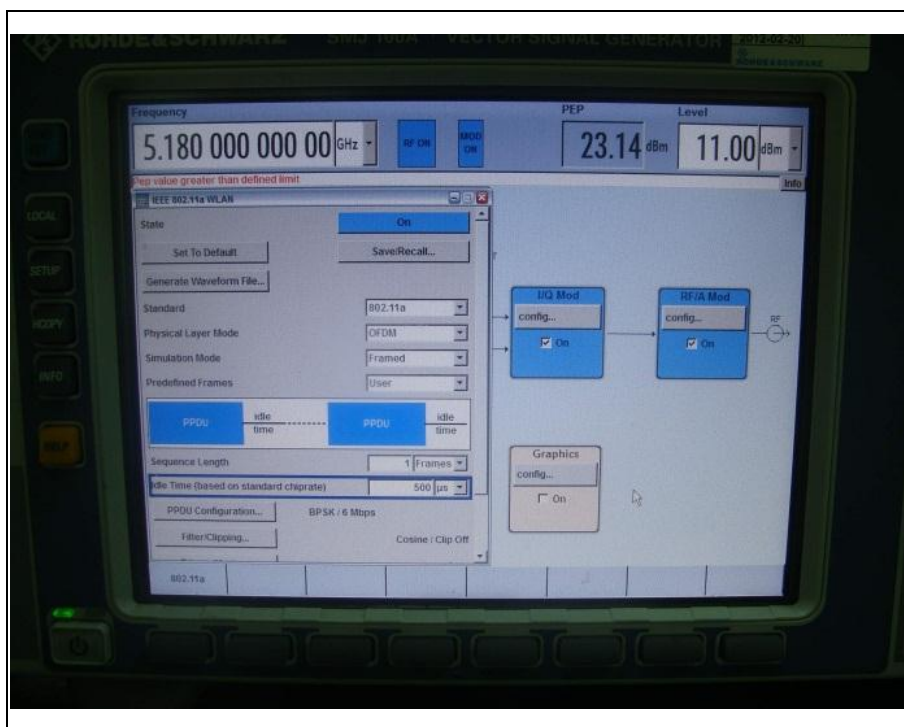


Appendix D. SAR measurement Equipment Linearity Analysis

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.

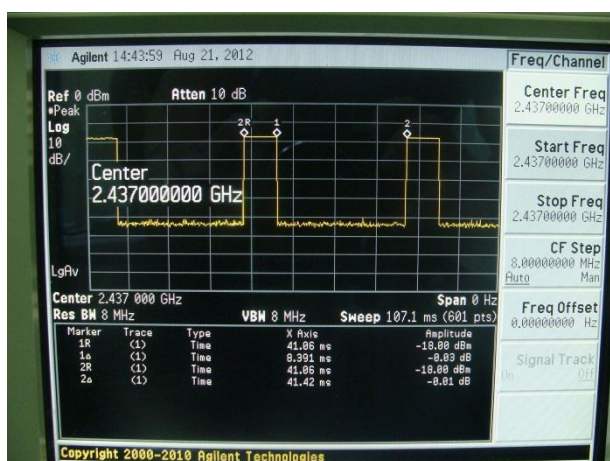


Signal Generator Setting

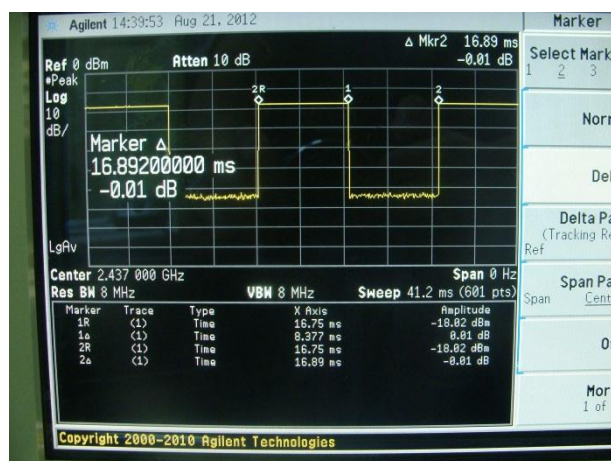
802.11b, 1Mbps	
Idle Time	Duty Cycle
1us	100%
2800us	75.00%
8500us	50.00%
33000us	20.00%

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

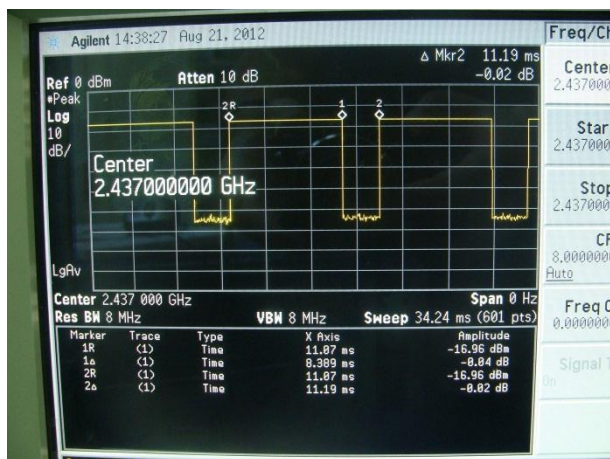
The spectrum plots of different duty cycle signals



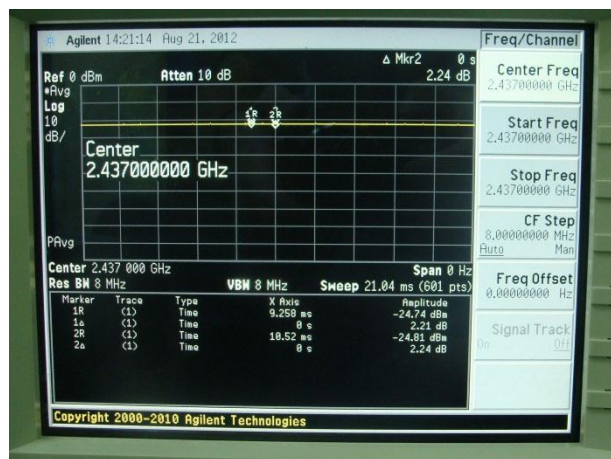
802.11b CCK BPSK 1Mbps
20% Duty Cycle



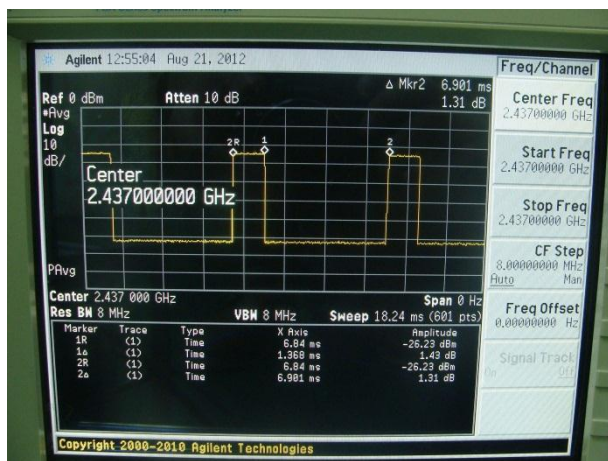
802.11b CCK BPSK 1Mbps
50% Duty Cycle



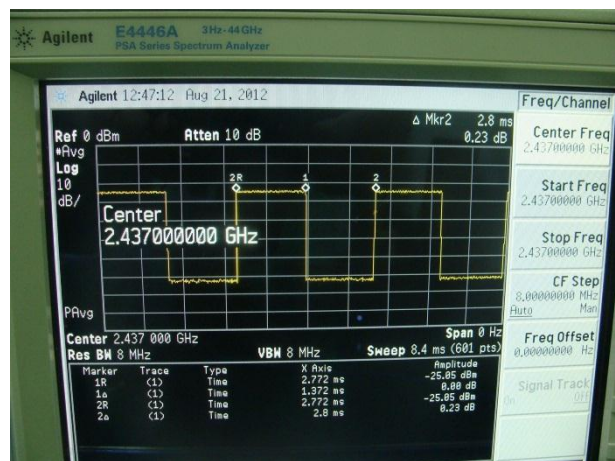
802.11b CCK BPSK 1Mbps
75% Duty Cycle



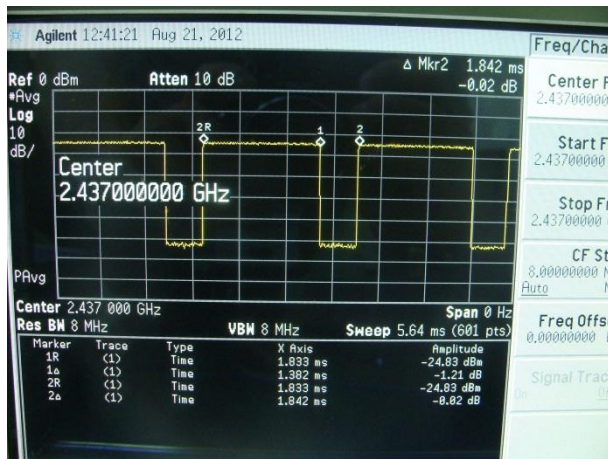
802.11b CCK BPSK 1Mbps
100% Duty Cycle



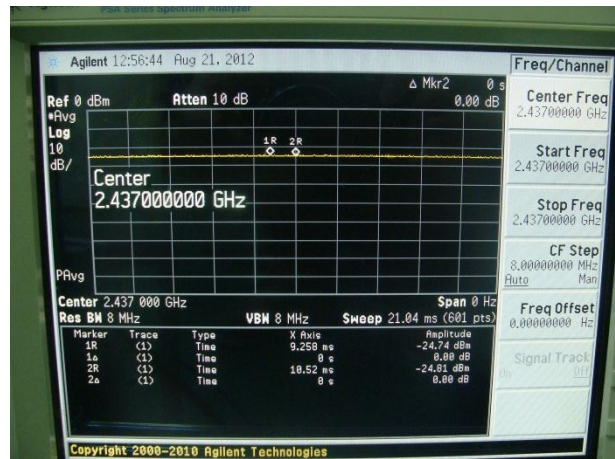
802.11g OFDM 6Mbps
20% Duty Cycle



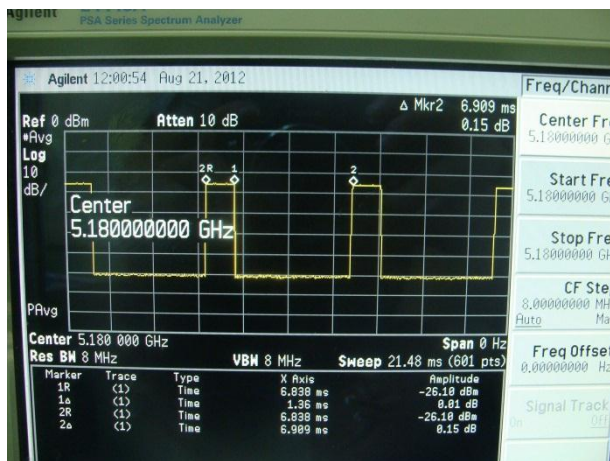
802.11g OFDM 6Mbps
50% Duty Cycle



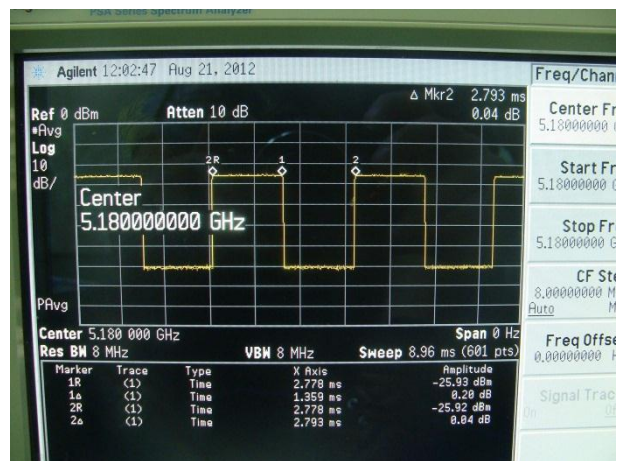
802.11g OFDM 6Mbps
75% Duty Cycle



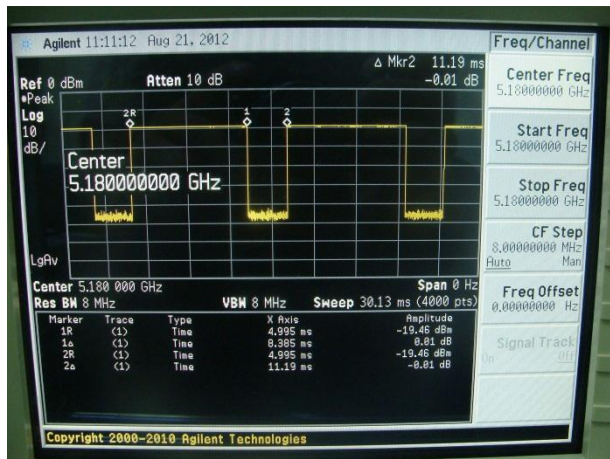
802.11g OFDM 6Mbps
100% Duty Cycle



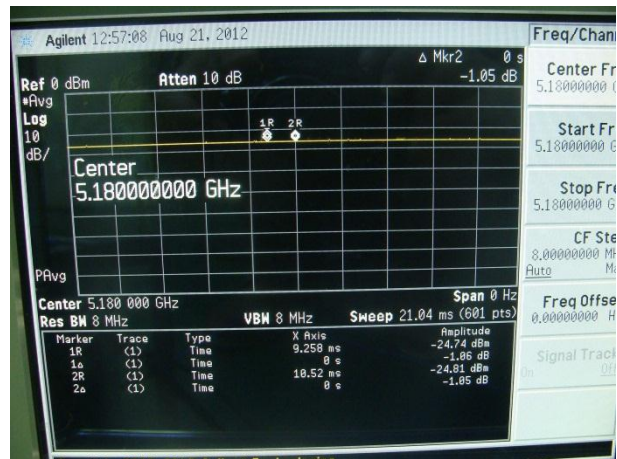
802.11a OFDM 6Mbps
20% Duty Cycle



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 phantom 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.

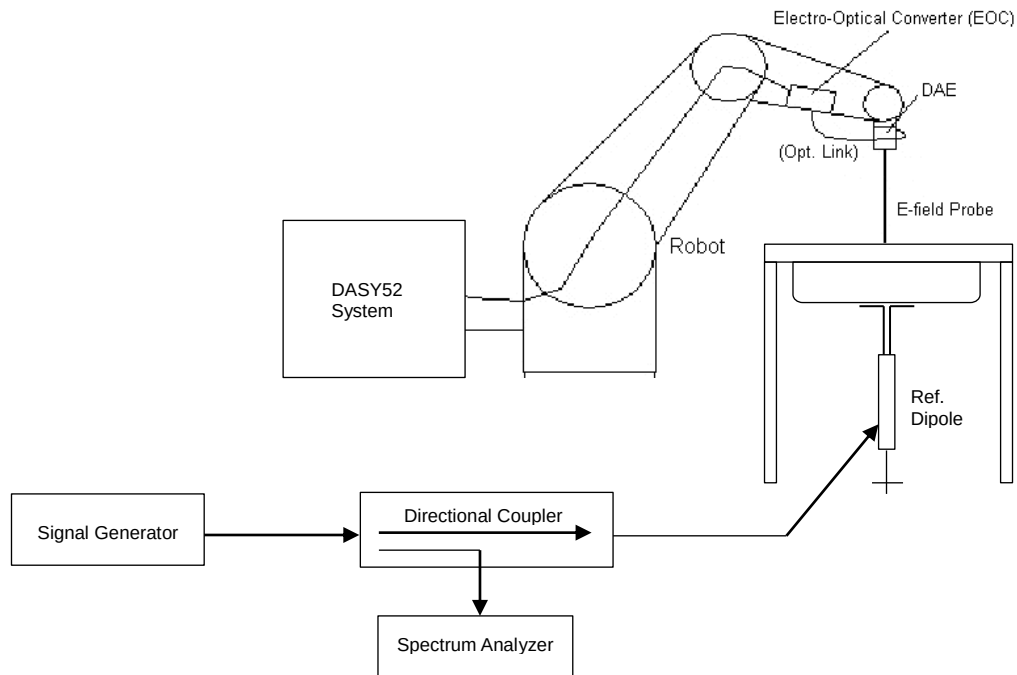
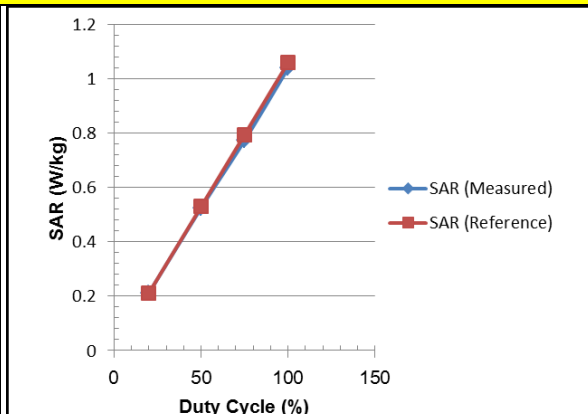
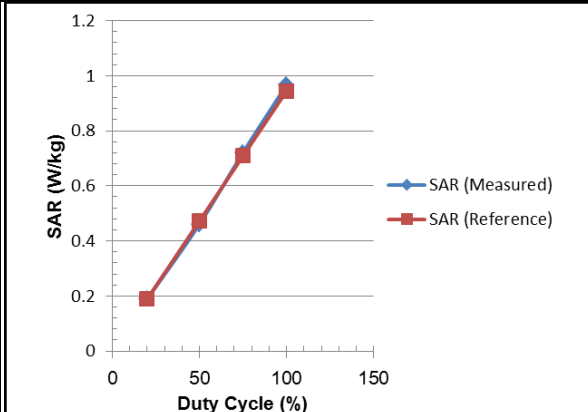
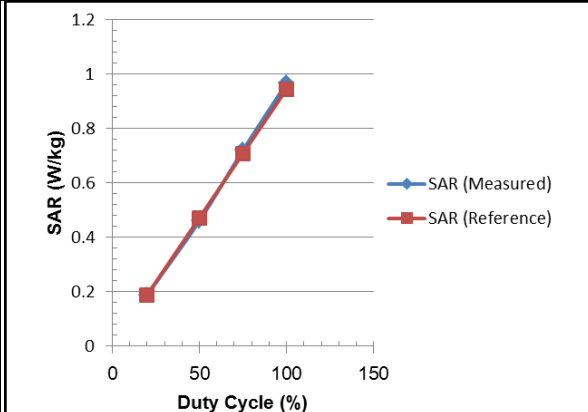
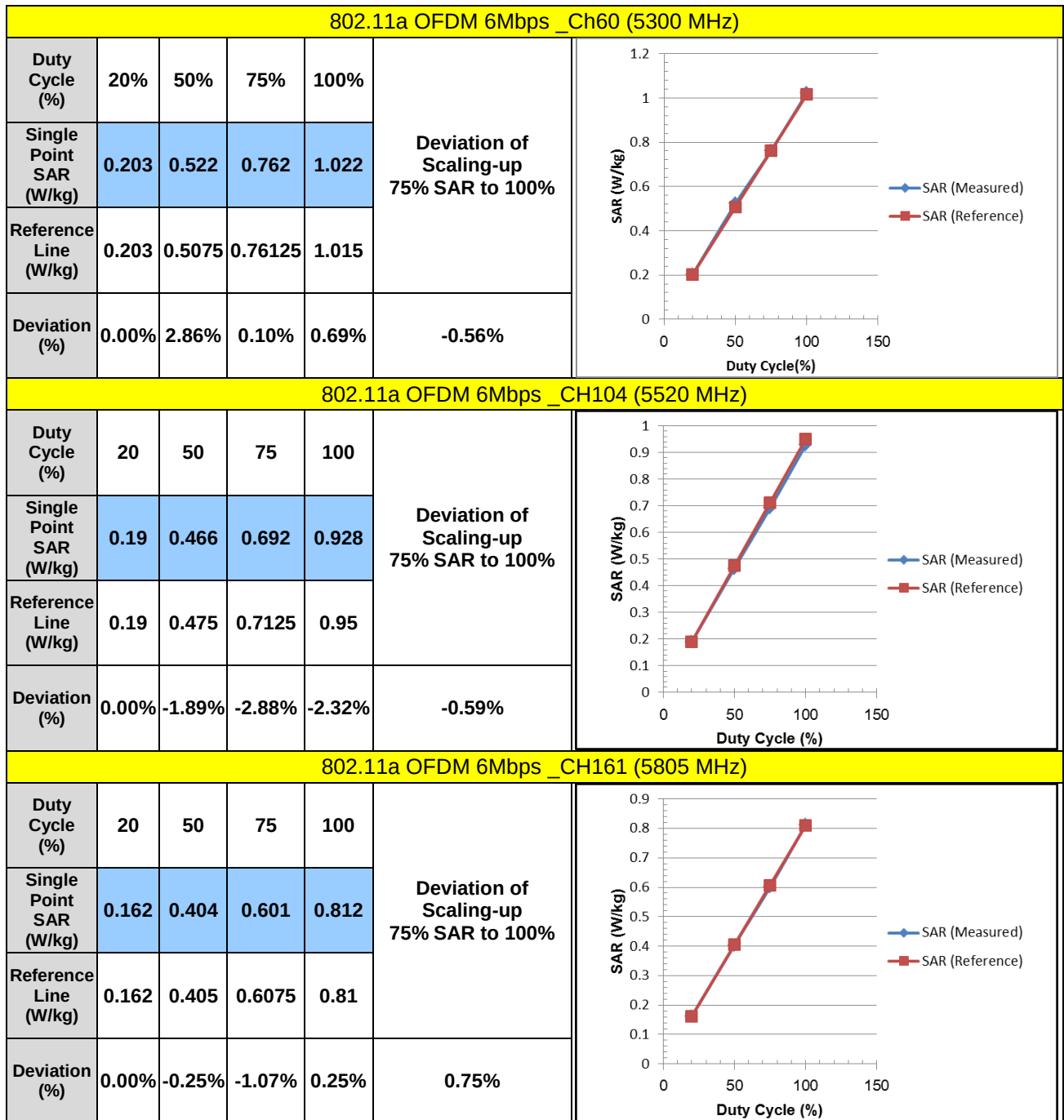


Fig: System Setup Configuration

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%





Conclusion:

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

Therefore, SAR measurement facility linearity versus different duty factor of 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

Measurement Date	Aug. 20, 2012 ~ Aug. 21, 2012
------------------	-------------------------------