Mobile Devices business
iDEN Mobile Devices Operations

RF Test Report

FCC Rule Parts: 15C (Bluetooth)
Industry Canada: RSS-Gen, RSS-210

Product Name: i856
FCC ID: IHDT56KC1
IC ID: 109O-KC1

Date: June 10, 2009

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Modulation Characteristics TIMCO Report

Test Report Details

Tests Performed by:	Motorola EMC Laboratory Plantation, Florida 8000 W. Sunrise Blvd Plantation, Florida 33322 Phone: FAX:
	FCC Registration Number: **91932** Industry Canada Number: **IC109U-1**
Product Type:	Cellular Phone
Signaling Capabilities:	Bluetooth Transceiver (2.4 GHz ISM)
FCC ID:	IHDT56KC1
IC ID:	109O-KC1

Applicable Standards

All tests and measurements indicated in this document were performed in accordance with the United States Code of Federal Regulations, Title 47 Part 2, Sub-part J, as well as the following parts:

X	Part 15 Subpart C – Radio Frequency Devices.
X	RSS-210 – Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment.

Applicable Standards: TIA/EIA-603-A, TIA/EIA-603-B, and ANSI C63.4-2003

Exhibit 6c: Bluetooth Measured Data– Pursuant 47 CFR 2.1041; RSS-Gen Section 3.

Bluetooth conducted measurement setup and procedure was provided in Exhibit 7.

6c.1. Bluetooth Carrier Frequency Separation – Pursuant 47 CFR 15.247(a)(1); RSS-210 Section A8.1.

Criterion: 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.

The measurement shows a carrier frequency separation of 1.0 MHz, which is greater than the measured 20 dB bandwidth of 797 kHz.

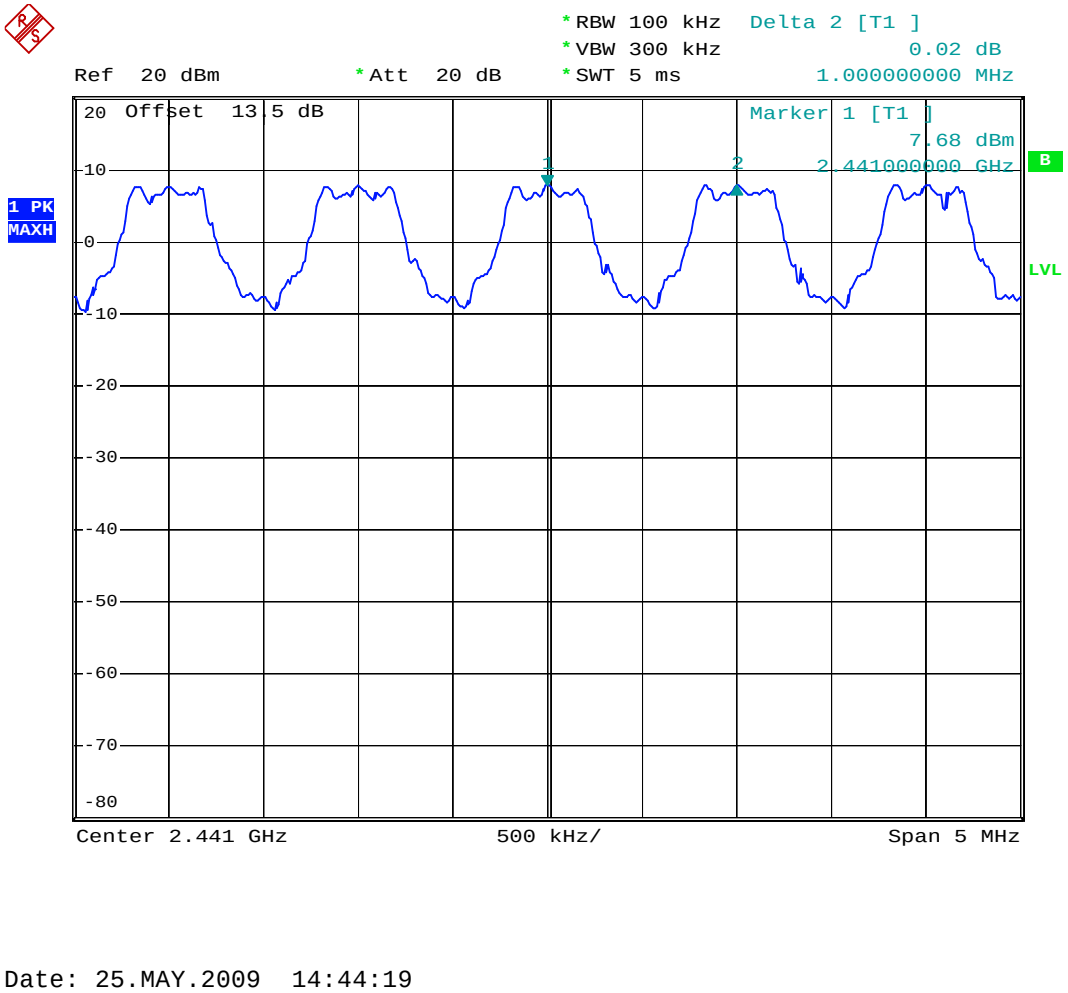

Figure 6c.1-1: Plot of Bluetooth carrier frequency separation

6c.2. 20 dB Bandwidth – Pursuant 47 CFR 15.247(a)(1); RSS-210 Section A8.1.

The 20 dB bandwidth of the emission is 797 kHz.

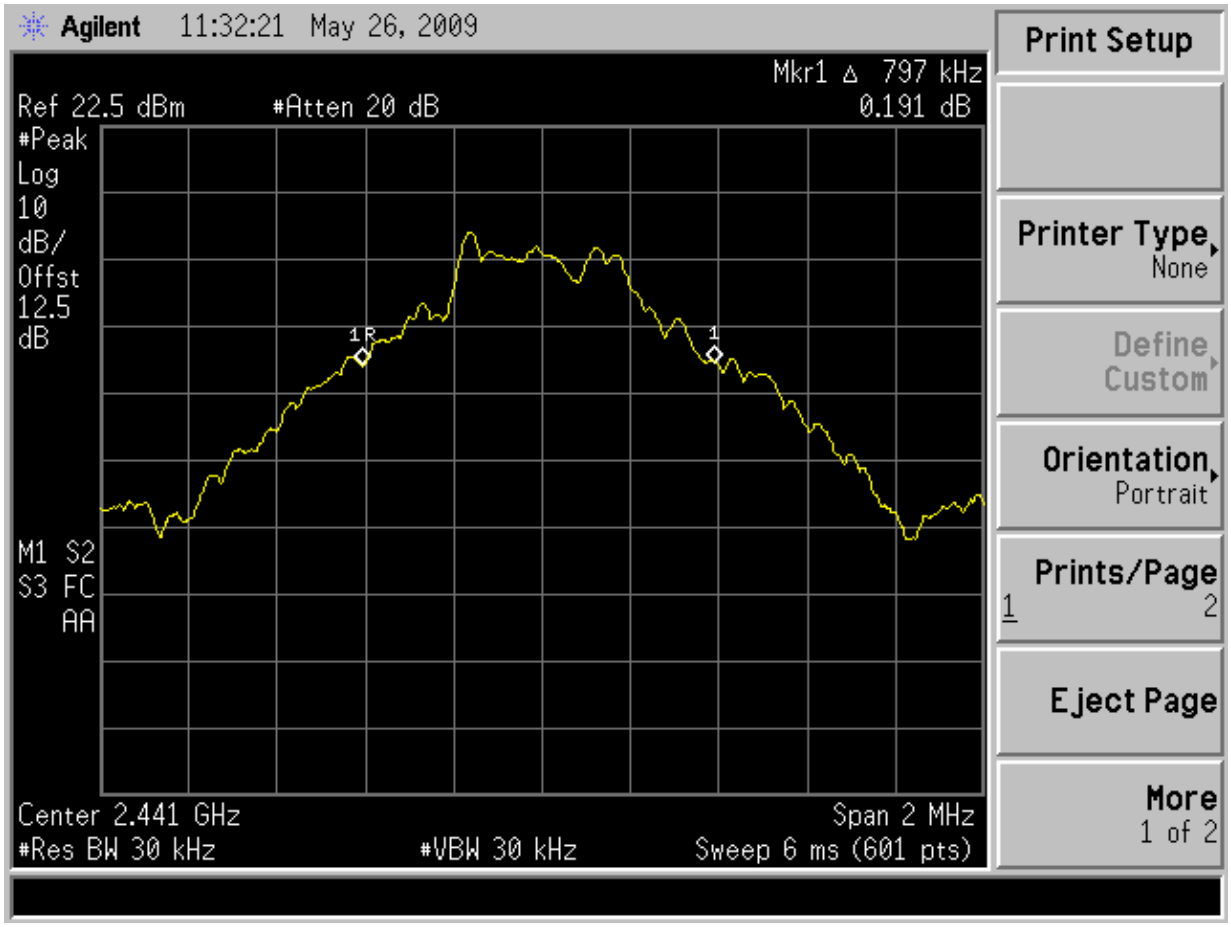

Figure 6c.2-1: Plot of 20 – dB bandwidth

6c.3. Bluetooth number of hopping frequencies – Pursuant 47 CFR 15.247(a)(1)(iii); RSS-210 Section A8.1.

Criterion: Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

The measurement shows 79 non-overlapping channels over a span of 79 MHz.

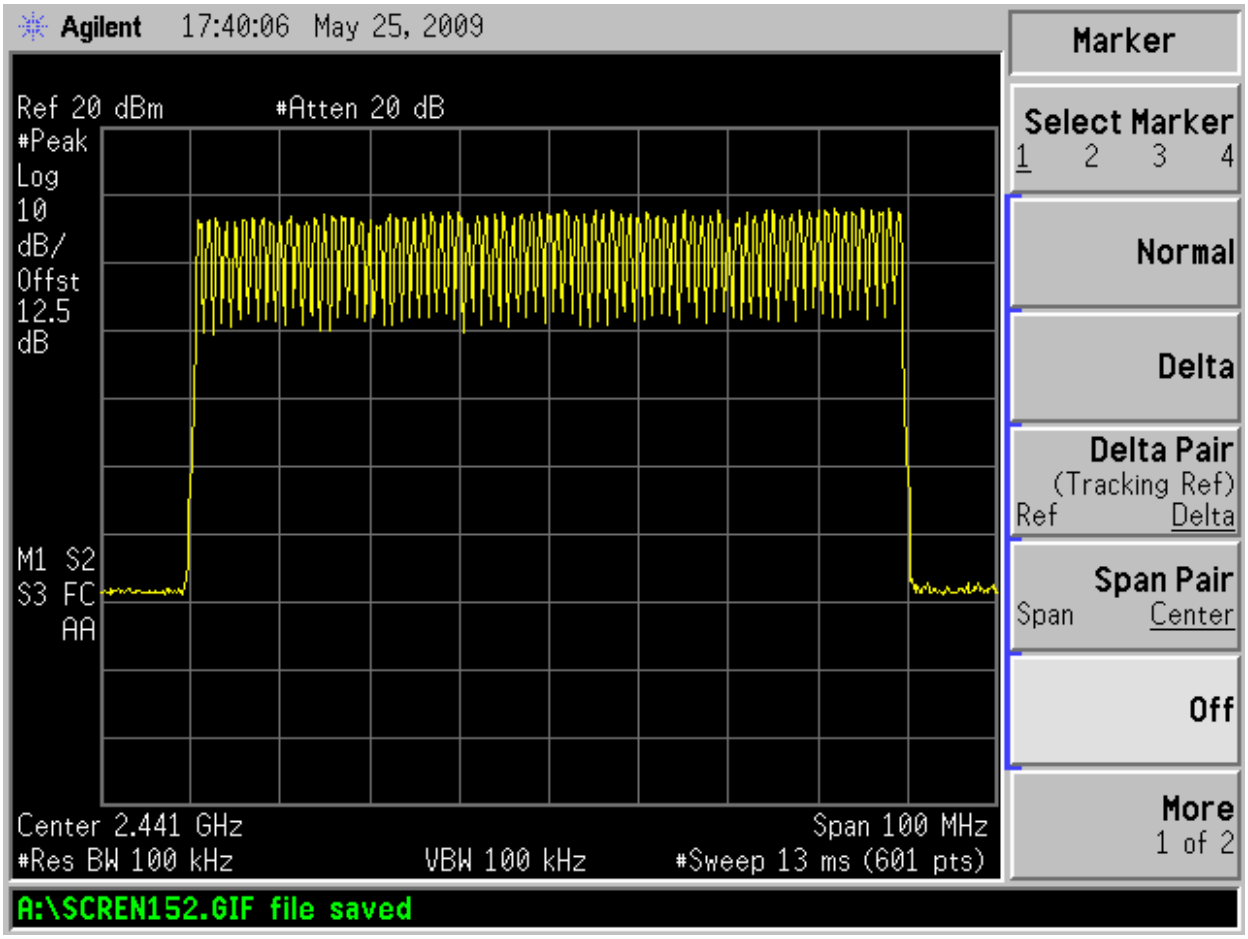

Figure 6c.3-1: Plot of number of Bluetooth hopping frequencies

6c.4. Time of Occupancy (Dwell Time) – Pursuant 47 CFR 15.247(a)(1)(iii); RSS-210 Section A8.1.

Criterion: 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.

The measurement shows the total dwell time in a 31.6 second period to be 119.9 ms.

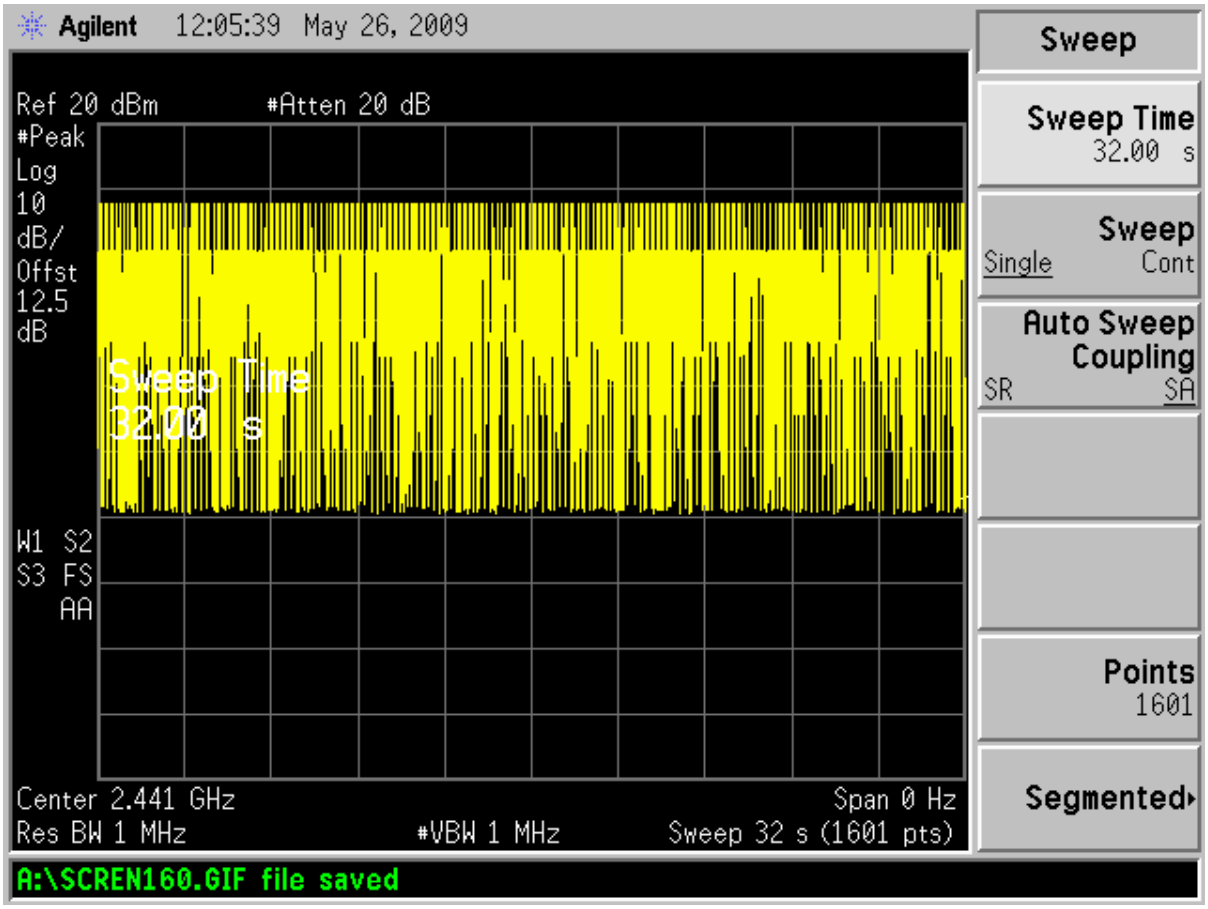

Figure 6c.4-1: Plot of dwell time over 32 second period

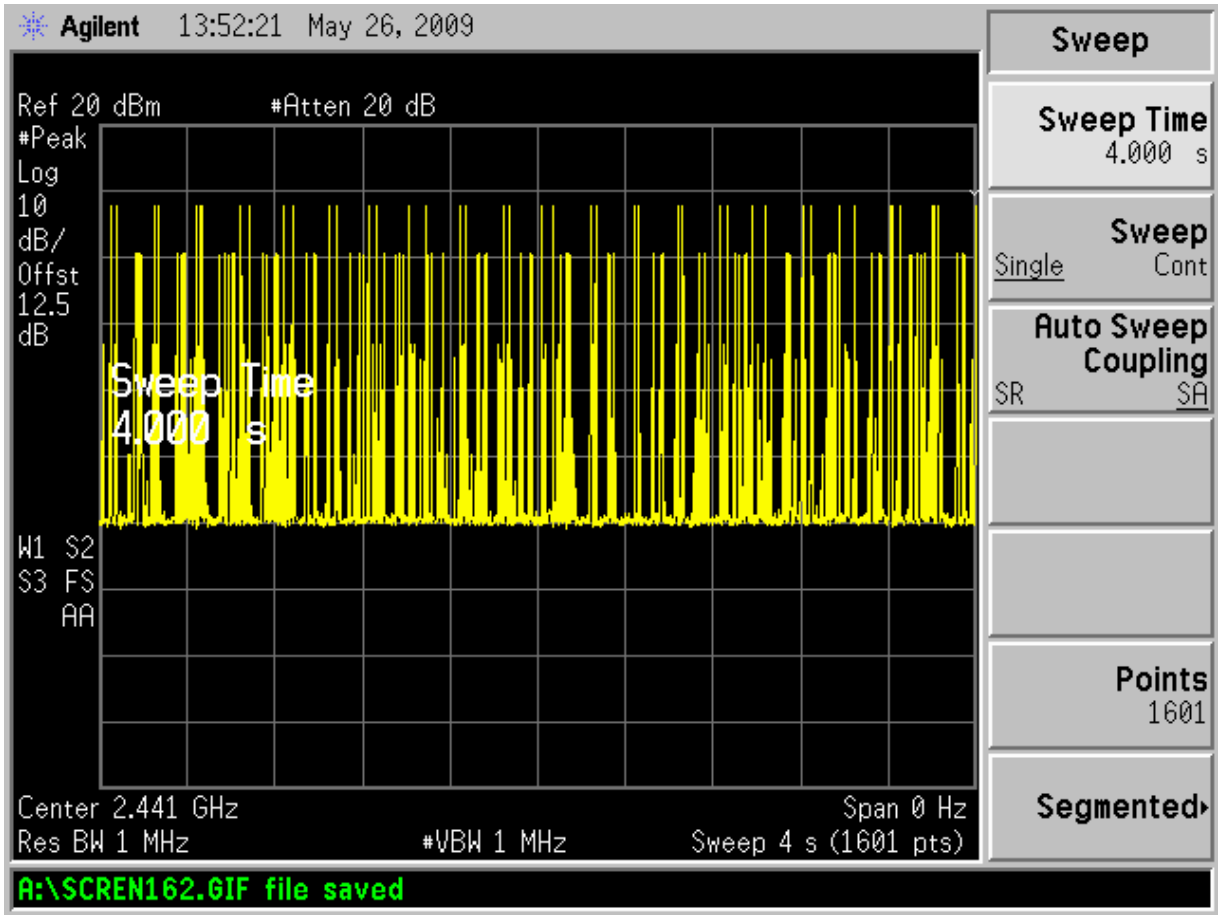

Figure 6c.4-2: Plot of dwell time over 4 second period.

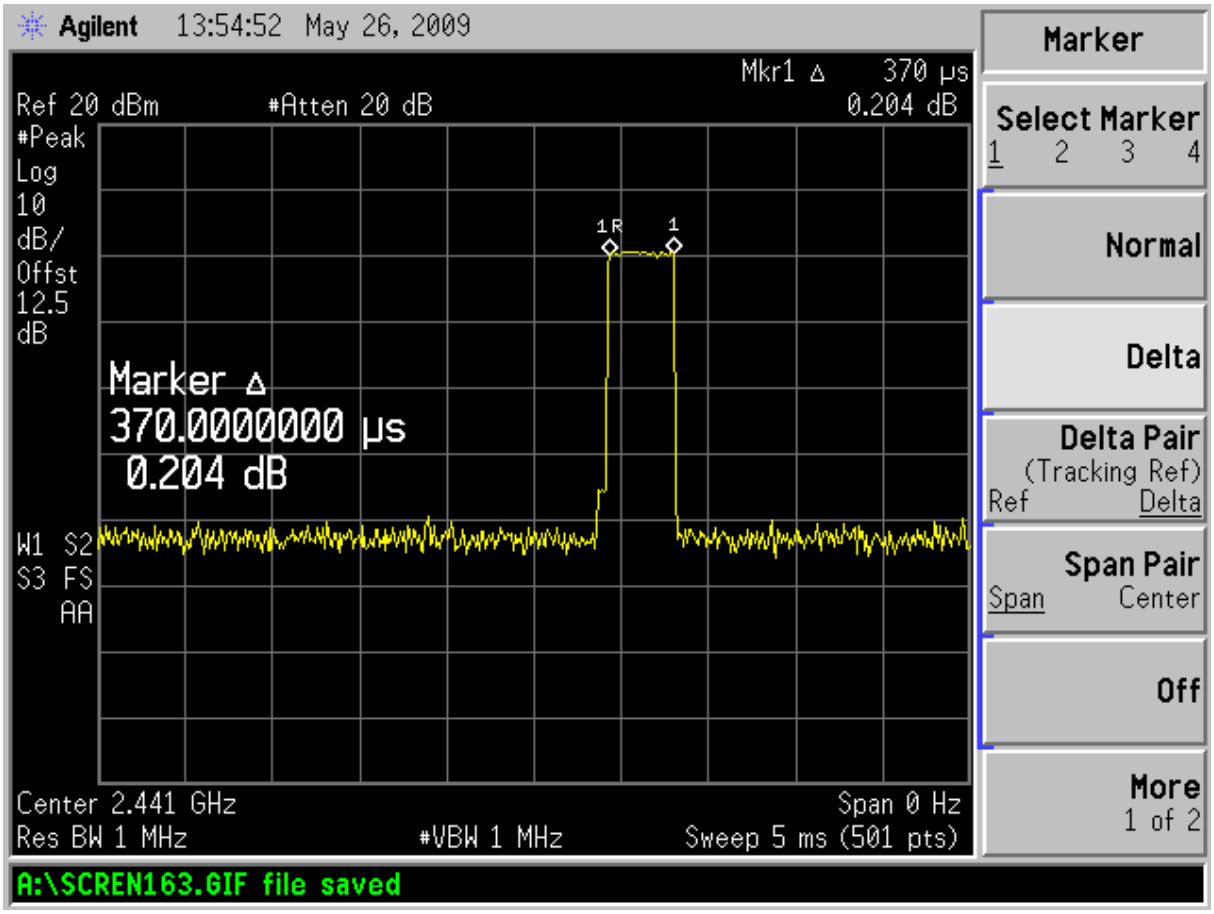

Figure 6c.4-3: Plot of dwell time over 5 ms period.

6c.5. Peak Bluetooth Output Power – Pursuant 47 CFR 15.247(b)(1); RSS-210 Section A8.4.

Criterion: For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1 watt.

The peak output power is +7.66 dBm, which is equivalent to 5.8 mW (see Exhibit 12).

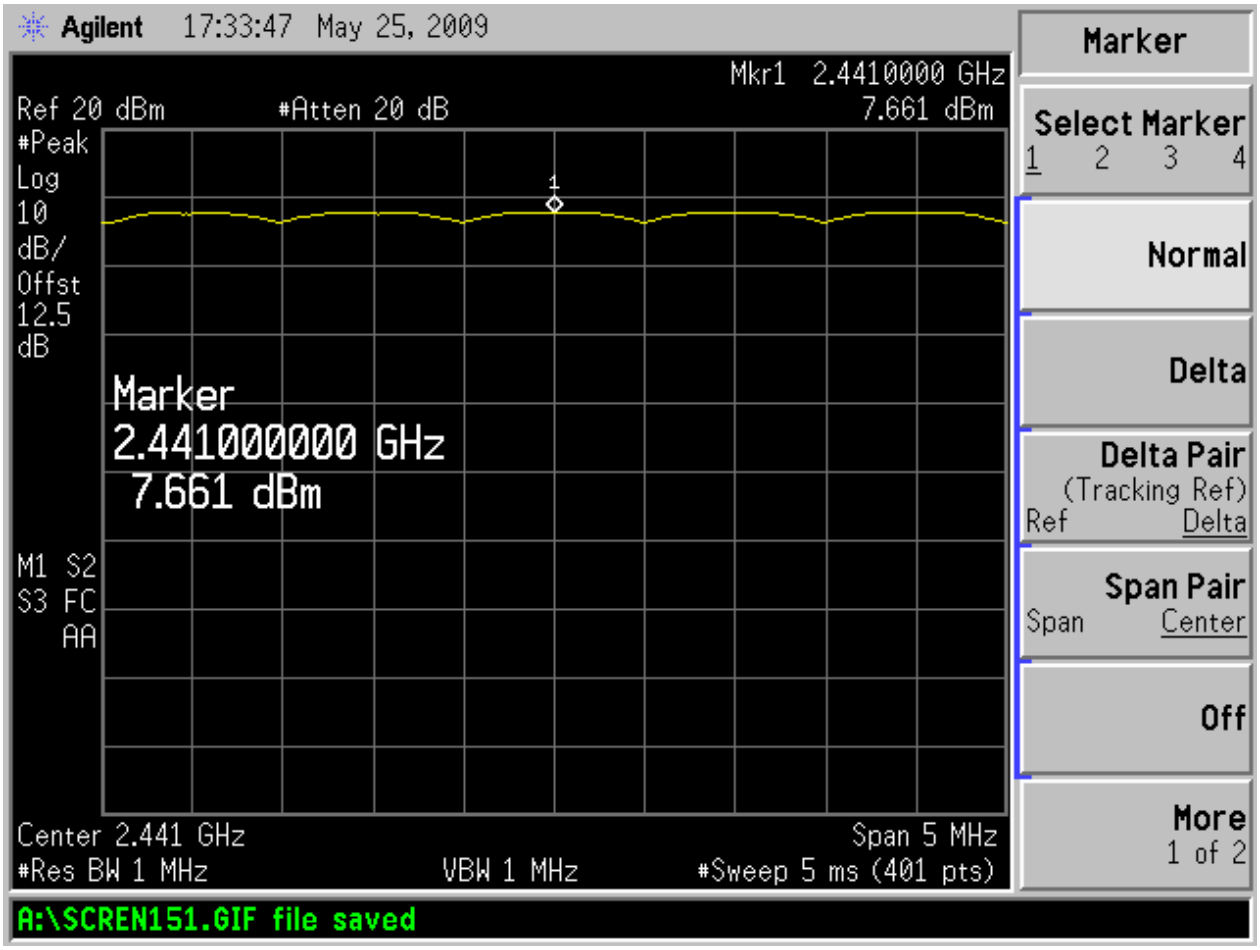

Figure 6c.5-1: Plot of peak output power

6c.6. De Facto EIRP Limit – Pursuant 47 CFR 15.247(b)(4); RSS-210 Section A8.4.

Criterion: The conducted output power limit of 1-watt is based on the use of antennas with directional gains that do not exceed 6 dB_i. If transmitting antennas of directional gain greater than 6 dB_i are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB_i.

The antenna employed by this transmitter is intended to be omni-directional, and thus will not exhibit directional gain in excess of 6 dB_i. The conducted power is less than the limits set forth (see elsewhere in this report for details).

6c.7. Band-Edge Compliance of RF Conducted Emissions – Pursuant 47 CFR 15.247(d); RSS-210 Section A8.1.

Criterion: 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.

The measurement shows 55.55 dB at the lower band edge and 54.64 dB at the upper band edge with the hopping function disabled. The measurement shows 52.85 dB at the lower band edge and 51.02 dB at the upper band edge with the hopping function enabled.

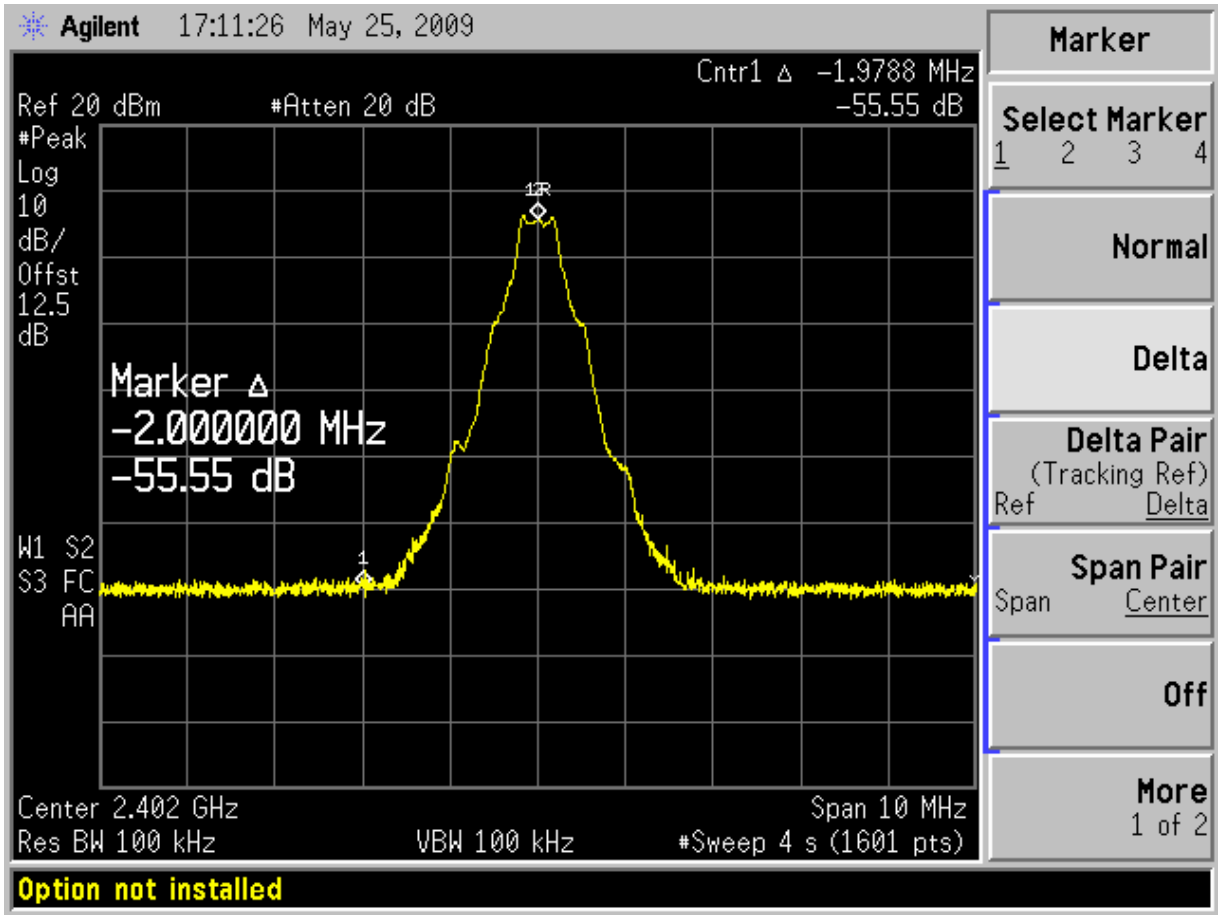

Figure 6c.6-1: Plot of lower band-edge conducted emissions with hopping disabled

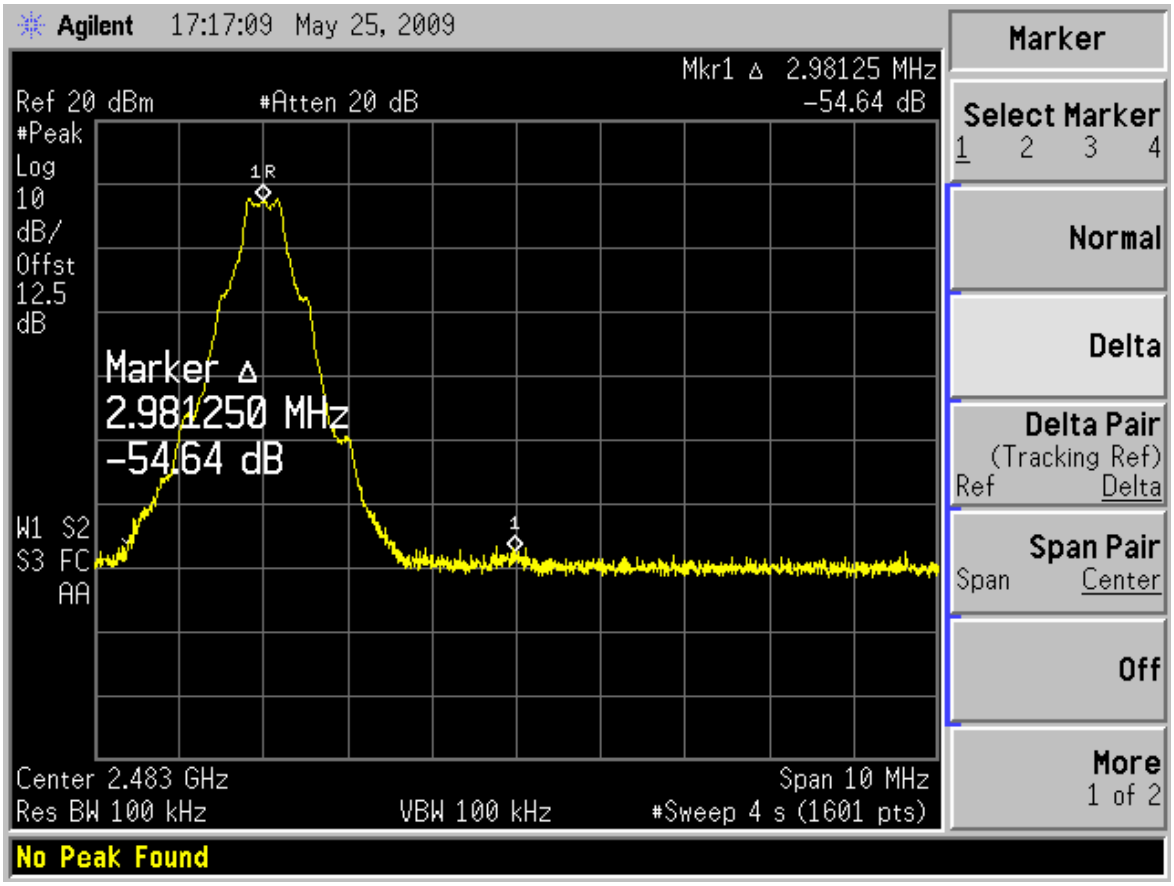

Figure 6c.6-2: Plot of upper band-edge conducted emissions with hopping disabled.

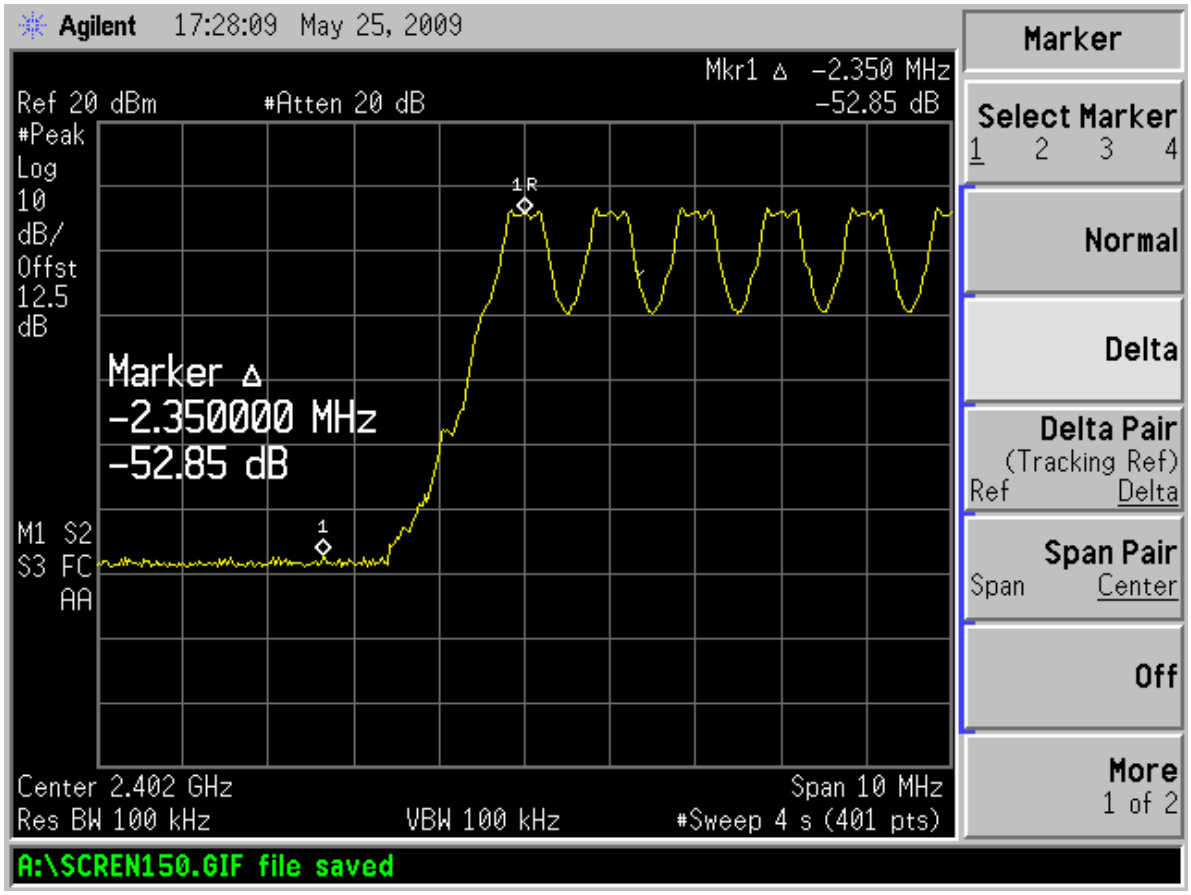

Figure 6c.6-3: Plot of lower band-edge conducted emissions with hopping enabled.

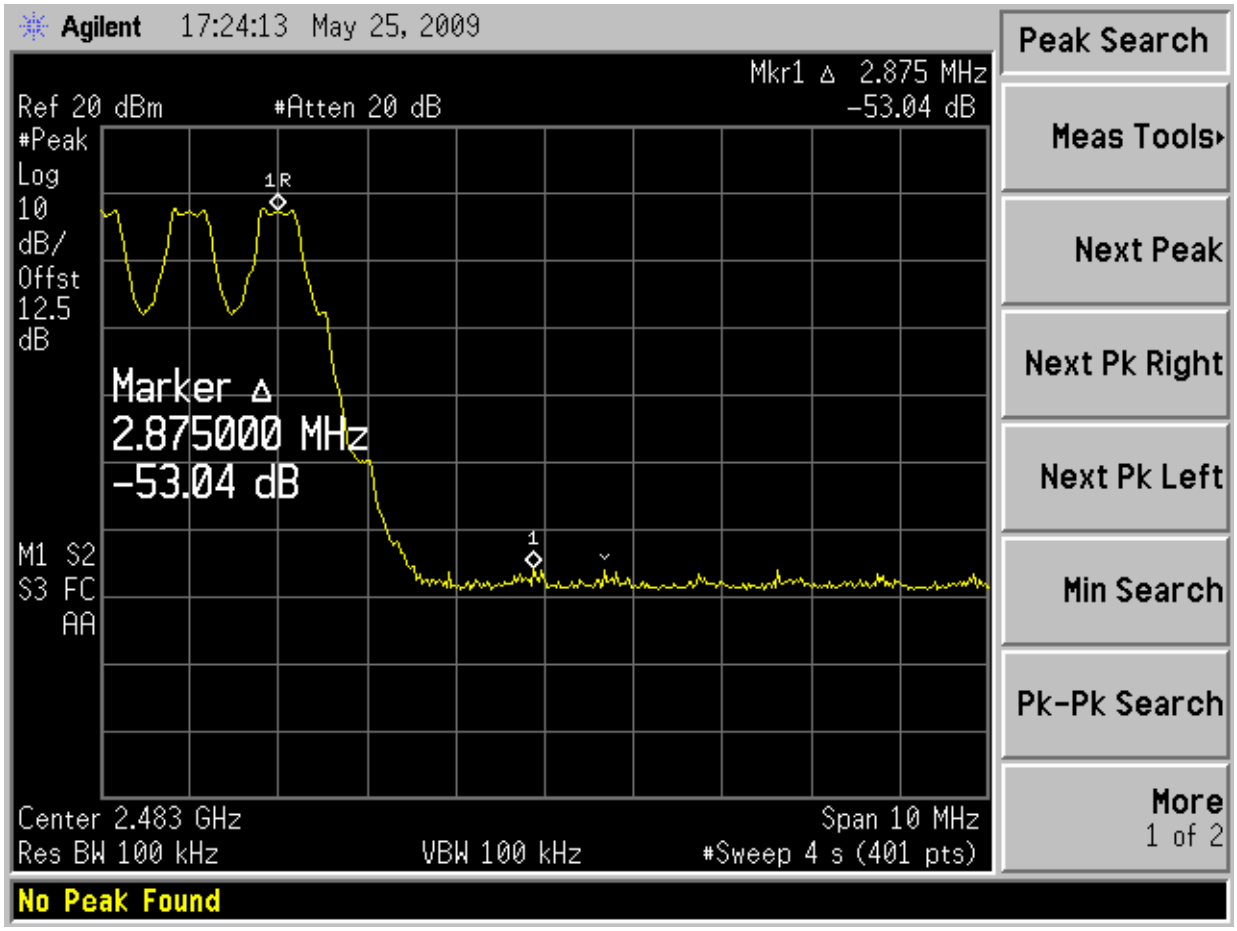

Figure 6c.6-4: Plot of upper band-edge conducted emissions with hopping enabled.

6c.8. Spurious RF Conducted Emissions – Pursuant 47 CFR 15.247(d); RSS-210 A8.5.

Criterion: 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.

The emissions are below 30 dBc at the second harmonic of the transmit frequency and far lower at all other frequencies.

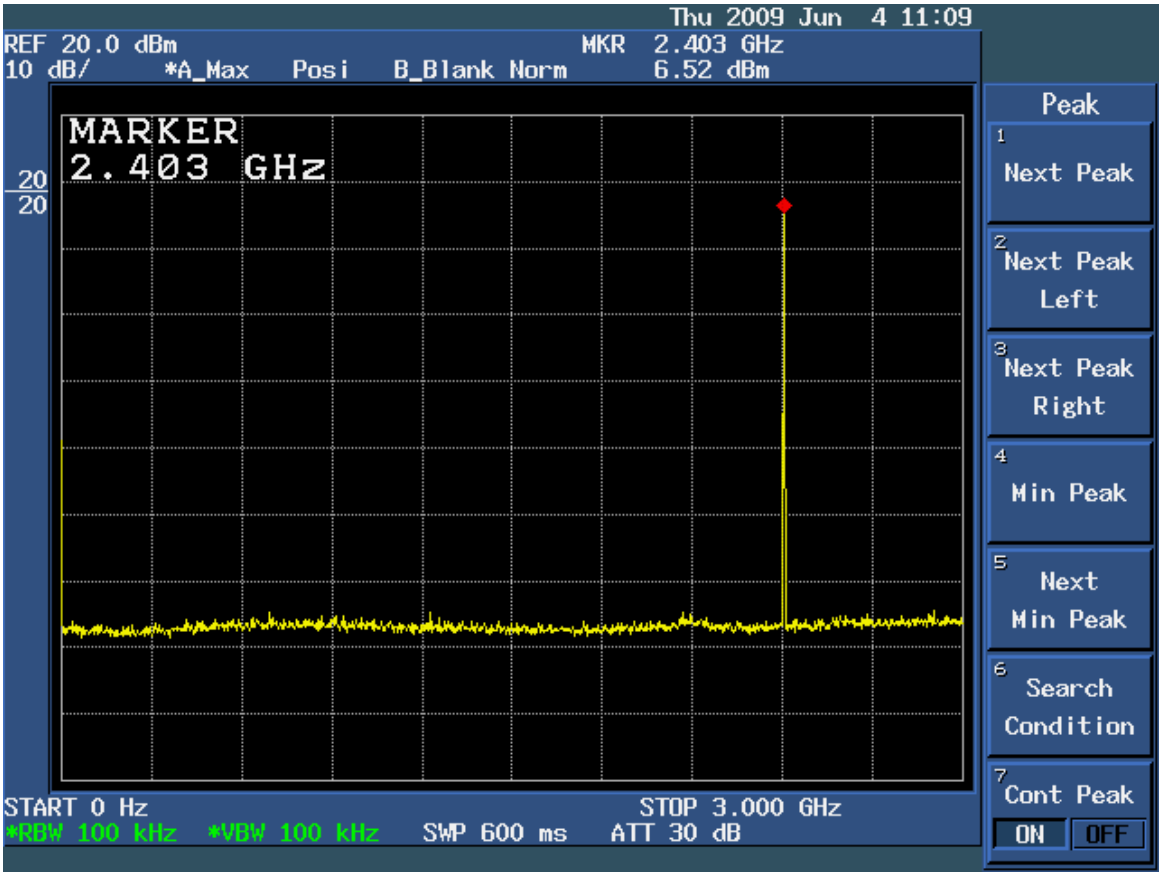

Figure 6c.7-1: Plot of spurious conducted emissions 9 kHz – 3 GHz (Low Channel Enabled).

Figure 6c.7-2: Plot of spurious conducted emissions 3 GHz – 13 GHz (Low Channel Enabled).

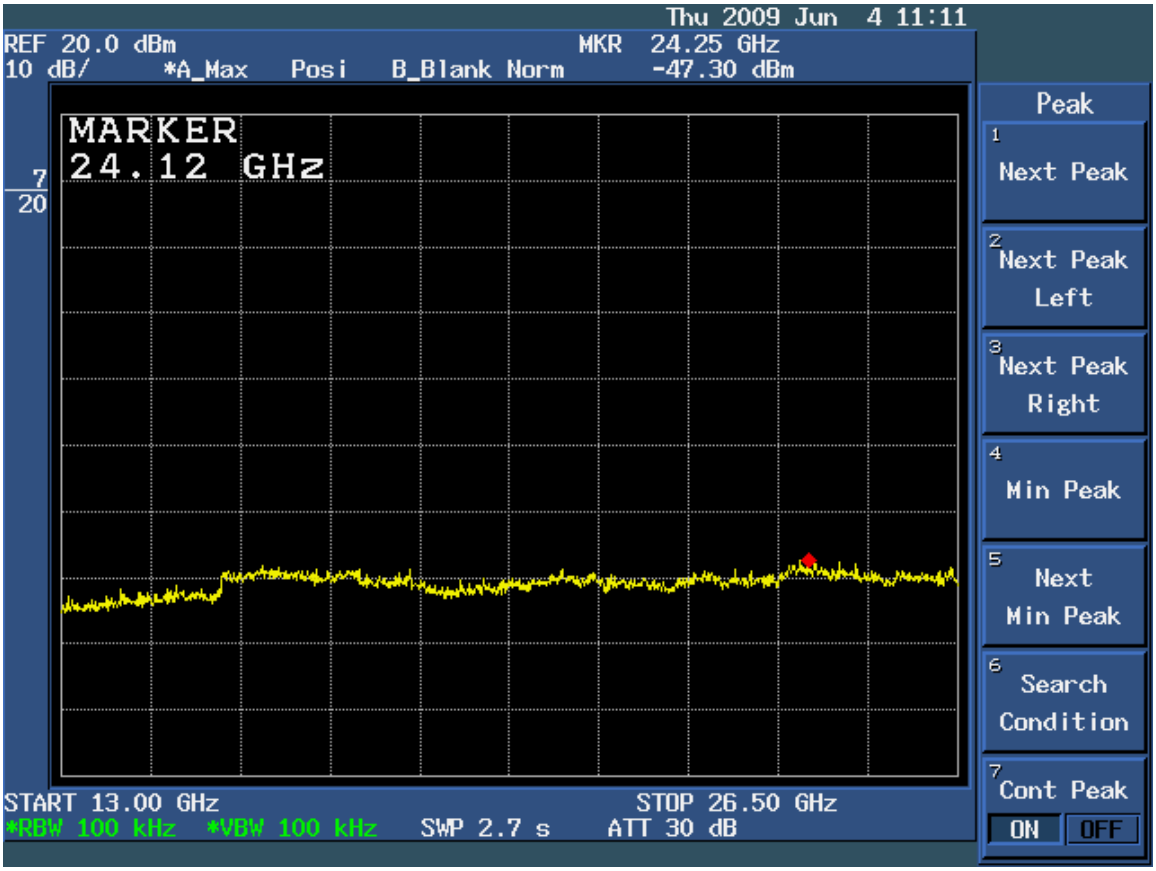

Figure 6c.7-3: Plot of spurious conducted emissions 13 GHz – 26.5 GHz (Low Channel Enabled).

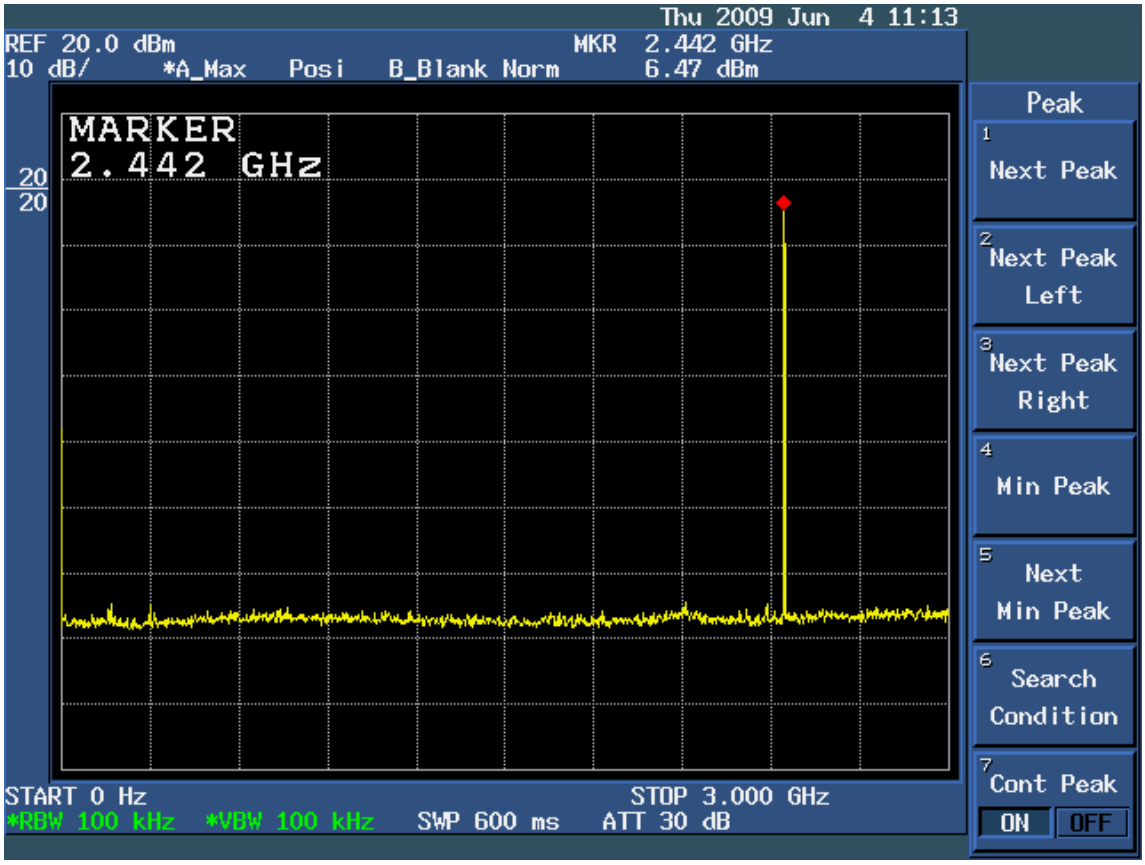

Figure 6c.7-4: Plot of spurious conducted emissions 9 kHz – 3 GHz (Mid Channel Enabled).

Figure 6c.7-5: Plot of spurious conducted emissions 3 GHz – 13 GHz (Mid Channel Enabled).

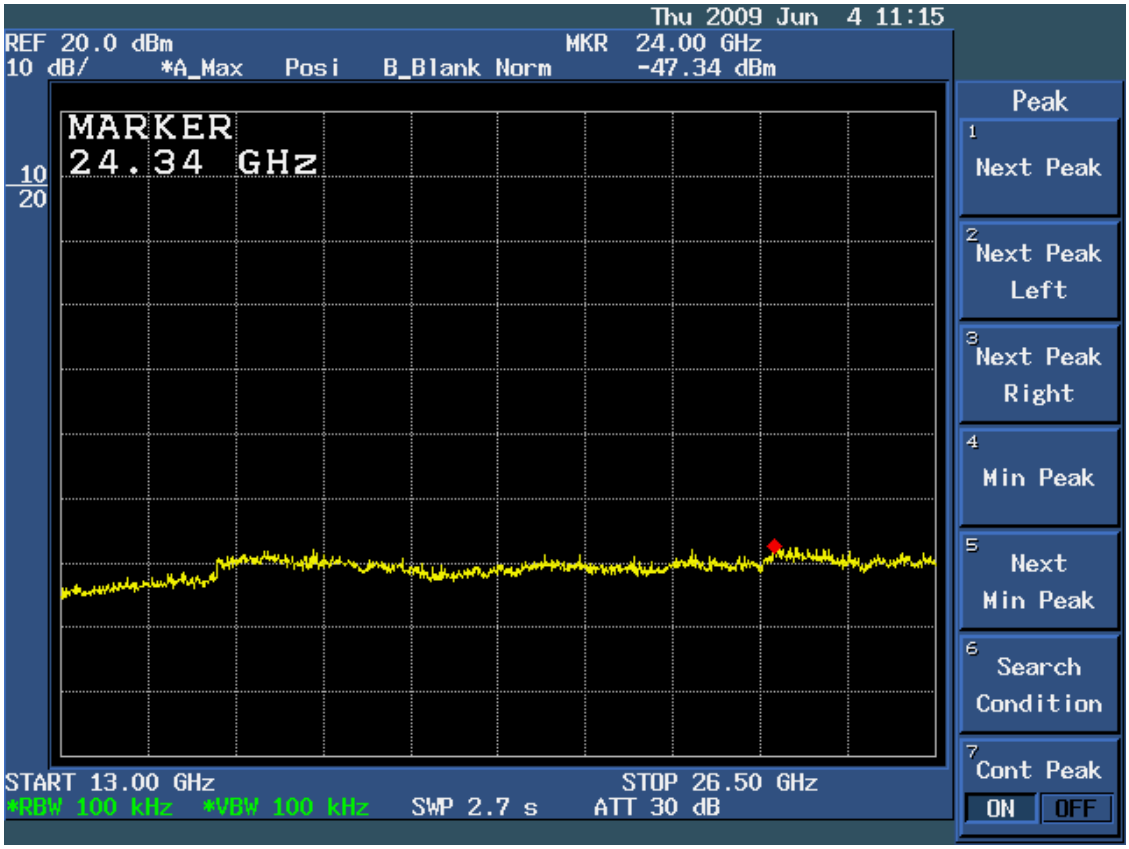

Figure 6c.7-6: Plot of spurious conducted emissions 13 GHz – 26.5 GHz (Mid Channel Enabled).

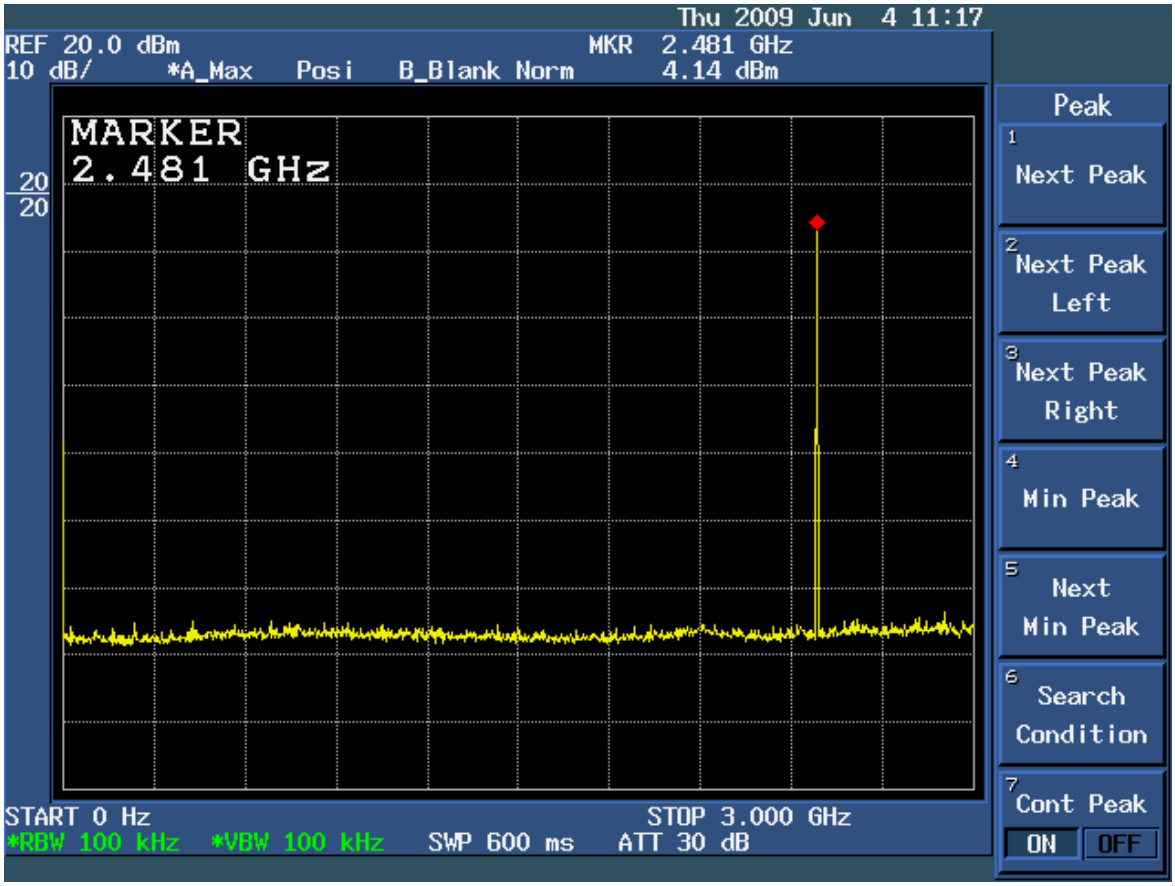

Figure 6c.7-7: Plot of spurious conducted emissions 9 kHz – 3 GHz (High Channel Enabled).

Figure 6c.7-8: Plot of spurious conducted emissions 3 GHz – 13 GHz (High Channel Enabled).

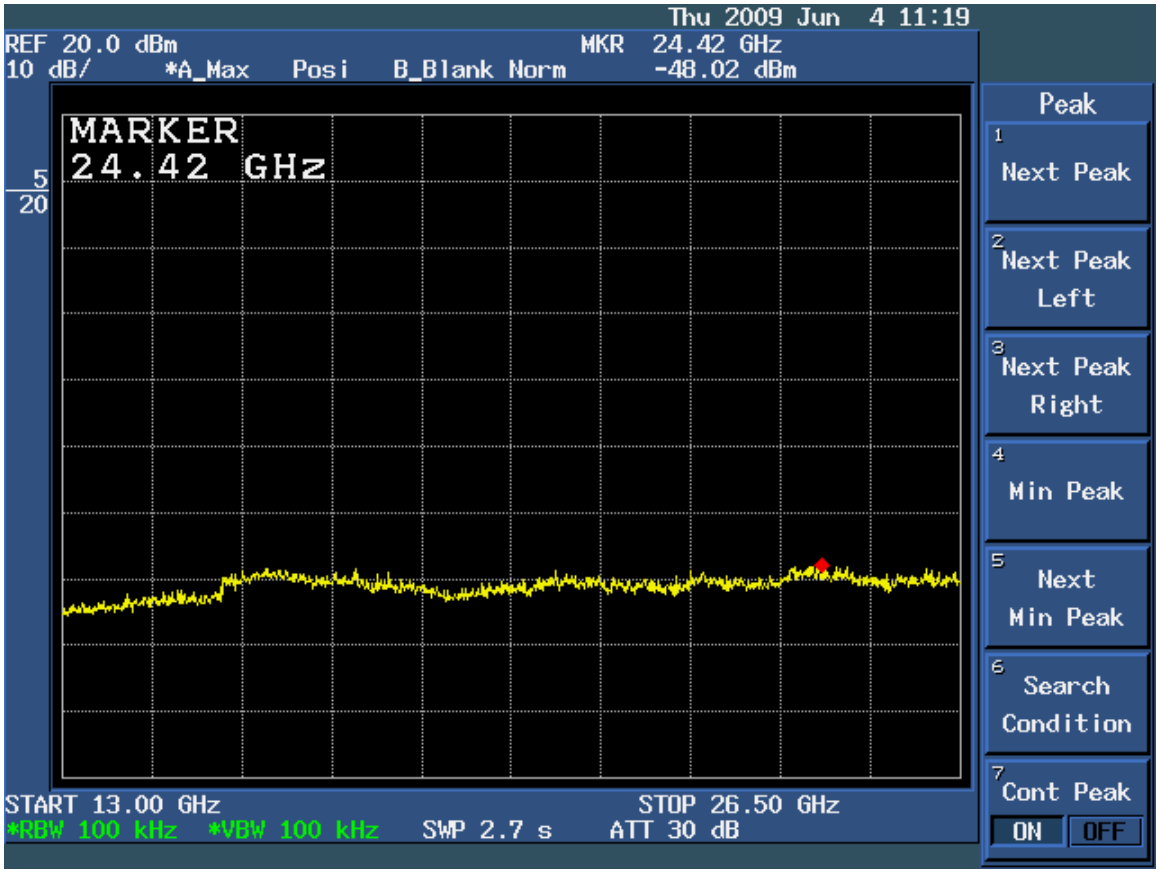

Figure 6c.7-9: Plot of spurious conducted emissions 13 GHz – 26.5 GHz (High Channel Enabled).

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Email: info@timcoengr.com
Website: www.timcoengr.com

FCC PART 15.247 TEST REPORT

DIGITAL SPREAD SPECTRUM

Applicant	MOTOROLA, INC.
Address	600 NORTH U.S. HWY 45
	LIBERTYVILLE ILLINOIS 60048-5343 USA
FCC ID	IHDT56KC1
Model Number	H74XAN6JR7AN
Product Description	iDEN i856
Date Sample Received	5/4/2009
Date Tested	5/8/2009
Tested By	Richard Block
Approved By	Mario de Aranzeta
Report Number	947UT9TestReport.doc
Test Results	☒ PASS ☐ FAIL

ACCREDITED
Testing Certificate # 0955-01

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GENERAL REMARKS

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

The test results relate only to the items tested.

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.

Testing 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:

Mario de Aranzeta C.E.T.
Compliance Engineer/ Lab. Supervisor

Date: 5/8/2009

GENERAL INFORMATION

DUT Specification

Applicable Standard	Part 15.247		
DUT Description	iDEN i856		
FCC ID	IHDT56KC1		
Serial Number	364VKH3V2D		
Operating Frequency	TX: 2.402-2.480 GHz		
DUT Power Source	☐ 110–120Vac/50– 60Hz		
	☐ DC Power		
	☒ Battery Operated Exclusively		
Test Item	☐ Prototype	☒ Pre-Production	☐ Production
Type of Equipment	☐ Fixed	☐ Mobile	☒ Portable
Test Facility	Timco Engineering Inc. located at 849 NW State Road 45 Newberry, FL 32669 USA.		
Test Conditions	Temperature: 26°C Relative humidity: 50%		
Test Exercise	The DUT was placed in continuous transmit mode of operation.		

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	Listed 3/20/07	3/19/10
3-Meter OATS	TEI	N/A	N/A	Listed 2/5/09	2/5/12
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	Listed 5/11/07	5/11/10
AC Voltmeter	HP	400FL	2213A14499	CAL 3/23/09	3/23/11
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 11/30/07	11/30/09
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 11/30/07	11/30/09
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 11/30/07	11/30/09
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CAL 11/30/07	11/30/09
Frequency Counter	HP	5385A	2730A03025	CAL 7/6/07	7/6/09
Hygro-Thermometer	Extech	445703	0602	CAL 11/15/07	11/15/09
Antenna: Log-Periodic	Electro-Metrics	LPA-30	409	CAL 7/18/07	7/18/09
Measuring Tape-7.5M	Kraftixx	7.5M PROFI		CHAR 11/13/07	11/13/09
Digital Multimeter	Fluke	FLUKE-77-3	79510405	CAL 5/18/09	5/18/11
System One	Audio Precision	System One	SYS1-45868	CHAR 2/27/08	2/27/10
Temperature Chamber	Tenney Engineering	TTRC	11717-7	CHAR 4/25/08	4/25/10

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 dBuV) to the antenna correction factor supplied by the antenna manufacturer plus the coax loss. 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 dBuV	+ 10.36 dB	+ 0.5 = 30.86 dBuV/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 10 kHz 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.

Bandwidth 6.0dB: 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 MHz and the spectrum was scanned from 30 MHz to the 10th Harmonic of the fundamental. Above 1 GHz the resolution bandwidth was 1 MHz and the VBW = 3 MHz and the span to 50 MHz.

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.: 15.247, 15.209

Requirements:

Frequency	Limits
Part 15.209	
9 to 490 kHz	2400/F (kHz) µV/m @ 300 meters
490 to 1705 kHz	24000/F (kHz) µV/m @ 30 meters
1705 kHz to 30 MHz	29.54 dBµV/m @ 30 meters
30 – 88	40.0 dBµV/m @ 3 meters
80 – 216	43.5 dBµV/m @ 3 meters
216 – 960	46.0 dBµV/m @ 3 meters
Above 960	54.0 dBµV/m @ 3 meters
Part 15.247	
Fundamental 902 – 928 MHz	127.37 dBµV/m @ 3 meters
Fundamental 2.4 – 2.4835 MHz	127.37 dBµV/m @ 3 meters
Harmonics	54.0 dBµV/m @ 3 meters

Any emissions that fall in the restricted bands (15.205) must be less than or equal to to 54 dBuV/m. Spurious emissions not in a restricted band must be 20 dBc. Harmonics were checked through the 10th harmonic.

Test Data: All values are peak unless noted.
Items mark with an * designate a frequency in a restricted band.

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
2,406.0	**2,406.00**	**66.1**	**H**	**3.18**	**32.26**	**101.54**	**25.84**
2,406.0	**2,406.00**	**67.0**	**V**	**3.18**	**32.26**	**102.44**	**24.94**
2,406.0	**4,812.00**	**5.1**	**H**	**4.91**	**34.10**	**44.11**	**9.89**
2,406.0	**4,812.00**	**5.6**	**V**	**4.91**	**34.10**	**44.61**	**9.39**
2,406.0	**7,128.00**	**5.2**	**V**	**5.68**	**36.03**	**46.91**	**7.09**
2,406.0	**7,218.00**	**4.3**	**H**	**5.73**	**36.04**	**46.07**	**7.93**
2,406.0	**9,624.00**	**4.7**	**V**	**6.79**	**36.72**	**48.21**	**5.79**
2,406.0	**9,624.00**	**4.9**	**H**	**6.79**	**36.72**	**48.41**	**5.59**
2,406.0	**12,030.00**	**3.5**	**V**	**7.82**	**38.72**	**50.04**	**3.96**
2,406.0	**12,030.00**	**5.5**	**H**	**7.82**	**38.72**	**52.04**	**1.96**
2,438.0	**2,438.00**	**63.5**	**H**	**3.21**	**32.34**	**99.05**	**28.33**
2,438.0	**2,438.00**	**66.2**	**V**	**3.21**	**32.34**	**101.75**	**25.63**
2,438.0	**4,876.00**	**7.2**	**V**	**4.94**	**34.10**	**46.24**	**7.76**
2,438.0	**4,876.00**	**7.4**	**H**	**4.94**	**34.10**	**46.44**	**7.56**
2,438.0	**7,314.00**	**6.4**	**V**	**5.79**	**36.06**	**48.25**	**5.75**
2,438.0	**7,314.00**	**6.5**	**H**	**5.79**	**36.06**	**48.35**	**5.65**
2,438.0	**9,752.00**	**5.6**	**H**	**6.83**	**36.85**	**49.28**	**4.72**

TEST DATA CONTD.

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
2,438.0	9,752.00	5.8	V	6.83	36.85	49.48	4.52
2,438.0	12,190.00	3.3	H	7.93	38.85	50.08	3.92
2,438.0	12,190.00	4.5	V	7.93	38.85	51.28	2.72
2,478.5	2,478.50	58.8	H	3.23	32.44	94.47	32.91
2,478.5	2,478.50	61.8	V	3.23	32.44	97.47	29.91
2,478.5	4,957.00	7.4	V	4.98	34.10	46.48	7.52
2,478.5	4,957.00	8.2	H	4.98	34.10	47.28	6.72
2,478.5	7,435.50	5.6	H	5.86	36.09	47.55	6.45
2,478.5	7,435.50	5.7	V	5.86	36.09	47.65	6.35
2,478.5	9,914.00	4.6	V	6.87	37.01	48.48	5.52
2,478.5	9,914.00	6.4	H	6.87	37.01	50.28	3.72
2,478.5	12,392.50	3.2	V	8.07	39.01	50.28	3.72
2,478.5	12,392.50	3.9	H	8.07	39.01	50.98	3.02

BLUETOOTH MODULATION TEST

For TX iDEN 800 MHz band

Bluetooth Signal set to hopping, Tx discrete frequency

	Frequency		Code	Peak	Horizontal		Peak	Vertical			
	Bluetooth	TX		Freq	Reading	E-Field	Freq	Reading	E-Field	Limit	Margin
	MHz	MHz		MHz	dBuV	dBuV/m	MHz	dBuV	dBuV/m	dBuV/m	dB
fbt-ftx	hopping	806.025	A	1612	19.2	**50.5**	1612	16.5	**47.8**	54	**2.7**
		816.025	B	1598	15.8	**47.0**	1664	15.7	**47.3**	54	**6.7**
		825.000	C	1604	16.0	**47.2**	1650	16.3	**47.8**	54	**6.2**
fbt+ftx	hopping	806.025	D	3253	8.6	**45.1**	3264	8.9	**45.4**	54	**8.6**
		816.025	E	3262	8.2	**44.7**	3264	7.6	**44.1**	54	**9.3**
		825.000	F	3250	9.0	**45.5**	3250	8.6	**45.1**	54	**8.5**

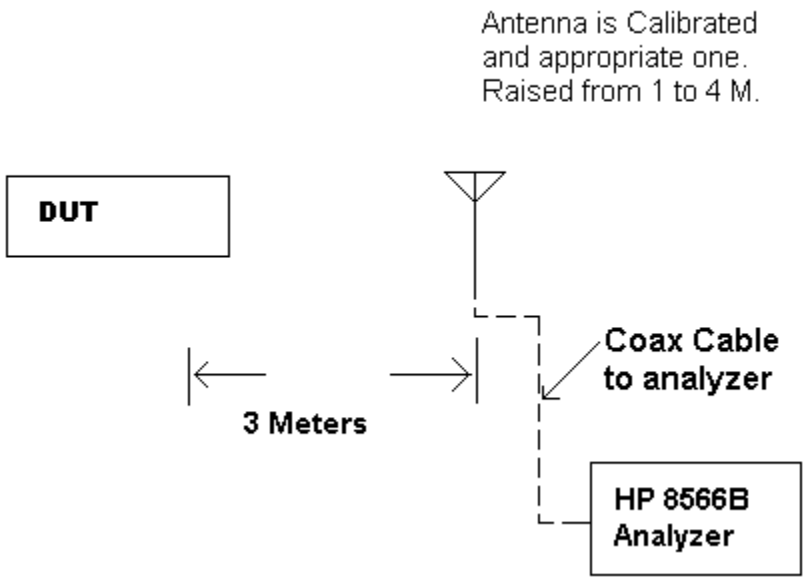
hopping = 2402 to 2480 MHz

For TX iDEN 800 MHz band

Bluetooth and TX signals set to discrete values

	Frequency		Code	Peak	Horizontal		Peak	Vertical			
	Bluetooth	TX		Freq	Reading	E-Field	Freq	Reading	E-Field	Limit	Margin
	MHz	MHz		MHz	dBuV	dBuV/m	MHz	dBuV	dBuV/m	dBuV/m	dB
fbt-ftx	2440	825.000	G	1615	13.6	**44.9**	1615	14.3	**45.6**	54	**8.4**
	2407	825.000	H	1582	13.4	**44.8**	1582	15.2	**46.2**	54	**7.8**
	2477	825.000	I	1652	13.8	**45.3**	1652	14.2	**45.7**	54	**8.3**
fbt+ftx	2440	825.000	G	3265	7.3	**43.8**	3265	6.4	**42.9**	54	**10.2**
	2407	825.000	H	3232	5.7	**42.1**	3232	5.3	**41.7**	54	**11.9**
	2477	825.000	I	3302	6.3	**42.8**	3302	5.5	**42.0**	54	**11.2**

Method of Measuring Radiated Spurious Emissions



METHOD OF MEASUREMENT: The procedure used was ANSI standard C63.4-2003 & the FCC/OET Guidance on Measurements for Spread Spectrum Systems – Public Notice DA 00-705 dated March 30th, 2000.

POWER LINE CONDUCTED INTERFERENCE

Rules Part No.: Part 15.207

Requirements:

Frequency (MHz)	Quasi Peak Limits (dBuv)	Average Limits (dBuV)
0.15 – 0.5	66 – 56 *	56 – 46 *
0.5 – 5.0	56	46
5.0 – 30	60	50
* Decrease with logarithm of frequency		

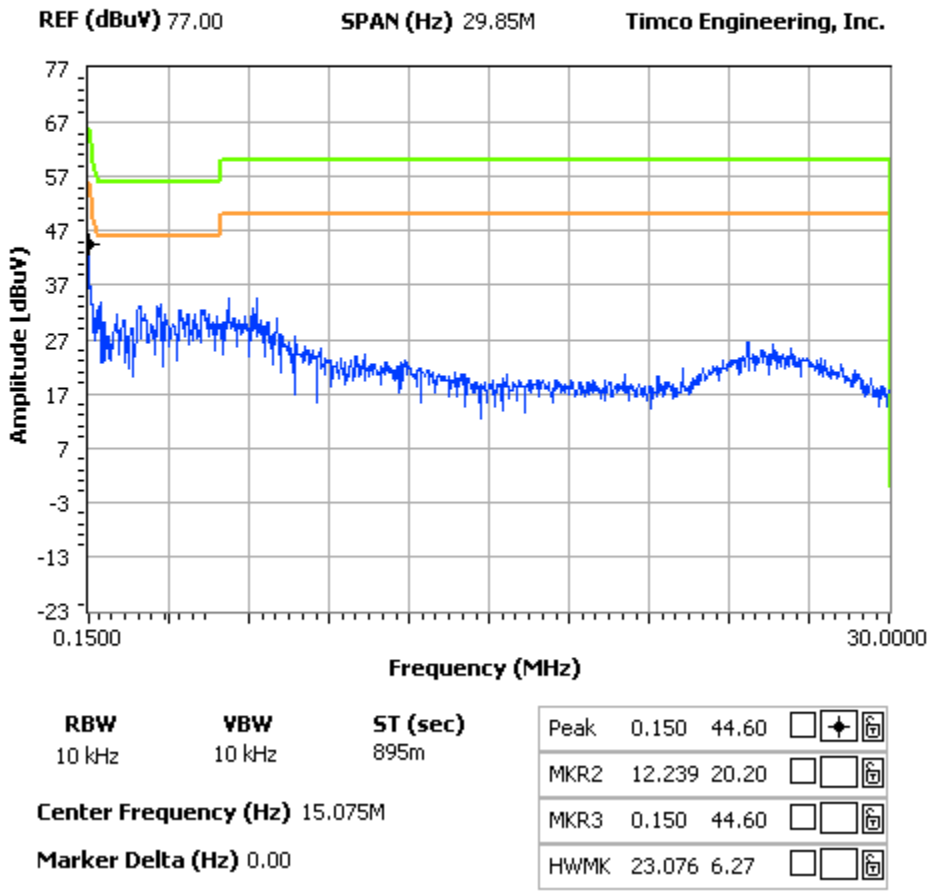
Test Data: The following plots represent the emissions read for power line conducted. Both lines were observed.

POWERLINE CONDUCTED PLOT – LINE 1
SPN5356A CHARGER

NOTES:

POWER LINE CONDUCTED -- LINE 1
MOTOROLA, INC. -- FCC ID: IHDT56KC1 - SPN5356A CHARGER

FCC 15.107 Mask Class B

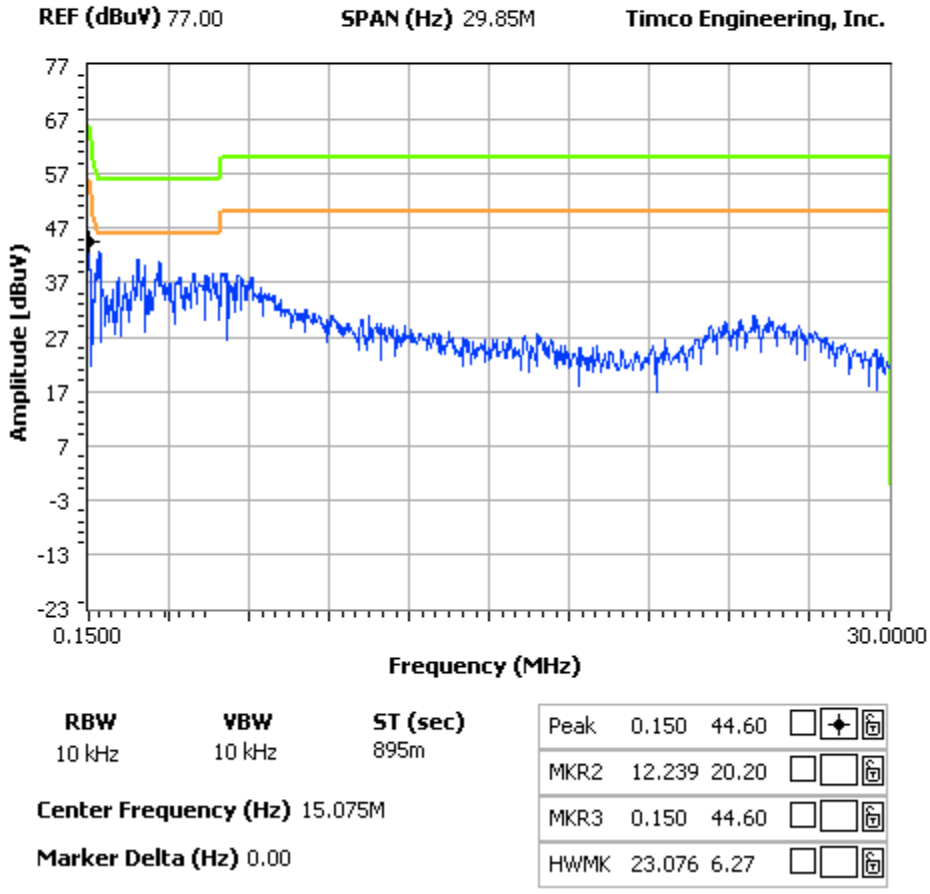


POWERLINE CONDUCTED PLOT – LINE 2
SPN5356A CHARGER

NOTES:

POWER LINE CONDUCTED -- LINE 2
MOTOROLA, INC. -- FCC ID: IHDT56KC1 - SPN5356A CHARGER

FCC 15.107 Mask Class B



RBW	VBW	ST (sec)
10 kHz	10 kHz	895m

Center Frequency (Hz) 15.075M

Marker Delta (Hz) 0.00

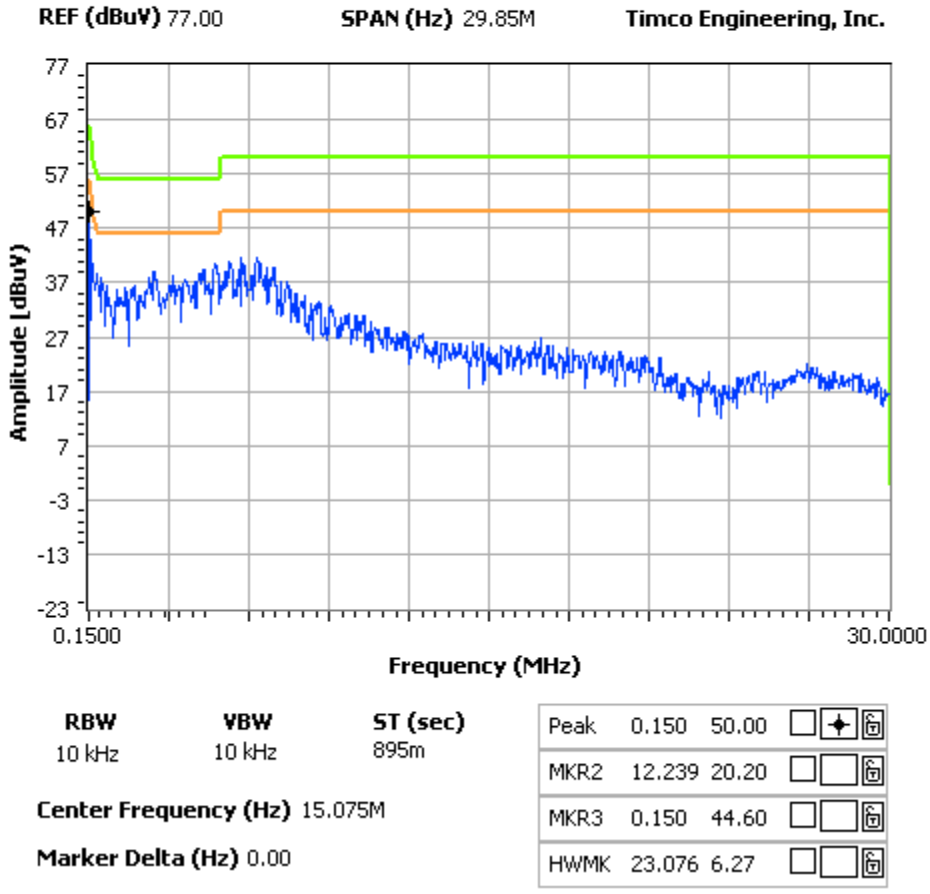
Peak	0.150	44.60
MKR2	12.239	20.20
MKR3	0.150	44.60
HWMK	23.076	6.27

POWERLINE CONDUCTED PLOT – LINE 1
SPN5374A CHARGER

NOTES:

POWER LINE CONDUCTED -- LINE 1
MOTOROLA, INC. -- FCC ID:IHDT56KC1 - SPN5374A CHARGER

FCC 15.107 Mask Class B



RBW	VBW	ST (sec)
10 kHz	10 kHz	895m

Center Frequency (Hz) 15.075M

Marker Delta (Hz) 0.00

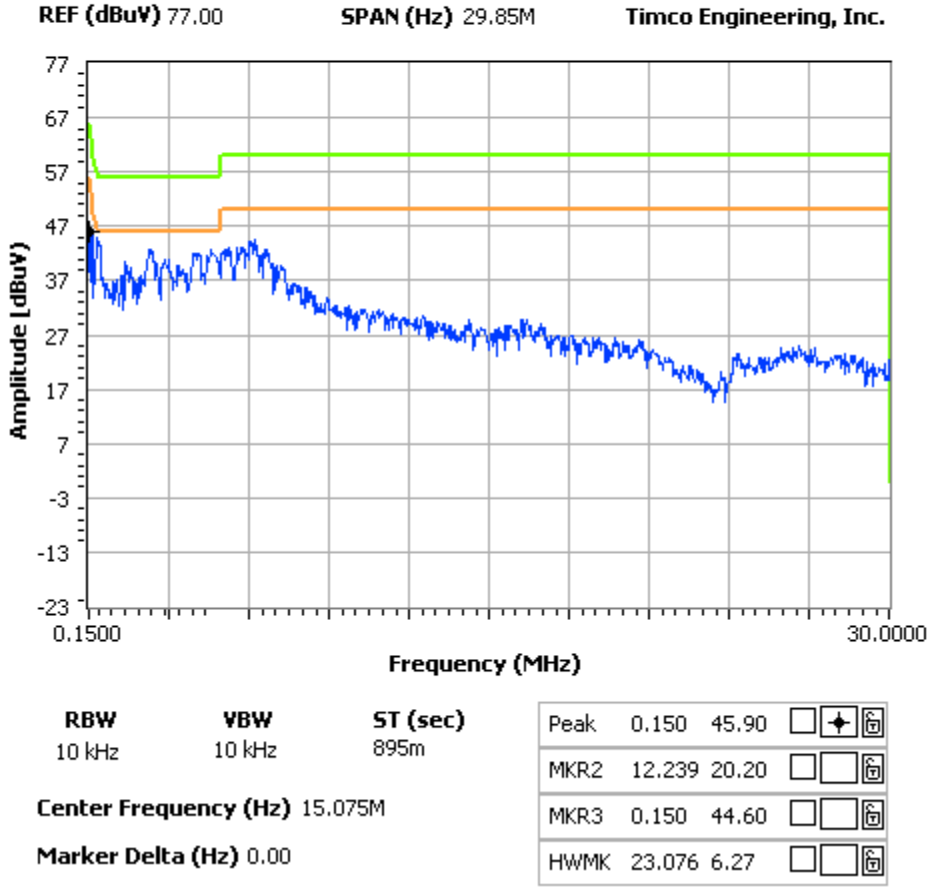
Peak	0.150	50.00
MKR2	12.239	20.20
MKR3	0.150	44.60
HWMK	23.076	6.27

POWERLINE CONDUCTED PLOT – LINE 2
SPN5374A CHARGER

NOTES:

POWER LINE CONDUCTED -- LINE 2
MOTOROLA, INC. -- FCC ID: IHDT56KC1 - SPN5374A CHARGER

FCC 15.107 Mask Class B

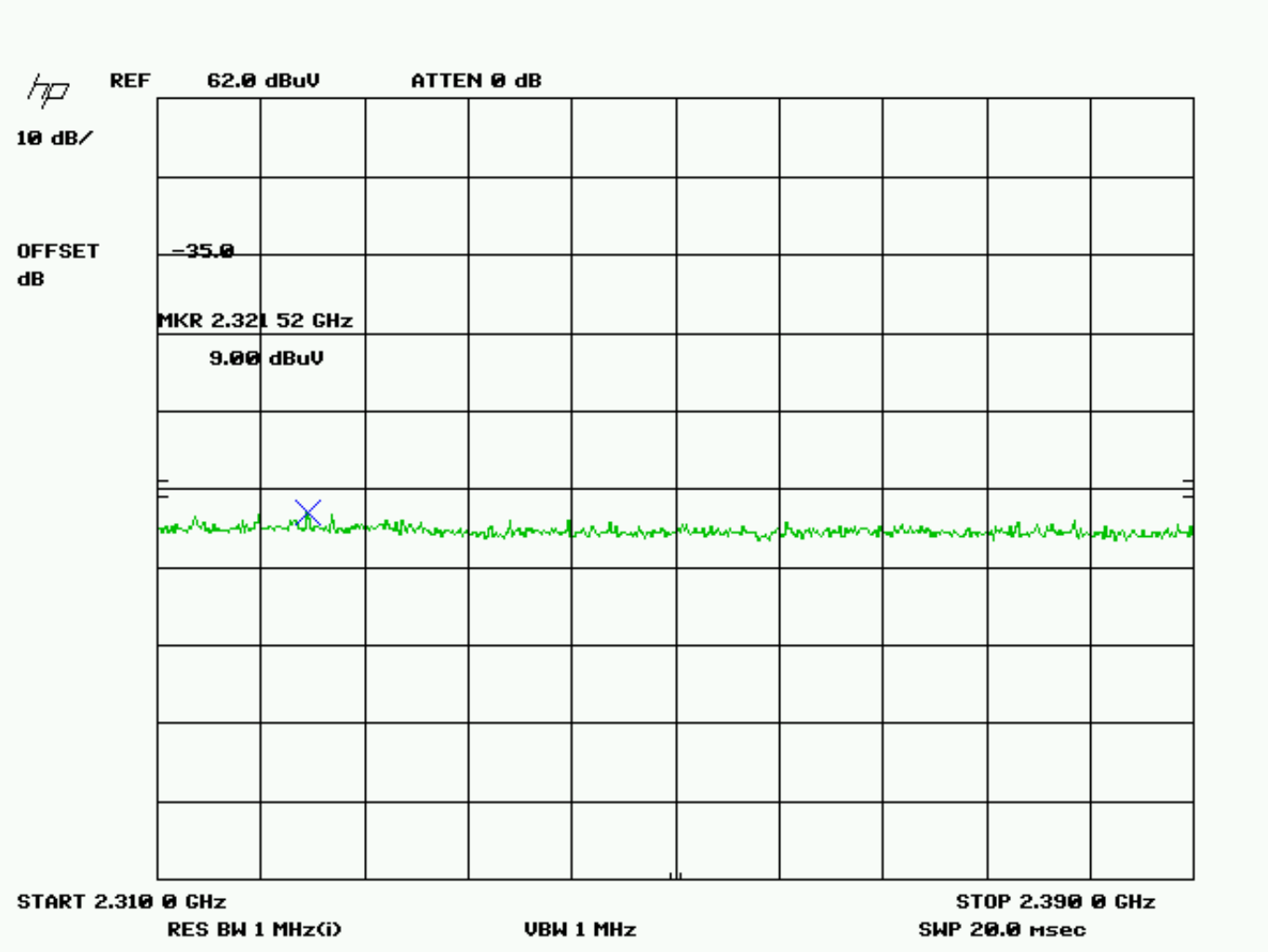


RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND

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).

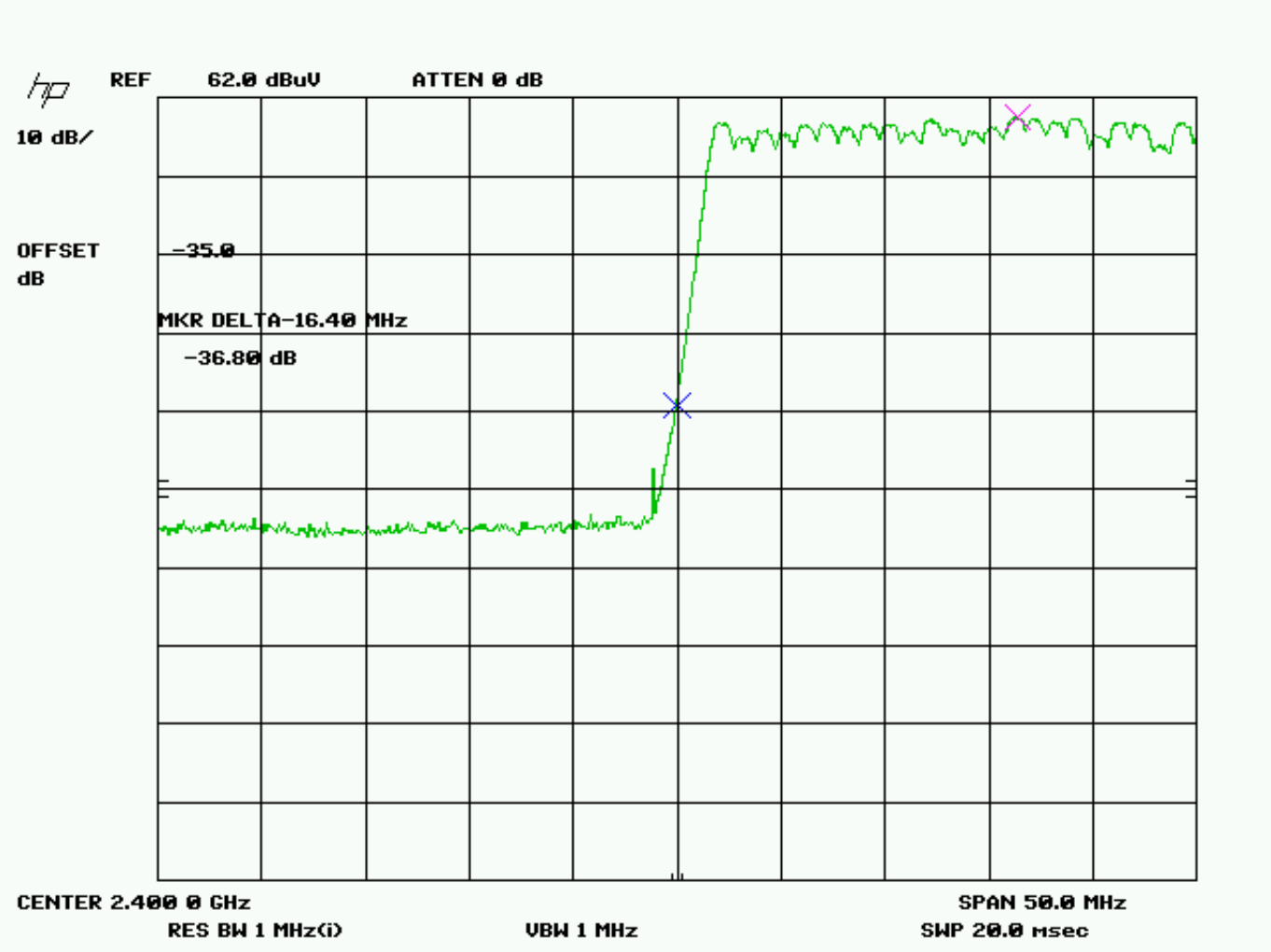
Test Procedure: An in band field strength measurement of the fundamental Emission using the RBW and detector function required by C63.4-2000 and FCC Rules. The procedure was repeated with an average detector and a plot made. The calculated field strength in the adjacent restricted band is presented below.

Lower adjacent restricted band

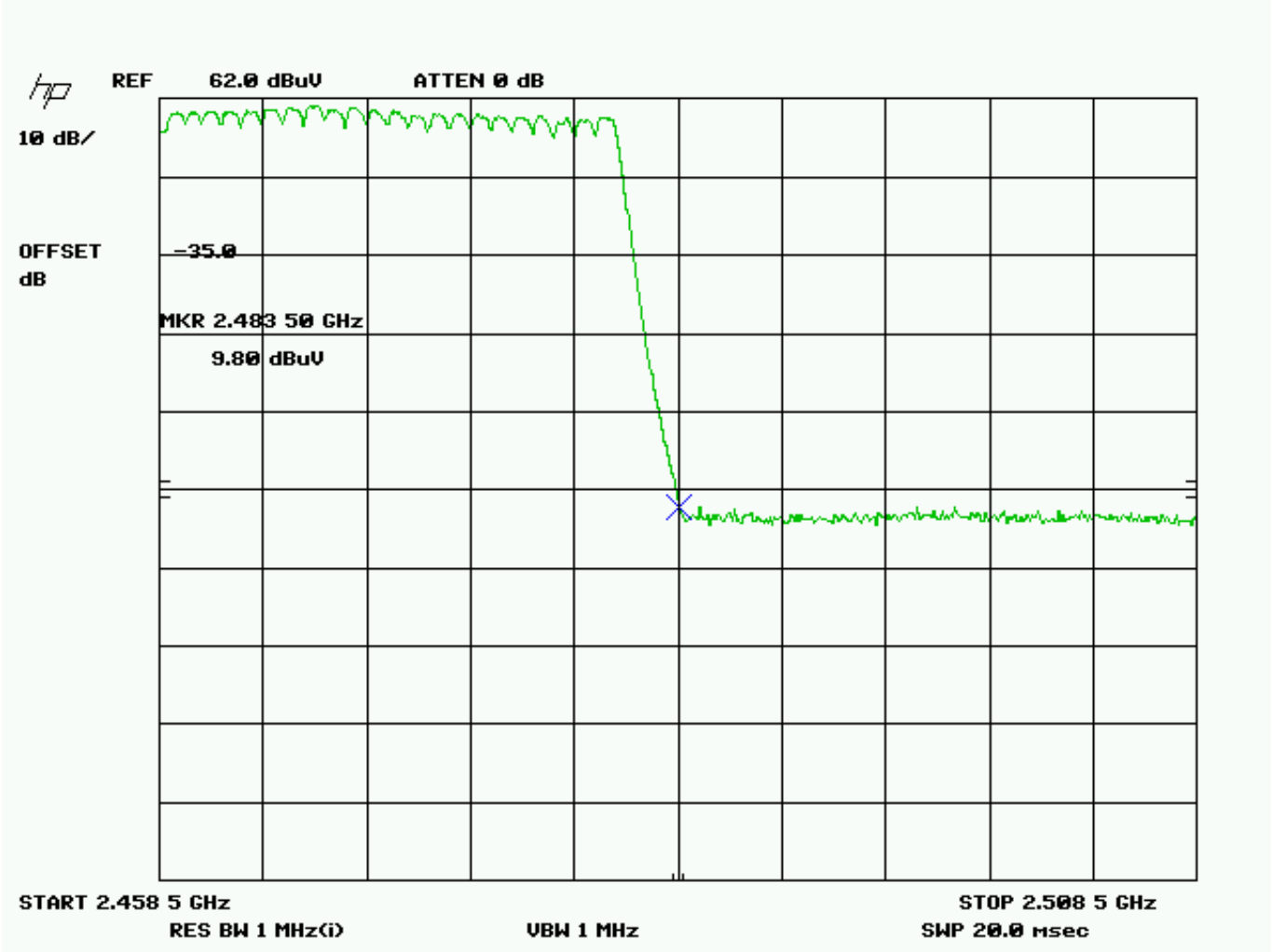


Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
2,321.5	2,321.52	9.0	V	3.13	32.04	44.17	9.83

Lower band edge

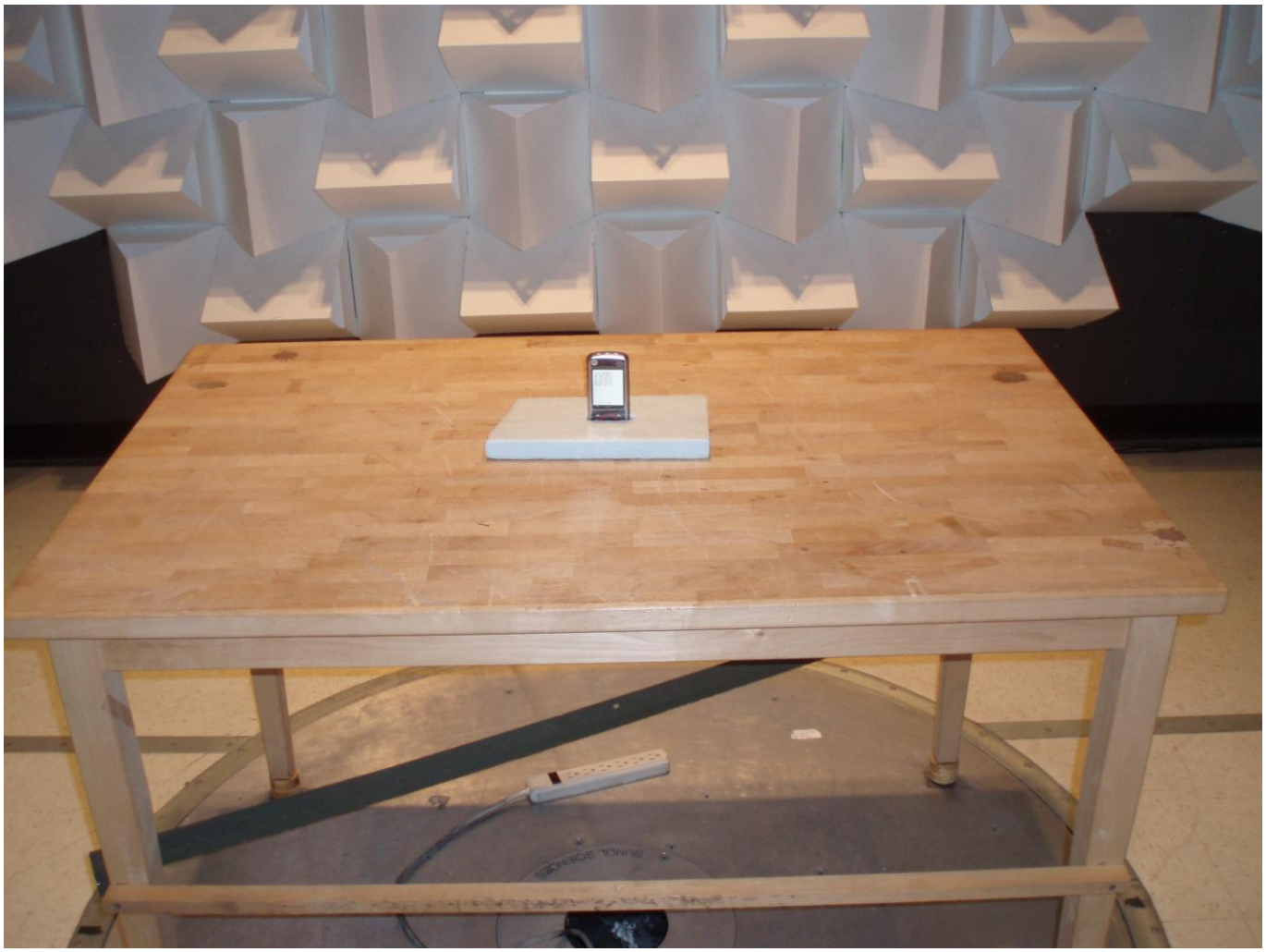


Upper band edge



Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
2,483.5	2,483.50	9.8	V	3.24	32.46	45.50	8.50

RADIATED EMISSIONS TEST SET UP PHOTO



POWERLINE EMISSIONS TEST SET UP PHOTO