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 (Signature Not Verified; 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 (Signature Not Verified; 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

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FS 21805

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-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 — Signature Not Verified — 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 — Signature Not Verified — 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 [X] No [ ]
APPLICANT'S CATEGORY:	MANUFACTURER [X] 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)	1st March 2005 – 2nd 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) $6^{O}C$

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 1560.06(R) 1872.00 2183.96 2496.02(R) 2807.88(R)	40.11 37.01 38.63 39.47 37.00 35.27	1.28 1.35 1.54 1.64 1.78 1.88	25.3 25.9 26.5 28.3 28.7 30.0	66.69 64.26 66.67 69.41 67.48 67.15	20 20 20 20 20 20	216.02 163.30 215.53 295.46 236.59 227.77	588 500 588 588 500 500
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) indicated frequency within restricted band from 15.205
9 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.
10 Spurious limit level of 588µV/m was calculated by reducing the fundamental limit by 20dB, as per 15.231(b).

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 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 orthagonal 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

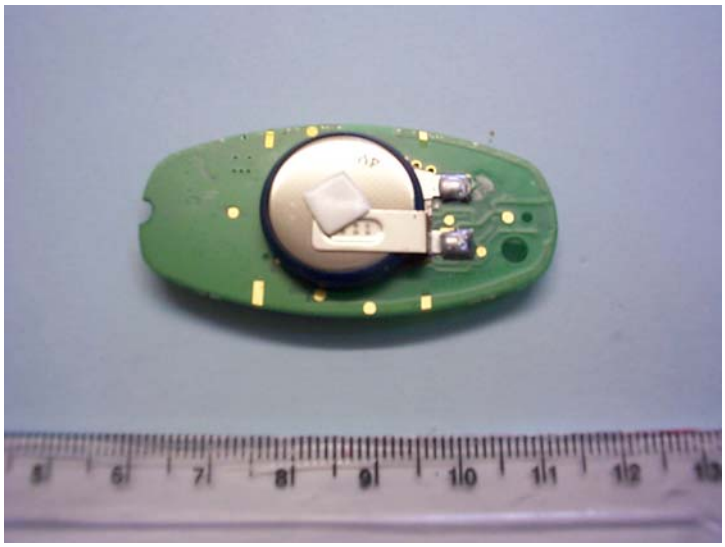
PHOTOGRAPHS

PHOTOGRAPH No. 1 **TEST SETUP**

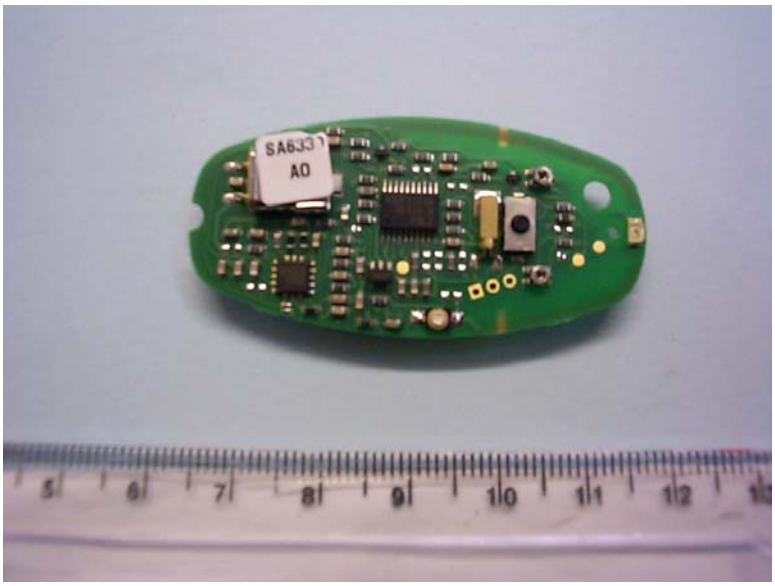
PHOTOGRAPH No. 2 **TRANSMITTER FRONT VIEW**

PHOTOGRAPH No. 3 **TRANSMITTER REAR VIEW**

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



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



ANNEX B

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

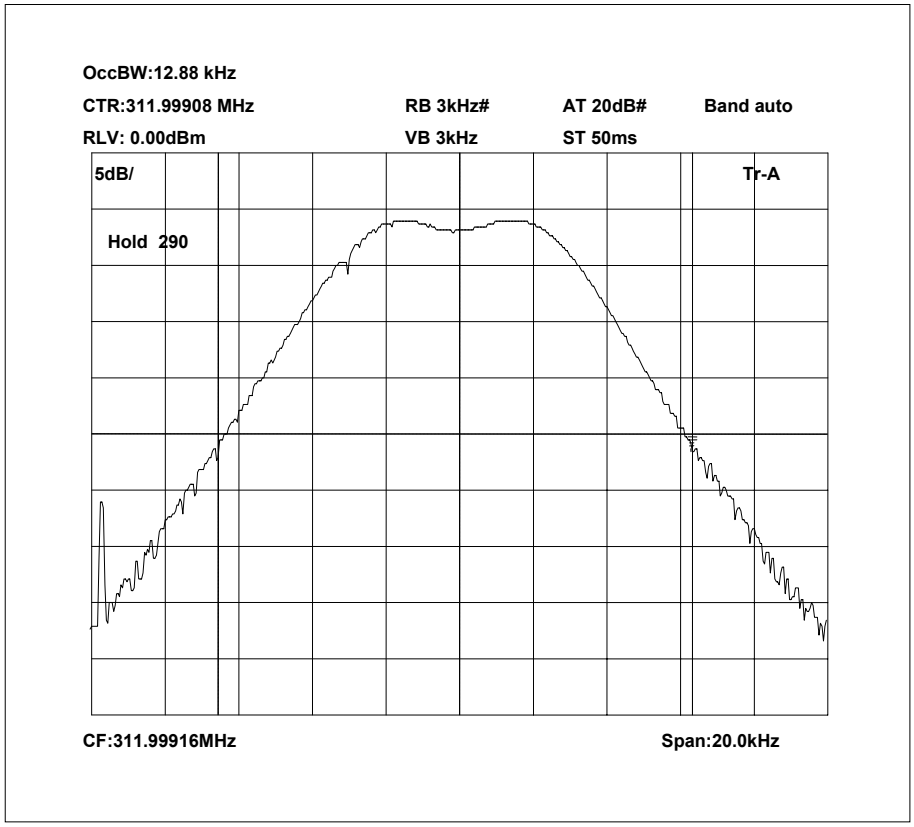
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

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

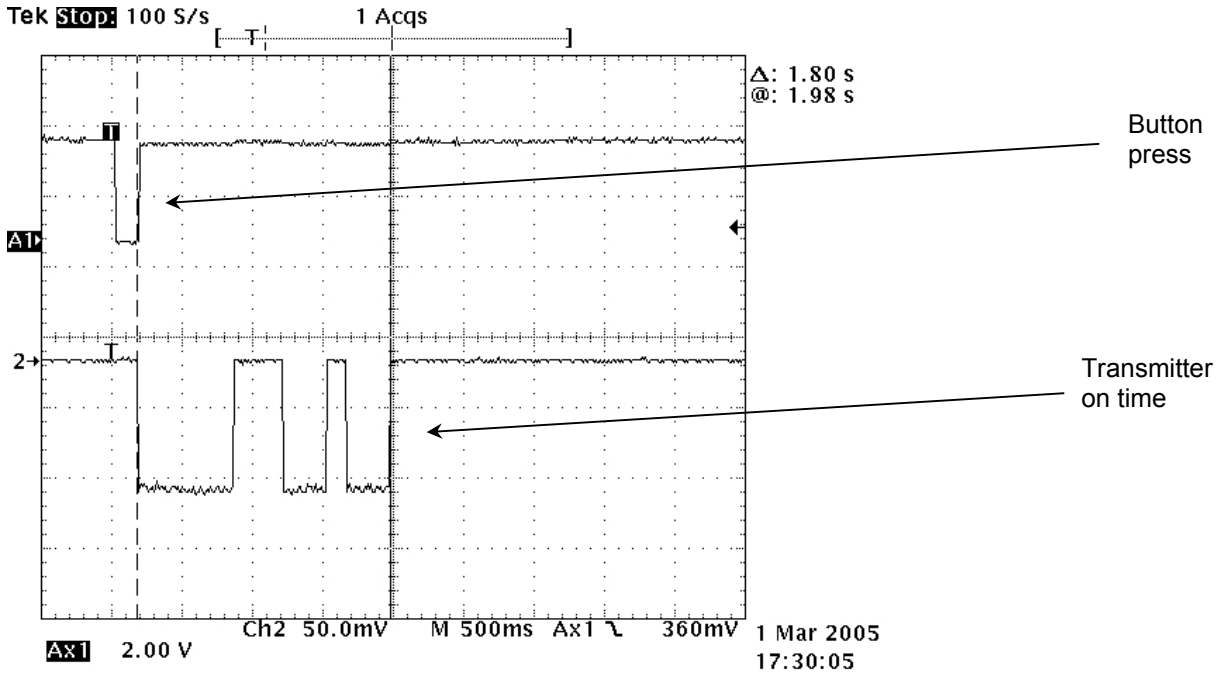


Occupied Bandwidth = 12.88kHz
Fl = 311.99264MHz
Fh = 312.00552MHz

ANNEX D

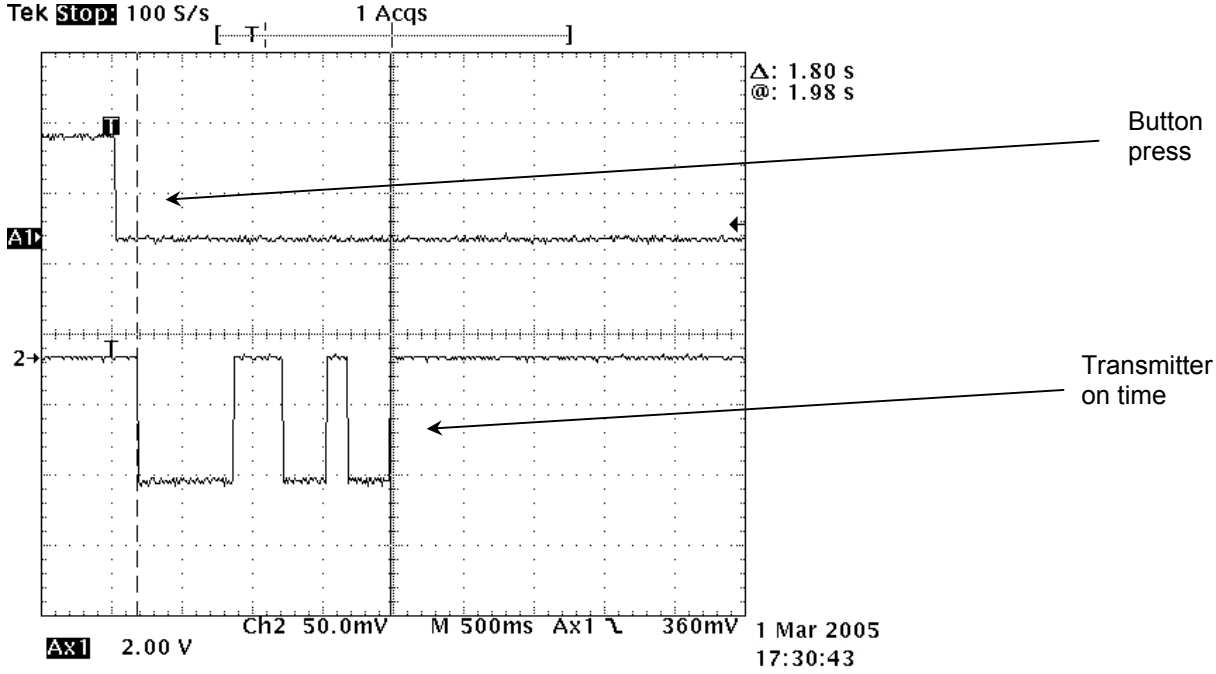
TRANSMITTER ON TIME

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