



# 1 CO-LOCATION

## 1.1 Transmitter Unwanted Emissions

### 1.1.1 Transmitter Unwanted Emissions Limit

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Un-restricted Band Emissions Limit	
RF output power procedure	Limit (dB)
Peak output power procedure	20
Average output power procedure	30

Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.

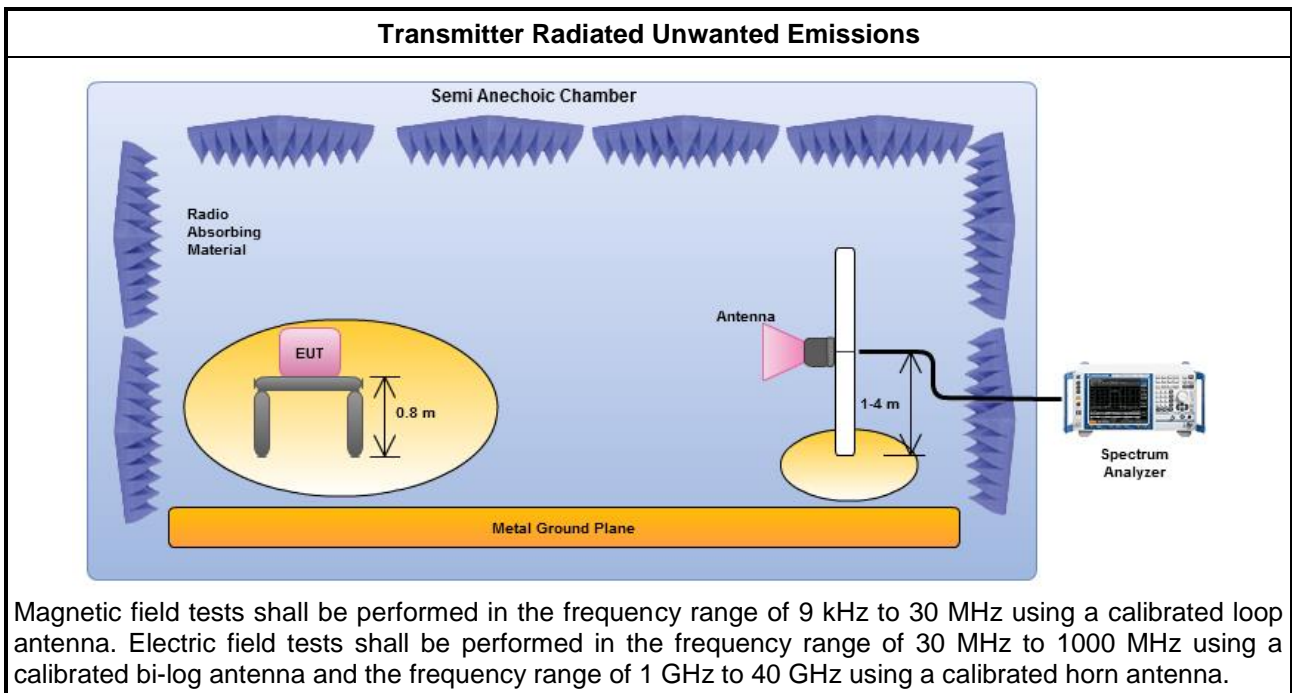
### 1.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

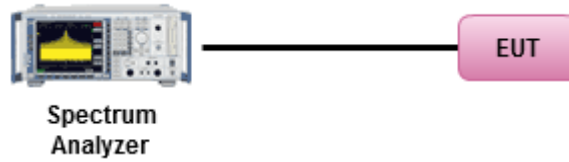
1.1.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
<input checked="" type="checkbox"/>	For the transmitter unwanted emissions shall be measured using following options below:
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). $VBW \geq 1/T$ , where T is pulse time.
<input checked="" type="checkbox"/>	Refer as KDB 558074, clause 12.2.3 measurement procedure peak limit.
<input checked="" type="checkbox"/>	For radiated measurement, refer as ANSI C63.10,
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.6 for radiated emissions from above 1 GHz.

1.1.4 Test Setup



Note: Test distance is 3m.

**Transmitter Conducted Unwanted Emissions****1.1.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)**

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.



1.1.6 Results of Radiated Emissions (Below 1GHz)

Mode 1: Internal antenna with adapter mode

Transmitter Radiated Unwanted Emissions									
Operating Mode	1			Polarization	H				
Operating Function	WLAN 2.4GHz HT20 CH6 + 5GHz VHT20 CH48								
<p>The graph displays the radiated emission levels in dBuV/m across a frequency range from 30 MHz to 1000 MHz. A red step function represents the FCC CLASS-B limit. Six specific peaks are identified and numbered 1 through 6, corresponding to the data in the table below.</p>									
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn
	MHz	level	dBuV/m	dB	reading	dB		High	Table
		dBuV/m			dBuV			cm	deg
1	100.53	33.94	43.50	-9.56	55.69	-21.75	Peak	---	---
2	122.43	34.87	43.50	-8.63	53.80	-18.93	Peak	---	---
3	194.58	32.26	43.50	-11.24	51.89	-19.63	Peak	---	---
4	375.26	31.17	46.00	-14.83	45.51	-14.34	Peak	---	---
5	500.39	33.99	46.00	-12.01	45.53	-11.54	Peak	---	---
6	625.49	38.36	46.00	-7.64	47.54	-9.18	Peak	---	---
<p>Note 1: "&gt;20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.            Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)            Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)</p>									



Transmitter Radiated Unwanted Emissions									
Operating Mode	1			Polarization	V				
Operating Function	WLAN 2.4GHz HT20 CH6 + 5GHz VHT20 CH48								
<p>The graph displays the radiated unwanted emissions. The y-axis represents the level in dBUV/m, ranging from 0 to 90. The x-axis represents the frequency in MHz, ranging from 30 to 1000. A red line indicates the FCC CLASS-B limit, which is constant at 40 dBUV/m from 30 MHz to 100 MHz, then steps up to 45 dBUV/m from 100 MHz to 1000 MHz. Six peaks are identified and labeled with blue numbers 1 through 6. Peak 1 is at 44.52 MHz, peak 2 at 79.23 MHz, peak 3 at 96.54 MHz, peak 4 at 191.61 MHz, peak 5 at 500.35 MHz, and peak 6 at 625.47 MHz. All peaks are below the applicable limit.</p>									
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn
	MHz	level	dBUV/m	dB	reading	dB		High	Table
		dBUV/m			dBuV			cm	deg
1	44.52	36.89	40.00	-3.11	53.71	-16.82	Peak	---	---
2	79.23	37.54	40.00	-2.46	59.01	-21.47	Peak	---	---
3	96.54	35.70	43.50	-7.80	57.95	-22.25	Peak	---	---
4	191.61	36.24	43.50	-7.26	55.85	-19.61	Peak	---	---
5	500.35	33.33	46.00	-12.67	44.87	-11.54	Peak	---	---
6	625.47	34.28	46.00	-11.72	43.46	-9.18	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)



Mode 2: Internal antenna with POE mode

Transmitter Radiated Unwanted Emissions									
Operating Mode	2				Polarization	H			
Operating Function	WLAN 2.4GHz HT20 CH6 + 5GHz VHT20 CH48								
<p>The graph plots Level (dBuV/m) on the y-axis (0 to 90) against Frequency (MHz) on the x-axis (30 to 1000). A red step function represents the FCC CLASS-B limit. Six blue vertical lines indicate peak emissions at the following frequencies: 1 (59.43 MHz), 2 (79.84 MHz), 3 (196.75 MHz), 4 (375.31 MHz), 5 (500.45 MHz), and 6 (625.34 MHz). All peaks are well below the applicable limit.</p>									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High cm	Turn Table deg
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB			
1	59.43	29.62	40.00	-10.38	46.73	-17.11	Peak	---	---
2	79.84	30.17	40.00	-9.83	51.77	-21.60	Peak	---	---
3	196.75	27.88	43.50	-15.62	47.52	-19.64	Peak	---	---
4	375.31	31.56	46.00	-14.44	45.90	-14.34	Peak	---	---
5	500.45	34.94	46.00	-11.06	46.48	-11.54	Peak	---	---
6	625.34	34.27	46.00	-11.73	43.46	-9.19	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)



Transmitter Radiated Unwanted Emissions									
Operating Mode	2	Polarization	V						
Operating Function	WLAN 2.4GHz HT20 CH6 + 5GHz VHT20 CH48								
<p>The graph displays the radiated unwanted emissions. The y-axis represents Level in dBuV/m, ranging from 0 to 90. The x-axis represents Frequency in MHz, ranging from 30 to 1000. A red stepped line indicates the FCC CLASS-B limit, which is 40 dBuV/m from 30 to 100 MHz, 45 dBuV/m from 100 to 200 MHz, and 55 dBuV/m from 200 to 1000 MHz. Six blue vertical lines represent emission peaks labeled 1 through 6, with their respective frequencies and levels listed in the table below.</p>									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	54.61	35.45	40.00	-4.55	52.27	-16.82	QP	---	---
2	79.75	37.74	40.00	-2.26	59.32	-21.58	Peak	---	---
3	132.92	32.00	43.50	-11.50	50.00	-18.00	Peak	---	---
4	196.84	29.23	43.50	-14.27	48.87	-19.64	Peak	---	---
5	275.55	27.99	46.00	-18.01	44.85	-16.86	Peak	---	---
6	500.53	34.92	46.00	-11.08	46.46	-11.54	Peak	---	---
<p>Note 1: "&gt;20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.            Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)            Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)</p>									



Mode 3: External antenna with adapter mode

Transmitter Radiated Unwanted Emissions									
Operating Mode	3			Polarization	H				
Operating Function	WLAN 2.4GHz 11g CH6 + 5GHz 11a CH40								
<p>The graph displays the radiated unwanted emissions. The y-axis represents Level in dBuV/m, ranging from 0 to 90. The x-axis represents Frequency in MHz, ranging from 30 to 1000. A red step function represents the FCC CLASS-B limit. Six peaks are identified and numbered 1 through 6. Peak 1 is at 81.88 MHz, peak 2 at 99.53 MHz, peak 3 at 122.46 MHz, peak 4 at 195.87 MHz, peak 5 at 500.43 MHz, and peak 6 at 625.50 MHz. All peaks are well below the applicable limit.</p>									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High cm	Turn Table deg
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB			
1	81.88	30.43	40.00	-9.57	52.31	-21.88	Peak	---	---
2	99.53	31.48	43.50	-12.02	53.36	-21.88	Peak	---	---
3	122.46	31.94	43.50	-11.56	50.86	-18.92	Peak	---	---
4	195.87	28.33	43.50	-15.17	47.96	-19.63	Peak	---	---
5	500.43	33.75	46.00	-12.25	45.29	-11.54	Peak	---	---
6	625.50	28.78	46.00	-17.22	37.96	-9.18	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)





Transmitter Radiated Unwanted Emissions									
Operating Mode	3			Polarization	V				
Operating Function	WLAN 2.4GHz 11g CH6 + 5GHz 11a CH40								
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn
	MHz	level	dBuV/m	dB	reading	dB		High	Table
								cm	deg
1	45.32	36.76	40.00	-3.24	53.54	-16.78	Peak	---	---
2	72.25	36.46	40.00	-3.54	56.38	-19.92	Peak	---	---
3	99.88	33.75	43.50	-9.75	55.59	-21.84	Peak	---	---
4	172.43	34.81	43.50	-8.69	52.52	-17.71	Peak	---	---
5	453.74	29.60	46.00	-16.40	42.05	-12.45	Peak	---	---
6	500.49	33.58	46.00	-12.42	45.12	-11.54	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)



Mode 4: External antenna with POE mode

Transmitter Radiated Unwanted Emissions									
Operating Mode	4				Polarization	H			
Operating Function	WLAN 2.4GHz 11g CH6 + 5GHz 11a CH40								
<p>The graph plots Level (dBuV/m) on the y-axis (0 to 90) against Frequency (MHz) on the x-axis (30 to 1000). A red step function represents the FCC CLASS-B limit. Six blue vertical lines indicate measured peaks at various frequencies, labeled 1 through 6. The measured levels are all below the applicable limit.</p>									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	37.73	29.17	40.00	-10.83	46.39	-17.22	Peak	---	---
2	81.56	30.90	40.00	-9.10	52.75	-21.85	Peak	---	---
3	196.47	28.14	43.50	-15.36	47.77	-19.63	Peak	---	---
4	375.29	28.99	46.00	-17.01	43.33	-14.34	Peak	---	---
5	500.26	35.97	46.00	-10.03	47.52	-11.55	Peak	---	---
6	749.14	31.36	46.00	-14.64	38.61	-7.25	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)



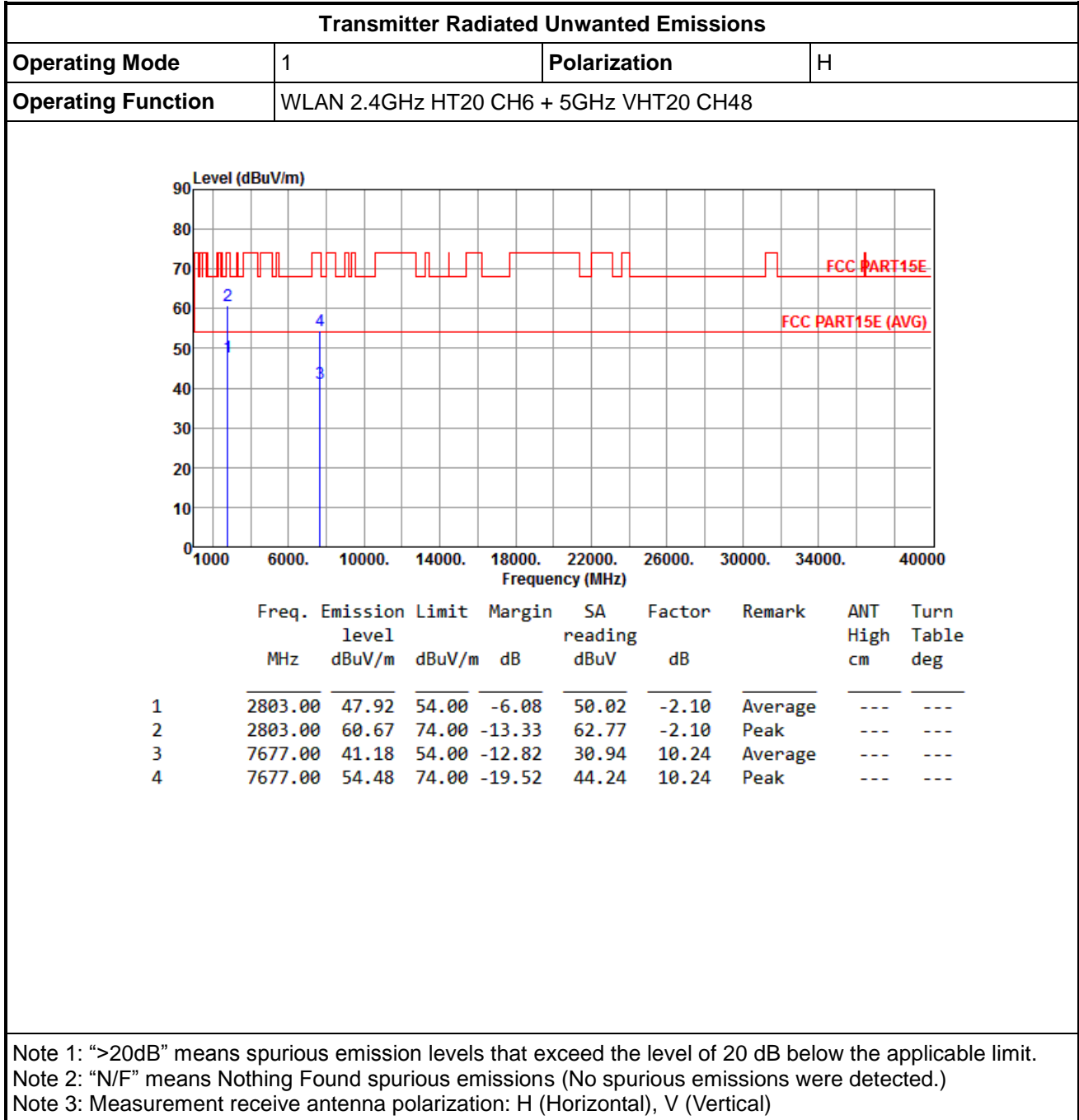
Transmitter Radiated Unwanted Emissions									
Operating Mode	4				Polarization	V			
Operating Function	WLAN 2.4GHz 11g CH6 + 5GHz 11a CH40								
<p>The graph displays the radiated unwanted emissions. The y-axis represents the level in dBuV/m, ranging from 0 to 90. The x-axis represents the frequency in MHz, ranging from 30 to 1000. A red step function represents the FCC CLASS-B limit. Six blue vertical lines indicate measured peaks at various frequencies: 47.58 MHz, 74.54 MHz, 184.58 MHz, 262.75 MHz, 439.18 MHz, and 500.37 MHz. The peak levels are 35.55, 36.89, 27.93, 30.37, 28.69, and 34.58 dBuV/m respectively. The applicable limit for these frequencies is 40.00 dBuV/m.</p>									
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn
	MHz	level	dBuV/m	dB	reading	dB		High	Table
		dBuV/m			dBuV			cm	deg
1	47.58	35.55	40.00	-4.45	52.20	-16.65	Peak	---	---
2	74.54	36.89	40.00	-3.11	57.34	-20.45	Peak	---	---
3	184.58	27.93	43.50	-15.57	46.94	-19.01	Peak	---	---
4	262.75	30.37	46.00	-15.63	47.84	-17.47	Peak	---	---
5	439.18	28.69	46.00	-17.31	41.46	-12.77	Peak	---	---
6	500.37	34.58	46.00	-11.42	46.12	-11.54	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)



1.1.7 Results for Radiated Emissions (Above 1GHz)

Mode 1: Internal antenna with adapter mode





Transmitter Radiated Unwanted Emissions									
Operating Mode	1			Polarization	V				
Operating Function	WLAN 2.4GHz HT20 CH6 + 5GHz VHT20 CH48								
<p>The graph displays the radiated unwanted emissions. The y-axis represents Level in dBuV/m, ranging from 0 to 90. The x-axis represents Frequency in MHz, ranging from 1000 to 40000. A red line indicates the FCC PART15E limit, and a lower red line indicates the FCC PART15E (AVG) limit. Two peaks are highlighted with blue vertical lines and labeled '2' and '4'. Peak 2 is at 2803.00 MHz and peak 4 is at 7677.00 MHz.</p>									
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn
	MHz	level	dBuV/m	dB	reading	dB		High	Table
		dBuV/m	dBuV/m	dB	dBuV			cm	deg
1	2803.00	48.75	54.00	-5.25	50.85	-2.10	Average	---	---
2	2803.00	61.16	74.00	-12.84	63.26	-2.10	Peak	---	---
3	7677.00	40.55	54.00	-13.45	30.31	10.24	Average	---	---
4	7677.00	53.01	74.00	-20.99	42.77	10.24	Peak	---	---
<p>Note 1: "&gt;20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.            Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)            Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)</p>									



Mode 3: External antenna with adapter mode

Transmitter Radiated Unwanted Emissions									
Operating Mode	3	Polarization	H						
Operating Function	WLAN 2.4GHz 11g CH6 + 5GHz 11a CH40								
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2763.00	48.28	54.00	-5.72	50.53	-2.25	Average	---	---
2	2763.00	61.65	74.00	-12.35	63.90	-2.25	Peak	---	---
3	7637.00	39.75	54.00	-14.25	29.47	10.28	Average	---	---
4	7637.00	52.79	74.00	-21.21	42.51	10.28	Peak	---	---
<p>Note 1: "&gt;20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.            Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)            Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)</p>									



Transmitter Radiated Unwanted Emissions									
Operating Mode	3			Polarization	V				
Operating Function	WLAN 2.4GHz 11g CH6 + 5GHz 11a CH40								
<p>The graph displays the radiated unwanted emissions. The y-axis represents Level in dBuV/m, ranging from 0 to 90. The x-axis represents Frequency in MHz, ranging from 1000 to 40000. Two horizontal red lines indicate the FCC Part 15E limits: a solid line at approximately 68 dBuV/m and an average line at approximately 55 dBuV/m. The test results are shown as a red stepped line with several peaks. Two specific peaks are highlighted with blue vertical lines and labeled '2' and '4'. Peak 2 is at 2763.00 MHz with a level of 62.02 dBuV/m. Peak 4 is at 7637.00 MHz with a level of 54.79 dBuV/m. Other peaks are visible at approximately 2763 MHz (level 48.72 dBuV/m) and 7637 MHz (level 41.77 dBuV/m).</p>									
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn
	MHz	level	dBuV/m	dB	reading	dB		High	Table
		dBuV/m			dBuV			cm	deg
1	2763.00	48.72	54.00	-5.28	50.97	-2.25	Average	---	---
2	2763.00	62.02	74.00	-11.98	64.27	-2.25	Peak	---	---
3	7637.00	41.77	54.00	-12.23	31.49	10.28	Average	---	---
4	7637.00	54.79	74.00	-19.21	44.51	10.28	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)



## 2 TEST EQUIPMENT AND CALIBRATION DATA

<b>Test Item</b>	Radiated Emissions				
<b>Test Site</b>	966 chamber1 / (03CH01-WS)				
<b>Instrument</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Date</b>	<b>Calibration Until</b>
Spectrum Analyzer	R&S	FSV40	101498	Jan. 25, 2014	Jan. 24, 2015
Receiver	R&S	ESR3	101658	Jan. 10, 2014	Jan. 09, 2015
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jan. 02, 2014	Jan. 01, 2015
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Feb. 13, 2014	Feb. 12, 2015
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Dec. 27, 2013	Dec. 26, 2014
Preamplifier	Burgeon	BPA-530	SN:100219	Nov. 28, 2013	Nov. 27, 2014
Preamplifier	Agilent	83017A	MY39501308	Dec. 16, 2013	Dec. 15, 2014
Preamplifier	WM	TF-130N-R1	923365	Oct. 23, 2013	Oct. 22, 2014
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Dec. 16, 2013	Dec. 15, 2014
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Dec. 16, 2013	Dec. 15, 2014
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16139/4	Dec. 16, 2013	Dec. 15, 2014
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Dec. 16, 2013	Dec. 15, 2014
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Dec. 16, 2013	Dec. 15, 2014
Note: Calibration Interval of instruments listed above is one year.					

Loop Antenna	R&S	HFH2-Z2	100330	Nov. 15, 2012	Nov. 14, 2014
Note: Calibration Interval of instruments listed above is two year.					