Electromagnetic Compatibility Test Report

Tests Performed on a Dearborn Group

Bluetooth Module Transciever, Model DPA5

Radiometrics Document RP-6632

ACCREDITED
Certification # 1495.01

Product Detail:
FCC ID: XOV13EAVOX
IC: 8377A-DGDPA5
Equipment type: 2.4 GHz Bluetooth Transmitter

Test Standards:
US CFR Title 47, Chapter I, FCC Part 15 Subpart C
FCC Part 15 CFR Title 47: 2008
Industry Canada RSS-210, Issue 7: 2007 as required for Category I Equipment

This report concerns: Original Grant for Certification
FCC Part 15.247

Tests Performed For:	*Test Facility:*
Dearborn Group 33604 West Eight Mile Rd. Farmington Hills, MI 48335	**Radiometrics Midwest Corporation** 12 East Devonwood Romeoville, IL 60446

Test Date(s): (Month-Day-Year)
October 14 to 26, 2009

Document RP-6632 Revisions:

Rev.	Issue Date	Affected Pages	Revised By
0	November 19, 2009		
1	December 16, 2009	All	
2	December 17, 2009	All	

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1 ADMINISTRATIVE DATA

Equipment Under Test: A Dearborn Group, Bluetooth Module Model: DPA5 Serial Number: 0000-0D8F-E378 This will be referred to as the EUT in this Report	
Date EUT Received at Radiometrics: (Month-Day-Year) October 14, 2009	*Test Date(s): (Month-Day-Year)* October 14 to 26, 2009
Test Report Written By: Joseph Strzelecki Senior EMC Engineer	*Test Witnessed By:* Marc Kiefer Dearborn Group
Radiometrics' Personnel Responsible for Test: Joseph Strzelecki 11/19/09 Joseph Strzelecki Senior EMC Engineer NARTE EMC-000877-NE	*Test Report Approved By* Chris W. Carlson Chris W. Carlson Director of Engineering NARTE EMC-000921-NE

2 TEST SUMMARY AND RESULTS

The EUT (Equipment Under Test) is a Bluetooth Module, Model DPA5, manufactured by Dearborn Group. The detailed test results are presented in a separate section. The following is a summary of the test results.

Spread Spectrum Transmitter Requirements

Environmental Phenomena	Frequency Range	FCC Section	RSS-210 Section	Test Result
Carrier Frequency Separation	2400 to 2483 MHz	15.247 a	A8.1 (2)	Pass
Number of Hopping Frequencies	2400 to 2483 MHz	15.247 a	A8.1 (2)	Pass
Time of Occupancy (Dwell Time)	2400 to 2483 MHz	15.247 a	A8.1 (2)	Pass
20 dB Bandwidth Test;	2400 to 2483 MHz	15.247 a	A8.1 (4)	Pass
Peak Output Power	2400 to 2483 MHz	15.247 b	A8.1 (1)	Pass
Band-edge Compliance of RF Conducted Emissions	2400 to 2483 MHz	15.247 d	A8.4 (2)	Pass
Spurious RF Conducted Emissions	30 MHz to 25 GHz	15.247 d	A8.5	Pass
Spurious Radiated Emissions	30 MHz to 25 GHz	15.247 d	A8.5	Pass

This product is battery powered or from the Automotive battery. Therefore it is exempt from AC conducted emissions.

2.1 RF Exposure Compliance Requirements

The effective radiated power output is 46 mW, The EUT meets the FCC requirement for RF exposure. Since the EUT is less than 200 mW, it is exempt from RSS-102. There are no power level adjustments and the antenna is permanently attached. The detailed calculations for RF Exposure are presented in a separate document.

3 EQUIPMENT UNDER TEST (EUT) DETAILS

3.1 EUT Description

The EUT is a Bluetooth Module, Model DPA5, manufactured by Dearborn Group. The EUT was in good working condition during the tests, with no known defects.

3.1.1 FCC Section 15.203 & RSS-GEN Antenna Requirements

The antenna is attached to the PCB via a unique connector. The antenna is internal to the EUT and it is not readily available to be modified by the end user. Therefore, it meets the 15.203 Requirement.

3.2 Related Submittals

Dearborn Group is not submitting any other products simultaneously for equipment authorization related to the EUT.

4 TESTED SYSTEM DETAILS

4.1 Tested System Configuration

The system was configured for testing in a typical fashion. The EUT was placed on an 80-cm high, nonconductive test stand. The testing was performed in conditions as close as possible to installed conditions. Wiring was consistent with manufacturer's recommendations.

Power was supplied at 13.5 VDC, as it is typically powered by an automotive power source.

The identification for all equipment, plus descriptions of all cables used in the tested system, are:

Tested System Configuration List

Item	Description	Type*	Manufacturer	Model Number	Serial Number
1	Bluetooth Module	E	Dearborn Group	DPA5	0000-0D8F-E378
2	Notebook PC	H	Panasonic	CF-73	CF-73JCQTXKM
3	Notebook PC Power Supply (CF-73)	P	Panasonic	CF-AA1653A M3	1563AM305505659C
4	Modem	P	3Com	Sportster	005686-03

* Type: E = EUT, P = Peripheral, S = Support Equipment; H = Host Computer

List of System Cables

QTY	Length (m)	Cable Description	Connected to (Item #)	Shielded?
1	1.8	Vehicle interface cable	#1 to vehicle simulator	No
1	1.8	USB cable	#1 and #3	Yes

4.2 Special Accessories

No special accessories were used during the tests in order to achieve compliance.

4.3 Equipment Modifications

No modifications were made to the EUT at Radiometrics' test facility in order to comply with the standards listed in this report.

5 TEST SPECIFICATIONS AND RELATED DOCUMENTS

Document	Date	Title
FCC CFR Title 47	2008	Code of Federal Regulations Title 47, Chapter 1, Federal Communications Commission, Part 15 - Radio Frequency Devices
ANSI C63.4-2003	2003	Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
IC RSS-210 Issue 7	2007	Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands) Category I Equipment
IC RSS-Gen Issue 2	2007	General Requirements and Information for the Certification of Radiocommunication Equipment (RSS-Gen)
FCC DA 00-705	2000	Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems

The test procedures used are in accordance with the FCC DA 00-705, Industry Canada RSS-212 and ANSI document C63.4-2003, "Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The specific procedures are described herein. Radiated testing was performed at an antenna to EUT distance of 3 meters. The antenna was raised and lowered from 1 to 4 meters.

6 RADIOMETRICS' TEST FACILITIES

The results of these tests were obtained at Radiometrics Midwest Corp. in Romeoville, Illinois, USA. Radiometrics is accredited by A2LA (American Association for Laboratory Accreditation) to conform to ISO/IEC 17025: 2005 "General Requirements for the Competence of Calibration and Testing Laboratories". Radiometrics' Lab Code is 121191 and Certification Number is 1495.01. Radiometrics' scope of accreditation includes all of the test methods listed herein. A copy of the accreditation can be accessed on our web site (www.radiomet.com). Radiometrics accreditation status can be verified at A2LA's web site (www.a2la2.org).

The following is a list of shielded enclosures located in Romeoville, Illinois used during the tests:

Chamber A: Is an anechoic chamber that measures 24' L X 12' W X 12' H. The walls and ceiling are fully lined with ferrite absorber tiles. The floor has a 10' x 10' section of ferrite absorber tiles located in the center. Panashield of Rowayton, Connecticut manufactured the chamber. The enclosure is NAMAS certified.

Chamber E: Is a custom made anechoic chamber that measures 52' L X 30' W X 18' H. The walls and ceiling are fully lined with RF absorber. Pro-shield of Collinsville, Oklahoma manufactured the chamber.

Test Station F: Is an area that measures 10' D X 12' W X 10' H. The floor and back wall are metal shielded. This area is used for conducted emissions measurements.

A separate ten-foot long, brass plated, steel ground rod attached via a 6 inch copper braid grounds each of the above chambers. Each enclosure is also equipped with low-pass power line filters.

The FCC has accepted these sites as test site number US1065. The FCC test site Registration Number is 732175. Details of the site characteristics are on file with the Industry Canada as site number IC3124A-1.

A complete list of the test equipment is provided herein. The calibration due dates are indicated on the equipment list. The equipment is calibrated in accordance to ANSI/NCSL Z540-1 with traceability to the National Institute of Standards and Technology (NIST).

7 DEVIATIONS AND EXCLUSIONS FROM THE TEST SPECIFICATIONS

There were no deviations or exclusions from the test specifications.

8 CERTIFICATION

Radiometrics Midwest Corporation certifies that the data contained herein was taken under conditions that meet or exceed the requirements of the test specification. The results relate only to the EUT listed herein. Any modifications made to the EUT subsequent to the indicated test date will invalidate the data and void this certification.

9 TEST EQUIPMENT TABLE

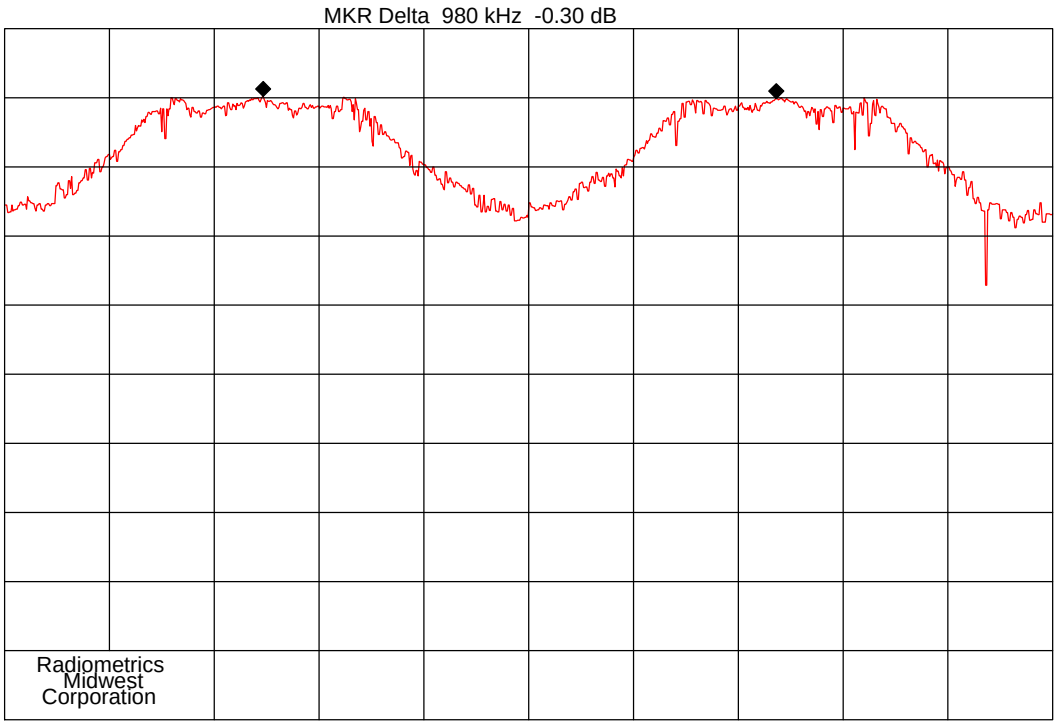
RMC ID	Manufacturer	Description	Model No.	Serial No.	Frequency Range	Cal Period	Cal Date
AMP-05	RMC/Celeritek	Pre-amplifier	MW110G	1001	1.0-12GHz	12 Mo.	02/01/09
AMP-20	Avantek	Pre-amplifier	SF8-0652	15221	8-18GHz	12 Mo	02/01/09
AMP-22	Anritsu	Pre-amplifier	MH648A	M23969	0.1-1200MHz	12 Mo.	02/03/09
ANT-13	EMCO	Horn Antenna	3115	2502	1.0-18GHz	24 Mo.	10/22/08
ANT-44	Impossible Machine	Super Log Antenna	SL-20M2G	1002	20-2000MHz	24 Mo.	12/26/07
ANT-53	EMCO	Loop Antenna	6507	1453	1 kHz-30 MHz	12 Mo	11/04/09
LSN-01	Electrometrics	50 uH LISN	FCC/VDE 50/2	1001	0.01-30MHz	24 Mo.	06/01/09
LSN-03	Farnell	50 uH LISN	1EXLSN30B	000314	0.01-30MHz	24 Mo.	06/01/09
REC-01	Hewlett Packard	Spectrum Analyzer	8566A	2106A02115, 2209A01349	30Hz-22GHz	12 Mo.	10/23/08
REC-03	Anritsu	Spectrum Analyzer	MS2601B	MT94589	0.01-2200MHz	12 Mo.	03/09/09
REC-07	Anritsu	Spectrum Analyzer	MS2601A	MT53067	0.01-2200MHz	12 Mo.	03/09/09
REC-08	Hewlett Packard	Spectrum Analyzer	8566B	2648A13481 2209A01436	30Hz-22GHz	12 Mo.	08/21/09
THM-01	Extech Inst.	Temp/Humid Meter	4465CF	001106557	N/A	24 Mo.	01/18/08

Note: All calibrated equipment is subject to periodic checks.

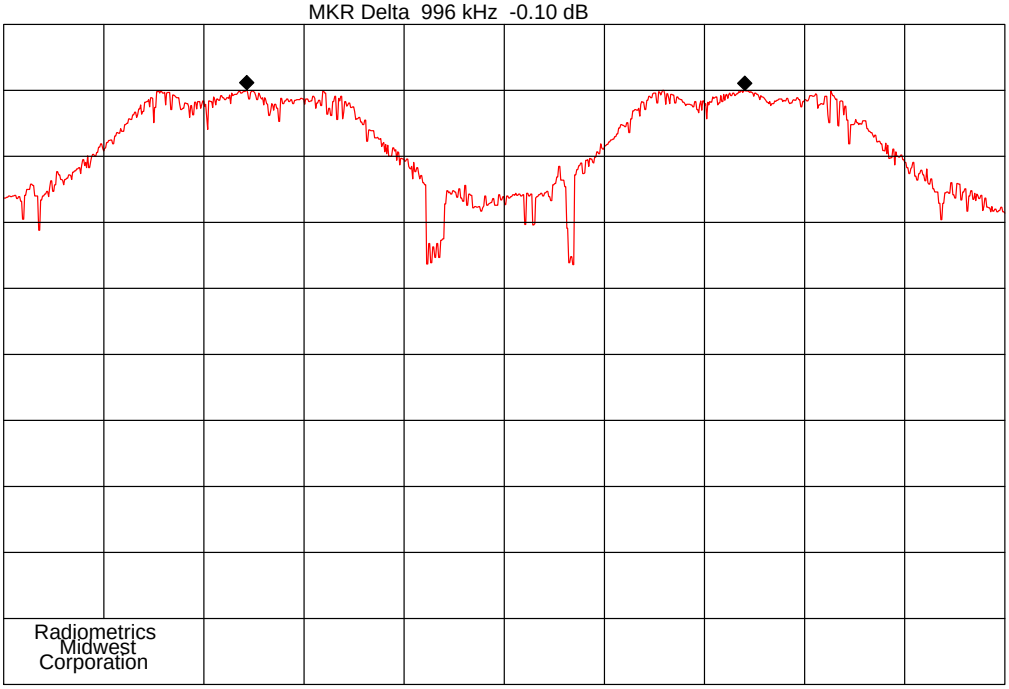
10 TEST SECTIONS

10.1 Carrier Frequency Separation

The EUT has its hopping function enabled. The spectrum analyzer was set to the MAX HOLD mode to read peak emissions. The sweep was set to AUTO. The trace was allowed to stabilize. The marker-delta function was used to determine the separation between the peaks of the adjacent channels.



MKR Delta 996 kHz -0.10 dB

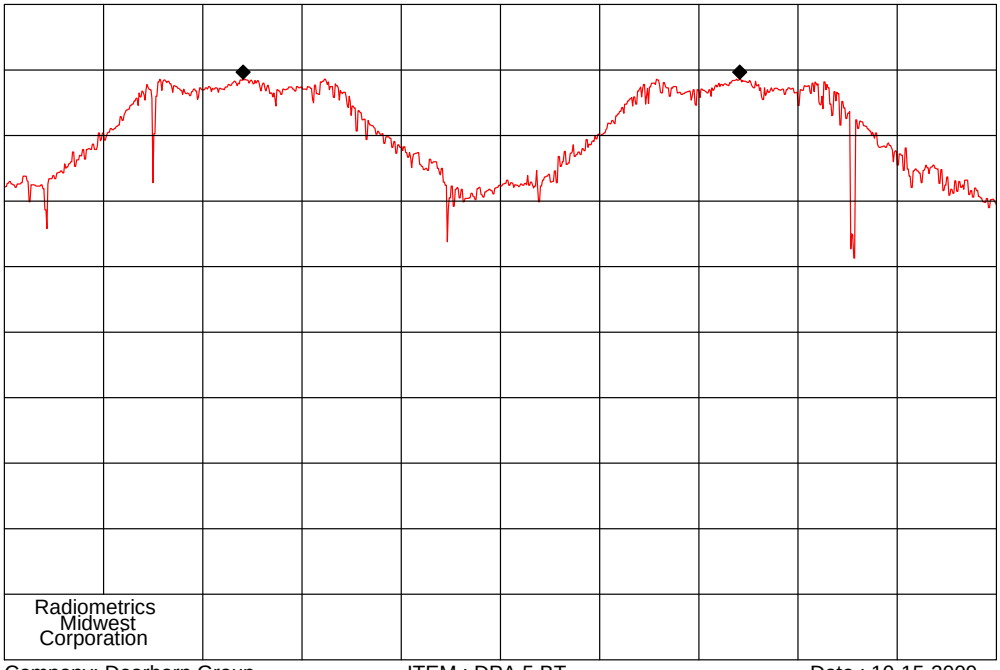


Company: Dearborn Group
CENTER 2.439 50 GHz
RES BW 100 kHz
10 dB/
Notes: Carrier Freq Separation, Middle Band

ITEM : DPA 5 BT
REF 97.0 dBuV
VBW 300 kHz
Time: 13:55

Date : 10-15-2009
SPAN 2.00 MHz
ATTEN 0 dB
SWP 20.0 msec

MKR Delta 1.002 MHz 0.00 dB



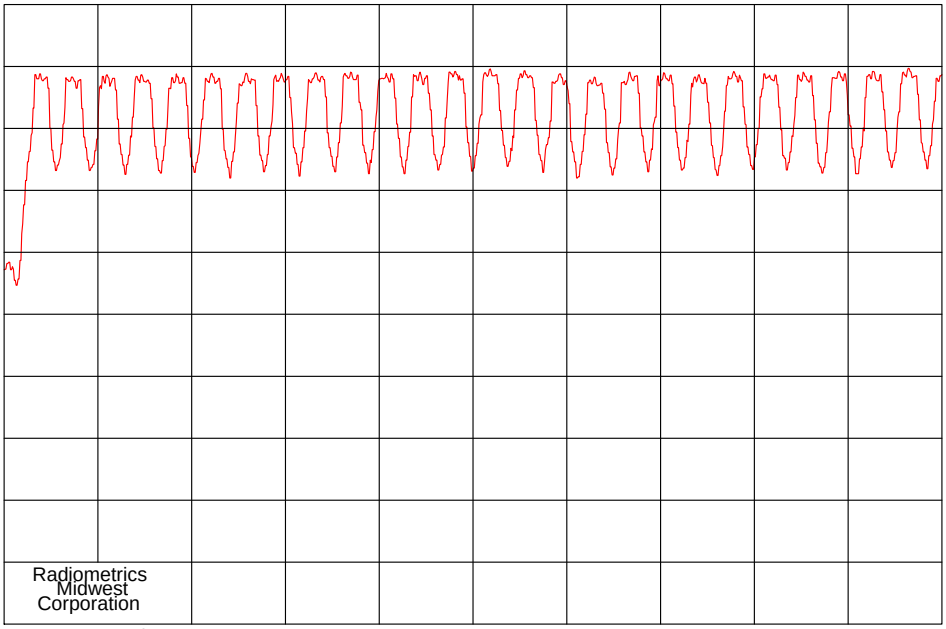
Company: Dearborn Group
CENTER 2.479 50 GHz
RES BW 100 kHz
10 dB/
Notes: Carrier Freq Separation, High Band

ITEM : DPA 5 BT
REF 97.0 dBuV
VBW 300 kHz
Time: 14:00

Date : 10-15-2009
SPAN 2.00 MHz
ATTEN 0 dB
SWP 20.0 msec

10.2 Number of Hopping Frequencies

The EUT has its hopping function enabled. The spectrum analyzer was set to the MAX HOLD mode to read peak emissions. The sweep was set to AUTO. The trace was allowed to stabilize.

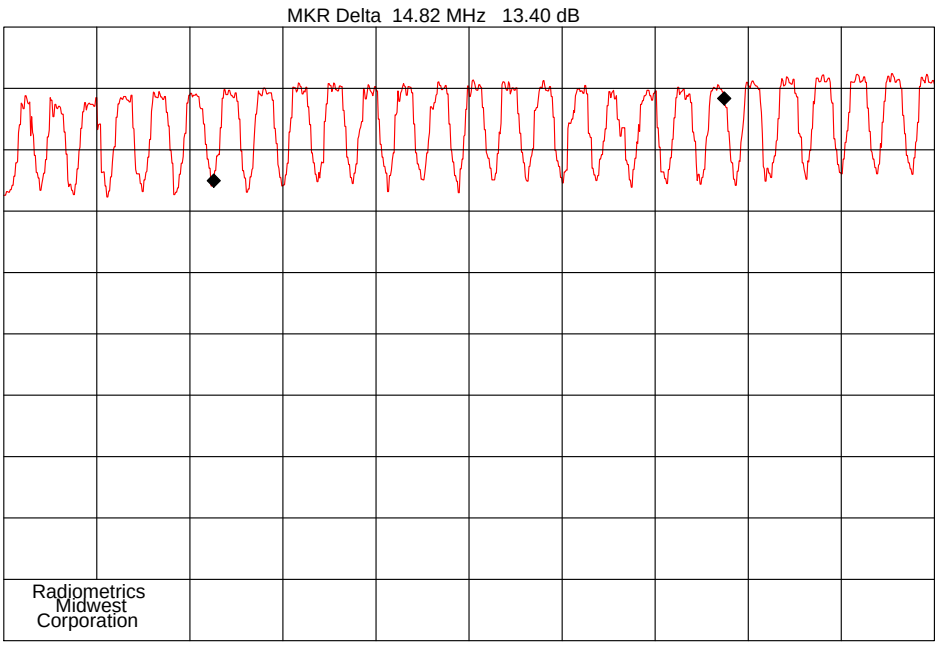


Company: Dearborn Group
CENTER 2.414 5 GHz
RES BW 100 kHz
10 dB/
Notes: # of Hopping Freqs, Low Band

ITEM : DPA 5 BT
REF 97.0 dBuV
VBW 300 kHz
Time: 14:47

Date : 10-15-2009
SPAN 27.0 MHz
ATTEN 0 dB
SWP 20.0 msec

26 Channels

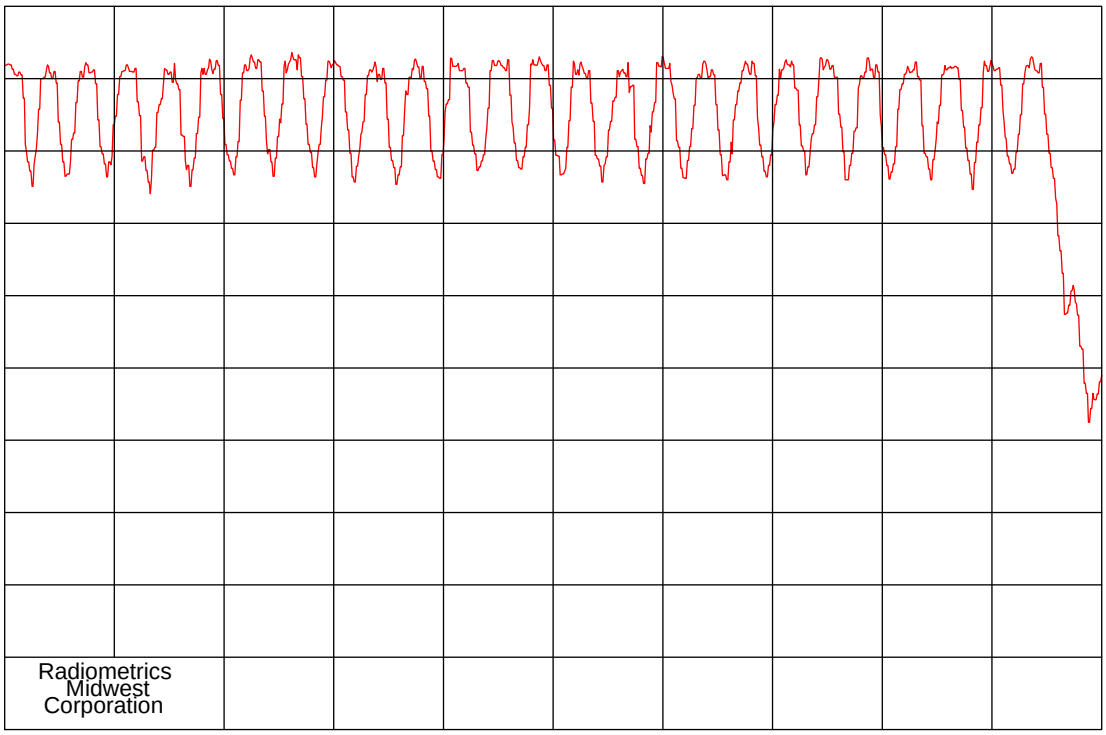


Company: Dearborn Group
CENTER 2.441 0 GHz
RES BW 100 kHz
10 dB/
Notes: # of Hopping Freqs, Middle Band

ITEM : DPA 5 BT
REF 97.0 dBuV
VBW 300 kHz
Time: 14:42

Date : 10-15-2009
SPAN 27.0 MHz
ATTEN 0 dB
SWP 20.0 msec

27 Channels



Company: Dearborn Group
CENTER 2.468 5 GHz
RES BW 100 kHz
10 dB/
Notes: # of Hopping Freqs, High Band

ITEM : DPA 5 BT
REF 97.0 dBuV
VBW 300 kHz
Time: 14:49

Date : 10-15-2009
SPAN 27.0 MHz
ATTEN 0 dB
SWP 20.0 msec

26 Channels

Total number of channels is 79.

10.3 Time of Occupancy (Dwell Time)

10.3.1 Dwell Time in a 30 second period

The period time = 0.4 (ms) * 79 = 32.6 (s)

2402 MHz
DH1 time slot = 0.405 (ms) * (1600/(2*79)) * 31.6 = 129.6 (mS)
DH3 time slot = 1.675 (ms) * (1600/(4*79)) * 31.6 = 268.0 (mS)
DH5 time slot = 2.925 (ms) * (1600/(6*79)) * 31.6 = 312.0 (ms)

2440 MHz
DH1 time slot = 0.405 (ms) * (1600/(2*79)) * 31.6 = 129.6 (mS)
DH3 time slot = 1.675 (ms) * (1600/(4*79)) * 31.6 = 268.0 (mS)
DH5 time slot = 2.906 (ms) * (1600/(6*79)) * 31.6 = 309.9 (mS)

2480 MHz
DH1 time slot = 0.416 (ms) * (1600/(2*79)) * 31.6 = 133.12 (mS)
DH3 time slot = 1.662 (ms) * (1600/(4*79)) * 31.6 = 265.92 (mS)
DH5 time slot = 2.906 (ms) * (1600/(6*79)) * 31.6 = 309.97 (mS)

Judgement: Pass Time of occupancy = 0.312 mS

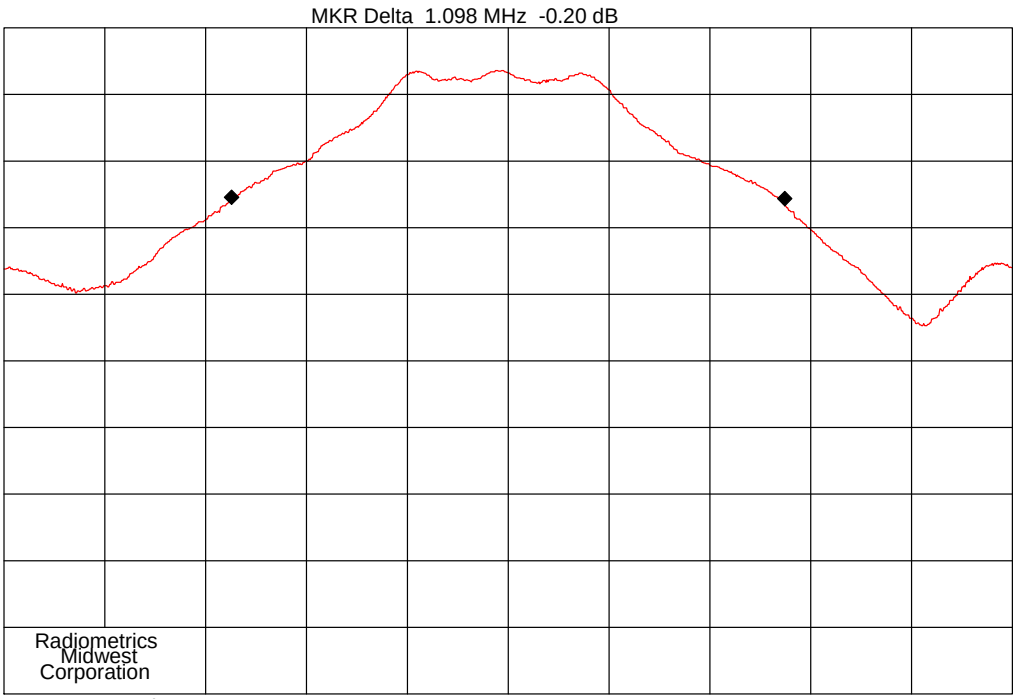
10.3.2 Dwell Time in a 0.1 second period

The Bluetooth "slot" of 625 uS provides a hop rate of 1600 hops/second, so with 79 channels each channel is hopped to an average of 20.3 times per second. Using the averaging effect of 15.35 shows that the allowed power increase via hopping in spurious power levels should be 20*log(1/79) = 38 dB. Bluetooth uses a 1 MHz channel bandwidth and the detector bandwidth is also 1 MHz for spurious measurement, so all the power is effectively in the detector bandwidth.

10.4 Occupied Bandwidth (20 dB)

The spectrum analyzer was set to the MAX HOLD mode to record the worst case of the modulation. The EUT was transmitting at its maximum data rate. The trace was allowed to stabilize.

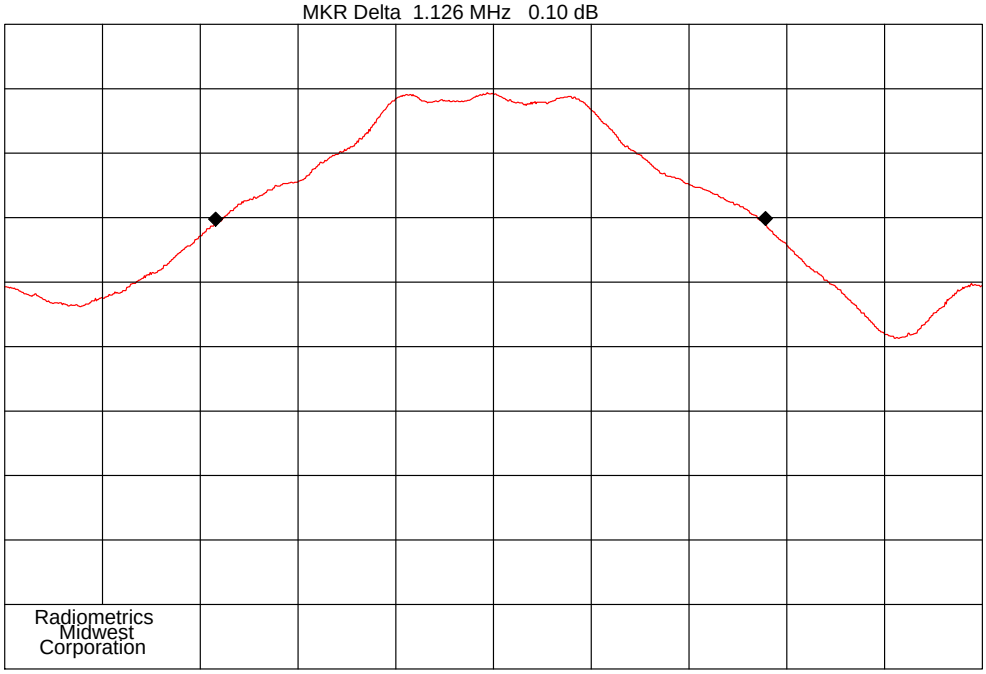
The marker-to-peak function was set to the peak of the emission. Then the marker-delta function was used to measure 20 dB down one side of the emission. The marker-delta function was reset and then moved to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.



Company: Dearborn Group
CENTER 2.480 01 GHz
RES BW 100 kHz
10 dB/
Notes: 20 dB Bandwidth, High Band

ITEM : DPA 5 BT
REF 97.0 dBuV
VBW 300 kHz
Time: 14:39

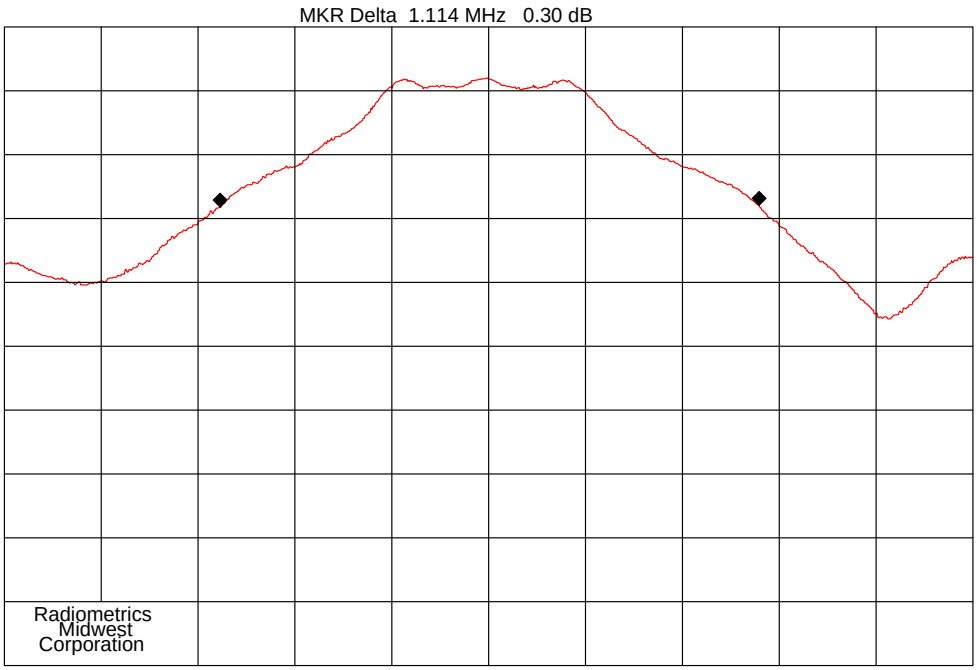
Date : 10-15-2009
SPAN 2.00 MHz
ATTEN 0 dB
SWP 20.0 msec



Company: Dearborn Group
CENTER 2.402 00 GHz
RES BW 100 kHz
10 dB/
Notes: 20 dB Bandwidth, 2402 MHz

ITEM : DPA 5 BT
REF 97.0 dBuV
VBW 300 kHz
Time: 14:30

Date : 10-15-2009
SPAN 2.00 MHz
ATTEN 0 dB
SWP 20.0 msec



Company: Dearborn Group
CENTER 2.441 00 GHz
RES BW 100 kHz
10 dB/
Notes: 20 dB Bandwidth, Middle Band

ITEM : DPA 5 BT
REF 97.0 dBuV
VBW 300 kHz
Time: 14:36

Date : 10-15-2009
SPAN 2.00 MHz
ATTEN 0 dB
SWP 20.0 msec

10.5 Peak Output Power

Radiated tests were performed to show compliance with this requirement. For the transmitter, the FCC procedures from power output option 2, Method #3 were used.

The transmitter's peak power was calculated using the following equation:

P = (E x d)^2 / (30)

Where: E = the measured maximum peak field strength in V/m.
d = Distance in meters from which the field strength was measured. (3 meters)
P = The EUT effective radiated power in watts

The Field Strength was measured using the procedures described in section 10.9, with the exception of the resolution and video bandwidths. The spectrum analyzer was set to the following settings:

Span = 3 MHz ; RBW = 3 MHz (> the 20 dB bandwidth of the emission being measured)
VBW = 3 MHz; Sweep = auto; Detector function = peak; Trace = max hold

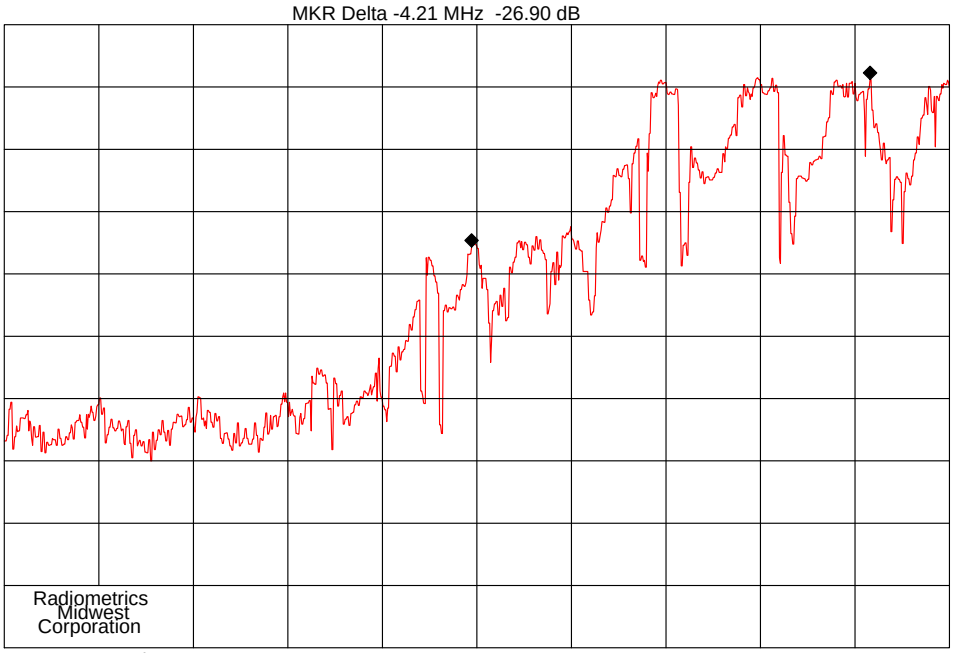
Since the gain of the antenna is always less than 6dB, the limit is not reduced.

	Freq	Peak Field Strength		Test Dist.	BW Corr.	Peak Radiated Output power from EUT		Limit
Function	MHz	dBuV/m	V/m	Meters	dB	Watts	dBm	dBm
Bluetooth	2402	109.0	0.28184	3	0.0	0.02383	13.77	30
Bluetooth	2441	110.6	0.33884	3	0.0	0.03444	15.37	30
Bluetooth	2480	111.9	0.39355	3	0.0	0.04646	16.67	30

Overall Test result: Pass by dB

10.6 Band-edge Compliance of RF Conducted Emissions

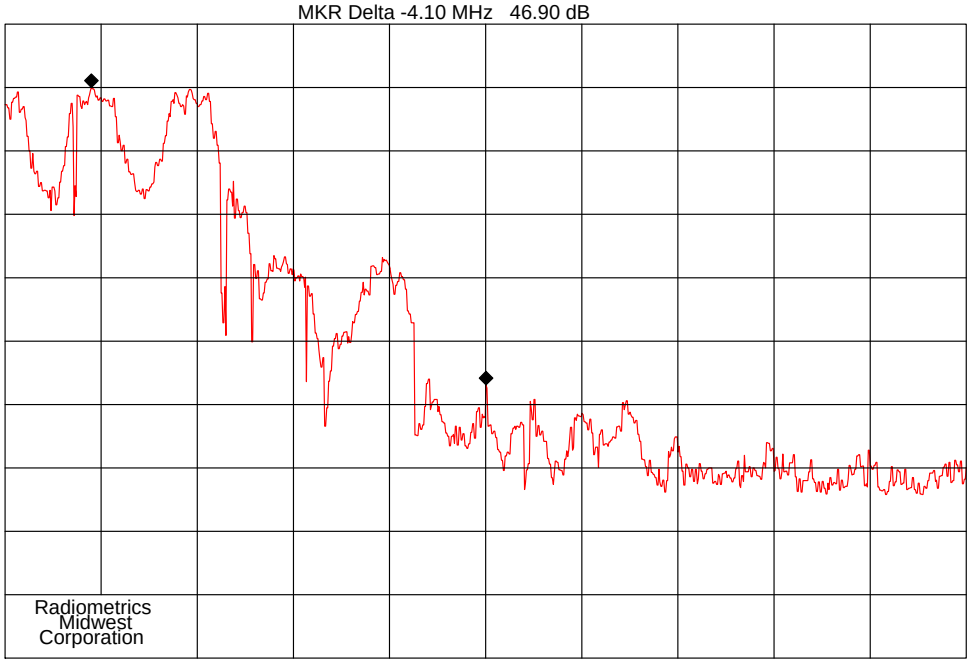
The spectrum analyzer was set to the MAX HOLD mode to record the worst case of the modulation at the band-edge, with the EUT set to the lowest frequency. The trace was allowed to stabilize.



Company: Dearborn Group
CENTER 2.400 0 GHz
RES BW 100 kHz
10 dB/
Notes: Band Edge, Low

ITEM : DPA 5 BT
REF 97.0 dBuV
VBW 300 kHz
Time: 15:18

Date : 10-15-2009
SPAN 10.0 MHz
ATTEN 0 dB
SWP 20.0 msec



Company: Dearborn Group
CENTER 2.483 0 GHz
RES BW 100 kHz
10 dB/
Notes: Band Edge, High

ITEM : DPA 5 BT
REF 97.0 dBuV
VBW 300 kHz
Time: 15:22

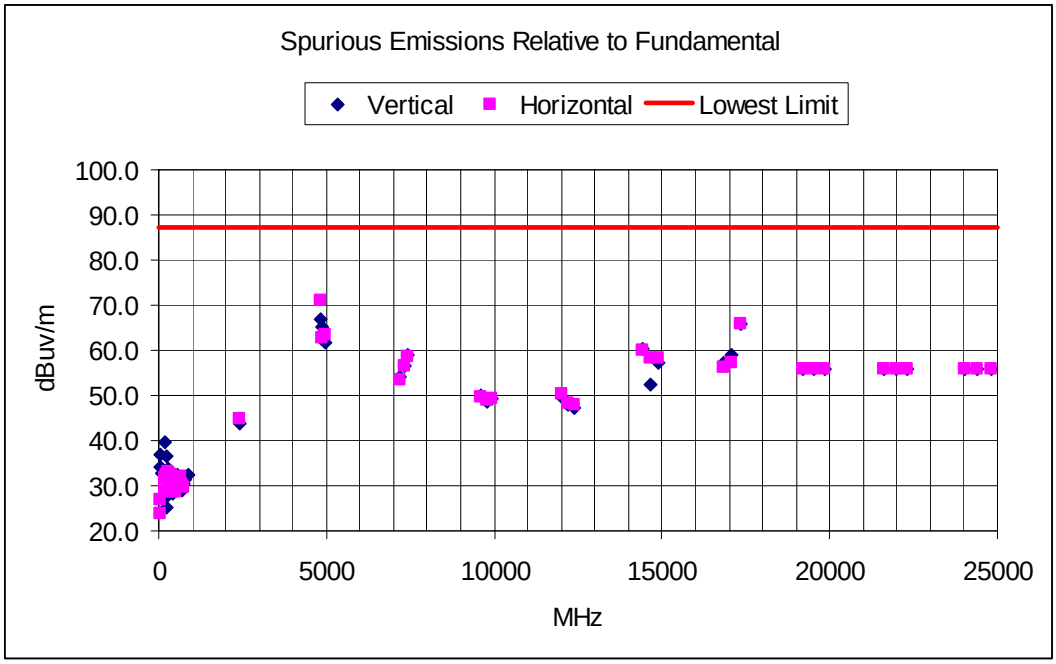
Date : 10-15-2009
SPAN 10.0 MHz
ATTEN 0 dB
SWP 20.0 msec

Judgement: Pass by 6.9 dB

10.7 Spurious RF Conducted Emissions

Since antenna conducted tests cannot be performed on the EUT, radiated tests were performed to show compliance with this requirement.

The EUT was tested in continous mode and peak readings were made from the lowest frequency generated in the EUT up through the 10th harmonic. The limit is 20 dB lower than the peak of the lowest fundamental. The data is shown graphically and in tabular form.



Judgement: Pass by 16.3 dB

10.8 Spurious Radiated Emissions (Restricted Band)

Radiated emission measurements were performed with linearly polarized broadband antennas. The results obtained with these antennas can be correlated with results obtained with a tuned dipole antenna. The radiated emission measurements were performed with a spectrum analyzer. The bandwidth used from 150 kHz to 30 MHz is 9 or 10 kHz and the bandwidth from 30 MHz to 1000 MHz is 100 or 120 kHz. Above 1 GHz, a 1 MHz bandwidth is used. A 10 dB linearity check is performed prior to start of testing in order to determine if an overload condition exists.

From 30 to 1000 MHz, an Anritsu spectrum analyzer was used. For tests from 1 to 25 GHz, an HP 8566 spectrum analyzer was used. For tests from 1 to 10 GHz, a high pass filter was used to reduce the fundamental emission. A harmonic mixer was used from 18 to 25 GHz. Figure 4 herein lists the details of the test equipment used during radiated emissions tests.

In addition, a high pass filter was used to reduce the fundamental emission.

The was device was rotated through three orthogonal axis as per 13.1.4.1 of ANSI C63.4 during the prescans and during final radiated tests.

Final radiated emissions measurements were performed inside of an anechoic chamber at a test distance of 3 meters. The anechoic chamber is designated as Chamber E. This Chamber meets the Site Attenuation requirements of ANSI C63.4 and CISPR 16-1. Chamber E is located at 12 East Devonwood Ave. Romeoville, Illinois EMI test lab.

The entire frequency range from 30 to 25000 MHz was slowly scanned with particular attention paid to those frequency ranges which appeared high. Measurements were performed using two antenna polarizations, (vertical and horizontal). The worst case emissions were recorded. All measurements may be performed using either the peak, average or quasi-peak detector functions. If the peak detector data exceeds or is marginally close to the limits, the measurements are repeated using a quasi-peak detector or average function as required by the specification for final determination of compliance.

The detected emission levels were maximized by rotating the EUT, adjusting the positions of all cables, and by scanning the measurement antenna from 1 to 4 meters above the ground.

10.8.1 Radiated Emissions Field Strength Sample Calculation

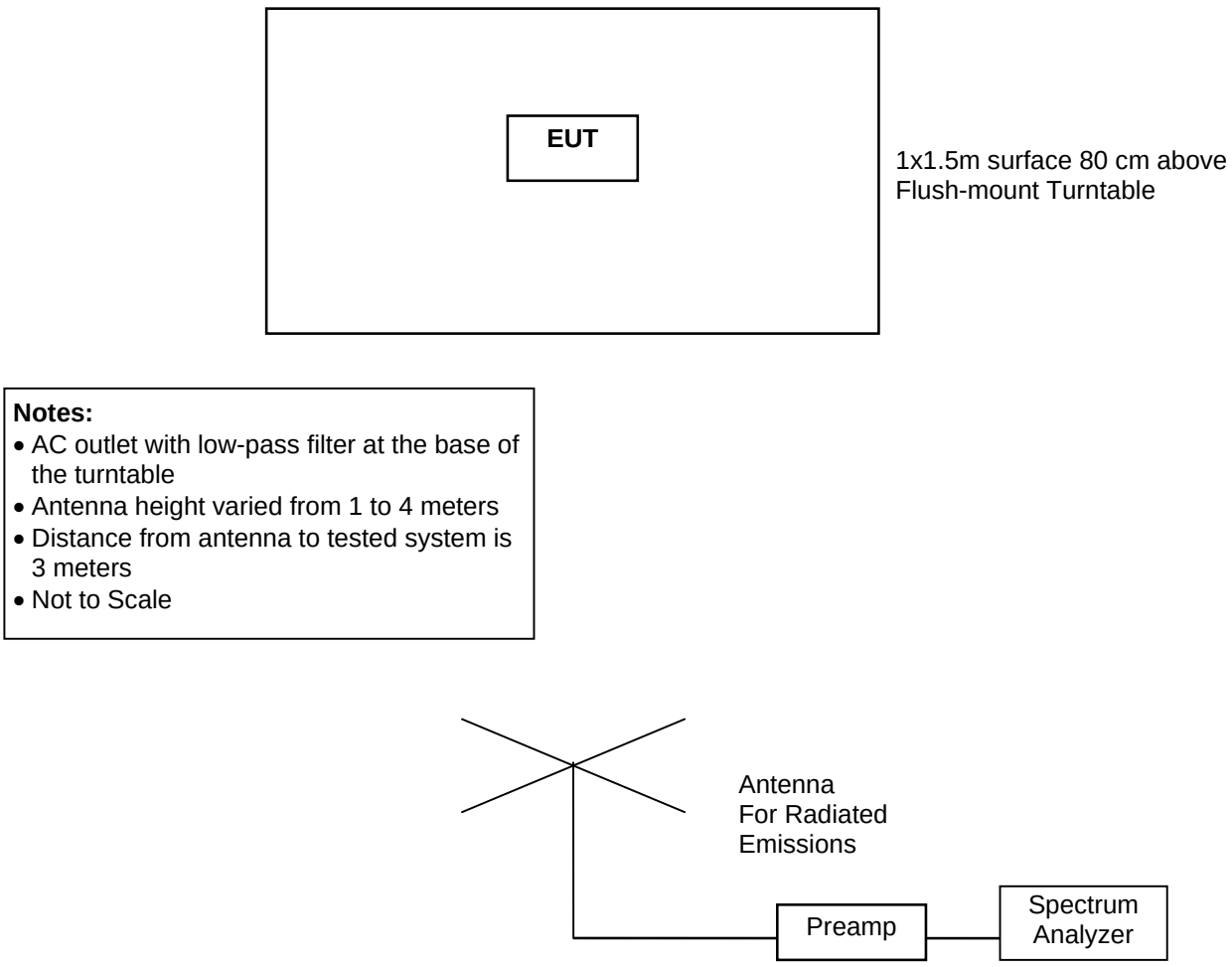
The field strength is calculated by adding the Antenna Factor and Cable Loss, and by subtracting the Amplifier Gain from the measured reading. The basic equation is as follows:

FS = RA + AF + CF - AG

Where: FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain
HPF = High pass Filter Loss
PKA = Peak to Average Factor (This is zero for non-average measurements)

The Peak to average factor is used when average measurements are required. It is calculated by the highest duty cycle in percent over any 100mS transmission. The factor in dB is 20 * Log(Duty cycle/100).

Figure 1. Drawing of Radiated Emissions Setup



10.8.2 Spurious Radiated Emissions Test Results

The following spectrum analyzer settings were used.

Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

A Video Bandwidth of 10 Hz was used for Average measurements above 1 GHz.

RADIOMETRICS MIDWEST CORPORATION - EMC Test Report
Testing of the Dearborn Group, Model DPA5, Bluetooth Module

Manufacturer	Dearborn Group	Specification	FCC Part 15 Subpart C & RSS-210
Model	DPA5	Test Date	10/15/09
Serial Number	0000-0D8F-E378	Test Distance	3 Meters
Abbreviations	Pol = Antenna Polarization; V = Vertical; H = Horizontal; P = peak; Q = QP		
Notes	Corr. Factors = Cable Loss – Preamp Gain		

Emissions Below 1 GHz.

Freq. MHz	Meter Reading dBuV	Dect. Type	Antenna Factor dB	Antenna Pol/ ID#	Corr. Factors dB	Field Strength dBuV/m EUT	Field Strength dBuV/m Limit	Margin Under Limit dB
48.4	50.9	P	13.6	V/44	-27.7	36.8	40.0	3.2
60.0	51.4	P	10.1	V/44	-27.5	34.0	40.0	6.0
96.0	49.7	P	10.0	V/44	-27.1	32.6	43.5	10.9
165.6	55.4	P	10.8	V/44	-26.4	39.8	43.5	3.7
183.6	48.4	P	9.5	V/44	-26.3	31.6	43.5	11.9
198.4	43.3	P	10.1	V/44	-26.2	27.2	43.5	16.3
220.4	39.6	P	11.6	V/44	-26.1	25.1	46.0	20.9
233.4	50.5	P	11.9	V/44	-26.0	36.4	46.0	9.6
271.0	46.1	P	13.5	V/44	-25.8	33.8	46.0	12.2
366.2	41.6	P	15.2	V/44	-25.4	31.4	46.0	14.6
431.1	37.3	P	15.8	V/44	-24.8	28.3	46.0	17.7
479.3	38.1	P	16.8	V/44	-24.5	30.4	46.0	15.6
518.0	37.0	P	17.4	V/44	-24.3	30.1	46.0	15.9
561.0	39.2	P	17.5	V/44	-24.2	32.5	46.0	13.5
623.0	36.3	P	18.6	V/44	-23.8	31.1	46.0	14.9
676.0	33.2	P	19.2	V/44	-23.3	29.1	46.0	16.9
724.0	33.3	P	20.0	V/44	-23.1	30.2	46.0	15.8
785.0	33.4	P	20.4	V/44	-22.4	31.4	46.0	14.6
870.0	33.0	P	21.1	V/44	-21.8	32.3	46.0	13.7
48.4	39.3	P	15.4	H/44	-27.7	27.0	40.0	13.0
60.4	40.2	P	11.1	H/44	-27.5	23.8	40.0	16.2
78.8	36.3	P	7.1	H/44	-27.3	16.1	40.0	23.9
166.0	45.1	P	10.2	H/44	-26.4	28.9	43.5	14.6
183.6	48.5	P	9.4	H/44	-26.3	31.6	43.5	11.9
232.9	46.6	P	11.9	H/44	-26.0	32.5	46.0	13.5
271.5	41.2	P	13.3	H/44	-25.8	28.7	46.0	17.3
299.0	44.9	P	13.8	H/44	-25.6	33.1	46.0	12.9
338.2	39.8	P	14.8	H/44	-25.2	29.4	46.0	16.6
366.7	42.5	P	15.4	H/44	-25.4	32.5	46.0	13.5
399.8	37.9	P	15.8	H/44	-25.0	28.7	46.0	17.3
431.7	38.9	P	16.4	H/44	-24.8	30.5	46.0	15.5
518.0	35.0	P	17.8	H/44	-24.3	28.5	46.0	17.5
567.0	35.3	P	18.8	H/44	-24.0	30.1	46.0	15.9
631.0	36.2	P	19.4	H/44	-23.7	31.9	46.0	14.1
697.0	33.3	P	20.4	H/44	-23.3	30.4	46.0	15.6
756.0	31.3	P	20.9	H/44	-22.7	29.5	46.0	16.5

Notes: 48 MHz from vehicle simulator

Emissions above 1 GHz

							EUT	Peak	Ave	Peak	Ave	Margin
hrm	Tx	Peak	Ave	Peak	Ave	Corr.	Emission	Tot. FS		Limit		Under
#	Freq	Vertical		Horizontal		Fact.	Freq MHz	dBuV/m		dBuV/m		Limit
1	2402	103.5	65.5	105.2	67.2	3.8	2402	109.0	71.0	125.0	125.0	16.0
be	2402	64.6	26.6	66.3	28.3	3.8	2400	70.1	32.1	74.0	54.0	3.9
be	2402	40.0	2.0	41.2	3.2	3.8	2390	45.0	7.0	74.0	54.0	29.0
2	2402	54.4	16.4	58.4	20.4	12.6	4804	71.0	33.0	74.0	54.0	3.0
3	2402	38.0	0.0	37.5	-0.5	16.1	7206	54.1	16.1	87.3	67.3	33.2
4	2402	40.0	2.0	39.4	1.4	10.1	9608	50.1	12.1	87.3	67.3	37.2
5	2402	38.1	0.1	38.8	0.8	11.6	12010	50.4	12.4	74.0	54.0	23.6
6	2402	44.1	6.1	43.7	5.7	16.2	14412	60.3	22.3	87.3	67.3	27.0
7	2402	42.6	4.6	41.7	3.7	14.5	16814	57.1	19.1	87.3	67.3	30.2
8	2402	36.0	-2.0	36.0	-2.0	20	19216	56.0	20.0	74.0	54.0	18.0
9	2402	36.0	-2.0	36.0	-2.0	20	21618	56.0	20.0	74.0	54.0	18.0
10	2402	36.0	-2.0	36.0	-2.0	20	24020	56.0	20.0	74.0	54.0	18.0
1	2441	104.4	66.4	106.6	68.6	4	2441	110.6	72.6	125.0	125.0	14.4
2	2441	52.7	14.7	50.2	12.2	12.6	4882	65.3	27.3	74.0	54.0	8.7
3	2441	36.0	-2.0	36.0	-2.0	20.5	7323	56.5	20.5	74.0	54.0	17.5
4	2441	38.7	0.7	39.0	1.0	9.9	9764	48.9	10.9	87.3	67.3	38.4
5	2441	37.2	-0.8	37.6	-0.4	10.8	12205	48.4	10.8	74.0	54.0	25.6
6	2441	37.2	-0.8	43.0	5.0	15.3	14646	58.3	20.3	87.3	67.3	29.0
7	2441	42.8	4.8	41.4	3.4	16	17087	58.8	20.8	87.3	67.3	28.5
8	2441	36.0	-2.0	36.0	-2.0	20	19528	56.0	20.0	74.0	54.0	18.0
9	2441	36.0	-2.0	36.0	-2.0	20	21969	56.0	20.0	74.0	54.0	18.0
10	2441	36.0	-2.0	36.0	-2.0	20	24410	56.0	20.0	74.0	54.0	18.0
1	2480	104.0	66.0	107.6	69.6	4.3	2480	111.9	73.9	125.0	125.0	13.1
be	2480	58.1	20.1	61.7	23.7	4.3	2483.5	66.0	28.0	74.0	54.0	8.0
2	2480	49.0	11.0	50.6	12.6	12.7	4960	63.3	25.3	74.0	54.0	10.7
3	2480	37.7	-0.3	37.4	-0.6	21.3	7440	59.0	21.3	74.0	54.0	15.0
4	2480	39.3	1.3	39.4	1.4	10	9920	49.4	11.4	87.3	67.3	37.9
5	2480	37.7	-0.3	38.3	0.3	9.7	12400	48.0	10.0	74.0	54.0	26.0
6	2480	42.7	4.7	43.7	5.7	14.7	14880	58.4	20.4	87.3	67.3	28.9
7	2480	41.8	3.8	41.8	3.8	23.9	17360	65.7	27.7	87.3	67.3	21.6
8	2480	36.0	-2.0	36.0	-2.0	20	19840	56.0	20.0	74.0	54.0	18.0
9	2480	36.0	-2.0	36.0	-2.0	20	22320	56.0	20.0	74.0	54.0	18.0
10	2480	36.0	-2.0	36.0	-2.0	20	24800	56.0	20.0	74.0	54.0	18.0
Column Numbers												
1	2	3	4	5	6	7	8	9	10	11	12	13

Notes on Columns:

Column #1. hrm = Harmonic; BE = Band Edge emissions
Column #2. Frequency of Transmitter.
Column #3. Uncorrected Vertical readings from the spectrum analyzer
Column #4. Raw Average reading; The average reading was converted from the peak reading. Ave = Peak – Dwell time correction factor from section 10.3.2 herein.
Column #5. Uncorrected Horizontal readings from the spectrum analyzer
Column #6. Raw Average reading; The average reading was converted from the peak reading. Ave = Peak – Dwell time correction factor from section 10.3.2 herein.
Column #7. Corr. Factors = Cable Loss – Preamp Gain + Antenna Factor
Column #8. Frequency of Tested Emission
Column #9. Highest peak field strength at listed frequency.
Column #10. Highest Average field strength at listed frequency.
Column #11. Peak Limit. Non restricted bands limits was measured to be 87.3 dBuV/m.
Column #12. Average Limit. Non restricted bands limits was measured to 67.3 dBuV/m.
Column #13. The margin (last column) is the worst case margin under the peak or average limits for that row.

Judgment: Passed by 3.0 dB
No other emissions were detected.