

## 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.

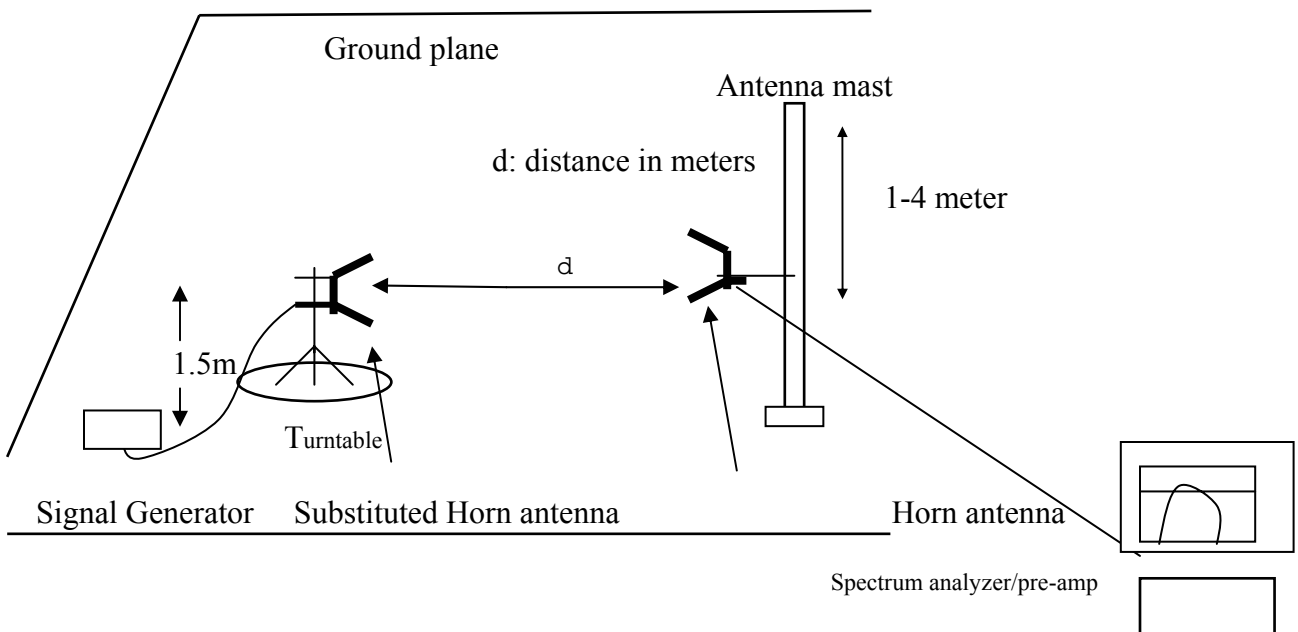
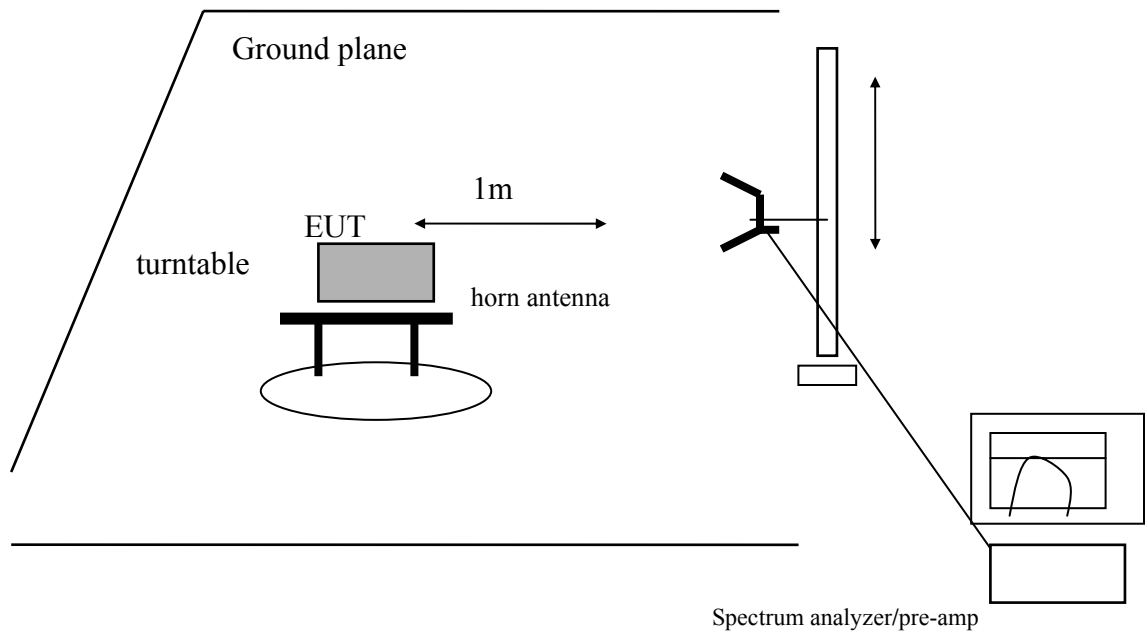
The low pass filter modification was effected by changing the etch shape on the foil side of the pcb. A drawing of the change is presented as a separate attachment. There were no changes to the schematic.

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											
Compliance Certification Services, Morgan Hill Open Field Site Site A											
N. Raj											
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:											
2.503 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
5.006	47.6	32.9	4.7	-36.1	-9.5	0.0	39.7	-57.7	-34.9	-22.8	VER, WITH PREAMP
7.509	42.9	37.1	5.9	-36.5	-9.5	0.0	40.0	-57.4	-34.9	-22.5	VER, WITH PREAMP
10.012	42.5	37.9	7.0	-35.7	-9.5	0.0	42.1	-55.3	-34.9	-20.4	VER, WITH PREAMP
12.515	43.0	39.3	7.8	-36.8	-9.5	0.0	43.8	-53.6	-34.9	-18.7	VER, WITH PREAMP
15.018	45.0	37.9	8.9	-36.5	-9.5	0.0	45.8	-51.6	-34.9	-16.7	VER, WITH PREAMP
17.521	44.0	39.1	10.1	-37.0	-9.5	0.0	46.7	-50.7	-34.9	-15.8	VER, WITH PREAMP
5.006	46.0	43.9	4.7	-38.0	-9.5	0.0	47.1	-50.3	-34.9	-15.4	H,WITH PREAMP
7.509	42.1	46.6	5.9	-39.0	-9.5	0.0	46.1	-51.3	-34.9	-16.4	H,WITH PREAMP
10.012	42.0	46.6	7.0	-39.0	-9.5	0.0	47.1	-50.3	-34.9	-15.4	H,WITH PREAMP
12.515	43.1	46.6	7.8	-39.0	-9.5	0.0	49.0	-48.4	-34.9	-13.5	H,WITH PREAMP
15.018	45.3	46.6	8.9	-39.0	-9.5	0.0	52.3	-45.1	-34.9	-10.2	H,WITH PREAMP
17.521	43.9	46.6	10.1	-39.0	-9.5	0.0	52.1	-45.3	-34.9	-10.4	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											
Peak R. Analyzer Peak Reading											
Avg. R. Analyzer Avg. Reading											

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								

		FCC Measurement											
<b>Compliance Certification Services, Morgan Hill Open Field Site</b>													
<b>Site A</b>													
<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	Discorrections to 3 meter							Avg Mar			
NED	No emission detected										

		FCC Measurement											
Compliance Certification Services, Morgan Hill Open Field Site									Site A				
N. Raj													
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		
5.366	42.4	33.9	4.9	-36.1	-9.5	0.0	35.6	-61.7	-34.9	-26.8	VER, WITH PREAMP		
8.049	41.6	36.9	6.1	-36.5	-9.5	0.0	38.6	-58.8	-34.9	-23.9	VER, WITH PREAMP		
10.732	40.0	38.2	7.2	-35.7	-9.5	0.0	40.1	-57.3	-34.9	-22.4	VER, WITH PREAMP		
13.415	42.0	41.2	8.2	-36.8	-9.5	0.0	45.0	-52.4	-34.9	-17.5	VER, WITH PREAMP		
16.098	43.9	37.9	9.4	-36.5	-9.5	0.0	45.2	-52.2	-34.9	-17.3	VER, WITH PREAMP		
18.781	44.0	39.1	10.6	-37.0	-9.5	0.0	47.2	-50.2	-34.9	-15.3	VER, WITH PREAMP		
5.366	41.8	43.9	4.9	-38.0	-9.5	0.0	43.1	-54.3	-34.9	-19.4	H, WITH PREAMP		
8.049	39.9	46.6	6.1	-39.0	-9.5	0.0	44.1	-53.3	-34.9	-18.4	H, WITH PREAMP		
10.732	39.7	46.6	7.2	-39.0	-9.5	0.0	45.0	-52.4	-34.9	-17.5	H, WITH PREAMP		
13.415	41.6	46.6	8.2	-39.0	-9.5	0.0	47.9	-49.5	-34.9	-14.6	H, WITH PREAMP		
16.098	43.0	46.6	9.4	-39.0	-9.5	0.0	50.5	-46.9	-34.9	-12.0	H, WITH PREAMP		
18.781	43.8	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													
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	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.

THOMAS N. COKENIAS  
Consultant, EMC&Radio Type Approvals  
Agent for PointRed Technologies