

3.8. Spurious Emission (Radiated)

Limit

Radiated Emission Limits (9 kHz~1000 MHz)

Frequency (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

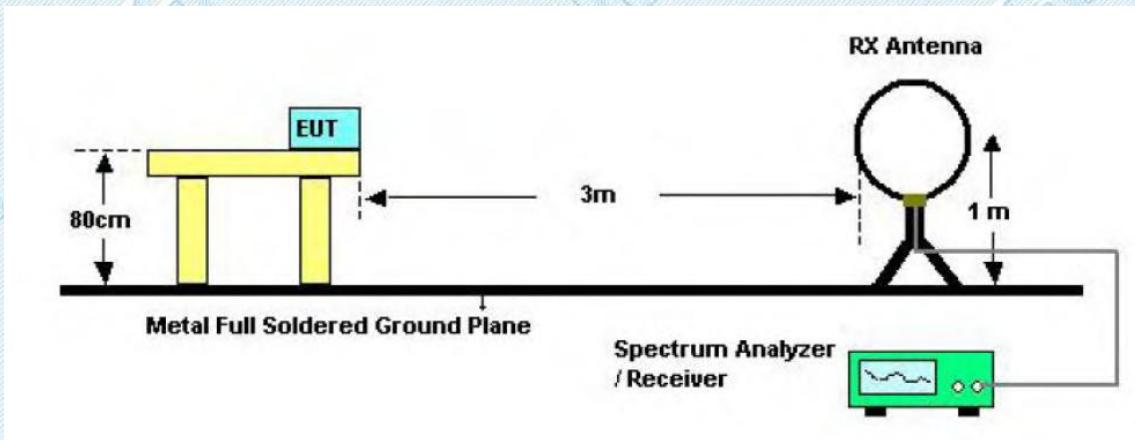
Radiated Emission Limit (Above 1000MHz)

Frequency (MHz)	Distance Meters(at 3m)	
	Peak	Average
Above 1000	74	54

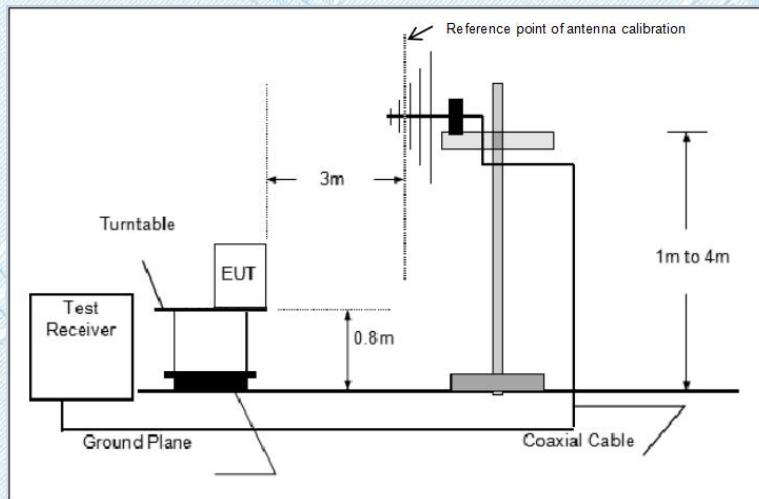
Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dB_{uV}/m)=20log Emission Level (uV/m).

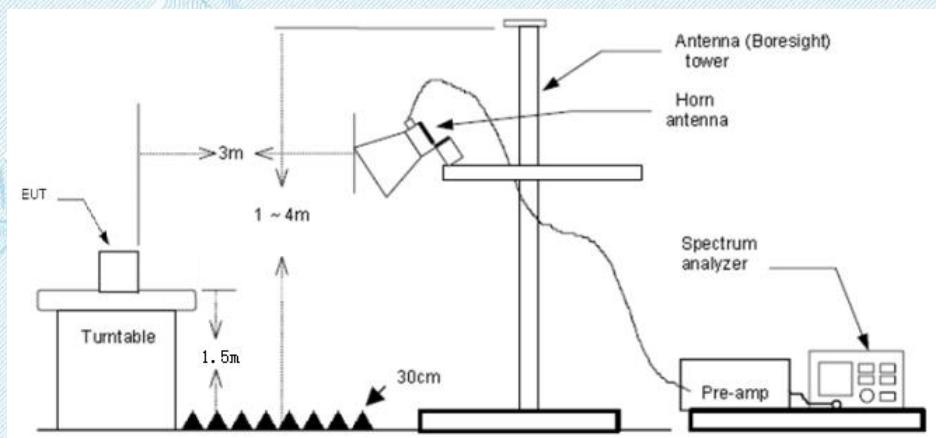
Test Configuration



Below 30MHz Test Setup



Below 1000MHz Test Setup



Above 1GHz Test Setup

Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Below 1 GHz:

RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;

If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

(3) From 1 GHz to 10th harmonic:

RBW=1MHz, VBW=3MHz Peak detector for Peak value.

RBW=1MHz, VBW=10Hz RMS detector for Average value.

Test Mode

Please refer to the clause 2.3.

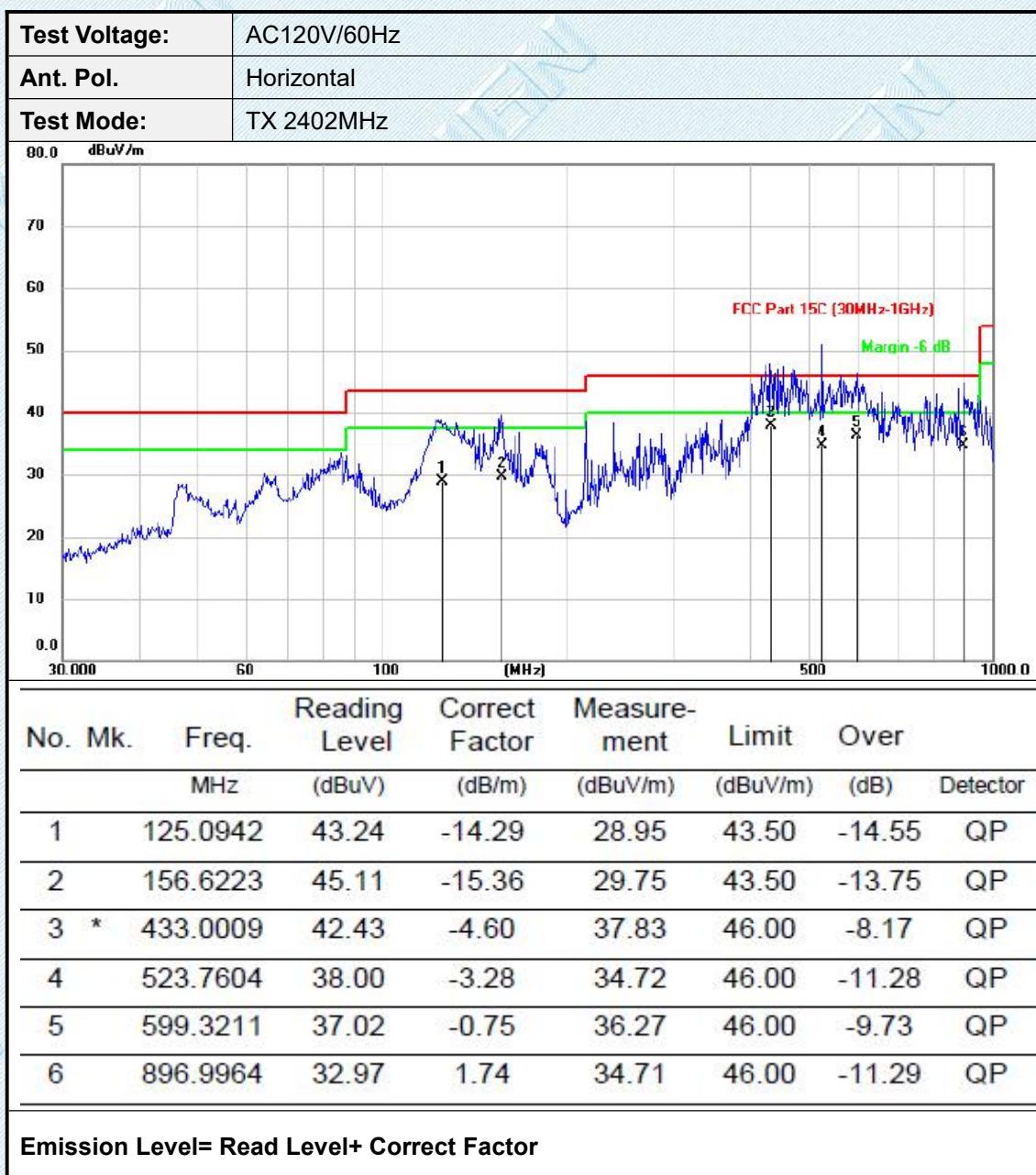
Test Result**9 KHz~30 MHz and 18GHz~25GHz**

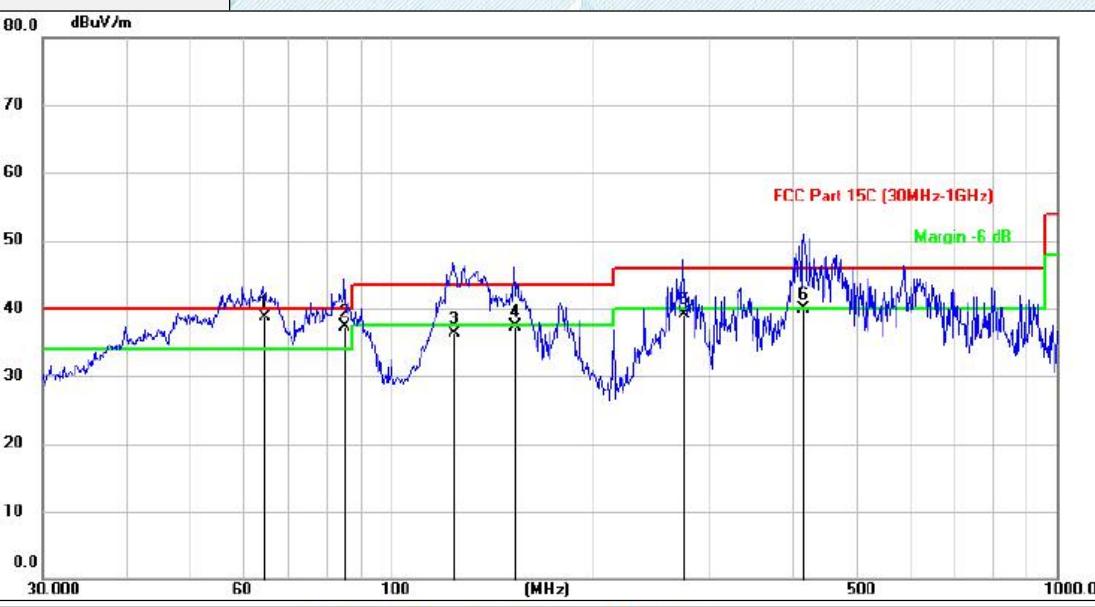
From 9 KHz~30 MHz and 18GHz~25GHz: Conclusion: PASS

Note:

- 1) Measurement = Reading level + Correct Factor
Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor
- 2) The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.
- 3) The emission levels of other frequencies are very lower than the limit and not show in test report.
- 4) The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
- 5) Pre-scan CH00, CH19 and CH39 modulation, and found the CH00 which it is worse case for 30MHz-1GHz , so only show the test data for worse case.

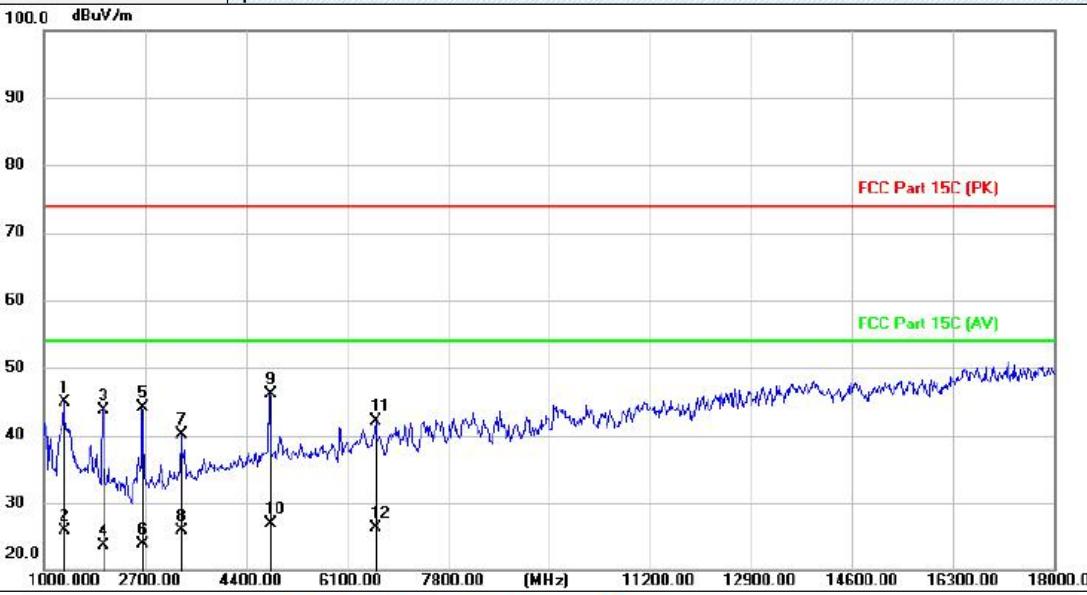
30MHz-1GHz



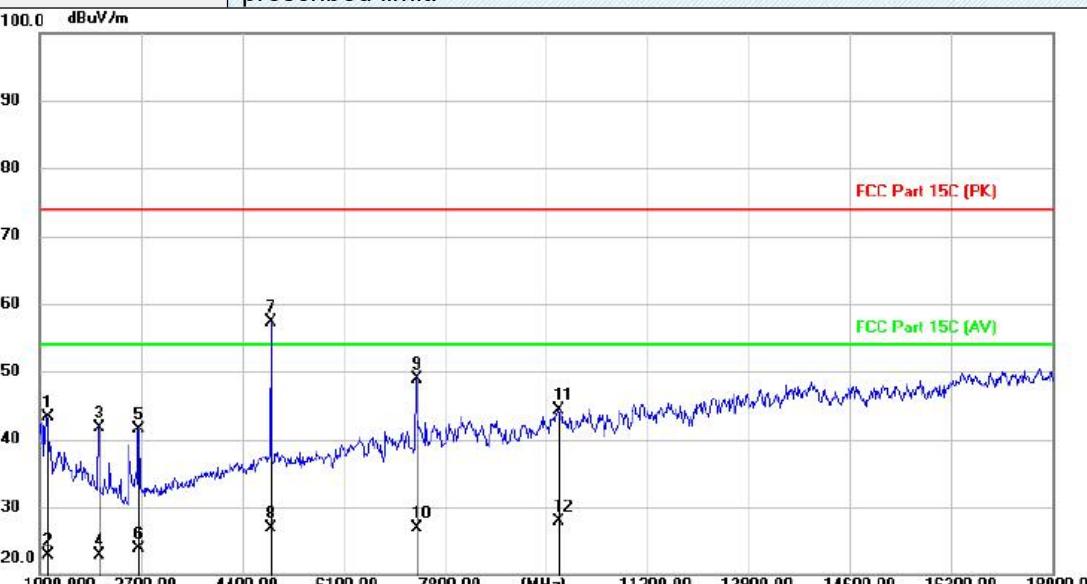
Test Voltage:	AC120V/60Hz																																																																								
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<table border="1"><thead><tr><th>No.</th><th>Mk.</th><th>Freq.</th><th>Reading Level</th><th>Correct Factor</th><th>Measure-ment</th><th>Limit</th><th>Over</th><th>Detector</th></tr><tr><th></th><th></th><th>MHz</th><th>(dBuV)</th><th>(dB/m)</th><th>(dBuV/m)</th><th>(dBuV/m)</th><th>(dB)</th><th></th></tr></thead><tbody><tr><td>1</td><td>*</td><td>64.4557</td><td>51.41</td><td>-12.70</td><td>38.71</td><td>40.00</td><td>-1.29</td><td>QP</td></tr><tr><td>2</td><td>!</td><td>85.2084</td><td>52.04</td><td>-14.70</td><td>37.34</td><td>40.00</td><td>-2.66</td><td>QP</td></tr><tr><td>3</td><td></td><td>124.3944</td><td>50.46</td><td>-14.17</td><td>36.29</td><td>43.50</td><td>-7.21</td><td>QP</td></tr><tr><td>4</td><td></td><td>153.2004</td><td>52.82</td><td>-15.46</td><td>37.36</td><td>43.50</td><td>-6.14</td><td>QP</td></tr><tr><td>5</td><td></td><td>274.9639</td><td>48.51</td><td>-9.36</td><td>39.15</td><td>46.00</td><td>-6.85</td><td>QP</td></tr><tr><td>6</td><td></td><td>415.0497</td><td>44.69</td><td>-4.81</td><td>39.88</td><td>46.00</td><td>-6.12</td><td>QP</td></tr></tbody></table>		No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Detector			MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)		1	*	64.4557	51.41	-12.70	38.71	40.00	-1.29	QP	2	!	85.2084	52.04	-14.70	37.34	40.00	-2.66	QP	3		124.3944	50.46	-14.17	36.29	43.50	-7.21	QP	4		153.2004	52.82	-15.46	37.36	43.50	-6.14	QP	5		274.9639	48.51	-9.36	39.15	46.00	-6.85	QP	6		415.0497	44.69	-4.81	39.88	46.00	-6.12	QP
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		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)																																																																		
1	*	64.4557	51.41	-12.70	38.71	40.00	-1.29	QP																																																																	
2	!	85.2084	52.04	-14.70	37.34	40.00	-2.66	QP																																																																	
3		124.3944	50.46	-14.17	36.29	43.50	-7.21	QP																																																																	
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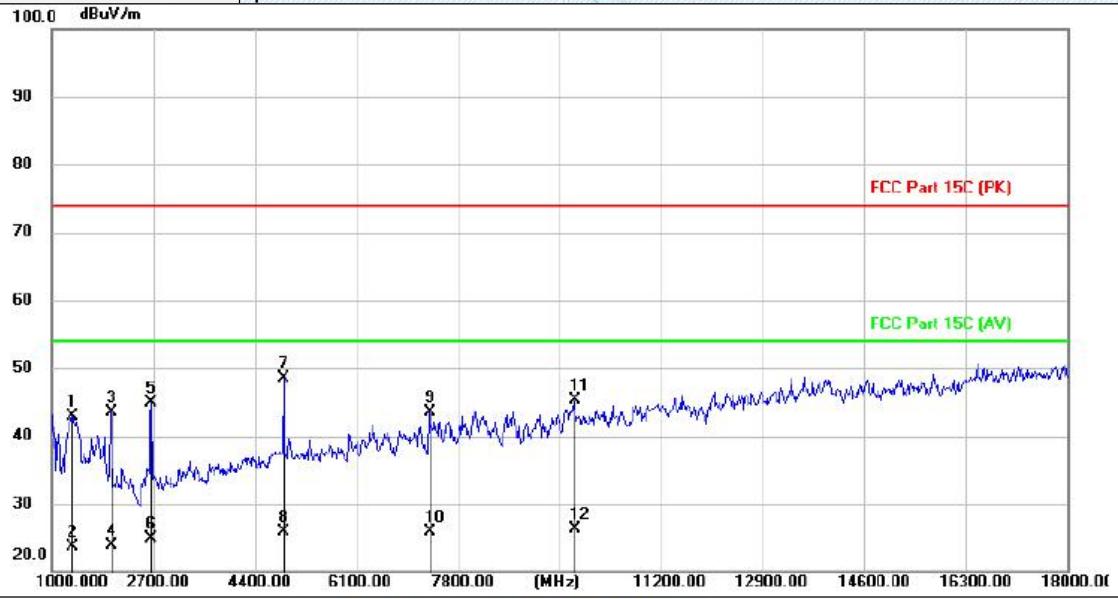
Adobe 1GHz

Test Voltage:	AC120V/60Hz						
Ant. Pol.	Horizontal						
Test Mode:	TX BLE Mode 2402MHz						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
100.0 dBuV/m							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)
1		1127.500	55.33	-12.19	43.14	74.00	-30.86 peak
2		1127.500	39.03	-12.19	26.84	54.00	-27.16 AVG
3		1999.600	51.08	-11.06	40.02	74.00	-33.98 peak
4		1999.600	36.00	-11.06	24.94	54.00	-29.06 AVG
5		2402.500	53.46	-10.91	42.55	74.00	-31.45 peak
6		2402.500	36.85	-10.91	25.94	54.00	-28.06 AVG
7		2521.500	56.26	-10.87	45.39	74.00	-28.61 peak
8		2521.500	37.71	-10.87	26.84	54.00	-27.16 AVG
9		2659.200	50.56	-10.79	39.77	74.00	-34.23 peak
10		2659.200	35.63	-10.79	24.84	54.00	-29.16 AVG
11	*	4802.900	61.80	-5.92	55.88	74.00	-18.12 peak
12		4802.900	30.17	-5.92	24.25	54.00	-29.75 AVG
Emission Level= Read Level+ Correct Factor							

Test Voltage:	AC120V/60Hz						
Ant. Pol.	Vertical						
Test Mode:	TX BLE Mode 2402MHz						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dB)	Detector
1		1345.100	56.82	-11.95	44.87	74.00	-29.13 peak
2		1345.100	37.79	-11.95	25.84	54.00	-28.16 AVG
3		1999.600	54.86	-11.06	43.80	74.00	-30.20 peak
4		1999.600	34.70	-11.06	23.64	54.00	-30.36 AVG
5		2655.800	54.79	-10.78	44.01	74.00	-29.99 peak
6		2655.800	34.62	-10.78	23.84	54.00	-30.16 AVG
7		3325.600	50.17	-10.00	40.17	74.00	-33.83 peak
8		3325.600	35.84	-10.00	25.84	54.00	-28.16 AVG
9		4804.600	52.10	-5.92	46.18	74.00	-27.82 peak
10	*	4804.600	32.76	-5.92	26.84	54.00	-27.16 AVG
11		6584.500	43.91	-1.87	42.04	74.00	-31.96 peak
12		6584.500	28.21	-1.87	26.34	54.00	-27.66 AVG

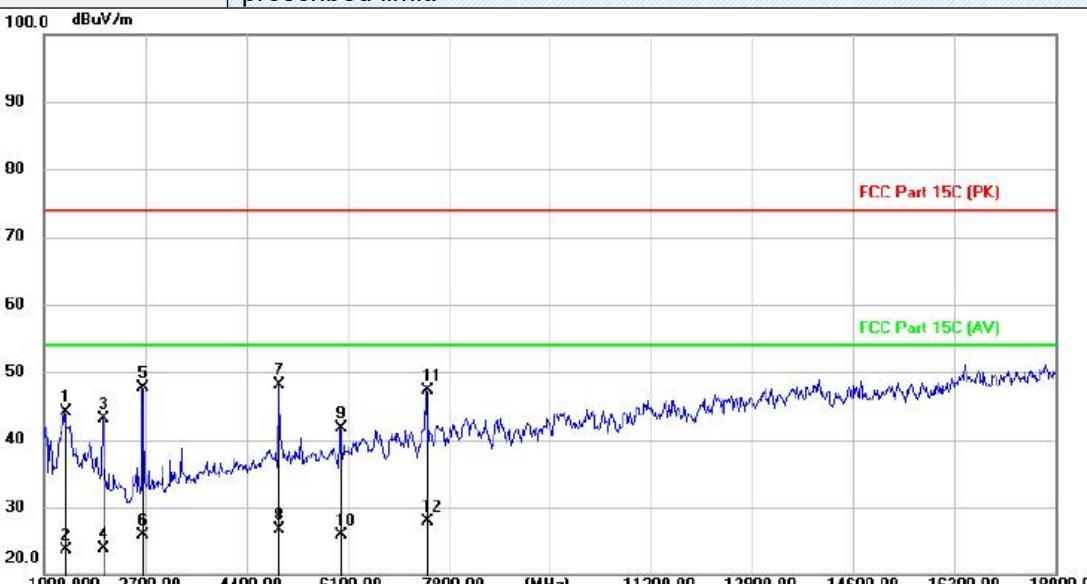
Emission Level= Read Level+ Correct Factor

Test Voltage:	AC120V/60Hz						
Ant. Pol.	Horizontal						
Test Mode:	TX BLE Mode 2440MHz						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dB)	Detector
1		1127.500	55.46	-12.19	43.27	74.00	-30.73 peak
2		1127.500	35.03	-12.19	22.84	54.00	-31.16 AVG
3		1997.900	52.79	-11.06	41.73	74.00	-32.27 peak
4		1997.900	34.00	-11.06	22.94	54.00	-31.06 AVG
5		2659.200	52.24	-10.79	41.45	74.00	-32.55 peak
6		2659.200	34.63	-10.79	23.84	54.00	-30.16 AVG
7	*	4879.400	62.99	-5.72	57.27	74.00	-16.73 peak
8		4879.400	32.56	-5.72	26.84	54.00	-27.16 AVG
9		7318.900	48.58	0.27	48.85	74.00	-25.15 peak
10		7318.900	26.57	0.27	26.84	54.00	-27.16 AVG
11		9700.600	40.88	3.41	44.29	74.00	-29.71 peak
12		9700.600	24.43	3.41	27.84	54.00	-26.16 AVG
Emission Level= Read Level+ Correct Factor							

Test Voltage:	AC120V/60Hz						
Ant. Pol.	Vertical						
Test Mode:	TX BLE Mode 2440MHz						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dB)	Detector
1		1346.800	54.86	-11.94	42.92	74.00	-31.08 peak
2		1346.800	35.58	-11.94	23.64	54.00	-30.36 AVG
3		1996.200	54.52	-11.06	43.46	74.00	-30.54 peak
4		1996.200	34.90	-11.06	23.84	54.00	-30.16 AVG
5		2666.000	55.69	-10.78	44.91	74.00	-29.09 peak
6		2666.000	35.62	-10.78	24.84	54.00	-29.16 AVG
7	*	4879.400	54.23	-5.72	48.51	74.00	-25.49 peak
8		4879.400	31.56	-5.72	25.84	54.00	-28.16 AVG
9		7318.900	43.17	0.27	43.44	74.00	-30.56 peak
10		7318.900	25.57	0.27	25.84	54.00	-28.16 AVG
11		9751.600	41.79	3.52	45.31	74.00	-28.69 peak
12		9751.600	22.86	3.52	26.38	54.00	-27.62 AVG

Emission Level= Read Level+ Correct Factor

Test Voltage:	AC120V/60Hz						
Ant. Pol.	Horizontal						
Test Mode:	TX BLE Mode 2480MHz						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dB)	Detector
1		1127.500	55.34	-12.19	43.15	74.00	-30.85 peak
2		1127.500	38.03	-12.19	25.84	54.00	-28.16 AVG
3		1997.900	49.77	-11.06	38.71	74.00	-35.29 peak
4		1997.900	35.90	-11.06	24.84	54.00	-29.16 AVG
5		2528.300	53.72	-10.87	42.85	74.00	-31.15 peak
6		2528.300	35.71	-10.87	24.84	54.00	-29.16 AVG
7	*	4959.300	62.39	-5.51	56.88	74.00	-17.12 peak
8		4959.300	31.35	-5.51	25.84	54.00	-28.16 AVG
9		6351.600	43.69	-2.61	41.08	74.00	-32.92 peak
10		6351.600	29.45	-2.61	26.84	54.00	-27.16 AVG
11		7439.600	48.89	0.64	49.53	74.00	-24.47 peak
12		7439.600	27.22	0.64	27.86	54.00	-26.14 AVG
Emission Level= Read Level+ Correct Factor							

Test Voltage:	AC120V/60Hz						
Ant. Pol.	Vertical						
Test Mode:	TX BLE Mode 2480MHz						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dB)	Detector
1		1362.100	56.06	-11.94	44.12	74.00	-29.88 peak
2		1362.100	35.58	-11.94	23.64	54.00	-30.36 AVG
3		1999.600	54.20	-11.06	43.14	74.00	-30.86 peak
4		1999.600	34.90	-11.06	23.84	54.00	-30.16 AVG
5		2655.800	58.45	-10.78	47.67	74.00	-26.33 peak
6		2655.800	36.62	-10.78	25.84	54.00	-28.16 AVG
7	*	4959.300	53.56	-5.51	48.05	74.00	-25.95 peak
8		4959.300	32.15	-5.51	26.64	54.00	-27.36 AVG
9		5986.100	45.58	-3.84	41.74	74.00	-32.26 peak
10		5986.100	29.68	-3.84	25.84	54.00	-28.16 AVG
11		7439.600	46.60	0.64	47.24	74.00	-26.76 peak
12		7439.600	27.20	0.64	27.84	54.00	-26.16 AVG
Emission Level= Read Level+ Correct Factor							

4. EUT TEST PHOTOS

Reference to the document No.: Test Photos.

5. PHOTOGRAPHS OF EUT CONSTRUCTIONAL

Reference to the document No.: External Photos and Internal Photos.

*****THE END*****