

Emission Test Report

Standard: FCC Part 15 Subpart C / IC RSS-210

Class II Permissive Change

Document Number : FCC 19-0264-0

Model Number: T60H786-U
measured with **IBM ThinkPad R50 Series**

FCC ID: ANO20030500CMR
IC: 349E-T60H786U

March 9, 2004

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MEASUREMENT / TECHNICAL REPORT – Part 15 Subpart C
(Intentional Radiator)

Model: T60H786-U (802.11b/g Wireless LAN Adapter)
with
IBM ThinkPad R50 Series
(Machine Type: 1829, 1830, 1831, 1832, 1833, 1836, 1840, 1841,
2883, 2887, 2888, 2889, 2894, 2895)

FCC ID : ANO20030500CMR**March 9, 2004**

This report concerns: (check one)

Original Grant ☐Class I change ☐Class II change ☒Equipment type: Wireless LAN device

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The measurement results contained in this report relate only to the item which was tested.

Measurement procedure used is ANSI C63.4-2000 unless otherwise specified.

Other test procedure: _____

The FCC has issued provisional acceptance of this test laboratory for Declaration of Conformity testing per letter dated 1997.

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A. General Information

APPLICANT : IBM Japan, Ltd.
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 Tel: +81-46-215-4779, Fax: +81-46-273-7420
 REGULATION : FCC Part 15 Subpart C
 Industry Canada RSS-210 (Issue No.5)
 MODEL NAME : T60H786-U
 (Advertising Name) (IBM 11b/g Wireless LAN Mini PCI Adapter)
 FCC ID : ANO20030500CMR
 IC Certification Number : 349E-T60H786U
 SERIAL NUMBER : DX39105T
 PHYSICAL CONDITION : Preproduction
 KIND OF EQUIPMENT : DTS: IEEE802.11b/g Wireless LAN Mini-PCI card
 TESTED DATE : November 6, 7, 13, 19, 25, 26 and 27, 2003

A.1 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4-2000. Radiated testing was performed at an antenna to EUT distance of 3 meters.

A.2 Test Facility / NVLAP Accreditation

The semi-anechoic chamber #1 used to correct the data are located in Yamato Laboratory, IBM Japan.

- This facility has been fully described in a report dated September 1998, submitted to the FCC office, and accepted in a letter, dated Nov. 2, 1998 (31040/SIT).
- IBM Yamato EMC Engineering is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance with Criteria established in Title 15, Part 285 Code of Federal Regulations. (NVLAP Lab code: 200198-0)
- These facilities are accepted by **Industry Canada** as number **IC 4221** for chamber #1 (expiry date: January 25, 2005), and as number **IC 4221-1** for chamber #2 (expiry date: February 16, 2007).

A.3 EUT details

Table A EUT details

Model and S/N	FCC ID IC Certification Number	Description
T60H786-U (s/n DX39105T)	FCC ID: ANO20030500CMR IC: 349E-T60H786U	Applying modular transmitter Built_in type IEEE802.11b/g Wireless LAN Mini-PCI card without antenna
ThinkPad R50 Series M/T : 1829-38x (s/n ZZ-08189)	N/A	Host equipment IBM Notebook PC with built_in antenna CPU: Intel® Pentium® M Processor, 1.5GHz LCD: 14 inch
P/N 02K6746	N/A	Universal AC adapter 72W, Unshielded power cord

B. Summary of Test Results

Table-B presents the list of the measurement items for DTS (Digital Transmissions System) devices under FCC Part 15 Subpart C and Industry Canada RSS-210.

The section numbers of upper portion are showing FCC number, and the other (lower) ones are for IC.

Table-B List of the measurements

Section(s)	Test Items : Transmit mode (TX):		Condition	Result
15.247(a)(2) 6.2.2(o)(b)	Bandwidth at 6 dB below	FCC requirement	Conducted	Pass
– 5.9.1	Occupied BW (Bandwidth at 20 dB below)	IC requirement		Pass
15.247(c) 6.2.2(o)(e1)	Out of Band Emissions	The radiated emission in any 100kHz of outband shall be at least 20dB below the highest inband spectral density.		Pass
15.247(b)(3) 6.2.2(o)(b)	Transmitter peak output power	Shall not exceed 1.0 W.		Pass
15.247(d) 6.2.2(o)(b)	Transmitter power spectral Density	Shall not be greater than 8 dBm in any 3kHz band.		Pass
15.207 6.2.2(o)(e3) / 6.6	AC Wireline Conducted Emissions 150kHz – 30MHz	Class B: Freq.(MHz) QP(dBμV) Ave.(dBμV) 0.15 - 0.5 66 - 56 56 - 46 0.5 - 5 56 46 5 - 30 60 50		Pass
15.205 / 209 6.2.1 / 6.2.2(o)(e3) / 6.3	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Shall not exceed the limits specified in FCC 15.209 or RSS-210 Table3.	Radiated (30MHz-1GHz)	Pass
			Radiated (1– 25GHz)	Pass

	Test Items : Receive mode (RX):			
15.207 6.2.2(o)(e3) / 7.4	AC Wireline Conducted Emissions 150kHz – 30MHz	Class B: Freq.(MHz) QP(dBμV) Ave.(dBμV) 0.15 - 0.5 66 - 56 56 - 46 0.5 - 5 56 46 5 - 30 60 50	Conducted	Pass
15.205 / 209 6.2.1 / 6.2.2(o)(e3) / 7.3	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Shall not exceed the limits specified in FCC 15.209 or RSS-210 Table3.	Radiated (30MHz -1GHz)	Pass
			Radiated (1– 25GHz)	Pass

	Other requirements		Result
15.247(b)(4)(i) –	Antenna gain	Peak gain of the device : 1.84 dBi	N/A
– 5.2	Supply Voltage	Main power source: Universal AC adapter 72W Mini-PCI PC bus to applying card : DC 3.3V ± 0.3V	N/A
15.203 6.2.2(o)(e2)	Unique antenna connector	The device employs an unique electronic connector so called BIOS Lock . Refer to “Confidential_BIOS-Lock” exhibit.	complies

C. Operation Mode of EUT

1. All tests were performed using the “Atheros Radio Test” program. This tool supports the continuous transmission mode for the testing purpose.
2. The following frequencies were chosen for the measurements.
 - 2412MHz (lowest), 2437MHz(middle), and 2462MHz (highest)
3. 11Mbps and 18Mb/s transmission modes were selected for full testing as the worse case samplings. See “Chapter 3. Conducted Peak Output Power” as to the determination of measurement plots.
4. As for the RF receiving test, the middle channels (2437MHz) were selected representatively.

Table-C Transmission mode of EUT (The measurement plots are shown in shading.)

Operation Frequency [GHz]	Rated output power (conducted) [dBm]										
	IEEE802.11b (DSSS)			IEEE802.11g (OFDM)							
	1/2M bps	5.5M bps	11M bps	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
2.412 (Ch. 1)	+17	+17	+17	+14	+14	+14	+14	+14	+14	+14	+13
2.417 (Ch. 2)	+17	+17	+17	+17	+17	+17	+17	+17	+17	+15	+13
2.422 (Ch. 3)	+17	+17	+17	+17	+17	+17	+17	+17	+17	+15	+13
2.427 (Ch. 4)	+17	+17	+17	+17	+17	+17	+17	+17	+17	+15	+13
2.432 (Ch. 5)	+17	+17	+17	+17	+17	+17	+17	+17	+17	+15	+13
2.437 (Ch. 6)	+17	+17	+17	+17	+17	+17	+17	+17	+17	+15	+13
2.442 (Ch. 7)	+17	+17	+17	+17	+17	+17	+17	+17	+17	+15	+13
2.447 (Ch. 8)	+17	+17	+17	+17	+17	+17	+17	+17	+17	+15	+13
2.452 (Ch. 9)	+17	+17	+17	+17	+17	+17	+17	+17	+17	+15	+13
2.457 (Ch. 10)	+17	+17	+17	+17	+17	+17	+17	+17	+17	+15	+13
2.462 (Ch. 11)	+17	+17	+17	+14	+14	+14	+14	+14	+14	+14	+13

D. Justification

The EUT was investigated for both the main (left) and the auxiliary (right) antennas for each Tx mode. The worse case data taken in this report represents the measurement result of the right antenna of 14 inch LCD model that has comparatively higher gain in 2.4GHz band as shown below.

Table-D Peak Antenna Gains of EUT

		14 inch LCD	15 inch LCD
2.4GHz band	Left Antenna gain	1.52 dBi (peak)	1.18 dBi (peak)
	Right Antenna gain	1.84 dBi (peak)	1.71 dBi (peak)

And the columns marked with shading in the Table-C are the worst cases of each Tx mode for all measurement items. This test report represents the measurement results performed with those Tx modes.

E. Test Instruments

Table-E List of Measuring Instruments

Description	Model	Serial Number	Calibration Date	Calibration Interval
Computer	IBM 6868-30J	97-901X3	N/A	N/A
Computer	IBM 6589-13J	97-15613	N/A	N/A
Spectrum Analyzer (100Hz-1.5GHz)	HP 85680B	2601A02634	09/09/03	1 year
Spectrum Analyzer (100Hz-1.5GHz)	HP 85680B	3019A05156	08/14/03	1 year
Spectrum Analyzer (100Hz-1.5GHz)	HP 85680B	2841A04254	08/25/03	1 year
Spectrum Analyzer Display	HP 85662A	2542A12308	09/09/03	1 year
Spectrum Analyzer Display	HP 85662A	3026A19366	08/14/03	1 year
Spectrum Analyzer Display	HP 85662A	2816A16831	08/25/03	1 year
Quasi-Peak Adapter	HP 85650A	2043A00062	09/09/03	1 year
Quasi-Peak Adapter	HP 85650A	2811A01433	08/14/03	1 year
Quasi-Peak Adapter	HP 85650A	2811A01156	08/25/03	1 year
Amplifier (100KHz - 1.3GHz)				
- for 30-200MHz	HP 8447D	2805A02919	04/14/03	1 year
- for 200-1000MHz	HP 8447D	2727A05190	04/14/03	1 year
Amplifier (1 - 18GHz)	HP 8449B	3008A00582	06/11/03	1 year
Amplifier (18 - 25GHz)	Agilent 83051A	3950M00193	01/06/03	1 year
Spectrum Analyzer EMI Test Receiver	R&S ESI26	836119/003	05/01/03	1 year
Receiver (9kHz-30MHz)	R&S ESH3	891806/012	10/17/03	1 year
Receiver (20MHz-1.3GHz)	R&S ESVP	892111/030	03/17/03	1 year
Biconical Antenna (30-200MHz)	EMCO 3108	2536	04/23/03	1 year
Log-Periodic Antenna (200-1000MHz)	EMCO 3146	2849	04/23/03	1 year
Horn Antenna (1- 18GHz)	EMCO 3115	9903-5774	07/17/03	1 year
Horn Antenna (3.95- 5.85GHz)	EMCO 3160-5	1099	07/17/03	1 year
Horn Antenna (5.85- 8.20GHz)	EMCO 3160-6	9712-1044	07/17/03	1 year
Horn Antenna (18- 25GHz)	EMCO 3160-9	0004-1202	07/17/03	1 year
LISN	EMCO 3810/2NM	00022007	05/20/03	1 year
Power Meter	HP 437B	3043U03437	11/08/02	1 year
Power Sensor	HP 8481A	US41030582	11/08/02	1 year
Switch/control unit	HP 3488A	2719A17226	N/A	N/A
		2719A17228	N/A	N/A
Plotter	HP 7550A	2631A33619	N/A	N/A
Coaxial cables (1 – 18GHz):	Length:			
- Horn Ant <=> RF Amp.	6 m	- EM206SCO	03/27/03	1 year
- RF Amp. <=> Spectrum Analyzer	16m	- GEM0101	03/27/03	1 year
Coaxial cables (18 – 25GHz):				
- Horn Ant <=> RF Amp.	3m	- SF102-20167	03/27/03	1 year
- RF Amp. <=> Spectrum Analyzer	1m	- SF102-21105	03/27/03	1 year
N-Coax cables:				
- Bi-coni Ant <=> 10m Cable	9 m	- EM103L01	04/14/03	1 year
- 10m Cable <=> Shield Panel	10 m	- EM103L02	04/14/03	1 year
- Shield Panel <=> RF Amp	7 m	- EM103L03	04/14/03	1 year

- RF Amp <=> Power Splitter	0.5m	- EM103L04	04/14/03	1 year
- Log-peri Ant <=> 10m Cable	9 m	- EM103H01	04/14/03	1 year
- 10m Cable <=> Shield Panel	10 m	- EM103H02	04/14/03	1 year
- Shield Panel <=> RF Amp	7 m	- EM103H03	04/14/03	1 year
- RF Amp <=> Power Splitter	0.5m	- EM103H04	04/14/03	1 year
Coax cables:				
- Lism-L <=> SW/Con.unit (SW100)	4 m	- EMIC-L	04/14/03	1 year
- Lism-N <=> SW/Con.unit (SW101)	4 m	- EMIC-N	04/14/03	1 year
- SW/Con.unit <=> RCVR (Input)	1 m	- EMIC-R	04/14/03	1 year
- SW/Con.unit<=> Spe Ana.(Signal In)	1 m	- EMIC-S	04/14/03	1 year
- Power Splitter <=> SW/Con.unit (SW110)	1 m	- EM103L05	04/14/03	1 year
- Power Splitter <=> SW/Con.unit (SW300)	1 m	- EM103L06	04/14/03	1 year
- Power Splitter <=> SW/Con.unit (SW100)	1 m	- EM103H05	04/14/03	1 year
- Power Splitter <=> SW/Con.unit (SW301)	1 m	- EM103H06	04/14/03	1 year
- SW/Con.unit <=> Receiver (Input)	2 m	- EM1RCV	04/14/03	1 year
- SW/Con.unit <=> Spe Ana.(Signal In) for 30- 200MHz	2 m	- EM1SPL	04/14/03	1 year
- SW/Con.unit <=> Spe Ana.(Signal In) for 200-1000MHz	2 m	- EM1SPH	04/14/03	1 year

Notes.

- The above equipment calibration is traceable to National standards.
- HP: Hewlett Packard, R&S: Rohde & Schwarz

F. Measurement Uncertainty

Uncertainties of the both, the Yamato EMI radiated test facilities (EMI chambers, #1 and #2) and the Yamato EMI conducted test facility are derived with the NIS 81 " Treatment of uncertainty in EMC measurements" 1994.

Estimated site uncertainty values are as follows.

EMI chamber #1 : 4.39dB

EMI chamber #2 : 4.40dB

EMI conducted measurement system : 2.4dB

Detail should be referred to "Treatment of Uncertainty, Calculations and Policy" report, document number TCR 10-0015.

G. Temperature and Humidity

The temperature is controlled within range of 17° to 28°.

The relative humidity is controlled within range of 40% to 70%.

H. Related Submittal(s)/Grant(s)/Notes

The host unit with full peripheral devices including the applying modular as an unintentional radiator is classified as a Digital Device under the FCC Part 15 Subpart B or the Industry Canada Class B Emission Compliance (ICES-003), and subject to DoC.

1. Bandwidth at 6 dB below

[FCC 15.247(a)(2), RSS-210 6.2.2(o)(b)]

1.1 Test Procedure

The bandwidth at 6 dB down from the highest inband spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT was operating in transmission mode at the appropriate center frequency.

The spectrum analyzer was set to :

RBW=100kHz, VBW=100kHz^{*1}, Span=30MHz, Mode= Peak detector,

Sweep = suitable duration based on the EUT specification

*1: To be adjusted accordingly based on the spectrum stability

1.2 Test Instruments and Measurement Setup

Table 1-1: 6 dB Bandwidth Test Instruments

Description	Model	Serial Number
Spectrum Analyzer EMI Test Receiver	R&S ESI26	836119/003
Coax cables: - Spectrum Analyzer <=> EUT	Length : 110 cm Loss : 1.3 dB (for 2.4GHz)	

Notes: - R&S: Rohde & Schwarz

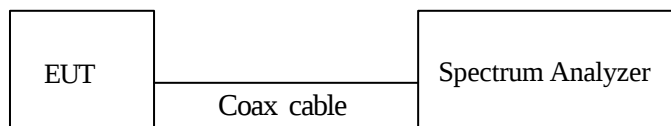


Figure 1: Measurement setup for 6dB bandwidth test

1.3 Measurement Results

Test Date: November 6, 2003

1.3.1 2.4GHz band DSSS mode

Table 1-2-1. 6dB bandwidth, 2.4GHz band DSSS mode, TX mode 1Mbps

Center Frequency (MHz)	Trace number	Lower frequency (MHz)	Upper frequency (MHz)	Bandwidth at 6 dB below (MHz)	Limit (MHz)
2412 (ch. 1)	omitted	2405.90	2418.10	12.20	> 0.5
2437 (ch. 6)	Plot 1-1	2430.90	2443.10	12.20	
2462 (ch. 11)	omitted	2455.90	2468.10	12.20	

Table 1-2-2. 6dB bandwidth, 2.4GHz band DSSS mode, TX mode 11Mbps

Center Frequency (MHz)	Trace number	Lower frequency (MHz)	Upper frequency (MHz)	Bandwidth at 6 dB below (MHz)	Limit (MHz)
2412 (ch. 1)	omitted	2406.26	2417.50	11.24	> 0.5
2437 (ch. 6)	Plot 1-2	2431.08	2442.14	11.06	
2462 (ch. 11)	omitted	2455.84	2467.44	11.60	

1.3.2 2.4GHz band OFDM mode

Table 1-2-3. 6dB bandwidth, 2.4GHz band OFDM mode, TX mode 6Mbps

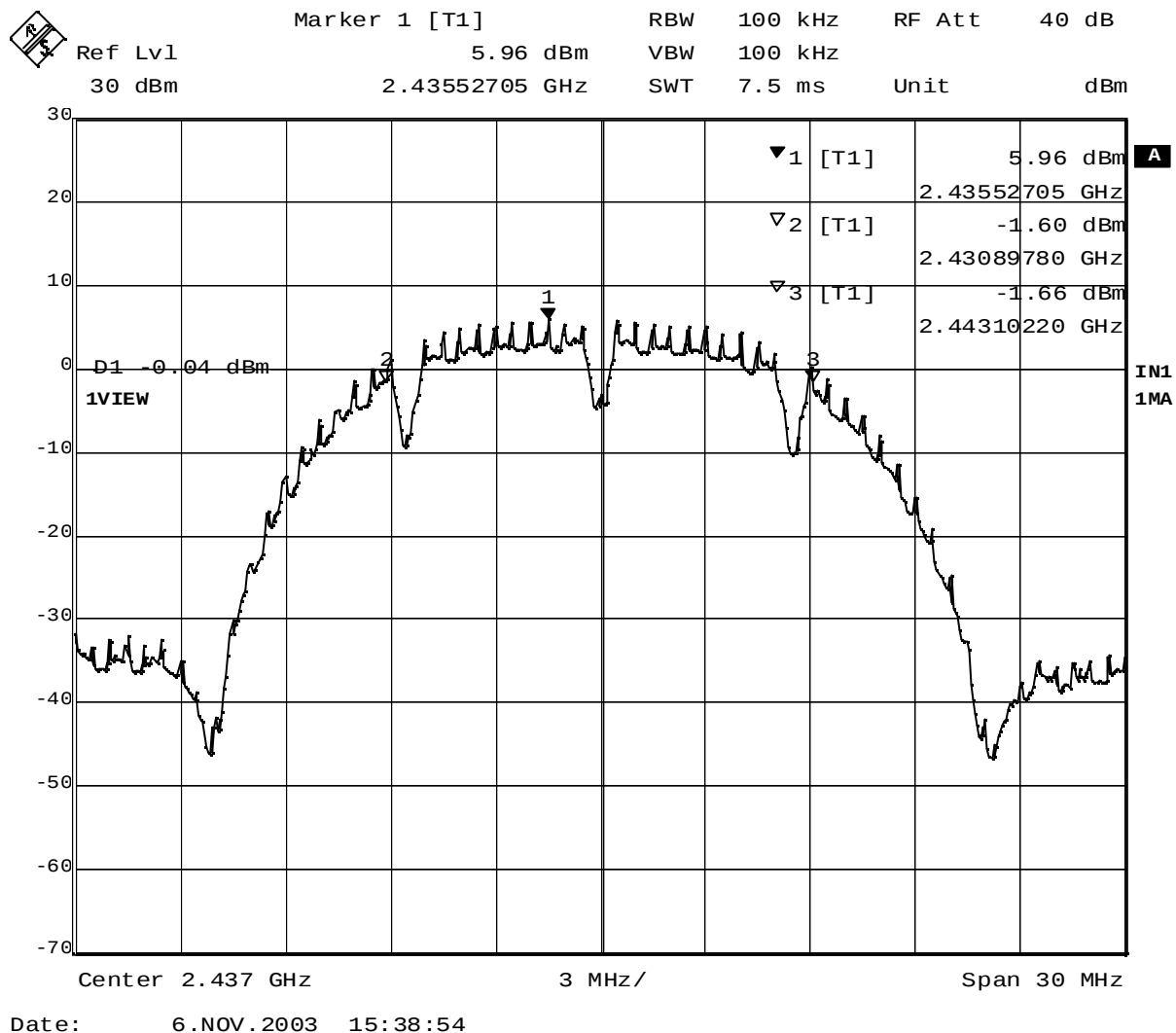
Center Frequency (MHz)	Trace number	Lower frequency (MHz)	Upper frequency (MHz)	Bandwidth at 6 dB below (MHz)	Limit (MHz)
2412 (ch. 1)	omitted	2403.73	2420.27	16.54	> 0.5
2437 (ch. 6)	Plot 1-3	2428.73	2445.27	16.54	
2462 (ch. 11)	omitted	2453.67	2470.27	16.60	

Table 1-2-4. 6dB bandwidth, 2.4GHz band OFDM mode, TX mode 18Mbps

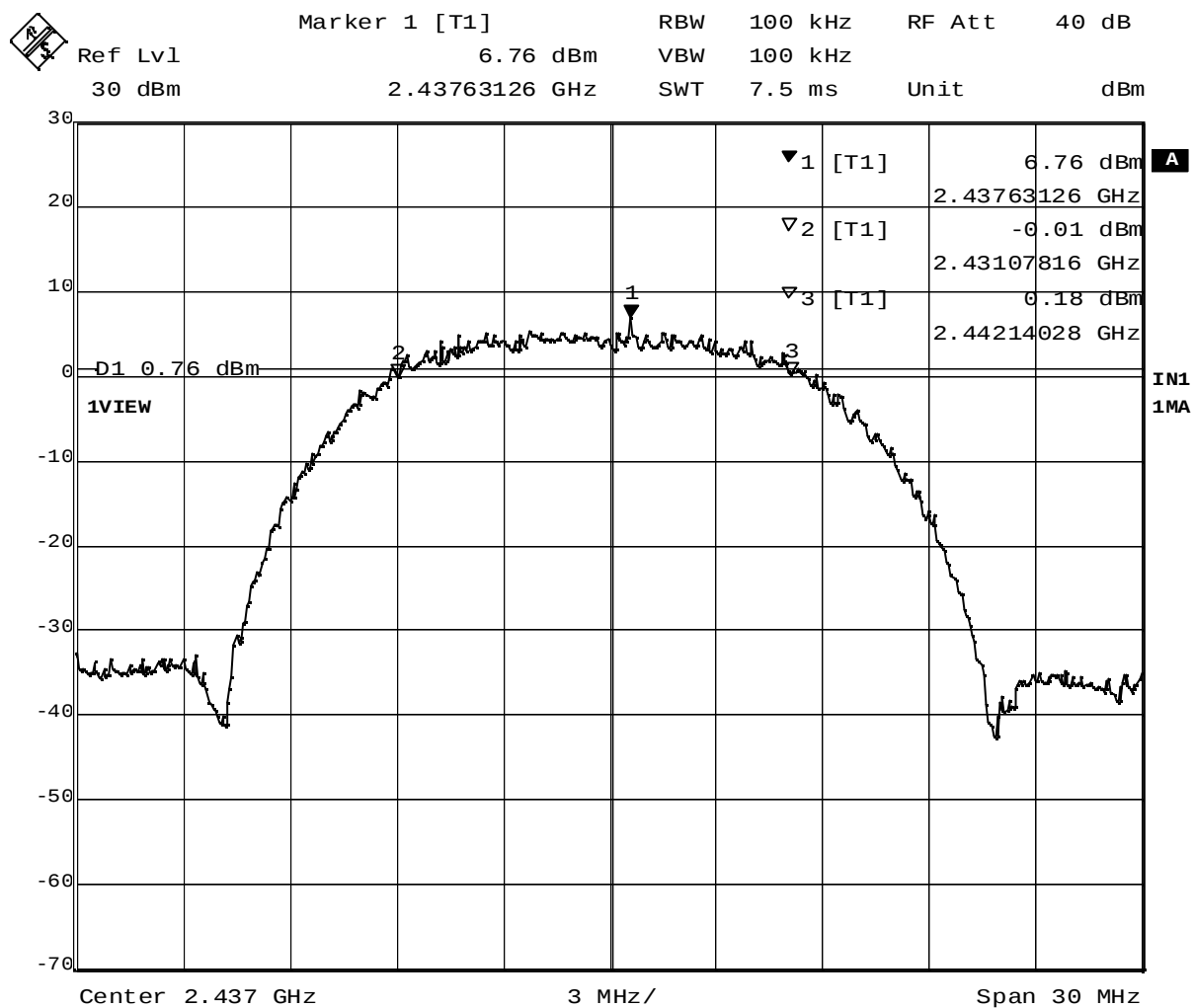
Center Frequency (MHz)	Trace number	Lower frequency (MHz)	Upper frequency (MHz)	Bandwidth at 6 dB below (MHz)	Limit (MHz)
2412 (ch. 1)	omitted	2403.73	2420.27	16.54	> 0.5
2437 (ch. 6)	Plot 1-4	2428.73	2445.21	16.48	
2462 (ch. 11)	omitted	2453.73	2470.27	16.54	

1.4 Trace Data of 6dB bandwidth

The plots are comparatively worse measurement cases in the previous [Table 1-2-1](#) through [Table 1-2-4](#).

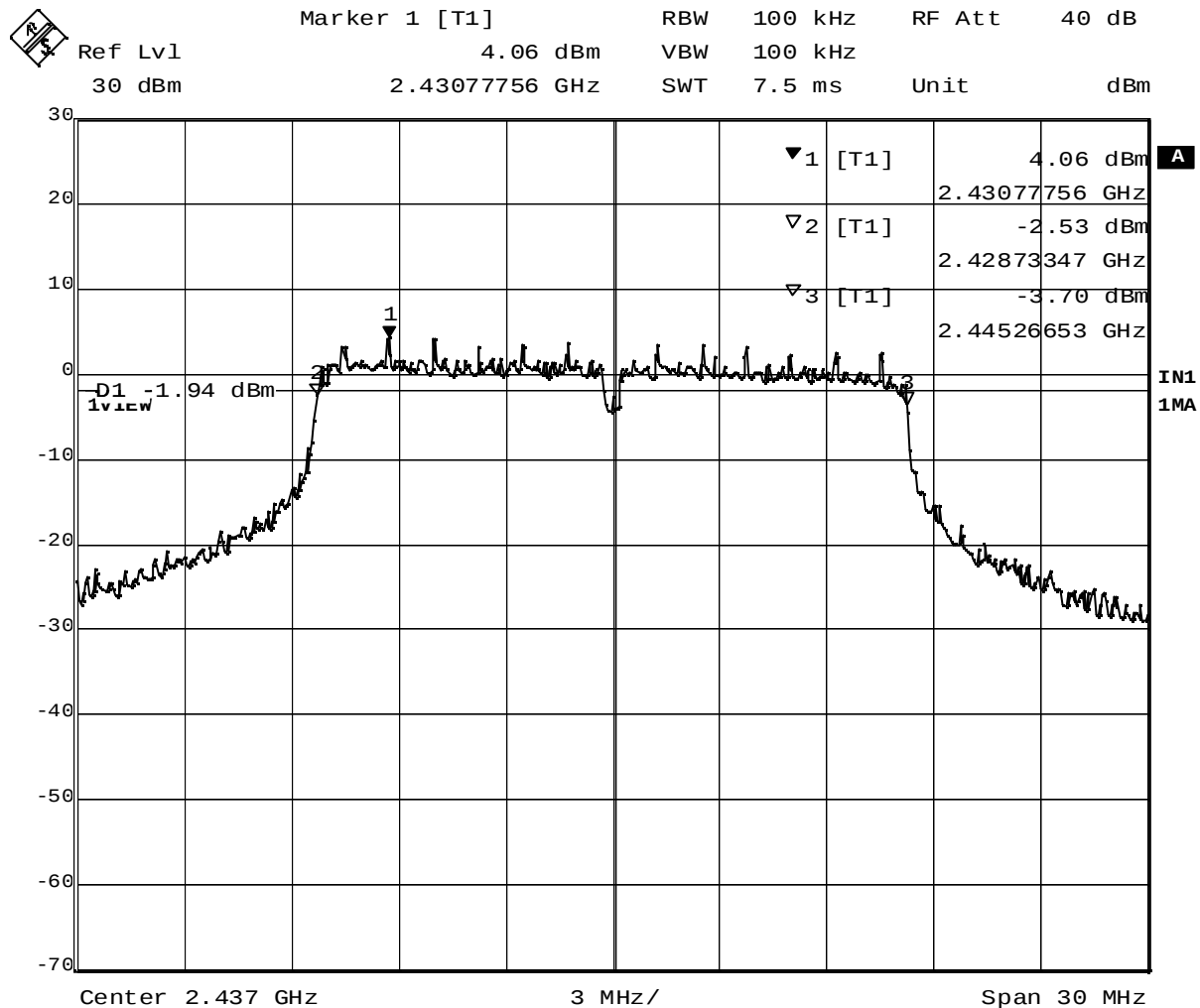


Plot 1-1. 6dB BW at 2437MHz. (DSSS. 1Mbps)



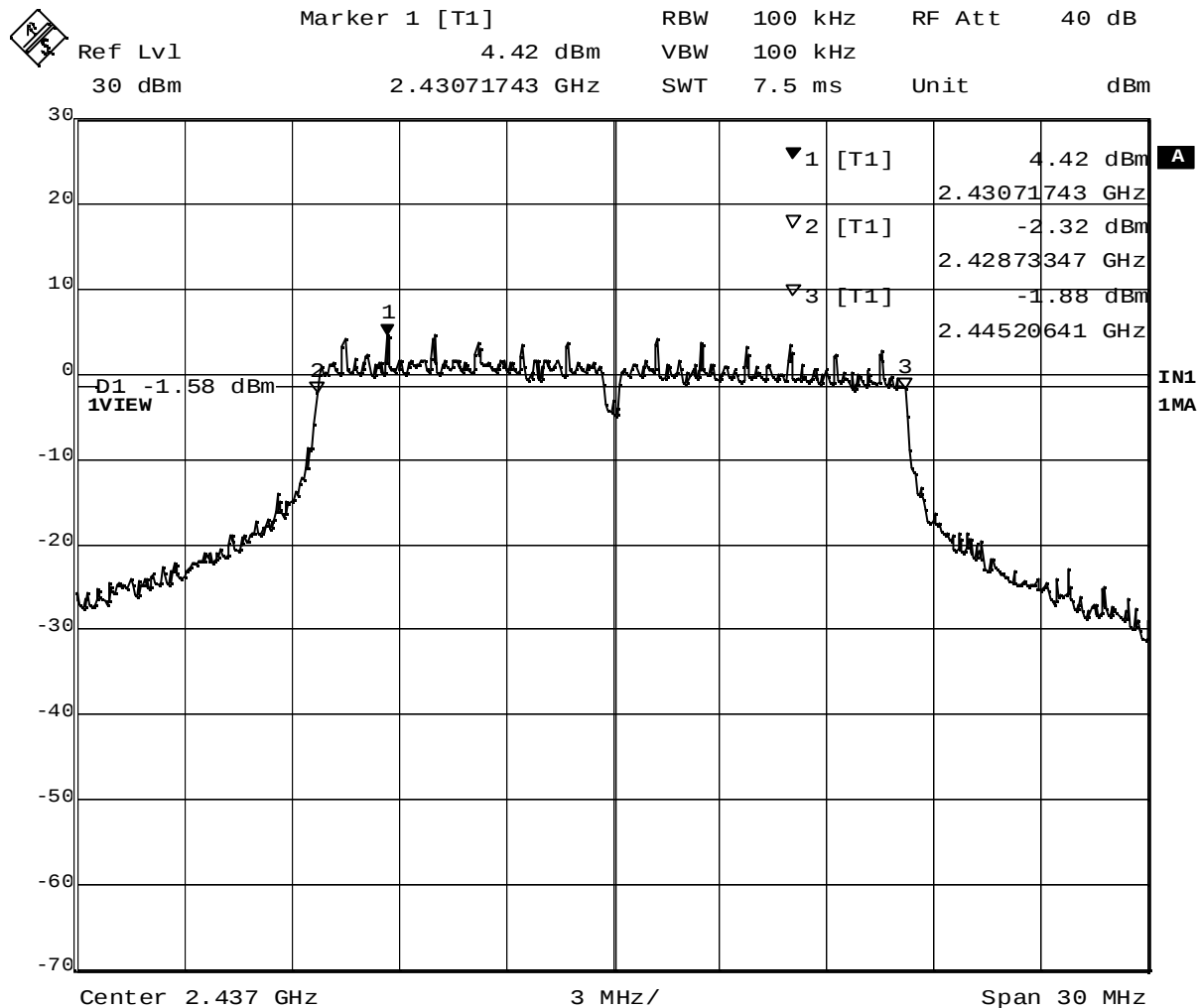
Date: 6.NOV.2003 15:37:03

Plot 1-2. 6dB BW at 2437MHz (DSSS, 11Mbps)



Date: 6.NOV.2003 16:03:35

Plot 1-3. 6dB BW at 2437MHz (OFDM, 6Mbps)



Date: 6.NOV.2003 16:01:04

Plot 1-4. 6dB BW at 2437MHz (OFDM, 18Mbps)

2. Occupied Bandwidth (20 dB Bandwidth)

[RSS-210 5.9.1]

2.1 Test Procedure

The bandwidth at 20 dB down from the highest inband spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT was operating in transmission mode at the appropriate center frequency.

The spectrum analyzer was set to:

RBW=100kHz, VBW=100kHz*¹, Span=50MHz, Mode= Peak detector,

Sweep = suitable duration based on the EUT specification

*1: To be adjusted accordingly based on the spectrum stability

2.2 Test Instruments and Measurement Setup

Same as the Chapter 1 (Table 1-1 & Figure 1).

2.3 Measurement Results

note) The transmission speed rate for the measurement was determined based on the results of previous 6 dB bandwidth measurement. The worse cases were selected representatively.

Test Date: November 6, 2003

2.3.1 2.4GHz band DSSS mode

Table 2-2-1. Occupied bandwidth, 2.4GHz band DSSS mode, TX 11Mbps

Center Frequency (MHz)	Trace number	Lower frequency (MHz)	Upper frequency (MHz)	Bandwidth at 20 dB below (MHz)
2412 (ch. 1)	Plot 2-1	2403.05	2420.89	17.84
2437 (ch. 6)	omitted	2428.03	2445.64	17.61
2462 (ch. 11)	omitted	2453.03	2470.69	17.66

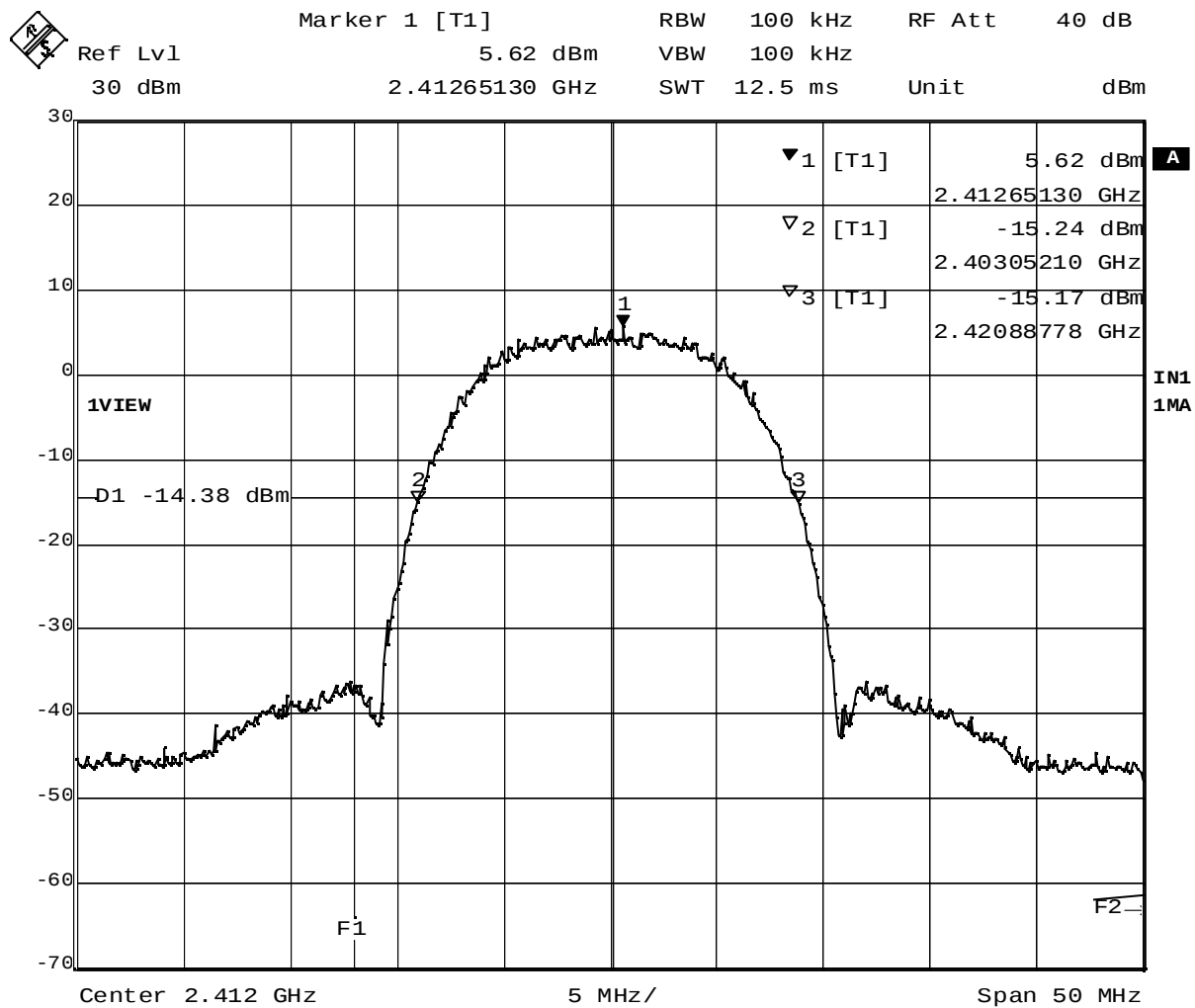
2.3.2 2.4GHz band OFDM mode

Table 2-2-2. Occupied bandwidth, 2.4GHz band OFDM mode, TX 18Mbps

Center Frequency (MHz)	Trace number	Lower frequency (MHz)	Upper frequency (MHz)	Bandwidth at 20 dB below (MHz)
2412 (ch. 1)	omitted	2402.93	2421.07	18.14
2437 (ch. 6)	Plot 2-2	2427.63	2445.92	18.29
2462 (ch. 11)	omitted	2452.83	2470.97	18.14

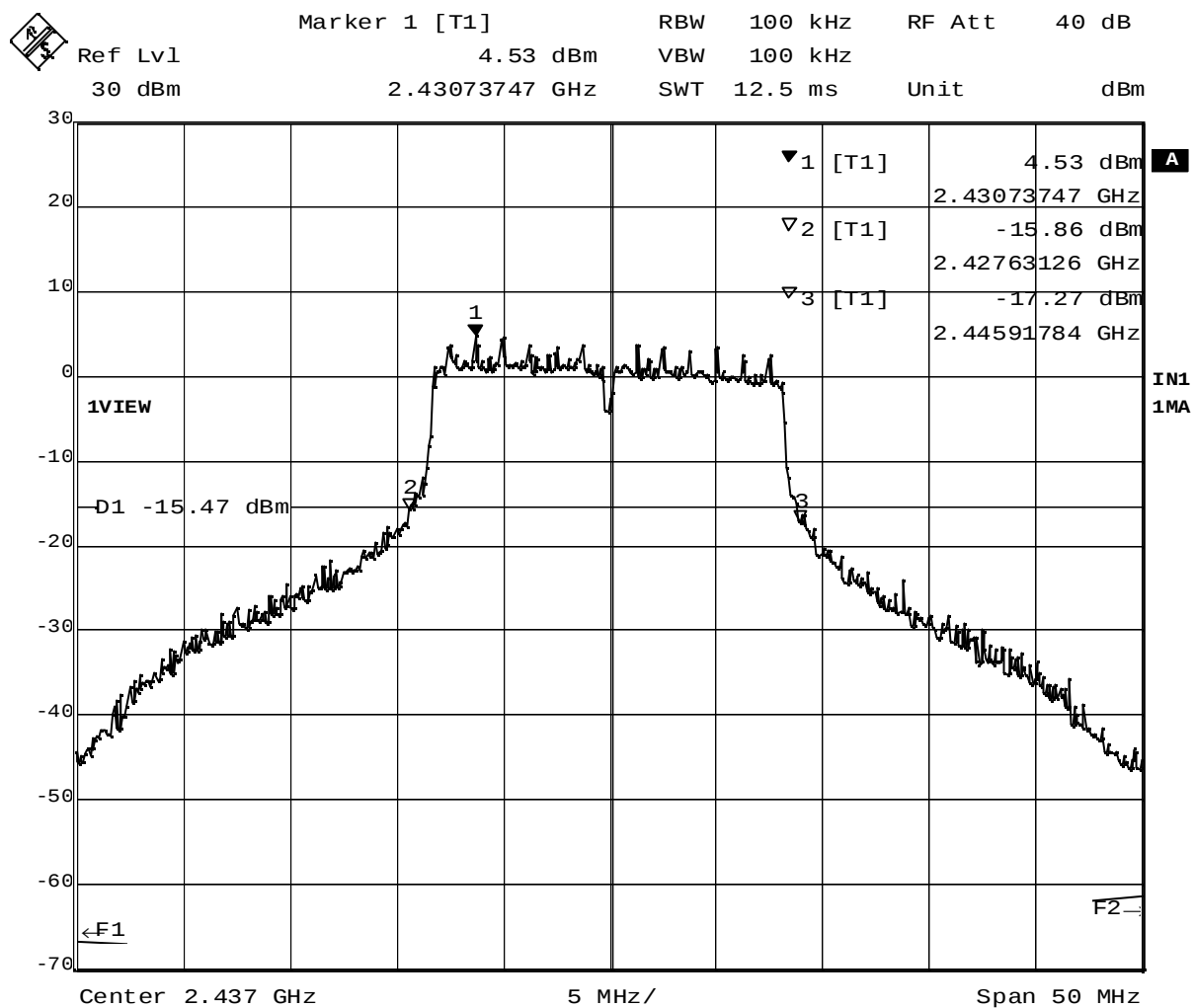
2.4 Trace Data of Occupied Bandwidth

The plots are comparatively worse measurement cases in the previous [Table 2-2-1](#) and [Table 2-2-2](#).



Date: 6.NOV.2003 16:20:26

Plot 2-1. 20dB BW at 2412MHz (DSSS, 11Mbps)



Date: 6.NOV.2003 16:45:16

Plot 2-2. 20dB BW at 2437MHz (OFDM, 18Mbps)

3. Conducted Peak Output Power

[FCC 15.247(b)(3), RSS-210 6.2.2(o)(b)]

The test was performed with two kinds of measurement methods using power meter or spectrum analyzer.

3.1 Test Procedure

3.1.1 Power Meter measurement method

The test was performed for search of the highest power levels of each Tx mode.

- A transmitter antenna terminal of EUT was connected to the input of a RF power sensor.
- The measurement was performed while EUT was operating in continuous transmission mode at the appropriate center frequencies. i.e. the lowest, middle, and highest frequencies of each DSSS or OFDM mode.

Table 3-1: Test Instruments of power meter method

Description	Model	Serial Number
Power Meter	HP 437B	3043U03437
Power Sensor	HP 8481A	US41030582
Coax cables: - Power Sensor <=> EUT	Length: 20 cm Loss: 0.7dB	

Notes: - HP: Hewlett Packard

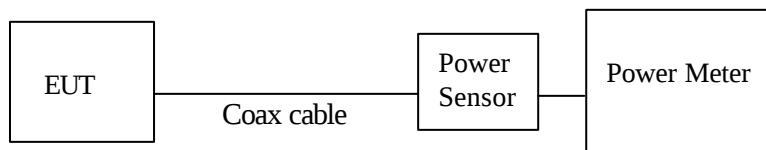


Figure 3-1: Measurement setup of power meter method

3.1.2 Spectrum Analyzer measurement method

The spectrum analyzer was connected to the antenna terminal, while EUT was operating in continuous transmission mode (shown in the Chapter C) at the appropriate center frequencies.

The spectrum analyzer was set to :

VBW= 30kHz, RBW=1MHz,

Span=30-40MHz encompassing the entire 6 dB emission bandwidth of the transmission signal,

Mode= sample detector, Trigger= free run

The band power measurement function was used to measure the peak power of each transmission mode selected by the step 3.1.1. The analyzer computed the peak power by integrating the spectrum across the 6 dB emission bandwidth given by the previous chapter.

The test instruments and setup configuration are the same as the Table 1-1 and Figure 1.

3.2 Measurement Results

Test Date: November 6, 2003

Table 3-2-1. Power meter measurement results

Operation Frequency [GHz]	Rated output power (conducted) [dBm]									
	DSSS		OFDM							
	1 / 2M bps	5.5/11M bps	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
2.412 (Aux)	16.33	16.37	13.42	13.42	13.43	13.45	13.39	13.35	13.32	–
Specification	17		14							
2.437 (Aux)	16.35	16.40	16.12	16.14	16.15	16.16	16.10	16.10	–	–
Specification	17		17							
2.462 (Aux)	16.14	16.19	13.21	13.23	13.25	13.27	13.24	13.20	13.17	–
Specification	17		14							

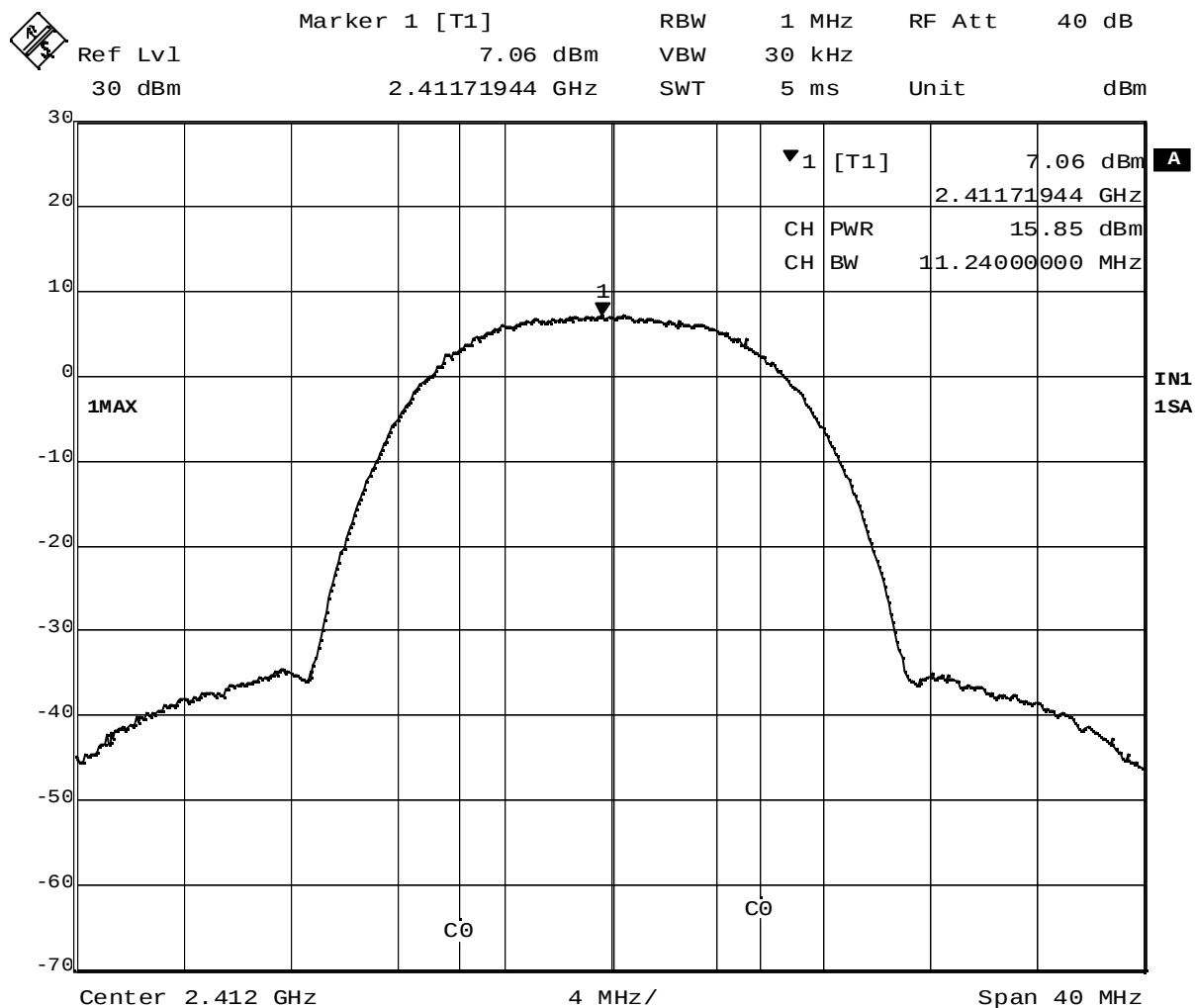
[Calculation table]

Measured Frequency (MHz)	Power Meter Reading (dBm)	Cable Loss (dB)	Results (dBm)	Limit		Margin to limit (dB)
				FCC (dBm)	IC (dBm)	
2412 (DSSS)	16.37	0.7	17.07 (50.9mW)	30	30	12.93
2437 (DSSS)	16.40	0.7	17.10 (51.3mW)			12.90
2462 (DSSS)	16.19	0.7	16.89 (48.9mW)			13.11
2412 (OFDM)	13.45	0.7	14.15 (26.0mW)			15.85
2437 (OFDM)	16.16	0.7	16.86 (48.5mW)			13.14
2462 (OFDM)	13.27	0.7	13.97 (24.9mW)			16.03

Table 3-2-2. Spectrum analyzer measurement results

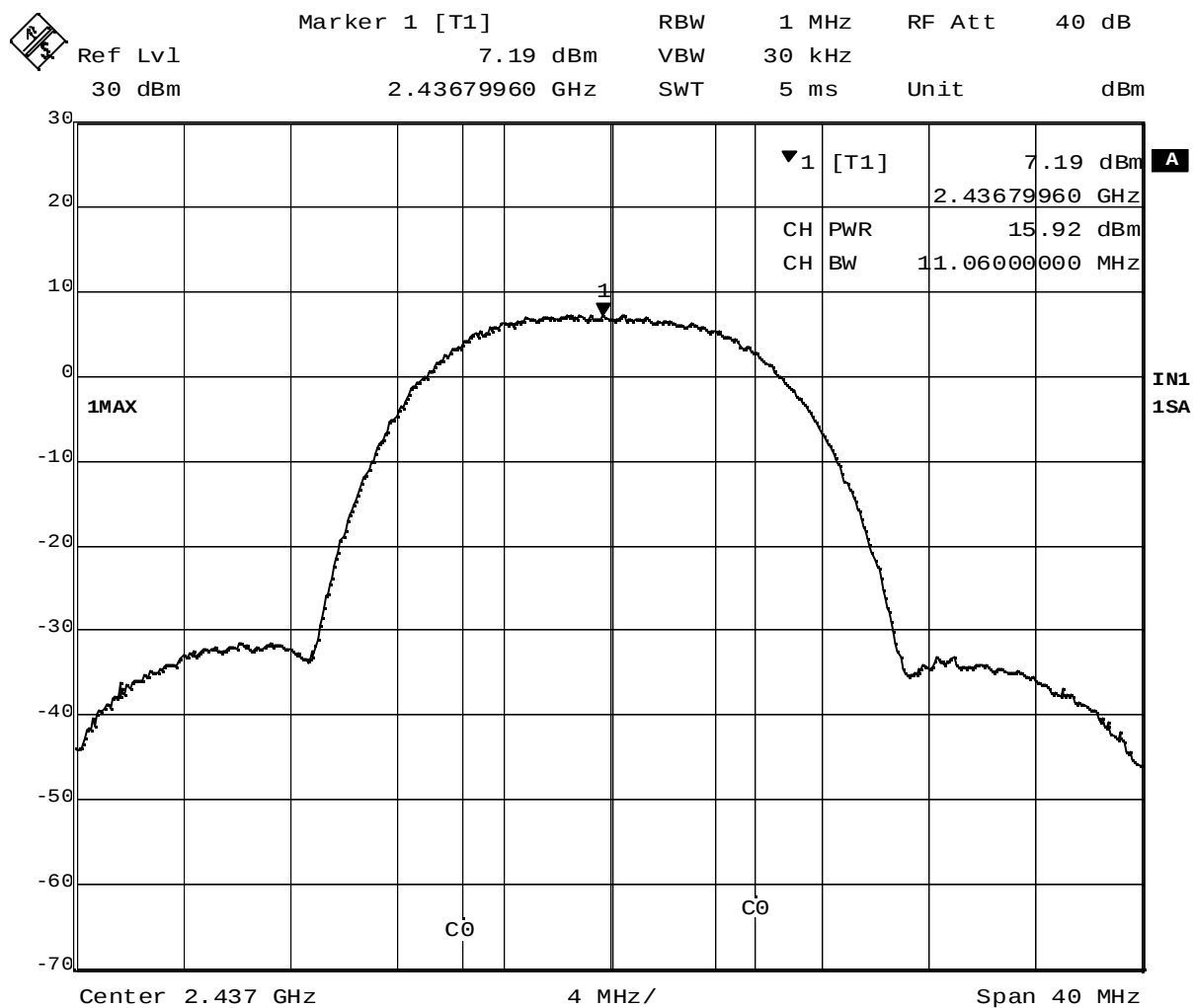
Measured Frequency (MHz)	Analyzer reading (dBm)	Trace number	Cable Loss (dB)	Results (dBm)	Limit		Margin to limit (dB)
					FCC (dBm)	IC (dBm)	
2412 (DSSS)	15.85	Plot 3-1	1.3	17.15 (51.9mW)	30	30	12.85
2437 (DSSS)	15.92	Plot 3-2	1.3	17.22 (52.7mW)			12.78
2462 (DSSS)	15.68	Plot 3-3	1.3	16.98 (49.9mW)			13.02
2412 (OFDM)	12.87	Plot 3-4	1.3	14.17 (26.1mW)			15.83
2437 (OFDM)	15.64	Plot 3-5	1.3	16.94 (49.4mW)			13.06
2462 (OFDM)	12.66	Plot 3-6	1.3	13.96 (24.9mW)			16.04

3.3 Trace Data of Conducted Peak Output Power



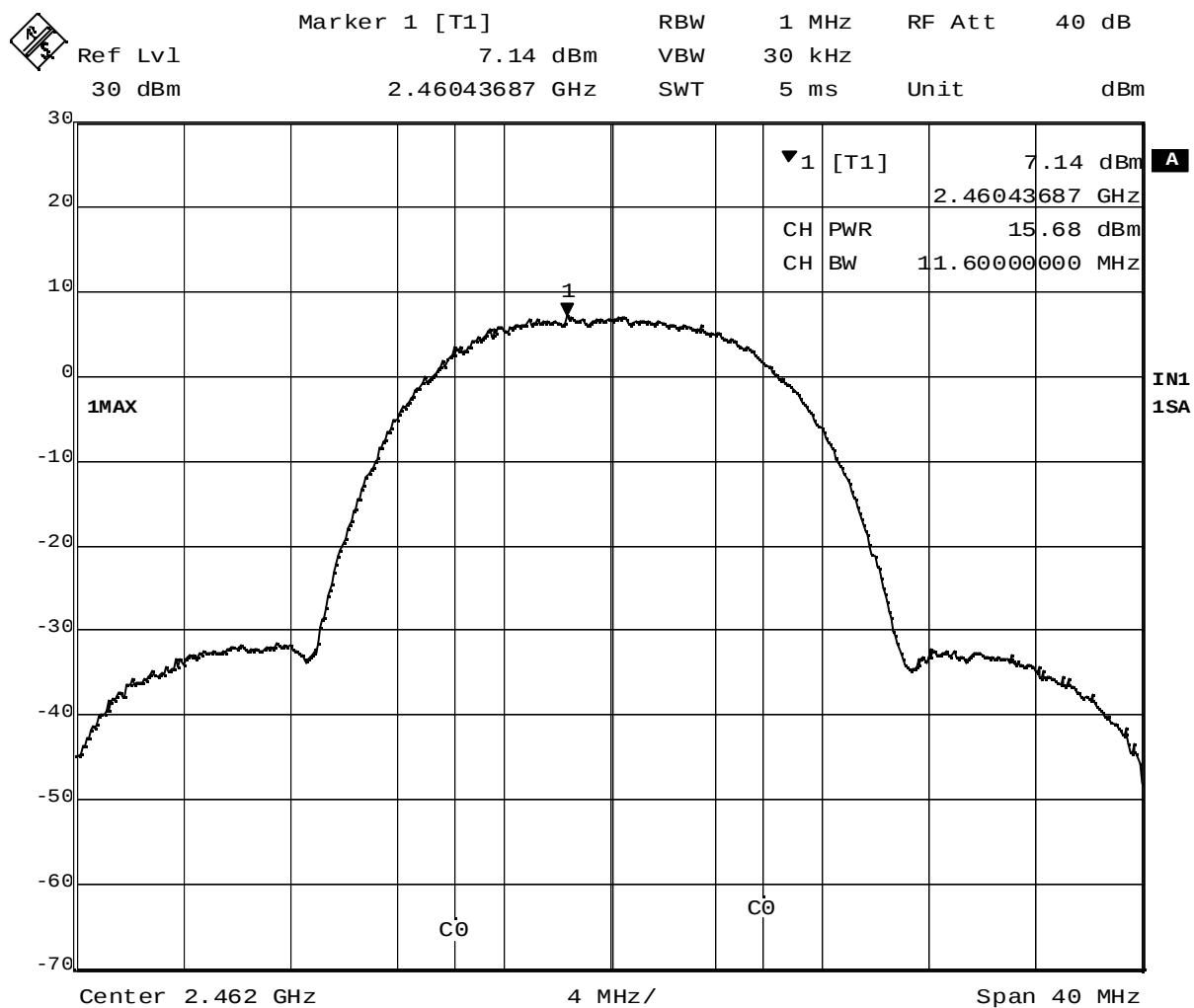
Date: 6.NOV.2003 17:05:03

Plot 3-1. Conducted Peak Output Power of 2412MHz (DSSS, 11Mbps)



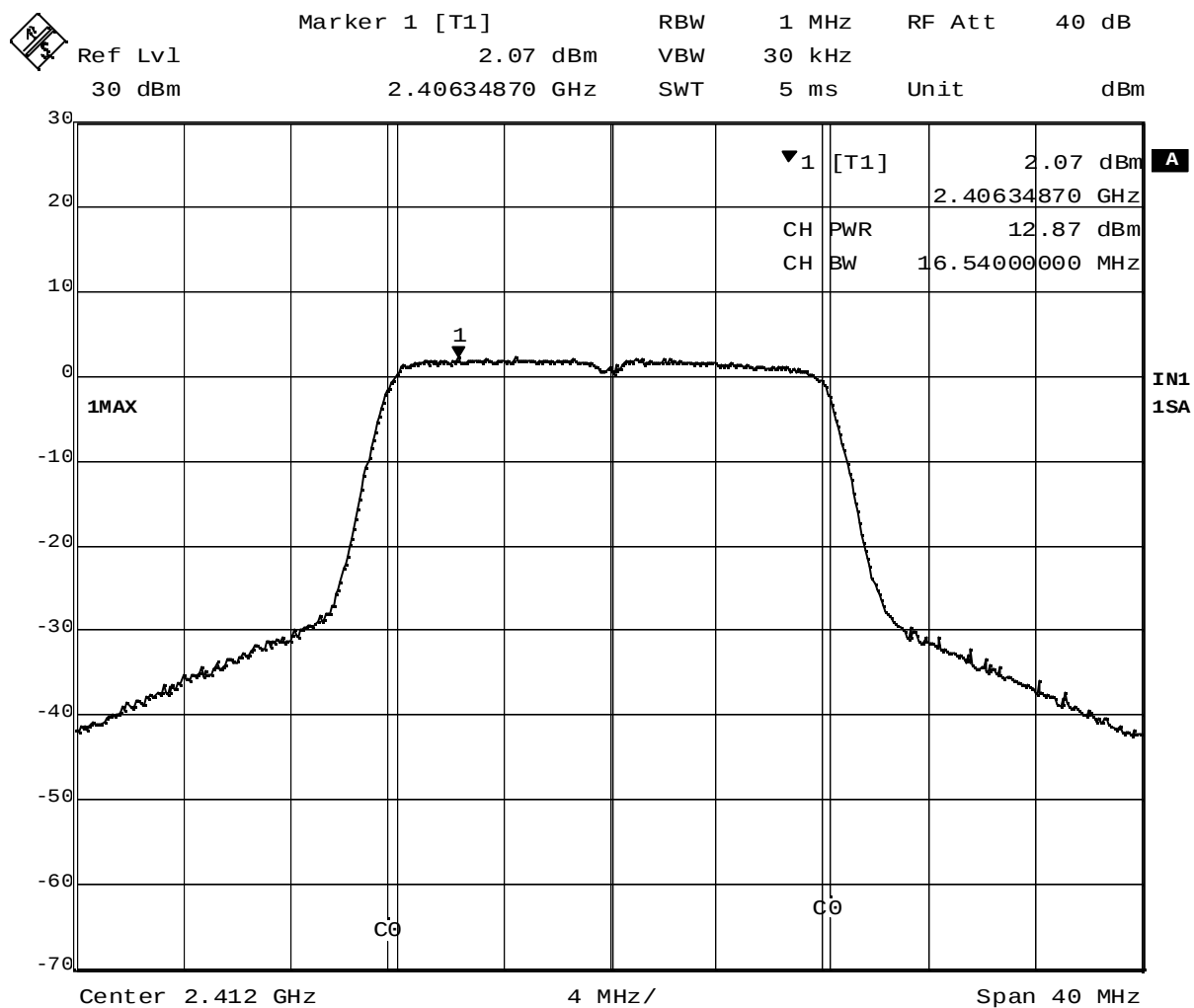
Date: 6.NOV.2003 17:06:25

Plot 3-2. Conducted Peak Output Power of 2437MHz (DSSS, 11Mbps)



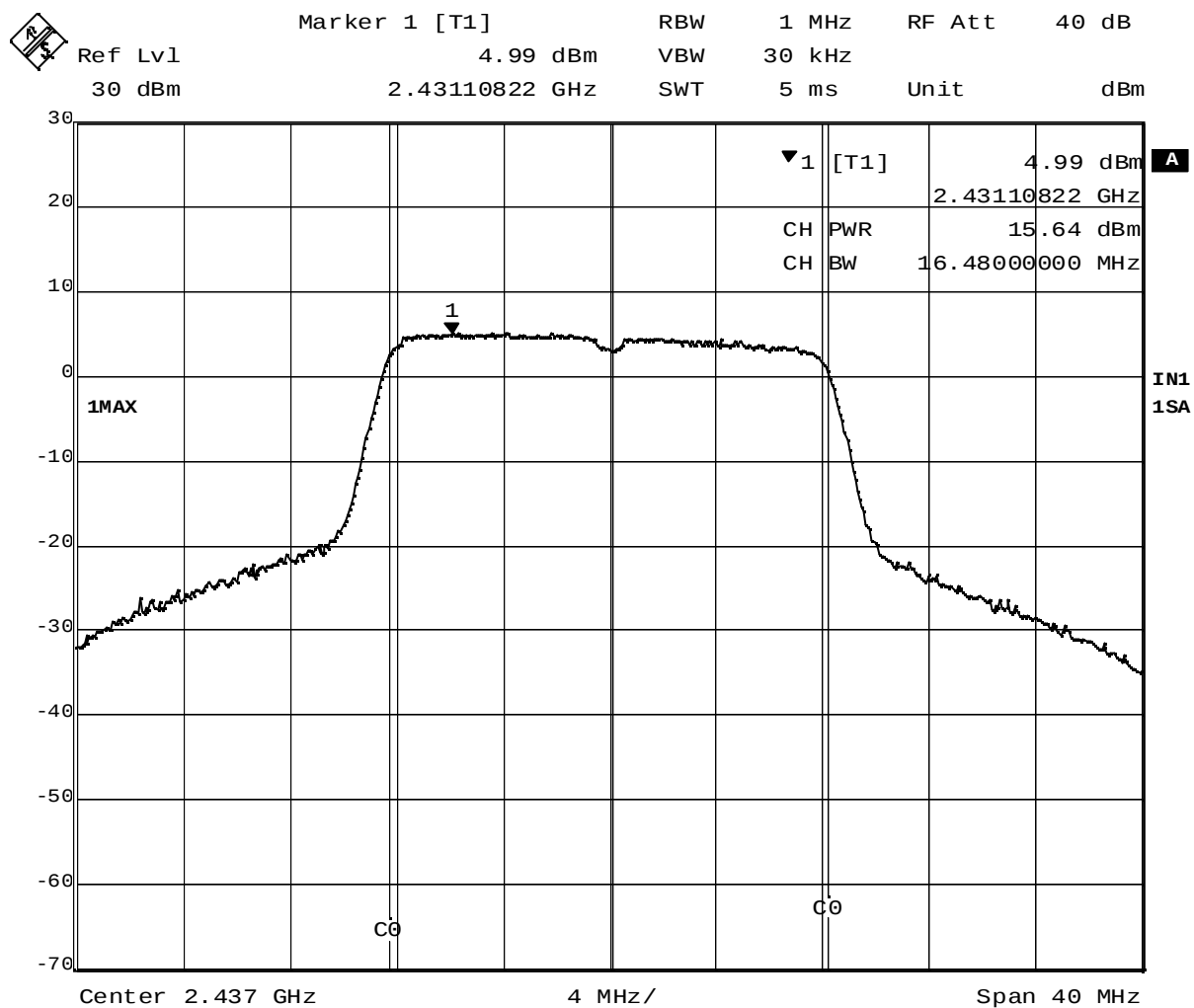
Date: 6.NOV.2003 17:09:02

Plot 3-3. Conducted Peak Output Power of 2462MHz (DSSS, 11Mbps)



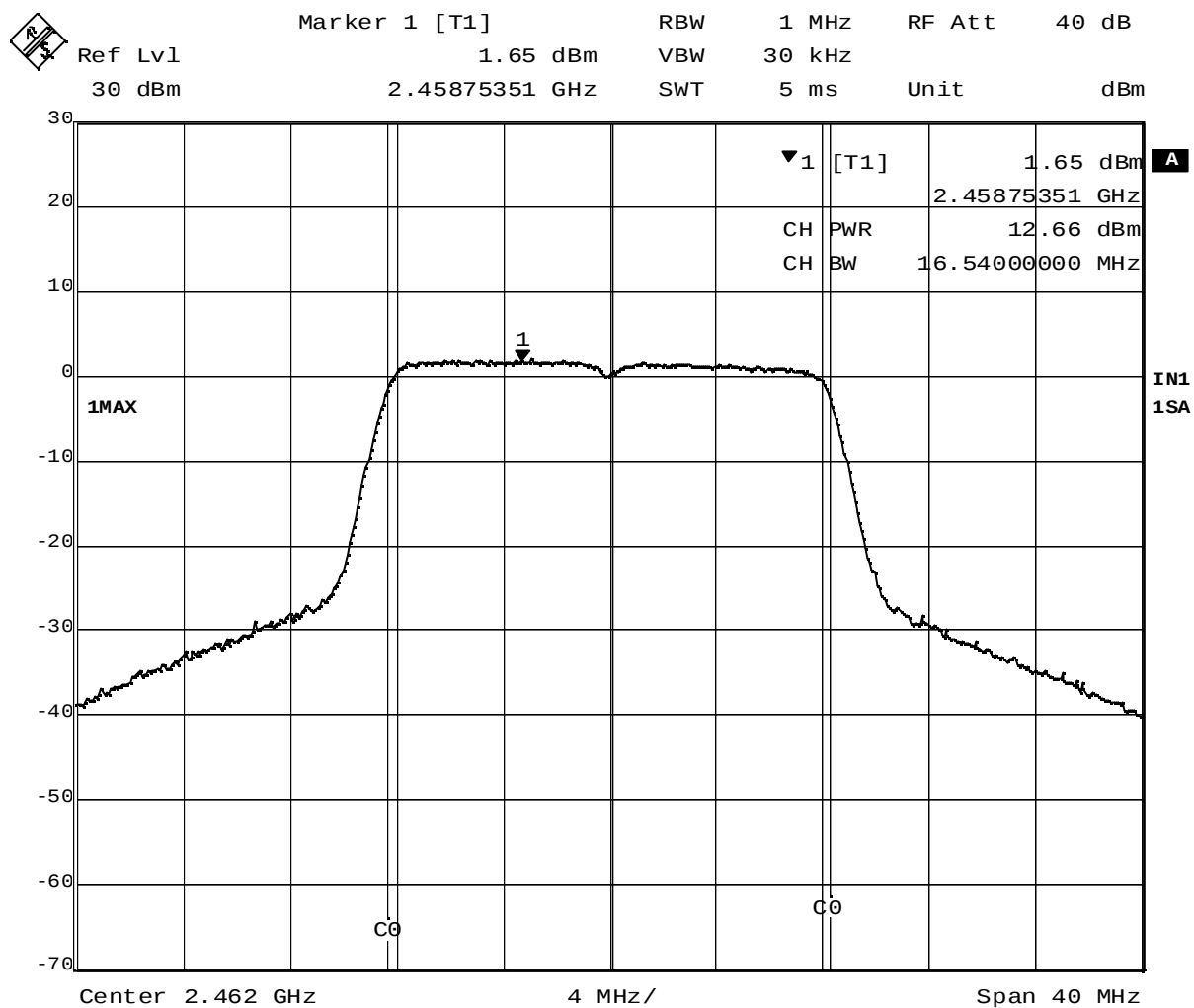
Date: 6.NOV.2003 17:12:10

Plot 3-4. Conducted Peak Output Power of 2412MHz (OFDM, 18Mbps)



Date: 6.NOV.2003 17:19:13

Plot 3-5. Conducted Peak Output Power of 2437MHz (OFDM, 18Mbps)



Date: 6.NOV.2003 17:29:39

Plot 3-6. Conducted Peak Output Power of 2462MHz (OFDM, 18Mbps)

4. Out of Band Emissions (Conducted Spurious)

[FCC 15.247(c), RSS-210 6.2.2(o)(e1)]

4.1 Test Procedure

The outband emissions in any 100kHz bandwidth was measured with a spectrum analyzer connected to the antenna terminal, while EUT was operating in transmission mode at the appropriate center frequency.

The spectrum analyzer was set to:

RBW = 100kHz, VBW = 100kHz*¹, Scanning frequency range = 30MHz~2Ghz, 2GHz~3GHz, and 3GHz~25GHz, Mode= Peak detector, Sweep = suitable duration based on the EUT specification

*1: To be adjusted accordingly based on the spectrum stability

4.2 Test Instruments and Measurement Setup

Same as the Chapter 1 (Table 1-1 & Figure 1).

4.3 Measurement Results

All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest inband spectral density.

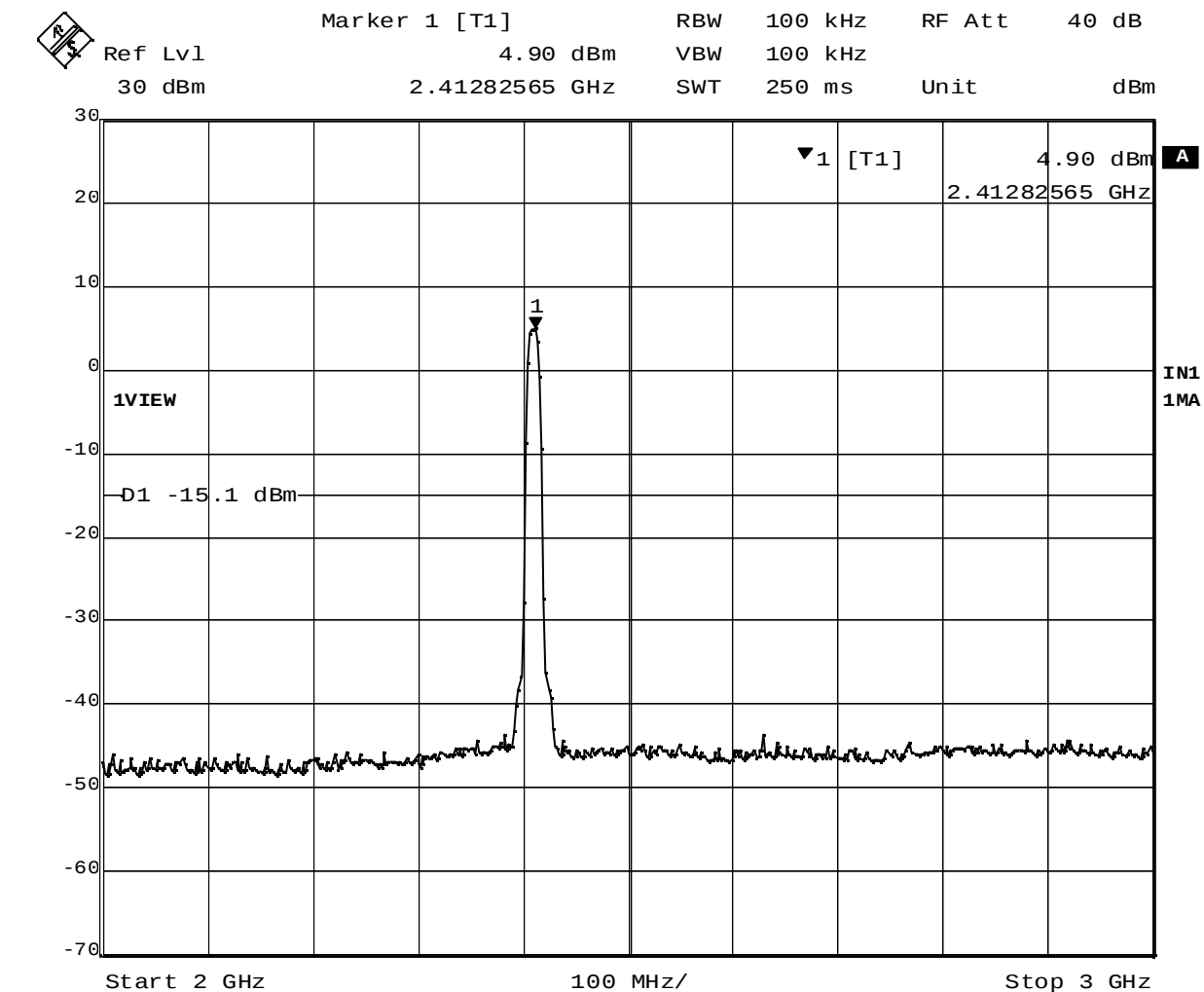
The measurement was performed with the worse cases of each transmission mode, that tend to have higher conducted peak power, based on the results of previous Chapter 3, “Conducted Peak Output Power” measurement.

Test Date: November 6, 2003 : See the following plots.

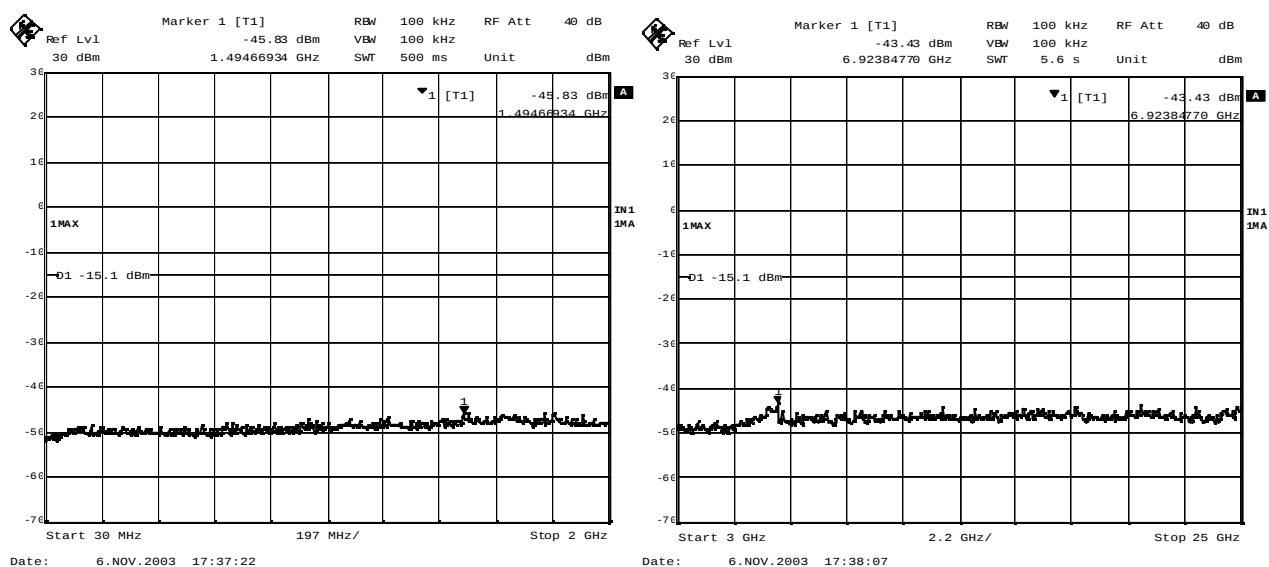
Center Frequency (MHz)			Trace number *1
2412 (ch. 1)	DSSS	11Mbps	Plot 4-1
2437 (ch. 6)			Plot 4-2
2462 (ch. 11)			Plot 4-3
2412 (ch. 1)	OFDM	18Mbps	Plot 4-4
2437 (ch. 6)			Plot 4-5
2462 (ch. 11)			Plot 4-6

*1 : Each submittal plot includes the highest conducted spurious in the 10th harmonics frequency range of each measured Tx mode.

4.4 Trace Data of Out of Band Emissions



Date: 6.NOV.2003 17:36:37



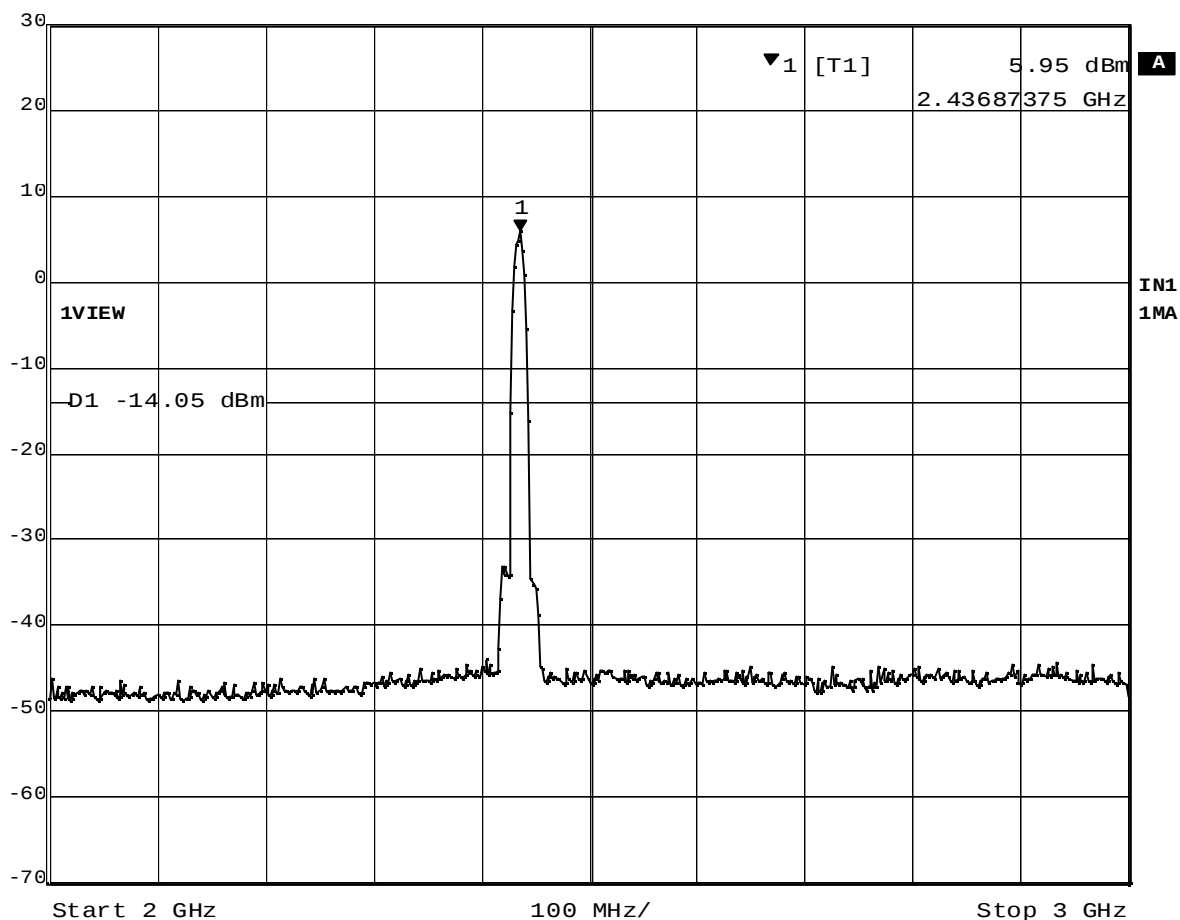
Date: 6.NOV.2003 17:37:22

Date: 6.NOV.2003 17:38:07

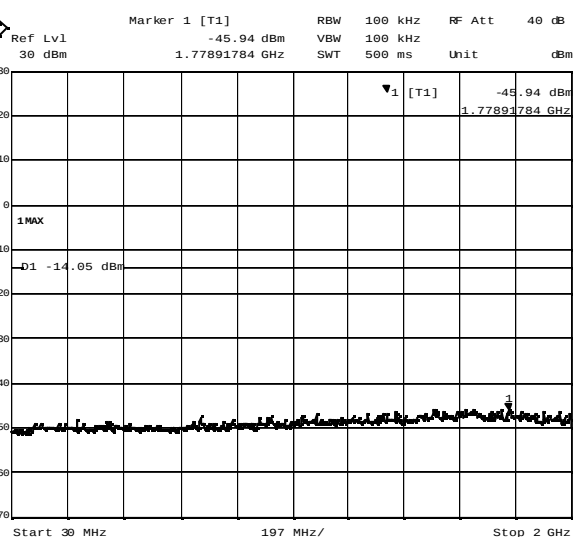
Plot 4-1. Out of band emissions around 2412MHz (DSSS, 11Mbps)



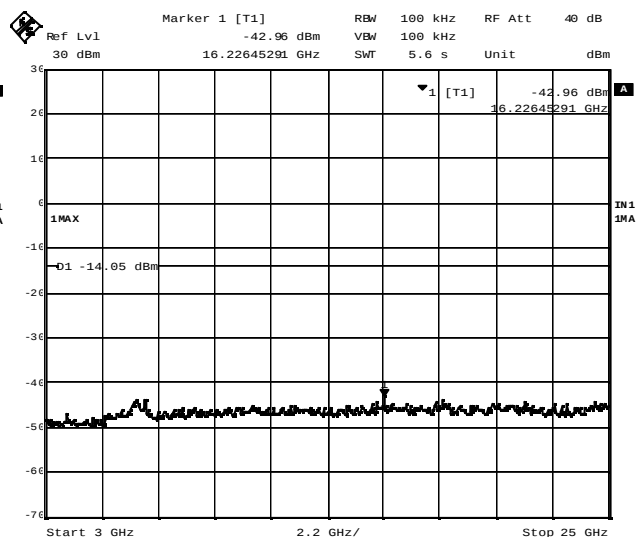
Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl 5.95 dBm VBW 100 kHz
30 dBm 2.43687375 GHz SWT 250 ms Unit dBm



Date: 6.NOV.2003 17:39:14



Date: 6.NOV.2003 17:39:55

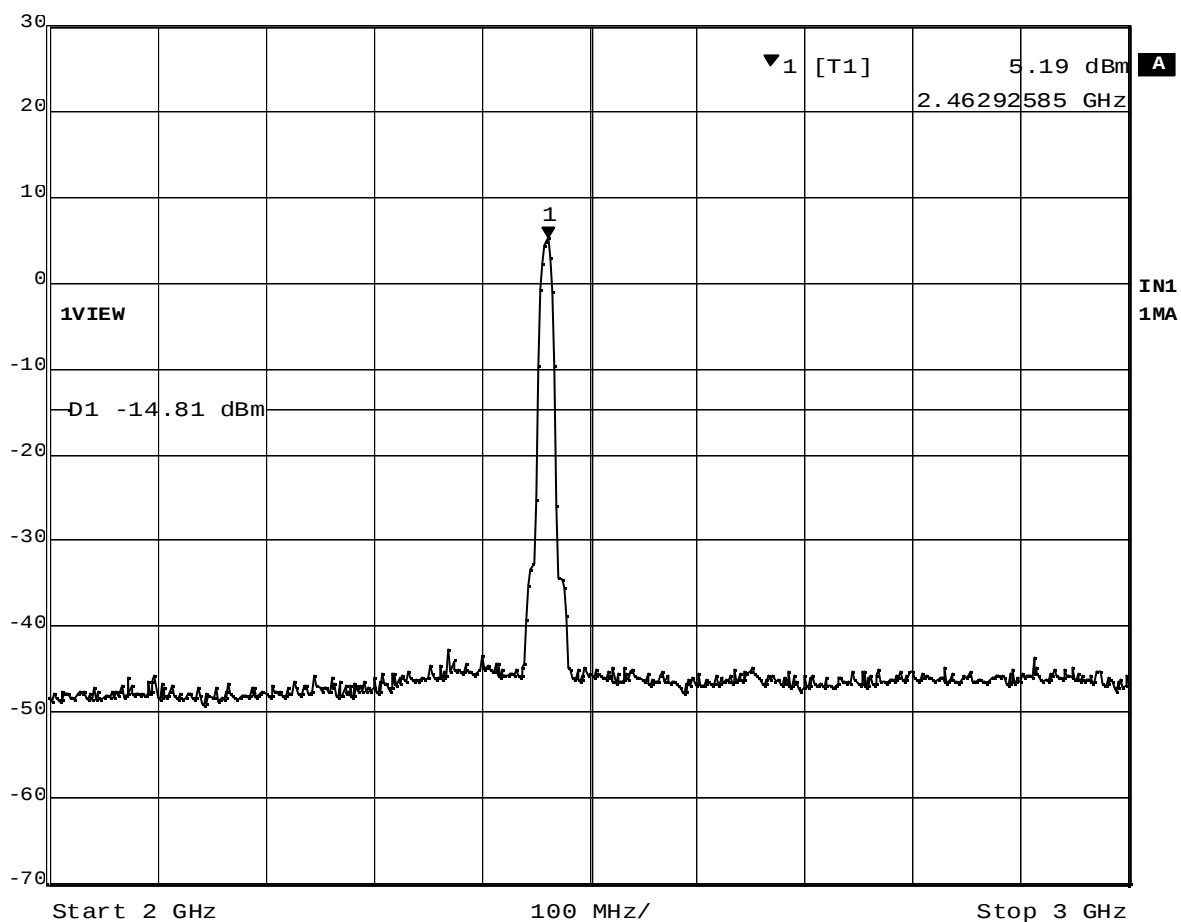


Date: 6.NOV.2003 17:40:39

Plot 4-2. Out of band emissions around 2437MHz (DSSS, 11Mbps)



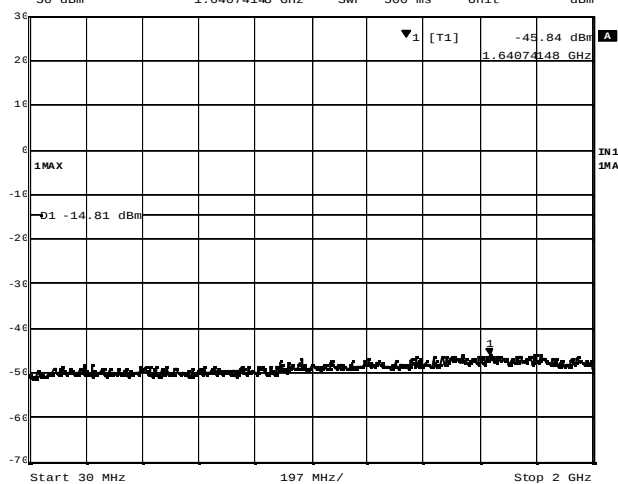
Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl 5.19 dBm VBW 100 kHz
30 dBm 2.46292585 GHz SWT 250 ms Unit dBm



Date: 6.NOV.2003 17:41:44



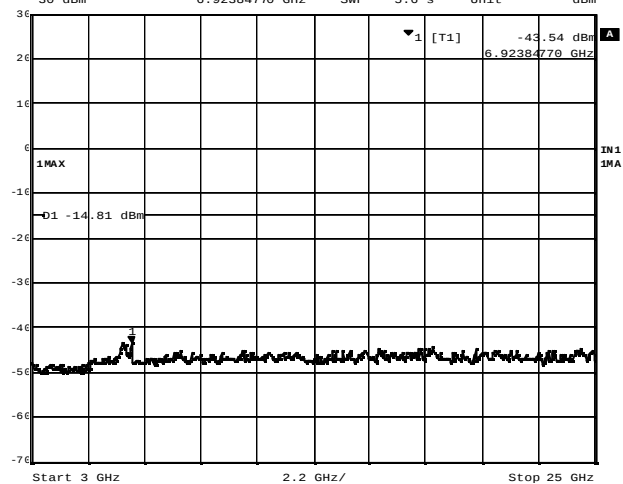
Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl -45.84 dBm VBW 100 kHz
30 dBm 1.64074148 GHz SWT 500 ms Unit dBm



Date: 6.NOV.2003 17:42:31



Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl -43.54 dBm VBW 100 kHz
30 dBm 6.92384770 GHz SWT 5.6 s Unit dBm

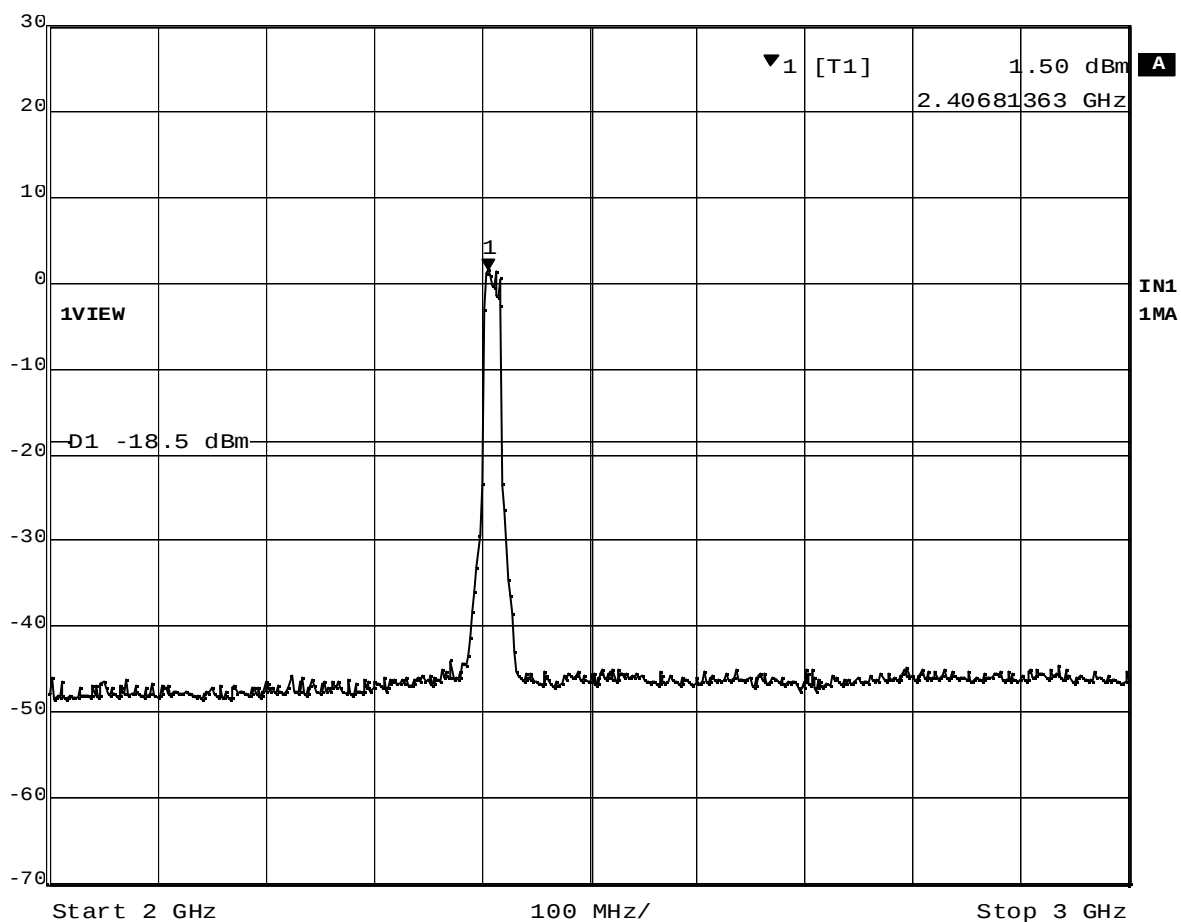


Date: 6.NOV.2003 17:43:07

Plot 4-3. Out of band emissions around 2462MHz (DSSS, 11Mbps)



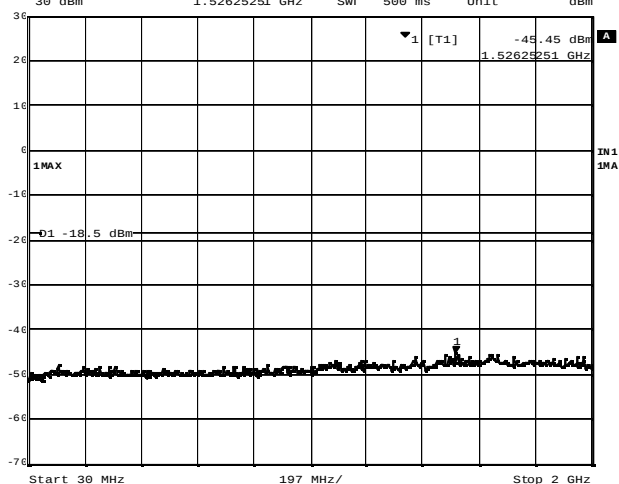
Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl 1.50 dBm VBW 100 kHz
30 dBm 2.40681363 GHz SWT 250 ms Unit dBm



Date: 6.NOV.2003 17:45:19



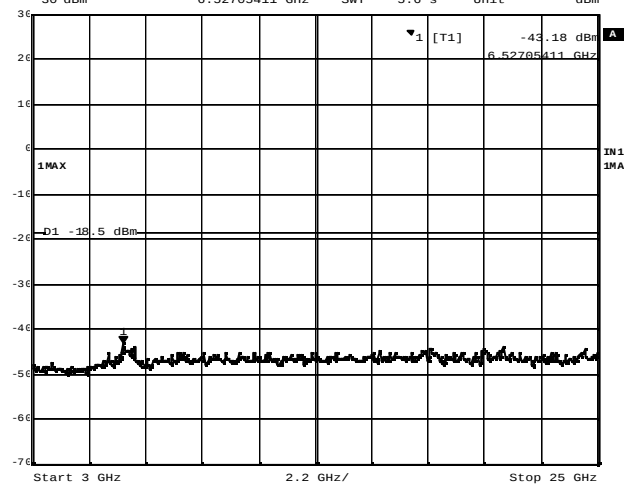
Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl -45.45 dBm VBW 100 kHz
30 dBm 1.52625251 GHz SWT 500 ms Unit dBm



Date: 6.NOV.2003 17:46:03



Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl -43.18 dBm VBW 100 kHz
30 dBm 6.52705411 GHz SWT 5.6 s Unit dBm

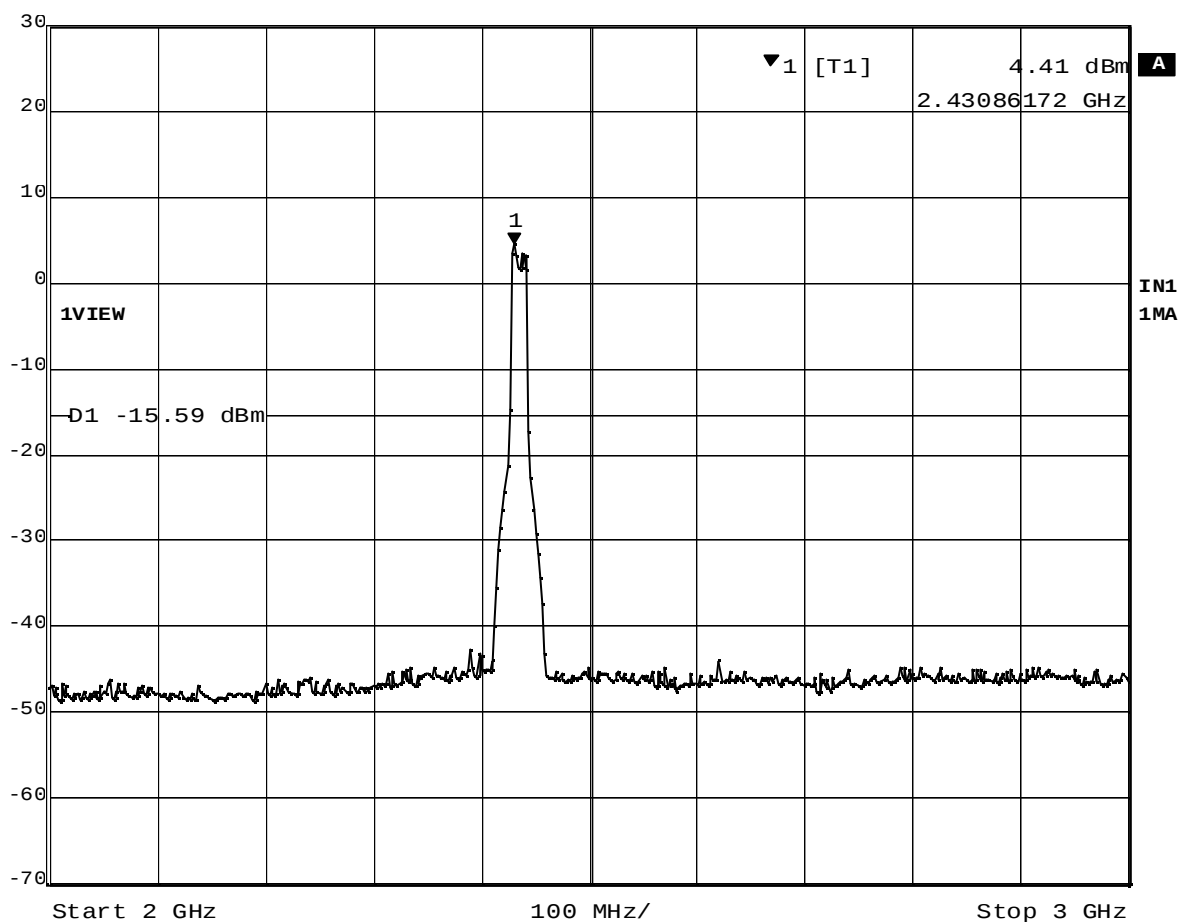


Date: 6.NOV.2003 17:46:45

Plot 4-4. Out of band emissions around 2412MHz (OFDM, 18Mbps)



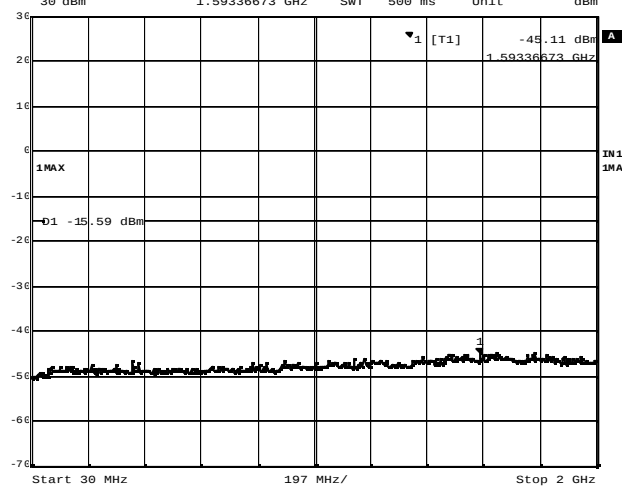
Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl 4.41 dBm VBW 100 kHz
30 dBm 2.43086172 GHz SWT 250 ms Unit dBm



Date: 6.NOV.2003 17:48:07



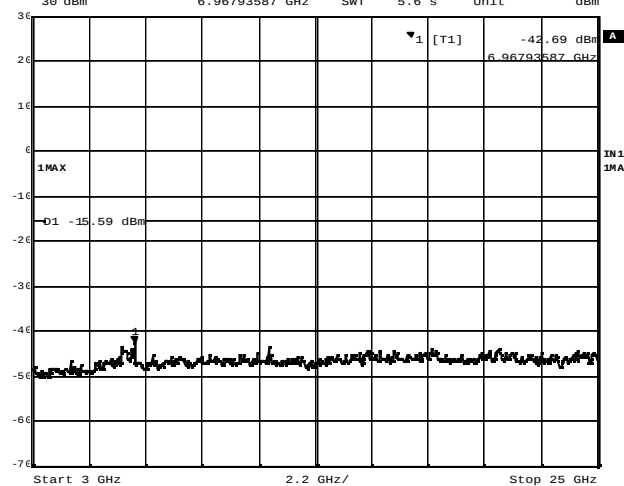
Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl -45.11 dBm VBW 100 kHz
30 dBm 1.59336673 GHz SWT 500 ms Unit dBm



Date: 6.NOV.2003 17:51:27



Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl -42.69 dBm VBW 100 kHz
30 dBm 6.96793587 GHz SWT 5.6 s Unit dBm

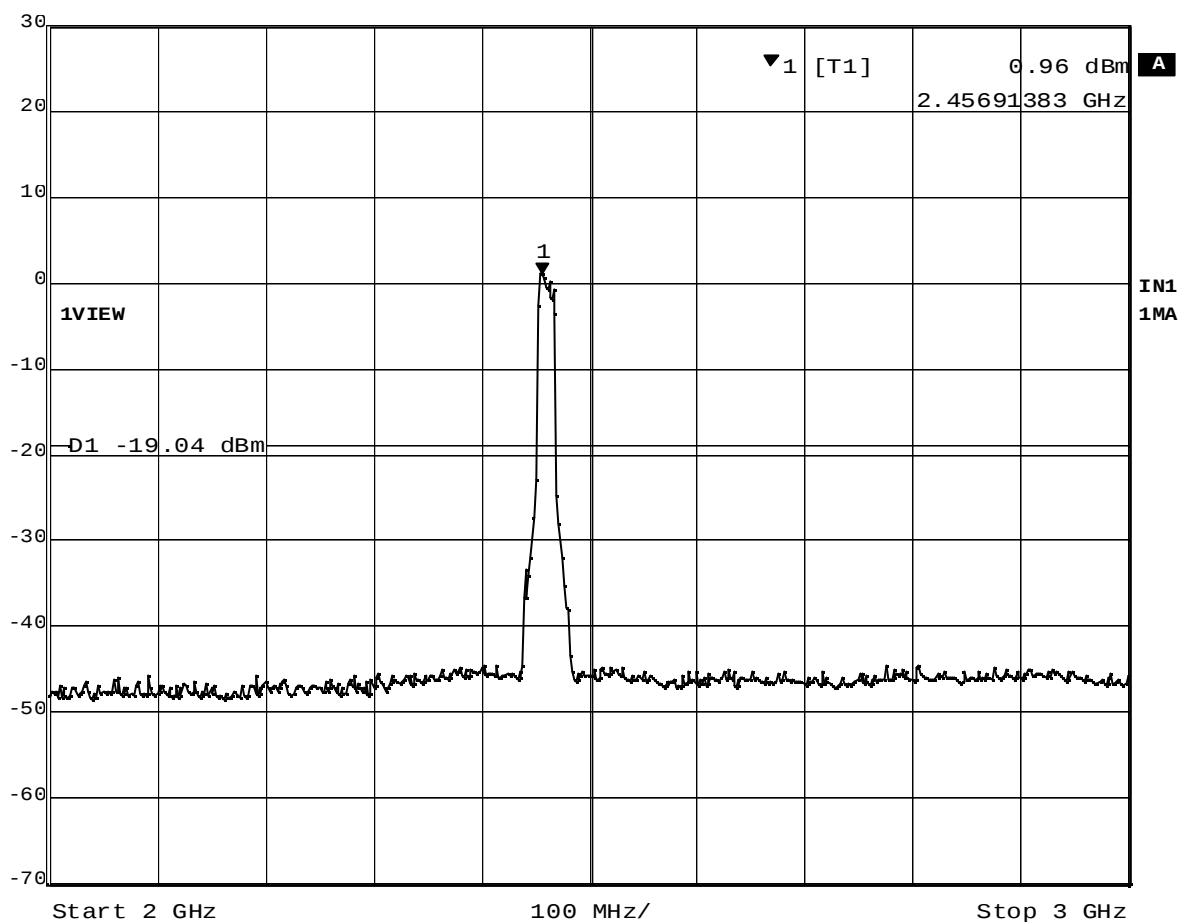


Date: 6.NOV.2003 17:52:09

Plot 4-5. Out of band emissions around 2437MHz (OFDM, 18Mbps)



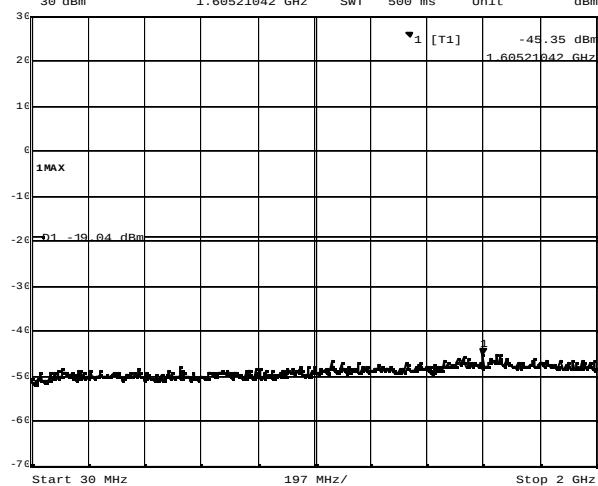
Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl 0.96 dBm VBW 100 kHz
30 dBm 2.45691383 GHz SWT 250 ms Unit dBm



Date: 6.NOV.2003 17:53:44



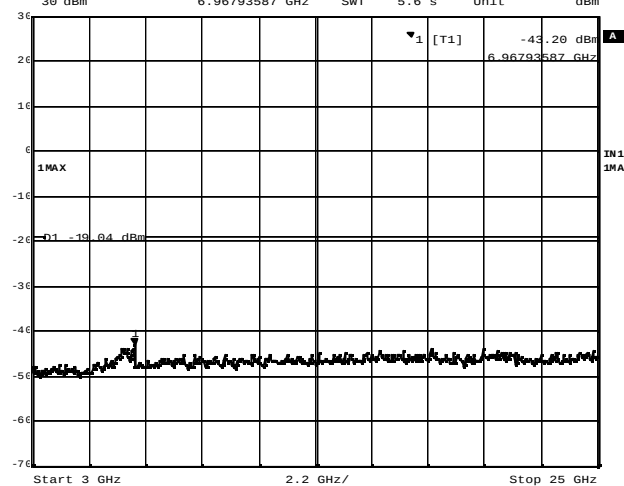
Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl -45.35 dBm VBW 100 kHz
30 dBm 1.60521042 GHz SWT 500 ms Unit dBm



Date: 6.NOV.2003 17:54:37



Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl -43.20 dBm VBW 100 kHz
30 dBm 6.96793587 GHz SWT 5.6 s Unit dBm



Date: 6.NOV.2003 17:55:16

Plot 4-6. Out of band emissions around 2462MHz (OFDM, 18Mbps)

5. Peak Power Spectral Density

[FCC 15.247(d), RSS-210 6.2.2(o)(b)]

5.1 Test Procedure

The power spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT was operating in transmission mode at the appropriate center frequency.

The pre-scanning was performed with the spectrum analyzer to search and locate the center frequency at the peak emission of each transmission mode.

Then, the spectral analyzer was set to the emission peak found in the pre-scan and the peak power spectral density was measured with:

RBW = 3 kHz, VBW = 3 kHz, Span = 300 KHz, Mode= Peak detector, Sweep = 100 seconds

5.2 Test Instruments and Measurement Setup

Same as the Chapter 1 (Table 1-1 & Figure 1).

5.3 Measurement Results

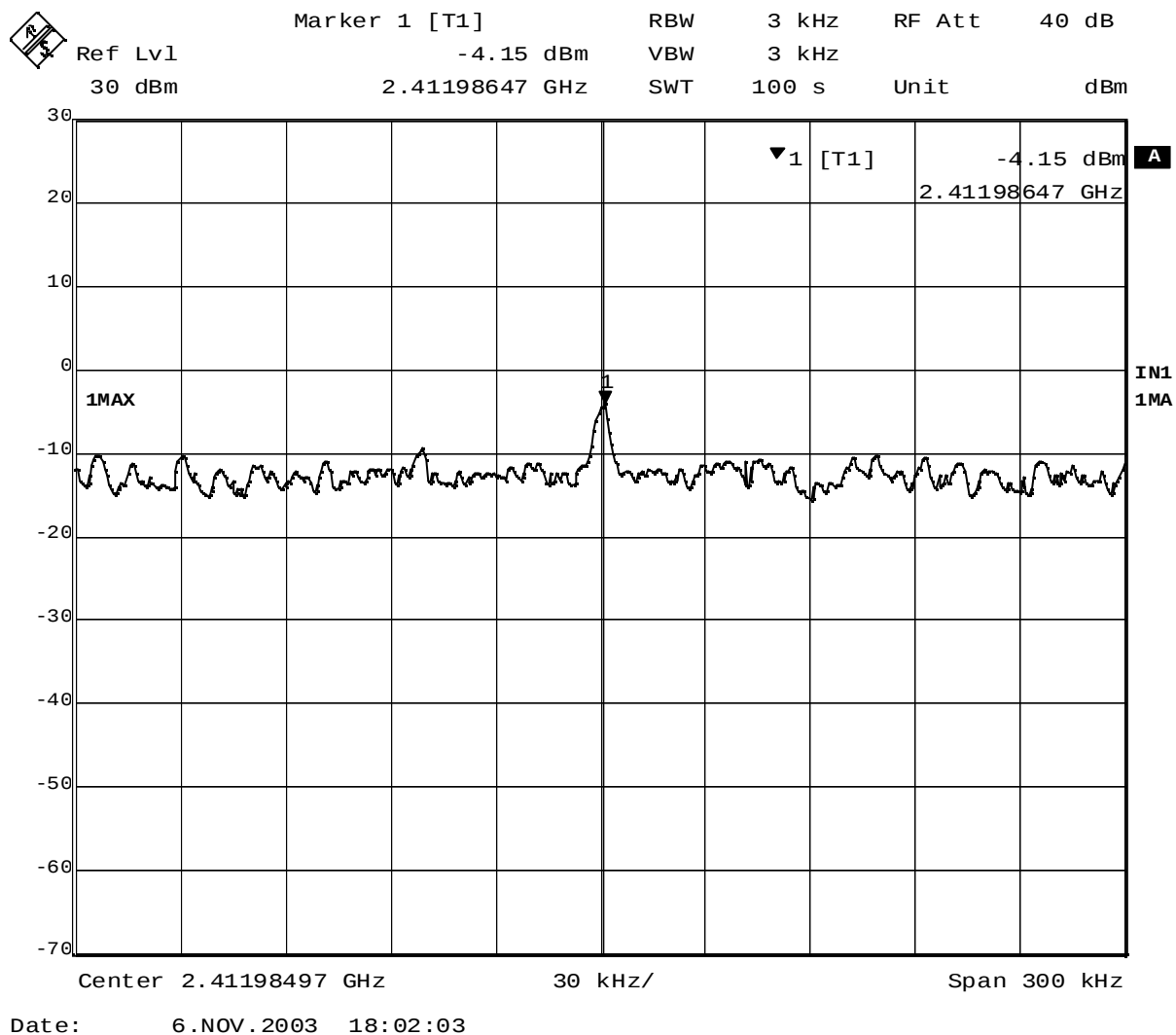
The measurement was performed with the worse cases of each transmission mode, that tend to have higher conducted peak power, based on the results of previous Chapter 3, “Conducted Peak Output Power” measurement.

Test Date: November 6, 2003

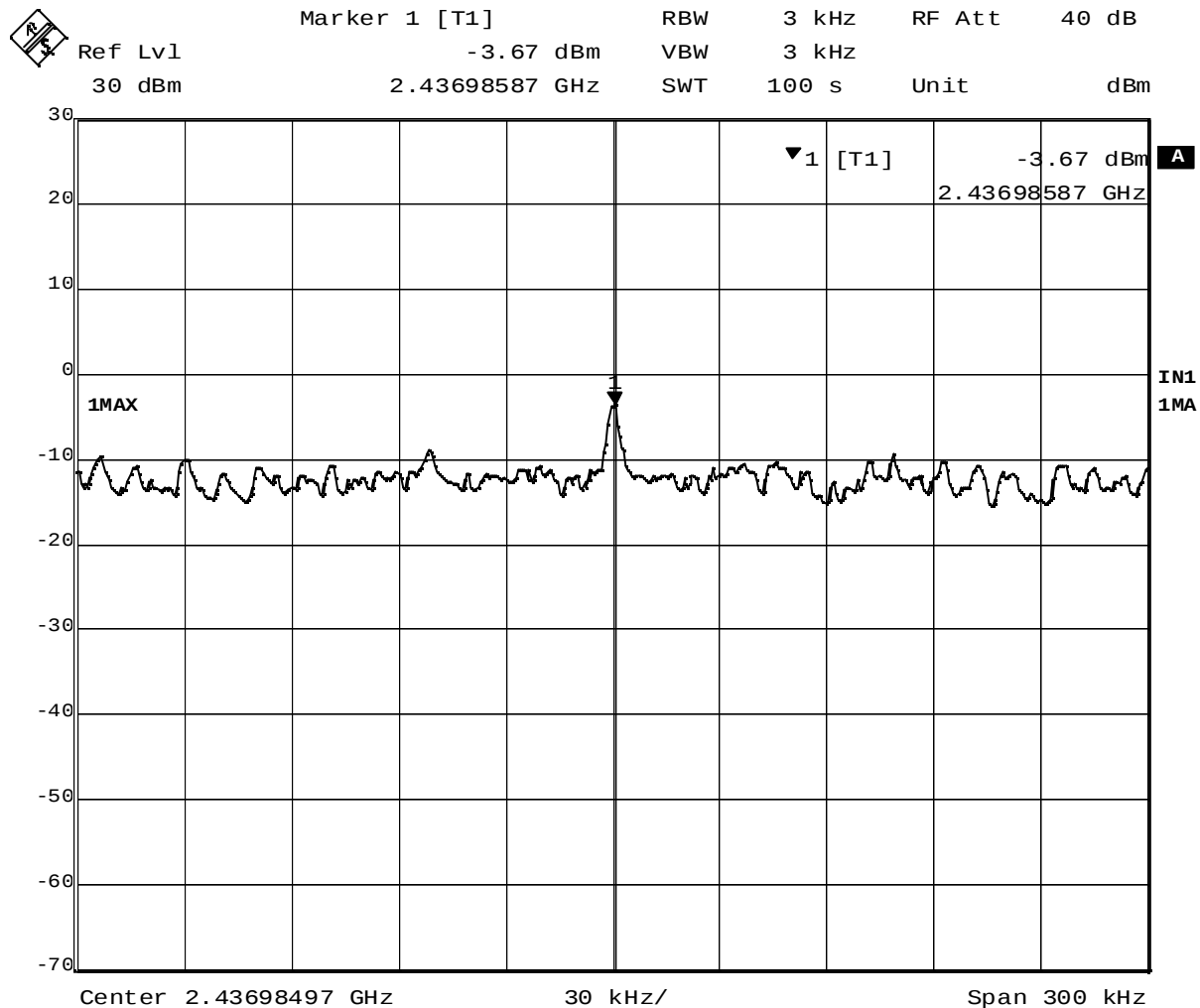
Table 5-1. Peak Power Spectrum Density, TX mode

Ch No.			Frequency (MHz)	Analyzer Reading (dBm)	Trace number	Cable loss (dB)	Result (dBm)	Limit (dBm)	Margin (dB)
DSSS	2.4GHz 11Mbps	1	2411.99	-4.15	Plot 5-1	1.3	- 2.9	8.0	10.9
		6	2436.99	-3.67	Plot 5-2	1.3	- 2.4	8.0	10.4
		11	2461.99	-3.67	Plot 5-3	1.3	- 2.4	8.0	10.4
OFDM	2.4GHz 18Mbps	1	2411.99	-11.22	Plot 5-4	1.3	- 9.9	8.0	17.9
		6	2436.99	-9.12	Plot 5-5	1.3	- 7.8	8.0	15.8
		11	2461.98	-9.37	Plot 5-6	1.3	- 8.1	8.0	16.1

5.4 Trace Data of Peak Power Spectral Density

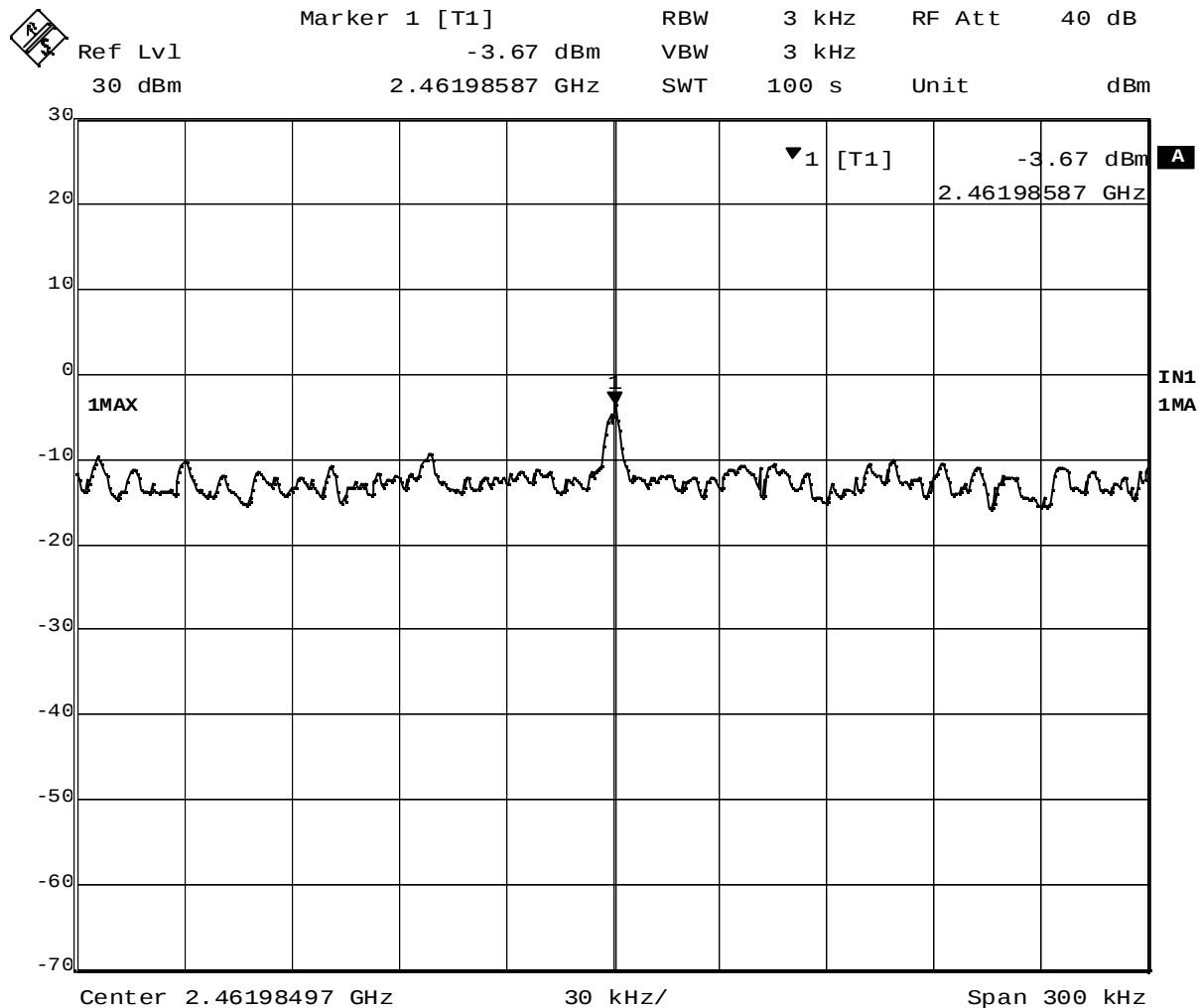


Plot 5-1. Peak Power Spectral Density of 2412MHz (DSSS, 11Mbps)



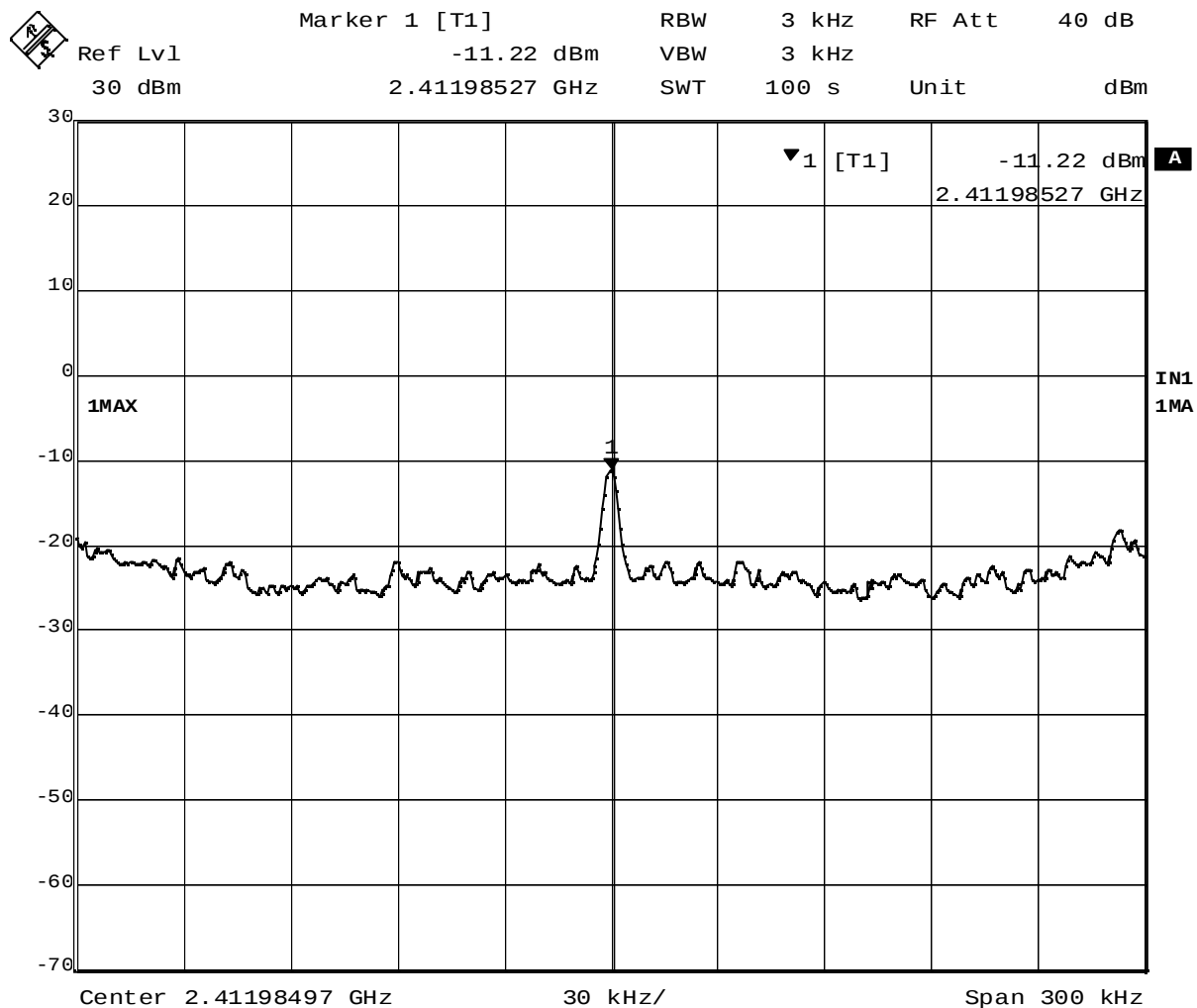
Date: 6.NOV.2003 18:05:35

Plot 5-2. Peak Power Spectral Density of 2437MHz (DSSS, 11Mbps)



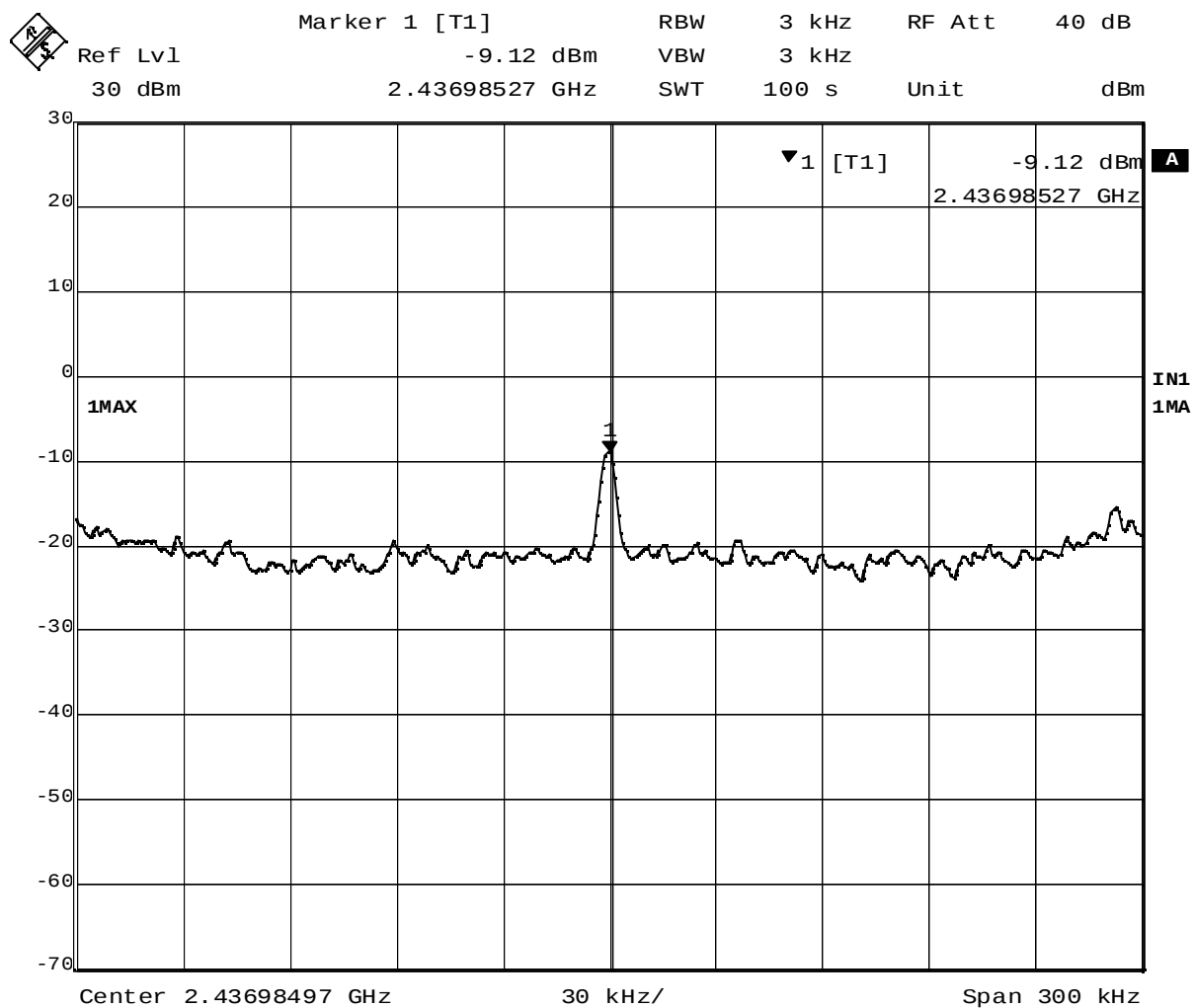
Date: 6.NOV.2003 18:08:14

Plot 5-3. Peak Power Spectral Density of 2462MHz (DSSS, 11Mbps)



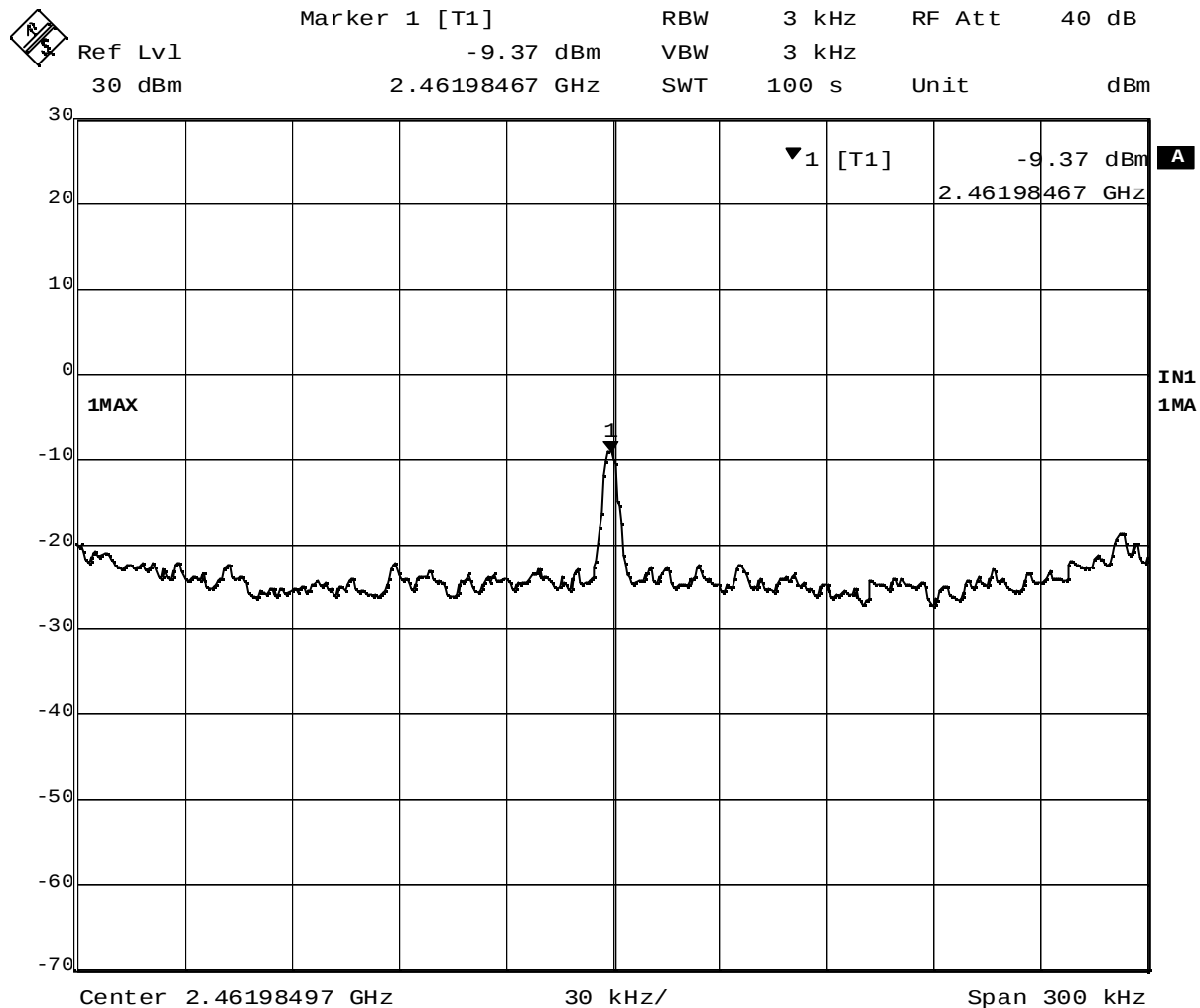
Date: 6.NOV.2003 18:11:32

Plot 5-4. Peak Power Spectral Density of 2412MHz (OFDM, 18Mbps)



Date: 6.NOV.2003 18:16:15

Plot 5-5. Peak Power Spectral Density of 2437MHz (OFDM, 18Mbps)



Date: 6.NOV.2003 18:33:45

Plot 5-6. Peak Power Spectral Density of 2462MHz (OFDM, 18Mbps)

6. AC WIRELINE CONDUCTED EMISSIONS (150KHz – 30MHz)

[FCC 15.207, RSS-210 6.6 / 7.4]

6.1 Test Procedure

The conducted emissions are measured in the IBM shielded room with a spectrum analyzer in peak hold. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9KHz. The emissions are maximized further by cable manipulation. The highest emissions relative to the limit are listed.

6.2 Test Instruments and Measurement Setup

Table 6-1. Conducted Emission Test Instrumentation

Description	Model	Serial Number
Computer	IBM 6589-13J	97-15613
Spectrum Analyzer (100Hz-1.5GHz)	HP 85680B	2841A04254
Spectrum Analyzer Display	HP 85662A	2816A16831
Quasi-Peak Adapter	HP 85650A	2811A01156
Receiver (9kHz-30MHz)	R&S ESH3	891806/012
LISN	EMCO 3810/2NM	00022007
Switch/control unit	HP 3488A	2719A17228
Plotter	HP 7550A	2631A33619
Coax cables: - Lisen-L <=> SW/Con.unit (SW100) - Lisen-N <=> SW/Con.unit (SW101) - SW/Con.unit <=> RCVR (Input) - SW/Con.unit<=> Spe Ana.(Signal In)	Length: 4 m 4 m 1 m 1 m	- EMIC-L - EMIC-N - EMIC-R - EMIC-S

Notes: - HP: Hewlett Packard, R&S: Rohde & Schwarz

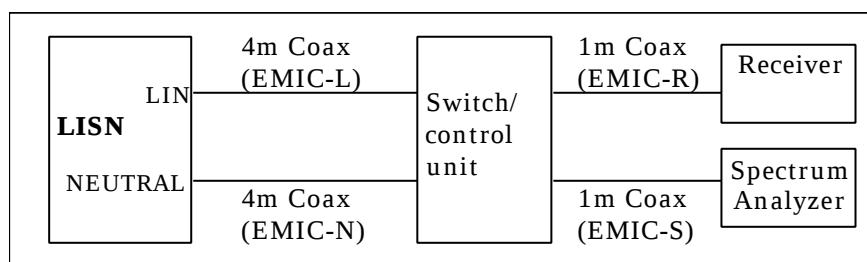


Figure 6. Cables for Conducted Emission Test

6.3 Powerline Voltage Calculation

The powerline voltage is calculated by adding insertion losses of LISN, Cable, Switch control unit and Pulse limiter to the measured reading. All factors are included in the reported data.

$$PV = R + CORR$$

where:

$$\begin{aligned} PV &= \text{Powerline Voltage (dB}\mu\text{V)} \\ R &= \text{Measured Receiver Input Amplitude (dB}\mu\text{V)} \\ CORR &= \text{Correction Factor (dB) = LL+CL+SWL+PLL} \\ LL &= \text{Insertion loss of LISN (dB)} \\ CL &= \text{Insertion loss of Cable (dB)} \\ SWL &= \text{Insertion loss of Switch control unit (dB)} \\ PLL &= \text{Insertion loss of Pulse Limiter (dB)} \end{aligned}$$

Given a Receiver input reading of 50.0 dB μ V, LISN loss of 0.6 dB, Cable loss of 0.1dB, Switch control unit loss of 0.1dB and Pulse limiter loss of 0.2dB. The Powerline Voltage of the measured emission is:

$$\begin{aligned} CORR &= 0.6 + 0.1 + 0.1 + 0.2 = 1.0 \text{ (dB)} \\ PV &= 50.0 + 1.0 = 51.0 \text{ (dB}\mu\text{V)} \end{aligned}$$

6.4 Measurement Results

The EUT was found to comply to the limits of FCC Part 15 Subpart C and RSS-210 with a margin of 11.2dB. The 6 highest emissions relative to the limits are reported.

Test Date: November 13, 2003

6.3.1 EUT in 2.4GHz DSSS transmission mode

Table 6-2-1. Ch.1 (2412MHz) **TX** mode 11Mbps

Frequency (MHz)	QP			AV			CISPR22 QP Limit (dBμV)	CISPR22 AV Limit (dBμV)	Phase
	Measured Reading (dBμV)	Corr. Factor (dB)	Powerline Voltage (dBμV)	Measured Reading (dBμV)	Corr. Factor (dB)	Powerline Voltage (dBμV)			
0.2014	45.5	0.5	46.0	34.3	0.5	34.8	63.6	53.6	Line
0.3191	39.2	0.6	39.8	13.4	0.6	14.0	59.7	49.7	Line
0.4091	37.1	0.6	37.7	34.9	0.6	35.5	57.7	47.7	Neutral
0.5444	28.1	0.6	28.7	20.7	0.6	21.3	56.0	46.0	Neutral
0.6135	31.3	0.6	31.9	24.8	0.6	25.4	56.0	46.0	Neutral
4.9291	33.1	0.7	33.8	22.7	0.7	23.4	56.0	46.0	Line

Table 6-2-2. Ch.6 (2437MHz) **TX** mode 11Mbps

Frequency (MHz)	QP			AV			CISPR22 QP Limit (dBμV)	CISPR22 AV Limit (dBμV)	Phase
	Measured Reading (dBμV)	Corr. Factor (dB)	Powerline Voltage (dBμV)	Measured Reading (dBμV)	Corr. Factor (dB)	Powerline Voltage (dBμV)			
0.2026	46.6	0.5	47.1	35.4	0.5	35.9	63.5	53.5	Line
0.2736	39.5	0.6	40.1	31.7	0.6	32.3	61.0	51.0	Neutral
0.3417	37.5	0.6	38.1	33.3	0.6	33.9	59.2	49.2	Neutral
0.4085	37.5	0.6	38.1	35.2	0.6	35.8	57.7	47.7	Neutral
0.6126	26.6	0.6	27.2	23.0	0.6	23.6	56.0	46.0	Neutral
0.6849	26.3	0.6	26.9	22.7	0.6	23.3	56.0	46.0	Neutral

Table 6-2-3. Ch.11 (2462MHz) **TX** mode 11Mbps

Frequency (MHz)	QP			AV			CISPR22 QP Limit (dBμV)	CISPR22 AV Limit (dBμV)	Phase
	Measured Reading (dBμV)	Corr. Factor (dB)	Powerline Voltage (dBμV)	Measured Reading (dBμV)	Corr. Factor (dB)	Powerline Voltage (dBμV)			
0.2088	44.9	0.5	45.4	34.1	0.5	34.6	63.3	53.3	Line
0.2752	39.2	0.6	39.8	31.4	0.6	32.0	61.0	51.0	Neutral
0.3397	36.3	0.6	36.9	32.3	0.6	32.9	59.2	49.2	Neutral
0.4122	37.0	0.6	37.6	34.9	0.6	35.5	57.6	47.6	Neutral
0.6171	28.5	0.6	29.1	24.9	0.6	25.5	56.0	46.0	Neutral
0.9497	24.0	0.6	24.6	22.7	0.6	23.3	56.0	46.0	Neutral

Table 6-2-4. Ch. 6 (2437MHz) **RX** mode

Frequency (MHz)	QP			AV			CISPR22 QP Limit (dBμ V)	CISPR22 AV Limit (dBμ V)	Phase
	Measured Reading (dBμ V)	Corr. Factor (dB)	Powerline Voltage (dBμ V)	Measured Reading (dBμ V)	Corr. Factor (dB)	Powerline Voltage (dBμ V)			
0.2042	47.6	0.5	48.1	37.0	0.5	37.5	63.4	53.4	Line
0.3426	39.2	0.6	39.8	35.7	0.6	36.3	59.1	49.1	Neutral
0.4135	33.9	0.6	34.5	26.7	0.6	27.3	57.6	47.6	Line
0.7539	29.0	0.6	29.6	25.7	0.6	26.3	56.0	46.0	Neutral
0.8917	27.6	0.6	28.2	25.4	0.6	26.0	56.0	46.0	Neutral
4.9402	35.1	0.7	35.8	22.0	0.7	22.7	56.0	46.0	Line

6.3.2 EUT in 2.4GHz OFDM transmission modeTable 6-2-5. Ch.1 (2412MHz) **TX** mode 18Mbps

Frequency (MHz)	QP			AV			CISPR22 QP Limit (dBμ V)	CISPR22 AV Limit (dBμ V)	Phase
	Measured Reading (dBμ V)	Corr. Factor (dB)	Powerline Voltage (dBμ V)	Measured Reading (dBμ V)	Corr. Factor (dB)	Powerline Voltage (dBμ V)			
0.2070	46.1	0.5	46.6	34.9	0.5	35.4	63.3	53.3	Line
0.2709	36.8	0.6	37.4	29.5	0.6	30.1	61.1	51.1	Neutral
0.3379	31.3	0.6	31.9	27.4	0.6	28.0	59.3	49.3	Neutral
0.4082	36.5	0.6	37.1	34.4	0.6	35.0	57.7	47.7	Neutral
0.6138	27.7	0.6	28.3	24.4	0.6	25.0	56.0	46.0	Neutral
0.6856	26.7	0.6	27.3	23.4	0.6	24.0	56.0	46.0	Neutral

Table 6-2-6. Ch.6 (2437MHz) **TX** mode 18Mbps

Frequency (MHz)	QP			AV			CISPR22 QP Limit (dBμ V)	CISPR22 AV Limit (dBμ V)	Phase
	Measured Reading (dBμ V)	Corr. Factor (dB)	Powerline Voltage (dBμ V)	Measured Reading (dBμ V)	Corr. Factor (dB)	Powerline Voltage (dBμ V)			
0.2068	46.6	0.5	47.1	35.3	0.5	35.8	63.3	53.3	Line
0.2734	38.9	0.6	39.5	31.1	0.6	31.7	61.0	51.0	Neutral
0.3438	36.9	0.6	37.5	33.1	0.6	33.7	59.1	49.1	Neutral
0.4096	38.6	0.6	39.2	35.9	0.6	36.5	57.7	47.7	Neutral
0.6141	28.7	0.6	29.3	25.5	0.6	26.1	56.0	46.0	Neutral
0.9524	23.6	0.6	24.2	22.1	0.6	22.7	56.0	46.0	Neutral

Table 6-2-7. Ch.11 (2462MHz) **TX** mode 18Mbps

Frequency (MHz)	QP			AV			CISPR22 QP Limit (dBμ V)	CISPR22 AV Limit (dBμ V)	Phase
	Measured Reading (dBμ V)	Corr. Factor (dB)	Powerline Voltage (dBμ V)	Measured Reading (dBμ V)	Corr. Factor (dB)	Powerline Voltage (dBμ V)			
0.2019	44.9	0.5	45.4	33.9	0.5	34.4	63.5	53.5	Line
0.4102	37.5	0.6	38.1	35.7	0.6	36.3	57.6	47.6	Neutral
0.6181	28.4	0.6	29.0	25.0	0.6	25.6	56.0	46.0	Neutral
0.6855	26.4	0.6	27.0	23.3	0.6	23.9	56.0	46.0	Neutral
0.7546	25.9	0.6	26.5	22.2	0.6	22.8	56.0	46.0	Neutral
5.4806	35.3	0.7	36.0	23.1	0.7	23.8	60.0	50.0	Line

Table 6-2-8. Ch.6 (2437MHz) **RX** mode

Frequency (MHz)	QP			AV			CISPR22 QP Limit (dB μ V)	CISPR22 AV Limit (dB μ V)	Phase
	Measured Reading (dB μ V)	Corr. Factor (dB)	Powerline Voltage (dB μ V)	Measured Reading (dB μ V)	Corr. Factor (dB)	Powerline Voltage (dB μ V)			
0.2072	47.0	0.5	47.5	37.5	0.5	38.0	63.3	53.3	Line
0.3451	38.7	0.6	39.3	34.3	0.6	34.9	59.1	49.1	Neutral
0.4807	36.9	0.6	37.5	33.9	0.6	34.5	56.3	46.3	Neutral
0.5487	34.0	0.6	34.6	30.1	0.6	30.7	56.0	46.0	Neutral
0.6839	30.0	0.6	30.6	26.6	0.6	27.2	56.0	46.0	Neutral
0.8922	28.1	0.6	28.7	26.2	0.6	26.8	56.0	46.0	Neutral

7. RESTRICTED BANDS RADIATIONS (30MHz – 1GHz)

[FCC 15.205 / 209, RSS-210 6.3 / 7.3]

7.1 Test Procedure

Preliminary radiated emissions are measured in the semi-anechoic chamber at a 3 meter distance on every azimuth in both horizontal and vertical polarity. The antennas are also scanned in height. The emissions are recorded with a spectrum analyzer in peak hold mode. The identified emissions are further maximized by a cable manipulation. Emissions closest to the limits are measured in the quasi-peak mode with the tuned receiver using a bandwidth of 120kHz. The highest emissions relative to the limit are listed.

7.2 Test Instruments and Measurement Setup

Table 7-1 Radiated Emission Test Instrumentation

Description	Model	Serial Number
Computer	IBM 6868-30J	97-901X3
Spectrum Analyzer (100Hz-1.5GHz) for 30-200MHz	HP 85680B	2601A02634
Spectrum Analyzer Display for 30-200MHz	HP 85662A	2542A12308
Quasi-Peak Adapter for 30-200MHz	HP 85650A	2043A00062
Spectrum Analyzer (100Hz-1.5GHz) for 200-1000MHz	HP 85680B	3019A05156
Spectrum Analyzer Display for 200-1000MHz	HP 85662A	3026A19366
Quasi-Peak Adapter for 200-1000MHz	HP 85650A	2811A01433
Amplifier (100KHz-1.3GHz)		
- for 30-200MHz	HP 8447D	2805A02919
- for 200-1000MHz	HP 8447D	2727A05190
Biconical Antenna (30-200MHz)	EMCO 3108	2536
Log-Periodic Antenna (200-1000MHz)	EMCO 3146	2849
Receiver (20MHz-1.3GHz)	R&S ESVP	892111/030
Switch/control unit	HP 3488A	2719A17226
N-Coax cables:	Length:	
- Bi-coni Ant <=> 10m Cable	9 m	- EM103L01
- 10m Cable <=> Shield Panel	10 m	- EM103L02
- Shield Panel <=> RF Amp	7 m	- EM103L03
- RF Amp <=> Power Splitter	0.5m	- EM103L04
- Log-peri Ant <=> 10m Cable	9 m	- EM103H01
- 10m Cable <=> Shield Panel	10 m	- EM103H02
- Shield Panel <=> RF Amp	7 m	- EM103H03
- RF Amp <=> Power Splitter	0.5m	- EM103H04
Coax cables:		
- Power Splitter <=> SW/Con.unit (SW110)	1 m	- EM103L05
- Power Splitter <=> SW/Con.unit (SW300)	1 m	- EM103L06
- Power Splitter <=> SW/Con.unit (SW100)	1 m	- EM103H05
- Power Splitter <=> SW/Con.unit (SW301)	1 m	- EM103H06
- SW/Con.unit <=> Receiver (Input)	2 m	- EM1RCV
- SW/Con.unit <=> Spe Ana.(Signal In) for 30- 200MHz	2 m	- EM1SPL
- SW/Con.unit <=> Spe Ana.(Signal In) for 200-1000MHz	2 m	- EM1SPH

Notes:

- HP: Hewlett Packard, R&S: Rohde & Schwarz

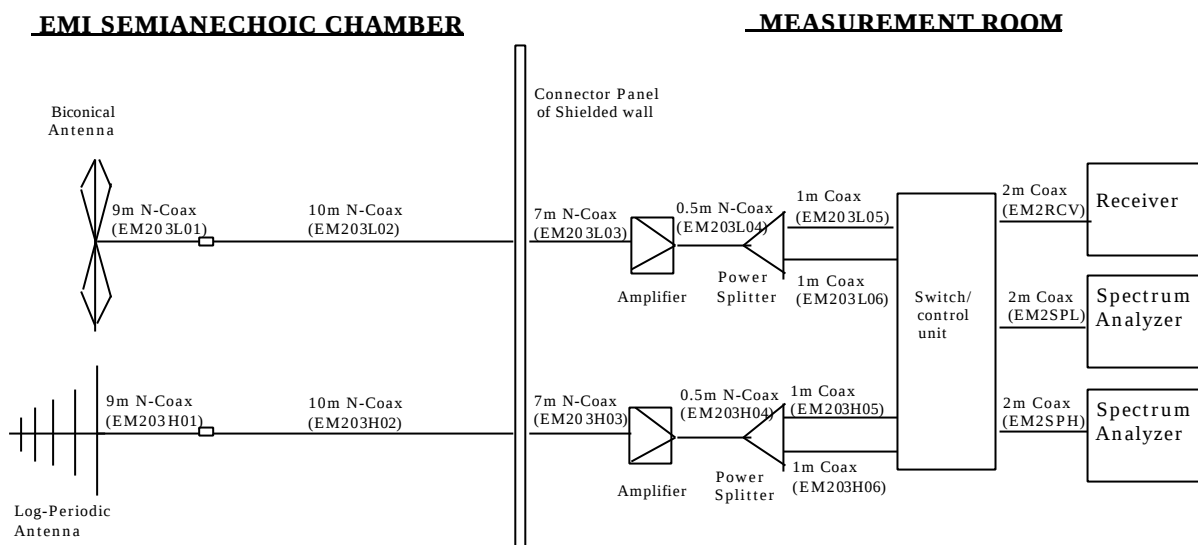


Figure 7 Cables for Radiated Emission Test

7.3 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. In this test facility, the Antenna Factor, Cable Loss, and Amplifier Gains are loaded into the Rohde & Schwarz Receiver and the corrected field strength can be read directly on the receiver. All factors are included in the reported data.

$$FS = R + AF + CORR$$

where:

FS	=	Field Strength
R	=	Measured Receiver Input Amplitude
AF	=	Antenna Factor
CORR	=	Correction Factor = CL - AG
CL	=	Cable Loss
AG	=	Amplifier Gain

For example :

Given a Receiver input reading of 51.5dB μ V; Antenna Factor of 8.5dB/m; Cable Loss of 1.3dB; and an Amplifier Gain of 26dB. The Field Strength of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26.0 = 35.3\text{dB}\mu\text{V/m}$$

Conversion between dB μ V/m (or dB μ V) and μ V/m (or μ V) are done as:

$$\text{Level}(\text{dB}\mu\text{V/m}) = 20 \times \text{Log}(\text{Level}(\mu\text{V/m}))$$

$$40\text{dB}\mu\text{V/m} = 100\mu\text{V/m}$$

$$48\text{dB}\mu\text{V/m} = 250\mu\text{V/m}$$

7.4 Measurement Results

The EUT was found to comply to the limits of FCC Part 15 Subpart C and RSS-210 with a margin of 2.0dB at 30MHz - 1000MHz band.

The 6 highest emissions relative to the limits are reported.

Test Date: November 19, 2003

7.4.1 EUT in 2.4GHz DSSS transmission mode

Table 7-2-1. Ch.1 (2412MHz) **TX** mode 11Mbps

Frequency (MHz)	Polarity (H/V)	Measured (dBμV)	Antenna Factor (dB/m)	Corr. Factor (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Field Strength (μV/m)	Limit (μV/m)
167.415	H	37.0	12.5	-16.2	33.3	43.5	46.2	150
171.818	V	35.4	12.5	-16.2	31.7	43.5	38.5	150
196.607	H	38.0	13.6	-15.8	35.8	43.5	61.7	150
200.454	H	37.6	11.4	-12.6	36.4	43.5	66.1	150
364.508	H	42.6	14.4	-13.6	43.4	46.0	147.9	200
458.447	V	34.5	16.6	-13.8	37.3	46.0	73.3	200

Table 7-2-2. Ch.6 (2437MHz) **TX** mode 11Mbps

Frequency (MHz)	Polarity (H/V)	Measured (dBμV)	Antenna Factor (dB/m)	Corr. Factor (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Field Strength (μV/m)	Limit (μV/m)
143.182	V	33.4	12.2	-16.6	29.0	43.5	28.2	150
167.692	H	37.0	12.5	-16.2	33.3	43.5	46.2	150
200.454	H	39.1	11.4	-12.6	37.9	43.5	78.5	150
229.090	V	35.4	10.6	-14.8	31.2	46.0	36.3	200
364.508	H	43.1	14.4	-13.6	43.9	46.0	156.7	200
458.447	V	34.1	16.6	-13.8	36.9	46.0	70.0	200

Table 7-2-3. Ch.11 (2462MHz) **TX** mode 11Mbps

Frequency (MHz)	Polarity (H/V)	Measured (dBμV)	Antenna Factor (dB/m)	Corr. Factor (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Field Strength (μV/m)	Limit (μV/m)
143.182	V	32.7	12.2	-16.6	28.3	43.5	26.0	150
167.263	H	35.5	12.5	-16.2	31.8	43.5	38.9	150
200.454	H	38.5	11.4	-12.6	37.3	43.5	73.3	150
364.508	H	43.2	14.4	-13.6	44.0	46.0	158.5	200
386.589	V	31.0	14.9	-14.1	31.8	46.0	38.9	200
455.072	V	34.5	16.5	-13.8	37.2	46.0	72.4	200

Table 7-2-4. Ch.6 (2437MHz) **RX** mode

Frequency (MHz)	Polarity (H/V)	Measured (dB μ V)	Antenna Factor (dB/m)	Corr. Factor (dB)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Field Strength (μ V/m)	Limit (μ V/m)
114.546	V	33.2	10.8	-17.2	26.8	43.5	21.9	150
143.182	H	34.1	12.2	-16.6	29.7	43.5	30.5	150
167.333	H	38.2	12.5	-16.2	34.5	43.5	53.1	150
200.454	V	38.1	11.4	-12.6	36.9	43.5	70.0	150
364.508	V	39.5	14.4	-13.6	40.3	46.0	103.5	200
458.447	V	34.0	16.6	-13.8	36.8	46.0	69.2	200

7.4.2 EUT in 2.4GHz OFDM transmission mode

Table 7-2-5. Ch.1 (2412MHz) **TX** mode 18Mbps

Frequency (MHz)	Polarity (H/V)	Measured (dB μ V)	Antenna Factor (dB/m)	Corr. Factor (dB)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Field Strength (μ V/m)	Limit (μ V/m)
143.182	V	32.7	12.2	-16.6	28.3	43.5	26.0	150
166.255	V	31.6	12.4	-16.2	27.8	43.5	24.5	150
200.454	H	38.2	11.4	-12.6	37.0	43.5	70.8	150
257.726	H	32.3	12.0	-14.6	29.7	46.0	30.5	200
364.508	H	40.6	14.4	-13.6	41.4	46.0	117.5	200
458.447	V	33.8	16.6	-13.8	36.6	46.0	67.6	200

Table 7-2-6. Ch.6 (2437MHz) **TX** mode 18Mbps

Frequency (MHz)	Polarity (H/V)	Measured (dB μ V)	Antenna Factor (dB/m)	Corr. Factor (dB)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Field Strength (μ V/m)	Limit (μ V/m)
143.182	H	35.0	12.2	-16.6	30.6	43.5	33.9	150
167.107	H	37.2	12.4	-16.1	33.5	43.5	47.3	150
200.454	V	37.1	11.4	-12.6	35.9	43.5	62.4	150
229.090	V	36.0	10.6	-14.8	31.8	46.0	38.9	200
364.508	H	41.6	14.4	-13.6	42.4	46.0	131.8	200
458.447	V	32.7	16.6	-13.8	35.5	46.0	59.6	200

Table 7-2-7. Ch.11 (2462MHz) **TX** mode 18Mbps

Frequency (MHz)	Polarity (H/V)	Measured (dB μ V)	Antenna Factor (dB/m)	Corr. Factor (dB)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Field Strength (μ V/m)	Limit (μ V/m)
143.181	H	37.1	12.2	-16.6	32.7	43.5	43.2	150
167.143	H	37.7	12.4	-16.1	34.0	43.5	50.1	150
200.454	H	38.2	11.4	-12.6	37.0	43.5	70.8	150
364.508	H	41.8	14.4	-13.6	42.6	46.0	134.9	200
458.447	V	32.7	16.6	-13.8	35.5	46.0	59.6	200
465.872	H	32.4	16.8	-13.7	35.5	46.0	59.6	200

Table 7-2-8. Ch.6 (2437MHz) **RX** mode

Frequency (MHz)	Polarity (H/V)	Measured (dB μ V)	Antenna Factor (dB/m)	Corr. Factor (dB)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Field Strength (μ V/m)	Limit (μ V/m)
143.182	H	36.6	12.2	-16.6	32.2	43.5	40.7	150
166.251	H	37.4	12.4	-16.2	33.6	43.5	47.9	150
200.453	H	39.3	11.4	-12.6	38.1	43.5	80.4	150
364.508	H	42.5	14.4	-13.6	43.3	46.0	146.2	200
386.589	V	32.3	14.9	-14.1	33.1	46.0	45.2	200
458.447	V	33.1	16.6	-13.8	35.9	46.0	62.4	200

8. RESTRICTED BANDS RADIATIONS (1GHz – 25GHz)

[FCC 15.205 / 209, RSS-210 6.3 / 7.3]

8.1 Test Procedure

Radiated emissions were measured in the frequency range with 1 GHz to 25GHz in transmitting mode and 1 GHz to 12.5GHz in receiving mode. All tests were performed in the semi-anechoic chamber at a 3-meter distance (except for the frequency range with 18 GHz to 25 GHz where test distance was reduced to 1 meter) on both horizontal and vertical polarities. The antenna was also scanned in height. The emissions are recorded with a spectrum analyzer in peak hold mode. The identified emissions are further maximized as a function of cable manipulation, azimuth, and antenna height. The emissions closest to the limits are measured in the peak mode with the tuned spectrum analyzer using resolution bandwidth of 1MHz / video bandwidth of 1MHz, and the average setting mode with the tuned spectrum analyzer using resolution bandwidth of 1MHz / video bandwidth of 100Hz or 10Hz. The highest emissions relative to the limit are listed.

8.2 Test Instruments and Measurement Setup

Table 8 Radiated Emission Test Instrumentation (1GHz – 25GHz)

Description	Model	Serial Number
Spectrum Analyzer EMI Test Receiver	R&S ESI26	836119/003
Amplifier (1 – 18GHz)	HP 8449B	3008A00582
Amplifier (18 – 25GHz)	Agilent 83051A	3950M00193
Horn Antenna (1 - 18GHz)	EMCO 3115	9903-5774
Horn Antenna (3.95 – 5.85GHz)	EMCO 3160-5	1099
Horn Antenna (5.85 – 8.2GHz)	EMCO 3160-6	9712-1044
Horn Antenna (18 - 25GHz)	EMCO 3160-9	0004-1202
Coaxial cables: - Horn Ant <=> RF Amp. (1-18GHz) - RF Amp. <=> Spectrum Analyzer (1-18GHz) - Horn Ant <=> RF Amp. (18-25GHz) - RF Amp. <=> Spectrum Analyzer (18-25GHz)	Length: 6 m 16 m 3m 1m	- EM206SCO - GEM0101 - SF102-20167 - SF102-21105

Notes: - HP: Hewlett Packard, R&S: Rohde & Schwarz

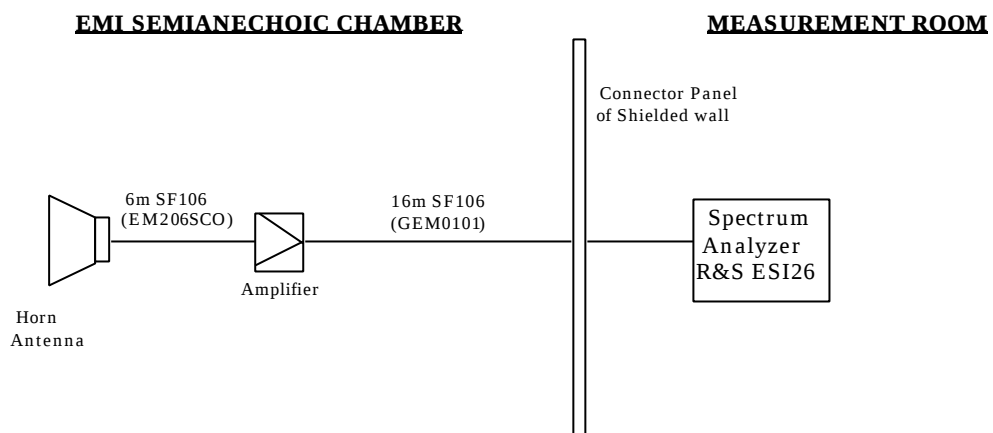


Figure 8-1. Cables for Radiated Emission Test (1 – 18 GHz)

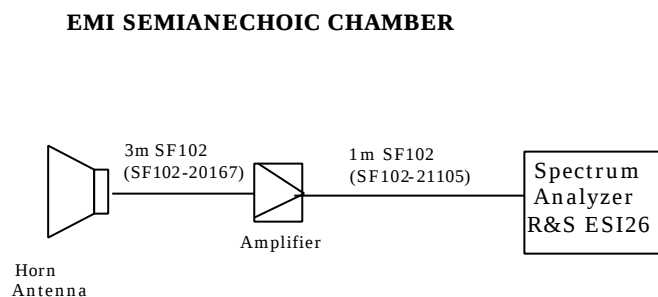


Figure 8-2. Cables for Radiated Emission Test (18 - 25GHz)

8.3 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

$$FS = R + AF + CORR - FO$$

where:

FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

CORR = Correction Factor = CL-AG

CL = Cable Loss

AG = Amplifier Gain

FO = Distance Falloff Factor

For example:

Given a Spectrum Analyzer input reading of 51.5 dB μ V; Antenna Factor of 8.5 dB/m; Cable Loss of 1.3 dB; Falloff Factor of 0 dB; and an Amplifier Gain of 26 dB. The Field Strength of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26 - 0.0 = 35.6 \text{ dB}\mu\text{V/m}$$

Conversions between dB μ V/m (or dB μ V) and μ V/m (or μ V) are done as :

$$\text{Level(dB}\mu\text{V/m)} = 20 \times \text{Log (Level}(\mu\text{V/m))}$$

$$40 \text{ dB}\mu\text{V/m} = 100 \mu\text{V/m}$$

$$48 \text{ dB}\mu\text{V/m} = 250 \mu\text{V/m}$$

8.4 Measurement Results

The EUT was found to comply to the limits of FCC Part 15 Subpart C and RSS-210 with a margin of 4.6dB. The measurement was done for the frequency range of 1 GHz to 25 GHz in TX mode and 1 GHz to 12.5GHz in RX mode.

Test Date: November 7, 25, 26 and 27, 2003

8.4.1 EUT in 2.4GHz DSSS transmission mode

*Note: OB means “operation band” (2400-2483.5MHz); in this case limit is 1W (measured conducted with power meter)

Table 8-2-1. Ch.1 (2412MHz) **TX** mode 11Mbps

Frequency (GHz)	Polarity (H/V)	Measured (dBμV) (<i>peak</i>)	Measured (dBμV) (<i>average</i>)	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dBμV/m) (<i>peak</i>)	FCC Limit (dBμV/m) (<i>peak</i>)	Field Strength (dBμV/m) (<i>average</i>)	FCC Limit (dBμV/m) (<i>average</i>)
Inband 2.412	H	107.7	99.2	28.3	-29.6	0.0	106.4	OB*	97.9	OB*
Adjacent RB 2.370	H	52.8	-	28.2	-29.6	0.0	51.4	74.0	-	54.0
2.386	H	54.1	-	28.2	-29.6	0.0	52.7	74.0	-	54.0
2.390	H	52.5	-	28.2	-29.6	0.0	51.1	74.0	-	54.0
1.065	V	51.6	-	24.6	-32.0	0.0	44.2	74.0	-	54.0
1.094	V	55.1	-	24.4	-31.9	0.0	47.6	74.0	-	54.0
1.160	V	50.3	-	24.6	-31.7	0.0	43.2	74.0	-	54.0
1.198	V	53.0	-	25.2	-31.6	0.0	46.6	74.0	-	54.0
2.347	H	49.5	-	28.1	-29.6	0.0	48.0	74.0	-	54.0
2.357	H	50.0	-	28.1	-29.6	0.0	48.5	74.0	-	54.0
4.826	H	44.9	-	27.1	-27.2	0.0	44.8	74.0	-	54.0

Table 8-2-2. Ch.6 (2437MHz) **TX** mode 11Mbps

Frequency (GHz)	Polarity (H/V)	Measured (dBμV) (<i>peak</i>)	Measured (dBμV) (<i>average</i>)	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dBμV/m) (<i>peak</i>)	FCC Limit (dBμV/m) (<i>peak</i>)	Field Strength (dBμV/m) (<i>average</i>)	FCC Limit (dBμV/m) (<i>average</i>)
Inband 2.437	H	110.2	101.7	28.4	-29.6	0.0	109.0	OB*	100.5	OB*
Adjacent RB 2.386	H	58.8	38.5	28.2	-29.6	0.0	57.4	74.0	37.1	54.0
2.486	H	62.2	40.1	28.4	-29.6	0.0	61.0	74.0	38.9	54.0
2.500	H	61.8	40.4	28.4	-29.6	0.0	60.6	74.0	39.2	54.0
1.065	V	51.5	-	24.6	-32.0	0.0	44.1	74.0	-	54.0
1.094	V	55.2	-	24.4	-31.9	0.0	47.7	74.0	-	54.0
1.160	V	54.3	-	24.6	-31.7	0.0	47.2	74.0	-	54.0
1.198	V	51.2	-	25.2	-31.6	0.0	44.8	74.0	-	54.0
2.346	H	49.4	-	28.1	-29.6	0.0	47.9	74.0	-	54.0
2.358	H	49.6	-	28.1	-29.6	0.0	48.1	74.0	-	54.0
2.372	H	49.2	-	28.2	-29.6	0.0	47.8	74.0	-	54.0
4.876	V	51.8	-	27.0	-27.0	0.0	51.8	74.0	-	54.0
7.313	H	40.1	-	29.9	-24.9	0.0	45.1	74.0	-	54.0

Table 8-2-3. Ch.11 (2462MHz) **TX** mode 11Mbps

Frequency (GHz)	Polarity (H/V)	Measured (dB μ V) (<i>peak</i>)	Measured (dB μ V) (<i>average</i>)	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dB μ V/m) (<i>peak</i>)	FCC Limit (dB μ V/m) (<i>peak</i>)	Field Strength (dB μ V/m) (<i>average</i>)	FCC Limit (dB μ V/m) (<i>average</i>)
Inband 2.462	H	110.6	102.1	28.4	-29.6	0.0	109.4	OB*	100.9	OB*
Adjacent RB 2.484	H	65.1	43.6	28.4	-29.6	0.0	63.9	74.0	42.4	54.0
2.492	H	64.3	41.3	28.4	-29.6	0.0	63.1	74.0	40.1	54.0
1.065	V	49.9	-	24.6	-32.0	0.0	42.5	74.0	-	54.0
1.094	V	55.2	-	24.4	-31.9	0.0	47.7	74.0	-	54.0
1.161	V	56.3	-	24.6	-31.7	0.0	49.2	74.0	-	54.0
1.198	V	51.5	-	25.2	-31.6	0.0	45.1	74.0	-	54.0
2.341	H	49.8	-	28.1	-29.6	0.0	48.3	74.0	-	54.0
2.351	H	49.8	-	28.1	-29.6	0.0	48.3	74.0	-	54.0
2.372	H	49.4	-	28.2	-29.6	0.0	48.0	74.0	-	54.0
2.379	H	50.5	-	28.2	-29.6	0.0	49.1	74.0	-	54.0
4.926	V	50.9	-	27.0	-27.0	0.0	50.9	74.0	-	54.0
7.385	V	37.2	-	29.8	-24.9	0.0	42.1	74.0	-	54.0

Table 8-2-4. Ch.6 (2437MHz) **RX** mode

Frequency (GHz)	Polarity (H/V)	Measured (dB μ V) (<i>peak</i>)	Measured (dB μ V) (<i>average</i>)	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dB μ V/m) (<i>peak</i>)	FCC Limit (dB μ V/m) (<i>peak</i>)	Field Strength (dB μ V/m) (<i>average</i>)	FCC Limit (dB μ V/m) (<i>average</i>)
1.065	V	50.1	-	24.6	-32.0	0.0	42.7	74.0	-	54.0
1.093	V	55.6	-	24.4	-31.9	0.0	48.1	74.0	-	54.0
1.162	V	49.0	-	24.6	-31.7	0.0	41.9	74.0	-	54.0
1.198	V	49.8	-	25.2	-31.6	0.0	43.4	74.0	-	54.0

8.4.2 EUT in 2.4GHz OFDM transmission mode

*Note: OB means “operation band” (2400-2483.5MHz); in this case limit is 1W (measured conducted with power meter)

Table 8-2-5. Ch.1 (2412MHz) **TX** mode 18Mbps

Frequency (GHz)	Polarity (H/V)	Measured (dBμV) (<i>peak</i>)	Measured (dBμV) (<i>average</i>)	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dBμV/m) (<i>peak</i>)	FCC Limit (dBμV/m) (<i>peak</i>)	Field Strength (dBμV/m) (<i>average</i>)	FCC Limit (dBμV/m) (<i>average</i>)
Inband 2.409	H	106.9	94.8	28.3	-29.6	0.0	105.6	OB*	93.5	OB*
Adjacent RB 2.375	H	57.5	39.3	28.2	-29.6	0.0	56.1	74.0	37.9	54.0
2.383	H	58.3	40.2	28.2	-29.6	0.0	56.9	74.0	38.8	54.0
2.390	H	61.8	44.2	28.2	-29.6	0.0	60.4	74.0	42.8	54.0
1.065	V	51.8	-	24.6	-32.0	0.0	44.4	74.0	-	54.0
1.094	V	54.6	-	24.4	-31.9	0.0	47.1	74.0	-	54.0
1.161	V	52.0	-	24.6	-31.7	0.0	44.9	74.0	-	54.0
1.198	V	51.0	-	25.2	-31.6	0.0	44.6	74.0	-	54.0
2.346	H	48.5	-	28.1	-29.6	0.0	47.0	74.0	-	54.0
2.358	H	49.4	-	28.1	-29.6	0.0	47.9	74.0	-	54.0
2.372	H	49.7	-	28.2	-29.6	0.0	48.3	74.0	-	54.0
4.826	H	41.8	-	27.1	-27.2	0.0	41.7	74.0	-	54.0

Table 8-2-6. Ch.6 (2437MHz) **TX** mode 18Mbps

Frequency (GHz)	Polarity (H/V)	Measured (dBμV) (<i>peak</i>)	Measured (dBμV) (<i>average</i>)	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dBμV/m) (<i>peak</i>)	FCC Limit (dBμV/m) (<i>peak</i>)	Field Strength (dBμV/m) (<i>average</i>)	FCC Limit (dBμV/m) (<i>average</i>)
Inband 2.434	H	110.7	101.7	28.4	-29.6	0.0	109.5	OB*	100.5	OB*
Adjacent RB 2.388	H	62.2	40.9	28.2	-29.6	0.0	60.8	74.0	39.5	54.0
2.390	H	63.5	41.3	28.2	-29.6	0.0	62.1	74.0	39.9	54.0
2.485	H	64.8	43.4	28.4	-29.6	0.0	63.6	74.0	42.2	54.0
1.066	V	51.0	-	24.6	-32.0	0.0	43.6	74.0	-	54.0
1.094	V	54.9	-	24.4	-31.9	0.0	47.4	74.0	-	54.0
1.166	V	51.5	-	24.6	-31.7	0.0	44.4	74.0	-	54.0
1.196	V	51.3	-	25.2	-31.6	0.0	44.9	74.0	-	54.0
2.333	H	50.7	-	28.1	-29.6	0.0	49.2	74.0	-	54.0
2.376	H	51.9	-	28.2	-29.6	0.0	50.5	74.0	-	54.0
2.379	H	52.8	-	28.2	-29.6	0.0	51.4	74.0	-	54.0
2.383	H	52.8	-	28.2	-29.6	0.0	51.4	74.0	-	54.0
4.876	H	50.3	-	27.0	-27.0	0.0	50.3	74.0	-	54.0
7.312	H	43.0	-	29.9	-24.9	0.0	48.0	74.0	-	54.0

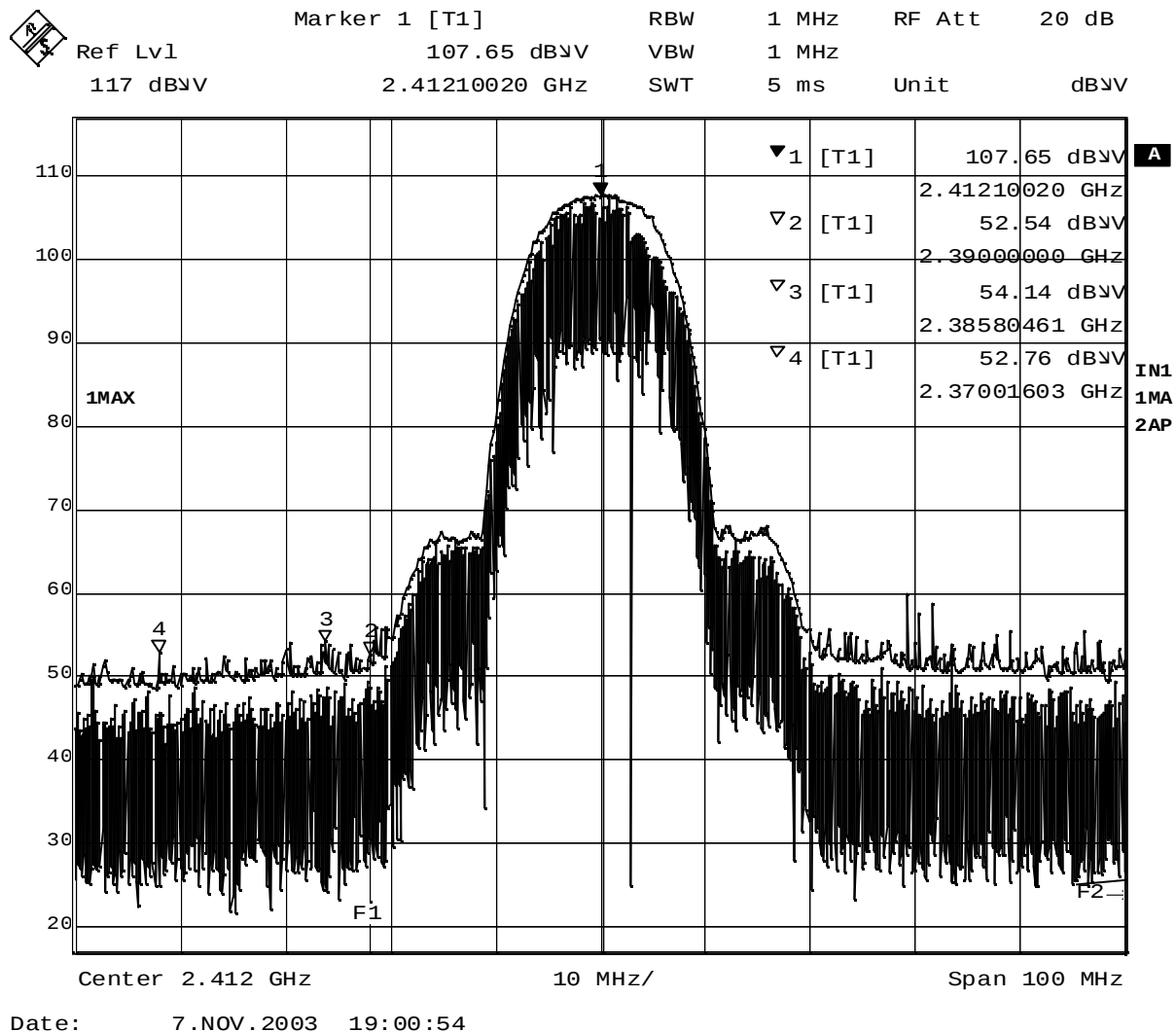
Table 8-2-7. Ch.11 (2462MHz) **TX** mode 18Mbps

Frequency (GHz)	Polarity (H/V)	Measured (dB μ V) (<i>peak</i>)	Measured (dB μ V) (<i>average</i>)	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dB μ V/m) (<i>peak</i>)	FCC Limit (dB μ V/m) (<i>peak</i>)	Field Strength (dB μ V/m) (<i>average</i>)	FCC Limit (dB μ V/m) (<i>average</i>)
Inband 2.467	H	107.9	96.6	28.4	-29.6	0.0	106.7	OB*	95.4	OB*
Adjacent RB 2.484	H	68.7	50.6	28.4	-29.6	0.0	67.5	74.0	49.4	54.0
1.065	V	50.3	-	24.6	-32.0	0.0	42.9	74.0	-	54.0
1.094	V	55.2	-	24.4	-31.9	0.0	47.7	74.0	-	54.0
1.161	V	50.1	-	24.6	-31.7	0.0	43.0	74.0	-	54.0
1.195	V	49.8	-	25.2	-31.6	0.0	43.4	74.0	-	54.0
2.339	V	50.3	-	28.1	-29.6	0.0	48.8	74.0	-	54.0
2.360	V	50.4	-	28.1	-29.6	0.0	48.9	74.0	-	54.0
2.364	V	48.9	-	28.1	-29.6	0.0	47.4	74.0	-	54.0
2.368	V	49.5	-	28.1	-29.6	0.0	48.0	74.0	-	54.0
4.922	H	46.6	-	27.0	-27.0	0.0	46.6	74.0	-	54.0
7.387	V	36.5	-	29.8	-24.9	0.0	41.4	74.0	-	54.0

Table 8-2-8. Ch.6 (2437MHz) **RX** mode

Frequency (GHz)	Polarity (H/V)	Measured (dB μ V) (<i>peak</i>)	Measured (dB μ V) (<i>average</i>)	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dB μ V/m) (<i>peak</i>)	FCC Limit (dB μ V/m) (<i>peak</i>)	Field Strength (dB μ V/m) (<i>average</i>)	FCC Limit (dB μ V/m) (<i>average</i>)
1.066	V	50.9	-	24.6	-32.0	0.0	43.5	74.0	-	54.0
1.093	V	55.7	-	24.4	-31.9	0.0	48.2	74.0	-	54.0
1.161	V	49.1	-	24.6	-31.7	0.0	42.0	74.0	-	54.0
1.199	V	50.1	-	25.2	-31.6	0.0	43.7	74.0	-	54.0

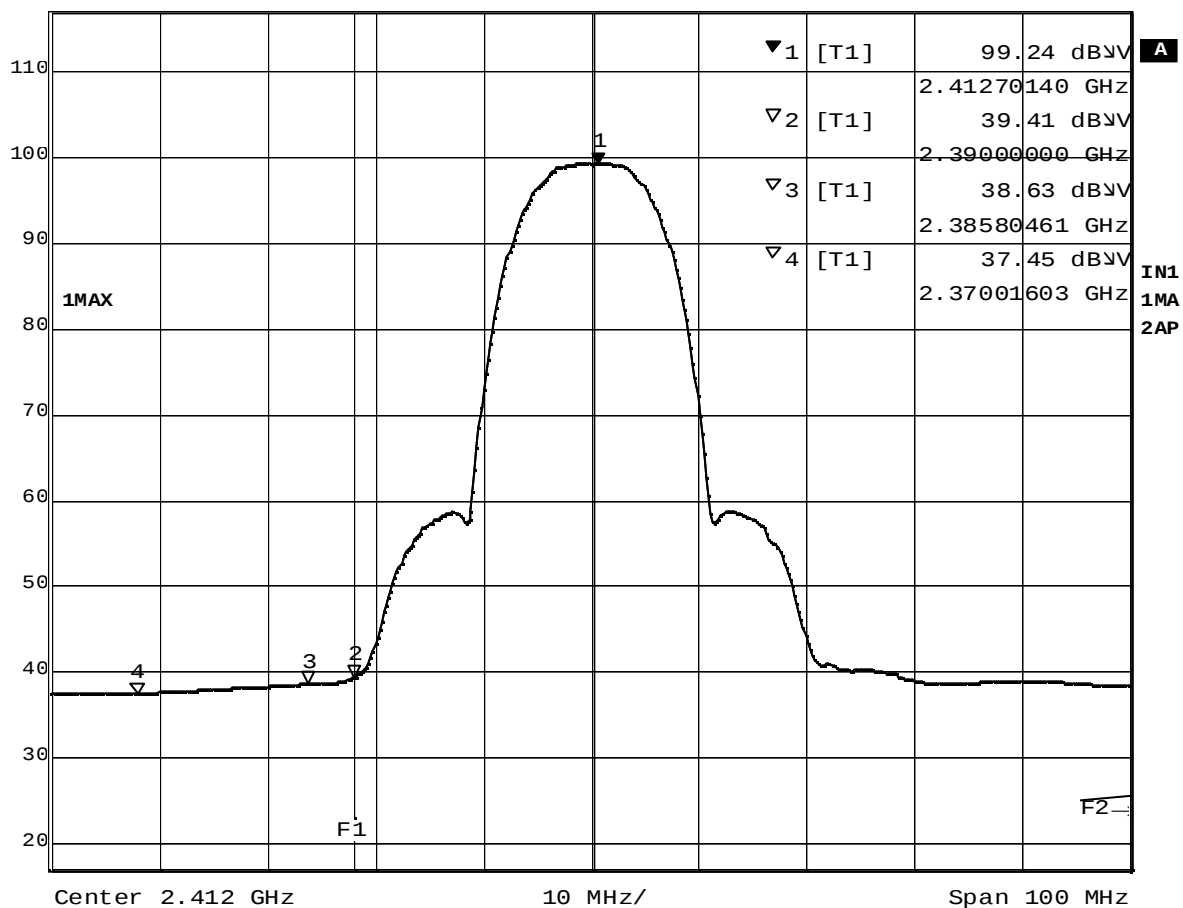
8.5 Measurement plots of adjacent restricted band



Plot 8-1 Ch.1 2412MHz TX, DSSS 11Mbps (Peak)



Ref Lvl 117 dBμV
Marker 1 [T1] 99.24 dBμV
2.41270140 GHz
RBW 1 MHz
VBW 10 Hz
SWT 25 s
RF Att 20 dB
Unit dBμV

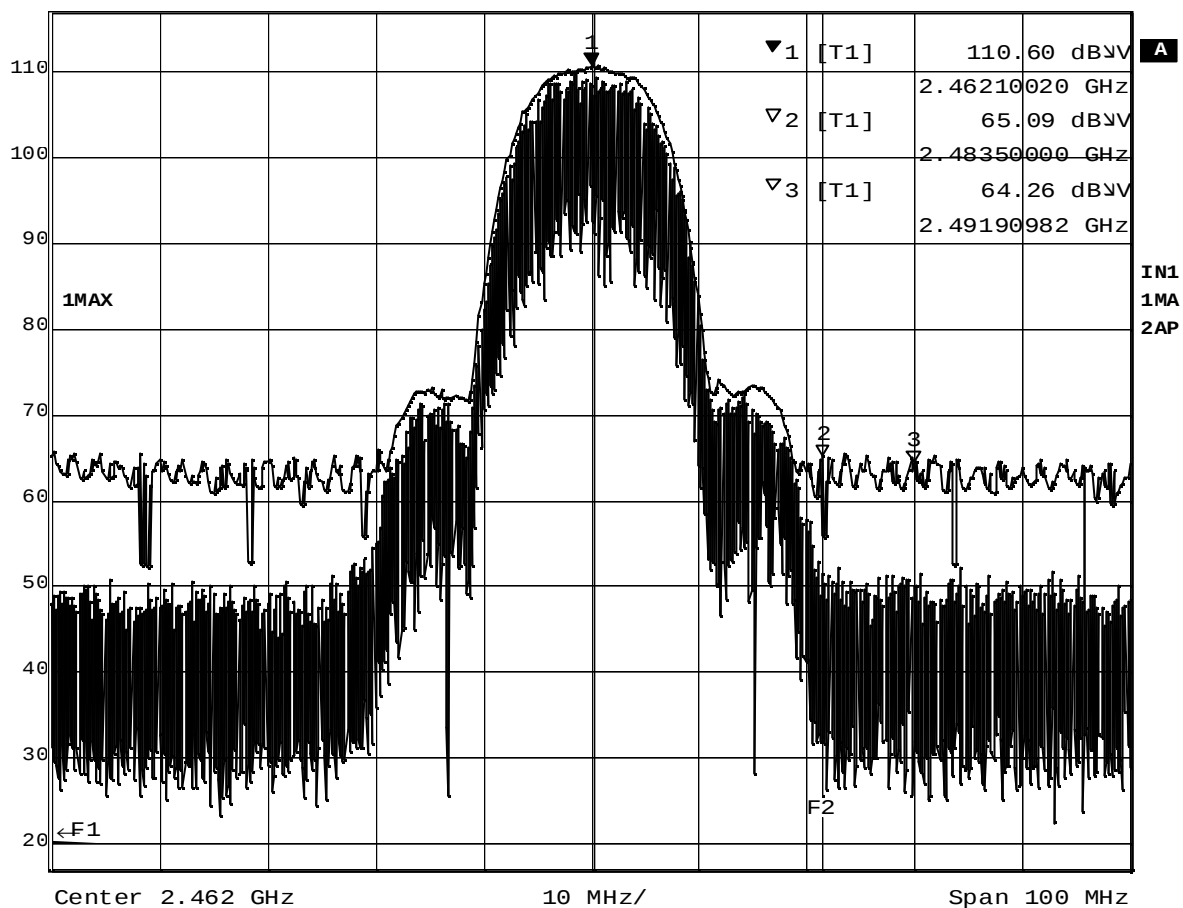


Date: 7.NOV.2003 19:01:43

Plot 8-2 Ch.1 2412MHz TX. DSSS 11Mbps (Average)



Marker 1 [T1] RBW 1 MHz RF Att 20 dB
Ref Lvl 110.60 dBμV VBW 1 MHz
117 dBμV 2.46210020 GHz SWT 5 ms Unit dBμV

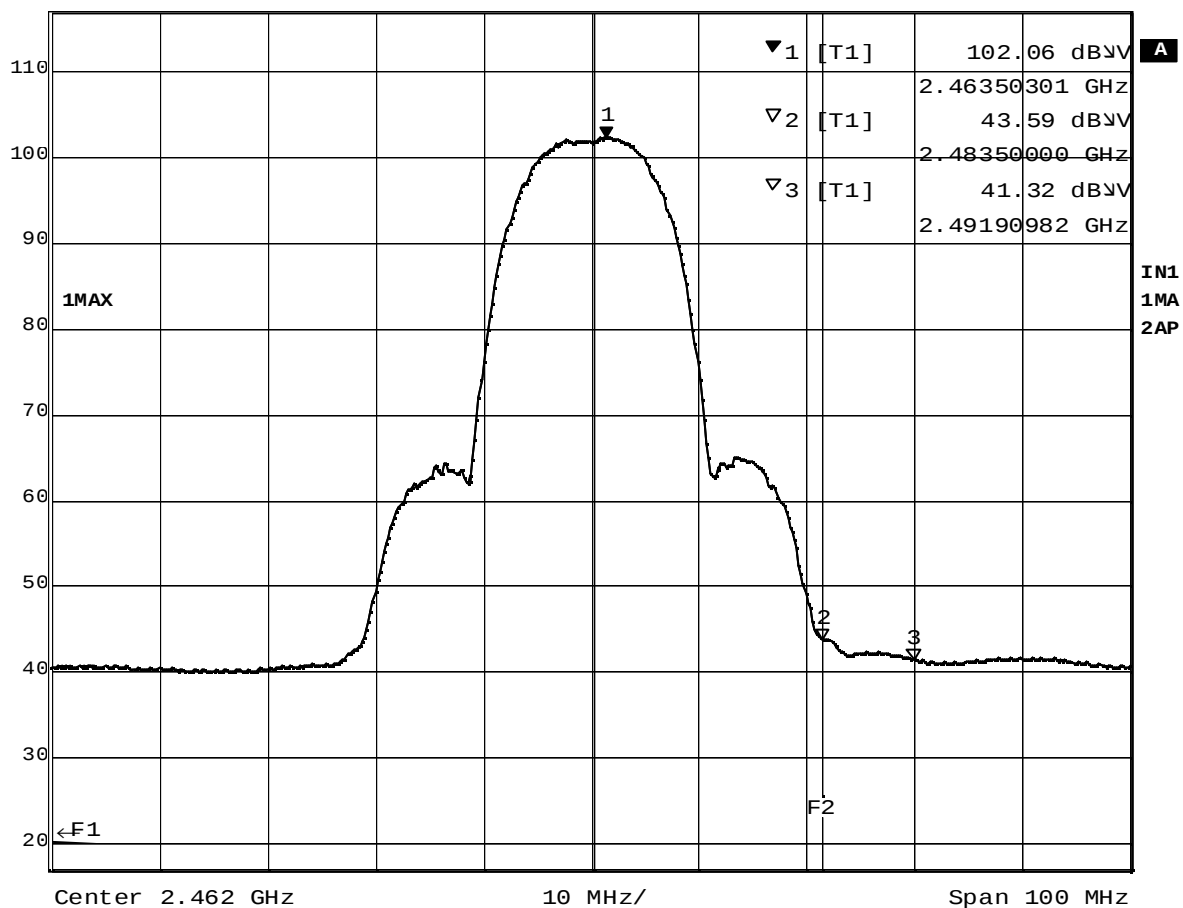


Date: 7.NOV.2003 18:45:21

Plot 8-3 Ch.11 2462MHz TX, DSSS 11Mbps (Peak)



Ref Lvl 117 dBμV
Marker 1 [T1] 102.06 dBμV
2.46350301 GHz
RBW 1 MHz
VBW 10 Hz
SWT 25 s
RF Att 20 dB
Unit dBμV

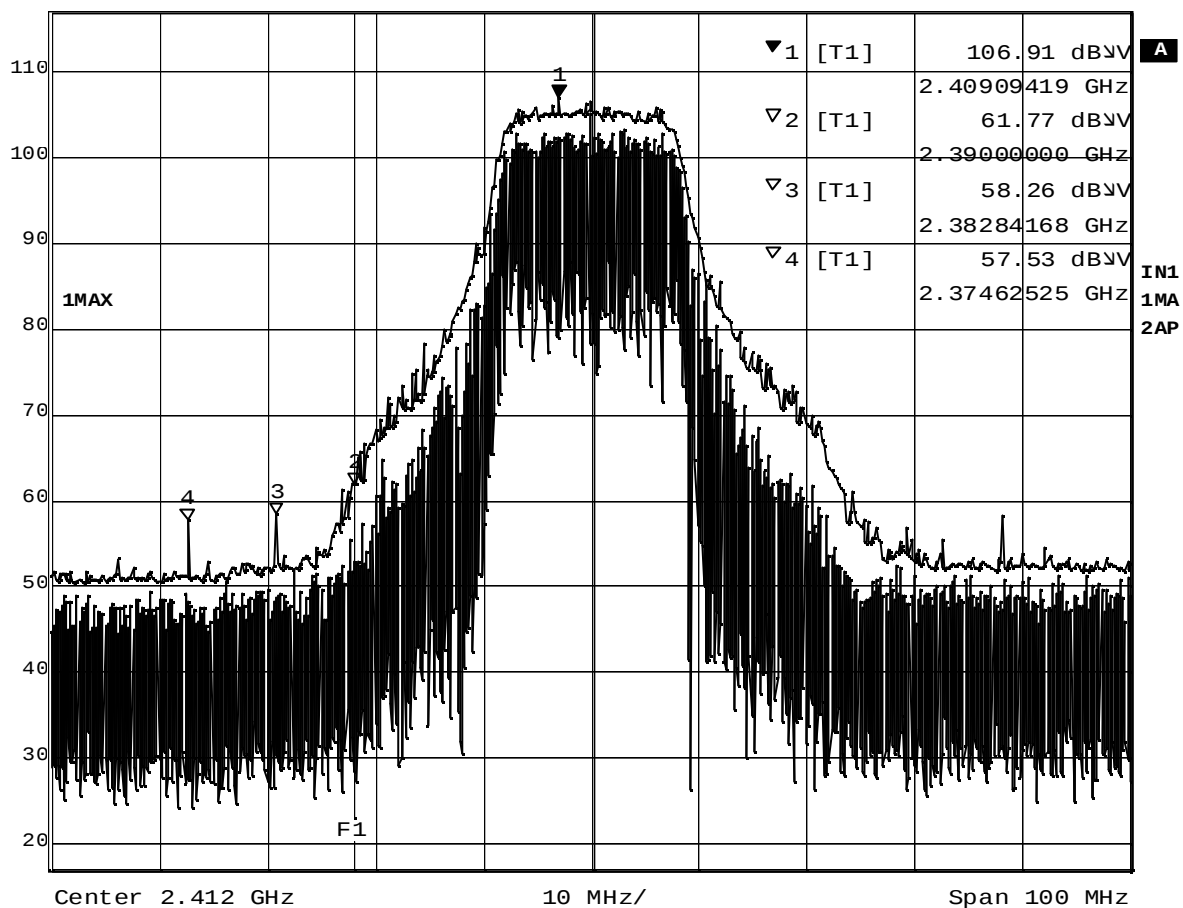


Date: 7.NOV.2003 18:46:11

Plot 8-4 Ch.11 2462MHz TX, DSSS 11Mbps (Average)



Ref Lvl 117 dB μ V
Marker 1 [T1] 106.91 dB μ V
2.40909419 GHz
RBW 1 MHz
VBW 1 MHz
SWT 5 ms
RF Att 20 dB
Unit dB μ V

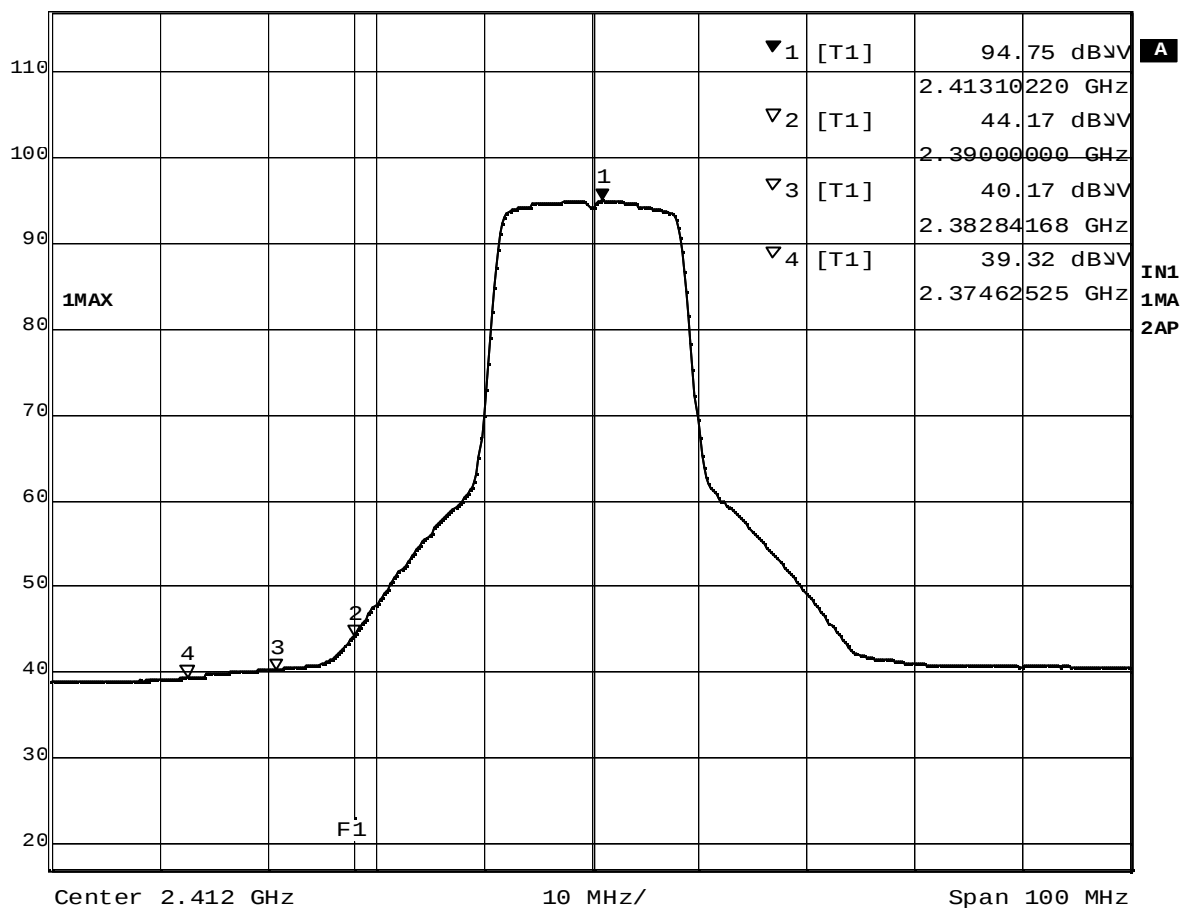


Date: 7.NOV.2003 18:13:43

Plot 8-5 Ch.1 2412MHz TX, OFDM 18Mbps (Peak)



Ref Lvl 117 dBμV
Marker 1 [T1] 94.75 dBμV
2.41310220 GHz
RBW 1 MHz
VBW 10 Hz
SWT 25 s
RF Att 20 dB
Unit dBμV

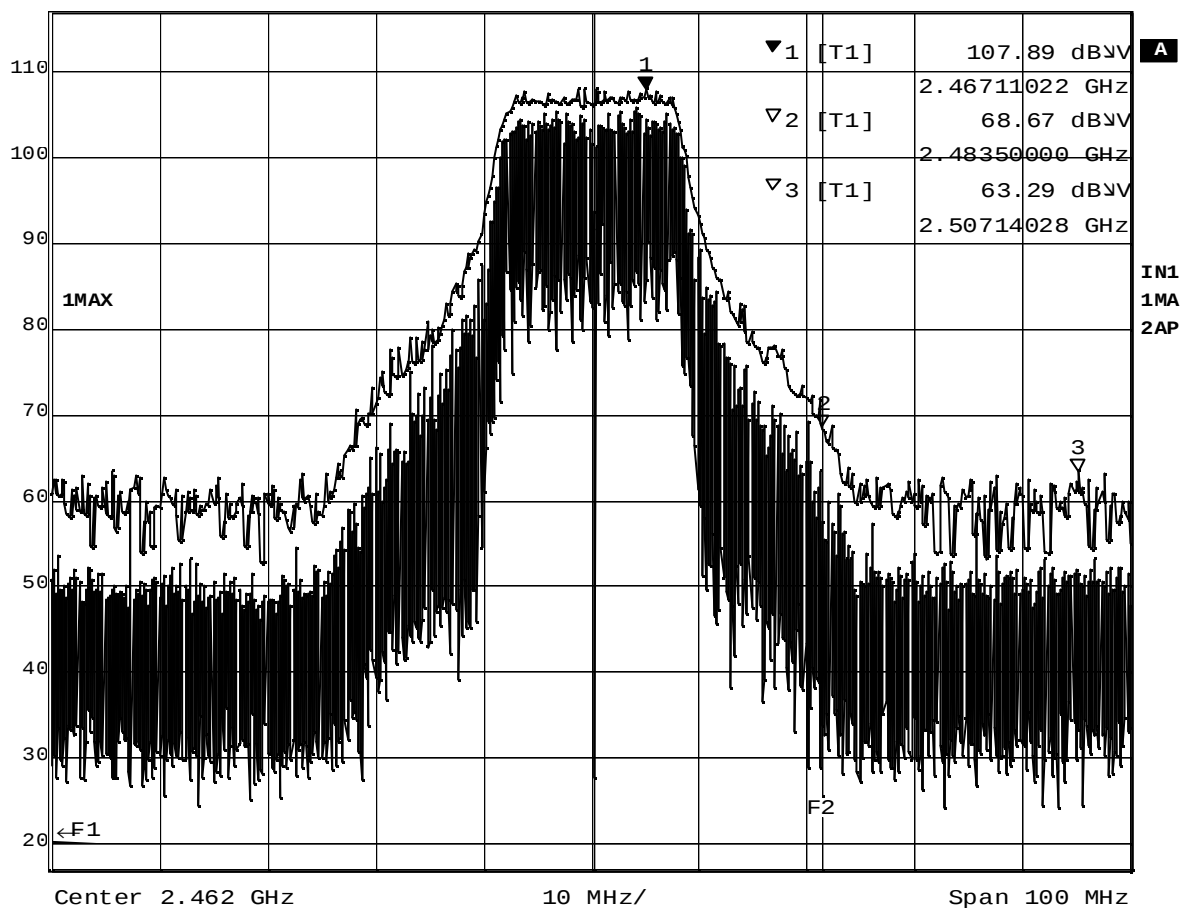


Date: 7.NOV.2003 18:14:37

Plot 8-6 Ch.1 2412MHz TX. OFDM 18Mbps (Average)



Marker 1 [T1] RBW 1 MHz RF Att 20 dB
Ref Lvl 107.89 dBμV VBW 1 MHz
117 dBμV 2.46711022 GHz SWT 5 ms Unit dBμV



Date: 7.NOV.2003 18:32:24

Plot 8-7 Ch.11 2462MHz TX. OFDM 18Mbps (Peak)



Prepared by T. Asano