RADIATED EMISSION ABOVE 1GHZ

Frequency (MHz)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
TX 11b 2412MHz					
4824	48.43	74	-25.57	Pk	Horizontal
4824	36.13	54	-17.87	AV	Horizontal
7236	51.28	74	-22.72	pk	Horizontal
7236	34.11	54	-19.89	AV	Horizontal
4824	52.64	74	-21.36	Pk	Vertical
4824	34.81	54	-19.19	AV	Vertical
7236	49.54	74	-24.46	Pk	Vertical
7236	39.49	54	-14.51	AV	Vertical
TX 11b 2437MHz					
4874	51.98	74	-22.02	Pk	Horizontal
4874	30.13	54	-23.87	AV	Horizontal
7311	49.34	74	-24.66	Pk	Horizontal
7311	36.21	54	-17.79	AV	Horizontal
4874	51.47	74	-22.53	Pk	Vertical
4874	42.19	54	-11.81	AV	Vertical
7311	49.47	74	-24.53	Pk	Vertical
7311	40.18	54	-13.82	AV	Vertical
TX 11b 2462MHz					
4924	51.34	74	-22.66	Pk	Horizontal
4924	31.31	54	-22.69	AV	Horizontal
7386	46.07	74	-27.93	Pk	Horizontal
7386	36.71	54	-17.29	AV	Horizontal
4924	51.19	74	-22.81	Pk	Vertical
4924	40.06	54	-13.94	AV	Vertical
7386	48.46	74	-25.54	Pk	Vertical
7386	39.78	54	-14.22	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	Modeshift Validator	**Model Name**	MTV101
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	Modeshift Validator	**Model Name**	MTV101
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	Modeshift Validator	**Model Name**	MTV101
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	Modeshift Validator	**Model Name**	MTV101
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	Modeshift Validator	**Model Name**	MTV101
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	Modeshift Validator	**Model Name**	MTV101
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	Modeshift Validator	**Model Name**	MTV101
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	Modeshift Validator	**Model Name**	MTV101
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	Modeshift Validator	**Model Name**	MTV101
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	Modeshift Validator	**Model Name**	MTV101
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	Modeshift Validator	**Model Name**	MTV101
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	Modeshift Validator	**Model Name**	MTV101
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	Modeshift Validator	**Model Name**	MTV101
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	Modeshift Validator	**Model Name**	MTV101
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	Modeshift Validator	**Model Name**	MTV101
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	Modeshift Validator	**Model Name**	MTV101
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

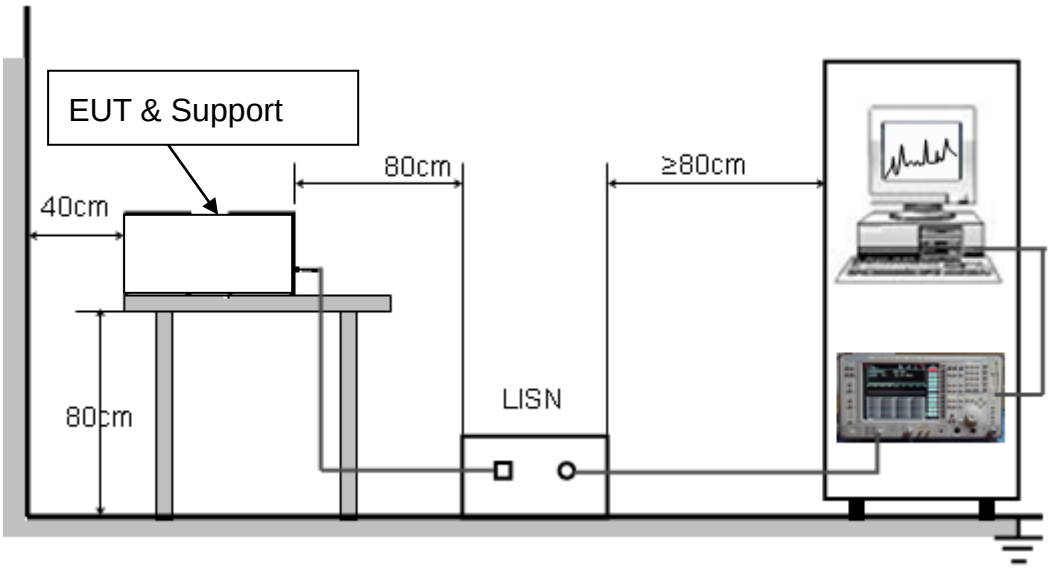
13.1. LIMITS OF LINE CONDUCTED EMISSION TEST

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 Modeshift Validator 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.

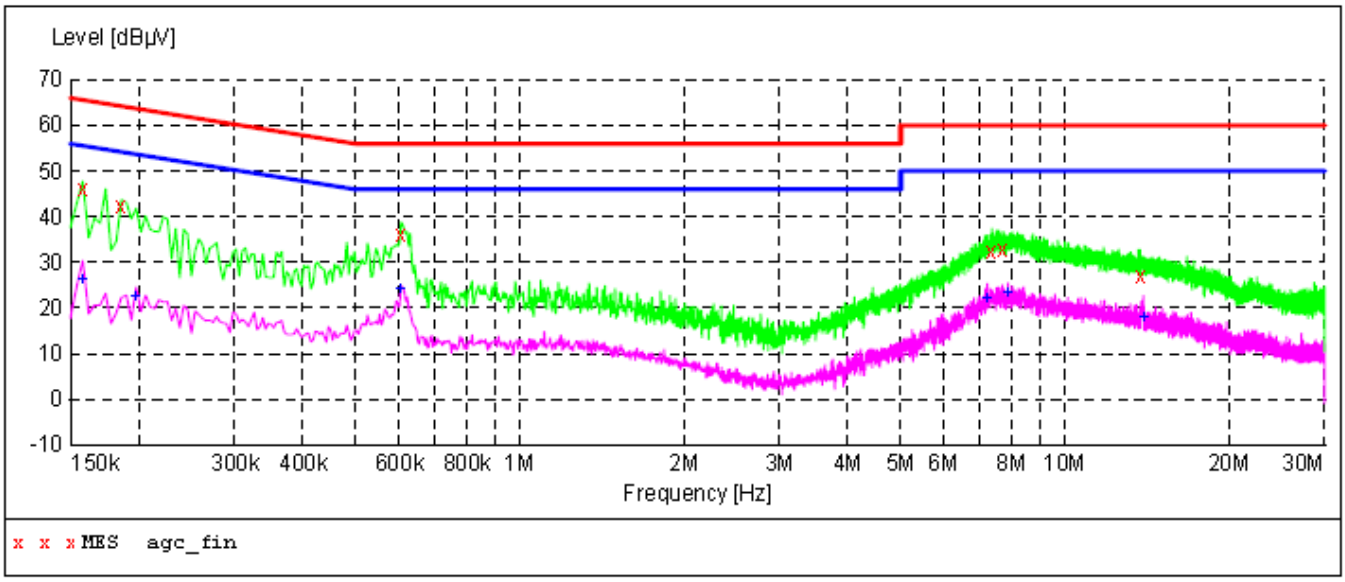
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

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"

2020/5/8 1:32

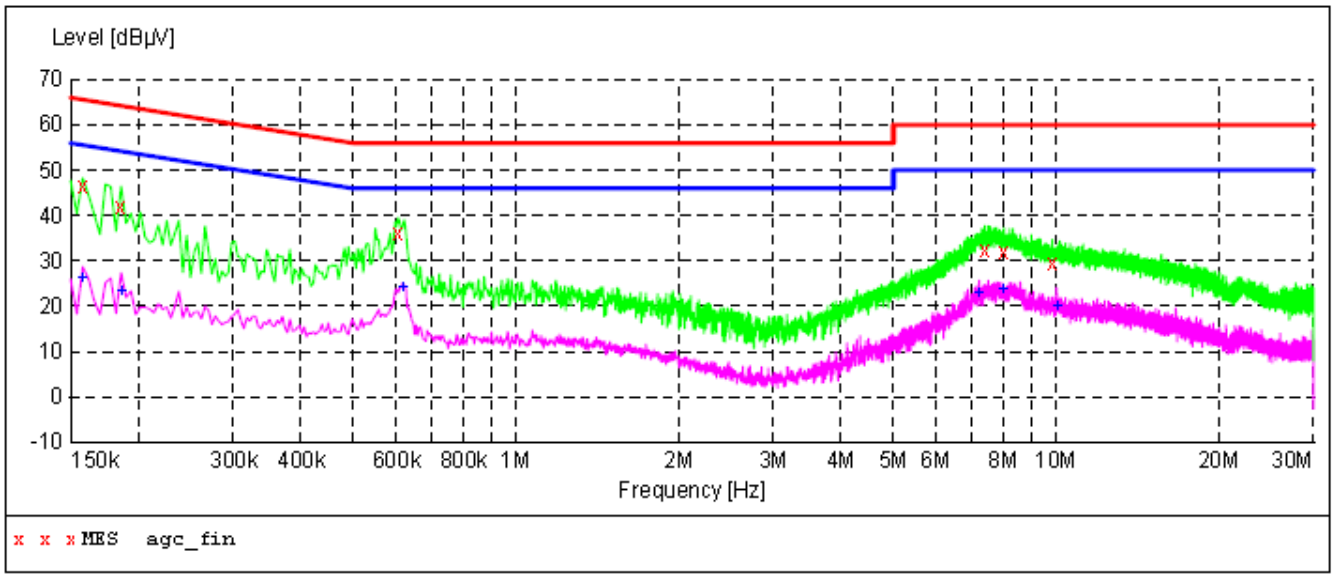
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.158000	46.20	11.3	66	19.4	QP	L1	GND
0.186000	42.30	11.3	64	21.9	QP	L1	GND
0.606000	36.10	11.3	56	19.9	QP	L1	GND
7.354000	32.30	11.5	60	27.7	QP	L1	GND
7.710000	32.70	11.5	60	27.3	QP	L1	GND
13.746000	27.10	11.9	60	32.9	QP	L1	GND

MEASUREMENT RESULT: "agc_fin2"

2020/5/8 1:32

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.158000	26.10	11.3	56	29.5	AV	L1	GND
0.198000	22.60	11.3	54	31.1	AV	L1	GND
0.606000	24.20	11.3	46	21.8	AV	L1	GND
7.214000	21.90	11.5	50	28.1	AV	L1	GND
7.874000	23.30	11.5	50	26.7	AV	L1	GND
13.942000	18.10	11.9	50	31.9	AV	L1	GND

Line Conducted Emission Test Line 2-N



MEASUREMENT RESULT: "agc_fin"

2020/5/8 1:36

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.158000	46.40	11.3	66	19.2	QP	N	GND
0.186000	41.80	11.3	64	22.4	QP	N	GND
0.606000	36.20	11.3	56	19.8	QP	N	GND
7.390000	32.50	11.5	60	27.5	QP	N	GND
8.018000	31.80	11.5	60	28.2	QP	N	GND
9.850000	29.30	11.6	60	30.7	QP	N	GND

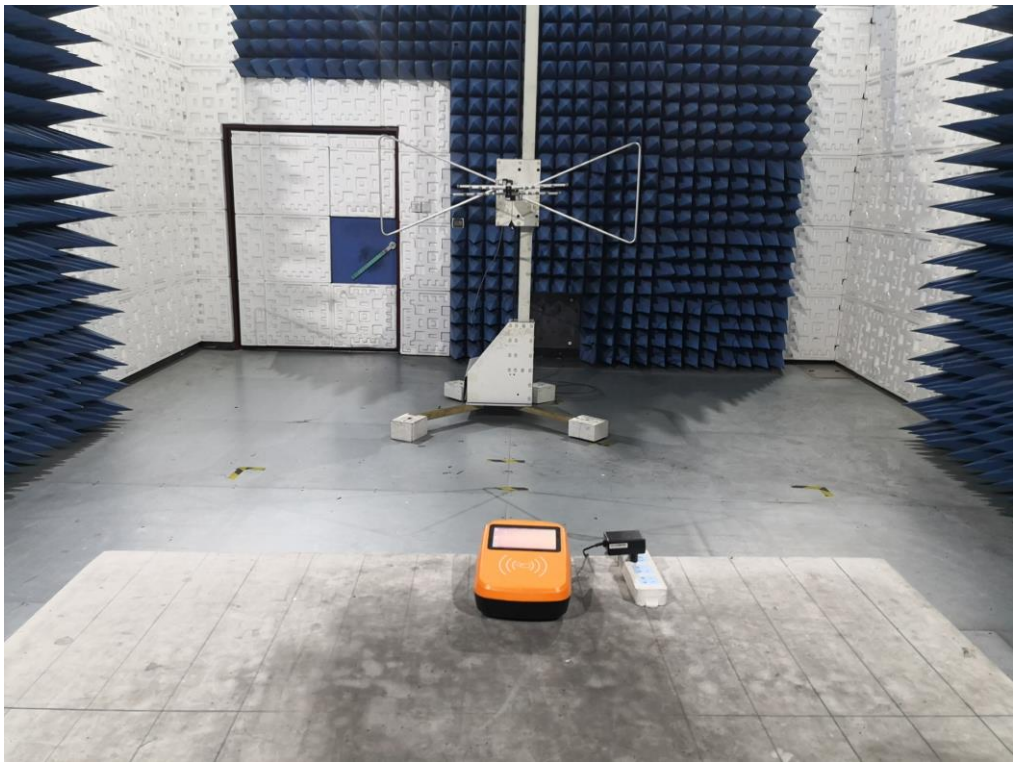
MEASUREMENT RESULT: "agc_fin2"

2020/5/8 1:36

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.158000	26.00	11.3	56	29.6	AV	N	GND
0.186000	23.30	11.3	54	30.9	AV	N	GND
0.618000	24.20	11.3	46	21.8	AV	N	GND
7.210000	23.00	11.5	50	27.0	AV	N	GND
7.958000	23.60	11.5	50	26.4	AV	N	GND
10.030000	19.90	11.6	50	30.1	AV	N	GND

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

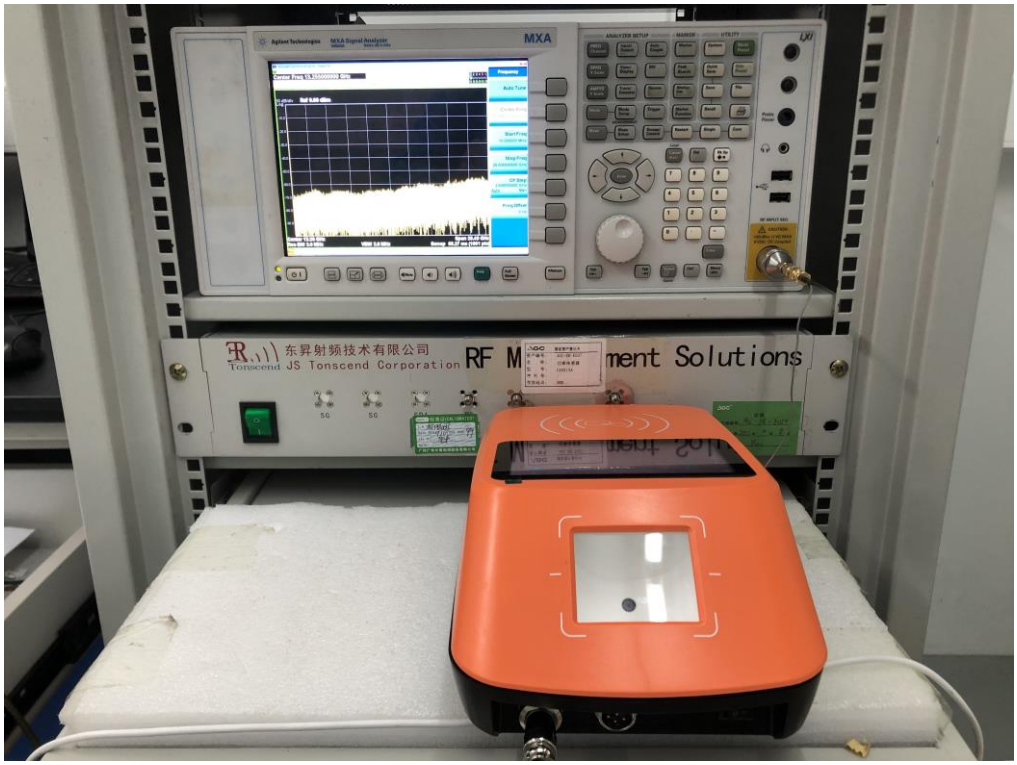
RADIATED EMISSION TEST SETUP BELOW 1GHZ



RADIATED EMISSION TEST SETUP ABOVE 1GHZ

CONDUCTED EMISSION TEST SETUP

CONDUCTED TEST SETUP



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