Marconi Communications Israel Ltd
1 Hamlacha St., LOD 71293, Israel
T: +972-8-9777000 ; F: +972-8-9777050
www.marconicomms.com

Subject: Hopping algorithm and compliance with FCC 15.247 (a) (1)

1. Hopping Algorithm description

- The hopping algorithm is defined by a table of n frequencies, when n 75 when the system is configured for 1, 2 and 3Mb/s and 38 when the system configured for 4Mb/s. The hopping sequence follows cyclically the frequencies in the table, staying in each frequency for a constant period. The frequencies note the center frequencies in each hop. Each frequency in the table apearsonce. The frequencies in the table are all in the range 2402- 2482, with at least 1MHz between any two frequencies in the table when the system configured for 1, 2 and 3mb/s and at least 2MHz when system configured for 4Mb/s. The order of frequencies in the table is pseudorandom.
- Attached two tables for the two modes 1MHz channel spacing and 2MHz channel spacing.

2. Hopping time

The hopping time in a given is constant. (typically WipLL uses 50mSec)

3. Number of channels

The number of channels is determined by the table size n which is at least 75 (WipLL uses n=79) when configured for 1, 2 and 3Mb/s and 38 frequencies when system configured for 4Mb/s.

4. Resolution

The minimum difference between any two channels is 1 MHz at 1,2 and 3Mb/s. 2MHz when configured for 4Mb/s.

5. Channel distribution.

Since any used channel is included once in the table, all the channels are equally used, each one occupies 1/n of the time.

6. Occupancy time.

Each used channel is used once per cycle of n frequencies (n =79 see par. 3 above). The total occupancy time in 30 seconds is:
(30sec)/n 0.4sec 30/79 = 0.380 sec.

7. Receiver synchronization.

The system receiver input bandwidth filter matches the hopping channel bandwidth and syncronized with the coresponding transmitter on the hopping sequence.

15.247 Spec.	Requirement	WipLL capability	Comply
Spread Specrum	FHSS or DSSS	FHSS	yes
Minimum Channel Seperation at 1,2 and 3Mb/s. Minimum Channel seperation at 4Mb/s	-20dB bandwidth (1MHz) -20dB bandwidth	-20dB bandwidth (1MHz) 2MHz	Yes Yes
List of Freq.	Pseudo random ordered list.	Pseudo random ordered list	yes
Use of Freq.	Equal use of Freq.	Constant hop period (50mS) each freq. used once in table.	yes
Frequency band	2400- 2483.5MHz	2402 – 2482MHz	yes
Number of frequencies at 1,2 and 3Mb/s Number of frequencies at	Min. 75 15 non over lapping channels	79 38	Yes Yes

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4Mb/s	with total span 75MHz		
Occupied BW per hop at 1,2 and 3Mb/s Occupied BW per hop at 4Mb/s	<1MHz at –20dB > 1MHz	<1MHz at –20dB 1MHz < BW < 2MHz at –20dB	Yes Yes
Average time of occupancy	<0.4 sec see within 30 sec period-average.	50mSec	yes

Shmuel Bleichman

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BSR flat panel Antenna at 2.45GHz

Item	Unit	Value	Note
Frequency Range	GHz	2.4 to 2.5	
Impedance	Ohm	50	
VSWR		1:1.5	Max
Polarization		Linear / Vertical	
Gain	dBi	11	Min
3dB Beamwith E-plane (Ele)	Deg	33	Max
3dB Beamwith H-plane (Az)	Deg	23	Max
Power Handling	W	5	Min
Lightning protection		All elements DC Grounded	
Sidelobes		ETSI-TS3	Min (15dB prefered)
Front-to-back ratio	DB	25	Min
Cross Polarization	DB	15	Min
Operating Temperature	ºC	-40 to 70	
Mechanical		Attached drawing	
RF Connector		Huber-suhner 81MCX-50-0-6	

SPR (Subscriber) flat panel Antenna at 2.45GHz

Item	Unit	Value	Note
Frequency Range	GHz	2.4 to 2.5	
Impedance	Ohm	50	
VSWR		1:1.5	Max
Polarization		Linear / Vertical	
Gain	dBi	15	Min
3dB Beamwith E-plane (Ele)	Deg	33	Max

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3dB Beamwith H-plane (Az)	Deg	23	Max
Power Handling	W	5	Min
Lightning protection		All elements DC Grounded	
Sidelobes		ETSI-TS3	Min (15dB prefered)
Front-to-back ratio	DB	25	Min
Cross Polarization	DB	15	Min
Operating Temperature	ºC	-40 to 70	
Mechanical		Attached drawing	
RF Connector		Huber-suhner 81MCX-50-0-6	