TEST REPORT NO: RU1214/6745

COPY NO: 2

ISSUE NO: 1

FCC ID: TMWTC900

REPORT ON THE CERTIFICATION TESTING OF A
TRANSMIT TECHNOLOGY Ltd
TC900
WITH RESPECT TO
THE FCC RULES CFR 47, PART 15.249 September 2005
INTENTIONAL RADIATOR SPECIFICATION

TEST DATE: 20th – 21st December 2005

TESTED BY: Daniel Winstanley — Digitally signed by Daniel Winstanley DN: CN = Daniel Winstanley, C = GB, O = TRL Compliance Ltd Reason: I am the author of this document Date: 2006.01.25 16:28:26 Z — D WINSTANLEY

APPROVED BY: Peter Green — Digitally signed by Peter Green DN: CN = Peter Green, C = GB, O = TRL Compliance Ltd. Date: 2006.01.25 16:33:44 Z — P GREEN EMC PRODUCT MANAGER

DATE: 25th January 2006

Distribution:

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1. TRANSMIT TECHNOLOGY Ltd
2. FCC EVALUATION LABORATORIES
3. TRL COMPLIANCE

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UKAS TESTING
0728

CONTENTS

Notes:

1. Component failure during test — YES [ ] NO [X]
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.

CERTIFICATE OF CONFORMITY & COMPLIANCE

FCC IDENTITY:	TMWTC900					
PURPOSE OF TEST:	Certification					
TEST SPECIFICATION:	FCC RULES CFR 47, Part 15.249 September 2005					
TEST RESULT:	Compliant to Specification					
EQUIPMENT UNDER TEST:	TC900					
EQUIPMENT SERIAL No:	02					
ITU: EMISSION CODE:	288kF1D					
EQUIPMENT TYPE:	Data transmitter					
PRODUCT USE:	Utilities meter data transmitter					
CARRIER EMISSION:	29.85 mV/m @3m					
ANTENNA TYPE:	Integral					
ALTERNATIVE ANTENNA:	Not applicable					
FREQUENCY OF OPERATION:	919.9 MHz					
CHANNEL SPACING:	Not applicable, single channel					
NUMBER OF CHANNELS:	1					
FREQUENCY GENERATION:	SAW Resonator	[ ]	Crystal	[ ]	Synthesiser	[X]
MODULATION METHOD:	Amplitude	[ ]	Digital	[X]	Angle	[ ]
POWER SOURCE(s):	+3.6 Vdc					
TEST DATE(s):	20th – 21st December 2005					
ORDER No(s):	1979					
APPLICANT:	Transmit Technology Ltd					
ADDRESS:	49 Newlands Avenue Radlett Hertfordshire WD7 8EJ					

TESTED BY: Daniel Winstanley

Digitally signed by Daniel Winstanley
DN: CN = Daniel Winstanley, C = GB, O = TRL Compliance Ltd
Reason: I am the author of this document
Date: 2006.01.25 16:29:17 Z

D WINSTANLEY

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Reason: I am approving this document
Date: 2006.01.25 16:34:45 Z

P GREEN
EMC PRODUCT MANAGER

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	TC900
EQUIPMENT TYPE:	Data transmitter
SERIAL NUMBER OF EUT:	02
PURPOSE OF TEST:	Certification
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 15.249 September 2005
TEST RESULT:	COMPLIANT Yes [X] No [ ]
APPLICANT'S CATEGORY:	MANUFACTURER [X] IMPORTER [ ] DISTRIBUTOR [ ] TEST HOUSE [ ] AGENT [ ]
APPLICANT'S ORDER No(s):	1979
APPLICANT'S CONTACT PERSON(s):	Mr D Want
E-mail address:	davewant@tclarity.com
APPLICANT:	Transmit Technology Ltd
ADDRESS:	49 Newlands Avenue Radlett Hertfordshire WD7 8EJ
TEL:	+44 (0) 1788 541790
FAX:	+44 (0) 1788 541790
MANUFACTURER:	Transmit Technology Ltd
EUT(s) COUNTRY OF ORIGIN:	United Kingdom
TEST LABORATORY:	TRL EMC
UKAS ACCREDITATION No:	0728
TEST DATE(s)	20th – 21st December 2005
TEST REPORT No:	RU1214/6745

EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.

TEST/EXAMINATION	RULE PART	DETECTOR	APPLICABILITY
Intentional Emission Frequency:	15.249(a)	Quasi Peak	YES
Intentional Emission Field Strength:	15.249(a)	Quasi Peak	YES
Intentional Emission Band Occupancy:	15.215	Peak	YES
Intentional Emission ERP (mW):	N/A	-	NO
Spurious Emissions – Conducted:	15.207	-	NO
Spurious Emissions – Radiated <1000MHz:	15.209	Quasi Peak	YES
Spurious Emissions – Radiated >1000MHz:	15.209 15.249(a)	Average	YES
Maximum Frequency of Search:	15.33	-	YES
Antenna Arrangements Integral:	15.203	-	YES
Antenna Arrangements External Connector:	15.204	-	YES
Restricted Bands	15.205	-	YES
Extrapolation Factor	15.31(f)	-	YES

2. Product Use: Water meter data transmitter

3. Emission Designator: 288kF1D

4. Duty Cycle: 0.04 %

5. Transmitter bit or pulse rate and level: 100 kbps

6. Temperatures: Ambient (Tnom) 6^{o}C

7. Supply Voltages: Vnom +3.6Vdc

   Note: Vnom voltages are as stated above unless otherwise shown on the test report page

8. Equipment Category:
   Single channel [X]
   Two channel [ ]
   Multi-channel [ ]

9. Channel spacing:
   Narrowband [ ]
   Wideband [X]

The TC900 consist of 3 models, these models differ in the data input method. The PCBs and RF circuitry for all 3 models are the same. The different data methods require different components to be mounted. These component changes do not affect RF circuitry. The model tested is the worst case model.

TRANSMITTER TESTS

TRANSMITTER SPURIOUS EMISSIONS – RADIATED – PART 15.209

Ambient temperature	=	20^{o}C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	47% (<1GHz),	0.3m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 0.3m	[X]
Supply voltage	=	+3.6Vdc		
Channel number	=	1		

	FREQ. (MHz)	MEAS. Rx. (dBµV)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dBµV/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH (µV/m)	LIMIT (µV/m)
1.705MHz - 30MHz								
30MHz - 88MHz								
88MHz - 216MHz								
216MHz - 960MHz	807.90	21.35	3.7	20.35	45.4	-	186.21	200
960MHz - 1GHz								
1GHz - 5GHz	1839.82 2759.72(r) 3679.62(r)	44.36 41.63 39.58	1.52 1.84 2.22	27.0 29.9 32.1	72.88 73.37 73.90	20 20 20	440.55 466.12 495.45	500 500 500

Limits			
	1.705MHz to 30MHz	30µV/m	@ 30m
	30MHz to 88MHz	100µV/m	@ 3m
	88MHz to 216MHz	150µV/m	@ 3m
	216MHz to 960MHz	200µV/m	@ 3m
	960MHz to 1GHz	500µV/m	@ 3m
	1GHz to 5GHz	500µV/m	@ 3m

Notes:

1 Results quoted are extrapolated as indicated
2 Emissions were searched to: (**x**) 1000MHz inclusive, as per Part 15.33a
3 Extrapolation factor 20dB from 0.3m to 3m, as per Part 15.31f
4 Measurements >1GHz @ 0.3m as per Part 15.31f(1)
5 Receiver detector <1GHz = CISPR, Quasi-Peak, 120kHz bandwidth
6 Receiver detector >1GHz = Peak Hold, 1MHz resolution bandwidth
7 New batteries used for battery powered products.
8 (r) Indicates restricted bands, as per Part 15.205
9 Results not within 10 dB's of limit are not necessarily recorded
10 See annex E for scan data
11 Unit transmitting permanent carrier wave.
12 For emissions > 1GHz all emission measured with peak detector meet average limit

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 orthagonal planes.
Maximum results recorded.

The test equipment used for the Transmitter Spurious Emissions – Radiated – Part 15.209 tests is shown overleaf:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
HORN ANTENNA	EMCO	3115	9010-3580	138	**X**
HORN ANTENNA	EMCO	3115	9010-3581	139	
SPECTRUM ANALYSER	TEKTRONIX	2756P	B010109	164	
BICONE ANTENNA	CHASE	BBA9106	N/A	193	
ANTENNA, LOG PERIODIC 300MHz – 1GHz	CHASE	UPA6108	1061	203	
RECEIVER	ROHDE & SCHWARZ	ESHS20	837960/003	237	
ANTENNA, BICONE 20MHz - 300MHz	CHASE	VBA6106A	1193	251	
BILOG ANTENNA	CHASE	CBL6112	2098	274	
RECEIVER	ROHDE & SCHWARZ	ESVS10	837948/003	317	
RECEIVER	ROHDE & SCHWARZ	ESVS10	844594/003	352	
RECEIVER	ROHDE & SCHWARZ	ESHS10	844077/019	353	
V / UHF RECEIVER 20MHz - 1GHz	ROHDE & SCHWARZ	ESVS 20	838804 / 005	415	
BILOG ANTENNA	SCHAFFNER	CBL6112B	2761	431	
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/001	UH03	
RECEIVER	ROHDE & SCHWARZ	ESVS 10	841431/014	UH186	**X**
RANGE 1	TRL	3 METRE	N/A	UH06	**X**
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	**X**
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	**X**

TRANSMITTER TESTS

TRANSMITTER INTENTIONAL EMISSION – RADIATED – Part 15.249 September 2005

Ambient temperature	=	6^{o}C(<1GHz),	3m measurements @ fc	[X]
Relative humidity	=	47%(<1GHz),	10m measurements @ fc	[ ]
Conditions	=	Open Area Test Site (OATS)	30m measurements @ fc	[ ]
Supply voltage	=	+3.6Vdc	30m extrapolated from 3m	[ ]
Channel number	=	1	30m extrapolated from 10m	[ ]

FREQ. (MHz)	MEASUREMENT Rx. READING (dBµV)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dBµV/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH (mV/m)
919.9	64.6	3.9	21.00	89.5	-	29.85
Limit value @ fc			**50 (mV/m)**			
Band occupancy @ -20dBc			**f lower**		**f higher**	
			919.7490 MHz		920.0370 MHz	

See spectrum analyser plot – Annex D

Notes:
1 Results quoted are extrapolated as indicated
2 Receiver detector @ fc = Quasi Peak 120kHz bandwidth
3 When battery powered the EUT was powered with new batteries
4 Unit transmitting a 2ms burst once ever 5 seconds (normal operation)
5 See Annex C for band occupancy plot
6 See Annex D for duty cycle plots

Test Method:
1 As per Radio – Noise Emissions, ANSI C63.4: 2003
2 Measuring distances 3m
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 orthagonal planes.
Maximum results recorded

The test equipment used for the Transmitter Intentional Emission – Radiated – Part 15.249 September 2005 tests is shown overleaf:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
HORN ANTENNA	EMCO	3115	9010-3580	138	
HORN ANTENNA	EMCO	3115	9010-3581	139	
SPECTRUM ANALYSER	TEKTRONIX	2756P	B010109	164	
BICONE ANTENNA	CHASE	BBA9106	N/A	193	
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ANTENNA, BICONE 20MHz - 300MHz	CHASE	VBA6106A	1193	251	
BILOG ANTENNA	CHASE	CBL6112	2098	274	
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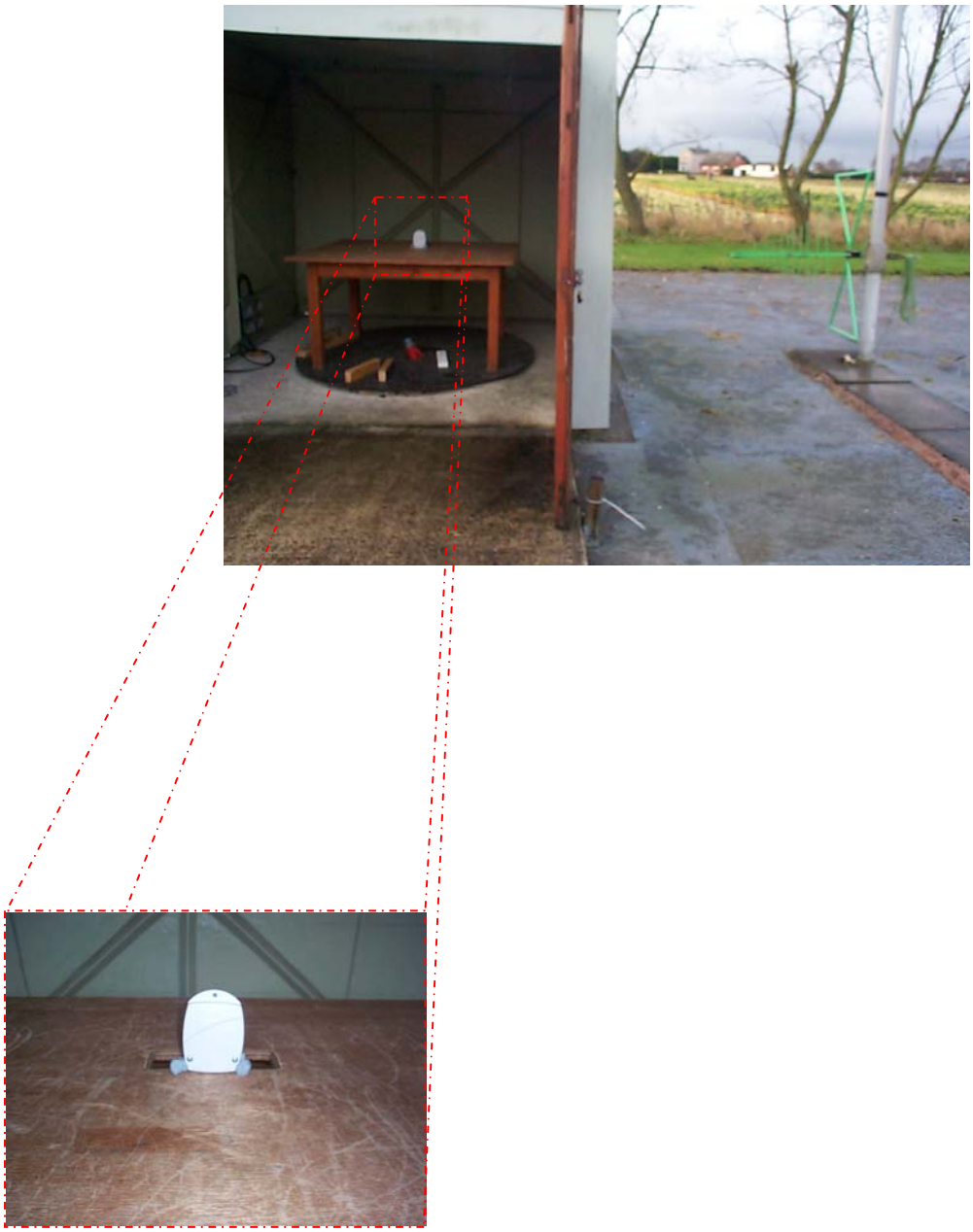
V / UHF RECEIVER 20MHz - 1GHz	ROHDE & SCHWARZ	ESVS 20	838804 / 005	415	
BILOG ANTENNA	SCHAFFNER	CBL6112B	2761	431	
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/001	UH03	
RECEIVER	ROHDE & SCHWARZ	ESVS 10	841431/014	UH186	**X**
RANGE 1	TRL	3 METRE	N/A	UH06	**X**
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	**X**
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	

ANNEX A

PHOTOGRAPHS

PHOTOGRAPH No. 1 **TEST SETUP**

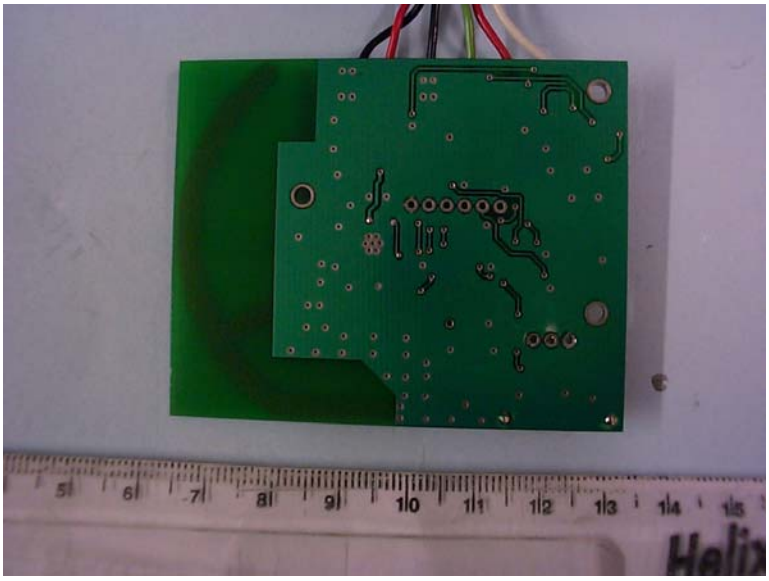


PHOTOGRAPH No. 2 **TRANSMITTER FRONT VIEW**

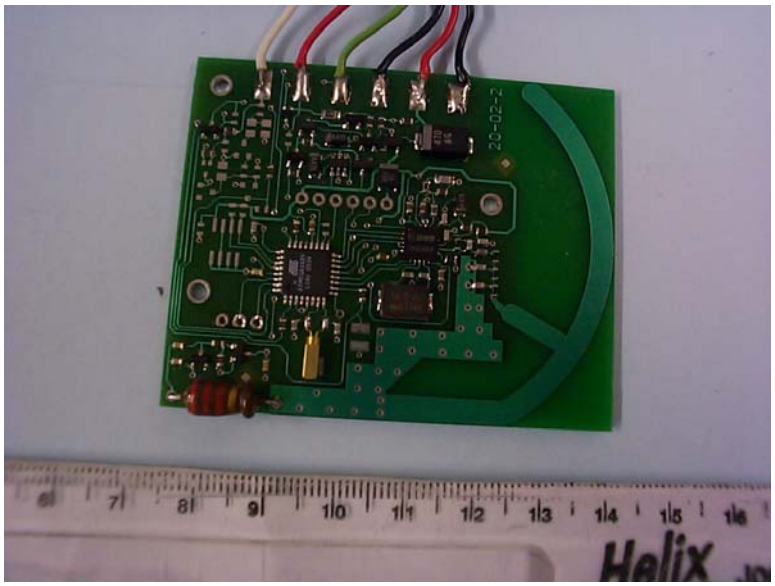
PHOTOGRAPH No. 3 **TRANSMITTER REAR VIEW**

PHOTOGRAPH No. 2 **TRANSMITTER FRONT VIEW COVERS REMOVED**

PHOTOGRAPH No. 5 **TRANSMITTER PCB TRACK SIDE**



PHOTOGRAPH No. 6 **TRANSMITTER PCB COMPONENT SIDE**



ANNEX B

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

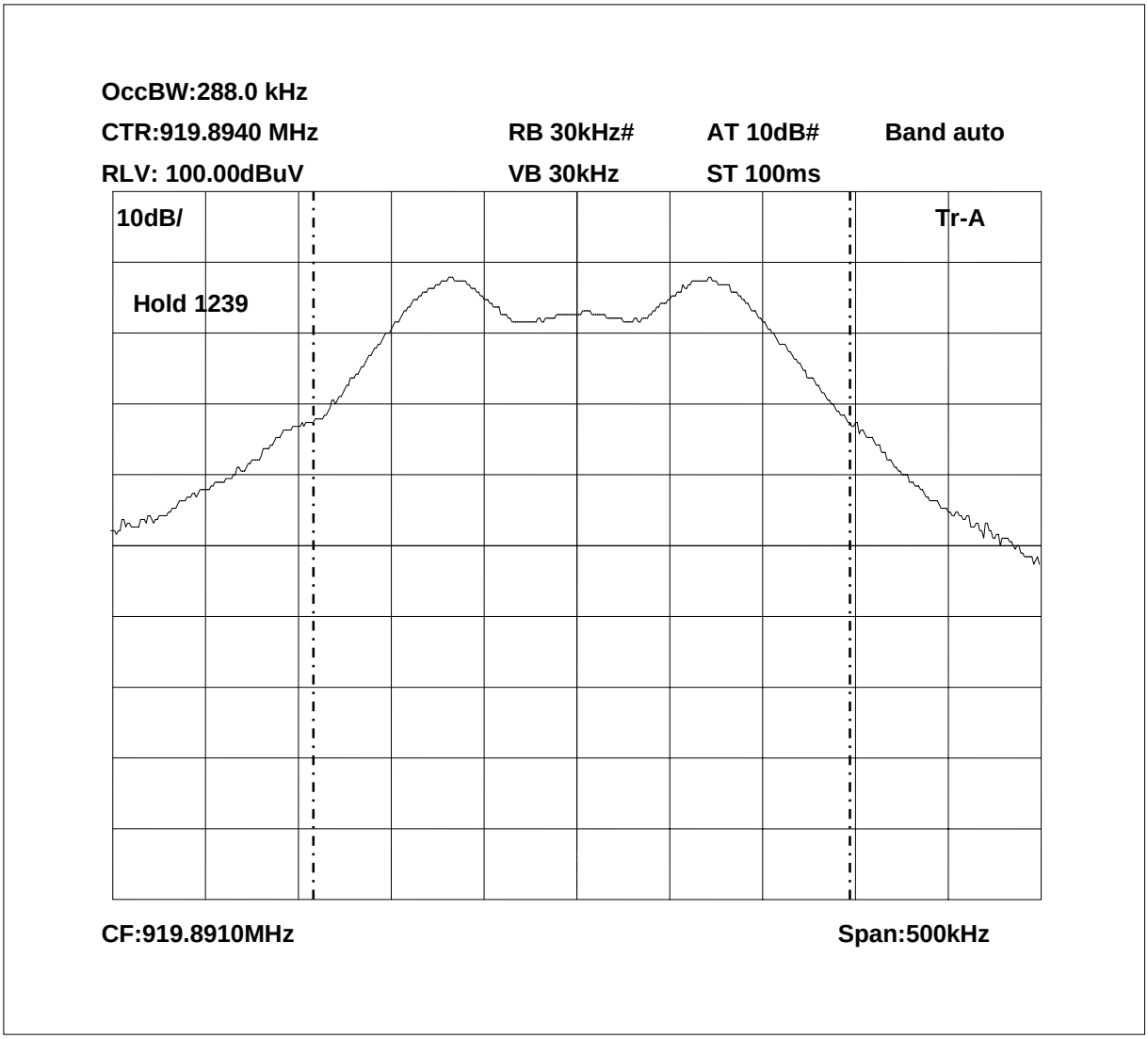
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

a.	TCB	-	APPLICATION	[X]
		-	FEE	[X]
b.	AGENT'S LETTER OF AUTHORISATION	-		[X]
c.	MODEL(s) vs IDENTITY	-		[ ]
d.	ALTERNATIVE TRADE P GREEN 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

BAND OCCUPANCY PLOT

BAND OCCUPANCY PLOT

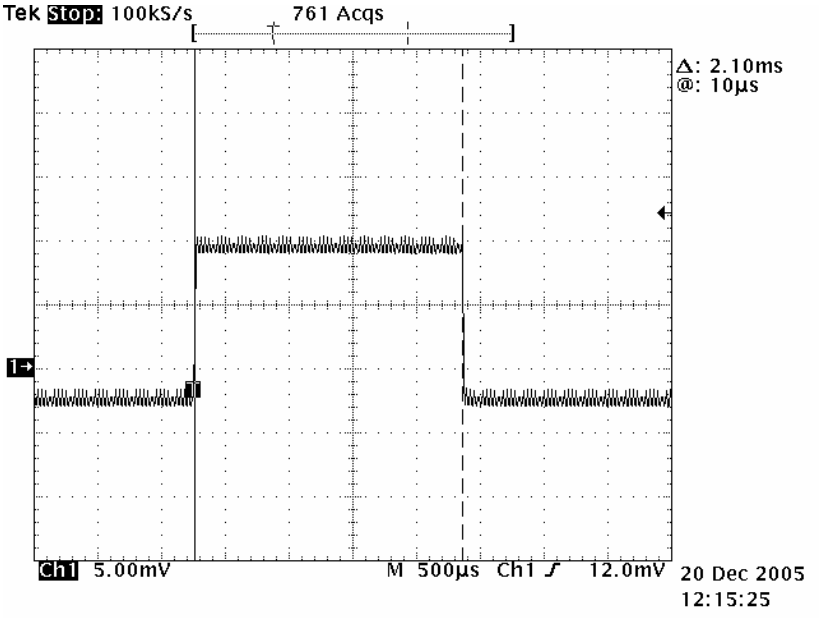


fl	=	919.7490 MHz
fh	=	920.0370 MHz
occupied bandwidth	=	288.0 kHz

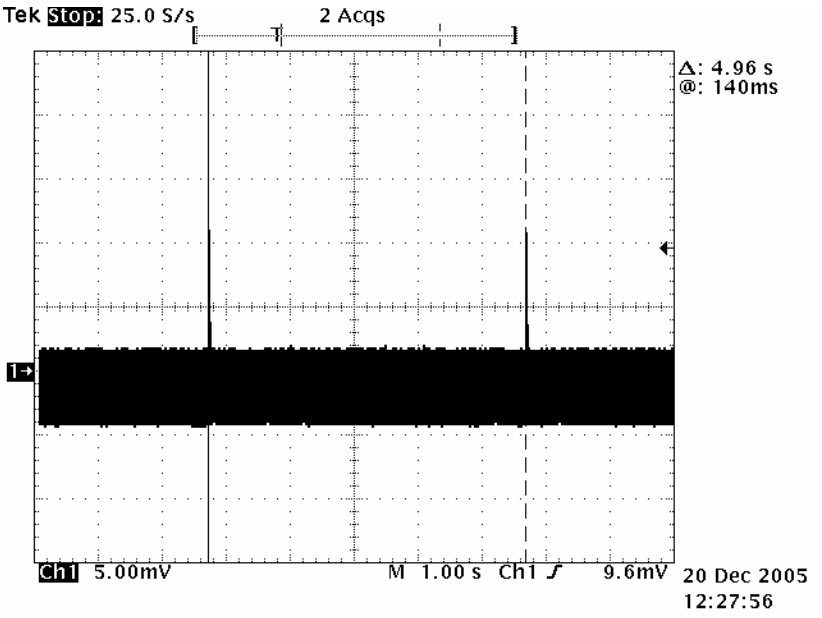
ANNEX D

DUTY CYCLE

DUTY CYCLE



Ton = 2.10ms



Tframe = 4.96s

ANNEX E

EMISSIONS GRAPH(s)

TRL Compliance Services Ltd

20 Dec 2005 09:33

E-Field Radiation (30MHz-1GHz)

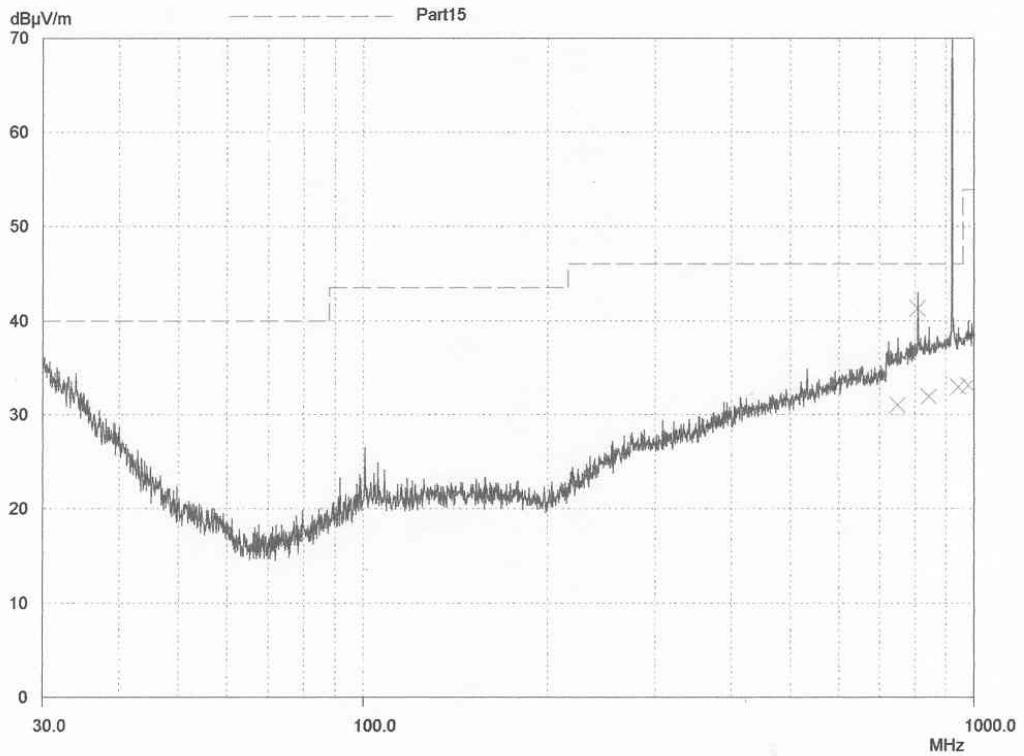
EUT:	TC900
Manuf:	RF Insight
Op Cond:	Prescan 30MHz - 1000MHz
Operator:	D Winstanley
Test Spec:	Part15
Comment:	Unit on TX CW. Cable 30cm bunched hanging off table RX Antenna Horizontal

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
30MHz	1000MHz	50kHz	120kHz	PK	1msec	Auto	ON	60dB

Transducer	No.	Start	Stop	Name
1	21	30MHz	1000MHz	UH72
	22	30MHz	1000MHz	UH93

Final Measurement:		
	Detector:	X QP
	Meas Time:	2sec
	Subranges:	50
	Acc Margin:	10 dB



PAGE 1

ANNEX F

EQUIPMENT CALIBRATION

TRL Number	Equipment Type	Manufacturer	Last Cal Calibration	Calibration Period	Due For Calibration
UH006	3m Range ERP CAL	TRL	01/03/05	12	01/03/06
UH028	Log Periodic Ant	Schwarbeck	28/04/05	24	28/04/07
UH029	Bicone Antenna	Schwarbeck	27/04/05	24	27/04/07
UH093	Bilog	Schafner	19/08/05	12	19/08/06
UH120	Spectrum Analyser	Marconi	15/03/05	12	15/03/06
UH122	Oscilloscope	Tektronix	07/06/05	24	07/06/07
UH162	ERP Cable Cal	TRL	23/05/05	12	23/05/06
UH186	Receiver >30MHz	R&S	22/03/05	12	22/03/06
UH253	1m Cable N type	TRL	10/01/05	12	10/01/06
UH254	1m Cable N type	TRL	10/01/05	12	10/01/06
UH265	Notch filer	Telonic	24/06/05	12	24/06/06
L005	CMTA	R&S	05/12/05	12	05/12/06
L007	Loop Antenna	R&S	29/03/05	24	29/03/07
L138	1-18GHz Horn	EMCO	15/04/05	24	15/04/07
L139	1-18GHz Horn	EMCO	03/05/05	24	03/05/07
L176	Signal Generator	Marconi	31/01/05	12	31/01/06
L280	18GHz Cable	Rosenberger	10/01/05	12	10/01/06
L343	CCIR Noise Filter	TRL	07/06/05	12	07/06/06