



<b>Prüfbericht - Nr.:</b> 02422020 001		Seite 1 von 16	
<i>Test Report No.:</i>		<i>Page 1 of 16</i>	
<b>Auftraggeber:</b> <i>Client:</i>	Arygon Technologies AG Erthalstrabe 1 D-55118 Mainz Germany		
<b>Gegenstand der Prüfung:</b> <i>Test Item:</i>	Low Power Device - Multi - ISO HF Reader		
<b>Bezeichnung:</b> <i>Identification / Model No:</i>	AMID2US00	<b>Serien-Nr.:</b> <i>Serial No.:</i>	0000000131
<b>Wareneingangs-Nr.:</b> <i>Receipt No.:</i>	1403007046	<b>Eingangsdatum:</b> <i>Date of Receipt:</i>	20.05.2009
<b>Prüfort:</b> <i>Testing Location:</i>	Refer Section for Testing facilities		
<b>Prüfgrundlage:</b> <i>Test Specification:</i>	FCC Part 15 Subpart C		
<b>Prüfergebnis:</b> <i>Test Result:</i>	Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test item passed the test specification(s).</i>		
<b>Prüflaboratorium:</b> <i>Testing Laboratory:</i>	TÜV Rheinland (India) Pvt. Ltd. Alpha Tower, Sigma Soft Tech Park, # 7, White Field Main Road, Varthur Kodi, Bangalore – 560 066. India		
<b>geprüft/ tested by:</b>	<b>kontrolliert/ checked by:</b>		
			
19.06.2009    L.Narasimha Charyulu / Manager	19.06.2009	Thomas Berns / Manager	
<b>Datum</b> <i>Date</i>	<b>Name/Stellung</b> <i>Name/Position</i>	<b>Unterschrift</b> <i>Signature</i>	<b>Datum</b> <i>Date</i>
			<b>Name/Stellung</b> <i>Name/Position</i>
			<b>Unterschrift</b> <i>Signature</i>
<b>Sonstiges/ Other Aspects:</b> FCC ID : XLWAMID2US00			
<b>Abkürzungen:</b>	P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet	<b>Abbreviations:</b>	P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested
<p>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</p> <p><i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i></p>			

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## Test Summary

### **Radiated Emission of Carrier Frequency**

Result : Pass

### **Spurious Radiated Emission**

Result : Pass

### **Frequency Stability**

Result : Pass

### **Conducted Emission Test on a.c power line**

Result : Pass

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## List of Test and Measurement Instruments

### Wipro Technologies, Bangalore

#### List of Test and Measurements

Equipment	Manufacturer	Type	S/N	Calibration Due Date
EMI Receiver	Rohde & Schwarz	ESIB40	100306	21.07.2009
Ultra Broad Band Antenna	Rohde & Schwarz	HL562	100287	19.01.2010

### SAMEER-Center for Electromagnetics, Chennai

#### List of Test and Measurements

Equipment	Manufacturer	Type	S/N	Calibration Due Date
EMI Receiver	Rohde & Schwarz	ESIB7	100319	06.03.2010
Loop Antenna	ETS Lingdren	6507	1484	12.10.2009

#### Testing Facilities

- 1) Wipro Technologies  
73-74, Ground Floor,  
South Phase, Ambattur Estate,  
Ambattur  
Chennai – 600058  
India
- 2) SAMEER-Center for Electromagnetics  
C.I.T.Campus, Taramani,  
2nd Main Road,  
Chennai – 600113  
India

## Product Information

The multi ISO reader has two configurations namely USB mode and RS 232 mode. The reader is tested for 'USB Reader'. The USB cable has a length of 100 cm. The reader gets power through the USB cable. The reader is connected to a computer and would be in an office / home environment.

The ARM processor executes code from the internal flash memory. It receives commands from the PC through USB interface, executes the function, perform read or write on the contact less smart card and passes back the results to the PC machine to the USB cable.

The RS232 cable translator is completely OFF in 'USB Reader' configuration. The configuration gets selected based on the type of cable connected. There are no optional parts on the board. A contact-less smart card placed on the reader is the normal operating condition.

## Manufacturer declaration

Communication Protocol	USB CCID Compatible
Data rate ( To Host )	Full Speed ( 12 Mbps)
Baud rate ( To transponder )	106 Kbps, 212 Kbps, 424 Kbps and 848 Kbps
Power Supply	High Bus Powered ( 5 VDC +/- 5 % )
Power Consumption	< 300 $\mu$ A Standby, 150 $\mu$ A operational
Antenna	Integrated
Dimensions	63 mm x 100 mm x 12 mm
Weight	72 g
Operating Temperature	-20 deg. C - +50 deg. C
Storage Temperature	-40 deg. C - +85 deg. C

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### Submitted Documents

Schematics  
Block diagram & operational description  
Bill of material  
User Manual

**Remark** ----

### Additional accessory used for testing

Laptop

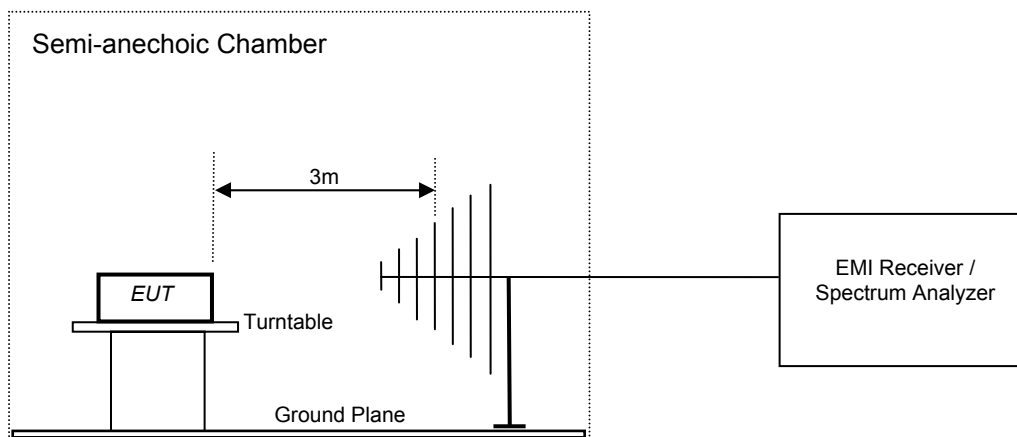
Make : HP  
Model Number : Compaq – NH6320  
Serial Number : CNU62605R9

## Test Methodology

### Radiated Emission

The radiated emission measurement was performed according to the procedures in ANSI C63.4-2003. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable, and the EUT is 3 or 10 meters far from the measuring antenna. The turntable was rotated 360° for obtaining the maximum emission. The height of the measuring antennas were scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. The measurement below 30MHz was performed by loop antenna, maximum emission was obtained by two antenna polarizations of loop faced and sided to the EUT.

### Test Setup :



**Radiated Emission of Carrier frequency**
**Section 15.225(a)–(c) / 15.215(c)**
**Result :**
**Pass**

Test Specification	:	FCC Part 15 Section 15.225(a)-(c) / 15.215(c)
Test Method	:	ANSI C63.4-2003
Measurement Location	:	Semi Anechoic Chamber
Supply Voltage	:	5.0V DC, USB powered
Measurement Bandwidth	:	100 kHz
Detector	:	Peak
Measuring distance	:	3m
Mode of operation	:	Transmitting

**Test Result: 15.225(a)**

Fundamental Frequency ( MHz )	Field strength measured ( dB $\mu$ V/m )	Limit ( dB $\mu$ V/m )	Margin ( dB )
13.560	69.61	104.00	-34.39

**Limit for Radiated Emission under section 15.225(a):**

Fundamental Frequency ( MHz )	Field strength, Fundamental ( $\mu$ V/m ) at 30m	Field strength, Fundamental ( dB $\mu$ V/m ) at 30m	Field strength, Fundamental ( dB $\mu$ V/m ) at 3m
13.56	15,848	84.0	104.0



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**Test Result: 15.225(b)**

Fundamental Frequency ( MHz )	Field strength measured ( dB $\mu$ V/m )	Limit ( dB $\mu$ V/m )	Margin ( dB )
13.410 – 13.553 13.567 – 13.710	63.50	70.50	-7.00

**Limit for Radiated Emission under section 15.225(b):**

Fundamental Frequency ( MHz )	Field strength, Fundamental ( $\mu$ V/m ) at 30m	Field strength, Fundamental ( dB $\mu$ V/m ) at 30m	Field strength, Fundamental ( dB $\mu$ V/m ) at 3m
13.410 - 13.553 13.567 - 13.710	334.00	50.5	70.50

**Test Result: 15.225(c)**

Fundamental Frequency ( MHz )	Field strength measured ( dB $\mu$ V/m )	Limit ( dB $\mu$ V/m )	Margin ( dB )
13.110 – 13.410 13.710 – 14.010	50.45	60.50	-10.05

**Limit for Radiated Emission under section 15.225(c):**

Fundamental Frequency ( MHz )	Field strength, Fundamental ( $\mu$ V/m ) at 30m	Field strength, Fundamental ( dB $\mu$ V/m ) at 30m	Field strength, Fundamental ( dB $\mu$ V/m ) at 3m
13.410 – 13.553 13.567 – 13.710	106.00	40.50	60.50

**Radiated Spurious Emission**
**Section 15.225(d)**
**Result :**
**Pass**

Test Specification	:	FCC Part 15 Section 15.225 and 15.209
Test Method	:	ANSI C63.4-2003
Measurement Location	:	Semi Anechoic Chamber
Detector	:	QP for frequency below 1 GHz.
Supply Voltage	:	5.0V DC, USB powered
Fundamental Frequency	:	13.560 MHz
Measuring frequency range	:	150 kHz – 1.0GHz
Measuring distance	:	3m
Mode of EUT	:	Transmitting
Requirement	:	Emissions radiated outside of the specified frequency bands, except for the harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in section 15.209, whichever is the lesser attenuation. Attenuation below the general limits specified in Sections 15.209(a) is not required.

**Test Result:**

Fundamental Frequency ( MHz )	Polarization	Spurious Emission ( MHz )	Field Strength ( dB $\mu$ V/m )	Limit ( dB $\mu$ V/m )	Margin ( dB )
13.560	V	40.700	32.98	40.00	-7.02
		67.800	38.21	40.00	-1.79
		406.100	36.48	40.00	-9.52
		474.050	34.75	46.00	-11.25
		476.300	36.41	46.00	-9.59
	H	67.800	36.72	40.00	-3.28
		203.450	38.37	43.50	-5.13
		406.050	30.11	46.00	-15.89
		408.200	30.67	46.00	-15.33
		786.500	38.50	46.00	-7.50

**Limit for Radiated Emission of Section 15.209:**

Frequency (MHz)	Field strength ( $\mu\text{V}$ )	Field strength ( $\text{dB}\mu\text{V}/\text{m}$ )	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	48.52 – 13.80 *	300
0.490 – 1.705	24000/F(kHz)	33.80 – 23.00 *	30
1.705-30	30 *	29.5 *	30
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Remark: \* the limit shows in the table above of frequency range 0.009 – 0.490, 0.490 – 1.705 MHz and 1.705-30MHz are at 300 meter, 30 meter and 30 meter range respectively, which corresponds to 128,52 – 73.80, 73.80 – 62.97 and 69.54 $\text{dB}\mu\text{V}/\text{m}$  at 3m range by extrapolation calculation and the measurement of loop antenna.

The emission limits shows in the table are based on measurements employing a CISPR quasi-peak detector and above 1000 MHz are based on the measurements employing an average detector.

**Frequency Stability**
**Section 15.225(e)**
**Result :**
**Pass**

Test Specification	:	FCC Part 15 Section 15.2159c)
Test Method	:	ANSI C63.4-2003
Measurement Location	:	Semi Anechoic Chamber
Detector	:	Peak
Supply Voltage	:	5.0V DC, USB powered
Fundamental Frequency	:	13.560 MHz
Mode of EUT	:	Transmitting
RBW/VBW Setting	:	100kHz / 300 KHz
Requirement	:	The frequency shall be maintained within +/-0.01% of the operating frequency over a temperature variation of -20 degrees C to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

**Test Result :**
**Temperature variation :**

Temperature, Deg. C	Voltage, Volt	Fundamental Frequency MHz	Observed Frequency, MHz	Deviation, MHz
-20	5.0	13.560	13.560434	0.000434
-10	5.0	13.560	13.560415	0.000415
0	5.0	13.560	13.560424	0.000424
10	5.0	13.560	13.560550	0.000550
20	5.0	13.560	13.560550	0.000550
30	5.0	13.560	13.560434	0.000434
40	5.0	13.560	13.560603	0.000603
50	5.0	13.560	13.560424	0.000424

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**Voltage Variation :**

<b>Temperature, Deg. C</b>	<b>Voltage, Volt</b>	<b>Fundamental Frequency MHz</b>	<b>Observed Frequency, MHz</b>	<b>Deviation, MHz</b>
20	4.25	13.5600	13.560318	0.000318
20	5.00	13.5600	13.560320	0.000320
20	5.75	13.5600	13.560315	0.000315

Maximum Deviation ( MHz ) : 0.000603

Maximum Deviation ( % ) : 0.004446

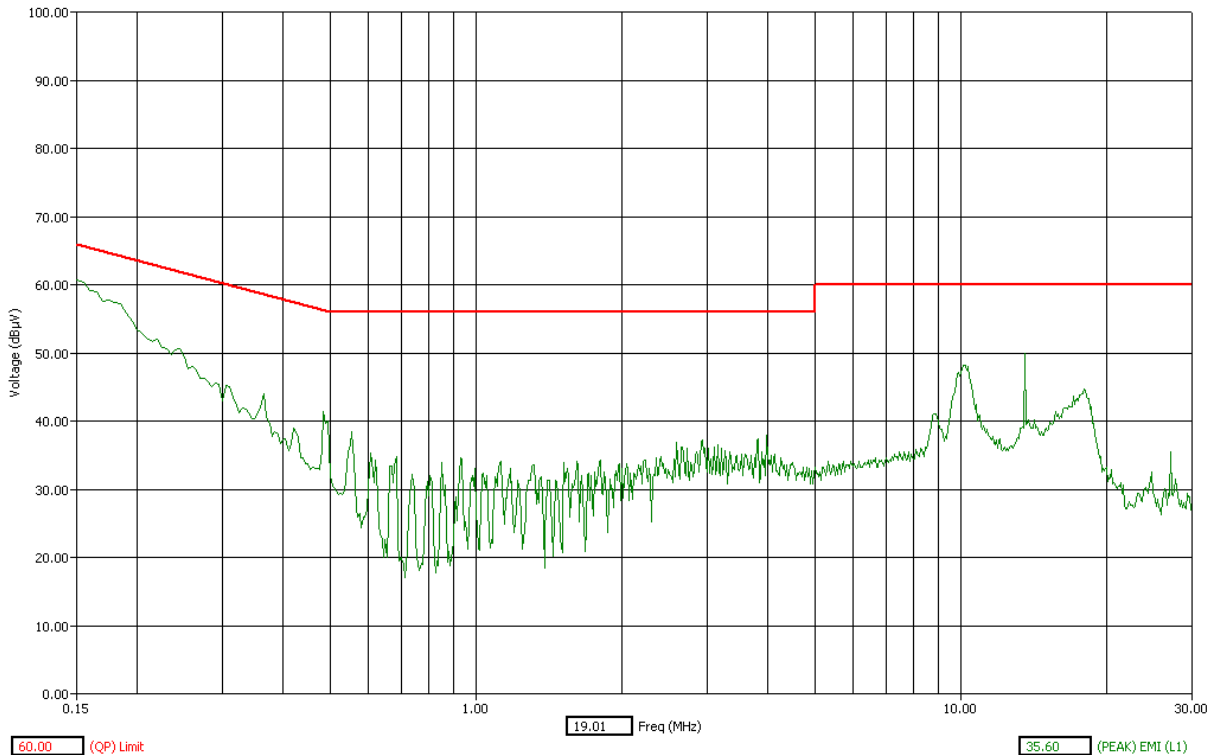
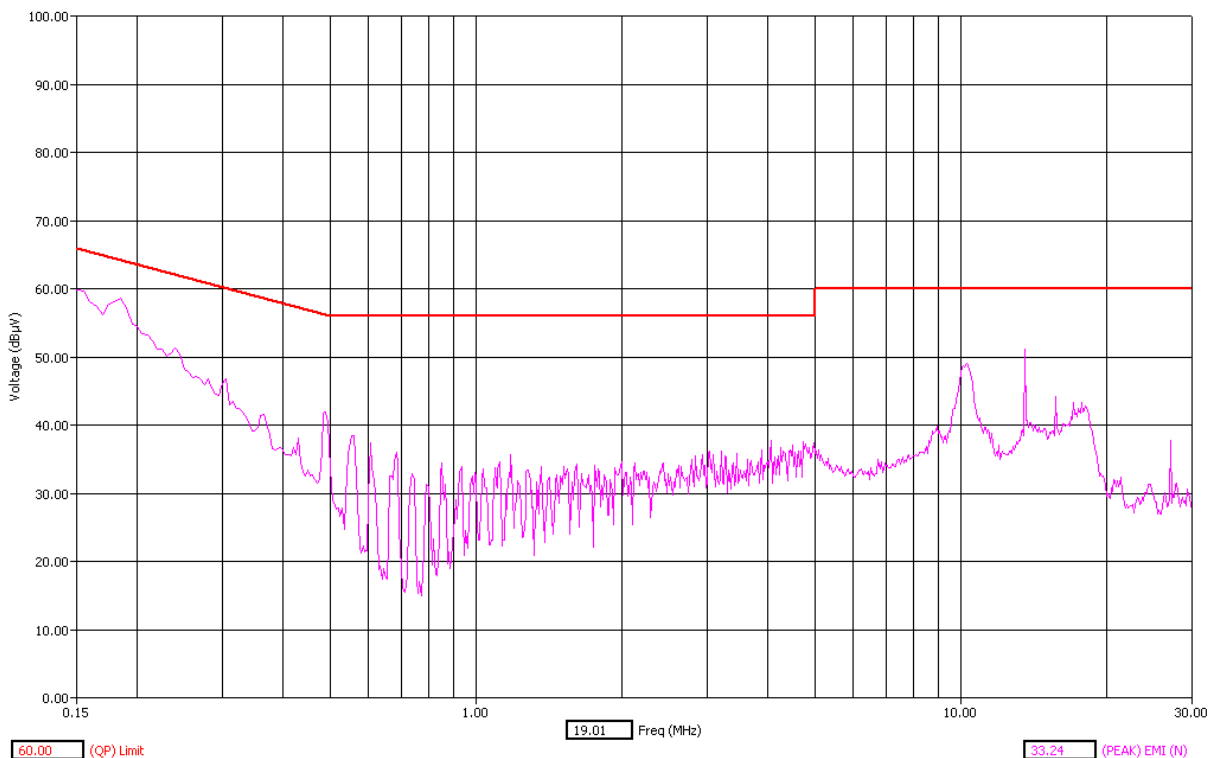
**Conducted Emission Test on a.c power line**
**Section 15.207**
**Result :**
**Pass**

Test Specification : FCC Part 15 Section 15.207  
 Test Method : ANSI C63.4-2003  
 Testing Location : Screened room  
 Measurement Bandwidth : 9kHz  
 Frequency Range : 150kHz – 30MHz  
 Supply Voltage : 120 Volt AC, 60 Hz

## Test Result:

Conductor	Frequency of Emission ( MHz )	Emission Level (QP)	Limit (QP)	Margin (dB)	Result
Line	0.150	63.17	66.00	-2.83	Pass
	10.090	42.31	60.00	-17.69	Pass
	10.200	41.45	60.00	-18.55	Pass
	13.560	47.16	60.00	-12.84	Pass
Neutral	0.150	61.93	66.00	-4.07	Pass
	0.190	52.09	64.39	-12.30	Pass
	10.280	40.22	60.00	-19.78	Pass
	13.560	47.23	60.00	-12.84	Pass

Conductor	Frequency of Emission ( MHz )	Emission Level (AV)	Limit (AV)	Margin (dB)	Result
Line	0.150	51.61	56.00	-4.39	Pass
	10.090	31.16	50.00	-18.84	Pass
	10.200	30.34	50.00	-19.66	Pass
	13.56	46.24	50.00	-3.76	Pass
Neutral	0.150	49.54	56.00	-6.46	Pass
	0.190	42.59	54.39	-11.80	Pass
	10.280	29.53	50.00	-20.47	Pass
	13.560	46.25	50.00	-3.75	Pass


**PLOT : LINE**

**PLOT : NEUTRAL**

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Limit of section 15.207:

Frequency of emission (MHz)	QP Limit (dB $\mu$ V)	AV Limit (dB $\mu$ V/m)
0.15 – 0.5	66 – 56*	56 – 46*
0.5 – 5	56	46
5 – 30	60	50

\* Decreases with the logarithm of the frequency.