

PointRed Base Station Transmitter Class 2 Permissive Change Request

FCC ID: QDU-MCRD-BASE-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.

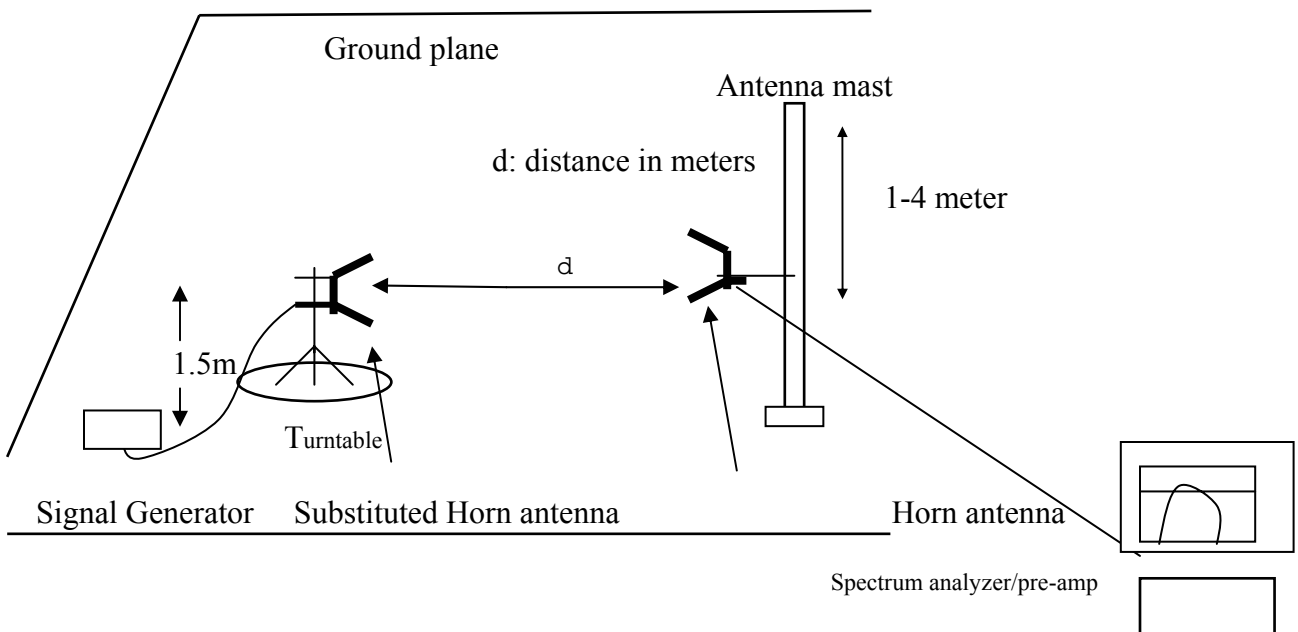
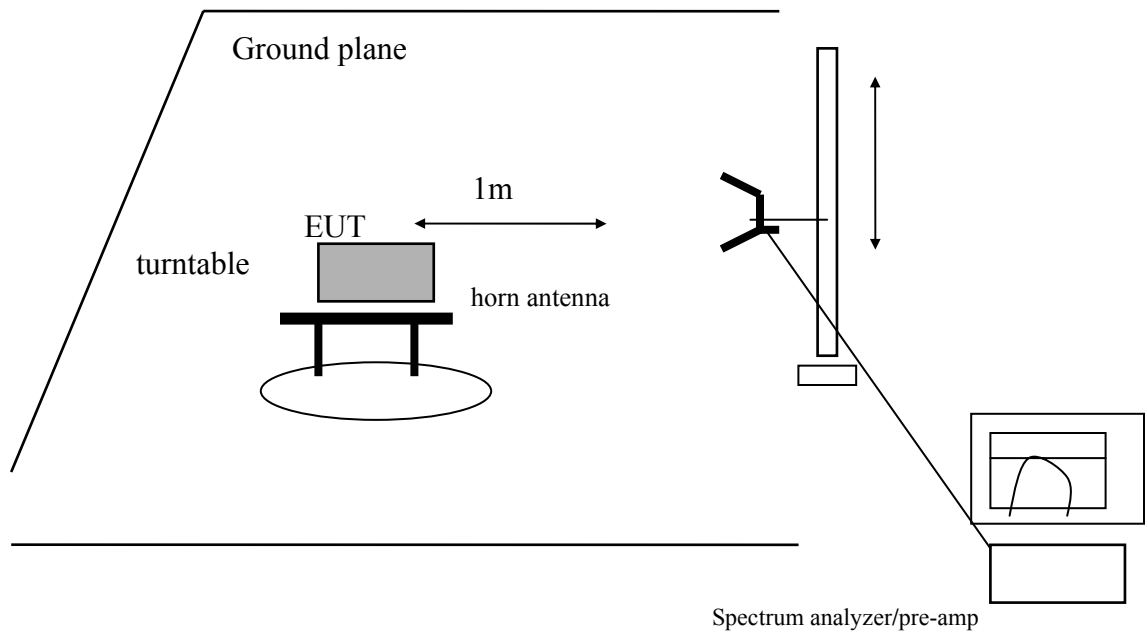
The low pass filter modification was effected by changing the etch shape on the foil side of the pcb. A drawing of the change is presented as a separate attachment. There were no changes to the schematic.

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-BASE-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											
Low Channel											
2.503 GHz											
3m E											
f	Peak R.	AF	CL	Amp	D Corr	HPF	Peak	ERPpk	Pk Lim	Peak Mar	Notes
GHz	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBm	dBuV/m	dB	
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					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	3m extrapolation					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-BASE-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	Peak R.	AF	CL	Amp	D Corr	HPF	Peak	ERPpk	Pk Lim	Peak Mar	Notes
GHz	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBm	dBuV/m	dB	
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-BASE-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							
High Channel:											
2.683 GHz				3m E							
f	Peak R.	AF	CL	Amp	D Corr	HPF	Peak	ERPpk	Pk Lim	Peak Mar	Notes
GHz	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBm	dBuV/m	dB	
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