Appendix D. SAR measurement Equpment Linearity Anaysis

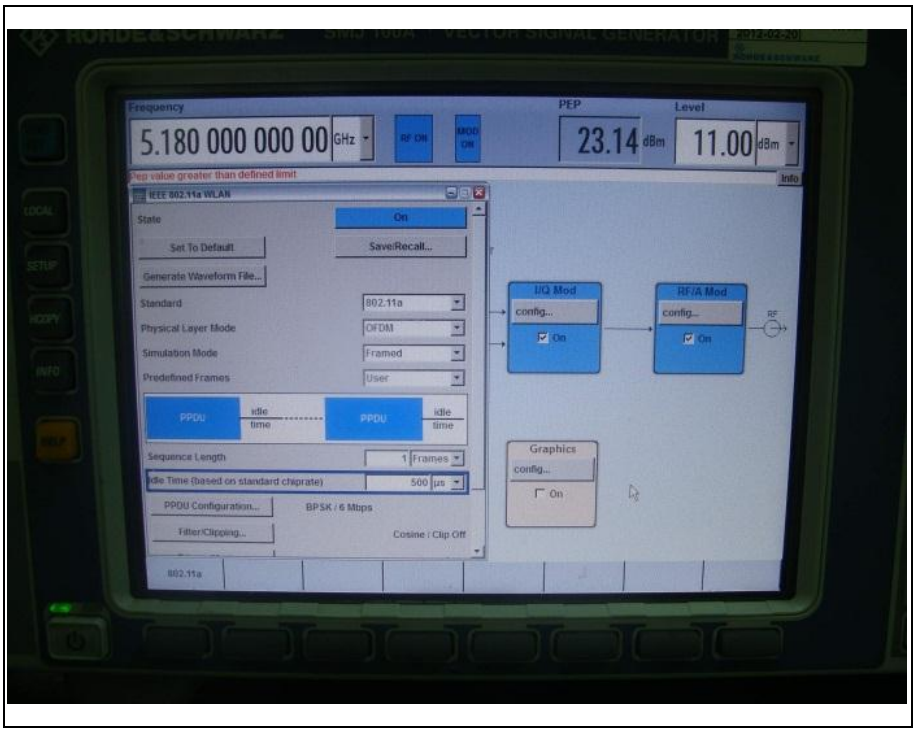
1 Signal Setup Configuration:

a. A set of signal was established from a Signal Generator with following setting

   i. Duty cycle: 20%/50%/75%/100%.

   ii. Duty factor is adjusted by insertion of different time-interval idle time.

b. The SG idle time settings and the resulting spectrum plots of each required duty cycle were recorded.

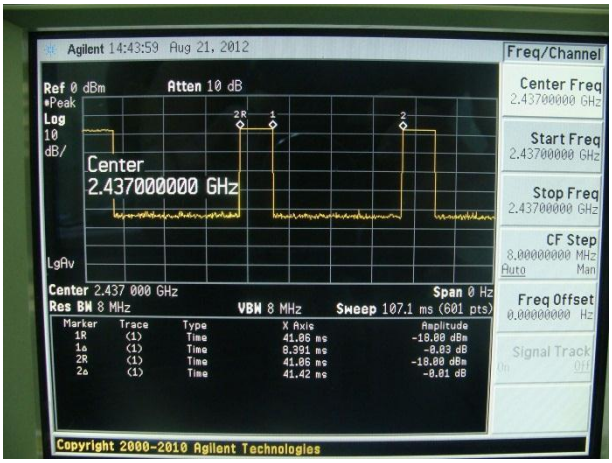
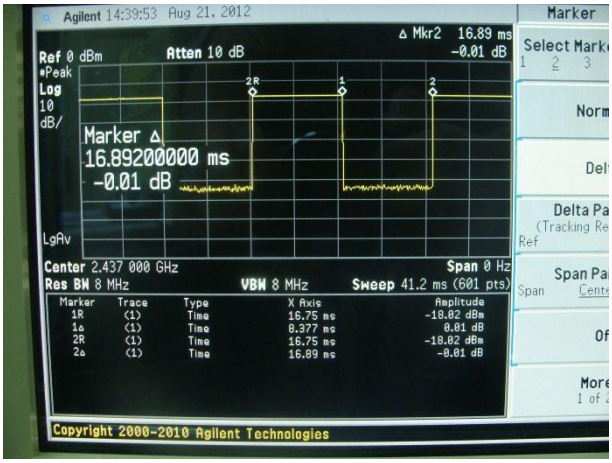
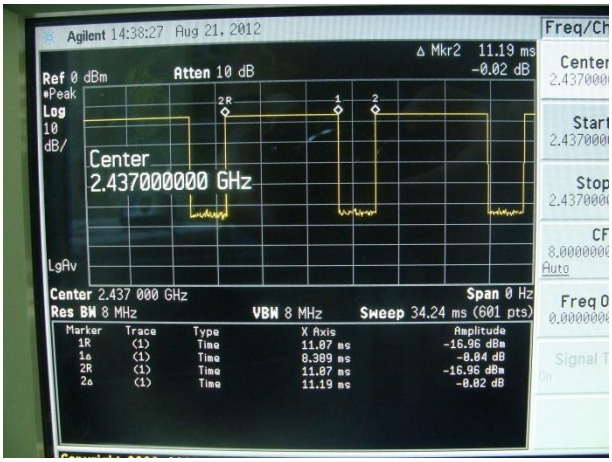
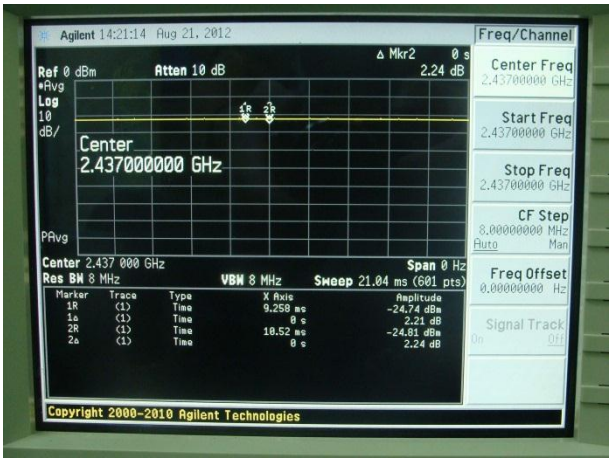


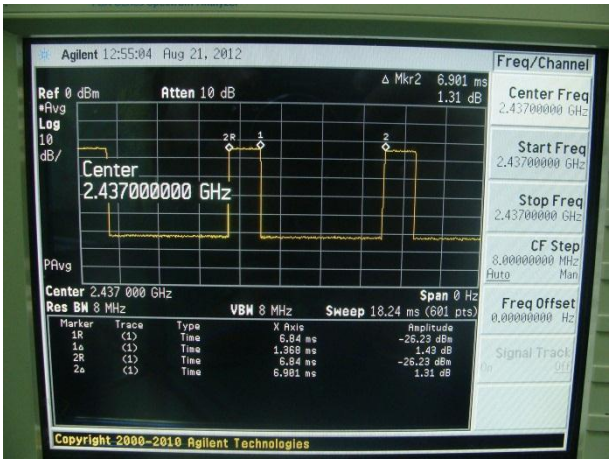
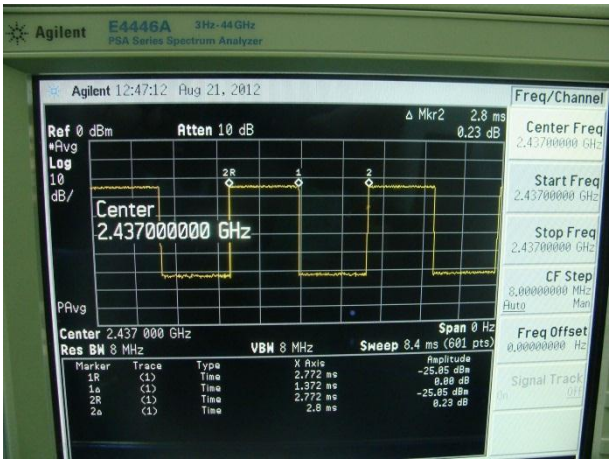
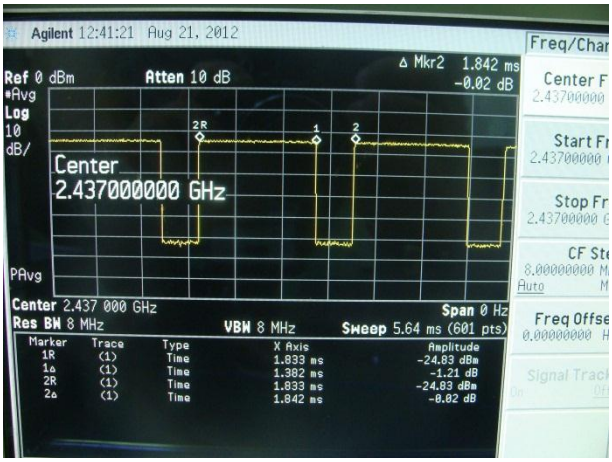
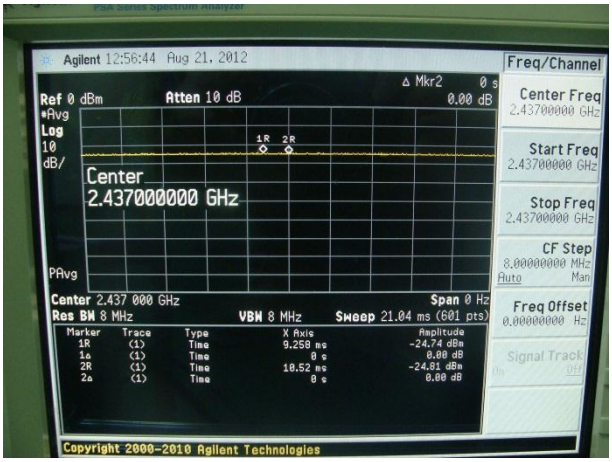
Signal Generator Setting

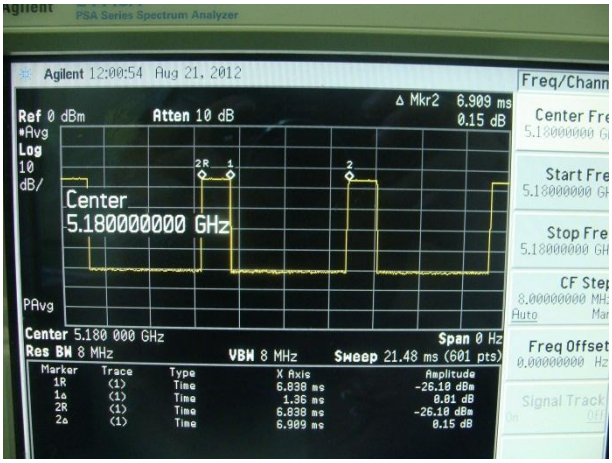
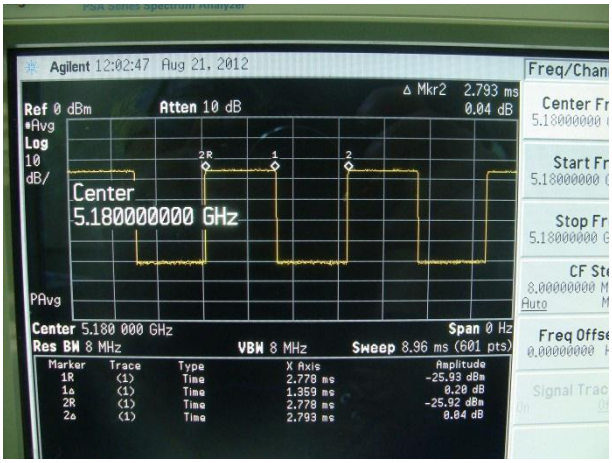
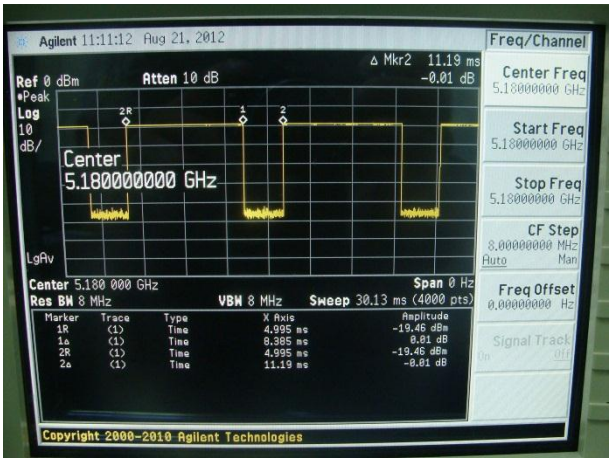
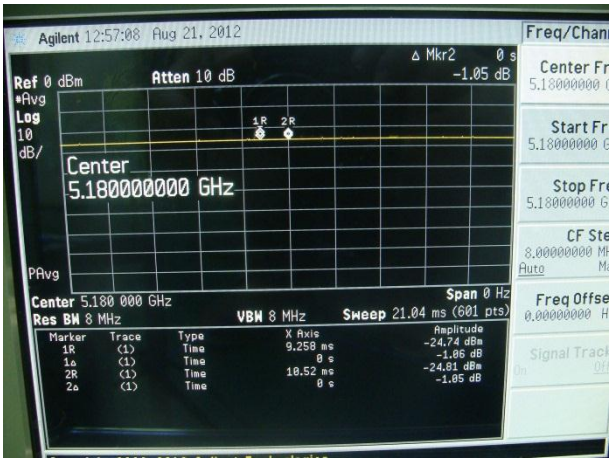
802.11b, 1Mbps	
Idle Time	Duty Cycle
1us	100%
2800us	75.00%
8500us	50.00%
33000us	20.00%

802.11a/802.11g, OFDM, 6Mbps	
Idle Time	Duty Cycle
1us	100%
500us	75.00%
1400us	50.00%
5500us	20.00%

The spectrum plots of different duty cycle signals

<table>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>802.11b CCK BPSK 1Mbps
20% Duty Cycle</td><td>802.11b CCK BPSK 1Mbps
50% Duty Cycle</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>802.11b CCK BPSK 1Mbps
75% Duty Cycle</td><td>802.11b CCK BPSK 1Mbps
100% Duty Cycle</td></tr>
</table>

	
802.11g OFDM 6Mbps **20% Duty Cycle**	**802.11g OFDM 6Mbps** **50% Duty Cycle**
	
802.11g OFDM 6Mbps **75% Duty Cycle**	**802.11g OFDM 6Mbps** **100% Duty Cycle**

	
802.11a OFDM 6Mbps **20% Duty Cycle**	**802.11a OFDM 6Mbps** **50% Duty Cycle**
	
802.11a OFDM 6Mbps **75% Duty Cycle**	**802.11a OFDM 6Mbps** **100% Duty Cycle**

2. System Setup Configuration:

a. The Signal Generator was connected to the Reference Dipole via a Directional Coupler referred to the drawing of Setup Configuration.
   i. The signal generator RF output was also coupled to the spectrum analyzer to monitor the test signal status
b. The Reference Dipole was positioned below a flat phatom filled with tissue-equivalent medium and the dipole touched the flat phantom.
c. Feed the 802.11a/802.11g/802.11b signal to the reference SAR dipole and measure SAR.
d. Move the probe to the highest SAR position, and use multi-meter function to monitor single-point SAR.
e. Apply different idle time setting in SG to generate different duty factor, record the single-point SAR value.

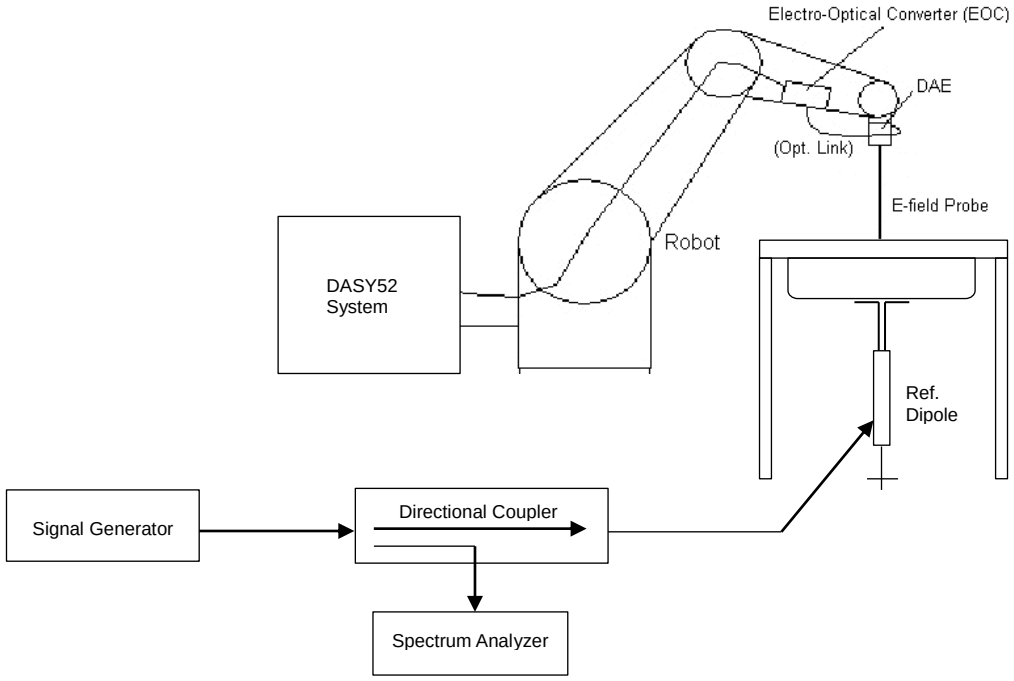
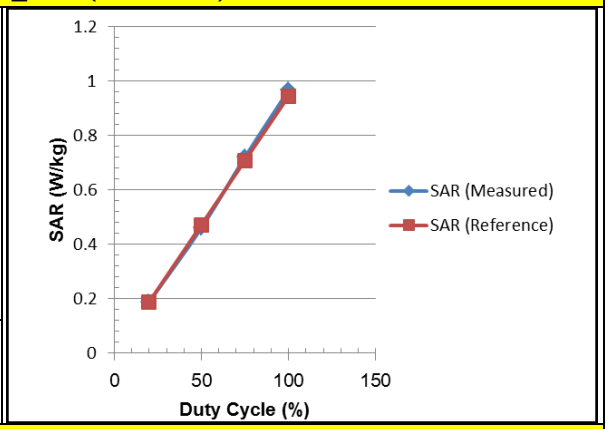
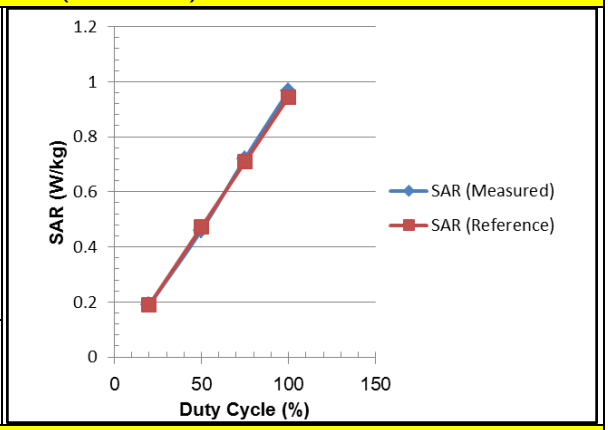
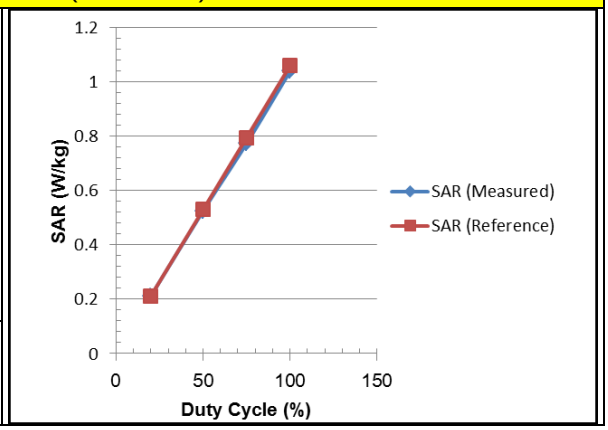


Fig: System Setup Configuration

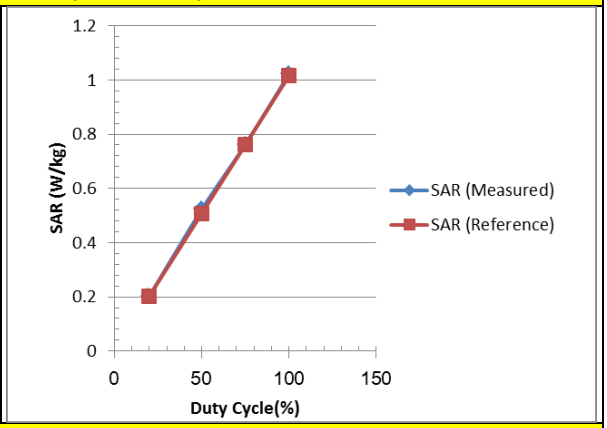
3. Linearity Response Check:

802.11b CCK BPSK 1Mbps_CH6 (2437 MHz)						
Duty Cycle (%)	20	50	75	100	Deviation of Scaling-up 75% SAR to 100%	
Single Point SAR (W/kg)	0.226	0.554	0.834	1.118		
Reference Line (W/kg)	0.226	0.565	0.8475	1.13		
Deviation (%)	0.00	-1.95	-1.59	-1.06	-0.53%	

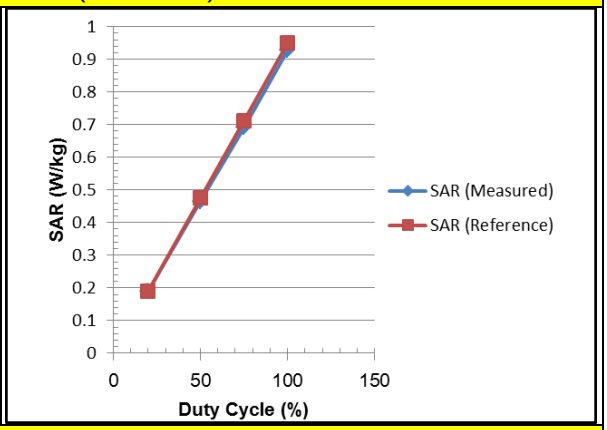
802.11g OFDM 6Mbps_CH6 (2437 MHz)						
Duty Cycle (%)	20	50	75	100	Deviation of Scaling-up 75% SAR to 100%	
Single Point SAR (W/kg)	0.189	0.461	0.721	0.967		
Reference Line (W/kg)	0.189	0.4725	0.70875	0.945		
Deviation (%)	0.00%	-2.43%	1.73%	2.33%	-0.60%	

802.11a OFDM 6Mbps _Ch36 (5180 MHz)						
Duty Cycle (%)	20	50	75	100	Deviation of Scaling-up 75% SAR to 100%	
Single Point SAR (W/kg)	0.212	0.525	0.774	1.04		
Reference Line (W/kg)	0.212	0.53	0.795	1.06		
Deviation (%)	0.00	-0.94	-2.64	-1.89	-1.32%	

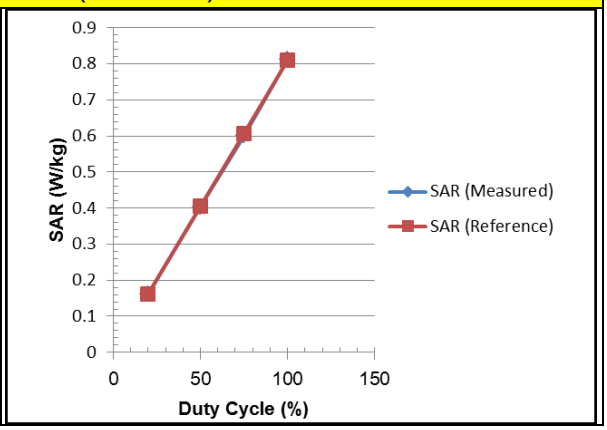
802.11a OFDM 6Mbps _Ch60 (5300 MHz)						
Duty Cycle (%)	20%	50%	75%	100%		
Single Point SAR (W/kg)	0.203	0.522	0.762	1.022	Deviation of Scaling-up 75% SAR to 100%	
Reference Line (W/kg)	0.203	0.5075	0.76125	1.015		
Deviation (%)	0.00%	2.86%	0.10%	0.69%	-0.56%	



802.11a OFDM 6Mbps _CH104 (5520 MHz)						
Duty Cycle (%)	20	50	75	100		
Single Point SAR (W/kg)	0.19	0.466	0.692	0.928	Deviation of Scaling-up 75% SAR to 100%	
Reference Line (W/kg)	0.19	0.475	0.7125	0.95		
Deviation (%)	0.00%	-1.89%	-2.88%	-2.32%	-0.59%	



802.11a OFDM 6Mbps _CH161 (5805 MHz)						
Duty Cycle (%)	20	50	75	100		
Single Point SAR (W/kg)	0.162	0.404	0.601	0.812	Deviation of Scaling-up 75% SAR to 100%	
Reference Line (W/kg)	0.162	0.405	0.6075	0.81		
Deviation (%)	0.00%	-0.25%	-1.07%	0.25%	0.75%	



Conclusion:

The worst case of linearity at 100% duty factor is -2.32%, and the worst difference between the deviation o 75% duty factor to 100% duty factor is -1.32%

Therefore, SAR measurement facility linearity versus different duty factor o f WLAN signal, is justified. Testing at 75% duty factor WLAN signal and scaling-up SAR to 100% duty factor (multiplication of 100/75=1.33) does not lead to concern of SAR reporting underestimation.

4. Equipment List:

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	Dosimetric E-Field Probe	EX3DV4	3792	Jun. 21, 2012	Jun. 20, 2013
SPEAG	Data Acquisition Electronics	DAE3	495	Apr. 23, 2012	Apr. 22, 2013
R&S	Signal Generator	SMJ100A	101375	Feb. 20, 2012	Feb. 19, 2013
Agilent	Spectrum Analyzer	E4446A	MY50180136	Apr. 17, 2012	Apr. 16, 2013

Masurement Date	Aug. 20, 2012 ~ Aug. 21, 2012