

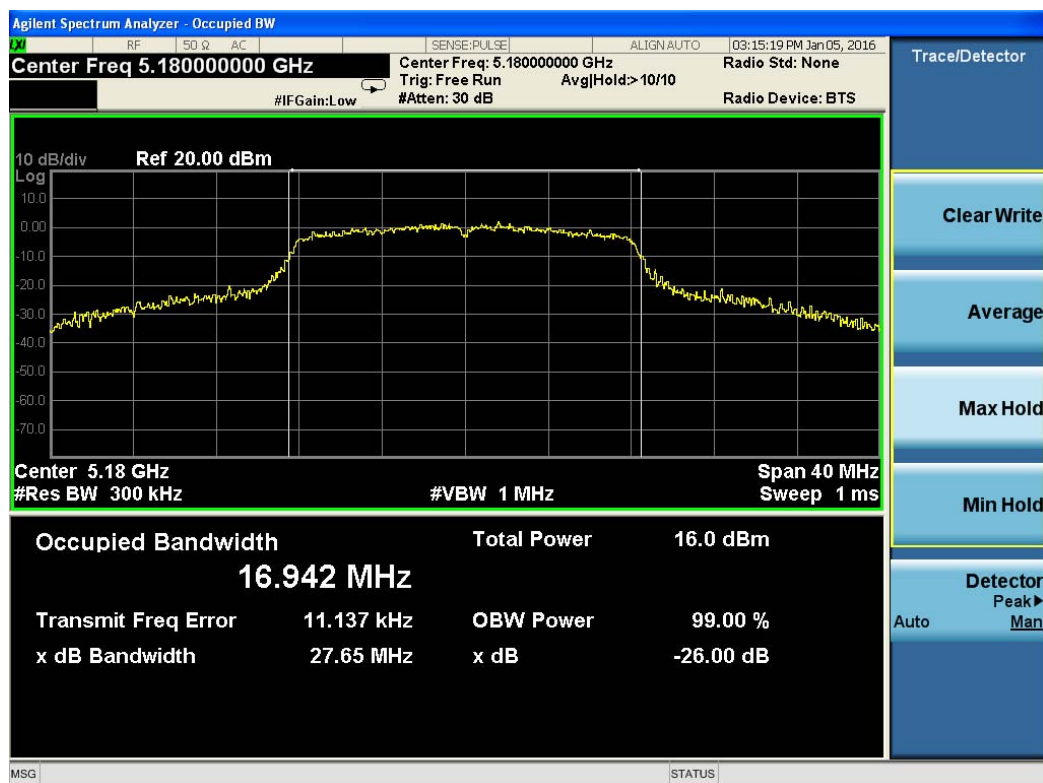


Test Plot For 802.11ac(VHT40)-6dB BW-5795M



Test Plot For 802.11ac(VHT80)-6dB BW-5775M

Mode	Channel	Frequency (MHz)	26dB BW (MHz)	99% BW (MHz)	Limit
802.11a	36	5180	27.65	16.94	Non-specified
	40	5200	25.38	16.72	
	48	5240	21.46	16.68	
802.11n(HT20)	36	5180	28.13	17.95	
	40	5200	25.67	17.80	
	48	5240	20.38	17.70	
802.11n(HT40)	38	5190	52.88	36.43	
	46	5230	42.07	36.21	
802.11ac(VHT20)	36	5180	28.86	17.90	
	40	5200	23.90	17.76	
	48	5240	22.94	17.71	
802.11ac(VHT40)	38	5190	53.65	36.48	
	46	5230	41.65	36.28	
802.11ac(VHT80)	38	5190	96.03	75.37	



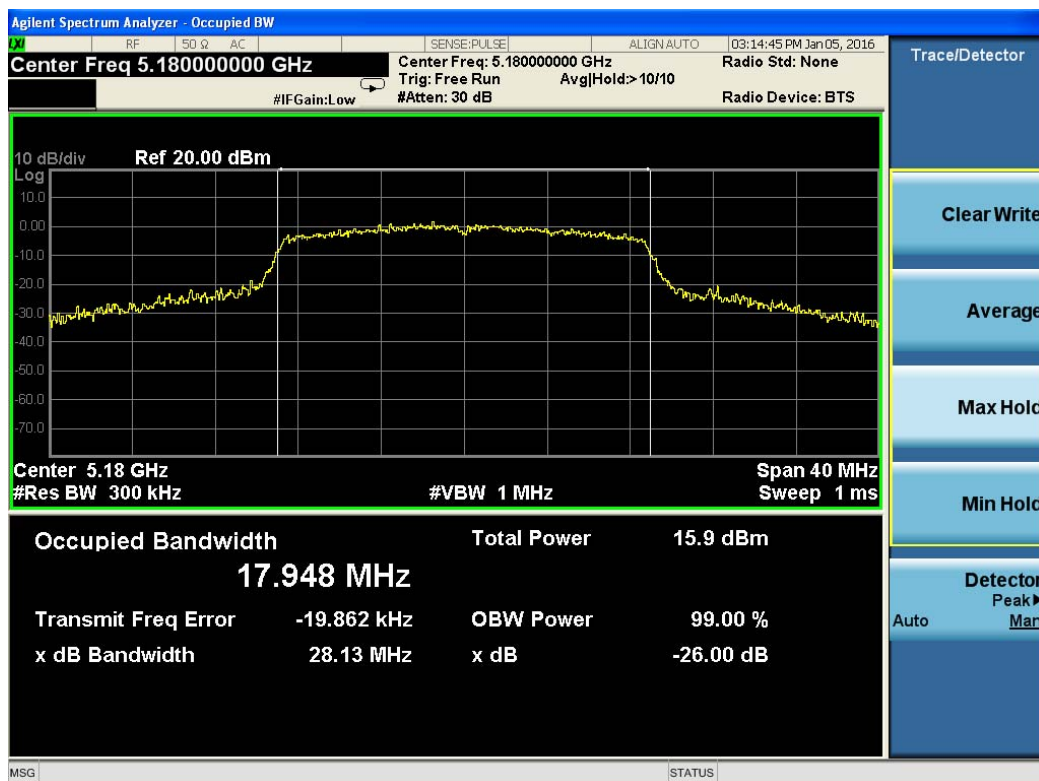
Test Plot For 802.11a-26dB BW-5180M



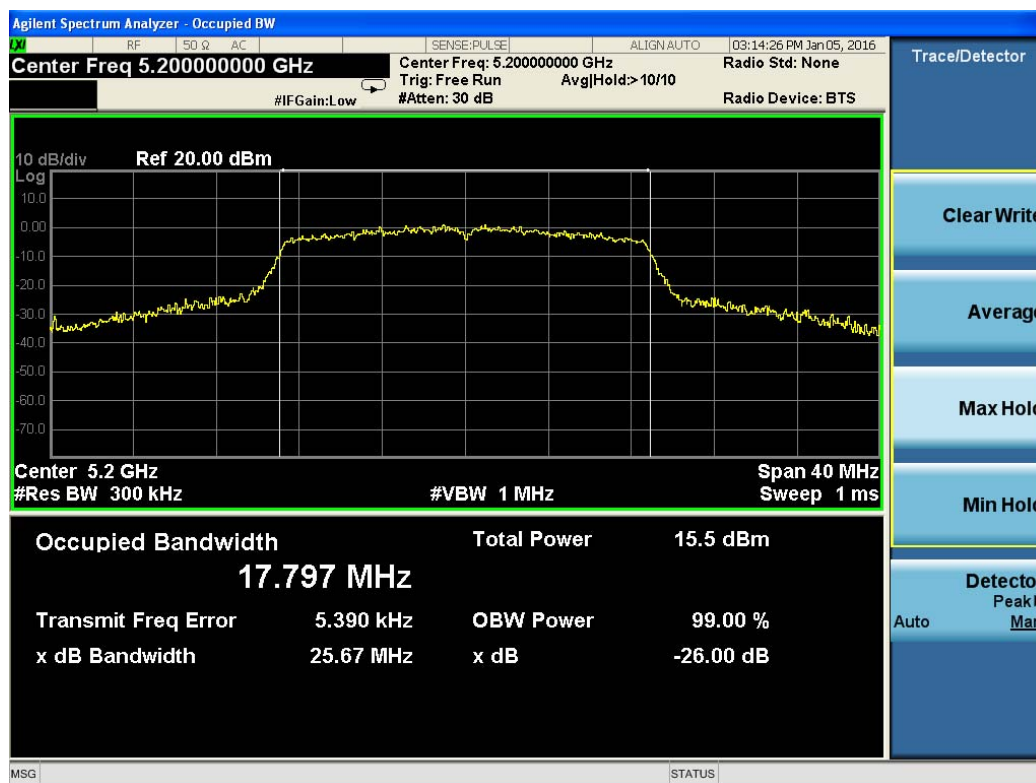
Test Plot For 802.11a-26dB BW-5200M



Test Plot For 802.11a-26dB BW-5240M



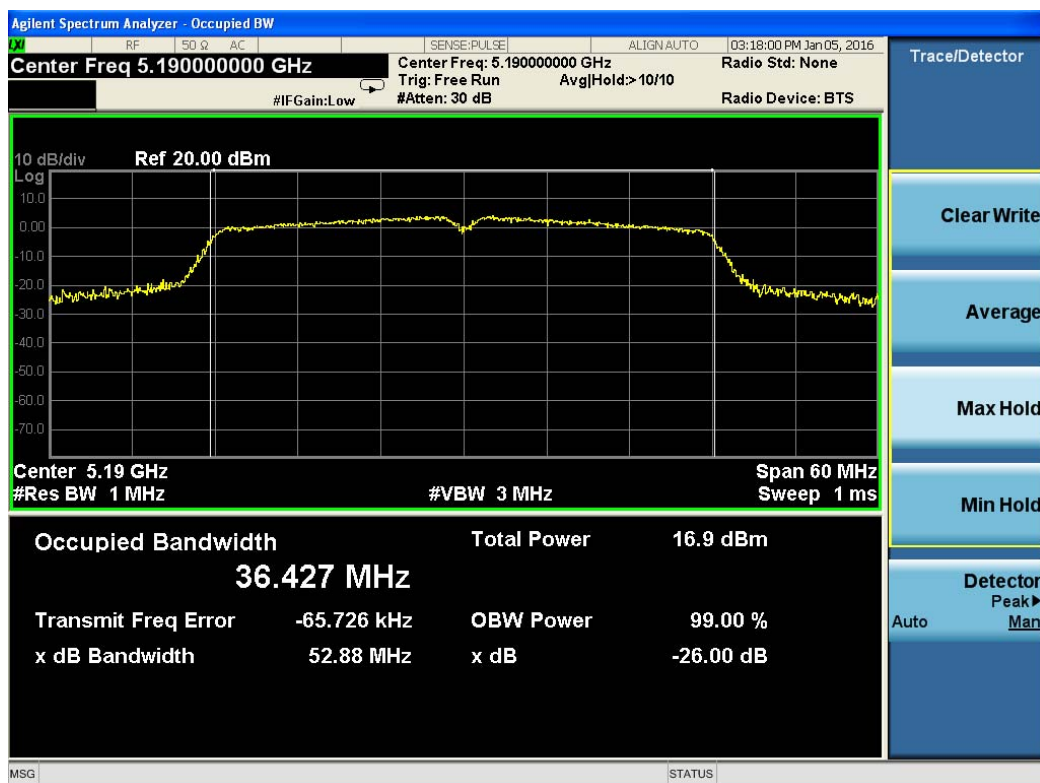
Test Plot For 802.11n(HT20)-26dB BW-5180M



Test Plot For 802.11n(HT20)-26dB BW-5200M



Test Plot For 802.11n(HT20)-26dB BW-5240M



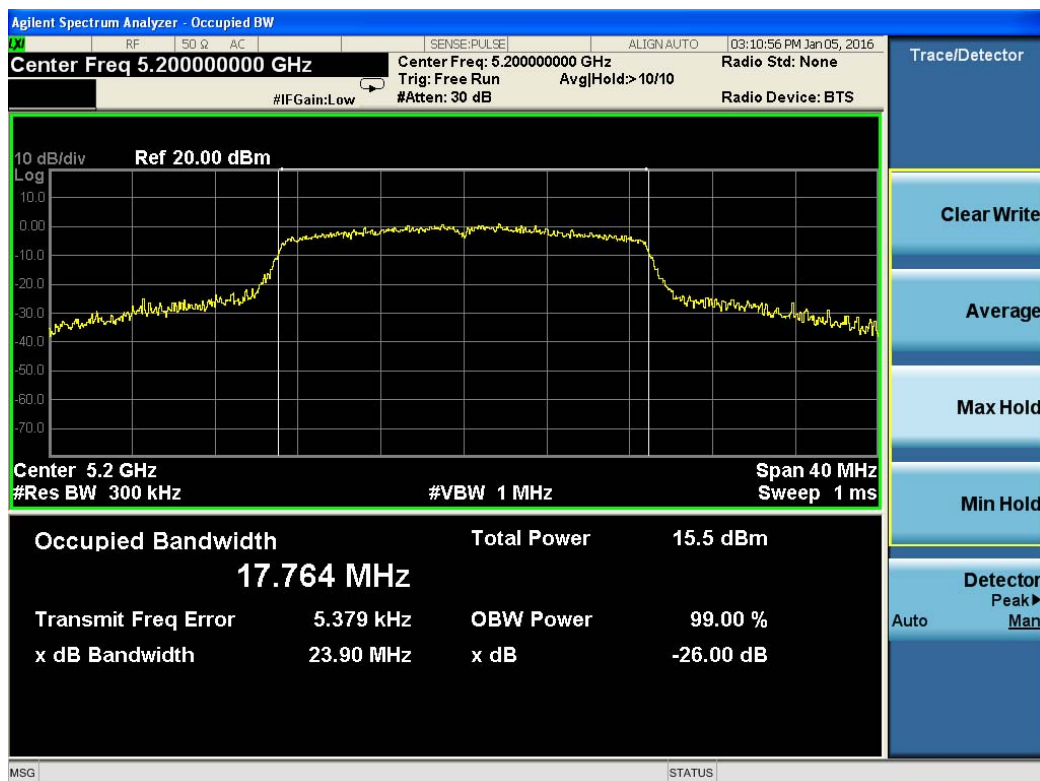
Test Plot For 802.11n(HT40)-26dB BW-5190M



Test Plot For 802.11n(HT40)-26dB BW-5230M



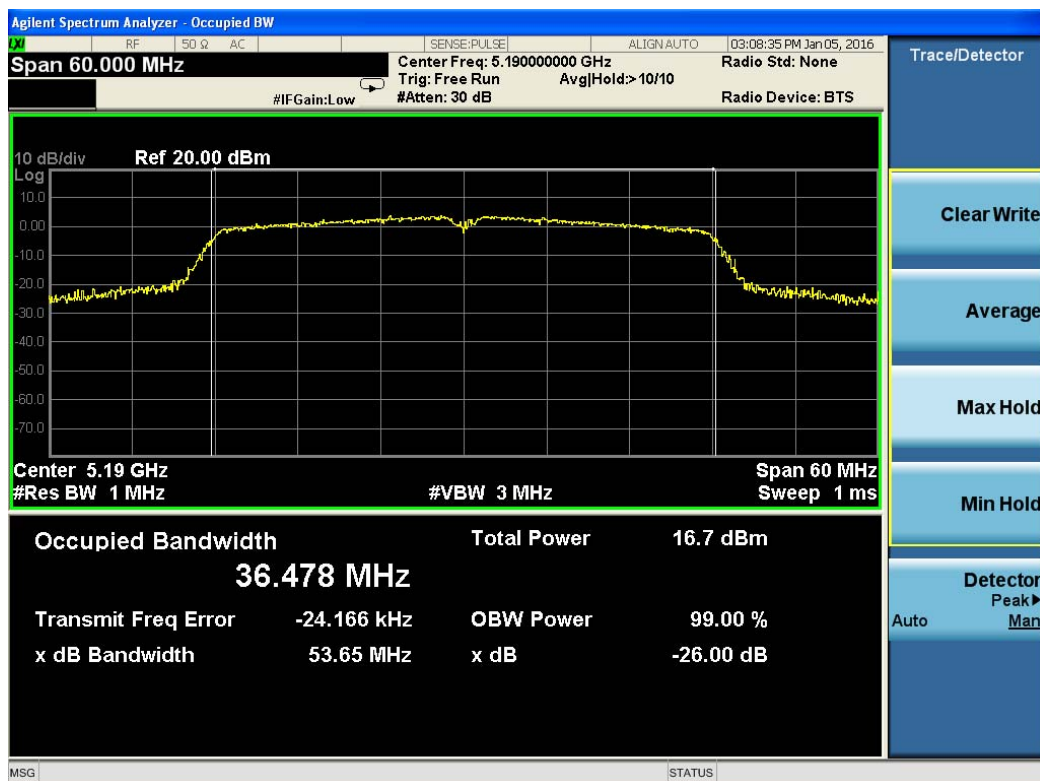
Test Plot For 802.11ac(VHT20)-26dB BW-5180M



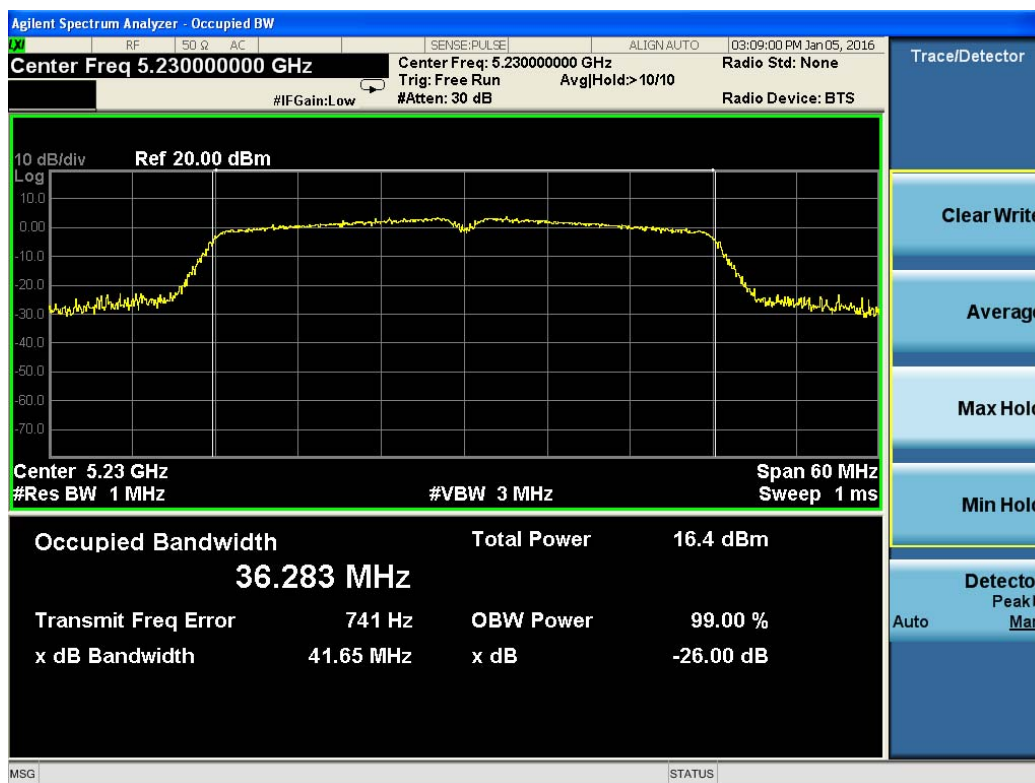
Test Plot For 802.11ac(VHT20)-26dB BW-5200M



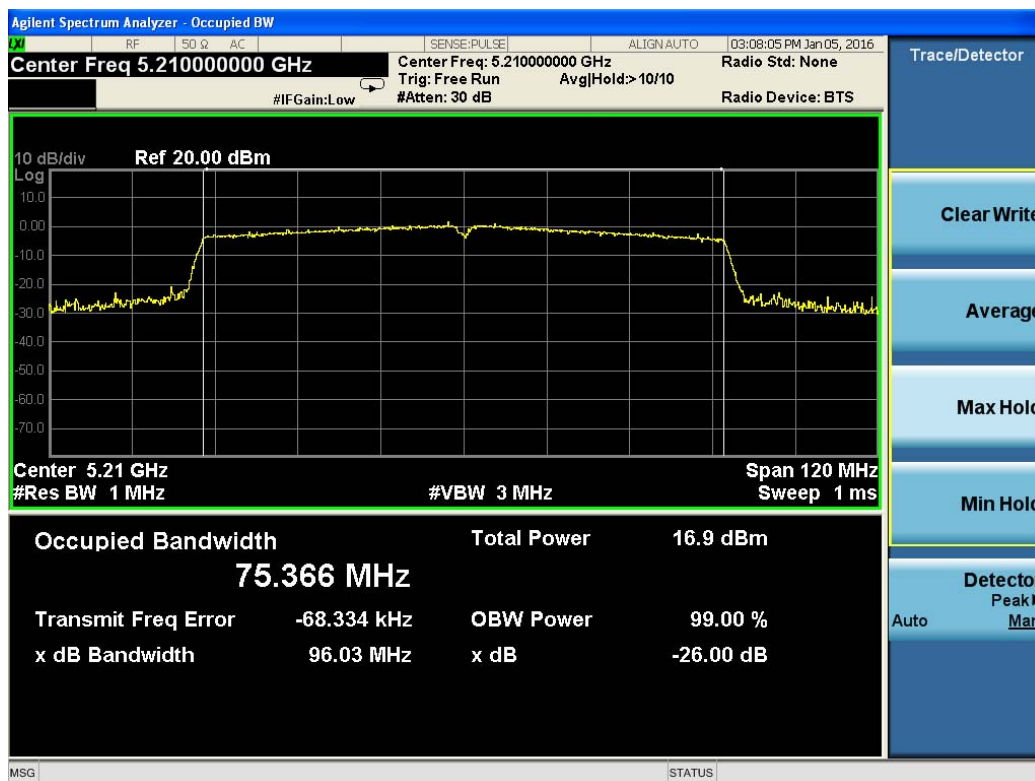
Test Plot For 802.11ac(VHT20)-26dB BW-5240M



Test Plot For 802.11ac(VHT40)-26dB BW-5190M



Test Plot For 802.11ac(VHT40)-26dB BW-5230M



Test Plot For 802.11ac(VHT80)-26dB BW-5210M

5.4. Radiated Emissions Measurement

5.4.1. Standard Applicable

According to §15.407 (b)(1) to (6):

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz (68.3dBuV/m at 3m).

For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz (78.3dBuV/m at 3m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz (68.3dBuV/m at 3m).

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies(MHz)	Field Strength(microvolts/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

5.4.2. Instruments Setting

The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 100kHz for QP

5.4.3. Test Procedures

1) Sequence of testing 9 kHz to 30 MHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
- If the EUT is a floor standing device, it is placed on the ground.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 0.8 meter.
- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).
- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 to 3 meter.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ($\pm 45^\circ$) and antenna movement between 1 and 4 meter.
- The final measurement will be done with QP detector with an EMI receiver.
- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 18 GHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height scan range is 1 meter to 2.5 meter.
- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ($\pm 45^\circ$) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.
- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18 GHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 1 meter.
- The EUT was set into operation.

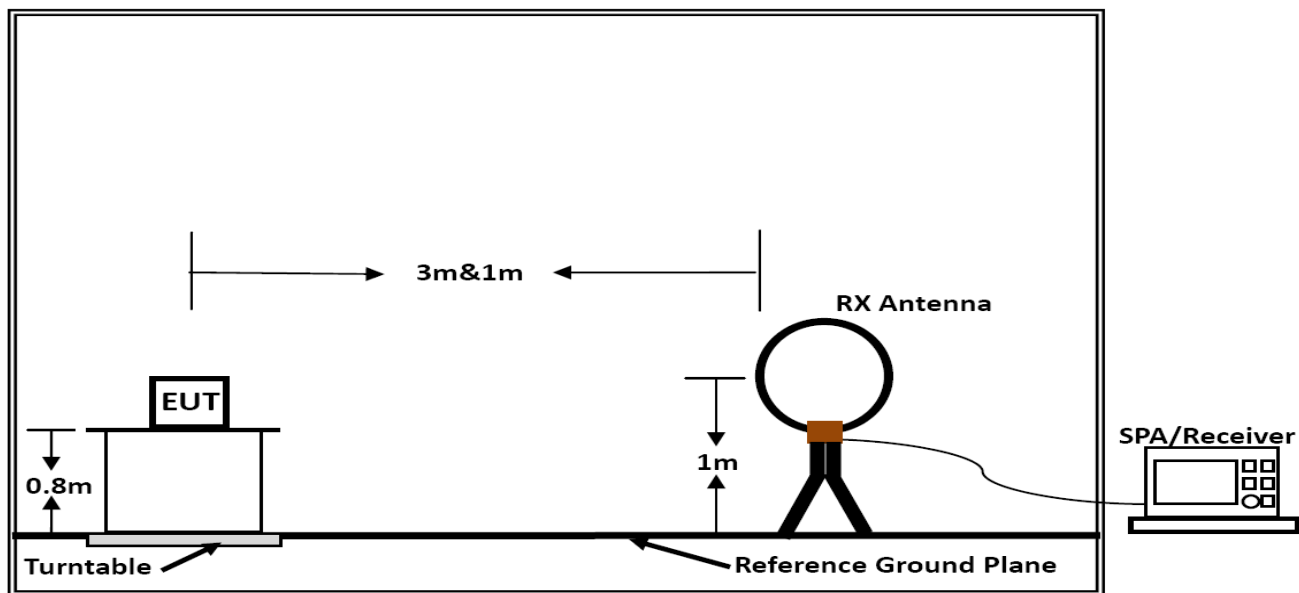
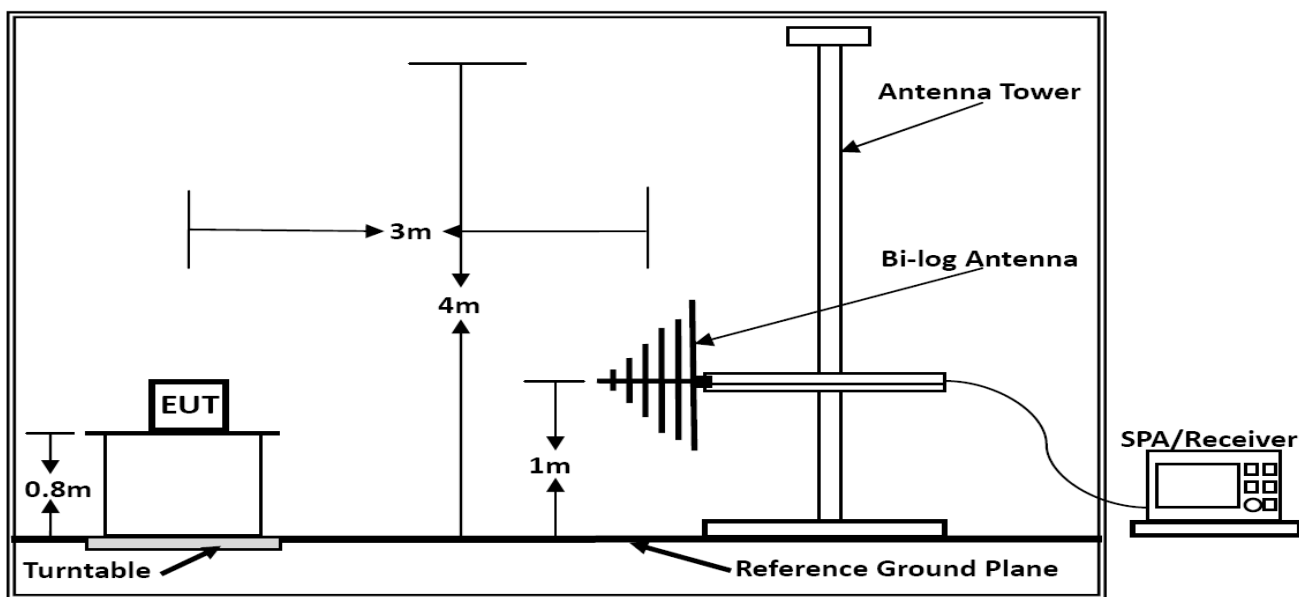
Premeasurement:

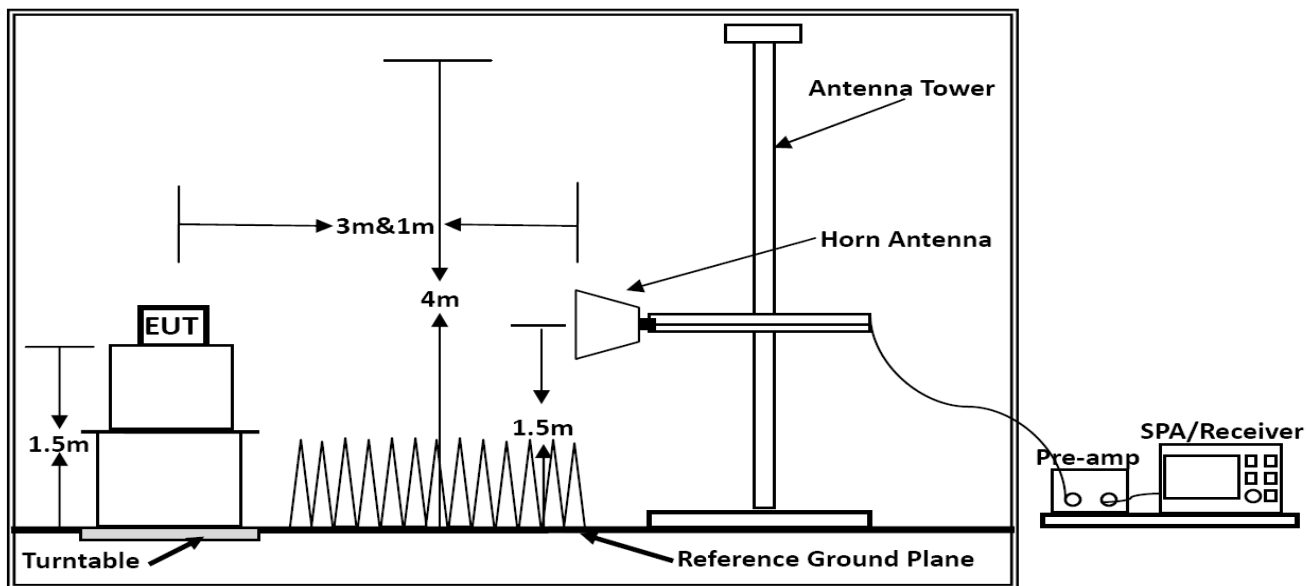
- The antenna is moved spherical over the EUT in different polarisations of the antenna.

Final measurement:

- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

5.4.4. Test Setup Layout

**Below 30MHz****Below 1GHz**



Above 1GHz

Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1.5m.

Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1.5m]})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

5.4.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

5.4.6. Results of Radiated Emissions (9kHz~30MHz)

Temperature	25°C	Humidity	60%
Test Engineer	Leo	Configurations	802.11a/n/ac

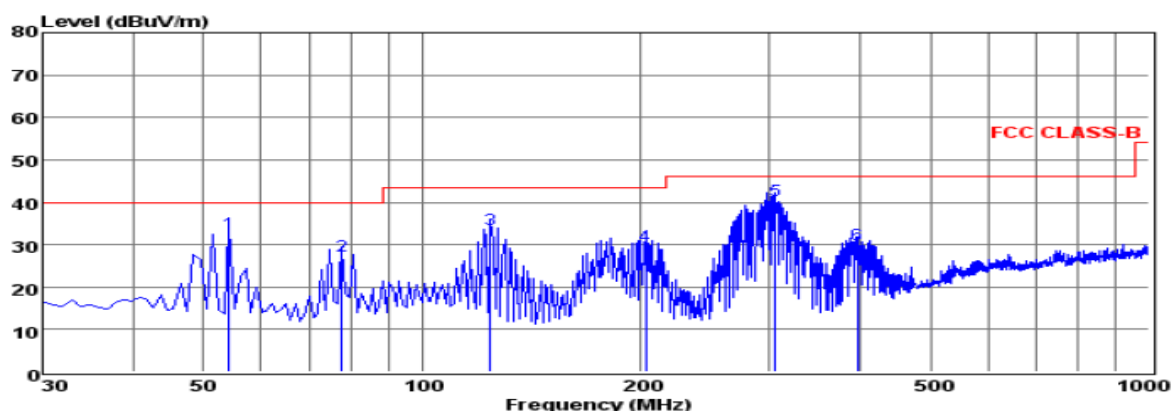
Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Over Limit (dBuV)	Remark
-	-	-	-	See Note

Note:

The radiated emissions from 9kHz to 30MHz are at least 20dB below the official limit and no need to report.

5.4.7. Results of Radiated Emissions (30MHz~1GHz)

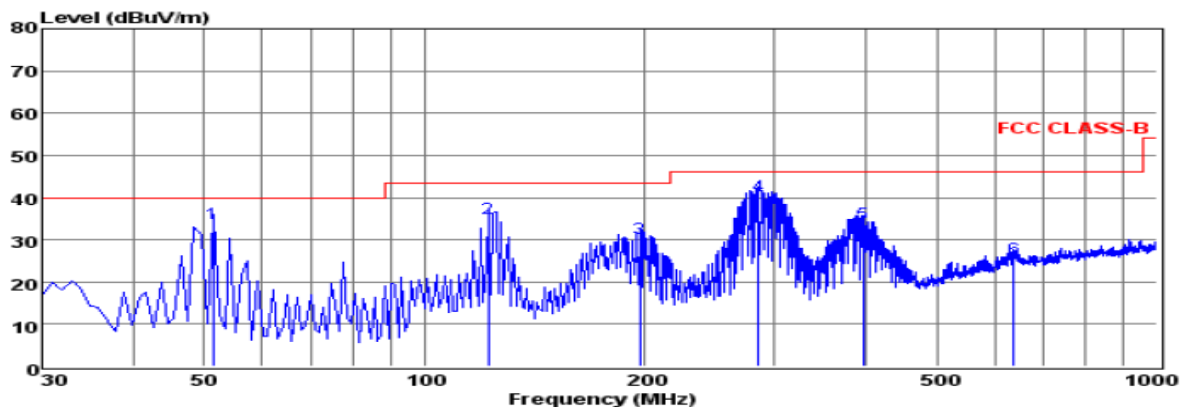
Note: Only record the worst test result in this report.



Env./Ins: 24°C/56%
 EUT: Smart Phone
 M/N: FTU152D
 Power Rating: AC 120V/60Hz
 Test Mode: TX-High channel (802.11a, 5745-5825MHz)
 Operator: Leo
 Memo:
 pol: HORIZONTAL

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	54.25	19.19	0.46	13.05	32.70	40.00	-7.30	QP
2	77.53	18.76	0.47	8.17	27.40	40.00	-12.60	QP
3	124.09	23.13	0.71	9.85	33.69	43.50	-9.81	QP
4	202.66	18.16	0.82	10.65	29.63	43.50	-13.87	QP
5	306.45	26.17	1.05	13.15	40.37	46.00	-5.63	QP
6	397.63	13.75	1.22	15.00	29.97	46.00	-16.03	QP

Note: 1. All readings are Quasi-peak values.
 2. Measured= Reading + Antenna Factor + Cable Loss
 3. The emission that are 20dB below the official limit are not reported



Env./Ins: 24°C/56%
 EUT: Smart Phone
 M/N: FTU152D
 Power Rating: AC 120V/60Hz
 Test Mode: TX-High channel (802.11a, 5745-5825MHz)
 Operator: Leo
 Memo:
 pol: VERTICAL

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	51.34	20.19	0.54	13.19	33.92	40.00	-6.08	QP
2	122.15	24.32	0.70	10.15	35.17	43.50	-8.33	QP
3	196.84	18.93	0.96	10.57	30.46	43.50	-13.04	QP
4	286.08	26.65	1.00	12.79	40.44	46.00	-5.56	QP
5	397.63	17.58	1.22	15.00	33.80	46.00	-12.20	QP
6	637.22	5.35	1.71	18.58	25.64	46.00	-20.36	QP

Note: 1. All readings are Quasi-peak values.
 2. Measured= Reading + Antenna Factor + Cable Loss
 3. The emission that are 20dB below the official limit are not reported

***Note:

Pre-scan all mode and recorded the worst case results in this report (802.11a mode(High Channel, 5745-5825MHz Band)).

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Only recorded the worst test case in this report.

5.4.8. Results for Radiated Emissions (Above 1GHz)

Note: Only recorded the worst test result in this report.

The Worst Test Result For 5180~5240MHz Band.

802.11a / Channel 36

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
15.54	45.52	33.21	35.82	9.52	52.43	74	-21.57	Peak	Horizontal
15.54	34.74	33.21	35.82	9.52	41.65	54	-12.35	Average	Horizontal
15.54	46.56	32.82	35.82	9.52	53.08	74	-20.92	Peak	Vertical
15.54	35.12	32.82	35.82	9.52	41.64	54	-12.36	Average	Vertical

802.11a / Channel 40

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
15.60	45.88	33.21	35.82	9.52	52.79	74	-21.21	Peak	Horizontal
15.60	35.03	33.21	35.82	9.52	41.94	54	-12.06	Average	Horizontal
15.60	47.11	32.82	35.82	9.52	53.63	74	-20.37	Peak	Vertical
15.60	35.68	32.82	35.82	9.52	42.20	54	-11.80	Average	Vertical

802.11a / Channel 48

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
15.72	46.36	33.21	35.82	9.52	53.27	74	-20.73	Peak	Horizontal
15.72	35.71	33.21	35.82	9.52	42.62	54	-11.38	Average	Horizontal
15.72	47.69	32.82	35.82	9.52	54.21	74	-19.79	Peak	Vertical
15.72	36.05	32.82	35.82	9.52	42.57	54	-11.43	Average	Vertical

802.11n(HT20) / Channel 36

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
15.54	45.10	33.21	35.82	9.52	52.01	74	-21.99	Peak	Horizontal
15.54	34.33	33.21	35.82	9.52	41.24	54	-12.76	Average	Horizontal
15.54	46.15	32.82	35.82	9.52	52.67	74	-21.33	Peak	Vertical
15.54	34.74	32.82	35.82	9.52	41.26	54	-12.74	Average	Vertical

802.11n(HT20) / Channel 40

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
15.60	45.63	33.21	35.82	9.52	52.54	74	-21.46	Peak	Horizontal
15.60	34.83	33.21	35.82	9.52	41.74	54	-12.26	Average	Horizontal
15.60	46.66	32.82	35.82	9.52	53.18	74	-20.82	Peak	Vertical
15.60	35.28	32.82	35.82	9.52	41.80	54	-12.20	Average	Vertical

802.11n(HT20) / Channel 48

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
15.72	46.21	33.21	35.82	9.52	53.12	74	-20.88	Peak	Horizontal
15.72	35.20	33.21	35.82	9.52	42.11	54	-11.89	Average	Horizontal
15.72	47.28	32.82	35.82	9.52	53.80	74	-20.20	Peak	Vertical
15.72	35.68	32.82	35.82	9.52	42.20	54	-11.80	Average	Vertical

802.11n(HT40) / Channel 38

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
15.57	45.72	33.21	35.82	9.52	52.63	74	-21.37	Peak	Horizontal
15.57	35.13	33.21	35.82	9.52	42.04	54	-11.96	Average	Horizontal
15.57	46.97	32.82	35.82	9.52	53.49	74	-20.51	Peak	Vertical
15.57	35.44	32.82	35.82	9.52	41.96	54	-12.04	Average	Vertical

802.11n(HT40) / Channel 46

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
15.69	45.95	33.21	35.82	9.52	52.86	74	-21.14	Peak	Horizontal
15.69	35.11	33.21	35.82	9.52	42.02	54	-11.98	Average	Horizontal
15.69	47.11	32.82	35.82	9.52	53.63	74	-20.37	Peak	Vertical
15.69	35.78	32.82	35.82	9.52	42.30	54	-11.70	Average	Vertical

802.11ac(VHT20) / Channel 36

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
15.54	45.23	33.21	35.82	9.52	52.14	74	-21.86	Peak	Horizontal
15.54	34.37	33.21	35.82	9.52	41.28	54	-12.72	Average	Horizontal
15.54	46.36	32.82	35.82	9.52	52.88	74	-21.12	Peak	Vertical
15.54	34.95	32.82	35.82	9.52	41.47	54	-12.53	Average	Vertical

802.11ac(VHT20) / Channel 40

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
15.60	45.56	33.21	35.82	9.52	52.47	74	-21.53	Peak	Horizontal
15.60	34.87	33.21	35.82	9.52	41.78	54	-12.22	Average	Horizontal
15.60	46.79	32.82	35.82	9.52	53.31	74	-20.69	Peak	Vertical
15.60	35.47	32.82	35.82	9.52	41.99	54	-12.01	Average	Vertical

802.11ac(VHT20) / Channel 48

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
15.72	46.16	33.21	35.82	9.52	53.07	74	-20.93	Peak	Horizontal
15.72	35.30	33.21	35.82	9.52	42.21	54	-11.79	Average	Horizontal
15.72	47.33	32.82	35.82	9.52	53.85	74	-20.15	Peak	Vertical
15.72	35.96	32.82	35.82	9.52	42.48	54	-11.52	Average	Vertical

802.11ac(VHT40) / Channel 38

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
15.57	45.32	33.21	35.82	9.52	52.23	74	-21.77	Peak	Horizontal
15.57	34.42	33.21	35.82	9.52	41.33	54	-12.67	Average	Horizontal
15.57	46.50	32.82	35.82	9.52	53.02	74	-20.98	Peak	Vertical
15.57	34.93	32.82	35.82	9.52	41.45	54	-12.55	Average	Vertical

802.11ac(VHT40) / Channel 46

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
15.69	45.87	33.21	35.82	9.52	52.78	74	-21.22	Peak	Horizontal
15.69	34.94	33.21	35.82	9.52	41.85	54	-12.15	Average	Horizontal
15.69	46.89	32.82	35.82	9.52	53.41	74	-20.59	Peak	Vertical
15.69	35.49	32.82	35.82	9.52	42.01	54	-11.99	Average	Vertical

802.11ac(VHT80) / Channel 42

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
15.63	45.07	33.21	35.82	9.52	51.98	74	-22.02	Peak	Horizontal
15.63	34.20	33.21	35.82	9.52	41.11	54	-12.89	Average	Horizontal
15.63	46.31	32.82	35.82	9.52	52.83	74	-21.17	Peak	Vertical
15.63	34.63	32.82	35.82	9.52	41.15	54	-12.85	Average	Vertical

Notes:

1. Measuring frequencies from 9k~40GHz, No emission found between lowest internal used/generated frequency to 30MHz.
2. Radiated emissions measured in frequency range from 30MHz~40GH were made with an instrument using Peak detector mode.
3. The radiated emissions from 18GHz to 40GHz are at least 20dB below the official limit and no need to report.

The Worst Test Result For 5745~5825MHz Band.

802.11a / Channel 149

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
17.235	50.07	33.92	36.09	10.26	58.16	74	-15.84	Peak	Horizontal
17.235	39.41	33.92	36.09	10.26	47.50	54	-6.50	Average	Horizontal
17.235	51.05	33.99	35.99	10.26	59.31	74	-14.69	Peak	Vertical
17.235	39.44	33.99	35.99	10.26	47.70	54	-6.30	Average	Vertical

802.11a / Channel 157

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
17.355	50.08	33.92	36.09	10.26	58.17	74	-15.83	Peak	Horizontal
17.355	39.42	33.92	36.09	10.26	47.51	54	-6.49	Average	Horizontal
17.355	51.26	33.99	35.99	10.26	59.52	74	-14.48	Peak	Vertical
17.355	39.95	33.99	35.99	10.26	48.21	54	-5.79	Average	Vertical

802.11a / Channel 165

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
17.475	50.67	33.92	36.09	10.26	58.76	74	-15.24	Peak	Horizontal
17.475	40.01	33.92	36.09	10.26	48.10	54	-5.90	Average	Horizontal
17.475	51.64	33.99	35.99	10.26	59.90	74	-14.10	Peak	Vertical
17.475	40.26	33.99	35.99	10.26	48.52	54	-5.48	Average	Vertical

802.11n(HT20) / Channel 149

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
17.235	50.21	33.92	36.09	10.26	58.30	74	-15.70	Peak	Horizontal
17.235	39.66	33.92	36.09	10.26	47.75	54	-6.25	Average	Horizontal
17.235	51.28	33.99	35.99	10.26	59.54	74	-14.46	Peak	Vertical
17.235	39.97	33.99	35.99	10.26	48.23	54	-5.77	Average	Vertical

802.11n(HT20) / Channel 157

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
17.355	49.83	33.92	36.09	10.26	57.92	74	-16.08	Peak	Horizontal
17.355	39.43	33.92	36.09	10.26	47.52	54	-6.48	Average	Horizontal
17.355	51.14	33.99	35.99	10.26	59.40	74	-14.60	Peak	Vertical
17.355	39.52	33.99	35.99	10.26	47.78	54	-6.22	Average	Vertical

802.11n(HT20) / Channel 165

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
17.475	49.86	33.92	36.09	10.26	57.95	74	-16.05	Peak	Horizontal
17.475	38.87	33.92	36.09	10.26	46.96	54	-7.04	Average	Horizontal
17.475	50.67	33.99	35.99	10.26	58.93	74	-15.07	Peak	Vertical
17.475	39.30	33.99	35.99	10.26	47.56	54	-6.44	Average	Vertical

802.11n(HT40) / Channel 151

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
17.265	49.55	33.92	36.09	10.26	57.64	74	-16.36	Peak	Horizontal
17.265	39.22	33.92	36.09	10.26	47.31	54	-6.69	Average	Horizontal
17.265	50.94	33.99	35.99	10.26	59.20	74	-14.80	Peak	Vertical
17.265	39.25	33.99	35.99	10.26	47.51	54	-6.49	Average	Vertical

802.11n(HT40) / Channel 159

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
17.385	49.41	33.92	36.09	10.26	57.50	74	-16.50	Peak	Horizontal
17.385	38.58	33.92	36.09	10.26	46.67	54	-7.33	Average	Horizontal
17.385	50.41	33.99	35.99	10.26	58.67	74	-15.33	Peak	Vertical
17.385	39.17	33.99	35.99	10.26	47.43	54	-6.57	Average	Vertical

802.11ac(VHT20) / Channel 149

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
17.235	49.45	33.92	36.09	10.26	57.54	74	-16.46	Peak	Horizontal
17.235	39.00	33.92	36.09	10.26	47.09	54	-6.91	Average	Horizontal
17.235	50.66	33.99	35.99	10.26	58.92	74	-15.08	Peak	Vertical
17.235	39.11	33.99	35.99	10.26	47.37	54	-6.63	Average	Vertical

802.11ac(VHT20) / Channel 157

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
17.355	49.17	33.92	36.09	10.26	57.26	74	-16.74	Peak	Horizontal
17.355	38.72	33.92	36.09	10.26	46.81	54	-7.19	Average	Horizontal
17.355	50.34	33.99	35.99	10.26	58.60	74	-15.40	Peak	Vertical
17.355	39.05	33.99	35.99	10.26	47.31	54	-6.69	Average	Vertical

802.11ac(VHT20) / Channel 165

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
17.475	49.13	33.92	36.09	10.26	57.22	74	-16.78	Peak	Horizontal
17.475	38.38	33.92	36.09	10.26	46.47	54	-7.53	Average	Horizontal
17.475	50.14	33.99	35.99	10.26	58.40	74	-15.60	Peak	Vertical
17.475	38.62	33.99	35.99	10.26	46.88	54	-7.12	Average	Vertical

802.11ac(VHT40) / Channel 151

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
17.265	49.35	33.92	36.09	10.26	57.44	74	-16.56	Peak	Horizontal
17.265	38.38	33.92	36.09	10.26	46.47	54	-7.53	Average	Horizontal
17.265	50.18	33.99	35.99	10.26	58.44	74	-15.56	Peak	Vertical
17.265	38.86	33.99	35.99	10.26	47.12	54	-6.88	Average	Vertical

802.11ac(VHT40) / Channel 159

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
17.385	48.76	33.92	36.09	10.26	56.85	74	-17.15	Peak	Horizontal
17.385	38.07	33.92	36.09	10.26	46.16	54	-7.84	Average	Horizontal
17.385	49.82	33.99	35.99	10.26	58.08	74	-15.92	Peak	Vertical
17.385	38.59	33.99	35.99	10.26	46.85	54	-7.15	Average	Vertical

802.11ac(VHT80) / Channel 155

Freq. GHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
17.325	49.17	33.92	36.09	10.26	57.26	74	-16.74	Peak	Horizontal
17.325	38.37	33.92	36.09	10.26	46.46	54	-7.54	Average	Horizontal
17.325	50.38	33.99	35.99	10.26	58.64	74	-15.36	Peak	Vertical
17.325	38.76	33.99	35.99	10.26	47.02	54	-6.98	Average	Vertical

Notes:

1. Measuring frequencies from 9k~40GHz, No emission found between lowest internal used/generated frequency to 30MHz.
2. Radiated emissions measured in frequency range from 30MHz~40GH were made with an instrument using Peak detector mode.
3. The radiated emissions from 18GHz to 40GHz are at least 20dB below the official limit and no need to report.

5.4.9. Results of Band Edges Test (Radiated)

Note: Only recorded the worst test result in this report.

The Worst Test Result For 5180~5240MHz Band.

802.11a / Channel 36

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
5150.00	48.71	33.79	36.42	7.80	53.88	74	-20.12	Peak	Horizontal
5150.00	38.38	33.79	36.42	7.80	43.55	54	-10.45	Average	Horizontal
5150.00	49.93	34.24	36.42	7.80	55.55	74	-18.45	Peak	Vertical
5150.00	39.18	34.24	36.42	7.80	44.80	54	-9.20	Average	Vertical

802.11a / Channel 48

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
5350.00	49.84	34.66	36.59	7.98	55.89	74	-18.11	Peak	Horizontal
5350.00	39.06	34.66	36.59	7.98	45.11	54	-8.89	Average	Horizontal
5350.00	51.48	34.69	36.59	7.98	57.56	74	-16.44	Peak	Vertical
5350.00	41.38	34.69	36.59	7.98	47.46	54	-6.54	Average	Vertical

802.11n(HT20) / Channel 36

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
5150.00	48.67	33.79	36.42	7.80	53.84	74	-20.16	Peak	Horizontal
5150.00	38.41	33.79	36.42	7.80	43.58	54	-10.42	Average	Horizontal
5150.00	50.01	34.24	36.42	7.80	55.63	74	-18.37	Peak	Vertical
5150.00	38.78	34.24	36.42	7.80	44.40	54	-9.60	Average	Vertical

802.11n(HT20) / Channel 48

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
5350.00	49.28	34.66	36.59	7.98	55.33	74	-18.67	Peak	Horizontal
5350.00	38.57	34.66	36.59	7.98	44.62	54	-9.38	Average	Horizontal
5350.00	50.98	34.69	36.59	7.98	57.06	74	-16.94	Peak	Vertical
5350.00	40.87	34.69	36.59	7.98	46.95	54	-7.05	Average	Vertical

802.11n(HT40) / Channel 38

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
5150.00	48.20	33.79	36.42	7.80	53.37	74	-20.63	Peak	Horizontal
5150.00	37.79	33.79	36.42	7.80	42.96	54	-11.04	Average	Horizontal
5150.00	49.33	34.24	36.42	7.80	54.95	74	-19.05	Peak	Vertical
5150.00	38.44	34.24	36.42	7.80	44.06	54	-9.94	Average	Vertical

802.11n(HT40) / Channel 46

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
5350.00	49.06	34.66	36.59	7.98	55.11	74	-18.89	Peak	Horizontal
5350.00	38.30	34.66	36.59	7.98	44.35	54	-9.65	Average	Horizontal
5350.00	50.91	34.69	36.59	7.98	56.99	74	-17.01	Peak	Vertical
5350.00	40.38	34.69	36.59	7.98	46.46	54	-7.54	Average	Vertical

802.11ac(VHT80) / Channel 42

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
5150.00	48.33	33.79	36.42	7.80	53.50	74	-20.50	Peak	Horizontal
5150.00	38.25	33.79	36.42	7.80	43.42	54	-10.58	Average	Horizontal
5150.00	49.53	34.24	36.42	7.80	55.15	74	-18.85	Peak	Vertical
5150.00	38.76	34.24	36.42	7.80	44.38	54	-9.62	Average	Vertical
5350.00	49.17	34.66	36.59	7.98	55.22	74	-18.78	Peak	Horizontal
5350.00	38.41	34.66	36.59	7.98	44.46	54	-9.54	Average	Horizontal
5350.00	50.60	34.69	36.59	7.98	56.68	74	-17.32	Peak	Vertical
5350.00	40.50	34.69	36.59	7.98	46.58	54	-7.42	Average	Vertical

The Worst Test Result For 5745~5825MHz Band.

802.11a / Channel 149

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
5725.00	49.41	34.46	36.75	8.19	55.31	74	-18.69	Peak	Horizontal
5725.00	37.99	34.46	36.75	8.19	43.89	54	-10.11	Average	Horizontal
5725.00	51.01	34.52	36.75	8.19	56.97	74	-17.03	Peak	Vertical
5725.00	39.57	34.52	36.75	8.19	45.53	54	-8.47	Average	Vertical

802.11a / Channel 165

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
5850.00	50.99	34.82	36.80	8.30	57.31	74	-16.69	Peak	Horizontal
5850.00	39.28	34.82	36.80	8.30	45.60	54	-8.40	Average	Horizontal
5850.00	52.28	34.86	36.80	8.30	58.64	74	-15.36	Peak	Vertical
5850.00	41.23	34.86	36.80	8.30	47.59	54	-6.41	Average	Vertical

802.11n(HT20) / Channel 149

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
5725.00	49.48	34.46	36.75	8.19	55.38	74	-18.62	Peak	Horizontal
5725.00	38.28	34.46	36.75	8.19	44.18	54	-9.82	Average	Horizontal
5725.00	51.05	34.52	36.75	8.19	57.01	74	-16.99	Peak	Vertical
5725.00	39.57	34.52	36.75	8.19	45.53	54	-8.47	Average	Vertical

802.11n(HT20) / Channel 165

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
5850.00	50.97	34.82	36.80	8.30	57.29	74	-16.71	Peak	Horizontal
5850.00	39.46	34.82	36.80	8.30	45.78	54	-8.22	Average	Horizontal
5850.00	52.55	34.86	36.80	8.30	58.91	74	-15.09	Peak	Vertical
5850.00	41.33	34.86	36.80	8.30	47.69	54	-6.31	Average	Vertical

802.11n(HT40) / Channel 151

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
5725.00	49.63	34.46	36.75	8.19	55.53	74	-18.47	Peak	Horizontal
5725.00	38.32	34.46	36.75	8.19	44.22	54	-9.78	Average	Horizontal
5725.00	51.28	34.52	36.75	8.19	57.24	74	-16.76	Peak	Vertical
5725.00	39.42	34.52	36.75	8.19	45.38	54	-8.62	Average	Vertical

802.11n(HT40) / Channel 159

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
5850.00	50.95	34.82	36.80	8.30	57.27	74	-16.73	Peak	Horizontal
5850.00	39.31	34.82	36.80	8.30	45.63	54	-8.37	Average	Horizontal
5850.00	52.42	34.86	36.80	8.30	58.78	74	-15.22	Peak	Vertical
5850.00	41.34	34.86	36.80	8.30	47.70	54	-6.30	Average	Vertical

802.11ac(VHT80) / Channel 155

Freq. MHz	Reading Level dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
5725.00	50.01	34.46	36.75	8.19	55.91	74	-18.09	Peak	Horizontal
5725.00	38.32	34.46	36.75	8.19	44.22	54	-9.78	Average	Horizontal
5725.00	51.22	34.52	36.75	8.19	57.18	74	-16.82	Peak	Vertical
5725.00	39.54	34.52	36.75	8.19	45.50	54	-8.50	Average	Vertical
5850.00	51.18	34.82	36.80	8.30	57.50	74	-16.50	Peak	Horizontal
5850.00	39.74	34.82	36.80	8.30	46.06	54	-7.94	Average	Horizontal
5850.00	52.24	34.86	36.80	8.30	58.60	74	-15.40	Peak	Vertical
5850.00	41.61	34.86	36.80	8.30	47.97	54	-6.03	Average	Vertical

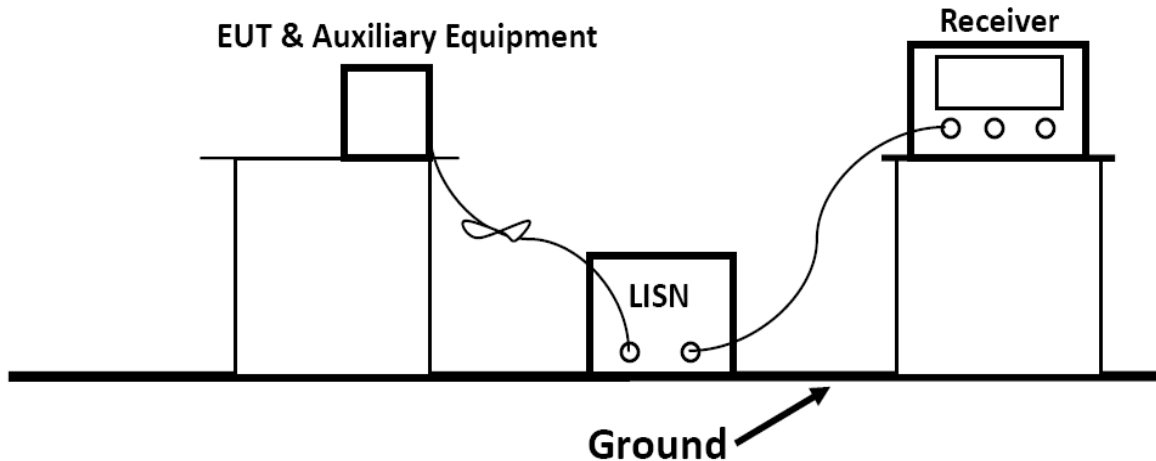
5.5. Power line conducted emissions

5.5.1 Standard Applicable

According to §15.207 (a): For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

5.5.2 Block Diagram of Test Setup



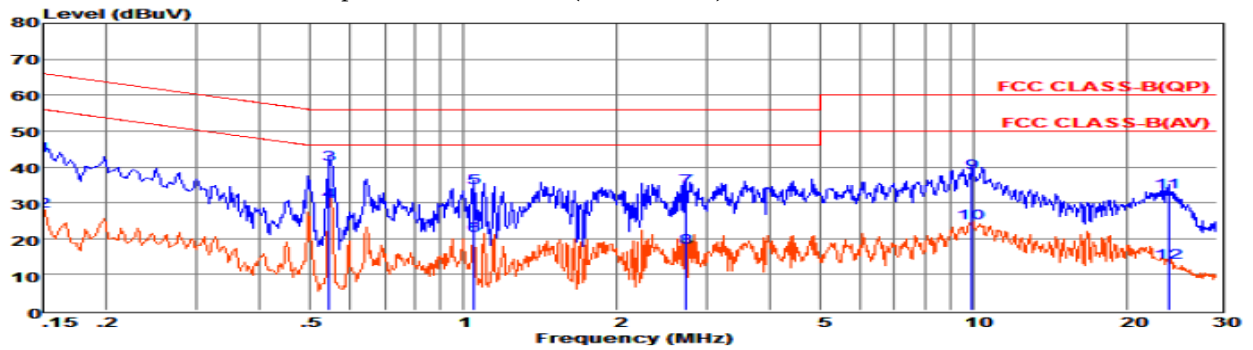
5.5.3 Test Results

PASS.

Only recorded the worst test case in this report.

The test data please refer to following page.

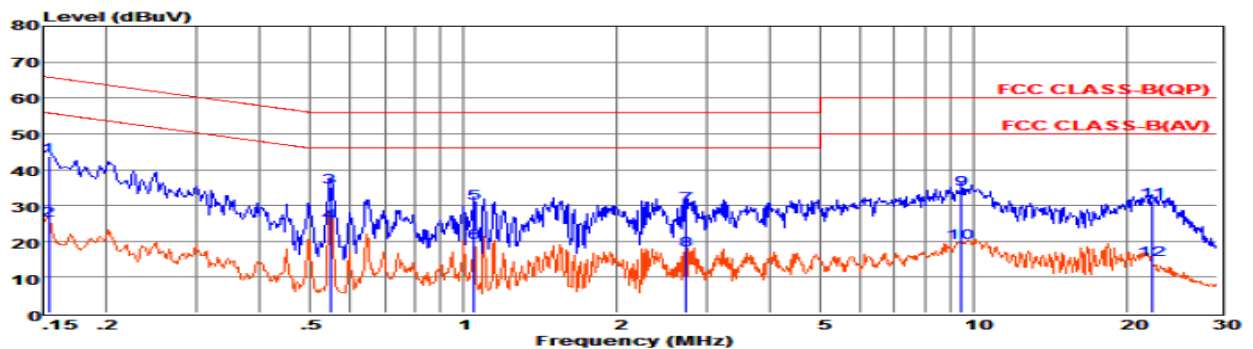
Test Result For Line Power Input AC 120V/60Hz (Worst Case)



Env. Ins: 24*/56%
 EUT: Smart Phone
 M/N: FTU152D
 Power Rating: AC 120V/60Hz
 Test Mode: TX-High channel (802.11a, 5745-5825MHz)
 Operator: Leo
 Memo:
 Pol: LINE

Freq	Reading	LisnFac	CabLos	Atten_Fac	Measured	Limit	Over	Remark
MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1 0.15000	23.67	9.57	0.02	10.00	43.26	66.00	-22.74	QP
2 0.15010	7.95	9.57	0.02	10.00	27.54	55.99	-28.45	Average
3 0.54644	21.10	9.63	0.04	10.00	40.77	56.00	-15.23	QP
4 0.54654	10.53	9.63	0.04	10.00	30.20	46.00	-15.80	Average
5 1.04850	14.47	9.63	0.05	10.00	34.15	56.00	-21.85	QP
6 1.04950	1.12	9.63	0.05	10.00	20.80	46.00	-25.20	Average
7 2.73562	14.62	9.64	0.05	10.00	34.31	56.00	-21.69	QP
8 2.73662	-2.21	9.64	0.05	10.00	17.48	46.00	-28.52	Average
9 9.91302	18.53	9.69	0.08	10.00	38.30	60.00	-21.70	QP
10 9.91402	4.57	9.69	0.08	10.00	24.34	50.00	-25.66	Average
11 24.01475	13.31	9.71	0.13	10.00	33.15	60.00	-26.85	QP
12 24.01575	-6.52	9.71	0.13	10.00	13.32	50.00	-36.68	Average

Remarks: 1. Measured = Reading + Lisn Factor + Cable Loss + Atten_Fac.
 2. The emission levels that are 20dB below the official limit are not reported.



Env. Ins: 24*/56%
 EUT: Smart Phone
 M/N: FTU152D
 Power Rating: AC 120V/60Hz
 Test Mode: TX-High channel (802.11a, 5745-5825MHz)
 Operator: Leo
 Memo:
 Pol: NEUTRAL

Freq	Reading	LisnFac	CabLos	Atten_Fac	Measured	Limit	Over	Remark
MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1 0.15403	23.97	9.69	0.02	10.00	43.68	65.78	-22.10	QP
2 0.15413	6.07	9.69	0.02	10.00	25.78	55.77	-29.99	Average
3 0.54934	15.48	9.62	0.04	10.00	35.14	56.00	-20.86	QP
4 0.54944	5.73	9.62	0.04	10.00	25.39	46.00	-20.61	Average
5 1.04850	10.87	9.63	0.05	10.00	30.55	56.00	-25.45	QP
6 1.04950	-0.18	9.63	0.05	10.00	19.50	46.00	-26.50	Average
7 2.73562	10.31	9.64	0.05	10.00	30.00	56.00	-26.00	QP
8 2.73662	-2.18	9.64	0.05	10.00	17.51	46.00	-28.49	Average
9 9.45141	14.77	9.72	0.08	10.00	34.57	60.00	-25.43	QP
10 9.45241	-0.26	9.72	0.08	10.00	19.54	50.00	-30.46	Average
11 22.41633	11.21	9.81	0.12	10.00	31.14	60.00	-28.86	QP
12 22.41733	-5.04	9.81	0.12	10.00	14.89	50.00	-35.11	Average

Remarks: 1. Measured = Reading + Lisn Factor + Cable Loss + Atten_Fac.
 2. The emission levels that are 20dB below the official limit are not reported.

Note: Pre-scan all modes and recorded the worst case results in this report.

5.6. Antenna Requirements

5.6.1. Standard Applicable

According to § 15.203, An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

5.6.2. Antenna Connector Construction

The antenna used for transmitting is permanently attached and no consideration of replacement. Please see EUT photo for details.

5.6.3. Results: Compliance.

-----THE END OF REPORT-----