

**FCC
Electromagnetic Compatibility
Test Report**

For

XT-1H Headset

**FCC ID: DGFBCSDXT1H
IC: 458A-BCSDXT1H**

Building & Commercial Services Division

St. Paul, MN

January 30, 2013

Report Number: RE1211002F

**Prepared By:
3M Regulatory Engineering and Quality
EMC Laboratory
410 Fillmore Avenue, Building 76
St. Paul, Minnesota 55144-1000**

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CERTIFICATE OF COMPLIANCE

MANUFACTURER'S NAME:	3M™ Company
NAME OF EQUIPMENT:	XT-1H Headset
DESIGNATION:	Short Range Device
MODEL NUMBER:	XT-1H
TEST REPORT NUMBER:	RE1211002F
DATE:	January 30, 2013

EMISSIONS:

Radiated / Conducted

**(FCC Part 15, Subpart B,
Class A): 2012**

(ICES-003): 2011

Radiated / Conducted

(FCC Part 15, Subpart C):2012

**(RSS-210 Issue 8,
RSS-GEN Issue 3)**

RF Exposure

(FCC CFR 47 1.1310, 2.1093)

(RSS-102 Issue 4)

FCC ID: DGFBCSDXT1H

IC ID: 458A-DCSDXT1H

As the responsible EMC Project Engineer, I hereby declare that the equipment tested, as specified in the test report, at the 3M Product Safety EMC Laboratory is in compliance with 47 CFR, Part 15, Subpart B and Subpart C, and Industry Canada RSS & ICES Standards. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

Bruce Jungwirth
Senior EMC Engineer



Lab Code 200033

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1.0 TEST SUMMARY

Test Report Number:	RE12011002F
Requester:	Michael Campbell
Company:	3M Company Building & Commercial Services Division 3M Center St Paul, Minnesota 55144
Telephone Number:	651-736-3091
Equipment Under Test:	XT-1H Wireless Communication System Headset
Condition upon receipt	Device was in good working condition
Test Environment:	See individual test sheets.
Test Results:	Passed the following tests: Conducted Emissions: FCC Part 15 Subpart B, ICES-003 Radiated Emissions: FCC Part 15 Subpart B, ICES-003 Conducted Emissions: FCC Part 15 Subpart C, Radiated Emissions: FCC Part 15 Subpart C, IC RSS-210, RSS-Gen IC RSS-102
Modifications:	No modifications were required. See section 2.3
Test Location:	3M Product Safety EMC Laboratory Building 76-1-01 410 Fillmore Ave. St. Paul, MN 55144-1000

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2.0 INTRODUCTION

2.1 Scope

This report contains results describing the conformance of the Equipment Under Test (EUT) to FCC Part 15, Subpart B and IC ICES-003 rules for unintentional radiators and FCC Part 15, Subpart C and IC RSS rules for intentional radiators.

This report is the confidential property of the client and applies only to the specific item tested under the stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. This report shall not be reproduced except in full without the written approval of the testing laboratory. The appropriate testing standards and references that were used are contained in Section 3.0. Worst case test data, test configuration, and photographs (worst case configuration) are provided in Sections 4.0 and 5.0. Equipment information is contained in Section 6.0. Documentation labeling information is contained in Section 7.0.

Subsequent tests are necessary from time to time on equipment taken at random from production. Retesting of the EUT is also required when the EMC profile has been changed or is suspected of being changed.

The 3M Regulatory Engineering and Quality EMC Laboratory is recognized under the United States Department of Commerce National Institute of Standards and Technology's National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 17025 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of test results. Accreditation by the National Voluntary Laboratory Accreditation Program is awarded for specific services, listed on the Scope of Accreditation for: Electromagnetic Compatibility and Telecommunications FCC under Lab Code 200033. A complete copy of the Scope of Accreditation is available upon request.

The FCC Site Registration Number is 790245. The Industry Canada (IC) Site Registration Number is 458A-1.

The NVLAP accreditation or this test report does not in any way constitute or imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

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2.2 EUT Description and Operation

The Equipment Under Test (EUT) was the 3M™ Wireless Communication System Model XT-1. The XT-1H is the Headset portion of the 3M™ Wireless Communication System Model XT-1 and its intended use is to provide 2-way radio-frequency audio communication in quick service drive through restaurants and convenience stores. The system must be professionally installed as specified in the 3M™ Wireless Communication System Model XT-1 Installation Instructions and operated as specified in 3M™ Wireless Communication System Model XT-1 Operating Instructions. It has not been evaluated for other uses or locations. The EUT was tested while exercising all functions and at an input power of 3.7 V DC



XT-1H Headset

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EUT operating frequency range: 2401.92 MHz to 2479.68 MHz

Number of channels: 75

The system hops to channel frequencies from a pseudo randomly ordered list of hopping frequencies. Each frequency is used equally on average by the transmitter, and separated by a minimum of 20 dB channel bandwidth.

Modulation Type: GFSK FHSS (Frequency Hopping Spread Spectrum), TDD (Time Division Duplex) & TDMA (Time Division Multiple Access). Data Rate of 576Kbits/s

Maximum Conducted Power Output: 22.80 dBm 190.55 mw
Power level, frequency range and channel characteristics are not user adjustable.

Antenna Type: Internal circuit trace. 0 dBi gain

2.3 Modifications to EUT

No modifications were required.

2.4 Measurement Uncertainty

The data and test results referenced in this report are true and accurate. However, there may be deviations within the calibration limits of the test equipment and facilities that can account for deviations. The following table lists the measurement uncertainty for the emissions testing. Furthermore, EUT component and manufacturing process variables may result in additional deviation.

Emission test	Confidence (95%)	Measurement Uncertainty	CISPR Limit
Radiated Emissions (30 MHz – 5 GHz)	k=2.0	4.11 dB	5.20 dB
Conducted Emissions (150 kHz – 30 MHz)	k=2.0	3.29 dB	3.60 dB

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3.0 APPLICABLE DOCUMENTS

The following documents were used as references. The dates that are referenced are the dates of the latest amendments. All 3M Test Procedures can be found in the Document Center of the SEMS QDS System.

CFR 47: 2011	Part 15 Radio Frequency Devices, Subpart B Unintentional Radiators and Subpart C, Intentional Radiators.	
FCC DA 00-705	Filing & Measurement Guidelines for Frequency Hopping Spread Spectrum Systems - Released March 30, 2000	
FCC OET Bulletin 65	Evaluating Compliance with FCC Guidelines for Human Exposure to RF Electromagnetic Fields	
CISPR 16-1	Specification for radio disturbance and immunity measuring apparatus and methods	
	-1 Measuring Apparatus	2006
	-2 Ancillary Equipment – Conducted Disturbance	2004
	-3 Ancillary Equipment – Disturbance Power	2004
	-4 Ancillary Equipment – Radiated Disturbance	2004
CISPR 16-2	Specification for radio disturbance and immunity measuring apparatus and methods	
	-1 Conducted Disturbance Measurements	2003
	-2 Measurements of Disturbance Power	2004
	-3 Radiated Disturbance Measurements	2003
CISPR 16-4	-1 Uncertainties in Standardized EMC Tests	2005
ANSI C63.4:2009	American National Standard for Methods of Measurement of Radio Noise Emissions from Low Voltage Electrical and Electronic Equipment in the range of 9 KHz to 40 GHz.	
ANSI C63.10:2009	American National Standard for Testing Unlicensed Wireless Devices	
ICES-003	Industry Canada, Interference-Causing Equipment Standard, 2012 Issue 5	
RSS-GEN	Industry Canada, Radio Standards Specification Issue 3 2010	
RSS-210	Industry Canada, Radio Standards Specification Issue 8 2010	
RSS-102	Industry Canada, Radio Frequency Exposure Compliance, Issue 4, 2010	
3M Test Procedure:	Radiated Emissions Test (30 MHz – 1 GHz), PBLI-6SHLK2	
3M Test Procedure:	Radiated Emissions Test (1 GHz – 5 GHz), PBLI-6SNHFY	
3M Test Procedure:	Conducted Emissions Test (150 kHz – 30 MHz), PBLI-S8LR2	
3M Test Procedure:	Frequency Hopping Spread Spectrum Intentional Radiator Test Procedure, PBLI-87ZLW7	

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4.0 CONDUCTED EMISSIONS TESTING - DIGITAL

No AC line Conducted Emissions required for XT-1H Headset. Headset is battery operated.

Conducted Emissions was measured on the Battery Charger while in charging mode.

Conducted emissions testing was performed in accordance with ANSI C63.4, FCC Part 15 and 3M Test Procedures: Conducted Emissions Test (150 kHz – 30 MHz), PBLI-6S8LR2. Conducted emissions tests were made to determine the level of electromagnetic noise that is conducted onto the power mains from the EUT.

4.1 Test Procedure:

A Line Impedance Stabilization Network (LISN) with 50Ω /50μH characteristic was used to isolate the EUT and give accurate and repeatable readings. An EMI test receiver was used for the emissions measurements in the range from 150 KHz to 30 MHz. Initial measurements were taken with the receiver in continuous frequency overview mode utilizing peak level signal detection. Initial results were measured at discrete frequencies utilizing quasi-peak detection. Measurement results were automatically calculated via software running the EMI receiver. The final quasi-peak and average measurements recorded were determined by the following: Result (dBμV) = receiver reading (μV) + LISN (dB) + cable loss (dB)

4.2 Test Criteria:

The FCC Part 15 Subpart B 15.107 conducted limits are given below. The lower limit shall apply at the transition frequency.

Mains Terminal Disturbance Limits		
Frequency (MHz)	Quasi-Peak (dBμV)	Average (dBμV)
0.15 to 0.50	79	66
0.5 to 30.0	73	60

4.3 Test Results

The EUT met the conducted emission and discontinuous requirements.

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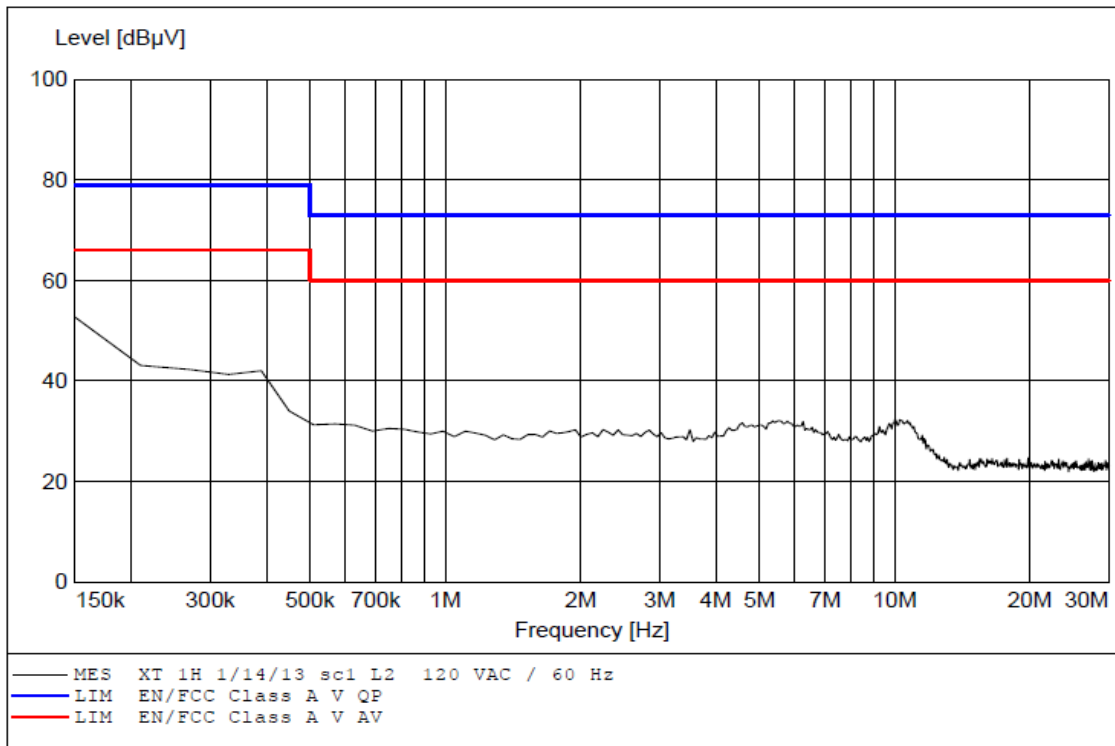
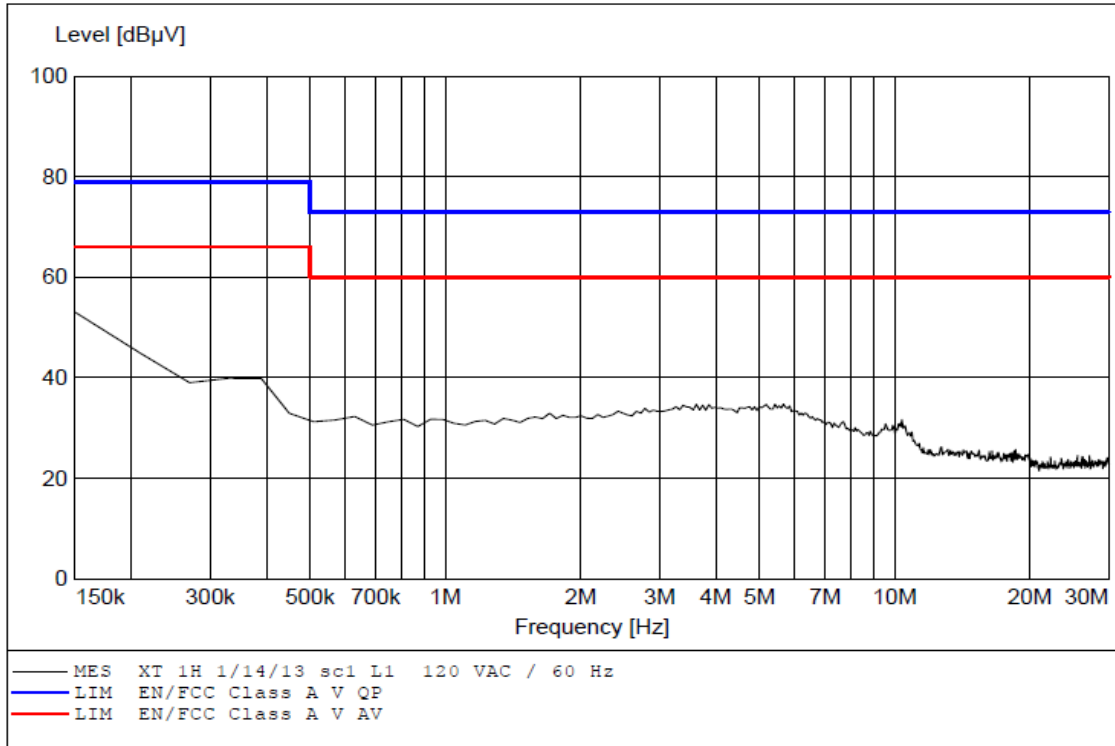
Report Number	RE1211002	Date	14 January 2013
EUT Name	XT-1 Wireless Communication System	EUT Power	See Below
EUT Model	XT-1H	Test Std	FCC 15.109
EUT Serial #		Temperature (°C)	22
EUT Description	XT-1H Headset Battery Charger	Humidity (%)	22
		Air Pressure (kPa)	10.03

MAXIMIZED FILES _____

FREQUENCY (MHz)	PEAK (dBµV)		QUASI-PEAK (dBµV)				AVERAGE (dBµV)			
	L1 Line	L2 N	L1 Line	L2 N	Limit	Passing Margin	L1 Line	L2 N	Limit	Passing Margin
XT 1H 1/4/13 sc1 L1 L2 120 VAC / 60 Hz										
.175	X	X	44.7	44.0	79	34.3	29.3	29.6	66	36.4
.300	X	X	33.0	35.2	79	46.0	24.7	26.9	66	39.1
.400	X	X	33.8	35.4	79	43.6	28.9	31.6	66	34.4
2.000	X	X	28.1	24.5	73	44.9	22.2	17.9	60	37.8
7.000	X	X	27.1	24.3	73	45.9	21.5	18.6	60	38.5
10.000	X	X	24.6	24.8	73	48.2	17.0	18.0	60	42.0
XT 1H 1/4/13 sc2 L1 L2 230 VAC / 50 Hz										
.175	X	X	41.9	41.6	79	37.1	27.0	30.1	66	35.9
.300	X	X	30.7	33.6	79	45.4	24.4	27.6	66	38.4
.500	X	X	36.9	29.5	79	42.1	33.0	22.4	66	33.0
2.000	X	X	31.6	29.6	73	41.4	25.4	23.2	60	34.6
5.000	X	X	33.7	30.5	73	39.3	29.0	25.3	60	31.0
10.000	X	X	23.2	24.6	73	48.4	19.0	16.6	60	41.0

Test Engineer: Mike Schultz	Date: 14 January 2013
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4.4 Test Setup Photo



Conducted Emissions
XT-1H Battery Charger

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5.0 Digital Radiated Emissions (30 MHz - 18000 MHz)

The EUT was placed in an anechoic chamber and radiated emissions testing was performed in accordance with ANSI C63.4, FCC Part 15 and 3M Test Procedures: Radiated Emissions Test (30 MHz – 1 GHz), PBLI-6SHLK2, and Radiated Emissions Test (1 GHz – 18 GHz), PBLI-6SNHFY. Radiated emissions measurements were made to determine the level of electromagnetic energy radiating from the EUT.

5.0.1 Test Procedure

The EUT was placed in the center of a turntable. An EMI receiver was used for the emissions measurements in the range of 30MHz to 40GHz (the upper limit of measurement is determined by the 5th harmonic of the highest frequency generated in the device or 40 GHz whichever is lower). Initial measurements were taken with the receiver in continuous frequency overview mode utilizing peak level signal detection. Peak results were maximized at discrete frequencies utilizing quasi-peak detection. Maximizing a frequency involves finding the angle of the highest emission levels by rotating the EUT 360 degrees (sampling every 4 degrees) and varying the antenna height between 1 and 4 meters at the angles of the highest emissions levels found. Measurements were taken in both vertical and horizontal antenna polarization. The final quasi-peak measurements recorded were determined by the following (the detector used above 1000 MHz is both average and peak):

Result (dB μ V /m) = receiver level (μ V) + antenna factor (dB/m) + cable loss (dB) - preamp gain (dB) + lineal conversion (dB)

5.0.2 Test Criteria

The FCC Class 'A' radiated limits are given below. The lower limit shall apply at the transition frequency.

Frequency (MHz)	Distance (Meters)	Field Strength (dB μ V/m)
30 - 88	10	39.08
88 - 216	10	43.52
216 - 960	10	46.44
960 - 1000	10	49.54
1000 – 40000	10	49.54 AVG 69.54 PEAK

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5.0.3 Test Results

The EUT met the FCC Class 'A' radiated emission requirements. The upper Limit of testing was 15000 MHz. All maximized quasi-peak measurements for the EUT were below the quasi-peak limit. **No Digital Emissions were detected above 1000 MHz**

Report Number	RE1211002	Date	14 Jan 2013
EUT Name	XT-1 Wireless Communication System	EUT Power	3.7 V DC
EUT Model	XT-1H	Test Std	FCC 15.109
EUT Serial #		Temperature (°C)	22
EUT Description	XT-1H Headset	Humidity (%)	22
		Air Pressure (kPa)	10.03

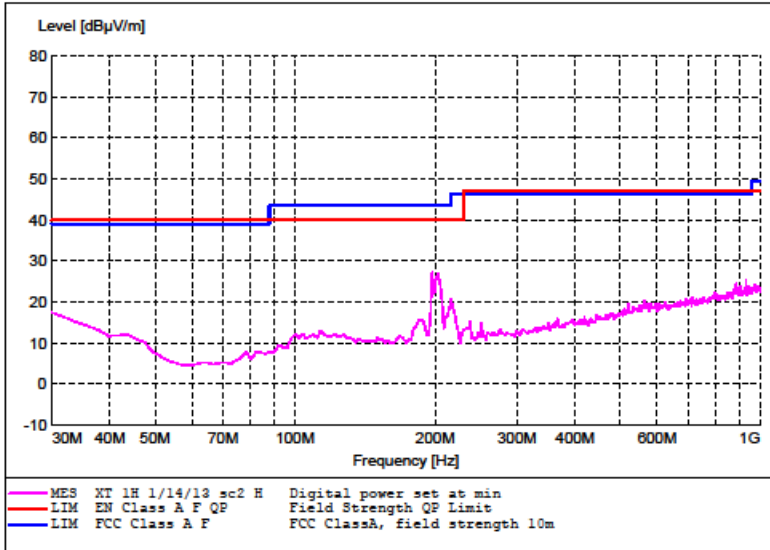
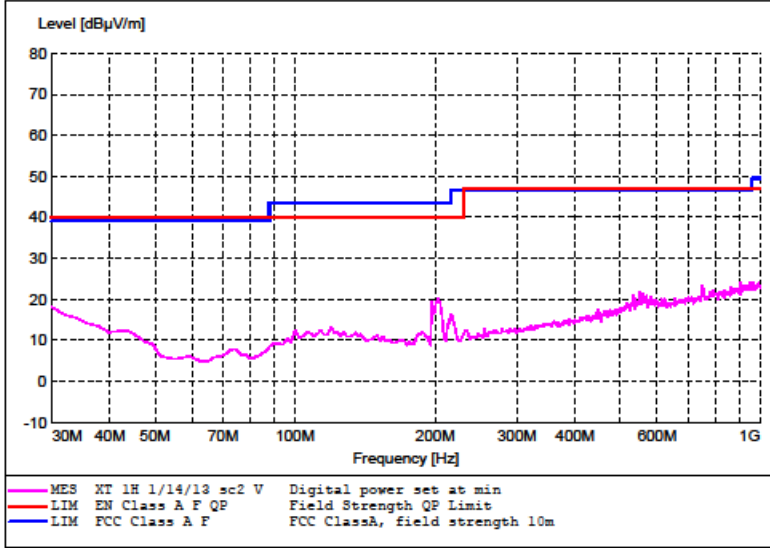
MAXIMIZED FILES XT1 H 1/14/13 sc2 V&H

FREQ. (MHz)	MAXIMIZED QP SIGNAL		LIMIT LINE	PASSING MARGIN	MAXIMIZED POSITION		REMARKS
	H/V	dBµV	dBµV	dBµV	TURNTABLE (°)	ANTENNA (M)	
186.823	H	13.60	43.52	29.92	0	1.0	
197.015	H	24.34	43.52	19.18	0	1.0	
202.745	H	26.71	43.52	16.81	0	1.0	
204.750	H	24.38	43.52	19.14	0	1.0	
206.715	H	19.25	43.52	24.27	0	1.0	
217.755	H	18.45	46.44	27.99	0	1.0	

* - All readings have the correction factors applied.

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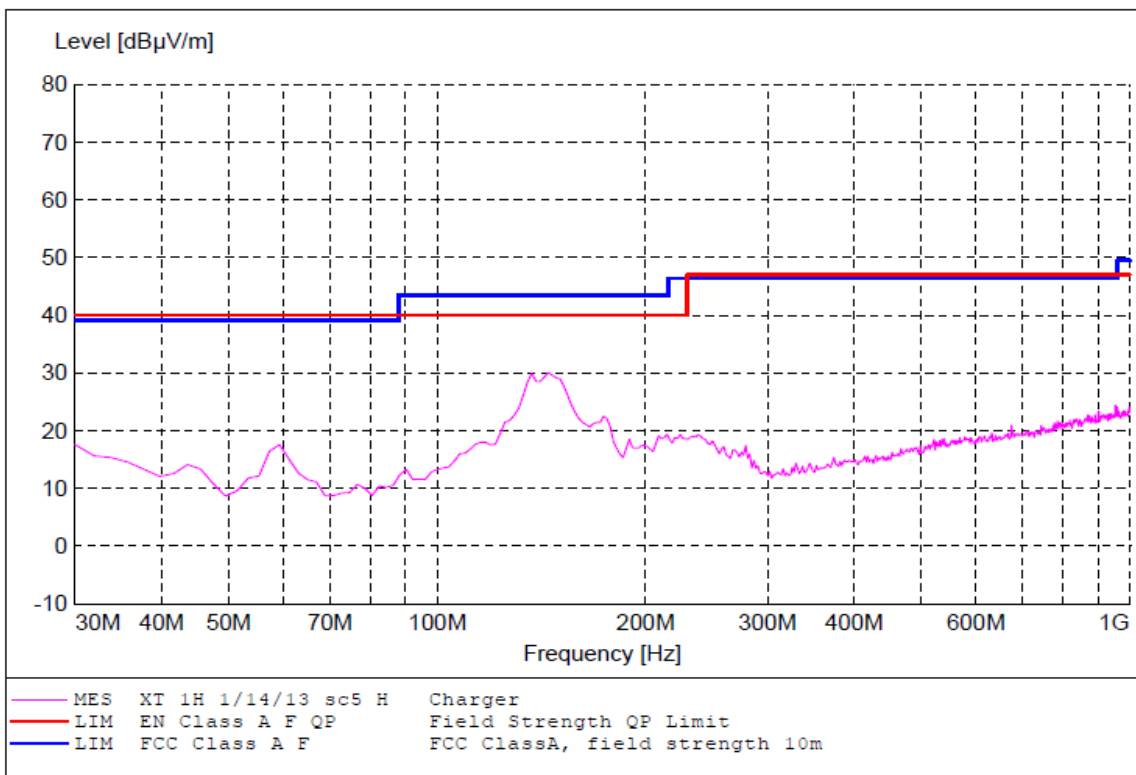
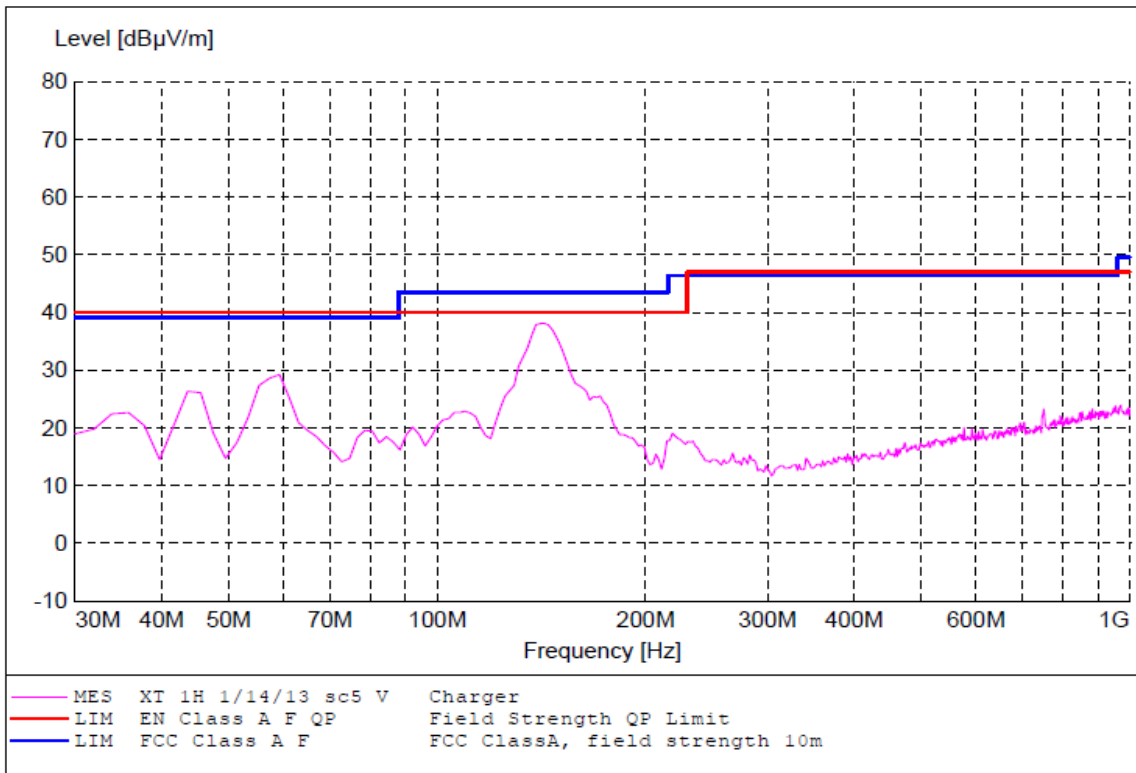
Report Number	RE1211002	Date	14 Jan 2013
EUT Name	XT-1 Wireless Communication System	EUT Power	120 / 60
EUT Model	XT-1H	Test Std	FCC 15.109
EUT Serial #		Temperature (°C)	22
EUT Description	XT-1H Headset Battery Charger	Humidity (%)	22
		Air Pressure (kPa)	10.03

MAXIMIZED FILES XT1 H 1/14/13 sc5 V&H Charger

FREQ. (MHz)	MAXIMIZED QP SIGNAL		LIMIT LINE	PASSING MARGIN	MAXIMIZED POSITION		REMARKS
	H/V	dBµV	dBµV	dBµV	TURNTABLE (°)	ANTENNA (M)	
37.000	V	15.04	39.08	24.04	265	1.0	
44.700	V	19.73	39.08	19.35	270	1.0	
58.875	V	26.27	39.08	12.81	223	1.0	
98.915	V	14.05	43.52	29.47	0	1.0	
110.000	V	19.16	43.52	24.36	190	1.0	
144.150	V	35.07	43.52	8.45	315	1.0	

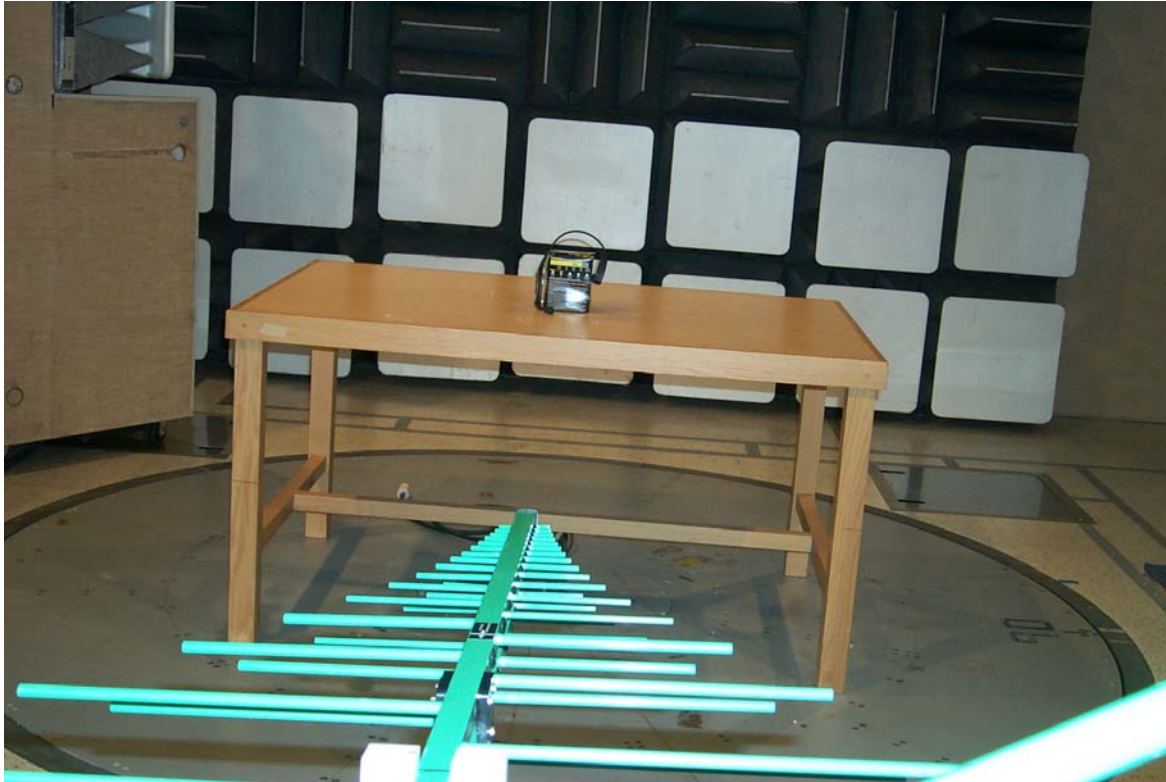
* - All readings have the correction factors applied.

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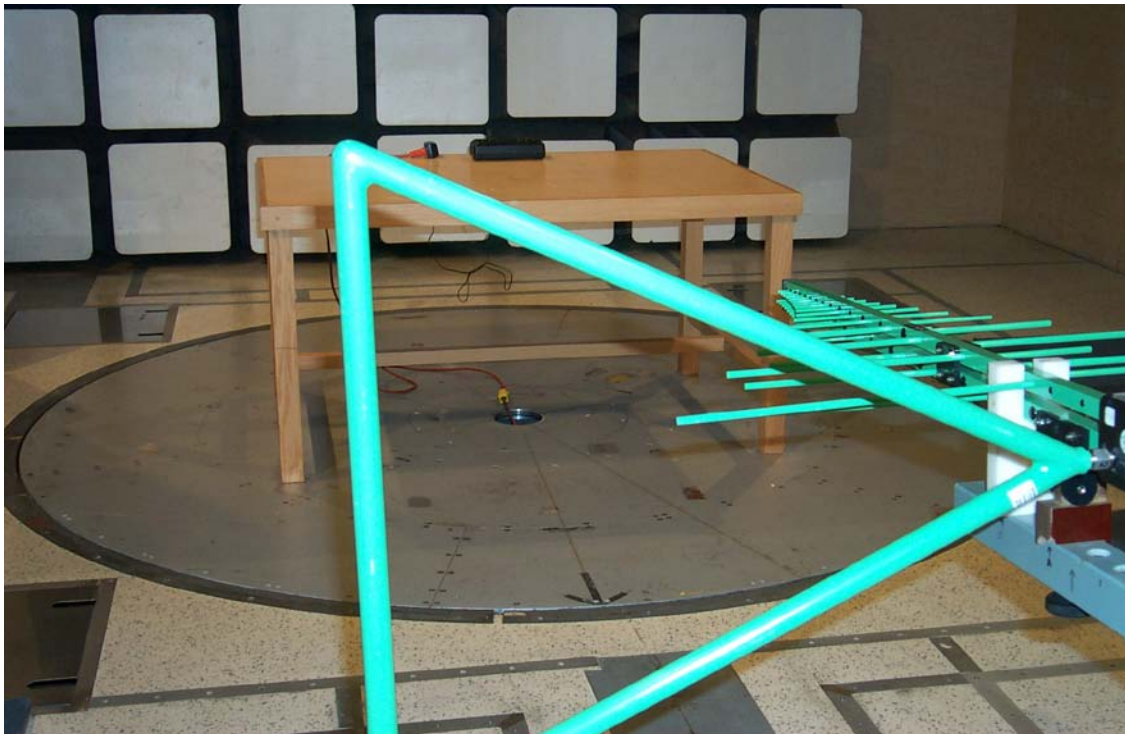


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5.0.4 Digital Emissions Setup Photos



Headset Radiated Emissions 30 to 1000 MHz



Charger Radiated Emissions 30 to 1000 MHz

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5.1 47 CFR Part 15 Subpart C – Intentional Radiators

5.2 15.203 Antenna Requirement

The XT-1B complies with this section. The EUT contains an integral antenna. The antenna consists of the matching unit and an etch on the EUT's PCB.

5.3 15.247 (a)

Unless otherwise specified, the following measurements were made in an RF conducted manner, with a direct connection between the antenna port of the EUT and the measuring instrument. If any attenuation was required between the EUT and the measuring instrument, this value, in addition to the measured cable loss, was added to the measured levels. If a direct connection could not be made to the antenna port, then one of the alternative procedures as outlined at the end of document DA 00-705 was used.

5.3.1 20 dB Bandwidth

The measurement was made on a Low, Mid & High channel. The EUT was cabled to a spectrum analyzer with the span centered on the transmit channel. A marker was set on the peak of the emission. Using the marker-delta function, markers were set 20 dB down on each side of peak, and the bandwidth was recorder at each channel frequency.

5.3.1.1 Results

20 dB Bandwidth	Low channel	670 KHz
	Mid Channel	683 KHz
	High Channel	637 KHz

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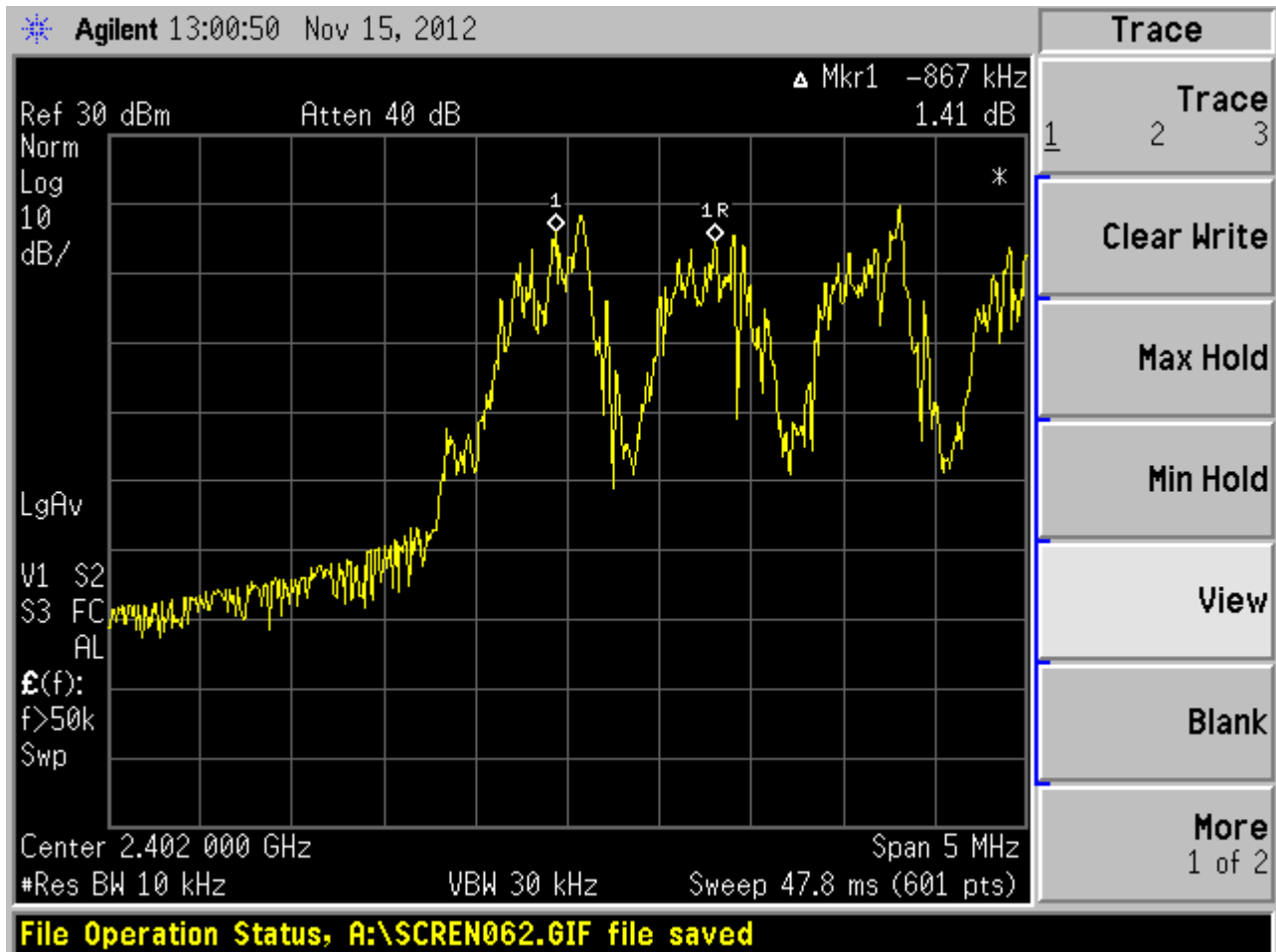
Low Channel Bandwidth

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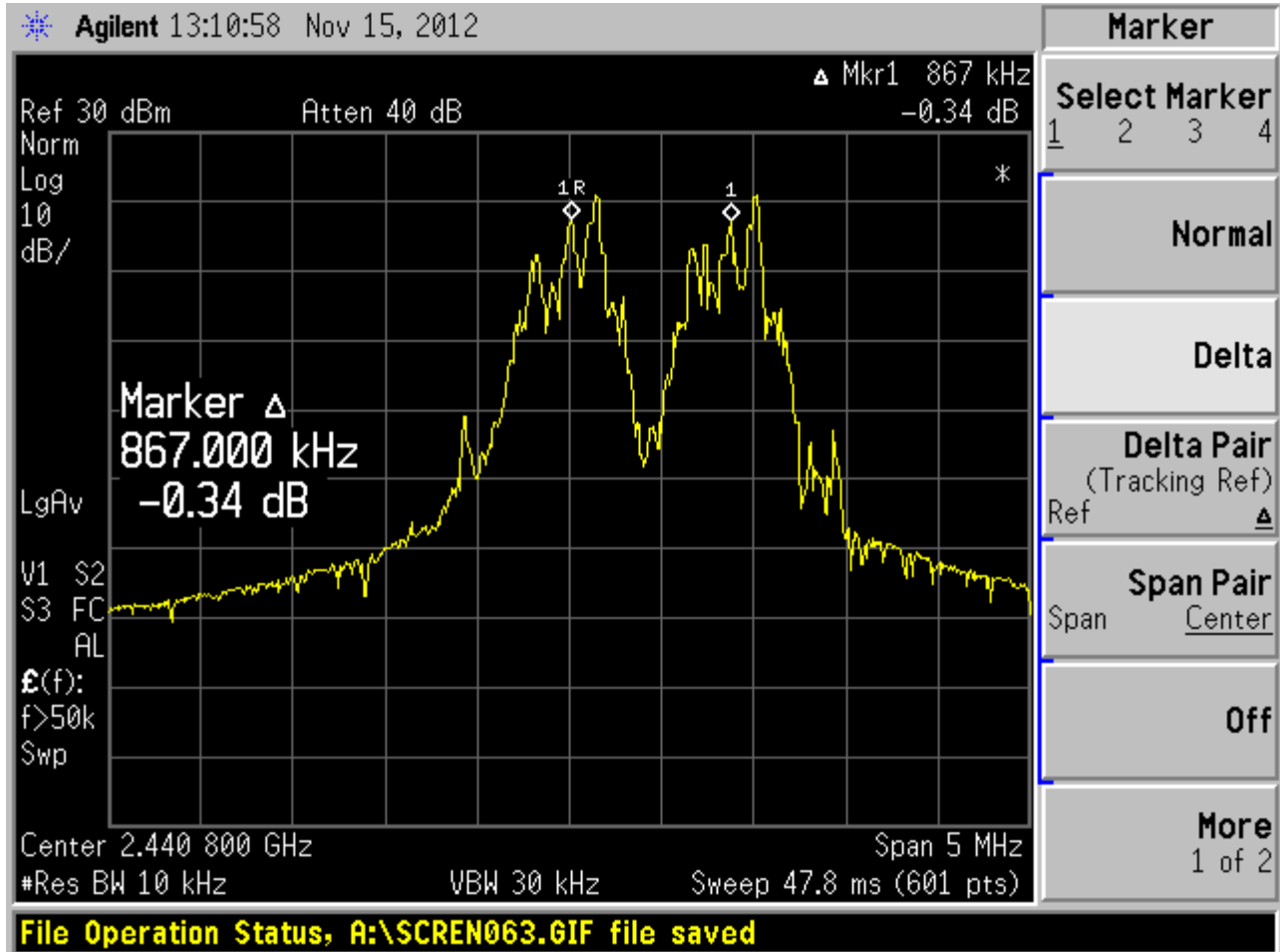
Mid Channel Bandwidth

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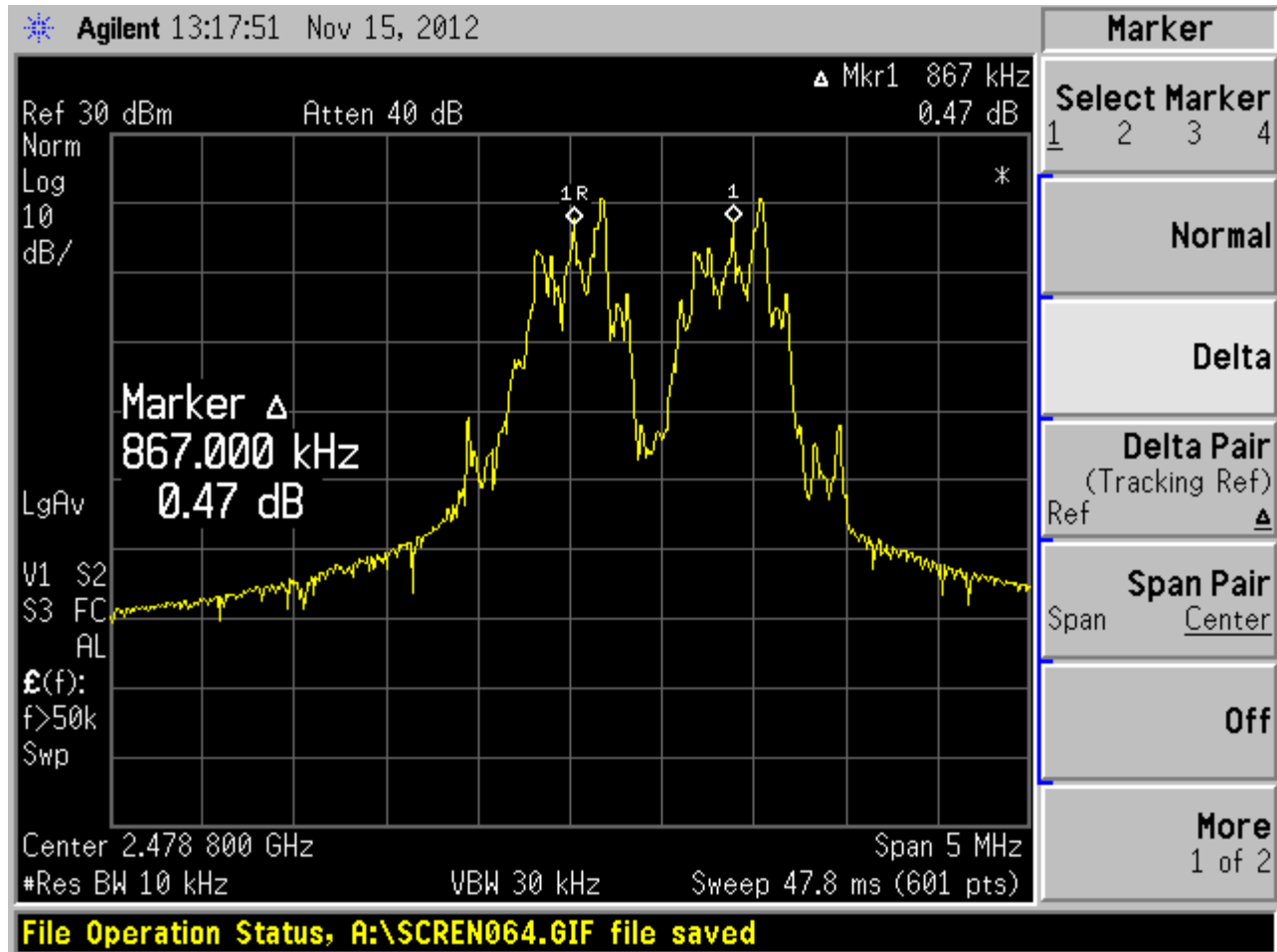
Channel Separation Low

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Channel Separation Mid

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Channel Separation High

5.3.3 Number of Hopping Frequencies

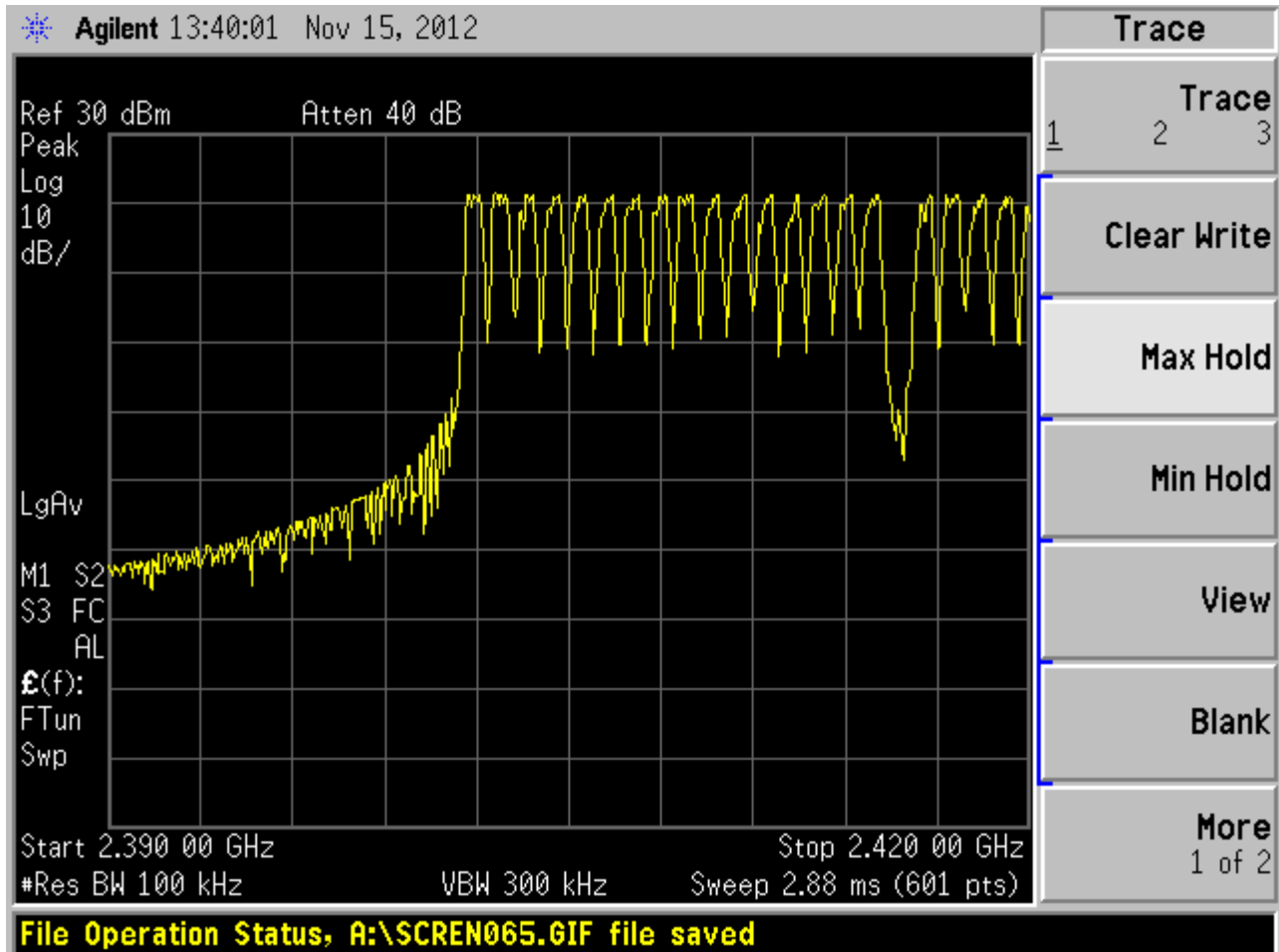
The EUT was placed in the hopping mode. The spectrum analyzer span was broken into sections in order to clearly show all of the hopping channels.

Limit: Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. Frequency hopping systems may avoid or suppress transmission on a particular frequency provided a minimum of 15 channels are used.

5.3.3.1 Results

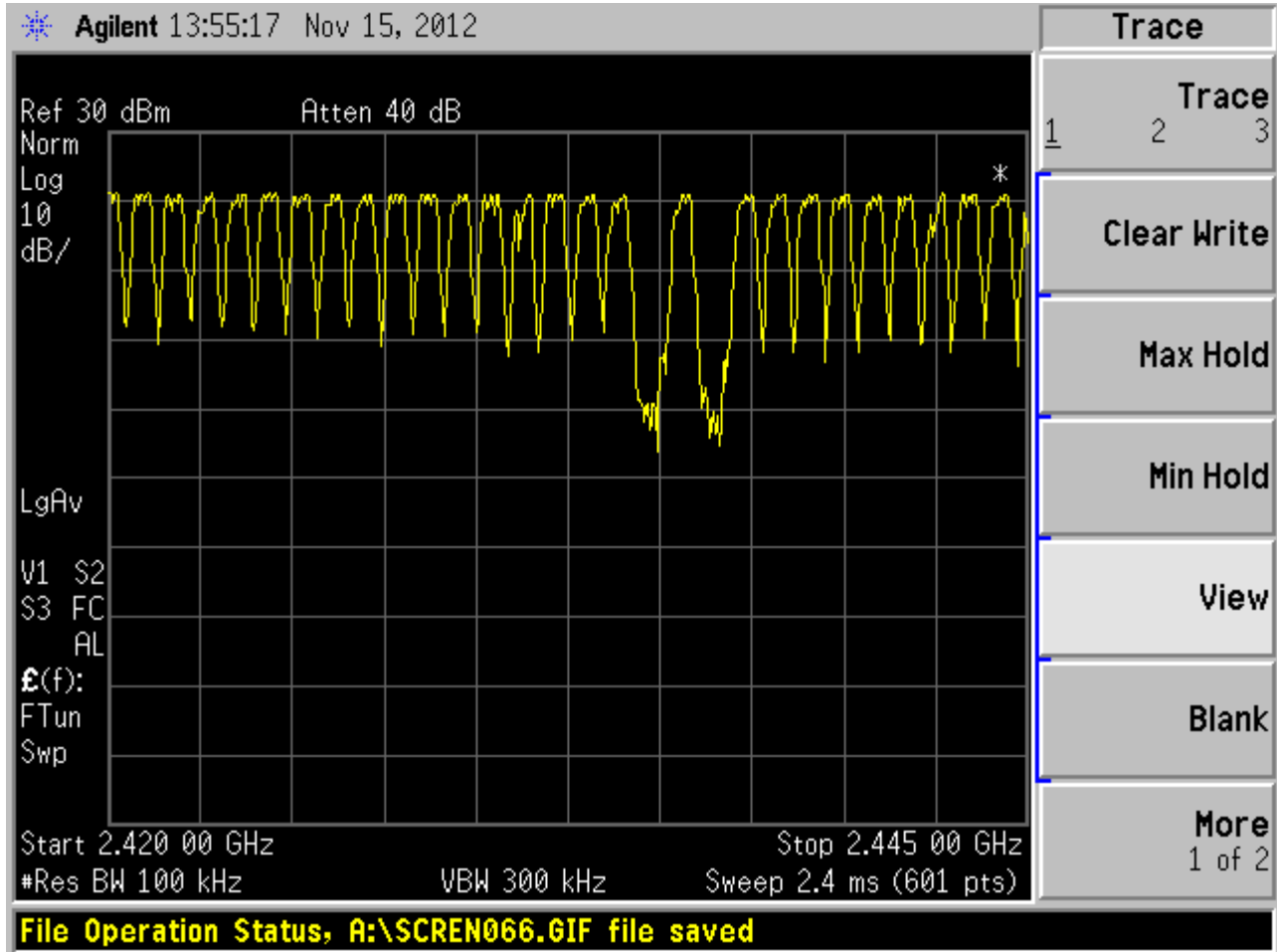
The EUT met the limit. The EUT uses 75 hopping channels.

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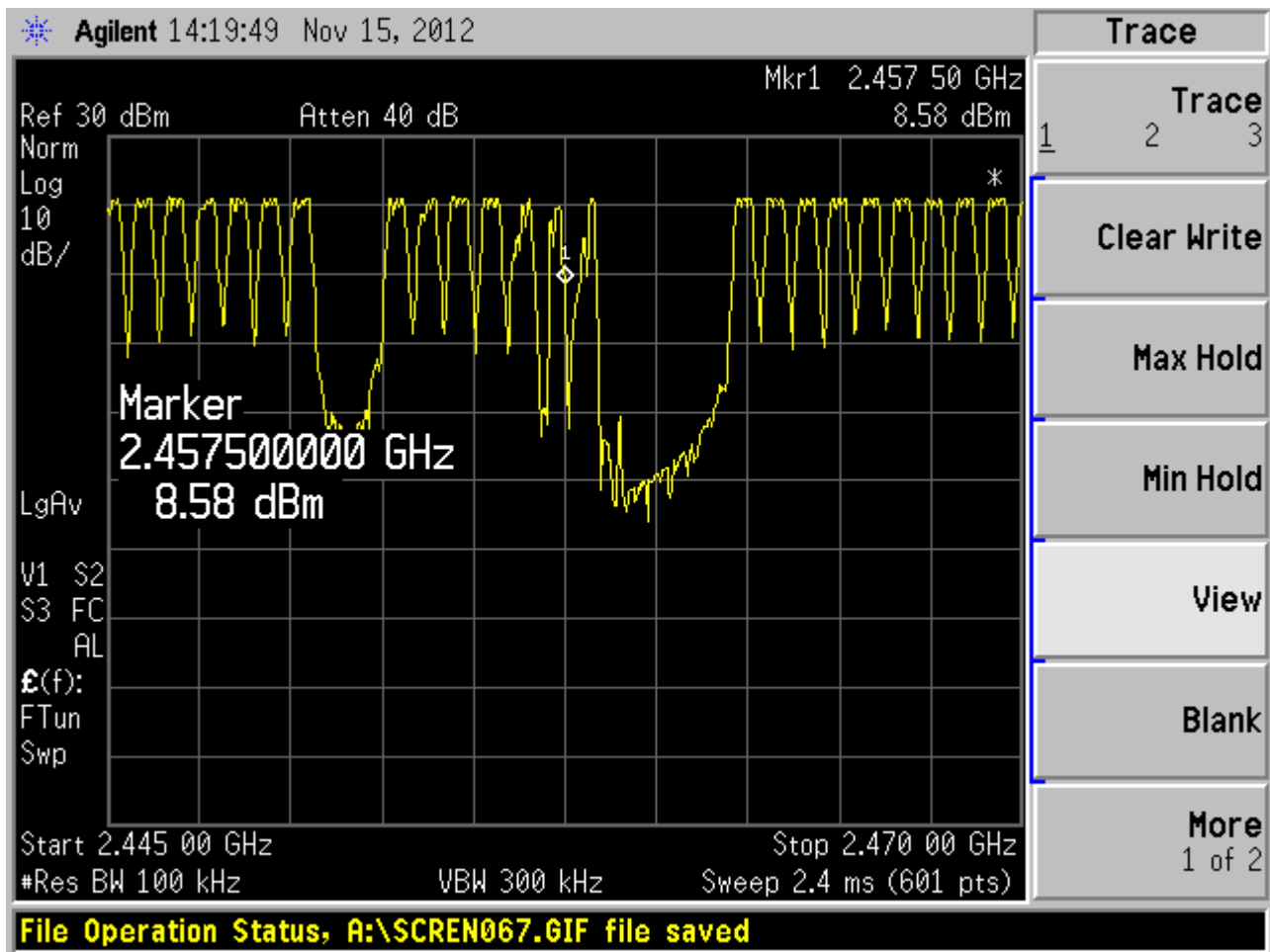
Low Section

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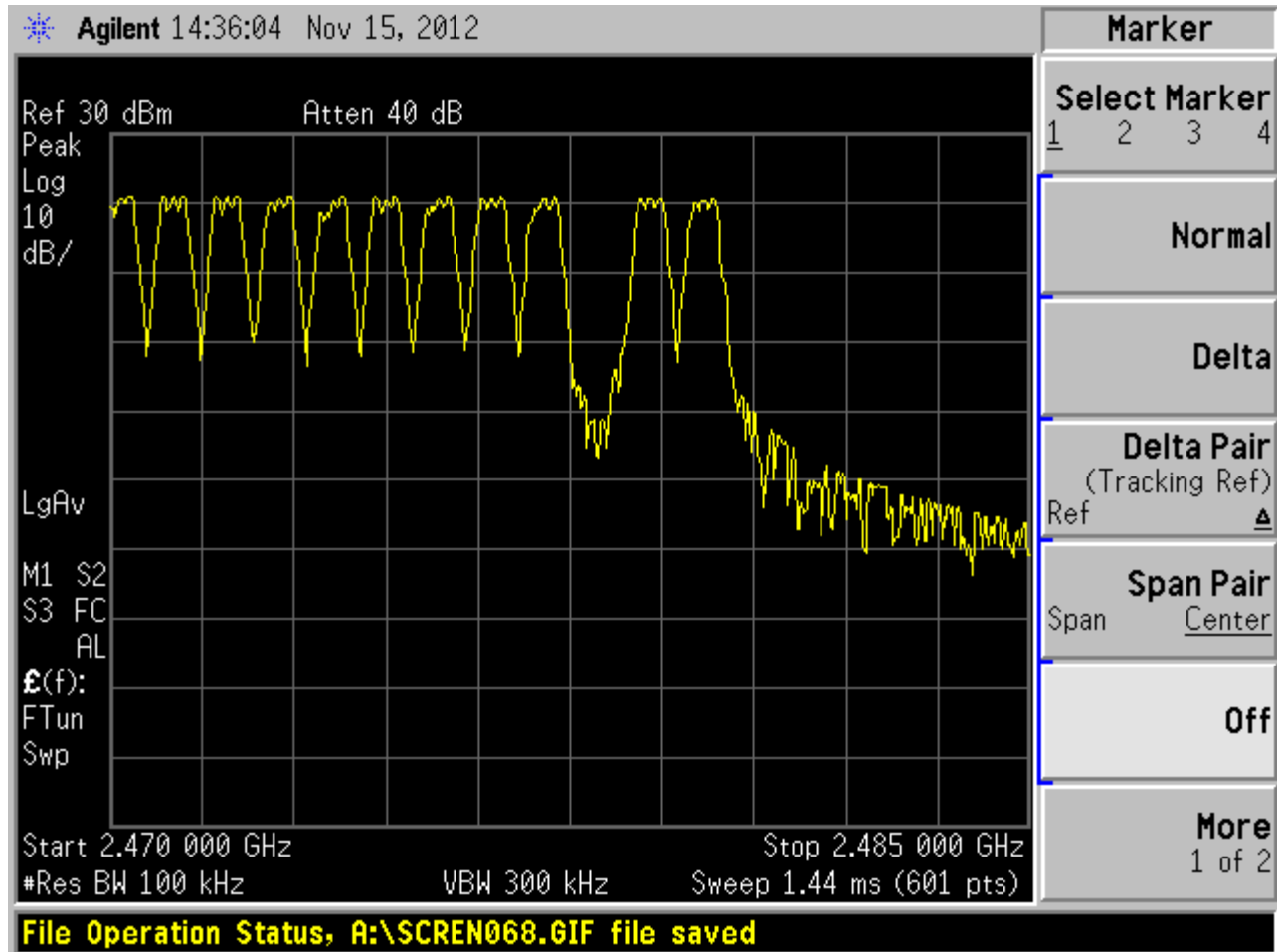
Mid Section 1

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Mid Section 2

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High Section

5.3.4 Time of Occupancy (Dwell Time)

The EUT was placed in the hopping mode. The spectrum analyzer span was set to zero span, centered on a hopping channel. The marker-delta function was used to determine the dwell time of each channel, (Low, Mid, High).

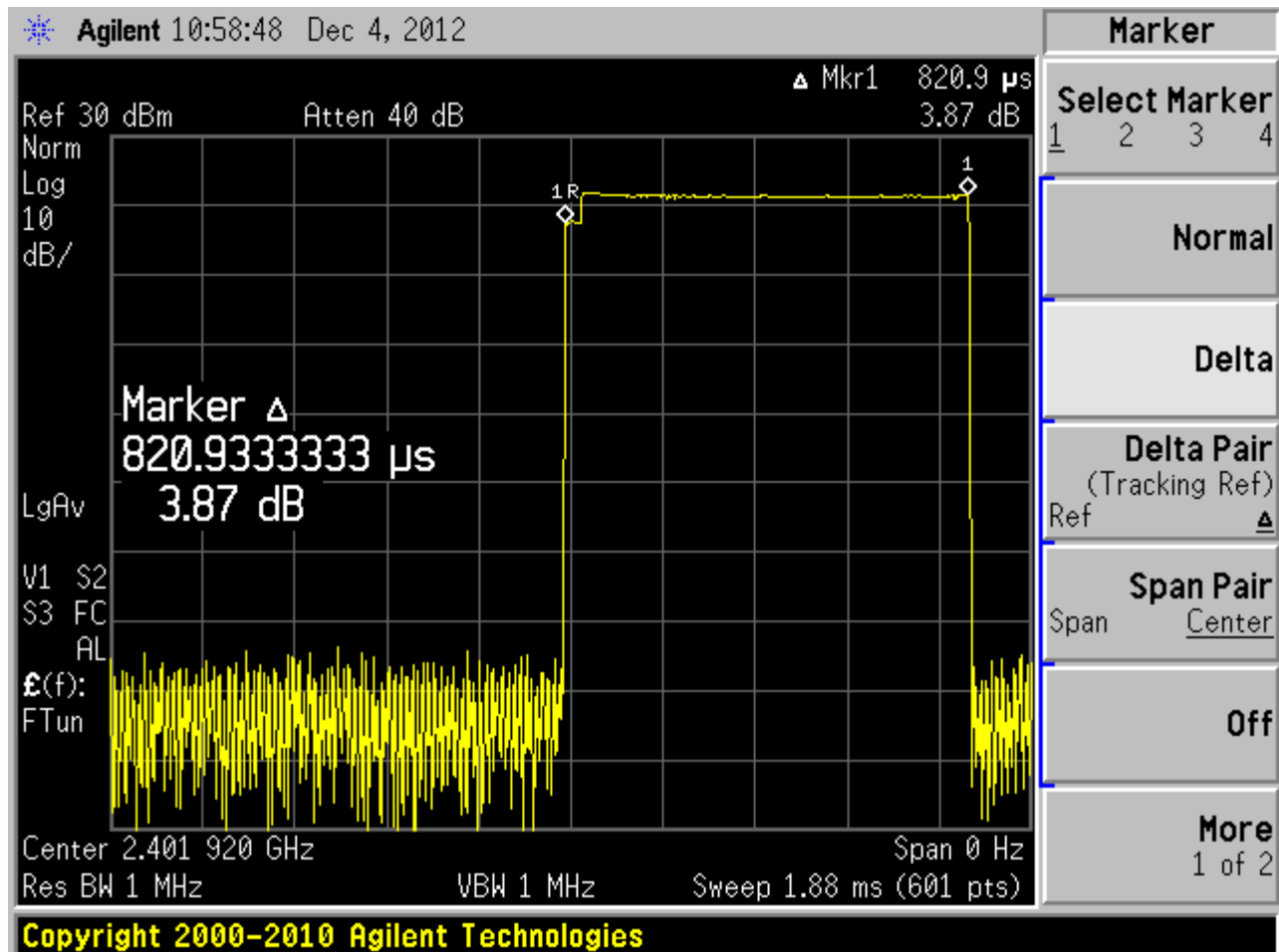
Limit: The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the on hopping channels employed.

The EUT employs 75 channels, therefore the period is 30 seconds, and occupancy must not be greater than 400 ms. The EUT met the limit.

5.3.4.1 Results

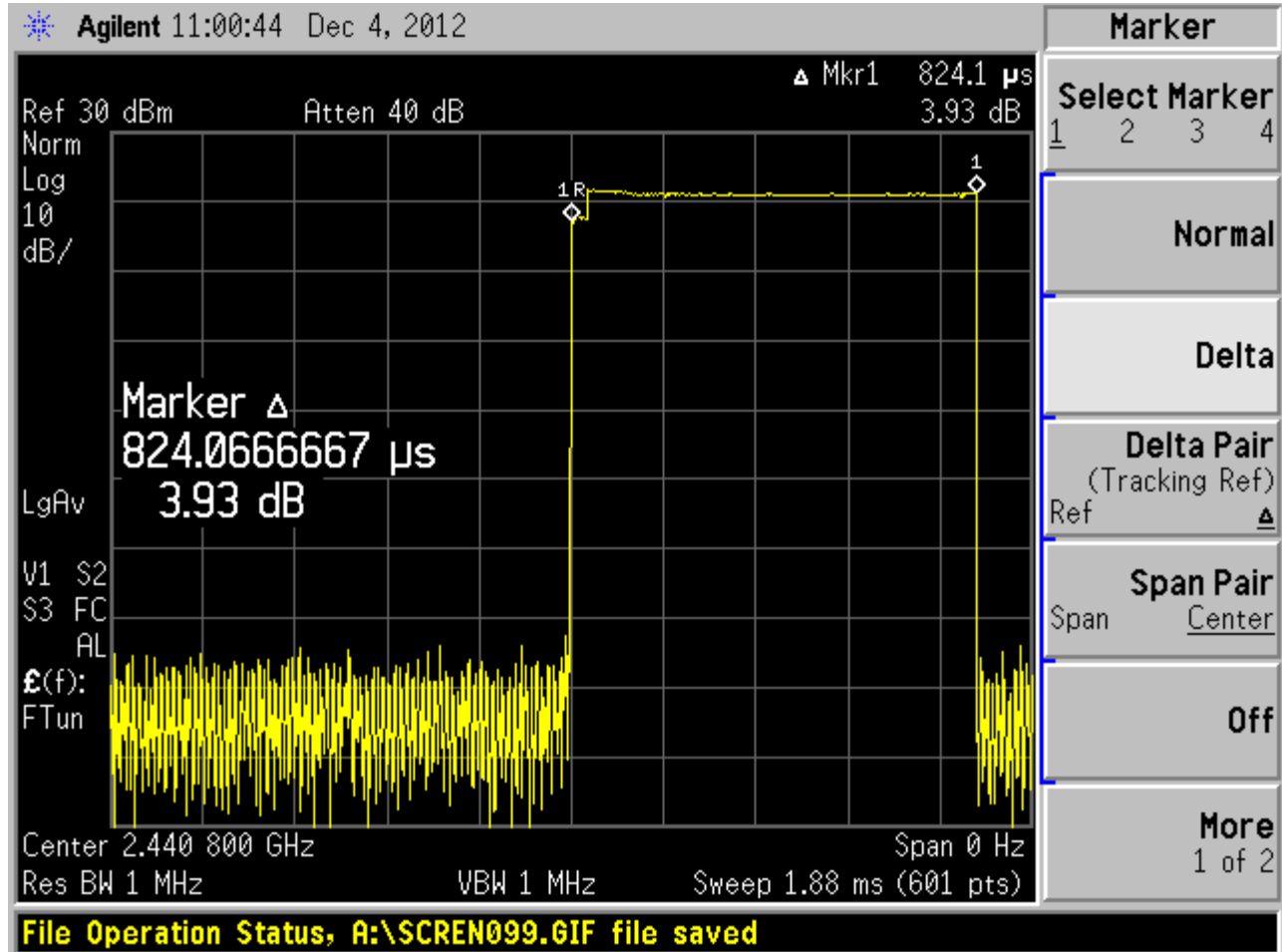
The maximum dwell time of any channel is 827.2 micro sec. During any 30 second period the EUT will occupy a given channel 40 times. **40 X 827.2 μ s = 33.088 ms**

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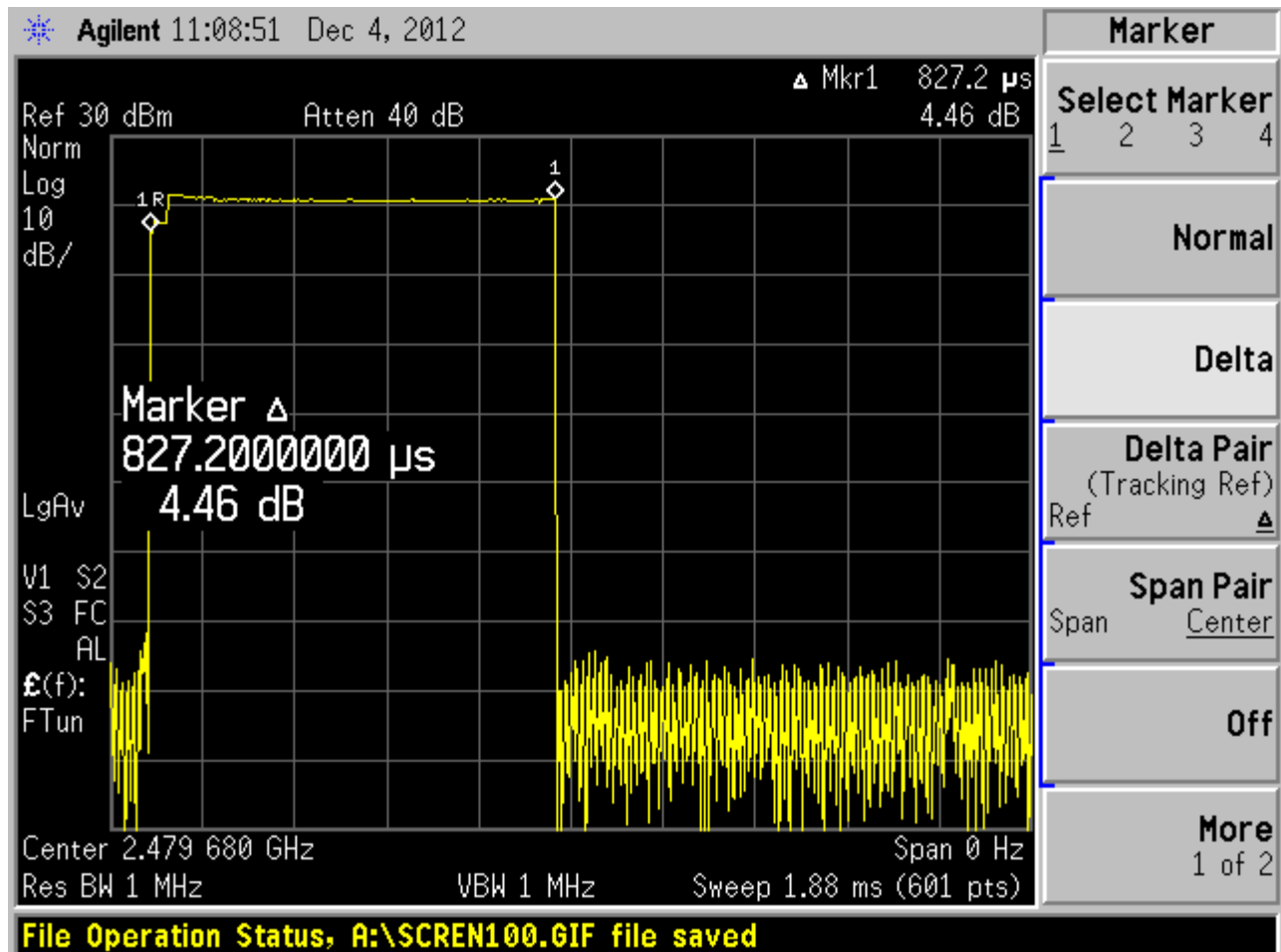
Dwell Time Low Channel

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Dwell Time Mid Channel

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Dwell Time High Channel

5.3.5 Pseudorandom Hopping Sequence and Equal Hopping Usage

This is explained in the Transmit Circuit Description Document. Confidentiality has been requested for this document.

5.4 15.247 (b)

5.4.1 Peak Output Power

The EUT was operating in a single frequency mode and cabled to the spectrum analyzer. Analyzer was centered on transmit frequency. Detector was Peak. Trace was max hold. Measurement was made using marker-to-peak function. Actual power output is equal to peak indicated level plus cable loss.

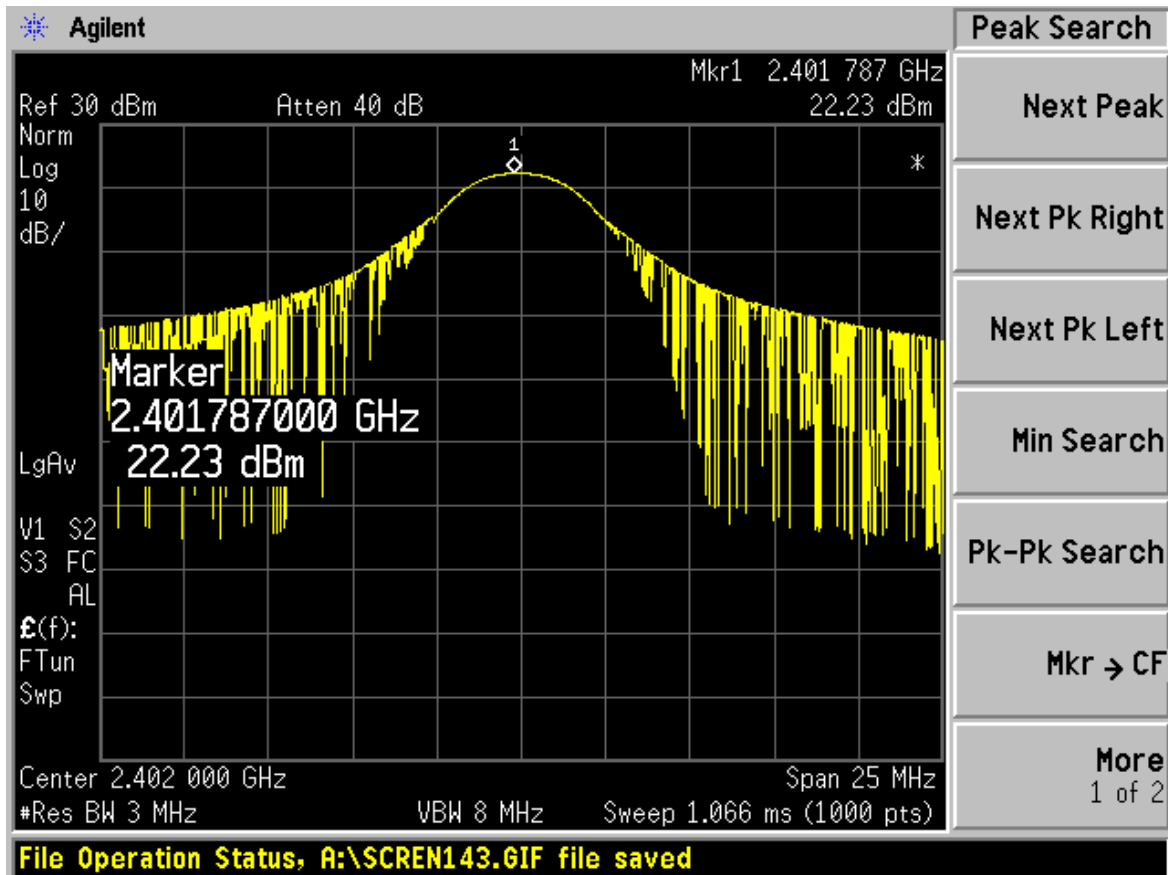
Limit: 1 Watt EUT met conducted output power limit.

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5.4.1.1 Results

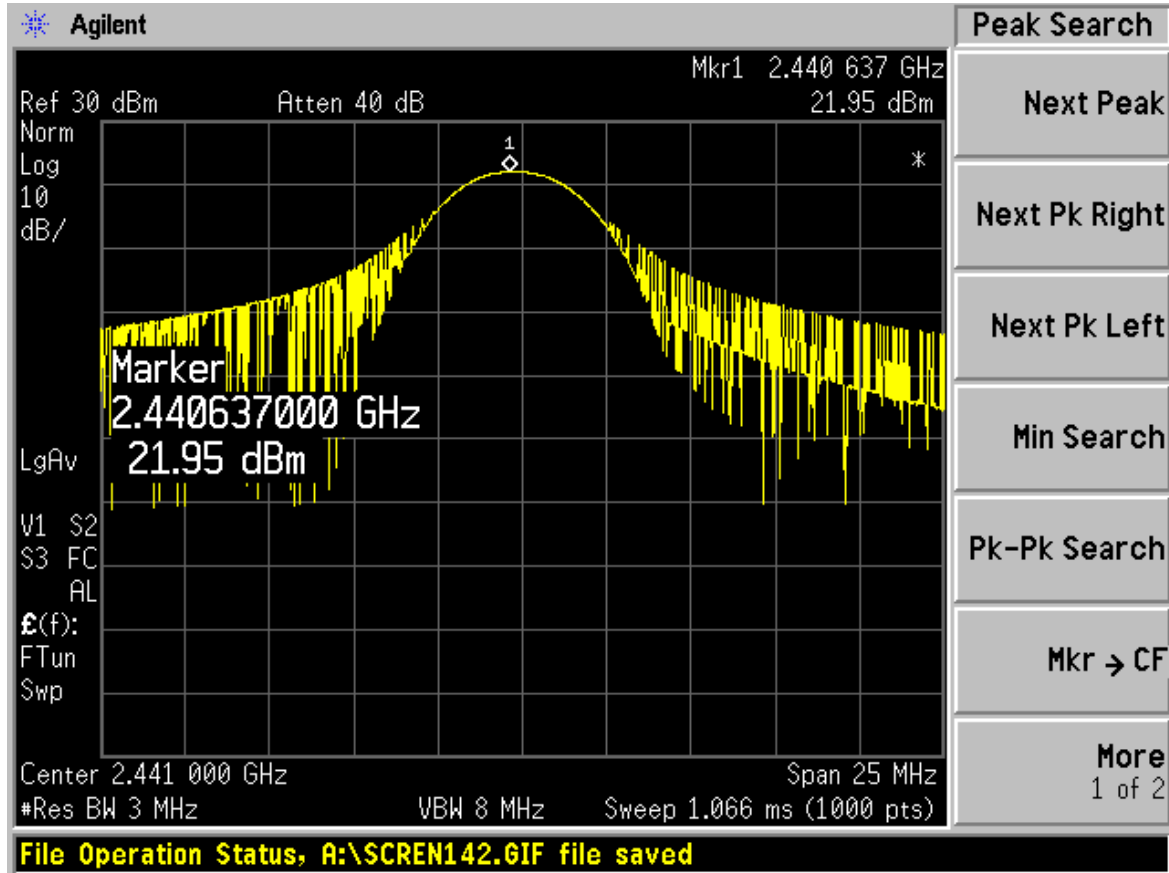
Corrected output = Measured level + Cable loss

Channel Number	Frequency MHz	Measured Level dBm	Cable Loss dB	Corrected Output dBm	Corrected Output mw
1	2401.92	22.23	0.57	22.8	190.55
46	2440.8	21.95	0.57	22.52	178.65
91	2479.68	21.52	0.57	22.09	161.81



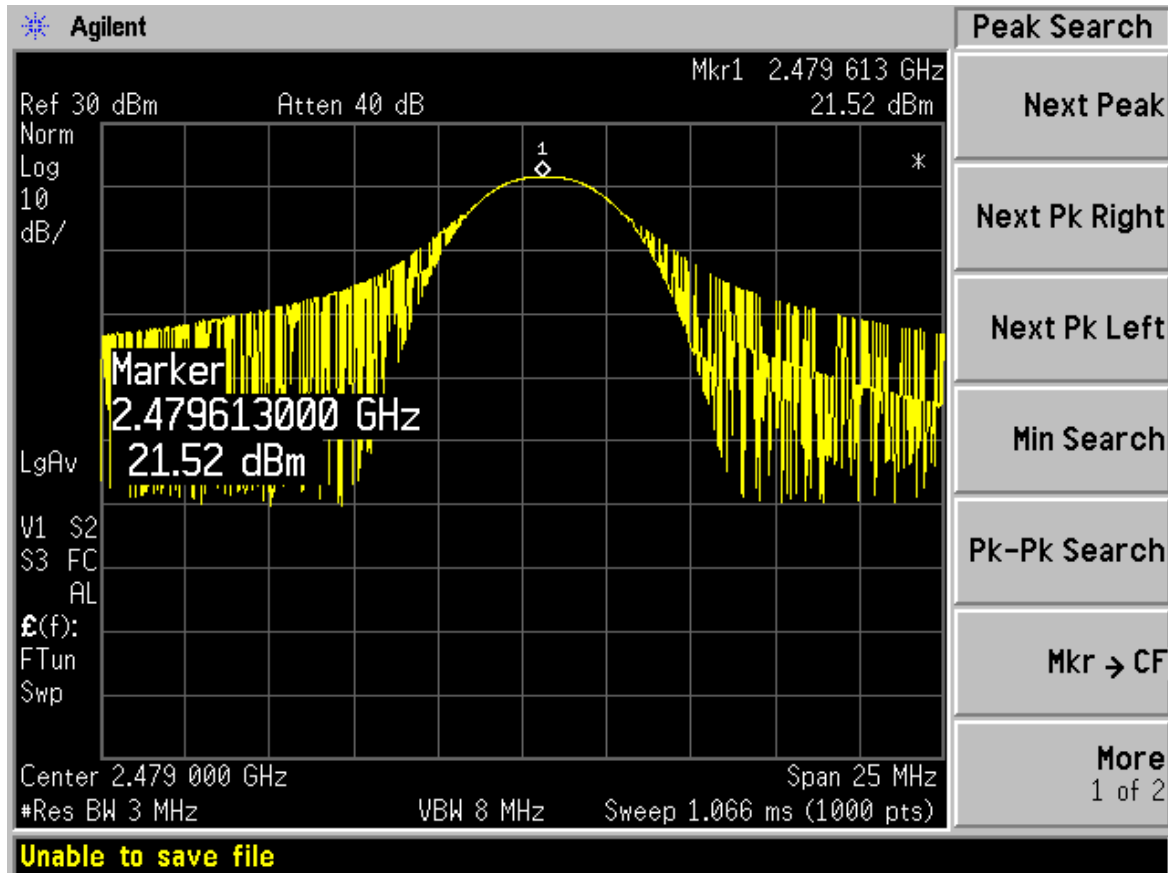
Output Power Channen1

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Output Power Channel 46

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Output Power Channel 91

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5.5 15.247 (c)

5.5.1 Band-edge Compliance of Conducted Emission

EUT is operated in single frequency mode on the channel closet to the band edge to be measured. (Channel 1 for lower edge & channel 91 for upper edge) Span is set to capture channel peak emission as well as any modulation product outside the band authorized for operation. Using marker-delta function, place a marker at the band edge or the highest modulation product outside the band edge as well as on the peak channel emission. The marker-delta value displayed must comply with the limit.

Repeat measurement with EUT operating in hopping mode.

Limit: 20 dB below Peak in band emission on channel closest to band edge.

Use RBW of 100 KHz per 15.247.

EUT met Limit requirements.

5.5.1.1 Results

Single channel operation

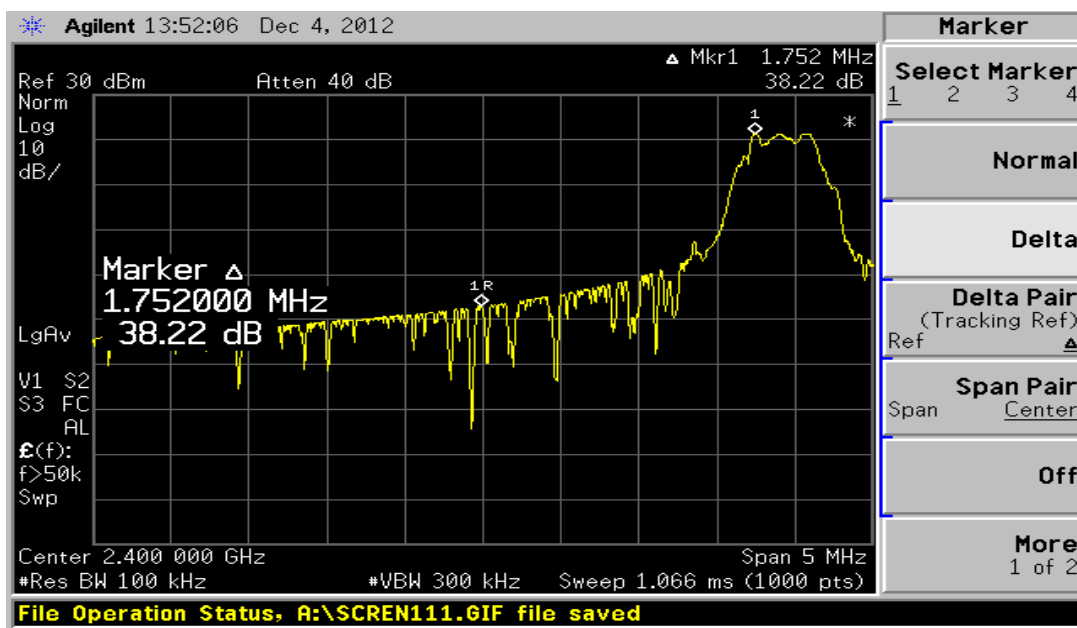
Lower Band edge -38.22 dBc

Upper Band edge -44.36 dBc

Hopping mode activated

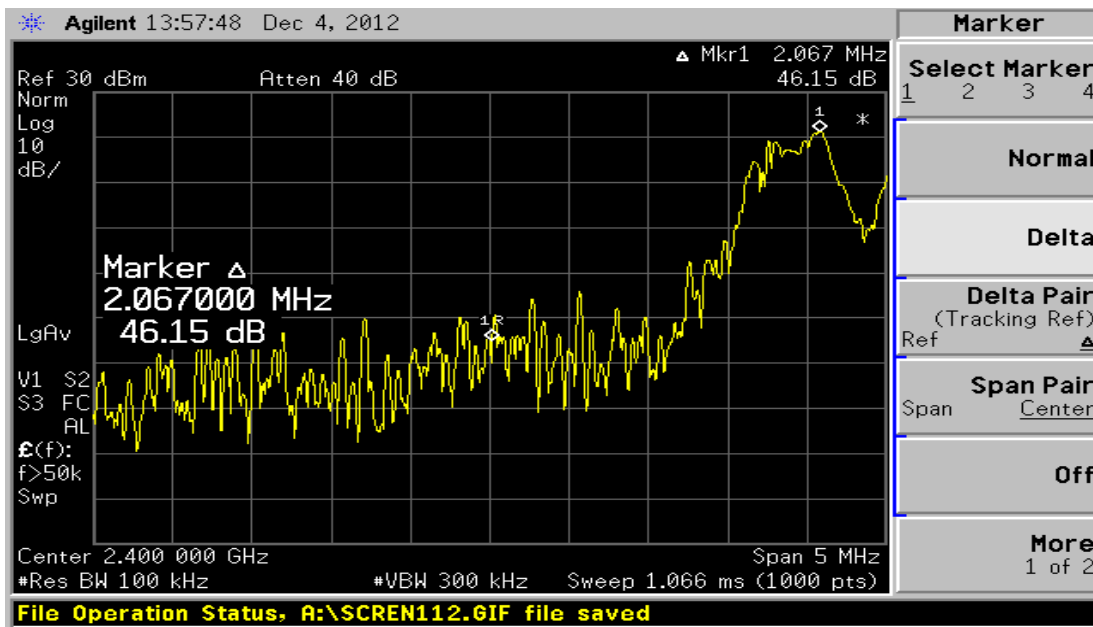
Lower Band edge -46.15 dBc

Upper Band edge -48.69 dBc



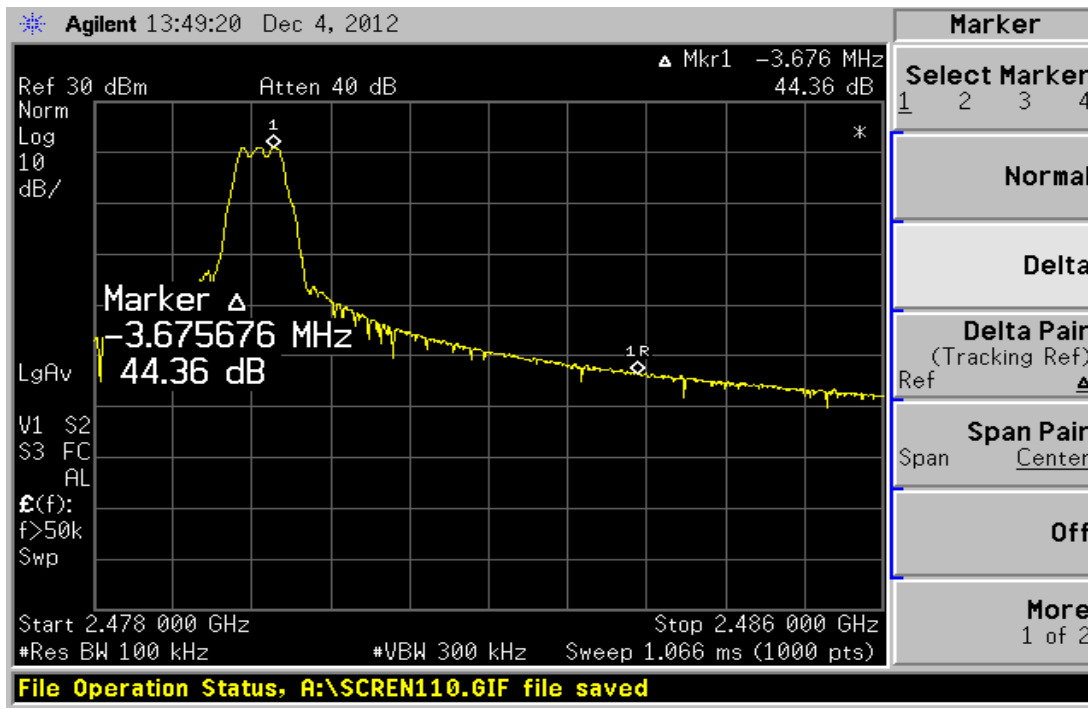
Lower Band Edge

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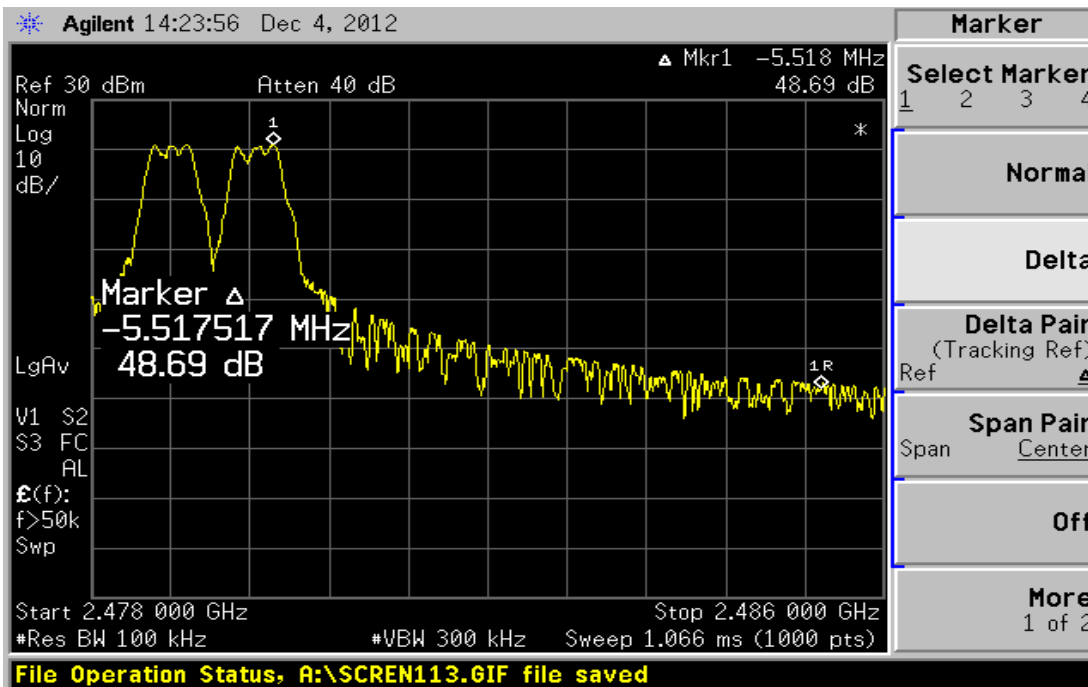


Lower Band Edge with Hopping

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Upper Band Edge



Upper Band Edge with Hopping

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5.5.2 Spurious Radiated Emissions

The EUT was placed in a semi-anechoic chamber for spurious emissions testing in accordance with ANSI C63.4, ANSI C63.10, FCC Part 15, Subpart C and 3M Test Procedures: Radiated Emissions Test (30 MHz – 1 GHz), PBLI-6SHLK2 and Radiated Emissions Test (1 GHz – 18 GHz), PBLI-6SNHFY. The Spurious Emission measurements were made to determine the level of spurious electromagnetic energy radiated from the EUT while in the transmit mode. Spurious emissions were measured using each antenna approved for use with the EUT.

5.5.2.1 Test Procedure

The EUT was placed in the center of a turntable. An EMI receiver was used for the emissions measurements in the range of 30MHz to 26000 MHz. Initial measurements were taken with the receiver in continuous frequency overview mode utilizing peak level signal detection. Peak results were maximized at discrete frequencies utilizing quasi-peak detection. Maximizing a frequency involves finding the angle of the highest emission levels by rotating the EUT 360 degrees (sampling every 4 degrees) and varying the antenna height between 1 and 4 meters at the angles of the highest emissions levels found. Measurements were taken in both vertical and horizontal antenna polarization. The final measurements recorded were determined by the following formula:

Result (dB μ V /m) = receiver level (μ V) + antenna factor (dB/m) + cable loss (dB) - preamp gain (dB) + lineal conversion (dB)

5.5.2.2 Test Criteria

The FCC Part 15, Subpart C radiated limits are given below for all spurious emissions within restricted bands (15.205)

Frequency (MHz)	Distance (Meters)	Field Strength (dB μ V/m)
30 - 88	3	40.0
88 - 216	3	43.52
216 - 960	3	46.0
960 and higher	3	53.98

Limit outside restricted bands: 20dB below highest in band emission.

RBW 100 KHz

5.5.2.3 Test Results

The EUT met the FCC Part 15, Subpart C Spurious Emissions (30 to 26000 MHz.) requirements.

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Report Number	RE	Date	11 Jan 2013
EUT Name	XT-1 Wireless Communication System	EUT Power	3.7 V DC
EUT Model	XT-1H	Test Std	FCC 15.247
EUT Serial #	092388	Temperature (°C)	22
EUT Description	XT-1H Headset	Humidity (%)	22
		Air Pressure (kPa)	9.75

Transmit channel 01

FREQ. (GHz)	MAXIMIZED SIGNAL		LIMIT LINE	PASSING MARGIN	MAXIMIZED SIGNAL		TURN TABLE	ANTENNA HEIGHT
	H/V	(dBµV/m)	(dBµV/m)	(dB)	Detector	RBW	(degrees)	(m)
1.2009	H	44.78*	73.97**	29.19	PK	1 MHz	133	1.15
1.2009	H	23.03*	53.97**	30.94	Ave	1 MHz	133	1.15
2.8353	V	61.25*	73.97**	12.72	PK	1 MHz	183	1.0
2.8353	V	7.50*	53.97**	46.47	AVE	1 MHz	183	1.0
4.8023	H	58.61*	73.97**	15.36	PK	1 MHz	303	1.0
4.8023	H	35.47*	53.97**	18.50	AVE	1MHz	303	1.0
12.0095	H	58.60*	73.97**	15.37	PK	1 MHz	232	1.0
12.0095	H	26.46*	53.97**	27.55	Ave	1 MHz	232	1.0

NOTE: * Corrected for Antenna Factor, Cable loss, Pre-Amp

** Restricted Band Limit per 15.205&15.209

^ Limit 20 dB below PK in band emission

No spurious emissions were detected in the range of 30 to 1000 MHz and above 12 GHz.

Test Engineer: Mike Schultz	Date: 11 Jan 2013
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3M	XT-1H Headset	Report RE1211002F	3M
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Report Number	RE1211002	Date	11 Jan 2013
EUT Name	XT-1 Wireless Communication System	EUT Power	3.7 V DC
EUT Model	XT-1H	Test Std	FCC 15.247
EUT Serial #	092388	Temperature (°C)	22
EUT Description	XT-1H Headset	Humidity (%)	22
		Air Pressure (kPa)	9.75

Transmit channel 46

FREQ. (GHz)	MAXIMIZED SIGNAL		LIMIT LINE	PASSING MARGIN	MAXIMIZED SIGNAL		TURN TABLE	ANTENNA HEIGHT
	H/V	(dBµV/m)	(dBµV/m)	(dB)	Detector	RBW	(degrees)	(m)
1.220	H	42.02*	73.97**	31.95	PK	1 MHz	131	1.18
1.220	H	20.26*	53.97**	33.71	Ave	1 MHz	131	1.18
4.881	V	57.59*	73.97**	16.38	PK	1 MHz	303	1.76
4.881	V	34.46*	53.97**	19.51	Ave	1 MHz	303	1.76
7.322	H	63.14*	73.97**	10.83	PK	1 MHz	140	1.0
7.322	H	40.11*	53.97**	13.86	Ave	1 MHz	140	1.0

NOTE: * Corrected for Antenna Factor, Cable loss, Pre-Amp

** Restricted Band Limit per 15.205 & 15.209

^ Limit 20 dB below PK in band emission

No spurious emissions were detected in the range of 30 to 1000 MHz and above 12 GHz.

Test Engineer: Mike Schultz	Date: 11 Jan 2013
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3M	XT-1H Headset	Report RE1211002F	3M
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Report Number	RE1211002	Date	11 Jan 2013
EUT Name	XT-1 Wireless Communication System	EUT Power	3.7 V DC
EUT Model	XT-1H	Test Std	FCC 15.247
EUT Serial #	092388	Temperature (°C)	22
EUT Description	XT-1H Headset	Humidity (%)	22
		Air Pressure (kPa)	9.75

Transmit channel 92

FREQ. (GHz)	MAXIMIZED SIGNAL		LIMIT LINE	PASSING MARGIN	MAXIMIZED SIGNAL		TURN TABLE	ANTENNA HEIGHT
	H/V	(dBµV/m)	(dBµV/m)	(dB)	Detector	RBW	(degrees)	(m)
1.239	V	36.71	73.97**	37.26	PK	1 MHz	125	1.35
1.239	V	14.30	53.97**	39.67	Ave	1 MHz	125	1.35
4.959	H	59.11	73.97**	14.86	PK	1 MHz	304	1.0
4.959	H	36.76	53.97**	17.21	Ave	1 MHz	304	1.0
7.438	H	59.8	73.97**	14.17	PK	1 MHz	132	1.0
7.438	H	35.87	53.97**	18.1	Ave	1 MHz	132	1.0

NOTE: * Corrected for Antenna Factor, Cable loss, Pre-Amp

** Restricted Band Limit per 15.205 & 15.209

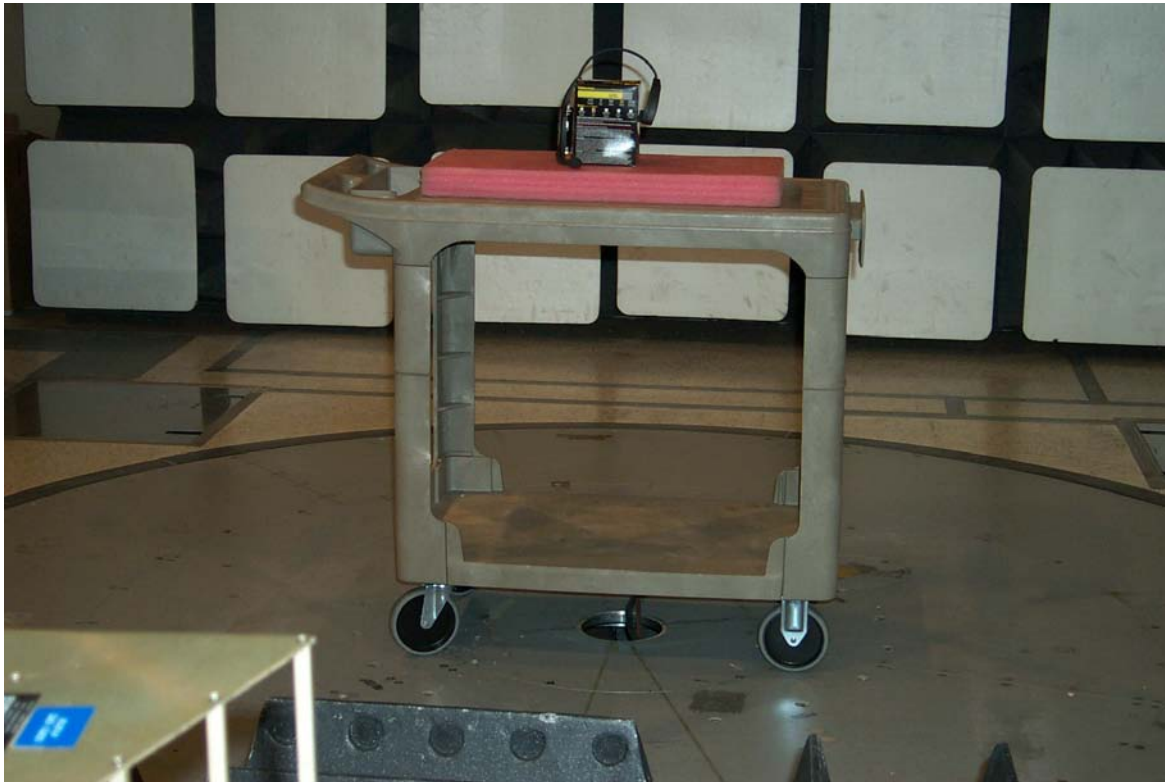
^ Limit 20 dB below PK in band emission

No spurious emissions were detected in the range of 30 to 1000 MHz and above 12 GHz.

Test Engineer: Mike Schultz	Date: 11 Jan 2013
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5.5.2.4 Setup Photos



Spurious Emissions Above 1 GHz

5.5.3 Conducted Spurious Emissions 15.247 (d)

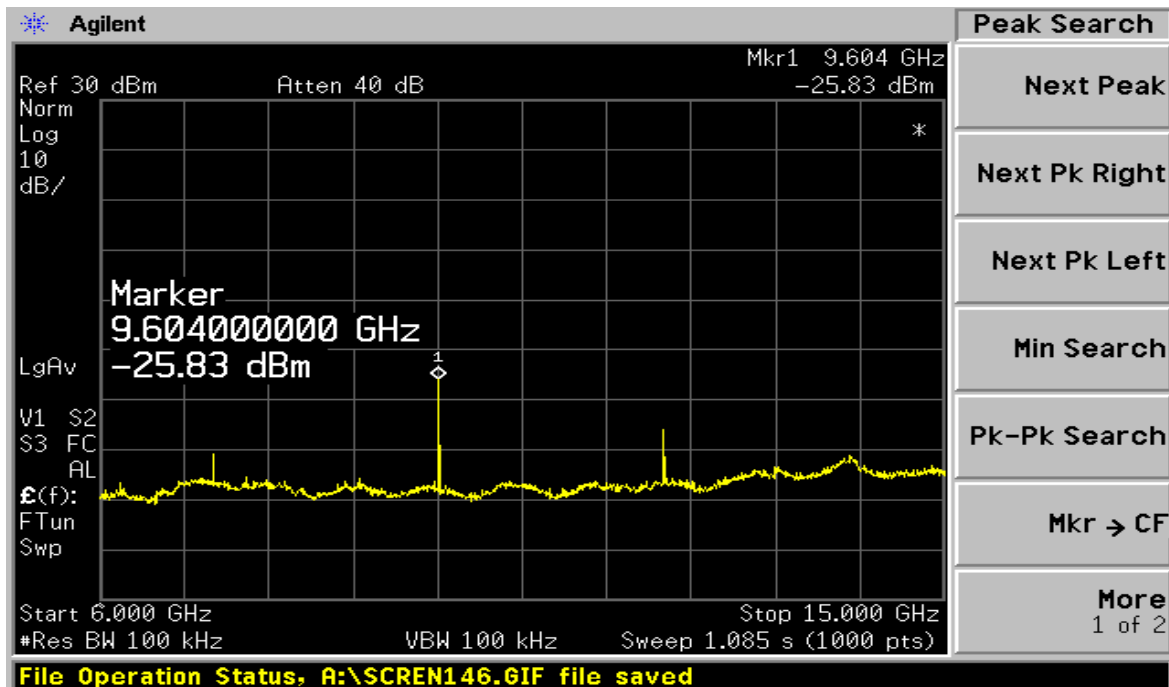
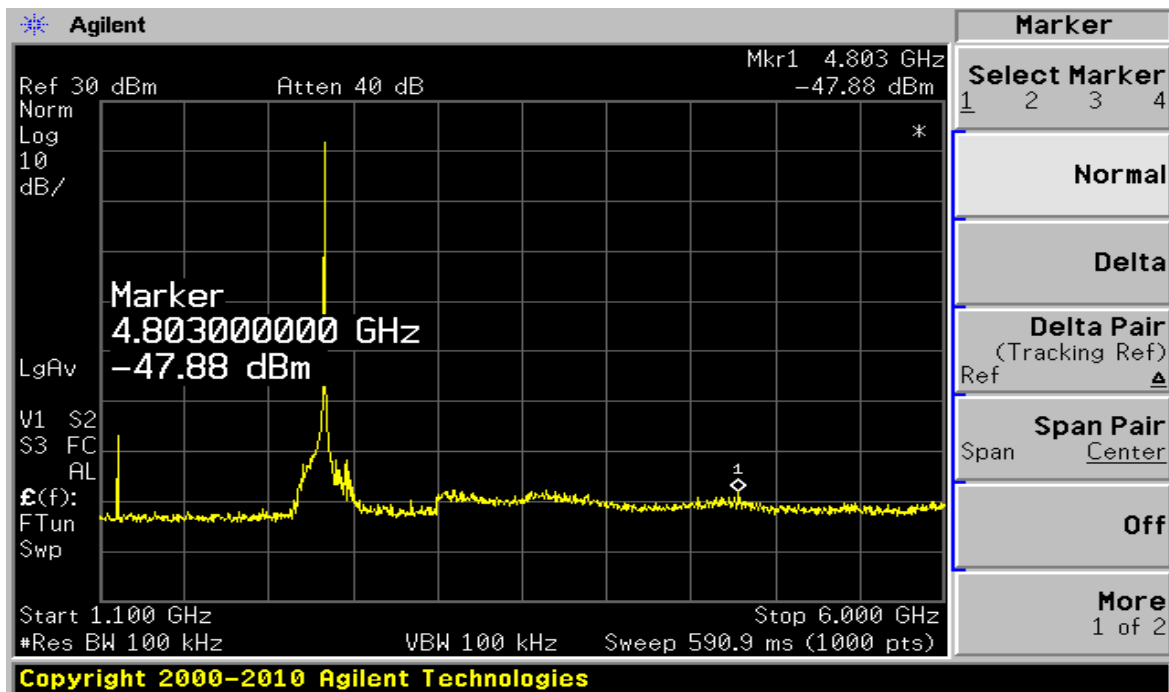
EUT is operated in single frequency mode on Low, Mid, & High channels. The EUT was connected to the input of a Spectrum Analyzer. The analyzer was set to capture the peak level of the in-band emission and all spurious emissions above and below the operating frequency.

5.5.3.1 Limit: In any 100 KHz bandwidth outside the band of operation, the radio frequency power that is produced shall be at least 20 dB below that of the 100 KHz bandwidth within the band that contains the highest level of the desired signal.

5.5.3.2 Results

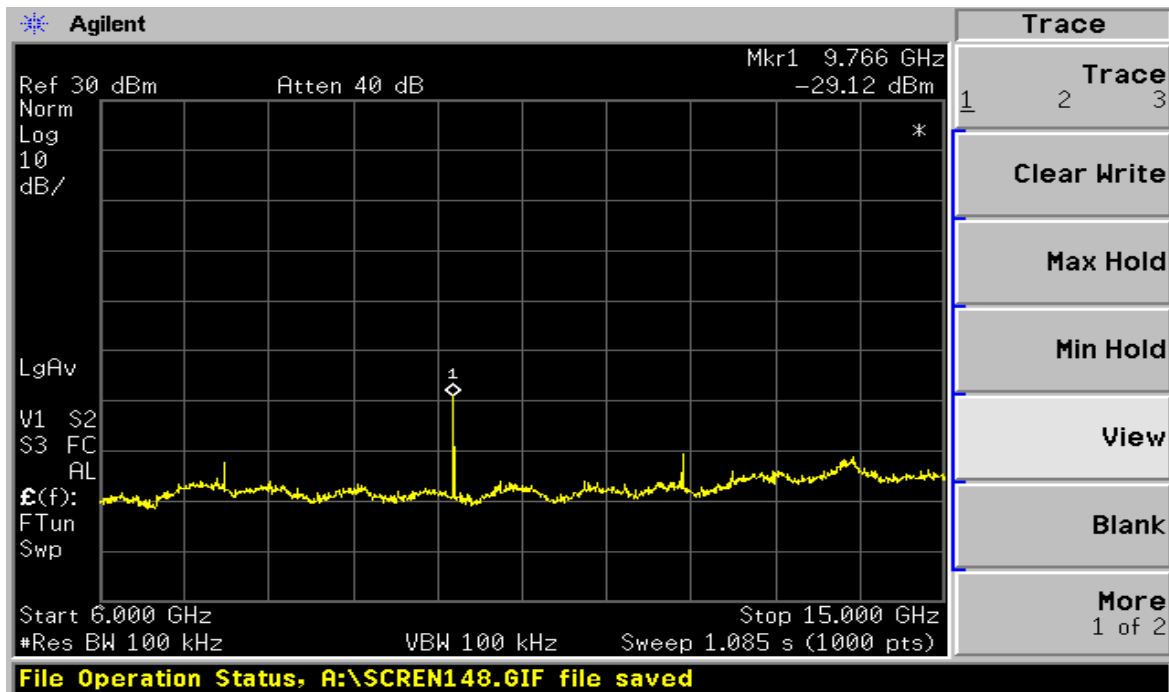
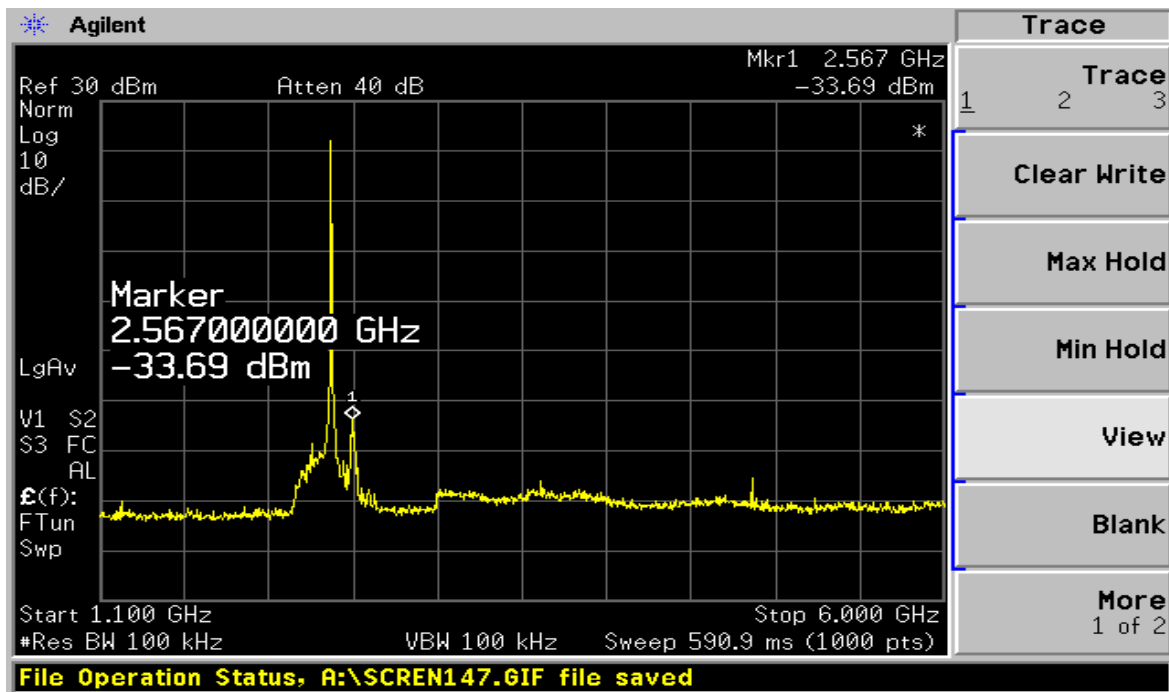
The EUT met the limit per 15.247 (d). All Conducted Spurious Emissions were more than 20 dB below the highest in-band emissions on each channel tested.

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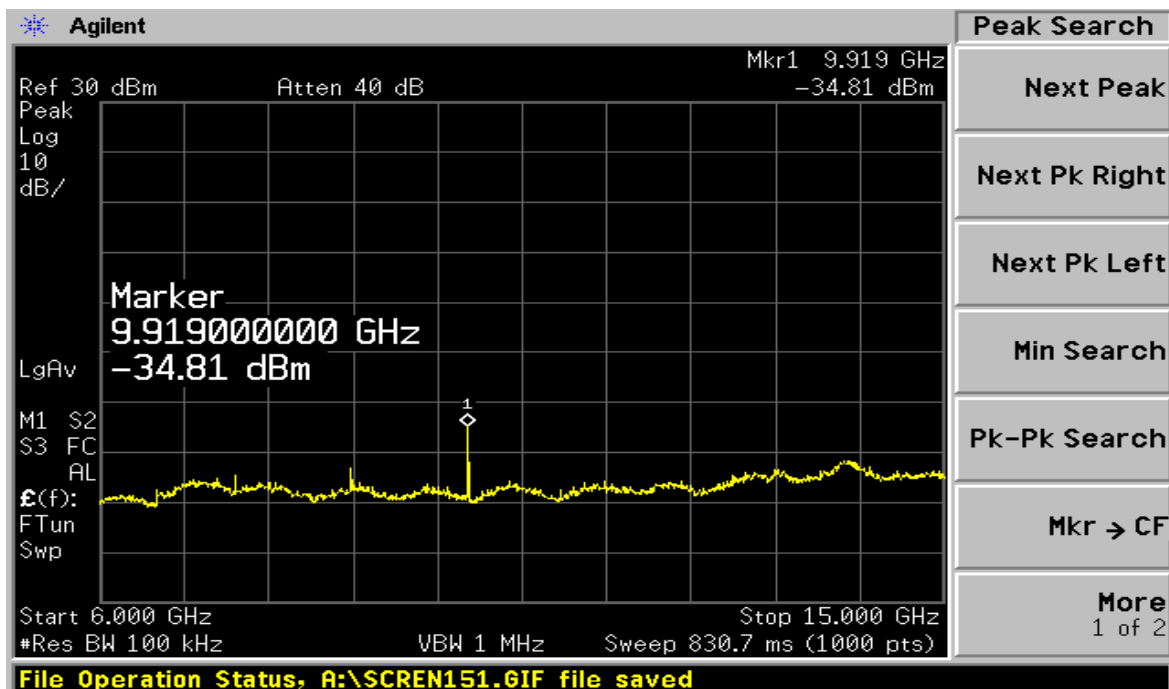
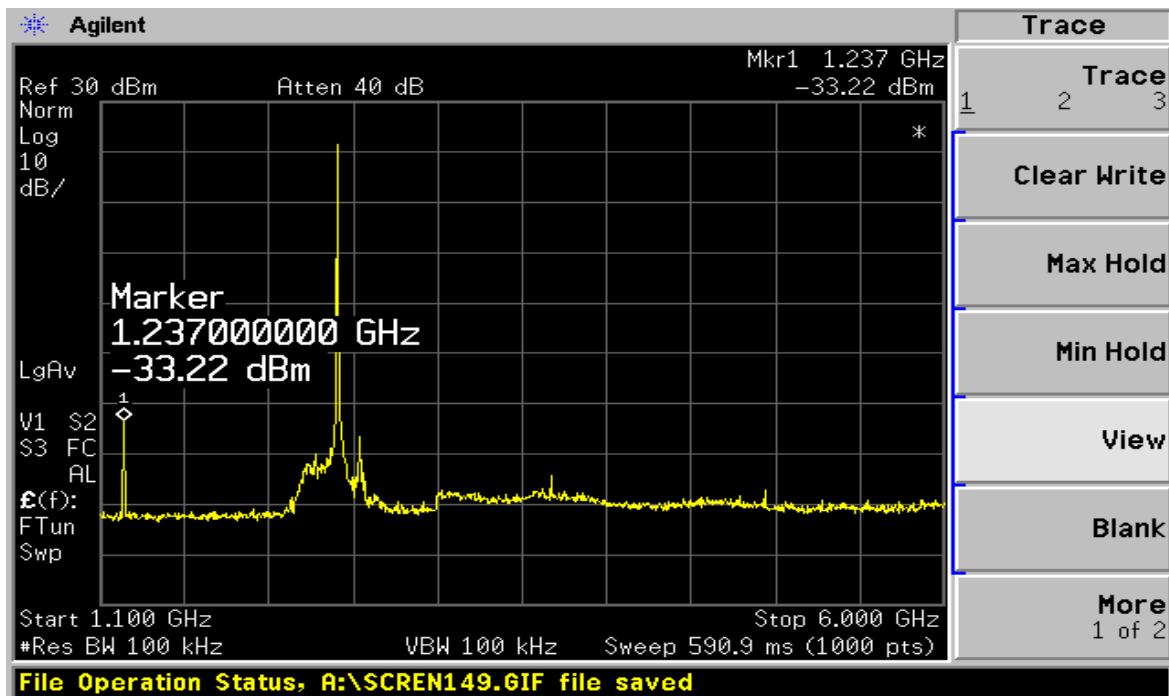
Conducted Spurious Emissions Channel 01

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Conducted Spurious Emissions Channel 46

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Conducted Spurious Emissions Channel 91

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5.6 Human Exposure (EMF)

The XT-1H is a Portable Device as defined in 2.1093 (b) and required to comply with SAR Limits. See SAR Test Report MET Laboratories EMCS37405-SAR.

6.0 LIST OF TEST EQUIPMENT

The following test equipment was used to perform the indicated tests. All test equipment was calibrated by an accredited calibration laboratory or by the manufacturer. All calibration intervals are one year. All equipment calibrations, test procedures, and test facility are traceable to the standards of the National Institute of Standards and Technology (NIST). The test facility site attenuation verification results fall within the normalized site attenuation (NSA) criteria for open area test sites using volumetric measurements.

RADIATED EMISSIONS

Schaffner Biconilog Antenna, Model CBL6112B, Serial No. 27491 (cal due date: 10 Oct 13)
A. H Systems Horn Antenna, Model SAS_200/571 Serial No: 234 (cal due date: 9 Oct 13)
HP Pre-Amplifier, Model 8447D, Serial No. 1937A03090 (cal due date: 10Oct 13)
HP Pre-Amplifier, Model 83017A, Serial No. 3123A00259 (cal due date: 10 Oct 13)
Rohde & Schwarz EMI Receiver, Model ESIB 40, S/N 100235 (cal due date: 7 Sep 13)
Rohde & Schwarz ESIB 40 Firmware Version 4.34.3

CONDUCTED EMISSIONS

EMCO LISN, Model 3816/2NM, Serial No. 1122 (cal due date: 9 Oct 13)
Solar High Pass Filter, Model 8130 - 5.0 (cal due date: 6 Jul 13)
Rohde & Schwarz EMI Receiver, Model ESIB 40, S/N 100235 (cal due date: 7 Sep 13)
Rohde & Schwarz ESIB 40 Firmware Version 4.34.3

CONDUCTED RF EMISSIONS / POWER OUTPUT

Agilent, Model E4448A Spectrum Analyzer, Serial No.MY50180107 (cal due date:11 Oct 13)

OCCUPIED BANDWIDTH

Agilent, Model E4448A Spectrum Analyzer, Serial No.MY50180107 (cal due date:11 Oct 13)

TEST FACILITY

Lindgren Semi-Anechoic Chamber, (verification due date: 30 Mar 13)
FCC Site Registration Number: 790245
Canadian Site Registration Number: 458A-1

SOFTWARE

EMI Measurement Software, Rohde & Schwarz ESIB-K1 Vers. 1.20

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7.0 LABELING INFORMATION

The following labeling information is required by the FCC (Federal Communications Commission) and IC (Industry Canada) for Class A digital devices. Since the equipment contains both intentional and unintentional radiators, it must be labeled as a digital device and as an intentional radiator.

Labels on the Product

The following statements shall be placed in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**FCC ID: DGFBCSDXT1H
IC: 458A-BCSDXT1H**

CAN ICES-3(A) / NMB-3(A)

Statements in the Manuals

The following statement shall be placed in a prominent location in the text of the user manual:

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide a reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

**FCC ID: DGFBCSDXT1H
IC: 458A-BCSDXT1H
CAN ICES-3(A) / NMB-3(A)**

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NO MODIFICATIONS. Modifications to this device shall not be made without the written consent of 3M, Company. Unauthorized modifications may void the authority granted under Federal Communications Commission and Industry Canada Rules permitting the operation of this device.

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