



TEST REPORT NO: RU1238/6954
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FCC ID: JRNUSAECOLINK

**REPORT ON THE CERTIFICATION TESTING OF A
SCOPE COMMUNICATIONS UK Ltd
ECTX Mk1
WITH RESPECT TO
FCC RULES CFR 47, PART 90 Subpart K**

TEST DATE: 11th – 13th April 2006

TESTED BY: _____ D WINSTANLEY

APPROVED BY: _____ J CHARTERS
RADIO SECTION
LEADER

DATE: 1st February 2007

Distribution:

Copy Nos: 1. Scope Communications UK Ltd
2. FCC EVALUATION LABORATORIES
3. TRL Compliance Ltd

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TRL COMPLIANCE LTD

MOSS VIEW NIPE LANE UP HOLLAND WEST LANCASHIRE WN8 9PY UNITED KINGDOM

TELEPHONE +44 (0)1695 556666 FAX +44 (0)1695 557077

E-MAIL test@trlicompliance.com www.trlicompliance.com



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Notes:

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



CERTIFICATE OF CONFORMITY & COMPLIANCE

FCC IDENTITY:	JRNUSAECOLINK
PURPOSE OF TEST:	Certification
TEST SPECIFICATION:	FCC RULES CFR 47, Part 90 Subpart K
TEST RESULT:	Compliant to Specification
EQUIPMENT UNDER TEST:	ECTX Mk1
EQUIPMENT SERIAL No:	SCP133595
ITU: EMISSION CODE:	12k5F1D
EQUIPMENT TYPE:	Pager System
PRODUCT USE:	Paging
CARRIER EMISSION:	0.4467 W Conducted
ANTENNA TYPE:	Not Applicable
FREQUENCY OF OPERATION:	457.525 MHz
CHANNEL SPACING:	12.5 kHz
NUMBER OF CHANNELS:	1
FREQUENCY GENERATION:	SAW Resonator <input type="checkbox"/> Crystal <input checked="" type="checkbox"/> Synthesiser <input type="checkbox"/>
MODULATION METHOD:	Amplitude <input type="checkbox"/> Digital <input checked="" type="checkbox"/> Angle <input type="checkbox"/>
POWER SOURCE(s):	+12Vdc
TEST DATE(s):	11 th – 13 th April 2006
ORDER No(s):	18191
APPLICANT:	Scope Communications UK Ltd
ADDRESS:	Quantum House Steamer Quay Totnes Devon TQ9 5AL

TESTED BY: D WINSTANLEY

APPROVED BY: _____ J CHARTERS
RADIO SECTION
LEADER

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT): ECTX Mk1

EQUIPMENT TYPE: Pager System

SERIAL NUMBER OF EUT: SCP133595

PURPOSE OF TEST: Certification

TEST SPECIFICATION(s): FCC RULES CFR 47, Part 90 Subpart K

TEST RESULT: COMPLIANT Yes No

APPLICANT'S CATEGORY: MANUFACTURER
IMPORTER
DISTRIBUTOR
TEST HOUSE
AGENT

APPLICANT'S ORDER No(s): 18191

APPLICANT'S CONTACT PERSON(s): Mr T Sams

E-mail address: tjs@scope-uk.com

APPLICANT: Scope Communications UK Ltd

ADDRESS: Quantum House
Steamer Quay
Totnes
Devon
TQ9 5AL

TEL: +44 (0) 1803 860700

FAX: +44 (0) 1803 863716

MANUFACTURER: Scope Communications UK Ltd

EUT(s) COUNTRY OF ORIGIN: United Kingdom

TEST LABORATORY: TRL Compliance

UKAS ACCREDITATION No: 0728

TEST DATE(s): 11th – 13th April 2006

TEST REPORT No: RU1238/6954

EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.	TEST/EXAMINATION	RULE PART	APPLICABILITY	RESULT
	RF Power Output	90.267	Yes	Complies
	Audio Frequency Response	TIA EIA-603.3.2.6	N/A	N/A
	Audio Low-Pass Filter Response	TIA EIA-603.3.2.6	N/A	N/A
	Modulation Limiting	TIA EIA-603.3.2.6	N/A	N/A
	Occupied Bandwidth	90.210	Yes	Complies
	Spurious Emissions at Antenna Terminals	90.210 (d)	Yes	Complies
	Field Strength of Spurious Emissions	90.210 (d)	Yes	Complies
	Frequency Stability	90.213	Yes	Complies
	Transient behaviour	90.214	Yes	Complies

2. Product Use: Paging

3. Emission Designator: 12k5F1D

4. Duty Cycle: <100%

5. Transmitter bit or pulse rate and level: 1200 bps

6. Temperatures: Ambient (T_{nom}) 14°C

7. Supply Voltages: V_{nom} +12Vdc

Note: V_{nom} voltages are as stated above unless otherwise shown on the test report page

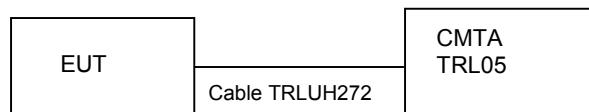
8. Equipment Category: Single channel Two channel Multi-channel

9. Channel spacing: Narrowband Wideband 12.5 kHz

TRANSMITTER TESTS

TRANSMITTER INTENTIONAL EMISSION – CONDUCTED – Part 2.1046

Ambient temperature	= 14 °C(<1GHz),	Conducted Measurement
Relative humidity	= 50%(<1GHz),	
Conditions	= Open Area Test Site (OATS)	
Supply voltage	= +12Vdc	
Channel number	= 1	



The test was set up as per the diagram. The unit was tested operating at maximum power.

FREQ. (MHz)	MEASUREMENT Rx. READING (dBm)	CABLE LOSS (dB)	OUTPUT POWER (dBm)	OUTPUT POWER (Watts)
457.525	26.3	0.2	26.5	0.4467
Limit value @ fc		6 Watts		
Band occupancy @ -20dBc		f lower	f higher	
		457.521160 MHz	457.529760 MHz	

See spectrum analyser plot – Annex C

Notes:

- 1 Receiver detector @ fc = Peak.
- 2 EUT transmitting permanent carrier for output power measurement.
- 3 EUT transmitting modulated carrier for band occupancy measurement.

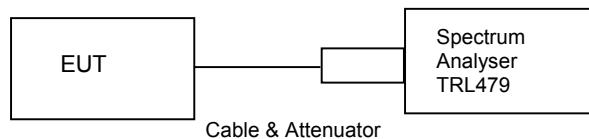
Test Method:

- 1 As per Radio – Noise Emissions, ANSI C63.4: 2003.
- 2 Conducted Measurement.
- 3 Maximum results recorded.
- 4 Unit power Via TRLUH177, Voltage Set using TRLUH41.

TRANSMITTER TESTS

TRANSMITTER SPURIOUS EMISSIONS – CONDUCTED – Part 2.1049 & 2.1051

Ambient temperature = 19°C Radio Laboratory
Relative humidity = 46%
Supply voltage = +12Vdc



The test was set up as per the diagram. The unit was tested operating at maximum power.

The Spurious limit is as follows:

On any frequency removed from the assigned frequency by the following offsets any emissions must be attenuated below the power P of the highest emission contained within the authorised bandwidth as follows:

±0 kHz	-	5.625 kHz	0 dB
±5.625 kHz	-	12.5 kHz	7.27(f _d – 2.88kHz) dB
> ±12.5 kHz	-	1MHz	At least 50 + 10 log (PdB) or 70 dB (Whichever is the lesser attenuation)

RESULTS

See Annex D for emissions mask showing compliance.

FREQUENCY RANGE	FREQ. (MHz)	MEASURED LEVEL (dBm)	ATTENUATOR & CABLE LOSSES (dB)	EMISSION LEVEL (dBm)	LIMIT (dBm)
< f _c – 1MHz		No Significant Emissions within 20dB of the Limit			-20
> f _c + 1MHz		No Significant Emissions within 20dB of the Limit			-20

Notes:

- 1 Emissions were searched to: (x) 1000MHz inclusive.
- 2 Receiver detector <1GHz = CISPR, Quasi-Peak, 120kHz bandwidth.
- 3 Receiver detector >1GHz = Peak Hold, 1MHz resolution bandwidth.
- 4 EUT transmitting permanent carrier.
- 5 See Annex E for conducted spurious emissions.

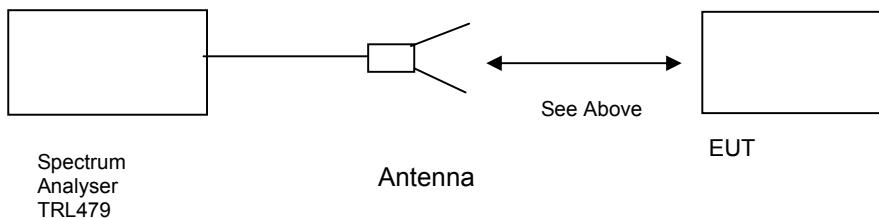
Test Method:

- 1 As per Radio – Noise Emissions, ANSI C63.4: 2003.
- 2 Unit power Via TRLUH177, Voltage Set using TRLUH41.

TRANSMITTER TESTS

TRANSMITTER SPURIOUS EMISSIONS – RADIATED – PART 2.1053

Ambient temperature	=	20°C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	46% (<1GHz),	0.3m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)		
Supply voltage	=	+12Vdc		
Channel number	=	1		



The test was set up as per the diagram. The unit was tested operating maximum power with a 50 ohm load on the output.

The Spurious limit is as follows:

On any frequency removed from the assigned frequency by the following offsets any emissions must be attenuated below the power P of the highest emission contained within the authorised bandwidth as follows:

±0 kHz	-	±5.625 kHz	0 dB
±5.625 kHz	-	±12.5 kHz	7.27(f _d – 2.88kHz) dB
> ±12.5 kHz			At least 50 + 10 log (PdB) or 70 dB (Whichever is the lesser attenuation)

RESULTS

FREQUENCY RANGE	FREQ. (MHz)	MEAS. Rx. (dB μ V)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dB μ V/m)	CALCULATED EIRP (dBm)	LIMIT (dB)
±0 kHz - ±5.625 kHz					No Significant Emissions within 10 dBs of the Limit		0 (dBc)
±5.625 kHz - ±12.5 kHz					No Significant Emissions within 10 dBs of the Limit		7.27(f _d - 2.88kHz) (dBc)
> ±12.5 kHz					No Significant Emissions within 10 dBs of the Limit		-20 (dBm)

Notes:

- 1 Emissions were searched to: (x) 1000MHz inclusive.
- 2 Measurements >1GHz @ 0.3m as per Part 15.31f(1).
- 3 Receiver detector <1GHz = CISPR, Quasi-Peak, 120kHz bandwidth.
- 4 Receiver detector >1GHz = Peak Hold, 1MHz resolution bandwidth.
- 5 See Annex F for radiated spurious emissions.
- 6 Unit power Via TRLUH177, Voltage Set using TRLUH41.

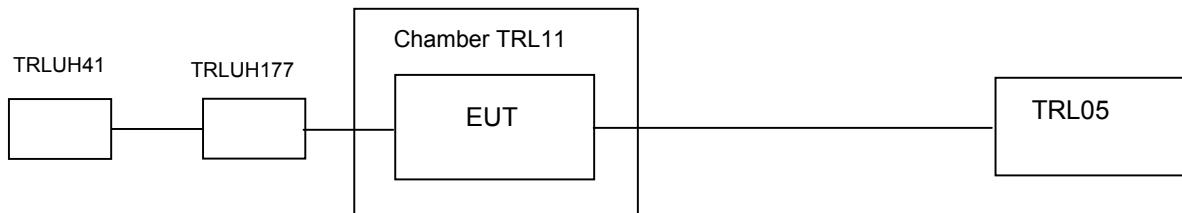
Test Method:

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

TRANSMITTER TESTS

TRANSMITTER FREQUENCY STABILITY – CONDUCTED – TEMPERATURE – PART 2.1055

Ambient temperature = 18°C
 Relative humidity = 48%
 Supply voltage = +12 Vdc
 Radio Laboratory



The test setup was as per the above diagram. The test equipment TRL05 was set to count the frequency of the transmission. The EUT was set transmit a permanent carrier.

RESULTS

TEMP °C	Frequency (MHz)			
	fc MHz	Δ fc kHz	Δ fc ppm	Limit ppm
+50	457.52288	+0.38	+0.83	± 1.5ppm
+40	457.52216	-0.34	-0.74	± 1.5ppm
+30	457.52233	-0.17	-0.37	± 1.5ppm
+20	457.52279	+0.29	+0.63	± 1.5ppm
+10	455.52316	+0.66	+1.44	± 1.5ppm
0	457.52300	+0.50	+1.09	± 1.5ppm
-7	457.52258	+0.08	+0.17	± 1.5ppm
-10	Note 2			± 1.5ppm
-20	Note 2			± 1.5ppm
-30	Note 2			± 1.5ppm

Notes:

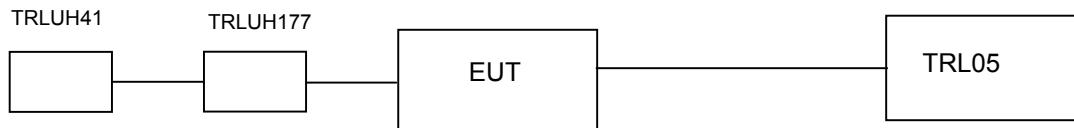
1. See Annex G for frequency stability plots versus limit.
2. The EUT Employs a thermistor function to disable transmissions below approximately -10°C.
3. The unit ceases operation below -7°C.
4. See Annex G for frequency stability plots versus limit.
5. fc = 457.5225MHz = 457.525 MHz (center frequency of channel) – 2.5kHz (Deviation).

The ECTX Mk1 was found to comply with the limits.

TRANSMITTER TESTS

TRANSMITTER FREQUENCY STABILITY – CONDUCTED – VOLTAGE – PART 2.1055

Ambient temperature = 17°C Radio Laboratory
Relative humidity = 48%
Supply voltage = +12 Vdc



See Annex C for full list of test equipment

The test setup was as per the above diagram. The test equipment TRL05 was set to count the frequency of the transmission. The EUT was set transmit a permanent carrier.

RESULTS

VOLTAGE	Frequency (MHz)				
	%	fc MHz	Δ fc kHz	Δ fc ppm	Limit ppm
85		457.52275	+0.25	+0.55	± 1.5ppm
90		457.52273	+0.23	+0.50	± 1.5ppm
95		457.52271	+0.21	+0.46	± 1.5ppm
100		457.52270	+0.20	+0.44	± 1.5ppm
105		457.52268	+0.18	+0.39	± 1.5ppm
110		457.52266	+0.16	+0.35	± 1.5ppm
115		457.52264	+0.14	+0.31	± 1.5ppm

Notes:

1. See Annex H for frequency stability plots versus limit.
2. The EUT Employs a thermistor function to disable transmissions below approximately -10°C.
3. The unit ceases operation below -7°C.
4. See Annex H for frequency stability plots versus limit.
5. fc = 457.5225MHz = 457.525 MHz (center frequency of channel) – 2.5kHz (Deviation).

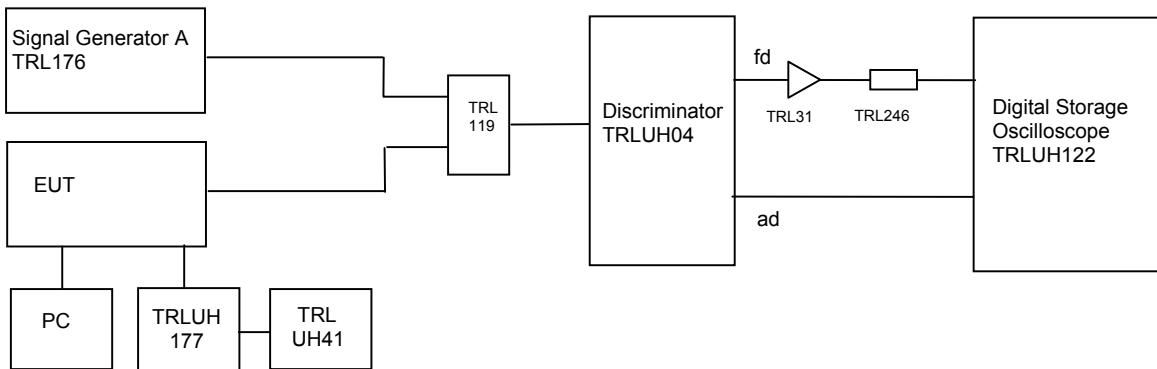
The ECTX Mk1 was found to comply with the limits.

TRANSMITTER TESTS

TRANSMITTER TRANSIENT FREQUENCY BEHAVIOUR – Part 90.214

Ambient temperature = 21°C
 Relative humidity = 36%
 Supply voltage = +12Vdc

Radio Laboratory



The test equipment was connected as above. Signal generator A was tuned to the centre frequency of the channel selected on the EUT. The signal was modulated with a 1 kHz tone with an FM deviation that corresponds to the EUT operational channel spacing. The power level of the signal is adjusted to 0.1% of the power of the transmitter under test. The EUT was set to transmit a permanent carrier.

Both signals were fed into the input of an RF discriminator via a combiner. The discriminator was connected to two channels of the digital storage oscilloscope (DSO). One channel monitored the frequency difference (fd) and the second monitored the audio difference (ad). The DSO is set to display the channel corresponding to the fd input up to ± 1 channel frequency difference. The DSO is set to 10ms/div and to trigger at 1 div from the left edge of the display.

The display will show the 1 kHz test signal continuously. The DSO is then set to trigger on the ad input. The transmitter is then turned on without modulation. Due to the ratio between the 1 kHz test signal and the wanted signal the test signal will be suppressed. The transmitter is then turned off. Due to the wanted signal being removed the test signal will be displayed. The resulting plots were recorded and compared to the limit..

RESULTS

The ECTX Mk1 was found to comply with the limits. See annex I for plots.

Time intervals ^{1,2}	Maximum Frequency Difference ³	All Equipment	
		457.525 MHz	
Transient Frequency Behaviour for Equipment Designed to operate on 12.5 kHz Channels			
t_1 ⁴	± 12.5 kHz		10.0 ms
t_2	± 6.25 kHz		25.0 ms
t_3 ⁴	± 12.5 kHz		10.0 ms
Notes	t_{on} is the instant when a 1 kHz test signal is completely suppressed, including any capture time due to phasing. t_1 is the time period immediately following t_{on} t_2 is the time period immediately following t_1 t_3 is the time period from when the transmitter is turned off until t_{off} t_{off} is the instant when the 1 kHz test signal starts to rise 2: During the time from the end of t_2 to the beginning of t_3 the frequency difference must not exceed the limits specified in 90.213 3: Difference between the actual transmitter frequency and the assigned transmitter frequency. 4: If the transmitter carrier output power rating is 6 watt or less the frequency difference during this time period may exceed the maximum frequency difference for this time period.		

ANNEX A
PHOTOGRAPHS

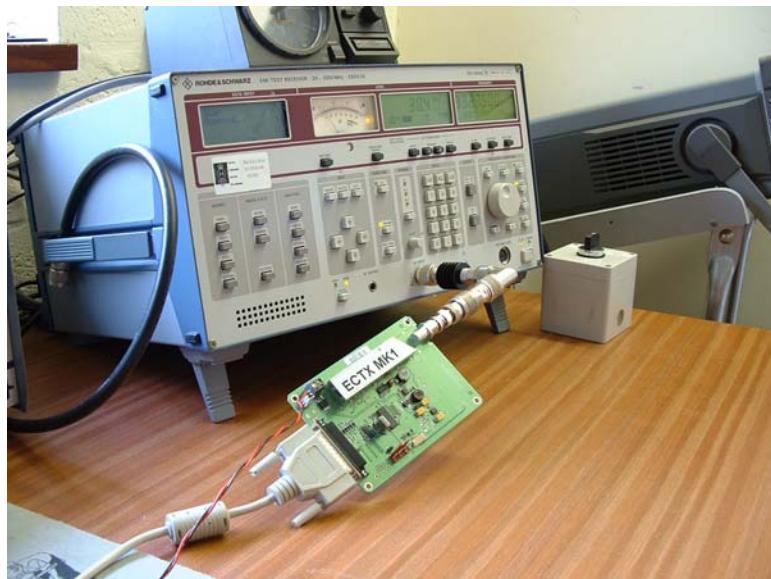
PHOTOGRAPH No. 1

RADIATED TEST SETUP



PHOTOGRAPH No. 2

CONDUCTED TEST SETUP

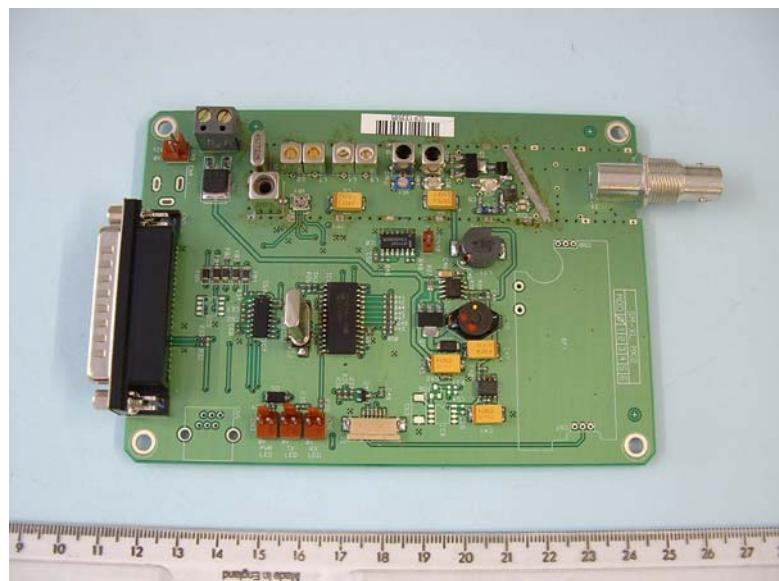


PHOTOGRAPH No. 3

TRANSMITTER TOP VIEW

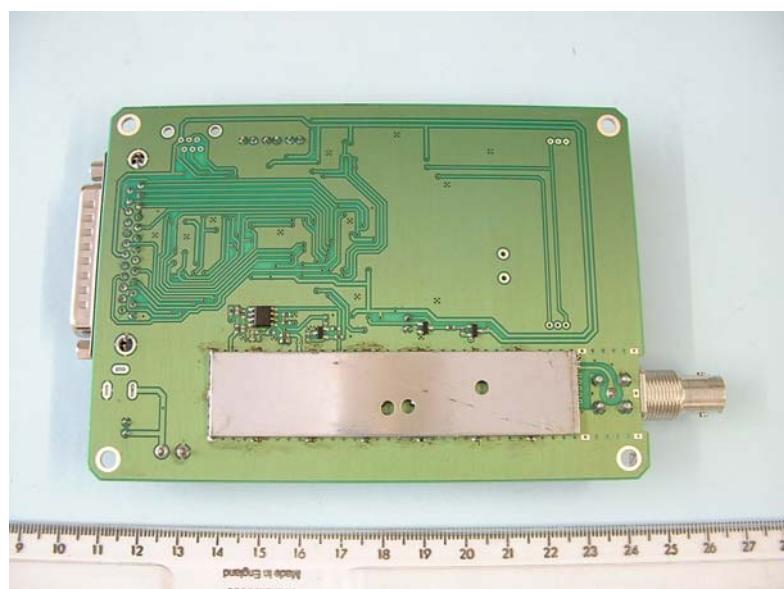


PHOTOGRAPH No. 4 **TRANSMITTER TOP VIEW, CAN REMOVED**

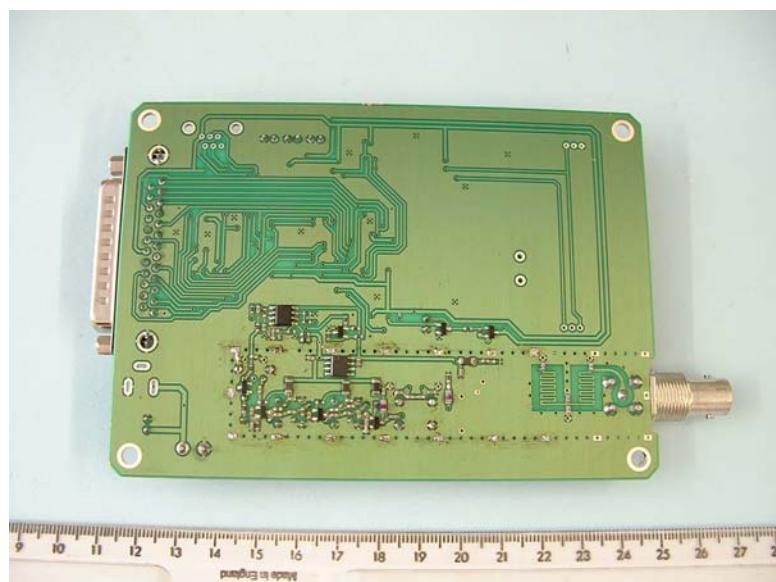


PHOTOGRAPH No. 5

TRANSMITTER BOTTOM VIEW



PHOTOGRAPH No. 6 **TRANSMITTER BOTTOM VIEW, CAN REMOVED**



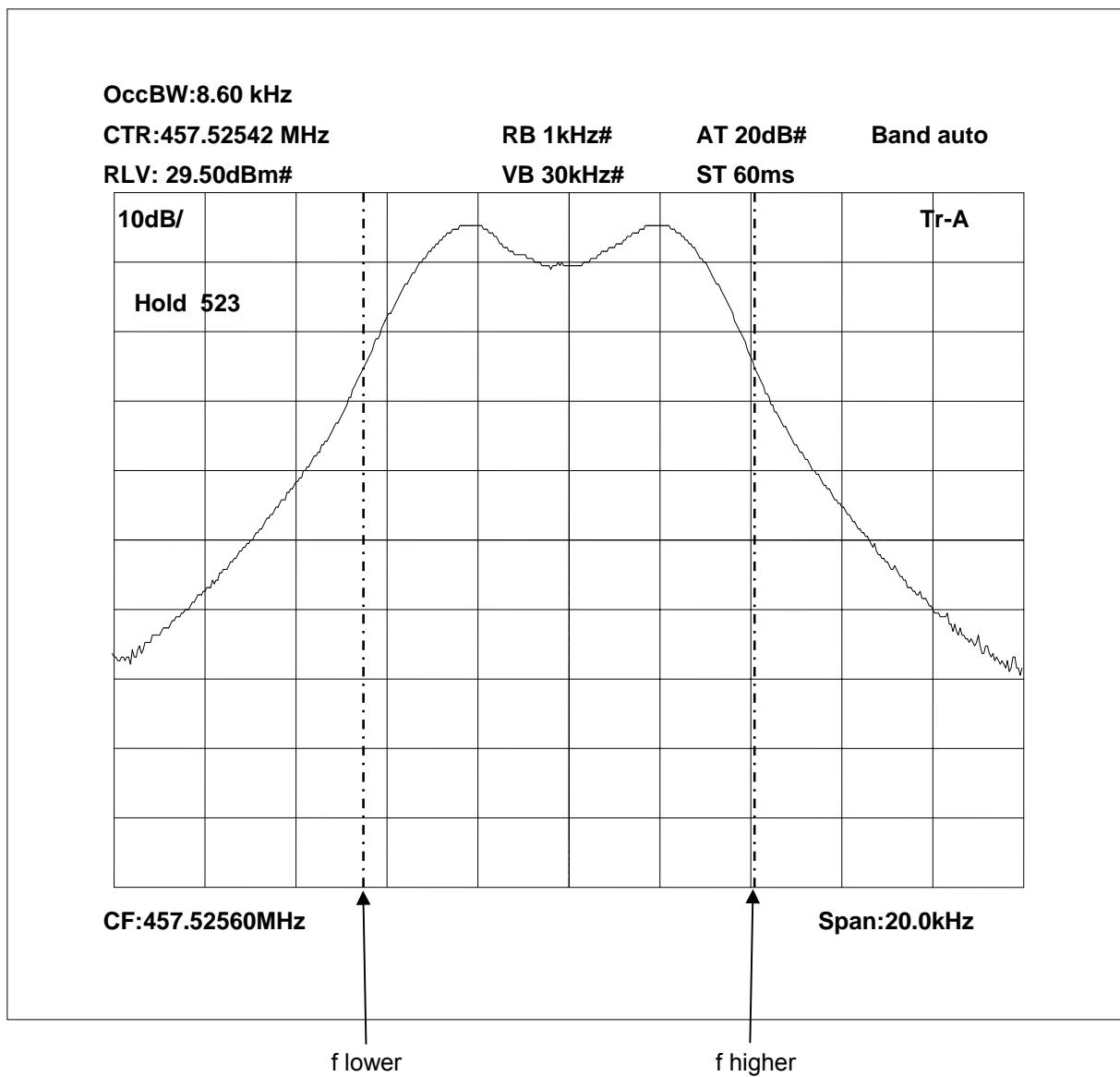
ANNEX B
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

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

ANNEX C
BANDWIDTH PLOT

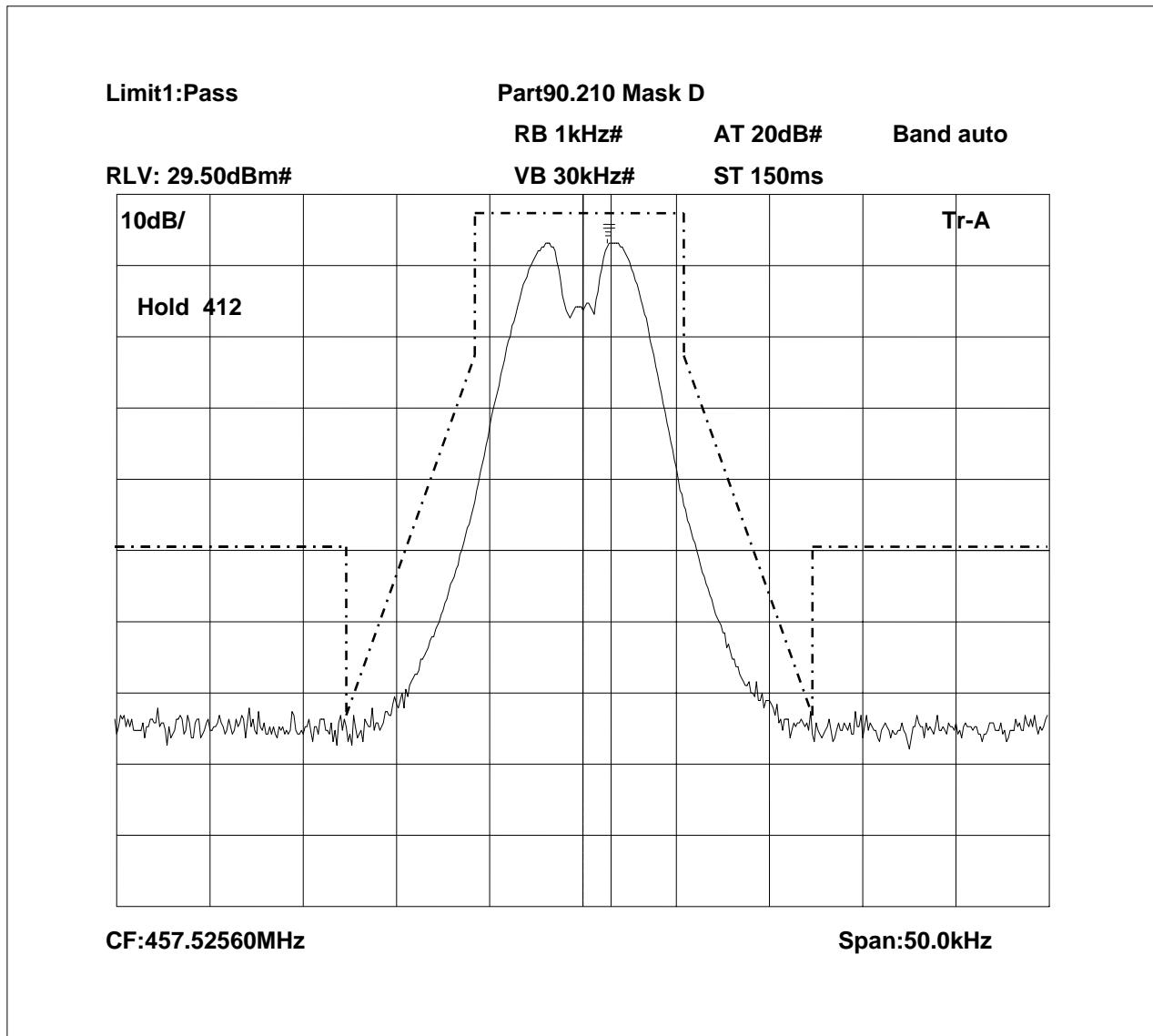
BANDWIDTH PLOT



f lower	= 457.521160 MHz
f higher	= 457.529760 MHz
Occupied Bandwidth	= 8.60 kHz

ANNEX D
EMISSIONS MASK

EMISSIONS MASK



----- Mask Limit line

ANNEX E
CONDUCTED SPURIOUS EMISSIONS

Conducted Spurious

30MHz – 1GHz

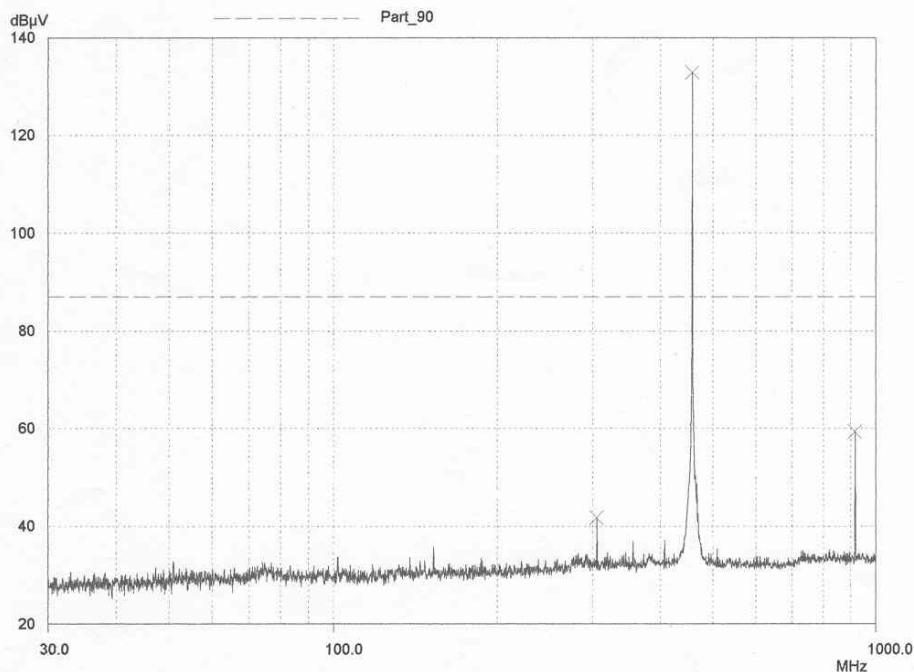
TRL Compliance Ltd.

11 Apr 2006 13:10

Conducted pre scan

EUT: ECTX MK1
Manuf: Scope
Op Cond: Pre scan TRL221
Operator: D Winstanley
Test Spec: Part_90
Comment: Unit Tx Carrier connected Via 20dB Pad to RX.

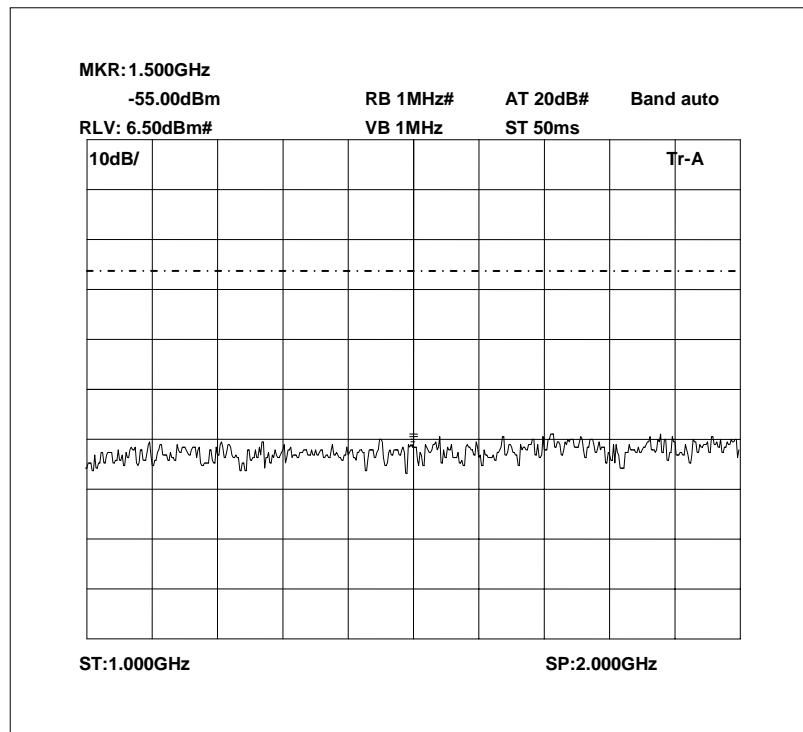
Scan Settings		(2 Ranges)				Receiver Settings				
		Frequencies		Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
Start		Stop		Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
30MHz		300MHz		50kHz	120kHz	PK	1msec	Auto	ON	60dB
300MHz		1000MHz		50kHz	120kHz	PK	1msec	Auto	ON	60dB
Transducer	No.	Start	Stop			Name				
	20	30MHz	1000MHz			20db_Pad				
Final Measurement:		Detector:	X QP							
		Meas Time:	1sec							
		Peaks:	50							
		Acc Margin:	25 dB							



PAGE 1

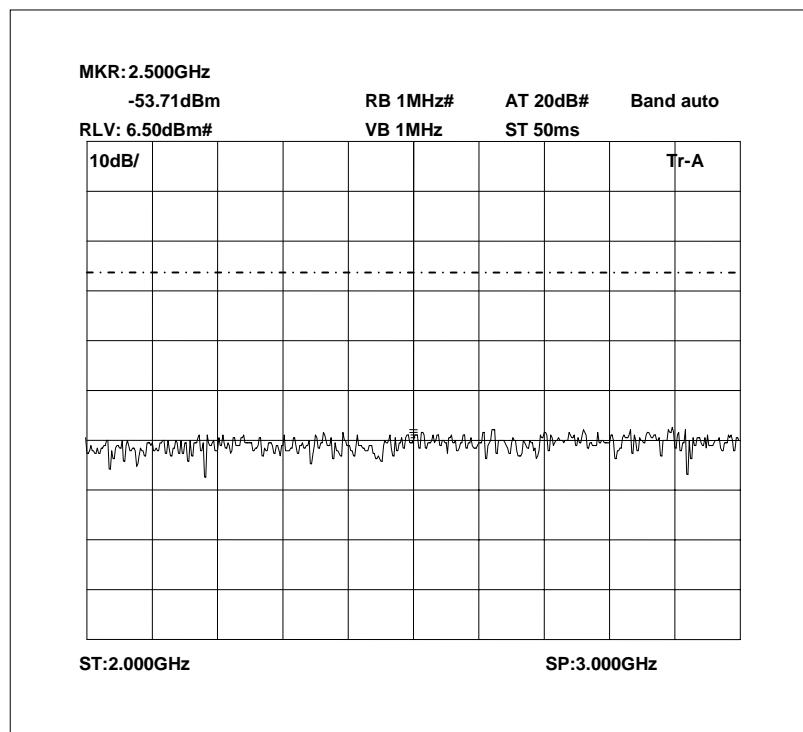
Conducted Spurious

1GHz – 2GHz



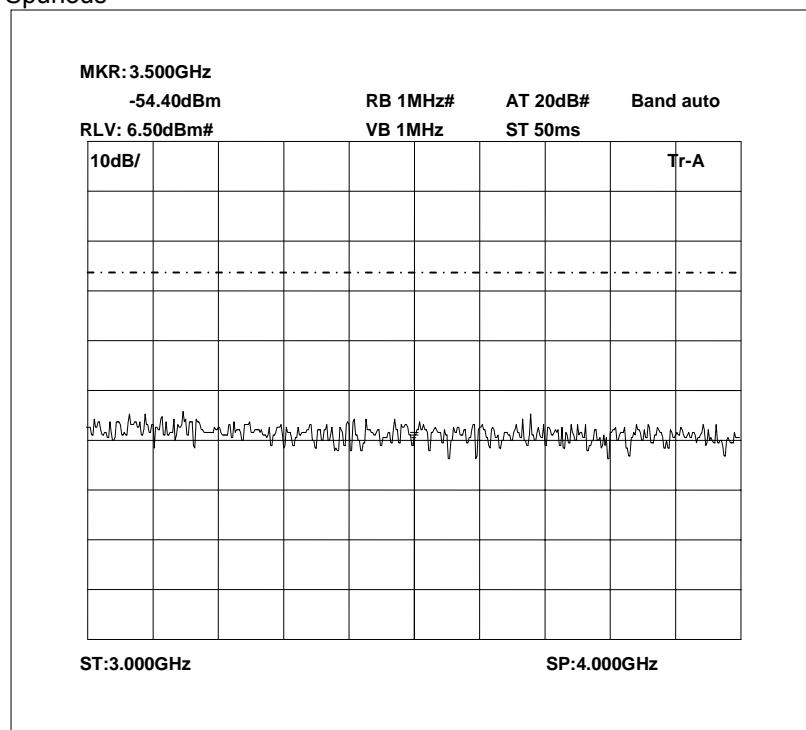
Conducted Spurious

2GHz – 3GHz



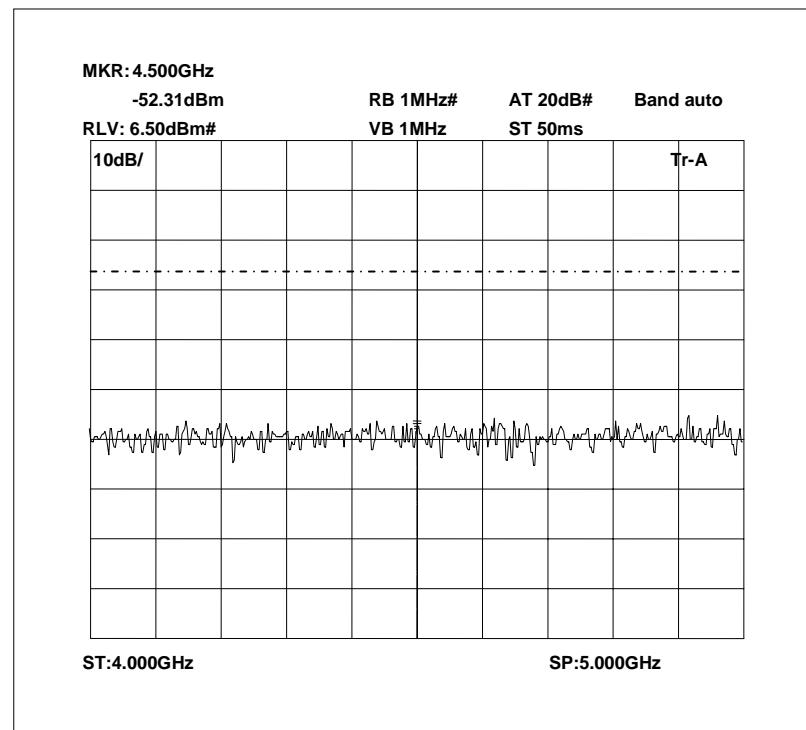
Conducted Spurious

3GHz – 4GHz



Conducted Spurious

4GHz – 5GHz



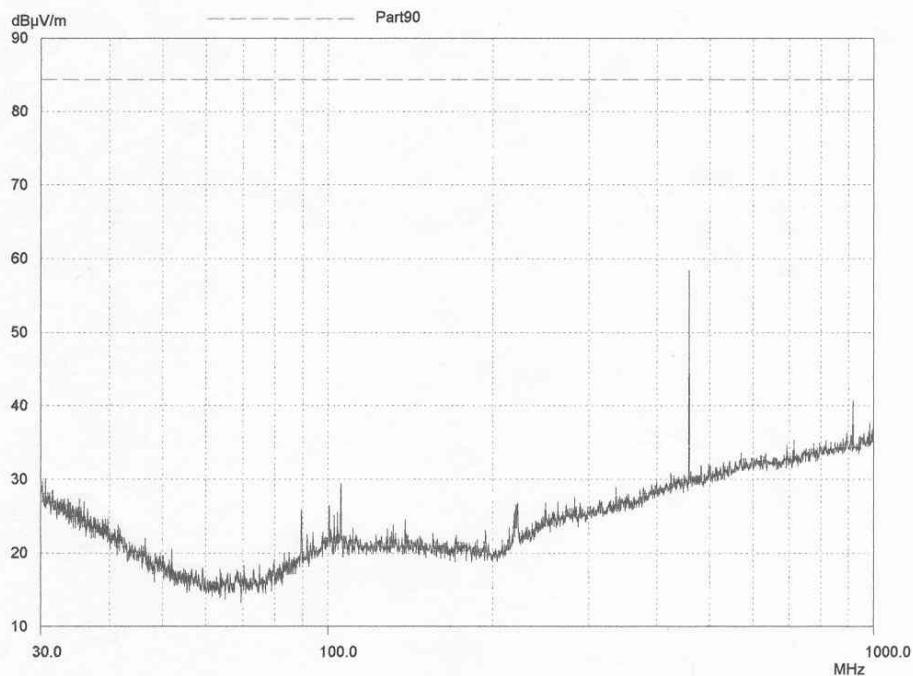
ANNEX F
RADIATED SPURIOUS EMISSIONS

TRL Compliance Ltd
E-Field Radiation (30MHz-1GHz)

11 Apr 2006 11:40

EUT: ECTX MK1
Manuf: Scope Communications UK Ltd
Op Cond: Prescan 30MHz - 1000MHz
Operator: Steven Hodgkinson
Test Spec: Part15
Comment: ECTX MK1 set to permanent carrier.Underside of PCB facing Rx antenna.
Rx antenna Horizontal

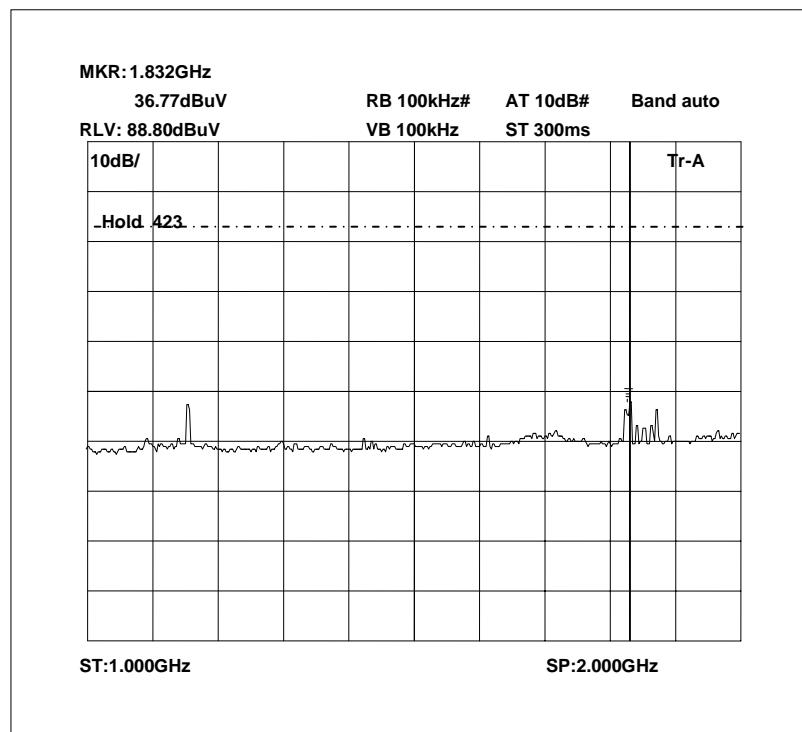
Scan Settings		(1 Range)				Receiver Settings				
		Frequencies		Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
Transducer	No.	Start	Stop	50kHz	120kHz	PK	1msec	Auto	ON	60dB
		Start 30MHz	Stop 1000MHz	Step 50kHz	IF BW 120kHz	Detector PK	M-Time 1msec	Atten Auto	Preamp ON	OpRge 60dB
1	21	30MHz	1000MHz			Name UH72				
	22	30MHz	1000MHz			Name UH93				
Prescan Measurement:		Detector:	X PK							
		Meas Time:	see scan settings							
		Subranges:	50							
		Acc Margin:	10 dB							



PAGE 1

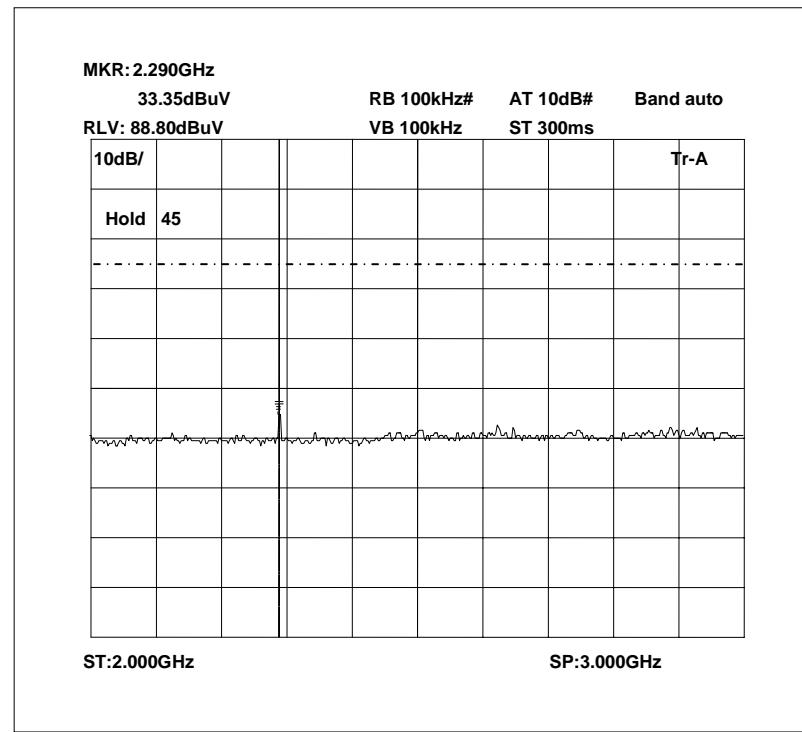
Radiated Spurious

1GHz – 2GHz



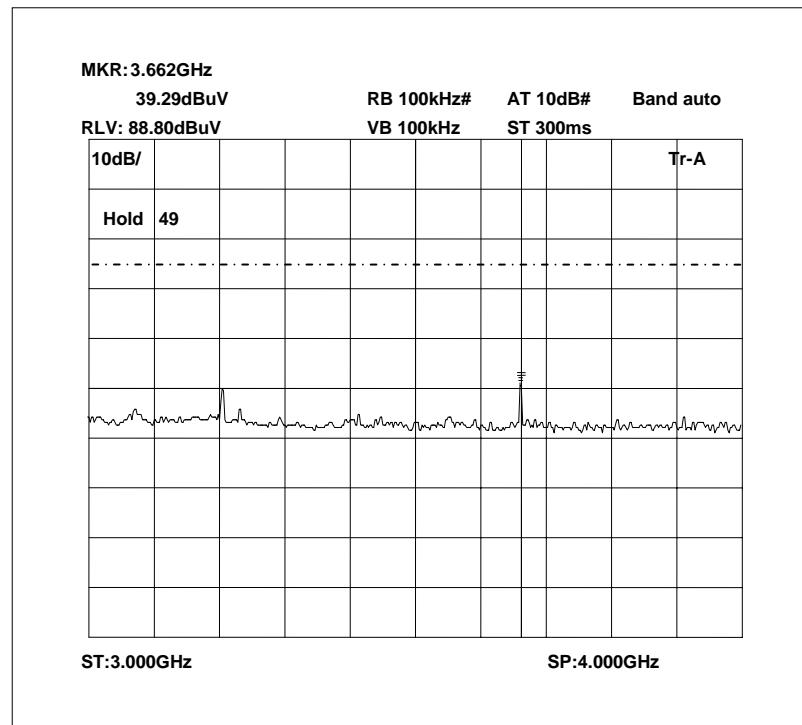
Radiated Spurious

2GHz – 3GHz



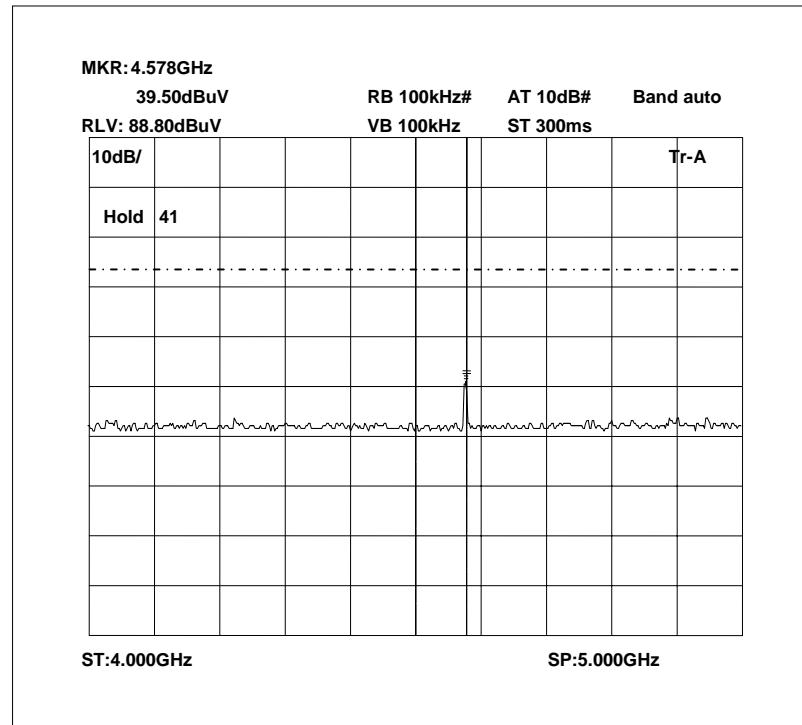
Radiated Spurious

3GHz – 4GHz

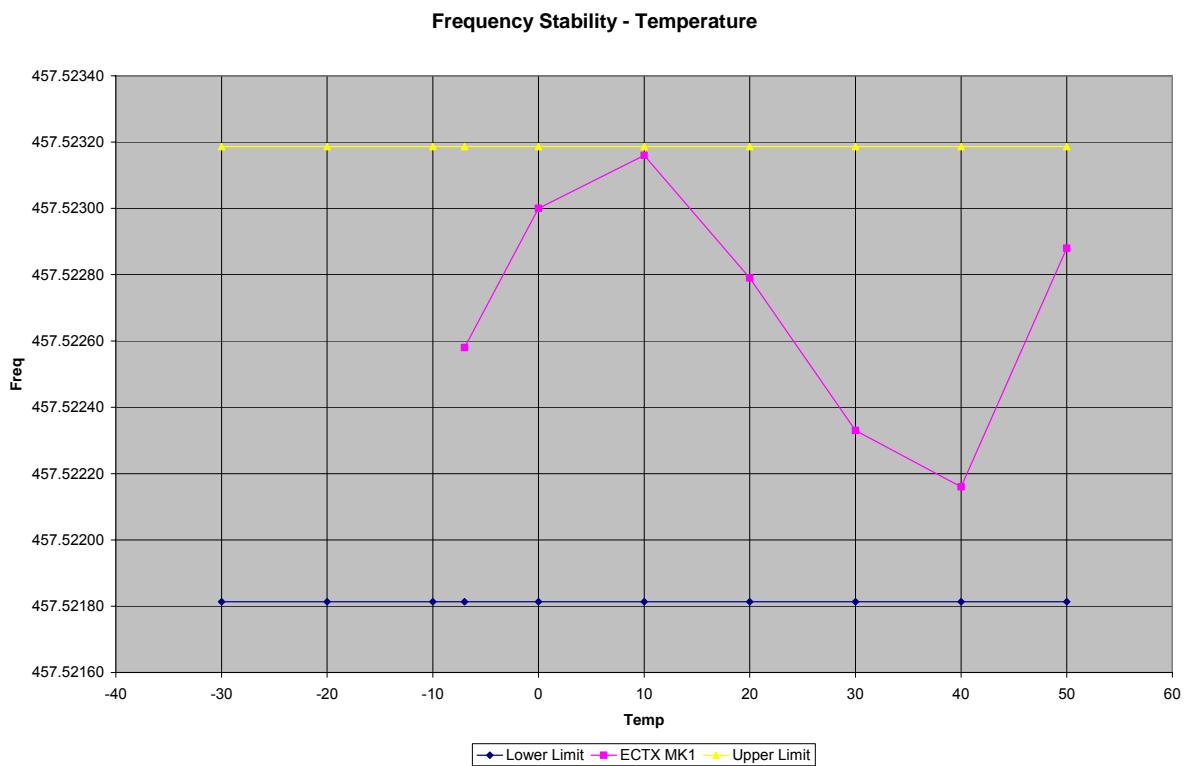


Radiated Spurious

4GHz – 5GHz

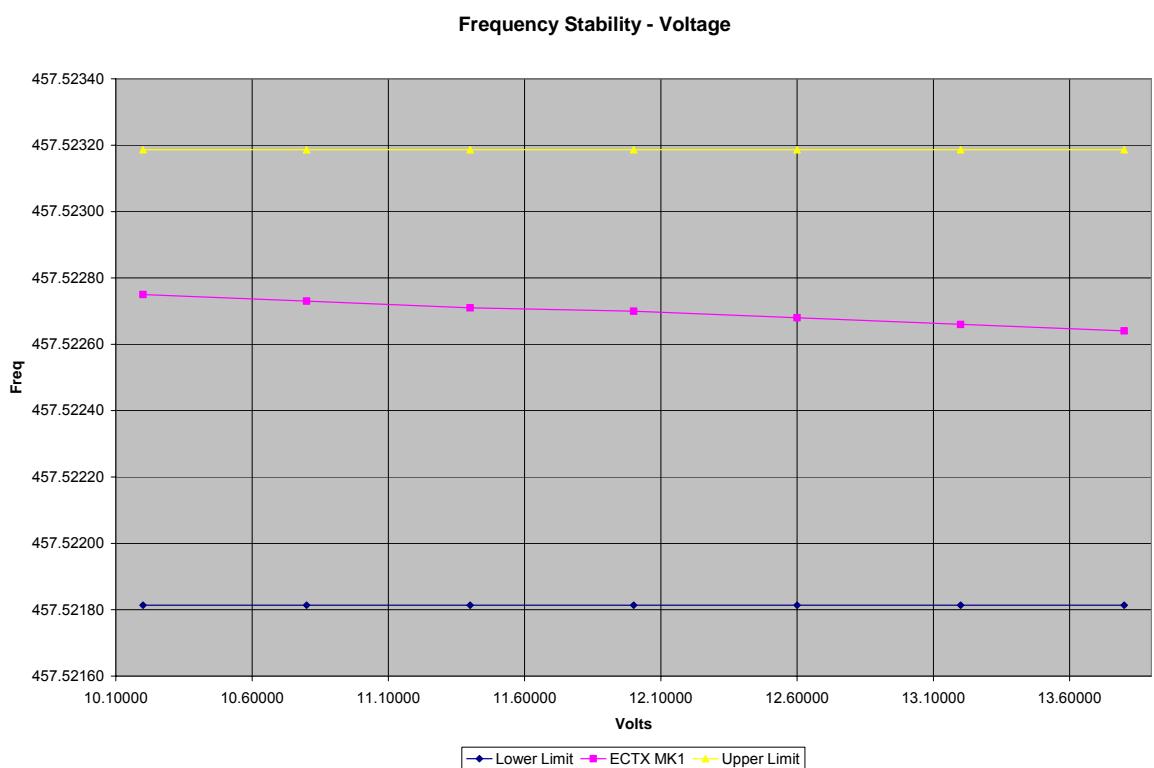


ANNEX G
FREQUENCY STABILITY - Temperature



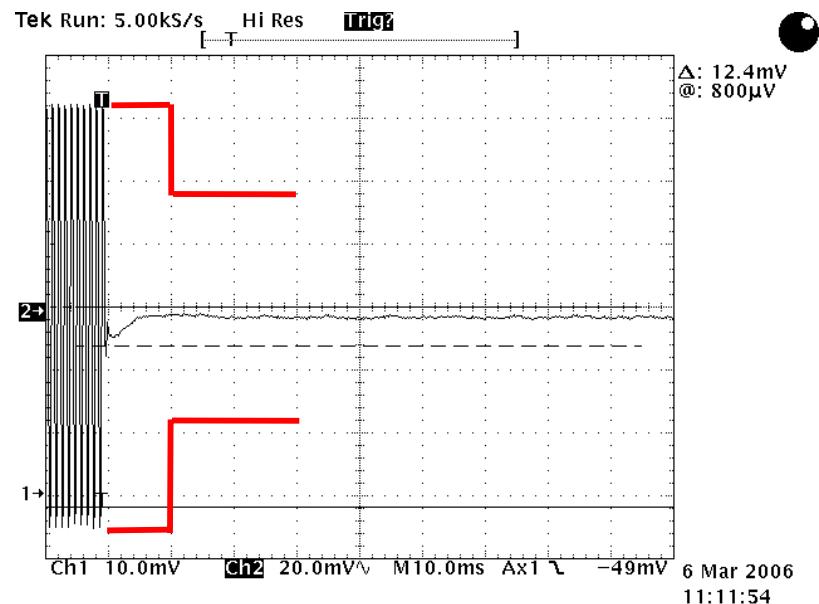
The EUT Employs a thermistor function to disable transmissions below approximately -10°C.
 The unit ceases operation below -7°C.

ANNEX H
FREQUENCY STABILITY - Voltage

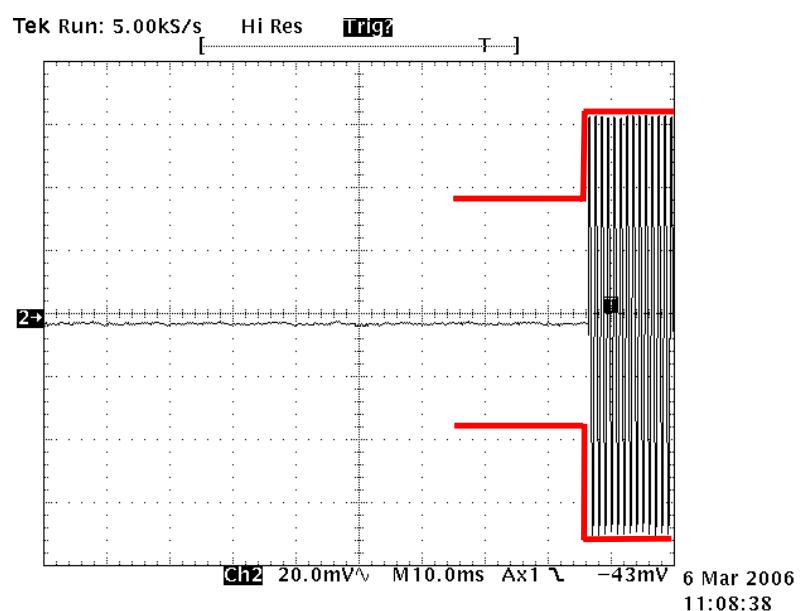


ANNEX I
TRANSMITTER TRANSIENT

Channel Spacing = 12.5 kHz



Ton



Toff

ANNEX J
TEST EQUIPMENT USED

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No
CMTA	R&S	CMTA52	894715/003	05
ENVIRONMENTAL CHAMBER	SHARTREE	TCC 125-815P	CS 203	11
POWER AMPLIFIER	ENI	603L	1240	31
50Ω RESISTIVE COUPLER	ELCOM	RC-3-50	N/A	119
HORN ANTENNA	EMCO	3115	9010-3580	138
SIGNAL GENERATOR	MARCONI	2042	119388/080	176
ATTENUATOR	BIRD	8304-100-N	N/A	221
RF DIODE	SHUNER	100.17.A	N/A	248
CABLE	ROSENBERGER	RTK161-GP-N	N/A	280
TEMPERATURE INDICATOR	FLUKE	52 Series II	74700044	426
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/001	UH03
RECEIVER	ROHDE & SCHWARZ	ESVS 10	825892/003	UH04
RANGE 1	TRL	3 METRE	N/A	UH06
MULTIMETER	AVOMeter	M3004	M3270006	UH41
BILOG ANTENNA	CHASE	CBL6112	2129	UH93
OSCILLOSCOPE	TEKTRONIX	TDS520B	B020491	UH122
POWER SUPPLY	MANSON	N/A	N/A	UH177
CABLE	TRL	N/A	N/A	UH253
CABLE	TRL	N/A	N/A	UH272

ANNEX K
EQUIPMENT CALIBRATION

TRL Number	Equipment Type	Manufacturer	Last Cal Calibration	Calibration Period	Due For Calibration
UH006	3m Range ERP CAL	TRL	06/01/2006	12	06/01/2007
UH028	Log Periodic Ant	Schwarbeck	28/04/2005	24	28/04/2007
UH029	Bicone Antenna	Schwarbeck	27/04/2005	24	27/04/2007
UH041	Multimeter	AVOMeter	20/12/2005	12	20/12/2006
UH093	Bilog Antenna	Chase			
UH120	Spectrum Analyser	Marconi	15/03/2005	12	15/03/2006
UH122	Oscilloscope	Tektronix	07/06/2005	24	07/06/2007
UH132	Power meter	Marconi	03/01/2006	12	03/01/2007
UH162	ERP Cable Cal	TRL	06/01/2006	12	06/01/2007
UH177	Power Supply	Manson		Use Calibrated Multimeter	
UH186	Receiver	R&S	01/02/2006	12	01/02/2007
UH228	Power Sensor	Marconi	03/01/2006	12	03/01/2007
UH253	1m Cable N type	TRL	23/02/2006	12	23/02/2007
UH254	1m Cable N type	TRL	05/01/2006	12	05/01/2007
UH271	1m Cable N type	TRL	23/02/2006	12	23/02/2007
UH272	1.5 m Cable N type	TRL		Calibrate in Use	
UH273	1m Cable N type	TRL	23/02/2006	12	23/02/2007
L005	CMTA	R&S	05/12/2005	12	05/12/2006
L007	Loop Antenna	R&S	29/03/2005	24	29/03/2007
L031	Power Amp	ENI		Calibrate in use	
L011	Environmental Chamber	Shartree		Use Calibrated Temperature Indicator	
L119	ResistiveCoupler	Elcom		Calibrate in Use	
L138	1-18GHz Horn	EMCO	15/04/2005	24	15/04/2007
L139	1-18GHz Horn	EMCO	03/05/2005	24	03/05/2007
L176	Signal Generator	Marconi	15/02/2006	12	15/02/2007
L193	Bicone Antenna	Chase	12/10/2003	24	12/10/2005
L203	Log Periodic Ant	Chase	21/10/2003	24	21/10/2005
L221	Attenuator	Bird		Calibrate in Use	
L248	RF Diode	Shunner		Calibrate in Use	
L280	18GHz Cable	Rosenberger	05/01/2006	12	05/01/2007
L343	CCIR Noise Filter	TRL	07/06/2005	12	07/06/2006
L426	Temperature Indicator	Fluke	04/01/2006	12	04/01/2007
L479	Analyser	Anritsu	18/11/2005	12	18/11/2006
L552	Signal Generator	Agilent	25/04/2005	12	25/04/2006
N/A	High Pass Filter	AFL	23/02/2006	12	23/02/2007

ANNEX L
MEASUREMENT UNCERTAINTY

Radio Testing – General Uncertainty Schedule

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

[1] Adjacent Channel Power

Uncertainty in test result = **1.86dB**

[2] Carrier Power

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

[3] Effective Radiated Power

Uncertainty in test result = **4.71dB**

[4] Spurious Emissions

Uncertainty in test result = **4.75dB**

[5] Maximum frequency error

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

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

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

[7] Frequency deviation

Uncertainty in test result = **3.2%**

[8] Magnetic Field Emissions

Uncertainty in test result = **2.3dB**

[9] Conducted Spurious

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

[10] Channel Bandwidth

Uncertainty in test result = **15.5%**

[11] Amplitude and Time Measurement – Oscilloscope

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

[11] Power Line Conduction

Uncertainty in test result = **3.4dB**