



849 NW STATE ROAD 45
NEWBERRY, FL 32669 USA
PH: 888.472.2424 OR 352.472.5500
FAX: 352.472.2030
EMAIL: INFO@TIMCOENGR.COM
[HTTP://WWW.TIMCOENGR.COM](http://WWW.TIMCOENGR.COM)

FCC PART 15.247 TEST REPORT

APPLICANT	MOTOROLA, INC.
ADDRESS	600 NORTH U.S. HWY 45 LIBERTYVILLE ILLINOIS 60048-5343 USA
FCC ID	IHDP56HS1
PRODUCT DESCRIPTION	MAJUA PLUS
DATE SAMPLE RECEIVED	6/19/2008
DATE TESTED	7/4/2008
TESTED BY	Richard Block
APPROVED BY	Mario de Aranzeta
TIMCO REPORT NO.	1292AUT8TestReport.doc
TEST RESULTS	<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.**



Certificate # 0955-01

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APPLICANT: MOTOROLA, INC.

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GENERAL REMARKS

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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: 7/14/2008

Applicant: MOTOROLA, INC.

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REPORT SUMMARY

Disclaimer:	The test results relate only to the items tested.
Purpose of Test:	To demonstrate that the DUT is in compliant with FCC Pt 15.247 requirements for a FHSS radio.
Applicable Standards:	FCC Pt 15.247, ANSI C63.4: 2003, ANSI TIA-603: 2004, FCC Pt 15.109
Related Reports:	N/A

TEST ENVIRONMENT AND TEST SETUP

Test Facilities:	All measurements were made at one or more of the test sites of TIMCO ENGINEERING INC. located at 849 N.W. State Road 45, Newberry, FL 32669.
Laboratory Test Conditions:	Temperature: 26°C , Humidity: 55%
Test Exercise:	The DUT was set in continuous transmit mode of operation.
Deviation to the Standards:	There was no deviation from the standard.
Modification to the DUT:	No modification was made.
Supporting Accessories:	None

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DUT DESCRIPTION

Applicant:	MOTOROLA, INC.
Product Description:	MAJUA PLUS
Serial Number	364VJJC2JJ
FCC ID:	IHDP56HS1
Operating Frequency:	2402 – 2480 MHz

Applicant: MOTOROLA, INC.

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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 1/11/06	1/10/09
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	Listed 5/11/07	5/10/10
Antenna: Biconnical	Eaton	94455-1	1057	CAL 1/15/08	1/15/10
Antenna: Biconnical	Eaton	94455-1	1096	CAL 10/11/06	10/11/08
Antenna: Biconnical	Electro-Metrics	BIA-25	1171	CAL 7/18/07	7/18/09
Antenna: Double-Ridged Horn	Electro-Metrics	RGA-180	2319	CAL 7/18/07	7/18/09
LISN	Electro-Metrics	ANS-25/2	2604	CAL 10/5/06	10/5/08
LISN	Electro-Metrics	EM-7820	2682	CAL 7/23/07	7/23/09
Antenna: Log-Periodic	Eaton	96005	1243	CAL 12/13/07	12/13/09
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 11/30/07	11/30/09
Analyzer Tan Tower RF Preselector	HP	85685A	3221A1400	CAL 11/30/07	11/30/09
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 11/30/07	11/30/09
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CAL 11/30/07	11/30/09

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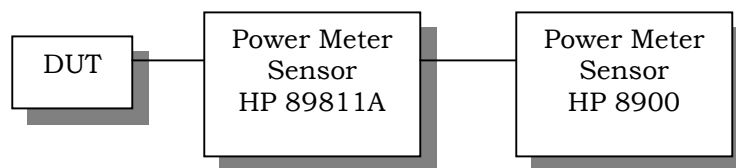
TEST PROCEDURES

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI C63.4-2003 using a 50uH LISN. Both lines were observed with the DUT transmitting. The resolution bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

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.

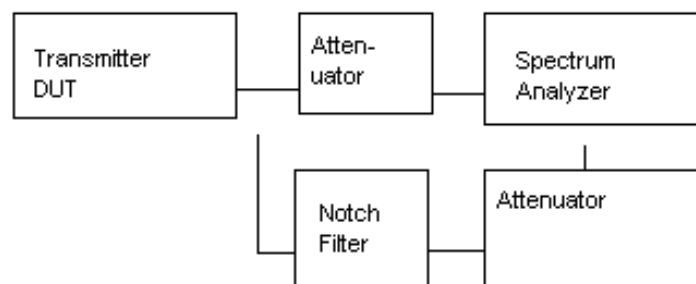
RF Power Output: The RF power output was measured at the antenna feed point using a peak power meter.

Output Power Test Setup Diagram



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 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. Power was measured by disconnecting the antennas and measuring across a 50 ohm load as recommended by the manufacturer using a peak power meter. The antenna is non-directional and doesn't exceed 6 dBi gain. The power output was measured at three places in the band highest is reported below.

Spurious Emissions at
Antenna Terminals





RADIATION INTERFERENCE: The test procedure used was ANSI C63.4-2003 using an Agilent spectrum receiver with preselector. 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.

RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND: An in band field strength measurement of the fundamental emission using the RBW and detector function required by ANSI C63.4-2003 and the FCC rules.

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FIELD STRENGTH OF SPURIOUS EMISSIONS

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

REQUIREMENTS:

§15.247(c)& §15.205	
(Fundamental) Frequency	(Field Strength) Limits
902 – 928MHz 2.4 – 2.4835GHz	127.37dBuV/m
	54 dBuV/m @3m
§15.209	
30 - 88 MHz	40 dBuV/m @3M
88 -216 MHz	43.5 dBuV/m @3M
216 -960 MHz	46 dBuV/m @3M
ABOVE 960 MHz	54dBuV/m

Emissions that fall in the restricted bands (15.205) must be less than or equal to 500 uV/m (54 dBuV/m). Spurious not in a restricted band must be 20 dBc.

Harmonics were measured to the 10th harmonic.

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	11.5	H	3.18	32.25	46.93	80.45
2,402.0	2,402.00	55.0	H	3.18	32.25	90.43	36.95
2,402.0	2,402.00	60.0	V	3.18	32.25	95.43	31.95
2,402.0	4,804.00	4.3	H	4.90	34.10	43.30	10.70
2,402.0	4,804.00	4.7	V	4.90	34.10	43.70	10.30
2,402.0	7,206.00	5.1	V	5.72	36.04	46.86	7.14
2,402.0	7,206.00	5.6	H	5.72	36.04	47.36	6.64
2,402.0	9,608.00	4.5	V	6.78	36.71	47.99	6.01
2,402.0	9,608.00	4.9	H	6.78	36.71	48.39	5.61
2,402.0	12,010.00	3.4	H	7.81	38.71	49.92	4.08
2,402.0	12,010.00	4.4	V	7.81	38.71	50.92	3.08
2,441.0	2,441.00	55.2	H	3.21	32.35	90.76	36.62
2,441.0	2,441.00	58.2	V	3.21	32.35	93.76	33.62

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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
2,441.0	4,882.00	5.3	V	4.94	34.10	44.34	9.66
2,441.0	4,882.00	5.6	H	4.94	34.10	44.64	9.36
2,441.0	7,323.00	5.0	V	5.79	36.06	46.85	7.15
2,441.0	7,323.00	6.0	H	5.79	36.06	47.85	6.15
2,441.0	9,764.00	4.1	H	6.83	36.86	47.79	6.21
2,441.0	9,764.00	5.0	V	6.83	36.86	48.69	5.31
2,441.0	12,205.00	4.2	V	7.94	38.86	51.00	3.00
2,441.0	12,205.00	4.8	H	7.94	38.86	51.60	2.40
2,480.0	2,480.00	54.1	H	3.24	32.45	89.79	37.59
2,480.0	2,480.00	57.4	V	3.24	32.45	93.09	34.29
2,480.0	4,960.00	5.5	H	4.98	34.10	44.58	9.42
2,480.0	4,960.00	5.5	V	4.98	34.10	44.58	9.42
2,480.0	7,440.00	4.7	V	5.86	36.09	46.65	7.35
2,480.0	7,440.00	5.9	H	5.86	36.09	47.85	6.15
2,480.0	9,920.00	3.7	V	6.88	37.02	47.60	6.40
2,480.0	9,920.00	5.8	H	6.88	37.02	49.70	4.30
2,480.0	12,400.00	3.7	H	8.08	39.02	50.80	3.20
2,480.0	12,400.00	4.2	V	8.08	39.02	51.30	2.70

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BLUETOOTH MODULATION TEST

For TX iDEN 800 MHz band

Bluetooth Signal set to hopping, Tx discrete frequency

	Frequency		Code	Peak	Horizontal		Peak	Vertical		Limit	Margin
	Bluetooth	TX			Reading	E-Field		Reading	E-Field		
	MHz	MHz			dBuV	dBuV/m		dBuV	dBuV/m		
fbt-ftx	hopping	806.025	A	1612	16.6	47.90	1612	18.9	50.20	54	3.80
		816.025	B	1632	15.3	46.74	1632	18.5	49.94	54	4.06
		825.025	C	1650	15.6	47.18	1650	17.9	49.48	54	4.52
fbt+ftx	hopping	806.025	D	3224	6.7	43.19	3224	8.9	45.39	54	8.61
		816.025	E	3264	6.7	43.24	3264	8.3	44.84	54	9.16
		825.025	F	3300	7.4	43.99	3300	7.9	44.49	54	9.51

hopping = 2402 to 2480 MHz

For TX iDEN 800 MHz band

Bluetooth and TX signals set to discrete values

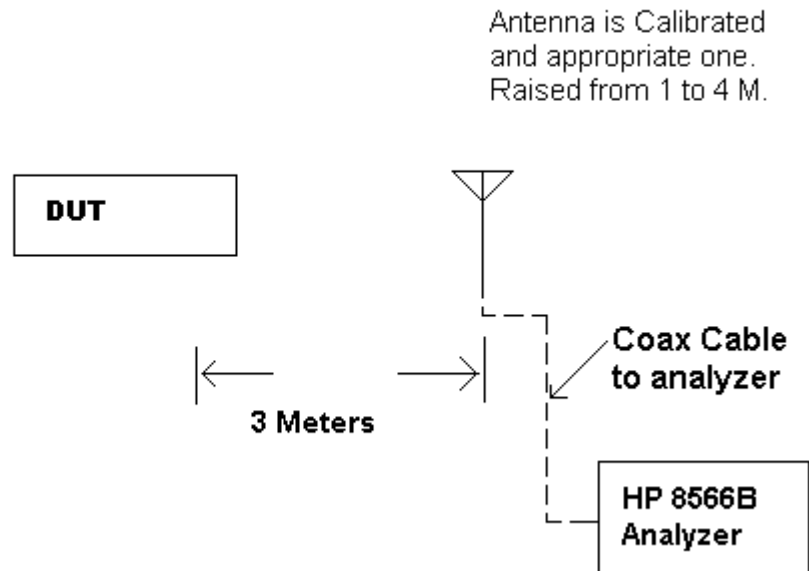
	Frequency		Code	Peak	Horizontal		Peak	Vertical		Limit	Margin
	Bluetooth	TX			Reading	E-Field		Reading	E-Field		
	MHz	MHz			dBuV	dBuV/m		dBuV	dBuV/m		
fbt-ftx	2441	825.025	G	1616	14.7	46.03	1616	14.14	45.43	54	7.97
	2402	825.025	H	1577	15.2	46.25	1577	14.6	45.65	54	7.75
	2480	825.025	I	1655	15.1	46.71	1655	14.9	46.51	54	7.29
fbt+ftx	2441	825.025	G	3266	7.7	44.24	3266	8.1	44.64	54	9.36
	2402	825.025	H	3277	7.8	44.35	3277	7.9	44.45	54	9.55
	2480	825.025	I	3305	6.3	42.89	3305	7	43.59	54	10.41

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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 Direct Sequence Spread Spectrum Systems – Public Notice 54797 Dated July 12, 1995.

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POWER LINE CONDUCTED INTERFERENCE

RULES PART NO.: 15.207

REQUIREMENTS:

Emission Frequency (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak (QP)	Average (AV)
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50
* Decreases with the logarithm of the frequency.		

TEST DATA: The attached graphs represent the emissions read for power line conducted for this device. Both lines were observed.

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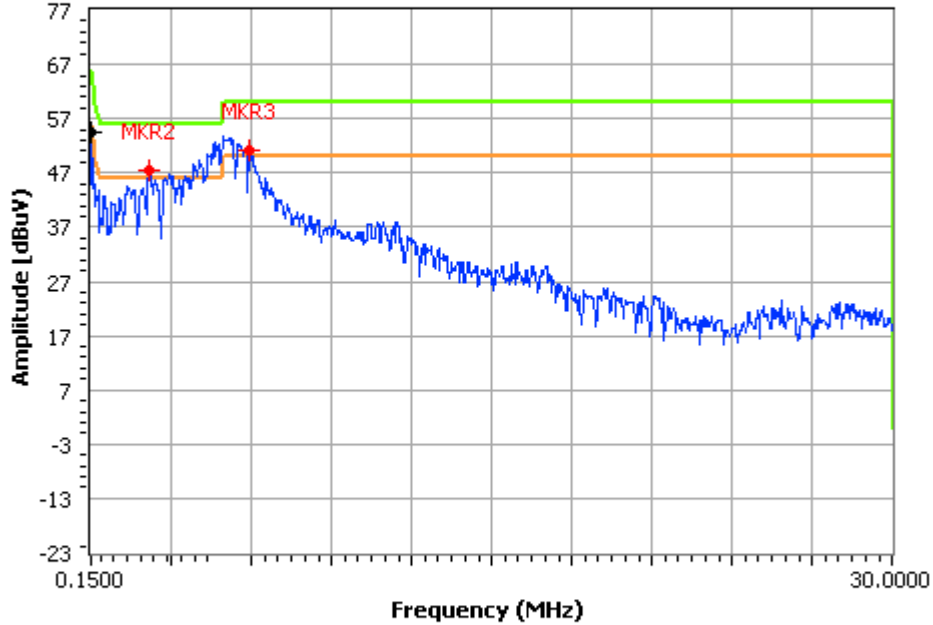
POWERLINE CONDUCTED EMISSIONS – LINE 1

NOTES:

POWERLINE CONDUCTED -- LINE 1
 MOTOROLA, INC. -- FCC: IHD P56HSI

FCC 15.107 Mask Class B

REF (dBuV) 77.00 SPAN (Hz) 29.85M Timco Engineering, Inc.



RBW	VBW	ST (sec)	Peak	0.150	54.40	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10 kHz	10 kHz	895m	MKR2	2.314	47.48	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
			MKR3	6.045	51.17	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
			HWMK	23.076	6.27	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Center Frequency (Hz) 15.075M
Marker Delta (Hz) 0.00

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POWERLINE CONDUCTED EMISSIONS – LINE 1

Quasi-Peak

Frequency (MHz)	Emission (dBuV)	Limit (dBuV)
2.314	41.82	56.00
2.348	44.45	56.00
2.676	44.98	56.00
2.784	45.18	56.00
4.803	45.83	56.00
4.911	46.27	56.00
5.120	46.97	60.00
6.045	42.53	60.00

Average

Frequency (MHz)	Emission (dBuV)	Limit (dBuV)
2.314	30.80	46.00
2.336	38.78	46.00
4.418	40.32	46.00
4.743	41.42	46.00
5.094	41.96	50.00
6.045	34.20	50.00

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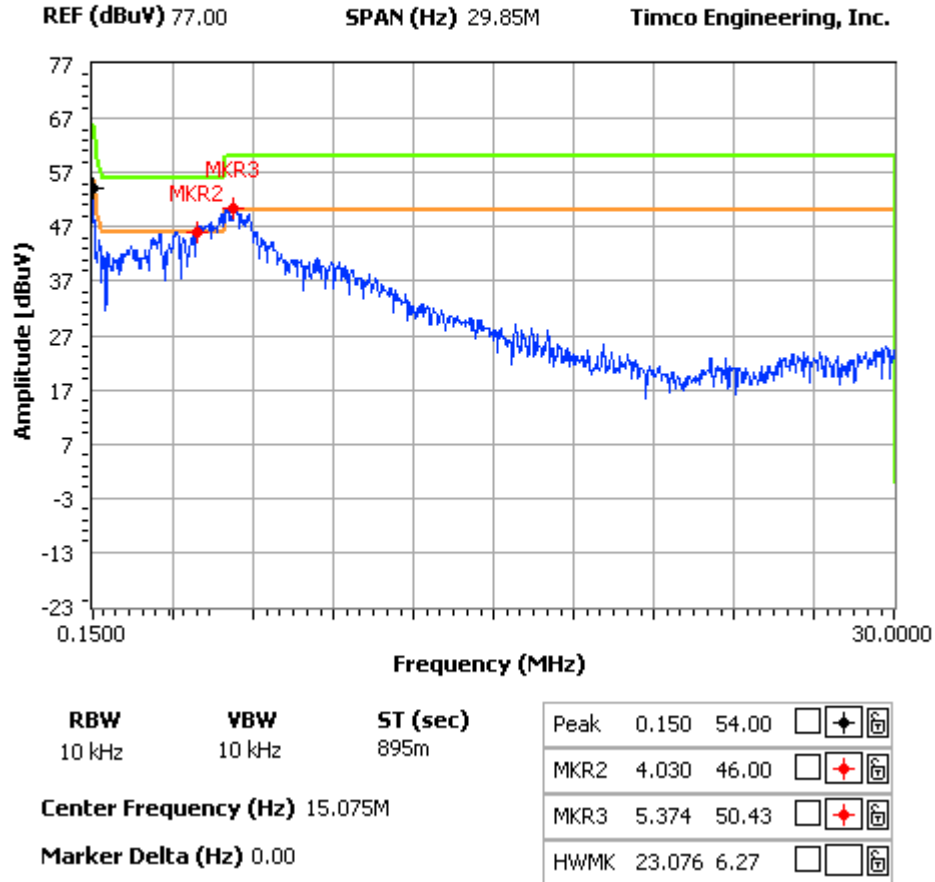
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POWERLINE CONDUCTED EMISSIONS – LINE 2

NOTES:

POWERLINE CONDUCTED -- LINE 2
 MOTOROLA, INC. -- FCC: IHD P56HSI

FCC 15.107 Mask Class B



Applicant: MOTOROLA, INC.

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POWERLINE CONDUCTED EMISSIONS – LINE 2

Quasi-Peak

Frequency (MHz)	Emission (dBuV)	Limit (dBuV)
4.030	41.42	56.00
4.715	42.36	56.00
4.999	42.75	56.00
5.034	43.18	56.00
5.342	43.60	60.00
5.374	41.85	60.00

Average

Frequency (MHz)	Emission (dBuV)	Limit (dBuV)
4.030	33.35	46.00
4.088	35.16	46.00
4.613	36.55	46.00
4.693	37.41	46.00
4.973	38.31	46.00
5.023	37.80	50.00
5.054	38.27	50.00
5.331	39.16	50.00
5.374	38.43	50.00

Applicant: MOTOROLA, INC.

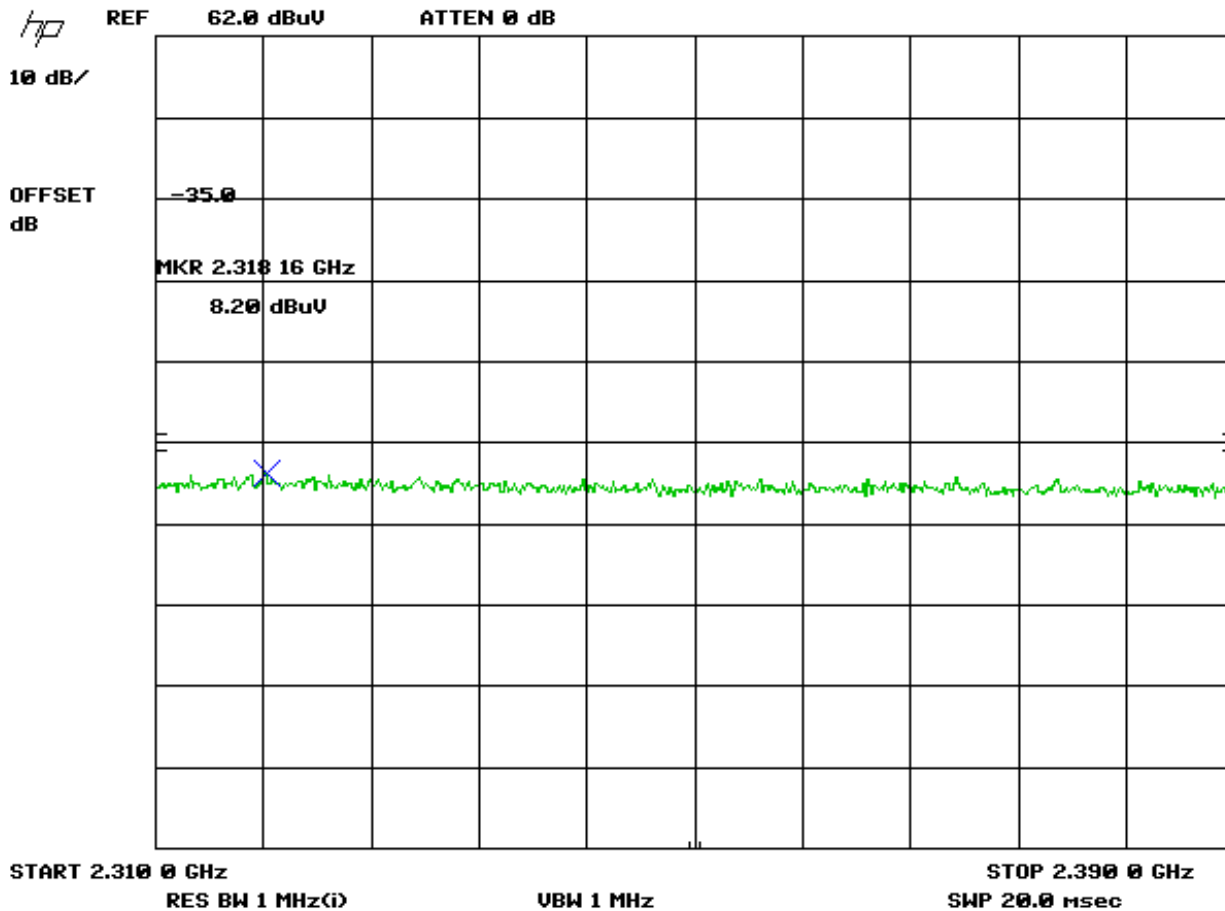
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RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND

REQUIREMENTS: Emissions that fall in the restricted bands (15.205). These emissions must be less than or equal to 500 uV/m (54dBuV/m). Emissions not in the restricted band must be 20 dBc.

TEST DATA: The plots are presented below.

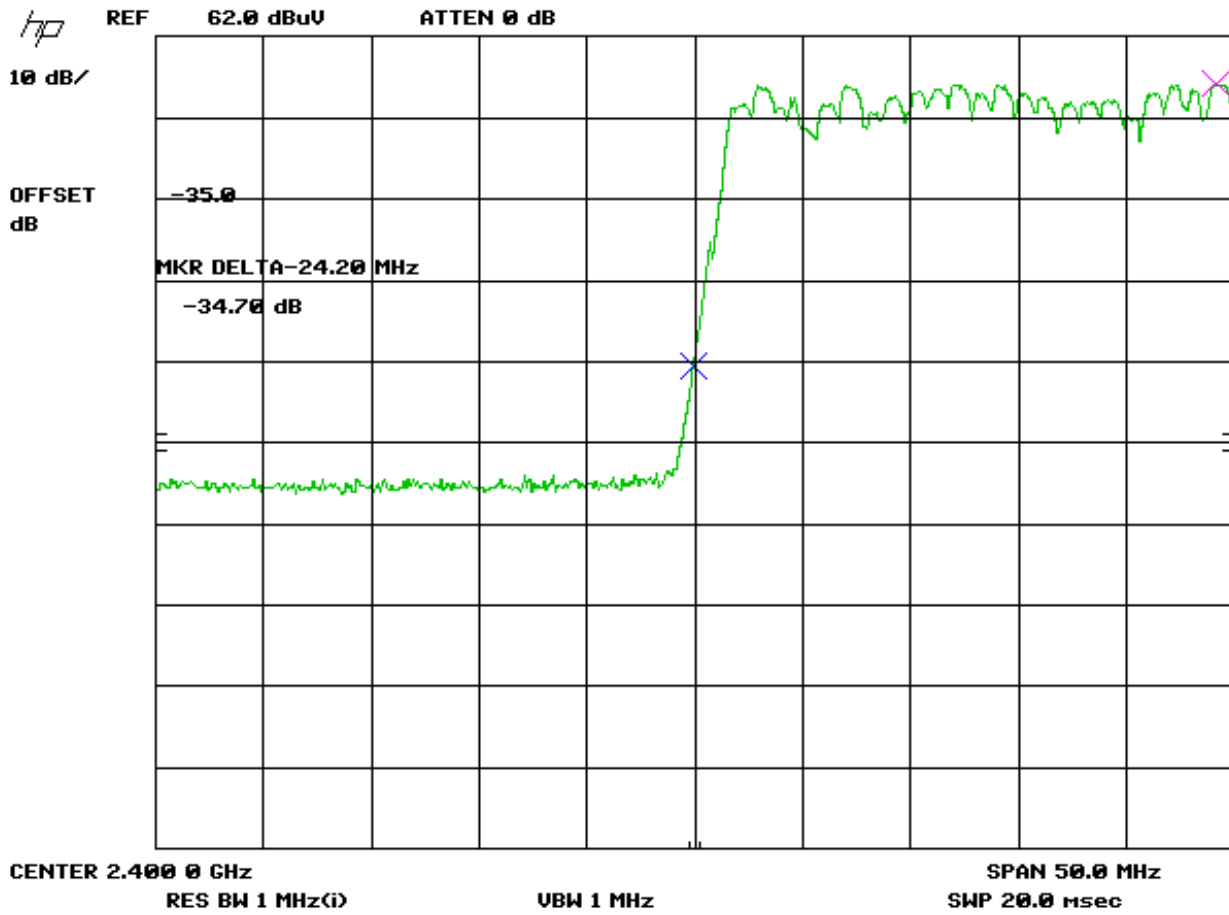


Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
2,318.2	2,318.16	8.2	V	3.12	32.03	43.35	10.65

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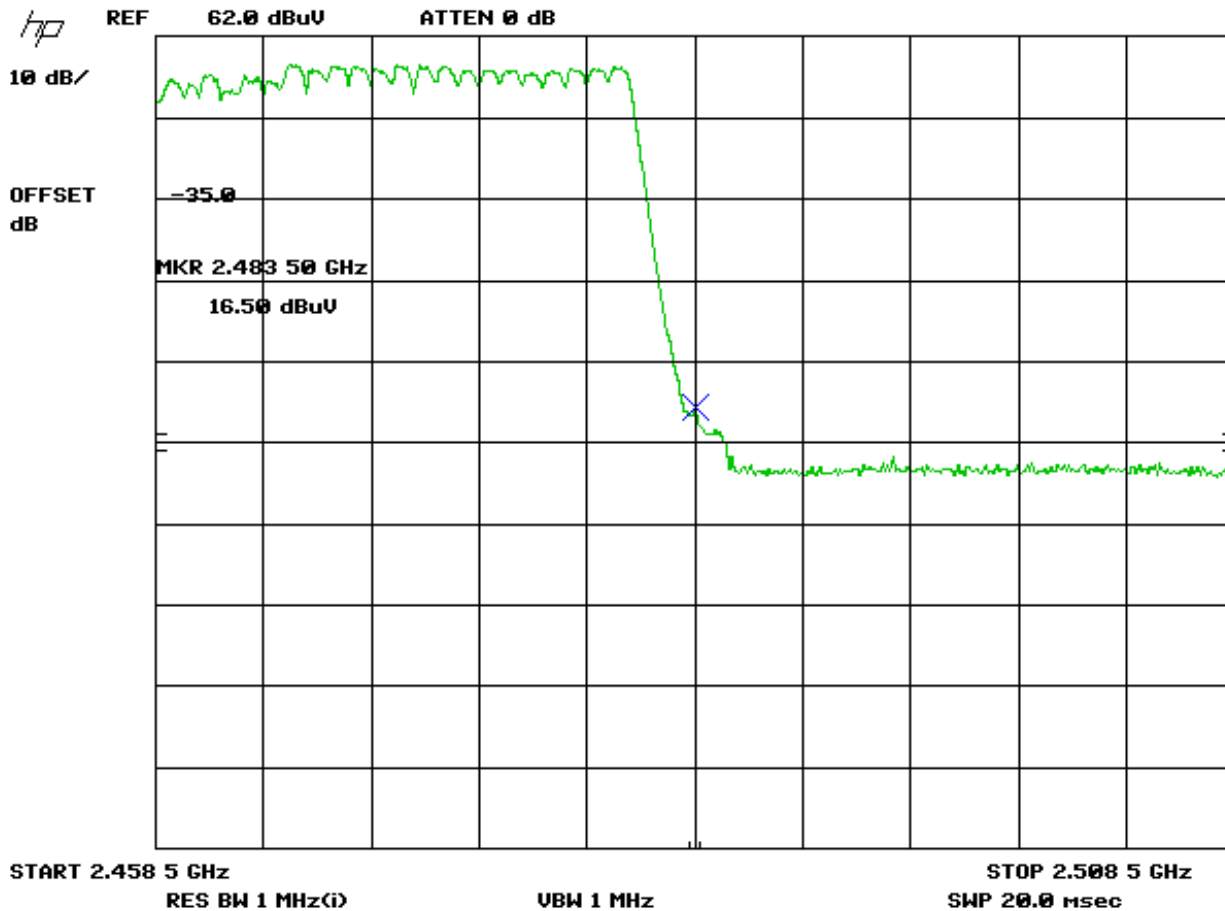
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Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
2,483.5	2,483.50	16.5	V	3.24	32.46	52.20	1.80

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RADIATED EMISSIONS TEST SET UP PHOTO



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POWERLINE EMISSIONS TEST SET UP PHOTO



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