TEST REPORT

In support of the Application for Grant of Equipment Authorization of the WTFA for use on the Nokia MetroSite EDGE 800, and the WTPA for use on the Nokia MetroSite EDGE 1900 Base Transceiver Stations to FCC part 22 and part 24.

FCC ID: L7KWTPA01/ L7KWTFA01

Report No RG611553





September 2003



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Equipment: Metrosite Edge Base Station using the WTPA and WTFA

FCC ID: L7KWTPA01 and L7KWTFA01

Specification: 47 CFR 2, 47 CFR 22 & 47 CFR 24

Applicant and

Manufacturer: Nokia UK Limited Stanhope Road

Camberley Surrey GU13 3BW

Manufacturer's

Representative: Mr Andrew Parry

APPROVED BY

M JENKINS

Wireless Group Leader

DATED 9th September 2003

Start of Test: Completion of Test: 25th July 2003 25th July 2003

DISTRIBUTION Nokia UK Limited

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ENGINEERING STATEMENT

I ATTEST: the measurements shown in this report were made in accordance with the procedures indicated, and that the emissions from this equipment were found to be within the applicable limits. I assume full responsibility for the accuracy and completeness of these measurements. On the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 47 CFR 2.1051, 22.905 and 47 CFR 2.1049, 24.238(b) of the FCC Rules under normal use and maintenance.

R Henlev



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Subclause	Parameter to be measured	
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Introduction

The information contained within this report is intended to show verification of compliance of the Nokia Base Transmitter Station, Metrosite GSM 800 base station with WTFA, and Metrosite GSM 1900 Base Station with WTPA, to the requirements of 47 CFR 2.1051, 22.905 and 47 CFR 2.1049, 24.238(b).

Test Location

All testing was conducted at the premises of BABT, Segensworth Road, Fareham, Hants, PO15 5RH. Testing at BABT was carried out by BABT Personnel, R Henley, Test Engineer.



Test Equipment and Ancillaries Used For Test

No	Instrument/Ancillary	Туре	Manufacturer	Serial No.	Cal Due
1	Signal Generator	ESG-4000A	Hewlett Packard	GB37040125	21 st Jan 03
2	Spectrum Analyser	FSEM	Rohde & Schwarz	827285/006	16 th Dec 03
3	Attenuator	47-10-34	Weinschel	BC 2506	13 th Sep 03

Table 1

Note(s)

- 1) All items are calibrated annually, except where labelled T/U (Traceability Unscheduled). These items are calibrated within the test configurations using calibrated equipment.
- 2) Throughout the test report the test equipment used for each test is referenced using the number indicated in the table above (1 to 3).

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Description of Equipment Under Test Configuration

The BTS can be configured as either 800 or 1900 or a combination of both. Both 800 and 1900 TRX's support both GMSK and 8PSK modulation. The cabinet can house a maximum of four TRX's. The testing was performed on the TRX RF output connector.

Test Rationale

Block Edge Measurements

The power supply option was deemed to have no effect on the block edge measurement. Testing the Frequency Error at Voltage Variation would indicate any error due to supply voltage, which would cause the fundamental to fall outside the block edge. Both modulation schemes were tested.

The power level used for each block edge measurement is detailed with the relevant plot of the measurement.

The power levels used within the report are shown as those required by the operation software (DSP), the relationship between the shown power levels and the 'end user' power levels are as follows:

GMSK Modulation – End User Power levels of 0 to 15 are shown as Power Levels 0 to 15 within this report.

8PSK Modulation – End User Power levels of 0 to 9 are shown as Power Levels 16 to 25 within this report. (For example : power level 19 within this report equates to an End User power level of 3)

Channel Configuration

For the Block Edge testing, the tested channels have been changed to demonstrate compliance with the standard. This is reflected in the user guide for the EUT. To cover bottom, middle and top channels for each block and each test case would involve a huge amount of testing. Thus, to provide a practical representative set of results, the EUT was tested at bottom, middle and top of the entire 800 and PCS1900 band to demonstrate compliance with the standard.

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The equipment under test is made up of the following component parts.

<u>Module</u>	Kit Number	Serial Number
Cabinet	058187A4-5 COPY	B020900045 COPY
<u>Transceivers</u>		
CTDA11	469691AX31	L1031174656
CTDA11	469691AX31	L1031174647
CTDA11	469691AX31	L1031174649
CTDA11	469691AX31	L1031174652
CTGA11	469690AX31	L1030958066
WTPA11	468231AX41	L1023721885
WTFA11	46854X22	L1024047077
Power Supplies		
48V DC PSU / HVSD 12	468263102	2A022500044
240 V PSU / CVSA 11	469712A101	9Q030500023
240 V PSU /CVSG 11	4697773A101	9Q030500014
<u>Digital Boards</u>		
Interface Unit /VIFA	11467208A103	4H021000567
Transmission Unit / FC-STM 1	0000279501	4H032263876
<u>Fan</u>		
HVMF	MADC24B41M-X	L2011300002

Table 2

List of Performed Measurements using the configuration in Table 2

i) Spurious Emissions at Antenna Terminals
 ii) Band Edge Measurements
 47 CFR 2.1051, 22.905
 47 CFR 24.238(b)

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SECTION 1

47 CFR 2.1051, 22.905 Spurious Emissions At Antenna Terminals (+/-1MHz)

Testing relating to the WTFA



Test Date: 25th July 2003

Rule Parts: 2.1051, 22.905

Measurement Method

In accordance with 22.917(e), any emissions outside of the block edges shall be attenuated by at least 43 + 10 log(P). The measurements are shown to ±1MHz from the block edges. The plots shown under the Spurious Emissions section covers the required range of 9kHz to 9GHz.

The reference power and path losses of all channels used for testing in each frequency block were measured. It was found that there was <0.5dB variation in all channels, thus the worst case reference level offset was used throughout. Having entered the reference level offset, the limit line was displayed, showing the -13dBm, (43+10logP), limit.

Table 3 shows the Frequency Blocks the EUT was tested against along with the tested channels.

Communication Channel Pair Blocks

Frequency Block	Lower Block Edge Test	Upper Block Edge Test
(MHz)	Channels/Frequencies	Channels/Frequencies
A	Channel: 128	Channel: 181
(869.040 – 879.990)	Frequency: 869.20MHz	Frequency: 879.80MHz
A	Channel: 233	Channel: 239
(890.010 – 891.480)	Frequency: 890.20MHz	Frequency: 891.40MHz
B	Channel: 183	Channel : 231
(880.020 – 889.980)	Frequency: 880.20MHz	Frequency : 889.80MHz
B	Channel: 240	Channel: 251
(891.510 – 893.970)	Frequency: 891.60MHz	Frequency: 893.80MHz

Table 3

Remarks

The channels shown in the table above are the minimum and maximum channels that can be used in each block to maintain compliance. Channels used outside of those stated in the table exceed the specification limits, thus they cannot be used.

The measurement plots are shown on pages 10 to 33.

Table 4 contains details of the power levels and channel settings used during testing.

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GSM 800

Channel Number	GMSK	Dsp settings 8PSK	End User 8PSK Levels
128	Power Level 3	Power Level 20	Power Level 4
181	Power Level 0	Power Level 16	Power Level 0
182	BLOCKED	BLOCKED	BLOCKED
183	Power Level 0	Power Level 16	Power Level 0
231	Power Level 0	Power Level 16	Power Level 0
232	BLOCKED	BLOCKED	BLOCKED
233	Power Level 0	Power Level 16	Power Level 0
239	Power Level 13	BLOCKED	BLOCKED
240	Power Level 13	BLOCKED	BLOCKED
251	Power Level 1	Power Level 16	Power Level 0

Table 4

FCC ID: L7KWTPA01/ L7KWTFA01

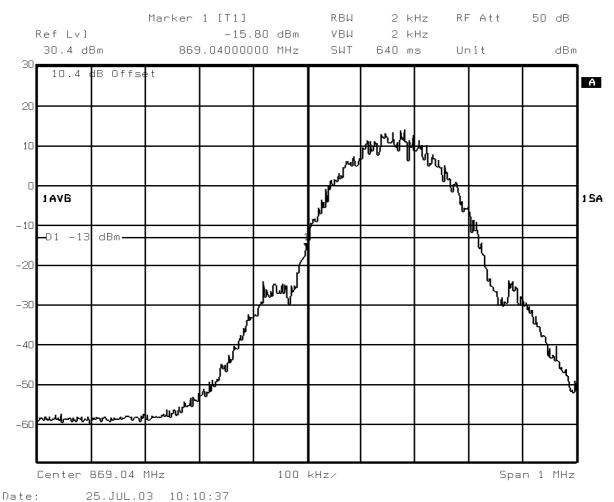


Test Date: 25th July 2003

Rule Parts: 2.1049, 22.905

Block Edge Measurement With EUT Transmitting at Power Level 3 On Channel 128, (869.20MHz) GMSK Modulation

Block A 869.040 – 879.990MHz



7ate. 23.30L.03 10.10.37

Test Equipment Used:

1, 2, 3

Report No RG611553

FCC ID: L7KWTPA01/ L7KWTFA01

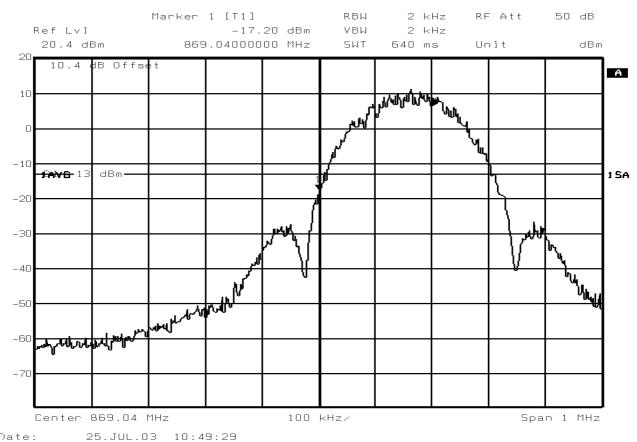


25th July 2003 Test Date:

Rule Parts: 2.1049, 22.905

Block Edge Measurement With EUT Transmitting at Power Level 4 On Channel 128, (869.20MHz) 8-PSK Modulation

Block A 869.040 - 879.990MHz



Date:

Test Equipment Used:

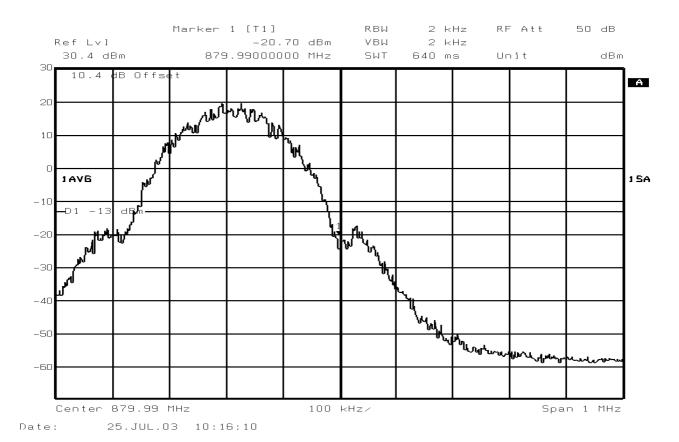


Test Date: 25th July 2003

Rule Parts: 2.1049, 22.905

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 181, (879.80MHz) GMSK Modulation

Block A 869.040 – 879.990MHz



Test Equipment Used:

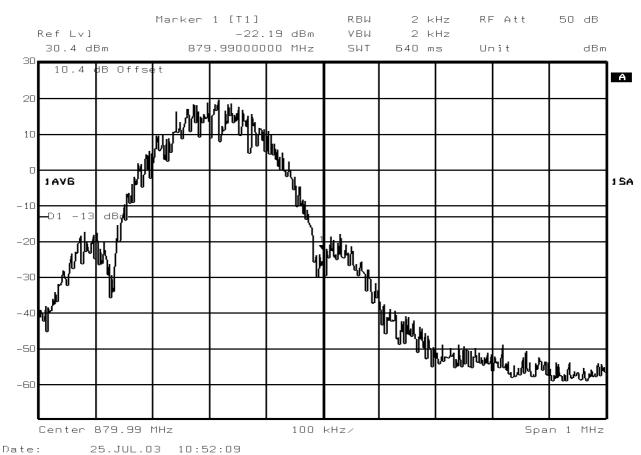


25th July 2003 Test Date:

Rule Parts: 2.1049, 22.905

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 181, (879.80MHz) 8-PSK Modulation

Block A 869.040 - 879.990MHz



Test Equipment Used:

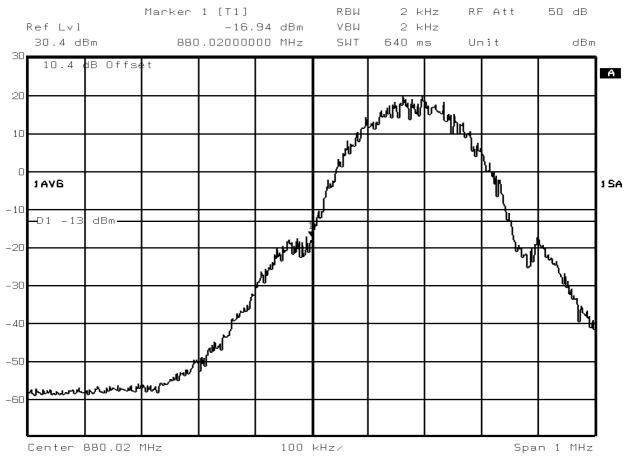


Test Date: 25th July 2003

Rule Parts: 2.1049, 22.905

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 183, (880.20MHz) GMSK Modulation

Block B 880.020 – 889.980 MHz



Date: 25.JUL.03 10:24:24

Test Equipment Used:

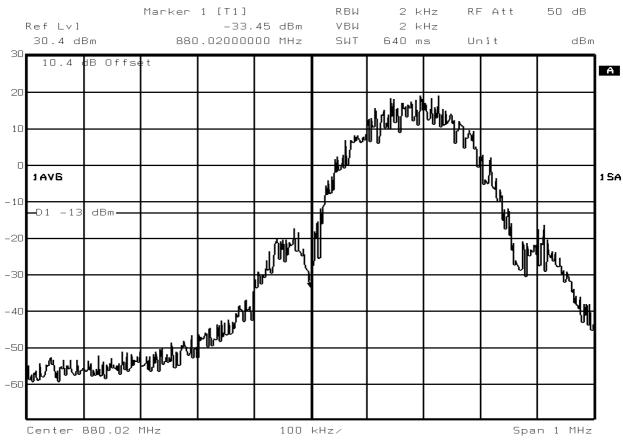


Test Date: 25th July 2003

Rule Parts: 2.1049, 22.905

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 183, (880.20MHz) 8-PSK Modulation

Block B 880.020 – 889.980 MHz



Date: 25.JUL.03 10:54:27

Test Equipment Used:

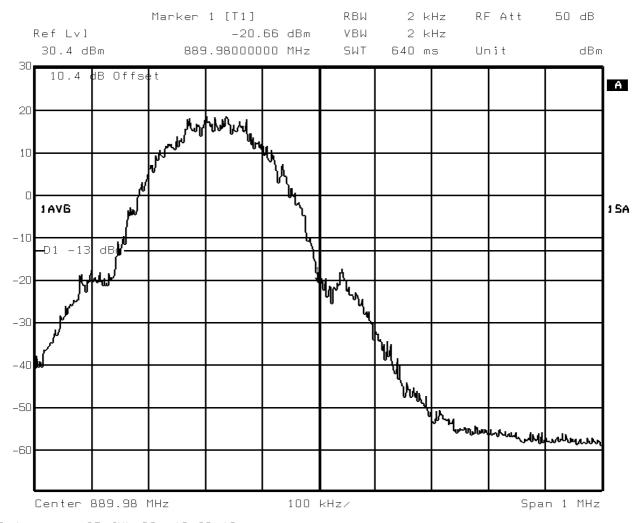


Test Date: 25th July 2003

Rule Parts: 2.1049, 22.905

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 231, (889.80MHz) GMSK Modulation

Block B 880.020 – 889.980 MHz



Date: 25.JUL.03 10:28:19

Test Equipment Used:

1, 2, 3

Report No RG611553

FCC ID: L7KWTPA01/ L7KWTFA01

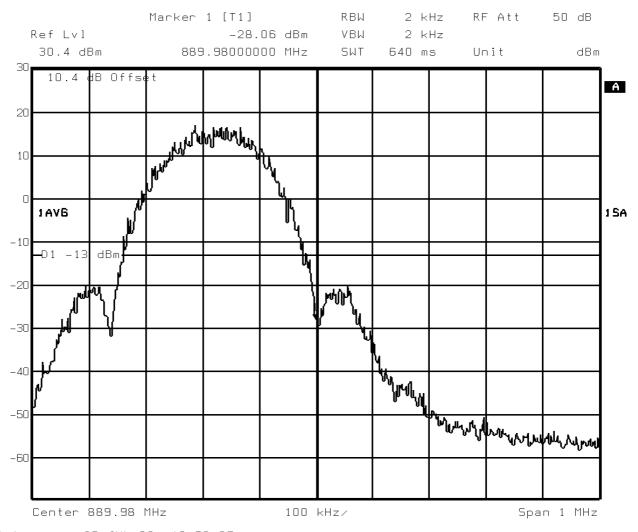


Test Date: 25th July 2003

Rule Parts: 2.1049, 22.905

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 231, (889.80MHz) 8-PSK Modulation

Block B 880.020 – 889.980 MHz



Date: 25.JUL.03 10:56:07

Test Equipment Used:

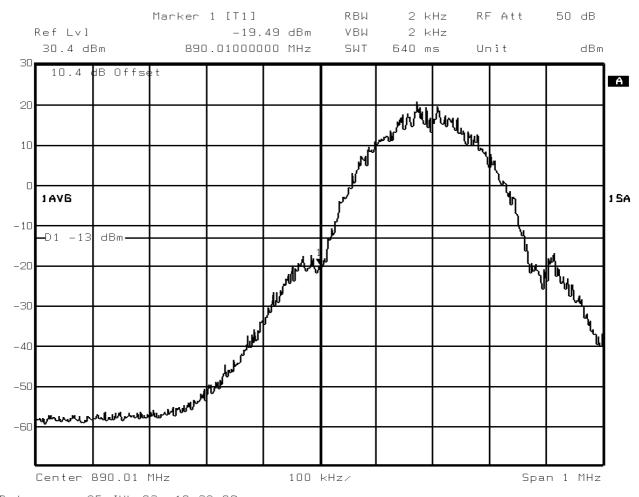


Test Date: 25th July 2003

Rule Parts: 2.1049, 22.905

Block Edge Measurement With EUT Transmitting at Power Level0 On Channel 233, (890.20MHz) GMSK Modulation

Block A 890.010 – 891.480 MHz



Date: 25.JUL.03 10:32:09

Test Equipment Used:

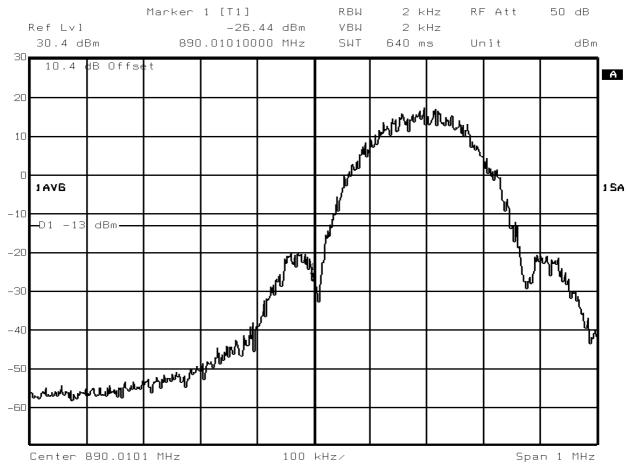


Test Date: 25th July 2003

Rule Parts: 2.1049, 22.905

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 233, (890.20MHz) 8-PSK Modulation

Block A 890.010 – 891.480 MHz



Date: 25.JUL.03 10:57:46

Test Equipment Used:

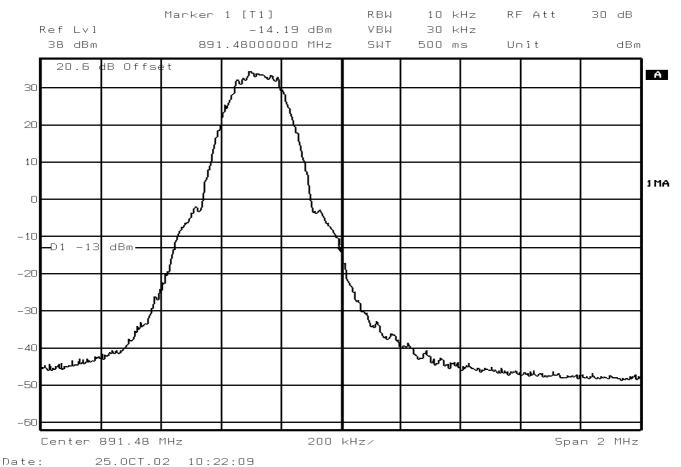


Test Date: 25th July 2003

Rule Parts: 2.1049, 22.905

Block Edge Measurement With EUT Transmitting at Power Level 13 On Channel 239, (891.40MHz) GMSK Modulation

Block A 890.010 – 891.480 MHz



pate. 25.001.02 10.22.03

Test Equipment Used:

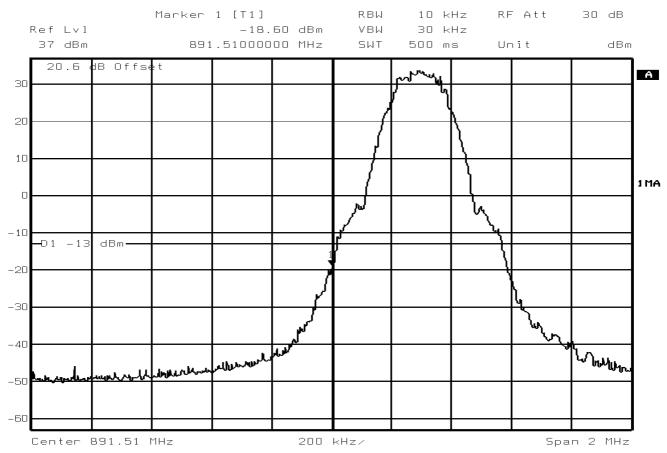


Test Date: 25th July 2003

Rule Parts: 2.1049, 22.905

Block Edge Measurement With EUT Transmitting on Power Level 13 On Channel 240, (891.60MHz) GMSK Modulation

Block B 891.510 – 893.970 MHz



Date: 25.0CT.02 10:54:55

Test Equipment Used:

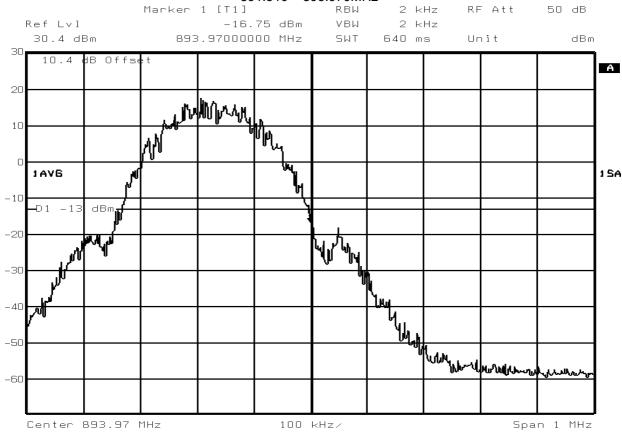


Test Date: 25th July 2003

Rule Parts: 2.1049, 22.905

Block Edge Measurement With EUT Transmitting at Power Level 1 On Channel 251, (893.80MHz) GMSK Modulation

Block B 891.510 – 893.970MHz



Date: 25.JUL.03 10:43:44

Test Equipment Used:

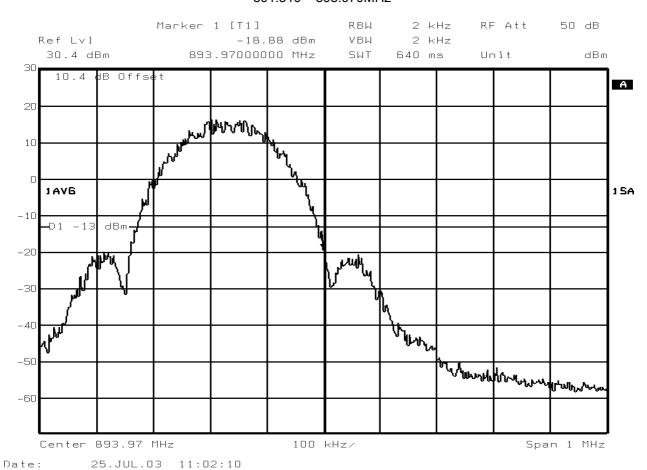


Test Date: 25th July 2003

Rule Parts: 2.1049, 22.905

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 251, (893.80MHz) 8PSK Modulation

Block B 891.510 – 893.970MHz



Test Equipment Used:



SECTION 2

47 CFR 24.238(b) Band Edge Measurements

Testing relating to the WTPA



Test Date: 17th March 2003

Rule Parts: 2.1049, 24.238(b)

Measurement Method

In accordance with Part 24.238, at least 1% of the 26dB bandwidth was used for the resolution and video bandwidths up to 1MHz away from the Block Edge. At greater than 1MHz away from block edge, the resolution and video bandwidths were increased to 1MHz.

The reference power and path losses of all channels used for testing in each frequency block were measured. It was found that there was <0.3dB variation in all channels, thus the worst case reference level offset was used throughout. Having entered the reference level offset, the limit line was displayed, showing the -13dBm, (43+10logP), limit.

Table 5 shows the Frequency Blocks the EUT was tested against along with the tested channels.

Communication Channel Pair Blocks

Frequency Block	Lower Block Edge Test	Upper Block Edge Test
(MHz)	Channels/Frequencies	Channels/Frequencies
A	Channel : 512	Channel : 585
(1930 – 1945)	Frequency : 1930.2MHz	Frequency : 1944.8MHz
B	Channel : 612	Channel: 685
(1950 – 1965)	Frequency : 1950.2MHz	Frequency: 1964.8MHz
C	Channel : 737	Channel: 810
(1975 – 1990)	Frequency : 1975.2MHz	Frequency: 1989.8MHz
D	Channel : 587	Channel : 610
(1945 – 1950)	Frequency : 1945.2MHz	Frequency : 1949.8MHz
E	Channel : 687	Channel : 710
(1965 – 1970)	Frequency : 1965.2MHz	Frequency : 1969.8MHz
F	Channel : 712	Channel : 735
(1970 – 1975)	Frequency : 1970.2MHz	Frequency : 1974.8MHz

Table 5

Remarks

The channels shown in the table above are the minimum and maximum channels that can be used in each block to maintain compliance. Channels used outside of those stated in the table exceed the specification limits, thus they cannot be used.

The measurement plots are shown pages 37 to 60

Table 6 contains details of the power levels and channel settings used during testing.



GSM 1900

Channel Number	GMSK	Dsp settings 8PSK	End User 8PSK Levels
512	Power Level 0	Power Level 16	Power Level 0
585	Power Level 0	Power Level 16	Power Level 0
586	BLOCKED	BLOCKED	BLOCKED
587	Power Level 0	Power Level 16	Power Level 0
610	Power Level 0	Power Level 16	Power Level 0
611	BLOCKED	BLOCKED	BLOCKED
612	Power Level 0	Power Level 16	Power Level 0
685	Power Level 0	Power Level 16	Power Level 0
686	BLOCKED	BLOCKED	BLOCKED
687	Power Level 0	Power Level 16	Power Level 0
710	Power Level 0	Power Level 16	Power Level 0
711	BLOCKED	BLOCKED	BLOCKED
712	Power Level 0	Power Level 16	Power Level 0
712	1 Ower Level 0	1 OWEI LEVEL 10	1 OWEI LEVELO
735	Power Level 0	Power Level 16	Power Level 0
736	BLOCKED	BLOCKED	BLOCKED
737	Power Level 0	Power Level 16	Power Level 0
810	Power Level 0	Power Level 16	Power Level 0

Table 6

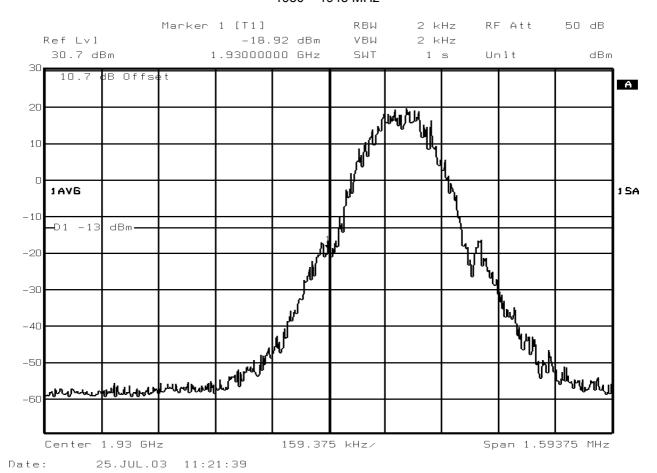


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 512, (1930.2MHz) GMSK Modulation

Block A 1930 – 1945 MHz



Test Equipment Used:

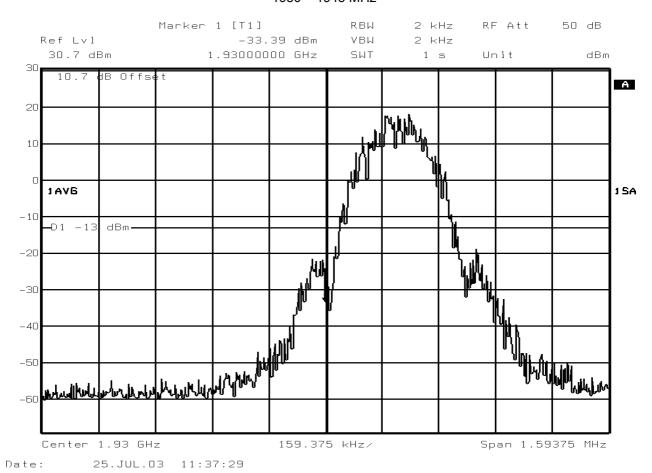


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 512, (1930.2MHz) 8-PSK Modulation

Block A 1930 – 1945 MHz



Test Equipment Used:

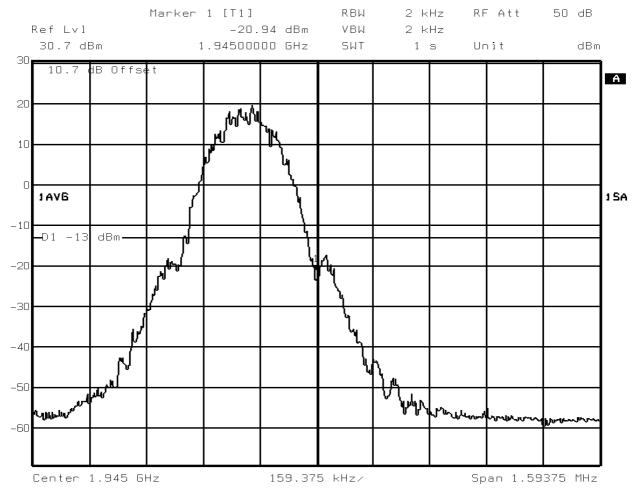


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 585, (1944.8MHz) GMSK Modulation

Block A 1930 – 1945 MHz



Date: 25.JUL.03 11:16:06

Test Equipment Used:

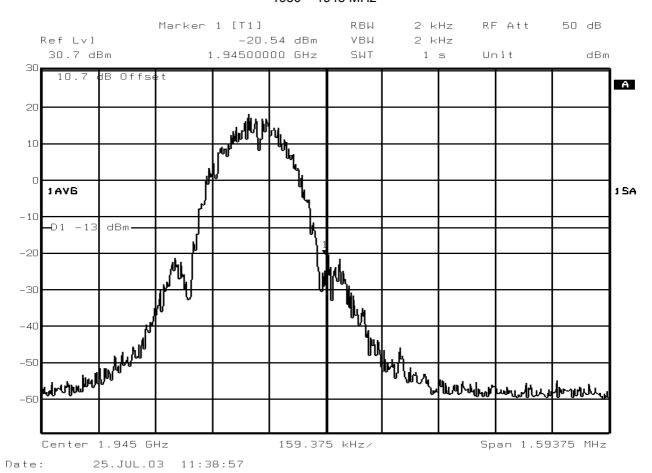


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 585, (1944.8MHz) 8-PSK Modulation

Block A 1930 – 1945 MHz



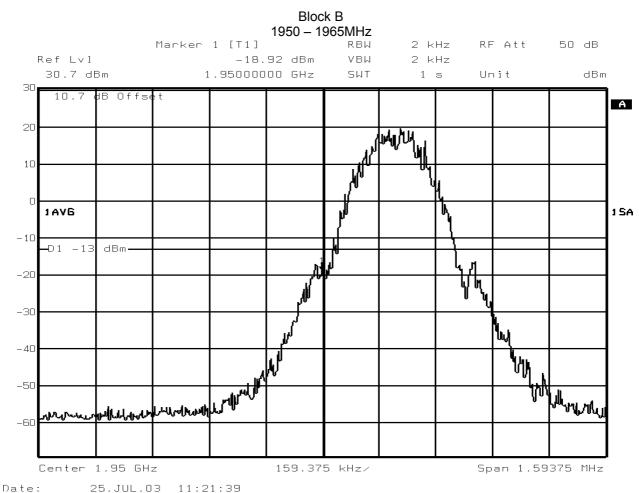
Test Equipment Used:



Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 612, (1950.2MHz) GMSK Modulation



nate. 20.30E.03 11.21.33

Test Equipment Used:

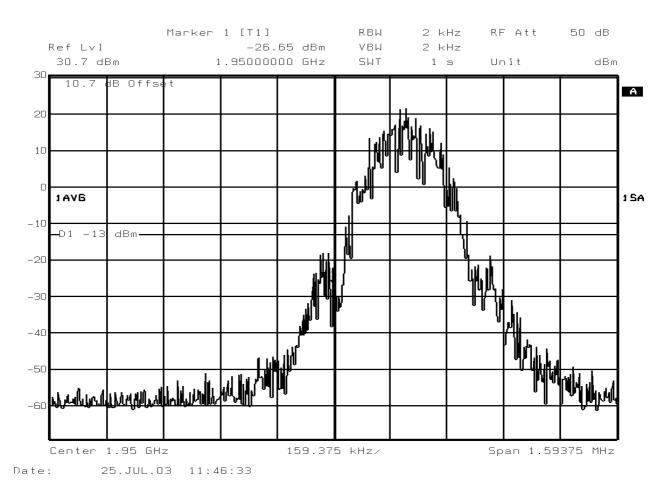


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 612, (1950.2MHz) 8-PSK Modulation

Block B 1950 – 1965MHz



Test Equipment Used:

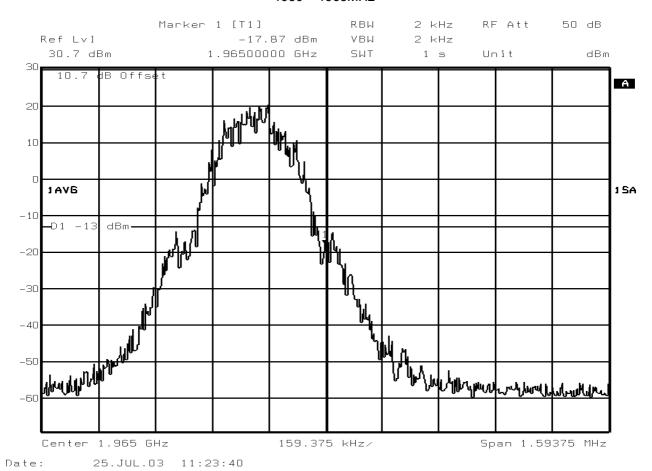


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 685, (1964.8MHz) GMSK Modulation

Block B 1950 – 1965MHz



Test Equipment Used:

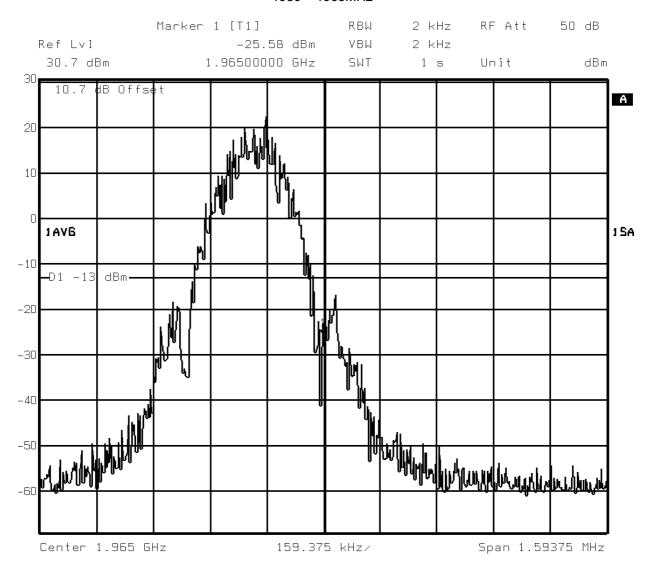


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 685, (1964.8MHz) 8-PSK Modulation

Block B 1950 – 1965MHz



Date: 25.JUL.03 11:48:04

Test Equipment Used:

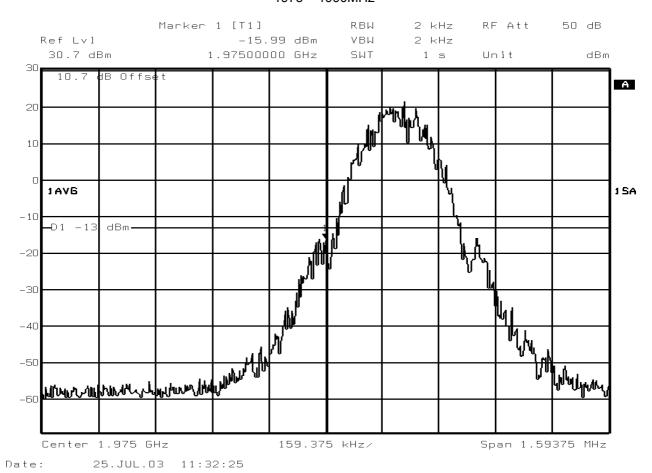


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 737, (1975.2MHz) GMSK Modulation

Block C 1975 – 1990MHz



Test Equipment Used:

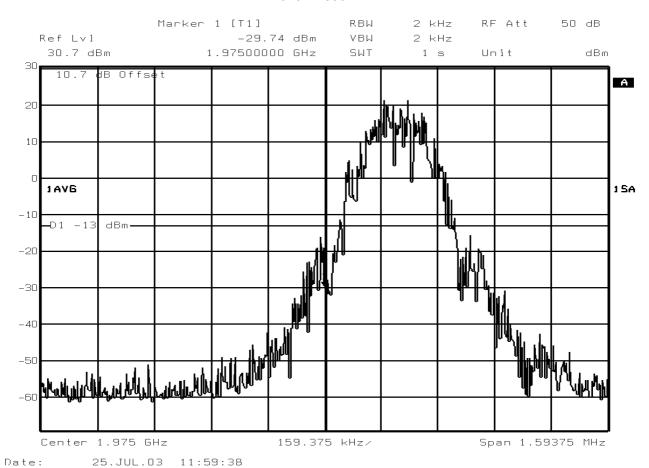


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 737, (1975.2MHz) 8-PSK Modulation

Block C 1975 – 1990MHz



Test Equipment Used:

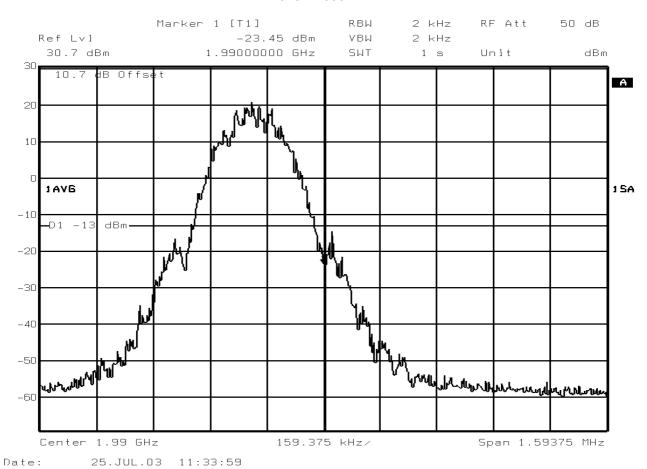


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 810, (1989.8MHz) GMSK Modulation

Block C 1975 – 1990MHz



Test Equipment Used:

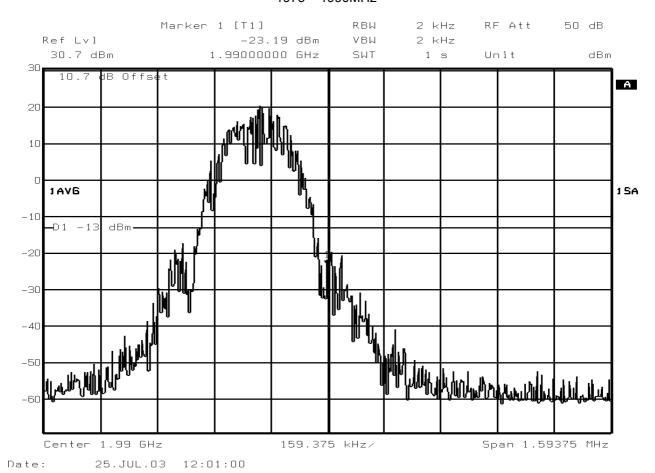


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 810, (1989.8MHz) 8-PSK Modulation

Block C 1975 – 1990MHz



Test Equipment Used:

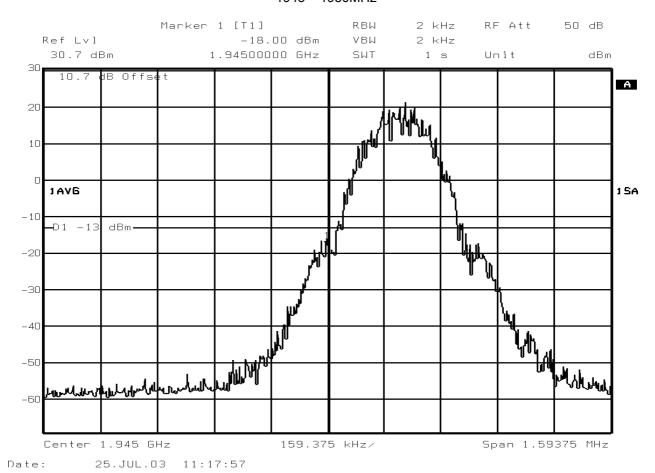


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 587, (1945.2MHz) GMSK Modulation

Block D 1945 – 1950MHz



Test Equipment Used:

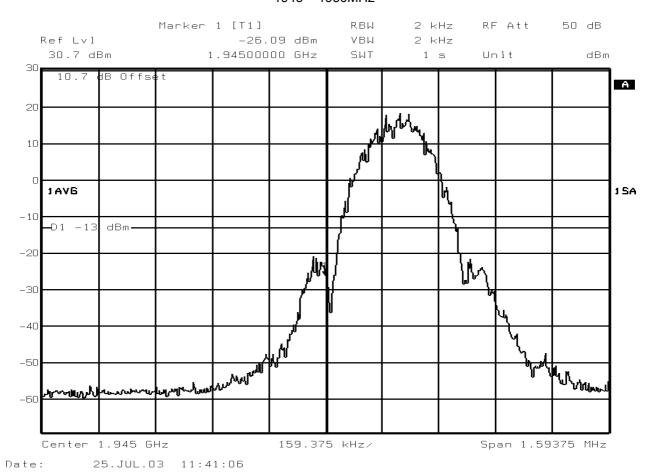


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 00 On Channel 587, (1945.2MHz) 8-PSK Modulation

Block D 1945 – 1950MHz



Test Equipment Used:

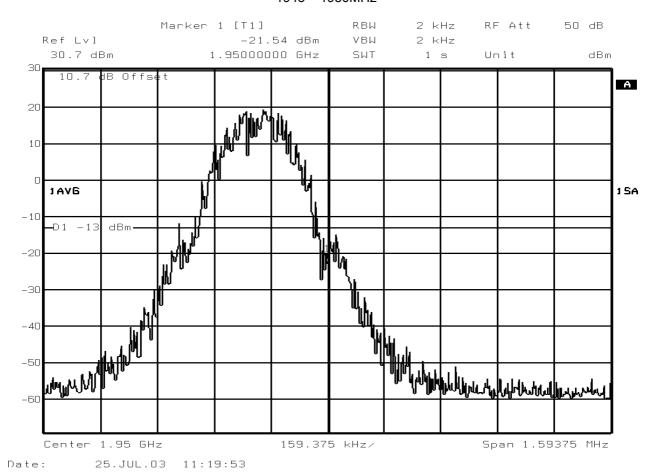


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 610, (1949.8MHz) GMSK Modulation

Block D 1945 – 1950MHz



Test Equipment Used:

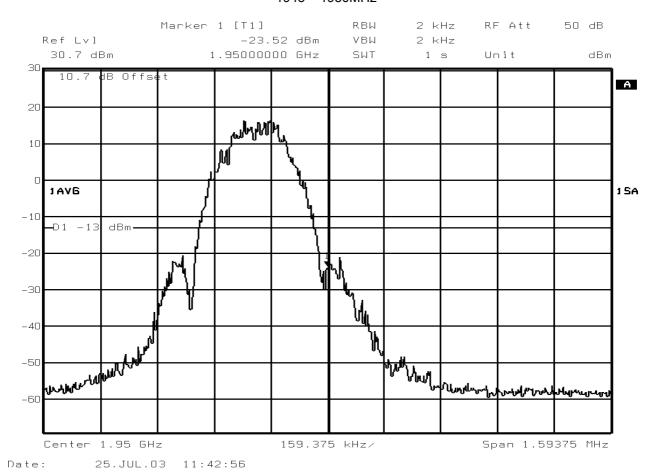


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 610, (1949.8MHz) 8-PSK Modulation

Block D 1945 – 1950MHz



Test Equipment Used:

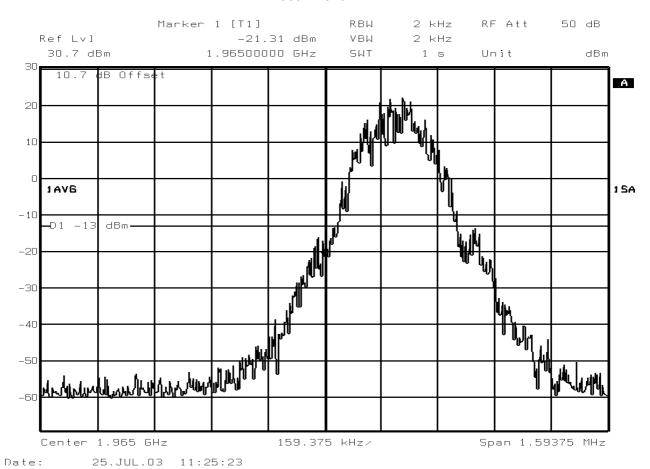


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 687, (1965.2MHz) GMSK Modulation

Block E 1965 – 1970MHz



Test Equipment Used:

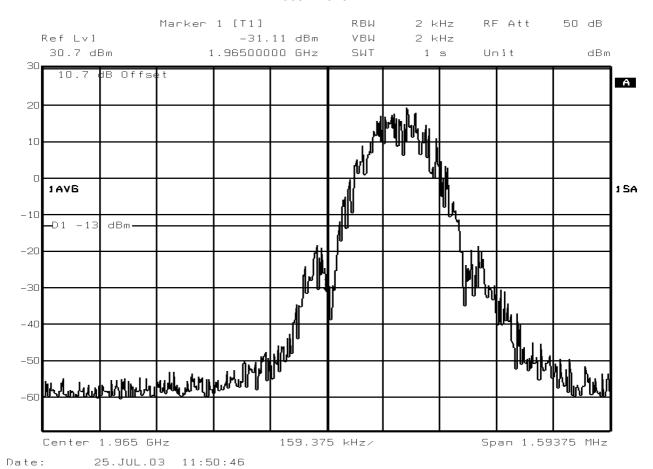


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 687, (1965.2MHz) 8-PSK Modulation

Block E 1965 – 1970MHz



Test Equipment Used:

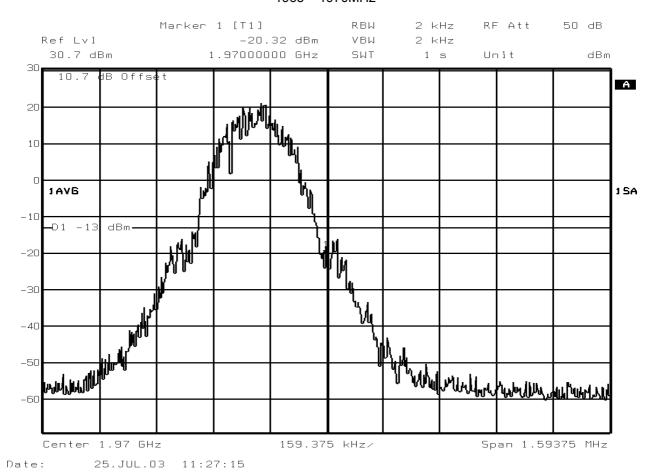


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 710, (1969.8MHz) GMSK Modulation

Block E 1965 – 1970MHz



Test Equipment Used:

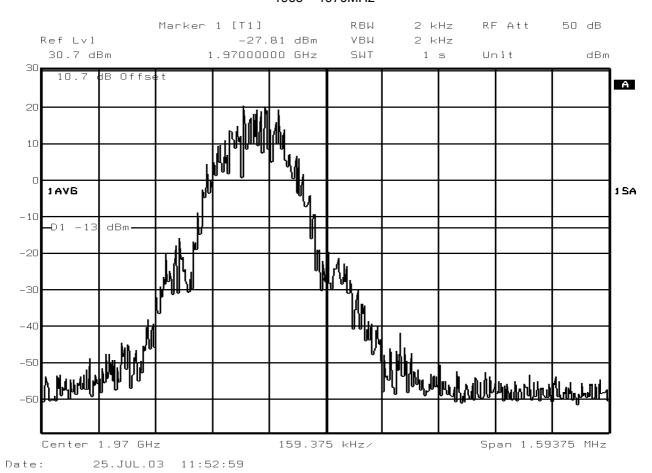


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 710, (1969.8MHz) 8-PSK Modulation

Block E 1965 – 1970MHz



Test Equipment Used:

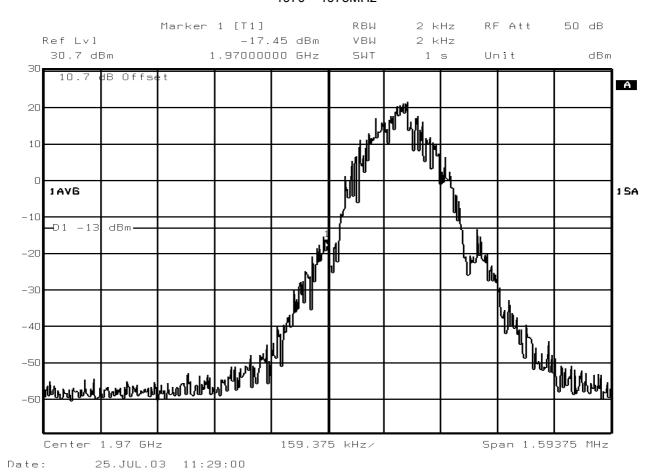


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 712, (1970.2MHz) GMSK Modulation

Block F 1970 – 1975MHz



Test Equipment Used:

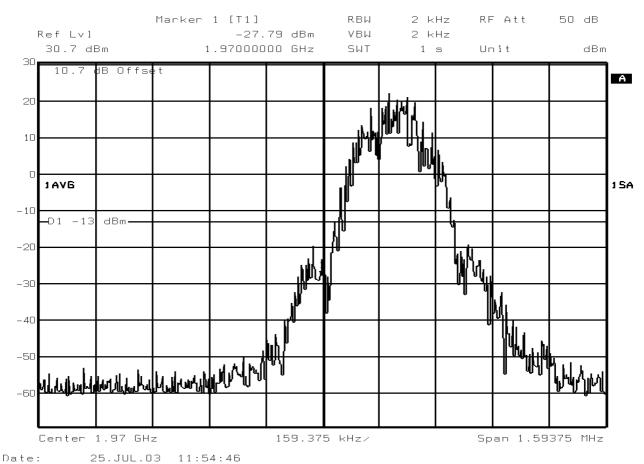


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 712, (1970.2MHz) 8-PSK Modulation

Block F 1970 – 1975MHz



Test Equipment Used:

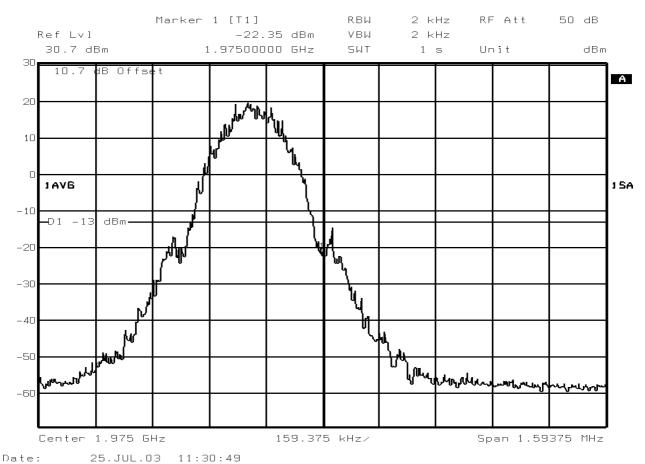


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 735, (1974.8MHz) GMSK Modulation

Block F 1970 – 1975MHz



Test Equipment Used:

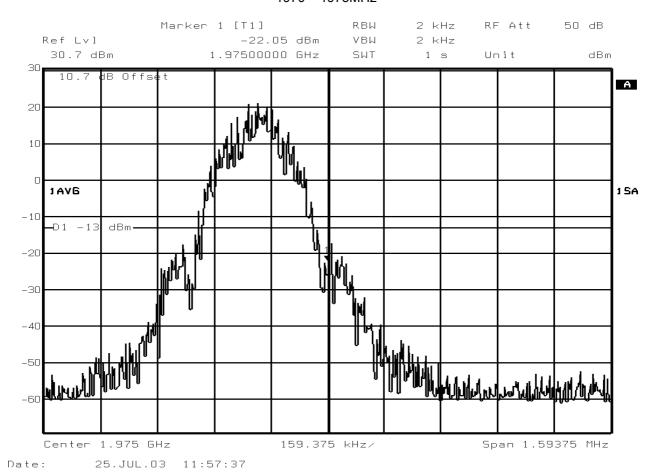


Test Date: 25th July 2003

Rule Parts: 2.1049, 24.238(b)

Block Edge Measurement With EUT Transmitting at Power Level 0 On Channel 735, (1974.8MHz) 8-PSK Modulation

Block F 1970 – 1975MHz



Test Equipment Used:





This report relates only to the actual item/items tested.

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