

TEST REPORT NO: RU1227/6911
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**REPORT ON THE CERTIFICATION TESTING OF A
VITEC GROUP COMMUNICATIONS
CELLCOM BELTPACK
WITH RESPECT TO
THE FCC RULES CFR 47, PART 15D February 2006
INTENTIONAL RADIATOR SPECIFICATION**

TEST DATE: 14th – 22nd March 2006

Daniel Winstanley

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24th April 2006

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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 February 2006

TEST RESULT: Compliant to Specification

EQUIPMENT UNDER TEST: CellCom Beltpack

EQUIPMENT SERIAL No: 3327 (radiated testing) & 3330 (conducted / etiquette testing)

EQUIPMENT TYPE: UPCS Transceiver

PRODUCT USE: Personal communications

CARRIER POWER: 16.66 dBm (conducted)

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): 14th – 22nd March 2006

ORDER No(s): 167952/1

APPLICANT: Vitec Group Communications

ADDRESS: 7400 Beach Drive
Cambridge Research Park
Cambridge
CB5 9TP

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APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	CellCom Beltpack
EQUIPMENT TYPE:	UPCS Transceiver
SERIAL NUMBER OF EUT:	3327 (radiated testing) & 3330 (conducted / etiquette testing)
PURPOSE OF TEST:	Certification
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 15D February 2006
TEST RESULT:	COMPLIANT Yes [X] No []
APPLICANT'S CATEGORY:	MANUFACTURER [X] IMPORTER [] DISTRIBUTOR [] TEST HOUSE [] AGENT []
APPLICANT'S ORDER No(s):	167952/1
APPLICANT'S CONTACT PERSON(s):	Mr Jiou-pahn Lee
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TEST LABORATORY:	TRL Compliance Ltd
UKAS ACCREDITATION No:	0728
TEST DATE(s):	14 th – 22 nd February 2006
TEST REPORT No:	RU1227/6911

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 4 th 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°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	☒
8.	Channel spacing:	Narrowband	☐
		Wideband	☒

9. System Description:

The system is made up of two parts, a fixed part and a portable part. The portable part is a belt-pack 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. A temporary antenna connector was used to allow conducted measurements.

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)
0.185	32.36	Average	Live	54.49

Notes:

- 1 See attached plot. Annex C.
- 2 Emissions that are 20 dB's or more below 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.

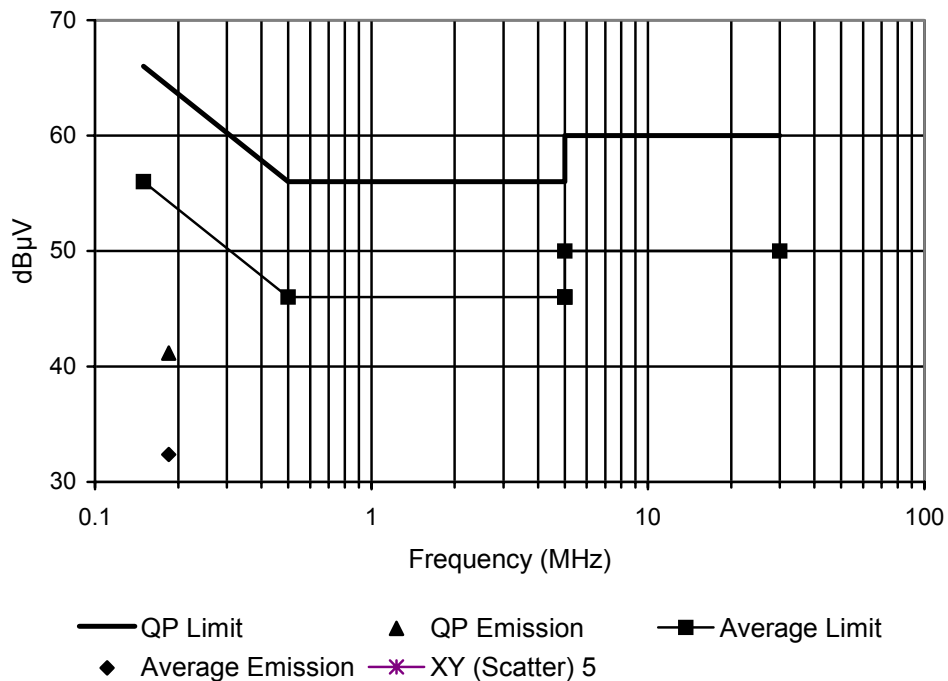
Test Method:

- 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

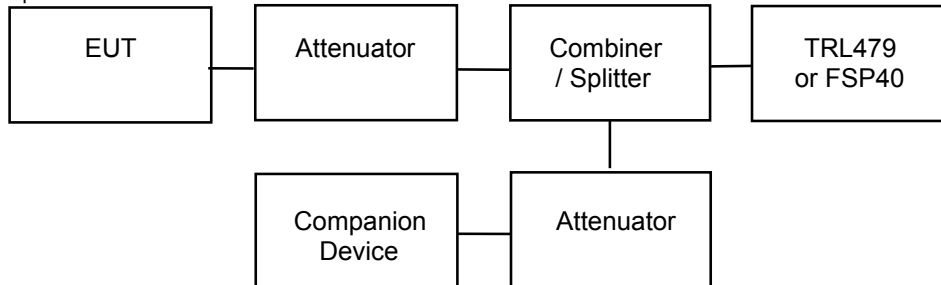
Quasi Peak Limit Part 15.107
(Levels below the limit are only displayed if within 20dB of the limit)



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:



$f_x = 1921.536 \text{ MHz}$				
$\Delta P \text{ (dBc)}$	$f_l \text{ (MHz)}$	$f_h \text{ (MHz)}$	$\Delta f \text{ (MHz)}$	Limit
-26	1920.816	1922.304	1.488	50kHz > Δf > 2.5MHz
-12	1920.966	1922.094	1.128	N/A
-6	1921.122	1921.986	0.864	N/A

$f_x = 1924.992 \text{ MHz}$				
$\Delta P \text{ (dBc)}$	$f_l \text{ (MHz)}$	$f_h \text{ (MHz)}$	$\Delta f \text{ (MHz)}$	Limit
-26	1924.272	1925.742	1.470	50kHz > Δf > 2.5MHz
-12	1924.434	1925.574	1.140	N/A
-6	1924.632	1925.328	0.696	N/A

$f_x = 1928.448 \text{ MHz}$				
$\Delta P \text{ (dBc)}$	$f_l \text{ (MHz)}$	$f_h \text{ (MHz)}$	$\Delta f \text{ (MHz)}$	Limit
-26	1927.732	1929.260	1.494	50kHz > Δf > 2.5MHz
-12	1927.870	1929.064	1.194	N/A
-6	1928.002	1928.926	0.924	N/A

Note: See emission bandwidth plot for 1928.448 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

$$EBW = 1.490 \text{ MHz}$$
$$PTP = 100\mu W \times \sqrt{1.494} \text{ MHz}$$
$$PTP = 20.8 \text{ dBm}$$

Results

Frequency (MHz)	Peak Transmit Power (dBm)	Limit (dBm)
1921.536	16.27	20.8
1924.992	16.22	20.8
1928.448	16.66	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 1928.448 MHz 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 Spectral Density (mW/3kHz)	Limit (mW/3kHz)
1921.536	1.35	3
1924.992	1.49	3
1928.448	2.01	3

Note:

1. See Annex F for 1928.448 MHz 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 fixed 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 tests were performed after a connection had 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	Battery charger connected to PCB	C	Pass
4	Power/Signal cable removed counter part (Active Antenna)	A	Pass
5	Power removed from Counter part (Base)	A	Pass
6	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 in a separate document

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

The monitoring threshold calculations are carried out in accordance with ANSI C63.17 sub-clause 7.2.1 using the calculations laid out in ANSI C63.17 sub-clauses 4.3.3 and 4.3.4

Calculation of monitoring threshold limits for isochronous devices:

$$\text{Lower threshold: } T_L = -174 + 10\log_{10}B + M_U + P_{MAX} - P_{EUT} \text{ (dBm)}$$

$$\text{Upper threshold: } T_U = -174 + 10\log_{10}B + M_U + P_{MAX} - P_{EUT} \text{ (dBm)}$$

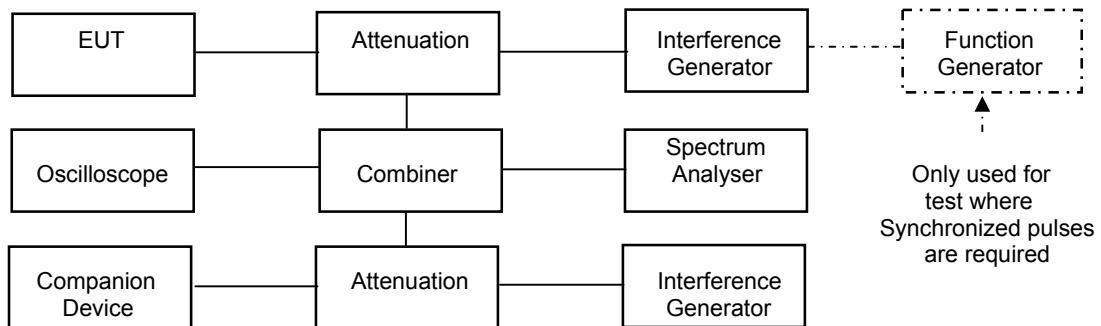
Where:
 B = Emission bandwidth (Hz)
 M_U = dBs the threshold may exceed thermal noise (30 for T_L & 50 for T_U)
 P_{MAX} = Output Power Limit (dBm)
 P_{EUT} = Transmitted power (dBm)

Monitor Threshold	B (MHz)	M_U (dB)	P_{MAX} (dBm)	P_{EUT} (dBm)	Threshold (dBm)
T_L	1.49	30	20.8	16.66	-78.1
T_U	1.49	50	20.8	16.66	-58.1

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

The monitoring threshold tests are carried out in accordance with ANSI C63.17 sub-clause 7.3 using the test setup 2. The lower threshold level was determined following the procedure as laid out in ANSI C63.17 sub-clause 7.3.1 (a) Frequency administration was used to allow operation on the carrier closest to the centre of the band.

Test Setup 2:



Limits

The EUT must not transmit until the interference level is less than or equal to:

$$\text{Measured Threshold Level} \leq T_L + U_M$$

Where:
 T_L = Lower threshold level
 U_M = Margin of uncertainty in threshold measurements (6dB)

Results

Monitor threshold	Measured Threshold Level	Limit
Lower Threshold (dBm)	-76.6	-72.1
Upper threshold (dBm)	N/A	N/A

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 the largest of $50\mu\text{s}$ and $50\sqrt{1.25/B}$ 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 the largest of $35\mu\text{s}$ and $35\sqrt{1.25/B}$ 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 the largest of $75\mu\text{s}$ and $75\sqrt{1.25/B}$ 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
$50\sqrt{1.25/B}$	50	Calculated	No	No	No
$35\sqrt{1.25/B}$	35	Calculated + 6	No	No	No
$75\sqrt{1.25/B}$	75	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 using test setup 2.(page12)

ANSI C63.17 sub-clause 7.4 states that if the monitoring is made through the radio receiver used by the EUT for communication the intended monitoring bandwidth requirements met.

As declared by the manufacturer the EUT uses the radio receiver used for communication for monitoring the intended monitoring bandwidth therefore requirements of ANSI C63.17 sub-clause 7.4 are met.

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	<2 Hours	<8 Hours
Second	<2 Hours	<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 7.3.3 using test setup 2.(page 12)

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

f1 = 1924.992 MHz
f2 = 1923.264 MHz

Test b)

Interference on f1 was set at $T_L + U_M + 7\text{dB}$ and at $T_L + U_M$ on f2. Initiate communication. The EUT should transmit on f2. Repeat 5 times. If the EUT transmits on f1 the test is failed.

Test c)

Interference on f1 was set at $T_L + U_M$ and at $T_L + U_M + 7\text{dB}$ on f2. Initiate communication. The EUT should transmit on f1. Repeat 5 times. If the EUT transmits on f2 the test is failed.

Test d)

Interference on f1 was set at $T_L + U_M + 1\text{dB}$ and at $T_L + U_M - 6\text{dB}$ on f2. Initiate communication. The EUT should transmit on f2. Repeat 5 times. If the EUT transmits on f1 the test is failed.

Test e)

Interference on f1 was set at $T_L + U_M - 6\text{dB}$ and at $T_L + U_M + 7\text{dB}$ on f2. Initiate communication. The EUT should transmit on f1. Repeat 5 times. If the EUT transmits on f2 the test is failed.

Result

Test	Transmit on f1	Transmit on f2	Wanted Transmit Channel	Pass/Fail
b	No	Yes	f2	Pass
c	Yes	No	f1	Pass
d	No	Yes	f2	Pass
e	Yes	No	f1	Pass

Note: 1. All tests were repeated 5 times.

Selected Channel Confirmation

This test was carried out in accordance with ANSI C63.17 sub-clause 7.3.4 using test setup 2 (page 12). The test is to ensure the EUT monitors the time/spectrum window immediately prior to transmission.

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

f1 = 1924.992 MHz
f2 = 1923.264 MHz

Test a)

Interference is applied on f1 at a level of $T_L + U_M$, verify a connection is established on f2.

The connection is terminated.

Test b)

Interference is applied on f2 at a level of $T_L + U_M$ and immediately removed from f1 and the EUT is immediately caused to attempt transmission. In this case the EUT should transmit on f1

Result

Test	Transmit on f1	Transmit on f2	Wanted Transmit Channel	Pass/Fail
a	No	Yes	f2	Pass
b	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 8.3.1 using test setup 2.(page12)

Before all tests are carried out any connection is terminated.

Test b)

The system is restricted to operation on one frequency (1924.992 MHz) using administration. Verify that a connection between the EUT and its companion device can be made.

Test c) & d)

Apply interference at a level $T_L + U_M$ to all transmit time slots and to all but one receive time slots.

The EUT should not establish a connection.

Test e) & f)

Apply interference at a level $T_L + U_M$ to all receive time slots and to all but one transmit time slots.

The EUT should not establish a connection.

Result

Test	Connection Made	Correct Time Slot	Required Slot	Pass/Fail
b	Yes	N/A	Any	Pass
c & d	No	N/A	N/A	Pass
e & f	No	N/A	N/A	Pass

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 8.4.

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.

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								
216MHz - 960MHz	337.50 (d)	26.70	2.15	13.95	42.8	-	138.03	200
	375.05 (d)	26.75	2.35	14.90	44.0	-	158.48	200
	393.80 (d)	19.10	2.40	15.50	37.0	-	70.79	200
	412.55 (d)	18.15	2.50	16.35	37.0	-	70.79	210
	450.05 (d)	20.78	2.70	16.52	40.0	-	100.00	200
	487.55 (d)	21.93	2.70	17.07	41.7	-	121.62	200
	525.05 (d)	21.43	2.80	17.67	41.9	-	124.45	200
	562.55 (d)	14.59	2.91	18.50	36.0	-	63.09	200
	600.05 (d)	15.90	3.10	19.00	38.0	-	79.43	200
	876.05 (d)	12.60	3.80	20.60	37.0	-	70.79	200
960MHz - 1GHz								
1GHz - 20GHz	3843.076	38.17	2.45	32.35	72.97	20	445.14	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 210µV/m @ 10m					
	960MHz to 1GHz		500µV/m @ 3m					
	1GHz to 20GHz		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.
- (d) Indicates emission due to digital circuitry not directly associated with the radio transmitter.
- 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.
- See annex H for scan plot 30MHz – 1GHz.
- See Annex I for conducted lower band edge compliance plot.
- (r) Indicates restricted band.

Test Method:

- As per Radio – Noise Emissions, ANSI C63.4: 2003.
- 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.

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

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								
216MHz - 960MHz	337.50 (d)	26.70	2.15	13.95	42.8	-	138.03	200
	375.05 (d)	26.75	2.35	14.90	44.0	-	158.48	200
	393.80 (d)	19.10	2.40	15.50	37.0	-	70.79	200
	412.55 (d)	18.15	2.50	16.35	37.0	-	70.79	210
	450.05 (d)	20.78	2.70	16.52	40.0	-	100.00	200
	487.55 (d)	21.93	2.70	17.07	41.7	-	121.62	200
	525.05 (d)	21.43	2.80	17.67	41.9	-	124.45	200
	562.55 (d)	14.59	2.91	18.50	36.0	-	63.09	200
	600.05 (d)	15.90	3.10	19.00	38.0	-	79.43	200
	876.05 (d)	12.60	3.80	20.60	37.0	-	70.79	200
960MHz - 1GHz								
1GHz - 20GHz	3856.984	37.18	2.45	32.35	71.98	20	397.19	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 210µV/m @ 10m					
	960MHz to 1GHz		500µV/m @ 3m					
	1GHz to 20GHz		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.
- (d) Indicates emission due to digital circuitry not directly associated with the radio transmitter.
- 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.
- See annex H for scan plot 30MHz – 1GHz.
- See Annex I for conducted lower band edge compliance plot.
- (r) Indicates restricted band.

Test Method:

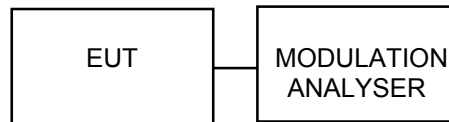
- As per Radio – Noise Emissions, ANSI C63.4: 2003.
- Measuring distances as Notes 1 to 4 above.
- EUT 0.8 metre above ground plane.
- Emissions maximised by rotation of EUT, on an automatic turntable.
Raising and lowering the receiver antenna between 1m & 4m.
Horizontal and vertical polarisations, of 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 tests is shown overleaf:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
TEMPERATURE CHAMBER	SHARTREE	TCC 125-815P	CS 203	11	
HORN ANTENNA	EMCO	3115	9010-3580	138	X
RESISTIVE COUPLER	ELCOM	RC-3-50	N/A	119	
RESISTIVE COUPLER	ELCOM	RC-4-50	N/A	170	
SIGNAL GENERATOR	MARCONI	2042	119388/080	176	
SIGNAL GENERATOR	MARCONI	2042	119562/021	254	
TEMPERATURE INDICATOR	FLUKE	52 Series II	74700044	426	
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	X
SIGNAL GENERATOR	HP	8341B	2819A02239	552	
RANGE 1	TRL	3 METRE	N/A	UH06	X
MULTIMETER	AVOMeter	M3004	M3270006	UH41	
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	X
OSCILLOSCOPE	TEKTRONIX	TDS520B	B020491	UH122	
POWER SUPPLY	MANSON	N/A	N/A	UH177	
RECEIVER	ROHDE & SCHWARZ	ESVS 10	841431/014	UH186	X
FUNCTION GENERATOR	WAVETEK	271	C6841078	UH221	
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSP 40	N/A	N/A	
MODULATION ANALYSER	ROHDE & SCHWARZ	CMD 60	N/A	N/A	

FRAME PERIOD 15.323 (e)

Frame repetition stability is tested according with ANSI C63.17 sub-clause 6.2.2. Frame period and jitter are tested in accordance with ANSI C63.17 sub-clause 6.2.3. 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 6.2.1 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 (°C)	Voltage (Vdc)	Fc (MHz)	offset (kHz)	offset (ppm)	Limit (ppm)
20	Vnom	1924.992	0	N/A	N/A
-20	Vnom	1924.988	-4kHz	-2.07	±10
+50	Vnom	1925.003	+11kHz	5.71	±10

ANNEX A
PHOTOGRAPHS

PHOTOGRAPH No. 1

TEST SETUP



PHOTOGRAPH No. 2

TRANSMITTER FRONT VIEW



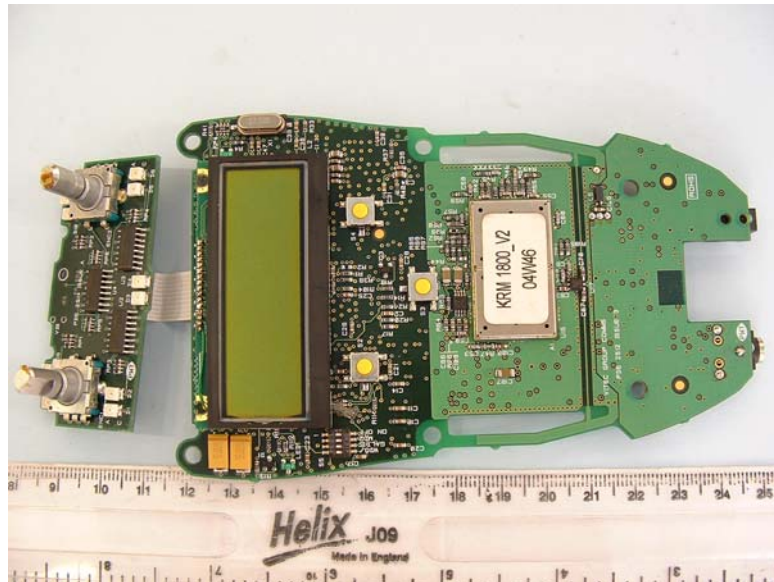
PHOTOGRAPH No. 3

TRANSMITTER REAR VIEW



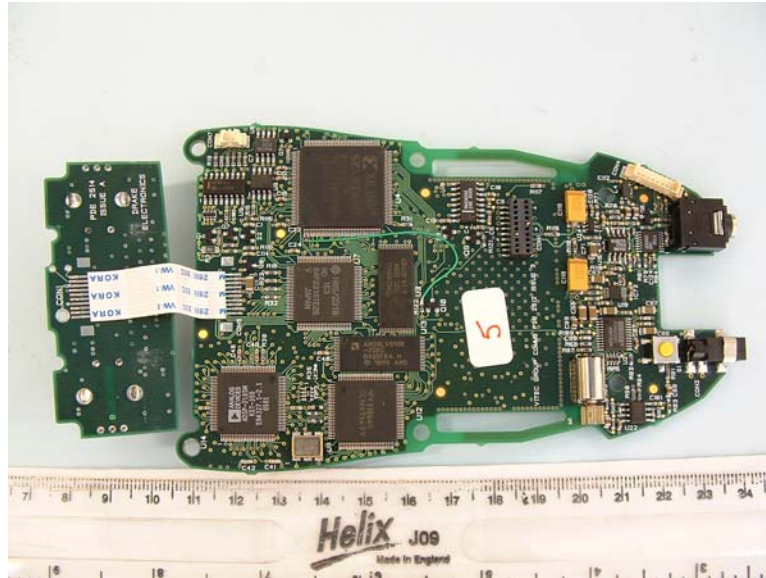
PHOTOGRAPH No. 4 TRANSMITTER REAR VIEW BATTERY REMOVED



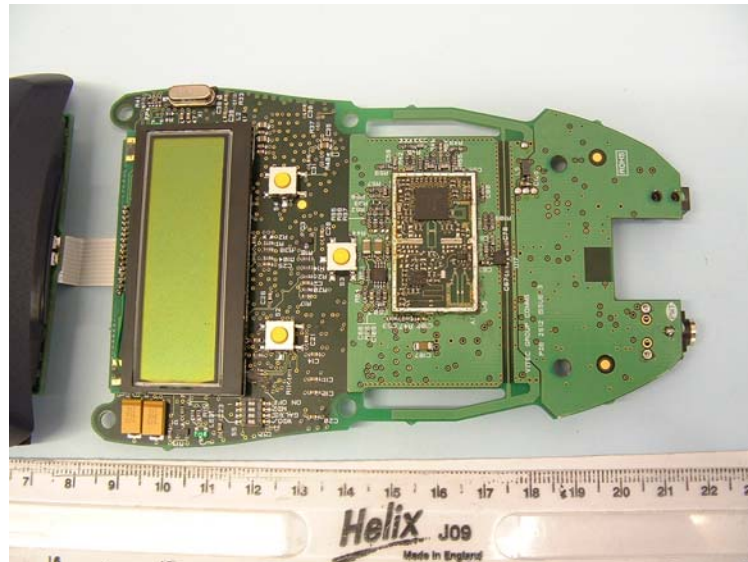


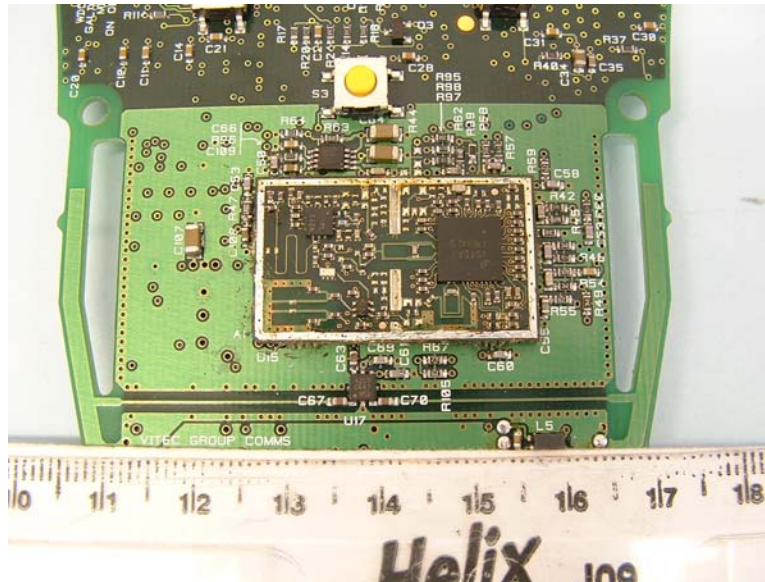
PHOTOGRAPH No. 6

MAIN PCB COMPONENT SIDE



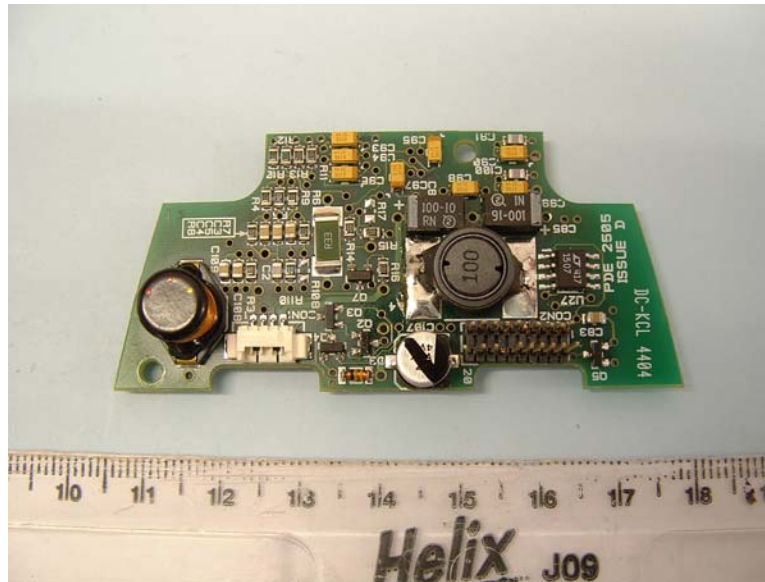
PHOTOGRAPH No. 7 **MAIN PCB LCD SIDE RF MODULE CAN REMOVED**

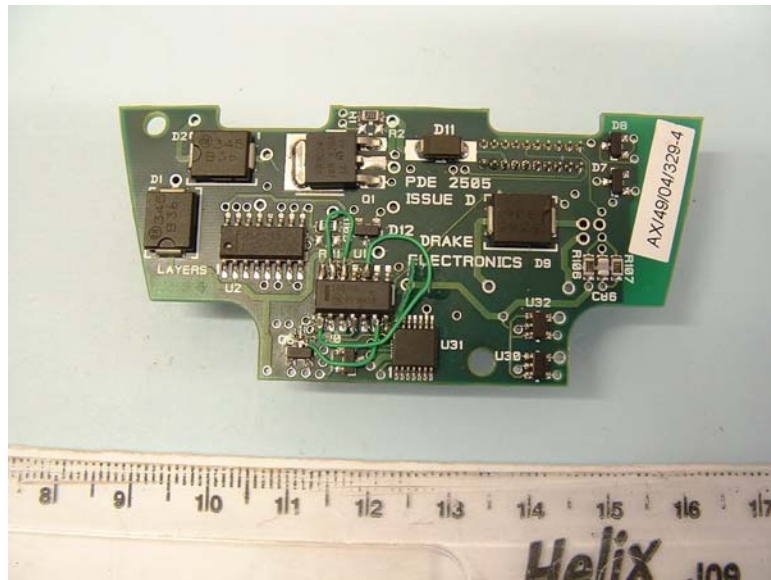




PHOTOGRAPH No. 9

POWER SUPPLY PCB TOP 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

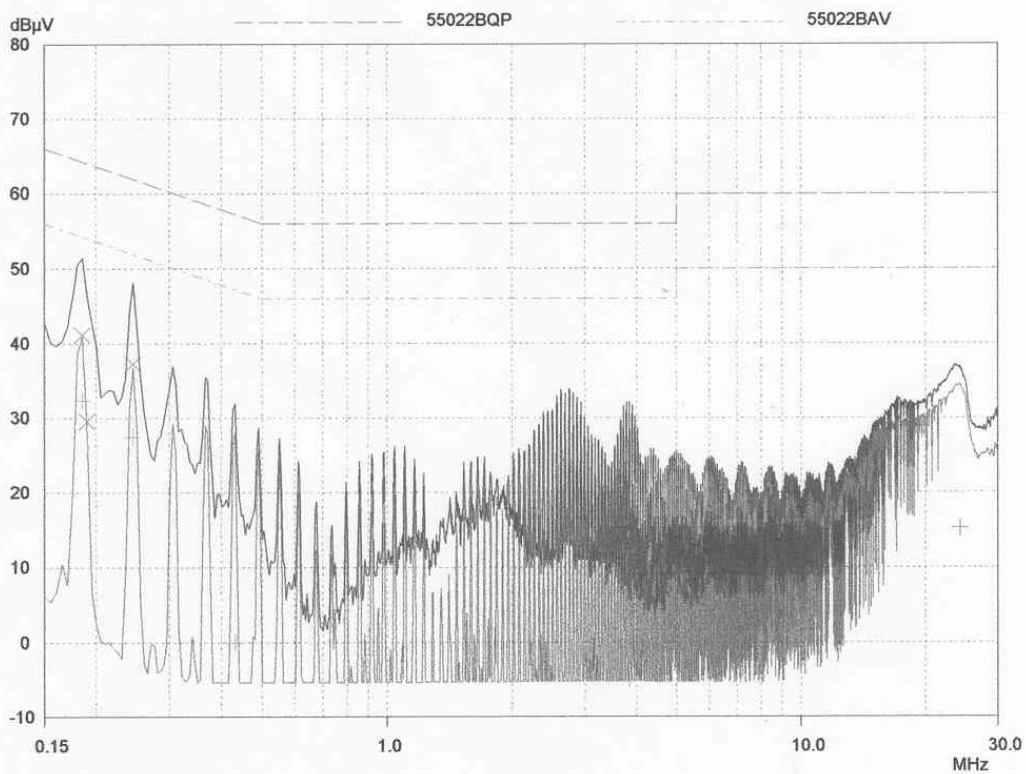
Powerline Conduction

20 Mar 2006 09:09

150kHz - 30MHz

EUT: Dect Belt Pack
 Manuf: Vitec
 Op Cond: LISN UH05, cable UH21 & Receiver UH187
 Operator: D Winstanley
 Test Spec: EN55022 Class B (or Variant)
 Comment: Live Line, 230V, 50Hz
 Belt pack in battery charge mode .Lisn live selected.

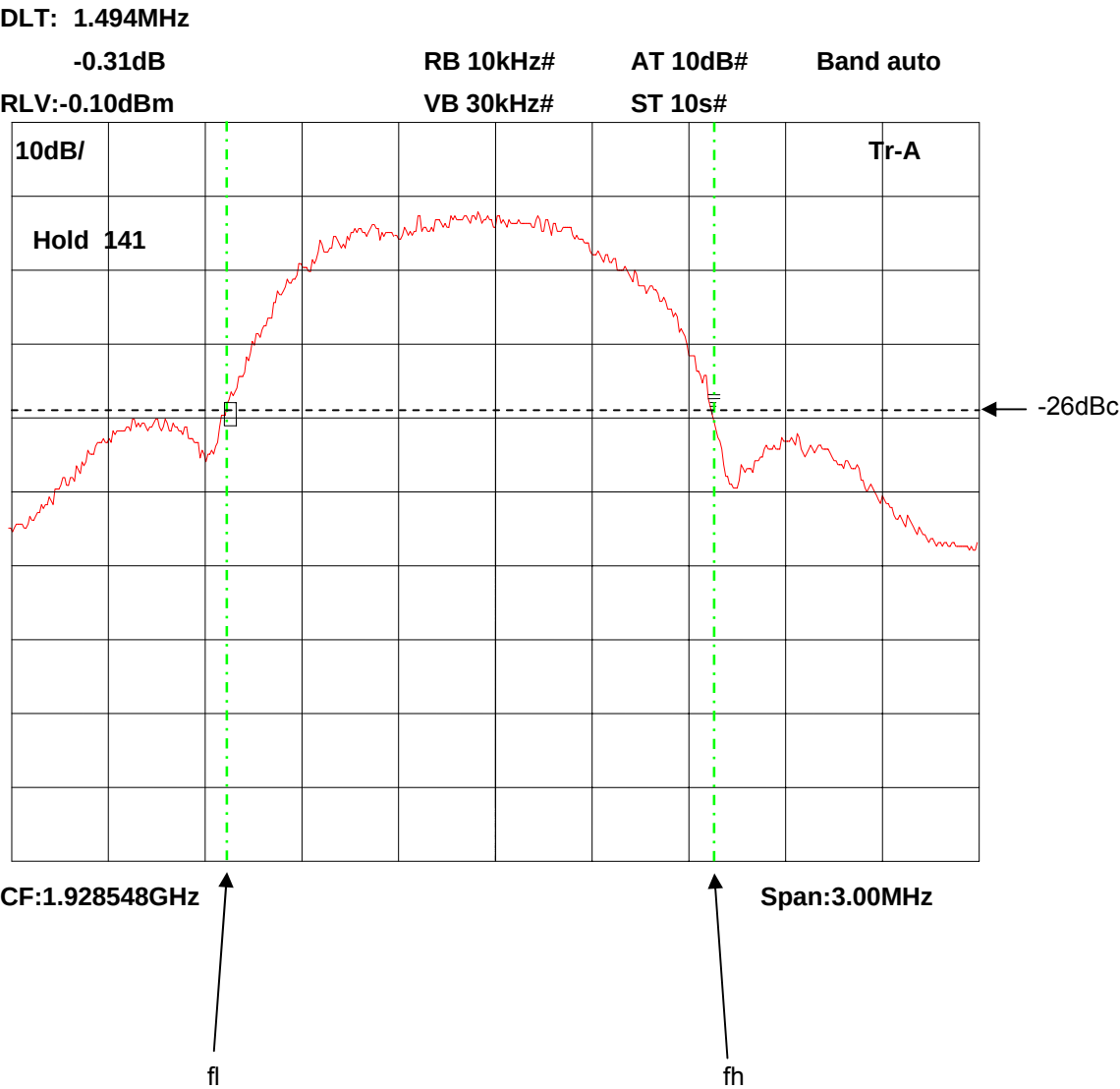
Scan Settings		(1 Range)		Receiver Settings					
Frequencies									
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge	
150kHz	30MHz	5kHz	10kHz	PK+AV	50msec	Auto	OFF	60dB	
Transducer	No.	Start	Stop	Name					
	1	150kHz	30MHz	UH21					
Final Measurement:		Detectors:	X QP / + AV						
		Meas Time:	2sec						
		Subranges:	25						
		Acc Margin:	20 dB						



PAGE 1

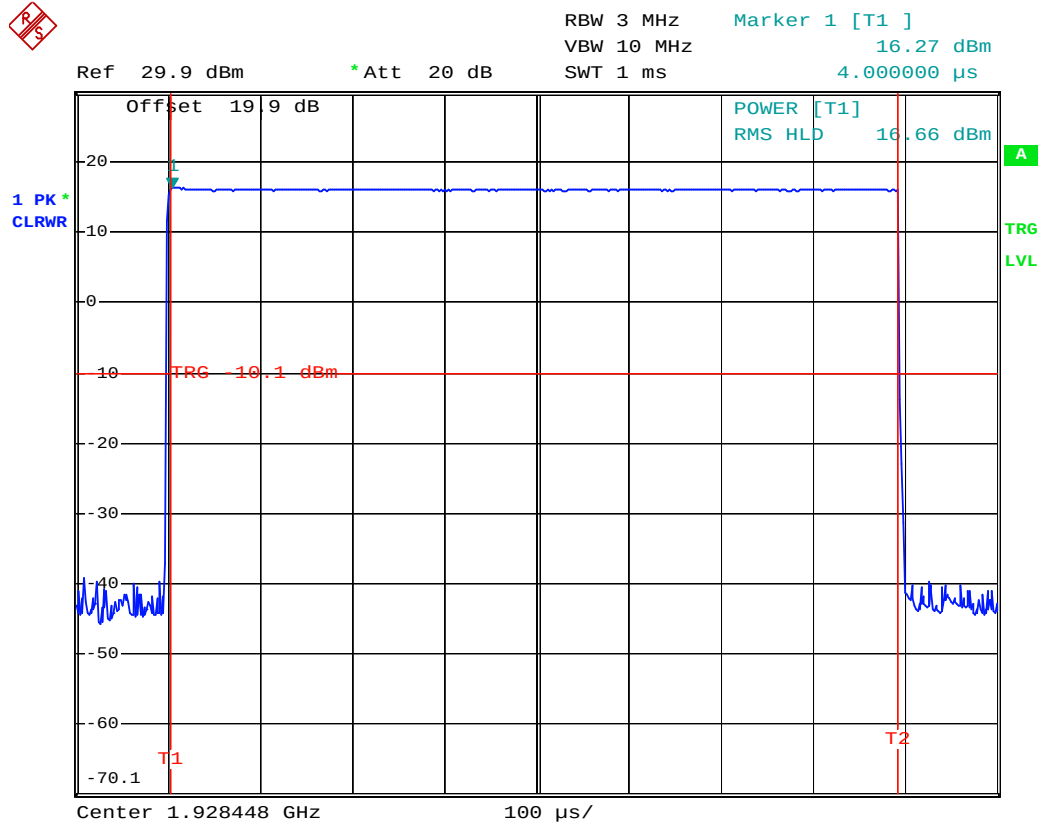
ANNEX D
EMISSION BANDWIDTH

EMISSION BANDWIDTH



ANNEX E
PEAK TRANSMIT POWER

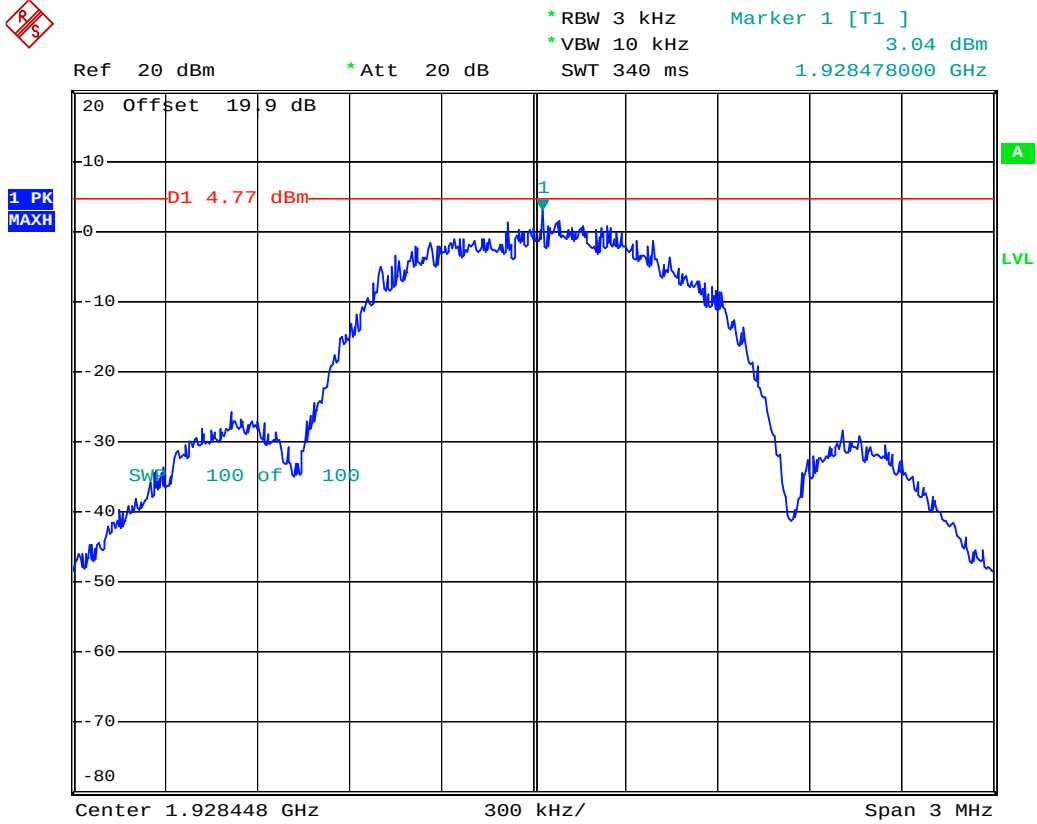
PEAK TRANSMIT POWER



Date: 15.MAR.2006 13:35:54

ANNEX F
POWER SPECTRAL DENSITY

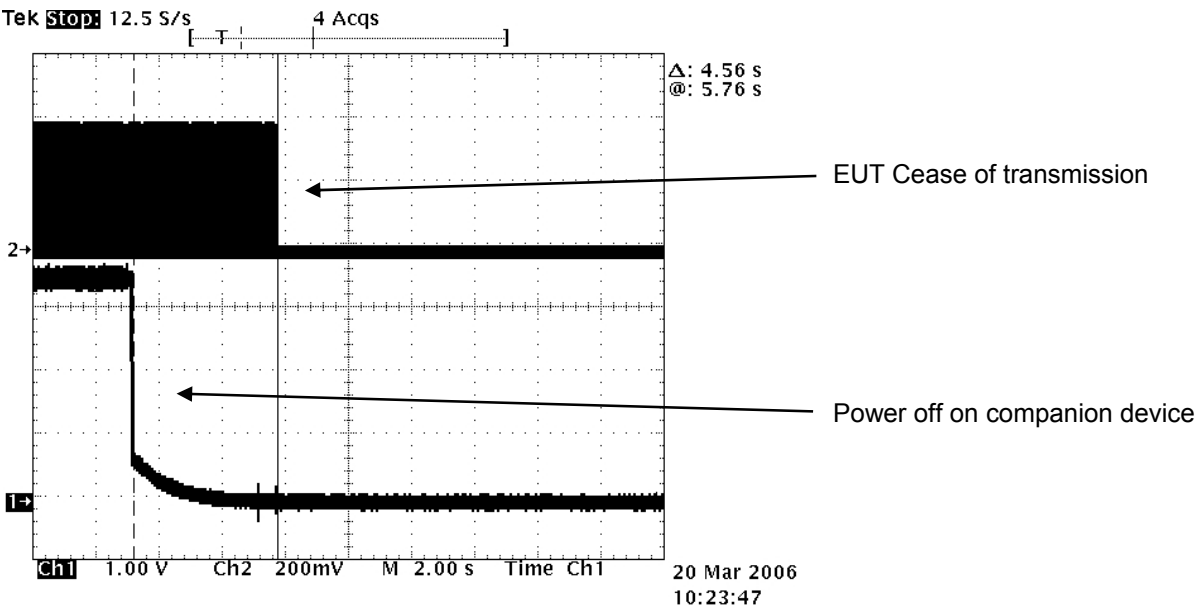
POWER SPECTRAL DENSITY



Date: 15.MAR.2006 14:58:52

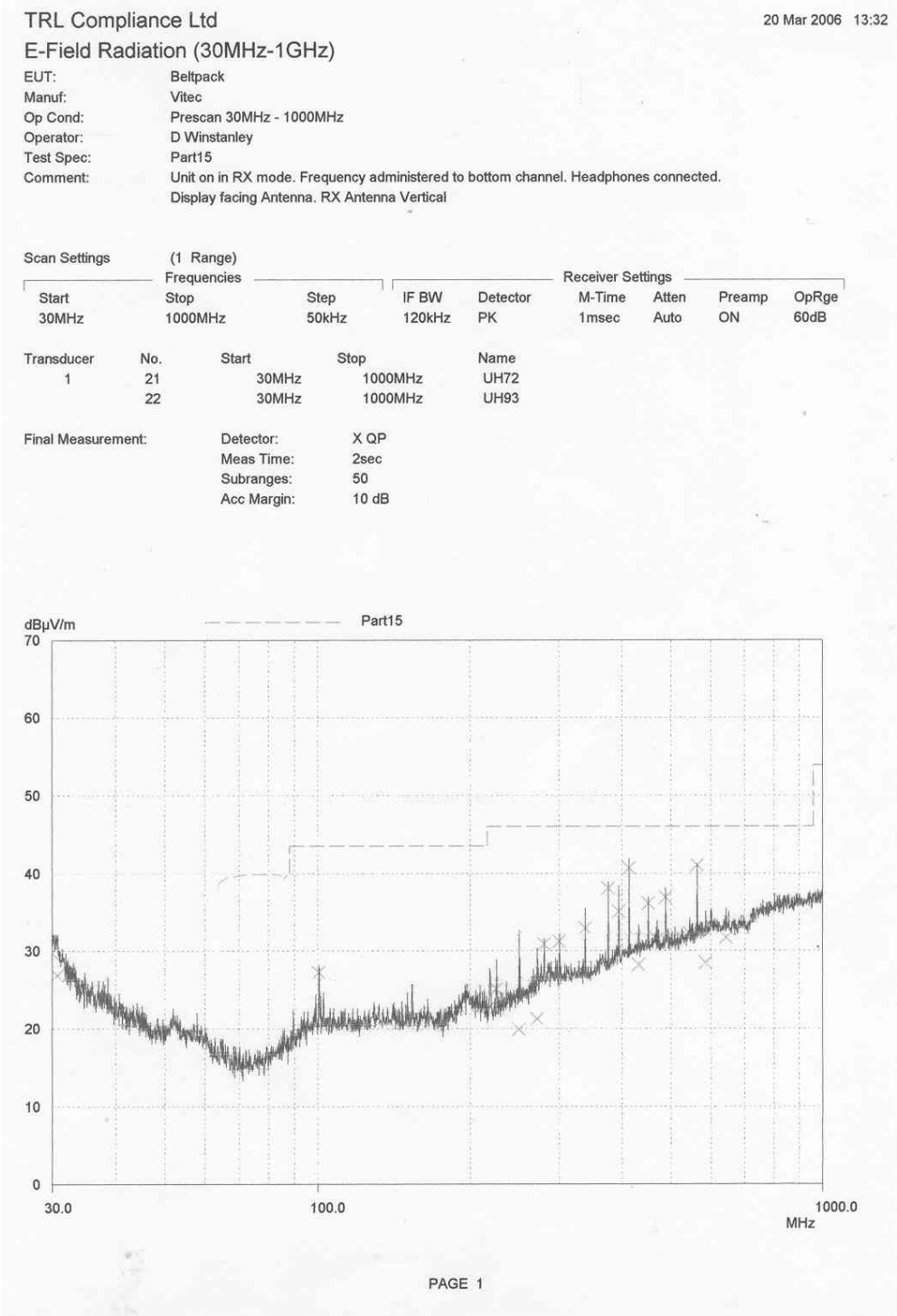
ANNEX G
CONNECTION ACKNOWLEDGEMENT

CONNECTION ACKNOWLEDGEMENT

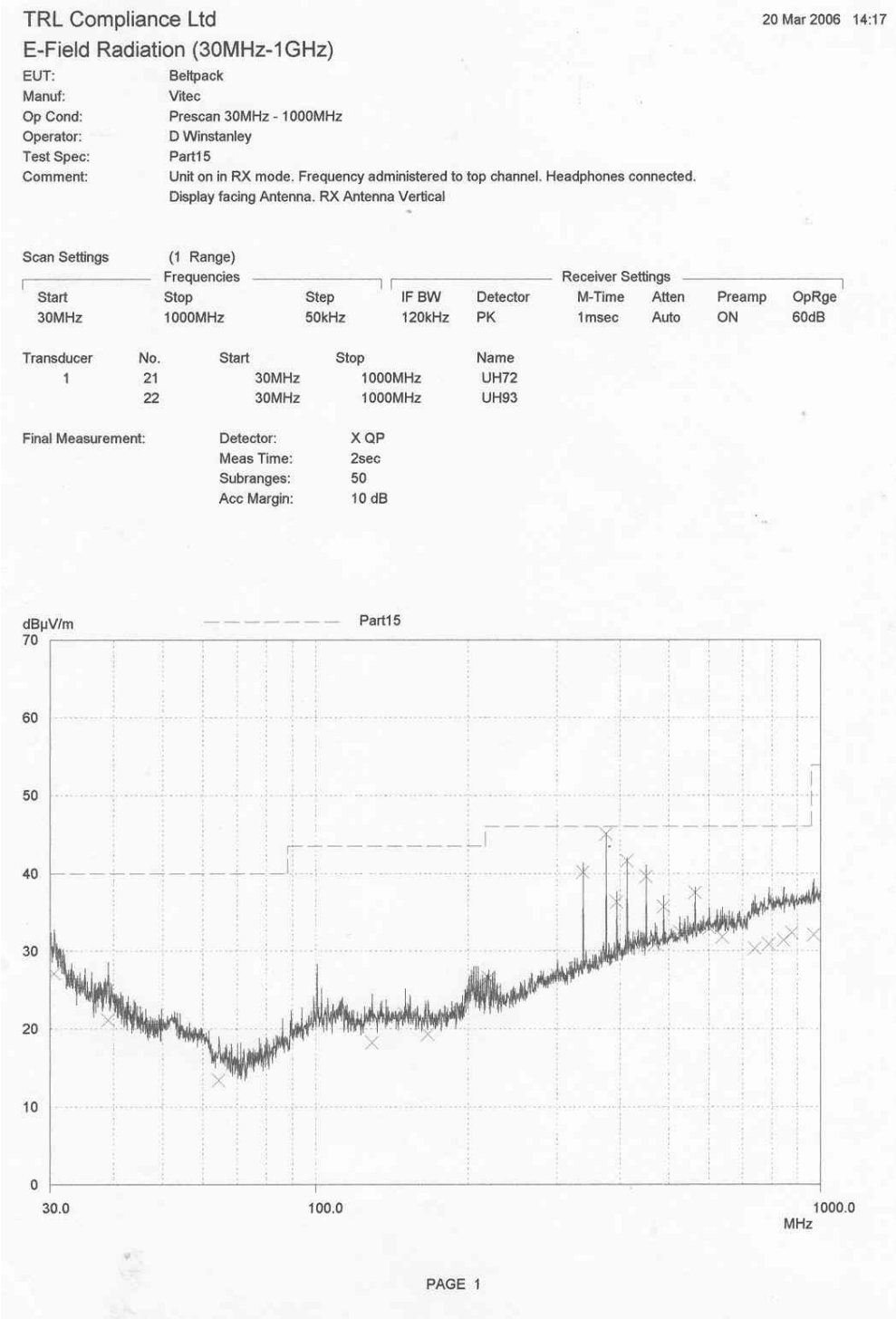


ANNEX H
EMISSIONS INSIDE AND OUTSIDE THE SUB-BAND – RADIATED

EUT SET TO CHANNEL NEAREST LOWER EDGE OF BAND

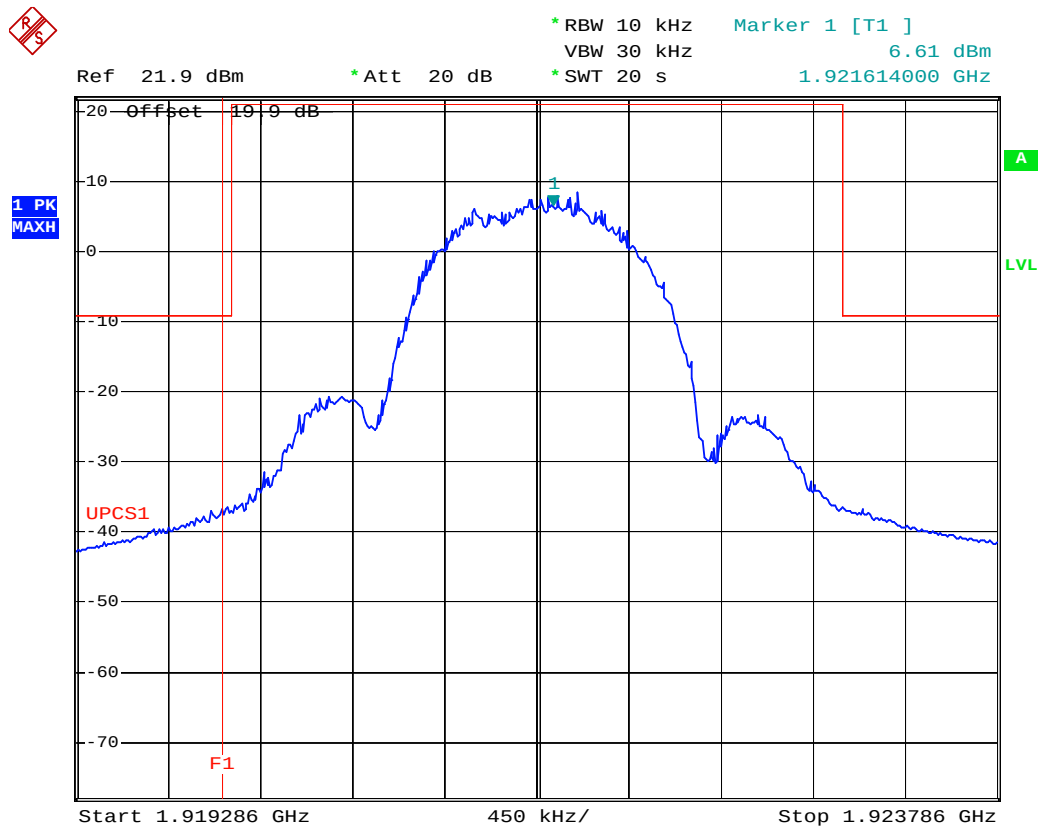


EUT SET TO CHANNEL NEAREST UPPER EDGE OF BAND



ANNEX I
BANDEDGE COMPLIANCE

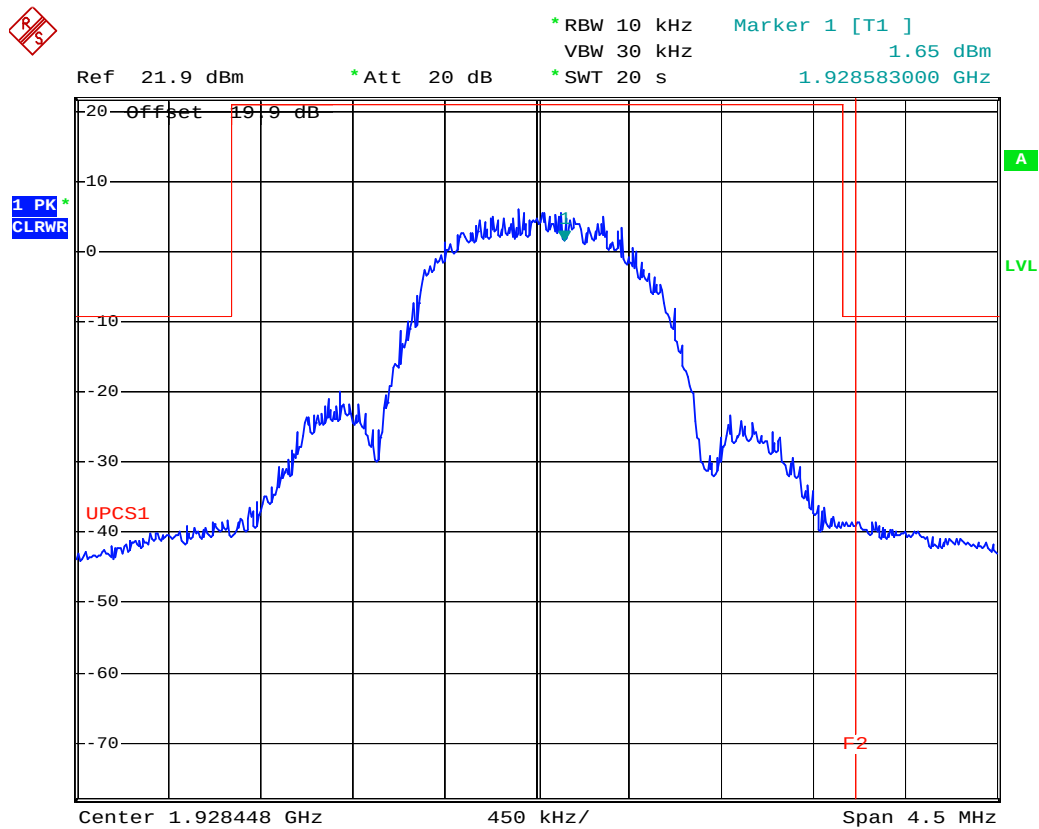
LOWER BANDEDGE COMPLIANCE



Date: 15.MAR.2006 15:33:05

Lower bandedge

UPPER BANDEDGE COMPLIANCE

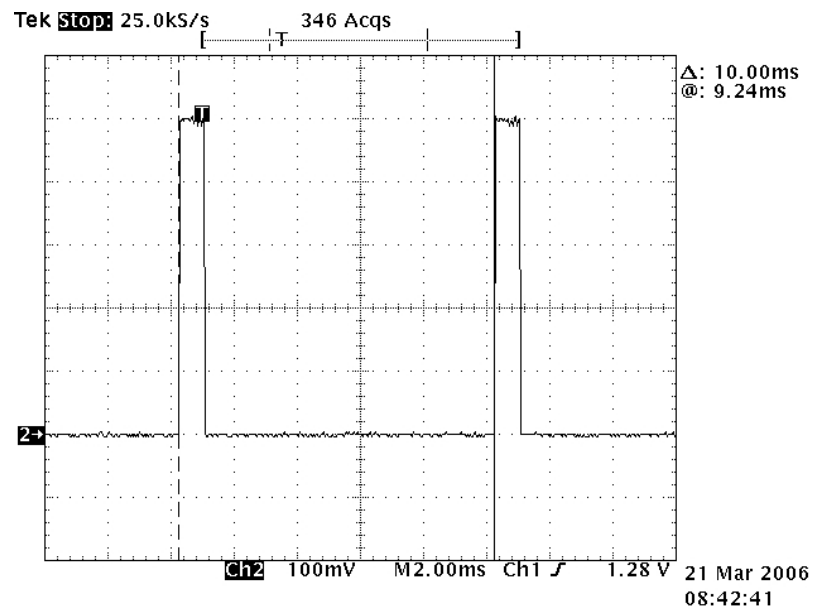


Date: 15.MAR.2006 15:42:12

↑
Upper band edge

ANNEX J
FRAME PERIOD

FRAME PERIOD



ANNEX K
EQUIPMENT CALIBRATION

TRL Number	Equipment Type	Manufacturer	Last Cal Calibration	Calibration Period	Due For Calibration
UH003	Receiver	R&S	22/06/2005	12	22/06/2006
UH005	LISN/AMN	R&S	21/03/2005	12	21/03/2006
UH006	3m Range ERP CAL	TRL	06/01/2006	12	06/01/2007
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	20/12/2005	12	20/12/2006
UH093	Bilog Antenna	Chase	19/08/2005	12	19/08/2006
UH122	Oscilloscope	Tektronix	07/06/2005	24	07/06/2007
UH132	Power meter	Marconi	03/01/2006	12	03/01/2007
UH162	ERP Cable Cal	TRL	06/01/2006	12	06/01/2007
UH177	Power supply	Manson	Use Calibrated Multimeter		
UH186	Receiver	R&S	01/02/2006	12	01/02/2007
UH221	Function Generator	Wavetek	Use Calibrated oscilloscope		
UH228	Power Sensor	Marconi	03/01/2006	12	03/01/2007
UH253	1m Cable N type	TRL	23/02/2006	12	23/02/2007
UH254	1m Cable N type	TRL	05/01/2006	12	05/01/2007
UH271	1m Cable N type	TRL	23/02/2006	12	23/02/2007
UH273	1m Cable N type	TRL	23/02/2006	12	23/02/2007
L005	CMTA	R&S	05/12/2005	12	05/12/2006
L007	Loop Antenna	R&S	29/03/2005	24	29/03/2007
L011	Temperature chamber	Shartree	Use Calibrated Temperature Indicator		
L119	Combiner	Elcom	Calibrate in use		
L138	1-18GHz Horn	EMCO	15/04/2005	24	15/04/2007
L139	1-18GHz Horn	EMCO	03/05/2005	24	03/05/2007
L170	Combiner	Elcom	Calibrate in use		
L176	Signal Generator	Marconi	15/02/2006	12	15/02/2007
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	04/01/2006	12	04/01/2007
L280	18GHz Cable	Rosenberger	05/01/2006	12	05/01/2007
L343	CCIR Noise Filter	TRL	07/06/2005	12	07/06/2006
L426	Temperature Indicator	Fluke	04/01/2006	12	04/01/2007
L479	Analyser	Anritsu	18/11/2005	12	18/11/2006
L552	Signal Generator	Agilent	25/04/2005	12	25/04/2006
N/A	High Pass Filter	AFL	23/02/2006	12	23/02/2007
N/A	CMD60	R&S			
N/A	FSP40	R&S			
N/A	Cables	TRL	Calibrate in use		
N/A	Attenuators	TRL	Calibrate in use		
N/A	RF Diode		For information only		