EMC Measurement/Technical Report

on

Motorola Bluetooth PCMCIA Card BTPCM100

Report Reference: 4-F0003d/00

7 Layers AG
Borsigstr. 11
40880 Ratingen
Germany

Table of Contents

0 Summary

0.1 Technical Report Summary

Type of Authorization

Certification for an Intentional Radiator (Frequency Hopping Spread Spectrum)

Applicable FCC Rules:

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 0 to 19 (10-1-98 Edition). The following subparts are applicable to the results in this test report.

Part 2, Subpart J - Equipment Authorization Procedures, Certification Sections

Part 15, Subpart C - Intentional Radiators

§ 15.201 Equipment authorization requirement

§ 15.203 Antenna requirements

§ 15.207 Conducted limits

§ 15.209 Radiated emission limits; general requirements

§ 15.247 Operation within the bands 902-928 MHz, 2400-2483,5 MHZ and 5725-5850 MHz

Note:
The tests were selected and performed with reference to the FCC Public Notice DA 00-705, released March 30, 2000

Summary Test Results:

The EUT complied with all the applicable FCC rules as listed above.

0.2 Measurement Summary

FCC Part 15, Subpart C § 15.247 (b) (1)

Peak Power Output

The measurement was performed according to FCC §15.31 10-1-1998

OP-Mode	Setup	Port	Final Result
op-mode 1	setup 1	Antenna port	passed
op-mode 2	setup 1	Antenna port	passed
op-mode 3	setup 1	Antenna port	passed

FCC Part 15, Subpart C § 15.247 (c)

Spurious RF Conducted Emissions

The measurement was performed according to FCC §15.31 10-1-1998

OP-Mode	Setup	Port	Final Result
op-mode 1	setup 1	Antenna port	passed
op-mode 2	setup 1	Antenna port	passed
op-mode 3	setup 1	Antenna port	passed

FCC Part 15, Subpart C § 15.247 (c), §15.35 (b), § 15.209

Spurious Radiated Emissions

The measurement was performed according to ANSI C63.4 1992

OP-Mode	Setup	Port	Final Result
op-mode 1	setup 2	enclosure pcb antenna	passed
op-mode 1	setup 2	enclosure patch antenna	passed
op-mode 2	setup 2	enclosure pcb antenna	passed
op-mode 2	setup 2	enclosure patch antenna	passed
op-mode 3	setup 2	enclosure pcb antenna	passed
op-mode 3	setup 2	enclosure patch antenna	passed

FCC Part 15, Subpart C § 15.247 (g)

Power Density

The measurement was performed according to FCC §15.31 10-1-1998

OP-Mode	Setup	Port	Final Result
op-mode 4	setup 1	Antenna port	passed
op-mode 5	setup 1	Antenna port	passed

Responsible for Accreditation Scope: _____ Responsible for Test Report: _____

1. Administrative Data

1.1 Testing Laboratory

Company Name:	7 Layers AG
Address:	Borsigstr. 11 40880 Ratingen Germany

This facility has been fully described in a report submitted to the FCC and accepted in a letter dated February 07, 2000 under the registration number 96716 .

The test facility is also accredited by the following accreditation organisation:

- Deutscher Akkreditierungs Rat DAR-Registration no. TTI-P-G 178/99-10

- Regulierungsbehörde für Telekommunikation und Post (Reg TP)

Responsible for Accreditation Scope: Dipl.-Ing Bernhard Retka
Dipl.-Ing Arndt Stöcker

1.2 Project Data

Project Leader:	Marco Kullik
Receipt of EUT:	25.04.00
Date of Test(s):	20.09.00, 21.09.00
Date of Report:	22.09.00
No. of Pages in Annex:	none

1.3 Applicant Data

Company Name:	Digianswer A/S
Address:	Skalhuse 5 DK-9240 Nibe Denmark
Contact Person:	Mr. Tom Ringtved

1.4 Manufacturer Data

Company Name:	see applicant
Address:	
Contact Person:	

2.0 Product Labeling

2.1 FCC ID Label:

All devices authorized under the certification procedures are required to display an identification label showing the FCC identifier (FCC ID) under which they are authorized. The type no. and FCC ID of the shown label will be modified to BTPCM100.

2.2 Location of Label on the EUT:

The label shall be located in a conspiciuous place on the device consistent with the requirements of section 15.19 of FCC CFR 47.

For this device it will be the topside.

3. Testobject Data

3.1 General EUT Description

Equipment under Test:	Motorola Bluetooth PCMCIA Card
Type Designation:	BTPCM100
Kind of Device: (optional)	
Voltage Type:	DC
Voltage level:	5,0 V

General product description:

Bluetooth is a short-range radio link intended to be a cable replacement between portable and/or fixed electronic devices.

Bluetooth operates in the unlicensed ISM Band at 2.4 GHz. In the US a band of 83.5 MHz width is available. In this band, 79 RF channels spaced 1MHz apart a defined. The channel is represented by a pseudo-random hopping sequence through the 79 channels. The channel is devided into time slots, with a nominal slot length of 625µs, where each slot corresponds to different RF hop frequencies. The nominal hop rate is 1600 hops/s. All frequencies are equally used. The average time of occupancy is 0.3797 s within a 30 second period.
The symbol rate on the channel is 1 Ms/s.

The EUT provides the following ports:

Ports

enclosure patch antenna
enclosure pcb antenna
Antenna port

The main components of EUT are listed and described in Chapter 2.2

3.2 EUT Main components:
Type, S/N, Short Descriptions etc. used in this Test Report

Short Description	Equipment under Test	Type Designation	Serial No.	HW Status	SW Status	Date of Receipt
EUT A	Bluetooth PCMCIA Card	BTPCM101	00003A	DIG8044240	PC Card Firmware - release 1.00	25.04.00
EUT B	Bluetooth PCMCIA Card	BTPCM101	00003E	DIG8044240	PC Card Firmware - release 1.00	25.04.00

NOTE: The short description is used to simplify the identification of the EUT in this test report

3.3 Ancillary Equipment

For the purposes of this test report, ancillary equipment is defined as equipment which is used in conjunction with the EUT to provide additional operational and control features to the EUT. It is necessary to configure the system in a typical fashion, as a customer would normally use it.

Short Description	Equipment under Test	Type Designation	HW Status	SW Status	Serial No.	FCC Id
AE 2	Laptop	HP Omnibook XE2	-	-	TW95004702	
AE 1	Laptop	IBM 2626	-	-	55-3211P 99/09	

3.4 EUT Setups

This chapter describes the combination of EUT's and ancillary equipment used for testing.

Setup No.	Combination of EUTs	Description
setup 1	EUT A + AE 2	for all conducted measurements
setup 2	EUT B + AE 1	for all radiated measurements

3.5 Operating Modes

This chapter describes the operating modes of the EUT's used for testing in this test report.

Op. Mode	Description of Operating Modes	Remarks
op-mode 1	transmit DH1 packets at 2401 MHz (channel B)	with hopping
op-mode 2	transmit DH1 packets at 2441 MHz (channel M)	with hopping
op-mode 3	transmit DH1 packets at 2480 MHz (channel T)	with hopping
op-mode 4	transmission in page mode	
op-mode 5	transmission in inquiry mode	

4. Test Results

4.1 Peak Power Output

Standard FCC Part 15, Subpart C 10-1-98

The test was performed according to: FCC §15.31 10-1-1998

4.1.1 Test Description

The Equipment Under Test (EUT) was set up in a shielded room to perform the output power measurements.

The results recorded were measured with the modulation which produces the worst-case (highest) output power.

The resolution bandwidth for measuring the output power was 3 MHz.

The reference level of the spectrum analyser was set equal to the output power of the EUT.

The EUT was connected to the spectrum analyzer via a short coax cable (Type: Rosenberger RTK 161, 1m, SMA connectors), with a known loss.

4.1.2 Test Limits

FCC Part 15, Subpart C, §15.247 (b) (1)
(1) For frequency hopping systems operating in the band 2400 - 2483,5 MHz or 5725 - 5850 MHz and for all direct sequence systems: 1 Watt

Used conversion factor: Limit (dBm) = 10 log (Limit (W)/1mW)

==> Maximum Output Power: 30 dBm

4.1.3 Test Protocol

Temperature: 21 °C
Air Pressure: 1024 hPa
Humidity: 54 %

Op. Mode	Setup	Port	Test Parameter
op-mode 1	setup 1	Antenna port	

Output Power dBm	Remarks
0,53	The EIRP including PCB antenna gain (2.52 dBi) is 3,05 dBm

Remark: none

Temperature: 21 °C
Air Pressure: 1024 hPa
Humidity: 54 %

Op. Mode	Setup	Port	Test Parameter
op-mode 2	setup 1	Antenna port	

Output Power dBm	Remarks
1,56	The EIRP including PCB antenna gain (2.52 dBi) is 4,08 dBm

Remark: none

Temperature: 21 °C
Air Pressure: 1024 hPa
Humidity: 54 %

Op. Mode	Setup	Port	Test Parameter
op-mode 3	setup 1	Antenna port	

Output Power dBm	Remarks
1,78	The EIRP including PCB antenna gain (2.52 dBi) is 4,3 dBm

Remark: none

4.1 .3 Test result: Peak Power Output

FCC Part 15, Subpart C	Op. Mode	Setup	Port	Result
	op-mode 1	setup 1	Antenna port	**passed**
	op-mode 2	setup 1	Antenna port	**passed**
	op-mode 3	setup 1	Antenna port	**passed**

4.2 Spurious RF Conducted Emissions

Standard FCC Part 15, Subpart C 10-1-98

The test was performed according to: FCC §15.31 10-1-1998

4.2.1 Test Description

The Equipment Under Test (EUT) was set up in a shielded room to perform the output power measurements

The EUT was connected to spectrum analyzer via a short coax cable (Type: Rosenberger RTK 161, 1m, SMA connectors), with a known loss.

Analyser settings:
- Detector: Peak-Maxhold
- Frequency range: 30 – 25000 MHz
- Resolution Bandwidth (RBW): 100 kHz
- Video Bandwidth (VBW): 100 kHz
- Sweep Time: Coupled

The reference level of the spectrum analyser was set equal to the reference level of the EUT.

4.2.2 Test Limits

FCC Part 15, Subpart C, §15.247(c)
(1) All harmonics/spurs must be at least 20dB below the highest emission level within the authorized band as measured with a 100kHz RBW, based on either RF conducted or radiated measurement.

4.2.3 Test Protocol

Temperature: 21 °C
Air Pressure: 1024 hPa
Humidity: 54 %

Op. Mode	Setup	Port	Test Parameter
op-mode 1	setup 1	Antenna port	

Frequency MHz	Measured Value dBm	Correction Factor dB	Corrected Value	Reference Value dB	Limit dBm	Delta to Limit dB
0,00	0,00	0,00	0,00	0,00	0,00	0,00

Remark: No spurious emission above noise level found

Temperature: 21 °
Air Pressure: 1024 hPa
Humidity: 54 %

Op. Mode	Setup	Port	Test Parameter
op-mode 2	setup 1	Antenna port	

Frequency MHz	Measured Value dBm	Correction Factor dB	Corrected Value	Reference Value dB	Limit dBm	Delta to Limit dB
0,00	0,00	0,00	0,00	0,00	0,00	0,00

Remark: No spurious emission above noise level found

Temperature: 21 °C
Air Pressure: 1024 hPa
Humidity: 54 %

Op. Mode	Setup	Port	Test Parameter
op-mode 3	setup 1	Antenna port	

Frequency MHz	Measured Value dBm	Correction Factor dB	Corrected Value	Reference Value dB	Limit dBm	Delta to Limit dB
0,00	0,00	0,00	0,00	0,00	0,00	0,00

Remark: No spurious emission above noise level found

4.2 .3 Test result: Spurious RF Conducted Emissions

FCC Part 15, Subpart C	Op. Mode	Setup	Port	Result
	op-mode 1	setup 1	Antenna port	**passed**
	op-mode 2	setup 1	Antenna port	**passed**
	op-mode 3	setup 1	Antenna port	**passed**

4.3 Spurious Radiated Emissions

Standard FCC Part 15, Subpart C 10-1-98

The test was performed according to: ANSI C63.4 1992

4.3.1 Test Description

The test set-up was made in accordance to the general provisions of ANSI C63.4-1992.

The Equipment Under Test (EUT) was set up on a non-conductive table 1.0 x 2.0 m in the semi-anechoic chamber. The test was performed at an EUT to receiving antenna distance of 3m.
The radiated emissions measurements was made in a typical installation configuration.

The measurement procedure consists of four steps. It is implemented into EMI test software ES-K1 from R&S.

Step 1: Preliminary scan
Preliminary test to identify the highest amplitudes relative to the limit.
Settings for step 1:
- Detector: Peak-Maxhold
- Frequency range: 30 – 1000 MHz
- Frequency steps: 60 kHz
- IF–Bandwidth: 120 kHz
- Measuring time / Frequency step: 100 µs
- Turntable angle range: –180 to 180 °
- Turntable stepsize: 90°
- Height variation range: 1 – 3m
- Height variation stepsize: 2m
- Polarisation: Horizontal + Vertical

Intention of this step is, to determine the radiated EMI-profile of the EUT. With this data, the test system performs (to reduce the number of final measurements) a data reduction with the following parameters:

- Offset for acceptance analysis: Limit line – 10 dB
- Maximum number of final measurements: 12

Step 2:
With the frequencies determined in step 1, an additional measurement with the following settings will be performed. Intention of this step is, to find out the approximate turntable angle and antenna height for each frequency.

Settings for step 2:
- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100ms
- Turntable angle range: –180 to 180 °
- Turntable stepsize: 45°
- Height variation range: 1 – 5m
- Height variation stepsize: 0,5m
- Polarisation: horizontal + vertical

After this step the EMI test system has determined the following values for each frequency (of step 1):
- Frequency
- Azimuth value (of turntable)
- Antenna height

The last two values have now the following accuracy:
- Azimuth value (of turntable): 45°
- Antenna height: 0,5m

Step 3:
In this step the accuracy of the turntable azimuth and antenna height will be improved. This is necessary to find out the maximum value of every frequency.

For each frequency the turntable azimuth and antenna height, which was determined in step 3, will be adjusted.
The turntable azimuth will be slowly varied by +/- 22,5° around this value. During this action the value of emission is continuously measured. The turntable azimuth at the highest emission will be recorded and adjusted. In this position the antenna height is also slowly varied by +/- 25 cm around the antenna height determined in step 3. During this action the value of emission is also continuously measured. The antenna height of the highest emission will also be recorded and adjusted.

Settings for step 3:
- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100ms
- Turntable angle range: –22,5° to + 22,5 ° around the value determined in step 2
- Height variation range: -0,25m to + 0,25m around the value determined in step 2

Step 4:
With the settings determined in step 3, the final measurement will be performed:
EMI receiver settings for step 4:
- Detector: Quasi-Peak(< 1GHz)
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 1s

The following modfications apply to the measurement procedure for the frequency range
above 1 GHz:
The measurement distance was reduced to 1m. The results were extrapolated by the extrapolation factor of 20 dB/decade (invers linear-distance for field strength measurements, invers linear-distance squared for the power reference level measurements). Due to the fact that in this frequency range a double ridged wave guided horn antenna (up to 18 Ghz) and a horn antenna (18-25 GHz) are used, the steps 2-4 are omitted. Step 1 was performed with one height of the receiving antenna only.
Detector: Peak, Average
RBW = VBW = 1 MHz, above 7 GHz 100 kHz

After the measurement a plot will be generated which contains a diagram with the results of the preliminary scan and a chart with the frequencies and values of the results of the final measurement.

4. 3 .2 Test Limits

FCC Part 15, Subpart C, §15.247(c)
(2) A radiated emission test applies to harmonic/spurs that fall in the restricted bands as listed in § 15.205(a). The maximum permitted QP (< 1GHz) and average (> 1GHz) field strength is listed in § 15.209(a).
(3)
FCC Part 15, Subpart C, §15.209, Radiated Emission Limits

Frequency Range (MHz):	Class B Limit (dBµV/m)
30 – 88	40,0
88 – 216	43,5
216 – 960	46,0
above 960	54,0

§15.35(b)
..., there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit....

Used conversion factor: Limit (dBµV/m) = 20 log (Limit (µV/m)/1µV/m)

4. 3 .3 Test Protocol

Temperature: 21 °C
Air Pressure: 1024 hPa
Humidity: 54 %

Op. Mode	Setup	Port	Test Parameter
op-mode 1	setup 2	enclosure pcb antenna	

Polarisation	Frequency MHz	Corrected Value dBµV/m			Limit QP/AV dBµV/m	Limit Peak dBµV/m	Delta to AV/QP Limit/dB	Delta to Peak Limit dB
		QP	Peak	AV				
Vertical	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Vertical	240,06	0,00	36,30	0,00	0,00	46,00	0,00	9,70
Vertical	246,60	0,00	28,40	0,00	0,00	46,00	0,00	17,60
Vertical	257,82	0,00	33,20	0,00	0,00	46,00	0,00	12,80
Vertical	258,72	0,00	33,80	0,00	0,00	46,00	0,00	12,20
Vertical	261,54	0,00	32,50	0,00	0,00	46,00	0,00	13,50
Vertical	264,84	0,00	32,20	0,00	0,00	46,00	0,00	13,80
Vertical	1227,00	0,00	38,69	35,52	54,00	74,00	18,48	35,31
Vertical	2292,00	0,00	55,15	36,48	54,00	74,00	17,52	18,85
Vertical	3603,00	0,00	48,29	38,03	54,00	74,00	15,97	25,71
Vertical	3691,00	0,00	50,45	44,74	54,00	74,00	9,26	23,55
Vertical	3770,50	0,00	51,52	49,59	54,00	74,00	4,41	22,48
Vertical	4584,00	0,00	47,42	37,03	54,00	74,00	16,97	26,58
Vertical	4804,00	0,00	52,93	43,49	54,00	74,00	10,51	21,07
Vertical	14471,00	0,00	54,70	42,79	54,00	74,00	11,21	19,30
Vertical	17701,00	0,00	58,52	47,05	54,00	74,00	6,95	15,48

Remark: none

Temperature: 21 °C
Air Pressure: 1024 hPa
Humidity: 54 %

Op. Mode	Setup	Port	Test Parameter
op-mode 2	setup 2	enclosure pcb antenna	

Polarisation	Frequency MHz	Corrected Value dBµV/m			Limit QP/AV dBµV/m	Limit Peak dBµV/m	Delta to AV/QP Limit/dB	Delta to Peak Limit dB
		QP	Peak	AV				
Vertical	240,24	0,00	33,80	0,00	0,00	46,00	0,00	12,20
Vertical	255,30	0,00	31,70	0,00	0,00	46,00	0,00	14,30
Vertical	255,66	0,00	32,30	0,00	0,00	46,00	0,00	13,70
Vertical	257,46	0,00	33,20	0,00	0,00	46,00	0,00	12,80
Vertical	260,64	0,00	33,30	0,00	0,00	46,00	0,00	12,70
Vertical	266,64	0,00	32,00	0,00	0,00	46,00	0,00	14,00
Vertical	2292,00	0,00	54,23	34,34	54,00	74,00	19,66	19,77
Vertical	3664,00	0,00	48,22	45,73	54,00	74,00	8,27	25,78
Vertical	3786,00	0,00	45,65	40,30	54,00	74,00	13,70	28,35
Vertical	4583,50	0,00	51,41	37,95	54,00	74,00	16,05	22,59
Vertical	4882,50	0,00	46,27	36,71	54,00	74,00	17,29	27,73
Vertical	7323,00	0,00	47,70	36,33	54,00	74,00	17,67	26,30
Vertical	14473,50	0,00	54,83	42,95	54,00	74,00	11,05	19,17
Vertical	17700,00	0,00	59,06	47,08	54,00	74,00	6,92	14,94

Remark: none

Temperature: 21 °C
Air Pressure: 1024 hPa
Humidity: 54 %

Op. Mode	Setup	Port	Test Parameter
op-mode 3	setup 2	enclosure pcb antenna	

Polarisation	Frequency MHz	Corrected Value dBµV/m			Limit QP/AV dBµV/m	Limit Peak dBµV/m	Delta to AV/QP Limit/dB	Delta to Peak Limit dB
		QP	Peak	AV				
Vertical	257,94	0,00	33,10	0,00	0,00	46,00	0,00	12,90
Vertical	258,18	0,00	33,20	0,00	0,00	46,00	0,00	12,80
Vertical	259,62	0,00	33,00	0,00	0,00	46,00	0,00	13,00
Vertical	261,90	0,00	32,90	0,00	0,00	46,00	0,00	13,10
Vertical	262,26	0,00	33,10	0,00	0,00	46,00	0,00	12,90
Vertical	401,58	0,00	34,10	0,00	0,00	46,00	0,00	11,90
Vertical	2292,00	0,00	52,41	36,90	54,00	74,00	17,10	21,59
Vertical	3685,50	0,00	49,62	47,06	54,00	74,00	6,94	24,38
Vertical	3720,00	0,00	47,49	37,89	54,00	74,00	16,11	26,51
Vertical	3806,00	0,00	50,27	48,23	54,00	74,00	5,77	23,73
Vertical	4960,50	0,00	49,38	36,49	54,00	74,00	17,51	24,62
Vertical	14500,00	0,00	54,34	42,81	54,00	74,00	11,19	19,66
Vertical	17722,50	0,00	60,04	47,52	54,00	74,00	6,48	13,96

Remark: none

4.3 .3 Test result: Spurious Radiated Emissions

FCC Part 15, Subpart C	Op. Mode	Setup	Port	Result
	op-mode 1	setup 2	enclosure patch antenna	**passed**
	op-mode 1	setup 2	enclosure pcb antenna	**passed**
	op-mode 2	setup 2	enclosure patch antenna	**passed**
	op-mode 2	setup 2	enclosure pcb antenna	**passed**
	op-mode 3	setup 2	enclosure patch antenna	**passed**
	op-mode 3	setup 2	enclosure pcb antenna	**passed**

4.4 Power Density

Standard FCC Part 15, Subpart C 10-1-98

The test was performed according to: FCC §15.31 10-1-1998

4.4.1 Test Description

The Equipment Under Test (EUT) was set up in a shielded room to perform the output power measurements

The EUT was connected to spectrum analyzer via a short coax cable (Type: Rosenberger RTK 161, 1m, SMA connectors), with a known loss.

The Analyser settings are according 15.247 (d):
- Detector: Peak-Maxhold
- Span: 2 MHz
- Resolution Bandwidth (RBW): 3 kHz
- Video Bandwidth (VBW): 3 kHz
- Sweep Time: Coupled

The reference level of the spectrum analyser was set equal to the reference level of the EUT.

4.4.2 Test Limits

FCC Part 15, Subpart C, §15.247 (g)

The power density shall be below 8 dBm measured with a resolution bandwidthof3 kHz.

4.4.3 Test Protocol

Temperature: 21 °C
Air Pressure: 1024 hPa
Humidity: 54 %

Op. Mode	Setup	Port	Test Parameter
op-mode 4	setup 1	Antenna port	

Power Density dBm	Remarks
-15,02	none

Remark: none

Temperature: 21 °C
Air Pressure: 1024 hPa
Humidity: 54 %

Op. Mode	Setup	Port	Test Parameter
op-mode 5	setup 1	Antenna port	

Power Density dBm	Remarks
-13,1	none

Remark: none

4.4 .3 Test result: Power Density

FCC Part 15, Subpart C	Op. Mode	Setup	Port	Result
	op-mode 4	setup 1	Antenna port	**passed**
	op-mode 5	setup 1	Antenna port	**passed**

5. Testequipment

EUT Digital Signaling System

Equipment	Type	Serial No.	Manufacturer	Cal due
Digital Radio Communication Tester	CMD 55	831050/020	Rohde & Schwarz	17.06.01

EMI Test System

Equipment	Type	Serial No.	Manufacturer	Cal due
EMI Analyzer	ESI 26	830482/004	Rohde & Schwarz	29.06.01
Signal Generator	SMR 20	846834/008	Rohde & Schwarz	26.07.02
Comparison Noise Emitter	CNE III	99/016	York	04.05.01

EMI Radiated Auxiliary Equipment

Equipment	Type	Serial No.	Manufacturer	Cal due
High Pass Filter	4HC1600/12750-1.	9942011	Trilithic	02.11.00
Loop Antenna	HFH2-Z2	829324/006	Rohde & Schwarz	16.06.01
Cable "ESI to Horn Antenna"	RTK 081	W18.04+3599/001	Rosenberger	09.12.00
Double-ridged horn	HF 906	357357/002	Rohde & Schwarz	18.05.01
Double-ridged horn	HF 906	357357/001	Rohde & Schwarz	18.05.01
Broadband Amplifier 45MHz-27GHz	JS4-00102600-42-5	619368	Miteq	
Log.-per. Antenna	HL 562 Ultralog	830547/003	Rohde & Schwarz	04.10.01
High Pass Filter	5HC2700/12750-1.	9942012	Trilithic	02.11.00
Pyramidal Horn Antenna 26,5 GHz	Model 3160-09	9910-1184	EMCO	22.08.01
Cable "ESI to EMI Antenna"	RTK081+Aircell7	W18.01+W38.01a	Huber+Suhner	09.12.00
Biconical dipole	VUBA 9117	9117108	Schwarzbeck	03.06.01

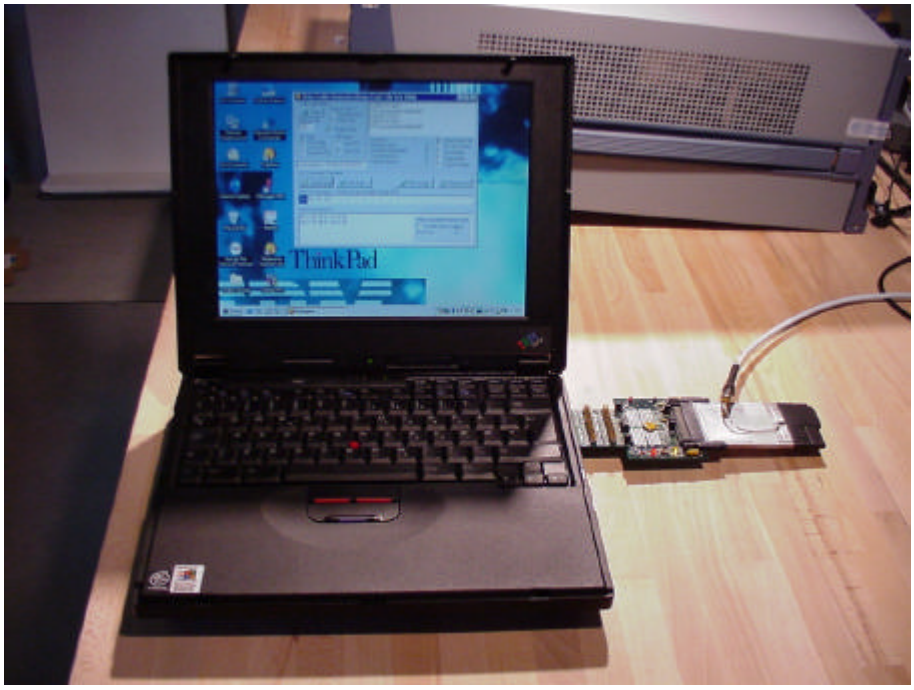
EMI Conducted Auxiliary Equipment

Equipment	Type	Serial No.	Manufacturer	Cal due
Two-Line V-Network	ESH 3-Z5	829996/002	Rohde & Schwarz	22.06.01
Cable "LISN to ESI"	RG214	W18.03+W48.03	Huber+Suhner	14.09.00
Two-Line V-Network	ESH 3-Z5	828304/029	Rohde & Schwarz	22.06.01

Auxiliary Test Equipment

Equipment	Type	Serial No.	Manufacturer	Cal due
Digital Multimeter 02	Voltcraft M-3860M	IJ095955	Conrad	03.06.01
Digital Multimeter 01	Voltcraft M-3860M	IJ096055	Conrad	03.06.01
Digital Oscilloscope	TDS 784C	B021311	Tektronix	26.05.01
Fibre optic link Transceiver	FO RS232 Link	182-018	Pontis	
Notch Filter ultra stable	WRCA800/960-6EE	24	Wainwright	03.02.03
Broadband Resist. Power Divider SMA	1515 / 93459	LN673	Weinschel	
Broadband Resist. Power Divider N	1506A / 93459	LM390	Weinschel	
Signal Generator	SMIQ 03B	832492/061	Rohde & Schwarz	09.11.00
I/Q Modulation Generator	AMIQ-B1	832085/018	Rohde & Schwarz	27.10.00
Temperature Chamber	VT 4002	58566002150010	Vötsch	
Temperature Chamber	S-1.2C-B	393/25-1389-27RF	Thermotron	23.05.03
Fibre optic link Satellite	FO RS232 Link	181-018	Pontis	

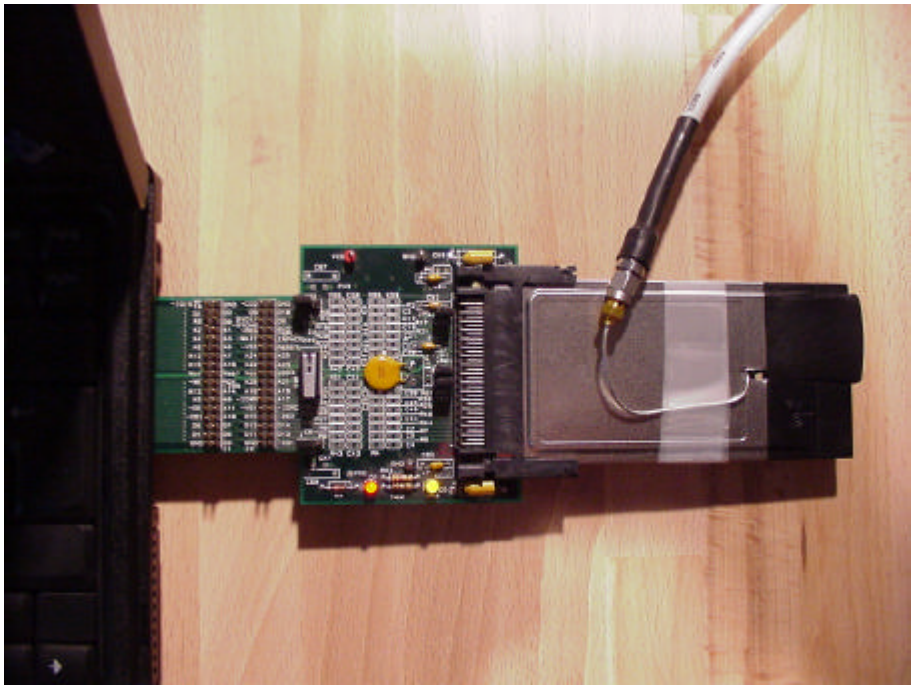
6. Foto Report



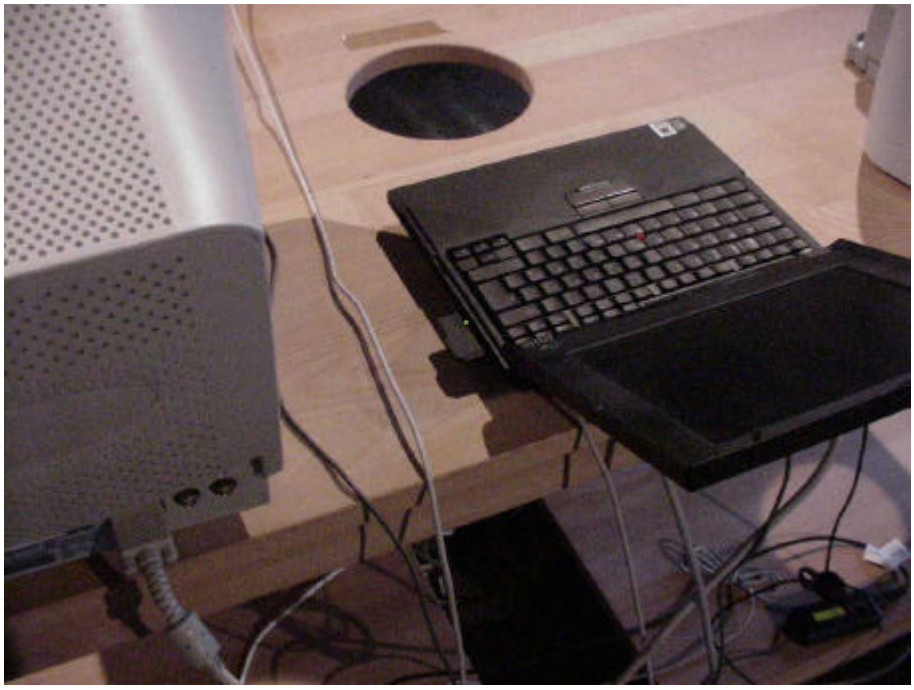
Picture 1 : RF Conducted Test set-up

Picture 2 : RF Radiated Test set-up, front view

Picture 3 : RF Radiated Test set-up, rear view

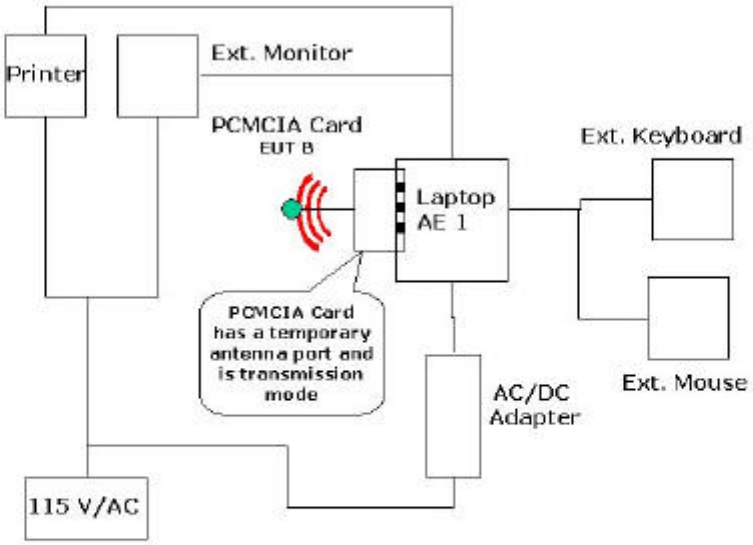


Picture 4 : Test set-up with antenna connector (Detail view)

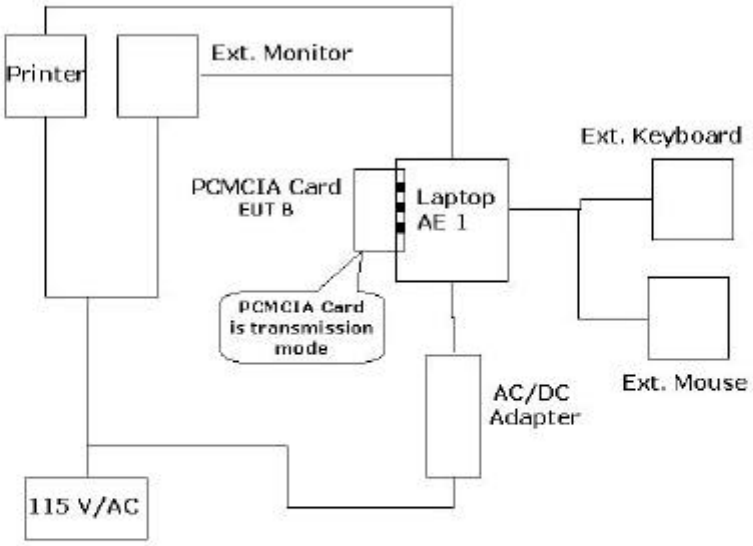


Picture 5 : RF Radiated Test set-up, detail view

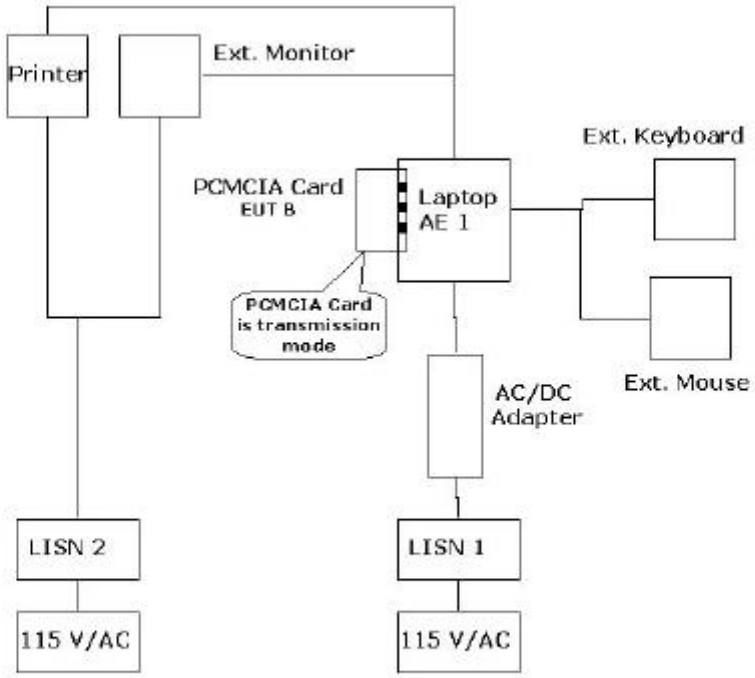
7. Setup Drawings



Drawin 1 : Setup 1 (Conducted Measurements)



Drawin 2 : Setup for radiated measurements

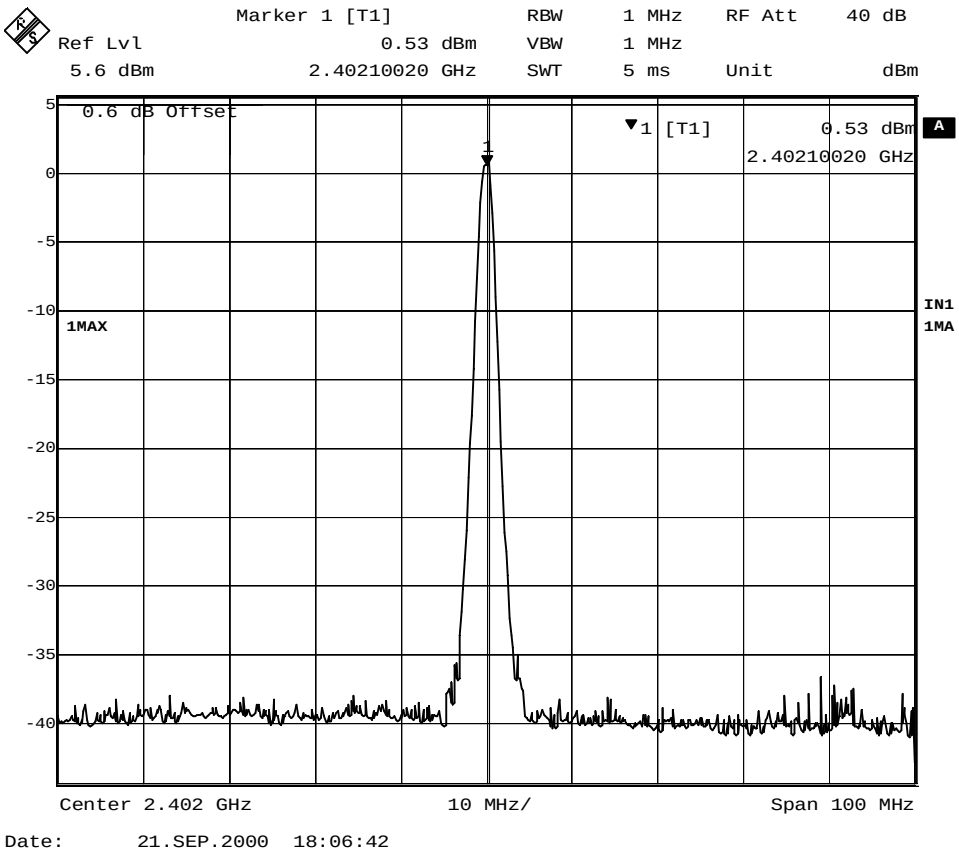


Drawin 3 : Setup for emission test on ac mains

8. Annex

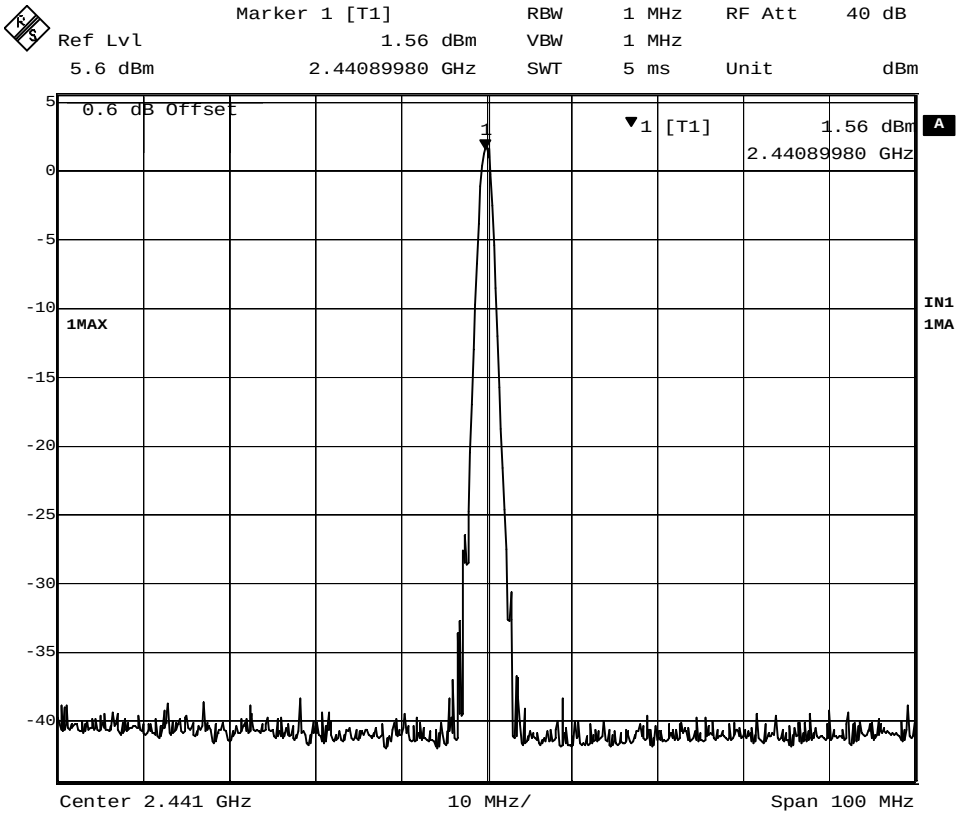
Peak Power Output

Op. Mode	Setup	Port
op-mode 1	setup 1	Antenna port



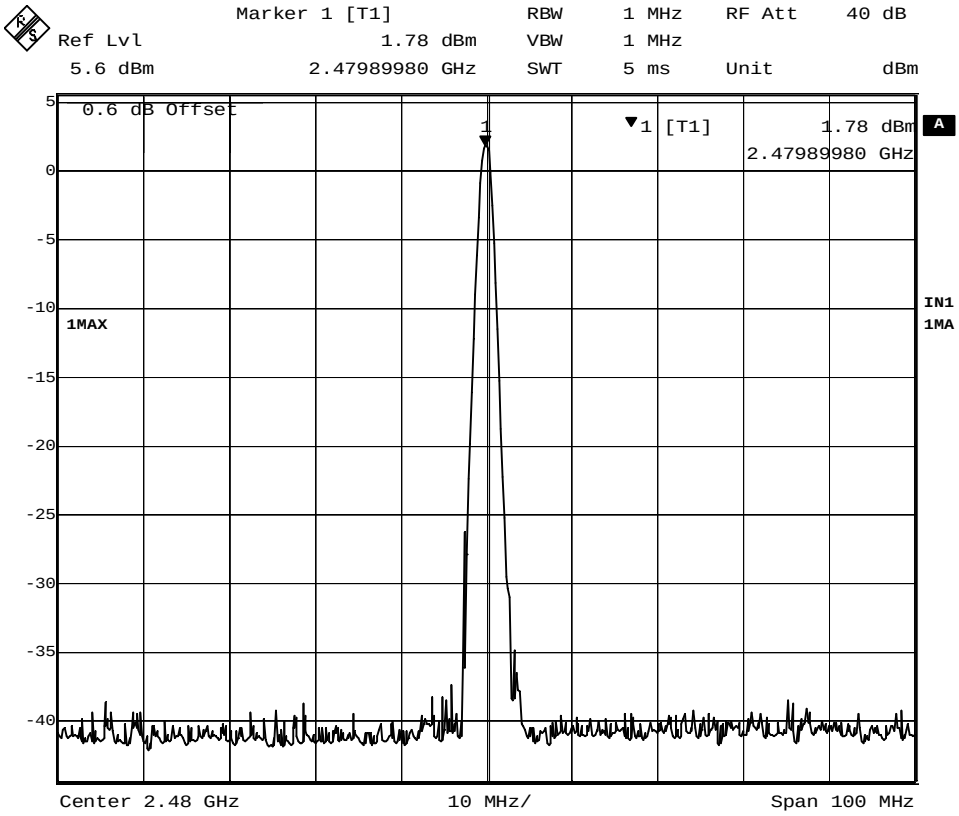
Output Power: TX=2402 MHz

Op. Mode	Setup	Port
op-mode 2	setup 1	Antenna port



Output Power: TX=2441 MHz

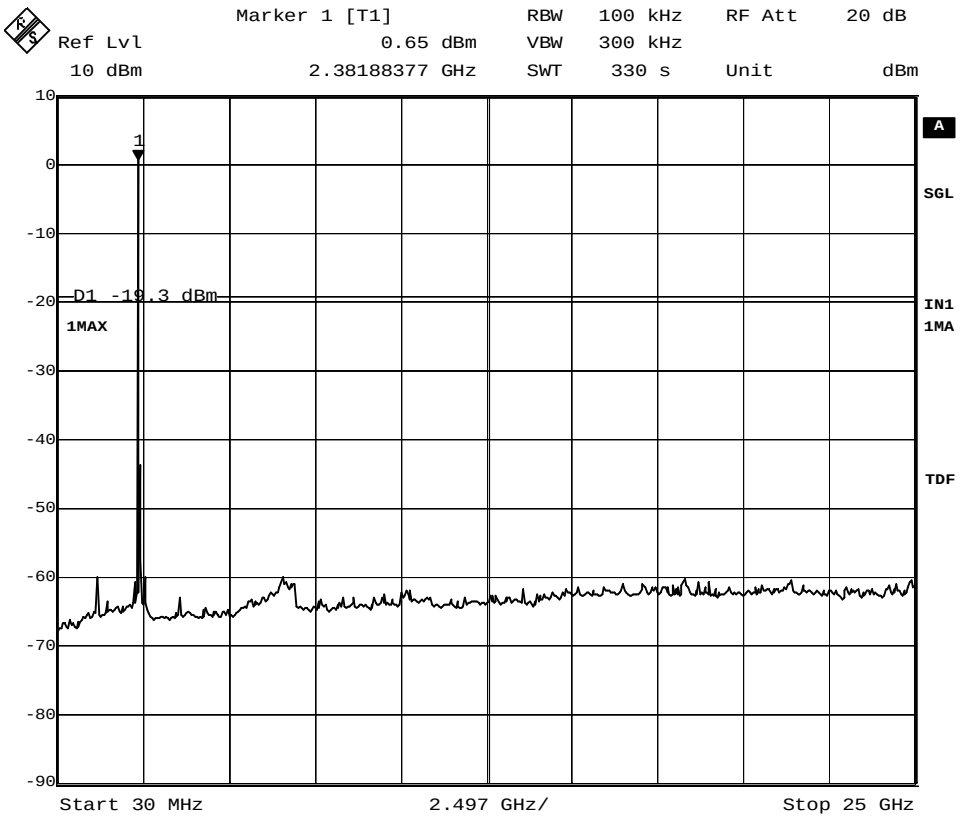
Op. Mode	Setup	Port
op-mode 3	setup 1	Antenna port



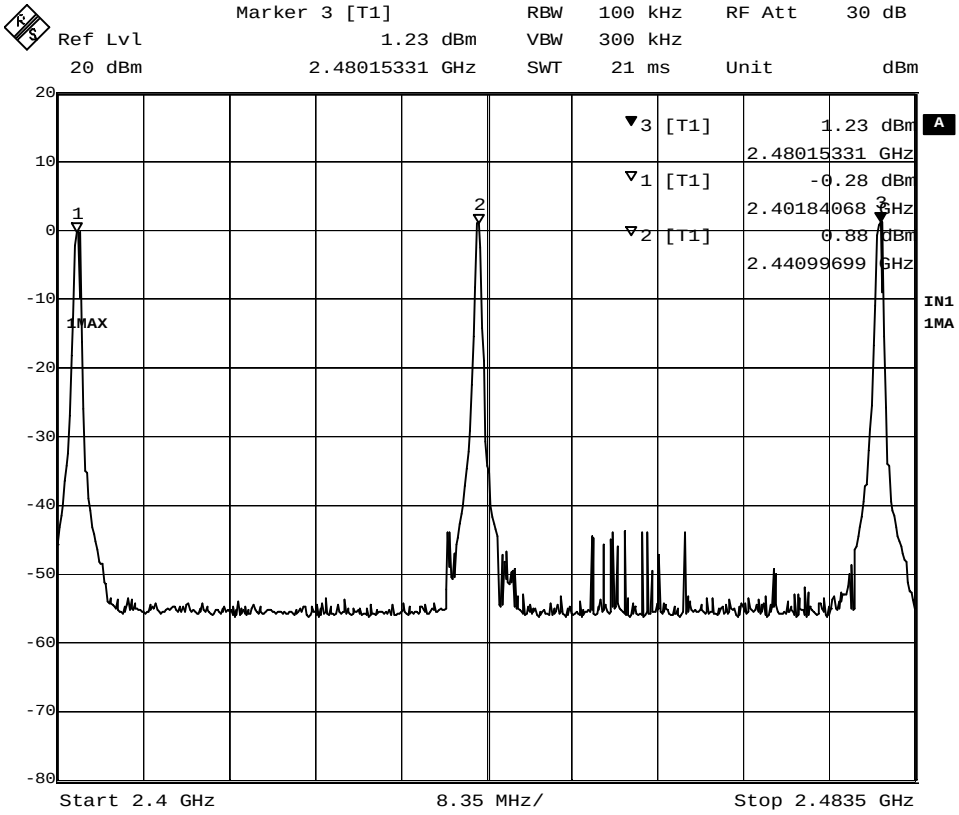
Output Power: TX=2480 MHz

Spurious RF Conducted Emissions

Op. Mode	Setup	Port
op-mode 1	setup 1	Antenna port



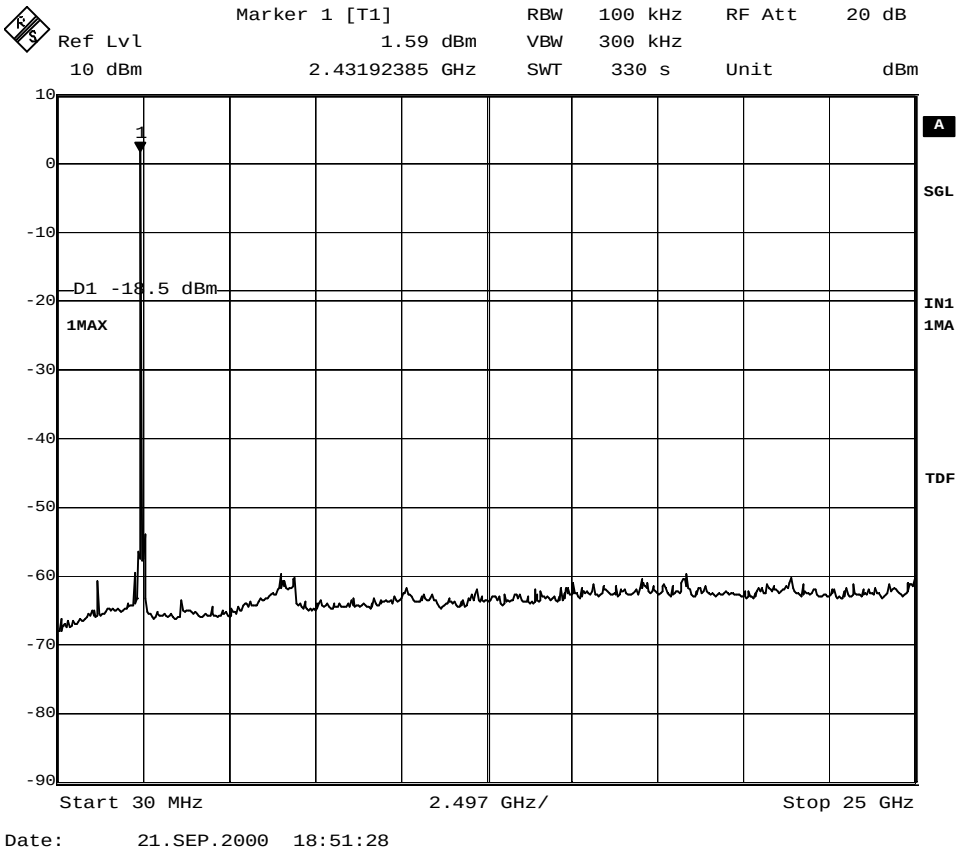
Spurious emissions conducted: TX = 2402 MHz



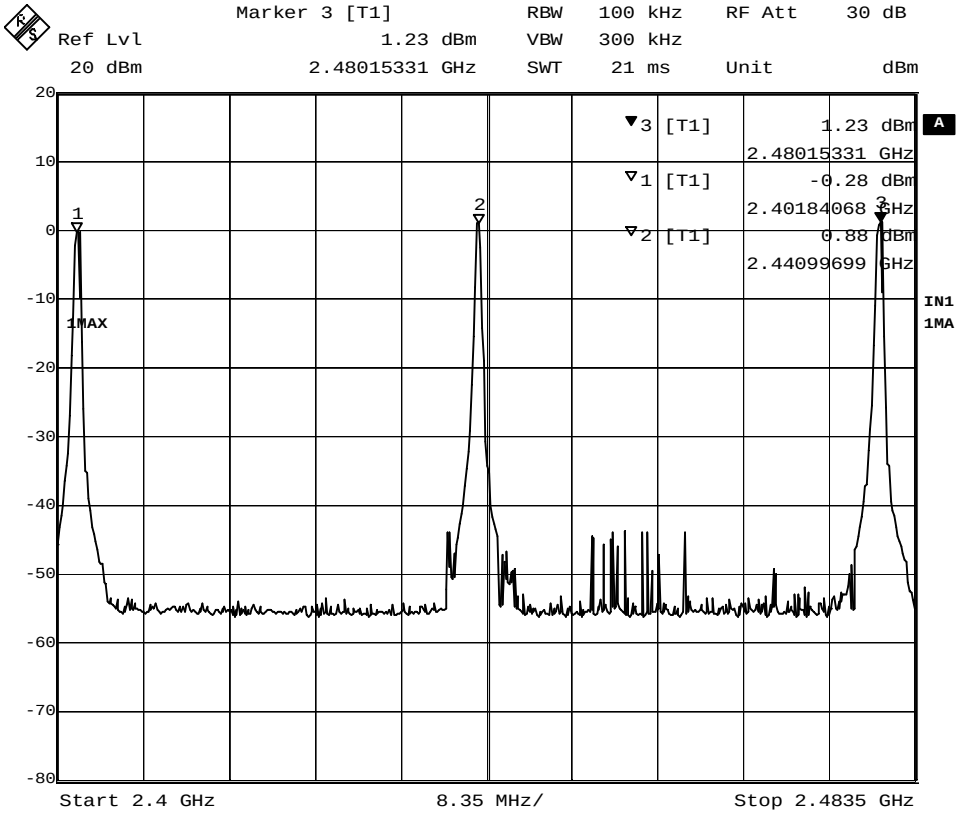
Date: 22.SEP.2000 14:15:37

Band-Edge Compliance

Op. Mode	Setup	Port
op-mode 2	setup 1	Antenna port



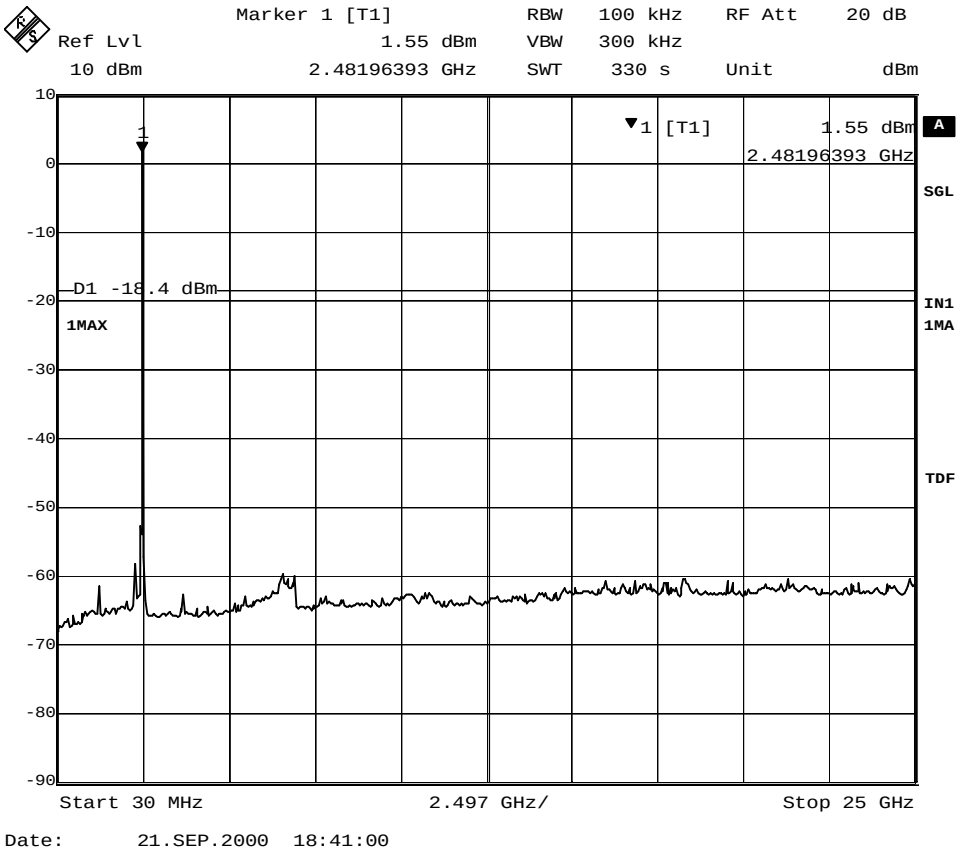
Spurious emissions conducted: TX = 2441 MHz



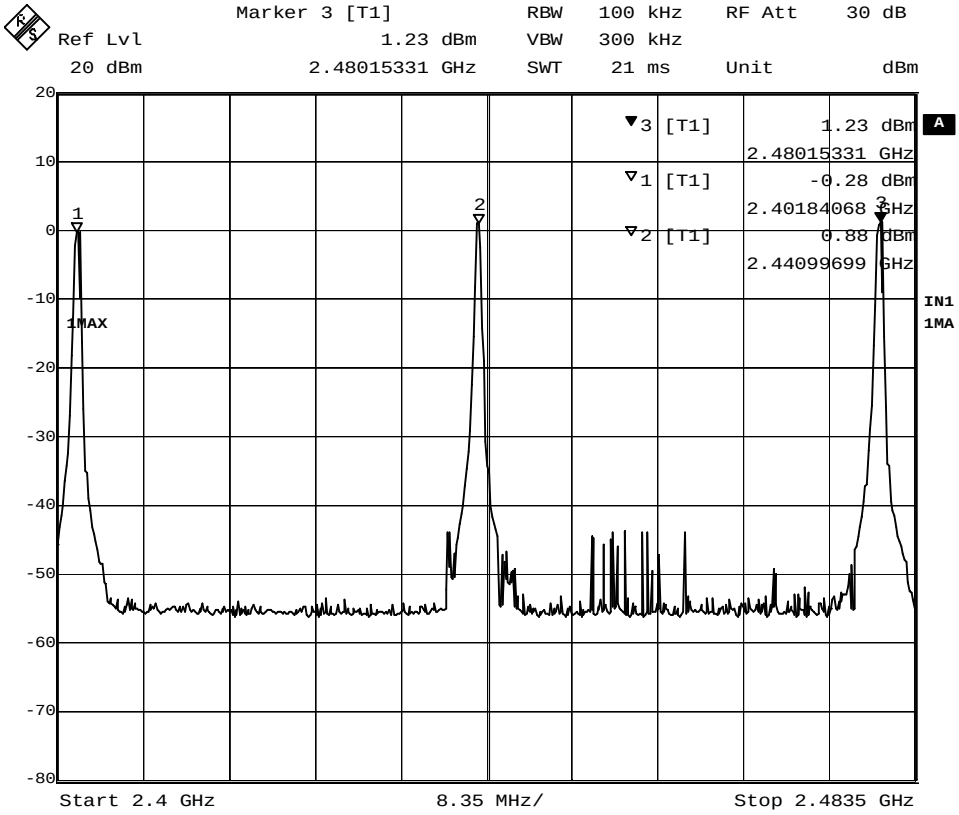
Date: 22.SEP.2000 14:15:37

Band-Edge Compliance

Op. Mode	Setup	Port
op-mode 3	setup 1	Antenna port



Spurious emissions conducted: TX = 2480 MHz

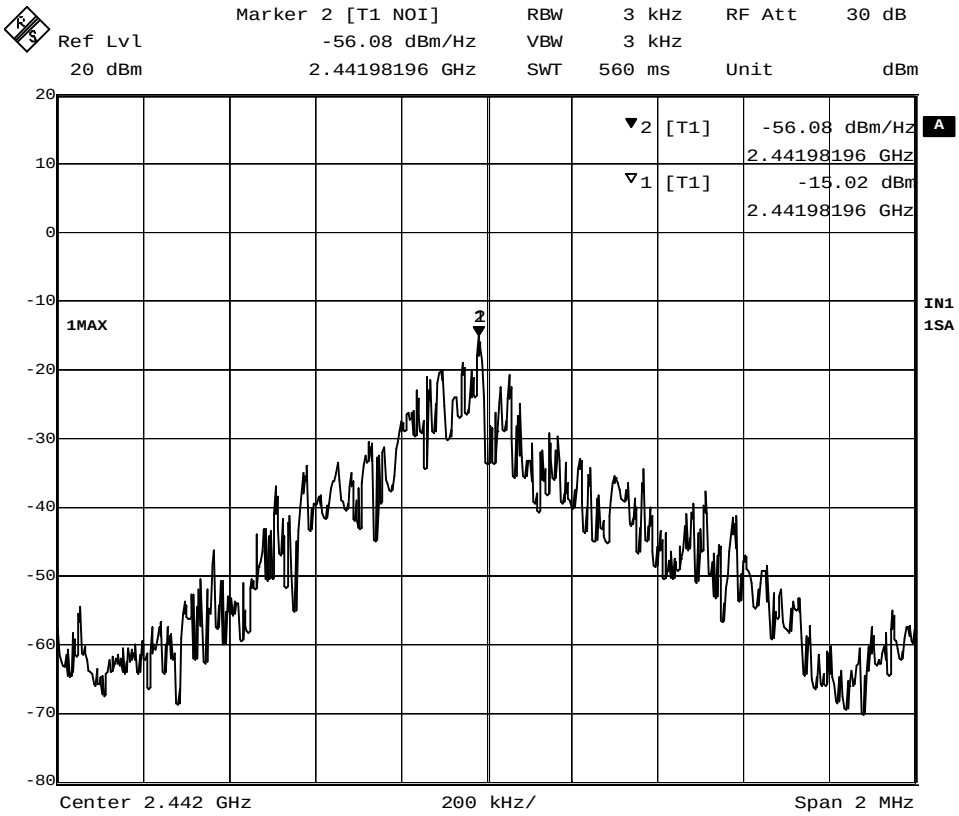


Date: 22.SEP.2000 14:15:37

Band-Edge Compliance

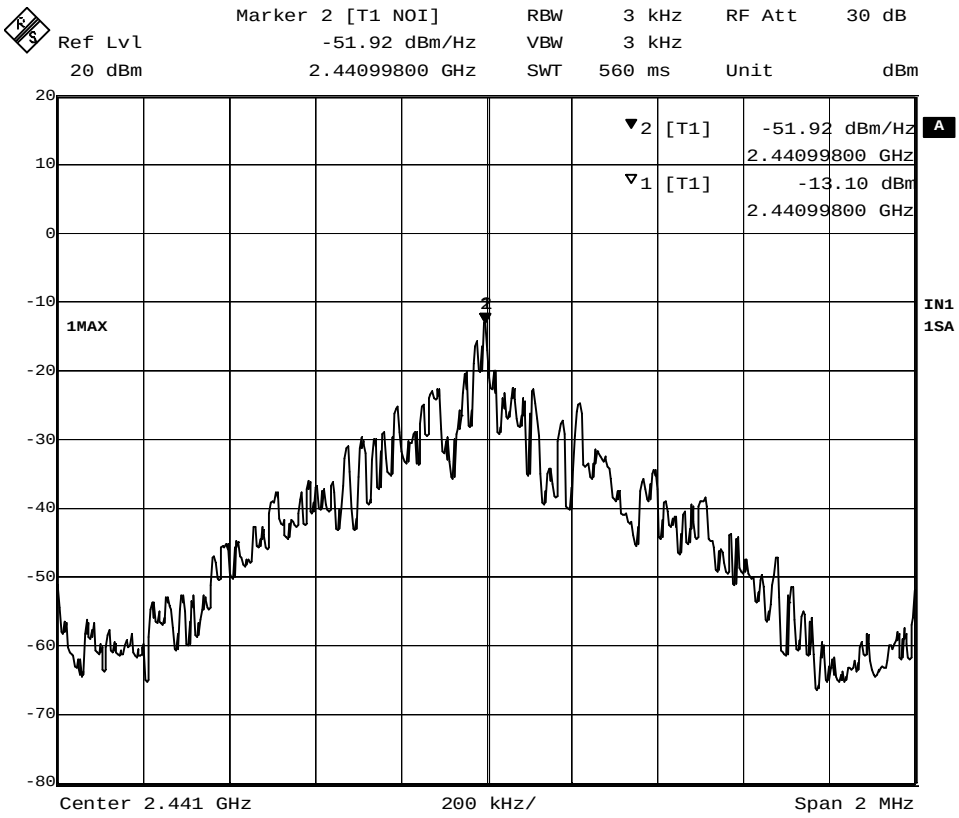
Power Density

Op. Mode	Setup	Port
op-mode 4	setup 1	Antenna port



Power density: EUT is in page mode

Op. Mode	Setup	Port
op-mode 5	setup 1	Antenna port



Power density: EUT is in inquiry mode