TEST REPORT NO: RU1175/6574

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ISSUE NO: 1

FCC ID: S30-CEL-BP

REPORT ON THE CERTIFICATION TESTING OF A
VITEC GROUP COMMUNICATIONS
CELLCOM BELTPACK
WITH RESPECT TO
THE FCC RULES CFR 47, PART 15D June 2005
INTENTIONAL RADIATOR SPECIFICATION

TEST DATE: 6th June 2005 – 30th September 2005

TESTED BY: Daniel Winstanley
Digitally signed by Daniel Winstanley
DN: CN = Daniel Winstanley, C = GB, O = TRL Compliance Services
Reason: I am the author of this document
Date: 2005.10.24 10:27:40 +01'00'
D WINSTANLEY

APPROVED BY: Peter Green
Digitally signed by Peter Green
DN: CN = Peter Green, C = GB
Reason: I am approving this document
Date: 2005.10.24 23:07:56 +01'00'
P GREEN
EMC PRODUCT MANAGER

DATE: 17th October 2005

Distribution:

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1. VITEC GROUP COMMUNICATIONS
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3. TRL EMC

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

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:	S30-CEL-BP					
PURPOSE OF TEST:	Certification					
TEST SPECIFICATION:	FCC RULES CFR 47, Part 15D June 2005					
TEST RESULT:	Compliant to Specification					
EQUIPMENT UNDER TEST:	CellCom Beltpack					
EQUIPMENT SERIAL No:	9638					
EQUIPMENT TYPE:	UPCS Transceiver					
PRODUCT USE:	Personal communications					
CARRIER POWER:	17.79 dBm					
ANTENNA TYPE:	Integral					
ALTERNATIVE ANTENNA:	Not Applicable					
BAND OF OPERATION:	1920 MHz – 1930 MHz					
CHANNEL SPACING:	Not Applicable					
NUMBER OF CHANNELS:	5 Frequencies, 6 double time slots per frequency giving 30 channels					
FREQUENCY GENERATION:	SAW Resonator	[ ]	Crystal	[ ]	Synthesiser	[X]
MODULATION METHOD:	Amplitude	[ ]	Digital	[X]	Angle	[ ]
POWER SOURCE(s):	4.8 Vdc					
TEST DATE(s):	6th June 2005 – 30th September 2005					
ORDER No(s):	90482					
APPLICANT:	Vitec Group Communications					
ADDRESS:	7400 Beach Drive Cambridge Research Park Cambridge CB5 9TP					

TESTED BY: Daniel Winstanley

Digitally signed by Daniel Winstanley
DN: CN = Daniel Winstanley, C = GB, O = TRL Compliance Services
Date: 2005.10.24 10:27:58 +01'00'

D WINSTANLEY

APPROVED BY: _____

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EMC PRODUCT MANAGER

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	CellCom Beltpack
EQUIPMENT TYPE:	UPCS Transceiver
SERIAL NUMBER OF EUT:	9638
PURPOSE OF TEST:	Certification
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 15D June 2005
TEST RESULT:	COMPLIANT Yes [X] No [ ]
APPLICANT'S CATEGORY:	MANUFACTURER [X] IMPORTER [ ] DISTRIBUTOR [ ] TEST HOUSE [ ] AGENT [ ]
APPLICANT'S ORDER No(s):	90482
APPLICANT'S CONTACT PERSON(s):	Mr Jiou-pahn Lee
E-mail address:	Jiou-Pahn.Lee@VitecGroup.com
APPLICANT:	Vitec Group Communications
ADDRESS:	7400 Beach Drive Cambridge Research Park Cambridge CB5 9TP
TEL:	+44 (0) 1223 815 000
FAX:	+44 (0) 1223 815 001
TEST LABORATORY:	TRL EMC
UKAS ACCREDITATION No:	0728
TEST DATE(s)	6th June 2005 – 30th September 2005
TEST REPORT No:	RU1175/6574

EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.

TEST/EXAMINATION	RULE PART	APPLICABILITY
Coordination with Fixed Microwave Service	15.307 (b)	No note 1
Cross reference to Subpart B	15.309 (b)	Yes
Labelling Requirements	15.311 15.19 (a)(3)	Yes
Measurement Procedures	15.313	Yes
Antenna Requirement	15.317 15.203	Yes
Modulation Techniques	15.319 (b)	Yes
Conducted AC Powerline	15.315 15.207	Yes
Emission Bandwidth	15.323 (a)	Yes
Peak Transmit Power	15.319 (c)	Yes
Power Spectral Density	15.319 (d)	Yes
Antenna Gain	15.319 (e)	Yes
Automatic Discontinuation of Transmission	15.319 (f)	Yes
Radio Frequency Radiation Exposure	15.319 (i)	Yes
Monitoring Thresholds	15.323 (c)(2) 15.323 (c)(9)	Yes
Monitoring of Intended Transmit Window and Maximum Reaction Time	15.323 (c)(1)	Yes
Monitoring Bandwidth	15.323 (c)(7)	Yes
Random Waiting Interval	15.323 (c)(6)	No Note 2
Duration of Transmission	15.323 (c)(3)	Yes
Connection Acknowledgement	15.323 (c)(4)	Yes
Lower threshold Selected Channel, Power Accuracy, Segment Occupancy	15.323 (c)(5)	Yes
Monitoring Antenna	15.323 (c)(8)	Yes
Duplex Connections	15.323 (c)(10)	Yes
Alternative Monitoring Interval for Co-located Devices	15.323 (c)(11)	No Note 3
Fair Access to Spectrum Related to (c)(10) & (c)(11)	15.323 (c)(12)	Yes
Emission Inside and Outside the Sub-band	15.323 (d)	Yes
Frame Period	15.323 (e)	Yes
Frequency Stability	15.323 (f)	Yes

Note:
1. Requirement removed April 4th 2005 see public notice DX 05-1005.
2. Only applicable to EUTs capable of transmitting control and signalling information.
3. Not utilized by this EUT as devices will not be co-located within 1m of each other.

2.	Product Use:	Personal Communications	
3.	Duty Cycle:		8.33%
4.	Transmitter bit or pulse rate and level:		2Mbps
5.	Temperatures:	Ambient (Tnom)	20^{o}C
6.	Supply Voltages:	Vnom	+4.8 Vdc

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

7.	Equipment Category:	Single channel	[ ]
		Two channel	[ ]
		Multi-channel	[X]
8.	Channel spacing:	Narrowband	[ ]
		Wideband	[X]

9. System Description:

The system is made up of two parts, a fixed part and a portable part. The portable part is a beltpack worn about the body. The fixed part constitutes two parts, an active antenna and a base unit. The base unit is rack mounted and is connected to the active antenna via a CAT-5 cable. This cable carries the data stream between the two units. It can also provide power from the base unit to the active antenna. The active antenna can also be powered from an additional power source.

The system operates in the 1920MHz -1930MHz band. The system use 5 different frequency channels 1.728MHz apart using MC/TDMA/TDD (Multi Carrier / Time Division Multiple Access / Time Division Duplex) using QPSK modulation.

The system employs a 10ms frame, divided into 24 equal timeslots, numbered 0-23. The system uses double-slots only, where a double-slot always begins on an even-numbered slot. The Base station always transmits in the first half of the frame, and the Portable always transmits on the duplex mate in the second half. A physical bearer is composed of a transmit double-slot and a receive double-slot. The two halves of a given bearer are always exactly half a frame (5ms, 12 slots) apart.

During the testing the belt pack was frequency administered to allow operation on only certain channels during the test. The frequency administration was performed using software.

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CROSS REFERENCE TO SUBPART B – PART 15.309 (b)

The unit contains digital circuitry which is not directly related to the radio transmitter. See emissions inside and outside the sub-bands for results.

LABELLING INFORMATION – PART 15.311 & 15.19 (a)(3)

This information is contained in a separate document. See attached exhibit.

ANTENNA REQUIREMENTS – PART 15.317

The unit employs an integral antenna arrangement

MODULATION TECHNIQUES – PART 15.319 (b)

The CellCom beltpack is an isochronous device operating in the 1920 MHz – 1930 MHz frequency band.

The CellCom beltpacks modulation technique is based on DECT technology as described in European standards EN 300 175-2 and EN 300 175-3.

The CellCom beltpacks modulation techniques are MC/TDMA/TDD (Multi Carrier / Time Division Multiple Access / Time Division Duplex) using QPSK modulation.

TRANSMITTER CONDUCTED EMISSIONS – AC POWER LINE PART 15.315

SIGNIFICANT EMISSIONS

FREQUENCY (MHz)	MEASUREMENT RECEIVER READING (dBµV)	DETECTOR	CONDUCTOR (L or N)	Limit (dBµV)
0.18	34.56	Average	Live	54.49

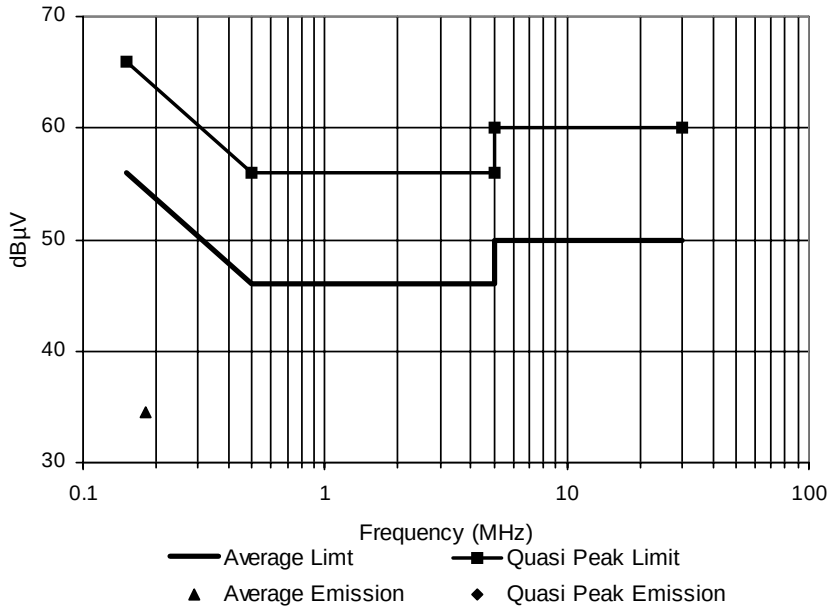
Notes:
1 See attached plot. Annex C
2 Emissions not within 20 dB's of the limit are not necessarily recorded
3 The only applicable mode of operation for ac powerline is with the transmitter turned off
4 The unit was tested while charging a flat battery.

Test Method: 1 As per Radio – Noise Emissions, ANSI C63.4: 2003

The test equipment used for the Transmitter Conducted Emissions – AC Power Line Part 15.207 test was:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/001	UH03	**X**
LISN/AMN	ROHDE & SCHWARZ	ESH3-Z5	863906/018	UH05	**X**

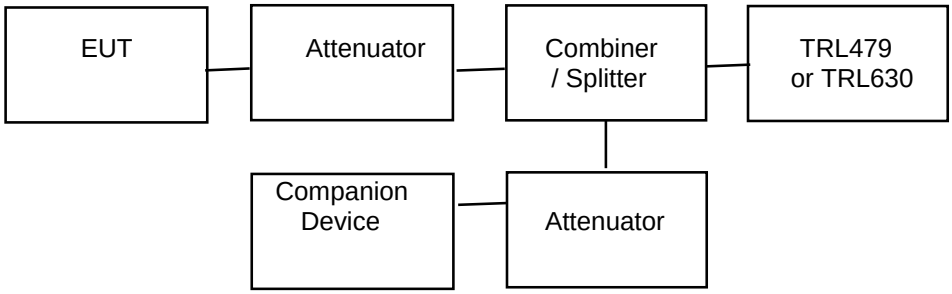
Quasi Peak and Average Limit Part 15.207
(Levels below the limit are only displayed if within 20dB of the limit)



TRANSMITTER EMISSION BANDWIDTH – PART 15.323 (a)

The emission bandwidth is measured in accordance with ANSI C63.17 sub-clause 6.1.3 using the setup below

TEST SETUP 1:



f_x = 1921.536 MHz				
Δ P (dBc)	fl (MHz)	fh (MHz)	Δf (MHz)	Limit
-26	1920.850	1922.340	1.490	50kHz> Δf > 2.5MHz
-24	1920.860	1922.310	1.450	N/A
-12	1920.970	1922.190	1.220	N/A
-6	1921.090	1922.000	0.910	N/A

f_x = 1924.992 MHz				
Δ P (dBc)	fl (MHz)	fh (MHz)	Δf (MHz)	Limit
-26	1924.308	1925.768	1.460	50kHz> Δf > 2.5MHz
-24	1924.338	1925.748	1.410	N/A
-12	1924.458	1925.648	1.190	N/A
-6	1924.528	1925.518	0.990	N/A

f_x = 1928.448 MHz				
Δ P (dBc)	fl (MHz)	fh (MHz)	Δf (MHz)	Limit
-26	1927.746	1929.234	1.488	50kHz> Δf > 2.5MHz
-24	1927.764	1929.218	1.454	N/A
-12	1927.890	1929.090	1.344	N/A
-6	1927.994	1928.938	0.944	N/A

Note: See emission bandwidth plot for 1921.536 MHz in Annex D

PEAK TRANSMIT POWER – PART 15.319 (c)

The peak transmit power is measured in accordance with ANSI C63.17 sub-clause 6.1.2 using test setup 1(page 9).

The limit for Peak Transmit Power (PTP) is calculated using the following formula:

$$PTP = 100\mu W \times \sqrt{EBW}$$

This limit must be corrected to take into account any gain of the antenna greater than 3dBi.
Where: EBW is the transmitter emission bandwidth in Hz as determined in the previous test.

Limit

EBW = 1.490 MHz

PTP = 100µW x $\sqrt{1.490}$ MHz

PTP = 20.8 dBm

Results

Frequency (MHz)	Peak Transmit Power (dBm)	Limit (dBm)
1921.536	17.59	20.8
1924.992	17.75	20.8
1928.448	17.79	20.8

Note:
1. Permanent antenna was replaced with temporary antenna connector to enable conducted measurement.
2. Antenna gain < 3dBi and so correction of the limit is not required.
3. See Annex E for 1921.536Mhz Peak Transmit Power Plot

POWER SPECTRAL DENSITY – PART 15.319 (d)

The power spectral density is measured using test setup 1. (page 9)The peak emission level measured in a 3kHz resolution bandwidth was compared directly to the limit

Limit

The power spectral density shall not exceed 3mW in any 3kHz bandwidth as measured with a spectrum analyser having a resolution bandwidth of 3kHz.

Results

Frequency (MHz)	Power Sectral Density (mW/3kHz)	Limit (mW/3kHz)
1921.536	2.51	3
1924.992	2.53	3
1928.448	2.54	3

Note:
1. See Annex F for 1921.536Mhz Power Spectral Density Plot

ANTENNA GAIN – PART 15.319 (e)

Any directional gain of the antenna exceeding 3dBi has an effect on the limit applied to the measurements taken for the peak transmit power test. If the directional gain of the antenna is less than 3dBi it is not required to be taken into account.

Maximum Antenna Gain	Exceeds 3dbi by
+2dBi	N/A

Note: Statement by manufacturer declaring maximum antenna gain. See attached exhibit.

AUTOMATIC DISCONTINUATION OF TRANSMISSION – PART 15.319 (f)

Automatic discontinuation of transmission means break off of transmissions that are not control and signalling information.

This test is monitored using the test setup 1(page 9) as per transmitter emission bandwidth and an active channel.

The S30-CEL-BP is a portable part and as such is not intended to transmit control and signalling information the counter part device is a fied part device and so does transmit control and signalling information.

Part	Transmits Control and Signaling Information	Equipment Under Test
Fixed Part	X	
Portable Part		X

Results

The following test are performed after a connections has been established with the counter part device

Number	Test	Reaction Of EUT	Pass / Fail
1	Power removed from EUT	C	Pass
2	EUT powered Down	C	Pass
3	Power/Signal Cable removed counter part (Active Antenna)	A	Pass
4	Power removed from Counter part (Base)	A	Pass
5	Counter part (Base) powered down	A	Pass

A – Connection breakdown, Cease of all transmissions
B – Connection breakdown, EUT transmits control and signalling information
C – Connection breakdown, Counterpart transmits control and signalling information

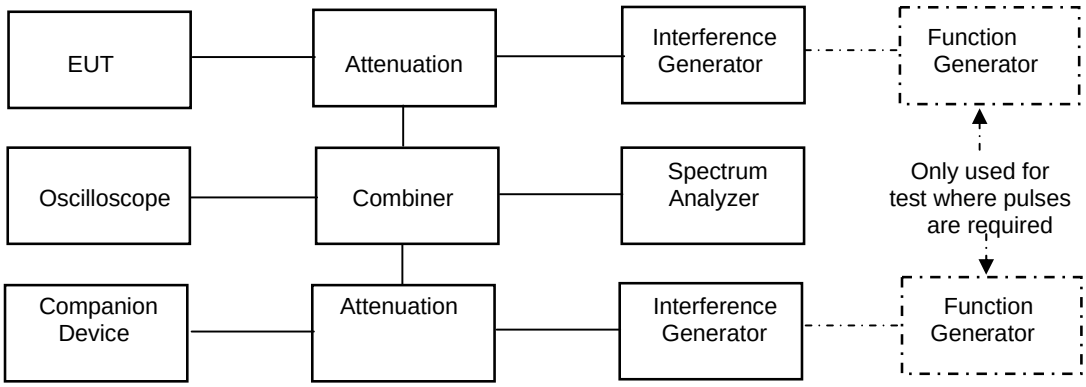
RADIO FREQUENCY RADIATION EXPOSURE – PART 15.319 (i)

This information is contained is a separate document

MONITORING THRESHOLDS – PART 15.323 (c)(2); (c)(9)

The monitoring threshold tests are carried out in accordance with ANSI C63.17 sub-clause 7.3.2.1 using the test setup 2. The lower threshold level was determined following the procedure as laid out in ANSI C63.17 sub-clause 7.3.2.1.1 (a-g) Frequency administration was used to allow operation on only two of the EUT's possible carrier frequencies (f1 and f2).

TEST SETUP 2:



Calculation of monitoring threshold limits for isochronous devices:

Lower threshold: $T_L = 15Log_{10}B - 184 + 30 - P$ (dBm)

Upper threshold: $T_L = 15Log_{10}B - 184 + 50 - P$ (dBm)

Where: B = Emission bandwidth (Hz)
P = Transmitted power (dBm)

Limits

Monitor Threshold	B (MHz)	P (dBm)	Limit (dBm)
Lower Limit	1.49	17.59	-78.9
Upper limit	1.49	17.59	-58.9

Note: 1. The upper threshold is only applicable for systems with a minimum of 40 channels

Results

Monitor threshold	Measured Threshold Level	Calculated Threshold level
Lower Threshold (dBm)	-100	-78.9
Upper threshold (dBm)	N/A	N/A

For a device with less than 40 channels ANSI C63.17 sub-clause 7.3.2.1.1 (h) applies to show that if all channels have interference on the transmit portion of the frame above the calculated lower threshold the EUT will not transmit.

Result

Interference	Transmission
TX portion only of f1 permanent on f2	No

MONITORING OF INTENDED TRANSMIT WINDOW AND MAXIMUM REACTION TIME – PART 15.323 (c)(1)

The monitoring of intended transmit window was carried out in accordance with ANSI C63.17 sub-clause 7.5 using test setup 2. (page 12)

The EUT was frequency administered to only one operating frequency channel and only one of the interference generators in the test setup was utilized. The interference generator was fed pulses from the function generator to produce a pulsed carrier of the specified time length and the output of the interference generator was set to the required level. The pulse generator and companion device were synchronized so the position of the pulses corresponded to the time-slot pattern in the frame of the EUT. The test is performed with the unit frequency administered to operate only on bottom, middle or top frequency.

For each of the required tests the pulse width and interference level are as below:

Test c)

With the interference generator output set at the calculated threshold level (lower) and the width of the pulse interference exceeds 50 $\sqrt{1.25/B}$ µs verify that the EUT does not establish a connection.

Test d)

With the interference generator output set at 6dB above the calculated threshold level (lower) and the width of the pulse interference exceeds 35 $\sqrt{1.25/B}$ µs verify that the EUT does not establish a connection.

Test e)

With the interference generator output set at 10dB above the calculated threshold level (lower) and the width of the pulse interference exceeds 75 $\sqrt{1.25/B}$ µs verify that the EUT does not establish a connection.

Where B = Emission bandwidth of the EUT in MHz

Results

Test Equation (µs)	Pulse Width (µs)	Interferer Level (dBm)	Connection		
			F_L	F_M	F_H
50√1.25/B	32.1	Calculated	No	No	No
35√1.25/B	45.8	Calculated + 6	No	No	No
75√1.25/B	68.7	Calculated + 10	No	No	No

MONITORING BANDWIDTH – PART 15.323 (c)(7)

The monitoring bandwidth test was carried out in accordance with ANSI C63.17 sub-clause 7.4.2 using test setup 2.(page12)

The EUT was frequency administered to only one operating frequency and only one of the interference generators in the test setup was utilized. A carrier is set a frequency determined by the -6, -12 and -24dBc as found in the emission bandwidth test. The level of the carrier is set to 6dB, 12dB and 24dB respectively above the calculated threshold. It shall be verified that the EUT does not establish a connection. The test is performed with the unit frequency administered to only bottom, middle or top operating frequency.

Results

f_x = 1921.536 MHz				
dBc	Freq of Interferer	Level above Threshold	Connection Made	Pass / Fail
-24	1920.860 MHz	24 dB	No	Pass
-12	1920.970 MHz	12 dB	No	Pass
-6	1921.090 MHz	6 dB	No	Pass
-6	1922.000 MHz	6 dB	No	Pass
-12	1922.190 MHz	12 dB	No	Pass
-24	1922.310 MHz	24 dB	No	Pass

f_x = 1924.992 MHz				
dBc	Freq of Interferer	Level above Threshold	Connection Made	Pass / Fail
-24	1924.338 MHz	24 dB	No	Pass
-12	1924.458 MHz	12 dB	No	Pass
-6	1924.528 MHz	6 dB	No	Pass
-6	1925.518 MHz	6 dB	No	Pass
-12	1925.648 MHz	12 dB	No	Pass
-24	1925.748 MHz	24 dB	No	Pass

f_x = 1928.448 MHz				
dBc	Freq of Interferer	Level above Threshold	Connection Made	Pass / Fail
-24	1927.764 MHz	24 dB	No	Pass
-12	1927.890 MHz	12 dB	No	Pass
-6	1927.994 MHz	6 dB	No	Pass
-6	1928.938 MHz	6 dB	No	Pass
-12	1929.090 MHz	12 dB	No	Pass
-24	1929.218 MHz	24 dB	No	Pass

DURATION OF TRANSMISSION – PART 15.323 (c)(3)

The duration of transmission test was carried out in accordance with ANSI C63.17 sub-clause 8.2.2 using test setup 2.(Page 12) (No interference generators were active during this test).

The time/spectrum window occupied by the connection was monitored using a spectrum analyzer for the spectrum window and an oscilloscope for the time slot. The connection was watched over a period of over 6 hours during this time the access criteria was repeated several times.

Result

Repetition of Access Criteria	Maximum Transmission Time	Maximum Transmission Time Limit
First	2Hours	<8 Hours
Second	2Hours	<8 Hours

CONNECTION ACKNOWLEDGEMENT – PART 15.323 (c)(4)

The connection acknowledgement test was carried out in accordance with ANSI C63.17 sub-clause 8.2.1 using test setup 2. (Page12)(No interference generators were active during this test).

The test was carried out in two parts. The first was to verify that with the companion device off the EUT does not transmit on the same time/spectrum window for more than the limit. The second was to verify that after a connection is broken the EUT terminates its transmission on the current time spectrum window.

Result

Test	Time Taken (seconds)	Limit (seconds)
Change of communication channel (note 1)	<1s (note 2)	1
Change of control Channel (note 1)	<30s (note 3)	30
Connection Breakdown	4.56	30

Note:
1. The companion device is off for these tests
2. The EUT will not transmit a communication channel with the companion device off
3. The EUT does not transmit a control channel
4. See Annex G for connection breakdown plot.

UPPER THRESHOLD SELECTED CHANNEL, POWER ACCURACY, SEGMENT OCCUPANCY – PART 15.323 (c)(5)

Least interfered Channel

As this system has less than 40 channels the least interfered channel relating to the lower monitoring threshold shall be assessed.
This test was carried out in accordance with ANSI C63.17 sub-clause 7.3.2.1.2 using test setup 2.(page 12)

The EUT was frequency administered to operating on two frequencies only, f1 and f2.

f1 = 1923.264 MHz
f2 = 1621.536 MHz

For the first test, interference on f1 was set at 10dB above the measured lower threshold and 3dB above the measured lower threshold on f2. In this case the EUT should transmit on f2. The third part of the test interference on f1 was set at 3dB above the measured lower threshold and 10db above the measured lower threshold on f2. In this case the EUT should transmit on f1. The second part of the test is applicable as the system utilizes TDMA. The interference on f2 is set to 3dB above the measured lower threshold. The interference on f1 is set to 10 dB above the measured lower threshold. The interference is is applied on over the transmit portion of the EUT's frame with one transmit double time slot free of interference. In this case the EUT should transmit in the interference free time slot.

Result

Test	Transmit on f1	Transmit on f2	Wanted Transmit Channel	Pass/Fail
1	No	Yes	f2	Pass
2 (note 1)	Yes	No	f1	Pass
3	Yes	No	f1	Pass

Note: 1. For test two due to the system having blind slots the test could only be performed when the position of the dummy bearer was in specific time slots relative to the interference free time slots. The system selected the interference free slot when the interference free slot was not a blind slot.

Selected Channel Confirmation

This test was carried out in accordance with ANSI C63.17 sub-clause 7.3.2.2 using test setup 2(page 12) using the same frequencies and interferer levels as test 3 detailed above. The interference on f2 is removed and a connection established on this frequency. The connection is terminated. The interference is reapplied and the EUT is immediately caused to attempt transmission. In this case the EUT should transmit on f1
The test is to ensure the EUT monitors the time/spectrum window immediately prior to transmission.

Result

Test	Transmit on f1	Transmit on f2	Wanted Transmit Channel	Pass/Fail
1	Yes	No	f1	Pass

Power Accuracy

The power measurement resolution for the previous comparison must be accurate to within 6dB. The monitoring threshold test covered in Part 15.323 (c)(2) automatically proves that this requirement is met.

Segment Occupancy

This section is not applicable as no units will be located within 1 meter of each other.

MONITORING ANTENNA – PART 15.323 (c)(8)

The antenna of the EUT used for transmitting is the same antenna that is used for monitoring.

DUPLEX CONNECTIONS – PART 15.323 (c)(10)

The tests laid out in this section verify that the access criteria are met by two devices communicating over a duplex connection. The EUT is the initiating device and the companion is the responding device.
These tests are carried out in accordance with ANSI C63.17 sub-clause 8.2.3 using test setup 2.(page12)
Before all tests are carried out any connection is terminated.

Test c)
The system is restricted to operation on one frequency using administration. Verify that a connection between the EUT and its companion device can be made and that interference to the companion device is at least 10 dB below the measured lower threshold.

Test d) & e)
Apply interference at the calculated lower threshold to all transmit time slots and to all but one receive time slots. The EUT has less than 40 channels so should not establish a connection.

Test f) & g)
Apply interference at the calculated lower threshold to all receive time slots and to all but one transmit time slots. The EUT has less than 40 channels so should not establish a connection.

Test h) & i)
Apply interference 3dB above the measured threshold to all but one transmit time slot. Apply interference 10dB above the measured threshold to all but one receive time slot. The interference free transmit time slot shall not be the duplex mate of the interference free receive time slot.
Connection should be made in the interference free receive time slot and its duplex mate

Test j) & k)
Apply interference 3dB above the measured threshold to all but one receive time slot. Apply interference 10dB above the measured threshold to all but one transmit time slot. The interference free receive time slot shall not be the duplex mate of the interference free transmit time slot.
Connection should be made in the interference free transmit time slot and its duplex mate

Test l)
Not applicable the EUT utilizes less than 40 channels.

Test	Connection Made	Correct Time Slot	Required Slot	Pass/Fail
c	Yes	N/A	Any	Pass
d & e	No	N/A	N/A	Pass
f & g	No	N/A	N/A	Pass
h & i (note1)	Yes	Interference free Receive time slot & Mate	Interference free Receive time slot & Mate	Pass
j & k (note 1)	Yes	Interference free Transmit time slot & Mate	Interference free Transmit time slot & Mate	Pass

Note: 1. For tests h & i and j & k due to the system having blind slots the test could only be performed when the position of the dummy bearer was in specific time slots relative to the interference free time slots. The system selected the interference free slot when the interference free slot was not a blind slot.

ALTERNATIVE MONITORING INTERVAL FOR CO-LOCATED DEVICES – PART 15.323 (c)(11)

This test is carried out in accordance with ANSI C63.17 sub-clause 7.3.2.1.2

The manufacturer declares that this provision is not utilized by the EUT

FAIR ACCESS TO SPECTRUM RELATED TO (c)(10) & (c)(11) – PART 15.323 (c)(12)

The provisions of (c)(10) & (c)(11) shall not be used to extend the range of spectrum occupied over space or time for the purposes of denying fair access to the spectrum to other devices.

The manufacturer declares that this device does not work in mode which denies fair access to the spectrum to others.

EMISSIONS INSIDE AND OUTSIDE THE SUB-BAND – RADIATED – PART 15.323 (d)

These measurements are carried out in accordance with ANSI C63.17 sub-clause 6.1.6.3 with the unit set to a channel near the lower sub-band edge.

EUT set to channel nearest lower bandedge	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	190.45	30.50	1.40	8.20	40.1	-	101.56	150
	194.55	30.00	1.40	8.50	39.9	-	98.85	150
	198.65	28.30	1.40	8.60	38.3	-	82.22	150
	202.75	24.50	1.40	8.60	34.5	-	53.08	150
216MHz - 960MHz	375.00	20.10	2.00	14.90	37.0	-	70.79	200
	412.50	20.00	2.20	16.30	38.5	-	84.14	200
960MHz - 1GHz								
1GHz - 20GHz	3843.033(r)	41.21	0.86	31.9	73.97	20	499.46	500
	5764.610	30.34	0.70	35.0	66.04	20	200.48	500
	7686.140(r)	26.19	2.10	38.2	66.49	20	211.11	500
	9607.680	29.19	1.67	38.4	69.26	20	290.40	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 20GHz	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 reduced to 10kHz for critical frequencies as per ANSI C63.17, 6.1.6.1.2
7 New batteries used for battery powered products.
8 See annex H for scan plot 30MHz – 1GHz
9 See Annex I for conducted lower band edge compliance plot.
10 (r) Indicates restricted band.

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:

EMISSIONS INSIDE AND OUTSIDE THE SUB-BAND – RADIATED – PART 15.323 (d)

These measurements are carried out in accordance with ANSI C63.17 sub-clause 6.1.6.3 with the unit set to a channel near the upper sub-band edge.

EUT set to channel nearest upper bandedge	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	190.45	30.50	1.40	8.20	40.1	-	101.56	150
	194.55	30.00	1.40	8.50	39.9	-	98.85	150
	198.65	28.30	1.40	8.60	38.3	-	82.22	150
	202.75	24.50	1.40	8.60	34.5	-	53.08	150
216MHz - 960MHz	375.00	20.10	2.00	14.90	37.0	-	70.79	200
	412.50	20.00	2.20	16.30	38.5	-	84.14	200
960MHz - 1GHz								
1GHz - 20GHz	3857.110(r)	40.72	0.86	32.0	73.58	20	477.53	500
	7713.790	28.22	2.10	38.3	68.60	20	269.15	500
	9624.240	32.67	1.67	38.5	72.84	20	438.53	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 20GHz	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 reduced to 1okHz for critical frequencies as per ANSI C63.17, 6.1.6.1.2
7 New batteries used for battery powered products.
8 See annex H for scan plot 30MHz – 1GHz
9 See Annex I for conducted upper band edge compliance plot
10 (r) Indicates restricted band.

Test Method:

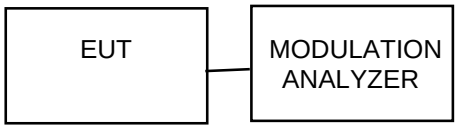
1 As per Radio – Noise Emissions, ANSI C63.4: 2003
2 Measuring distances as Notes 1 to 4 above
3 EUT 0.8 metre above ground plane
4 Emissions maximised by rotation of EUT, on an automatic turntable.
Raising and lowering the receiver antenna between 1m & 4m.
Horizontal and vertical polarisations, of the 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	
HORN ANTENNA	EMCO	3115	9010-3581	139	**X**
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**
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**

FRAME PERIOD 15.323 (e)

Frame repetition stability is tested according with ANSI C63.17 sub-clause 6.2.3. Frame period and jitter are tested in accordance with ANSI C63.17 sub-clause 6.2.4. The test setup below is used for the above measurements.



TEST SETUP 3:

Frame Repetition Stability

This is the mean value of the frame repetition rate recorded over 1000 samples. For devices that divide access in time the repetition rate shall not exceed 10ppm.

Result

Frame Repetition Stability (ppm)	Limit (ppm)	Pass/Fail
0.00	10	Pass

Frame Period and Jitter

Jitter is the difference in time between the rising edges of consecutive pulses.

Result

Maximum Jitter (µs)	3xSD Jitter (µs)	Frame period	Limit (µs)	
			Frame Period (ms)	Jitter (µs)
0.01	0.03	10.00003	2 or 10/X	25

FREQUENCY STABILITY – PART 15.323 (e)

The frequency stability is tests are carried out according with ANSI C63.17 sub-clause 6.2.2 using test setup number 1.(page 9)
The portable part is a battery powered device so voltage stability is not applicable**.**
This testing is carried out with the following conditions over 5000 samples.

Results

Temperature (^{o}C)	Voltage (Vdc)	Fc (MHz)	offset (kHz)	offset (ppm)	Limit (ppm)
20	Vnom	1924.992	0	N/A	N/A
-20	Vnom	1924.983	-9kHz	-4.6	±10
+50	Vnom	1925.002	+10kHz	5.2	±10

ANNEX A

PHOTOGRAPHS

PHOTOGRAPH No. 1 **TEST SETUP**

PHOTOGRAPH No. 2 **TRANSMITTER FRONT VIEW**

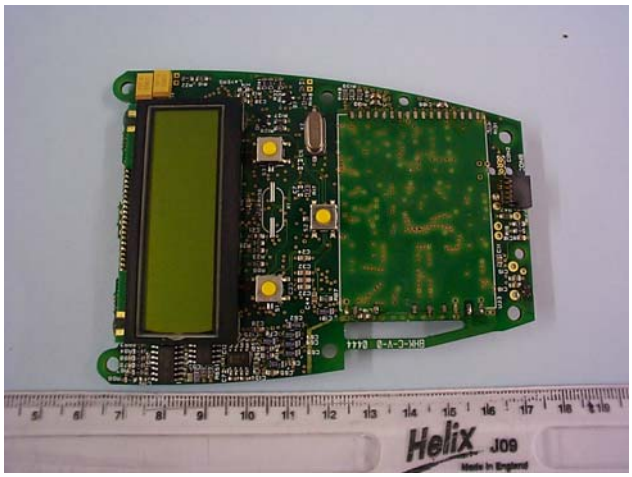
PHOTOGRAPH No. 3 **TRANSMITTER REAR VIEW**

PHOTOGRAPH No. 4 **TRANSMITTER REAR VIEW BATTERY REMOVED**

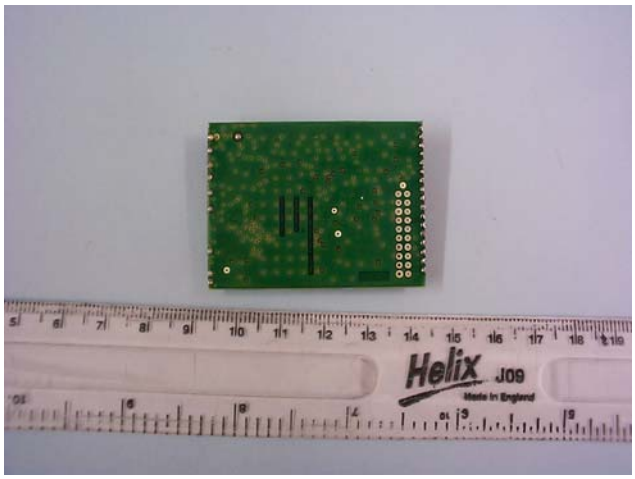
PHOTOGRAPH No. 5 **MAIN PCB LCD & RF MODULE SIDE**

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

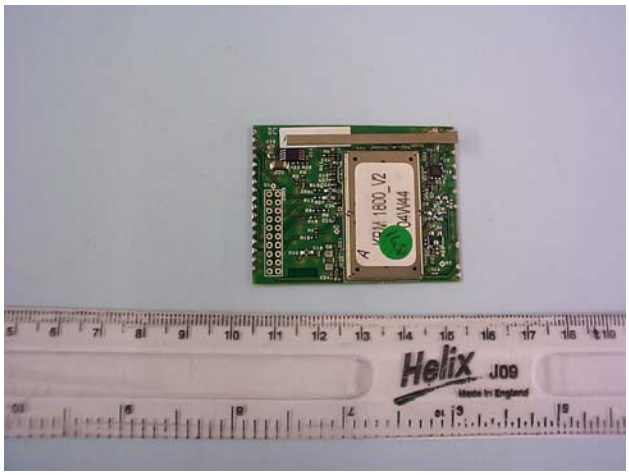
PHOTOGRAPH No. 7 **MAIN PCB LCD SIDE RF MODULE REMOVED**



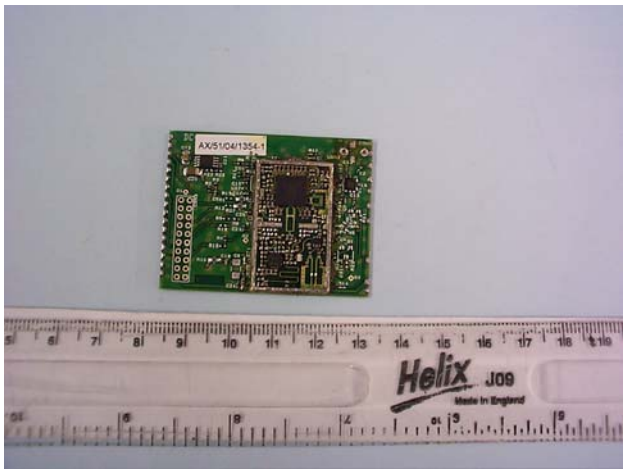
PHOTOGRAPH No. 8 **RF MODULE TRACK SIDE**



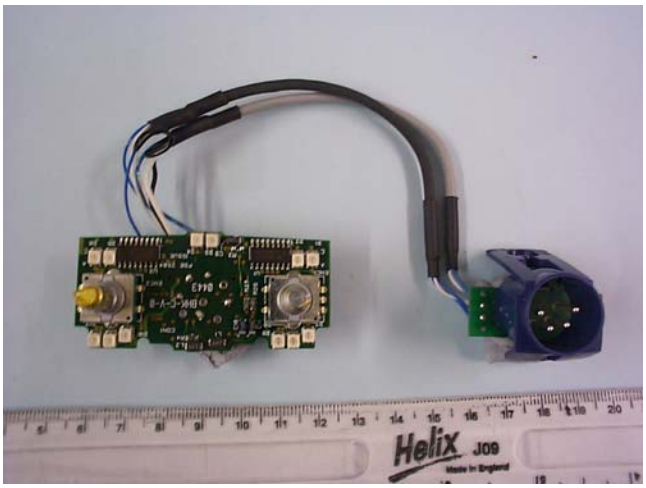
PHOTOGRAPH No. 9 **RF MODULE COMPONENT SIDE**



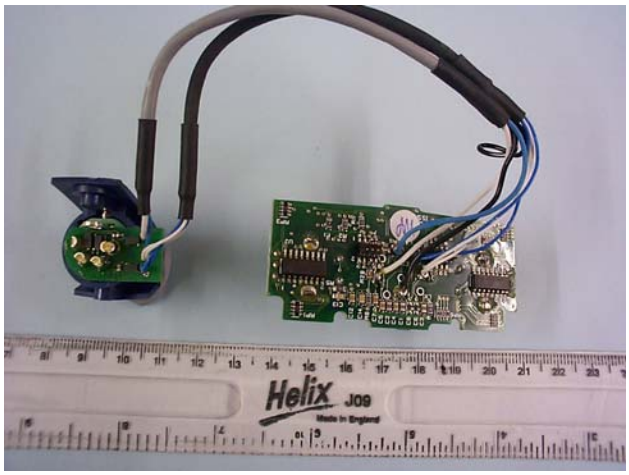
PHOTOGRAPH No. 10 **RF MODULE COMPONENT SIDE CAN REMOVED**



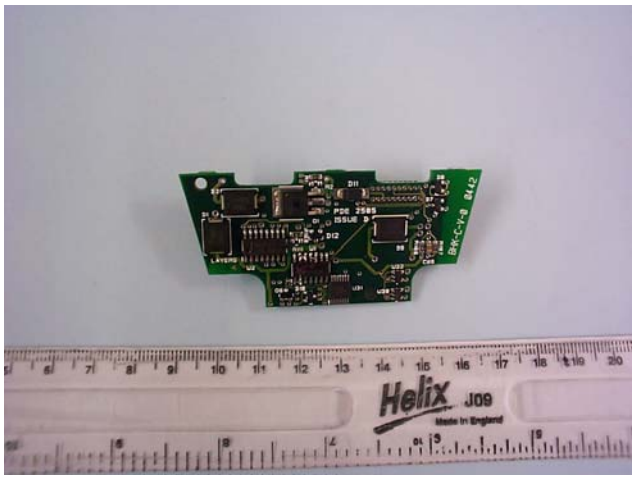
PHOTOGRAPH No. 11 **VOLUME CONTROL PCB TRACK SIDE**



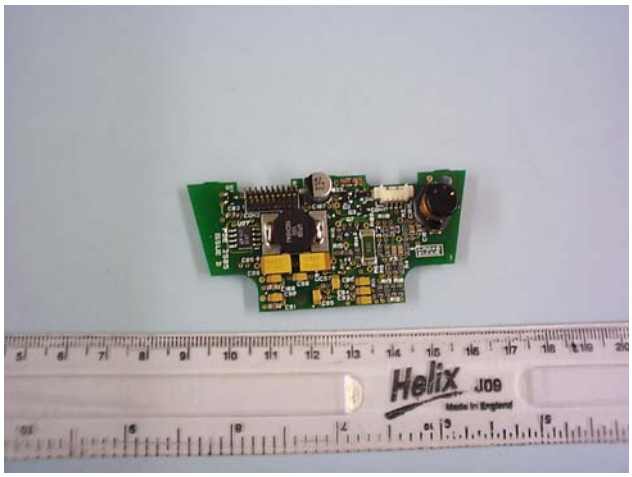
PHOTOGRAPH No. 12 **VOLUME CONTROL PCB COMPONENT SIDE**



PHOTOGRAPH No. 13 **POWER SUPPLY PCB TRACK SIDE**



PHOTOGRAPH No. 14 **POWER SUPPLY 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 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

AC POWERLINE CONDUCTION

Powerline Conduction

09 Sep 2005 10:08

150kHz - 30MHz

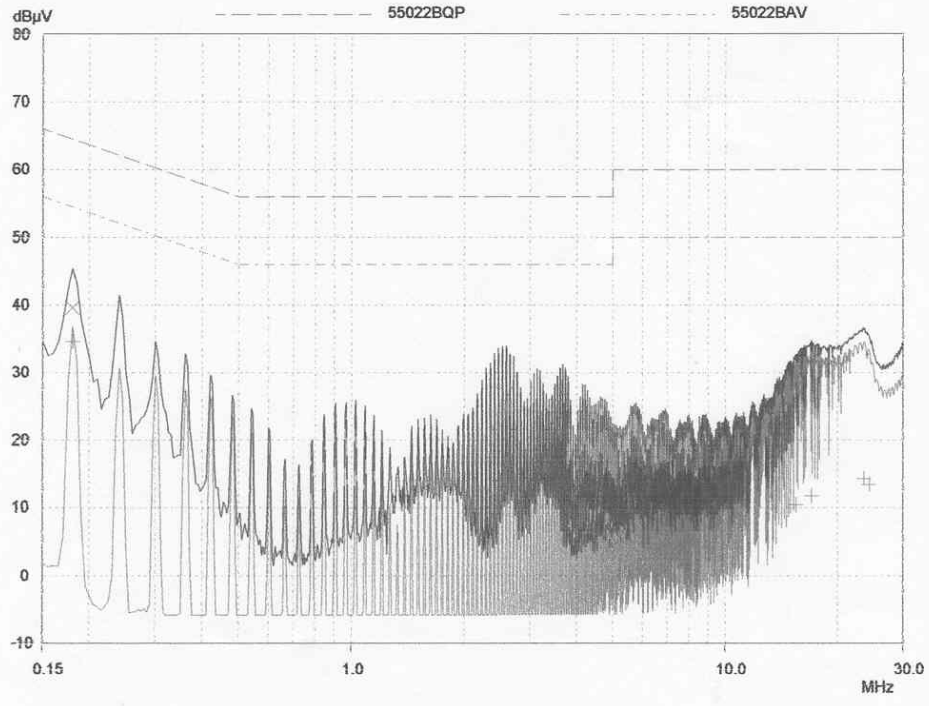
EUT:	Beltpack
Manuf:	Vitec
Op Cond:	LISN UH195, cable UH21 & Receiver UH03
Operator:	D Winstanley
Test Spec:	EN55022 Class B (or Variant)
Comment:	Unit off charging battery.
	110Vac Live Line

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK+AV	50msec	Auto	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	UH21

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	2sec
	Subranges:	25
	Acc Margin:	20 dB



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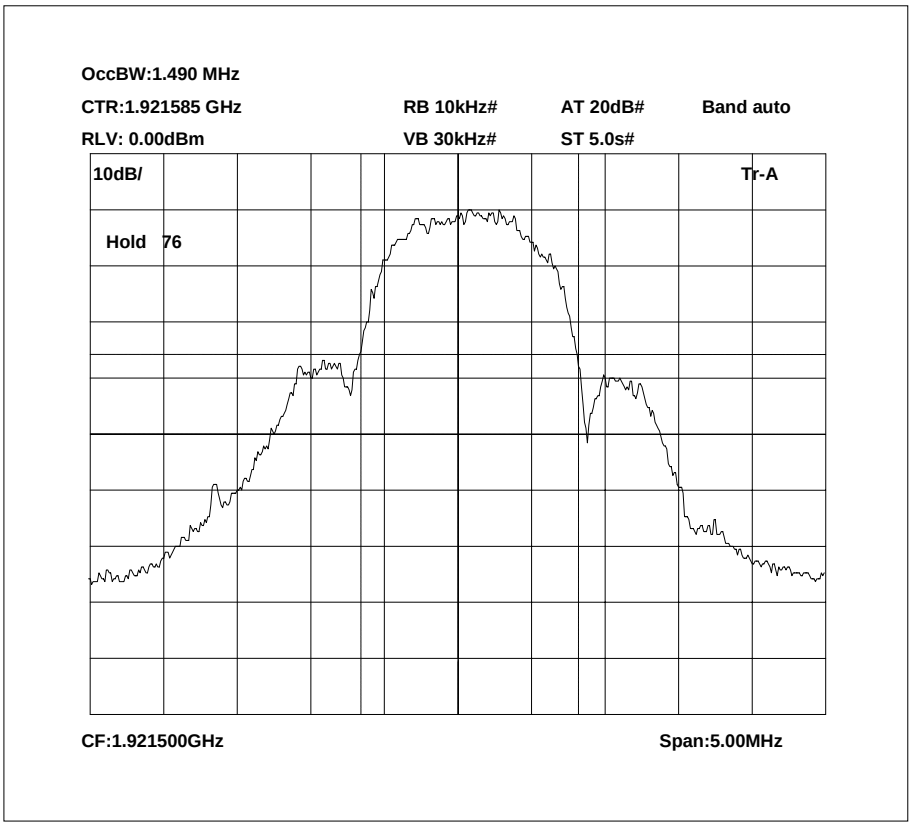
ANNEX D

EMISSION BANDWIDTH

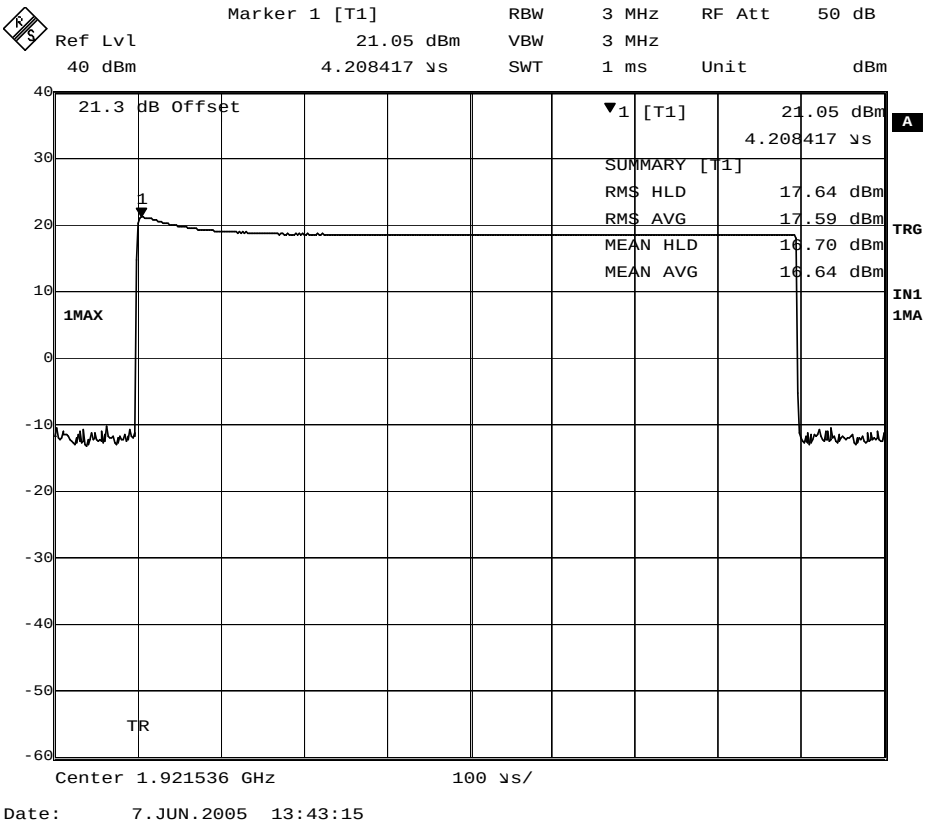
EMISSION BANDWIDTH



ANNEX E

PEAK TRANSMIT POWER

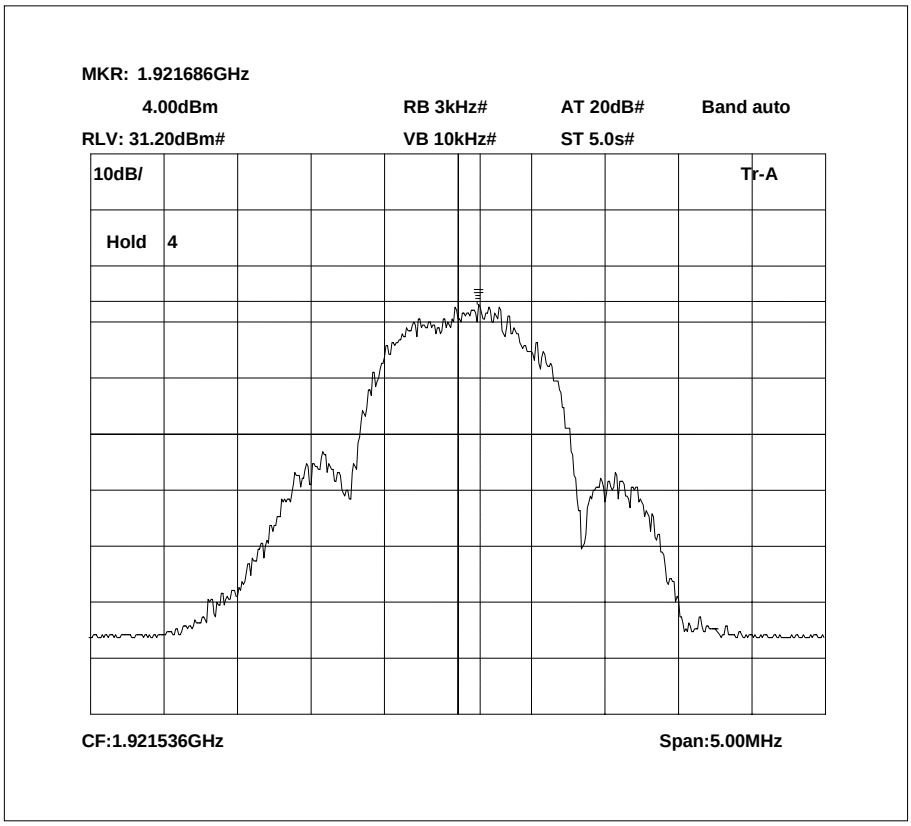
PEAK TRANSMIT POWER



ANNEX F

POWER SPECTRAL DENSITY

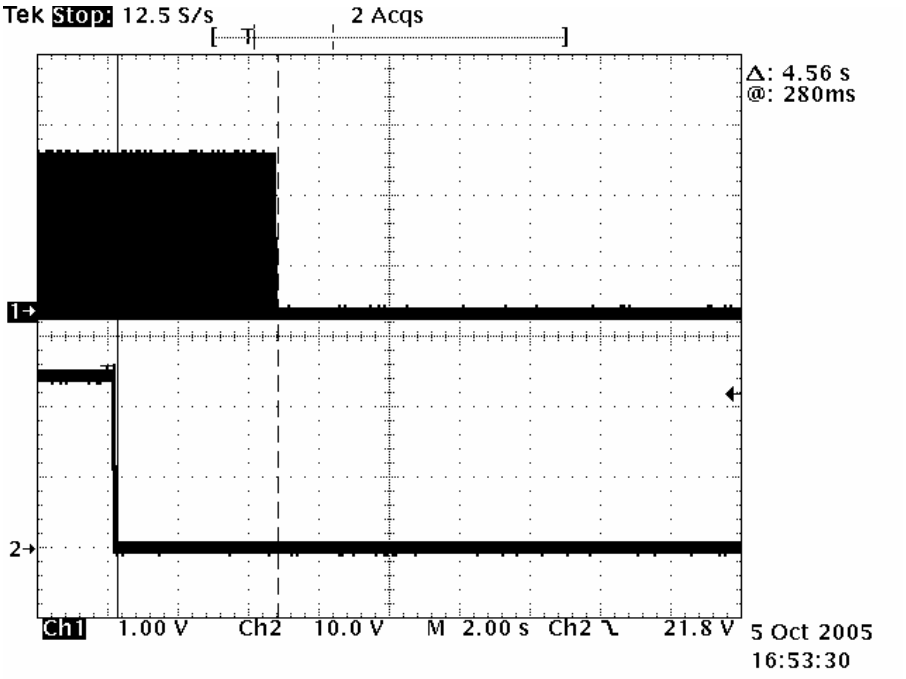
POWER SPECTRAL DENSITY



ANNEX G

CONNECTION ACKNOWLEDGEMENT

CONNECTION ACKNOWLEDGEMENT



EUT Cease of transmission

Power off on companion device

ANNEX H

EMISSIONS INSIDE AND OUTSIDE THE SUB-BAND – RADIATED

EUT SET TO CHANNEL NEAREST LOWER EDGE OF BAND

TRL Compliance Services Ltd

01 Sep 2005 11:07

E-Field Radiation (30MHz-1GHz)

EUT:	Beltpack
Manuf:	Vitec
Op Cond:	PreScan
Operator:	D Winstanley
Test Spec:	EN55022
Comment:	Unit on bottom channel. Coms with Base unit. Headphones connected. battery powered.
	RX Antenna Vertical

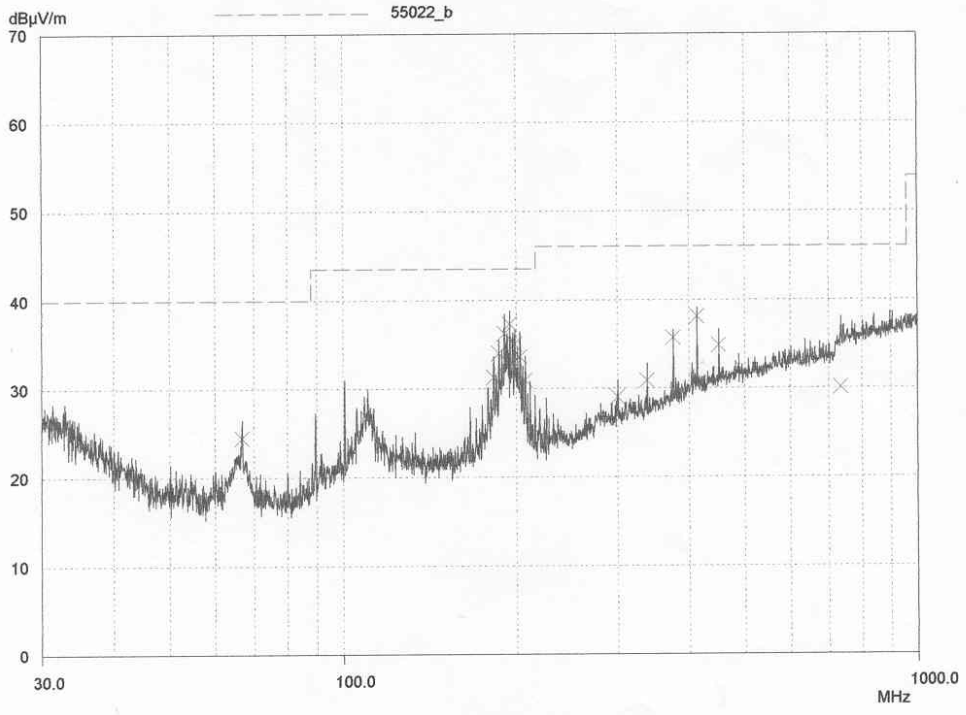
Scan Settings (1 Range)

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



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EUT SET TO CHANNEL NEAREST UPPER EDGE OF BAND

TRL Compliance Services Ltd

01 Sep 2005 10:53

E-Field Radiation (30MHz-1GHz)

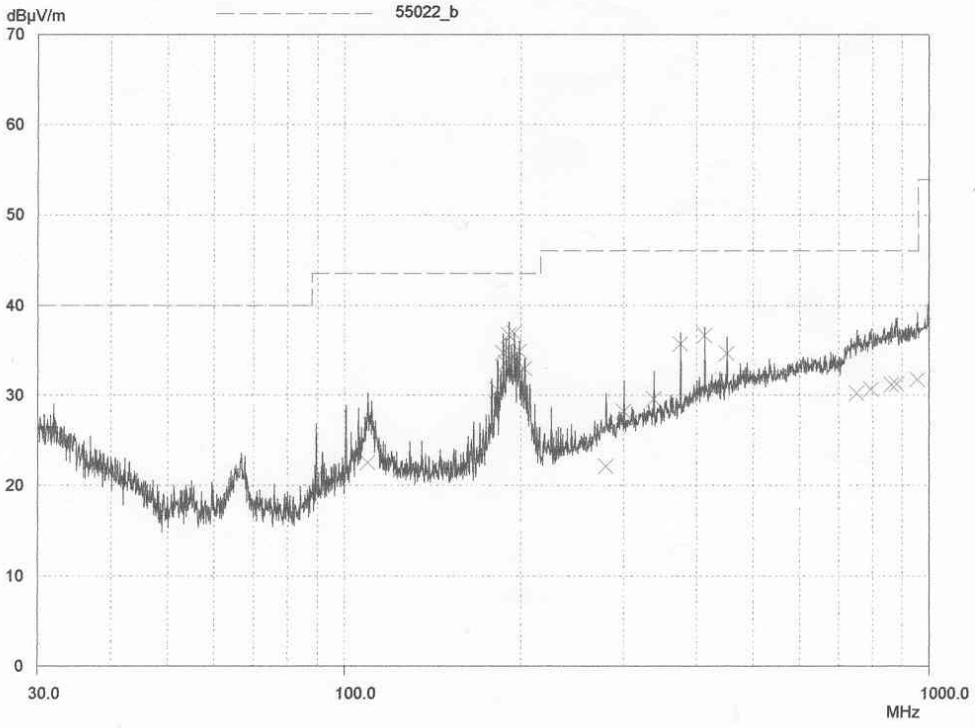
EUT:	Beltpack
Manuf:	Vitec
Op Cond:	PreScan
Operator:	D Winstanley
Test Spec:	EN55022
Comment:	Unit on top channel. Coms with Base unit. Headphones connected. battery powered.
	RX Antenna Vertical

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



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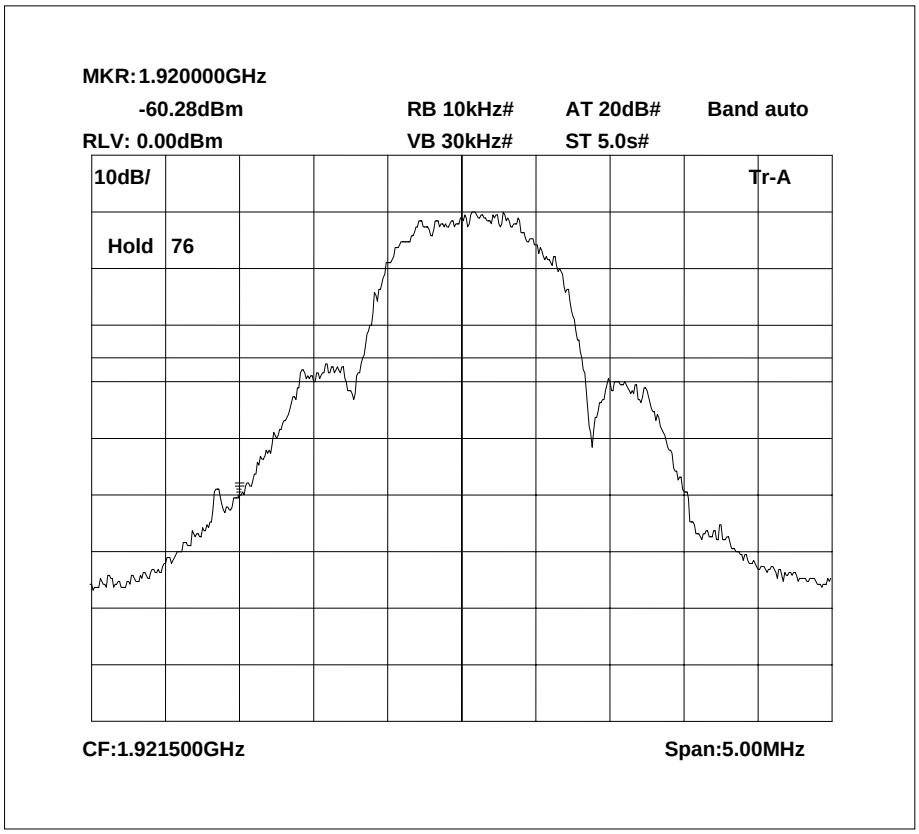
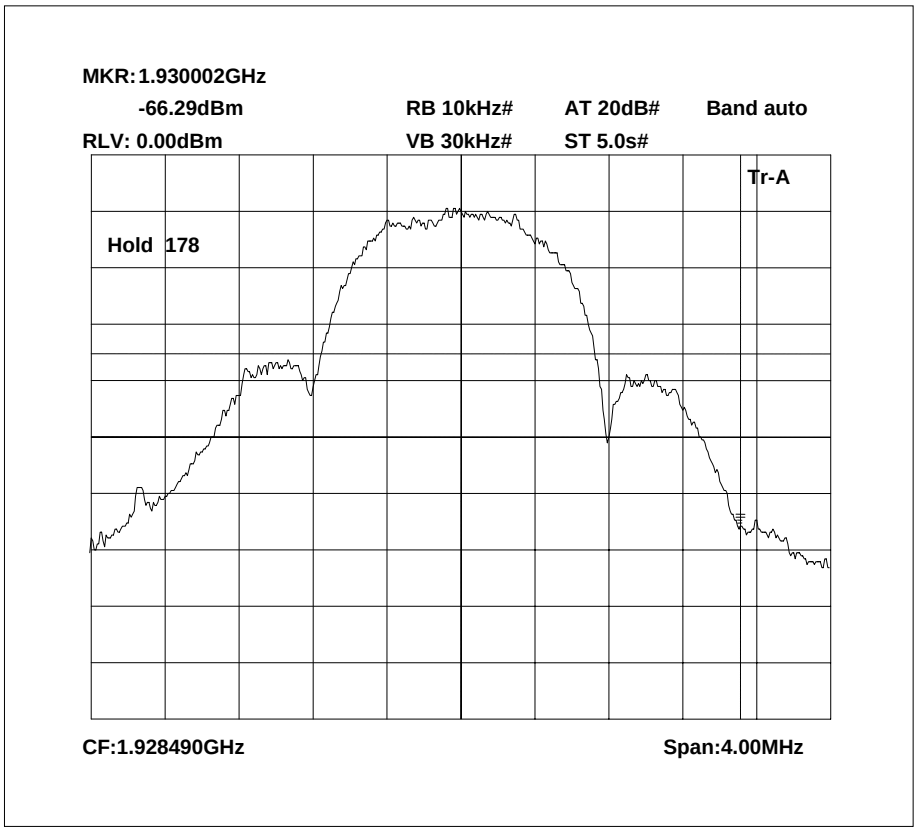
ANNEX I

BANDEDGE COMPLIANCE

LOWER BANDEDGE COMPLIANCE



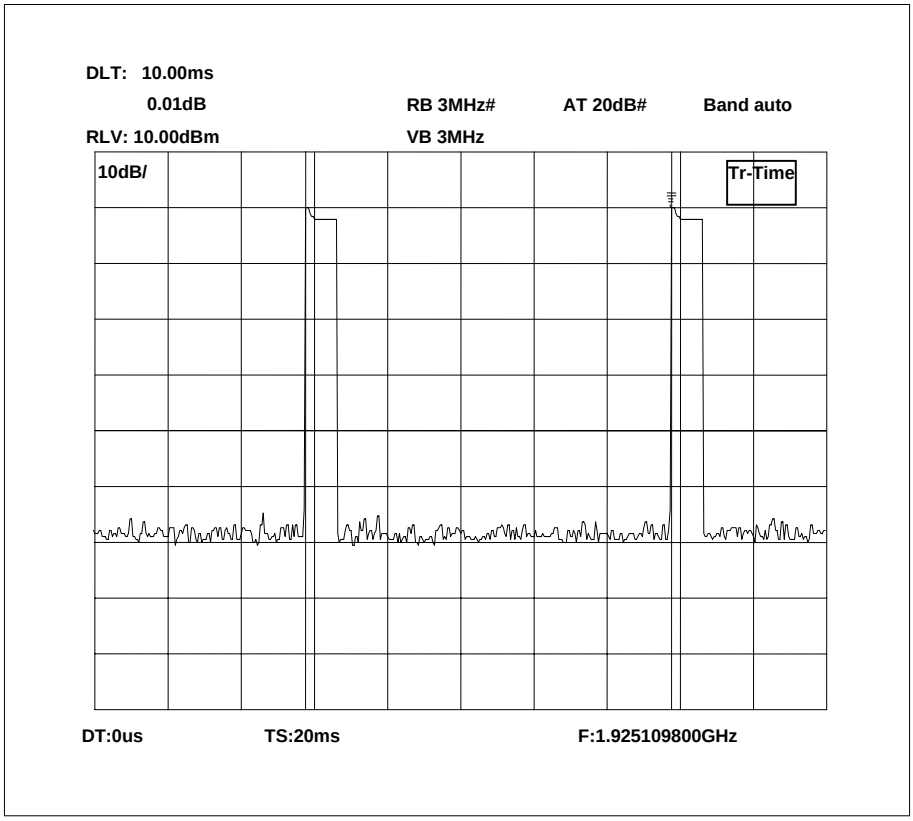
UPPER BANDEDGE COMPLIANCE



ANNEX J

FRAME PERIOD

FRAME PERIOD



ANNEX K

EQUIPMENT CALIBRATION

UH006	3m Range ERP CAL	TRL	01/03/2005	12	01/03/2006
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	14/12/2004	12	14/12/2005
UH120	Spectrum Analyser	Marconi	15/03/2005	12	15/03/2006
UH122	Oscilloscope	Tektronix	07/06/2005	24	07/06/2007
UH162	ERP Cable Cal	TRL	23/05/2005	12	23/05/2006
UH179	Power Sensor	Marconi	14/12/2004	12	14/12/2005
UH228	Power Sensor	Marconi	17/01/2005	12	17/01/2006
UH253	1m Cable N type	TRL	10/01/2005	12	10/01/2006
UH254	1m Cable N type	TRL	10/01/2005	12	10/01/2006
UH265	Notch filer	Telonic	24/06/2005	12	24/06/2006
L005	CMTA	R&S	22/10/2004	12	22/10/2005
L007	Loop Antenna	R&S	29/03/2005	24	29/03/2007
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	31/01/2005	12	31/01/2006
L193	Bicone Antenna	Chase	12/10/2003	24	12/10/2005
L203	Log Periodic Ant	Chase	21/10/2003	24	21/10/2005
L254	Signal Generator	Marconi	13/12/2004	12	13/12/2005
L280	18GHz Cable	Rosenberger	10/01/2005	12	10/01/2006
L343	CCIR Noise Filter	TRL	07/06/2005	12	07/06/2006
L426	Temperature Indicator	Fluke	14/12/2004	12	14/12/2005
L478	Signal Generator	R&S	19/05/2004	12	19/05/2005
L479	Analyser	Anritsu	05/10/2004	12	05/10/2005
L552	Signal Generator	Agilent	25/04/2005	12	25/04/2006