



ISO/IEC17025 Accredited Lab.

Report No: TW1207073-01
 File reference No: 2012-09-22

Applicant: TBS Avionics Limited

Product: Video Transmitter

Model No: TBS GREENHORN

Brand Name: TBS

Test Standards: ETSI EN 300 440-1 v 1.6.1
 (2010-08)
 ETSI EN 300 440-2 v 1.4.1
 (2010-08)

Test result: The EMC testing has been performed on the submitted samples and found in compliance with council EMC Directive 2004/108/EC and R & TTE Directive 1999/5/EC

Approved By
Jack Chung

Jack Chung
 EMC Manager

Dated: September 22, 2012

Results appearing herein relate only to the sample tested
The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO., LTD

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Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAL. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAL-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 899988

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.:899988.

IC- Registration No.: IC5205A-01

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration No.: IC 5205A-01.



Test Report Conclusion

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1. General Information

1.1 Notes

The test results of this report relate exclusively to the test item specified in 1.5. The TIMEWAY Lab does not assume Responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the TIMEWAY Lab.

1.2 Testing Laboratory

SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO., LTD

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Site on File With the Federal Communications and Commission – United States

Registration Number: 899988

For 3m & 10 m OATS

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A-01

For 3m & 10 m OATS

1.3 Details of Applicant

Name: TBS Avionics Limited

Address: Room 1302 13/F CRE Building, 303 Hennessy Road Wanchai, Hong Kong

1.4 Application Details

Date of Receipt of Application: July 18, 2012

Date of Receipt of Test Item: July 18, 2012

Date of Test: July 18, 2012~ August 12, 2012

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1.5 Test Item

Manufacturer: TBS Avionics Limited

Address: Room 1302 13/F CRE Building, 303 Hennessy Road Wanchai, Hong Kong

Brand Name: TBS

Model No.: TBS GREENHORN

Addition Model No.: N/A

Description: Video Transmitter

Additional Information

Frequency: 5.865GHz、 5.845GHz、 5.825GHz、 5.805GHz、 5.785GHz、 5.765GHz、 5.745GHz、 5.735GHz

Number of Channels: 84

Modulation Type: FM

Antenna Designation: Omni antenna with gain 2.0dBi

Power Supply: DC 5V

Operation Distance: N/A

Resolution: N/A

Note: Classification according to CEPT/ERC Recommendation 70-03

1.6 Test Standards

ETSI EN 300 440-1 v 1.6.1 (2010-08)

Electromagnetic compatibility and Radio spectrum Matters (ERM);

Short Range Devices (SRD);

Radio equipment to be used in the 1GHz to 40GHz frequency range;

Part 1: Technical characteristics and test methods

ETSI EN 300 440-2 v 1.4.1 (2010-08)

Electromagnetic compatibility and Radio spectrum Matters (ERM);

Short Range Devices (SRD);

Radio equipment to be used in the 1GHz to 40 GHz frequency range;

Part 3: Harmonized EN under article 3.2 of the R&TTE Directive

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

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1.7 Configuration of The EUT

The EUT was configured according to **CISPR16**. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

Device	Manufacturer	Model
Video Transmitter	TBS Avionics Limited	TBS GREENHORN

B. Internal Devices

Device	Manufacturer	Model
N/A		

C. Peripherals

Device	Manufacturer	Model	Cable
N/A			

1.8 EUT Modifications

No modification by Shenzhen Timeway Technology Consulting Co., Ltd

Tests or Witness Test Engineering

Test By: _____

Printing Name: Terry Tang



2. Technical Test

2.1 Summary of Test Results

No deviations from the technical specification(s) were ascertained in the course of the tests Performed	
Final Verdict: (Only "Passed" if all Measurements are "Passed")	Pass

2.2 Test Report

Test Report Reference

List of Measurements	
Parameter to be Measured	Clause
Transmitter Parameters	
Transmitter Requirements	Clause 4.2
Equivalent Isotropically Radiated Power (eirp)	Clause 4.2.1.1
Permitted Range of Operating Frequencies	Clause 4.2.1.2
Spurious Emissions	Clause 4.2.1.3
Duty Cycle	Clause 4.2.1.4
Receiver Parameters	
Receiver Requirements	Clause 4.2
Adjacent Band Selectivity	Clause 4.2.2.1
Blocking or Desensitisation	Clause 4.2.2.2
Receiver Spurious Emissions	Clause 4.2.2.3

Note: The clause numbers are referenced to ETSI EN 300 440-2 V 1.4.1 (2010-08).

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Clause 4.1 Transmitter Requirements

The transmitter with a dedicated antenna.

Clause 4.2.1.1 Equivalent Isotropically Radiated Power (eirp)

For Transmitter

EIRP is calculated by method described under EN 300 440-1 sub clause 7.1.2.1,

Conducted measurements

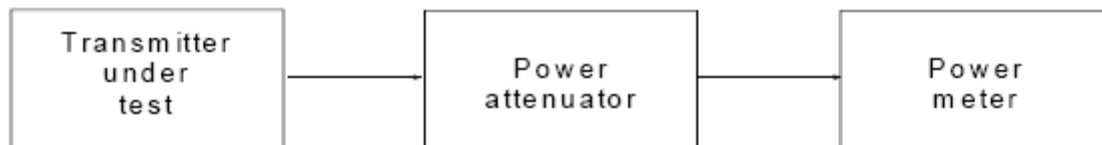


Figure 6: Measurement arrangement

For practical reasons, measurements shall be performed only at the highest power level at which the transmitter is intended to operate. The measurement arrangement in figure 6 shall be used.

The measurement shall be performed preferably in the absence of modulation.

When it is not possible to measure it in the absence of modulation, this fact shall be stated in test reports.

The transmitter shall be set in continuous transmission mode. If this is not possible, the measurements shall be carried out in a period shorter than the duration of the transmitted burst. It may be necessary to extend the duration of the burst.

The transmitter shall be connected to an artificial antenna (see clause 6.2) and the power delivered to this artificial antenna shall be measured.

The equivalent isotropically radiated power is then calculated from the measured value, the known antenna gain, relative to an isotropic antenna, and if applicable, any losses due to cables and connectors in the measurement system.

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Test Conditions		-6 dB transmitter bandwidth			
		5735MHz	5785MHz	5805MHz	5865MHz
T _{nor} (25°C)	V _{nor} (5.0V)	2512.2kHz	2525.9kHz	2564.3kHz	2539.8kHz

Test Conditions		Transmitter Power (Limit 13.98dBm) EIRP							
		5735MHz		5785MHz		5805MHz		5865MHz	
T _{nor} (25°C)	V _{nor} (5.0V)	Pk	12.6	Pk	12.5	Pk	12.5	Pk	12.3
T _{min} (-10°C)	V _{nor} (5.0V)	Pk	12.4	Pk	12.3	Pk	12.2	Pk	12.2
T _{max} (+55°C)	V _{nor} (5.0V)	Pk	12.2	Pk	12.2	Pk	12.3	Pk	12.3
T _{min} (-10°C)	V _L (4.3V)	Pk	11.9	Pk	12.0	Pk	11.9	Pk	11.6
T _{max} (+55°C)	V _L (4.3V)	Pk	11.8	Pk	12.1	Pk	11.7	Pk	11.7
T _{nor} (25°C)	V _L (4.3V)	Pk	12.0	Pk	11.8	Pk	11.8	Pk	11.7

Note:

- (1) EIRP=Reading + Loss + Antenna Gain
- (2) The EUT is a stand-alone radio device (see the clause 5.2.1 of EN 300 440-1). The Tx part powered by the batteries (rechargeable or non-rechargeable batteries, a type of lithium).
- (3) The value of table is worst case during test condition, includes different combinations of transmitter rate antenna polarity and temperature.

Limits: EN 300 440-1, Clause 7.1.3

Table 4: Maximum radiated peak power (e.i.r.p.)

Frequency Bands	Power	Application	Notes
2 400 MHz to 2 483,5 MHz	10 mW e.i.r.p.	Generic use	
2 400 MHz to 2 483,5 MHz	25 mW e.i.r.p.	Detection, movement and alert applications	
(a) 2 446 MHz to 2 454 MHz	500 mW e.i.r.p.	RFID	See also table 7 and annex C
(b) 2 446 MHz to 2 454 MHz	4 W e.i.r.p.	RFID	See also table 7 and annex C
5 725 MHz to 5 875 MHz	25 mW e.i.r.p.	Generic use	
9 200 MHz to 9 500 MHz	25 mW e.i.r.p.	Detection, movement and alert applications	
9 500 MHz to 9 975 MHz	25 mW e.i.r.p.	Detection, movement and alert applications	
10,5 GHz to 10,6 GHz	25 mW e.i.r.p.	Detection, movement and alert applications	
13,4 GHz to 14,0 GHz	25 mW e.i.r.p.	Detection, movement and alert applications	
17,1 GHz to 17,3 GHz	400 mW e.i.r.p.	GBSAR detection, movement and alert applications	See annex E
24,00 GHz to 24,25 GHz	100 mW e.i.r.p.	Generic use and detection, movement and alert applications	

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Clause 4.2.1.2 Permitted Range of Operating Frequencies

Test Conditions		Frequency(MHz) at which-30 dBm occurs	
		Low Frequency (F _L) 5735Hz	High Frequency (F _H) 5865MHz
T _{nor} (25°C)	V _{nor} (5.0V)	5730.557	5870.435
T _{min} (-10°C)	V _{nor} (5.0V)	5730.555	5870.433
T _{max} (+55°C)	V _{nor} (5.0V)	5730.556	5870.434
T _{nor} (25°C)	V _L (4.3V)	5730.558	5870.436
T _{min} (-10°C)	V _L (4.3V)	5730.556	5870.435
T _{max} (+55°C)	V _L (4.3V)	5730.556	5870.434

Note:

- (1) The EUT is a stand-alone radio device (see the clause 5.2.1 of EN 300 440-1). The Tx part and Rx part are powered by the batteries (rechargeable or non-rechargeable batteries, a type of lithium).
- (2) The value of table is worst case during test condition, includes different combinations of transmitter rate antenna polarity and temperature.

Limits EN 300 440-1 Clause 7.2.4

Under Normal Test Conditions	F _L >5725MHz, f _H <5875MHz
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**Clause 4.2.1.3 Spurious Emissions
(Radiated)**

Product	Video Transmitter	Test Mode	Keep Transmitting
Test Item	Spurious Emissions data	Temperature	25°C
Test Voltage	DC 5.0V	Humidity	56%RH
Test Result	PASS	Model:	TBS GREENHORN

Note:

1. Measurements were done on low & high channels, the worst case are submitted in the report.
2. The spurious emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges.
3. The test frequency range is from 25M-40G and please see clause 7.3.4 of EN 300 440-1 for the test method.

Low Channel (5735)

Lowest Frequency			Highest Frequency		
F(MHz)	Band-Width(kHz)	Level (dBm)	F(MHz)	Band-Width(kHz)	Level(dBm)
--	--	NF	--	--	NF
Measurement Uncertainty		4. 7dB			

High Channel (5865Hz)

Lowest Frequency			Highest Frequency		
F(MHz)	Band-Width(kHz)	Level (dBm)	F(MHz)	Band-Width(kHz)	Level(dBm)
--	--	NF	--	--	NF
Measurement Uncertainty		4. 7dB			

Note: NF = No Significant Peak was Found.

Limits EN 300 440-1, Clause 7.3.6

Table 5: Radiated spurious emissions

Frequency ranges	47 MHz to 74 MHz 87,5 MHz to 108 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies ≤ 1 000 MHz	Frequencies > 1 000 MHz
State			
Operating	4 nW	250 nW	1 μW
Standby	2 nW	2 nW	20 nW

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**Clause 4.2.1.4 Duty Cycle
For Transmitter**

The EUT is intended to use in data transmission or related application, It's declared by the manufacturer as a duty ratio up to 100%

Product	Video Transmitter	Test Mode	Keep Transmitting
Test Item	Spurious Emissions data	Temperature	25°C
Test Voltage	DC 5.0V	Humidity	56%RH
Test Result	PASS	Model:	TBS GREENHORN

X = Duty Cycle Ratio, Up to 80%
Limits EN 300 440-1, Clause 7.4.3

Table 6: Duty cycle limits

Frequency Band	Duty cycle	Application	Notes
2 400 MHz to 2 483,5 MHz	No Restriction	Generic use	
2 400 MHz to 2 483,5 MHz	No Restriction	Detection, movement and alert applications	
(a) 2 446 MHz to 2 454 MHz	No Restriction	RFID	See annex C
(b) 2 446 MHz to 2 454 MHz	≤ 15 %	RFID	See annex C
5 725 MHz to 5 875 MHz	No Restriction	Generic use	
9 200 MHz to 9 500 MHz	No Restriction	Detection, movement and alert applications	
9 500 MHz to 9 975 MHz	No Restriction	Detection, movement and alert applications	
10,5 GHz to 10,6 GHz	No Restriction	Detection, movement and alert applications	
13,4 GHz to 14,0 GHz	No Restriction	Detection, movement and alert applications	
17,1 GHz to 17,3 GHz	DAA or equivalent techniques	GBSAR detecting and movement and alert applications	See annex E
24,00 GHz to 24,25 GHz	No Restriction	Generic use and for detection, movement and alert applications	

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Clause 4.2 Receiver Requirements

For Receiver

Receiver Classification, Table 2 of EN300 440-1.

Table 2

Receiver class	Relevant receiver clauses	Risk assessment of receiver performance
1	8.1, 8.2, 8.3 and 8.4	Highly reliable SRD communication media; e.g. serving human life inherent systems (may result in a physical risk to a person).
2	8.3 and 8.4	Medium reliable SRD communication media e.g. causing inconvenience to persons, which cannot simply be overcome by other means.
3	8.4	Standard reliable SRD communication media e.g. inconvenience to persons, which can simply be overcome by other means (e.g. manual).

NOTE: With reference to the present document manufacturers are recommended to declare classification of their devices in accordance with table 2 and EN 300 440-2 [5] clause 4.2, as relevant. In particular where an SRD which may have an inherent safety of human life implications, manufacturers and users should pay particular attention to the potential for interference from other systems operating in the same or adjacent bands.

Note: The EUT (Rx part) belong to Class 3.

Clause 4.2.2.1 Adjacent Band Selectivity

For Receiver

Not applicable, Since the test applies to Class 1 receivers only, Please refer to clause 4.2.1.1 of EN300 300 440-2.

Clause 4.2.2.2 Blocking or Desensitization

For Receiver

Not applicable, Since the test applies to Class 1 and Class 2 receivers only, Please refer to clause 4.2.1.1 of EN300 300 440-2.

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**Clause 4.2.2.3 Receiver Spurious Emissions
 (Radiated)**

Product	Video Transmitter	Test Mode	Keep Transmitting
Test Item	Spurious Emissions data	Temperature	25°C
Test Voltage	DC5.0V	Humidity	56%RH
Test Result	N/A	Model:	TBS GREENHORN

Note:

1. Measurements were done on low & high channels, the worst case are submitted in the test report.
2. The receiver spurious emissions were done with different settings, using the relevant and pre-amplifiers for the relevant frequency ranges.

Lowest Frequency			Highest Frequency		
F(MHz)	Band-Width(kHz)	Level (dBm)	F(MHz)	Band-Width(kHz)	Level(dBm)
--	--	--	-	-	--
Measurement Uncertainty		4. 7dB			

- Note: 1. All reading are peak; Scan from 25MHz to 25GHz; find the maximum radiation frequency to measure.
 2. The EUT is only a receiver. This test item not applicable..

Limits EN 300 440-1, Clause 8.3.5

The power of any spurious emission shall not exceed 2 nW in the range 25 MHz to 1 GHz and shall not exceed 20 nW on frequencies above 1 GHz.

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3.0 Product Labelling

CE Mark label specification

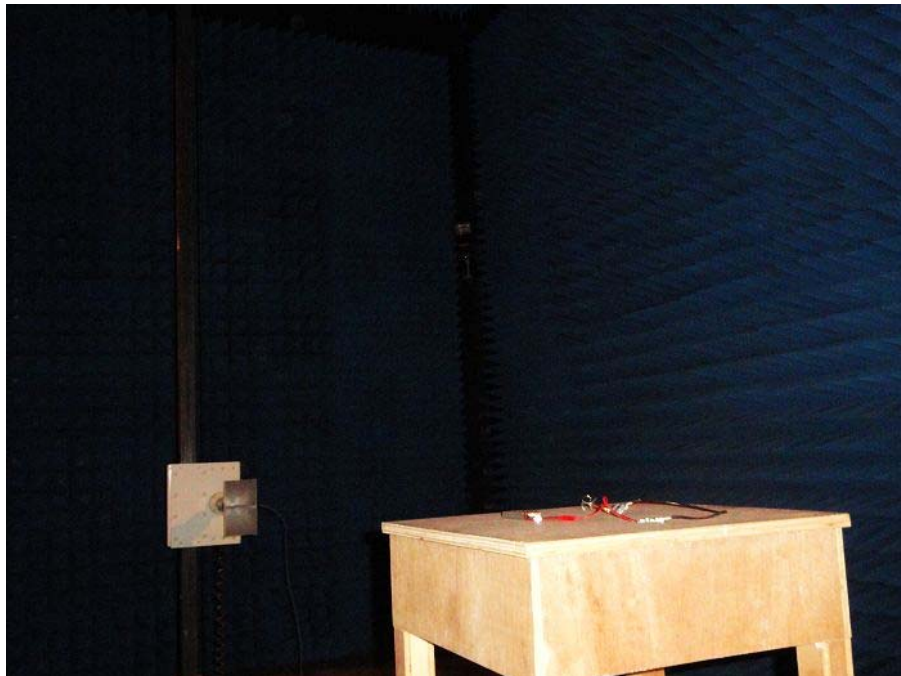
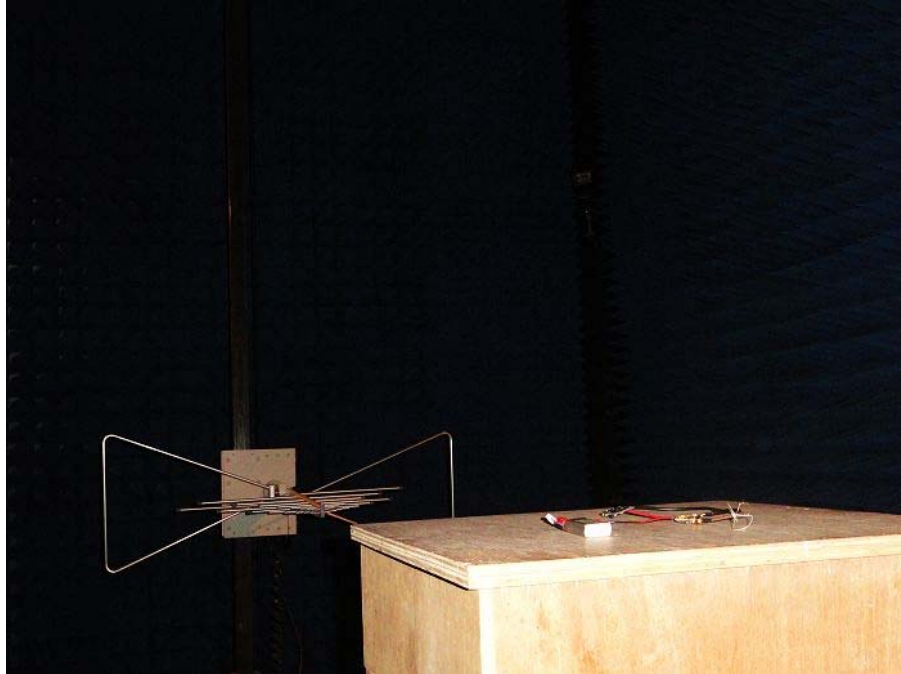
Text of the mark is black or white in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT or silk-screened onto the EUT.



Mark Location: Rear enclosure

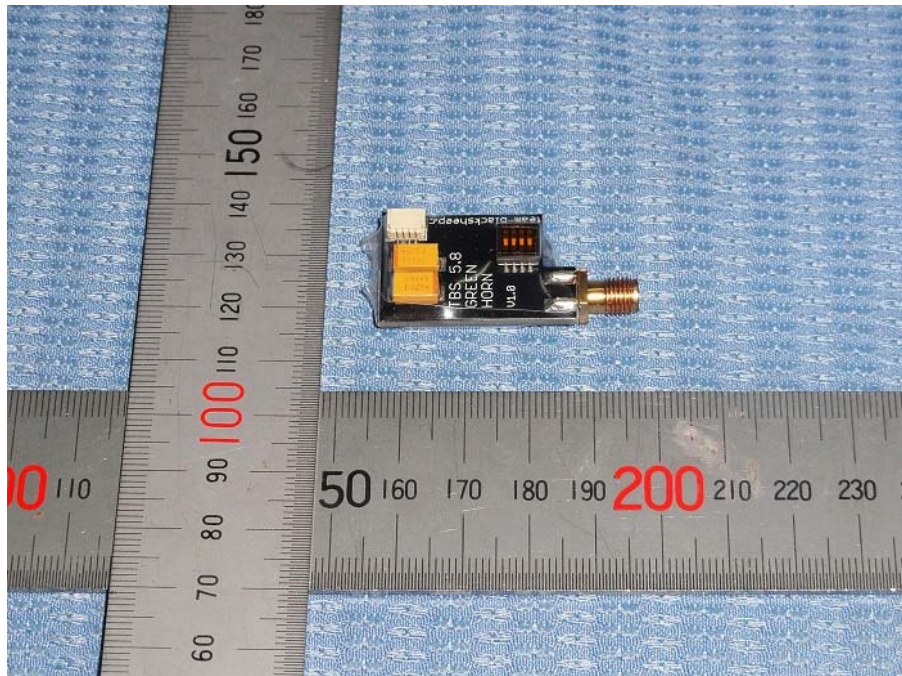
4. Photographs – Test Setup

Spurious Radiated emission test view

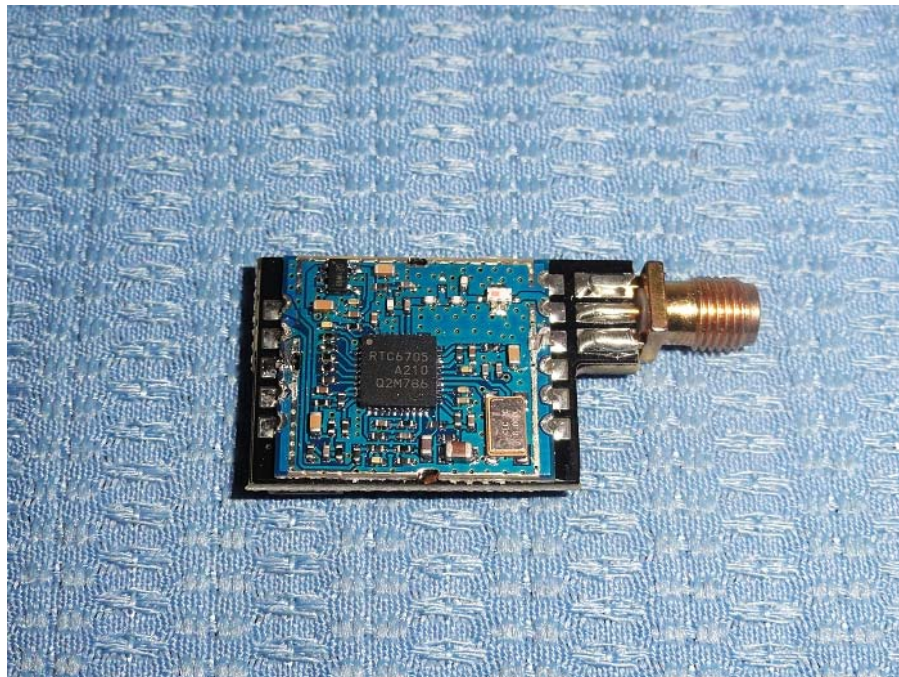


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5. Photographs - EUT



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6.0 Test Equipments					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2011-12-04	2012-12-03
Absorbing Clamp	ROHDE&SCHWARZ	MDS-21	100126	2011-12-04	2012-12-03
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100294	2011-12-04	2012-12-03
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100253	2011-12-04	2012-12-03
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2011-12-04	2012-12-03
ESDV Test Receiver	ROHDE&SCHWARZ	ESDV	100008	2011-12-04	2012-12-03
4-WIRE ISN	ROHDE&SCHWARZ	ENY 41	830663/044	2011-12-04	2012-12-03
GG ENY22 Double 2-Wire ISN	ROHDE&SCHWARZ	ENY22	83066/016	2011-12-04	2012-12-03
Impuls-Begrenzer	ROHDE&SCHWARZ	ESH3-Z2	100281	2011-12-04	2012-12-03
System Controller	CT	SC100	-	2011-10-04	2012-10-03

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Printer	EPSON	PHOTO EX3	CFNH234850	2011-12-04	2012-12-03
FM-AM Signal Generator	JUNGJIN	SG-150M	389911177	2011-12-04	2012-12-03
Color TV Pattern Generator	PHILIPS	PM5418	LO621747	2011-12-04	2012-12-03
Computer	IBM	8434	1S8434KCE99BLXL O*	-	
Oscillator	KENWOOD	AG-203D	3070002	2011-12-04	2012-12-03
Spectrum Analyzer	HAMEG	HM5012	-	-	
Power Supply	LW	APS1502	-	-	
5K VA AC Power Source	California Instruments	5001iX	56060	2011-12-04	2012-12-03
CDN	EM TEST	CDN M2/M3	-	2011-12-04	2012-12-03
Attenuation	EM TEST	ATT6/75	-	2011-12-04	2012-12-03
Resistance	EM TEST	R100	-	2011-12-04	2012-12-03
Electromagnetic Injection Clamp	LITTHI	EM101	35708	2011-12-04	2012-12-03
Inductive Components	EM TEST	MC2630	-	2011-12-04	2012-12-03
Antenna	EM TEST	MS100	-	2011-12-04	2012-12-03
Signal Generator	ROHDE&SCHWARZ	SMT03	100029	2011-12-04	2012-12-03
Power Amplifier	AR	150W1000	300999	2011-11-04	2012-11-03
Field probe	Holaday	HI-6005	105152	2011-12-04	2012-12-03
Bilog Antenna	Chase	CBL6111C	2576	2011-12-04	2012-12-03
Loop Antenna	EMCO	6502	00042960	2011-12-04	2012-12-03
ESPI Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2011-12-04	2012-12-03
3m OATS	--	--	N/A	2011-12-04	2012-12-03

End of the Report

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