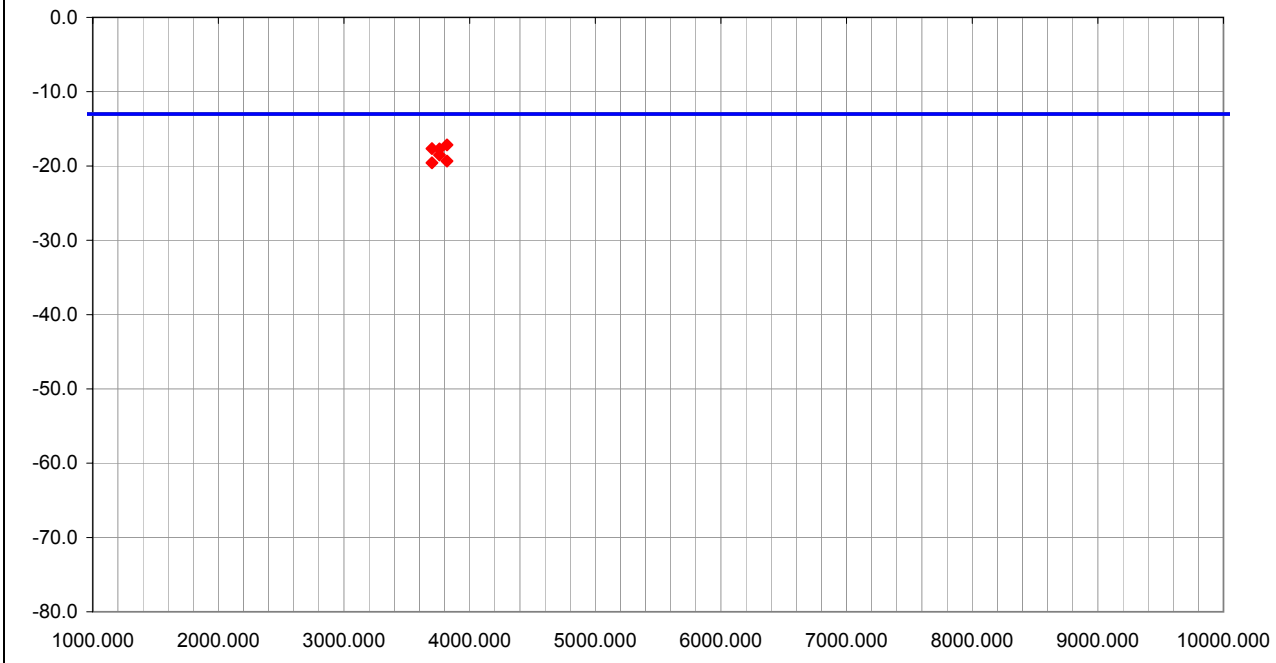
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Test Distance (m)	Run #
Pass	3	8

Other

Tested By:



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
3819.400			118.0	1.2			V-Horn	PK		-17.2	-13.0	-4.2	High Channel
3699.400			102.0	1.2			V-Horn	PK		-17.6	-13.0	-4.6	Low Channel
3759.400			141.0	1.2			V-Horn	PK		-17.7	-13.0	-4.7	Mid Channel
3759.400			324.0	1.3			H-Horn	PK		-18.5	-13.0	-5.5	Mid Channel
3819.400			99.0	1.3			H-Horn	PK		-19.3	-13.0	-6.3	High Channel
3699.400			301.0	1.3			H-Horn	PK		-19.6	-13.0	-6.6	Low Channel

NORTHWEST EMC

Apparent Power Data Sheet

REV df3.02 10/23/2002

EUT:	SB555 Radio used in Model 700C			Work Order:	INMC0044
Serial Number:	6301FEOC			Date:	12/24/02
Customer:	INTERMEC Corporation			Temperature:	66
Attendees:	None			Humidity:	33%
Cust. Ref. No.:				Barometric Pressure	30.2
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC Part 22.901(d)	Year:	2002
Method:	TIA/EIA-603	Year:	1998

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Antenna PSTGO-900 / 1900SCI

EUT OPERATING MODES

Transmitting - Cellular Band

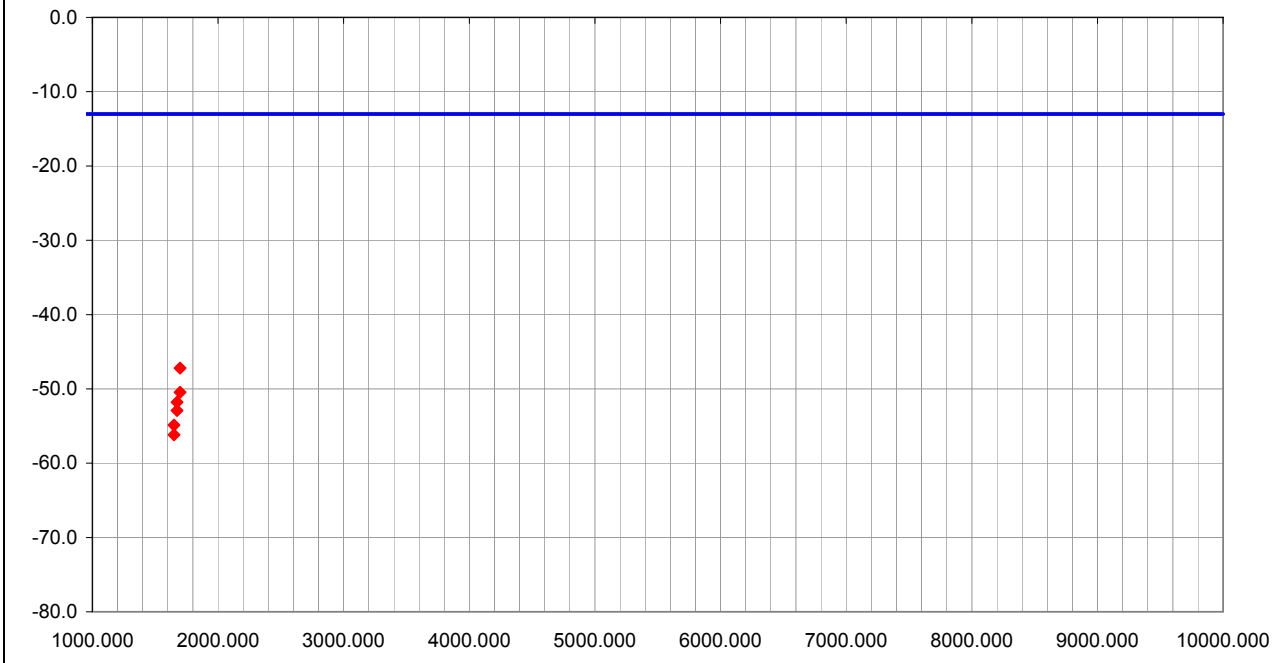
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Test Distance (m)	Run #
Pass	3	10

Other

Tested By:



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
1697.400			184.0	1.5			H-Horn	PK		-47.2	-13.0	-34.2	High Channel
1697.400			275.0	1.2			V-Horn	PK		-50.5	-13.0	-37.5	High Channel
1673.400			161.0	1.2			H-Horn	PK		-51.8	-13.0	-38.8	Mid Channel
1673.400			69.0	1.2			V-Horn	PK		-52.9	-13.0	-39.9	Mid Channel
1649.400			176.0	1.2			H-Horn	PK		-54.9	-13.0	-41.9	Low Channel
1649.400			74.0	1.2			V-Horn	PK		-56.2	-13.0	-43.2	Low Channel

NORTHWEST EMC

OATS DATA SHEET

REV df3.02 10/23/2002

EUT:	SB555 Radio used in Model 700C			Work Order:	INMC0044
Serial Number:	6301FEOC			Date:	12/24/02
Customer:	INTERMEC Corporation			Temperature:	72
Attendees:	None			Humidity:	32%
Cust. Ref. No.:				Barometric Pressure	29.75
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC Part 15 Class B	Year:	2000
Method:	ANSI C63.4	Year:	1992

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Antenna PSTGO-900 / 1900SCI

EUT OPERATING MODES

Receive Mode - Cellular Band

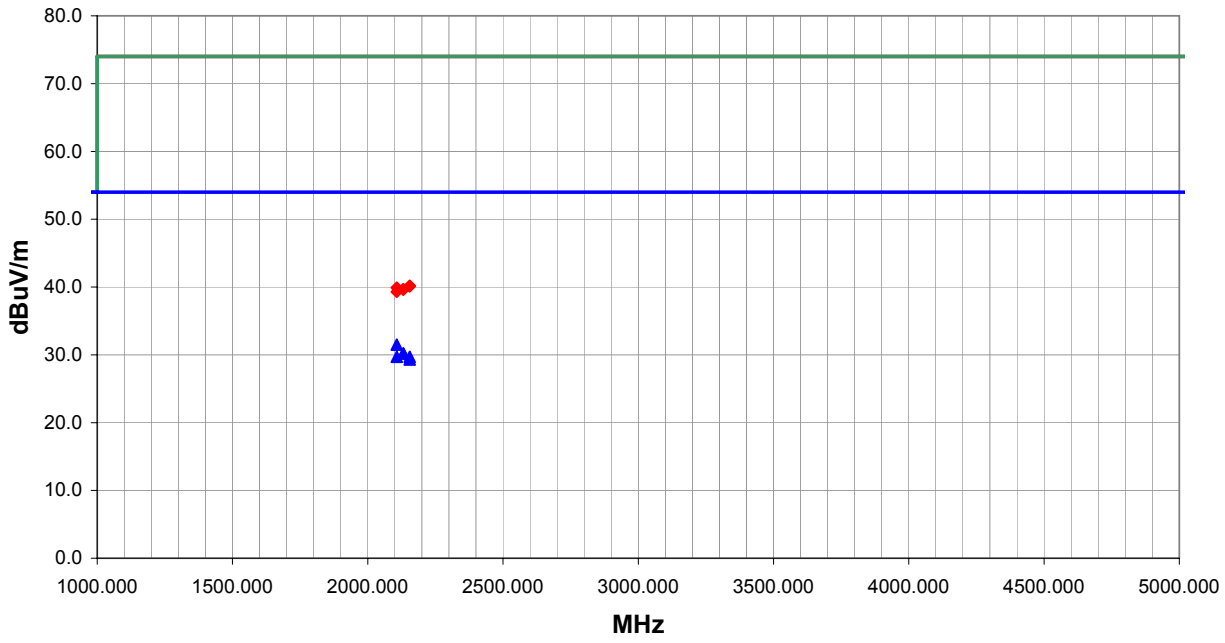
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Test Distance (m)	Run #
Pass	3	12

Other

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
2107.230	31.8	-0.3	172.0	1.6	3.0	0.0	V-Horn	AV	0.0	31.5	54.0	-22.5	Low Channel
2131.200	30.5	-0.3	77.0	1.3	3.0	0.0	H-Horn	AV	0.0	30.2	54.0	-23.8	Mid Channel
2131.200	30.5	-0.3	155.0	1.6	3.0	0.0	V-Horn	AV	0.0	30.2	54.0	-23.8	Mid Channel
2107.230	30.0	-0.3	147.0	1.3	3.0	0.0	H-Horn	AV	0.0	29.7	54.0	-24.3	Low Channel
2155.150	30.0	-0.3	255.0	1.3	3.0	0.0	H-Horn	AV	0.0	29.7	54.0	-24.3	High Channel
2155.150	29.6	-0.3	157.0	1.2	3.0	0.0	V-Horn	AV	0.0	29.3	54.0	-24.7	High Channel
2155.150	40.5	-0.3	255.0	1.3	3.0	0.0	H-Horn	PK	0.0	40.2	74.0	-33.8	High Channel
2155.150	40.4	-0.3	157.0	1.2	3.0	0.0	V-Horn	PK	0.0	40.1	74.0	-33.9	High Channel
2107.230	40.2	-0.3	172.0	1.6	3.0	0.0	V-Horn	PK	0.0	39.9	74.0	-34.1	Low Channel
2131.200	40.0	-0.3	155.0	1.6	3.0	0.0	V-Horn	PK	0.0	39.7	74.0	-34.3	Mid Channel
2131.200	39.9	-0.3	77.0	1.3	3.0	0.0	H-Horn	PK	0.0	39.6	74.0	-34.4	Mid Channel
2107.230	39.6	-0.3	147.0	1.3	3.0	0.0	H-Horn	PK	0.0	39.3	74.0	-34.7	Low Channel

NORTHWEST EMC

Apparent Power Data Sheet

REV df3.02 10/23/2002

EUT:	SB555 Radio used in Model 700C			Work Order:	INMC0044
Serial Number:	6301FEOC			Date:	12/31/02
Customer:	INTERMEC Corporation			Temperature:	73
Attendees:	None			Humidity:	34%
Cust. Ref. No.:				Barometric Pressure	29.75
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC Part 24E	Year:	2002
Method:	TIA/EIA-603	Year:	1998

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Antenna PSTGO-900 / 1900SCI

EUT OPERATING MODES

Transmitting in PCS mode and 802.11(b) mode

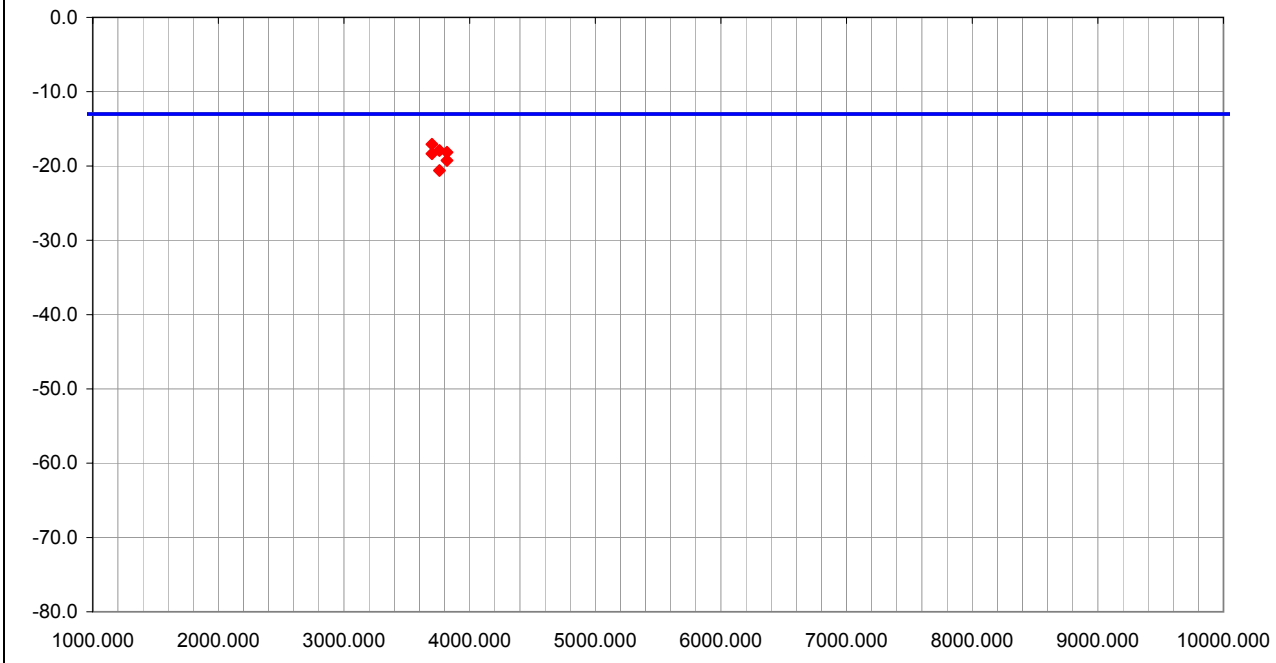
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Test Distance (m)	Run #
Pass	3	14

Other

Tested By:



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
3699.356			71.0	2.0			H-Horn	PK		-17.1	-13.0	-4.1	Low Channel
3759.348			49.0	1.9			H-Horn	PK		-17.9	-13.0	-4.9	Mid Channel
3819.360			20.0	1.9			H-Horn	PK		-19.2	-13.0	-6.2	High Channel
3819.360			344.0	1.0			V-Horn	PK		-18.2	-13.0	-5.2	High Channel
3699.356			153.0	1.0			V-Horn	PK		-18.3	-13.0	-5.3	Low Channel
3759.400			355.0	1.3			V-Horn	PK		-20.6	-13.0	-7.6	Mid Channel

NORTHWEST EMC

Apparent Power Data Sheet

REV df3.02 10/23/2002

EUT:	SB555 Radio used in Model 700C			Work Order:	INMC0044
Serial Number:	6301FEOC			Date:	12/31/02
Customer:	INTERMEC Corporation			Temperature:	73
Attendees:	None			Humidity:	34%
Cust. Ref. No.:				Barometric Pressure	29.75
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC Part 22.901(d)	Year:	2002
Method:	TIA/EIA-603	Year:	1998

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Antenna PSTGO-900 / 1900SCI

EUT OPERATING MODES

Transmitting in Cellular mode and 802.11(b) mode

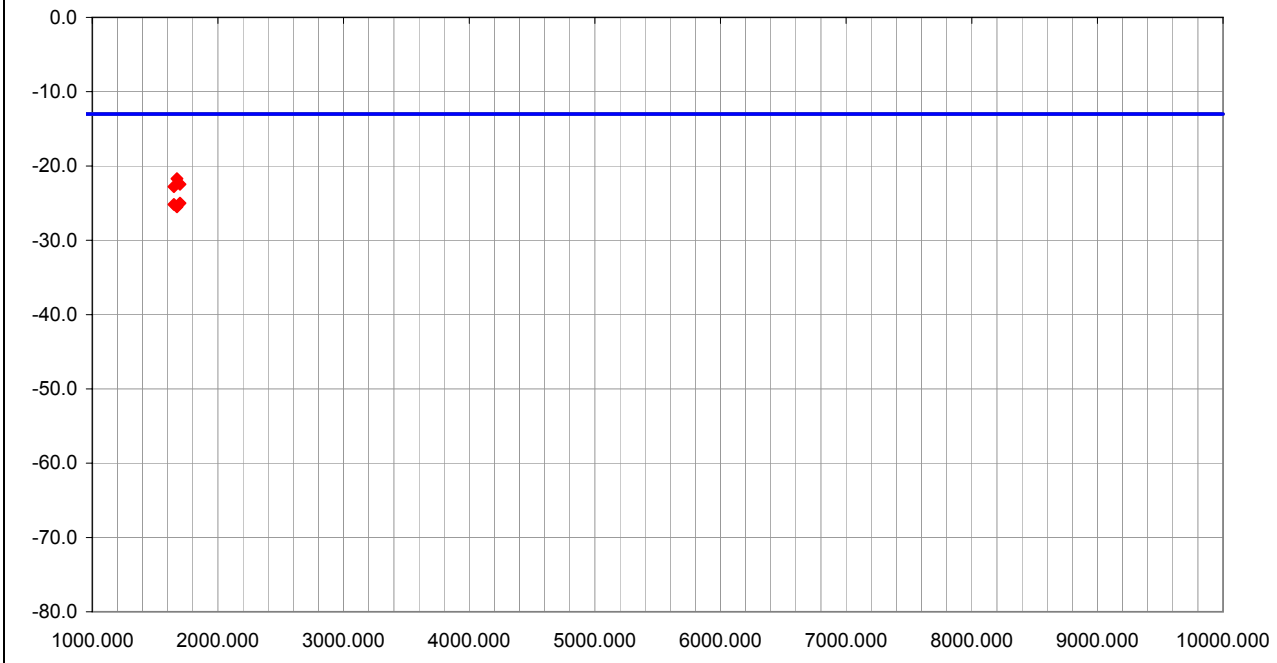
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Test Distance (m)	Run #
Pass	3	16

Other

Tested By:



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
1673.360			319.0	1.2			V-Horn	PK		-21.7	-13.0	-8.7	Mid Channel
1697.360			113.0	1.3			H-Horn	PK		-25.0	-13.0	-12.0	High Channel
1697.360			19.0	1.2			V-Horn	PK		-22.5	-13.0	-9.5	High Channel
1649.360			78.0	1.3			H-Horn	PK		-25.2	-13.0	-12.2	Low Channel
1649.360			116.0	1.2			V-Horn	PK		-22.8	-13.0	-9.8	Low Channel
1673.360			176.0	1.3			H-Horn	PK		-25.5	-13.0	-12.5	Mid Channel

NORTHWEST EMC

OATS DATA SHEET

REV df3.02 10/23/2002

EUT:	SB555 Radio used in Model 700C			Work Order:	INMC0044
Serial Number:	6301FEOC			Date:	01/02/03
Customer:	INTERMEC Corporation			Temperature:	72
Attendees:	None			Humidity:	35%
Cust. Ref. No.:				Barometric Pressure	29.92
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC Part 15.247(c)	Year:	2001
Method:	ANSI C63.4	Year:	1992

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Antenna PSTGO-900 / 1900SCI

EUT OPERATING MODES

Transmitting in Cellular mode and 802.11(b) mode

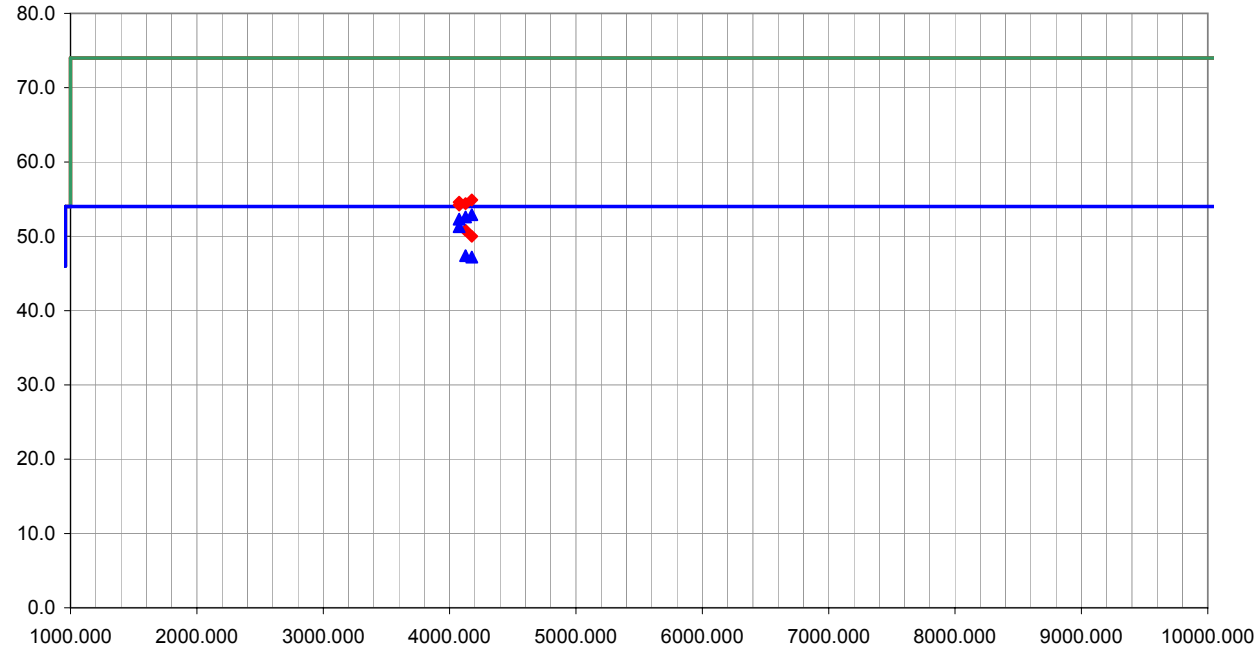
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Test Distance (m)	Run #
Pass	3	18

Other

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
4176.000	47.0	5.9	16.0	1.3	3.0	0.0	H-Horn	AV	0.0	52.9	54.0	-1.1	High Channel
4126.000	46.6	6.0	360.0	1.7	3.0	0.0	H-Horn	AV	0.0	52.6	54.0	-1.4	Mid Channel
4076.000	46.3	6.0	86.0	1.3	3.0	0.0	V-Horn	AV	0.0	52.3	54.0	-1.7	Low Channel
4076.000	45.3	6.0	66.0	1.8	3.0	0.0	H-Horn	AV	0.0	51.3	54.0	-2.7	Low Channel
4126.000	41.4	6.0	348.0	1.3	3.0	0.0	V-Horn	AV	0.0	47.4	54.0	-6.6	Mid Channel
4176.000	41.3	5.9	342.0	1.1	3.0	0.0	V-Horn	AV	0.0	47.2	54.0	-6.8	High Channel
4176.000	49.0	5.9	16.0	1.3	3.0	0.0	H-Horn	PK	0.0	54.9	74.0	-19.1	High Channel
4076.000	48.6	6.0	86.0	1.3	3.0	0.0	V-Horn	PK	0.0	54.6	74.0	-19.4	Low Channel
4126.000	48.4	6.0	360.0	1.7	3.0	0.0	H-Horn	PK	0.0	54.4	74.0	-19.6	Mid Channel
4076.000	48.2	6.0	66.0	1.8	3.0	0.0	H-Horn	PK	0.0	54.2	74.0	-19.8	Low Channel
4126.000	44.8	6.0	348.0	1.3	3.0	0.0	V-Horn	PK	0.0	50.8	74.0	-23.2	Mid Channel
4176.000	44.1	5.9	329.0	1.2	3.0	0.0	V-Horn	PK	0.0	50.0	74.0	-24.0	High Channel

NORTHWEST EMC

OATS DATA SHEET

REV df3.02 10/23/2002

EUT:	SB555 Radio used in Model 700C			Work Order:	INMC0044
Serial Number:	6301FEOC			Date:	01/02/03
Customer:	INTERMEC Corporation			Temperature:	73
Attendees:	None			Humidity:	34%
Cust. Ref. No.:				Barometric Pressure	29.75
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC Part 15.247(c)	Year:	2001
Method:	ANSI C63.4	Year:	1992

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Antenna PSTGO-900 / 1900SCI

EUT OPERATING MODES

Transmitting in PCS mode and 802.11(b) mode

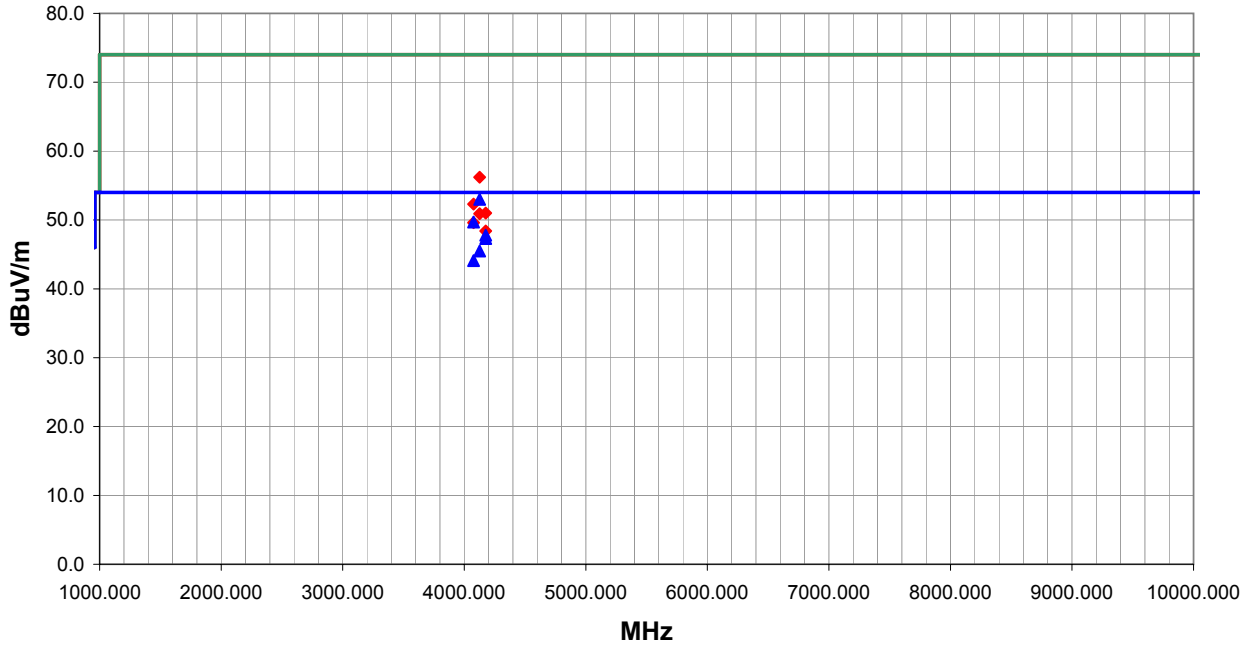
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Test Distance (m)	Run #
Pass	3	20

Other

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
4126.000	47.0	6.0	31.0	1.5	3.0	0.0	H-Horn	AV	0.0	53.0	54.0	-1.0	Mid Channel
4076.000	43.7	6.0	226.0	1.1	3.0	0.0	V-Horn	AV	0.0	49.7	54.0	-4.3	Low Channel
4176.000	41.9	5.9	57.0	1.2	3.0	0.0	V-Horn	AV	0.0	47.8	54.0	-6.2	High Channel
4176.000	41.4	5.9	143.0	1.3	3.0	0.0	H-Horn	AV	0.0	47.3	54.0	-6.7	High Channel
4126.000	39.5	6.0	135.0	1.2	3.0	0.0	V-Horn	AV	0.0	45.5	54.0	-8.5	Mid Channel
4076.000	38.1	6.0	221.0	1.3	3.0	0.0	H-Horn	AV	0.0	44.1	54.0	-9.9	Low Channel
4126.000	50.2	6.0	31.0	1.5	3.0	0.0	H-Horn	PK	0.0	56.2	74.0	-17.8	Mid Channel
4076.000	46.3	6.0	226.0	1.1	3.0	0.0	V-Horn	PK	0.0	52.3	74.0	-21.7	Low Channel
4176.000	45.1	5.9	143.0	1.3	3.0	0.0	H-Horn	PK	0.0	51.0	74.0	-23.0	High Channel
4126.000	44.9	6.0	135.0	1.2	3.0	0.0	V-Horn	PK	0.0	50.9	74.0	-23.1	Mid Channel
4076.000	43.6	6.0	221.0	1.3	3.0	0.0	H-Horn	PK	0.0	49.6	74.0	-24.4	Low Channel
4176.000	42.5	5.9	145.0	1.2	3.0	0.0	V-Horn	PK	0.0	48.4	74.0	-25.6	High Channel

NORTHWEST EMC

Apparent Power Data Sheet

REV df3.02 10/23/2002

EUT:	SB555 Radio used in Model 700C			Work Order:	INMC0044
Serial Number:	6301FEOC			Date:	12/31/02
Customer:	INTERMEC Corporation			Temperature:	75
Attendees:	None			Humidity:	33%
Cust. Ref. No.:				Barometric Pressure	29.75
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC Part 24E	Year:	2002
Method:	TIA/EIA-603	Year:	1998

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Antenna PSTGO-900 / 1900SCI

EUT OPERATING MODES

Transmitting in Channel 526 (1876MHz) PCS mode and Channel 1 (2412MHz) 802.11(b) mode

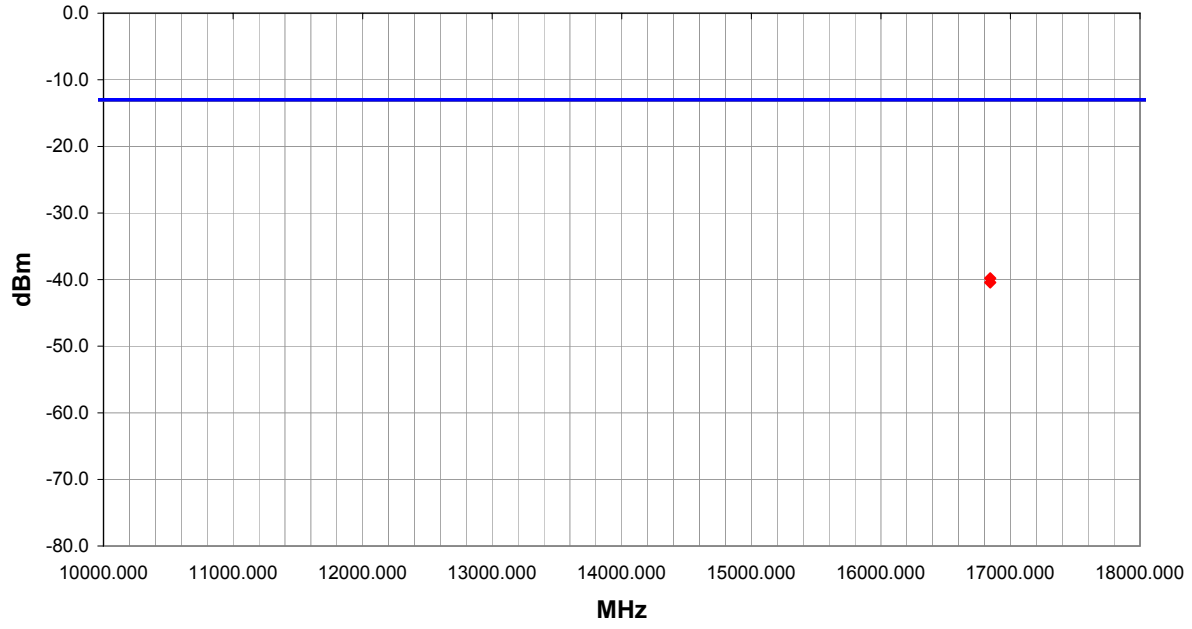
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Test Distance (m)	Run #
Pass	1	22

Other

Tested By:



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
16844.000			135.0	1.2			H-Horn	PK		-40.4	-13.0	-27.4
16844.000			140.0	1.2			V-Horn	PK		-39.8	-13.0	-26.8

NORTHWEST EMC

Apparent Power Data Sheet

REV df3.02 10/23/2002

EUT:	SB555 Radio used in Model 700C			Work Order:	INMC0044
Serial Number:	6301FEOC			Date:	12/31/02
Customer:	INTERMEC Corporation			Temperature:	73
Attendees:	None			Humidity:	34%
Cust. Ref. No.:				Barometric Pressure	29.75
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC Part 24E	Year:	2002
Method:	TIA/EIA-603	Year:	1998

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

Antenna PSTGO-900 / 1900SCI

EUT OPERATING MODES

Transmitting in Channel 930 (1896MHz) PCS mode and Channel 6 (2437MHz) 802.11(b) mode

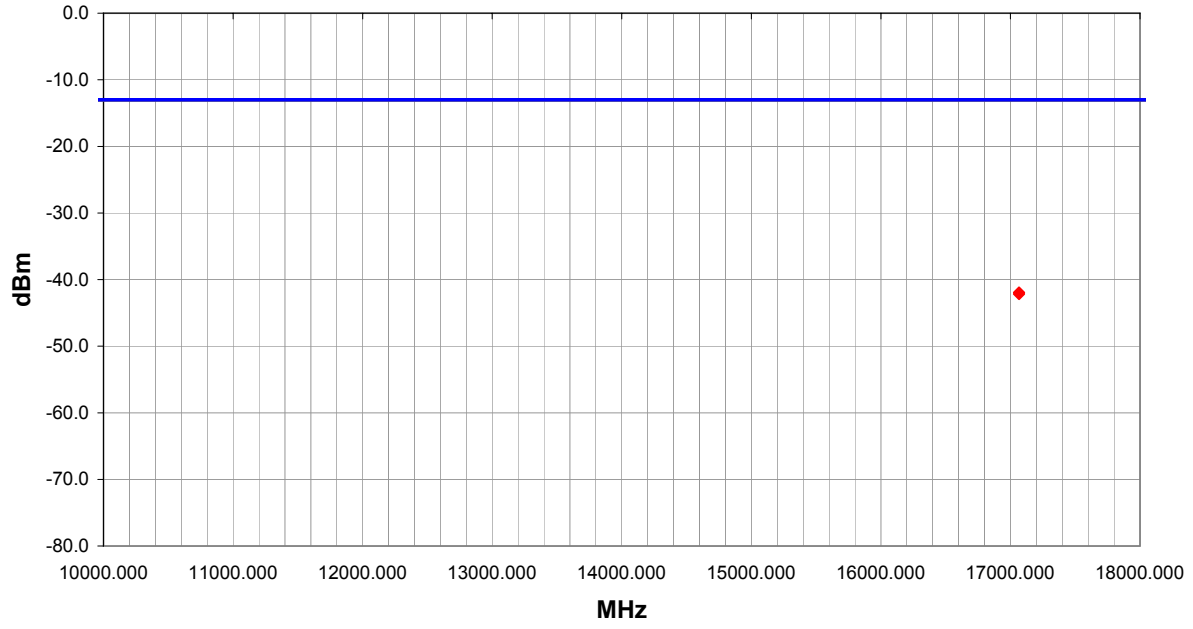
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Test Distance (m)	Run #
Pass	1	24

Other

Tested By:



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
17066.000			180.0	1.0			H-Horn	PK		-42.2	-13.0	-29.2
17066.000			180.0	1.0			V-Horn	PK		-41.9	-13.0	-28.9

RF Conducted Test Report from Sierra Wireless

FCC Part 22 and 24
800/1900 MHz CDMA DUAL BAND MODULE
Model: SB555-S

Prepared by
SIERRA WIRELESS INC.
13811 WIRELESS WAY
RICHMOND, BC V6V 3A4
CANADA

Test Date(s): September 2002

Table of Contents

1 Introduction and Purpose

This document provides the FCC test data for the SB555-S module. The tests included in this report are limited to all conducted tests required. Other radiated tests were performed at an external test facility.

2 Test Summary

FCC RULE	DESCRIPTION OF TEST	RESULT	PAGE
2.1046	RF Power Output	Complies	6
2.1049	Occupied Bandwidth	Complies	15
2.1051, 22.901(d) 22.917(f), 24.238(a)	Out of Band Emissions at Antenna Terminals Mobile Emissions In Base Frequency Range	Complies	18
2.1053	Field Strength of Spurious Radiation	Complies	See CCS Report
2.1055	Frequency Stability vs Temperature	Complies	44
2.1055	Frequency Stability vs Voltage	Complies	45

The tests described in this report were performed by Mr. Sean Hoare, under the supervision of Mr Ron Vanderhelm, P.Eng. at

Sierra Wireless, Inc.
13811 Wireless Way
Richmond, B.C. V6V 3A4
Canada

3 Product Description

The Sierra Wireless Inc. model SB555-S is a dual band CDMA embedded modem.

EUT Type	Cellular and PCS CDMA Embedded Modem
Whether quantity(>1) production is planned	[X] Yes [ ]No
Standards	CDMA2000
Types of Emission	1M25F9W
RF Output Power	824-849 MHz: 23.5 dBm max 1850-1910 MHz: 23.5 dBm max In both bands, power is variable to –50 dBm.
Frequency Range	824-849 MHz, 1850-1910 MHz

4 Test Configuration

Tests were performed on the radio module alone. For frequency stability versus temperature, testing the module requires a wider range of temperature at the higher extreme to account for the insulating and warming affects of the end-user device. We test up to 70 degrees C for the module alone rather than just 50 deg C for the module in the end user device. For the effect of variation of DC power supply on frequency stability, the DC supply to the module was varied to the extremes of its specified voltage range, 3.15 to 4.2 volts.

Item #	Description	Model No.	Serial No.
1	Module EUT	SB555-S	E0207135003503C

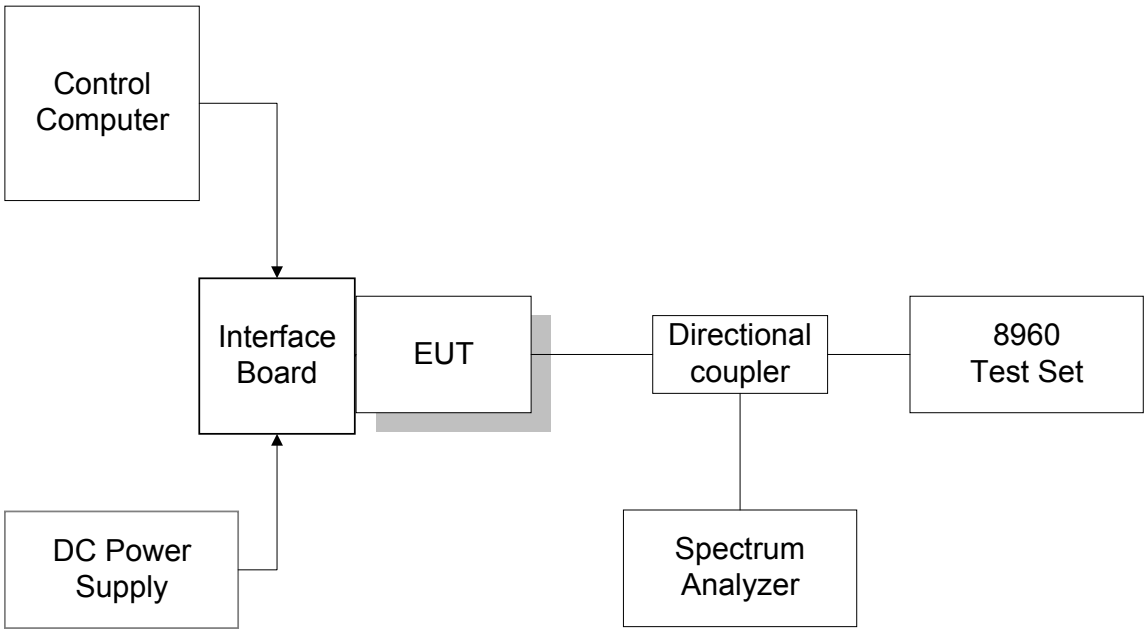
5 RF Power Output

FCC 2.1046

5.1 Test Procedure

The transmitter output was connected to an Agilent 8960 CDMA Test Set and configured to operate at maximum power. The power was measured at three equally spaced operating frequencies in each band and was confirmed by the plots taken on the Spectrum Analyzer.

Test Setup



5.2 Test Equipment

Instrument List

EQUIPMENT	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DATE
Control Computer	TC	Generic PC	100844	N/A
Wireless Test Set	Agilent	8960	US41070182	09/05/2001
Spectrum Analyzer	Agilent	PSA E4440A	US41421268	2002-01-25
DC Power Supply	HP	HP6632A	3326A-03423	N/A
Interface Board	Shop built	Nest	N/a	N/A
Directional Coupler	Pasternack	PE2209-10	N/A	N/A

5.3 Test Results

Frequency (MHz)	Power (dBm)
824.70	23.28
836.52	23.50
848.31	23.30
1851.25	23.44
1880.0	23.69
1908.75	23.72

- **Cellular Band (CDMA Mode)**

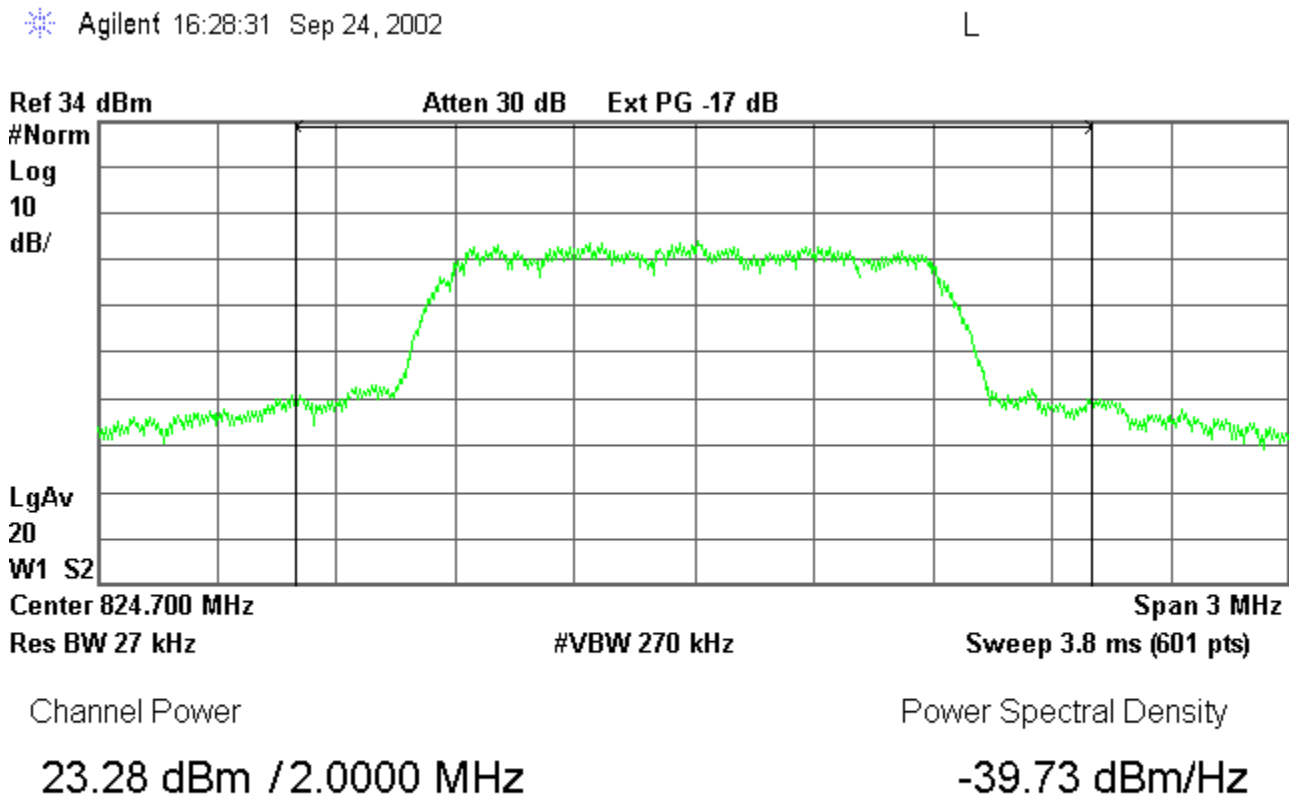
Plot Number	Description
1.1	Low Channel (Ch 1013)
1.2	Middle Channel (Ch 384)
1.3	High Channel (Ch 777)

- **PCS Band (CDMA Mode)**

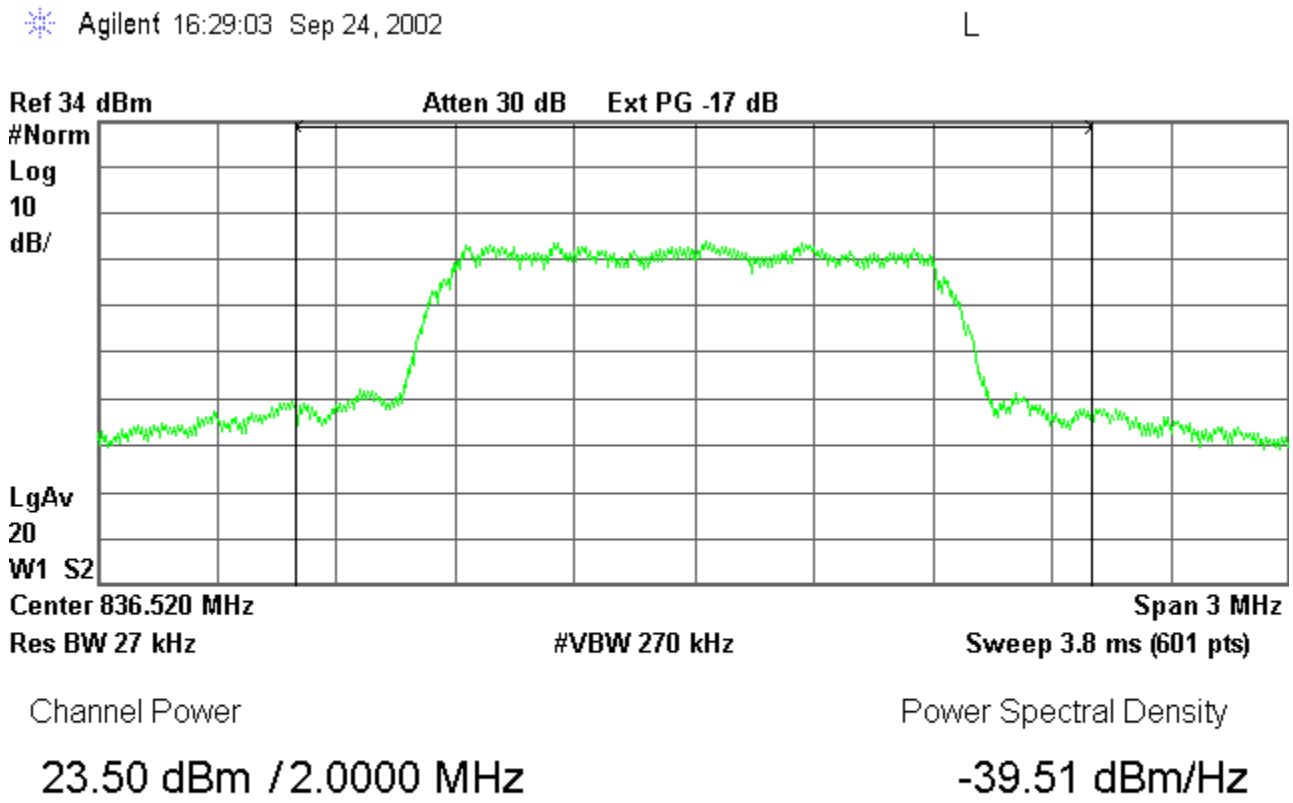
Plot Number	Description
1.4	Low Channel (Ch 25)
1.5	Middle Channel (Ch 600)
1.6	High Channel (Ch 1175)

The Modem was calibrated to a maximum power of 23.5 dBm.

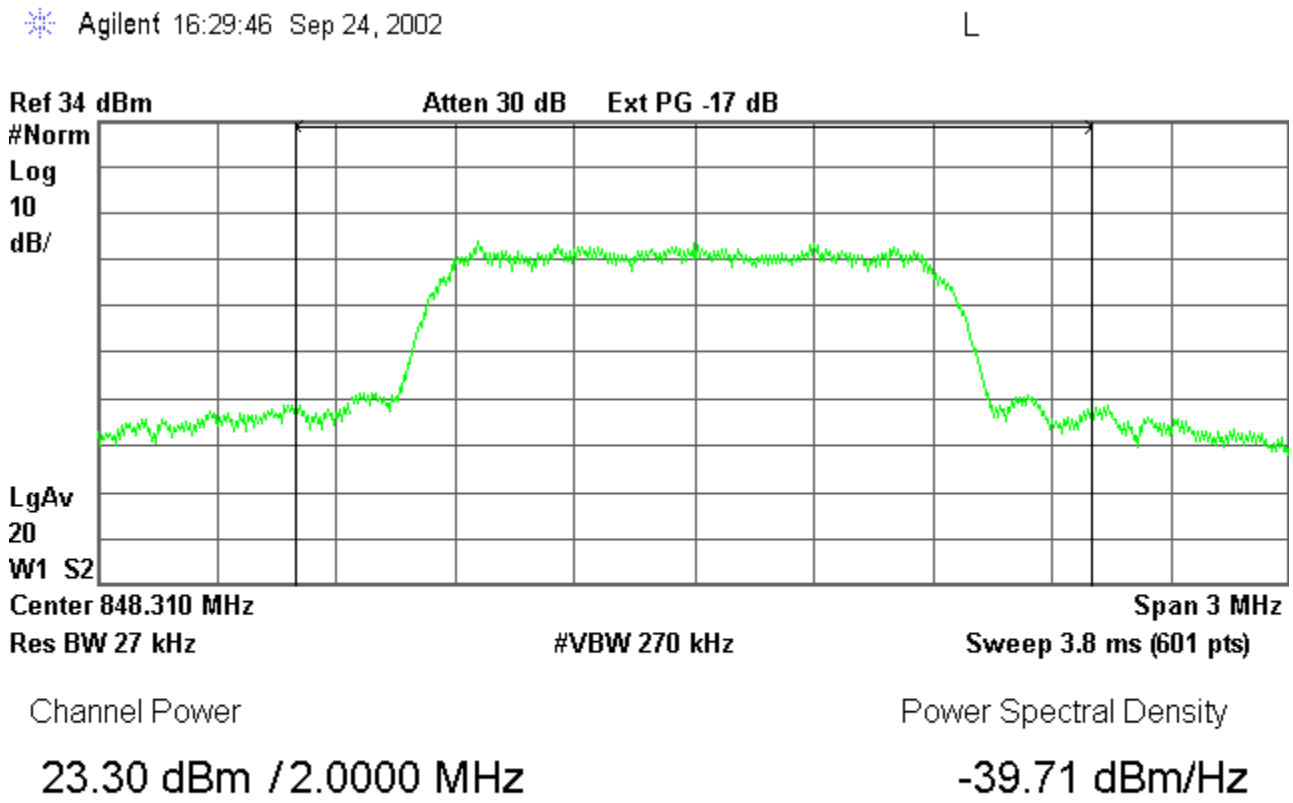
Plot 1.1 Cellular Band (Low Channel)



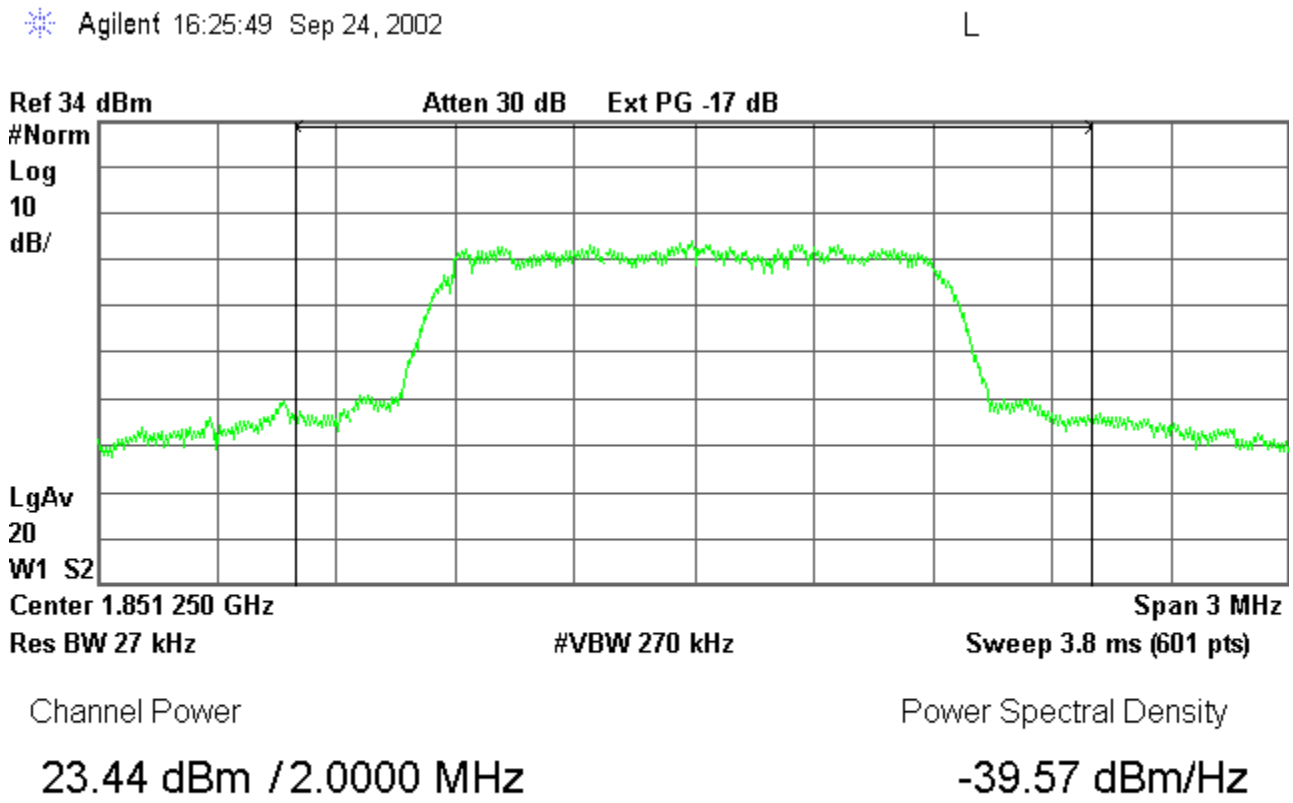
Plot 1.2 Cellular Band (Middle Channel)



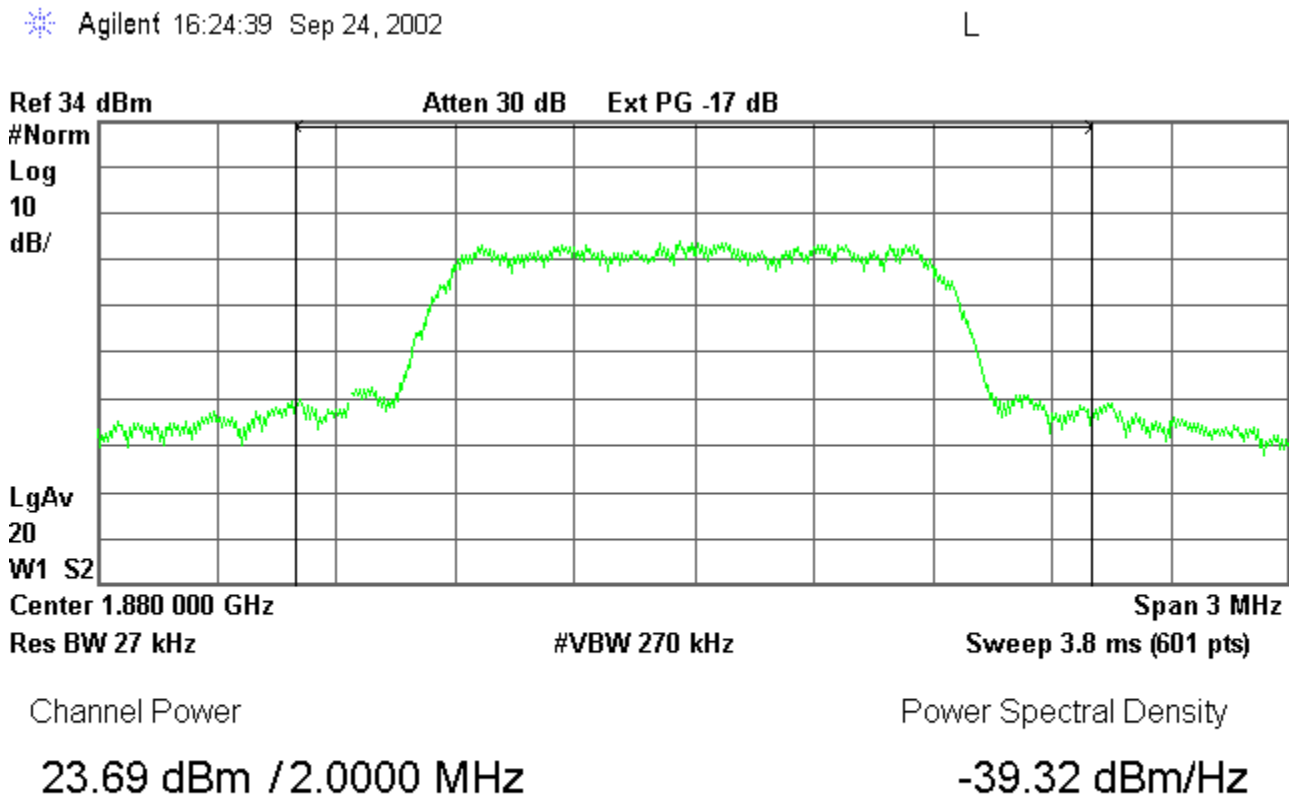
Plot 1.3 Cellular Band (High Channel)



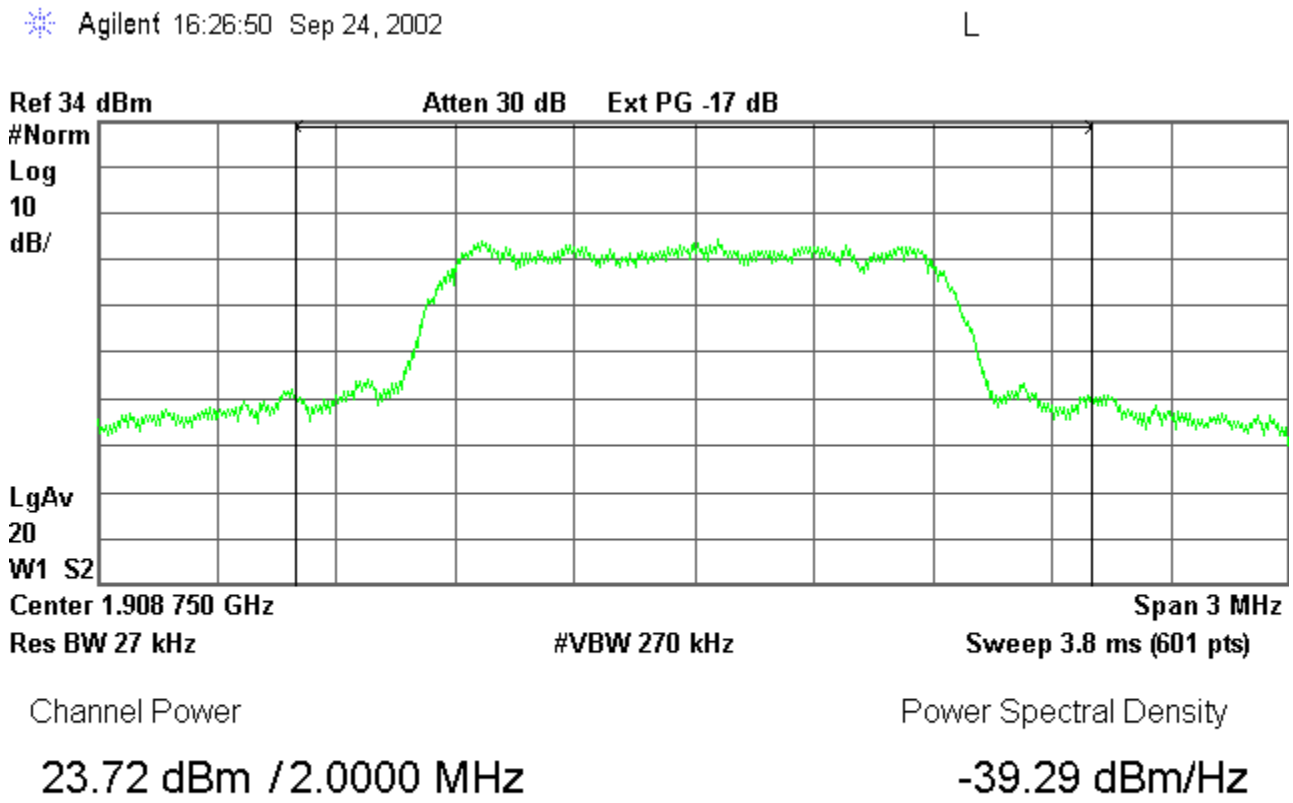
Plot 1.4 PCS Band (Low Channel)



Plot 1.4 PCS Band (Middle Channel)



Plot 1.4 PCS Band (High Channel)



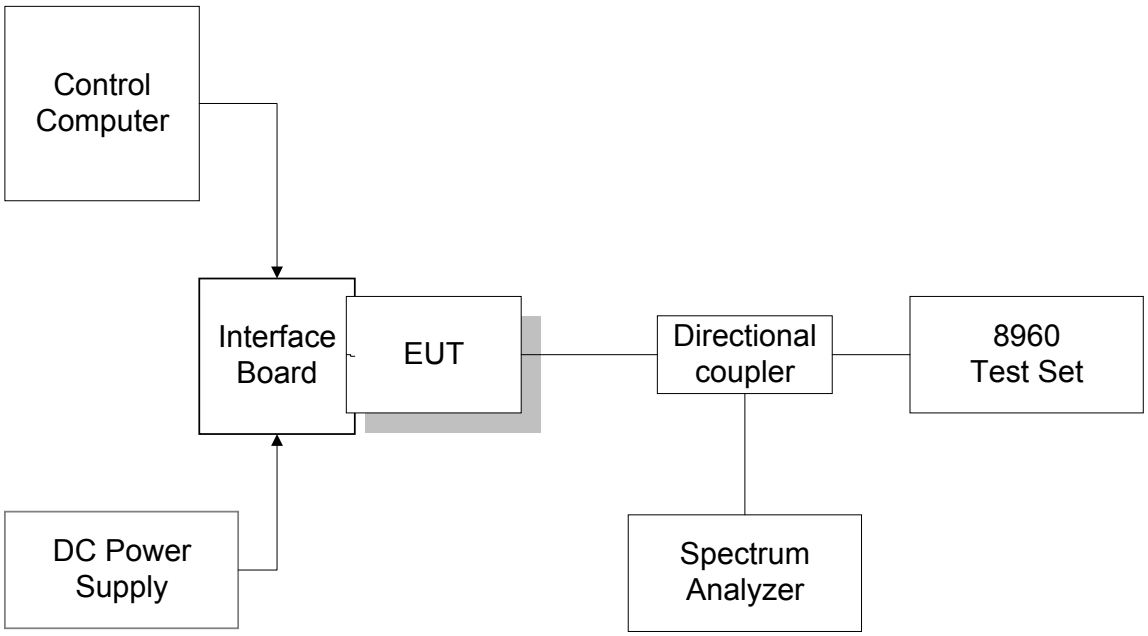
6 Occupied Bandwidth

FCC 2.1049

6.1 Test Procedure

The transmitter output was connected to a calibrated coaxial cable, the other end of which was connected to a spectrum analyzer. The occupied Bandwidth (defined as the 99% Power Bandwidth) was measured with the Spectrum Analyzer at the center frequency of each band.

Test Setup



6.2 Test Equipment

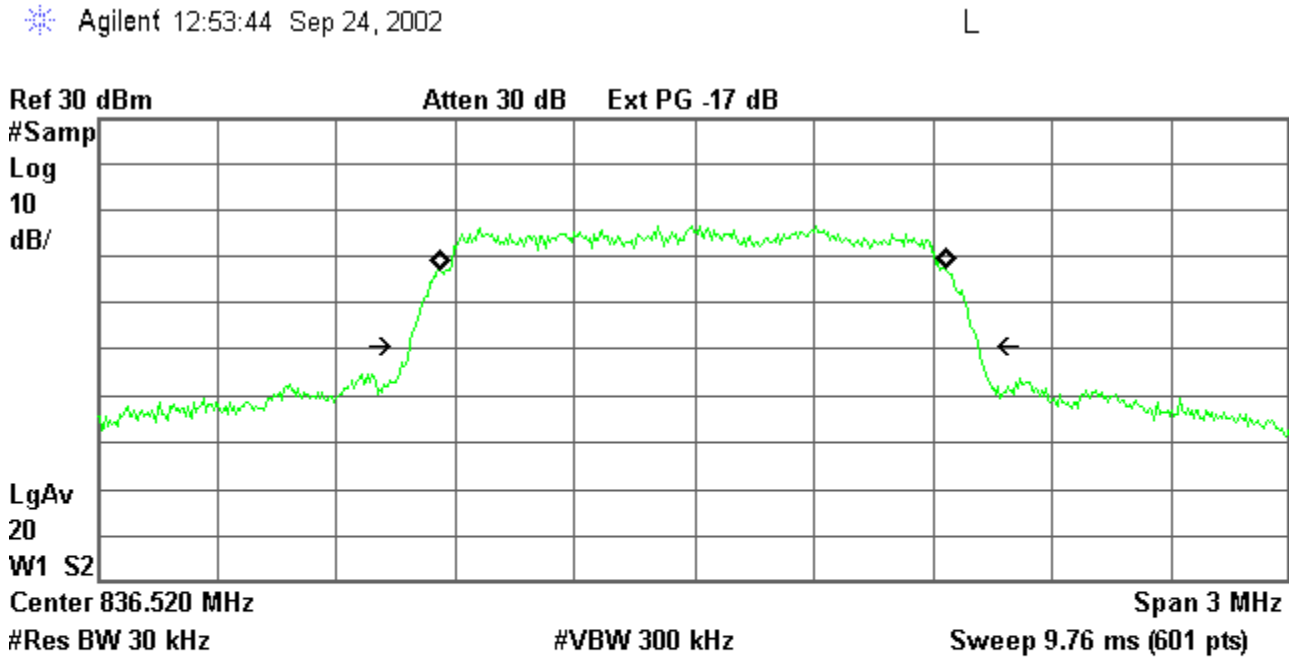
EQUIPMENT	MANUFACTURER	MODEL NO.	SERIAL NO.	Last CAL.DATE
Spectrum Analyzer	Agilent	PSA E4440A	US41421268	2002-01-25
Interface Board	Shop built	Nest	N/a	N/a
Control Computer	TC	Generic PC	100844	N/a
DC Power Supply	HP	HP6632A	3326A-03423	N/a

6.3 Test Results

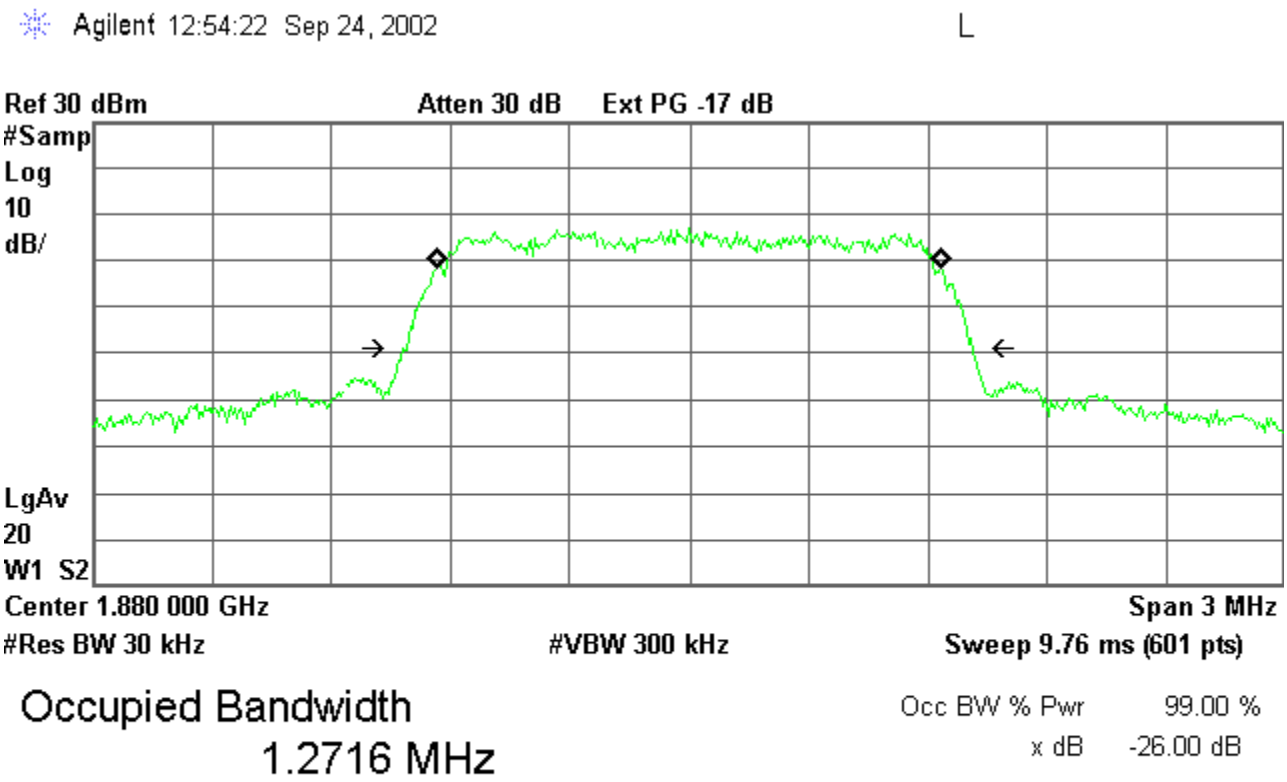
The performance of 800 MHz cellular band is shown in plots 2.1.
Performance of 1900 MHz PCS band is shown in plots 2.3.

The test results shows that the bandwidth in all cases is approximately 1.270 MHz.

Plot 2.1 Cellular Band (Middle Channel)



Plot 2.2 PCS Band (Middle Channel)



7 Out of Band Emissions at Antenna Terminals

FCC 22.901(d), 22.917(f), 24.238(a)

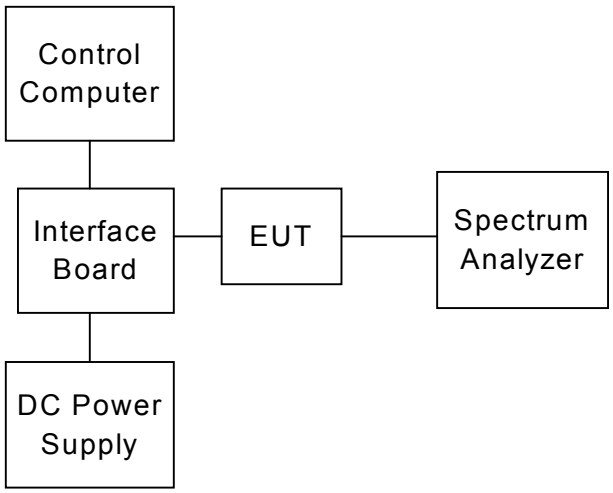
Out of Band Emissions:
The mean power of emissions must be attenuated below the mean power of the unmodulated carrier (P) on any frequency outside the frequency band by at least (43 + 10 log P) dB, in this case, -13dBm.

Mobile Emissions in Base Frequency Range:
The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not exceed –80 dBm at the transmit antenna connector.

7.1 Test Procedure

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. The EUT was scanned for spurious emissions from 1MHz to 20GHz with sufficient bandwidth and video resolution. Data plots are included.

Test Setup



7.2 Test Equipment

EQUIPMENT	MANUFACTURER	MODEL NO.	SERIAL NO.	Last CAL. DATE
Spectrum Analyzer	Agilent	PSA E4440A	US41421268	2002-01-25
Interface Board	Shop built	Nest	N/a	N/a
Control Computer	TC	Generic PC	100844	N/a
DC Power Supply	HP	HP6632A	3326A-03423	N/a
Directional Coupler	Pasternack	PE2209-10	N/A	N/A

7.3 Test Results

Refer to the following plots.

- **Cellular Band**

Plot Number	Description
3.1a – 3.1c	Low channel, 824.70 MHz
3.2a – 3.2c	Middle Channel, 836.52 MHz
3.3a – 3.3c	High Channel, 848.31 MHz

- **PCS Band**

Plot Number	Description
3.4a – 3.4c	Low Channel, 1851.25 MHz
3.5a – 3.5c	Middle Channel, 1880 MHz
3.6a – 3.6c	High Channel, 1908.75 MHz

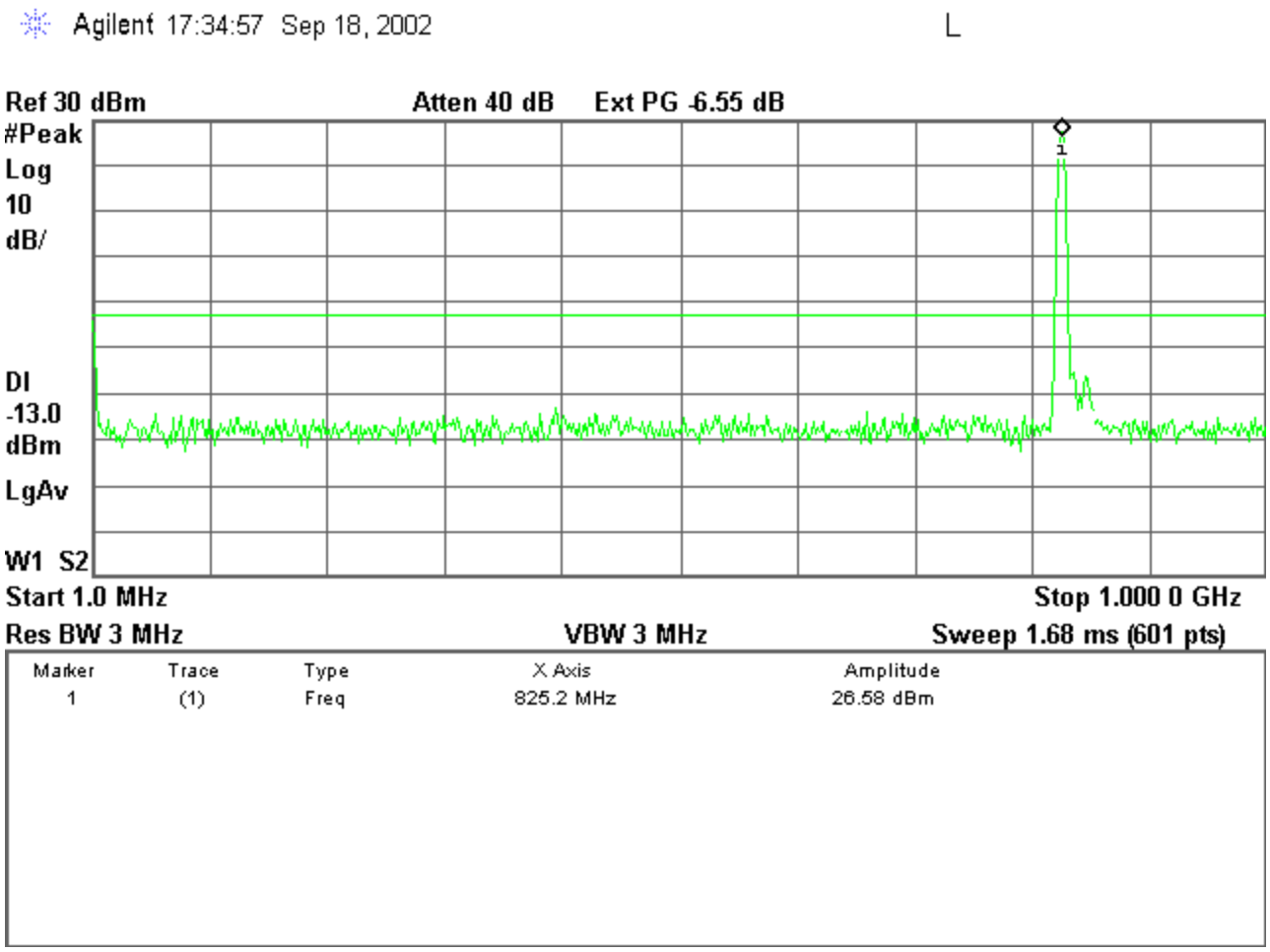
- **Emissions in Base Station Frequency Range, Cellular band**

Plot Number	Description
3.7a	Low Channel, 824.70 MHz,
3.8a	Middle Channel, 836.52 MHz
3.9a	High Channel, 848.31 MHz

These plots show that the radiated emission limits requirements are met.

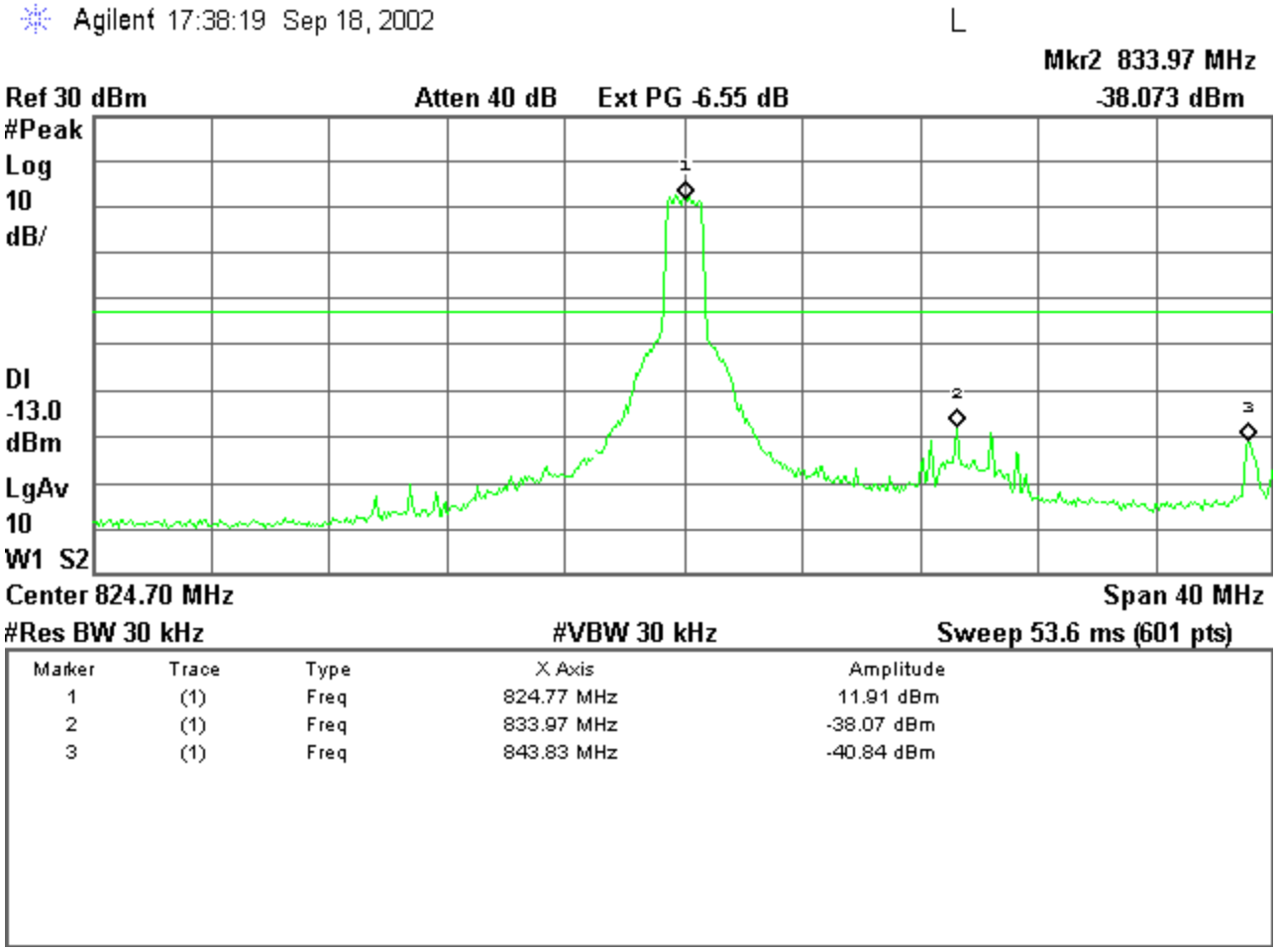
Plot 3.1a Out of Band Emissions at Antenna Terminals

Low channel, 824.700 MHz,
1 Mhz to 1 GHz



Plot 3.1b Out of Band Emissions at Antenna Terminals

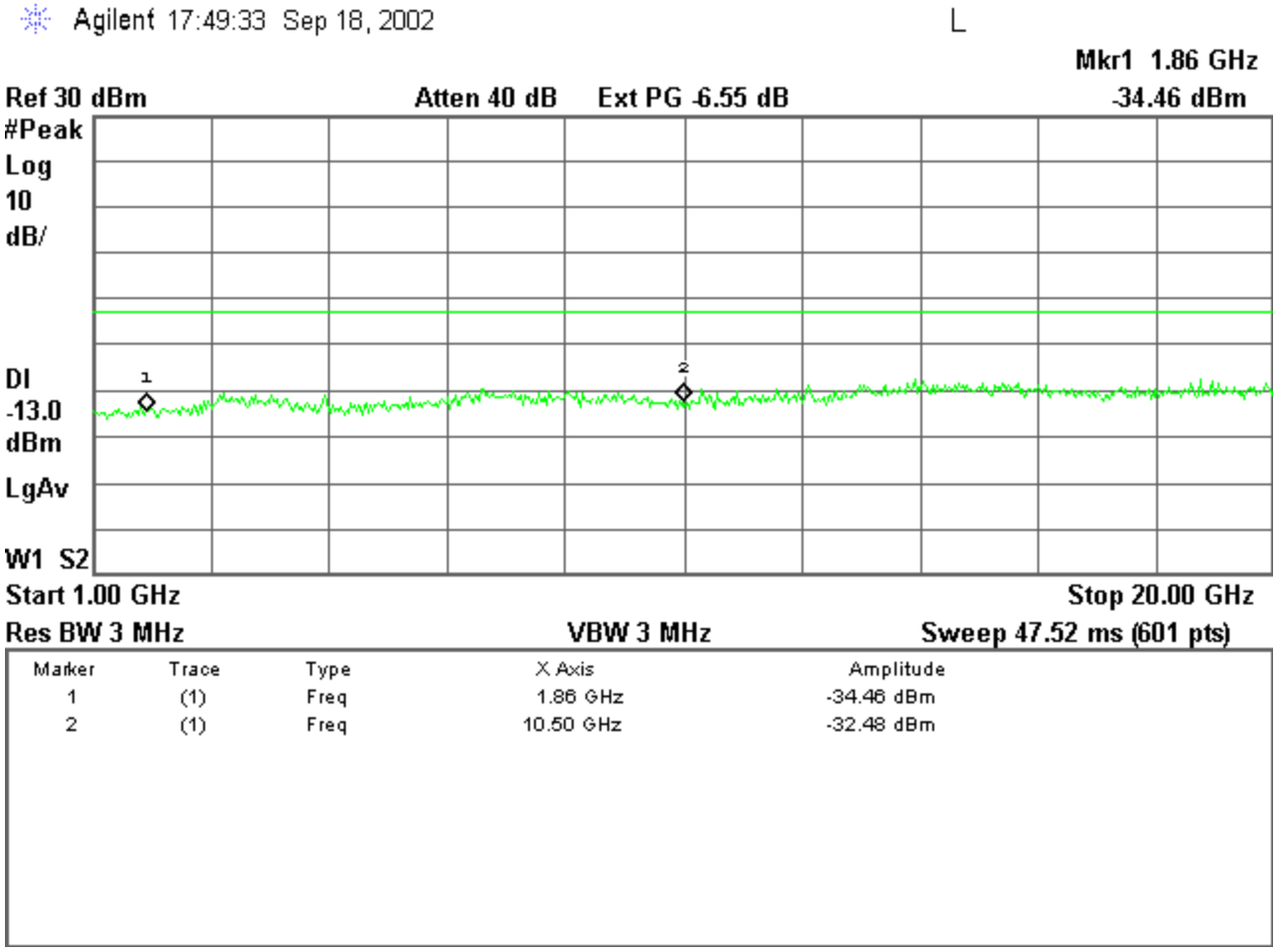
Low channel, 824.700 MHz
TX signal +/- 20 MHz



Plot 3.1c Out of Band Emissions at Antenna Terminals

Low channel, 824.700 MHz

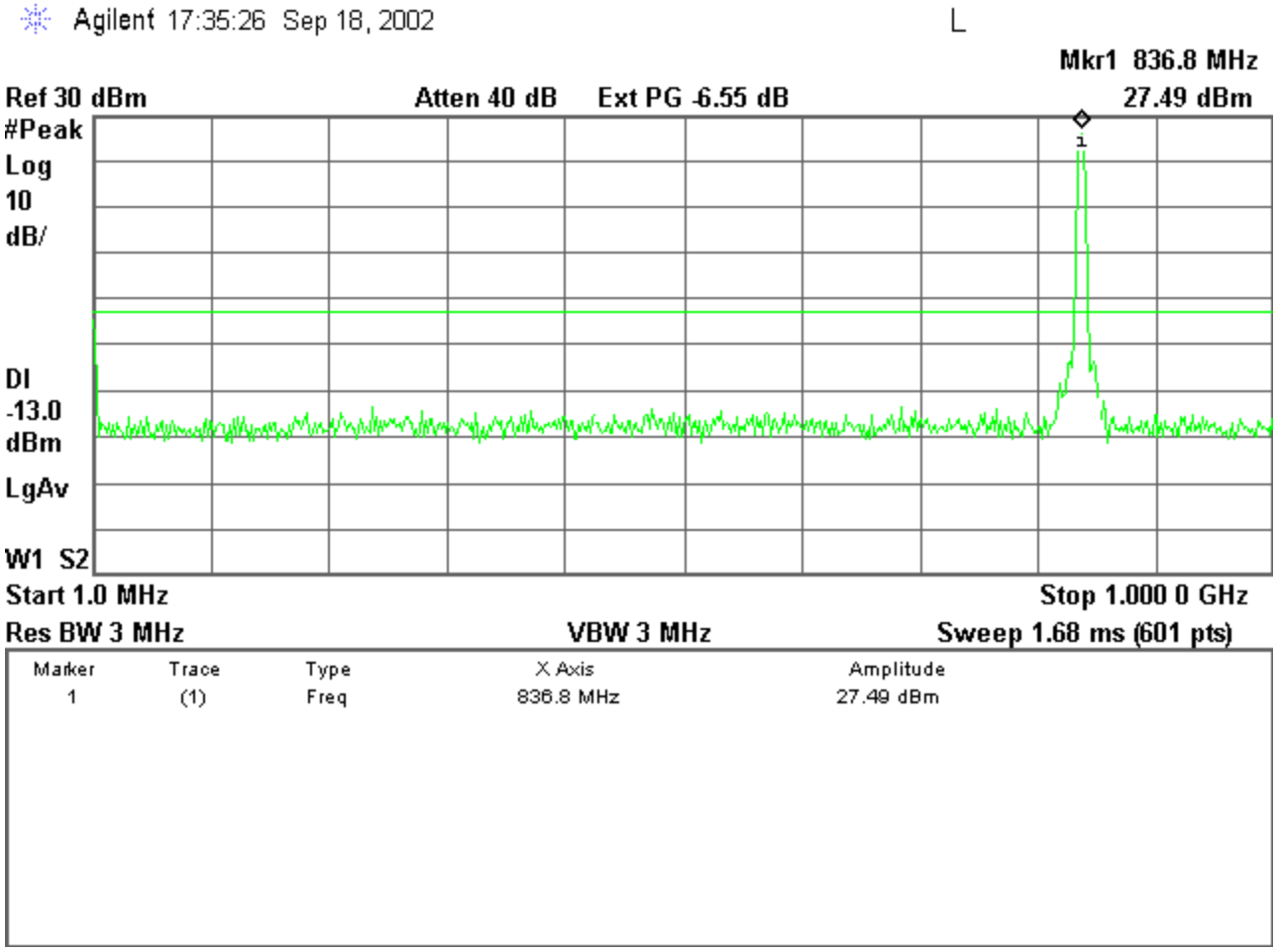
1 GHz to 20 GHz



Plot 3.2a Out of Band Emissions at Antenna Terminals

Mid Channel, 836.52 MHz

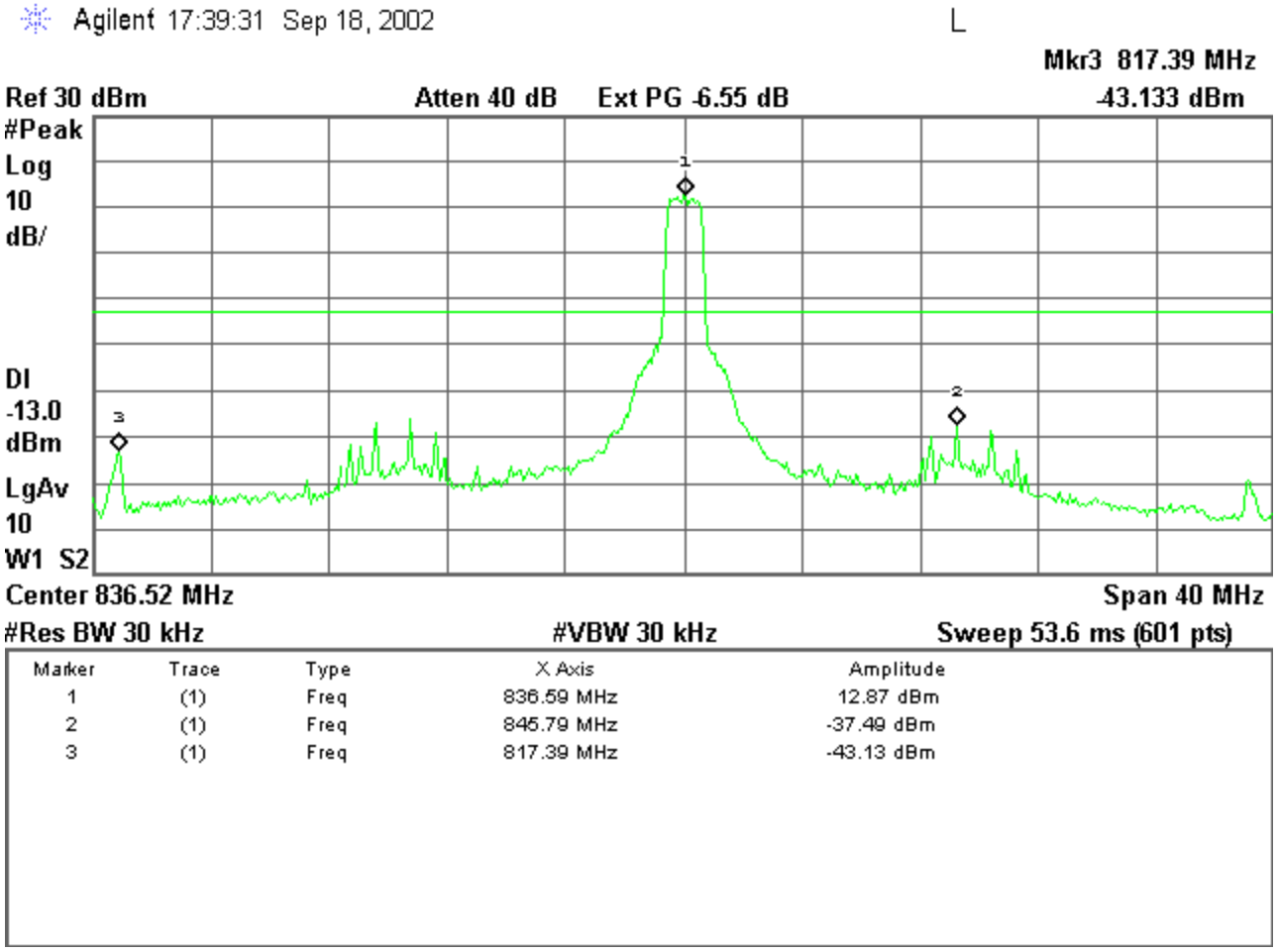
1 MHz to 1 GHz



Plot 3.2b Out of Band Emissions at Antenna Terminals

Mid Channel, 836.52 MHz

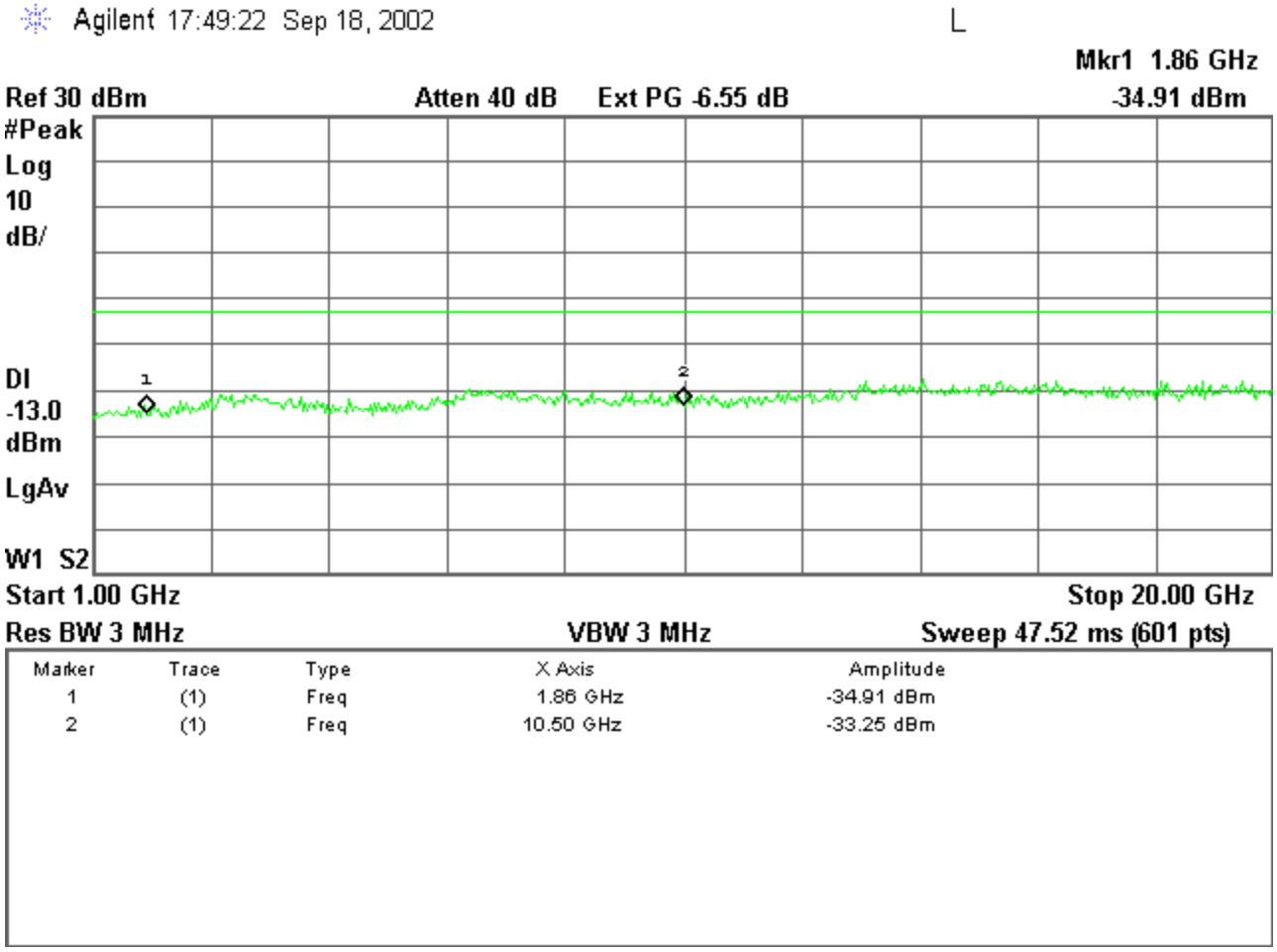
TX signal +/- 20 MHz



Plot 3.2c Out of Band Emissions at Antenna Terminals

Mid Channel, 836.52 MHz

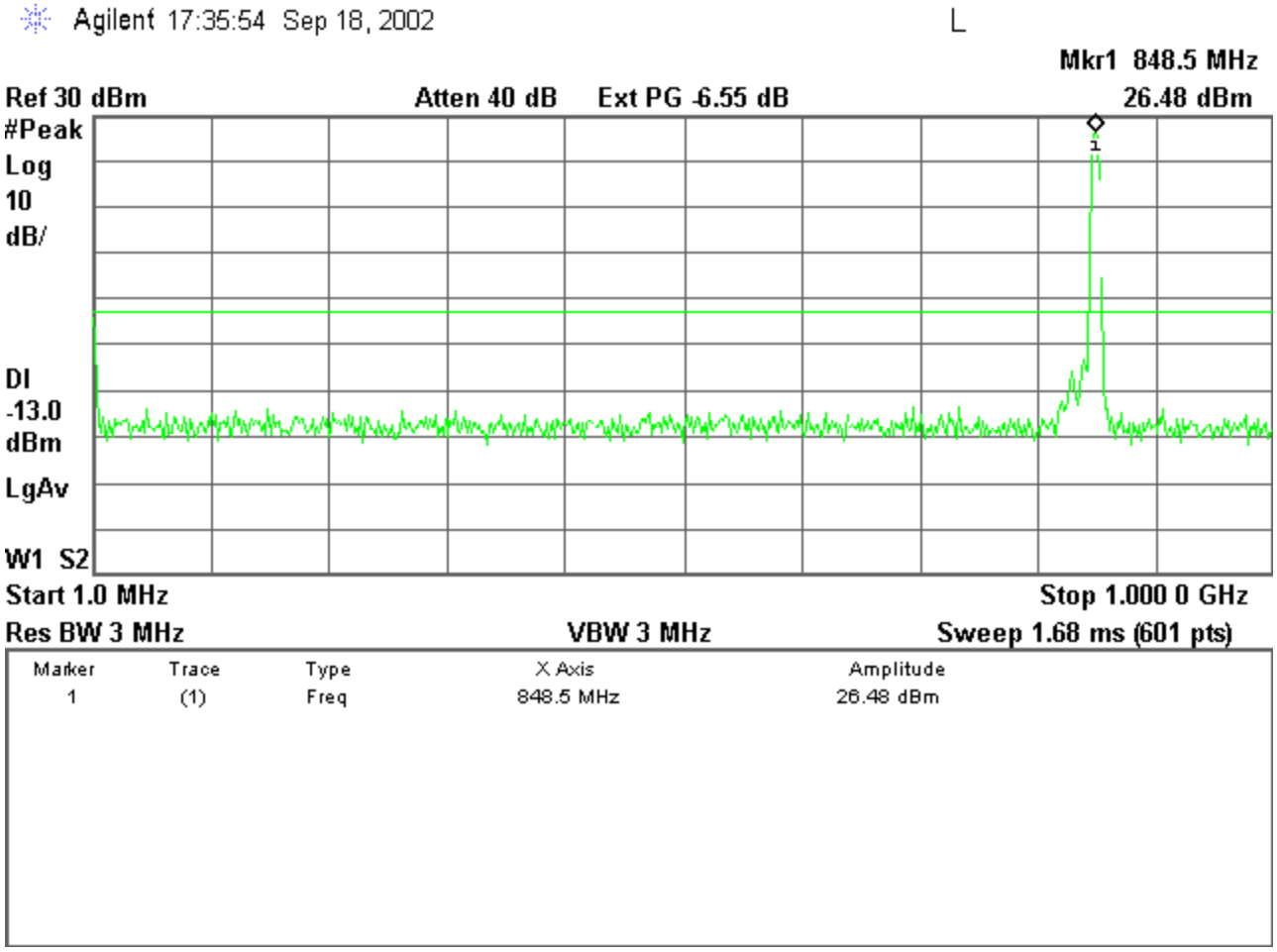
1 GHz to 20 GHz



Plot 3.3a Out of Band Emissions at Antenna Terminals

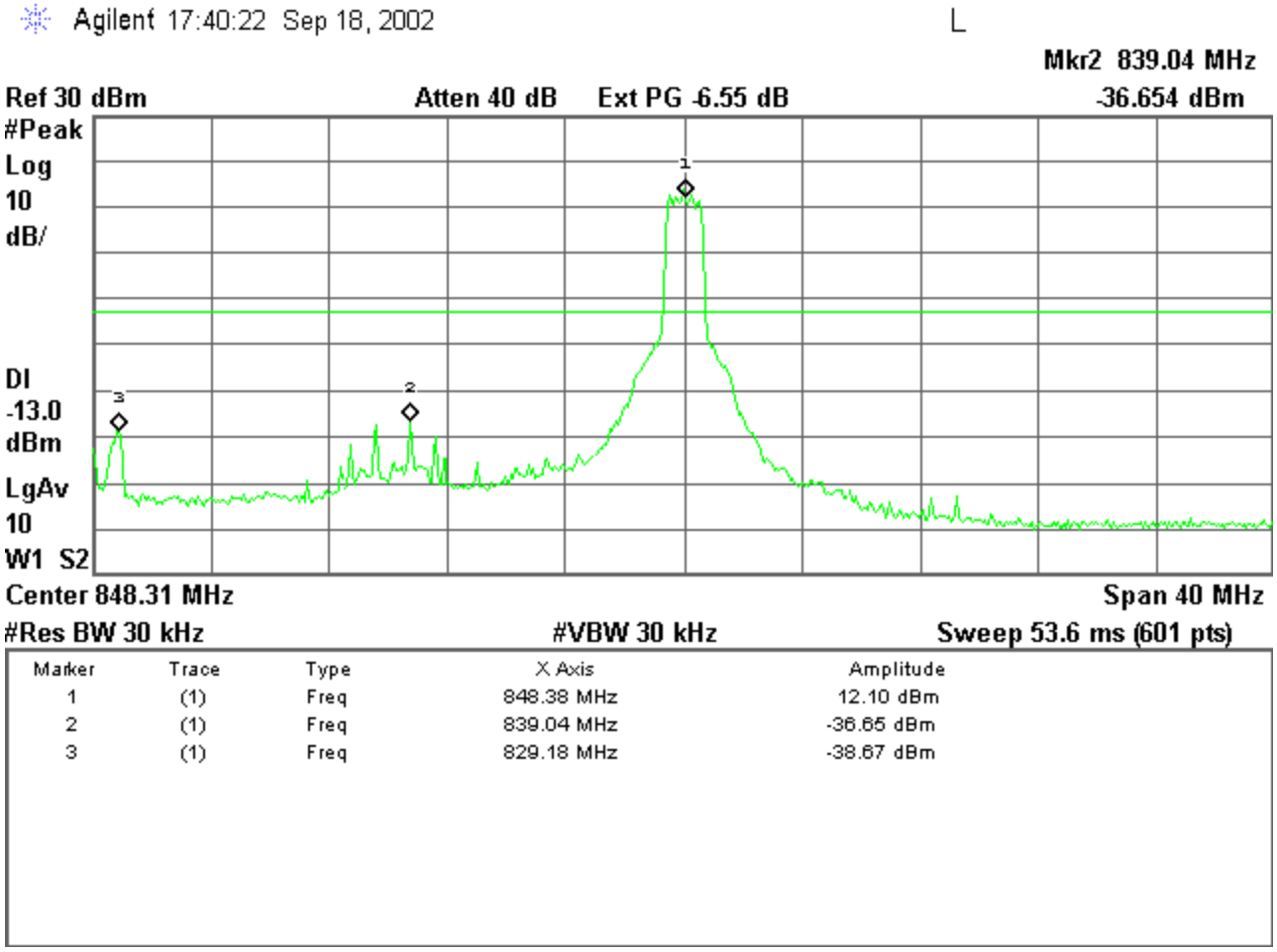
High Channel, 848.31 MHz

1 Mhz to 1 GHz



Plot 3.3b Out of Band Emissions at Antenna Terminals

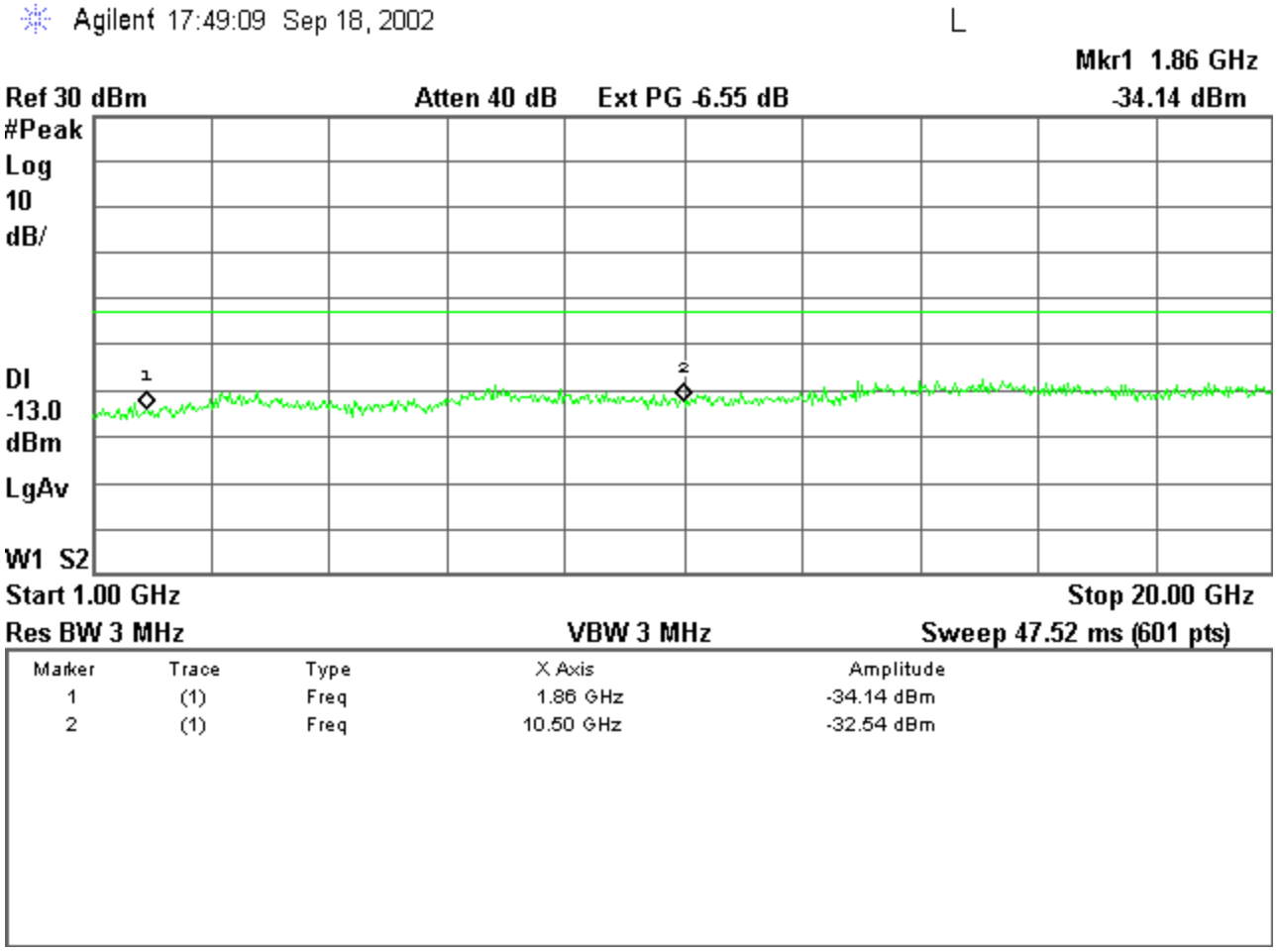
High Channel, 848.31 MHz
TX signal +/- 20 MHz



Plot 3.3c Out of Band Emissions at Antenna Terminals

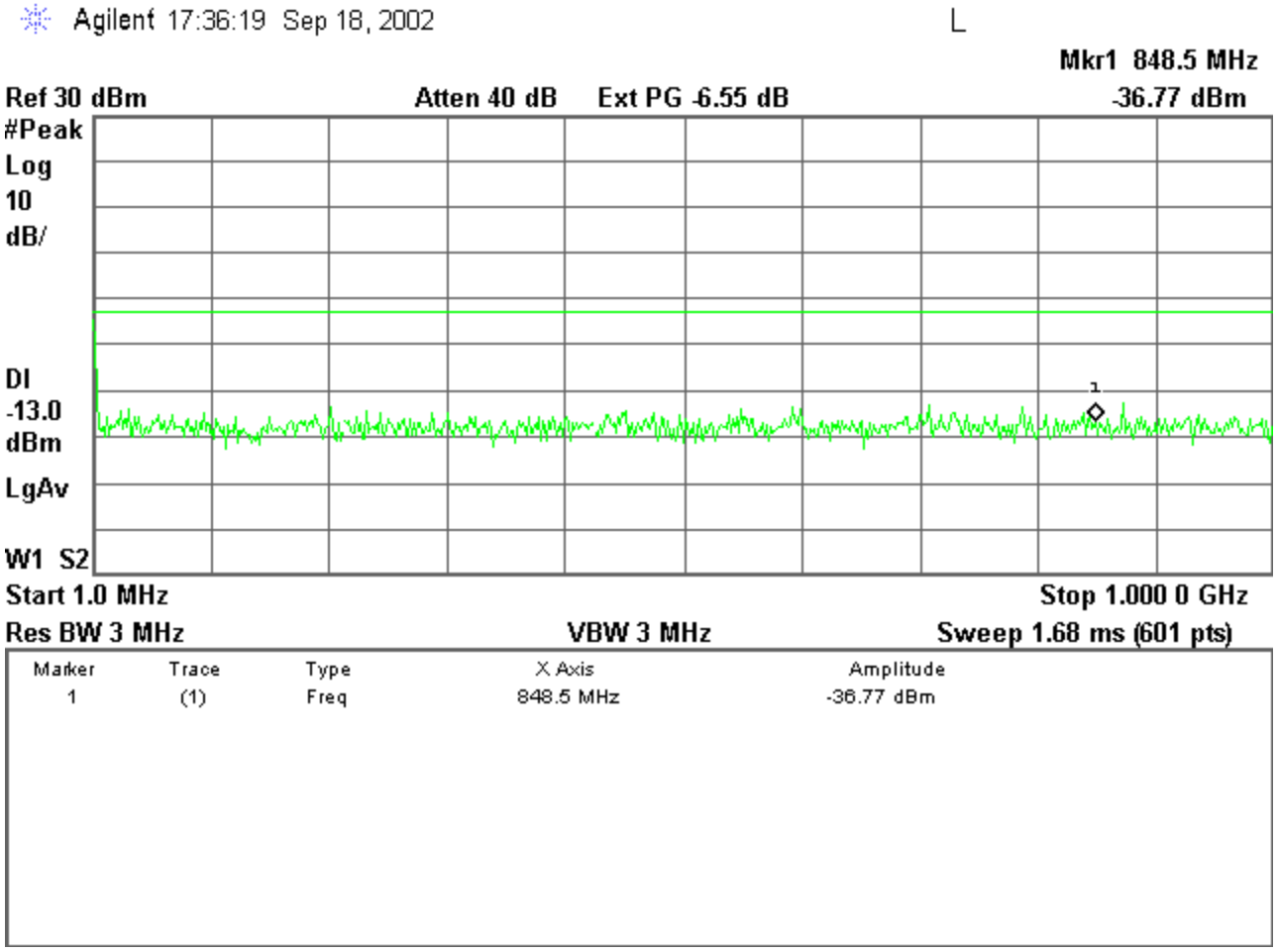
High Channel, 848.31 MHz

1 Ghz to 20 GHz



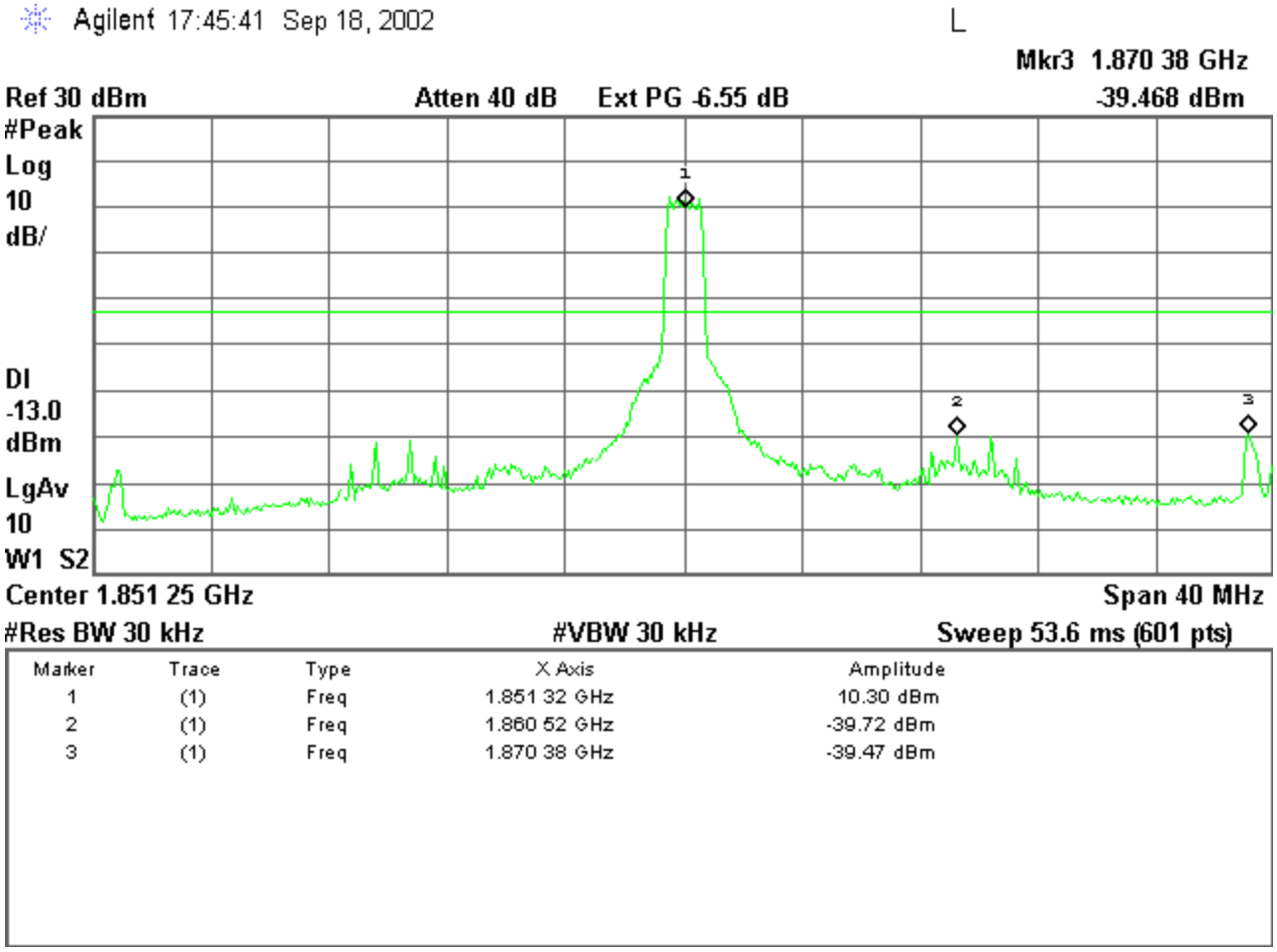
Plot 3.4a Out of Band Emissions at Antenna Terminals

Low channel, 1851.25 MHz
1 Mhz to 1 GHz



Plot 3.4b Out of Band Emissions at Antenna Terminals

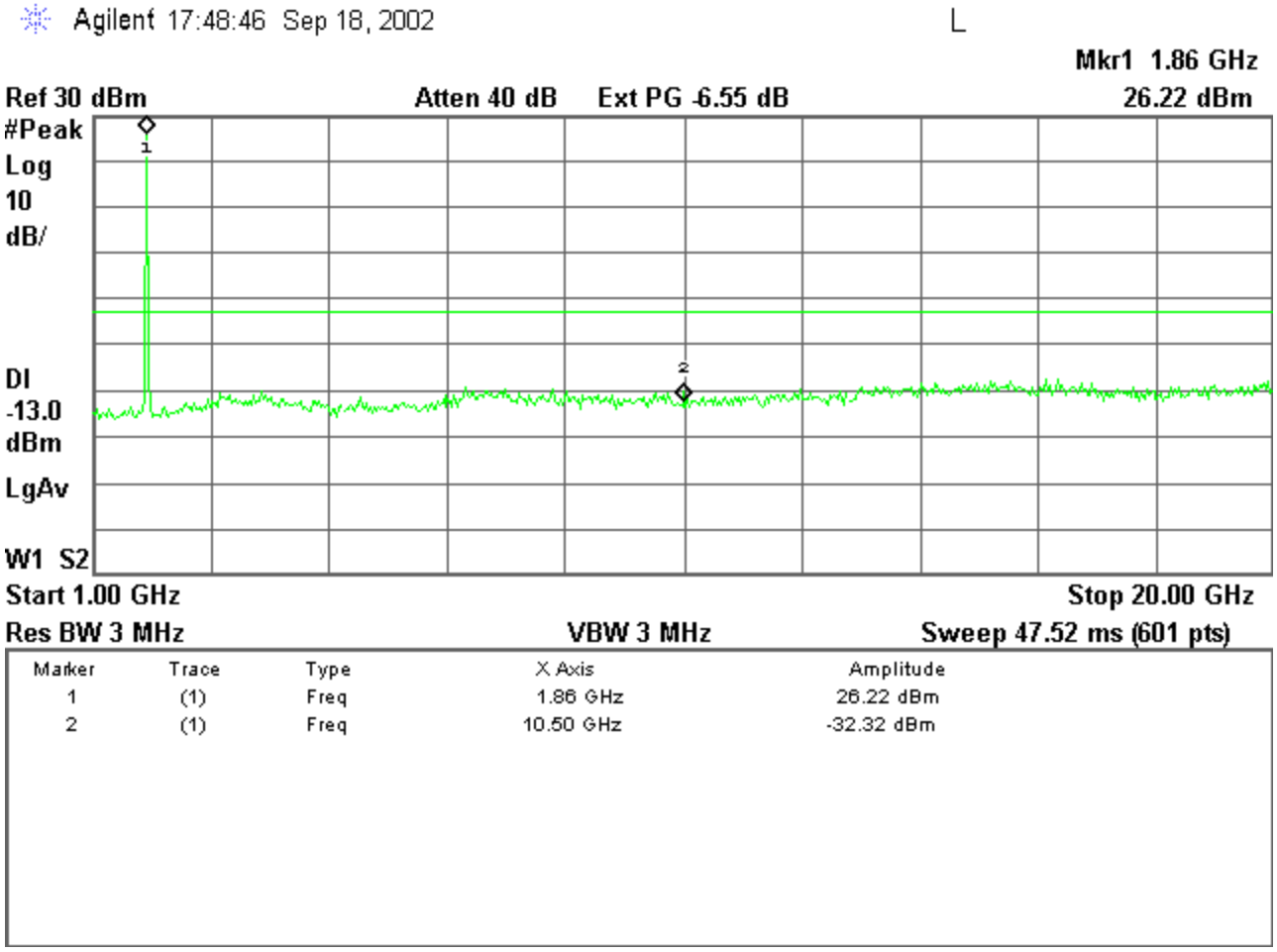
Low channel, 1851.25 MHz
TX signal +/- 20 MHz



Plot 3.4c Out of Band Emissions at Antenna Terminals

Low channel, 1851.25 MHz

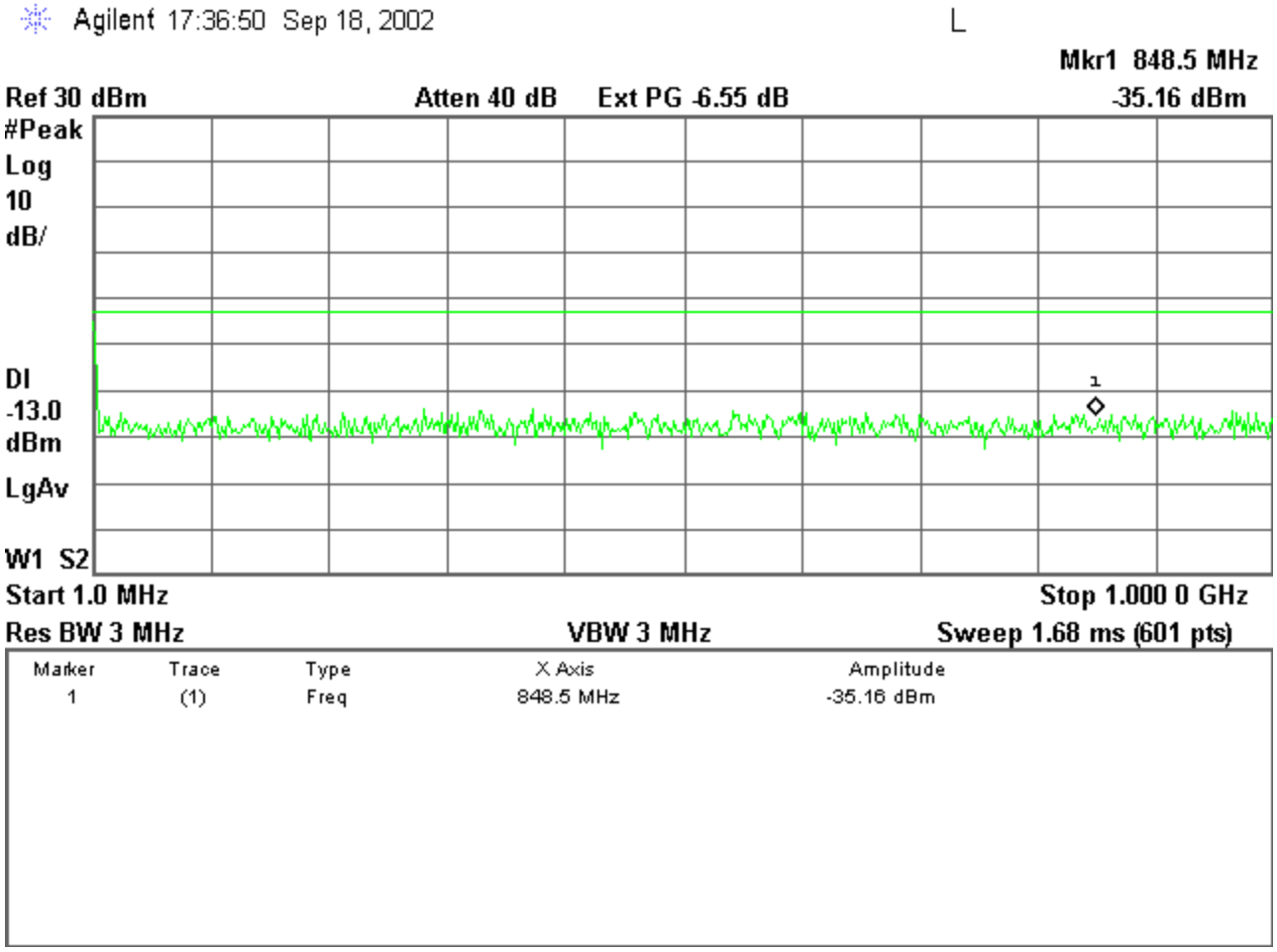
1 GHz to 20 GHz



Plot 3.5a Out of Band Emissions at Antenna Terminals

Mid Channel, 1880 MHz

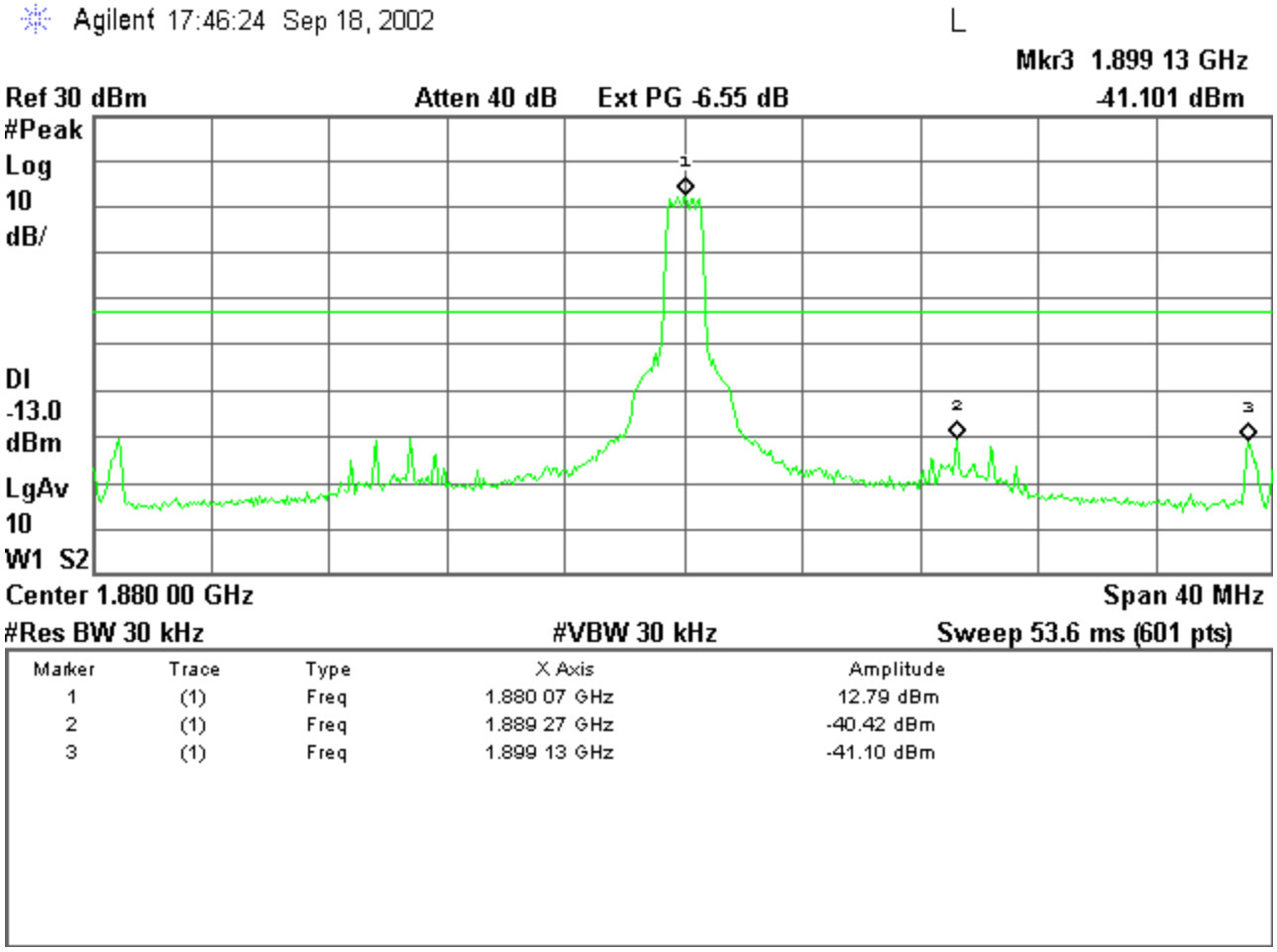
1 Mhz to 1 GHz



Plot 3.5b Out of Band Emissions at Antenna Terminals

Mid Channel, 1880 MHz

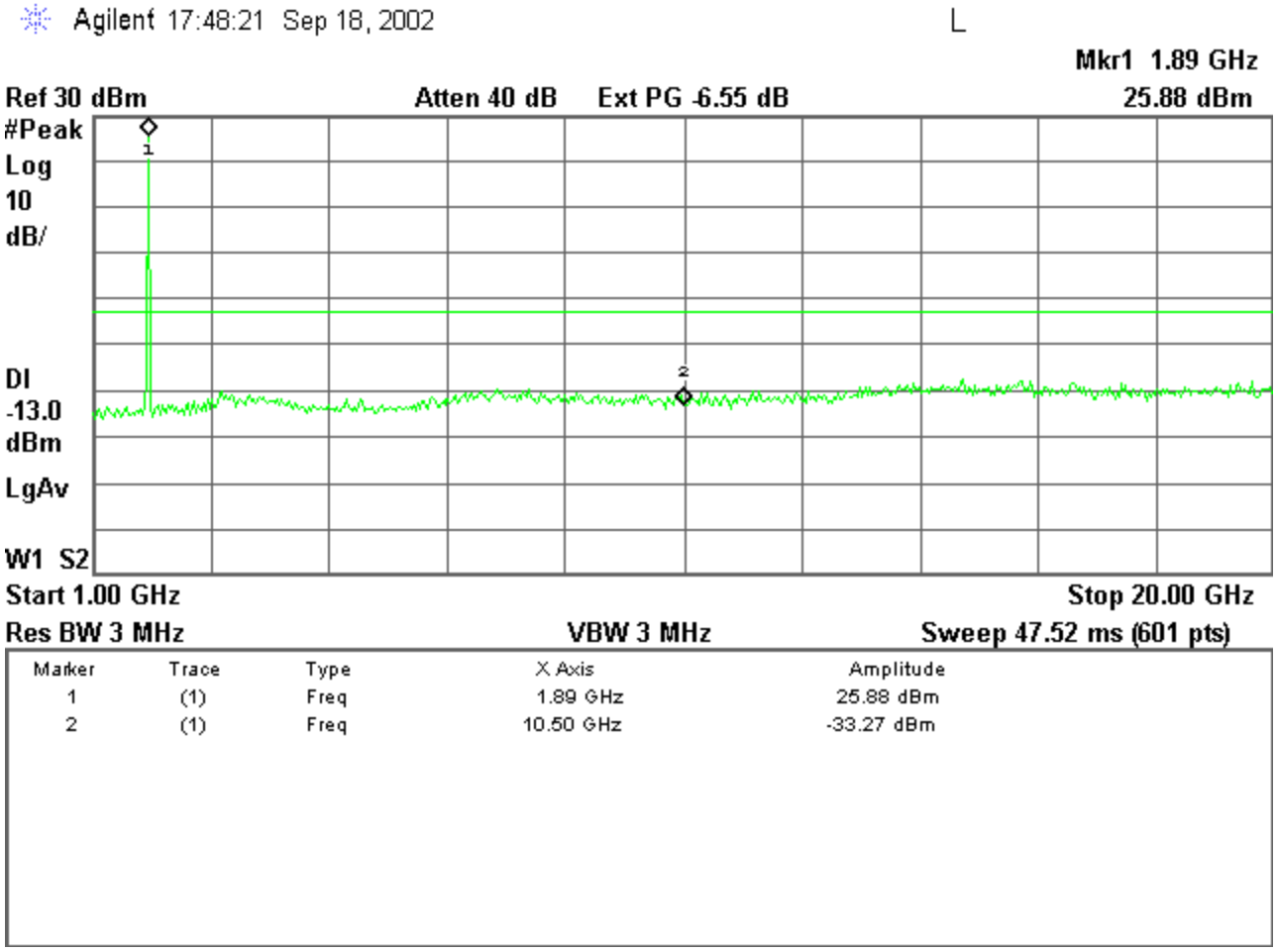
TX signal +/- 20 MHz



Plot 3.5c Out of Band Emissions at Antenna Terminals

Mid Channel, 1880 MHz

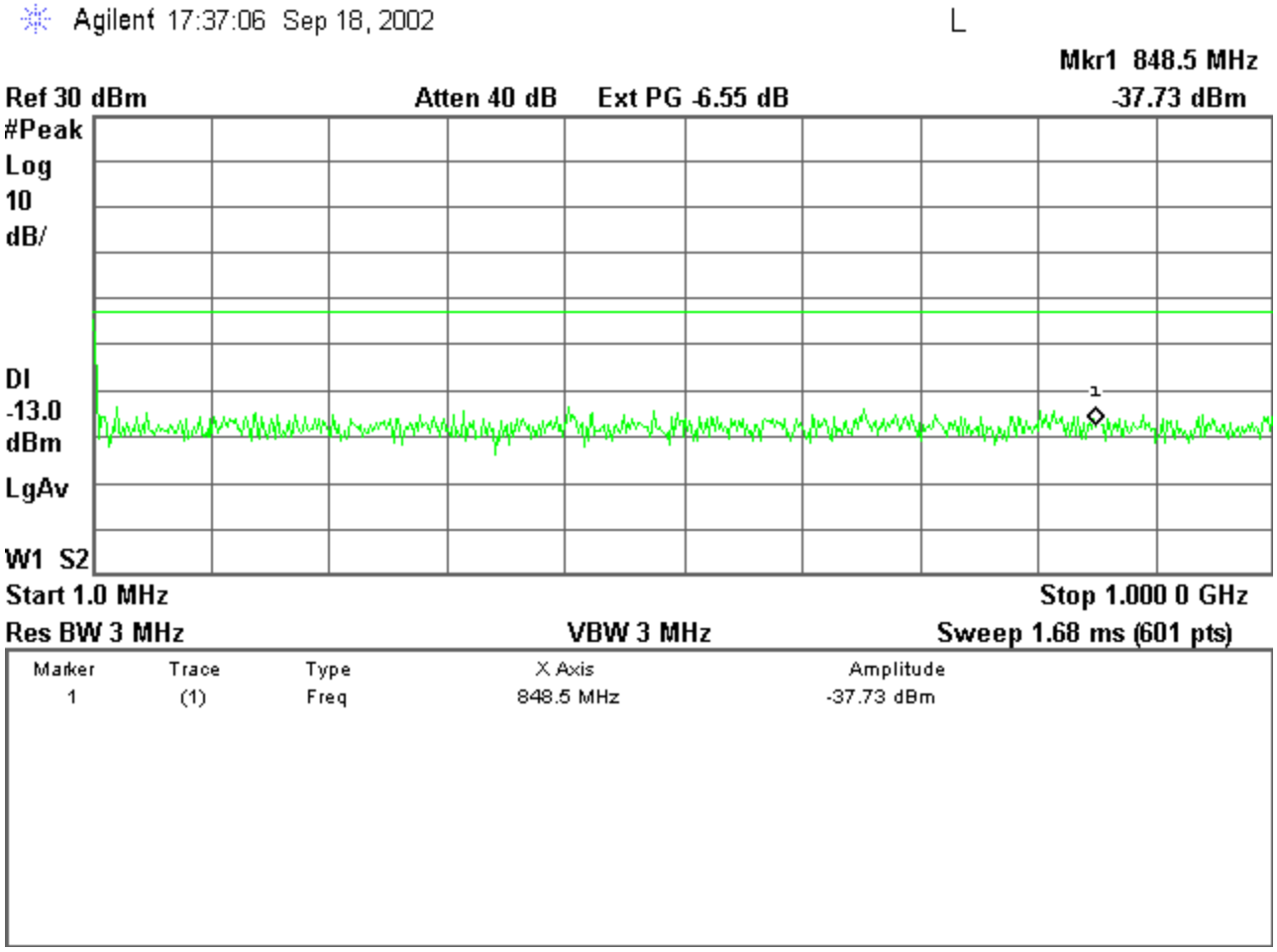
1 GHz to 20 GHz



Plot 3.6a Out of Band Emissions at Antenna Terminals

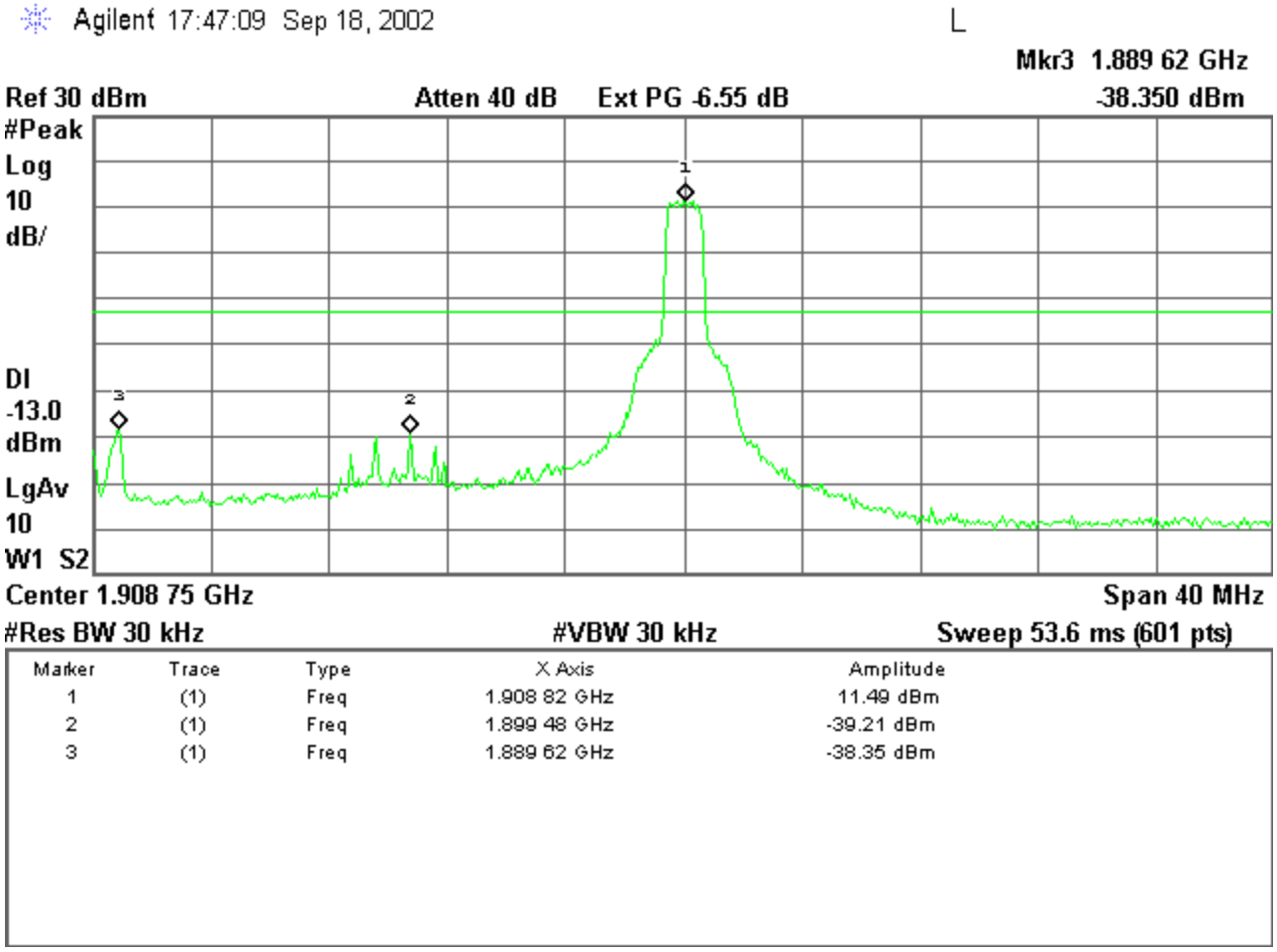
High Channel, 1908.75 MHz

1 Mhz to 1 GHz



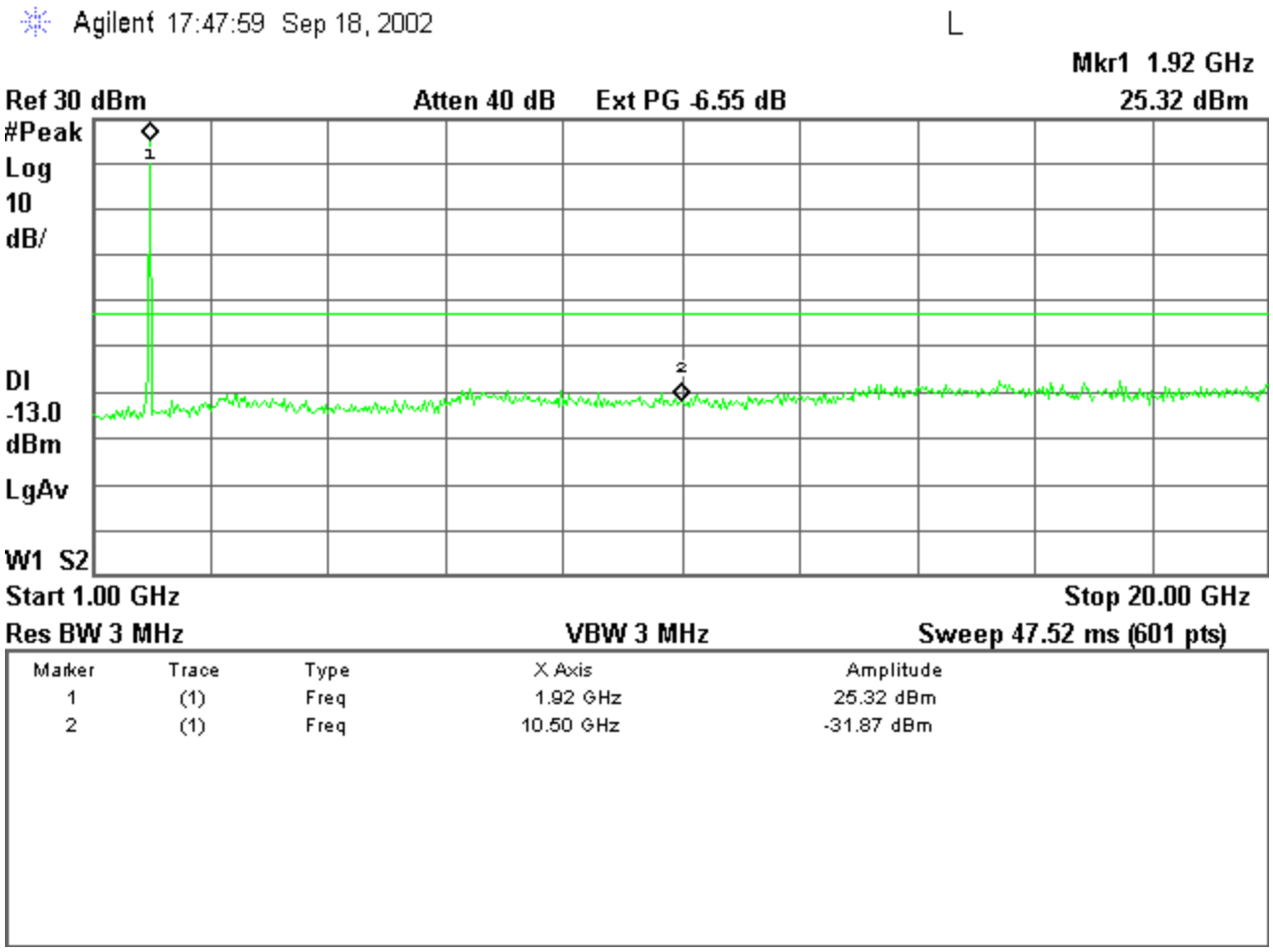
Plot 3.6b Out of Band Emissions at Antenna Terminals

High Channel, 1908.75 MHz
TX signal +/- 20 MHz

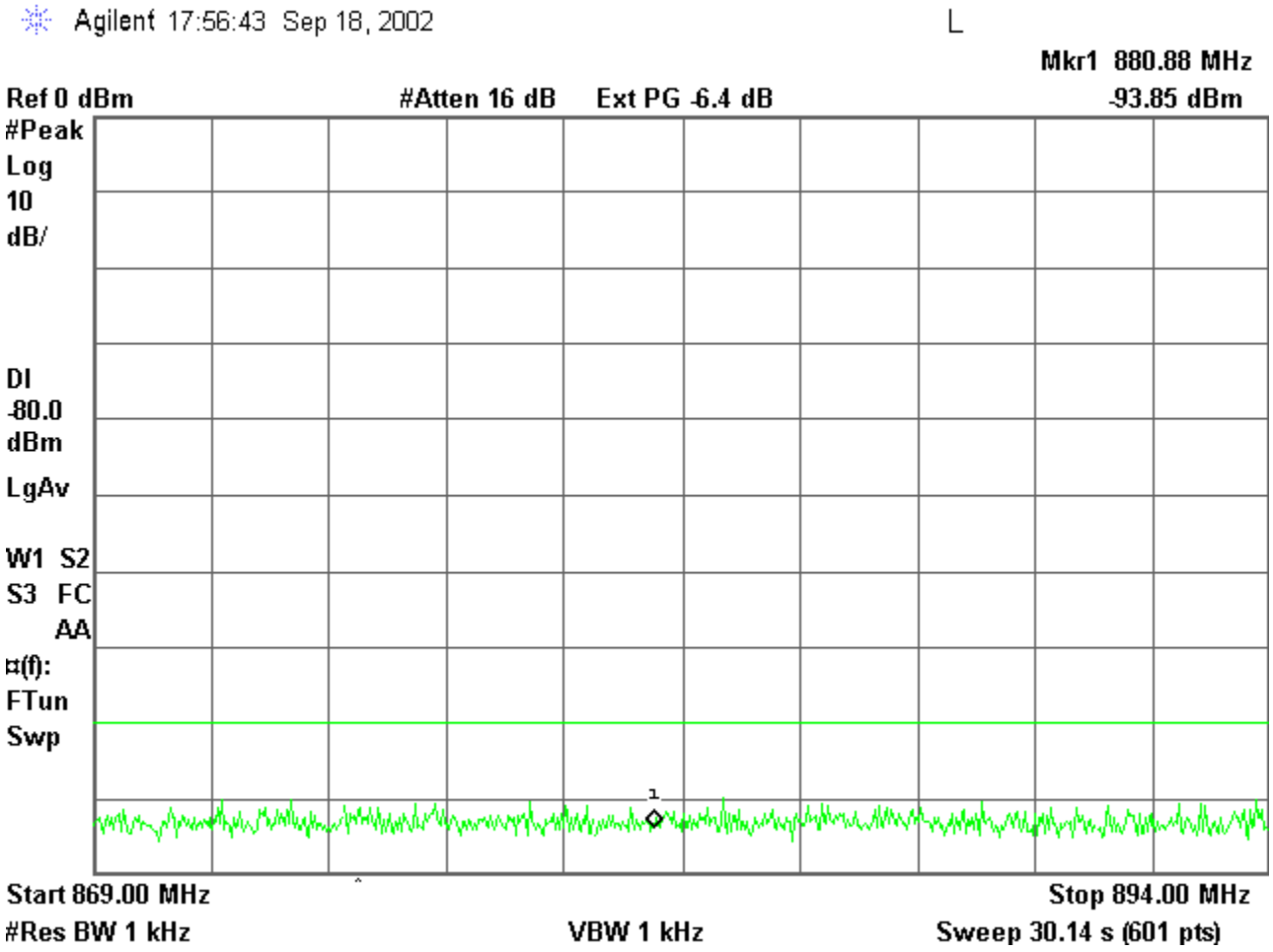


Plot 3.6c Out of Band Emissions at Antenna Terminals

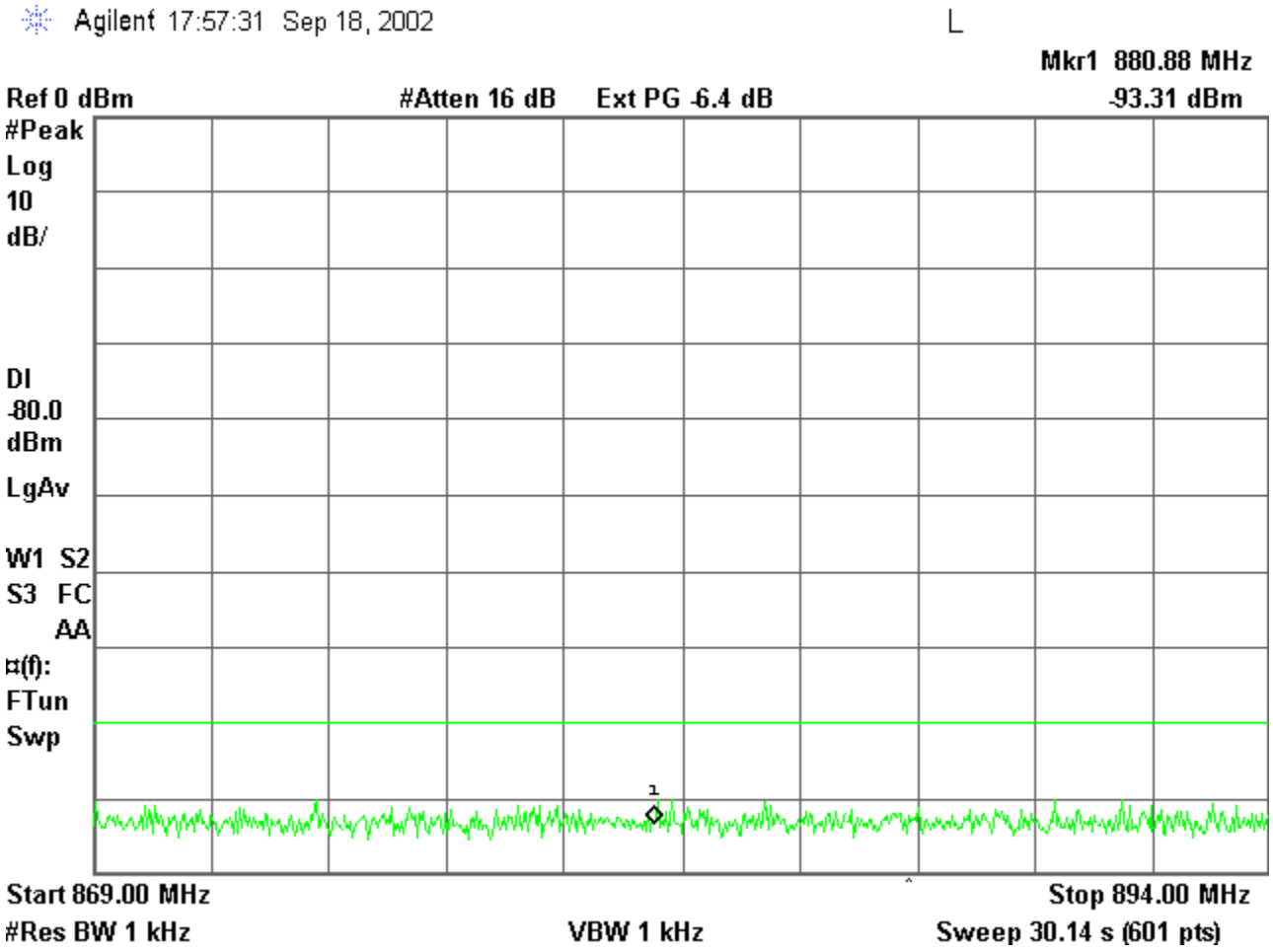
High Channel, 1908.75 MHz
1 GHz to 20 GHz



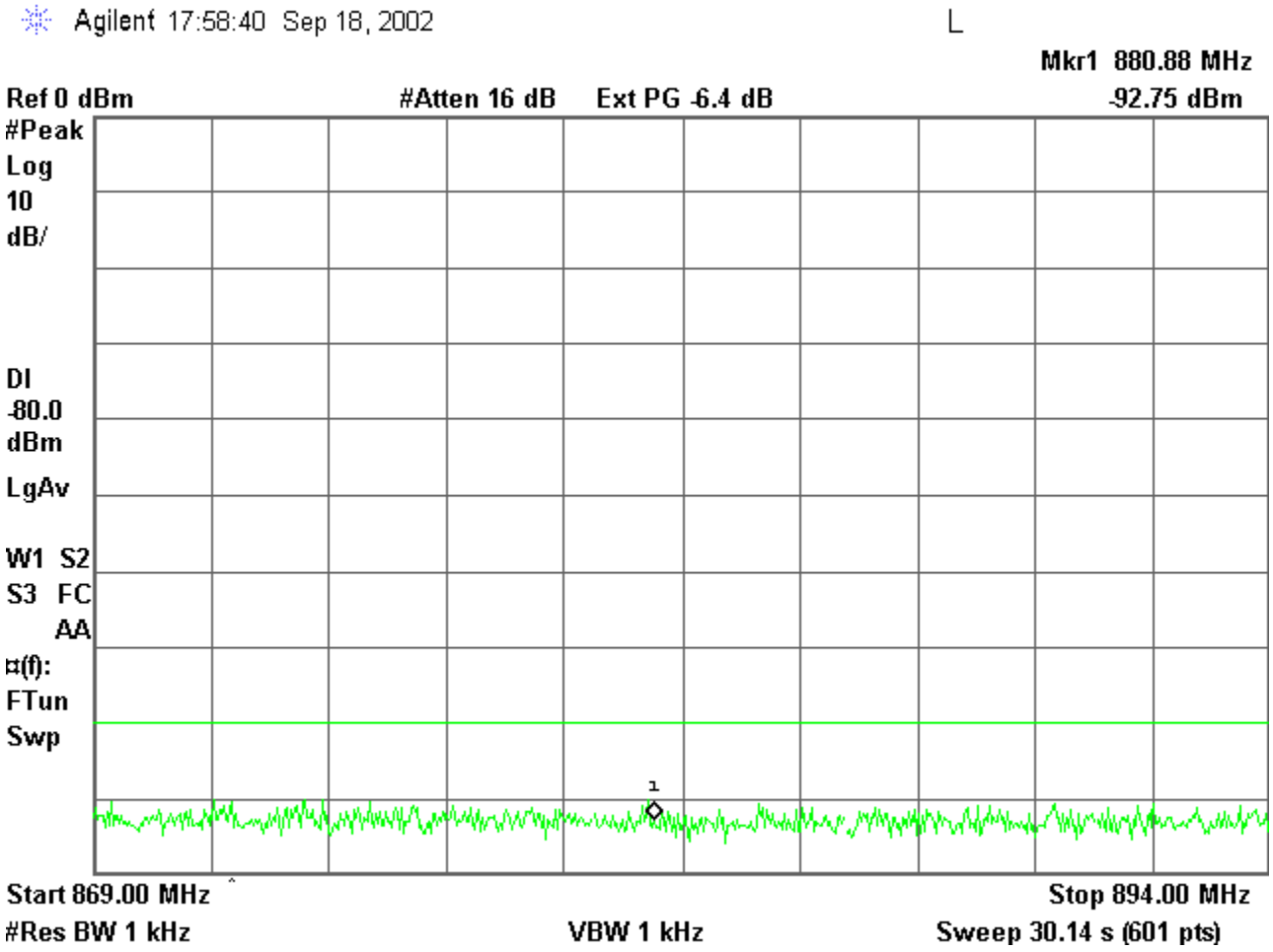
Plot 3.7a Low Channel, 824.70 MHz



Plot 3.7a Middle Channel, 836.52 MHz



Plot 3.7c High Channel, 848.31 MHz



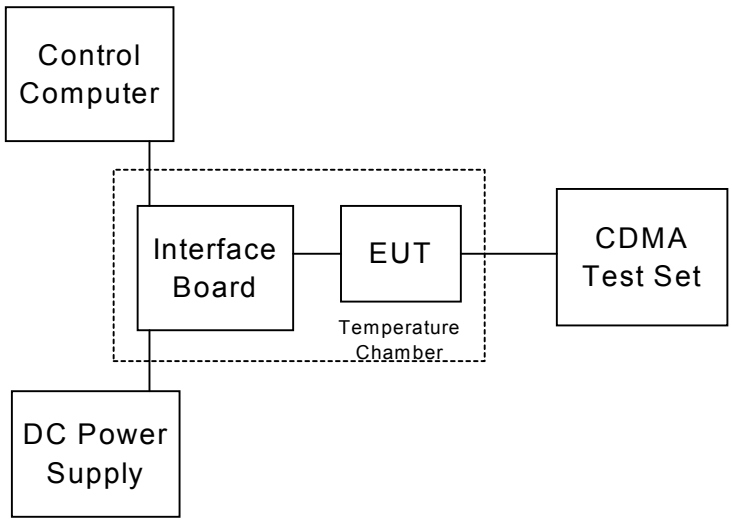
8 Frequency Stability vs Temperature

FCC 2.1055

8.1 Test Procedure

The SB555-S was placed inside the temperature chamber. The transmitting frequency error is measured at 25 deg C, then the temperature is set to –30 deg C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, then the measurement is repeated. This is repeated until 80 deg C is completed. Frequency metering included averaging of 50 samples per reading to stabilize the reading. Reference power supply voltage for these tests is 3.30 volts.

Test Setup



8.2 Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	SERIAL NO.	Last CAL. DATE
Wireless Test Set	Agilent	8960	US41070182	09/05/2001
DC Power Supply	Hewlett Packard	E3631A	MY40003202	1/11/00
Temperature Chamber	Sigma Systems	M30M	7550	N/a
Control Computer	ACT	Canadien	N/A	N/a
Interface Board	Shop built	Nest	N/a	N/a

8.3 Test Results

PCS band

	1880.00 MHz	
Temperature (degC)	Frequency error (Hz)	Worst case Frequency error (ppm)
25	1.83	.001
-30	1.21	-.001
-20	2.21	0
-10	2.22	.001
0	1.29	-.002
10	-0.32	-.002
20	-0.55	-.001
30	2.22	0
40	1.17	.001
50	1.65	.001
60	2.74	.001
70	1.18	.001
80	-1.89	.002

9 Frequency Stability vs Voltage

FCC 2.1055

9.1 Test Procedure

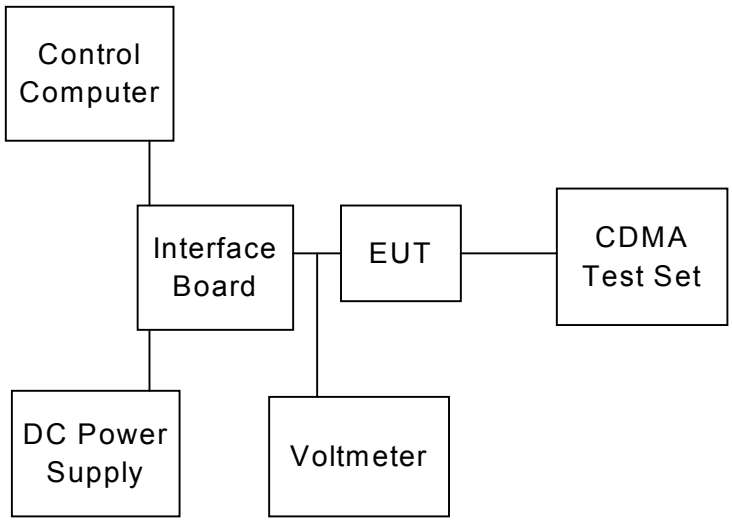
The SB555-S was connected to a DC Power Supply and a CDMA test set with frequency error measurement capability. The power supply output is adjusted to the test voltage as measured at the input terminals to the module while transmitting. A voltmeter was used to confirm the terminal voltage.

The test voltages are:

3.15 V, rated voltage
3.2 V, minimum specified operating voltage
4.2 V, maximum specified operating voltage.

The output frequency error was recorded for each voltage setting at one center channel for each band of operation. Frequency metering included averaging of 50 samples per reading to stabilize the reading.

Test Setup



9.2 Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	SERIAL NO.	Last Cal. DATE
CDMA Test Set	Agilent	8960	US41070182	09/05/2001
DC Power Supply	Hewlett Packard	HP6632A	3326A-03423	N/A
Control Computer	TC	Generic PC	100844	N/a
Interface Board	Shop built	Nest	N/a	N/a
Voltmeter	Fluke	75III	78270326	21/12/01

9.3 Test Results

Cellular Band

Expected Transmitting Frequency : **837.00 MHz**

Vcc (Volts)	**Measured Frequency Error (Hz)**	**Measured Frequency Error (ppm) see note 1 below**
3.3	2.77	.001 (+/-.006)
3.2	3.29	-.002 (+/-.006)
4.2	0.77	-.001 (+/-.006)

PCS Band

Expected Transmitting Frequency: **1880 MHz**

Vcc (Volts)	**Measured Frequency Error (Hz)**	**Measured Frequency Error (ppm) see note 1 below**
3.3	2.00	0 (+/-.006)
3.2	1.02	.001 (+/-.006)
4.2	1.14	.001 (+/-.006)

Note 1 There is considerable short-term variation of the frequency as measured on an 8960 test set. Without averaging, an actual error of 0 Hz can appear to vary from –50 to +50 Hz from one sample to the next due to the effect of the CDMA modulation. Averaging helps steady this variation down to +/- 5 Hz or less, and that is what was used for our tests. Observation of the readings by the test engineer are that the variation is symmetrical around 0 Hz.

This data shows that frequency stability versus voltage meets the requirements.