11.3. LIMITS AND MEASUREMENT RESULT

15.209(a) Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (micorvolts/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

Note: All modes were tested For restricted band radiated emission,
the test records reported below are the worst result compared to other modes.

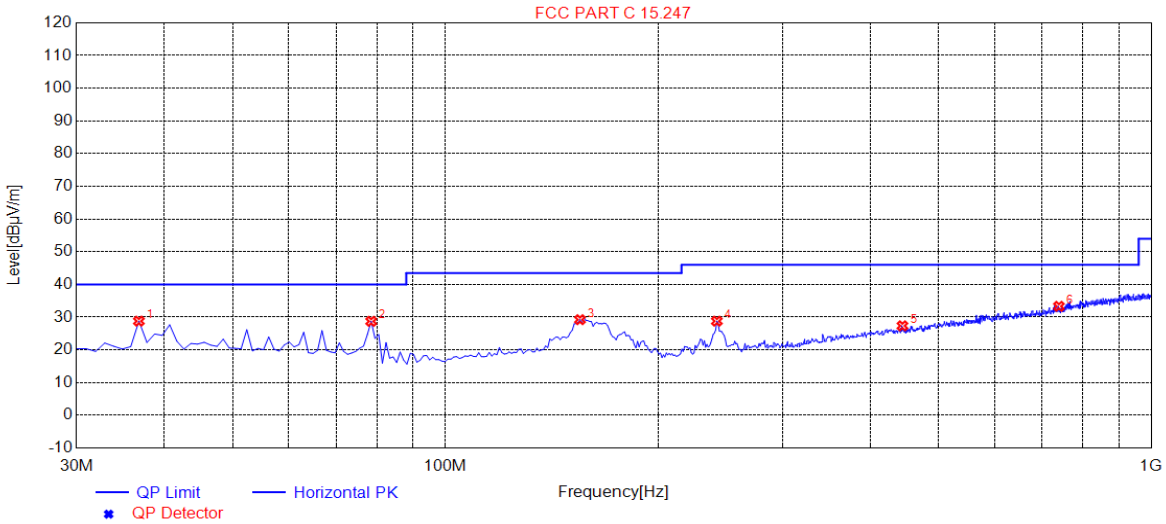
11.4. TEST RESULT

RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

RADIATED EMISSION BELOW 1GHZ

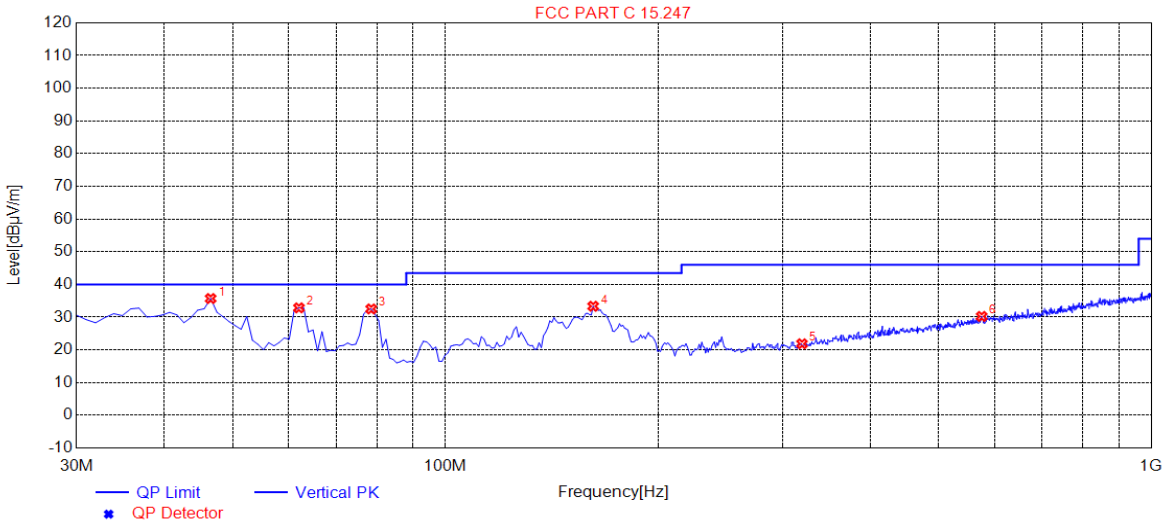
RADIATED EMISSION TEST- (30MHZ-1GHZ) -HORIZONTAL



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.7900	28.80	14.16	40.00	11.20	200	249	Horizontal
2	78.5000	28.74	10.46	40.00	11.26	200	217	Horizontal
3	155.130	29.24	14.93	43.50	14.26	200	82	Horizontal
4	242.430	28.80	14.81	46.00	17.20	100	119	Horizontal
5	444.190	27.36	20.86	46.00	18.64	200	1	Horizontal
6	740.040	33.33	26.97	46.00	12.67	200	65	Horizontal

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ) -VERTICAL



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	46.4900	35.71	14.77	40.00	4.29	100	238	Vertical
2	62.0100	32.86	13.58	40.00	7.14	100	270	Vertical
3	78.5000	32.52	10.46	40.00	7.48	100	183	Vertical
4	161.920	33.35	14.75	43.50	10.15	100	338	Vertical
5	320.030	21.88	16.69	46.00	24.12	100	232	Vertical
6	575.140	30.24	23.79	46.00	15.76	100	346	Vertical

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin= Result -Limit.

2. The “Factor” value can be calculated automatically by software of measurement system.

3. All test modes had been pre-tested. The 802.11b at low channel is the worst case and recorded in the report.

RADIATED EMISSION ABOVE 1GHZ

Frequency (MHz)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
TX 11b 2412MHz					
4824	48.58	74	-25.42	Pk	Horizontal
4824	36.25	54	-17.75	AV	Horizontal
7236	51.46	74	-22.54	pk	Horizontal
7236	34.25	54	-19.75	AV	Horizontal
4824	52.69	74	-21.31	Pk	Vertical
4824	34.87	54	-19.13	AV	Vertical
7236	49.62	74	-24.38	Pk	Vertical
7236	39.56	54	-14.44	AV	Vertical
TX 11b 2437MHz					
4874	52.13	74	-21.87	Pk	Horizontal
4874	30.25	54	-23.75	AV	Horizontal
7311	49.52	74	-24.48	Pk	Horizontal
7311	36.35	54	-17.65	AV	Horizontal
4874	51.52	74	-22.48	Pk	Vertical
4874	42.28	54	-11.72	AV	Vertical
7311	49.63	74	-24.37	Pk	Vertical
7311	40.25	54	-13.75	AV	Vertical
TX 11b 2462MHz					
4924	51.56	74	-22.44	Pk	Horizontal
4924	31.42	54	-22.58	AV	Horizontal
7386	46.25	74	-27.75	Pk	Horizontal
7386	36.85	54	-17.15	AV	Horizontal
4924	51.24	74	-22.76	Pk	Vertical
4924	40.15	54	-13.85	AV	Vertical
7386	48.62	74	-25.38	Pk	Vertical
7386	39.85	54	-14.15	AV	Vertical

RESULT: PASS

Note:

1. Margin = Emission Level - Limit

2.1GHz-25GHz(All test modes had been pre-tested. The 802.11b mode is the worst case and recorded in the report. No recording in the test report at least have 20dB margin).

12. BAND EDGE EMISSION

12.1. MEASUREMENT PROCEDURE

1)Radiated restricted band edge measurements

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting

2)Conducted Emissions at the bang edge

a)The transmitter output was connected to the spectrum analyzer

b)Set RBW=1MHz,VBW=3MHz

c)Suitable frequency span including 100kHz bandwidth from band edge

12.2. TEST SET-UP

Radiated same as 11.2

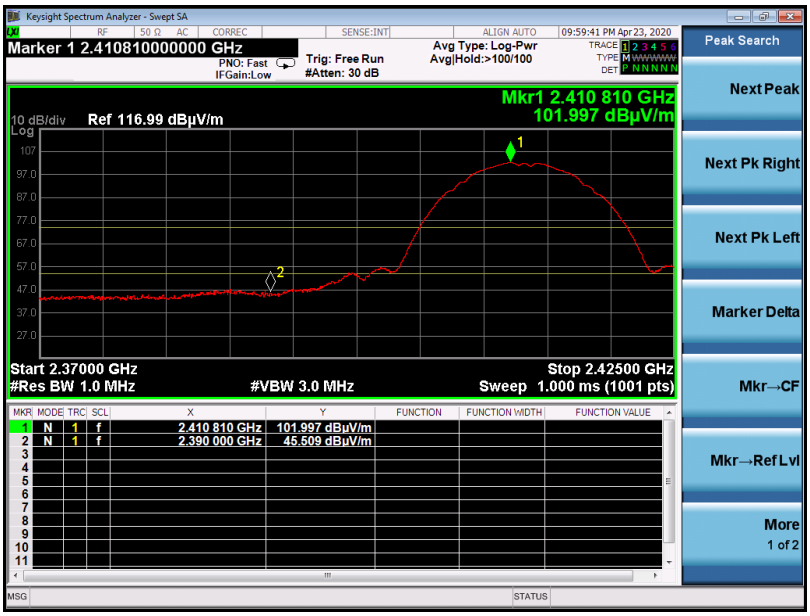
Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level
2. The factor had been edited in the “Input Correction” of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB(μV) to represent the Amplitude. Use the F dB(μV/m) to represent the Field Strength. So A=F.

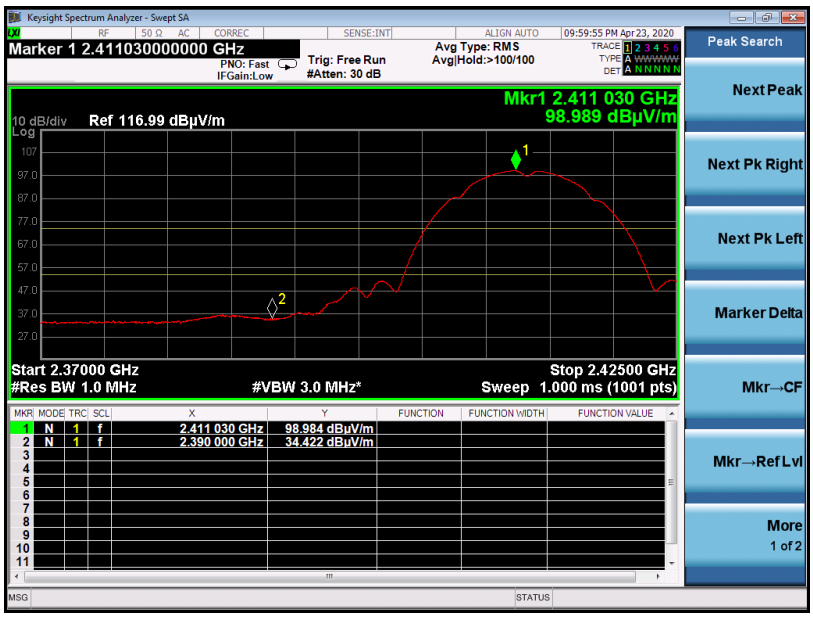
12.3. TEST RESULT

EUT	Smart Phone	**Model Name**	Mara Phones Z1
Temperature	25˚C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHZ	**Antenna**	Horizontal

PK



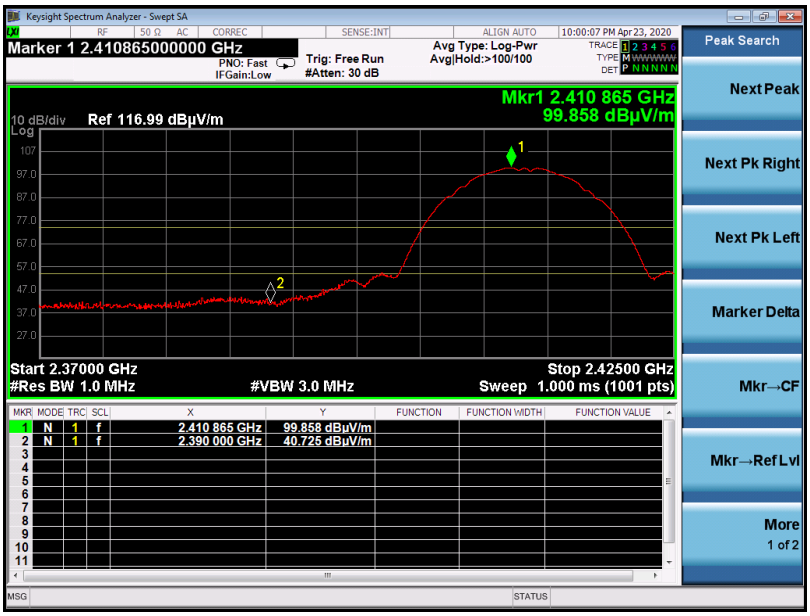
AV



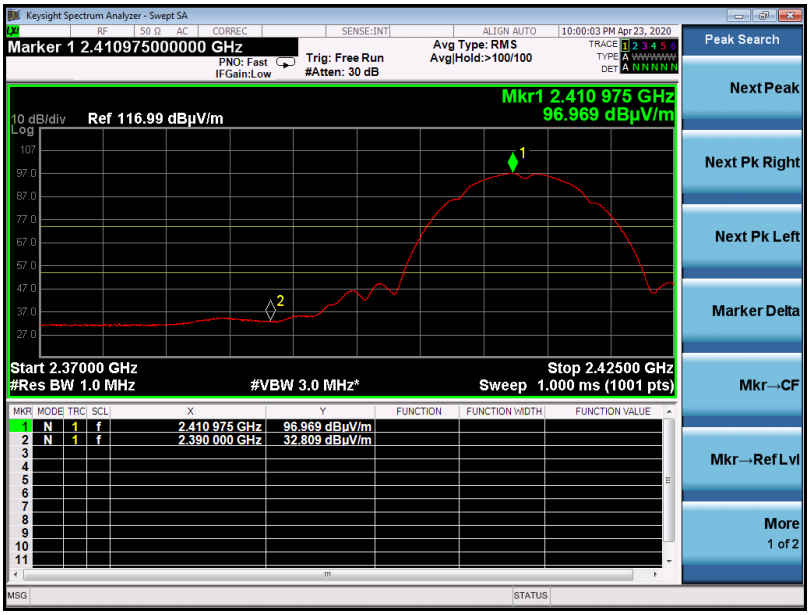
RESULT: PASS

EUT	Smart Phone	**Model Name**	Mara Phones Z1
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHZ	**Antenna**	Vertical

PK



AV



RESULT: PASS

EUT	Smart Phone	**Model Name**	Mara Phones Z1
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with data rate 1 2462MHZ	**Antenna**	Horizontal

PK

AV

RESULT: PASS

EUT	Smart Phone	**Model Name**	Mara Phones Z1
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with data rate 1 2462MHZ	**Antenna**	Vertical

PK

AV

RESULT: PASS

EUT	Smart Phone	**Model Name**	Mara Phones Z1
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11g with data rate 6 2412MHZ	**Antenna**	Horizontal

PK

AV

RESULT: PASS

EUT	Smart Phone	**Model Name**	Mara Phones Z1
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11g with data rate 6 2412MHZ	**Antenna**	Vertical

PK

AV

RESULT: PASS

EUT	Smart Phone	**Model Name**	Mara Phones Z1
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11g with data rate 6 2462MHZ	**Antenna**	Horizontal

PK

AV

RESULT: PASS

EUT	Smart Phone	**Model Name**	Mara Phones Z1
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11g with data rate 6 2462MHZ	**Antenna**	Vertical

PK

AV

RESULT: PASS

EUT	Smart Phone	**Model Name**	Mara Phones Z1
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2412MHZ	**Antenna**	Horizontal

PK

AV

RESULT: PASS

EUT	Smart Phone	**Model Name**	Mara Phones Z1
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2412MHZ	**Antenna**	Vertical

PK

AV

RESULT: PASS

EUT	Smart Phone	**Model Name**	Mara Phones Z1
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2462MHZ	**Antenna**	Horizontal

PK

AV

RESULT: PASS

EUT	Smart Phone	**Model Name**	Mara Phones Z1
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2462MHZ	**Antenna**	Vertical

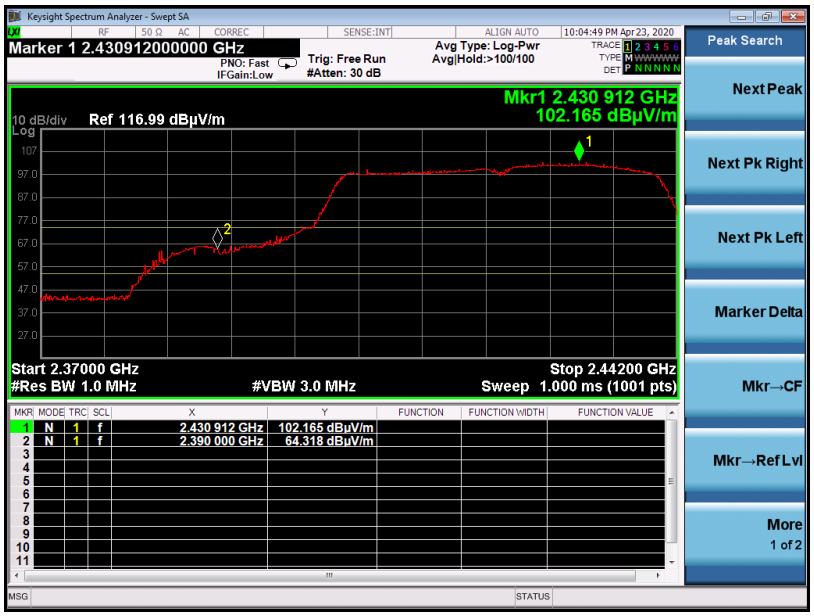
PK

AV

RESULT: PASS

EUT	Smart Phone	**Model Name**	Mara Phones Z1
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11n 40 with data rate 13.5 2422MHZ	**Antenna**	Horizontal

PK



AV

RESULT: PASS

EUT	Smart Phone	**Model Name**	Mara Phones Z1
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11n 40 with data rate 13.5 2422MHZ	**Antenna**	Vertical

PK

AV

RESULT: PASS

EUT	Smart Phone	**Model Name**	Mara Phones Z1
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11n 40with data rate 13.5 2452MHZ	**Antenna**	Horizontal

PK

AV

RESULT: PASS

EUT	Smart Phone	**Model Name**	Mara Phones Z1
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11n 40 with data rate 13.5 2452MHZ	**Antenna**	Vertical

PK

AV

RESULT: PASS

13. FCC LINE CONDUCTED EMISSION TEST

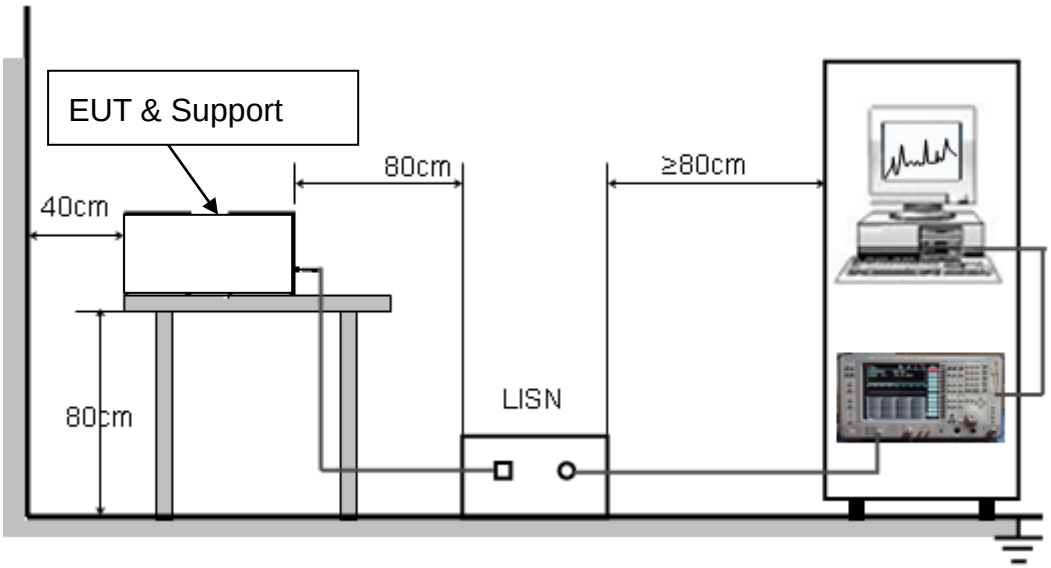
13.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

13.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



13.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a Smart Phone op system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received charging voltage by adapter which received 120V/60Hzpower by a LISN..
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

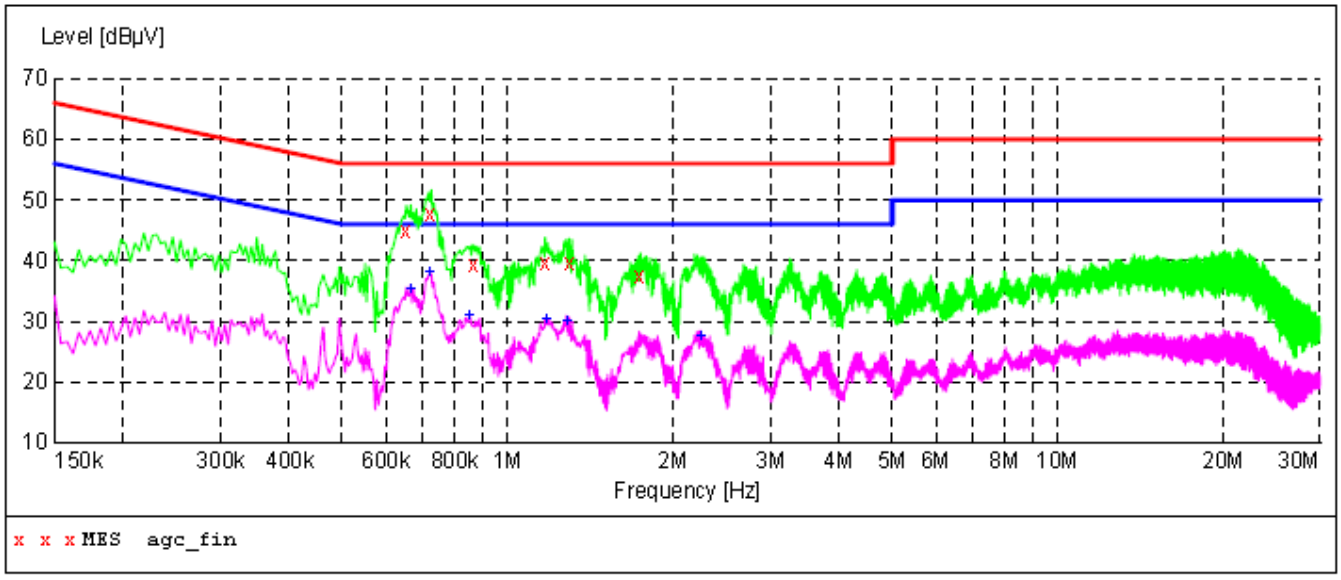
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

13.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

13.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST LINE 1-L



MEASUREMENT RESULT: "agc_fin"

2020/4/17 23:59

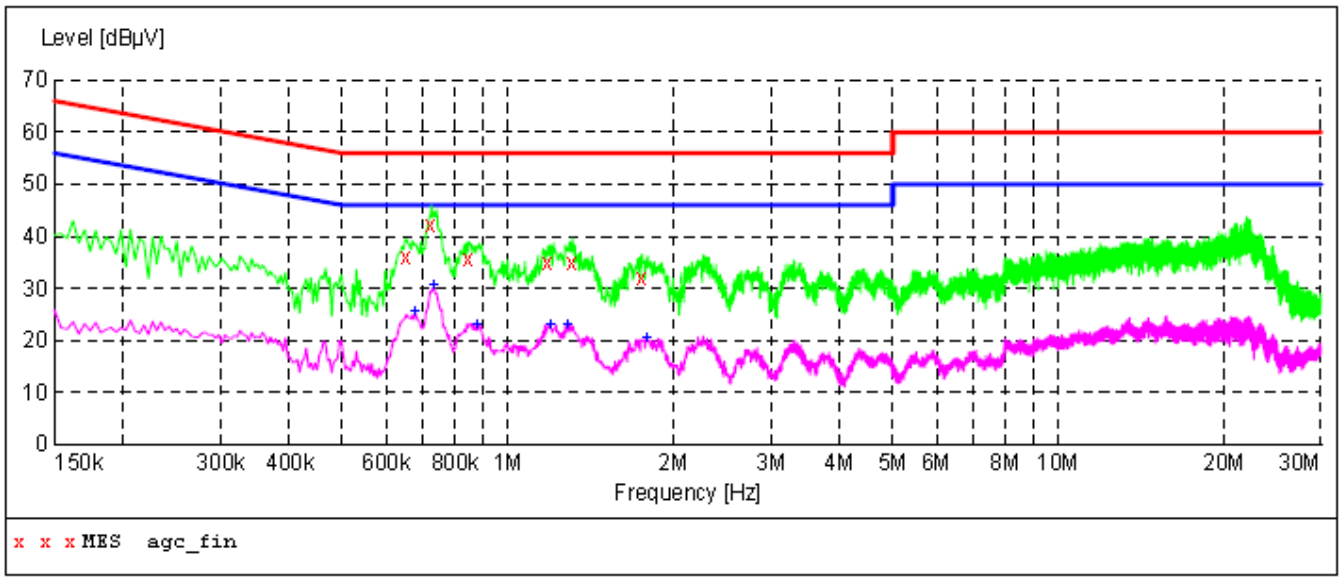
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.654000	44.80	11.3	56	11.2	QP	L1	FLO
0.726000	47.70	11.3	56	8.3	QP	L1	FLO
0.866000	39.20	11.3	56	16.8	QP	L1	FLO
1.170000	39.70	11.3	56	16.3	QP	L1	FLO
1.294000	39.60	11.3	56	16.4	QP	L1	FLO
1.742000	37.40	11.3	56	18.6	QP	L1	FLO

MEASUREMENT RESULT: "agc_fin2"

2020/4/17 23:59

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.666000	35.20	11.3	46	10.8	AV	L1	FLO
0.722000	38.10	11.3	46	7.9	AV	L1	FLO
0.850000	30.90	11.3	46	15.1	AV	L1	FLO
1.178000	30.40	11.3	46	15.6	AV	L1	FLO
1.278000	29.90	11.3	46	16.1	AV	L1	FLO
2.242000	27.40	11.3	46	18.6	AV	L1	FLO

Line Conducted Emission Test Line 2-N



MEASUREMENT RESULT: "agc_fin"

2020/4/18 0:40

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.654000	36.00	11.3	56	20.0	QP	N	FLO
0.726000	42.30	11.3	56	13.7	QP	N	FLO
0.850000	35.50	11.3	56	20.5	QP	N	FLO
1.182000	34.80	11.3	56	21.2	QP	N	FLO
1.310000	34.90	11.3	56	21.1	QP	N	FLO
1.750000	31.90	11.3	56	24.1	QP	N	FLO

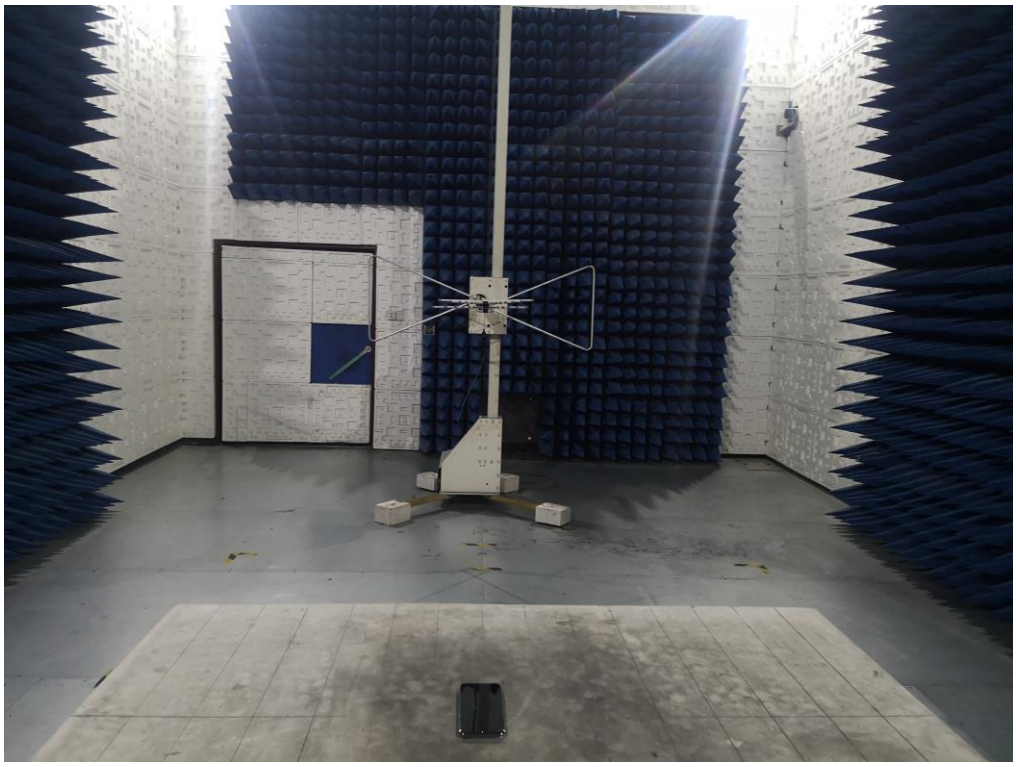
MEASUREMENT RESULT: "agc_fin2"

2020/4/18 0:40

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.678000	25.60	11.3	46	20.4	AV	N	FLO
0.730000	30.60	11.3	46	15.4	AV	N	FLO
0.878000	23.10	11.3	46	22.9	AV	N	FLO
1.190000	22.90	11.3	46	23.1	AV	N	FLO
1.278000	23.00	11.3	46	23.0	AV	N	FLO
1.790000	20.60	11.3	46	25.4	AV	N	FLO

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

RADIATED EMISSION TEST SETUP BELOW 1GHZ



RADIATED EMISSION TEST SETUP ABOVE 1GHZ

CONDUCTED EMISSION TEST SETUP

----END OF REPORT----