



TEST REPORT NO: RU1167/6117
COPY NO: 2
ISSUE NO: 1
FCC ID: G2X-63604A

**REPORT ON THE CERTIFICATION TESTING OF A
TUNSTALL TELECOM LIMITED
AIME RADIO TRIGGER
WITH RESPECT TO
FCC RULES CFR 47, PART 15.231 January 2005
INTENTIONAL RADIATOR SPECIFICATION**

TEST DATE: 1st March 2005 – 2nd March 2005

TESTED BY:  **Daniel Winstanley** Digitally signed by Daniel Winstanley
DN: cn=Daniel Winstanley,
o=TRL Compliance Services,
c=GB
Date: 2005.03.17 13:37:06 Z D WINSTANLEY

APPROVED BY:  **Peter Green** Digitally signed by Peter Green
DN: cn=Peter Green,
o=TRL Compliance Services, c=GB
Date: 2005.03.17 08:26:43 Z P GREEN
EMC PRODUCT
MANAGER

DATE: 17th March 2005

Distribution:

- Copy Nos:
1. TUNSTALL TELECOM LIMITED
 2. FCC EVALUATION LABORATORIES
 3. TRL EMC

THIS DOCUMENT MAY BE REPRODUCED ONLY IN ITS ENTIRETY AND WITHOUT CHANGE

TRL COMPLIANCE SERVICES LTD EMC DIVISION
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@trl-emc.co.uk www.trlcompliance.com



FS 21805



0728

CONTENTS

	PAGE
CERTIFICATE OF CONFORMITY & COMPLIANCE	3
APPLICANT'S SUMMARY	4
EQUIPMENT TEST CONDITIONS	5
TESTS REQUIRED	5
TEST RESULTS	6-8

ANNEX

PHOTOGRAPHS	A
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	
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST	B
BAND OCCUPANCY PLOT	C
TRANSMITTER ON TIME	D

Notes:

- | | | | |
|----|--|-----|-------------------------------------|
| 1. | Component failure during test | YES | ☐ |
| | | NO | ☒ |
| 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-63604A

PURPOSE OF TEST: Certification

TEST SPECIFICATION: FCC RULES CFR 47, Part 15.231 January 2005

TEST RESULT: Compliant to Specification

EQUIPMENT UNDER TEST: AIME Radio Trigger

EQUIPMENT SERIAL No: Engineering Sample

ITU: EMISSION CODE: 3K00F1DAN

EQUIPMENT TYPE: Low Power Radio Trigger

PRODUCT USE: Assistance Call

CARRIER EMISSION: 3311.3µV/m

ANTENNA TYPE: PCB Integral

ALTERNATIVE ANTENNA: Not applicable

BAND OF OPERATION: 312.0MHz

CHANNEL SPACING: Not applicable. Wideband

NUMBER OF CHANNELS: 1

FREQUENCY GENERATION: SAW Resonator [] Crystal [X] Synthesiser []

MODULATION METHOD: Amplitude [] Digital [] Angle [X]

POWER SOURCE(s): +3Vdc

TEST DATE(s): 1st March 2005 – 2nd March 2005

ORDER No(s): 259249

APPLICANT: Tunstall Telecom Limited

ADDRESS: Whitley Lodge
Whitley Bridge
Yorkshire
DN14 0HR

TESTED BY:

 **Daniel Winstanley**
Digitally signed by Daniel Winstanley
DN: cn=Daniel Winstanley,
o=TRL Compliance
Services, c=GB
Date: 2005.03.17 13:36:50 Z

D WINSTANLEY

APPROVED BY:

 **Peter Green**
Digitally signed by Peter Green
DN: cn=Peter Green,
o=TRL Compliance
Services, c=GB
Date: 2005.03.18
08:27:09 Z

P GREEN
EMC PRODUCT
MANAGER

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	AIME Radio Trigger
EQUIPMENT TYPE:	Low Power Radio Trigger
SERIAL NUMBER OF EUT:	Engineering Sample
PURPOSE OF TEST:	Certification
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 15.231 January 2005
TEST RESULT:	COMPLIANT Yes ☒ No ☐
APPLICANT'S CATEGORY:	MANUFACTURER ☒ IMPORTER ☐ DISTRIBUTOR ☐ TEST HOUSE ☐ AGENT ☐
APPLICANT'S ORDER No(s):	259249
APPLICANT'S CONTACT PERSON(s):	Mr R Nadin
E-mail address:	r_nadin@tustall.co.uk
APPLICANT:	Tunstall Telecom Limited
ADDRESS:	Whitley Lodge Whitley Bridge Yorkshire DN14 0HR
TEL:	+44 1977 660398
FAX:	+44 1977 660550
EUT(s) COUNTRY OF ORIGIN:	United Kingdom
TEST LABORATORY:	TRL EMC
UKAS ACCREDITATION No:	0728
TEST DATE(s)	1 st March 2005 – 2 nd March 2005
TEST REPORT No:	RU1167/6117

EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.	TEST/EXAMINATION	RULE PART	DETECTOR	APPLICABILITY
	Intentional Emission Frequency:	15.231(b)	Quasi Peak	Yes
	Intentional Emission Field Strength:	15.231(b)	Quasi Peak	Yes
	Intentional Emission Band Occupancy:	15.231(c)	Peak	Yes
	Intentional Emission ERP (mW):	-	-	No
	Spurious Emissions – Conducted:	15.207	-	No
	Spurious Emissions – Radiated <1000MHz:	15.231(b) 15.209	Quasi Peak Average	Yes
	Spurious Emissions – Radiated >1000MHz:	15.231 15.209(b)	Quasi Peak 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: Low Power Radio Trigger
3. Emission Designator: 3K00F1DAN
4. Duty Cycle: <1%
5. Transmitter bit or pulse rate and level: 1000bps
6. Temperatures: Ambient (Tnom) 6°C
7. Supply Voltages: Vnom +3Vdc
- 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	=	6°C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	59% (<1GHz),	0.3m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 0.3m	[X]
Supply voltage	=	+3Vdc		
Channel number	=	1		

	FREQ. (MHz)	MEAS Rx. (dBμV)	CABLE LOSS (dB)	ANT FACT.	FIELD STRENGTH (dBμV/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH (μV/m)	LIMIT (μV/m)
30MHz - 88MHz								
88MHz - 216MHz								
216MHz - 960MHz	642.0 936.0	18.40 20.45	2.9 4.0	18.80 20.25	40.10 44.70	-	101.15 171.79	588 588
960MHz - 1GHz								
1GHz - 5GHz	1247.94	40.11	1.28	25.3	66.69	20	216.02	588
	1560.06(R)	37.01	1.35	25.9	64.26	20	163.30	500
	1872.00	38.63	1.54	26.5	66.67	20	215.53	588
	2183.96	39.47	1.64	28.3	69.41	20	295.46	588
	2496.02(R)	37.00	1.78	28.7	67.48	20	236.59	500
	2807.88(R)	35.27	1.88	30.0	67.15	20	227.77	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:

- Results quoted are extrapolated as indicated
- Emissions were searched to: (x) 1000MHz inclusive, as per Part 15.33a
- Extrapolation factor 20dB from 0.3m to 3m, as per Part 15.31f
- Measurements >1GHz @ 0.3m as per Part 15.31f(1)
- Receiver detector <1GHz = CISPR, Quasi-Peak, 120kHz bandwidth
- Receiver detector >1GHz = Peak Hold, 1MHz resolution bandwidth
- New batteries used for battery powered products.
- (R) indicated frequency within restricted band from 15.205
- Due to the transmitted signal lasting only 1.8 seconds a unit with modified software, which allowed continuous transmission, was used during spurious emissions testing.
- Spurious limit level of 588μV/m was calculated by reducing the fundamental limit by 20dB, as per 15.231(b).

Test Method:

- As per Radio – Noise Emissions, ANSI C63.4: 1992
- Measuring distances as Notes 1 to 4 above
- EUT 0.8 metre above ground plane
- 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.

The test equipment used for the Transmitter Spurious Emissions – Radiated – Part 15.209 test 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	825892/003	UH04	X
RANGE 1	TRL	3 METRE	N/A	UH06	X
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	X
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	X
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	

TRANSMITTER TESTS

TRANSMITTER INTENTIONAL EMISSION – RADIATED – Part 15.231 January 2005

Ambient temperature	=	6°C(<1GHz),	3m measurements @ fc	[X]
Relative humidity	=	59%(<1GHz),	10m measurements @ fc	[]
Conditions	=	Open Area Test Site (OATS)	30m measurements @ fc	[]
Supply voltage	=	+3Vdc	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	54.9	2.0	13.5	70.4	-	3311.3
Limit value @ fc			5916.677(μV/m)			
Band occupancy @ spurious limit value			f lower		f higher	
			311.992640 MHz		312.005520 MHz	
Transmitter on time during button press			1.80 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

- 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 orthogonal planes.
Maximum results recorded

The test equipment used for the Transmitter Intentional Emission – Radiated – Part 15.231 January 2005 test 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	
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
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	X
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	X
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	

ANNEX A
PHOTOGRAPHS



PHOTOGRAPH No. 2

TRANSMITTER FRONT VIEW



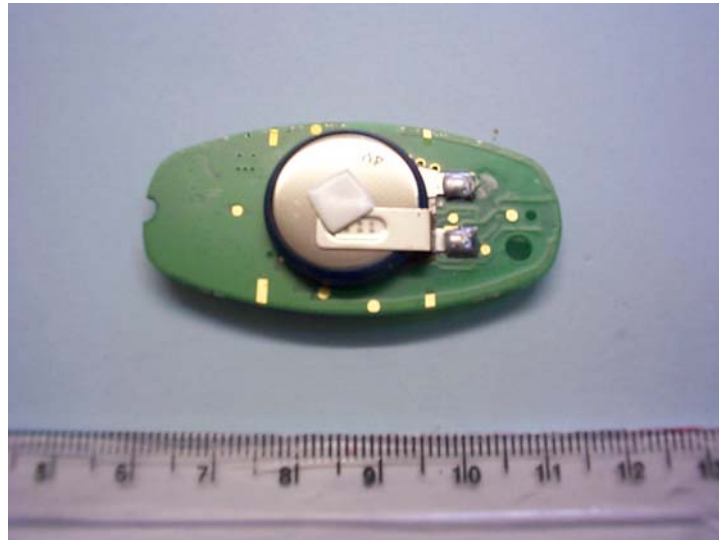
PHOTOGRAPH No. 3

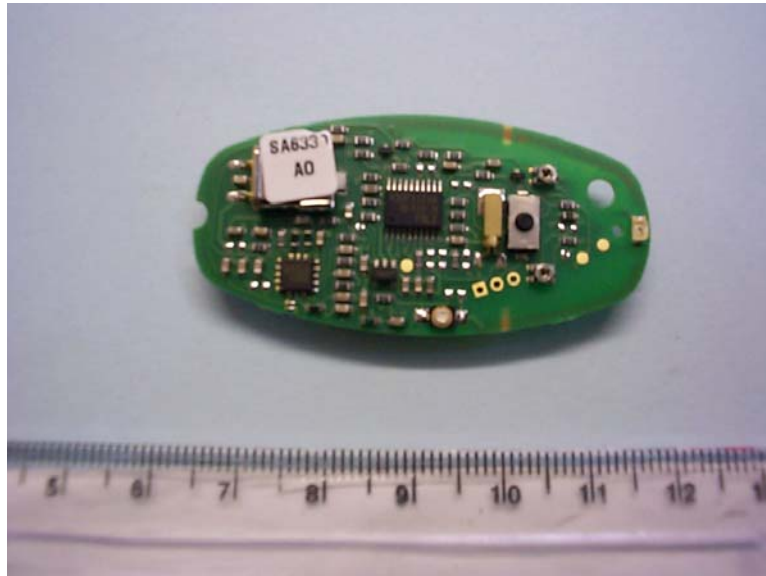
TRANSMITTER REAR VIEW



PHOTOGRAPH No. 4

TRANSMITTER PCB TRACK SIDE





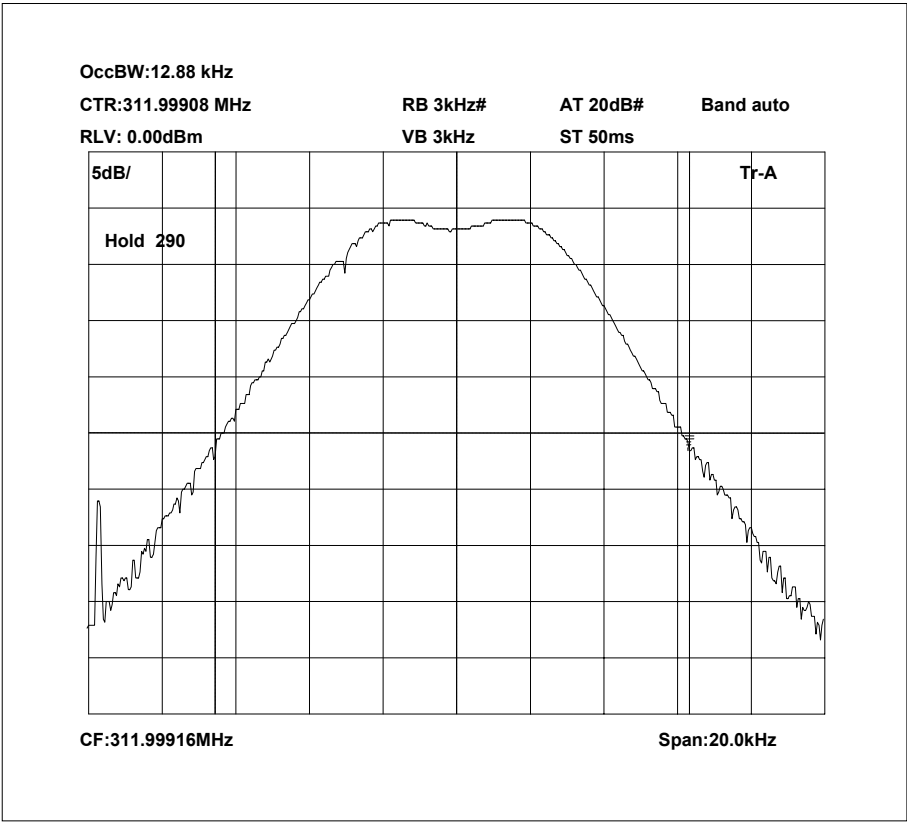
ANNEX B
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

a.	TCB	-	APPLICATION	[X]
		-	FEE	[X]
b.	AGENT'S LETTER OF AUTHORISATION	-		[X]
c.	MODEL(s) vs IDENTITY	-		[X]
d.	ALTERNATIVE TRADE NAME DECLARATION(s)	-		[X]
e.	LABELLING	-	PHOTOGRAPHS	[X]
		-	DECLARATION	[]
		-	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

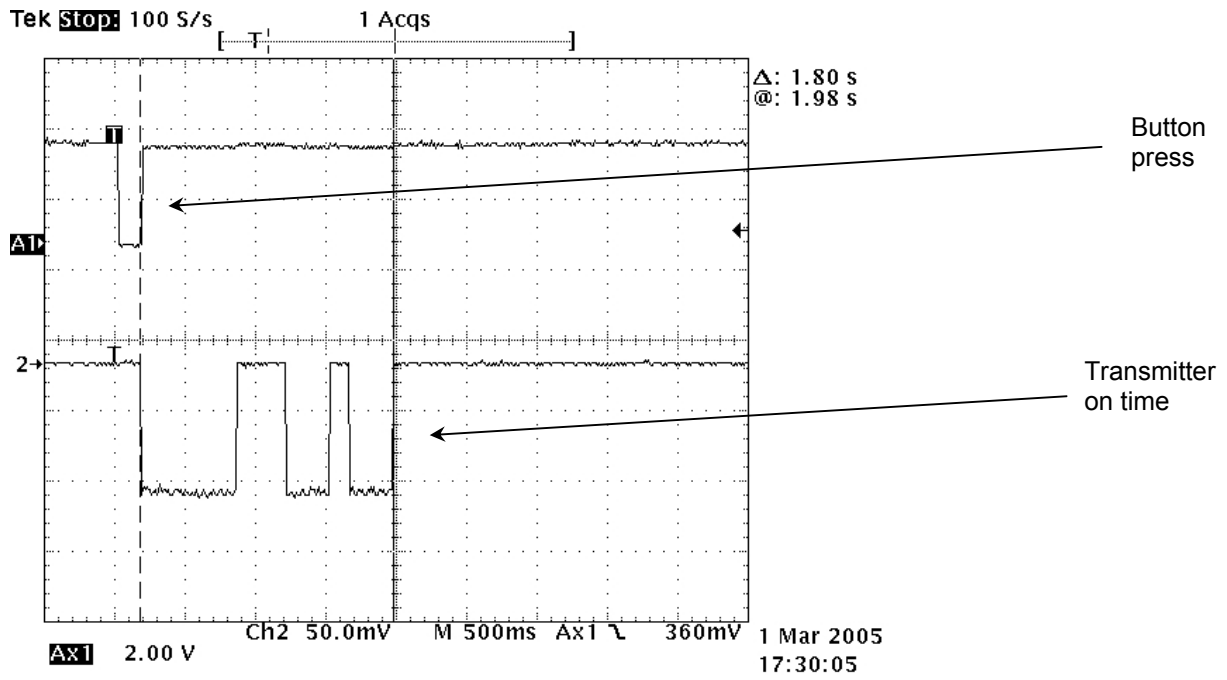
BANDWIDTH PLOT



Occupied Bandwidth = 12.88kHz
Fl = 311.99264MHz
Fh = 312.00552MHz

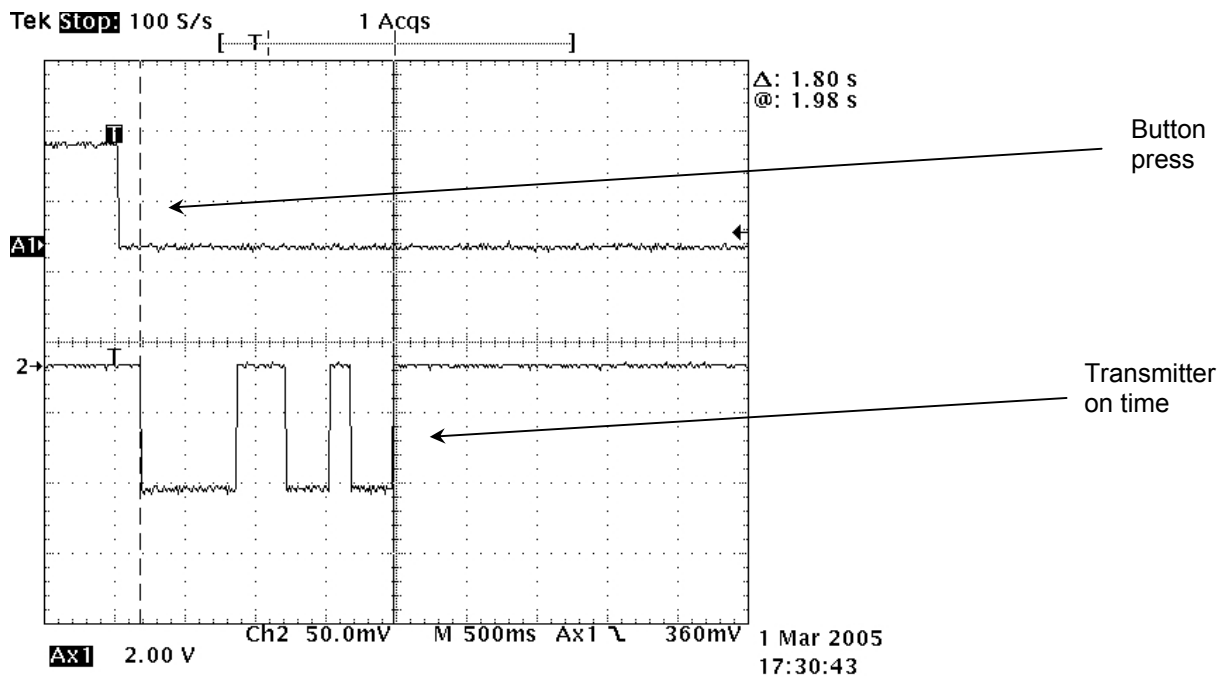
ANNEX D
TRANSMITTER ON TIME

Transmitter on time, Short Button Press



Transmitter on time during long button press 1.80 Seconds

Transmitter on time, Long Button Press



Transmitter on time during long button press 1.80 Seconds