REPORT ON THE CERTIFICATION TESTING OF AN ALCATEL BUSINESS SYSTEMS RADIO BASE WITH RESPECT TO FCC RULES CFR 47, PART 15D August 2006 INTENTIONAL RADIATOR SPECIFICATION

TEST REPORT NO: RU1304/7507

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REPORT ON THE CERTIFICATION TESTING OF AN
ALCATEL BUSINESS SYSTEMS
RADIO BASE
WITH RESPECT TO
FCC RULES CFR 47, PART 15D August 2006
INTENTIONAL RADIATOR SPECIFICATION

TEST DATE: 19th February – 2nd April 2007

TESTED BY: Daniel Winstanley Digitally signed by Daniel Winstanley DN: CN = Daniel Winstanley, C = <n Reason: I am the author of this document Date: 2007.07.02 10:54:18 +01'00' D WINSTANLEY

APPROVED BY: Steve Hayes I am approving this document 2007.07.02 11:37:56 +01'00' p.p. J CHARTERS RADIO SECTION LEADER

DATE: 2nd July 2007

Distribution:

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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.

TRL Compliance
part of TRAC global

CERTIFICATE OF CONFORMITY & COMPLIANCE

FCC IDENTITY:	OL34070
PURPOSE OF TEST:	Certification
TEST SPECIFICATION:	FCC RULES CFR 47, Part 15D August 2006
TEST RESULT:	Compliant to Specification
EQUIPMENT UNDER TEST:	RADIO BASE
MODEL(s) TESTED	4070 IO Conducted Sample 4070 IO Radiated Sample 4070 EO Radiated Sample 4070 IO Ex Radiated Sample
EQUIPMENT TYPE:	UPCS Transceiver
PRODUCT USE:	Personal communications
CARRIER POWER:	19.69 dBm (Conducted)
ANTENNA TYPE:	4070 IO Omnidirectional <2dBi 4070 EO Omnidirectional <2dBi 4070 EO Right Circular <2dBi (Fixed Inline Attenuation Required) 4070 EO Left Circular <2dBi (Fixed Inline Attenuation Required) 4070 IO Ex Omnidirectional <2dBi
BAND OF OPERATION:	1920 MHz – 1930 MHz
CHANNEL SPACING:	1.728 MHz
NUMBER OF CHANNELS:	5 frequencies, 12 single time slots per frequency giving 60 channels
FREQUENCY GENERATION:	SAW Resonator [ ] Crystal [ ] Synthesiser [X]
MODULATION METHOD:	Amplitude [ ] Digital [X] Angle [ ]
POWER SOURCE(s):	42 Vdc
TEST DATE(s):	19th February – 14th March 2007
ORDER No(s):	Pro Forma Invoice
APPLICANT:	Alcatel Business Systems
ADDRESS:	1 Route Du Dr Albert Schweitzer 67408 Illkirch Cedex France

TESTED BY: Daniel Winstanley — Digitally signed by Daniel Winstanley, DN: CN = Daniel Winstanley, C = <n, Reason: I am the author of this document, Date: 2007.07.02 10:54:07 +01'00' — D WINSTANLEY

APPROVED BY: Steve Hayes, I am approving this document, 2007.07.02 11:38:14 +01'00' — p.p. J CHARTERS RADIO SECTION LEADER

TRAC testing regulatory and compliance

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	RADIO BASE		
EQUIPMENT TYPE:	UPCS Transceiver		
PURPOSE OF TEST:	Certification		
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 15D August 2006		
TEST RESULT:	COMPLIANT	Yes	[X]
		No	[ ]
APPLICANT'S CATEGORY:	MANUFACTURER		[X]
	IMPORTER		[ ]
	DISTRIBUTOR		[ ]
	TEST HOUSE		[ ]
	AGENT		[ ]
APPLICANT'S ORDER No(s):	Pro Forma Invoice		
APPLICANT'S CONTACT PERSON(s):	Mr Rainier Baltz		
E-mail address:	rainier.baltz@alcatel-lucent.fr		
APPLICANT:	Alcatel Business Systems		
ADDRESS:	1 Route Du Dr Albert Schweitzer 67408 Illkirch Cedex France		
TEL:	+33 390 676790		
FAX:	+33 390 676541		
TEST LABORATORY:	TRL Compliance Ltd		
UKAS ACCREDITATION No:	0728		
TEST DATE(s):	19th February – 2nd April 2007		
TEST REPORT No:	RU1304/7507		

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
Access Criteria Functional Test	15.323 (c)(6)	Yes
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. 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)	22°C
6.	Supply Voltages:	Vnom	42 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 cordless telephone device. The portable part is capable of operating on a maximum of 60 channels (time spectrum windows). The fixed part is wall mounted and consists of two transmitters connected to an Alcatel OmniPCX exchange. One fixed part transmitter operates on odd time slots only and the second fixed part transmitter operates on even time slots only. This gives the portable part access to a maximum of 60 channels (time spectrum windows).

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 single-slots only. 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 of the frame. A physical bearer is composed of a transmit single-slot and a receive single-slot. The two halves of a given bearer are always exactly half a frame (5ms, 12 slots) apart.

During the testing frequency administration was utilised to allow operation on only certain channels during the tests. The frequency administration was performed using a software interface. A portable part was supplied with a temporary antenna connector to allow a conducted path.

This report covers three fixed part models, the 4070 IO, 4070 EO and the 4070 IO Ex. The radio and etiquette portions of these fixed parts are identical. The same PCBs are used for all three models and are identical. The external housings for the 3 models vary in material, size and location of the integral antenna. The 4070 IO is an indoor unit, the 4070 EO is an outdoor unit and the 4070 IO Ex is for explosive atmospheres. Due to differences in the models, non radio related circuitry emissions testing was performed on all three models.

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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 outside the sub-band for results.

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

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

ANTENNA REQUIREMENTS – PART 15.317

The units employ an integral antenna arrangement.

MODULATION TECHNIQUES – PART 15.319 (b)

The Alcatel Business Systems Radio Base is an isochronous device operating in the 1920 MHz – 1930 MHz frequency band.

The Alcatel Business Systems Radio Bases modulation technique is based on DECT technology as described in European standards EN 300 175-2 and EN 300 175-3.

The Alcatel Business Systems Radio Bases 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	35.30	Average	Live	54.26
0.240	42.49	Average	Neutral	52.10
0.275	42.71	Quasi Peak	Neutral	60.97
1.040	26.28	Average	Live	46.00
20.135	31.96	Average	Neutral	50.00

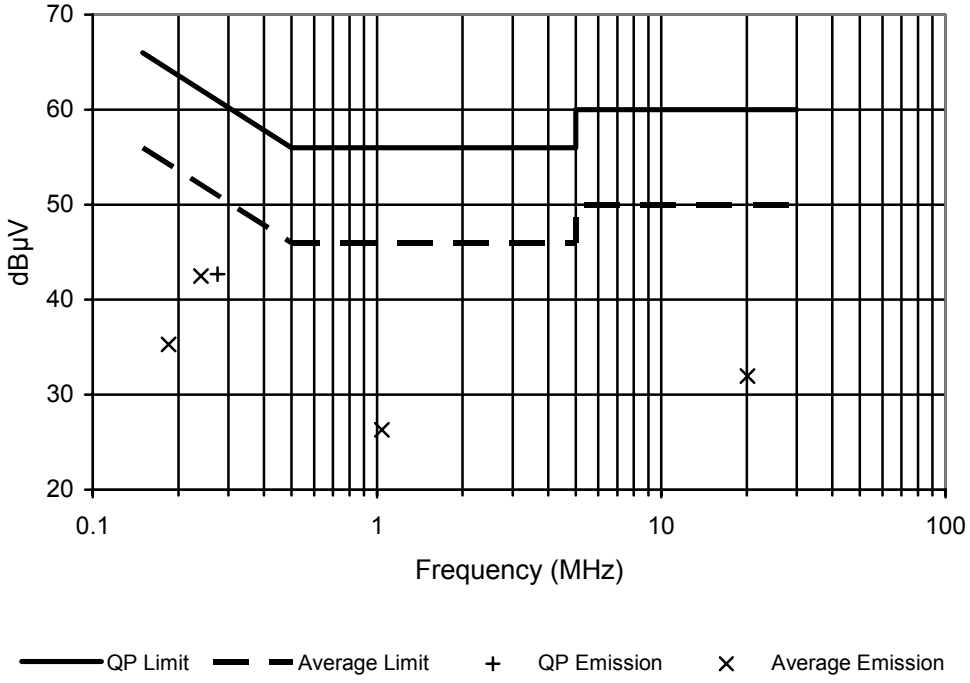
Notes:
1 See Annex C for sample powerline plot.
2 Emissions that are 20 dB's or more below the limit are not necessarily recorded.
3 The EUT was tested transmitting a dummy bearer and traffic bearer simultaneously.
4 Closest emissions to the applicable limit are recorded.
5 Testing was performed on the 4070 IO as this is the only model with a user accessible AC power port.

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 tests was:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/01	UH03	
LISN	ROHDE & SCHWARZ	ESH3-Z5	863906/018	UH05	**X**
RECEIVER	ROHDE & SCHWARZ	ESHS 10	841429/012	UH187	**X**
LISN	ROHDE & SCHWARZ	ESH3-Z5.831.5	8470 31/015	UH195	

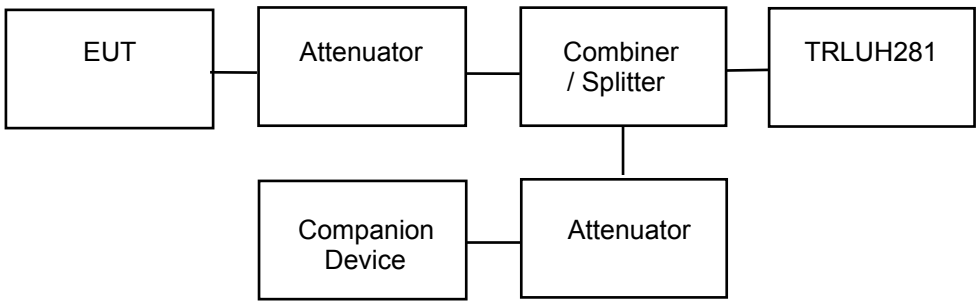
AC Powerline Conduction
(Levels below the limit are only displayed if
within 20dB of the limit)



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	1920.8052310	1922.2811920	1.500	50kHz> Δf > 2.5MHz
-12	1920.9735000	1922.1225380	1.150	N/A
-6	1921.1417690	1921.9446540	0.803	N/A

f_x = 1924.992 MHz				
Δ P (dBc)	fl (MHz)	fh (MHz)	Δf (MHz)	Limit
-26	1924.2612310	1925.7371920	1.470	50kHz> Δf > 2.5MHz
-12	1924.4102690	1925.5737310	1.160	N/A
-6	1924.5929620	1925.4054620	0.812	N/A

f_x = 1928.448 MHz				
Δ P (dBc)	fl (MHz)	fh (MHz)	Δf (MHz)	Limit
-26	1927.7220380	1929.1883850	1.460	50kHz> Δf > 2.5MHz
-12	1927.8806920	1929.0105000	1.130	N/A
-6	1928.0970380	1928.8374230	0.740	N/A

Notes: 1. See emission bandwidth plots in Annex D.
2. Emission bandwidth Δf rounded up.
3. Emission bandwidth measured with an active communications channel.

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 12).

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 = 1.500 MHz

$PTP = 100\mu W \times \sqrt{1.500}$ MHz

PTP = 20.88 dBm

Results

Frequency (MHz)	Peak Transmit Power (dBm)	Limit (dBm)
1921.536	19.65	20.88
1924.992	19.68	20.88
1928.448	19.69	20.88

Note:
1. A connection was made to the antenna connector to enable conducted measurements.
2. Antenna gain < 3dBi and so correction of the limit is not required.
3. See Annex E for Peak Transmit Power Plots.

POWER SPECTRAL DENSITY – PART 15.319 (d)

The power spectral density is measured using test setup 1, (page 12).

Limit

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

Results

Frequency (MHz)	Power Spectral Density (mW/3kHz)	Limit (mW/3kHz)
1921.536	1.08	3
1924.992	1.01	3
1928.448	1.17	3

Note:
1. See Annex F for Power Spectral Density Plots.

ANTENNA GAIN – PART 15.319 (e)

Any directional gain of any 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.

Base Station	Antenna type	Configuration details
4070 IO	Omnidirectional 2dBi	4070 IO with Integral antenna
4070 EO	Omnidirectional 2dBi	4070 EO with Integral antenna
4070 IO Ex	Omnidirectional 2dBi	4070 IO Ex with Integral antenna same as 4070 EO
4070 EO	Right circular 2 dBi	OEM antenna & Fixed attenuator
4070 EO	Left circular 2 dBi	OEM antenna & Fixed attenuator

Note: Statement by manufacturer declaring maximum gain of any type of antenna used. 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 10) as per transmitter emission bandwidth and an active channel.

The OL34070 is a fixed part and as such transmits control and signalling information the counter part device is a portable part device and so does not transmit control and signalling information.

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

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 down EUT (exchange)	A	Pass
2	Power removed from EUT	A	Pass
3	Disconnection of cable between fixed and exchange	A	Pass
4	Disconnection of extension used for call from exchange	B	Pass
5	Power down counter part	B	Pass
6	Power removed from counter part	B	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 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:

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

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

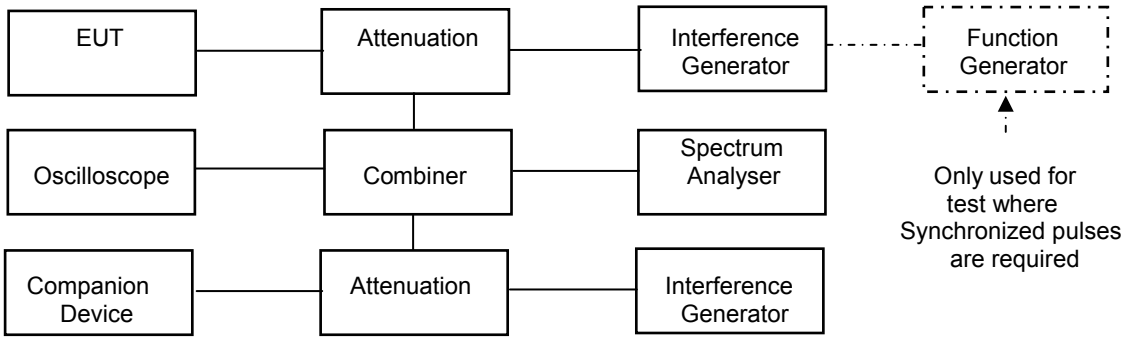
Where: B = Emission bandwidth (Hz)
M_U = dBs the threshold may exceed thermal noise (30 for T_L & 50 for T_U)
P_{MAX} = Output Power Limit (dBm)
P_{EUT} = Transmitted power (dBm)

Monitor Threshold	B (MHz)	M_U (dB)	P_{MAX} (dBm)	P_{EUT} (dBm)	Threshold (dBm)
T_L	1.50	30	20.88	19.69	-81.05
T_U	1.50	50	20.88	19.69	-61.05

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 upper threshold level was determined following the procedure as laid out in ANSI C63.17 sub-clause 7.3.2 (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:

Measured Threshold Level ≤ $T_U + U_M$

Where: T_U = Calculated Upper threshold level
U_M = Margin of uncertainty in threshold measurements (6dB)

Results

Monitor threshold	Measured Threshold Level	Limit	Pass/Fail
Lower Threshold (dBm)	N/A	N/A	Pass
Upper threshold (dBm)	-64.05	-55.05	Pass

Notes: 1. The upper threshold is applicable as the EUT utilizes more than 40 system channels.

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 16).

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 EUT 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 (upper) plus measurement uncertainty (U_M) and the width of the pulse interference exceeds the largest of 50µs 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 (upper) plus measurement uncertainty (U_M) and the width of the pulse interference exceeds the largest of 35µs and $35\sqrt{1.25/B}$ 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 Made			Pass/Fail
			F_L	F_M	F_H	
$50\sqrt{1.25/B}$	50	$T_U + U_m$	No	No	No	Pass
$35\sqrt{1.25/B}$	35	$T_U + U_m + 6$	No	No	No	Pass

Notes:
1. T_U is the calculated upper threshold.
2. U_M is Margin of uncertainty in threshold measurements (6dB).

ACCESS CRITERIA FUNCTIONAL TEST– PART 15.323 (c)(6)

The access criteria test interval tests were carried out in accordance with ANSI C63.17 sub-clause 8.1.1 and 8.1.2 using test setup 2 (page 16) These tests only apply to an EUT capable of transmitting control and signaling information. ANSI C63.17 sub-clause 8.1.3 is not applicable the random waiting interval option is not implemented.

The EUT was frequency administered to only one operating frequency. 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 EUT were synchronized so the position of the pulses corresponded to the time-slot pattern in the frame of the EUT. The tests were performed to find the following:

ANSI C63.17 sub-clause 8.1.1

Test b)
The interference generator was setup to introduce interference on all but one time slot (single slot). The free slot was set to coincide with slot 2. The transmissions if any should occur on the free time slot. Verify that the access criteria are checked not less frequently than every 30 seconds

Results

Test	Test Data Required	Test Result	Limit	Pass/Fail
Access Criteria Selection of Channel,	Any transmissions and on which time slot	Transmissions occurred on time slot 2	Transmit on time slot 2	Pass
Repetition of Access Criteria (note 1)	Interval Between Access Criteria	1.28 seconds	<30 Seconds	Pass

Note: 1. The interval between access criteria test is checked 5 times.
2. See Annex G for plots of the access criteria test interval.

ANSI C63.17 sub-clause 8.1.2

f1 = 1924.992 MHz
f2 = 1923.264 MHz

Test b)
With no interference on, the EUT must transmit on f1 or f2. The interference is then applied to the channel used by the EUT at the appropriate level. Verify that after the application of interference the EUT transmits on the open channel after the next pause.

Results

Test	Before interference applied EUT transmits on	After interference applied on f1 EUT transmits on	Limit	Pass/Fail
8.1.2 Test b	f1	f2	Change channel after application of interference	Pass

Notes: 1. See Annex H for timing plots of access criteria functional test.
2. 47CFR15.323(c)(6) Random Waiting Interval option not implemented.

MONITORING BANDWIDTH – PART 15.323 (c)(7)

The monitoring bandwidth test was carried out in accordance with ANSI C63.17 sub-clause 7.4.

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 bandwidth requirements for the monitoring system are met.

As declared by the manufacturer, the EUT uses the radio receiver used for communication for monitoring therefore the intended bandwidth requirements of ANSI C63.17 sub-clause 7.4 for the monitoring system 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 16) (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 3 hours during this time the access criteria was repeated several times.

Result

Repetition of Access Criteria	Maximum Transmission Time	Maximum Transmission Time Limit	Pass/Fail
First	1 Hour	<8 Hours	Pass
Second	1 Hour	<8 Hours	Pass

Notes:
1. The portable part is the initiating device that repeats the access criteria.
2. The test was performed using a version V85-86 portable part.

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. (Page 16)(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 communication channel within 30 seconds or less.

Result

Test	Time Taken (seconds)	Limit (seconds)	Pass/Fail
Transmission on communications channel no acknowledgement received (note 1)	<1 (note 2)	1	Pass
Established communication channel termination, acknowledgements blocked during communication	9.52	30	Pass

Note:
1. The Companion device is off for this test.
2. The EUT will not transmit a communication channel with the companion device off.
3. See Annex I Acknowledgement plots.

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

Least interfered Channel

The EUT utilizes more than 40 channels the least interfered channel testing is applicable. This test was carried out in accordance with ANSI C63.17 sub-clause 7.3.3 using test setup 2 (page 13).

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 $T_L + U_M$ + 7dB 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 $T_L + U_M$ + 7dB 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 $T_L + U_M$ + 1dB and at $T_L + U_M$ - 6dB 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 $T_L + U_M$ - 6dB and at $T_L + U_M$ + 7dB 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 16).
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 $T_U + U_M$. Verify a connection is established on f2.

Any connection is terminated.

Test b)
Interference is applied on f2 at a level of $T_U + U_M$ 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 metre 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. For the purposes of this testing 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 8.3.2 using test setup 2 (page 16) 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 except one which has interference at least 10dB below T_L. Apply interference at a level $T_L + U_M + 7dB$ to all receive time slots except one which has interference at least 10dB below T_L. The interference free receive timeslot should not be the duplex mate of the interference free transmit timeslot. The EUT should establish a connection on the interference free receive slot and its duplex mate.

Test e) & f)
Apply interference at a level $T_L + U_M$ to all receive time slots except one which has interference at least 10dB below T_L. Apply interference at a level $T_L + U_M + 7dB$ to all transmit time slots except one which has interference at least 10dB below T_L. The interference free transmit timeslot should not be the duplex mate of the interference free receive timeslot. The EUT should establish a connection on the interference free transmit slot and its duplex mate.

Test g)
Apply interference at a level $T_U + U_M$ to all receive and transmit time slots except one which has interference at least 10dB below T_L. The interference free transmit and receive time slots shall not constitute a duplex pair. The EUT should not transmit or establish a connection.

Result

Test	Connection Made	Time Slot Selected	Required Time Slot	Pass/Fail
b	Yes	N/A	Any	Pass
c & d	Yes	Interference Free Receive Slot and Duplex Mate	Interference Free Receive Slot and Duplex Mate	Pass
e & f	Yes	Interference Free Transmit Slot and Duplex Mate	Interference Free Transmit Slot and Duplex Mate	Pass
g	No	None	None	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 a mode which denies fair access to the spectrum to others.

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

RF carrier set to the lowest carrier defined by the EUT.

These measurements are carried out in accordance with ANSI C63.17 sub-clause 6.1.6.

Out-of-Band Emissions from UPCS bandedge	FREQ. (MHz)	MEAS. Rx. (dBm)	CABLE LOSS (dB)	ATTEN. LOSS (dB)	EMISSION LEVEL (dBm)	LIMIT (dBm)
> - 2.5MHz					Note 10	-39.5
- 1.25 MHz – 2.5 MHz					Note 10	-29.5
- 1.25 MHz					Note 10	-9.5
+ 1.25 MHz					Note 10	-9.5
+ 1.25 MHz – 2.5 MHz					Note 10	-29.5
> + 2.5MHz	1935.272 3842.445 9606.101	-79.80 -69.69 -77.30	0.50 0.56 0.60	20.1 20.1 17.6	-58.30 -49.05 -59.10	-39.5 -39.5 -39.5

Limits		
	Out-of-Band Emissions from UPCS bandedge	**Attenuation (dB) required below reference power of 112mW**
	± 1.25MHz	30
	±1.25 MHz – 2.5 MHz	50
	> ±2.5MHz	60
	In band Emissions from centre of emission bandwidth	**Attenuation (dB) required below permitted peak power for the EUT**
	1B – 2B	30
	2B – 3B	50
	3B – UPCS band edge	60

Notes:
1 The EUT was connected via a cable and attenuator.
2 Emissions were searched to: (**x**) 1000MHz inclusive, as per Part 15.33a.
3 New / Fully Charged batteries used for battery powered products.
4 See Annex J for out of band emissions compliance plots.
5 See Annex K for in band emissions compliance plots.
6 As per 15.323(g) attenuation to the requirements of 15.209 is not required.
7 Resolution bandwidth approximately 1% of emissions bandwidth.
8 Video bandwidth 3 x Resolution bandwidth.
9 Receiver detector = Peak detector, Max Hold Enabled.
10 Only emissions within 20 dB of the limit are recorded.
11 Due to identical PCBs and software conducted measurements were made on one EUT only.

Test Method:
1 The EUT was connected to a spectrum analyser via suitable attenuation or filter.
2 The Spectrum analyser was tuned across the required frequency range in steps.
3 Any emissions found were measured with the required analyser settings.

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

RF carrier set to the highest carrier defined by the EUT.

These measurements are carried out in accordance with ANSI C63.17 sub-clause 6.1.6.

Out-of-Band Emissions from UPCS bandedge	FREQ. (MHz)	MEAS. Rx. (dBm)	CABLE LOSS (dB)	ATTEN. LOSS (dB)	EMISSION LEVEL (dBm)	LIMIT (dBm)
> - 2.5MHz					Note 10	-39.5
- 1.25 MHz – 2.5 MHz					Note 10	-29.5
- 1.25 MHz					Note 10	-9.5
+ 1.25 MHz					Note 10	-9.5
+ 1.25 MHz – 2.5 MHz					Note 10	-29.5
> + 2.5MHz	1942.278 3856.266 9643.995	-76.99 -70.22 -72.96	0.50 0.56 0.60	20.1 20.1 17.6	-56.39 -49.56 -54.76	-39.5 -39.5 -39.5

Limits		
	Out-of-Band Emissions from UPCS bandedge	**Attenuation (dB) required below reference power of 112mW**
	± 1.25MHz	30
	±1.25 MHz – 2.5 MHz	50
	> ±2.5MHz	60
	In band Emissions from centre of emission bandwidth	**Attenuation (dB) required below permitted peak power for the EUT**
	1B – 2B	30
	2B – 3B	50
	3B – UPCS band edge	60

Notes:
1 EUT fitted with temporary antenna connector.
2 Emissions were searched to: (**x**) 1000MHz inclusive, as per Part 15.33a.
3 New / Fully Charged batteries used for battery powered products.
4 See Annex J for out of band emissions compliance plots.
5 See Annex K for in band emissions compliance plots.
6 As per 15.323(g) attenuation to the requirements of 15.209 is not required.
7 Resolution bandwidth approximately 1% of emissions bandwidth.
8 Video bandwidth 3 x Resolution bandwidth.
9 Receiver detector = Peak detector, Max Hold Enabled.
10 Only emissions within 20 dB of the limit are recorded.
11 Due to identical PCBs and software conducted measurements were made on one EUT only.

Test Method:
1 The EUT was connected to a spectrum analyser via suitable attenuation or filter.
2 The Spectrum analyser was tuned across the required frequency range in steps.
3 Any emissions found were measured with the required analyser settings.

EMISSIONS OUTSIDE THE SUB-BAND – RADIATED – PART 15.109

The 4070 IO, 4070 EO and 4070 IO Ex were tested for radiated spurious emissions from digital circuitry not directly related to the radio transmitter.

These measurements are carried out in accordance with ANSI C63.17 sub-clause 6.1.6

4070 IO	FREQ. (MHz)	MEAS. Rx. (dBµV)	CABLE LOSS (dB)	PRE AMP (dB)	ANT FACTOR	FIELD STRENGTH (dBµV/m)	FIELD STRENGTH (µV/m)	LIMIT (µV/m)
30MHz - 88MHz	44.70	13.67	1.03	-	10.30	25.0	17.78	100
	45.35	14.17	1.03	-	10.20	25.4	18.62	100
	47.45	22.02	1.08	-	8.90	32.0	39.81	100
	48.10	20.31	1.09	-	8.50	29.9	31.26	100
	50.20	23.19	1.11	-	7.50	31.8	38.91	100
	50.85	22.38	1.12	-	7.20	30.7	34.27	100
88MHz - 216MHz							Note 9	150
216MHz - 960MHz	276.50	12.08	2.22	-	12.60	26.9	22.13	200
	304.15	19.15	2.35	-	13.00	34.5	53.08	200
	317.95	14.50	2.40	-	13.50	30.4	33.11	200
	331.80	23.65	2.35	-	14.00	40.0	100.00	200
	359.45	18.76	2.52	-	14.30	35.6	60.25	200
	442.35	22.10	2.80	-	16.80	41.7	121.62	200
	525.30	20.48	3.12	-	18.40	42.0	125.89	200
	553.00	14.50	3.25	-	20.25	38.0	79.43	200
	580.60	16.17	3.33	-	19.70	39.2	91.20	200
	663.55	15.12	3.53	-	20.35	39.0	89.12	200
960MHz - 1GHz							Note 9	500
1GHz - 20GHz							Note 9	500

Limits		
	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 Emission due to digital circuitry not directly associated with the radio transmitter.
4 Measurements >1GHz @ 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 / Fully Charged batteries used for battery powered products.
8 See Annex L for scan plot 30MHz – 1GHz.
9 No significant emissions within 20 dB of the limit due to digital circuitry.

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 Spurious Emissions – Radiated – Part 15.109 tests is shown on page 28

EMISSIONS OUTSIDE THE SUB-BAND – RADIATED – PART 15.109 Continued

The 4070 IO, 4070 EO and 4070 IO Ex were tested for radiated spurious emissions from digital circuitry not directly related to the radio transmitter.

These measurements are carried out in accordance with ANSI C63.17 sub-clause 6.1.6

4070 EO	**FREQ. (MHz)**	**MEAS. Rx. (dBµV)**	**CABLE LOSS (dB)**	**PRE AMP (dB)**	**ANT FACTOR**	**FIELD STRENGTH (dBµV/m)**	**FIELD STRENGTH (µV/m)**	**LIMIT (µV/m)**
30MHz - 88MHz							Note 9	90
88MHz - 216MHz	110.60	14.31	1.49	-	10.80	26.6	21.38	150
216MHz - 960MHz	331.80 442.35 663.50	13.55 20.80 15.52	2.35 2.80 3.53	- - -	14.00 16.80 20.35	29.9 40.4 39.4	31.26 104.71 93.33	210 210 210
960MHz - 1GHz							Note 9	300
1GHz - 20GHz							Note 9	300

	30MHz to 88MHz	90µV/m @ 10m
	88MHz to 216MHz	150µV/m @ 10m
	216MHz to 960MHz	210µV/m @ 10m
	960MHz to 1GHz	300µV/m @ 10m
	1GHz to 20GHz	300µV/m @ 10m

Notes:
1 Results quoted are extrapolated as indicated.
2 Emissions were searched to: (**x**) 1000MHz inclusive, as per Part 15.33a.
3 Emission due to digital circuitry not directly associated with the radio transmitter.
4 Measurements >1GHz @ 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 / Fully Charged batteries used for battery powered products.
8 See Annex L for scan plot 30MHz – 1GHz.
9 No significant emissions within 20 dB of the limit due to digital circuitry.

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 Spurious Emissions – Radiated – Part 15.109 tests is shown on page 28

EMISSIONS OUTSIDE THE SUB-BAND – RADIATED – PART 15.109 Continued

The 4070 IO, 4070 EO and 4070 IO Ex were tested for radiated spurious emissions from digital circuitry not directly related to the radio transmitter.

These measurements are carried out in accordance with ANSI C63.17 sub-clause 6.1.6

4070 IO Ex	FREQ. (MHz)	MEAS. Rx. (dBµV)	CABLE LOSS (dB)	PRE AMP (dB)	ANT FACTOR	FIELD STRENGTH (dBµV/m)	FIELD STRENGTH (µV/m)	LIMIT (µV/m)
30MHz - 88MHz	66.55	15.67	1.23	-	5.00	21.9	12.44	100
	73.70	18.86	1.24	-	5.80	25.9	19.72	100
	75.85	17.03	1.27	-	6.10	24.4	16.59	100
	82.95	16.75	1.35	-	7.50	25.6	19.05	100
	96.75	22.02	1.38	-	9.40	32.8	43.65	100
88MHz - 216MHz	110.60	21.91	1.49	-	10.80	34.2	51.28	150
	124.40	10.64	1.56	-	11.60	23.8	15.48	150
	138.25	26.35	1.65	-	11.40	39.4	93.32	150
216MHz - 960MHz	248.85	22.20	2.10	-	12.00	36.3	65.13	200
	258.05	13.20	2.20	-	13.00	28.4	26.30	200
	276.45	16.08	2.22	-	12.60	30.9	35.07	200
	290.30	16.56	2.24	-	12.90	31.7	38.46	200
	304.15	24.85	2.35	-	13.00	40.2	102.33	200
	331.80	16.65	2.35	-	14.00	33.0	44.67	200
	359.40	11.18	2.52	-	14.30	28.0	25.12	200
	552.95	17.50	3.25	-	20.25	41.0	112.20	200
	663.55	14.22	3.53	-	20.35	38.1	80.35	200
960MHz - 1GHz							Note 9	500
1GHz - 20GHz							Note 9	500

Limits		
	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 Emission due to digital circuitry not directly associated with the radio transmitter.
4 Measurements >1GHz @ 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 / Fully Charged batteries used for battery powered products.
8 See Annex L for scan plot 30MHz – 1GHz.
9 No significant emissions within 20 dB of the limit due to digital circuitry.

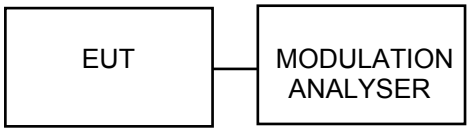
Test Method:
1 As per Radio – Noise Emissions, ANSI C63.4: 2003.
2 Measuring distances as Notes 1 to 4 above.
3 EUT 0.8 metre above ground plane.
4 Emissions maximised by rotation of EUT, on an automatic turntable.
Raising and lowering the receiver antenna between 1m & 4m.
Horizontal and vertical polarisations, of the receive antenna.
EUT orientation in three orthagonal planes.
Maximum results recorded.

The test equipment used for the Spurious Emissions – Radiated – Part 15.109 tests is shown on page 28

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
HORN ANTENNA	EMCO	3115	9010-3581	139	**X**
RECEIVER	ROHDE & SCHWARZ	ESVS 10	844594/003	352	**X**
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	**X**
PRE AMP	AGILENT	8449B	3008A016	572	**X**
RANGE 1	TRL	3 METRE	N/A	UH06	**X**
RANGE 1	TRL	10 METRE	N/A	UH07	**X**
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	**X**
RECEIVER	ROHDE & SCHWARZ	ESVS 10	841431/014	UH186	**X**
BILOG ANTENNA	YORK	CBL611/A	1618	UH191	**X**
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSU 46	200034	UH281	**X**
SIGNAL GENERATOR	HP	83630B	3722A00588	UH340	**X**

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
0.74 ppm	10ppm	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 (ms)	Limit (µs)		Pass/Fail
			Frame Period (ms)	Jitter (µs)	
-0.01	0.03	10.00003	2 or 10/X	25	Pass

Notes: 1. See Annex M for frame period plot.

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 3 (page 29). 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	+4	+2.07	±10
+20	85% Vnom	1924.992	+3	+1.56	±10
+20	115% Vnom	1924.992	+4	+2.07	±10
-20	Vnom	1924.992	+5	+2.60	±10
+55	Vnom	1924.992	+5	+2.60	±10

ANNEX A

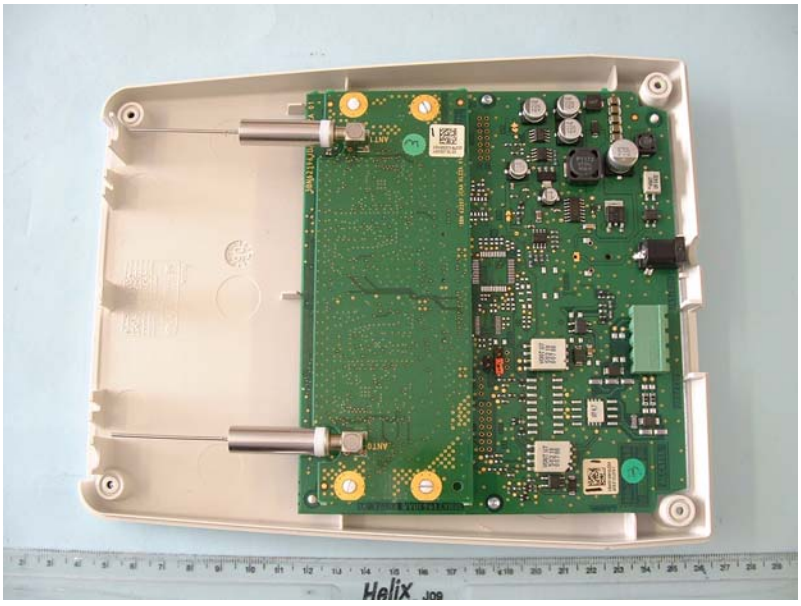
PHOTOGRAPHS

PHOTOGRAPH No. 1 **RADIATED TEST SETUP**

PHOTOGRAPH No. 2 **POWERLINE CONDUCTION TEST SETUP**

PHOTOGRAPH No. 3 **4070 IO OVERVIEW**

PHOTOGRAPH No. 4 **4070 IO OVERVIEW TOP REMOVED**

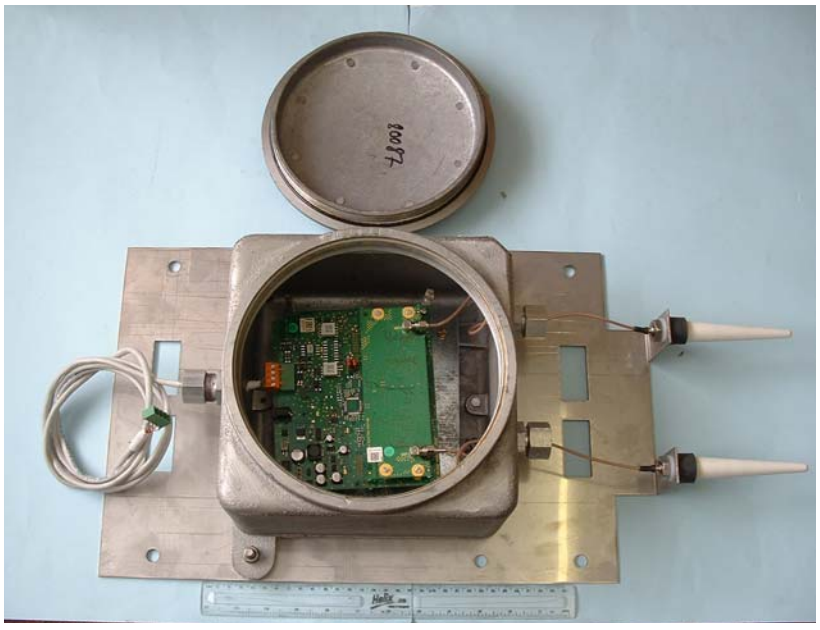


PHOTOGRAPH No. 5 **4070 EO OVERVIEW**

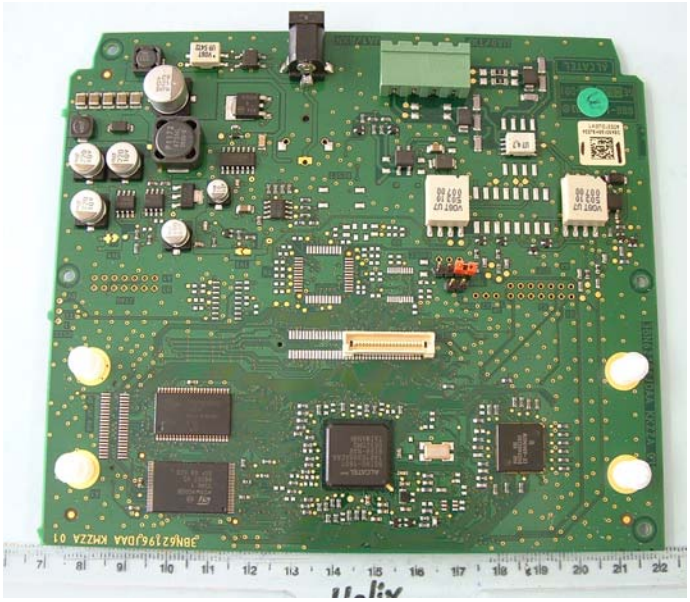
PHOTOGRAPH No. 6 **4070 EO OVERVIEW TOP OPEN**

PHOTOGRAPH No. 7 **4070 IO Ex OVERVIEW**

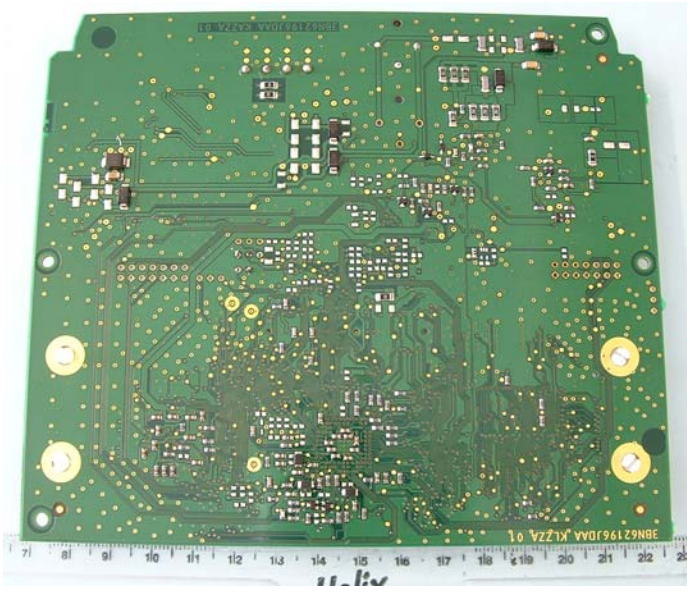
PHOTOGRAPH No. 8 **4070 IO Ex OVERVIEW TOP REMOVED**



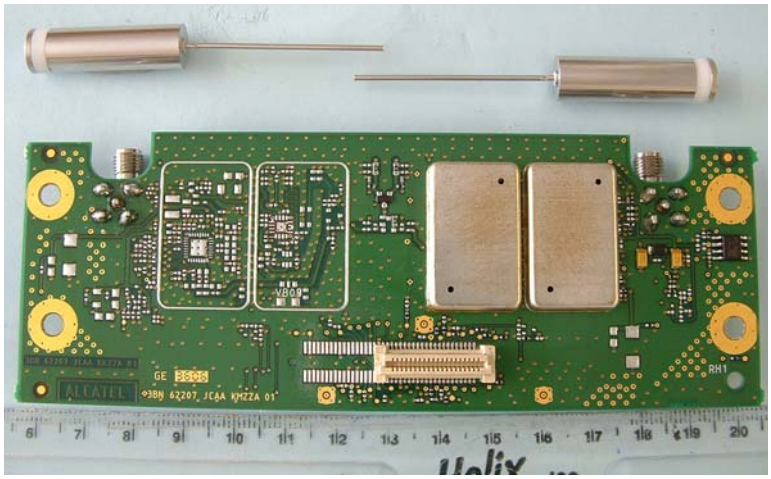
PHOTOGRAPH No. 9 **MAIN PCB COMPONENT SIDE**



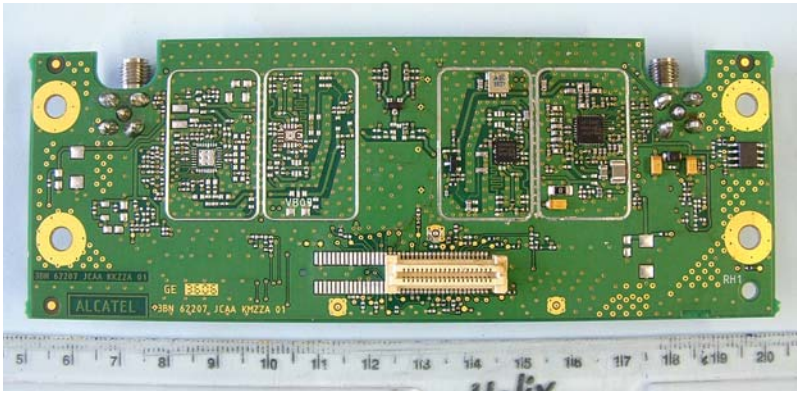
PHOTOGRAPH No. 10 **MAIN PCB TRACK SIDE**



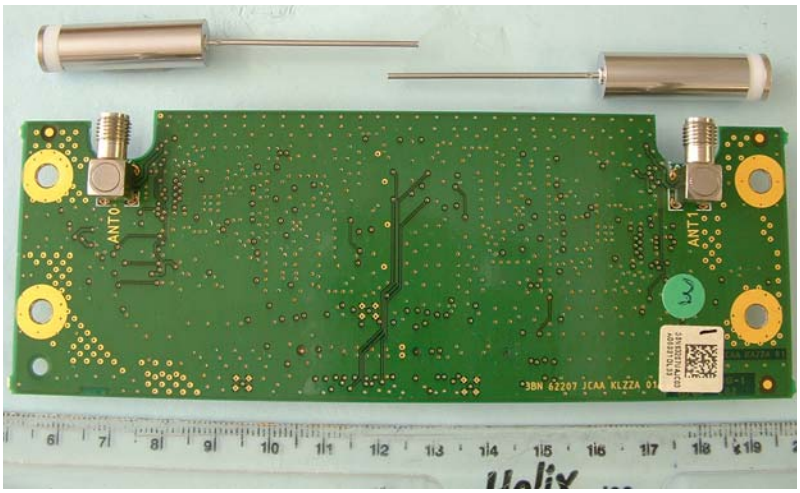
PHOTOGRAPH No. 11 **RF PCB COMPONENT SIDE & ANTENNAS**



PHOTOGRAPH No. 12 **RF PCB COMPONENT SIDE CAN REMOVED**



PHOTOGRAPH No. 13 **RF PCB TRACK SIDE & ANTENNAS**



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

01 Mar 2007 11:46

150kHz - 30MHz

EUT:	4070 IO
Manuf:	Alcatel-Lucent
Op Cond:	LISN UH05, cable UH21 & Receiver UH187
Operator:	D Winstanley
Test Spec:	Part 15
Comment:	Live Line, 110V, 60Hz, EUT on. Powered By external supply, Transmitting Dummy Bearer & Traffic Bearer. Comms with MR300

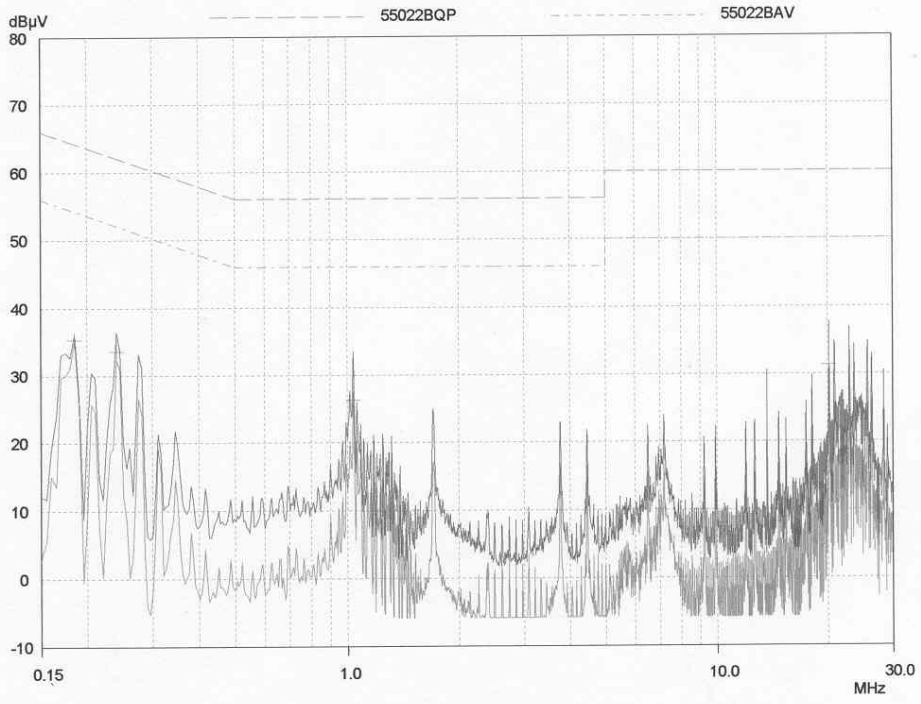
Scan Settings (1 Range)

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	10kHz	30MHz	UH21

Final Measurement:

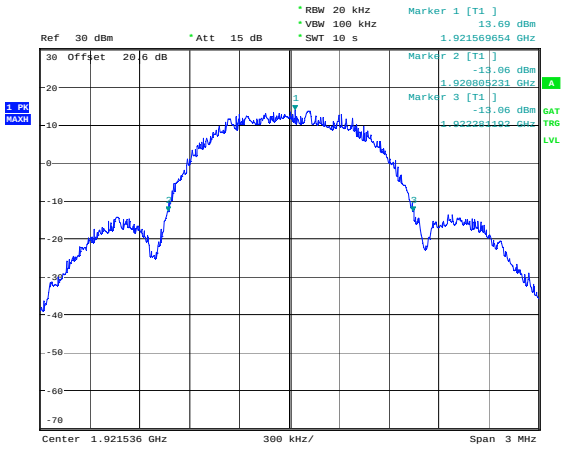
Detectors:	X QP / + AV
Meas Time:	2sec
Subranges:	25
Acc Margin:	20 dB



PAGE 1

ANNEX D

EMISSION BANDWIDTH



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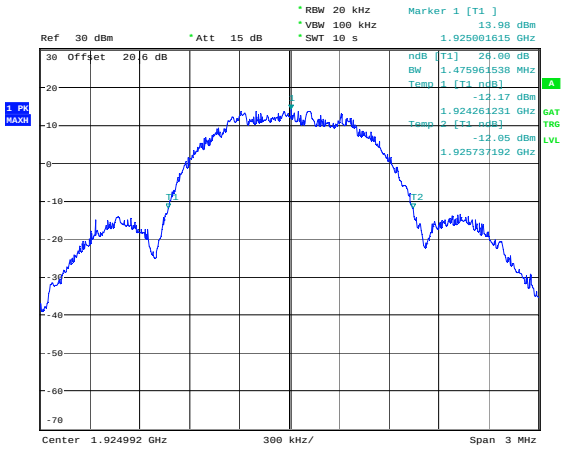

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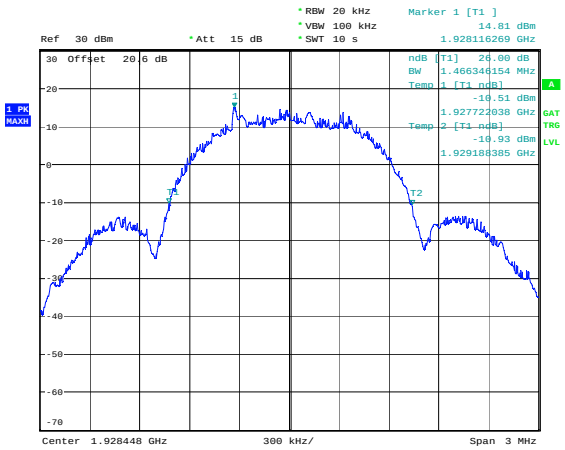
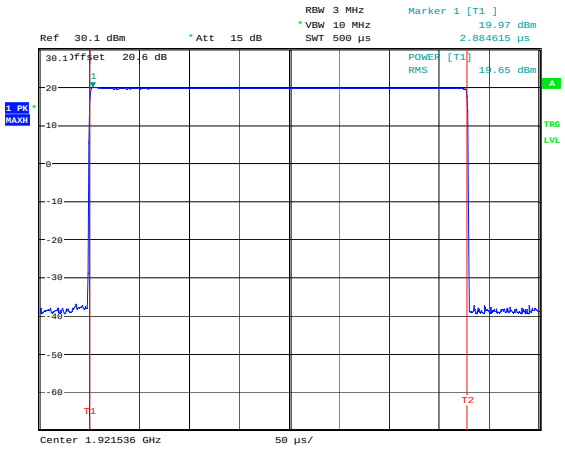


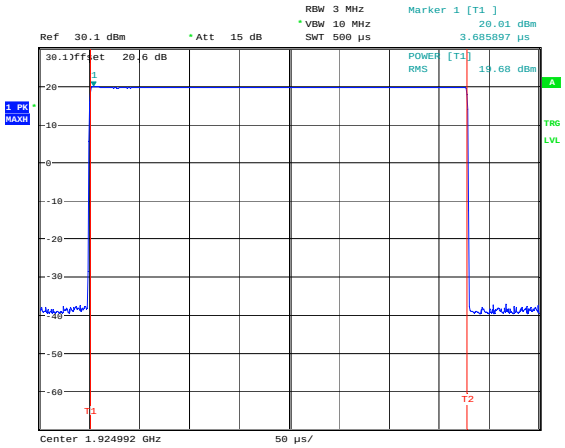
Date: 27.FEB.2007 14:29:51

ANNEX E

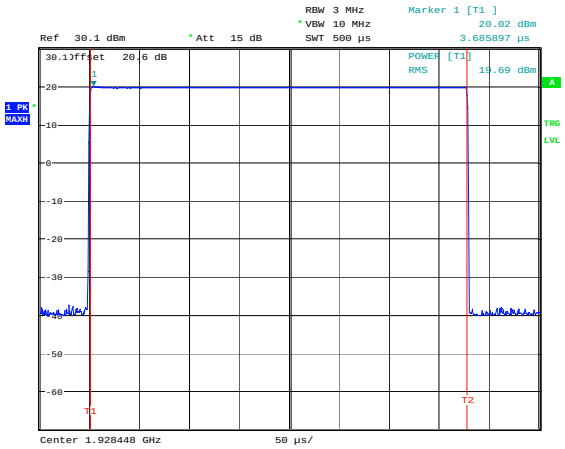
PEAK TRANSMIT POWER



Date: 27.FEB.2007 11:48:44



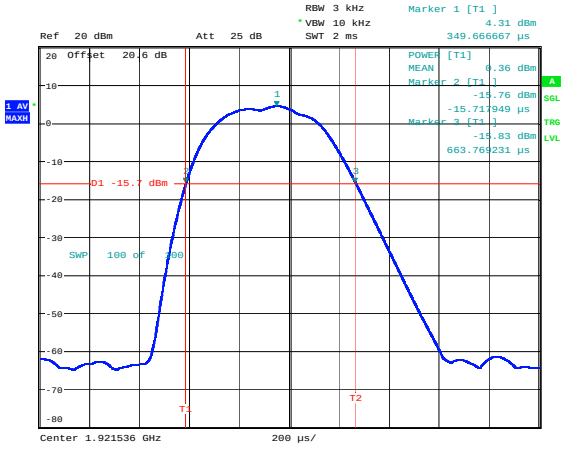
Date: 27.FEB.2007 11:45:45



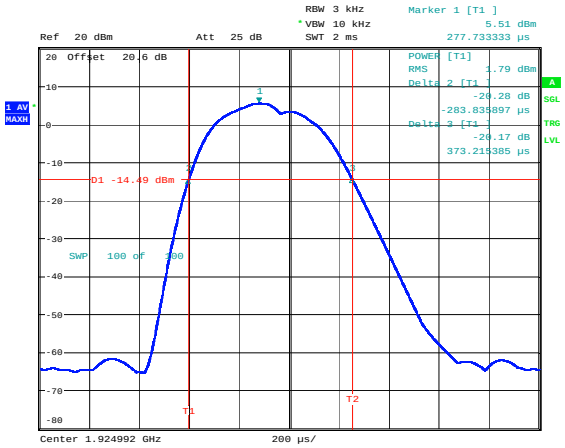
Date: 27.FEB.2007 11:46:55

ANNEX F

POWER SPECTRAL DENSITY



Date: 28.FEB.2007 10:45:18



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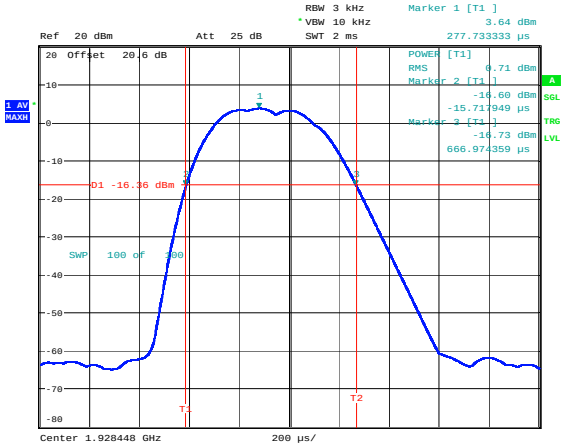

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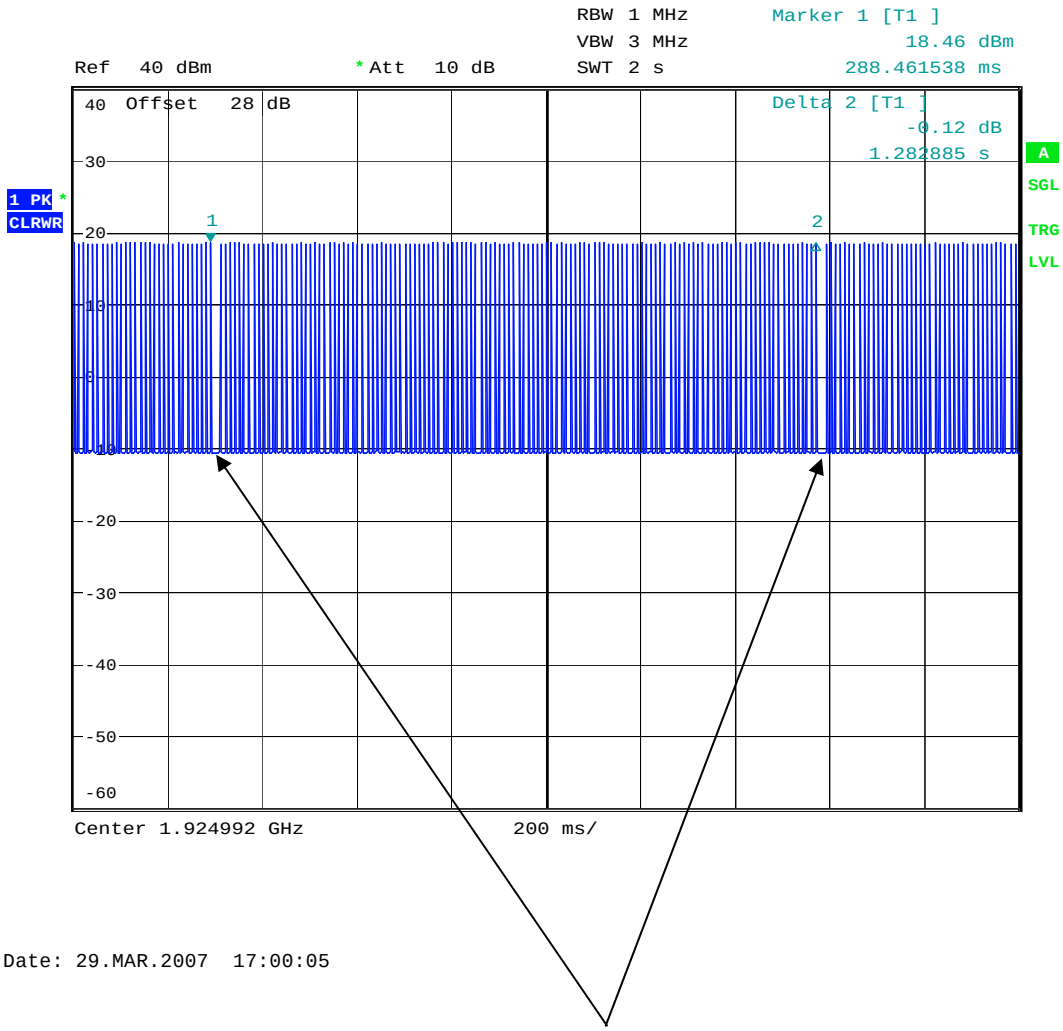
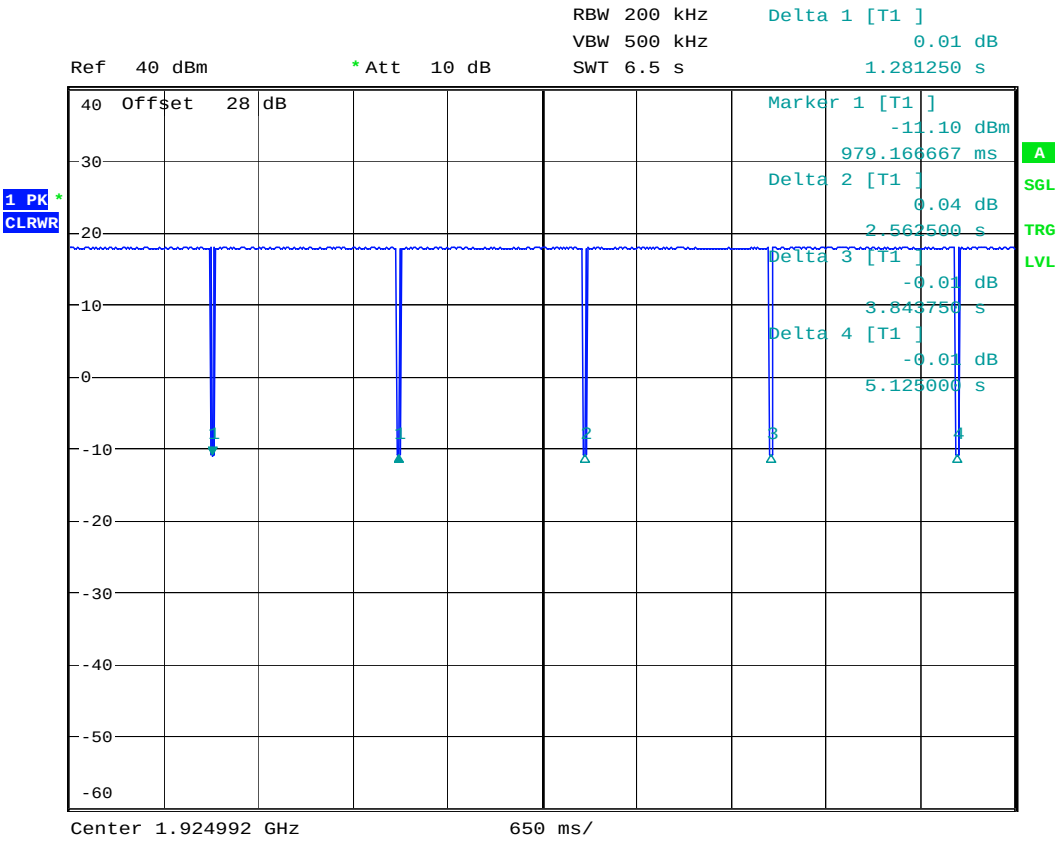
ANNEX G

ACCESS CRITERIA TEST INTERVAL



ACCESS CRITERIA PERFORMED

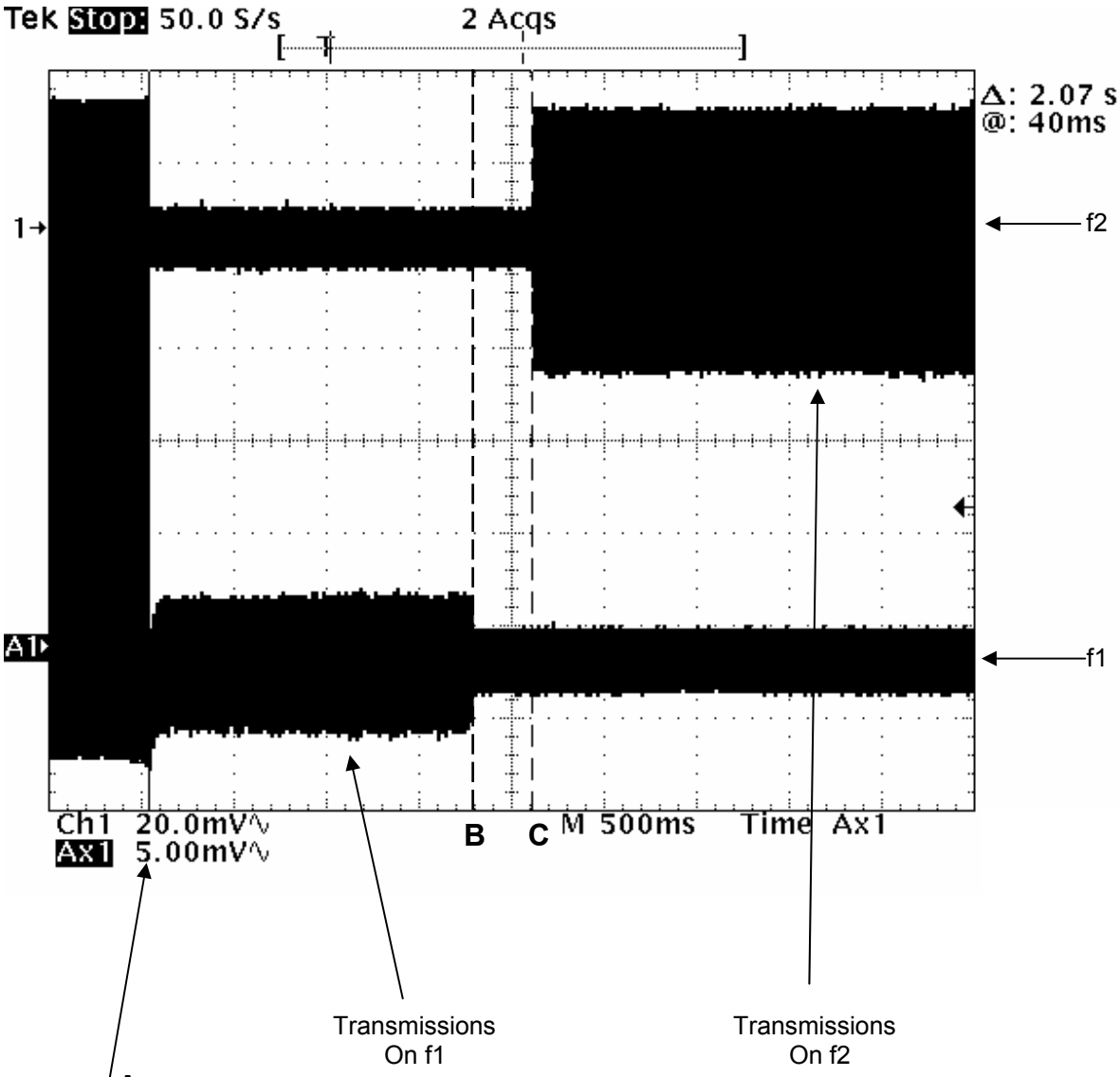


Date: 29.MAR.2007 17:03:09

5 REPETITIONS OF ACCESS CRITERIA

ANNEX H

ACCESS CRITERIA FUNCTIONAL TEST

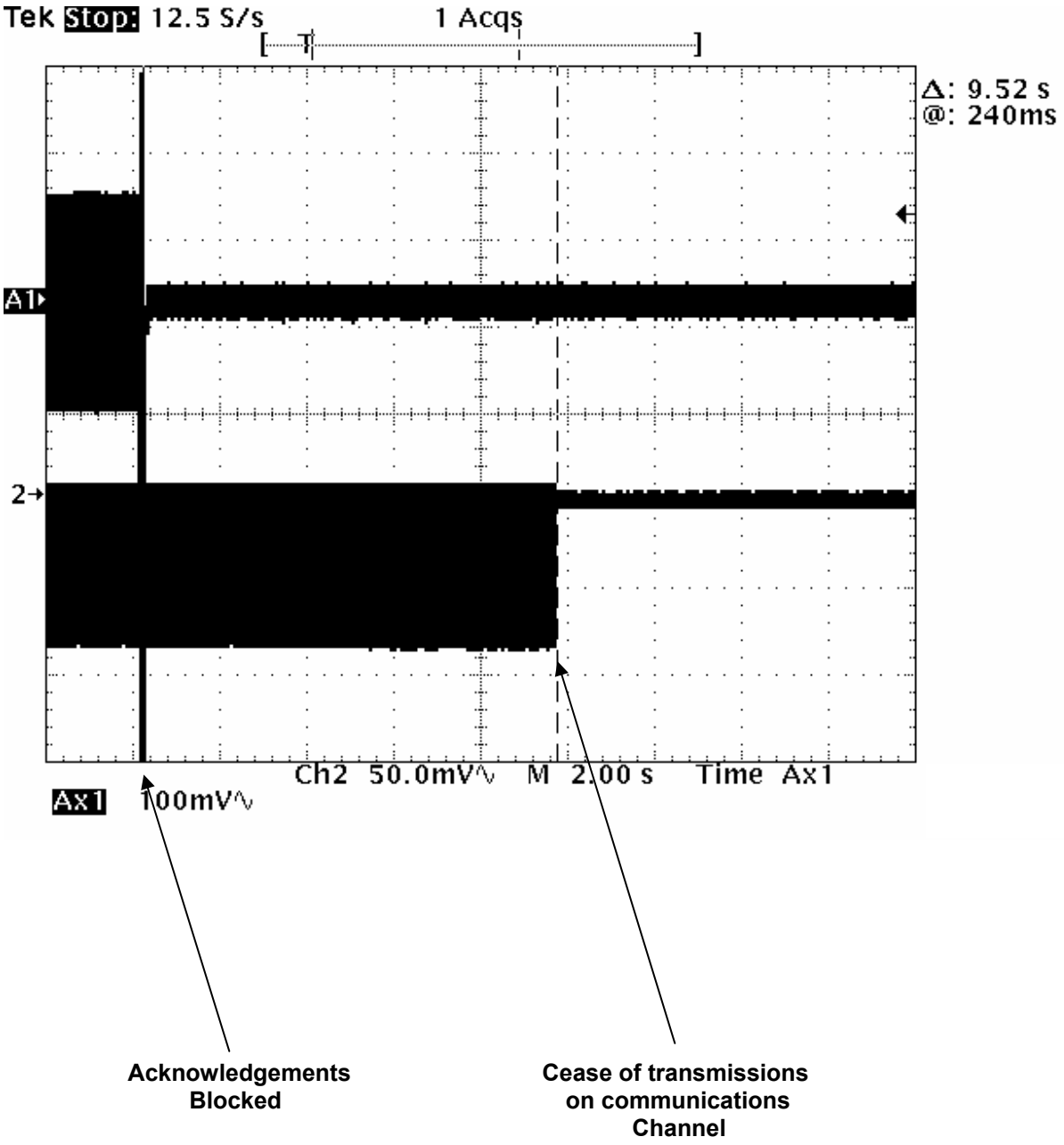


Δ A – B	1.76 second
Δ A – C	2.07 seconds
Δ B – C	310 milliseconds

ANNEX I

ACKNOWLEDGEMENTS

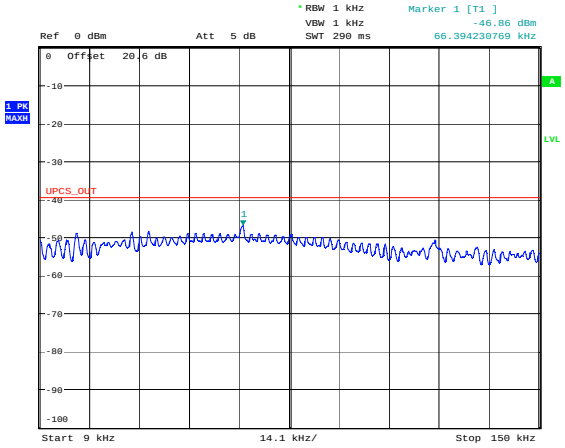
Cease of Transmissions on Communications Channel
Acknowledgements Blocked



ANNEX J

EMISSIONS OUTSIDE THE SUB-BAND

RF carrier set to the lowest carrier defined by the EUT



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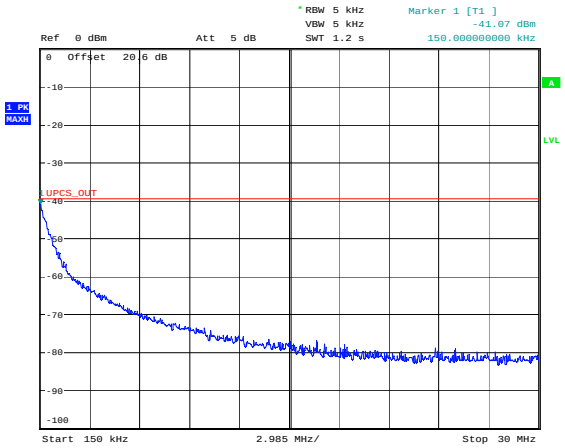

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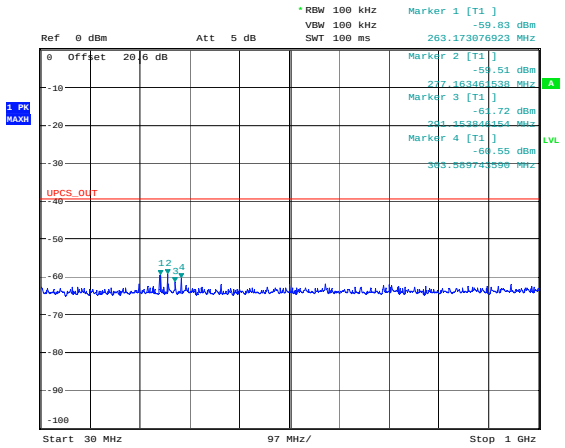

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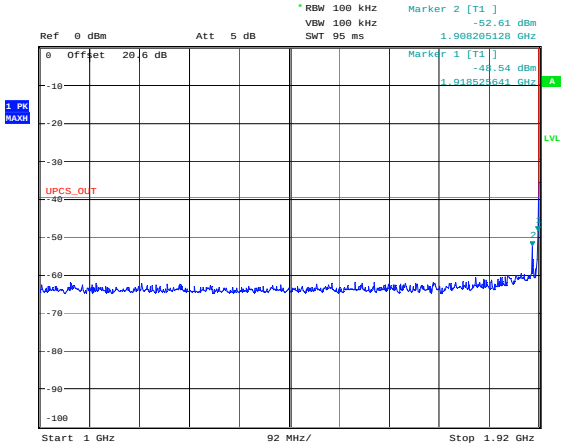
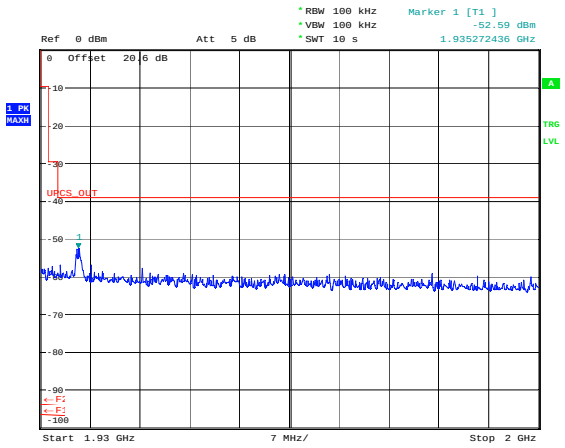
RF carrier set to the lowest carrier defined by the EUT



Date: 28.FEB.2007 11:54:55



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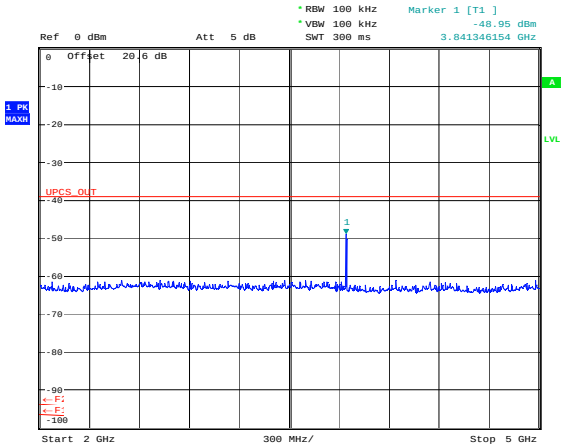

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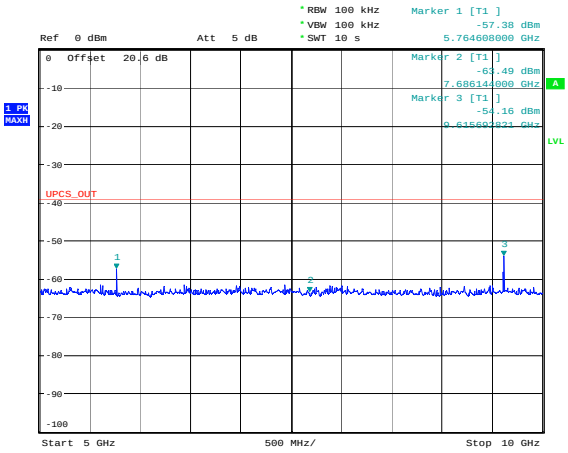
RF carrier set to the lowest carrier defined by the EUT



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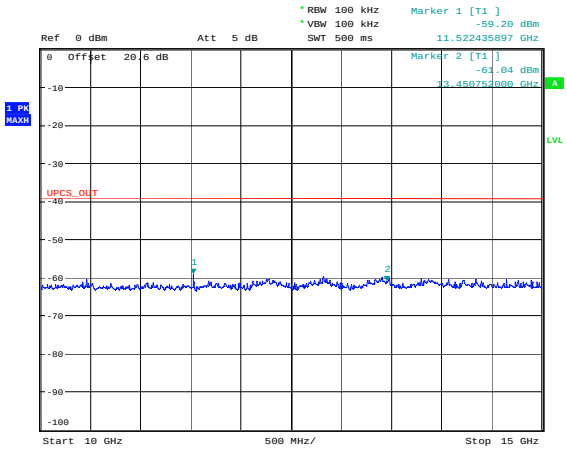

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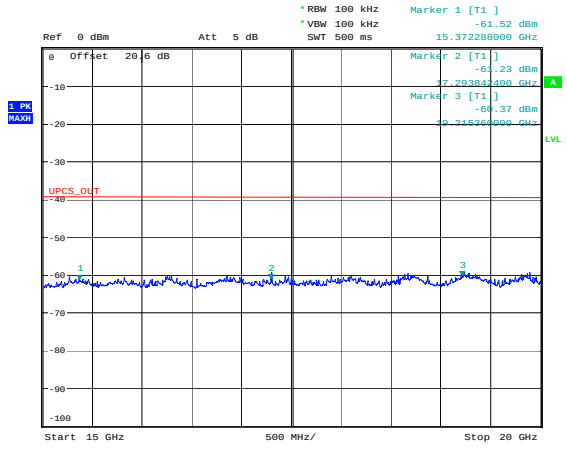

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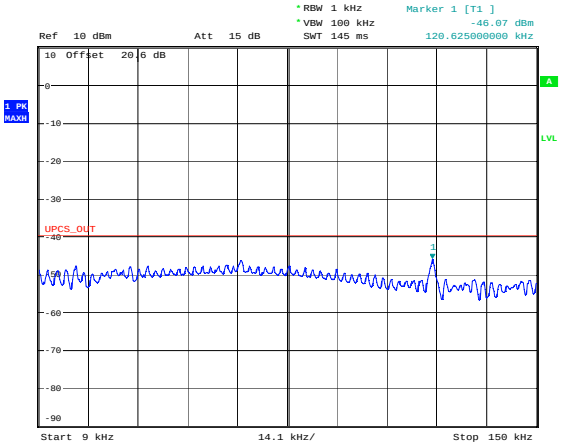

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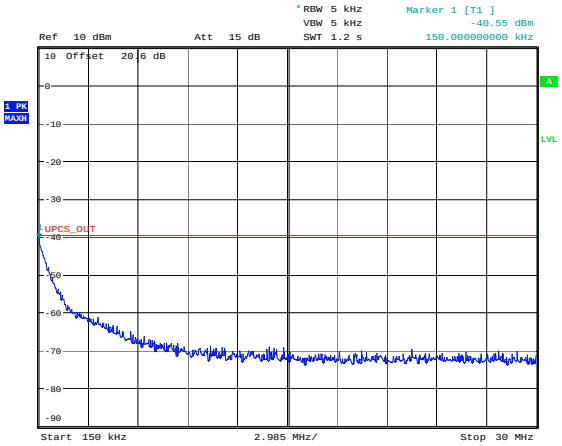

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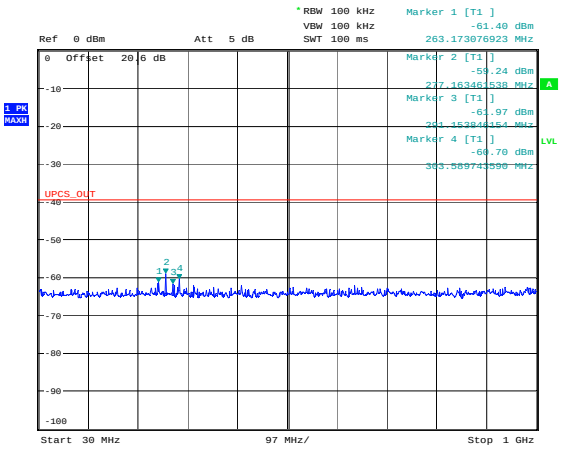

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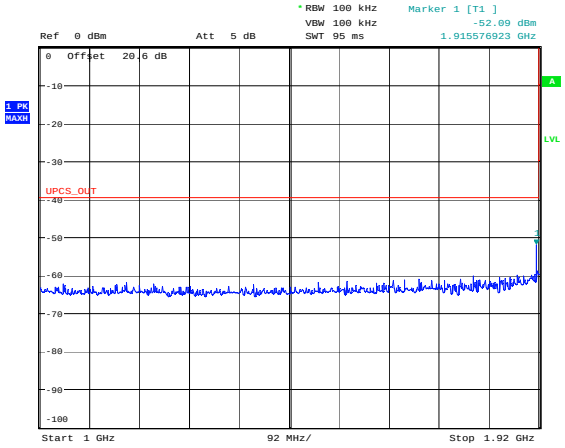

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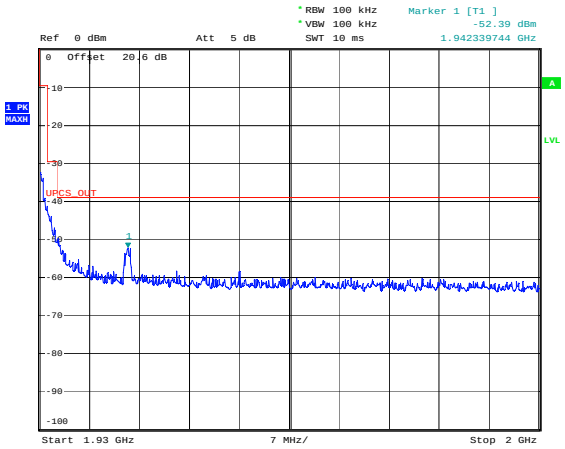

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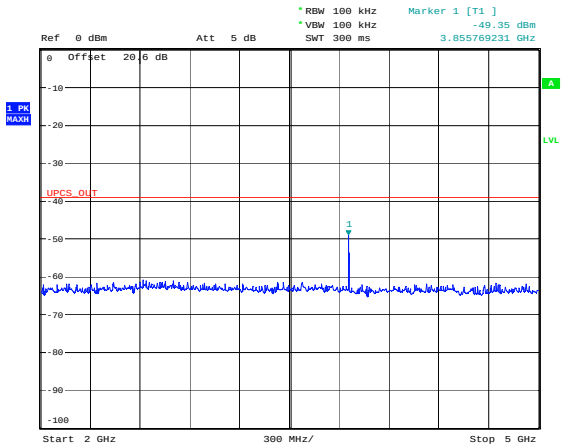

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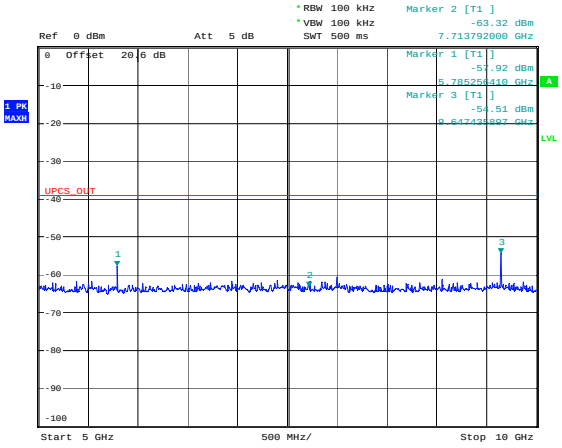

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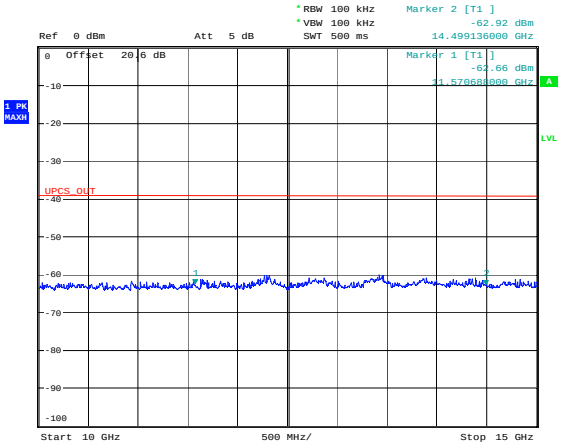

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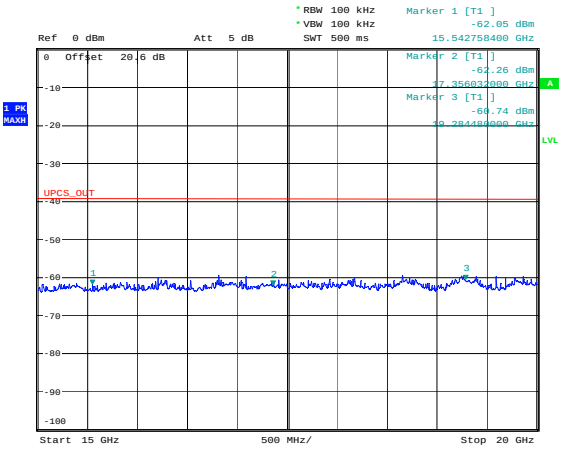
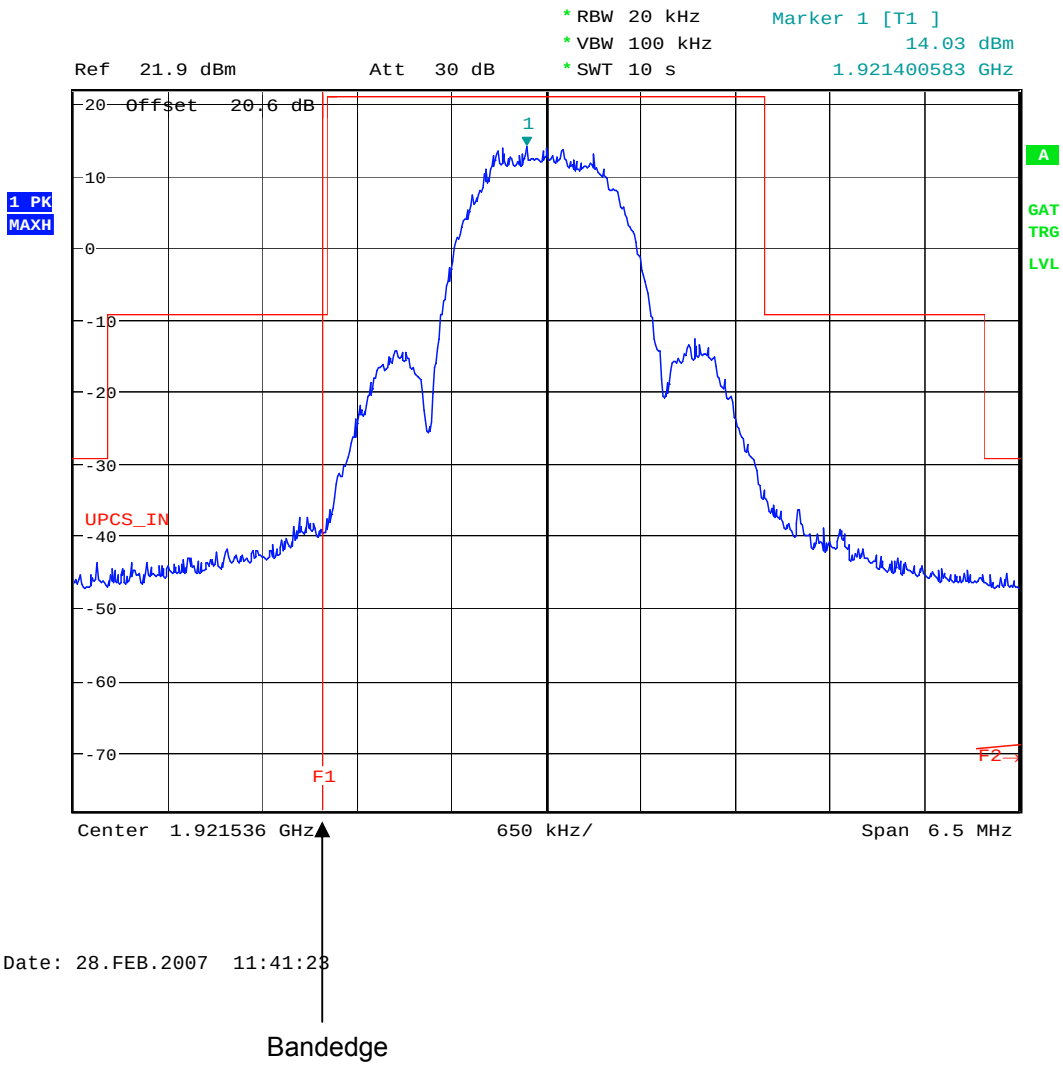


Date: 28.FEB.2007 14:47:59

ANNEX K

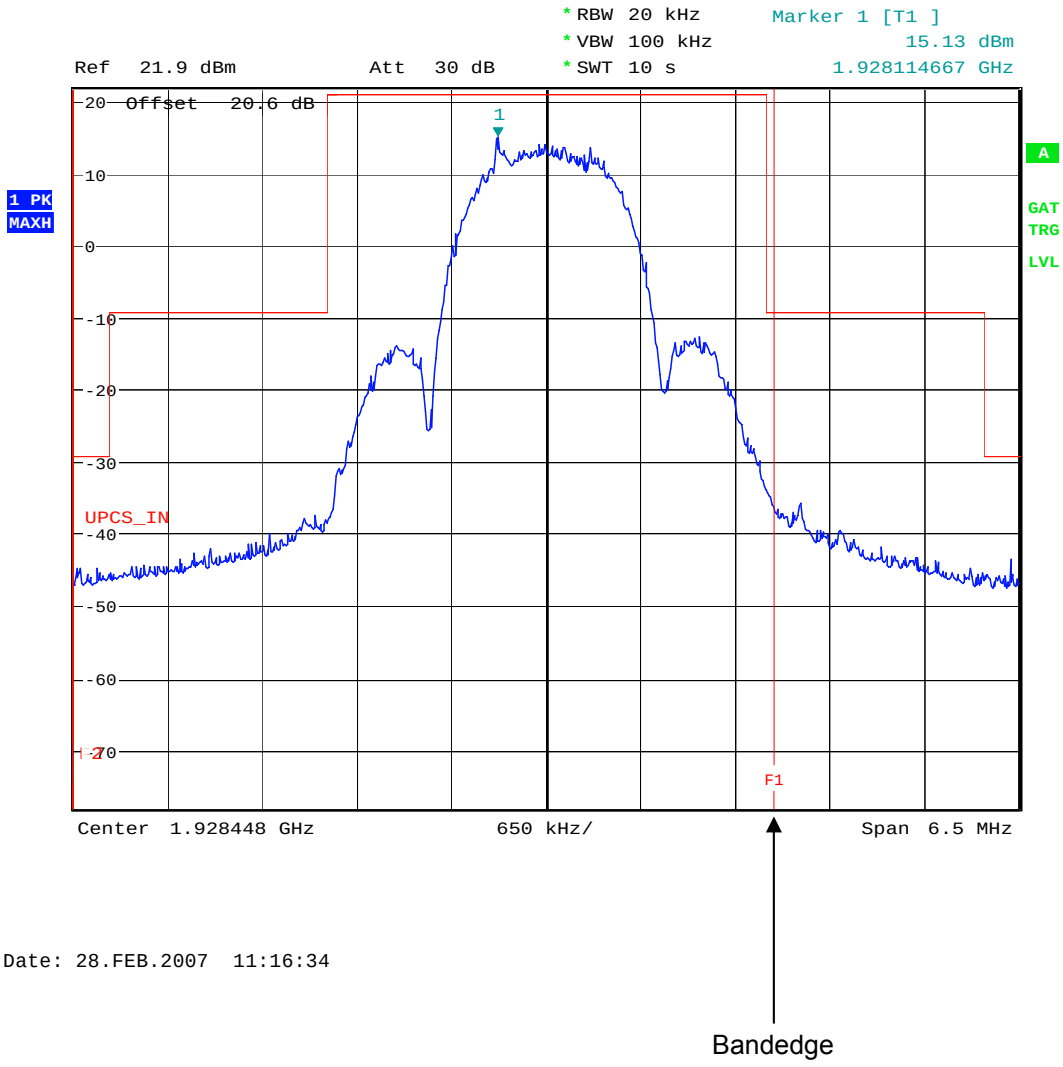
EMISSIONS INSIDE THE SUB-BAND – CONDUCTED

RF carrier set to the lowest carrier defined by the EUT



Bandedge

RF carrier set to the highest carrier defined by the EUT



ANNEX L

SPURIOUS EMISSIONS – RADIATED

4070 IO

TRL Compliance Ltd

23 Feb 2007 10:57

E-Field Radiation (30MHz-1GHz)

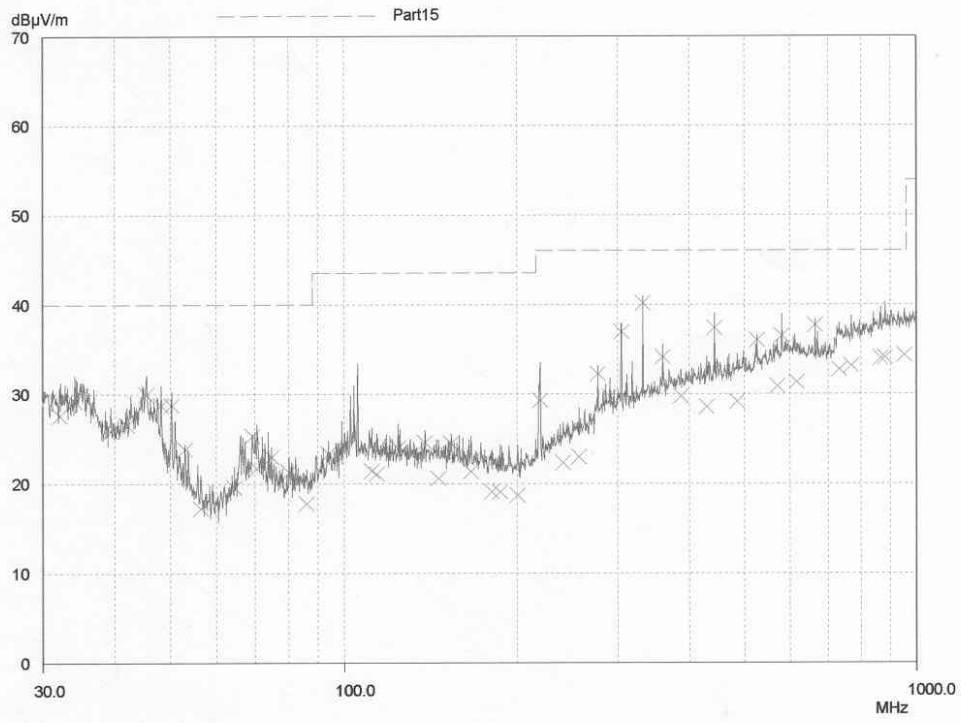
EUT:	4070 IO
Manuf:	Alcatel-Lucent
Op Cond:	Prescan 30MHz - 1000MHz
Operator:	D Winstanley
Test Spec:	Part15
Comment:	EUT On, TX mode, Dummy & Traffic bearer Active on Bottom Channel.
	RX Antenna ~~Horizontal~~. VERTICAL

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



PAGE 1

4070 EO

TRL Compliance Ltd

23 Feb 2007 10:57

E-Field Radiation (30MHz-1GHz)

EUT:	4070 IO
Manuf:	Alcatel-Lucent
Op Cond:	Prescan 30MHz - 1000MHz
Operator:	D Winstanley
Test Spec:	Part15
Comment:	EUT On, TX mode, Dummy & Traffic bearer Active on Bottom Channel.
	RX Antenna ~~Horizontal~~. VERTICAL

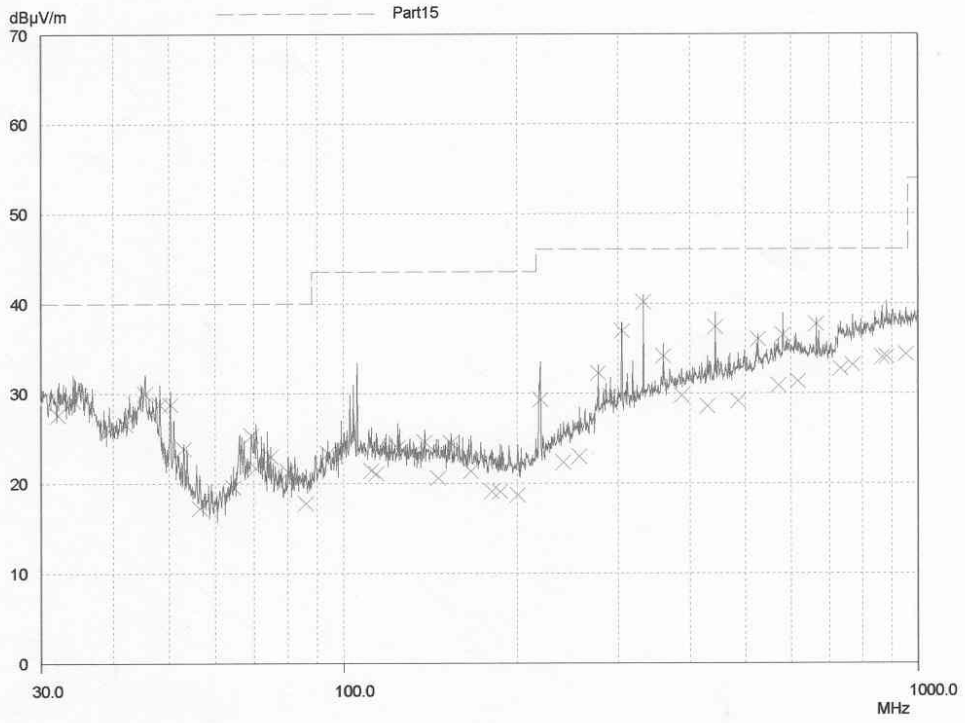
Scan Settings (1 Range)

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



PAGE 1

4070 IO Ex

TRL Compliance Ltd

26 Feb 2007 15:10

E-Field Radiation (30MHz-1GHz)

EUT:	4070 EO EX
Manuf:	Alcatuel-Lucent
Op Cond:	Prescan 30MHz - 1000MHz
Operator:	D Winstanley
Test Spec:	Part15
Comment:	EUT On TX Dummy & Traffic Bearer On BOTTOM Channel. PBX outside room. RX Antenna Vertical.

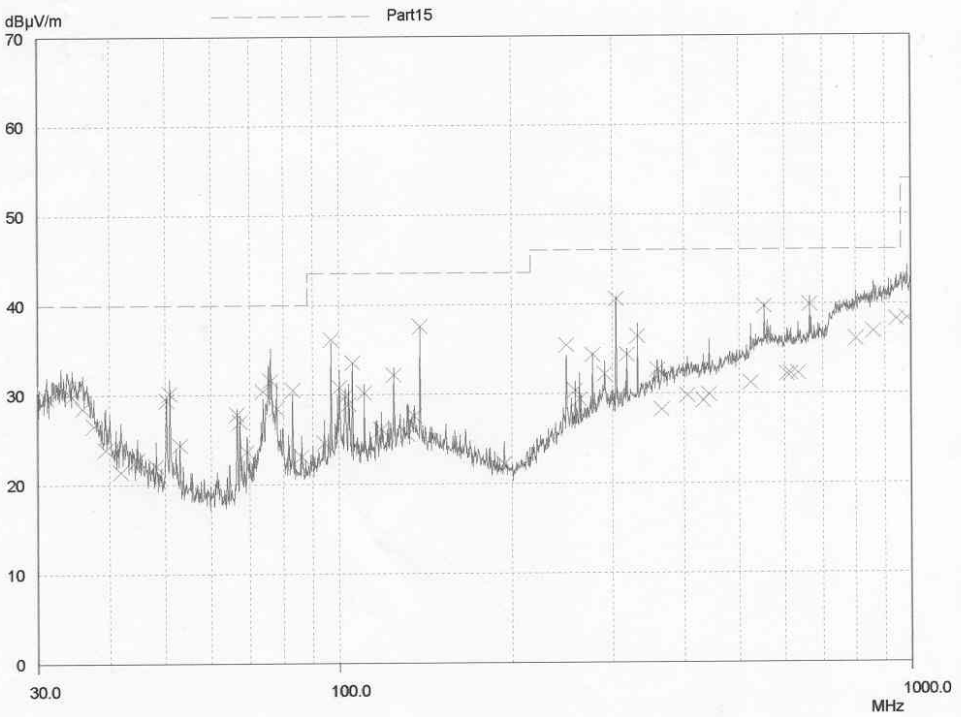
Scan Settings (1 Range)

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	UH191

Final Measurement:

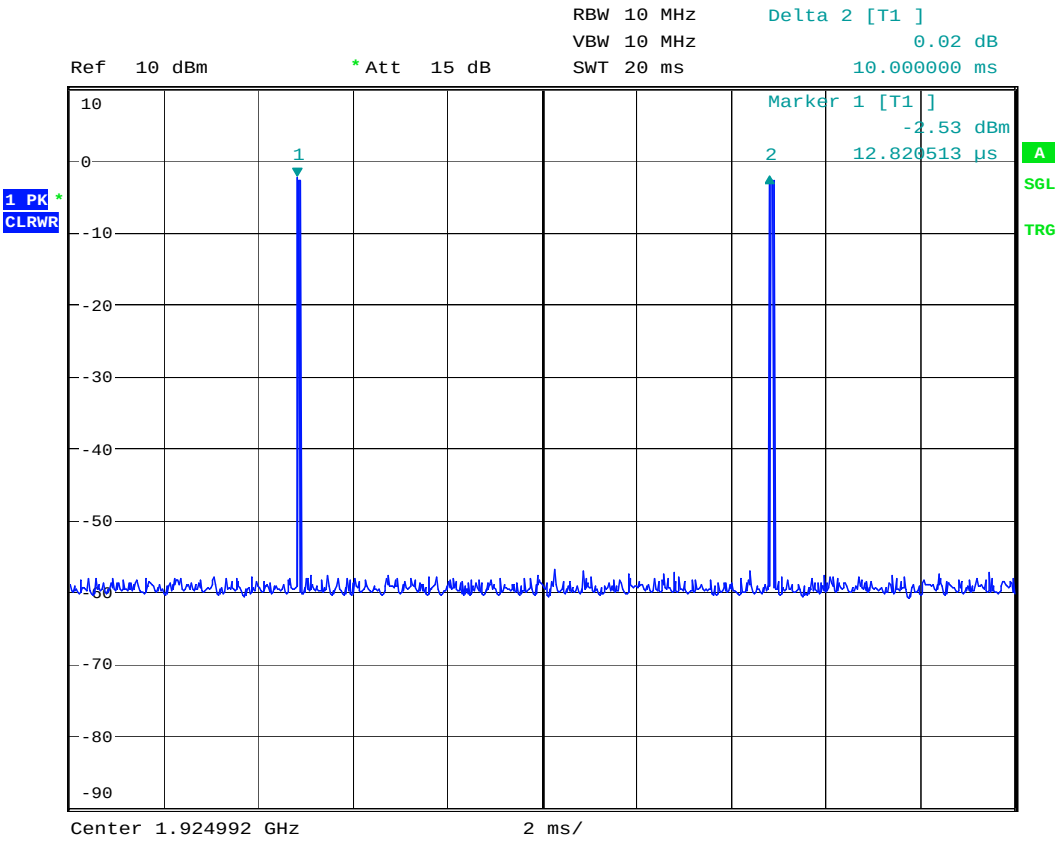
Detector:	X QP
Meas Time:	2sec
Subranges:	50
Acc Margin:	10 dB



PAGE 1

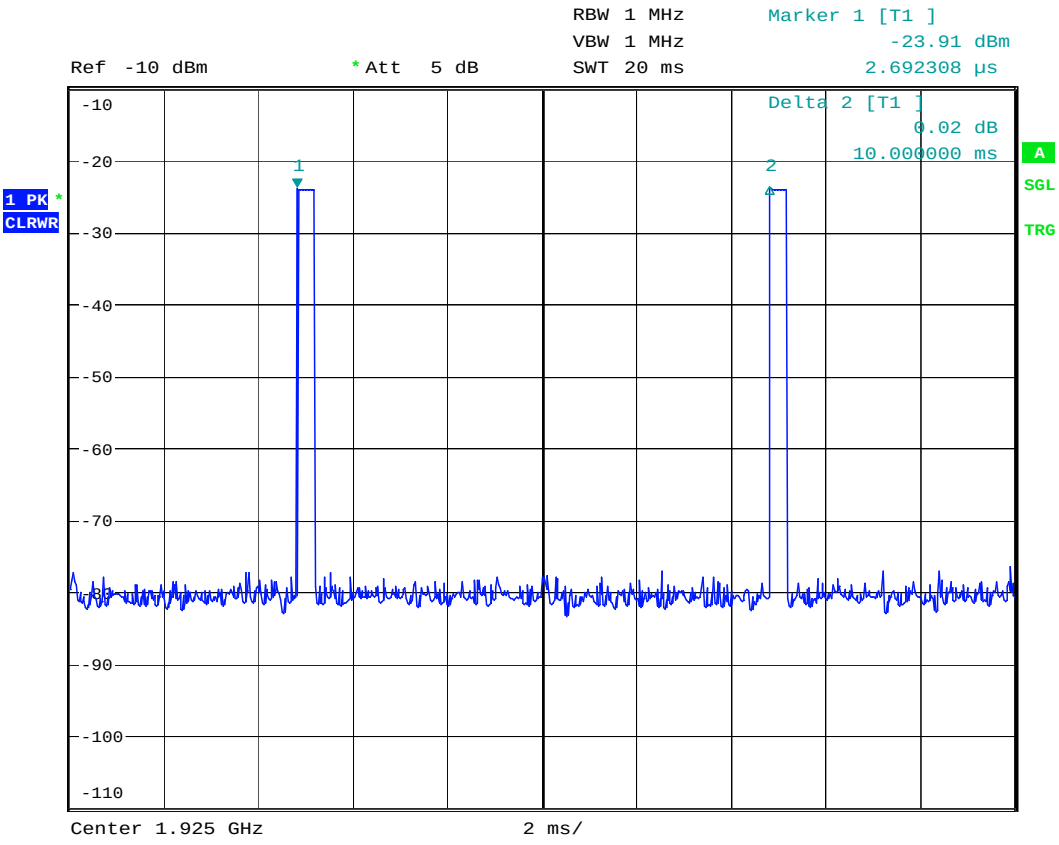
ANNEX M

FRAME PERIOD



Date: 1.MAR.2007 10:30:23

Control and Signalling Information



Date: 1.MAR.2007 16:33:51

Communications Channel Active

ANNEX N

EQUIPMENT DETAILS & CALIBRATION

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
TEMPERATURE CHAMBER	SHARTREE	TCC 125-815P	CS 203	11	X
RESISTIVE COUPLER	ELCOM	RC-3-50	N/A	119	X
HORN ANTENNA	EMCO	3115	9010-3581	139	X
RESISTIVE COUPLER	ELCOM	RC-4-50	N/A	170	X
ATTENUATOR	BIRD	8304-200-N	N/A	221	X
RECEIVER	ROHDE & SCHWARZ	ESVS 10	844594/003	352	X
TEMPERATURE INDICATOR	FLUKE	52 Series II	74700044	426	X
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	X
PRE AMP	AGILENT	8449B	3008A016	572	X
FUNCTION GENERATOR	WAVETEK	178	V644080	638	X
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/01	UH03	X
LISN	ROHDE & SCHWARZ	ESH3-Z5	863906/018	UH05	X
RANGE 1	TRL	3 METRE	N/A	UH06	X
RANGE 1	TRL	10 METRE	N/A	UH07	X
MULTIMETER	AVOMeter	M3004	M3270006	UH41	X
OSCILLOSCOPE	TEKTRONIX	TDS520B	B020491	UH122	X
RECEIVER	ROHDE & SCHWARZ	ESVS 10	841431/014	UH186	X
RECEIVER	ROHDE & SCHWARZ	ESHS 10	841429/012	UH187	X
BILOG ANTENNA	YORK	CBL611/A	1618	UH191	X
LISN	ROHDE & SCHWARZ	ESH3-Z5.831.5	8470 31/015	UH195	X
FUNCTION GENERATOR	WAVETEK	271	C6841078	UH221	X
SPECTRUM ANALYSER	ROHDE & SCHWARZ	FSU 46	200034	UH281	X

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
SIGNAL GENERATOR	ROHDE & SCHWARZ	SML 03	102268	UH297	**X**
CRYSTAL DETECTOR	HP	8472A	1822A00897	UH307	**X**
SIGNAL GENERATOR	HP	83630B	3722A00588	UH340	**X**
MODULATION ANALYSER	ROHDE & SCHWARZ	CMD 60	N/A	N/A	**X**

TRL Number	Equipment Type	Manufacturer	Last Cal Calibration	Calibration Period	Due For Calibration
L011	Temperature chamber	Shartree	Use Calibrated Temperature Indicator		
L119	Combiner	Elcom	Calibrate in use		
L139	1-18GHz Horn	EMCO	03/05/2005	24	03/05/2007
L170	Combiner	Elcom	Calibrate in use		
L221	Attenuator	Bird	Calibrate in use		
L352	Receiver	R&S	07/08/2006	12	07/08/2007
L426	Temperature Indicator	Fluke	09/01/2007	12	09/01/2008
L479	Analyser	Anritsu	09/01/2007	12	09/01/2008
L572	Pre Amp	Agilent	Calibrate in use		
L638	Function Generator	Wavetek	Use Calibrated oscilloscope		
UH003	Receiver	R&S	24/07/2006	12	24/07/2007
UH005	LISN/AMN	R&S	11/04/2006	12	11/04/2007
UH006	3m Range CAL	TRL	23/01/2007	12	23/01/2008
UH007	10 Range CAL	TRL	23/01/2007	12	23/01/2008
UH041	Multimeter	AVOmeter	04/01/2007	12	04/01/2008
UH122	Oscilloscope	Tektronix	07/06/2005	24	07/06/2007
UH177	Power supply	Manson	Use Calibrated Multimeter		
UH186	Receiver	R&S	01/02/2006	12	01/02/2007
UH187	Receiver	R&S	11/10/2006	12	11/10/2007
UH191	Bilog Antenna	Schaffner	11/08/2006	24	11/08/2008
UH195	LISN/AMN	R&S	09/01/2007	12	09/01/2008
UH221	Function Generator	Wavetek	Use Calibrated oscilloscope		
UH281	Spectrum Analyser	R&S	24/07/2006	12	24/07/2007
UH297	Signal Generator	R&S	21/04/2006	12	21/04/2007
UH307	Crystal Detector	R&S	For Information Only		
UH340	Signal Generator	HP	29/06/2006	12	29/06/2007
N/A	CMD60	R&S			

ANNEX O

MEASUREMENT UNCERTAINTY

Radio Testing – General Uncertainty Schedule

All statements of uncertainty are expanded standard uncertainty using a coverage factor of 1.96 to give a 95% confidence where no required test level exists.

[1] Adjacent Channel Power

Uncertainty in test result = **1.86dB**

[2] Carrier Power

Uncertainty in test result (Equipment - TRLUH120) = **2.18dB**
Uncertainty in test result (Equipment – TRL05) = **1.08dB**
Uncertainty in test result (Equipment – TRL479) = **2.48dB**

[3] Effective Radiated Power

Uncertainty in test result = **4.71dB**

[4] Spurious Emissions

Uncertainty in test result = **4.75dB**

[5] Maximum frequency error

Uncertainty in test result (Equipment - TRLUH120) = **119ppm**
Uncertainty in test result (Equipment – TRL05) = **0.113ppm**
Uncertainty in test result (Equipment – TRL479) = **0.265ppm**

[6] Radiated Emissions, field strength OATS 14kHz-18GHz Electric Field

Uncertainty in test result (14kHz – 30MHz) = **4.8dB**, Uncertainty in test result (30MHz – 1GHz) = **4.6dB**, Uncertainty in test result (1GHz-18GHz) = **4.7dB**

[7] Frequency deviation

Uncertainty in test result = **3.2%**

[8] Magnetic Field Emissions

Uncertainty in test result = **2.3dB**

[9] Conducted Spurious

Uncertainty in test result (Equipment TRL479) Up to 8.1GHz = **3.31dB**
Uncertainty in test result (Equipment TRL479) 8.1GHz – 15.3GHz = **4.43dB**
Uncertainty in test result (Equipment TRL479) 15.3GHz – 21GHz = **5.34dB**
Uncertainty in test result (Equipment TRLUH120) Up to 26GHz = **3.14dB**

[10] Channel Bandwidth

Uncertainty in test result = **15.5%**

[11] Amplitude and Time Measurement – Oscilloscope

Uncertainty in overall test level = **2.1dB**, Uncertainty in time measurement = **0.59%,** Uncertainty in Amplitude measurement = **0.82%**

[11] Power Line Conduction

Uncertainty in test result = **3.4dB**

[12] Spectrum Mask Measurements

Uncertainty in test result = **2.59% (frequency)**
Uncertainty in test result = **1.32dB (amplitude)**

[13] Adjacent Sub Band Selectivity

Uncertainty in test result = **1.24dB**

[14] Receiver Blocking – Listen Mode, Radiated

Uncertainty in test result = **3.42dB**

[15] Receiver Blocking – Talk Mode, Radiated

Uncertainty in test result = **3.36dB**

[16] Receiver Blocking – Talk Mode, Conducted

Uncertainty in test result = **1.24dB**

[17] Receiver Threshold

Uncertainty in test result = **3.23dB**

[18] Transmission Time Measurement

Uncertainty in test result = **7.98%**