



Nemko USA, Inc.
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CERTIFICATION TEST REPORT

Applicant: HME
14110 STOWE DR.
Poway, CA 92064

Equipment Under Test (EUT): WIRELESS BELTPACK WITH HEADSET

Model: COM6100

FCC ID: BYMC61
IC: 1860A-C61

In Accordance With: FCC Part 15 Subpart C, 15.247
IC RSS-210 Issue 8 December 2010
IC RSS-Gen Issue 3 December 2010

Authorized By: Nemko USA Inc.
11696 Sorrento Valley Road, Suite F
San Diego, CA 92121

Tested By: Alan Laudani, EMC/RF Test Engineer

Date: JUNE 21, 2011
Report Number: 2011 06176874 FCC
Project Number: 1029124
Nex Number: 176874
Total Number of Pages: 40



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 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 and IC.

The assessment summary is as follows:

Apparatus Assessed:	MODEL: COM6100 SERIAL NUMBER: F13N0046
Specifications:	FCC Part 15 Subpart C, 15.247 IC RSS-210 Issue 8 December 2010
Date Received in Laboratory:	JUNE 16, 2011 TO JUNE 20, 2011
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None





1.2 Report Release History:

REVISION	DATE	COMMENTS
-	JUNE 21, 2011	Prepared By: Alan Laudani
-	JUNE 21, 2011	Initial Release: Alan Laudani

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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: June 21, 2011
Alan Laudani, RF/EMC Test Engineer





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Section 2: Equipment Under Test

2.1 Product Identification

DEVICE	MANUFACTURER MODEL # SERIAL #	POWER CABLE
EUT - Wireless Beltpack with Headset	HME Model: COM6100 Serial #: F13N0046	NA

Connection	I/O Cable
EUT to EUT HeadSet	HME made cable

2.2 Theory of Operation

The COM6100 is a Wireless Beltpack with Headset. Its function is to work as transceiver in communication with a base station, a fully certified transceiver. The EUT was exercised by linking with the base station or via a laptop for RF channel changes. Its microphone modulates the RF output by digital means. Conducted RF measurements were made on the test antenna service port. A temporary communication connection on the EUT was provided by the client during assessment in order to control radio parameters. The EUT is powered by a battery which is charged externally (removed from the EUT) by a charger not covered in this certification.





2.3 Technical Specifications of the EUT

Manufacturer:	HME
Operating Frequency:	2401.920 to 2481.408 MHz in the 2400.0-2483.5 MHz Band
Number of Operating Frequencies:	47
Output Power:	0.068 W
Modulation:	GFSK
Antenna Data:	Integral antenna traces on circuit board Or Antenna
Antenna Connector:	None
Power Source:	3 V HME battery

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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 °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
110	Antenna, LPA	Electrometrics	LPA-25	1217	4/1/2011	4/1/2013
115	Antenna, Bicon	EMCO	3104	3020	9/28/2010	9/28/2011
317	Preamplifier	HP	8449A	2749A00167	5/7/2010	5/7/2011
835	Spectrum Analyzer	Rohde & Schwarz	RHDFSEK	829058/005	7/12/2010	7/12/2011
877	Antenna, DRG Horn, .7-18GHz	AH Systems	SAS-571	688	8/16/2010	8/16/2012
897	Spectrum Analyzer	Rohde & Schwarz	FSP7	837620/009	10/27/2010	10/27/2011
E1014	DRG Horn Antenna	A.H.Systems, Inc.	SAS-570	174	2/18/2010	2/18/2012

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.

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.



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	A8.1(c)	20dB & 99% Bandwidth	Y	Pass
12.247a1	A8.1(c)	Channel Separation Average time of occupancy	Y	Pass
15.247a1i	A8.1(c)	Number of Hopping Channels	Y	Pass
15.247 b1	A8.4	Peak Output Power	Y	Pass
15.209 a	A8.5	Radiated Emissions within Restricted Bands	Y	Pass
15.247c	A8.5		Y	Pass
15.247c	A8.5	Bandedge	Y	Pass
15.109	RSS-GEN 4.10	Receiver Spurious Emissions	NA	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 μ H/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 (dB μ V)	
	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:	COM6100	Temperature:	°C
Date:		Humidity:	%
Modification State:	Low ,Mid and High Channel	Tester:	Alan Laudani
		Laboratory:	Nemko SR2

Test Results: EUT does not have AC Mains

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

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20 dB/ 99% 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:	COM6100	Temperature:	20°C
Date:	6/16/2011	Humidity:	31 %
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	Nemko GP1

Test Results: EUT complies

- This was a conducted test.
- The EUT was placed <1m from the receiving antenna to allow a representative signal to fill the display > 30dB from the noise floor.
- The Spectrum Analyzer RES BW was set to 100 kHz.
- For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier.
- A PEAK output 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.
- 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 1410 kHz (low channel).
- Observed maximum 20 dB BW is 1250 kHz (high channel).
- 2401.920 MHz – (1410/2) kHz = 2401.215 MHz (within the frequency band)
- 2481.408 MHz + (1250/2) kHz = 2481.998 MHz (within the frequency band)

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FCC ID: BYMC61

IC: 1860A-C61

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Report Number:

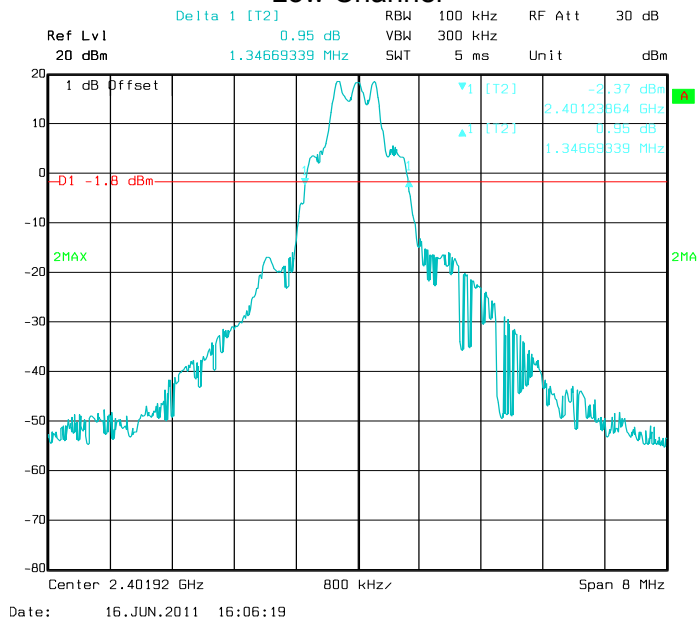
Specification: FCC Part 15 Subpart C, 15.247

Channel Range	20dB Bandwidth	99% Bandwidth
Low (2401.920 MHz)	1.35 MHz	1.17 MHz
Mid (2441.664 MHz)	1.41 MHz	1.25 MHz
High (2481.408 MHz)	1.35 MHz	1.19 MHz

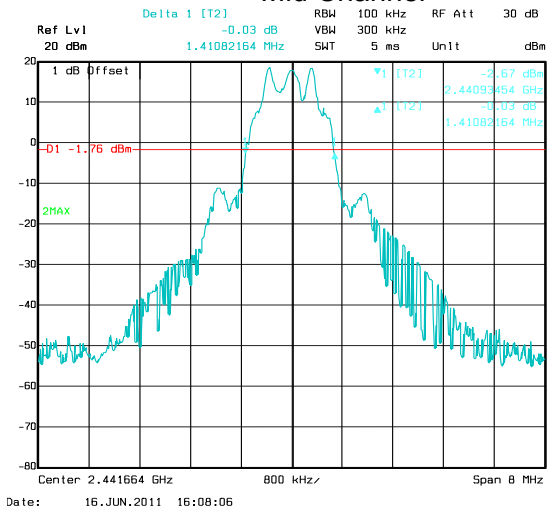
Equipment Used: 835

20dB Bandwidth

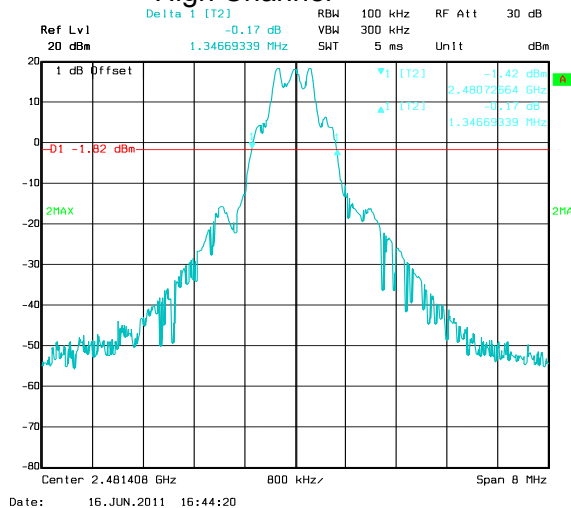
Low Channel



Mid Channel

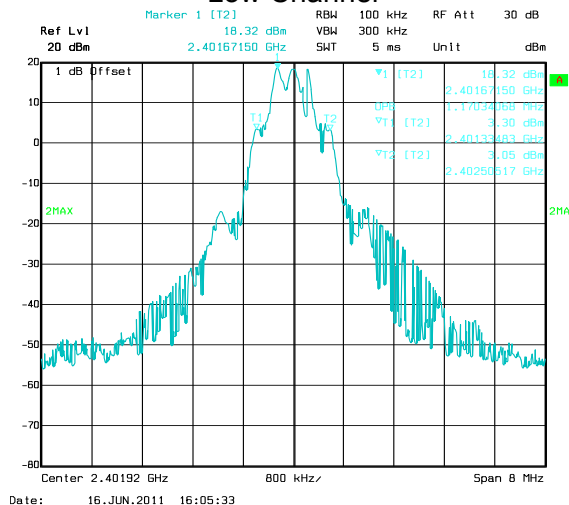


High Channel

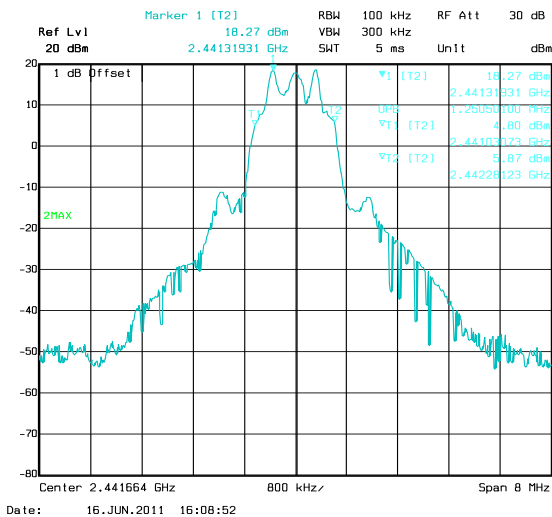


99% Bandwidth

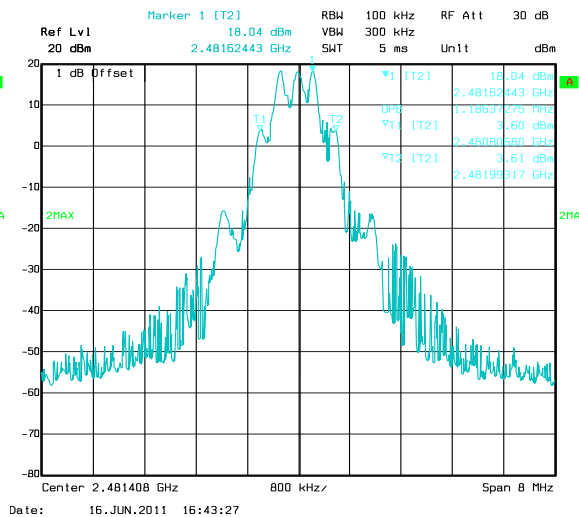
Low Channel



Mid Channel



High Channel





Frequency hopping systems operating in the 2400-2483.5 MHz band

Clause 15.247(a)(1)(iii)

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used

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Test Conditions:

Sample Number:	COM6100	Temperature:	22°C
Date:	6-17-2011	Humidity:	51 %
Modification State:	Centered on a Channel	Tester:	Alan Laudani
		Laboratory:	Nemko

Test Results: EUT complies.

The Spectrum Analyzer RES BW was set to 1 MHz.

The test sample was set to hopping mode and the frequency span was set zero.

The sweep was set to 19 seconds.

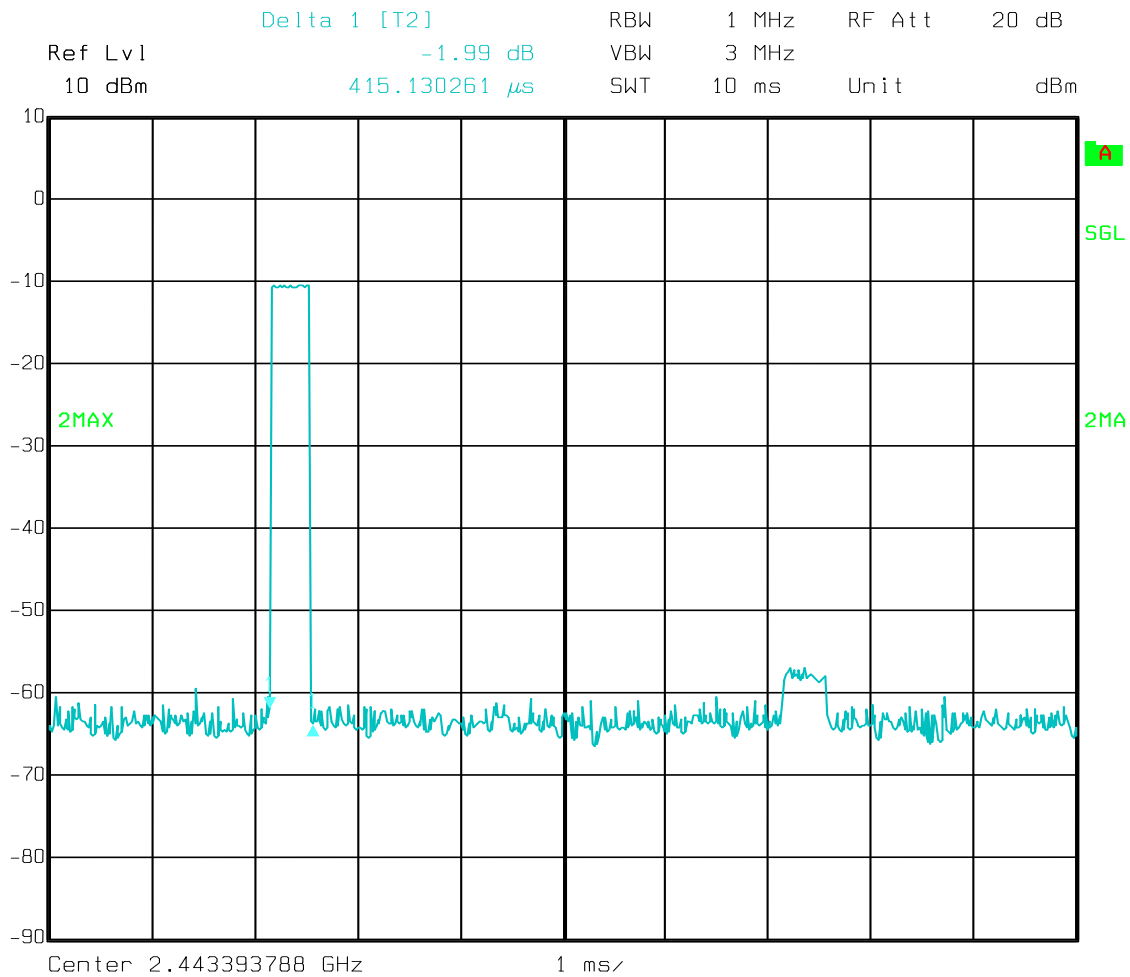
Hopping mode was turned on.

Equipment Used: 835



Time of Occupancy

This channel was on 0.415 ms.
Other emissions are reflections of adjacent channels.



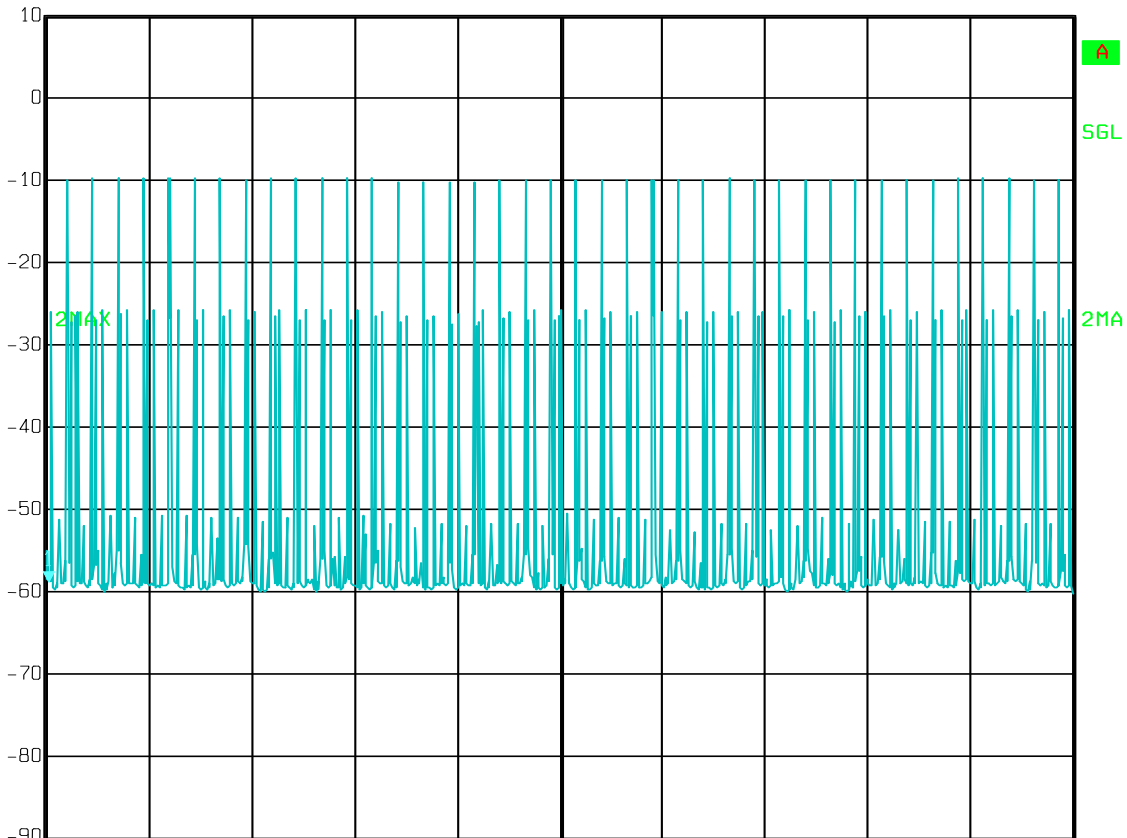
Date: 17.JUN.2011 12:40:51

47 channels x 0.4 seconds = 18.8 seconds

This channel was on 40 times in 19 (18.8 seconds).

415 ms x 40 times = 0.0166 seconds < 0.4 seconds, EUT complies

Marker 1 [T2] RBW 1 MHz RF Att 20 dB
Ref Lvl -58.95 dBm VBW 3 MHz
10 dBm 20.000000 ms SWT 19 s Unit dBm



Center 2.443393788 GHz 1.9 s/

Date: 17.JUN.2011 12:39:11

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.

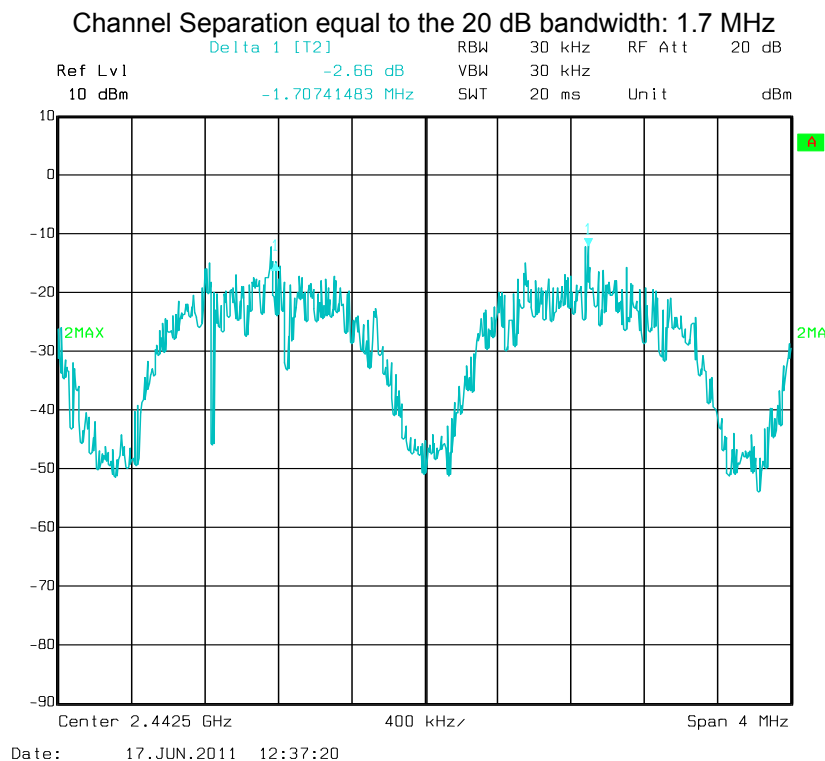
Test Conditions:

Sample Number:	COM6100	Temperature:	20°C
Date:	6-17-2011	Humidity:	51 %
Modification State:	All Channels, Hopping	Tester:	Alan Laudani
		Laboratory:	Nemko

Test Results: EUT Complies

- 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





Frequency Plan

<p>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.</p>
--

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Test Conditions:

Sample Number:	COM6100	Temperature:	20°C
Date:		Humidity:	31 %
Modification State:	All Channels, Hopping	Tester:	Alan Laudani
		Laboratory:	Nemko

Test Results:

The Frequency Plan is discussed in the Technical Description (confidential document) exhibit and was reviewed by this test engineer and was found to comply. The sequential hops in a pseudorandom hop sequence due to a frequency hopping algorithm and is randomly distributed in both magnitude and direction.



Number of Hopping Channels

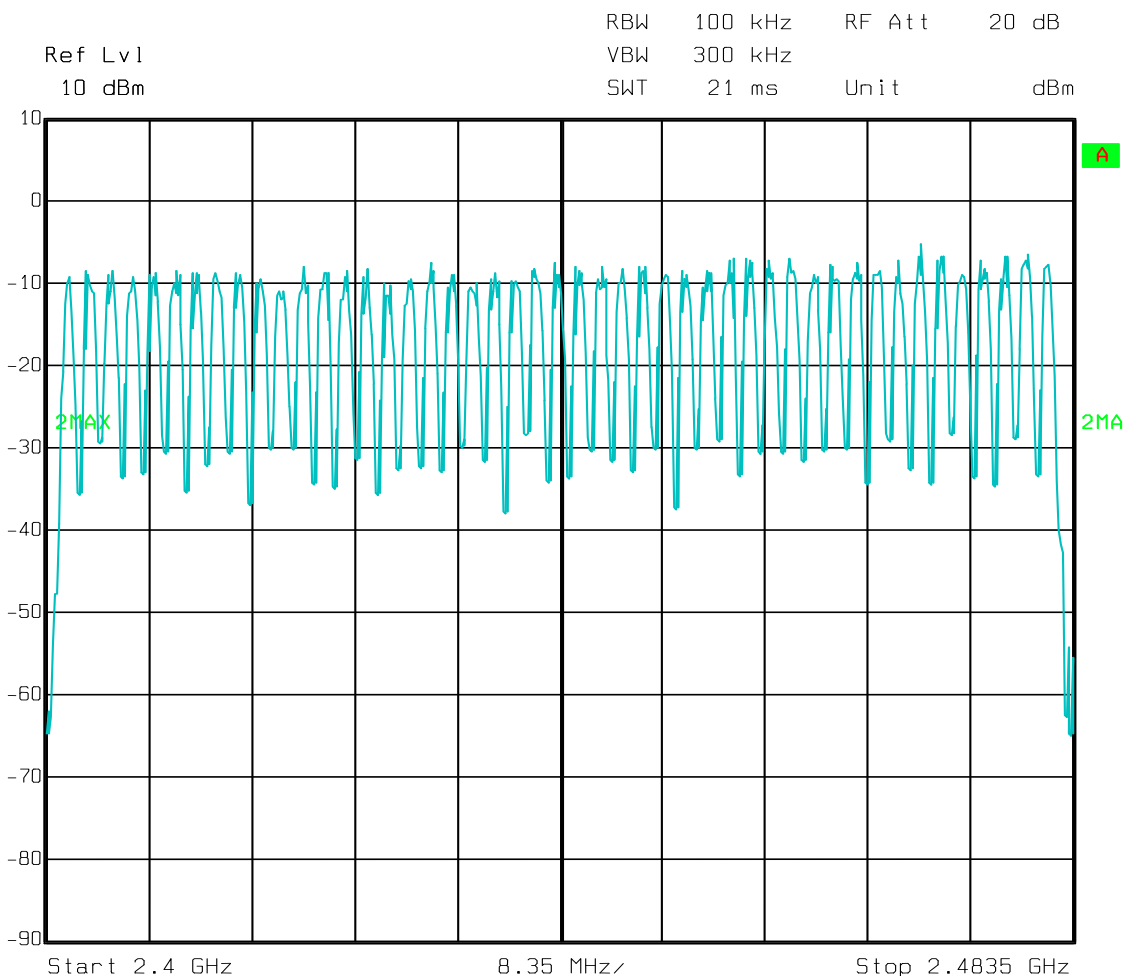
Clause 15.247(a)(1)(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within 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:	COM6100	Temperature:	22°C
Date:	5-17-2011	Humidity:	51 %
Modification State:	All Channels, Hopping	Tester:	Alan Laudani
		Laboratory:	Nemko

Test Results: 47 Channels, EUT complies.

- This is a conducted test
- The Spectrum Analyzer RES BW was set to 100 kHz to discriminate channels.



Date: 17.JUN.2011 12:20:05



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

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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:	COM6100	Temperature:	19°C
Date:	6-16-2011	Humidity:	40%
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	SOATS

Test Results: EUT complies

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 60 minutes of test time.
 There are no emissions found that apply to the restricted bands defined in FCC Part 15 Subpart C, 15.205.
 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.

Radiated Emissions Data

Job #: 1029124 Date: 6-16-2011
NEX #: 176874 Time: 0840
Staff: aal

Page 1 of 1

Client Name: HM Electronics
EUT Name: Wireless Beltpack with Headset
EUT Model #: COM6100
EUT Serial #: F13N0046
EUT Config.: TRANSMIT

EUT Voltage: BATT
EUT Frequency: _____
Phase: _____
NOATS _____
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. #: 115 3m Temp. (°C): 19
Log Ant. #: 110 3m Humidity (%): 40
DRG Ant. #: 877 Spec An. #: 898
Cable LF#: SOATS Spec An. Display #: 898
Cable HF#: SOATS QP #: 898
Preamp LF#: NA PreSelect#: 899
Preamp HF#: 317

Quasi-Peak	RBW: 120 kHz
	Video Bandwidth 300 kHz
Peak	RBW: 1 MHz
	Video Bandwidth 3 MHz
Average	RBW: 1 MHz
	Video Bandwidth 10 Hz

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
35.0	8.5	3.3	Q	-	1.0	8.5	19.8	40.0	-20.2	Pass	AMBIENT
43.3	9.7	3.7	Q	-	1.0	9.7	20.6	40.0	-19.4	Pass	AMBIENT
62.3	6.3	5.1	Q	-	1.0	6.3	18.6	40.0	-21.4	Pass	AMBIENT
79.0	9.2	7.5	Q	-	1.0	9.2	17.2	40.0	-22.8	Pass	AMBIENT
137.4	6.3	-1.0	Q	-	1.0	6.3	19.4	43.5	-24.1	Pass	AMBIENT
225.0	7.1	-4.0	Q	-	1.0	7.1	20.5	46.0	-25.5	Pass	AMBIENT
255.0	-4.0	0.5	Q	-	1.0	0.5	15.0	46.0	-31.0	Pass	AMBIENT
415.0	-11.0	-2.0	Q	-	1.0	-2	16.9	46.0	-29.1	Pass	AMBIENT
485.00	-4.0	-4.0	Q	-	1.0	-4	16.3	46.0	-29.7	Pass	AMBIENT

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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:	COM6100	Temperature:	°C
Date:		Humidity:	%
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	SOATS

Test Results: EUT complies

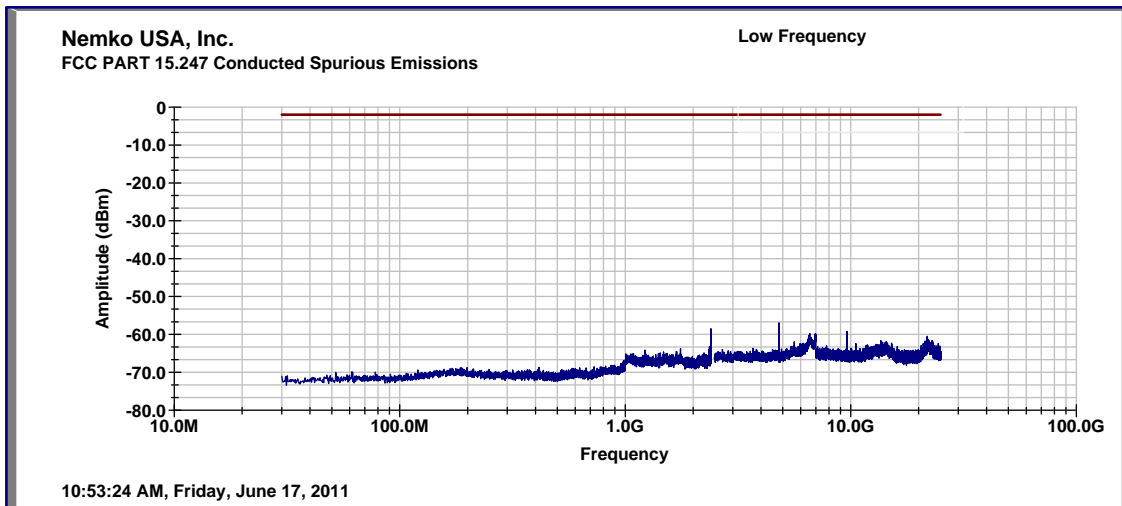
See plots below.

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.
- Emissions were searched from 30 MHz to 2400 MHz and from 2483.5 MHz to 25000 MHz, no emissions within 20 dB of the limit were detected.
- Long and/or short duty cycle were noted and did not factor in the spurious emissions.

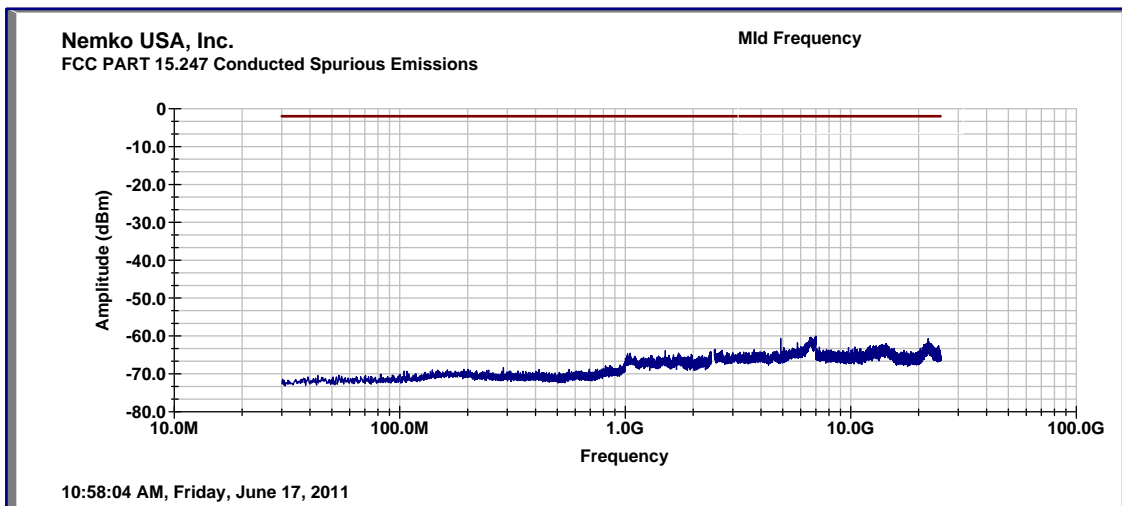


Low Channel Transmit

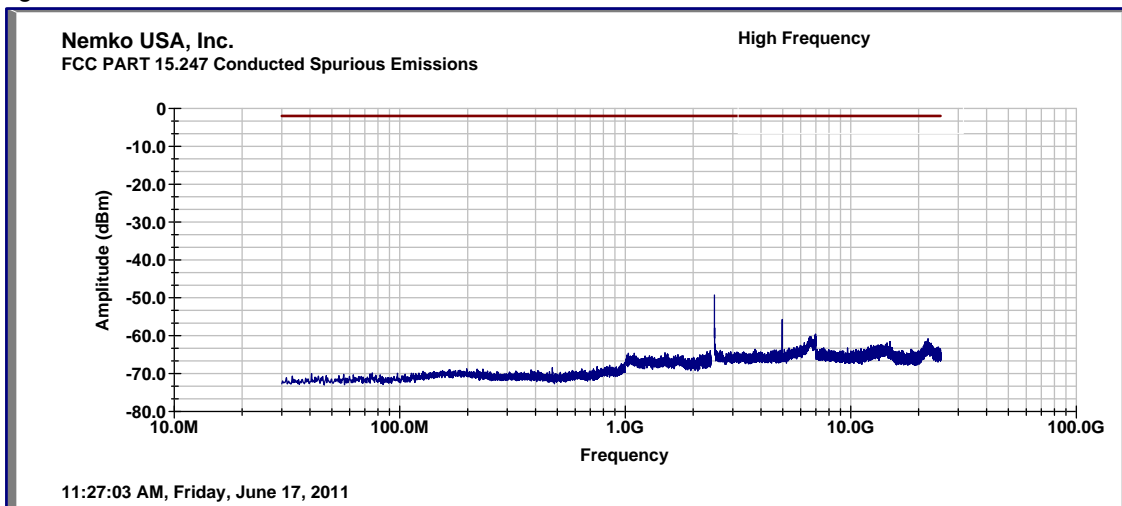


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Mid Channel Transmit



High Channel Transmit



Radiated Emissions: Output Power and Spurious to 10th Harmonic

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: $52.4 = 59.1 + 25.5 + 2.0 - 28.0 - 6.2$

$52.4 - 74 = -21.6$

Bandedge Measurements

Test Conditions:

Sample Number:	COM6100	Temperature:	°C
Date:	6-16-2011	Humidity:	%
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	SOATS

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Test Results: EUT complies

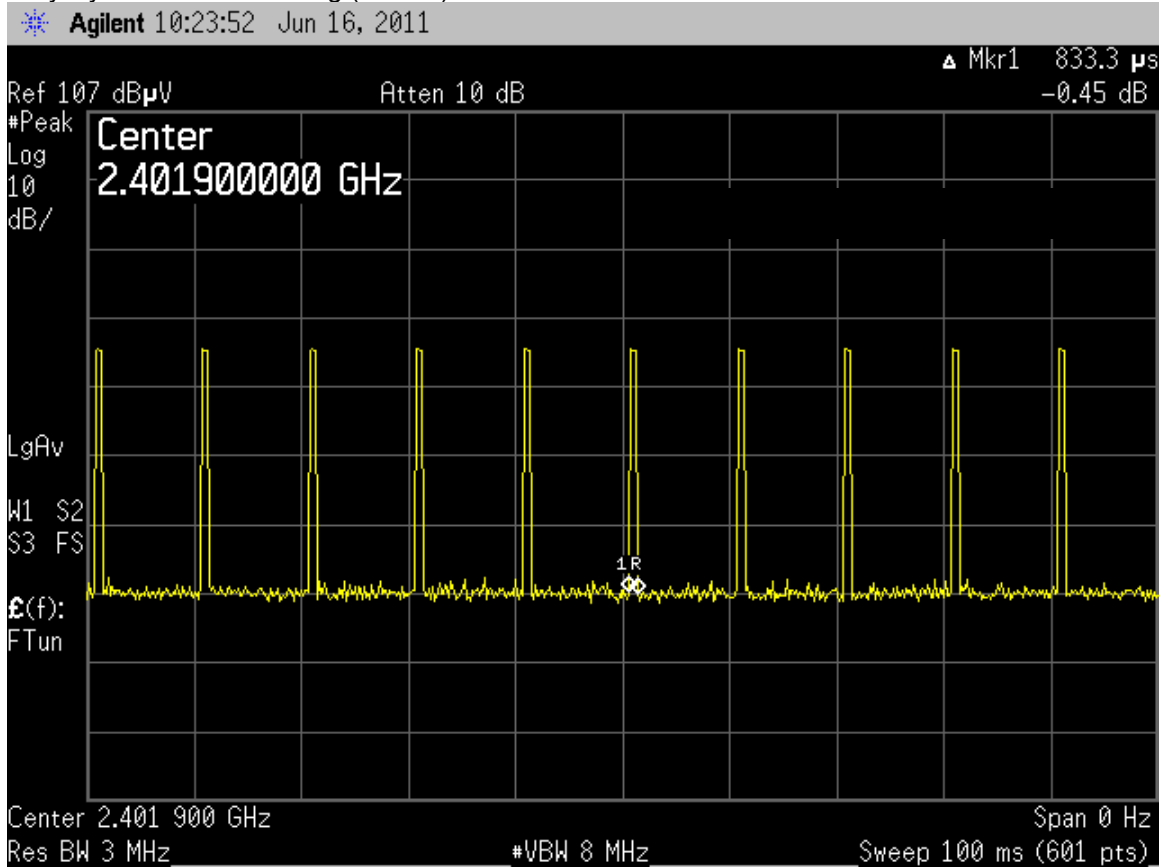
See plots and table below.

Additional Observations:

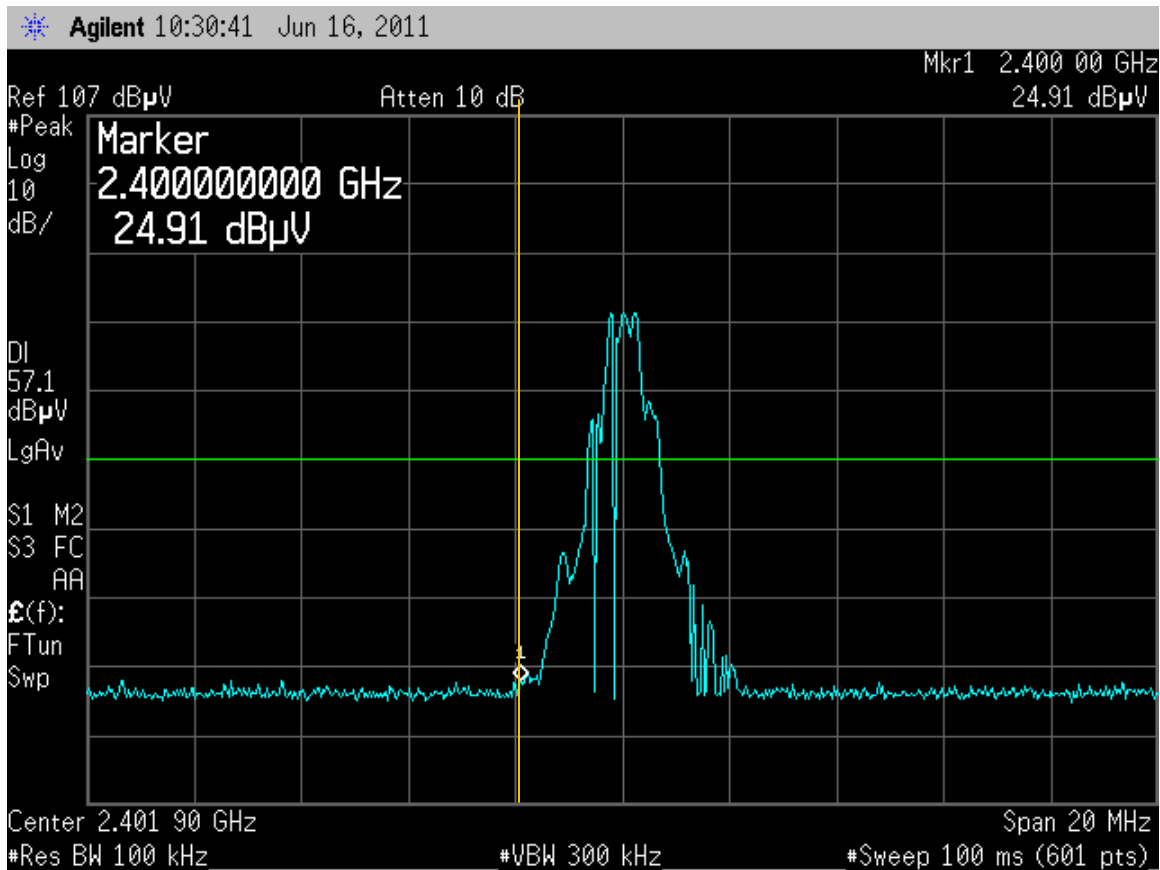
- Lower Band Edge at 2400 MHz: The peak level reading was taken at the carrier frequency (BW is 3 MHz; VBW is 3X RBW) then a display line was drawn 20 dBc below this level (-20 dBm) which will be the limit for this test. RBW is 100 kHz; VBW is 3X RBW
- Lower Band Edge at 2390 MHz: The emissions shall meet 74 dBµV/m Peak and 54 dBµV/m Average: RBW is 1 MHz; VBW is 3X RBW
- Upper Band Edge at 2483.5 MHz: The emissions shall meet 74 dBµV/m Peak and 54 dBµV/m Average: BW is 1 MHz; VBW is 3X RBW
- Lower and Upper Band Edges, Single Channel Mode, were tested at antenna 0 and antenna 1: Hopping Mode requires both antenna 0 and 1 to operate.
- Average = Peak + Duty Cycle Factor.
- Sweep is auto.
- Detector is Peak, Trace is Max Hold

Duty Cycle = 0.0833×10 times = 8.33 ms (in 100 ms)

Duty Cycle Factor = $20 \times \log(0.0833) = -21.6$ dB therefore DCF = -20 dB



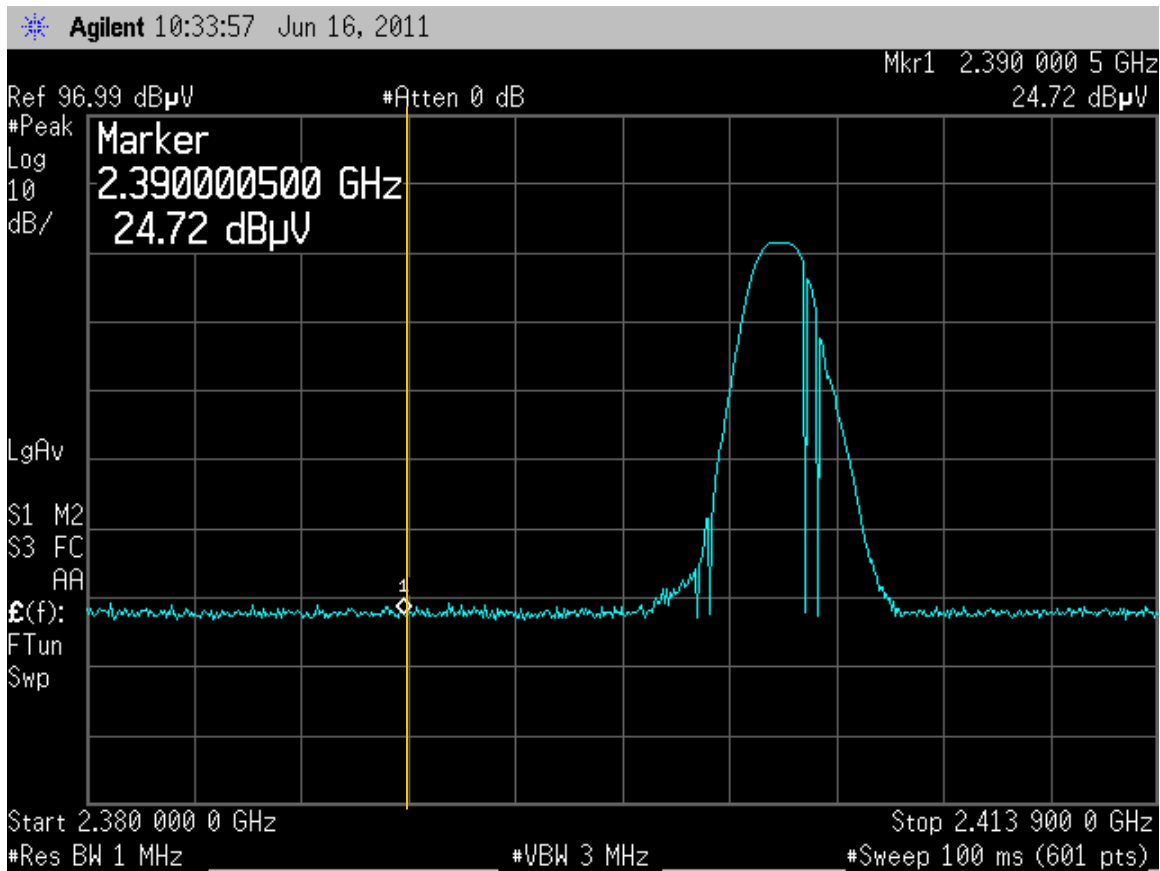
Low Channel Not Hopping Mode Antenna 0



Frequency Line F1 is 2400 MHz
Display Line D1 is 20 dBc

Low Channel Not Hopping Mode Antenna 0

Frequency Line F1 is 2390 MHz (noise floor)



Low Channel Not Hopping Mode Antenna 0

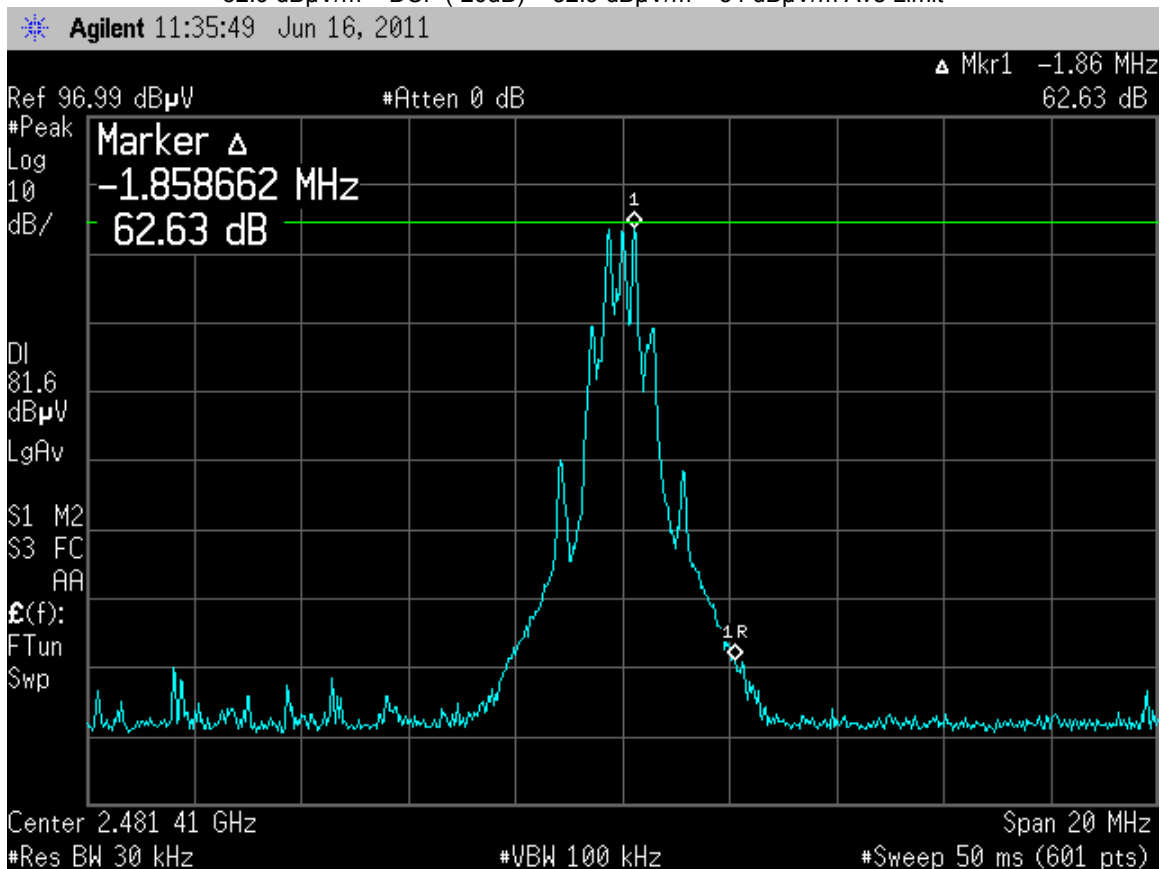
Marker Delta Step 1 @ RBW 1 MHz, 80.2 dB μ V/m

Marker Delta Step 2 @ RBW 30 kHz plot below

Marker Delta step 3, delta applied 80.2 -62.3 = 17.9 dB μ V/m

17.9 + ant factor 29.2 + cable loss 5.9 = 52.9 dB μ V/m < 74 dB μ V/m Peak Limit

52.9 dB μ V/m + DCF (-20dB) = 32.9 dB μ V/m < 54 dB μ V/m Ave Limit



Radiated Emissions Data

Job # : 1029124 Date : 6-16-2011
 NEX # : 176874 Time : 10:00
 Staff : aal

Page 1 of 1

Client Name : HM Electronics
 EUT Name : Wireless Beltpack with Headset
 EUT Model # : COM6100
 EUT Serial # : F13N0046
 EUT Config. : TRANSMIT ANTENNA 0

EUT Voltage : BATT
 EUT Frequency : _____
 Phase: _____
 NOATS _____
 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.#: 115 3m Temp. (°C) : 19
 Log Ant.#: 110 3m Humidity (%) : 40
 DRG Ant. # 877 Spec An.#: 897
 Cable LF#: SOATS Spec An. Display #: 897
 Cable HF#: 40FT QP #: 897
 Preamp LF#: NA PreSelect#: NA
 Preamp HF# 317

Quasi-Peak	RBW: 120 kHz
Video Bandwidth 300 kHz	
Peak	RBW: 1 MHz
Video Bandwidth 3 MHz	
Average = Peak + Duty Cycle Factor	
Duty Cycle < 0.1	

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
2401.920	76.8	76.0	P	-	1.0	76.8	111.8	124.0	-12.2	Pass	BACK
2401.920	77.7	75.0	P	-	1.0	77.7	112.7	124.0	-11.3	Pass	SIDE
2401.920	80.4	74.1	P	-	1.0	80.4	115.4	124.0	-8.6	Pass	END
2400.0	34.0		P	-	1.0	34	69.0	104.0	-35.0	Pass	100 kHz
2390.0	24.7		P	-	1.0	24.7	58.9	74.0	-15.1	Pass	1MHz
2390.0	4.7		A	-	1.0	4.7	38.9	54.0	-15.1	Pass	END
				-	1.0						
2481.408	75.7	76.5	P	-	1.0	76.5	111.5	124.0	-12.5	Pass	BACK
2481.408	73.8	74.1	P	-	1.0	74.1	109.1	124.0	-14.9	Pass	SIDE
2481.408	80.2	71.2	P	-	1.0	80.2	115.2	124.0	-8.8	Pass	END
2483.5	17.9		P	-	1.0	17.9	52.9	74.0	-21.0	Pass	1MHz
2483.5	-2.1		A	-	1.0	-2.1	32.9	54.0	-21.0	Pass	END

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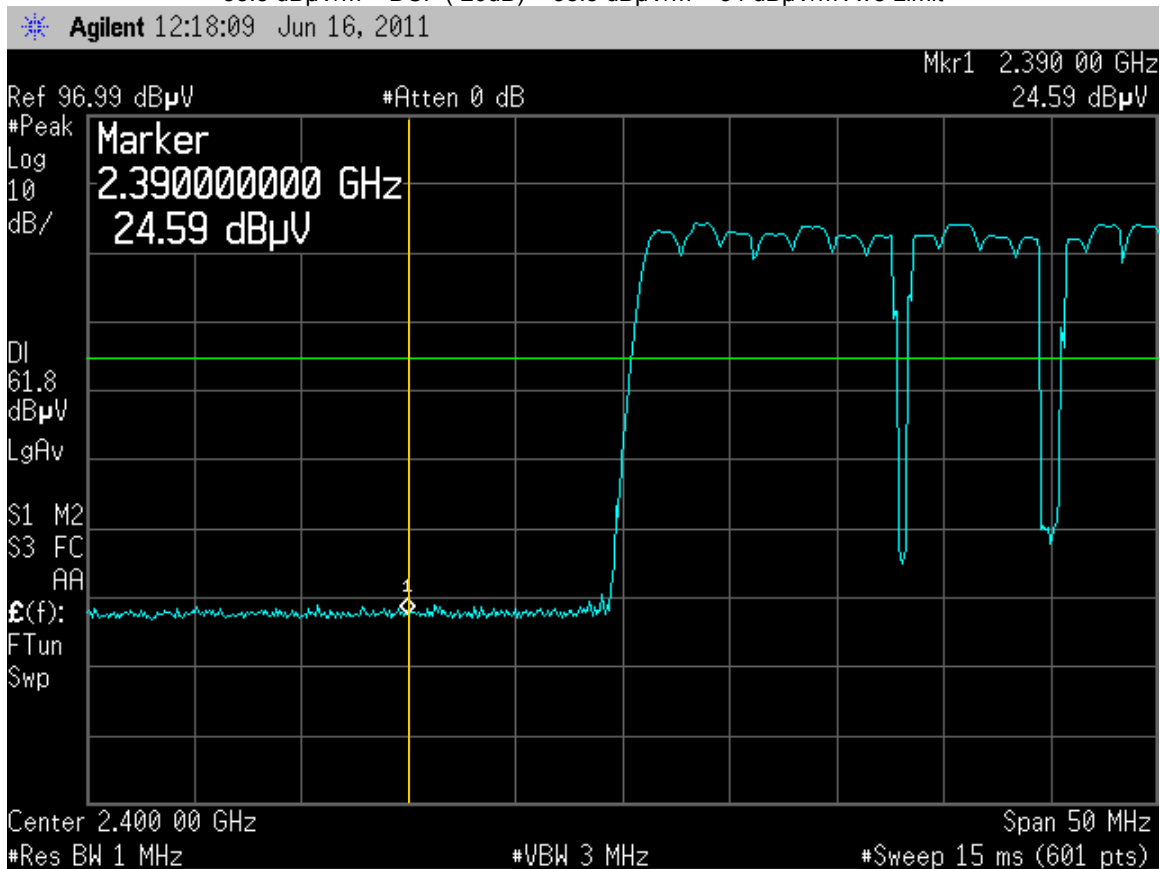
Low Channel Hopping Mode Antennas 0 & 1

Orange Frequency Line is 2390 MHz

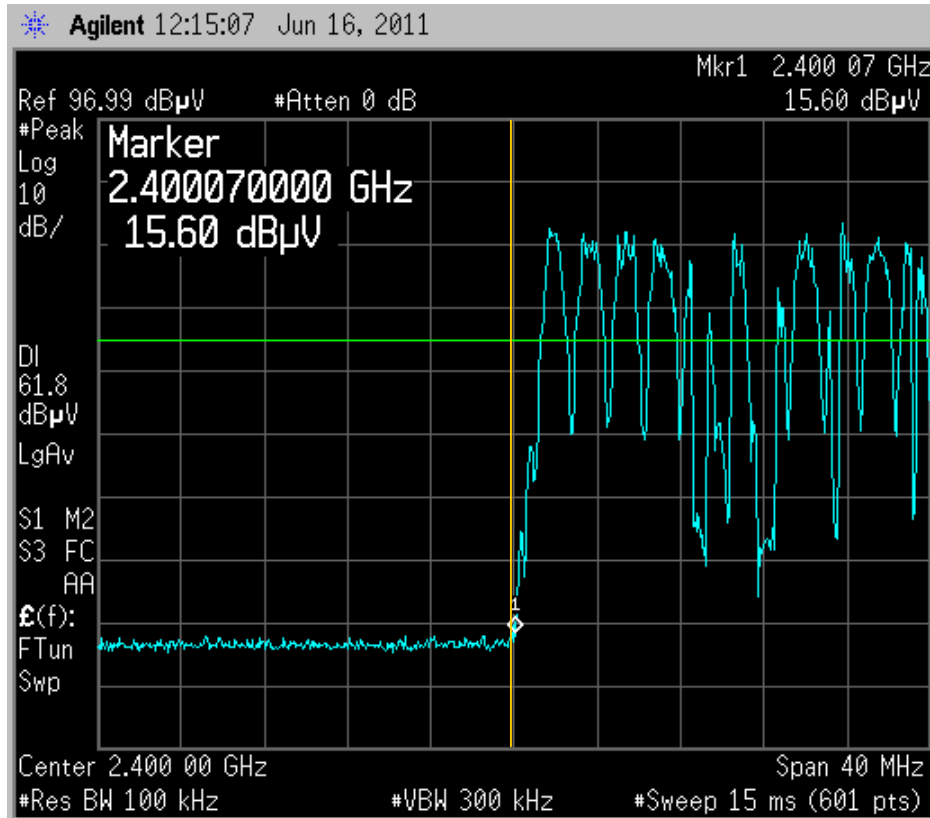
Green Display Line D1 is 20 dBc

24.6 (noise floor) + ant factor 28.5 + cable loss 5.7 = 58.8 dBμV/m < 74 dBμV/m Peak Limit

58.8 dBμV/m + DCF (-20dB) = 38.8 dBμV/m < 54 dBμV/m Ave Limit



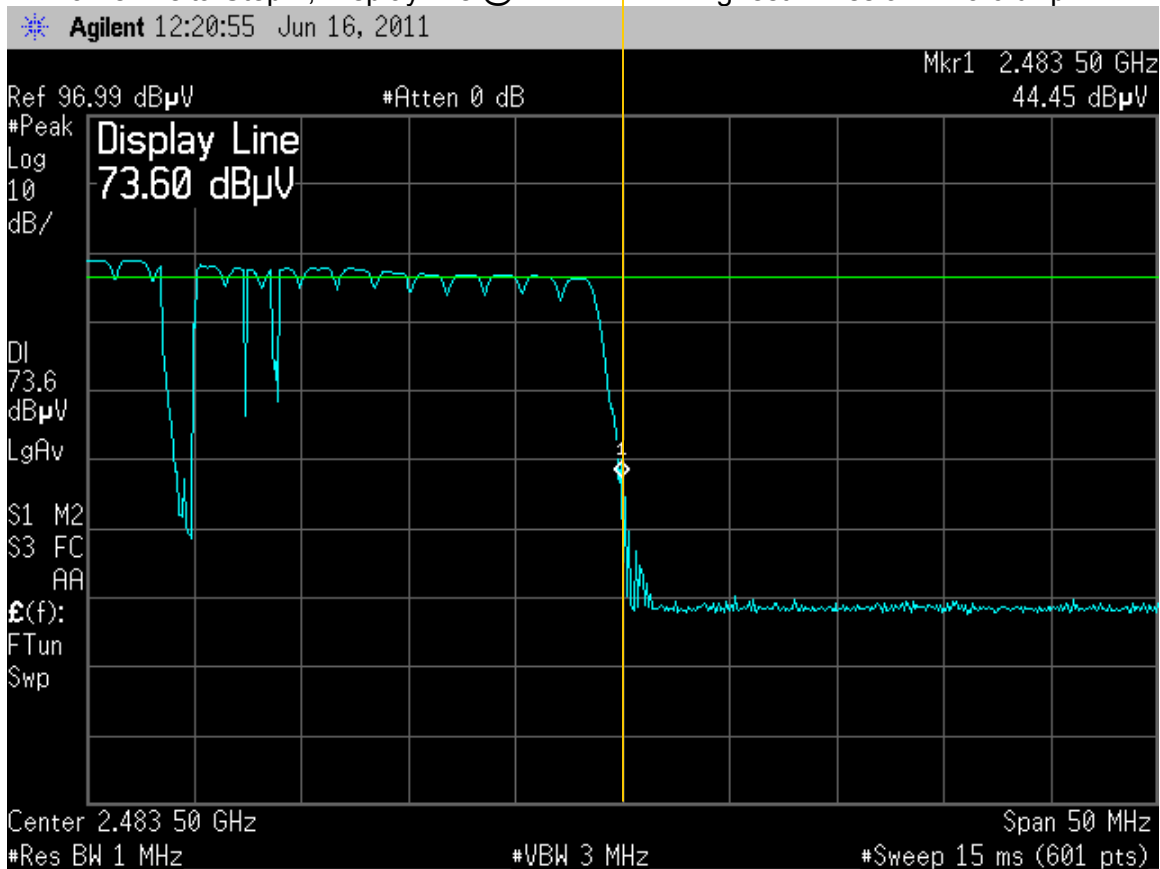
Orange Frequency Line is 2400 MHz
Green Display Line D1 is 20 dBc



High Channel Hopping Mode Antennas 0 & 1

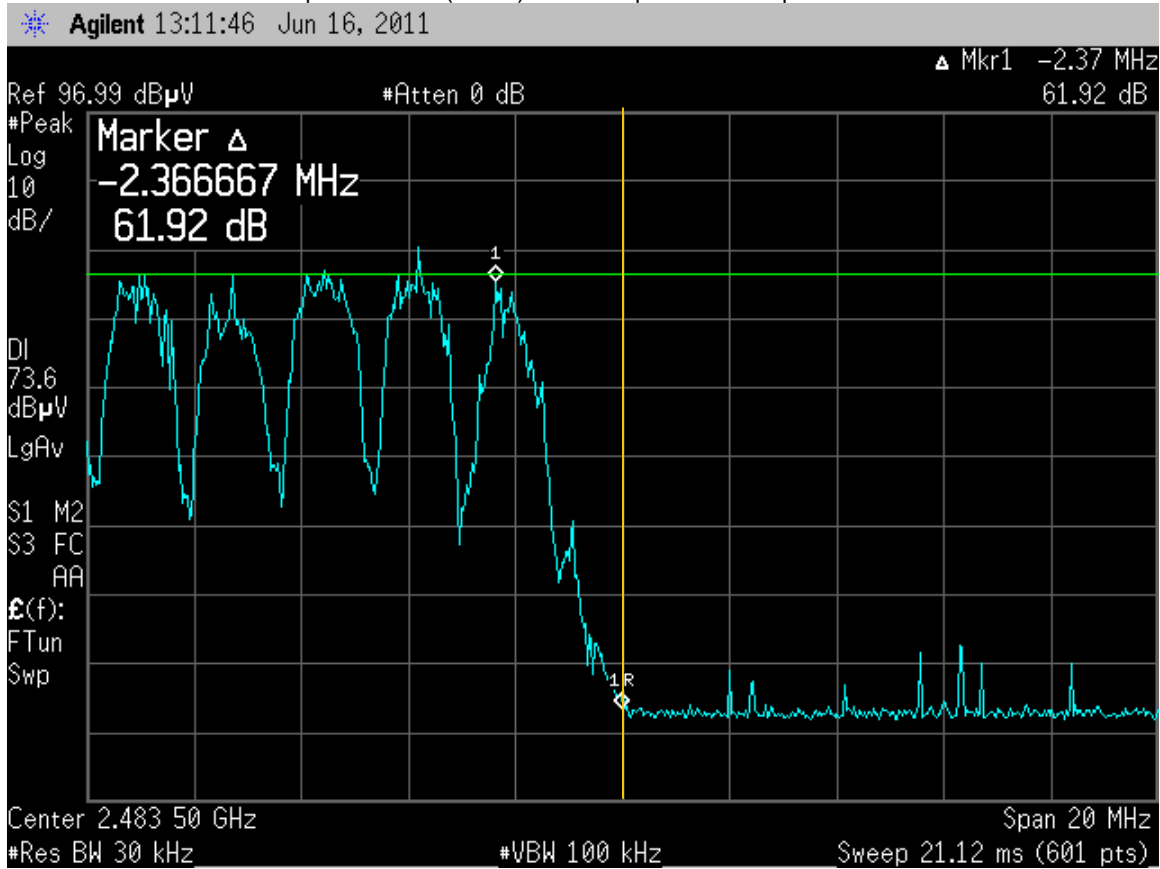
Orange Frequency Line is 2483.5 MHz

Marker Delta Step 1, Display line @ RBW 1 MHz Highest Emission = 73.6 dBμV/m



Marker Delta Step 2 @ RBW 30 kHz plot below

Marker Delta step 3, delta applied $73.6 - 61.9 = 11.7 \text{ dB}\mu\text{V/m}$
 $11.7 + \text{ant factor } 29.2 + \text{cable loss } 5.9 = 46.7 \text{ dB}\mu\text{V/m} < 74 \text{ dB}\mu\text{V/m Peak Limit}$
 $46.7 \text{ dB}\mu\text{V/m} + \text{DCF } (-20\text{dB}) = 26.7 \text{ dB}\mu\text{V/m} < 54 \text{ dB}\mu\text{V/m Ave Limit}$





Peak Output Power

15.247(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:
(1) For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

Test Conditions:

Sample Number:	COM6100	Temperature:	22°C
Date:	6-16-2011, 6-17-2011	Humidity:	51 %
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	Nemko

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Test Results: EUT complies.

Antenna port measurements with special circuit connector used. EUT normally has internal circuit trace antennas not accessible to user.

Peak max hold analyzer measurements at RBW, VBW = 10 MHz.

Measurements account for cable loss.

Conducted Peak Output Power Antenna 0 Port:

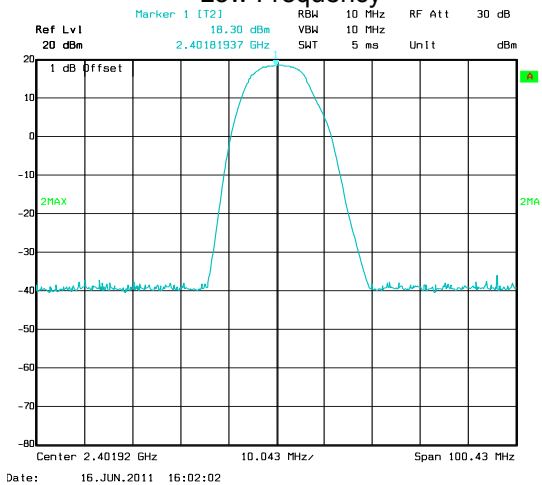
Channel	Frequency	Peak Output Power dBm	Calculated Output Power (W)
Low	2401.920 MHz	18.3	0.068
Mid	2441.664 MHz	18.1	0.064
High	2481.408 MHz	18.1	0.064

Conducted Peak Output Power Antenna 1 Port:

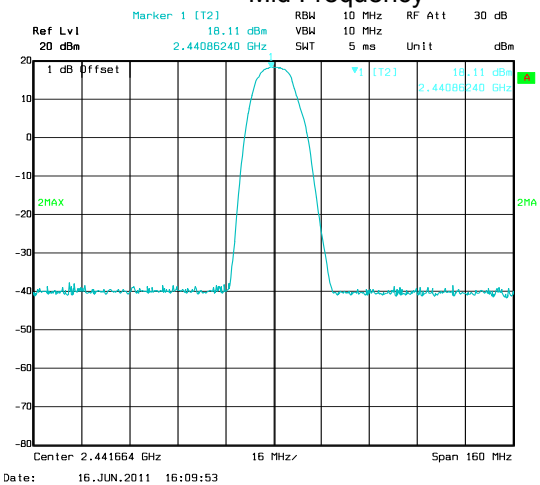
Channel	Frequency	Peak Output Power dBm	Calculated Output Power (W)
Low	2401.920 MHz	18.1	0.064
Mid	2441.664 MHz	18.2	0.066
High	2481.408 MHz	18.0	0.063

Antenna Port O

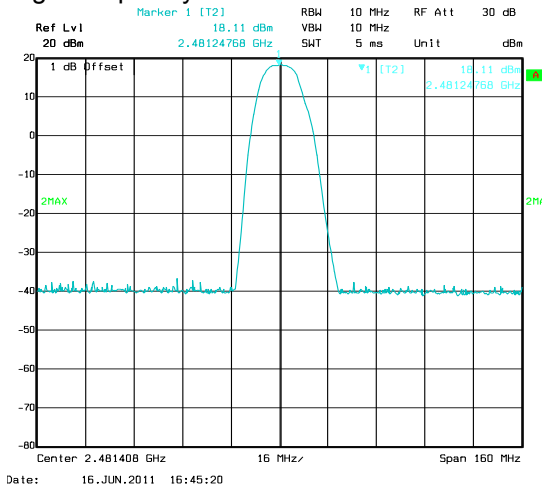
Low Frequency



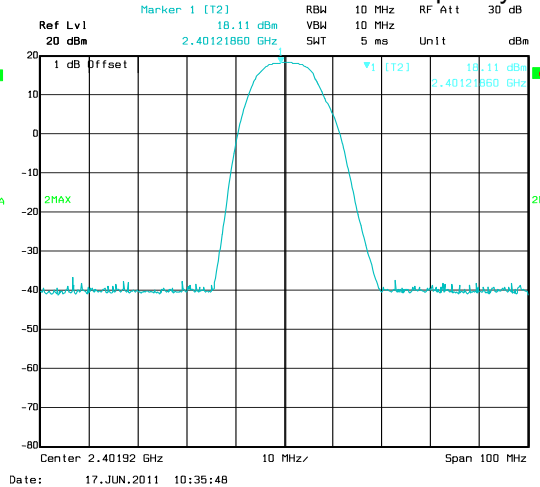
Mid Frequency



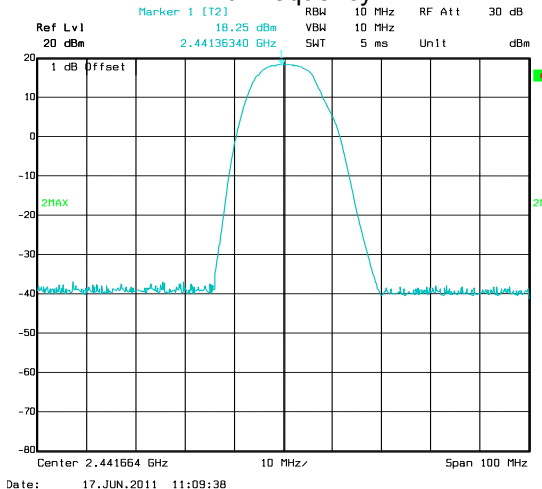
High Frequency



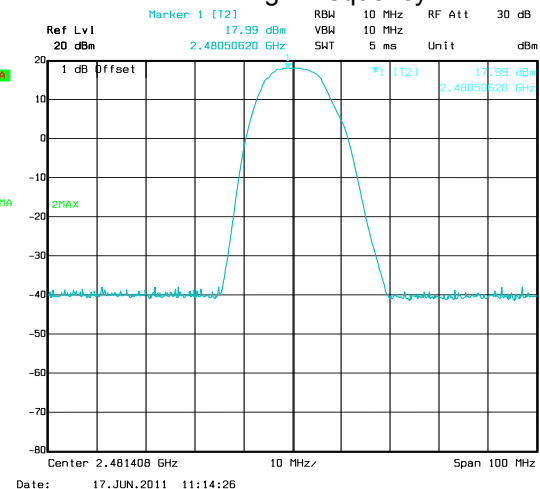
Antenna Port 1 Low Frequency



Mid Frequency



High Frequency



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:	COM6100	Temperature:	22°C
Date:	6-17-2011	Humidity:	51 %
Modification State:	TEST RECEIVE MODE	Tester:	A. Laudani
		Laboratory:	NEMKO

Test Results:

Additional Observations:

- The Spectrum was searched from 30 MHz to 12500 MHz.
- EUT operated on "test receive mode".
- Below 1GHz measurements are measured using CISPR quasi-peak detector while above 1GHz are measured using peak and average detectors with 1MHz RBW.
- No other emissions within 20 dB of the limit were detected.
- As a frequency hopper, channel selection does not result in changes to emissions.
- Radiated Emissions, no emissions evident.