REPORT ON THE CERTIFICATION TESTING OF A
AGD SYSTEMS Ltd
AGD330
WITH RESPECT TO
FCC RULES CFR 47, PART 15.245 July 2008
INTENTIONAL RADIATOR SPECIFICATION

TEST REPORT NO: 8F2048Q1WRP1

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AGD SYSTEMS Ltd
AGD330
WITH RESPECT TO
FCC RULES CFR 47, PART 15.245 July 2008
INTENTIONAL RADIATOR SPECIFICATION

TEST DATE: 6th – 9th April 2009

TESTED BY: Daniel Winstanley — Digitally signed by Daniel Winstanley DN: CN = Daniel Winstanley, C = <n Reason: I am the author of this document Date: 2009.04.20 08:41:45 +01'00' — D WINSTANLEY

APPROVED BY: John Charters — Digitally signed by John Charters Reason: I am approving this document Date: 2009.04.20 08:45:16 +01'00' — J CHARTERS RADIO SECTION LEADER

DATE: 20th April 2009

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UKAS 0728

CONTENTS

	PAGE
CERTIFICATE OF CONFORMITY & COMPLIANCE	4
APPLICANT'S SUMMARY	5
EQUIPMENT TEST CONDITIONS	6
TESTS REQUIRED	6
TEST RESULTS	7 - 9
	ANNEX
PHOTOGRAPHS	A
PHOTOGRAPH No. 1: Test setup	
PHOTOGRAPH No. 2: Top Overview	
PHOTOGRAPH No. 3: Bottom Overview	
PHOTOGRAPH No. 4: Top Overview RF Module Removed	
PHOTOGRAPH No. 5: Bottom Overview Can Removed	
PHOTOGRAPH No. 6: RF Module Antenna side	
PHOTOGRAPH No. 7: RF Module Rear side	
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST	B
MEASUREMENT UNCERTAINTY	C
TEST EQUIPMENT CALIBRATION	D
BAND OCCUPANCY PLOT	E
EMISSIONS GRAPH(s)	F

Notes:

1. Component failure during test — YES [ ] NO [X]
2. If Yes, details of failure:
3. The facilities used for the testing of the product contain in this report are FCC Listed.
4. The contents of the attached applicants declarations and other supplied information are not covered by the scope of this laboratory's UKAS or FCC accreditations' and is provided in good faith.

CERTIFICATE OF CONFORMITY & COMPLIANCE

FCC IDENTITY:	WH3AGD330-101
PURPOSE OF TEST:	Certification
TEST SPECIFICATION:	FCC RULES CFR 47, Part 15.245 July 2008
TEST RESULT:	Compliant to Specification
EQUIPMENT UNDER TEST:	AGD330
ITU: EMISSION CODE:	3M68N0N
EQUIPMENT TYPE:	Field Disturbance Sensor
PRODUCT USE:	In Sign K-Band Doppler Radar Detector
CARRIER EMISSION:	794.33 mV/m @3m
ANTENNA TYPE:	Patch Antenna
ALTERNATIVE ANTENNA:	Not Applicable
BAND OF OPERATION:	24.075 – 24.175GHz
CHANNEL SPACING:	Not Applicable, Wideband
FREQUENCY GENERATION:	External Source [ ] Crystal [ ] Synthesiser [X]
MODULATION METHOD:	Amplitude [ ] Digital [X] Angle [ ]
POWER SOURCE(s):	+12Vdc
TEST DATE(s):	6th – 9th April 2009
ORDER No(s):	
APPLICANT:	AGD Systems Ltd
ADDRESS:	White Lion House Gloucester Road Staverton Cheltenham Gloucester GL51 0TF

TESTED BY: Daniel Winstanley

Digitally signed by Daniel Winstanley
DN: CN = Daniel Winstanley, C = <n
Reason: I am the author of this document
Date: 2009.04.20 08:41:24 +01'00'

D WINSTANLEY

APPROVED BY:

Digitally signed by John Charters
Reason: I am approving this document
Date: 2009.04.20 08:45:41 +01'00'

J CHARTERS
RADIO SECTION LEADER

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	AGD330
EQUIPMENT TYPE:	Field Disturbance Sensor
PURPOSE OF TEST:	Certification
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 15.245 July 2008
TEST RESULT:	COMPLIANT Yes [X] No [ ]
APPLICANT'S CATEGORY:	MANUFACTURER [X] IMPORTER [ ] DISTRIBUTOR [ ] TEST HOUSE [ ] AGENT [ ]
APPLICANT'S ORDER No(s):	
APPLICANT'S CONTACT PERSON(s):	Mr R Fyfe
E-mail address:	rob.fyfe@agd-systems.com
APPLICANT:	AGD Systems Ltd
ADDRESS:	White Lion House Gloucester Road Staverton Cheltenham Gloucester GL51 0TF
TEL:	+44 (0) 1452 854212
FAX:	+44 (0) 1452 854213
EUT(s) COUNTRY OF ORIGIN:	United Kingdom
TEST LABORATORY:	TRaC Telecoms & Radio, Up Holland
UKAS ACCREDITATION No:	0728
TEST DATE(s):	6th – 9th April 2009
TEST REPORT No:	8F2048Q1WRP1

EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.

TEST/EXAMINATION	RULE PART	DETECTOR	APPLICABILITY
Intentional Emission Frequency:	15.245(a)	Average	YES
Intentional Emission Field Strength:	15.245(a)	Average	YES
Intentional Emission Band Occupancy:	15.215 (c)	Peak	YES
Intentional Emission ERP (mW):	N/A	-	NO
Spurious Emissions – Conducted:	15.207	Quasi Peak Average	YES
Spurious Emissions – Radiated <1000MHz:	15.209	Quasi Peak	YES
Spurious Emissions – Radiated >1000MHz:	15.245 15.209	Average	YES
Maximum Frequency of Search:	15.33	-	YES
Antenna Arrangements Integral:	15.203	-	YES
Antenna Arrangements External Connector:	15.204	-	YES
Restricted Bands	15.205	-	YES
Extrapolation Factor	15.31(f)	-	YES

2. Product Use: Field Disturbance Sensor

3. Emission Designator: 3M68N0N

4. Duty Cycle: 100%

5. Temperatures: Ambient (Tnom) 23^{o}C

6. Supply Voltages: Vnom +12Vdc

Note: Vnom voltages are as stated above unless otherwise shown on the test report page

7. Equipment Category:
   Single channel [X]
   Two channel [ ]
   Multi-channel [ ]

8. Channel spacing:
   Narrowband [ ]
   Wideband [X]

TRANSMITTER TESTS

TRANSMITTER SPURIOUS EMISSIONS – RADIATED – PART 15.209

Ambient temperature	=	12°C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	69% (<1GHz),	3m measurements <26.5GHz	[X]
Conditions	=	Open Area Test Site (OATS)	0.3m measurements <100GHz	[X]
Supply voltage	=	+12Vdc	3m extrapolated from 0.3m	[X]
Channel number	=	1		

	FREQ. (MHz)	MEAS Rx (dBµV)	CABLE LOSS (dB)	ANT FACT. (dB/m)	PRE AMP (dB)	FIELD ST'GH (dBµV/m)	EXTRAP FACT (dB)	FIELD ST'GH (µV/m)	LIMIT (µV/m)
0.009MHz - 0.49MHz									**Note 9**
0.49MHz - 1.705MHz									**Note 9**
1.705MHz - 30MHz									**Note 9**
30MHz - 88MHz									**Note 9**
88MHz - 216MHz	169.55	22.00	1.80	9.2	-	33.0	-	44.67	150
	173.35	19.00	1.80	9.1	-	29.9	-	31.26	150
	192.30	26.00	1.90	8.1	-	36.0	-	63.09	150
	203.20	24.97	1.93	7.9	-	34.8	-	54.95	150
216MHz - 960MHz	232.20	17.60	2.10	9.7	-	29.4	-	29.51	200
	257.75	17.40	2.20	13.1	-	32.7	-	43.15	200
	272.15	24.50	2.20	12.8	-	39.5	-	94.41	200
	300.70	19.46	2.34	13.0	-	34.8	-	54.95	200
	306.15	16.05	2.35	13.1	-	31.5	-	37.58	200
	329.35	17.66	2.34	14.0	-	34.0	-	50.12	200
	386.60	22.30	2.60	15.3	-	40.2	-	102.33	200
	406.10	20.00	2.70	16.4	-	39.1	-	90.16	200
	415.25	17.86	2.74	16.6	-	37.2	-	72.44	200
	432.00	15.10	2.80	16.6	-	34.5	-	53.08	200
	443.85	19.50	2.80	16.7	-	39.0	-	89.12	200
	473.70	16.62	2.88	17.5	-	37.0	-	70.79	200
	499.95	12.38	3.02	18.0	-	33.4	-	46.77	200
	541.40	14.47	3.13	19.4	-	37.0	-	70.79	200
	544.10	15.62	3.18	19.7	-	38.5	-	84.14	200
960MHz - 1GHz									**Note 9**
1GHz - 100GHz	48228.02	34.39	23.7*	42.7	-	100.79	20	10952	25000

Limits		
	Restricted Bands 15.205	
	0.009 MHz to 0.49 MHz	2400/f(kHz) µV/m @ 300m
	0.49 MHz to 1.705 MHz	24000/f(kHz) µV/m @ 30m
	1.705MHz to 30MHz	30µV/m @ 30m
	30MHz to 88MHz	100µV/m @ 3m
	88MHz to 216MHz	150µV/m @ 3m
	216MHz to 960MHz	200µV/m @ 3m
	960MHz to 1GHz	500µV/m @ 3m
	1GHz to 100GHz	500µV/m @ 3m
	Un-restricted Bands & Harmonics	
	Harmonics	25000µV/m @ 3m
	All other Emissions	50 dBc or 15.209 Whichever is lesser attenuation @ 3m

Notes:

1 Results quoted are extrapolated as indicated
2 Emissions were searched to: (**x**) 1000MHz inclusive, as per Part 15.33a
3 Extrapolation factor 20dB per decade as per 0.3m to 3m, as per Part 15.31f
4 Measurements >26.5GHz @ 0.3m as per Part 15.31f(1)
5 Receiver detector <1GHz = CISPR, Quasi-Peak, 120kHz bandwidth
6 Receiver detector >1GHz = Average, 1MHz resolution bandwidth, Peak hold for plots
7 New batteries used for battery-powered products.
8 See Annex F for Emissions Graph(s)
9 Only Emissions Within 20dB of the limit are recorded
10 * Relates to Mixer Conversion Loss

Test Method:

1 As per Radio – Noise Emissions, ANSI C63.4: 2003
2 Measuring distances as Notes 1 to 4 above
3 EUT 0.8 metre above ground plane
4 Emissions maximised by rotation of EUT, on an automatic turntable.
Raising and lowering the receiver antenna between 1m & 4m.
Horizontal and vertical polarisations, of the receive antenna.
EUT orientation in three orthagonal planes.
Maximum results recorded.

The test equipment used for the Transmitter Spurious Emissions – Radiated – Part 15.209 tests is shown overleaf:

TYPE OF EQUIPMENT	MAKER/SUPPLIER	MODEL No	SERIAL No	TRL No	EQUIPMENT USED
HORN ANTENNA	EMCO	3115	9010 - 3580	138	**X**
HORN ANTENNA	FLANN	24240-20	124	265A	**X**
HORN ANTENNA	FLANN	20240-20	322	300	**X**
RECEIVER	R & S	ESVS 10	844594/003	352	**X**
PRE AMPLIFIER	AGILENT	8449B	3008A016	572	**X**
SPECTRUM ANALYSER	HP	8563A	3133A00894	654	**X**
BILOG ANTENNA	YORK	CBL611/A	1618	UH191	**X**
SPECTRUM ANALYSER	R & S	FSU	200034	UH281	**X**
HARMONIC MIXER 33 -50 GHz	AGILENT	11970Q	MY30030406	UH365	**X**
HARMONIC MIXER 50 – 75 GHz	AGILENT	11970V	MY30030198	UH366	**X**
HARMONIC MIXER 75 – 110 GHz	AGILENT	11970W	MY25210349	UH367	**X**
HORN ANTENNA 33 – 50 GHz	FLANN	23240-20	83	264A	**X**
HORN ANTENNA 50 – 75 GHz	FLANN	25240-20	167771	UH386	**X**
HORN ANTENNA 75 – 110 GHz	FLANN	27240-20	164857	UH369	**X**

TRANSMITTER TESTS

TRANSMITTER INTENTIONAL EMISSION – RADIATED – Part 15.245 July 2008

Ambient temperature	=	23^{o}C(<1GHz),	3m measurements @ fc	[X]
Relative humidity	=	37%(<1GHz),	10m measurements @ fc	[ ]
Conditions	=	Semi-Anechoic Chamber	30m measurements @ fc	[ ]
Supply voltage	=	+12Vdc	30m extrapolated from 3m	[ ]
Channel number	=	1	30m extrapolated from 10m	[ ]

FREQ. (GHz)	**MEAS READING (dBµV)**	**CABLE LOSS (dB)**	**ANT FACTOR (dB/m)**	**PRE AMP (dB)**	**FIELD ST'GH (dBµV/m)**	**EXTRAP FACTOR (dB)**	**FIELD ST'GH (mV/m)**
24.111186	109.6	4.70	37.5	33.8	118.00	-	794.33

Limit value @ fc	**2,500 (mV/m)**	
Band occupancy @ -20 dBc	**f lower**	**f higher**
	24.109198718 GHz	24.112884615 GHz

See spectrum analyser plot – Annex E

Notes:
1 Results quoted are extrapolated as indicated
2 Receiver detector @ fc = Average 1MHz bandwidth
3 When battery powered the EUT was powered with new batteries

Test Method:
1 As per Radio – Noise Emissions, ANSI C63.4: 2003
2 Measuring distances 3m
3 EUT 0.8 metre above ground plane
4 Emissions maximised by rotation of EUT.
Raising and lowering the receiver antenna between 1m & 4m.
Horizontal and vertical polarisations, of the receive antenna.
EUT orientation in three orthagonal planes.
Maximum results recorded

The test equipment used for the Transmitter Intentional Emission – Radiated – Part 15.245 July 2008 tests is shown below:

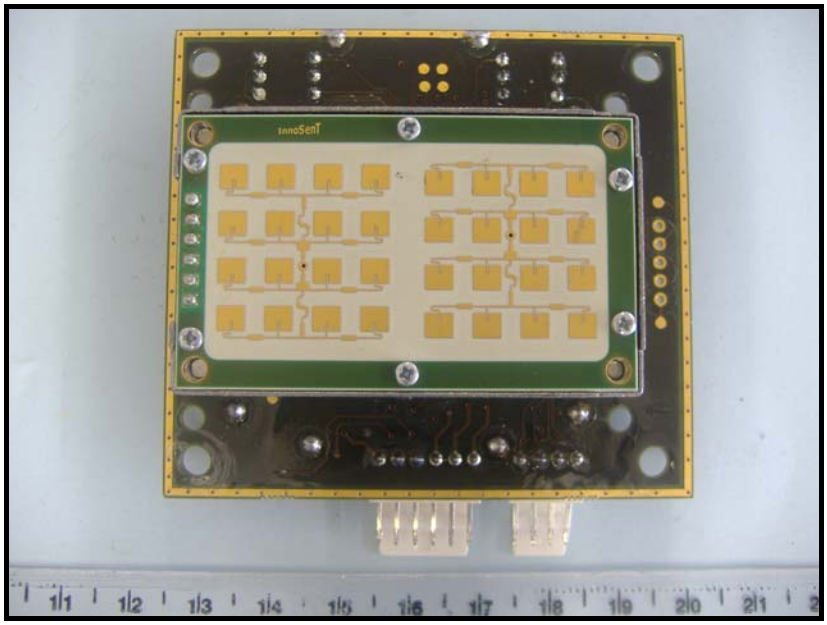
TYPE OF EQUIPMENT	MAKER/SUPPLIER	MODEL No	SERIAL No	TRL No	EQUIPMENT USED
HORN ANTENNA	FLANN	20240-20	322	300	**X**
PRE AMPLIFIER	AGILENT	8449B	3008A016	572	**X**
SPECTRUM ANALYSER	R & S	FSU	200034	UH281	**X**

ANNEX A

PHOTOGRAPHS

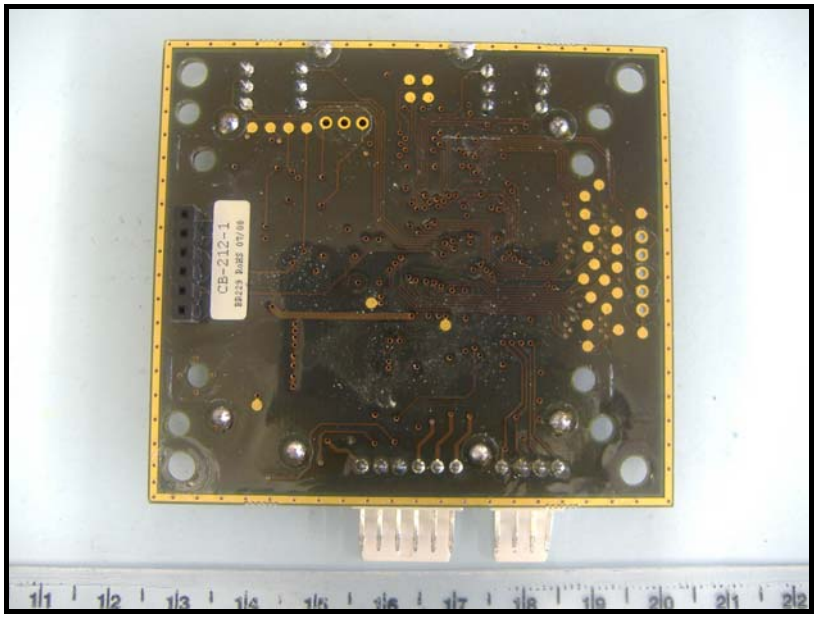
PHOTOGRAPH No. 1 **TEST SETUP**

PHOTOGRAPH No. 2 **TOP OVERVIEW**

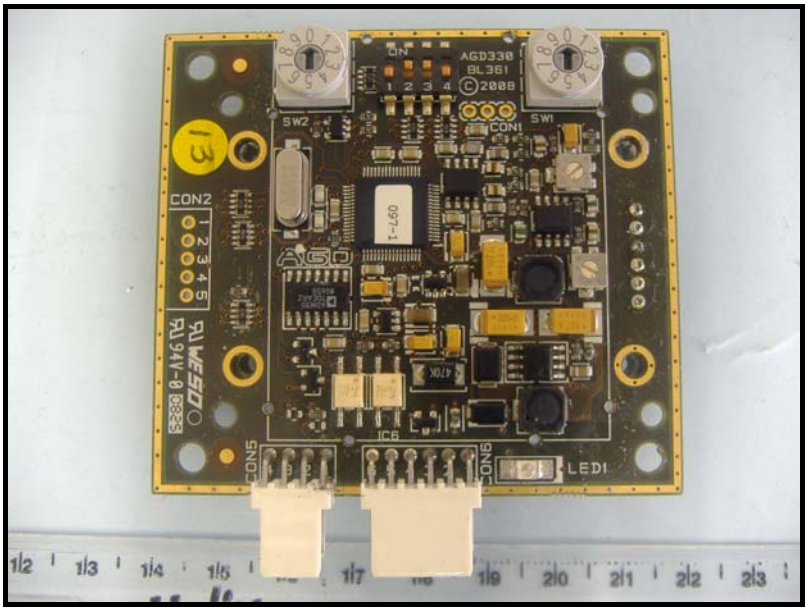


PHOTOGRAPH No. 3 **BOTTOM OVERVIEW**

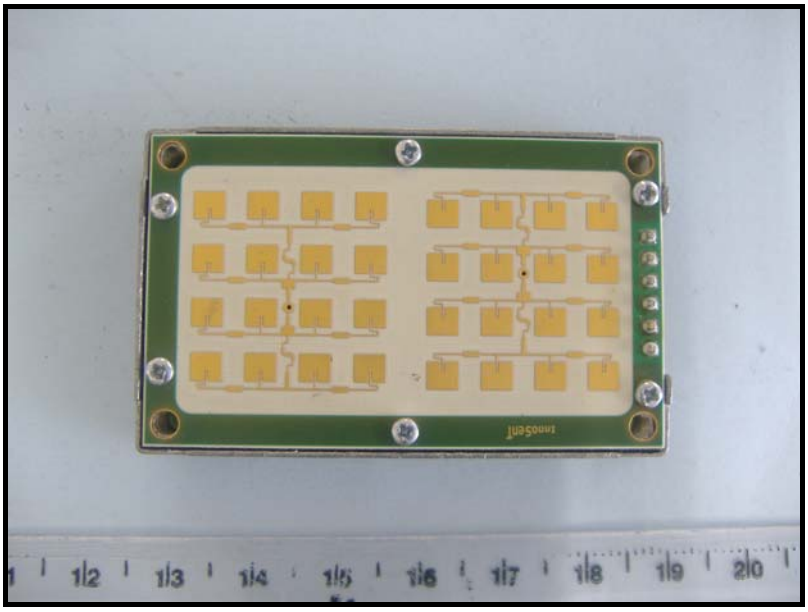
PHOTOGRAPH No. 4 **TOP OVERVIEW RF MODULE REMOVED**



PHOTOGRAPH No. 5 **BOTTOM OVERVIEW CAN REMOVED**



PHOTOGRAPH No. 6 **RF MODULE ANTENNA SIDE**



PHOTOGRAPH No. 7 **RF MODULE REAR SIDE**

ANNEX B

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

a.	TCB	-	APPLICATION	[X]
		-	FEE	[X]
b.	AGENT'S LETTER OF AUTHORISATION	-		[X]
c.	MODEL(s) vs IDENTITY	-		[X]
d.	ALTERNATIVE TRADE NAME DECLARATION(s)	-		[ ]
e.	LABELLING	-	PHOTOGRAPHS	[X]
		-	DECLARATION	[ ]
		-	DRAWINGS	[ ]
f.	TECHNICAL DESCRIPTION	-		[X]
g.	BLOCK DIAGRAMS	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
h.	CIRCUIT DIAGRAMS	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
i.	COMPONENT LOCATION	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
j.	PCB TRACK LAYOUT	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
k.	BILL OF MATERIALS	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	AUX	[ ]
l.	USER INSTALLATION / OPERATING INSTRUCTIONS	-		[X]

ANNEX C

MEASUREMENT UNCERTAINTY

Radio Testing – General Uncertainty Schedule

All statements of uncertainty are expanded standard uncertainty using a coverage factor of 1.96 to give a 95% confidence where no required test level exists.

[1] Adjacent Channel Power

Uncertainty in test result = **1.86dB**

[2] Carrier Power

Uncertainty in test result (Equipment - TRLUH120) = **2.18dB**
Uncertainty in test result (Equipment – TRL05) = **1.08dB**
Uncertainty in test result (Equipment – TRL479) = **2.48dB**

[3] Effective Radiated Power

Uncertainty in test result = **4.71dB**

[4] Spurious Emissions

Uncertainty in test result = **4.75dB**

[5] Maximum frequency error

Uncertainty in test result (Equipment - TRLUH120) = **119ppm**
Uncertainty in test result (Equipment – TRL05) = **0.113ppm**
Uncertainty in test result (Equipment – TRL479) = **0.265ppm**

[6] Radiated Emissions, field strength OATS 14kHz-18GHz Electric Field

Uncertainty in test result (14kHz – 30MHz) = **4.8dB**, Uncertainty in test result (30MHz – 1GHz) = **4.6dB**, Uncertainty in test result (1GHz-18GHz) = **4.7dB**

[7] Frequency deviation

Uncertainty in test result = **3.2%**

[8] Magnetic Field Emissions

Uncertainty in test result = **2.3dB**

[9] Conducted Spurious

Uncertainty in test result (Equipment TRL479) Up to 8.1GHz = **3.31dB**
Uncertainty in test result (Equipment TRL479) 8.1GHz – 15.3GHz = **4.43dB**
Uncertainty in test result (Equipment TRL479) 15.3GHz – 21GHz = **5.34dB**
Uncertainty in test result (Equipment TRLUH120) Up to 26GHz = **3.14dB**

[10] Channel Bandwidth

Uncertainty in test result = **15.5%**

[11] Amplitude and Time Measurement – Oscilloscope

Uncertainty in overall test level = **2.1dB**, Uncertainty in time measurement = **0.59%,** Uncertainty in Amplitude measurement = **0.82%**

[11] Power Line Conduction

Uncertainty in test result = **3.4dB**

[12] Spectrum Mask Measurements

Uncertainty in test result = **2.59% (frequency)**
Uncertainty in test result = **1.32dB (amplitude)**

[13] Adjacent Sub Band Selectivity

Uncertainty in test result = **1.24dB**

[14] Receiver Blocking – Listen Mode, Radiated

Uncertainty in test result = **3.42dB**

[15] Receiver Blocking – Talk Mode, Radiated

Uncertainty in test result = **3.36dB**

[16] Receiver Blocking – Talk Mode, Conducted

Uncertainty in test result = **1.24dB**

[17] Receiver Threshold

Uncertainty in test result = **3.23dB**

[18] Transmission Time Measurement

Uncertainty in test result = **7.98%**

ANNEX D

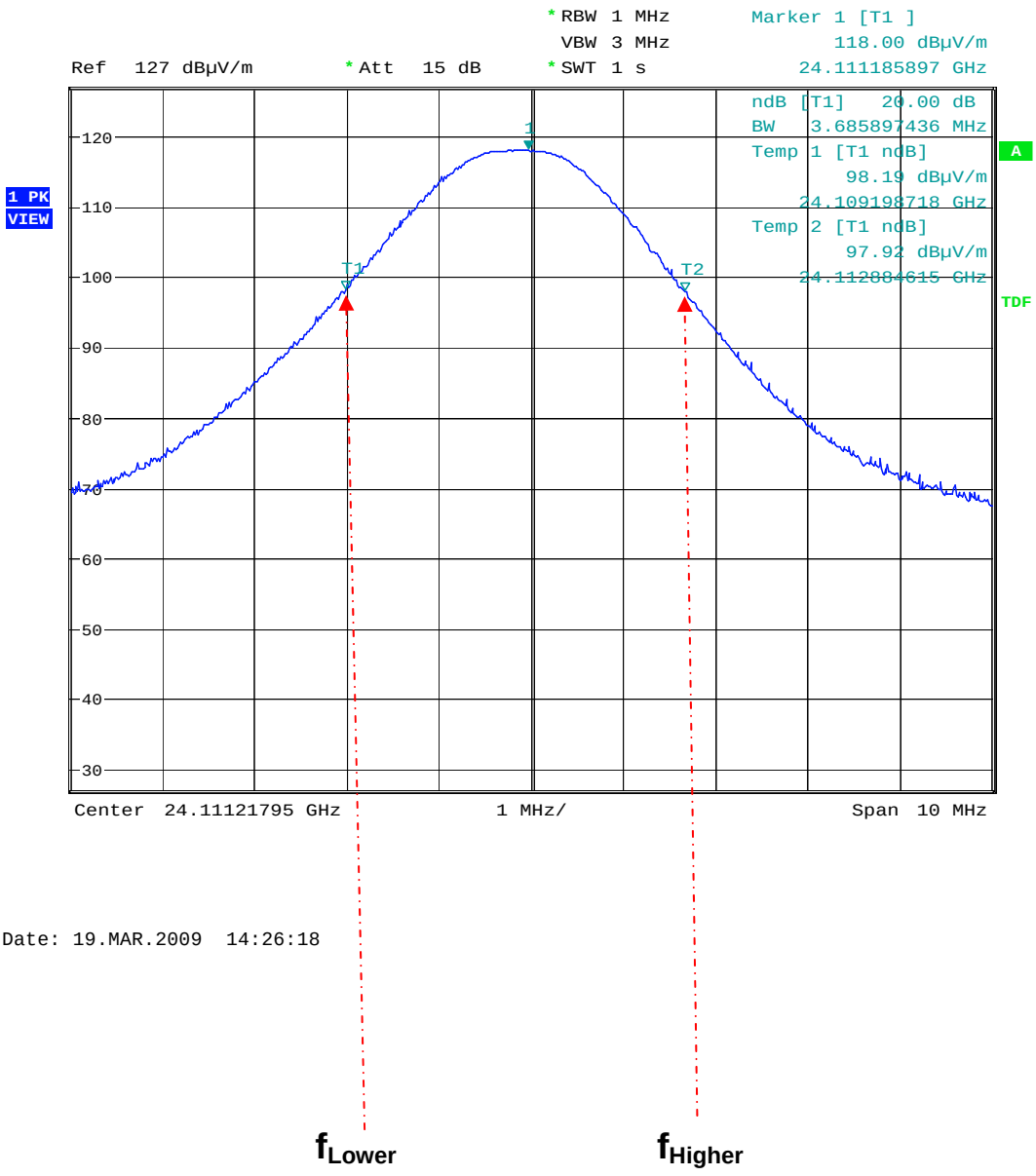
TEST EQUIPMENT CALIBRATION

TRL Number	Equipment Type	Manufacturer	Last Cal Calibration	Calibration Period	Due For Calibration
UH06/07	IC OATS Submission	TRaC	01/06/2007	24	01/06/2009
UH191	Bilog Antenna	York	01/10/2008	12	01/10/2009
UH281	Spectrum Analyser	R&S	28/10/2008	12	28/10/2009
UH330	K type transition	Maury M'wave	13/06/2008	24	13/06/2010
UH340	Signal Generator	HP	06/05/2008	12	06/05/2009
UH365	Harmonic Mixer 33-50GHz	Agilent	16/07/2008	24	16/07/2010
UH366	Harmonic Mixer 50-75GHz	Agilent	21/07/2008	24	21/07/2010
UH367	Harmonic Mixer 75-110GHz	Agilent	02/07/2008	24	02/07/2010
UH368	Horn 50 –75 GHz	Flann			
UH369	Horn 75 –110 GHz	Flann			
L005	CMTA	R&S	29/10/2008	12	29/10/2009
L007	Loop Antenna	R&S	22/05/2007	24	22/05/2009
L138	1-18GHz Horn	EMCO	23/05/2007	24	23/05/2009
L139	1-18GHz Horn	EMCO	23/05/2007	24	23/05/2009
L176	Signal Generator	Marconi	06/05/2008	12	06/05/2009
L193	Bicone Antenna	Chase	06/05/2008	24	06/05/2010
L203	Log Periodic Ant	Chase	06/05/2008	24	06/05/2010
L263/A	Horn 18-26GHz	Flann	13/06/2008	24	13/06/2010
L264/A	Horn 33-50GHz	Flann			
L300	Horn 18-26GHz	Flann	12/06/2008	24	12/06/2010
L309	SMA Transition	Flann	13/06/2008	24	13/06/2010
L352	Receiver	R&S	09/12/2008	12	09/12/2009
L426	Temperature Indicator	Fluke	21/01/2009	12	21/01/2010
L479	Analyser	Anritsu	22/09/2008	12	22/09/2009
L572	Pre Amp	Agilent	04/07/2008	12	04/07/2009
L654	Spectrum Analyser	HP	01/07/2008	12	01/07/2009

ANNEX E

BANDWIDTH PLOT

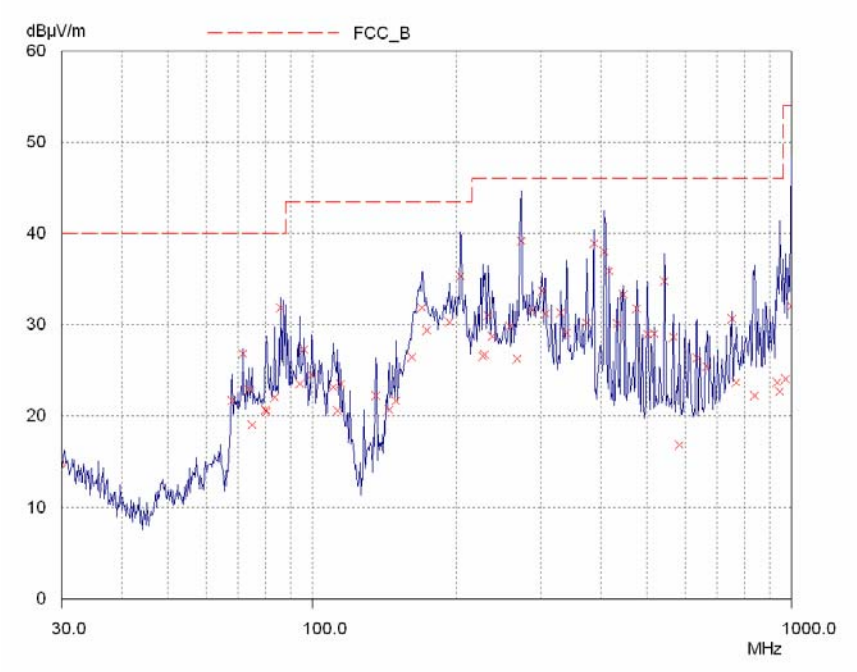
BANDWIDTH PLOT



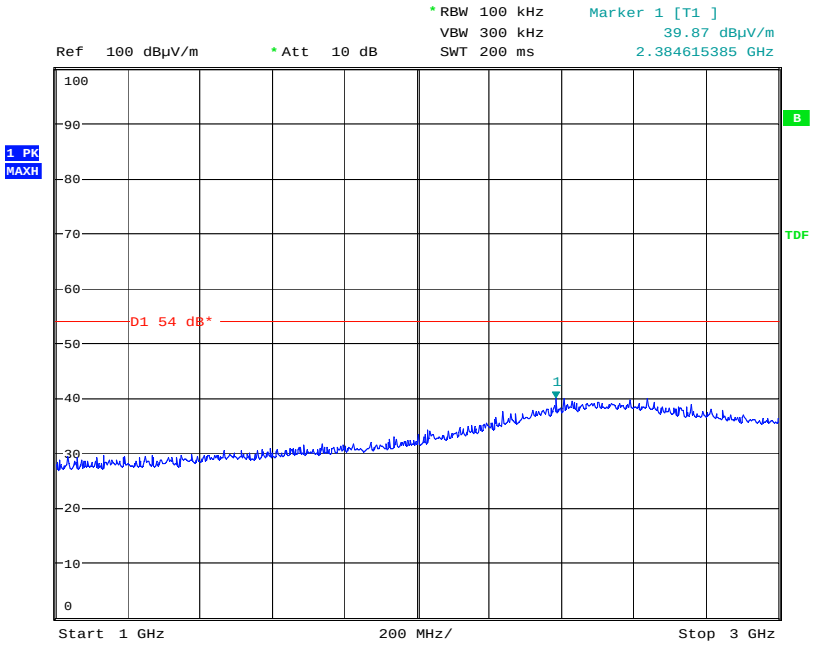
f_{Lower}	=	24.109198718 GHz
f_{Higher}	=	24.112884615 GHz
Occupied Bandwidth	=	3.68589 MHz

ANNEX F

EMISSIONS GRAPH(s)

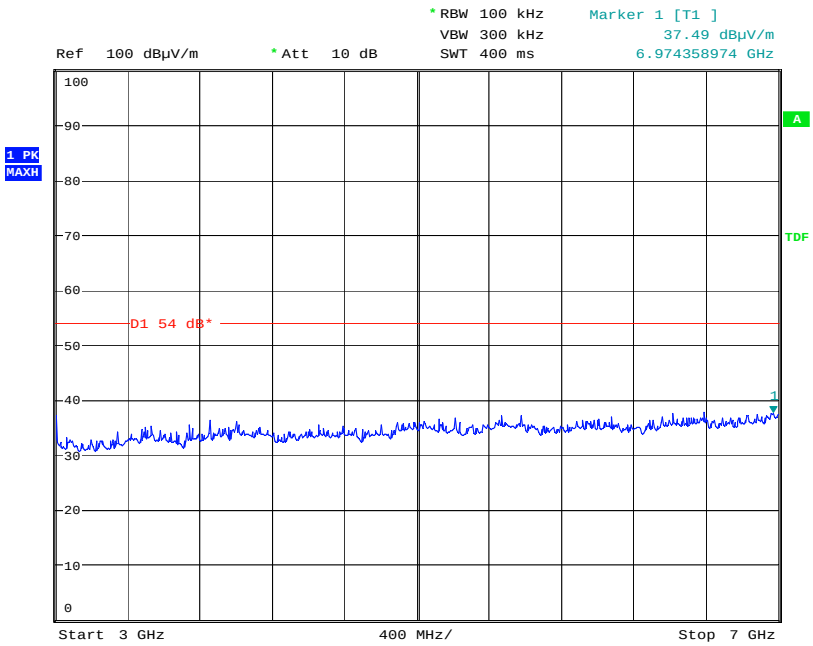


30 MHz – 1 GHz



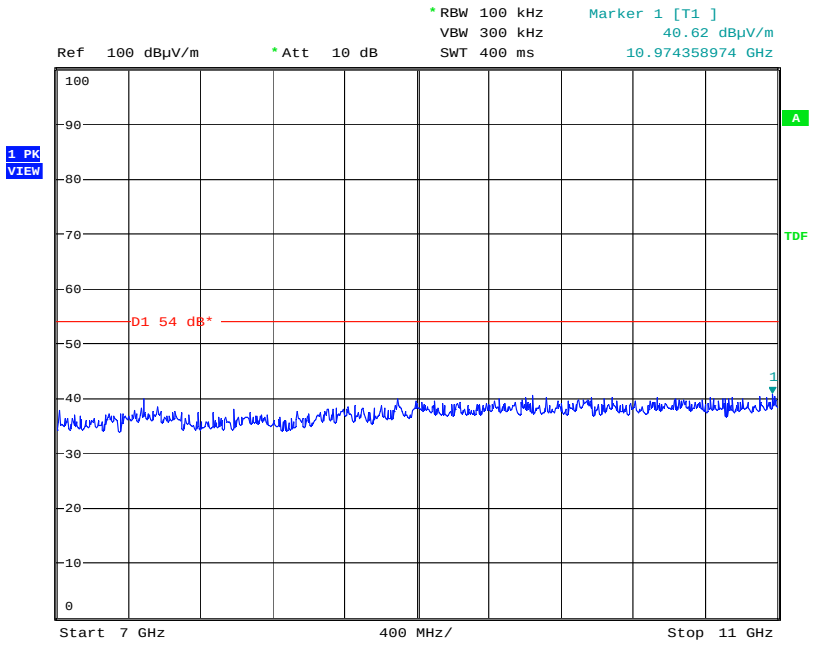
Date: 6.APR.2009 11:12:04

1 GHz – 3 GHz



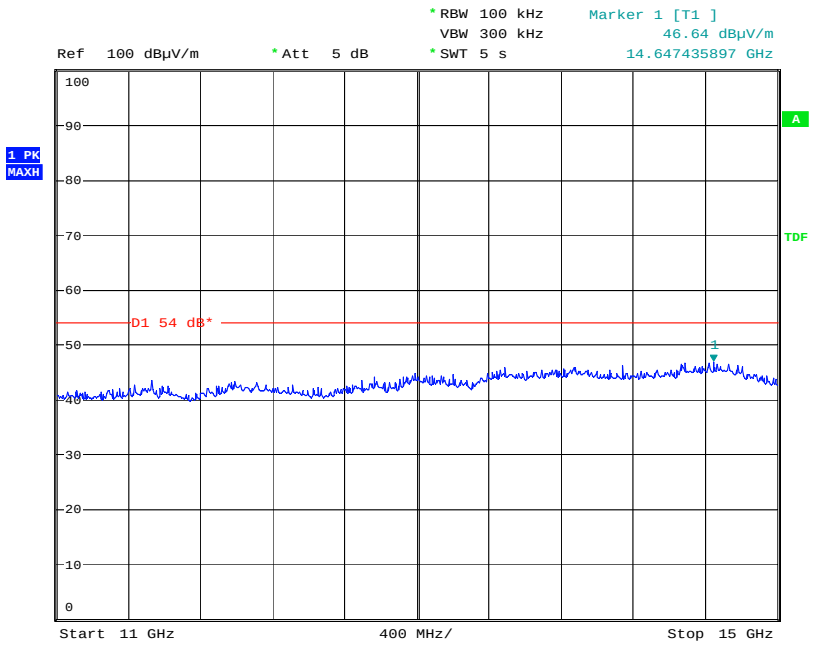
Date: 19.MAR.2009 14:48:21

3 GHz – 7 GHz



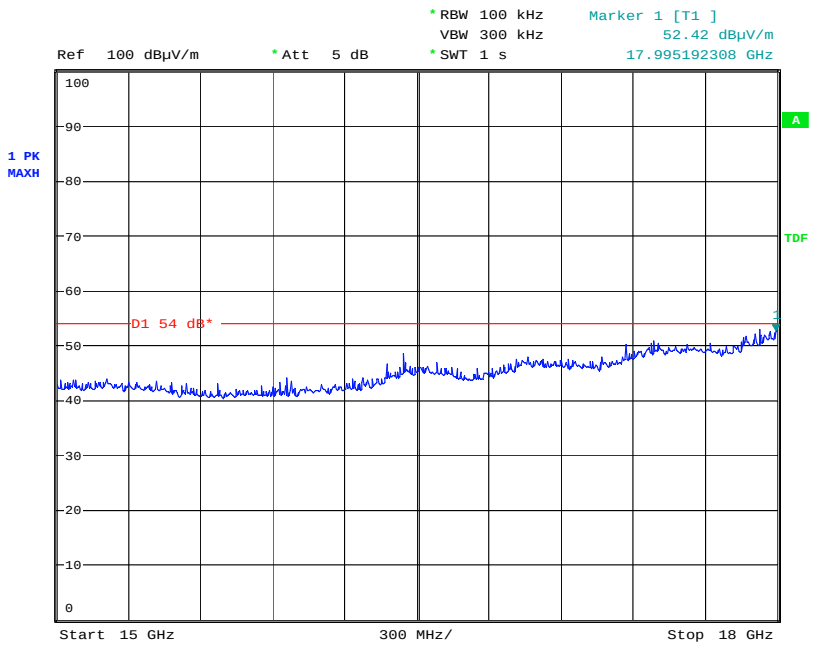
Date: 19.MAR.2009 14:49:06

7 GHz – 11 GHz



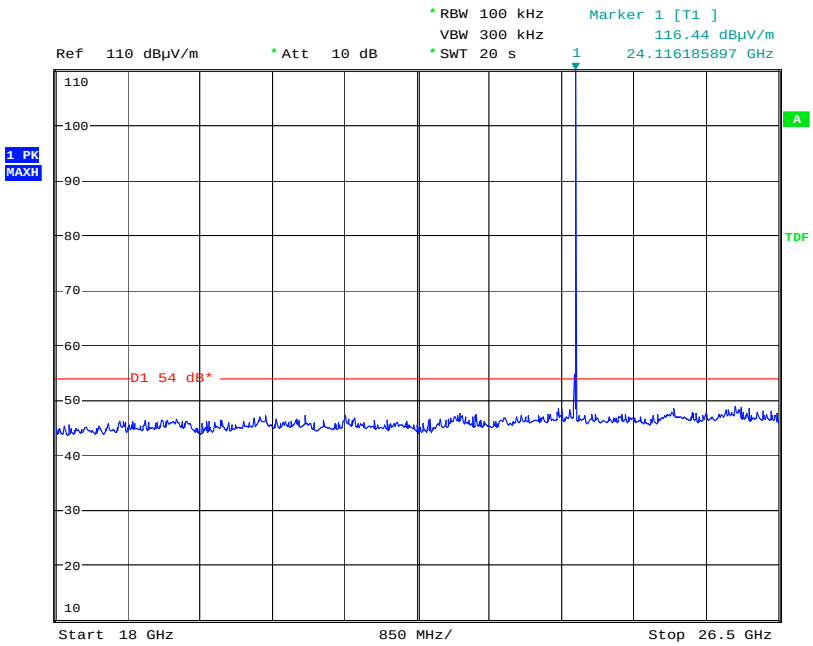
Date: 19.MAR.2009 14:50:31

11 GHz – 15 GHz



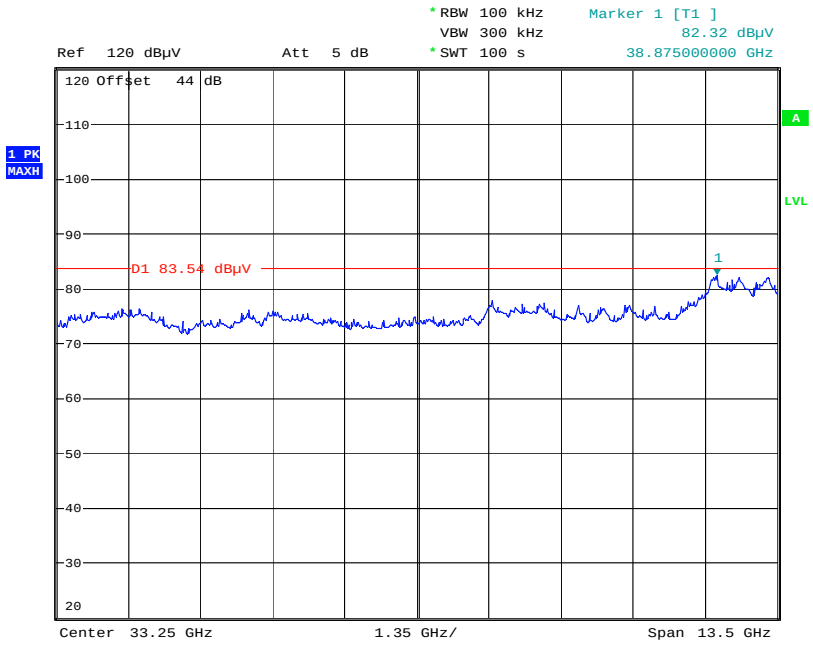
Date: 19.MAR.2009 14:51:26

15 GHz – 18 GHz



Date: 19.MAR.2009 14:40:01

18 GHz – 26.5 GHz



Date: 20.MAR.2009 11:07:10

26.5 GHz – 40 GHz