DECLARATION OF COMPLIANCE - RF MEASUREMENT REPORT (FCC/IC)

Test Lab Information	**Name**	**CELLTECH LABS INC.**
	Address	21-364 Lougheed Road, Kelowna, British Columbia V1X 7R8 Canada
Test Lab Registration No.(s)	**FCC**	714830
	IC	3874A-1
Applicant Information	**Name**	Microlynx Systems Ltd.
	Address	Suite 107, 1925 - 18 Ave NE Calgary, AB T2E 7T8 Canada
Standard(s) & Procedure(s)	**FCC**	**47 CFR Part 15.249**
	IC	**RSS-210 Issue 8; RSS-Gen Issue 3**
	ANSI	C63.4-2003
Device Classification(s)	**FCC**	Low Power Communication Device (DXX)
	IC	Low-power License-exempt Radiocommunication Device
Application Type(s)	**FCC/IC**	TCB/CB Certification
Device Identifier(s)	**FCC ID:**	L5M5031416
	IC:	6364A-5031416
Device Model(s) Tested	Testork 5031416	
Test Sample Serial No.	#124604	
Transmit Frequency Band	2400 – 2483.5 MHz	
Transmit Frequency Range	2405-2475 MHz	
Max. RF Output Power (measured)	89.16 dBuV/m@3m	
Antenna Type(s) Tested	Integral, 4dBi	
Power Source(s) Tested	45Ah Lithium DC Cell	

This wireless device has demonstrated compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in FCC 47 CFR Part 15.249; Industry Canada RSS-210 Issue 8 and RSS-Gen Issue 3; and ANSI C63.4-2003.

I attest to the accuracy of data. All measurements were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

The results and statements contained in this report pertain only to the device(s) evaluated.

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Test Report Approved By		**Glen Westwell**	**Laboratory Manager**	**Celltech Labs Inc.**

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TEST SUMMARY

Referenced Standard(s):		FCC CFR Title 47 Part 15 Subpart C				
Section	**Description of Test**	**Procedure Reference**	**Limit Reference**	**Test Start**	**Test End**	**Result**
8	Field Strength of Intentional Radiators, Band Edge & Restricted Band Emissions	ANSI C63.4-2003	15.249(a)(d)	Aug 12	Aug 16	Pass
9	Radiated Spurious Emissions	ANSI C63.4-2003	15.205,15.209	Aug 12	Aug 16	Pass
10	Antenna Requirements	n/a	15.203	n/a	n/a	Pass
Referenced Standard(s):		**Industry Canada RSS-210 Issue 8**				
Appendix	**Description of Test**	**Procedure Reference**	**Limit Reference**	**Test Start**	**Test End**	**Result**
8	Field Strength of Intentional Radiators, Band Edge & Restricted Band Emissions	ANSI C63.4-2003	RSS-210 A8.2(a)	Aug 12	Aug 16	Pass
9	Radiated Spurious Emissions	ANSI C63.4-2003	RSS-210 A8.2(a)	Aug 12	Aug 16	Pass
10	Antenna Requirements	n/a	15.203	n/a	n/a	Pass

REVISION LOG

Revision	Description	Implemented By	Issue Date
1.0	Initial Release	Glen Westwell	8/28/2013

SIGNATORIES

Prepared By	Glen Westwell	Reviewed By	Mike Meaker	Date
	Lab Manager		Engineering Technologist	8/28/2013

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1.0 SCOPE

This report outlines the measurements made and results collected during electromagnetic emissions testing of Microlynx Systems Ltd. Testork 5031416. The measurement results were applied against the applicable FCC requirements and limits outlined in the technical rules and regulations set forth in the Federal Communication's Commission Code of Federal Regulations Title 47 Part 15 Subpart C and Industry Canada Radio Standards Specification RSS-210 Issue 8 and RSS-Gen Issue 3.

2.0 REFERENCES

2.1 Normative References

ANSI/ISO 17025:2005	General Requirements for competence of testing and calibration laboratories
IEEE/ANSI C63.4-2003	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
CFR Title 47 Part 15C	Code of Federal Regulations Title 47: Telecommunication Part 15C: Intentional Radiators
IC Spectrum Management & Telecommunications Policy	Radio Standards Specification RSS-210 Issue 8 - Low-Power License-Exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment RSS-Gen Issue 3 - General Requirements and Information for the Certification of Radiocommunication Equipment

3.0 PASS/FAIL CRITERIA

Unless otherwise noted in the Appendices, the pass/fail criteria is the limit set forth in the reference standards. The DUT is considered to have passed the requirements if the data collected during the described measurement procedure is no greater than the specified limits as defined. The pass/fail statements made in this report only apply to the unit tested.

4.0 FACILITIES AND ACCREDITATIONS

The facilities used in collecting the test results outlined in this report are located at 21-364 Lougheed Road, Kelowna, British Columbia, Canada V1X 7R8. The radiated emissions site conforms to the requirements set forth in ANSI C63.4 and is filed and listed with the FCC under Test Firm Registration Number 714830 and Industry Canada under Test Site File Number IC 3874A-1.

5.0 GENERAL INFORMATION

5.1 Applicant Information

Company Name	**MICROLYNX SYSTEMS LTD.**
Address	#107, 1925 – 18 Ave. NE Calgary, AB T2E 7T8

5.2 DUT Description

Device (DUT)	2.4GHz Testork 5031416 Transmitter	
Device Model(s) Tested	Testork 5031416	
Test Sample Serial No.(s)	None.	
Device Identifier(s)	**FCC ID:**	L5M5031416
	IC:	6364A-5031416
Power Source(s) Tested	45Ah Lithium DC Cell	
Antenna Type(s) Tested	Integral = 4dBi	

5.3 Mode(s) of Operation Tested

Transmit Frequency Range	2405.0 – 2475.0 MHz
Transmitter Test Frequency(s)	2405, 2425, 2475 MHz
Transmitter Test Mode(s)	Continuous CW, Continuous Modulated

5.4 Modification(s)

The EUT was configured for continuous transmit (worst case).

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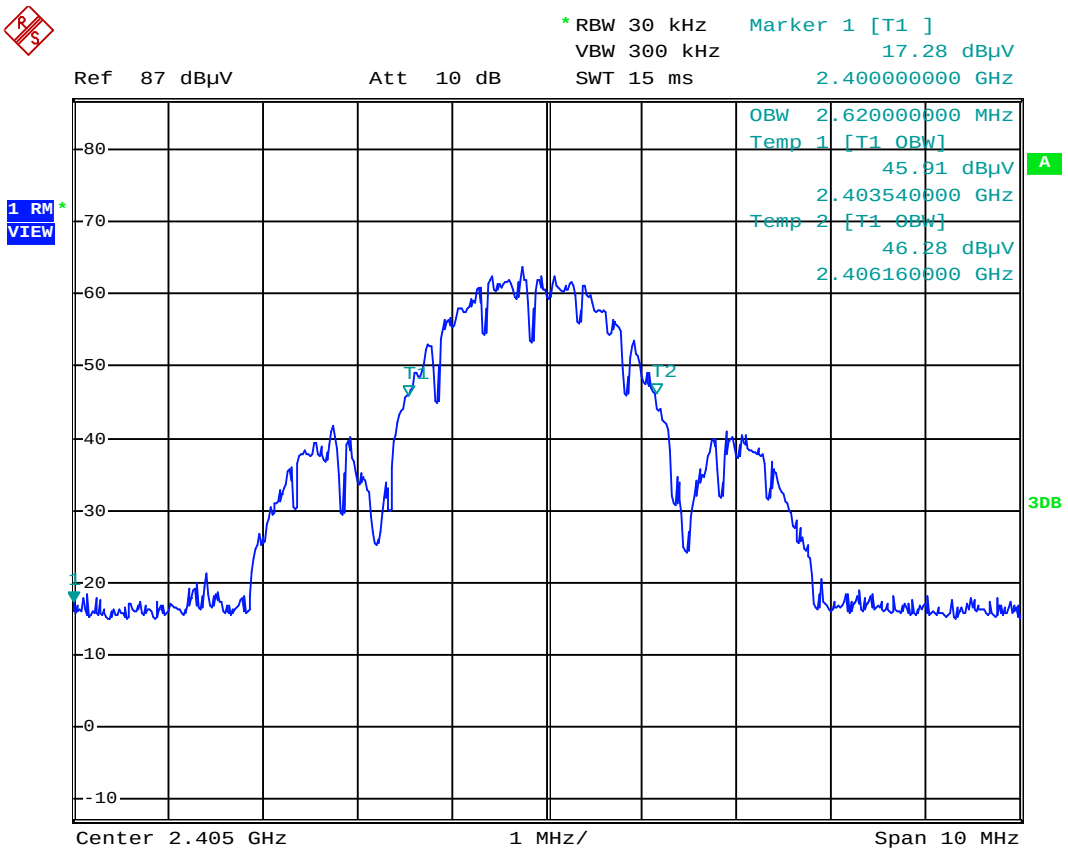
6.0 99% OCCUPIED BANDWIDTH = 2.62 MHZ

Testork

Bottom Channel



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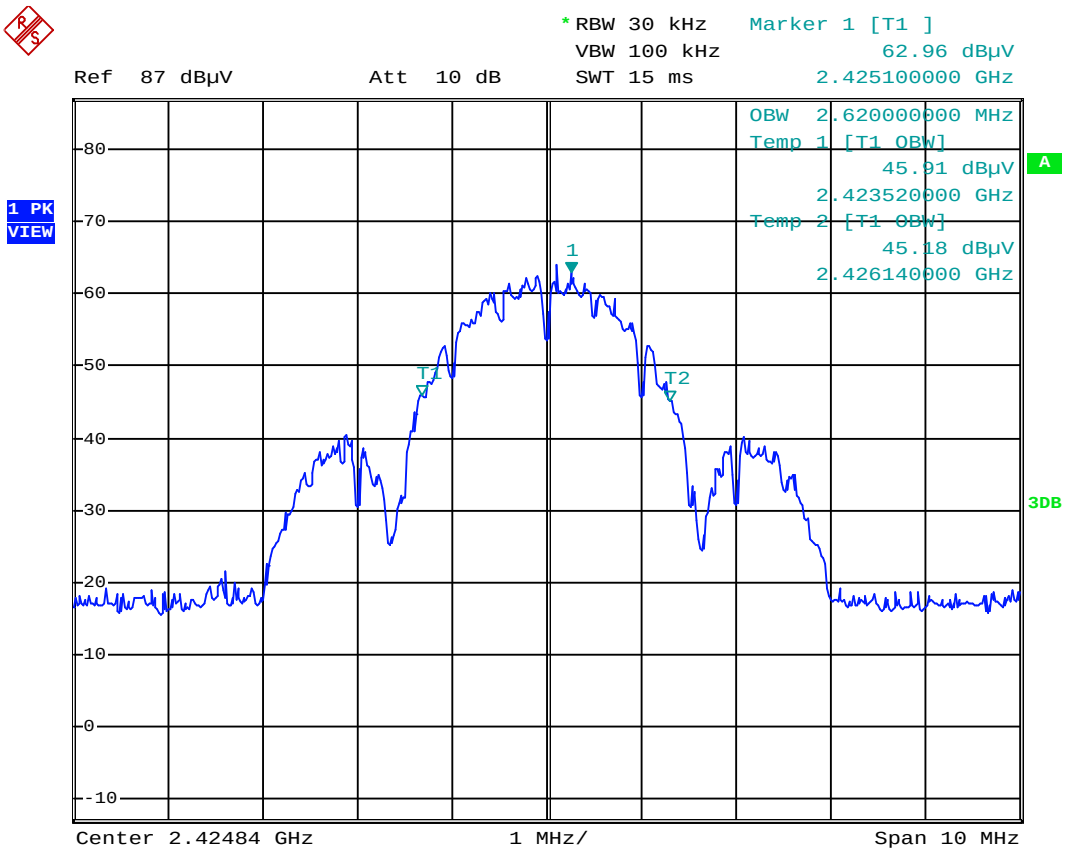
Mid Channel



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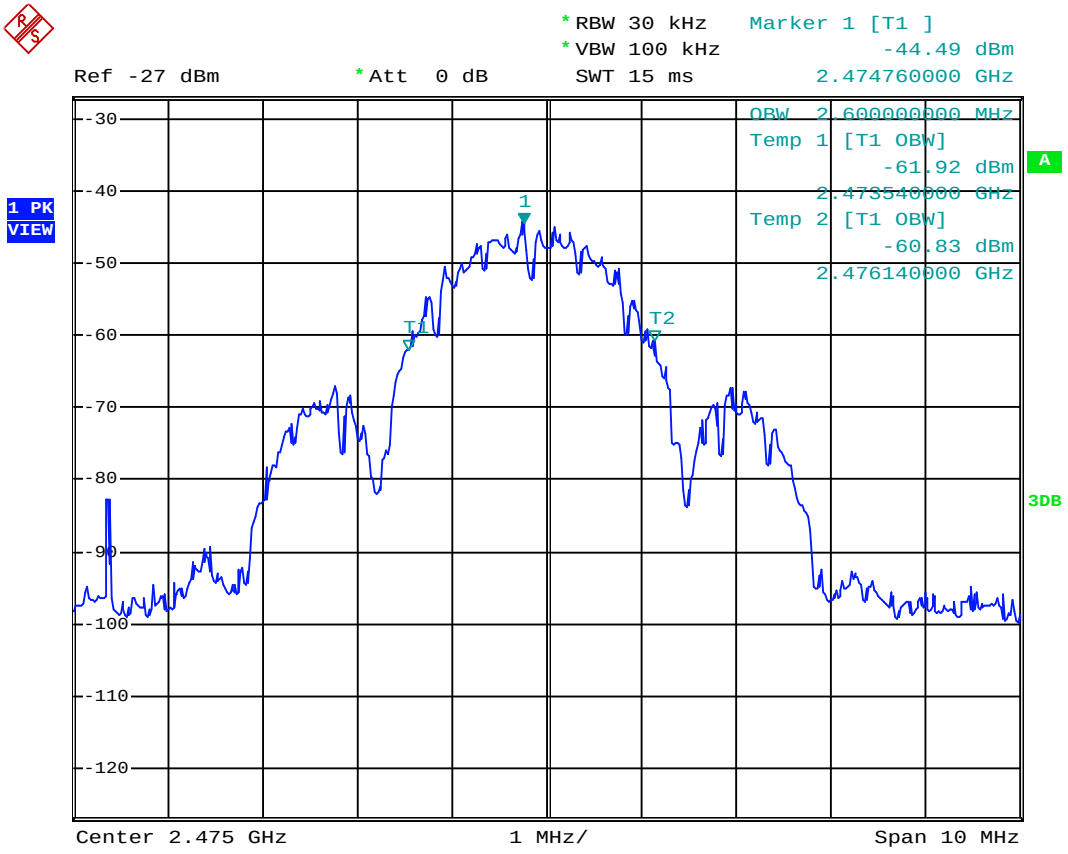
Top Channel



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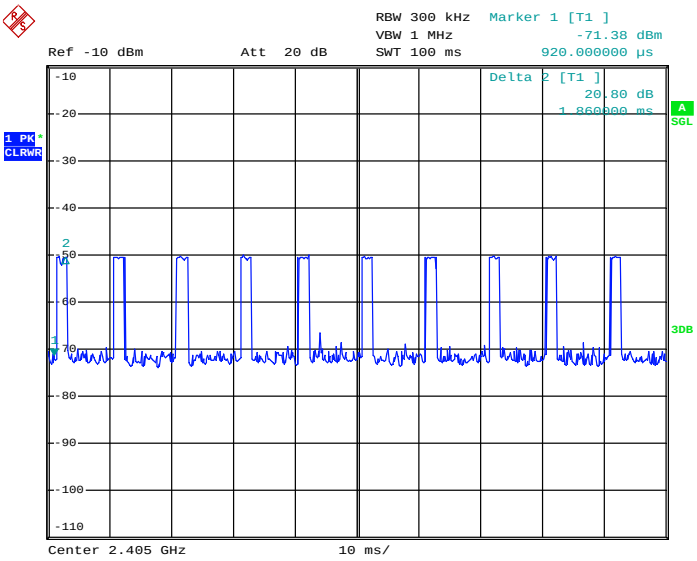
7.0 DUTY CYCLE CORRECTION FACTOR.

Measured Duty Cycle = 18.6mS/100mS (-7.3 dB)
Manufacturers declared max. duty cycle = 20mS/100mS (-7.0 dB)



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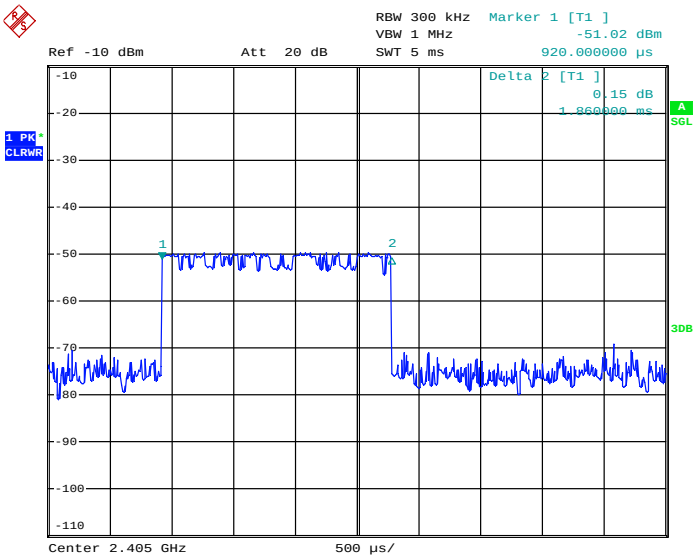

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8.0 FIELD STRENGTH OF INTENTIONAL RADIATOR, BAND EDGE AND RESTRICTED BAND EMISSIONS

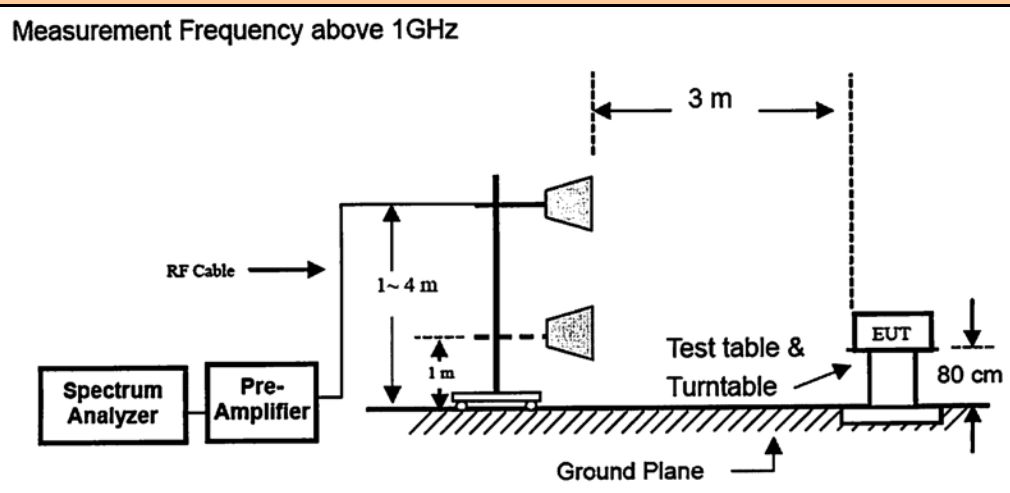
REFERENCES	
Normative Reference Standard	FCC CFR 47 §15.249; RSS-210
Procedure Reference	ANSI C63.4:2003

ENVIRONMENTAL CONDITIONS	
Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00241	R&S	FSP40	Spectrum Analyzer	09 Apr 15
00072	EMCO	2075	Mini-mast	n/a
00073	EMCO	2080	Turn Table	n/a
00071	EMCO	2090	Multi-Device Controller	n/a
00050	Chase	CBL-6111A	Bilog Antenna	03 May14
00034	ETS	3115	Double Ridged Guide Horn	06 Dec 14

SETUP DRAWING, SETUP DRAWING – RADIATED TX SPURIOUS EMISSIONS (> 1 GHZ)



15.249(a) Field Strength of Fundamental – Peak Detector Testork Low Power Transmitter									
Frequency (MHz)	Antenna Pol.	Emission Level (dBuV/m) @1m	Antenna Factor (dB)	Cable Loss	Distance Correction	D/C Corr.	Emission Level (dBuV/m@3m)	Limit (dBuV/m@3m)	Margin
2405.0	V	72.0	28.4	4.5	-9.54	-7.0	88.36	94.0	-5.64
2405.0	H	71.5	28.4	4.5	-9.54	-7.0	87.86	94.0	-6.14
2425.0	V	72.8	28.4	4.5	-9.54	-7.0	89.16	94.0	-4.84
2425.0	H	72.7	28.4	4.5	-9.54	-7.0	89.06	94.0	-4.94
2475.0	V	70.3	28.4	4.5	-9.54	-7.0	86.66	94.0	-7.34
2475.0	H	70.9	28.4	4.5	-9.54	-7.0	87.26	94.0	-6.74
Band Edge -15.249(d) (Worst Case)									
2400.0	V	26.1	28.3	4.5	-9.54	--	49.36	54.0	-4.64
2483.5	V	22.0	28.4	4.5	-9.54	--	45.36	54.0	-8.64
15.205 Restricted Band Emissions (worst Case)									
2390.0	V	22.0	28.2	4.5	-9.54	--	45.16	54.0	-8.84
2483.5	V	22.0	28.4	4.5	-9.54	--	45.36	54.0	-8.64

Data for the fundamental and bandedge presented using a Pk detector compared to average limits.
Device characterization was performed on all axis to determine worst case orientation.
The device was tested using a fresh DC cell throughout all testing.
D/C = Duty Cycle

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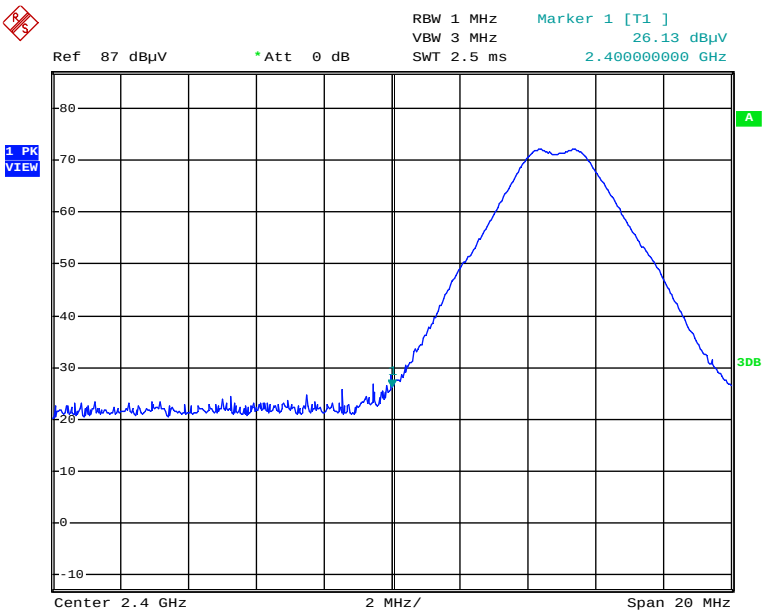
Band Edge Plots

LBE -2.400 GHz



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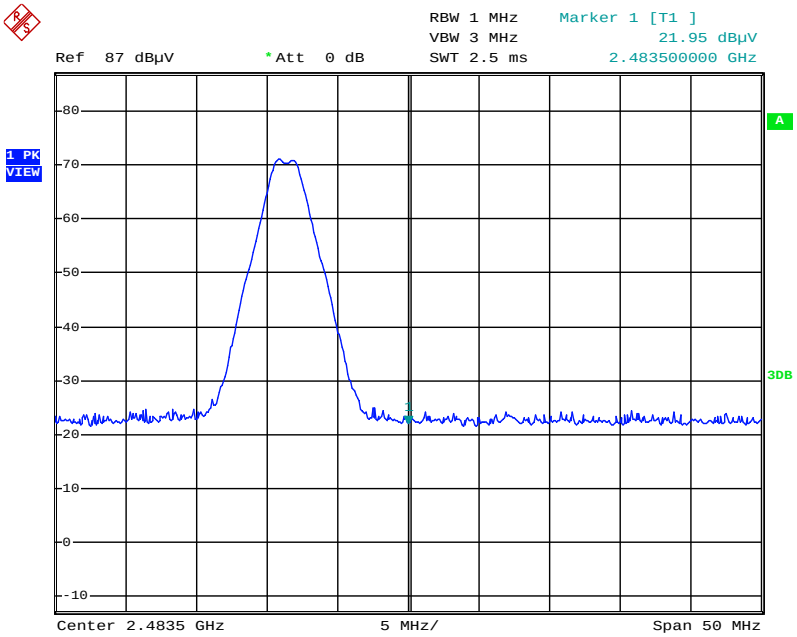
UBE -2.4835 GHz



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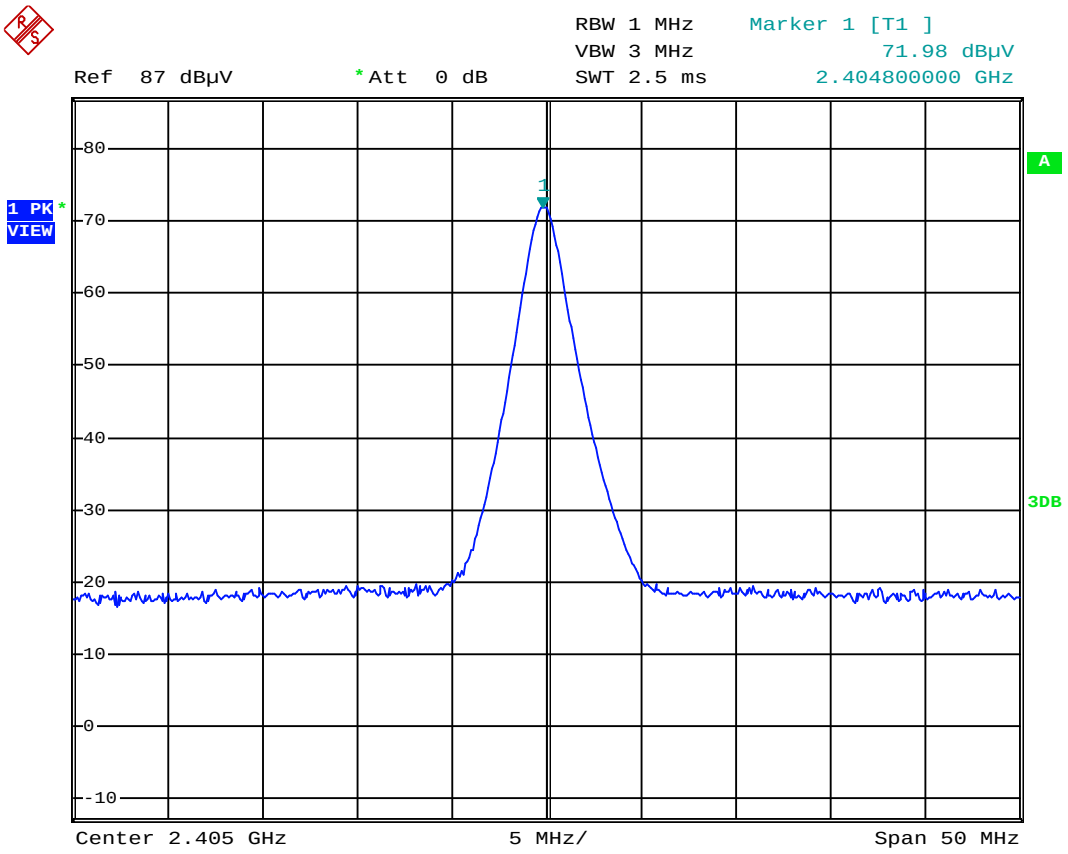
TX Peak Power (worst case)



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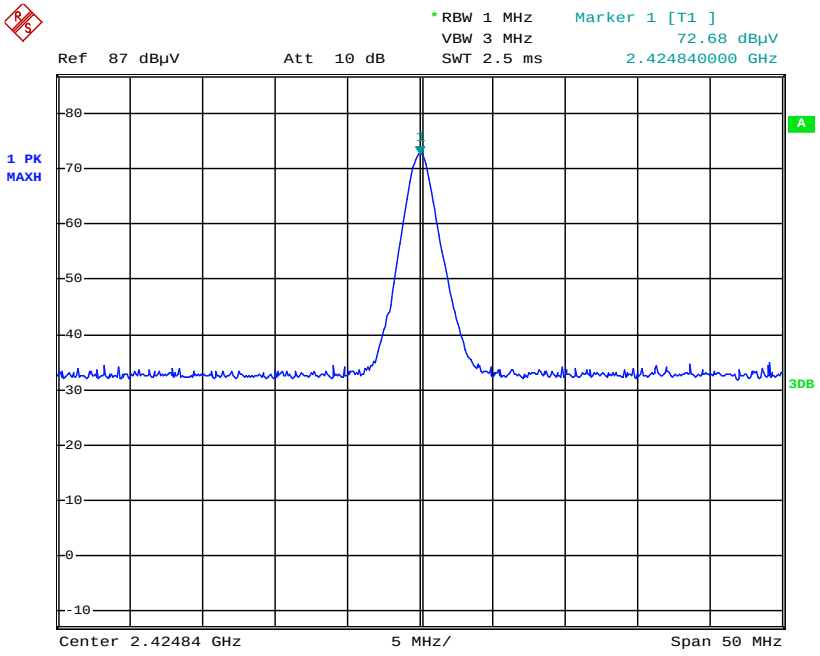
TX Peak Power – worst case



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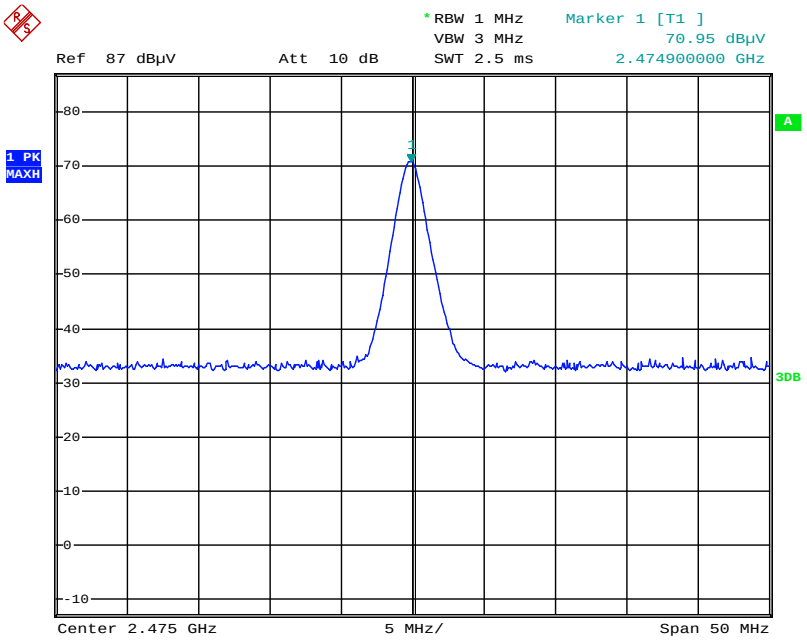

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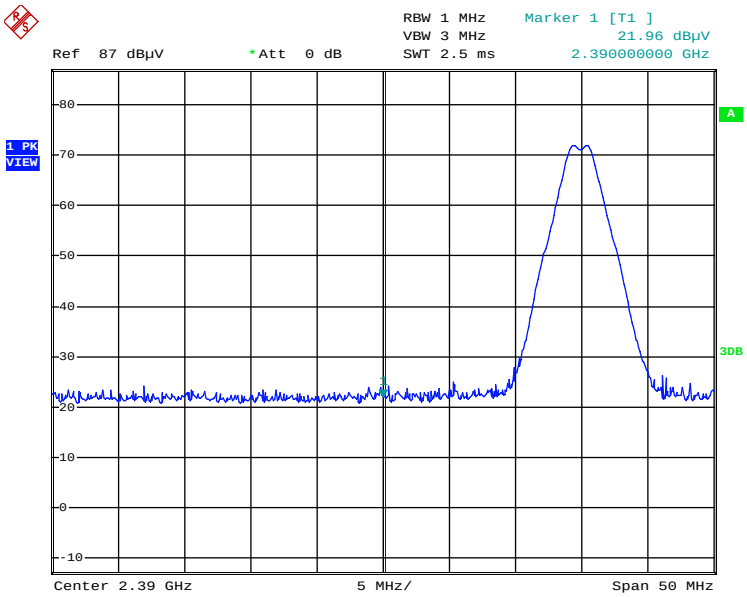
Restricted Band

Peak emission = 26.3dBuV @ 1m



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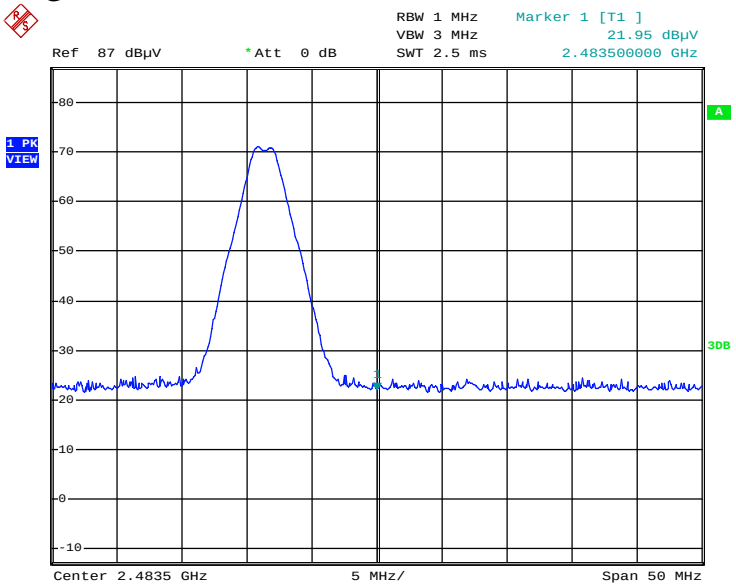
Restricted Band

Peak emission = 24.86dBuV @ 1m



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9.0 RADIATED SPURIOUS EMISSIONS

REFERENCES	
Normative Reference Standard	FCC CFR 47 §15.205; §15.209: §15.249, RSS-210, IECS-003
Procedure Reference	ANSI C63.4:2003

ENVIRONMENTAL CONDITIONS	
Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00051	HP	8566B	Spectrum Analyzer RF Section	09 May14
00049	HP	85650A	Quasi-peak Adapter	10 May14
00047	HP	85685A	RF Preselector	09 May14
00072	EMCO	2075	Mini-mast	n/a
00073	EMCO	2080	Turn Table	n/a
00071	EMCO	2090	Multi-Device Controller	n/a
00030	HP	83017A	Microwave system amplifier	n/a
00050	Chase	CBL-6111A	Bilog Antenna	03 May14
00034	ETS	3115	Double Ridged Guide Horn	06 Dec 14
00085	EMCO	6502	Active Loop Antenna	03 June 14
00162	Waveline	899	Horn Antenna	n/a

MEASUREMENT EQUIPMENT SETUP

MEASUREMENT EQUIPMENT CONNECTIONS

For the field strength measurements, the measurement equipment was connected as shown in E.4. Various antenna types may be required to cover the applicable frequency range tested. The ranges in which each antenna was used are shown below.

Frequency Range	RX Antenna	TX Antenna
9kHz – 30Mhz	Active Loop	N/a
30 MHz - 1GHz	Bilog	N/a
1 GHz - 18 GHz	ETS 3115 Horn	N/a
18-26.5 GHz	Waveline Horn	N/a

MEASUREMENT EQUIPMENT SETTINGS

For the spurious out-of-band emissions, the spectrum analyzer was set to the following settings:

Measurement	RBW	VBW	Detector
	kHz	kHz	
< 1 GHz	100	300	Peak*
> 1 GHz	1000	3000	Peak*

- The spectrum was searched from the lowest frequency generated by the EUT to the 10th harmonic of the fundamental.
- All detected emissions are reported.
- No emissions below 1GHz were detected.

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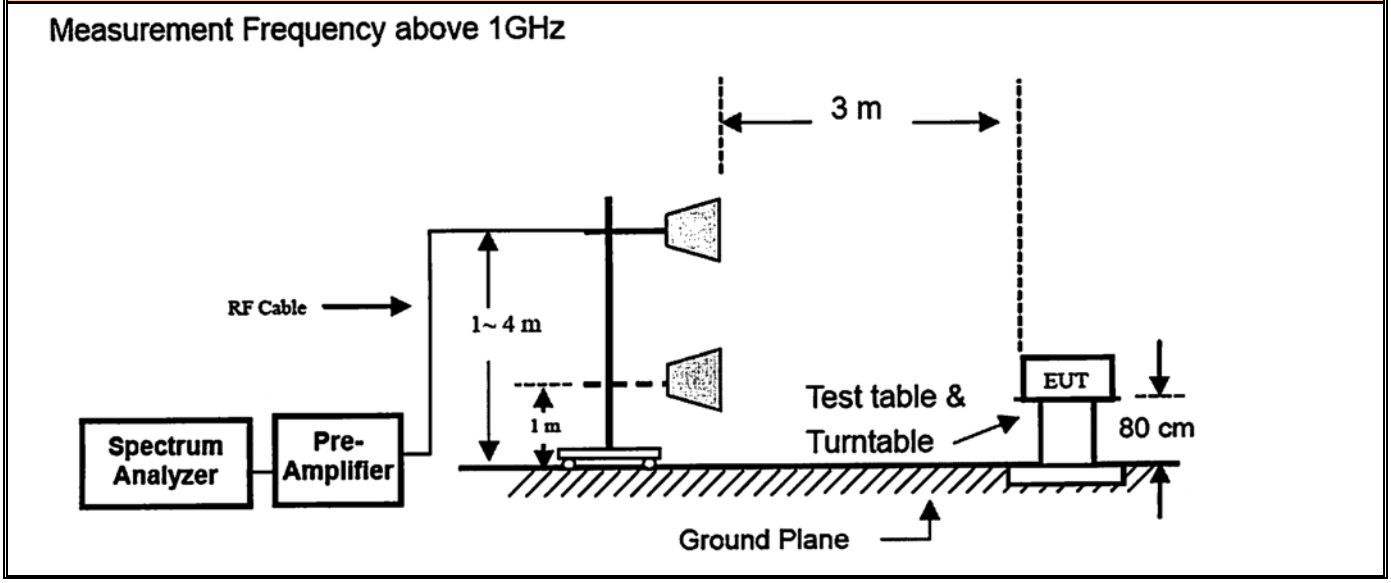
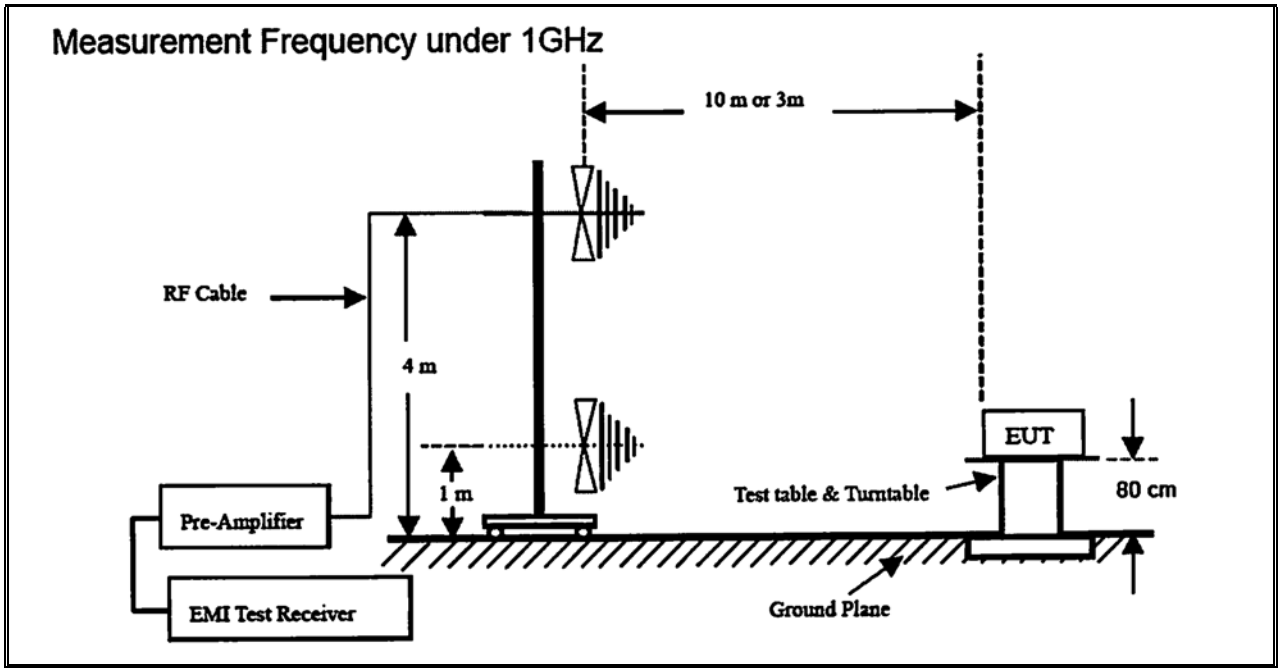
SETUP DRAWING, SETUP DRAWING – RADIATED TX SPURIOUS EMISSIONS (> 1 GHZ)



SETUP DRAWING, SETUP DRAWING – RADIATED TX SPURIOUS EMISSIONS (< 1 GHZ)



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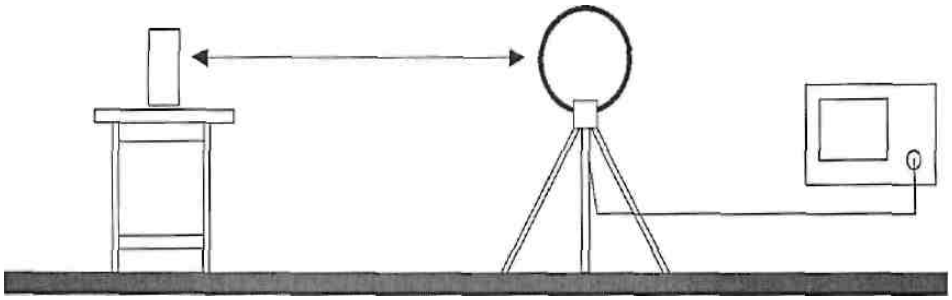
SETUP DRAWING, 9KHZ-30MHZ

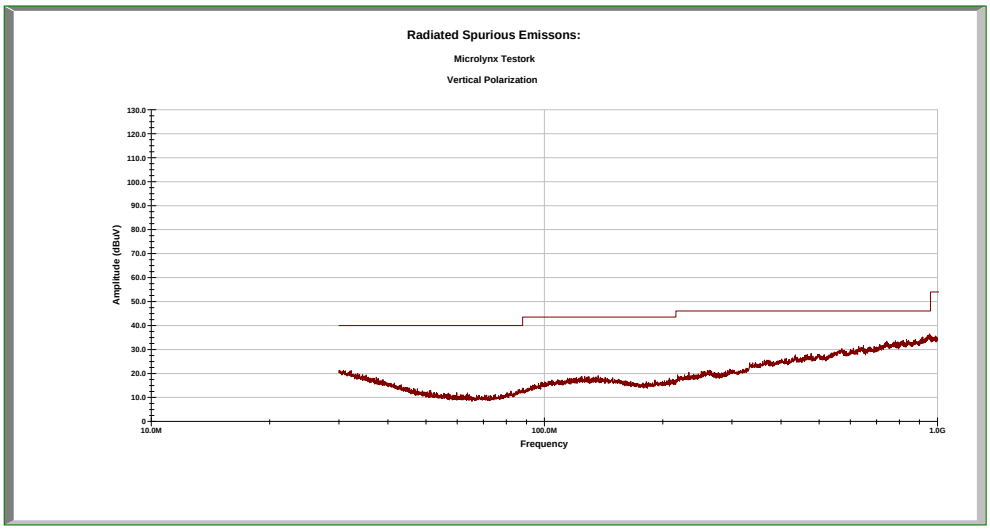
Active Loop Ant.

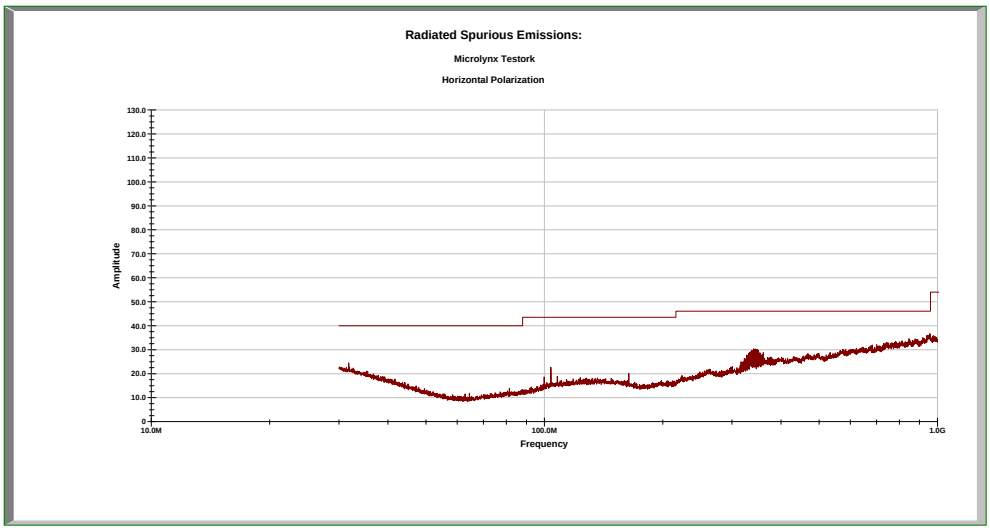


15.249(a)(d) Emissions Field Strength– Peak Detector Testork Low Power Transmitter								
Frequency (MHz)	Antenna Pol.	Emission Level (dBuV/m) @1m	Antenna Factor (dB)	Cable Loss/Amp Gain Corr.	Distance Correction	Emission Level (dBuV/m@3m)	Limit (avg) (dBuV/m@3m)	Margin
7215.0	V	40.61	35.9	-26.0	-9.54	40.97	54.0	-13.03
7275.0	V	41.44	36.2	-26.0	-9.54	42.1	54.0	-11.9
7425.0	V	35.96	36.5	-26.0	-9.54	36.92	54.0	-17.08

Notes:
Data presented using a Pk detector compared to average limits.
Device characterization was performed on all axis to determine worst case orientation.
The device was tested using fresh batteries throughout all testing.
Worst case performance has been presented.
The Device was searched to the 10th harmonic of the fundamental (24.75 GHz).
All detected emissions have been reported.

15.209 Radiated Emissions





10.0 ANTENNA REQUIREMENTS

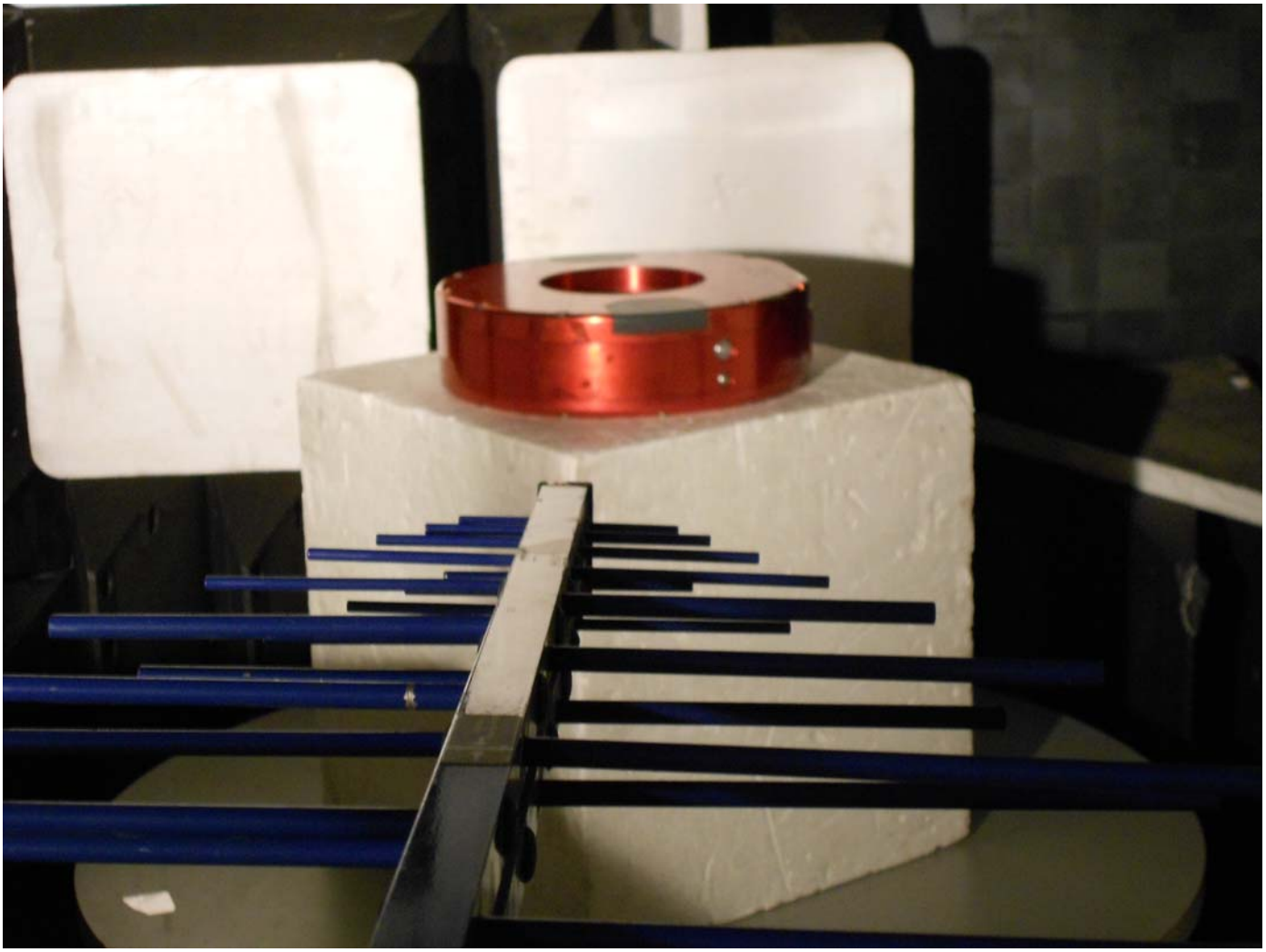
§ 15.203 Antenna Requirement

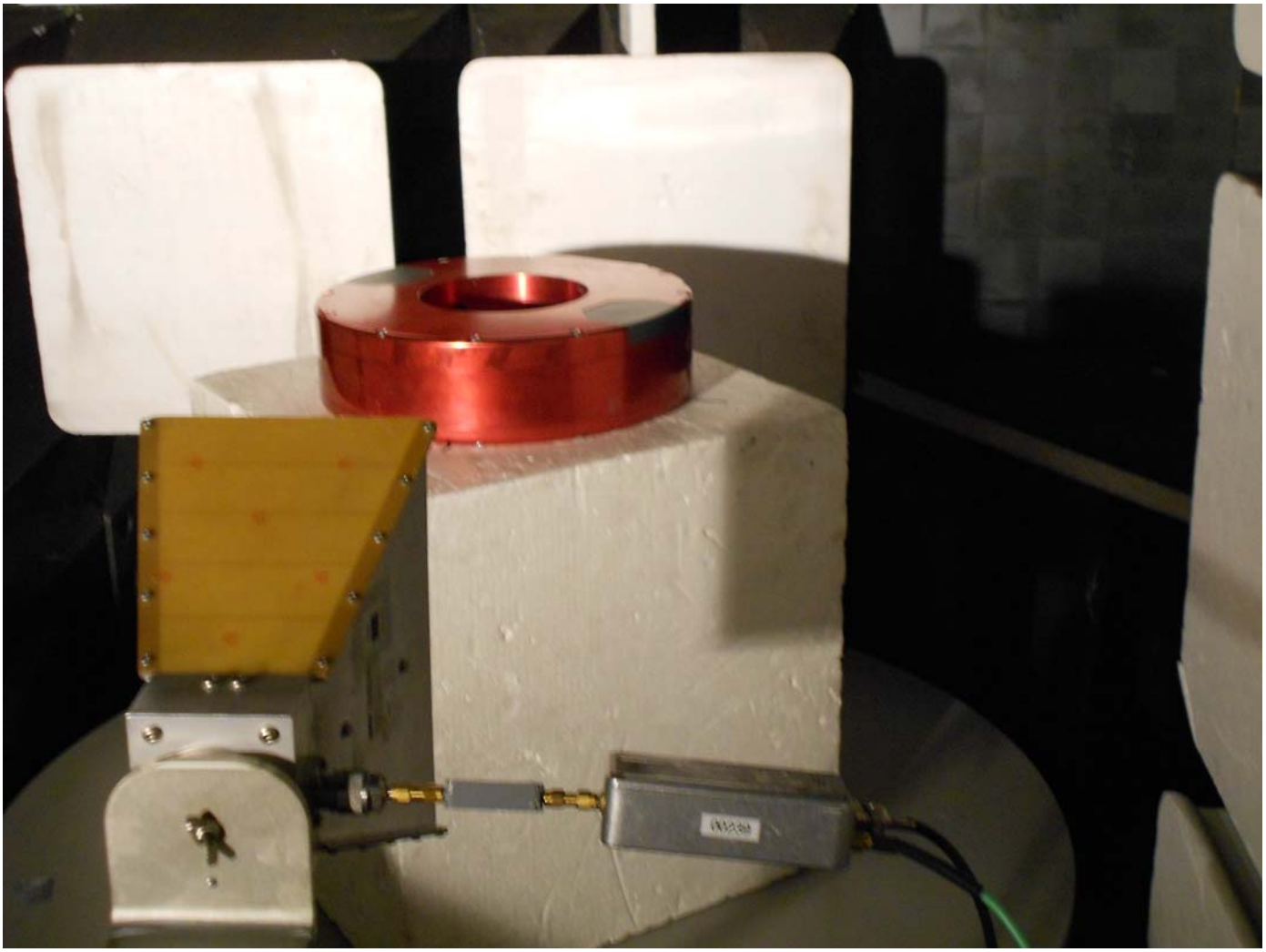
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

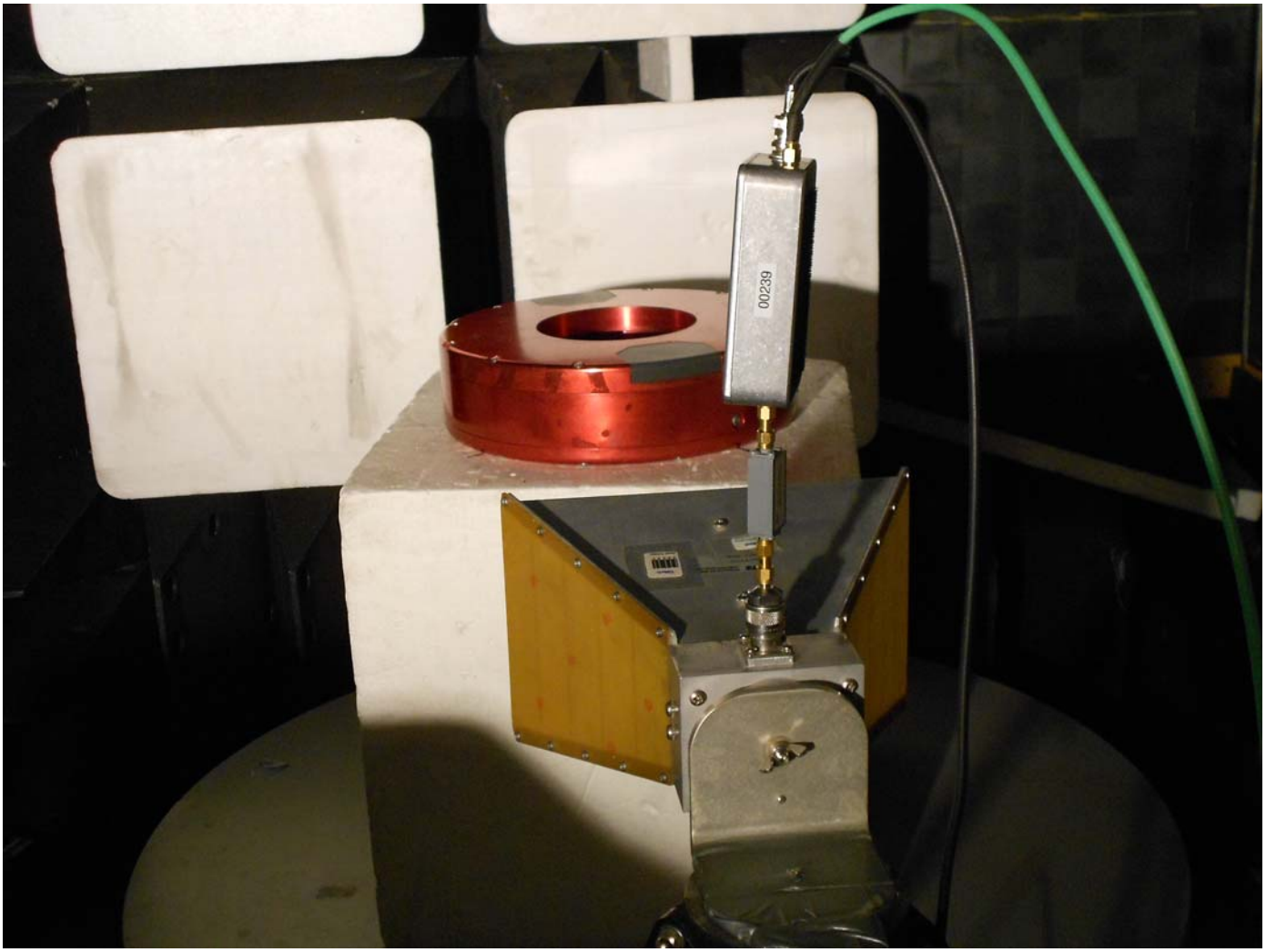
The DUT complies with the antenna requirements of 15.203 as follows:

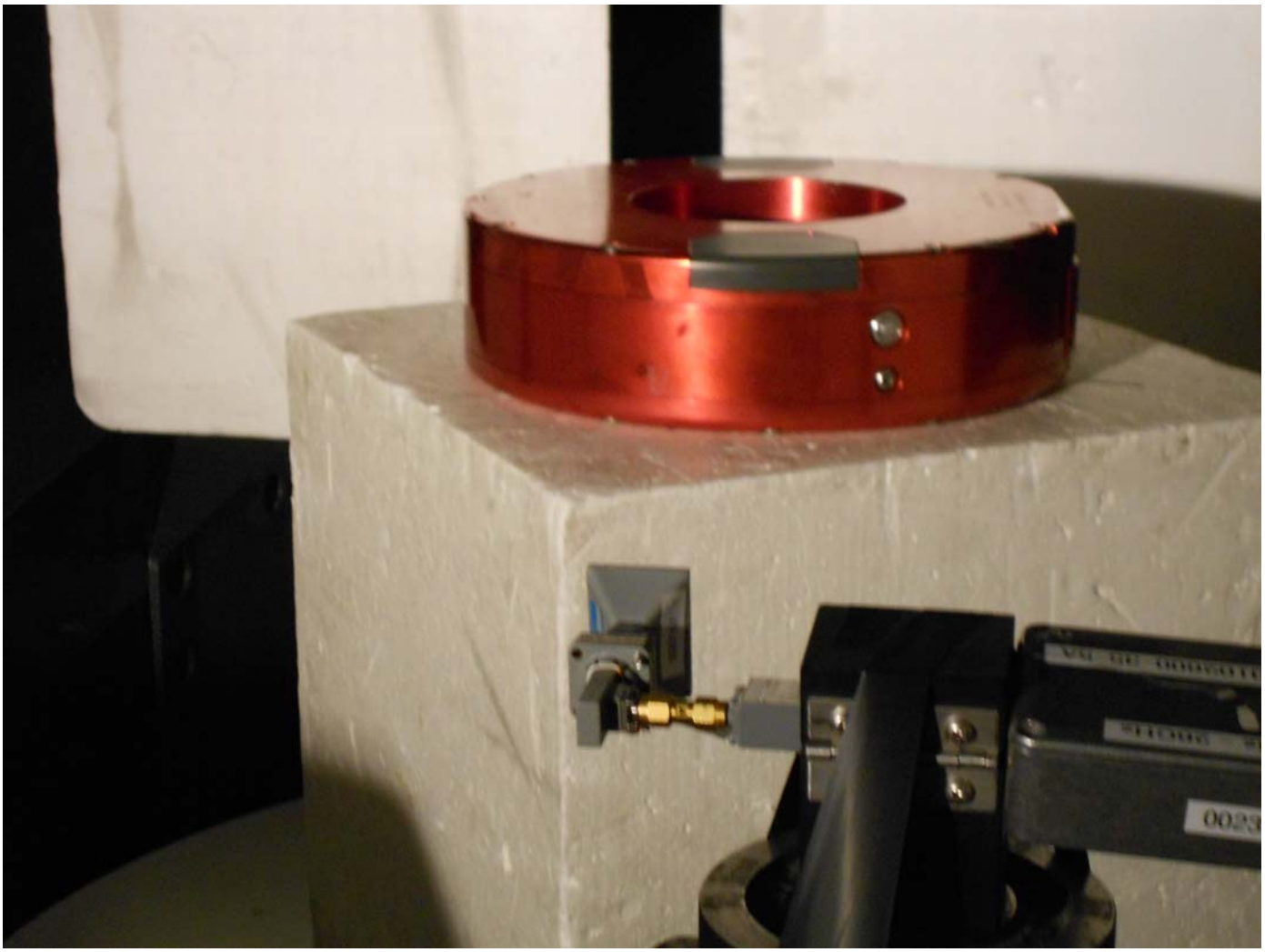
Integral antenna is used.

11.0 TEST SET UP PHOTO'S






00239



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