FCC 15 SUBPART C

EMI MEASUREMENT AND TEST REPORT

For

Actiontec Electronics, Inc.

760 North Mary Avenue
Sunnyvale, CA 94086

FCC ID: LNQ802AI

December 5, 2001

This Report Concerns:	**Equipment Type:**
☒ Original Report	Wireless LAN Device

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Test Date:	October 17, 2001
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1 - General Information

1.1 Product Description for Equipment Under Test (EUT)

The *Actiontec Electronics, Inc'*s *802AI* or the "EUT" as referred to in this report is a Wireless LAN USB Device which measures approximately 5.1"L x 2.9"Wx 6.25"H.

The EUT is designed to provide IEEE 802.1 1b compliant WLAN Access Point services to a 2.4 GHz RF network and bridges to an Ethernet backbone. The design is based on Intersil ISL 3865 Access point Controller, which implements the full IEEE802.1 1b standard date rates up to 11Mbps.

The test data in this test report was good for the test sample only. It may have deviation to other test samples.

1.2 Objective

This type approval report is prepared on behalf of. *Actiontec Electronics, Inc.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The objective of the manufacturer is to demonstrate compliance with FCC rules for Output Power, Antenna Requirements, 6 dB Bandwidth, power density, 100 kHz Bandwidth of Band Edges Measurement, Conducted and Spurious Radiated Emission, and processing gain.

1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s).

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4 –1992, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory Corporation. The radiated testing was performed at an antenna-to-EUT distance of 3 Meters.

1.5 Test Facility

The Open Area Test site used by Bay Area Compliance Laboratory Corporation to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA.

Test site at Bay Area Compliance Laboratory Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI).

The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-1992.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratory Corporation is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (NVLAP). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, IEC/CISPR 22: 1998, and AS/NZS 3548: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods under NVLAP Lab Code 200167-0.

1.6 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Due Date
HP	Spectrum Analyzer	8568B	2610A02165	12/6/02
HP	Spectrum Analyzer	8593B	2919A00242	12/20/02
HP	Amplifier	8349B	2644A02662	12/20/01
HP	Quasi-Peak Adapter	85650A	917059	12/6/02
HP	Amplifier	8447E	1937A01046	12/6/02
A.H. System	Horn Antenna	SAS0200/571	261	12/27/01
Com-Power	Log Periodic Antenna	AL-100	16005	11/2/02
Com-Power	Biconical Antenna	AB-100	14012	11/2/02
Solar Electronics	LISN	8012-50-R-24-BNC	968447	12/28/01
Com-Power	LISN	LI-200	12208	12/20/01
Com-Power	LISN	LI-200	12005	12/20/01
BACL	Data Entry Software	DES1	0001	12/20/01

*** Statement of Traceability: Bay Area Compliance Laboratory Corp.** certifies that all calibration has been performed using suitable standards traceable to the NATIONAL INSTITUTE of STANDARDS and TECHNOLOGY (NIST).

1.7 Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
HP	Motherboard	CUW-AM	A04-02961	DOC
HP	Video card	Build-in		
SONY	3.5”Floppy Drive	MPF920-F	20588872	DOC
Bestec Electronics Corp.	Power Supply	ATX100-5	0011A064353	DOC
Western Digital	Hard Drive	Caviar 33200	None	DOC
SAMSUNG	CD-ROM	SC-140	0000226P	DOC
HP	Chassis	Pavillion	None	None
Trendnet	Ethernet Card	TE100-PCIWN	0122E1A57873	DOC

1.8 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
Microsoft	KB	Elite	E06401COMB	DOC
Microsoft	Mouse	X03-48591	6818005-00000	C3KKMPS
Sony	Monitor	P815-1M	Q664908112	GSS21002
Citizen	Printer	LSP-10	5047999-82	DLK66TLSP-10
EVEREX	Modem	EV-945	None	E3E5UVEV-945
HP	PC System	Pavillion 6830	MX10606093	DOC

1.9 External I/O Cabling List and Details

Cable Description	Length (M)	Port/From	To
Shielded KB Cable	1.6	KB Port/Host	Microsoft Keyboard
Shielded Mouse Cable	1.8	Mouse Port/Host	Microsoft Mouse
Shielded Serial Cable	1.5	Serial Port/Host	EVEREX Modem
Shielded Printer Cable	2.0	Parallel Port/Host	Citizen Printer
Shielded USB cable	0.0	USB Port/Host	Wireless LAN Card/EUT
Shielded Video Cable	1.8	VGA /EUT	KDS Monitor

2 - System Test Configuration

2.1 Justification

The host system was configured for testing in a typical fashion (as a normally used by a typical user).

The EUT was tested in the normal (native) operating mode to represent *worst* case results during the final qualification test.

The power supply EUT used is Sunpower Power AC/DC adapter, M/N: MA15-050

2.2 EUT Exercise Software

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The test software, terminal.exe, provided by the customer, is started the Windows 98 terminal program under the Windows 98 operating system. Once loaded, the program sequentially exercises each system component.

The sequence used is as follows:

1. Lines of Hs scroll across the notebook monitor.
2. The modem(s) receives Hs.
3. The printer output Hs.

This process is continuous throughout all tests.

2.3 Special Accessories

As shown in section 2.5, all interface cables used for compliance testing are shielded as normally supplied by INMAC and their respective support equipment manufacturers. The host pc and other peripherals featured shielded metal connectors.

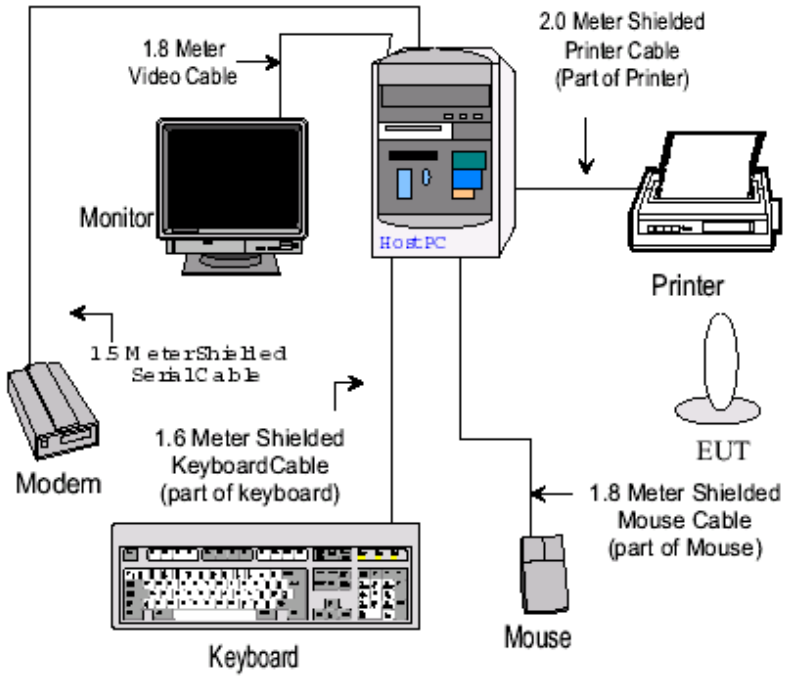
2.4 Schematics / Block Diagram

Appendix A contains a copy of the EUT's schematics diagram as reference.

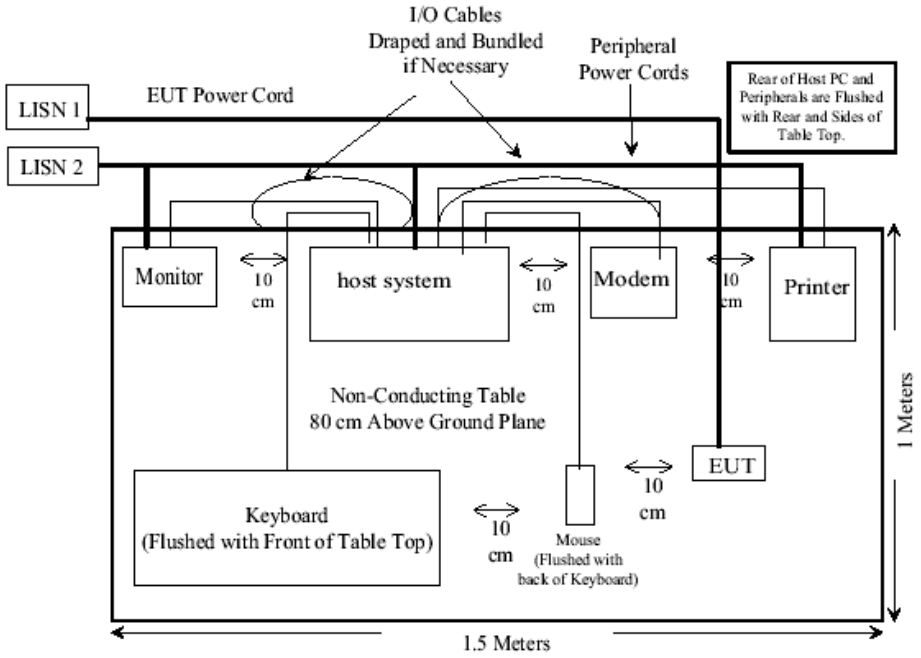
2.5 Equipment Modifications

No modifications were made by BACL Corporation to ensure the EUT to comply with the applicable limits and requirements.

2.6 Configuration of Test System



2.7 Test Setup Block Diagram



3 - Summary Of Test Results

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 15.205	Restricted Bands	Passed
§ 2.1091	RF Safety Requirements	Passed
§15.203	Antenna Requirement	Passed
§15.207 (a)	Conducted Emission	Passed
§15.209 (a)	Radiated Emission	Passed
§15.209 (f)	Spurious Emission	Passed
§15.247 (a) (2)	6 dB Bandwidth	Passed
§15.247 (b) (2)	Output Power	Passed
§ 15.247 (c)	100 kHz Bandwidth of Frequency Band Edges	Passed
§15.247 (d)	Peak Power Spectral Density	Passed
§15.247 (e)	Processing Gain	Passed

4 - Conducted Output Power Measurement

4.1 Standard Applicable

According to §15.247(b) (2), the maximum peak output power of the intentional radiator shall not exceed 1 Watt.

4.2 Measurement Procedure

1. Place the EUT on the turntable and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.

4.3 Measurement Result

Please refer to the attached pictures for more information.

Peak Output Power	Test Data	Test Result
Low Channel	14.16 dBm	Pass
Middle Channel	13.89 dBm	Pass
High Channel	14.36 dBm	Pass

4.4 Test Equipment

Manufacturer	Model No.	Serial No.	Calibration Due Date
Agilent	E4419b	GB40202891	4/8/02
Agilent	E4412a	US38486529	4/8/02


Agilent
14.16dBm
No Sensor Ch8


Agilent
13.89dBm
No Sensor Ch8


Agilent
14.36dBm
No Sensor Ch8

5 – Spurious Emission

5.1 Standard Applicable

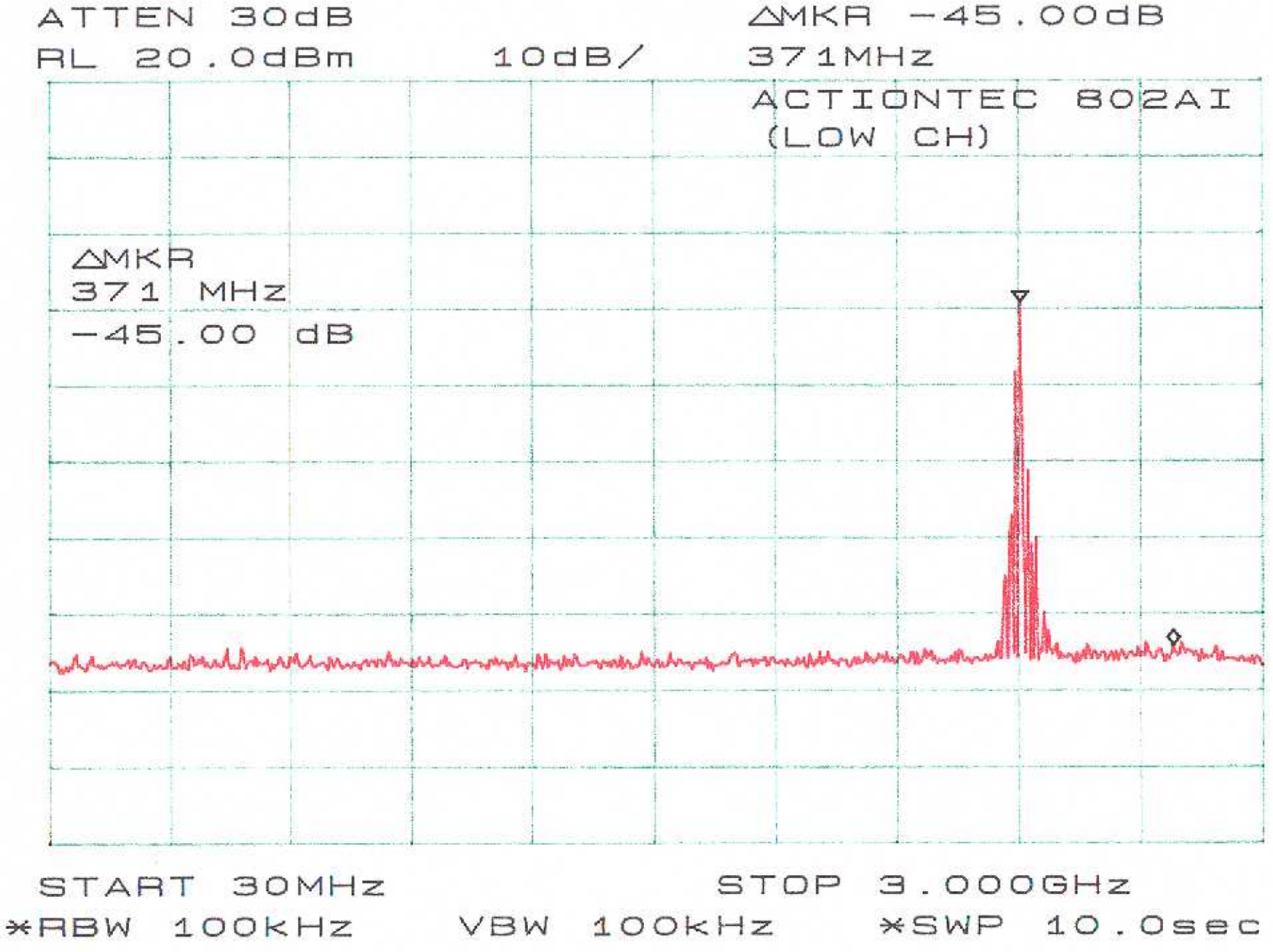
According to §15.209 (f) and §15.33(a), in some cases the emissions from an intentional radiator must be measured to beyond the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator because of the incorporation f a digital device. If measurements above the tenth harmonic are so required, the radiated emissions above the tenth harmonic shall comply with the general radiated emission limits applicable to the incorporated digital device, as shown in §15.109 and as based on the frequency of the emission being measured, or, except for emissions contained in the restricted frequency bands shown in §15.205, the limit on spurious emissions specified for the intentional radiator, whichever is the higher limit.

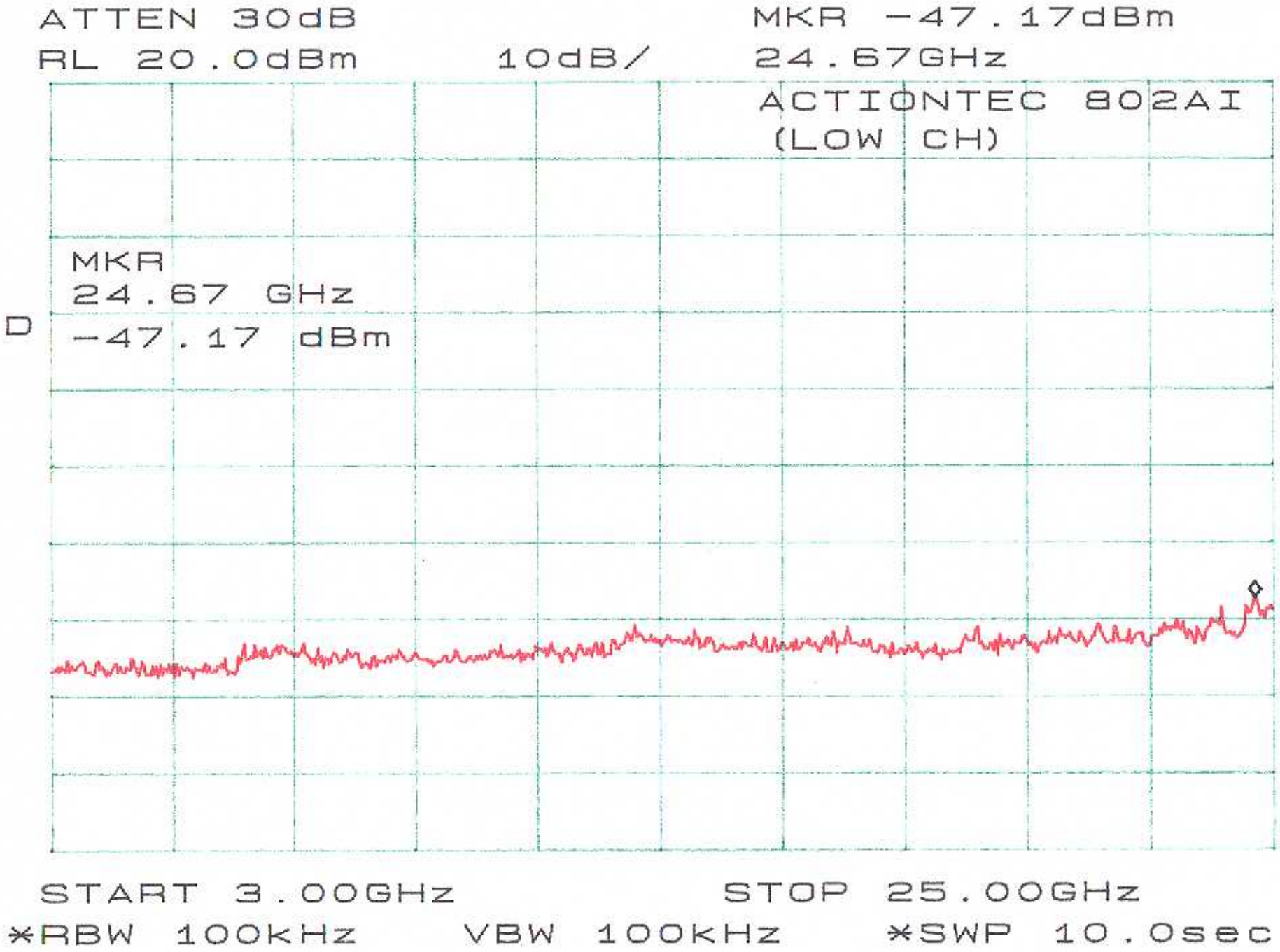
5.2 Measurement Procedure

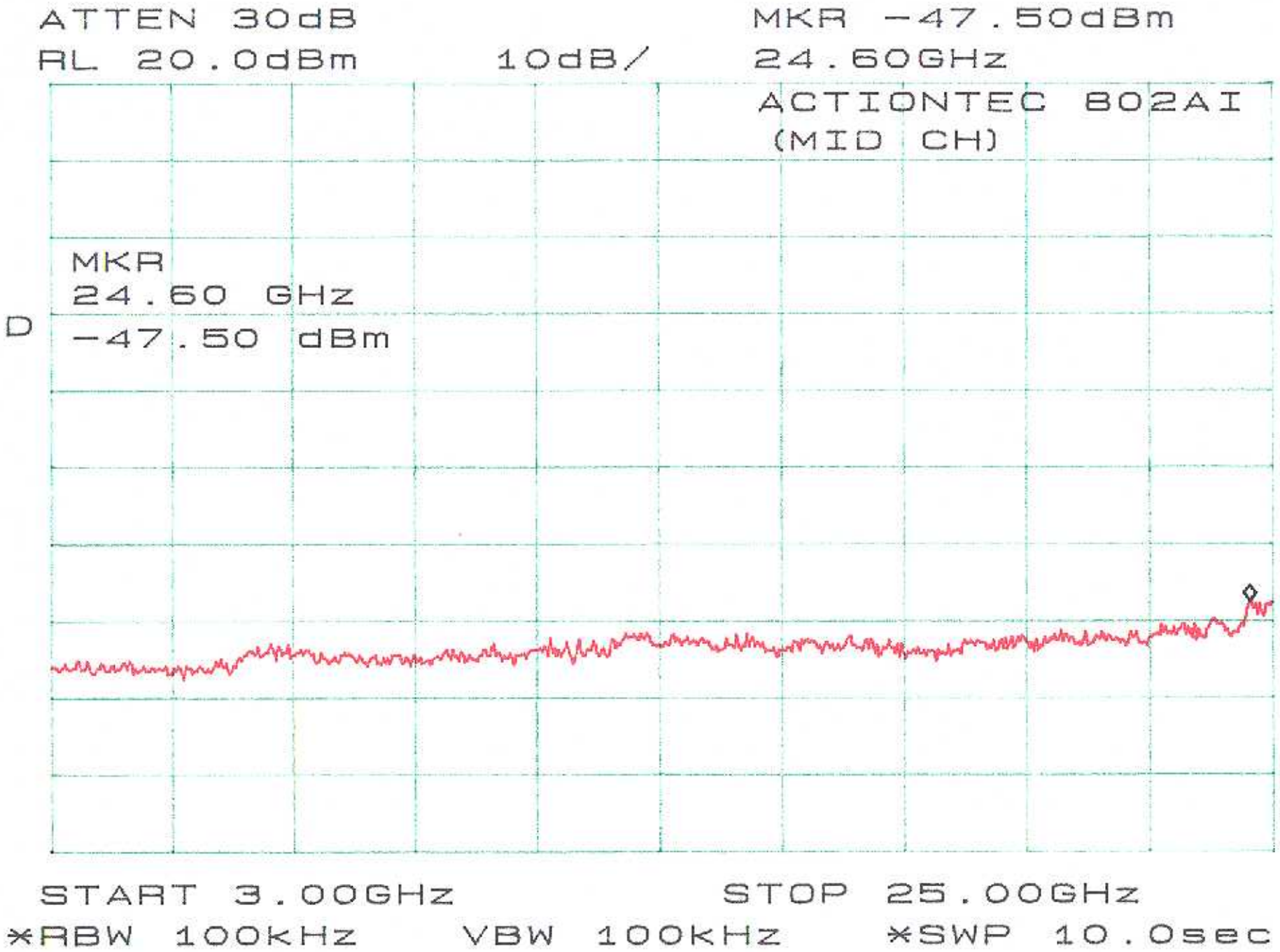
1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 4 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the SA on Max-Hold Mode, and then keep the EUT in transmitting mode. Record all the signals from each channel until each one has been recorded.
4. Set the SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

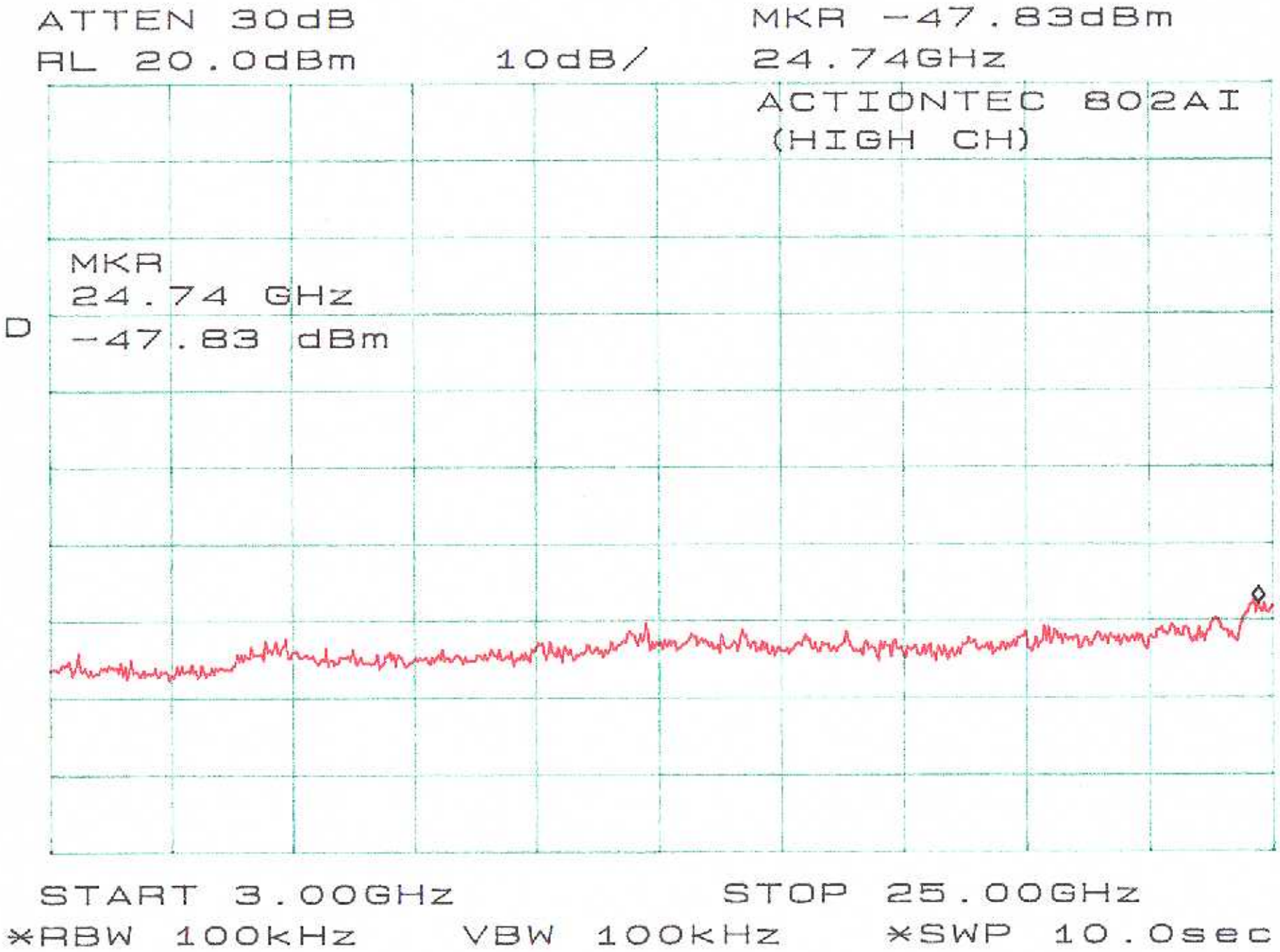
5.3 Measurement Data

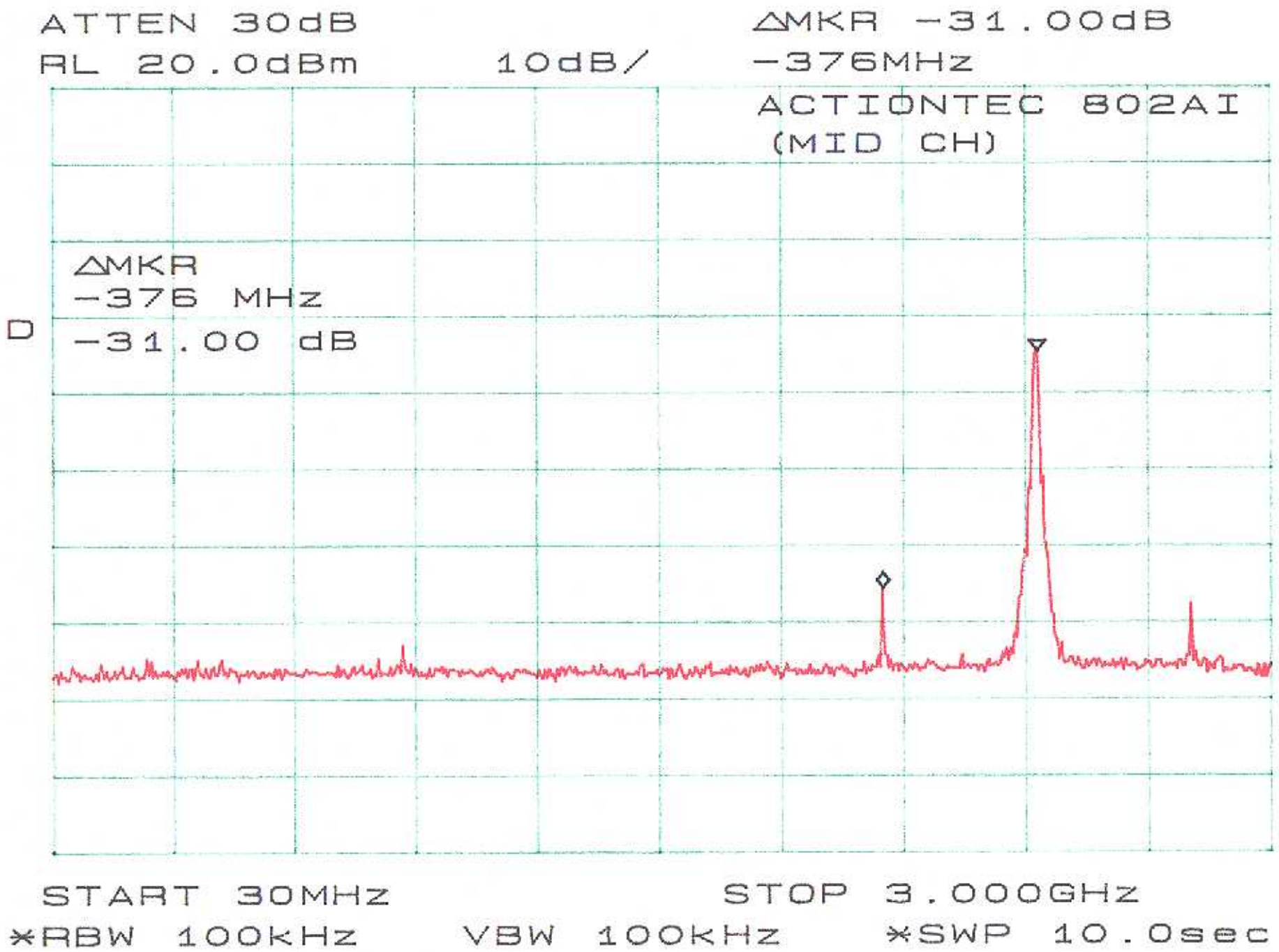
Please refer to the appending for more information.

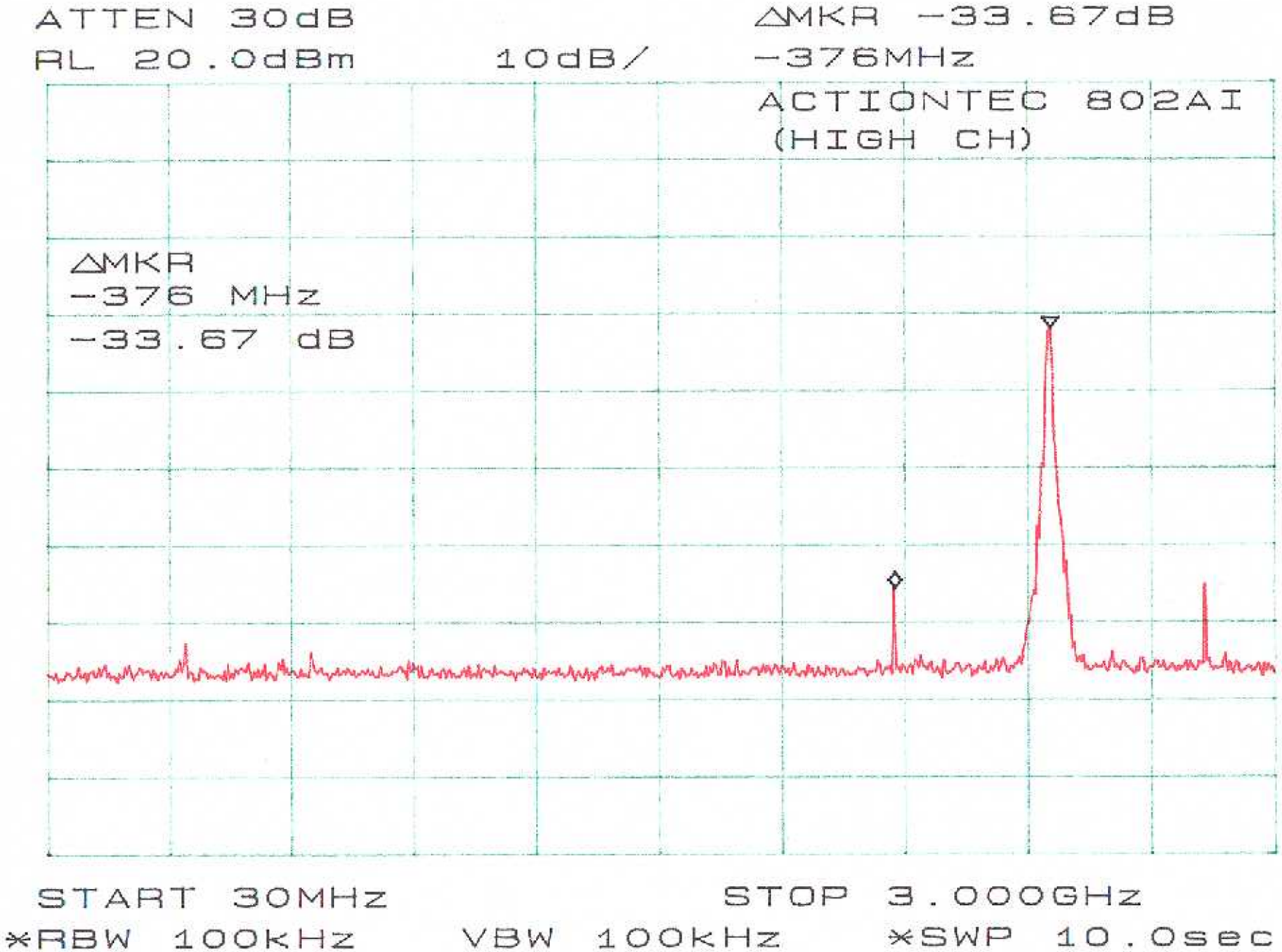

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -45.00dB
371MHz
ACTIONTEC 802AI
(LOW CH)
ΔMKR
371 MHz
-45.00 dB
START 30MHz
STOP 3.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -47.17dBm
24.67GHz
ACTIONTEC 802AI
(LOW CH)
MKR
24.67 GHz
-47.17 dBm
D
START 3.00GHz
STOP 25.00GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -47.50dBm
24.60GHz
ACTIONTEC 802AI
(MID CH)
MKR
24.60 GHz
-47.50 dBm
D
START 3.00GHz
STOP 25.00GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -47.83dBm
24.74GHz
ACTIONTEC 802AI
(HIGH CH)
MKR
24.74 GHz
-47.83 dBm
D
START 3.00GHz
STOP 25.00GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -31.00dB
-376MHz
ACTIONTEC 802AI
(MID CH)
ΔMKR
-376 MHz
-31.00 dB
D
START 30MHz
STOP 3.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -33.67dB
-376MHz
ACTIONTEC 802AI
(HIGH CH)
ΔMKR
-376 MHz
-33.67 dB
START 30MHz
STOP 3.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 10.0sec

6 – Power Density

6.1 Standard Applicable

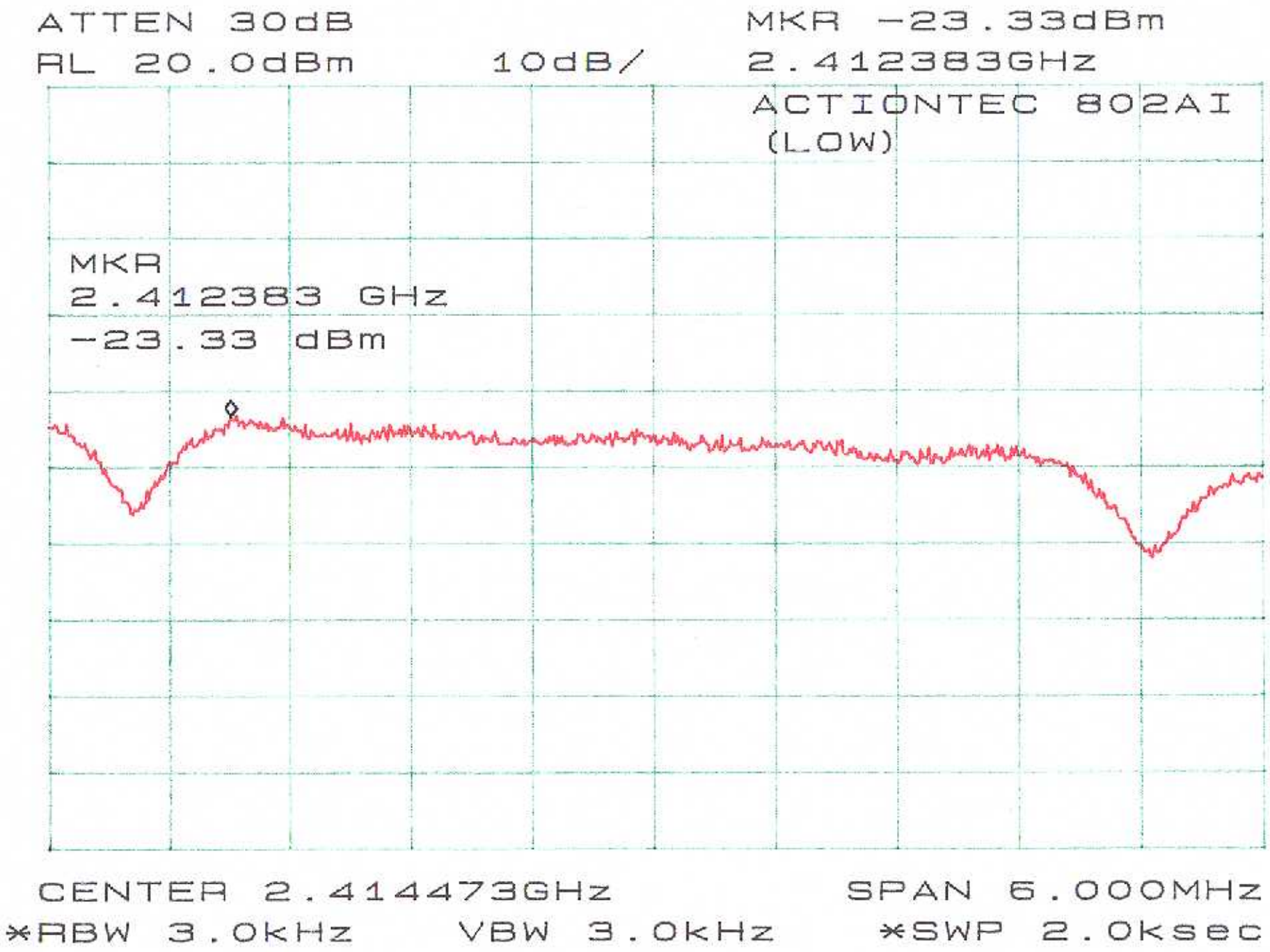
According to §15.247 (d), for direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

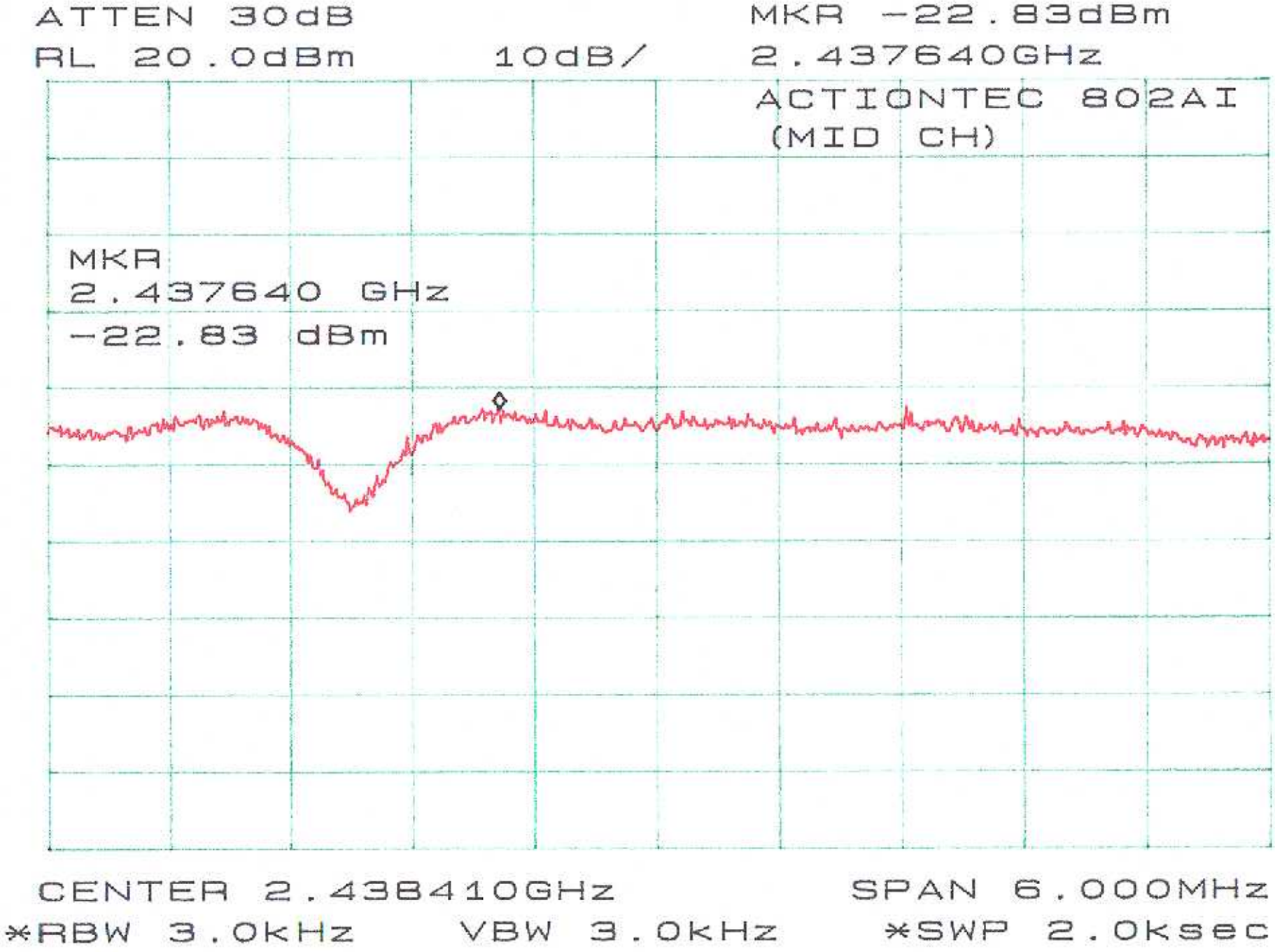
6.2 Measurement Procedure

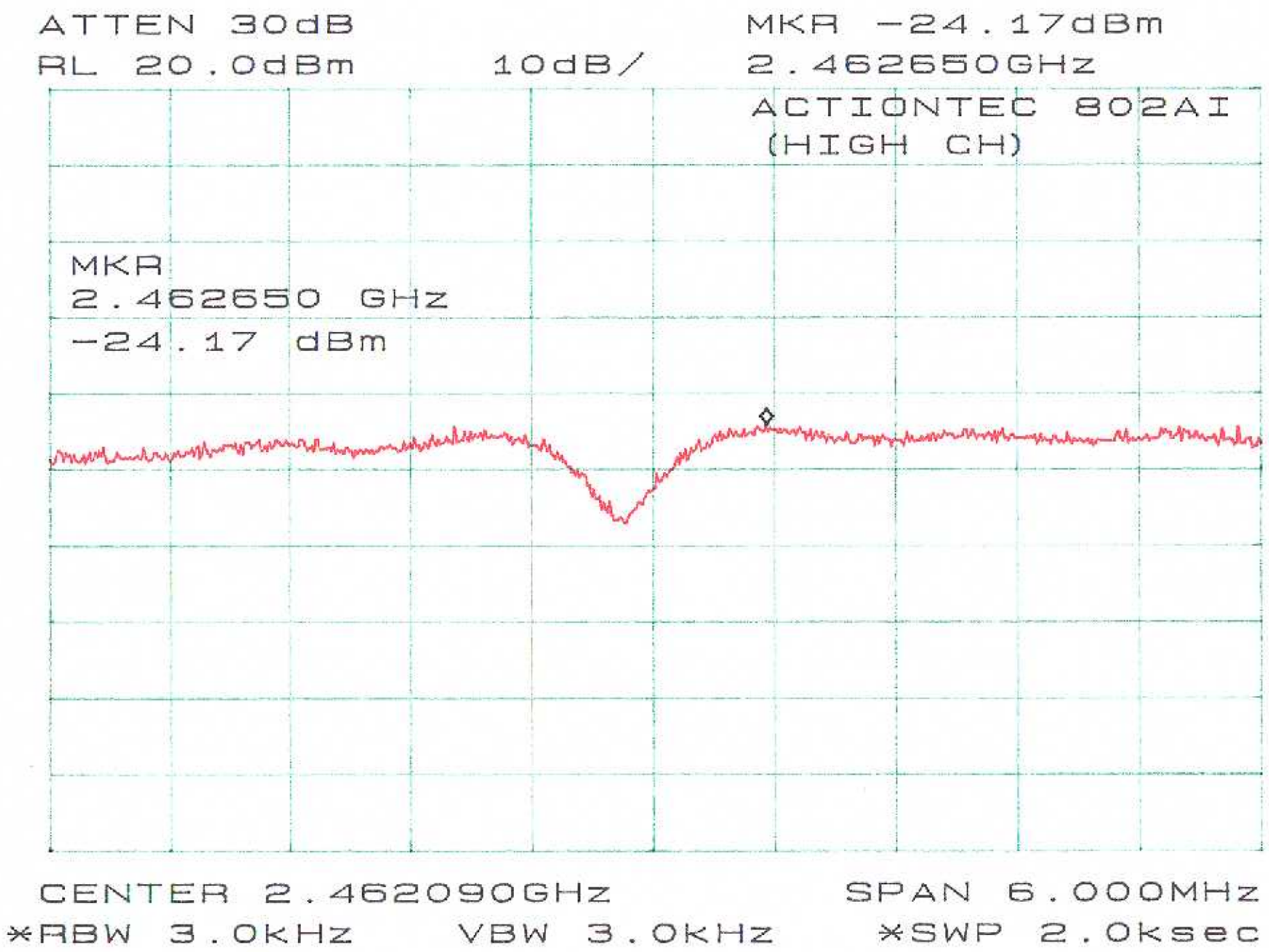
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Repeat above procedures until all frequencies measured were complete.

6.3 Test Results

Please refer to the attached plot(s).


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -23.33dBm
2.412383GHz
ACTIONTEC 802AI
(LOW)
MKR
2.412383 GHz
-23.33 dBm
CENTER 2.414473GHz
SPAN 6.000MHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 2.0ksec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -22.83dBm
2.437640GHz
ACTIONTEC 802AI
(MID CH)
MKR
2.437640 GHz
-22.83 dBm
CENTER 2.438410GHz
SPAN 6.000MHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 2.0ksec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -24.17dBm
2.462650GHz
ACTIONTEC 802AI
(HIGH CH)
MKR
2.462650 GHz
-24.17 dBm
CENTER 2.462090GHz
SPAN 6.000MHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 2.0ksec

7 – 6 dB BANDWIDTH

7.1 Standard Applicable

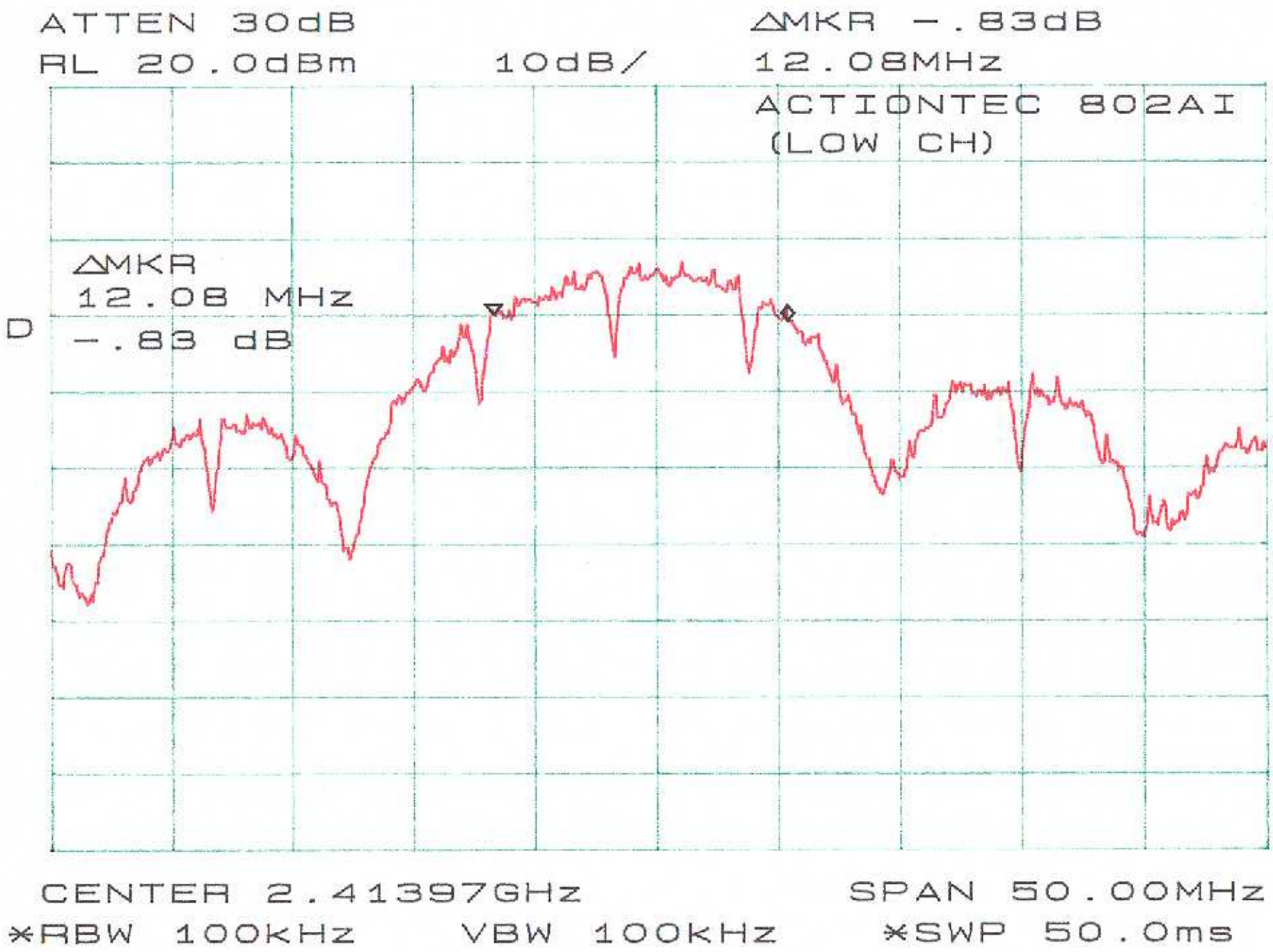
According to §15.247(a)(2), for direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz.

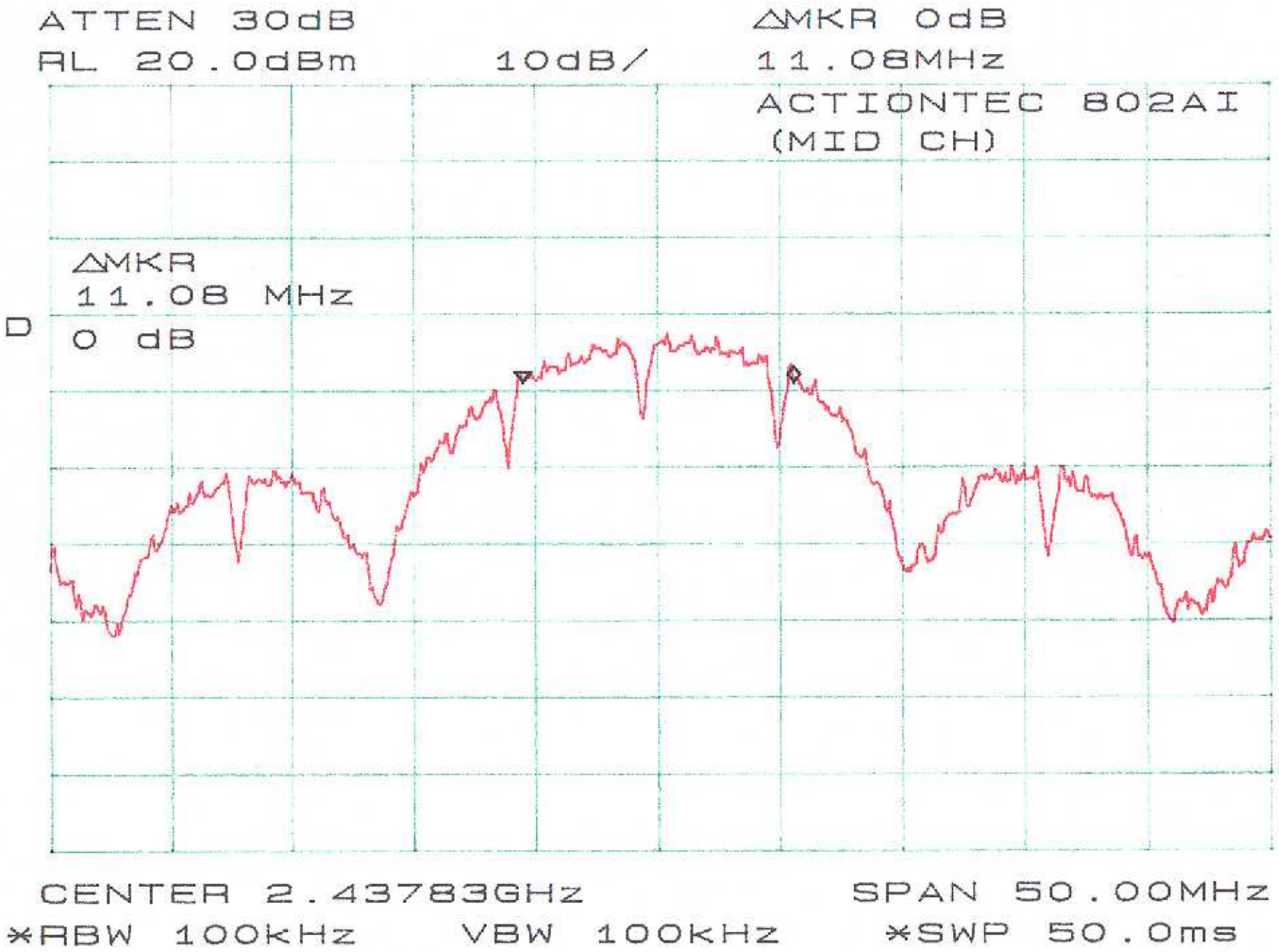
7.2 Measurement Procedure

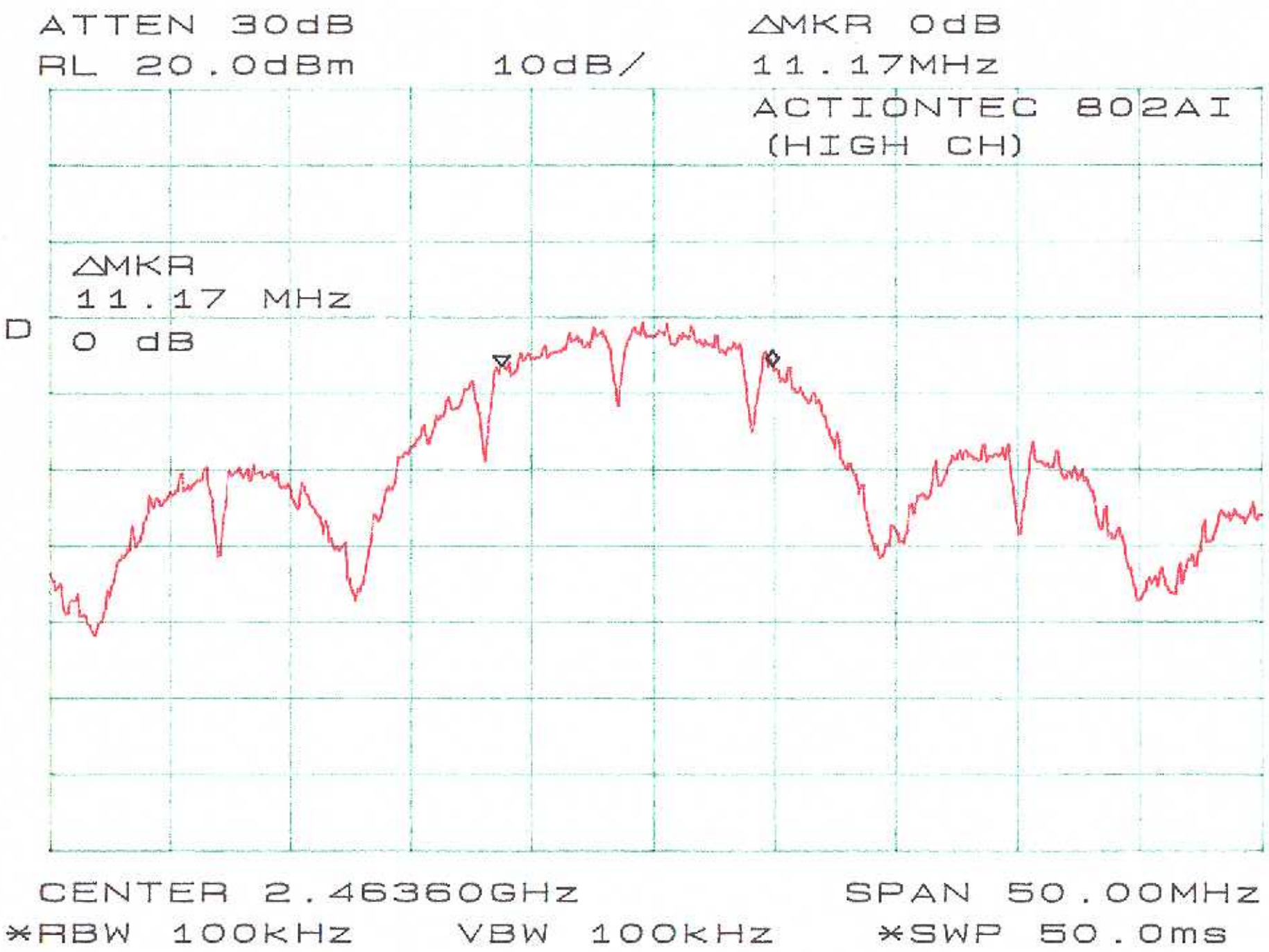
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

7.3 Measurement Data

Please refer to appending plot for more information.


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -.83dB
12.08MHz
ACTIONTEC 802AI
(LOW CH)
ΔMKR
12.08 MHz
-.83 dB
D
CENTER 2.41397GHz
SPAN 50.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 0dB
11.08MHz
ACTIONTEC 802AI
(MID CH)
ΔMKR
11.08 MHz
0 dB
D
CENTER 2.43783GHz
SPAN 50.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 0dB
11.17MHz
ACTIONTEC 802AI
(HIGH CH)
ΔMKR
11.17 MHz
0 dB
D
CENTER 2.463600GHz
SPAN 50.00MHz
*RBW 100KHz
VBW 100KHz
*SWP 50.0ms

8 -100 kHz Bandwidth Of Band Edges Measurement

8.1 Standard Applicable

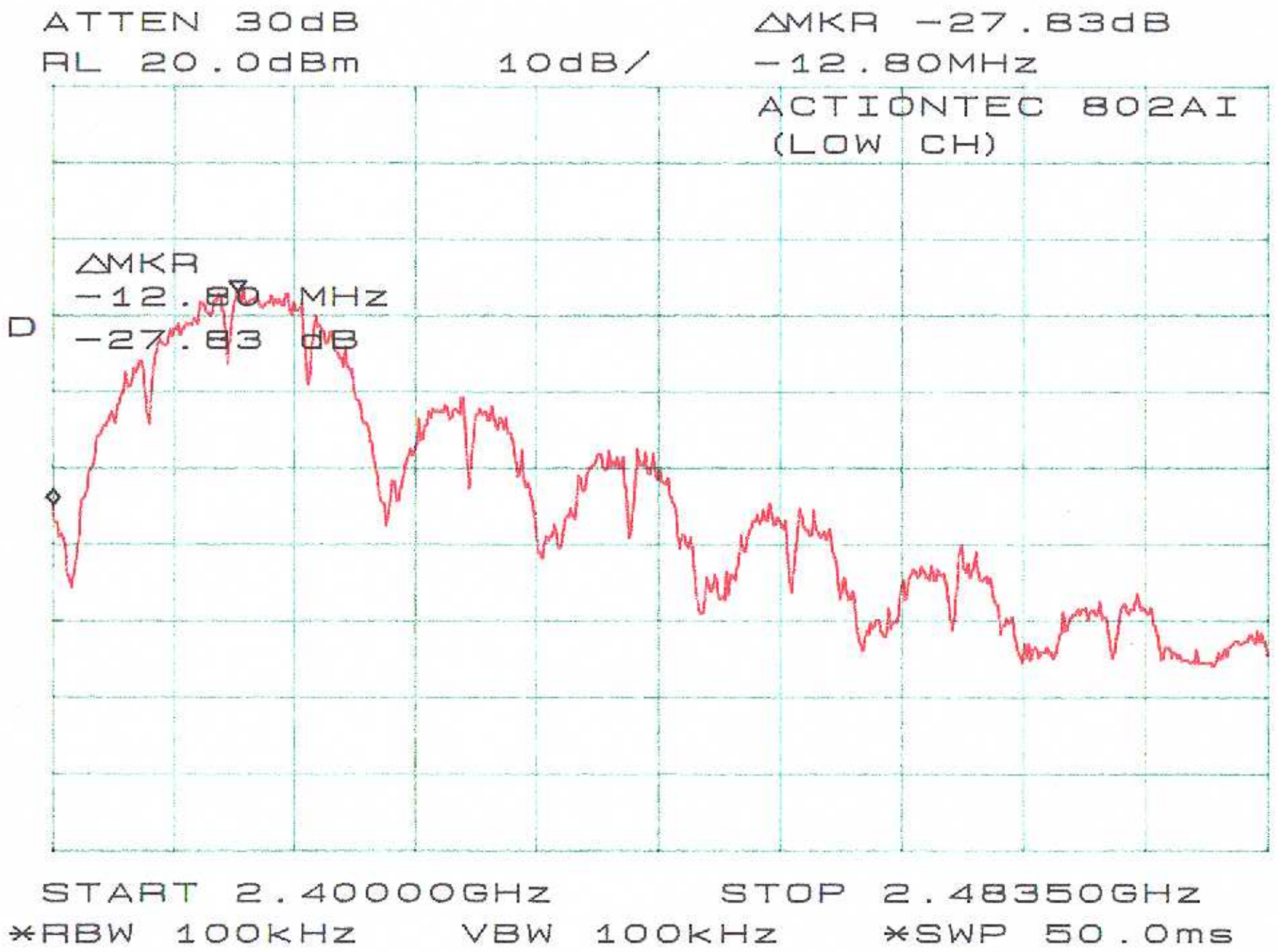
According to §15.247(c), if *any* 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in § 15.209(a), whichever results in the lesser attenuation.

8.2 Measurement Procedure

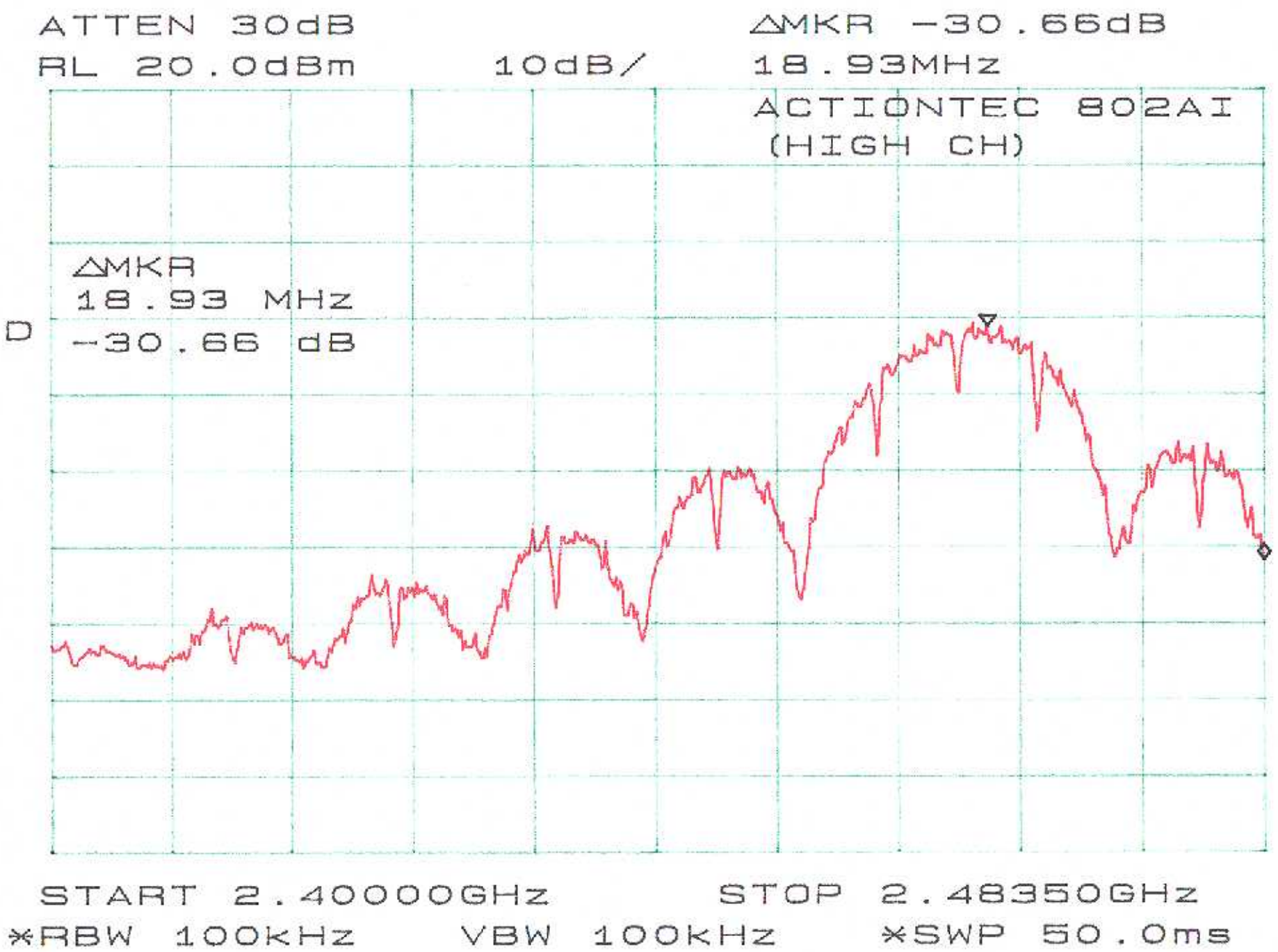
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

8.3 Test Results

Please refer to the appending plot for more information.


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -27.83dB
-12.80MHz
ACTIONTEC 802AI
(LOW CH)
ΔMKR
-12.80 MHz
-27.83 dB
D
START 2.40000GHz
STOP 2.48350GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -33.00dB
-38.41MHz
ACTIONTEC 802AI
(MID CH)
ΔMKR
-38.41 MHz
-33.00 dB
D
START 2.40000GHz
STOP 2.48350GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -30.66dB
18.93MHz
ACTIONTEC 802AI
(HIGH CH)
ΔMKR
18.93 MHz
-30.66 dB
D
START 2.40000GHz
STOP 2.48350GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms

9 - Antenna Requirement

9.1 Standard Applicable

For intentional device, according to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to § 15.247 (1), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

9.2 Antenna Connected Construction

The directional gain of antenna used for transmitting is 2 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

10 – RF Exposure

According to 15.247(b)(4), RF exposure is calculated.

MPE Prediction

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG/4\pi R^2$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal: 14.36 (dBm)
Maximum peak output power at antenna input terminal: 27.29 (mW)
Antenna Gain (typical): 2 (dBi)
Maximum antenna gain: 1.58 (numeric)
Prediction distance: 3 (cm)
Predication frequency: 2400 (MHz)
MPE limit for uncontrolled exposure at prediction frequency: 1 (mW/cm^2)
Power density at predication frequency: 0.38 (mW/cm^2)
Maximum allowable antenna gain: 4.144 (dBi)

Test Result

The predicted power density level at 3 cm is 0.38mW/cm². This is below the uncontrolled exposure limit of 1mW/cm² at 2400 MHz.

This radio is intended to be installed in laptop PC only and is thus classed as mobile equipment.

11 - Spurious Radiated Emission Data

11.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is ±4.0 dB.

11.2 EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup in accordance with the ANSI C63.4 - 1992. The specification used was the FCC 15 Subpart C limits.

The EUT was put in the front of the test table. The host PC system was placed on the center of the back edge on the test table. The modem and the monitor were placed on the left side of the host PC system, and the printer was placed on the left side of the host PC system. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.

The keyboard was placed directly in front of the monitor, flushed with the front of tabletop. The mouse was placed next to the keyboard, flushed with the back of keyboard.

The spacing between the peripherals was 10 centimeters.

Input / Output cables were draped along the edge of the test table and bundle when necessary.

The host PC system was connected with 110 Vac/60Hz power source.

11.3 Spectrum Analyzer Setup

According to FCC Rules, 47 CFR §15.33 (a) (1), the system was tested to 24.5GHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Start Frequency	30 MHz
Stop Frequency	24.5GHz
Sweep Speed	Auto
IF Bandwidth	1 MHz
Video Bandwidth	1 MHz
Quasi-Peak Adapter Bandwidth	120 kHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth	1MHz

11.4 Test Procedure

For the radiated emissions test, the Host PC system and all support equipment power cords were connected to the AC floor outlet since the power supply used in the EUT did not provide an accessory power outlet.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dBµV of specification limits), and are distinguished with a "**Qp**" in the data table.

11.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBµV means the emission is 7dBµV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. - Class B Limit

11.6 Summary of Test Results

According to the data in section 11.7, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.207 and 15.247, and had the worst margin of:

-1.1 (Ave) dBµV at **4823.97 MHz** in the **Horizontal** polarization, 30 MHz to 24.5GHz, **Low Channel, 3 meters**

-1.7 (Ave) dBµV at **7312.24 MHz** in the **Vertical** polarization, 30 MHz to 24.5GHz, **Middle Channel, 3 meters**

-1.3 (Ave) dBµV at **4921.5647 MHz** in the **Vertical** polarization, 30 MHz to 24.5GHz, **High Channel, 3 meters**

-4.0 dBµV at **792.1 MHz** in the **Horizontal** polarization, 30 MHz to 24.5GHz, **Unintentional Emission, 3 meters**

11.7.a. Final Test Data, Low Channel, 30MHz to 24.5GHz, 3 meters

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15 Subpart C	
Frequency MHz	Ampl. dBµV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBµV/m	Cable DB	Amp. DB	Corr. Ampl. dBµV/m	Limit dBµV/m	Margin dB
2413.44	95.83	Fund.	225	1.3	H	28.1	3.4	30.0	97.3		
2413.44	101.5	Fund.	135	1.0	V	28.1	3.4	30.0	109.3		
4823.97	45.5	Ave.	225	1.0	H	32.5	4.9	30.0	52.9	54	-1.1
7236.29	42.0	Ave.	135	1.0	H	35.1	5.6	30.0	52.7	54	-1.3
4823.97	43.0	Ave.	135	1.2	V	32.5	4.9	30.0	50.4	54	-3.6
7236.29	30.67	Ave.	225	1.2	V	35.1	5.6	30.0	41.4	54	-12.6

11.7.b Final Test Data, Middle Channel, 30MHz to 24.5GHz, 3 meters

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15 Subpart C	
Frequency MHz	Ampl. dBµV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBµV/m	Cable dB	Amp. dB	Corr. Ampl. dBµV/m	Limit dBµV/m	Margin dB
2439.38	109.33	Fund.	180	1.0	V	28.1	3.4	30.0	110.8		
2439.38	108.0	Fund.	45	2.0	H	28.1	3.4	30.0	109.5		
7312.24	41.6	Ave.	135	1.3	V	35.1	5.6	30.0	52.3	54	-1.7
4874.07	40.7	Ave.	180	1.4	V	32.5	4.9	30.0	48.1	54	-5.9
4874.07	35.5	Ave.	270	2.0	H	32.5	4.9	30.0	42.9	54	-11.1
7312.24	29.33	Ave.	270	1.7	H	35.1	5.6	30.0	40.1	54	-13.9

11.7.c Final Test Data, High Channel, 30MHz to 24.5GHz, 3 meters

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15 Subpart C	
Frequency MHz	Ampl. dBµV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBµV/m	Cable dB	Amp. dB	Corr. Ampl. dBµV/m	Limit dBµV/m	Margin dB
2460.78	107.17	Fund.	90	1.8	V	28.1	3.4	30.0	109.6		
2460.78	91.7	Fund.	315	1.6	H	28.1	3.4	30.0	93.1		
4921.56	45.3	Ave.	90	1.8	V	32.5	4.9	30.0	52.7	54	-1.3
4921.56	44.0	Ave.	90	1.5	H	32.5	4.9	30.0	51.4	54	-2.6
7384.82	29.5	Ave.	45	1.3	V	35.1	5.6	30.0	40.2	54	-13.8
7384.82	29.67	Ave.	135	1.5	H	35.1	5.6	30.0	40.4	54	-13.6

11.7.d Final Test Data, Unintentional Emission, 30MHz to 24.5GHz, 3 meters

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15 Subpart C	
Frequency	Ampl.	Angle	Height	Polar	Antenna	Cable	Amp.	Corr. Ampl.	Limit	Margin
MHz	dBµV/m	Degree	Meter	H/ V	dBµV/m	dB	dB	dBµV/m	dBµV/m	dB
792.10	40.33	135	1.2	H	23.0	3.7	25.0	42.0	46.0	-4.0
224.99	48.8	315	1.0	H	12.1	3.9	25.0	39.8	46.0	-6.2
132.01	46.6	360	1.4	V	12.6	2.0	25.0	36.2	43.5	-7.3
149.98	45.5	315	1.0	V	13.4	1.6	25.0	35.5	43.5	-8.0
264.02	44.3	315	1.0	H	13.3	4.9	25.0	37.5	46.0	-8.5
250.00	44.33	180	1.2	H	13.1	3.0	25.0	35.4	46.0	-10.6
143.98	43.7	315	1.5	V	13.2	1.0	25.0	32.9	43.5	-10.6
440.05	39.0	180	1.0	H	17.4	2.7	25.0	34.1	46.0	-11.9
325.01	39.67	135	1.3	H	15.5	2.8	25.0	33.0	46.0	-13.0
240.00	40.83	45	2	H	12.6	2.3	25.0	30.7	46.0	-15.3
396.00	34.8	45	1.0	H	16.5	2.8	25.0	29.1	46.0	-16.9

12 - Conducted Emissions Test Data

12.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is $\pm$2.4 dB.

12.2 EUT Setup

The measurement was performed at the **O**pen **A**rea **T**est **S**ite, using the same setup per ANSI C63.4 - 1992 measurement procedure. The specification used was FCC 15 Subpart C limits.

The EUT was put in front of the test table. The host PC system was placed on the center of the back edge on the test table. The modem and the monitor were placed on the left side of the host PC system, and the printer was placed on the left side of the host PC system. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.

The keyboard was placed directly in front of the monitor, flushed with the front of tabletop. The mouse was placed next to the keyboard, flushed with the back of keyboard.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

The host PC system was connected with 110 Vac/60Hz power source.

12.3 Spectrum Analyzer Setup

The spectrum analyzer was set with the following configurations during the conduction test:

Start Frequency	450 kHz
Stop Frequency	30 MHz
Sweep Speed	Auto
IF Bandwidth	100 kHz
Video Bandwidth	100 kHz
Quasi-Peak Adapter Bandwidth	9 kHz
Quasi-Peak Adapter Mode	Normal

12.4 Test Procedure

During the conducted emission test, the power cord of the host system was connected to the auxiliary outlet of the first LISN.

Maximizing procedure was performed on the six (6) highest emissions of each modes tested to ensure EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings were only performed when an emission was found to be marginal (within -4 dBμV of specification limits). Quasi-peak readings are distinguished with a "**Qp**".

12.5 Summary of Test Results

According to the data in section 12.6, the EUT complied with the FCC Conducted margin for a Class B device, with the *worst* margin reading of:

> **-5.7 dBμV** at **0.700 MHz** in the **Line** mode, 450kHz~30MHz, Sunpower AC/DC adapter, M/N: MA15-050

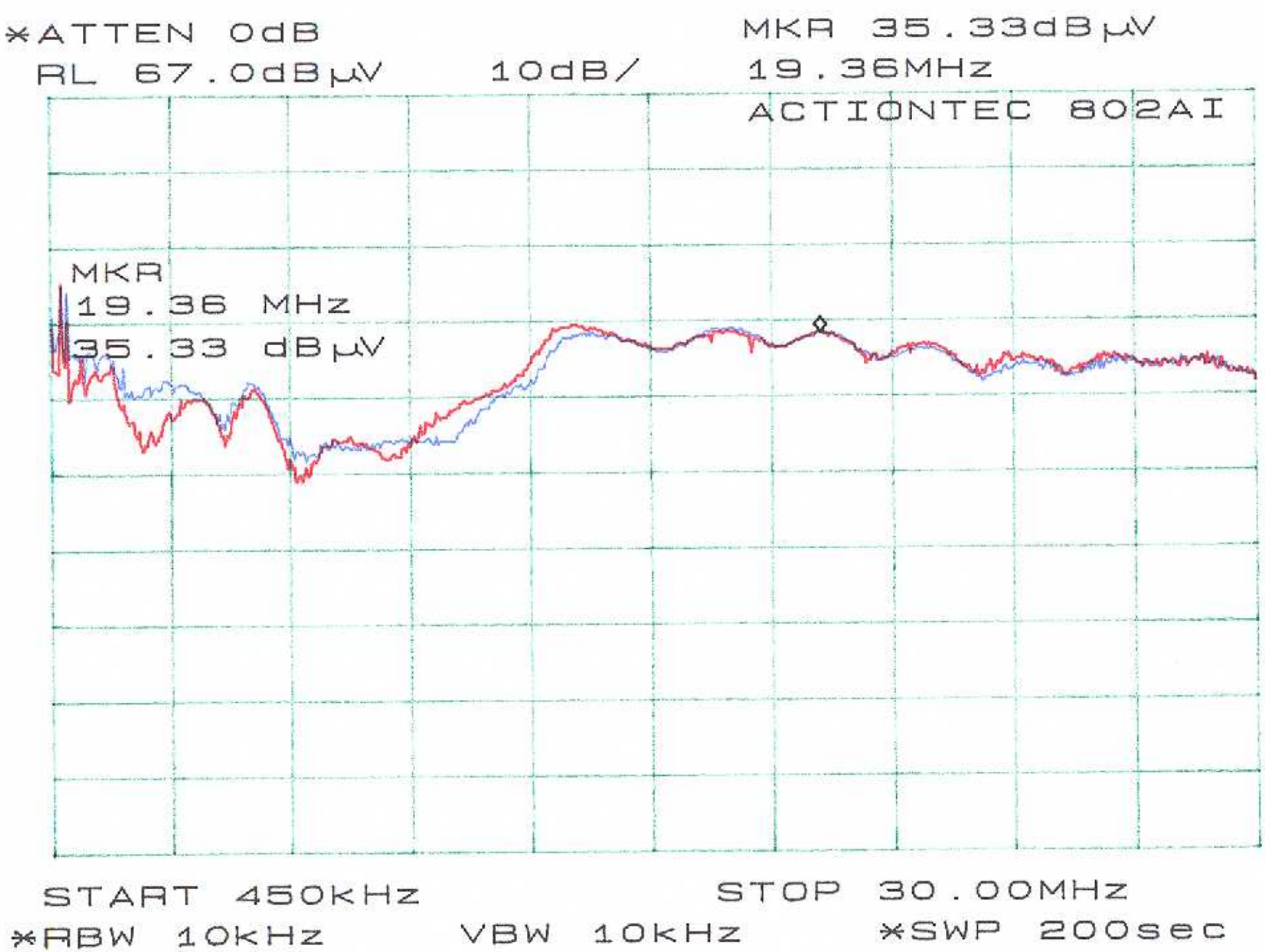
12.6 Conducted Emissions Test Data

12.6.1 Test Data, 0.45 - 30 MHz

LINE CONDUCTED EMISSIONS				FCC CLASS B	
Frequency MHz	Amplitude dBμV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBμV	Margin dB
0.700	42.3	QP	Line	48	-5.7
0.700	42.0	QP	Neutral	48	-6.0
13.300	36.5	QP	Line	48	-11.5
17.150	36.0	QP	Neutral	48	-12.0
19.360	35.3	QP	Line	48	-12.7
13.550	35.2	QP	Neutral	48	-12.8

12.7 Plot of Conducted Emissions Test Data

Plot(s) of Conducted Emissions Test Data is presented hereinafter as reference.


*ATTEN 0dB
RL 67.0dBµV
10dB/
MKR 35.33dBµV
19.36MHz
ACTIONTEC 802AI
MKR
19.36 MHz
35.33 dBµV
START 450kHz
STOP 30.00MHz
*RBW 10kHz
VBW 10kHz
*SWP 200sec

13 - Processing Gain

13.1 Brief Explanations on Processing Gain Data

Please see the attached file.

13.2 Test Data for Processing Gain

Please see the attached file.

13.3 Test Setup – Processing Gain

Please see the attached file.

Brief Explanations on Processing Gain Data

1. The formula of Processing Gain is: Gp = (S/N)o +Mj + Lsys

   Where Gp: Processing Gain;
   (S/N)o: the ratio of signal energy vs noise power density. Based on the data provided by the chip set manufacturer, it is 16.4dB @11Mb/s, 13.4dB @5.5Mb/s, 13.3dB @2.0Mb/s, 10.3dB @1.0Mb/s;
   Lsys: test system loss. The measurement result to our test set-up is 2.0dB;
   Mj: Jamming Margin. It is the ratio of jammer vs WLAN channel signal;

2. The purpose of the measurement here is to figure out Mj at different frequencies. Processing Gain will be gotten through calculation based on the above formula at different frequencies;

3. During the tests (see the Block Diagram of Test Set-up), the input signal to RX is about –60dBm (not exactly at –60dBm) and Mj (dB) = Jammer level (dBm) – Channel signal level (dBm);

4. The criteria we define the transmission link failure is: PER = 8%;

5. FCC defines that when testing the Processing Gain for a specific channel, if the frequency is fo, the jammer frequency has to scan from fo-8.5 MHz to fo+8.5MHz with 50 KHz per step. In another word, 340 data will be taken just for a single channel measurement;

6. Having calculated out 340 Processing Gains for a specific channel, use the percentile average function of Microsoft Excel to figure out the final result.

   Example: see the first row of 11Mb/s @ Channel 6
   Frequency—Jammer frequency = fo-8.5 =2437-8.5 = 2428.50 MHz;
   (S/N)o—16.4 dB @11 Mb/s (see Item 1);
   Lsys—2.0 dB (see Item 1);
   PER— 8.0%, which is the failure criteria;
   Jammer— -57.2dBm, which is the Jammer level @ PER=8.0%;
   Mj—Jamming Margin. 5.5 (dB) = -57.2 (dBm) – (-62.7) (dBm) (see Item 3). On here, also see the next page of spread sheet, which shows that XMIT level = -62.7 dBm);
   Gp—Processing Gain = (S/N)o + Mj + Lsys = 16.4 + 5.5 + 2.0 = 23.9 (dB).

After having calculated out 340 Gps, use the percentile function of Microsoft Excel, the final Gp of 11Mb/s @ Ch 6 is 12.9 dB. At the same time, incorporate those 340 data into f—Gp chart, you'll get a whole picture of it.

Chip/symbol rate, the symbol/bit rate and the Chip/bit

Bit rate	Chip/symbol rate	Bit/symbol rate	Chip/bit rate	Gp (dB)	Spec (dB)
1 Mbit/sec	11	1, DBPSK	11	13.2	10
2 Mbit/sec	11	2, DQPSK	5.5	12.6	10
5.5 Mbit/sec	8	4, CCK	2	13.4	10
11 Mbit/sec	8	8, CCK	1	12.9	10

Note: 1. Gp is Processing Gain;
2. Spec is Processing Gain specifications defined by FCC on DSSS systems.

Processing Gain

11Mbps CHANNEL 6 Processing Gain						
Gp = (S/N)o + Mj + Lsys						
Freq.	Gp	(S/N)o	Mj=J/S	Lsys	Jammer	PER
(MHz)	(dB)	(dB)	(dB)	(dB)	(dBm)	(%)
2428.50	23.9	16.4	5.5	2.0	-57.2	<=8.0
2428.55	23.9	16.4	5.5	2.0	-57.2	<=8.0
2428.60	23.9	16.4	5.5	2.0	-57.2	<=8.0
2428.65	23.8	16.4	5.4	2.0	-57.3	<=8.0
2428.70	23.8	16.4	5.4	2.0	-57.3	<=8.0
2428.75	24.0	16.4	5.6	2.0	-57.1	<=8.0
2428.80	24.1	16.4	5.7	2.0	-57.0	<=8.0
2428.85	24.1	16.4	5.7	2.0	-57.0	<=8.0
2428.90	24.2	16.4	5.8	2.0	-56.9	<=8.0
2428.95	24.1	16.4	5.7	2.0	-57.0	<=8.0
2429.00	24.4	16.4	6.0	2.0	-56.7	<=8.0
2429.05	24.3	16.4	5.9	2.0	-56.8	<=8.0
2429.10	24.3	16.4	5.9	2.0	-56.8	<=8.0
2429.15	24.3	16.4	5.9	2.0	-56.8	<=8.0
2429.20	24.4	16.4	6.0	2.0	-56.7	<=8.0
2429.25	23.7	16.4	5.3	2.0	-57.4	<=8.0
2429.30	23.3	16.4	4.9	2.0	-57.8	<=8.0
2429.35	23.2	16.4	4.8	2.0	-57.9	<=8.0
2429.40	22.2	16.4	3.8	2.0	-58.9	<=8.0
2429.45	21.3	16.4	2.9	2.0	-59.8	<=8.0
2429.50	21.2	16.4	2.8	2.0	-59.9	<=8.0
2429.55	21.1	16.4	2.7	2.0	-60.0	<=8.0
2429.60	21.1	16.4	2.7	2.0	-60.0	<=8.0
2429.65	21.0	16.4	2.6	2.0	-60.1	<=8.0
2429.70	21.0	16.4	2.6	2.0	-60.1	<=8.0
2429.75	20.8	16.4	2.4	2.0	-60.3	<=8.0
2429.80	20.7	16.4	2.3	2.0	-60.4	<=8.0
2429.85	21.1	16.4	2.7	2.0	-60.0	<=8.0
2429.90	21.0	16.4	2.6	2.0	-60.1	<=8.0
2429.95	21.1	16.4	2.7	2.0	-60.0	<=8.0
2430.00	20.9	16.4	2.5	2.0	-60.2	<=8.0
2430.05	20.9	16.4	2.5	2.0	-60.2	<=8.0
2430.10	20.5	16.4	2.1	2.0	-60.6	<=8.0
2430.15	19.5	16.4	1.1	2.0	-61.6	<=8.0
2430.20	19.5	16.4	1.1	2.0	-61.6	<=8.0
2430.25	19.0	16.4	0.6	2.0	-62.1	<=8.0
2430.30	19.0	16.4	0.6	2.0	-62.1	<=8.0
2430.35	18.7	16.4	0.3	2.0	-62.4	<=8.0
2430.40	18.7	16.4	0.3	2.0	-62.4	<=8.0
2430.45	18.5	16.4	0.1	2.0	-62.6	<=8.0
2430.50	18.4	16.4	0.0	2.0	-62.7	<=8.0
2430.55	18.4	16.4	0.0	2.0	-62.7	<=8.0
2430.60	18.4	16.4	0.0	2.0	-62.7	<=8.0
2430.65	18.1	16.4	-0.3	2.0	-63.0	<=8.0
2430.70	17.9	16.4	-0.5	2.0	-63.2	<=8.0
2430.75	17.4	16.4	-1.0	2.0	-63.7	<=8.0
2430.80	17.4	16.4	-1.0	2.0	-63.7	<=8.0
2430.85	17.1	16.4	-1.3	2.0	-64.0	<=8.0
2430.90	17.1	16.4	-1.3	2.0	-64.0	<=8.0

Processing Gain

11Mbps CHANNEL 6 Processing Gain						
Gp = (S/N)o + Mj + Lsys						
Freq.	Gp	(S/N)o	Mj=J/S	Lsys	Jammer	PER
(MHz)	(dB)	(dB)	(dB)	(dB)	(dBm)	(%)
2430.95	16.9	16.4	-1.5	2.0	-64.2	<=8.0
2431.00	16.8	16.4	-1.6	2.0	-64.3	<=8.0
2431.05	16.7	16.4	-1.7	2.0	-64.4	<=8.0
2431.10	16.7	16.4	-1.7	2.0	-64.4	<=8.0
2431.15	16.3	16.4	-2.1	2.0	-64.8	<=8.0
2431.20	16.5	16.4	-1.9	2.0	-64.6	<=8.0
2431.25	16.4	16.4	-2.0	2.0	-64.7	<=8.0
2431.30	16.3	16.4	-2.1	2.0	-64.8	<=8.0
2431.35	16.3	16.4	-2.1	2.0	-64.8	<=8.0
2431.40	15.8	16.4	-2.6	2.0	-65.3	<=8.0
2431.45	15.9	16.4	-2.5	2.0	-65.2	<=8.0
2431.50	15.7	16.4	-2.7	2.0	-65.4	<=8.0
2431.55	15.5	16.4	-2.9	2.0	-65.6	<=8.0
2431.60	15.4	16.4	-3.0	2.0	-65.7	<=8.0
2431.65	15.2	16.4	-3.2	2.0	-65.9	<=8.0
2431.70	15.1	16.4	-3.3	2.0	-66.0	<=8.0
2431.75	15.0	16.4	-3.4	2.0	-66.1	<=8.0
2431.80	15.0	16.4	-3.4	2.0	-66.1	<=8.0
2431.85	14.9	16.4	-3.5	2.0	-66.2	<=8.0
2431.90	15.0	16.4	-3.4	2.0	-66.1	<=8.0
2431.95	15.1	16.4	-3.3	2.0	-66.0	<=8.0
2432.00	15.1	16.4	-3.3	2.0	-66.0	<=8.0
2432.05	15.1	16.4	-3.3	2.0	-66.0	<=8.0
2432.10	15.0	16.4	-3.4	2.0	-66.1	<=8.0
2432.15	14.8	16.4	-3.6	2.0	-66.3	<=8.0
2432.20	14.9	16.4	-3.5	2.0	-66.2	<=8.0
2432.25	14.9	16.4	-3.5	2.0	-66.2	<=8.0
2432.30	14.8	16.4	-3.6	2.0	-66.3	<=8.0
2432.35	14.6	16.4	-3.8	2.0	-66.5	<=8.0
2432.40	14.3	16.4	-4.1	2.0	-66.8	<=8.0
2432.45	14.5	16.4	-3.9	2.0	-66.6	<=8.0
2432.50	14.6	16.4	-3.8	2.0	-66.5	<=8.0
2432.55	14.5	16.4	-3.9	2.0	-66.6	<=8.0
2432.60	14.3	16.4	-4.1	2.0	-66.8	<=8.0
2432.65	14.3	16.4	-4.1	2.0	-66.8	<=8.0
2432.70	14.2	16.4	-4.2	2.0	-66.9	<=8.0
2432.75	14.1	16.4	-4.3	2.0	-67.0	<=8.0
2432.80	14.1	16.4	-4.3	2.0	-67.0	<=8.0
2432.85	13.8	16.4	-4.6	2.0	-67.3	<=8.0
2432.90	13.5	16.4	-4.9	2.0	-67.6	<=8.0
2432.95	13.7	16.4	-4.7	2.0	-67.4	<=8.0
2433.00	13.6	16.4	-4.8	2.0	-67.5	<=8.0
2433.05	13.5	16.4	-4.9	2.0	-67.6	<=8.0
2433.10	13.5	16.4	-4.9	2.0	-67.6	<=8.0
2433.15	13.5	16.4	-4.9	2.0	-67.6	<=8.0
2433.20	13.6	16.4	-4.8	2.0	-67.5	<=8.0
2433.25	13.7	16.4	-4.7	2.0	-67.4	<=8.0
2433.30	13.7	16.4	-4.7	2.0	-67.4	<=8.0
2433.35	13.6	16.4	-4.8	2.0	-67.5	<=8.0

Processing Gain

11Mbps CHANNEL 6 Processing Gain						
Gp = (S/N)o + Mj + Lsys						
Freq.	Gp	(S/N)o	Mj=J/S	Lsys	Jammer	PER
(MHz)	(dB)	(dB)	(dB)	(dB)	(dBm)	(%)
2433.40	13.5	16.4	-4.9	2.0	-67.6	<=8.0
2433.45	13.4	16.4	-5.0	2.0	-67.7	<=8.0
2433.50	13.4	16.4	-5.0	2.0	-67.7	<=8.0
2433.55	13.4	16.4	-5.0	2.0	-67.7	<=8.0
2433.60	13.4	16.4	-5.0	2.0	-67.7	<=8.0
2433.65	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2433.70	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2433.75	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2433.80	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2433.85	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2433.90	12.7	16.4	-5.7	2.0	-68.4	<=8.0
2433.95	13.4	16.4	-5.0	2.0	-67.7	<=8.0
2434.00	13.4	16.4	-5.0	2.0	-67.7	<=8.0
2434.05	13.4	16.4	-5.0	2.0	-67.7	<=8.0
2434.10	13.3	16.4	-5.1	2.0	-67.8	<=8.0
2434.15	13.2	16.4	-5.2	2.0	-67.9	<=8.0
2434.20	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2434.25	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2434.30	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2434.35	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2434.40	12.6	16.4	-5.8	2.0	-68.5	<=8.0
2434.45	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2434.50	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2434.55	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2434.60	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2434.65	12.7	16.4	-5.7	2.0	-68.4	<=8.0
2434.70	12.7	16.4	-5.7	2.0	-68.4	<=8.0
2434.75	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2434.80	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2434.85	12.3	16.4	-6.1	2.0	-68.8	<=8.0
2434.90	12.1	16.4	-6.3	2.0	-69.0	<=8.0
2434.95	12.4	16.4	-6.0	2.0	-68.7	<=8.0
2435.00	12.4	16.4	-6.0	2.0	-68.7	<=8.0
2435.05	12.4	16.4	-6.0	2.0	-68.7	<=8.0
2435.10	12.6	16.4	-5.8	2.0	-68.5	<=8.0
2435.15	12.5	16.4	-5.9	2.0	-68.6	<=8.0
2435.20	12.7	16.4	-5.7	2.0	-68.4	<=8.0
2435.25	12.7	16.4	-5.7	2.0	-68.4	<=8.0
2435.30	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2435.35	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2435.40	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2435.45	12.6	16.4	-5.8	2.0	-68.5	<=8.0
2435.50	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2435.55	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2435.60	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2435.65	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2435.70	12.4	16.4	-6.0	2.0	-68.7	<=8.0
2435.75	12.5	16.4	-5.9	2.0	-68.6	<=8.0
2435.80	12.5	16.4	-5.9	2.0	-68.6	<=8.0

Processing Gain

11Mbps CHANNEL 6 Processing Gain						
Gp = (S/N)o + Mj + Lsys						
Freq.	Gp	(S/N)o	Mj=J/S	Lsys	Jammer	PER
(MHz)	(dB)	(dB)	(dB)	(dB)	(dBm)	(%)
2435.85	12.5	16.4	-5.9	2.0	-68.6	<=8.0
2435.90	12.6	16.4	-5.8	2.0	-68.5	<=8.0
2435.95	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2436.00	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2436.05	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2436.10	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2436.15	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2436.20	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2436.25	13.2	16.4	-5.2	2.0	-67.9	<=8.0
2436.30	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2436.35	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2436.40	12.4	16.4	-6.0	2.0	-68.7	<=8.0
2436.45	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2436.50	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2436.55	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2436.60	12.5	16.4	-5.9	2.0	-68.6	<=8.0
2436.65	12.6	16.4	-5.8	2.0	-68.5	<=8.0
2436.70	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2436.75	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2436.80	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2436.85	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2436.90	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2436.95	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2437.00	12.7	16.4	-5.7	2.0	-68.4	<=8.0
2437.05	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2437.10	12.7	16.4	-5.7	2.0	-68.4	<=8.0
2437.15	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2437.20	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2437.25	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2437.30	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2437.35	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2437.40	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2437.45	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2437.50	13.3	16.4	-5.1	2.0	-67.8	<=8.0
2437.55	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2437.60	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2437.65	12.6	16.4	-5.8	2.0	-68.5	<=8.0
2437.70	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2437.75	12.6	16.4	-5.8	2.0	-68.5	<=8.0
2437.80	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2437.85	12.6	16.4	-5.8	2.0	-68.5	<=8.0
2437.90	12.2	16.4	-6.2	2.0	-68.9	<=8.0
2437.95	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2438.00	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2438.05	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2438.10	13.2	16.4	-5.2	2.0	-67.9	<=8.0
2438.15	13.3	16.4	-5.1	2.0	-67.8	<=8.0
2438.20	13.2	16.4	-5.2	2.0	-67.9	<=8.0
2438.25	13.0	16.4	-5.4	2.0	-68.1	<=8.0

Processing Gain

11Mbps CHANNEL 6 Processing Gain						
Gp = (S/N)o + Mj + Lsys						
Freq.	Gp	(S/N)o	Mj=J/S	Lsys	Jammer	PER
(MHz)	(dB)	(dB)	(dB)	(dB)	(dBm)	(%)
2438.30	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2438.35	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2438.40	12.5	16.4	-5.9	2.0	-68.6	<=8.0
2438.45	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2438.50	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2438.55	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2438.60	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2438.65	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2438.70	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2438.75	13.1	16.4	-5.3	2.0	-68.0	<=8.0
2438.80	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2438.85	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2438.90	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2438.95	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2439.00	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2439.05	12.7	16.4	-5.7	2.0	-68.4	<=8.0
2439.10	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2439.15	12.7	16.4	-5.7	2.0	-68.4	<=8.0
2439.20	12.7	16.4	-5.7	2.0	-68.4	<=8.0
2439.25	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2439.30	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2439.35	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2439.40	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2439.45	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2439.50	13.0	16.4	-5.4	2.0	-68.1	<=8.0
2439.55	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2439.60	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2439.65	12.5	16.4	-5.9	2.0	-68.6	<=8.0
2439.70	12.5	16.4	-5.9	2.0	-68.6	<=8.0
2439.75	12.4	16.4	-6.0	2.0	-68.7	<=8.0
2439.80	12.6	16.4	-5.8	2.0	-68.5	<=8.0
2439.85	12.3	16.4	-6.1	2.0	-68.8	<=8.0
2439.90	12.6	16.4	-5.8	2.0	-68.5	<=8.0
2439.95	12.5	16.4	-5.9	2.0	-68.6	<=8.0
2440.00	12.5	16.4	-5.9	2.0	-68.6	<=8.0
2440.05	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2440.10	13.2	16.4	-5.2	2.0	-67.9	<=8.0
2440.15	13.2	16.4	-5.2	2.0	-67.9	<=8.0
2440.20	13.3	16.4	-5.1	2.0	-67.8	<=8.0
2440.25	13.5	16.4	-4.9	2.0	-67.6	<=8.0
2440.30	13.6	16.4	-4.8	2.0	-67.5	<=8.0
2440.35	13.2	16.4	-5.2	2.0	-67.9	<=8.0
2440.40	12.8	16.4	-5.6	2.0	-68.3	<=8.0
2440.45	13.3	16.4	-5.1	2.0	-67.8	<=8.0
2440.50	13.5	16.4	-4.9	2.0	-67.6	<=8.0
2440.55	13.3	16.4	-5.1	2.0	-67.8	<=8.0
2440.60	12.5	16.4	-5.9	2.0	-68.6	<=8.0
2440.65	12.5	16.4	-5.9	2.0	-68.6	<=8.0
2440.70	13.7	16.4	-4.7	2.0	-67.4	<=8.0

Processing Gain

11Mbps CHANNEL 6 Processing Gain						
Gp = (S/N)o + Mj + Lsys						
Freq.	Gp	(S/N)o	Mj=J/S	Lsys	Jammer	PER
(MHz)	(dB)	(dB)	(dB)	(dB)	(dBm)	(%)
2440.75	13.7	16.4	-4.7	2.0	-67.4	<=8.0
2440.80	13.8	16.4	-4.6	2.0	-67.3	<=8.0
2440.85	12.9	16.4	-5.5	2.0	-68.2	<=8.0
2440.90	13.8	16.4	-4.6	2.0	-67.3	<=8.0
2440.95	14.0	16.4	-4.4	2.0	-67.1	<=8.0
2441.00	14.1	16.4	-4.3	2.0	-67.0	<=8.0
2441.05	13.9	16.4	-4.5	2.0	-67.2	<=8.0
2441.10	13.9	16.4	-4.5	2.0	-67.2	<=8.0
2441.15	13.8	16.4	-4.6	2.0	-67.3	<=8.0
2441.20	14.1	16.4	-4.3	2.0	-67.0	<=8.0
2441.25	14.1	16.4	-4.3	2.0	-67.0	<=8.0
2441.30	14.0	16.4	-4.4	2.0	-67.1	<=8.0
2441.35	14.4	16.4	-4.0	2.0	-66.7	<=8.0
2441.40	14.4	16.4	-4.0	2.0	-66.7	<=8.0
2441.45	14.3	16.4	-4.1	2.0	-66.8	<=8.0
2441.50	14.5	16.4	-3.9	2.0	-66.6	<=8.0
2441.55	14.6	16.4	-3.8	2.0	-66.5	<=8.0
2441.60	14.7	16.4	-3.7	2.0	-66.4	<=8.0
2441.65	14.6	16.4	-3.8	2.0	-66.5	<=8.0
2441.70	14.6	16.4	-3.8	2.0	-66.5	<=8.0
2441.75	14.5	16.4	-3.9	2.0	-66.6	<=8.0
2441.80	14.4	16.4	-4.0	2.0	-66.7	<=8.0
2441.85	14.3	16.4	-4.1	2.0	-66.8	<=8.0
2441.90	14.3	16.4	-4.1	2.0	-66.8	<=8.0
2441.95	14.5	16.4	-3.9	2.0	-66.6	<=8.0
2442.00	14.7	16.4	-3.7	2.0	-66.4	<=8.0
2442.05	14.9	16.4	-3.5	2.0	-66.2	<=8.0
2442.10	15.0	16.4	-3.4	2.0	-66.1	<=8.0
2442.15	15.1	16.4	-3.3	2.0	-66.0	<=8.0
2442.20	15.2	16.4	-3.2	2.0	-65.9	<=8.0
2442.25	15.5	16.4	-2.9	2.0	-65.6	<=8.0
2442.30	15.7	16.4	-2.7	2.0	-65.4	<=8.0
2442.35	15.7	16.4	-2.7	2.0	-65.4	<=8.0
2442.40	15.5	16.4	-2.9	2.0	-65.6	<=8.0
2442.45	15.9	16.4	-2.5	2.0	-65.2	<=8.0
2442.50	15.9	16.4	-2.5	2.0	-65.2	<=8.0
2442.55	16.0	16.4	-2.4	2.0	-65.1	<=8.0
2442.60	16.1	16.4	-2.3	2.0	-65.0	<=8.0
2442.65	16.1	16.4	-2.3	2.0	-65.0	<=8.0
2442.70	16.1	16.4	-2.3	2.0	-65.0	<=8.0
2442.75	16.2	16.4	-2.2	2.0	-64.9	<=8.0
2442.80	16.3	16.4	-2.1	2.0	-64.8	<=8.0
2442.85	16.4	16.4	-2.0	2.0	-64.7	<=8.0
2442.90	16.7	16.4	-1.7	2.0	-64.4	<=8.0
2442.95	16.9	16.4	-1.5	2.0	-64.2	<=8.0
2443.00	17.0	16.4	-1.4	2.0	-64.1	<=8.0
2443.05	17.1	16.4	-1.3	2.0	-64.0	<=8.0
2443.10	17.2	16.4	-1.2	2.0	-63.9	<=8.0
2443.15	17.2	16.4	-1.2	2.0	-63.9	<=8.0

Processing Gain

11Mbps CHANNEL 6 Processing Gain						
Gp = (S/N)o + Mj + Lsys						
Freq.	Gp	(S/N)o	Mj=J/S	Lsys	Jammer	PER
(MHz)	(dB)	(dB)	(dB)	(dB)	(dBm)	(%)
2443.20	17.4	16.4	-1.0	2.0	-63.7	<=8.0
2443.25	17.6	16.4	-0.8	2.0	-63.5	<=8.0
2443.30	17.7	16.4	-0.7	2.0	-63.4	<=8.0
2443.35	17.7	16.4	-0.7	2.0	-63.4	<=8.0
2443.40	17.7	16.4	-0.7	2.0	-63.4	<=8.0
2443.45	18.0	16.4	-0.4	2.0	-63.1	<=8.0
2443.50	18.3	16.4	-0.1	2.0	-62.8	<=8.0
2443.55	18.6	16.4	0.2	2.0	-62.5	<=8.0
2443.60	18.6	16.4	0.2	2.0	-62.5	<=8.0
2443.65	18.9	16.4	0.5	2.0	-62.2	<=8.0
2443.70	19.0	16.4	0.6	2.0	-62.1	<=8.0
2443.75	19.1	16.4	0.7	2.0	-62.0	<=8.0
2443.80	19.2	16.4	0.8	2.0	-61.9	<=8.0
2443.85	19.2	16.4	0.8	2.0	-61.9	<=8.0
2443.90	19.4	16.4	1.0	2.0	-61.7	<=8.0
2443.95	19.7	16.4	1.3	2.0	-61.4	<=8.0
2444.00	19.8	16.4	1.4	2.0	-61.3	<=8.0
2444.05	20.1	16.4	1.7	2.0	-61.0	<=8.0
2444.10	20.5	16.4	2.1	2.0	-60.6	<=8.0
2444.15	20.8	16.4	2.4	2.0	-60.3	<=8.0
2444.20	21.1	16.4	2.7	2.0	-60.0	<=8.0
2444.25	21.6	16.4	3.2	2.0	-59.5	<=8.0
2444.30	21.7	16.4	3.3	2.0	-59.4	<=8.0
2444.35	21.8	16.4	3.4	2.0	-59.3	<=8.0
2444.40	21.9	16.4	3.5	2.0	-59.2	<=8.0
2444.45	21.9	16.4	3.5	2.0	-59.2	<=8.0
2444.50	22.0	16.4	3.6	2.0	-59.1	<=8.0
2444.55	23.3	16.4	4.9	2.0	-57.8	<=8.0
2444.60	23.4	16.4	5.0	2.0	-57.7	<=8.0
2444.65	23.6	16.4	5.2	2.0	-57.5	<=8.0
2444.70	24.0	16.4	5.6	2.0	-57.1	<=8.0
2444.75	24.0	16.4	5.6	2.0	-57.1	<=8.0
2444.80	23.9	16.4	5.5	2.0	-57.2	<=8.0
2444.85	23.9	16.4	5.5	2.0	-57.2	<=8.0
2444.90	23.8	16.4	5.4	2.0	-57.3	<=8.0
2444.95	25.0	16.4	6.6	2.0	-56.1	<=8.0
2445.00	25.2	16.4	6.8	2.0	-55.9	<=8.0
2445.05	25.3	16.4	6.9	2.0	-55.8	<=8.0
2445.10	25.4	16.4	7.0	2.0	-55.7	<=8.0
2445.15	25.6	16.4	7.2	2.0	-55.5	<=8.0
2445.20	25.8	16.4	7.4	2.0	-55.3	<=8.0
2445.25	25.9	16.4	7.5	2.0	-55.2	<=8.0
2445.30	26.3	16.4	7.9	2.0	-54.8	<=8.0
2445.35	26.5	16.4	8.1	2.0	-54.6	<=8.0
2445.40	26.6	16.4	8.2	2.0	-54.5	<=8.0
2445.45	26.5	16.4	8.1	2.0	-54.6	<=8.0
2445.50	26.3	16.4	7.9	2.0	-54.8	<=8.0

Processing Gain

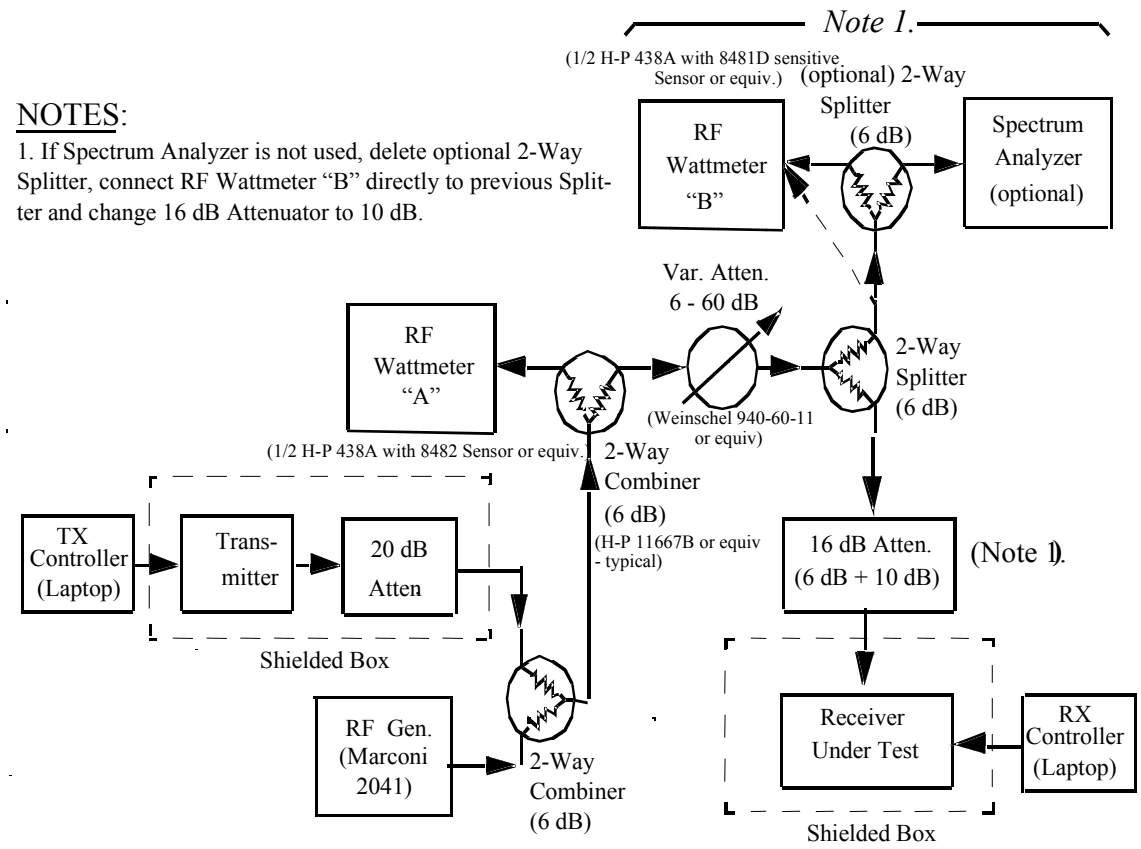
11Mbps CHANNEL 6 Processing Gain						
Gp = (S/N)o + Mj + Lsys						
Freq.	Gp	(S/N)o	Mj=J/S	Lsys	Jammer	PER
(MHz)	(dB)	(dB)	(dB)	(dB)	(dBm)	(%)
						12.9

Test Conditions

TX Card **HWB3163-04 Rev B**
S/N **99360038**
RX Card **ISL37400M Rev A**
S/N **00500038**
TX Firmware **P10002C0, MS11168A3**
RX Firmware **ID010000, PK010001, SF010000**
Software Ver. **3.0.24**
Mode **11 MB Pseudo IBSS**
Pkt Size **1024**
Pkt Dly **1**
Pkt Burst **6**

Intersil Chips on Card: **ISL3984**
ISL3685
HFA3783
ISL3183
ISL3874

Test Set-up - Processing Gain



NOTES:

1. If Spectrum Analyzer is not used, delete optional 2-Way Splitter, connect RF Wattmeter "B" directly to previous Splitter and change 16 dB Attenuator to 10 dB.