

FCC 47 CFR PART 15 SUBPART B TEST REPORT

for

Motherboard

MODEL: IMB-154XXXXXXX

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Test Report Number:

T150604D03-D

Issued to:

ASRock Incorporation

**2F., No.37, Sec. 2, Zhongyang S. Rd., Beitou Dist.,
Taipei City 11270, Taiwan (R.O.C.)**

Issued by:

Compliance Certification Services Inc.

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Issued Date: June 22, 2015



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Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		June 22, 2015		Initial Issue	ALL	Wendy Wang

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1 TEST RESULT CERTIFICATION

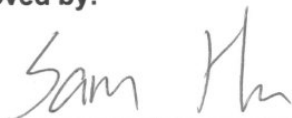
Product: Motherboard**Model:** IMB-154XXXXXXX (X="0-9","A-Z","a-z","+","-","(",")","/","blank")**Brand:** ASRock**Applicant:** ASRock Incorporation2F., No.37, Sec. 2, Jhongyang S. Rd., Beitou Dist.,
Taipei City 11270, Taiwan (R.O.C.)**Manufacturer:** ASRock Incorporation2F., No.37, Sec. 2, Jhongyang S. Rd., Beitou Dist.,
Taipei City 11270, Taiwan (R.O.C.)**Tested:** June 17, 2015 ~ June 22, 2015

EMISSION			
Standard	Item	Result	Remarks
FCC 47 CFR Part 15 Subpart B, ICES-003 Issue 5-2012 ANSI C63.4-2009	Conducted (Power Port)	PASS	Meet Class B limit
	Radiated	PASS	Meet Class B limit

Note: 1. The statements of test result on the above are decided by the request of test standard only; the measurement uncertainties are not factored into this compliance determination.
2. The information of measurement uncertainty is available upon the customer's request.

Deviation from Applicable Standard
None

The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:Sam Hu
Assistant Manager**Reviewed by:**Eva Fan
Supervisor of report document dept.

2 EUT DESCRIPTION

Product	Motherboard
Brand Name	ASRock
Model	IMB-154XXXXXXXX (X="0-9","A-Z","a-z","+","-","(",")","/","blank")
Applicant	ASRock Incorporation
Housing material	N/A
Identify Number	T150604D03
Received Date	June 4, 2015
EUT Power Rating	3.3VDC/ ± 5 VDC/ ± 12 VDC from Host PC Power Supply
AC Power During Test	120VAC / 60Hz to Host PC Power Supply

Model Difference

Model Name	Difference	Tested (Checked)
IMB-154	Original	☒
IMB-154XXXXXXXX	1. X="0-9","A-Z","a-z","+","-","(",")","/","blank" 2. For marketing purpose only.	☐

I/O PORT

I/O PORT TYPES	Q'TY	TESTED WITH
1. PIO Port	1	1
2. SIO Port	6	6
3. PS/2 Keyboard Port	1	1
4. PS/2 Mouse Port	1	1
5. VGA Port	1	1
6. Microphone Port	1	1
7. Earphone Port	1	1
8. USB 2.0 Port	2	2
9. USB 3.0 Port	4	4
10. LAN Port	2	2
11. HDMI Port	1	1

Note: Client consigns only one model sample to test (Model Number: IMB-154).

3 TEST METHODOLOGY

3.1. DECISION OF FINAL TEST MODE

The EUT was tested together with the below additional components, and a configuration, which produced the worst emission levels, was selected and recorded in this report.

The test configuration modes are as the following:

Conduction Modes:

No.	CPU	Power	Operate State	
1	CPU (1.6GHz) / N3700	4 pin 12VDC + 20 pins 3.3VDC/±5VDC/±12VDC	VGA + HDMI Mode	1920X1080, VF=60Hz
2				1600X900, VF=60Hz
3				1280X1024, VF=60Hz
4				800X600, VF=60Hz
5			VGA Mode	2048X1536, VF=75Hz
6	CPU (1.6GHz) / N3150	4 pin 12VDC	VGA + HDMI Mode	1920X1080, VF=60Hz
7		20 pins 3.3VDC/±5VDC/±12VDC		
8		4 pin 12VDC + 20 pins 3.3VDC/±5VDC/±12VDC		
9	CPU (1.6GHz) / N3050	4 pin 12VDC + 20 pins 3.3VDC/±5VDC/±12VDC		

Radiation Modes:

No.	CPU	Power	Operate State	
1	CPU (1.6GHz) / N3700	4 pin 12VDC + 20 pins 3.3VDC/±5VDC/±12VDC	VGA + HDMI Mode	1920X1080, VF=60Hz
				1920X1080, VF=60Hz / Open Chassis
				1920X1080, VF=60Hz / 1-8GHz
				1920X1080, VF=60Hz / Open Chassis / 1-8GHz
				1600X900, VF=60Hz
2	CPU (1.6GHz) / N3150	4 pin 12VDC + 20 pins 3.3VDC/±5VDC/±12VDC	VGA + HDMI Mode	1280X1024, VF=60Hz
3				800X600, VF=60Hz
4				2048X1536, VF=75Hz
5	CPU (1.6GHz) / N3050	4 pin 12VDC + 20 pins 3.3VDC/±5VDC/±12VDC	VGA Mode	1920X1080, VF=60Hz
6				
7				
8	CPU (1.6GHz) / N3150	4 pin 12VDC + 20 pins 3.3VDC/±5VDC/±12VDC		
9	CPU (1.6GHz) / N3050	4 pin 12VDC + 20 pins 3.3VDC/±5VDC/±12VDC		

Worst:

Conduction: Mode 1

Radiation: Mode 1

3.2. EUT SYSTEM OPERATION

1. Windows 7 boots system.
2. Run Emctest.exe to activate all peripherals and display "H" pattern on monitor screen.
3. Run Winemc.exe and choose media player to play music.
4. Run Winemc.exe then select "F:/ & G:/ & H:/ & I:/" to test EUT.
5. Press the start menu, select executive and type ping 192.168.0.2&3 -t (EUT), ping 192.168.0.1&4 -t (Server Notebook).

Note: Test program is self-repeating throughout the test.

4 SETUP OF EQUIPMENT UNDER TEST

4.1. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Host PC Devices:

No	Equipment	Model #	Serial #	FCC ID/ BSMI ID	Brand Name
1	HDD	ST340016A	3HR0ZMB9	BSMI ID: 3902B322 BSMI: D33016	Seagate
2	Power Supply	SS-500FB Active PFC	N/A	BSMI: D33080 DoC	Seasonic
3	CD/R	CD-552E	5145319	BSMI: D33066 DoC	TEAC
4	CPU (1.6GHz)	N3150	N/A	N/A	Intel
	CPU (1.6GHz)	N3050	N/A	N/A	Intel
	CPU (1.6GHz)	N3700	N/A	N/A	Intel
5	SODIMM (DDRIII)	N/A	N/A	N/A	Kingston

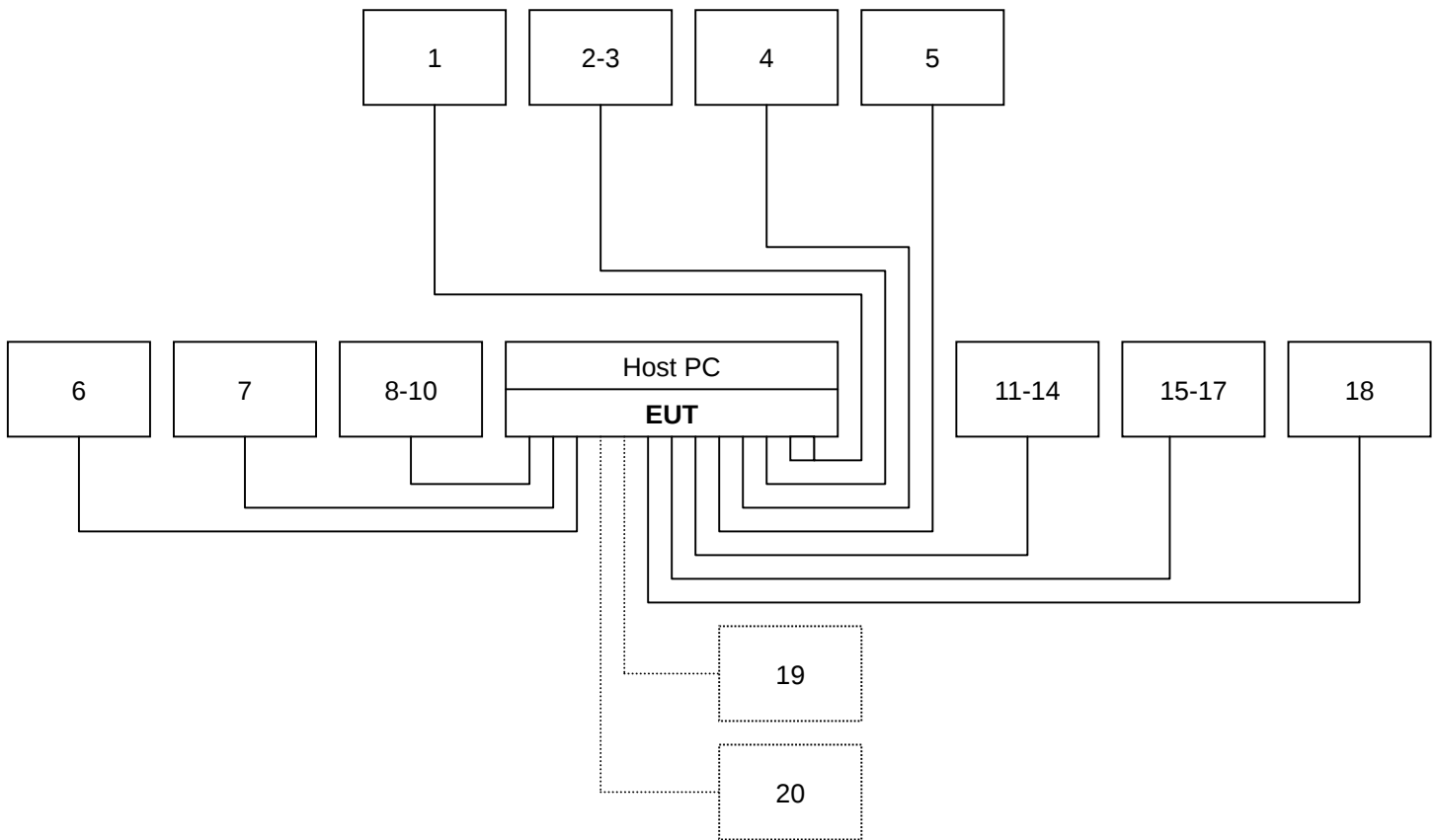
Peripherals Devices:

No.	Equipment	Model No.	Serial No.	FCC ID / BSMI ID	Brand Name	Data Cable	Power Cord
1	Earphone & Microphone	SBZ-4	N/A	N/A	KRONE	Unshielded, 1.8m	N/A
2-3	USB Mouse	SBF69	N/A	BSMI: R41126	LOGITECH	Shielded, 1.8m	N/A
4	PS/2 Mouse	M-SBF96	FATSQ0C5BYJQKZ	DOC BSMI: T41126	hp	Shielded, 1.8m	N/A
5	PS/2 Keyboard	SK-2880	BAUEL0HCPY76G7	DOC BSMI: T3A002	hp	Shielded, 1.8m	N/A
6	Printer	C20SX	EW4E126644	BSMI ID: 3902E004	EPSON	Shielded, 1.8m	Unshielded, 1.8m
7	Monitor	U2412MD	N/A	DOC BSMI: R33002	DELL	Shielded, 1.8m with two cores	Unshielded, 1.8m
8-10	Modem	AL-56ERM	N/A	DOC	GALILEO	Shielded, 1.5m	Unshielded, 1.8m with a core
11-14	USB HDD	HD-EG5	N/A	DOC BSMI: D33021	SONY	Shielded, 0.5m	N/A
15-17	Modem	AL-56ERM	N/A	DOC	GALILEO	Shielded, 1.5m	Unshielded, 1.8m with a core
18	Monitor	B2230H	NEBKHMAZ800018E	DOC BSMI: R33475	Samsung	Shielded, 1.8m	Unshielded, 1.8m
19	Server Notebook	Compaq 2210b	CNU7472KDP	N/A	hp	Unshielded, 20m	Unshielded, 1.8m
20	Server Notebook	2210B	CNV7472KG5	DOC BSMI: R33001	hp	Unshielded, 20m	Unshielded, 1.8m

Note:

- 1) All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.2. CONFIGURATION OF SYSTEM UNDER TEST



5 FACILITIES AND ACCREDITATIONS

5.1. FACILITIES

All measurement facilities used to collect the measurement data are located at CCSrf Taiwan Xindian Lab. at No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, 23151 Taiwan.

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4 and CISPR 16-1-5.

5.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

Taiwan	TAF
USA	A2LA

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	Industry Canada
Norway	Nemko
Japan	VCCI
Taiwan	BSMI
USA	FCC

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Uncertainty
Conducted emissions	0.15MHz ~ 30MHz	± 1.59
Radiated emissions	30MHz ~ 1000MHz	± 3.73
	1000MHz ~ 18000MHz	± 4.53
	18000MHz ~ 26000MHz	± 3.03
	26000MHz ~ 40000MHz	± 3.38

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

Consistent with industry standard (e.g. CISPR 22: 2005, clause 11, Measurement Uncertainty) determining compliance with the limits shall be based on the results of the compliance measurement. Consequently the measured emissions being less than the maximum allowed emission result in this being a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is based on conducted and radiated emissions being less than U_{CISPR} which is 3.6dB and 5.2dB respectively. CCS values (called U_{Lab} in CISPR 16-4-2) is less than U_{CISPR} as shown in the table above. Therefore, MU need not be considered for compliance.

6 CONDUCTED EMISSION MEASUREMENT

6.1. LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTE:

- (1) The lower limit shall apply at the transition frequencies.
- (2) The limit decreases in line with the logarithm of the frequency in the range 0.15 to 0.50 MHz.
- (3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

6.2. TEST INSTRUMENTS

Conducted Emission room # B				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
TEST RECEIVER	R&S	ESCI	100234	06/09/2016
LISN (EUT)	SCHWARZBECK	NSLK 8127	8127691	06/08/2016
LISN	SCHWARZBECK	NSLK 8127	8127382	06/09/2016
BNC CABLE	EMCI	CFD300-NL	BNC B4	03/12/2016
Pulse Limiter	R&S	ESH3-Z2	100374	01/07/2016
THERMO-HYGRO METER	WISEWIND	201A	No. 05	06/02/2016
Test S/W	EZ-EMC			

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. N.C.R = No Calibration Request.

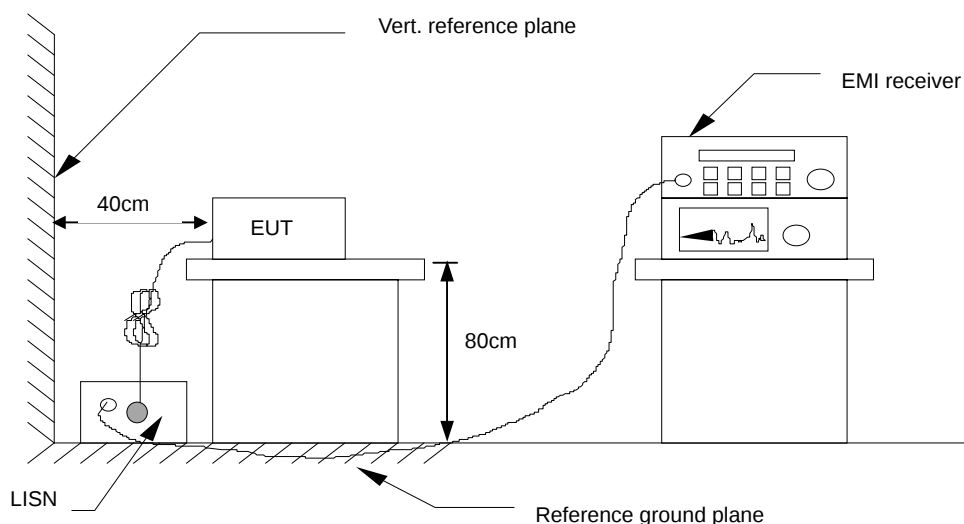
6.3. TEST PROCEDURES (please refer to measurement standard or CCS SOP PA-031)**Procedure of Preliminary Test**

- The EUT and support equipment, if needed, were set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (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 12 mm non-conductive covering to insulate the EUT from the ground plane.
- All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- The test equipment EUT installed by AC 120VAC/60Hz main power, through a Line Impedance Stabilization Network (LISN), which was supplied power source and was grounded to the ground plane.
- All support equipment power by from a second LISN.
- The test program of the EUT was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
- The Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- During the above scans, the emissions were maximized by cable manipulation.
- The test mode(s) described in Item 3.1 were scanned during the preliminary test.
- After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.
- The worst configuration of EUT and cable of the above highest emission level were recorded for reference of the final test.

Procedure of Final Test

- EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.
- 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.
- The test data of the worst-case condition(s) was recorded.

6.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

6.5. DATA SAMPLE

Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)
x.xx	42.95	0.55	43.50	56	-12.50	Q	L1

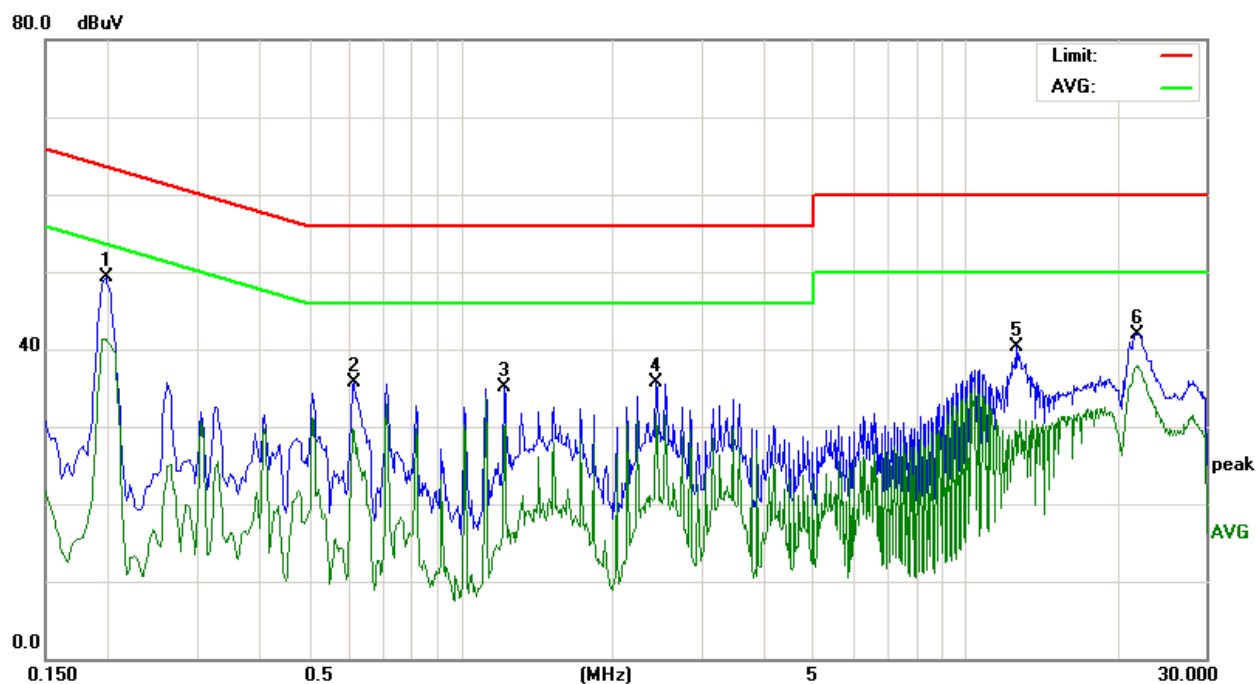
Freq.	= Emission frequency in MHz
Reading	= Uncorrected Analyzer/Receiver reading
Factor	= Insertion loss of LISN + Cable Loss + Pulse Limit
Result	= Reading + Factor
Limit	= Limit stated in standard
Margin	= Reading in reference to limit
P	= Peak Reading
Q	= Quasi-peak Reading
A	= Average Reading
L1	= Hot side
L2	= Neutral side

Calculation Formula

Margin (dB) = Result (dBuV) – Limit (dBuV)

6.6. TEST RESULTS

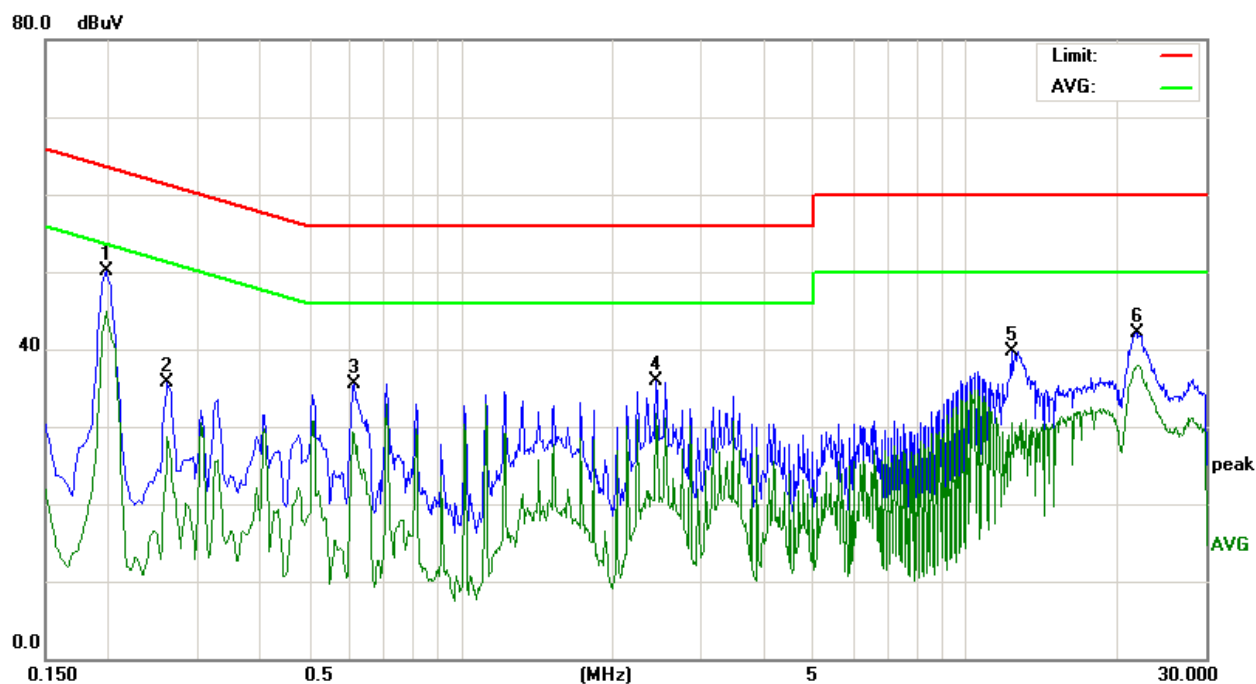
Model No.	IMB-154	6dB Bandwidth	9 kHz
Environmental Conditions	22°C, 61% RH	Test Mode	Mode 1
Tested by	David Cheng	Phase	L1
Standard	FCC CLASS B		



Conducted Emission Readings							
Frequency Range Investigated				150 kHz to 30 MHz			
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)
0.1980	39.31	9.95	49.26	63.69	-14.43	P	L1
0.6140	25.73	9.99	35.72	56.00	-20.28	P	L1
1.2220	25.11	10.03	35.14	56.00	-20.86	P	L1
2.4460	25.68	10.09	35.77	56.00	-20.23	P	L1
12.6420	29.81	10.49	40.30	60.00	-19.70	P	L1
22.0180	31.16	10.75	41.91	60.00	-18.09	P	L1

Note: L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

Model No.	IMB-154	6dB Bandwidth	9 kHz
Environmental Conditions	22°C, 61% RH	Test Mode	Mode 1
Tested by	David Cheng	Phase	L2
Standard	FCC CLASS B		



Conducted Emission Readings							
Frequency Range Investigated				150 kHz to 30 MHz			
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)
0.1980	40.24	9.92	50.16	63.69	-13.53	P	L2
0.2620	25.78	9.94	35.72	61.36	-25.64	P	L2
0.6140	25.50	9.95	35.45	56.00	-20.55	P	L2
2.4460	25.76	10.05	35.81	56.00	-20.19	P	L2
12.3340	29.32	10.46	39.78	60.00	-20.22	P	L2
21.9140	31.31	10.74	42.05	60.00	-17.95	P	L2

Note: L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

7 RADIATED EMISSION MEASUREMENT

7.1. LIMITS OF RADIATED EMISSION MEASUREMENT

Below 1GHz (for digital device)

FREQUENCY (MHz)	dBuV/m (At 10m)	
	Class A	Class B
30 ~ 230	40	30
230 ~ 1000	47	37

Limit tables for non-digital device:

Class A Radiated Emission limit at 10m (for others)

Frequency (MHZ)	Field Strength Limit (uV/m)Q.P.	Field Strength Limit (dBuV/m)Q.P.
30 - 88	90	39
88 - 216	150	43.5
216 – 960	210	46.4
Above 960	300	49.5

Class B Radiated Emission limit at 3m (for others)

Frequency (MHZ)	Field Strength Limit (uV/m)Q.P.	Field Strength Limit (dBuV/m)Q.P.
30 - 88	100	40
88 - 216	150	43.5
216 – 960	200	46
Above 960	500	54

Above 1GHz(for all device)

Frequency (MHZ)	Class A (dBuV/m) (At 10m)		Class B (dBuV/m) (At 3m)	
	Average	Peak	Average	Peak
Above 1000	49.5	69.5	54	74

NOTE: (1) The lower limit shall apply at the transition frequencies.
 (2) Emission level (dBuV/m) = 20 log Emission level (uV/m).
 (3) The measurement above 1GHz is at close-in distances 3m, and determine the limit L_2 corresponding to the close-in distance d_2 by applying the following relation: $L_2 = L_1 (d_1/d_2)$, where L_1 is the specified limit in microvolts per metre (uV/m) at the distance d_1 (10m), L_2 is the new limit for distance d_2 (3m).
 So the new Class A limit above 1GHz at 3m is as following table:

Frequency (MHZ)	Class A (dBuV/m) (At 3m)	
	Average	Peak
Above 1000	60	80

According to FCC Part 15.33 (b), for an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5 th harmonic of the highest frequency or 40GHz, whichever is lower

7.2. TEST INSTRUMENTS

Open Area Test Site # J				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
MEASURE RECEIVER	R&S	ESCI	101054	03/31/2016
ANTENNA	SUNOL	JB1	A100209-2	08/18/2015
PRE-AMPLIFIER	SCHAFFNER	CPA9231A	3613	05/28/2016
CABLE	EMCI	8Dr	N-TYPE #J4 、 J6	08/15/2015
THERMO-HYGRO METER	WISEWIND	201A	No. 04	06/02/2016
Test S/W	EZ-EMC			
Above 1GHz Used				
SIGNAL ANALYZER (9kHz-44GHz)	Agilent	N9010A	MY53440125	12/15/2015
ANTENNA (1-18GHz)	ETS	3117	00139062	10/19/2015
AMPLIFIER (1-26.5GHz)	HP	8449B	3008A01266	12/15/2015
CABLE (1-40GHz)	HUBER +SUHNER	SUCOFLEX 102	33106/2	12/14/2015
CABLE (1-40GHz)	HUBER +SUHNER	SUCOFLEX 102	33633/2	12/14/2015
CABLE (1-26.5GHz)	HUBER +SUHNER	SUCOFLEX 104PEA	39448/4PEA	12/14/2015
THERMO-HYGRO METER	WISEWIND	201A	No. 02	05/10/2016
Test S/W	EZ-EMC			

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. N.C.R = No Calibration Request.

7.3. TEST PROCEDURES (please refer to measurement standard or CCS SOP PA-031)**Procedure of Preliminary Test**

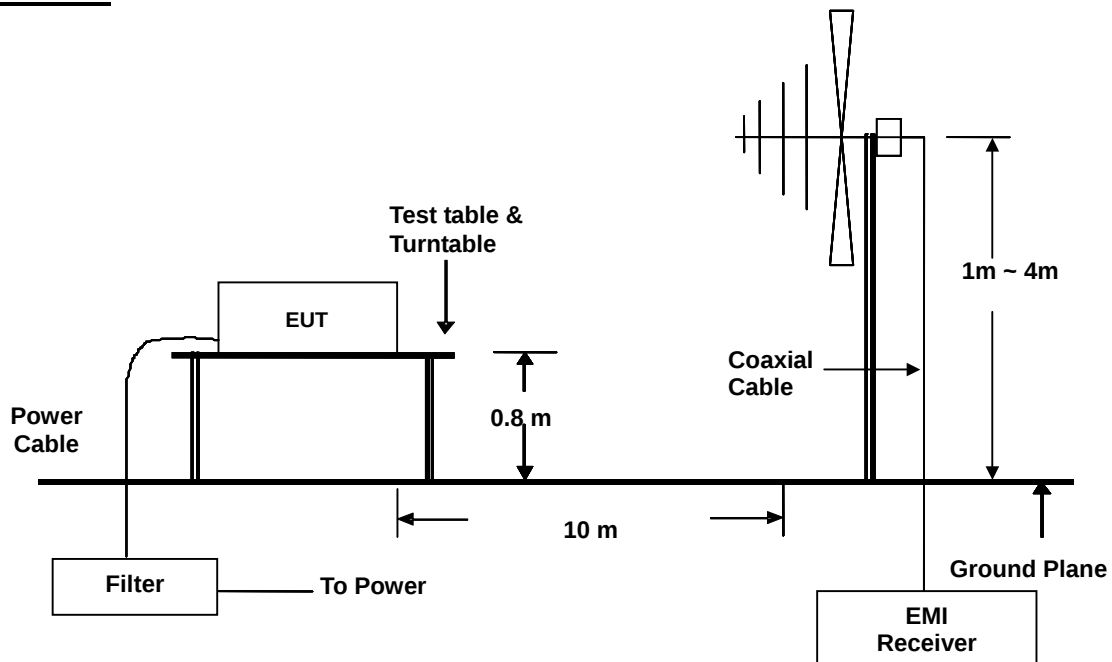
- The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor standing equipment, it is placed on the ground plane which has a 12 mm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per ANSI C63.4.
- All I/O cables were positioned to simulate typical usage as per ANSI C63.4.
- The EUT received AC 120VAC/60Hz power source from the outlet socket under the turntable. All support equipment power received from another socket under the turntable.
- The antenna was placed at 3 or 10 meter away from the EUT as stated in ANSI C63.4. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.
- The Analyzer / Receiver quickly scanned from 30MHz to 40GHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- The test mode(s) described in Item 3.1 were scanned during the preliminary test:
- After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.
- The worst configuration of EUT and cable of the above highest emission level were recorded for reference of the final test.

Procedure of Final Test

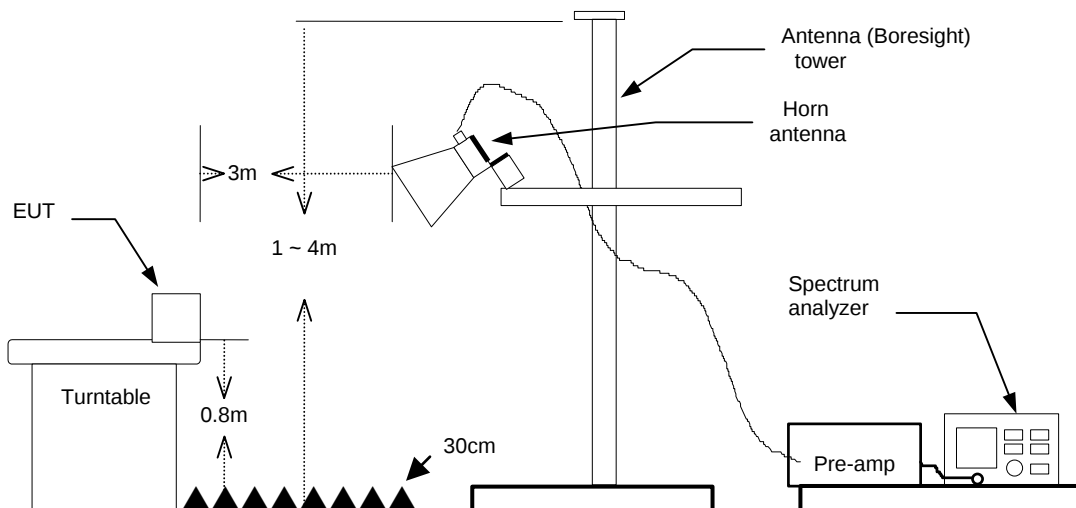
- EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.
- The Analyzer / Receiver scanned from 30MHz to 40GHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 or 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- Recording at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. Below 1GHz the Q.P. reading and above 1GHz the Peak and Average reading are presented.
- The test data of the worst-case condition(s) was recorded.

7.4. TEST SETUP

Below 1GHz



Above 1GHz



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.5. DATA SAMPLE

Below 1GHz

Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/Q)	Pol. (H/V)
x.xx	14.0	12.2	26.2	30	-3.8	Q	H

Above 1GHz

Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/A)	Pol. (H/V)
x.xx	42.95	0.55	43.50	54	-10.50	A	H

Freq. = Emission frequency in MHz
Reading = Uncorrected Analyzer/Receiver reading
Factor = Antenna Factor + Cable Loss - Amplifier Gain
Result = Reading + Factor
Limit = Limit stated in standard
Margin = Reading in reference to limit
P = Peak Reading
Q = Quasi-peak Reading
A = Average Reading
H = Antenna Polarization: Horizontal
V = Antenna Polarization: Vertical

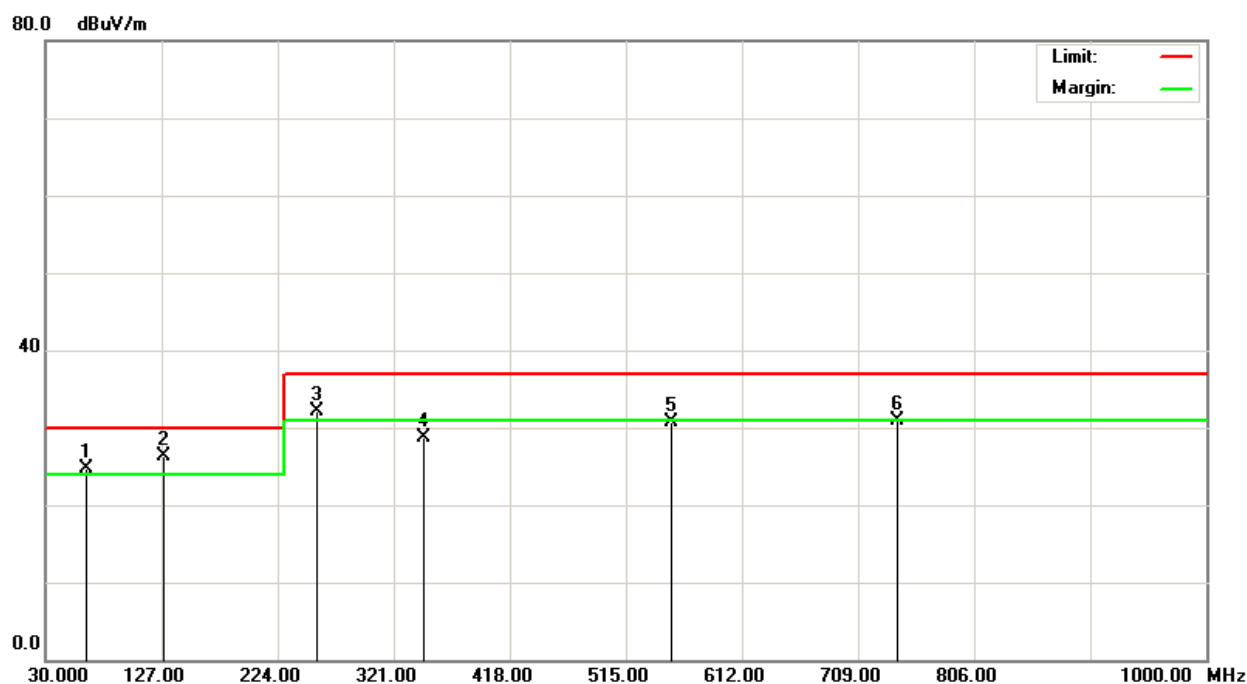
Calculation Formula

Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)

7.6. TEST RESULTS

Below 1GHz

Model No.	IMB-154	Test Mode	Mode 1
Environmental Conditions	28°C, 67% RH	6dB Bandwidth	120 kHz
Antenna Pole	Vertical	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	David Cheng
Standard	FCC CLASS B W/ CISPR 22 CLASS B LIMIT		

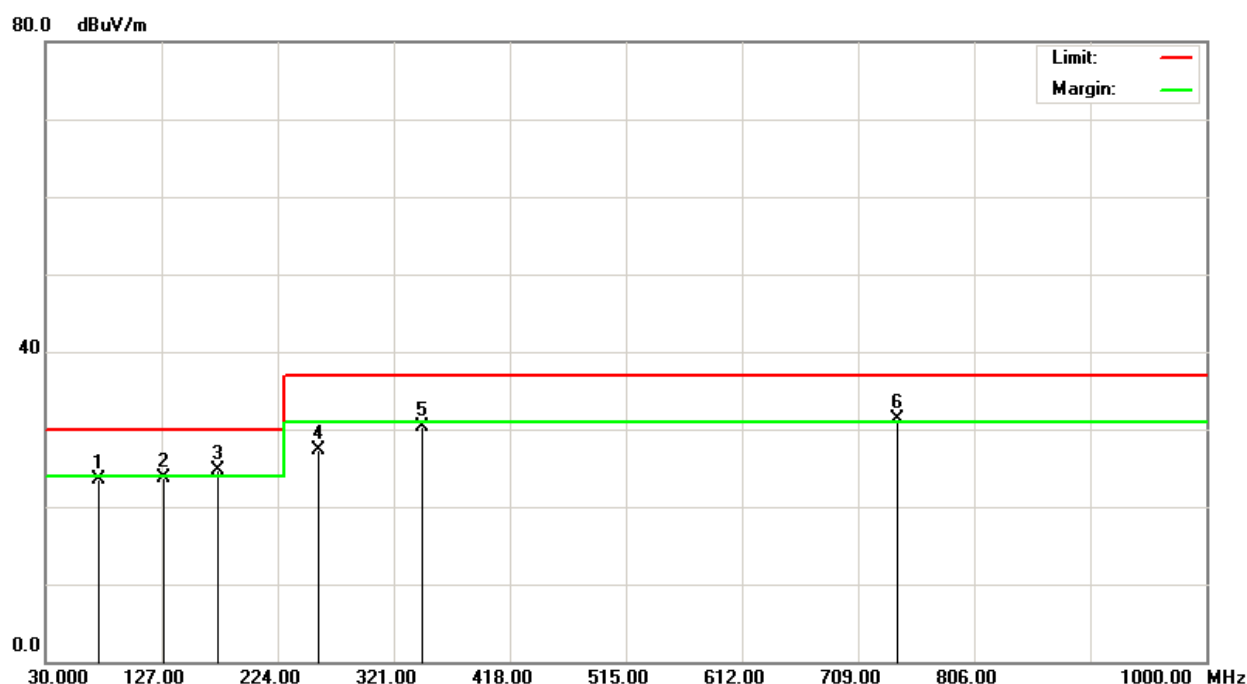


Radiated Emission Readings									
Frequency Range Investigated					30 MHz to 1000 MHz at 10m				
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Detector (P/Q)	Pol. (H/V)
64.8100	44.20	-19.45	24.75	30.00	-5.25	100	222	Q	V
129.4200	39.50	-13.20	26.30	30.00	-3.70	100	194	Q	V
257.1500	46.10	-13.97	32.13	37.00	-4.87	100	312	Q	V
345.9100	39.90	-11.27	28.63	37.00	-8.37	100	56	Q	V
552.7400	36.70	-5.90	30.80	37.00	-6.20	400	177	Q	V
742.0800	33.40	-2.43	30.97	37.00	-6.03	400	102	Q	V

Note: 1. 30MHz to 1000MHz test is Applicable CISPR 22 standard.

2. P= Peak Reading; Q= Quasi-peak Reading.

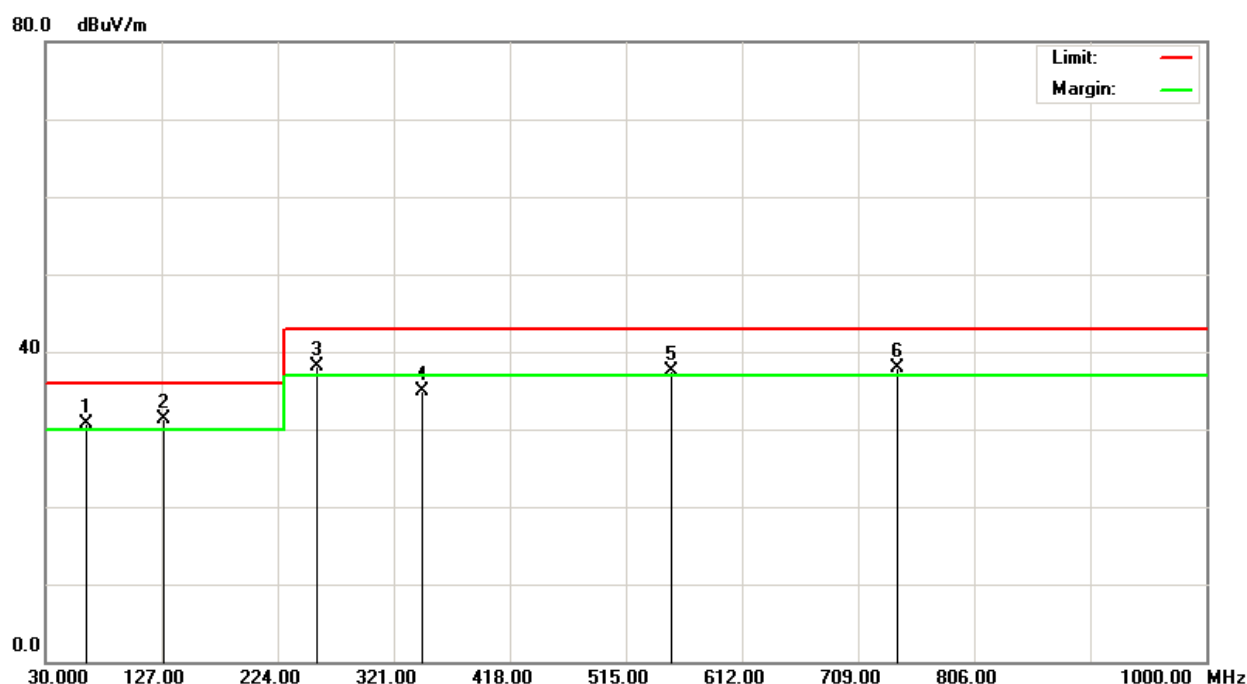
Model No.	IMB-154	Test Mode	Mode 1
Environmental Conditions	28°C, 67% RH	6dB Bandwidth	120 kHz
Antenna Pole	Horizontal	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	David Cheng
Standard	FCC CLASS B W/ CISPR 22 CLASS B LIMIT		



Radiated Emission Readings									
Frequency Range Investigated				30 MHz to 1000 MHz at 10m					
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Detector (P/Q)	Pol. (H/V)
74.6100	42.90	-19.47	23.43	30.00	-6.57	400	139	Q	H
129.2500	36.80	-13.19	23.61	30.00	-6.39	400	201	Q	H
173.6200	39.50	-14.83	24.67	30.00	-5.33	400	87	Q	H
257.6900	41.30	-13.95	27.35	37.00	-9.65	400	164	Q	H
345.2200	41.60	-11.29	30.31	37.00	-6.69	400	312	Q	H
742.0300	33.70	-2.43	31.27	37.00	-5.73	100	21	Q	H

Note: 1. 30MHz to 1000MHz test is Applicable CISPR 22 standard.
2. P= Peak Reading; Q= Quasi-peak Reading.

Model No.	IMB-154	Test Mode	Mode 1
Environmental Conditions	28°C, 67% RH	6dB Bandwidth	120 kHz
Antenna Pole	Vertical	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	David Cheng
Standard	FCC CLASS B W/CISPR 22 CLASS B LIMIT + 6dB		



Radiated Emission Readings									
Frequency Range Investigated				30 MHz to 1000 MHz at 10m					
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Detector (P/Q)	Pol. (H/V)
64.4600	50.10	-19.48	30.62	36.00	-5.38	100	52	Q	V
129.5200	44.50	-13.20	31.30	36.00	-4.70	100	154	Q	V
257.2300	52.10	-13.97	38.13	43.00	-4.87	100	229	Q	V
345.1600	46.20	-11.29	34.91	43.00	-8.09	100	174	Q	V
552.5100	43.50	-5.90	37.60	43.00	-5.40	400	312	Q	V
742.0300	40.30	-2.43	37.87	43.00	-5.13	400	91	Q	V

Note: 1. 30MHz to 1000MHz test is Applicable CISPR 22 standard.

2. P= Peak Reading; Q= Quasi-peak Reading.

Model No.	IMB-154	Test Mode	Mode 1
Environmental Conditions	28°C, 67% RH	6dB Bandwidth	120 kHz
Antenna Pole	Horizontal	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	David Cheng
Standard	FCC CLASS B W/ CISPR 22 CLASS B LIMIT + 6dB		



Radiated Emission Readings									
Frequency Range Investigated				30 MHz to 1000 MHz at 10m					
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Detector (P/Q)	Pol. (H/V)
74.3600	50.10	-19.45	30.65	36.00	-5.35	400	61	Q	H
129.0800	43.10	-13.19	29.91	36.00	-6.09	400	131	Q	H
173.4200	45.90	-14.82	31.08	36.00	-4.92	400	298	Q	H
257.5900	48.60	-13.95	34.65	43.00	-8.35	400	107	Q	H
345.2500	50.20	-11.29	38.91	43.00	-4.09	400	54	Q	H
742.0700	40.60	-2.43	38.17	43.00	-4.83	100	115	Q	H

Note: 1. 30MHz to 1000MHz test is Applicable CISPR 22 standard.

2. P= Peak Reading; Q= Quasi-peak Reading.

Above 1GHz

Model No.	IMB-154	Test Mode	Mode 1
Environmental Conditions	22°C, 56% RH	6dB Bandwidth	1 MHz
Antenna Pole	Vertical / Horizontal	Antenna Distance	3m
Highest frequency generated or used	1600MHz	Upper frequency	8000MHz
Detector Function	Peak and average.	Tested by	Jim Lian
Standard	FCC CLASS B		

Radiated Emission Readings							
Frequency Range Investigated				Above 1GHz at 3m			
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/A)	Pol. (H/V)
1758.333	52.42	-4.46	47.96	74.00	-26.04	P	V
2033.333	49.77	-2.20	47.57	74.00	-26.43	P	V
2291.667	49.55	-1.79	47.76	74.00	-26.24	P	V
3000.000	49.34	-0.54	48.80	74.00	-25.20	P	V
3700.000	50.44	0.36	50.80	74.00	-23.20	P	V
6000.000	48.87	3.86	52.73	74.00	-21.27	P	V

Radiated Emission Readings							
Frequency Range Investigated				Above 1GHz at 3m			
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/A)	Pol. (H/V)
1983.333	50.28	-2.41	47.87	74.00	-26.13	P	H
2258.333	48.64	-1.84	46.80	74.00	-27.20	P	H
3000.000	49.59	-0.54	49.05	74.00	-24.95	P	H
5000.000	49.12	2.21	51.33	74.00	-22.67	P	H
5233.333	47.89	2.57	50.46	74.00	-23.54	P	H
6000.000	48.56	3.86	52.42	74.00	-21.58	P	H

Note: P= Peak Reading; A= Average Reading.

Model No.	IMB-154	Test Mode	Mode 1
Environmental Conditions	22°C, 56% RH	6dB Bandwidth	1 MHz
Antenna Pole	Vertical / Horizontal	Antenna Distance	3m
Highest frequency generated or used	1600MHz	Upper frequency	8000MHz
Detector Function	Peak and average.	Tested by	Jim Lian
Standard	FCC CLASS B + 6dB		

Radiated Emission Readings							
Frequency Range Investigated				Above 1GHz at 3m			
Freq. (MHz)	Reading (dBUV)	Factor (dB/m)	Result (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector (P/A)	Pol. (H/V)
1758.333	56.15	-4.46	51.69	80.00	-28.31	P	V
3000.000	52.02	-0.54	51.48	80.00	-28.52	P	V
3700.000	55.67	0.36	56.03	80.00	-23.97	P	V
4158.333	52.51	1.18	53.69	80.00	-26.31	P	V
5233.333	52.55	2.57	55.12	80.00	-24.88	P	V
6000.000	50.01	3.86	53.87	80.00	-26.13	P	V

Radiated Emission Readings							
Frequency Range Investigated				Above 1GHz at 3m			
Freq. (MHz)	Reading (dBUV)	Factor (dB/m)	Result (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector (P/A)	Pol. (H/V)
1008.333	58.37	-8.33	50.04	80.00	-29.96	P	H
1600.000	56.80	-5.90	50.90	80.00	-29.10	P	H
2550.000	54.57	-1.37	53.20	80.00	-26.80	P	H
3200.000	54.46	-0.33	54.13	80.00	-25.87	P	H
5233.333	50.82	2.57	53.39	80.00	-26.61	P	H
6000.000	47.90	3.86	51.76	80.00	-28.24	P	H

Note: P= Peak Reading; A= Average Reading.

8 PHOTOGRAPHS OF THE TEST CONFIGURATION CONDUCTED EMISSION TEST



RADIATED EMISSION TEST



RADIATED EMISSION TEST (Open Chassis)

