TÜV
PRODUCT SERVICE

10 August 1998

Chief, Equipment Authorization Branch
Federal Communications Commission
P. O. Box 358315
Pittsburgh, PA 15251-5315

RE: Application for ORTEL CORPORATION
CDMA Channel Selective Repeater, Models CDR 1901 and CDR 1912
FCC ID: LB41900CDMA

Dear Sir/Madam:

Transmitted herewith, on behalf of ORTEL CORPORATION, is the application (FCC Form 731) for the Equipment Authorization by the Type Acceptance Procedure for the CDMA Channel Selective Repeater, Models CDR 1901 and CDR 1912.

Please note that TÜV Product Service is the authorized agent for ORTEL CORPORATION. Direct all communications and send the grant to TÜV Product Service.

If you have any questions concerning this application, please contact me at 619 546 3999.

Sincerely,

Mary Washington
EMC Engineer

enclosures

Making Light *Work* For You

ORTEL®
CORPORATION

August 10, 1998

Federal Communications Commission
Equipment Authorization Division, Applications Processing Branch
7435 Oakland Mills Road
Columbia, MD 21046

Product: Ortel Channel Selective CDMA Repeaters
Re: CDR Test Data Submitted to the FCC
FCC ID: LB41900CDMA

The test data measured by Ortel for the CDR repeaters (various configurations) is in accordance as outlined per the FCC requirements in Parts 2.985, 2.989, 2.991, and 24.238. Additionally, the data for intermodulation and input/output spreading were also in accordance to the guidelines set forth by the FCC via fax and verbal communication.

Sincerely,

Martin R. Kies

Martin R. Kies
Quality Engineering Section Head,
Systems and Products

Phone: (626)-293-3640
Fax: (626)-281-7913

Making Light *Work* For You

ORTEL®
CORPORATION

August 10, 1998

Federal Communications Commission
Authorization and Evaluation Division
7485 Oakland Mills Road
Columbia, MD 21046

Re: Request for Confidentiality
Applicant: Ortel Corporation
Product: CDR Repeaters (FCC ID LB41900CDMA)

Pursuant to Sections 0.457 (d) (1) (ii) and 0.459 of the Commission's Rules, the Applicant hereby requests confidential treatment of Product information accompanying as outlined below:

1. Schematics
2. Bill of Materials
3. Semiconductor devices used
4. Operating manual

The above materials contain trade secrets and proprietary information not customarily released to the public. The public disclosure of these matters might be harmful to the Applicant and provide unjustified benefits to its competitors.

The Applicant understands that pursuant to Rule 0.457 (d) (1) (ii), disclosure of this Application and all accompanying documentation will not be made before the date of the Grant for this Application.

Sincerely,

Martin R. Kies

Martin R. Kies
Quality Engineering Section Head,
Systems and Products

Phone: (626)-293-3640
Fax: (626)-281-7913

Greg Czumak <GCZUMAK@fcc.gov> on 06/09/98 12:20:19 PM (1)

To: Martin Kies/Ortel Corporation
cc: mwashington@tuvps.com
Subject: Quick Question -Reply

Martin,

This is in response to your e-mail, copied below, and the subsequent fax you sent me (re-sent yesterday). The 1 ch. 4W repeater and the 2 ch. 2W/ch. repeaters (labelled a) and b) in the fax) may be authorized under one FCC ID, a different FC ID than the previously authorized 1 ch. 2W device. Run a complete set of tests on the 1 ch. 4W repeater, and in addition, run a 2 tone intermod test on the 2 ch. version.

Please include a copy of this e-mail with the application. Please contact me with any further questions.

>>> <mkies@ortel.com> 04/29/98 05:48pm >>>
Greg:

Per our phone conversation last Monday (4/27), you mentioned that the 2ch x
2W CDR repeater is a worst case unit in that the 2ch x 2W CDR repeater will
cover both the 1ch x 4W CDR version and the 2ch x 1W CDR version.

We have approval for the 1ch x 2W CDR repeater (FCC ID LB41901CDMA). Does
the 2ch x 2W CDR repeater also cover the 1ch x 2W CDR repeater (this would
follow the same logic in that the 2ch x 2W CDR repeater covers the 2ch x 1W
CDR)?

I know we will have to start an entire new application process with new FCC
ID number for the 2ch x 2W CDR, but would like to know if the 2ch x 2W CDR
version will also cover the already approved 1ch x 2W CDR version.

Recall that all amps are exactly the same electrically (only they are biased differently).

Thanks for your help,

Martin

ORTEL® CORPORATION

ORTEL CORPORATION
2015 West Chestnut Street
Alhambra, CA 91803-1542

6/8/98

Ch: channelizer
LNA: low noise amplifier

Date: [redacted]

Number of pages including cover sheet: 1

To: Greg Czumak (x230)
FCC

Phone:
Fax Phone: [redacted] 301-344-2050
CC:

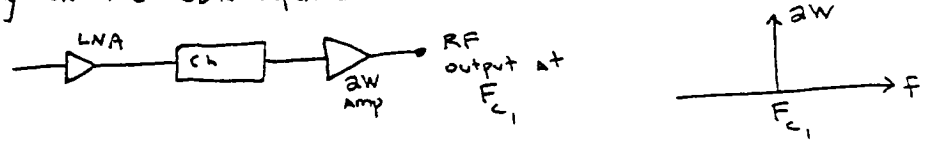
From:
Martin R. Kies
Ortel (Alhambra)

Phone: (626)-293-3640
Fax Phone: (626)-281-7913

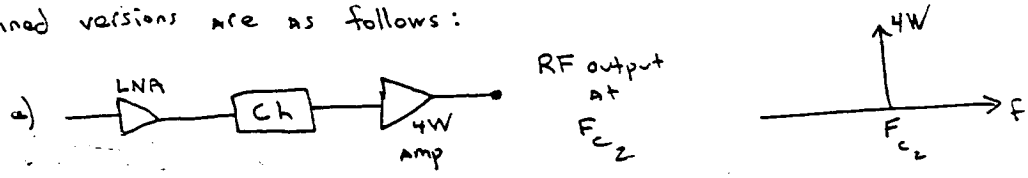
REMARKS:

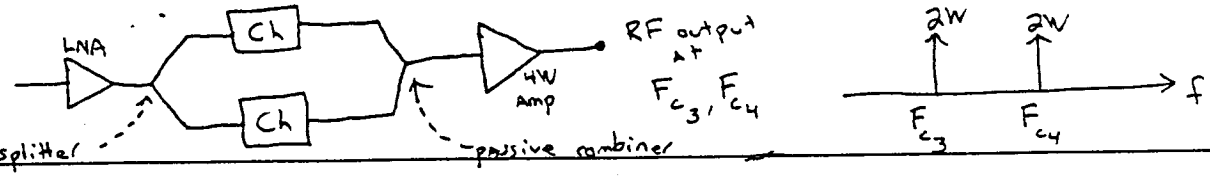
☐ Urgent ☐ For your review ☐ Reply ASAP ☒ Please comment

Greg: Here is some information to supplement my voicemail on 4/14. We are approved for the following on the CDR repeater (FCC ID: LB41901CDMA):



Planned versions are as follows:

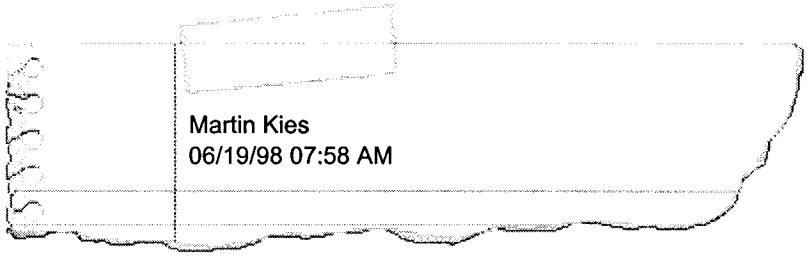




All amps are exactly the same electrically, they are only biased differently. Version b) would add a splitter, combiner, and 2 additional Ch to the repeater box. Does one version (a or b) approve the other? Can we test to one to "cover" the other?

CONFIDENTIALITY NOTE: The documents accompanying this telecopy transmission contain information from Ortel Corporation which is confidential and/or legally privileged. The information is intended for the use of the individual or entity named as the recipient on the transmission sheet. If you are not the intended recipient, you are hereby notified that you have received this information in error and any review, disclosure, copying, use, distribution or the taking of any action in reliance on the contains of this telecopied information is strictly prohibited, and that the documents should be returned to Ortel Corporation immediately. In this regard, if you have received this telecopy in error, please notify us by telephone immediately so that we can arrange for the return of the original documents to us at no cost to you.

Thx!
Martin



Martin Kies
06/19/98 07:58 AM

To: Douglas Morais/Ortel Corporation@Ortel Corporation, Tamiru Agunae/Ortel Corporation@Ortel Corporation, Hal Zarem/Ortel Corporation@Ortel Corporation, Bob Mielke/Ortel Corporation@Ortel Corporation
cc: gczumak@fcc.gov, mwashington@tuvps.com
Subject: Re(3): Quick Question -Follow Up (All CDR Configurations)

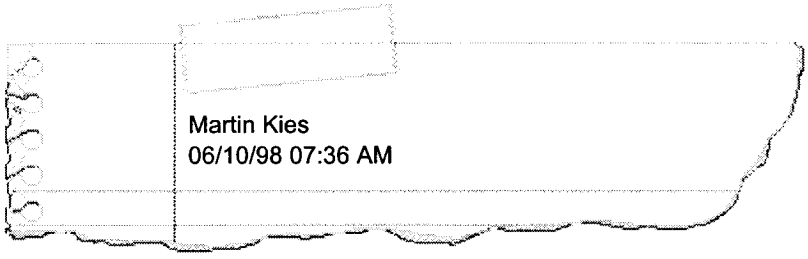
I phoned Greg Czumak at the FCC this morning regarding the questions below. The answers are given in bold italic form.

Greg, I will include this e-mail in all applications to you. Please let me know if you have any follow up questions.

Thanks,

Martin

Martin Kies



Martin Kies
06/10/98 07:36 AM

To: Greg Czumak <GCZUMAK@fcc.gov>
cc: Douglas Morais/Ortel Corporation@Ortel Corporation, Tamiru Agunae/Ortel Corporation@Ortel Corporation, Hal Zarem/Ortel Corporation@Ortel Corporation, Bob Mielke/Ortel Corporation@Ortel Corporation, mwashington@tuvps.com
Subject: Re(2): Quick Question -Follow Up

Greg:

Thank you for the information, it will help us a great deal in submitting in the most cost effective way new applications. Ortel is going to proceed with new CDR configurations, and will be submitting units shortly.

In light of your answers, I have a couple of follow up questions:

1) You mention that 1chx4W is worst case when compared to 2chx2W. There also may be a 2chx1W (exactly the same electronic block configuration as the 2chx2W, only amp is biased to 2W composite, 1W for each channel). Is 2chx1W automatically included since this is only lower power than the 2chx2W, which should be covered by the 1chx4W testing?

ANSWER: 2chx1W will be covered under 2chx2W (1chx4W) if the 2chx1W has less emissions than

2chx2W. We need to perform parts 15.109 (radiated emissions from 30 - 960MHz) and 2.993 (any band) to verify that these emissions are equal to or less than the 2chx2W (1chx4W), and within the FCC guidelines. Only one band needs to be tested to cover the same bands as we would test to for the 1chx4W. Band edge in house plots are required.

2) Ortel has FCC approval for 1chx2W (FCC ID LB41901CDMA) for bands A, B, and D. If we submit a 1chx4W as a worst case for the 2chx2W (as you mentioned above), does the 2chx2W approval then automatically include the 1chx2W (even though the 2chx2W and 1chx2W will have different FCC ID numbers)? If this is agreed upon, then testing the 1chx4W C, E, and F bands will apply to the 1chx2W, and then Ortel will have approval for A-F bands for the 1chx2W. Again, exactly the same electronic hardware is used between the 1chx2W and 1chx4W, only that the amp is biased higher.

ANSWER: 1chx4W will cover 1chx2W. When we test 1chx4W C, E, and F bands, this will cover 1chx2W. Ortel will use FCC ID LB41901CDMA for 1chx2W A, B, and D bands (as before). However, Ortel will use FCC ID LB41900CDMA for 1chx2W C, E, and F bands. LB41900CDMA will be the FCC ID number for 1chx4W, 2chx2W, 2chx1W, 1chx2W (C, E, and F bands), and CDF (C, E, and F bands). LB41901CDMA will be the FCC ID number for CDR 1chx2W A, B, and D bands, and CDF A, B, and D bands.

3) Does the FCC consider any marginal headroom for output power? On FCC Form 731, section 8b, "rated RF power output in Watts" is noted by the manufacturer submitting the form. For example, say a device tested for radiated emissions with a nominal output power of X Watts. To my interpretation, this would be the same value noted in section 8b. However, the manufacturer usually rates the output power within some range, say X Watts +/- YdB, due to gain flatness variations across the bandwidth. Thus it is possible to radiate at X + Y Watts. Usually Y is no more than 1 or 2 dB. What limit does the FCC consider on the +Y margin (if any)?

ANSWER: The +Y margin is +20% or 1dB, whichever is least.

4) Any word on the applications for CSR C-band (FCC ID LB41901) or 5800PCS B-band (FCC ID LB45800PCS)?

ANSWER: CSR C-band has verbal approval, 5800PCS B-band is still pending.

5) (new question: follow up to question 3) How does FCC view increases in output power?

ANSWER: A new FCC application (new ID number) is required anytime the maximum output power is exceeded by 1dB or 20% rule.

6) (new question: follow up to question 1) Recall that for 2chx2W, 2-tone IMD plots are required. Do we need to do this for each 1chx4W (2chx2W) band that is tested, or only once for any band to give an representative idea of IMD on one unit?

ANSWER: Only one band need to be tested for 2-tone IMD to cover all bands.

I will try and get a hold of you within the next few days to discuss these points.

Thanks again for your help,

Greg Czumak <GCZUMAK@fcc.gov> on 06/09/98 12:20:19 PM

Greg Czumak <GCZUMAK@fcc.gov> on 06/09/98 12:20:19 PM

To: Martin Kies/Ortel Corporation
cc: mwashington@tuvps.com
Subject: Quick Question -Reply

Martin,

This is in response to your e-mail, copied below, and the subsequent fax you sent me (re-sent yesterday). The 1 ch. 4W repeater and the 2 ch. 2W/ch. repeaters (labelled a) and b) in the fax) may be authorized under one FCC ID, a different FC ID than the previously authorized 1 ch. 2W device. Run a complete set of tests on the 1 ch. 4W repeater, and in addition, run a 2 tone intermod test on the 2 ch. version.

Please include a copy of this e-mail with the application. Please contact me with any further questions.

>>> <mkies@ortel.com> 04/29/98 05:48pm >>>
Greg:

Per our phone conversation last Monday (4/27), you mentioned that the 2ch x
2W CDR repeater is a worst case unit in that the 2ch x 2W CDR repeater will
cover both the 1ch x 4W CDR version and the 2ch x 1W CDR version.

We have approval for the 1ch x 2W CDR repeater (FCC ID LB41901CDMA). Does
the 2ch x 2W CDR repeater also cover the 1ch x 2W CDR repeater (this would
follow the same logic in that the 2ch x 2W CDR repeater covers the 2ch x 1W
CDR)?

I know we will have to start an entire new application process with new FCC
ID number for the 2ch x 2W CDR, but would like to know if the 2ch x 2W CDR
version will also cover the already approved 1ch x 2W CDR version.

Recall that all amps are exactly the same electrically (only they are biased differently).

Thanks for your help,

Martin

Martin Kies
07/30/98 07:55 AM

To: mwashington@tuvps.com, gczumak@fcc.gov
cc: Douglas Morais/Ortel Corporation@Ortel Corporation, Tamiru Agunae/Ortel Corporation@Ortel Corporation
Subject: Re: Re(2): New Version of Product

Greg:

As you may know, Ortel is currently testing with TUV approval for various CDR repeater configurations (1chx7.1W, 1chx4W, 2chx2W, and 2chx1W). Recall from our previous correspondence that the 2chx2W should cover the testing for the 1chx2W (the 1chx2W A, B, and D bands are already approved with FCC ID LB41901CDMA).

I would like to include with these new configurations the CDF models. From the information below, recall that testing has already been performed on this unit to "merge" with any additional filings with the 1chx2W unit (if an additional band is added to the 1chx2W, the CDF model would automatically be approved for this additional band).

With the new 2chx2W and 2chx1W testing, I would like the same to occur for the CDF. We agreed earlier that the 2 channel units would be a worse case and thus the 1 channel unit would be included in the new CDR application (LB41900CDMA). I would like the CDF model to also be merged with the 2 channel testing. The CDF downlink configuration is still exactly the same as the downlink configurations for the 2chx2W unit (and 1chx1W). There is no mechanical or electrical difference.

I will include this e-mail in the official application which should arrive in Maryland in 2-3 weeks.

Thanks,

Martin

Martin Kies

Martin Kies
02/04/98 09:11 AM

To: mwashing@qualcomm.com
cc:
Subject: Re(2): New Version of Product

Mary:

(3)

Please see the two e-mails below for history.

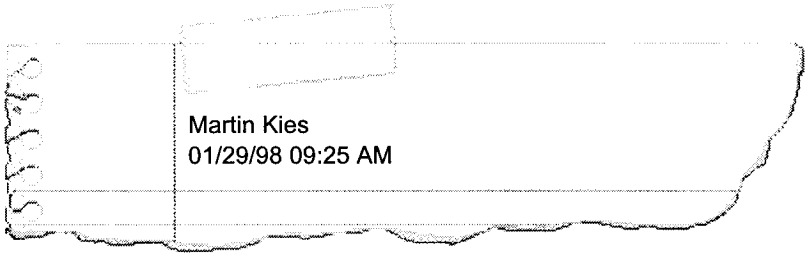
The CDF would most likely be the next testing along with a band addition for the CSR low power unit (C-band). Once I do get the units from Engineering (several weeks), I will schedule the testing.

It was good hearing from you and that everything is going well. It is nice to see that everything has worked out for the both of us.

Hope to see you soon...

Martin

---------- Forwarded by Martin Kies/Ortel Corporation on 02/04/98 09:03 AM ----------



Martin Kies
01/29/98 09:25 AM

To: Tamiru Agunae/Ortel Corporation@Ortel Corporation, Vu Tran/Ortel Corporation@Ortel Corporation, Hal Zarem/Ortel Corporation@Ortel Corporation, Bob Mielke/Ortel Corporation@Ortel Corporation

cc:

Subject: Re(2): New Version of Product

I just received information from the FCC regarding what is required for type acceptance for the CDF model.

Since we are adding a channel to this unit and there is a new enclosure, we will only need to test to part 2.993 (radiated spurs from low frequency through the device harmonics). The testing will only take about a half a day and we will need to supply photos and a description of the device for this Class 2 Permissive Change.

Furthermore, we will only need to do this once with this CDF unit to get all of the bands (A, B, D) that we already have approved for the CDR. In the future when we want to add a band to either the CDR or CDF, we would need to test the CDR since it radiates in both the UL and DL directions (the CDF would automatically be approved through this).

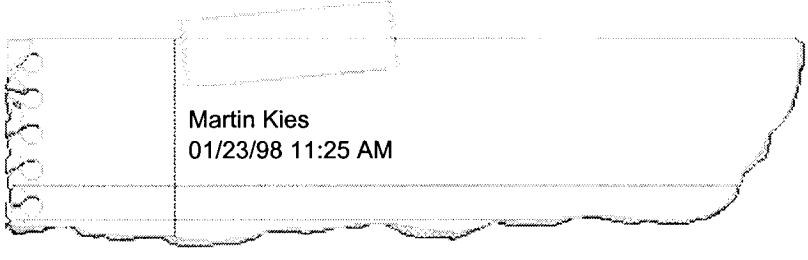
Both the CDR and CDR repeaters would have the same FCC ID numbers (LB41901CDMA).

Vu, please let me know when a unit will be available for about two months (worst case, depending upon FCC workload) while we are going through this approval process. I will then go ahead and schedule the testing.

Thanks,

Martin

Martin Kies



Martin Kies
01/23/98 11:25 AM

To: gczumak@fcc.gov
cc: Floyd Fleury, Tamiru Agunae/Ortel Corporation@Ortel Corporation, Vu Tran/Ortel Corporation@Ortel Corporation, Bob Mielke/Ortel Corporation@Ortel Corporation
Subject: New Version of Product

Greg:

Hello Greg, I have not spoken to you in some time. I tried to call you via phone but you mentioned that you will be out of the office until late next week. Thus, this e-mail.

I have a question regarding a new version of a repeater product. Ortel already has type acceptance for the CDR repeater product, FCC ID LB41901CDMA (A, B, and D bands). Recall that this product is an intentional radiator for both the uplink and downlink paths and consists of one unit. At time of approval, the CDR can only transmit one channel at a time.

We have a new version of the CDR repeater, the CDR fiberoptic (CDR FO) or CDF repeater system. This system consists of a hub and repeater unit. The hub and repeater are connected via fiberoptic fiberoptic cables (there is no intentional RF emission between the hub and repeater).

The downlink is as follows: source downlink signal is connected via RF cable to the hub unit, the hub unit converts this RF cable signal to a fiberoptic signal to the repeater, the repeater converts this fiberoptic signal from the hub to an intentional RF radiated signal to the mobile unit via the downlink repeater antenna.

The uplink is as follows: the radiated source RF mobile signal is received at the repeater uplink antenna unit, the repeater converts this signal to a fiberoptic signal and transmits this light signal to the hub, then the hub converts this light signal to a RF signal which is transmitted via cable out of the hub to the original system.

Thus the only intentional radiator for CDR FO system is the downlink RF output of the repeater unit. In addition, Ortel will use the same components in the RF path for the CDR FO repeater unit as in the already FCC approved CDR unit (low noise amplifiers, channelizers, and power amplifiers).

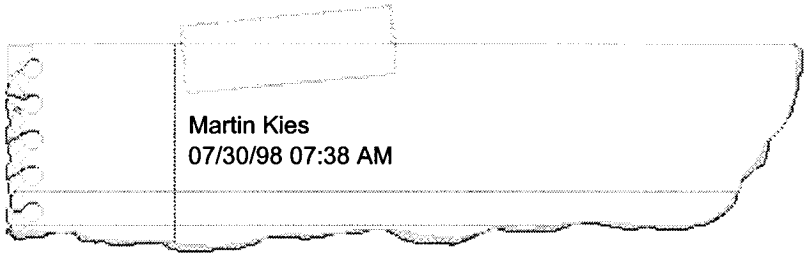
The main differences between the CDR FO repeater unit and the CDR repeater unit is that the CDR FO uses a different housing and has two channel capability. Also, there were two power modules for the CDR repeater unit: an AC/DC power supply and a DC/DC power supply; for the CDR FO, the two power supplies from the CDR have been combined into one unit with exactly the same electrical components as the two separate units.

Recall that the CDR FO system has a similar signal configuration to the PCS5800 system (FCC ID LB45800PCS), which you handled for Ortel also.

From this information I have given you, I would like to know what we need to do (if anything) to approve the CDR FO for type acceptance. Please call me if you have any questions at (626)-293-3640, or I will try and get in contact with you when you get back.

Thanks again,

Martin



Martin Kies
07/30/98 07:38 AM

To: mwashington@tuvps.com
cc:
Subject: CDR Model Descriptions

Mary:

Per your request (and IC's), here are the CDR model descriptions:

CDR1901: 1chx2W or 1chx4W or 1chx7.1W
CDR1912: 2chx1W or 2chx2W

All maximum uplink radiated power is 0.25W (but we will test the UL to 1W so that there will be approval for this power on the uplink). Furthermore, on the 2chx2W unit, this unit will be biased on the UL to 2W, so for this model Ortel will have approval for 2W.

For maximum downlink radiated power, there are several options:

option 730 (1W)
option 733 (2W)
option 736 (4W)
option 738.5 (7.1W)

All repeaters use the same AC and DC power supplies, control modules, low noise amplifiers, enclosure, and amplifiers. Power is changed by altering the bias to the amplifiers.

Recall that 1chx2W (A, B, and D bands) is already approved per FCC ID LB41901CDMA. Once there is FCC approval on the remaining models (including 1chx2W C, E, and F bands), these will have FCC ID LB41900CDMA.

I will be in touch the next few days.

Thanks,

Martin