

RADIO TEST REPORT

No. 0109217R1

EQUIPMENT UNDER TEST

Equipment : Bluetooth Local Infotainment Point
Type / model : blip C11
Manufacturer : Ericsson Microwave Systems AB
Tested by request of : Ericsson Microwave Systems AB

SUMMARY

The equipment complies with the requirements regarding conducted emission on ac power line, and radiated emission requirements, according to the following standard.

FCC part 15 (1999)
Subpart C 15.207 and subpart C 15.247

Date of issue: Mars 2, 2001

Tested by:



Jan Adolfsson

Approved by:

Annika Nyberger

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Chart: Radiated emission 22 – 25 GHz

1. CLIENT INFORMATION

The EUT has been tested by request of

Company: Ericsson Microwave Systems AB
TS/U CTP
431 84 Mölndal

Telephone: tel: 031 747 00 00
fax: 031 747 05 50

Name of contact: Hans Welén

2. EQUIPMENT UNDER TEST (EUT)

2.1 Identification of the EUT

Equipment: Bluetooth Local Infotainment Point
Type/Model: blip C11
Brand name: Ericsson
Manufacturer: Ericsson Microwave Systems AB
Rating: AC/DC-adapter:100 – 240 V AC 50-60 Hz

2.2 Additional information about the EUT

The EUT consists of the following units:

Units	Product number	Serial number
blip C11	BFM 90199/1 P3A 01W07 S 80 000232 01W07	
Power supply	BML 162130/13R1B	047036820G

2.2.1 Transmitter technical characteristics.

Frequency band: 2.4 GHz
Supported specification: Bluetooth 1.0 B

2.2.2 Transmitter RF power characteristics:

Maximum rated transmitter output power: 0 dBm
Antenna: Integrated

2.2.3 Transmitter modulation

Modulation: FHSS, GFSK
Bit rate: 460 kbps

2.2.4 Power source

Power supply:

AC/DC-adapter:100 – 240 V AC 50-60 Hz

blip C11:

Nominal voltage 5 V DC

Operational voltage 4,5 . 15 V DC

Power consumption :

< 1,5 W

2.3 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not included as part of the testing and evaluation of the EUT.

Equipment

Product number

blip C11”tester”
computer

BFM 90199/1 P2A 01W07

Cables

Type

Length

Serial RS232

Shielded

3 m

Serial RS232

Shielded

10 m

Ethernet

Shielded cat 5

10 m

3. TEST SPECIFICATIONS

3.1 Standards

FCC (1999) Part 15-Radio frequency devices

Subpart C – Intentional radiators 15.207 Conducted limits

Subpart C – Intentional radiators 15.247 Frequency hopping systems operating in the 2400 – 2486.5 MHz and 5725 – 5850 MHz.

Subpart C – Intentional radiators 15.209 Radiated emission limits; general requirements

Subpart A – General 15.35 Measurement detector functions and bandwidths

Conducted emission:

Limit	0.45 – 30 MHz	47.9 dB μ V
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Radiated emission 3 m distance:

Limits	30 – 88 MHz	40.0 dB μ V/m
	88 – 216 MHz	43.5 dB μ V/m
	216 – 960 MHz	46.0 dB μ V/m
	960 MHz – 1000 MHz	54.0 dB μ V/m
	1 – 25 GHz	74.0 dB μ V/m

4. TEST SUMMARY

The results in this report apply only to the tested sample

Test	Result	Note
Conducted emission, 0,45 – 30 MHz	Pass	
Radiated spurious emission, transmitter 30 MHz – 25 GHz	Pass	

5 MAINS TERMINAL CONTINUOUS DISTURBANCE VOLTAGE, 0,45 – 30 MHz

5.1 Operating environment

Temperature: 22 °C
Relative Humidity: 16 %

5.2 Test set-up and test procedure

The mains terminal disturbance voltage was measured with the equipment under test (EUT) 0,8 m above the ground plane and 0,4 m from the vertical ground plane. The EUT was connected to an artificial mains network (AMN). The AMN was placed on a metallic, grounded floor. Amplitude measurements were performed with a quasi-peak detector.

5.3 Measurement uncertainty

Mains terminal disturbance voltage, quasi-peak detection: $\pm 2,0$ dB
Mains terminal disturbance voltage, average detection: $\pm 2,0$ dB

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT in the above mentioned way.

Measurement uncertainty is calculated in accordance with WECC 19-1990.
The measurement uncertainty is given with a confidence of 95%.

5.4 Test equipment

Test site: Shielded room

Equipment	Manufacturer	Type	SEMKO No.
Measurement receiver	Rohde & Schwarz	ESHS 30	4946
Artificial mains network	Rohde & Schwarz	ESH3-Z5	2727

5.5 Test protocol

Date of test: March 1, 2001

Frequency MHz	Disturbance Quasi peak dB(μ V)	
	Level	Limit
0,889	38	48
1,673	43	48
1,840	40	48
2,819	38	48
3,001	45	48
3,199	40	48
6,371	40	48
6,564	39	48
6,758	40	48

5.6 Conducted emission, diagram

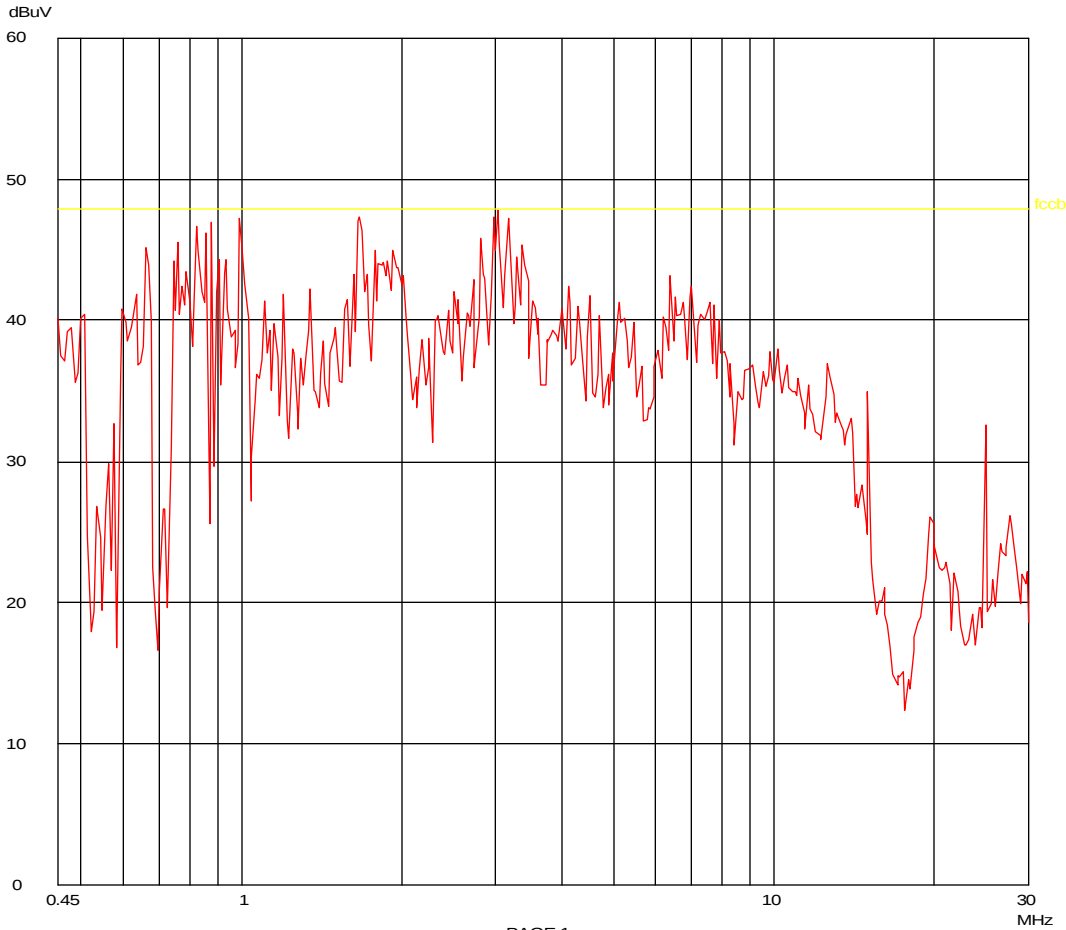
Overview sweep with max peak detection

EMC-CENTER
FCC part151 conducted

01. Mar 01 14:52

EUT: BLIP C11
Manuf: Ericsson
Op Cond: TX hopping
Operator: JAA
Test Spec: Mains terminals. Peak measurements.
Comment: 115 V AC 50 Hz

Scan Settings (1 Range)				Receiver Settings			
Frequencies							
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp OpRge
450k	30M	7k	10k	PK	20ms	AUTO	LN OFF 60dB



6 RADIATED SPURIOUS EMISSION

6.1 Operating environment

The measurements in the frequency range 30 – 1000 MHz were performed in a semi-anechoic chamber.
The measurements in the frequency range 1 – 25 GHz were performed in a anechoic chamber.

Temperature: 22 °C (15 - 35 °C)
Relative Humidity: 11 % (30 - 60 %)

6.2 Measurement uncertainty

Radiated disturbance electric field intensity, 30-200 MHz: ±3,0 dB
Radiated disturbance electric field intensity, 200-1000 MHz: ±2,5 dB
Radiated disturbance electric field intensity, 1-25 GHz: ±4,0 dB

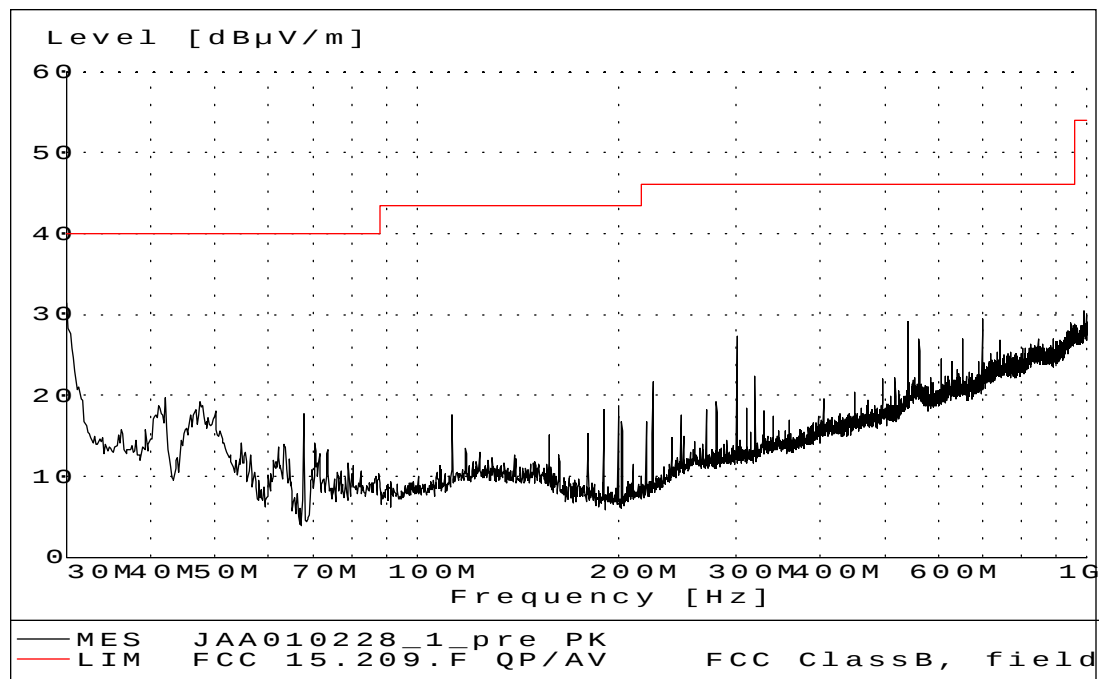
6.3 Test equipment

Equipment	Manufacturer	Type	SEMKO No.
Software:	R&S	ES-K1	
Software:	Frank Hoppert	REMI	
Measurement receiver:			
Monitor unit:	R&S	ESAI	2973
RF unit:	R&S	ESAI	2974
Spectrum analyzer:	HP	8566B	7091
Spectrum analyzer	HP	8593E	6661
Antenna amplifier:	SEMKO		7992, 7993
Preamplifier:	HP	8449B	6685
Attenuator:	HP	8491A	2296
High pass filter 4-18GHz:	K&L	4H10-X4500	5133
Antennas:			
Bilog:	Chase	CBL6111A	1550
Double Ridge Waveguide Horn:	EMCO	3115	3006
Pyramidal Horn Antenna:	EMCO	3160-08	
Pyramidal Horn Antenna:	EMCO	3160-09	

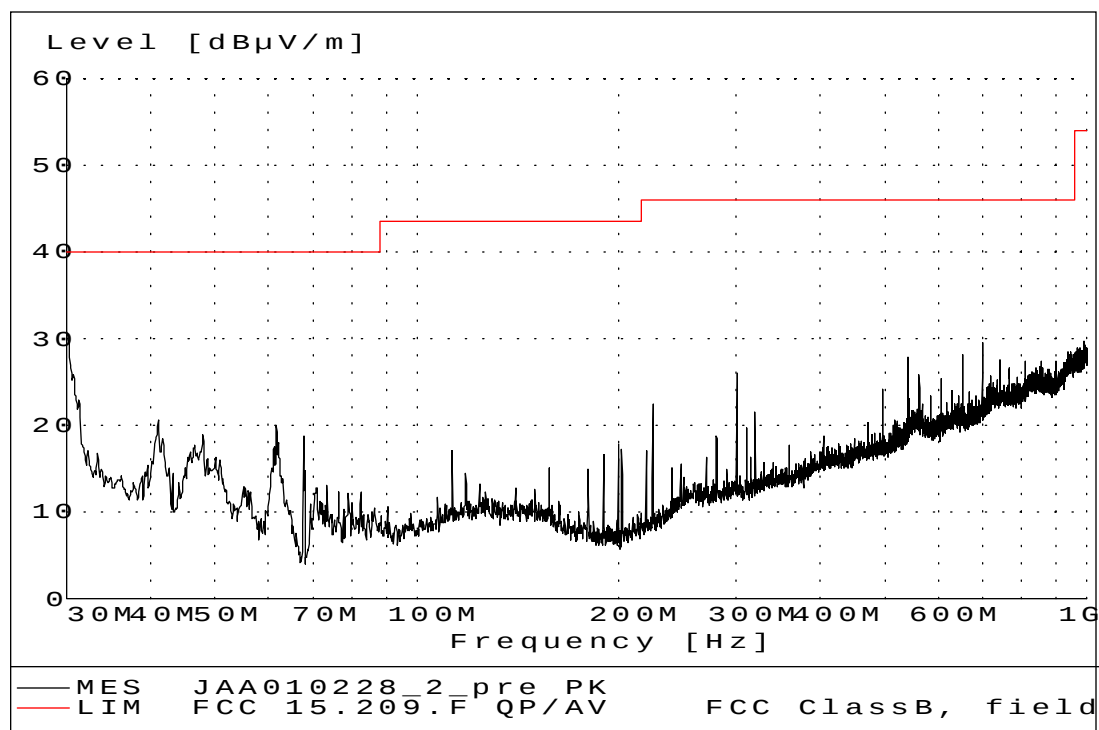
6.4 Diagram, 30 MHz – 1 GHz

Date of test: February 28, 2001

Overview sweep with max peak detection. RBW = 120 kHz



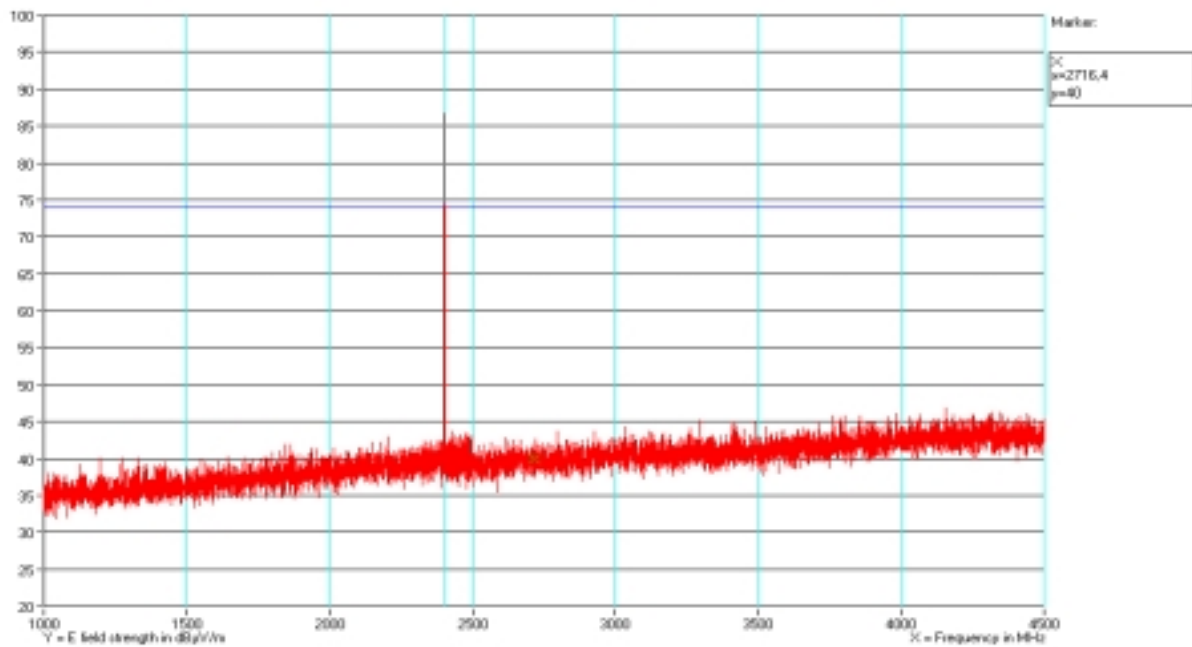
TX Channel 1



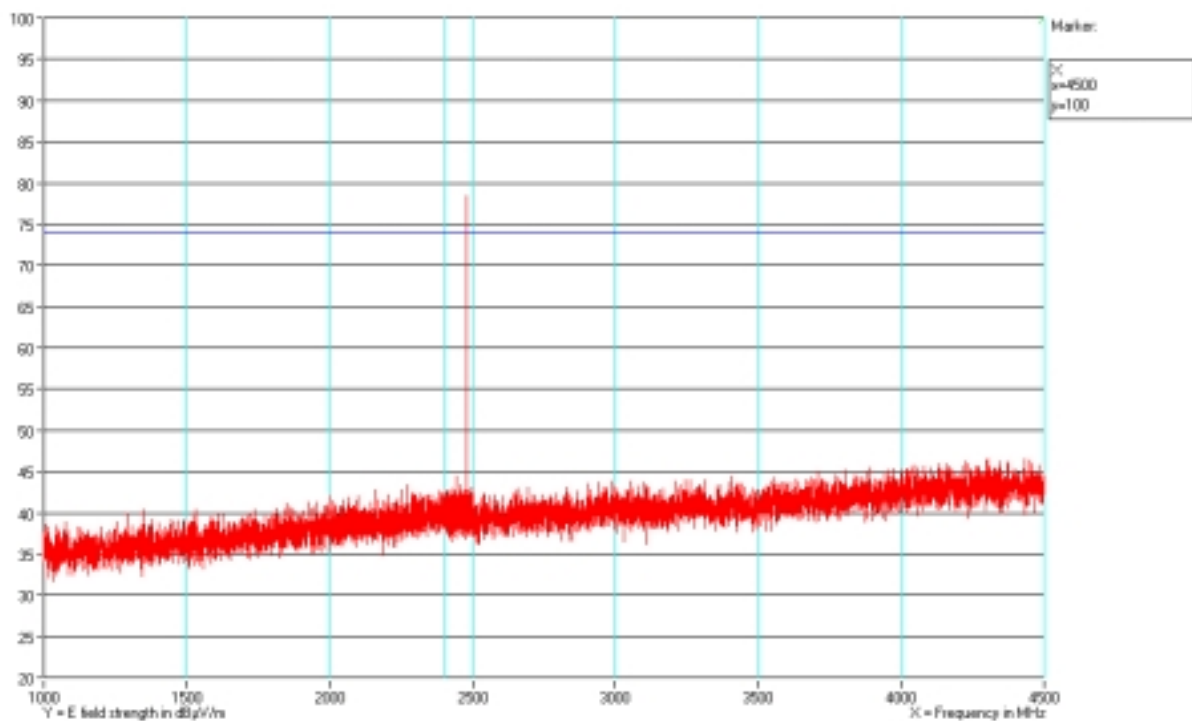
TX Channel 79

6.5 Diagram 1- 4.5 GHz

Overview sweep max peek detection, RBW = 1 MHz, VBW = RBW



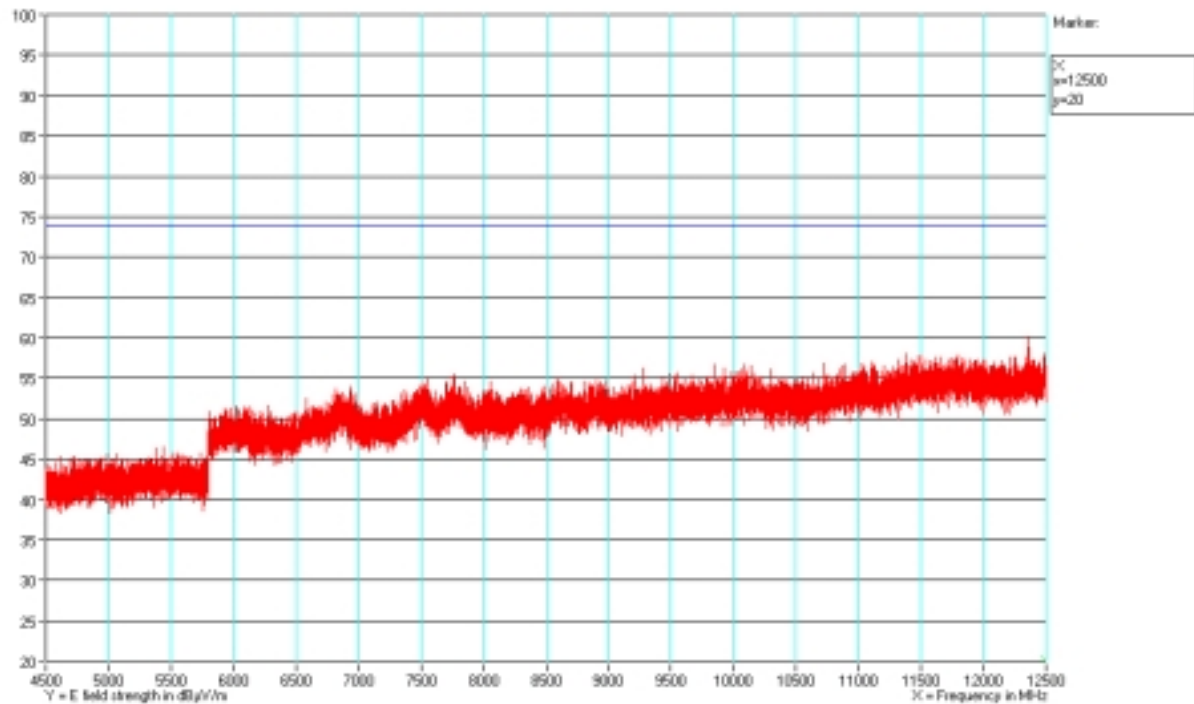
TX channel 1



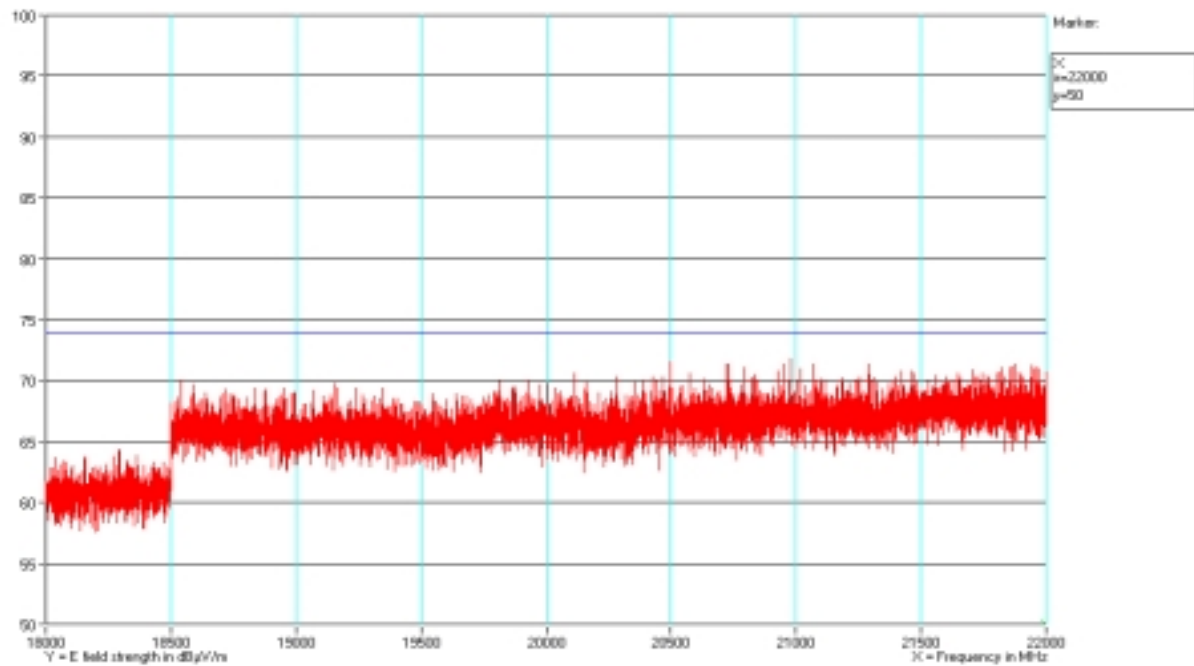
TX Channel 79

6.6 Diagram 4.5 – 22 GHz

Overview sweep with max peak detection RBW = 1 MHz, VBW = RBW



4,5 – 12,5 GHz



12,5 – 22 GHz

6.7 Test protocol

Field strength of spurious emission						
Frequency [MHz]	RBW [kHz]	Measured level		Limit		Note
		Peak [dB μ V/m]	QP [dB μ V/m]	Peak [dB μ V/m]	QP [dB μ V/m]	
300,0	120		28	-	46	
540,0	120		28	-	46	
652,48	120		27	-	46	
697,52	120		29	-	46	
1000 - 25000	1	<65		74		1

Note 1. Limit for peak detection

Fulfil requirements: Yes