CERTIFICATION TEST REPORT

Report Number:	2012 02164553 FCC
Project Number:	1023311
Nex Number:	164553
Applicant:	DEI HEADQUARTERS INC. 1 VIPER WAY Vista, CA 92081
Equipment Under Test (EUT):	HAND HELD UNIT : MODEL 7703A HUB: MODEL 6703A,
FCC ID: IC:	EZSDEI7703 1513A-7703
In Accordance With:	FCC Part 15 Subpart C, 15.247 IC RSS-210 Issue 8 December 2010 IC RSS-Gen Issue 3 December 2010
Tested By:	Nemko USA Inc. 11696 Sorrento Valley Road, Suite F San Diego, CA 92121
Authorized By:	 Alan Laudani, EMC/RF Test Engineer
Date:	AUGUST 1, 2012
Total Number of Pages:	52

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Section 1. Summary of Test Results

1.1 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 and RSS-210, Issue 8 December 2010. Radiated tests were conducted is 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 and IC.

The assessment summary is as follows:

Apparatus Assessed:	6703A, 7703A
Specifications:	FCC Part 15 Subpart C, 15.247 IC RSS-210 Issue 8 December 2010
Date Received in Laboratory:	MARCH 18, 2011 TO AUGUST 1, 2012
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None

1.2 Report Release History:

REVISION	DATE	COMMENTS	
-	AUGUST 1, 2012	Prepared By:	Alan Laudani
-	AUGUST 1, 2012	Initial Release:	Alan Laudani

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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TESTED BY:  Date: AUGUST 1, 2012

Alan Laudani, EMC Test Engineer

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Section 2: Equipment Under Test

2.1 Product Identification

DEVICE	MANUFACTURER MODEL # SERIAL #	POWER CABLE
EUT - Hub	DEI Headquarters Inc. Model: 6703A Serial #: 6	5 VDC from power supply
EUT - Hand Held Unit	DEI Headquarters Inc. Model: 7703A Serial #: NA	5 VDC from power supply
EUT – Switching Adaptor	ITE LPS Model: DSC-DPFB-05FUS Serial #: NA	2 prong wall pack 100-240VAC 0.2A
EUT – Power Supply Input: 100-240VAC 50/60Hz 0.2A Output: +5VDC 0.7A	Switching Adaptor Model:DSC-3PFB-05 FUS Serial #: 6	2 Prong Wall Mount 2 Wire DC Output 1.8m, unshielded

CONNECTION	I/O CABLE
No connections	

2.2 Theory of Operation

The 6703A and 7703A are Hand Held Units. Their function is to arm/disarm vehicle systems. The EUT was exercised by push buttons to change state of the alarm system. A continuous transmit mode was configured for RF testing.

Model differences: Model 7703A for the configuration with the internal loop antenna
7703A with the external monopole antenna configuration

The EUT's performance during test was evaluated against the performance criterion specified by applicable test standards. Performance results are detailed in the test results section of this report.

2.3 Technical Specifications of the EUT

Manufacturer:	Directed Electronics, Inc.
Operating Frequency:	909.440 to 918.500 MHz in the 902-928 MHz Band
Number of Operating Frequencies:	25
Output Power:	5 mW
Modulation:	FSK
Antenna Connector:	Trace in Hand Held Unit and post Antenna with RSMA connector on Hub
Power Source:	3 V battery or Wall Pack

Section 3: Test Conditions

3.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.247
Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz and 24.0-24.25 GHz bands.

IC RSS-210 Issue 8 December 2010
Low-power Licence-exempt Radio-communication Devices (All Frequency Bands): Category I Equipment. Annex 8 - Frequency Hopping and Digital Modulation Systems Operating in the Bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

IC RSS-Gen Issue 3 December 2010
General Requirements and Information for the Certification of Radio-communication Equipment

3.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	15.6 – 23.3 ^{o}C
Humidity range	:	26 - 65 %
Pressure range	:	86 - 106 kPa
Power supply range	:	+/- 1% of rated voltages

3.4 Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
Original testing 2011						
111	Antenna, LPA	EMCO	3146	1382	11/29/2010	11/29/2012
128	Antenna	Electro-Metrics	3104	2882	3/21/2011	3/21/2013
317	Preamp	HP	8449A	2749A00167	5/16/2011	5/16/2012
529	Antenna, DRWG	EMCO	3115	2505	10/18/2010	10/18/2012
535	Spectrum Analyzer	HP	85680A	2517A01757	8/20/2010	8/20/2011
674	Spectrum Analyzer	HP	8568B	2007A00910	5/19/2010	5/19/2011
675	Spectrum Analyzer Display	HP	85662A	2005A01282	5/19/2010	5/19/2011
676	Quasi-Peak Adapter	HP	85650A	2430A00576	5/19/2010	5/19/2011
835	Spectrum Analyzer	Rohde & Schwarz	RHDFSEK	829058/005	7/22/2011	7/22/2012
E1013	DRG Horn	EMCO	3116	00119488	12/23/2009	12/23/2011
	Additional Tests 2012					
317	Preamplifier	Hewlett Packard	8449A	2749A00167	5/16/11	5/16/12
E1029	Preamplifier (20MHz to 18GHz)	A.H. Systems, Inc.	PAM-0118	343	2/21/2012	2/21/2013
N/A	Attenuator	Weinschel	24-20-34	BN8863	N/A	N/A
110	Antenna, LPA	Electrometrics	LPA-25	1217	4/1/11	4/1/13
128	Antenna, Bicon	EMCO	3104	2882	3/21/2011	3/21/2013
901	pre amp	Sonoma	310 N	130607	10/27/2011	10/27/2012
752	Antenna, DRWG	EMCO	3115	4943	12/2/2010	12/2/2012
877	Antenna, DRWG	A.H. Systems	SAS-571	688	8/16/10	08/16/12
911	Spectrum Analyzer	Agilent	E4440A	US41421266	10/27/11	10/27/12

Registration of the OATS are on file with the Federal Communications Commission, and are also registered with Industry Canada under Site Numbers 2040B-1 and 2040B-2, additional testing on 2040B-3 (2012)

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Section 4: Observations

4.1 Modifications Performed During Assessment

No modifications were performed during assessment.

4.2 Record Of Technical Judgments

No technical judgements were made during the assessment.

4.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

4.4 Deviations From Laboratory Test Procedures

No deviations from Laboratory Test Procedure

4.5 Test Deleted

No Tests were deleted from this assessment.

4.6 Additional Observations

There were no additional observations made during this assessment.

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Section 5: Results Summary

This section contains the following:

Test Results

The column headed “Required” indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N No: not applicable / not relevant
Y Yes: Mandatory i.e. the apparatus shall conform to these test.
N/T Not Tested, mandatory but not assessed. (See section 4.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

5.1 Test Results

Part 15	RSS-210	Test Description	Required	Result
15.207 (a)	RSS-Gen 7.2.2	Conducted Emission Limit	Y	Pass
15.247 a1i	A81(3)	20dB & 99% Bandwidth	Y	Pass
12.247a1	A81(3)	Channel Separation | Average time of occupancy	Y	Pass
15.247a1i	A81(3)	Number of Hopping Channels	Y	Pass
15.247 b1	A81(2)	Peak Output Power	Y	Pass
15.209 a 15.247c	A81(3), A2.9	Radiated Emissions within Restricted Bands	Y	Pass
15.247c	A2.9	Bandedge	Y	Pass
15.109	RSS-GEN 4.10	Receiver Spurious Emissions	Y	Pass

Appendix A: Test Results

Power Line Conducted Emissions

15.207(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

*Decreases with the logarithm of the frequency.

Test Conditions:

Sample Number:	7703A	Temperature:	20°C
Date:	3-18-2011	Humidity:	31 %
Modification State:	Low, Mid and High Channel	Tester:	Alan Laudani
		Laboratory:	Nemko SR2

Test Results: EUT complies

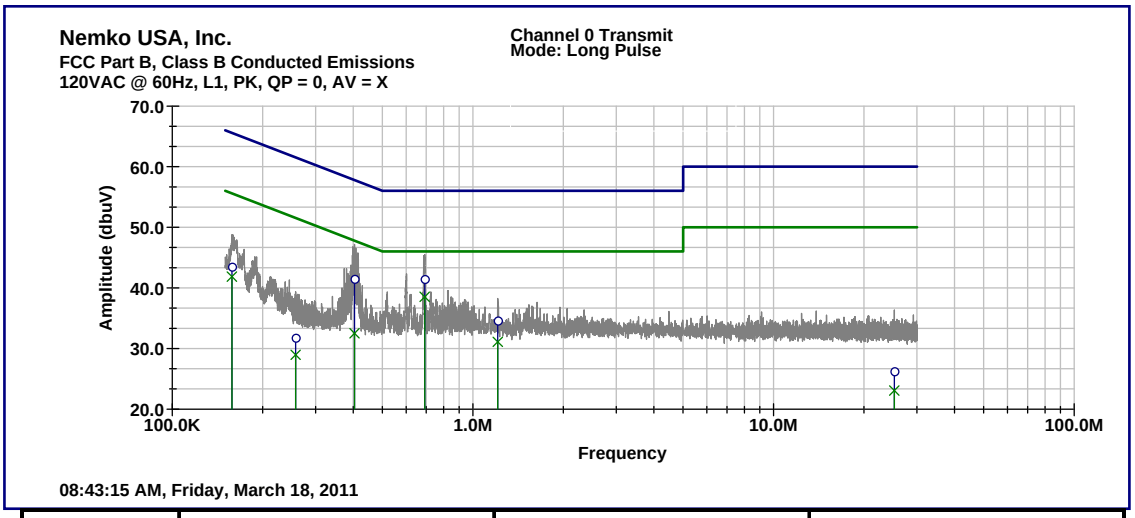
See attached plots

Test Parameters

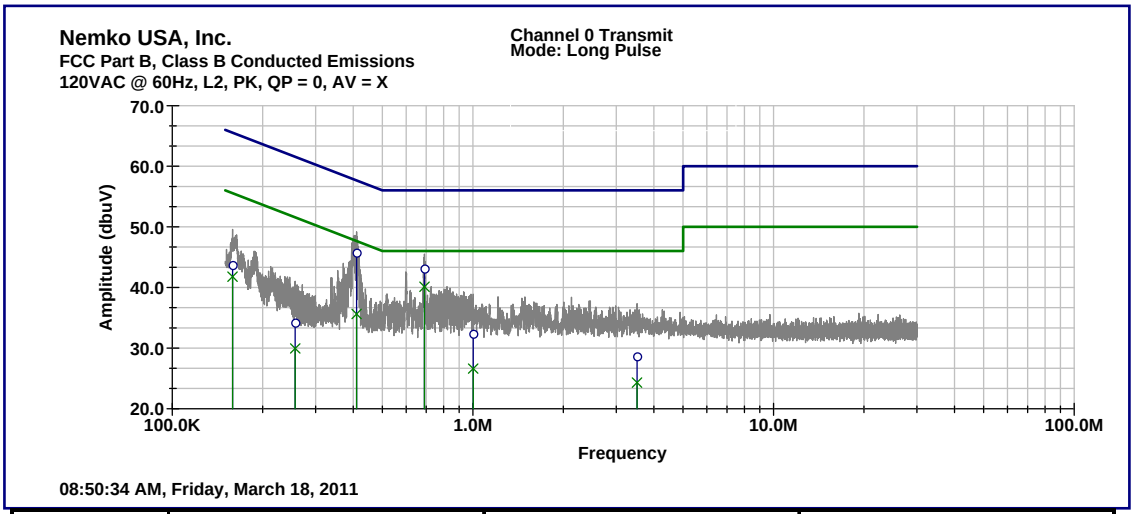
Peak RBW: 100kHz VBW: 100kHz
Quasi-Peak: RBW 9kHz, VBW 30 kHz
Average: RBW 9kHz, VBW 30 kHz
Quasi-Peak Limit Blue Line, Average Limit Green Line

Test mode Transmit of LONG Duty Cycle Pulse was noted to be worst case.

Low Channel

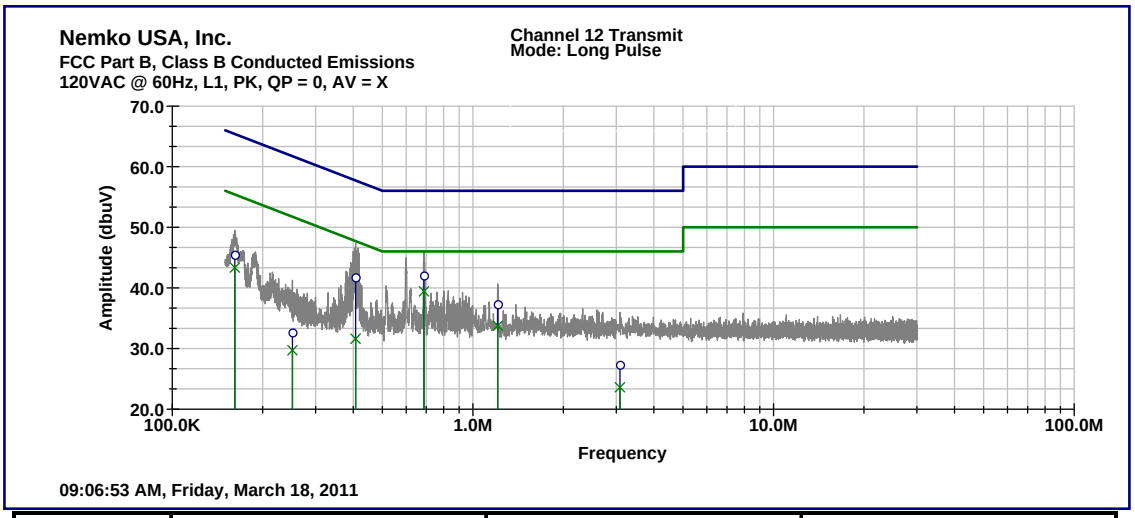


Frequency	Measured		Limit		Margin	
(kHz)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
157.9	43.5	41.9	65.6	55.6	-22.1	-13.7
257.3	31.8	29.0	61.5	51.5	-29.7	-22.6
403.8	41.5	32.5	57.8	47.8	-16.3	-15.3
691.2	41.5	38.5	56.0	46.0	-14.5	-7.5
1210.0	34.6	31.1	56.0	46.0	-21.4	-14.9
25188.6	26.3	23.1	60.0	50.0	-33.7	-26.9

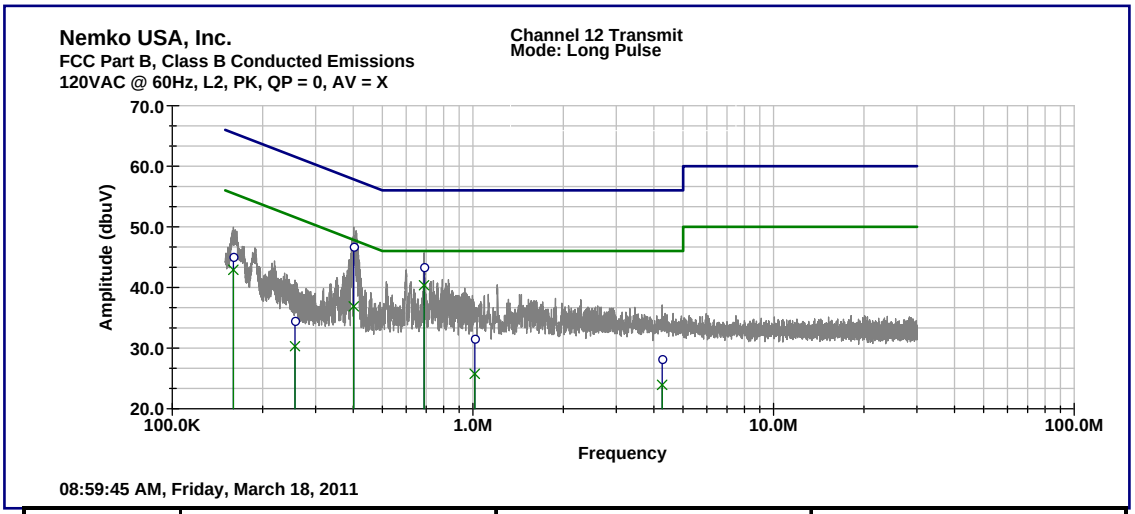


Frequency	Measured		Limit		Margin	
(kHz)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
158.7	43.7	41.8	65.5	55.5	-21.8	-13.7
256.5	34.2	29.9	61.5	51.5	-27.4	-21.6
410.4	45.8	35.6	57.6	47.6	-11.9	-12.0
690.4	43.1	40.1	56.0	46.0	-12.9	-5.9
1002.0	32.4	26.6	56.0	46.0	-23.6	-19.4
3513.0	28.6	24.3	56.0	46.0	-27.4	-21.7

Mid Channel

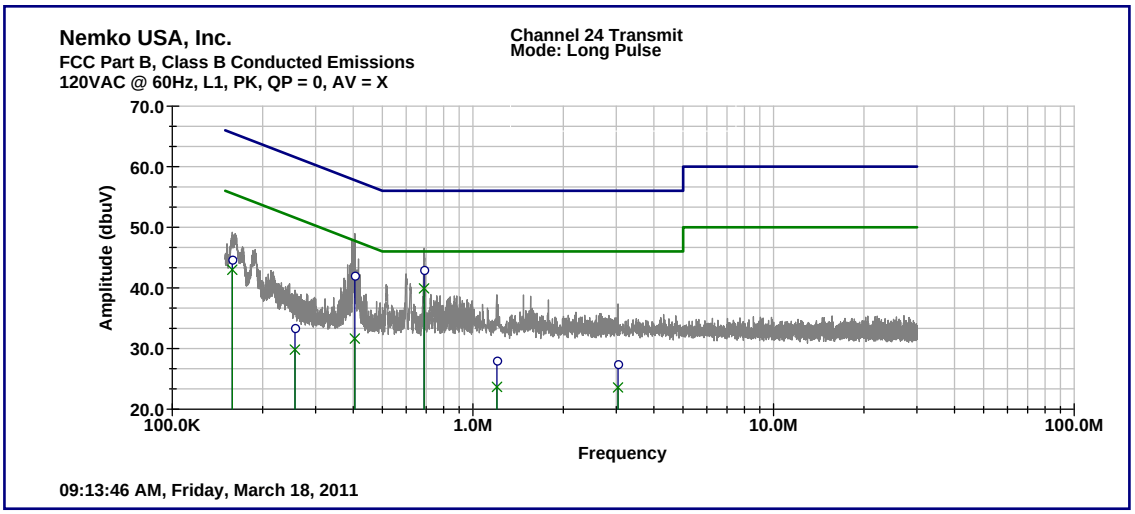


Frequency	Measured		Limit		Margin	
(kHz)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
161.5	45.5	43.3	65.4	55.4	-19.9	-12.0
251.1	32.6	29.7	61.7	51.7	-29.1	-22.0
407.1	41.7	31.6	57.7	47.7	-16.0	-16.1
687.2	42.1	39.4	56.0	46.0	-13.9	-6.6
1210.0	37.3	33.8	56.0	46.0	-18.7	-12.2
3081.0	27.3	23.6	56.0	46.0	-28.7	-22.4

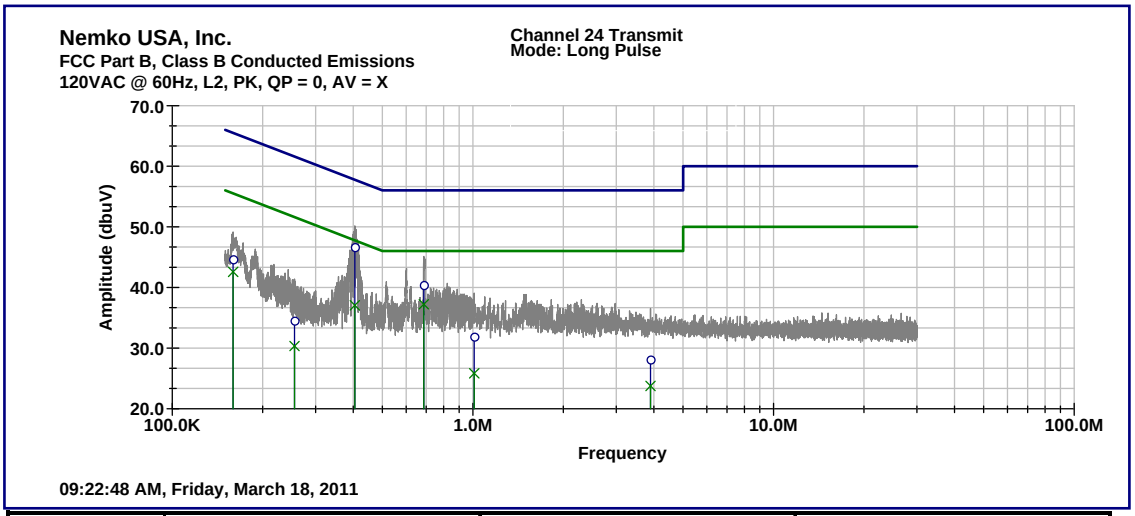


Frequency	Measured		Limit		Margin	
(kHz)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
159.7	45.1	42.9	65.5	55.5	-20.4	-12.6
256.1	34.5	30.3	61.6	51.6	-27.1	-21.3
401.7	46.7	36.9	57.8	47.8	-11.1	-10.9
688.0	43.4	40.4	56.0	46.0	-12.6	-5.6
1014.0	31.5	25.8	56.0	46.0	-24.5	-20.2
4258.2	28.2	23.9	56.0	46.0	-27.8	-22.1

High Channel

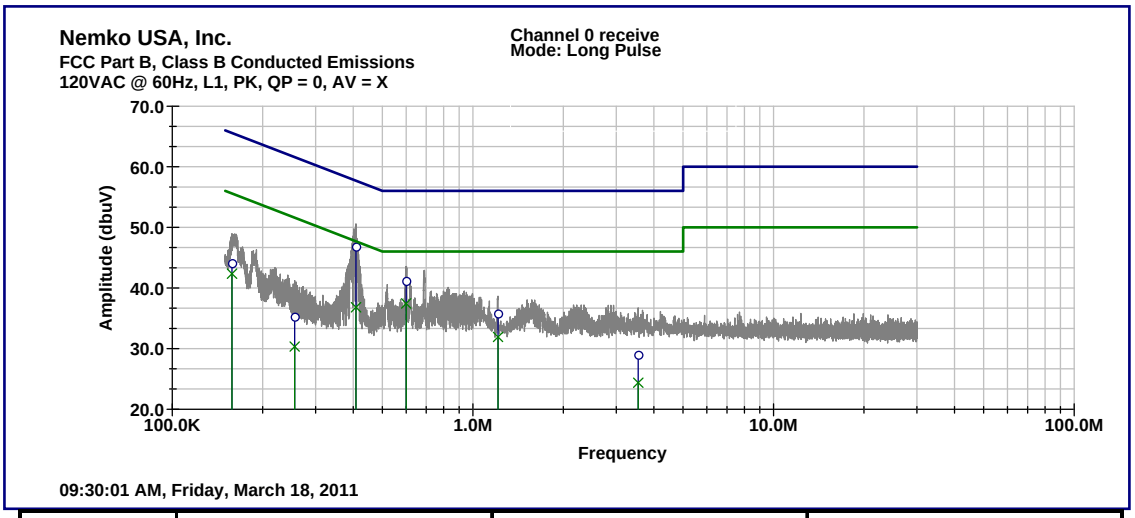


Frequency	Measured		Limit		Margin	
(kHz)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
158.4	44.7	43.0	65.5	55.5	-20.9	-12.6
255.9	33.4	29.8	61.6	51.6	-28.2	-21.7
405.0	42.0	31.6	57.8	47.8	-15.7	-16.1
688.0	43.0	39.9	56.0	46.0	-13.0	-6.1
1202.0	28.0	23.7	56.0	46.0	-28.0	-22.3
3037.8	27.4	23.6	56.0	46.0	-28.6	-22.4

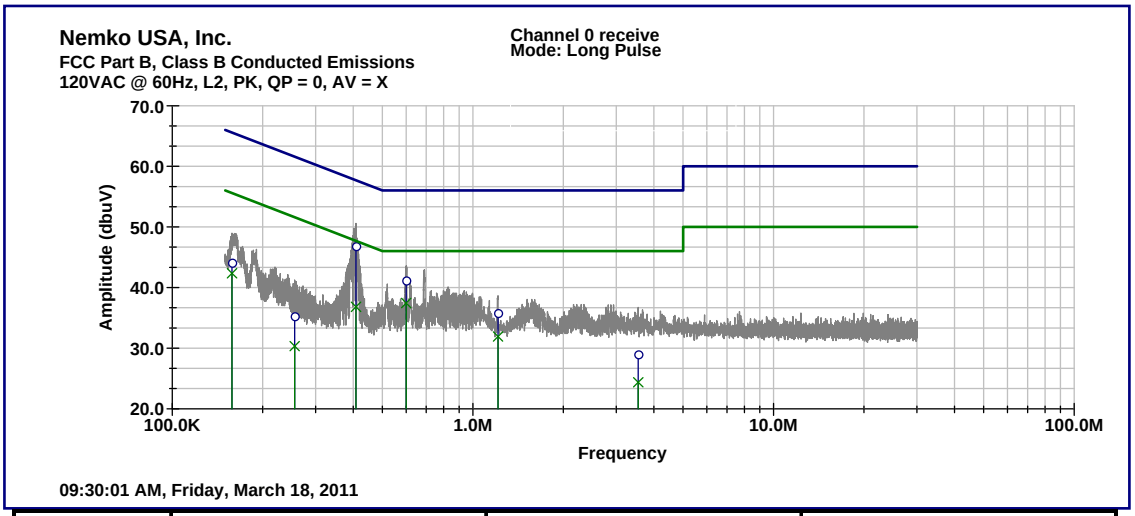


Frequency	Measured		Limit		Margin	
(kHz)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
159.5	44.7	42.6	65.5	55.5	-20.8	-12.9
255.0	34.5	30.3	61.6	51.6	-27.1	-21.3
405.0	46.7	37.0	57.8	47.8	-11.1	-10.7
686.4	40.4	37.2	56.0	46.0	-15.6	-8.8
1010.0	31.9	25.8	56.0	46.0	-24.1	-20.2
3896.4	28.1	23.8	56.0	46.0	-27.9	-22.2

Receiver Conducted Emissions-- Low Channel

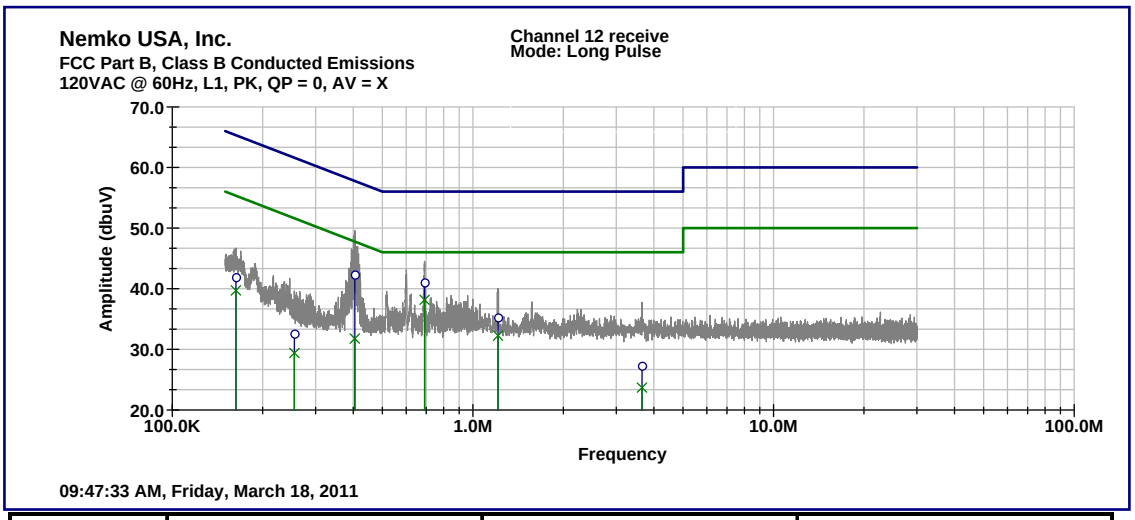


Frequency	Measured		Limit		Margin	
(kHz)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
158.1	44.1	42.4	65.6	55.6	-21.5	-13.2
255.5	35.3	30.3	61.6	51.6	-26.3	-21.2
408.6	46.8	36.8	57.7	47.7	-10.8	-10.9
600.0	41.2	37.4	56.0	46.0	-14.8	-8.6
1212.0	35.8	31.9	56.0	46.0	-20.2	-14.1
3545.4	29.0	24.4	56.0	46.0	-27.0	-21.6

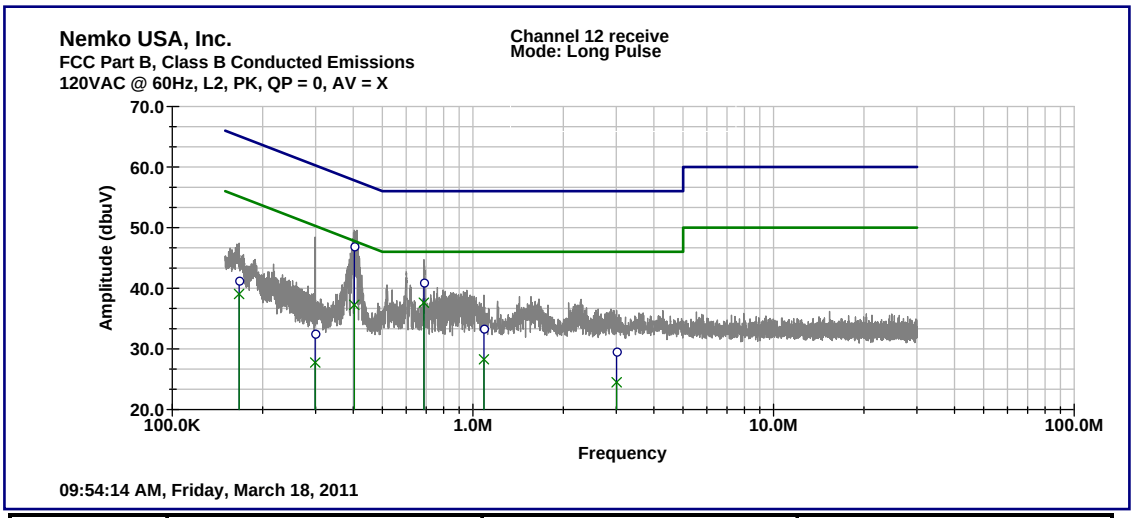


Frequency	Measured		Limit		Margin	
(kHz)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
158.1	44.1	42.4	65.6	55.6	-21.5	-13.2
255.5	35.3	30.3	61.6	51.6	-26.3	-21.2
408.6	46.8	36.8	57.7	47.7	-10.8	-10.9
600.0	41.2	37.4	56.0	46.0	-14.8	-8.6
1212.0	35.8	31.9	56.0	46.0	-20.2	-14.1
3545.4	29.0	24.4	56.0	46.0	-27.0	-21.6

Mid Channel

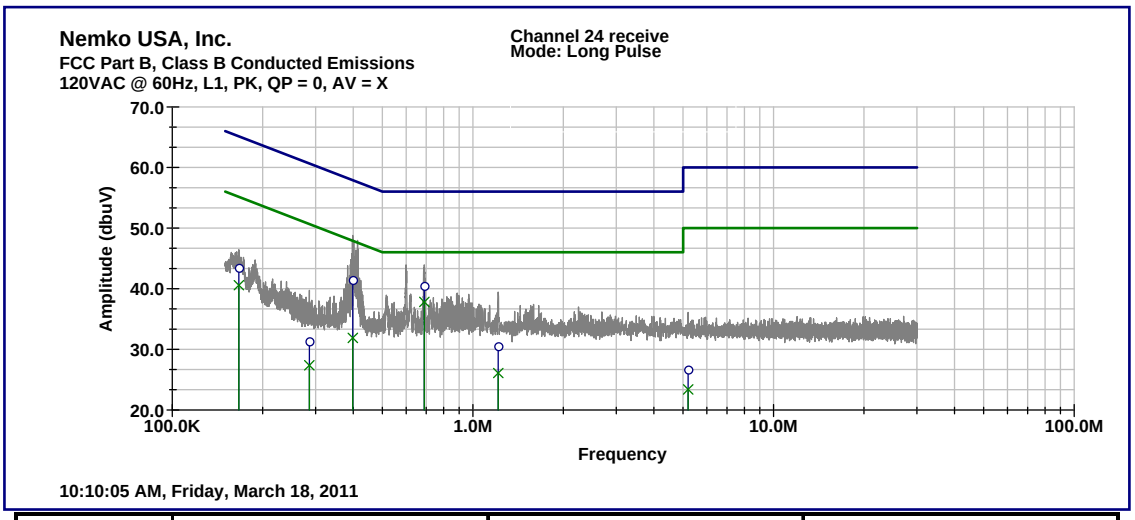


Frequency	Measured		Limit		Margin	
(kHz)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
162.8	41.9	39.7	65.3	55.3	-23.4	-15.6
254.9	32.6	29.4	61.6	51.6	-29.0	-22.2
404.7	42.3	31.8	57.8	47.8	-15.4	-16.0
690.8	41.0	38.2	56.0	46.0	-15.0	-7.8
1212.0	35.3	32.2	56.0	46.0	-20.7	-13.8
3648.0	27.3	23.7	56.0	46.0	-28.7	-22.3

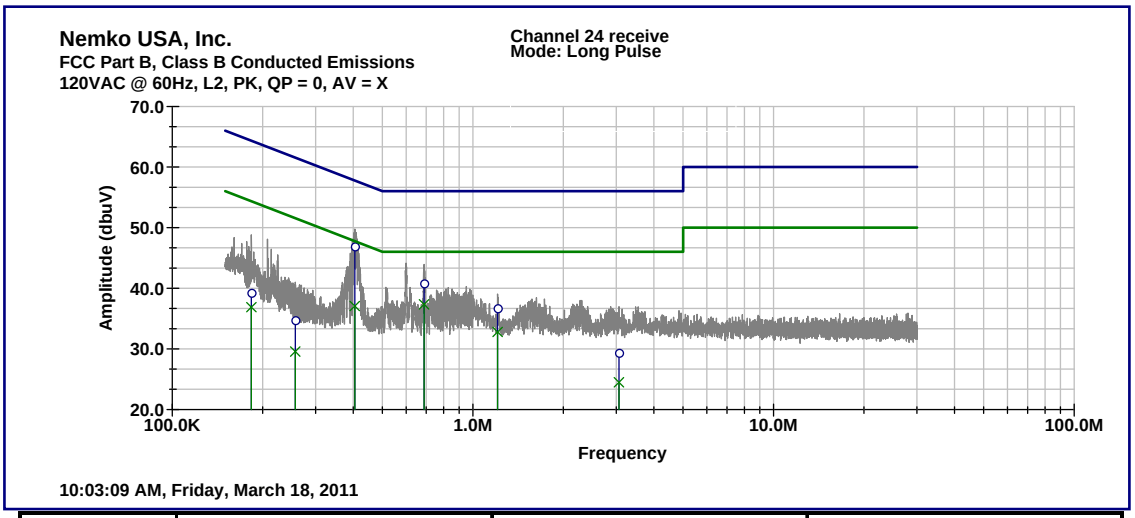


Frequency	Measured		Limit		Margin	
(kHz)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
166.9	41.3	39.0	65.1	55.1	-23.8	-16.1
298.9	32.5	27.8	60.3	50.3	-27.8	-22.5
403.2	46.9	37.3	57.8	47.8	-10.9	-10.5
686.8	41.0	37.6	56.0	46.0	-15.1	-8.4
1088.0	33.3	28.3	56.0	46.0	-22.7	-17.7
3005.4	29.6	24.5	56.0	46.0	-26.4	-21.5

High Channel



Frequency	Measured		Limit		Margin	
(kHz)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
166.6	43.453	40.575	65.1	55.1	-21.7	-14.6
285.7	31.3	27.4	60.6	50.6	-29.3	-23.3
398.7	41.4	31.9	57.9	47.9	-16.4	-16.0
689.2	40.5	37.8	56.0	46.0	-15.5	-8.2
1214.0	30.5	26.1	56.0	46.0	-25.5	-19.9
5197.8	26.7	23.4	60.0	50.0	-33.3	-26.6



Frequency	Measured		Limit		Margin	
(kHz)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
183.4	39.247	36.874	64.3	54.3	-25.1	-17.5
256.7	34.7	29.6	61.5	51.5	-26.8	-22.0
404.7	46.9	37.1	57.8	47.8	-10.8	-10.7
688.0	40.8	37.3	56.0	46.0	-15.2	-8.7
1208.0	36.7	32.8	56.0	46.0	-19.3	-13.2
3059.4	29.3	24.5	56.0	46.0	-26.7	-21.5

20 dB Bandwidth

Clause 15.247(a)(1)(i)
(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500kHz.

Test Conditions:

Sample Number:	6703A	Temperature:	20°C
Date:	3-21-2011	Humidity:	31 %
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	Nemko GP1

Test Results: EUT complies

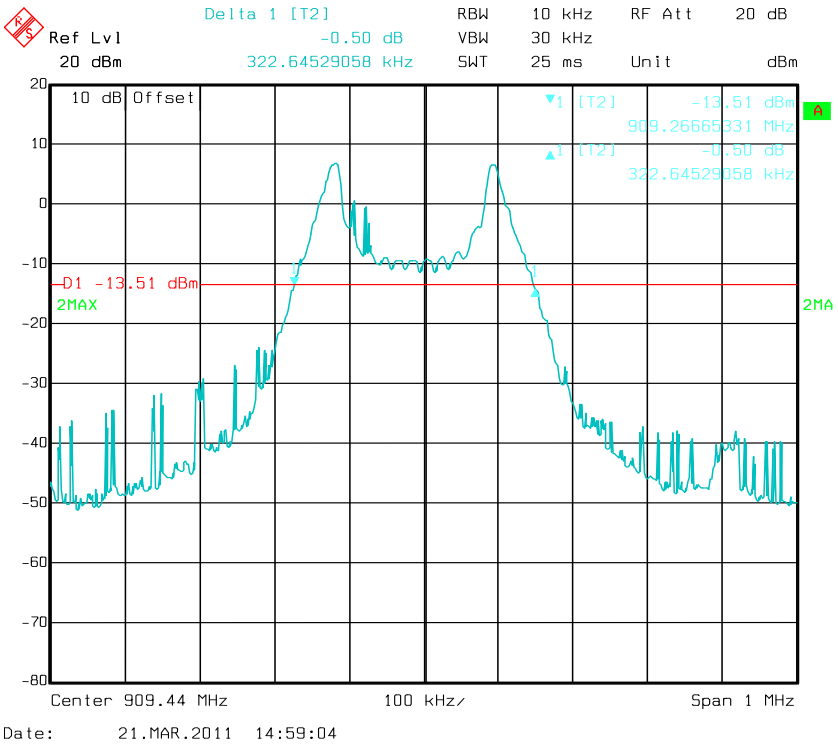
- This was a conducted test.
- Bandwidth measurements were first taken with short duty cycle mode.
- Bandwidth measurements were repeated for long duty cycle mode.
- Span is wide enough to capture the channel transmission
- RBW is 1% of the span
- VBW is 3X RBW
- Sweep is auto
- Detector is Peak
- Trace is Max Hold
- 99% bandwidth: Used Spectrum Analyzer's programmed function.
- 20 dB bandwidth: A peak output max hold reading was taken, a display line was drawn 20 dB lower than peak level. The 20 dB bandwidth was determined from where the channel output spectrum intersected the display line.
- Observed maximum 20 dB BW is 322 kHz (low channel).
- Observed maximum 20 dB BW is 276 kHz (high channel).
- 909.440 MHz – (322/2) kHz = 909.279 MHz (within the frequency band)
- 918.500 MHz + (276/2) kHz = 918.638 MHz (within the frequency band)

Channel Range	Mode	20dB Bandwidth	99% Bandwidth
Low (909.440 MHz)	Long DCM	320 kHz	300 kHz
	Short DCM	322 kHz	301 kHz
Mid (914.196 MHz)	Long DCM	274 kHz	254 kHz
	Short DCM	272 kHz	254 kHz
High (918.500 MHz)	Long DCM	274 KHz	256 kHz
	Short DCM	276 kHz	260 kHz

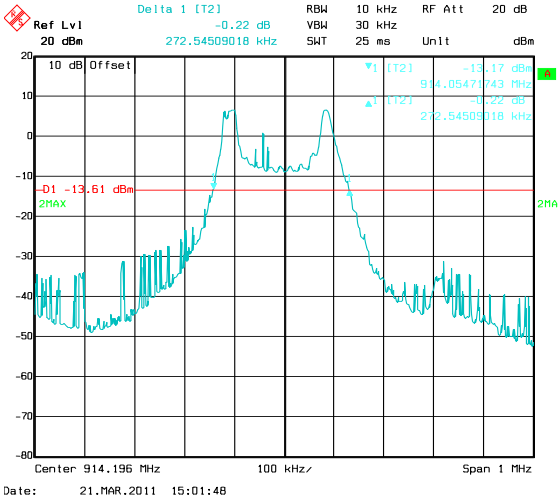
Equipment Used: 835

20dB Bandwidth Short Duty Cycle Mode

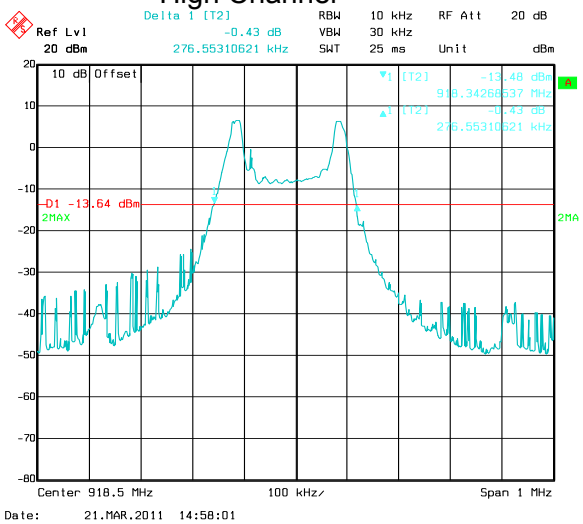
Low Channel



Mid Channel

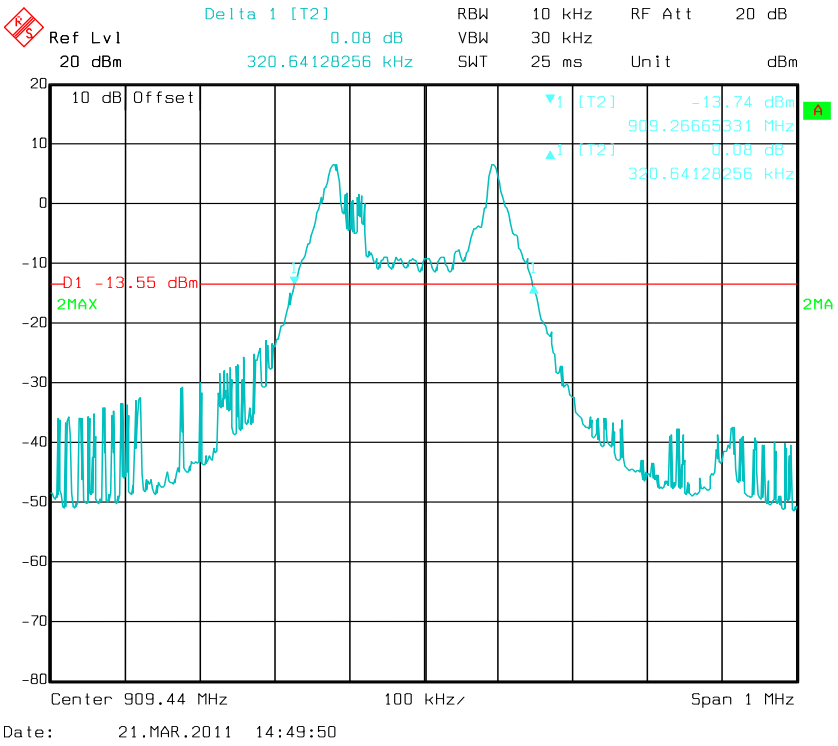


High Channel

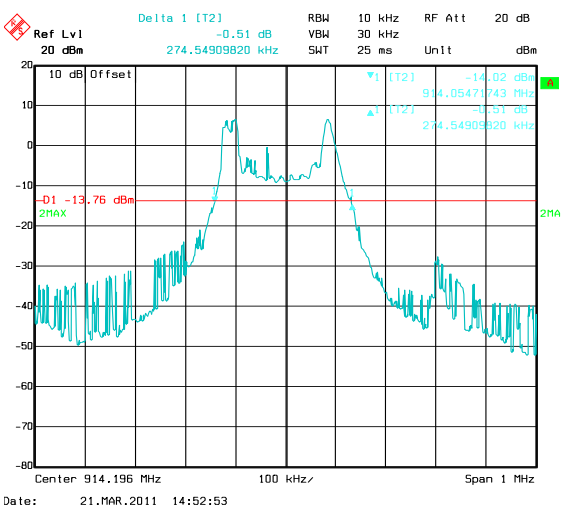


20dB Bandwidth Long Duty Cycle Mode

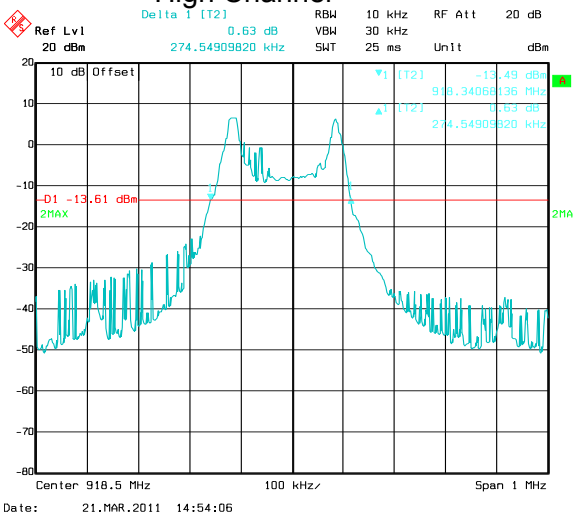
Low Channel



Mid Channel

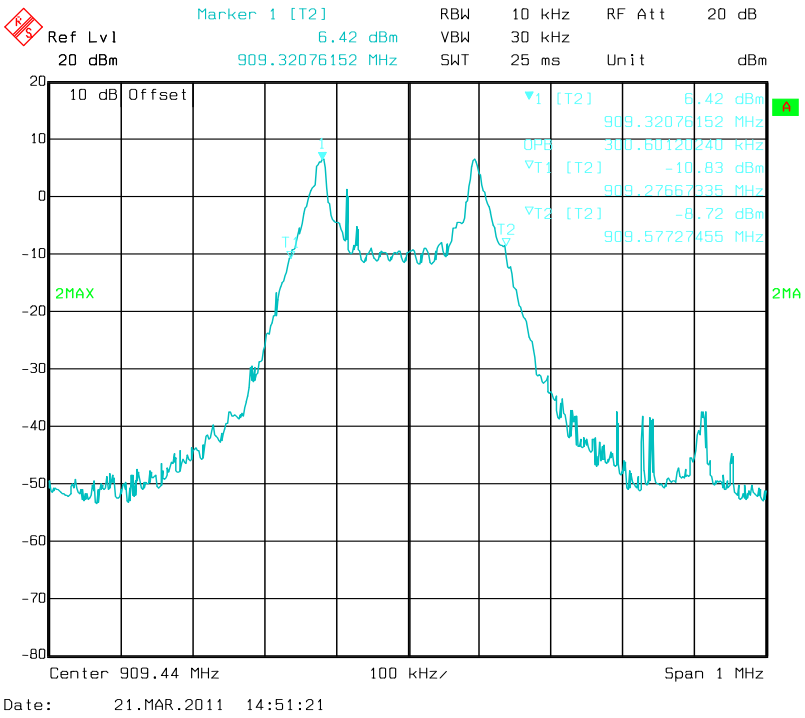


High Channel

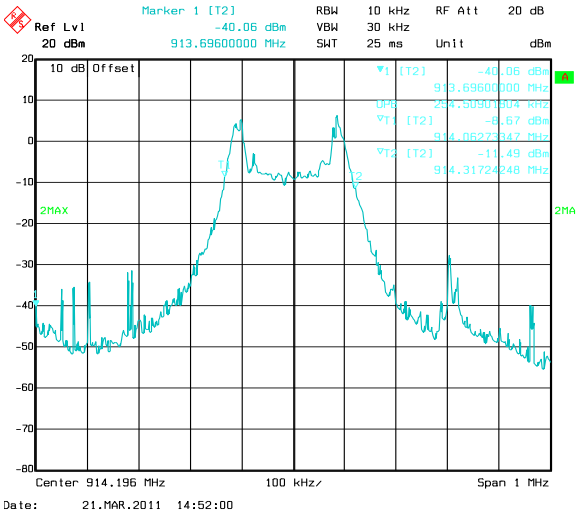


99% Bandwidth Short Duty Cycle Mode

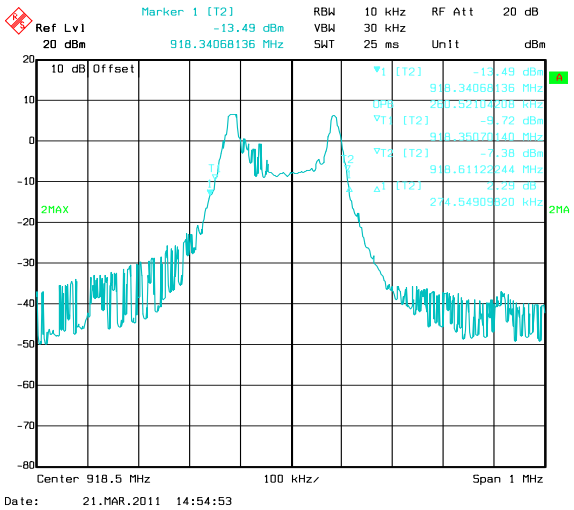
Low Channel



Mid Channel

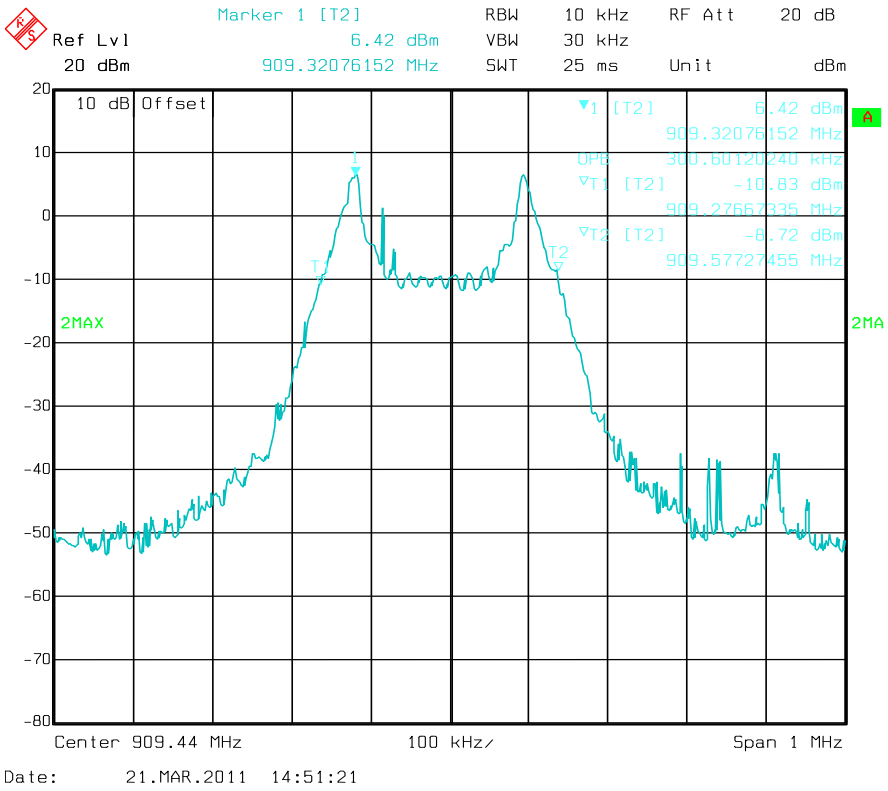


High Channel

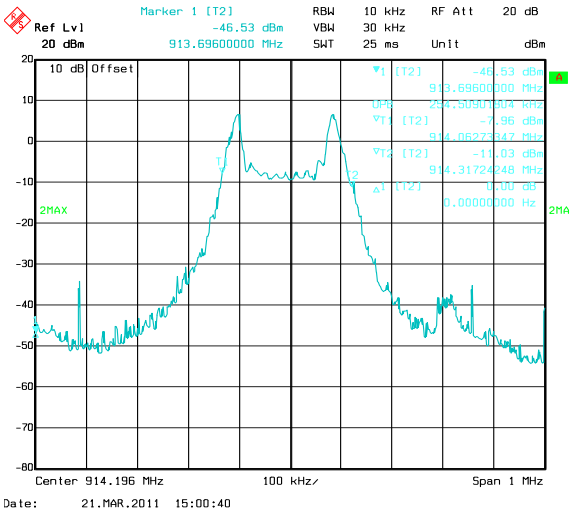


99% Bandwidth Long Duty Cycle Mode

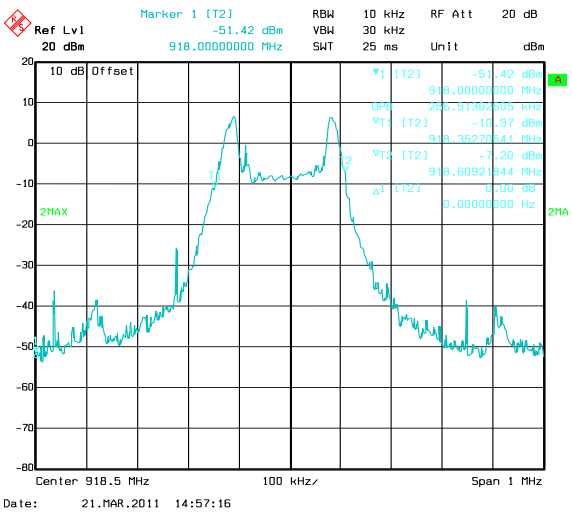
Low Channel



Mid Channel



High Channel



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Frequency Hopping Systems Operating in the 902-928 MHz Band

Clause 15.247(a)(1)(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Test Conditions:

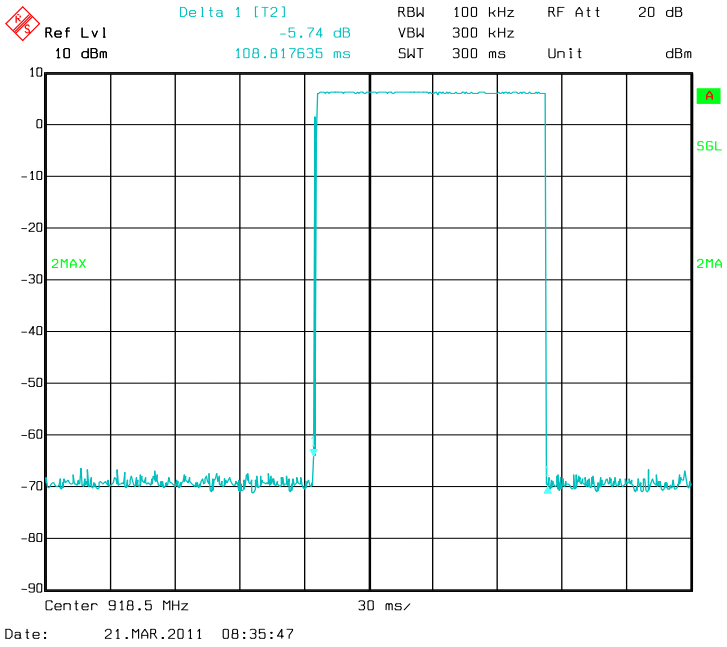
Sample Number:	6703A	Temperature:	20°C
Date:	3-21-2011	Humidity:	31 %
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	Nemko

Test Results: EUT complies

Equipment Used: 835

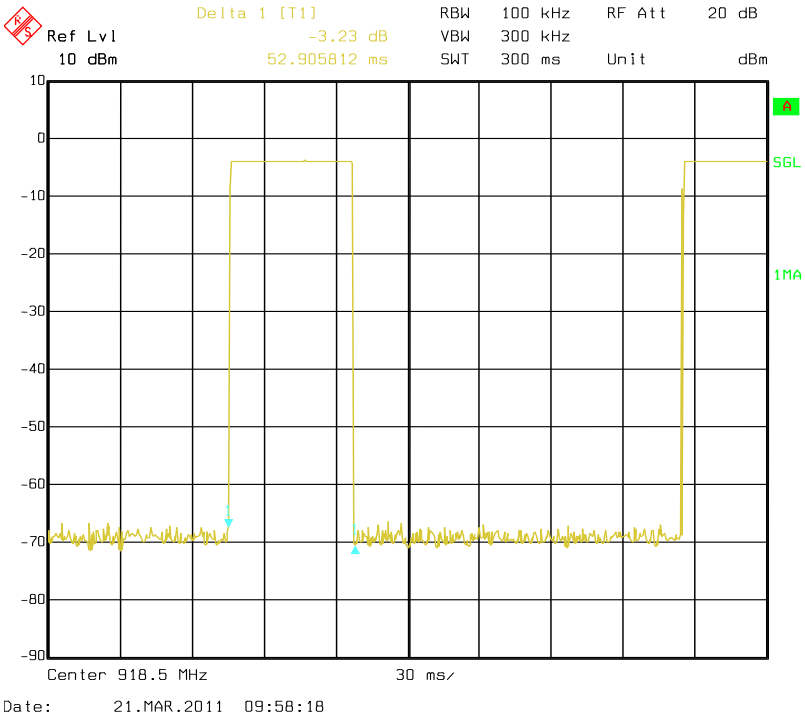
Long Duty Cycle

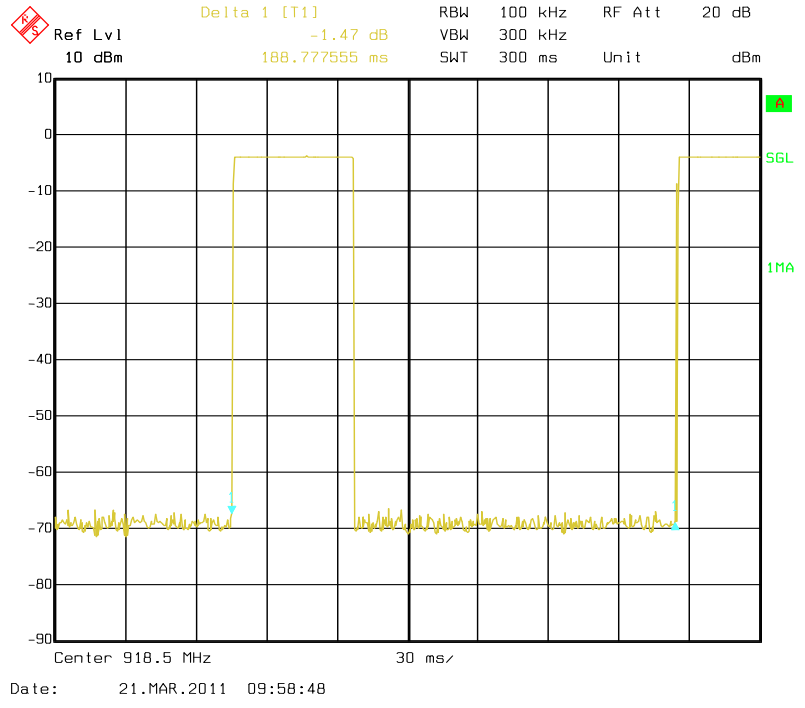
This channel was 108.8 ms
DCF = 100%



Short Duty Cycle

This channel was 52.9 ms and repeats in 188.8 ms, test mode
DCF 20 x log .529 = -5.5 dB





Channel Separation

Clause 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 pseudo randomly 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.

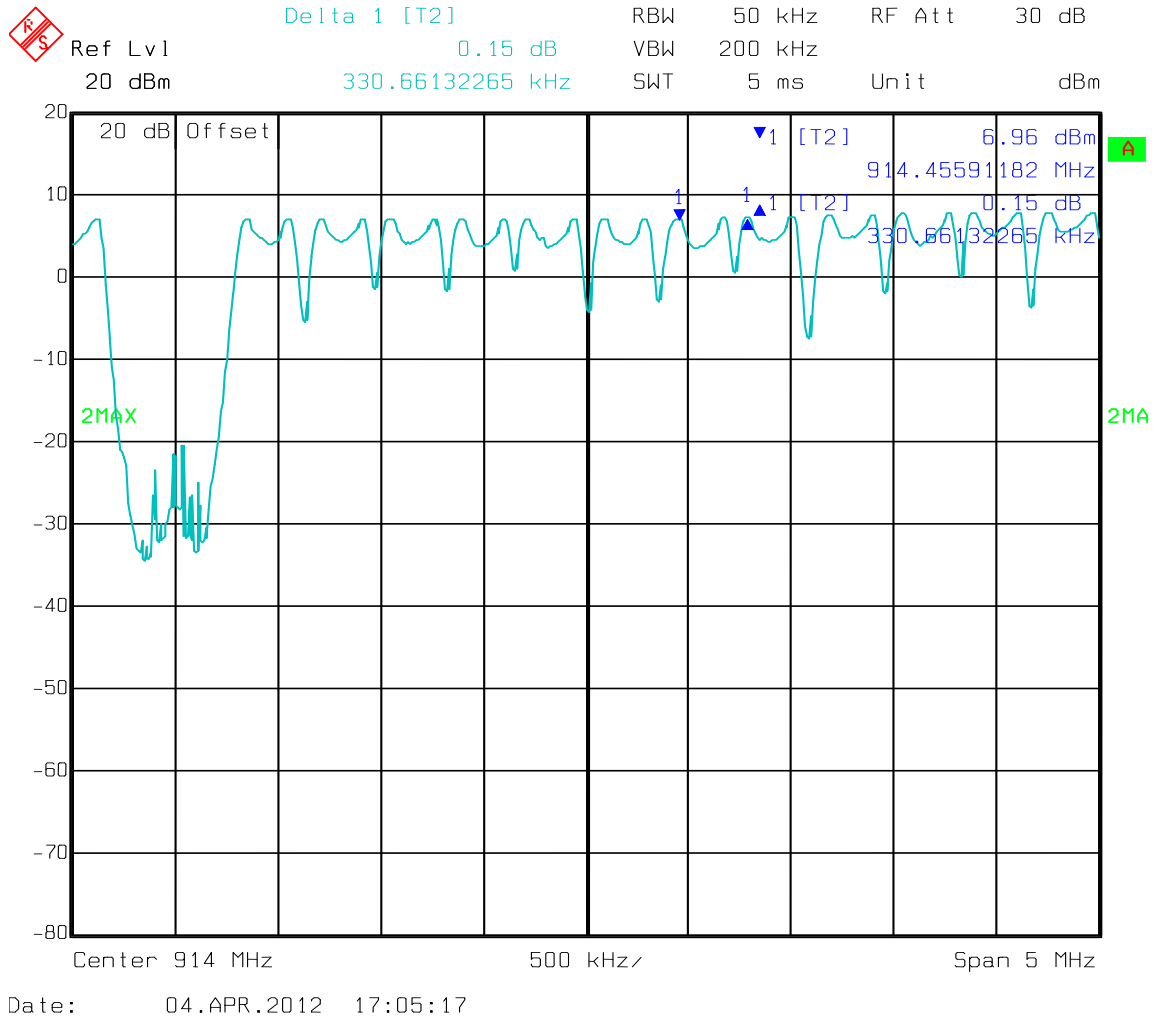
Test Conditions:

Sample Number:	6703A	Temperature:	20°C
Date:	3-21-2011	Humidity:	31 %
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	Nemko

Test Results: EUT Complies

- The Spectrum Analyzer Span was 5 MHz, RES BW was set to 1% or 50 kHz, VBW > RBW.
- Detector was peak, max hold.
- The test sample was set to hopping mode and the frequency span was set to a value to capture two or more hopping channels.
- Marker delta shows frequency separation.

Equipment Used: 835



Channel Separation greater than the 20 dB bandwidth: 320 kHz

Frequency Plan

Clause 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 pseudo randomly 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.

Test Conditions:

Sample Number:	6703A	Temperature:	20°C
Date:	3-21-2011	Humidity:	31 %
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	Nemko

Test Results:

The Frequency Plan is discussed in the Technical Description exhibit and was reviewed by this test engineer and was found to comply.

- 25 channels: channel 0 at 909.440 to channel 24 at 918.500
- Psuedo-Random Hopping Sequence:
  0,5,12,10,6,3,8,1,2,9,15,22,16,18,23,20,19,17,24,21,14,7,13,11,4

Time of Occupancy

(i) For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

Test Conditions:

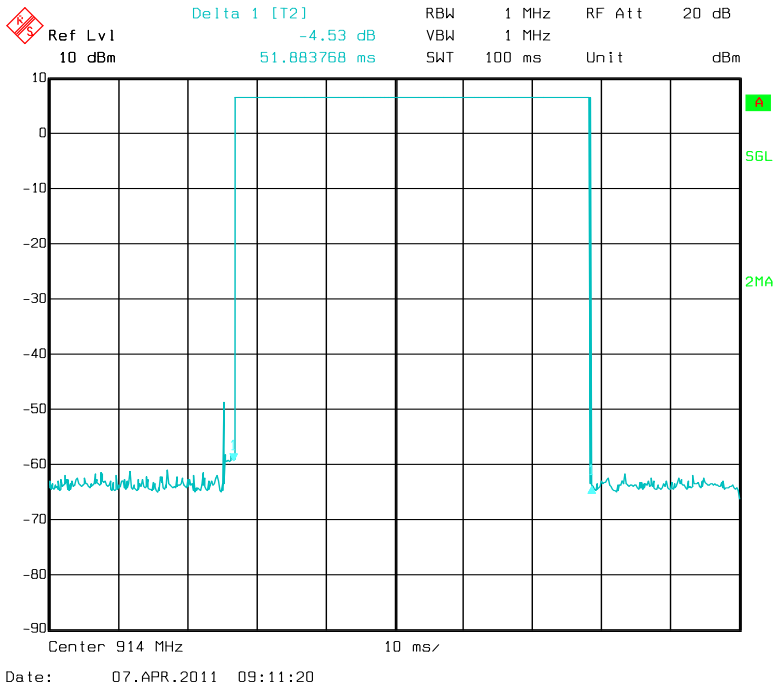
Sample Number:	6703A	Temperature:	18°C
Date:	4-7-2011	Humidity:	31 %
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	Nemko

EUT was placed in pseudo – hopping mode, all channels.

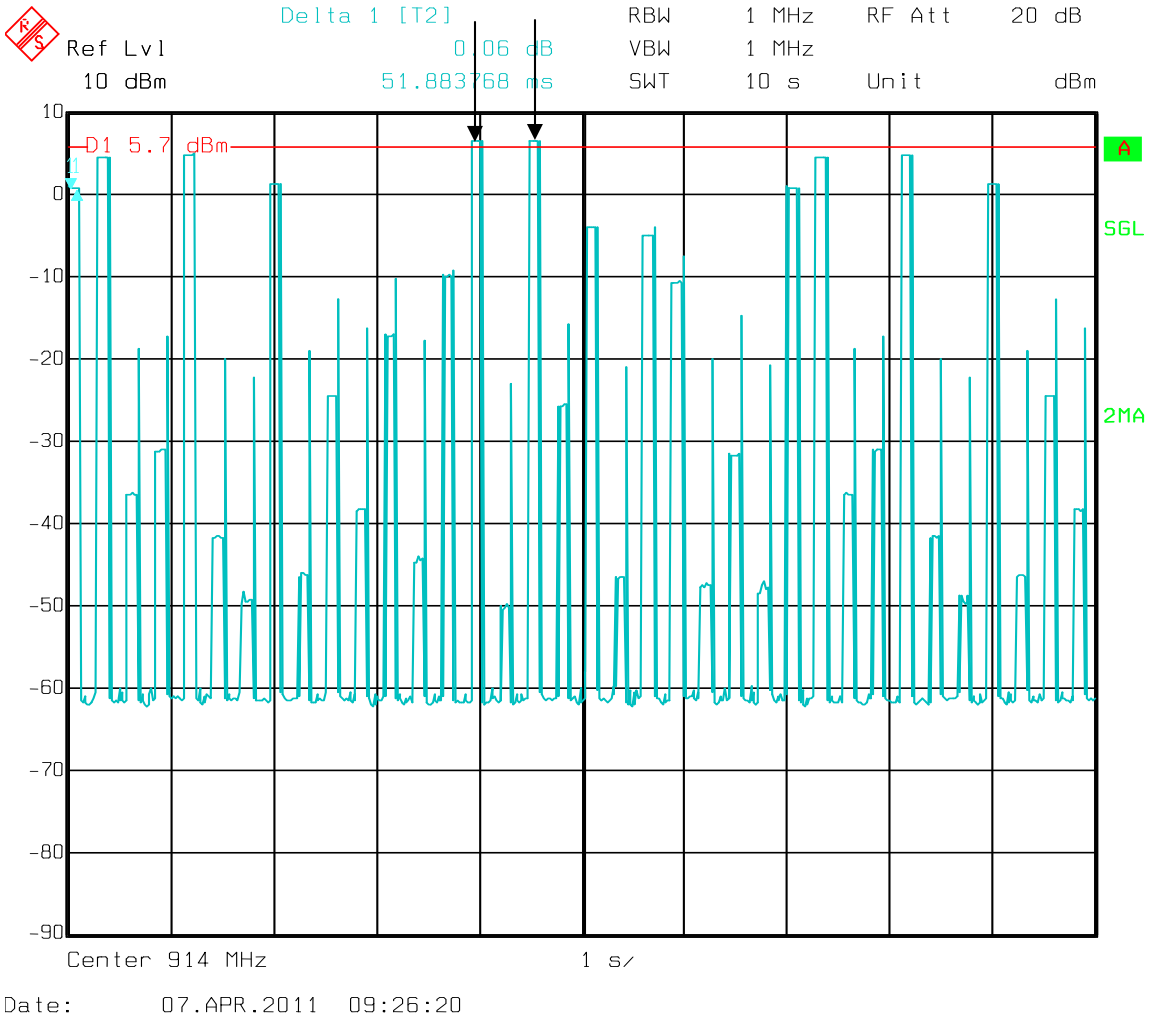
Test Results:

Short burst: 51.89 ms x 2 bursts = 0.1038 seconds, EUT complies

51.89 ms per burst



2 bursts of channel 12 in 10 Seconds



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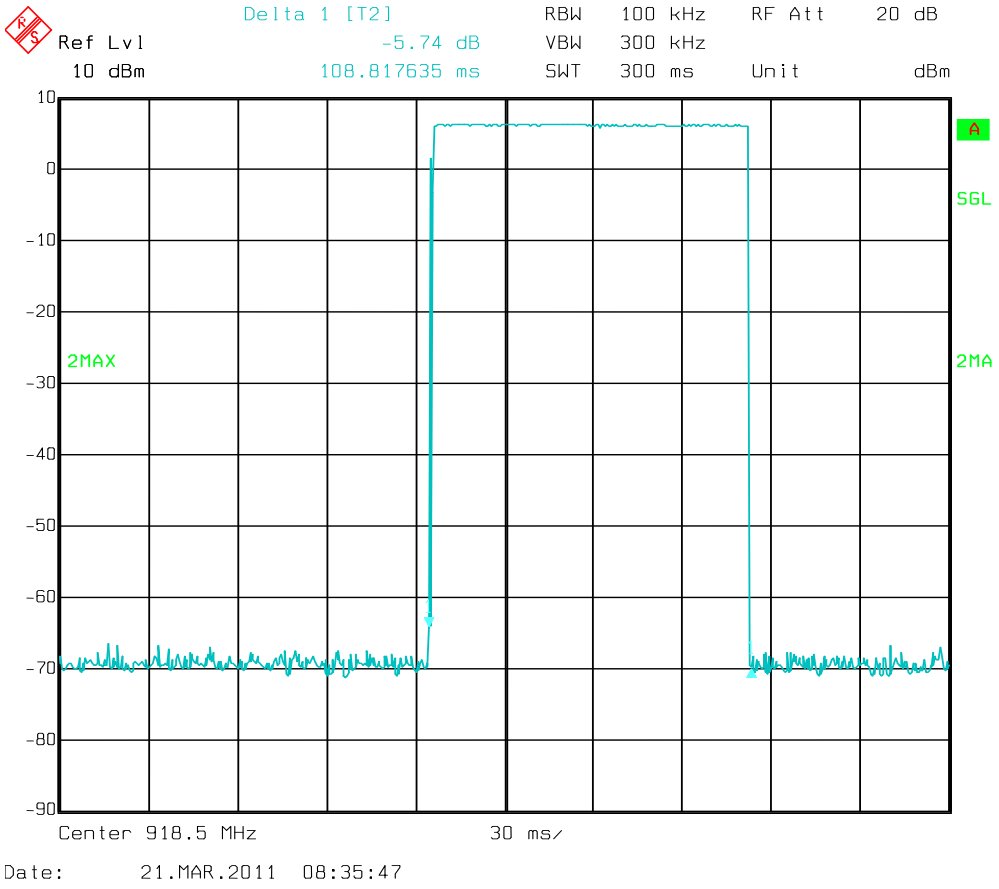
Long burst: 108.8 ms x 2 bursts in 10 seconds = 0.2176 seconds, EUT complies



Number of Hopping Channels

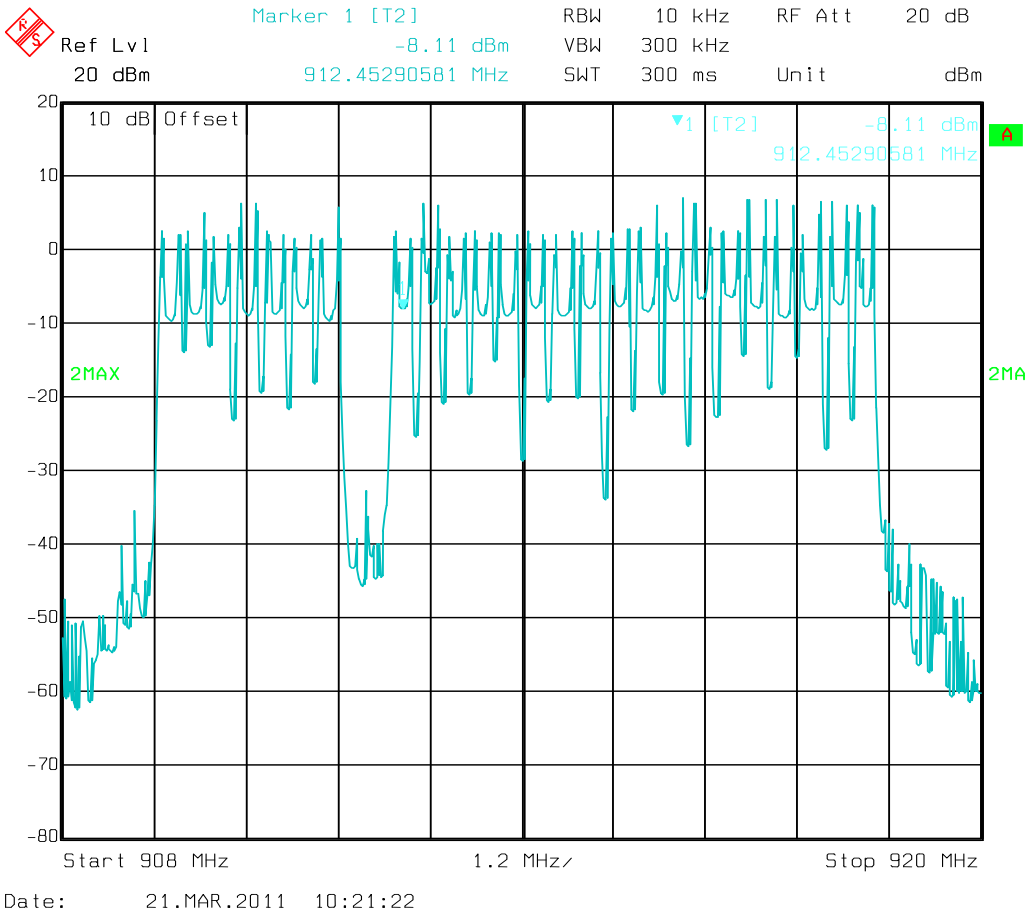
Clause 15.247(a)(1)(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Test Conditions:

Sample Number:	6703A	Temperature:	20°C
Date:	3-21-2011	Humidity:	31 %
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	Nemko

Test Results: 25 Channels, EUT complies.

- This is a conducted test
- The Spectrum Analyzer RES BW was set to 10 kHz to discriminate channels.



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Radiated Emissions within Restricted Bands

Clause 15.209(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (uV/meter)	Measurement Distance (meter)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30.0	30	3
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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 Sec. 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a) must also comply with the radiated emission limits specified in Sec. 15.209(a) (see Sec. 15.205(c)).

Test Conditions:

Sample Number:	7703A	Temperature:	17 °C
Date:	3-18-2011	Humidity:	46 %
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	SOATS

Test Results:

See Table Below.

Additional Observations:

The Spectrum was searched from 30 MHz to the 10th Harmonic.
Three orthogonal axes were tried to maximize emissions. Worst case was used in measurements presented. A new battery was installed initially and replaced every 20 minutes of test time.
There are no emissions found that apply to the restricted bands defined in FCC Part 15 Subpart C, 15.205. The EUT was measured on three orthogonal axes. Worst case measured with antenna horizontal and vertical. Measurements below 1GHz were performed at 3m with a Quasi-Peak detector while Peak and Average detectors were used above 1GHz.
As the emission is pulsing, a duty cycle factor was introduced to spurious harmonics. See calculation in section on Time of Occupancy.

Long Duty Cycle = 100 %

Short Duty Cycle FACTOR = -5.5 dB

Math: Corrected Reading =
Max of Vertical or Horizontal measured + Antenna Factor + Cable Loss – preamplifier (if used). – Duty Cycle Factor

CR/SL Dif = Limit – Corrected Reading. Pass if result is negative.

At 1819.092 MHz: 52.4 = 59.1 + 25.5 + 2.0 – 28.0 –6.2
52.4 – 74 = -21.6

Radiated Emissions 30 MHz to 1000 MHz

Comment: Digital emissions that occur regardless of transmit frequency.
Hand Held Model worst case as fully populated.

Radiated Emissions Data

Job # :	1023311	Date :	3-18-2011	Page 1 of 1	
NEX#:	164553	Time :	10:30		
		Staff :	aal		
Client Name :	DEI Headquarters Inc.			EUT Voltage :	120
EUT Name :	Hand Held Unit			EUT Frequency :	60
EUT Model # :				Phase:	1
EUT Serial # :	NA			NOATS	
EUT Config. :	Transmit			SOATS	X
				Distance < 1000 MHz:	3 m
				Distance > 1000 MHz:	3 m
Specification :	CFR47 Part 15, Subpart B, Class B				
Loop Ant. #:	NA				
Bicon Ant.#:	116_3m	Temp. (°C) :	17.2		
Log Ant.#:	110_3M	Humidity (%) :	46		
DRG Ant. #	877	Spec Analyzer #:	E1018		
Cable LF#:	SOATS	Analyzer Display #:	E1018		
Cable HF#:	SOATS	Quasi-Peak Detector #:	E1018		
Preamp LF#:	901	Duty Cycle (%):	100		
Preamp HF#	317				

Quasi-Peak	RBW: 120 kHz
	Video Bandwidth 300 kHz
Peak	RBW: 1 MHz
	Video Bandwidth 3 MHz

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
31.0	40.0	40.8	Q	-	1.0	40.8	27.3	40.0	-12.7	Pass	
40.0	43.6	43.7	Q	-	1.0	43.7	26.2	40.0	-13.8	Pass	
72.3	51.1	51.2	Q	-	1.0	51.2	25.8	40.0	-14.2	Pass	
77.5	48.8	52.1	Q	-	1.0	52.1	26.8	40.0	-13.2	Pass	
208.8	38.8	40.8	Q	-	1.0	40.8	22.5	43.5	-21.0	Pass	
300.0	38.6	38.7	Q	-	1.0	38.7	23.7	46.0	-22.3	Pass	
902.0	35.3	35.4	Q	-	1.0	35.4	30.8	46.0	-15.3	Pass	
922.0	46.5	48.0	Q	-	1.0	48.0	43.4	46.0	-2.7	Pass	

Radiated Emissions Data

Job # :	1023311	Date :	07/20-08/01, 2012	Page 1 of 1	
NEX#:	212548	Time :	14:00		
		Staff :	AG		
Client Name :	Directed			EUT Voltage :	DC
EUT Name :	Hub			EUT Frequency :	N/A
EUT Model # :	6703A			Phase:	1
EUT Serial # :	N/A				
EUT Config. :	long pulse on battery				
	X=flat on table, charger right; Y=charger port up			Distance < 1000 MHz:	3 m
	Z: up on short side, charger right			Distance > 1000 MHz:	3 m
Specification :	FCC Part 15.247				
Loop Ant. #:	NA				
Bicon Ant.#:	128_3m	Temp. (°C) :	24		
Log Ant.#:	110_3m	Humidity (%) :	64		
DRG Ant. #	752	Spec Analyzer #:	911		
Cable LF#:	SAC_10m	Analyzer Display #:	911		
Cable HF#:	WCC	Quasi-Peak Detector #:	911		
Preamp LF#:	901				
Preamp HF#	_E1029				

Peak	RBW: 1 MHz
	Video Bandwidth 3 MHz
Average	RBW: 1 MHz
	Video Bandwidth 10 Hz

Peak meets Average limits.

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side DEG	Ant. Height cm	Max. Reading (dBµV)	Corrected Reading (dBµV)	Spec. limit (dBµV)	CR/SL Diff. (dB)	Pass Fail	Comment
											low channel
909.4	63.7	75.8	P	158	110	75.8	105.4	125.3	-19.9	Pass	X
909.4	72.0	74.8	P	351	100	74.8	104.4	125.3	-20.9	Pass	Y
909.4	76.6	70.9	P	40	100	76.6	106.2	125.3	-19.1	Pass	Z
1818.9	48.2	54.6	P	349	161	54.6	44.5	65.4	-20.9	Pass	X
1818.9	55.5	53.6	P	349	161	55.5	45.4	64.4	-19.0	Pass	Y
1818.9	49.7	55.4	P	349	161	55.4	45.3	66.2	-20.9	Pass	Z
2728.3	53.1	57.9	P	235	100	57.9	52.2	54.0	-1.8	Pass	X
2728.3	52.8	56.8	P	177	154	56.8	51.1	54.0	-2.9	Pass	Y
2728.3	56.6	55.6	P	194	157	56.6	50.9	54.0	-3.1	Pass	Z
3637.8	49.0	51.0	P	350	156	51.0	48.7	54.0	-5.3	Pass	Y worst case
											mid channel
914.2	63.7	74.1	P	256	105	74.1	103.7	125.3	-21.6	Pass	X
914.2	71.1	73.9	P	348	103	73.9	103.5	125.3	-21.8	Pass	Y
914.2	75.7	70.1	P	40	100	75.7	105.3	125.3	-20.0	Pass	Z
2742.6	50.4	52.7	P	232	100	52.7	47.0	54.0	-7.0	Pass	X
2742.6	51.5	55.0	P	171	158	55.0	49.3	54.0	-4.7	Pass	Z worst case
2742.6	51.6	49.9	P	281	122	51.6	45.9	54.0	-8.1	Pass	Y
3657.0	48.2	49.4	P	45	113	49.4	47.1	63.5	-16.4	Pass	Y worst case
6400.0	42.3	43.2	P	141.0	148.0	43.2	46.4	54.0	-7.6	Pass	Y worst case
											high channel
918.5	69.1	74.2	P	257	108	74.2	103.8	125.3	-21.5	Pass	X
918.5	71.4	74.0	P	349	100	74.0	103.6	125.3	-21.7	Pass	Y
918.5	76.1	70.7	P	40	100	76.1	105.7	125.3	-19.6	Pass	Z
2755.5	52.4	54.4	P	231.0	100.0	54.4	48.7	54.0	-5.3	Pass	X worst case
3674.0	47.9	49.2	P	41.0	113.0	49.2	46.9	54.0	-7.1	Pass	Y worst case

Radiated Emissions Data

Job # : 1023311 Date : 7/20-08/01, 2012 Page 1 of 1
NEX#: 212548 Time : 14:00
Staff : AG

Client Name : Directed
EUT Name : Hub
EUT Model # : 6703A
EUT Serial # : N/A
EUT Config. : long pulse, charging
X=flat on table, charger right; Y=charger port up
Z: up on short side, charger right
Specification : FCC Part 15.247
Loop Ant. #: NA
Bicon Ant.#: 128_3m
Log Ant.#: 110_3m
DRG Ant. # 752
Cable LF#: SAC_10m
Cable HF#: WCC
Preamp LF#: 901
Preamp HF# _E1029

Temp. (°C) : 24
Humidity (%) : 64
Spec Analyzer #: 911
Analyzer Display #: 911
Quasi-Peak Detector #: 911

EUT Voltage : 120V
EUT Frequency : 60 Hz
Phase: 1

Distance < 1000 MHz: 3 m
Distance > 1000 MHz: 3 m

Peak RBW: 1 MHz
Video Bandwidth 3 MHz
Average RBW: 1 MHz
Video Bandwidth 10 Hz
Peak meets average limits.

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side DEG	Ant. Height cm	Max. Reading (dBµV)	Corrected Reading (dBµV)	Spec. limit (dBµV)	CR/SL Diff. (dB)	Pass Fail		Comment
												lowest channel
909.4	71.3	74.6	P	125.0	135.0	74.6	104.2	125.3	-21.1	Pass	X	VBW 1MHz
909.4	72.1	75.6	P	350.0	100.0	75.6	105.2	125.3	-20.1	Pass	Y	VBW 1MHz
909.4	77.8	67.0	P	43.0	100.0	77.8	107.4	125.3	-17.9	Pass	Z	VBW 1MHz
1818.9	53.8	53.8	P	275.0	100.0	53.8	43.7	64.2	-20.5	Pass	X	
1818.9	52.1	51.2	P	302.0	145.0	52.1	42.0	65.2	-23.2	Pass	Y	
1818.9	55.9	49.3	P	157.0	100.0	55.9	45.8	67.4	-21.6	Pass	Z	
2728.3	53.6	56.8	P	229.0	100.0	56.8	51.1	54.0	-2.9	Pass	X	
2728.3	53.3	56.5	P	162.0	221.0	56.5	50.8	54.0	-3.2	Pass	Y	
2728.3	54.1	51.9	P	284.0	110.0	54.1	48.4	54.0	-5.6	Pass	Z	
3637.8	45.6	49.0	P	27.0	100.0	49.0	46.7	54.0	-7.3	Pass	Y	Worst case
												mid channel
914.2	70.3	74.0	P	118.0	134.0	74	103.6	125.3	-21.7	Pass	X	VBW 1MHz
914.2	71.4	74.7	P	359.0	100.0	74.7	104.3	125.3	-21.0	Pass	Y	VBW 1MHz
914.2	77.1	66.6	P	39.0	100.0	77.1	106.7	125.3	-18.6	Pass	Z	VBW 1MHz
1828.4	53.7	55.6	P	276.0	100.0	55.6	45.5	63.6	-18.1	Pass	X	
1828.4	52.6	53.0	P	174.0	200.0	53.0	42.9	64.3	-21.4	Pass	Y	
1828.4	55.8	50.4	P	147.0	100.0	55.8	45.7	66.7	-21.0	Pass	Z	
2742.6	51.0	54.7	P	75.0	100.0	54.7	49.0	54.0	-5.0	Pass	X	
2742.6	50.4	55.0	P	163.0	213.0	55.0	49.3	54.0	-4.7	Pass	Y	Worst case
2742.6	51.1	51.0	P	324.0	110.0	51.1	45.4	54.0	-8.6	Pass	Z	
3657.0	46.3	n	P	346.0	110.0	46.3	44.0	54.0	-10.0	Pass	X	
3657.0	45.3	48.7	P	49.0	131.0	48.7	46.4	54.0	-7.6	Pass	Y	Worst case
3657.0	45.7	45.5	P	306.0	100.0	45.7	43.4	54.0	-10.6	Pass	Z	
4570.0	44.4	43.9	P	146.0	123.0	44.4	43.5	54.0	-10.5	Pass	Z	Worst case
6400.0	43.8	44.2	P	177.0	143.0	44.2	47.4	54.0	-6.6	Pass	Z	Worst case
												Highest channel
918.5	70.5	74.2	P	118.0	128.0	74.2	103.8	125.3	-21.5	Pass	X	VBW 1MHz
918.5	71.6	74.5	P	359.0	100.0	74.5	104.1	125.3	-21.2	Pass	Y	VBW 1MHz
918.5	77.1	67.5	P	48.0	100.0	77.1	106.7	125.3	-18.6	Pass	Z	VBW 1MHz
1837.0	52.1	53.5	P	273.0	100.0	53.5	43.4	63.8	-20.4	Pass	X	
1837.0	52.1	51.0	P	303.0	100.0	52.1	42.0	64.1	-22.1	Pass	Y	
1837.0	55.6	49.0	P	156.0	100.0	55.6	45.5	66.7	-21.2	Pass	Z	
			P									
2755.5	51.4	55.2	P	75.0	100.0	55.2	49.5	54.0	-4.5	Pass	X	Worst case
			P									
3674.0	45.0	48.7	P	32.0	110.0	48.7	46.4	54.0	-7.6	Pass	Y	Worst case
4592.0	44.4	n	P	147.0	105.0	44.4	43.5	54.0	-10.5	Pass	Z	Worst case

Radiated Emissions Data

Job # :	1023311	Date :	July 6, 2012	Page	1 of 1
NEX#:	212548	Time :	14:00		
		Staff :	AG		
Client Name :	Directed			EUT Voltage :	DC
EUT Name :	Keypad			EUT Frequency :	N/A
EUT Model # :	7703A			Phase:	1
EUT Serial # :	N/A				
EUT Config. :	long pulse on battery				
	X=flat on table, charger right; Y=charger port up			Distance < 1000 MHz:	3 m
	Z: up on short side, charger right			Distance > 1000 MHz:	3 m
Specification :	FCC Part 15.247				
Loop Ant. #:	NA				
Bicon Ant.#:	128_3m	Temp. (°C) :	22		
Log Ant.#:	110_3m	Humidity (%) :	33		
DRG Ant. #	752	Spec Analyzer #:	911		
Cable LF#:	SAC_10m	Analyzer Display #:	911		
Cable HF#:	WCC	Quasi-Peak Detector #:	911		
Preamp LF#:	901				
Preamp HF#	_E1029				

Peak RBW: 1 MHz
Video Bandwidth 3 MHz
Peak meets average limits

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side DEG	Ant. Height cm	Max. Reading (dBµV)	Corrected Reading (dBµV)	Spec. limit (dBµV)	CR/SL Diff. (dB)	Pass Fail	Comment
909.4	65.0	73.6	P	101.0	100.0	73.6	103.2	125.3	-22.1	Pass	X VBW 1MHz
909.4	60.2	73.1	P	352.0	100.0	73.1	102.7	125.3	-22.6	Pass	Y VBW 1MHz
909.4	71.2	59.1	P	234.0	100.0	71.2	100.8	125.3	-24.5	Pass	Z VBW 1MHz
914.2	63.7	72.0	P	258.0	100.0	72	101.6	125.3	-23.7	Pass	X VBW 1MHz
914.2	58.0	71.5	P	359.0	100.0	71.5	101.1	125.3	-24.2	Pass	Y VBW 1MHz
914.2	68.9	57.5	P	12.0	100.0	68.9	98.5	125.3	-26.8	Pass	Z VBW 1MHz
918.5	64.7	73.5	P	262.0	100.0	73.5	103.1	125.3	-22.2	Pass	X VBW 1MHz
918.5	58.2	72.9	P	159.0	100.0	72.9	102.5	125.3	-22.8	Pass	Z VBW 1MHz
918.5	70.7	58.6	P	13.0	100.0	70.7	100.3	125.3	-25.0	Pass	Y VBW 1MHz
2728.3	56.3	58.0	P	318.0	105.0	58.0	52.7	54.0	-1.3	Pass	X
2742.6	55.4	57.6	P	319.0	105.0	57.6	52.3	54.0	-1.7	Pass	X

Radiated Emissions Data

Job # :	1023311	Date :	July 6, 2012	Page	1 of 1
NEX #:	212548	Time :	14:00		
		Staff :	AG		
Client Name :	Directed			EUT Voltage :	120V
EUT Name :	Keypad			EUT Frequency :	60 Hz
EUT Model # :	7703A			Phase:	1
EUT Serial # :	N/A				
EUT Config. :	long pulse, charging				
	X=flat on table, charger right; Y=charger port up			Distance < 1000 MHz:	3 m
	Z: up on short side, charger right			Distance > 1000 MHz:	3 m
Specification :	FCC Part 15.247				
Loop Ant. #:	NA				
Bicon Ant.#:	128_3m	Temp. (°C) :	22		
Log Ant.#:	110_3m	Humidity (%) :	33	Peak	RBW: 1 MHz
DRG Ant. #	752	Spec Analyzer #:	911		Video Bandwidth 3 MHz
Cable LF#:	SAC_10m	Analyzer Display #:	911		Peak meets average limits
Cable HF#:	WCC	Quasi-Peak Detector #:	911		
Preamp LF#:	901				
Preamp HF#	_E1029				

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side DEG	Ant. Height cm	Max. Reading (dBµV)	Corrected Reading (dBµV)	Spec. limit (dBµV)	CR/SL Diff. (dB)	Pass Fail	Comment
909.4	64.2	73.3	P	250.0	100.0	73.3	102.9	125.3	-22.4	Pass	X VBW 1MHz
909.4	64.3	73.5	P	182.0	100.0	73.5	103.1	125.3	-22.2	Pass	Y VBW 1MHz
909.4	72.6	60.9	P	197.0	120.0	72.6	102.2	125.3	-23.1	Pass	Z VBW 1MHz
914.2	61.2	71.5	P	109.0	100.0	71.5	101.1	125.3	-24.2	Pass	X VBW 1MHz
914.2	60.8	71.8	P	182.0	105.0	71.8	101.4	125.3	-23.9	Pass	Y VBW 1MHz
914.2	69.1	59.7	P	9.0	110.0	69.1	98.7	125.3	-26.6	Pass	Z VBW 1MHz
918.5	64.2	72.7	P	109.0	100.0	72.7	102.3	125.3	-23.0	Pass	X VBW 1MHz
918.5	61.5	73.2	P	171.0	100.0	73.2	102.8	125.3	-22.5	Pass	Y VBW 1MHz
918.5	72.3	59.9	P	188.0	100.0	72.3	101.9	125.3	-23.4	Pass	Z VBW 1MHz
1818.9	52.0	53.5	P	322.0	118.0	53.5	43.7	62.9	-19.2	Pass	X
1818.9			P				-9.8	63.1	-72.9	Pass	Y
1818.9	56.4	47.2	P	198.0	100.0	56.4	46.6	62.2	-15.6	Pass	Z
2728.3	55.8	58.8	P	265.0	118.0	58.8	53.5	54.0	-0.5	Pass	X
2728.3	54.7	57.4	P	173.0	100.0	57.4	52.1	54.0	-1.9	Pass	Y
2728.3	53.6	56.5	P	146.0	188.0	56.5	51.2	54.0	-2.8	Pass	Z
3637.8	46.8		P	22.0	100.0	46.8	45.0	54.0	-9.0	Pass	X
3637.8	43.3		P	156.0	100.0	43.3	41.5	54.0	-12.5	Pass	Z
4546.4	45.5	46.9	P	135.0	145.0	46.9	46.9	54.0	-7.1	Pass	Z
1828.4	54.2	56.5	P	264.0	100.0	56.5	46.7	61.1	-14.4	Pass	X
1828.4			P				-9.8	61.4	-71.2	Pass	Y
1828.4	57.9	49.8	P	199.0	100.0	57.9	48.1	58.7	-10.6	Pass	Z
2742.6	55.1	58.0	P	264.0	115.0	58.0	52.7	54.0	-1.3	Pass	X
2742.6	53.0	56.7	P	170.0	100.0	56.7	51.4	54.0	-2.6	Pass	Y
2742.6	56.8	52.0	P	29.0	100.0	56.8	51.5	54.0	-2.5	Pass	Z
4570.0	44.4	45.3	P	144.0	145.0	45.3	44.8	54.0	-9.2	Pass	Z
1837.0	52.4	54.4	P	327.0	117.0	54.4	44.6	62.3	-17.7	Pass	X
1837.0	56.4	48.2	P	198.0	100.0	56.4	46.6	61.9	-15.3	Pass	Z
2755.5	55.1	54.0	P	5.0	112.0	55.1	49.8	54.0	-4.2	Pass	X
2755.5	55.3	52.6	P	157.0	100.0	55.3	50.0	54.0	-4.0	Pass	Y
2755.5	53.6	50.4	P	43.0	100.0	53.6	48.3	54.0	-5.7	Pass	Z
3674.0	45.9		P	20.0	120.0	45.9	44.1	54.0	-9.9	Pass	X
3674.0	43.3	45.6	P	135.0	161.0	45.6	43.8	54.0	-10.2	Pass	Z
4592.0	45.9	48.1	P	134.0	150.0	48.1	47.6	54.0	-6.4	Pass	Z
5510.0	42.3		P	1.0	100.0	42.3	44.9	62.2	-17.3	Pass	Z
8267.0	40.3	40.0	P	322.0	100.0	40.3	47.6	54.0	-6.4	Pass	Z

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Conducted Spurious Emissions

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 Sec. 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a) must also comply with the radiated emission limits specified in Sec. 15.209(a) (see Sec. 15.205(c)).

Test Conditions:

Sample Number:	6703A	Temperature:	22 °C
Date:	3-21-2011	Humidity:	47 %
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	SOATS

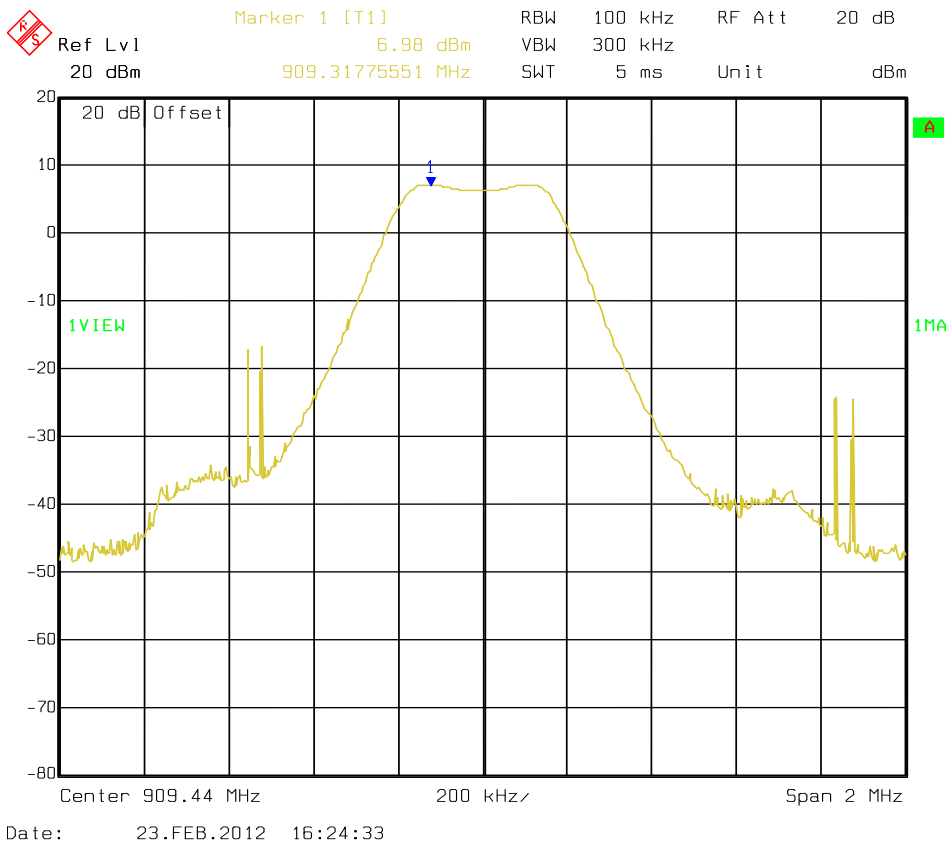
Test Results: EUT complies

See plots below.

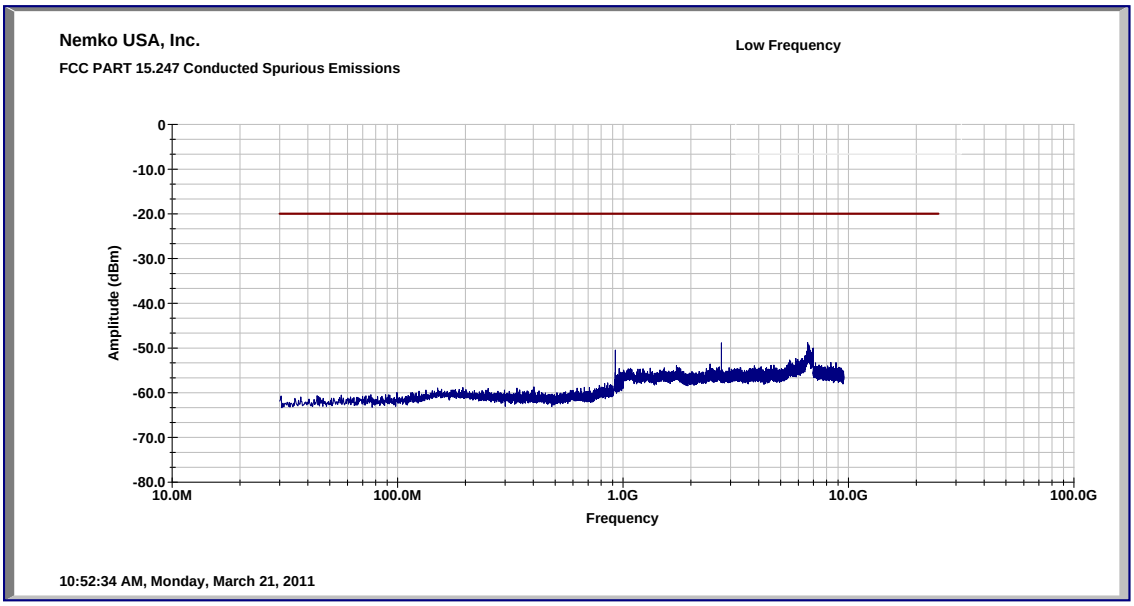
Additional Observations:

- The peak level reading was taken at the carrier frequency 10 dBm then a display line was drawn 30 dBc below this level (-20 dBm) which will be the limit for this test.
- RBW is 100 kHz
- VBW is 3X RBW
- Sweep is auto.
- Detector is Peak, Trace is Max Hold
- A 10 dB attenuator was used between the input of the Spectrum Analyzer and the EUT's antenna port.
- The Spectrum was searched from 30 MHz to 9500 MHz using a computer to control sweep time, ranges and record peak hold data. RBW = 100 kHz, VBW = 300 kHz.
- Emissions were searched from 30 MHz to 902 MHz and from 928 MHz to 9500 MHz, no emissions within 20 dB of the limit were detected.
- Fundamental emissions are excluded from plots.
- Long and/or short duty cycles were noted and did not factor in the spurious emissions.

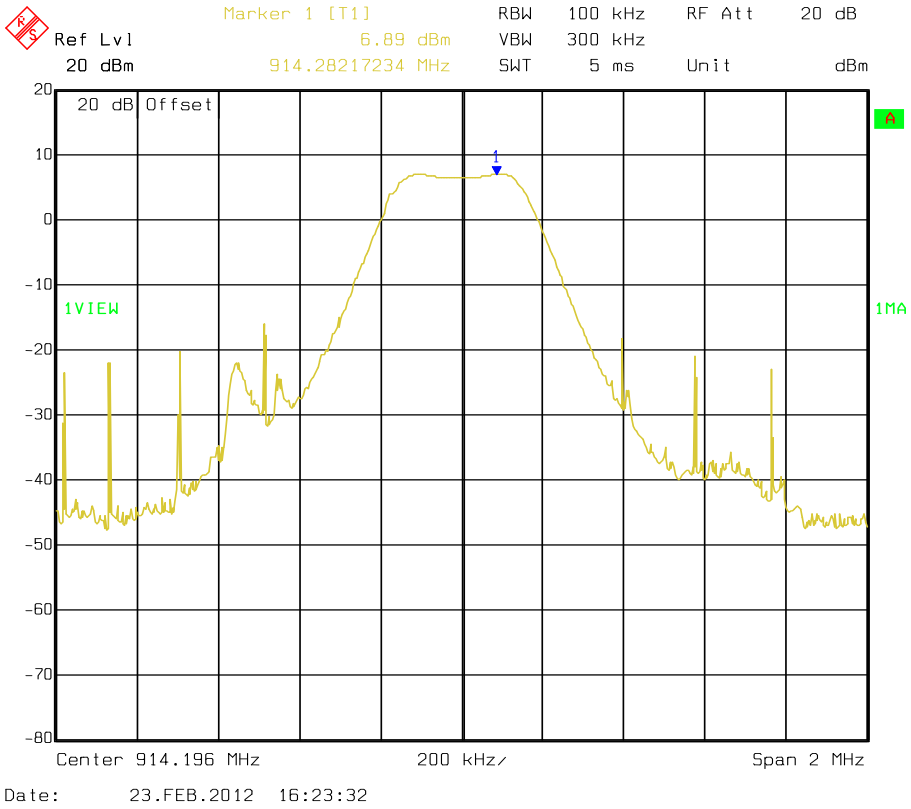
Low Channel Transmit



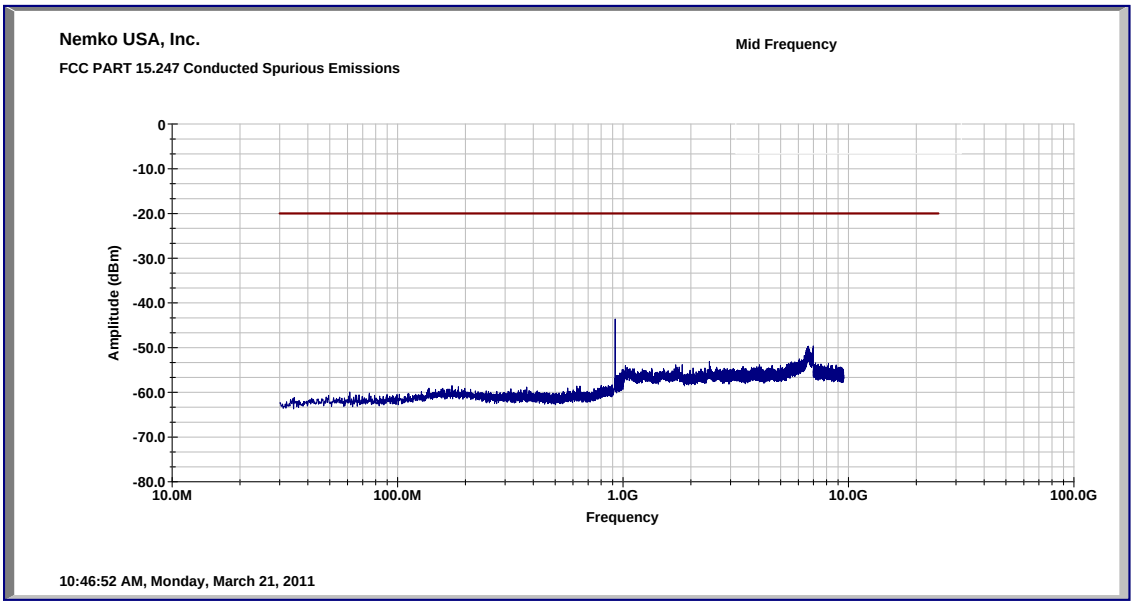
Limit is 6.98 dBm -20 dB or -13.0 dBm



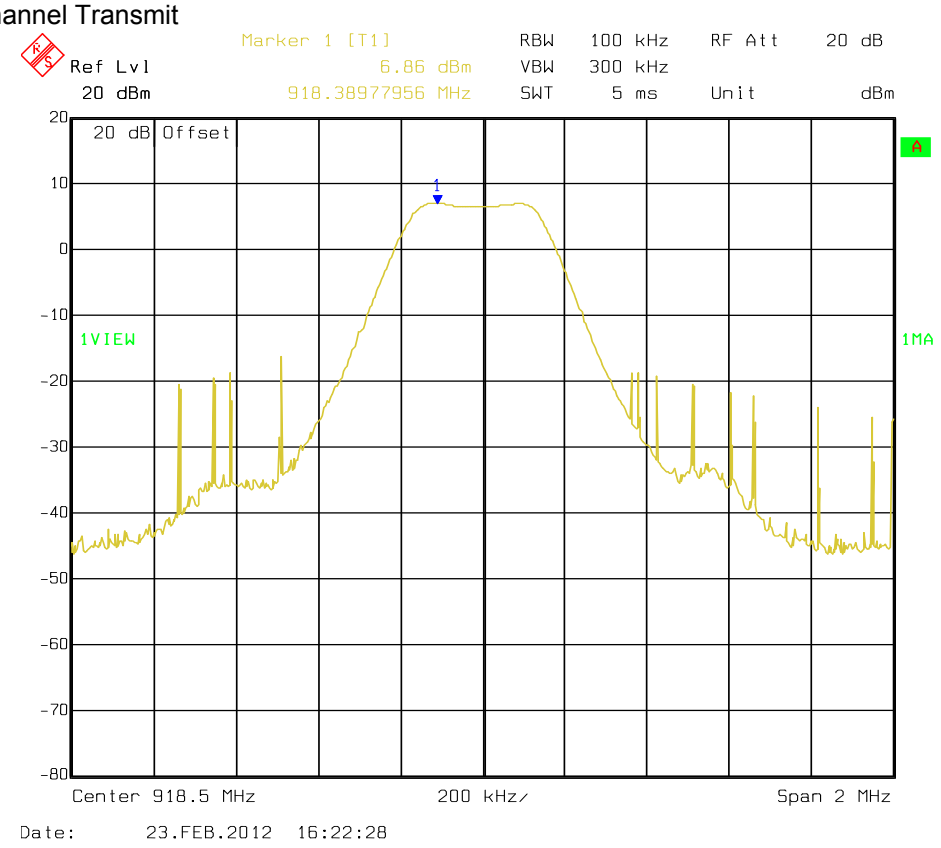
Mid Channel Transmit



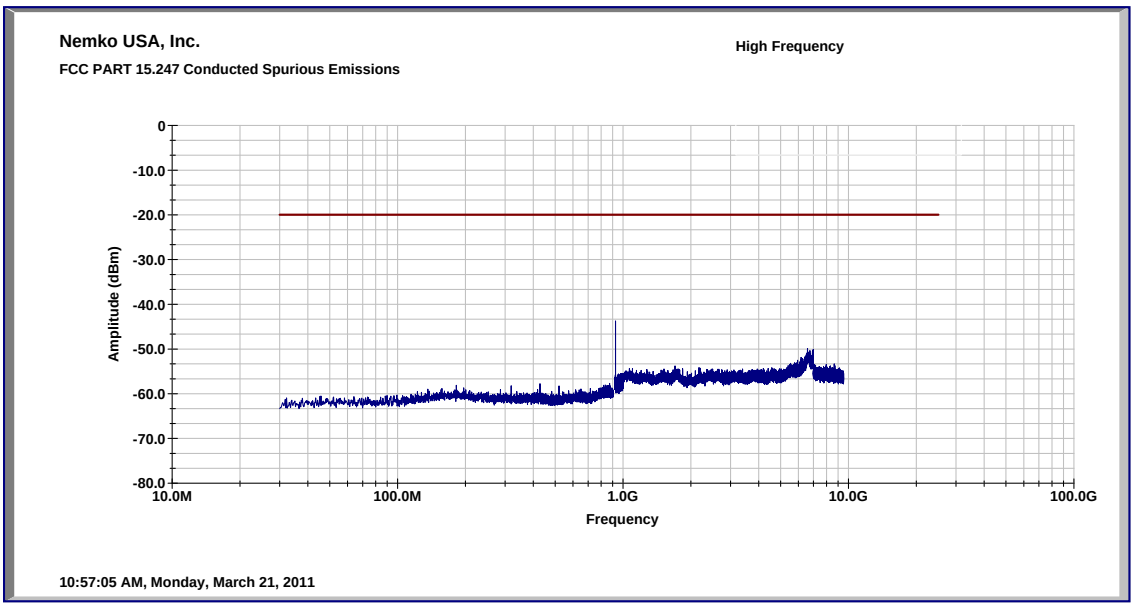
Limit is 6.89 dBm -20 dB or -13.1 dBm



High Channel Transmit

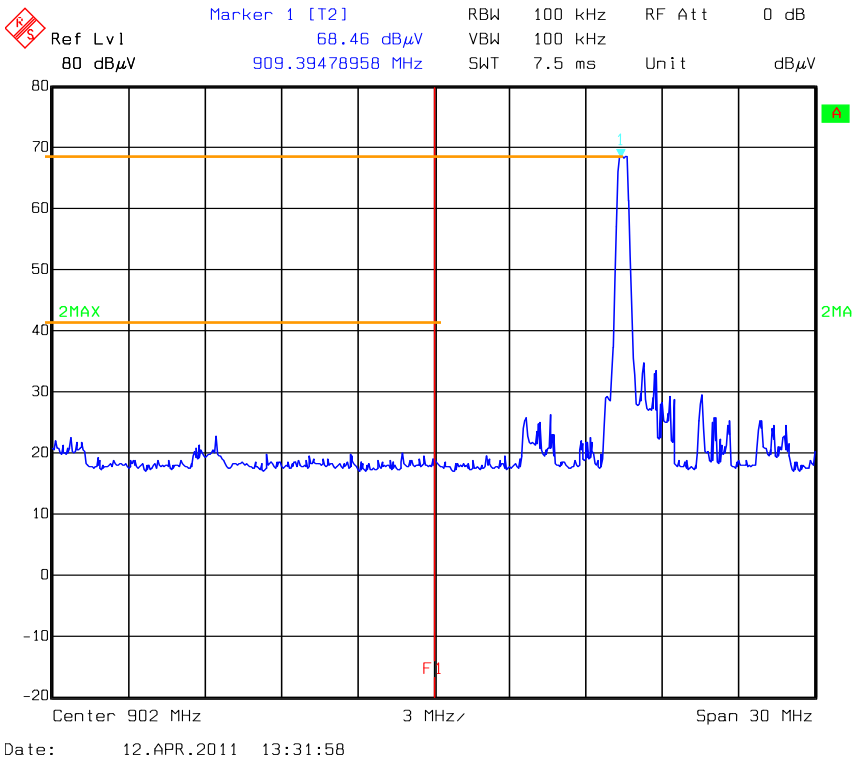


Limit is 6.86 dBm -20 dB or -13.1 dBm



Bandedge Measurements

Detector is Peak, Trace is Max Hold
3m site SOATS, equipment used: 835, 775



Low Channel Not Hopping Mode

Frequency Line F1 is 902 MHz
Orange Lines 20 dBc

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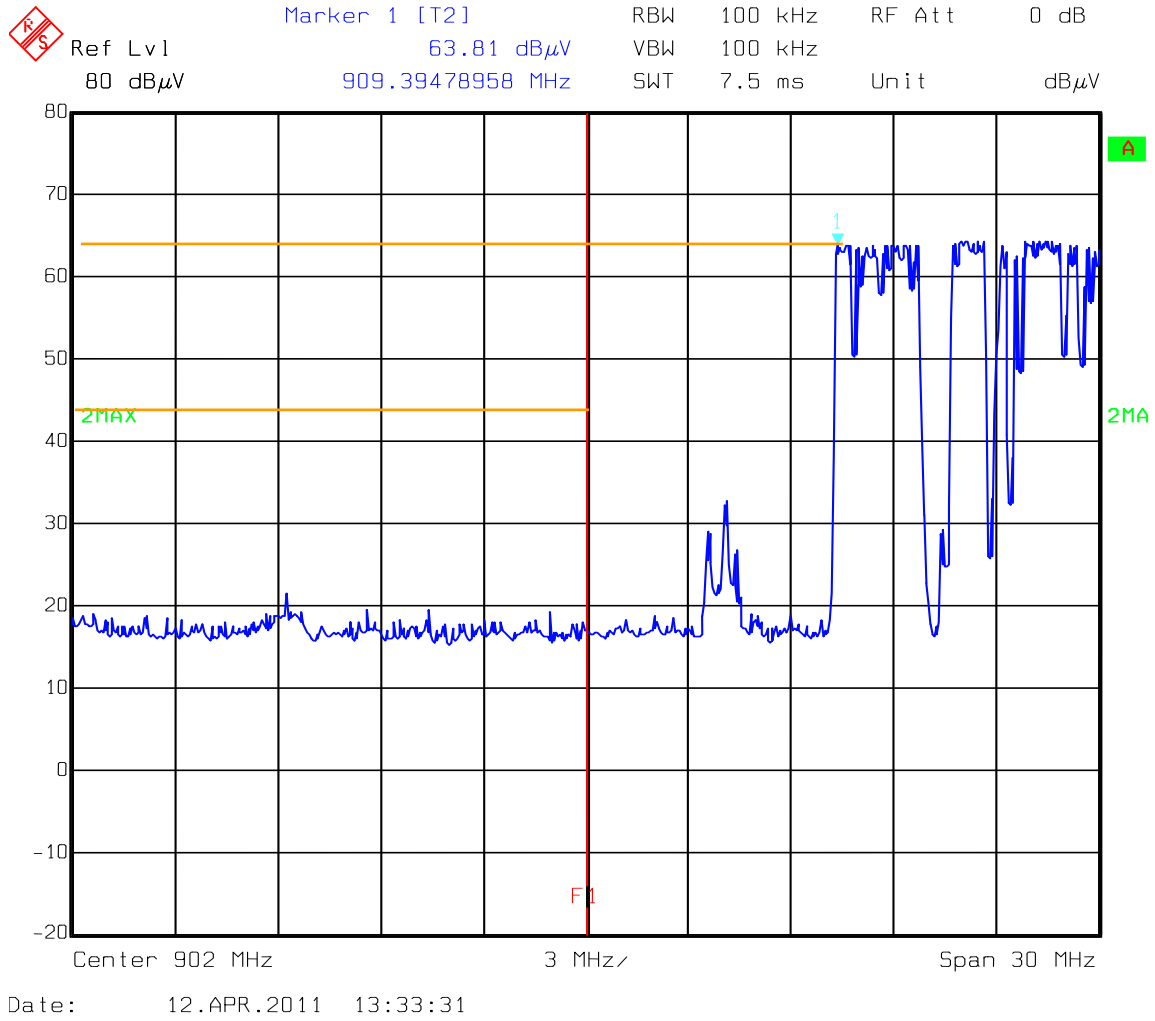
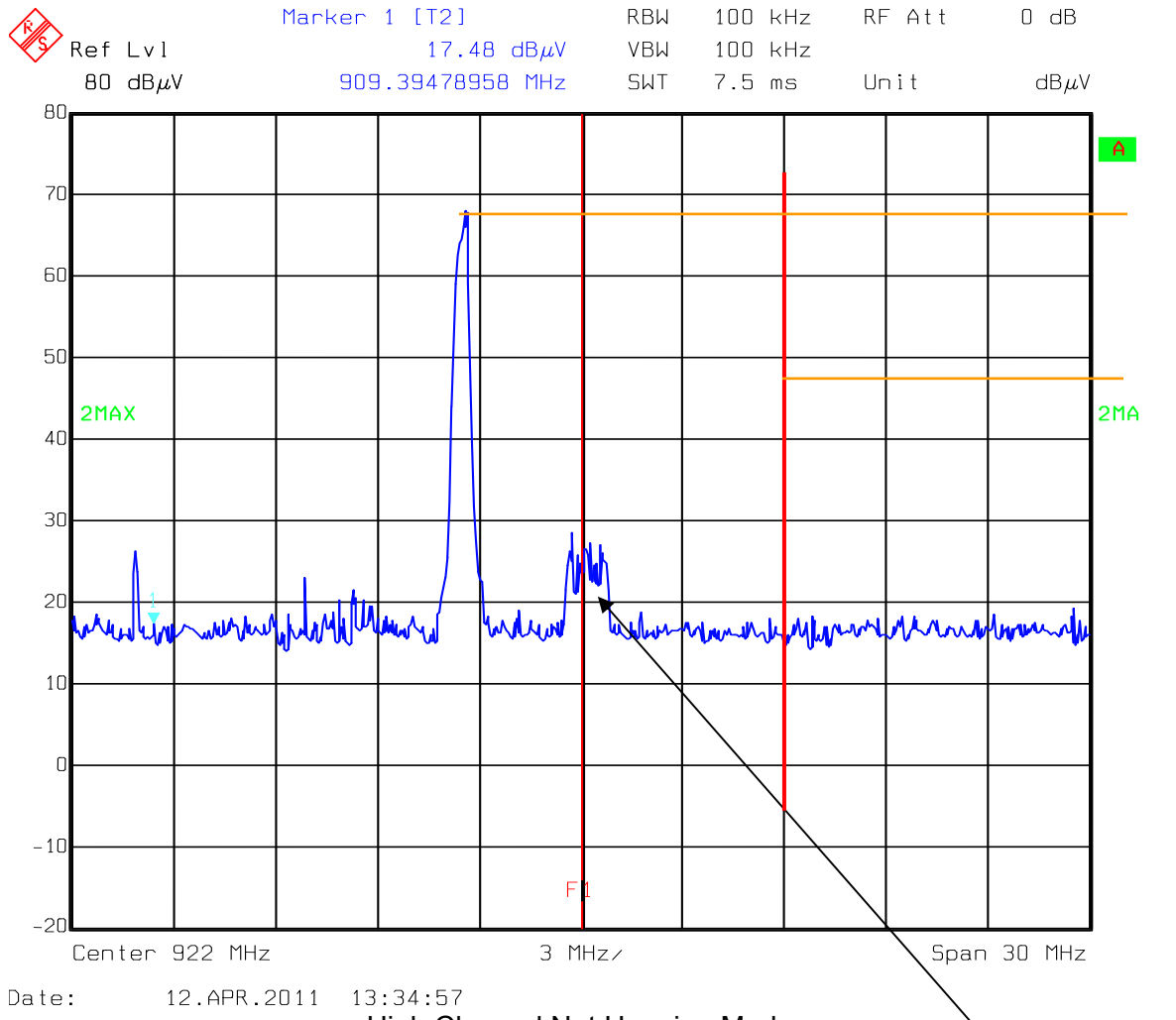


Low Channel Hopping Mode

Frequency Line F1 is 902 MHz
Orange Lines 20 dBc



High Channel Not Hopping Mode

Red line 928 MHz
Orange Lines 20 dBc

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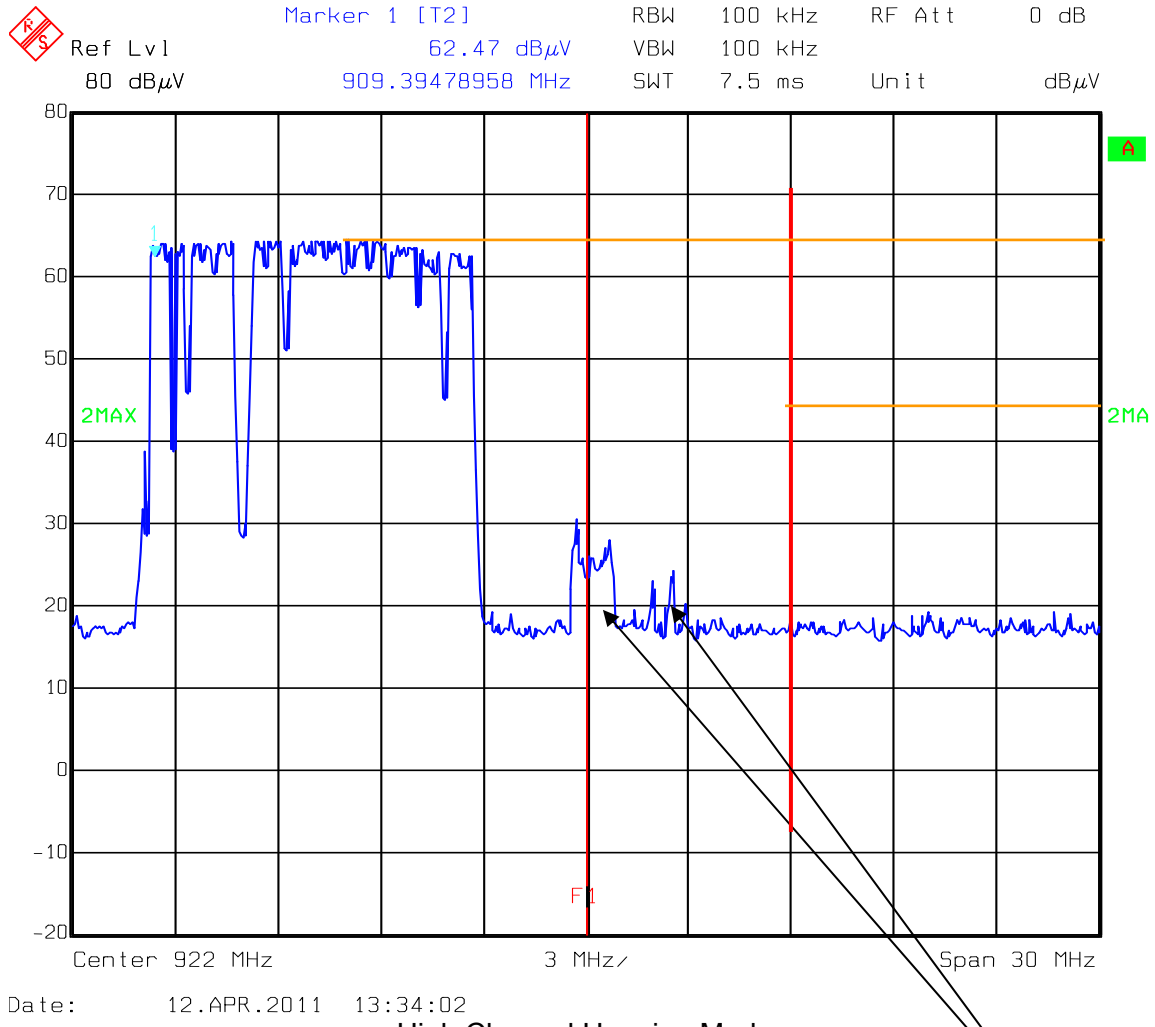


High Channel Hopping Mode

Red Line is 928 MHz
Orange Lines 20 dBc

Ambients

Peak Output Power

Clause 15.247(b)(2) For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

Test Conditions:

Sample Number:	6703A	Temperature:	21°C
Date:	3-21-2011	Humidity:	38 %
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	Nemko

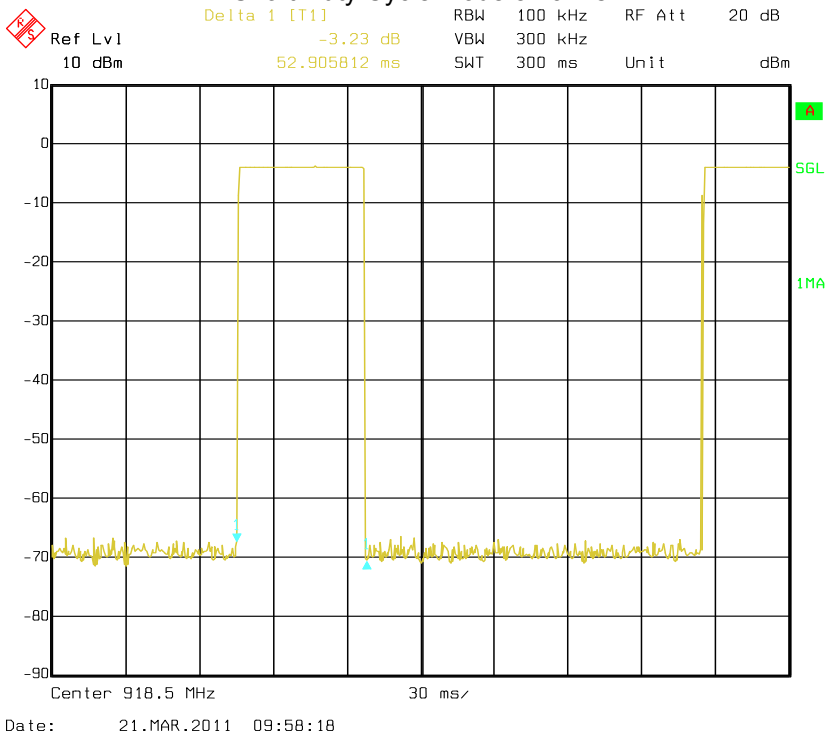
Test Results: EUT complies.

- The EUT may be powered by a Wall Pack at 120 VAC 60 Hz or battery powered. Input to the Wall Pack was varied +/-15% from 102 to 138 VAC. No significant change in output power was noted.
- RBW is 10 MHz, VBW is 10 MHz.
- Detector is Peak, Trace is Max Hold
- A 20 dB attenuator was used between the input of the Spectrum Analyzer and the EUT's antenna port.
- Long duty cycles are shown. As max hold was used, duty cycle would not vary power level.

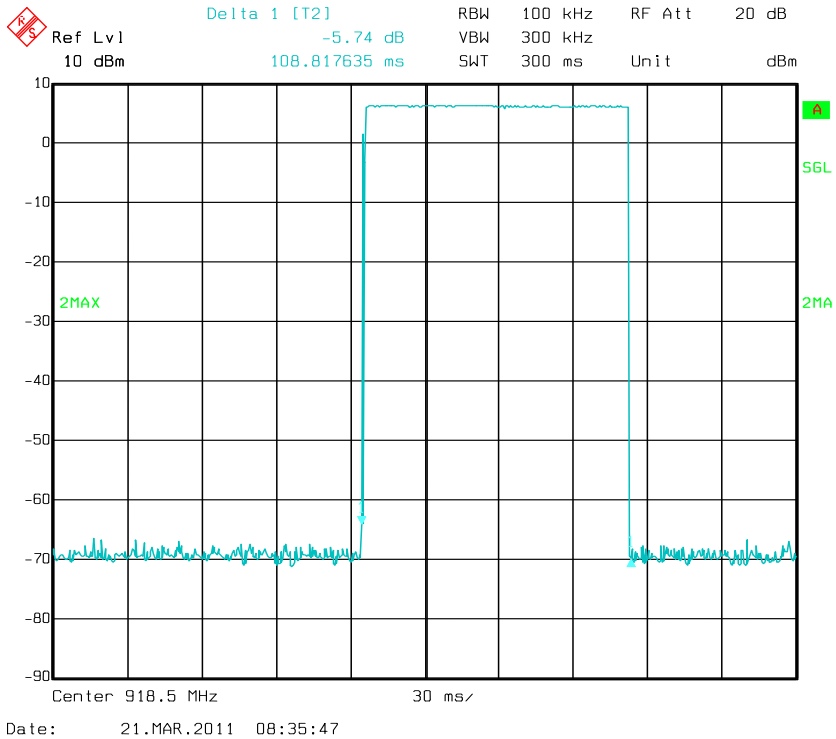
Conducted Peak Output Power:

Channel	Mode	Frequency	Peak Output Power dBm	Calculated Output Power (mW)
Low	Long	909.440 MHz	7.07	5.0
Mid	Long	914.196 MHz	6.89	
High	Long	918.500 MHz	7.07	

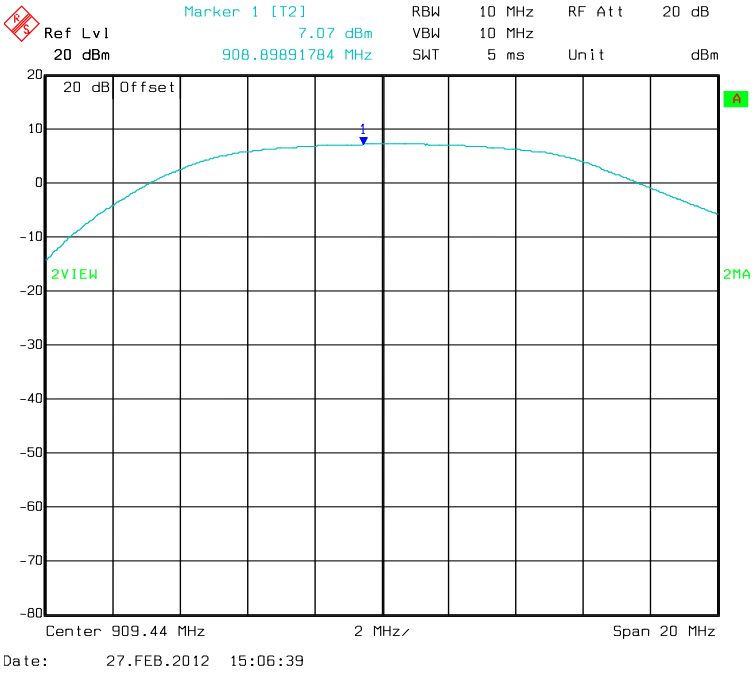
Short Duty Cycle Mode 52.9 ms



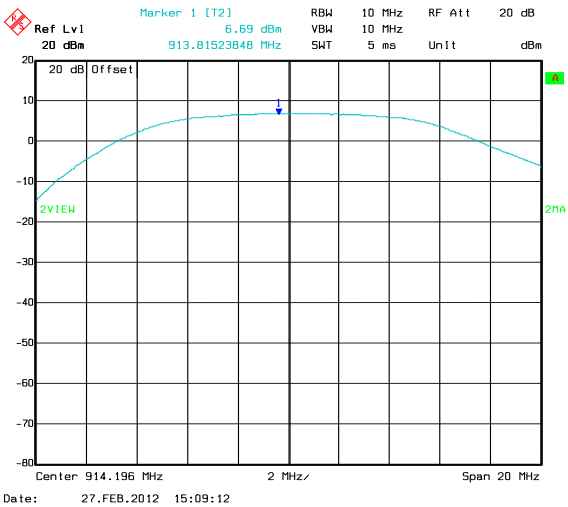
Long Duty Cycle Mode 108 ms



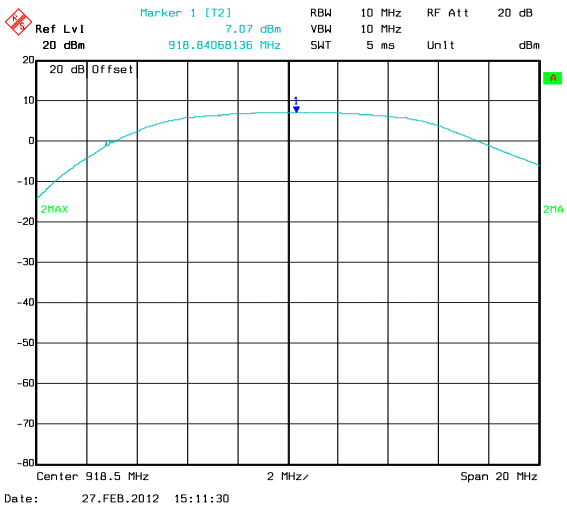
Long Duty Cycle Mode
Low Channel



Mid Channel



High Channel



Receiver Spurious Emissions

The following receiver spurious emission limits shall be complied with:
(a) If a radiated measurement is made, all spurious emissions shall comply with the limits of Table 1.
Table 1 - Spurious Emission Limits for Receivers

Spurious Frequency (MHz)	Field Strength (microvolt/m at 3 meters)
30-88	100
88-216	150
216-960	200
Above 960	500

Test Conditions:

Sample Number:	6703A	Temperature:	21°C
Date:	3-18-2011	Humidity:	39 %
Modification State:	test receive mode	Tester:	A. Laudani
		Laboratory:	SOATS

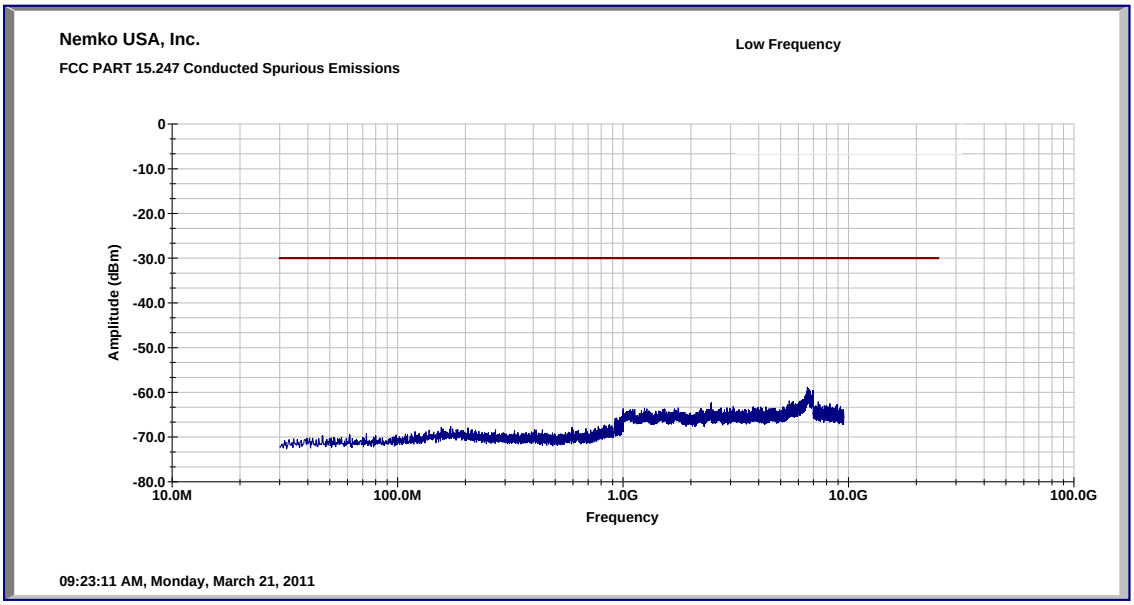
Test Results:

See attached test result.

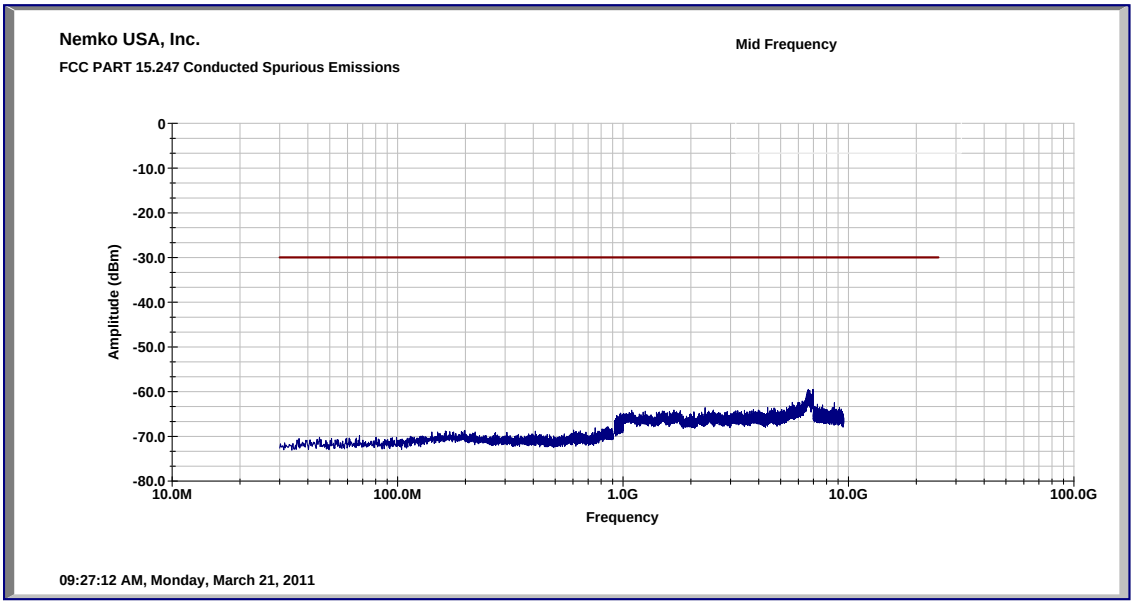
Additional Observations:

- The Spectrum was searched from 30 MHz to 9500 MHz using a computer to control sweep time, ranges and record peak hold data. RBW = 100 kHz, VBW = 300 kHz.
- Below 1GHz measurements are measured using CISPR quasi-peak detector while above 1GHz are measured using average detector with 1MHz RBW.
- No other emissions within 20 dB of the limit were detected.

Low Channel Receive



Mid Channel Receive



High Channel Receive