

### 5.8. Conducted Emission

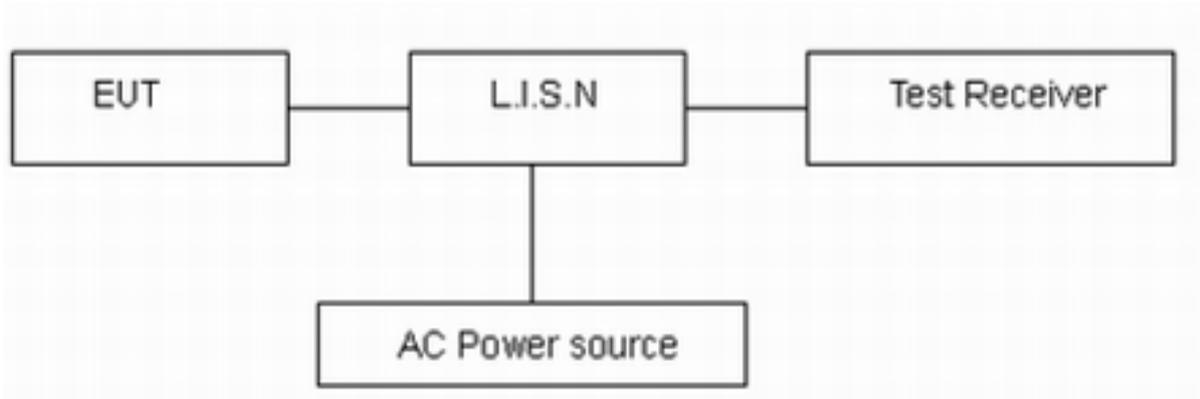
#### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

#### Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.10-2013. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz. The measurement result should include both L line and N line. The test is in transmitting mode.

#### Test Setup



Note: AC Power source is used to change the voltage 110V/60Hz.

#### Limits

Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

\*: Decreases with the logarithm of the frequency.

#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ ,  $U = 2.69$  dB.



Test Results:

Following plots, Blue trace uses the peak detection and Green trace uses the average detection.

802.11b, Channel No.: 1

L Line

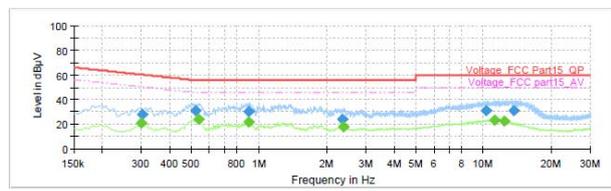


Table with 10 columns: Frequency (MHz), QuasiPeak (dBuV), Average (dBuV), Limit (dBuV), Margin (dB), Meas. Time (ms), Bandwidth (kHz), Line, Filter, Corr. (dB). Contains 14 rows of data for L Line.

N Line

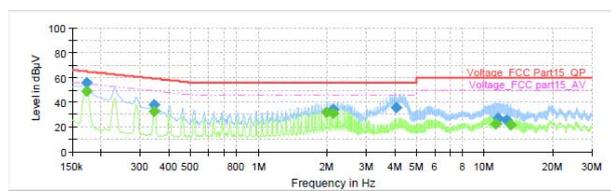


Table with 10 columns: Frequency (MHz), QuasiPeak (dBuV), Average (dBuV), Limit (dBuV), Margin (dB), Meas. Time (ms), Bandwidth (kHz), Line, Filter, Corr. (dB). Contains 14 rows of data for N Line.

802.11b, Channel No.: 6

L Line

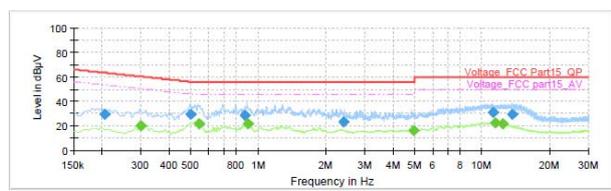


Table with 10 columns: Frequency (MHz), QuasiPeak (dBuV), Average (dBuV), Limit (dBuV), Margin (dB), Meas. Time (ms), Bandwidth (kHz), Line, Filter, Corr. (dB). Contains 14 rows of data for L Line.

N Line

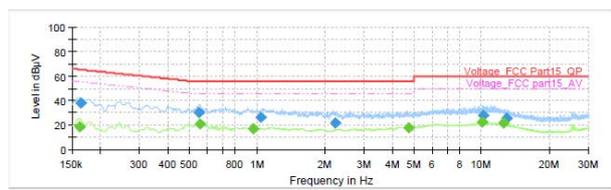


Table with 10 columns: Frequency (MHz), QuasiPeak (dBuV), Average (dBuV), Limit (dBuV), Margin (dB), Meas. Time (ms), Bandwidth (kHz), Line, Filter, Corr. (dB). Contains 14 rows of data for N Line.



802.11b, Channel No.: 11

L Line

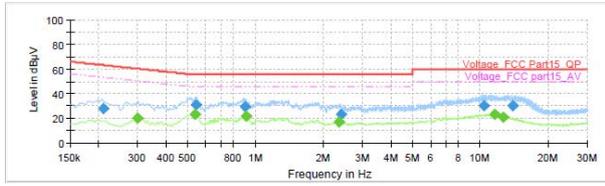


Table with 11 columns: Frequency (MHz), QuasiPeak (dBµV), Average (dBµV), Limit (dBµV), Margin (dB), Meas. Time (ms), Bandwidth (kHz), Line, Filter, Corr. (dB). Contains 15 rows of test data.

N Line

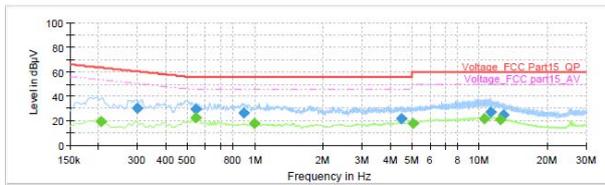


Table with 11 columns: Frequency (MHz), QuasiPeak (dBµV), Average (dBµV), Limit (dBµV), Margin (dB), Meas. Time (ms), Bandwidth (kHz), Line, Filter, Corr. (dB). Contains 15 rows of test data.

802.11g, Channel No.: 1

L Line

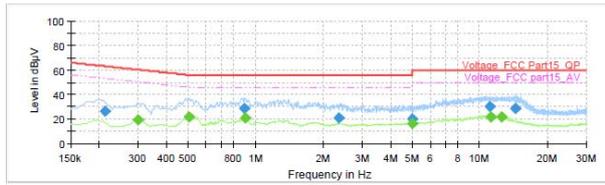


Table with 11 columns: Frequency (MHz), QuasiPeak (dBµV), Average (dBµV), Limit (dBµV), Margin (dB), Meas. Time (ms), Bandwidth (kHz), Line, Filter, Corr. (dB). Contains 15 rows of test data.

N Line

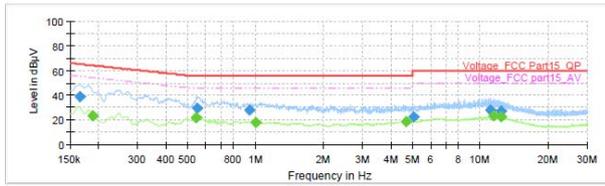
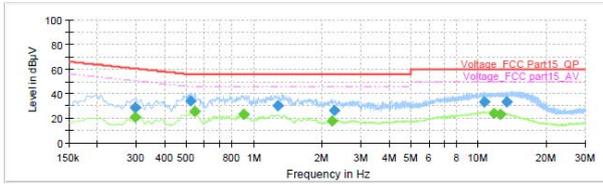


Table with 11 columns: Frequency (MHz), QuasiPeak (dBµV), Average (dBµV), Limit (dBµV), Margin (dB), Meas. Time (ms), Bandwidth (kHz), Line, Filter, Corr. (dB). Contains 15 rows of test data.



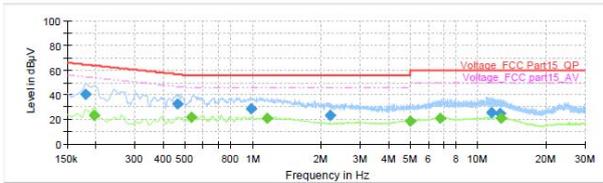
802.11g, Channel No.: 6

L Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.294000	---	20.66	50.41	29.75	1000.0	9.000	L1	ON	19.2
0.296250	28.95	---	60.35	31.39	1000.0	9.000	L1	ON	19.2
0.521250	34.36	---	56.00	21.64	1000.0	9.000	L1	ON	19.2
0.546000	---	25.47	46.00	20.53	1000.0	9.000	L1	ON	19.2
0.899250	---	23.03	46.00	22.98	1000.0	9.000	L1	ON	19.2
1.272750	30.07	---	56.00	25.93	1000.0	9.000	L1	ON	19.2
2.240250	---	18.11	46.00	27.89	1000.0	9.000	L1	ON	19.1
2.274000	26.07	---	56.00	29.93	1000.0	9.000	L1	ON	19.1
10.572000	32.96	---	60.00	27.04	1000.0	9.000	L1	ON	19.4
11.694750	---	24.17	50.00	25.83	1000.0	9.000	L1	ON	19.4
12.531750	---	23.30	50.00	26.70	1000.0	9.000	L1	ON	19.4
13.431750	33.25	---	60.00	26.75	1000.0	9.000	L1	ON	19.5

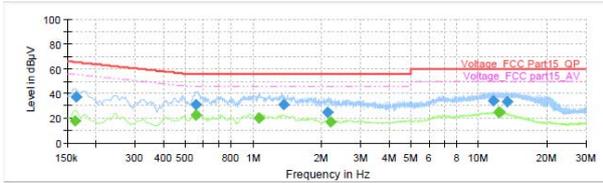
N Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.181500	40.61	---	64.42	23.80	1000.0	9.000	N	ON	19.2
0.197250	---	23.38	53.73	30.34	1000.0	9.000	N	ON	19.2
0.460500	32.42	---	56.68	24.26	1000.0	9.000	N	ON	19.2
0.534750	---	21.84	46.00	24.16	1000.0	9.000	N	ON	19.2
0.982500	29.04	---	56.00	26.96	1000.0	9.000	N	ON	19.2
1.153500	---	21.03	46.00	24.97	1000.0	9.000	N	ON	19.2
2.204250	23.31	---	56.00	32.69	1000.0	9.000	N	ON	19.1
4.980750	---	18.28	46.00	27.72	1000.0	9.000	N	ON	19.1
6.825750	---	21.19	50.00	28.81	1000.0	9.000	N	ON	19.1
11.595750	25.21	---	60.00	34.79	1000.0	9.000	N	ON	19.4
12.475500	24.84	---	60.00	35.16	1000.0	9.000	N	ON	19.4
12.642000	---	20.91	50.00	29.09	1000.0	9.000	N	ON	19.4

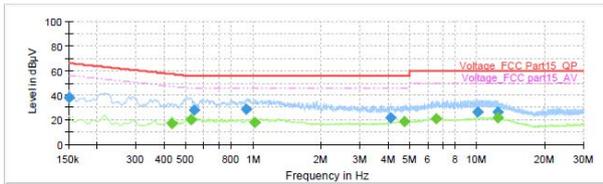
802.11g, Channel No.: 11

L Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.161250	---	17.85	55.48	37.55	1000.0	9.000	L1	ON	19.1
0.163500	36.89	---	65.28	28.39	1000.0	9.000	L1	ON	19.1
0.555000	31.13	---	56.00	24.87	1000.0	9.000	L1	ON	19.3
0.557250	---	22.77	46.00	23.23	1000.0	9.000	L1	ON	19.3
1.056750	---	20.05	46.00	25.95	1000.0	9.000	L1	ON	19.2
1.358250	30.94	---	56.00	25.06	1000.0	9.000	L1	ON	19.2
2.139000	24.78	---	56.00	31.22	1000.0	9.000	L1	ON	19.1
2.215500	---	16.97	46.00	29.03	1000.0	9.000	L1	ON	19.1
11.580000	34.29	---	60.00	25.71	1000.0	9.000	L1	ON	19.4
12.275250	---	24.85	50.00	25.15	1000.0	9.000	L1	ON	19.4
12.374250	---	24.49	50.00	25.51	1000.0	9.000	L1	ON	19.4
13.350750	33.63	---	60.00	26.37	1000.0	9.000	L1	ON	19.5

N Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.150000	38.23	---	56.00	17.77	1000.0	9.000	N	ON	19.1
0.431250	---	17.09	47.23	30.14	1000.0	9.000	N	ON	19.2
0.528000	---	19.86	46.00	26.14	1000.0	9.000	N	ON	19.2
0.541500	27.99	---	56.00	28.01	1000.0	9.000	N	ON	19.2
0.930750	28.84	---	56.00	27.16	1000.0	9.000	N	ON	19.2
1.016250	---	17.60	46.00	28.40	1000.0	9.000	N	ON	19.2
4.092000	21.84	---	56.00	34.16	1000.0	9.000	N	ON	19.1
4.717500	---	18.75	46.00	27.25	1000.0	9.000	N	ON	19.1
6.580000	---	21.11	50.00	28.89	1000.0	9.000	N	ON	19.1
10.011750	26.43	---	60.00	33.57	1000.0	9.000	N	ON	19.4
12.423750	---	21.50	50.00	28.50	1000.0	9.000	N	ON	19.4
12.430500	26.10	---	60.00	33.90	1000.0	9.000	N	ON	19.4



802.11n(HT20), Channel No.: 1

L Line

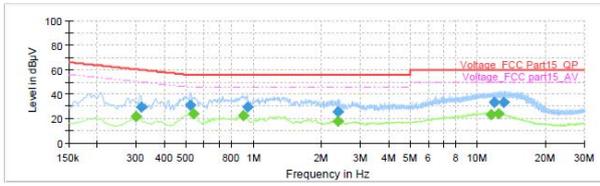


Table with 10 columns: Frequency (MHz), QuasiPeak (dBuV), Average (dBuV), Limit (dBuV), Margin (dB), Meas. Time (ms), Bandwidth (kHz), Line, Filter, Corr. (dB). Contains 15 rows of test data for L Line.

N Line

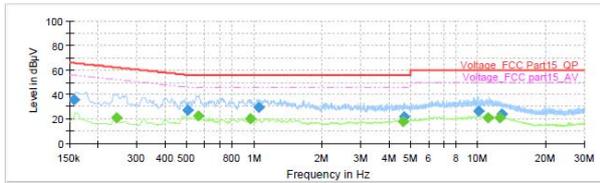


Table with 10 columns: Frequency (MHz), QuasiPeak (dBuV), Average (dBuV), Limit (dBuV), Margin (dB), Meas. Time (ms), Bandwidth (kHz), Line, Filter, Corr. (dB). Contains 15 rows of test data for N Line.

802.11n(HT20), Channel No.: 6

L Line

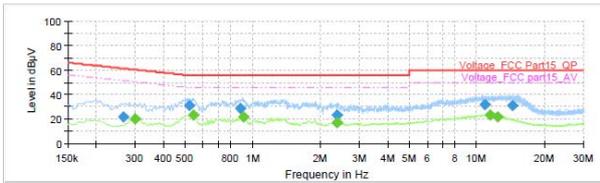


Table with 10 columns: Frequency (MHz), QuasiPeak (dBuV), Average (dBuV), Limit (dBuV), Margin (dB), Meas. Time (ms), Bandwidth (kHz), Line, Filter, Corr. (dB). Contains 15 rows of test data for L Line.

N Line

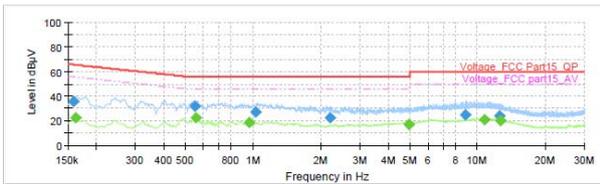
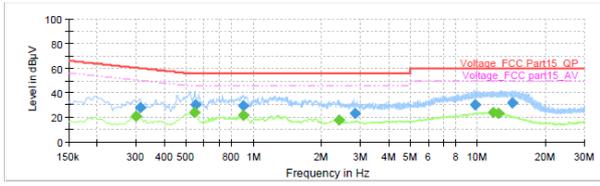


Table with 10 columns: Frequency (MHz), QuasiPeak (dBuV), Average (dBuV), Limit (dBuV), Margin (dB), Meas. Time (ms), Bandwidth (kHz), Line, Filter, Corr. (dB). Contains 15 rows of test data for N Line.



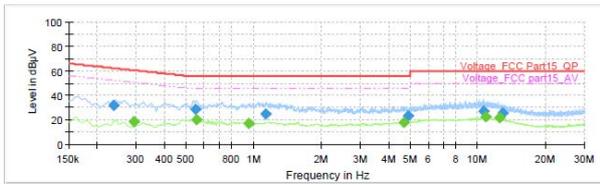
802.11n(HT20), Channel No.: 11

L Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.298500	---	21.05	50.28	29.24	1000.0	9.000	L1	ON	19.2
0.312000	28.28	---	59.92	31.64	1000.0	9.000	L1	ON	19.2
0.541500	---	23.90	46.00	22.10	1000.0	9.000	L1	ON	19.2
0.548250	30.34	---	56.00	25.66	1000.0	9.000	L1	ON	19.3
0.897000	29.66	---	56.00	26.34	1000.0	9.000	L1	ON	19.2
0.903750	---	22.02	46.00	23.98	1000.0	9.000	L1	ON	19.2
2.404500	---	17.92	46.00	28.08	1000.0	9.000	L1	ON	19.0
2.819500	22.88	---	56.00	33.12	1000.0	9.000	L1	ON	19.0
3.710250	30.54	---	60.00	29.46	1000.0	9.000	L1	ON	19.4
11.728500	---	23.79	50.00	26.21	1000.0	9.000	L1	ON	19.4
12.432750	---	23.14	50.00	26.86	1000.0	9.000	L1	ON	19.4
14.291250	32.05	---	60.00	27.95	1000.0	9.000	L1	ON	19.5

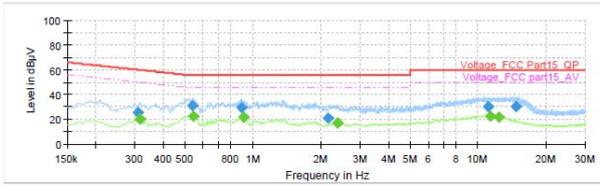
N Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.237750	31.64	---	62.17	30.53	1000.0	9.000	N	ON	19.1
0.291750	---	18.53	50.47	31.94	1000.0	9.000	N	ON	19.2
0.548250	28.88	---	56.00	27.12	1000.0	9.000	N	ON	19.3
0.555000	---	20.54	46.00	25.46	1000.0	9.000	N	ON	19.3
0.951000	---	17.23	46.00	28.77	1000.0	9.000	N	ON	19.2
1.133250	24.76	---	56.00	31.24	1000.0	9.000	N	ON	19.2
4.661250	---	18.12	46.00	27.88	1000.0	9.000	N	ON	19.1
4.895250	23.14	---	56.00	32.86	1000.0	9.000	N	ON	19.1
10.644000	27.14	---	60.00	32.86	1000.0	9.000	N	ON	19.4
10.844250	---	22.82	50.00	27.18	1000.0	9.000	N	ON	19.4
12.513750	---	21.38	50.00	28.62	1000.0	9.000	N	ON	19.4
12.900750	25.42	---	60.00	34.58	1000.0	9.000	N	ON	19.5

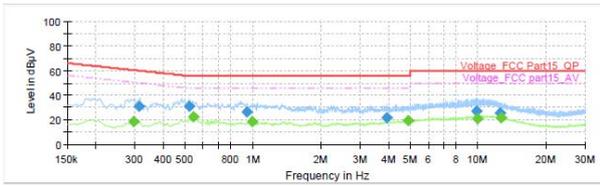
802.11n(HT40), Channel No.: 3

L Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.309750	25.95	---	59.98	34.03	1000.0	9.000	L1	ON	19.2
0.314250	---	19.92	49.86	29.94	1000.0	9.000	L1	ON	19.2
0.537000	30.71	---	56.00	25.29	1000.0	9.000	L1	ON	19.2
0.541500	---	22.84	46.00	23.16	1000.0	9.000	L1	ON	19.2
0.890250	29.21	---	56.00	26.79	1000.0	9.000	L1	ON	19.2
0.906000	---	21.68	46.00	24.32	1000.0	9.000	L1	ON	19.2
2.161500	20.65	---	56.00	35.35	1000.0	9.000	L1	ON	19.1
2.386500	---	17.02	46.00	28.98	1000.0	9.000	L1	ON	19.0
11.044500	30.43	---	60.00	29.57	1000.0	9.000	L1	ON	19.4
11.379750	---	22.66	50.00	27.34	1000.0	9.000	L1	ON	19.4
12.368750	---	21.48	50.00	28.52	1000.0	9.000	L1	ON	19.4
14.707500	29.89	---	60.00	30.11	1000.0	9.000	L1	ON	19.5

N Line

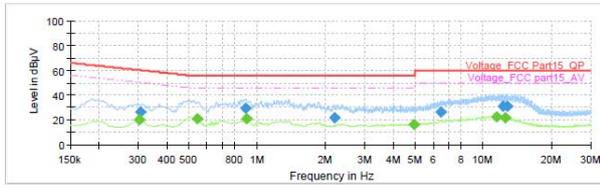


Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.294000	---	18.70	50.41	31.71	1000.0	9.000	N	ON	19.2
0.312000	30.81	---	59.92	29.11	1000.0	9.000	N	ON	19.2
0.521250	30.83	---	56.00	25.17	1000.0	9.000	N	ON	19.2
0.546000	---	22.19	46.00	23.81	1000.0	9.000	N	ON	19.2
0.935250	26.42	---	56.00	29.58	1000.0	9.000	N	ON	19.2
0.937750	---	18.30	46.00	27.70	1000.0	9.000	N	ON	19.2
3.936750	22.02	---	56.00	33.98	1000.0	9.000	N	ON	19.0
4.890750	---	19.10	46.00	26.90	1000.0	9.000	N	ON	19.1
9.894750	26.83	---	60.00	33.17	1000.0	9.000	N	ON	19.4
10.050000	---	21.12	50.00	28.88	1000.0	9.000	N	ON	19.4
12.468750	25.89	---	60.00	34.11	1000.0	9.000	N	ON	19.4
12.588000	---	21.41	50.00	28.59	1000.0	9.000	N	ON	19.4



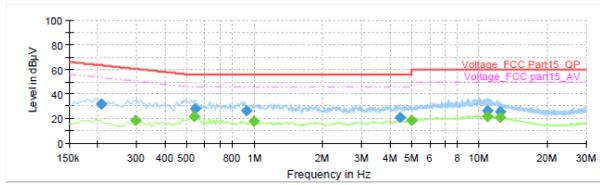
802.11n(HT40), Channel No.: 6

L Line



Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.300750	---	19.86	50.22	30.36	1000.0	9.000	L1	ON	19.2
0.305250	26.70	---	60.10	33.40	1000.0	9.000	L1	ON	19.2
0.546000	---	21.24	46.00	24.76	1000.0	9.000	L1	ON	19.2
0.888000	29.39	---	56.00	26.61	1000.0	9.000	L1	ON	19.2
0.897000	---	21.21	46.00	24.79	1000.0	9.000	L1	ON	19.2
2.195250	22.01	---	56.00	33.99	1000.0	9.000	L1	ON	19.1
4.949250	---	16.35	46.00	29.65	1000.0	9.000	L1	ON	19.1
5.474750	26.01	---	60.00	33.99	1000.0	9.000	L1	ON	19.1
11.487500	---	22.37	50.00	27.63	1000.0	9.000	L1	ON	19.4
12.279750	31.35	---	60.00	28.65	1000.0	9.000	L1	ON	19.4
12.491250	---	21.52	50.00	28.48	1000.0	9.000	L1	ON	19.4
12.772500	31.18	---	60.00	28.82	1000.0	9.000	L1	ON	19.5

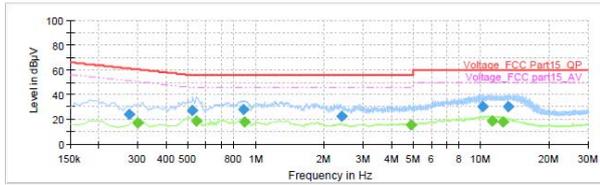
N Line



Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.208500	31.43	---	63.27	31.84	1000.0	9.000	N	ON	19.2
0.296250	---	18.55	50.35	31.80	1000.0	9.000	N	ON	19.2
0.539250	---	21.62	46.00	24.38	1000.0	9.000	N	ON	19.2
0.543750	28.14	---	56.00	27.86	1000.0	9.000	N	ON	19.2
0.924000	26.56	---	56.00	29.44	1000.0	9.000	N	ON	19.2
0.996000	---	17.49	46.00	28.51	1000.0	9.000	N	ON	19.2
4.418250	21.29	---	56.00	34.71	1000.0	9.000	N	ON	19.1
4.996500	---	18.24	46.00	27.76	1000.0	9.000	N	ON	19.1
10.896000	---	21.88	50.00	28.12	1000.0	9.000	N	ON	19.4
10.905000	26.65	---	60.00	33.35	1000.0	9.000	N	ON	19.4
12.342750	25.30	---	60.00	34.70	1000.0	9.000	N	ON	19.4
12.405750	---	21.15	50.00	28.85	1000.0	9.000	N	ON	19.4

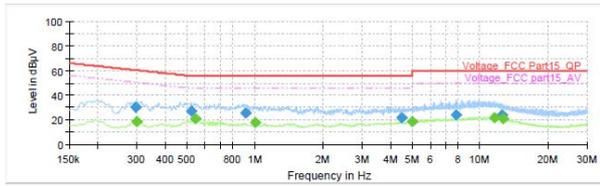
802.11n(HT40), Channel No.: 9

L Line



Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.273750	24.14	---	61.00	36.87	1000.0	9.000	L1	ON	19.1
0.298500	---	17.39	50.28	32.89	1000.0	9.000	L1	ON	19.2
0.523500	27.51	---	56.00	28.49	1000.0	9.000	L1	ON	19.2
0.546000	---	18.49	46.00	27.51	1000.0	9.000	L1	ON	19.2
0.881250	28.09	---	56.00	27.91	1000.0	9.000	L1	ON	19.2
0.894750	---	17.56	46.00	28.44	1000.0	9.000	L1	ON	19.2
2.393250	22.42	---	56.00	33.58	1000.0	9.000	L1	ON	19.0
4.868250	---	15.18	46.00	30.83	1000.0	9.000	L1	ON	19.1
10.153500	30.28	---	60.00	29.72	1000.0	9.000	L1	ON	19.4
11.181750	---	18.77	50.00	31.23	1000.0	9.000	L1	ON	19.4
12.480000	---	18.12	50.00	31.88	1000.0	9.000	L1	ON	19.4
13.229250	29.93	---	60.00	30.07	1000.0	9.000	L1	ON	19.5

N Line



Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.296250	30.15	---	60.35	30.20	1000.0	9.000	N	ON	19.2
0.298500	---	18.53	50.28	31.75	1000.0	9.000	N	ON	19.2
0.519000	26.91	---	56.00	29.09	1000.0	9.000	N	ON	19.2
0.541500	---	21.19	46.00	24.81	1000.0	9.000	N	ON	19.2
0.908250	25.65	---	56.00	30.35	1000.0	9.000	N	ON	19.2
1.002750	---	17.81	46.00	28.19	1000.0	9.000	N	ON	19.2
4.483500	21.34	---	56.00	34.66	1000.0	9.000	N	ON	19.1
5.005500	---	18.51	50.00	31.49	1000.0	9.000	N	ON	19.1
7.809000	23.85	---	60.00	36.15	1000.0	9.000	N	ON	19.2
11.613750	---	21.91	50.00	28.09	1000.0	9.000	N	ON	19.4
12.473250	23.75	---	60.00	36.25	1000.0	9.000	N	ON	19.4
12.718500	---	20.81	50.00	29.19	1000.0	9.000	N	ON	19.5



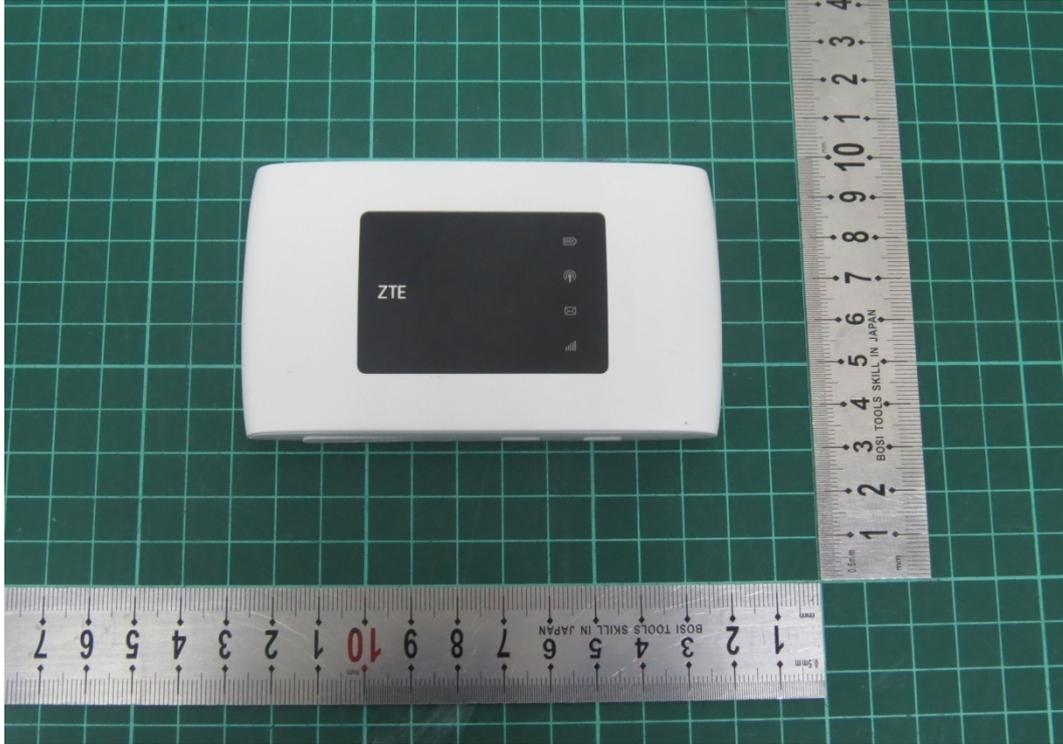
## 6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Time
Spectrum Analyzer	R&S	FSV30	100815	2016-12-16	2017-12-15
EMI Test Receiver	R&S	ESCI	100948	2017-05-20	2018-05-19
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-201	2014-12-06	2017-12-05
Double Ridged Waveguide Horn Antenna	R&S	HF907	100126	2014-12-06	2017-12-05
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-02-18	2020-02-17
Standard Gain Horn	ETS-Lindgren	3160-09	00102644	2015-01-30	2018-01-29
EMI Test Receiver	R&S	ESCS30	100138	2016-12-16	2017-12-15
LISN	R&S	ENV216	101171	2016-12-16	2019-12-15
Spectrum Analyzer	Agilent	N9010A	MY47191109	2017-05-20	2018-05-19
RF Cable	Agilent	SMA 15cm	0001	2017-02-06	2017-08-05

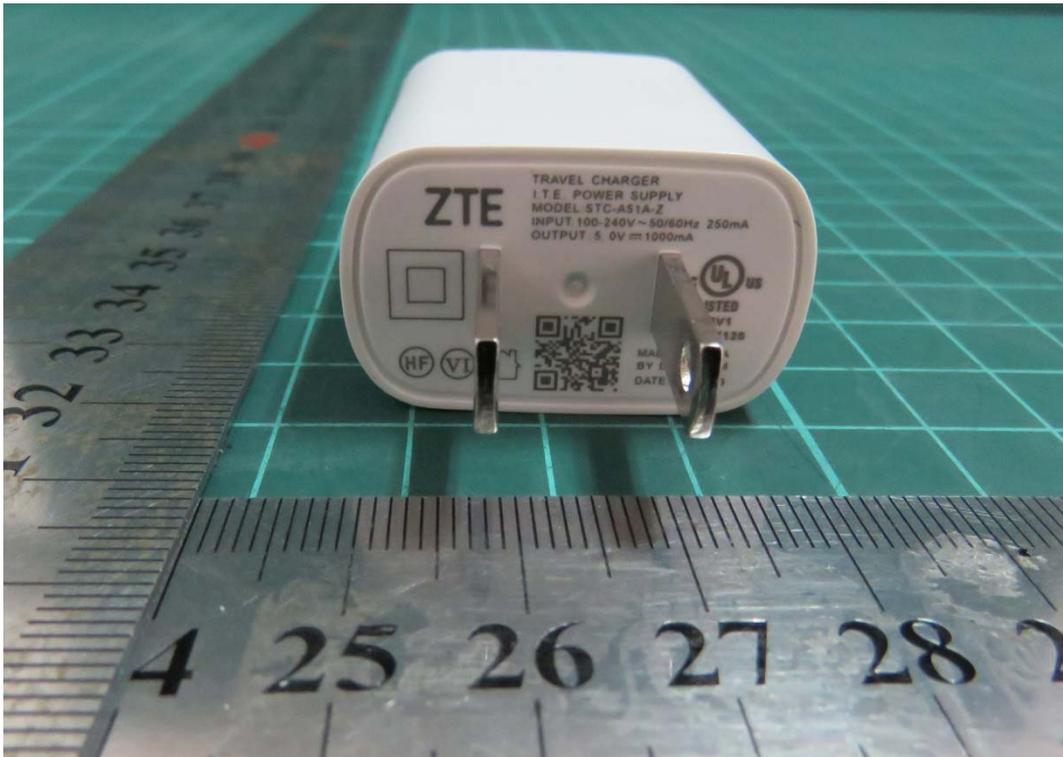
\*\*\*\*\*END OF REPORT \*\*\*\*\*

## ANNEX A: EUT Appearance and Test Setup

### A.1 EUT Appearance



a: EUT

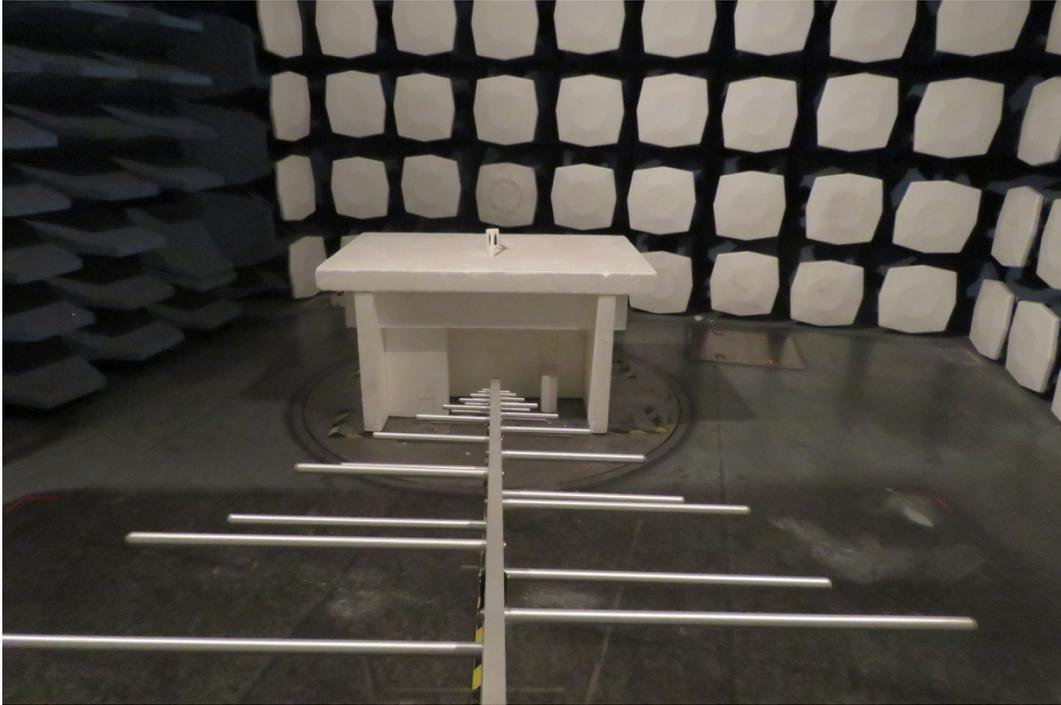


b: Adapter

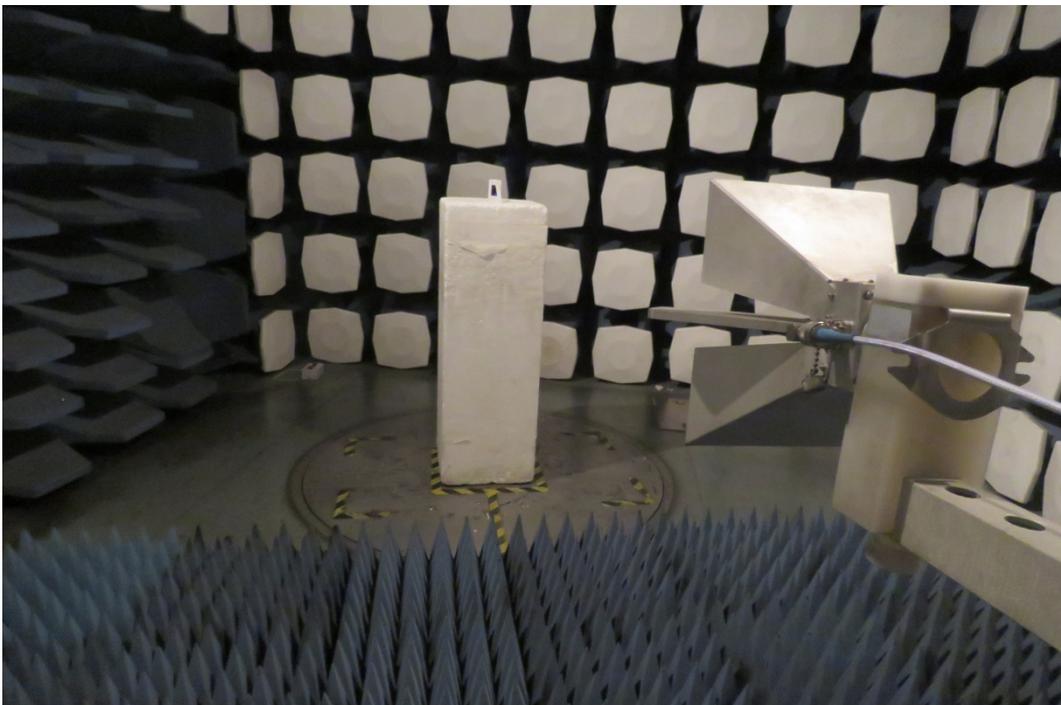


c: USB Cable  
Picture 1 EUT

## A.2 Test Setup



30M Hz-1GHz



Above 1GHz

**Picture 2 Radiated Emission Test Setup**



**Picture 3 Conducted Emission Test Setup**