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Electrical

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TEST REPORT

ACCORDING TO: FCC CFR 47 PART 15 Subpart C, section 15.209 and subpart B

FOR:

Rosslare Enterprises Ltd.

Proximity & Keypad Reader Models: AYC-F64, AYC-G64, AYC-Q64

Report ID: ROSRAD_FCC.16388.doc
Date of Issue: 5/22/2005

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1 Applicant information

Client name:	Rosslare Enterprises Ltd.
Address:	9th FL Wing, Flat 12 Wing Fat Industrial Bldg, Kowloon Bay, 12 Wang Tai Rd, Kowloon, Hong Kong
Telephone:	+852 2795 5630
Fax:	+852 2795 1508
E-mail:	benzi.torem@rosslaresecurity.com
Contact name:	Mr. Benzi Torem

2 Equipment under test attributes

Product name:	Proximity & keypad reader
Product type:	Transmitter
Model(s):	AYC-F64, AYC-G64, AYC-Q64
Receipt date	4/25/2005

3 Manufacturer information

Manufacturer name:	Rosslare Enterprises Ltd.
Address:	9th FL Wing, Flat 12 Wing Fat Industrial Bldg, Kowloon Bay, 12 Wang Tai Rd, Kowloon, Hong Kong
Telephone:	+852 2795 5630
Fax:	+852 2795 1508
E-Mail:	benzi.torem@rosslaresecurity.com
Contact name:	Mr. Benzi Torem

4 Test details

Project ID:	16388
Location:	Hermon Laboratories Ltd. P.O.Box 23, Binyamina 30500, Israel
Test started:	4/25/2005
Test completed:	4/26/2005
Test specification(s):	FCC Part 15, subpart C, §15.209; subpart B, §15.109
Test suite:	FCC_15.225 (5/3/2004 5:43:04 PM, modified)

5 Tests summary

Test	Status
Transmitter characteristics	
Section 15.209 (a), Fundamental radiated emissions	Pass
Section 15. 209 (c), Unwanted radiated emissions	Pass
Section 15.207 (a), Conducted emission	Pass
Unintentional emissions	
Section 15.107, Conducted emission at AC power port	Pass
Section 15.109, Radiated emission	Pass

Testing was completed against all relevant requirements of the test standard. The results obtained indicate that the product under test complies in full with the requirements tested.
The test results relate only to the items tested. Pass/ fail decision was based on nominal values.

	Name and Title	Date	Signature
Tested by:	Mr. A. Lane, test engineer	April 26, 2005	
Reviewed by:	Mrs. M. Cherniavsky, certification engineer	May 22, 2005	
	Mr. M. Nikishin, EMC group leader	May 31, 2005	
Approved by:	Mr. A. Usoskin, CEO	June 1, 2005	

6 EUT description

6.1 General information

The EUT is a door access controller with proximity reader, operating at 125 kHz. The device is powered by 12 VDC supplied with the controller via the common power and signal cable.

6.2 Ports and lines

Port type	Port description	Connected		Connector type	Qty.	Cable type	Cable length	Indoor / outdoor
		From	To					
Power and signal	Power and signal	EUT	Controller	Non detachable	1	Unshielded	12 m	Indoor

6.3 EUT cards

Name of card	Hardware version of card
AYC-F64 model	
Keyboard	OP-ALM244-V4
Main	OP-ALM233-V3
AYC-G64 model	
Keyboard	OP-ALM194-V7
Main	OP-ALM198-V8
AYC-Q64 model	
Main	OP-ALM235-V2

6.4 Auxiliary equipment

Description	Manufacturer	Model number	Serial number
Power supply	FP	D48-138-880	NA
Controller	DSX	DSX-1020	M4901

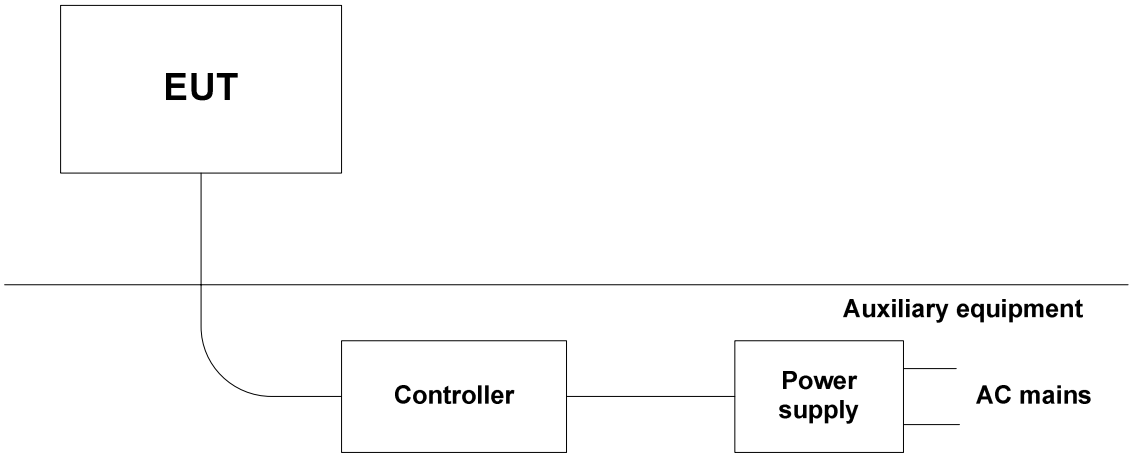
6.5 Operating frequencies

Source	Frequency, MHz
Crystal	20

6.6 Changes made in the EUT

No changes were implemented.

6.7 Test configuration



6.8 Transmitter characteristics

Type of equipment	
V	Stand-alone (Equipment with or without its own control provisions)
	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)
	Plug-in card (Equipment intended for a variety of host systems)

Intended use		Condition of use
	fixed	Always at a distance more than 2 m from all people
V	mobile	Always at a distance more than 20 cm from all people
	portable	May operate at a distance closer than 20 cm to human body

Assigned frequency range	NA
Operating frequency range	125 kHz
RF channel spacing	NA

Is transmitter output power variable?				
V	No			
	Yes		continuous variable	
			stepped variable with stepsize	dB
		minimum RF power		dBm
		maximum RF power		dBm

Antenna connection				
unique coupling	standard connector	V	integral	with temporary RF connector
				V without temporary RF connector

Transmitter 99% power bandwidth	NA
Transmitter aggregate data rate/s	NA
Transmitter aggregate symbol (baud) rate/s	NA
Type of modulation	ASK
Type of multiplexing	NA
Modulating test signal (baseband)	ID Code
Transmitter duty cycle supplied for test	100%

Transmitter power source					
	Battery	**Nominal rated voltage**	VDC	Battery type	
V	DC	**Nominal rated voltage**	12 VDC		
	AC mains	**Nominal rated voltage**	VAC	Frequency	Hz

Test specification:	Section 15.209(a), Field strength of fundamental		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/25/2005 6:26:03 PM		
Temperature: 21 ºC	Air Pressure: 1010 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

7 Transmitter tests according to 47CFR part 15 subpart C requirements

7.1 Field strength of fundamental emission

7.1.1 General

This test was performed to measure field strength of fundamental and spurious emissions from the EUT. Specification test limits are given in Table 7.1.1.

Table 7.1.1 Radiated emission test limits

Frequency, MHz	Class B limit, dB(µV/m) @3 m distance		
	Peak	Quasi-peak	Average
0.009 – 0.090	148.5 – 128.5	NA	128.5 – 108.5
0.090 – 0.110	NA	108.5 – 106.8	NA
0.110 – 0.490	126.8 – 113.8	NA	106.8 – 93.8
0.490 – 1.705	NA	73.8 – 63.0	NA
1.705 – 30.0		69.5	
30 - 88		40.0	
88 - 216		43.5	
216 - 960		46.0	
960 - 1000		54.0	
1000 –10thharmonic	74.0	NA	54.0

* The limit for test distance other than specified was calculated using the inverse linear distance extrapolation factor as follows: $Lim_{S2} = Lim_{S1} + 40 \log (S_1/S_2)$,
where S_1 and S_2 – standard defined and test distance respectively in meters.

Table 7.1.2 Radiated fundamental emission limits

Fundamental frequency, kHz	Field strength at 3 m, dB(µV/m)
	Average
125	105.67

7.1.2 Test procedure

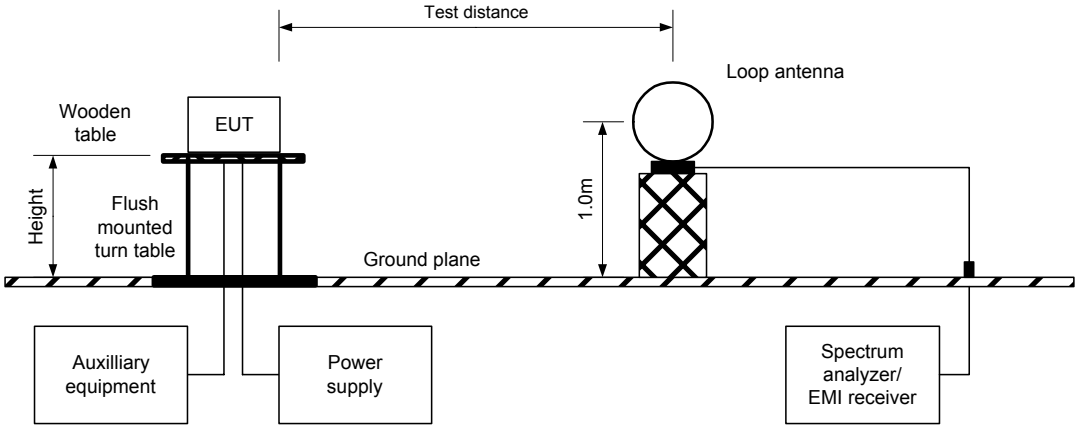
7.1.2.1 The EUT was set up as shown in Figure 7.1.1 energized and the performance check was conducted.

7.1.2.2 The specified frequency range was investigated with loop antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360^0, the measuring antenna was rotated around its vertical axis and the measuring antenna polarization was switched from vertical to horizontal.

7.1.2.3 The worst test results (the lowest margins) were recorded in Table 7.1.3 and shown in the associated plots.

Test specification:	**Section 15.209(a), Field strength of fundamental**		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/25/2005 6:26:03 PM		
Temperature: 21 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %	**Power Supply:** 12 V DC
Remarks:			

Figure 7.1.1 Setup for in band radiated emission measurements



Test specification:	**Section 15.209(a), Field strength of fundamental**		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/25/2005 6:26:03 PM		
Temperature: 21 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %	**Power Supply:** 12 V DC
Remarks:			

Table 7.1.3 Fundamental emission test results

TEST DISTANCE: 3 m
EUT POSITION: Typical (Vertical)
MODULATION: ASK
MODULATING SIGNAL: CW
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
RESOLUTION BANDWIDTH: 9.0 kHz
VIDEO BANDWIDTH: 30.0 kHz

Frequency, kHz	Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*	Antenna polarization	Azimuth**, degrees	Verdict
AYC-G64						
123.64	76.31	105.67	-29.36	V	148	Pass
AYC-Q64						
125.76	64.54	105.67	-41.13	V	150	Pass
AYC-F64						
126.81	77.75	105.67	-27.92	V	138	Pass

*- Margin = Measured emission - specification limit.
**- EUT front panel refer to 0 degrees position of turntable.

Reference numbers of test equipment used

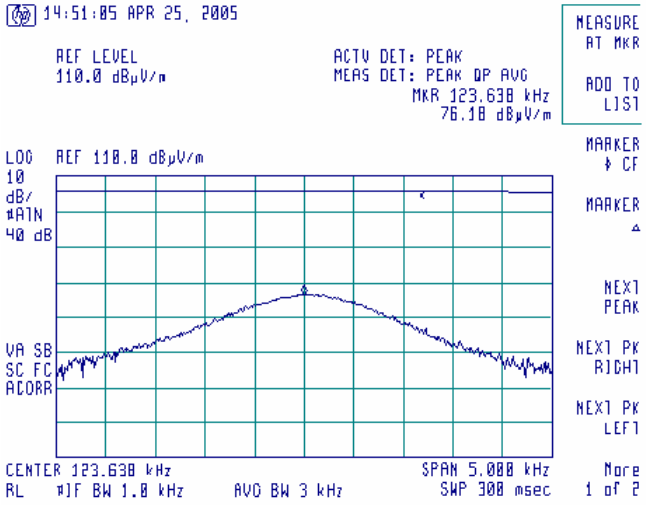
HL 0446	HL 0465	HL 0592	HL 0593	HL 0594	HL 0521	HL 0589	HL 2009

Full description is given in Appendix A.

Test specification:	**Section 15.209(a), Field strength of fundamental**		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/25/2005 6:26:03 PM		
Temperature: 21 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %	**Power Supply:** 12 V DC
Remarks:			

Plot 7.1.1 Fundamental emission test results

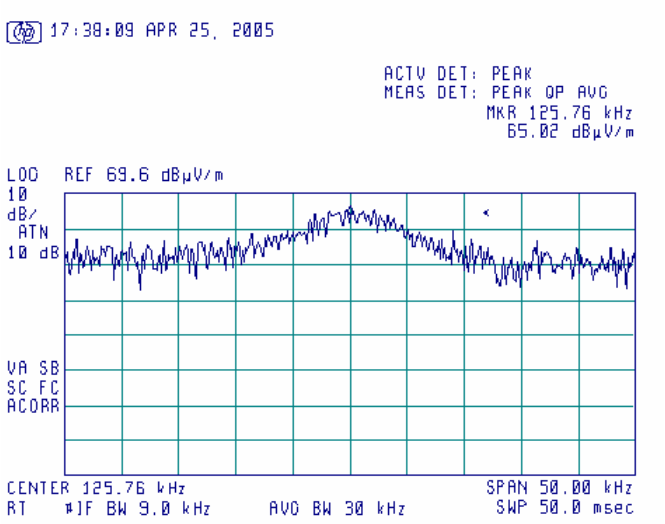
EUT: AYC-G64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
DETECTOR: Peak hold



Test specification:	**Section 15.209(a), Field strength of fundamental**		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/25/2005 6:26:03 PM		
Temperature: 21 ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %	**Power Supply:** 12 V DC
Remarks:			

Plot 7.1.2 In band radiated emission test results

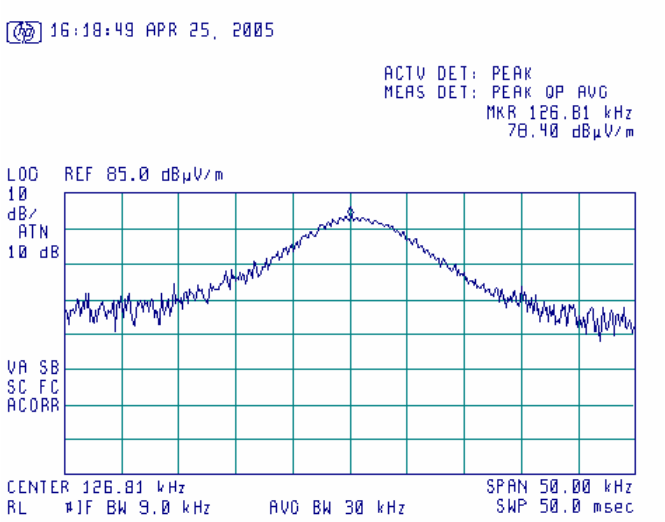
EUT:	AYC-Q64
TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
DETECTOR:	Peak hold



Test specification:	Section 15.209(a), Field strength of fundamental		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/25/2005 6:26:03 PM		
Temperature: 21 ºC	Air Pressure: 1010 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

Plot 7.1.3 In band radiated emission test results

EUT:	AYC-F64
TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
DETECTOR:	Peak hold



Test specification:	Sections 15.209(c), Unwanted radiated emissions		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/25/2005 6:30:37 PM		
Temperature: 21ºC	Air Pressure: 1010 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

7.2 Unwanted radiated emissions

7.2.1 General

This test was performed to measure field strength of spurious emissions from the EUT. Specification test limits are given in Table 7.2.1.

Table 7.2.1 Radiated emission limits

Frequency*, MHz	Field strength at 3 m, dB(μV/m)		
	Peak	Quasi Peak	Average
0.009 – 0.490**	NA	128.5 – 93.8***	NA
0.490 – 1.705**		73.8 – 63.0***	
1.705 – 30.0**		69.5	
30 – 88		40.0	
88 – 216		43.5	
216 – 960		46.0	
960 – 1000		54.0	
1000 – 10th harmonic	74.0	NA	54.0

*- The above field strength limits applied from the lowest radio frequency generated in the device, without going below 9 kHz up to the tenth harmonic of the highest fundamental frequency.
**- The limit for 3 m test distance was calculated using the inverse square distance extrapolation factor as follows:

$$Lim_{S2} = Lim_{S1} + 40 \log (S_1/S_2),$$

where S_1 and S_2 – standard defined and test distance respectively in meters.
***- The limit decreases linearly with the logarithm of frequency.

7.2.2 Test procedure for spurious emission field strength measurements in 9 kHz to 30 MHz band

7.2.2.1 The EUT was set up as shown in Figure 7.2.1, energized and the performance check was conducted.

7.2.2.2 The specified frequency range was investigated with loop antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360^0, the measuring antenna was rotated around its vertical axis and the measuring antenna polarization was switched from vertical to horizontal.

7.2.2.3 The worst test results (the lowest margins) were recorded in Table 7.2.2 and shown in the associated plots.

7.2.3 Test procedure for spurious emission field strength measurements above 30 MHz

7.2.3.1 The EUT was set up as shown in Figure 7.2.2, energized and the performance check was conducted.

7.2.3.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360^0, the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal.

7.2.3.3 The worst test results (the lowest margins) were recorded in Table 7.2.2 and shown in the associated plots.

Test specification:	**Sections 15.209(c), Unwanted radiated emissions**		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/25/2005 6:30:37 PM		
Temperature: 21ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %	**Power Supply:** 12 V DC
Remarks:			

Figure 7.2.1 Radiated emissions below 30 MHz test set up

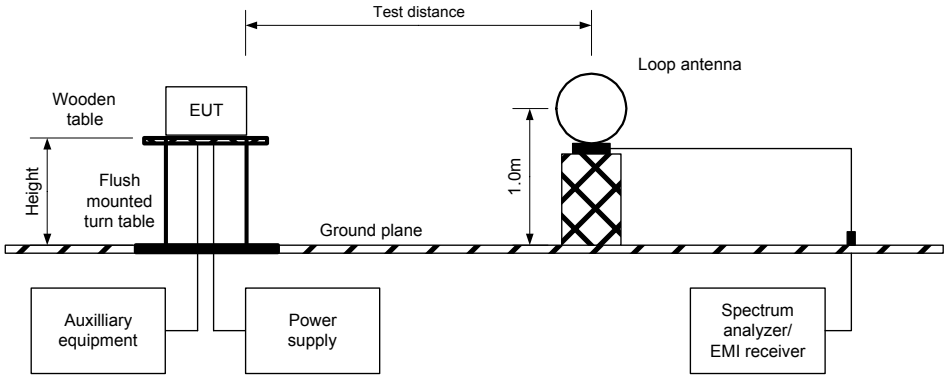
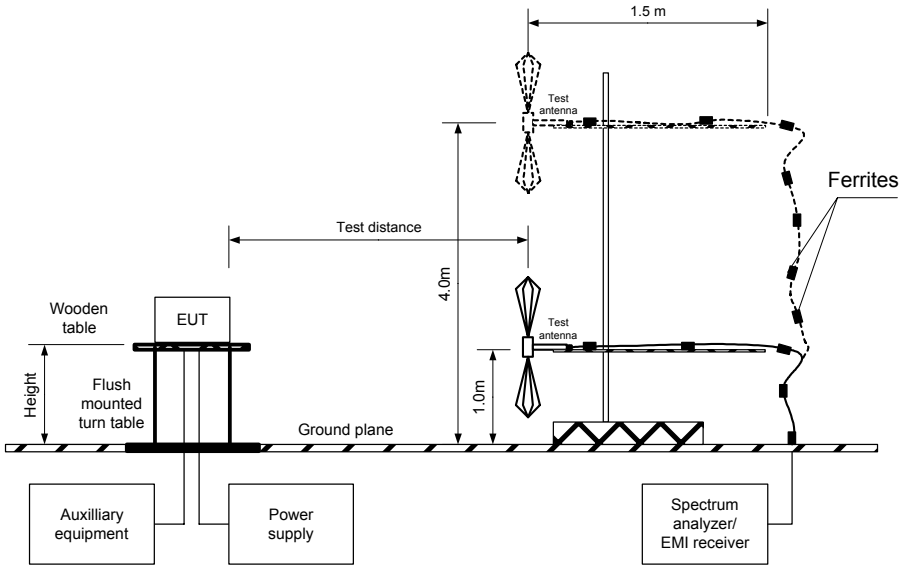


Figure 7.2.2 Radiated emissions above 30 MHz test set up



Test specification:	**Sections 15.209(c), Unwanted radiated emissions**		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/25/2005 6:30:37 PM		
Temperature: 21ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %	**Power Supply:** 12 V DC
Remarks:			

Table 7.2.2 Out of band radiated emissions test results

TEST DISTANCE:	3 m
EUT POSITION:	Typical (Vertical)
MODULATION:	ASK
MODULATING SIGNAL:	CW
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
INVESTIGATED FREQUENCY RANGE:	0.009 – 1000 MHz
RESOLUTION BANDWIDTH:	0.2 kHz (9 kHz – 150 kHz) 9.0 kHz (150 kHz – 30 MHz) 120 kHz (30 MHz – 1000 MHz)
VIDEO BANDWIDTH:	≥ Resolution bandwidth
TEST ANTENNA TYPE:	Active loop (9 kHz – 30 MHz) Biconilog (30 MHz – 1000 MHz)

Frequency, MHz	**Peak emission, dB(µV/m)**	**Quasi-peak**			**Antenna polarization**	**Antenna height, m**	**Turn-table position**, degrees**	**Verdict**
		Measured emission, dB(µV/m)	**Limit, dB(µV/m)**	**Margin, dB***				
AYC-F64								
60.010000	25.63	24.52	40.00	-15.48	V	1.2	200	Pass
100.016250	26.02	24.62	43.50	-18.88	v	1	265	Pass
AYC-G64								
59.997500	22.67	21.01	40.00	-18.99	V	1	216	Pass
AYC-Q64								
All spurious were found at least 20 dB below the specified limit								Pass

*- Margin = Measured emission - specification limit.
**- EUT front panel refer to 0 degrees position of turntable.

Reference numbers of test equipment used

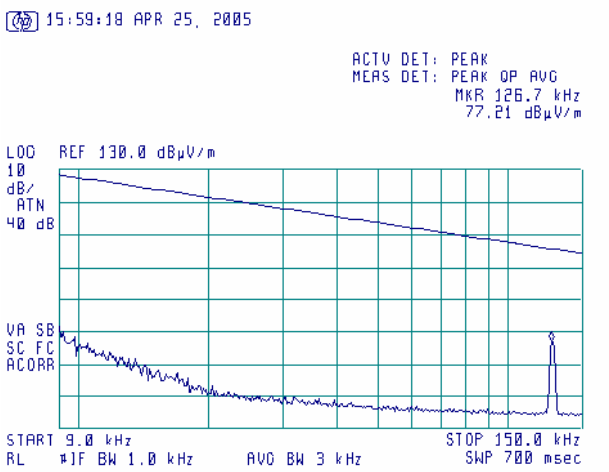
HL 0446	HL 0465	HL 0521	HL 0589	HL 0592	HL 0593	HL 0594	HL 0604
HL 2009							

Full description is given in Appendix A.

Test specification:	**Sections 15.209(c), Unwanted radiated emissions**		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/25/2005 6:30:37 PM		
Temperature: 21ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %	**Power Supply:** 12 V DC
Remarks:			

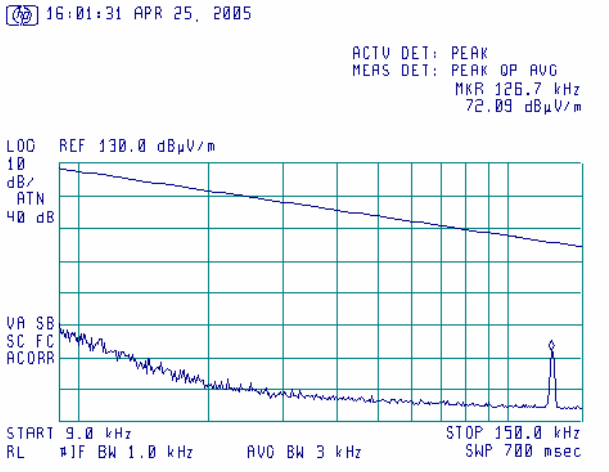
Plot 7.2.1 Radiated emission measurements from 9 to 150 kHz

EUT: AYC-F64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
DETECTOR: Peak hold



Plot 7.2.2 Radiated emission measurements from 9 to 150 kHz

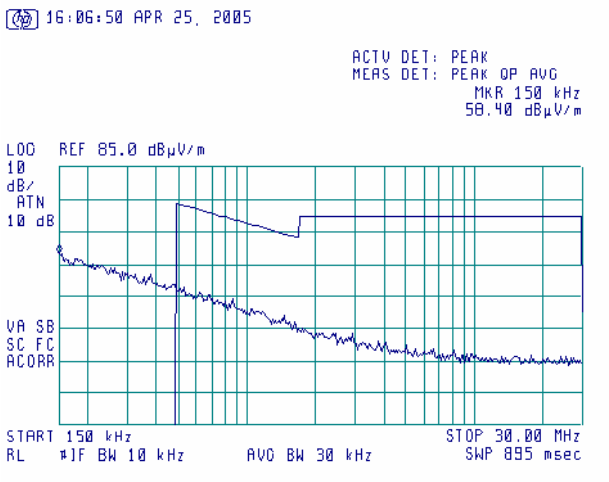
EUT: AYC-F64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal
DETECTOR: Peak hold



Test specification:	**Sections 15.209(c), Unwanted radiated emissions**		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/25/2005 6:30:37 PM		
Temperature: 21ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %	**Power Supply:** 12 V DC
Remarks:			

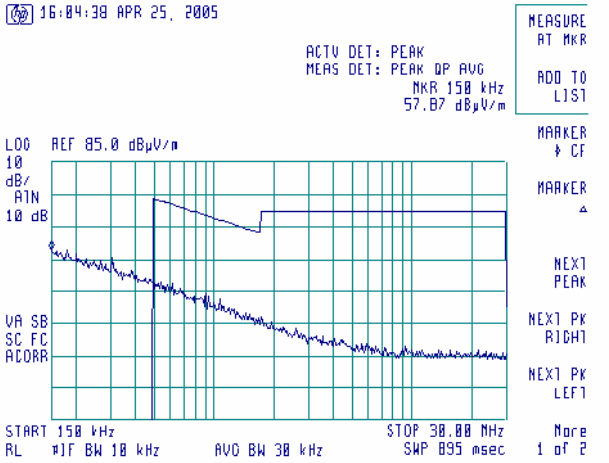
Plot 7.2.3 Radiated emission measurements from 0.15 to 30 MHz

EUT:	AYC-F64
TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
ANTENNA POLARIZATION:	Vertical
DETECTOR:	Peak hold



Plot 7.2.4 Radiated emission measurements from 0.15 to 30 MHz

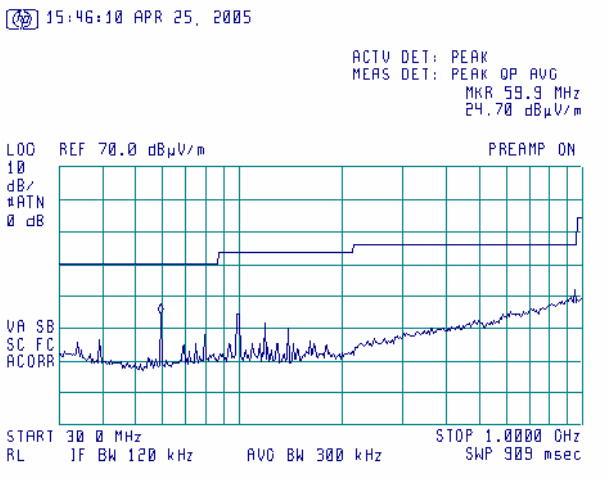
EUT:	AYC-F64
TEST SITE:	Semi anechoic chamber
TEST DISTANCE:	3 m
ANTENNA POLARIZATION:	Horizontal
DETECTOR:	Peak hold



Test specification:	**Sections 15.209(c), Unwanted radiated emissions**		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/25/2005 6:30:37 PM		
Temperature: 21ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %	**Power Supply:** 12 V DC
Remarks:			

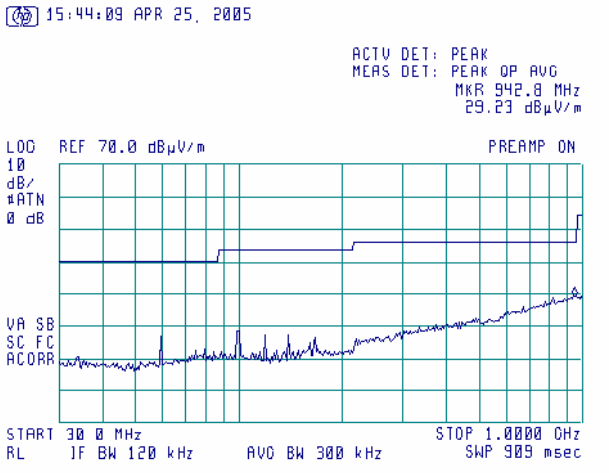
Plot 7.2.5 Radiated emission measurements from 30 to 1000 MHz

EUT: AYC-F64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
DETECTOR: Peak hold



Plot 7.2.6 Radiated emission measurements from 30 to 1000 MHz

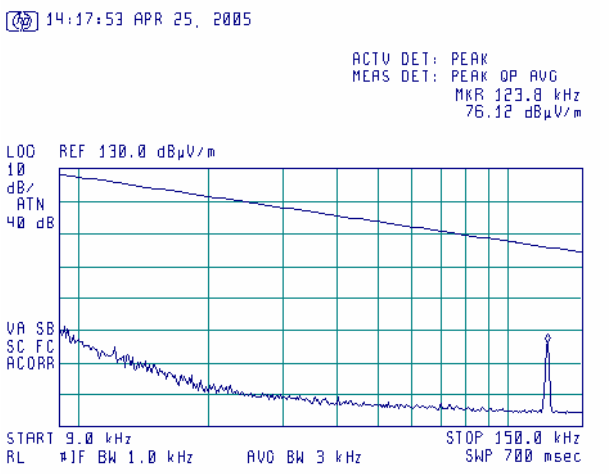
EUT: AYC-F64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal
DETECTOR: Peak hold



Test specification:	Sections 15.209(c), Unwanted radiated emissions		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/25/2005 6:30:37 PM		
Temperature: 21ºC	Air Pressure: 1010 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

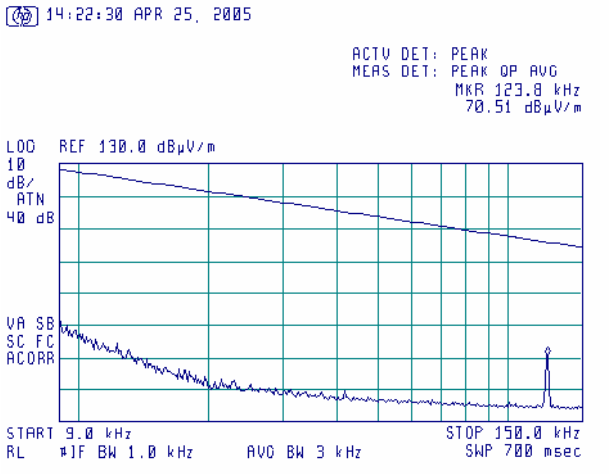
Plot 7.2.7 Radiated emission measurements from 9 to 150 kHz

EUT: AYC-G64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
DETECTOR: Peak hold



Plot 7.2.8 Radiated emission measurements from 9 to 150 kHz

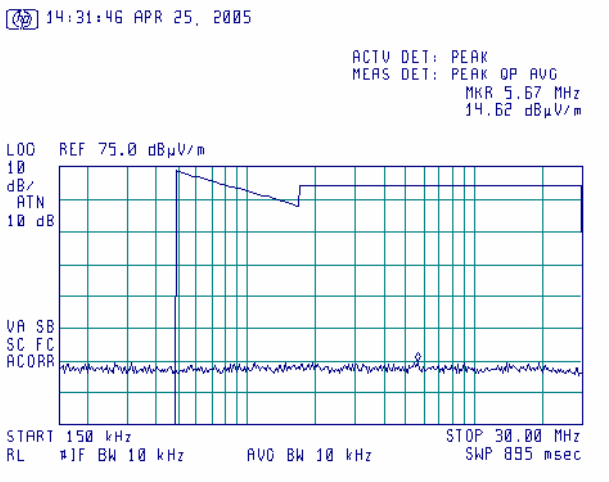
EUT: AYC-G64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal
DETECTOR: Peak hold



Test specification:	**Sections 15.209(c), Unwanted radiated emissions**		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/25/2005 6:30:37 PM		
Temperature: 21ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %	**Power Supply:** 12 V DC
Remarks:			

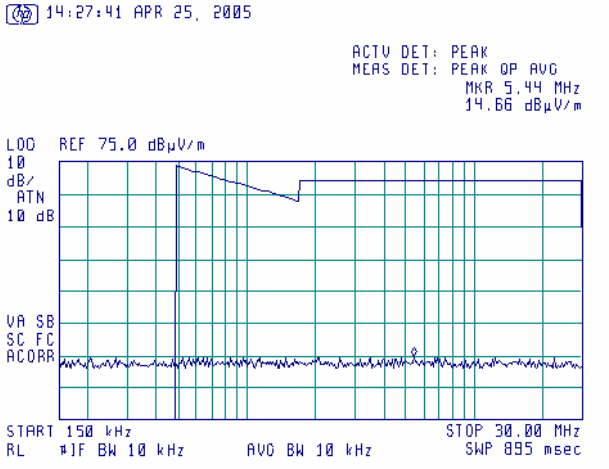
Plot 7.2.9 Radiated emission measurements from 0.15 to 30 MHz

EUT: AYC-G64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
DETECTOR: Peak hold



Plot 7.2.10 Radiated emission measurements from 0.15 to 30 MHz

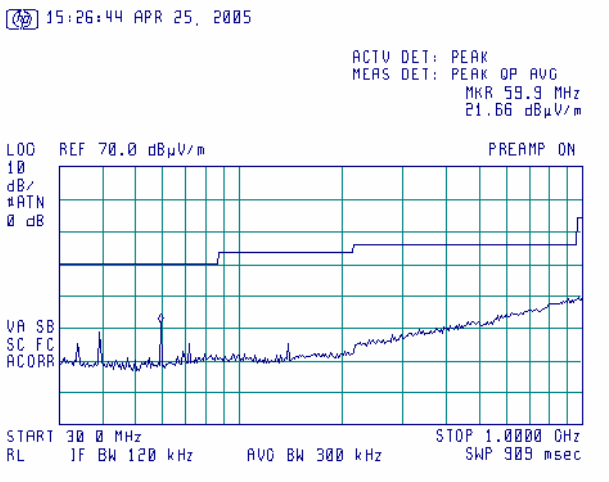
EUT: AYC-G64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal
DETECTOR: Peak hold



Test specification:	**Sections 15.209(c), Unwanted radiated emissions**		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/25/2005 6:30:37 PM		
Temperature: 21ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %	**Power Supply:** 12 V DC
Remarks:			

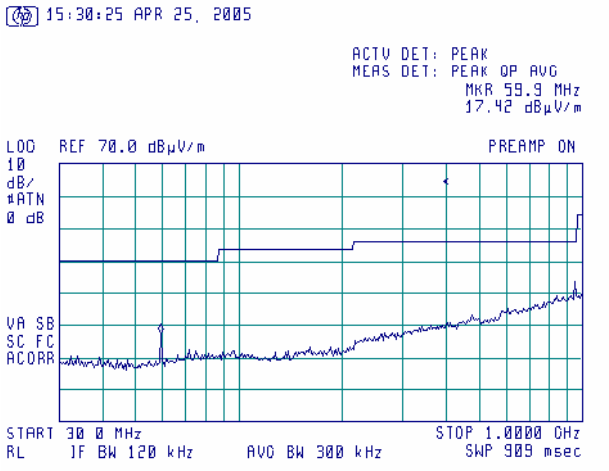
Plot 7.2.11 Radiated emission measurements from 30 to 1000 MHz

EUT: AYC-G64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
DETECTOR: Peak hold



Plot 7.2.12 Radiated emission measurements from 30 to 1000 MHz

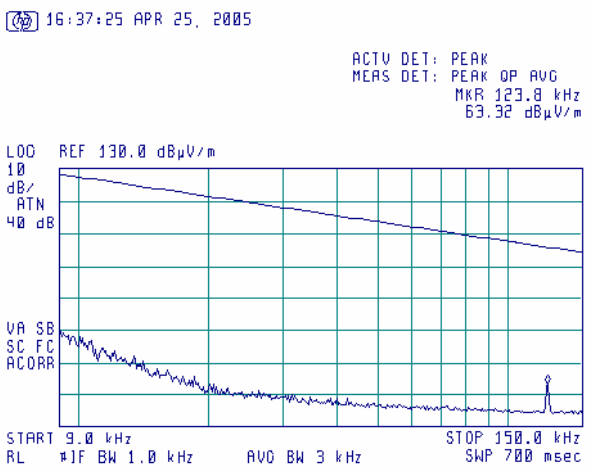
EUT: AYC-G64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal
DETECTOR: Peak hold



Test specification:	Sections 15.209(c), Unwanted radiated emissions		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/25/2005 6:30:37 PM		
Temperature: 21ºC	Air Pressure: 1010 hPa	Relative Humidity: 48 %	Power Supply: 12 V DC
Remarks:			

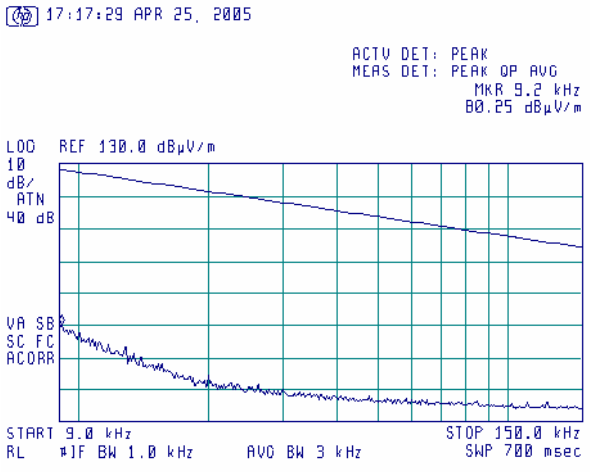
Plot 7.2.13 Radiated emission measurements from 9 to 150 kHz

EUT: AYC-Q64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
DETECTOR: Peak hold



Plot 7.2.14 Radiated emission measurements from 9 to 150 kHz

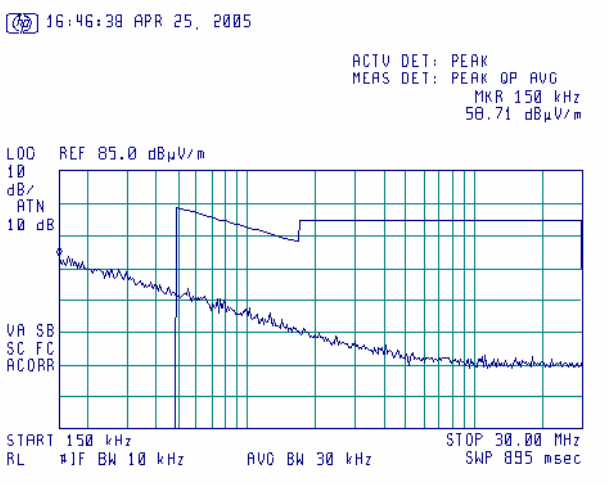
EUT: AYC-Q64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal
DETECTOR: Peak hold



Test specification:	**Sections 15.209(c), Unwanted radiated emissions**		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/25/2005 6:30:37 PM		
Temperature: 21ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %	**Power Supply:** 12 V DC
Remarks:			

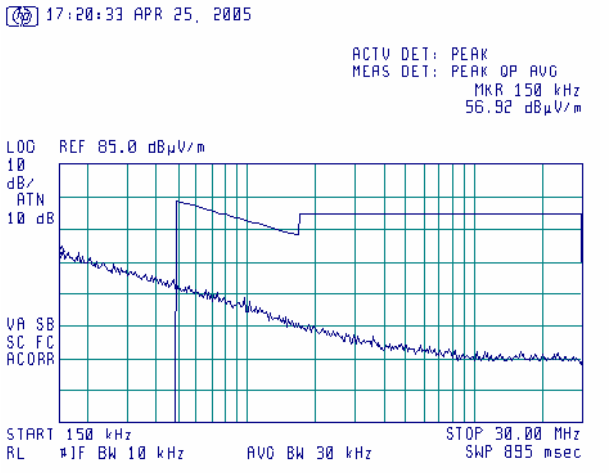
Plot 7.2.15 Radiated emission measurements from 0.15 to 30 MHz

EUT: AYC-Q64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
DETECTOR: Peak hold



Plot 7.2.16 Radiated emission measurements from 0.15 to 30 MHz

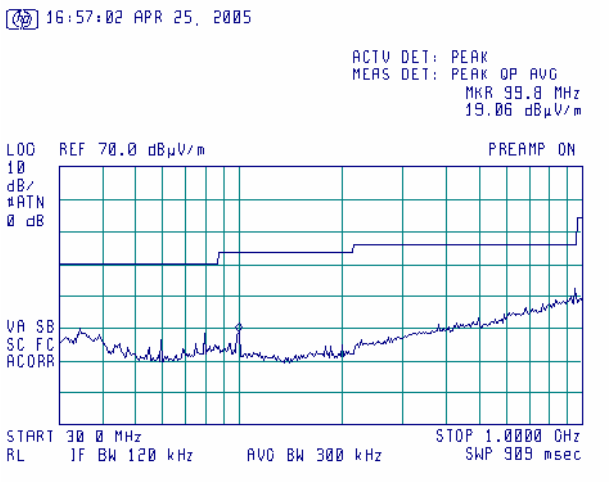
EUT: AYC-Q64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal
DETECTOR: Peak hold



Test specification:	**Sections 15.209(c), Unwanted radiated emissions**		
Test procedure:	ANSI C63.4, Sections 5.3 and 13.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/25/2005 6:30:37 PM		
Temperature: 21ºC	**Air Pressure:** 1010 hPa	**Relative Humidity:** 48 %	**Power Supply:** 12 V DC
Remarks:			

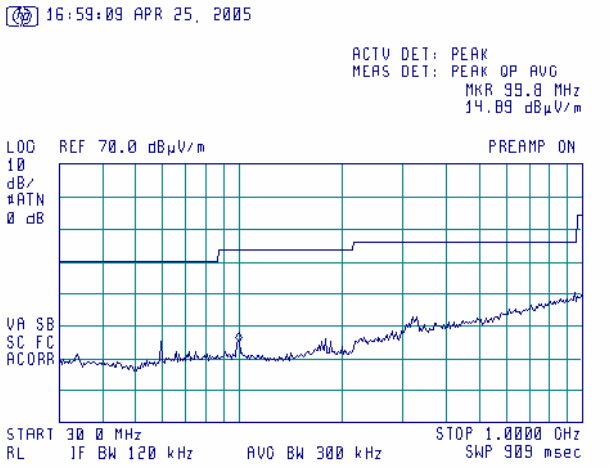
Plot 7.2.17 Radiated emission measurements from 30 to 1000 MHz

EUT: AYC-Q64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical
DETECTOR: Peak hold



Plot 7.2.18 Radiated emission measurements from 30 to 1000 MHz

EUT: AYC-Q64
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Horizontal
DETECTOR: Peak hold



Test specification:	Section 15.207(a), Conducted emission		
Test procedure:	ANSI C63.4, Section 13.1.3		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/26/2005 4:19:38 PM		
Temperature: 22 ºC	Air Pressure: 1015 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

7.3 Conducted emissions

7.3.1 General

This test was performed to measure common mode conducted emissions at the power port. Specification test limits are given in Table 7.3.1. The worst test results (the lowest margins) were recorded in Table 7.3.2 and shown in the associated plots.

Table 7.3.1 Limits for conducted emissions

Frequency, MHz	Class B limit, dB(µV)	
	QP	AVRG
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5.0	56	46
5.0 - 30	60	50

* The limit decreases linearly with the logarithm of frequency.

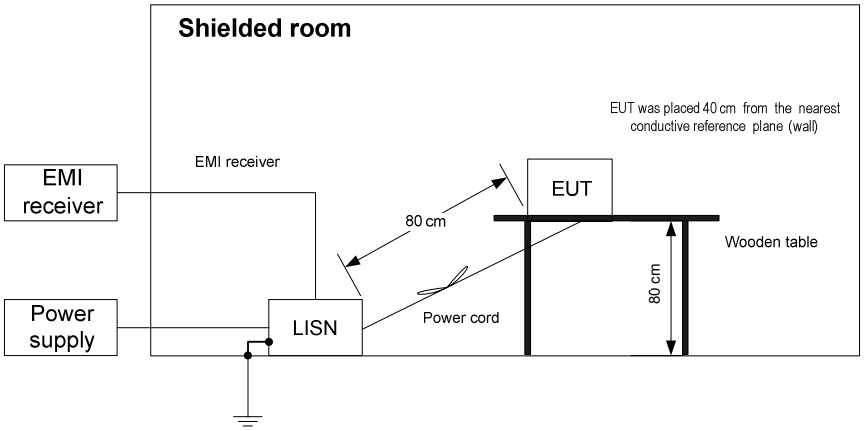
7.3.2 Test procedure

7.3.2.1 The EUT was set up as shown in Figure 7.3.1 and associated photographs, energized and the performance check was conducted.

7.3.2.2 The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer in the frequency range referred to in Table 7.3.1. Unused coaxial connector of the LISN was terminated with 50 Ohm. Quasi-peak and average detectors were used throughout the testing.

7.3.2.3 The position of the device cables was varied to determine maximum emission level.

Figure 7.3.1 Setup for conducted emission measurements, table-top equipment



Test specification:	**Section 15.207(a), Conducted emission**		
Test procedure:	ANSI C63.4, Section 13.1.3		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/26/2005 4:19:38 PM		
Temperature: 22 ºC	**Air Pressure:** 1015 hPa	**Relative Humidity:** 45 %	**Power Supply:** 120 V AC
Remarks:			

Table 7.3.2 Conducted emission test results

LINE:	AC mains
LIMIT:	Class B
EUT OPERATING MODE:	Transmit
EUT SET UP:	TABLE-TOP
TEST SITE:	SHIELDED ROOM
DETECTORS USED:	PEAK / QUASI-PEAK / AVERAGE
FREQUENCY RANGE:	150 kHz - 30 MHz
RESOLUTION BANDWIDTH:	9 kHz

EUT: AYC-Q64

Frequency, MHz	Peak emission, dB(µV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*	Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*		
0.173128	62.86	54.73	64.87	-10.14	24.32	54.87	-30.55	L1	Pass
0.198569	62.77	54.71	63.71	-9.00	24.34	53.71	-29.37		
0.204264	62.72	54.68	63.49	-8.81	24.28	53.49	-29.21		
0.231734	61.85	53.84	62.43	-8.59	23.43	52.43	-29.00		
0.250081	60.61	52.65	61.79	-9.14	22.04	51.79	-29.75		
0.299194	53.80	46.22	60.30	-14.08	15.95	50.30	-34.35		
0.198341	63.57	55.20	63.72	-8.52	24.52	53.72	-29.20	L2	Pass
0.199909	63.47	55.13	63.66	-8.53	24.47	53.66	-29.19		
0.201404	63.45	55.17	63.60	-8.43	24.49	53.60	-29.11		
0.242844	61.94	53.68	62.01	-8.33	23.16	52.01	-28.85		
0.275936	58.36	50.07	61.00	-10.93	19.64	51.00	-31.36		

EUT: AYC-F64

Frequency, MHz	Peak emission, dB(µV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*	Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*		
0.161081	62.36	54.54	65.46	-10.92	23.91	55.46	-31.55	L1	Pass
0.198493	62.22	54.51	63.71	-9.20	23.92	53.71	-29.79		
0.205579	62.10	54.44	63.44	-9.00	23.94	53.44	-29.50		
0.205831	62.17	54.45	63.43	-8.98	23.86	53.43	-29.57		
0.214790	61.89	54.21	63.09	-8.88	23.74	53.09	-29.35		
0.244766	60.54	53.07	61.95	-8.88	22.32	51.95	-29.63		
0.258079	59.13	51.73	61.54	-9.81	21.17	51.54	-30.37		
0.164471	63.45	55.15	65.29	-10.14	24.84	55.29	-30.45	L2	Pass
0.199243	63.43	55.15	63.68	-8.53	24.83	53.68	-28.85		
0.201319	63.42	55.16	63.60	-8.44	24.79	53.60	-28.81		
0.218798	63.43	55.15	62.93	-7.78	24.47	52.93	-28.46		
0.244926	61.92	53.66	61.94	-8.28	23.17	51.94	-28.77		
0.266069	59.81	51.69	61.30	-9.61	21.27	51.30	-30.03		

*- Margin = Measured emission - specification limit.

Test specification:	**Section 15.207(a), Conducted emission**		
Test procedure:	ANSI C63.4, Section 13.1.3		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/26/2005 4:19:38 PM		
Temperature: 22 ºC	**Air Pressure:** 1015 hPa	**Relative Humidity:** 45 %	**Power Supply:** 120 V AC
Remarks:			

EUT: AYC-G64

Frequency, MHz	Peak emission, dB(µV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*	Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*		
0.165865	63.10	54.95	65.23	-10.28	24.39	55.23	-30.84	L1	Pass
0.175116	63.00	54.88	64.77	-9.89	24.42	54.77	-30.35		
0.212709	62.73	54.72	63.17	-8.45	24.35	53.17	-28.82		
0.215388	62.62	54.63	63.06	-8.43	24.29	53.06	-28.77		
0.257801	59.80	52.04	61.55	-9.51	21.34	51.55	-30.21		
0.311864	52.54	45.02	59.93	-14.91	14.51	49.93	-35.42		
0.170923	63.49	55.21	64.98	-9.77	24.54	54.98	-30.44	L2	Pass
0.181031	63.44	55.17	64.49	-9.32	24.60	54.49	-29.89		
0.198330	63.64	55.35	63.72	-8.37	24.60	53.72	-29.12		
0.202584	63.36	55.01	63.55	-8.54	24.73	53.55	-28.82		
0.227981	62.95	54.73	62.58	-7.85	24.16	52.58	-28.42		
0.233434	62.69	54.43	62.37	-7.94	24.03	52.37	-28.34		
0.238006	62.45	54.09	62.19	-8.10	23.45	52.19	-28.74		

*- Margin = Measured emission - specification limit.

Reference numbers of test equipment used

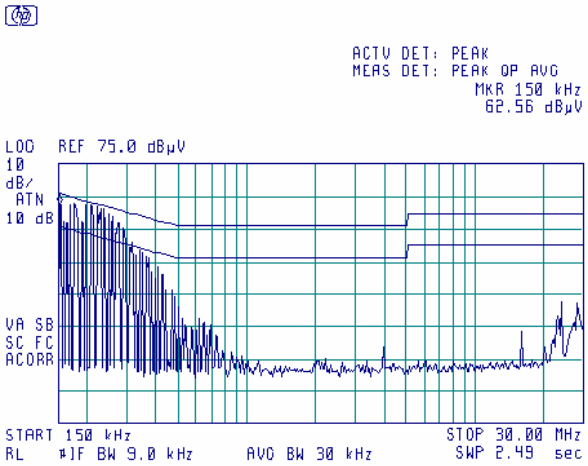
HL 0447	HL 0672	HL 0787	HL 1430	HL 1502	HL 1510		

Full description is given in Appendix A.

Test specification:	Section 15.207(a), Conducted emission		
Test procedure:	ANSI C63.4, Section 13.1.3		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/26/2005 4:19:38 PM		
Temperature: 22 ºC	Air Pressure: 1015 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

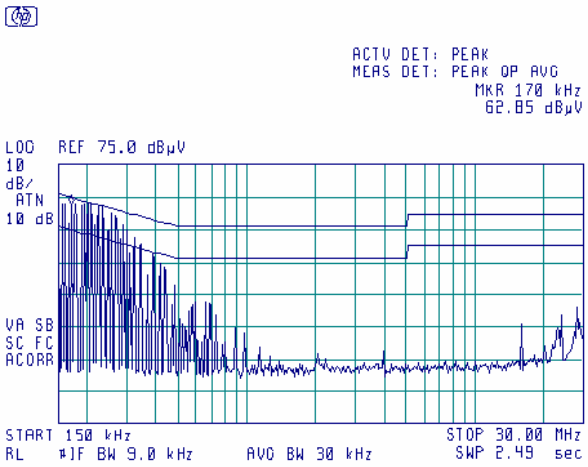
Plot 7.3.1 Conducted emission measurements

EUT: AYC-Q64
LINE: L1
EUT OPERATING MODE: Transmit
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Plot 7.3.2 Conducted emission measurements

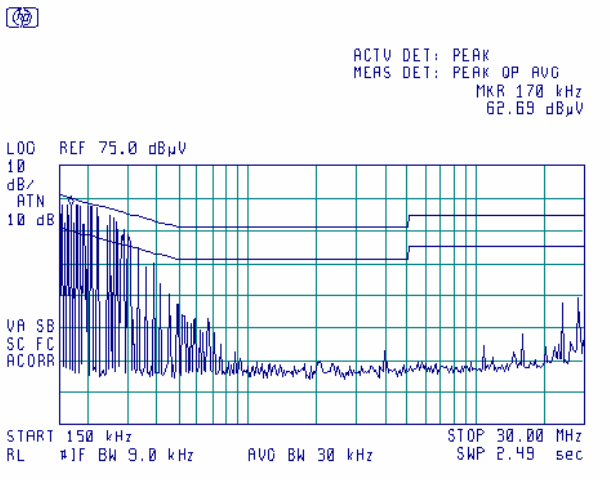
EUT: AYC-Q64
LINE: L2
EUT OPERATING MODE: Transmit
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Test specification:	**Section 15.207(a), Conducted emission**		
Test procedure:	ANSI C63.4, Section 13.1.3		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/26/2005 4:19:38 PM		
Temperature: 22 ºC	**Air Pressure:** 1015 hPa	**Relative Humidity:** 45 %	**Power Supply:** 120 V AC
Remarks:			

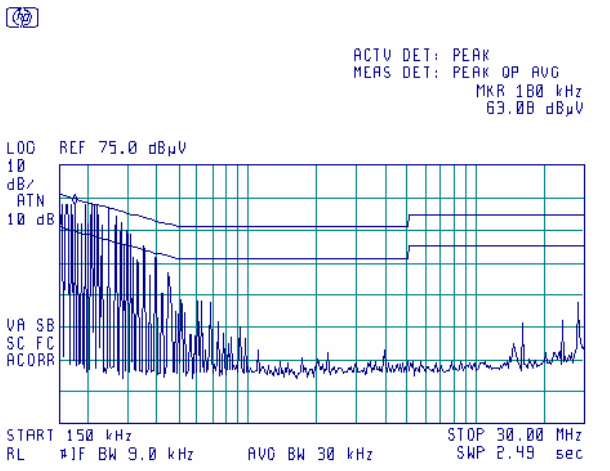
Plot 7.3.3 Conducted emission measurements

EUT: AYC-F64
LINE: L1
LIMIT: Class B
EUT OPERATING MODE: Transmit
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Plot 7.3.4 Conducted emission measurements

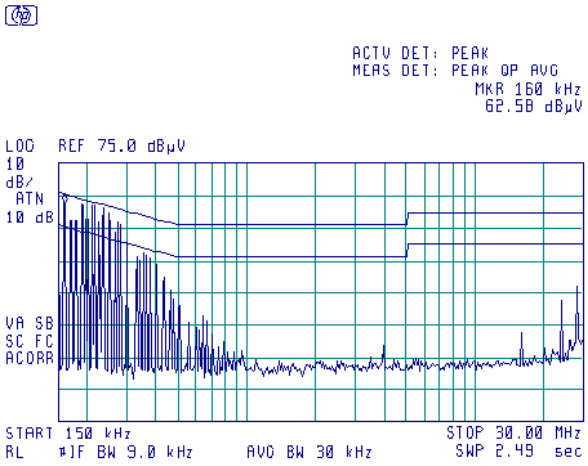
EUT: AYC-F64
LINE: L2
LIMIT: Class B
EUT OPERATING MODE: Transmit
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Test specification:	Section 15.207(a), Conducted emission		
Test procedure:	ANSI C63.4, Section 13.1.3		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/26/2005 4:19:38 PM		
Temperature: 22 ºC	Air Pressure: 1015 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

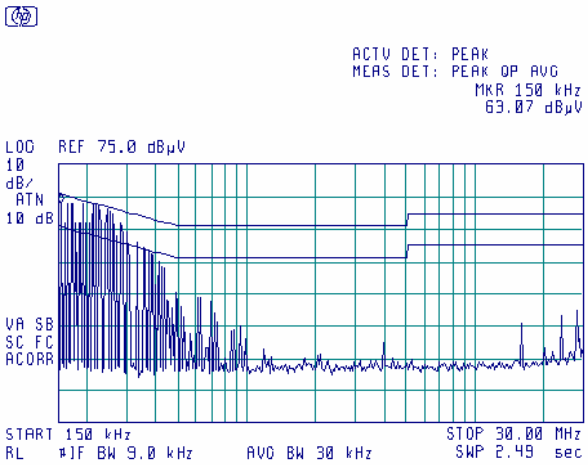
Plot 7.3.5 Conducted emission measurements

EUT: AYC-G64
LINE: L1
EUT OPERATING MODE: Transmit
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Plot 7.3.6 Conducted emission measurements

EUT: AYC-G64
LINE: L2
EUT OPERATING MODE: Transmit
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Test specification:	Section 15.107, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/26/2005 4:20:21 PM		
Temperature: 22 ºC	Air Pressure: 1015 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

8 Emission tests according to 47CFR part 15 subpart B requirements

8.1 Conducted emissions

8.1.1 General

This test was performed to measure common mode conducted emissions at the mains power port.
Specification test limits are given in Table 8.1.1. The worst test results (the lowest margins) were recorded in Table 8.1.2 and shown in the associated plots.

Table 8.1.1 Limits for conducted emissions

Frequency, MHz	Class B limit, dB(µV)		Class A limit, dB(µV)	
	QP	AVRG	QP	AVRG
0.15 - 0.5	66 - 56*	56 - 46*	79	66
0.5 - 5.0	56	46	73	60
5.0 - 30	60	50	73	60

* The limit decreases linearly with the logarithm of frequency.

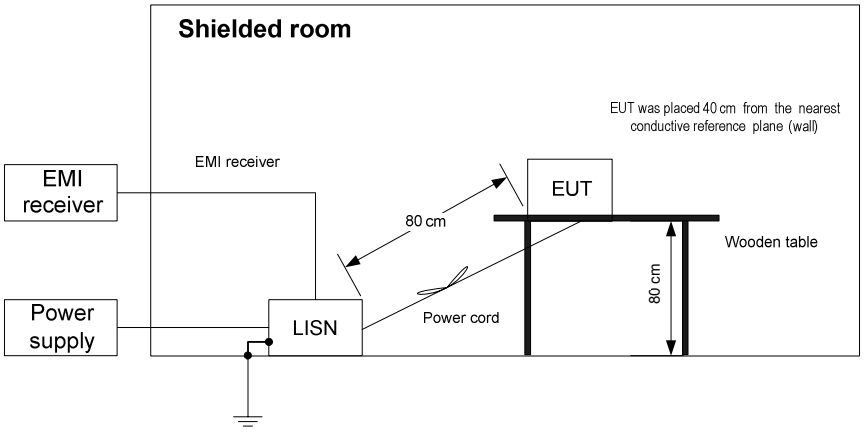
8.1.2 Test procedure

8.1.2.1 The EUT was set up as shown in Figure 8.1.1, energized and the performance check was conducted.

8.1.2.2 The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer in the frequency range referred to in Table 8.1.1. Unused coaxial connector of the LISN was terminated with 50 Ohm. Quasi-peak and average detectors were used throughout the testing.

8.1.2.3 The position of the device cables was varied to determine maximum emission level.

Figure 8.1.1 Setup for conducted emission measurements, table-top equipment



Test specification:	**Section 15.107, Conducted emission at AC power port**		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/26/2005 4:20:21 PM		
Temperature: 22 ºC	**Air Pressure:** 1015 hPa	**Relative Humidity:** 45 %	**Power Supply:** 120 V AC
Remarks:			

Table 8.1.2 Conducted emission test results

LINE:	AC mains
LIMIT:	Class B
EUT OPERATING MODE:	Receive / Stand-by
EUT SET UP:	TABLE-TOP
TEST SITE:	SHIELDED ROOM
DETECTORS USED:	PEAK / QUASI-PEAK / AVERAGE
FREQUENCY RANGE:	150 kHz - 30 MHz
RESOLUTION BANDWIDTH:	9 kHz

EUT: AYC-Q64

Frequency, MHz	Peak emission, dB(µV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*	Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*		
0.173128	62.86	54.73	64.87	-10.14	24.32	54.87	-30.55	L1	Pass
0.198569	62.77	54.71	63.71	-9.00	24.34	53.71	-29.37		
0.204264	62.72	54.68	63.49	-8.81	24.28	53.49	-29.21		
0.231734	61.85	53.84	62.43	-8.59	23.43	52.43	-29.00		
0.250081	60.61	52.65	61.79	-9.14	22.04	51.79	-29.75		
0.299194	53.80	46.22	60.30	-14.08	15.95	50.30	-34.35		
0.198341	63.57	55.20	63.72	-8.52	24.52	53.72	-29.20	L2	Pass
0.199909	63.47	55.13	63.66	-8.53	24.47	53.66	-29.19		
0.201404	63.45	55.17	63.60	-8.43	24.49	53.60	-29.11		
0.242844	61.94	53.68	62.01	-8.33	23.16	52.01	-28.85		
0.275936	58.36	50.07	61.00	-10.93	19.64	51.00	-31.36		

EUT: AYC-F64

Frequency, MHz	Peak emission, dB(µV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*	Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*		
0.161081	62.36	54.54	65.46	-10.92	23.91	55.46	-31.55	L1	Pass
0.198493	62.22	54.51	63.71	-9.20	23.92	53.71	-29.79		
0.205579	62.10	54.44	63.44	-9.00	23.94	53.44	-29.50		
0.205831	62.17	54.45	63.43	-8.98	23.86	53.43	-29.57		
0.214790	61.89	54.21	63.09	-8.88	23.74	53.09	-29.35		
0.244766	60.54	53.07	61.95	-8.88	22.32	51.95	-29.63		
0.258079	59.13	51.73	61.54	-9.81	21.17	51.54	-30.37		
0.164471	63.45	55.15	65.29	-10.14	24.84	55.29	-30.45	L2	Pass
0.199243	63.43	55.15	63.68	-8.53	24.83	53.68	-28.85		
0.201319	63.42	55.16	63.60	-8.44	24.79	53.60	-28.81		
0.218798	63.43	55.15	62.93	-7.78	24.47	52.93	-28.46		
0.244926	61.92	53.66	61.94	-8.28	23.17	51.94	-28.77		
0.266069	59.81	51.69	61.30	-9.61	21.27	51.30	-30.03		

*- Margin = Measured emission - specification limit.

Test specification:	Section 15.107, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/26/2005 4:20:21 PM		
Temperature: 22 ºC	Air Pressure: 1015 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

EUT: AYC-G64

Frequency, MHz	Peak emission, dB(µV)	Quasi-peak			Average			Line ID	Verdict
		Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*	Measured emission, dB(µV)	Limit, dB(µV)	Margin, dB*		
0.165865	63.10	54.95	65.23	-10.28	24.39	55.23	-30.84	L1	Pass
0.175116	63.00	54.88	64.77	-9.89	24.42	54.77	-30.35		
0.212709	62.73	54.72	63.17	-8.45	24.35	53.17	-28.82		
0.215388	62.62	54.63	63.06	-8.43	24.29	53.06	-28.77		
0.257801	59.80	52.04	61.55	-9.51	21.34	51.55	-30.21		
0.311864	52.54	45.02	59.93	-14.91	14.51	49.93	-35.42		
0.170923	63.49	55.21	64.98	-9.77	24.54	54.98	-30.44	L2	Pass
0.181031	63.44	55.17	64.49	-9.32	24.60	54.49	-29.89		
0.198330	63.64	55.35	63.72	-8.37	24.60	53.72	-29.12		
0.202584	63.36	55.01	63.55	-8.54	24.73	53.55	-28.82		
0.227981	62.95	54.73	62.58	-7.85	24.16	52.58	-28.42		
0.233434	62.69	54.43	62.37	-7.94	24.03	52.37	-28.34		
0.238006	62.45	54.09	62.19	-8.10	23.45	52.19	-28.74		

*- Margin = Measured emission - specification limit.

Reference numbers of test equipment used

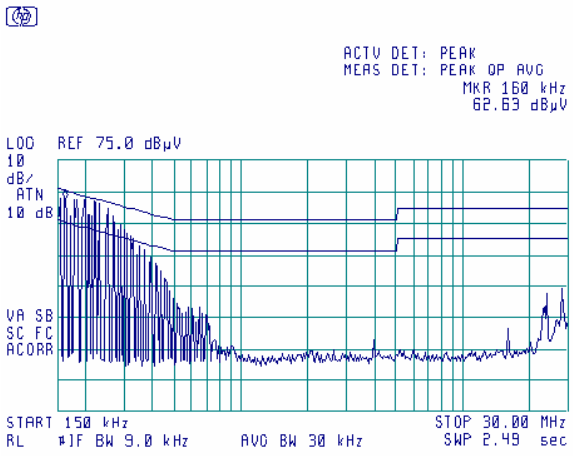
HL 0447	HL 0672	HL 0787	HL 1430	HL 1502	HL 1510		

Full description is given in Appendix A.

Test specification:	Section 15.107, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/26/2005 4:20:21 PM		
Temperature: 22 ºC	Air Pressure: 1015 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

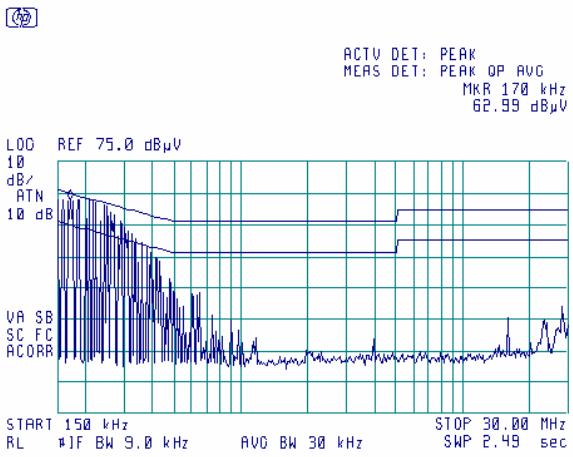
Plot 8.1.1 Conducted emission measurements

EUT: AYC-Q64
LINE: L1
LIMIT: Class B
EUT OPERATING MODE: Receive / Stand-by
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Plot 8.1.2 Conducted emission measurements

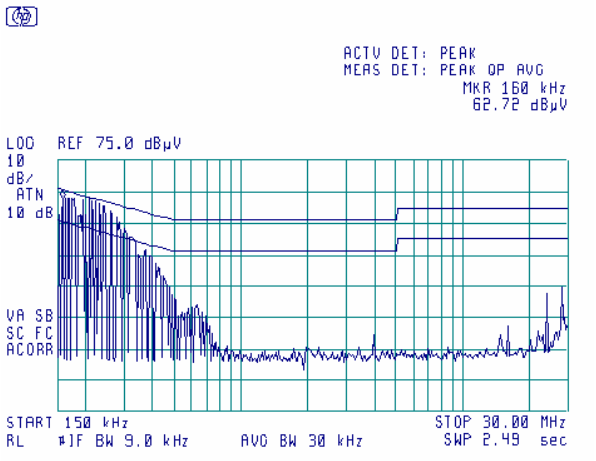
EUT: AYC-Q64
LINE: L2
LIMIT: Class B
EUT OPERATING MODE: Receive / Stand-by
LIMIT: QUASI-PEAK, AVERAGE
DETECTOR: PEAK



Test specification:	Section 15.107, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/26/2005 4:27:47 PM		
Temperature: 22 ºC	Air Pressure: 1015 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

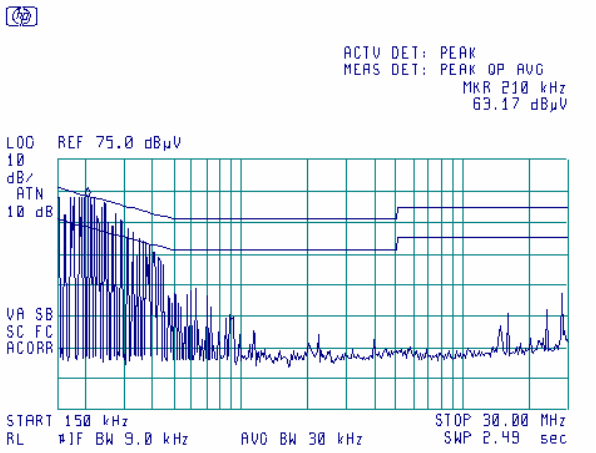
Plot 8.1.3 Conducted emission measurements

EUT:	AYC-F64
LINE:	L1
LIMIT:	Class B
EUT OPERATING MODE:	Receive / Stand-by
LIMIT:	QUASI-PEAK, AVERAGE
DETECTOR:	PEAK



Plot 8.1.4 Conducted emission measurements

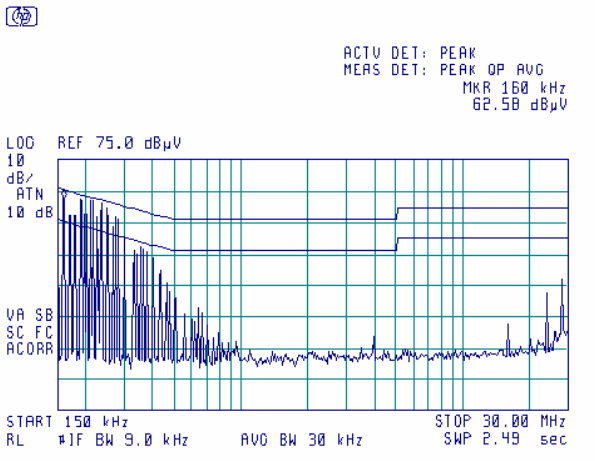
EUT:	AYC-F64
LINE:	L2
LIMIT:	Class B
EUT OPERATING MODE:	Receive / Stand-by
LIMIT:	QUASI-PEAK, AVERAGE
DETECTOR:	PEAK



Test specification:	Section 15.107, Conducted emission at AC power port		
Test procedure:	ANSI C63.4, Sections 11.5 and 12.1.3		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/26/2005 4:27:47 PM		
Temperature: 22 ºC	Air Pressure: 1015 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

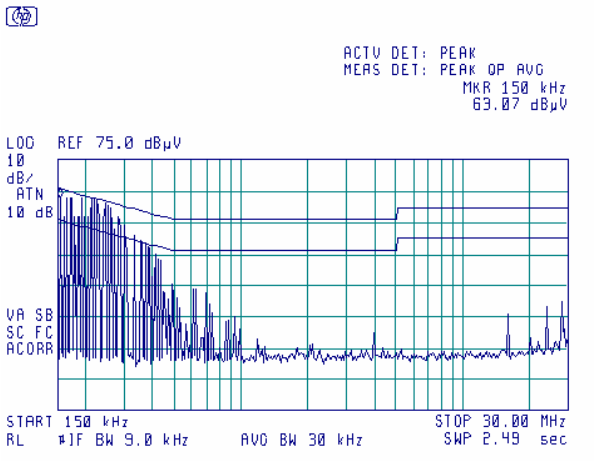
Plot 8.1.5 Conducted emission measurements

EUT:	AYC-G64
LINE:	L1
LIMIT:	Class B
EUT OPERATING MODE:	Receive / Stand-by
LIMIT:	QUASI-PEAK, AVERAGE
DETECTOR:	PEAK



Plot 8.1.6 Conducted emission measurements

EUT:	AYC-G64
LINE:	L2
LIMIT:	Class B
EUT OPERATING MODE:	Receive / Stand-by
LIMIT:	QUASI-PEAK, AVERAGE
DETECTOR:	PEAK



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/26/2005 4:11:01 PM		
Temperature: 22 ºC	Air Pressure: 1015 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

8.2 Radiated emission measurements

8.2.1 General

This test was performed to measure radiated emissions from the EUT enclosure. The specification test limits are given in Table 8.2.1.

Table 8.2.1 Radiated emission test limits

Frequency, MHz	Class B limit, dB(µV/m)		Class A limit, dB(µV/m)	
	10 m distance	3 m distance	10 m distance	3 m distance
30 - 88	29.5*	40.0	39.0	49.5*
88 - 216	33.0*	43.5	43.5	54.0*
216 - 960	35.5*	46.0	46.4	56.9*
Above 960	43.5*	54.0	49.5	60.0*

* - The limit for a test distance other than specified was calculated using the inverse linear distance extrapolation factor as follows: $Lim_{S2} = Lim_{S1} + 20 \log (S_1/S_2)$,

where S_1 and S_2 – the standard defined and the test distance respectively in meters.

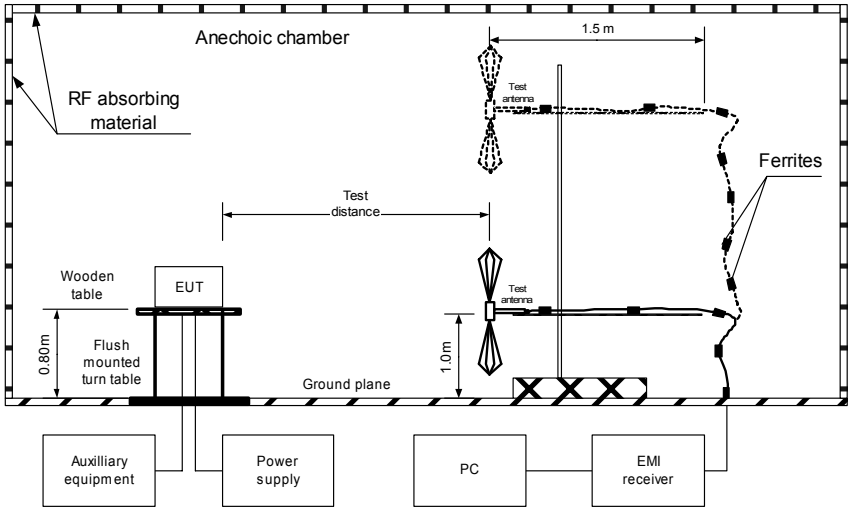
8.2.2 Test procedure for measurements in semi-anechoic chamber

8.2.2.1 The EUT was set up as shown in Figure 8.2.1, energized and the EUT performance was checked.

8.2.2.2 The specified frequency range was investigated with the antenna connected to the EMI receiver. To find the highest emission the turntable was rotated 360^0 and the measuring antenna height was swept from 1 to 4 m in both, vertical and horizontal polarizations. The EUT cables position was varied to maximize emission.

8.2.2.3 The worst test results with respect to the limits were recorded in Table 8.2.2 and shown in the associated plots.

Figure 8.2.1 Setup for radiated emission measurements in anechoic chamber, table-top EUT



Test specification:	**Section 15.109, Radiated emission**		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	**Verdict:**	PASS
Date & Time:	4/26/2005 4:11:01 PM		
Temperature: 22 ºC	**Air Pressure:** 1015 hPa	**Relative Humidity:** 45 %	**Power Supply:** 120 V AC
Remarks:			

Table 8.2.2 Radiated disturbance test results

EUT SET UP: TABLE-TOP
TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
DETECTORS USED: PEAK / QUASI-PEAK
FREQUENCY RANGE: 30 MHz – 1000 MHz
RESOLUTION BANDWIDTH: 120 kHz

AYC-F64

Frequency, MHz	Peak emission, dB(µV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*				
60.005000	25.47	24.47	40.00	-15.53	V	1	271	Pass
100.010000	26.18	24.86	43.50	-18.64	V	1	154	
120.015000	24.17	22.31	43.50	-21.19	V	1	260	

AYC-G64

Frequency, MHz	Peak emission, dB(µV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*				
60.020000	22.01	20.57	40.00	-19.43	V	1	240	Pass

AYC-Q64

Frequency, MHz	Peak emission, dB(µV/m)	Quasi-peak			Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
		Measured emission, dB(µV/m)	Limit, dB(µV/m)	Margin, dB*				
All emissions were found at least 20 dB below the specified limit								Pass

*- Margin = Measured emission - specification limit.
**- EUT front panel refers to 0 degrees position of turntable.

Reference numbers of test equipment used

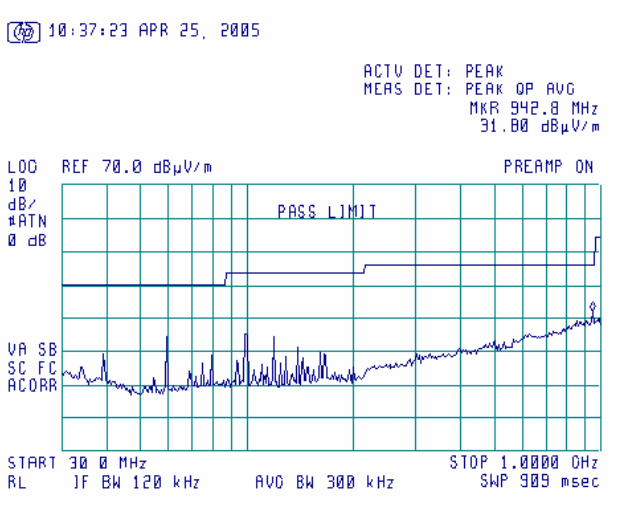
HL 0465	HL 0521	HL 0589	HL 0592	HL 0593	HL 0594	HL 0604	HL 2009

Full description is given in Appendix A.

Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/26/2005 4:11:01 PM		
Temperature: 22 ºC	Air Pressure: 1015 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

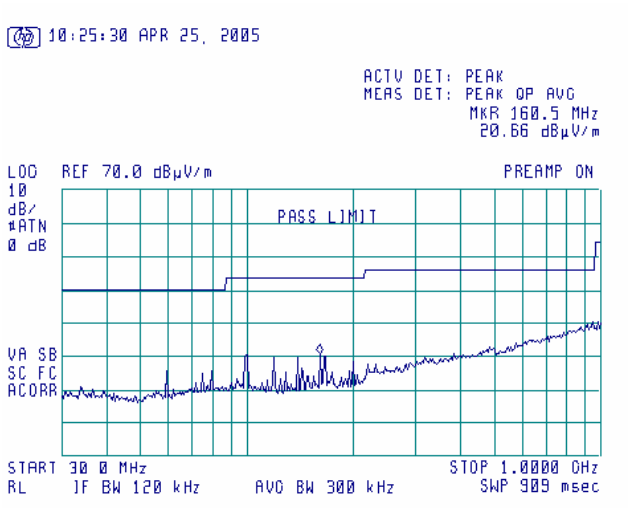
Plot 8.2.1 Radiated disturbance measurements in 30- 1000 MHz range, vertical antenna polarization

EUT: AYC-F64
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m



Plot 8.2.2 Radiated disturbance measurements in 30- 1000 MHz range, horizontal antenna polarization

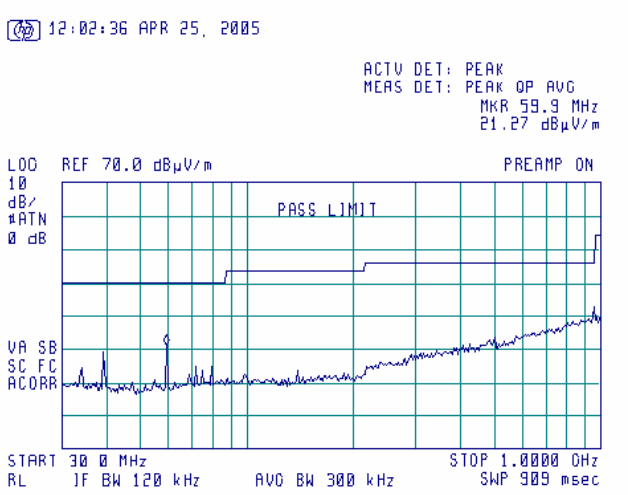
EUT: AYC-F64
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/26/2005 4:11:01 PM		
Temperature: 22 ºC	Air Pressure: 1015 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

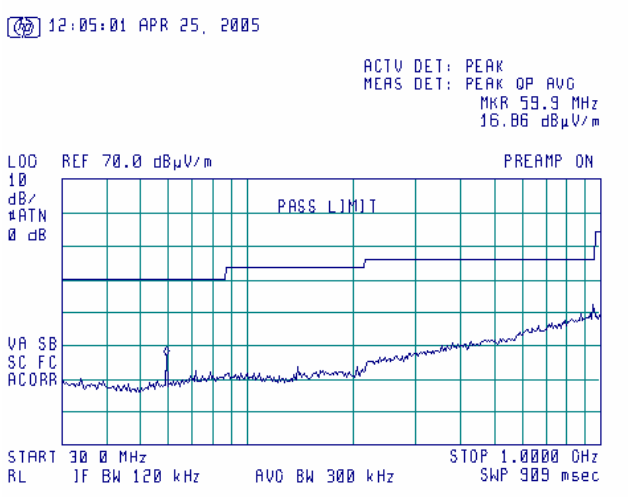
Plot 8.2.3 Radiated emission measurements in 30- 1000 MHz range, vertical antenna polarization

EUT: AYC-G64
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m



Plot 8.2.4 Radiated emission measurements in 30- 1000 MHz range, horizontal antenna polarization

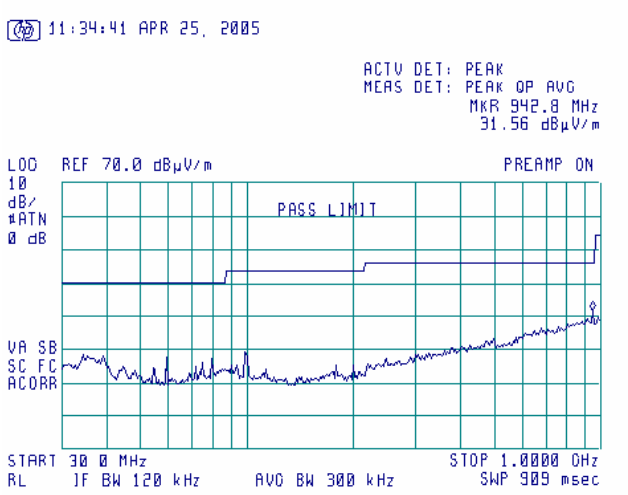
EUT: AYC-G64
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m



Test specification:	Section 15.109, Radiated emission		
Test procedure:	ANSI C63.4, Sections 11.6 and 12.1.4		
Test mode:	Compliance	Verdict:	PASS
Date & Time:	4/26/2005 4:11:01 PM		
Temperature: 22 ºC	Air Pressure: 1015 hPa	Relative Humidity: 45 %	Power Supply: 120 V AC
Remarks:			

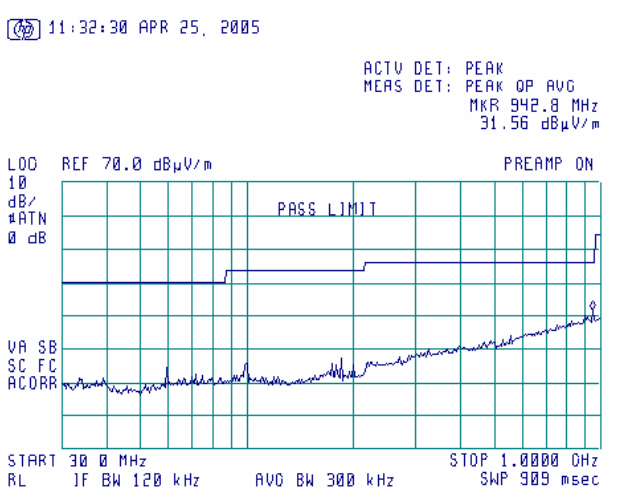
Plot 8.2.5 Radiated emission measurements in 30- 10000 MHz range, vertical antenna polarization

EUT: AYC-Q64
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m



Plot 8.2.6 Radiated emission measurements in 30- 10000 MHz range, horizontal antenna polarization

EUT: AYC-Q64
TEST SITE: Anechoic chamber
TEST DISTANCE: 3 m



9 APPENDIX A Test equipment and ancillaries used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0446	Antenna, Loop active, 10kHz-30MHz	EMCO	6502	2857	28-Jun-04	28-Jun-05
0447	LISN, 16/2, 300V RMS	HL	LISN 16 - 1	066	03-Nov-04	03-Nov-05
0465	Anechoic Chamber 9(L) x 6.5(W) x 5.5(H) m	HL	AC - 1	023	03-Nov-04	03-Nov-05
0521	EMI Receiver (Spectrum Analyzer) with RF filter section 9 kHz-6.5 GHz	Hewlett Packard	8546A	3617A 00319, 3448A002 53	10-Oct-04	10-Oct-05
0589	Cable Coaxial, GORE A2P01POL118, 2.3 m	HL	GORE-3	176	02-Dec-04	02-Dec-05
0592	Position Controller	HL	L2-SR3000 (HL CRL-3)	100	18-May-05	18-May-06
0593	Antenna Mast, 1-4 m Pneumatic	Madgesh	AM-F1	101	03-Feb-05	03-Feb-06
0594	Turn Table FOR ANECHOIC CHAMBER flush mount d=1.2 m Pneumatic	HL	TT-WDC1	102	27-Jan-05	27-Jan-06
0604	Antenna BiconiLog Log-Periodic/T Bow-TIE 26 - 2000 MHz	EMCO	3141	9611-1011	27-Jan-05	27-Jan-06
0672	Shielded Room 4,6(L) x 4,2(W) x 2,4(H) m	HL	SR - 3	027	10-Jan-05	10-Jan-06
0787	Transient Limiter	Hewlett Packard	11947A	3107A018 77	21-Nov-04	21-Nov-05
1430	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1431, HL1432	Agilent Technologies (HP)	8542E	3807A002 62,3705A0 0217	11-Nov-04	11-Nov-05
1502	Cable RF, 6 m	Belden	M17/167 MIL-C-17	1502	12-Feb-05	12-Feb-06
1510	Cable RF, 8 m	Belden	M17/167 MIL-C-17	1510	02-Dec-04	02-Dec-05
2009	Cable RF, 8 m	Alpha Wire	RG-214	C-56	02-Dec-04	02-Dec-05

10 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Conducted emissions with LISN	9 kHz to 150 kHz: ± 3.9 dB 150 kHz to 30 MHz: ± 3.8 dB
Radiated emissions at 10 m measuring distance Horizontal polarization Vertical polarization	 Biconilog antenna: ± 5.0 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.1 dB Double ridged horn antenna: ± 5.3 dB Biconilog antenna: ± 5.5 dB Biconical antenna: ± 5.5 dB Log periodic antenna: ± 5.6 dB Double ridged horn antenna: ± 5.8 dB
Radiated emissions at 3 m measuring distance Horizontal polarization Vertical polarization	 Biconilog antenna: ± 5.3 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.3 dB Double ridged horn antenna: ± 5.3 dB Biconilog antenna: ± 6.0 dB Biconical antenna: ± 5.7 dB Log periodic antenna: ± 6.0 dB Double ridged horn antenna: ± 6.0 dB
Conducted emissions at RF antenna connector	9 kHz to 2.9 GHz: ± 2.6 dB 2.9 GHz to 6.46 GHz: ± 3.5 dB 6.46 GHz to 13.2 GHz: ± 4.3 dB 13.2 GHz to 22.0 GHz: ± 5.0 dB 22.0 GHz to 26.8 GHz: ± 5.5 dB 26.8 GHz to 40.0 GHz: ± 4.8 dB

The test equipment has been calibrated according to its recommended procedures and is within the manufacturer's published limit of error. The standards and instruments used in the calibration system conform to the present requirements of ISO/IEC 17025 (or alternately ANSI/NCSL Z540-1).
The laboratory calibrates its measurement standards by a third party (traceable to NIST, USA) on a regular basis according to equipment manufacturer requirements. The Hermon Labs EMC measurements uncertainty is given in the table above.

11 APPENDIX C Test facility description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private, EMC, safety, environmental and telecommunication testing facility. Hermon Laboratories is listed by the Federal Communications Commission (USA) for all parts of Code of Federal Regulations 47 (CFR 47) and by Industry Canada for electromagnetic emissions (file numbers IC 2186-1 for OATS and IC 2186-2 for anechoic chamber), certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, C-845 for conducted emissions site), assessed by TNO Certification EP&S (Netherlands) for a number of EMC, telecommunications, environmental, safety standards, and by AMTAC (UK) for safety of medical devices. The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing and environmental simulation (for exact scope please refer to Certificate No. 839.01).

Address: P.O. Box 23, Binyamina 30500, Israel.
Telephone: +972 4628 8001
Fax: +972 4628 8277
e-mail: mail@hermonlabs.com
website: www.hermonlabs.com

Person for contact: Mr. Alex Usoskin, CEO.

12 APPENDIX D Specification references

47CFR part 15: 2004	Radio Frequency Devices.
ANSI C63.2: 1996	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4: 2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

13 APPENDIX E Abbreviations and acronyms

A	ampere
AC	alternating current
A/m	ampere per meter
AM	amplitude modulation
AVRG	average (detector)
BB	broad band
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(μV)	decibel referred to one microvolt
dB(μV/m)	decibel referred to one microvolt per meter
dB(μA)	decibel referred to one microampere
dBΩ	decibel referred to one Ohm
DC	direct current
EIRP	equivalent isotropically radiated power
ERP	effective radiated power
EUT	equipment under test
F	frequency
GHz	gigahertz
GND	ground
H	height
HL	Hermon laboratories
Hz	hertz
k	kilo
kHz	kilohertz
LISN	line impedance stabilization network
LO	local oscillator
m	meter
MHz	megahertz
min	minute
mm	millimeter
ms	millisecond
μs	microsecond
NA	not applicable
NB	narrow band
NT	not tested
OATS	open area test site
Ω	Ohm
PCB	printed circuit board
PM	pulse modulation
PS	power supply
QP	quasi-peak
RE	radiated emission
RF	radio frequency
rms	root mean square
Rx	receive
s	second
T	temperature
Tx	transmit
V	volt
VA	volt-ampere

14 APPENDIX F Test equipment correction factors

Correction factor
Line impedance stabilization network
Model LISN 16 - 1
Hermon Laboratories

Frequency, kHz	Correction factor, dB
10	4.9
15	2.86
20	1.83
25	1.25
30	0.91
35	0.69
40	0.53
50	0.35
60	0.25
70	0.18
80	0.14
90	0.11
100	0.09
125	0.06
150	0.04

The correction factor in dB is to be added to meter readings of an interference analyzer or a spectrum analyzer.

Antenna factor
Active loop antenna
Model 6502, S/N 2857, HL 0446

Frequency, MHz	Magnetic antenna factor, dB	Electric antenna factor, dB
0.009	-32.8	18.7
0.010	-33.8	17.7
0.020	-38.3	13.2
0.050	-41.1	10.4
0.075	-41.3	10.2
0.100	-41.6	9.9
0.150	-41.7	9.8
0.250	-41.6	9.9
0.500	-41.8	9.8
0.750	-41.9	9.7
1.000	-41.4	10.1
2.000	-41.5	10.0
3.000	-41.4	10.2
4.000	-41.4	10.1
5.000	-41.5	10.1
10.000	-41.9	9.6
15.000	-41.9	9.6
20.000	-42.2	9.3
25.000	-42.8	8.7
30.000	-44.0	7.5

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).

Antenna factor
Biconilog antenna EMCO Model 3141
Ser.No.1011, HL 0604

Frequency, MHz	Antenna Factor, dB(1/m)	Frequency, MHz	Antenna Factor, dB(1/m)
26	7.8	940	24.0
28	7.8	960	24.1
30	7.8	980	24.5
40	7.2	1000	24.9
60	7.1	1020	25.0
70	8.5	1040	25.2
80	9.4	1060	25.4
90	9.8	1080	25.6
100	9.7	1100	25.7
110	9.3	1120	26.0
120	8.8	1140	26.4
130	8.7	1160	27.0
140	9.2	1180	27.0
150	9.8	1200	26.7
160	10.2	1220	26.5
170	10.4	1240	26.5
180	10.4	1260	26.5
190	10.3	1280	26.6
200	10.6	1300	27.0
220	11.6	1320	27.8
240	12.4	1340	28.3
260	12.8	1360	28.2
280	13.7	1380	27.9
300	14.7	1400	27.9
320	15.2	1420	27.9
340	15.4	1440	27.8
360	16.1	1460	27.8
380	16.4	1480	28.0
400	16.6	1500	28.5
420	16.7	1520	28.9
440	17.0	1540	29.6
460	17.7	1560	29.8
480	18.1	1580	29.6
500	18.5	1600	29.5
520	19.1	1620	29.3
540	19.5	1640	29.2
560	19.8	1660	29.4
580	20.6	1680	29.6
600	21.3	1700	29.8
620	21.5	1720	30.3
640	21.2	1740	30.8
660	21.4	1760	31.1
680	21.9	1780	31.0
700	22.2	1800	30.9
720	22.2	1820	30.7
740	22.1	1840	30.6
760	22.3	1860	30.6
780	22.6	1880	30.6
800	22.7	1900	30.6
820	22.9	1920	30.7
840	23.1	1940	30.9
860	23.4	1960	31.2
880	23.8	1980	31.6
900	24.1	2000	32.0
920	24.1		

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).

Cable loss
Cable Coaxial, GORE A2P01POL118, 2.3 m, model:GORE-3, HL 0589
+ Cable Coaxial, ANDREW PSWJ4, 6m, model: ANDREW-6, HL 1004

No.	Frequency, MHz	Cable loss, dB	Tolerance (Specification), dB	Measurement uncertainty, dB
1	30	0.33	≤ 6.5	±0.12
2	50	0.40		
3	100	0.57		
4	300	0.97		
5	500	1.25		
6	800	1.59		
7	1000	1.81		
8	1200	1.97		
9	1400	2.15		
10	1600	2.28		
11	1800	2.43		
12	2000	2.61		
13	2200	2.75		
14	2400	2.89		
15	2600	2.97		
16	2800	3.21	≤ 6.5	±0.12
17	3000	3.32		
18	3300	3.47		
19	3600	3.62		
20	3900	3.84		
21	4200	3.92		±0.17
22	4500	4.07		
23	4800	4.36		
24	5100	4.62		
25	5400	4.78		
26	5700	5.16		
27	6000	5.67		
28	6500	5.99		

Cable loss
Cable coaxial, 6 m, model: M17/167 MIL-C-17, HL 1502

Frequency, MHz	Cable loss, dB
0.1	0.02
1	0.07
3	0.15
5	0.17
10	0.26
30	0.43
50	0.57
80	0.72
100	0.81
300	1.48
500	2.00
800	2.70
1000	3.09

Cable loss
Cable M17/167 MIL-C-17, HL 1510

No.	Frequency, MHz	Cable loss, dB
1	0.1	0.05
2	1	0.09
3	3	0.16
4	5	0.18
5	10	0.27
6	30	0.44
7	50	0.58
8	80	0.69
9	100	0.82
10	300	1.48
11	500	2.01
12	800	2.65
13	1000	3.12

Cable loss
RF cable 8 m, model RG-214, HL 2009

No.	Frequency, MHz	Cable loss, dB	Tolerance (Specification), dB	Measurement uncertainty, dB
1	1	0.10	NA	±0.12
2	10	0.14		
3	30	0.25		
4	50	0.34		
5	100	0.53		
6	300	0.99		
7	500	1.31		
8	800	1.73		
9	1000	1.98		
10	1100	2.11		
11	1200	2.21		
12	1300	2.35		
13	1400	2.46		
14	1500	2.55		
15	1600	2.68		
16	1700	2.78		
17	1800	2.88		
18	1900	2.98		
19	2000	3.09		