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## **FCC PART 15.247 AND IC RSS-210 TEST REPORT**

<b>APPLICANT</b>	MOTOROLA, INC.
	1301 EAST ALGONQUIN ROAD
	SCHAUMBURG IL 60196 USA
<b>FCC ID</b>	ABZ99FT7006
<b>IC CERTIFICATION</b>	109AB-99FT7006
<b>MODEL NUMBER</b>	RMN5104A
<b>PRODUCT DESCRIPTION</b>	HANDSET BLUETOOTH DEVICE
<b>DATE SAMPLE RECEIVED</b>	10/1/2007
<b>DATE TESTED</b>	10/15/2007
<b>TESTED BY</b>	Richard Block
<b>APPROVED BY</b>	
<b>TIMCO REPORT NO.</b>	3215AUT7TestReport.doc
<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.

TABLE OF CONTENTS

LETTER OF EXPLANATION .....	3
EMC EQUIPMENT LIST .....	4
TEST PROCEDURE .....	5
POWER LINE CONDUCTED INTERFERENCE .....	6
NUMBER OF HOPPING CHANNELS .....	7
DWELL TIME OF A HOPPING CHANNEL .....	9
ANTENNA GAIN .....	10
POWER OUTPUT .....	11
FIELD STRENGTH OF SPURIOUS EMISSIONS .....	12
RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND .....	15

APPLICANT: MOTOROLA, INC.

FCC ID: «GranteeCode»«EquipmentProductCode»

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## LETTER OF EXPLANATION

October 12, 2007

Federal Communications Commission  
Authorization and Evaluation Division  
7435 Oakland Mills Road  
Columbia, MD 21046

SUBJECT: MOTOROLA, INC.

FCC ID: ABZ

To Whom It May Concern:

The attached application is for a portable device that employs Bluetooth device.

The unit employs an internal antenna. The antenna for the Bluetooth device has an antenna gain of +1.2 dBi.

Should you have any questions or require any further information with regards to this, please feel free to contact me.

Sincerely,

Mario R. de Aranzeta C.E.T.  
Engineer

MRD/sh  
Encl.

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# **EMC EQUIPMENT LIST**

<b>Device</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial Number</b>	<b>Cal/Char Date</b>	<b>Due Date</b>
<b>3/10-Meter OATS</b>	<b>TEI</b>	<b>N/A</b>	<b>N/A</b>	<b>Listed 3/20/07</b>	<b>3/19/10</b>
<b>3-Meter OATS</b>	<b>TEI</b>	<b>N/A</b>	<b>N/A</b>	<b>Listed 1/11/06</b>	<b>1/10/09</b>
<b>3-Meter Semi-Anechoic Chamber</b>	<b>Panashield</b>	<b>N/A</b>	<b>N/A</b>	<b>Listed 5/11/07</b>	<b>5/10/10</b>
<b>Antenna: Biconnical</b>	<b>Eaton</b>	<b>94455-1</b>	<b>1057</b>	<b>CAL 12/12/05</b>	<b>12/12/07</b>
<b>Antenna: Biconnical</b>	<b>Eaton</b>	<b>94455-1</b>	<b>1096</b>	<b>CAL 10/11/06</b>	<b>10/11/08</b>
<b>Analyzer Blue Tower Quasi-Peak Adapter</b>	<b>HP</b>	<b>85650A</b>	<b>2811A01279</b>	<b>CAL 5/17/07</b>	<b>5/17/09</b>
<b>Analyzer Blue Tower RF Preselector</b>	<b>HP</b>	<b>85685A</b>	<b>2926A00983</b>	<b>CAL 5/17/07</b>	<b>5/17/09</b>
<b>Analyzer Blue Tower Spectrum Analyzer</b>	<b>HP</b>	<b>8568B</b>	<b>2928A04729 2848A18049</b>	<b>CAL 5/17/07</b>	<b>5/17/09</b>
<b>LISN</b>	<b>Electro-Metrics</b>	<b>ANS-25/2</b>	<b>2604</b>	<b>CAL 10/5/06</b>	<b>10/5/08</b>
<b>Antenna: Log-Periodic</b>	<b>Electro-Metrics</b>	<b>LPA-25</b>	<b>1122</b>	<b>CAL 12/1/06</b>	<b>12/1/08</b>

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## TEST PROCEDURE

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**POWER LINE CONDUCTED INTERFERENCE:** The procedure used was ANSI standard C63.4-2003 using a 50uH LISN. Both lines were observed with the UUT transmitting. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed. The ambient temperature of the UUT was 76°F with a humidity of 55%.

**BANDWIDTH 20 dB:** The measurements were made with the spectrum analyzer's resolution bandwidth (RBW) = 1 MHz and the video bandwidth (VBW) = 3 MHz and the span set as shown on plot.

**POWER OUTPUT:** The RF power output was measured at the antenna feed point using a peak power meter.

**ANTENNA CONDUCTED EMISSIONS:** The RBW = 100 kHz, VBW = 300 kHz and the span set to 10.0 MHz and the spectrum was scanned from 30 MHz to the 10<sup>th</sup> Harmonic of the fundamental. Above 1 GHz the resolution bandwidth was 1 MHz and the VBW = 3 MHz and the span to 50 MHz.

**RADIATION INTERFERENCE:** The test procedure used was ANSI standard C63.4-2003 using an Agilent spectrum receiver with pre-selector. The bandwidth (RBW) of the spectrum receiver was 100 kHz up to 1 GHz and 1 MHz above 1 GHz with an appropriate sweep speed. The VBW above 1 GHz was 3 MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient temperature of the UUT was 76°F with a humidity of 55%.

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REPORT #: W:\M\MOTOROLA\_SCHAUMBURG\3215AUT7\3215AUT7TestReport.doc

## POWER LINE CONDUCTED INTERFERENCE

RULES PART NO.: 15.107(a)

**REQUIREMENTS:**

	<b>QUASI-PEAK</b>	<b>AVERAGE</b>
.15 - 0.5 MHz	66-56 dBuV	56-46 dBuV
0.5 - 5.0	56	46
5.0 - 30.	60	50

**TEST PROCEDURE:** ANSI C63.4-2003. The spectrum was scanned from .15 to 30 MHz.

**TEST DATA** - Not applicable.

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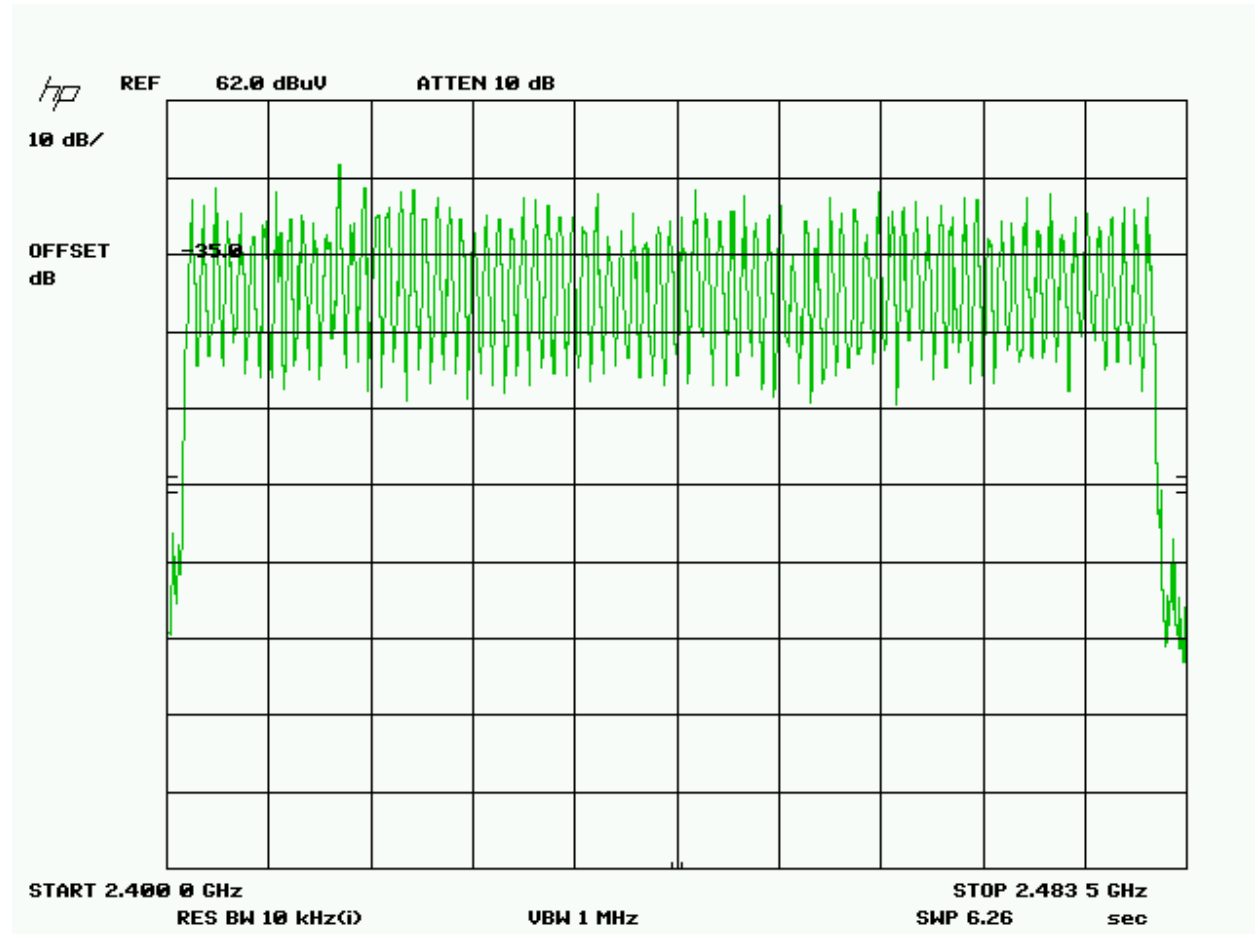
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## NUMBER OF HOPPING CHANNELS

RULES PART NO.: 15.247(a)(1)

TEST DATA: The number of hops is 79 hops

### NUMBER OF HOPPING CHANNELS



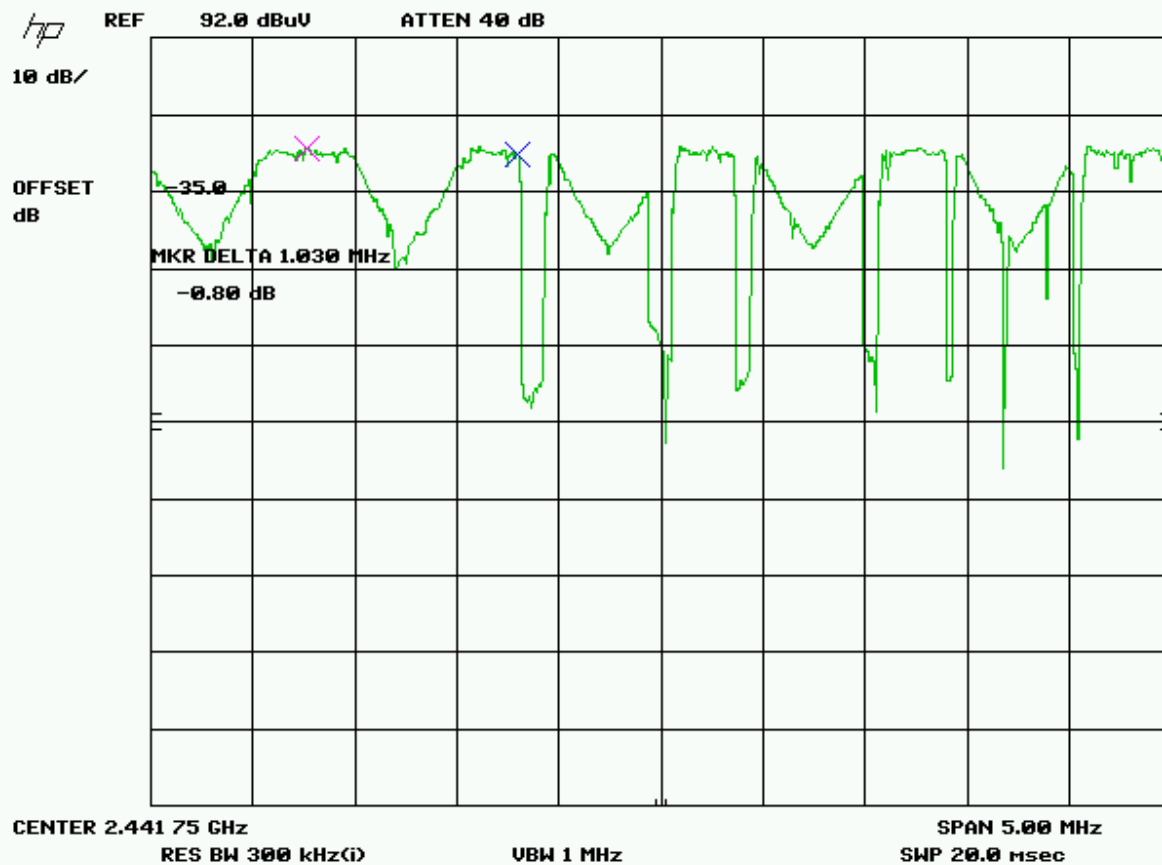
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## CHANNEL/CARRIER SPACING

**TEST DATA:** The channel spacing is 1.03 MHz



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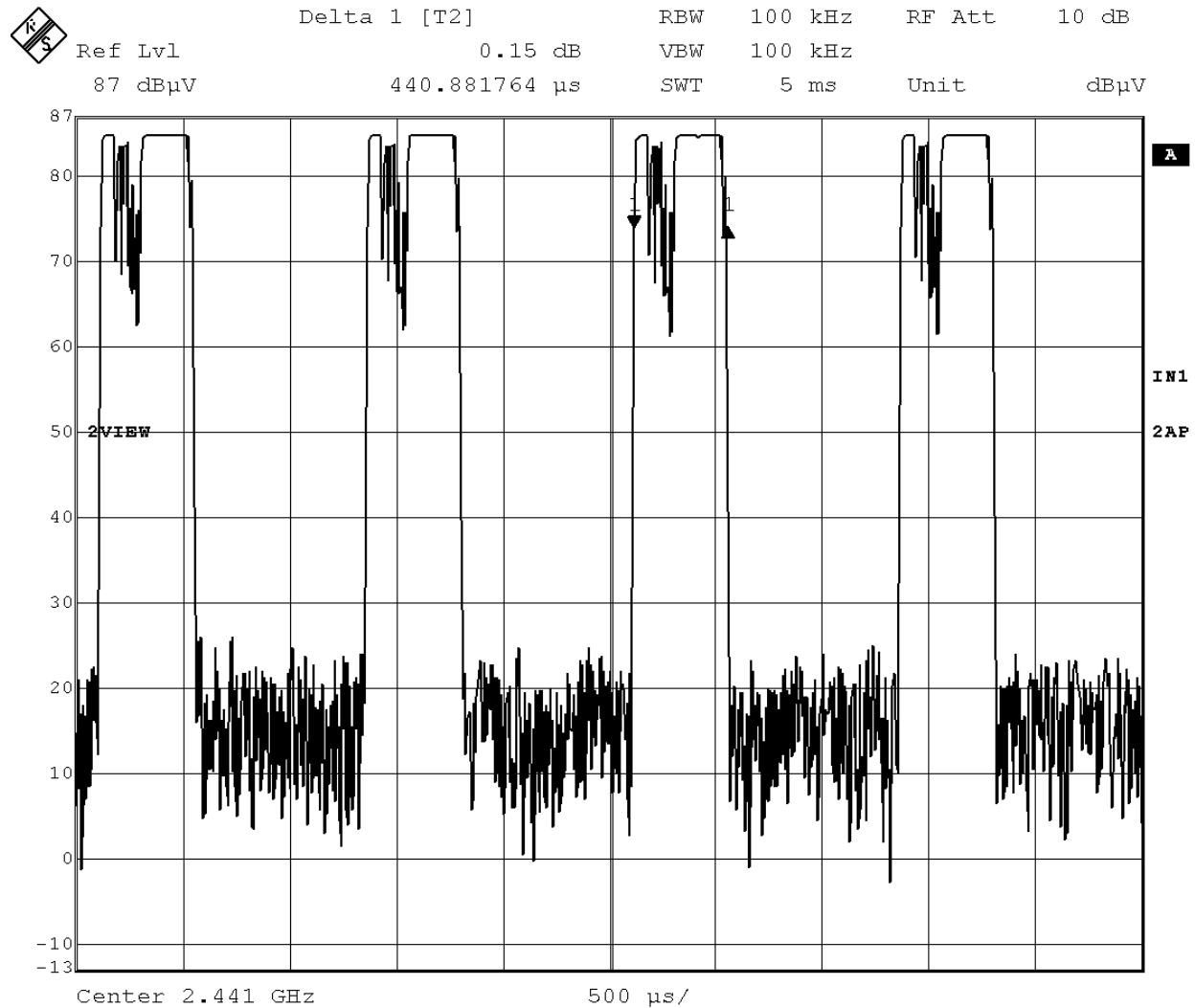
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## DWELL TIME OF A HOPPING CHANNEL

RULES PART NO.: 15.247(a)(1)(i)

**TEST DATA:** The system makes the worst case at 1600 hops per second, and 1 time slot has a length of 625us with 79 channels. A DH 1 packet needs 1 time slot for transmitting and 1 time slot for receiving. The system makes the worst case as  $1600/2 = 800$  hops per second with 79 channels. Each channel is  $800/79 = 10.13$  times per second and so for a period of  $0.4 \times 79 = 31.6$  seconds you have  $10.13 \times 31.6 = 320.11$  times of appearance. Each TX time per appearance is 441us  
 $320.11 \times 441\text{us} = 141.168\text{ms}$  per 31.6 seconds



Date: 22.OCT.2007 10:26:45

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REPORT #: W:\M\MOTOROLA\_SCHAUMBURG\3215AUT7\3215AUT7TestReport.doc

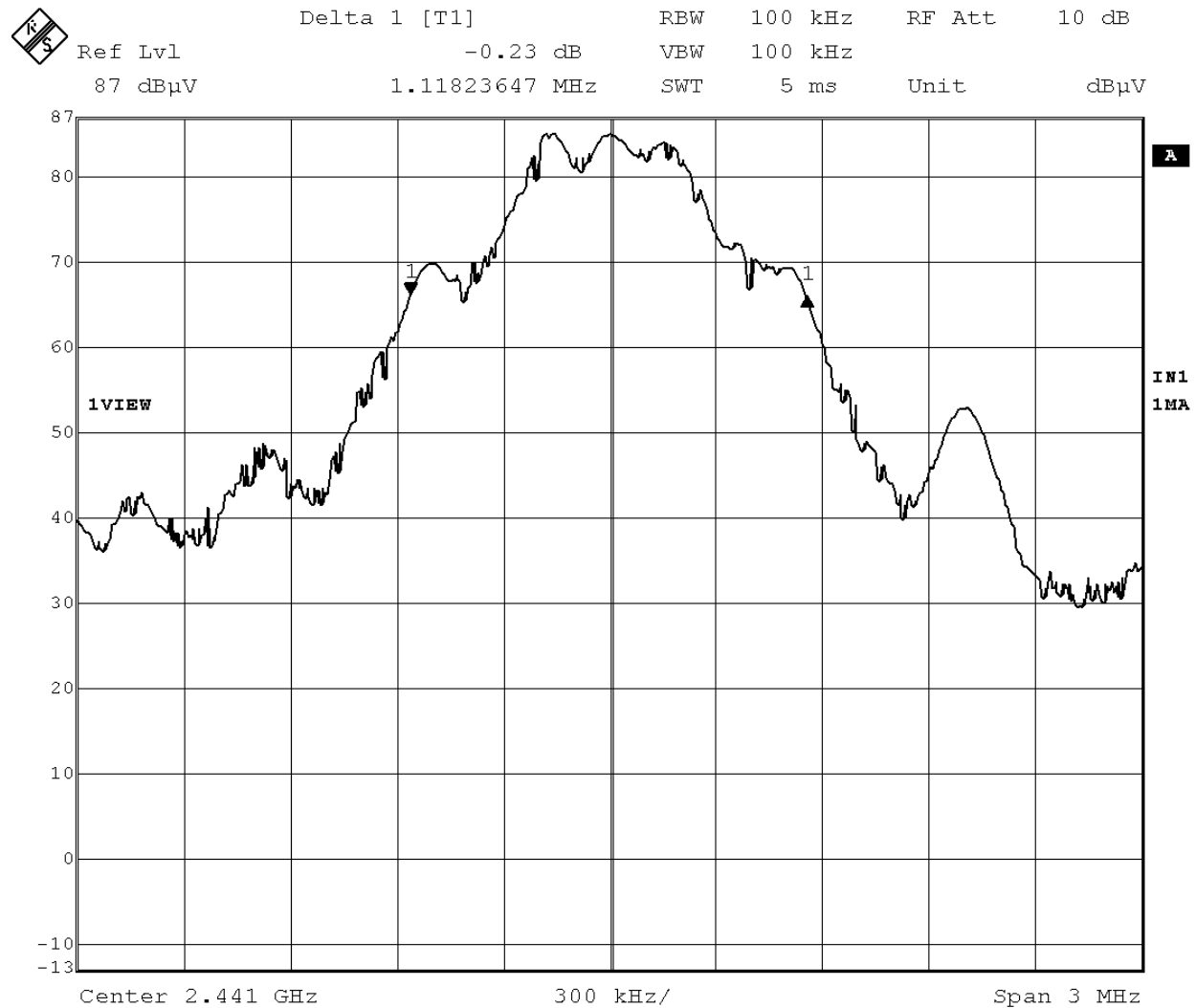
## ANTENNA GAIN

RULE PART NO.: 15.247(b)(3)

## 20dB BANDWIDTH

RULE PART NO.: 15.247(a)(1)(iii)

TEST DATA: The 20 dB bandwidth measured was 1.12 MHz.



Date: 22.OCT.2007 10:38:32

Three places in the band were measured and the worst case presented above.

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REPORT #: W:\M\MOTOROLA\_SCHAUMBURG\3215AUT7\3215AUT7TestReport.doc

## POWER OUTPUT

**RULE PART NO.:** 15.247(b)(1)

**REQUIREMENTS:** 1.0 Watt or +30 dBm

**MEASUREMENT:**

2402 MHz	0.54 mW or 0.00054 Watts EIRP
2441 MHz	0.47 mW or 0.00047 Watts EIRP
2480 MHz	0.69 mW or 0.00069 Watts EIRP

**Method:** 15.247(c)

The device under test has an integral antenna and the power was measured on a radiated basis.

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REPORT #: W:\M\MOTOROLA\_SCHAUMBURG\_\3215AUT7\3215AUT7TestReport.doc

## FIELD STRENGTH OF SPURIOUS EMISSIONS

RULES PART NO.: 15.247(c), 15.205 & 15.209(b)

### REQUIREMENTS:

FIELD STRENGTH of Fundamental:	FIELD STRENGTH of Harmonics	S15.209 30 - 88 MHz 40 dBuV/m @3M
902-928MHz		88 -216 MHz 43.5
2.4-2.4835GHz	127.37dBuV/m	216 -960 MHz 46
127.38dBuV/m @3m	54 dBuV/m @3m	ABOVE 960 MHz 54dBuV/m

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 20 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209, WHICHEVER IS THE LESSER ATTENUATION.

Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

### TEST DATA:

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
2,402.0	2,402.00	58.1	H	3.18	32.25	93.53	33.85
2,402.0	2,402.00	59.3	V	3.18	32.25	94.73	32.65
2,402.0	4,804.00	10.5	V	4.90	34.10	49.50	4.50
2,402.0	4,804.00	13.9	H	4.90	34.10	52.90	1.10
2,402.0	7,206.00	9.1	V	5.72	36.04	50.86	3.14
2,402.0	7,206.00	9.7	H	5.72	36.04	51.46	2.54
2,402.0	9,608.00	8.7	H	6.78	36.71	52.19	1.81
2,402.0	9,608.00	10.1	V	6.78	36.71	53.59	0.41
2,441.0	2,441.00	51.5	H	3.21	32.35	87.06	40.32
2,441.0	2,441.00	58.6	V	3.21	32.35	94.16	33.22
2,441.0	4,882.00	12.3	V	4.94	34.10	51.34	2.66
2,441.0	4,882.00	14.2	H	4.94	34.10	53.24	0.76
2,441.0	7,323.00	9.2	H	5.79	36.06	51.05	2.95
2,441.0	7,323.00	9.3	V	5.79	36.06	51.15	2.85
2,441.0	9,764.00	9.1	V	6.83	36.86	52.79	1.21
2,441.0	9,764.00	9.7	H	6.83	36.86	53.39	0.61
2,480.0	2,480.00	57.7	H	3.24	32.45	93.39	33.99
2,480.0	2,480.00	60.1	V	3.24	32.45	95.79	31.59
2,480.0	4,960.00	14.2	V	4.98	34.10	53.28	0.72
2,480.0	4,960.00	14.7	H	4.98	34.10	53.78	0.22
2,480.0	7,440.00	9.7	V	5.86	36.09	51.65	2.35
2,480.0	7,440.00	10.2	H	5.86	36.09	52.15	1.85
2,480.0	9,220.00	9.0	H	6.67	36.43	52.10	1.90
2,480.0	9,220.00	9.7	V	6.67	36.43	52.80	1.20

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FCC ID: «GranteeCode»«EquipmentProductCode»

REPORT #: W:\M\MOTOROLA\_SCHAUMBURG\3215AUT7\3215AUT7TestReport.doc

Emissions attenuated more than 20 dB below the permissible value are not reported.

# FIELD STRENGTH OF SPURIOUS EMISSIONS (CONTINUED)

RULE PART NO. 15.247(c), 15.205 & 15.209(b)

## REQUIREMENTS:

FIELD STRENGTH of Fundamental:	FIELD STRENGTH of Harmonics	S15.209 30 - 88 MHz 40 dBuV/m @3M
902-928MHz		88 -216 MHz 43.5
2.4-2.4835GHz	127.37dBuV/m	216 -960 MHz 46
127.38dBuV/m @3m	54 dBuV/m @3m	ABOVE 960 MHz 54dBuV/m

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 20 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209, WHICHEVER IS THE LESSER ATTENUATION.

Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dBc.

TEST DATA: from 30 MHz to 1 GHz

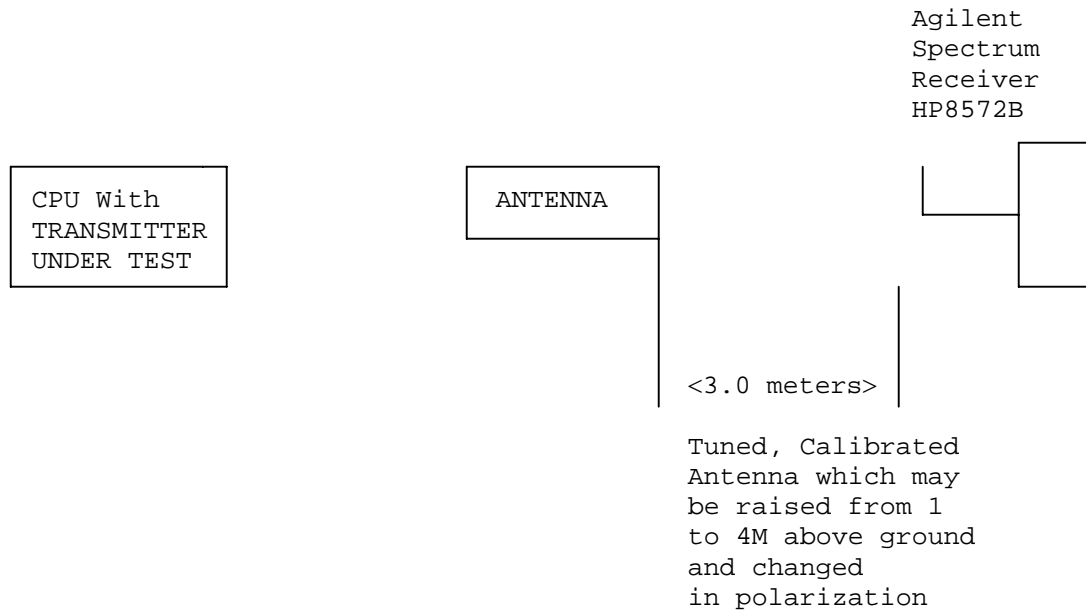
Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
33.38	3.7	H	0.42	12.65	16.77	23.23
40.20	3.9	V	0.45	9.72	14.07	25.93
48.48	4.1	V	0.49	10.80	15.39	24.61
51.54	3.9	H	0.51	11.20	15.61	24.39
64.04	4.3	H	0.55	10.37	15.22	24.78
70.00	4.3	H	0.57	8.50	13.37	26.63
153.05	4.0	V	0.71	14.38	19.09	24.41
195.30	4.1	V	0.88	17.39	22.37	21.13
210.81	4.2	V	0.92	11.66	16.78	26.72
218.54	4.3	V	0.94	11.27	16.51	29.49
221.32	4.0	H	0.94	11.50	16.44	29.56
225.06	5.1	H	0.95	11.50	17.55	28.45
250.86	4.6	V	1.00	12.53	18.13	27.87
317.99	4.7	V	1.12	14.78	20.60	25.40
342.42	5.4	V	1.14	14.60	21.14	24.86
379.95	6.4	V	1.18	15.30	22.88	23.12
497.64	5.1	H	1.30	17.81	24.21	21.79
634.20	5.4	H	1.63	19.73	26.76	19.24
759.90	7.6	V	1.82	20.70	30.12	15.88

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REPORT #: W:\M\MOTOROLA\_SCHAUMBURG\3215AUT7\3215AUT7TestReport.doc

## Method of Measuring Radiated Spurious Emissions



Equipment placed 80cm above ground on a rotatable platform.

**METHOD OF MEASUREMENT:** The procedure used was ANSI standard C63.4-2003 & the FCC/OET Guidance on Measurements for Direct Sequence Spread Spectrum Systems - Public Notice 54797 Dated July 12, 1995. Measurements were made at the open area test site of TIMCO ENGINEERING INC. located at 849 N.W. State Road 45, Newberry, FL 32669.

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REPORT #: W:\M\MOTOROLA\_SCHAUMBURG\_\3215AUT7\3215AUT7TestReport.doc

## **RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND**

**RULE PART NO.:** 15.205

**REQUIREMENTS:** Emissions that fall in the restricted bands (15.205). These emissions must be less than or equal to 500 uV/m (54 dBuV/m).

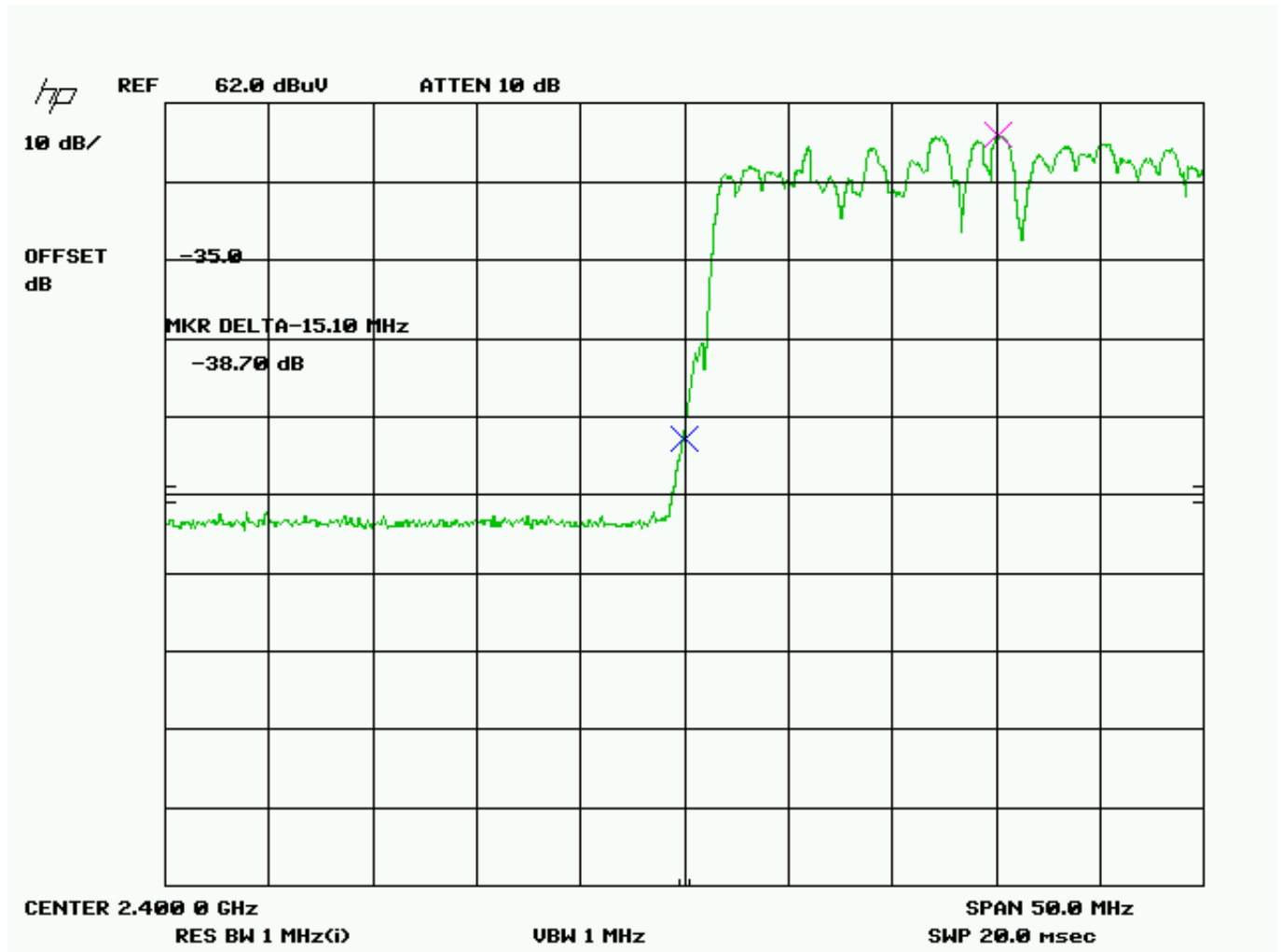
**TEST PROCEDURE:** An in band field strength measurement of the fundamental Emission using the RBW and detector function required by C63.4-2003 and FCC Rules. The procedure was repeated with an average detector and a plot made. The calculated field strength in the adjacent restricted band is presented below.

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REPORT #: W:\M\MOTOROLA\_SCHAUMBURG\_\3215AUT7\3215AUT7TestReport.doc

Lower Bandedge



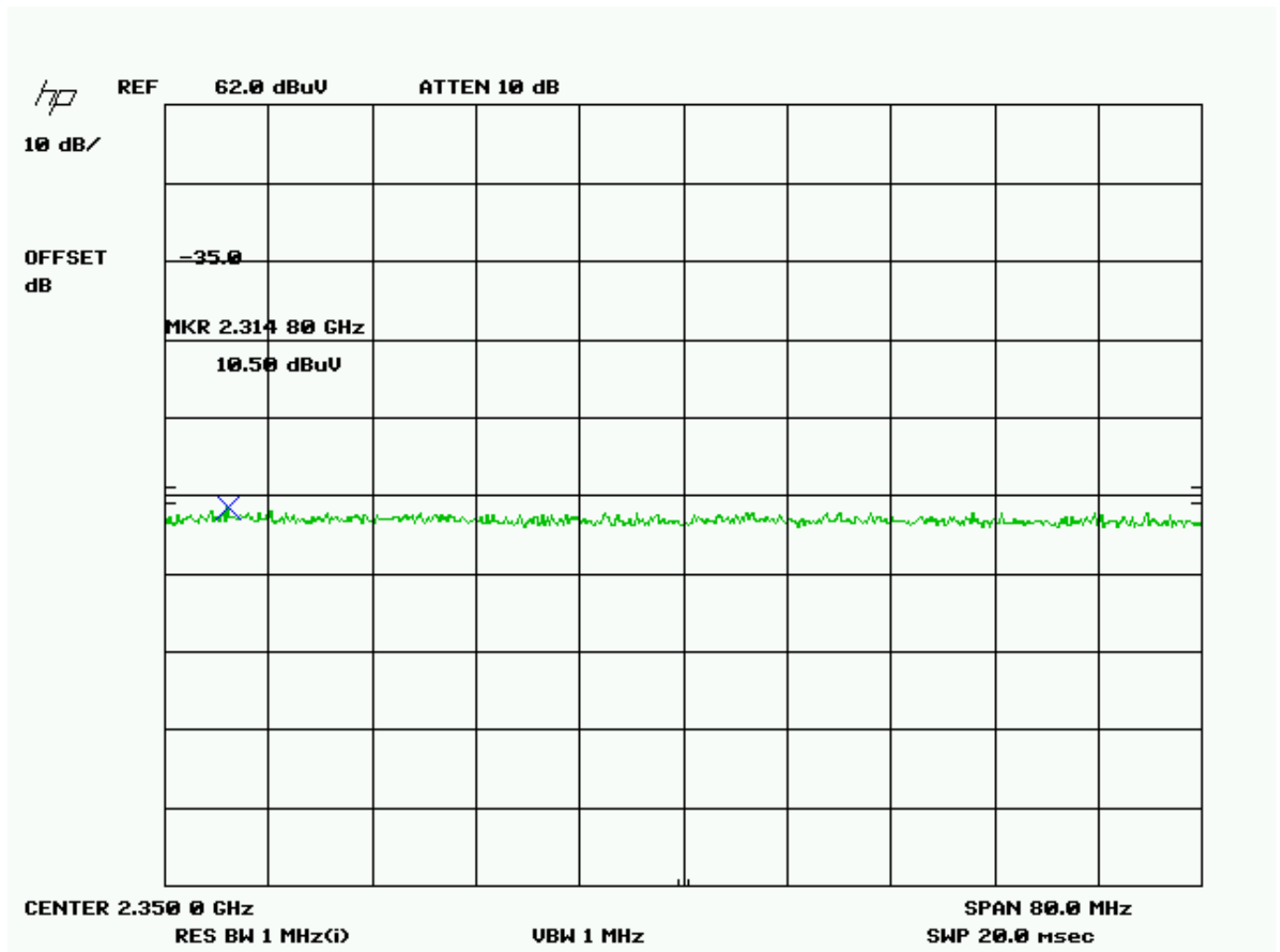
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Lower Restricted Band



Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
2,314.80	10.5	V	3.12	32.02	45.64	8.36

Peak meets the Average Value.

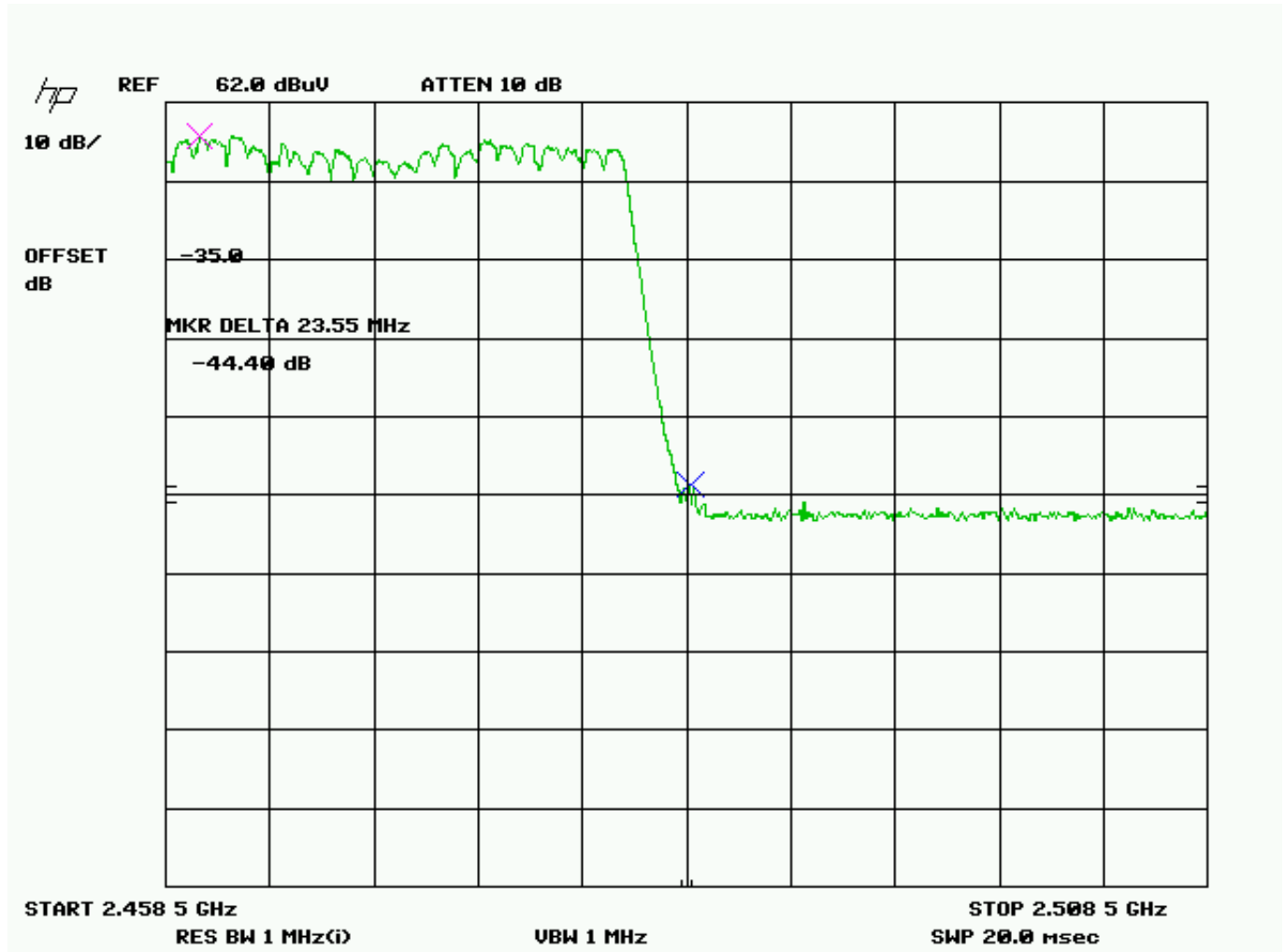
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Upper bandedge and restricted band (peak value)

Peak



Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
2,483.85	16.7	V	3.24	32.46	52.40	1.60

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TEST SETUP PHOTO



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FCC ID: «GranteeCode»«EquipmentProductCode»  
REPORT #: «JobRPTFileName»