ENGINEERING TEST REPORT

2.4GHz FHSS Cordless Handset
Model No.: KX-TD7684 AND KX-TD7694

FCC ID: ACJ96NKX-TD7694

Applicant:

Panasonic Corporation of North America
One Panasonic Way, Panazip 4B-8
Secaucus, NJ
USA 07094

In Accordance With

FEDERAL COMMUNICATIONS COMMISSION (FCC)
PART 15, SUBPART C, SECTION 15.247
Frequency Hopping Operating in the Frequency Band 2401.056-2479.680 MHz

UltraTech's File No.: PAN-078F15C247-A

This Test report is Issued under the Authority of Tri M. Luu, Professional Engineer, Vice President of Engineering UltraTech Group of Labs Date: May 24, 2007	
Report Prepared by: JaeWook Choi Issued Date: May 24, 2007	Tested by: Hung Trinh, RFI Technologist Test Dates: March 29, April 03, April 10 ~ 12, April 23 ~ 24, April 26, April 30, May 01, 2007

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.*

UltraTech

3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4
Tel.: (905) 829-1570 Fax.: (905) 829-8050
Website: www.ultratech-labs.com Email: vic@ultratech-labs.com, Email: tri.luu@sympatico.ca

TABLE OF CONTENTS

EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	Part 15, Subpart C, Section 15.247
Title:	Telecommunication - Code of Federal Regulations, CFR 47, Part 15
Purpose of Test:	To gain FCC Equipment Authorization for Frequency Hopping Operating in the Frequency Band 2401.056-2479.680 MHz.
Test Procedures:	Both conducted and radiated emissions measurements were conducted in accordance with American National Standards Institute ANSI C63.4 - American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
Environmental Classification:	Commercial

1.2. RELATED SUBMITTAL(S)/GRANT(S)

None.

1.3. NORMATIVE REFERENCES

Publication	Year	Title
FCC 47CFR Parts 0-19	2006	Code of Federal Regulations, Title 47 – Telecommunication
ANSI C63.4	2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
CISPR 22 +A1 EN 55022	2003-04-10 2004-10-14 2003	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
CISPR 16-1-1	2003	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus
CISPR 16-2-1	2003	Specification for radio disturbance and immunity measuring apparatus and methods. Part 2-1: Conducted disturbance measurement
CISPR 16-2-3	2003	Specification for radio disturbance and immunity measuring apparatus and methods. Part 2-3: Radiated disturbance measurement
FCC Public Notice DA 00-705	2000	Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems
KDB Publication No. 558074	2005	Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

APPLICANT:	
Name:	Panasonic Corporation of North America
Address:	One Panasonic Way, Panazip 4B-8 Secaucus, NJ USA 07094
Contact Person:	Mr. Richard Mullen Phone #: +1 201 348 7758 Email Address: mullenr@us.panasonic.com

MANUFACTURER:	
Name and Address #1:	Panasonic Communications Co., Ltd. Kumamoto Factory
	1080, Takano, Nagomi-machi, Tamana-gun, Kumamoto, 865-0193, Japan
Name and Address #2:	SUGA ELECTRON (M) SDN.BHD.
	No.2&3, Jalan Teknologi 1, Kawasan Perindustrian Tangkak, 84900 Tangkak, Johor, Malaysia
Name and Address #3:	Panasonic Communications Vietnam Co., Ltd.
	Lot J1, Thang Long Industrial Park, Dong Anh district, Hanoi, Vietnam
Contact Person:	Mr. Edmond Leung c/o Panasonic Canada Phone #: +1 905 238 2225 Fax #: +1 905 238 2226 Email Address: elueng@ca.panasonic.com

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

Brand Name:	Panasonic
Product Name:	2.4GHz FHSS Cordless Handset
Model Name or Number:	KX-TD7684 AND KX-TD7694
Serial Number:	Preproduction
Type of Equipment:	FHSS
Input Power Supply Type:	3.6V DC rechargeable battery
Primary User Functions of EUT:	Wireless network communication

2.3. EUT'S TECHNICAL SPECIFICATIONS

TRANSMITTER	
Equipment Type:	Portable
Intended Operating Environment:	Commercial
Power Supply Requirement:	3.6V DC 650 mAh Ni-MH rechargeable battery
RF Output Power Rating:	24.49 dBm peak
Operating Frequency Range:	2401.056-2479.680 MHz
RF Output Impedance:	50 Ω
Channel Spacing:	864 KHz
Duty Cycle:	7.8%
Modulation Type:	GFSK
Antenna Connector Type:	Integral
Antenna Description:	Manufacturer: Panasonic Communication Co., Ltd. Type: PIFA Part No.: PSUL1010ZA Frequency Range: 2400 – 2500 MHz Gain: 2.14 dBi Max

2.4. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Type (Shielded/Non-shielded)
1	Earphone Jack Plug	1	2.5 mm	Non-shielded

2.5. ANCILLARY EQUIPMENT

N/A

2.6. TEST SETUP BLOCK DIAGRAM

EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	21°C
Humidity:	51%
Pressure:	102 kPa
Power input source:	3.6V DC

3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

Operating Modes:	▪ Each of lowest, middle and highest channel frequencies transmits in Tx burst mode for emissions measurements. ▪ The EUT operates in frequency hopping mode and digital modulation mode.
Special Test Software:	Special software is provided by the applicant to select and operate the EUT at each channel frequency continuously and mode of operation such as frequency hopping and direct sequence or digital modulation for testing purpose.
Special Hardware Used:	Special serial cable is provided by the applicant to put the EUT into test mode.
Transmitter Test Antenna:	The EUT is tested with the antenna fitted in a manner typical of normal intended use as integral antenna equipment.

Transmitter Test Signals	
Frequency Band(s):	2401.056 – 2479.680 MHz
Frequency(ies) Tested: (Near lowest, near middle & near highest frequencies in the frequency range of operation.)	2401.056, 2440.800 & 2479.680 MHz.
RF Power Output:	24.49 dBm peak
Normal Test Modulation:	GFSK
Modulating Signal Source:	Internal

EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville 3-10 TDK Semi-Anechoic Chamber has been filed with FCC office (FCC File No.: 31040/SIT 1300B3) and Industry Canada office (Industry Canada File No.: IC2049-1). Last Date of Site Calibration: June 20, 2006

4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC Section(s)	Test Requirements	Compliance (Yes/No)
15.107(a) /15.207(a)	AC Power Conducted Emissions	Yes
15.109(a)	Class B Radiated Emissions	Yes (Note 1)
15.247(a)(1)	20dB Bandwidth	Yes
15.247(b)(1)	Peak Output Power	Yes
15.247(d), 15.209 & 15.205	Spurious Radiated Emissions	Yes
15.247(i), 1.1310 & 2.1091	RF Exposure	Yes (Note 2)

Notes:

(1) A separate engineering test report for compliance with FCC Part 15, Subpart B – Class B Unintentional Radiators will be provided upon request.
(2) See SAR test report.

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None.

EXHIBIT 5. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS

5.1. TEST PROCEDURES

This section contains test results only. Details of test methods and procedures can be found in ANSI C63.4; KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247); FCC Public Notice DA 00-705: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

5.2. MEASUREMENT UNCERTAINTIES

The measurement uncertainties stated were calculated in accordance with requirements of UKAS Document LAB 34 with a confidence level of 95%. Please refer to Exhibit 6 for Measurement Uncertainties.

5.3. MEASUREMENT EQUIPMENT USED

The measurement equipment used complied with the requirements of the Standards referenced in the Methods & Procedures ANSI C63.4 and CISPR 16-1.

5.4. COMPLIANCE WITH FCC PART 15 – GENERAL TECHNICAL REQUIREMENTS

FCC Section	FCC Rules	Manufacturer's Clarification
15.31	The hoping function must be disabled for tests, which should be performed with the EUT transmitting on the number of frequencies specified in this Section. The measurements made at the upper and lower ends of the band of operation should be made with the EUT tuned to the highest and lowest available channels.	Software was provided which allowed the hopping function to be disabled for testing and permitted the EUT to be tuned to the highest and lowest available channel.
15.203	Described how the EUT complies with the requirement that either its antenna is permanently attached, or that it employs a unique antenna connector, for every antenna proposed for use with the EUT. The exception is in those cases where EUT must be professionally installed. In order to demonstrate that professional installation is required, the following 3 points must be addressed: ➢ The application (or intended use) of the EUT ➢ The installation requirements of the EUT ➢ The method by which the EUT will be marketed	The antenna is internal. It is permanently attached.
15.204	Provided the information for every antenna proposed for use with the EUT: (a) type (e.g. Yagi, patch, grid, dish, etc…), (b) manufacturer and model number (c) gain with reference to an isotropic radiator	Type of antenna: PIFA Manufacturer: Panasonic Communications Co., Ltd. Model: PSUL1010ZA Frequency Range: 2400-2500 MHz Gain: Max. 2.14 dBi
15.247(a)	Description of how the EUT meets the definition	The EUT hops every 10 ms, according to a

	of a frequency hopping spread spectrum, found in Section 2.1. Based on the technical description.	pseudo random sequence, a total of 75 channels.
15.247(a)	Pseudo Frequency Hopping Sequence: Describe how the hopping sequence is generated. Provide an example of the hopping sequence channels, in order to demonstrate that the sequence meets the requirements specified in the definition of a frequency hopping spread spectrum system, found in Section 2.1	There is a pseudo random table, using the channel designation from 1 to 75. The hopping sequences are generated by a pseudo random number generator.
15.247(a)	Equal Hopping Frequency Use: Describe how each individual EUT meets the requirement that each of its hopping channels is used equally on average (e.g. that each new transmission event begins on the next channel in the hopping sequence after final channel used in the previous transmission events).	When starting transmission, the EUT will select an initial frequency channel at random. From that point, the EUT follows the sequence set by the hopping table.
15.247(g)	Describe how the EUT complies with the requirement that it be designed to be capable of operating as a true frequency hopping system	This unit hops every 10 ms, which complies with the requirement of not more than 400 ms within a 30 second period at any frequency.
15.247(h)	Describe how the EUT complies with the requirement that it not have the ability to coordinated with other FHSS is an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitters	The EUT doesn't coordinate frequency-hopping channels for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters.
Public Notice DA 00-705	System Receiver Input Bandwidth: Describe how the associated receiver(s) complies with the requirement that its input bandwidth (either RF or IF) matches the bandwidth of the transmitted signal.	The EUT uses low IF filters to ensure matching the receiver bandwidth to the transmitter bandwidth.
Public Notice DA 00-705	System Receiver Hopping Capability: Describe how the associated receiver(s) has the ability to shift frequencies in synchronization with the transmitted signals	The EUT uses super-heterodyne receiver. The receiver shifts frequencies in synchronization with the transmitted signals by a pseudo random table.

5.5. AC POWER LINE CONDUCTED EMISSIONS [§15.207(a)]

5.5.1. Limit

The equipment shall meet the limits of the following table:

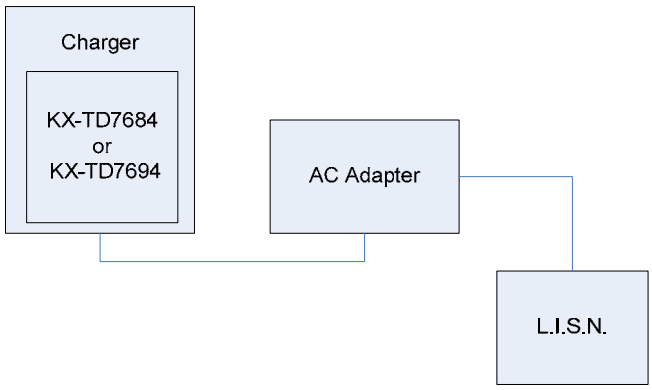
Frequency of emission (MHz)	Class B Conducted Limits (dBμV)		Measuring Bandwidth
	Quasi-peak	Average	
0.15–0.5 .....……..	66 to 56*	56 to 46*	RBW = 9 kHz
0.5–5 .....……..	56	46	VBW ≥ 9 kHz for QP
5-30 ……..	60 ..……..	50	VBW = 1 Hz for Average

*Decreases linearly with the logarithm of the frequency

5.5.2. Method of Measurements

Refer to Exhibit 8, Section 8.2 of this test report & ANSI C63.4

5.5.3. Test Arrangement



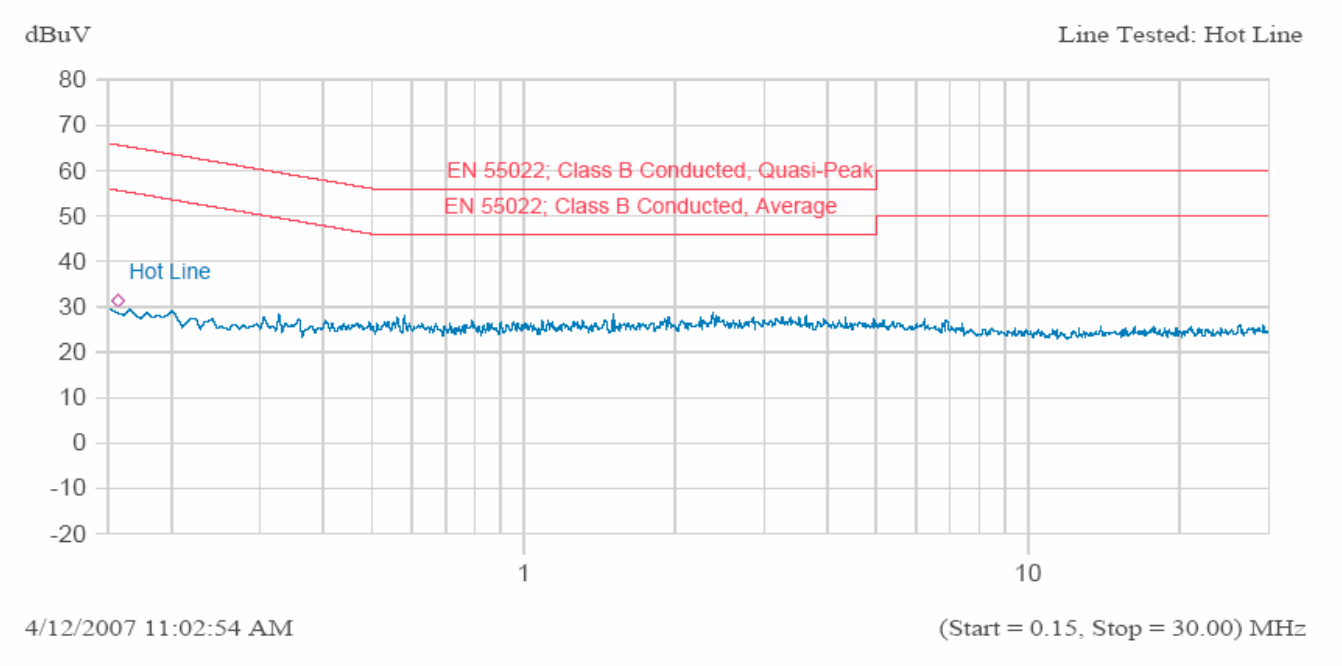
5.5.4. Test Equipment List

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer/ EMI Receiver	Hewlett Packard	HP 8593EM	3412A00103	9 kHz – 26.5 GHz
Transient Limiter	Hewlett Packard	11947A	310701998	9 kHz – 200 MHz 10 dB attenuation
L.I.S.N.	EMCO	3825/2	89071531	9 kHz – 200 MHz 50 Ohms / 50 μH
24'(L) x 16'(W) x 8'(H) RF Shielded Chamber	Braden Shielding	…	…	…

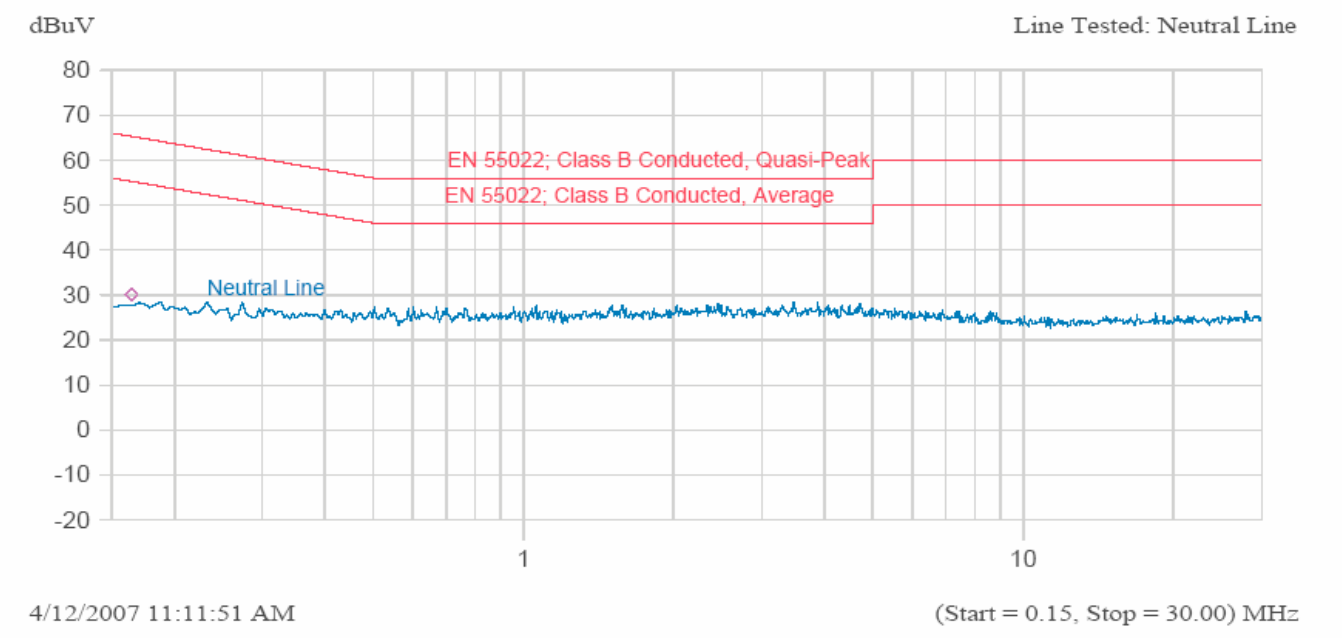
5.5.5. Test Data

5.5.5.1. KX-TD7684

Plot 5.5.5.1.1.
AC Power Line Conducted Emissions
Line Voltage: 120VAC 60Hz
Line Tested: L1

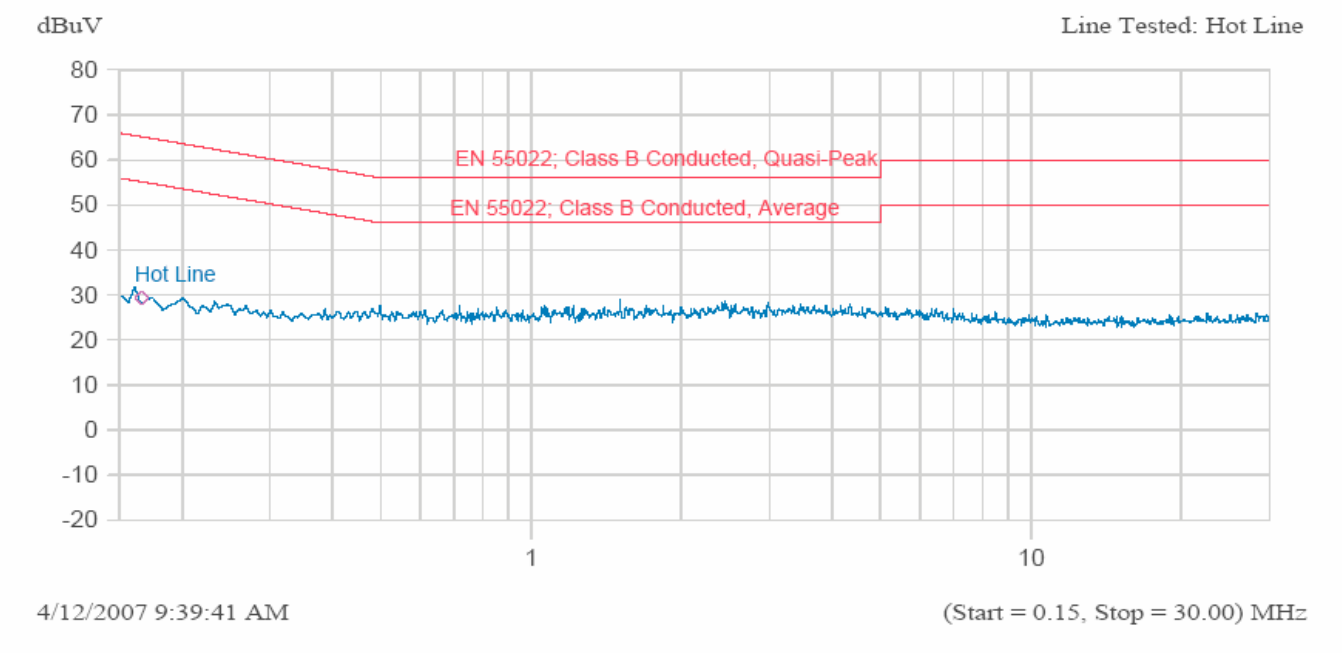


Plot 5.5.5.1.2.
AC Power Line Conducted Emissions
Line Voltage: 120VAC 60Hz
Line Tested: L2

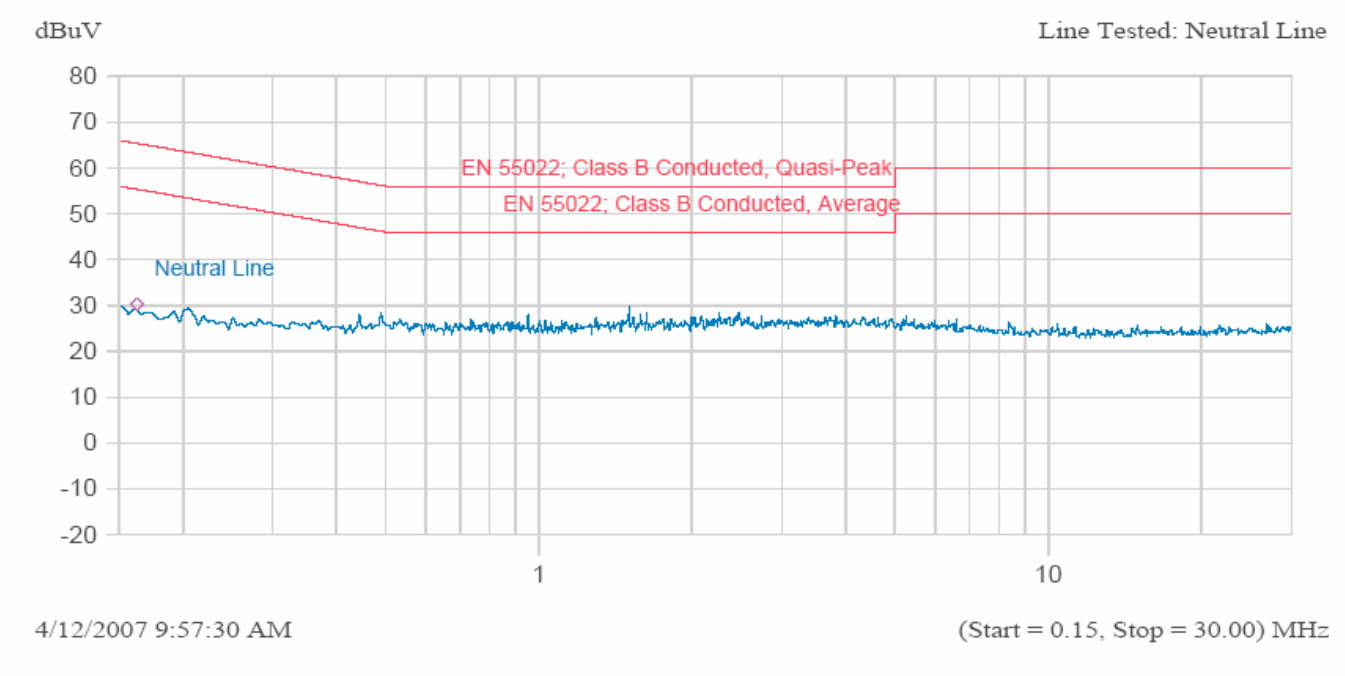


5.5.5.2. KX-TD7694

Plot 5.5.5.2.1.
AC Power Line Conducted Emissions
Line Voltage: 120VAC 60Hz
Line Tested: L1



Plot 5.5.5.2.2.
AC Power Line Conducted Emissions
Line Voltage: 120VAC 60Hz
Line Tested: L2



5.6. 20 dB Bandwidth [§15.247(a)(1) & §15.247(a)(1)(iii)]

5.6.1. Limits

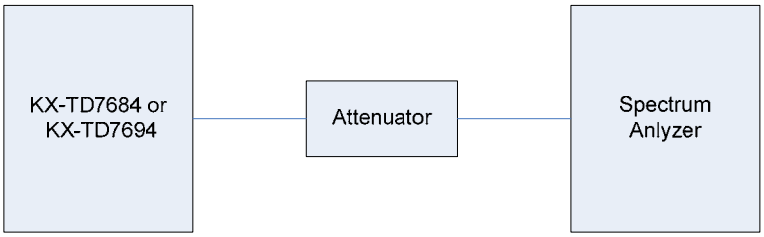
FCC 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

FCC 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

5.6.2. Method of Measurements

Refer to FCC Public Notice DA 00-705, KDB Publication No. 558074 and ANSI C63.4 for measurement methods.

5.6.3. Test Arrangement



5.6.4. Test Equipment List

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer/ EMI Receiver	Rohde & Schwarz	FSEK20/B4/B21	834157/005	9 kHz – 40 GHz with external mixer
Attenuator	Weinchel Corp.	46-20-34	BM0653	DC -18GHz

5.6.5. Test Data

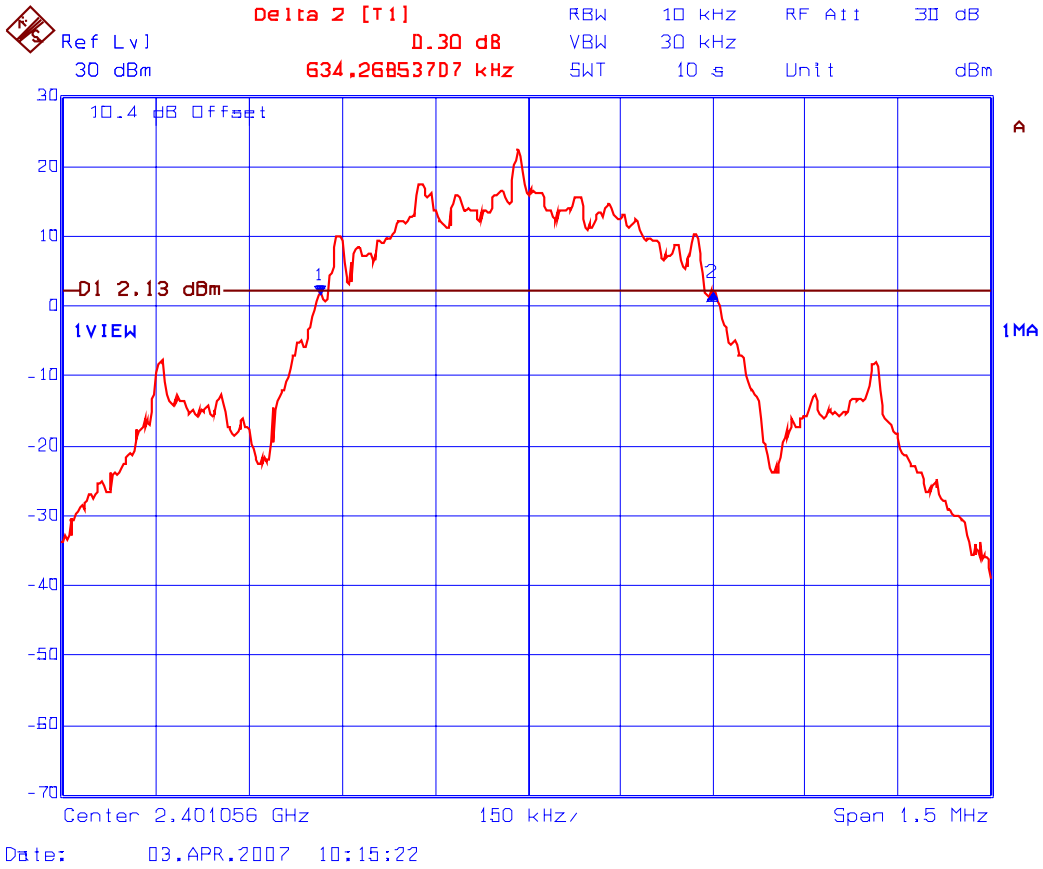
Note: Bandwidth measurements were done using the built-in auto function of the analyzer.

5.6.5.1. KX-TD7684

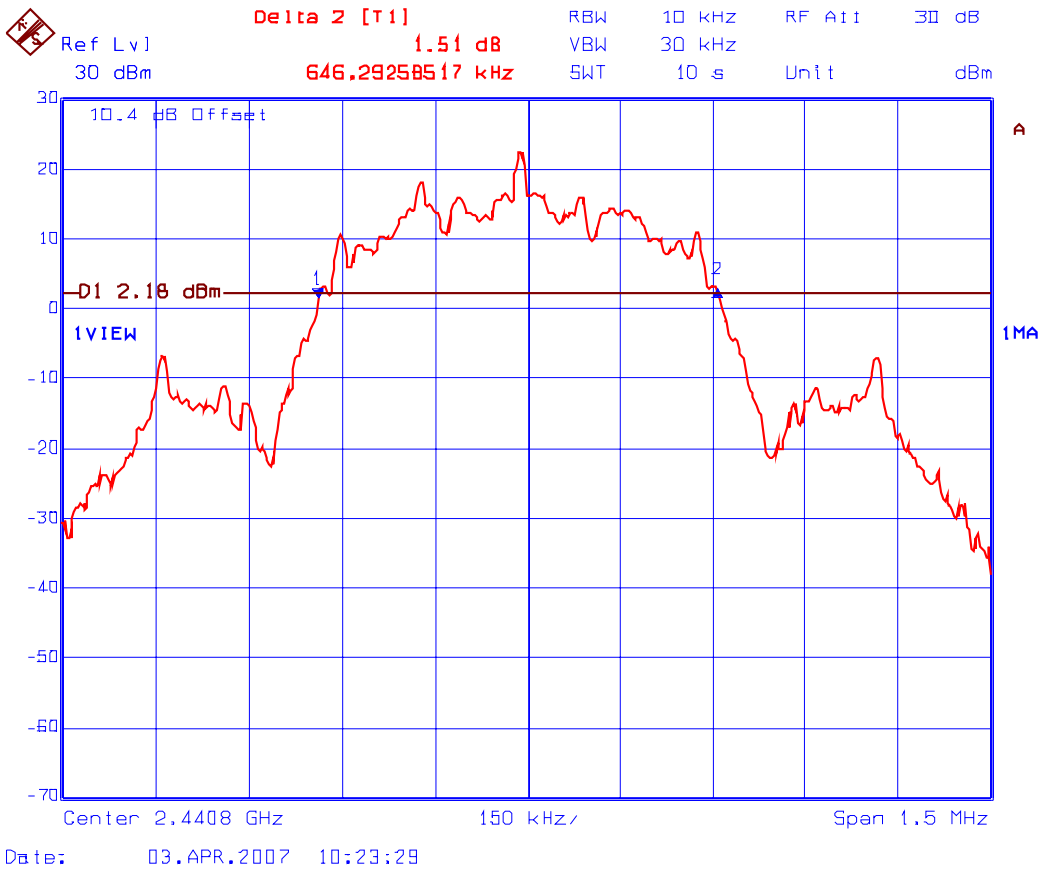
Frequency (MHz)	20 dB Bandwidth (kHz)
2401.056	634.26
2440.800	646.29
2479.680	646.29

See the following plots for detailed measurements.

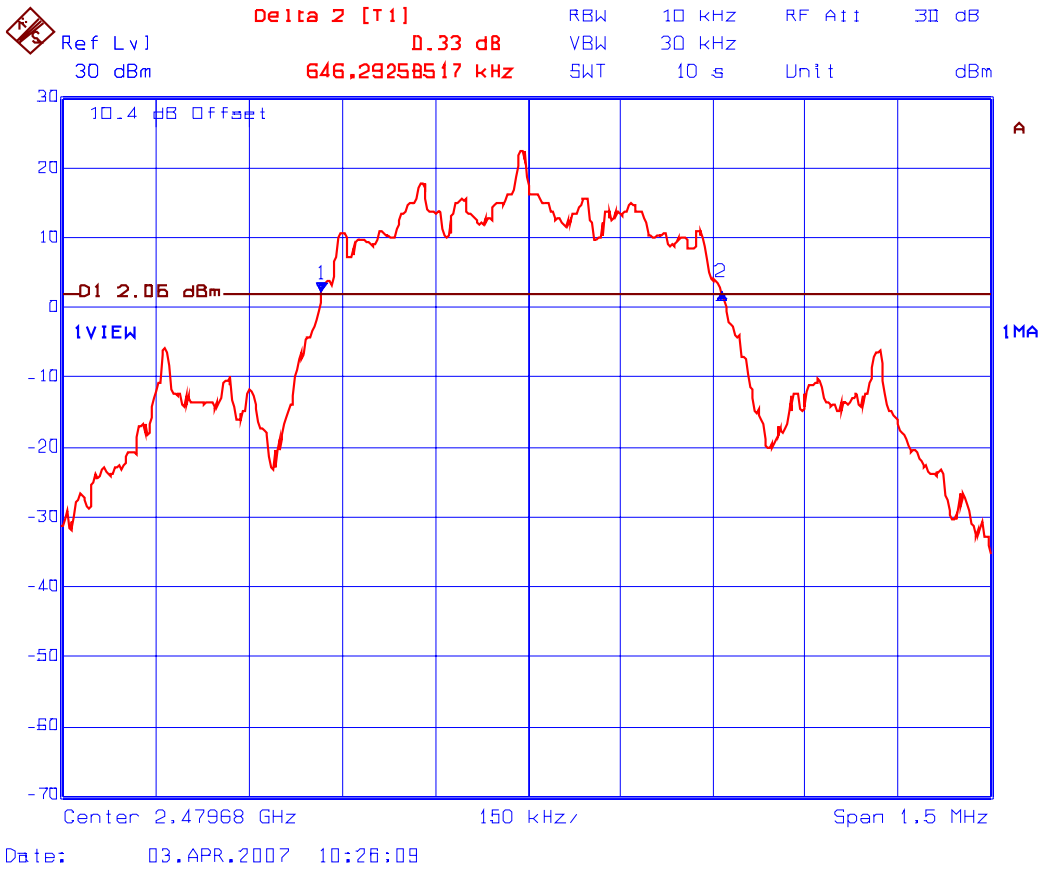
Plot 5.6.5.1.1. 20 dB Bandwidth
Test Frequency: 2401.056 MHz



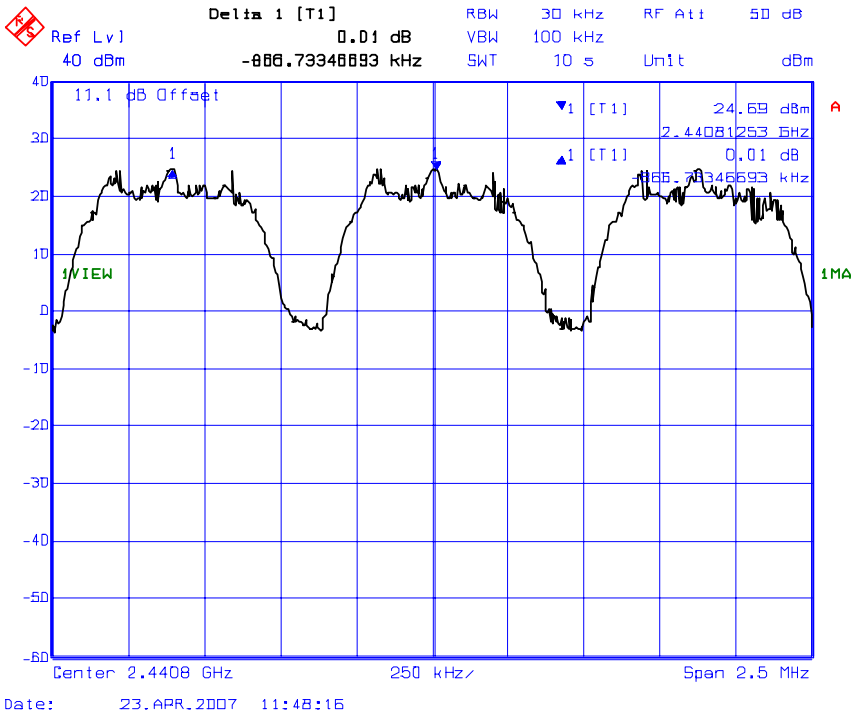
Plot 5.6.5.1.2. 20 dB Bandwidth
Test Frequency: 2440.800 MHz



Plot 5.6.5.1.3. 20 dB Bandwidth
Test Frequency: 2479.680 MHz

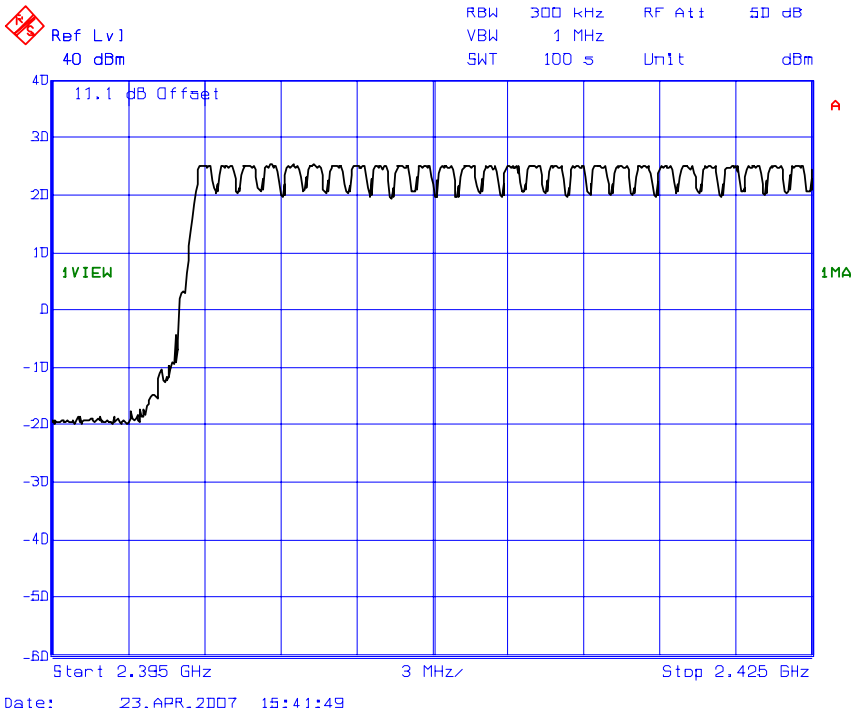


Plot 5.6.5.1.4.Carrier Frequency Separation



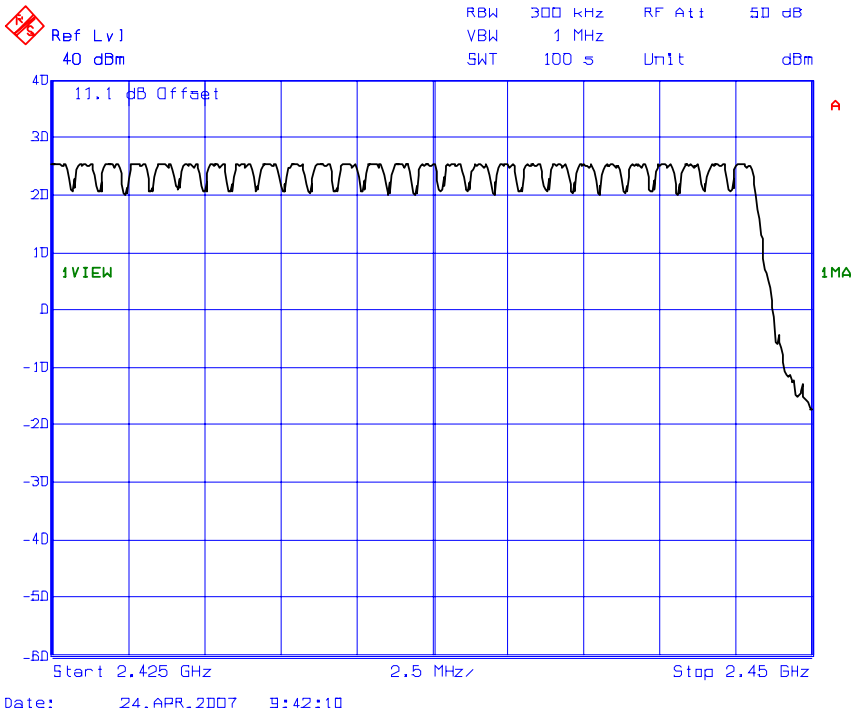
2/3 * 20dB BW = 2/3 * 646.29 KHz = 430.86 KHz < 866.733 KHz

Plot 5.6.5.1.5. Number of hopping frequencies
2.395GHz ~ 2.425GHz



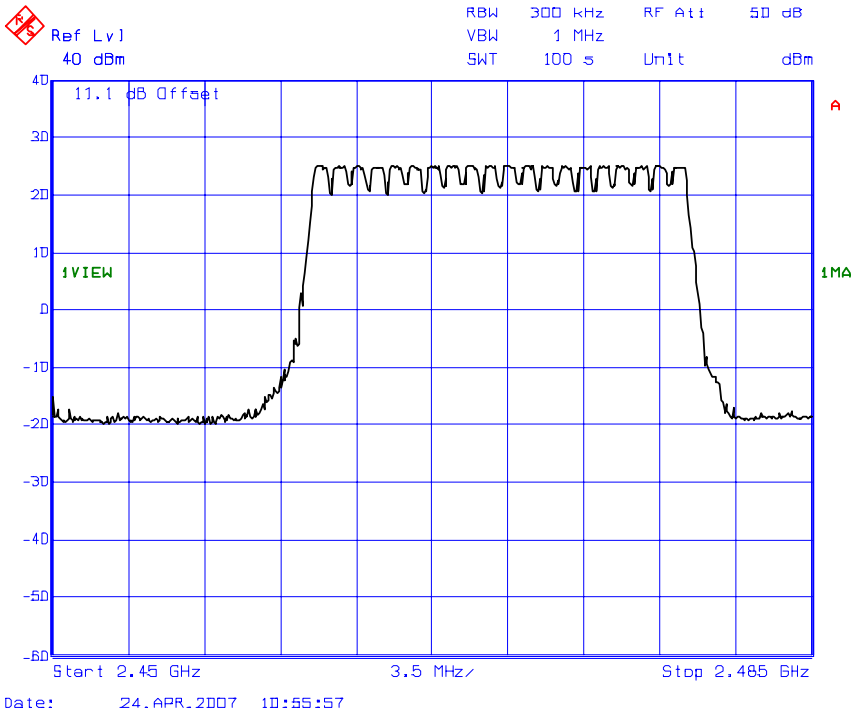
28 hopping frequencies

Plot 5.6.5.1.6. Number of hopping frequencies
2.425GHz ~ 2.45GHz



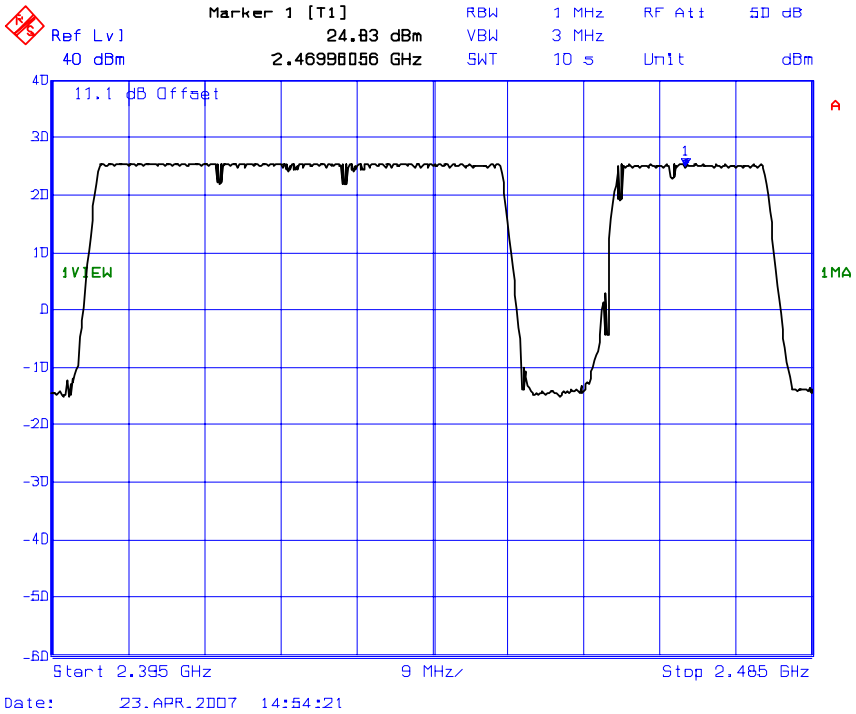
27 hopping frequencies

Plot 5.6.5.1.7. Number of hopping frequencies
2.45GHz ~ 2.485GHz



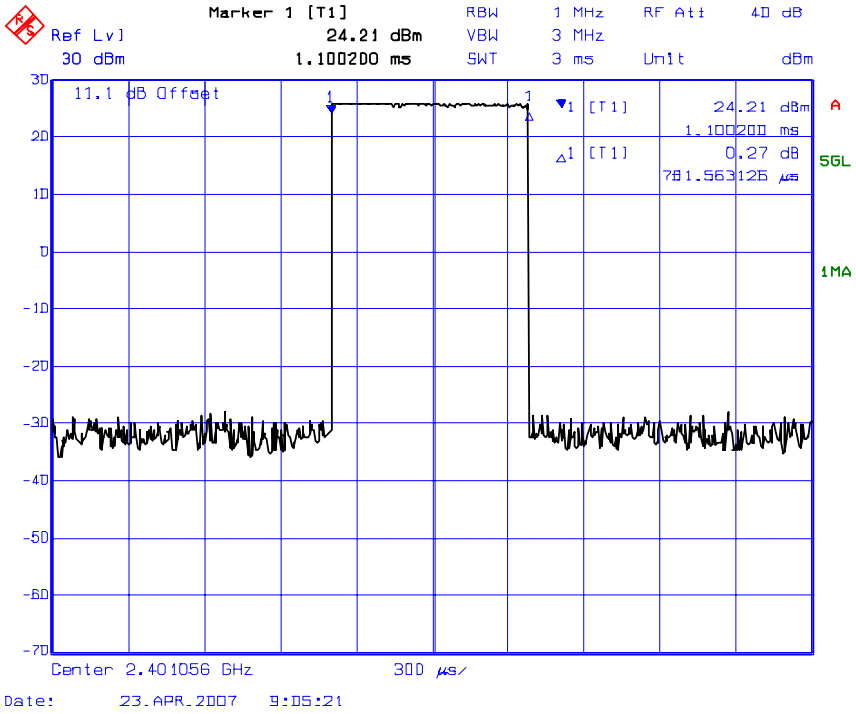
20 hopping frequencies

Plot 5.6.5.1.8. Number of hopping frequencies
2.395GHz ~ 2.485GHz



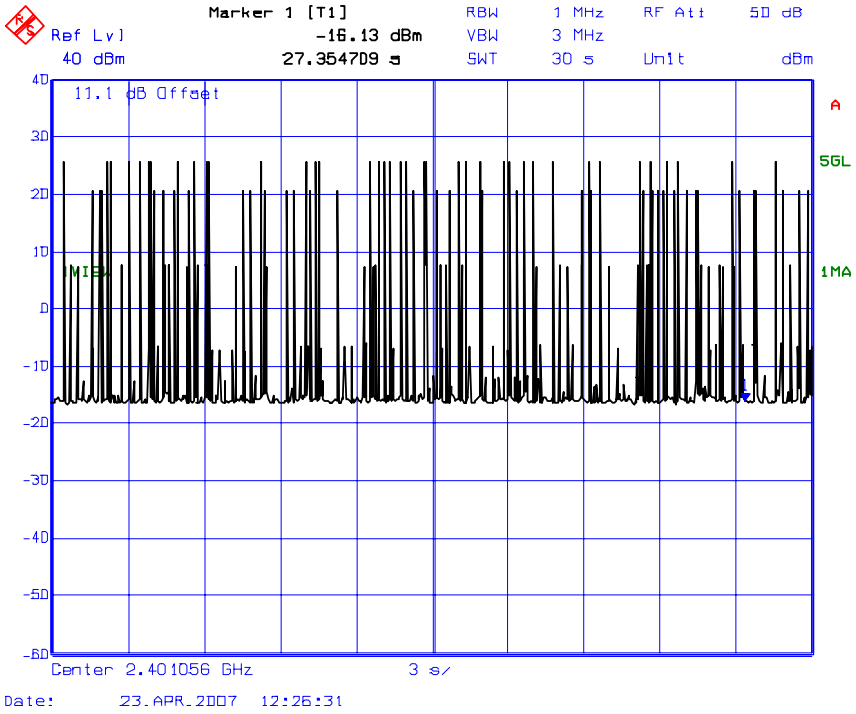
28 + 27 + 20 = 75 hopping frequencies

Plot 5.6.5.1.9. Time of Occupancy
Test Frequency: 2401.056 MHz



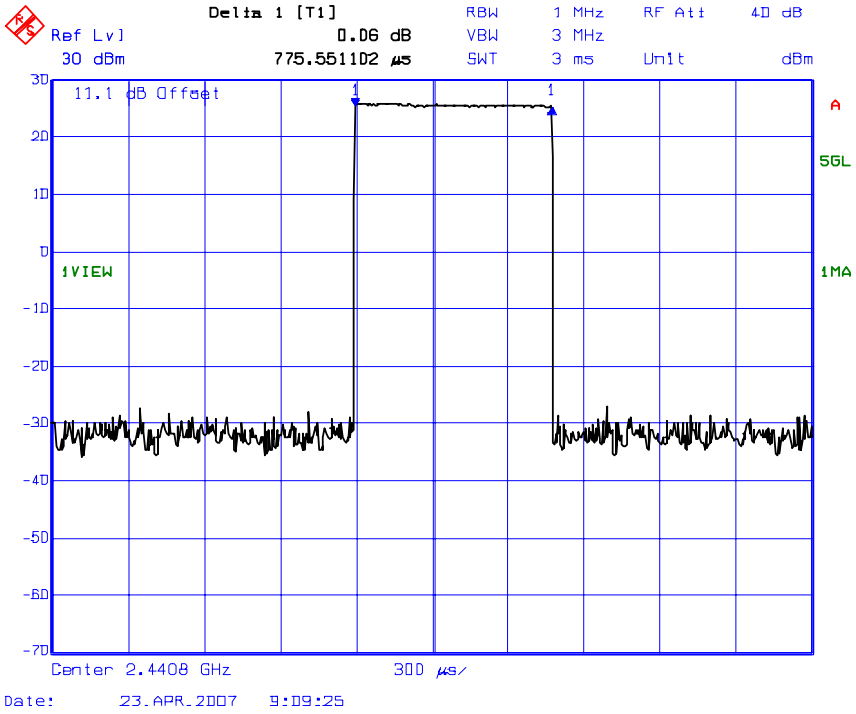
781.56 usec

Plot 5.6.5.1.10. Time of Occupancy
Test Frequency: 2401.056 MHz



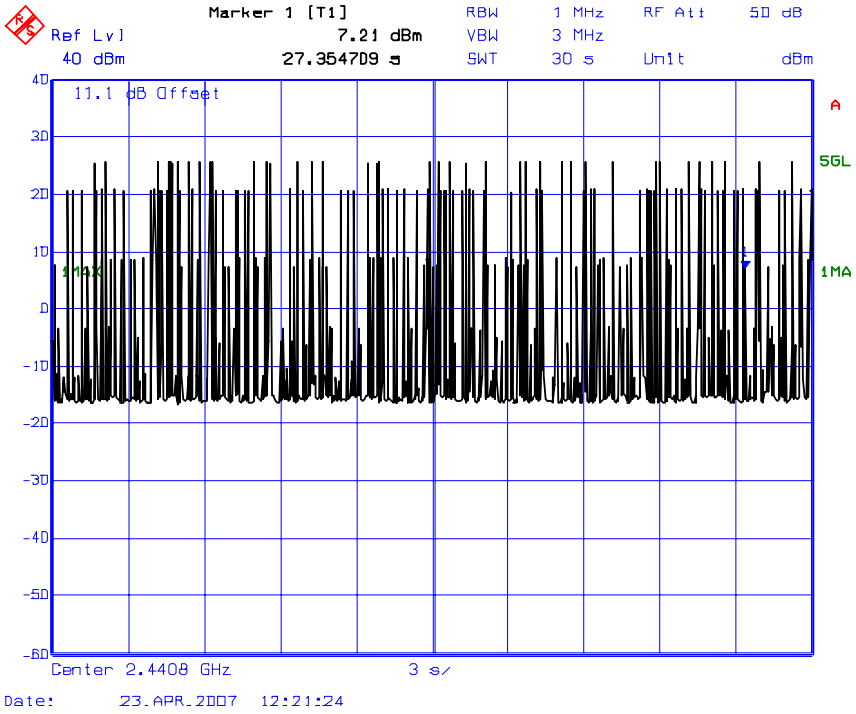
781.56 usec * 40 = 31.262 msec
75 frequencies channels * 0.4 msec = 3 sec
0.313 sec within the period of 3 sec < 0.4 sec

Plot 5.6.5.1.11. Time of Occupancy
Test Frequency: 2440.800 MHz



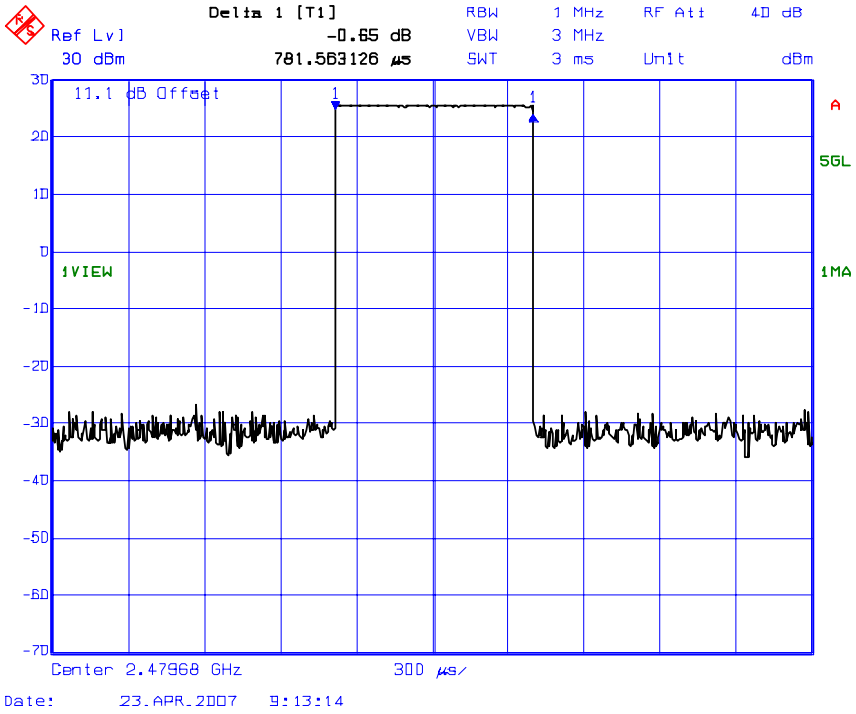
775.55 usec

Plot 5.6.5.1.12. Time of Occupancy
Test Frequency: 2440.800MHz



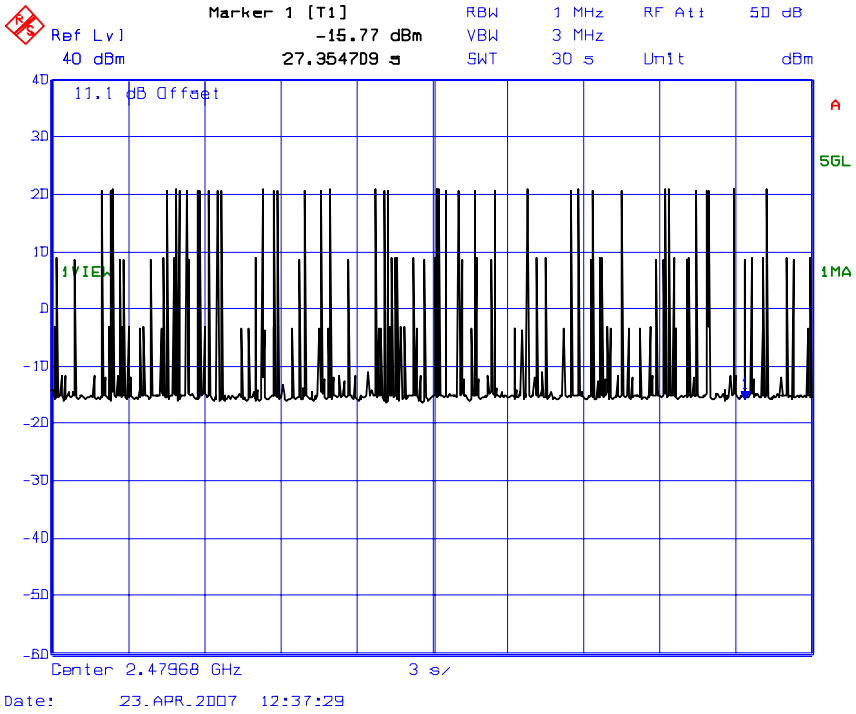
775.55 usec * 40 = 31.022 msec
75 frequencies channels * 0.4 msec = 3 sec
0.310 sec within the period of 3 sec < 0.4 sec

Plot 5.6.5.1.13. Time of Occupancy
Test Frequency: 2479.680 MHz



781.56 usec

Plot 5.6.5.1.14. Time of Occupancy
Test Frequency: 2479.680MHz



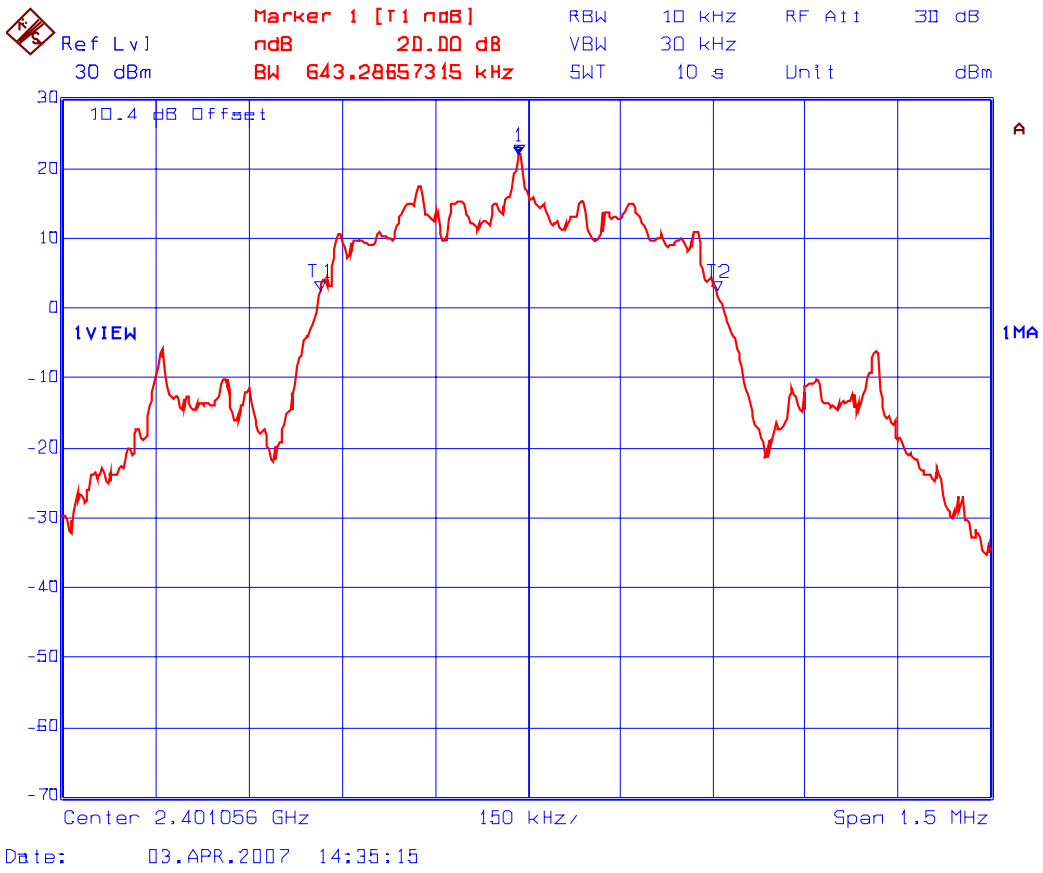
781.56 usec * 40 = 31.262 msec
75 frequencies channels * 0.4 msec = 3 sec
0.313 sec within the period of 3 sec < 0.4 sec

5.6.5.2. KX-TD7694

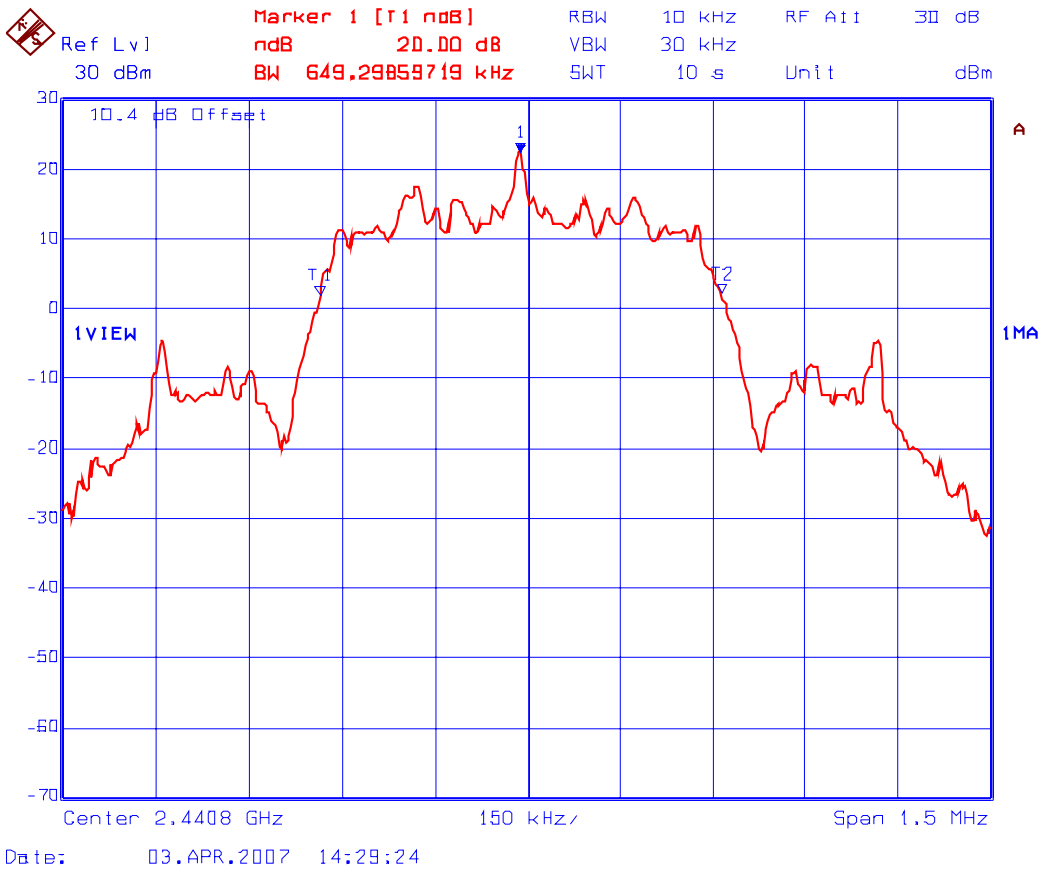
Frequency (MHz)	20 dB Bandwidth (kHz)
2401.056	643.29
2440.800	649.30
2479.680	649.30

See the following plots for detailed measurements.

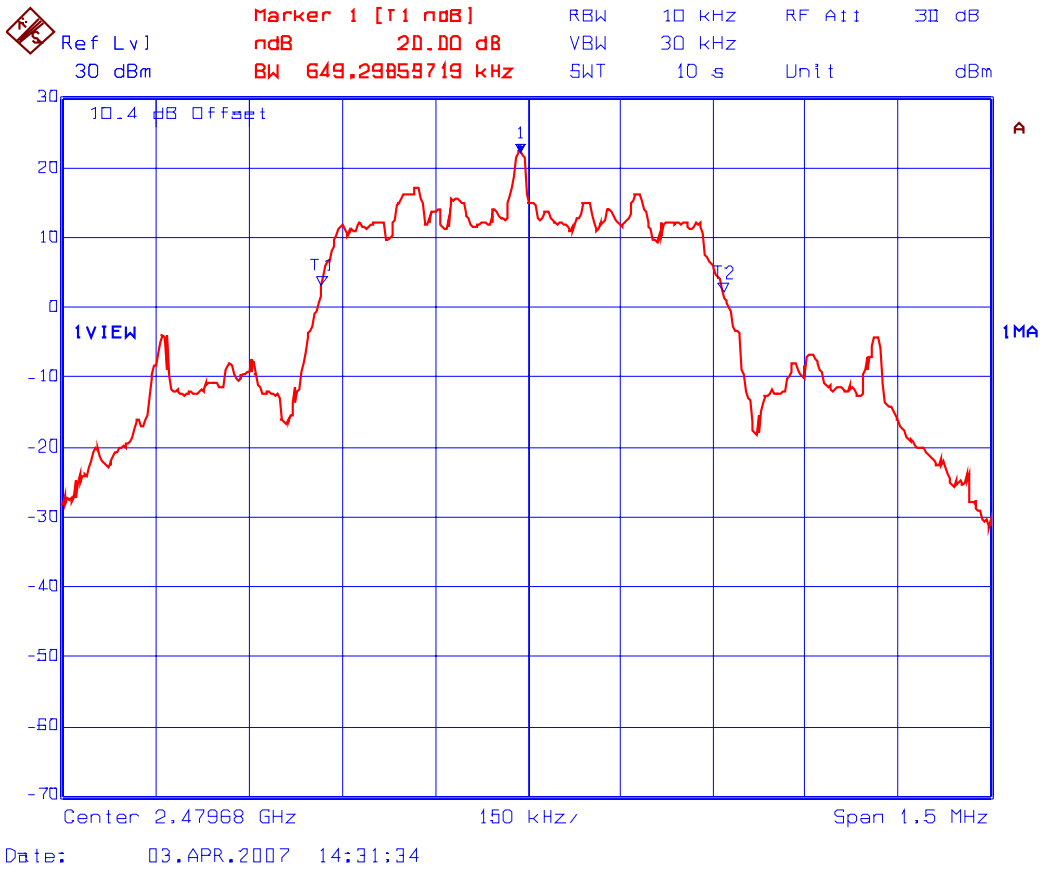
Plot 5.6.5.2.1. 20 dB Bandwidth
Test Frequency: 2401.056 MHz



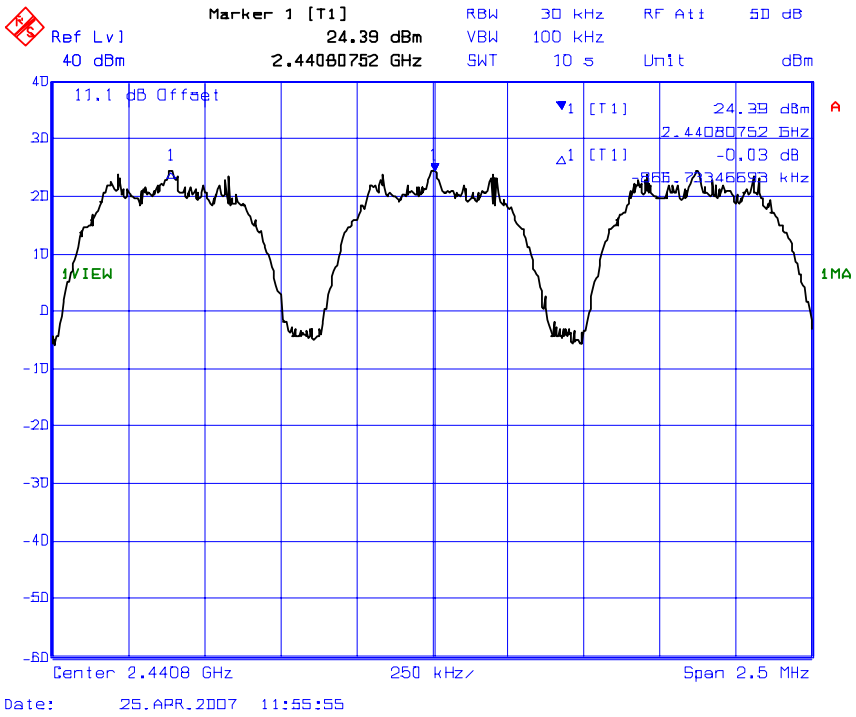
Plot 5.6.5.2.2. 20 dB Bandwidth
Test Frequency: 2440.800 MHz



Plot 5.6.5.2.3. 20 dB Bandwidth
Test Frequency: 2479.680 MHz

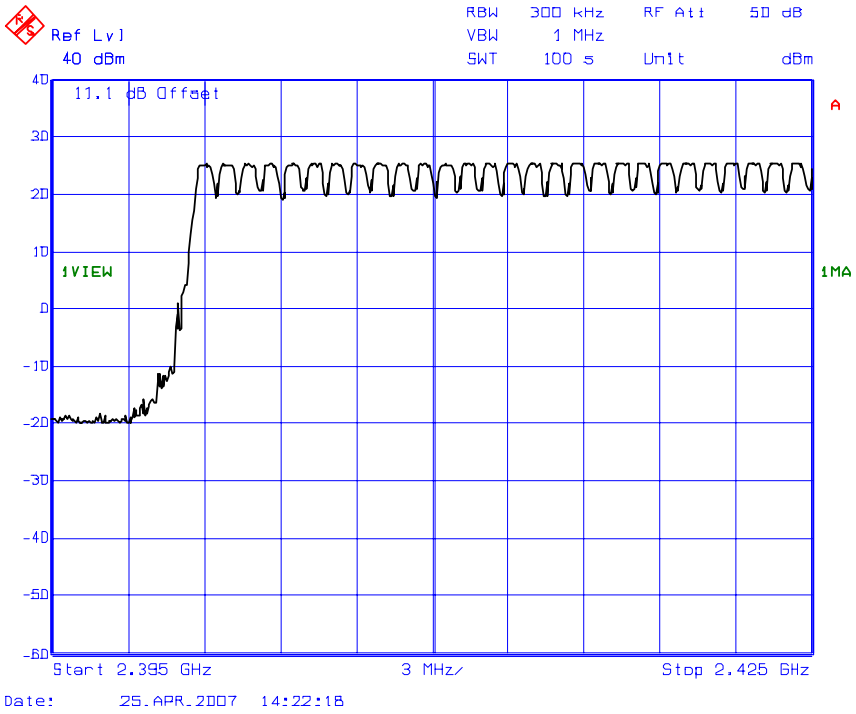


Plot 5.6.5.2.4. Carrier Frequency Separation



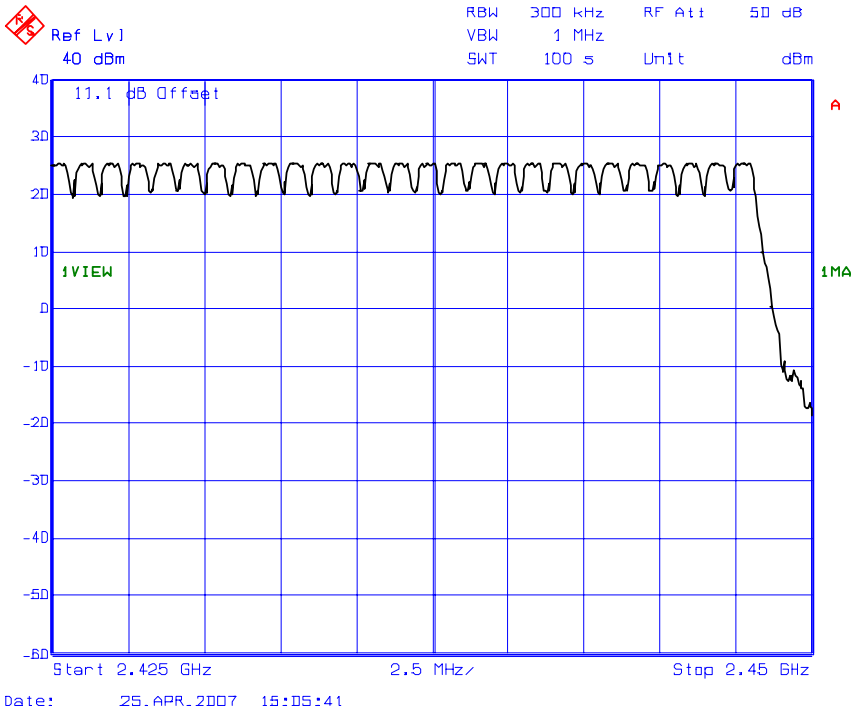
2/3 * 20dB BW = 2/3 * 649.30 KHz = 432.87 KHz < 866.733 KHz

Plot 5.6.5.2.5. Number of hopping frequencies
2.395GHz ~ 2.425GHz



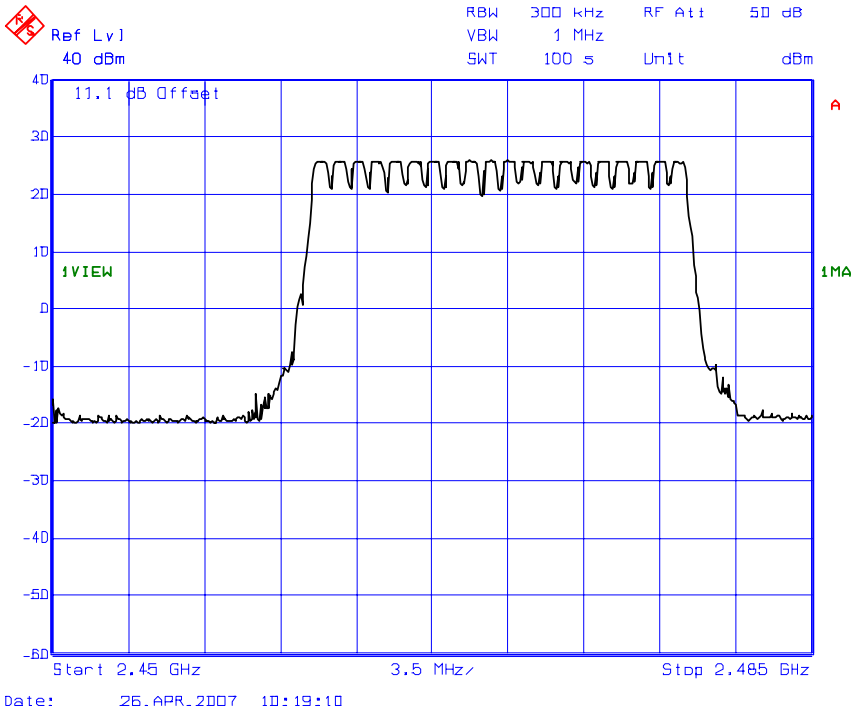
28 hopping frequencies

Plot 5.6.5.2.6. Number of hopping frequencies
2.425GHz ~ 2.45GHz



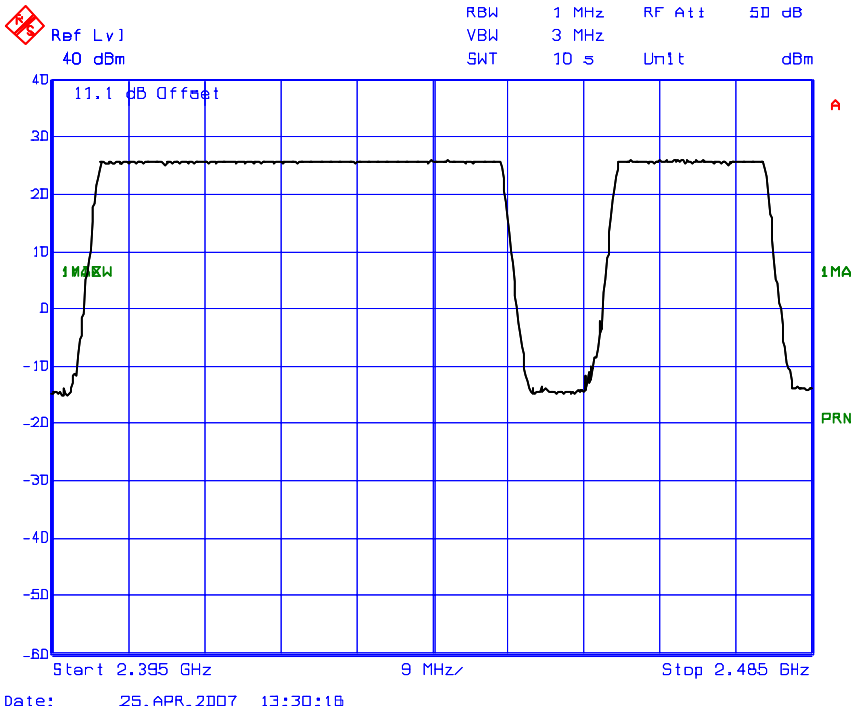
27 hopping frequencies

Plot 5.6.5.2.7. Number of hopping frequencies
2.45GHz ~ 2.485GHz



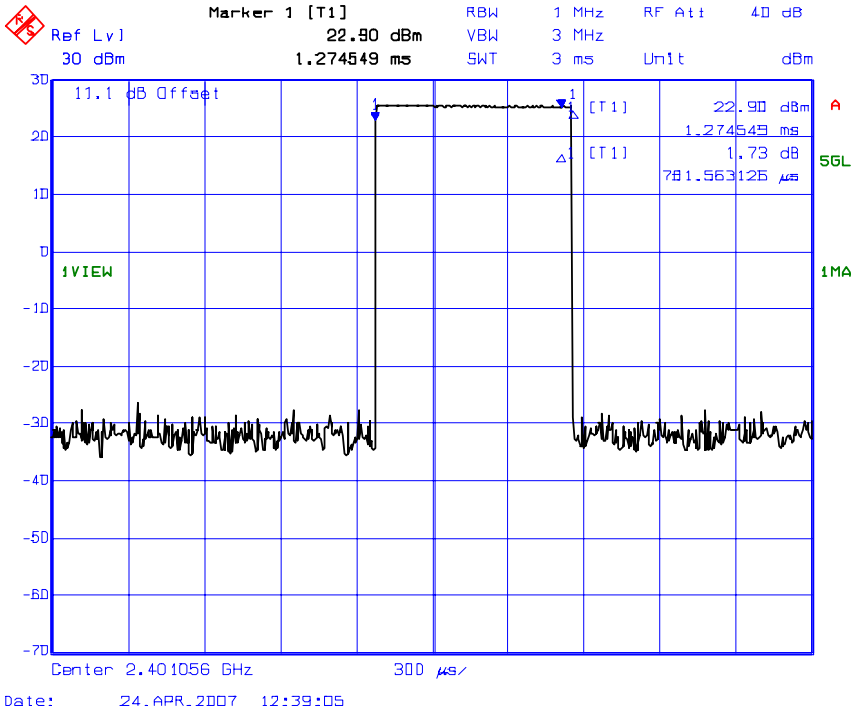
20 hopping frequencies

Plot 5.6.5.2.8. Number of hopping frequencies
2.395GHz ~ 2.485GHz



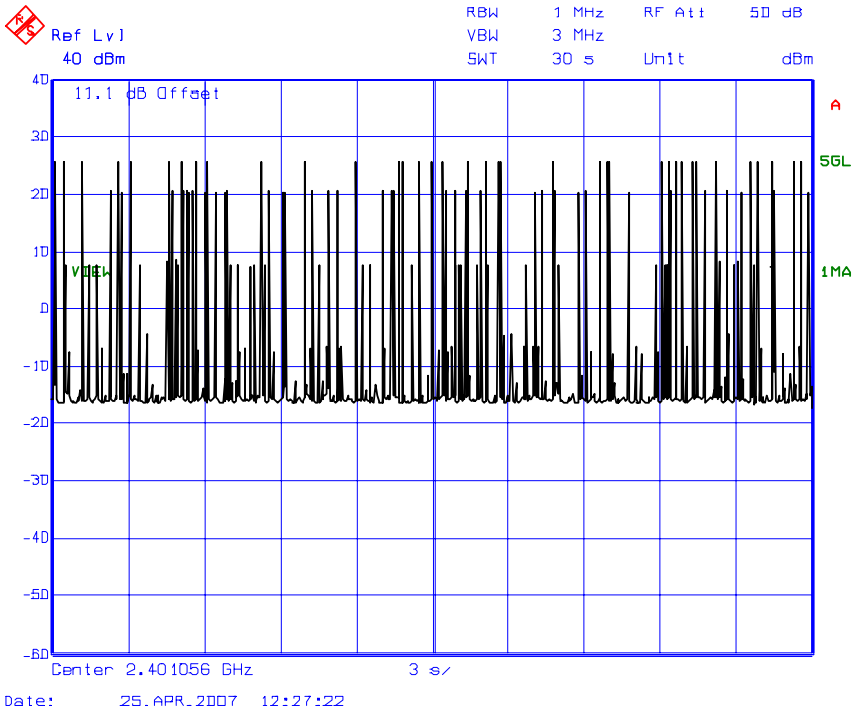
28 + 27 + 20 = 75 hopping frequencies

Plot 5.6.5.2.9. Time of Occupancy
Test Frequency: 2401.056 MHz



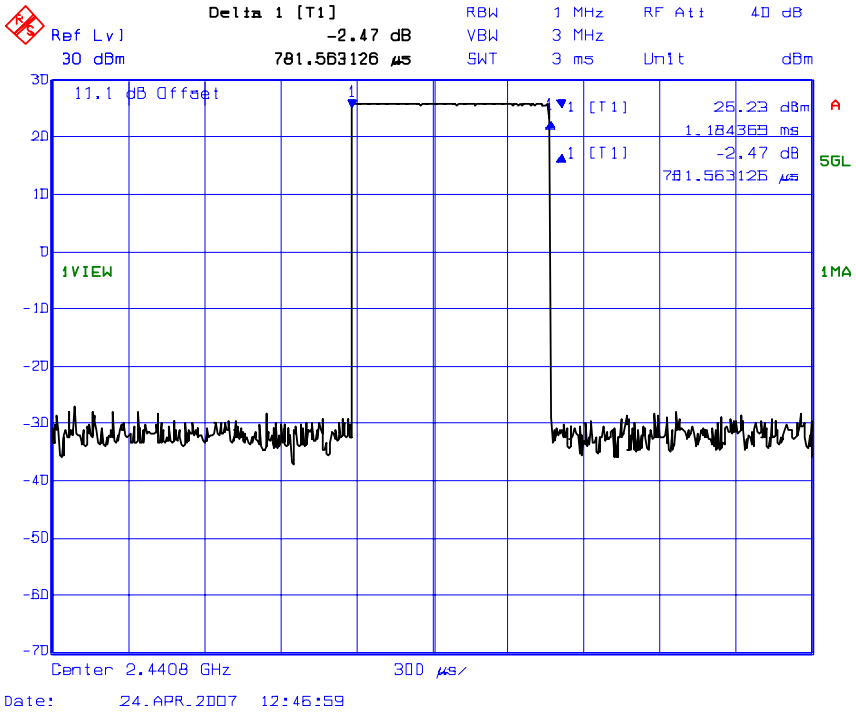
781.56 usec

Plot 5.6.5.2.10. Time of Occupancy
Test Frequency: 2401.056 MHz



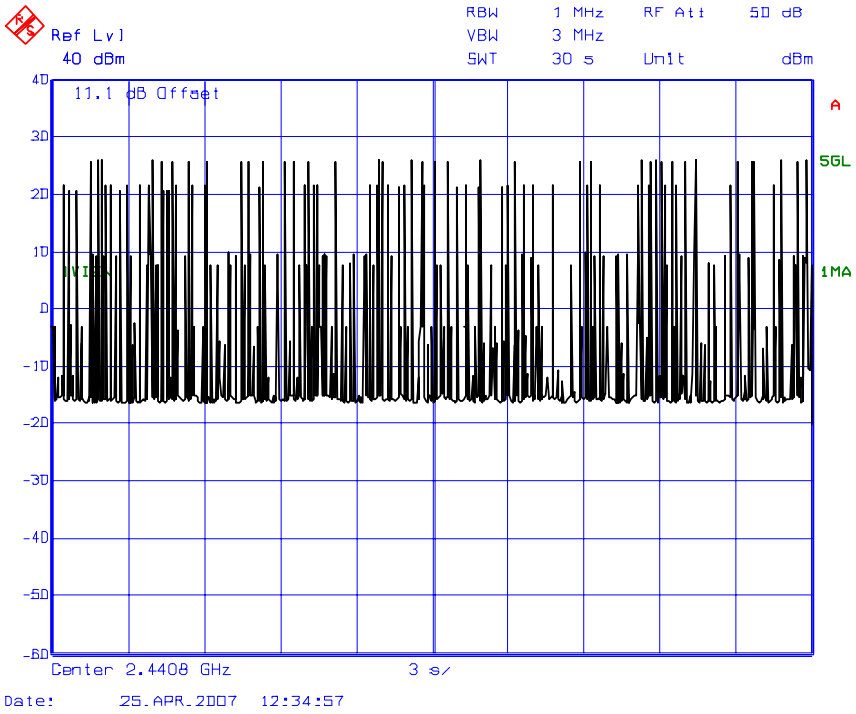
781.56 usec * 40 = 31.262 msec
75 frequencies channels * 0.4 msec = 3 sec
0.313 sec within the period of 3 sec < 0.4 sec

Plot 5.6.5.2.11. Time of Occupancy
Test Frequency: 2440.800 MHz



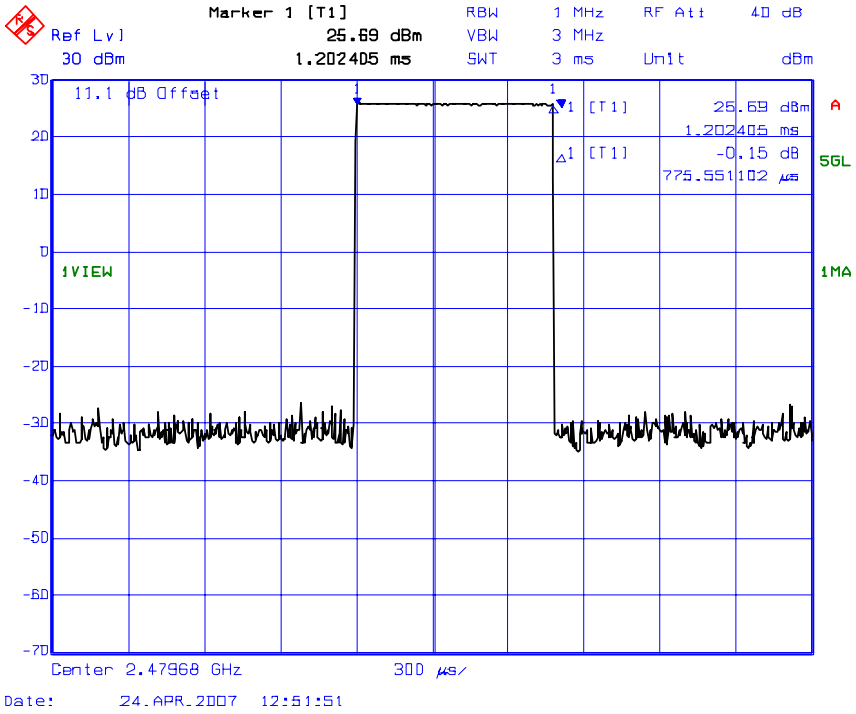
781.56 usec

Plot 5.6.5.2.12. Time of Occupancy
Test Frequency: 2440.800MHz



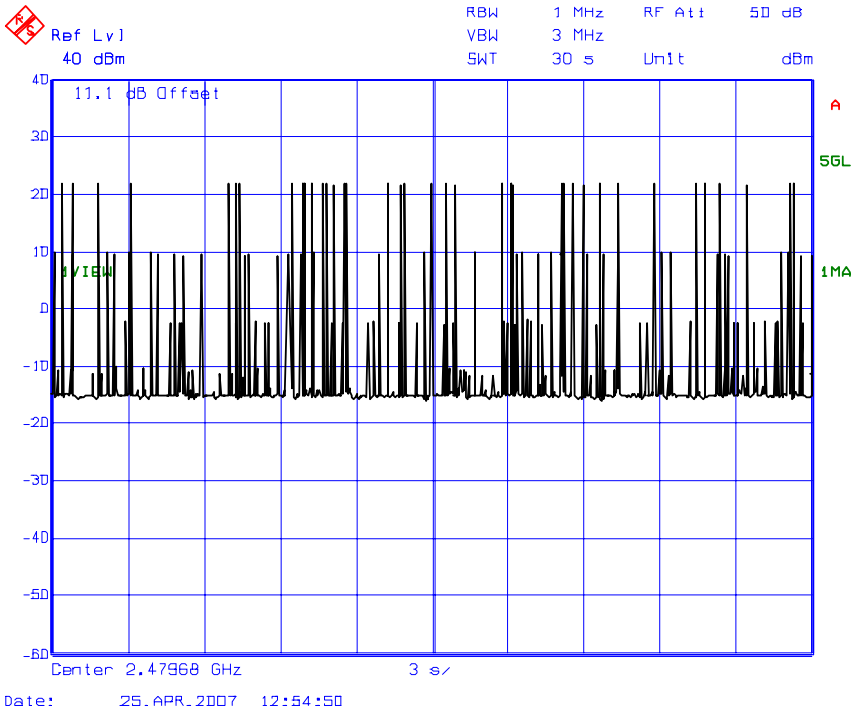
781.56 usec * 40 = 31.262 msec
75 frequencies channels * 0.4 msec = 3 sec
0.313 sec within the period of 3 sec < 0.4 sec

Plot 5.6.5.2.13. Time of Occupancy
Test Frequency: 2479.680 MHz



775.55 usec

Plot 5.6.5.2.14. Time of Occupancy
Test Frequency: 2479.680MHz



775.55 usec * 40 = 30.862 msec
75 frequencies channels * 0.4 msec = 3 sec
0.309 sec within the period of 3 sec < 0.4 sec

5.7. PEAK OUTPUT POWER [§§ 15.247(b)(1)]

5.7.1. Limits

- **FCC 15.247(b)(1):** Maximum peak output power of the transmitter shall not exceed 1 Watt.

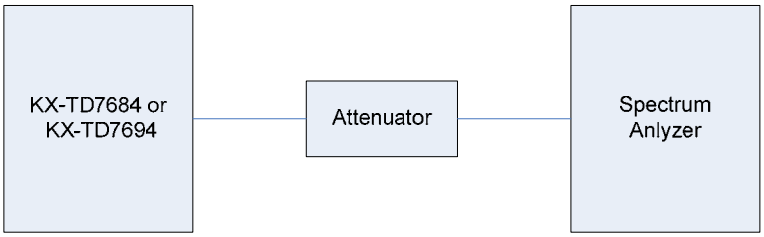
5.7.2. Method of Measurements

Refer to FCC Public Notice DA 00-705, KDB Publication No. 558074 and ANSI C63.4 for measurement methods.

5.7.3. Test Equipment List

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer/ EMI Receiver	Rohde & Schwarz	FSEK20/B4/B21	834157/005	9 kHz – 40 GHz with external mixer
Attenuator	Weinchel Corp.	46-20-34	BM0653	DC -18GHz

5.7.4. Test Arrangement



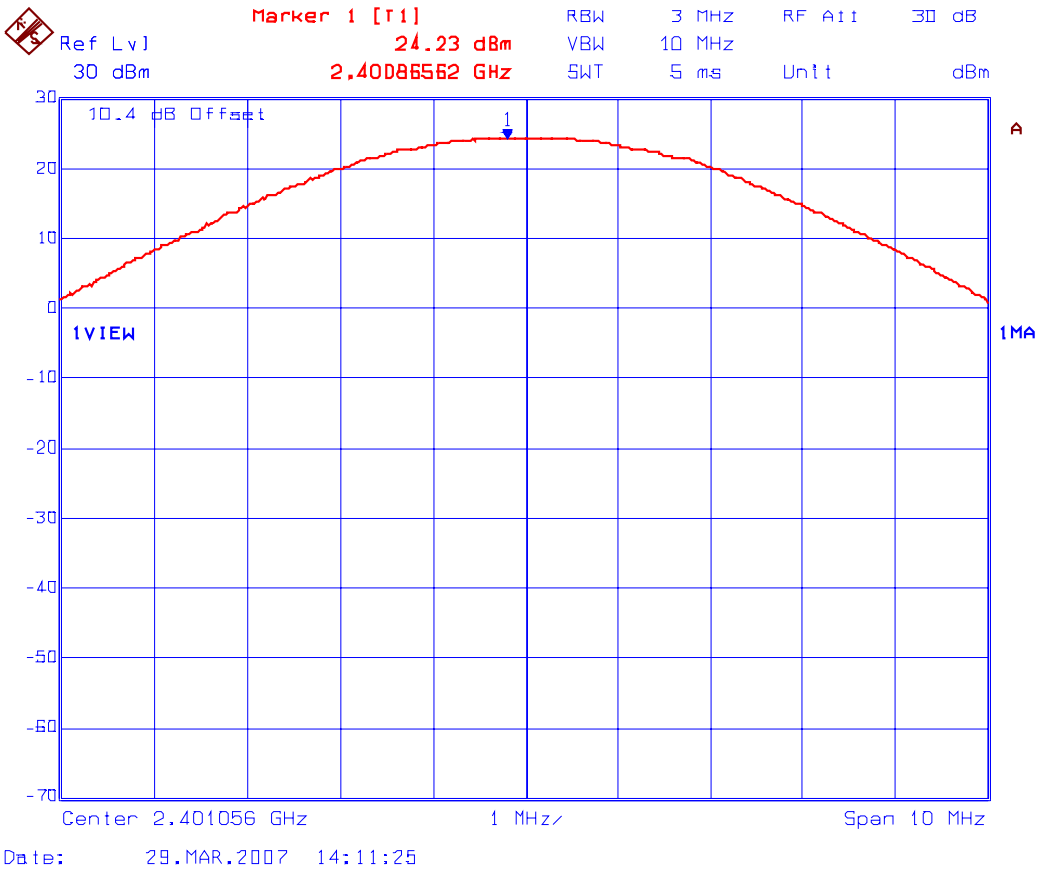
5.7.5. Test Data

5.7.5.1. KX-TD7684

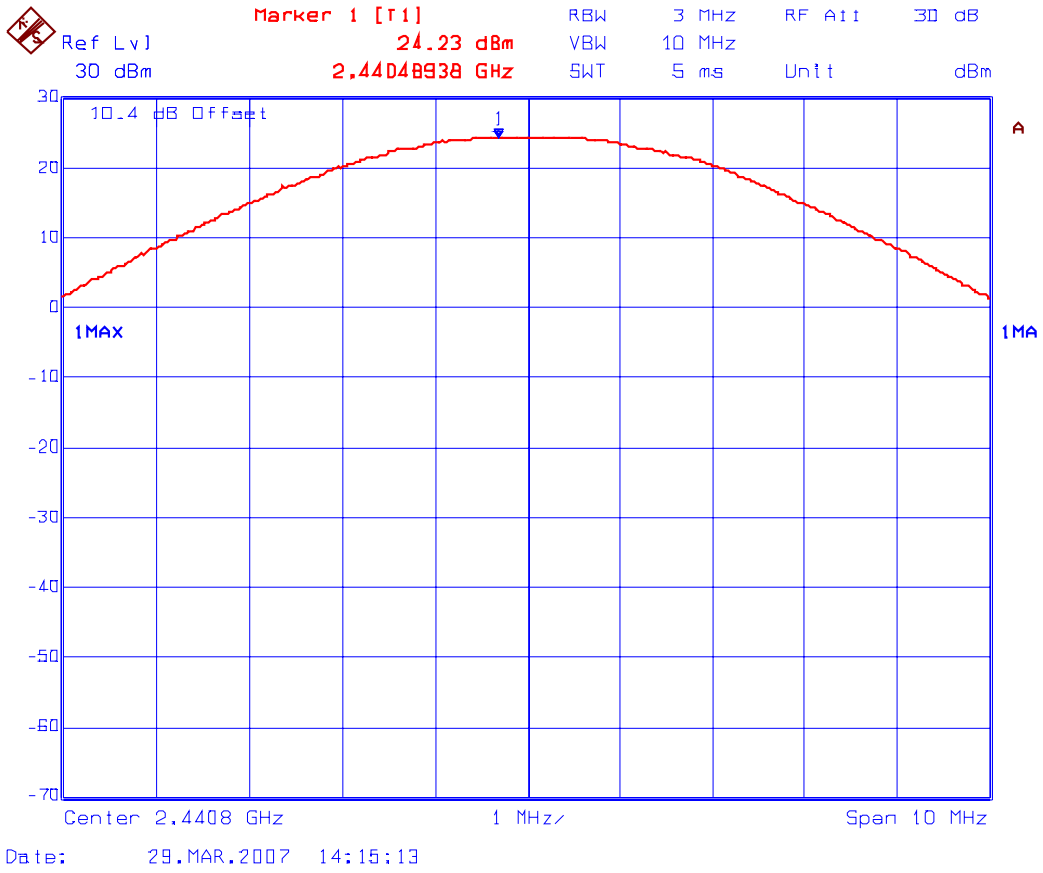
Frequency (MHz)	Channel	Peak Power (dBm)	Limit (dBm)
2401.056	0	24.23	30
2440.800	46	24.23	30
2479.680	91	24.15	30

See the following plots for detailed measurements.

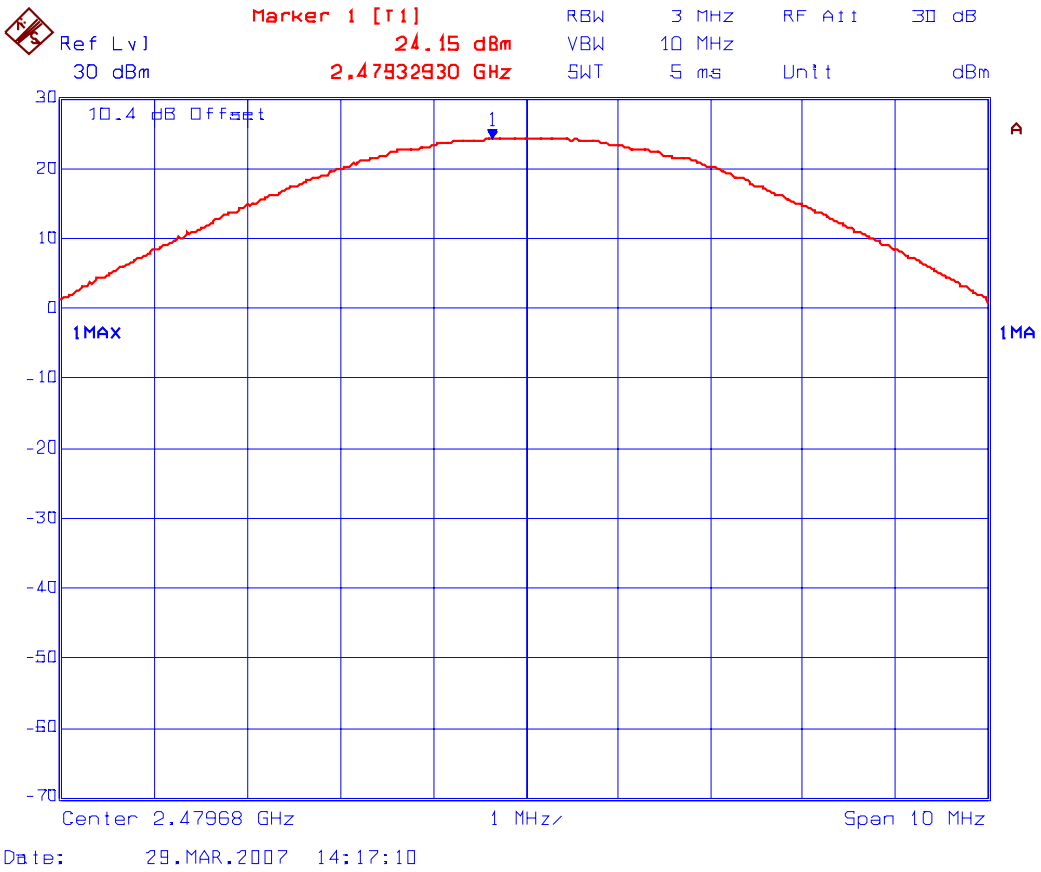
Plot 5.7.5.1.1. Peak Power Output
Test Frequency: 2401.056 MHz



Plot 5.7.5.1.2. Peak Power Output
Test Frequency: 2440.800 MHz



Plot 5.7.5.1.3. Peak Power Output
Test Frequency: 2479.680 MHz

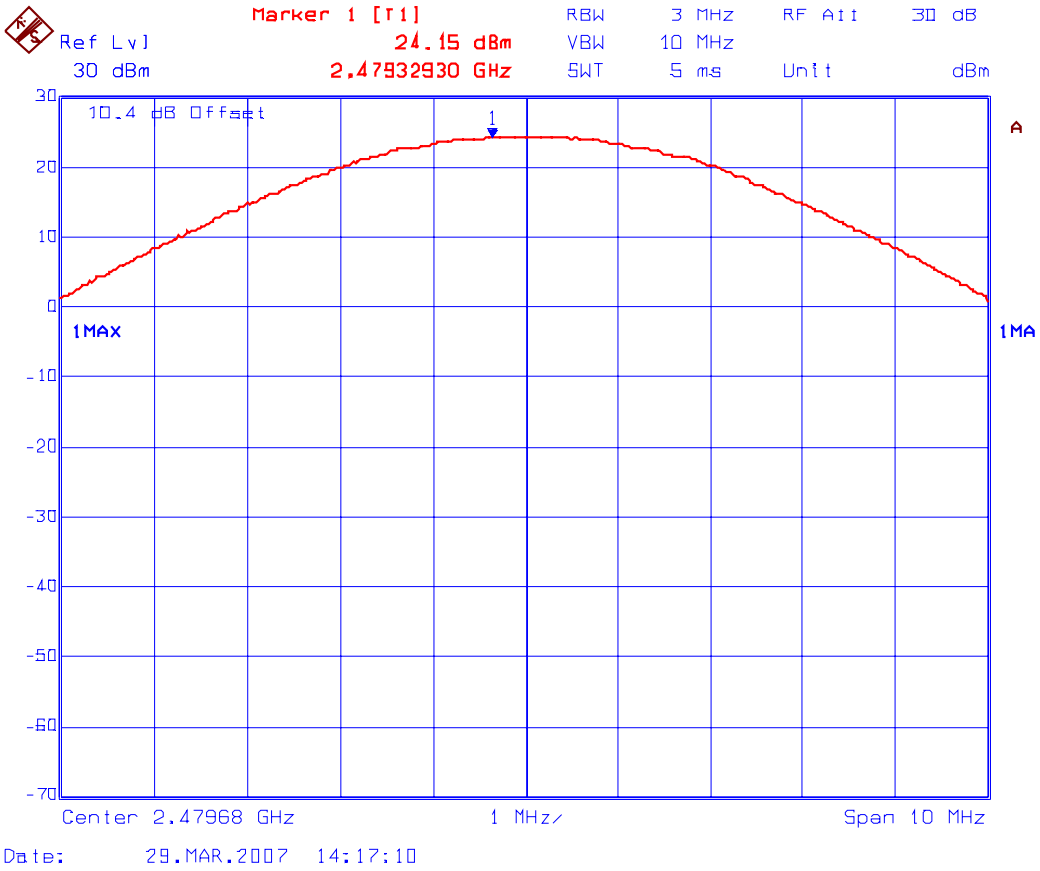


5.7.5.2. KX-TD7694

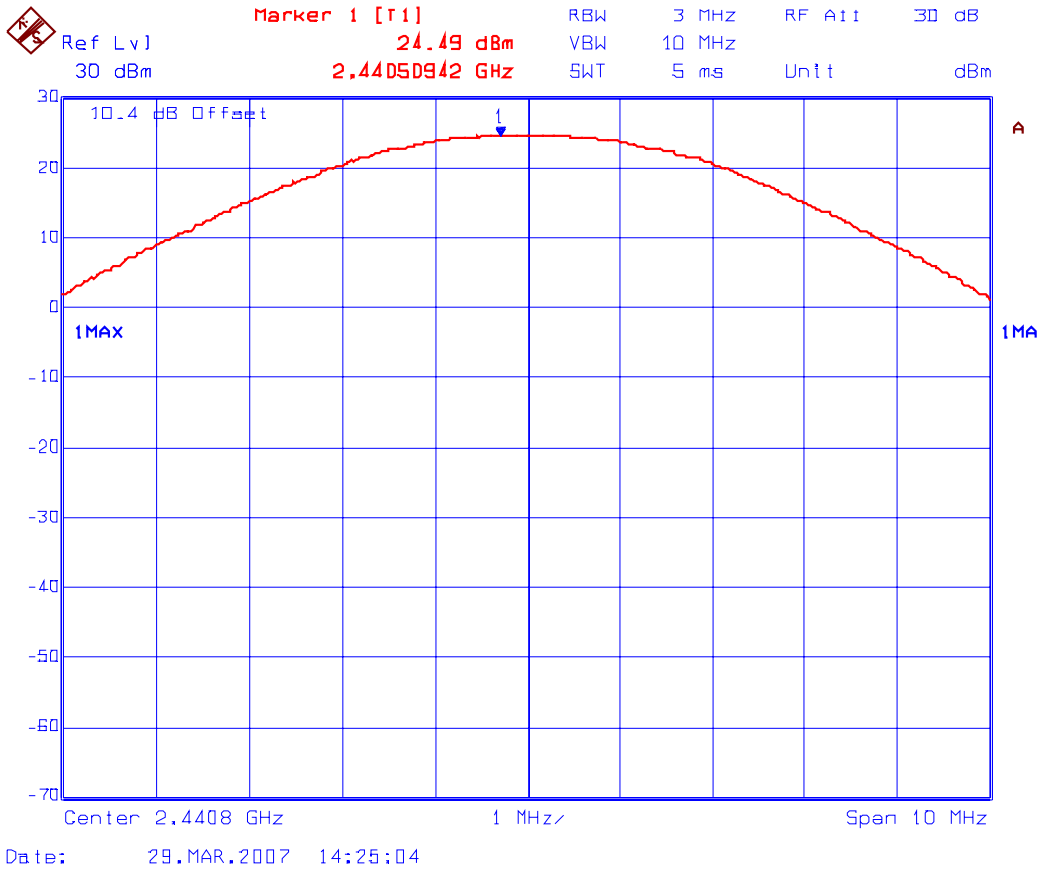
Frequency (MHz)	Channel	Peak Power (dBm)	Limit (dBm)
2401.056	0	24.15	30
2440.800	46	24.49	30
2479.680	91	24.49	30

See the following plots for detailed measurements.

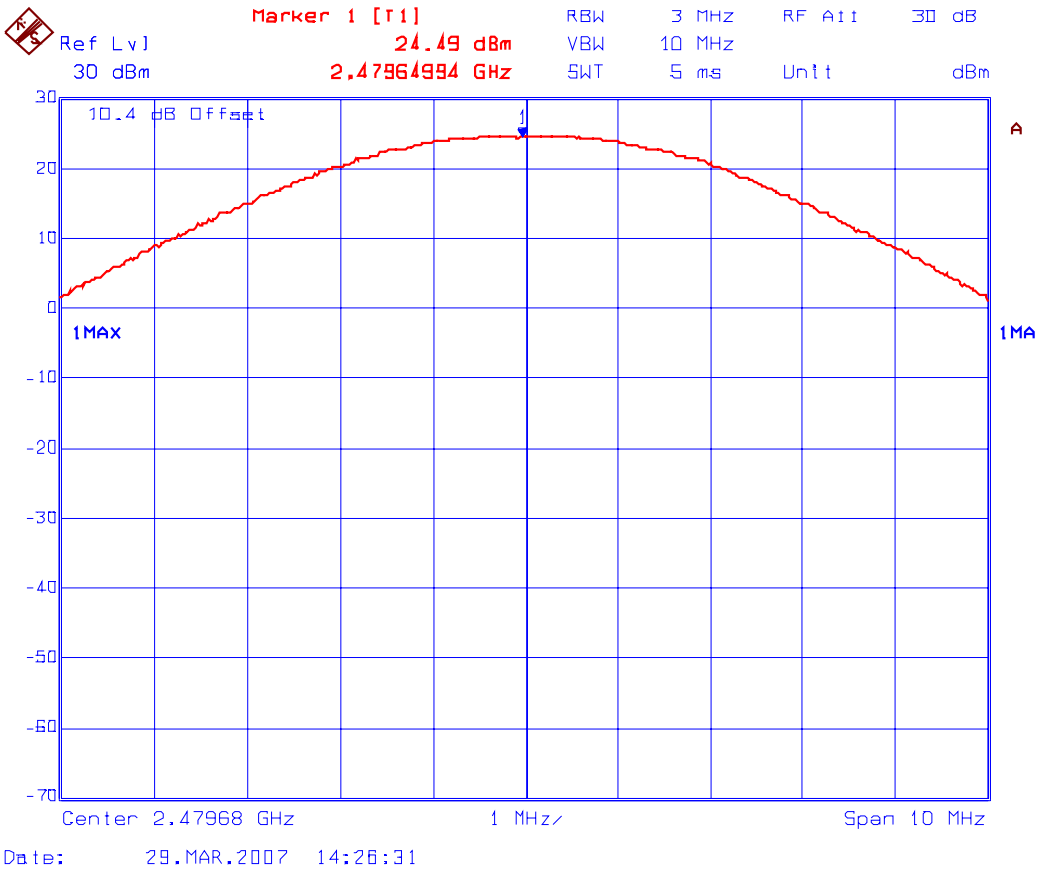
Plot 5.7.5.2.1. Peak Power Output
Test Frequency: 2401.056 MHz



Plot 5.7.5.2.2. Peak Power Output
Test Frequency: 2440.800 MHz



Plot 5.7.5.2.3. Peak Power Output
Test Frequency: 2479.680 MHz



5.8. TRANSMITTER BAND-EDGE & SPURIO CONDUCTED EMISSIONS [§ 15.247(d)]

5.8.1. Limits

FCC 15.247 (d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

47 CFR 15.205(a) - Restricted Bands of Operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(2)
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

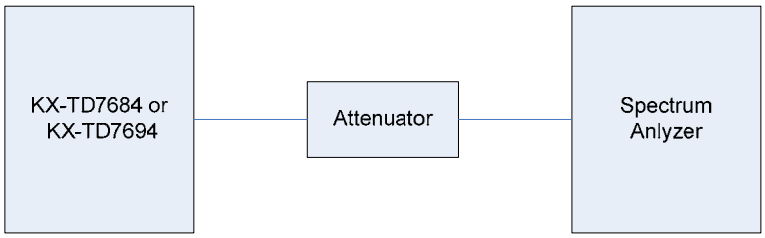
47 CFR 15.209(a) - Radiated emission limits, general requirements

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.		

5.8.2. Method of Measurements

Refer to Ultratech Test Procedures, Files # ULTR P002-2004 or ULTR P003-2004 and ANSI C63.4 for measurement methods

5.8.3. Test Arrangement



5.8.4. Test Equipment List

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer	Rhode & Schwarz	FSEK20/B4/B21	834157/005	9kHz - 40GHz
High Pass Filter	K & L	11SH10-15001T8000	2	1 - 18 GHz
Attenuator	Weinschel Corp.	46-20-34	BM0653	DC -18GHz

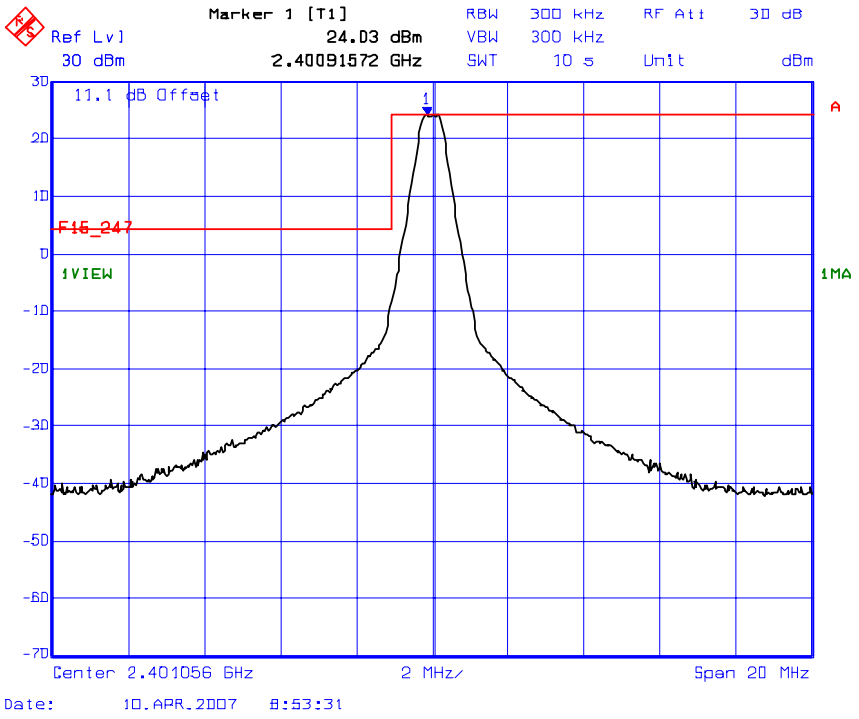
5.8.5. Test Data

5.8.5.1. Band-Edge RF Conducted Emissions

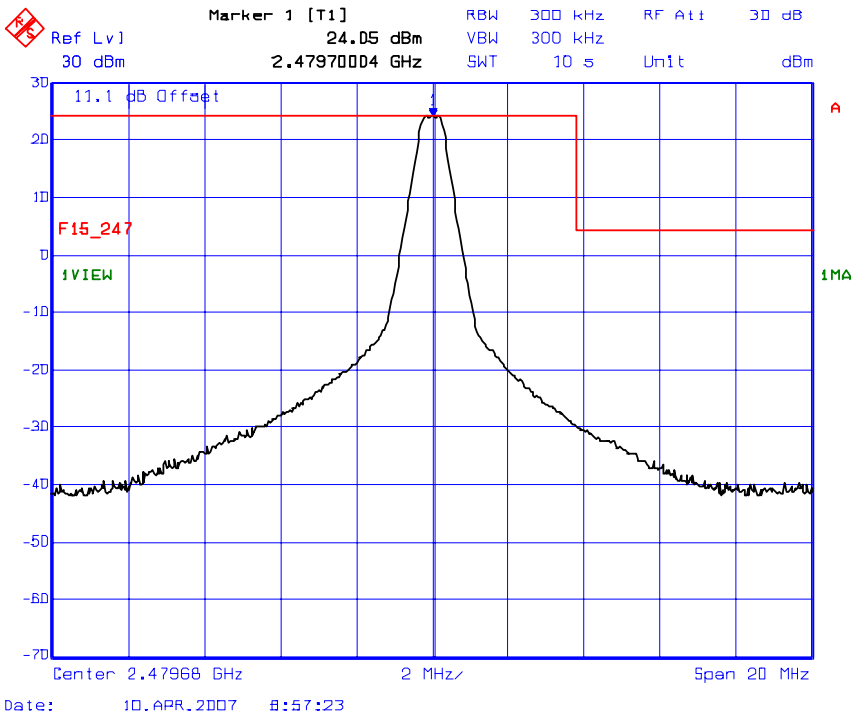
5.8.5.1.1. KX-TD7684

See the following test data plots for measurement results:

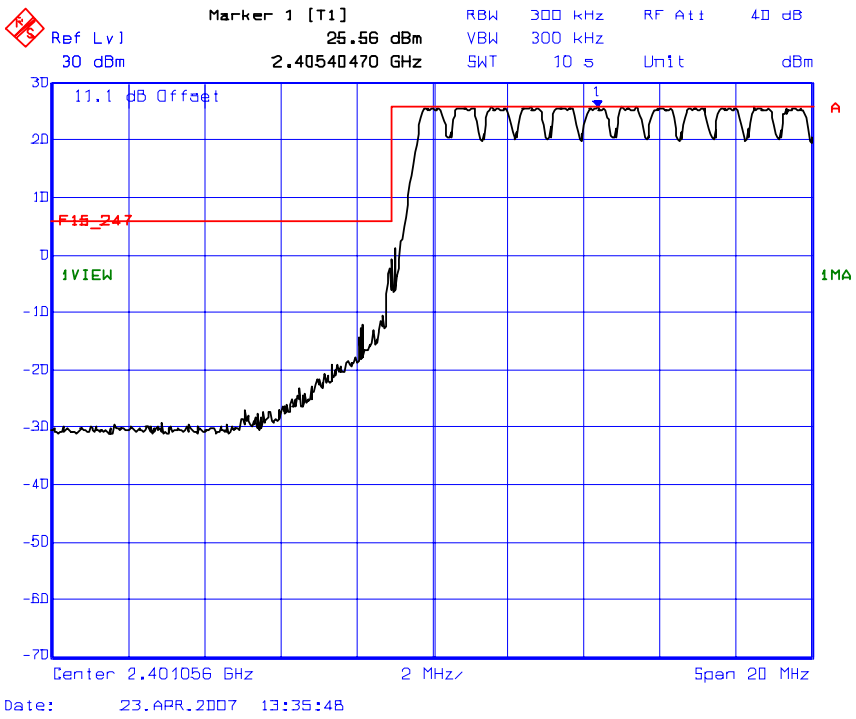
Plot 5.8.5.1.1.1.
Band-Edge RF Conducted Emissions
Low end of frequency band
Single frequency mode



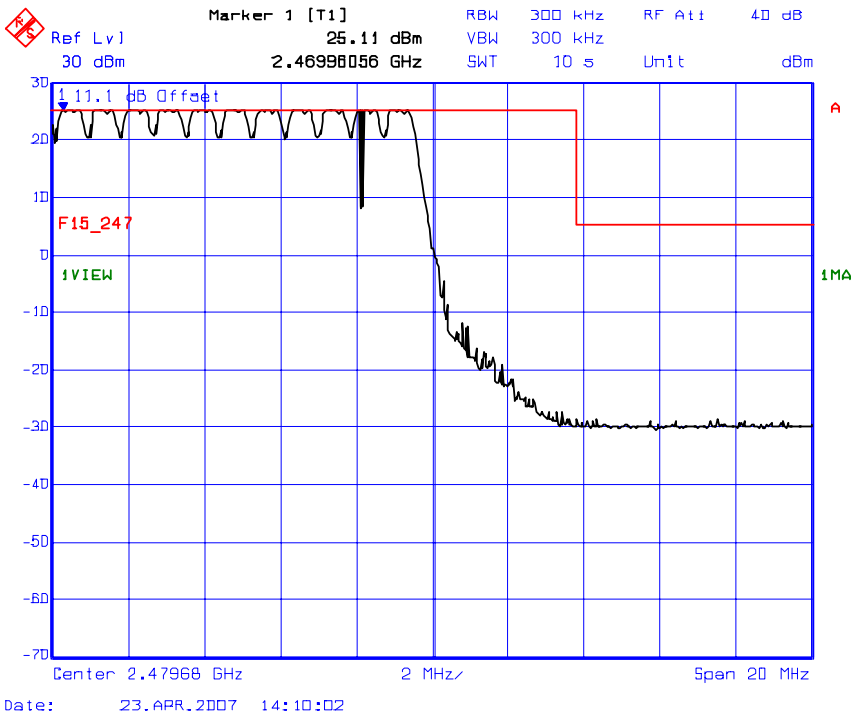
Plot 5.8.5.1.1.2.
Band-Edge RF Conducted Emissions
High end of frequency band
Single frequency mode



Plot 5.8.5.1.1.3.
Band-Edge RF Conducted Emissions
Low end of frequency band
Frequency hopping mode



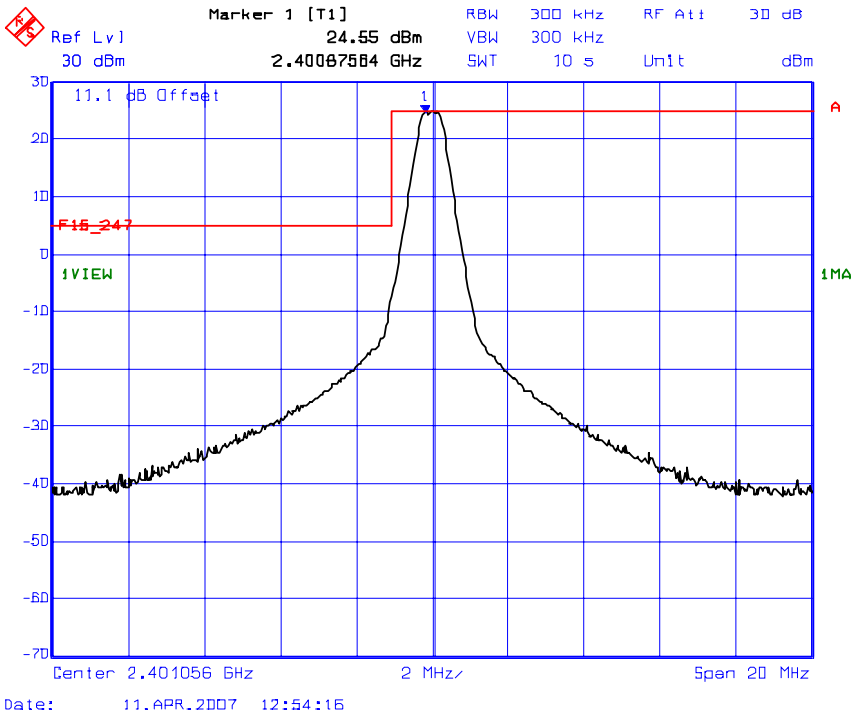
Plot 5.8.5.1.1.4.
Band-Edge RF Conducted Emissions
High end of frequency band
Frequency hopping mode



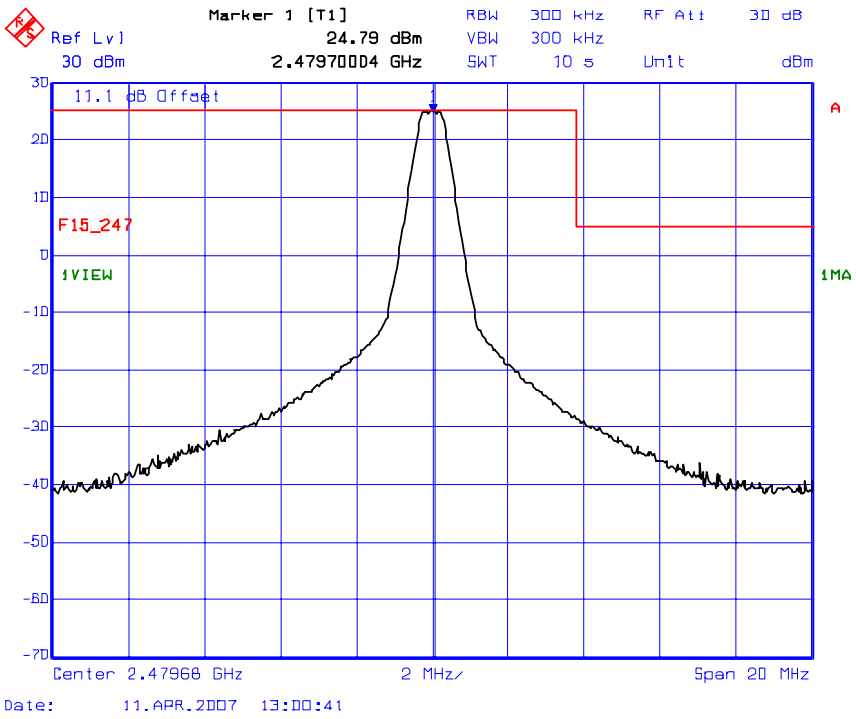
5.8.5.1.2. KX-TD7694

See the following test data plots for measurement results:

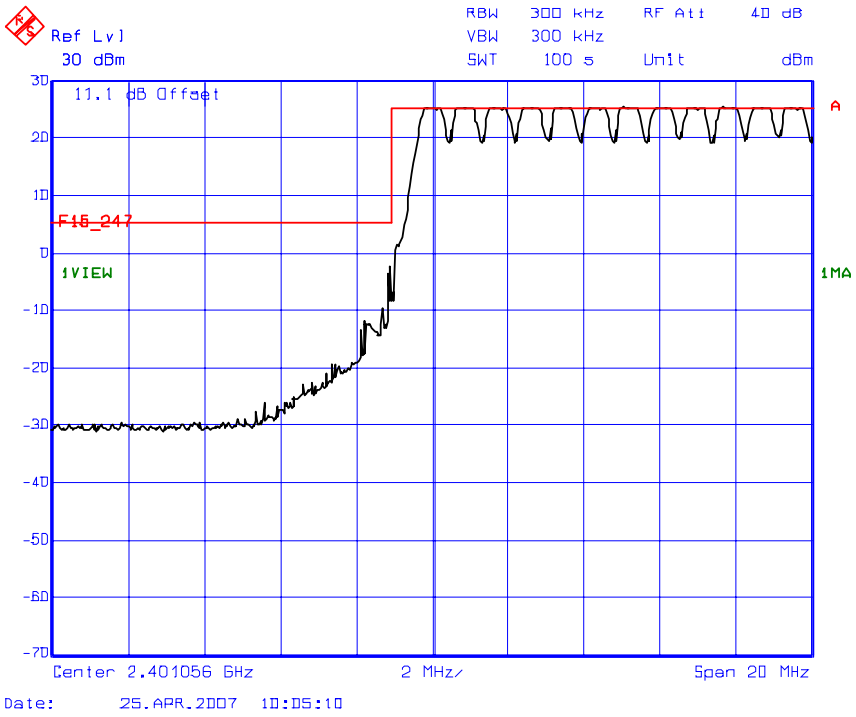
Plot 5.8.5.1.2.1.
Band-Edge RF Conducted Emissions
Low end of frequency band
Single frequency mode



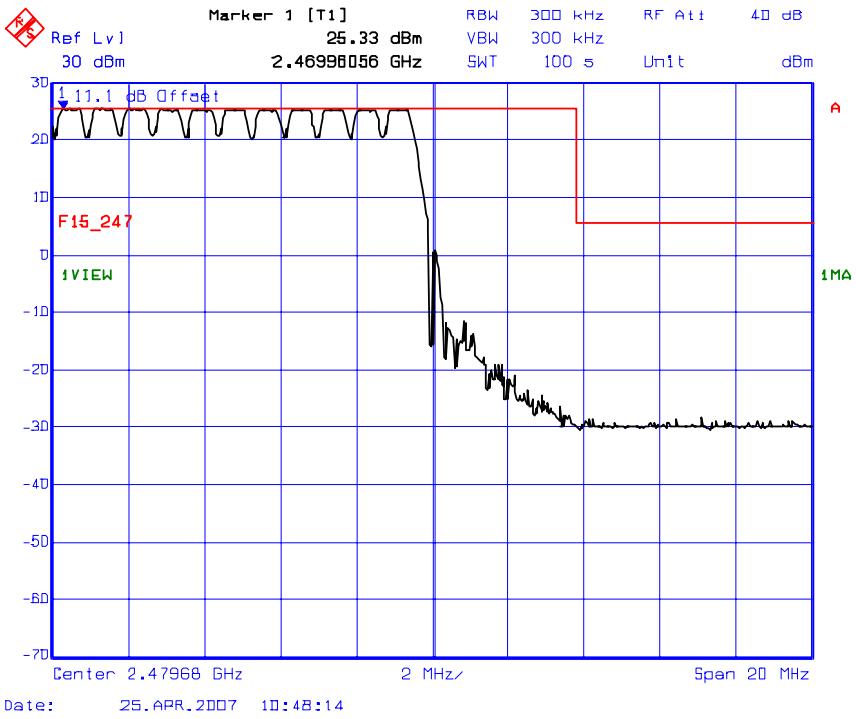
Plot 5.8.5.1.2.2.
Band-Edge RF Conducted Emissions
High end of frequency band
Single frequency mode



Plot 5.8.5.1.2.3.
Band-Edge RF Conducted Emissions
Low end of frequency band
Frequency hopping mode



Plot 5.8.5.1.2.4.
Band-Edge RF Conducted Emissions
High end of frequency band
Frequency hopping mode

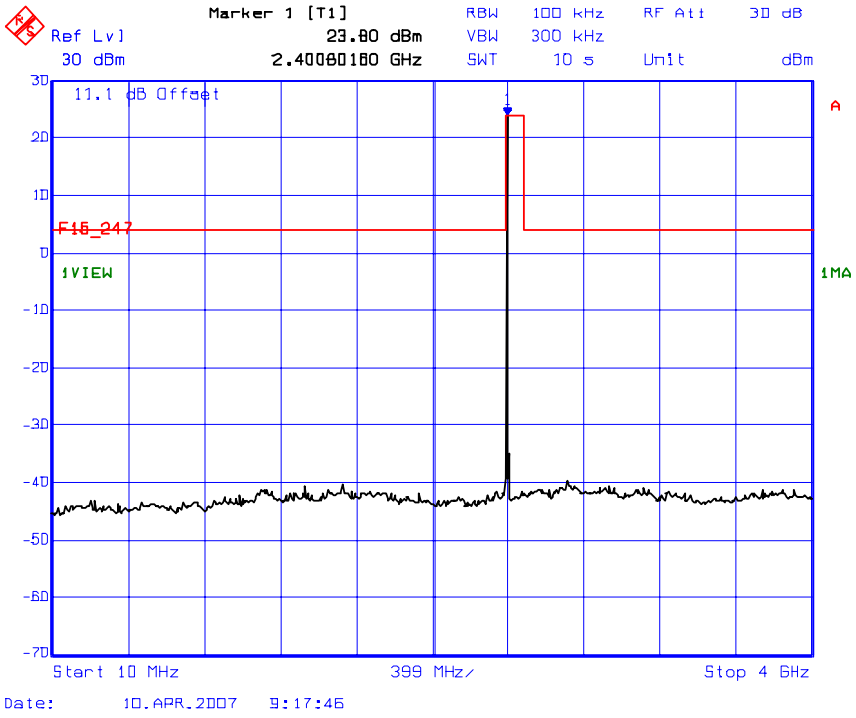


5.8.5.2. Spurious RF Conducted Emissions

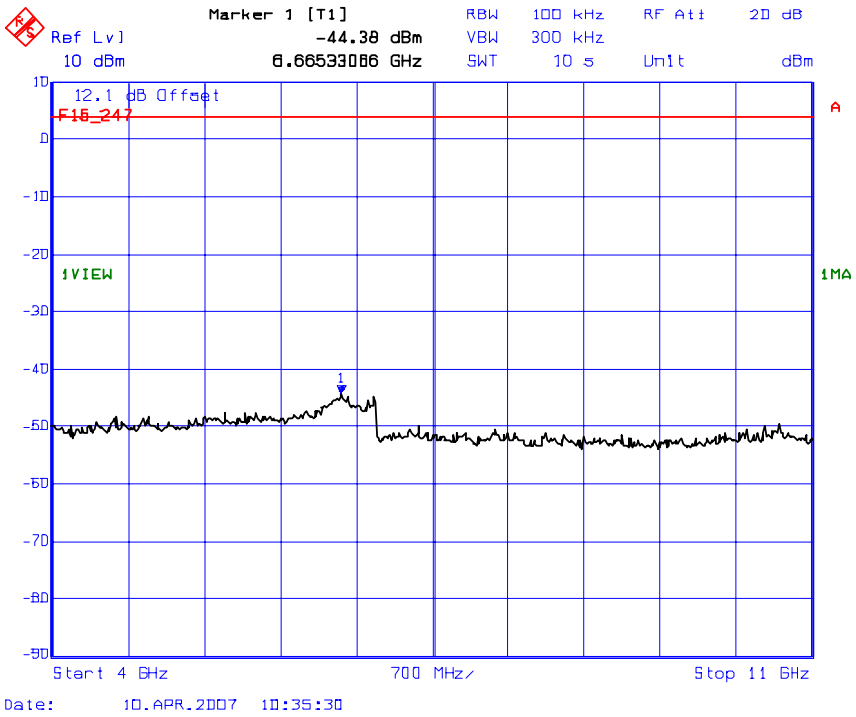
5.8.5.2.1. KX-TD7684

The Emissions were scanned from 10 MHz to 25 GHz

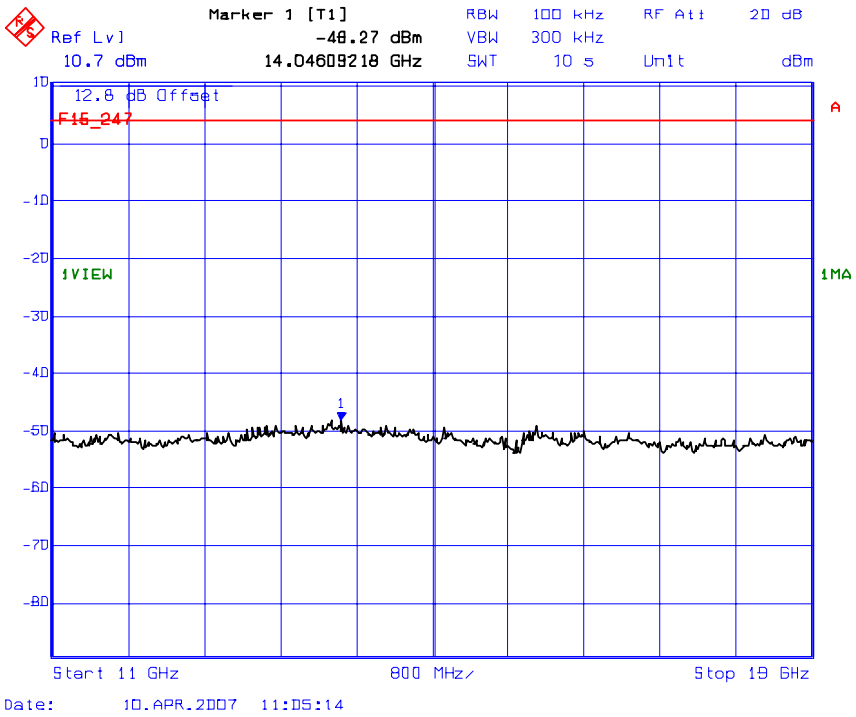
Plot 5.8.5.2.1.1.
Spurious RF Conducted Emissions
Transmitter frequency: 2401.056 MHz at maximum power setting



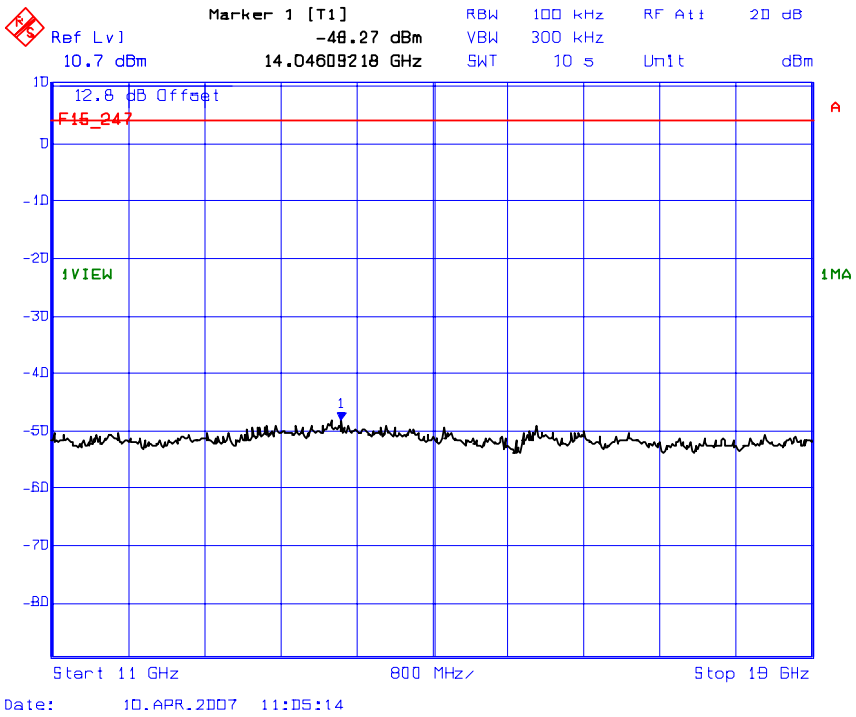
Plot 5.8.5.2.1.2.
Spurious RF Conducted Emissions
Transmitter frequency: 2401.056 MHz at maximum power setting



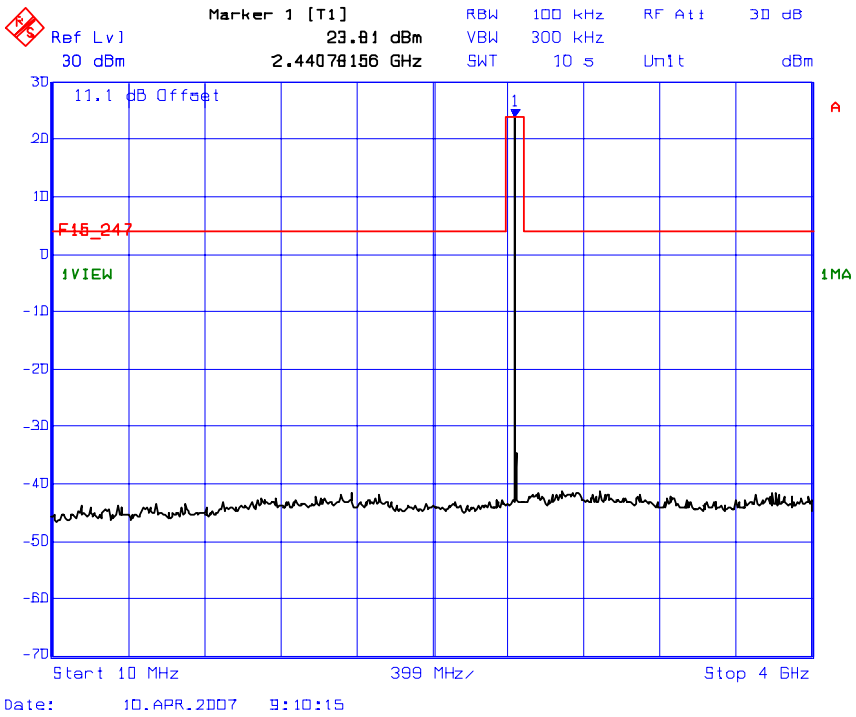
Plot 5.8.5.2.1.3.
Spurious RF Conducted Emissions
Transmitter frequency: 2401.056 MHz at maximum power setting



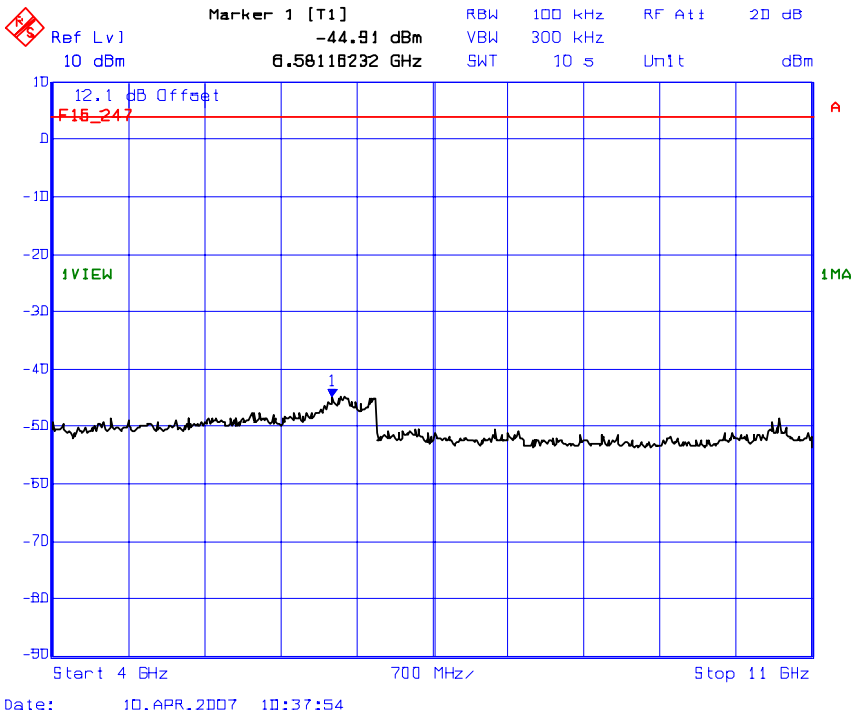
Plot 5.8.5.2.1.4.
Spurious RF Conducted Emissions
Transmitter frequency: 2401.056 MHz at maximum power setting



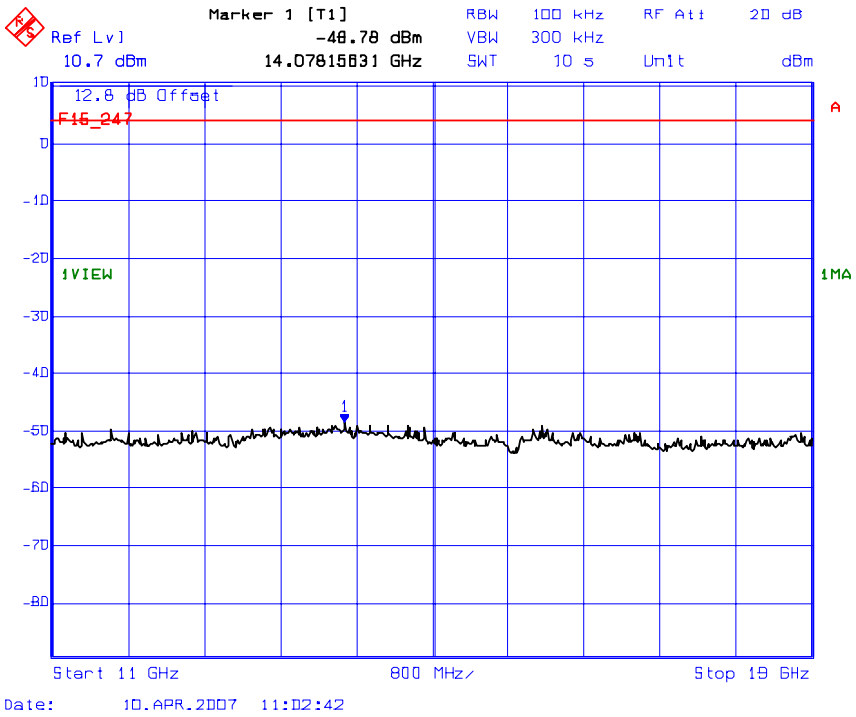
Plot 5.8.5.2.1.5.
Spurious RF Conducted Emissions
Transmitter frequency: 2440.800 MHz at maximum power setting



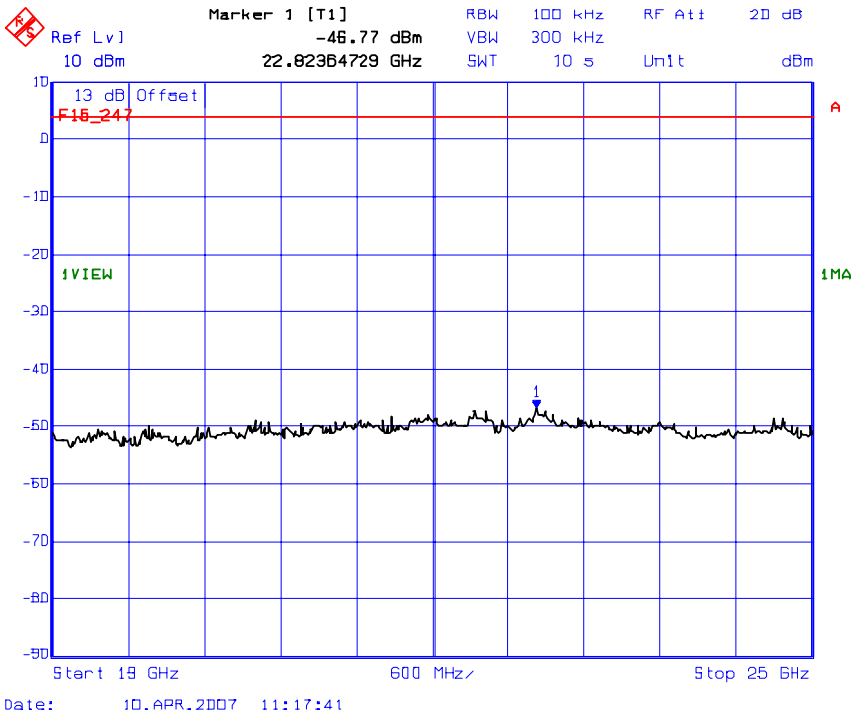
Plot 5.8.5.2.1.6.
Spurious RF Conducted Emissions
Transmitter frequency: 2440.800 MHz at maximum power setting



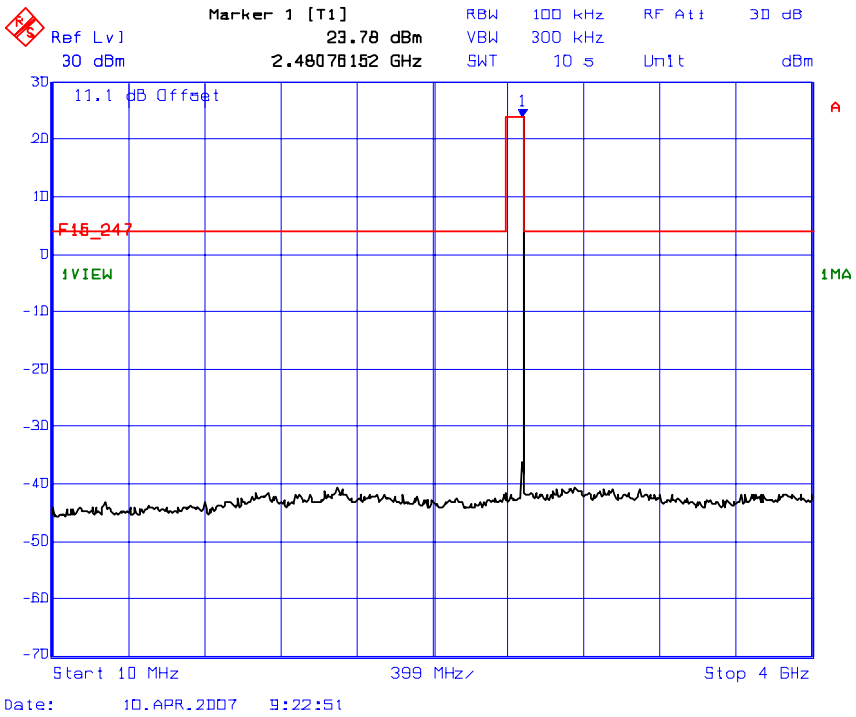
Plot 5.8.5.2.1.7.
Spurious RF Conducted Emissions
Transmitter frequency: 2440.800 MHz at maximum power setting



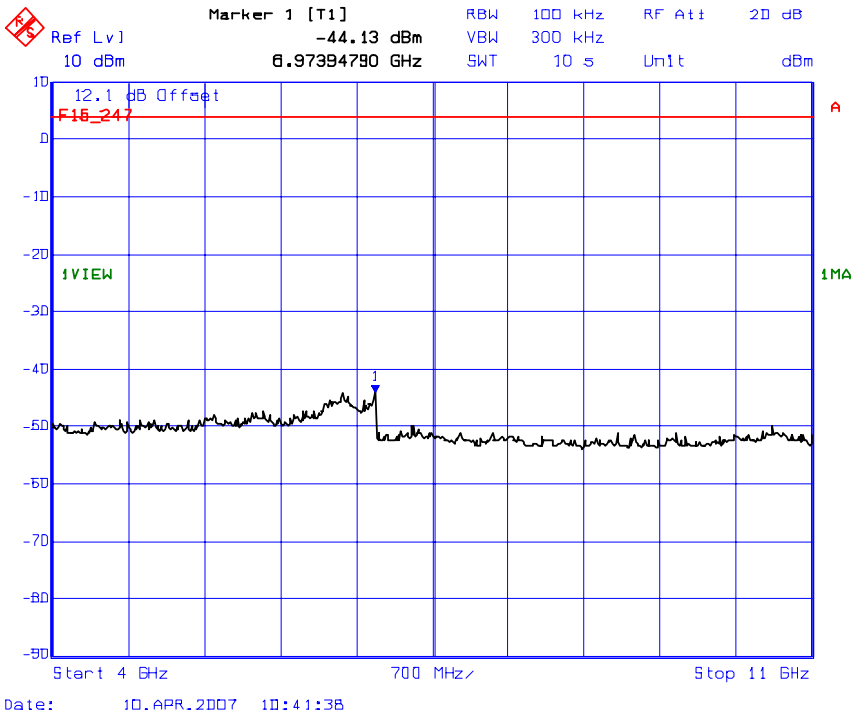
Plot 5.8.5.2.1.8.
Spurious RF Conducted Emissions
Transmitter frequency: 2440.800 MHz at maximum power setting



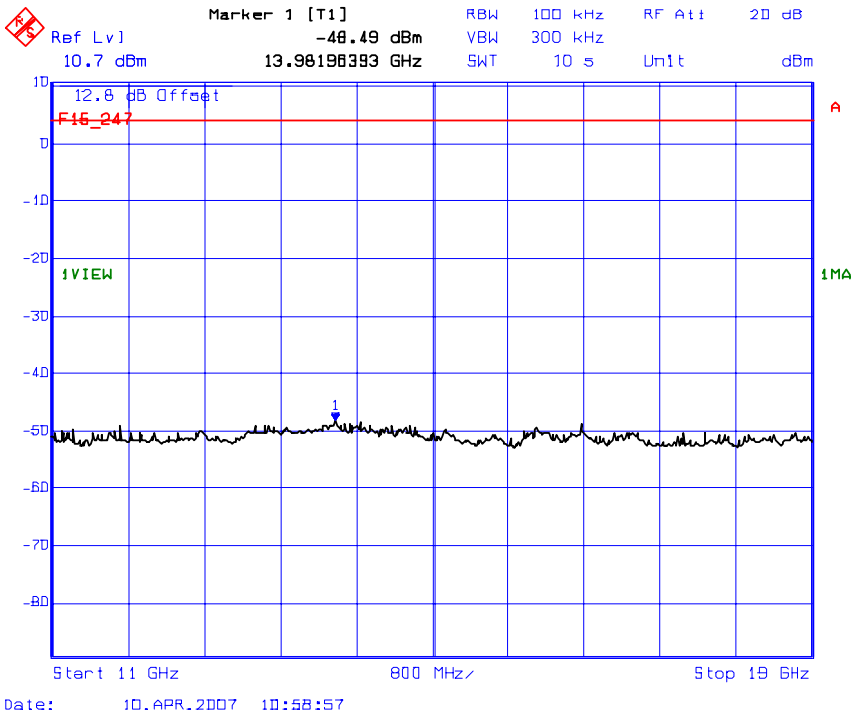
Plot 5.8.5.2.1.9.
Spurious RF Conducted Emissions
Transmitter frequency: 2479.680 MHz at maximum power setting



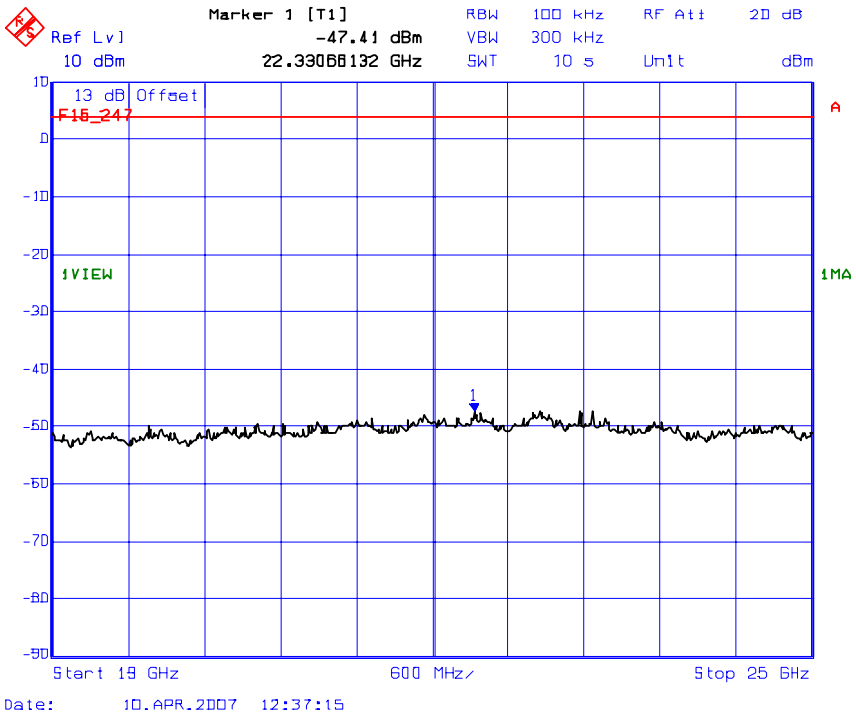
Plot 5.8.5.2.1.10.
Spurious RF Conducted Emissions
Transmitter frequency: 2479.680 MHz at maximum power setting



Plot 5.8.5.2.1.11.
Spurious RF Conducted Emissions
Transmitter frequency: 2479.680 MHz at maximum power setting



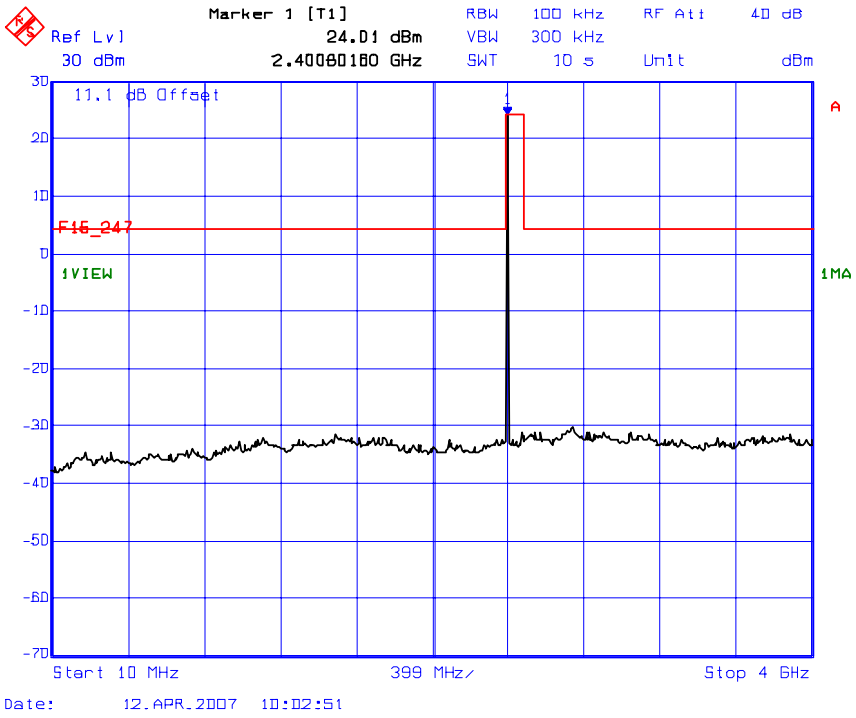
Plot 5.8.5.2.1.12.
Spurious RF Conducted Emissions
Transmitter frequency: 2479.680 MHz at maximum power setting



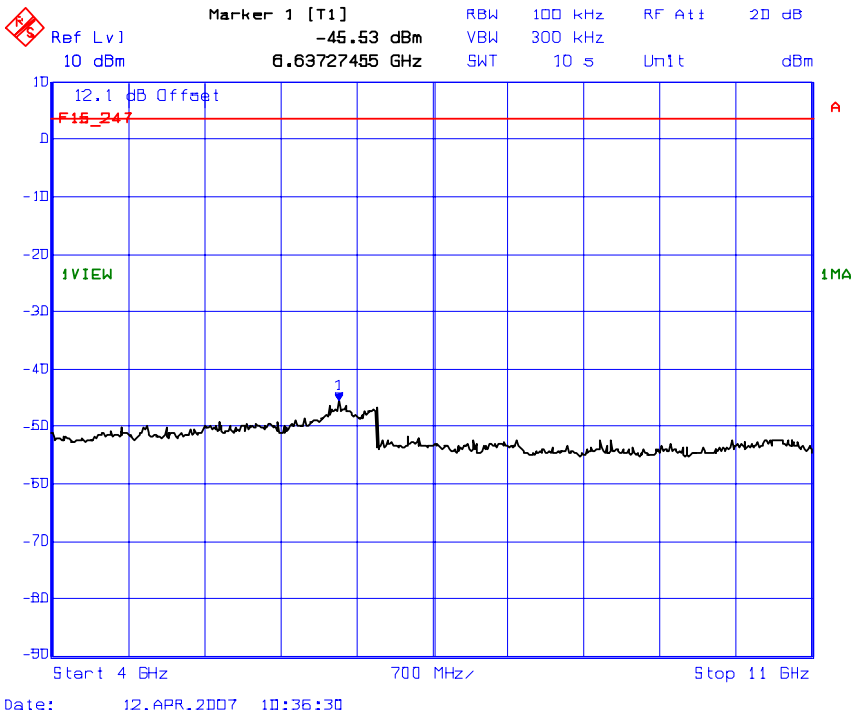
5.8.5.2.2. KX-TD7694

The Emissions were scanned from 10 MHz to 25 GHz

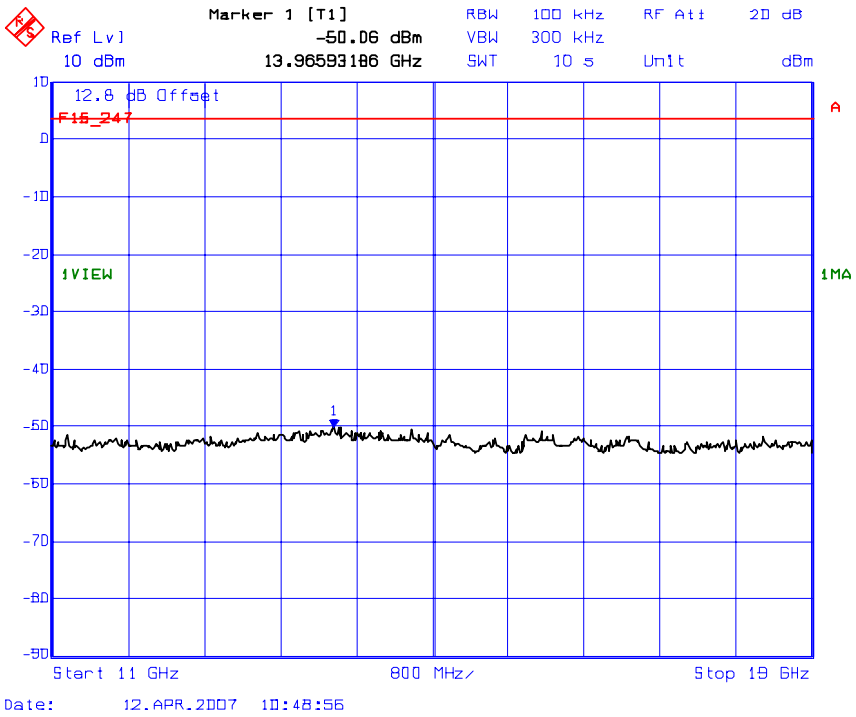
Plot 5.8.5.2.2.1.
Spurious RF Conducted Emissions
Transmitter frequency: 2401.056 MHz at maximum power setting



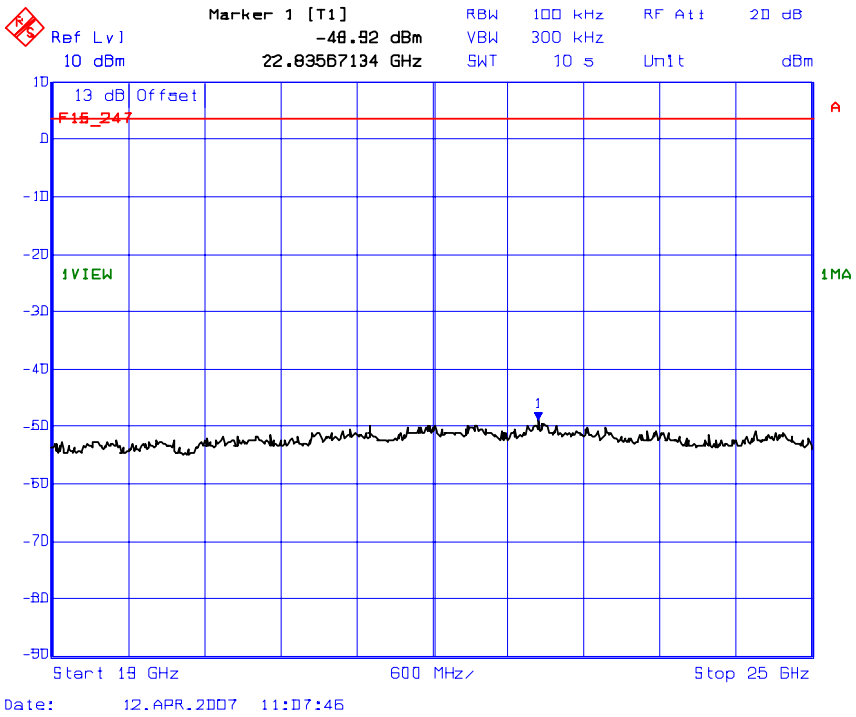
Plot 5.8.5.2.2.2.
Spurious RF Conducted Emissions
Transmitter frequency: 2401.056 MHz at maximum power setting



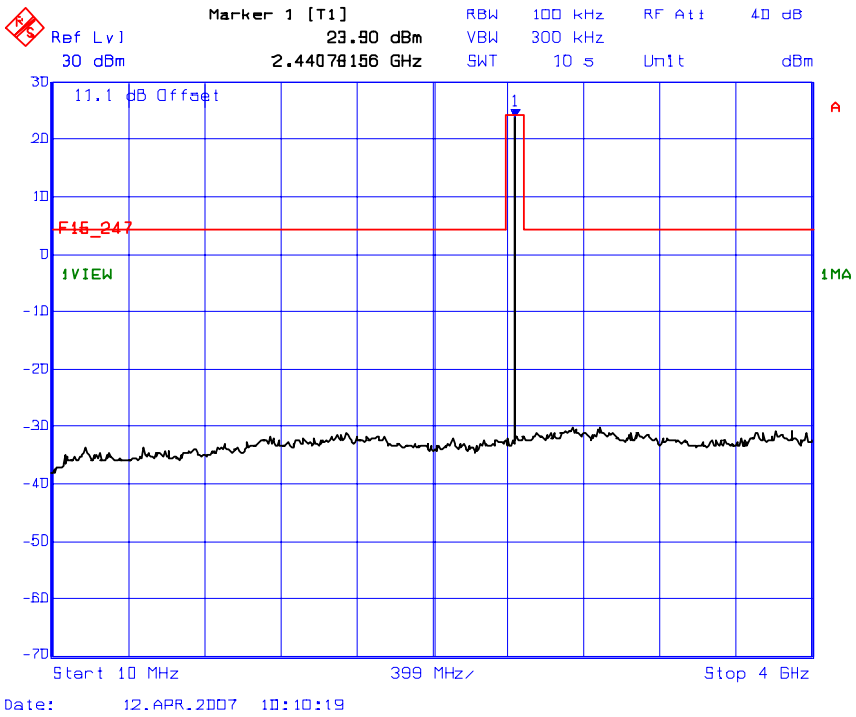
Plot 5.8.5.2.2.3.
Spurious RF Conducted Emissions
Transmitter frequency: 2401.056 MHz at maximum power setting



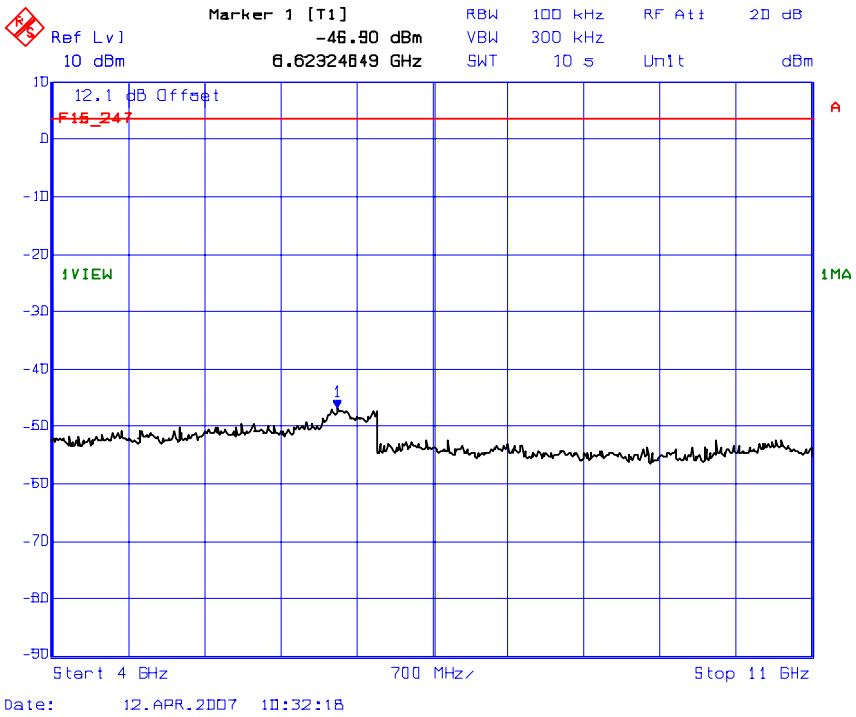
Plot 5.8.5.2.2.4.
Spurious RF Conducted Emissions
Transmitter frequency: 2401.056 MHz at maximum power setting



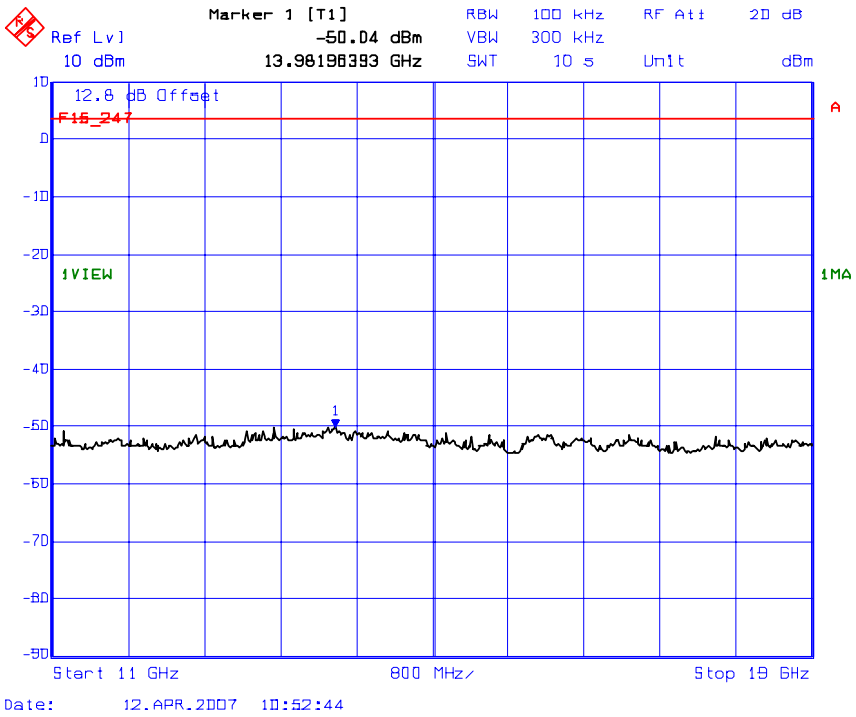
Plot 5.8.5.2.2.5.
Spurious RF Conducted Emissions
Transmitter frequency: 2440.800 MHz at maximum power setting



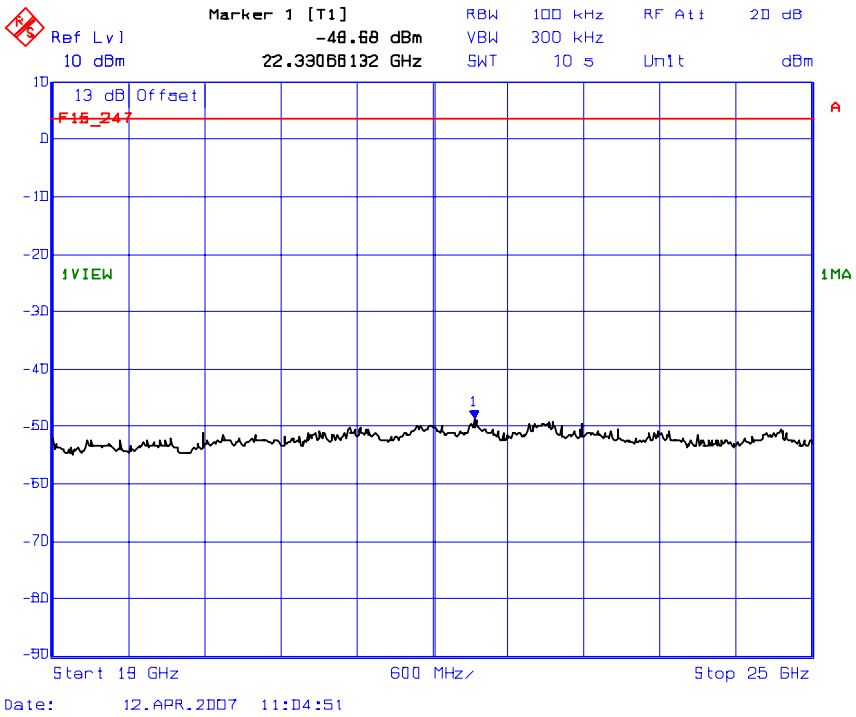
Plot 5.8.5.2.2.6.
Spurious RF Conducted Emissions
Transmitter frequency: 2440.800 MHz at maximum power setting



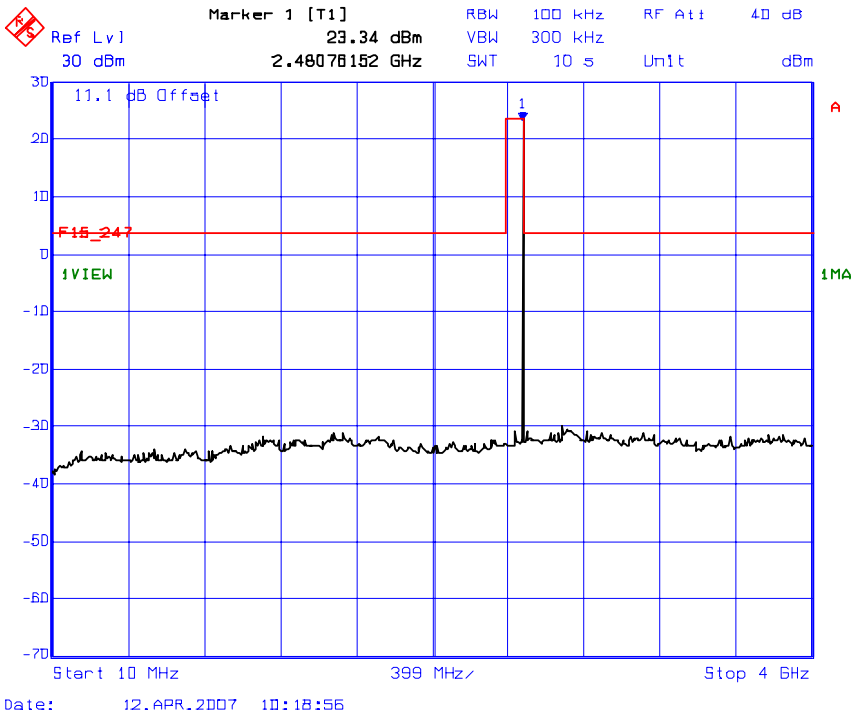
Plot 5.8.5.2.2.7.
Spurious RF Conducted Emissions
Transmitter frequency: 2440.800 MHz at maximum power setting



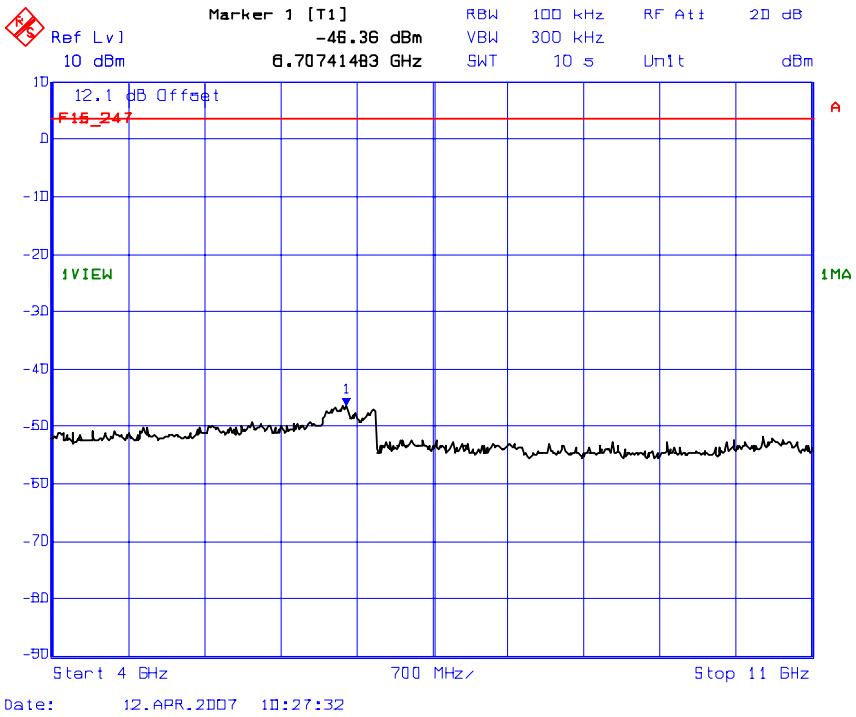
Plot 5.8.5.2.2.8.
Spurious RF Conducted Emissions
Transmitter frequency: 2440.800 MHz at maximum power setting



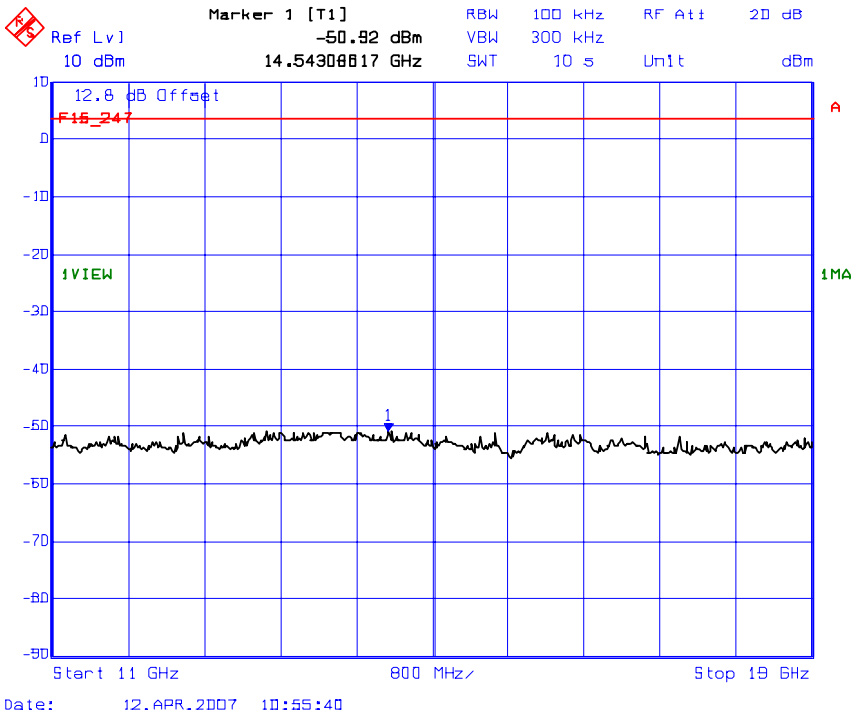
Plot 5.8.5.2.2.9.
Spurious RF Conducted Emissions
Transmitter frequency: 2479.680 MHz at maximum power setting



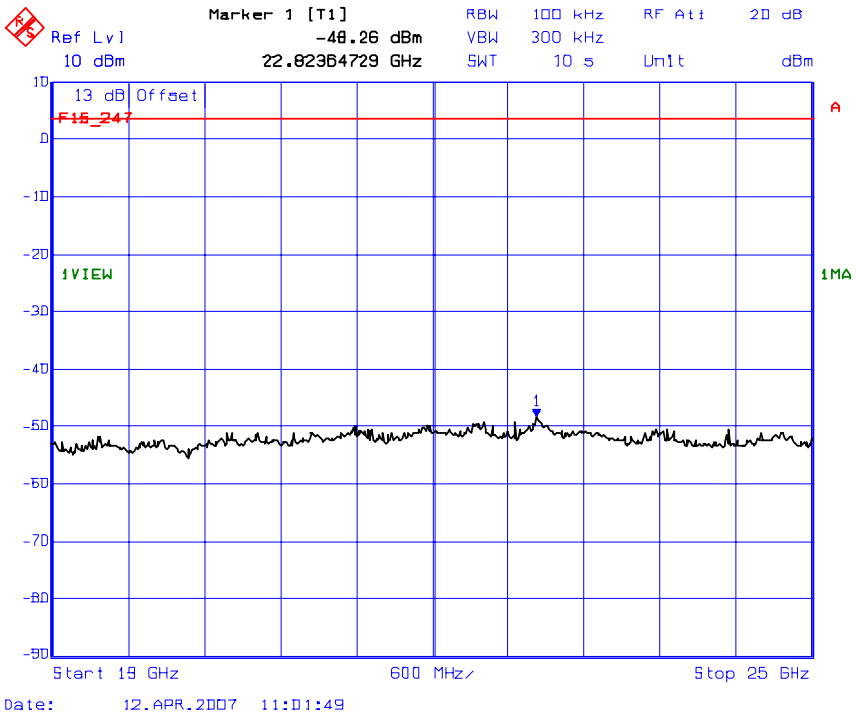
Plot 5.8.5.2.2.10.
Spurious RF Conducted Emissions
Transmitter frequency: 2479.680 MHz at maximum power setting



Plot 5.8.5.2.2.11.
Spurious RF Conducted Emissions
Transmitter frequency: 2479.680 MHz at maximum power setting



Plot 5.8.5.2.2.12.
Spurious RF Conducted Emissions
Transmitter frequency: 2479.680 MHz at maximum power setting



5.9. SPURIOUS RADIATED EMISSIONS @ 3 METERS [§ 15.247(d), §15.209 & §15.205]

5.9.1. Limits

FCC 15.247 (d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

47 CFR 15.205(a) - Restricted Bands of Operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(2)
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

47 CFR 15.209(a) - Radiated emission limits, general requirements

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.		

5.9.2. Method of Measurements

Refer to Ultratech Test Procedures, Files # ULTR P002-2004 or ULTR P003-2004 and ANSI C63.4 for measurement methods

5.9.3. Test Arrangement

Refer to Section 2.6 of this test report for test setup.

5.9.4. Test Equipment List

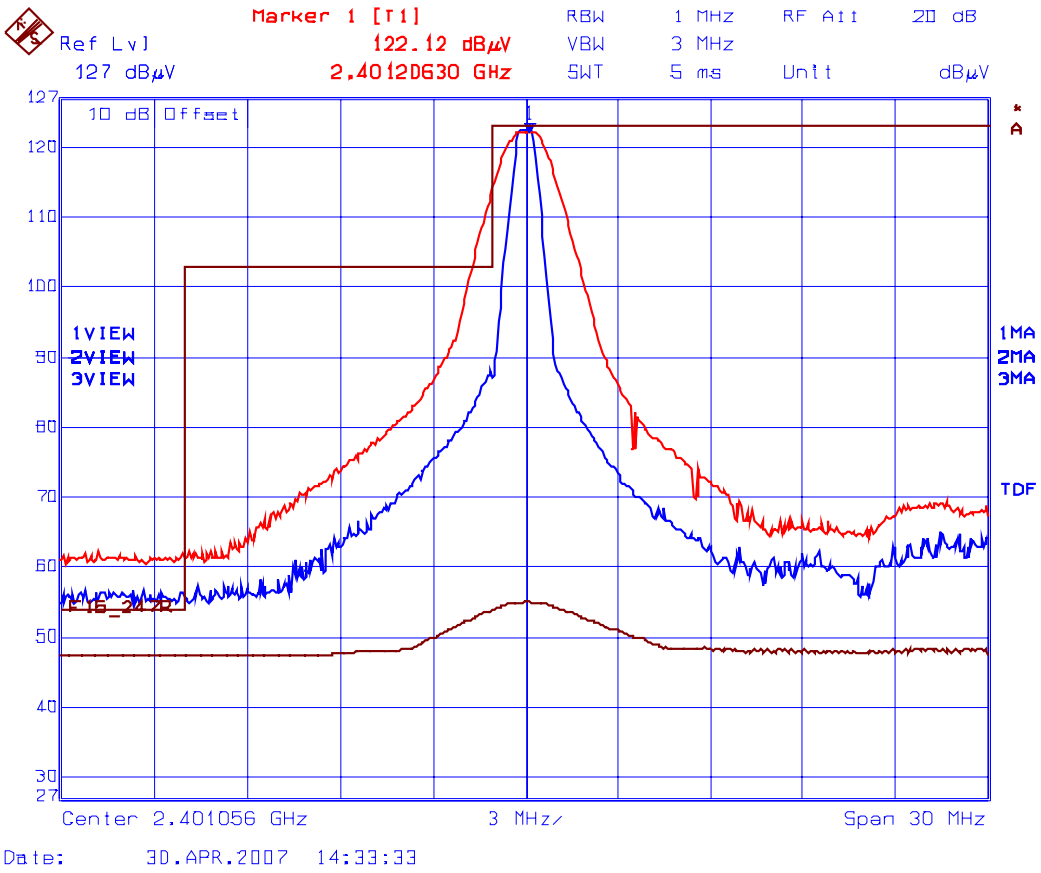
Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer/ EMI Receiver	Rohde & Schwarz	FSEK20/B4/B21	834157/005	9 kHz – 40 GHz with external mixer
Microwave Amplifier	Hewlett Packard	HP 83017A		1 GHz to 26.5 GHz
Biconilog Antenna	EMCO	3143	1029	20 MHz to 2 GHz
Horn Antenna	EMCO	3155	9701-5061	1 GHz – 18 GHz
Horn Antenna	EMCO	3160-09	..	18 GHz – 26.5 GHz
Horn Antenna	EMCO	3160-10	..	26.5 GHz – 40 GHz
Mixer	Tektronix	118-0098-00	..	18 GHz – 26.5 GHz
Mixer	Tektronix	119-0098-00	..	26.5 GHz – 40 GHz

5.9.5. Test Data

5.9.5.1. Band-edge Radiated Emissions

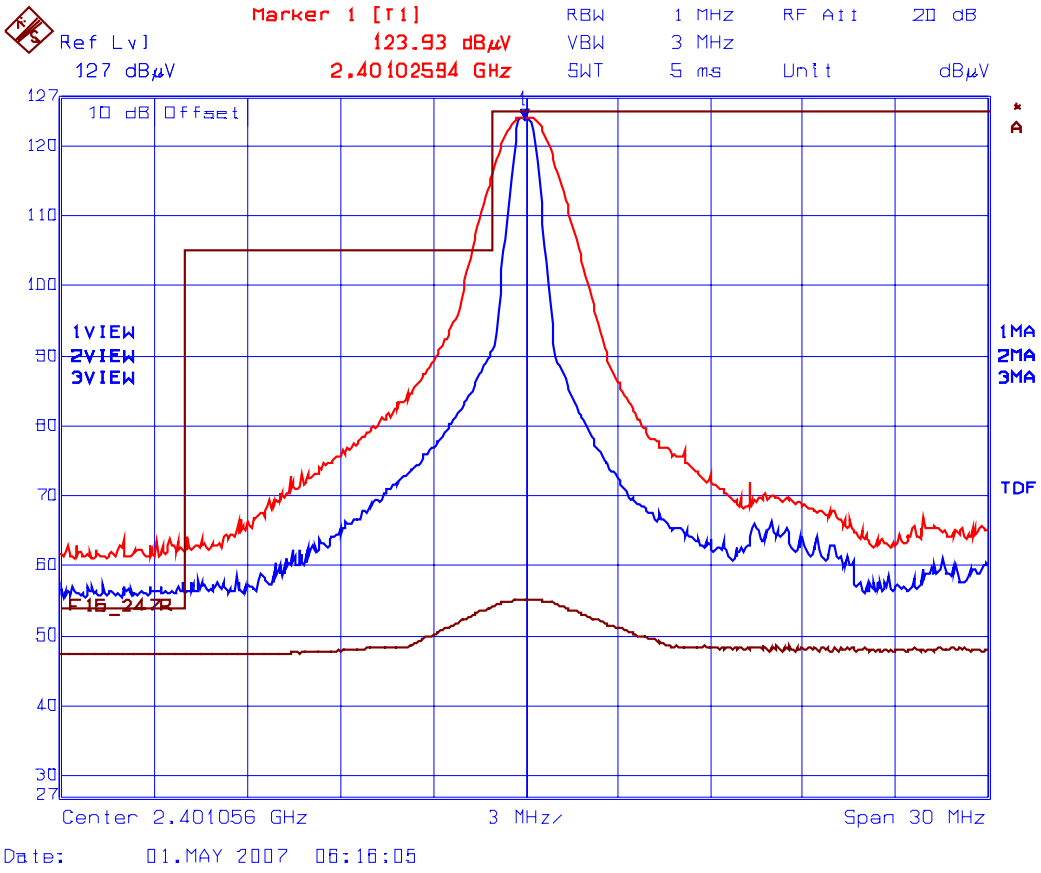
5.9.5.1.1. KX-TD7684

Plot 5.9.5.1.1.1. Band-Edge Radiated Emissions @ 3 meters
Vertical Polarization, Low End of Frequency Band, Single Frequency Mode



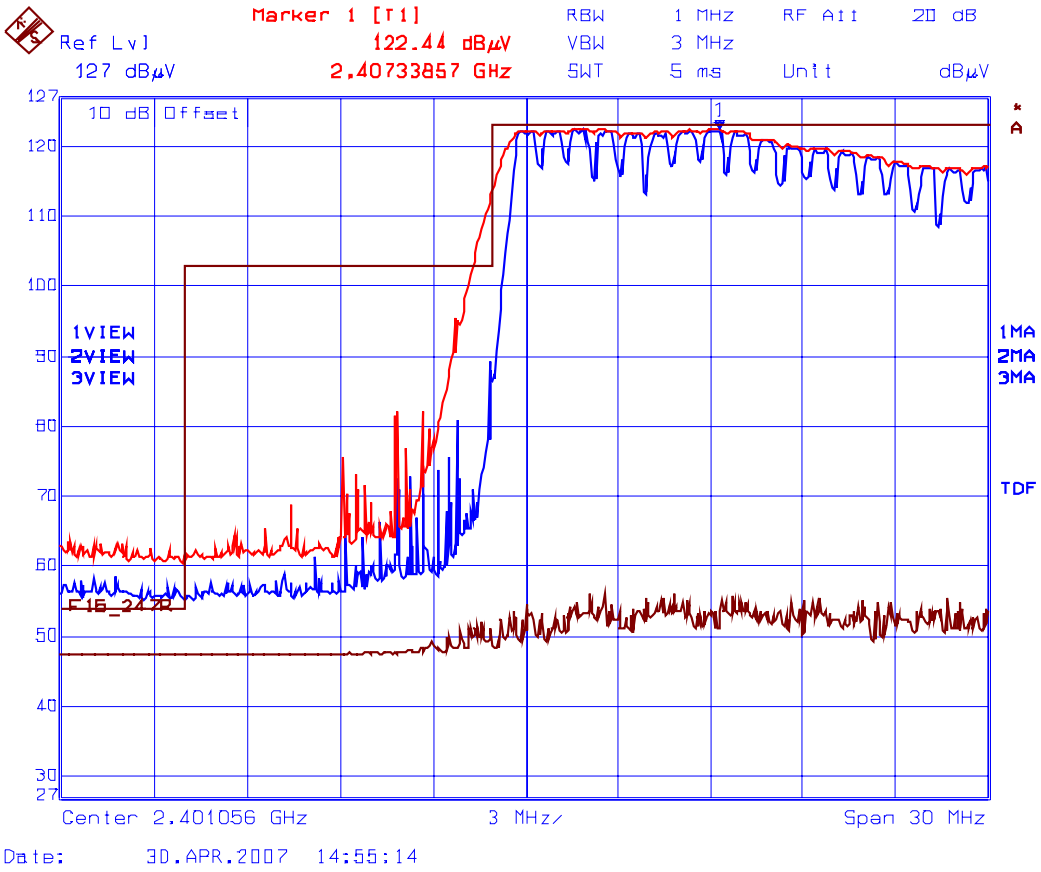
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz
Trace 3: RBW= 1 MHz, VBW= 10 Hz

Plot 5.9.5.1.1.2. Band-Edge Radiated Emissions @ 3 meters
Horizontal Polarization Low End of Frequency Band, Single Frequency Mode



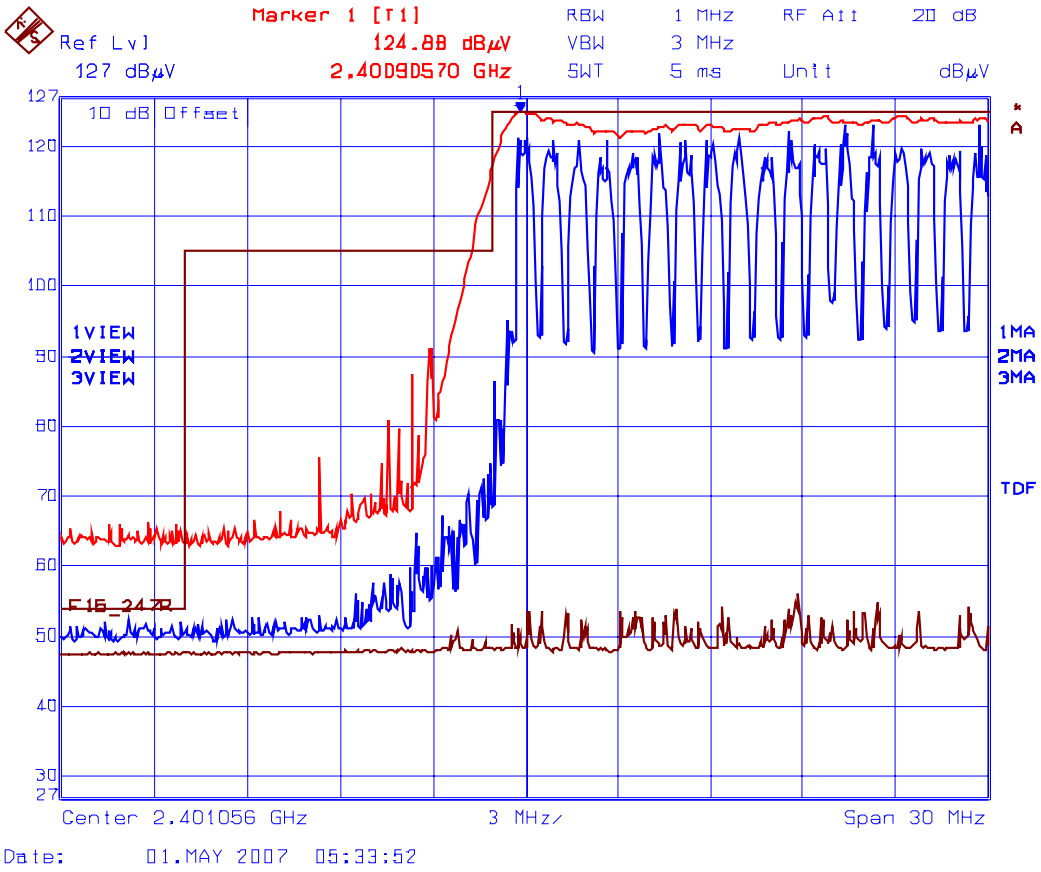
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz
Trace 3: RBW= 1 MHz, VBW= 10 Hz

Plot 5.9.5.1.1.3. Band-Edge Radiated Emissions @ 3 meters
Vertical Polarization Low End of Frequency Band, Pseudorandom Channel Hopping Mode



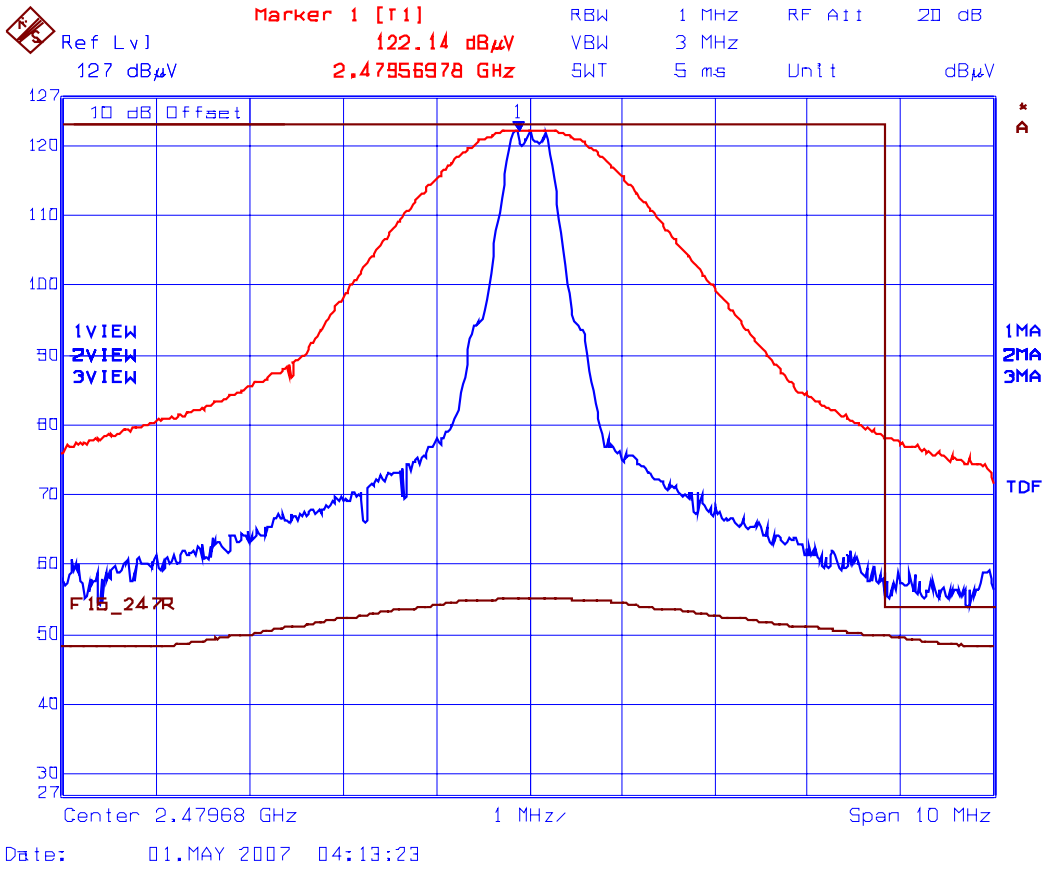
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz
Trace 3: RBW= 1 MHz, VBW= 10 Hz

Plot 5.9.5.1.1.4. Band-Edge Radiated Emissions @ 3 meters
Horizontal Polarization, Low End of Frequency Band, Pseudorandom Channel Hopping Mode



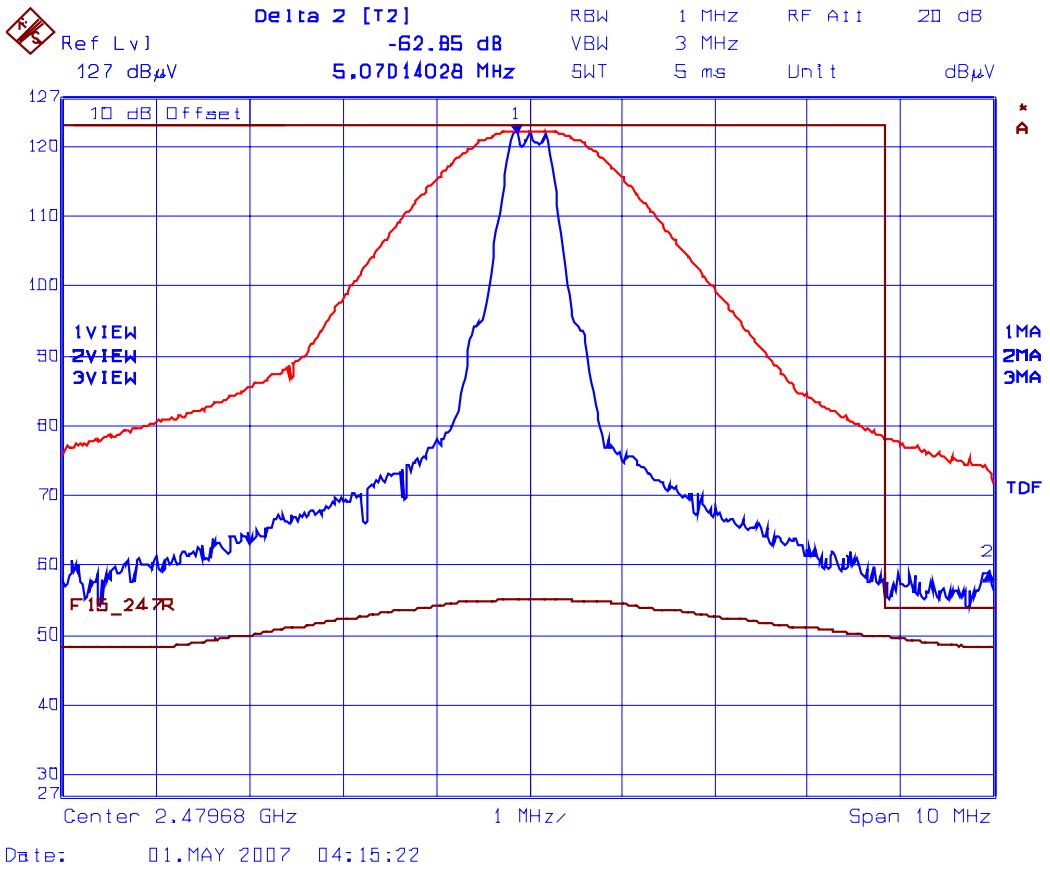
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz
Trace 3: RBW= 1 MHz, VBW= 10 Hz

Plot 5.9.5.1.1.5. Band-Edge Radiated Emissions @ 3 meters
Vertical Polarization, Upper End of Frequency Band, Single Frequency Mode



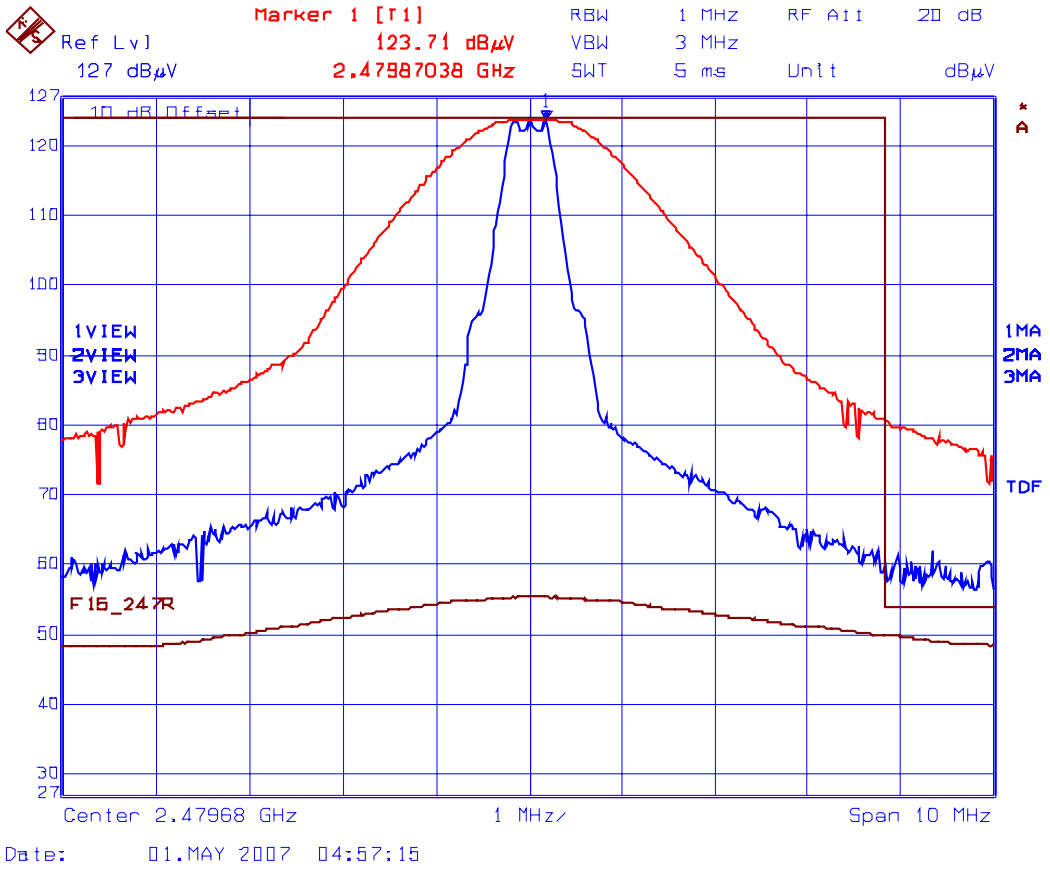
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz
Trace 3: RBW= 1 MHz, VBW= 10 Hz

Plot 5.9.5.1.1.6. Band-Edge Radiated Emissions @ 3 meters
Vertical Polarization, Upper End of Frequency Band, Single Frequency Mode



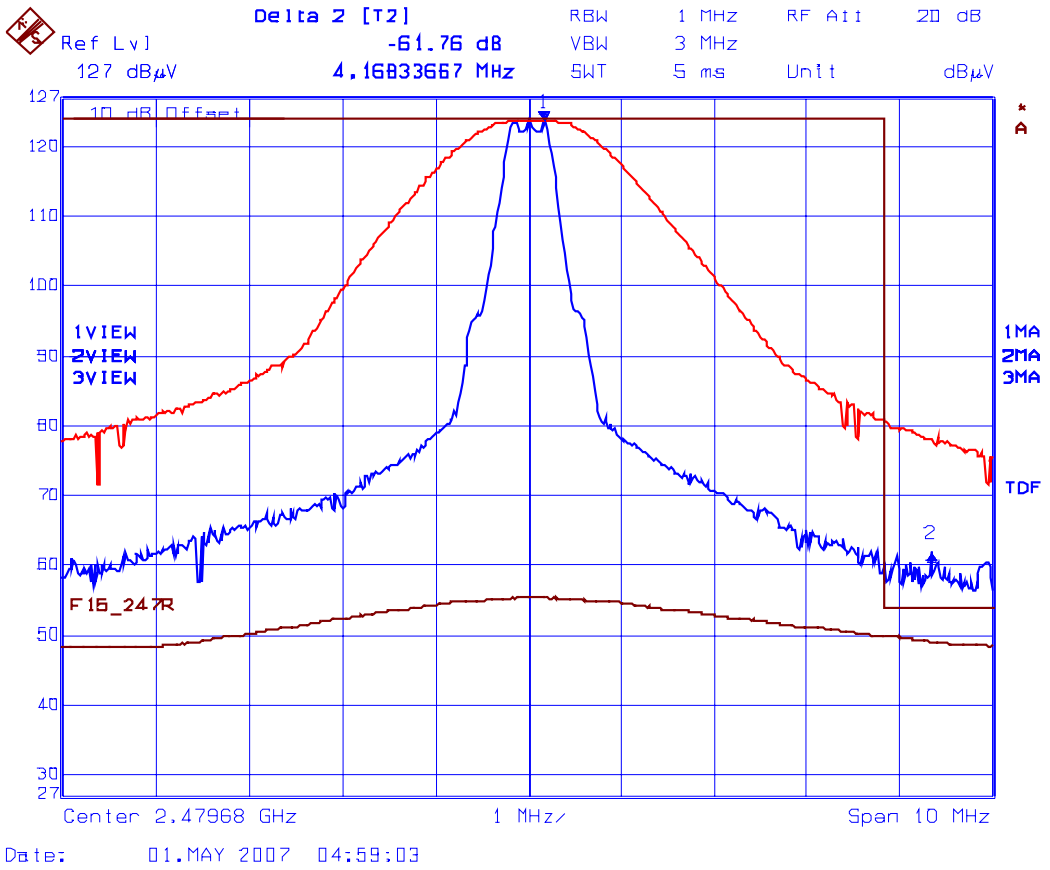
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz (Peak to Band-Edge): 62.85 dB
Trace 3: RBW= 1 MHz, VBW= 10 Hz
Band-Edge Level at 2483.5 MHz: 122.14dBuV/m – 62.85 dB= 59.29dBuV/m

Plot 5.9.5.1.1.7. Band-Edge Radiated Emissions @ 3 meters
Horizontal Polarization, Upper End of Frequency Band, Single Frequency Mode



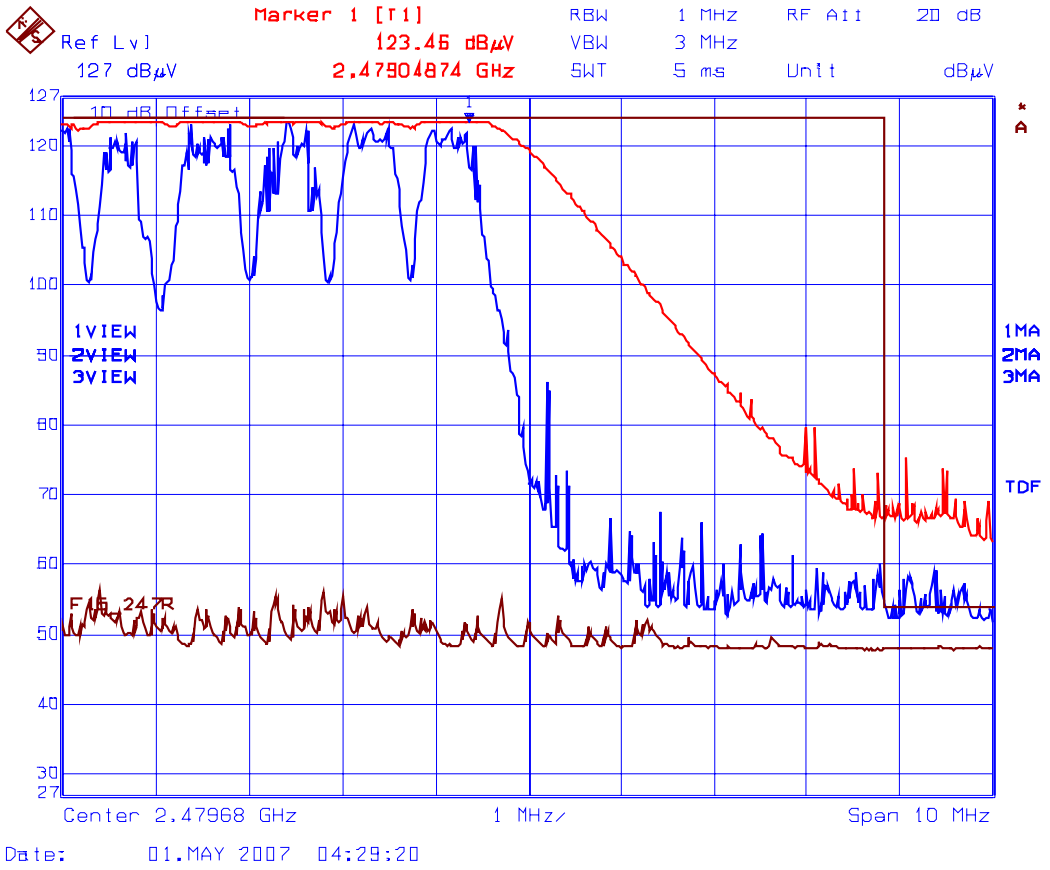
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz
Trace 3: RBW= 1 MHz, VBW= 10 Hz

Plot 5.9.5.1.1.8. Band-Edge Radiated Emissions @ 3 meters
Horizontal Polarization, Upper End of Frequency Band, Single Frequency Mode



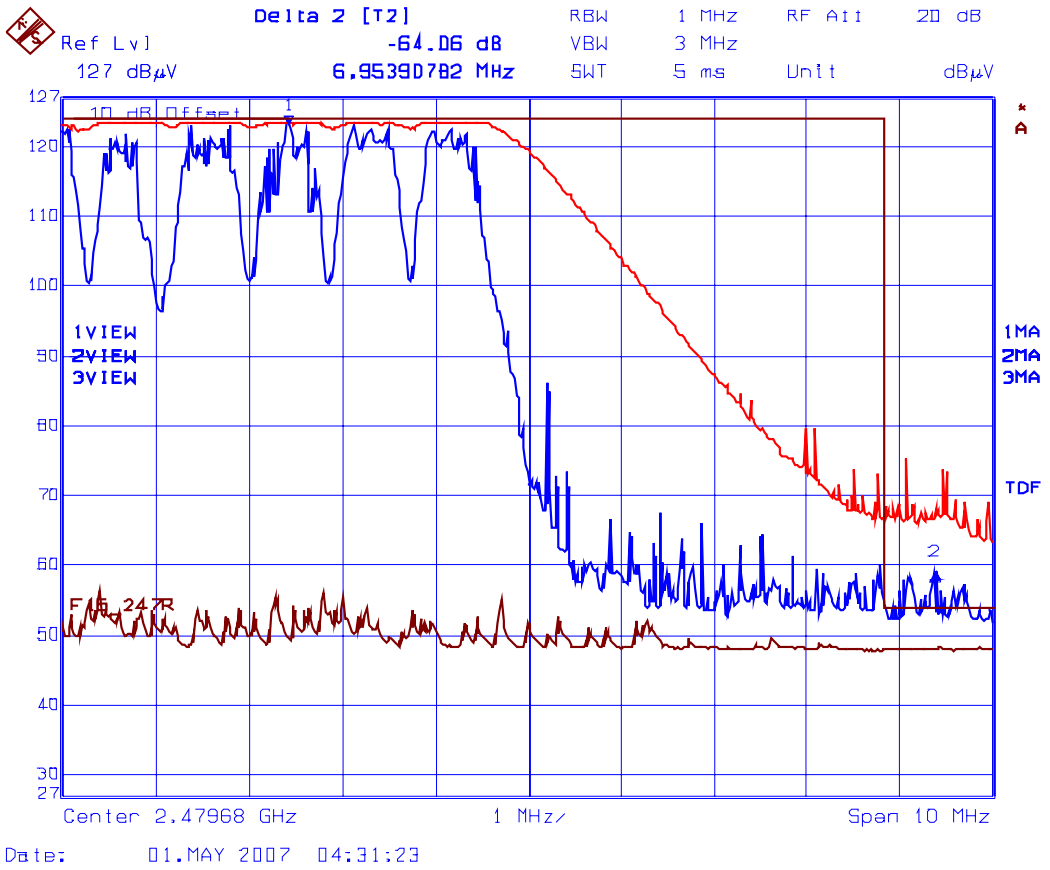
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz (Peak to Band-Edge): 61.76 dB
Trace 3: RBW= 1 MHz, VBW= 10 Hz
Band-Edge Level at 2483.5 MHz: 123.71dBuV/m – 61.76 dB= 61.95dBuV/m

Plot 5.9.5.1.1.9. Band-Edge Radiated Emissions @ 3 meters
Vertical Polarization, Upper End of Frequency Band, Pseudorandom Channel Hopping Mode



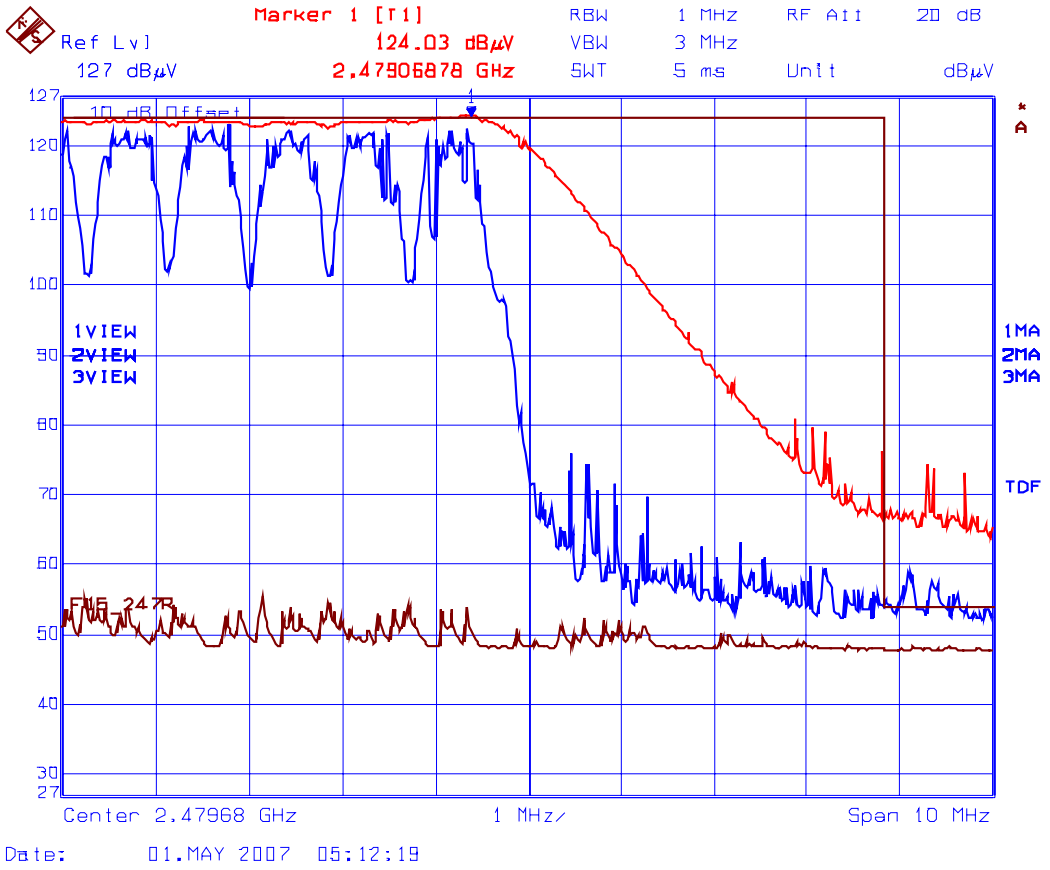
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz
Trace 3: RBW= 1 MHz, VBW= 10 Hz

Plot 5.9.5.1.1.10. Band-Edge Radiated Emissions @ 3 meters
Vertical Polarization, Upper End of Frequency Band, Pseudorandom Channel Hopping Mode



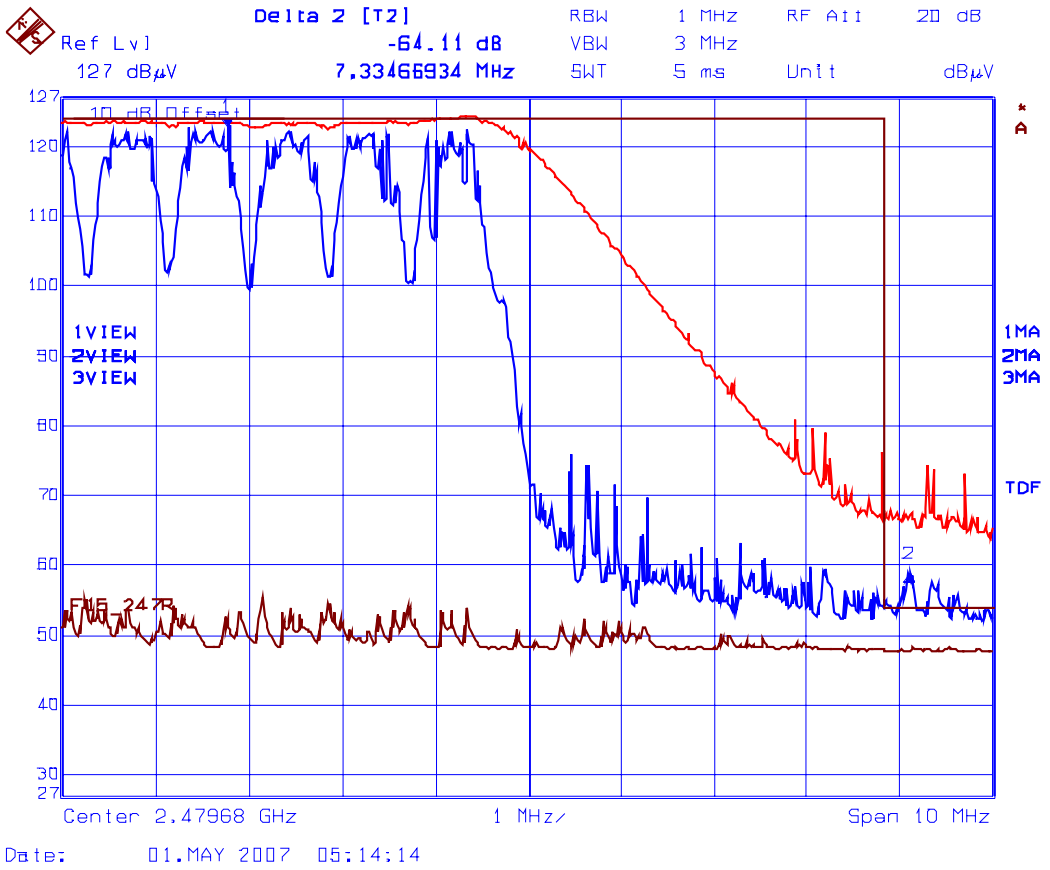
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz (Peak to Band-Edge): 64.06 dB
Trace 3: RBW= 1 MHz, VBW= 10 Hz
Band-Edge Level at 2483.5 MHz: 123.46dBuV/m – 64.06 dB= 59.40dBuV/m

Plot 5.9.5.1.1.11. Band-Edge Radiated Emissions @ 3 meters
Horizontal Polarization, Upper End of Frequency Band, Pseudorandom Channel Hopping Mode



Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz
Trace 3: RBW= 1 MHz, VBW= 10 Hz

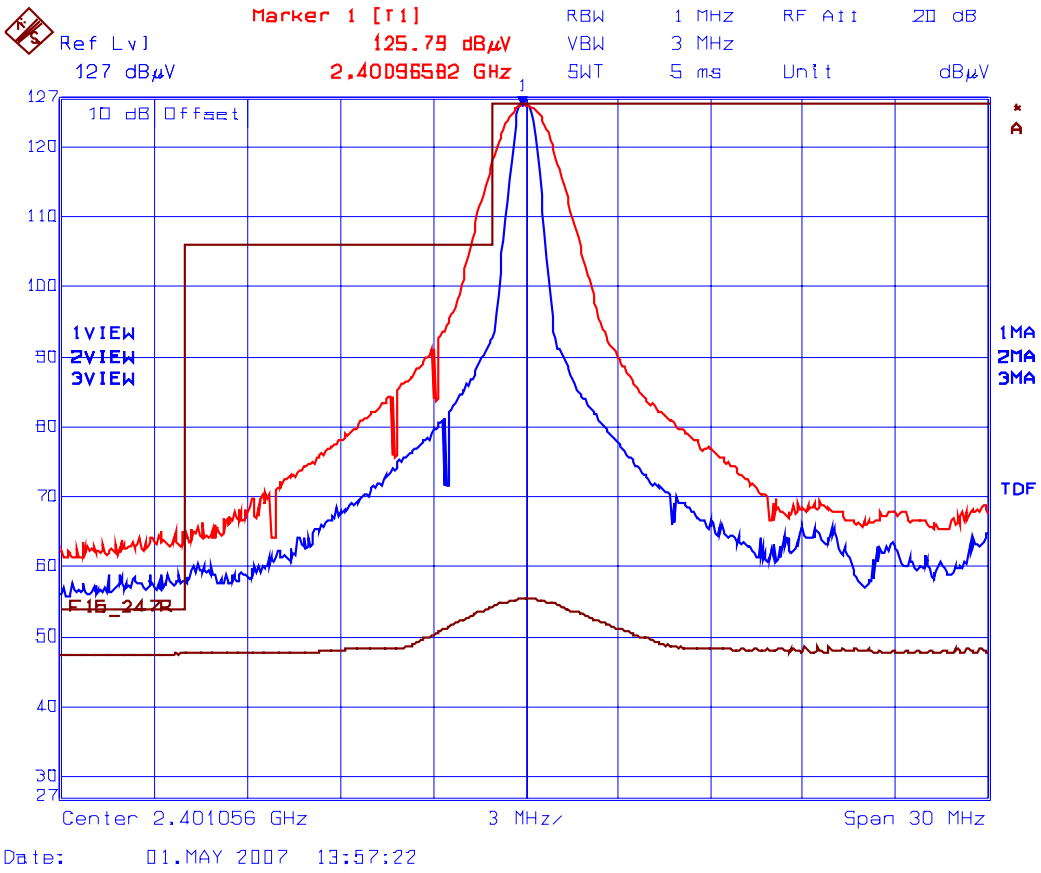
Plot 5.9.5.1.1.12. Band-Edge Radiated Emissions @ 3 meters
Horizontal Polarization, Upper End of Frequency Band, Pseudorandom Channel Hopping Mode



Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz (Peak to Band-Edge): 64.11 dB
Trace 3: RBW= 1 MHz, VBW= 10 Hz
Band-Edge Level at 2483.5 MHz: 124.03dBuV/m – 64.11 dB= 59.92dBuV/m

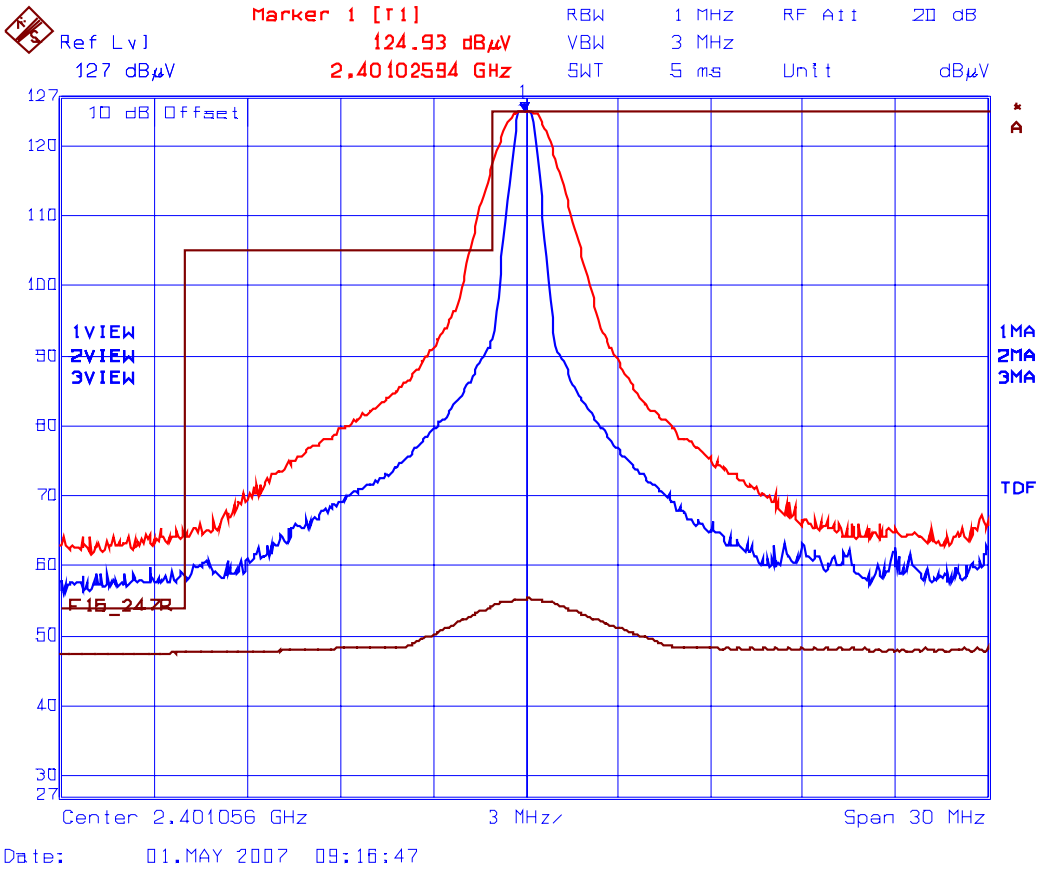
5.9.5.1.2. KX-TD7694

Plot 5.9.5.1.2.1. Band-Edge Radiated Emissions @ 3 meters
Vertical Polarization, Low End of Frequency Band, Single Frequency Mode



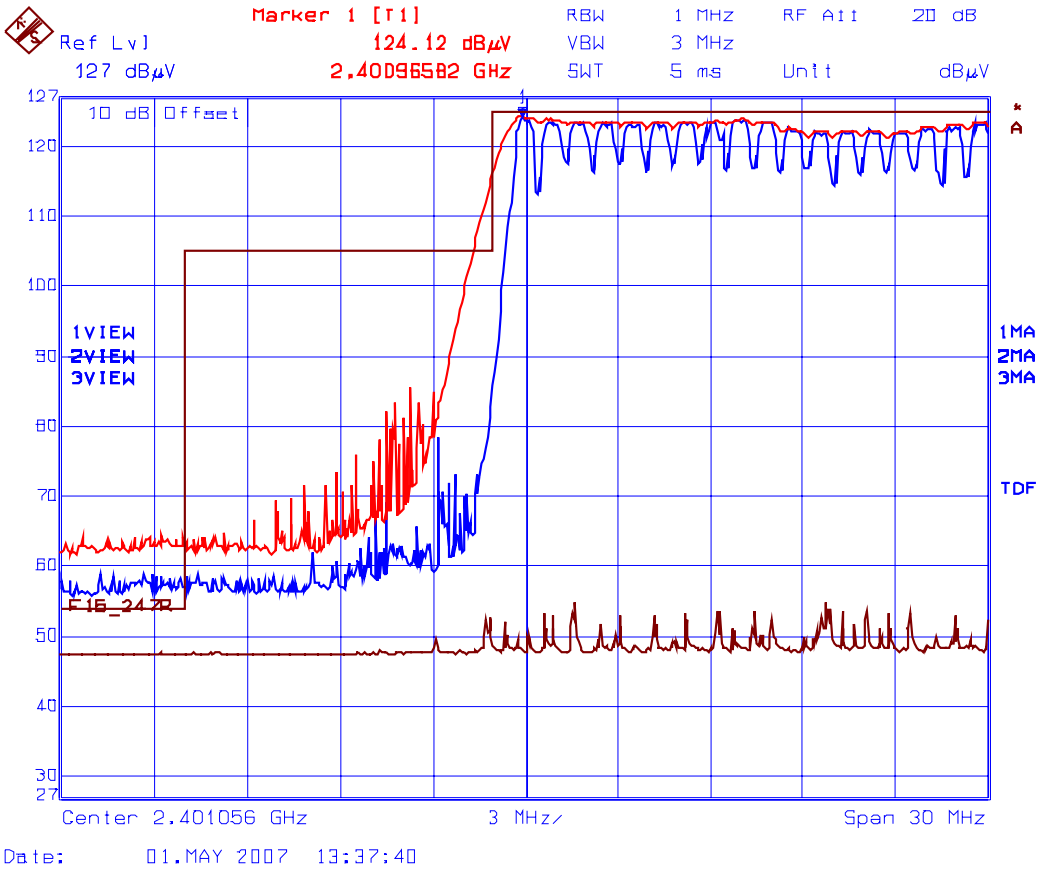
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz
Trace 3: RBW= 1 MHz, VBW= 10 Hz

Plot 5.9.5.1.2.2. Band-Edge Radiated Emissions @ 3 meters
Horizontal Polarization Low End of Frequency Band, Single Frequency Mode



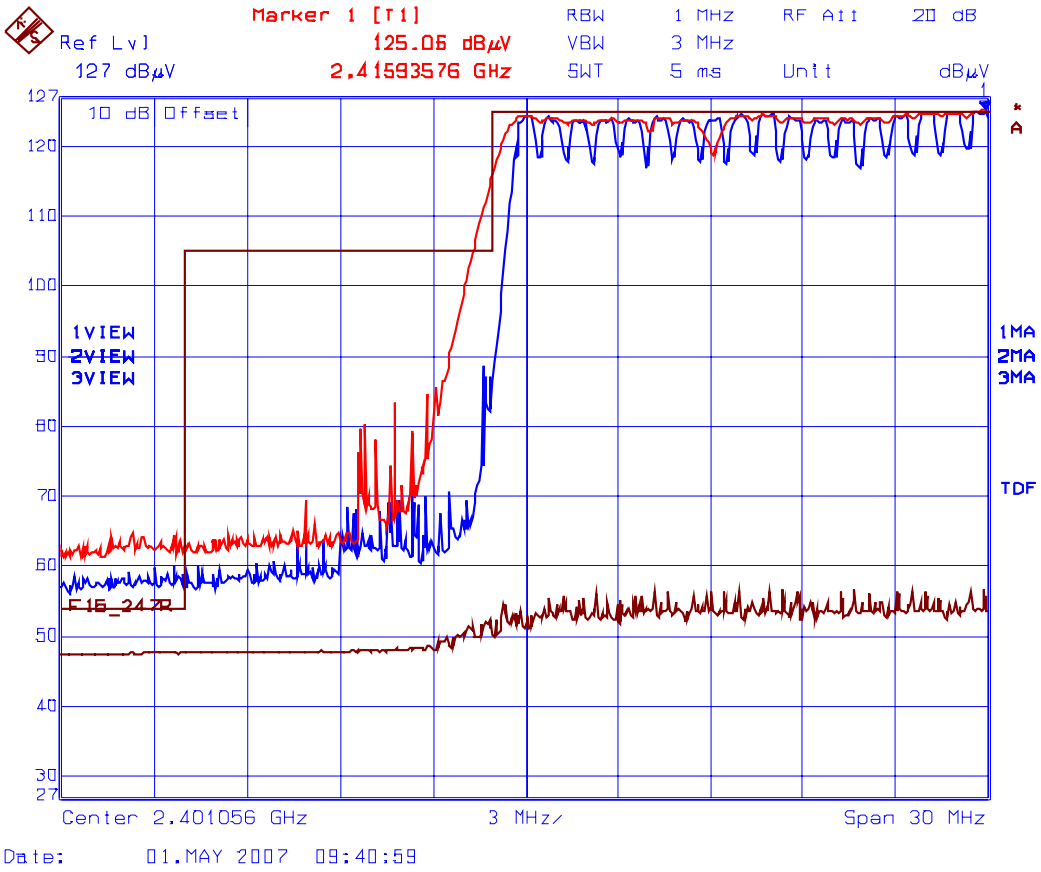
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz
Trace 3: RBW= 1 MHz, VBW= 10 Hz

Plot 5.9.5.1.2.3. Band-Edge Radiated Emissions @ 3 meters
Vertical Polarization Low End of Frequency Band, Pseudorandom Channel Hopping Mode



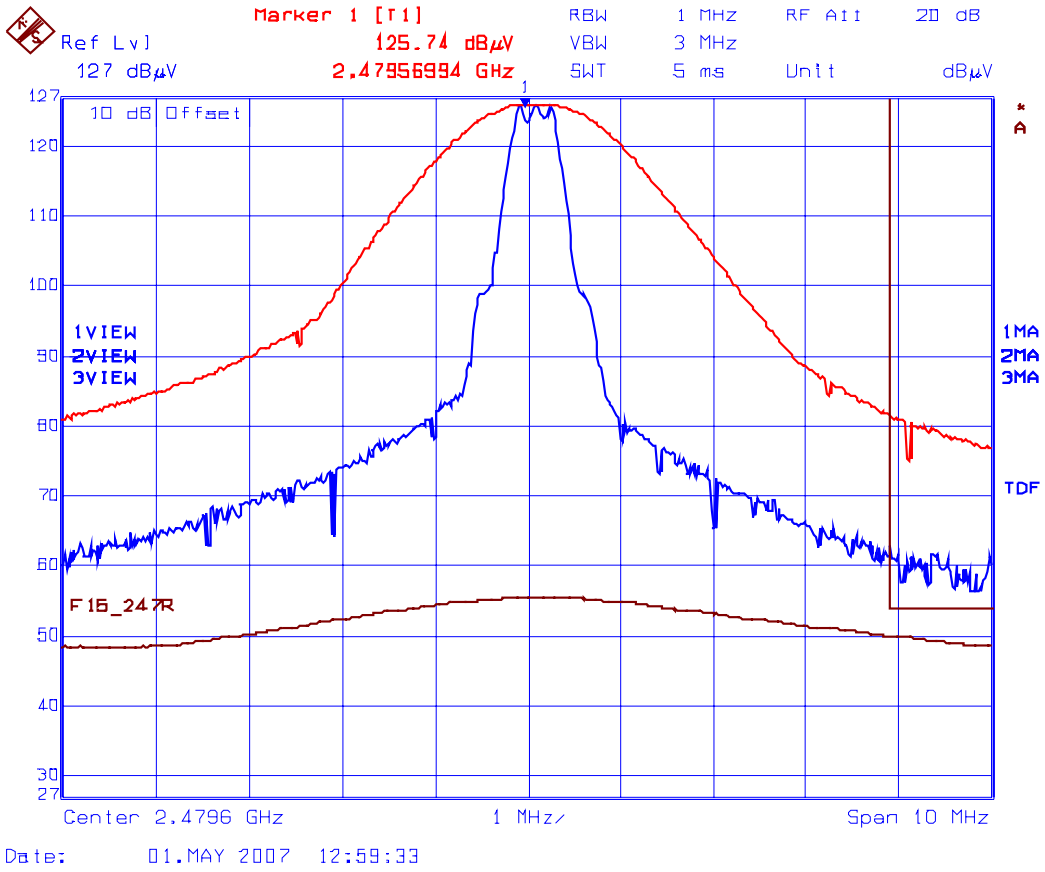
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz
Trace 3: RBW= 1 MHz, VBW= 10 Hz

Plot 5.9.5.1.2.4. Band-Edge Radiated Emissions @ 3 meters
Horizontal Polarization, Low End of Frequency Band, Pseudorandom Channel Hopping Mode



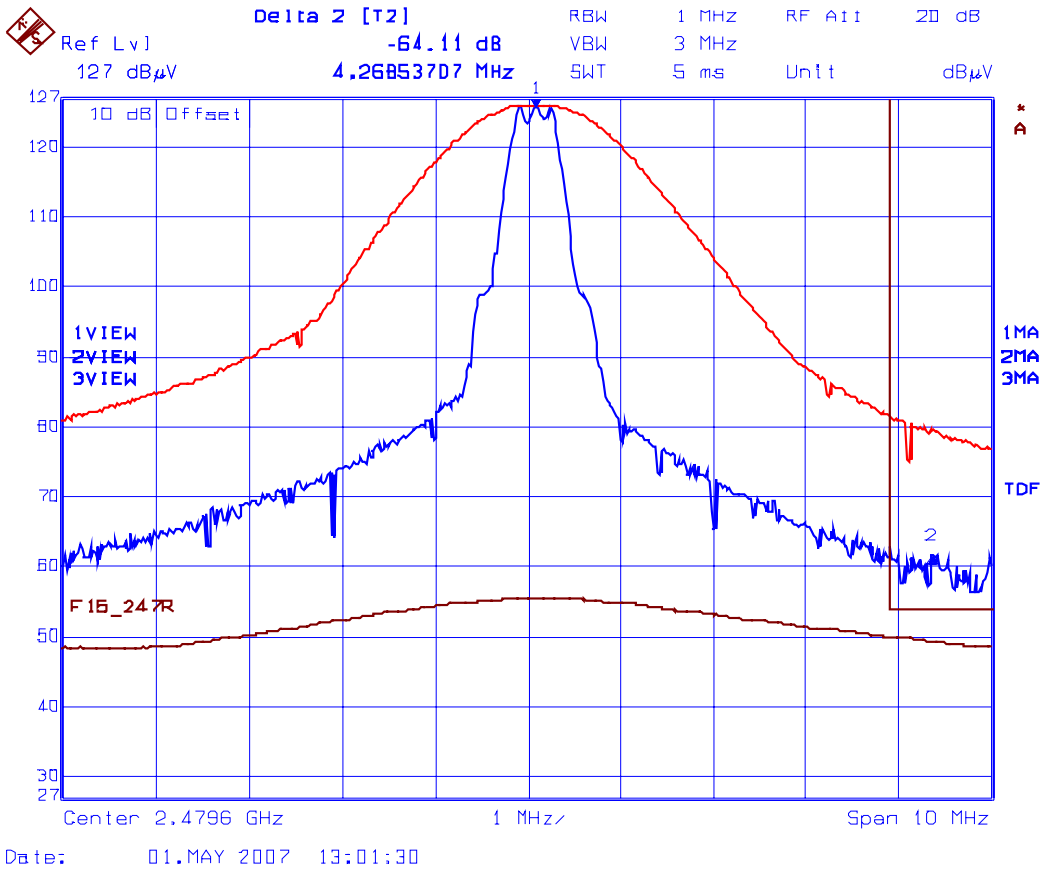
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz
Trace 3: RBW= 1 MHz, VBW= 10 Hz

Plot 5.9.5.1.2.5. Band-Edge Radiated Emissions @ 3 meters
Vertical Polarization, Upper End of Frequency Band, Single Frequency Mode



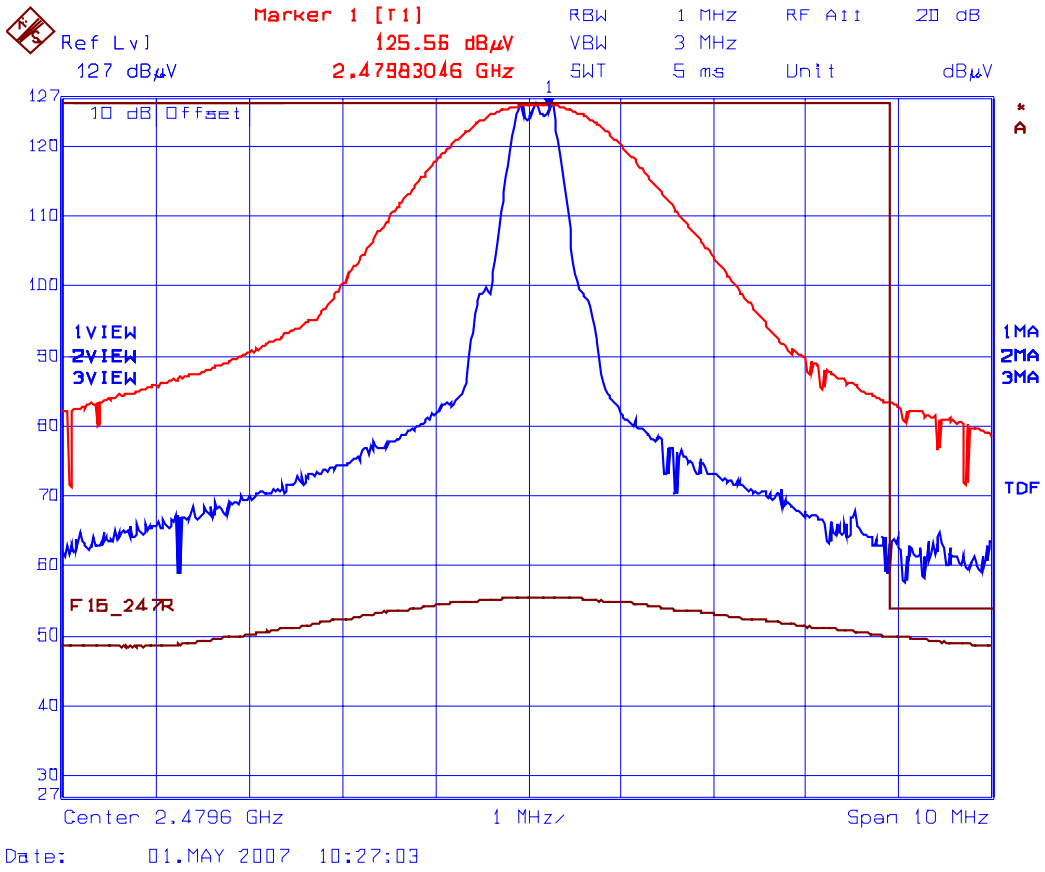
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz
Trace 3: RBW= 1 MHz, VBW= 10 Hz

Plot 5.9.5.1.2.6. Band-Edge Radiated Emissions @ 3 meters
Vertical Polarization, Upper End of Frequency Band, Single Frequency Mode



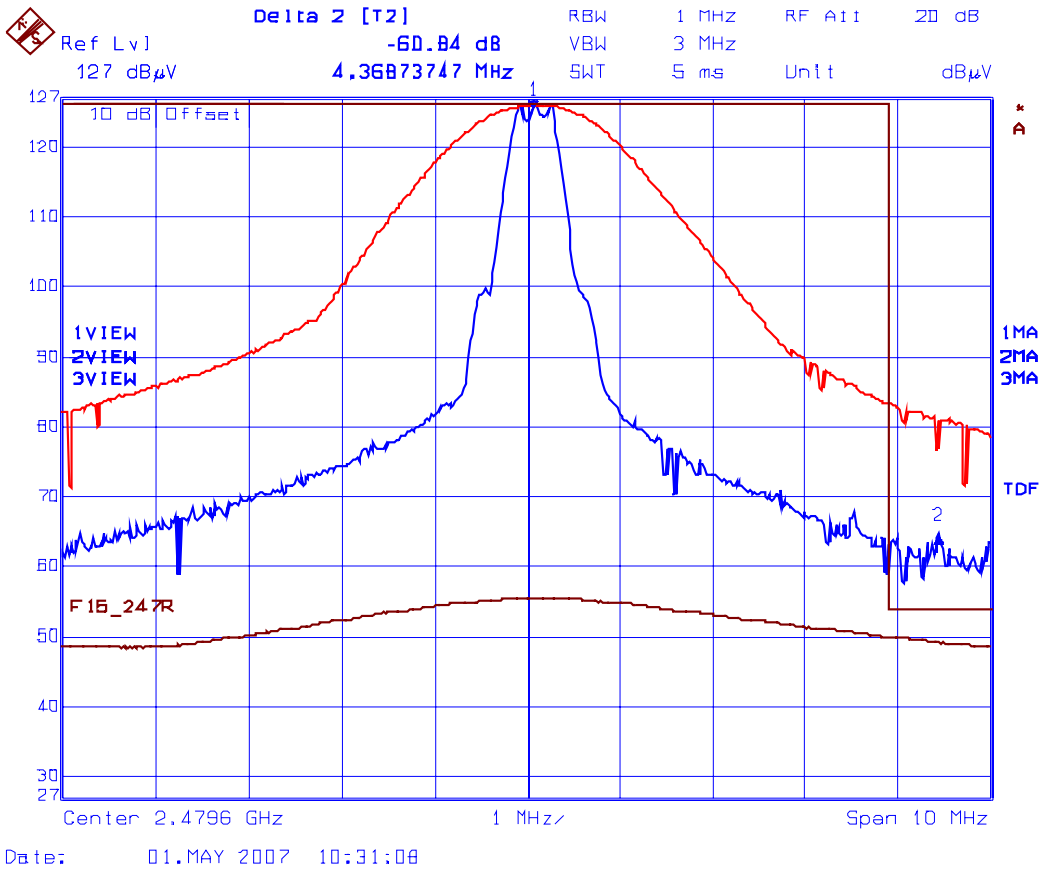
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz (Peak to Band-Edge): 64.11 dB
Trace 3: RBW= 1 MHz, VBW= 10 Hz
Band-Edge Level at 2483.5 MHz: 125.74dBuV/m – 64.11 dB= 61.63dBuV/m

Plot 5.9.5.1.2.7. Band-Edge Radiated Emissions @ 3 meters
Horizontal Polarization, Upper End of Frequency Band, Single Frequency Mode



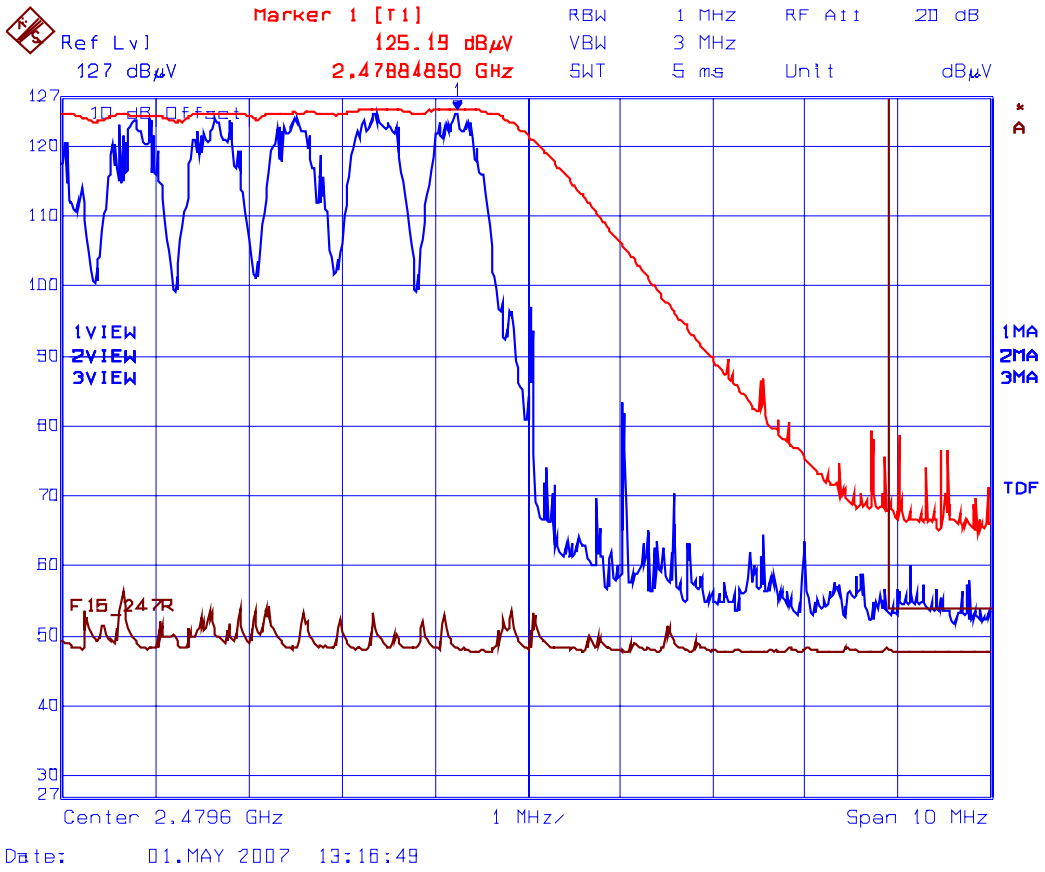
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz
Trace 3: RBW= 1 MHz, VBW= 10 Hz

Plot 5.9.5.1.2.8. Band-Edge Radiated Emissions @ 3 meters
Horizontal Polarization, Upper End of Frequency Band, Single Frequency Mode



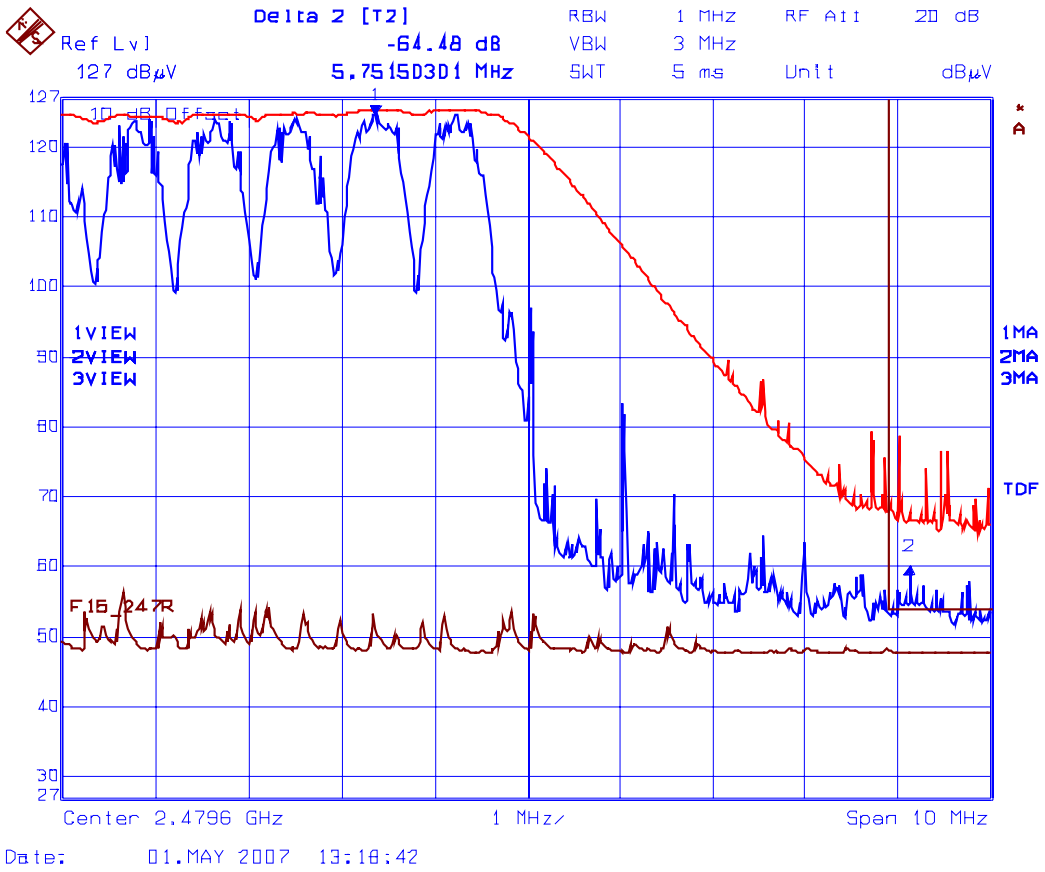
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz (Peak to Band-Edge): 60.84 dB
Trace 3: RBW= 1 MHz, VBW= 10 Hz
Band-Edge Level at 2483.5 MHz: 125.56dBuV/m – 60.84 dB= 64.72dBuV/m

Plot 5.9.5.1.2.9. Band-Edge Radiated Emissions @ 3 meters
Vertical Polarization, Upper End of Frequency Band, Pseudorandom Channel Hopping Mode



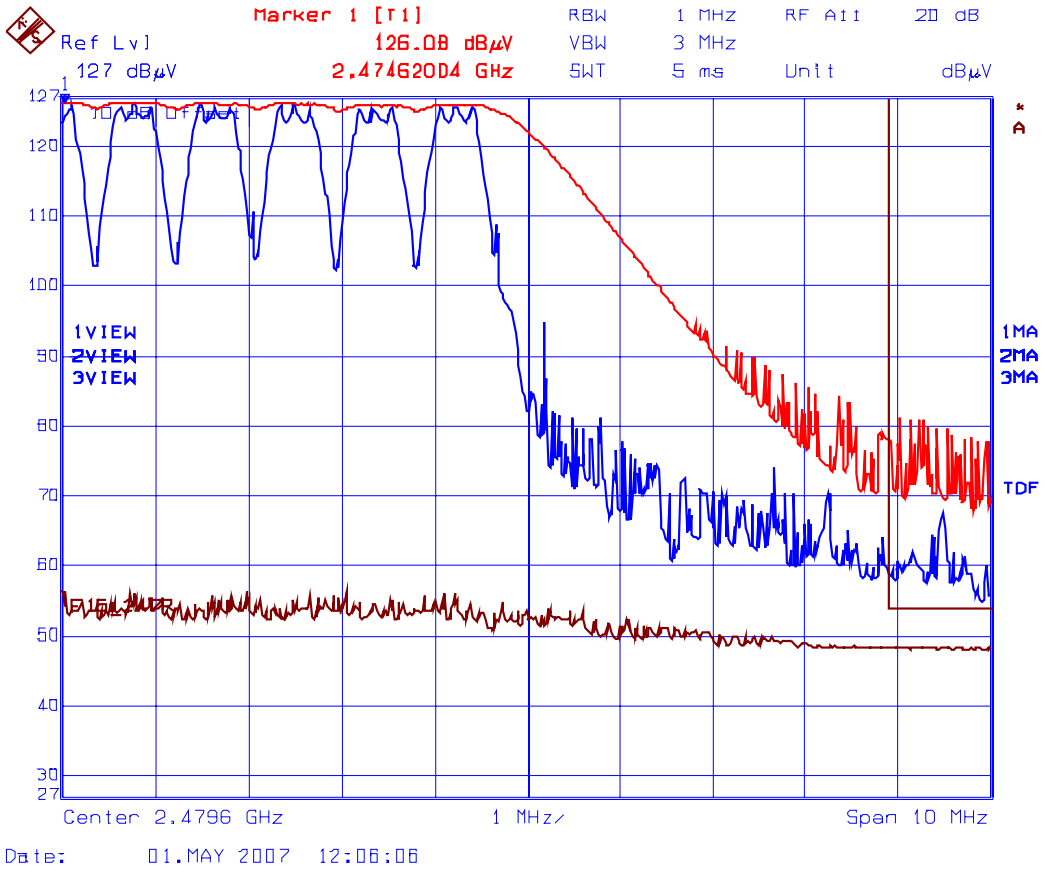
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz
Trace 3: RBW= 1 MHz, VBW= 10 Hz

Plot 5.9.5.1.2.10. Band-Edge Radiated Emissions @ 3 meters
Vertical Polarization, Upper End of Frequency Band, Pseudorandom Channel Hopping Mode



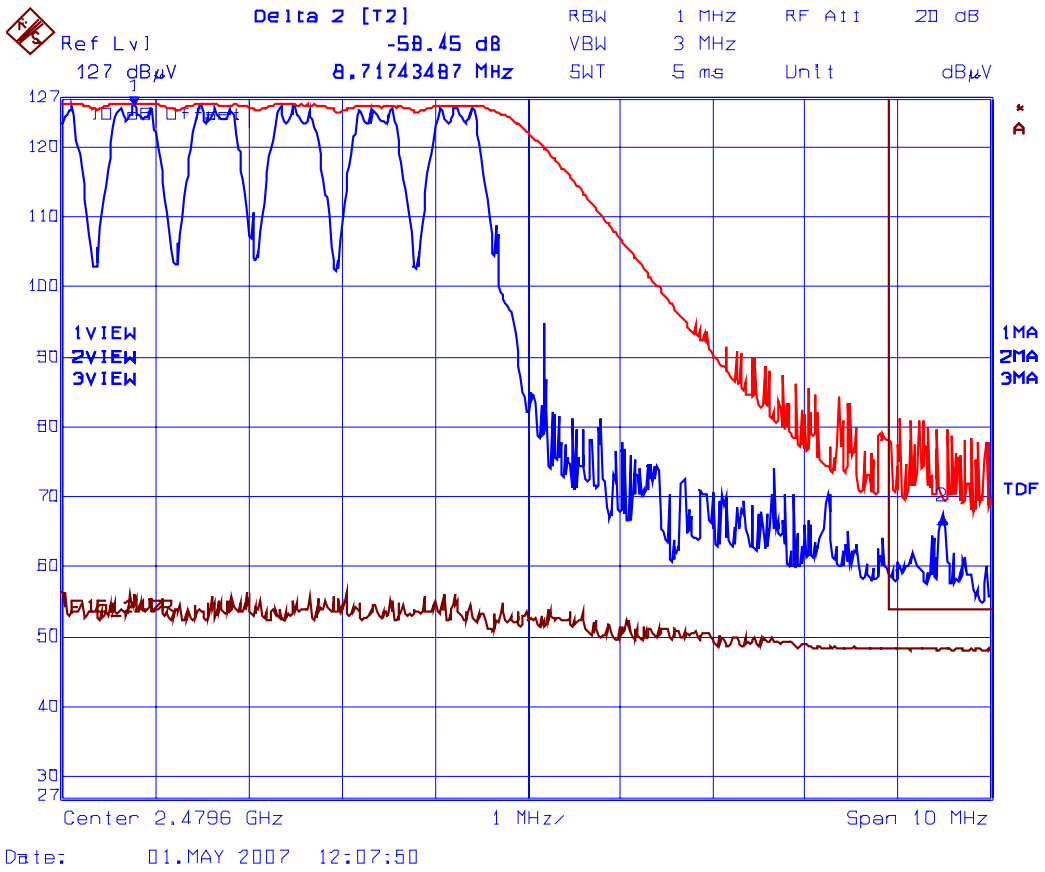
Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz (Peak to Band-Edge): 64.48 dB
Trace 3: RBW= 1 MHz, VBW= 10 Hz
Band-Edge Level at 2483.5 MHz: 125.19dBuV/m – 64.48 dB= 60.71dBuV/m

Plot 5.9.5.1.2.11. Band-Edge Radiated Emissions @ 3 meters
Horizontal Polarization, Upper End of Frequency Band, Pseudorandom Channel Hopping Mode



Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz
Trace 3: RBW= 1 MHz, VBW= 10 Hz

Plot 5.9.5.1.2.12. Band-Edge Radiated Emissions @ 3 meters
Horizontal Polarization, Upper End of Frequency Band, Pseudorandom Channel Hopping Mode



Trace 1: RBW= 1 MHz, VBW= 3 MHz
Trace 2: RBW= 300 kHz, VBW= 1 MHz (Peak to Band-Edge): 58.45 dB
Trace 3: RBW= 1 MHz, VBW= 10 Hz
Band-Edge Level at 2483.5 MHz: 126.08dBuV/m – 58.45 dB= 67.63dBuV/m

5.9.5.2. Transmitter Radiated Spurious Emissions

5.9.5.2.1. KX-TD7684

The emissions were scanned from 30 MHz to 25 GHz; all signals within 20 dB below the permissible limit were recorded in the table below.

Frequency (MHz)	RF Peak Level (dBµV/m)	RF Avg Level (dBµV/m)	Antenna Plane (H/V)	Limit 15.209 (dBµV/m)	Limit 15.247 (dBµV/m)	Margin (dB)	Pass/ Fail
Fundamental Frequency: 2401.056 MHz							
2401.056	122.44	-	V	-	-	-	-
2401.056	124.88	-	H	-	-	-	-
4802.112*	56.86	39.41	V	54.0	78.0	-14.6	Pass*
4802.112*	58.62	38.14	H	54.0	78.0	-15.9	Pass*
7203.168	56.95	39.41	V	54.0	78.0	-38.6	Pass
7203.168	55.74	38.14	H	54.0	78.0	-39.9	Pass
Fundamental Frequency: 2440.800 MHz							
2440.800	123.15	-	V	-	-	-	-
2440.800	124.57	-	H	-	-	-	-
4881.600*	57.97	37.26	V	54.0	78.0	-16.7	Pass*
4881.600*	57.33	37.59	H	54.0	78.0	-16.4	Pass*
7322.400*	55.48	38.75	V	54.0	78.0	-15.3	Pass*
7322.400*	55.61	38.83	H	54.0	78.0	-15.2	Pass*
Fundamental Frequency: 2479.680 MHz							
2479.680	123.46	-	V	-	-	-	-
2479.680	124.03	-	H	-	-	-	-
4959.360*	61.88	38.19	V	54.0	78.0	-15.8	Pass*
4959.360*	66.93	38.51	H	54.0	78.0	-15.5	Pass*
7439.040*	56.12	39.02	V	54.0	78.0	-15.0	Pass*
7439.040*	62.72	39.77	H	54.0	78.0	-14.2	Pass*
9918.720	58.92	43.42	V	54.0	78.0	-34.6	Pass
9918.720	59.00	43.60	H	54.0	78.0	-34.4	Pass
12398.400*	60.09	44.37	V	54.0	74.3	-9.6	Pass*
12398.400*	61.85	44.08	H	54.0	74.3	-10.0	Pass*

* Emission in restricted bands.

5.9.5.2.2. KX-TD7694

The emissions were scanned from 30 MHz to 25 GHz; all signals within 20 dB below the permissible limit were recorded in the table below.

Frequency (MHz)	RF Peak Level (dBµV/m)	RF Avg Level (dBµV/m)	Antenna Plane (H/V)	Limit 15.209 (dBµV/m)	Limit 15.247 (dBµV/m)	Margin (dB)	Pass/ Fail
Fundamental Frequency: 2401.056 MHz							
2401.056	125.79	-	V	-	-	-	-
2401.056	125.06	-	H	-	-	-	-
4802.112*	61.50	37.90	V	54.0	78.0	-16.1	Pass*
4802.112*	56.79	37.88	H	54.0	78.0	-16.1	Pass*
7203.168	57.73	38.75	V	54.0	78.0	-39.3	Pass
7203.168	54.88	38.46	H	54.0	78.0	-39.5	Pass
12005.280*	62.88	44.78	V	54.0	78.0	-9.2	Pass*
12005.280*	60.90	44.40	H	54.0	78.0	-9.6	Pass*
Fundamental Frequency: 2440.800 MHz							
2440.800	125.62	-	V	-	-	-	-
2440.800	125.56	-	H	-	-	-	-
4881.600*	57.97	37.72	V	54.0	78.0	-16.3	Pass*
4881.600*	54.63	37.59	H	54.0	78.0	-16.4	Pass*
7322.400*	55.19	38.54	V	54.0	78.0	-15.5	Pass*
7322.400*	55.67	38.12	H	54.0	78.0	-15.9	Pass*
12204.000*	62.79	44.67	V	54.0	78.0	-9.3	Pass*
12204.000*	60.54	44.15	H	54.0	78.0	-9.9	Pass*
Fundamental Frequency: 2479.680 MHz							
2479.680	125.74	-	V	-	-	-	-
2479.680	126.08	-	H	-	-	-	-
4959.360*	54.81	37.39	V	54.0	78.0	-16.6	Pass*
4959.360*	58.21	38.03	H	54.0	78.0	-16.0	Pass*
7439.040*	55.39	38.28	V	54.0	78.0	-15.7	Pass*
7439.040*	54.67	39.06	H	54.0	78.0	-14.9	Pass*
12398.400*	61.47	43.96	V	54.0	74.3	-10.0	Pass*
12398.400*	60.58	44.30	H	54.0	74.3	-9.7	Pass*

* Emission in restricted bands.

EXHIBIT 6. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 and NIS 81 (1994)

6.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY

CONTRIBUTION (Line Conducted)	PROBABILITY DISTRIBUTION	UNCERTAINTY (dB)	
		9-150 kHz	0.15-30 MHz
EMI Receiver specification	Rectangular	±1.5	±1.5
LISN coupling specification	Rectangular	±1.5	±1.5
Cable and Input Transient Limiter calibration	Normal (k=2)	±0.3	±0.5
Mismatch: Receiver VRC Γ_1 = 0.03 LISN VRC Γ_R = 0.8(9 kHz) 0.2 (30 MHz) Uncertainty limits 20Log(1±$\Gamma_1\Gamma_R$)	U-Shaped	±0.2	±0.3
System repeatability	Std. deviation	±0.2	±0.05
Repeatability of EUT	--	--	--
Combined standard uncertainty	Normal	±1.25	±1.30
Expanded uncertainty U	Normal (k=2)	±2.50	±2.60

Sample Calculation for Measurement Accuracy in 450 kHz to 30 MHz Band:

$u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)} = \pm \sqrt{(1.5^2 + 1.5^2)/3 + (0.5/2)^2 + (0.05/2)^2 + 0.35^2} = \pm 1.30$ dB

$U = 2u_c(y) = \pm 2.6$ dB

6.2. RADIATED EMISSION MEASUREMENT UNCERTAINTY

CONTRIBUTION (Radiated Emissions)	PROBABILITY DISTRIBUTION	UNCERTAINTY (± dB)	
		3 m	10 m
Antenna Factor Calibration	Normal (k=2)	±1.0	±1.0
Cable Loss Calibration	Normal (k=2)	±0.3	±0.5
EMI Receiver specification	Rectangular	±1.5	±1.5
Antenna Directivity	Rectangular	+0.5	+0.5
Antenna factor variation with height	Rectangular	±2.0	±0.5
Antenna phase center variation	Rectangular	0.0	±0.2
Antenna factor frequency interpolation	Rectangular	±0.25	±0.25
Measurement distance variation	Rectangular	±0.6	±0.4
Site imperfections	Rectangular	±2.0	±2.0
Mismatch: Receiver VRC Γ_1 = 0.2 Antenna VRC Γ_R = 0.67(Bi) 0.3 (Lp) Uncertainty limits 20Log(1±$\Gamma_1\Gamma_R$)	U-Shaped	+1.1 -1.25	±0.5
System repeatability	Std. Deviation	±0.5	±0.5
Repeatability of EUT		-	-
Combined standard uncertainty	Normal	+2.19 / -2.21	+1.74 / -1.72
Expanded uncertainty U	Normal (k=2)	+4.38 / -4.42	+3.48 / -3.44

Calculation for maximum uncertainty when 3m biconical antenna including a factor of k = 2 is used:

$U = 2u_c(y) = 2x(+2.19) = +4.38$ dB And $U = 2u_c(y) = 2x(-2.21) = -4.42$ dB