

FCC PART 15.247
EMI MEASUREMENT AND TEST REPORT

For

Metrologic Instruments, Inc.

90 Coles Road, Blackwood, NJ, USA

FCC ID: LW5MLPN1633

August 19, 2006

This Report Concerns: ☒ Original Report	Equipment Type: FocusBT Bluetooth Area Imaging Barcode Scanner
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Report No.: RSH06070701	
Test Date: July 25-August 19, 2006	
Reviewed By: Boni Baniqued <i>Boni</i>	
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Note: The test report is specially limited to the above company and this particular sample only. It may not be duplicated without prior written consent of Bay Area Compliance Lab Corp. (ShenZhen). This report **must not** be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the US Government.

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Metrologic Instruments, Inc.*'s product, model number: MS1633 or the "EUT" as referred to in this report is a FocusBT Bluetooth Area Imaging Barcode Scanner, which measures approximately 18.0cmL x 8.0cmW x 12.0cmH, rated input voltage: DC 5 V battery.

** The test data gathered are from production sample, serial number: 0607005 provided by the manufacturer, we receive the EUT on 2006-7-7.*

Objective

This Type approval report is prepared on behalf of *Metrologic Instruments, Inc.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203,15.205,15.207,15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Lab Corp. (ShenZhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Lab Corp. (ShenZhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone, ShenZhen, Guangdong 518038, P.R.China.

Test site at Bay Area Compliance Lab Corp. (ShenZhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179 and Industrial Canada registration test site No.: 5500A. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Lab Corp. (ShenZhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

Equipment Modifications

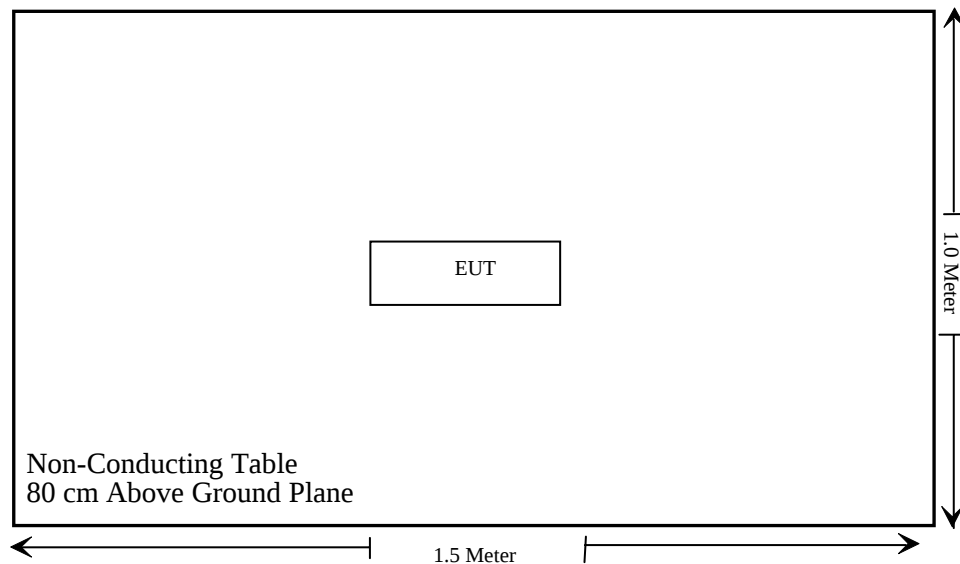
Bay Area Compliance Lab Corp. (ShenZhen) has not done any modification on the EUT.

Configuration of Test Setup



EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Compliant
§15.205	Restricted Band	Compliant
§15.207 (a)	Conducted Emission	N/A
§15.205, §15.209, §15.247(d)	Radiated Emission	Compliant*
§15.247 (a)(1)	20 dB Bandwidth	Compliant
§15.247(a)(1)	Channel Separation Test	Compliant
§15.247(a)(1)(iii)	Time of occupancy (Dwell Time)	Compliant
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliant
§15.247(b)(1)	Peak Output Power Measurement	Compliant
§15.247(d)	Band edges testing	Compliant

* Within measurement uncertainty.

§15.203 - ANTENNA REQUIREMENT

Standard Applicable

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to § 15.247 (b) (4), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The antenna for this device is an integral antenna with gain of 1 dBi.

§15.205, §15.209, §15.247 - RADIATED EMISSION

Standard Applicable

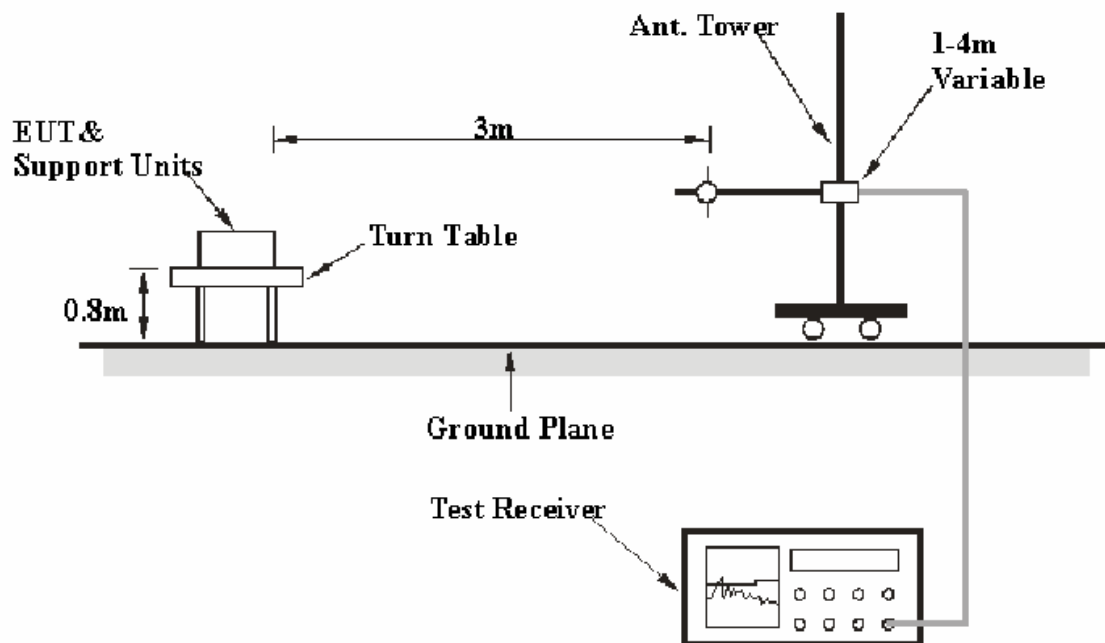
According to FCC §15.247 (d)

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Lab Corp. (ShenZhen) is ± 4.0 dB.

EUT Setup



The radiated emission tests were performed in the 3-meter Chamber, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 and FCC 15.247 limits.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

<i>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</i>
30MHz – 1000 MHz	100 kHz	300 kHz
1000 MHz – 25 GHz	1 MHz	3 MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
A.H. System	Horn Antenna	SAS-200/571	135	2006-4-28	2007-4-28
Agilent	Spectrum Analyzer	8564E	3943A01781	2005-12-8	2006-12-8
HP	Amplifier	HP8447D	2944A09795	2005-8-17	2006-8-17
HP	Preamplifier	8449B	3008A00277	2005-8-17	2006-8-17
Rohde&Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17
SUNOL SCIENCES	Broadband Antenna	JB1	A040904-1	2006-4-28	2007-4-28

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Peak, Average, and Quasi-Peak detection mode.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Standard Limit}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209, and 15.247, with the worst margin reading of:

Transmitting (Low Channel): **-11.96 dB** at **7206 MHz** in the **Horizontal** polarization

Transmitting (Middle Channel): **-7.74 dB** at **11960 MHz** in the **Horizontal** polarization

Transmitting (High Channel): **-6.66 dB** at **14800 MHz** in the **Horizontal** polarization

Transmitting (30-1000 MHz): **-3.88 dB** at **234.17 MHz** in the **Horizontal** polarization

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	53%
ATM Pressure:	1009mbar

The testing was performed by Merry Zhao on 2006-7-25.

Test Mode: Transmitting

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC Part 15.247	
Frequency	Meter Reading	Comments	Angle	Height	Polar	Antenna Loss	Cable Loss	Amp. Gain	Corr. Ampl.	Limit	Margin
MHz	dBμV/m		Degree	Meter	H/ V	dB	dB	dB	dBμV/m	dBμV/m	dB
Low Channel (Above 1 GHz)											
2402	83.67	PK	90	1	H	27.4	3.61	35	79.68		
2402	50	AV	45	1	H	27.4	3.61	35	46.01		
2402	85.33	PK	90	1	V	27.4	3.61	35	81.34		
2402	45.33	AV	45	1	V	27.4	3.61	35	41.34		
7206	35.83	AV	180	1.2	H	35.4	4.51	33.7	42.04	54	-11.96
7206	34.67	AV	180	1.2	V	35.4	4.51	33.7	40.88	54	-13.12
7206	50.83	PK	45	1.2	V	35.4	4.51	33.7	57.04	74	-16.96
4804	33.67	AV	90	1	H	31.3	4.64	33.4	36.21	54	-17.79
4804	33.5	AV	90	1	V	31.3	4.64	33.4	36.04	54	-17.96
4804	49.17	PK	180	1.2	V	31.3	4.64	33.4	51.71	74	-22.29
7206	40.89	PK	45	1.2	H	35.4	4.51	33.7	47.1	74	-26.9
4804	39.33	PK	180	1.2	H	31.3	4.64	33.4	41.87	74	-32.13
Middle Channel (Above 1 GHz)											
2441	84.67	PK	60	1.4	V	27.4	3.61	35	80.68		
2441	51.17	AV	152	1.3	V	27.4	3.61	35	47.18		
2441	86.17	PK	128	1.5	H	27.4	3.61	35	82.18		
2441	50.83	AV	156	1.2	H	27.4	3.61	35	46.84		
11960	36.33	AV	120	1	H	37.5	6.53	34.1	46.26	54	-7.74
15480	37.2	AV	270	1.2	V	36	6.96	34.1	46.06	54	-7.94
7323	37	AV	85	1.5	H	35.3	4.75	33.7	43.35	54	-10.65
7323	36.83	AV	135	1.3	V	35.3	4.75	33.7	43.18	54	-10.82
15480	53	PK	210	1.2	V	36	6.96	34.1	61.86	74	-12.14
11960	51.67	PK	90	1.2	H	37.5	6.53	34.1	61.6	74	-12.4
7323	51.33	PK	265	1.4	H	35.3	4.75	33.7	57.68	74	-16.32
7323	50.83	PK	156	1.4	V	35.3	4.75	33.7	57.18	74	-16.82
4882	33.83	AV	243	1.4	H	31.3	4.64	33.4	36.37	54	-17.63
4882	33.33	AV	142	1.6	V	31.3	4.64	33.4	35.87	54	-18.13
4882	48.83	PK	153	1.5	H	31.3	4.64	33.4	51.37	74	-22.63
4882	48	PK	234	1.8	V	31.3	4.64	33.4	50.54	74	-23.46

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC Part 15.247	
Frequency	Meter Reading	Comments	Angle	Height	Polar	Antenna Loss	Cable Loss	Amp. Gain	Corr. Ampl.	Limit	Margin
MHz	dBμV/m		Degree	Meter	H/ V	dB	dB	dB	dBμV/m	dBμV/m	dB
High Channel (Above 1GHz)											
2480	84.17	PK	89	1.5	H	27.4	3.61	35	80.18		
2480	53.67	AV	65	1.5	H	27.4	3.61	35	49.68		
2480	84.33	PK	65	1.4	V	27.4	3.61	35	80.34		
2480	51.17	AV	65	1.6	V	27.4	3.61	35	47.18		
14800	37	AV	145	1.1	H	37.8	6.64	34.1	47.34	54	-6.66
14680	35.5	AV	210	1.2	V	38.8	6.64	34.1	46.84	54	-7.16
14680	52.5	PK	240	1.4	V	38.8	6.64	34.1	63.84	74	-10.16
7440	37	AV	45	1.6	H	35.3	4.75	33.7	43.35	54	-10.65
7440	36.83	AV	324	1.2	V	35.3	4.75	33.7	43.18	54	-10.82
14800	51.67	PK	120	1	H	37.8	6.64	34.1	62.01	74	-11.99
7440	50.83	PK	56	1.4	H	35.3	4.75	33.7	57.18	74	-16.82
7440	50.5	PK	324	1.3	V	35.3	4.75	33.7	56.85	74	-17.15
4960	33.5	AV	256	1.8	H	32	4.55	33.4	36.65	54	-17.35
4960	33.33	AV	142	1.5	V	32	4.55	33.4	36.48	54	-17.52
5560	33.5	AV	156	1.2	H	32.5	4.3	34.4	35.9	54	-18.1
4960	47.83	PK	145	1.4	H	32	4.55	33.4	50.98	74	-23.02

Indicated				Table	Antenna		Correction Factor			FCC Part 15.209	
Frequency	Meter Reading	Comments	Direction	Height	Polar	Antenna Loss	Cable Loss	Amp. Gain	Corr. Ampl.	Limit	Margin
MHz	dBμV/m		Degree	Meter	H/ V	dB	dB	dB	dBμV/m	dBμV/m	dB
30 – 1000 MHz											
234.17	54.69	QP	289	1.0	H	11.70	2.17	26.44	42.12	46.00	-3.88*
912.86	42.07	QP	45	1.0	H	22.80	3.63	26.71	41.79	46.00	-4.21
945.44	39.96	QP	45	1.2	V	23.40	3.86	26.96	40.26	46.00	-5.74
325.59	48.04	QP	45	1.2	H	14.30	2.77	26.59	38.52	46.00	-7.48
207.85	47.69	QP	289	1.0	H	11.90	2.01	26.58	35.02	43.50	-8.48
260.14	48.67	QP	60	1.0	H	12.40	2.32	26.23	37.16	46.00	-8.84
431.03	43.06	QP	180	1.2	H	16.80	3.12	27.36	35.62	46.00	-10.38
129.01	39.85	QP	45	1.0	V	14.40	1.78	26.58	29.45	43.50	-14.05
47.66	40.42	QP	60	1.2	V	10.80	0.44	27.01	24.65	40.00	-15.35
234.17	42.52	QP	35	3.8	V	11.70	2.17	26.44	29.95	46.00	-16.05
128.11	36.29	QP	35	3.8	V	14.40	1.78	26.58	25.89	43.50	-17.61

* Within measurement uncertainty.

§15.247(a)(1)-CHANNEL SEPARATION TEST

Standard Applicable

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB Bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2005-8-17	2006-8-17

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 100 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another truce
3. Measure the channel separation.

Limit

FCC Part 15, Subpart C Section 15.247(a)(1). Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB Bandwidth of the hopping channel, whichever is greater.

FREQUENCY RANGE (MHz)	Limit (kHz)
902-928	>25kHz
2400-2483.5	>25kHz
5725-5850	>25kHz

Test Data

Environmental Conditions

Temperature:	27 °C
Relative Humidity:	50 %
ATM Pressure:	1009 mbar

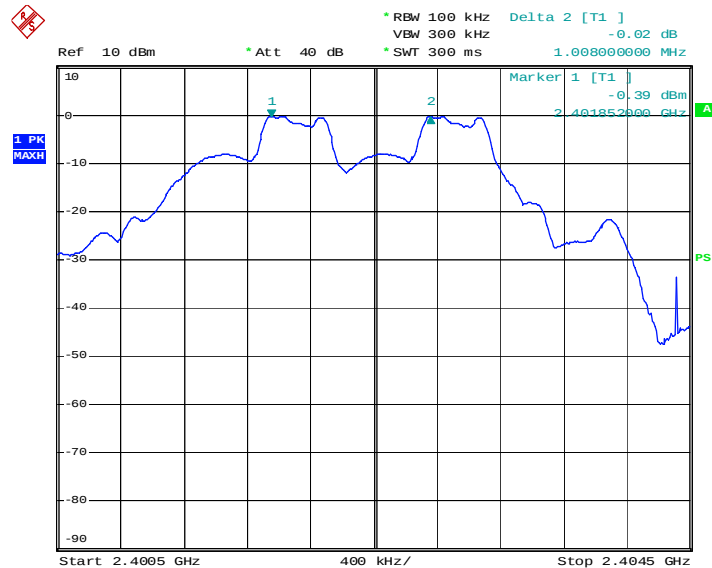
The testing was performed by Merry Zhao on 2006-8-19.

Test Result: Pass

Test mode: Transmitting

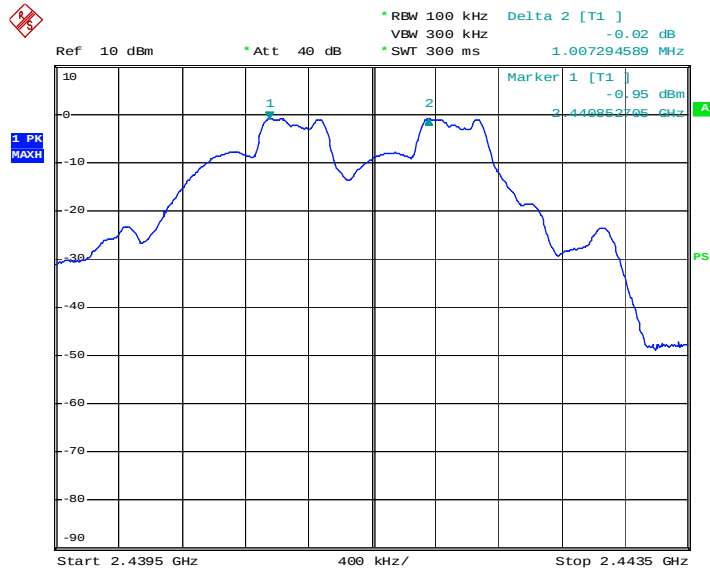
Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	2402	1.008	0.986	Pass
Adjacency Channel	2403			
Mid Channel	2441	1.007	0.933	Pass
Adjacency Channel	2442			
High Channel	2479	1.000	0.960	Pass
Adjacency Channel	2480			

Note: Limit based on the 20 dB bandwidth of the hopping channel as outlined on page 17



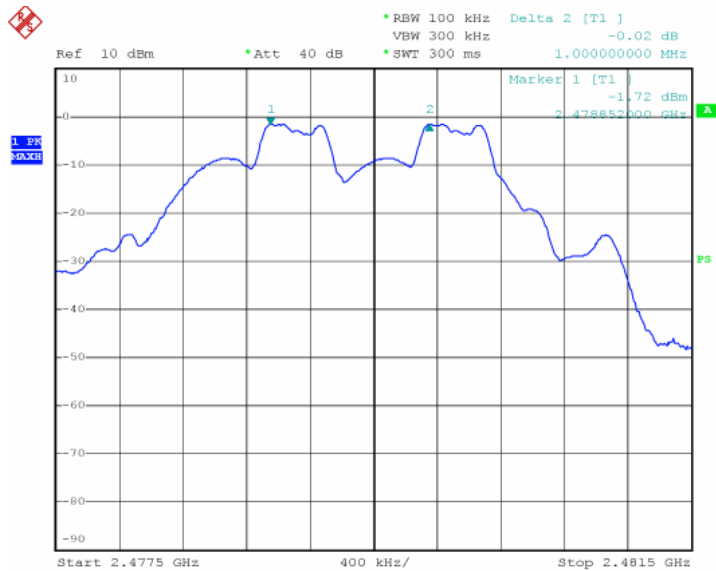
Metro bluetooth barcode scanner low channel channel separation

Date: 19.AUG.2006 14:13:10



Metro bluetooth barcode scanner middle channel channel separation

Date: 19.AUG.2006 14:28:00



Metro bluetooth barcode scanner high channel channel separation

Date: 19.AUG.2006 14:30:04

§15.247(a)(1) –20dB BANDWIDTH TESTING

Standard Applicable

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB Bandwidth of the hopping channel, whichever is greater.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

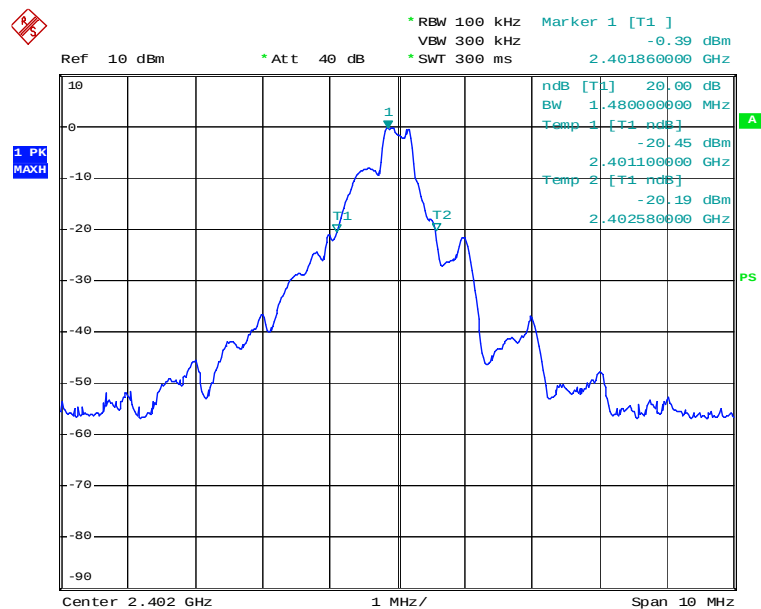
Temperature:	25 ° C
Relative Humidity:	53%
ATM Pressure:	1009mbar

The testing was performed by Merry Zhao on 2006-8-19.

Test Result: Pass

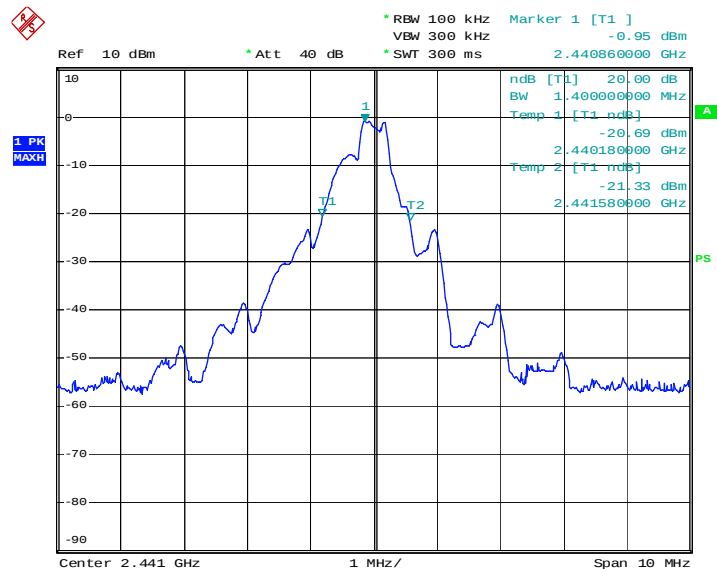
Test Mode: Transmitting

Channel	Channel Frequency (MHz)	20dB Bandwidth (MHz)	Result
Low Channel	2402	1.48	Pass
Mid Channel	2441	1.40	Pass
High Channel	2480	1.44	Pass



Metro bluetooth barcode scanner low channel 20dB bandwidth

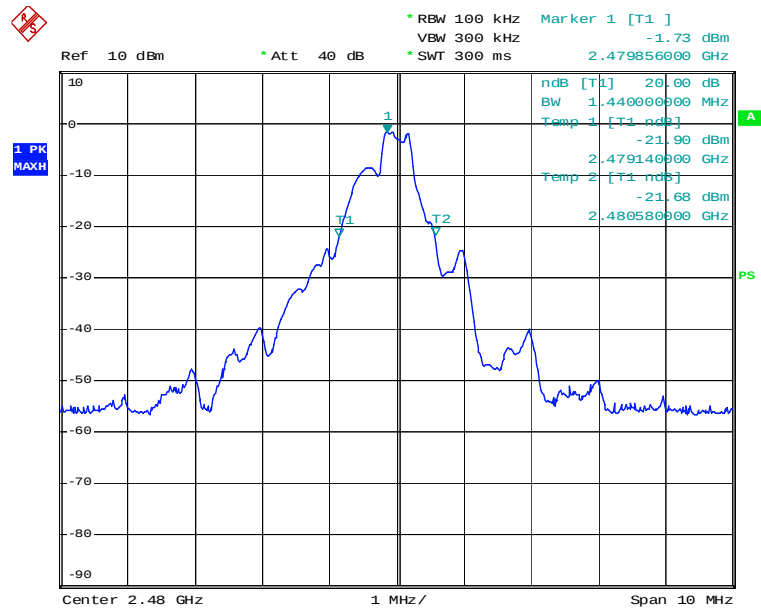
Date: 19.AUG.2006 14:35:14



Metro bluetooth barcode scanner middle channel 20dB bandwidth

h

Date: 19.AUG.2006 14:33:47



Metro bluetooth barcode scanner high channel 20dB bandwidth

Date: 19.AUG.2006 14:32:50

§15.247(a)(1)(iii)-QUANTITY OF HOPPING CHANNEL TEST**Standard Applicable**

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in transmitting mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

Limit

FCC Part 15, Subpart C Section 15.247

FREQUENCY RANGE (MHz)	Limit (Quantity of Hopping Channel)			
	20 dB bandwidth <250 kHz	20 dB bandwidth >250 kHz	20 dB bandwidth <1 MHz	20 dB bandwidth >1 MHz
902-928	50	25	N/A	N/A
2400-2483.5	N/A	N/A	15	15
5725-5850	N/A	N/A	75	N/A

Test Data**Environmental Conditions**

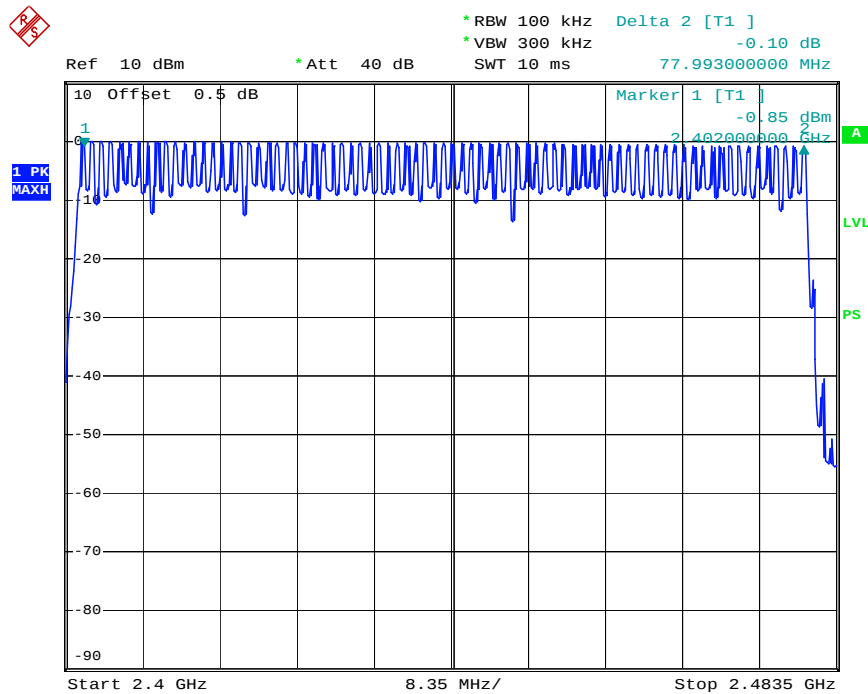
Temperature:	27 °C
Relative Humidity:	50 %
ATM Pressure:	1009 mbar

The testing was performed by Merry Zhao on 2006-7-28.

Test Result: Pass

The frequency hopping systems operating in 2.402~2.480 GHz band employ 79 nonoverlapping channels.

Hopping Channel Frequency Range (MHz)	Quantity OF hopping Channel Read Value (Channel)	Quantity Of Hopping channel limit (Channel)
2402.0 ~ 2480.0	79	>15



Date: 28.JUL.2006 14:47:22

§15.247(a)(1)(iii) -TIME OF OCCUPANCY (DWELL TIME)

Standard Applicable

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 X channel no.(s), The quantity of False was get from single sweep. In addition, the time of single Pluses was tested.

Limit

FCC Part 15, Subpart C Section 15.247.

FREQUENCY RANGE (MHz)	LIMIT (ms)		
	20dB bandwidth <250kHz (50 Channel)	20dB bandwidth >250kHz (50 Channel)	20dB bandwidth <1 MHz (79 Channel)
902-928	400(20s)	400(10s)	N/A
2400-2483.5	N/A	N/A	400(31.6s)
5725-5850	N/A	N/A	400(30s)

Test Data

Environmental Conditions

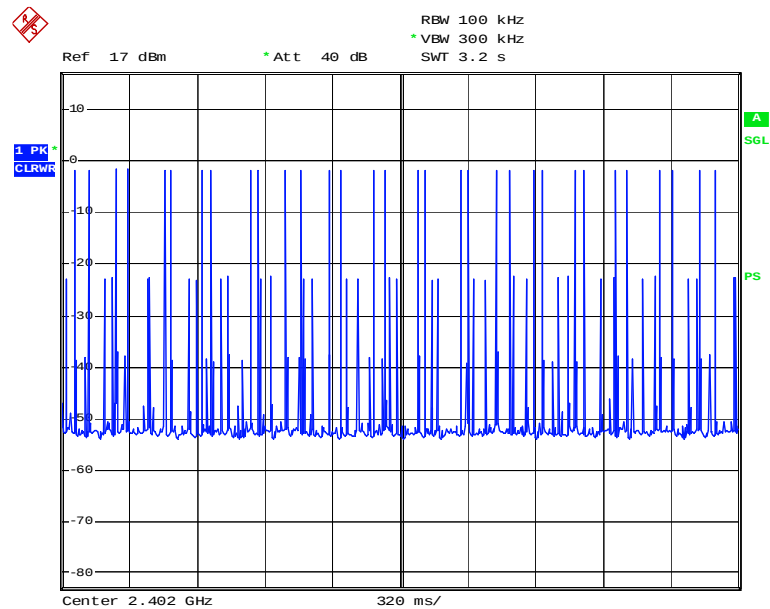
Temperature:	27 °C
Relative Humidity:	50 %
ATM Pressure:	1009 mbar

The testing was performed by Merry Zhao on 2006-7-28.

Test Result: Pass

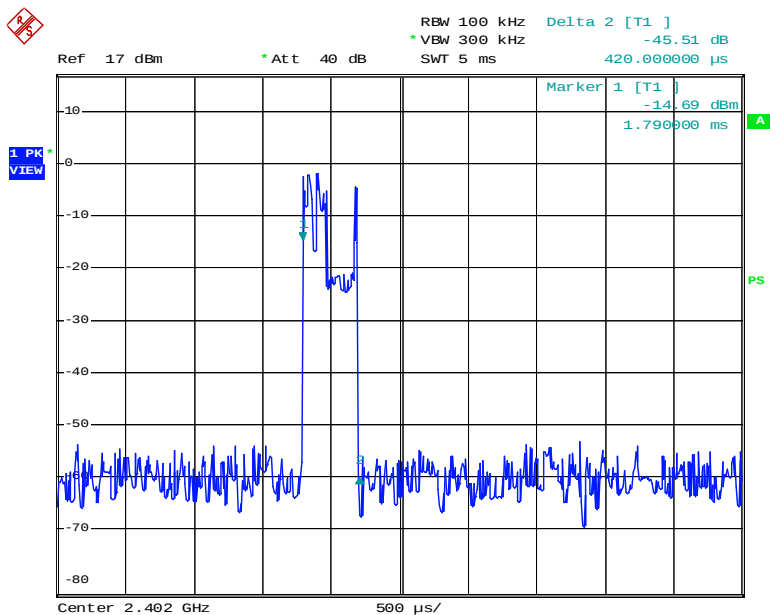
Test mode: Transmitting

Channel	Frequency MHz	Pulse Wide m Sec	Quantity Pulse per 31.6 Sec	Dwell Time Sec	Limit Sec
Low channel	2402	0.42	320	0.1344	0.4
Middle channel	2441	0.44	320	0.1408	0.4
High channel	2480	0.43	320	0.1376	0.4



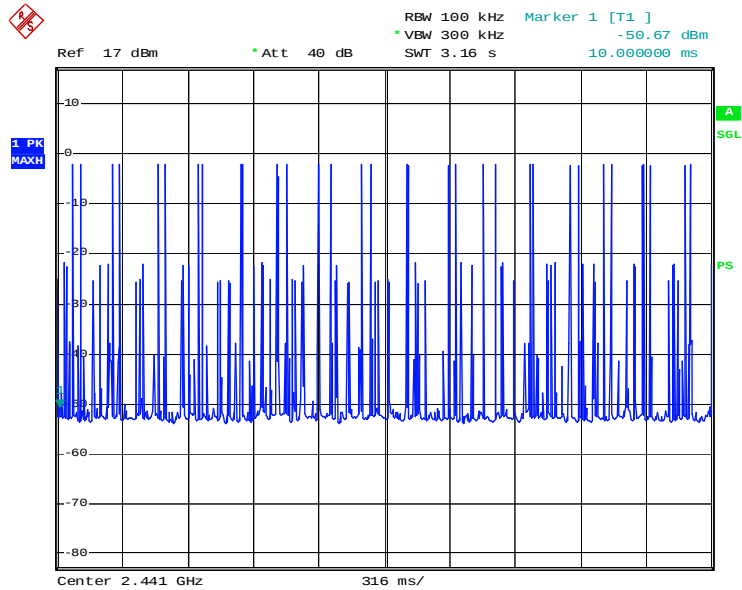
Metro Bluetooth barcode scanner M/N:1633 L-CH number of pulses

Date: 28.JUL.2006 15:31:31



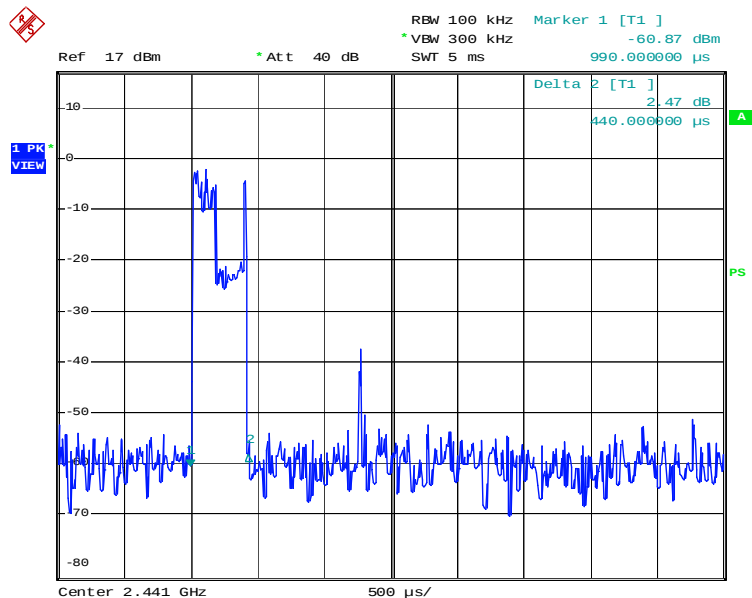
Metro Bluetooth barcode scanner M/N:1633 L-CH pulses width

Date: 28.JUL.2006 16:00:55



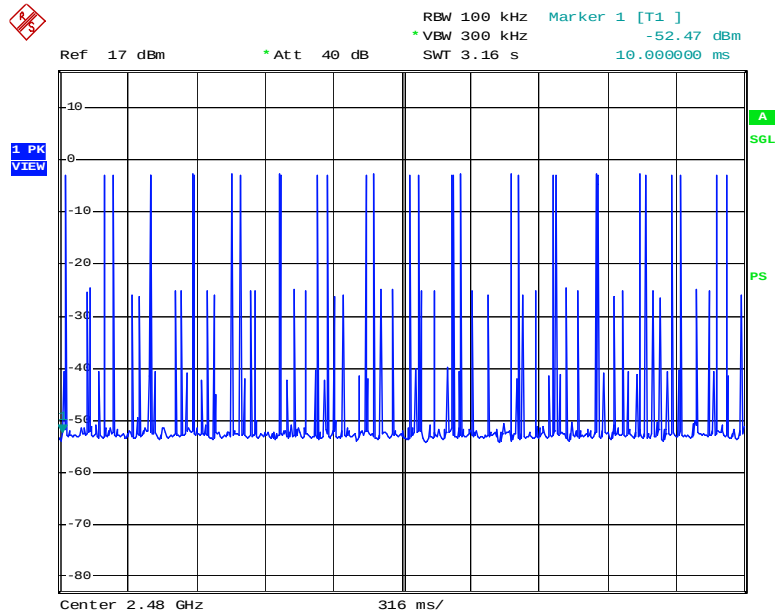
Metro Bluetooth barcode scanner M/N:1633 M-CH number of pulses

Date: 28.JUL.2006 15:45:25



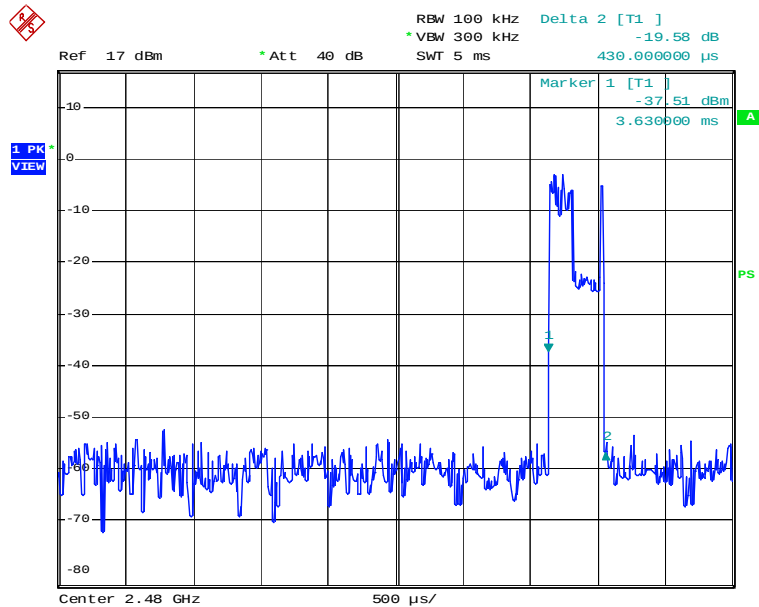
Metro Bluetooth barcode scanner M/N:1633 M-CH pulses width

Date: 28.JUL.2006 15:57:19



Metro Bluetooth barcode scanner M/N:1633 H-CH number of pulses

Date: 28.JUL.2006 15:47:19



Metro Bluetooth barcode scanner M/N:1633 H-CH pulses width

Date: 28.JUL.2006 15:51:29

§15.247(b)(1) - PEAK OUTPUT POWER MEASUREMENT

Standard Applicable

According to §15.247(b) (1), for frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

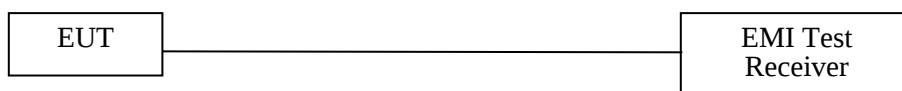
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to a EMI Test Receiver.
3. Add a correction factor to the display.



Test Data

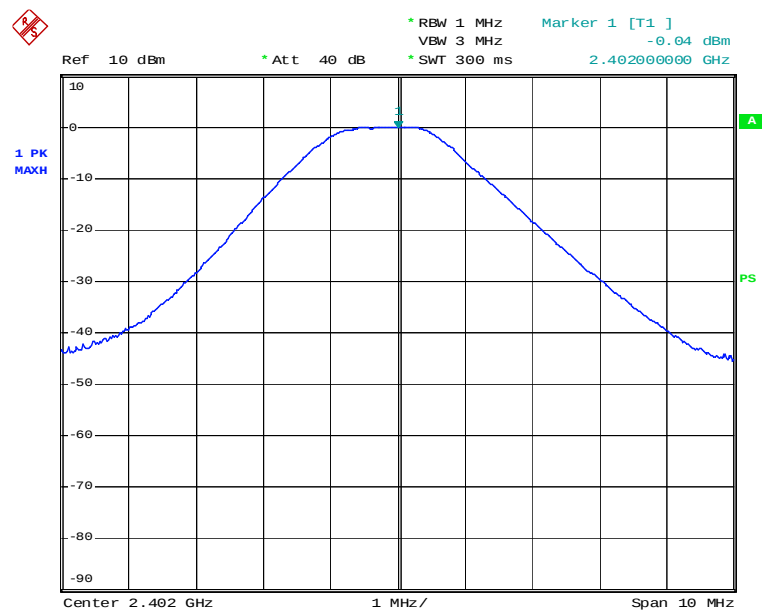
Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	53%
ATM Pressure:	1009mbar

The testing was performed by Merry Zhao on 2006-8-19.

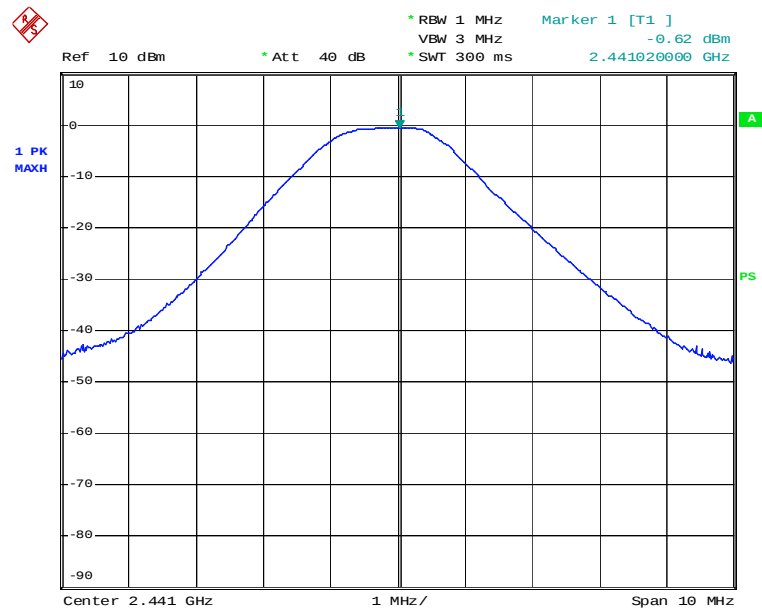
Please refer to the following plots.

Channel	Channel Frequency (MHz)	Reading Power (dBm)	Cable Loss (dB)	Power Output		Limit (w)
				(dBm)	(w)	
Low Channel	2402	-0.04	0.3	0.26	0.00106	1
Mid Channel	2441	-0.62	0.3	-0.32	0.00093	1
High Channel	2480	-1.44	0.3	-1.14	0.00077	1



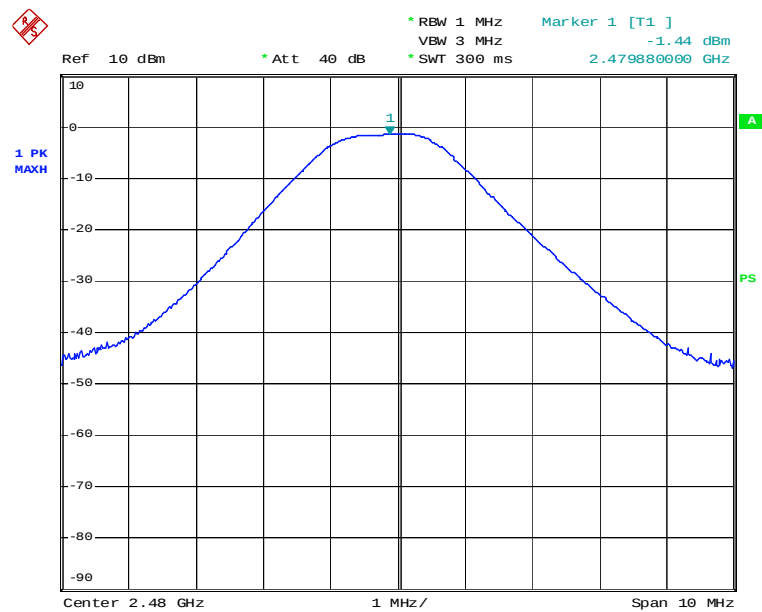
Metro bluetooth barcode scanner low channel output power

Date: 19.AUG.2006 11:20:12



Metro bluetooth barcode scanner middle channel output power

Date: 19.AUG.2006 11:21:40



Metro bluetooth barcode scanner high channel output power

Date: 19.AUG.2006 11:24:27

§15.247(d) - 100 KHZ BANDWIDTH OF BAND EDGES

Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Data**Environmental Conditions**

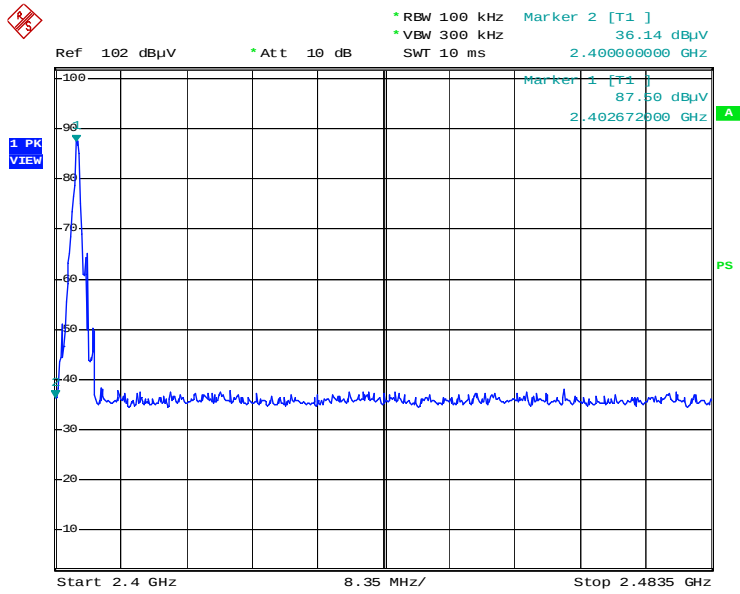
Temperature:	18 °C
Relative Humidity:	53 %
ATM Pressure:	1009mbar

The testing was performed by Merry Zhao on 2006-7-26.

Test Result: Pass

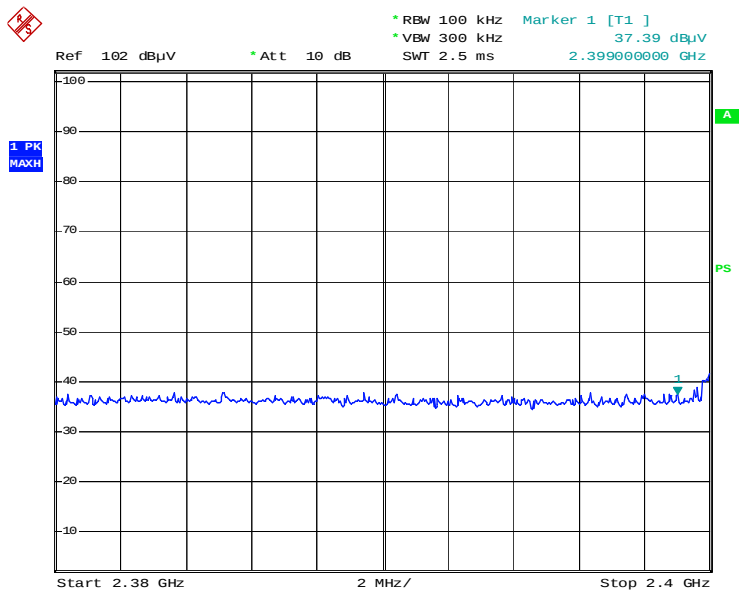
Test Mode: Transmitting

Frequency MHz	Delta of Peak to Edge Point dB	Limit dB
2399.00	50.11	≥ 20
2483.60	46.84	≥ 20



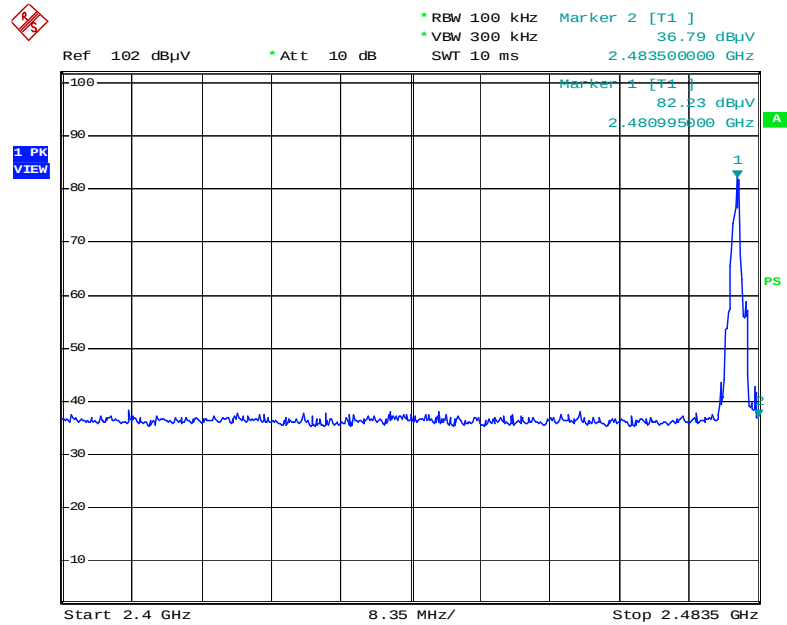
metrp bandege 3

Date: 26.JUL.2006 18:32:23



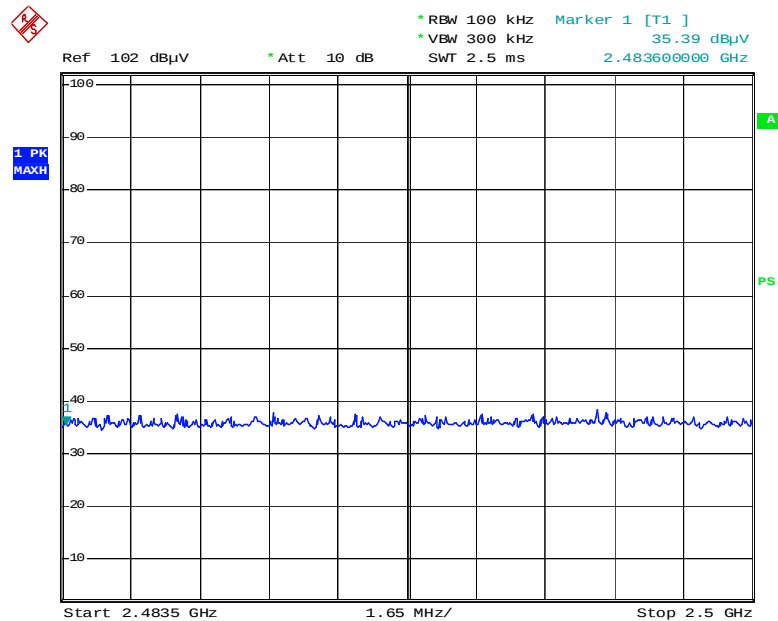
metrp bandege 4

Date: 26.JUL.2006 18:35:06



metro bandege7

Date: 26.JUL.2006 18:56:32



metrp bandege 6

Date: 26.JUL.2006 18:52:29