



CURTIS-STRAUS

Test Report

Report No I0406-1

Client Thing Magic LLC
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Cambridge, MA 02142

Phone 617-862-3787
Fax 617-225-4410
FRN 0008403743

Model Tool Link RFID Reader

FCC ID QV5SR5E
IC ID 5407A-SR5E

Equipment Type Spread Spectrum Transmitter
Equipment Code DSS
Emission Designator 66K9A7D

Results As detailed within this report

Prepared by 
Tuyen Truong – Test Engineer

Authorized by 
Michael Buchholz – EMC Manager

Issue Date 8/1/08

Conditions of Issue This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 32 of this report.

Curtis-Straus LLC is accredited to ISO/IEC 17025 by A2LA for the specific scope of accreditation under Certificate Number 1627-01. This report may contain data which is not covered by the A2LA accreditation. See our scope of accreditation at the end of this test report. Any opinions or interpretations expressed in this report are outside the scope of our A2LA accreditation as A2LA only accredits testing.



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Form Final Report REV 10-16-07 (DW)



Summary

This test report supports an application for certification of a transmitter operating pursuant to 47 CFR 15.247 and RSS210 Issue 7. The product is the Thing Magic Tool Link RFID reader. It is a frequency hopper that operates in the range 902-928MHz. It utilizes a hopping table of 50 channels between channel 0 (902.75MHz) and channel 49 (927.25MHz) inclusively.

Radio module used in the Tool Link RFID reader is M5e which has FCC ID **QV5MERCURY5E**. For this configuration, the M5e radio module has two antenna ports, one port connects directly to RP-TNC and second port goes through a RF switch that switches between two new antenna ports.

Conducted emissions tests were not performed as the product is intended to operate within the vehicular environment.

Test Methodology

Testing is performed according to the procedures specified in ANSI C63.4 (2003) and public notice DA 00-705 "*Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems*" was followed for testing as well.

Frequency range investigated: 30MHz – 10GHz

Measurement distance for Radiated Emissions: 3m

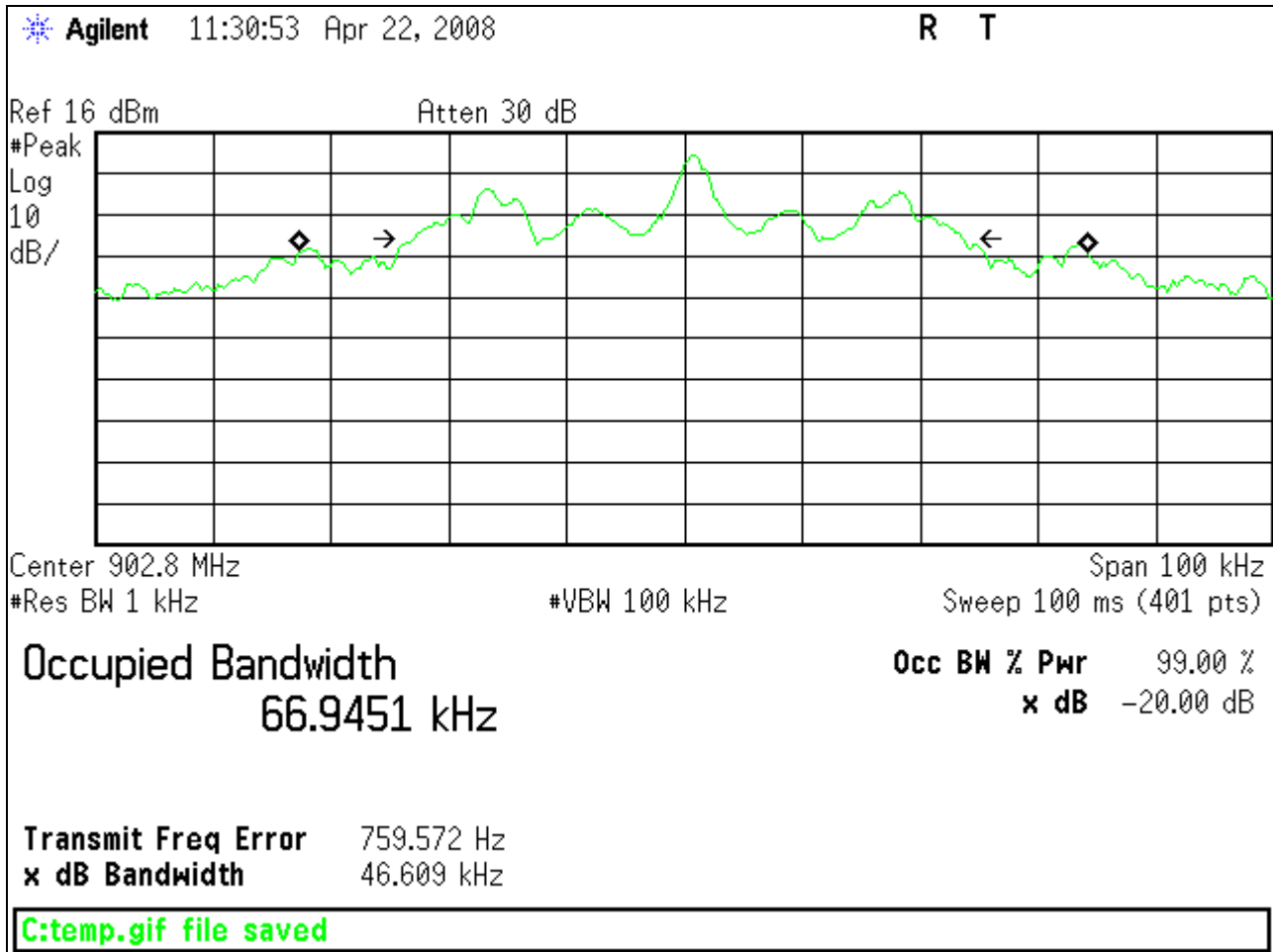
EUT Configuration

EUT Configuration									
Work Order: I0406 Company: Thing Magic LLC Company Address: 1 Broadway 5th Floor Cambridge, MA 02142 Contact: Paul Franzosa Person Present: Kapil Asher						Date: 21-Apr-08 Engineer: Tuyen Truong			
			MN		SN				
EUT:			--		--				
RFID Module			Tool Link RFID Reader		Prototype 2				
MTI Wireless Edge Antenna			MT-262024/TLH/A		00111				
EUT Description: Tool Link RFID Reader EUT Max Frequency: 927MHz									
Support Equipment:			MN		SN				
Toshiba Laptop			1805S204		Y1019065PU				
GW Instek Programmable PS			PST - 3202		EG181424				
					Max				
EUT Ports:	Cable Type	Qty	Populated	Shielded	Ferrites	Length	Length	Unpopulated Reason	Comment
DC Power	2-wire Conductor	1	Yes	No	No	6 Meter	--	--	--
Serial	DB9 RS232	1	Yes	Yes	No	6 Meter	--	--	--
Port 1	Coaxial	1	Yes	Yes	No	10 feet	10 feet	--	--
Port 2 (redundant of Port 1)	NA	1	Yes	NA	NA	NA	NA	--	50 Ohm terminator
Port 3	NA	1	Yes	NA	NA	NA	NA	--	50 Ohm terminator
Software / Operating Mode Description:									
Embedded RFID Module emits a transmission every 2.5 seconds, LOG.vi software documents the transmission.									

20dB Bandwidth

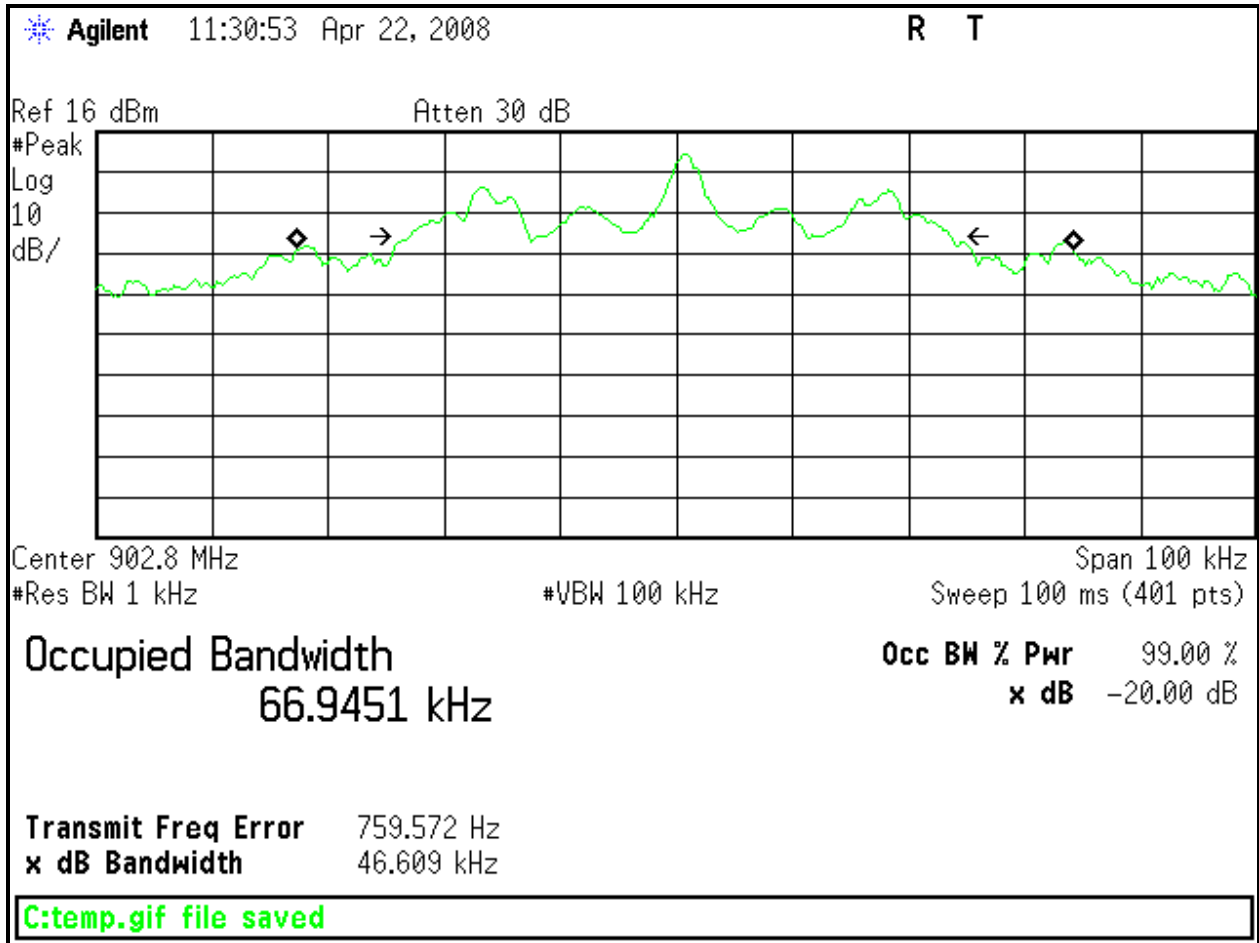
The 20dB bandwidth measured was 46.609 KHz. This value was used as the limit for the channel separation requirement.

Analyzer Plot



20dB Bandwidth

99% Occupied Bandwidth



Channel Separation

REQUIREMENT

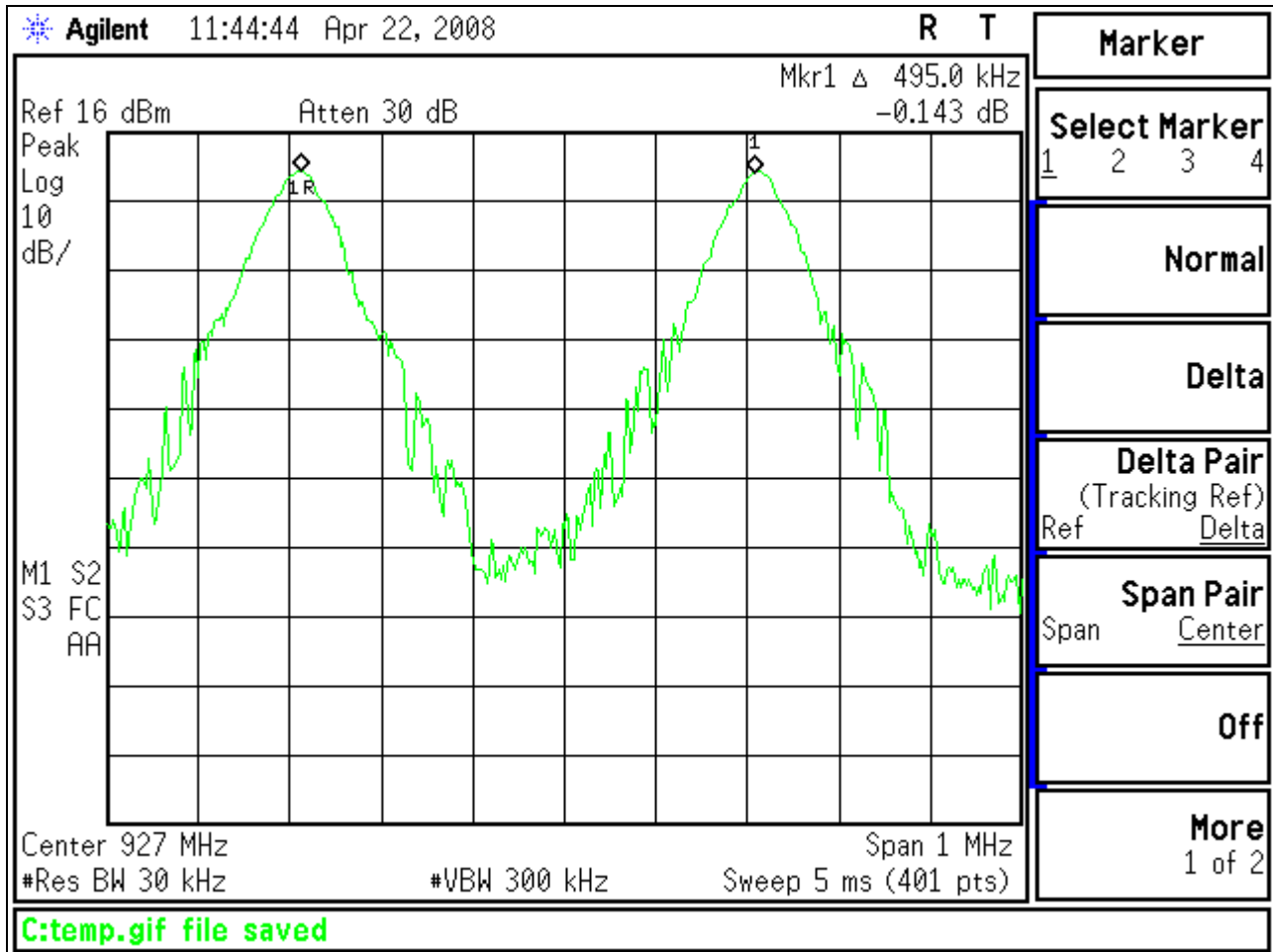
“Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.”
 [15.247(a)(1)]

20dB bandwidth = 46.609 KHz.

MEASUREMENT

Channel separation = 495.0 KHz.

ANALYZER PLOT



Channel Separation

Number of Hopping Frequencies

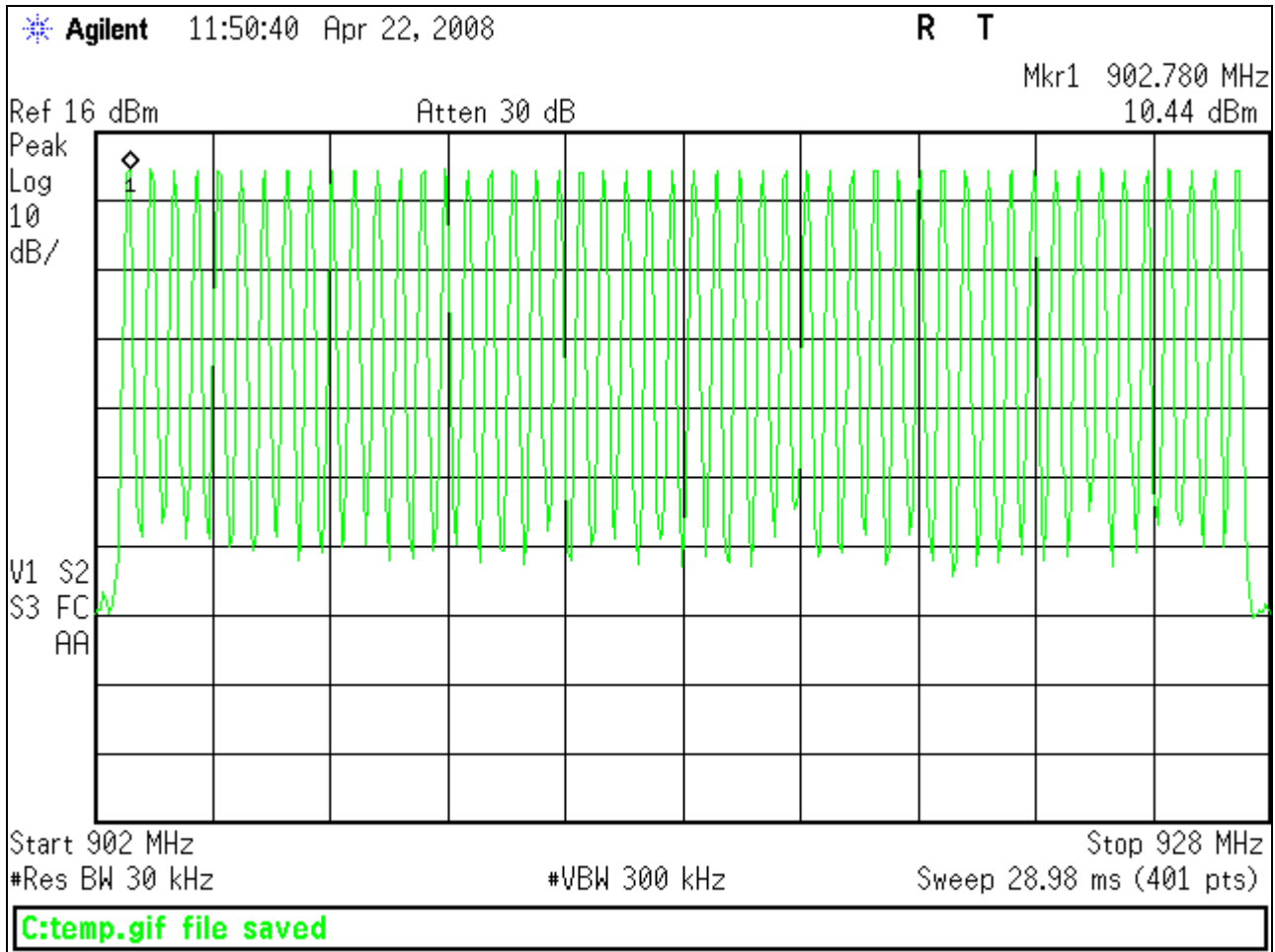
REQUIREMENT

“Frequency hopping systems in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies... ”
[15.247(a) (1) (i)]

MEASUREMENT

Number of Hopping Frequencies = 50

ANALYZER PLOTS



50 Channel Hopping Frequencies from 902 - 928 MHz

Time of Occupancy (Dwell Time)**REQUIREMENT**

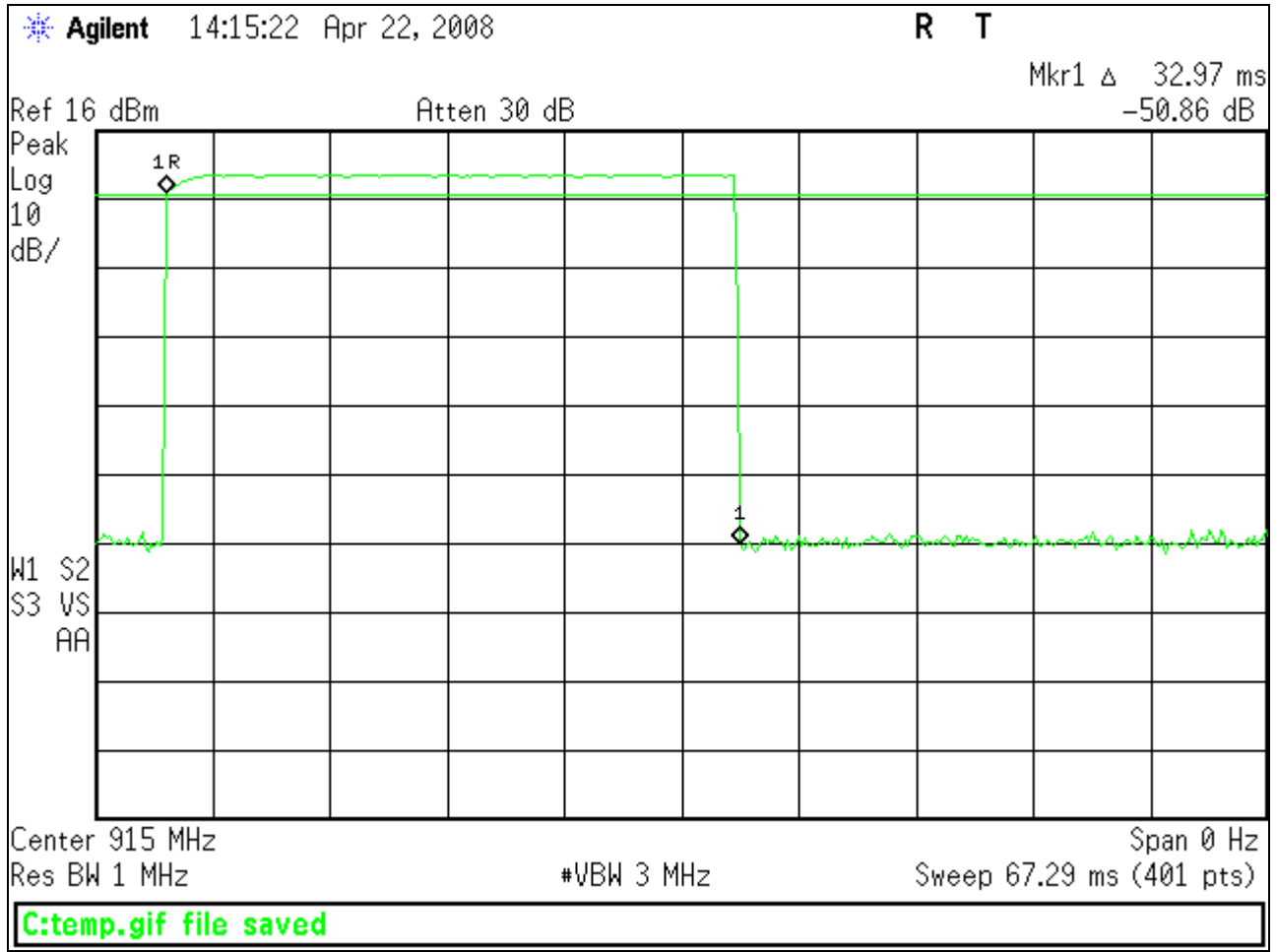
“...the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 20 second period.” [15.247(a)(1)(i)]

MEASUREMENTS

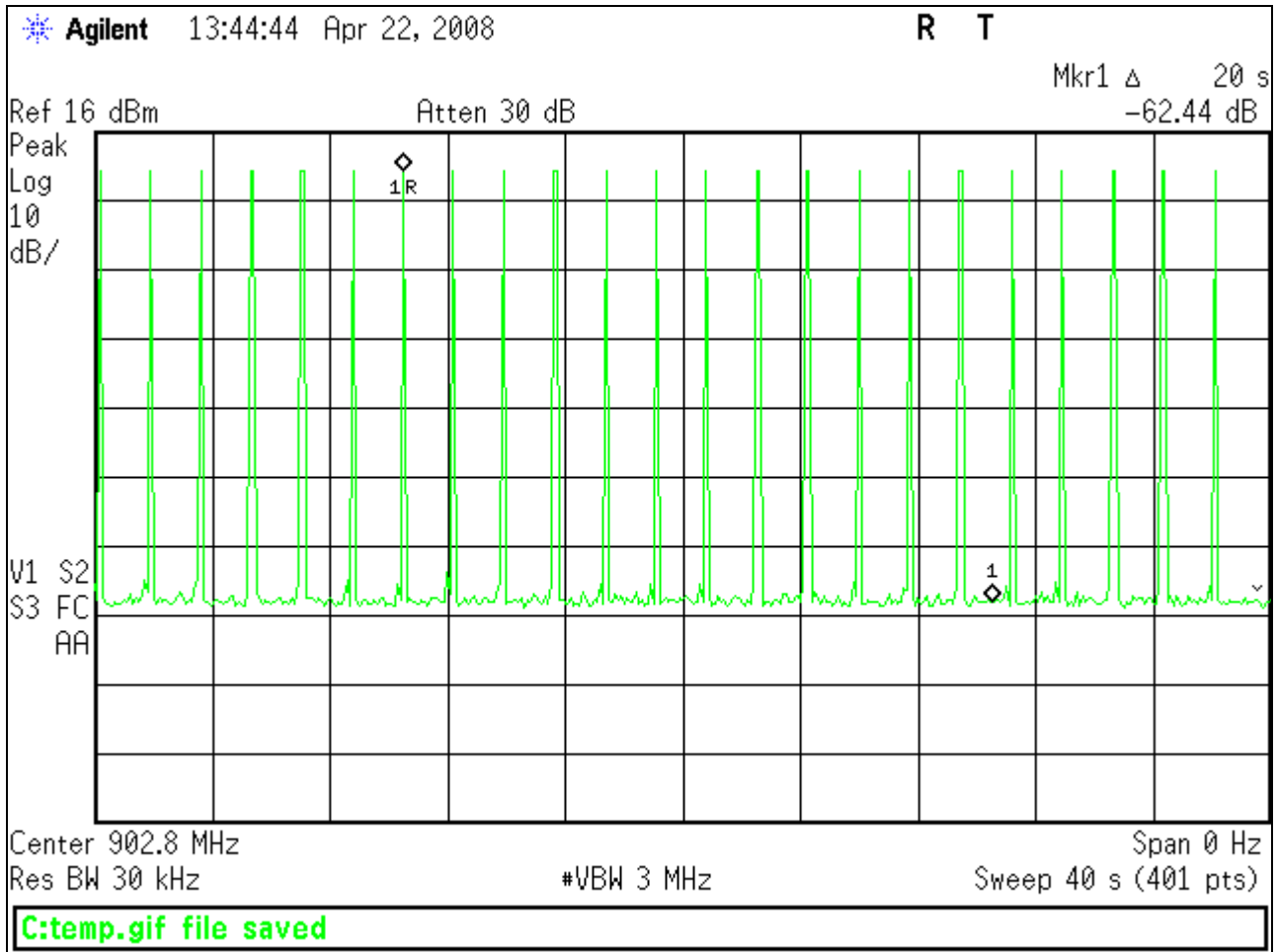
Individual dwell time = 32.97 milliseconds

Average time of occupancy in one 20 second period = 0.39564 seconds.

ANALYZER PLOTS



Time of Occupancy (Dwell Time)



Number of Times Hoped To Any Channel in One 20s Period

The average time of occupancy in one 20-second period is calculated below:

Sample Calculation:

Single channel ON time = 0.03297 seconds
 Number of Times Hoped to Any Channel in One 20 second Period = 12 times
 Average Time of Occupancy during the 20 second period = 0.03297 * 12 = 0.39564sec

Peak Output Power

LIMIT

“The maximum peak output power of...systems operating in the 902-928 MHz band: 1 Watt for systems employing at least 50 hopping channels.” [15.247(b)(2)]

MEASUREMENT

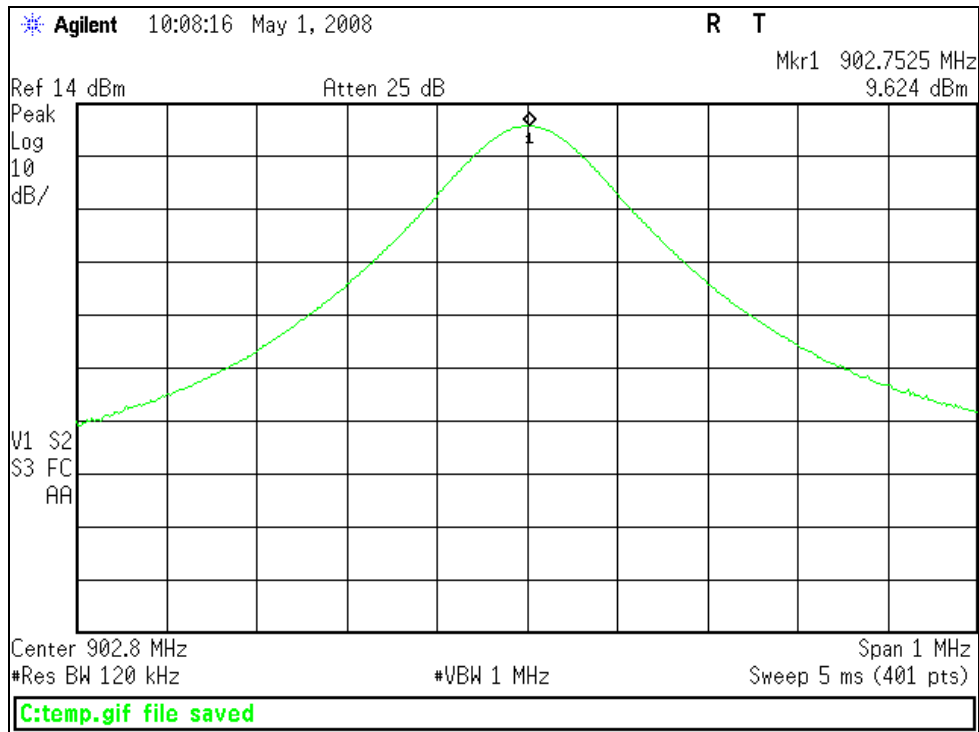
Peak Conducted Power						Curtis-Straus LLC	
Date: 01-May-08		Company: Thing Magic, LLC			Work Order: I0406		
Engineer: Tuyen Truong		EUT Desc: Tool Link			EUT's power setting is 31.5 dBm		
EUT's Port	Freq (MHz)	Reading (dBm)	Attn (dB)	Adjusted reading (dBm)	Limit (dBm)	Result (Pass/Fail)	
-	-	-	-	-	-	-	
3	902.75	9.624	19.45	29.074	30	Pass	
3	915	9.471	19.45	28.921	30	Pass	
3	927.25	9.413	19.45	28.863	30	Pass	
1	902.75	10.28	19.45	29.73	30	Pass	
1	915	10.31	19.45	29.76	30	Pass	
1	927.25	10.47	19.45	29.92	30	Pass	
SA: Brown		Test Site: EMC4			External Attn Pad: 19.45dB		

Note: Peak Detector was used unless otherwise stated.

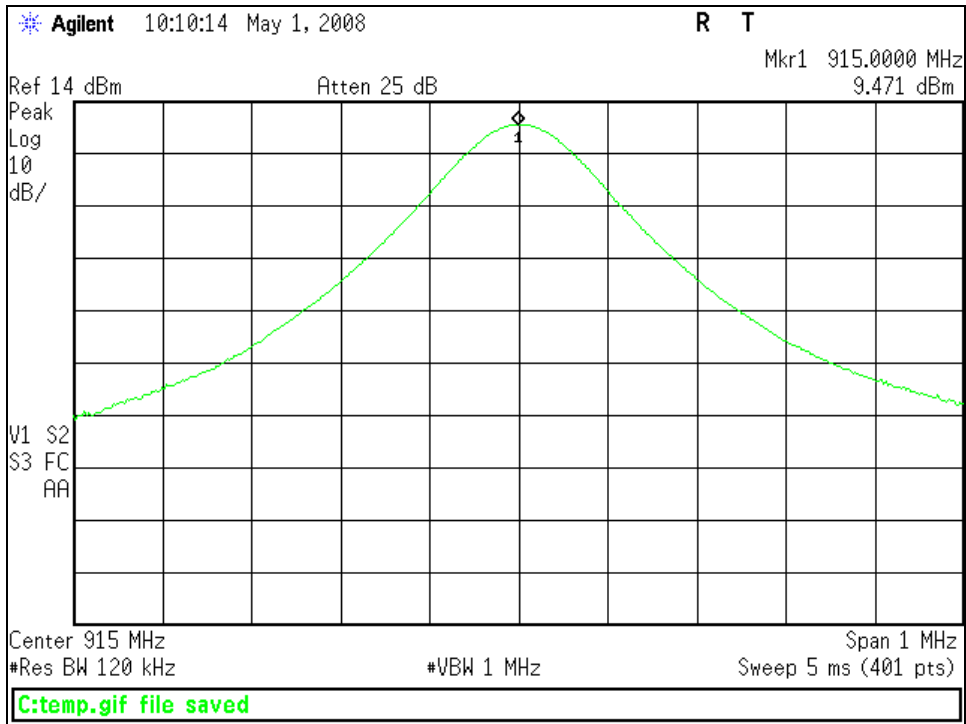
Sample Calculation: Adjusted Reading = Reading + Attenuation Factor

SAMPLE ANALYZER PLOTS

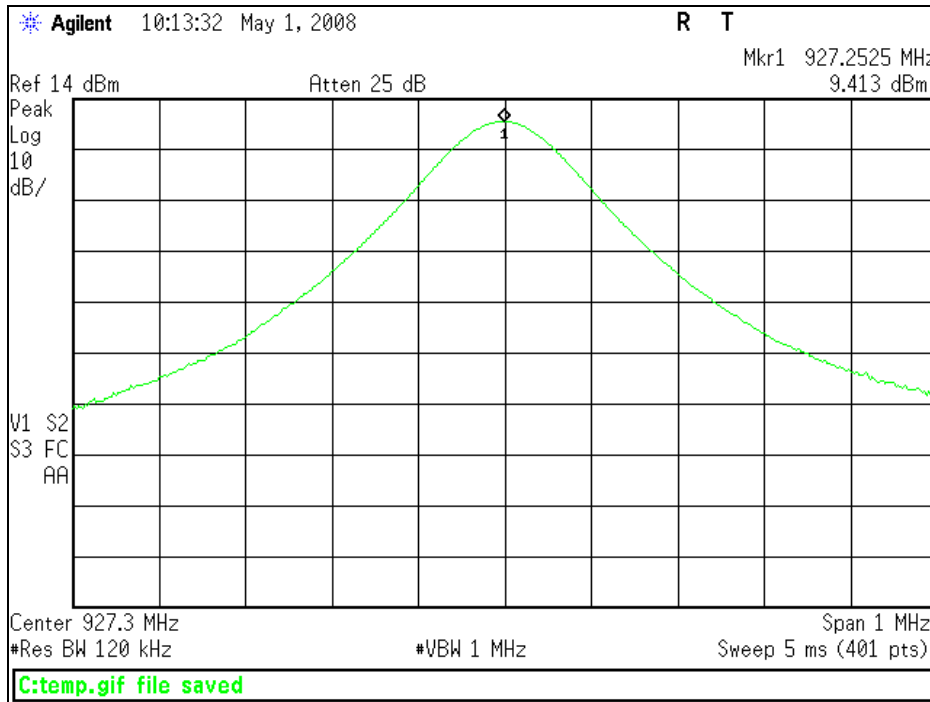
Port 3:



Peak Output Power @ 902.75 MHz

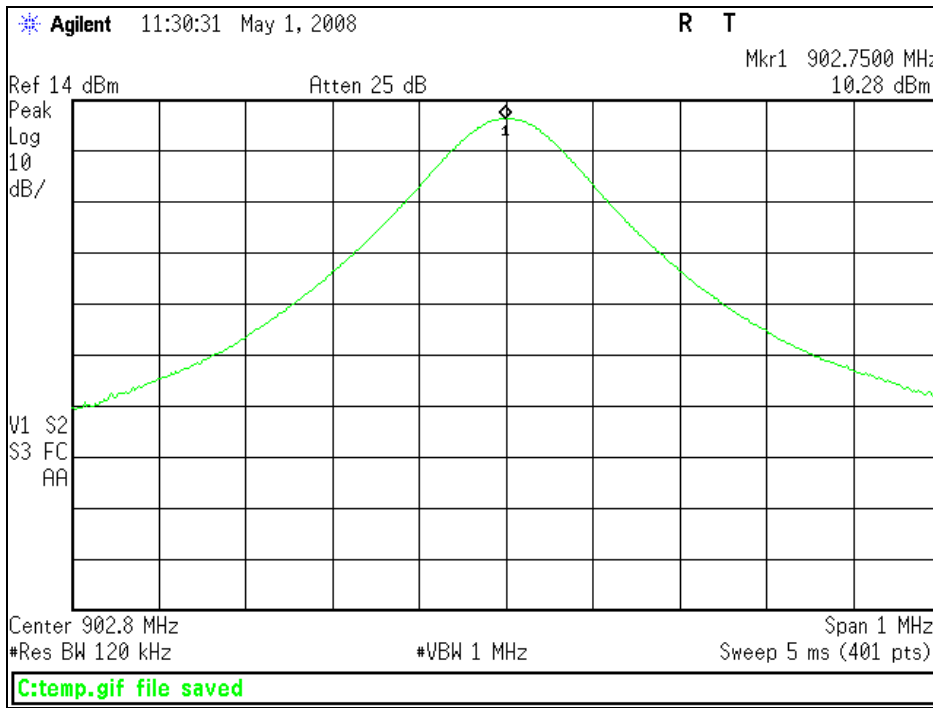


Peak Output Power @ 915.25 MHz

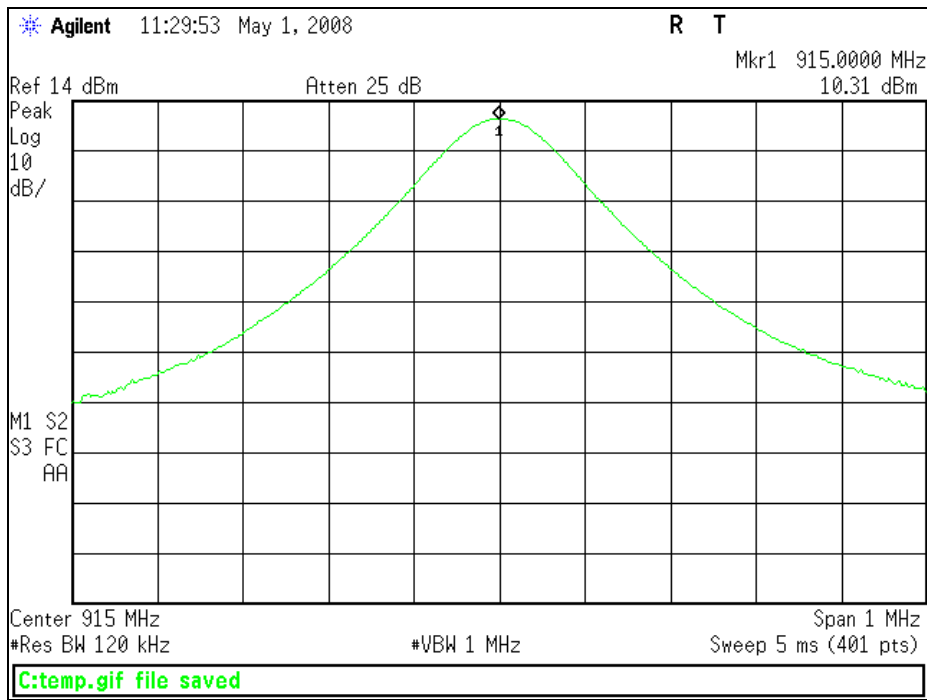


Peak Output Power @ 927.25 MHz

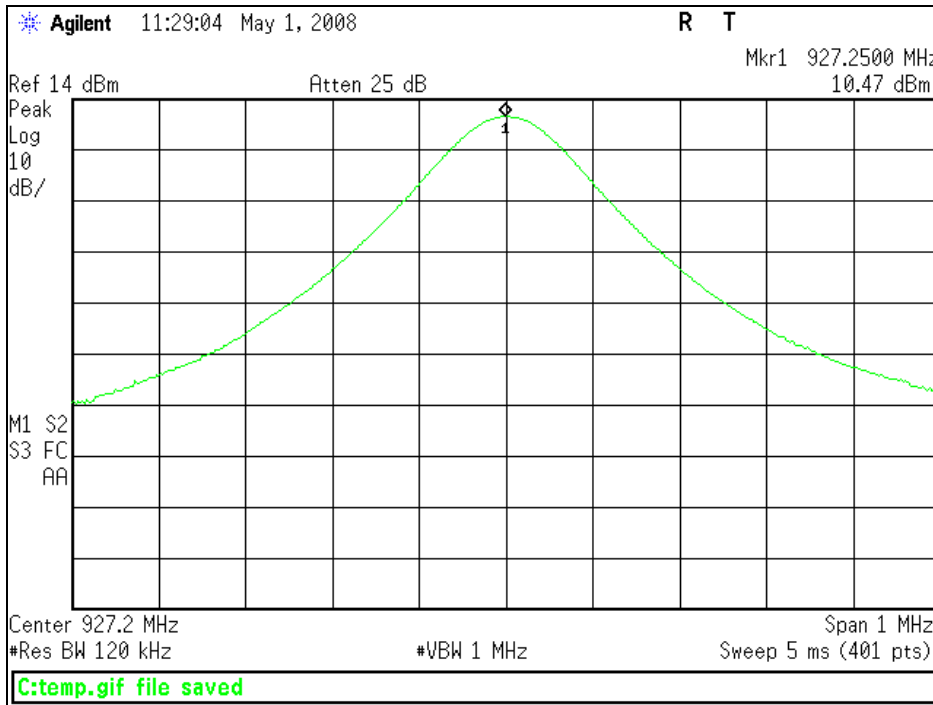
Port 1:



Peak Output Power @ 902.75 MHz



Peak Output Power @ 915 MHz



Peak Output Power @ 927.25 MHz

Radiated Spurious Emissions

LIMITS

“...radiated emissions which fall in the restricted bands, as defined in §15.209(a), must also comply with the radiated emission limits specified in §15.209(a)” [15.247(d)]

MEASUREMENTS

Port 1:

Radiated Emissions Table							Curtis-Straus LLC				
Date: 21-Apr-08		Company: Thing Magic LLC			Work Order: I0406						
Engineer: Tuyen Truong		EUT Desc: Tool Link RFID Reader			EUT Operating Voltage/Frequency: 14Vdc						
Frequency Range: 30 to 1000MHz				Measurement Distance: 3 m							
Notes: EUT is running on channel 902.75MHz				EUT Max Freq: 927MHz							
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	FCC Class B				
							Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)		
vbb	46.98	50.7	25.6	10.0	0.8	35.9	40.0	-4.1	Pass		
vbb	53.0	46.6	25.7	7.9	0.9	29.7	40.0	-10.3	Pass		
vbb	58.3	44.5	25.6	7.6	1.0	27.5	40.0	-12.5	Pass		
vbb	77.8	48.3	25.4	8.3	1.1	32.3	40.0	-7.7	Pass		
vbb	85.0	36.4	25.5	7.9	1.2	20.0	40.0	-20.0	Pass		
vbb	132.75	36.4	25.6	14.1	1.5	26.4	43.5	-17.1	Pass		
vbb	148.0	37.9	25.5	13.0	1.5	26.9	43.5	-16.6	Pass		
vbb	156.48	36.6	25.6	12.6	1.6	25.2	43.5	-18.3	Pass		
vbb	167.95	37.0	25.6	12.2	1.7	25.3	43.5	-18.2	Pass		
vbb	175.95	36.3	25.7	11.5	1.7	23.8	43.5	-19.7	Pass		
vbb	188.825	41.6	25.5	11.6	1.8	29.5	43.5	-14.0	Pass		
vbb	245.0	26.4	25.7	12.3	2.1	15.1	46.0	-30.9	Pass		
vbb	407.0	25.1	25.3	16.4	3.1	19.3	46.0	-26.7	Pass		
vbb	611.1	30.4	25.4	19.2	3.8	28.0	46.0	-18.0	Pass		
vbb	963.6	23.7	24.8	23.3	5.2	27.4	54.0	-26.6	Pass		

Table Result: Pass by -4.1 dB **Worst Freq:** 46.98 MHz

Test Site: "T" Pre-Amp: Orange Cable: EMIR-11 Analyzer: White Antenna: Red-Black

Channel 902.75MHz

Radiated Emissions Table							Curtis-Straus LLC				
Date: 21-Apr-08		Company: Thing Magic LLC			Work Order: I0406						
Engineer: Tuyen Truong		EUT Desc: Tool Link RFID Reader			EUT Operating Voltage/Frequency: 14Vdc						
Frequency Range: 1 to 10GHz				Measurement Distance: 3 m							
Notes: EUT is running on channel 902.75MHz				EUT Max Freq: 927MHz							
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	FCC Class B				
							Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)		
v	1805.0	33.0	42.3	26.0	1.1	17.8	54.0	-36.2	Pass		
v	2708.0	29.0	42.0	29.1	1.4	17.5	54.0	-36.5	Pass		

Table Result: Pass by -36.2 dB **Worst Freq:** 1805.0 MHz

Test Site: "T" Pre-Amp: Red-Green Cable: EMIR-HIGH-21 Analyzer: White Antenna: Orange Horn

Channel 902.75MHz



Radiated Emissions Table							Curtis-Straus LLC				
Date: 21-Apr-08		Company: Thing Magic LLC				Work Order: I0406					
Engineer: Tuyen Truong		EUT Desc: Tool Link RFID Reader				EUT Operating Voltage/Frequency: 14Vdc					
Frequency Range: 1 to 10GHz					Measurement Distance: 3 m						
Notes: EUT is running on channel 915.25 MHz							EUT Max Freq: 927MHz				
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	FCC Class B				
							Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)		
v	1830.0	29.8	42.3	26.1	1.1	14.7	54.0	-39.4	Pass		
v	2745.0	28.9	42.0	29.2	1.4	17.5	54.0	-36.5	Pass		
Table Result: Pass by -36.5 dB							Worst Freq: 2745.0 MHz				
Test Site: "T"		Pre-Amp: Red-Greer		Cable: EMIR-HIGH-21		Analyzer: White		Antenna: Orange Horn			

Channel 915.25MHz

Radiated Emissions Table							Curtis-Straus LLC				
Date: 21-Apr-08		Company: Thing Magic LLC				Work Order: I0406					
Engineer: Tuyen Truong		EUT Desc: Tool Link RFID Reader				EUT Operating Voltage/Frequency: 14Vdc					
Frequency Range: 1 to 10GHz					Measurement Distance: 3 m						
Notes: EUT is running on channel 927MHz							EUT Max Freq: 927 MHz				
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	FCC Class B				
							Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)		
v	1854.0	30.0	42.3	26.2	1.1	15.0	54.0	-39.0	Pass		
v	2781.0	29.2	42.0	29.3	1.4	17.9	54.0	-36.1	Pass		
Table Result: Pass by -36.1 dB							Worst Freq: 2781.0 MHz				
Test Site: "T"		Pre-Amp: Red-Greer		Cable: EMIR-HIGH-21		Analyzer: White		Antenna: Orange Horn			

Channel 927.25MHz

Sample Calculation: Adjusted Reading = Reading – Preamp Factor + Antenna Factor + Cable Factor

Conducted Spurious Emissions

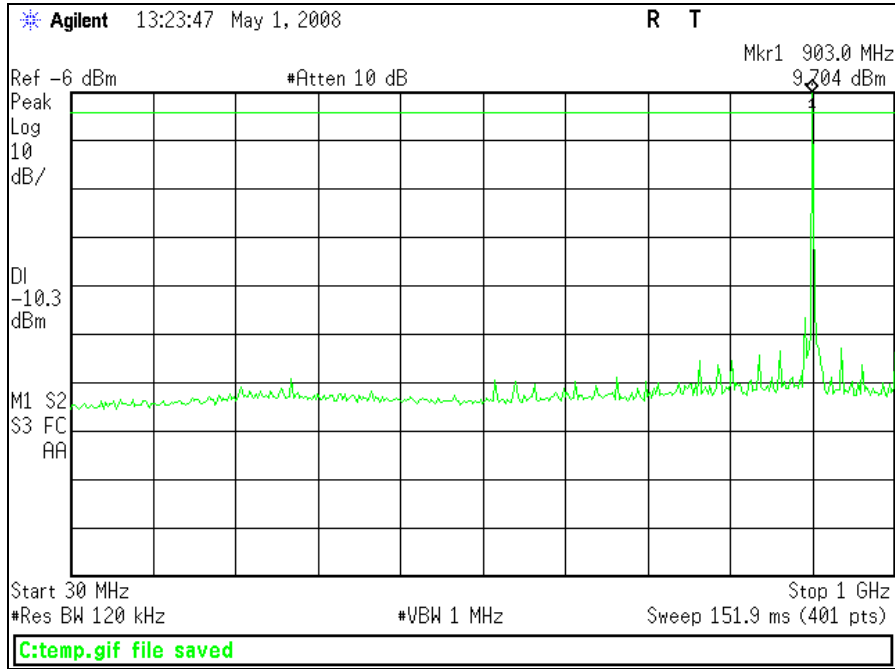
LIMITS

"In any 100kHz bandwidth outside of 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 20dB below that in the 100kHz bandwidth within the band contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. [15.247 (d)]

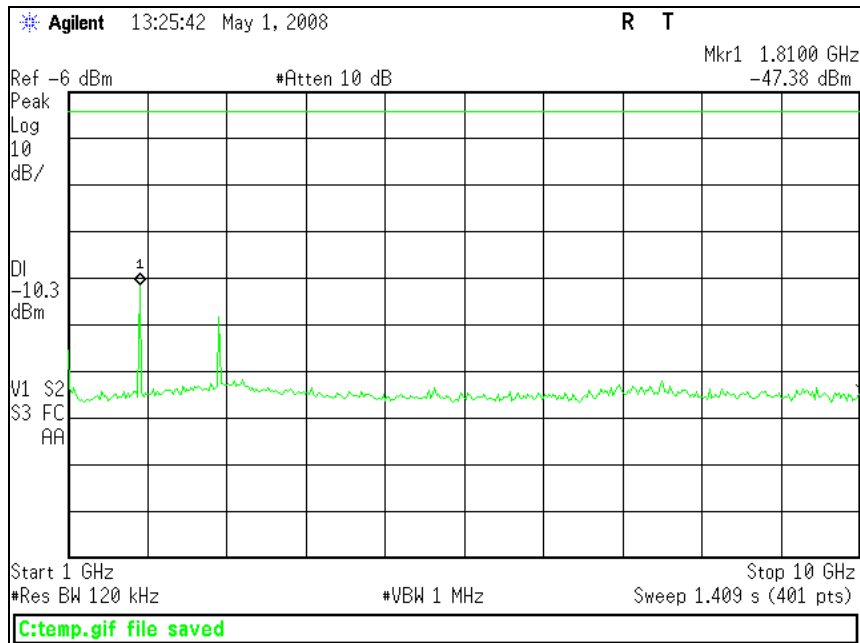
MEASUREMENTS

As can be seen from the plots below there are no emissions above 20dB limit defined by the fundamental.

Port 1:
Channel 902.75MHz

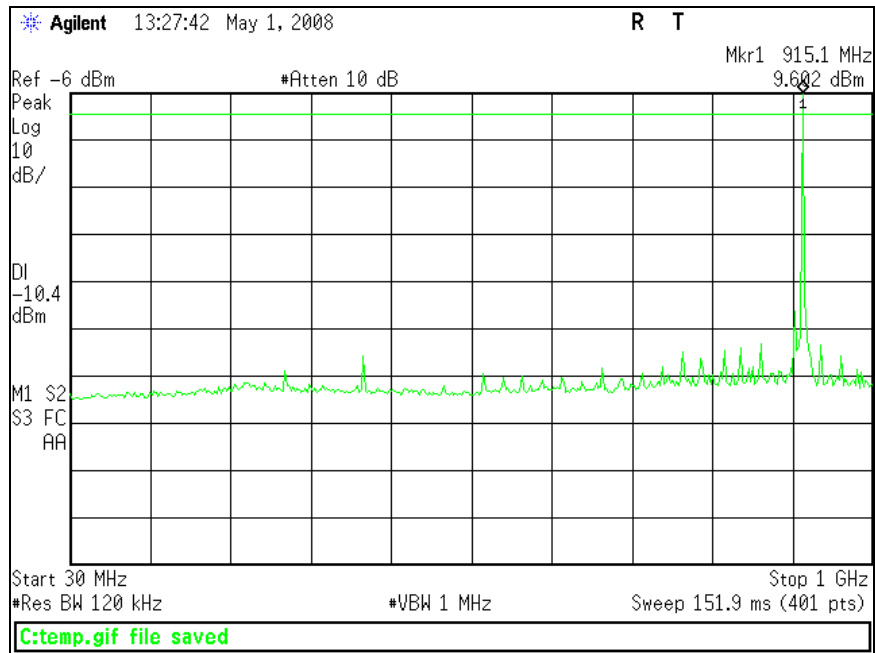


Conducted Spurious Emission on the TX port - 30 to 1000 MHz

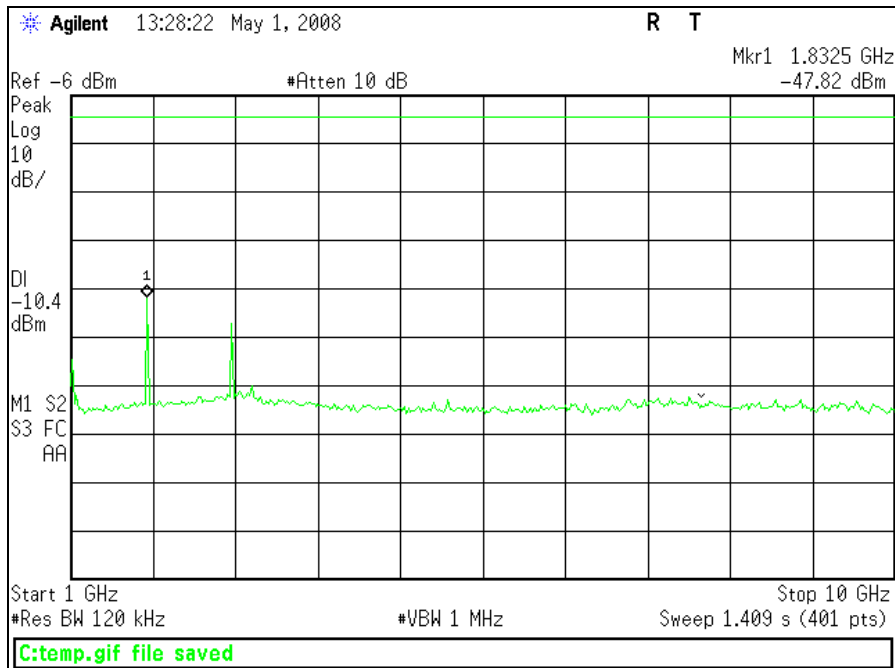


Conducted Spurious Emission on the TX port - 1 - 10 GHz

Channel 915.25MHz

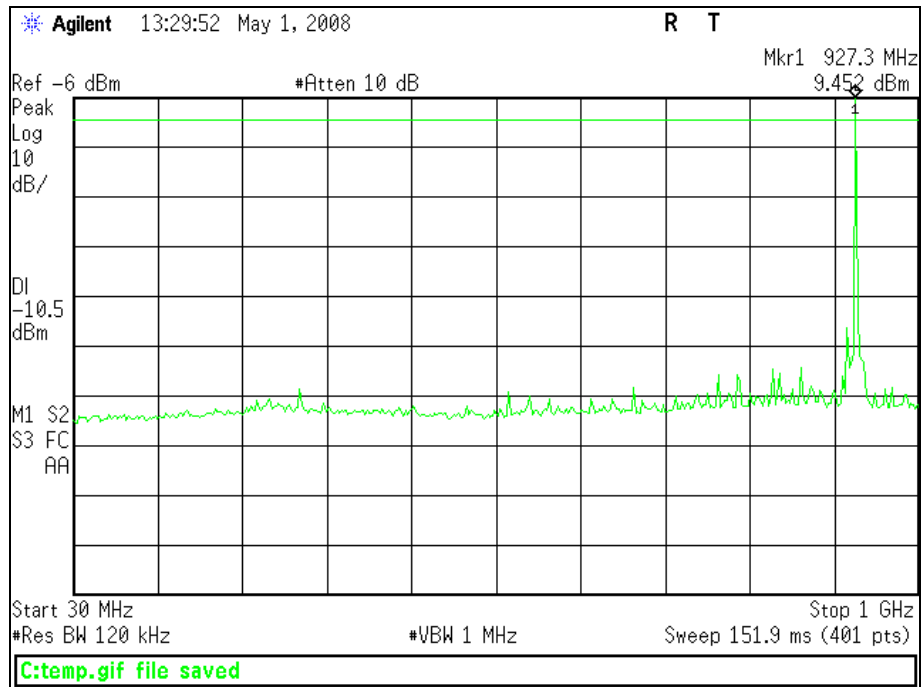


Conducted Spurious Emission on the TX port - 30 to 1000 MHz

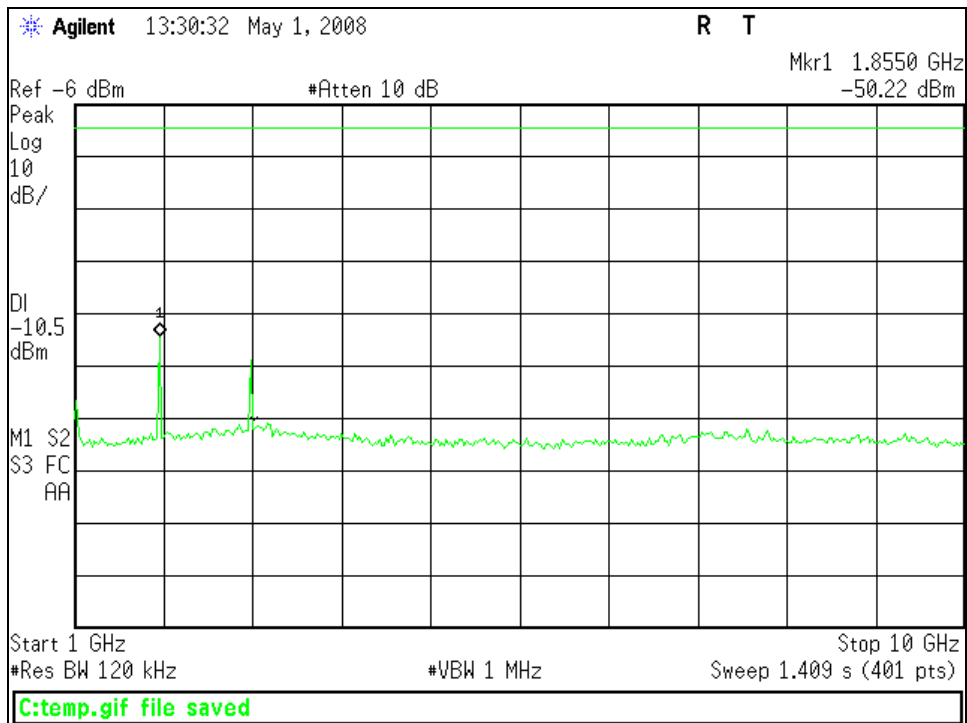


Conducted Spurious Emission on the TX port - 1 - 10 GHz

Channel 927.25MHz

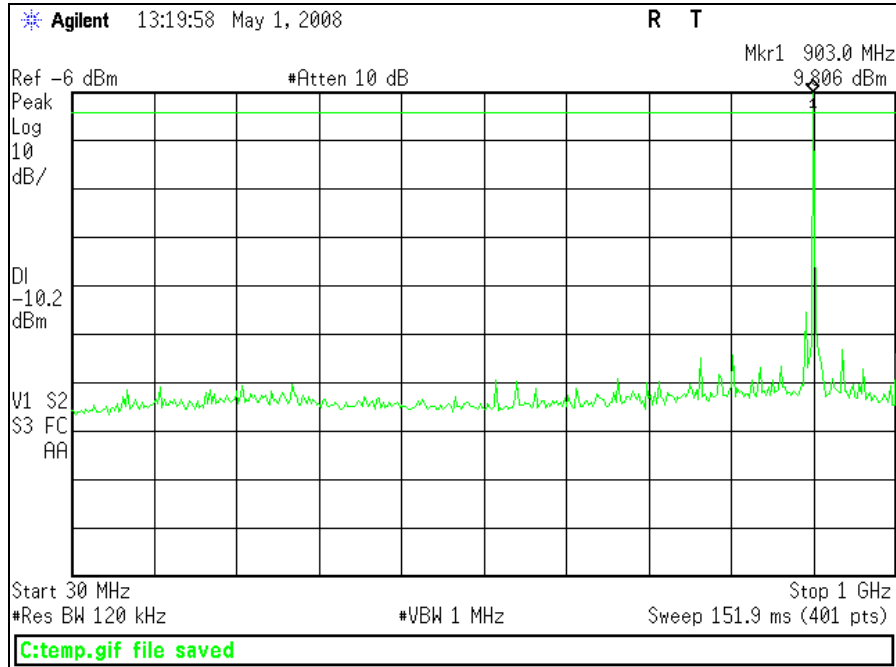


Conducted Spurious Emission on the TX port - 30 to 1000 MHz

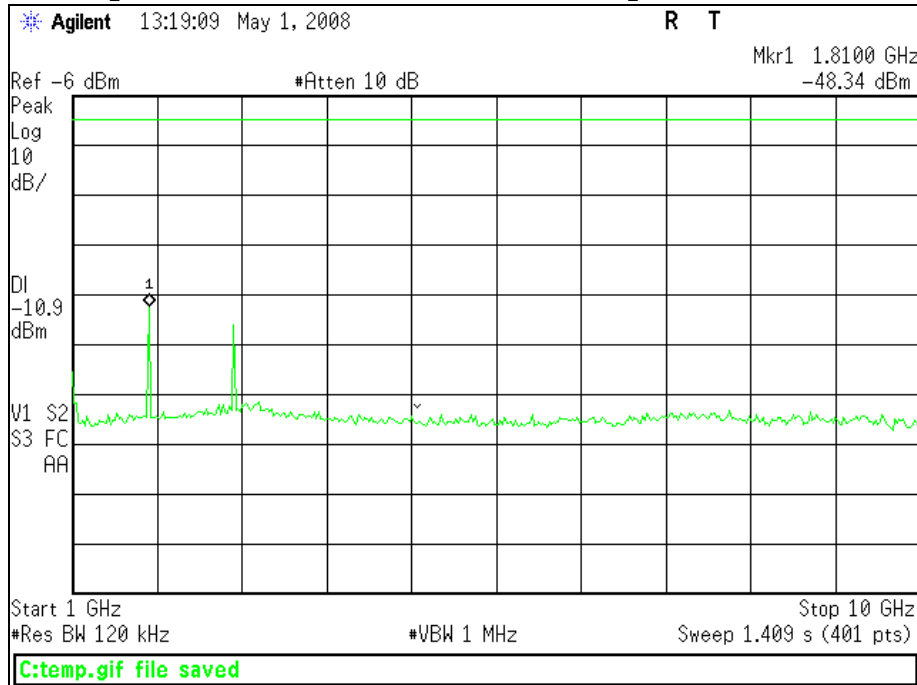


Conducted Spurious Emission on the TX port - 1 - 10 GHz

Port 3:
Channel 902.75MHz

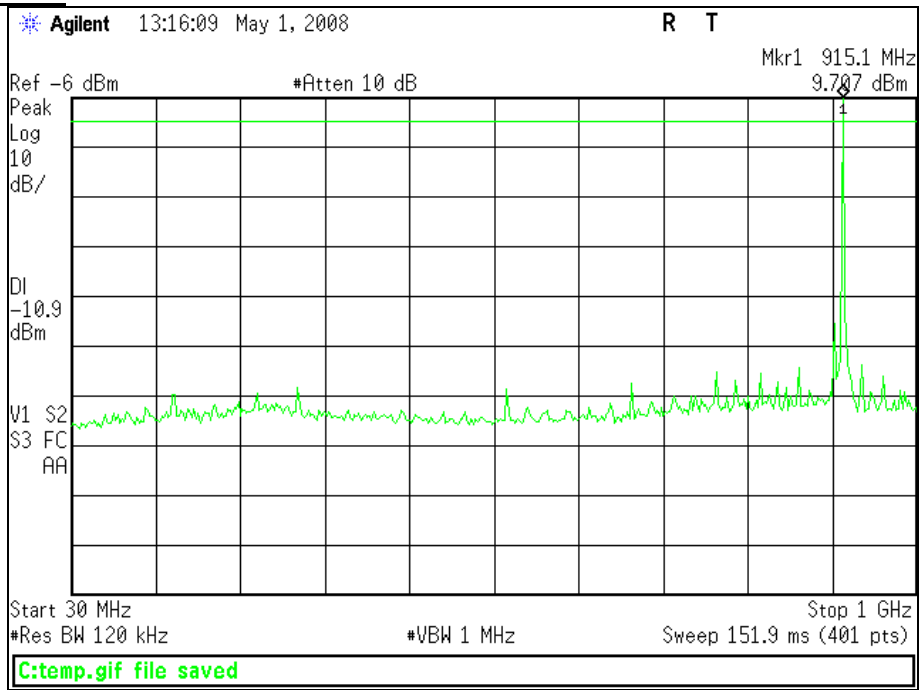


Conducted Spurious Emission on the TX port - 30 to 1000 MHz

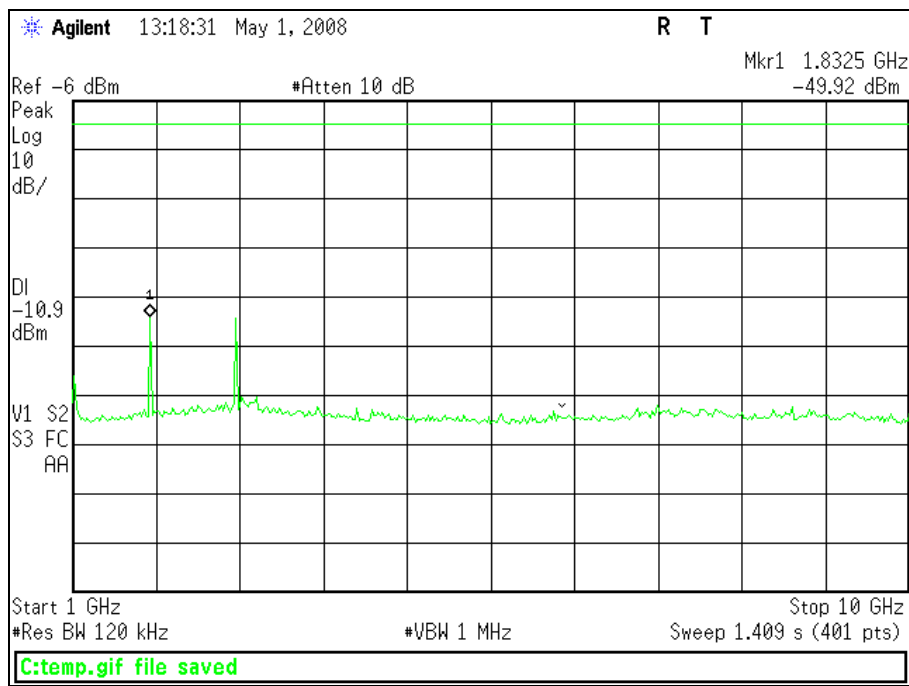


Conducted Spurious Emission on the TX port - 1 - 10 GHz

Channel 915MHz

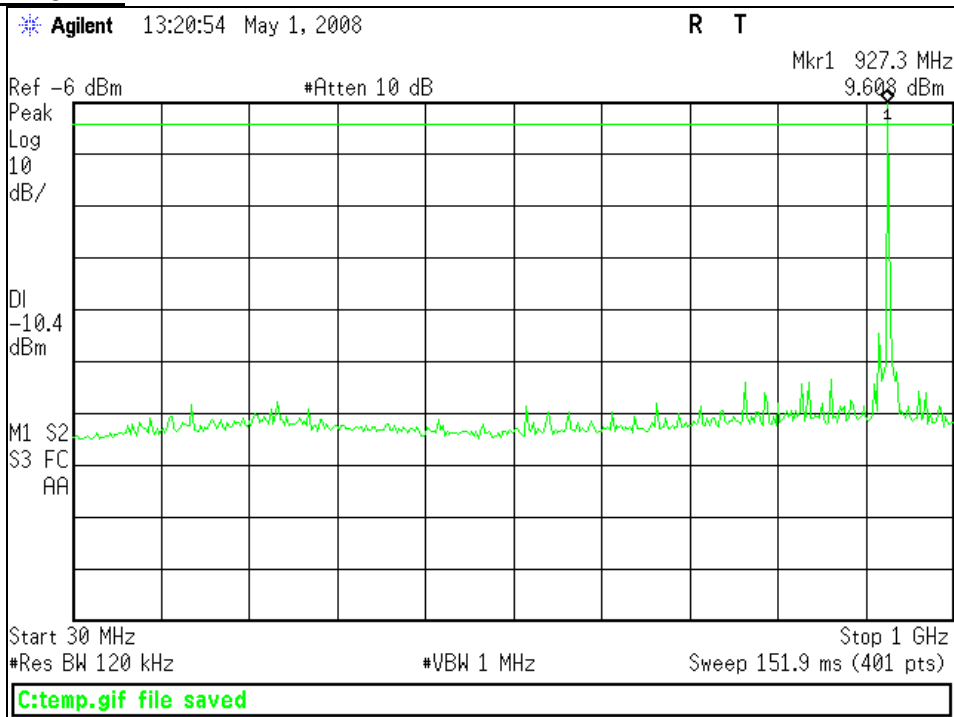


Conducted Spurious Emission on the TX port - 30 to 1000 MHz

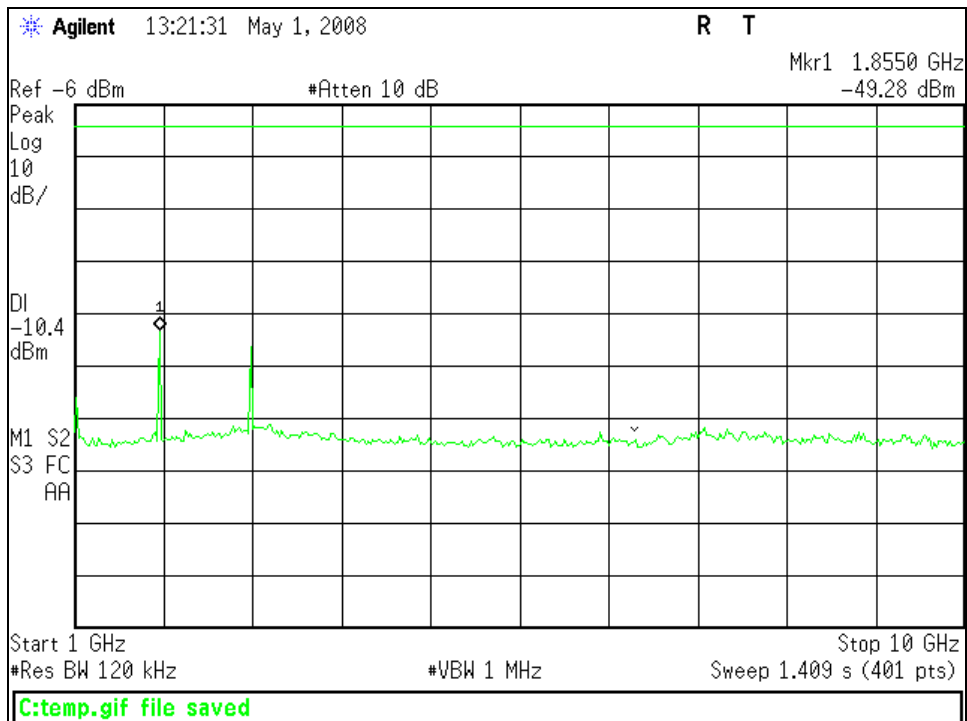


Conducted Spurious Emission on the TX port - 1 - 10 GHz

Channel 927.25MHz

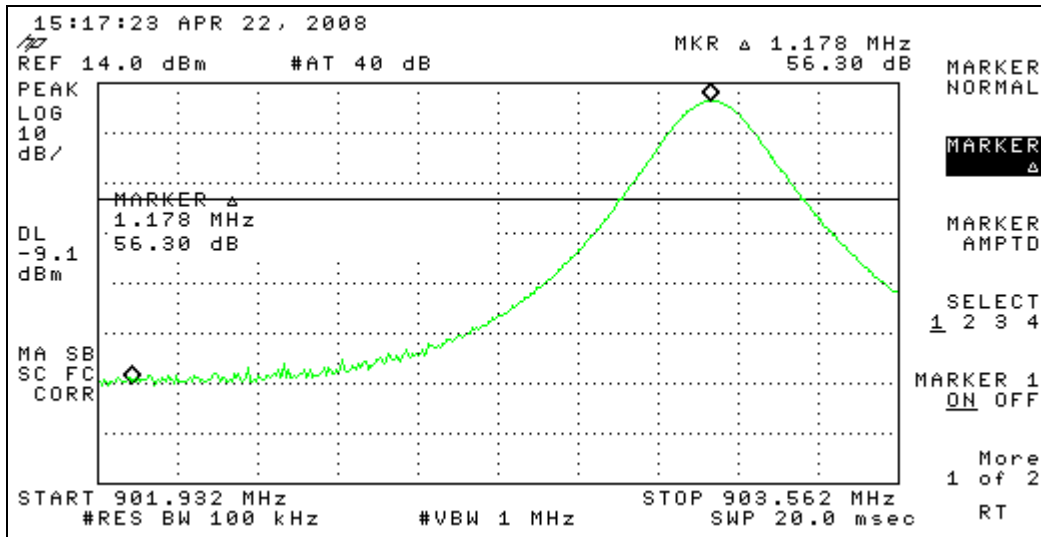


Conducted Spurious Emission on the TX port - 30 to 1000 MHz

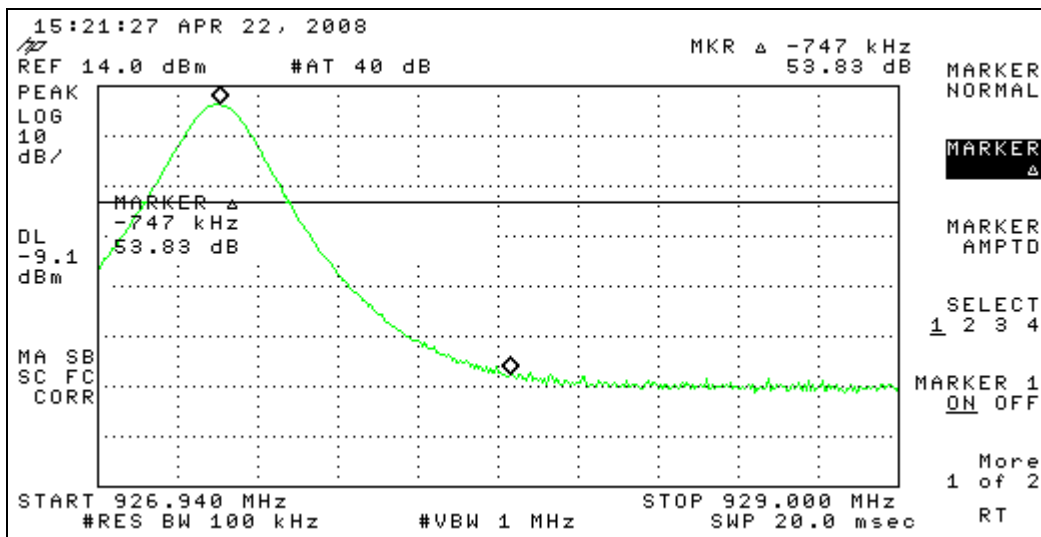


Conducted Spurious Emission on the TX port - 1 - 10 GHz

Conducted Band Edge



Conducted Lower Band Edge - 902MHz



Conducted Upper Band Edge - 928MHz

Voltage Variation

REQUIREMENT

“For intentional radiators, measurements of the variation of the...radiated signal level of the fundamental frequency component of the emission...shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.” [15.31(e)]

EQUIPMENT

Brown Spectrum Analyzer

MEASUREMENTS

Nominal input power is +14Vdc.

Voltage Variations		Curtis Straus LLC
Date: 22-Apr-08		Company: Thing Magic
Engineer: Tuyen Truong		EUT Desc: Tool Link
WO: I0406		
Voltage (DC)	Readings (dBm)	
14.00	10.20	
11.90	10.29	
16.10	10.27	

Test Equipment Used

REV. 18-APR-2008

SPECTRUM ANALYZERS / RECEIVERS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	9kHz-1.8GHz	8591E	Agilent	3441A03559	00024	I	25-FEB-2009
WHITE	9kHz-22GHz	8593E	Agilent	3547U01252	00022	I	31-OCT-2008
BLUE	9kHz-1.8GHz	8591E	Agilent	3223A00227	00070	I	01-OCT-2008
YELLOW	9kHz-2.9GHz	8594E	Agilent	3523A01958	00100	I	08-JUN-2008
GREEN	9kHz-26.5GHz	8593E	Agilent	3829A03618	00143	I	Out of Service
BLACK	9kHz-12.8GHz	8596E	Agilent	3710A00944	00337	I	02-AUG-2008
TELECOM 3585A	20Hz-40.0MHz	3585A	Agilent	2504A05219	00030	I	Out of Cal
TELECOM 3585A	20Hz-40.0MHz	3585A	Agilent	1750A03418	00558	I	Out of Service
TELECOM 3585A	20Hz-40.0MHz	3585A	Agilent	1750A02762	01067	I	Out of Service
ORANGE	9kHz-26.5GHz	E4407B	Agilent	US39440975	00394	I	Out of Service
GOLD	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	25-JUL-2008
REFERENCE EMI TEST RECEIVER	20-1000MHz	ESVS30	R&S	827957/001	01098	I	To be determined
RENTAL SA #1 (BROWN)	9kHz-26.5GHz	E4407B	Agilent	SG44210511	Rental	I	29-JAN-2009
RENTAL SA #2	100Hz-26.5 GHz	E7405A	Agilent	MY44212795	Rental	I	Out of Service
RENTAL SA #3	9kHz-1.8GHz	8591EM	Agilent	3536A00617	Rental	I	25-JUL-2008
RENTAL SA #4	100Hz-3 GHz	E7402A	Agilent	MY45103221	Rental	I	23-JUL-2008

LISNS/MEASUREMENT PROBES	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	9kHz-50MHz	8012-50-R-24-BNC	SOLAR	956348	00753	I	06-JUN-2008
BLUE (DC)	50kHz-50MHz	8012-50-R-24-BNC	SOLAR	956349	00752	I	06-JUN-2008
YELLOW-BLACK	9kHz-50MHz	8012-50-R-24-BNC	SOLAR	0411657	00248	I	24-MAY-2008
ORANGE	9kHz-30MHz	8012-50-R-24-BNC	SOLAR	903707	00754	I	07-MAY-2008
GOLD (DC)	9kHz-50MHz	8012-50-R-24-BNC	SOLAR	984734	00247	I	13-JUN-2008
BROWN	50kHz-50MHz	8012-50-R-24-BNC	SOLAR	0411656	00986	I	12-JUN-2008
GREEN	9kHz-50MHz	8012-50-R-24-BNC	SOLAR	984735	00987	I	20-MAR-2009
YELLOW	9kHz-50MHz	8012-50-R-24-BNC	SOLAR	0411658	1080	I	06-JUN-2008
WHITE-BLACK	10kHz-30MHz	8610-50-TS-100-N	SOLAR	972019	00678	I	17-MAY-2008
BLACK	10kHz-30MHz	8610-50-TS-100-N	SOLAR	972017	00675	I	18-MAY-2008
RED-BLACK	10kHz-30MHz	8610-50-TS-100-N	SOLAR	972016	00677	I	18-MAY-2008
BLUE-BLACK	10kHz-30MHz	8610-50-TS-100-N	SOLAR	972018	00676	I	17-MAY-2008
BLUE MONITORING PROBE	0.01-150MHz	91550-2	TEGAM	12350	00807	I	31-MAY-2009
YELLOW MONITORING PROBE	0.01-150MHz	91550-2	ETS	50972	00493	I	29-JAN-2010
GREEN CURRENT TRANSFORMER	40Hz-20MHz	150	PEARSON	10226	00793	I	19-APR-2009
BLUE CISPR LINE PROBE	10kHz-50MHz	N/A	C-S	N/A	00805	II	08-JUN-2009
BLACK CISPR LINE PROBE	10kHz-50MHz	N/A	C-S	N/A	1254	II	08-JUN-2009
CISPR TELCO VOLTAGE PROBE	10kHz-30MHz	CS A/C-10	C-S	CS01	00296	II	13-AUG-2008
CISPR 22 TELCO ISN	9kHz-30MHz	FCC-TLISN-T4	FISCHER	20115	00746	I	15-NOV-2008

OPEN AREA TEST SITES (OATS)	FCC CODE	IC CODE	VCCI CODE	CAT	CALIBRATION DUE
SITE F	93448	2762A-1	R-1688	II	23-JUN-2008
SITE T	93448	2762A-2	R-905	II	06-DEC-2009
SITE A	93448	2762A-4	R-903	II	04-DEC-2009
SITE M	93448	2762A-5	R-904	II	19-JUN-2008
SITE J	93448	2762A-3	R-2377	II	12-APR-2008

CONDUCTED TEST SITES (MAINS / TELCO)	FCC CODE	IC CODE	VCCI CODE	CAT	CALIBRATION DUE
EMI 1	93448	N/A	C-1801, T-268	III	NA
EMI 2	93448	N/A	C-1802, T-269	III	NA
EMI 3	93448	N/A	C-1803, T-270	III	NA
EMI 4	93448	N/A	C-3013, T-391	III	NA

MIXERS/DIPLEXERS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
MIXER / HORN	26.5-40 GHz	11970A/28-442-6	HP/ATM	2332A01695/A046903-01	1087	I	01-OCT-2009
MIXER / HORN	26.5-40 GHz	11970A/28-442-6	HP/ATM	3003A07825/A046903-01	1086	I	19-SEP-2008
MIXER / HORN	40-60 GHz	M19HW/A	OML	U30110-1	00821	I	29-JUN-2009
MIXER	33-50 GHz	11970Q	HP	3003A03155	00104	I	28-NOV-2009
MIXER / HORN	50-75 GHz	11970V /QWH-VPRROO	HP/QUINSTAR	2521A01197/8794001	1179	I	28-NOV-2009
MIXER	75-110 GHz	11970W	HP	2521A01334	00105	I	28-NOV-2009
MIXER / HORN	60-90 GHz	M12HW/A	OML	U30110-1	00822	I	29-JUN-2009
MIXER / HORN	90-140 GHz	MO8HW/A	OML	F21206-1	00811	I	29-JUN-2009



MIXER / HORN DIPLEXER	140-220 GHz 40-220 GHz	MO5HW/A DPL.26	OML OML	G21206-1 N/A	00812 00813	I I	29-JUN-2009 29-JUN-2009
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ABSORBING CLAMPS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
FISCHER CLAMP	30-1000MHZ	F-201-23MM	FISCHER	10	00081	I	29-JAN-2010

HARMONIC & FLICKER ANALYZER	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
HFTS	HP6842A	HP	3531A-00169	00738	II	04-MAR-2009
100011/2 AC POWER SYSTEM	(2) 500I	CALIFORNIA INSTRUMENTS	HK53687/HK53688	00376	II	26-OCT-2008
RENTAL 50011/2 AC POWER SYSTEM	500I	CALIFORNIA INSTRUMENTS	56220	RENTAL	II	17-OCT-2009

PREAMPS/COUPLERS ATTENUATORS / FILTERS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	0.009-2000MHZ	ZFL-1000-LN	C-S	N/A	00798	II	04-APR-2009
BLUE	0.009-2000MHZ	ZFL-1000-LN	C-S	N/A	00759	II	04-APR-2009
BLUE-BLACK	0.009-2000MHZ	ZFL-1000-LN	C-S	N/A	00800	II	30-JUL-2008
GREEN	0.009-2000MHZ	ZFL-1000-LN	C-S	N/A	00802	II	04-APR-2009
BLACK	0.009-2000MHZ	ZFL-1000-LN	C-S	N/A	00799	II	22-AUG-2008
ORANGE	0.009-2000MHZ	ZFL-1000-LN	C-S	N/A	00765	II	14-MAR-2009
RED-WHITE	0.009-2000MHZ	ZFL-1000-LN	C-S	N/A	1258	II	04-APR-2009
WHITE	1-20GHZ	SMC-12A	C-S	426643	00760	II	09-JUL-2008
BROWN	1-20GHZ	PM2-38-218-4R5-17-15-SFF	C-S	PL1655	1132	II	OUT OF SERVICE
YELLOW-BLACK	1-20GHZ	SMC-12A	C-S	535055	00801	II	OUT OF SERVICE
RED-GREEN	1-20GHZ	PM2-38-218-4R5-17-15-SFF	C-S	N/A	1256	II	14-AUG-2008
RED-BLUE	1-20GHZ	PE2-38-218-4R5-17-15-SFF	C-S	PL3177	1257	II	19-APR-2008
HF (YELLOW)	18-26.5GHZ	AFS4-18002650-60-8P-4	C-S	467559	1266	I	01-OCT-2009
HIGH PASS FILTER	0.03-20 GHZ	SPA-F-55204	K&L	36	00817	II	08-JAN-2010
LOW PASS FILTER	0.03-18 GHZ	11SL10-4100/X4400-O/O	K&L	4	00816	II	08-JAN-2010
HIGH PASS FILTER	0.03-6.5 GHZ	11SH10-1000/T3000-O/O	K&L	1	1310	II	08-JAN-2010
HIGH PASS FILTER	0.03-14.5 GHZ	11SH10-3000/T9000-O/O	K&L	1	1311	II	08-JAN-2010
HIGH PASS FILTER	0.03-8 GHZ	VHP-19	MINI-CIRCUITS	NA	1287	II	08-JAN-2010
HIGH PASS FILTER	0.03-9 GHZ	VHP-16	MINI-CIRCUITS	NA	1288	II	08-JAN-2010
HF 20dB 50W ATTENUATOR	0.03-20 GHZ	PE 7019-20	PASTERNAK	01	00791	II	08-MAY-2009
HF 30dB 50W ATTENUATOR	0.03-20 GHZ	PE 7019-30	PASTERNAK	02	1168	II	08-MAY-2009
40dB 100W ATTENUATOR	0.09-2000MHZ	BW-40N100W+	MINI-CIRCUITS	V N014900638	1231	II	06-NOV-2008
RFI-LOW 130 KHZ LPF	10-100KHZ PASS	130 KHZ LPF	KIWA	NA	1235	II	17-APR-2009
50W HF DIRECT. COUPLER	1-20GHZ	DC7420	AR	0325960	1307	II	06-NOV-2008
500W DIRECT. COUPLER	0.009-2000MHZ	C6277-10	WERLATONE	41911	1264	II	06-NOV-2008
200W DIRECT. COUPLER	0.009-2000MHZ	C5571-10	WERLATONE	23098	1185	II	06-NOV-2008

ANTENNAS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
GREEN BILOG	30-2000MHZ	CBL6112B	CHASE	2742	00620	II	13-FEB-2010
GREEN-BLACK BILOG	30-2000MHZ	CBL6112B	CHASE	2412	00127	II	13-FEB-2010
GREEN-RED BILOG	30-2000MHZ	CBL6112B	CHASE	2435	00990	I	OUT OF SERVICE
BLUE BILOG	30-1000MHZ	3143	EMCO	1271	00803	II	06-MAY-2009
GRAY BILOG	20-2000MHZ	3141	EMCO	9703-1038	00066	II	07-MAY-2009(EMI) / 07-FEB-2009(RF12)
YELLOW-BLACK BILOG	20-2000MHZ	CBL6140A	CHASE	1112	00126	II	07-MAY-2009(EMI) / 20-APR-2008(RF1)
RED-WHITE BILOG	30-2000MHZ	JB1	SUNOL	A091604-1	01105	I	07-NOV-2008
RED-BLACK BILOG	30-2000MHZ	JB1	SUNOL	A091604-2	01106	I	20-OCT-2008
RED-BROWN BILOG	30-2000MHZ	JB1	SUNOL	A0032406	1218	I	04-AUG-2008
YELLOW HORN	1-18GHZ	3115	EMCO	9608-4898	00037	I	31-MAY-2009(EMI) / 14-JUN-2008 (RF1)
BLACK HORN	1-18GHZ	3115	EMCO	9703-5148	00056	I	22-JUN-2009(EMI) / 16-MAY-2008 (RF1)
ORANGE HORN	1-18GHZ	3115	EMCO	0004-6123	00390	I	12-JUN-2009 (EMI) / 16-MAY-2008 (RF1)
HF (WHITE) HORN	18-26.5GHZ	801-WLM	WAVELINE	00758	00758	I	01-OCT-2008
SMALL LOOP	10KHZ-30MHZ	PLA-130/A	ARA	1024	00755	I	05-MAR-2010
LARGE LOOP	20HZ-5MHZ	6511	EMCO	9704-1154	00067	I	20-FEB-2010
RENTAL 6509 LOOP	1KHZ-30MHZ	6509	EMCO	1503	RENTAL	I	04-FEB-2010
ACTIVE MONOPOLE	30HZ-30MHZ	3301B	EMCO	3824	00068	II	14-JUN-2008
INDUCTION COIL	50-60HZ	1000-4-8	C-S	N/A	00778	II	11-SEP-2008
INDUCTION COIL	50-60HZ	1000-4-8	C-S	N/A	1314	II	16-APR-2010
ADJUSTABLE DIPOLE	30-1000MHZ	3121C	EMCO	1370	00757	I	26-OCT-2008
ADJUSTABLE DIPOLE	30-1000MHZ	3121C	EMCO	1371	00756	I	09-NOV-2008
RE101 LOOP SENSOR	30HZ-100KHZ	RE101-13.3CM	C-S	N/A	00818	II	22-MAR-2009
RS101 RADIATING LOOP	30HZ-100KHZ	RS101-12CM	C-S	N/A	00819	II	22-MAR-2009
RS101 LOOP SENSOR	30HZ-100KHZ	RS101-4CM	C-S	N/A	00820	II	22-MAR-2009



<i>EFT</i>	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
CAS 3025 BURST VERIFICATION ATTENUATORS	INA 265A/266	SCHAFFNER	20096	00947	II	28-JUN-2008
EFT DIRECT COUPLING CAP MODULA6150	N/A MODULA6150	C-S TESEQ	01 34525	00794 1268	II I	19-JUL-2008 11-JUL-2008
RED BESTEMC-2 EMC PRO PLUS ECOMPACT4	711-1100 EMCPRO PLUS ECOMPACT4	SCHAFFNER KEYTEK HAEFELY	200122-074SC 0608208 155858	00623 RENTAL RENTAL	II II II	27-FEB-2009 17-MAY-2008 11-FEB-2009

<i>ESD GENERATORS</i>	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
GREEN	NSG435	SCHAFFNER	000839	00763	I	12-NOV-2008
RED	NSG435	SCHAFFNER	001625	00762	I	13-MAR-2009
YELLOW	930D	ETS	201	00673	I	27-SEP-2009

<i>DIPS AND INTERRUPTS</i>	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
MODULA6150	MODULA6150	TESEQ	34525	1268	I	11-JUL-2008
INA 6502 AUTOMATIC STEPTRANSFORMER	INA 6502	TESEQ	105	1269	I	11-JUL-2008
100011/2 AC POWER SYSTEM	(2) 500I	CALIFORNIA INSTRUMENTS	HK53687/HK53688	00376	II	OUT OF CAL
RED BESTEMC-2 ECOMPACT4	711-1100 ECOMPACT4	SCHAFFNER HAEFELY	200122-074SC 155858	00623 RENTAL	II II	27-FEB-2009 11-FEB-2009

<i>CHAMBERS AND STRIPLINE</i>	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RFI 1 CHAMBER	3 METER COMPACT	PANASHIELD	N/A	00797	II	21-AUG-2008
RFI 2 CHAMBER	04' x 07' SHIELDING SYSTEM	LINDGREN	13329	00795	II	07-FEB-2009
RFI 3 STRIPLINE	N/A	C-S	N/A	00796	III	NA
ENVIRONMENTAL (SAFETY)	ECL5	B-M-A INC.	2041	00029	I	03-JAN-2009
ENVIRONMENTAL (SAFETY)	SGTH-31S	B-M-A INC.	2245	00321	I	03-JAN-2009

<i>AMPLIFIERS</i>	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	0.5-1000MHZ	10W1000B	AR	18708	00032	II	OUT OF CAL
GREEN	0.5-1000MHZ	10W1000B	AR	23423	00123	II	07-FEB-2009 (RFI2)
BLUE	0.01-250MHZ	75A250	AR	19165	00039	II	06-NOV-2008 (EU CRFI) / 12-DEC-2008 (NEBS CRFI)
BLACK	0.01-250MHZ	75A250	AR	23411	00122	II	11-DEC-08 (EU CRFI) / 12-DEC-08 (NEBS) / 20-APR-08 (RFI1)
ORANGE	0.01-250MHZ	75A250	AR	26827	00367	II	28-JUN-08 (NEBS CRFI) / 29-JUN-2008 (EU)
BROWN 150W	0.1-250MHZ	150A250	AR	313454	1255	II	07-FEB-2009 (RFI2)
YELLOW 150W	80-1000MHZ	150W1000	AR	0324607	1253	II	21-AUG-2008 (RFI1)
500W AMP	0.1-250MHZ	500A250	AR	0326385	1297	II	23-OCT-2008 (RFI1)
GTC 1-2.6	1.0-2.6 GHz	GRF5016A	GTC	1221	RENTAL	II	14-JUN-2008 (YELLOW & ORANGE HORN) / 28-JUN-2008 (BLK)
HUGHES 10W	2.0-4.0GHZ	1177H01	HUGHES	055	RENTAL	II	14-JUN-2008 (YELLOW HORN) / 16-MAY-2008 (BLK & ORANGE)
HUGHES 10W	4.0-8.0GHZ	8010H02F	HUGHES	240	RENTAL	II	14-JUN-2008 (YELLOW HORN) / 16-MAY-2008 (BLK & ORANGE)
HUGHES 10W	8-10.0GHZ	80108	HUGHES	138	RENTAL	II	14-JUN-2008 (YELLOW HORN) / 17-MAY-2008 (BLK & ORANGE)
HP495A	7.0-10.0GHZ	HP495A	HP	304-00237	00086	II	OUT OF SERVICE (SPARE)
AUDIO AMP	AUDIO FREQ	MPA-200	RADIO SHACK	700438	NONE	III	NA
AUDIO AMP	AUDIO FREQ	MPA-200	RADIO SHACK	708545	00862	III	NA

<i>FIELD PROBES</i>	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	0.01-1000MHZ	HI-4422	HOLADAY	90369	00031	I	24-MAR-2009
GREEN	0.01-1000MHZ	HI-4422	HOLADAY	97363	00136	I	09-NOV-2008
BLUE	0.01-1000MHZ	HI-4422	HOLADAY	95696	01100	I	OUT FOR CAL
Reference Laser Field Probe	0.1-6000MHZ	FL7006 Star Probe	AR	321700	1252	I	31-JAN-2010
MICROWAVE SURVEY METER	2450MHZ	HI-1501	HOLADAY	00075464	1244	I	Calibrate Before Use
GAUSSMETER (ELF METER)	25Hz-1kHz	4080	SYPRIS	114173	1305	II	03-OCT-2008

<i>SIGNAL GENERATORS</i>	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	0.09-2000MHZ	HP8648B	Agilent	3847U02192	00366	I	03-MAY-2008
BLUE	0.1-1000MHZ	HP8648A	Agilent	3426A00548	00034	I	26-SEP-2008
GREEN	0.09-2000MHZ	HP8648B	Agilent	3623A02072	00125	I	21-OCT-2008
ORANGE	0.1-1000MHZ	HP8648B	Agilent	3537A01210	00025	I	19-JUN-2008
BROWN	0.01Hz-15MHZ	HP33120A	Agilent	US36016621	1211	I	OUT OF SERVICE
WHITE	0.01Hz-15MHZ	HP33120A	Agilent	US36048143	1219	I	17-MAY-2008
BROWN-WHITE	0.01Hz-15MHZ	HP33120A	Agilent	SG40019842	1232	I	13-NOV-2008
BLUE-WHITE	0.1Hz-13MHZ	HP3312A	Agilent	1432A07632	00775	I	26-MAR-2009
SWEEPER	0.01-20.0GHZ	HP83752A	Agilent	3610A01133	00087	II	08-MAY-2008
AM/FM STEREO SIG. GEN.	0.1-170MHZ	LG3236	LEADER	3687301	00959	I	To be determined
IMPULSE GENERATOR	1-100HZ	CIG-25	ELECTRO-METRICS	290	00942	I	To be determined



BULK INJECTION CLAMPS	RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE		
GREEN (NEBS CRFI)	0.01-30MHZ	95236-1	ETS	50215	00118	II	12-DEC-2008(BLUE)	12-DEC-2008(BLK)	29-JUN-2008(ORANGE)
GREEN (EU CRFI)	0.15-80MHZ	95236-1	ETS	50215	00118	II	06-NOV-2008(BLUE)	11-DEC-2008(BLK)	28-JUN-2008(ORANGE)
RED (NEBS CRFI)	0.01-30MHZ	95236-1	ETS	34026	1020	II	12-DEC-2008(BLUE)	12-DEC-2008(BLK)	29-JUN-2008(ORANGE)
RED (EU CRFI)	0.15-80MHZ	95236-1	ETS	34026	1020	II	06-NOV-2008(BLUE)	11-DEC-2008(BLK)	28-JUN-2008(ORANGE)
RED (RTCA/DO-160E)	0.01-2MHZ	95236-1	ETS	34026	1020	II	10-JAN-2010 (BLK)		
BLUE (RTCA/DO-160E)	2-450MHZ	9142-1N	SOLAR	063824	1237	II	10-JAN-2010 (RED)		

ANSI T1.315	MFR	ASSET	CAT	CALIBRATION DUE	
SBC NOISE CART	C-S	1285	III	CALIBRATION NOT REQUIRED	
SBC TRANSIENT CART	C-S	1286	III	WAVESHAPE VERIFIED BEFORE USE	

OSCILLOSCOPES	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
EMC 100MHZ	TDS 220	TEKTRONIX	C036986	1166	I	25-MAY-2008
ESD REFERENCE 1GHZ	TDS 684B	TEKTRONIX	B011287	RENTAL	I	03-MAY-2008
400MHZ E*SCOPE	TDS 3044B	TEKTRONIX	C010074	1275	I	19-JUL-2008
PRODUCT SAFETY 100 MHZ	TDS 340	TEKTRONIX	B012357	00737	I	17-OCT-2008
TELECOM 100 MHZ	54645A	HP/AGILENT	US36320452	00103	I	21-SEP-2008
DIFFERENTIAL PROBE	4222	PROBEMASTER	07-134	1296	I	10-OCT-2008
REFERENCE 500MHZ 10X PROBE	P6139A	TEKTRONIX	NA	1280	I	19-JUL-2008
REFERENCE 500MHZ 10X PROBE	P6139A	TEKTRONIX	NA	1281	I	19-JUL-2008
500MHZ 10X PROBE	P6139A	TEKTRONIX	NA	1282	I	19-JUL-2008
500MHZ 10X PROBE	P6139A	TEKTRONIX	NA	1283	I	19-JUL-2008
REFERENCE HV 1000X PROBE	P6015A	TEKTRONIX	B056555	1277	I	20-JUL-2008
REFERENCE HV 1000X PROBE	P6015A	TEKTRONIX	B056590	1278	I	20-JUL-2008

CDN NETWORKS	RANGE	MN	MFR	ASSET	CAT	CALIBRATION DUE		
BLUE	0.10-100MHZ	20A M-3	C-S	00806	II	06-NOV-2008 (BLUE AMP)	11-DEC-2008 (BLK)	28-JUN-2008 (ORANGE)
RED	0.10-100MHZ	15A M-3	C-S	00780	II	06-NOV-2008 (BLUE AMP)	11-DEC-2008 (BLK)	28-JUN-2008 (ORANGE)
YELLOW-BLACK	0.10-100MHZ	15A M-3	C-S	00784	II	06-NOV-2008 (BLUE AMP)	11-DEC-2008 (BLK)	28-JUN-2008 (ORANGE)
GREEN	0.10-100MHZ	30A M-3	C-S	00779	II	06-NOV-2008 (BLUE AMP)	11-DEC-2008 (BLK)	28-JUN-2008 (ORANGE)
YELLOW	0.10-100MHZ	30A M-5	C-S	00804	II	06-NOV-2008 (BLUE AMP)	11-DEC-2008 (BLK)	28-JUN-2008 (ORANGE)
BROWN	0.10-100MHZ	M-3	C-S	1169	II	06-NOV-2008 (BLUE AMP)	11-DEC-2008 (BLK)	28-JUN-2008 (ORANGE)
BROWN-WHITE	0.10-100MHZ	M-3	C-S	1170	II	06-NOV-2008 (BLUE AMP)	11-DEC-2008 (BLK)	28-JUN-2008 (ORANGE)
BROWN-BLACK	0.10-100MHZ	M-2 (DC)	C-S	1171	II	06-NOV-2008 (BLUE AMP)	11-DEC-2008 (BLK)	28-JUN-2008 (ORANGE)
RED-BLACK	0.10-100MHZ	M-2 (DC)	C-S	1177	II	06-NOV-2008 (BLUE AMP)	11-DEC-2008 (BLK)	28-JUN-2008 (ORANGE)
GREEN-WHITE	0.10-100MHZ	M-2 (DC)	C-S	1259	II	06-NOV-2008 (BLUE AMP)	11-DEC-2008 (BLK)	28-JUN-2008 (ORANGE)
YELLOW (RES)	0.10-100MHZ	100Ω RESISTOR	C-S	00810	II	06-NOV-2008 (BLUE AMP)	11-DEC-2008 (BLK)	28-JUN-2008 (ORANGE)
GREEN (RES)	0.10-100MHZ	100Ω RESISTOR	C-S	1172	II	06-NOV-2008 (BLUE AMP)	11-DEC-2008 (BLK)	28-JUN-2008 (ORANGE)
ARTIFICIAL HAND	510Ω / 220PF	CS-AH	C-S	1262	II	04-JUN-2008		
ARTIFICIAL HAND	510Ω / 220PF	CS-AH	C-S	1263	II	04-JUN-2008		

RMS VOLTMETERS/CURRENT CLAMP	MN	MNFR	SN	ASSET	CAT	CALIBRATION DUE
TRUE-RMS MULTIMETER	79III	FLUKE	71700298	00769	I	06-FEB-2009
TRUE RMS MULTIMETER	179	FLUKE	89280616	1228	I	04-SEP-2008
TRUE-RMS MULTIMETER	177	FLUKE	83390024	00973	I	22-MAR-2009
TRUE-RMS MULTIMETER (REFERENCE)	177	FLUKE	83390025	00974	I	11-MAR-2009
TRUE-RMS MULTIMETER (D RAND)	177	FLUKE	91320460	1226	I	11-MAR-2009
TRUE-RMS MULTIMETER	177	FLUKE	83430419	00975	I	31-MAR-2009
AC/DC CURRENT PROBE	A622	TEKTRONIX	08DD 6275DV	1246	I	12-MAR-2009

SURGE GENERATORS	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
TRANSIENT WAVEFORM MONITOR	TWM-5	CDI	003982	00323	II	05-JUN-2008
UNIVERSAL SURGE GENERATOR	M5	CDI	003966	00324	II	CAL BEFORE USE
THREE PHASE COUPLING NWK	3CN	CDI	003455	00325	II	CAL BEFORE USE
1.2x50uS PLUGIN MODULE	1.2x50uS PLUGIN	CDI	N/A	00842	II	CAL BEFORE USE
10x160uS PLUGIN MODULE	10x160uS PLUGIN	C-S	N/A	00843	II	CAL BEFORE USE
10x560uS PLUGIN MODULE	10x560uS PLUGIN	C-S	N/A	00841	II	CAL BEFORE USE
PSURGE CONTROLLER MODULE	PSURGE 8000	HAEFELY	150267	00879	II	05-JUN-2008
COUPLING/DECOUPLING MODULE	PCD 900	HAEFELY	149213	00880	II	05-JUN-2008
IMPULSE MODULE	PIM 900	HAEFELY	149202	00881	II	05-JUN-2008
HIGH VOLTAGE CAP NWK 5kVDC, 18μF	CS-HVCC	C-S	01	00772	II	16-APR-2009
NEBS SURGE GENERATOR (LIMITED CAL)	N/A	C-S	N/A	00088	II	24-NOV-2008
2x10uS SURGE GENERATOR	2x10uS	C-S	N/A	00846	II	CAL BEFORE USE



10x700US SURGE GENERATOR	10x700US	C-S	N/A	00847	II	06-JUN-2008
12 PAIR SURGE RESISTOR MODULE	N/A	C-S	N/A	00768	II	26-OCT-2008
VSS 500-M	TSS 500 M12 S2	EMTEST	V0502100032	1155	II	CAL BEFORE USE
TSS 500-M	TSS500 M10	EMTEST	V0502100031	1156	II	CAL BEFORE USE
NSG 2050 SURGE GENERATOR	NSG 2050	TESEQ	200720-605LU	1273	I	11-JUL-2008
PNW 2050 1.2x50 IMPULSE NETWORK	PNW 2050	TESEQ	200711-604LU	1279	I	11-JUL-2008
CDN 133 3 PHASE COUPLING NETWORK	CDN 133	TESEQ	34416	1274	I	11-JUL-2008
MODULA6150	MODULA6150	TESEQ	34525	1268	I	11-JUL-2008
RED BESTEMC-2	711-1100	SCHAFFNER	200122-074SC	00623	II	27-FEB-2009
SURGE CURRENT MONITOR	CM-1-L	ION PHYSICS	896730	1276	II	26-JUL-2008
ECOMPACT4	ECOMPACT4	HAEFELY	155858	RENTAL	II	11-FEB-2009

POWER/NOISE METERS	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
POWER METER	435B	HP	2445A11012	00773	I	03-MAY-2008
POWER METER	437B	HP	2912A01367	01099	I	03-MAY-2008
POWER SENSOR	8481A	HP	2702A61351	00774	I	04-MAY-2008
POWER METER	4232A	BOONTON	11000	1260	I	24-JUL-2008
POWER SENSOR	51013-4E	BOONTON	34457	1261	I	24-JUL-2008
PSOPHOMETER	2429	BRUEL & KJAER	1237642	00585	II	23-FEB-2009
TRANSMISSION LINE TESTER (dBRNC)	185T	AMREL	18507030010	1236	II	04-APR-2009
TRANSMISSION LINE TESTER (dBRNC)	185T	AMREL	998658	00823	II	04-APR-2009
THD, POWER & HARMONIC ANALYZER	NANOVIP PLUS	ELCONTROL ENERGY	15925	00250	I	04-SEP-2009
CURRENT CLAMP FOR NANOVIP	MN 13-EL	ELCONTROL ENERGY	NA	1293	I	04-SEP-2009

OVERVOLTAGE CHAMBERS	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
72kW POWER FAULT SIMULATOR	OV1	C-S	N/A	00792	III	N/A
POWER FAULT SIMULATOR	OV2	C-S	N/A	00116	III	N/A

DIPOLE TAPE MEASURES	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
26FT TAPE #1	2338CME	LUFKIN	C3166-1	00776	II	22-MAR-2009
26FT TAPE #2	2338CME	LUFKIN	C3166-2	00777	II	22-MAR-2009

METEOROLOGICAL METERS	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
TEMP./HUMIDITY/ATM. PRESSURE GAUGE	7400 PERCEPTION II	DAVIS	N/A	00965	II	OUT OF SERVICE
TEMPERATURE /HUMIDITY GAUGE	THG-912	HUGER	4000562	00789	I	31-JAN-2009
WEATHER CLOCK (PRESSURE ONLY)	BA928	OREGON SCIENTIFIC	C3166-1	00831	I	08-FEB-2009
OFFICE HYGRO/THERMOMETER	35519-044	CONTROL COMPANY	72436083	1336	I	07-AUG-2009
HYGRO/THERMOMETER (SITE A)	35519-044	CONTROL COMPANY	72457628	1337	I	14-AUG-2009
HYGRO/THERMOMETER (EMI3)	35519-044	CONTROL COMPANY	72457729	1338	I	14-AUG-2009
HYGRO/THERMOMETER (EMI4)	35519-044	CONTROL COMPANY	72457728	1339	I	14-AUG-2009
HYGRO/THERMOMETER (EMI2)	35519-044	CONTROL COMPANY	72457719	1340	I	14-AUG-2009
HYGRO/THERMOMETER (OV1)	35519-044	CONTROL COMPANY	72457633	1341	I	14-AUG-2009
HYGRO/THERMOMETER (SITE F)	35519-044	CONTROL COMPANY	72457631	1342	I	14-AUG-2009
HYGRO/THERMOMETER (SITE M)	35519-044	CONTROL COMPANY	72457758	1343	I	14-AUG-2009
HYGRO/THERMOMETER (EMI1)	35519-044	CONTROL COMPANY	72457730	1344	I	14-AUG-2009
HYGRO/THERMOMETER (RF11)	35519-044	CONTROL COMPANY	72457635	1334	I	26-NOV-2009
HYGRO/THERMOMETER (RF12)	35519-044	CONTROL COMPANY	72457738	1335	I	26-NOV-2009
HYGRO/THERMOMETER (RF13)	35519-044	CONTROL COMPANY	72457642	1345	I	14-AUG-2009
HYGRO/THERMOMETER (EMC 1-2)	35519-044	CONTROL COMPANY	72457636	1346	I	14-AUG-2009
HYGRO/THERMOMETER (SITE T)	35519-044	CONTROL COMPANY	72457639	1347	I	14-AUG-2009
HYGRO/THERMOMETER (EMC 3-4)	35519-044	CONTROL COMPANY	72457647	1348	I	14-AUG-2009
THERMOCOUPLE MODULE (FOR DMM)	80TK	FLUKE	93410013	1308	I	20-NOV-2008
THERMOCOUPLE MODULE (FOR DMM)	80TK	FLUKE	93410017	1309	I	20-NOV-2008

CONSUMABLES	SPEC.	MFR	STOCK/MN	ASSET	CAT	CALIBRATION DUE
NEBS CHEESECLOTH	26-28M/KG	ED&D	ACC-01	N/A	III	N/A
NEBS CARBON BLOCK	3-MIL-GAP 1KV SURGE	RELIABLE	3AB	N/A	III	N/A

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



Conditions Of Testing

[Bureau Veritas Consumer Products Services, Inc., a Massachusetts corporation], and/or its affiliates (collectively, the "Company") will conduct, at the request of the Submitter ("Client"), the tests specified on the submitted Test Request Form or equivalent in accordance with, and subject to, the following terms and conditions (collectively, "Conditions"):

1. All orders for tests are subject to acceptance by the Company, and no order will constitute a binding commitment of the Company unless and until such order is accepted by it, as evidenced by the issuance of a written report ("Test Report") by the Company. The Test Report is issued solely by the Company, is intended for the exclusive use of Client and shall not be published, used for advertising purposes, copied or replicated for distribution to any other person or entity or otherwise publicly disclosed without the prior written consent of the Company. By submitting a request for services to the Company, Client consents to the disclosure to accreditation bodies of those records of Client relevant to the accreditation body's assessment of the Company's competence and compliance with relevant accreditation criteria. The Company shall not be liable for any loss or damage whatsoever resulting from the failure of the Company to provide its services within any time period for completion estimated by the Company. If Client anticipates using the Test Report in any legal proceeding, arbitration, dispute resolution forum or other proceeding, it shall so notify the Company prior to submitting the Test Report in such proceeding. The Company has no obligation to provide a fact or expert witness at such proceeding unless the Company agrees in advance to do so for a separate and additional fee.
2. The Test Report will set forth the findings of the Company solely with respect to the test samples identified therein. Unless specifically and expressly indicated in the Test Report, the results set forth in such Test Report are not intended to be indicative or representative of the quality or characteristics of the lot from which a test sample is taken, and Client shall not rely upon the Test Report as being so indicative or representative of the lot or of the tested product in general. The Test Report will reflect the findings of the Company at the time of testing only, and the Company shall have no obligation to update the Test Report after its issuance. The Test Report will set forth the results of the tests performed by the Company based upon the written information provided to the Company. The Test Report will be based solely on the samples and written information submitted to the Company by Client, and the Company shall not be obligated to conduct any independent investigation or inquiry with respect thereto.
3. The Company may, in its sole discretion, destroy samples which have been furnished to the Company for testing and which have not been destroyed in the course of testing. The Company may delegate the performance of all or a portion of the services contemplated hereunder to an affiliate, agent or subcontractor of the Company, and Client consents to such delegation.
4. These Conditions and the Test Report represent the entire understanding of the parties hereto with respect to the subject matter hereof and of the Test Report, and no modification, variance or extrapolation with respect thereto shall be permitted without the prior written consent of the Company.
5. The names, service marks, trademarks and copyrights of the Company and its affiliates, including the names "BUREAU VERITAS," "BUREAU VERITAS CONSUMER PRODUCTS SERVICES," "BVCPS," "MTL," "ACTS," "MTL-ACTS" and "CURTIS-STRAUS" (collectively, the "Marks") are and shall remain the sole property of the Company or its affiliates and shall not be used by Client except solely to the extent that Client obtains the prior written approval of the Company and then only in the manner prescribed by the Company. Client shall not contest the validity of the Marks or take any action that might impair the value or goodwill associated with the Marks or the image or reputation of the Company or its affiliates.
6. Payment in full shall be due 30 days after the date of invoice. Interest shall be due on overdue amounts from the due date until paid at an interest rate of 1.5% per month or, if less, the maximum rate permitted by law. The Company reserves the right, at any time and from time to time, to revoke any credit extended to Client. Client shall reimburse the Company for any costs it incurs in collecting past due amounts, including court costs and fees and expenses of attorneys and collection agencies. The Test Report may not be used or relied upon by Client if and for so long as Client fails to pay when due any invoice issued by the Company or any affiliate of it to Client or any affiliate or subsidiary of Client together with interest and penalties, if any, accrued thereon.
7. The Company disclaims any and all responsibility or liability arising out of or in connection with e-mail transmissions of such information.
8. Client understands and agrees that the Company is neither an insurer nor a guarantor, that the Company does not take the place of Client or any designer, manufacturer, agent, buyer, distributor or transportation or shipping company, and that the Company disclaims all liability in such capacities. Client further understands that if it seeks assurance against loss or damage, it should obtain appropriate insurance.
9. Client agrees that the Company, by providing the services, does not take the place of Client nor any third party, nor does the Company release them from any of their obligations, nor does the Company otherwise assume, abridge, abrogate or undertake to discharge any duty of any third party to Client or any duty of Client or any third party to any other third party, and Client will not release any third party from its obligations and duties with respect to the tested goods.
10. Client shall, on a timely basis, (a) provide adequate instructions to the Company in order to enable the Company to perform properly its services, (b) provide, or cause Client's suppliers and contractors to provide, the Company with all documents necessary to enable the Company to perform its services, (c) furnish the Company with all relevant information regarding Client's intended use and purposes of the tested goods, (d) advise the Company of essential dates and deadlines relevant to the tested goods and (e) fully exercise all rights and remedies available to Client against third parties in respect of the tested goods.
11. The Company shall undertake due care and ordinary skill in the performance of its services to Client, and the Company shall accept responsibility only were such skill has not been exercised and, even in such event, only to the extent of the limitation of liability set forth herein.
12. If Client desires to assert a claim arising from or relating to (i) the performance, purported performance or non-performance of any services by the Company or (ii) the sale, resale, manufacture, distribution or use of any tested goods, it must submit that claim to the Company in a writing that sets forth with particularity the basis for such claim within 60 days from discovery of the potential claim and not more than six months after the date of issuance of the Test Report to Client. Client waives any and all such claims including, without limitation, claims that the Test Report is inaccurate, incomplete or misleading or that additional or different testing is required, unless and then only to the extent that Client submits a written claim to the Company within both such time periods.
13. CLIENT SHALL, EXCEPT TO THE EXTENT OF COMPANY'S LIABILITY TO CLIENT HEREUNDER (WHICH IN NO EVENT SHALL EXCEED THE LIMITATION OF LIABILITY HEREIN), HOLD HARMLESS AND INDEMNIFY THE COMPANY, ITS

AFFILIATES AND THEIR RESPECTIVE DIRECTORS, OFFICERS, EMPLOYEES, AGENTS AND SUBCONTRACTORS AGAINST ALL ACTUAL OR ALLEGED THIRD PARTY CLAIMS FOR LOSS, DAMAGE OR EXPENSE OF WHATSOEVER NATURE AND HOWSOEVER ARISING FROM OR RELATING TO (i) THE PERFORMANCE, PURPORTED PERFORMANCE OR NON-PERFORMANCE OF ANY SERVICES BY THE COMPANY OR (ii) THE SALE, RESALE, MANUFACTURE, DISTRIBUTION OR USE OF ANY TESTED GOODS.

14. EXCEPT AS MAY OTHERWISE BE EXPRESSLY AGREED TO IN WRITING BY THE COMPANY AND NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN OR IN ANY TEST REPORT, NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, IS MADE.

15. (A) IN NO EVENT WHATSOEVER SHALL THE COMPANY BE LIABLE FOR ANY CONSEQUENTIAL, SPECIAL, INCIDENTAL, EXEMPLARY OR PUNITIVE DAMAGES IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE TEST REPORT OR THE SERVICES PROVIDED BY THE COMPANY HEREUNDER, INCLUDING WITHOUT LIMITATION LOSS OF OR DAMAGE TO PROPERTY; LOSS OF INCOME, PROFIT OR USE; OR ANY CLAIMS OR DEMANDS MADE AGAINST CLIENT OR ANY OTHER PERSON BY ANY THIRD PARTY IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE SERVICES PROVIDED BY THE COMPANY HEREUNDER.

(B) NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN, AND IN RECOGNITION OF THE RELATIVE RISKS AND BENEFITS TO CLIENT AND THE COMPANY ASSOCIATED WITH THE TESTING SERVICES CONTEMPLATED HEREBY, THE RISKS HAVE BEEN ALLOCATED SUCH THAT UNDER NO CIRCUMSTANCES WHATSOEVER SHALL THE LIABILITY OF THE COMPANY TO CLIENT OR ANY THIRD PARTY IN RESPECT OF ANY CLAIM FOR LOSS, DAMAGE OR EXPENSE, OF WHATSOEVER NATURE OR MAGNITUDE, AND HOWSOEVER ARISING, EXCEED AN AMOUNT EQUAL TO FIVE (5) TIMES THE AMOUNT OF THE FEES PAID TO THE COMPANY FOR THE SPECIFIC SERVICES WHICH GAVE RISE TO SUCH CLAIM OR U.S.\$10,000, WHICHEVER IS THE LESSER AMOUNT.

16. The Company shall not be liable for any loss or damage resulting from any delay or failure in performance of its obligations hereunder resulting directly or indirectly from any event of force majeure or any event outside the control of the Company. If any such event occurs, the Company may immediately cancel or suspend its performance hereunder without incurring any liability whatsoever to Client.

17. Company's services, including these Conditions, shall be governed by, and construed in accordance with, the local laws of the country where the Company performs the tests or, in the case of tests performed in the United States of America, the laws of Massachusetts without regard to conflicts of laws principles. If any aspect(s) of these Conditions is found to be illegal or unenforceable, the validity, legality and enforceability of all remaining aspects of these Conditions shall not in any way be affected or impaired thereby. Any proceeding related to the subject matter hereof shall be brought, if at all, in the courts of the country where the Company performs the tests or, in the case of tests performed in the United States of America, in the courts of Massachusetts. Client waives the right to interpose any counterclaim or setoffs of any nature in any litigation arising hereunder.

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