Logitech, Inc.

Cordless Vantage Headset

September 26, 2007

Report No. LABT0276

Report Prepared By

www.nwemc.com
1-888-EMI-CERT

EMC Test Report

NORTHWEST EMC

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Issue Date: September 26, 2007
Logitech, Inc.
Model: Cordless Vantage Headset

Emissions			
Test Description	**Specification**	**Test Method**	**Pass/Fail**
Spurious Radiated Emissions	FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074	**Pass**
Radiated Emissions from Digital Portion	FCC 15.109(g) (CISPR 22:1997):2006 Class B	ANSI C63.4:2003	**Pass**
Occupied Bandwidth	FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000	**Pass**
Output Power	FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074	**Pass**
Band Edge Compliance	FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074	**Pass**
Spurious Conducted Emissions	FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074	**Pass**
Power Spectral Density	FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074	**Pass**

Modifications made to the product
See the Modifications section of this report

Test Facility

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.
22975 NW Evergreen Parkway, Suite 400
Hillsboro, OR 97124
Phone: (503) 844-4066 Fax: 844-3826

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada.

Approved By:

Ethan Schoonover, Sultan Lab Manager

NVLAP Lab Code: 200630-0

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test.

Revision Number	Description	Date	Page Number
00	None		

FCC: Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.

NVLAP: Northwest EMC, Inc. is accredited under the United States Department of Commerce, National Institute of Standards and Technology, and National Voluntary Laboratory Accreditation Program for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 2004/108/EC, and ANSI C63.4. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.

NVLAP LAB CODE 200629-0
NVLAP LAB CODE 200630-0
NVLAP LAB CODE 200676-0
NVLAP LAB CODE 200761-0

Industry Canada: Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS 212, Issue 1 (Provisional) and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements.

CAB: Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement.

TÜV Product Service: Included in TUV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TUV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TUV's current Listing of CARAT Laboratories, available from TUV. A certificate was issued to represent that this laboratory continues to meet TUV's CARAT Program requirements. Certificate No. USA0604C.

TÜV Rheinland: Authorized to carryout EMC tests by order and under supervision of TÜV Rheinland. This authorization is based on "Conditions for EMC-Subcontractors" of November 1992.

NEMKO: Assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification (Authorization No. ELA 119).

Australia/New Zealand: The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body (NVLAP).

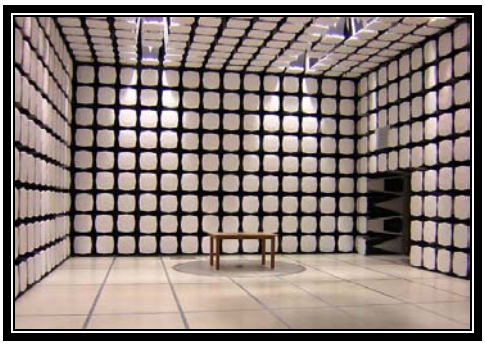
VCCI: Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. *(Registration Numbers. - Hillsboro: C-1071, R-1025, C-2687, T-289, and R-2318, Irvine: R-1943, C-2766, and T-298, Sultan: R-871, C-1784, and T-294).*

BSMI: Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement. License No.SL2-IN-E-1017.

GOST: Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification

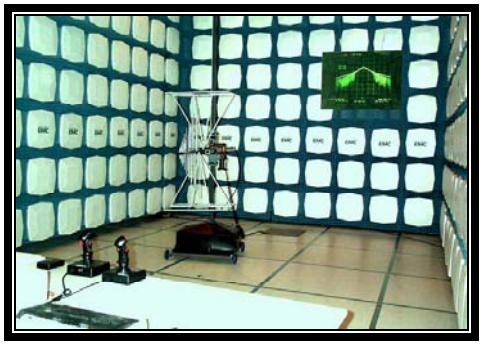
SCOPE

For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/scope.asp



California – Orange County Facility
Labs OC01 – OC13

41 Tesla Ave. Irvine, CA 92618
(888) 364-2378 Fax: (503) 844-3826



Oregon – Evergreen Facility
Labs EV01 – EV11

22975 NW Evergreen Pkwy. Suite 400 Hillsboro, OR 97124
(503) 844-4066 Fax: (503) 844-3826

Washington – Sultan Facility
Labs SU01 – SU07

14128 339th Ave. SE Sultan, WA 98294
(888) 364-2378

Party Requesting the Test

Company Name:	Logitech, Inc.
Address:	1499 SE Tech Center Place Suite 350
City, State, Zip:	Vancouver, WA 98683
Test Requested By:	Aaron Cohen
Model:	Cordless Vantage Headset
First Date of Test:	September 14, 2007
Last Date of Test:	September 20, 2007
Receipt Date of Samples:	September 11, 2007
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):
Bluetooth EDR device

Testing Objective:
Client says, "Links to PS3 or other BT device. Mainly in SCO/eSCO mode (Bluetooth)". Seeking TCB certification under 15.247.

CONFIGURATION 1 LABT0276

Software/Firmware Running during test	
Description	**Version**
BlueTest	Unknown

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Bluetooth Headset - direct connect	Logitech, Inc.	Cordless Vantage Headset	Unknown

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	IBM	2628	78-HKYY6
Laptop power supply	IBM	02K6657	11S02K6657Z1Z0ZA083446
Serial Adapter	Logitech, Inc.	Unknown	Unknown
Serial Adapter Power supply	Logitech, Inc.	KWT06A00JL0622	Unknown

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB to Molex	No	0.5m	No	Bluetooth Headset (during set-up only)	Serial Adapter
Serial	Yes	1.4m	No	Serial Adapter	Laptop
DC	No	1.0m	No	Serial Adapter	Serial Adapter Power Supply
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 2 LABT0276

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Bluetooth Headset	Logitech, Inc.	Cordless Vantage Headset	000D 443E 0266

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	9/14/2007	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	9/14/2007	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
3	9/14/2007	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
4	9/17/2007	Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
5	9/18/2007	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
6	9/20/2007	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
7	9/20/2007	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION
Typical hopping mode

POWER SETTINGS INVESTIGATED
Battery

FREQUENCY RANGE INVESTIGATED			
Start Frequency	30 MHz	Stop Frequency	1000 MHz

SAMPLE CALCULATIONS
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
EV11 cables a,b,c			EVL	5/1/2007	13
Antenna, Biconilog	EMCO	3142	AXB	12/28/2006	24
Pre-Amplifier	AR	LN1000A	APR	5/3/2007	13

MEASUREMENT BANDWIDTHS

	Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
	0.01 - 0.15	1.0	0.2	0.2
	0.15 - 30.0	10.0	9.0	9.0
	30.0 - 1000	100.0	120.0	120.0
	Above 1000	1000.0	N/A	1000.0
Measurements were made using the bandwidths and detectors specified. No video filter was used.				

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, a final radiated emissions test was performed. The frequency range investigated (scanned), is also noted in this report. Radiated emissions measurements were made at the EUT azimuth and antenna height such that the maximum radiated emissions level will be detected. This requires the use of a turntable and an antenna positioner. The preferred method of a continuous azimuth search is utilized for frequency scans of the EUT field strength with both polarities of the measuring antenna. A calibrated, linearly polarized antenna was positioned at the specified distance from the periphery of the EUT.

Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Though specified in the report, the measurement distance shall be 3 meters or 10 meters. At any measurement distance, the antenna height was varied from 1 meter to 4 meters. These height scans apply for both horizontal and vertical polarization, except that for vertical polarization the minimum height of the center of the antenna shall be increased so that the lowest point of the bottom of the antenna clears the ground surface by at least 25 cm.

NORTHWEST

EMC

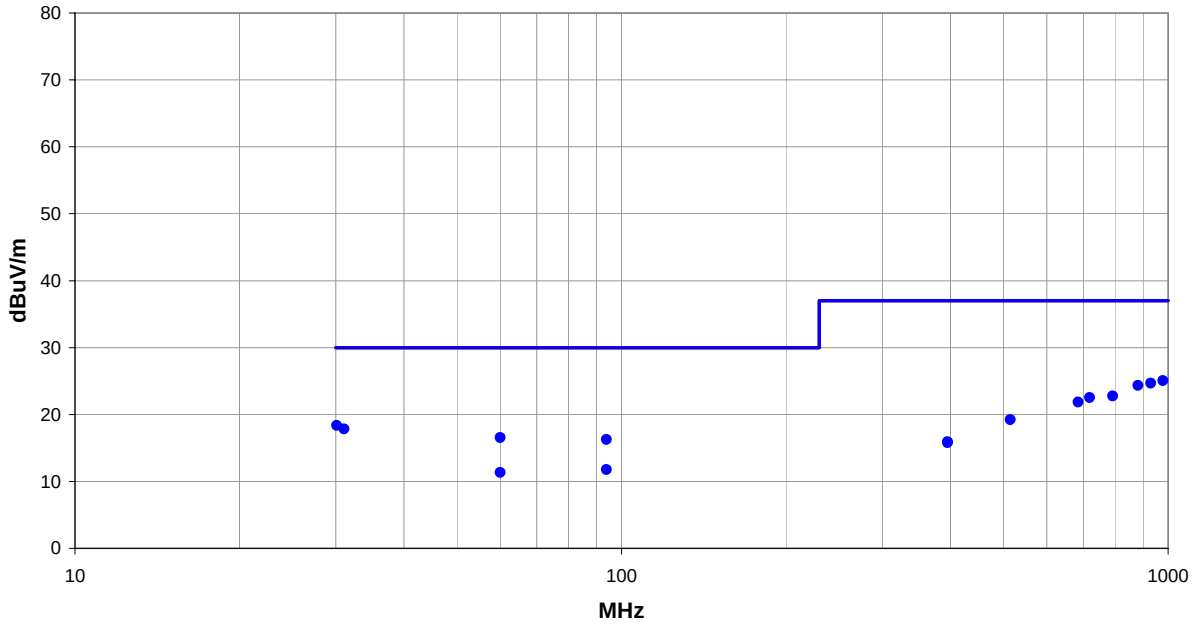
RADIATED EMISSIONS

Version 2007.8.27
PSA-ESCI 2007.05.07

Work Order:	LABT0276	**Date:**	09/17/07		
Project:	None	**Temperature:**	22		
Job Site:	EV11	**Humidity:**	41		
Serial Number:	Unknown	**Barometric Pres.:**	1016.4	**Tested by:**	Holly Ashkannejhad
EUT:	Cordless Vantage Headset				
Configuration:	2 - Radiated Emissions				
Customer:	Logitech, Inc.				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Typical hopping mode				
Deviations:					
Comments:					

Test Specifications	**Class B**	**Test Method**
EN 55022:1998 (Amended by A1:2000 and A2:2003)		CISPR 22:2005 (Amended by A1:2005 and A2:2006)

Run #	2	**Test Distance (m)**	10	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq	Amplitude	Factor	Antenna Height	Azimuth (degrees)	Test Distance	External Attenuation	Polarity/ Transducer Type	Detector	Distance Adjustment	Adjusted	Spec. Limit	Compared to Spec. (dB)
30.118	24.8	-6.4	1.0	241.0	10.0	0.0	Vert	QP	0.0	18.4	30.0	-11.6
978.360	23.9	1.2	1.0	328.0	10.0	0.0	Horz	QP	0.0	25.1	37.0	-11.9
31.066	24.7	-6.9	3.5	163.0	10.0	0.0	Horz	QP	0.0	17.8	30.0	-12.2
929.932	24.3	0.4	2.6	123.0	10.0	0.0	Horz	QP	0.0	24.7	37.0	-12.3
881.384	24.6	-0.3	2.5	327.0	10.0	0.0	Horz	QP	0.0	24.3	37.0	-12.7
59.960	33.6	-17.1	1.0	214.0	10.0	0.0	Vert	QP	0.0	16.5	30.0	-13.5
93.830	34.2	-17.9	1.0	359.0	10.0	0.0	Vert	QP	0.0	16.3	30.0	-13.7
791.868	24.8	-2.0	1.5	146.0	10.0	0.0	Vert	QP	0.0	22.8	37.0	-14.2
719.165	24.7	-2.2	3.0	38.0	10.0	0.0	Horz	QP	0.0	22.5	37.0	-14.5
684.353	24.5	-2.7	1.9	216.0	10.0	0.0	Vert	QP	0.0	21.8	37.0	-15.2
514.556	24.4	-5.2	2.0	324.0	10.0	0.0	Vert	QP	0.0	19.2	37.0	-17.8
93.830	29.7	-17.9	1.9	177.0	10.0	0.0	Horz	QP	0.0	11.8	30.0	-18.2
59.960	28.4	-17.1	3.5	326.0	10.0	0.0	Horz	QP	0.0	11.3	30.0	-18.7
395.200	24.0	-8.1	1.0	358.0	10.0	0.0	Horz	QP	0.0	15.9	37.0	-21.1
395.200	23.9	-8.1	1.0	84.0	10.0	0.0	Vert	QP	0.0	15.8	37.0	-21.2

Spurious Radiated Emissions

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION
Bluetooth, GFSK, DH5
Bluetooth, pi/4 - DQPSK, 2DH5
Bluetooth, 8DPSK, 3DH5

CHANNELS INVESTIGATED
Low channel, 2402MHz
Mid channel, 2441MHz
High channel, 2480MHz

POWER SETTINGS INVESTIGATED
Battery

FREQUENCY RANGE INVESTIGATED			
Start Frequency	30 MHz	Stop Frequency	26 GHz

SAMPLE CALCULATIONS
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
EV01 Cable D			EVD	7/25/2007	13
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	7/25/2007	13
Antenna, Horn	EMCO	3160-09	AHG	NCR	0
EV01 cables g,h,I			EVF	5/10/2007	13
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	6/22/2007	13
Antenna, Horn	EMCO	3160-08	AHK	NCR	0
Low Pass Filter 0-1000 MHz	Micro-Tronics	LPM50004	LFD	12/29/2006	13
High Pass Filter	Micro-Tronics	HPM50111	HFO	12/29/2006	13
EV01 cables g,h,j			EVB	5/10/2007	13
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	5/10/2007	13
Antenna, Horn	EMCO	3115	AHC	8/24/2006	24
EV01 cables c,g, h			EVA	12/29/2006	13
Pre-Amplifier	Miteq	AM-1616-1000	AOL	12/29/2006	13
Antenna, Biconilog	EMCO	3141	AXE	12/28/2005	24

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Measurements were made using the bandwidths and detectors specified. No video filter was used.

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:2003). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

NORTHWEST EMC

Spurious Radiated Emissions

PSA 2007.05.07
EMI 2006.11.29

EUT:	Cordless Vantage Headset			Work Order:	LABT0276
Serial Number:	Unknown			Date:	09/18/07
Customer:	Logitech, Inc.			Temperature:	21
Attendees:	None			Humidity:	34%
Project:	None			Barometric Pres.:	1020.8
Tested by:	Holly Ashkannejhad	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

EUT OPERATING MODES

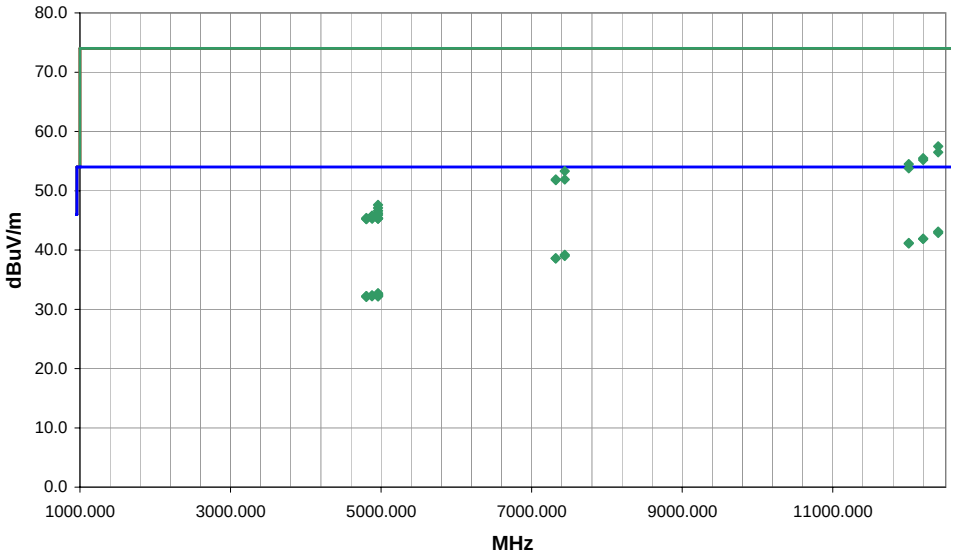
Bluetooth Transmit mode. See comments for channel and modulation.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	1
Configuration #	2
Results	Pass

Signature Holly Ashkannejhad



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
12399.740	25.1	18.0	66.0	1.0	3.0	0.0	V-Horn	AV	0.0	43.1	54.0	-10.9	3DH5, Z-axis, high channel
12399.290	24.9	18.0	41.0	1.0	3.0	0.0	H-Horn	AV	0.0	42.9	54.0	-11.1	3DH5, Y-axis, high channel
12199.750	25.0	16.9	136.0	1.0	3.0	0.0	V-Horn	AV	0.0	41.9	54.0	-12.1	3DH5, Z-axis, mid channel
12200.840	25.0	16.9	166.0	1.0	3.0	0.0	H-Horn	AV	0.0	41.9	54.0	-12.1	3DH5, Y-axis, mid channel
12010.060	25.3	15.9	145.0	1.0	3.0	0.0	V-Horn	AV	0.0	41.2	54.0	-12.8	3DH5, Z-axis, low channel
12009.550	25.2	15.9	169.0	1.3	3.0	0.0	H-Horn	AV	0.0	41.1	54.0	-12.9	3DH5, Y-axis, low channel
7440.022	24.7	14.5	52.0	1.0	3.0	0.0	V-Horn	AV	0.0	39.2	54.0	-14.8	3DH5, Z-axis, high channel
7439.842	24.5	14.5	138.0	1.0	3.0	0.0	H-Horn	AV	0.0	39.0	54.0	-15.0	3DH5, Y-axis, high channel
7319.412	24.7	13.9	232.0	1.0	3.0	0.0	H-Horn	AV	0.0	38.6	54.0	-15.4	3DH5, Y-axis, mid channel
7320.025	24.7	13.9	293.0	1.0	3.0	0.0	V-Horn	AV	0.0	38.6	54.0	-15.4	3DH5, Z-axis, mid channel
12399.890	39.5	18.0	66.0	1.0	3.0	0.0	V-Horn	PK	0.0	57.5	74.0	-16.5	3DH5, Z-axis, high channel
12399.840	38.5	18.0	41.0	1.0	3.0	0.0	H-Horn	PK	0.0	56.5	74.0	-17.5	3DH5, Y-axis, high channel
12199.830	38.6	16.9	136.0	1.0	3.0	0.0	V-Horn	PK	0.0	55.5	74.0	-18.5	3DH5, Z-axis, mid channel
12200.250	38.3	16.9	166.0	1.0	3.0	0.0	H-Horn	PK	0.0	55.2	74.0	-18.8	3DH5, Y-axis, mid channel
12010.020	38.6	15.9	145.0	1.0	3.0	0.0	V-Horn	PK	0.0	54.5	74.0	-19.5	3DH5, Z-axis, low channel
12009.550	37.9	15.9	169.0	1.3	3.0	0.0	H-Horn	PK	0.0	53.8	74.0	-20.2	3DH5, Y-axis, low channel
7440.308	38.8	14.5	52.0	1.0	3.0	0.0	V-Horn	PK	0.0	53.3	74.0	-20.7	3DH5, Z-axis, high channel
4960.147	24.7	8.0	61.0	1.0	3.0	0.0	V-Horn	AV	0.0	32.7	54.0	-21.3	3DH5, X-axis, high channel
4959.975	24.6	8.0	285.0	2.1	3.0	0.0	H-Horn	AV	0.0	32.6	54.0	-21.4	3DH5, Y-axis, high channel
4959.913	24.5	8.0	121.0	1.0	3.0	0.0	H-Horn	AV	0.0	32.5	54.0	-21.5	2DH5, Y-axis, high channel

NORTHWEST EMC

Spurious Radiated Emissions

PSA 2007.05.07
EMI 2006.11.29

EUT:	Cordless Vantage Headset			Work Order:	LABT0276
Serial Number:	Unknown			Date:	09/18/07
Customer:	Logitech, Inc.			Temperature:	21
Attendees:	None			Humidity:	34%
Project:	None			Barometric Pres.:	1020.8
Tested by:	Holly Ashkannejhad	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

EUT OPERATING MODES

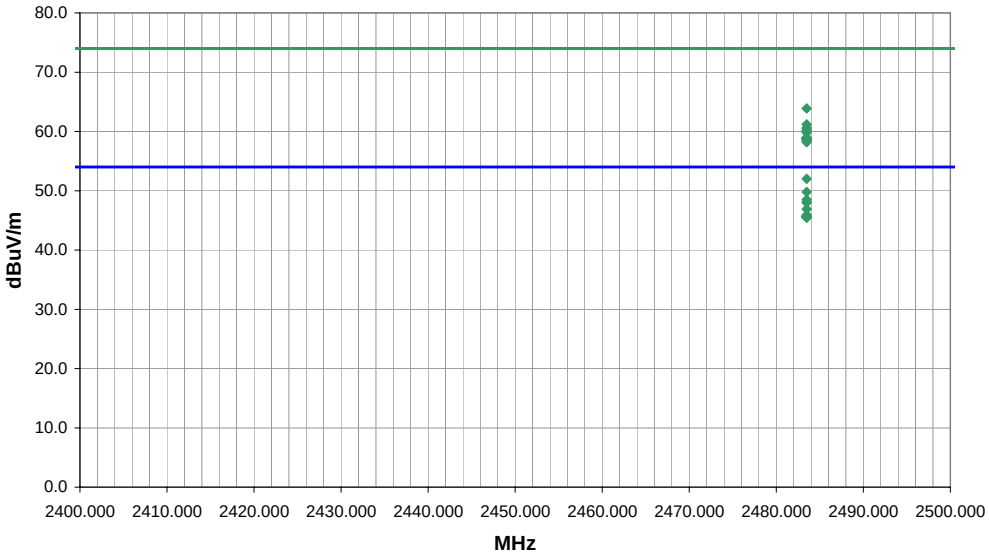
Bluetooth Transmit mode, high channel. See comments for modulation.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	2
Configuration #	2
Results	Pass

Signature Holly Ashkannejhad



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
2483.500	31.6	0.4	250.0	1.0	3.0	20.0	H-Horn	AV	0.0	52.0	54.0	-2.0	2DH5, Z-axis, high channel
2483.500	29.4	0.4	97.0	1.0	3.0	20.0	V-Horn	AV	0.0	49.8	54.0	-4.2	2DH5, Z-axis, high channel
2483.500	28.1	0.4	217.0	1.0	3.0	20.0	V-Horn	AV	0.0	48.5	54.0	-5.5	3DH5, Z-axis, high channel
2483.500	27.7	0.4	204.0	1.0	3.0	20.0	V-Horn	AV	0.0	48.1	54.0	-5.9	3DH5, Y-axis, high channel
2483.500	27.6	0.4	346.0	3.6	3.0	20.0	H-Horn	AV	0.0	48.0	54.0	-6.0	3DH5, X-axis, high channel
2483.500	26.5	0.4	197.0	1.0	3.0	20.0	V-Horn	AV	0.0	46.9	54.0	-7.1	2DH5, Y-axis, high channel
2483.500	25.5	0.4	66.0	1.0	3.0	20.0	H-Horn	AV	0.0	45.9	54.0	-8.1	2DH5, Y-axis, high channel
2483.500	25.4	0.4	103.0	1.0	3.0	20.0	V-Horn	AV	0.0	45.8	54.0	-8.2	2DH5, Z-axis, high channel
2483.500	25.3	0.4	355.0	1.0	3.0	20.0	H-Horn	AV	0.0	45.7	54.0	-8.3	3DH5, Z-axis, high channel
2483.500	25.2	0.4	99.0	1.8	3.0	20.0	H-Horn	AV	0.0	45.6	54.0	-8.4	DH5, Y-axis, high channel
2483.500	25.2	0.4	295.0	3.6	3.0	20.0	H-Horn	AV	0.0	45.6	54.0	-8.4	2DH5, Z-axis, high channel
2483.500	25.2	0.4	84.0	1.8	3.0	20.0	H-Horn	AV	0.0	45.6	54.0	-8.4	DH5, X-axis, high channel
2483.500	25.2	0.4	197.0	3.6	3.0	20.0	H-Horn	AV	0.0	45.6	54.0	-8.4	3DH5, Y-axis, high channel
2483.500	25.2	0.4	191.0	3.6	3.0	20.0	V-Horn	AV	0.0	45.6	54.0	-8.4	DH5, Y-axis, high channel
2483.500	25.1	0.4	359.0	3.6	3.0	20.0	V-Horn	AV	0.0	45.5	54.0	-8.5	DH5, X-axis, high channel
2483.500	25.1	0.4	33.0	1.0	3.0	20.0	H-Horn	AV	0.0	45.5	54.0	-8.5	DH5, Z-axis, high channel
2483.500	25.1	0.4	292.0	1.0	3.0	20.0	V-Horn	AV	0.0	45.5	54.0	-8.5	3DH5, X-axis, high channel
2483.500	25.1	0.4	65.0	3.6	3.0	20.0	V-Horn	AV	0.0	45.5	54.0	-8.5	DH5, Z-axis, high channel
2483.500	43.5	0.4	250.0	1.0	3.0	20.0	H-Horn	PK	0.0	63.9	74.0	-10.1	2DH5, Z-axis, high channel
2483.500	40.8	0.4	97.0	1.0	3.0	20.0	V-Horn	PK	0.0	61.2	74.0	-12.8	2DH5, Z-axis, high channel

Occupied Bandwidth

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	6/8/2007	13
Spectrum Analyzer	Agilent	E440A	AAX	10/1/2007	12

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

The occupied bandwidth was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting in a no hop mode at its maximum data rate for each of the three different modulations available.

NORTHWEST EMC

Occupied Bandwidth

XMit 2007.06.13

EUT:	Cordless Vantage Headset			**Work Order:**	LABT0276
Serial Number:	Unknown			**Date:**	09/14/07
Customer:	Logitech, Inc.			**Temperature:**	24°C
Attendees:	None			**Humidity:**	42%
Project:	None			**Barometric Pres.:**	1017.8
Tested by:	Holly Ashkannejhad	**Power:**	Battery	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000

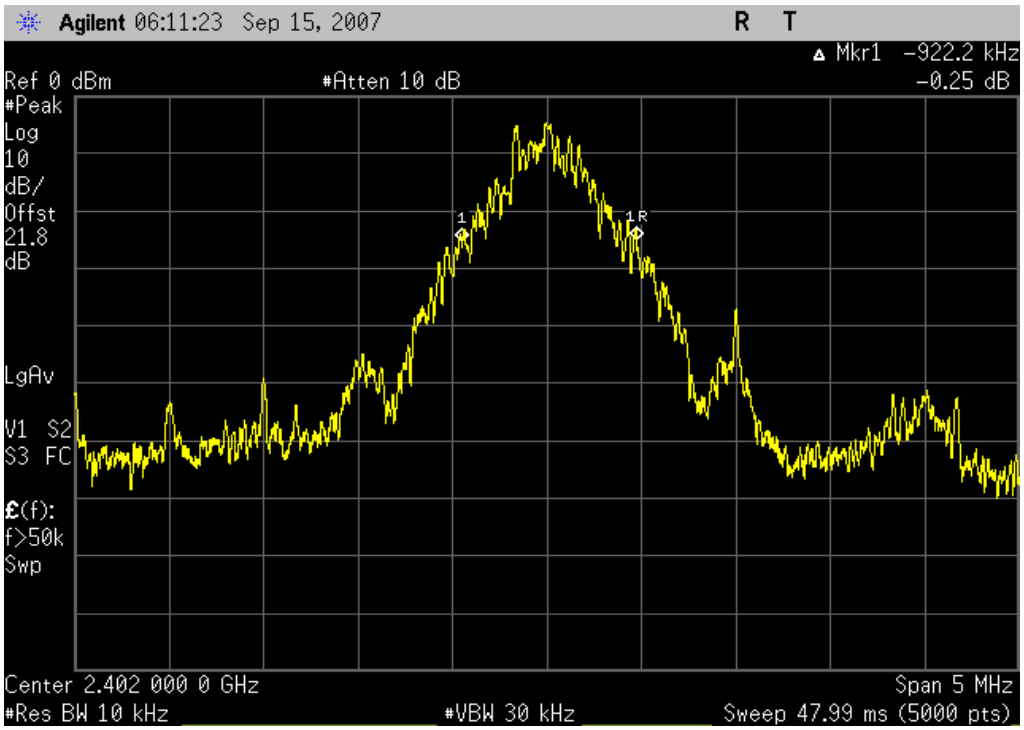
COMMENTS

DEVIATIONS FROM TEST STANDARD

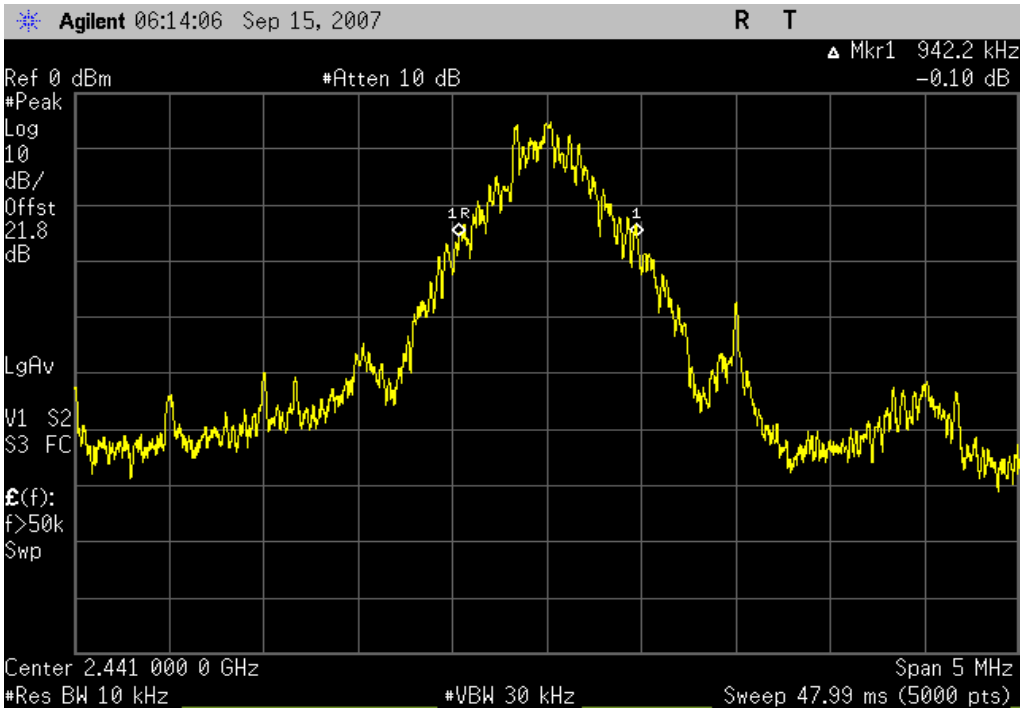
Configuration #	1	Signature Holly Ashkannejhad

		Value	Limit	Results
20 dB Bandwidth				
	Bluetooth, GFSK, DH5			
	Low channel, 2402MHz	922.2 kHz	1.5 MHz	Pass
	Mid channel, 2441MHz	942.2 kHz	1.5 MHz	Pass
	High channel, 2480MHz	822.2 kHz	1.5 MHz	Pass
	Bluetooth, pi/4 - DQPSK, 2DH5			
	Low channel, 2402MHz	1.31 MHz	1.5 MHz	Pass
	Mid channel, 2441MHz	1.32 kHz	1.5 MHz	Pass
	High channel, 2480MHz	1.32 MHz	1.5 MHz	Pass
	Bluetooth, 8DPSK, 3DH5			
	Low channel, 2402MHz	1.30 MHz	1.5 MHz	Pass
	Mid channel, 2441MHz	1.30 MHz	1.5 MHz	Pass
	High channel, 2480MHz	1.29 MHz	1.5 MHz	Pass

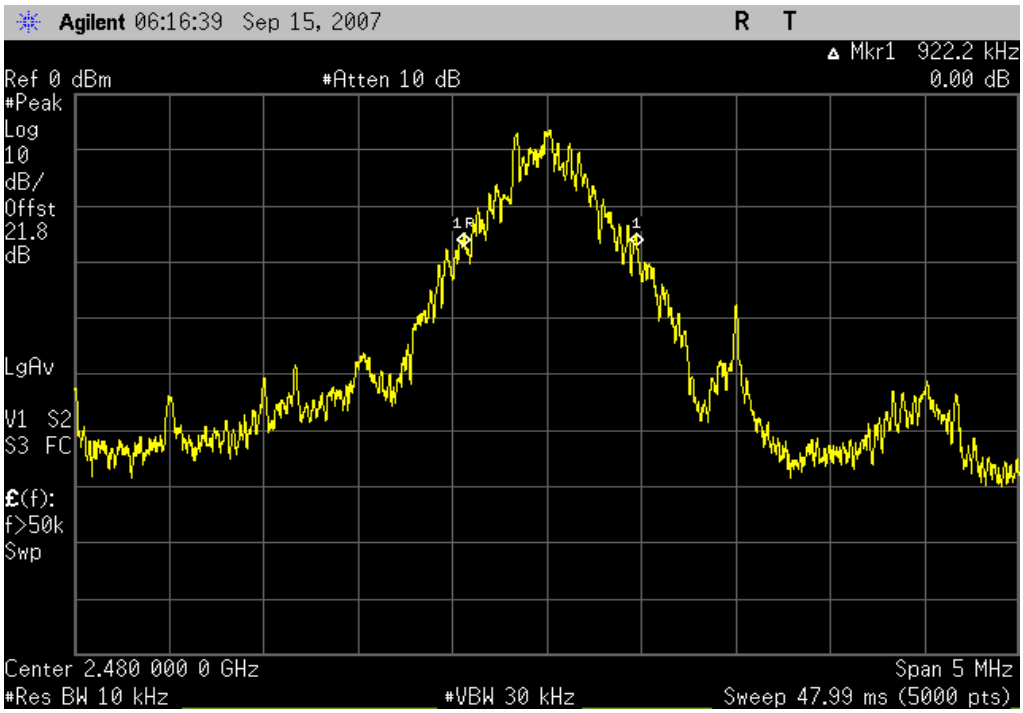
20 dB Bandwidth, Bluetooth, GFSK, DH5, Low channel, 2402MHz					
Result:	Pass	**Value:**	922.2 kHz	**Limit:**	1.5 MHz



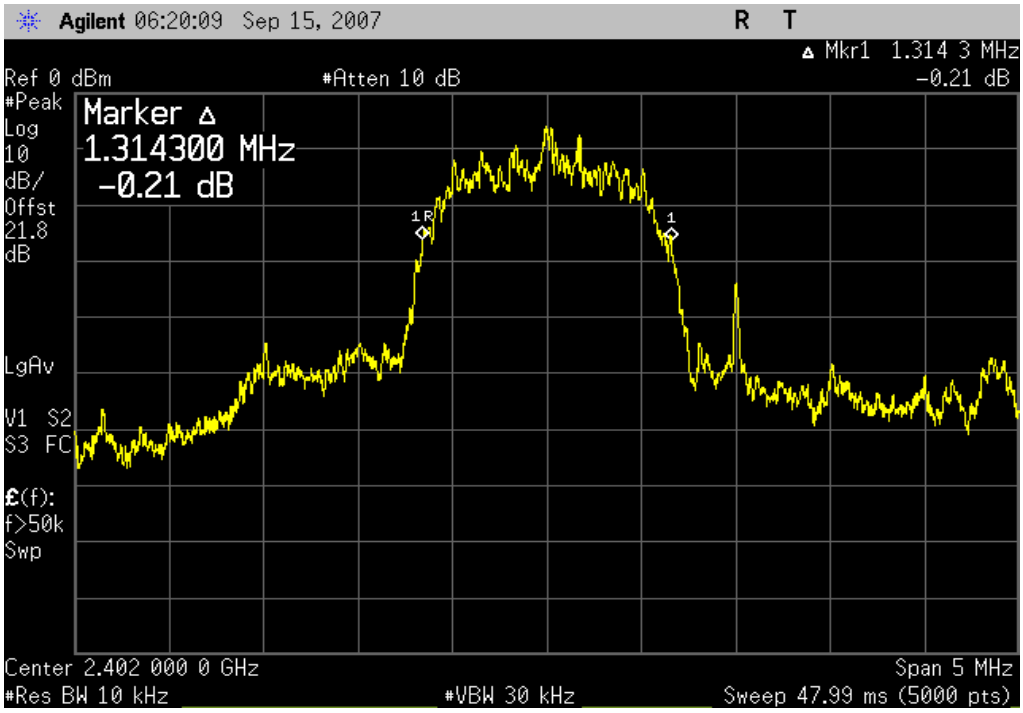
20 dB Bandwidth, Bluetooth, GFSK, DH5, Mid channel, 2441MHz					
Result:	Pass	**Value:**	942.2 kHz	**Limit:**	1.5 MHz



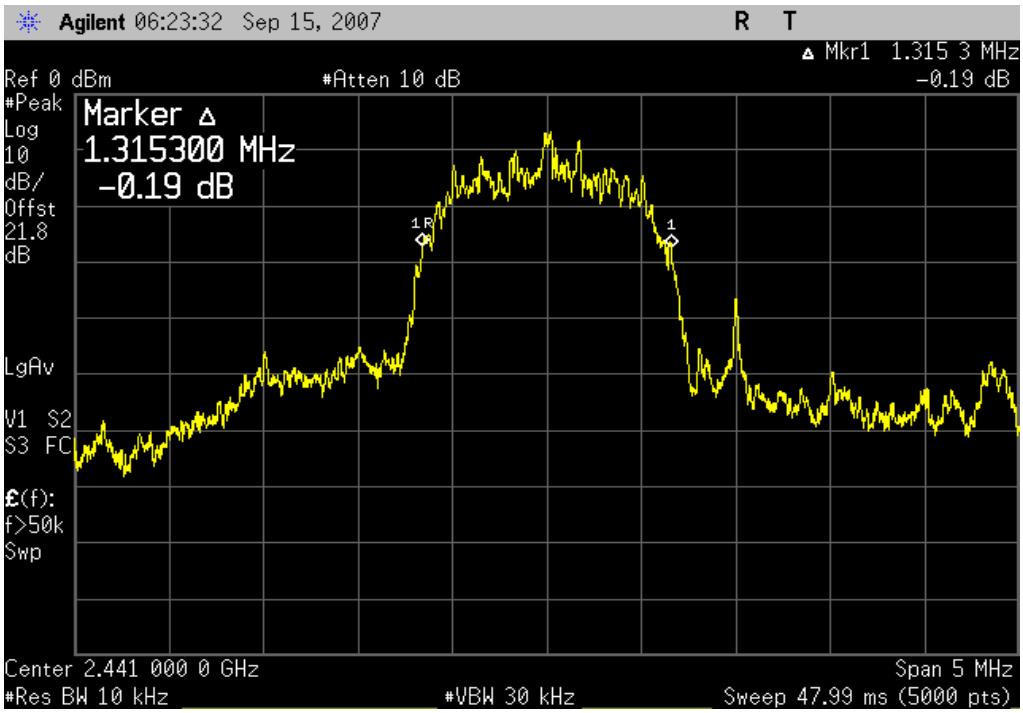
20 dB Bandwidth, Bluetooth, GFSK, DH5, High channel, 2480MHz					
Result:	Pass	**Value:**	822.2 kHz	**Limit:**	1.5 MHz



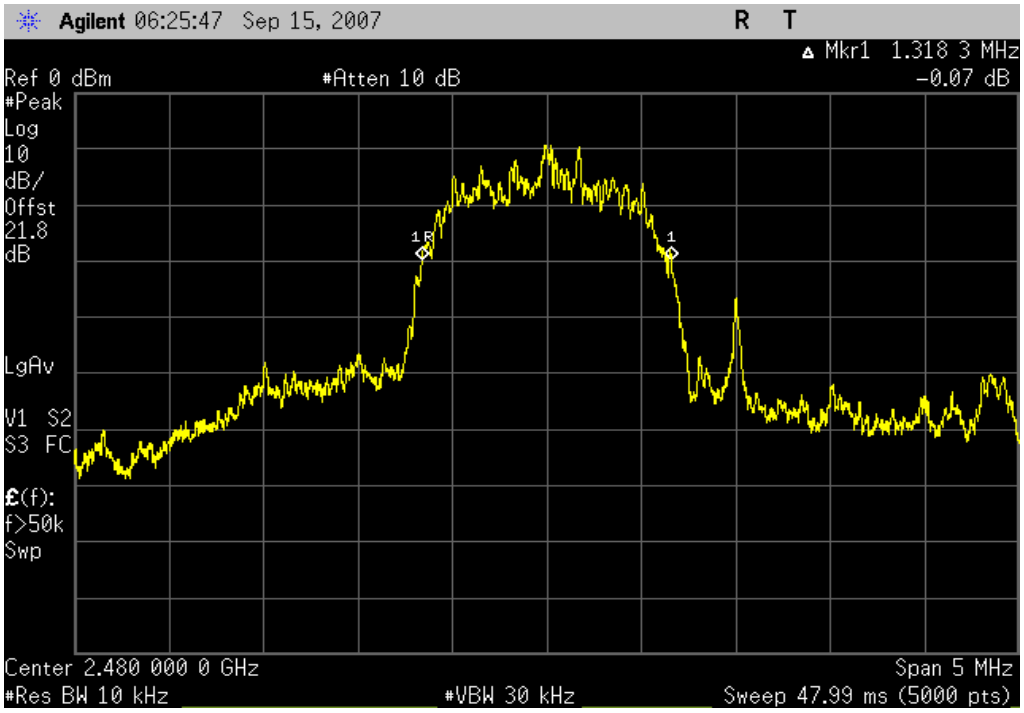
20 dB Bandwidth, Bluetooth, pi/4 - DQPSK, 2DH5, Low channel, 2402MHz					
Result:	Pass	**Value:**	1.31 MHz	**Limit:**	1.5 MHz



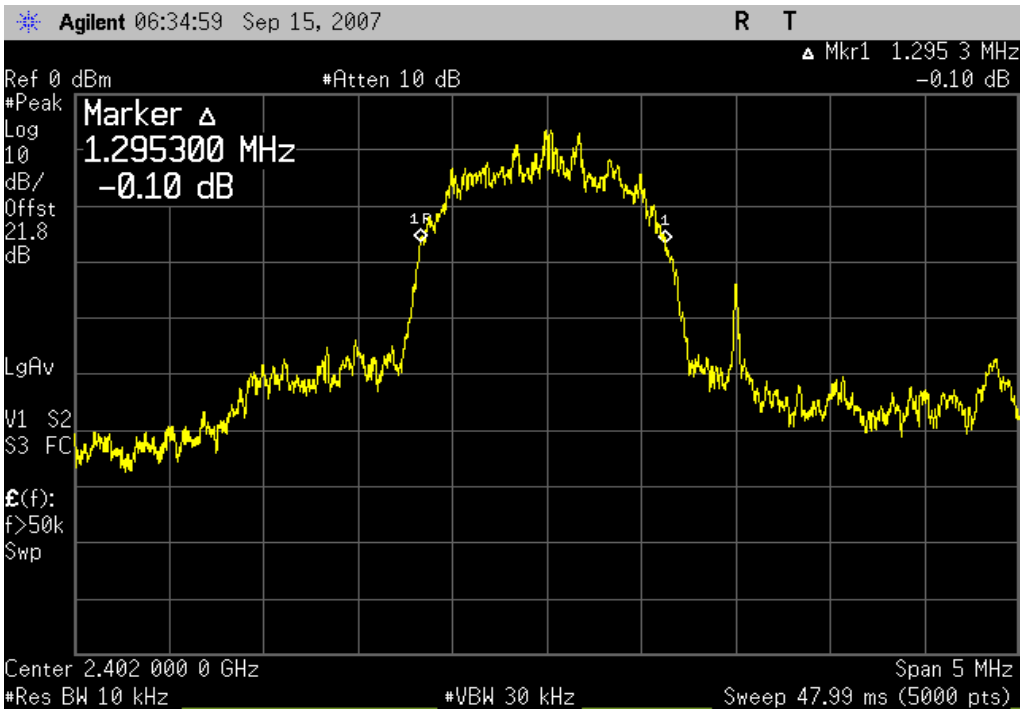
20 dB Bandwidth, Bluetooth, pi/4 - DQPSK, 2DH5, Mid channel, 2441MHz					
Result:	Pass	**Value:**	1.32 kHz	**Limit:**	1.5 MHz



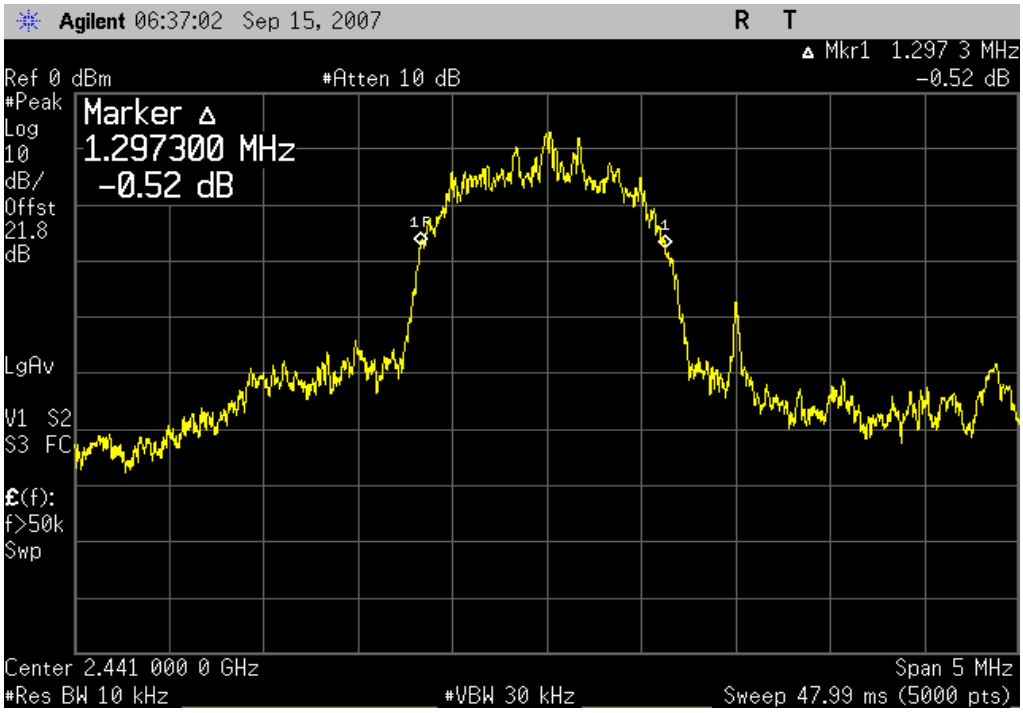
20 dB Bandwidth, Bluetooth, pi/4 - DQPSK, 2DH5, High channel, 2480MHz					
Result:	Pass	**Value:**	1.32 MHz	**Limit:**	1.5 MHz



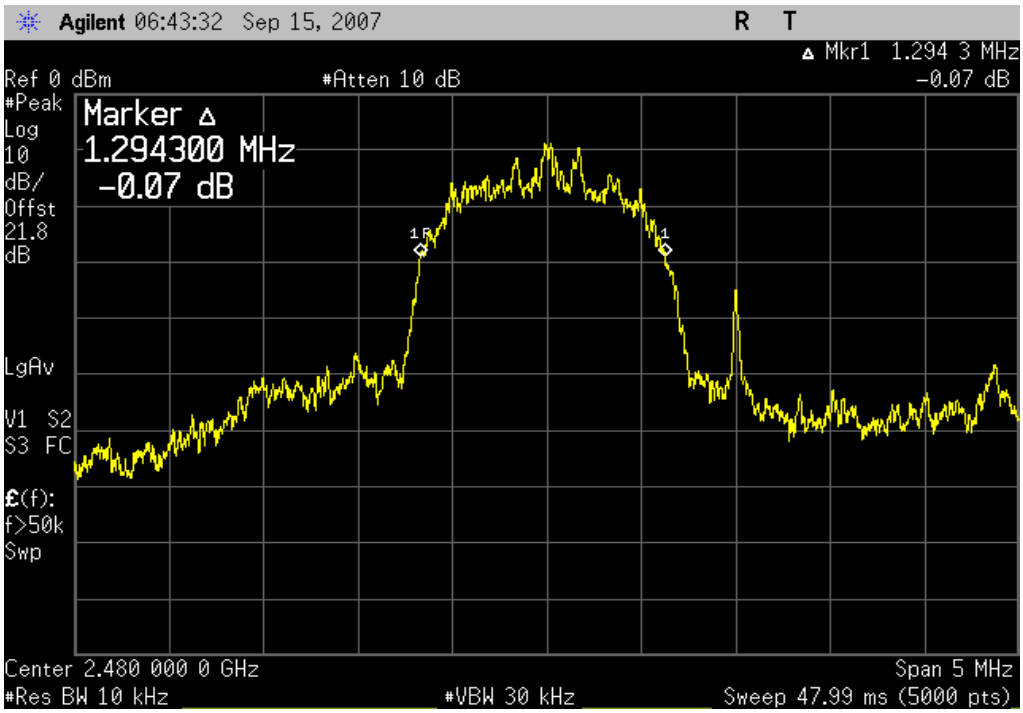
20 dB Bandwidth, Bluetooth, 8DPSK, 3DH5, Low channel, 2402MHz					
Result:	Pass	**Value:**	1.30 MHz	**Limit:**	1.5 MHz



20 dB Bandwidth, Bluetooth, 8DPSK, 3DH5, Mid channel, 2441MHz					
Result:	Pass	**Value:**	1.30 MHz	**Limit:**	1.5 MHz



20 dB Bandwidth, Bluetooth, 8DPSK, 3DH5, High channel, 2480MHz					
Result:	Pass	**Value:**	1.29 MHz	**Limit:**	1.5 MHz



Output Power

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	6/8/2007	13
Spectrum Analyzer	Agilent	E440A	AAX	10/1/2007	12

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

The peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +36dBm.

NORTHWEST EMC

Output Power

XMit 2007.06.13

EUT:	Cordless Vantage Headset			**Work Order:**	LABT0276
Serial Number:	Unknown			**Date:**	09/14/07
Customer:	Logitech, Inc.			**Temperature:**	24°C
Attendees:	None			**Humidity:**	42%
Project:	None			**Barometric Pres.:**	1017.8
Tested by:	Holly Ashkannejhad	**Power:**	Battery	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074

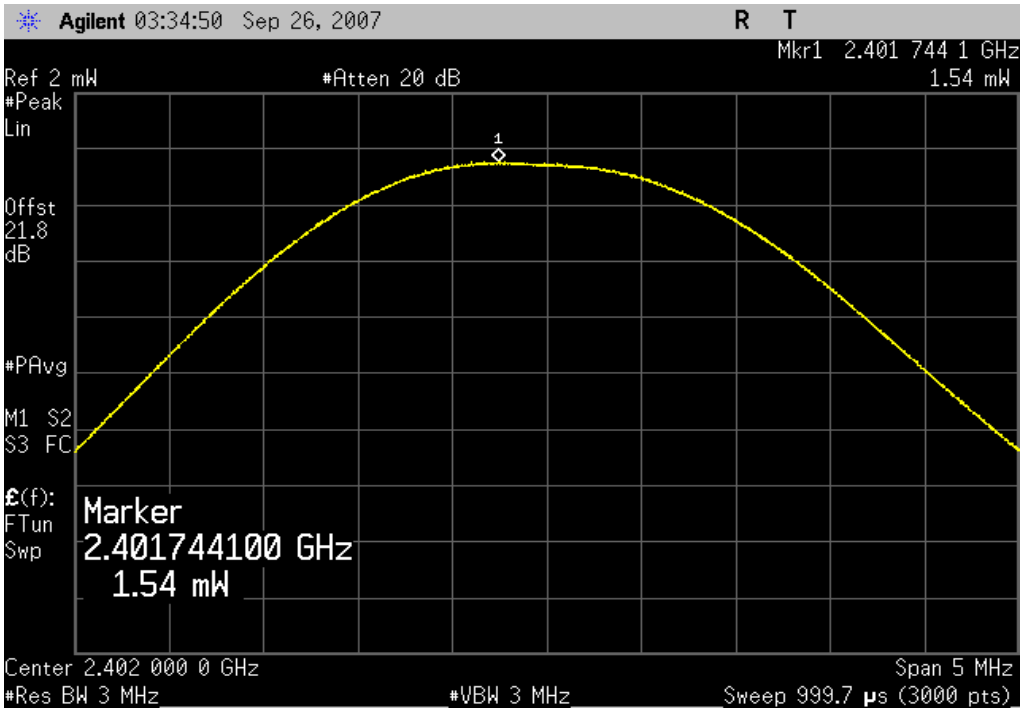
COMMENTS

DEVIATIONS FROM TEST STANDARD

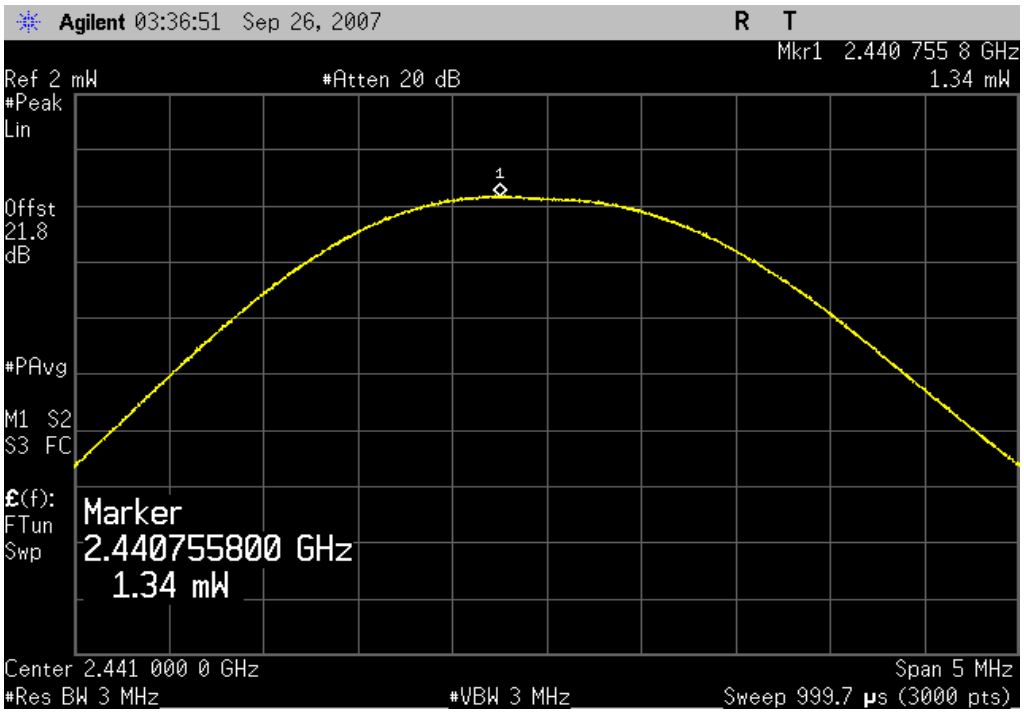
Configuration #	1	Signature Holly Ashkannejhad

	Value	Limit	Results
Bluetooth, GFSK, DH5			
Low channel, 2402MHz	1.54 mW	1 Watt	Pass
Mid channel, 2441MHz	1.34 mW	1 Watt	Pass
High channel, 2480MHz	0.9799 mW	1 Watt	Pass
Bluetooth, pi/4 - DQPSK, 2DH5			
Low channel, 2402MHz	1.56 mW	1 Watt	Pass
Mid channel, 2441MHz	1.28 mW	1 Watt	Pass
High channel, 2480MHz	0.8490 mW	1 Watt	Pass
Bluetooth, 8DPSK, 3DH5			
Low channel, 2402MHz	1.64 mW	1 Watt	Pass
Mid channel, 2441MHz	1.36 mW	1 Watt	Pass
High channel, 2480MHz	0.9043 mW	1 Watt	Pass

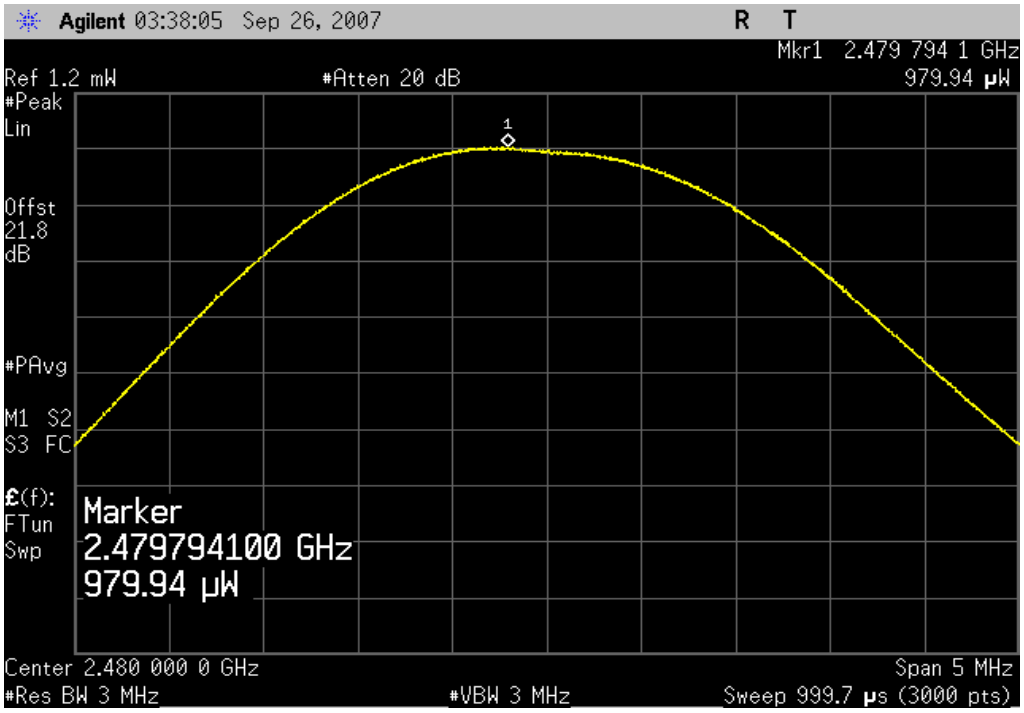
Bluetooth, GFSK, DH5, Low channel, 2402MHz					
Result:	Pass	**Value:**	1.54 mW	**Limit:**	1 Watt



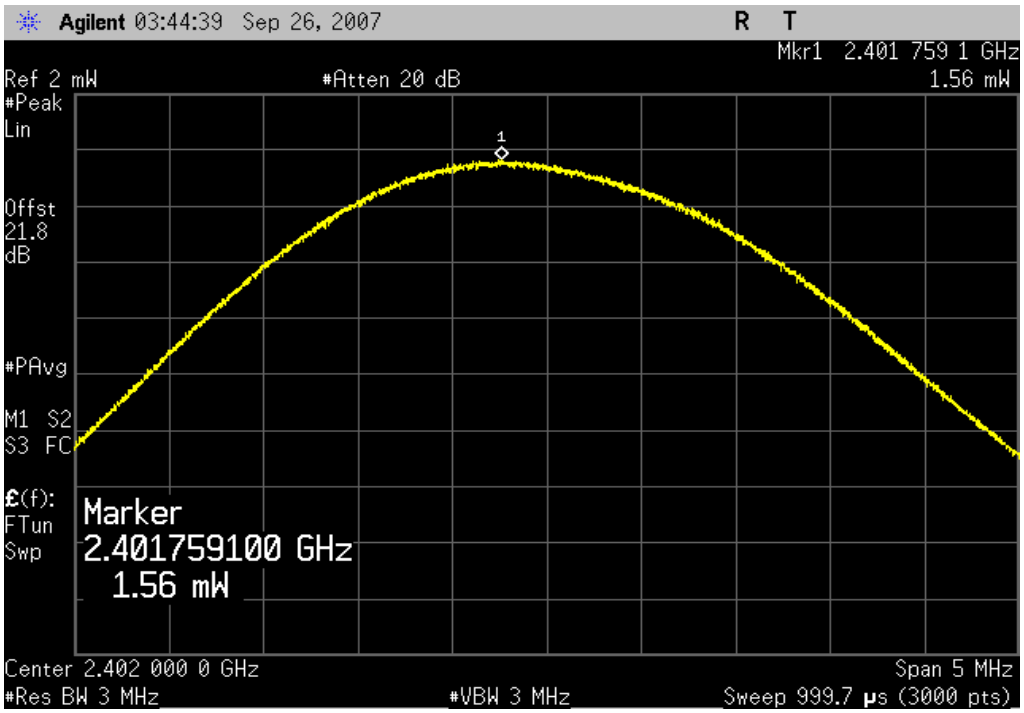
Bluetooth, GFSK, DH5, Mid channel, 2441MHz					
Result:	Pass	**Value:**	1.34 mW	**Limit:**	1 Watt



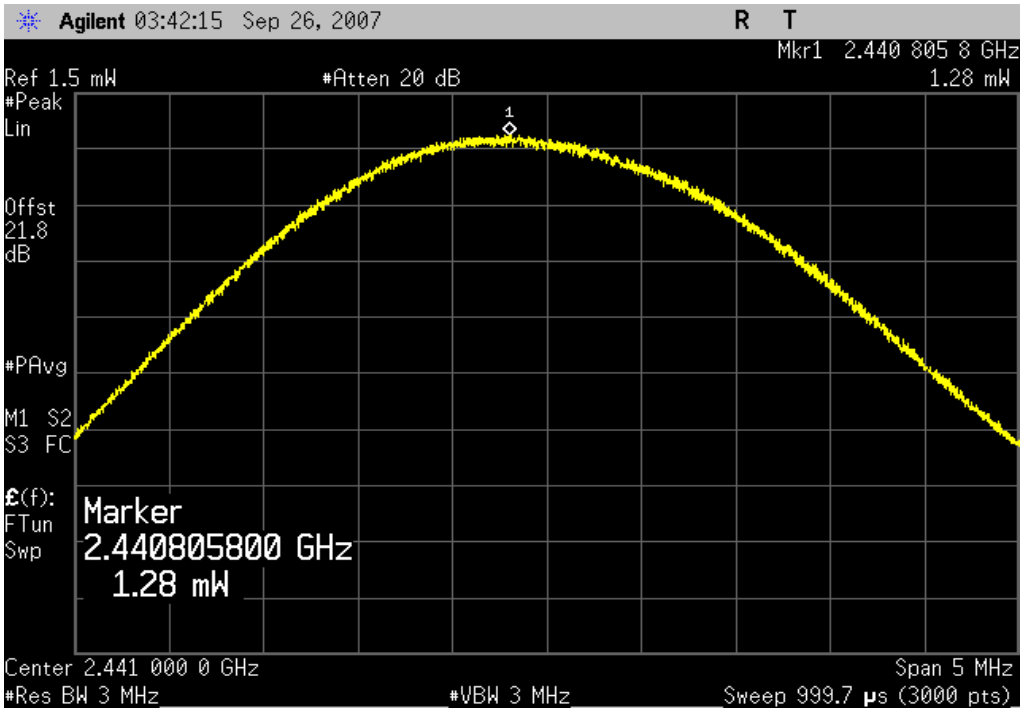
Bluetooth, GFSK, DH5, High channel, 2480MHz					
Result:	Pass	**Value:**	0.9799 mW	**Limit:**	1 Watt



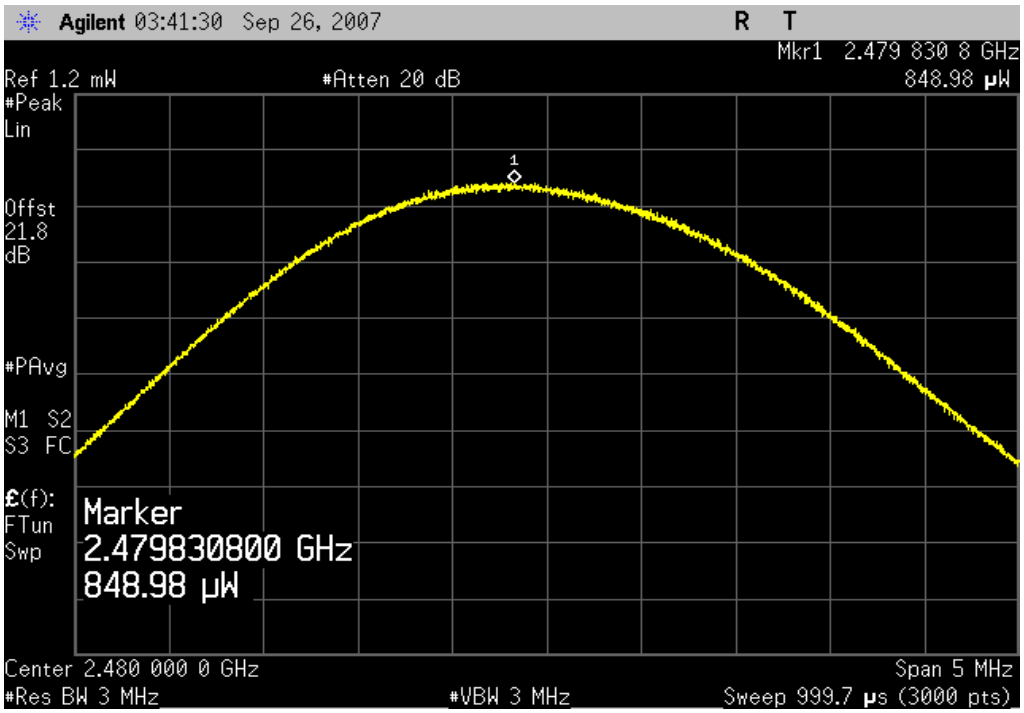
Bluetooth, pi/4 - DQPSK, 2DH5, Low channel, 2402MHz					
Result:	Pass	**Value:**	1.56 mW	**Limit:**	1 Watt



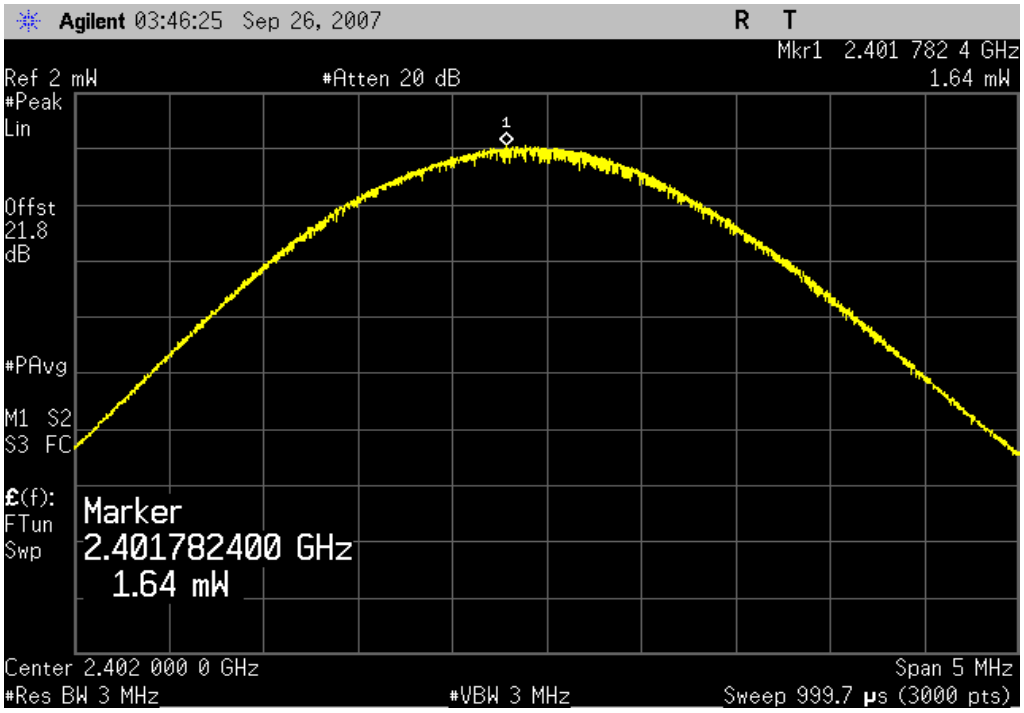
Bluetooth, pi/4 - DQPSK, 2DH5, Mid channel, 2441MHz					
Result:	Pass	**Value:**	1.28 mW	**Limit:**	1 Watt



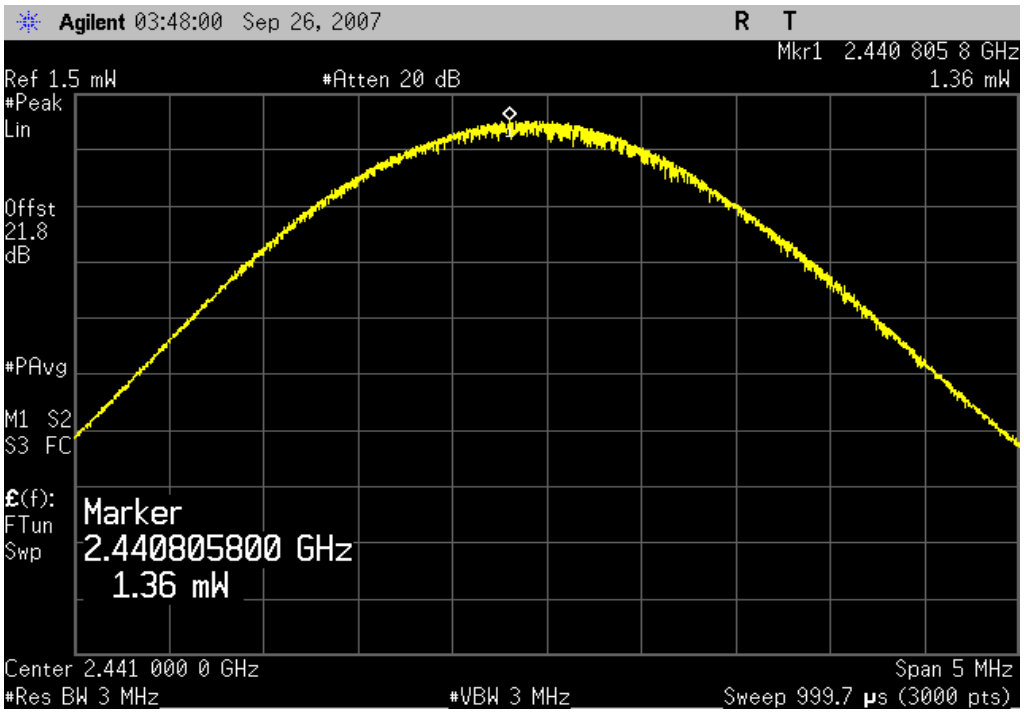
Bluetooth, pi/4 - DQPSK, 2DH5, High channel, 2480MHz					
Result:	Pass	**Value:**	0.8490 mW	**Limit:**	1 Watt



Bluetooth, 8DPSK, 3DH5, Low channel, 2402MHz					
Result:	Pass	**Value:**	1.64 mW	**Limit:**	1 Watt

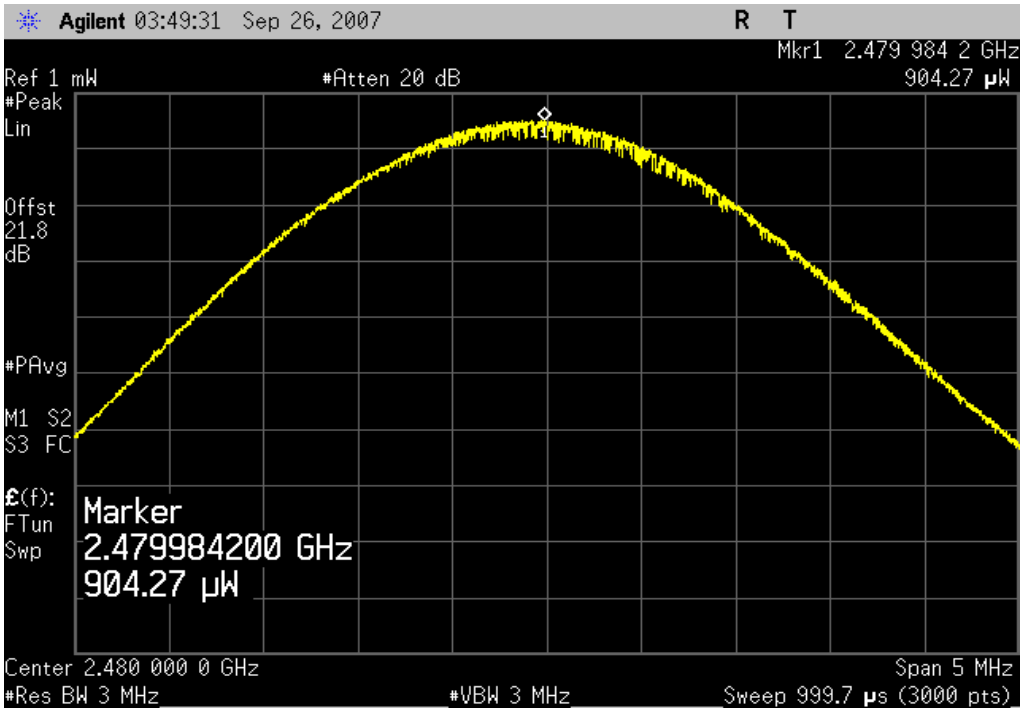


Bluetooth, 8DPSK, 3DH5, Mid channel, 2441MHz					
Result:	Pass	**Value:**	1.36 mW	**Limit:**	1 Watt



Output Power

Bluetooth, 8DPSK, 3DH5, High channel, 2480MHz					
Result:	Pass	**Value:**	0.9043 mW	**Limit:**	1 Watt



Band Edge Compliance

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	6/8/2007	13
Spectrum Analyzer	Agilent	E4440A	AAX	10/1/2007	12

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

The requirements of FCC 15.247(d) for emissions at least 20dB below the carrier in any 100kHz bandwidth outside the allowable band was measured with the EUT set to low and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The channels closest to the band edges were selected. The spectrum was scanned across each band edge from 10 MHz below the band edge to 10 MHz above the band edge.

The EUT was transmitting at its maximum data rate using all three types of modulations available in Bluetooth EDR.

NORTHWEST EMC

Band Edge Compliance

XMit 2007.06.13

EUT:	Cordless Vantage Headset			Work Order:	LABT0276
Serial Number:	Unknown			Date:	09/20/07
Customer:	Logitech, Inc.			Temperature:	23°C
Attendees:	None			Humidity:	32%
Project:	None			Barometric Pres.:	1018
Tested by:	Holly Ashkannejhad	Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074

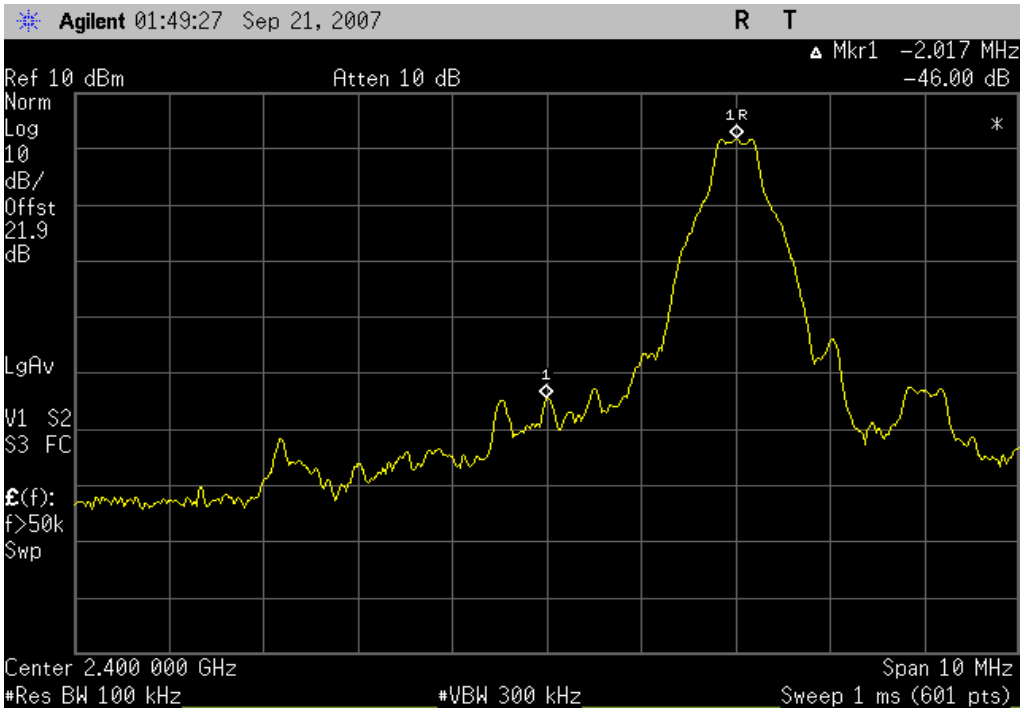
COMMENTS

DEVIATIONS FROM TEST STANDARD

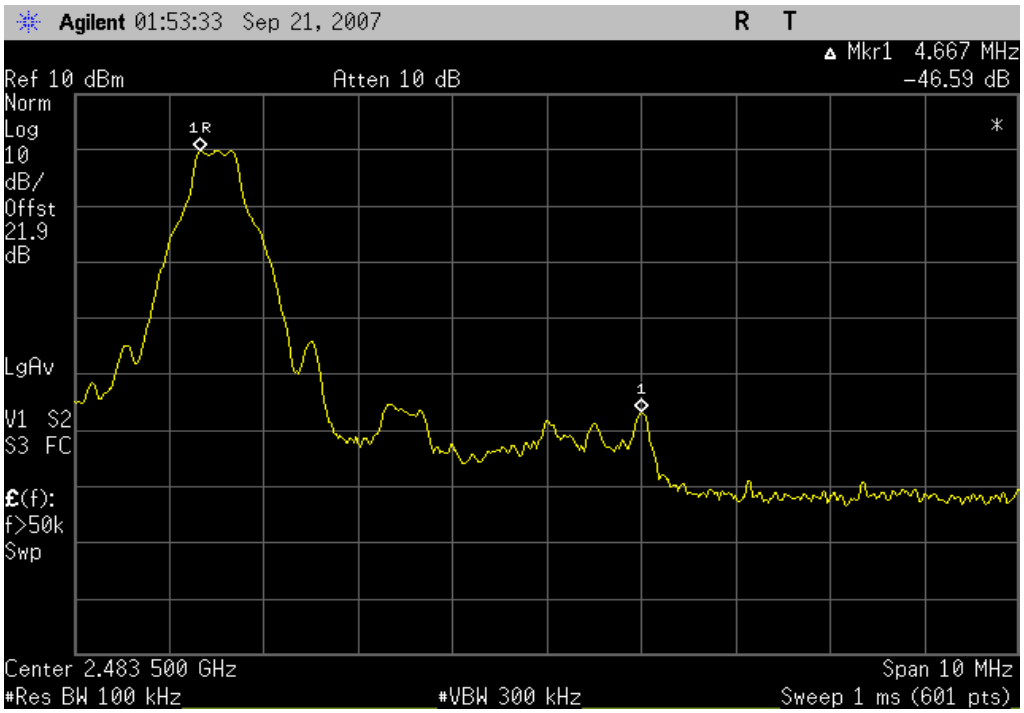
Configuration #	1	Signature

	Value	Limit	Results
Bluetooth, GFSK, DH5			
Low channel, 2402MHz	-46 dBc	≤ -20 dBc	Pass
High channel, 2480MHz	-46.59 dBc	≤ -20 dBc	Pass
Bluetooth, pi/4-DQPSK, 2DH5			
Low channel, 2402MHz	-49.9 dBc	≤ -20 dBc	Pass
High channel, 2480MHz	-42.37 dBc	≤ -20 dBc	Pass
Bluetooth, 8-DPSK, 3DH5			
Low channel, 2402MHz	-51.27 dBc	≤ -20 dBc	Pass
High channel, 2480MHz	-44.79 dBc	≤ -20 dBc	Pass

Bluetooth, GFSK, DH5, Low channel, 2402MHz					
Result:	Pass	**Value:**	-46 dBc	**Limit:**	≤ -20 dBc

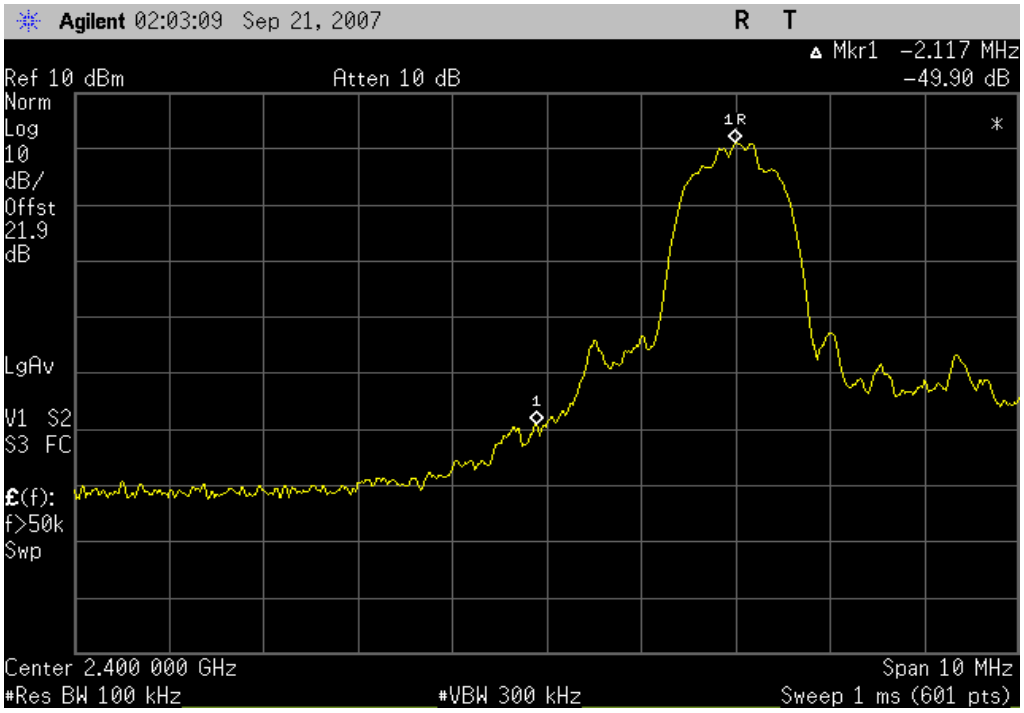


Bluetooth, GFSK, DH5, High channel, 2480MHz					
Result:	Pass	**Value:**	-46.59 dBc	**Limit:**	≤ -20 dBc

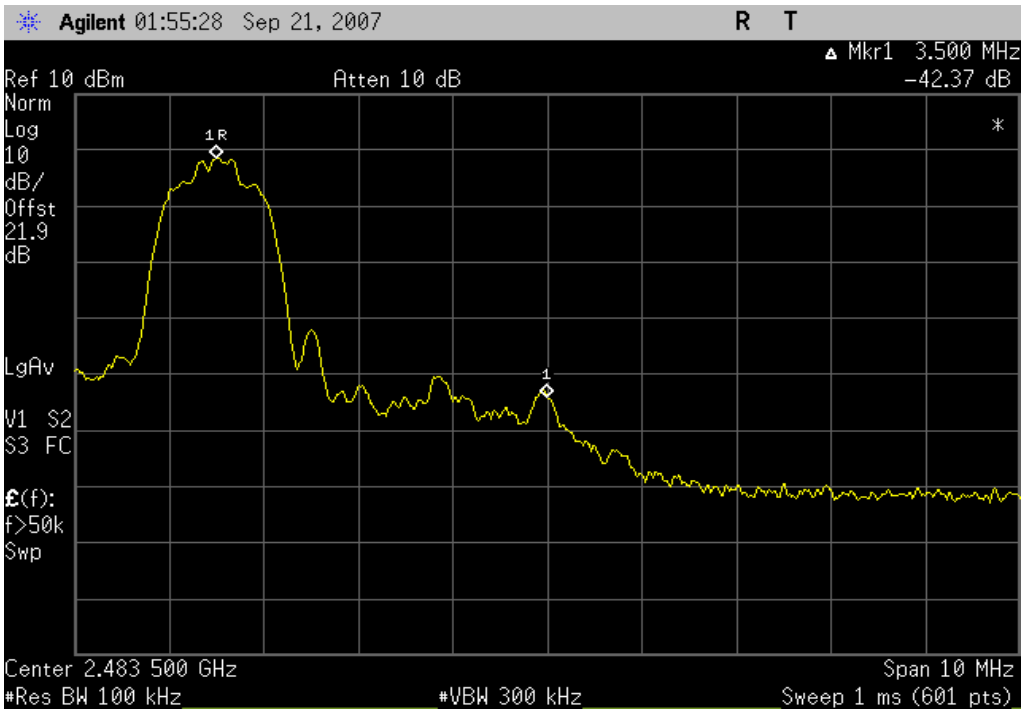


Band Edge Compliance

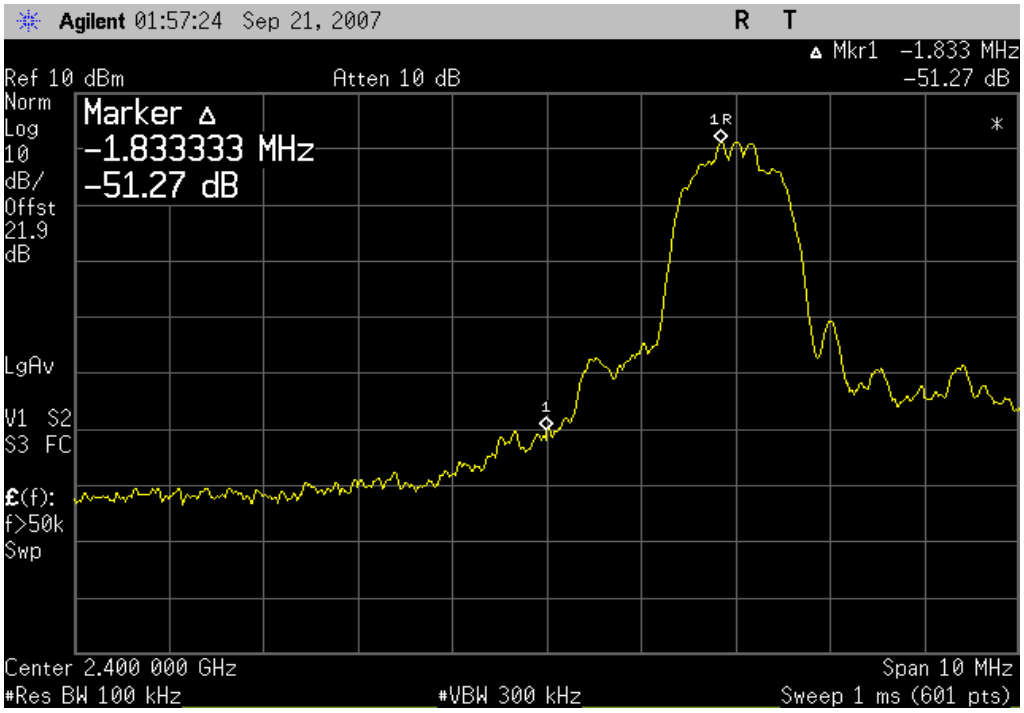
Bluetooth, pi/4-DQPSK, 2DH5, Low channel, 2402MHz					
Result:	Pass	**Value:**	-49.9 dBc	**Limit:**	≤ -20 dBc



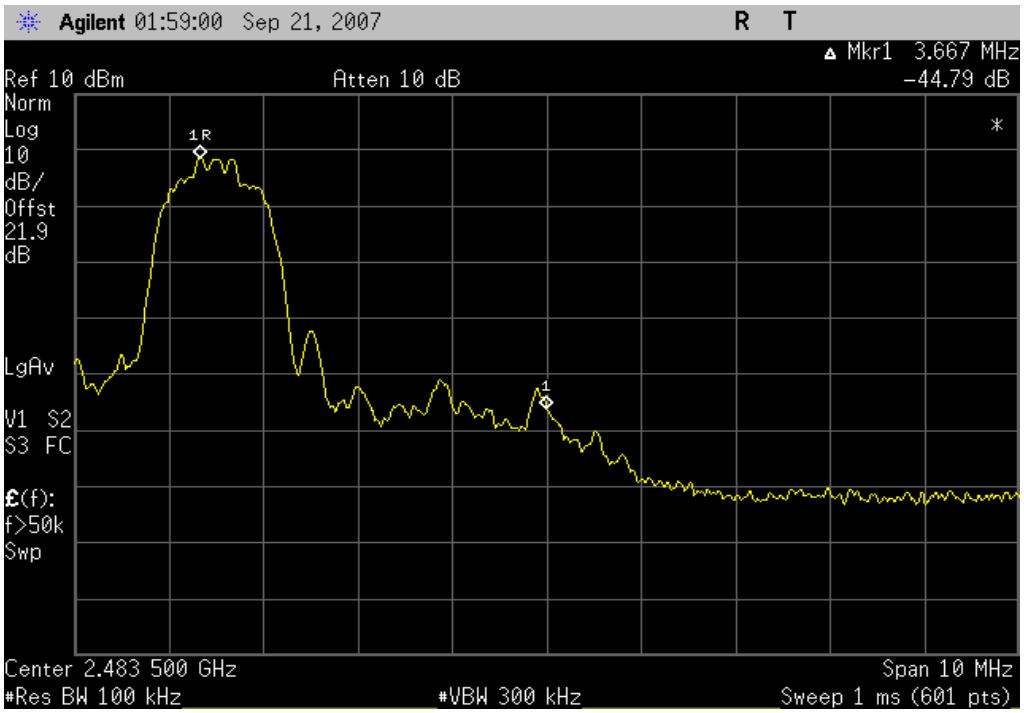
Bluetooth, pi/4-DQPSK, 2DH5, High channel, 2480MHz					
Result:	Pass	**Value:**	-42.37 dBc	**Limit:**	≤ -20 dBc



Bluetooth, 8-DPSK, 3DH5, Low channel, 2402MHz					
Result:	Pass	**Value:**	-51.27 dBc	**Limit:**	≤ -20 dBc



Bluetooth, 8-DPSK, 3DH5, High channel, 2480MHz					
Result:	Pass	**Value:**	-44.79 dBc	**Limit:**	≤ -20 dBc



Spurious Conducted Emissions

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	6/8/2007	13
Spectrum Analyzer	Agilent	E440A	AAX	10/1/2007	12

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

The spurious RF conducted emissions were measured with the EUT set to low, medium, and high transmit frequencies. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate using direct sequence modulation. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

NORTHWEST EMC

Spurious Conducted Emissions

XMit 2007.06.13

EUT:	Cordless Vantage Headset			Work Order:	LABT0276
Serial Number:	Unknown			Date:	09/14/07
Customer:	Logitech, Inc.			Temperature:	24°C
Attendees:	None			Humidity:	42%
Project:	None			Barometric Pres.:	1017.8
Tested by:	Holly Ashkannejhad	Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2006	ANSI C63.4: 2003 KDB No. 558074

COMMENTS

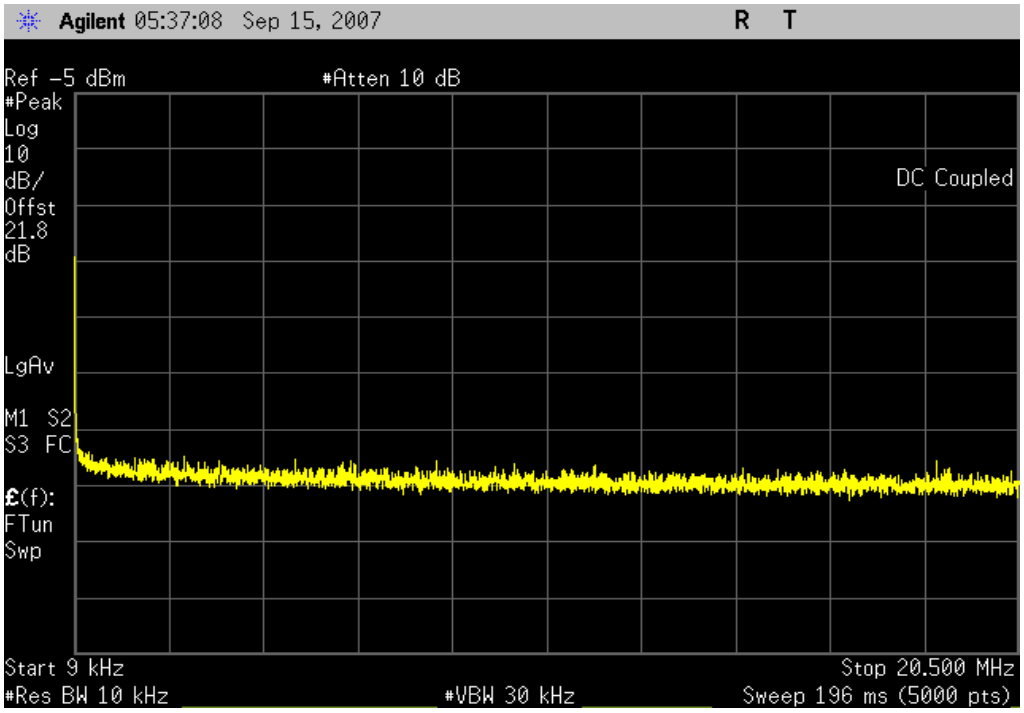
DEVIATIONS FROM TEST STANDARD

Configuration #	1	Signature

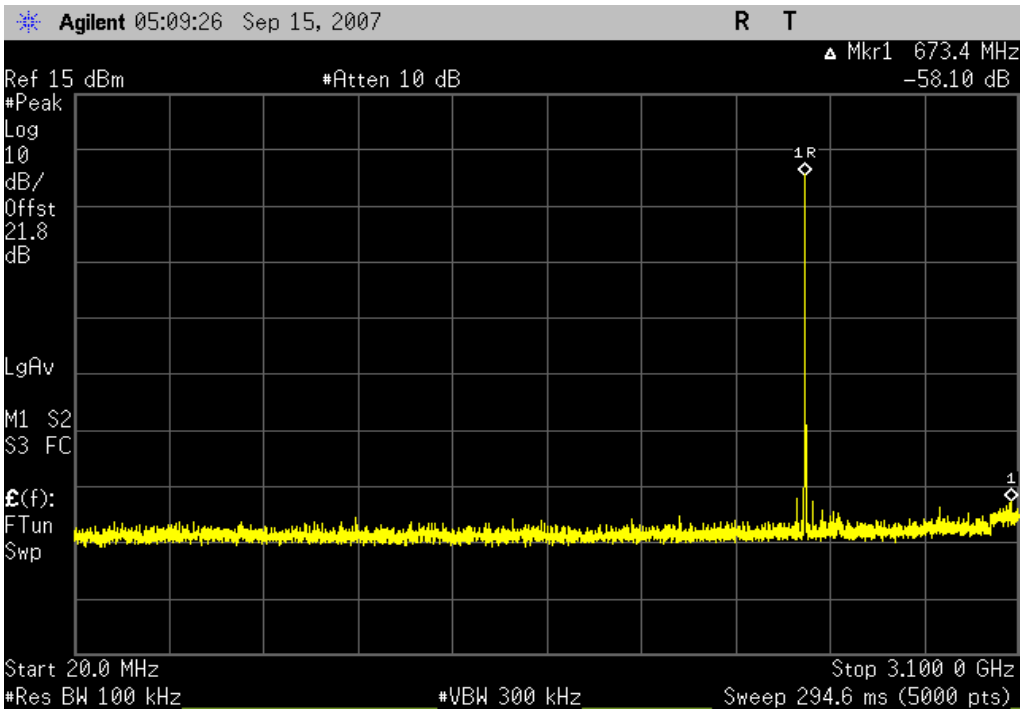
		Value	Limit	Results
Bluetooth, GFSK, DH5				
	Low channel, 2402MHz			
	9 kHz - 20.5 MHz	≤ -50 dBc	≤ -20 dBc	Pass
	20 MHz - 3.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	3 GHz - 6.6 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	6.5 GHz - 13.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	13 GHz - 26 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	Mid channel, 2441MHz			
	9 kHz - 20.5 MHz	≤ -50 dBc	≤ -20 dBc	Pass
	20 MHz - 3.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	3 GHz - 6.6 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	6.5 GHz - 13.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	13 GHz - 26 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	High channel, 2480MHz			
	9 kHz - 20.5 MHz	≤ -50 dBc	≤ -20 dBc	Pass
	20 MHz - 3.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	3 GHz - 6.6 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	6.5 GHz - 13.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	13 GHz - 26 GHz	≤ -50 dBc	≤ -20 dBc	Pass
Bluetooth, pi/4-DQPSK, 2DH5				
	Low channel, 2402MHz			
	9 kHz - 20.5 MHz	≤ -50 dBc	≤ -20 dBc	Pass
	20 MHz - 3.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	3 GHz - 6.6 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	6.5 GHz - 13.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	13 GHz - 26 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	Mid channel, 2441MHz			
	9 kHz - 20.5 MHz	≤ -50 dBc	≤ -20 dBc	Pass
	20 MHz - 3.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	3 GHz - 6.6 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	6.5 GHz - 13.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	13 GHz - 26 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	High channel, 2480MHz			
	9 kHz - 20.5 MHz	≤ -50 dBc	≤ -20 dBc	Pass
	20 MHz - 3.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	3 GHz - 6.6 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	6.5 GHz - 13.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	13 GHz - 26 GHz	≤ -50 dBc	≤ -20 dBc	Pass
Bluetooth, 8DPSK, 3DH5				
	Low channel, 2402MHz			
	9 kHz - 20.5 MHz	≤ -50 dBc	≤ -20 dBc	Pass
	20 MHz - 3.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	3 GHz - 6.6 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	6.5 GHz - 13.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	13 GHz - 26 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	Mid channel, 2441MHz			
	9 kHz - 20.5 MHz	≤ -50 dBc	≤ -20 dBc	Pass
	20 MHz - 3.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	3 GHz - 6.6 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	6.5 GHz - 13.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	13 GHz - 26 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	High channel, 2480MHz			
	9 kHz - 20.5 MHz	≤ -50 dBc	≤ -20 dBc	Pass
	20 MHz - 3.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	3 GHz - 6.6 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	6.5 GHz - 13.1 GHz	≤ -50 dBc	≤ -20 dBc	Pass
	13 GHz - 26 GHz	≤ -50 dBc	≤ -20 dBc	Pass

Spurious Conducted Emissions

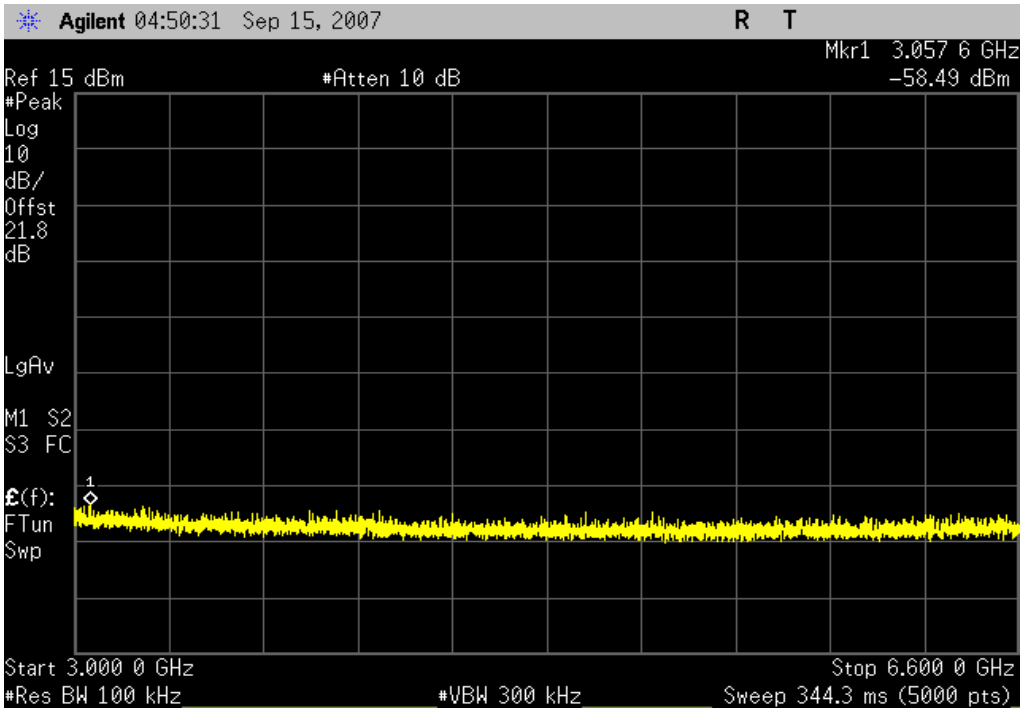
Bluetooth, GFSK, DH5, Low channel, 2402MHz, 9 kHz - 20.5 MHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



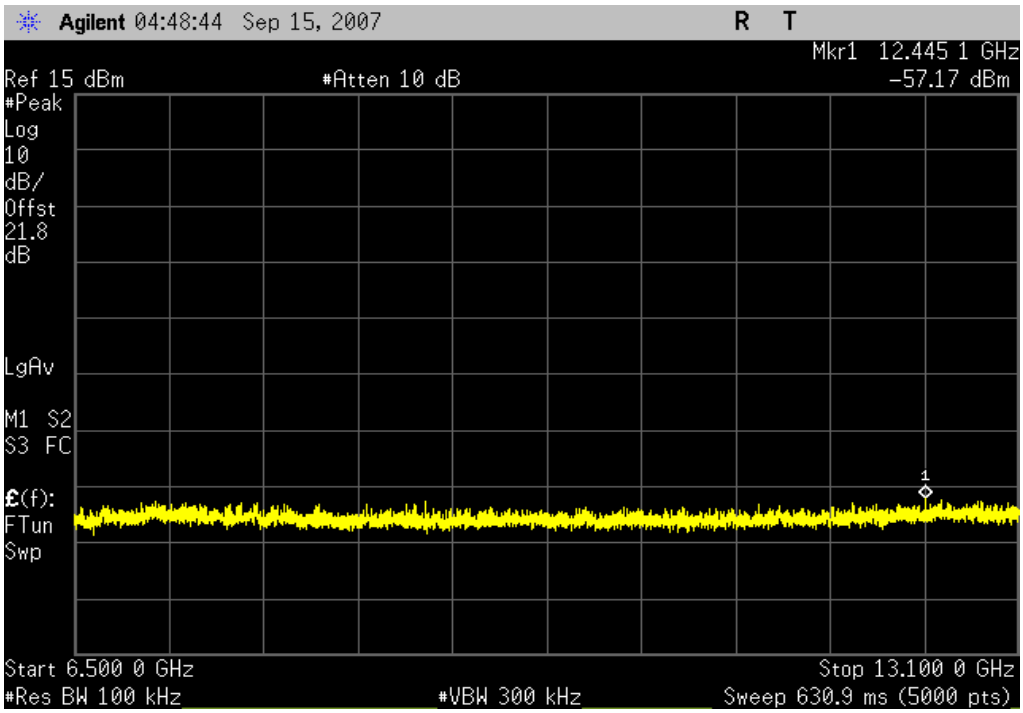
Bluetooth, GFSK, DH5, Low channel, 2402MHz, 20 MHz - 3.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



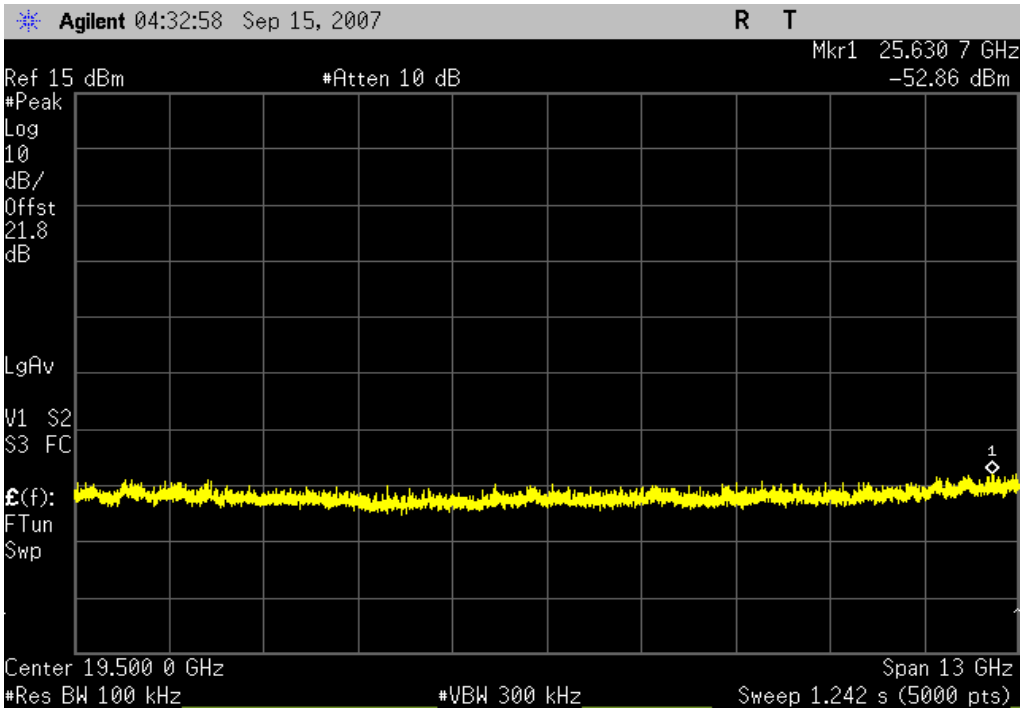
Bluetooth, GFSK, DH5, Low channel, 2402MHz, 3 GHz - 6.6 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



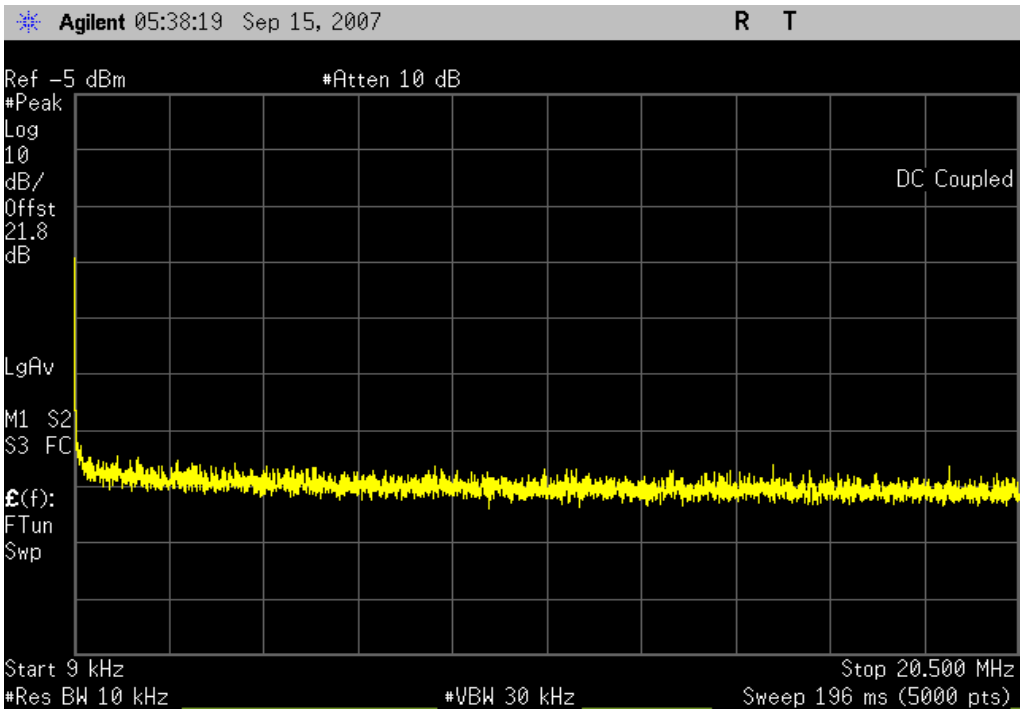
Bluetooth, GFSK, DH5, Low channel, 2402MHz, 6.5 GHz - 13.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



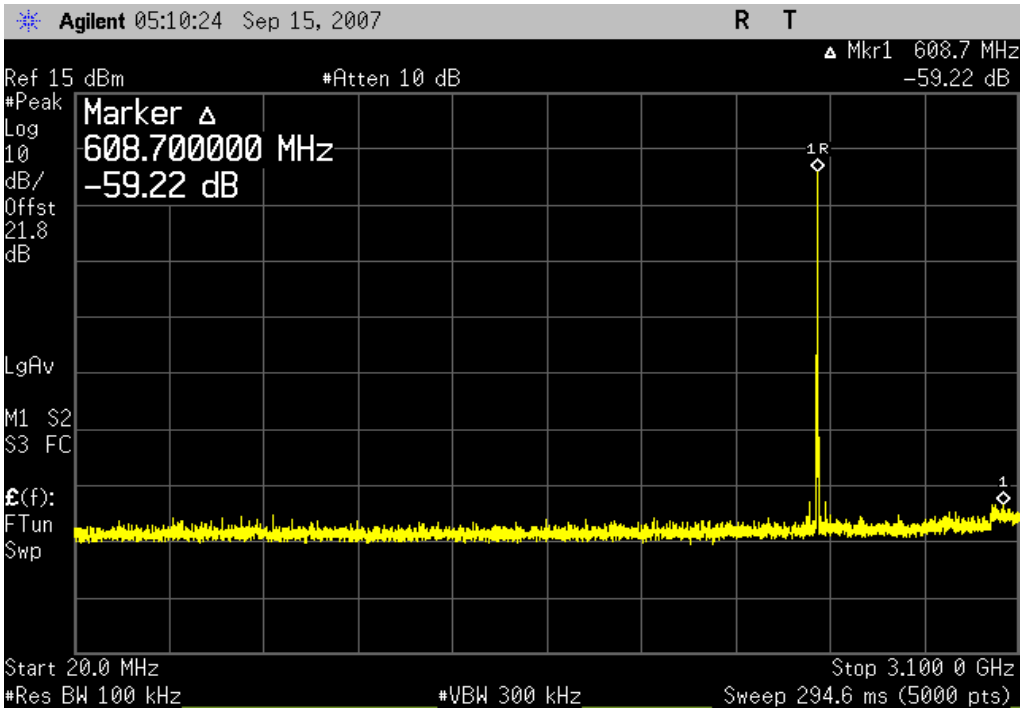
Bluetooth, GFSK, DH5, Low channel, 2402MHz, 13 GHz - 26 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



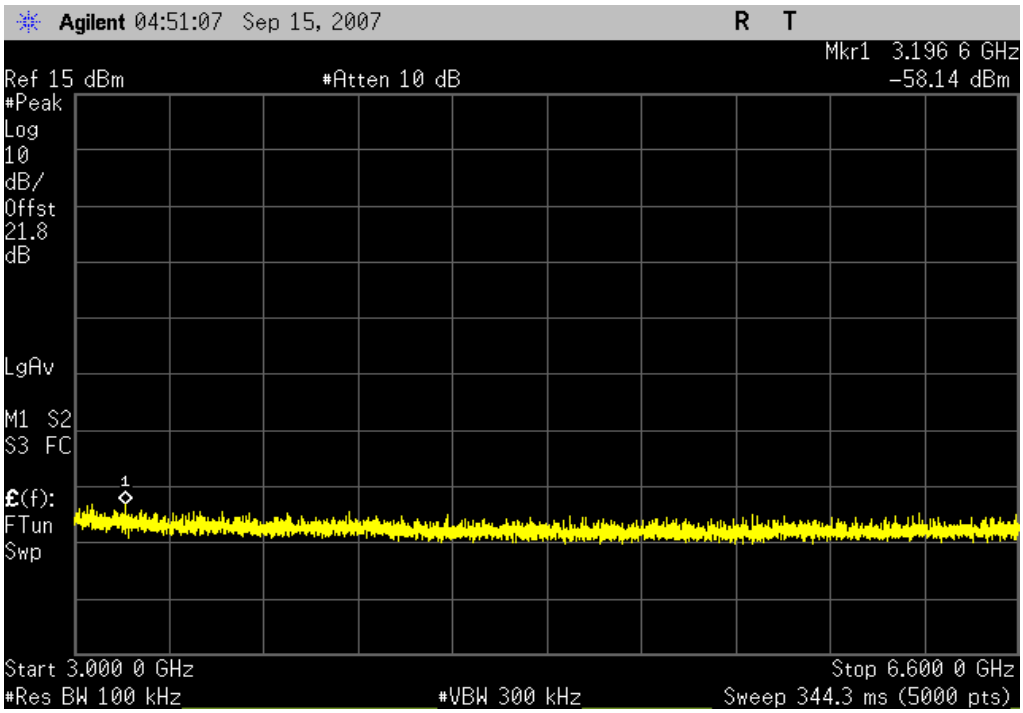
Bluetooth, GFSK, DH5, Mid channel, 2441MHz, 9 kHz - 20.5 MHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



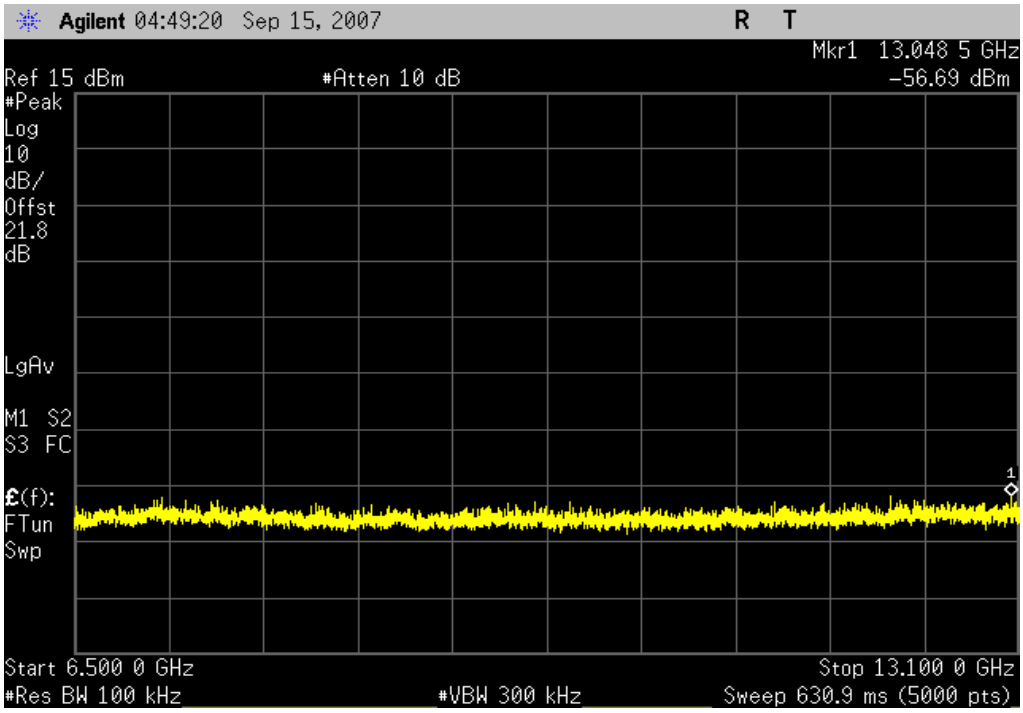
Bluetooth, GFSK, DH5, Mid channel, 2441MHz, 20 MHz - 3.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



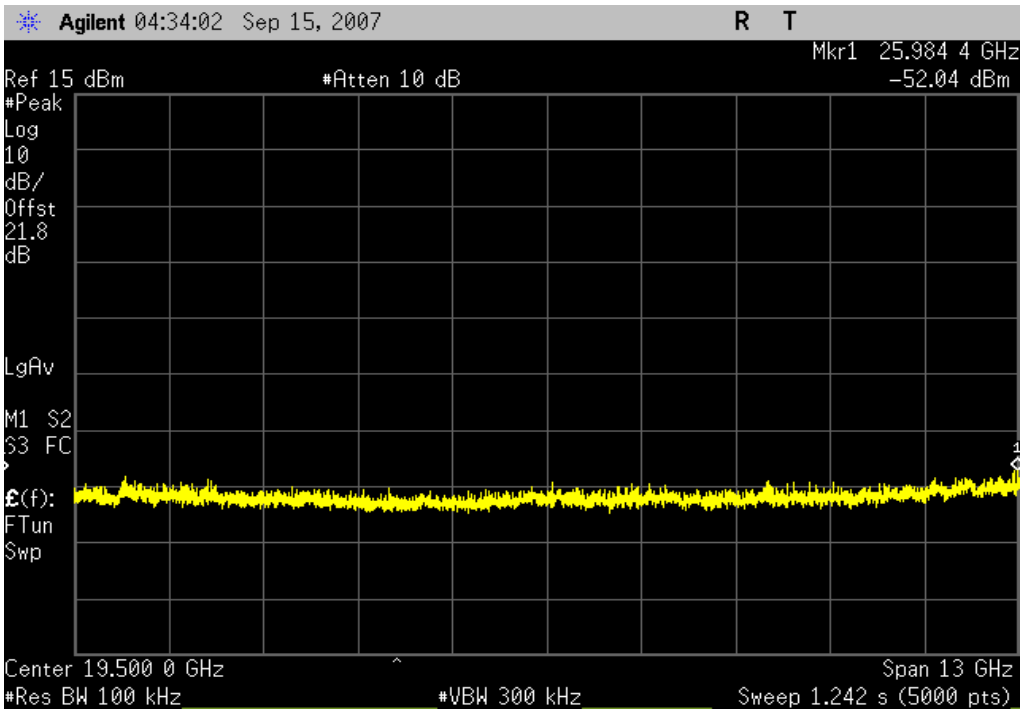
Bluetooth, GFSK, DH5, Mid channel, 2441MHz, 3 GHz - 6.6 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



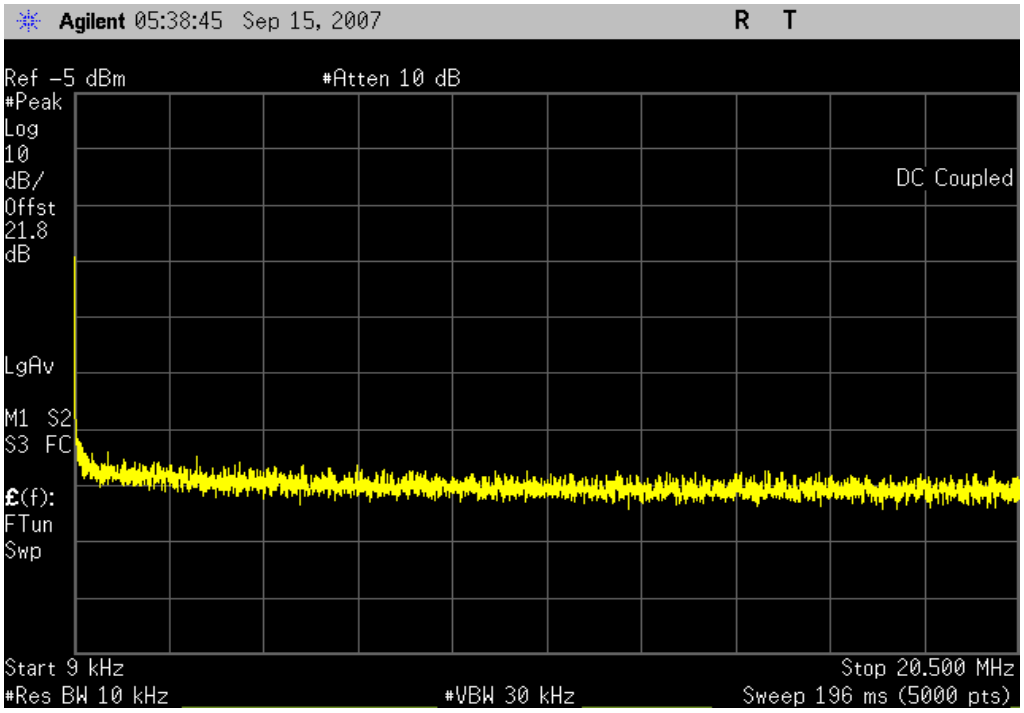
Bluetooth, GFSK, DH5, Mid channel, 2441MHz, 6.5 GHz - 13.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



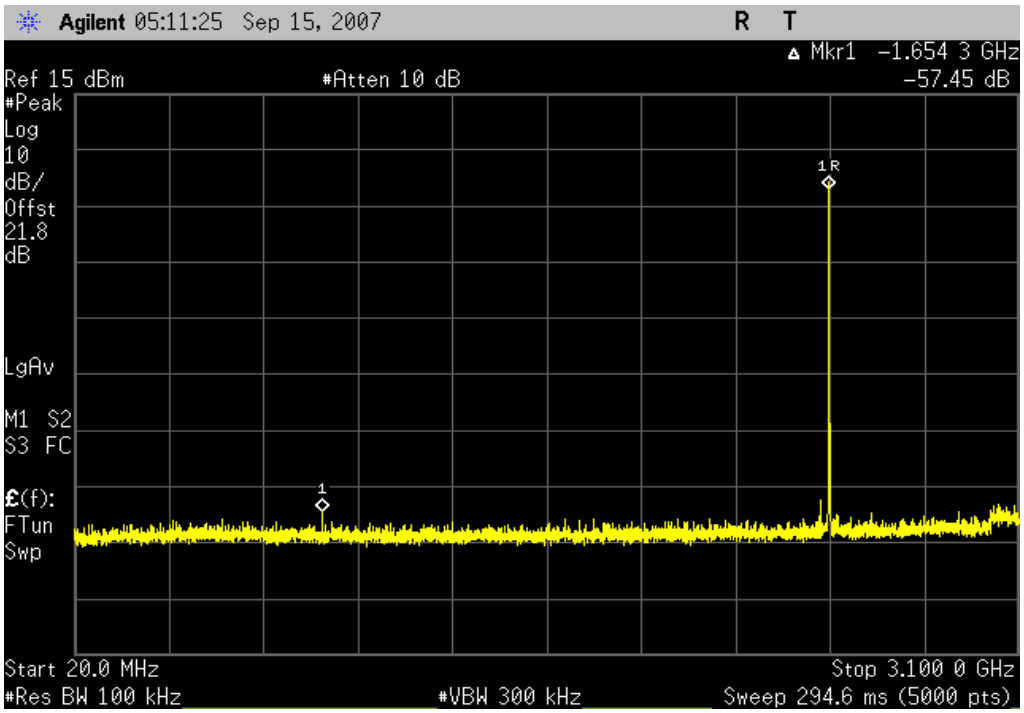
Bluetooth, GFSK, DH5, Mid channel, 2441MHz, 13 GHz - 26 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



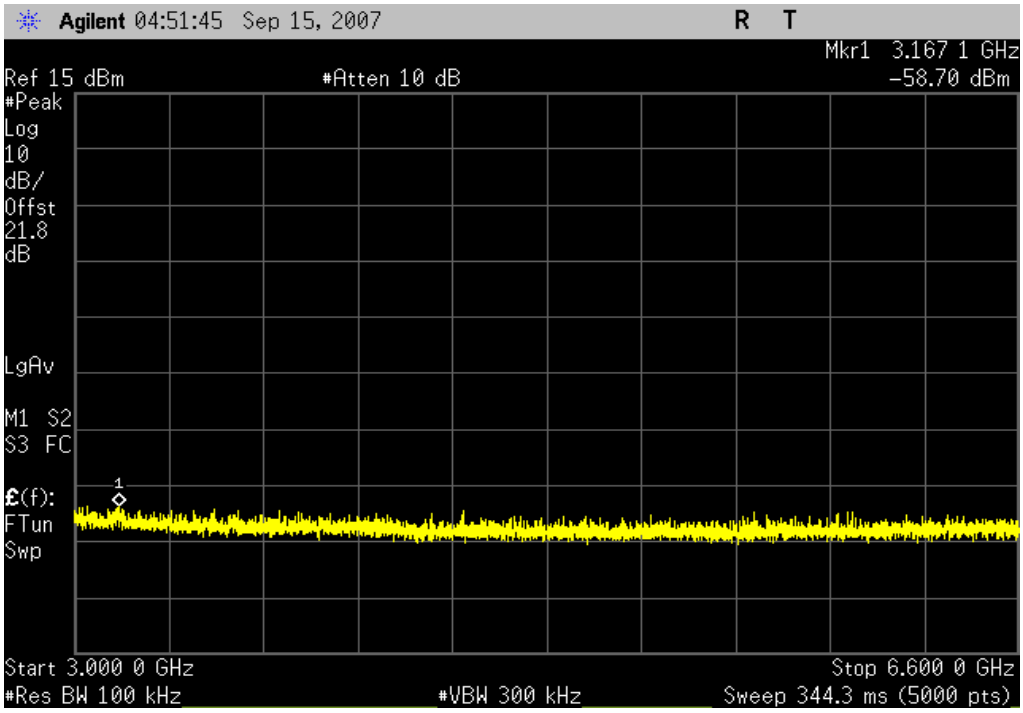
Bluetooth, GFSK, DH5, High channel, 2480MHz, 9 kHz - 20.5 MHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



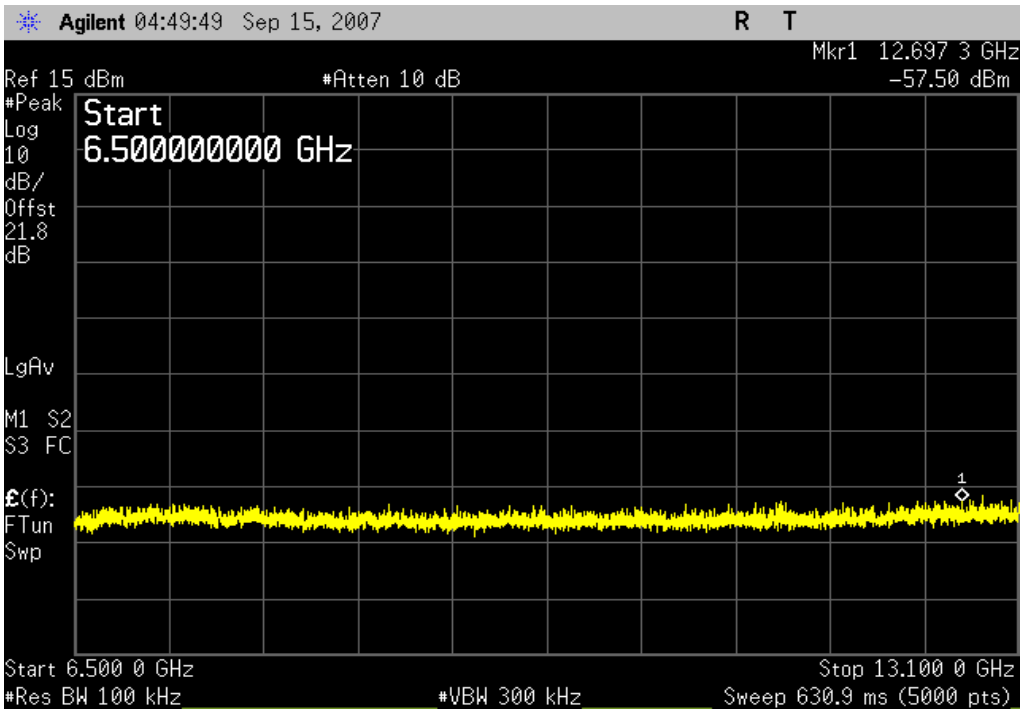
Bluetooth, GFSK, DH5, High channel, 2480MHz, 20 MHz - 3.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



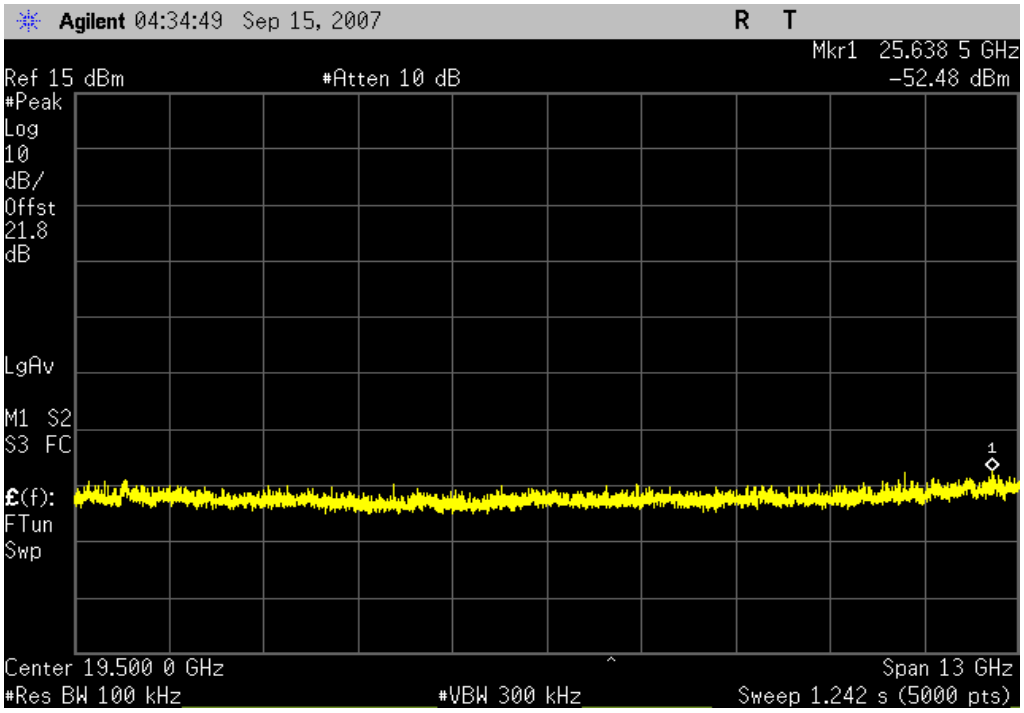
Bluetooth, GFSK, DH5, High channel, 2480MHz, 3 GHz - 6.6 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



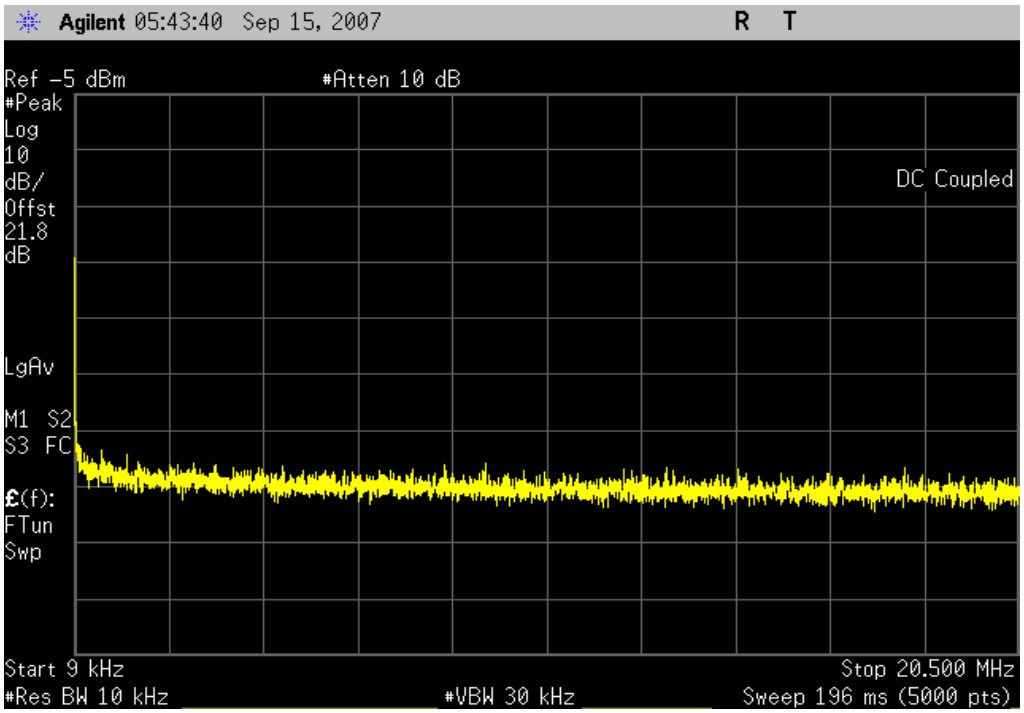
Bluetooth, GFSK, DH5, High channel, 2480MHz, 6.5 GHz - 13.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



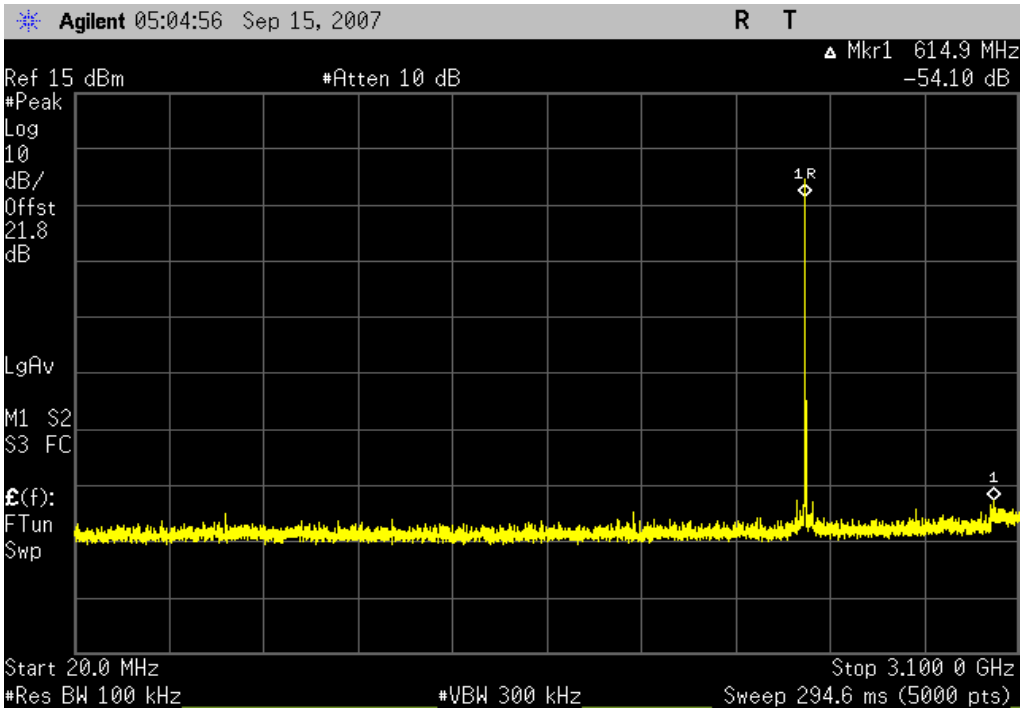
Bluetooth, GFSK, DH5, High channel, 2480MHz, 13 GHz - 26 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



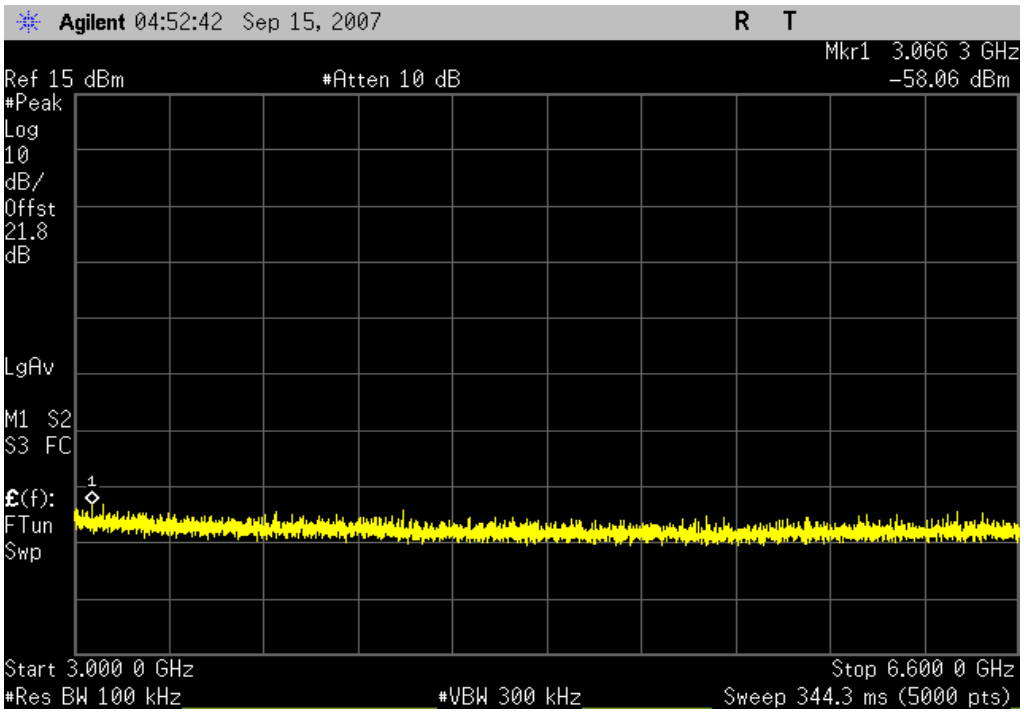
Bluetooth, pi/4-DQPSK, 2DH5, Low channel, 2402MHz, 9 kHz - 20.5 MHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



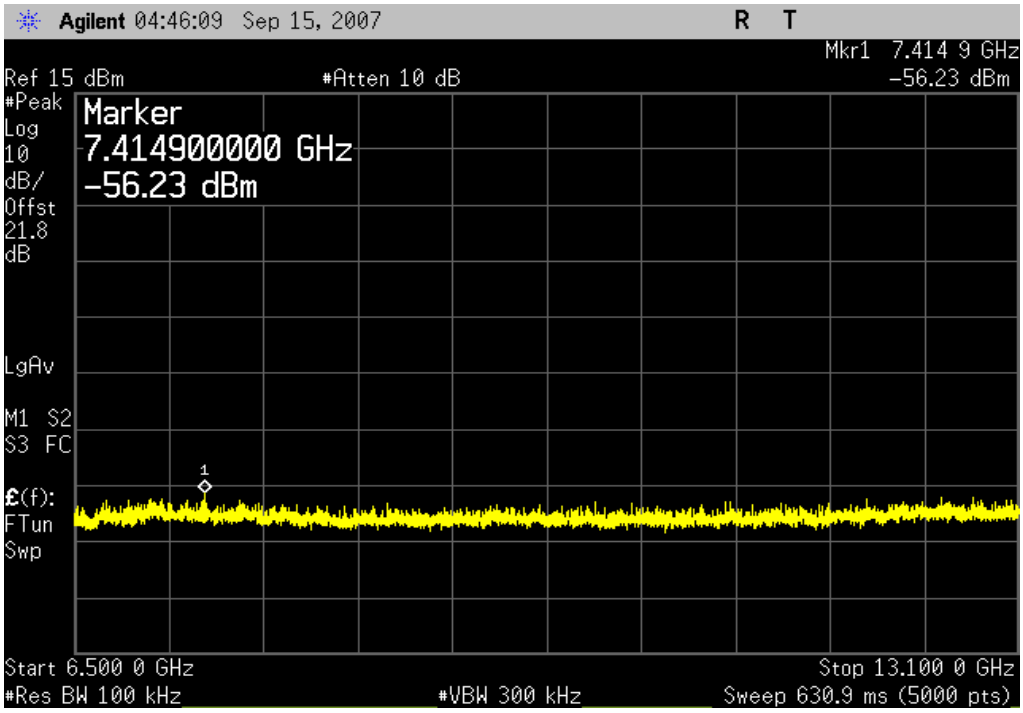
Bluetooth, pi/4-DQPSK, 2DH5, Low channel, 2402MHz, 20 MHz - 3.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



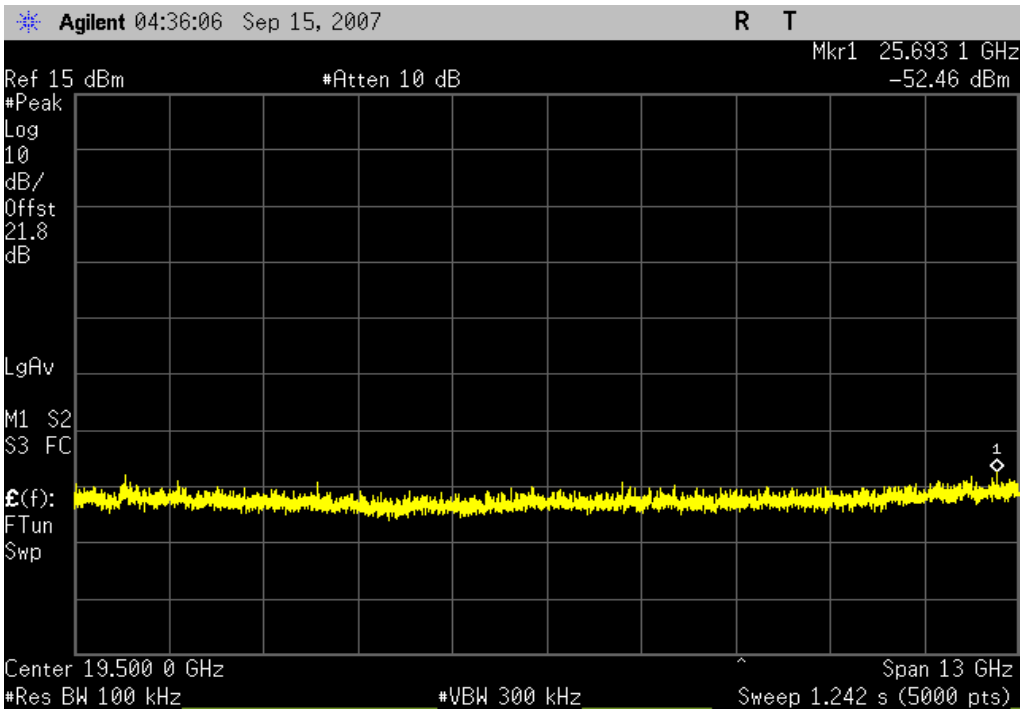
Bluetooth, pi/4-DQPSK, 2DH5, Low channel, 2402MHz, 3 GHz - 6.6 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



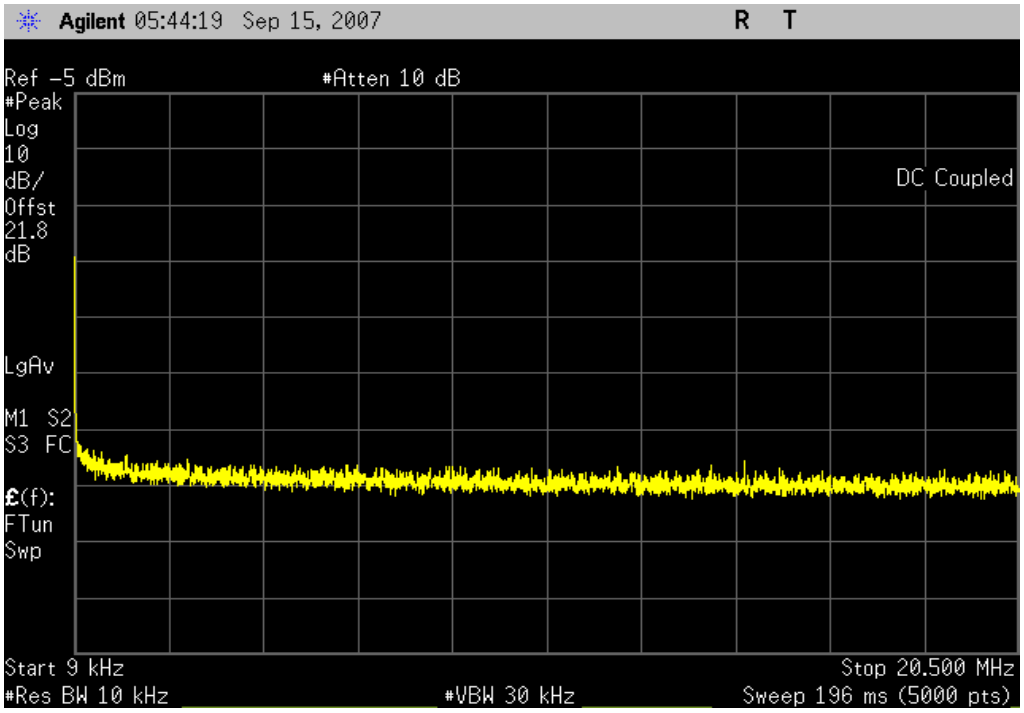
Bluetooth, pi/4-DQPSK, 2DH5, Low channel, 2402MHz, 6.5 GHz - 13.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



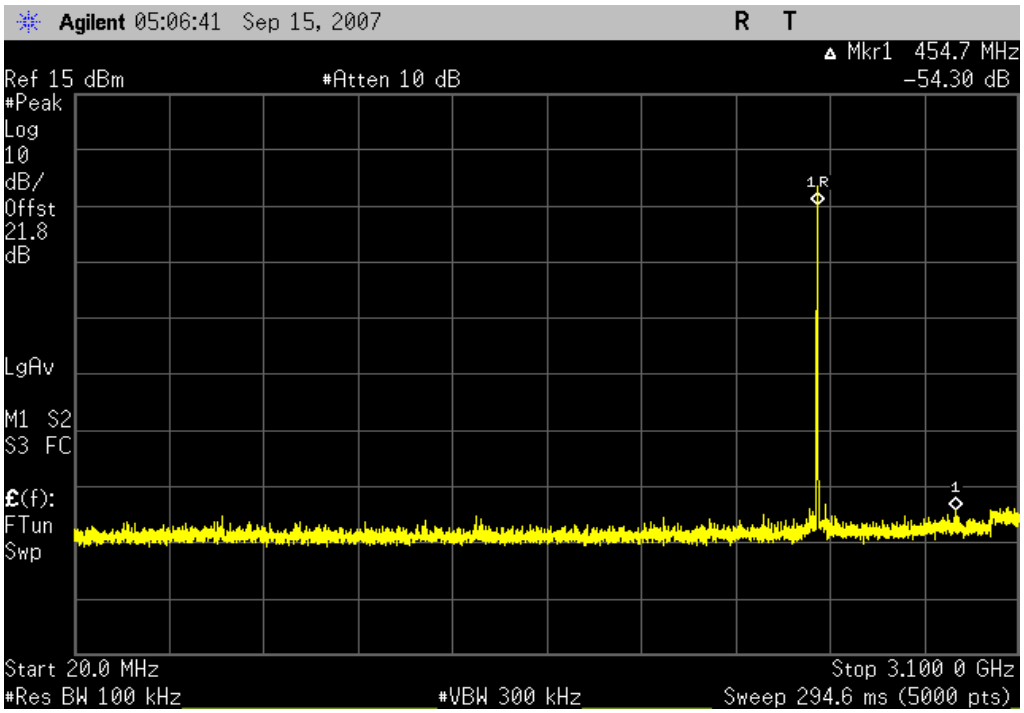
Bluetooth, pi/4-DQPSK, 2DH5, Low channel, 2402MHz, 13 GHz - 26 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



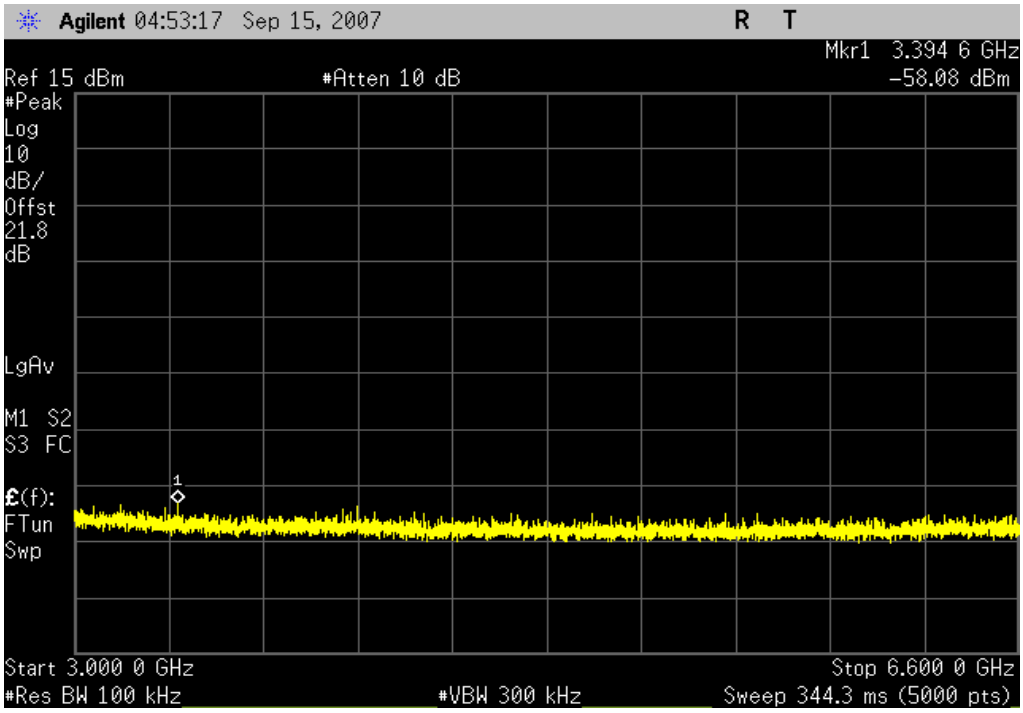
Bluetooth, pi/4-DQPSK, 2DH5, Mid channel, 2441MHz, 9 kHz - 20.5 MHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



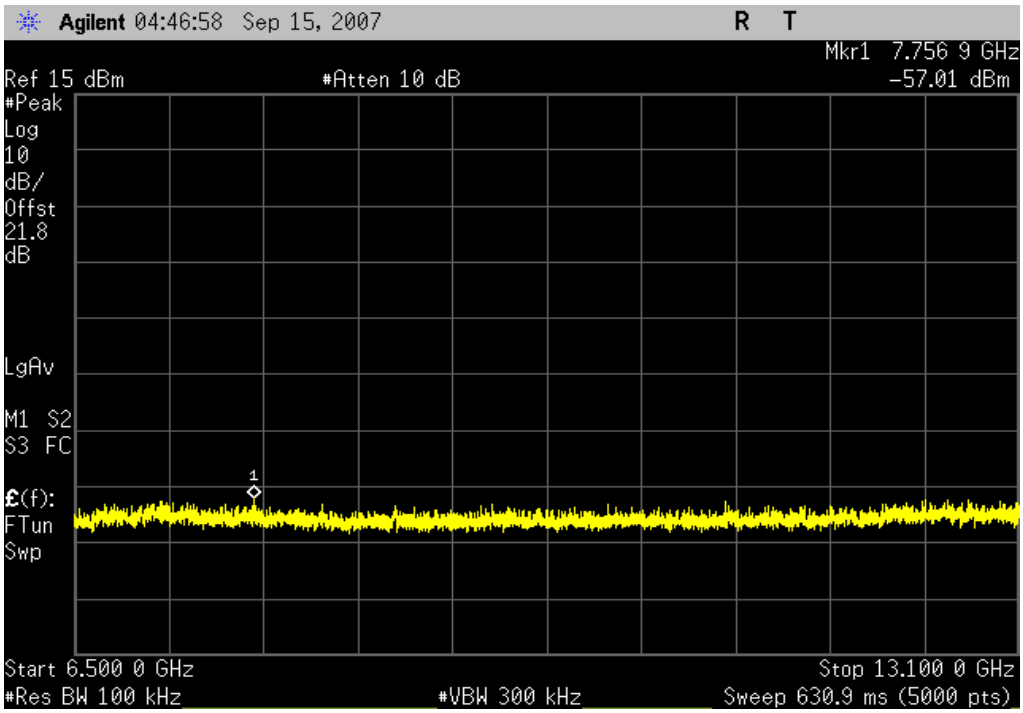
Bluetooth, pi/4-DQPSK, 2DH5, Mid channel, 2441MHz, 20 MHz - 3.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



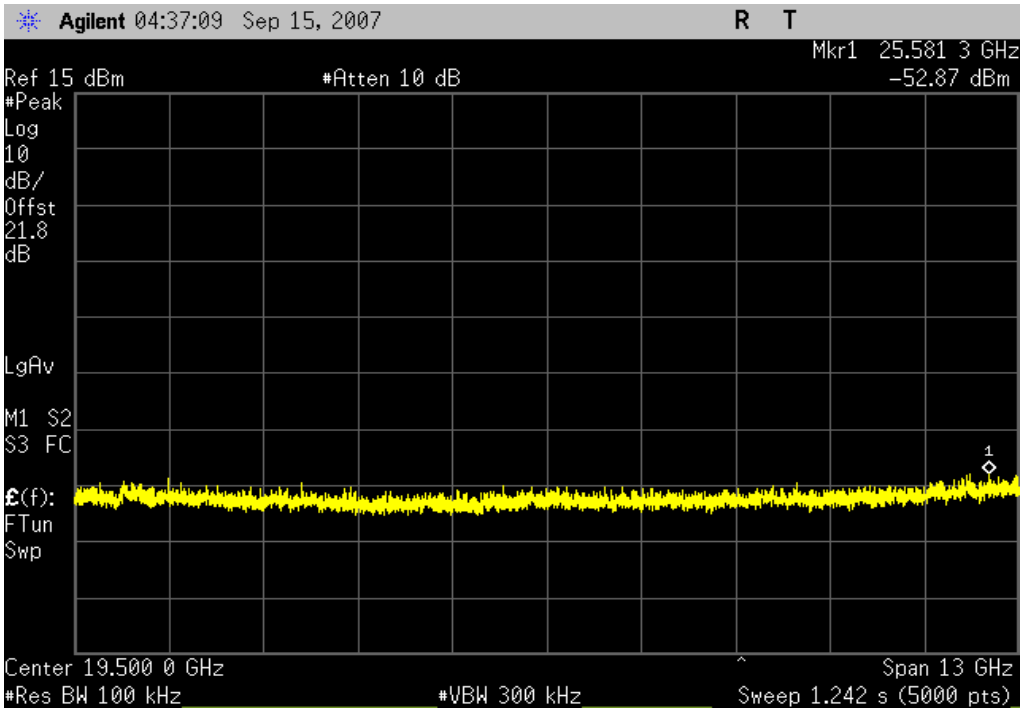
Bluetooth, pi/4-DQPSK, 2DH5, Mid channel, 2441MHz, 3 GHz - 6.6 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



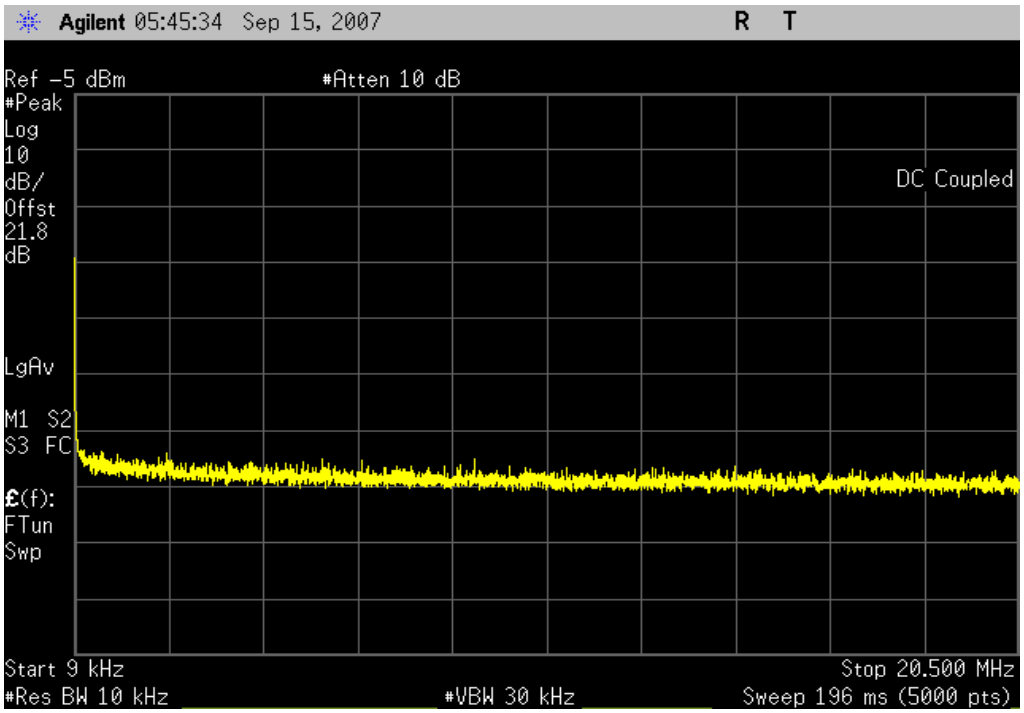
Bluetooth, pi/4-DQPSK, 2DH5, Mid channel, 2441MHz, 6.5 GHz - 13.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



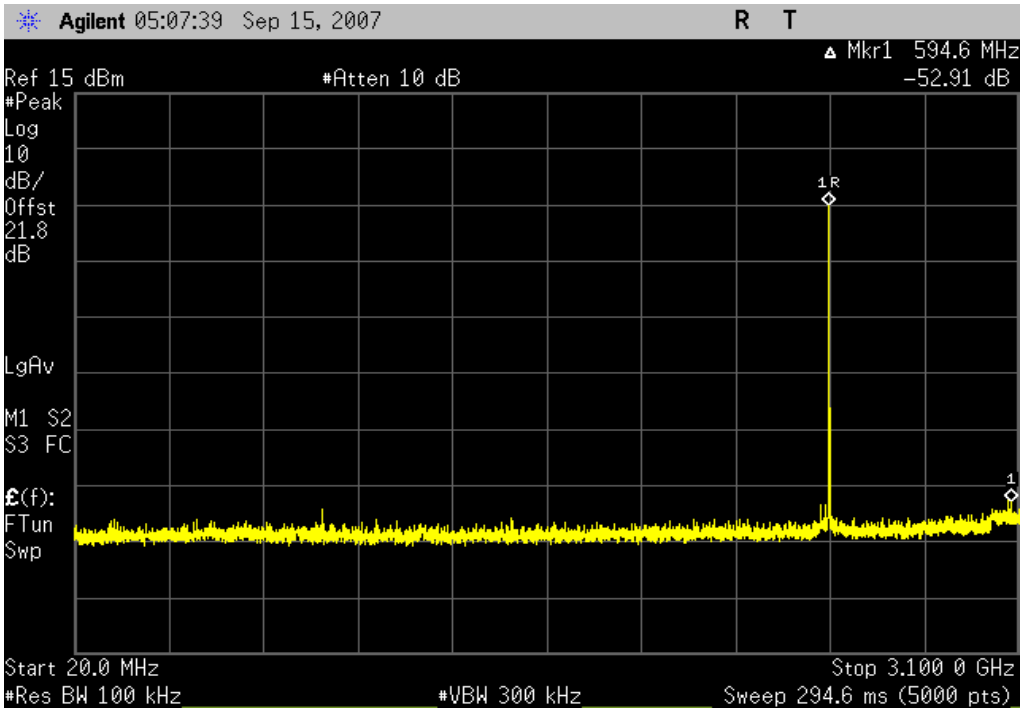
Bluetooth, pi/4-DQPSK, 2DH5, Mid channel, 2441MHz, 13 GHz - 26 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



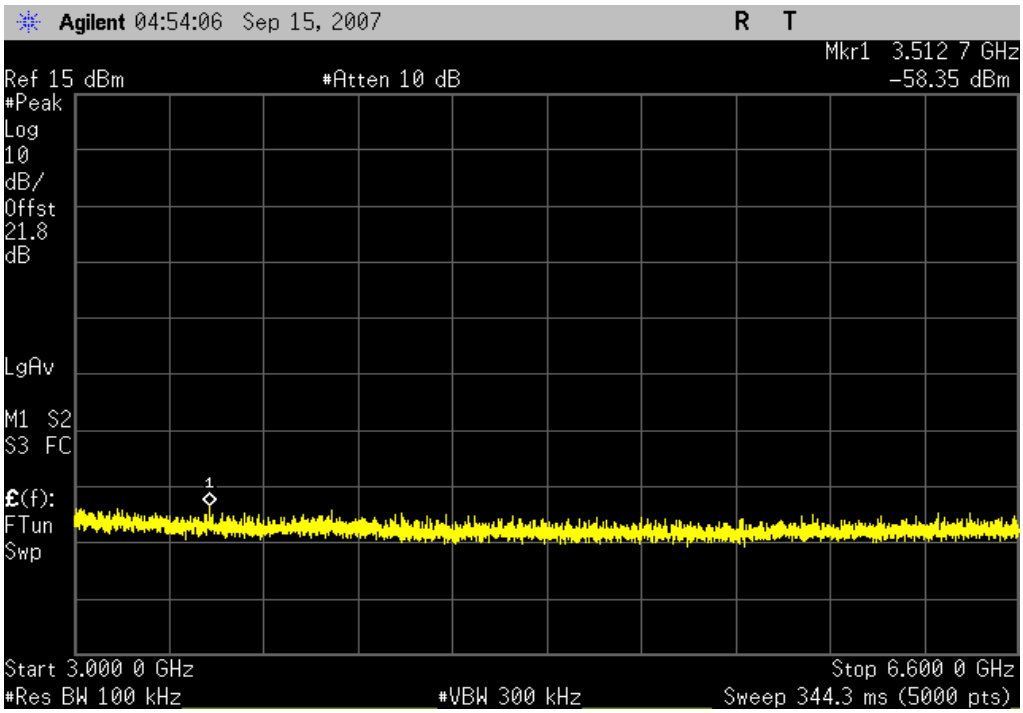
Bluetooth, pi/4-DQPSK, 2DH5, High channel, 2480MHz, 9 kHz - 20.5 MHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



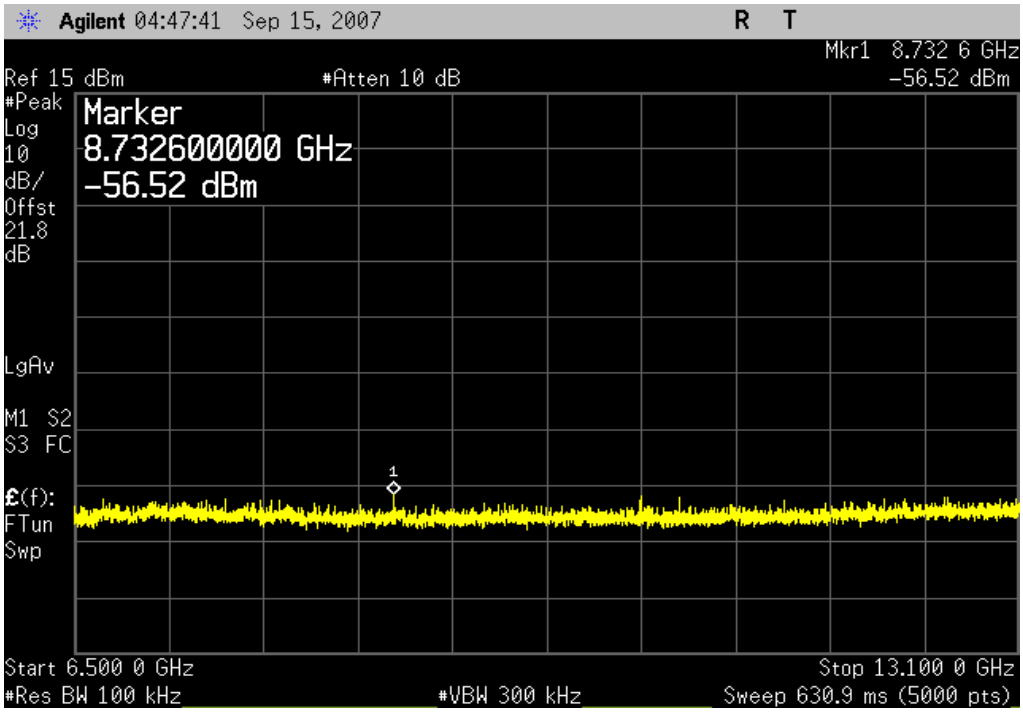
Bluetooth, pi/4-DQPSK, 2DH5, High channel, 2480MHz, 20 MHz - 3.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



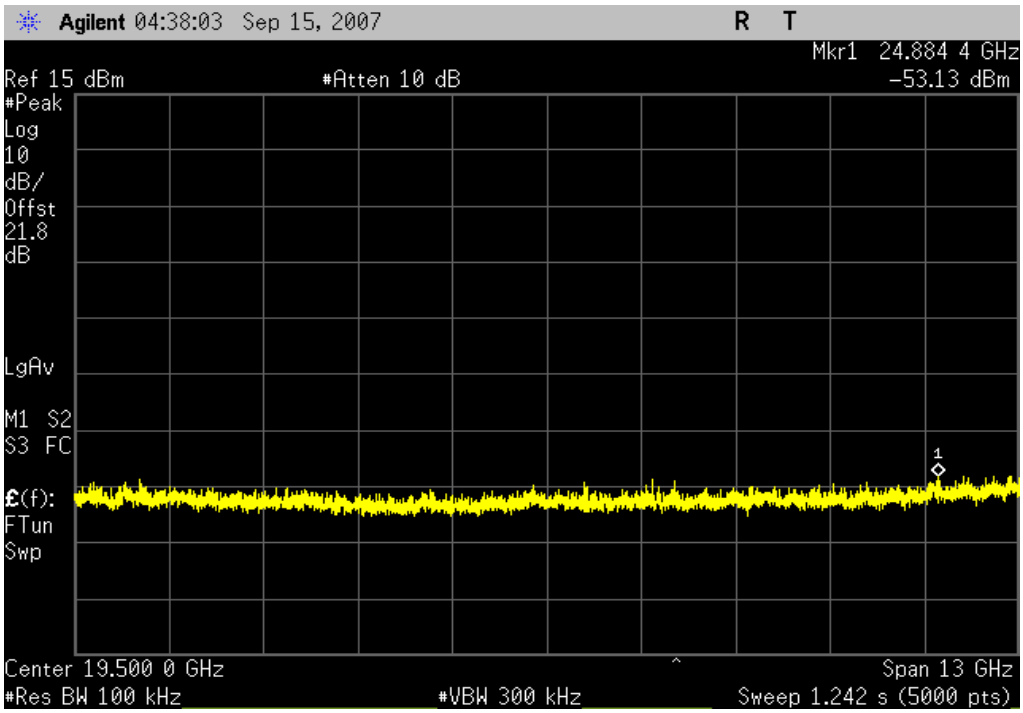
Bluetooth, pi/4-DQPSK, 2DH5, High channel, 2480MHz, 3 GHz - 6.6 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



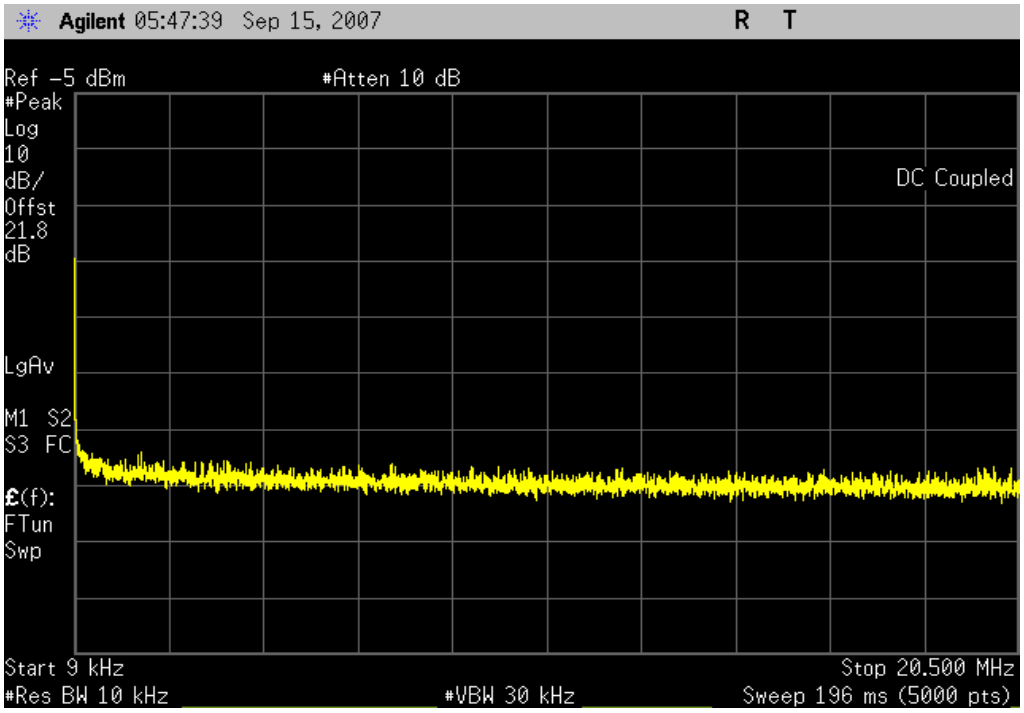
Bluetooth, pi/4-DQPSK, 2DH5, High channel, 2480MHz, 6.5 GHz - 13.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



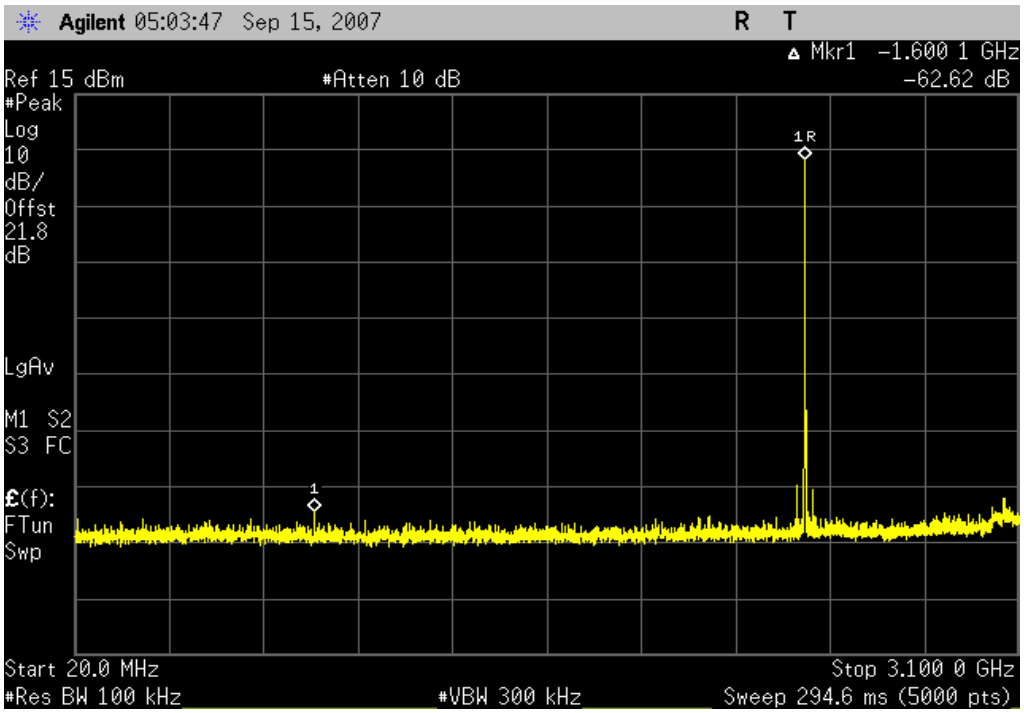
Bluetooth, pi/4-DQPSK, 2DH5, High channel, 2480MHz, 13 GHz - 26 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



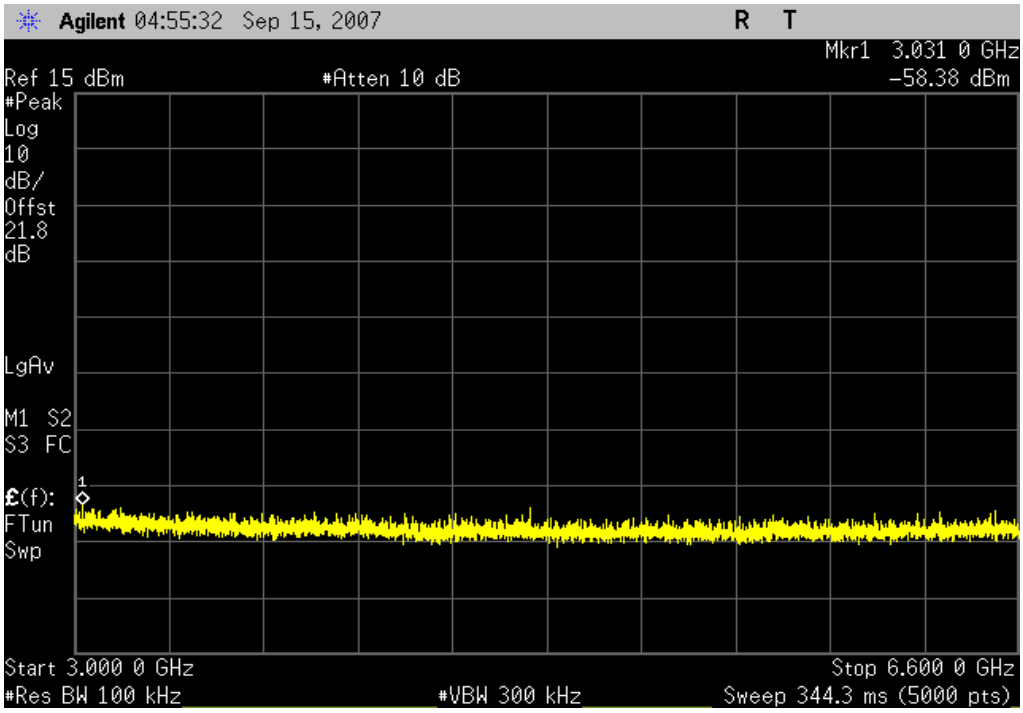
Bluetooth, 8DPSK, 3DH5, Low channel, 2402MHz, 9 kHz - 20.5 MHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



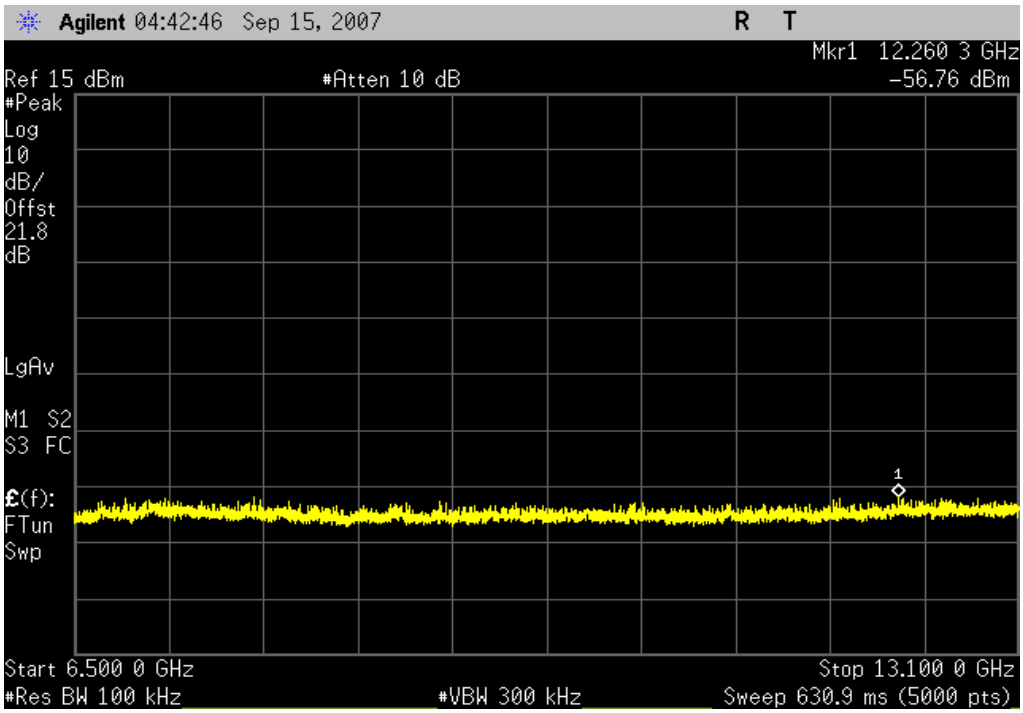
Bluetooth, 8DPSK, 3DH5, Low channel, 2402MHz, 20 MHz - 3.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



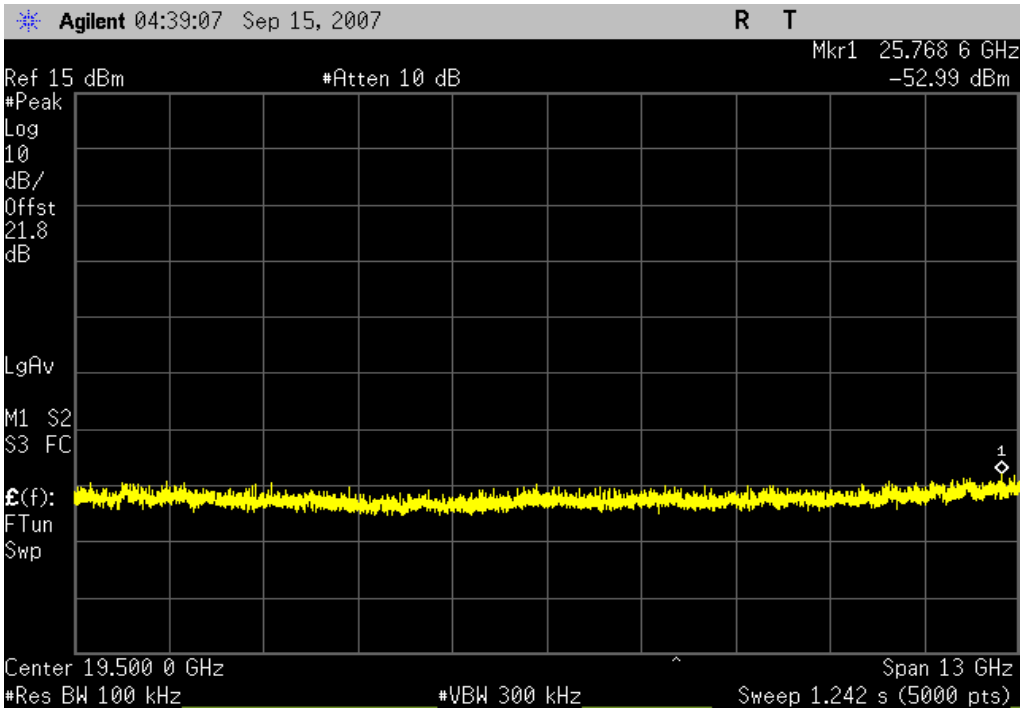
Bluetooth, 8DPSK, 3DH5, Low channel, 2402MHz, 3 GHz - 6.6 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



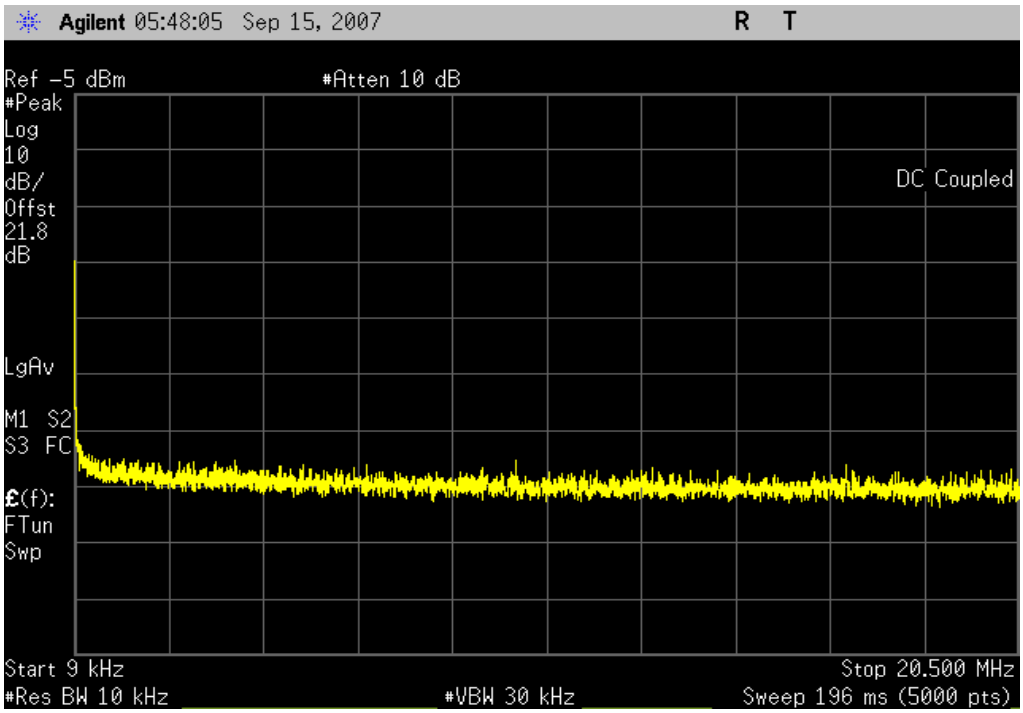
Bluetooth, 8DPSK, 3DH5, Low channel, 2402MHz, 6.5 GHz - 13.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



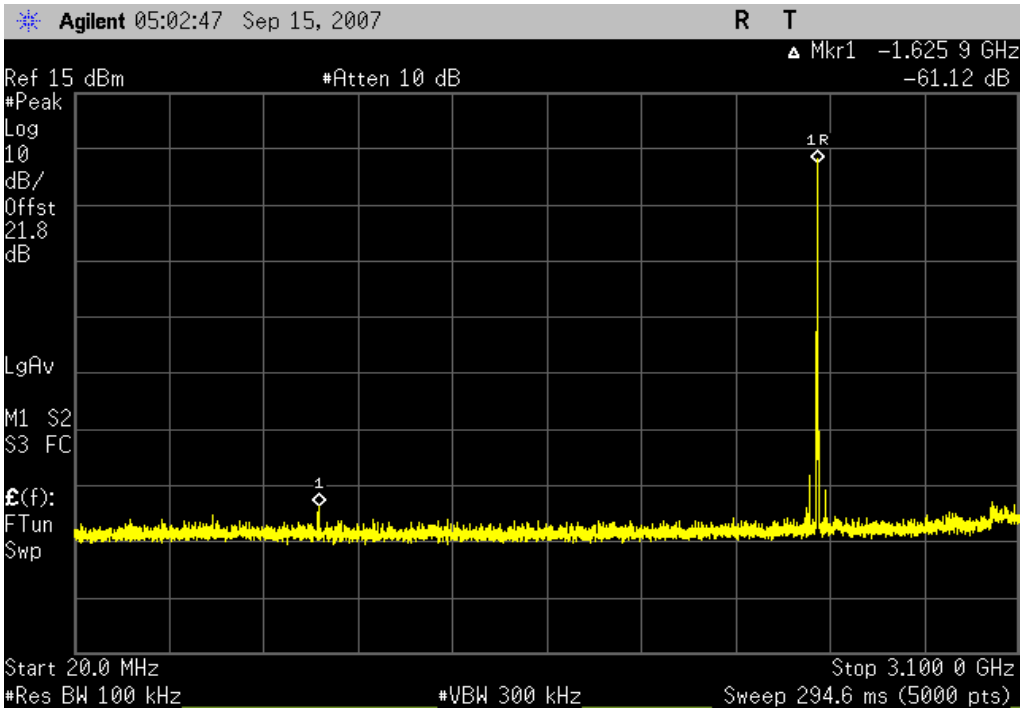
Bluetooth, 8DPSK, 3DH5, Low channel, 2402MHz, 13 GHz - 26 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



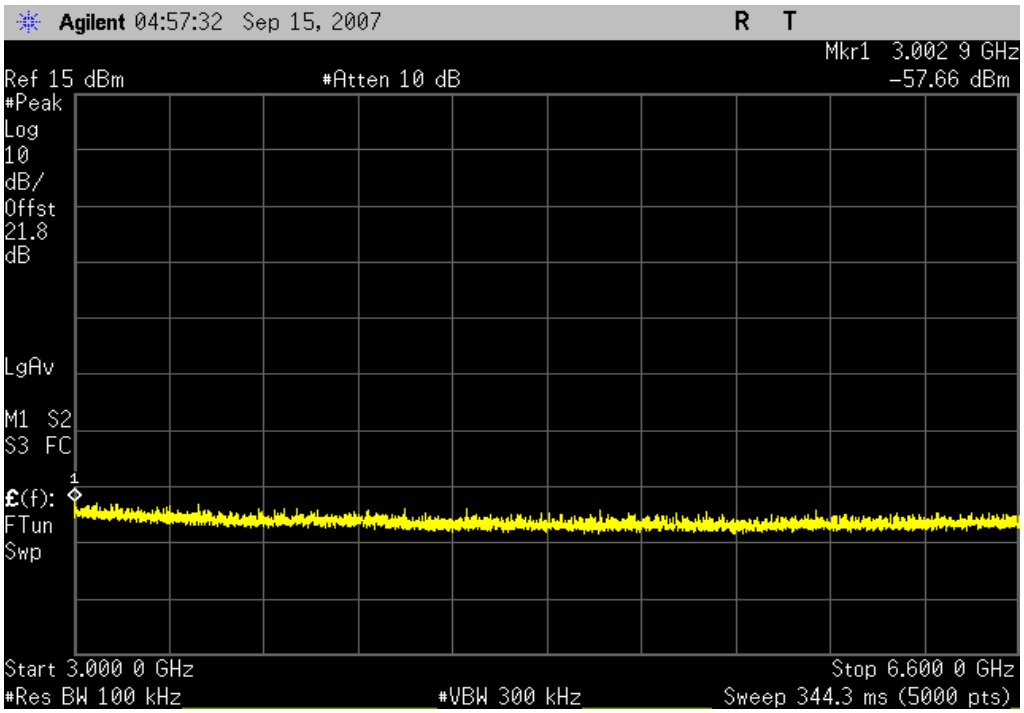
Bluetooth, 8DPSK, 3DH5, Mid channel, 2441MHz, 9 kHz - 20.5 MHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



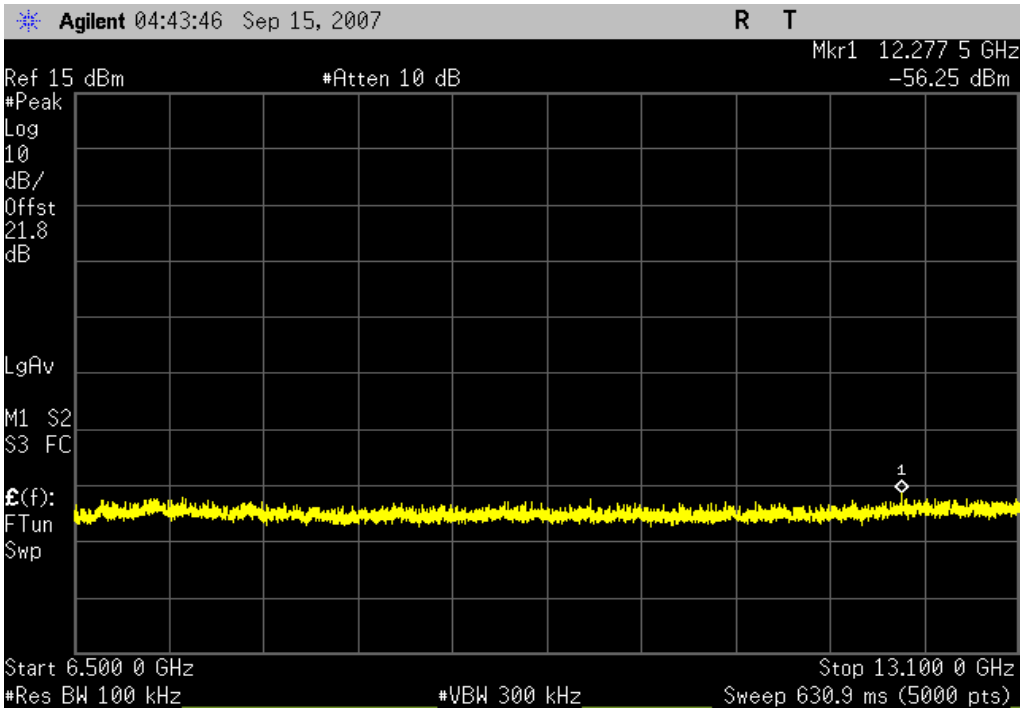
Bluetooth, 8DPSK, 3DH5, Mid channel, 2441MHz, 20 MHz - 3.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



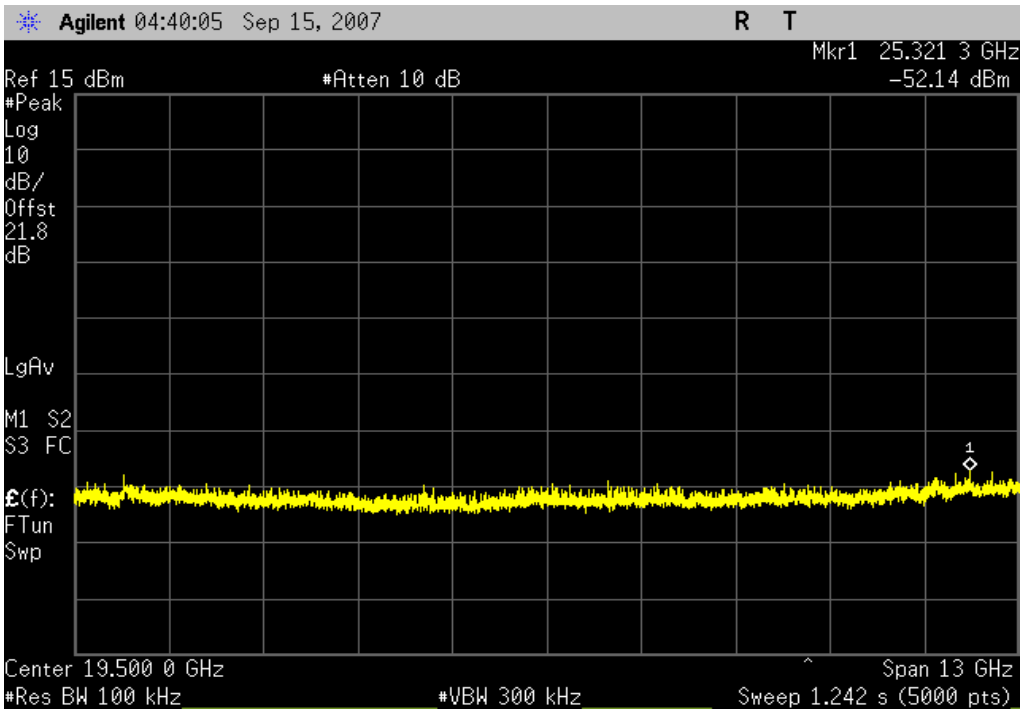
Bluetooth, 8DPSK, 3DH5, Mid channel, 2441MHz, 3 GHz - 6.6 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



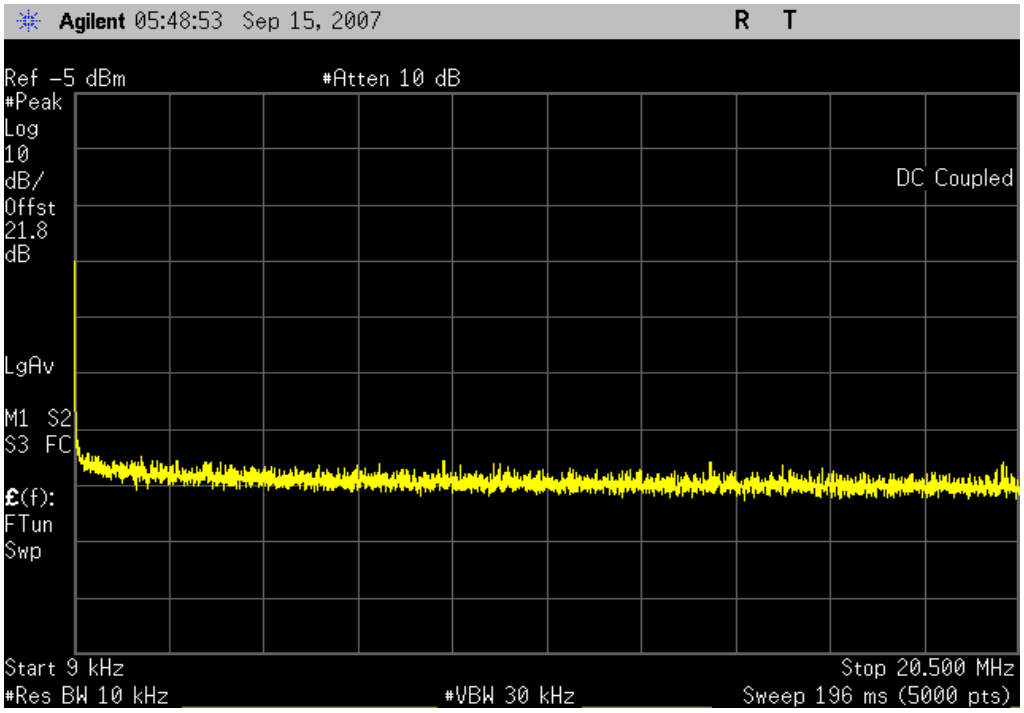
Bluetooth, 8DPSK, 3DH5, Mid channel, 2441MHz, 6.5 GHz - 13.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



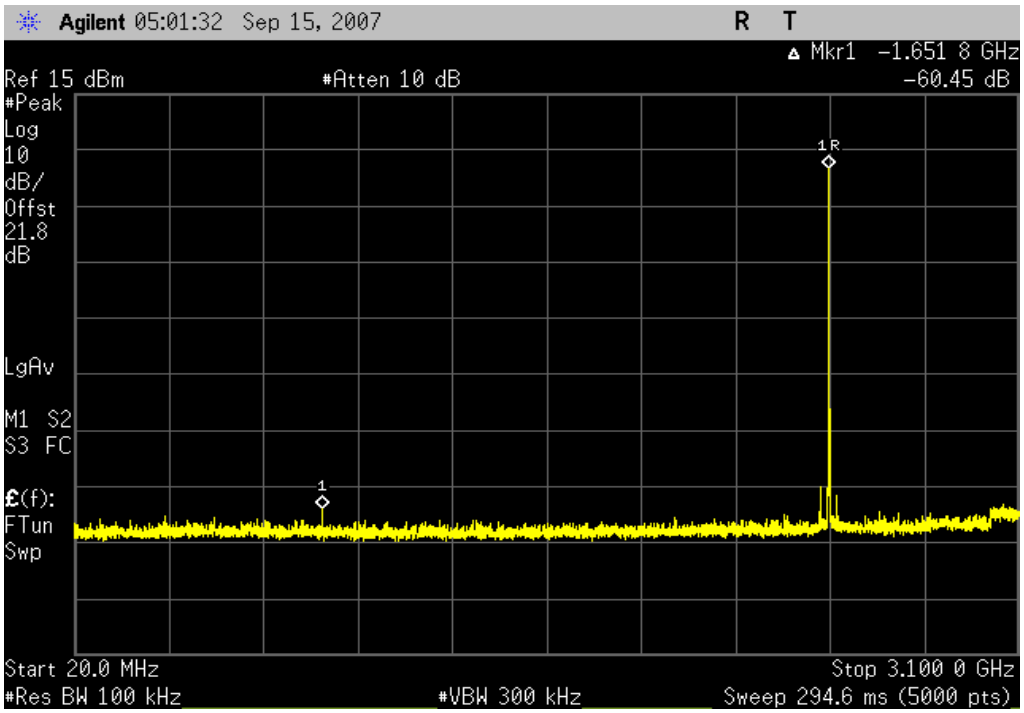
Bluetooth, 8DPSK, 3DH5, Mid channel, 2441MHz, 13 GHz - 26 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



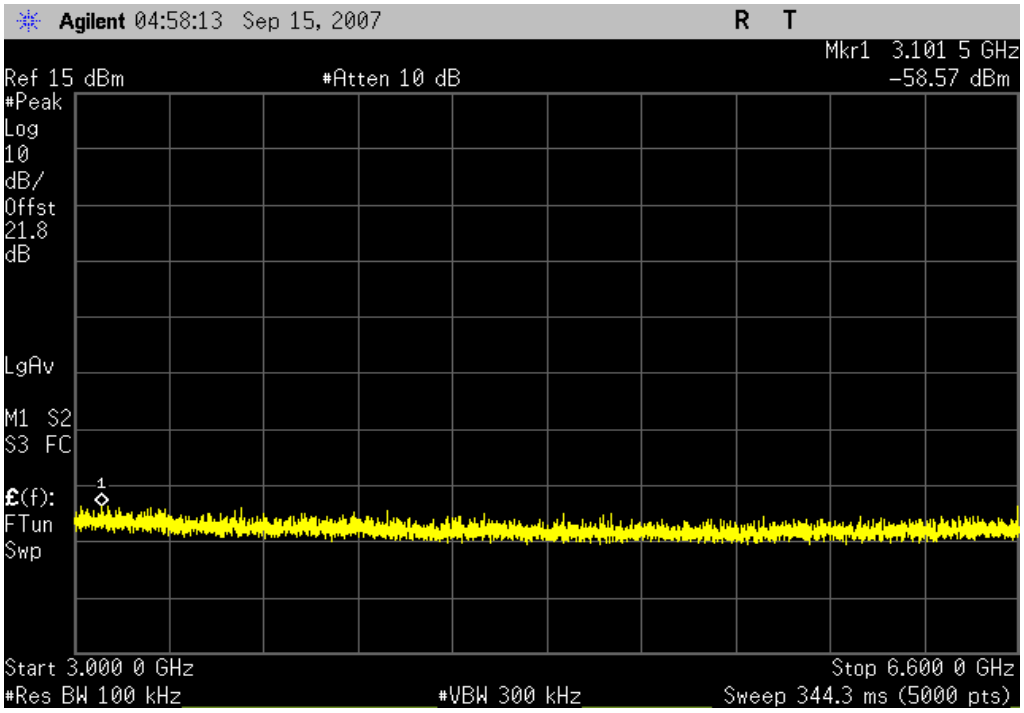
Bluetooth, 8DPSK, 3DH5, High channel, 2480MHz, 9 kHz - 20.5 MHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



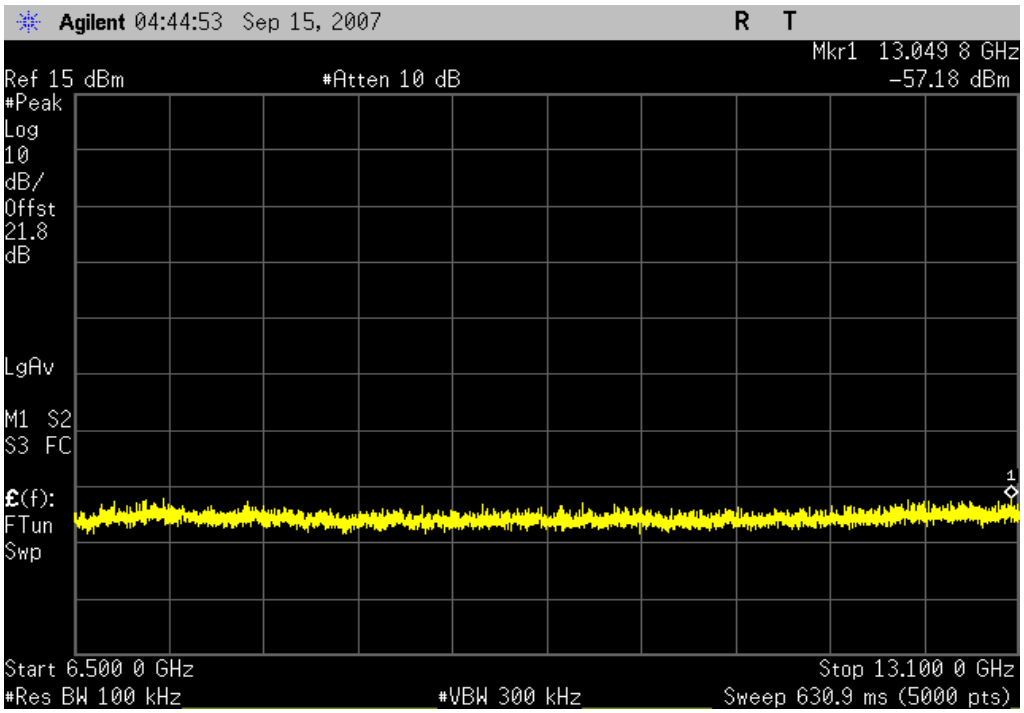
Bluetooth, 8DPSK, 3DH5, High channel, 2480MHz, 20 MHz - 3.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



Bluetooth, 8DPSK, 3DH5, High channel, 2480MHz, 3 GHz - 6.6 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc

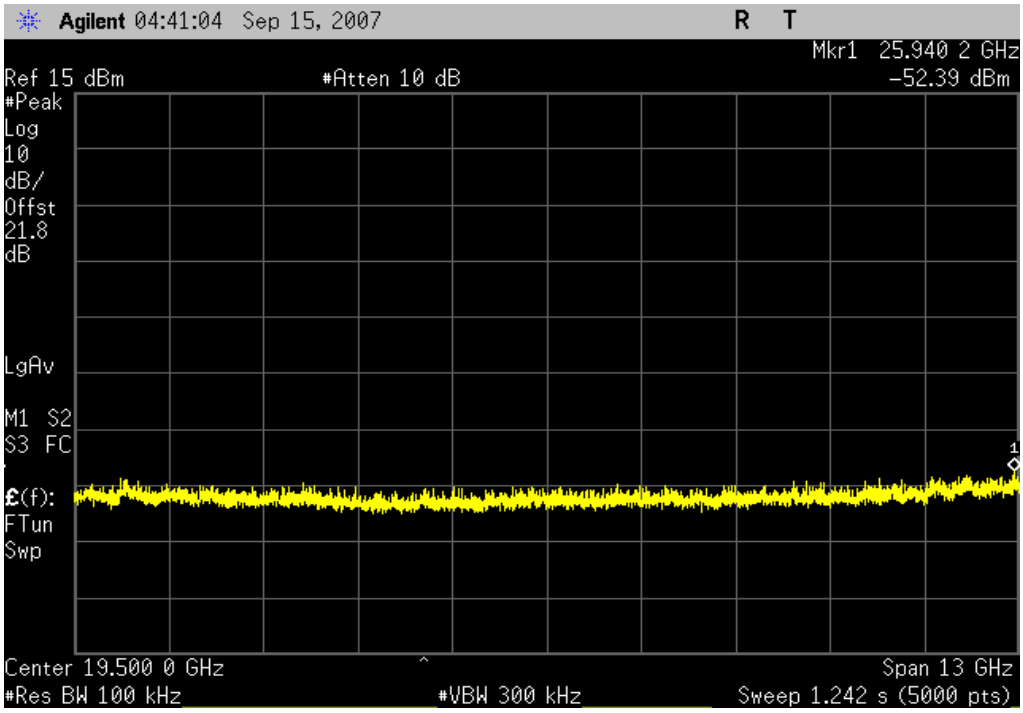


Bluetooth, 8DPSK, 3DH5, High channel, 2480MHz, 6.5 GHz - 13.1 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



Spurious Conducted Emissions

Bluetooth, 8DPSK, 3DH5, High channel, 2480MHz, 13 GHz - 26 GHz					
Result:	Pass	**Value:**	≤ -50 dBc	**Limit:**	≤ -20 dBc



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	6/8/2007	13
Spectrum Analyzer	Agilent	E4440A	AAX	10/1/2007	12

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

The peak power spectral density measurements were measured with the EUT set to low, mid, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate using direct sequence modulation. Per the procedure outlined in FCC 97-114, the spectrum analyzer was used as follows:

> The emission peak(s) were located and zoom in on within the passband. The resolution bandwidth was set to 3 kHz, the video bandwidth was set to greater than or equal to the resolution bandwidth. The sweep speed was set equal to the span divided by 3 kHz (sweep = (SPAN/3 kHz)). For example, given a span of 1.5 MHz, the sweep should be 1.5 x 10^6 ÷ 3 x 10^3 = 500 seconds. External attenuation was used and added to the reading. The following FCC procedure was used for modifying the power spectral density measurements:

"If the spectrum line spacing cannot be resolved on the available spectrum analyzer, the noise density function on most modern conventional spectrum analyzers will directly measure the noise power density normalized to a 1 Hz noise power bandwidth. Add 34.8 dB for correction to 3 kHz."

NORTHWEST EMC

Power Spectral Density

XMit 2007.06.13

EUT:	Cordless Vantage Headset			Work Order:	LABT0276
Serial Number:	Unknown			Date:	09/20/07
Customer:	Logitech, Inc.			Temperature:	24°C
Attendees:	None			Humidity:	31%
Project:	None			Barometric Pres.:	1018
Tested by:	Holly Ashkannejhad	Power:	Battery	Job Site:	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074

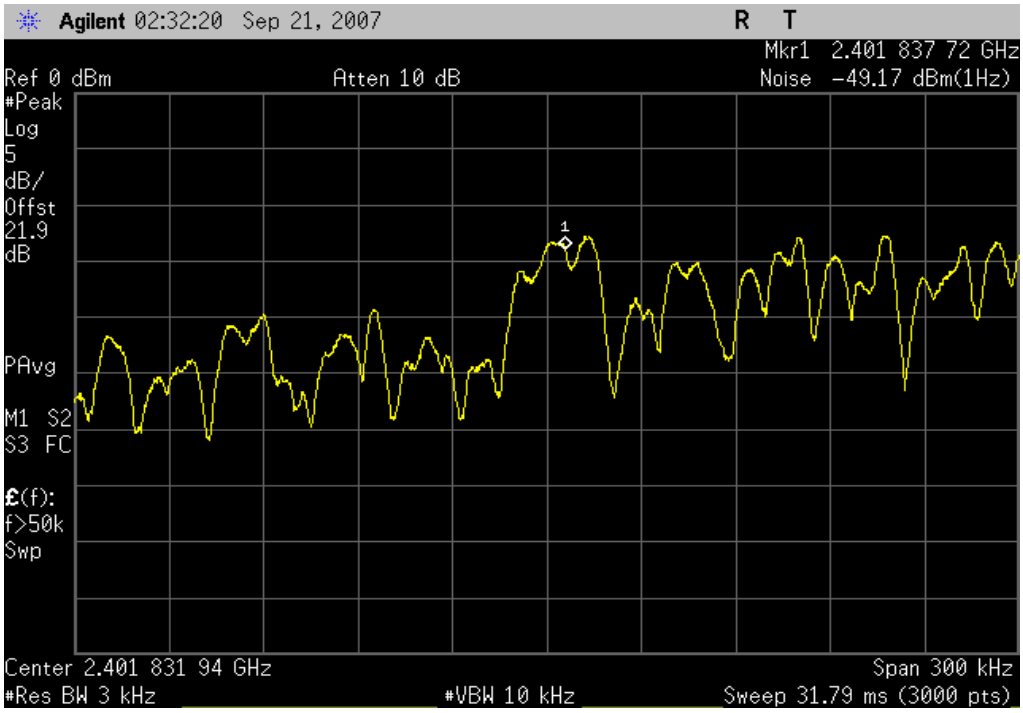
COMMENTS

DEVIATIONS FROM TEST STANDARD

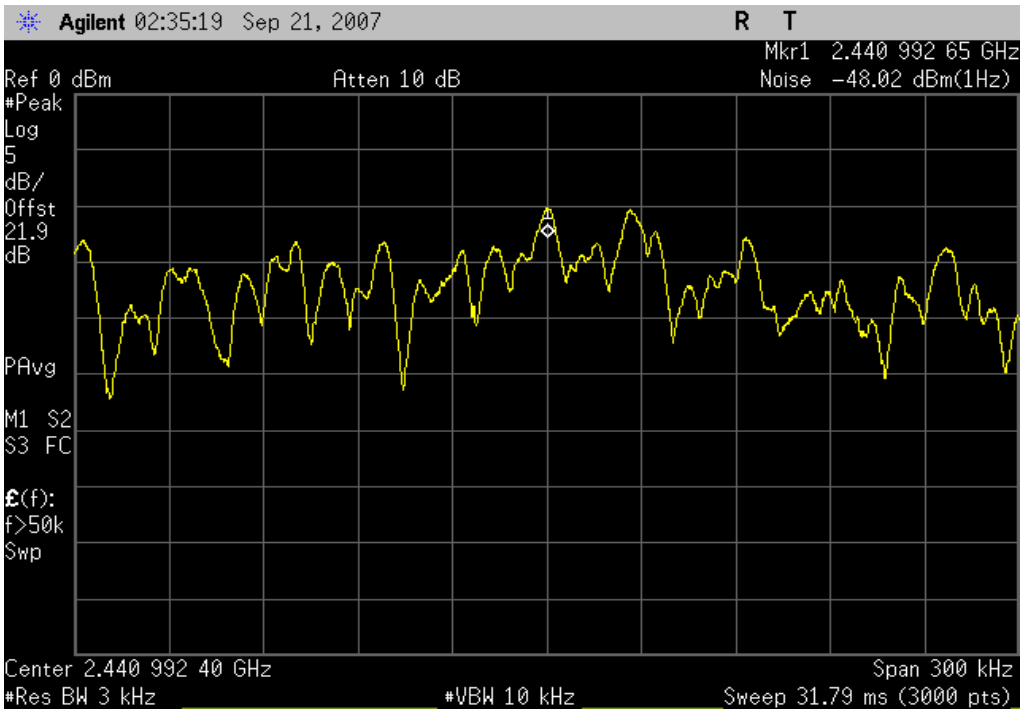
Configuration #	1	Signature

	Value	Limit	Results
Bluetooth, GFSK, DH5			
Low channel, 2402MHz	-14.37 dBm / 3 kHz	8 dBm / 3 kHz	Pass
Mid channel, 2441MHz	-13.22 dBm / 3 kHz	8 dBm / 3 kHz	Pass
High channel, 2480MHz	-14.7 dBm / 3 kHz	8 dBm / 3 kHz	Pass
Bluetooth, pi/4 -DQPSK, 2DH5			
Low channel, 2402MHz	-14.78 dBm / 3 kHz	8 dBm / 3 kHz	Pass
Mid channel, 2441MHz	-15.46 dBm / 3 kHz	8 dBm / 3 kHz	Pass
High channel, 2480MHz	-17.35 dBm / 3 kHz	8 dBm / 3 kHz	Pass
Bluetooth, 8-DPSK, 3DH5			
Low channel, 2402MHz	-14.46 dBm / 3 kHz	8 dBm / 3 kHz	Pass
Mid channel, 2441MHz	-15.49 dBm / 3 kHz	8 dBm / 3 kHz	Pass
High channel, 2480MHz	-17.35 dBm / 3 kHz	8 dBm / 3 kHz	Pass

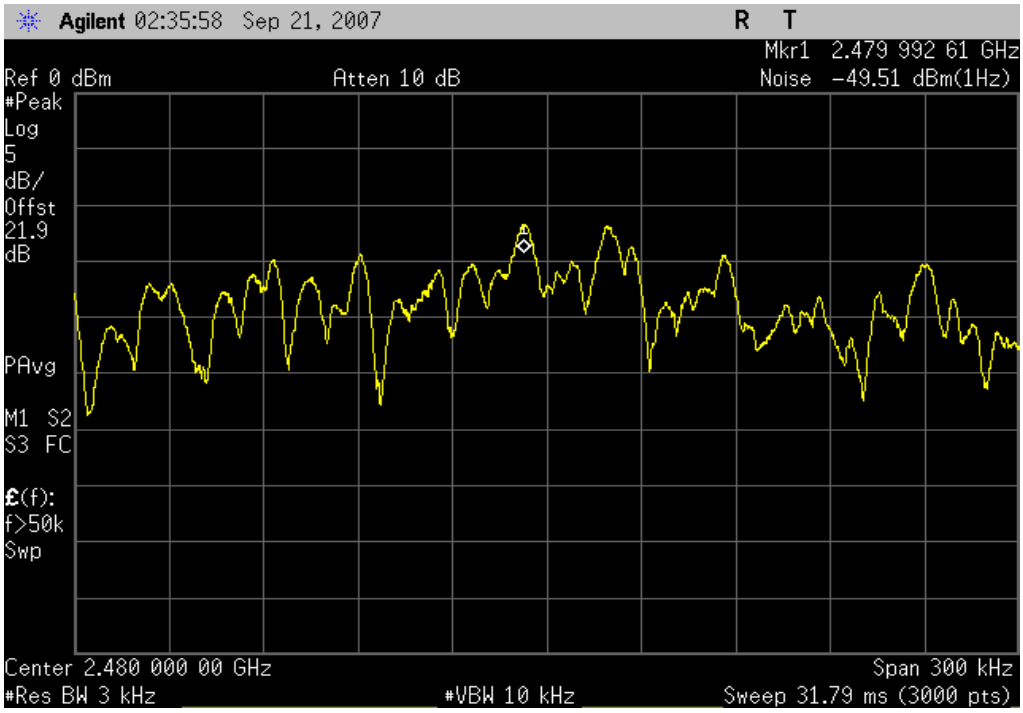
Bluetooth, GFSK, DH5, Low channel, 2402MHz					
Result:	Pass	**Value:**	-14.37 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



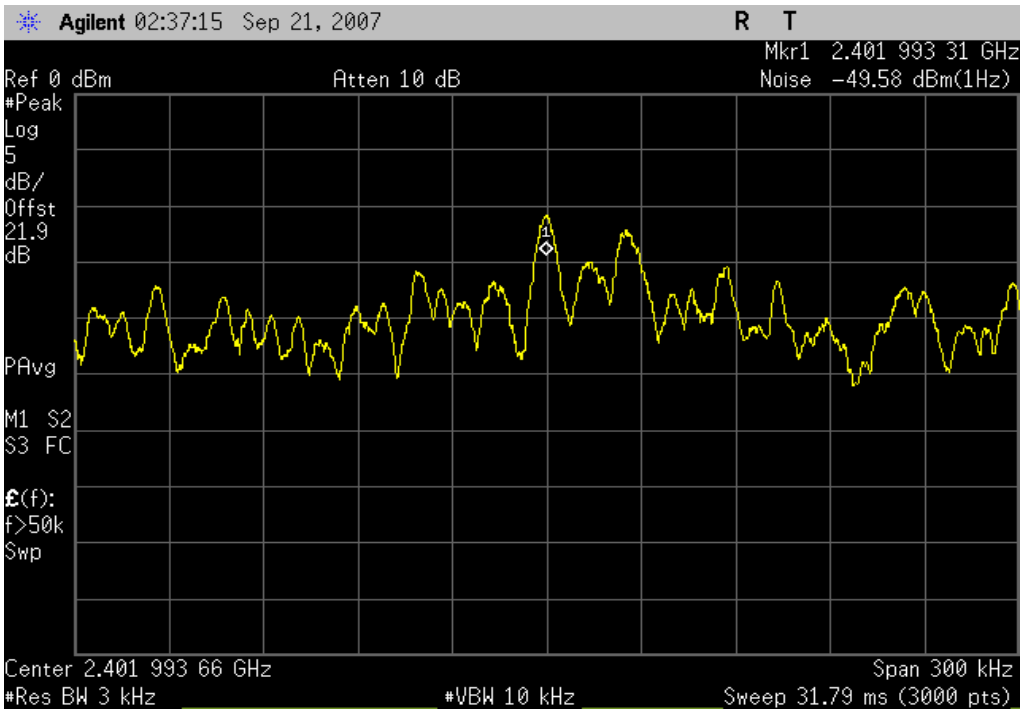
Bluetooth, GFSK, DH5, Mid channel, 2441MHz					
Result:	Pass	**Value:**	-13.22 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



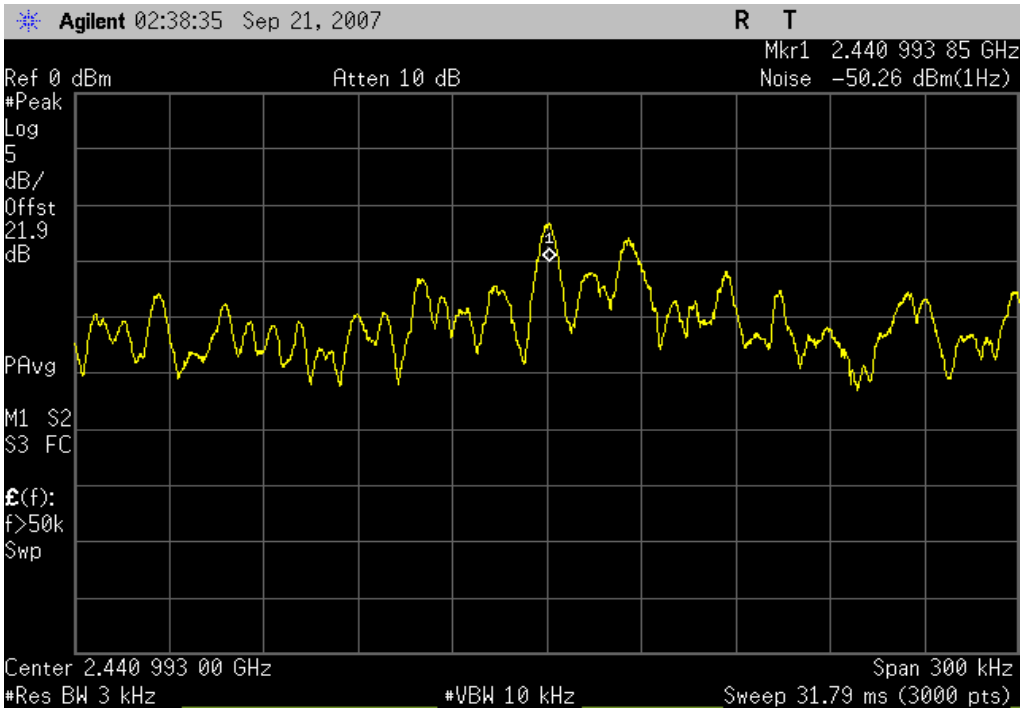
Bluetooth, GFSK, DH5, High channel, 2480MHz					
Result:	Pass	**Value:**	-14.7 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



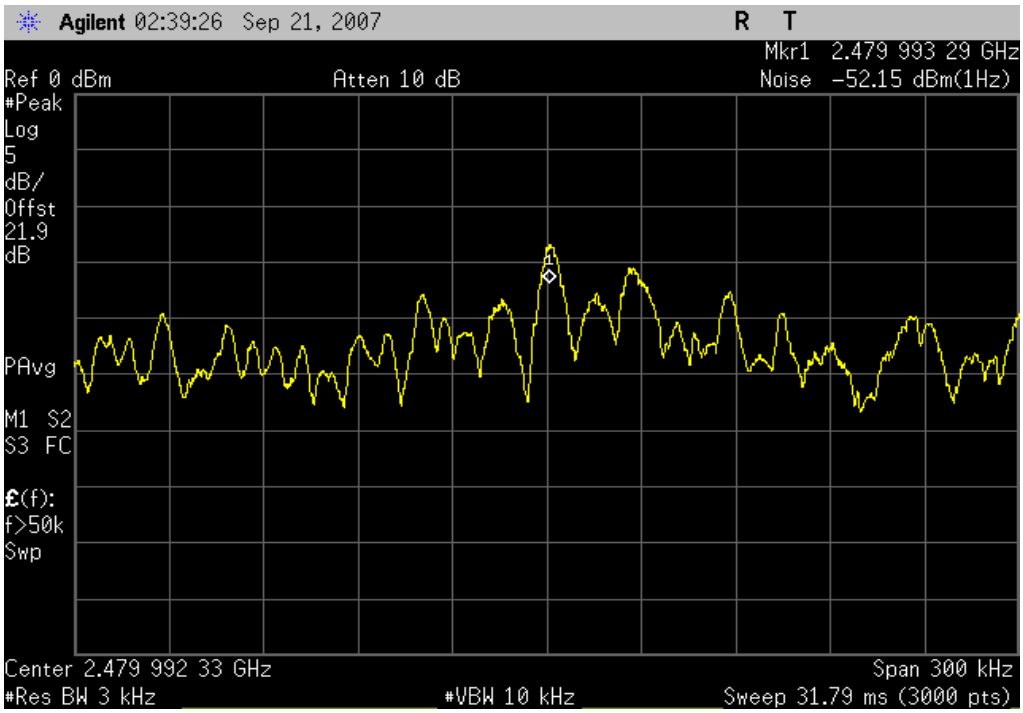
Bluetooth, pi/4 -DQPSK, 2DH5, Low channel, 2402MHz					
Result:	Pass	**Value:**	-14.78 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



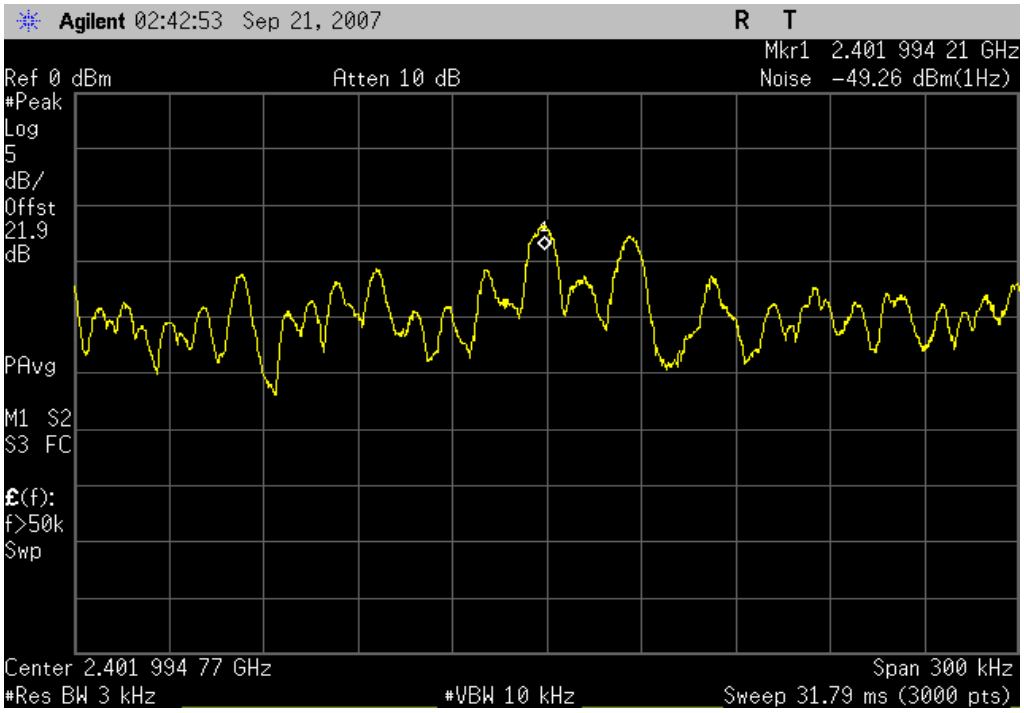
Bluetooth, pi/4 -DQPSK, 2DH5, Mid channel, 2441MHz					
Result:	Pass	**Value:**	-15.46 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



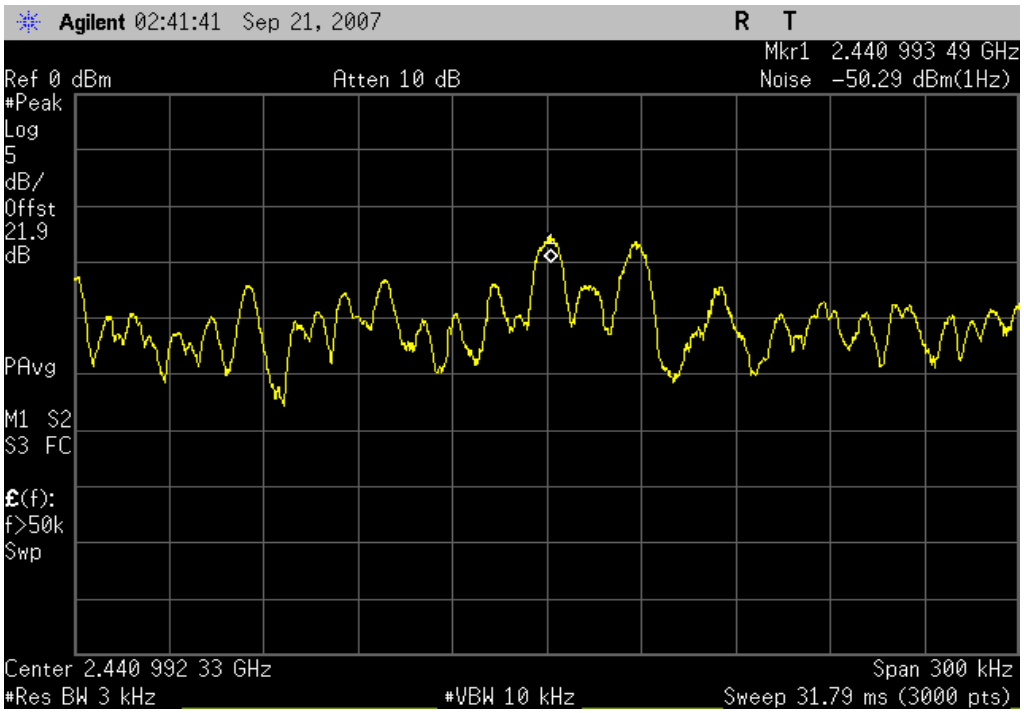
Bluetooth, pi/4 -DQPSK, 2DH5, High channel, 2480MHz					
Result:	Pass	**Value:**	-17.35 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



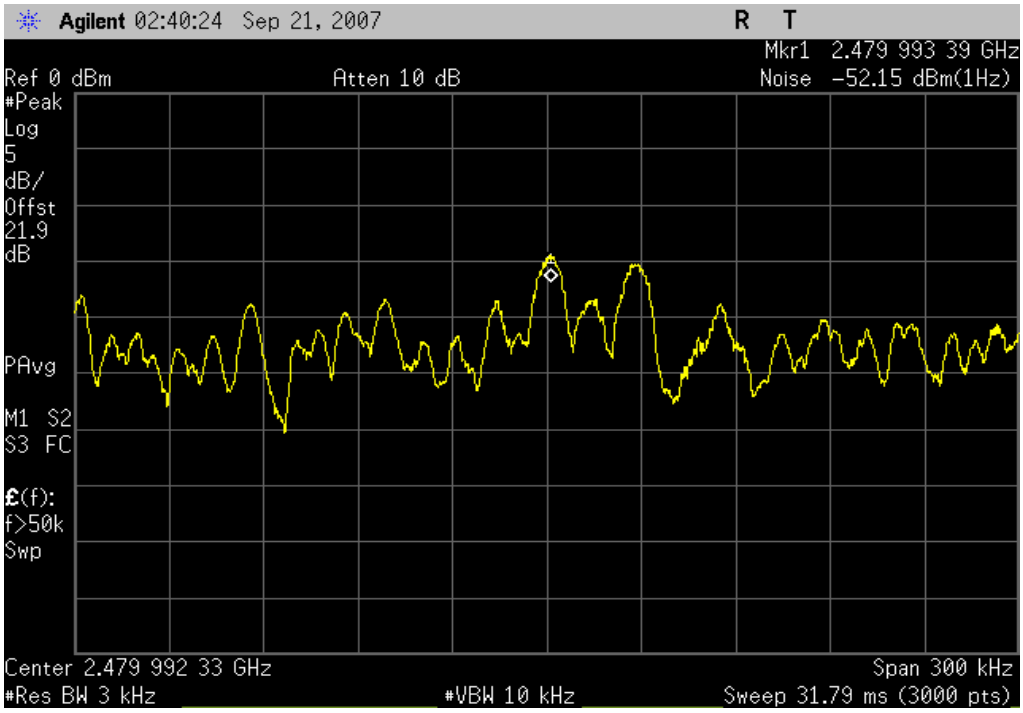
Bluetooth, 8-DPSK, 3DH5, Low channel, 2402MHz					
Result:	Pass	**Value:**	-14.46 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



Bluetooth, 8-DPSK, 3DH5, Mid channel, 2441MHz					
Result:	Pass	**Value:**	-15.49 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



Bluetooth, 8-DPSK, 3DH5, High channel, 2480MHz					
Result:	Pass	**Value:**	-17.35 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



BLUETOOTH APPROVALS

FCC Procedure Received from Joe Dichoso on 2-15-02

The following exhibit indicates the FCC Spread Spectrum requirements in Section 15.247 for devices meeting the Bluetooth Specifications in the 2.4 GHz band as of February 2001 operating in the USA. The purpose of this exhibit is to help expedite the approval process for Bluetooth devices. This exhibit provides items that vary for each device and also provides a list of items that are common to Bluetooth devices that explains the remaining requirements. The list of common items can be submitted for each application for equipment authorization. This exhibit only specifies requirements in Section 15.247, requirements in other rule Sections for intentional radiators such as in Section 15.203 or 15.207 must be also be addressed. A Bluetooth device is a FHSS transmitter in the data mode and applies as a Hybrid spread spectrum device in the acquisition mode.

For each individual device, the following items, 1-7 will vary from one device to another and must be submitted.

1) The occupied bandwidth in Section 15.247(a)(1)(ii).
2) Conducted output power specified in Section 15.247(b)(1).
3) EIRP limit in Section 15.247(b)(3).
4) RF safety requirement in Section 15.247(b)(4)
5) Spurious emission limits in Section 15.247(c).
6) Processing gain and requirements for Hybrids in Section 15.247(f) in the acquisition mode.
7) Power spectral density requirement in Section 15.247(f) in the acquisition mode.

For all devices, the following items, 1-12, are common to all Bluetooth devices and will not vary from one device to another. This list can be copied into the filing.

1 Output power and channel separation of a Bluetooth device in the different operating modes:

The different operating modes (data-mode, acquisition-mode) of a Bluetooth device don't influence the output power and the channel spacing. There is only one transmitter which is driven by identical input parameters concerning these two parameters.
Only a different hopping sequence will be used. For this reason, the RF parameters in one op-mode is sufficient.

2 Frequency range of a Bluetooth device:

The maximum frequency of the device is: **2402 – 2480 M**Hz.
This is according the Bluetooth Core Specification V 1.0B (+ critical errata) for devices which will be operated in the USA. Other frequency ranges (e.g. for Spain, France, Japan) which are allowed according the Core Specification must **not be** supported by the device.

3 Co-ordination of the hopping sequence in data mode to avoid simultaneous occupancy by multiple transmitters:

Bluetooth units which want to communicate with other units must be organized in a structure called piconet. This piconet consist of max. 8 Bluetooth units. One unit is the master the other seven are the slaves. The master co-ordinates frequency occupation in this piconet for all units. As the master hop sequence is derived from it's BD address which is unique for every Bluetooth device, additional masters intending to establish new piconets will always use different hop sequences.

4 Example of a hopping sequence in data mode:

Example of a 79 hopping sequence in data mode:
40, 21, 44, 23, 42, 53, 46, 55, 48, 33, 52, 35, 50, 65, 54, 67,
56, 37, 60, 39, 58, 69, 62, 71, 64, 25, 68, 27, 66, 57, 70, 59,
72, 29, 76, 31, 74, 61, 78, 63, 01, 41, 05, 43, 03, 73, 07, 75,
09, 45, 13, 47, 11, 77, 15, 00, 64, 49, 66, 53, 68, 02, 70, 06,
01, 51, 03, 55, 05, 04

5 Equally average use of frequencies in data mode and short transmissions:

The generation of the hopping sequence in connection mode depends essentially on two input values:
1. LAP/UAP of the master of the connection
2. Internal master clock

The LAP (lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP (upper address part) are the 24 MSB's of the 48 BD_ADDRESS. The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For synchronization with other units, only the offsets are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5 µs. The clock has a cycle of about one day (23h30). In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire LAP (24 bits), 4 LSB's (4 bits) (Input 1) and the 27 MSB's of the clock (Input 2) are used. With this input values different mathematical procedures (permutations, additions, XOR-operations) are performed to generate the sequence. This will be done at the beginning of every new transmission.
Regarding short transmissions, the Bluetooth system has the following behavior:
The first connection between the two devices is established, a hopping sequence is generated. For transmitting the wanted data, the complete hopping sequence is not used and the connection ends. The second connection will be established. A new hopping sequence is generated. Due to the fact that the Bluetooth clock has a different value, because the period between the two transmission is longer (and it cannot be shorter) than the minimum resolution of the clock (312.5 µs). The hopping sequence will always differ from the first one.

6 Receiver input bandwidth, synchronization and repeated single or multiple packets:

The input bandwidth of the receiver is 1 MHz.
In every connection, one Bluetooth device is the master and the other one is the slave. The master determines the hopping sequence (see chapter 5). The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally the type of connection (e.g. single or multi-slot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing is according to the packet type of the connection. Also, the slave of the connection uses these settings. Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence

7 Dwell time in data mode

The dwell time of 0.3797s within a 30 second period in data mode is independent from the packet type (packet length). The calculation for a 30 second period is a follows:
Dwell time = time slot length * hop rate / number of hopping channels *30s
Example for a DH1 packet (with a maximum length of one time slot)
Dwell time = 625 µs * 1600 1/s / 79 * 30s = 0.3797s (in a 30s period)

For multi-slot packet the hopping is reduced according to the length of the packet.
Example for a DH5 packet (with a maximum length of five time slots)
Dwell time = 5 * 625 µs * 1600 * 1/5 *1/s / 79 * 30s = 0.3797s (in a 30s period)
This is according the Bluetooth Core Specification V 1.0B (+ critical errata) for all Bluetooth devices. Therefore, all Bluetooth devices **comply** with the FCC dwell time requirement in the data mode.
This was checked during the Bluetooth Qualification tests.
The Dwell time in hybrid mode is approximately 2.6 mS (in a 12.8s period)

8 Channel Separation in hybrid mode

The nominal channel spacing of the Bluetooth system is 1Mhz independent of the operating mode.
The maximum “initial carrier frequency tolerance” which is allowed for Bluetooth is fcenter = 75 kHz.
This was checked during the Bluetooth Qualification tests (Test Case: TRM/CA/07-E) for three frequencies (2402, 2441, 2480 MHz).

9 Derivation and examples for a hopping sequence in hybrid mode

For the generation of the inquiry and page hop sequences the same procedures as described for the data mode are used (see item 5), but this time with different input vectors:
**For the inquiry hop sequence, a predefined fixed address is always used. This results in the same 32 frequencies used by all devices doing an inquiry but every time with a different start frequency and phase in this sequence.
**For the page hop sequence, the device address of the paged unit is used as the input vector. This results in the use of a subset of 32 frequencies which is specific for that initial state of the connection establishment between the two units. A page to different devices would result in a different subset of 32 frequencies.
So it is ensured that also in hybrid mode, the frequency is used equally on average.
Example of a hopping sequence in inquiry mode:
48, 50, 09, 13, 52, 54,41, 45, 56, 58, 11, 15, 60, 62, 43, 47, 00, 02, 64, 68, 04, 06, 17, 21, 08, 10, 66, 70, 12, 14, 19, 23
Example of a hopping sequence in paging mode:
08, 57, 68, 70, 51, 02, 42, 40, 04, 61, 44, 46, 63, 14, 50, 48, 16, 65, 52, 54, 67, 18, 58, 56, 20, 53, 60, 62, 55, 06, 66, 64

10 Receiver input bandwidth and synchronization in hybrid mode:

The receiver input bandwidth is the same as in the data mode (1 MHz). When two Bluetooth devices establish contact for the first time, one device sends an inquiry access code and the other device is scanning for this inquiry access code. If two devices have been connected previously and want to start a new transmission, a similar procedure takes place. The only difference is, instead of the inquiry access code, a special access code, derived from the BD_ADDRESS of the paged device will be, will be sent by the master of this connection. Due to the fact that both units have been connected before (in the inquiry procedure) the paging unit has timing and frequency information about the page scan of the paged unit. For this reason the time to establish the connection is reduced.

11 Spread rate / data rate of the direct sequence signal

The Spread rate / Data rate in inquiry and paging mode can be defined via the access code. The access code is the only criterion for the system to check if there is a valid transmission or not. If you regard the presence of a valid access code as one bit of information, and compare it with the length of the access code of 68 bits, the Spread rate / Data rate will be 68/1.

12 Spurious emission in hybrid mode

The Dwell in hybrid mode is shorter than in data mode. For this reason the spurious emissions average level in data mode is worst case. The spurious emissions peak level is the same for both modes.