Radio Frequency Exposure Report

On Behalf of

Deliberant LLC

FCC ID:	**UB8- FWBD1102**
Product Description:	**Broadband Digital Transmission System**
Model No.:	**FWBD-1102**
Supplementary Model:	**N/A**

Prepared for:	**Deliberant LLC** 138 Mountain Brook Dr Canton, GA 30115 United States
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Tested by: Jiankuai.Li **Reviewed by:** Lv yi

Approved by: Owen Yang

1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	**Deliberant LLC**
Address of Applicant:	138 Mountain Brook Dr Canton, GA 30115 United States
Manufacturer :	**Deliberant LLC**
Address of manufacturer:	138 Mountain Brook Dr Canton, GA 30115 United States

General Description of E.U.T

Items	Description
EUT Description:	Broadband Digital Transmission System
Trade Name:	N/A
Model No.:	FWBD-1102
Operation Frequency:	For 802.11a/n-HT20: 5180~5240MHz, 5745~5825MHz For 802.11n-HT40: 5190~5230MHz, 5755~5795MHz
Channel numbers:	5150MHz-5250MHz:802.11a/ 802.11n20:13, 802.11n40:2 5725MHz-5850MHz:802.11a/ 802.11n20:5, 802.11n40:2
Channel separation:	802.11a/802.11n20 :20MHz, 802.11n40 :40MHz
Modulation technology: (IEEE 802.11a)	BPSK,QPSK,16-QAM,64-QAM
Modulation technology: (IEEE 802.11n/802.11n)	BPSK,QPSK,16-QAM,64-QAM
Data speed(IEEE 802.11a)	6MHz,9MHz,12MHz,18MHz,24MHz,36MHz,48MHz,54MHz
Data speed (IEEE 802.11n20):	MCS0: 6.5MHz,MCS1:13MHz,MCS2:19.5MHz,MCS3:26MHz, MCS4:39MHz,MCS5:52MHz,MCS6:58.5MHz,MCS7:65MHz
Data speed (IEEE 802.11n40):	MCS0:15MHz,MCS1:30MHz,MCS2:45MHz,MCS3:60MHz, MCS4:90MHz,MCS5:120MHz,MCS6:135MHz,MCS7:150MHz
Antenna Type:	ANT1:Omni-directional,ANT2:Omni-directional, ANT3:Sector,ANT4: Directional,ANT5:Dish
Antenna Gain:	ANT1:3 dBi,ANT2:12 dBi,ANT3:19 dBi,ANT4:23 dBi,ANT5:30 dBi
Power Supply:	DC 24V 0.5A
Adapter Information:	1# Model No: AY012E-ZF243; 2# Model No: GRT-240050; Input: 100-240V AC 50/60Hz 0.5A Output: DC 24V 0.5A

Remark: * *The test data gathered are from the production sample provided by the manufacturer.*

Prediction of MPE at a given distance

2 Limits

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*($900/f^2$)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

3. Test Procedure

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

Where:

S = power density

P = power input to the antenna

G = numeric gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the centre of radiation of the antenna

4. Result

4.1 Frequency range 5725-5850MHz

Frequency range 5725-5850MHz E.I.R.P is according to UB8 - FWBD1102 Part 15.407 5725-5850 MHz Test Report of Maximum 2 x2 MIMO power.

For 30 dBi antenna

EIRP	S	Distance	Limit for controled	Limit for public
mW	mW/cm2	cm	mW/cm2	mW/cm2
2930.893	0.5837840	20	5	1
2930.893	0.9115287	16		
2930.893	1.0371170	15		
2930.893	3.6461150	8		
2930.893	4.7622730	7		
2930.893	6.4819820	6		

EIRP=ERP+ Antenna gain + log (Duty ratio)

For 23 dBi antenna

EIRP	S	Distance	Limit for controled	Limit for public
mW	mW/cm2	cm	mW/cm2	mW/cm2
2831.392	0.5635732	20	5	1
2831.392	0.8805832	16		
2831.392	1.0019080	15		
2831.392	3.5223330	8		
2831.392	4.6005980	7		
2831.392	6.2619250	6		

EIRP=ERP+ Antenna gain + log (Duty ratio)

For 19 dBi antenna

EIRP	S	Distance	Limit for controled	Limit for public
mW	mW/cm2	cm	mW/cm2	mW/cm2
2754.299	0.5482283	20	5	1
2754.299	0.9746281	15		
2754.299	2.1929130	35		
2754.299	3.4264270	8		
2754.299	4.4753330	7		
2754.299	6.0914260	6		

EIRP=ERP+ Antenna gain + log (Duty ratio)

Remark:

: Distance for Population/Uncontrolled Exposure

: Distance for Occupational/Controlled Exposure

For 15 dBi antenna

EIRP	S	Distance	Limit for controled	Limit for public
mW	mW/cm2	cm	mW/cm2	mW/cm2
2818.383	0.5609839	20	5	1
2818.383	0.9973047	15		
2818.383	2.2439360	10		
2818.383	3.5061490	8		
2818.383	4.5794600	7		
2818.383	6.2331540	6		

EIRP=ERP+ Antenna gain + log (Duty ratio)

For 3 dBi antenna

EIRP	S	Distance	Limit for controled	Limit for public
mW	mW/cm2	cm	mW/cm2	mW/cm2
1377.209	0.2741260	20	5	1
1377.209	0.9062016	11		
1377.209	1.0965040	10		
1377.209	3.0458440	6		
1377.209	4.3860160	5		
1377.209	6.8531500	4		

EIRP=ERP+ Antenna gain + log (Duty ratio)

Remark:

□: Distance for Population/Uncontrolled Exposure

□: Distance for Occupational/Controlled Exposure

4.2 Frequency range 5150-5250MHz

* Frequency range 5150-5250MHz E.I.R.P is according to UB8 - FWBD1102 Part 15.407 5150-5250 MHz Test Report of Maximum 2 x2 MIMO power.

For 30 dBi antenna

EIRP	S	Distance	Limit for controled	Limit for public
mW	mW/cm2	cm	mW/cm2	mW/cm2
2910.717	0.559458	20	5	1
2910.717	0.994592	15		
2910.717	2.810717	10		
2910.717	3.496613	8		
2910.717	4.567004	7		
2910.717	6.216200	6		

EIRP=ERP+ Antenna gain + log (Duty ratio)

For 23 dBi antenna

EIRP	S	Distance	Limit for controled	Limit for public
mW	mW/cm2	cm	mW/cm2	mW/cm2
3061.963	0.6094672	20	5	1
3061.963	0.9522924	16		
3061.963	2.4378690	10		
3061.963	3.8091700	8		
3061.963	4.9752420	7		
3061.963	6.7718570	6		

EIRP=ERP+ Antenna gain + log (Duty ratio)

For 19 dBi antenna

EIRP	S	Distance	Limit for controled	Limit for public
mW	mW/cm2	cm	mW/cm2	mW/cm2
2890.679	0.575374	20	5	1
2890.679	0.899022	16		
2890.679	2.301496	10		
2890.679	3.596088	8		
2890.679	4.696931	7		
2890.679	6.393044	6		

EIRP=ERP+ Antenna gain + log (Duty ratio)

Remark:

□: Distance for Population/Uncontrolled Exposure

□: Distance for Occupational/Controlled Exposure

For 15 dBi antenna

EIRP	S	Distance	Limit for controled	Limit for public
mW	mW/cm2	cm	mW/cm2	mW/cm2
2741.574	0.545695	20	5	1
2741.574	0.970125	15		
2741.574	2.182782	10		
2741.574	3.410597	8		
2741.574	4.454657	7		
2741.574	6.063283	6		

EIRP=ERP+ Antenna gain + log (Duty ratio)

For 3 dBi antenna

EIRP	S	Distance	Limit for controled	Limit for public
mW	mW/cm2	cm	mW/cm2	mW/cm2
1425.608	0.283759	20	5	1
1425.608	0.938048	11		
1425.608	1.135038	10		
1425.608	3.152884	6		
1425.608	4.540153	5		
1425.608	7.093989	4		

EIRP=ERP+ Antenna gain + log (Duty ratio)

Remark:

□: Distance for Population/Uncontrolled Exposure

□: Distance for Occupational/Controlled Exposure