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Re: FCC ID: QC8-AN100UXA

Applicant: Redline Communications Inc.

Correspondence Reference Number: 38901

Form 731 Confirmation Number: EA366641

Date of Original E-mail: 06/03/2010

Date of Response: 06/25/2010

Dear Carlos,

Thank you for the email dated June 3rd, 2010 (ref# 38901). Redline is pleased to provide the answers to the questions.

Question 1:
Please submit test results that demonstrate threshold parameters. In this test you should use a single tone interference signal in and out of band. Tests may include spectrum analyzer screen captures and tabulated data.

Answer 1:

Section 1describes the test equipment used, the test set-up and the test results to demonstrate the threshold parameters.

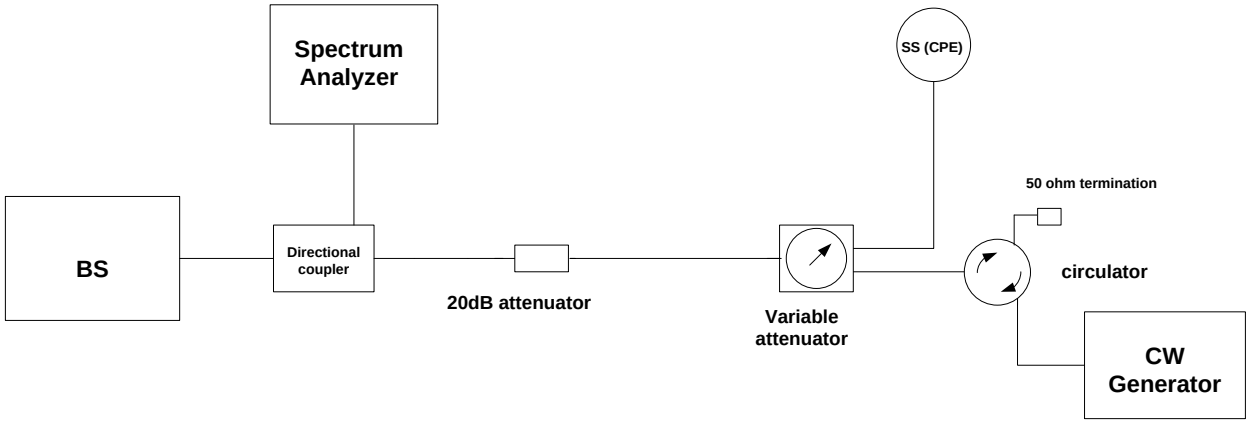
1. Transmitter Unrestricted Contention Based Protocol Test

1.1. Test Equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
Spectrum Analyzer	Rhode & Schwarz	FSL 6	RLC-1230-510-00012	March -5-2010	March-5-2011
Signal Generator	Rhode & Schwarz	SMR 20	RLC-1260-525-00004	Sept-01-2009	Sept-01-2010
Directional Coupler	Pasternak	PE 2210-10	–	COU	COU
Fixed Attenuator 20dB	Mini-Circuits	UNAT-20	–	COU	COU
50 ohm termination	Mini-Circuits	MLC ANNE -50	–	COU	COU
Variable Attenuator 0 – 80 dB	ARRA Inc.	5955-80	SN: 914	COU	COU
Circulator	JQL	B01260267		COU	COU

*COU-calibrate on use

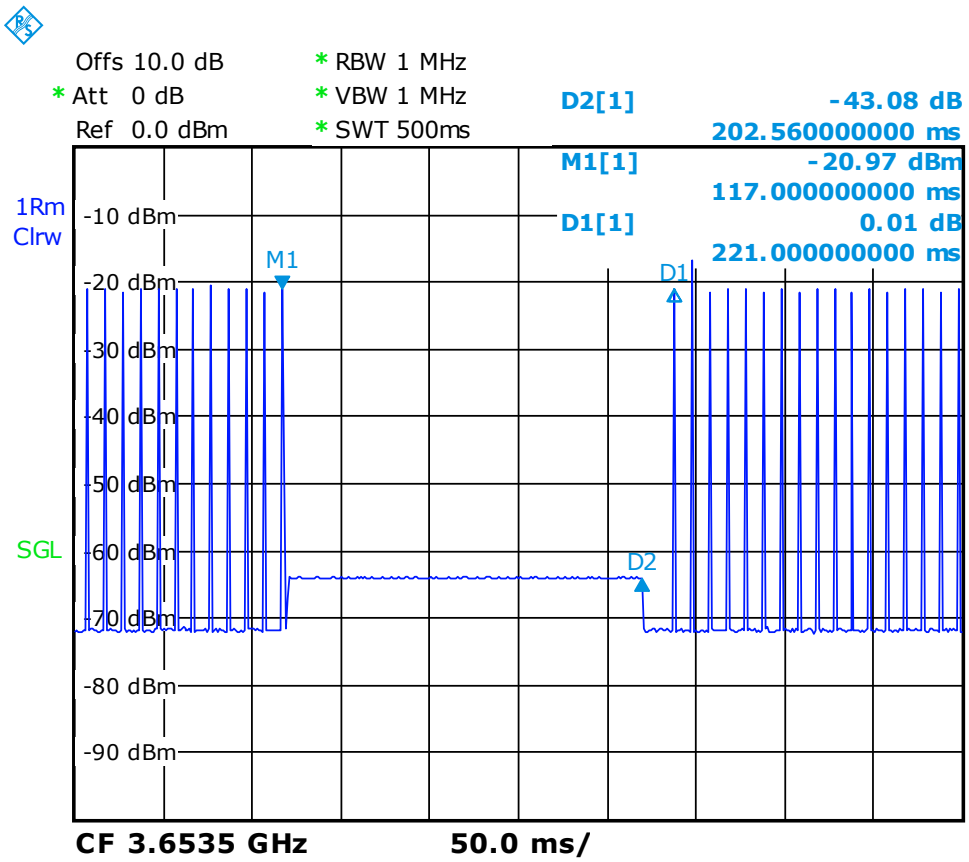
1.2. Test Setup



1.3. Test Results

The plots below show the EUT turning off when an interferer is applied, then on again when interferer is turned off.

Test No.	Channel Frequency (MHz)	Channel Bandwidth (MHz)	Noise Threshold (dBm)	Interferer Frequency offset (MHz)	Interferer level (dBm)	Tx-Off
1	3653.5	7	-65	0	-64	Y



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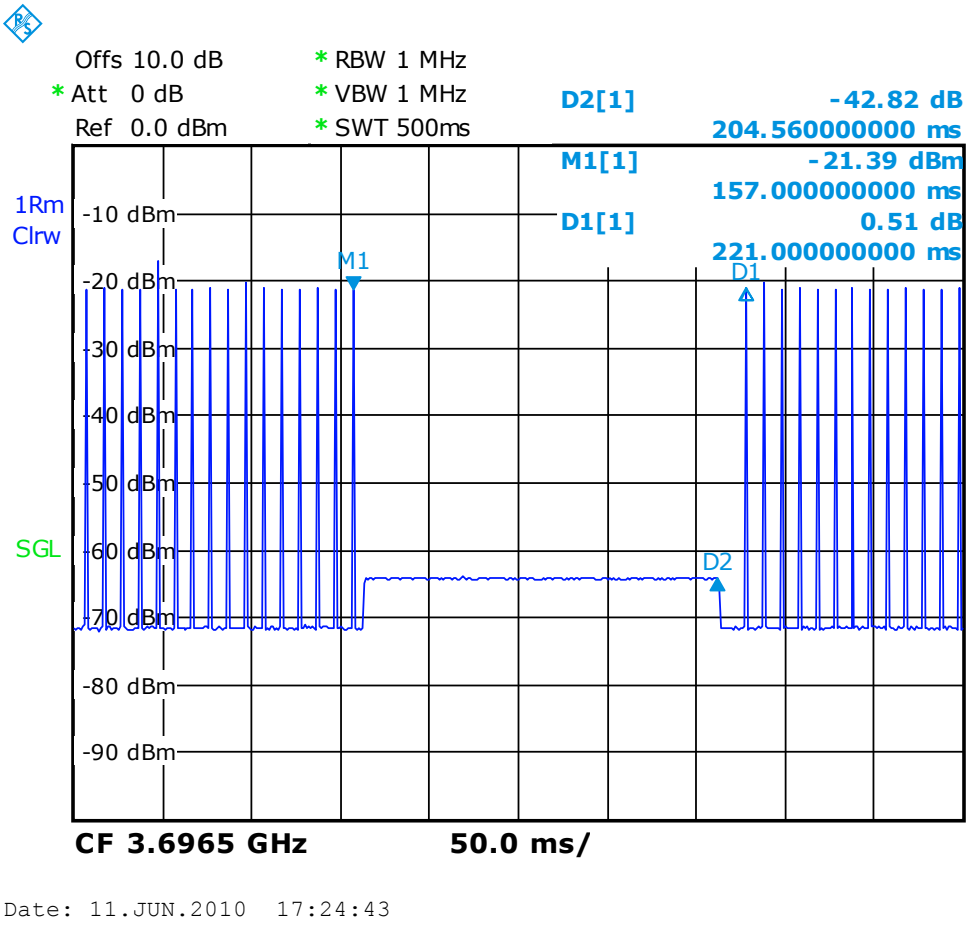
Test No.	Channel Frequency (MHz)	Channel Bandwidth (MHz)	Noise Threshold (dBm)	Interferer Frequency Offset(MHz)	Interferer level (dBm)	Tx-Off
2	3696.5	7	-65	0	-64	Y



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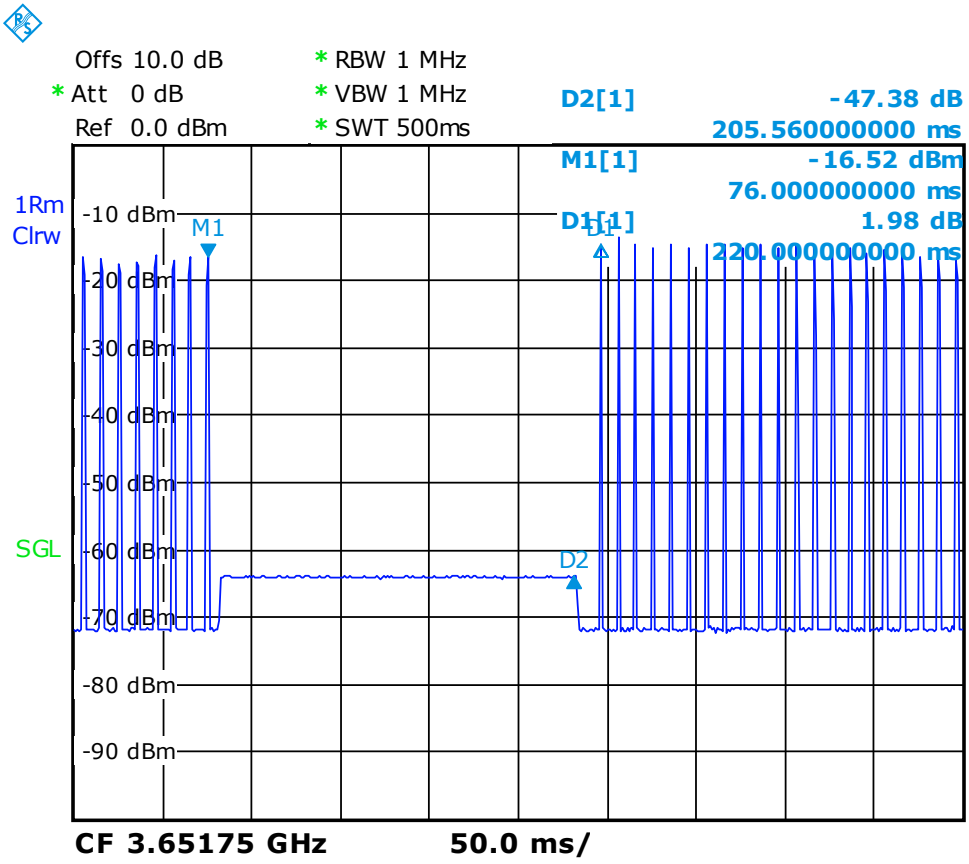
Test No.	Channel Frequency (MHz)	Channel Bandwidth (MHz)	Noise Threshold (dBm)	Interferer Frequency Offset(MHz)	Interferer level (dBm)	Tx-Off
3	3651.75	3.5	-65	0	-64	Y



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Test No.	Channel Frequency (MHz)	Channel Bandwidth (MHz)	Noise Threshold (dBm)	Interferer Frequency Offset(MHz)	Interferer level (dBm)	Tx-Off
4	3698.25	3.5	-65	0	-64	Y

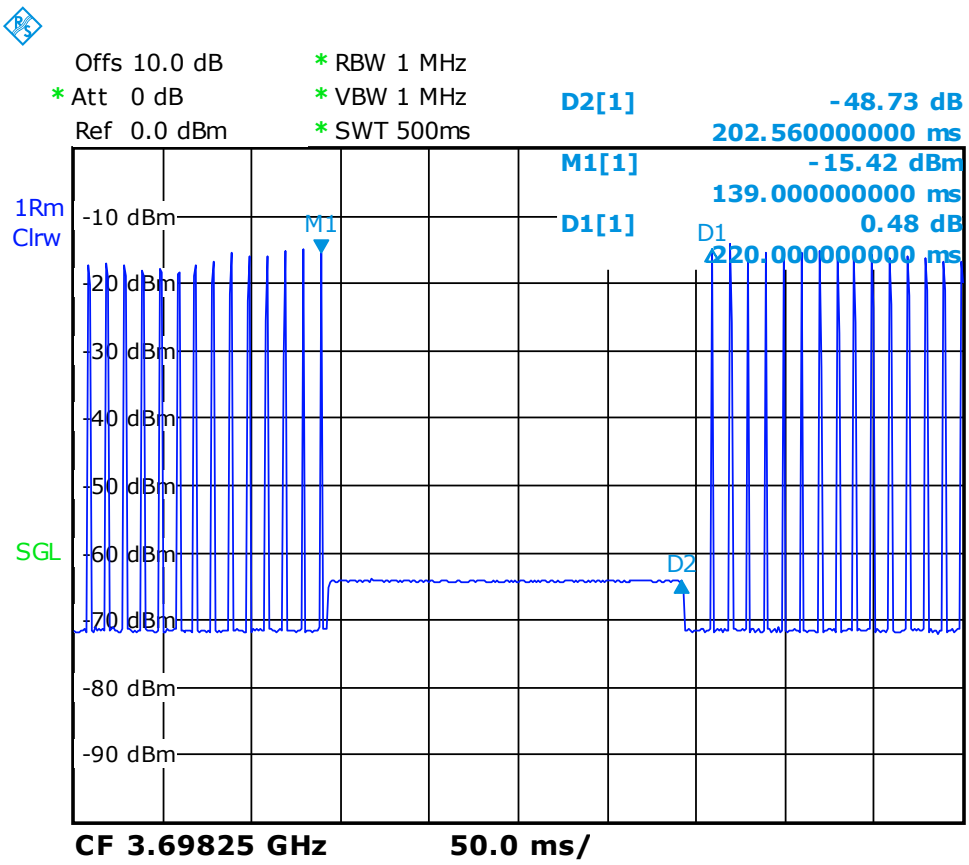

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Table 1 7-MHz Channel Bandwidth
Tests were performed at co-channel, adjacent channel and adjacent half-channel spacing.

Test No.	Channel Frequency (MHz)	Channel Bandwidth (MHz)	Noise Threshold (dBm)	Interferer Frequency Offset (MHz)	Interferer level (dBm)	Tx-Off
1	3653.5	7	-65	0	-64	Y
2	3653.5	7	-65	0	-70	N
3	3653.5	7	-65	-7	-65	N
4	3653.5	7	-65	-7	-60	N
5	3653.5	7	-65	+7	-65	N
6	3653.5	7	-65	+7	-60	N
7	3653.5	7	-100	0	-99	Y
8	3653.5	7	-100	0	-101	N
9	3653.5	7	-100	-7	-100	N
10	3653.5	7	-100	-7	-95	N
11	3653.5	7	-100	+7	-100	N
12	3653.5	7	-100	+7	-95	N
13	3653.5	7	-65	-3.5	-64	Y
14	3653.5	7	-65	+3.5	-64	Y
15	3653.5	7	-100	-3.5	-101	N
16	3653.5	7	-100	+3.5	-101	N
17	3696.5	7	-65	0	-64	Y
18	3696.5	7	-65	0	-70	N
19	3696.5	7	-65	-7	-65	N
20	3696.5	7	-65	-7	-60	N
21	3696.5	7	-65	+7	-65	N
22	3696.5	7	-65	+7	-60	N
23	3696.5	7	-100	0	-99	Y
24	3696.5	7	-100	0	-101	N
25	3696.5	7	-100	-7	-100	N
26	3696.5	7	-100	-7	-95	N
27	3696.5	7	-100	+7	-100	N
28	3696.5	7	-100	+7	-95	N
29	3696.5	7	-65	-3.5	-64	Y
30	3696.5	7	-65	+3.5	-64	Y
31	3696.5	7	-100	-3.5	-101	N
32	3696.5	7	-100	+3.5	-101	N

Table 2 3.5MHz Channel Bandwidth

Tests were performed at co-channel, adjacent channel and adjacent half-channel spacing.

Test No.	Channel Frequency (MHz)	Channel Bandwidth (MHz)	Noise Threshold (dBm)	Interferer Frequency Offset (MHz)	Interferer level (dBm)	Tx-Off
1	3651.75	3.5	-65	0	-64	Y
2	3651.75	3.5	-65	0	-70	N
3	3651.75	3.5	-65	-3.5	-65	N
4	3651.75	3.5	-65	-3.5	-60	N
5	3651.75	3.5	-65	+3.5	-65	N
6	3651.75	3.5	-65	+3.5	-60	N
7	3651.75	3.5	-100	0	-99	Y
8	3651.75	3.5	-100	0	-101	N
9	3651.75	3.5	-100	-3.5	-100	N
10	3651.75	3.5	-100	-3.5	-95	N
11	3651.75	3.5	-100	+3.5	-100	N
12	3651.75	3.5	-100	+3.5	-95	N
13	3651.75	3.5	-65	-1.75	-64	Y
14	3651.75	3.5	-65	+1.75	-64	Y
15	3651.75	3.5	-100	-1.75	-101	N
16	3651.75	3.5	-100	+1.75	-101	N
17	3698.25	3.5	-65	0	-64	Y
18	3698.25	3.5	-65	0	-70	N
19	3698.25	3.5	-65	-3.5	-65	N
20	3698.25	3.5	-65	-3.5	-60	N
21	3698.25	3.5	-65	+3.5	-65	N
22	3698.25	3.5	-65	+3.5	-60	N
23	3698.25	3.5	-100	0	-99	Y
24	3698.25	3.5	-100	0	-101	N
25	3698.25	3.5	-100	-3.5	-100	N
26	3698.25	3.5	-100	-3.5	-95	N
27	3698.25	3.5	-100	+3.5	-100	N
28	3698.25	3.5	-100	+3.5	-95	N
29	3698.25	3.5	-65	-1.75	-64	Y
30	3698.25	3.5	-65	+1.75	-64	Y
31	3698.25	3.5	-100	-1.75	-101	N
32	3698.25	3.5	-100	+1.75	-101	N

Question 2:
Please clarify how 8-16 usecs is enough listening period under light load conditions. Does your device only listen 8-16 usecs under light load conditions?

Answer 2:

The RedMAX Base Station performs the interference level measurement every frame during the RTG interval at the end of each 802.16 wireless frame. This implementation solution has been chosen for the following reasons:

- The measurement should be done just before the RF chain is switched into TX mode. If interference is detected, then the Base Station shall not transmit the downlink burst over the air. In this case the RF path will not be switched into TX mode.
- The listening interval should be long enough to accurately measure the level of interference.
- The measurement should be done at every frame.

The total listening interval is 24 microseconds on 3.5 MHz channels and 12 microseconds on 7 MHz channels, but only 64 PHY samples are used to calculate the received signal level (16 microseconds on 3.5 MHz and 8 microseconds on 7 MHz channels). 64 PHY samples represent a quarter of an OFDM symbol which is enough for RedMAX Base Station to accurately measure the received signal level in time domain.

This interval is used regardless of the traffic load. Increasing the listening interval under light traffic conditions would not help improving the collision-avoidance mechanism since the channel is shared with other uncoordinated wireless systems.

Under light-load conditions, the Base Station and the Subscriber Stations do not occupy the channel with unnecessary transmissions to let other systems utilize the channel. However, prior to attempting any transmission, the Base Station will check the channel occupancy. If the Base Station detects interference in the RF channel, it will not transmit the Uplink MAP, thus, the subscriber stations will not transmit anything during the current wireless frame duration.

Sincerely yours,

Rod Cronin
Director, Product Management
Redline Communications