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**FCC PART 15.249**  
**TEST REPORT**  
**UNLICENSED INTENTIONAL RADIATOR**

<b>Applicant</b>	COBRA ELECTRONICS CORPORATION
<b>Address</b>	6500 WEST CORTLAND STREET CHICAGO IL 60707 USA
<b>FCC ID</b>	BBORBTM7800
<b>Model Number</b>	RBTM7800
<b>Product Description</b>	BLUETOOTH MODULE
<b>Date Sample Received</b>	7/17/2013
<b>Date Tested</b>	7/25/2013
<b>Tested By</b>	John A. Day
<b>Approved By</b>	John A. Day
<b>Report Number</b>	1232AUT13TestReport.docx
<b>Test Results</b>	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL

**THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL  
WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.**



Testing Certificate #0955-01



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APPLICANT: COBRA ELECTRONICS CORPORATION  
FCC ID: BBORBTM7800  
REPORT #: C\COBRA\1232AUT13\1232AUT13TestReport.docx

## GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

## Summary

The device under test does:

- fulfill the general approval requirements as identified in this test report  
 not fulfill the general approval requirements as identified in this test report

## Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.



Certificate # 0955-01

I attest that the necessary measurements were made, under my supervision, at:

Timco Engineering Inc.  
849 NW State Road 45  
Newberry, Fl 32669



## Authorized Signatory Name:

John A. Day  
Engineering Project Manager

**Date:** 7/31/2013

APPLICANT: COBRA ELECTRONICS CORPORATION  
FCC ID: BBORBTM7800  
REPORT #: C:\COBRA\1232AUT13\1232AUT13TestReport.docx



**GENERAL INFORMATION**

**DUT Specification**

The test results relate only to the items tested.			
<b>Applicable Standard</b>	Part 15.249, RSS-210, RSS-GEN		
<b>DUT Description</b>	BLUETOOTH MODULE		
<b>FCC ID</b>	BBORBTM7800		
<b>Model Number</b>	RBTM7800		
<b>Operating Frequency</b>	TX: 2402 - 2480	RX: Same	
<b>No. of Channels</b>	79		
<b>Modulations</b>	GFSK		
<b>DUT Power Source</b>	<input type="checkbox"/> 110-120Vac/50- 60Hz		
	<input checked="" type="checkbox"/> DC Power		
	<input type="checkbox"/> Battery Operated Exclusively		
<b>Test Item</b>	<input type="checkbox"/> Prototype	<input checked="" type="checkbox"/> Pre-Production	<input type="checkbox"/> Production
<b>Type of Equipment</b>	<input type="checkbox"/> Fixed	<input type="checkbox"/> Mobile	<input checked="" type="checkbox"/> Portable
<b>Antenna Connector</b>	FCC Rules require that the antenna connector be unique.		
<b>Test Facility</b>	Timco Engineering Inc. located at 849 NW State Road 45 Newberry, FL 32669 USA.		
<b>Test Conditions</b>	Temperature: 26°C Relative humidity: 50%		
<b>Test Exercise</b>	The DUT was placed in continuous transmit mode of operation.		
<b>Modifications</b>			

**Test Supporting Equipment**

Supporting Device	Manufacturer	Model / FCC ID	Serial Number
N/A			

## EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	12/31/11	12/31/13
3-Meter OATS	TEI	N/A	N/A	12/31/11	12/31/13
Antenna: Passive Loop	EMC Test Systems	EMCO 6512	9706-1211	06/14/12	06/14/14
Frequency Counter	HP	5385A	2730A03025	08/17/11	08/17/13
Frequency Counter	HP	5352B	2632A00165	06/26/13	06/26/15
Digital Multimeter	Fluke	77	43850817	02/22/12	02/22/14
Digital Multimeter	Fluke	FLUKE-77-3	79510405	06/20/13	06/20/15
Frequency Counter	HP	5385A	3242A07460	06/16/13	06/16/15
Antenna: Active Loop	ETS-Lindgren	6502	00062529	09/23/10	09/23/13
Antenna: Double-Ridged Horn	Electro-Metrics	RGA-180	2319	06/19/12	06/19/14
LISN	Electro-Metrics	ANS-25/2	2604	10/28/11	10/28/13
LISN	Electro-Metrics	EM-7820	2682	02/26/13	02/26/15
DC Power Supply	HP	6264B		05/06/13	05/06/15
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	12/31/11	12/31/13
Temperature Chamber	Tenney Engineering	TTRC	11717-7	07/03/12	07/03/14
Antenna: Biconnical	Electro-Metrics	BIA-25	1171	06/13/12	06/13/14
Temperature Chamber	Thermotron Corp.	S1.2 Mini Max	25-1420-09	07/03/12	07/03/14
Antenna: Log-Periodic	Electro-Metrics	LPA-25	1122	05/09/13	05/09/15
Digital Multimeter	Fluke	77	35053830	09/09/11	09/09/13
Antenna: Biconnical	Eaton	94455-1	1096	05/10/13	05/10/15



**TEST EQUIPMENT LIST CONTD.**

<b>Device</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial Number</b>	<b>Cal/Char Date</b>	<b>Due Date</b>
<b>Analyzer Tan Tower Preamplifier</b>	<b>HP</b>	<b>8449B-H02</b>	<b>3008A00372</b>	<b>10/28/11</b>	<b>10/28/13</b>
<b>Analyzer Tan Tower Quasi-Peak Adapter</b>	<b>HP</b>	<b>85650A</b>	<b>3303A01690</b>	<b>10/28/11</b>	<b>10/28/13</b>
<b>Analyzer Tan Tower RF Preselector</b>	<b>HP</b>	<b>85685A</b>	<b>3221A01400</b>	<b>10/28/11</b>	<b>10/28/13</b>
<b>Analyzer Tan Tower Spectrum Analyzer</b>	<b>HP</b>	<b>8566B Opt 462</b>	<b>3138A07786 3144A20661</b>	<b>10/28/11</b>	<b>10/28/13</b>
<b>Antenna: Biconnical</b>	<b>Eaton</b>	<b>94455-1</b>	<b>1057</b>	<b>06/14/13</b>	<b>06/14/15</b>
<b>Antenna: Log-Periodic</b>	<b>Eaton</b>	<b>96005</b>	<b>1243</b>	<b>05/31/13</b>	<b>05/31/15</b>
<b>Antenna: Standard Gain Horn 18.0-26.3 GHz</b>	<b>Systron Donner</b>	<b>DBE-520-20</b>	<b>No Serialized</b>	<b>No Cal Required</b>	<b>No Cal Required</b>

**TEST PROCEDURES**

**Radiation Interference:** ANSI C63.4-2003 using a spectrum analyzer, a preselector, a quasi-peak adapter, and an appropriate antenna. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100 kHz with an appropriate sweep speed and the video bandwidth was 300 kHz up to 1 GHz and 1 MHz with a video BW of 3 MHz above 1 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported. The spectrum was searched to at least the tenth (10) harmonic of the fundamental.

**Formula Of Conversion Factors:** The field strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBμV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the preselector was accounted for in the spectrum analyzer meter reading.

Example:

Freq (MHz)	Meter Reading	+ ACF	+ CL = FS
33	20 dBμV	+ 10.36 dB	+ 0.5 = 30.86 dBμV/m @ 3m

**Power Line Conducted Interference:** The procedure used was ANSI C63.4-2003 using a 50uH LISN. Both lines were observed. The bandwidth of the spectrum analyzer was 10kHz with an appropriate sweep speed. The spectrum was scanned from 0.15 to 30 MHz.

**Occupied Bandwidth:** A small sample of the transmitter output was fed into the spectrum analyzer and the attached plot was printed. The vertical scale is set to -10 dBm per division.

**ANSI C63.4-2003 10.1 Measurement Procedures:** The DUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The DUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes. Emissions attenuated more than 20 dB below the permissible value are not reported.



**RADIATION INTERFERENCE**

**Rules Part No.:** 15.249, 15.209, RSS-210, RSS-GEN

**Requirements:**

Frequency	Limits
Part 15.209, RSS-210	
9 to 490 kHz	2400/F (kHz) $\mu$ V/m @ 300 meters
490 to 1705 kHz	24000/F (kHz) $\mu$ V/m @ 30 meters
1705 kHz to 30 MHz	29.54 dB $\mu$ V/m @ 30 meters
30 – 88	40.0 dB $\mu$ V/m @ 3 meters
80 – 216	43.5 dB $\mu$ V/m @ 3 meters
216 – 960	46.0 dB $\mu$ V/m @ 3 meters
Above 960	54.0 dB $\mu$ V/m @ 3 meters
Part 15.249, RSS-210	
Fundamental 902 – 928 MHz	94.0 dB $\mu$ V/m @ 3 meters
Fundamental 2.4 – 2.4835 MHz	94.0 dB $\mu$ V/m @ 3 meters
Harmonics	54.0 dB $\mu$ V/m @ 3 meters

**Test Data:** Measurements were made from 9 kHz or the lowest frequency generated to the tenth harmonic. Measurements in the table are peak unless noted otherwise.

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB/m	Duty Cycle	Field Strength dBuV/m	Margin dB
2,402.0	2,402.00	62.2	V	3.18	32.40	12.6	85.2	8.8
2,402.0	2,402.00	65.1	H	3.18	32.40	12.6	88.1	5.9
2,402.0	4,804.00	13.4	H	4.90	34.38	12.6	40.1	53.9
2,402.0	4,804.00	13.8	V	4.90	34.38	12.6	40.5	53.5
2,402.0	7,206.00	9.4	H	5.72	36.16	12.6	38.7	55.3
2,402.0	7,206.00	9.7	V	5.72	36.16	12.6	39.0	55.0
2,402.0	9,608.00	9.4	H	6.78	36.73	12.6	40.3	53.7
2,402.0	9,608.00	9.5	V	6.78	36.73	12.6	40.4	53.6
2,442.0	2,442.00	59.8	V	3.21	32.48	12.6	82.9	11.1
2,442.0	2,442.00	64.0	H	3.21	32.48	12.6	87.1	6.9
2,442.0	4,896.00	9.6	H	4.95	34.44	12.6	36.4	57.6
2,442.0	4,896.00	9.9	V	4.95	34.44	12.6	36.7	57.3
2,442.0	7,344.00	10.0	H	5.81	36.13	12.6	39.3	54.7
2,442.0	7,344.00	10.2	V	5.81	36.13	12.6	39.5	54.5
2,442.0	9,792.00	9.0	V	6.84	36.95	12.6	40.2	53.8
2,442.0	9,792.00	9.9	H	6.84	36.95	12.6	41.1	52.9
2,480.0	2,480.00	58.9	V	3.24	32.56	12.6	82.1	11.9
2,480.0	2,480.00	62.4	H	3.24	32.56	12.6	85.6	8.4
2,480.0	4,960.00	10.2	H	4.98	34.48	12.6	37.1	56.9
2,480.0	4,960.00	14.1	V	4.98	34.48	12.6	41.0	53.0
2,480.0	7,440.00	10.1	H	5.86	36.11	12.6	39.5	54.5
2,480.0	7,440.00	10.2	V	5.86	36.11	12.6	39.6	54.4
2,480.0	9,920.00	9.2	H	6.88	37.10	12.6	40.6	53.4
2,480.0	9,920.00	9.3	V	6.88	37.10	12.6	40.7	53.3

Note: Emissions that are 20 dB below the limit are not required to be reported.

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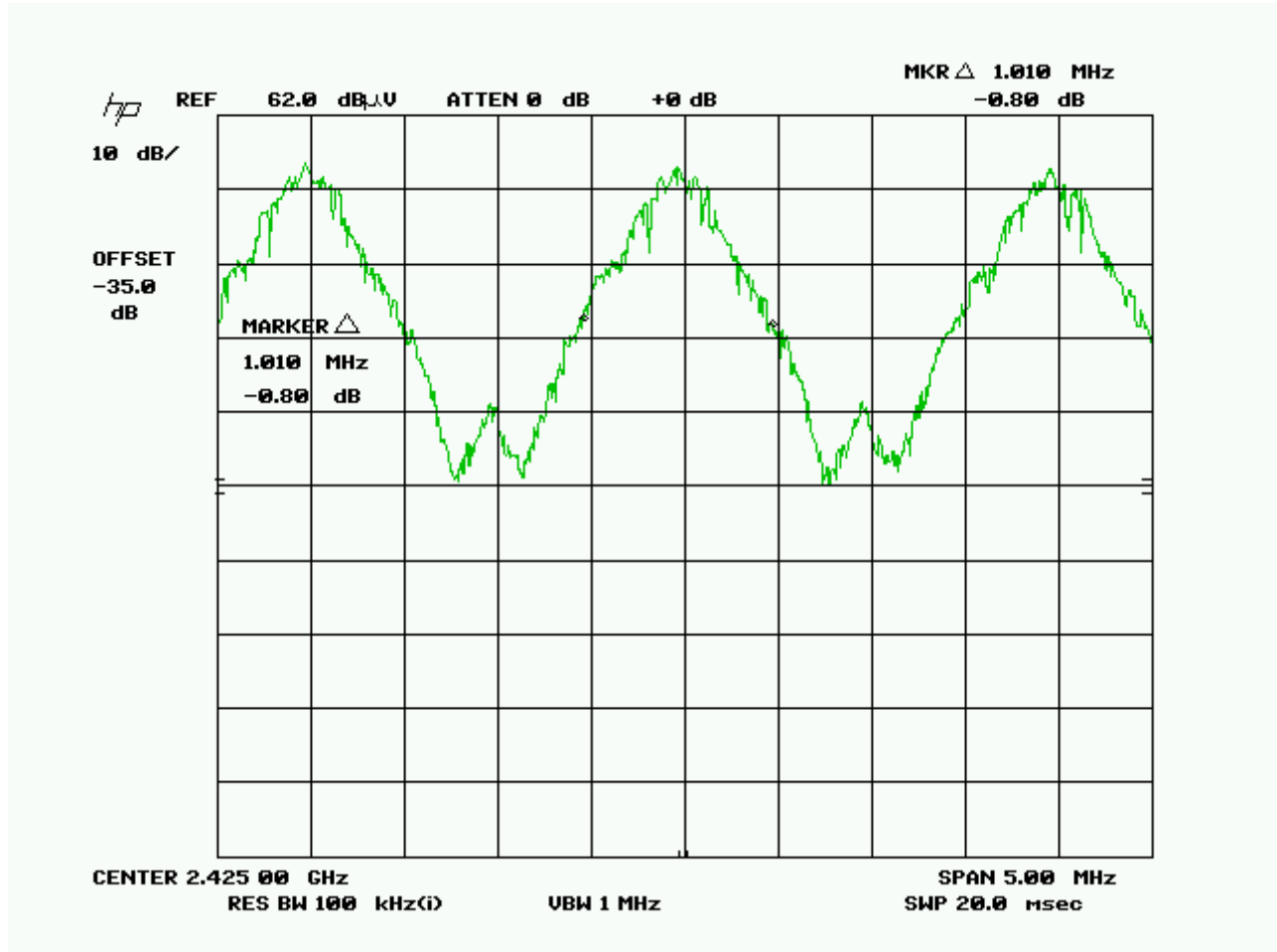


### OCCUPIED BANDWIDTH

**Rules Part No.:** 15.249 (d), RSS-210, RSS-GEN

**Requirements:** The field strength of any emissions appearing outside the specified frequency bands, except harmonics shall be attenuated at least 50 dB below the level of the carrier or to the general limits of 15.209 whichever is the lesser.

**Test Data:**



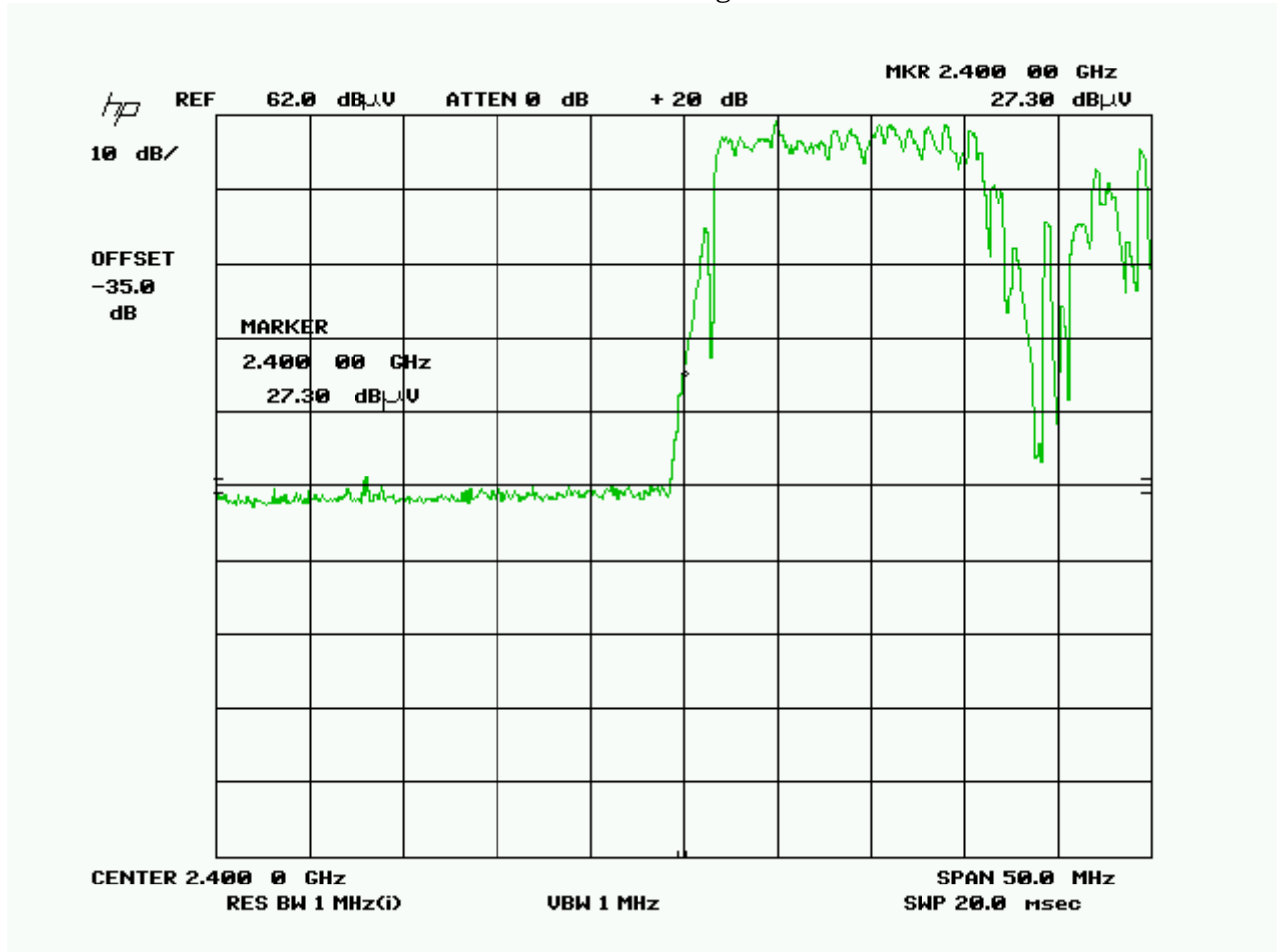
**BAND EDGE COMPLIANCE**

**Rules Part No.:** 15.249 (d), RSS-210, RSS-GEN

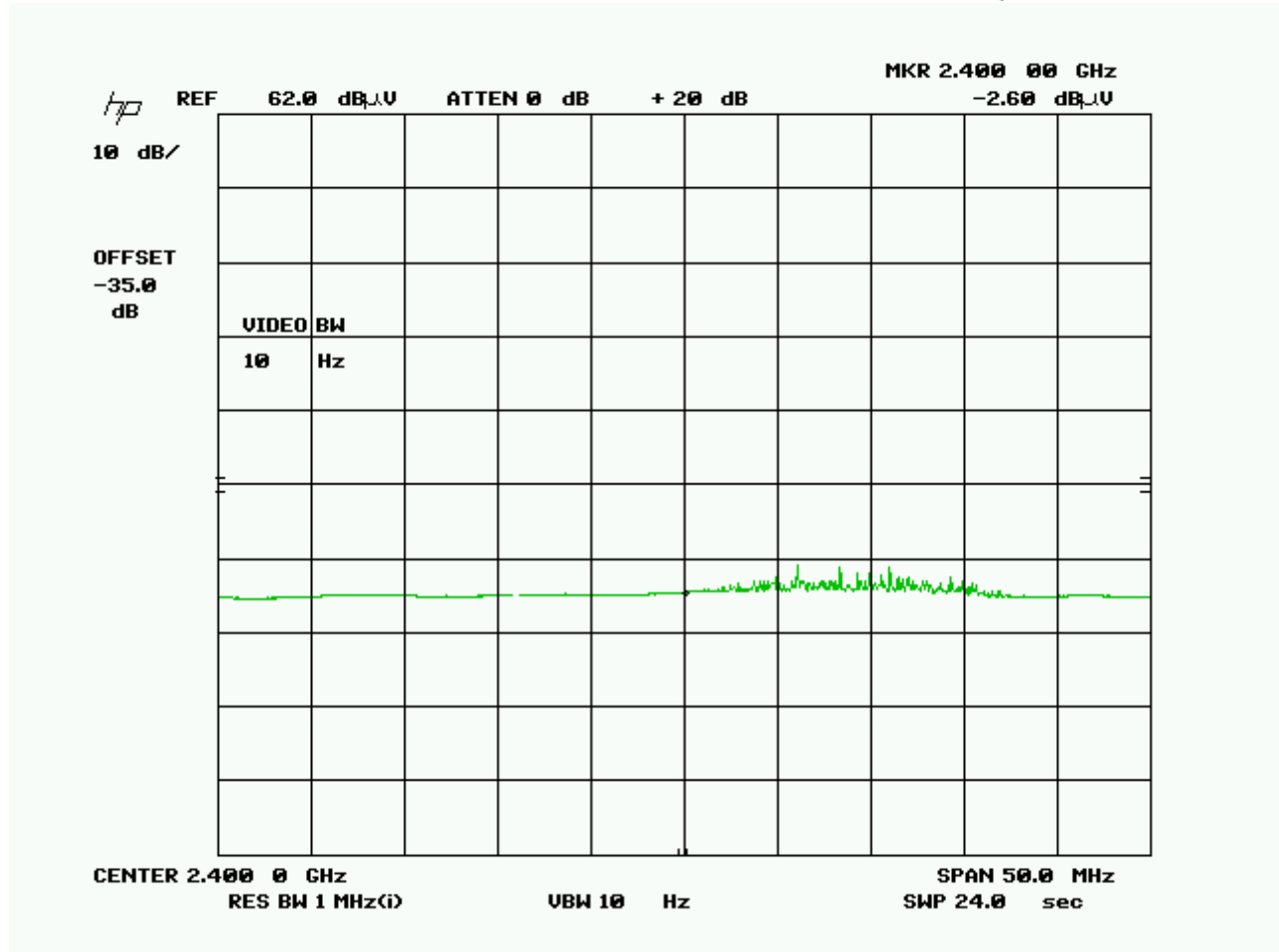
**Requirements:** 40 dBc or in the case of restricted bands 54 dB $\mu$ V/m.

**Test Data:**

Lower bandedge



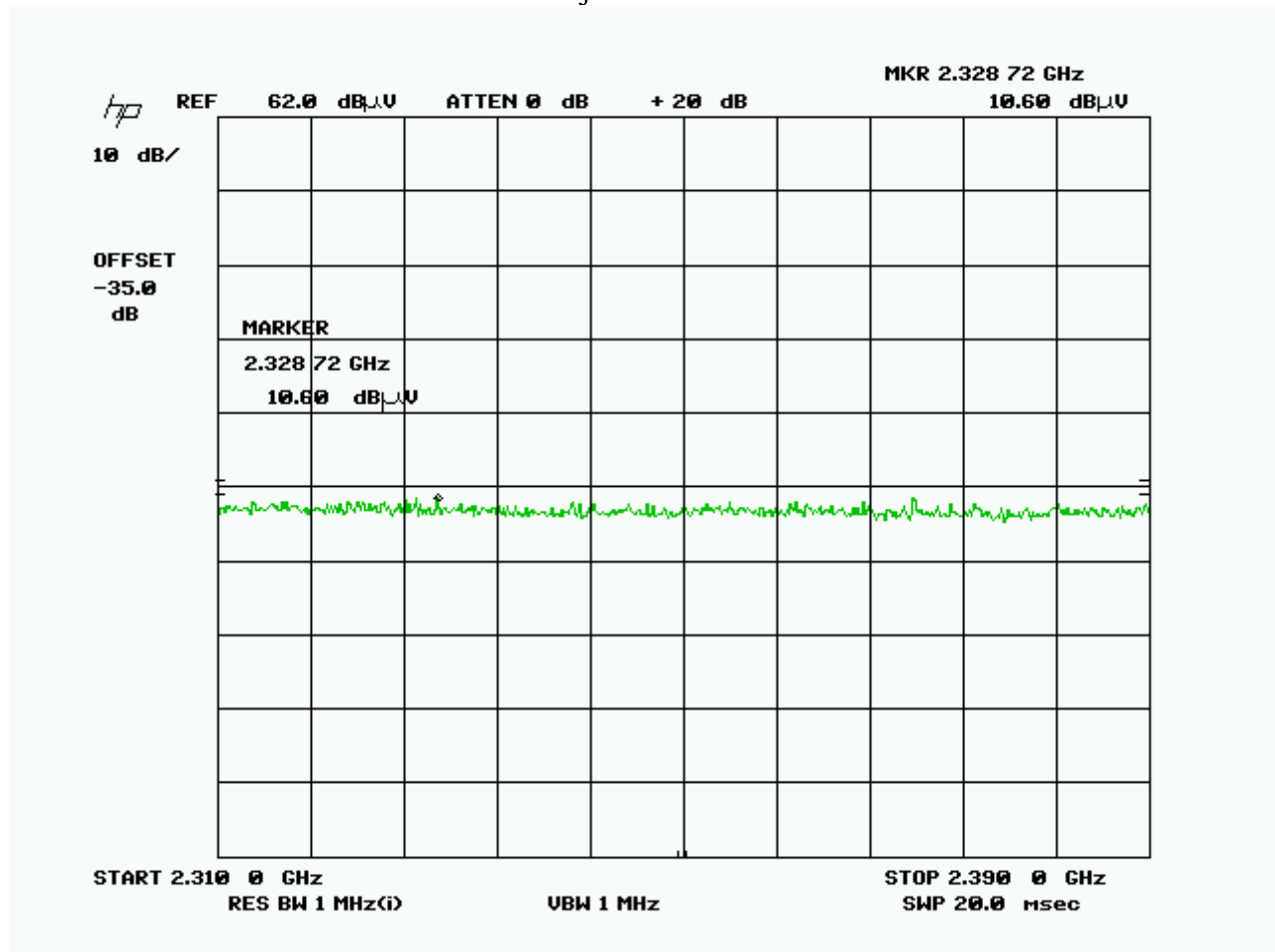
Peak Plot



Average Plot

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBμV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBμV/m	Margin dB
2,402.0	2,400.00	27.3	V	3.18	32.40	62.88	-8.88
2,402.0	2,400.00	-2.8	V	3.18	32.40	32.78	21.22

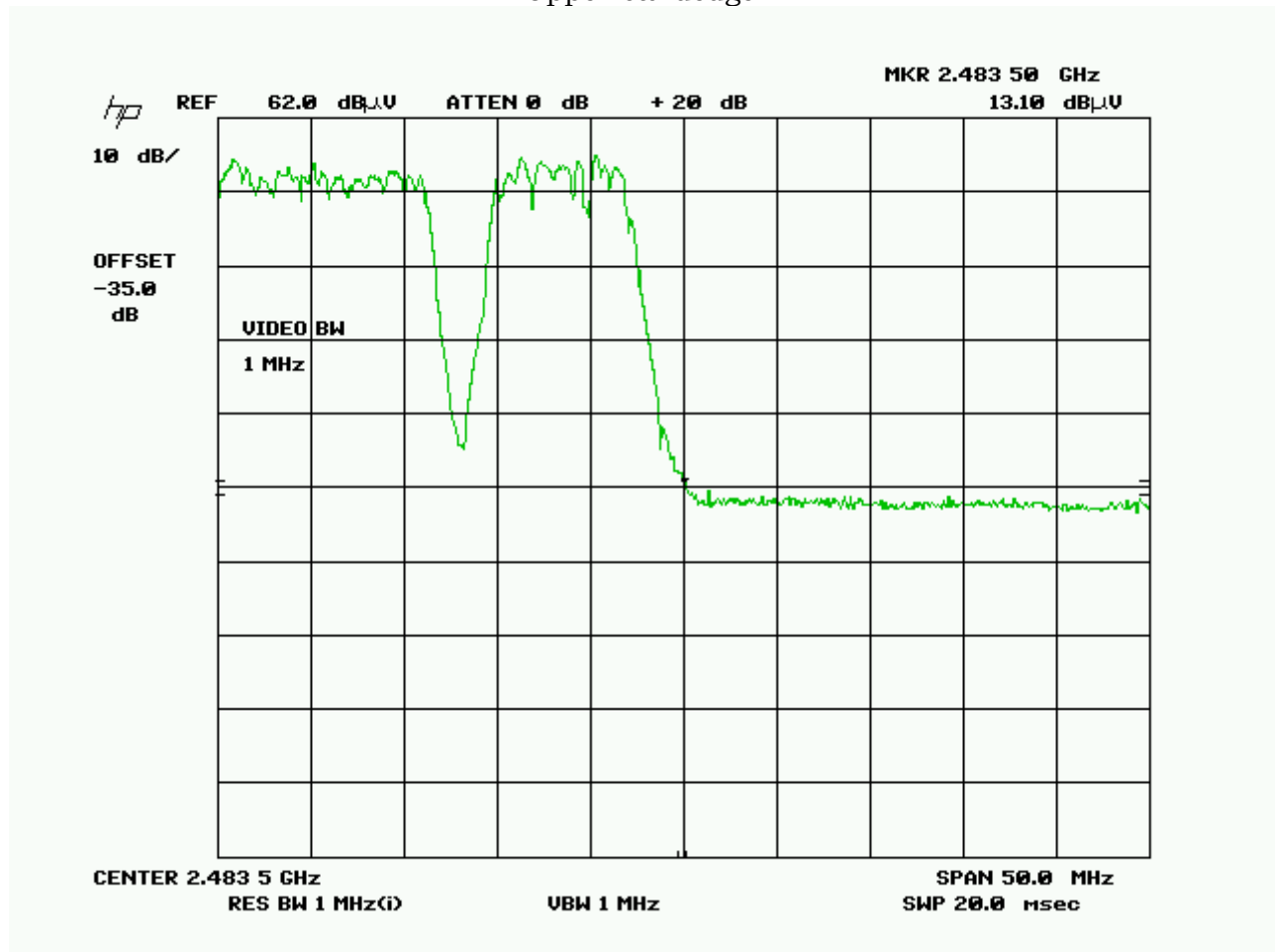
Lower non-adjacent restricted band



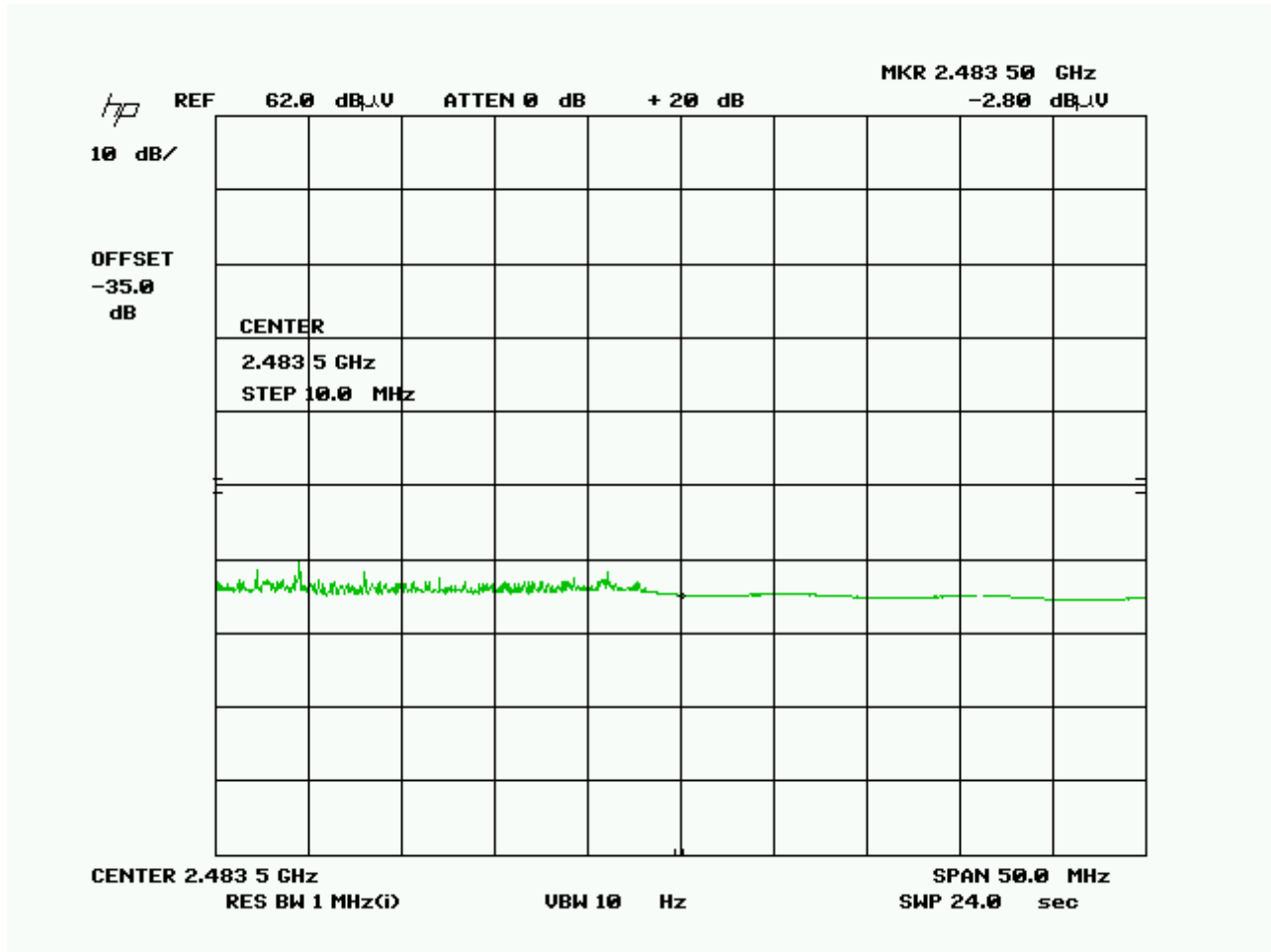
Peak Plot

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBμV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBμV/m	Margin dB
2,402.0	2,328.72	10.6	V	3.13	32.26	45.99	8.01

Upper bandedge



Peak Plot



Average Plot

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBμV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBμV/m	Margin dB
2,480.0	2,483.50	13.1	V	3.24	32.57	48.91	5.09
2,480.0	2,483.50	-2.8	V	3.24	32.57	33.01	20.99



## **DUTY CYCLE**

**Total # of pulses:** 6 in 32 ms

**Duration of pulse:** 1.25 ms maximum duration of pulse.

$20 \cdot \log \left( \frac{10 \cdot 1.25}{32} \right) = 20 \cdot \log (0.23) = 12.6 \text{ dB}$

**POWER LINE CONDUCTED INTERFERENCE**

**Rules Part No.:** 15.207, RSS-GEN

**Requirements:**

Frequency (MHz)	Quasi Peak Limits (dB $\mu$ V)	Average Limits (dB $\mu$ V)
0.15 – 0.5	66 – 56	56 – 46
0.5 – 5.0	56	46
5.0 – 30	60	50

**Test Data:** The attached graphs represent the emissions read for power line conducted for this device. Both lines were observed.

**N/A**  
**Battery or vehicle powered DUT.**