

TEST REPORT

Reference No. : WTS14S1120180E
FCC ID : 2AAGEVTM2MBTA-DE
Applicant : Chengdu Vantron Technology, Ltd.
Address : No.5 Gaopeng Road, Hi-Tech Zone, Chengdu, Sichuan, P.R. China
610045
Manufacturer : Chengdu Vantron Technology, Ltd.
Address : 3rd floor, 3rd building, No.9, 3rd WuKe East Street, WuHou District,
Chengdu, China 610045
Product Name : Gateway
Model No. : VT-M2M-BTA-DE
Standards : FCC PART15 SUBPART B: 2014
Date of Receipt sample : Nov.13, 2014
Date of Test : Nov.14- Dec.18, 2014
Date of Issue : Jan. 04, 2015
Test Result : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

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Compiled by:

Approved by:

Zero Zhou / Project Engineer

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1 Test Summary

Test Item	Test Requirement	Class	Test Method	Test Result
Power Line Conducted Emission (150kHz to 30MHz)	FCC PART 15, SUBPART B: 2014	Class B	ANSI C63.4: 2003	Pass
Radiated Emission (12MHz to 30MHz)	FCC PART 15, SUBPART B: 2014	Class B	ANSI C63.4: 2003	N/A
Radiated Emission (30MHz to 1GHz)	FCC PART 15, SUBPART B: 2014	Class B	ANSI C63.4: 2003	Pass
Radiated Emission (Above 1GHz)	FCC PART 15, SUBPART B: 2014	Class B	ANSI C63.4: 2003	Pass

Remark:

Pass Test item meets the requirement

Fail Test item does not meet the requirement

N/A Test case does not apply to the test object

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3 General Information

3.1 General Description of E.U.T.

Product Name	:	Gateway
Model No.	:	VT-M2M-BTA-DE
Model Difference	:	The model is the same, but only for the CPU and hardware different. The model VT-M2M-BTA-DE (With quad-core CPU, for AT&T) Model No.: VT-M2M-BTA-DE Part No.: 900G63-5H8DR2 Serial No.: V14497-017 The model VT-M2M-BTA-DE (With dual-core CPU, for Verizon) Model No.: VT-M2M-BTA-DE Part No.: 900G63-5H6BR2 Serial No.: V14497-018 The model VT-M2M-BTA-DE (With quad-core CPU, for AT&T) is tested sample.
The lowest oscillator	:	20MHz
The highest oscillator	:	1.8GHz

3.2 Details of E.U.T.

Technical Data	:	Output: DC 12V 5000mA, 60W by SWITCHING MODE POWER SUPPLY (Input: AC 100~240V 50/60Hz 1.5A)
Adapter	:	Model: GPE652-120500D

3.3 Standards Applicable for Testing

The tests were performed according to following standards:

FCC PART 15, SUBPART B: Electronic Code of Federal Regulations- Unintentional Radiators 2014

3.4 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A-1**

Waltek Services(Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration 7760A-1, July 12, 2012.

- **FCC Test Site 1#– Registration No.: 880581**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 328995, December 3, 2014.

3.5 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

Yes No

If Yes, list the related test items and lab information:

Test Lab: N/A

Lab address: N/A

Test items: N/A

3.6 Abnormalities from Standard Conditions

None.

4 Equipment Used during Test

4.1 Equipment List

Conducted Emissions Test Site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	100947	Sep.15,2014	Sep.14,2015
2.	LISN	R&S	ENV216	101215	Sep.15,2014	Sep.14,2015
3.	Cable	Top	TYPE16(3.5M)	-	Sep.15,2014	Sep.14,2015
Conducted Emissions Test Site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	101155	Sep.15,2014	Sep.14,2015
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.15,2014	Sep.14,2015
3.	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.15,2014	Sep.14,2015
4.	Cable	LARGE	RF300	-	Sep.15,2014	Sep.14,2015
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMC Analyzer	Agilent	E7405A	MY45114943	Sep.15,2014	Sep.14,2015
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Sep.15,2014	Sep.14,2015
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.19,2014	Apr.18,2015
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.15,2014	Sep.14,2015
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.19,2014	Apr.18,2015
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.19,2014	Apr.18,2015
7	Broadband Pre-amplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Mar.17,2014	Mar.16,2015
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr.10,2014	Apr.09,2015
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	Sep.15,2014	Sep.14,2015
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Sep.15,2014	Sep.14,2015
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Sep.15,2014	Sep.14,2015
4	Cable	HUBER+SUHNER	CBL2	525178	Sep.15,2014	Sep.14,2015

4.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
Computer	DELL	Vostro 200	-
Notebook	LENOVO	X201i	75Y4408
LCD	Dell	E2414HT	DN-OF8CRD-74445-3AF-843U
Keyboard	shuangfeiyan	KB-3	-
Mouse	JEEJA	M-01	-
Earphone	leisheng	LS-120M	-

4.3 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conduction disturbance	150kHz~30MHz	± 3.64 dB	(1)
Radiation Emission	30MHz~1000MHz	± 5.03 dB	(1)
	1GHz~6GHz	± 5.47 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

5 Emission Test Results

5.1 Power Line Conducted Emission, 150kHz to 30MHz

Test Requirement : FCC PART 15, SUBPART B
 Test Method : ANSI C63.4
 Test Result : Pass
 Frequency Range : 150kHz to 30MHz
 Class : Class B
 Limit :

Frequency (MHz)	Limit (dB μ V)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

5.1.1 E.U.T. Operation

Operating Environment:

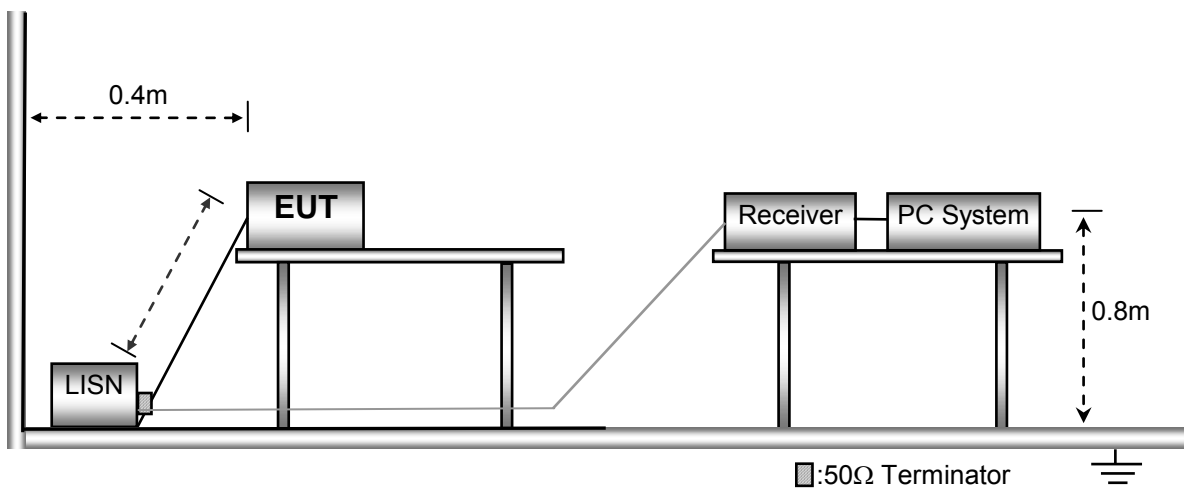
Temperature : 23°C
 Humidity : 53.6%RH
 Atmospheric Pressure : 101kPa

EUT Operation:

Input Voltage : AC 120V 60Hz
 Operating Mode : Working mode

5.1.2 Block Diagram of Test Setup

The Mains Terminals Disturbance Voltage tests were performed in accordance with the ANSI C63.4 .

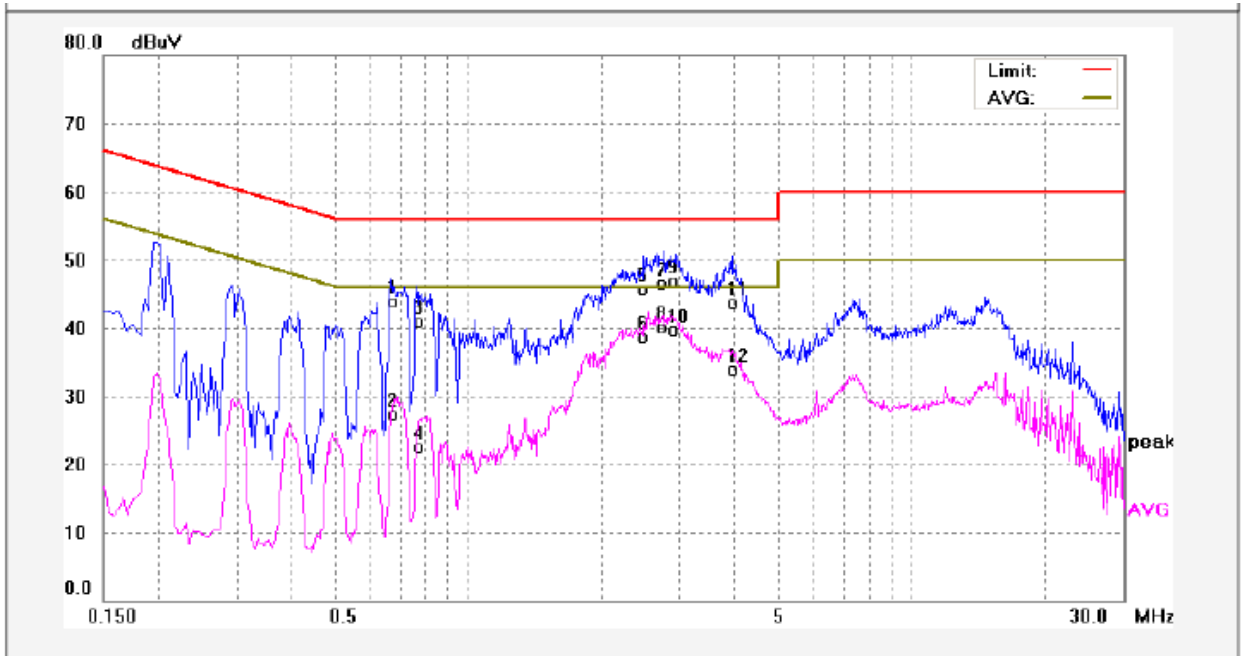


5.1.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line. According to the data in section 5.1.4, the EUT complied with the FCC PART 15, SUBPART B standards.

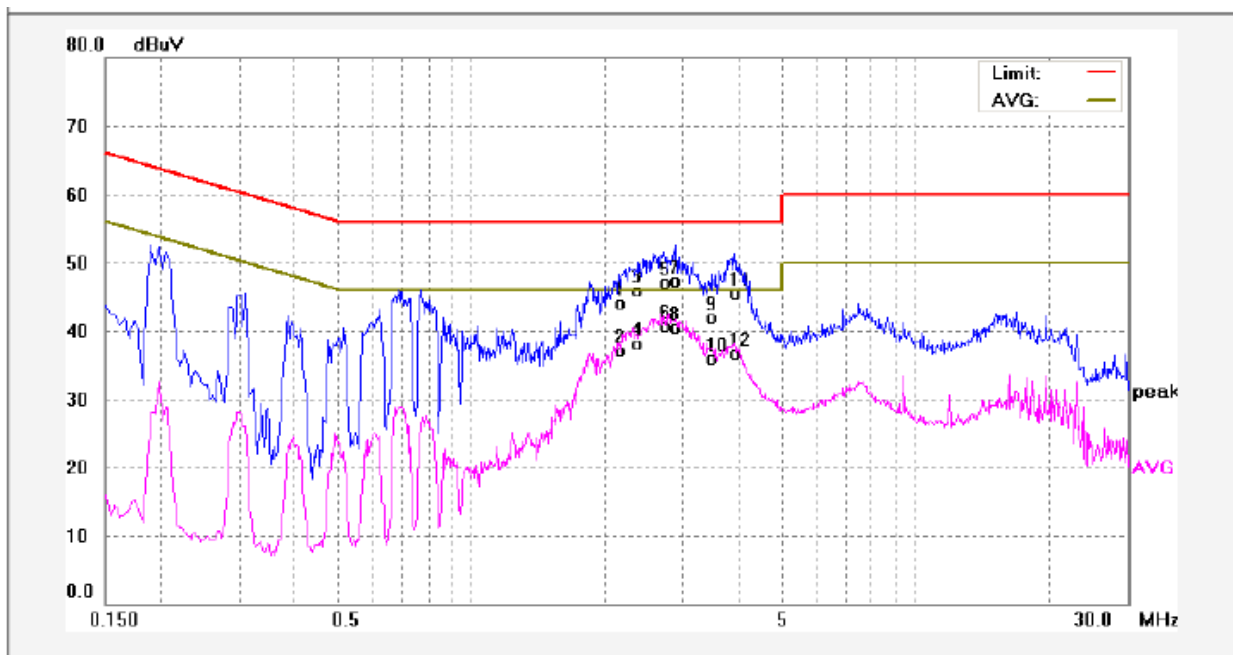
5.1.4 Power Line Conducted Emission Test Data

Live Line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.6700	33.29	10.57	43.86	56.00	-12.14	QP	
2	0.6700	16.69	10.57	27.26	46.00	-18.74	AVG	
3	0.7620	30.27	10.59	40.86	56.00	-15.14	QP	
4	0.7620	11.98	10.59	22.57	46.00	-23.43	AVG	
5	2.4820	35.10	10.63	45.73	56.00	-10.27	QP	
6	2.4820	28.16	10.63	38.79	46.00	-7.21	AVG	
7	2.7780	35.95	10.64	46.59	56.00	-9.41	QP	
8	2.7780	29.42	10.64	40.06	46.00	-5.94	AVG	
9	2.9219	36.20	10.64	46.84	56.00	-9.16	QP	
10	2.9219	29.01	10.64	39.65	46.00	-6.35	AVG	
11	3.9260	32.99	10.65	43.64	56.00	-12.36	QP	
12	3.9260	23.26	10.65	33.91	46.00	-12.09	AVG	

Neutral Line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Remark
1	2.1460	33.44	10.63	44.07	56.00	-11.93	QP	
2	2.1460	26.43	10.63	37.06	46.00	-8.94	AVG	
3	2.3820	35.24	10.63	45.87	56.00	-10.13	QP	
4	2.3820	27.52	10.63	38.15	46.00	-7.85	AVG	
5	2.7180	36.43	10.64	47.07	56.00	-8.93	QP	
6	2.7180	30.11	10.64	40.75	46.00	-5.25	AVG	
7	2.8420	36.62	10.64	47.26	56.00	-8.74	QP	
8	2.8420	29.82	10.64	40.46	46.00	-5.54	AVG	
9	3.4740	31.29	10.64	41.93	56.00	-14.07	QP	
10	3.4740	25.28	10.64	35.92	46.00	-10.08	AVG	
11	3.9140	34.94	10.65	45.59	56.00	-10.41	QP	
12	3.9140	26.02	10.65	36.67	46.00	-9.33	AVG	

5.2 Radiation Emission, 30MHz ~ 1000MHz

Test Requirement..... : FCC PART 15, SUBPART B
 Test Method : ANSI C63.4
 Test Result : Pass
 Frequency Range..... : 30MHz to 1000MHz
 Class. : Class B
 Limit..... :

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

5.2.1 E.U.T. Operation

Operating Environment:

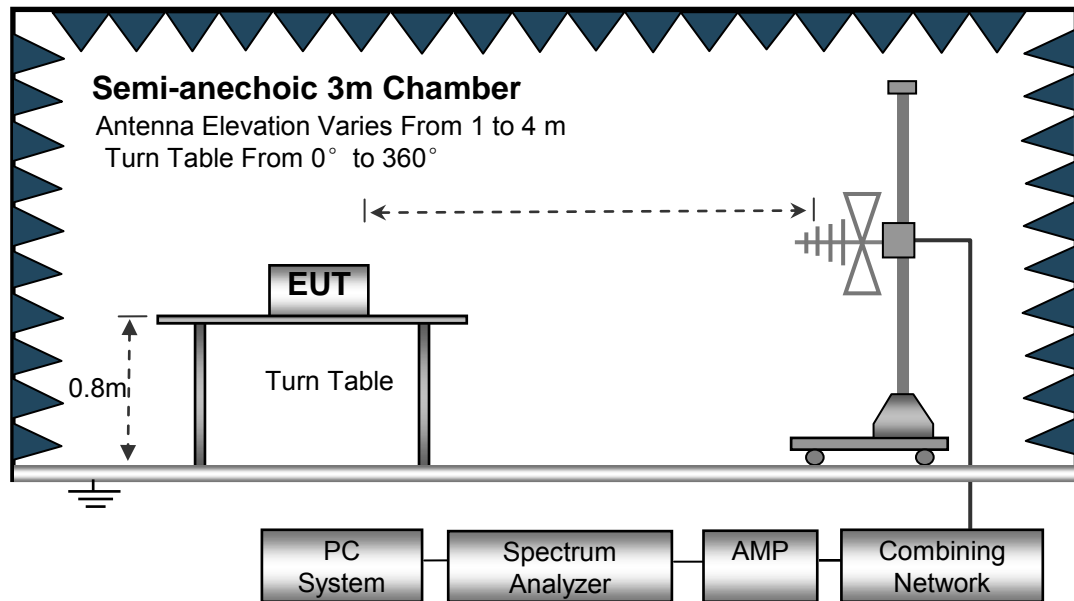
Temperature : 23°C
 Humidity : 54.1%RH
 Atmospheric Pressure..... : 101kPa

EUT Operation:

Input Voltage : AC 120V 60Hz
 Operating Mode : Working mode

5.2.2 Block Diagram of Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4.

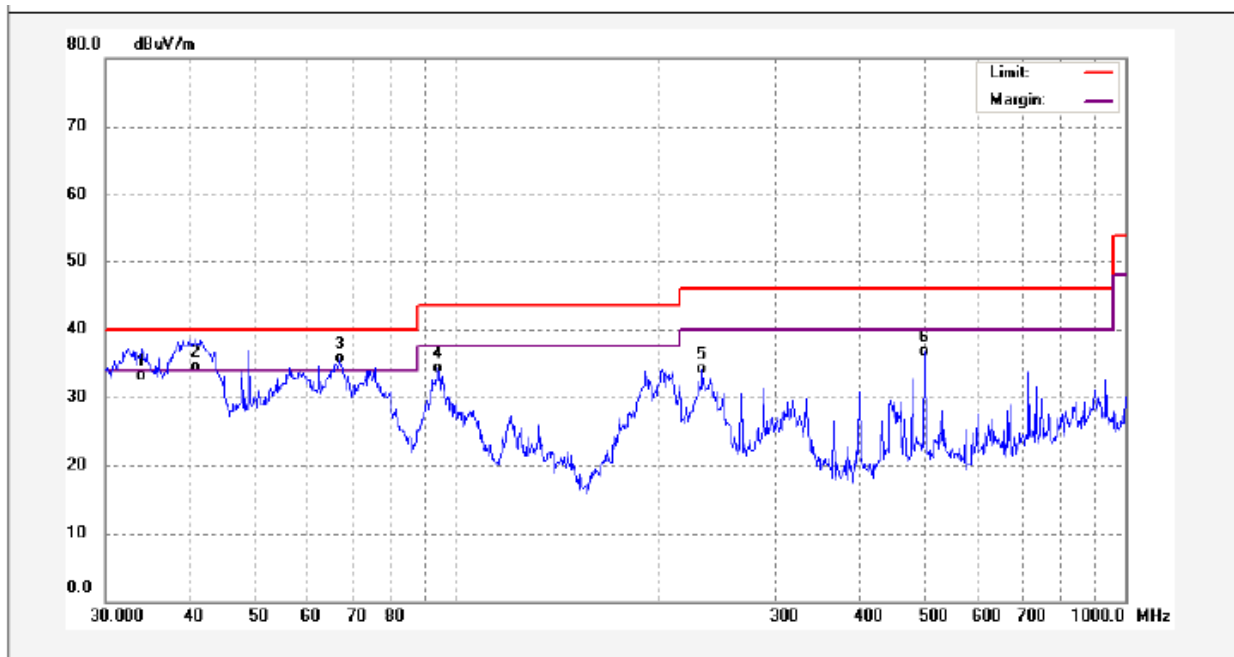


5.2.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for both the Antenna Vertical Polarization and Antenna Horizontal Polarization. Quasi-peak measurements were performed if peak emissions were within 6dB of the Quasi-peak limit line.

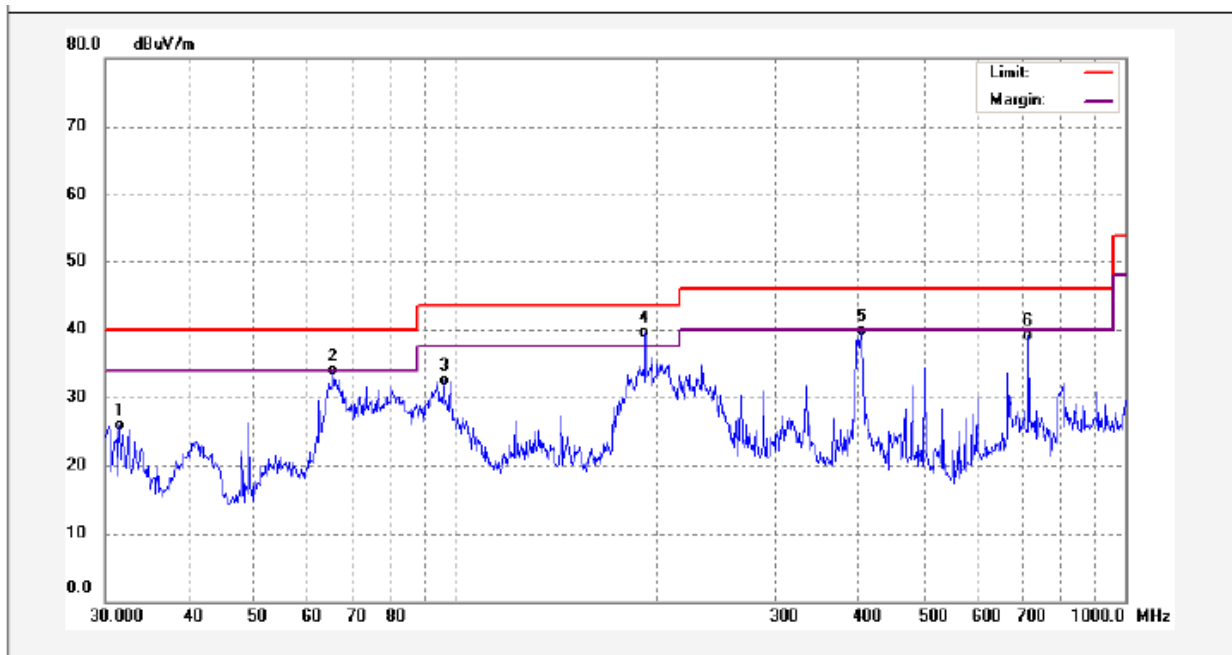
5.2.4 Radiated Emission Test Data

Antenna Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	33.9174	54.03	-20.93	33.10	40.00	-6.90	QP	
2	40.9881	54.25	-19.75	34.50	40.00	-5.50	QP	
3	67.2022	60.27	-24.58	35.69	40.00	-4.31	QP	
4	94.0979	56.74	-22.53	34.21	43.50	-9.29	QP	
5	233.3487	55.04	-20.84	34.20	46.00	-11.80	QP	
6	501.1790	52.03	-15.23	36.80	46.00	-9.20	QP	

Antenna Polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	31.5095	47.40	-21.54	25.86	40.00	-14.14	QP	
2	65.5727	58.18	-24.27	33.91	40.00	-6.09	QP	
3	96.0986	54.93	-22.38	32.55	43.50	-10.95	QP	
4	191.7450	61.42	-21.85	39.57	43.50	-3.93	QP	
5	404.6665	56.54	-16.86	39.68	46.00	-6.32	QP	
6	716.6820	50.11	-10.97	39.14	46.00	-6.86	QP	

5.3 Radiation Emission, Above 1000MHz

Test Requirement : FCC PART 15, SUBPART B
 Test Method : ANSI C63.4
 Test Result : Pass
 Frequency Range : 1GHz~6GHz
 Class. : Class B
 Limit. :

Frequency Range (MHz)	Distance (Meter)	Average Limit dB(uV/m)	Peak Limit (dBUV/m)
Above 1GHz	3	54	74

5.3.1 E.U.T. Operation

Operating Environment:

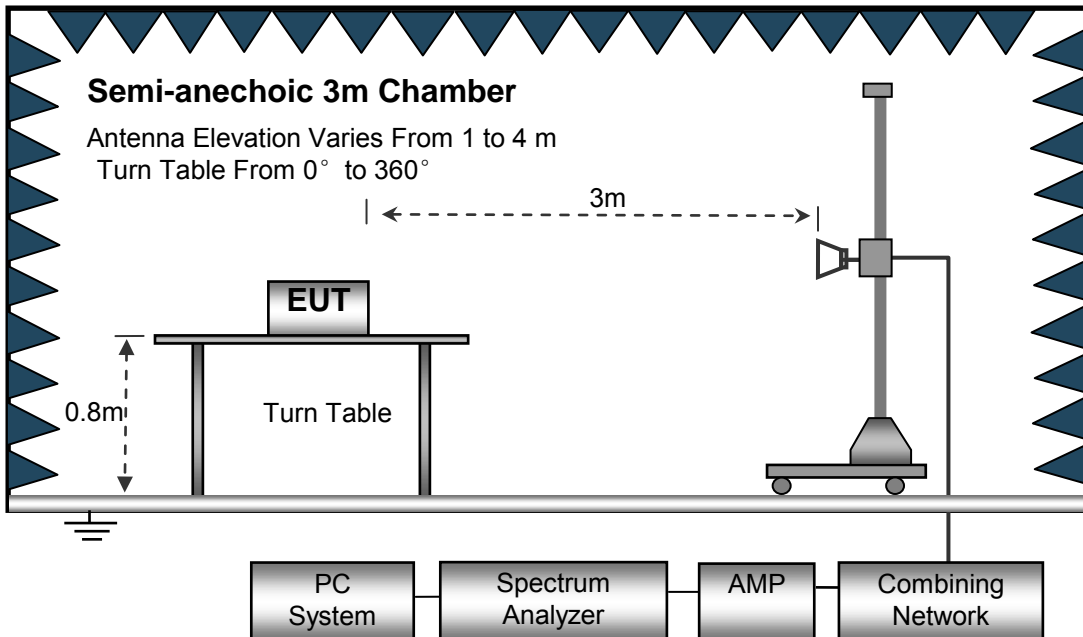
Temperature : 23°C
 Humidity : 52.6%RH
 Atmospheric Pressure : 101.3kPa

EUT Operation:

Input Voltage : AC 120V 60Hz
 Operating Mode : Working mode

5.3.2 Block Diagram of Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4.

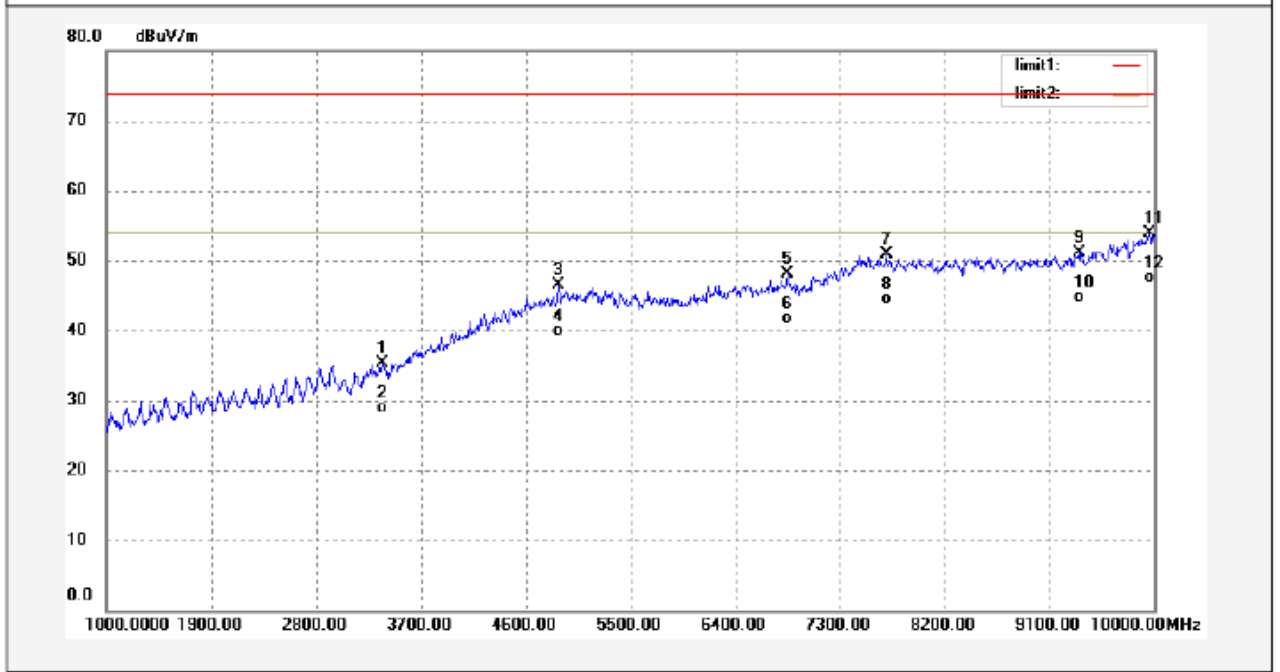


5.3.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for both the Antenna Vertical Polarization and Antenna Horizontal Polarization. Average measurements were performed if peak emissions were within 6dB of the average limit line

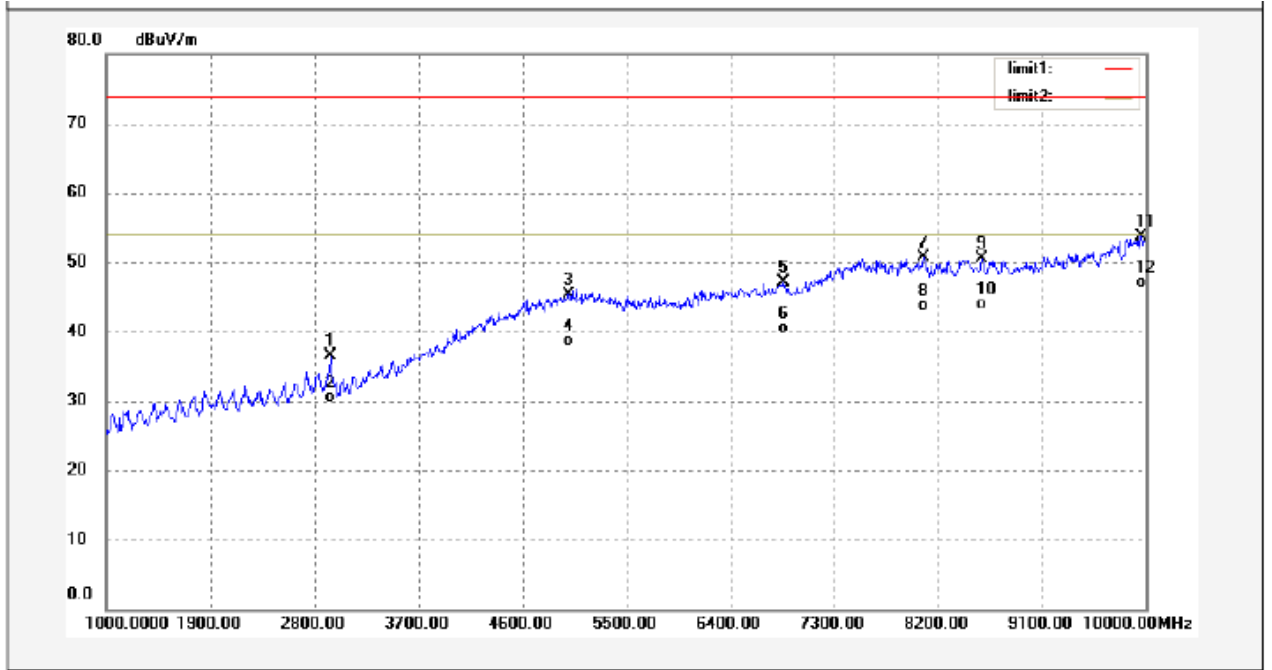
5.3.4 Radiated Emission Test Data, Above 1000MHz

Antenna Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	3367.000	47.32	-12.00	35.32	74.00	-38.68	peak	
2	3367.000	40.15	-12.00	28.15	54.00	-25.85	AVG	
3	4879.000	47.81	-1.30	46.51	74.00	-27.49	peak	
4	4879.000	40.50	-1.30	39.20	54.00	-14.80	AVG	
5	6850.000	48.23	-0.16	48.07	74.00	-25.93	peak	
6	6850.000	41.06	-0.16	40.90	54.00	-13.10	AVG	
7	7696.000	47.78	3.12	50.90	74.00	-23.10	peak	
8	7696.000	40.64	3.12	43.76	54.00	-10.24	AVG	
9	9352.000	47.60	3.53	51.13	74.00	-22.87	peak	
10	9352.000	40.43	3.53	43.96	54.00	-10.04	AVG	
11	9955.000	47.94	6.03	53.97	74.00	-20.03	peak	
12	9955.000	40.62	6.03	46.65	54.00	-7.35	AVG	

Antenna Polarization: Horizontal



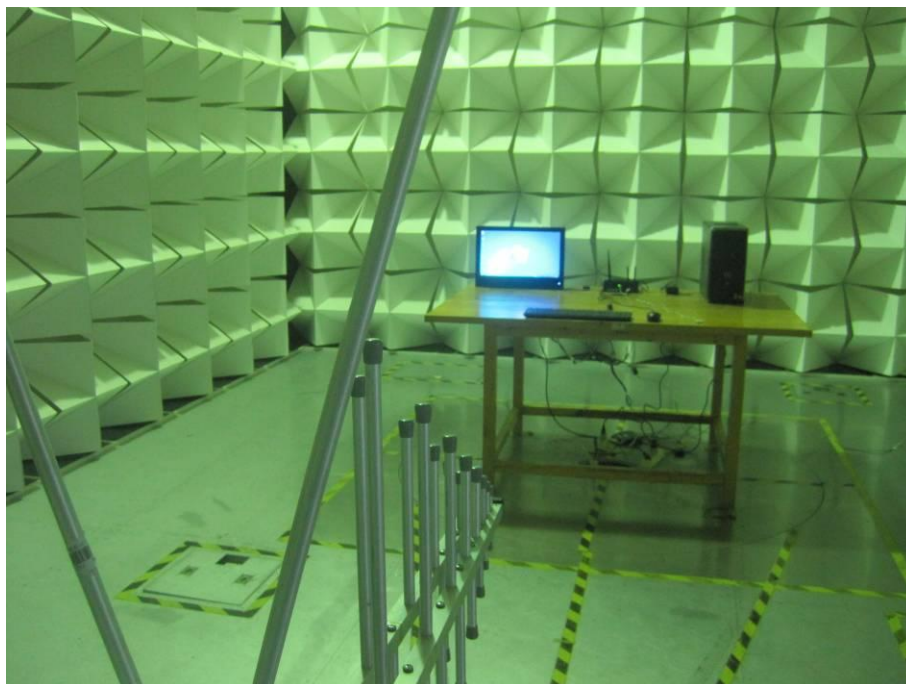
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2935.000	50.17	-13.67	36.50	74.00	-37.50	peak	
2	2935.000	43.33	-13.67	29.66	54.00	-24.34	AVG	
3	4996.000	45.95	-0.55	45.40	74.00	-28.60	peak	
4	4996.000	38.41	-0.55	37.86	54.00	-16.14	AVG	
5	6859.000	47.25	-0.15	47.10	74.00	-26.90	peak	
6	6859.000	39.83	-0.15	39.68	54.00	-14.32	AVG	
7	8074.000	48.01	2.69	50.70	74.00	-23.30	peak	
8	8074.000	40.27	2.69	42.96	54.00	-11.04	AVG	
9	8578.000	48.72	1.83	50.55	74.00	-23.45	peak	
10	8578.000	41.36	1.83	43.19	54.00	-10.81	AVG	
11	9955.000	47.60	6.03	53.63	74.00	-20.37	peak	
12	9955.000	40.29	6.03	46.32	54.00	-7.68	AVG	

6 Photographs – Test Setup

6.1 Photograph – Power Line Conducted Emission Test Setup at Test Site 1#



6.2 Photograph – Radiated Emission Test Setup for 30MHz ~ 1000MHz at Test Site 2#



6.3 Photograph – Radiated Emission Test Setup for Above 1GHz at Test Site 1#

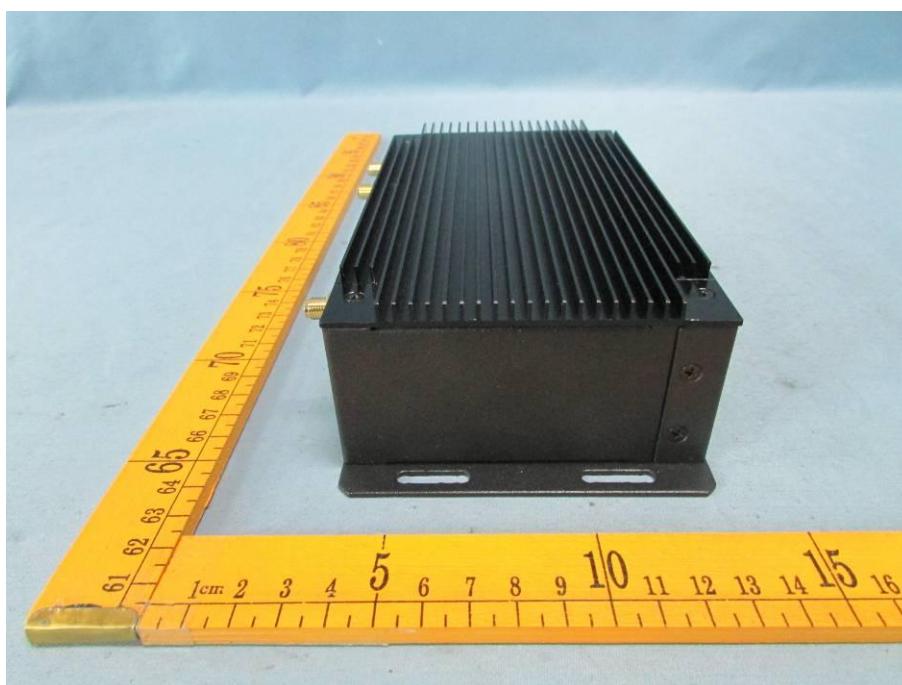


7 Photographs – Constructional Details

7.1 EUT – Appearance View

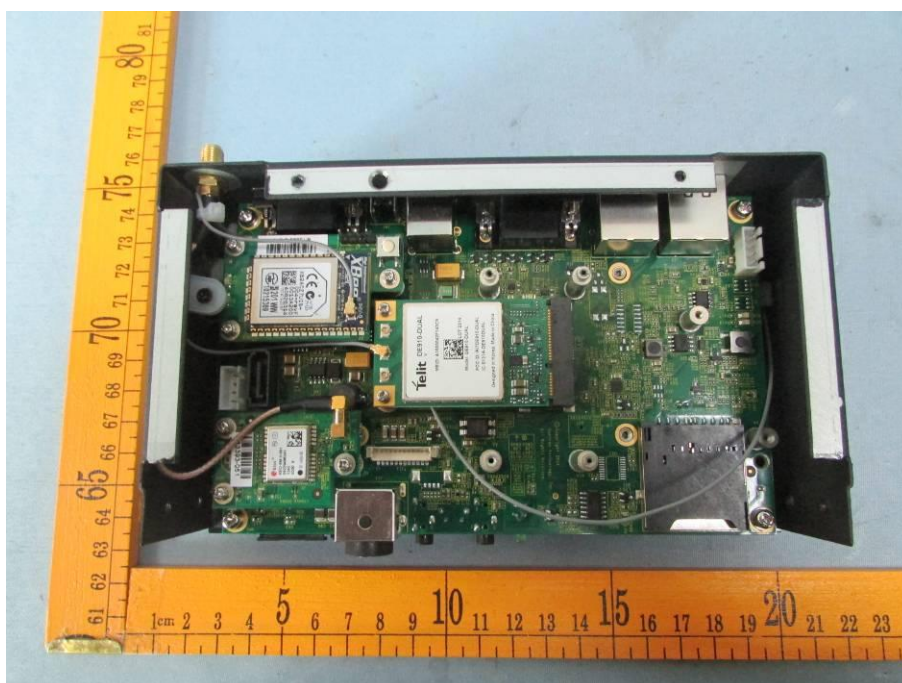
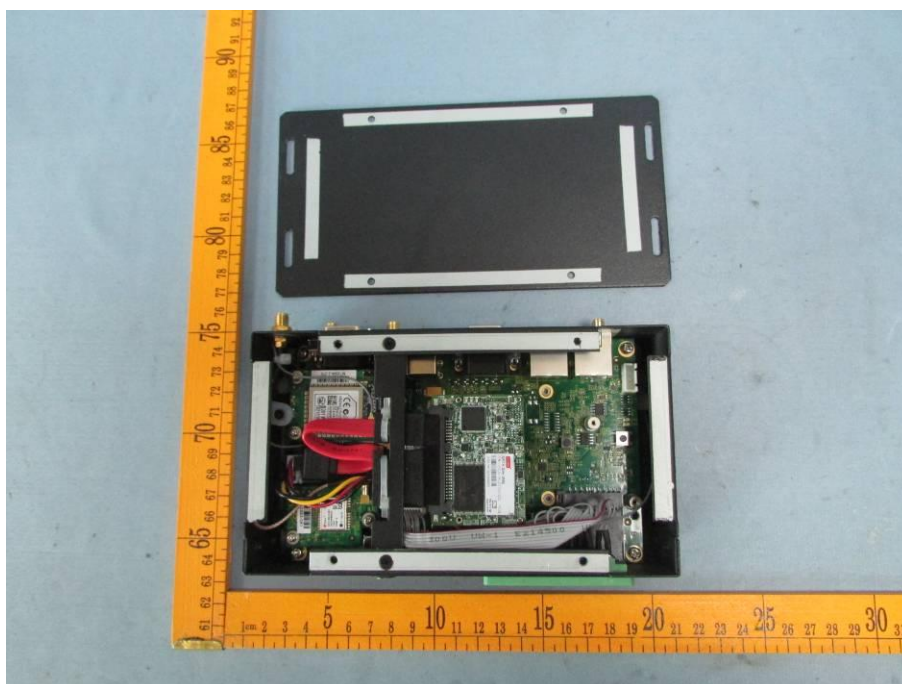


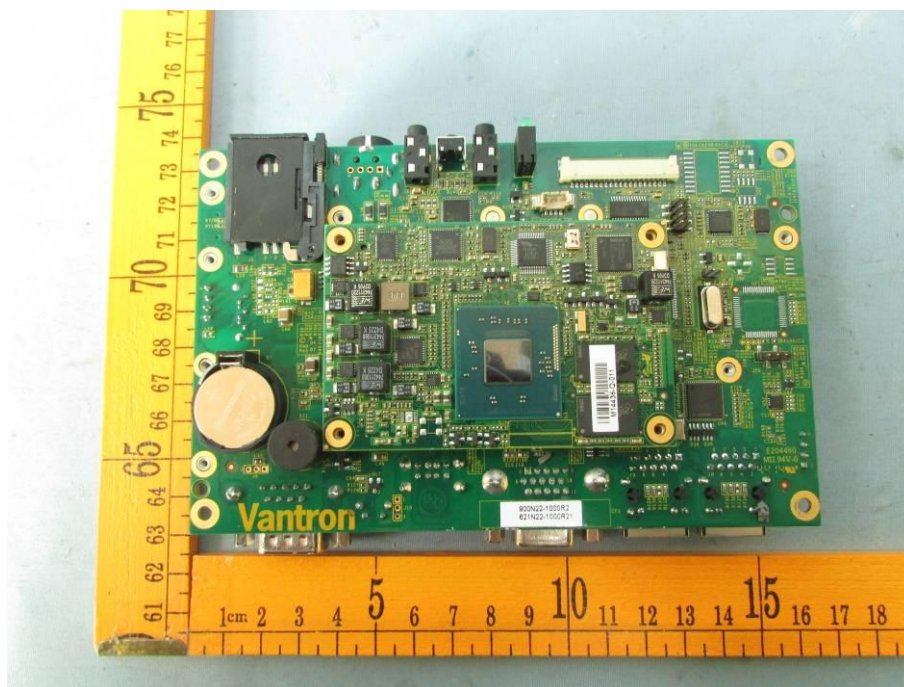




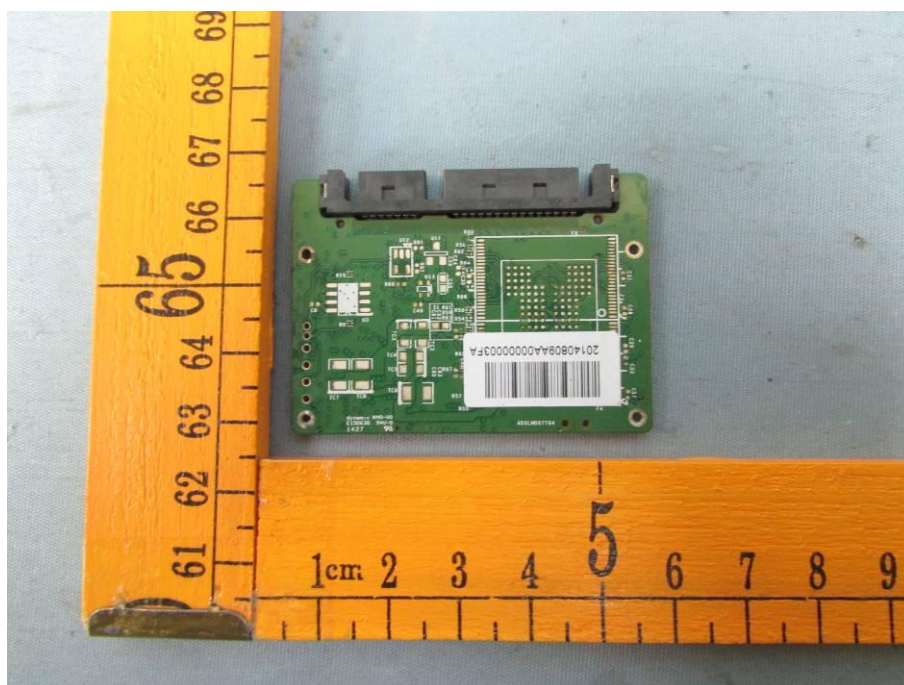


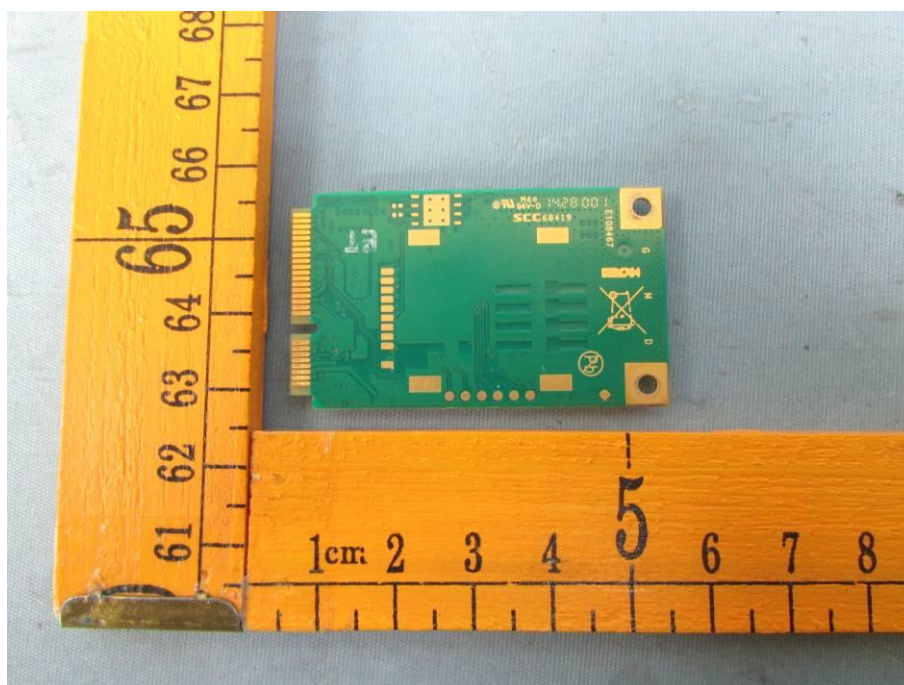
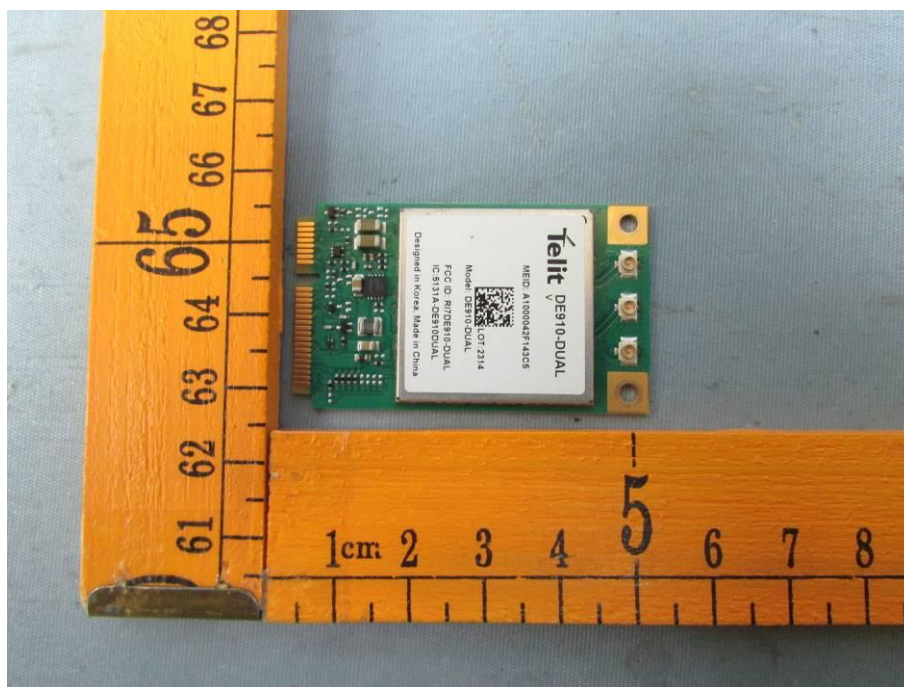
7.2 EUT – Open View

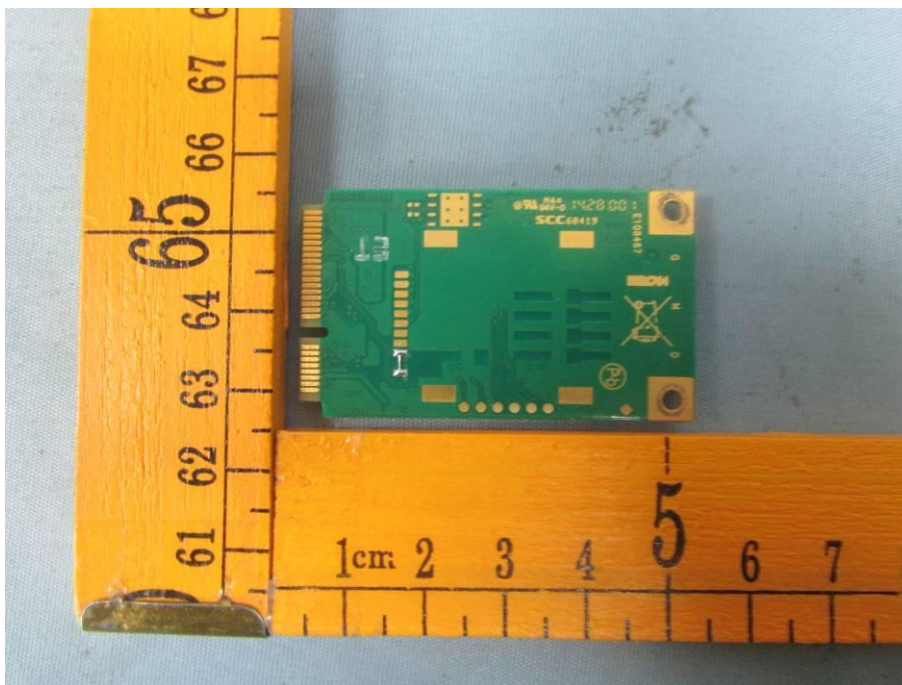


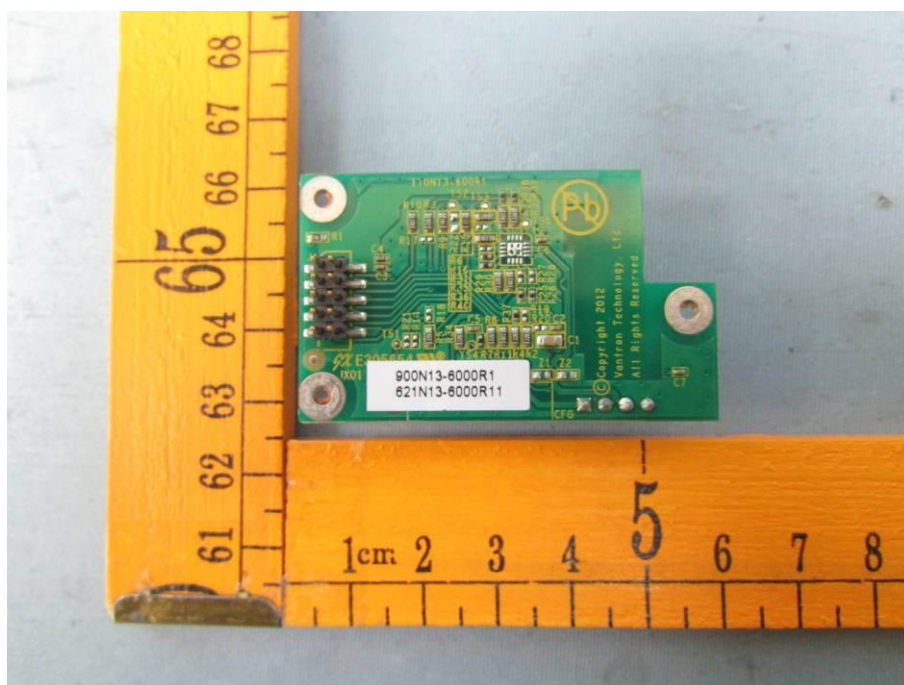
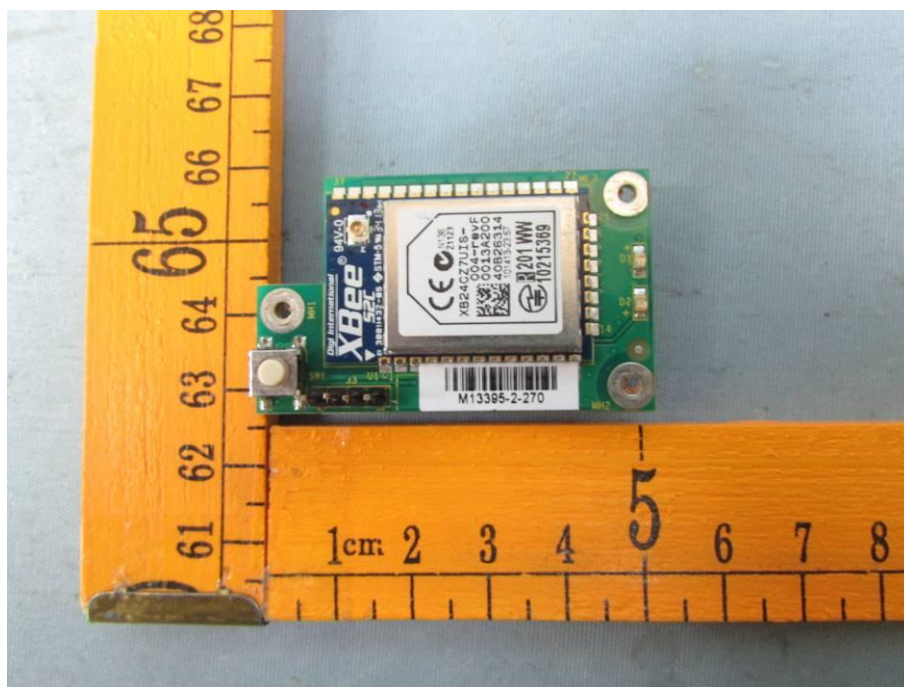


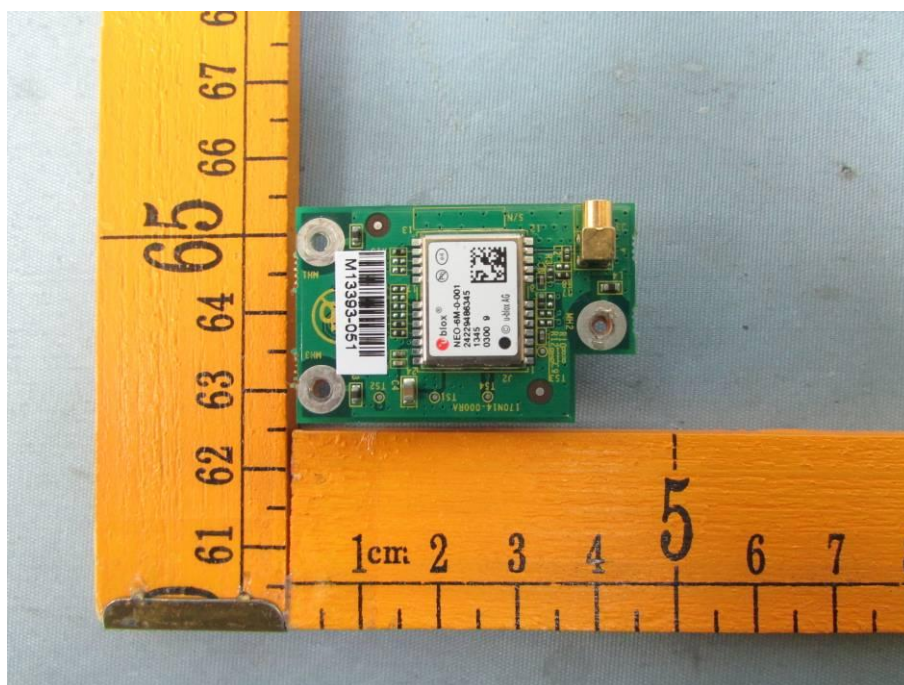
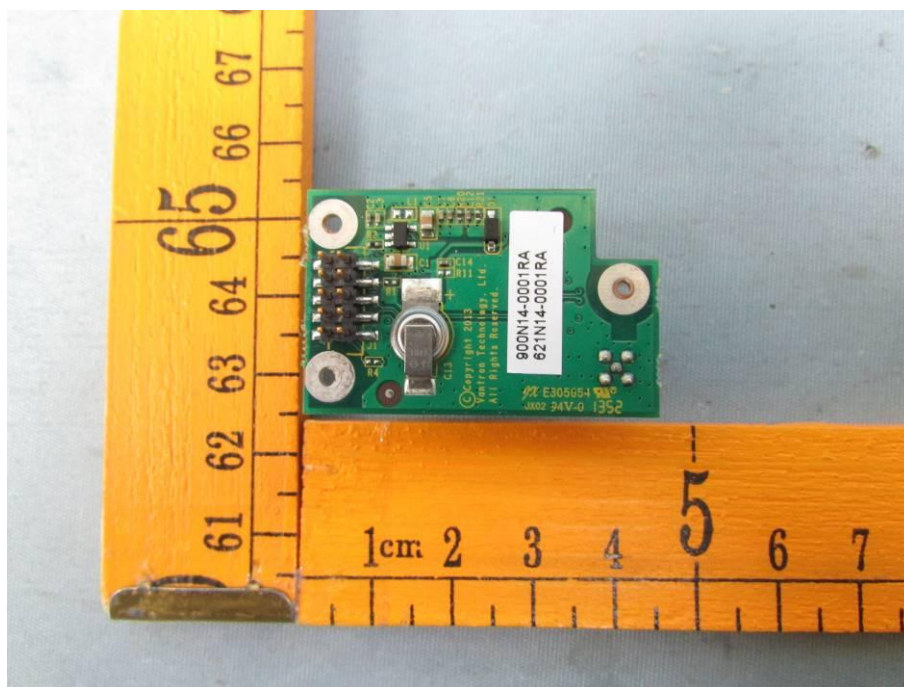


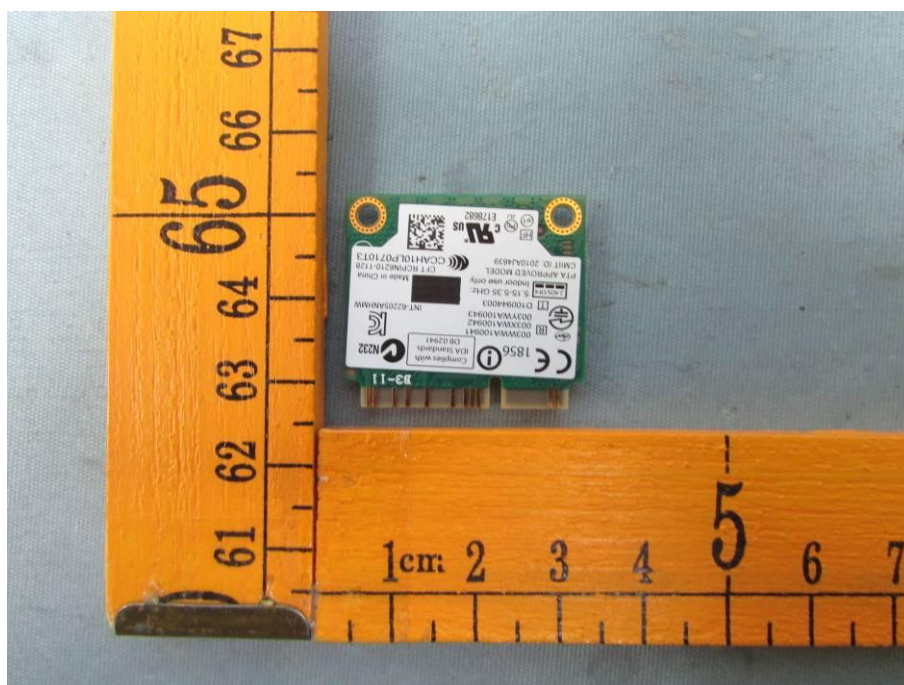
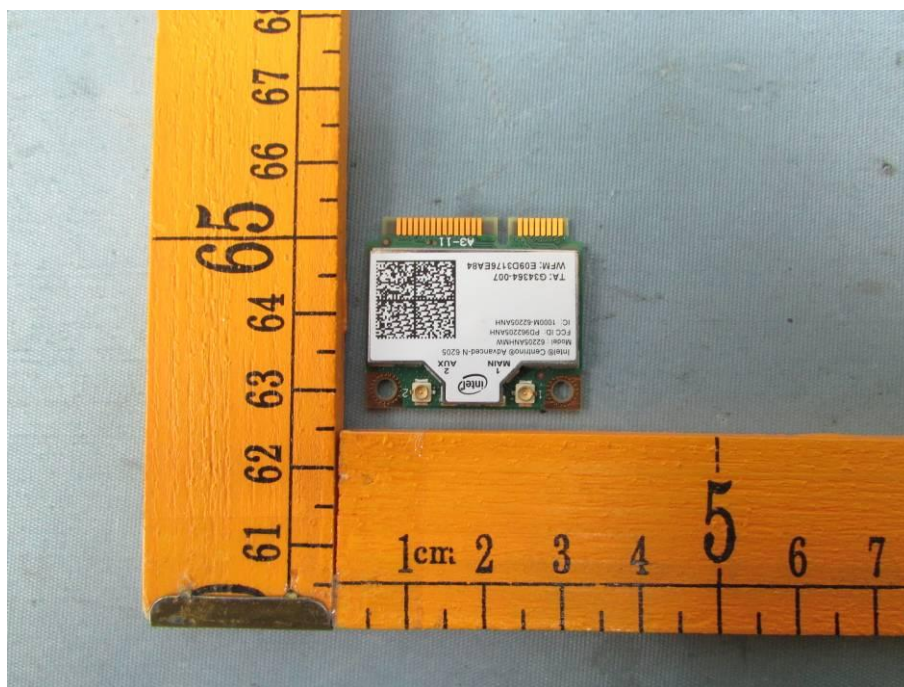












=====End of Report=====