

## PointRed MMDS CPE Transmitter

### Class 2 Permissive Change Request

FCC ID: QDU-MCRD-CPE-2R5  
 Original Grant: 25 June 2002

Two changes have been made to the original equipment:

- a) A new case has been designed for the outdoor radio transceiver unit.
- b) The low pass filter at the antenna port has been improved.

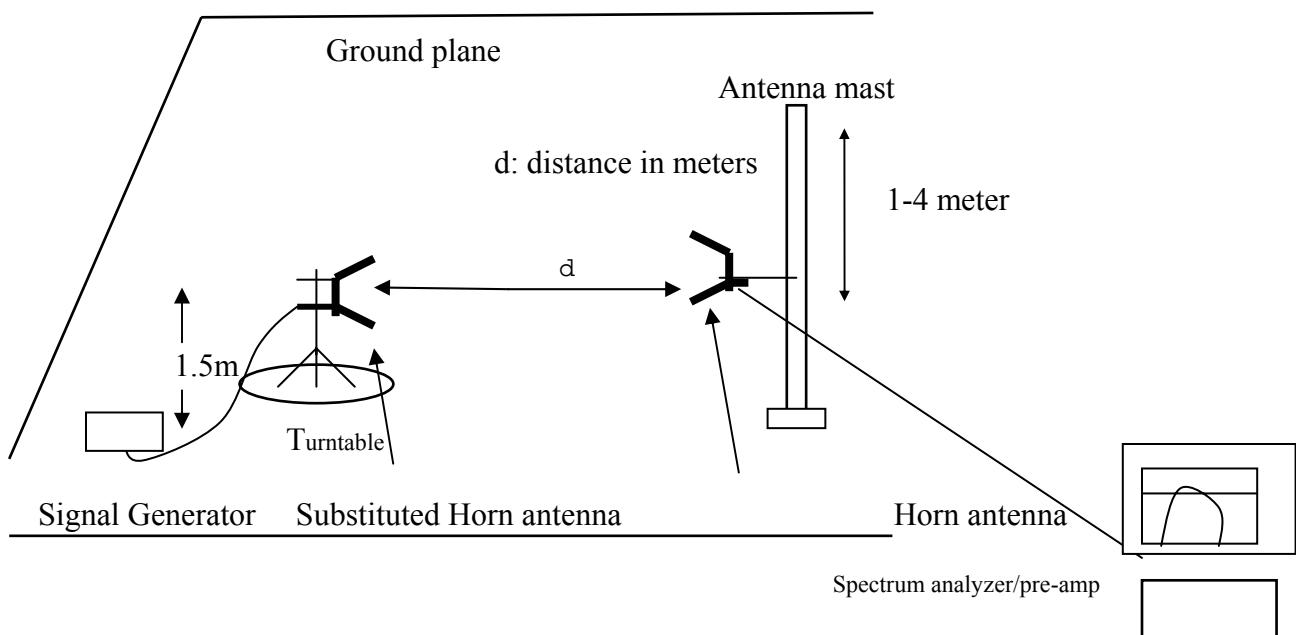
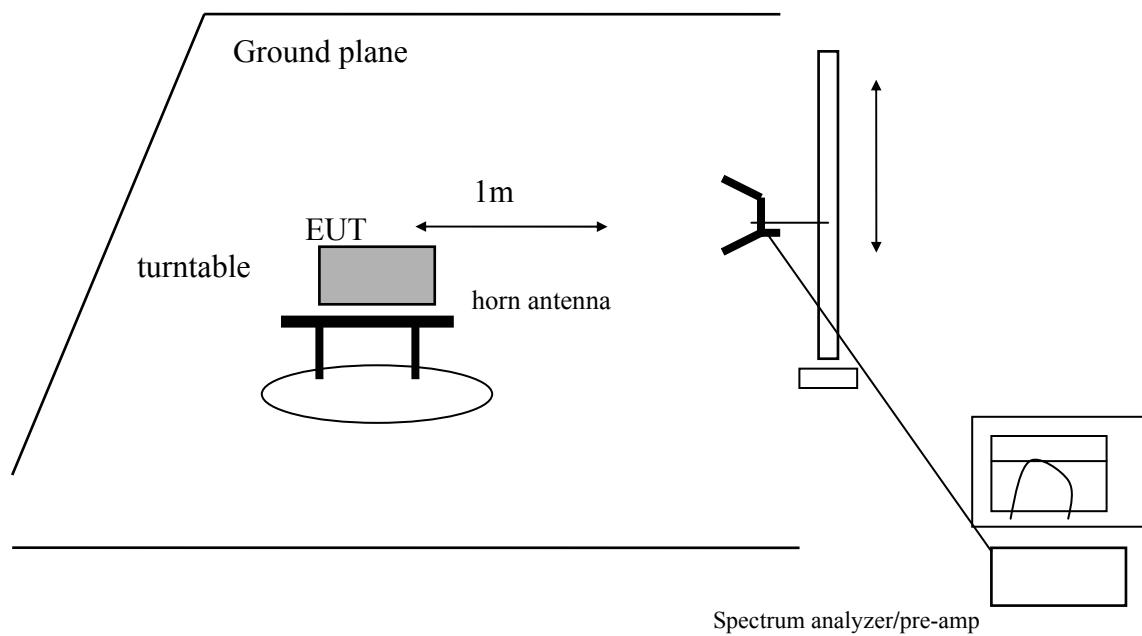
The low pass filter modification was effected by changing the etch shape on the foil side of the pcb. A drawing of the change is presented as a separate attachment. There were no changes to the schematic.

The nature of the change requires that only radiated emissions testing be performed to determine continuing compliance.

TEST EQUIPMENT LIST				
Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
EMI Test Receiver	R & S	ESHS 20	827129/006	4/17/2003
LISN, 10 kHz ~ 30 MHz	FCC	50/250-25-2	114	9/6/2003
LISN, 10 kHz ~ 30 MHz	Solar	012-50-R-24-BN	837990	9/6/2003
Preamplifier, 1 ~ 26 GHz	Miteq	NSP10023988	646456	4/26/2003
Quasi-Peak Adaptor	HP	85650A	2811A01155	5/16/2003
SA Display Section 2	HP	85662A	2816A16696	5/16/2003
SA RF Section, 1.5 GHz	HP	85680B	2732A03661	5/16/2003
Preamplifier, 1300 MHz	HP	8447D	2944A06589	8/22/2003
Antenna, Bilog	Chase	CBL6112B	2586	3/28/2003
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	1/31/2003
PSA Series Spectrum Analyzer	Agilent	E4440A	89443	9/24/2003
Horn Antenna	ARA	3115	6717	1/31/2004
High Pass Filter	FSY Microwave	FM-4570-9SS	3	NCR

**Section 2.1053 Field Strength of Spurious and Harmonic Radiation**  
**Requirement/Limit: 21.909(e)**

**Test Set-Up**



## Minimum Requirement

The magnitude of each spurious and harmonic emission detected as being radiated from the EUT must be at a level more than 60 dB below channel output power.

Output power: 25.1 dBm

Limit:  $(25.11 - 60) \text{ dBm} = -34.9 \text{ dBm ERP}$

## Test Method

The antenna output port of the EUT was terminated with a 50 ohm load. With the transmitter operating at full power, the EUT was rotated 360° and the search antenna was raised and lowered in both polarities, all in an attempt to maximize the levels of the received emission for each harmonic and spurious emission up to 10 fo.

## Test Results

**Pass.** No emissions were detected above test system noise floor. Field strengths were measured and were compared against EIRP using the relationship

$E, \text{ dBuV/m} @ 3\text{m} = 95.24 \text{ dB} + \text{EIRP}$

$\text{ERP} = \text{EIRP} - 2.15 \text{ dB}$

Calculations indicated noise floor is at least 10 dB below the limit.

Refer to data presented in the attached spread sheets.

FCC Measurement											
<b>Compliance Certification Services</b> , Morgan Hill Open Field Site											Site A
<b>N. Raj</b>											
PointRed Networks				02/03/03							
Radio module											
FCC ID: QDU-MCRD-CPE-2R5											

AF	Antenna Factor				Pk Lim				
CL	Cable Loss				Avg Lim				
Amp	Pre amp gain				Pk Mar				
D Corr	Dis corrections to 3 meter				Avg Mar				
NED	No emission detected								

FCC Measurement																					
<b>Compliance Certification Services</b> , Morgan Hill Open Field Site										Site A											
<b>N. Raj</b>																					
PointRed Networks					02/03/03																
Radio module																					
FCC ID: QDU-MCRD-CPE-2R5																					
Cable length																					
12.0 feet																					
Distance to Antenna																					
3.3 feet																					
Average Measurements:					Peak Measurements:																
1 MHz Resolution Bandwidth					1MHz Resolution Bandwidth																
10Hz Video Bandwidth					1MHz Video Bandwidth																
Mid Channel:																					
2.575 GHz										3m E											
f GHz	Peak R. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF dB	Peak dBuV/m	ERPpk dBm	Pk Lim dBuV/m	Peak Mar dB	Notes										
5.150	47.6	33.3	4.8	-36.1	-9.5	0.0	40.1	-57.3	-34.9	-22.4	VER, WITH PREAMP										
7.725	41.3	37.0	6.0	-36.5	-9.5	0.0	38.3	-59.1	-34.9	-24.2	VER, WITH PREAMP										
10.300	41.7	38.1	7.1	-35.7	-9.5	0.0	41.6	-55.8	-34.9	-20.9	VER, WITH PREAMP										
12.875	44.2	39.8	7.9	-36.8	-9.5	0.0	45.7	-51.7	-34.9	-16.8	VER, WITH PREAMP										
15.450	45.9	37.9	9.1	-36.5	-9.5	0.0	46.9	-50.4	-34.9	-15.5	VER, WITH PREAMP										
18.025	43.1	39.1	10.3	-37.0	-9.5	0.0	46.0	-51.4	-34.9	-16.5	VER, WITH PREAMP										
5.150	46.2	43.9	4.8	-38.0	-9.5	0.0	47.4	-50.0	-34.9	-15.1	H, WITH PREAMP										
7.725	41.6	46.6	6.0	-39.0	-9.5	0.0	45.7	-51.7	-34.9	-16.8	H, WITH PREAMP										
10.300	41.5	46.6	7.1	-39.0	-9.5	0.0	46.7	-50.7	-34.9	-15.8	H, WITH PREAMP										
12.875	43.0	46.6	7.9	-39.0	-9.5	0.0	49.0	-48.4	-34.9	-13.5	H, WITH PREAMP										
15.450	45.0	46.6	9.1	-39.0	-9.5	0.0	52.2	-45.2	-34.9	-10.3	H, WITH PREAMP										
18.025	43.0	46.6	10.3	-39.0	-9.5	0.0	51.4	-46.0	-34.9	-11.1	H, WITH PREAMP										
to 26 GHz	NED																				
TX Pout = 25.1 dBm																					
21.909(e) limit: 25.1 - 60 = -34.9 ERP																					
E, dBuV/m at 3m = 95.24 dB + PdBm + GdBi = 95.24 + EIRP																					
ERP (dipole) = EIRP (isotropic) - 2.15 dB																					
ERP, dBm = E, dBuV/m at 3m - 95.24 - 2.15																					
f	Measurement Frequency										HPF										
Peak R.	Analyzer Peak Reading										Peak										
Avg. R.	Analyzer Avg. Reading										Avg										
AF	Antenna Factor										Pk Lim										
CL	Cable Loss										Avg Lim										
Amp	Pre amp gain										Pk Mar										

D Corr	Dis corrections to 3 meter			Avg Mar		
NED	No emission detected					

FCC Measurement											
<b>Compliance Certification Services</b> , Morgan Hill Open Field Site											Site A
<b>N. Raj</b>											
PointRed Networks											02/03/03
Radio module											
FCC ID: QDU-MCRD-CPE-2R5											
Cable length											
12.0 feet											
Distance to Antenna											
3.3 feet											
Average Measurements:						Peak Measurements:					
1 MHz Resolution Bandwidth						1MHz Resolution Bandwidth					
10Hz Video Bandwidth						1MHz Video Bandwidth					
Mid Channel:											
2.683 GHz						3m E					
f GHz	Peak R. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF dB	Peak dBuV/m	ERPpk dBm	Pk Lim dBuV/m	Peak Mar dB	Notes
<b>5.366</b>	<b>42.4</b>	33.9	4.9	-36.1	-9.5	0.0	35.6	-61.7	-34.9	-26.8	VER, WITH PREAMP
<b>8.049</b>	<b>41.6</b>	36.9	6.1	-36.5	-9.5	0.0	38.6	-58.8	-34.9	-23.9	VER, WITH PREAMP
<b>10.732</b>	<b>40.0</b>	38.2	7.2	-35.7	-9.5	0.0	40.1	-57.3	-34.9	-22.4	VER, WITH PREAMP
<b>13.415</b>	<b>42.0</b>	41.2	8.2	-36.8	-9.5	0.0	45.0	-52.4	-34.9	-17.5	VER, WITH PREAMP
<b>16.098</b>	<b>43.9</b>	37.9	9.4	-36.5	-9.5	0.0	45.2	-52.2	-34.9	-17.3	VER, WITH PREAMP
<b>18.781</b>	<b>44.0</b>	39.1	10.6	-37.0	-9.5	0.0	47.2	-50.2	-34.9	-15.3	VER, WITH PREAMP
<b>5.366</b>	<b>41.8</b>	43.9	4.9	-38.0	-9.5	0.0	43.1	-54.3	-34.9	-19.4	H, WITH PREAMP
<b>8.049</b>	<b>39.9</b>	46.6	6.1	-39.0	-9.5	0.0	44.1	-53.3	-34.9	-18.4	H, WITH PREAMP
<b>10.732</b>	<b>39.7</b>	46.6	7.2	-39.0	-9.5	0.0	45.0	-52.4	-34.9	-17.5	H, WITH PREAMP
<b>13.415</b>	<b>41.6</b>	46.6	8.2	-39.0	-9.5	0.0	47.9	-49.5	-34.9	-14.6	H, WITH PREAMP
<b>16.098</b>	<b>43.0</b>	46.6	9.4	-39.0	-9.5	0.0	50.5	-46.9	-34.9	-12.0	H, WITH PREAMP
<b>18.781</b>	<b>43.8</b>	46.6	10.6	-39.0	-9.5	0.0	52.5	-44.9	-34.9	-10.0	H, WITH PREAMP
to 26 GHz NED											
TX Pout = 25.1 dBm											
21.909(e) limit: 25.1 - 60 = -34.9 ERP											
E, dBuV/m at 3m = 95.24 dB + PdBm + GdBi = 95.24 + EIRP											
ERP (dipole) = EIRP (isotropic) - 2.15 dB											
ERP, dBm = E, dBuV/m at 3m -95.24 -2.15											
<b>f</b>	Measurement Frequency					HPF					
Peak R.	Analyzer Peak Reading					Peak					
Avg. R.	Analyzer Avg. Reading					Avg					
AF	Antenna Factor					Pk Lim					

CL	Cable Loss					Avg Lim		
Amp	Pre amp gain					Pk Mar		
D Corr	Discorrections to 3 meter					Avg Mar		
NED	No emission detected							

### Test Site

All testing was performed at PointRed Technologies (antenna conducted measurement) and at Compliance Certification Services (radiated emissions) either by me or under my supervision. Conducted and radiated emissions were performed using test equipment with calibration traceable to NIST, and following test procedures accepted by the industry.

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Agent for PointRed Technologies