MEASUREMENT REPORT
of
WIRELESS LAN ACCESS POINT

Applicant : Toko Inc.
Model No. : TMW1003
EUT : Wireless LAN Access Point
FCC ID : NUSTMW1003
Report No. : T6815899

Tested by :

Training Research Co., Ltd.

TEL : 886-2-26935155 FAX : 886-2-26934440
2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan, R.O.C.

CERTIFICATION

We here by verify that:

The test data, data evaluation, test procedures and equipment configurations shown in this report were made mainly in accordance with the procedures given in ANSI C63.4 (1992) as a reference. All test were conducted by ***Training Research Co., Ltd.***, 2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan, R.O.C. Also, we attest to the accuracy of each.

We further submit that the energy emitted by the sample EUT tested as described in the report is **in compliance with** the technical requirements set forth in the FCC Rules Part 15 Subpart C Section 15.247.

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Test Date : December 18, 2001

Prepared by: Jack Tsai *Jack Tsai*

Approved by: Frank Tsai *Frank Tsai*

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Ⅰ. GENERAL

1.1 Introduction

The following measurement report is submitted on behalf of Applicant in support of a wireless access point certification in accordance with Part 2 Subpart J and Part 15 Subpart A and C of the Commission's Rules and Regulations.

1.2 Description of EUT

EUT	**:**	Wireless LAN Access Point
Model No.	**:**	TMW1003
Granted FCC ID	**:**	NUSTMW1003
Frequency Range	**:**	2.412 GHz ~ 2.462GHz
Support Channel	**:**	11 Channel
Modulation Skill	**:**	DBPSK, DQPSK, CCK
Power Cable	**:**	Non-shielded, 178cm long, No ferrite core
Data Cable	**:**	RJ45: Non-shielded, 10-meter, No ferrite bead
Power Type	**:**	AC to DC Switching Adapter
		Input: 100 ~ 120Vac, 50/60Hz, 1A
		Output: +5.5Vdc, 1.2A
Applicant	**:**	Toko Inc.

1.3 Description of Support Equipment

In order to construct the minimum testing, following equipment were used as the supporting units.

Notebook	**:**	**IBM Think Pad X20**
Model No.	:	2662-11T
Serial No.	:	FX-1192200/09
FCC ID	:	N/A, DoC Approved
檢磁	:	3892B565

Adaptor	**:**	**IBM**
Model No.	:	PA2450U
Serial No.	:	02K6654
FCC ID	:	N/A, DoC Approved
Power type	:	I/P: 100 ~ 240vac, 50 ~ 60 Hz, 0.5A ~ 1.2A O/P: 16Vdc, 4.5A
Power cord	:	Non-shielded, 1.80m long, Plastic, with ferrite core

HUB	**:**	**Cameo Communications, Inc.**
Model No.	:	SOHO-SW16A
Serial No.	:	N/A
Power Type	:	Switch
FCC ID	:	N/A, DoC Approved
Power cord	:	Non-shielded, 1.95m long, Plastic, No ferrite core

USB Ethernet LAN:		**Netgear**
Model No.	:	FA101
Serial No.	:	N/A
FCC ID	:	N/A, DoC Approved

1.4 Configuration of System Under Test

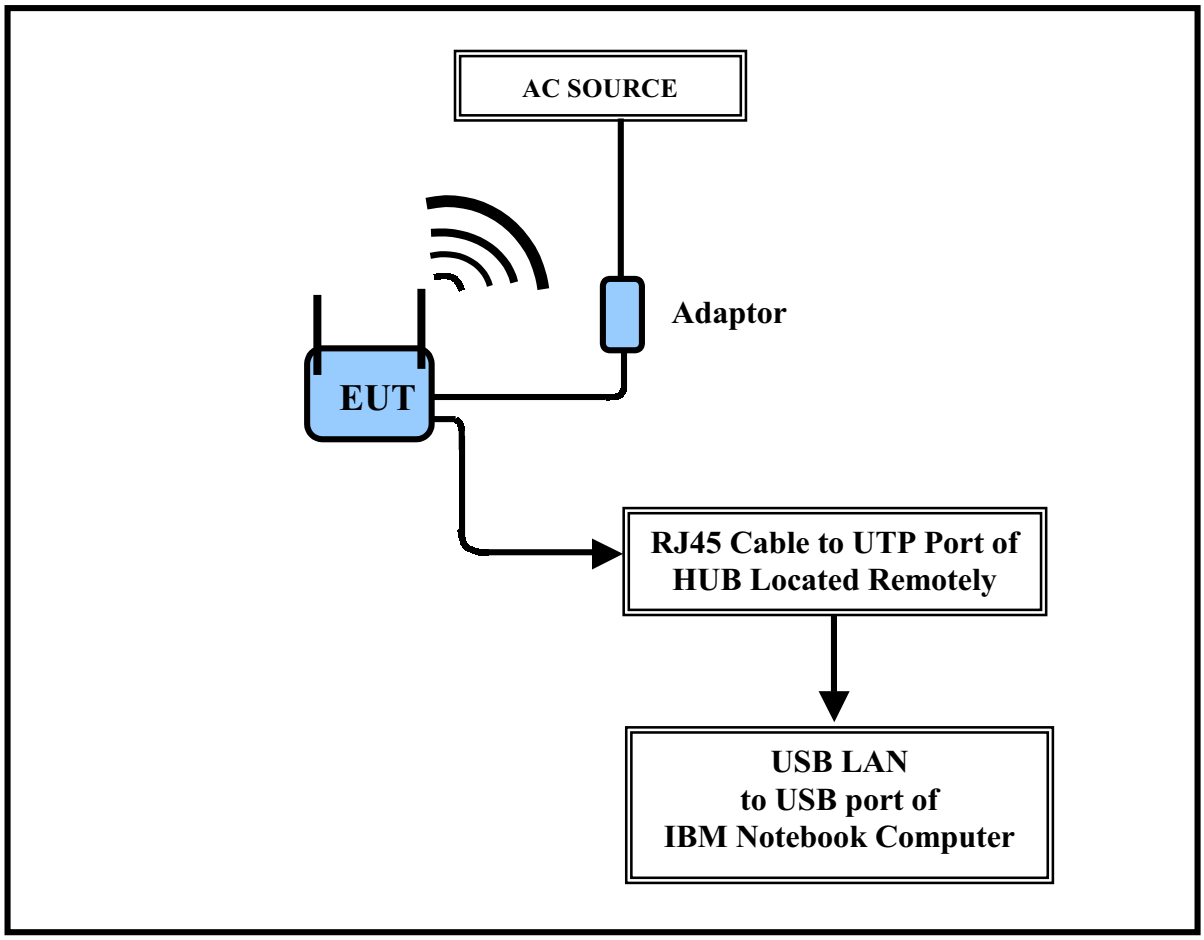


Fig. 1 Configuration of system under test

The tests below are performed with the EUT transmitter set at high power in TDD mode. A USB LAN from a USB port of notebook computer to the Ethernet hub, then the UTP port of hub is connected to UTP port of EUT by RJ45 cable. The EUT is needed to force on selecting of output power level and channel number by notebook computer.

The setting up procedure was recorded in Appendix A.

1.5 Verify the Frequency and Channel

Channel	Frequency (GHz)
1	2.412
2	2.417
3	2.422
4	2.427
5	2.432
6	2.437
7	2.442
8	2.447
9	2.452
10	2.457
11	2.462

Note:
1.This is a verification that all frequencies are in 2.412GHz to 2.462GHz.

2.Section 15.31(m): Measurements on intentional radiators or receivers shall be performed at three frequencies for operating frequency range over 10 MHz.
(The selection of these frequencies one at the top, one at the middle and one at the bottom.)

After the verification, the EUT operating frequencies are in 2.412GHz to 2.462GHz. So all the items as followed in testing report are needed to test these three frequencies:
(Top: Channel – 1; Middle: Channel – 6; Bottom: Channel – 11.)

1.6 Test Procedure

All the measurements included in this report were performed mainly according to the techniques described in ANSI C63.4 (1992). The setup procedure is written on the Appendix A, and the detailed setup of each test is written on the corresponding chapter.

1.7 Location of the Test Site

The *radiated emissions* measurements required by the rules were performed on a **three-meter**, **Anechoic Chamber (Registration Number: 93906)** maintained by *Training Research Co., Ltd.* 1F, No. 2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan, R.O.C. Complete description and measurement data have been placed on file with the commission. The *conducted power line emissions* tests and other test items were performed in an anechoic chamber also located at Training Research Co., Ltd.

No. 2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan, R.O.C. *Training Research Co., Ltd.* is listed by the FCC as a facility available to do measurement work for others on a contract basis.

1.8 General Test Condition

The conditions of test vary among different test being performed and the modes of the EUT were varied to determine its emission characteristics in the pretest. The final configurations of the test system and the modes of operation were chosen at which producing the highest emission levels. However, beside those conditions, which the EUT was demonstrated likely to encounter in normal use.

In test, the EUT is set to be in high power and continuously transmitting mode that controlled by notebook computer. The ch01, ch06 and ch11 were all tested. The setting up procedure shows on Appendix A.

II. Section 15.203: Antenna requirement

The EUT equipped with *2 Internal diversity dipole antennas* and 1 RF connector for *optional external antenna (The connector is unique and no antenna other than that furnished by the responsible party shall be used with the connector, the antenna isn't develop by applicant). T*he external antenna is designed exclusively for the EUT and cannot remove it freely without any tools from outside. This complies with the Antenna requirement stated in Sect.15.203.

III. Section 15.207: Power Line Conducted Emissions for AC Powered Units

3.1 Test Condition & Setup

The power line conducted emission measurements were performed in an anechoic chamber. The EUT was assembled on a wooden table, which is 80 centimeters high, was placed 40 centimeters from the back wall and at least 1 meter from the sidewall.

Power was fed to the EUT from the public utility power grid through a line filter and Line Impedance Stabilization Networks (LISNs). The LISN housing, measuring instrumentation case, ground plane, etc., were electrically bonded together at the same RF potential. The Spectrum analyzer (or EMI receiver) was connected to the AC line through an isolation transformer. The 50-ohm output of the LISN was connected to the spectrum analyzer directly. Conducted emission levels were in the CISPER quasi-peak detection mode. The analyzer's 6dB bandwidth was set to 9 KHz. No post-detector video filter was used.

The spectrum was scanned from 450 KHz to 30 MHz. The physical arrangement of the test system and associated cabling was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude and frequency. All spurious emission frequencies were observed. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in paragraph 2.4.

There is a test condition apply in this test item, the test procedure description as the following:

1.EUT transmit only:
Using LAN port of notebook computer and software to control the EUT through. Then making access to the mode of continuous transmission and set testing channel and internal antenna kit. Three channels were tested, one in the top (CH01), one in the middle (CH06) and the other in bottom (CH11).

2.Idle state (Rx mode)
The setting up procedure is recorded on Appendix A.

3.2 List of Test Instruments

Instrument	Model No.	Brand	Serial No.	Last Cali.	Due on
EMI Receiver	8546A	H P	3520A00242	06/29/01	06/29/02
RF Filter Section	85460A	H P	3448A00217	06/29/01	06/29/02
LISN (EUT)	LISN-01	TRC	9912-03,04	12/09/00	12/09/01
LISN (Support E.)	LISN-01	TRC	9912-05	01/04/01	01/04/02
Switch/Control Unit (< 30MHz)	3488A	HP	N/A	11/20/00	11/20/01
Auto Switch Box (< 30MHz)	ASB-01	TRC	9904-01	11/20/00	11/20/01

3.3 Test Configuration

Conducted Emissions Test Placement

3.4 Test Result of Conducted Emissions

EUT station transmit only

The following table shows a summary of the highest emissions of power line conducted emissions on the LINE and NEUTRAL conductors of the EUT power cord.

Table 1 Power Line Conducted Emissions (Channel 1, Transmitter Mode)

Power Connected Emissions				*FCC Class B*	
Conductor	*Frequency (kHz)*	*Peak Amplitude (dB μV)*	*QP Amplitude (dB μV)*	*Limit (dB μV)*	*Margin (dB)*
Line 1	545.00	44.95	---	48.00	-3.05
	620.00	44.76	---	48.00	-3.24
	845.00	43.08	---	48.00	-4.92
	922.00	46.60	---	48.00	-1.40
	997.00	46.69	---	48.00	-1.31
	1084.00	43.33	---	48.00	-4.67
	1224.00	42.66	---	48.00	-5.34
	1307.00	44.92	---	48.00	-3.08
	1390.00	44.66	---	48.00	-3.34
	1691.00	45.41	---	48.00	-2.59
Line 2	608.00	44.27	---	48.00	-3.73
	697.00	44.09	---	48.00	-3.91
	845.00	43.51	---	48.00	-4.49
	922.00	47.04	---	48.00	-0.96
	997.00	47.25	---	48.00	-0.75
	1307.00	46.23	---	48.00	-1.77
	1382.00	46.63	---	48.00	-1.37
	1602.00	44.96	---	48.00	-3.04
	1691.00	47.17	---	48.00	-0.83
	1769.00	46.77	---	48.00	-1.23

NOTE:

1. Margin = Peak Amplitude - Limit
2. A "+" sign in the margin column means the emission is OVER the Class B Limit and "–" sign of means UNDER the Class B limit

Table 2 Power Line Conducted Emissions (Channel 6, Transmitter Mode)

Power Connected Emissions				FCC Class B	
Conductor	*Frequency (kHz)*	*Peak Amplitude (dB μV)*	*QP Amplitude (dB μV)*	*Limit (dB μV)*	*Margin (dB)*
Line 1	538.00	44.13	---	48.00	-3.87
	620.00	45.13	---	48.00	-2.87
	839.00	42.78	---	48.00	-5.22
	916.00	46.60	---	48.00	-1.40
	997.00	46.28	---	48.00	-1.72
	1299.00	45.03	---	48.00	-2.97
	1374.00	44.87	---	48.00	-3.13
	1680.00	45.34	---	48.00	-2.66
	1758.00	44.19	---	48.00	-3.81
	2830.00	42.71	---	48.00	-5.29
Line 2	542.00	43.96	---	48.00	-4.04
	615.00	44.66	---	48.00	-3.34
	916.00	46.55	---	48.00	-1.45
	984.00	46.71	---	48.00	-1.29
	1224.00	44.01	---	48.00	-3.99
	1299.00	46.26	---	48.00	-1.74
	1365.00	45.86	---	48.00	-2.14
	1612.00	44.75	---	48.00	-3.25
	1680.00	47.12	---	48.00	-0.88
	1758.00	45.32	---	48.00	-2.68

The reading amplitudes are all under limit.

Table 3 Power Line Conducted Emissions (Channel 11, Transmitter Mode)

Power Connected Emissions				*FCC Class B*	
Conductor	*Frequency (kHz)*	*Peak Amplitude (dB μV)*	*QP Amplitude (dB μV)*	*Limit (dB μV)*	*Margin (dB)*
Line 1	530.00	43.80	---	48.00	-4.20
	612.00	44.71	---	48.00	-3.29
	910.00	46.60	---	48.00	-1.40
	978.00	43.56	---	48.00	-4.44
	1070.00	43.54	---	48.00	-4.46
	1291.00	44.92	---	48.00	-3.08
	1357.00	44.70	---	48.00	-3.30
	1657.00	44.99	---	48.00	-3.01
	1747.00	44.05	---	48.00	-3.95
	2770.00	43.92	---	48.00	-4.08
Line 2	534.00	44.48	---	48.00	-3.52
	604.00	44.36	---	48.00	-3.64
	904.00	46.71	---	48.00	-1.29
	984.00	46.99	---	48.00	-1.01
	1291.00	46.04	---	48.00	-1.96
	1357.00	45.83	---	48.00	-2.17
	1574.00	45.61	---	48.00	-2.39
	1657.00	47.17	---	48.00	-0.83
	1736.00	46.00	---	48.00	-2.00
	2790.00	45.58	---	48.00	-2.42

****The reading amplitudes are all under limit.***

Table 4 Power Line Conducted Emissions (Standby mode)

Power Connected Emissions				*FCC Class B*	
Conductor	***Frequency (kHz)***	***Peak Amplitude (dB μV)***	***QP Amplitude (dB μV)***	***Limit (dB μV)***	***Margin (dB)***
Line 1	628.00	44.99	---	48.00	-3.01
	719.00	46.63	---	48.00	-1.37
	813.00	46.00	---	48.00	-2.00
	984.00	41.81	---	48.00	-6.19
	1163.00	46.03	---	48.00	-1.97
	1257.00	44.79	---	48.00	-3.21
	1526.00	44.07	---	48.00	-3.93
	1623.00	45.48	---	48.00	-2.52
	1702.00	43.93	---	48.00	-4.07
	2590.00	41.44	---	48.00	-6.56
Line 2	628.00	45.27	---	48.00	-2.73
	719.00	46.85	---	48.00	-1.15
	808.00	46.20	---	48.00	-1.80
	904.00	43.98	---	48.00	-4.02
	1077.00	45.71	---	48.00	-2.29
	1170.00	45.40	---	48.00	-2.60
	1257.00	45.53	---	48.00	-2.47
	1349.00	43.22	---	48.00	-4.78
	1439.00	42.65	---	48.00	-5.35
	1623.00	47.37	---	48.00	-0.63

****The reading amplitudes are all under limit.***

IV. Section 15.247 (a): Technical description of the EUT

Based on the Section 2.1, *Direct Sequence System* is a spread spectrum system in which the carrier has been modulated by a high speed spreading code and an information data stream. The high speed code sequence dominates the "modulating function" and is the direct cause of the wide spreading of the transmitted signal. In the Exhibit H, *operational description* demonstrates the operation principles of the baseband processor employed by the EUT, shows that which is a complete DSSS baseband processor and meets the definition of the Direct Sequence Spread Spectrum System.

V. Section 15.247(a)(2): Bandwidth for Direct Sequence System.

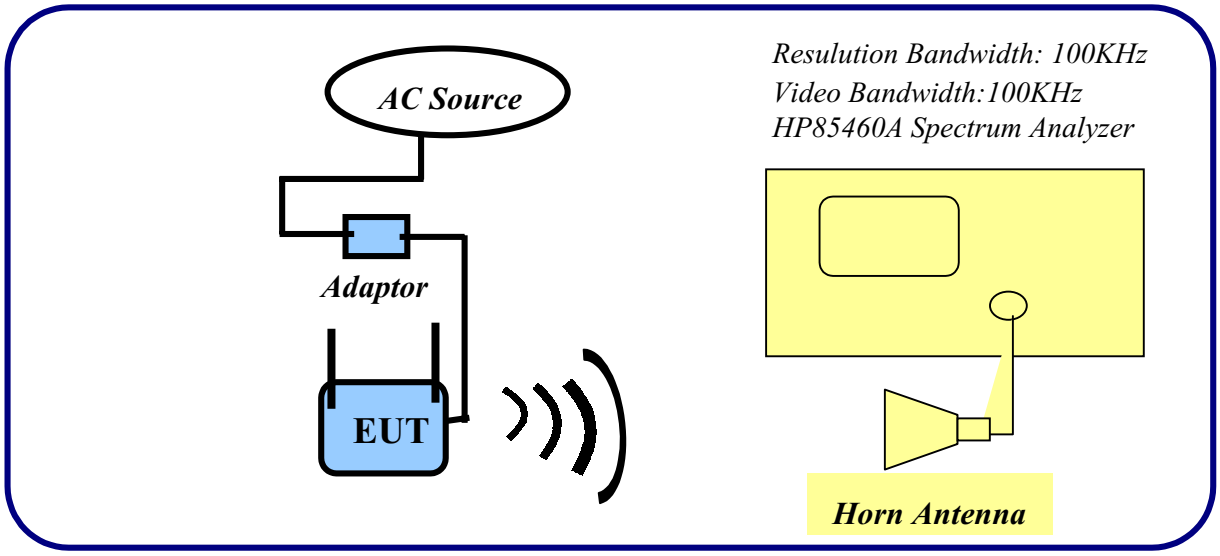
5.1 Test Condition & Setup

The transmitter bandwidth measurements were performed in an anechoic chamber. The EUT was placed on a wooded table, which is 0.8-meters height. The EUT was set to transmit continuously. Various channels were also investigated to find the maximum occupied bandwidth. The minimum 6 dB bandwidth shall be at least 500 KHz.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 KHz. Set the span>> RBW. The detector function was set to peak and hold mode to clearly observe the components.

Setup procedure is written on Appendix A.

5.2 Test Instruments Configuration



P.S.: Notebook computer is used to control the EUT at maximal power output, channel and set antenna kit

Test Configuration of Bandwidth for Direct Sequence System

5.3 List of Test Instruments

Instrument	Model No.	Brand	Serial No.	Last Cali.	Due on
EMI Receiver	8546A	H P	3520A00242	06/29/01	06/29/02
RF FilterSection	85460A	H P	3448A00217	06/29/01	06/29/02
Horn Antenna	3115	EMCO	9704 – 5178	08/01/01	08/01/02

5.4 Test Result of Bandwidth

Bandwidth of Channel 1

Bandwidth	:	9.75 MHz
The min. 6 dB BW at least	:	500 KHz

Bandwidth of Channel 6

Bandwidth	:	9.75 MHz
The min. 6 dB BW at least	:	500 KHz

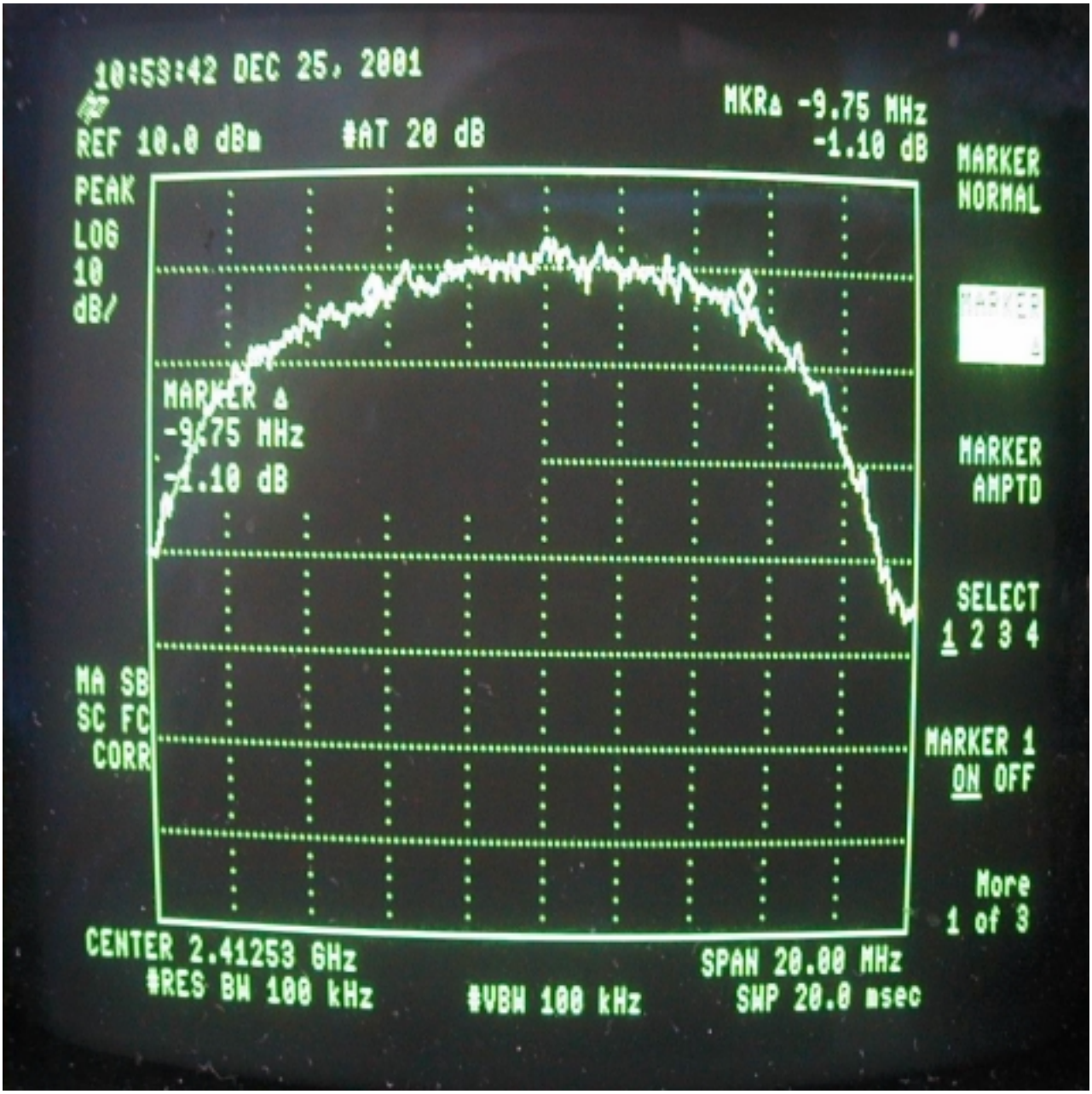
Bandwidth of Channel 11

Bandwidth	:	9.75 MHz
The min. 6 dB BW at least	:	500 KHz

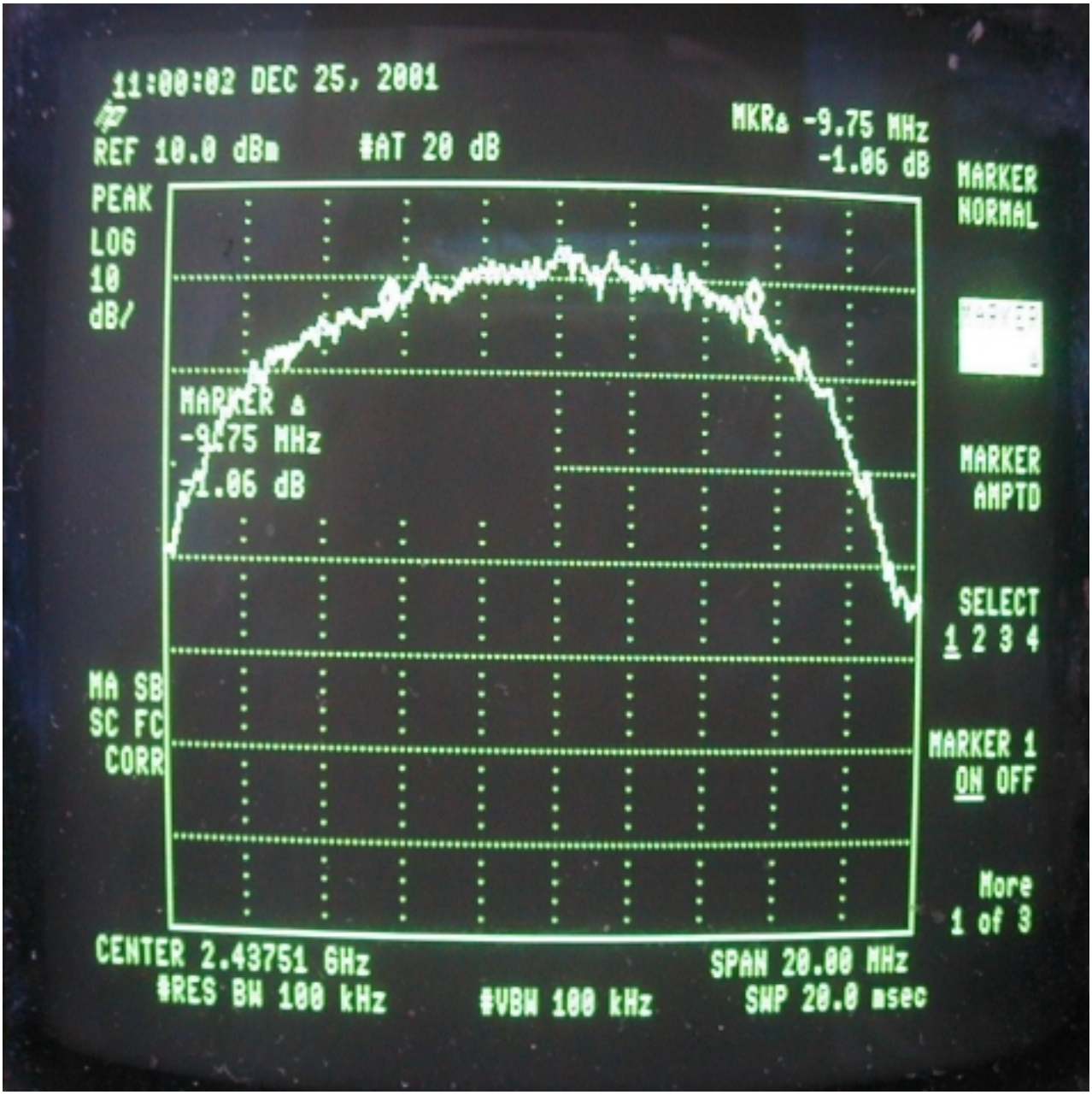
Note:

1. The data in the above table are summarizing the following attachment spectrum analyzer hard copy attached. According to the guidance, we'd made the measurement with the spectrum analyzer's resolution bandwidth *(RBW)=100kHz* and set the *span>>RBW*. The results show the measured 6dB bandwidth complying with the minimum 500kHz requirement.
2. The attachments show these on the following pages.

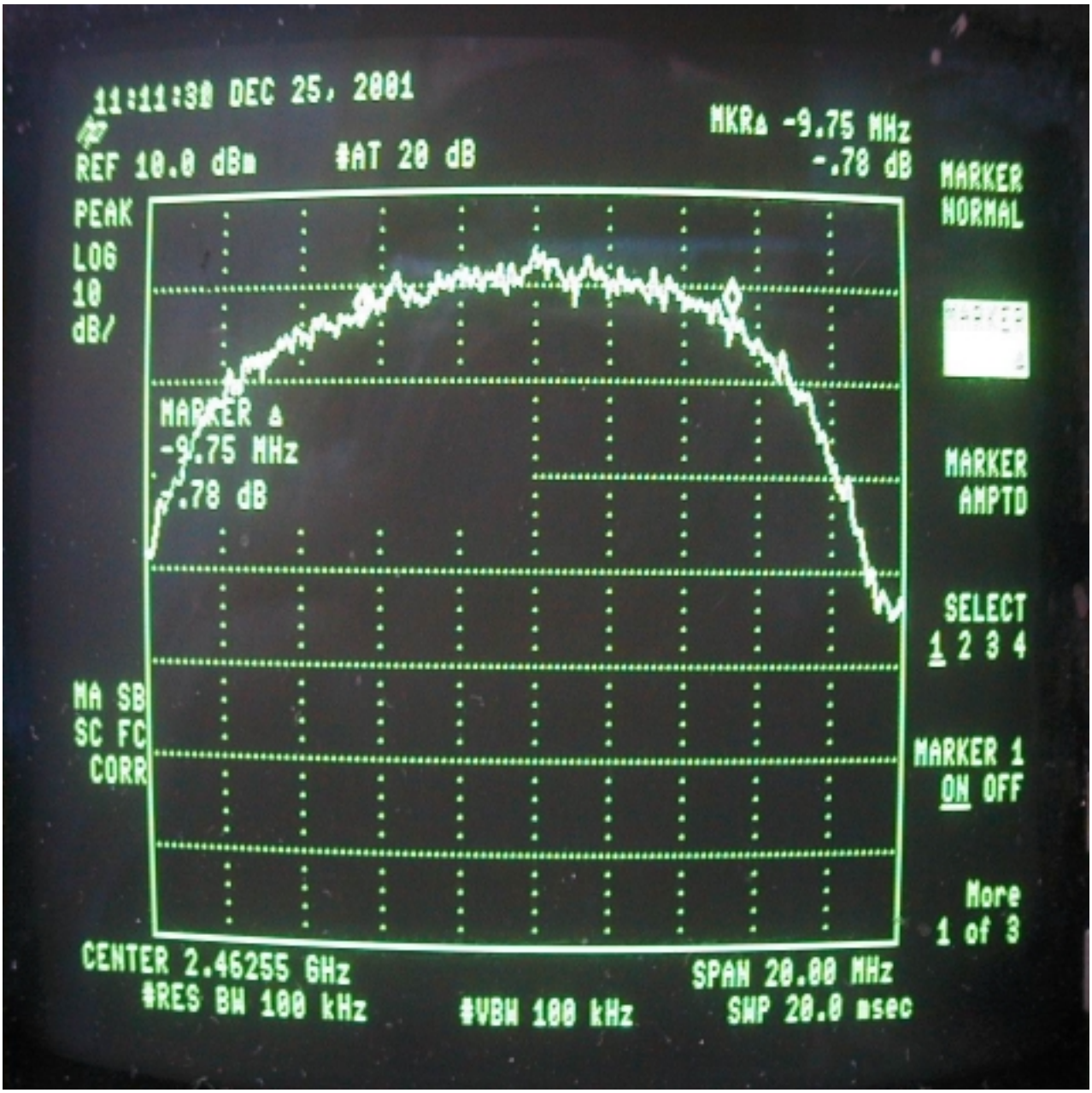
Bandwidth of Channel 1: 9.75 MHz



Bandwidth of Channel 6: 9.75 MHz



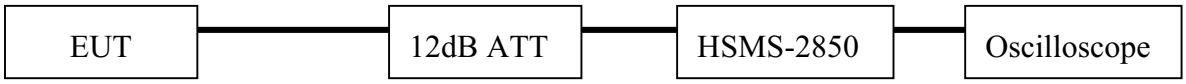
Bandwidth of Channel 11: 9.75 MHz



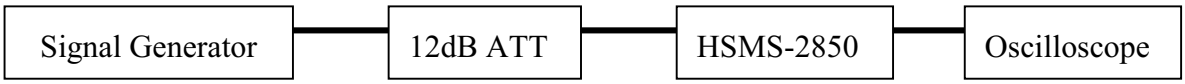
VI. Section 15.247(b): Power Output

6.1 Test Condition & Setup

A:



B:



1. The output of the transmitter thought 12dB attenuator and terminated by Schottkey Detector Diode (Hewlett- Packard HSMS-2850)
2. The output of the Shocttkey Diode Detector connected to the vertical channel of an oscilloscope. The observed trace of the oscilloscope shall be recorded as "A".
3. The combination of the diode detector and the oscilloscope capable of faithfully reproducing the envelop peaks and the duty cycle of the transmitter output signal.
4. The transmitter replaced by a signal generator. The output frequency of the signal made equal to the center of the frequency range occupied by the transmitter and unmodulated.
5. The output of the signal generator raised to reach the peak of trace "A" named X.
6. The signal generator output level X(mW) is the transmitter output peak power. Recording the following.

6.2 List of Test Instruments

Instrument Name	Model No.	Brand	Serial No.
Oscilloscope	54600A	H P	
Signal Generator	83711A	H P	3429A00434
Shocttkey Diode	HSMS-2850	H P	
Attenuator	MCL BW-S6W2	Mini-Circuits	

6.3 Test Result

Channel	Signal Generator	Antenna Gain	Output peak power	
	dBm	dBi	dBm	mW
CH1	14.12	4.53	18.65	73.282
CH6	14.60	4.53	19.13	81.846
CH11	14.90	4.53	19.43	87.700

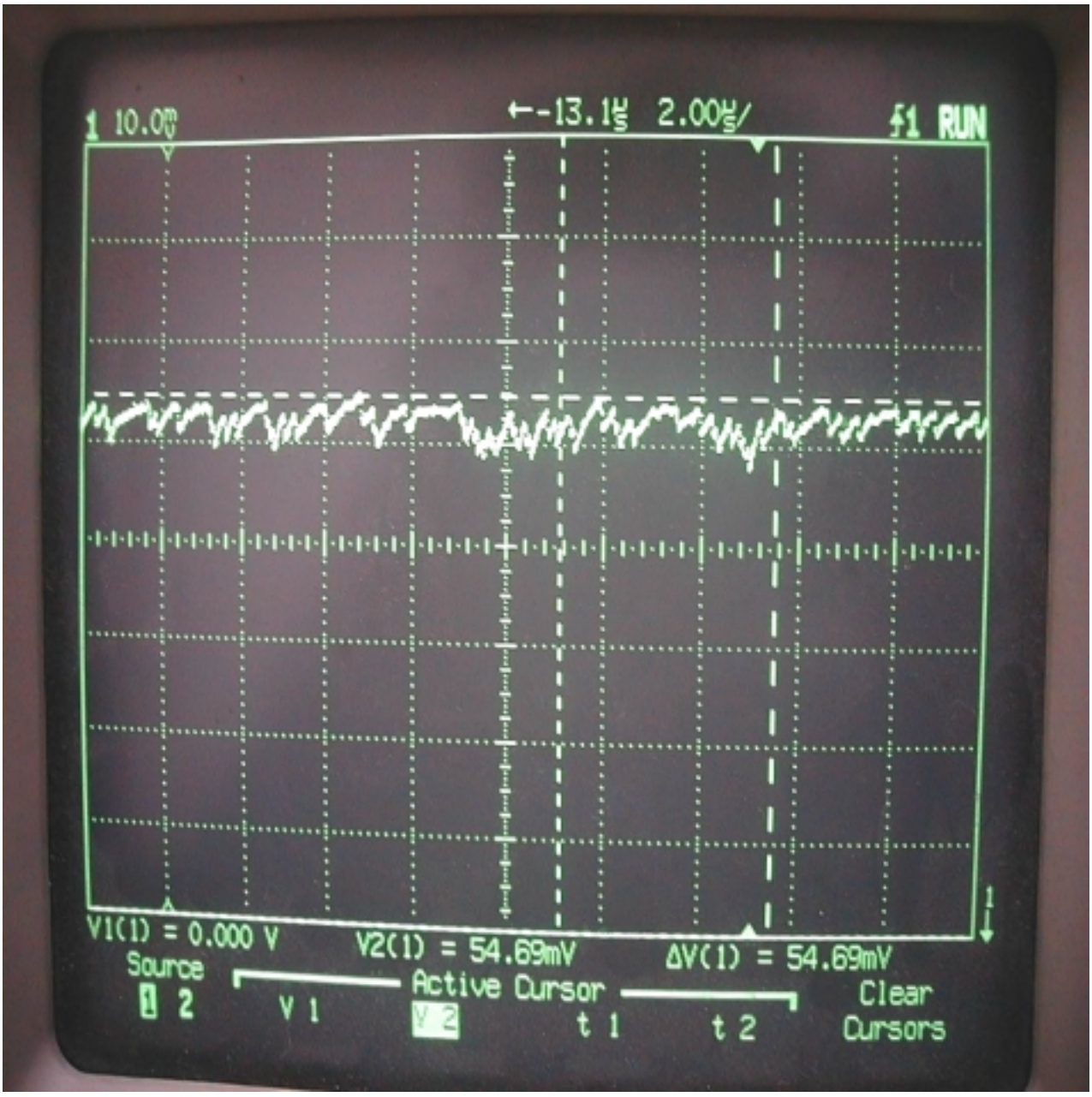
Formula: *Signal generator + Antenna gain = Output peak power*

Note:

1. As the results of the test of Power Output, the readings of the test comply with the de facto EIRP limit. The reduction is not necessary since the readings are already below the limit.
2. The test shows the worst-case in the RF exposure. The reading complies with the EIRP limit without the adjusting of output power with single antenna. Thus no professional installation is required.
3. It's not be classified as *fixed, point-to-point operation*. Furthermore, the worst-case do comply with de facto +36dBm EIRP limit: (14.90dBm+4.53dBi=19.43dBm(EIRP))
4. The warnings statement included in the user's manual shown in the <FCC Radio Frequency Exposure Statement>.

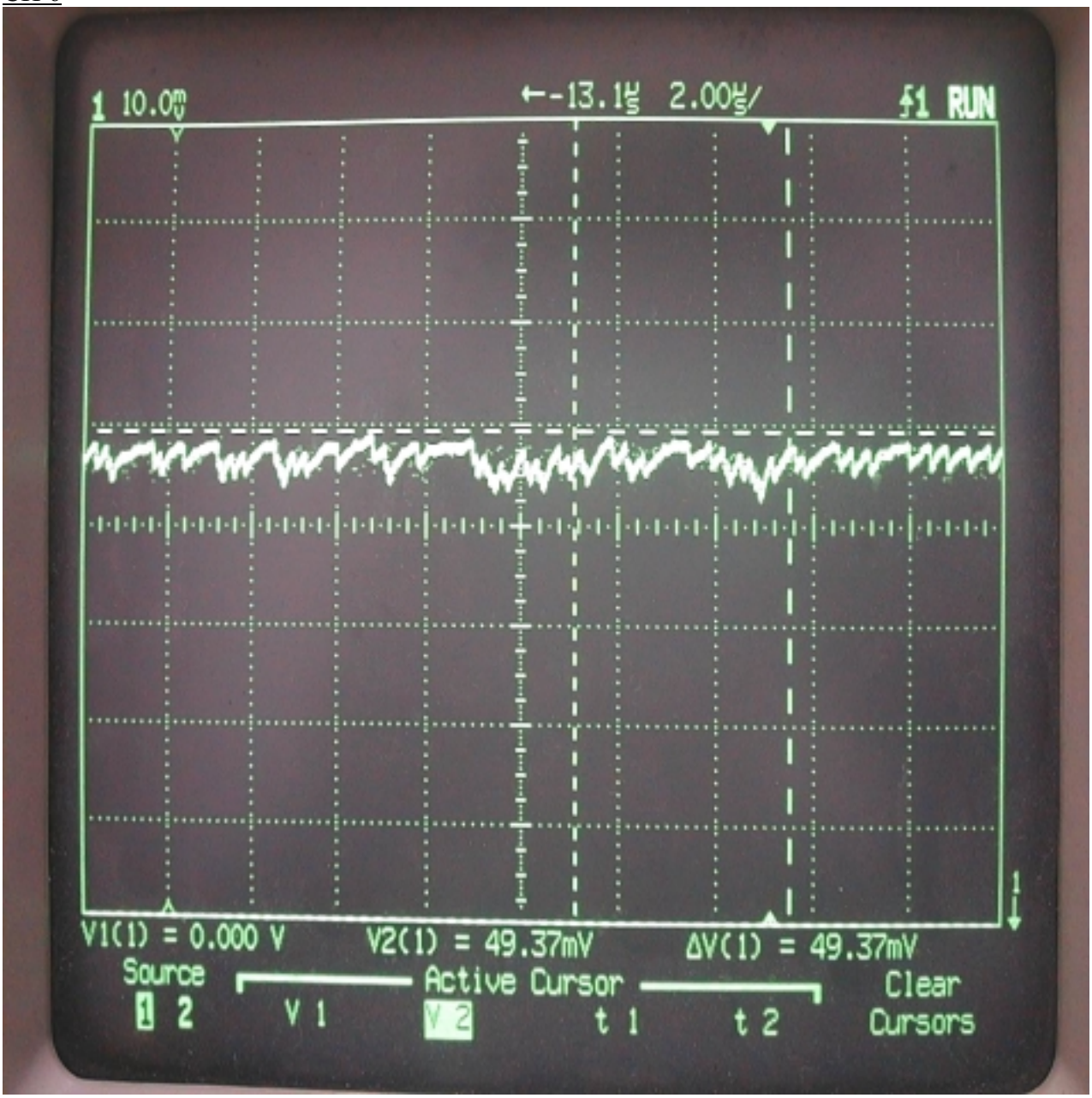
Oscilloscope set in Auto storing mode use delta V function measure the Peak Output Voltage.

CH 1



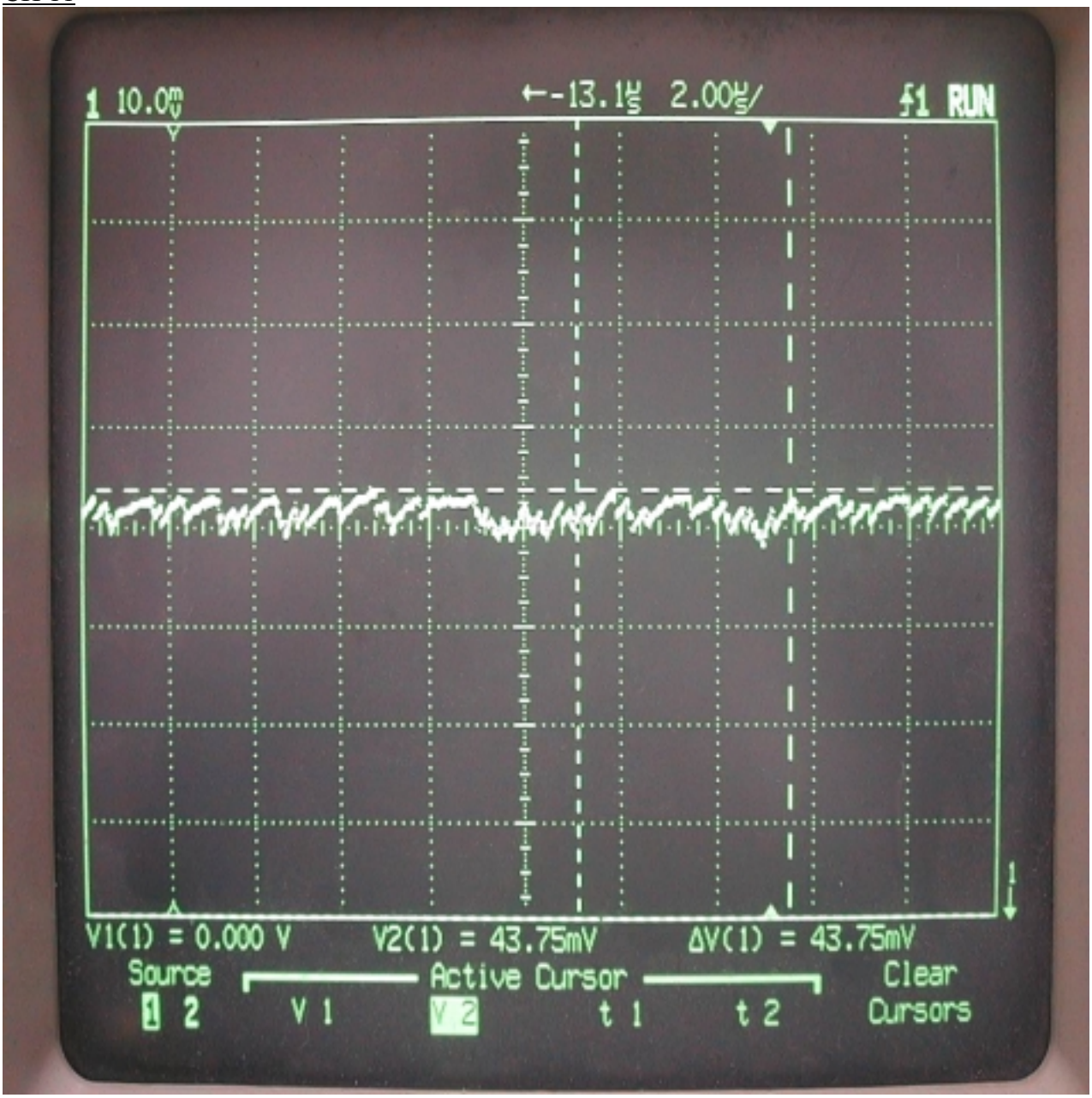
Oscilloscope set in Auto storing mode use delta V function measure the Peak Output Voltage.

CH 6



Oscilloscope set in Auto storing mode use delta V function measure the Peak Output Voltage.

CH 11



VII. Section 15.247 (C): Spurious Emissions (Radiated)

7.1 Test Condition & Setup

We'd performed the test with the *radiated emission* skill: The EUT was placed in an anechoic chamber, and set the EUT transmitting continuously and scanned at 3-meter distance to determine its emission characteristics. The physical arrangement of the EUT was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude, directivity, and frequency. The exact system configuration, which produced the highest emissions was noted so it could be reproduced later during the final tests. For the measurement above 1GHz, according to the guidance we'd set the spectrum analyzer's 6dB bandwidth RBW to 1MHz.

This was done to ensure that the final measurements would demonstrate the worst-case interference potential of the EUT.

Final radiation measurements were made on a three-meter, anechoic chamber. The EUT system was placed on a nonconductive turntable, which is 0.8 meters height, top surface 1.0 x 1.5 meter.

The spectrum was examined from 30 MHz to 1000 MHz using an Hewlett Packard 85460A EMI Receiver, Schaffner whole range Bi-Log antenna (Model No.: CBL6141A) is used to measure frequency from 30 MHz to 1GHz.The final test is used the spectrum HP 85460A and spectrum was examined from 1GHz to 18GHz using an Hewlett Packard 8564E Spectrum Analyzer, EMCO Horn Antenna (Model 3115) for 1G ~ 18GHz.

At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. There are two spectrum analyzers use on this testing, HP 85460A for frequency 30MHz to 1000MHz, and 8564E for frequency 1GHz to 18GHz. No post-detector video filters were used in the test. The spectrum analyzer's 6dB bandwidth was set to 120KHz (spectrum was examined from 30 MHz to 1000 MHz), the spectrum analyzer's 6 dB bandwidth was set to 1 MHz (spectrum was examined from 1GHz to 18GHz) and the analyzer was operated in the maximum hold mode. There is a test condition apply in this test item, the test procedure description as the following:

EUT transmit only:

Using the Notebook computer and software to control the EUT through Ethernet hub. Then making access to the mode of continuous transmission. Three channels is tested, one in the top (CH01), one in the middle (CH06) and the other in bottom (CH11).

With the transmitter operating from a AC source and using the internal of EUT, radiates spurious emissions falling within the restricted bands of 15.209 were measured at operating frequencies

corresponding to low, mid and high channels in the 2400 ~ 2483.5 MHz band.

The actual field intensity in decibels referenced to 1 microvolt per meter (dBμV/m) is determined by algebraically adding the measured reading in dBμV, the antenna factor (dB), and cable loss (dB) at the appropriate frequency. Since the EUT was set to transmit continuously, no *duty cycle* is present.

The EUT have 2 antennas, both of these antennas were tested under our pre-scan. The report exhibits only the highest gain in the pre-scan. We'd also test the lowest one but present the worst-case data in our report only.

For frequency between 30MHz to 1000MHz

FIa (dBuV/m) = FIr (dBμV) – Correction Factors

FIa : Actual Field Intensity

FIr : Reading of the Field Intensity

Correction Factors = Antenna Factor + Cable Loss – Amplifier Gain

For frequency between 1 GHz to 18 GHz

FIa (dBμV/m) = FIr (dBμV) + Correction Factor

FIa : Actual Field Intensity

FIr : Reading of the Field Intensity

Correction Factors = Antenna Factor + Cable Loss – Amplifier Gain

The setting up procedure is recorded on Appendix A.

7.2 List of Test Instruments

Instrument	Model No.	Brand	Serial No.	Last Cali.	Due on
EMI Receiver	8546A	H P	3520A00242	06/29/01	06/29/02
RF Filter Section	85460A	H P	3448A00217	06/29/01	06/29/02
Bi-log Antenna	CBL6141A	Schaffner	4206	03/09/01	03/09/02
Switch/Control Unit (> 30MHz)	3488A	HP	N/A	11/20/01	11/20/02
Auto Switch Box (> 30MHz)	ASB-01	TRC	9904-01	11/20/01	11/20/02
Spectrum Analyzer	8564E	HP	US36433002	08/01/01	08/01/02
Microwave Preamplifier	83051A	HP	3232A00347	08/01/01	08/01/02
Horn Antenna	3115	EMCO	9704 – 5178	08/01/01	08/01/02
Anechoic Chamber (cable calibrated together)				05/20/01	05/20/02
Anechoic Chamber (cable calibrated together)				05/20/01	05/20/02

7.3 Test Instruments Configuration

Front View of the Test Configuration

Rear View of the Test Configuration

The test configuration for frequency between 1GHz to 18GHz is same as above.

7.4 Test Result of Spurious Radiated Emissions

EUT's transmit only

The highest peak values of radiated emissions form the EUT at various antenna heights, antenna polarizations, EUT orientation, etc. The worse cases (high gain antenna) are recorded on the following.

Test Conditions: Testing room : Temperature : 26 ° C Humidity : 73 % RH
Testing site : Temperature : 30 ° C Humidity : 75 % RH

Table 5 Radiated Emissions for 30MHz ～ 1GHz [CH 1, Horizontal]

Radiated Emission				*Correction Factors*	*Corrected Amplitude*	*FCC Class B (3 m)*	
Frequency (MHz)	*Amplitude (dBμV/m)*	*Ant. H. (m)*	*Table ( )*	*(dB)*	*(dBμV/m)*	*Limit (dBμV/m)*	*Margin (dB)*
125.018	13.56	2.43	118	-14.40	27.96	43.50	-15.54
352.057	11.70	1.00	128	-18.25	29.95	46.00	-16.05
440.071	15.80	2.43	142	-20.05	35.85	46.00	-10.15
616.098	8.23	1.00	106	-23.13	31.36	46.00	-14.64
792.127	14.52	1.00	146	-26.18	40.70	46.00	-5.30
968.154	7.89	1.00	33	-28.53	36.42	53.98	-17.56

Note:

1.Margin = Corrected Amplitude – Limit.

2.Peak Amplitude – Correction Factors = Corrected Amplitude

Table 6 Radiated Emissions for 30MHz ～ 1GHz [CH 1, Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude	FCC Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table ( )	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
47.803	14.83	1.00	53	-15.80	30.63	40.00	-9.37
125.952	10.52	1.00	26	-13.96	24.48	43.50	-19.02
440.066	11.97	1.00	54	-20.15	32.12	46.00	-13.88
528.079	14.72	1.00	7	-22.39	37.11	46.00	-8.89
792.112	8.55	1.00	10	-26.50	35.05	46.00	-10.95
968.144	8.23	1.00	5	-30.19	38.42	53.98	-15.56

Table 7 Open Field Radiated Emissions for 1GHz ～ 18GHz [Channel 1, Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude		FCC Class B (3m)		
Frequency (GHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table ( )	(dB)	Peak	Average	Limit Peak	Limit Ave.	Margin (dB)
*4.810	42.36	1.00	65	3.91	46.27	---	74.00	53.98	-7.71
7.240	48.89	1.00	48	9.72	58.61	51.27	74.00	53.98	-2.71
9.655	41.22	1.00	167	9.72	50.94	---	74.00	53.98	-3.04
*12.055	39.05	1.00	11	9.72	48.77	---	74.00	53.98	-5.21

Table 8 Open Field Radiated Emissions for 1GHz ~ 18GHz [Channel 1, Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude		FCC Class B (3m)		
Frequency (Hz)	Amplitude (dBμV/m)	Ant. H. (m)	Table (°)	(dB)	Peak	Average	Limit Peak	Limit Ave.	Margin (dB)
*4.810	47.86	1.00	115	3.91	51.77	---	74.00	53.98	-2.21
7.240	54.05	1.00	21	9.72	63.77	49.06	74.00	53.98	-4.92
9.655	47.22	1.00	357	9.72	56.94	48.44	74.00	53.98	-5.54
*12.055	40.72	1.00	181	9.72	50.44	---	74.00	53.98	-3.54

Note:

1. Margin = Corrected - Limit.
2. Peak Amplitude + Correction Factor = Corrected
3. The " * " means restricted bands.
4. The EUT utilizes a *permanently attached antenna*. In addition the spurious RF conducted emissions
   levels do comply with the *20dBc limit* both at its bandedges and other spurious emissions.
5. As stated in Section 15.35(b), for any frequencies above 1000MHz, radiated limits shown are based
   upon the use of measurement instrumentation employing an average detector function. As the results of our test, the peak amplitudes are already below the FCC limit. Thus the average amplitudes of the rest are omitted.
6. **Above emissions of 10GHz, they are all under the limits of 20dB in Test Site.**

Table 9 Radiated Emissions for 30MHz ~ 1GHz [CH 6, Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude	FCC Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table ( )	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
125.004	11.88	3.93	121	-14.40	26.28	43.50	-17.22
352.046	11.03	1.00	132	-18.25	29.28	46.00	-16.72
440.064	16.01	1.00	127	-20.05	36.06	46.00	-9.94
616.078	8.37	1.00	105	-23.13	31.50	46.00	-14.50
792.125	14.26	1.00	145	-26.18	40.44	46.00	-5.56
968.163	6.98	1.00	31	-28.53	35.51	53.98	-18.47

Table 10 Radiated Emissions for 30MHz ~ 1GHz [CH 6, Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude	FCC Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table ( )	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
47.803	18.38	1.00	9	-15.80	34.18	40.00	-5.82
125.951	8.34	1.00	71	-13.96	22.30	43.50	-21.20
440.072	11.77	1.00	12	-20.15	31.92	43.50	-11.58
528.086	15.47	1.00	7	-22.39	37.86	46.00	-8.14
792.126	8.33	1.00	17	-26.50	34.83	46.00	-11.17
968.154	8.44	1.00	0	-30.19	38.63	53.98	-15.35

Table 11 Open Field Radiated Emissions for 1GHz ~ 18GHz [Channel 6, Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude		FCC Class B (3m)		
Frequency (GHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table ( )	(dB)	Peak	Average	Limit Peak	Limit Ave.	Margin (dB)
*4.870	40.53	1.00	84	3.91	44.44	---	74.00	53.98	-9.54
*7.330	49.05	1.00	49	9.72	58.77	46.27	74.00	53.98	-7.71
9.760	39.55	1.00	157	9.72	49.27	---	74.00	53.98	-4.71
*12.190	40.89	1.00	264	9.72	50.61	---	74.00	53.98	-3.37

Table 12 Open Field Radiated Emissions for 1GHz ~ 18GHz [Channel 6, Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude		FCC Class B (3m)		
Frequency (GHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table ( )	(dB)	Peak	Average	Limit Peak	Limit Ave.	Margin (dB)
*4.870	49.20	1.00	84	3.91	53.11	---	74.00	53.98	-0.87
*7.330	57.72	1.00	49	9.72	67.44	50.11	74.00	53.98	-3.87
9.760	42.55	1.00	157	9.72	52.27	---	74.00	53.98	-1.71
*12.190	41.89	1.00	264	9.72	51.61	51.44	74.00	53.98	-2.54

Table 13 Radiated Emissions for 30MHz ~ 1GHz [CH11, Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude	FCC Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table ( )	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
125.018	11.00	3.93	124	-14.40	25.40	43.50	-18.10
351.997	8.45	1.00	129	-18.25	26.70	46.00	-19.30
440.071	15.91	1.00	132	-20.05	35.96	46.00	-10.04
616.099	9.06	1.00	101	-23.13	32.19	46.00	-13.81
792.126	14.10	1.00	146	-26.18	40.28	46.00	-5.72
968.154	7.64	1.00	30	-28.53	36.17	53.98	-17.81

Table 14 Radiated Emissions for 30MHz ~ 1GHz [CH 11, Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude	FCC Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table ( )	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
47.803	14.83	1.00	53	-15.80	30.63	40.00	-9.37
125.952	10.52	1.00	26	-13.96	24.48	43.50	-19.02
440.066	11.97	1.00	54	-20.15	32.12	46.00	-13.88
528.079	14.72	1.00	7	-22.39	37.11	46.00	-8.89
792.112	8.55	1.00	10	-26.50	35.05	46.00	-10.95
968.144	8.23	1.00	5	-30.19	38.42	53.98	-15.56

Table 15 Open Field Radiated Emissions for 1Hz ~ 18Hz [Channel 11, Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude		FCC Class B (3m)		
Frequency (Hz)	Amplitude (dBμV/m)	Ant. H. (m)	Table ( )	(dB)	Peak	Average	Limit Peak	Limit Ave.	Margin (dB)
*4.915	41.53	1.00	96	3.91	45.44	---	74.0	53.9	-8.46
*7.390	49.05	1.00	306	9.72	58.77	45.61	74.0	53.9	-8.29
9.850	41.72	1.00	116	9.72	51.44	---	74.0	53.9	-2.46
*12.310	39.72	1.00	58	9.72	49.44	---	74.0	53.9	-4.46

Table 16 Open Field Radiated Emissions for 1GHz ~ 18GHz [Channel 11, Vertical]

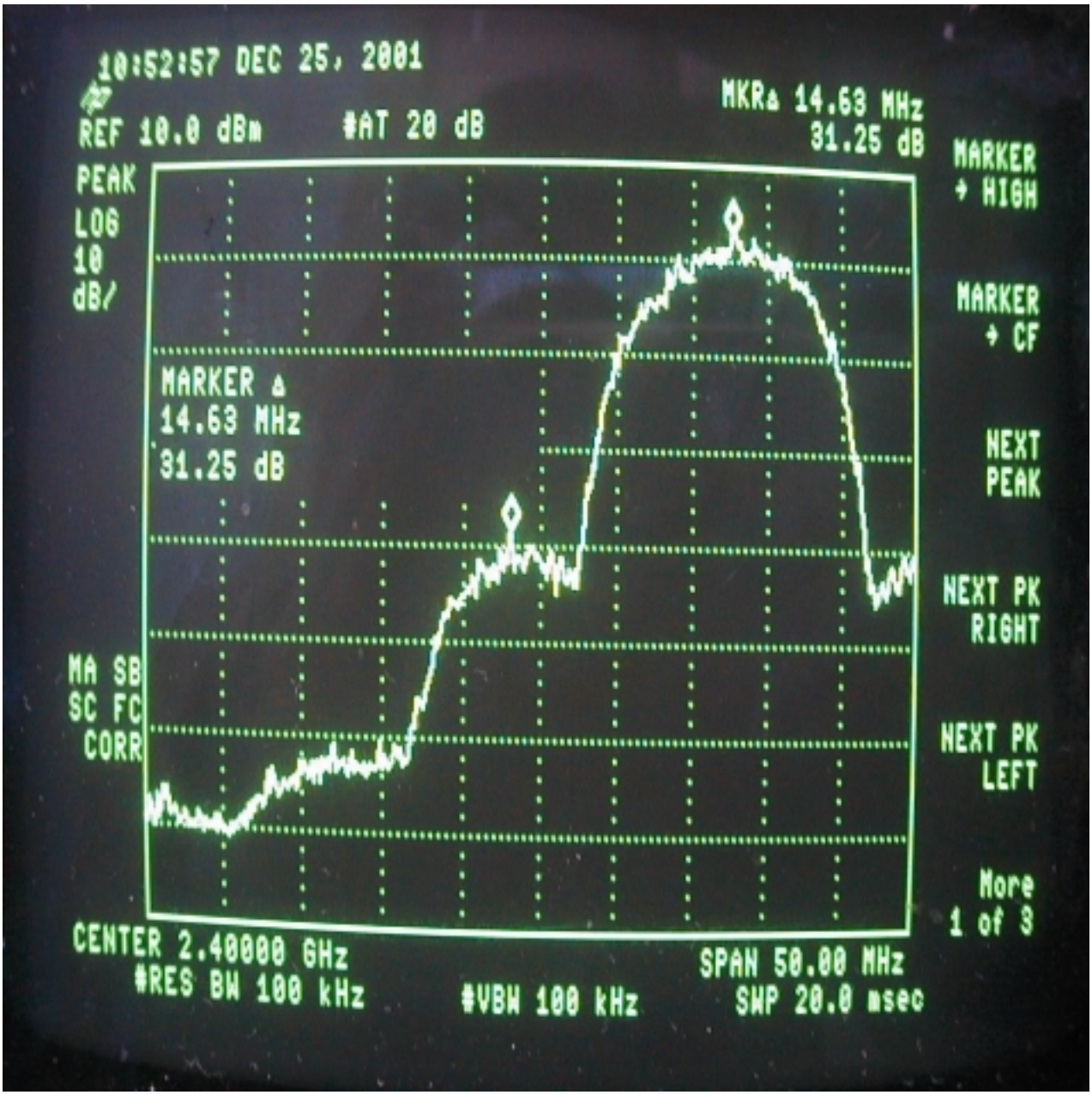
Radiated Emission				Correction Factors	Corrected Amplitude		FCC Class B (3m)		
Frequency (Hz)	Amplitude (dBμV/m)	Ant. H. (m)	Table ( )	(dB)	Peak	Average	Limit Peak	Limit Ave.	Margin (dB)
*4.915	49.86	1.00	227	3.91	53.77	---	74.0	53.9	-0.13
*7.390	56.05	1.00	6	9.72	65.77	50.61	74.0	53.9	-3.29
9.850	43.89	1.00	45	9.72	53.61	---	74.0	53.9	-0.29
*12.310	45.39	1.00	289	9.72	55.11	49.11	74.0	53.9	-4.79

7.5 Test Result of Bandedge

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 id § 15.209(a), whichever results in the lesser attenuation.

Test Condition & Setup: same as 8.1

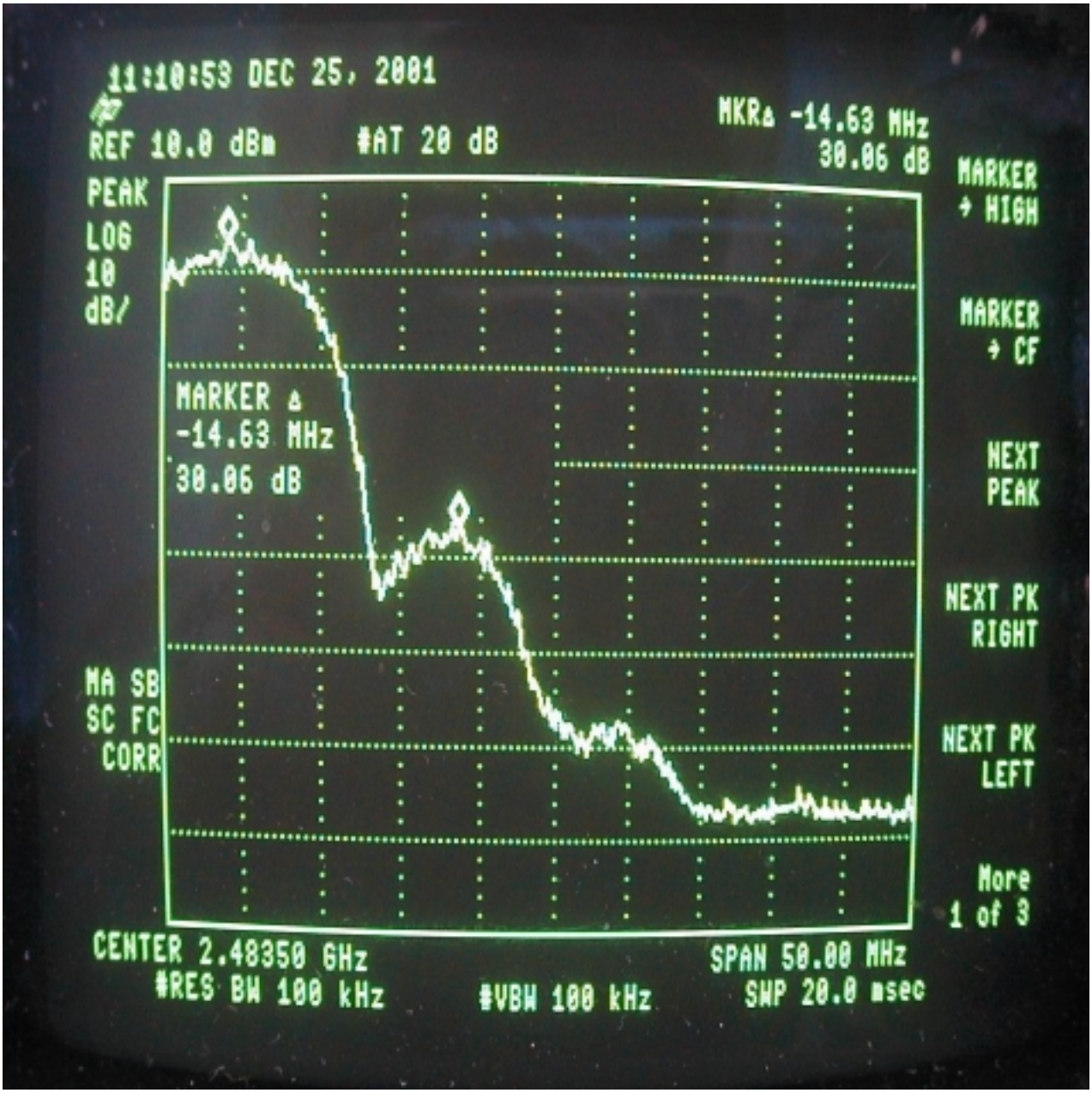
Channel 1



#This is the hard copy of our measurement on *channel 1 bandedge*. The spectrum plot extended to the 2390MHz (restriction band) is below 10dBuV. By involving our correction factor 35.6dB(1/m), the field strength should be also below 45.6dBuV/m. According to the Sect.15.205, The EUT comply with all the the spurious emission below 54dbuV/m.

#The EUT have 2 antennas, both of these antennas are tested under our pre-scan. The report exhibits only the highest gain in the pre-scan. We'd also test the lowest one but only present the worst-case data in our report.

Channel 11



#This is the hard copy of our measurement on *channel 11 bandedge*. The spectrum plot extended to the 2483.5MHz (restriction band) is below 10dBuV. By involving our correction factor 35.6dB(1/m), the field strength should be also below 45.6dBuV/m. According to the Sect.15.205, The EUT comply with all the the spurious emission below 54dbuV/m.

#The EUT have 2 antennas, both of these antennas are tested under our pre-scan. The report exhibits only the highest gain in the pre-scan. We'd also test the lowest one but only present the worst-case data in our report.

VIII. Section 15.247(d): Power Spectral Density

8.1 Test Condition & Setup

The tests below are running with the EUT transmitter set at high power in TDD mode .A LAN port from a notebook computer connect to the EUT. The EUT is needed to force selection of output power level and channel number. While testing, the EUT was set to transmit continuously. A horn antenna was connected with the spectrum analyzer.

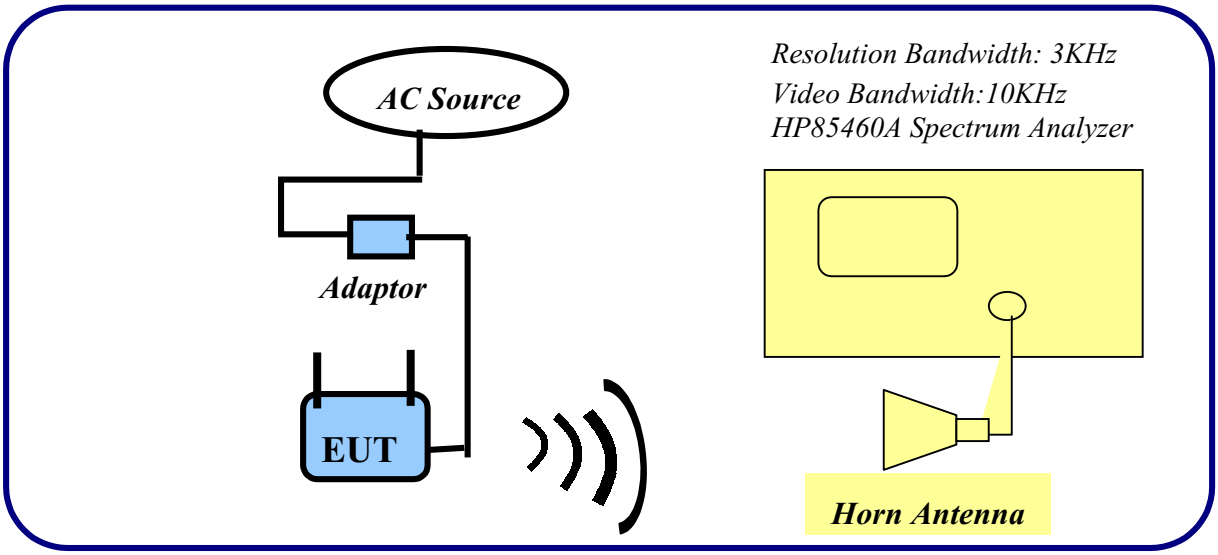
The EUT is tested in open field site. Put EUT on the middle of a wooden table. Set spectrum analyzer RBW = 3 KHz, VBW > RBW (e.g. VBW = 10 KHz), Span = 2 MHz. Turn around the table to find maximum emission. Then set the Span = 300 KHz and sweep time = 100 sec. Peak the maximum emission again. The peak level measured must be no greater than + 8dBm.

The setting up procedure is recorded on Appendix A.

According to the guidance, *sweep=(SPAN/3kHz)*. We'd used the *SPAN=300kHz* and *sweep time=100sec* in our configuration. The EUT was set transmitting continuously and force selection of output power level and channel number. We'd observed that the peak levels aren't greater than +8dBm limit.

The attachments below show our observation.

8.2 Test Instruments Configuration



Test Configuration of Power Spectral Density

8.3 List of Test Instruments

Instrument	Model No.	Brand	Serial No.	Last Cali.	Due on
EMI Receiver	8546A	H P	3520A00242	06/29/01	06/29/02
RF FilterSection	85460A	H P	3448A00217	06/29/01	06/29/02
Horn Antenna	3115	EMCO	9704 – 5178	08/01/01	08/01/02

8.4 Test Result of Power spectral density

The following table shows a summary of the highest power out of EUT.

FCC ID : NUSTMW1003

Channel	*Frequency (GHz)*	*Ppr (dBm)*	*CF (dB)*	*Ppq (dBm)*	*Limit (dB)*	*Margin (dB)*
CH 01	2.411	-10.28	4.53	-5.75	8.00	-13.75
CH 06	2.438	-9.53	4.53	-5.00	8.00	-13.00
CH 11	2.462	-9.70	4.53	-5.17	8.00	-13.17

Note:

1.The attachment follow by this page and there is no page number.

2.Ppr: spectrum read power density (using peak search mode), CF: correct factor, Ppq: actual peak power density in the spread spectrum band.

3.Ppq = Ppr + CF

4. Effective Radiation Power (E.R.P.) = $(E\ d)^2 / 30G$

"E" is the measured maximum field strength in V/m utilizing the maximum hold mode RBW (3KHz)

"G" is the numeric gain of the transmitting antenna over an isotropic radiator (1.00).

"d" is the distance in meters from which the field strength was measured (3M).

Example: the Max Radiation Emission = 39.64 + (35.60) = 87.33 dBμV/m

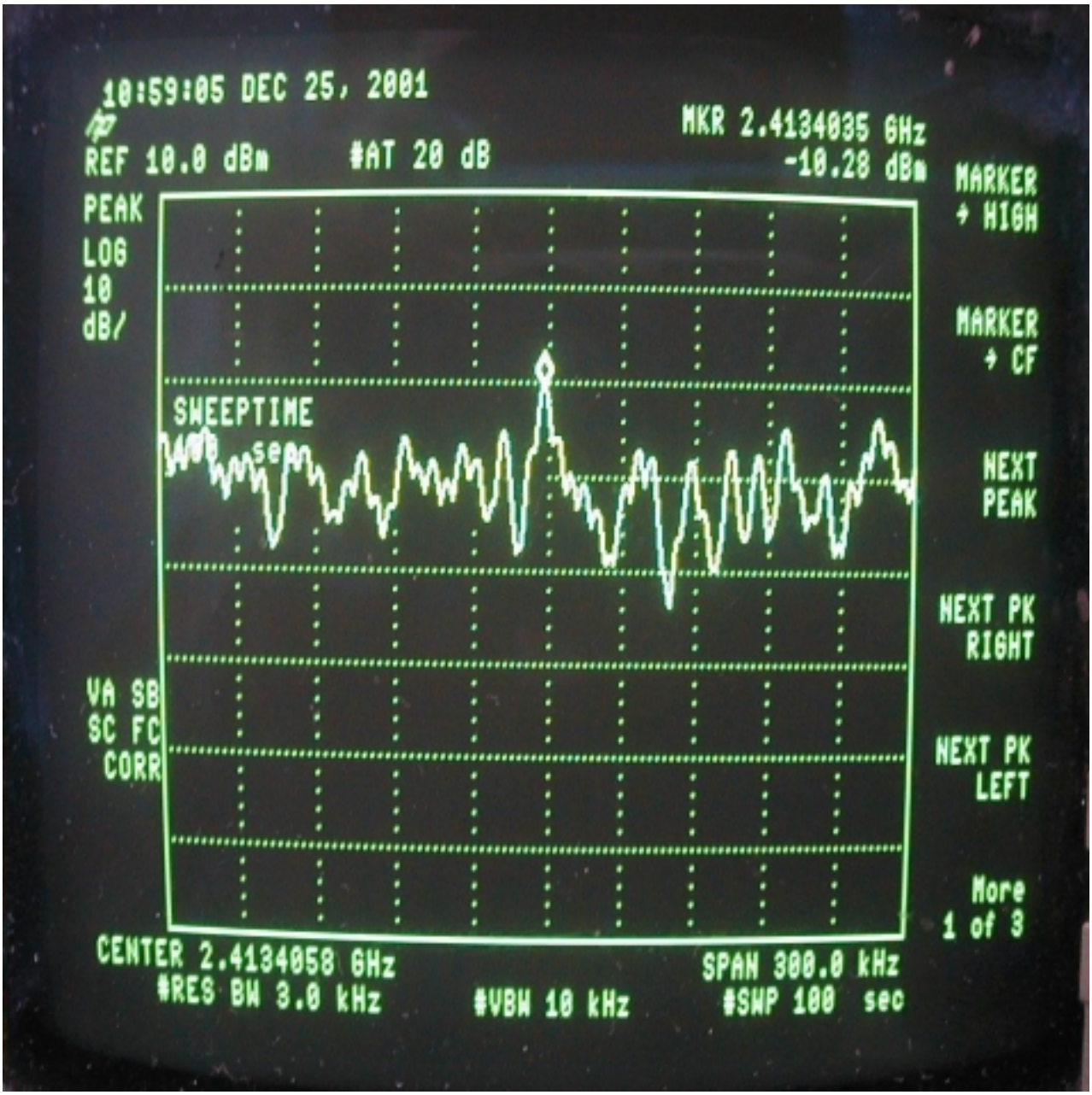
$10^{(87.33/20)} \times 10^{-6} = 0.011028$ V

E.R.P. = $(0.023254 \times 3)^2 / 30 = 0.162226$ mW

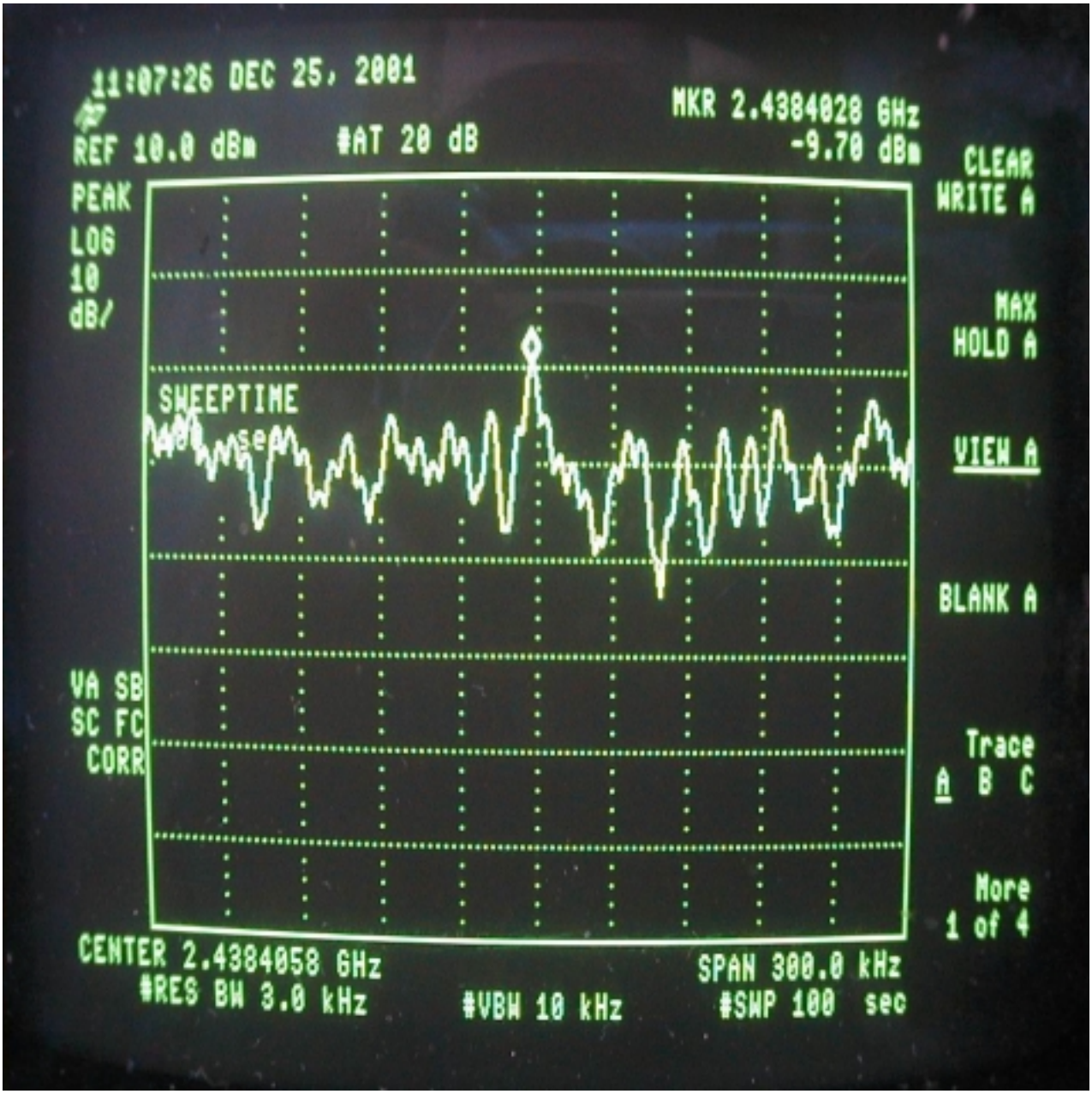
= 10 x log (0.162226 mW/1mW)

= -7.90 dBm

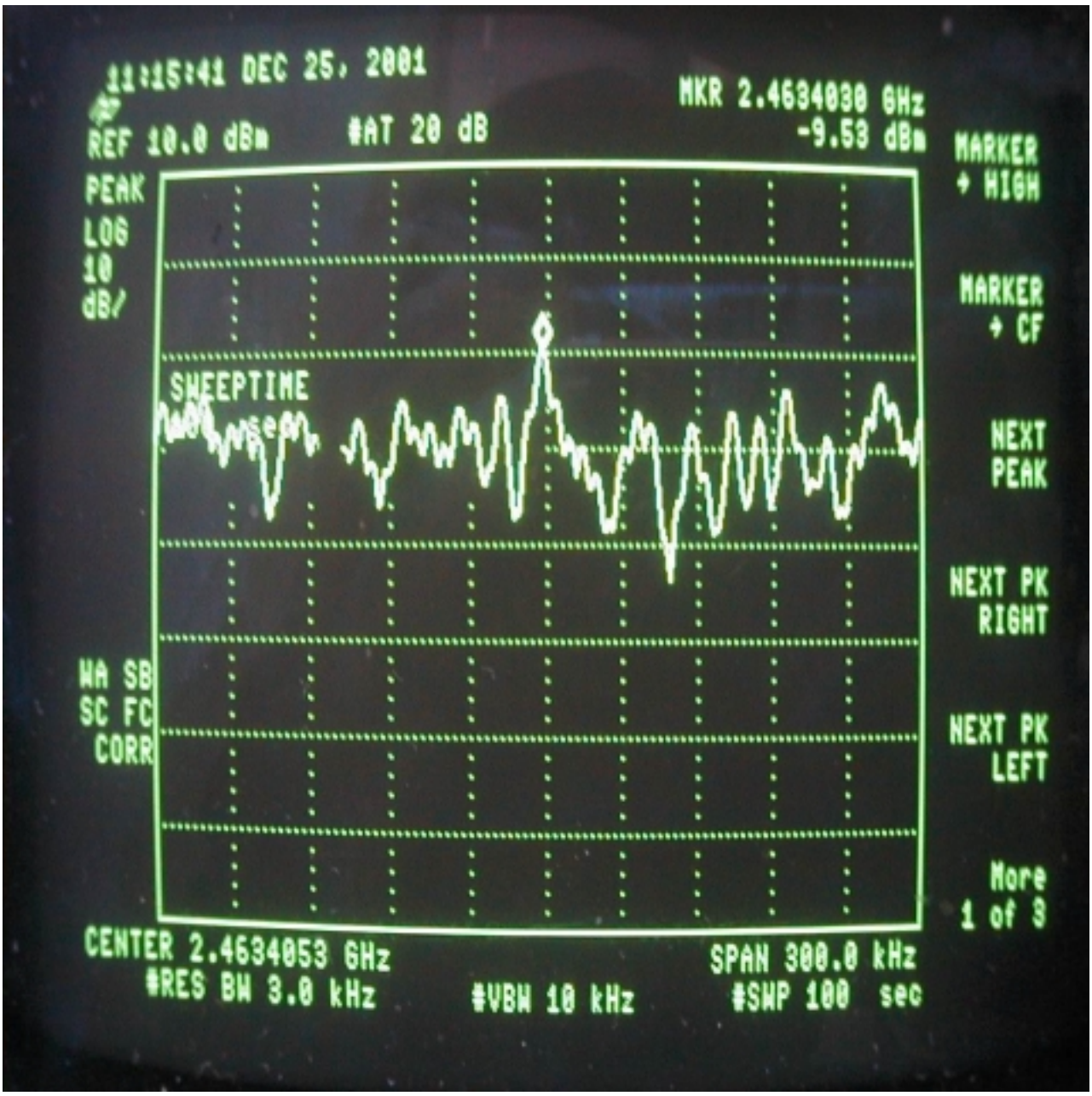
Channel 01


10:59:05 DEC 25, 2001
MKR 2.4134035 GHz
REF 10.0 dBm
#AT 20 dB
-10.28 dBm
PEAK
LOG
10
dB/
SWEEPTIME
sec
MARKER
→ HIGH
MARKER
→ CF
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 3
VA SB
SC FC
CORR
CENTER 2.4134058 GHz
#RES BW 3.0 kHz
#VBW 10 kHz
SPAN 300.0 kHz
#SWP 100 sec

Channel 06


11:07:26 DEC 25, 2001
MKR 2.4384028 GHz
REF 10.0 dBm
#AT 20 dB
-9.70 dBm
CLEAR
WRITE A
PEAK
LOG
10
dB/
MAX
HOLD A
SWEEPTIME
sec
VIEW A
BLANK A
VA SB
SC FC
CORR
Trace
A B C
More
1 of 4
CENTER 2.4384058 GHz
SPAN 300.0 kHz
#RES BW 3.0 kHz
#VBW 10 kHz
#SWP 100 sec

Channel 11


11:15:41 DEC 25, 2001
MKR 2.4634030 GHz
REF 10.0 dBm
#AT 20 dB
-9.53 dBm
MARKER
→ HIGH
PEAK
LOG
10
dB/
MARKER
→ CF
SWEEPTIME
sec
NEXT
PEAK
NEXT PK
RIGHT
MA SB
SC FC
CORR
NEXT PK
LEFT
More
1 of 3
CENTER 2.4634053 GHz
SPAN 300.0 kHz
#RES BW 3.0 kHz
#VBW 10 kHz
#SWP 100 sec

IX. Section 15.247(e) : Processing Gain of a Direct Sequence System

According to the 15.247(e), the processing gain of a direct sequence system shall be at least 10dB. The processing gain represents the improvement to the received signal-to-noise ratio, after filtering to the information bandwidth, from the spreading / dispreading function. The processing gain may be determined using one of the following methods:

1. As measured at the demodulated output of the receiver; and
2. As measured using the CW jamming margin method.

The processing gain exhibits follow is using the CW jamming margin method, the testing procedure and configuration shown in the <*Appendix B*>. This part is performed by the manufacturer and the results are summarized below:

Channel & Offset Freq (kHz)	*Processing Gain (dB) at 11Mbps*	
	Mj (after discarding 20% worst ones)	*Gp=Mj+(S/N)o+L_{sys}*
Ch.1 (2412MHz)	-7.9dB	11.1dB
Ch.6 (2437MHz)	-8.0dB	11.0dB
Ch.11(2462MHZ)	-8.2dB	10.8dB

For the details of the processing gain, please refer to the <*Appendix B*>.

Appendix A

Setting up Procedure

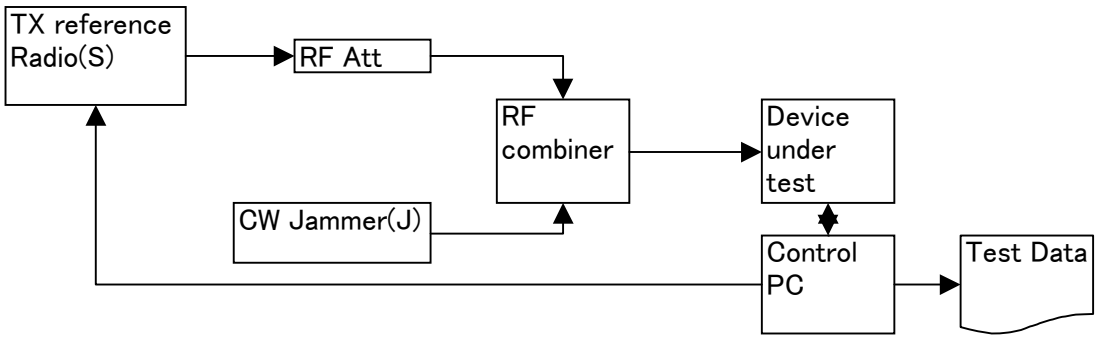
1. Connect the EUT and notebook computer with the LAN ports on both ends.
2. Through the software (given by the manufacturer) installed in the notebook to control the EUT
3. Then making access to the mode of continuous transmission and setting the channel under tests.

Appendix B

Data of Processing Gain

Testing Configuration : CW Jamming Margin (15.247)(e)

Basic Test Block Diagram



Test Procedure

The processing gain is measured using the CW jamming margin method. A signal generator producing a CW Jammer Signal (J) is stepped in 50kHz increments across the 10MHz pass band of the system. At each point the CW Jammer Signal Generator level required to produce a Bit Error Rate equivalent to BER = 10E-5 is recorded as the Jammer level (J). The output power of the TX reference Radio is fixed at -50 dBm (which is about 30.0 dB above RX sensitivity threshold) and referred to as Mj and is used to calculate the Processing Gain (Gp) using the following formula:

$$Gp = (S/N)o + Mj + Lsys$$

With:
Lsys = 2.0 dB and
(S/N)o as derived from data sheet of HFA3863 chipset.

Device Under Test	TMW1003
Baseband Processor	HFA3863
RF channel	ch 1 (2412MHz)
Bit Rate	11Mbps
Mj (after discarding 20% worst ones)	−7.9 dB
Gp = Mj + (S/N)o + Lsys	11.1 dB

Offset Frequency Δf (kHz)	Processing Gain (dB)			
	ch1			
	Gp(dB)	(S/N)o	Mj=J/S	Lsys
−8500	28.0	17.0	9.0	2.0
−8450	27.8	17.0	8.8	2.0
−8400	27.8	17.0	8.8	2.0
−8350	27.7	17.0	8.7	2.0
−8300	27.5	17.0	8.5	2.0
−8250	27.1	17.0	8.1	2.0
−8200	26.8	17.0	7.8	2.0
−8150	26.8	17.0	7.8	2.0
−8100	26.7	17.0	7.7	2.0
−8050	26.4	17.0	7.4	2.0
−8000	26.1	17.0	7.1	2.0
−7950	25.8	17.0	6.8	2.0
−7900	25.7	17.0	6.7	2.0
−7850	24.8	17.0	5.8	2.0
−7800	24.2	17.0	5.2	2.0
−7750	24.0	17.0	5.0	2.0
−7700	24.0	17.0	5.0	2.0
−7650	23.8	17.0	4.8	2.0
−7600	23.5	17.0	4.5	2.0
−7550	22.5	17.0	3.5	2.0
−7500	22.3	17.0	3.3	2.0
−7450	21.9	17.0	2.9	2.0
−7400	21.8	17.0	2.8	2.0
−7350	21.8	17.0	2.8	2.0
−7300	20.4	17.0	1.4	2.0
−7250	20.0	17.0	1.0	2.0
−7200	19.8	17.0	0.8	2.0
−7150	19.4	17.0	0.4	2.0
−7100	19.4	17.0	0.4	2.0
−7050	19.4	17.0	0.4	2.0
−7000	19.2	17.0	0.2	2.0
−6950	19.0	17.0	0.0	2.0
−6900	18.8	17.0	−0.2	2.0
−6850	18.5	17.0	−0.5	2.0
−6800	18.2	17.0	−0.8	2.0
−6750	17.7	17.0	−1.3	2.0
−6700	17.7	17.0	−1.3	2.0
−6650	18.0	17.0	−1.0	2.0
−6600	17.7	17.0	−1.3	2.0
−6550	17.6	17.0	−1.4	2.0
−6500	16.6	17.0	−2.4	2.0
−6450	16.7	17.0	−2.3	2.0
−6400	17.4	17.0	−1.6	2.0
−6350	17.4	17.0	−1.6	2.0
−6300	17.0	17.0	−2.0	2.0
−6250	16.9	17.0	−2.1	2.0
−6200	16.9	17.0	−2.1	2.0
−6150	17.0	17.0	−2.0	2.0
−6100	17.0	17.0	−2.0	2.0
−6050	16.7	17.0	−2.3	2.0

-6000	16.6	17.0	-2.4	2.0
-5950	16.6	17.0	-2.4	2.0
-5900	16.6	17.0	-2.4	2.0
-5850	16.5	17.0	-2.5	2.0
-5800	16.6	17.0	-2.4	2.0
-5750	16.6	17.0	-2.4	2.0
-5700	16.0	17.0	-3.0	2.0
-5650	16.0	17.0	-3.0	2.0
-5600	16.0	17.0	-3.0	2.0
-5550	15.7	17.0	-3.3	2.0
-5500	15.0	17.0	-4.0	2.0
-5450	14.8	17.0	-4.2	2.0
-5400	14.8	17.0	-4.2	2.0
-5350	14.8	17.0	-4.2	2.0
-5300	14.7	17.0	-4.3	2.0
-5250	14.2	17.0	-4.8	2.0
-5200	14.0	17.0	-5.0	2.0
-5150	13.9	17.0	-5.1	2.0
-5100	13.9	17.0	-5.1	2.0
-5050	13.9	17.0	-5.1	2.0
-5000	13.9	17.0	-5.1	2.0
-4950	13.9	17.0	-5.1	2.0
-4900	14.0	17.0	-5.0	2.0
-4850	13.9	17.0	-5.1	2.0
-4800	13.5	17.0	-5.5	2.0
-4750	13.5	17.0	-5.5	2.0
-4700	13.5	17.0	-5.5	2.0
-4650	13.5	17.0	-5.5	2.0
-4600	13.5	17.0	-5.5	2.0
-4550	13.5	17.0	-5.5	2.0
-4500	13.5	17.0	-5.5	2.0
-4450	13.4	17.0	-5.6	2.0
-4400	13.4	17.0	-5.6	2.0
-4350	13.4	17.0	-5.6	2.0
-4300	13.3	17.0	-5.7	2.0
-4250	13.1	17.0	-5.9	2.0
-4200	13.1	17.0	-5.9	2.0
-4150	13.1	17.0	-5.9	2.0
-4100	12.9	17.0	-6.1	2.0
-4050	12.9	17.0	-6.1	2.0
-4000	12.9	17.0	-6.1	2.0
-3950	12.8	17.0	-6.2	2.0
-3900	12.9	17.0	-6.1	2.0
-3850	12.9	17.0	-6.1	2.0
-3800	12.6	17.0	-6.4	2.0
-3750	11.6	17.0	-7.4	2.0
-3700	11.6	17.0	-7.4	2.0
-3650	11.7	17.0	-7.3	2.0
-3600	11.6	17.0	-7.4	2.0
-3550	11.2	17.0	-7.8	2.0
-3500				
-3450				
-3400				
-3350				
-3300				
-3250				
-3200				
-3150				
-3100				
-3050				
-3000				

−2950				
−2900				
−2850				
−2800				
−2750				
−2700				
−2650	11.1	17.0	−7.9	2.0
−2600	11.1	17.0	−7.9	2.0
−2550	11.1	17.0	−7.9	2.0
−2500	11.1	17.0	−7.9	2.0
−2450	11.3	17.0	−7.7	2.0
−2400	11.3	17.0	−7.7	2.0
−2350	11.2	17.0	−7.8	2.0
−2300				
−2250				
−2200				
−2150				
−2100				
−2050				
−2000				
−1950				
−1900				
−1850				
−1800				
−1750				
−1700				
−1650				
−1600				
−1550				
−1500				
−1450				
−1400				
−1350				
−1300				
−1250				
−1200				
−1150	11.2	17.0	−7.8	2.0
−1100	11.2	17.0	−7.8	2.0
−1050	11.5	17.0	−7.5	2.0
−1000	11.6	17.0	−7.4	2.0
−950	11.5	17.0	−7.5	2.0
−900	11.4	17.0	−7.6	2.0
−850	11.4	17.0	−7.6	2.0
−800	11.4	17.0	−7.6	2.0
−750	11.4	17.0	−7.6	2.0
−700	11.4	17.0	−7.6	2.0
−650	11.4	17.0	−7.6	2.0
−600	11.6	17.0	−7.4	2.0
−550	11.6	17.0	−7.4	2.0
−500	12.9	17.0	−6.1	2.0
−450	12.8	17.0	−6.2	2.0
−400	12.8	17.0	−6.2	2.0
−350	12.0	17.0	−7.0	2.0
−300	11.1	17.0	−7.9	2.0
−250	11.7	17.0	−7.3	2.0
−200	11.7	17.0	−7.3	2.0
−150	11.7	17.0	−7.3	2.0
−100	11.7	17.0	−7.3	2.0
−50	11.4	17.0	−7.6	2.0
0	11.4	17.0	−7.6	2.0
50	11.4	17.0	−7.6	2.0

100	11.5	17.0	−7.5	2.0
150	11.3	17.0	−7.7	2.0
200	11.6	17.0	−7.4	2.0
250	11.6	17.0	−7.4	2.0
300	11.2	17.0	−7.8	2.0
350	11.3	17.0	−7.7	2.0
400	11.3	17.0	−7.7	2.0
450	11.2	17.0	−7.8	2.0
500	12.1	17.0	−6.9	2.0
550	12.2	17.0	−6.8	2.0
600	12.1	17.0	−6.9	2.0
650	12.2	17.0	−6.8	2.0
700	11.3	17.0	−7.7	2.0
750	11.4	17.0	−7.6	2.0
800	12.4	17.0	−6.6	2.0
850	12.2	17.0	−6.8	2.0
900	12.2	17.0	−6.8	2.0
950	12.3	17.0	−6.7	2.0
1000	12.4	17.0	−6.6	2.0
1050	12.8	17.0	−6.2	2.0
1100	12.8	17.0	−6.2	2.0
1150	12.3	17.0	−6.7	2.0
1200	12.3	17.0	−6.7	2.0
1250	12.6	17.0	−6.4	2.0
1300	12.6	17.0	−6.4	2.0
1350	12.6	17.0	−6.4	2.0
1400	12.8	17.0	−6.2	2.0
1450	11.4	17.0	−7.6	2.0
1500	11.3	17.0	−7.7	2.0
1550	11.3	17.0	−7.7	2.0
1600	11.3	17.0	−7.7	2.0
1650	11.6	17.0	−7.4	2.0
1700	11.8	17.0	−7.2	2.0
1750	11.3	17.0	−7.7	2.0
1800				
1850				
1900				
1950				
2000				
2050				
2100				
2150				
2200				
2250				
2300	11.2	17.0	−7.8	2.0
2350	11.3	17.0	−7.7	2.0
2400	11.3	17.0	−7.7	2.0
2450	11.3	17.0	−7.7	2.0
2500	11.3	17.0	−7.7	2.0
2550	11.3	17.0	−7.7	2.0
2600	11.3	17.0	−7.7	2.0
2650	11.8	17.0	−7.2	2.0
2700	11.7	17.0	−7.3	2.0
2750	11.7	17.0	−7.3	2.0
2800	11.9	17.0	−7.1	2.0
2850	11.9	17.0	−7.1	2.0
2900	11.9	17.0	−7.1	2.0
2950	12.2	17.0	−6.8	2.0
3000	12.4	17.0	−6.6	2.0
3050	12.2	17.0	−6.8	2.0
3100	12.2	17.0	−6.8	2.0

3150	12.2	17.0	−6.8	2.0
3200	12.2	17.0	−6.8	2.0
3250	12.2	17.0	−6.8	2.0
3300	12.1	17.0	−6.9	2.0
3350	12.3	17.0	−6.7	2.0
3400	11.4	17.0	−7.6	2.0
3450	11.4	17.0	−7.6	2.0
3500	11.2	17.0	−7.8	2.0
3550	11.2	17.0	−7.8	2.0
3600	11.3	17.0	−7.7	2.0
3650				
3700				
3750				
3800				
3850				
3900				
3950				
4000				
4050				
4100				
4150				
4200				
4250				
4300				
4350				
4400				
4450				
4500				
4550	11.8	17.0	−7.2	2.0
4600	11.9	17.0	−7.1	2.0
4650	11.9	17.0	−7.1	2.0
4700	11.9	17.0	−7.1	2.0
4750	11.9	17.0	−7.1	2.0
4800	11.9	17.0	−7.1	2.0
4850	12.3	17.0	−6.7	2.0
4900	12.3	17.0	−6.7	2.0
4950	12.4	17.0	−6.6	2.0
5000	12.5	17.0	−6.5	2.0
5050	12.7	17.0	−6.3	2.0
5100	12.8	17.0	−6.2	2.0
5150	12.9	17.0	−6.1	2.0
5200	13.7	17.0	−5.3	2.0
5250	13.5	17.0	−5.5	2.0
5300	13.2	17.0	−5.8	2.0
5350	13.3	17.0	−5.7	2.0
5400	13.4	17.0	−5.6	2.0
5450	13.3	17.0	−5.7	2.0
5500	13.3	17.0	−5.7	2.0
5550	13.2	17.0	−5.8	2.0
5600	13.6	17.0	−5.4	2.0
5650	13.6	17.0	−5.4	2.0
5700	13.6	17.0	−5.4	2.0
5750	13.6	17.0	−5.4	2.0
5800	13.6	17.0	−5.4	2.0
5850	13.7	17.0	−5.3	2.0
5900	13.7	17.0	−5.3	2.0
5950	14.3	17.0	−4.7	2.0
6000	14.1	17.0	−4.9	2.0
6050	14.0	17.0	−5.0	2.0
6100	14.0	17.0	−5.0	2.0
6150	14.0	17.0	−5.0	2.0

6200	14.0	17.0	−5.0	2.0
6250	14.0	17.0	−5.0	2.0
6300	14.6	17.0	−4.4	2.0
6350	15.2	17.0	−3.8	2.0
6400	15.2	17.0	−3.8	2.0
6450	15.1	17.0	−3.9	2.0
6500	14.9	17.0	−4.1	2.0
6550	15.0	17.0	−4.0	2.0
6600	15.5	17.0	−3.5	2.0
6650	16.1	17.0	−2.9	2.0
6700	16.0	17.0	−3.0	2.0
6750	16.1	17.0	−2.9	2.0
6800	16.4	17.0	−2.6	2.0
6850	16.9	17.0	−2.1	2.0
6900	16.9	17.0	−2.1	2.0
6950	17.3	17.0	−1.7	2.0
7000	17.4	17.0	−1.6	2.0
7050	17.5	17.0	−1.5	2.0
7100	18.6	17.0	−0.4	2.0
7150	18.5	17.0	−0.5	2.0
7200	18.5	17.0	−0.5	2.0
7250	18.3	17.0	−0.7	2.0
7300	18.3	17.0	−0.7	2.0
7350	19.2	17.0	0.2	2.0
7400	19.7	17.0	0.7	2.0
7450	19.6	17.0	0.6	2.0
7500	19.8	17.0	0.8	2.0
7550	19.9	17.0	0.9	2.0
7600	20.1	17.0	1.1	2.0
7650	20.3	17.0	1.3	2.0
7700	20.8	17.0	1.8	2.0
7750	21.0	17.0	2.0	2.0
7800	21.4	17.0	2.4	2.0
7850	22.3	17.0	3.3	2.0
7900	22.7	17.0	3.7	2.0
7950	22.7	17.0	3.7	2.0
8000	23.5	17.0	4.5	2.0
8050	24.1	17.0	5.1	2.0
8100	24.1	17.0	5.1	2.0
8150	24.2	17.0	5.2	2.0
8200	24.8	17.0	5.8	2.0
8250	25.2	17.0	6.2	2.0
8300	26.3	17.0	7.3	2.0
8350	26.9	17.0	7.9	2.0
8400	27.1	17.0	8.1	2.0
8450	27.5	17.0	8.5	2.0
8500	28.0	17.0	9.0	2.0
Min.	11.1		−7.9	

Device Under Test	TMW1003
Baseband Processor	HFA3863
RF channel	ch 6 (2437MHz)
Bit Rate	11Mbps
Mj (after discarding 20% worst ones)	−8.0 dB
Gp = Mj + (S/N)o + Lsys	11.0 dB

Offset Frequency Δf (kHz)	Processing Gain (dB)			
	ch6			
	Gp(dB)	(S/N)o	Mj=J/S	Lsys
−8500	26.8	17.0	7.8	2.0
−8450	26.7	17.0	7.7	2.0
−8400	26.6	17.0	7.6	2.0
−8350	26.7	17.0	7.7	2.0
−8300	26.7	17.0	7.7	2.0
−8250	26.1	17.0	7.1	2.0
−8200	25.9	17.0	6.9	2.0
−8150	25.9	17.0	6.9	2.0
−8100	25.9	17.0	6.9	2.0
−8050	25.4	17.0	6.4	2.0
−8000	24.8	17.0	5.8	2.0
−7950	24.4	17.0	5.4	2.0
−7900	24.4	17.0	5.4	2.0
−7850	23.8	17.0	4.8	2.0
−7800	23.2	17.0	4.2	2.0
−7750	23.1	17.0	4.1	2.0
−7700	23.0	17.0	4.0	2.0
−7650	23.0	17.0	4.0	2.0
−7600	22.2	17.0	3.2	2.0
−7550	22.0	17.0	3.0	2.0
−7500	21.7	17.0	2.7	2.0
−7450	21.3	17.0	2.3	2.0
−7400	21.0	17.0	2.0	2.0
−7350	20.4	17.0	1.4	2.0
−7300	19.4	17.0	0.4	2.0
−7250	19.2	17.0	0.2	2.0
−7200	19.2	17.0	0.2	2.0
−7150	19.2	17.0	0.2	2.0
−7100	19.2	17.0	0.2	2.0
−7050	19.0	17.0	0.0	2.0
−7000	18.8	17.0	−0.2	2.0
−6950	18.2	17.0	−0.8	2.0
−6900	18.0	17.0	−1.0	2.0
−6850	17.5	17.0	−1.5	2.0
−6800	17.5	17.0	−1.5	2.0
−6750	17.3	17.0	−1.7	2.0
−6700	17.2	17.0	−1.8	2.0
−6650	16.9	17.0	−2.1	2.0
−6600	16.7	17.0	−2.3	2.0
−6550	16.5	17.0	−2.5	2.0
−6500	16.3	17.0	−2.7	2.0
−6450	16.3	17.0	−2.7	2.0
−6400	16.6	17.0	−2.4	2.0
−6350	16.7	17.0	−2.3	2.0
−6300	16.2	17.0	−2.8	2.0
−6250	15.9	17.0	−3.1	2.0
−6200	16.1	17.0	−2.9	2.0
−6150	16.2	17.0	−2.8	2.0
−6100	16.4	17.0	−2.6	2.0
−6050	16.1	17.0	−2.9	2.0

-6000	16.0	17.0	-3.0	2.0
-5950	16.0	17.0	-3.0	2.0
-5900	15.9	17.0	-3.1	2.0
-5850	15.9	17.0	-3.1	2.0
-5800	15.7	17.0	-3.3	2.0
-5750	15.5	17.0	-3.5	2.0
-5700	15.5	17.0	-3.5	2.0
-5650	15.5	17.0	-3.5	2.0
-5600	15.4	17.0	-3.6	2.0
-5550	15.0	17.0	-4.0	2.0
-5500	14.6	17.0	-4.4	2.0
-5450	14.5	17.0	-4.5	2.0
-5400	14.5	17.0	-4.5	2.0
-5350	14.5	17.0	-4.5	2.0
-5300	14.1	17.0	-4.9	2.0
-5250	14.1	17.0	-4.9	2.0
-5200	13.6	17.0	-5.4	2.0
-5150	13.8	17.0	-5.2	2.0
-5100	13.8	17.0	-5.2	2.0
-5050	14.1	17.0	-4.9	2.0
-5000	13.4	17.0	-5.6	2.0
-4950	13.3	17.0	-5.7	2.0
-4900	13.5	17.0	-5.5	2.0
-4850	13.5	17.0	-5.5	2.0
-4800	13.3	17.0	-5.7	2.0
-4750	13.3	17.0	-5.7	2.0
-4700	13.4	17.0	-5.6	2.0
-4650	13.5	17.0	-5.5	2.0
-4600	13.5	17.0	-5.5	2.0
-4550	13.3	17.0	-5.7	2.0
-4500	13.2	17.0	-5.8	2.0
-4450	13.0	17.0	-6.0	2.0
-4400	13.0	17.0	-6.0	2.0
-4350	13.1	17.0	-5.9	2.0
-4300	12.9	17.0	-6.1	2.0
-4250	12.9	17.0	-6.1	2.0
-4200	13.1	17.0	-5.9	2.0
-4150	13.2	17.0	-5.8	2.0
-4100	12.2	17.0	-6.8	2.0
-4050	12.3	17.0	-6.7	2.0
-4000	12.4	17.0	-6.6	2.0
-3950	12.4	17.0	-6.6	2.0
-3900	12.7	17.0	-6.3	2.0
-3850	12.7	17.0	-6.3	2.0
-3800	12.6	17.0	-6.4	2.0
-3750	12.1	17.0	-6.9	2.0
-3700	12.0	17.0	-7.0	2.0
-3650	12.1	17.0	-6.9	2.0
-3600	12.0	17.0	-7.0	2.0
-3550	11.3	17.0	-7.7	2.0
-3500	11.1	17.0	-7.9	2.0
-3450				
-3400				
-3350				
-3300				
-3250				
-3200				
-3150				
-3100				
-3050				
-3000				

−2950	11.1	17.0	−7.9	2.0
−2900	11.1	17.0	−7.9	2.0
−2850	11.1	17.0	−7.9	2.0
−2800				
−2750				
−2700				
−2650	11.2	17.0	−7.8	2.0
−2600				
−2550				
−2500	11.3	17.0	−7.7	2.0
−2450	11.4	17.0	−7.6	2.0
−2400	11.1	17.0	−7.9	2.0
−2350	11.2	17.0	−7.8	2.0
−2300	11.2	17.0	−7.8	2.0
−2250	11.1	17.0	−7.9	2.0
−2200				
−2150				
−2100				
−2050				
−2000				
−1950				
−1900				
−1850				
−1800				
−1750				
−1700				
−1650				
−1600				
−1550				
−1500				
−1450				
−1400				
−1350				
−1300				
−1250				
−1200				
−1150				
−1100	11.3	17.0	−7.7	2.0
−1050	11.7	17.0	−7.3	2.0
−1000	11.8	17.0	−7.2	2.0
−950	11.8	17.0	−7.2	2.0
−900	11.8	17.0	−7.2	2.0
−850	12.3	17.0	−6.7	2.0
−800	12.1	17.0	−6.9	2.0
−750	11.7	17.0	−7.3	2.0
−700	11.9	17.0	−7.1	2.0
−650	11.9	17.0	−7.1	2.0
−600	11.9	17.0	−7.1	2.0
−550	12.0	17.0	−7.0	2.0
−500	12.4	17.0	−6.6	2.0
−450	12.6	17.0	−6.4	2.0
−400	12.9	17.0	−6.1	2.0
−350	12.3	17.0	−6.7	2.0
−300				
−250	11.9	17.0	−7.1	2.0
−200	11.9	17.0	−7.1	2.0
−150	12.0	17.0	−7.0	2.0
−100	12.1	17.0	−6.9	2.0
−50	11.8	17.0	−7.2	2.0
0	11.5	17.0	−7.5	2.0
50	11.5	17.0	−7.5	2.0

100	11.9	17.0	−7.1	2.0
150	11.8	17.0	−7.2	2.0
200	11.8	17.0	−7.2	2.0
250	11.8	17.0	−7.2	2.0
300	11.4	17.0	−7.6	2.0
350	11.5	17.0	−7.5	2.0
400	11.4	17.0	−7.6	2.0
450	11.4	17.0	−7.6	2.0
500	12.0	17.0	−7.0	2.0
550	12.0	17.0	−7.0	2.0
600	12.0	17.0	−7.0	2.0
650	12.0	17.0	−7.0	2.0
700	11.0	17.0	−8.0	2.0
750	11.0	17.0	−8.0	2.0
800	11.8	17.0	−7.2	2.0
850	11.9	17.0	−7.1	2.0
900	12.1	17.0	−6.9	2.0
950	12.0	17.0	−7.0	2.0
1000	12.3	17.0	−6.7	2.0
1050	12.5	17.0	−6.5	2.0
1100	12.4	17.0	−6.6	2.0
1150	12.1	17.0	−6.9	2.0
1200	12.1	17.0	−6.9	2.0
1250	12.2	17.0	−6.8	2.0
1300	12.2	17.0	−6.8	2.0
1350	12.2	17.0	−6.8	2.0
1400	12.5	17.0	−6.5	2.0
1450	11.3	17.0	−7.7	2.0
1500	11.3	17.0	−7.7	2.0
1550	11.5	17.0	−7.5	2.0
1600	11.4	17.0	−7.6	2.0
1650	12.2	17.0	−6.8	2.0
1700	12.1	17.0	−6.9	2.0
1750				
1800				
1850				
1900				
1950				
2000				
2050				
2100				
2150				
2200				
2250				
2300	11.5	17.0	−7.5	2.0
2350	11.4	17.0	−7.6	2.0
2400	11.2	17.0	−7.8	2.0
2450				
2500				
2550				
2600				
2650	11.9	17.0	−7.1	2.0
2700	11.9	17.0	−7.1	2.0
2750	12.0	17.0	−7.0	2.0
2800	12.0	17.0	−7.0	2.0
2850	11.8	17.0	−7.2	2.0
2900	11.8	17.0	−7.2	2.0
2950	11.8	17.0	−7.2	2.0
3000	12.2	17.0	−6.8	2.0
3050	12.1	17.0	−6.9	2.0
3100	12.6	17.0	−6.4	2.0

3150	12.8	17.0	−6.2	2.0
3200	12.3	17.0	−6.7	2.0
3250	11.8	17.0	−7.2	2.0
3300	11.8	17.0	−7.2	2.0
3350	12.5	17.0	−6.5	2.0
3400	12.1	17.0	−6.9	2.0
3450	12.0	17.0	−7.0	2.0
3500	11.1	17.0	−7.9	2.0
3550	11.0	17.0	−8.0	2.0
3600	11.1	17.0	−7.9	2.0
3650	11.1	17.0	−7.9	2.0
3700				
3750				
3800				
3850				
3900				
3950				
4000				
4050				
4100				
4150				
4200				
4250				
4300	11.1	17.0	−7.9	2.0
4350	11.4	17.0	−7.6	2.0
4400				
4450				
4500				
4550	11.1	17.0	−7.9	2.0
4600	12.6	17.0	−6.4	2.0
4650	12.9	17.0	−6.1	2.0
4700	12.3	17.0	−6.7	2.0
4750	12.5	17.0	−6.5	2.0
4800	12.5	17.0	−6.5	2.0
4850	12.7	17.0	−6.3	2.0
4900	12.8	17.0	−6.2	2.0
4950	12.8	17.0	−6.2	2.0
5000	12.7	17.0	−6.3	2.0
5050	13.2	17.0	−5.8	2.0
5100	13.3	17.0	−5.7	2.0
5150	13.3	17.0	−5.7	2.0
5200	13.7	17.0	−5.3	2.0
5250	13.5	17.0	−5.5	2.0
5300	13.6	17.0	−5.4	2.0
5350	13.7	17.0	−5.3	2.0
5400	13.7	17.0	−5.3	2.0
5450	13.7	17.0	−5.3	2.0
5500	13.3	17.0	−5.7	2.0
5550	13.6	17.0	−5.4	2.0
5600	13.9	17.0	−5.1	2.0
5650	14.0	17.0	−5.0	2.0
5700	13.9	17.0	−5.1	2.0
5750	13.9	17.0	−5.1	2.0
5800	13.7	17.0	−5.3	2.0
5850	13.7	17.0	−5.3	2.0
5900	14.0	17.0	−5.0	2.0
5950	14.2	17.0	−4.8	2.0
6000	14.3	17.0	−4.7	2.0
6050	14.7	17.0	−4.3	2.0
6100	14.7	17.0	−4.3	2.0
6150	14.7	17.0	−4.3	2.0

6200	14.6	17.0	−4.4	2.0
6250	14.8	17.0	−4.2	2.0
6300	14.8	17.0	−4.2	2.0
6350	15.8	17.0	−3.2	2.0
6400	16.0	17.0	−3.0	2.0
6450	15.3	17.0	−3.7	2.0
6500	15.2	17.0	−3.8	2.0
6550	15.6	17.0	−3.4	2.0
6600	16.2	17.0	−2.8	2.0
6650	16.9	17.0	−2.1	2.0
6700	16.8	17.0	−2.2	2.0
6750	16.9	17.0	−2.1	2.0
6800	17.1	17.0	−1.9	2.0
6850	17.6	17.0	−1.4	2.0
6900	17.4	17.0	−1.6	2.0
6950	17.7	17.0	−1.3	2.0
7000	18.1	17.0	−0.9	2.0
7050	18.4	17.0	−0.6	2.0
7100	18.6	17.0	−0.4	2.0
7150	18.8	17.0	−0.2	2.0
7200	19.0	17.0	0.0	2.0
7250	18.9	17.0	−0.1	2.0
7300	19.1	17.0	0.1	2.0
7350	20.2	17.0	1.2	2.0
7400	20.2	17.0	1.2	2.0
7450	20.5	17.0	1.5	2.0
7500	20.5	17.0	1.5	2.0
7550	20.6	17.0	1.6	2.0
7600	20.7	17.0	1.7	2.0
7650	21.1	17.0	2.1	2.0
7700	21.2	17.0	2.2	2.0
7750	21.3	17.0	2.3	2.0
7800	21.5	17.0	2.5	2.0
7850	22.9	17.0	3.9	2.0
7900	23.3	17.0	4.3	2.0
7950	23.6	17.0	4.6	2.0
8000	23.6	17.0	4.6	2.0
8050	24.0	17.0	5.0	2.0
8100	24.7	17.0	5.7	2.0
8150	25.6	17.0	6.6	2.0
8200	25.6	17.0	6.6	2.0
8250	25.6	17.0	6.6	2.0
8300	26.6	17.0	7.6	2.0
8350	26.9	17.0	7.9	2.0
8400	26.9	17.0	7.9	2.0
8450	28.1	17.0	9.1	2.0
8500	28.6	17.0	9.6	2.0
Min.	11.0		−8.0	

Device Under Test	TMW1003
Baseband Processor	HFA3863
RF channel	ch 11 (2462MHz)
Bit Rate	11Mbps
Mj (after discarding 20% worst ones)	−8.2 dB
Gp = Mj + (S/N)o + Lsys	10.8 dB

Offset Frequency Δf (kHz)	Processing Gain (dB)			
	ch11			
	Gp(dB)	(S/N)o	Mj=J/S	Lsys
−8500	26.5	17.0	7.5	2.0
−8450	26.4	17.0	7.4	2.0
−8400	26.4	17.0	7.4	2.0
−8350	26.3	17.0	7.3	2.0
−8300	25.8	17.0	6.8	2.0
−8250	25.6	17.0	6.6	2.0
−8200	25.5	17.0	6.5	2.0
−8150	25.3	17.0	6.3	2.0
−8100	25.2	17.0	6.2	2.0
−8050	25.1	17.0	6.1	2.0
−8000	24.6	17.0	5.6	2.0
−7950	24.1	17.0	5.1	2.0
−7900	24.0	17.0	5.0	2.0
−7850	23.5	17.0	4.5	2.0
−7800	23.1	17.0	4.1	2.0
−7750	22.4	17.0	3.4	2.0
−7700	22.3	17.0	3.3	2.0
−7650	22.1	17.0	3.1	2.0
−7600	21.6	17.0	2.6	2.0
−7550	21.1	17.0	2.1	2.0
−7500	20.4	17.0	1.4	2.0
−7450	20.4	17.0	1.4	2.0
−7400	20.3	17.0	1.3	2.0
−7350	20.1	17.0	1.1	2.0
−7300	19.1	17.0	0.1	2.0
−7250	18.3	17.0	−0.7	2.0
−7200	18.3	17.0	−0.7	2.0
−7150	18.3	17.0	−0.7	2.0
−7100	18.2	17.0	−0.8	2.0
−7050	18.2	17.0	−0.8	2.0
−7000	18.0	17.0	−1.0	2.0
−6950	17.3	17.0	−1.7	2.0
−6900	17.3	17.0	−1.7	2.0
−6850	16.8	17.0	−2.2	2.0
−6800	16.6	17.0	−2.4	2.0
−6750	16.5	17.0	−2.5	2.0
−6700	16.5	17.0	−2.5	2.0
−6650	16.6	17.0	−2.4	2.0
−6600	16.5	17.0	−2.5	2.0
−6550	16.3	17.0	−2.7	2.0
−6500	16.1	17.0	−2.9	2.0
−6450	15.9	17.0	−3.1	2.0
−6400	16.1	17.0	−2.9	2.0
−6350	16.3	17.0	−2.7	2.0
−6300	15.6	17.0	−3.4	2.0
−6250	15.6	17.0	−3.4	2.0
−6200	15.6	17.0	−3.4	2.0
−6150	15.9	17.0	−3.1	2.0
−6100	15.8	17.0	−3.2	2.0
−6050	15.6	17.0	−3.4	2.0

-6000	15.5	17.0	-3.5	2.0
-5950	15.5	17.0	-3.5	2.0
-5900	15.5	17.0	-3.5	2.0
-5850	15.4	17.0	-3.6	2.0
-5800	15.4	17.0	-3.6	2.0
-5750	15.3	17.0	-3.7	2.0
-5700	14.9	17.0	-4.1	2.0
-5650	14.8	17.0	-4.2	2.0
-5600	14.7	17.0	-4.3	2.0
-5550	14.2	17.0	-4.8	2.0
-5500	13.7	17.0	-5.3	2.0
-5450	13.6	17.0	-5.4	2.0
-5400	13.8	17.0	-5.2	2.0
-5350	13.6	17.0	-5.4	2.0
-5300	13.5	17.0	-5.5	2.0
-5250	13.6	17.0	-5.4	2.0
-5200	13.0	17.0	-6.0	2.0
-5150	13.0	17.0	-6.0	2.0
-5100	13.1	17.0	-5.9	2.0
-5050	13.2	17.0	-5.8	2.0
-5000	13.0	17.0	-6.0	2.0
-4950	13.0	17.0	-6.0	2.0
-4900	13.0	17.0	-6.0	2.0
-4850	13.0	17.0	-6.0	2.0
-4800	13.0	17.0	-6.0	2.0
-4750	12.8	17.0	-6.2	2.0
-4700	12.9	17.0	-6.1	2.0
-4650	13.1	17.0	-5.9	2.0
-4600	12.8	17.0	-6.2	2.0
-4550	12.6	17.0	-6.4	2.0
-4500	12.4	17.0	-6.6	2.0
-4450	12.3	17.0	-6.7	2.0
-4400	12.3	17.0	-6.7	2.0
-4350	12.3	17.0	-6.7	2.0
-4300	12.1	17.0	-6.9	2.0
-4250	12.1	17.0	-6.9	2.0
-4200	12.3	17.0	-6.7	2.0
-4150	12.4	17.0	-6.6	2.0
-4100	11.8	17.0	-7.2	2.0
-4050	11.8	17.0	-7.2	2.0
-4000	11.8	17.0	-7.2	2.0
-3950	11.7	17.0	-7.3	2.0
-3900	11.9	17.0	-7.1	2.0
-3850	12.0	17.0	-7.0	2.0
-3800	11.7	17.0	-7.3	2.0
-3750	11.5	17.0	-7.5	2.0
-3700	11.5	17.0	-7.5	2.0
-3650	11.5	17.0	-7.5	2.0
-3600	11.2	17.0	-7.8	2.0
-3550				
-3500				
-3450				
-3400				
-3350				
-3300				
-3250				
-3200				
-3150				
-3100				
-3050				
-3000				

−2950				
−2900				
−2850				
−2800				
−2750				
−2700				
−2650				
−2600				
−2550				
−2500				
−2450				
−2400				
−2350				
−2300				
−2250				
−2200				
−2150				
−2100				
−2050				
−2000				
−1950				
−1900				
−1850				
−1800				
−1750				
−1700				
−1650				
−1600				
−1550				
−1500				
−1450				
−1400				
−1350				
−1300				
−1250				
−1200				
−1150				
−1100	10.8	17.0	−8.2	2.0
−1050	11.0	17.0	−8.0	2.0
−1000	11.1	17.0	−7.9	2.0
−950	11.3	17.0	−7.7	2.0
−900	11.3	17.0	−7.7	2.0
−850	11.5	17.0	−7.5	2.0
−800	11.3	17.0	−7.7	2.0
−750	11.4	17.0	−7.6	2.0
−700	11.4	17.0	−7.6	2.0
−650	11.4	17.0	−7.6	2.0
−600	11.4	17.0	−7.6	2.0
−550	11.7	17.0	−7.3	2.0
−500	12.2	17.0	−6.8	2.0
−450	12.6	17.0	−6.4	2.0
−400	12.6	17.0	−6.4	2.0
−350	12.1	17.0	−6.9	2.0
−300				
−250	11.4	17.0	−7.6	2.0
−200	11.5	17.0	−7.5	2.0
−150	11.5	17.0	−7.5	2.0
−100	11.5	17.0	−7.5	2.0
−50	11.4	17.0	−7.6	2.0
0	11.2	17.0	−7.8	2.0
50	11.0	17.0	−8.0	2.0

100	11.1	17.0	−7.9	2.0
150	11.1	17.0	−7.9	2.0
200	11.1	17.0	−7.9	2.0
250	11.2	17.0	−7.8	2.0
300	11.1	17.0	−7.9	2.0
350	11.4	17.0	−7.6	2.0
400	11.3	17.0	−7.7	2.0
450	11.3	17.0	−7.7	2.0
500	11.8	17.0	−7.2	2.0
550	11.8	17.0	−7.2	2.0
600	11.6	17.0	−7.4	2.0
650	11.9	17.0	−7.1	2.0
700	11.2	17.0	−7.8	2.0
750	11.3	17.0	−7.7	2.0
800	11.3	17.0	−7.7	2.0
850	12.0	17.0	−7.0	2.0
900	12.0	17.0	−7.0	2.0
950	12.0	17.0	−7.0	2.0
1000	12.0	17.0	−7.0	2.0
1050	12.0	17.0	−7.0	2.0
1100	12.1	17.0	−6.9	2.0
1150	12.9	17.0	−6.1	2.0
1200	12.4	17.0	−6.6	2.0
1250	12.5	17.0	−6.5	2.0
1300	12.4	17.0	−6.6	2.0
1350	12.3	17.0	−6.7	2.0
1400	12.3	17.0	−6.7	2.0
1450	11.7	17.0	−7.3	2.0
1500	11.6	17.0	−7.4	2.0
1550	11.6	17.0	−7.4	2.0
1600	11.2	17.0	−7.8	2.0
1650	11.7	17.0	−7.3	2.0
1700	11.0	17.0	−8.0	2.0
1750				
1800				
1850				
1900				
1950				
2000				
2050				
2100				
2150				
2200				
2250				
2300	11.2	17.0	−7.8	2.0
2350	11.1	17.0	−7.9	2.0
2400	11.1	17.0	−7.9	2.0
2450	11.0	17.0	−8.0	2.0
2500	11.0	17.0	−8.0	2.0
2550	11.0	17.0	−8.0	2.0
2600	11.1	17.0	−7.9	2.0
2650	11.5	17.0	−7.5	2.0
2700	11.5	17.0	−7.5	2.0
2750	11.8	17.0	−7.2	2.0
2800	11.8	17.0	−7.2	2.0
2850	11.9	17.0	−7.1	2.0
2900	11.9	17.0	−7.1	2.0
2950	11.9	17.0	−7.1	2.0
3000	12.1	17.0	−6.9	2.0
3050	12.1	17.0	−6.9	2.0
3100	12.6	17.0	−6.4	2.0

3150	12.6	17.0	−6.4	2.0
3200	12.4	17.0	−6.6	2.0
3250	12.3	17.0	−6.7	2.0
3300	12.1	17.0	−6.9	2.0
3350	12.2	17.0	−6.8	2.0
3400	11.7	17.0	−7.3	2.0
3450	11.7	17.0	−7.3	2.0
3500				
3550	11.6	17.0	−7.4	2.0
3600	11.6	17.0	−7.4	2.0
3650	11.1	17.0	−7.9	2.0
3700	10.8	17.0	−8.2	2.0
3750	10.9	17.0	−8.1	2.0
3800	10.9	17.0	−8.1	2.0
3850	10.8	17.0	−8.2	2.0
3900				
3950	11.0	17.0	−8.0	2.0
4000	10.9	17.0	−8.1	2.0
4050				
4100				
4150				
4200				
4250				
4300	10.9	17.0	−8.1	2.0
4350	11.1	17.0	−7.9	2.0
4400	11.1	17.0	−7.9	2.0
4450	11.3	17.0	−7.7	2.0
4500	11.3	17.0	−7.7	2.0
4550	11.4	17.0	−7.6	2.0
4600	11.7	17.0	−7.3	2.0
4650	13.0	17.0	−6.0	2.0
4700	12.2	17.0	−6.8	2.0
4750	12.1	17.0	−6.9	2.0
4800	12.1	17.0	−6.9	2.0
4850	12.7	17.0	−6.3	2.0
4900	12.8	17.0	−6.2	2.0
4950	12.3	17.0	−6.7	2.0
5000	12.6	17.0	−6.4	2.0
5050	13.1	17.0	−5.9	2.0
5100	13.1	17.0	−5.9	2.0
5150	13.2	17.0	−5.8	2.0
5200	13.5	17.0	−5.5	2.0
5250	13.6	17.0	−5.4	2.0
5300	13.6	17.0	−5.4	2.0
5350	13.6	17.0	−5.4	2.0
5400	13.7	17.0	−5.3	2.0
5450	13.8	17.0	−5.2	2.0
5500	13.7	17.0	−5.3	2.0
5550	13.8	17.0	−5.2	2.0
5600	13.8	17.0	−5.2	2.0
5650	13.8	17.0	−5.2	2.0
5700	13.8	17.0	−5.2	2.0
5750	14.0	17.0	−5.0	2.0
5800	14.0	17.0	−5.0	2.0
5850	14.0	17.0	−5.0	2.0
5900	14.3	17.0	−4.7	2.0
5950	14.7	17.0	−4.3	2.0
6000	14.7	17.0	−4.3	2.0
6050	14.7	17.0	−4.3	2.0
6100	14.9	17.0	−4.1	2.0
6150	14.9	17.0	−4.1	2.0

6200	15.0	17.0	−4.0	2.0
6250	15.0	17.0	−4.0	2.0
6300	15.2	17.0	−3.8	2.0
6350	15.7	17.0	−3.3	2.0
6400	15.7	17.0	−3.3	2.0
6450	15.6	17.0	−3.4	2.0
6500	15.6	17.0	−3.4	2.0
6550	16.1	17.0	−2.9	2.0
6600	16.2	17.0	−2.8	2.0
6650	16.7	17.0	−2.3	2.0
6700	16.7	17.0	−2.3	2.0
6750	16.8	17.0	−2.2	2.0
6800	18.1	17.0	−0.9	2.0
6850	18.0	17.0	−1.0	2.0
6900	17.9	17.0	−1.1	2.0
6950	18.1	17.0	−0.9	2.0
7000	18.0	17.0	−1.0	2.0
7050	18.2	17.0	−0.8	2.0
7100	18.4	17.0	−0.6	2.0
7150	19.2	17.0	0.2	2.0
7200	19.2	17.0	0.2	2.0
7250	19.2	17.0	0.2	2.0
7300	19.4	17.0	0.4	2.0
7350	19.4	17.0	0.4	2.0
7400	19.6	17.0	0.6	2.0
7450	20.0	17.0	1.0	2.0
7500	20.4	17.0	1.4	2.0
7550	20.4	17.0	1.4	2.0
7600	21.1	17.0	2.1	2.0
7650	22.1	17.0	3.1	2.0
7700	22.0	17.0	3.0	2.0
7750	22.0	17.0	3.0	2.0
7800	22.9	17.0	3.9	2.0
7850	23.0	17.0	4.0	2.0
7900	23.3	17.0	4.3	2.0
7950	23.3	17.0	4.3	2.0
8000	24.5	17.0	5.5	2.0
8050	25.1	17.0	6.1	2.0
8100	25.1	17.0	6.1	2.0
8150	25.7	17.0	6.7	2.0
8200	25.7	17.0	6.7	2.0
8250	25.9	17.0	6.9	2.0
8300	26.7	17.0	7.7	2.0
8350	27.8	17.0	8.8	2.0
8400	28.1	17.0	9.1	2.0
8450	28.5	17.0	9.5	2.0
8500	28.6	17.0	9.6	2.0
Min.	10.8		−8.2	