



**Nemko Test Report:** 5L0548RUS1

**Applicant:** Nokia, Inc.

**Equipment Under Test:  
(E.U.T.)** 6265

**FCC Identifier:** QMNRM-66

**In Accordance With:** **FCC Part 15, Subpart C, 15.247**  
Frequency Hopping Transmitters

**Tested By:** Nemko USA Inc.  
802 N. Kealy  
Lewisville, Texas 75057-3136

**Authorized By:**   
Tom Tidwell, Frontline Manager

**Date:** 20 Dec., 2005

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**Section 1. Summary of Test Results**

Manufacturer: Nokia, Inc.

Model No.: 6265

Type: RM-66

Serial No.: 04414181553 (Radiated Tests)  
04417181579 (Conducted Tests)General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C, Paragraph 15.247 for Frequency Hopping Spread Spectrum devices. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.



New Submission



Production Unit



Class II Permissive Change



Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See "Summary of Test Data".

**NVLAP LAB CODE: 100426-0**

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**Summary Of Test Data**

NAME OF TEST	PARA. NO.	RESULT
Powerline Conducted Emissions	15.207(a)	Not Tested
Channel Separation	15.247(a)(1)	Complies
Pseudorandom Hopping Algorithm	15.247(a)(1)	Not tested
Time of Occupancy	15.247(a)(1)(ii)	Not tested
20 dB Occupied Bandwidth	15.247(a)(1)	Complies
Peak Power Output	15.247(b)	Not tested
Spurious Emissions (Antenna Conducted)	15.247(c)	Not tested
Spurious Emissions (Radiated)	15.247(c)	Complies

## **Section 2. Equipment Under Test (E.U.T.)**

### **General Equipment Information**

**Frequency Band:** 2402 to 2480 MHz

**Number of Channels:** 79

**Channel Spacing:** 1 MHz

**User Frequency Adjustment:** Software controlled

**Section 3. Spurious Emissions (Radiated)**

NAME OF TEST: Spurious Emissions (Radiated)	PARA. NO.: 15.247(c)
TESTED BY: David Light	DATE: 15 December 2005

**Test Results:** Complies.

**Measurement Data:** There were no harmonic emissions detected above the noise floor

The worst case emission was 55.6 dB $\mu$ V/m. peak at 2483.5 MHz in the vertical polarity with the handset transmitting at 2480 MHz. This is 18.4 dB below the peak limit of 74 dB $\mu$ V/m at 3 meters

**Duty Cycle Calculation:**

Duty Cycle correction factor(dB) =  $20 \log (rf_{ON} \text{ in ms}/100\text{ms})$

**Equipment Used:** 1484-1485-1464-1016-993

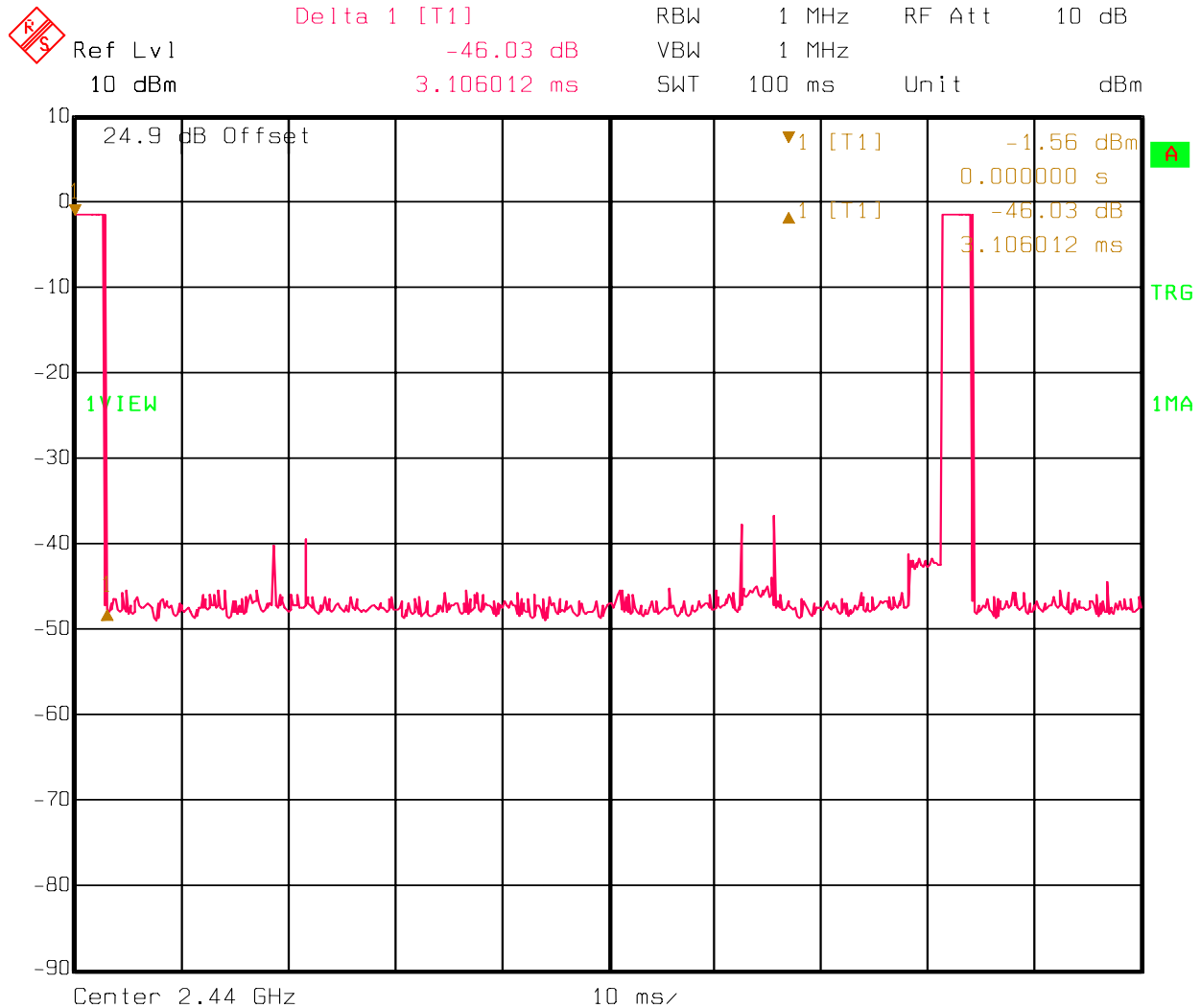
**Measurement Uncertainty:** +/- 3.7 dB

**Temperature:** 22 °C

**Relative Humidity:** 45 %

The handset was tested on three orthogonal axis'.

## Test Data – Duty Cycle (Normal Hop Mode)



Date: 14.DEC.2005 11:44:24

Duty cycle correction =  $20 \log_{10} (\text{Time On mS}/100 \text{ mS})$ 

$$20 \log_{10}(6.212/100) = -24.1 \text{ dB}$$

**Test Data – Radiated Emissions**

Peak reading: RBW = VBW = 1 MHz

Average reading: RBW = VBW = 1 MHz

Average readings are corrected for duty cycle.

Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Pre-Amp Gain (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Detector / Polarity
2483.5	53.7	29.0	3.1	32.8	53.0	74		Peak/Horizontal
2483.5	29.6	29.0	3.1	32.8	28.9		54	Average/Horizontal
2483.5	56.3	29.0	3.1	32.8	55.6	74		Peak/Vertical
2483.5	32.2	29.0	3.1	32.8	31.5		54	Average/Vertical
4960	42.5	33.7	4.3	32.6	47.9	74		Peak/Horizontal
4960	18.4	33.7	4.3	32.6	23.8		54	Average/Horizontal
4960	43.3	33.7	4.3	32.6	48.7	74		Peak/Vertical
4960	19.2	33.7	4.3	32.6	24.6		54	Average/Vertical
7440	40.7	35.9	5.3	32.5	49.4	74		Peak/Horizontal
7440	16.6	35.9	5.3	32.5	25.3		54	Average/Horizontal
7440	41.2	35.9	5.3	32.5	49.9	74		Peak/Vertical
7440	17.1	35.9	5.3	32.5	25.8		54	Average/Vertical
9920	41.7	37.2	6.1	35.7	49.3	74		Peak/Horizontal
9920	17.6	37.2	6.1	35.7	25.2		54	Average/Horizontal
9920	42.2	37.2	6.1	35.7	49.8	74		Peak/Vertical
9920	18.1	37.2	6.1	35.7	25.7		54	Average/Vertical
12400	40.8	40.1	7.3	34.5	53.7	74		Peak/Horizontal
12400	17.4	40.1	7.3	34.5	30.3		54	Average/Horizontal
12400	41.7	40.1	7.3	34.5	54.6	74		Peak/Vertical
12400	17.6	40.1	7.3	34.5	30.5		54	Average/Vertical
14880	42	40.7	7.3	32.1	57.9	74		Peak/Horizontal
14880	17.9	40.7	7.3	32.1	33.8		54	Average/Horizontal
14880	42	40.7	7.3	32.1	57.9	74		Peak/Vertical
14880	17.9	40.7	7.3	32.1	33.8		54	Average/Vertical
17360	40.8	42.6	8.7	33.3	58.8	74		Peak/Horizontal
17360	16.7	42.6	8.7	33.3	34.7		54	Average/Horizontal
17360	40.8	42.6	8.7	33.3	58.8	74		Peak/Vertical
17360	16.7	42.6	8.7	33.3	34.7		54	Average/Vertical

The spectrum was searched to the 10<sup>th</sup> harmonic of carrier on channels 0, 38 and 78. Noise floor data presented for channel 78 (Highest Tx frequency) is representative of all frequencies tested.



**Radiated Photograph**



**Section 4. Channel Separation**

NAME OF TEST: Channel Separation	PARA. NO.: 15.247(a)(1)
TESTED BY: David Light	DATE: 14 December 2005

**Test Results:** Complies.

**Measurement Data:** See 20 dB BW plot  
Measured 20 dB bandwidth: 939 kHz max  
Channel Separation: 1 MHz

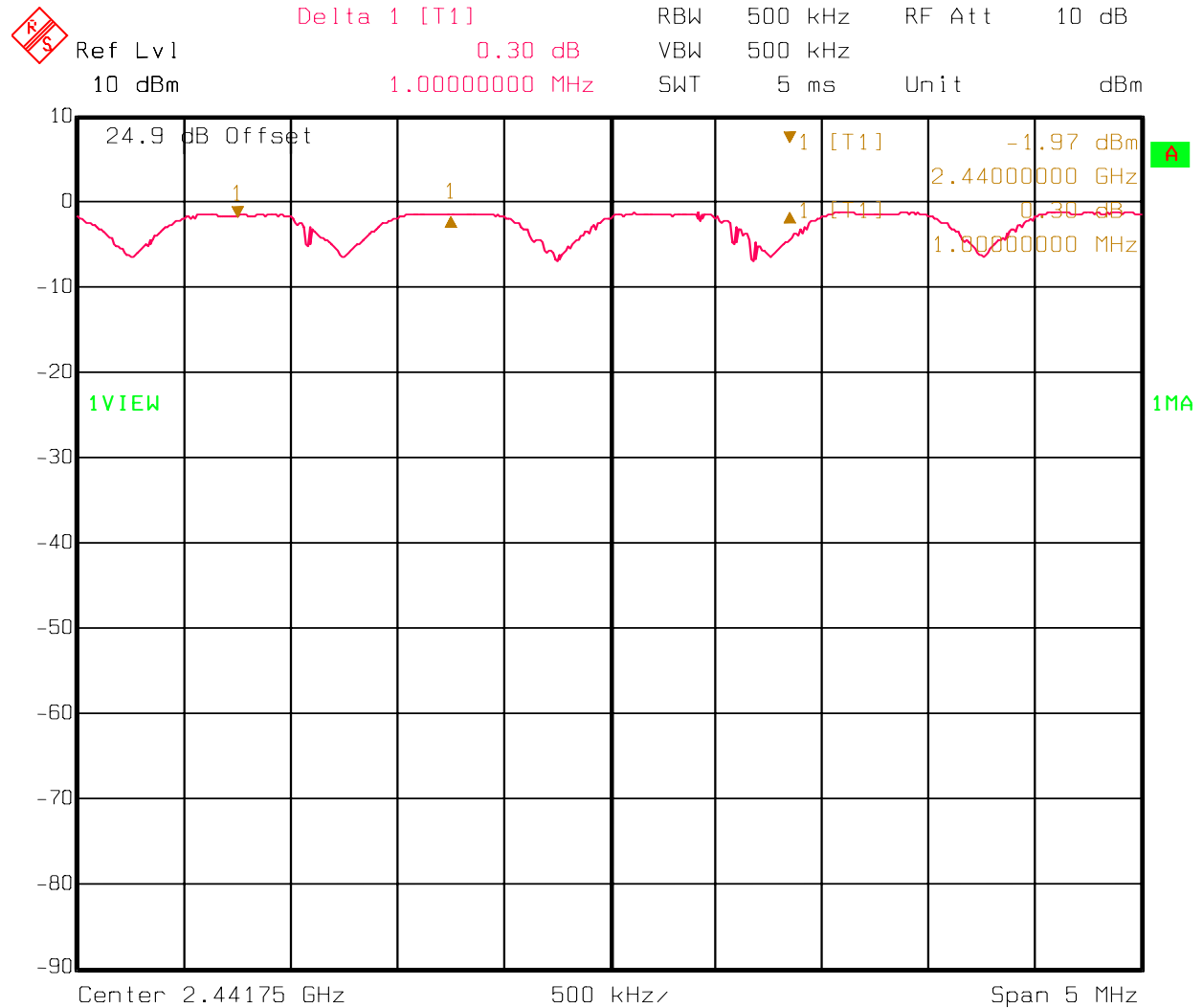
**Equipment Used:** 1036-1082-1472

**Measurement Uncertainty:** +/- 1.7 dB

**Temperature:** 22 °C

**Relative Humidity:** 45 %

# Test Data – Channel Separation



Date: 14.DEC.2005 11:41:00

Channel separation 1 MHz

## Section 5. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.247(a)(1)(i)
TESTED BY: David Light	DATE: 11/15/05

**Test Results:** Complies.

**Measurement Data:** See attached plots.

**Equipment Used:** 1036-1472-1082

**Measurement Uncertainty:** +/- 1.7 dB

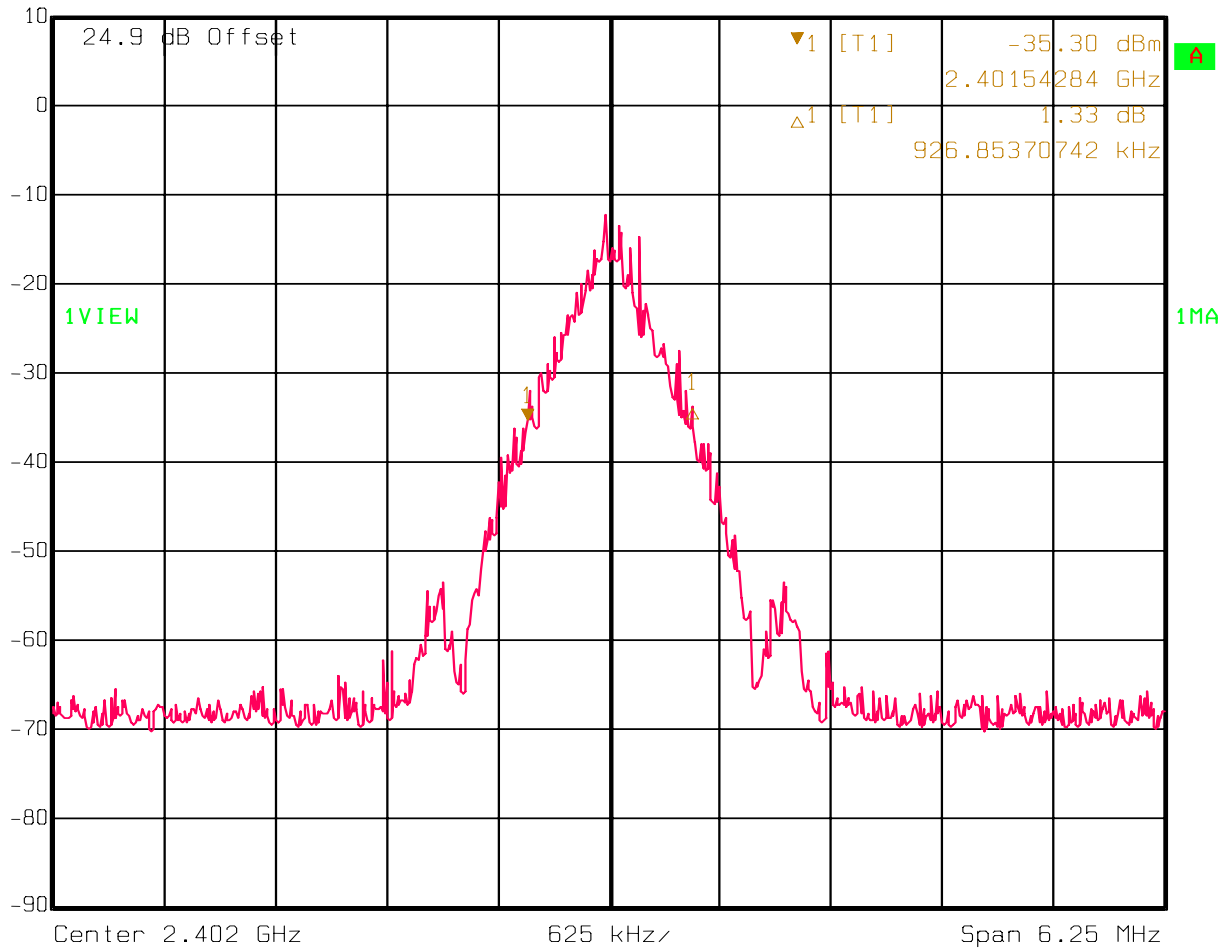
**Temperature:** 20 °C

**Relative Humidity:** 45 %

# Test Data – Occupied Bandwidth

Channel 0

 Ref Lvl 10 dBm Marker 1 [T1] -35.30 dBm RBW 10 kHz RF Att 10 dB  
 2.40154284 GHz VBW 10 kHz Unit dBm  
 SWT 160 ms



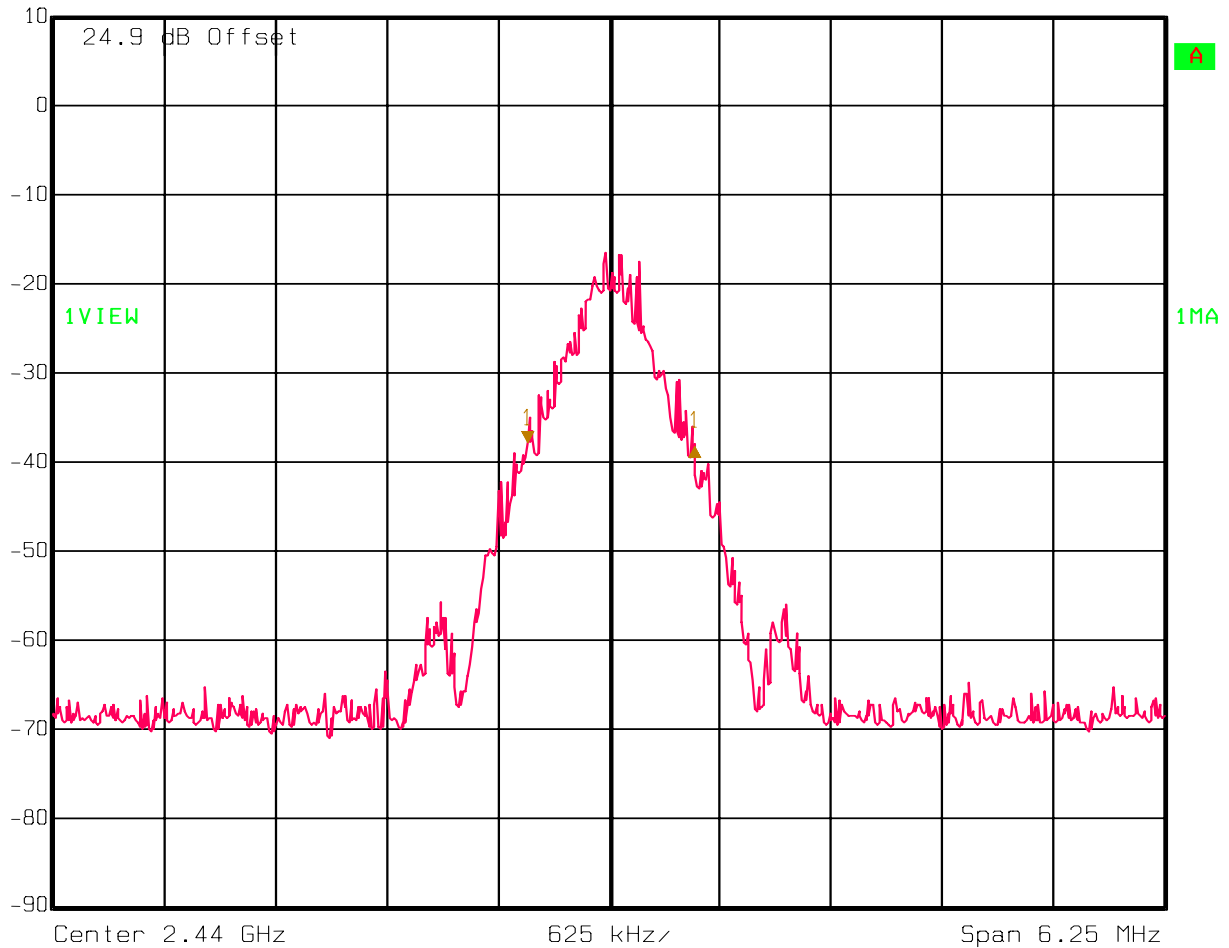
Date: 14.DEC.2005 11:17:31

# Test Data – Occupied Bandwidth

Channel 38



Delta 1 [T1] RBW 10 kHz RF Att 10 dB  
 Ref Lvl -0.20 dB VBW 10 kHz  
 10 dBm 939.37875751 kHz SWT 160 ms Unit dBm



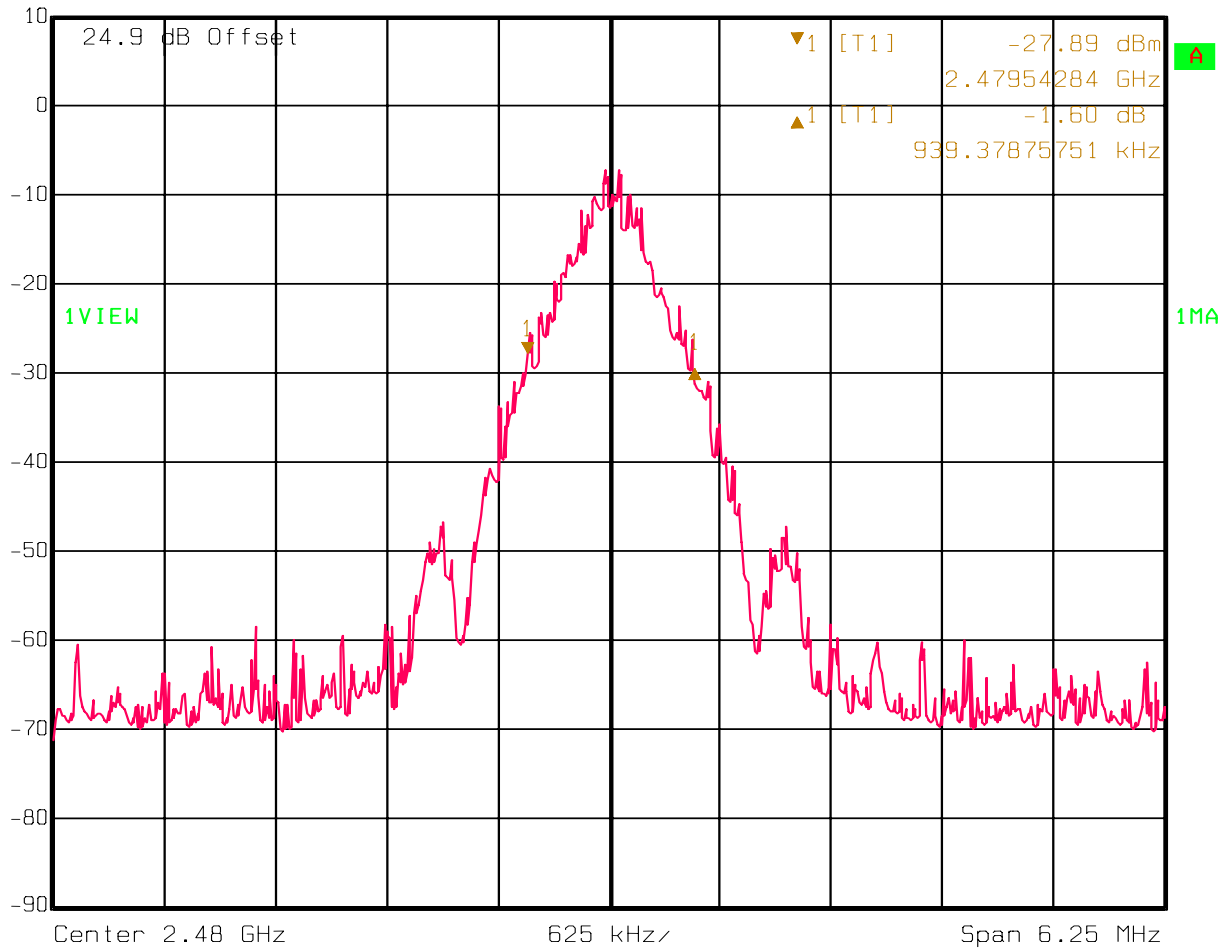
Date: 14.DEC.2005 11:06:51

## Test Data – Occupied Bandwidth

Channel 78



Delta 1 [T1] RBW 10 kHz RF Att 10 dB  
Ref Lvl -1.60 dB VBW 10 kHz  
10 dBm 939.37875751 kHz SWT 160 ms Unit dBm



Date: 14.DEC.2005 11:22:27

## Section 6. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	03/22/04	03/23/06
1472	20db Attenuator DC 18 Ghz	Omni Spectra 20600-20db	NONE	CBU	N/A
1082	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	CBU	N/A
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	08/26/05	08/26/06
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	08/26/05	08/26/06
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/14/05	01/15/07
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	11/12/05	11/12/06
791	PREAMP, 25dB	ICC LNA25	398	11/12/05	11/12/06
760	Antenna biconical	Electro Metrics MFC-25	477	08/04/05	08/04/06
1034	ANTENNA,LP	A.H. SYSTEMS SAS-200/510	121	09/04/05	09/04/06
	BlueTooth Tester	ROHDE & SCHWARZ CMU200	1100.0008.02	06/08/05	06/08/06



**Nemko USA, Inc.**

FCC PART 15, SUBPART C

FREQUENCY HOPPING SPREAD SPECTRUM TRANSMITTER

*EQUIPMENT:* 6265

**Test Report No.: 5L0548US1**

## **ANNEX A - TEST DETAILS**

**Nemko USA, Inc.**

FCC PART 15, SUBPART C

FREQUENCY HOPPING SPREAD SPECTRUM TRANSMITTER

*EQUIPMENT:* 6265

**Test Report No.: 5L0548US1**

NAME OF TEST: Channel Separation	PARA. NO.: 15.247(a)(1)
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**Minimum Standard:**

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.

NAME OF TEST: Occupied Bandwidth

PARA. NO.: 15.247(a)(2)

**Minimum Standard:**

Frequency Band (MHz)	Maximum 20 dB Bandwidth
902 - 928	500 kHz
2400 – 2483.5	1 MHz
5725 – 5850	1 MHz

**Method Of Measurement:**

The spectrum analyzer is set as follows:

RBW: At least 1% of span/div.

VBW: >RBW

Span: Sufficient to display 20 dB bandwidth

LOG dB/div.: 10 dB

Sweep: Auto

**Number of channels tested:**

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

NAME OF TEST: Radiated Spurious Emissions

PARA. NO.: 15.247(c)

**Minimum Standard:** In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits:

**Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:**

Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

**THE SPECTRUM WAS SEARCHED TO THE 10th HARMONIC**

#### **15.205 Restricted Bands**

MHz	MHz	MHz	GHz
0.09-0.11	16.42-16.423	399.9-410	4.5-5.25
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
6.125-6.218	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	2655-2900	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	Above 38.6
13.36-13.41	1718		

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

**Nemko USA, Inc.**

FCC PART 15, SUBPART C

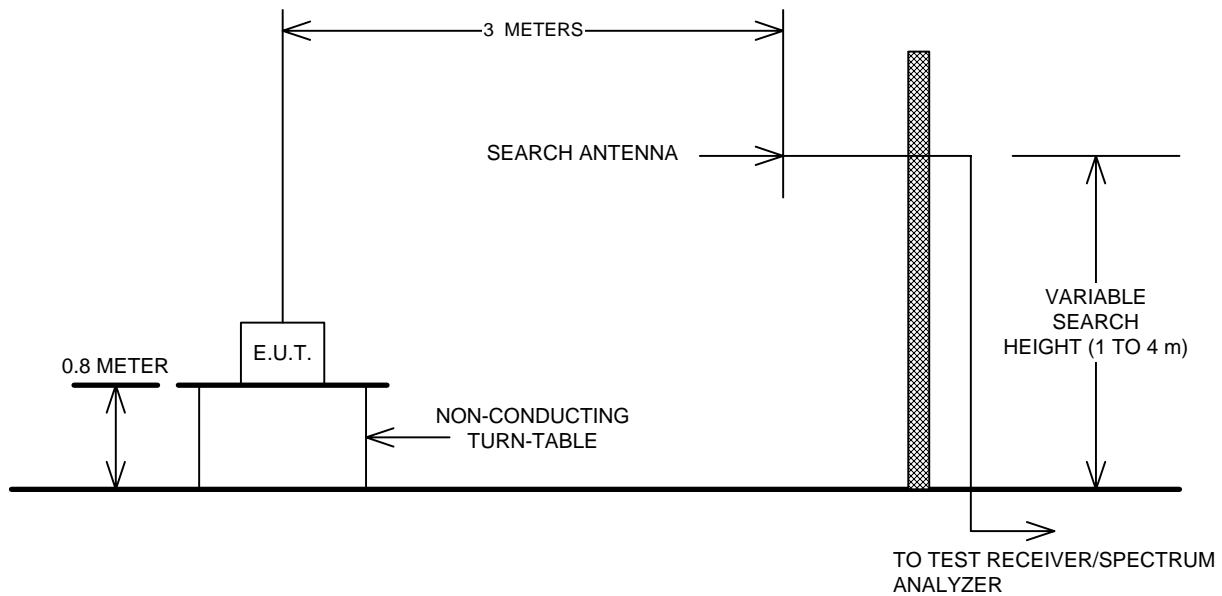
FREQUENCY HOPPING SPREAD SPECTRUM TRANSMITTER

*EQUIPMENT:* 6265

**Test Report No.: 5L0548US1**

## **ANNEX B - TEST DIAGRAMS**

### Test Site For Radiated Emissions



### Conducted Emissions

