TEST REPORT NO: RU1051/4303

COPY NO: 1

ISSUE NO: 1

FCC ID: G2X 63004A

REPORT ON THE CERTIFICATION TESTING OF A
TUNSTALL TELECOM Ltd.
AMIE RADIO TRANSMITTER
WITH RESPECT TO
THE FCC RULES CFR 47, PART 15.231
INTENTIONAL RADIATOR SPECIFICATION

TEST DATE: 15th – 22nd April 2003

TESTED BY: JOHN CHARTERS (Signature Not Verified; Digitally signed by JOHN CHARTERS DN: cn=JOHN CHARTERS, o=TRL COMPLIANCE SERVICES, c=US Date: 2003.05.06 12:50:26 Z) J CHARTERS

APPROVED BY: Peter Green (Signature Not Verified; Digitally signed by Peter Green DN: cn=Peter Green, o=TRL Compliance Services, c=GB Date: 2003.05.06 14:28:22 Z) P GREEN
PRODUCT MANAGER

DATE: 2nd May 2003

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1. TUNSTALL TELECOM Ltd.
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TRL COMPLIANCE SERVICES LTD EMC DIVISION
LONG GREEN FORTHAMPTON GLOUCESTER GL19 4QH UNITED KINGDOM
TELEPHONE +44 (0)1684 833818 FAX +44 (0)1684 833858
E-MAIL test@trlcompliance.com www.trlcompliance.com

Quality System Certified
To BS EN ISO 9001 (1994)
Registration FS 21805

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:	G2X 63004A					
PURPOSE OF TEST:	Certification					
TEST SPECIFICATION:	FCC RULES CFR 47, Part 15.231					
TEST RESULT:	Compliant to Specification					
EQUIPMENT UNDER TEST:	AMIE RADIO TRANSMITTER					
EQUIPMENT SERIAL No:	Engineering sample					
ITU: EMISSION CODE:	3k00F1DAN					
EQUIPMENT TYPE:	63004					
PRODUCT USE:	Fall Alarm					
CARRIER EMISSION:	1678.8μV/m @3m					
ANTENNA TYPE:	Integral					
ALTERNATIVE ANTENNA:	N/A					
BAND OF OPERATION:	260MHz-470MHz					
CHANNEL SPACING:	N/A					
NUMBER OF CHANNELS:	1					
FREQUENCY GENERATION:	SAW Resonator	[ ]	Crystal	[X]	Synthesiser	[ ]
MODULATION METHOD:	Amplitude	[ ]	Digital	[X]	Angle	[ ]
POWER SOURCE(s):	6Vdc					
TEST DATE(s):	15th – 22nd April 2003					
ORDER No(s):	10543					
APPLICANT:	TUNSTALL TELECOM Ltd.					
ADDRESS:	Whitley Lodge Whitley Bridge Yorkshire United Kingdom DN14 0HR					

TESTED BY: JOHN CHARTERS — Signature Not Verified — Digitally signed by JOHN CHARTERS DN: cn=JOHN CHARTERS, o=TRL COMPLIANCE SERVICES, c=US Date: 2003.05.06 12:50:49 Z

J CHARTERS

APPROVED BY: Peter Green — Signature Not Verified — Digitally signed by Peter Green DN: cn=Peter Green, o=TRL Compliance Services, c=GB Date: 2003.05.06 14:29:38 Z

P GREEN
PRODUCT MANAGER

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	AMIE RADIO TRANSMITTER
EQUIPMENT TYPE:	63004
SERIAL NUMBER OF EUT:	Engineering sample
PURPOSE OF TEST:	Certification
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 15.231
TEST RESULT:	COMPLIANT Yes [X] No [ ]
APPLICANT'S CATEGORY:	MANUFACTURER [X] IMPORTER [ ] DISTRIBUTOR [ ] TEST HOUSE [ ] AGENT [ ]
APPLICANT'S ORDER No(s):	10543
APPLICANT'S CONTACT PERSON(s):	Mr Richard Nadin
E-mail address:	R_nadin@tunstall.co.uk
APPLICANT:	TUNSTALL TELECOM Ltd.
ADDRESS:	Whitley Lodge Whitley Bridge Doncaster DN14 0HR United Kingdom
TEL:	01977 661234
FAX:	01977 662570
MANUFACTURER:	TUNSTALL TELECOM Ltd.
EUT(s) COUNTRY OF ORIGIN:	United Kingdom
TEST LABORATORY:	TRL EMC
UKAS ACCREDITATION No:	0728
TEST DATE(s)	15th – 22nd April 2003
TEST REPORT No:	RU1051/4303

EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.

TEST/EXAMINATION	RULE PART	DETECTOR	APPLICABILITY
Intentional Emission Frequency:	15.231	Quasi Peak	Yes
Intentional Emission Field Strength:	15.231(b)	Quasi Peak	Yes
Intentional Emission Band Occupancy:	15.231(c)	Quasi Peak	Yes
Intentional Emission ERP (mW):	-	-	No
Spurious Emissions – Conducted:	15.207	-	No
Spurious Emissions – Radiated <1000MHz:	15.209 15.231(b)	Quasi Peak Average	Yes
Spurious Emissions – Radiated >1000MHz:	15.209 15.231(b)	Average 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: Fall Alarm

3. Emission Designator: 3K00F1DAN

4. Duty Cycle: <1%

5. Transmitter bit or pulse rate and level: 20 Bps

6. Temperatures: Ambient (Tnom) 20°C

7. Supply Voltages: Vnom 2x3V lithium cells

   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]

TRANSMITTER TESTS

TRANSMITTER SPURIOUS EMISSIONS – RADIATED – PART 15.209

Ambient temperature	=	20°C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	54% (<1GHz),	0.3m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 0.3m	[X]
Supply voltage	=	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)
30MHz - 88MHz								
88MHz - 216MHz	104.0	14.61	0.6	11.0	26.21	-	20.4	500
216MHz - 960MHz								
960MHz - 1GHz								
1GHz - 5GHz	1560.0(R) 1872.0 2184.0	30.6 41.6 36.9	0.2 0.2 0.3	25.7 26.8 28.0	56.5 68.6 65.2	20 20 20	66.8 269.1 181.9	500 588 588

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 9.5dB from 1m to 3m, as per Part 15.31f
4 Measurements >1GHz @ 1m 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) indicated frequency within restricted band from 15.205
9 Due to the transmitted signal lasting only 1.1 second. A unit with modified software which allowed continuos transmission was used during spurious emissions testing.

Test Method:

1 As per Radio – Noise Emissions, ANSI C63.4: 1992
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	
HORN ANTENNA	EMCO	3115	9010-3581	139	**X**
SPECTRUM ANALYSER	TEKTRONIX	2756P	B010109	164	
BICONE ANTENNA	CHASE	BBA9106	N/A	193	**X**
ANTENNA, LOG PERIODIC 300MHz – 1GHz	CHASE	UPA6108	1061	203	**X**
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	825892/003	UH04	**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	
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	**X**

TRANSMITTER TESTS

TRANSMITTER INTENTIONAL EMISSION – RADIATED – Part 15.231

Ambient temperature	=	20°C(<1GHz),	3m measurements @ fc	[X]
Relative humidity	=	40%(<1GHz),	10m measurements @ fc	[ ]
Conditions	=	Open Area Test Site (OATS)	30m measurements @ fc	[ ]
Supply voltage	=	6V	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 (µV/m)
312.0	49.2	1.8	13.5	64.5	-	1678.8

Limit value @ fc	**5916.6µV/m**	
Band occupancy @ -20dBc	**f lower**	**f higher**
During button press	311.812MHz	312.168MHz
During pole signal	311.816MHz	312.176MHz
Transmitter on time during button press	1.16 seconds	
Transmitter on time during pole signal	1.02 seconds	

See spectrum analyser plot – Annex C

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. For transmitter shut down time see annex D
5. The transmitter sends a pole signal once every 4 hours for 1 second duration
6. Due to the transmitted signal lasting only 1.1 second. A unit with modified software which allowed continuos transmission was used during the carrier power testing.

Test Method:
1. As per Radio – Noise Emissions, ANSI C63.4: 1992
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 15.231 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	
ANTENNA, LOG PERIODIC 300MHz – 1GHz	CHASE	UPA6108	1061	203	**X**
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	825892/003	UH04	**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	
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	

ANNEX A

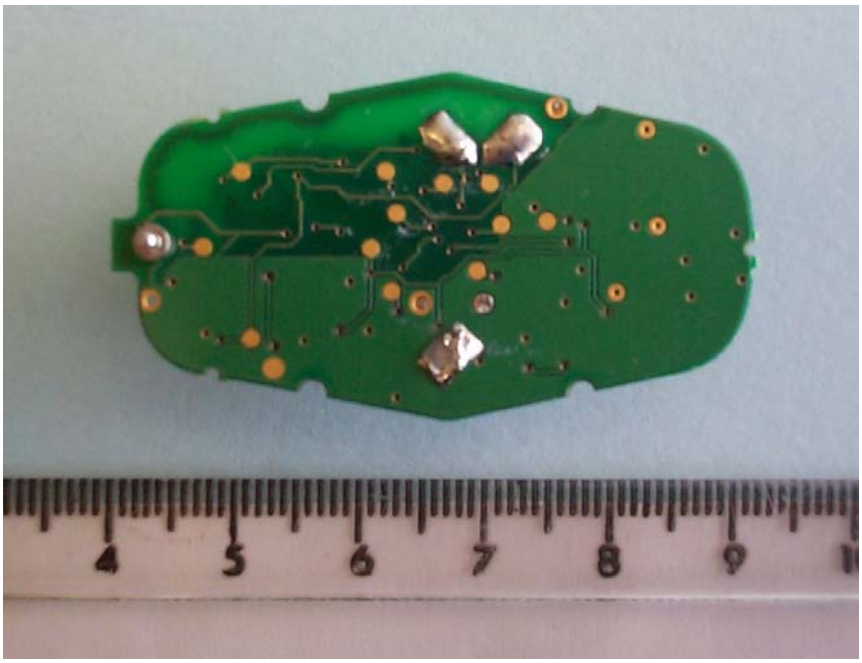
PHOTOGRAPHS

PHOTOGRAPH No. 1 **TEST SETUP**

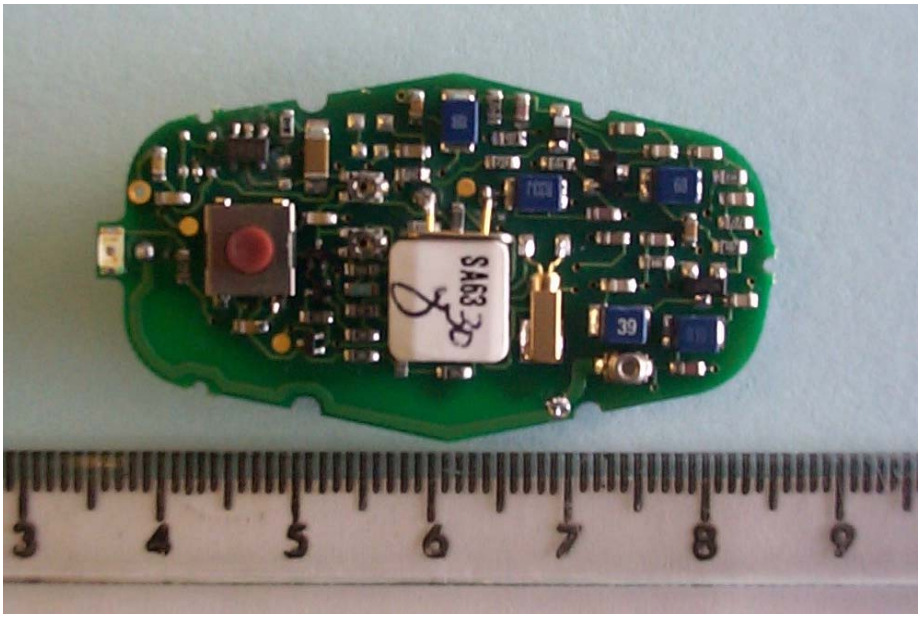
PHOTOGRAPH No. 2 **TRANSMITTER FRONT VIEW**

PHOTOGRAPH No. 3 **TRANSMITTER REAR VIEW**

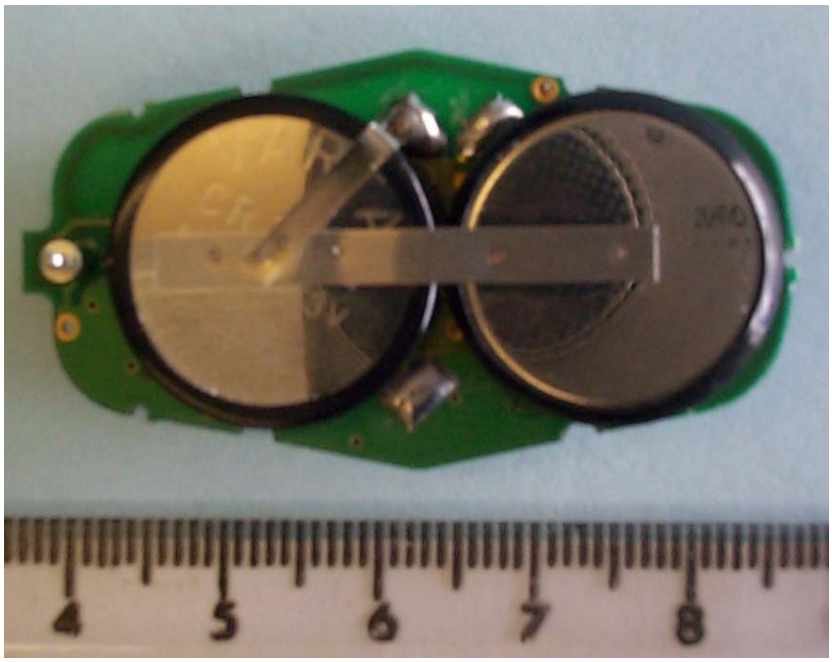
PHOTOGRAPH No. 4 **TRANSMITTER PCB TRACK SIDE**



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



PHOTOGRAPH No. 6 TRANSMITTER TRACK SIDE WITH BATTERY



ANNEX B

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

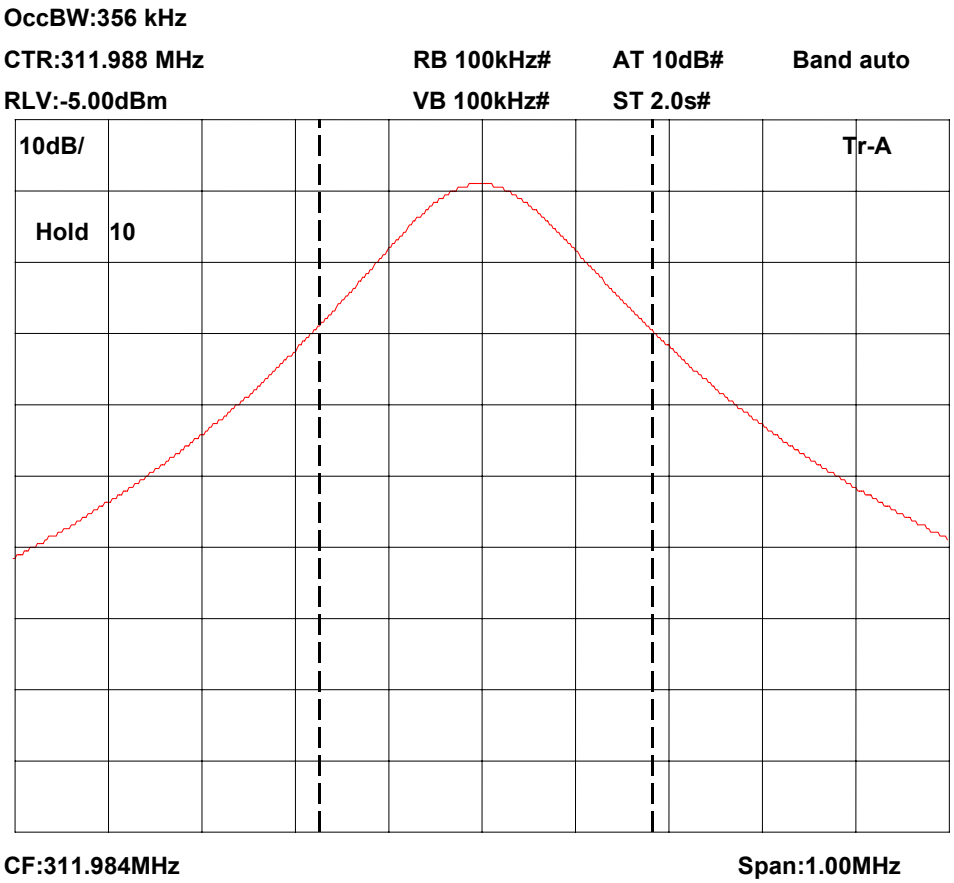
a.	TCB	-	APPLICATION	[X]
		-	FEE	[X]
b.	AGENT'S LETTER OF AUTHORISATION	-		[X]
c.	MODEL(s) vs IDENTITY	-		[X]
d.	ALTERNATIVE TRADE NAME DECLARATION(s)	-		[ ]
e.	LABELLING	-	PHOTOGRAPHS	[X]
		-	DECLARATION	[X]
		-	DRAWINGS	[ ]
f.	TECHNICAL DESCRIPTION	-		[X]
g.	BLOCK DIAGRAMS	-	Tx	[X]
		-	Rx	[ ]
		-	PSU	[ ]
		-	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

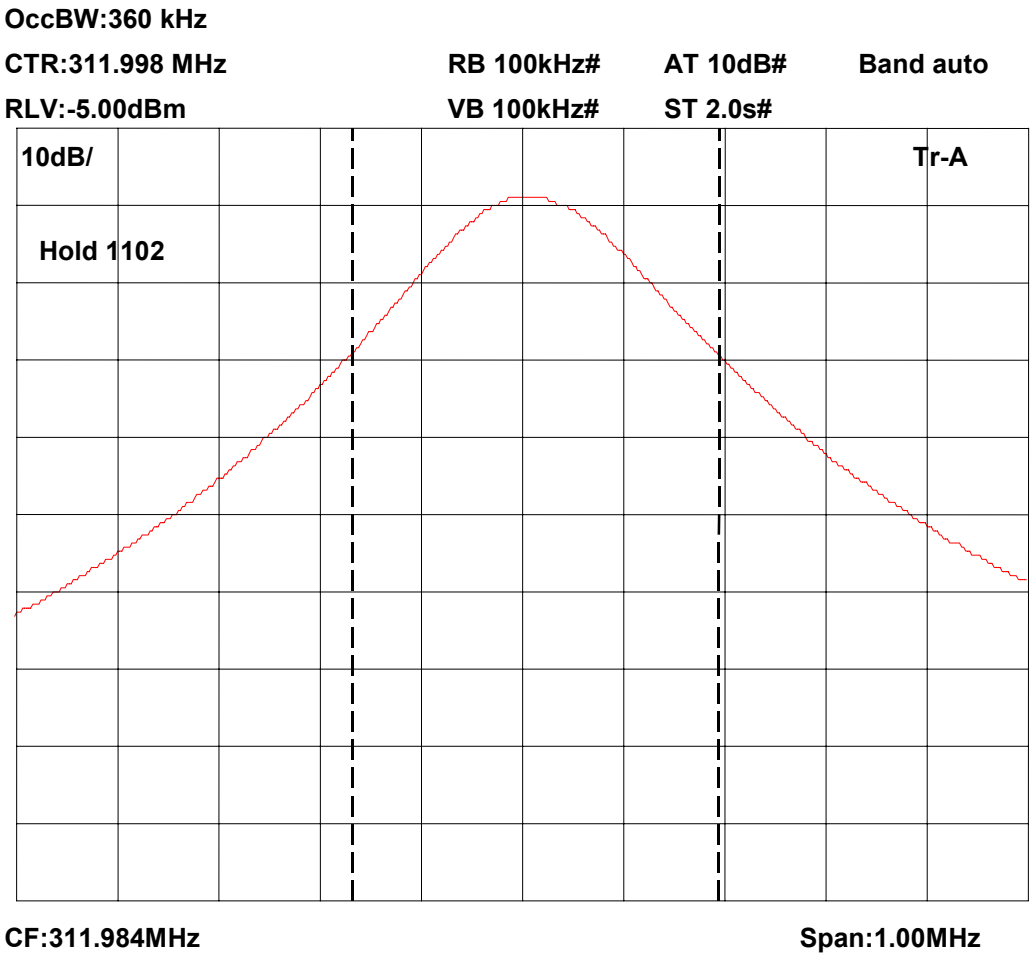
BANDWIDTH PLOT DURING BUTTON PRESS

Lower Frequency 311.812MHz
Upper Frequency 312.168MHz
Occupied Bandwidth @-20dBc = 356kHz



BANDWIDTH PLOT DURING POLE

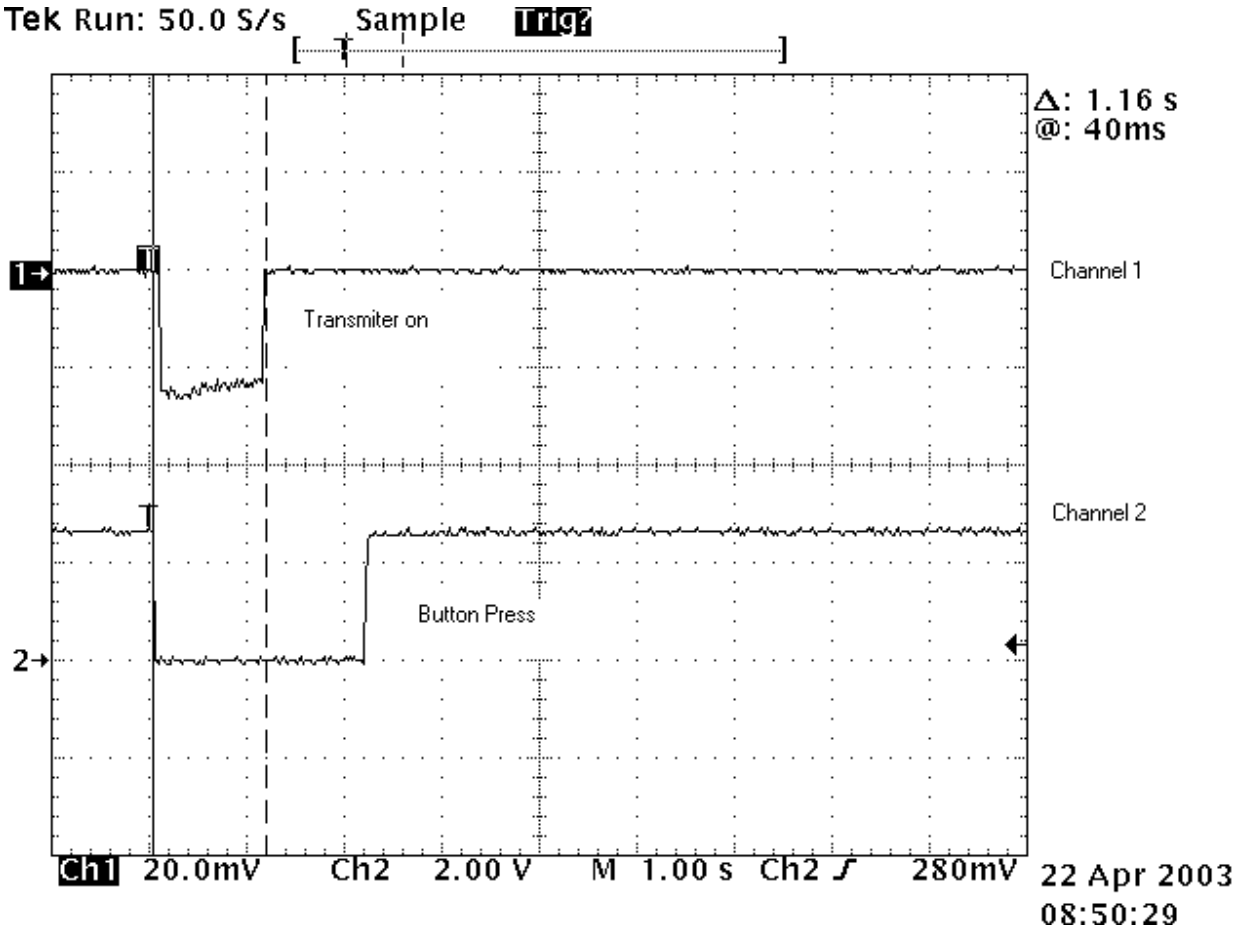
Lower Frequency 311.816MHz
Upper Frequency 312.176MHz
Occupied Bandwidth @-20dBc = 360kHz



ANNEX D

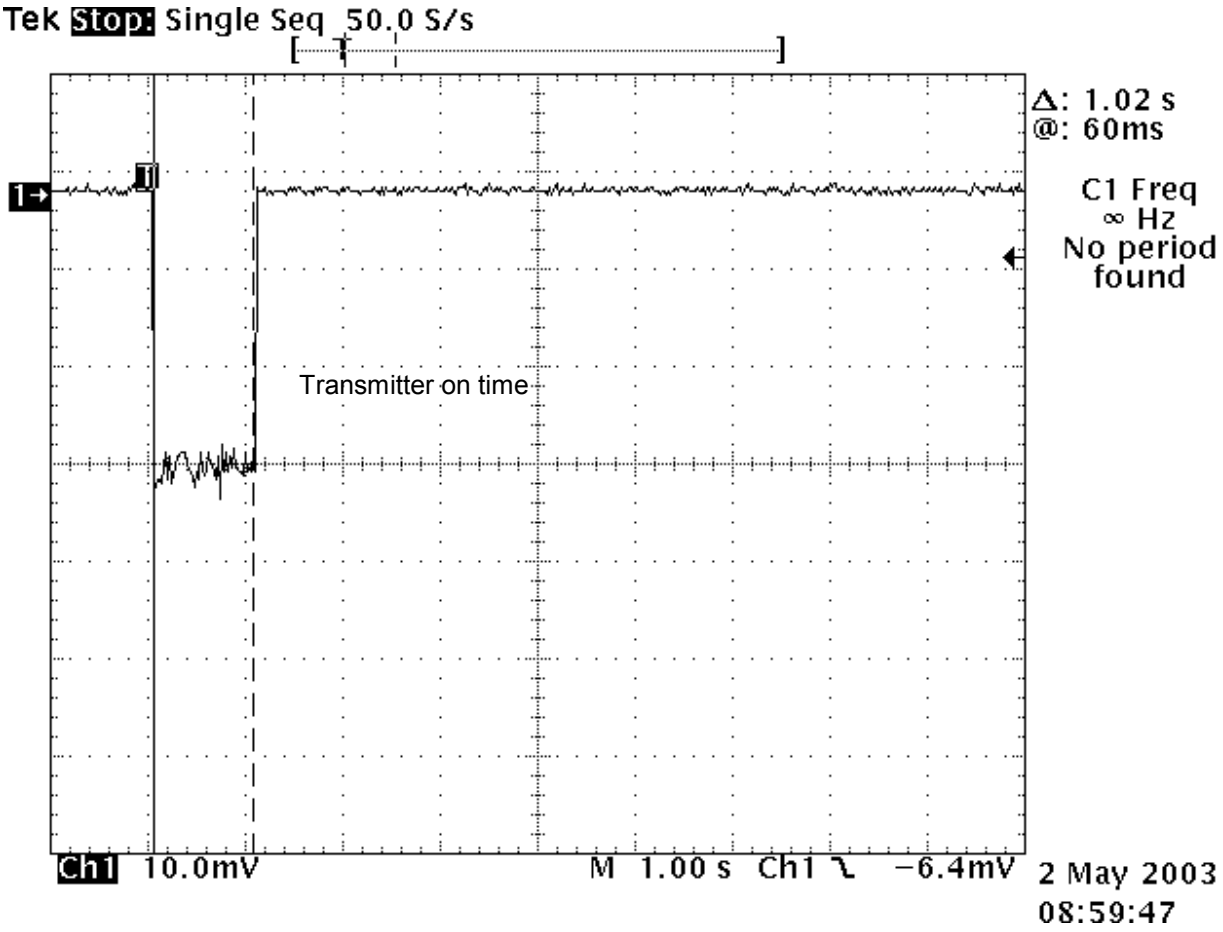
TANSMITTER ON TIME PLOT

Transmitter on time during button press



1. The transmitter on time is 1.16seconds.
2. The length of time the button is pressed does not affect the transmit time.

Transmitter on time during pole signal.



Transmitter on time during polling signal is 1.02 seconds.