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

Document Number : FCC 19-0237-0

Product: IBM 11a/b/g Wireless LAN Mini PCI Adapter

measured with **IBM ThinkPad R40 Series**

FCC ID: ANO20030400LEG
IC: 349E-PH12127E

May 29, 2003

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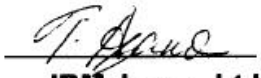
Signature: 
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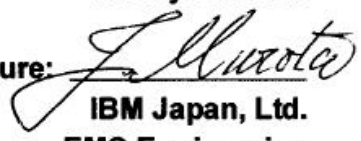
Signature: 
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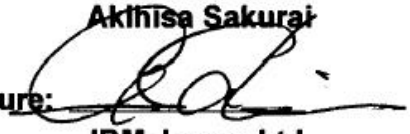
Signature: 
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MEASUREMENT / TECHNICAL REPORT – Part 15 Subpart C
(Intentional Radiator)

IBM 11a/b/g Wireless LAN Mini PCI Adapter
with
IBM ThinkPad R40 Series
(Machine type : 2681, 2682, 2683, 2722, 2723, 2724, 2892, 2893, 2898, 2899)

FCC ID : ANO20030400LEG

May 29, 2003

This report concerns: (check one) Original Grant ✓ Class I change _____ Class II change _____ Equipment type: Wireless LAN device
This report shall not be reproduced except in full, without the written permission of this test lab.
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.
TEST SITE	: IBM Japan, Ltd., Yamato Semi-anechoic chamber #1
TEST SITE ADDRESS	: 1623 – 14 Shimotsuruma, Yamato-shi, Kanagawa 242-8502 Japan 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	: IBM 11a/b/g Wireless LAN Mini PCI Adapter
FCC ID IC Certification Number	: ANO20030400LEG : 349E-PH12127E
SERIAL NUMBER	: A310037307
PYSICAL CONDITION	: Preproduction
KIND OF EQUIPMENT	: Personal computer with an IEEE802.11a, 11b & 11g Wireless LAN Mini-PCI Combo Card (Composite application)
TESTED DATE	: May 15, 16, 19 and 23, 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)
- This facility is accepted by **Industry Canada** in a letter dated March 19, 2001 as number **IC 349E** for chamber #2, and January 25, 2002 as number **IC 4221** for chamber #1.

A.3 EUT details

Table-A EUT details

Model and S/N	**FCC ID** **IC Certification Number**	**Description**
IBM 11a/b/g Wireless LAN Mini PCI Adapter (s/n A310037307)	FCC ID: ANO20030400LEG IC: 349E-PH12127E	**Applying equipment** IEEE802.11a/b/g Wireless LAN Mini-PCI Combo Card without antenna
ThinkPad R40 Series M/T 2681-F9U (s/n FX-00365)	N/A	IBM Notebook PC with built_in antenna CPU: Intel® Mobile Pentium® 4, 1.6GHz LCD: 14” XGA
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		Condition	Result
	Transmit mode (TX):			
15.247(a)(2) **–**	Bandwidth at 6 dB below	FCC requirement	Conducted	Pass
– **5.9.1**	Bandwidth at 20 dB below Occupied BW (or Band-edge)	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) **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 **6.6**	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 / 6.3**	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
	Receive mode (RX):			
15.207 **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
15.209 **7.3**	General Field Strength Limits (Radiated Emission Limits)	Shall not exceed the limits specified in RSS-210.	Radiated (30MHz - 1GHz)	Pass
			Radiated (1– 25GHz)	Pass

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. 18Mbps transmission mode was selected for full testing (i.e. conducted and radiated measurements) as the worse case samplings. See "Chapter 3. Conducted Peak Output Power" as to the determination of measurement plots.
   Also 6Mbps transmission mode was used for 6dB band width and other conducted testing.
4. As for the RF receiving test, the middle channel (2437MHz) was 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			**IEEE802.11g**							
	1/2M bps	5.5M bps	11M bps	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	18M bps	54M bps
2.412 (Ch. 1)	*1			+14	+14	+14	+14	+14	14	13.5	11.5
2.417 (Ch. 2)				+17	+17	+17	+17	+17	15.5	13.5	11.5
2.422 (Ch. 3)				+17	+17	+17	+17	+17	15.5	13.5	11.5
2.427 (Ch. 4)				+17	+17	+17	+17	+17	15.5	13.5	11.5
2.432 (Ch. 5)				+17	+17	+17	+17	+17	15.5	13.5	11.5
2.437 (Ch. 6)				+17	+17	+17	+17	+17	15.5	13.5	11.5
2.442 (Ch. 7)				+17	+17	+17	+17	+17	15.5	13.5	11.5
2.447 (Ch. 8)				+17	+17	+17	+17	+17	15.5	13.5	11.5
2.452 (Ch. 9)				+17	+17	+17	+17	+17	15.5	13.5	11.5
2.457 (Ch. 10)				+17	+17	+17	+17	+17	15.5	13.5	11.5
2.462 (Ch. 11)				+14	+14	+14	+14	+14	14	13.5	11.5
				IEEE802.11a							
5.745 (Ch.149)	N/A			*1							
5.765 (Ch.153)											
5.785 (Ch.157)											
5.805 (Ch.161)											
5.825 (Ch.165)											

*1: See the separate test report (Document number: FCC 19-0222-0).

D. Justification

The EUT was investigated for both the main (left) and the auxiliary (right) antennas for each LCD size. The worse case data taken in this report represents the measurement result of the right antenna for the 13/14" LCD model that has comparatively higher gain in 2.4GHz band as shown below.

Table-D Peak Antenna Gains of EUT

		13" / 14" LCD model	15" LCD model
2.4GHz band	Left Antenna gain	-0.37 dBi (peak)	+0.46 dBi (peak)
	Right Antenna gain	+**0.83** dBi (peak)	-1.06 dBi (peak)

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	08/28/02	1 year
Spectrum Analyzer (100Hz-1.5GHz)	HP 85680B	2841A04242	10/30/02	1 year
Spectrum Analyzer (100Hz-1.5GHz)	HP 85680B	2841A04254	06/17/02	1 year
Spectrum Analyzer Display	HP 85662A	2542A12308	08/28/02	1 year
Spectrum Analyzer Display	HP 85662A	2816A16827	10/30/02	1 year
Spectrum Analyzer Display	HP 85662A	2816A16831	06/17/02	1 year
Quasi-Peak Adapter	HP 85650A	2043A00062	08/28/02	1 year
Quasi-Peak Adapter	HP 85650A	2811A01156	06/17/02	1 year
Quasi-Peak Adapter	HP 85650A	2811A01126	10/30/02	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	06/13/02	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	10/07/02	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	07/18/02	1 year
Horn Antenna (3.95- 5.85GHz)	EMCO 3160-5	1099	07/18/02	1 year
Horn Antenna (5.85- 8.20GHz)	EMCO 3160-6	9712-1044	07/18/02	1 year
Horn Antenna (8.2- 12.4GHz)	EMCO 3160-7	1156	07/18/02	1 year
Horn Antenna (18- 26.5GHz)	EMCO 3160-9	0004-1202	07/18/02	1 year
LISN	EMCO 3825/2	1426	09/01/02	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	09/05/02	1 year
- RF Amp.<=>Spectrum Analyzer	16m	- GEM0101	03/27/03	1 year
Coaxial cables (18 – 25GHz):				
- Horn Ant <=> RF Amp.	3m	- SF102-20167	09/05/02	1 year
- RF Amp.<=>Spectrum Analyzer	1m	- SF102-21105	09/05/02	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:				
- Lisn-L <=> SW/Con.unit (SW100)	4 m	- EMIC-L	04/14/03	1 year
- Lisn-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

1.1 Test Procedure

The bandwidth at 6 dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.
The spectrum analyzer is set to:
RBW=100kHz, VBW=100kHz*1, Span=30MHz, 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: Loss: 110 cm 1.3 dB	

Notes: - R&S: Rohde & Schwarz

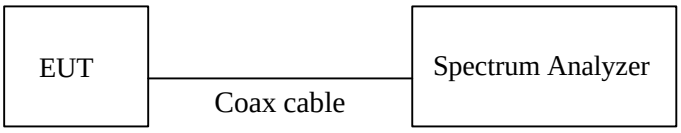


Figure 1: Measurement setup for 6dB bandwidth test

1.3 Measurement Results

Test Date: May 14, 2003

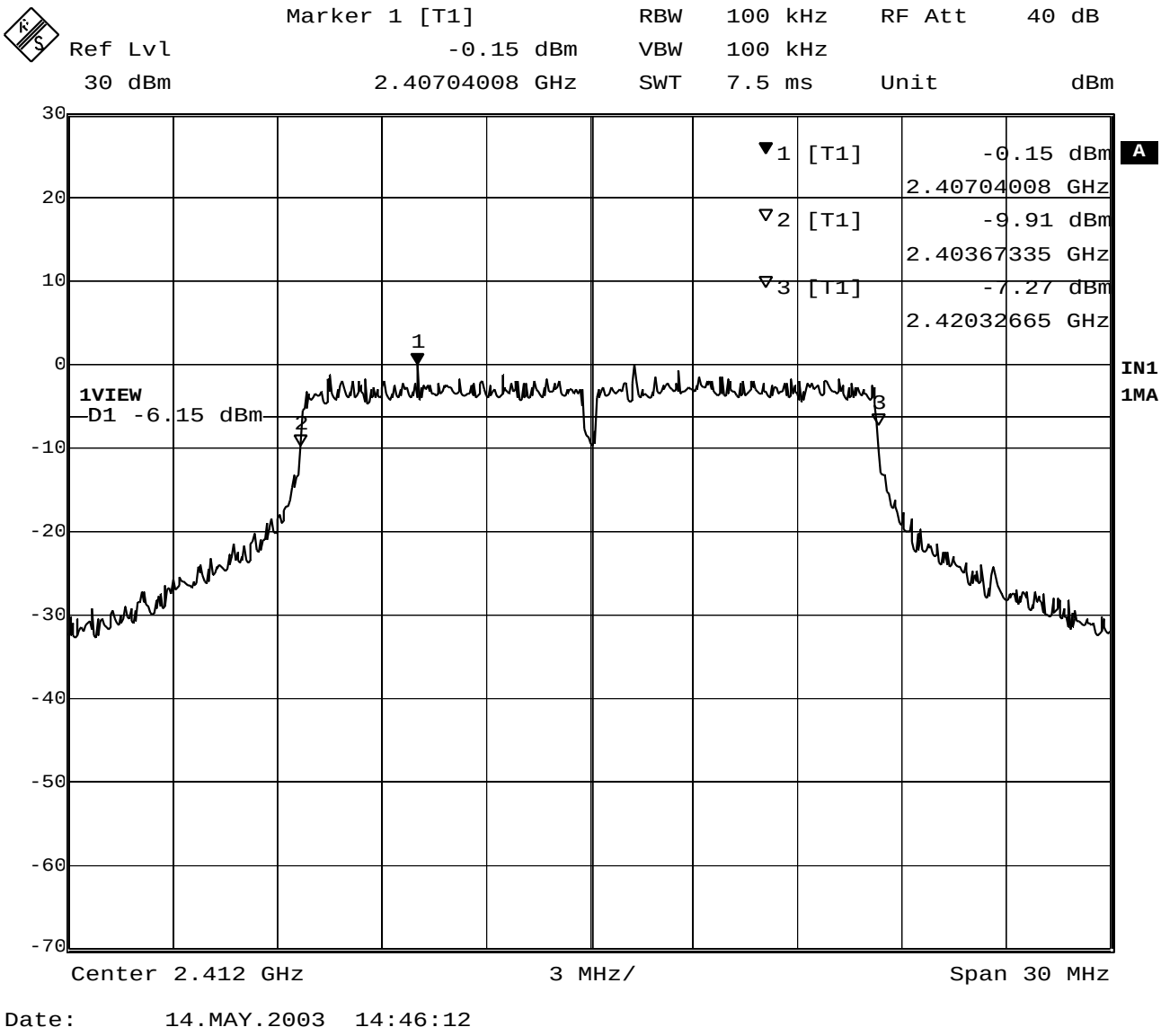
Table 1-2-1. EUT: M/T 2681-F9U, s/n FX-00365 , TX mode 6Mbps

Center Frequency (MHz)	Trace number	Lower frequency (MHz)	Upper frequency (MHz)	Bandwidth at 6 dB below (MHz)
2412 (ch. 1)	Plot 1-1	2403.67	2420.33	16.66
2437 (ch. 6)	Plot 1-2	2428.73	2445.39	16.66
2462 (ch. 11)	Plot 1-3	2453.67	2470.33	16.66

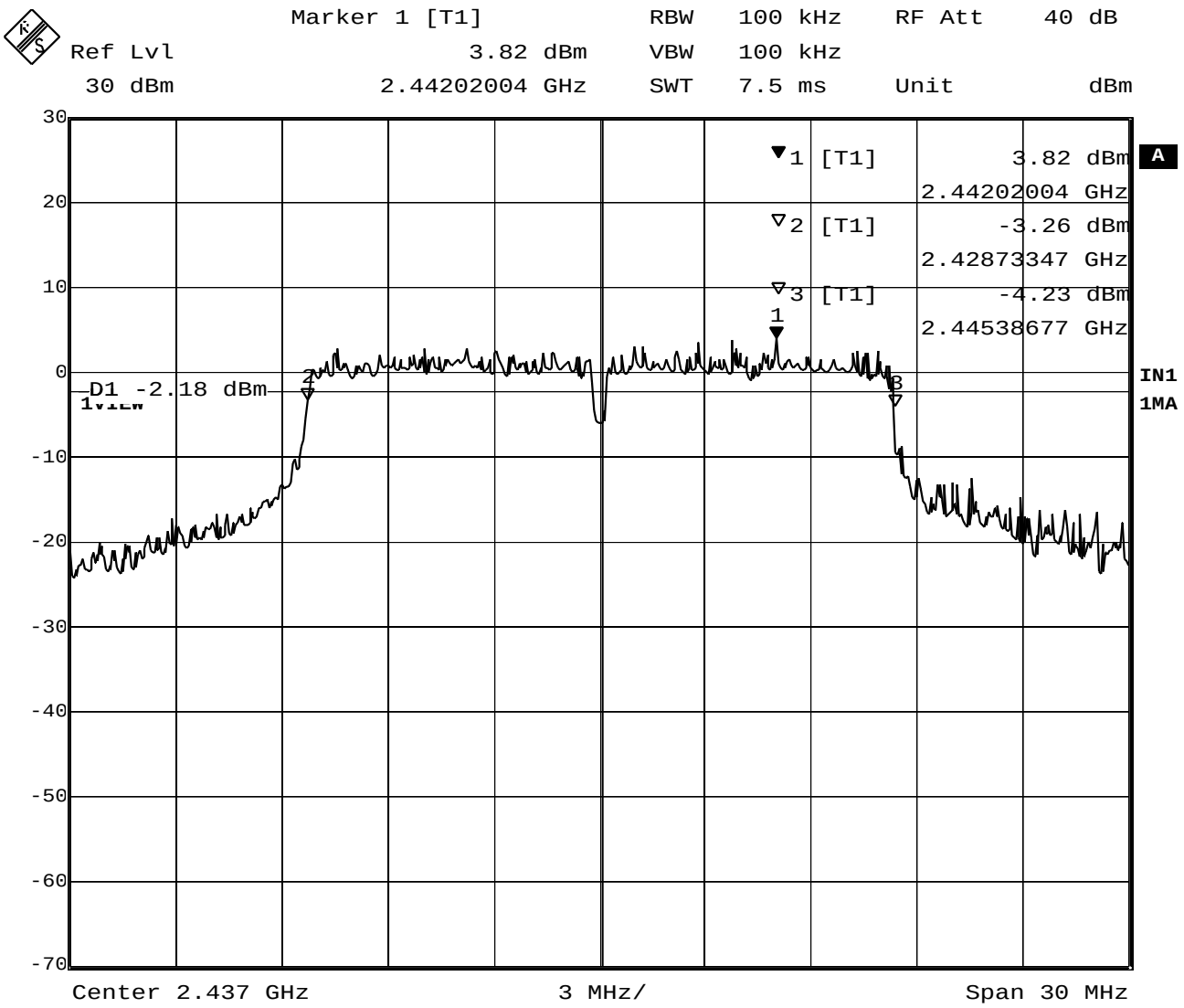
Table 1-2-2. EUT: M/T 2681-F9U, s/n FX-00365 , TX mode 18Mbps

Center Frequency (MHz)	Trace number	Lower frequency (MHz)	Upper frequency (MHz)	Bandwidth at 6 dB below (MHz)
2412 (ch. 1)	Plot 1-4	2403.73	2420.33	16.60
2437 (ch. 6)	Plot 1-5	2428.73	2445.33	16.60
2462 (ch. 11)	Plot 1-6	2453.73	2470.33	16.60

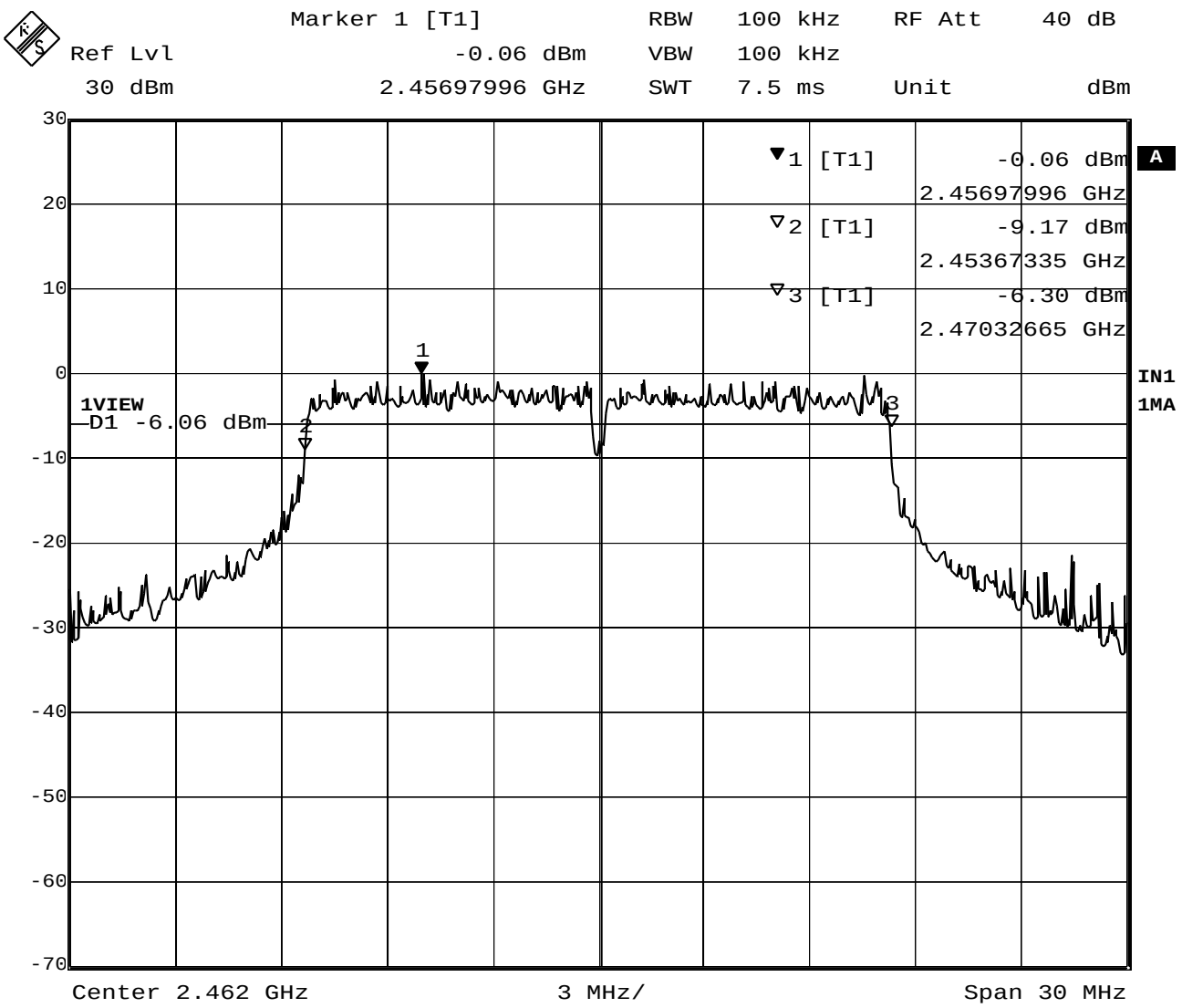
1.4 Trace Data



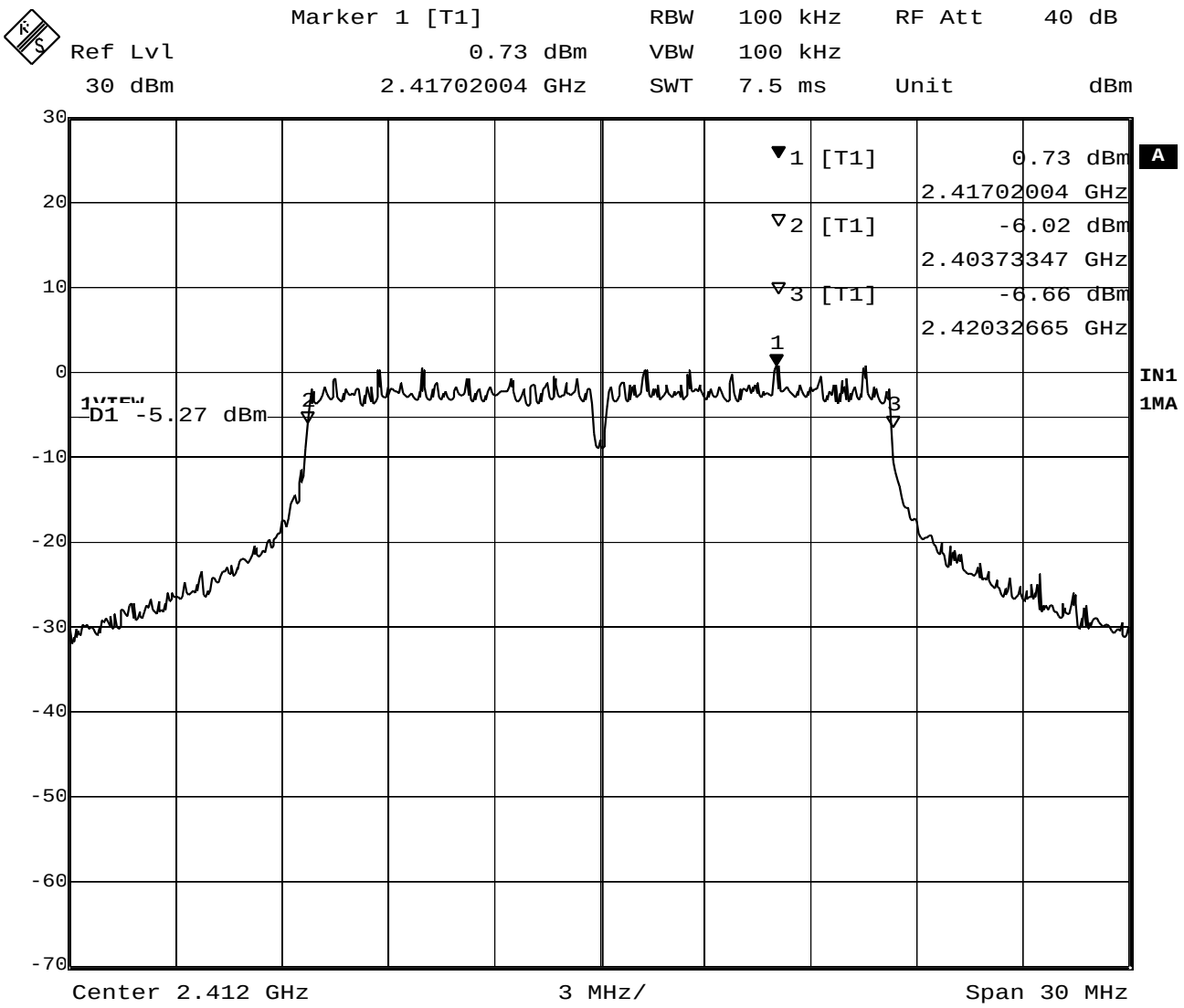
Plot 1-1. 6dB BW at 2412MHz (6Mbps)



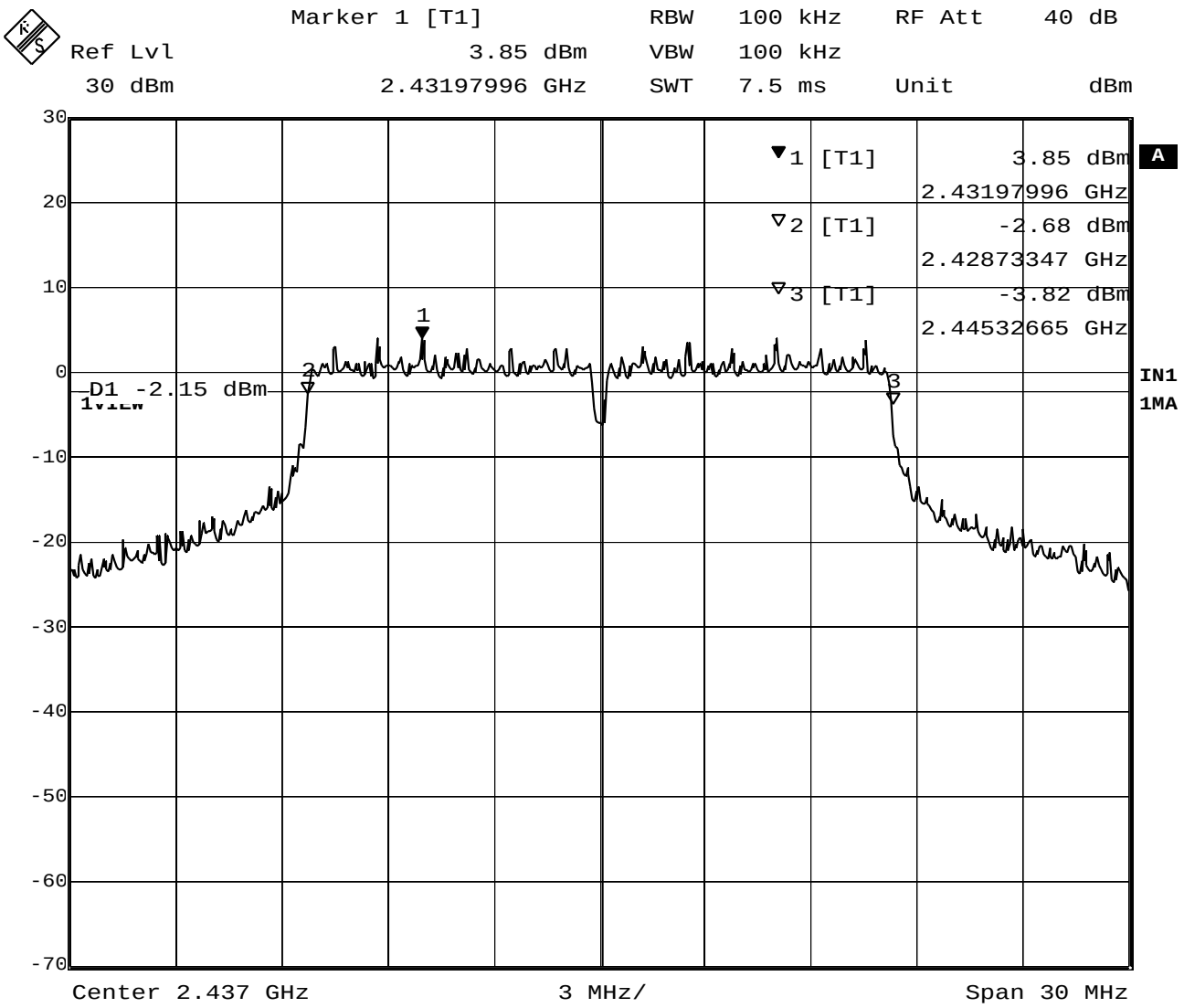
Plot 1-2. 6dB BW at 2437MHz (6Mbps)



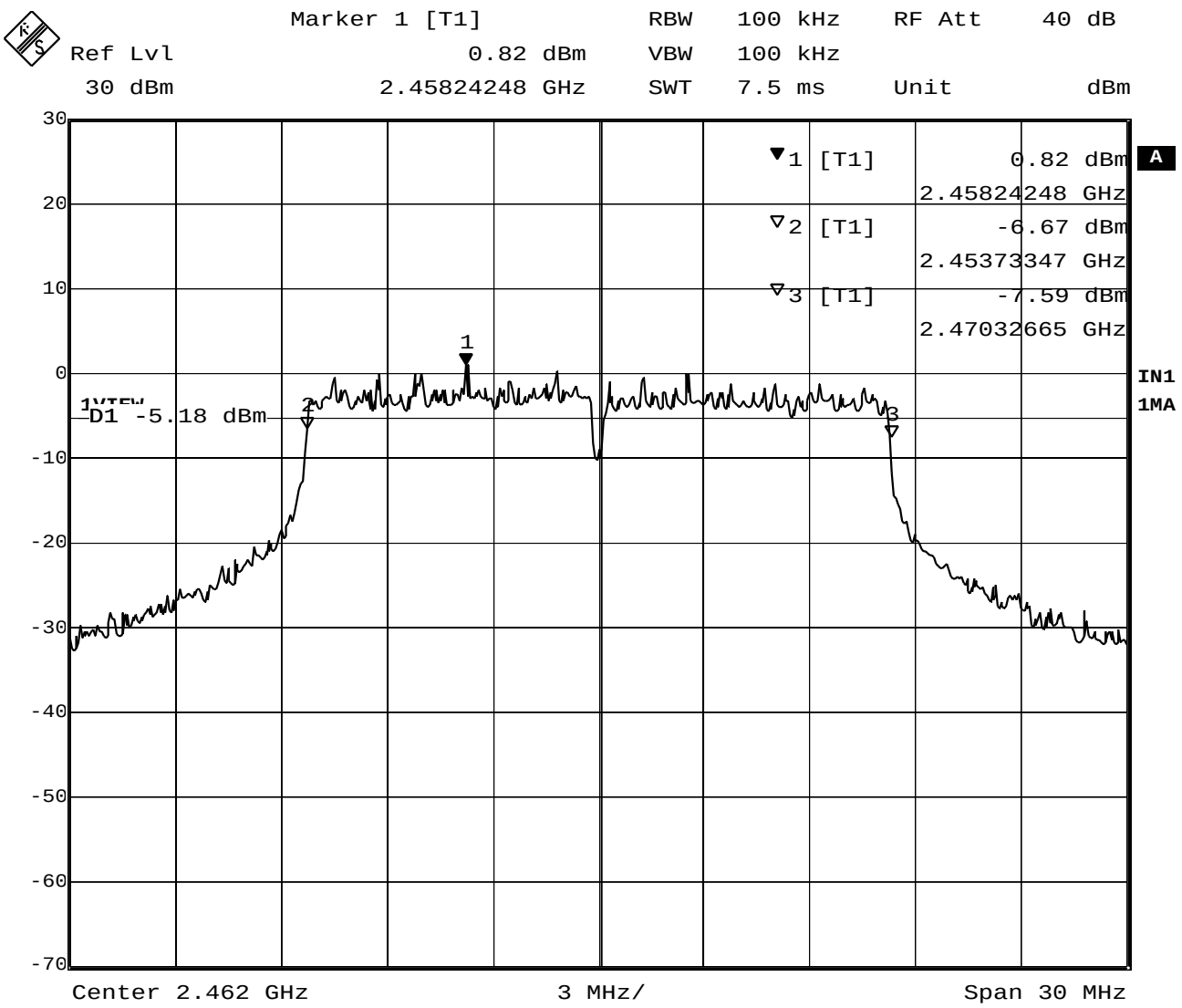
Plot 1-3. 6dB BW at 2462MHz (6Mbps)



Plot 1-4. 6dB BW at 2412MHz (18Mbps)



Plot 1-5. 6dB BW at 2437MHz (18Mbps)



Plot 1-6. 6dB BW at 2462MHz (18Mbps)

2. Out of Band Emissions and Occupied Bandwidth at 20 dB below / Bandedge

2.1 Test Procedure

The bandwidth at 20 dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.
The spectrum analyzer is set to:
RBW=100kHz, VBW=100kHz*1, Span=50MHz, 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 of Occupied Bandwidth / Band-edge

note) Canadian requirement

Test Date: May 14, 2003

Table 2-1-1. EUT: M/T 2681-F9U, s/n FX-00365 , TX mode 6Mbps

Center Frequency (MHz)	Trace number	Lower Frequency (MHz)	Upper Frequency (MHz)	Bandwidth at 20 dB below (MHz)	Margin to Lower limit (MHz)	Margin to Upper limit (MHz)
2412 (ch. 1)	Plot 2-1	2402.43	2421.37	18.94	2.43	
2437 (ch. 6)	Plot 2-2	2427.18	2447.37	20.19		
2462 (ch. 11)	Plot 2-3	2452.23	2471.33	19.10		12.17

Table 2-1-2. EUT: M/T 2681-F9U, s/n FX-00365 , TX mode 18Mbps

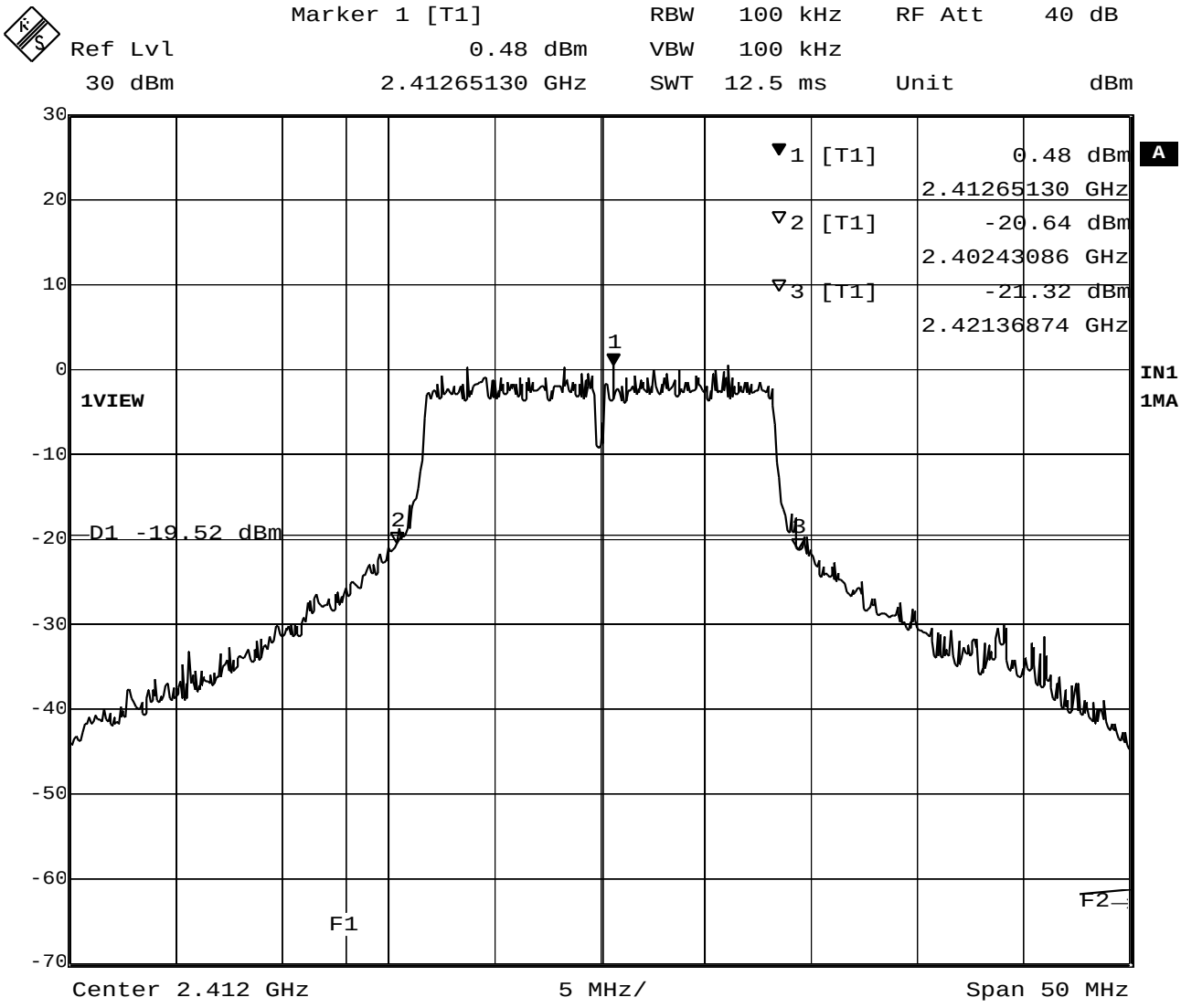
Center Frequency (MHz)	Trace number	Lower Frequency (MHz)	Upper Frequency (MHz)	Bandwidth at 20 dB below (MHz)	Margin to Lower limit (MHz)	Margin to Upper limit (MHz)
2412 (ch. 1)	Plot 2-4	2402.87	2421.13	18.26	2.87	
2437 (ch. 6)	Plot 2-5	2426.93	2446.98	20.05		
2462 (ch. 11)	Plot 2-6	2452.73	2471.33	18.60		12.17

2.4 Measurement Results of Out of Band Emissions

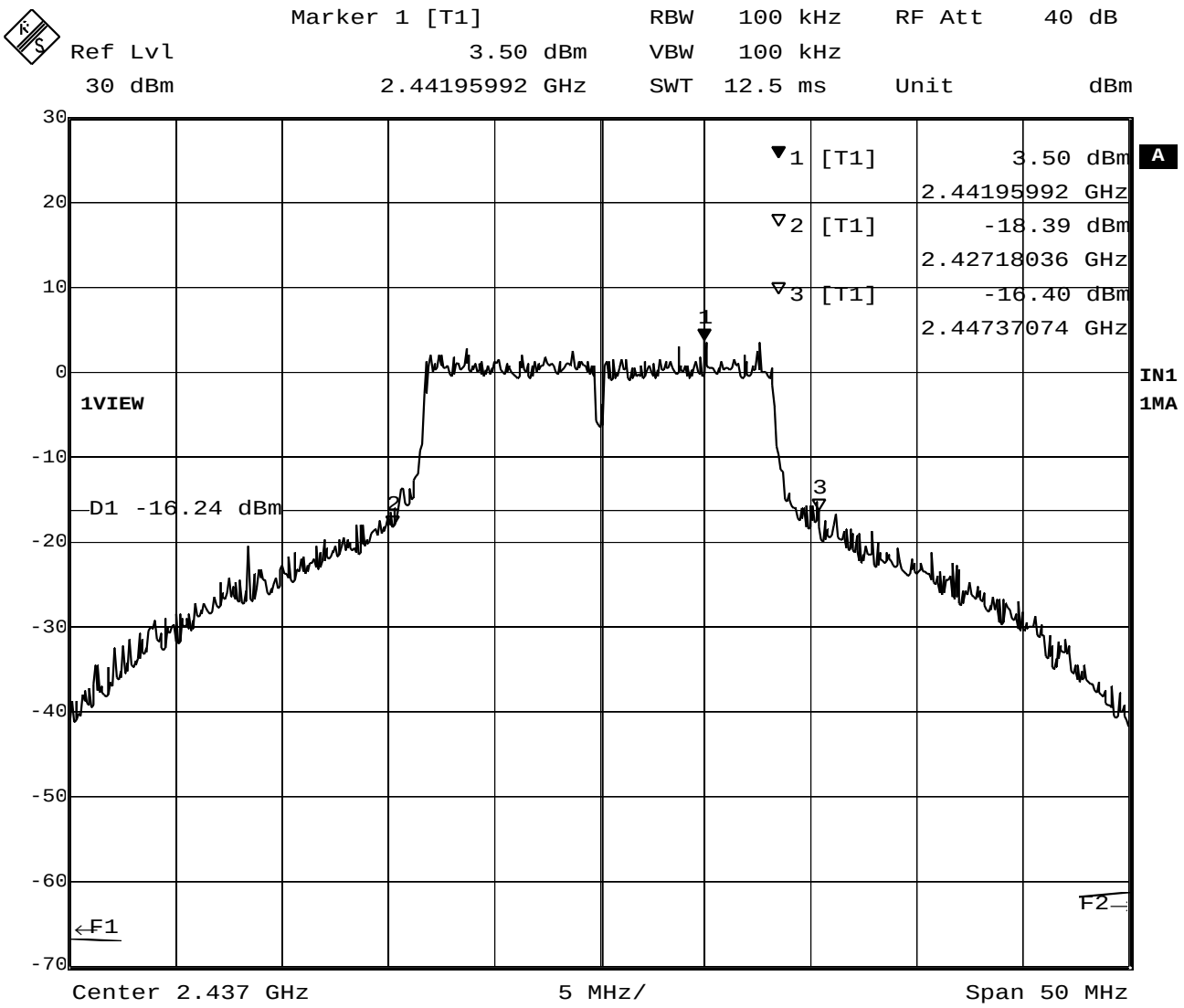
All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest inband spectral density.

Test Date: May 14, 2003 : See Plot 2-7 to 2-12

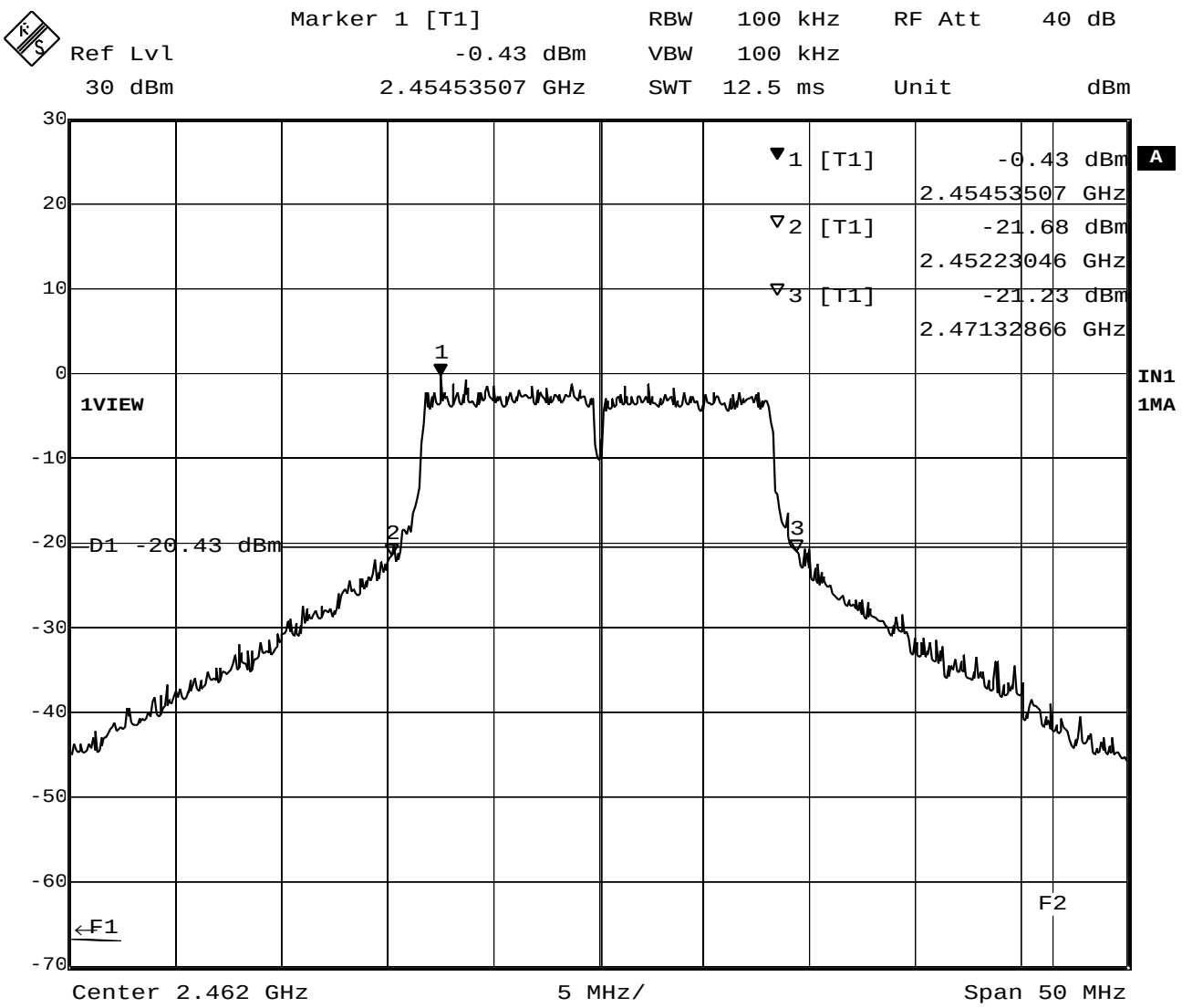
2.5 Trace Data of Band-edge



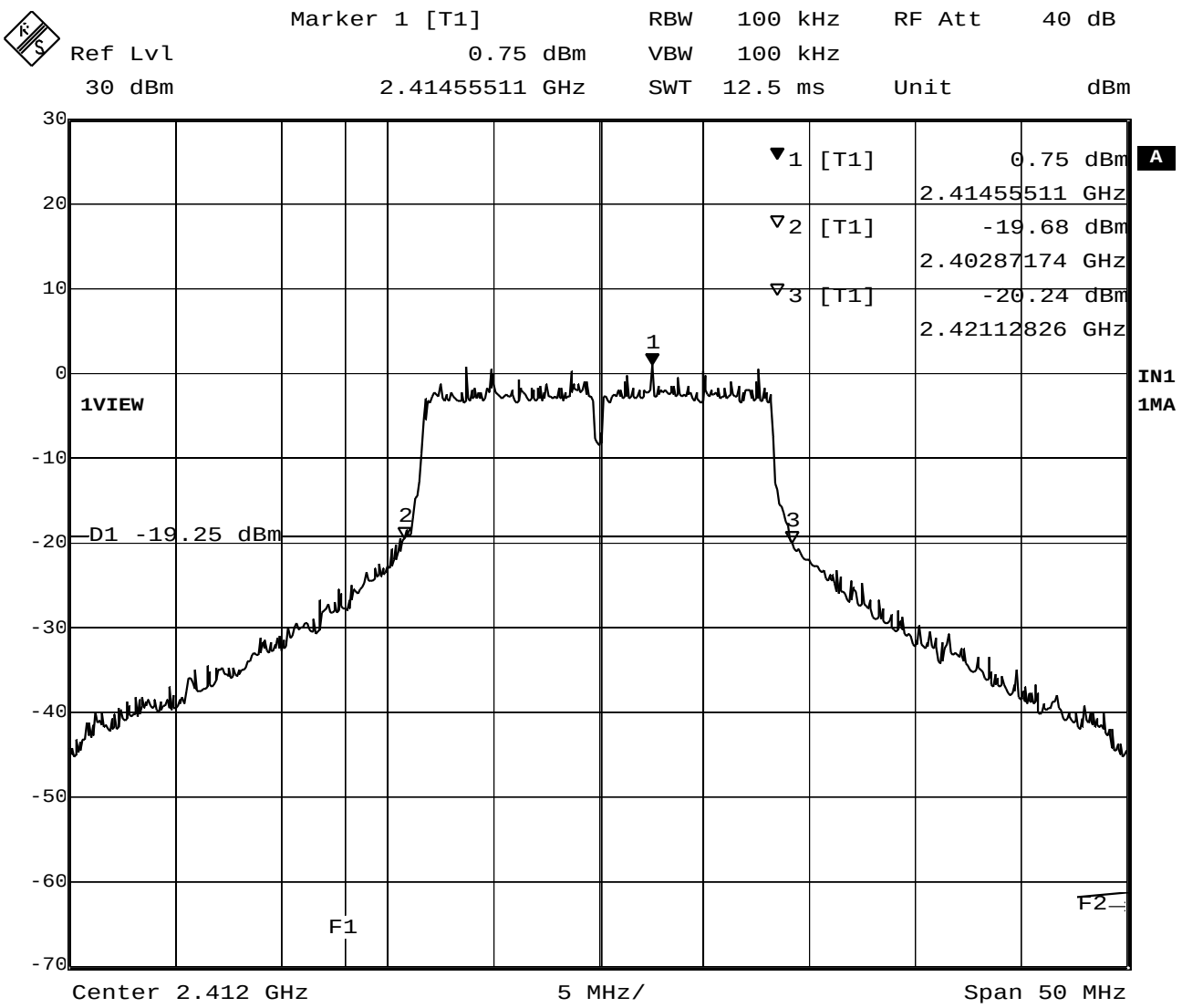
Plot 2-1. 20dB BW at 2412MHz (6Mbps)



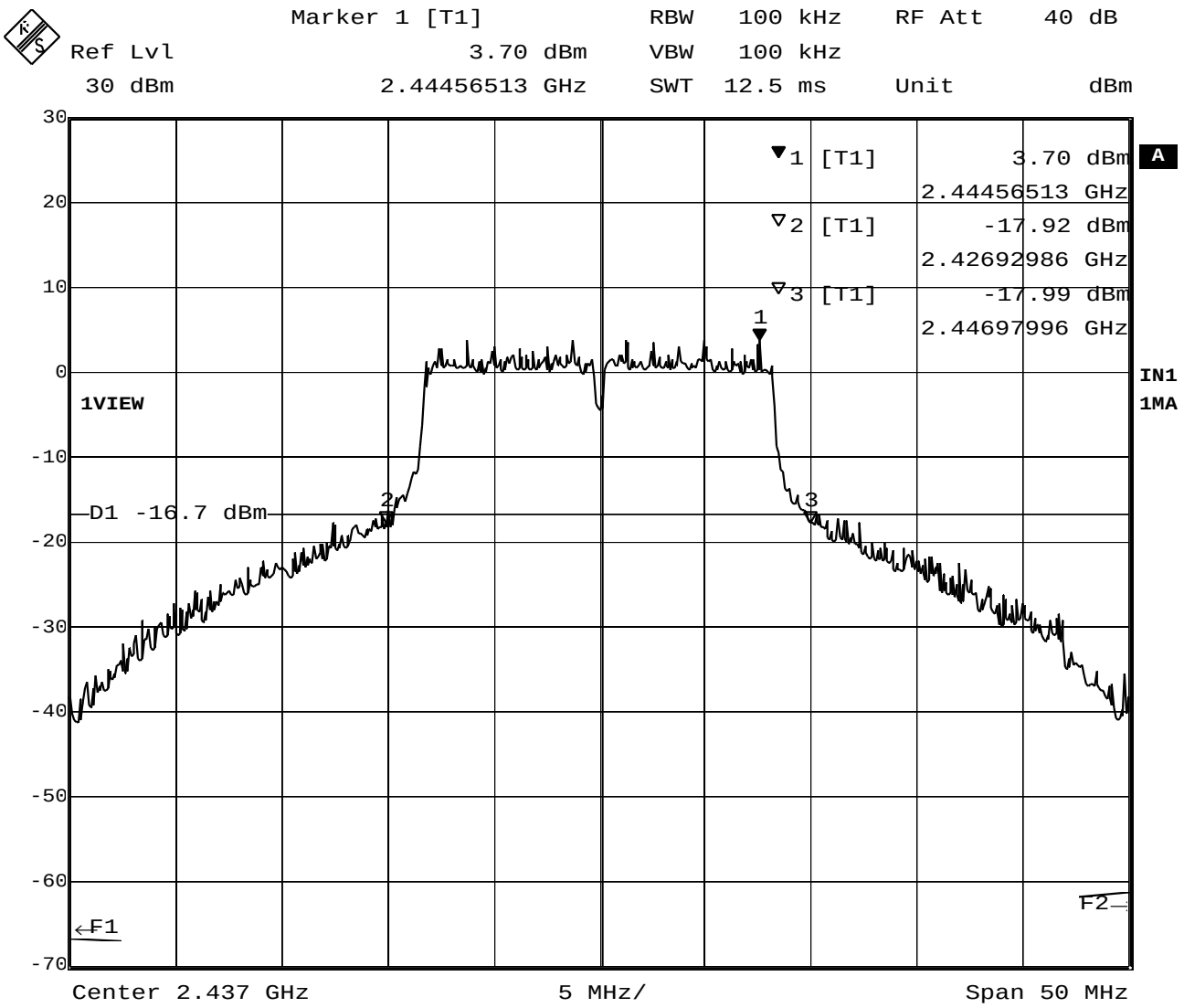
Plot 2-2. 20dB BW at 2437MHz (6Mbps)



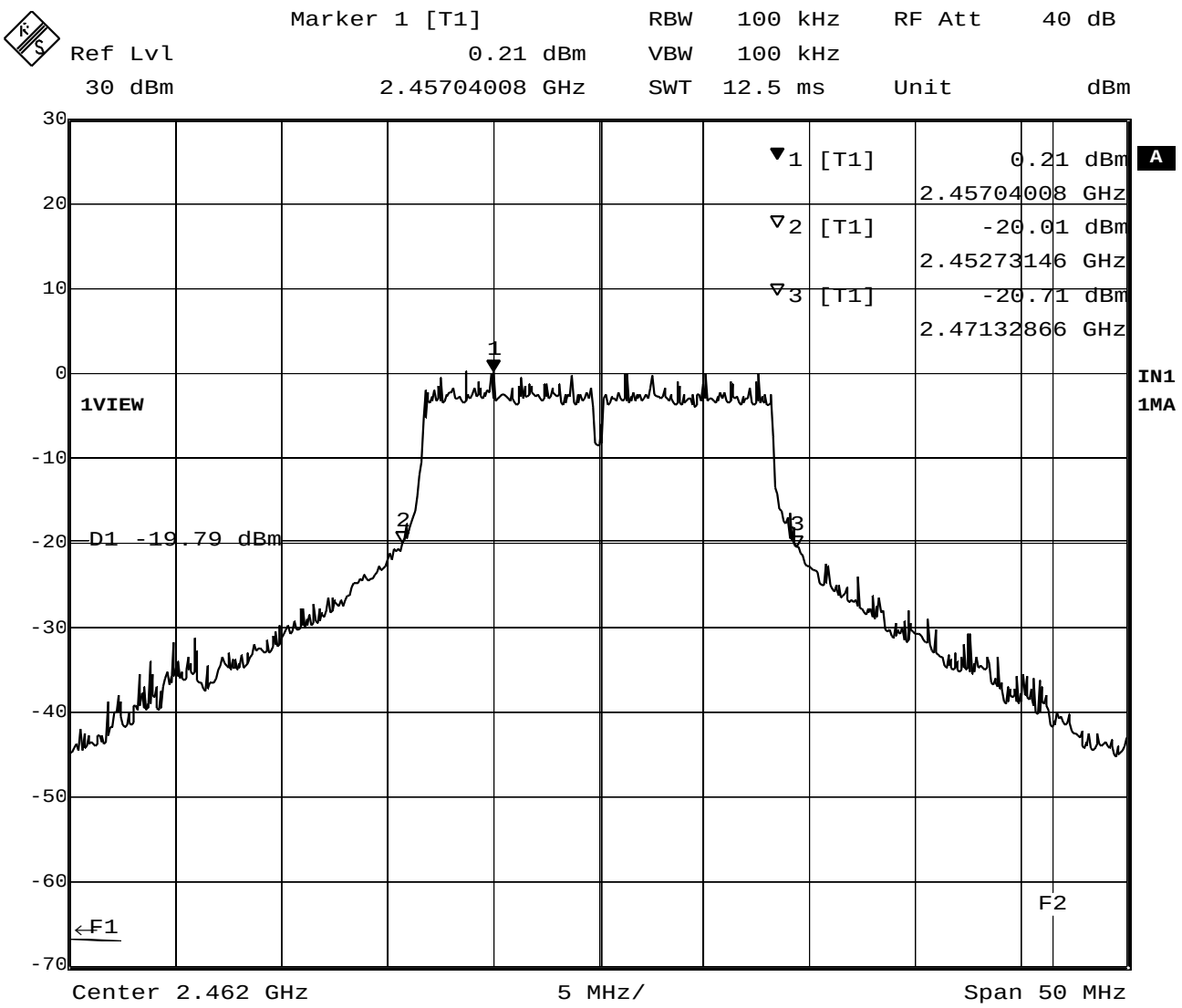
Plot 2-3. 20dB BW at 2462MHz (6Mbps)



Plot 2-4. 20dB BW at 2412MHz (18Mbps)

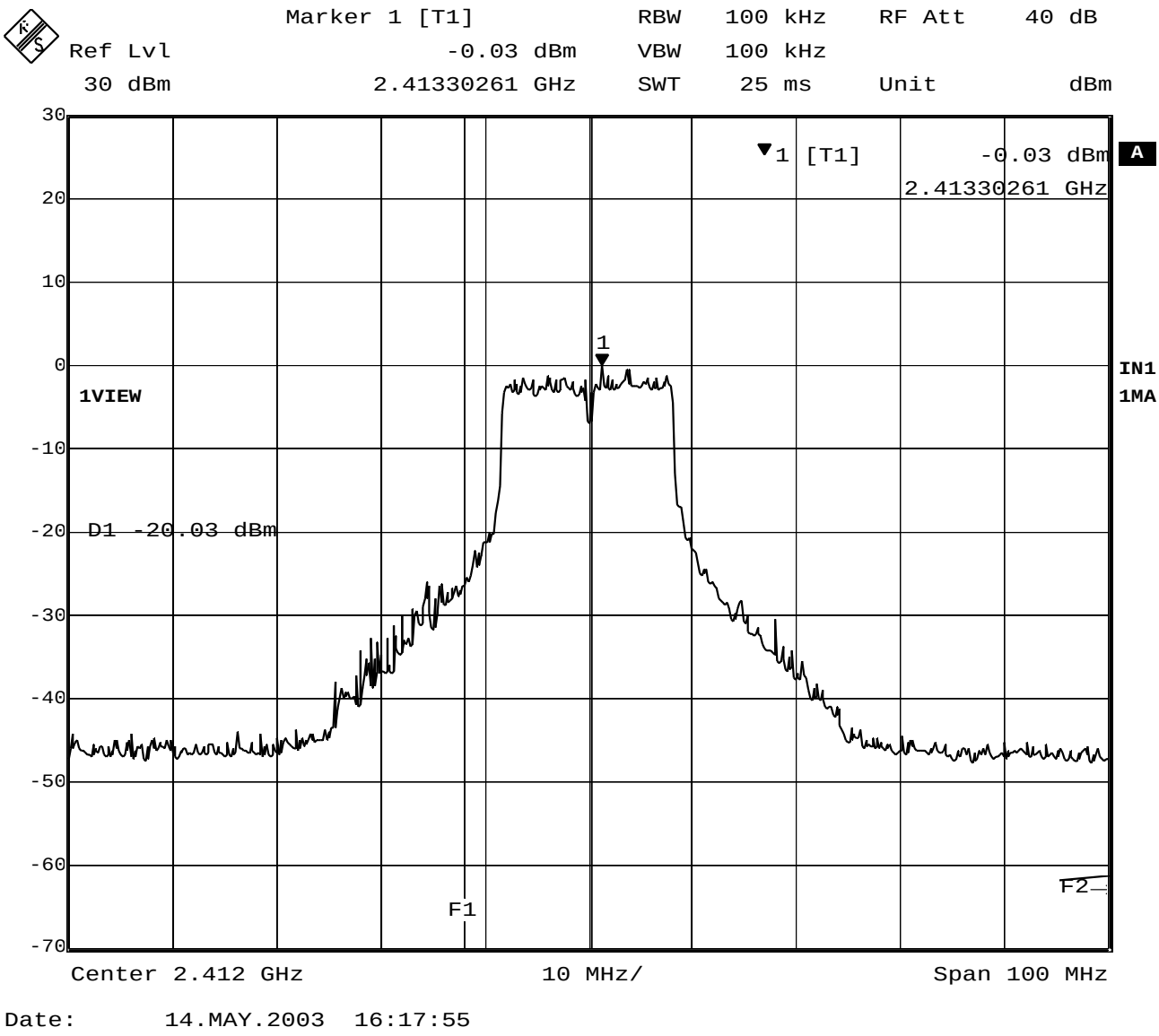


Plot 2-5. 20dB BW at 2437MHz (18Mbps)

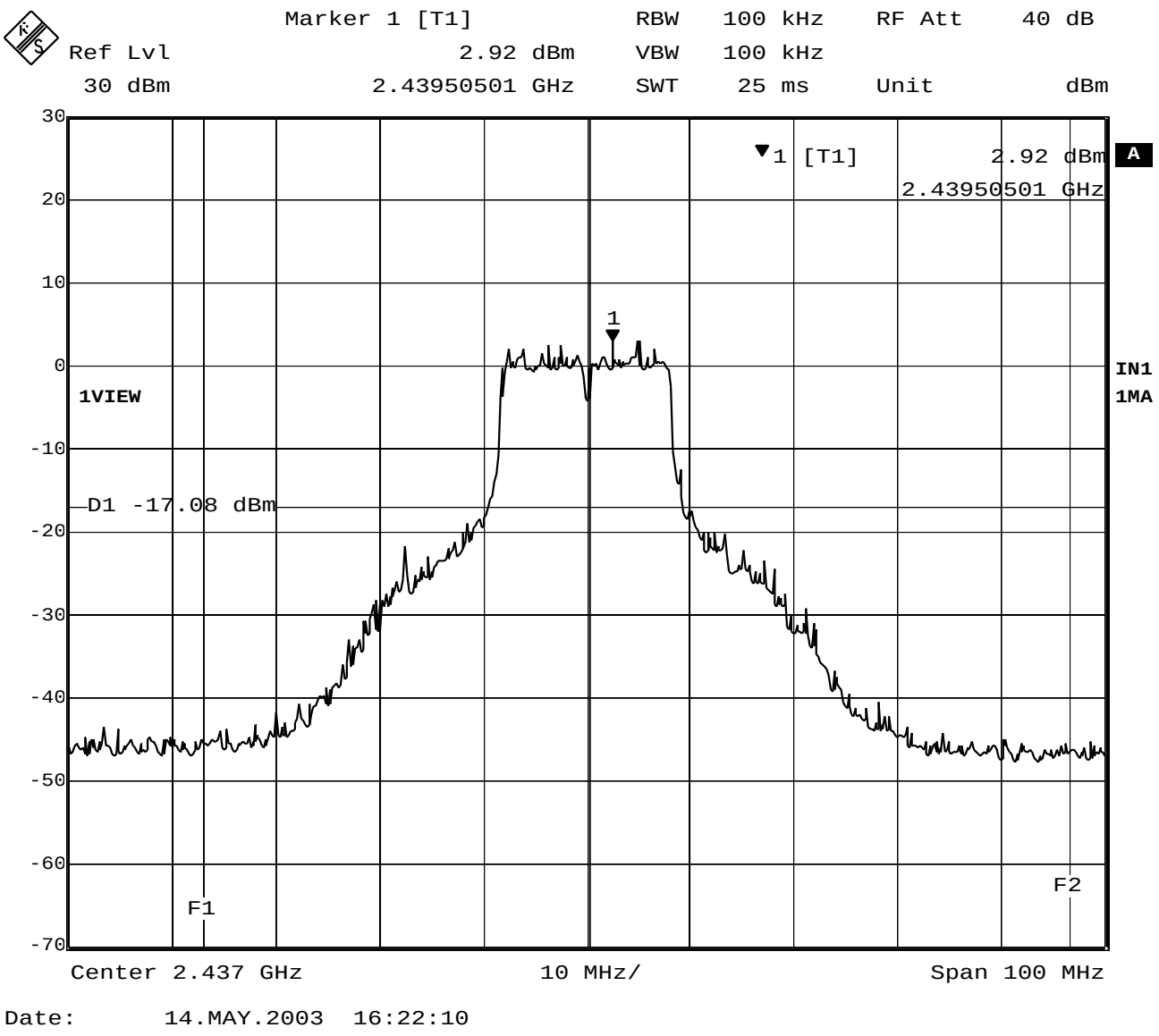


Plot 2-6. 20dB BW at 2462MHz (18Mbps)

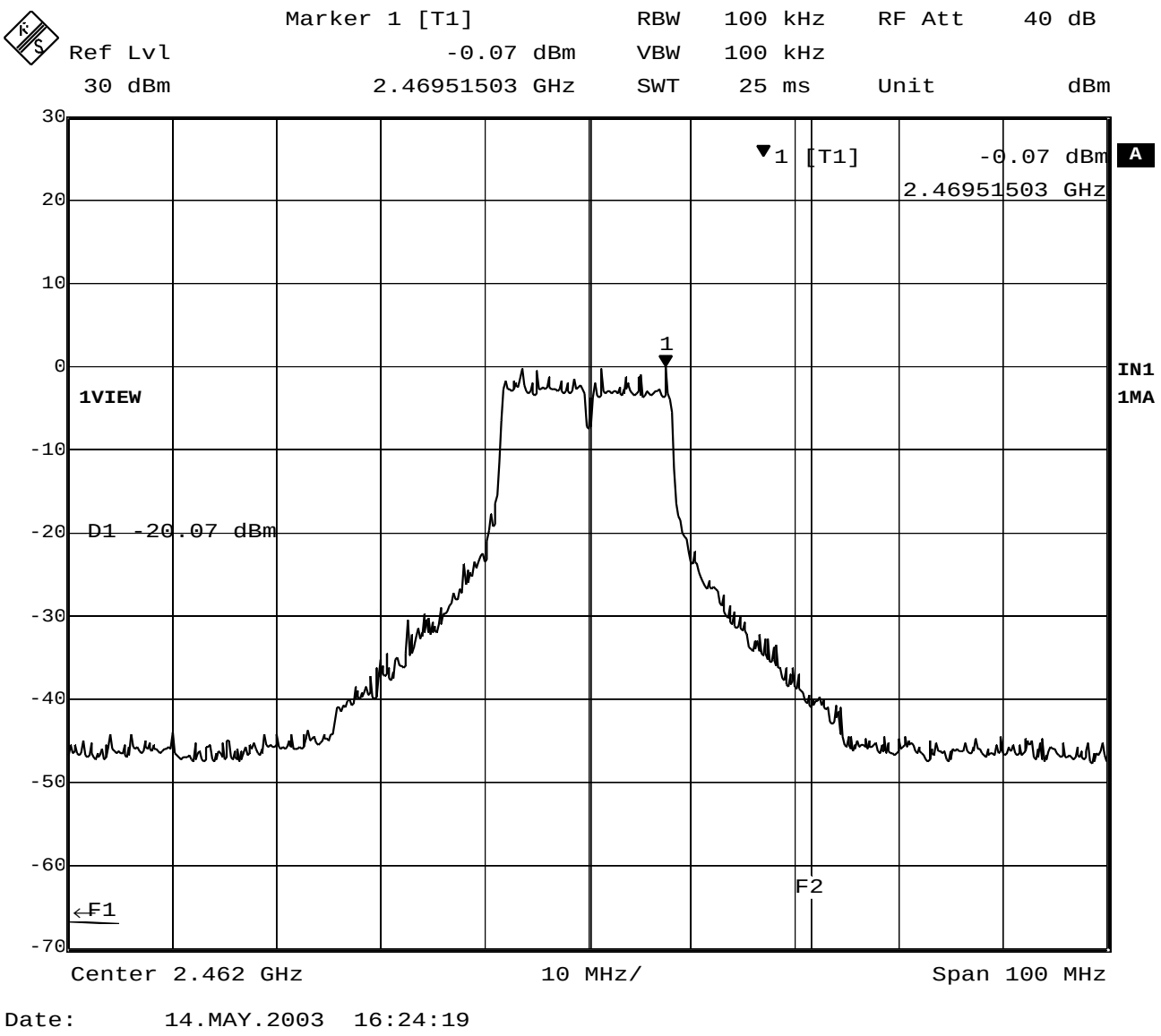
2.6 Trace Data of Out of Band Emissions



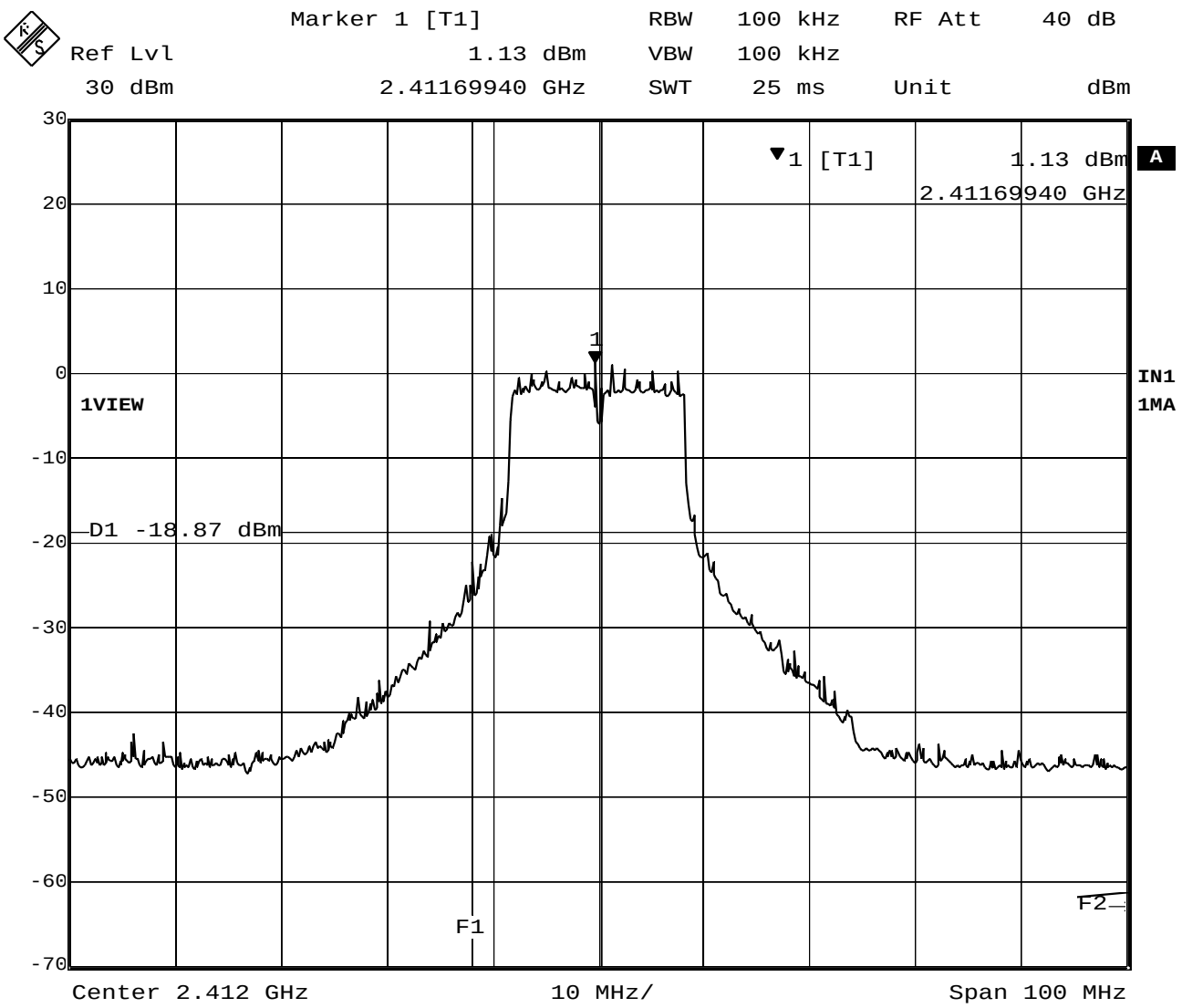
Plot 2-7. Out of band emissions around 2412MHz (6Mbps)



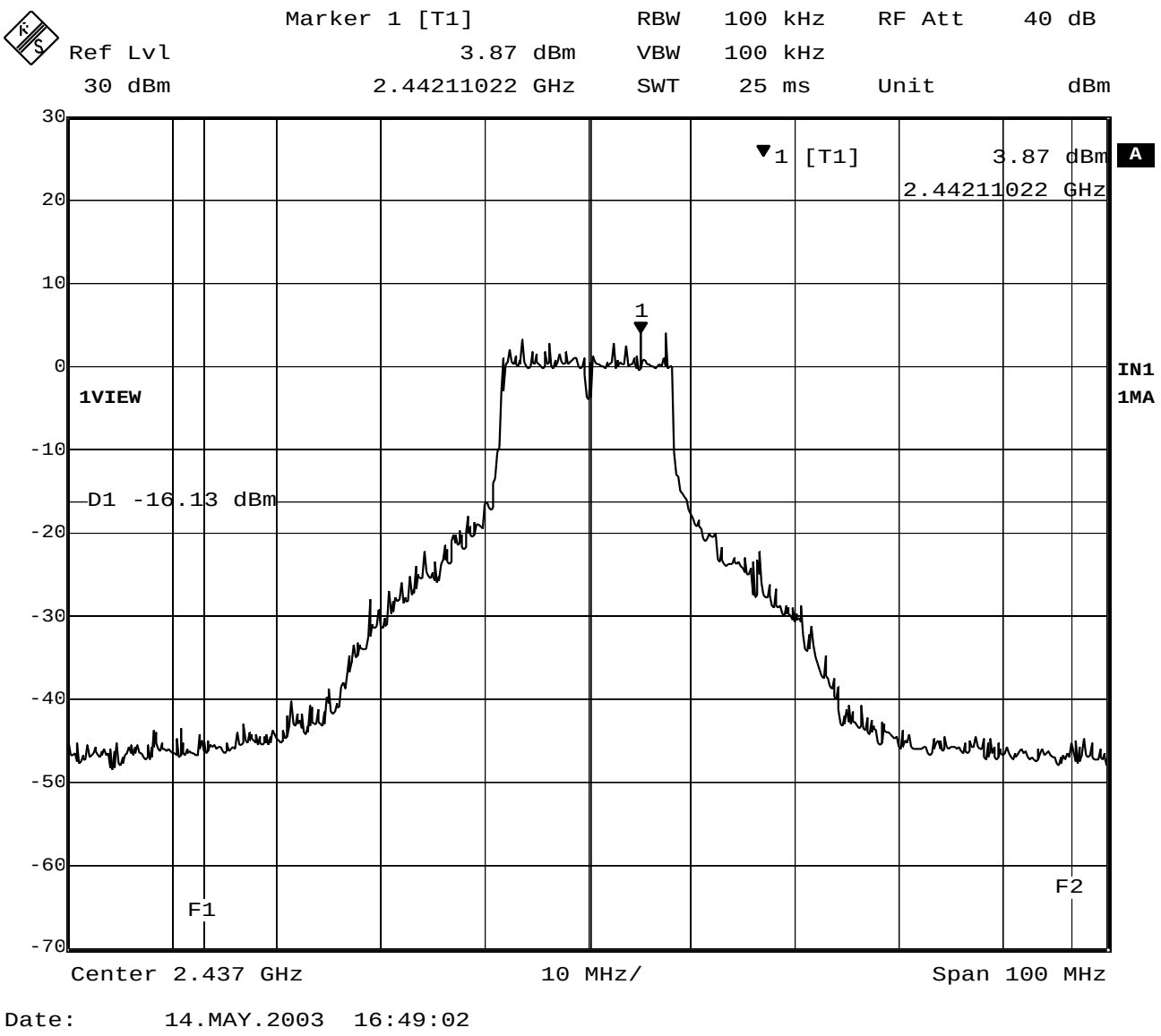
Plot 2-8. Out of band emissions around 24372MHz (6Mbps)



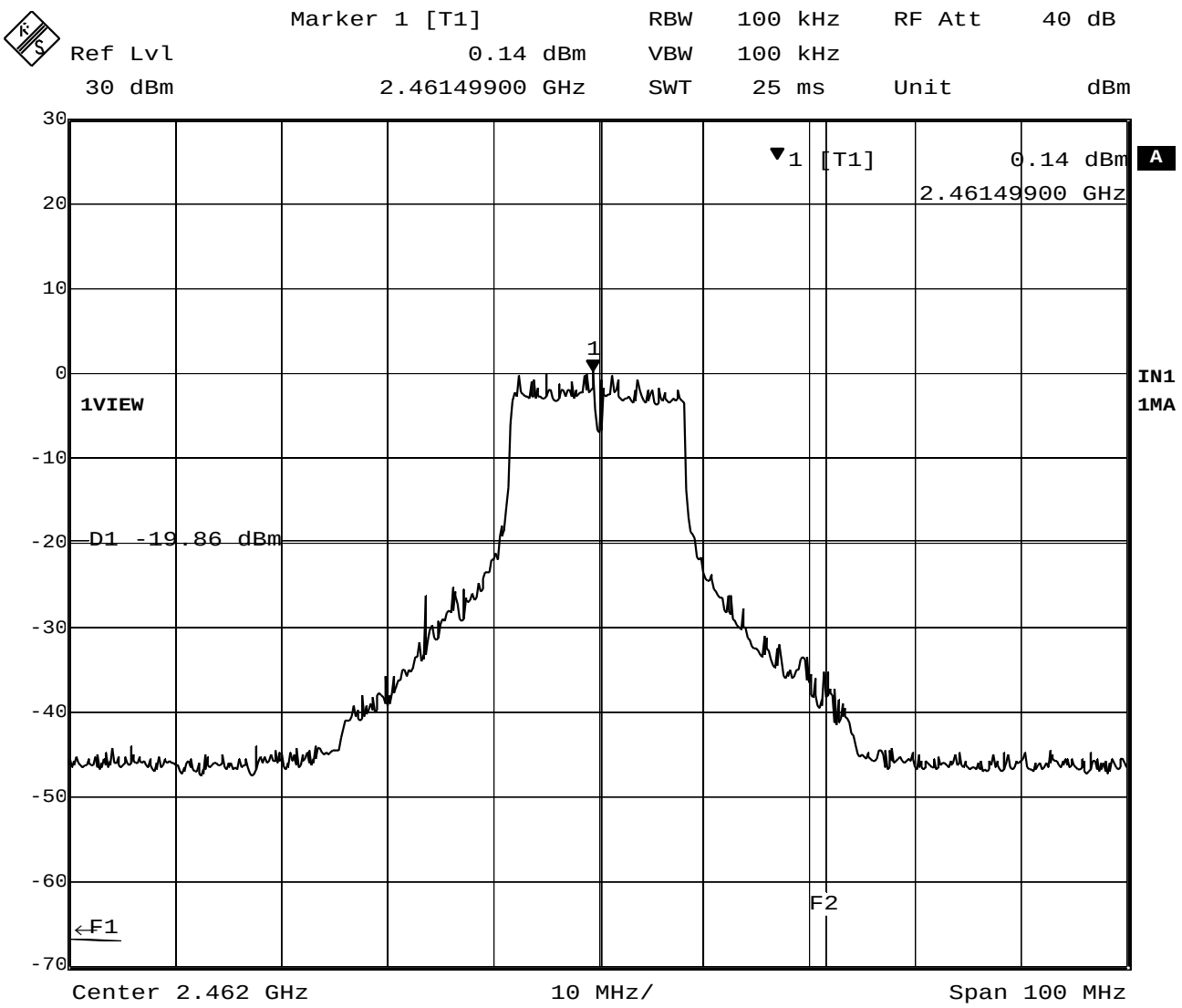
Plot 2-9. Out of band emissions around 2462MHz (6Mbps)



Plot 2-10. Out of band emissions around 2412MHz (18Mbps)



Plot 2-11. Out of band emissions around 2437MHz (18Mbps)



Plot 2-12. Out of band emissions around 2462MHz (18Mbps)

3. Conducted Peak Output Power

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

- A transmitter antenna terminal of EUT was connected to the input of a RF power sensor.
- Measurement was performed while EUT was operating in continuous transmission mode at the appropriate center frequencies. i.e. the lowest = 2412MHz, middle = 2437MHz, and highest frequency = 2462MHz.

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: Loss: 20 cm 0.7dB (for 2.4GHz) 1.3dB (for 5.8GHz)	

Notes: - HP: Hewlett Packard

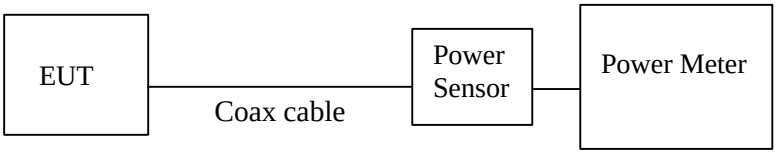


Figure 3-1: Measurement setup of power meter method

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: May 14, 2003

Table 3-2-1. Power meter measurement results (EUT: M/T 2681-F9U, s/n FX-00365)

Operation Frequency [GHz]	Rated output power (conducted) [dBm]							
	6M bps	9M bps	12M bps	18M bps	24M bps	36M bps	48M bps	54M bps
2.412 (Aux)	13.32	13.46	13.54	**13.56**	13.47	12.92	-	-
Specification	14						13.5	11.5
2.437 (Aux)	16.45	16.52	16.63	**16.65**	16.45	-	-	-
Specification	17					15.5	13.5	11.5
2.462 (Aux)	12.87	12.95	13.05	**13.07**	13.00	12.59	-	-
Specification	14						13.5	11.5

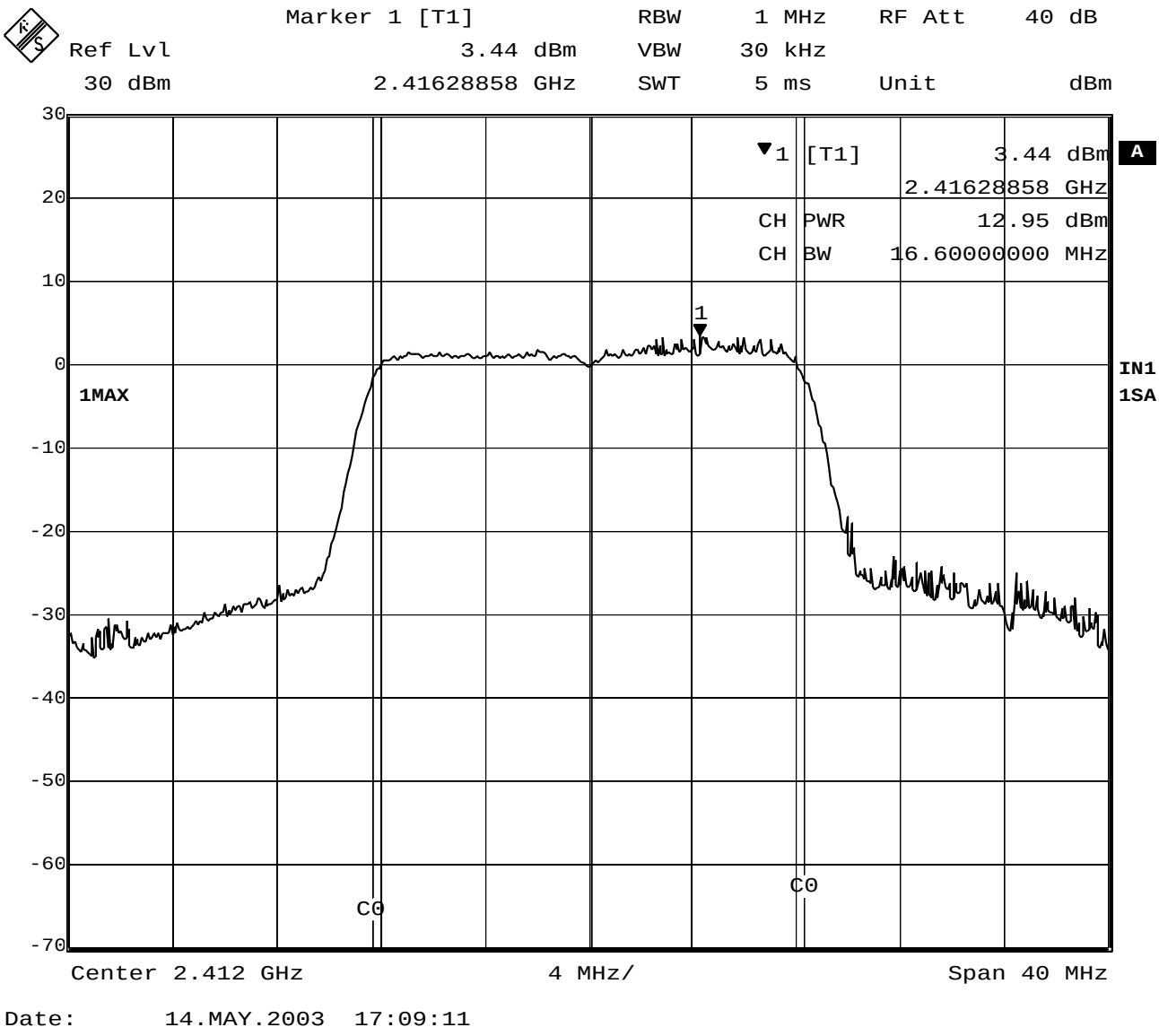
[Calculation table]

Measured Frequency (MHz)	Power Meter Reading (dBm)	Cable Loss (dB)	**Results** (dBm)	Limit		Margin to limit (dBi)
				FCC (dBm)	IC (dBm)	
2412	**13.56**	0.7	**14.26**	30	30	15.74
2437	**16.65**	0.7	**17.35**			12.65
2462	**13.07**	0.7	**13.77**			16.23

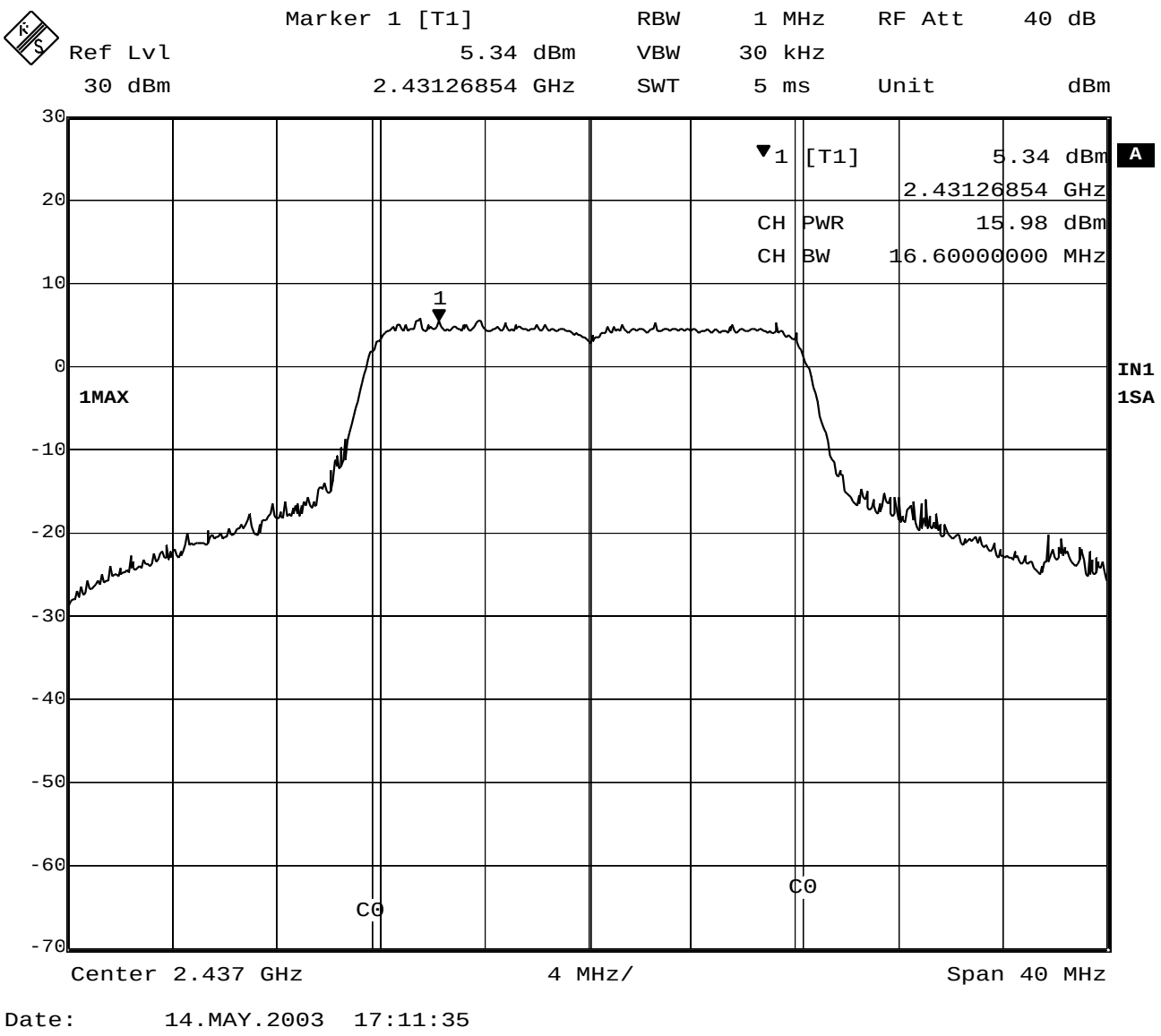
Table 3-2-2. Spectrum analyzer measurement results (EUT: M/T 2681-F9U, s/n FX-00365)

Measured Frequency (MHz)	Analyzer reading (dBm)	Trace number	Cable Loss (dB)	**Results** (dBm)	Limit		Margin to limit (dBi)
					FCC (dBm)	IC (dBm)	
2412	12.95	Plot 3-1	1.3	**14.25**	30	30	15.75
2437	15.98	Plot 3-2	1.3	**17.28**			12.72
2462	12.40	Plot 3-3	1.3	**13.70**			16.30

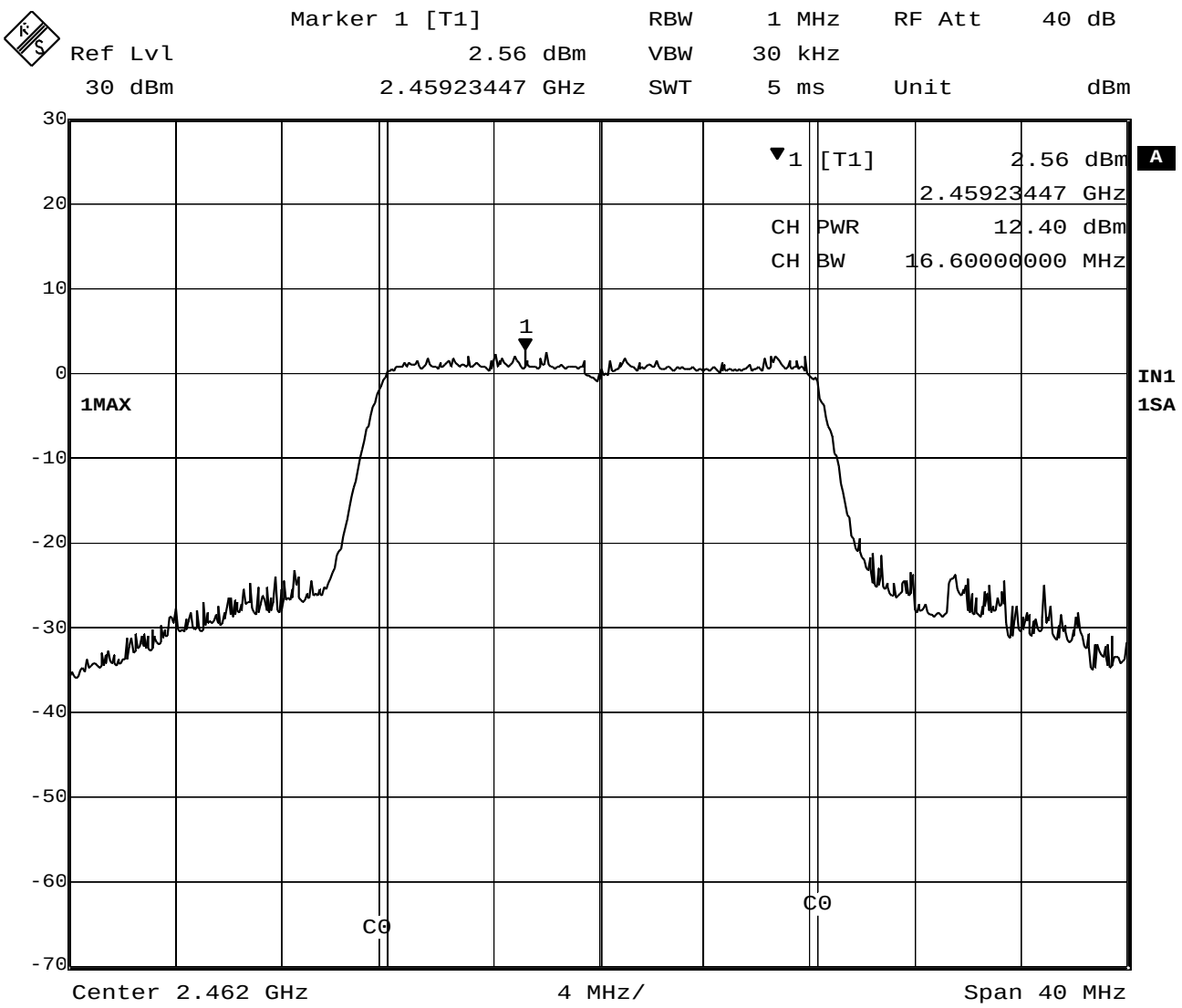
3.3 Trace Data of Conducted Peak Output Power



Plot 3-1. Conducted Peak Output Power of 2412MHz



Plot 3-2. Conducted Peak Output Power of 2437MHz



Plot 3-3. Conducted Peak Output Power of 2462MHz

4. Transmitter Power Spectral Density

4.1 Test Procedure

The peak power density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.
The spectrum analyzer is set to:
RBW= 3kHz, VBW=100kHz, Span=10MHz, Sweep = 2.8 seconds

4.2 Test Instruments and Measurement Setup

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

4.3 Measurement Results

Test Date: May 14, 2003

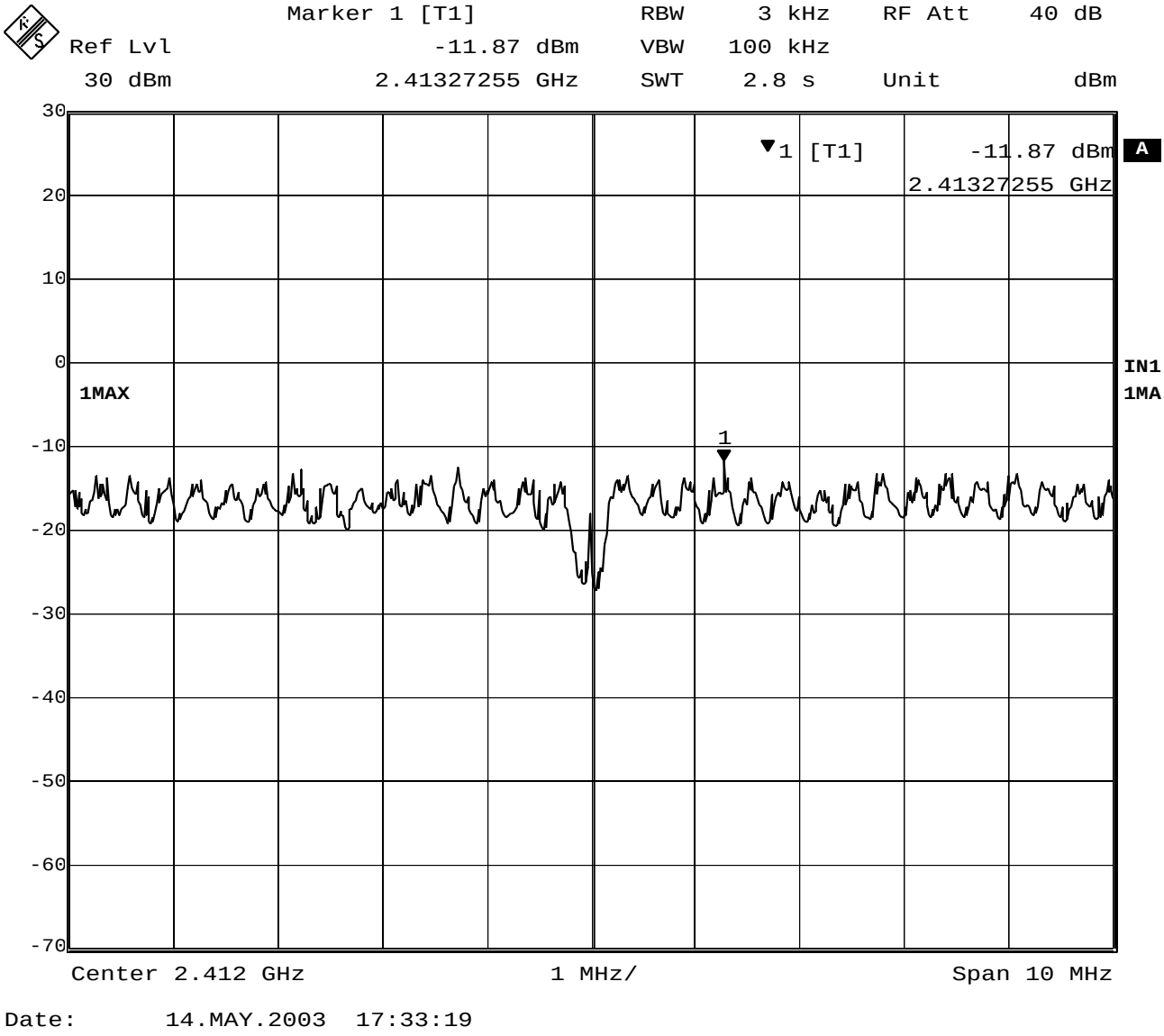
Table 4-1-1. EUT: M/T 2681-F9U, s/n FX-00365 , TX mode 6Mbps

Ch No.	Frequency (MHz)	Analyzer Reading (dBm)	Trace number	Cable loss (dB)	Result (dBm)	Limit (dBm)	Margin (dB)
1	2413.27	-11.87	Plot 4-1	1.3	-10.6	8.0	18.6
6	2435.49	-9.05	Plot 4-2	1.3	- 7.8	8.0	15.8
11	2458.24	-12.94	Plot 4-3	1.3	-11.6	8.0	19.6

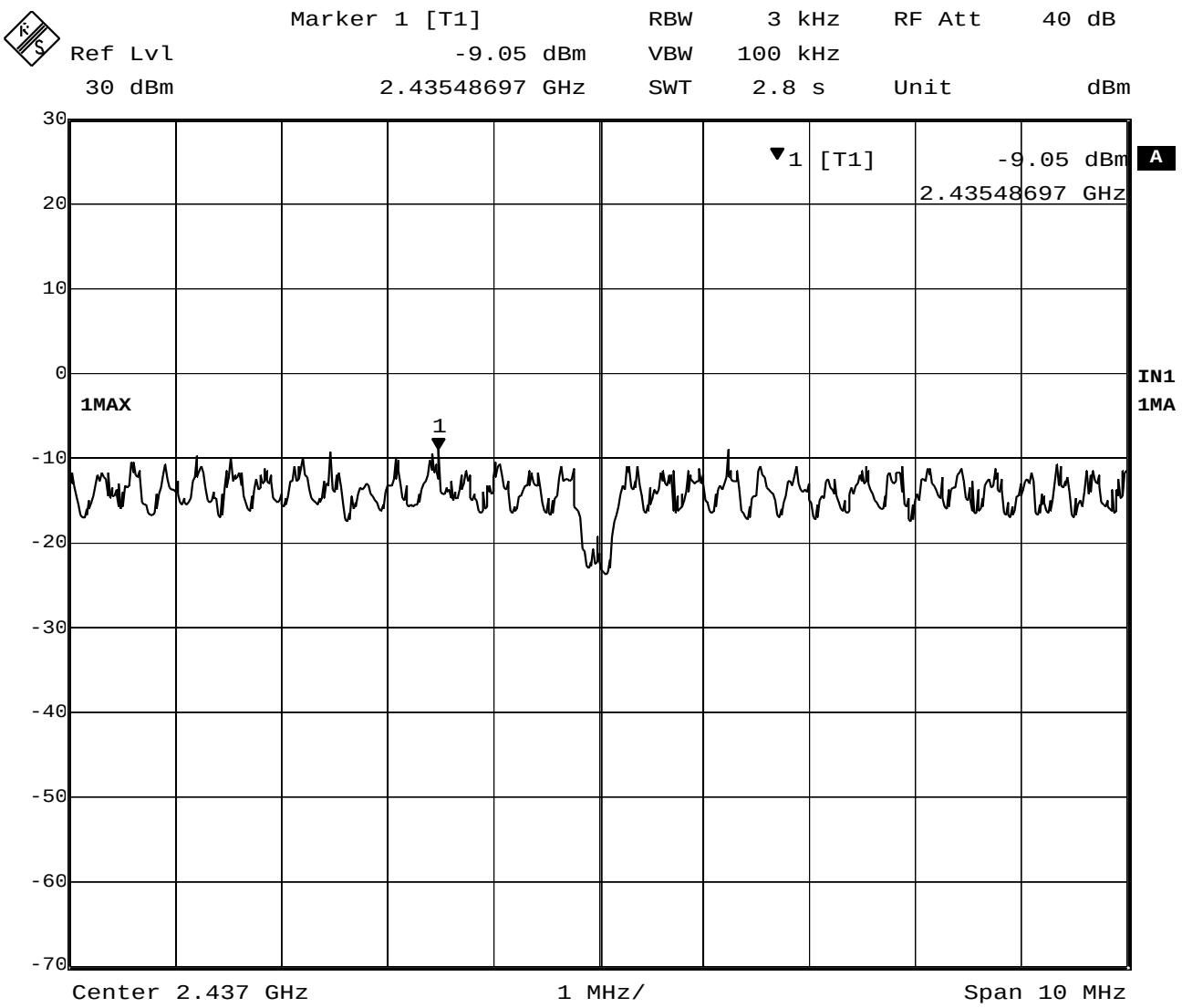
Table 4-1-2. EUT: M/T 2681-F9U, s/n FX-00365 , TX mode 18Mbps

Ch No.	Frequency (MHz)	Analyzer Reading (dBm)	Trace number	Cable loss (dB)	Result (dBm)	Limit (dBm)	Margin (dB)
1	2411.07	-11.74	Plot 4-4	1.3	-10.4	8.0	18.4
6	2437.29	-8.13	Plot 4-5	1.3	- 6.8	8.0	14.8
11	2466.08	-12.23	Plot 4-6	1.3	-10.9	8.0	18.9

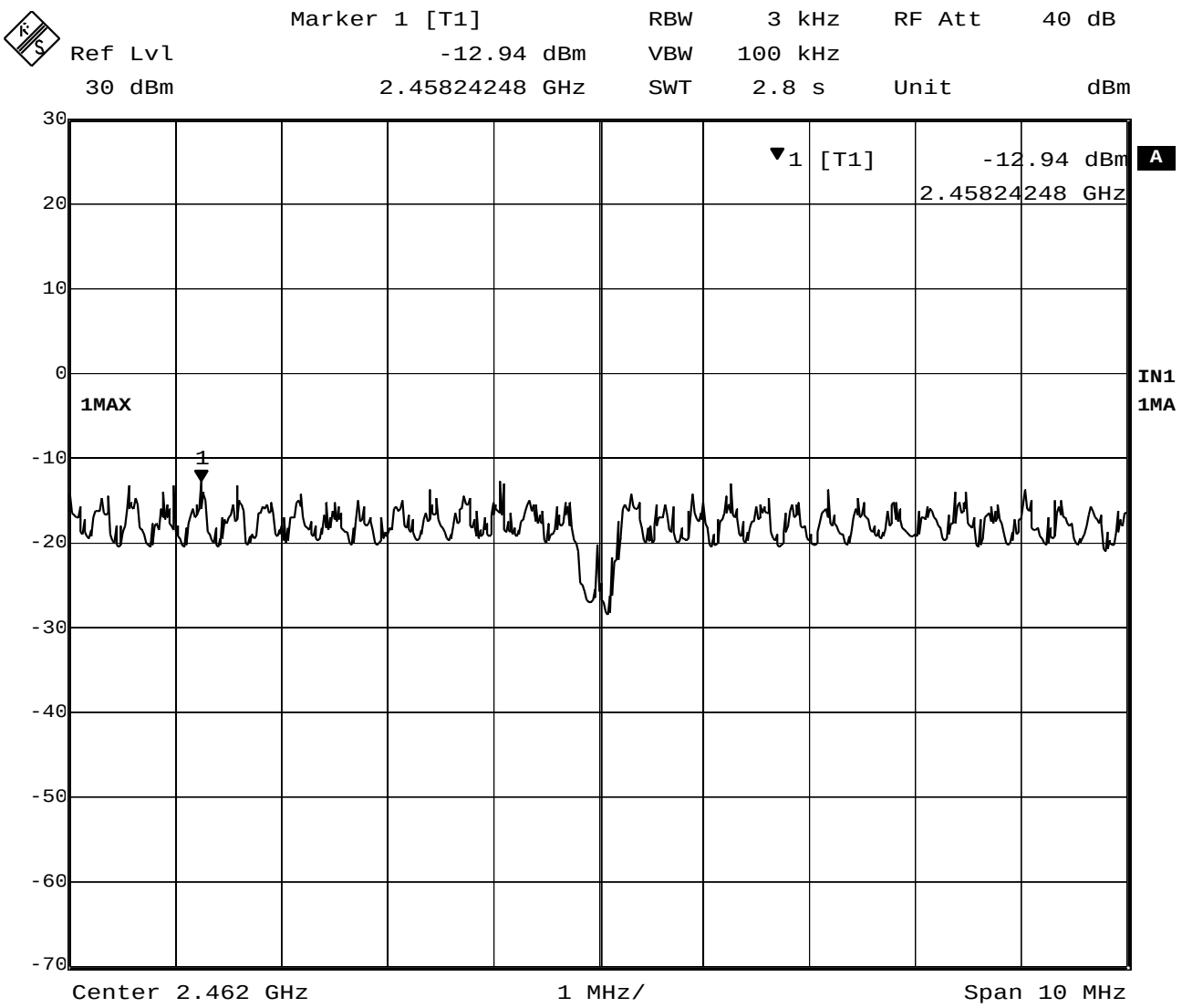
4.4 Trace Data



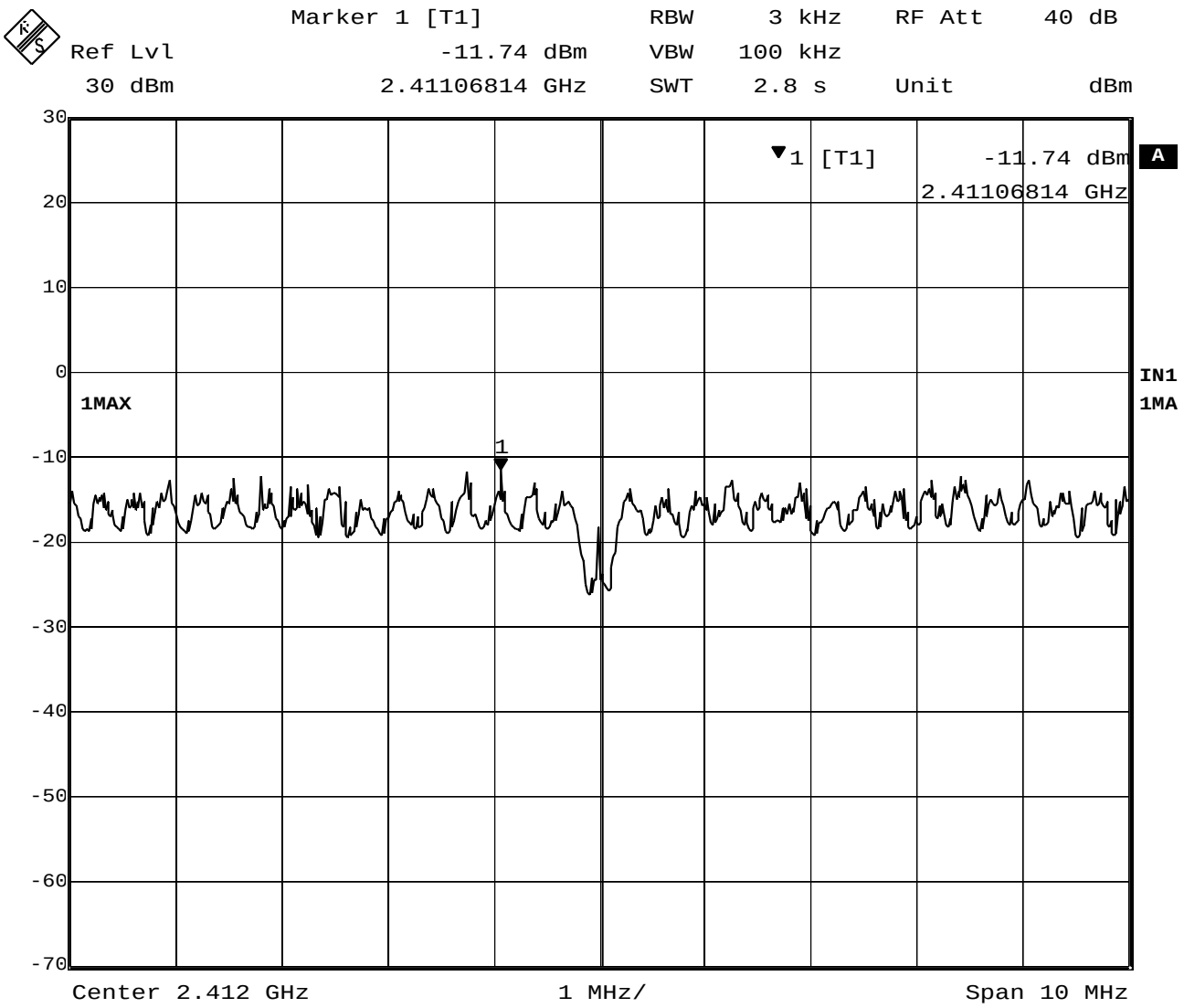
Plot 4-1. Peak Power Spectral Density of 2412MHz (6Mbps)



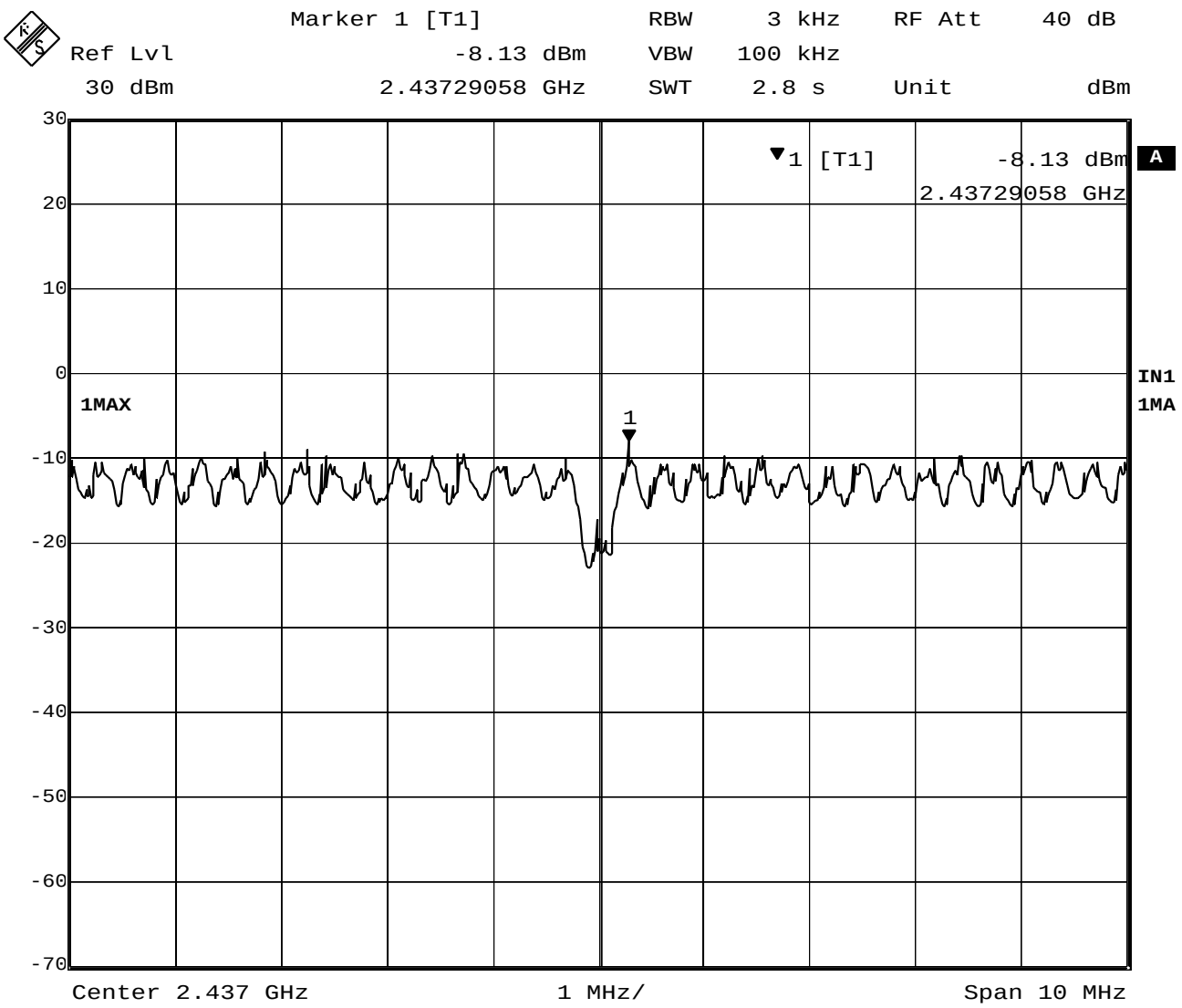
Plot 4-2. Peak Power Spectral Density of 2437MHz (6Mbps)



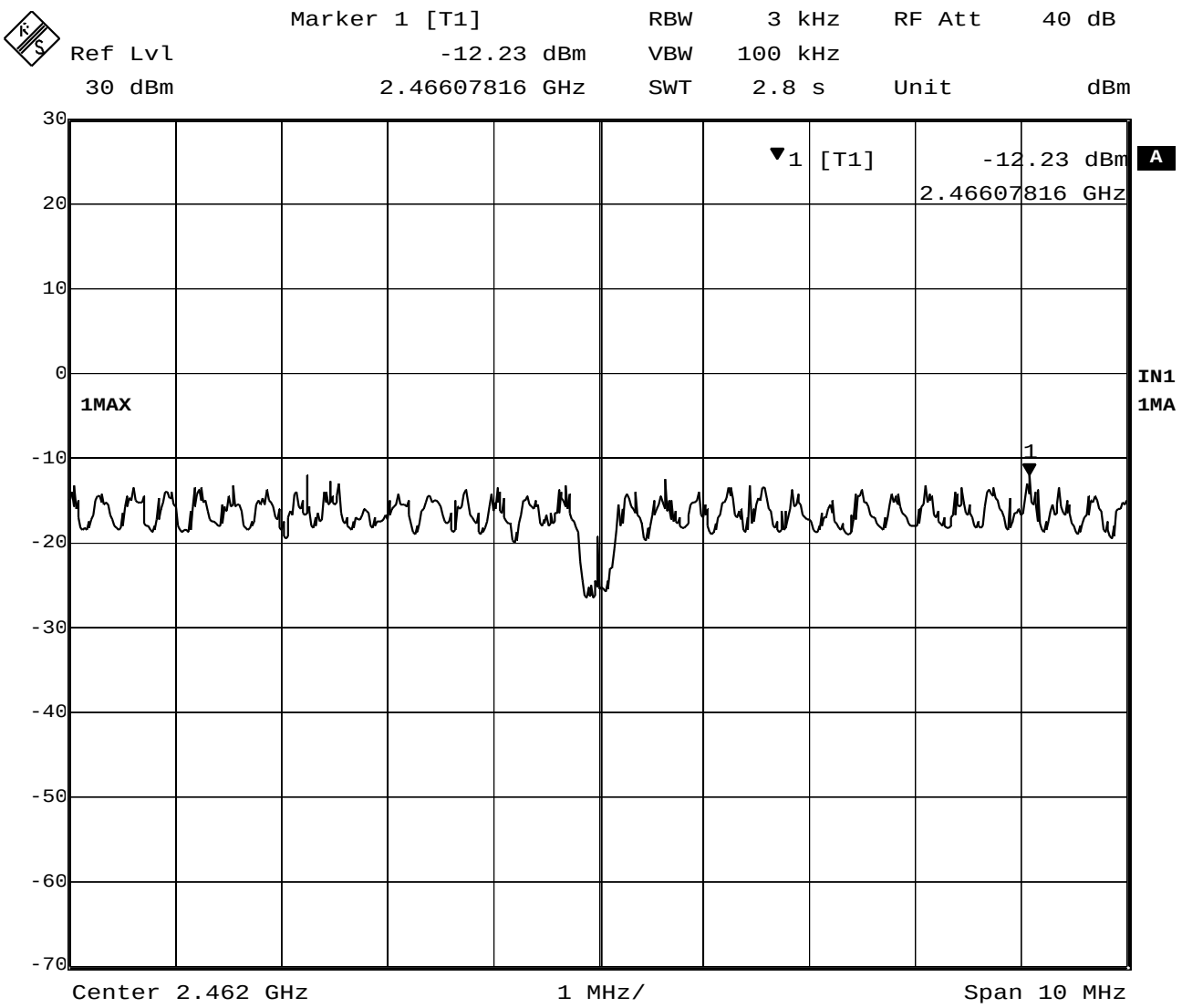
Plot 4-3. Peak Power Spectral Density of 2462MHz (6Mbps)



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



Plot 4-5. Peak Power Spectral Density of 2437MHz (18Mbps)



Plot 4-6. Peak Power Spectral Density of 2462MHz (18Mbps)

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

5.1 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.

5.2 Test Instruments and Measurement Setup

Table 5-1. Conducted Emission Test Instrumentation

Description	**Model**	**Serial Number**
Computer	IBM 6589-13J	97-15613
Spectrum Analyzer (100Hz-1.5GHz)	HP 85680B	2601A02634
Spectrum Analyzer Display	HP 85662A	2542A12308
Quasi-Peak Adapter	HP 85650A	2043A00062
Receiver (9kHz-30MHz)	R&S ESH3	891806/012
LISN	EMCO 3825/2	1426
Switch/control unit	HP 3488A	2719A17228
Plotter	HP 7550A	2631A33619
Coax cables: - Lisn-L <=> SW/Con.unit (SW100) - Lisn-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

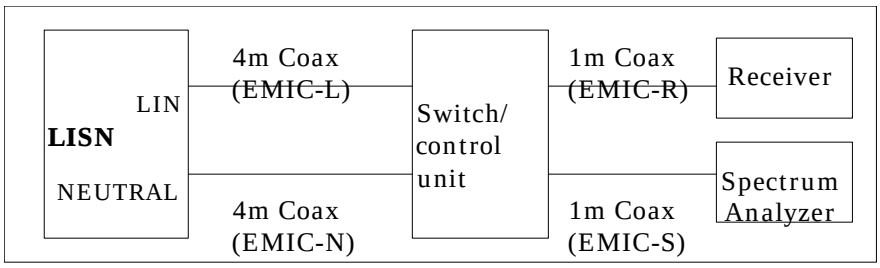


Figure 5. Cables for Conducted Emission Test

5.3 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:

PV = Powerline Voltage (dBµV)
R = Measured Receiver Input Amplitude (dBµV)
CORR = Correction Factor (dB) = LL+CL+SWL+PLL
LL = Insertion loss of LISN (dB)
CL = Insertion loss of Cable (dB)
SWL = Insertion loss of Switch control unit (dB)
PLL = Insertion loss of Pulse Limiter (dB)

Given a Receiver input reading of 50.0 dBµV, 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:

CORR = 0.6 + 0.1 + 0.1 + 0.2 = 1.0 (dB)
PV = 50.0 + 1.0 = 51.0 (dBµV)

5.4 Measurement Results

The EUT was found to comply to the limits of FCC Part 15 Subpart C and RSS-210 with a margin of 2.6dB. The 6 highest emissions relative to the limits are reported.

Test Date: May 19, 2003

1) EUT in transmission mode

Table 5-2-1. EUT: M/T 2681-F9U, s/n FX-00365, Ch.1(2412MHz) TX mode 18Mbps

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)			
0.1821	46.0	0.4	46.4	32.4	0.4	32.8	64.4	54.4	Neutral
0.3676	39.6	0.5	40.1	30.4	0.5	30.9	58.6	48.6	Line
0.4408	41.0	0.5	41.5	28.8	0.5	29.3	57.0	47.0	Line
0.5098	49.3	0.5	49.8	35.8	0.5	36.3	56.0	46.0	Neutral
0.5534	50.2	0.5	50.7	41.6	0.5	42.1	56.0	46.0	Line
0.6153	43.8	0.5	44.3	35.9	0.5	36.4	56.0	46.0	Neutral

Table 5-2-2. EUT: M/T 2681-F9U, s/n FX-00365 , Ch.6(2437MHz) TX mode 18Mbps

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)			
0.2524	38.0	0.5	38.5	25.3	0.5	25.8	61.7	51.7	Line
0.4438	34.3	0.5	34.8	20.4	0.5	20.9	57.0	47.0	Neutral
0.4893	38.3	0.5	38.8	29.8	0.5	30.3	56.2	46.2	Neutral
0.5549	39.4	0.5	39.9	33.4	0.5	33.9	56.0	46.0	Line
0.6170	34.6	0.5	35.1	28.4	0.5	28.9	56.0	46.0	Neutral
0.6943	34.2	0.5	34.7	22.9	0.5	23.4	56.0	46.0	Neutral

Table 5-2-3. EUT: M/T 2681-F9U, s/n FX-00365, Ch.11(2462MHz) TX mode 18Mbps

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)			
0.3666	39.4	0.5	39.9	29.7	0.5	30.2	58.6	48.6	Line
0.4306	41.0	0.5	41.5	29.3	0.5	29.8	57.2	47.2	Line
0.5095	48.7	0.5	49.2	34.2	0.5	34.7	56.0	46.0	Neutral
0.5558	49.8	0.5	50.3	42.9	0.5	43.4	56.0	46.0	Line
0.6148	44.1	0.5	44.6	36.2	0.5	36.7	56.0	46.0	Neutral
0.6944	43.2	0.5	43.7	31.3	0.5	31.8	56.0	46.0	Neutral

2) EUT in receiving mode

Table 5-2-4. EUT: M/T 2681-F9U, s/n FX-00365, Ch.6(2437MHz) RX mode

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)			
0.3693	38.8	0.5	39.3	32.6	0.5	33.1	58.5	48.5	Neutral
0.4450	40.7	0.5	41.2	25.6	0.5	26.1	57.0	47.0	Line
0.4924	46.8	0.5	47.3	40.3	0.5	40.8	56.1	46.1	Neutral
0.5522	45.0	0.5	45.5	36.9	0.5	37.4	56.0	46.0	Line
0.6130	45.5	0.5	46.0	37.6	0.5	38.1	56.0	46.0	Neutral
0.7976	41.4	0.5	41.9	32.6	0.5	33.1	56.0	46.0	Neutral

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

6.1 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.

6.2 Test Instruments and Measurement Setup

Table 6-1 Radiated Emission Test Instrumentation

Description	**Model**	**Serial Number**
Computer	IBM 6868-30J	97-901X3
Spectrum Analyzer (100Hz-1.5GHz) for 30-200MHz	HP 85680B	2841A04242
Spectrum Analyzer Display for 30-200MHz	HP 85662A	2816A16827
Quasi-Peak Adapter for 30-200MHz	HP 85650A	2811A01126
Spectrum Analyzer (100Hz-1.5GHz) for 200-1000MHz	HP 85680B	2841A04254
Spectrum Analyzer Display for 200-1000MHz	HP 85662A	2816A16831
Quasi-Peak Adapter for 200-1000MHz	HP 85650A	2811A01156
Amplifier (100KHz-1.3GHz) - for 30-200MHz - for 200-1000MHz	 HP 8447D HP 8447D	 2805A02919 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: - Bi-coni Ant <=> 10m Cable - 10m Cable <=> Shield Panel - Shield Panel <=> RF Amp - RF Amp <=> Power Splitter - Log-peri Ant <=> 10m Cable - 10m Cable <=> Shield Panel - Shield Panel <=> RF Amp - RF Amp <=> Power Splitter	Length: 9 m 10 m 7 m 0.5m 9 m 10 m 7 m 0.5m	 - EM103L01 - EM103L02 - EM103L03 - EM103L04 - EM103H01 - EM103H02 - EM103H03 - EM103H04
Coax cables: - Power Splitter <=> SW/Con.unit (SW110) - Power Splitter <=> SW/Con.unit (SW300) - Power Splitter <=> SW/Con.unit (SW100) - Power Splitter <=> SW/Con.unit (SW301) - SW/Con.unit <=> Receiver (Input) - SW/Con.unit <=> Spe Ana.(Signal In) for 30- 200MHz - SW/Con.unit <=> Spe Ana.(Signal In) for 200-1000MHz	 1 m 1 m 1 m 1 m 2 m 2 m 2 m	 - EM103L05 - EM103L06 - EM103H05 - EM103H06 - EM1RCV - EM1SPL - EM1SPH

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

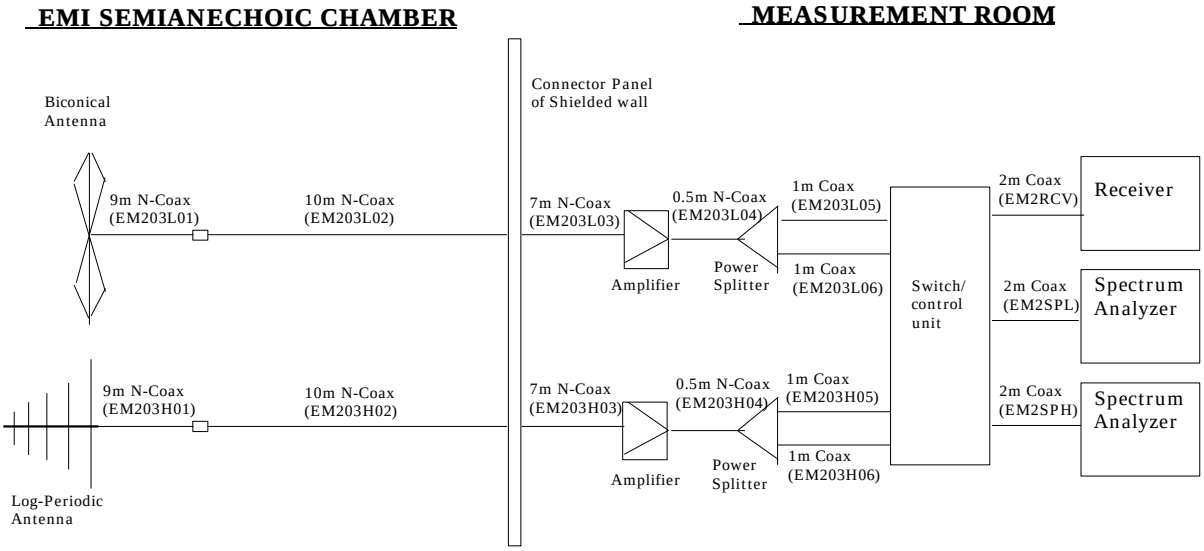


Figure 6 Cables for Radiated Emission Test

6.3 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 51.5dBμV; 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 = 35.3dBμV/m

Conversion between dBμV/m (or dBμV) and μV/m (or μV) are done as:

Level(dBμV/m) = 20 $\times$ Log(Level(μV/m))

40dBμV/m = 100μV/m
48dBμV/m = 250μV/m

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 5.4 dB at 30MHz - 1000MHz band.
The 6 highest emissions relative to the limits are reported.

Test Date: May 15, 2003

1) EUT in transmission mode

Table 6-2-1. EUT: M/T 2681-F9U, s/n FX-00365, Ch.1(2412MHz) TX mode 18Mbps

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)
232.630	H	34.4	10.7	-14.5	30.6	46.0	33.9	200
288.008	V	36.2	13.4	-14.2	35.4	46.0	58.9	200
399.113	V	30.8	15.2	-14.3	31.7	46.0	38.5	200
585.384	V	33.8	18.5	-13.1	39.2	46.0	91.2	200
885.396	H	17.0	22.7	-9.7	30.0	46.0	31.6	200
907.697	V	17.3	22.8	-9.1	31.0	46.0	35.5	200

Table 6-2-2. EUT: M/T 2681-F9U, s/n FX-00365, Ch.6(2437MHz) TX mode 18Mbps

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)
232.411	H	33.2	10.7	-14.5	29.4	46.0	29.5	200
288.008	H	36.3	13.4	-14.2	35.5	46.0	59.6	200
398.931	V	29.8	15.2	-14.3	30.7	46.0	34.3	200
528.100	V	30.0	17.8	-13.2	34.6	46.0	53.7	200
585.438	V	35.2	18.5	-13.1	40.6	46.0	107.2	200
911.041	V	17.3	22.8	-9.1	31.0	46.0	35.5	200

Table 6-2-3. EUT: M/T 2681-F9U, s/n FX-00365, Ch.11(2462MHz) TX mode 18Mbps

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)
163.070	H	41.8	12.4	-16.3	37.9	43.5	78.5	150
202.651	H	37.5	11.3	-14.0	34.8	43.5	55.0	150
270.203	H	36.1	12.5	-14.2	34.4	46.0	52.5	200
288.009	H	32.4	13.4	-14.2	31.6	46.0	38.0	200
585.439	V	32.8	18.5	-13.1	38.2	46.0	81.3	200
927.523	V	20.3	22.7	-9.1	33.9	46.0	49.5	200

2) EUT in receiving mode

Table 6-2-4. EUT: M/T 2681-F9U, s/n FX-00365, RX mode

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)
162.024	H	41.2	12.4	-16.3	37.3	43.5	73.3	150
288.009	V	37.7	13.4	-14.2	36.9	46.0	70.0	200
399.031	V	31.0	15.2	-14.3	31.9	46.0	39.4	200
528.099	V	28.7	17.8	-13.2	33.3	46.0	46.2	200
585.330	V	35.0	18.5	-13.1	40.4	46.0	104.7	200
720.135	V	22.9	21.1	-11.2	32.8	46.0	43.7	200

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

7.1 Test Procedure

Radiated emissions were measured in the frequency range with 1 GHz to 25GHz in transmitting mode and 1 GHz to 12.5 GHz 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 a 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.

7.2 Test Instruments and Measurement Setup

Table 7 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 – 8.20GHz)	EMCO 3160-6	9712-1044
Horn Antenna (8.20 – 12.40GHz)	EMCO 3160-7	1156
Horn Antenna (18- 26.5GHz)	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

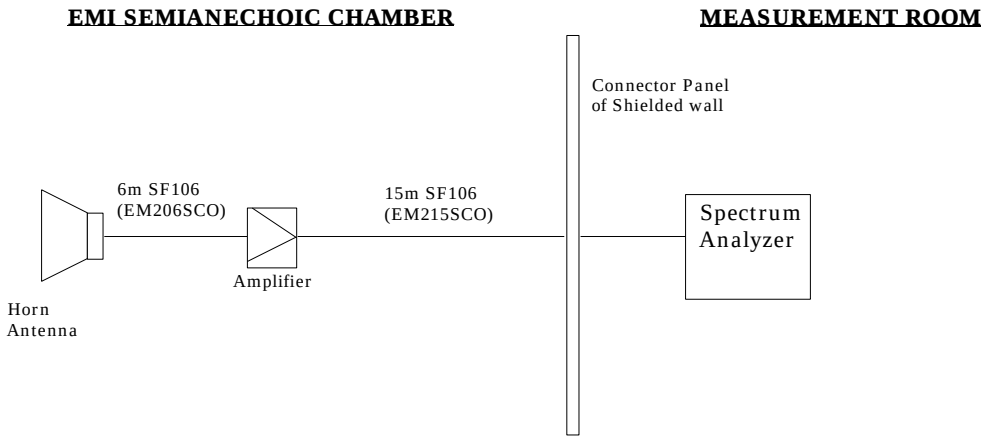


Figure 7-1. Cables for Radiated Emission Test (1-18GHz)

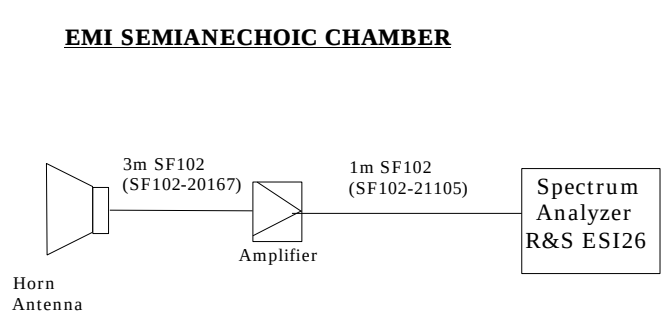


Figure 7-2. Cables for Radiated Emission Test (18 - 25GHz)

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. 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 dBμV; 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 dBμV/m

Conversions between dBμV/m (or dBμV) and μV/m (or μV) are done as :

Level(dBμV/m) = 20 × Log (Level(μV/m))
40 dBμV/m = 100 μV/m
48 dBμV/m = 250 μV/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 3.7 dB. 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: May 15, 16 and 23, 2003

1) EUT in transmission mode

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

Table 7-2-1. EUT: M/T 2681-F9U, s/n FX-00365, Ch.1(2412MHz) TX mode 18Mbps

Frequency (GHz)	Polarity (H/V)	Measured (dBμV) ***(peak)***	Measured (dBμV) ***(average)***	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dBμV/m) ***(peak)***	FCC Limit (dBμV/m) ***(peak)***	Field Strength (dBμV/m) ***(average)***	FCC Limit (dBμV/m) ***(average)***
Inband										
2.406	V	105.6	93.6	28.3	-29.7	0.0	104.2	OB*	92.2	OB*
Adjacent RB										
2.368	V	56.5	47.7	28.1	-29.6	0.0	55.0	74.0	46.2	54.0
2.390	V	67.9	50.4	28.2	-29.7	0.0	66.4	74.0	48.9	54.0
1.008	V	51.8	-	24.1	-32.3	0.0	43.6	74.0	-	54.0
1.154	V	51.7	-	24.6	-31.7	0.0	44.6	74.0	-	54.0
1.201	V	56.6	-	25.2	-31.6	0.0	50.2	74.0	-	54.0
1.490	V	50.8	-	25.5	-30.9	0.0	45.4	74.0	-	54.0
2.274	V	49.6	-	27.8	-29.8	0.0	47.6	74.0	-	54.0
4.826	V	39.5	-	27.1	-27.3	0.0	39.3	74.0	-	54.0

Table 7-2-2. EUT: M/T 2681-F9U, s/n FX-00365, Ch.6(2437MHz) TX mode 18Mbps

Frequency (GHz)	Polarity (H/V)	Measured (dBμV) ***(peak)***	Measured (dBμV) ***(average)***	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dBμV/m) ***(peak)***	FCC Limit (dBμV/m) ***(peak)***	Field Strength (dBμV/m) ***(average)***	FCC Limit (dBμV/m) ***(average)***
Inband										
2.434	V	107.9	96.5	28.4	-29.6	0.0	106.7	OB*	95.3	OB*
Adjacent RB										
2.368	V	58.0	48.8	28.1	-29.6	0.0	56.5	74.0	47.3	54.0
2.380	V	56.4	45.4	28.2	-29.7	0.0	54.9	74.0	43.9	54.0
2.390	V	55.7	43.5	28.2	-29.7	0.0	54.2	74.0	42.0	54.0
1.008	V	50.7	-	24.1	-32.3	0.0	42.5	74.0	-	54.0
1.154	V	52.6	-	24.6	-31.7	0.0	45.5	74.0	-	54.0
1.201	V	56.0	-	25.2	-31.6	0.0	49.6	74.0	-	54.0
1.490	V	51.1	-	25.5	-30.9	0.0	45.7	74.0	-	54.0
2.274	V	50.5	-	27.8	-29.8	0.0	48.5	74.0	-	54.0
4.872	V	39.5	-	27.0	-27.0	0.0	39.5	74.0	-	54.0
7.313	V	40.9	-	29.9	-25.1	0.0	45.7	74.0	-	54.0

Table 7-2-3. EUT: M/T 2681-F9U, s/n FX-00365, Ch.11(2462MHz) TX mode 18Mbps

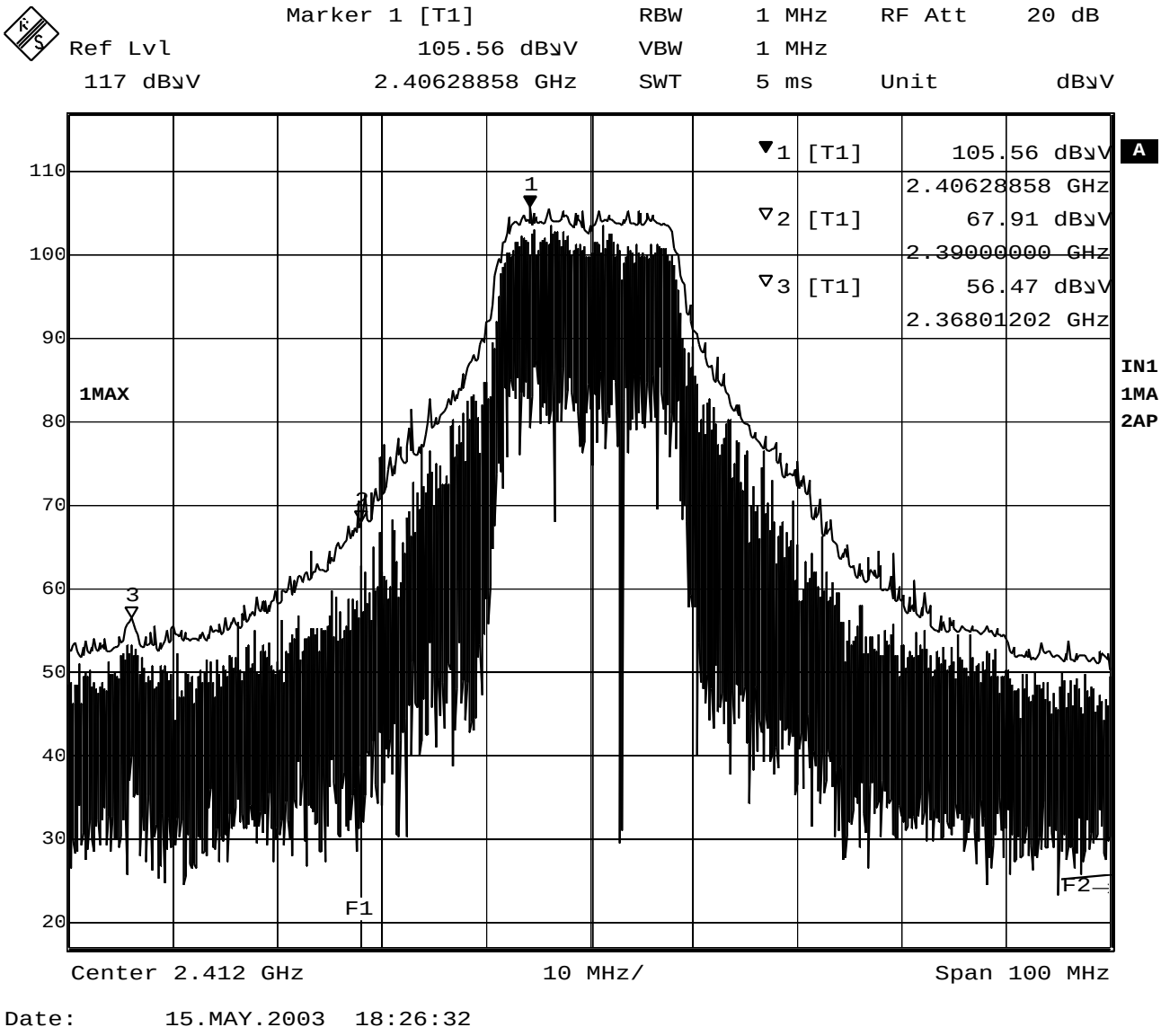
Frequency (GHz)	Polarity (H/V)	Measured (dBμV) ***(peak)***	Measured (dBμV) ***(average)***	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dBμV/m) ***(peak)***	FCC Limit (dBμV/m) ***(peak)***	Field Strength (dBμV/m) ***(average)***	FCC Limit (dBμV/m) ***(average)***
Inband										
2.460	H	104.0	92.5	28.4	-29.6	0.0	102.8	OB*	91.3	OB*
Adjacent RB										
2.484	H	68.4	51.5	28.4	-29.6	0.0	67.2	74.0	50.3	54.0
2.496	H	53.2	-	28.4	-29.6	0.0	52.0	74.0	-	54.0
1.008	V	51.4	-	24.1	-32.3	0.0	43.2	74.0	-	54.0
1.154	V	53.0	-	24.6	-31.7	0.0	45.9	74.0	-	54.0
1.201	V	57.1	-	25.2	-31.6	0.0	50.7	74.0	-	54.0
1.490	V	51.9	-	25.5	-30.9	0.0	46.5	74.0	-	54.0
2.274	V	49.3	-	27.8	-29.8	0.0	47.3	74.0	-	54.0
2.369	V	51.9	-	28.1	-29.6	0.0	50.4	74.0	-	54.0
4.922	V	39.3	-	27.0	-27.0	0.0	39.3	74.0	-	54.0
7.387	V	38.1	-	29.8	-25.1	0.0	42.8	74.0	-	54.0

2) EUT in receiving mode

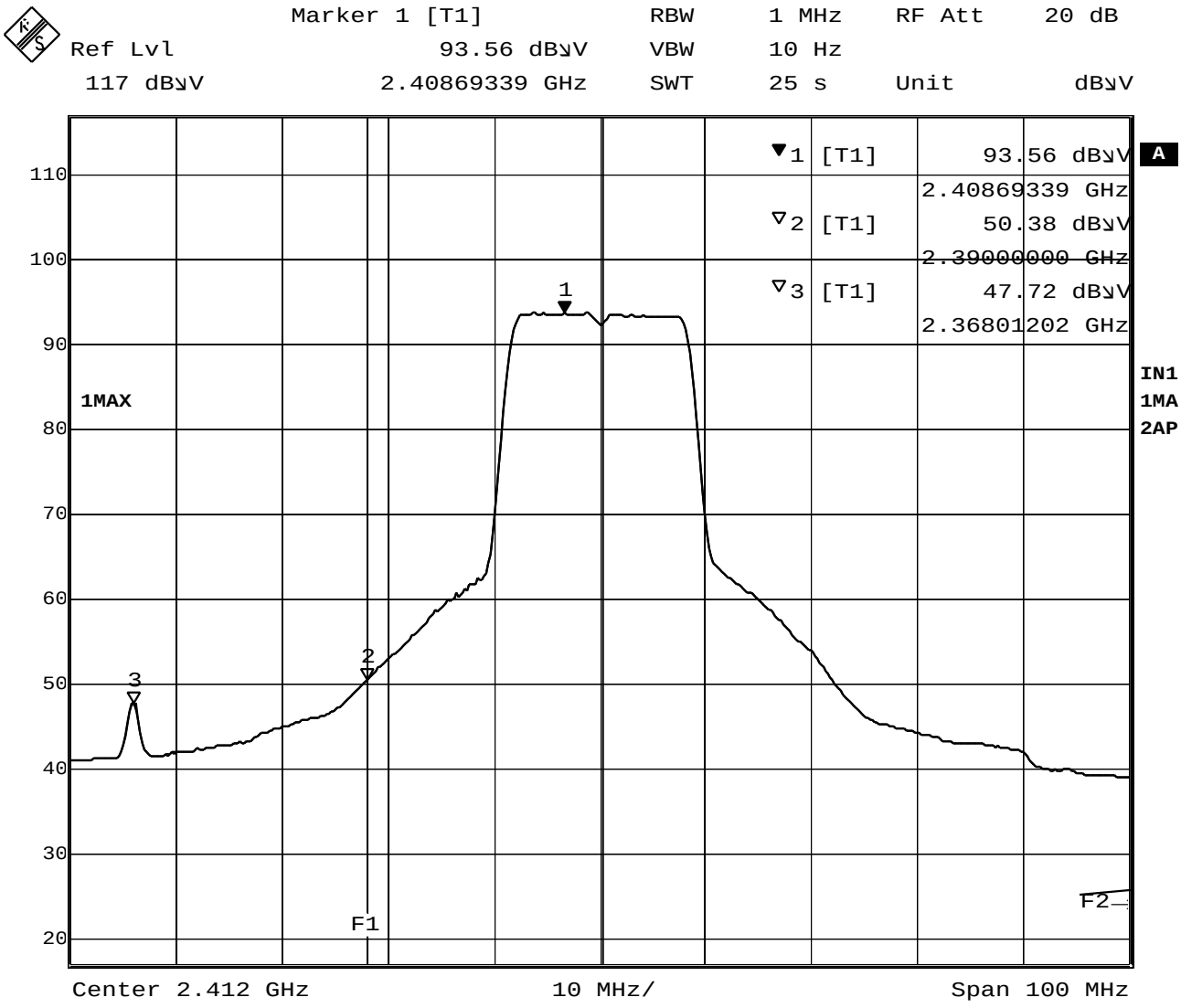
Table 7-2-4. EUT: M/T 2681-F9U, s/n FX-00365, Ch.6(2437MHz) RX mode

Frequency (GHz)	Polarity (H/V)	Measured (dBμV) ***(peak)***	Measured (dBμV) ***(average)***	Antenna Factor (dB/m)	Corr. Factor (dB)	Falloff Factor (dB)	Field Strength (dBμV/m) ***(peak)***	FCC Limit (dBμV/m) ***(peak)***	Field Strength (dBμV/m) ***(average)***	FCC Limit (dBμV/m) ***(average)***
1.008	V	52.1	-	24.1	-32.3	0.0	43.9	74.0	-	54.0
1.154	V	51.8	-	24.6	-31.7	0.0	44.7	74.0	-	54.0
1.201	V	57.9	-	25.2	-31.6	0.0	51.5	74.0	-	54.0
1.490	V	51.3	-	25.5	-30.9	0.0	45.9	74.0	-	54.0

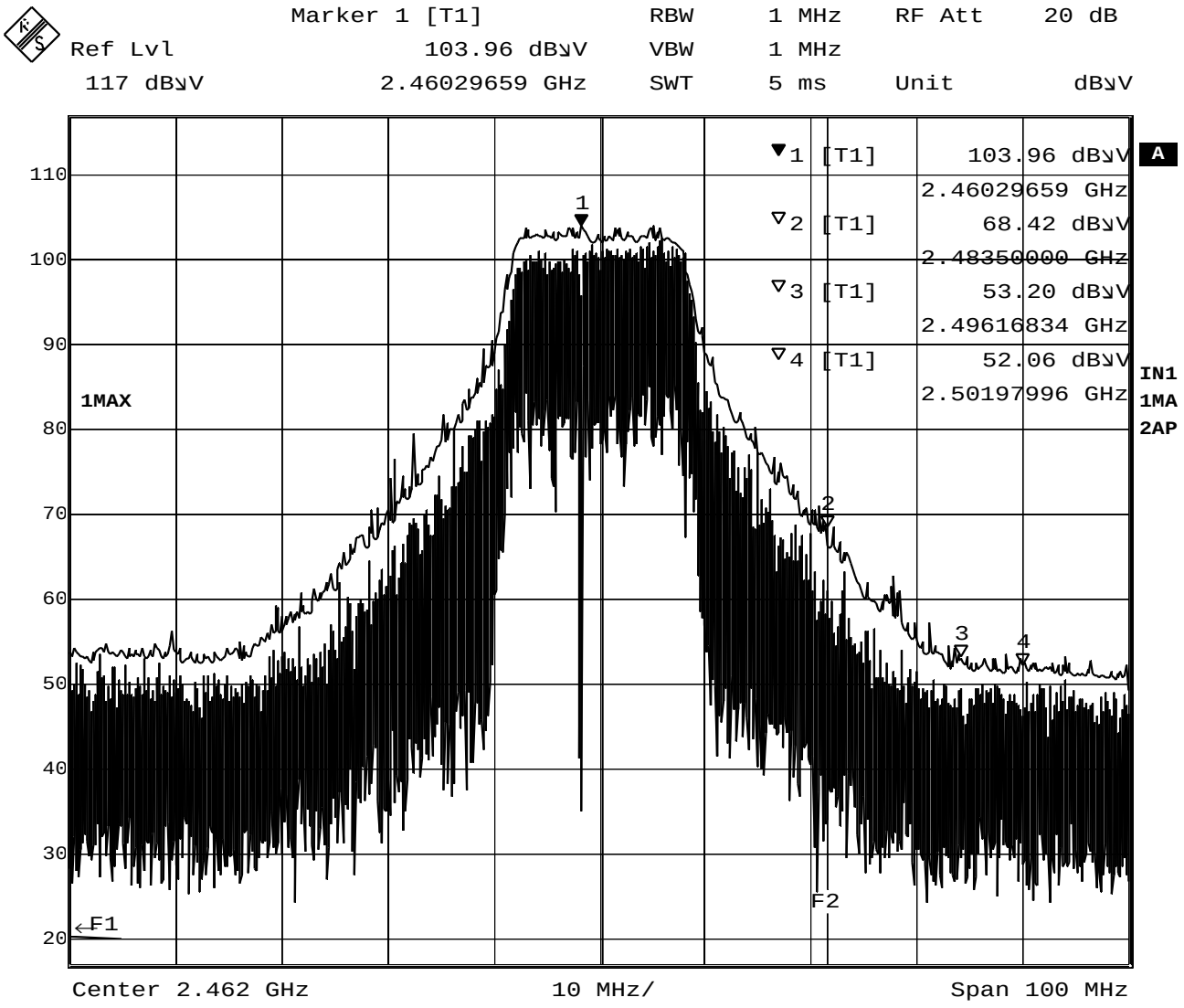
7.5 Measurement plots of adjacent restricted band



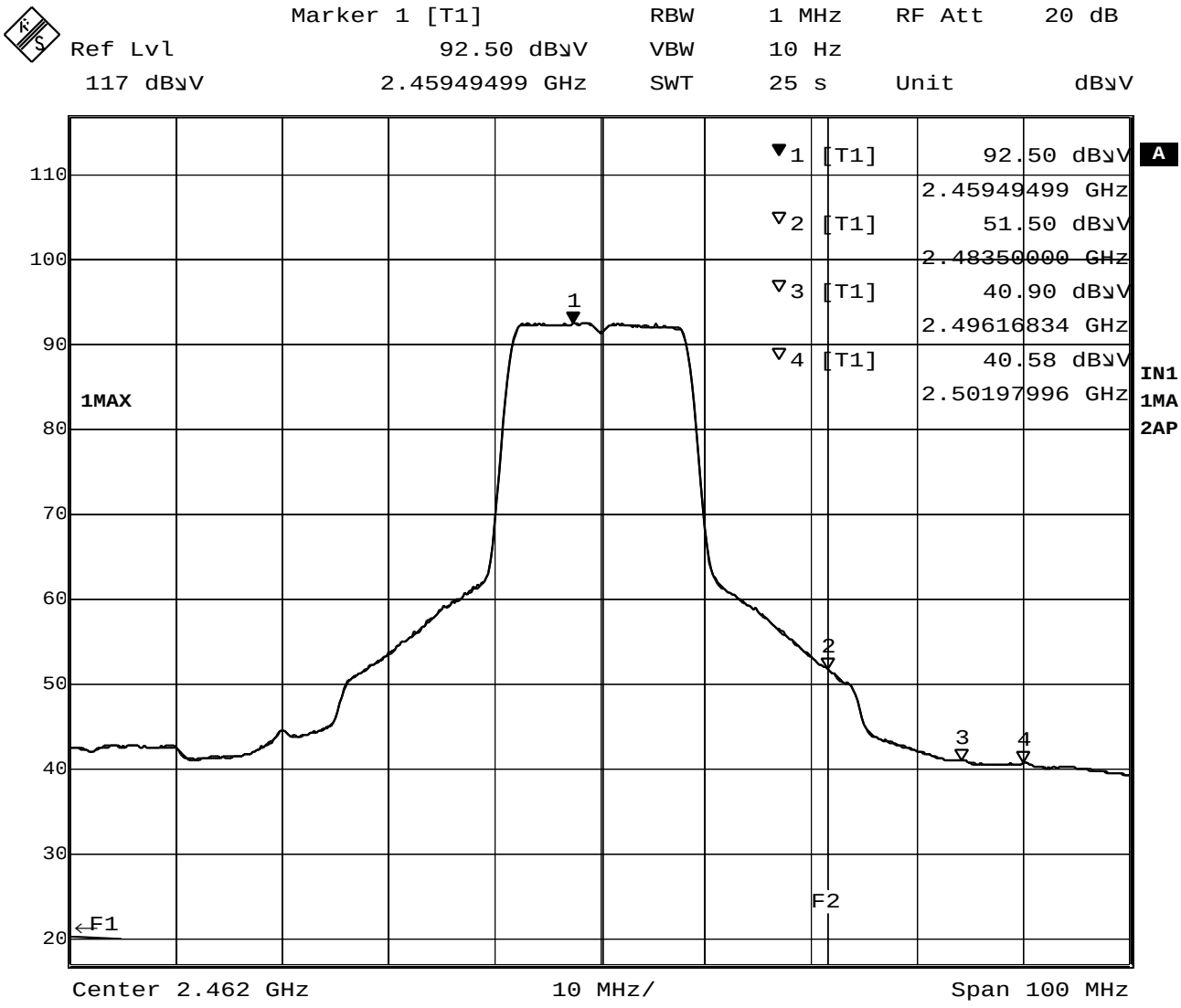
Plot 7-2-1 Ch.1 2412MHz TX 18Mb/s (Peak)



Plot 7-2-2 Ch.1 2412MHz TX18Mb/s (Average)



Plot 7-2-3 Ch.11 2462MHz TX 18Mb/s (Peak)



Plot 7-2-4 Ch.11 2462MHz TX 18Mb/s (Average)