

FCC Part 15B Measurement and Test Report

For

Abocom Systems Inc

No.77, Yu-Yih Rd., Chu-Nan, Miao-Lih County 35059, Taiwan R.O.C.

FCC ID: MQ4-MBR-1100

Test Rule(s): FCC Part 15 Subpart B

Product Description: Android TV Dongle

Tested Model: MBR-1100

Report No.: STR14078217I-2

Tested Date: 2014-07-23 to 2014-08-27

Issued Date: 2014-08-27

Tested By: Jason Su / Engineer

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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Abocom Systems Inc
Address of applicant: No.77, Yu-Yih Rd., Chu-Nan, Miao-Lih County
35059,Taiwan R.O.C.
Manufacturer: Abocom Systems Inc
Address of manufacturer: No.77, Yu-Yih Rd., Chu-Nan, Miao-Lih County
35059,Taiwan R.O.C.

General Description of EUT	
Product Name:	Android TV Dongle
Trade Name:	/
Model No.:	MBR-1100
Adding Model(s):	XMP-6200
<i>Note: The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model MBR-1100, but the circuit and the electronic construction do not change, declared by the manufacturer.</i>	

Technical Characteristics of EUT	
Rated Voltage:	AC 120V Adapter:DC5.35V
Rated Current:	2A
Rated Power:	/
Power Adapter Model:	PSAI10R-050Q
Lowest Internal Frequency:	32.768KHz
Highest Internal Frequency:	1GHz
Classification of ITE:	Class B

1.2 Test Standards

The following report is prepared on behalf of the Abocom Systems Inc in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart B, and section 15.205, 15.107, and 15.109 rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

1.4 Test Facility

FCC – Registration No.: 934118

Shenzhen SEM.Test Technology 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 and the Registration is 934118.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101).

1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

Test Mode	Description	Remark
TM1	Playing	USB Input HDMI Output And RJ45
TM2	Playing	TF Card Input HDMI Output
TM3	Downloading	

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
USB Cable	1.0	Shielded	With Ferrite

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
USB flash disk	SONY	8G	/
TF Card	Kingston	4G	/
Mouse	DELL	N889	/
USB flash disk	SONY	8G	/

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
HDMI Cable	1.2	Shielded	Without Ferrite
RJ45	2.0	Unshielded	Without Ferrite

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 15.107 (a)	Conducted Emissions	Compliant
§ 15.109 (a)	Radiated Emissions	Compliant

N/A: not applicable

3. Conducted Emissions

3.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

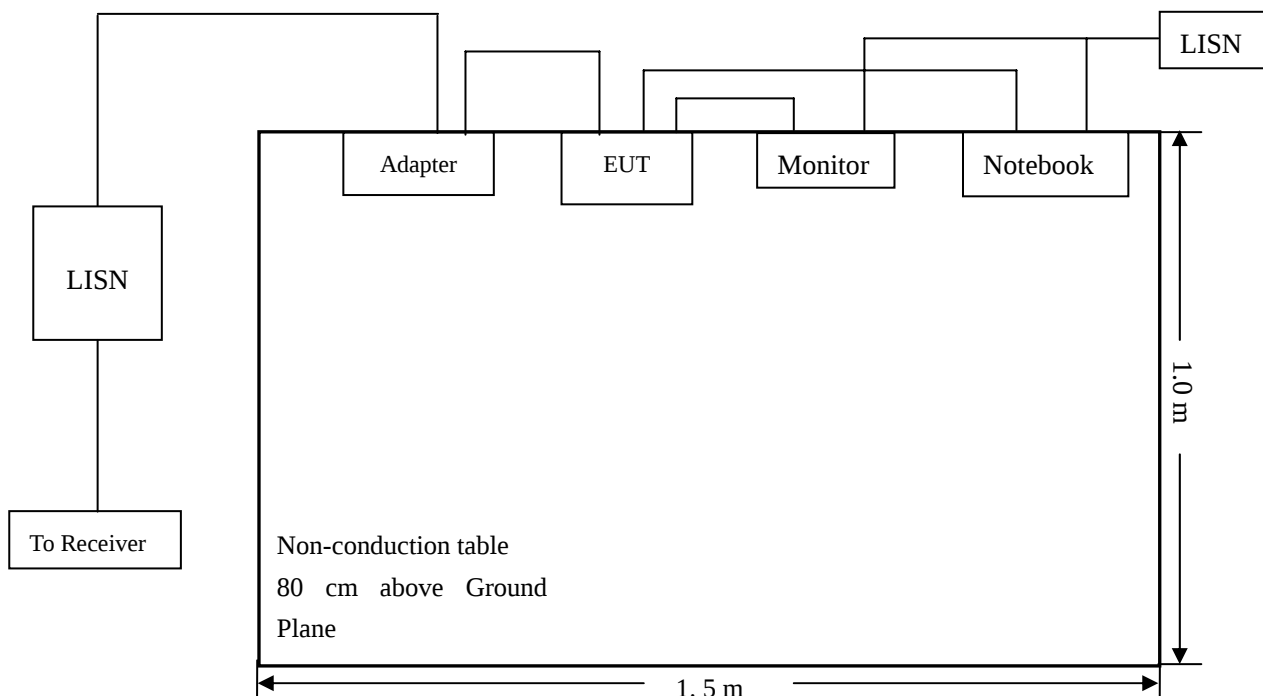
3.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2014-05-28	2015-05-27
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2014-05-28	2015-05-27
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2014-05-28	2015-05-27

3.3 Test Procedure

Test is conducting under the description of ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

3.4 Basic Test Setup Block Diagram



3.5 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

3.6 Summary of Test Results/Plots

According to the data in section 3.7, the EUT complied with the FCC Part 15.107(a) Conducted margin for a Class B device, with the *worst* margin reading of:

-10.29 dB at **0.1540 MHz** in the **Line, Peak** detector, 0.15-30MHz

3.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

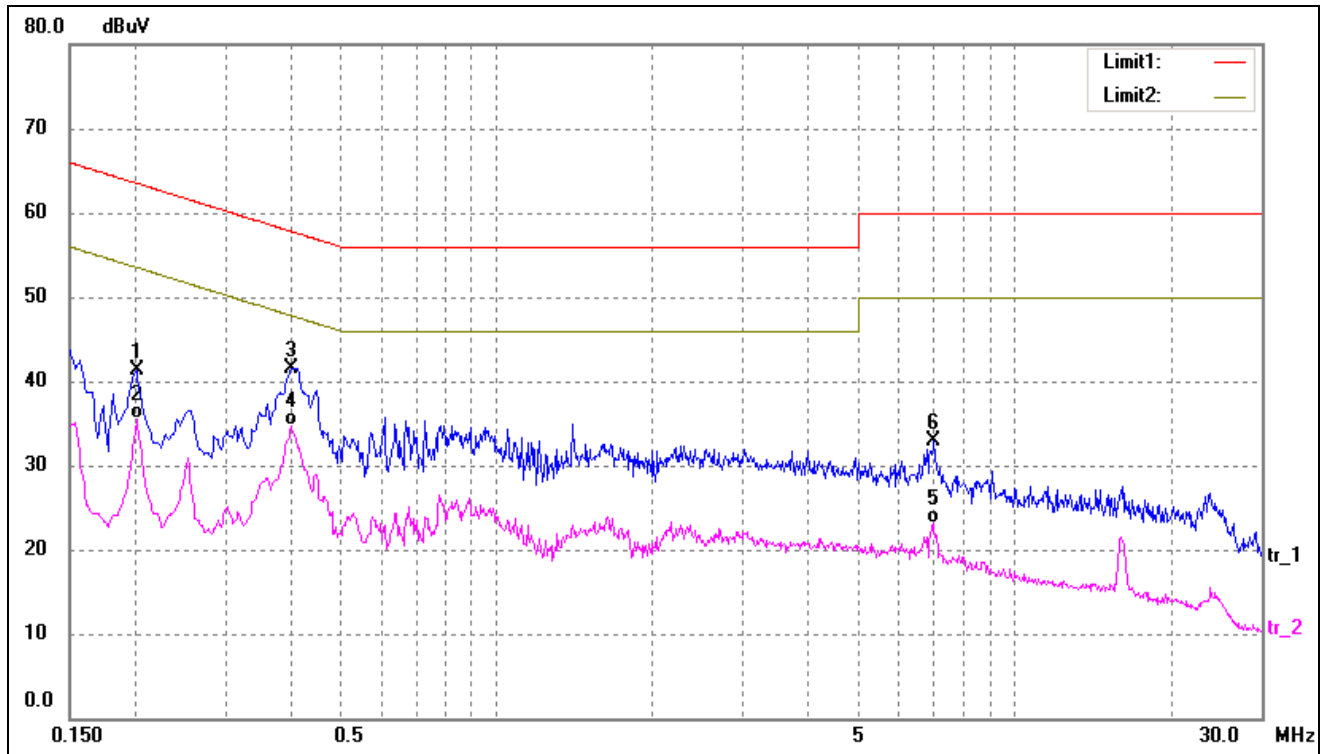
EUT: Android TV Dongle

Tested Model: MBR-1100

Operating Condition: Playing: USB Input HDMI Output And RJ45

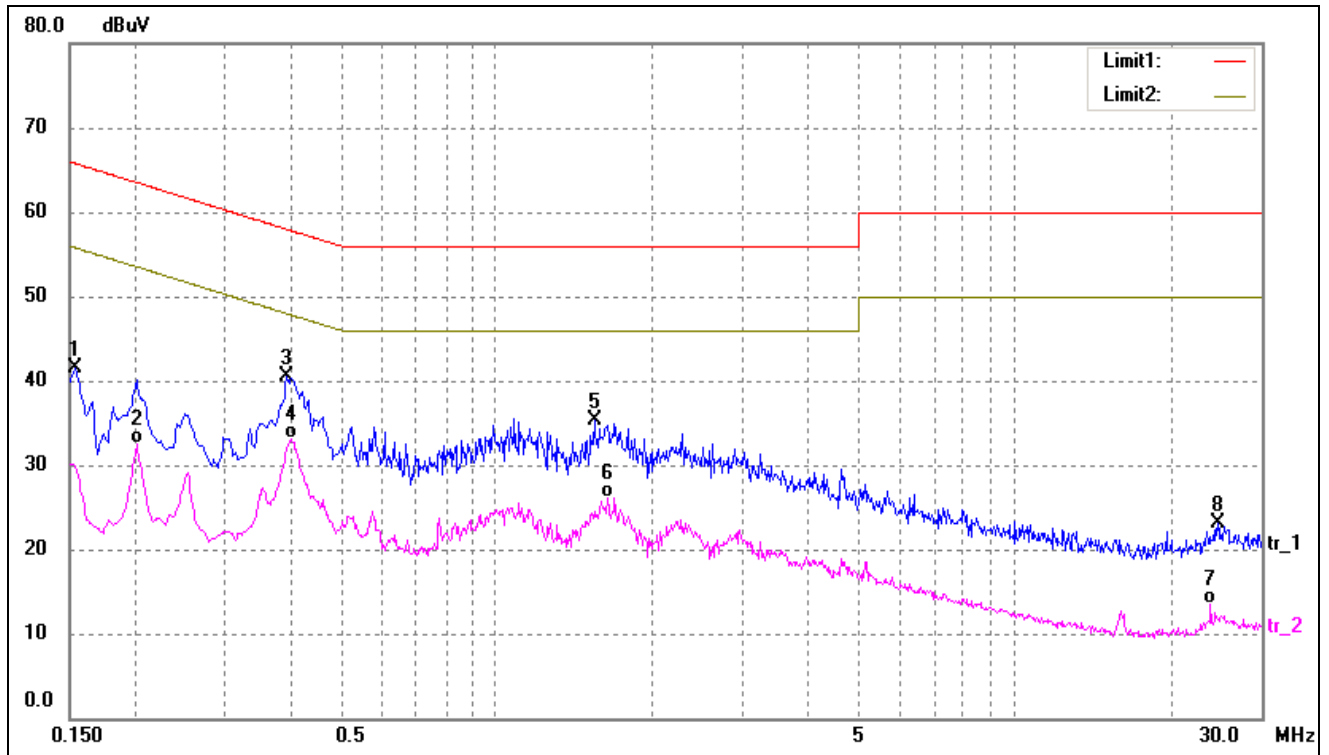
Comment: Adapter:DC5.35V

Test Specification: Neutral



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.2020	31.81	9.50	41.31	63.53	-22.22	peak
2	0.2020	25.99	9.50	35.49	53.53	-18.04	AVG
3	0.4020	32.07	9.50	41.57	57.81	-16.24	peak
4	0.4020	25.12	9.50	34.62	47.81	-13.19	AVG
5	6.9660	13.05	10.00	23.05	50.00	-26.95	AVG
6	7.0100	22.89	10.00	32.89	60.00	-27.11	peak

Test Specification: Line

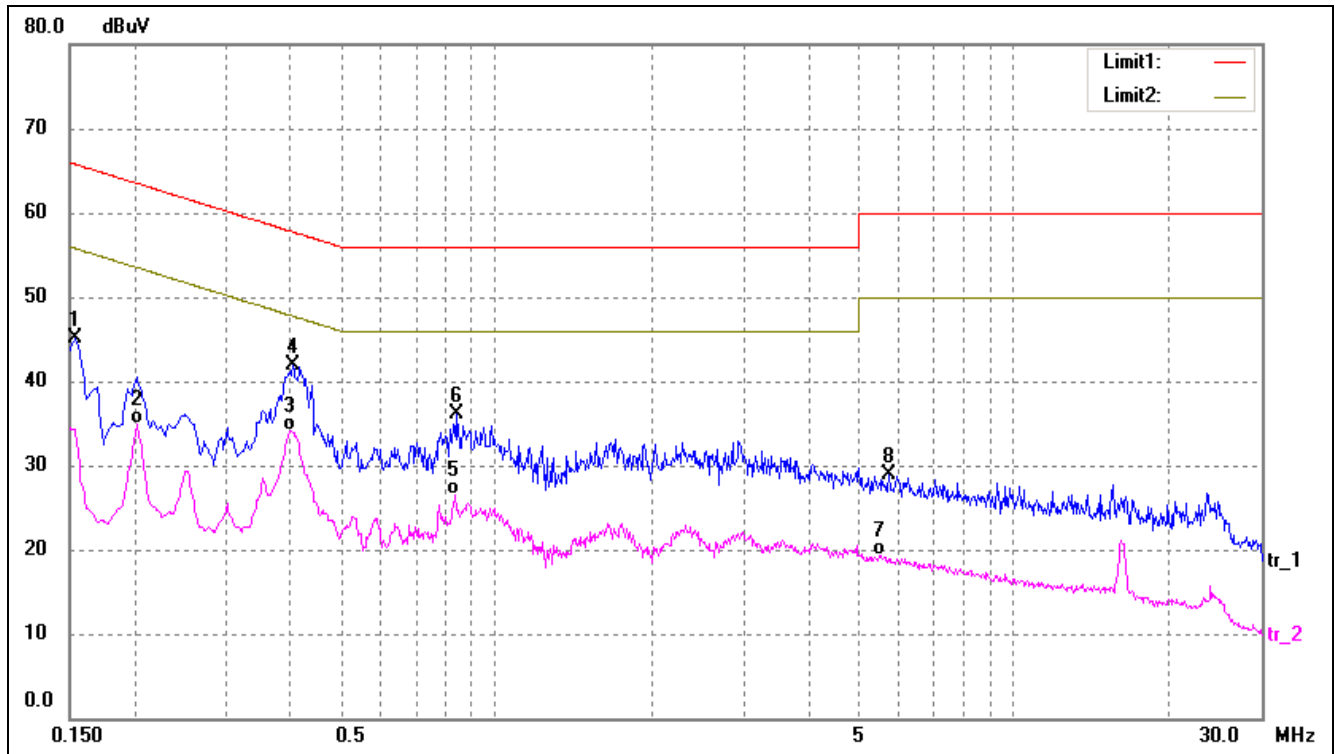


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1540	32.07	9.50	41.57	65.78	-24.21	peak
2	0.2020	22.91	9.50	32.41	53.53	-21.12	AVG
3	0.3940	31.05	9.50	40.55	57.98	-17.43	peak
4	0.4020	23.63	9.50	33.13	47.81	-14.68	AVG
5	1.5460	25.30	10.00	35.30	56.00	-20.70	peak
6	1.6420	16.07	10.00	26.07	46.00	-19.93	AVG
7	24.0020	0.83	12.67	13.50	50.00	-36.50	AVG
8	24.7220	10.15	12.91	23.06	60.00	-36.94	peak

Plot of Conducted Emissions Test Data

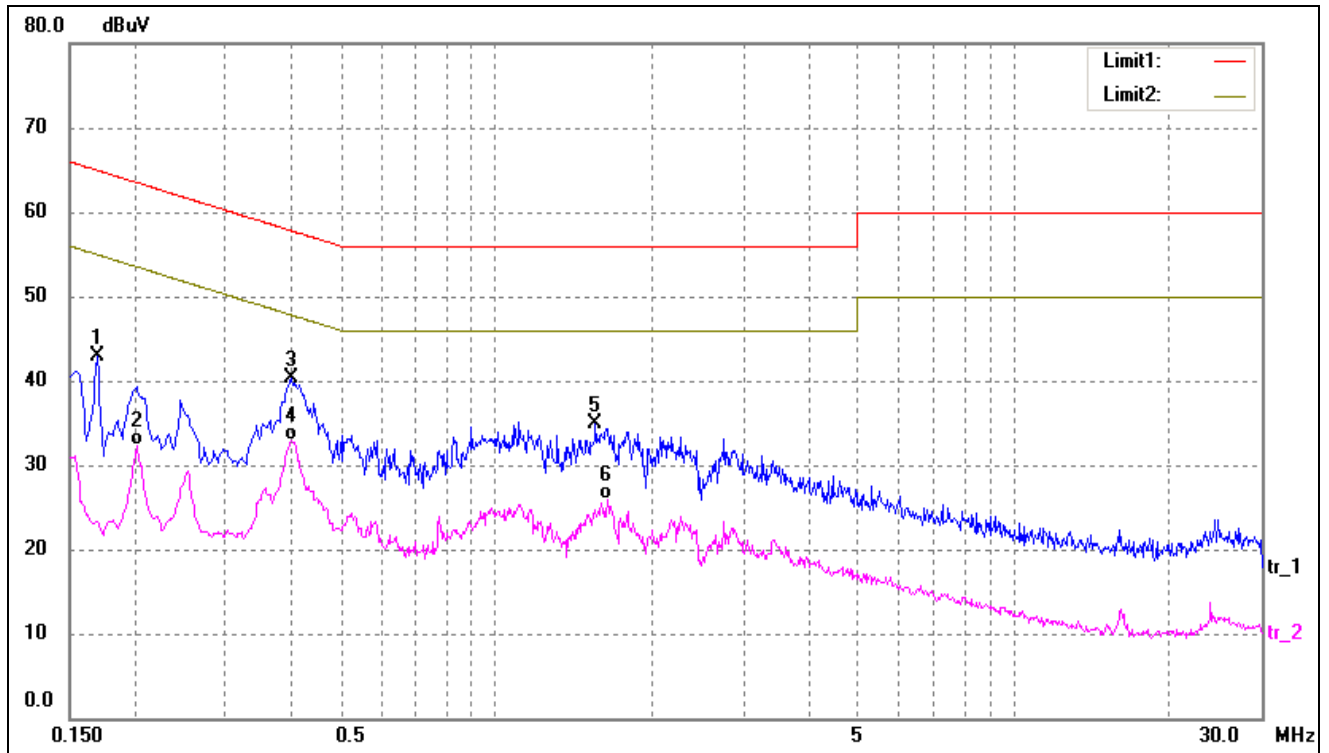
EUT: Android TV Dongle
 Tested Model: MBR-1100
 Operating Condition: TF Card Input HDMI Output
 Comment: Adapter:DC5.35V

Test Specification: Neutral



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.1540	35.69	9.50	45.19	65.78	-20.59	peak
2	0.2020	25.49	9.50	34.99	53.53	-18.54	AVG
3	0.4020	24.59	9.50	34.09	47.81	-13.72	AVG
4	0.4060	32.38	9.50	41.88	57.73	-15.85	peak
5	0.8340	16.70	9.83	26.53	46.00	-19.47	AVG
6	0.8380	26.27	9.84	36.11	56.00	-19.89	peak
7	5.4780	9.22	10.00	19.22	50.00	-30.78	AVG
8	5.7260	18.90	10.00	28.90	60.00	-31.10	peak

Test Specification: Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1700	33.49	9.50	42.99	64.96	-21.97	peak
2	0.2020	22.72	9.50	32.22	53.53	-21.31	AVG
3	0.4020	30.72	9.50	40.22	57.81	-17.59	peak
4	0.4020	23.48	9.50	32.98	47.81	-14.83	AVG
5	1.5580	24.97	10.00	34.97	56.00	-21.03	peak
6	1.6420	15.89	10.00	25.89	46.00	-20.11	AVG

Plot of Conducted Emissions Test Data

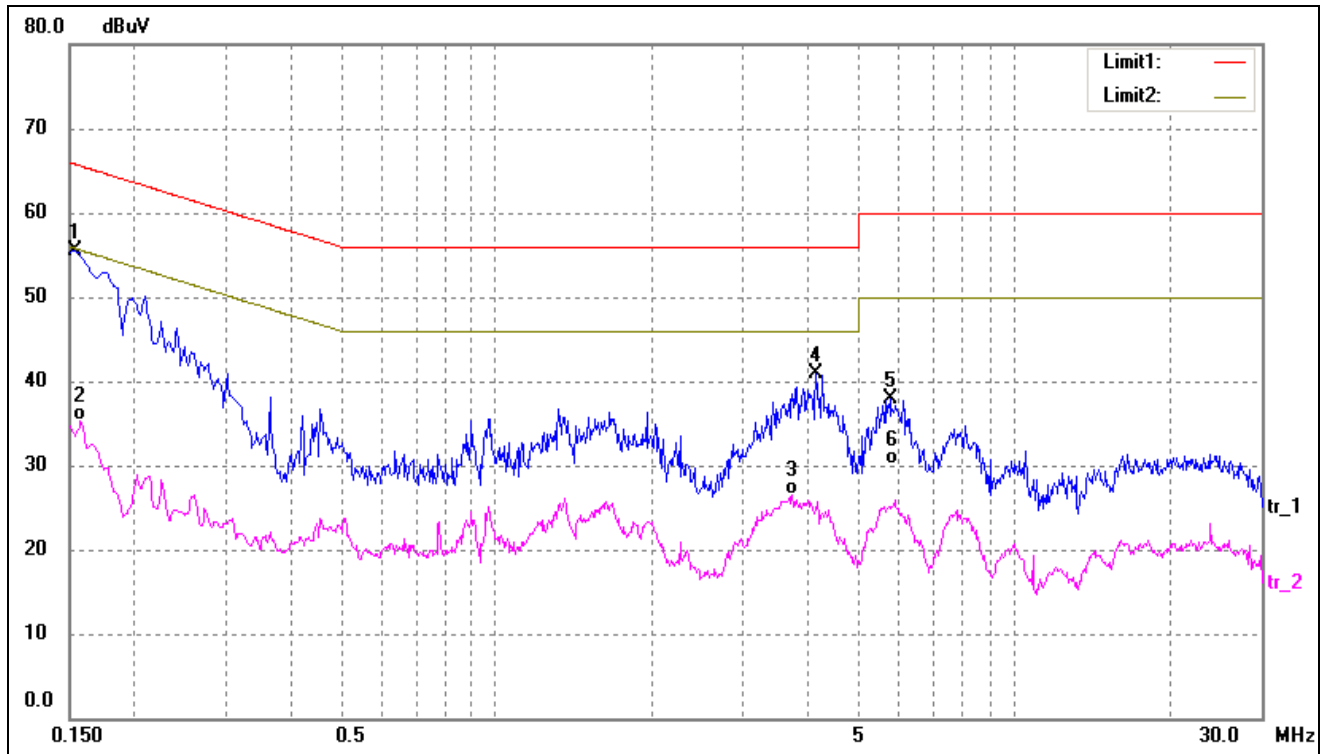
EUT: Android TV Dongle

Tested Model: MBR-1100

Operating Condition: Downloading

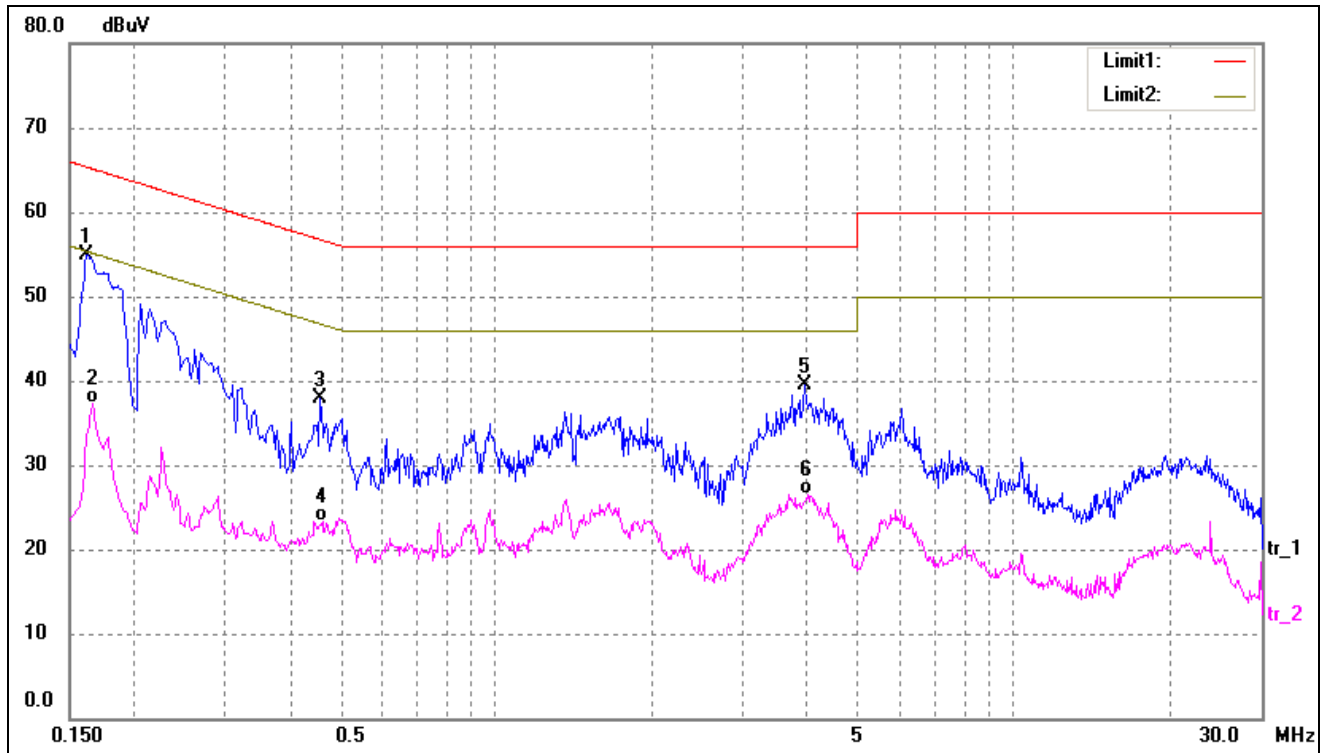
Comment: Adapter:DC5.35V

Test Specification: Neutral



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.1540	45.99	9.50	55.49	65.78	-10.29	peak
2	0.1580	25.72	9.50	35.22	55.57	-20.35	AVG
3	3.7380	16.57	10.00	26.57	46.00	-19.43	AVG
4	4.1380	30.85	10.00	40.85	56.00	-15.15	peak
5	5.7540	27.86	10.00	37.86	60.00	-22.14	peak
6	5.7540	20.05	10.00	30.05	50.00	-19.95	AVG

Test Specification: Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1620	45.42	9.50	54.92	65.36	-10.44	peak
2	0.1660	27.79	9.50	37.29	55.16	-17.87	AVG
3	0.4580	28.40	9.50	37.90	56.73	-18.83	peak
4	0.4620	13.83	9.50	23.33	46.66	-23.33	AVG
5	3.9380	29.47	10.00	39.47	56.00	-16.53	peak
6	4.0020	16.55	10.00	26.55	46.00	-19.45	AVG

4. Radiated Emissions

4.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is ± 5.10 dB.

4.2 Test Equipment List and Details

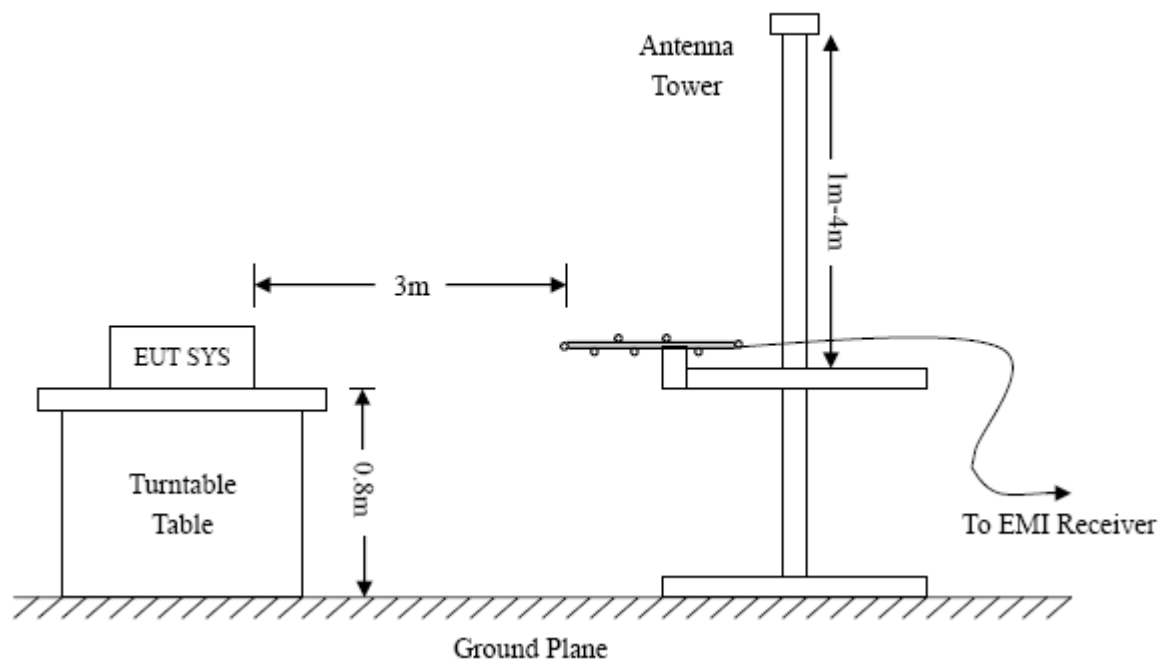
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2014-05-28	2015-05-27
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-28	2015-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-28	2015-05-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-28	2015-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-05-24	2015-05-23
Horn Antenna	ETS	3117	00086197	2014-05-24	2015-05-23
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2014-05-24	2015-05-23

4.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.109 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



4.4 Test Receiver Setup

Frequency :9kHz-30MHz

RBW=10KHz,

VBW =30KHz

Sweep time= Auto

Trace = max hold

Detector function = peak

Frequency :30MHz-1GHz

RBW=120KHz,

VBW=300KHz

Sweep time= Auto

Trace = max hold

Detector function = peak, QP

Frequency :Above 1GHz

RBW=1MHz,

VBW=3MHz(Peak), 10Hz(AV)

Sweep time= Auto

Trace = max hold

Detector function = peak, AV

4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} - \text{Corr. Factor}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for a Class B device. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15.109(a) Limit}$$

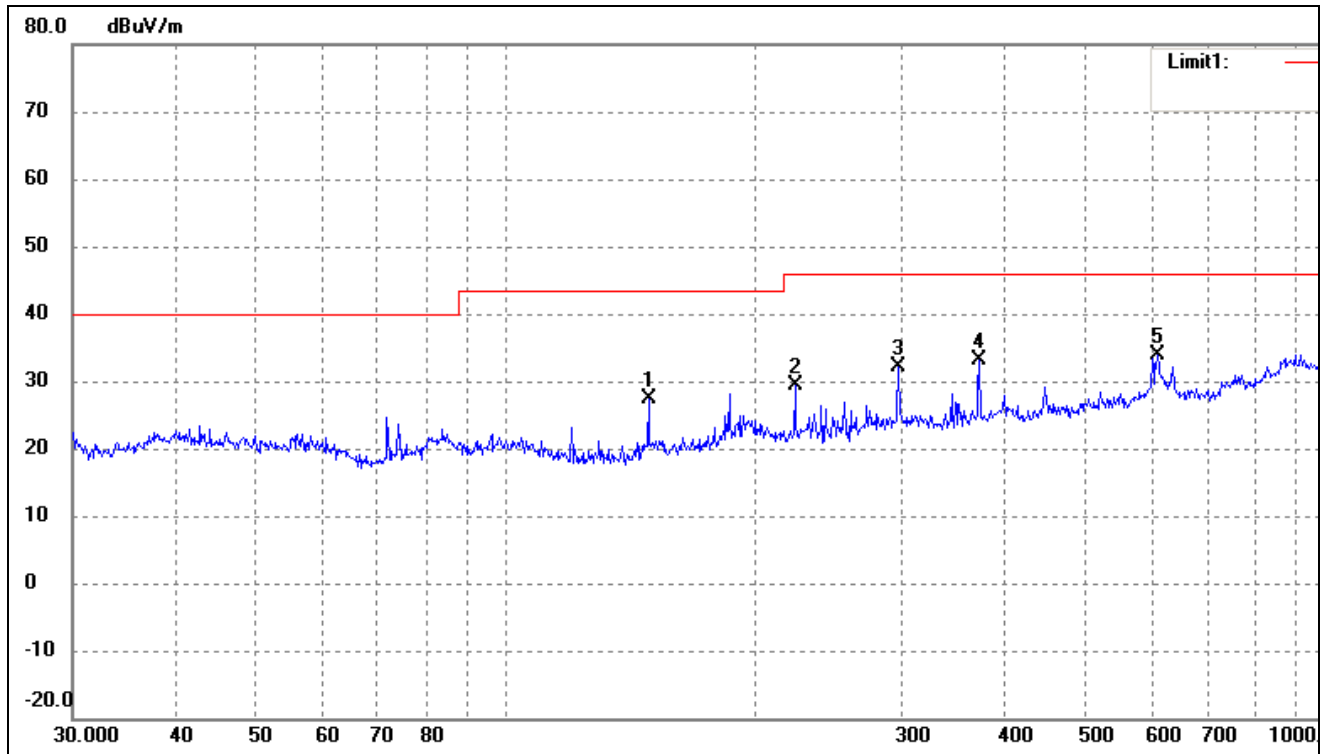
4.6 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	55 %
ATM Pressure:	1011 mbar

4.7 Summary of Test Results/Plots

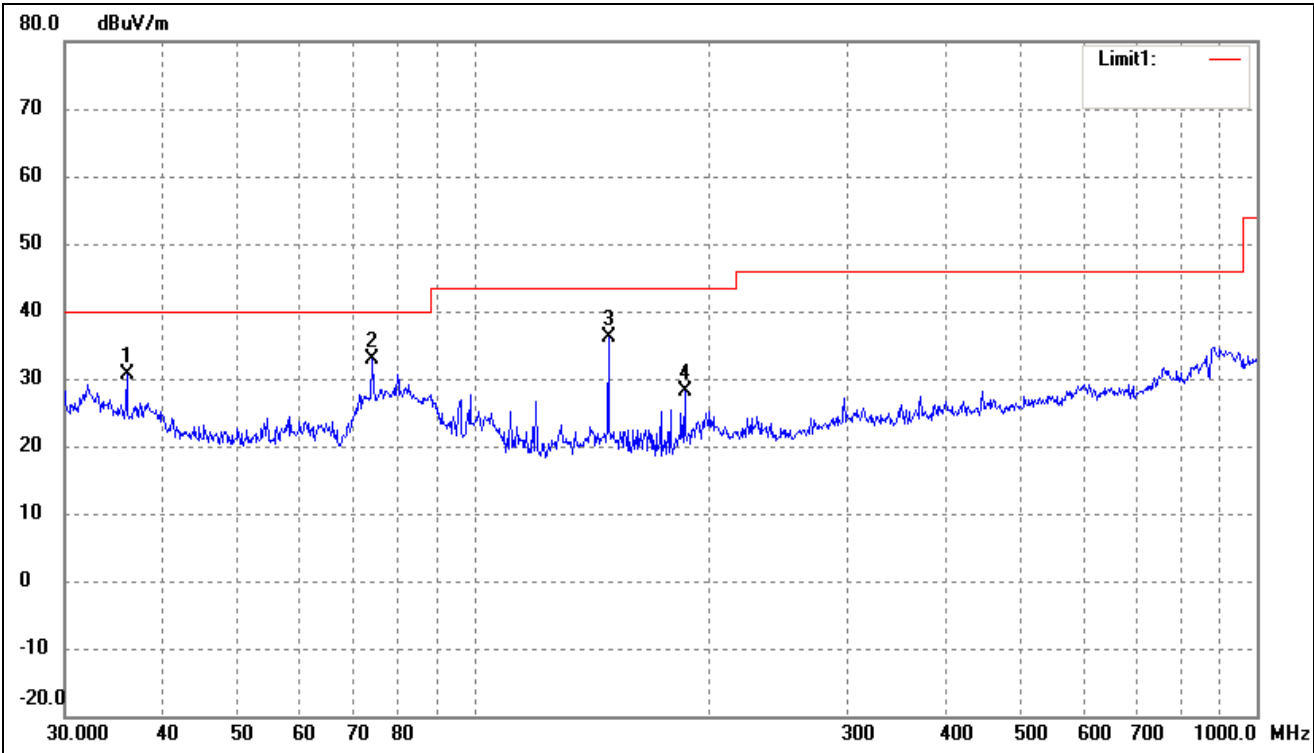
According to the data, the EUT complied with the FCC Part 15.109(a) rule, and had the worst margin of:

-1.08 dB at 323.3204 MHz in the Horizontal polarization, 9 kHz to 5 GHz, 3Meters

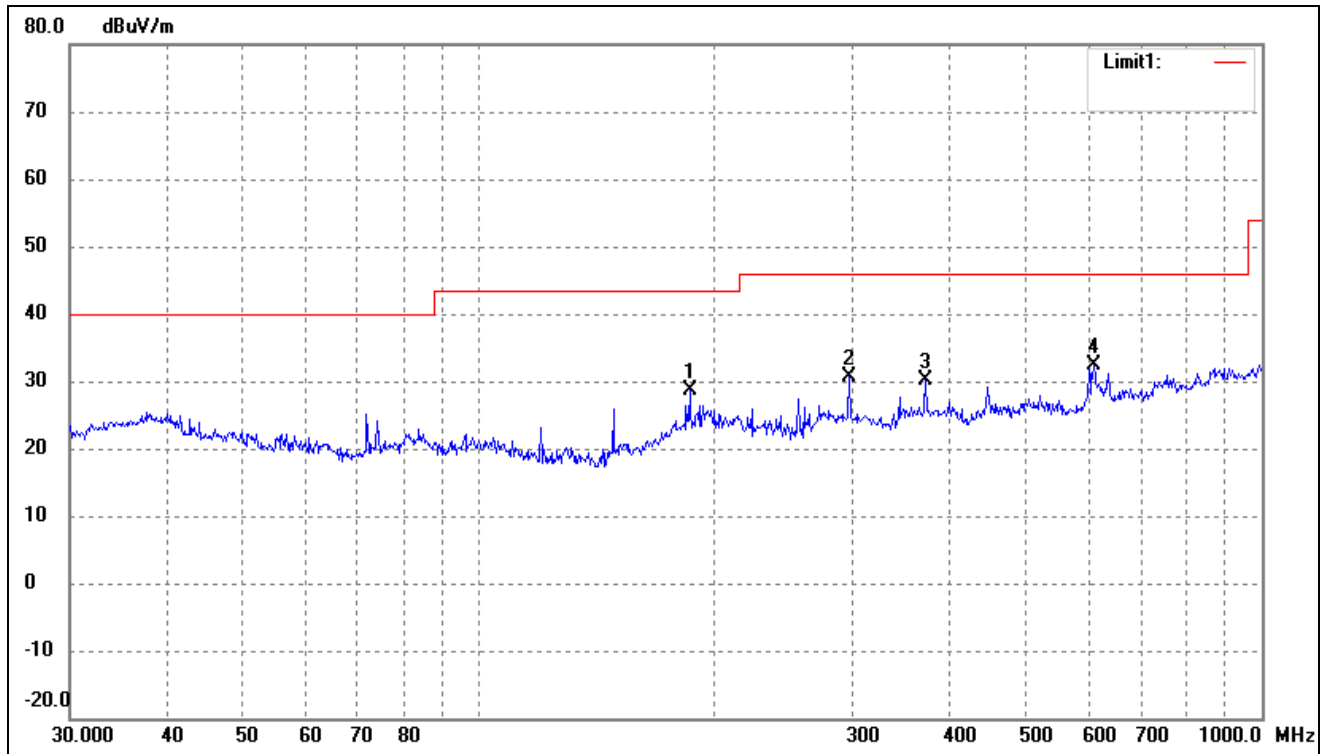
Plot of Radiated Emissions Test DataEUT: *Android TV Dongle*Tested Model: *MBR-1100*Operating Condition: *Playing: USB Input HDMI Output And RJ45*Comment: *Adapter:DC5.35V*Test Specification: *Horizontal*

No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	148.4410	24.92	2.49	27.41	43.50	-16.09	21	100	peak
2	222.9502	24.22	5.28	29.50	46.00	-16.50	155	100	peak
3	297.2241	22.99	9.06	32.05	46.00	-13.95	102	200	peak
4	372.0045	23.92	9.21	33.13	46.00	-12.87	123	100	peak
5	609.9217	21.33	12.63	33.96	46.00	-12.04	20	100	peak

Test Specification: Vertical

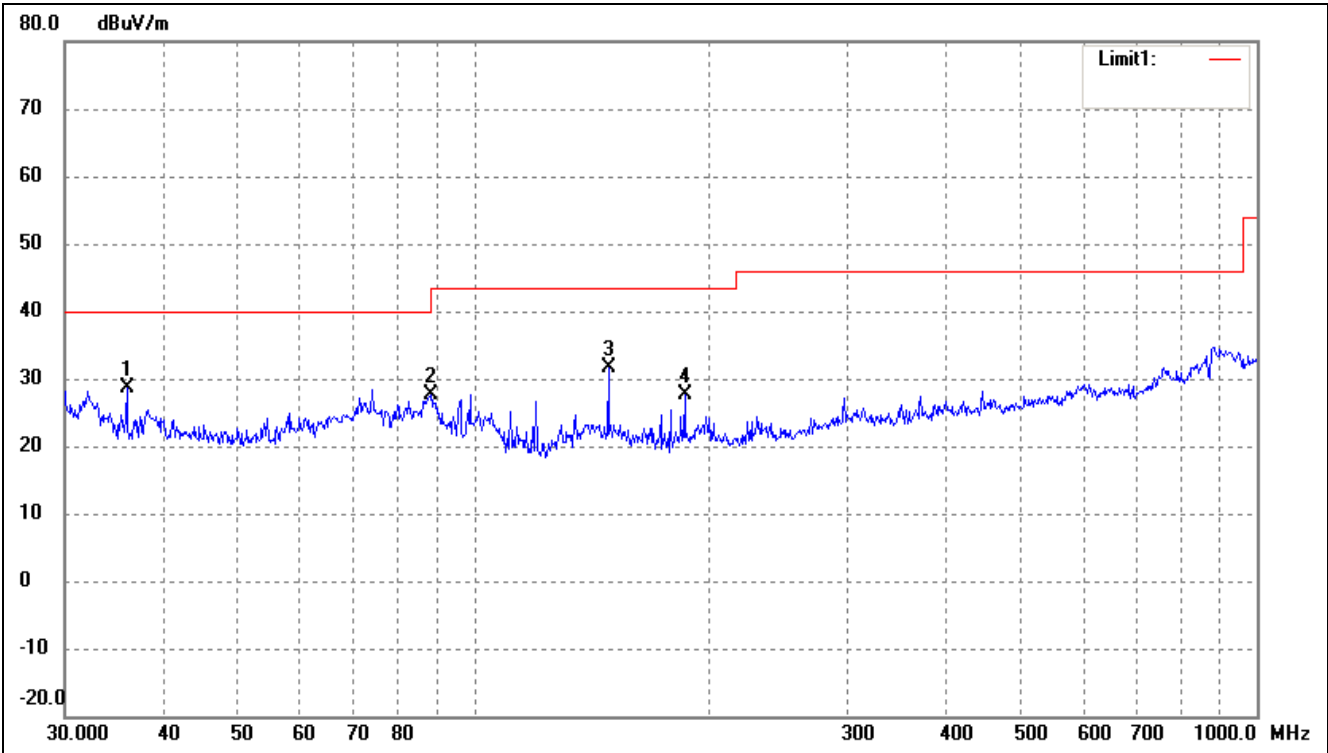


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	36.0007	22.00	8.56	30.56	40.00	-9.44	51	100	peak
2	74.1351	31.26	1.70	32.96	40.00	-7.04	308	100	peak
3	148.4410	33.65	2.49	36.14	43.50	-7.36	120	100	peak
4	185.7882	25.04	3.01	28.05	43.50	-15.45	359	100	peak

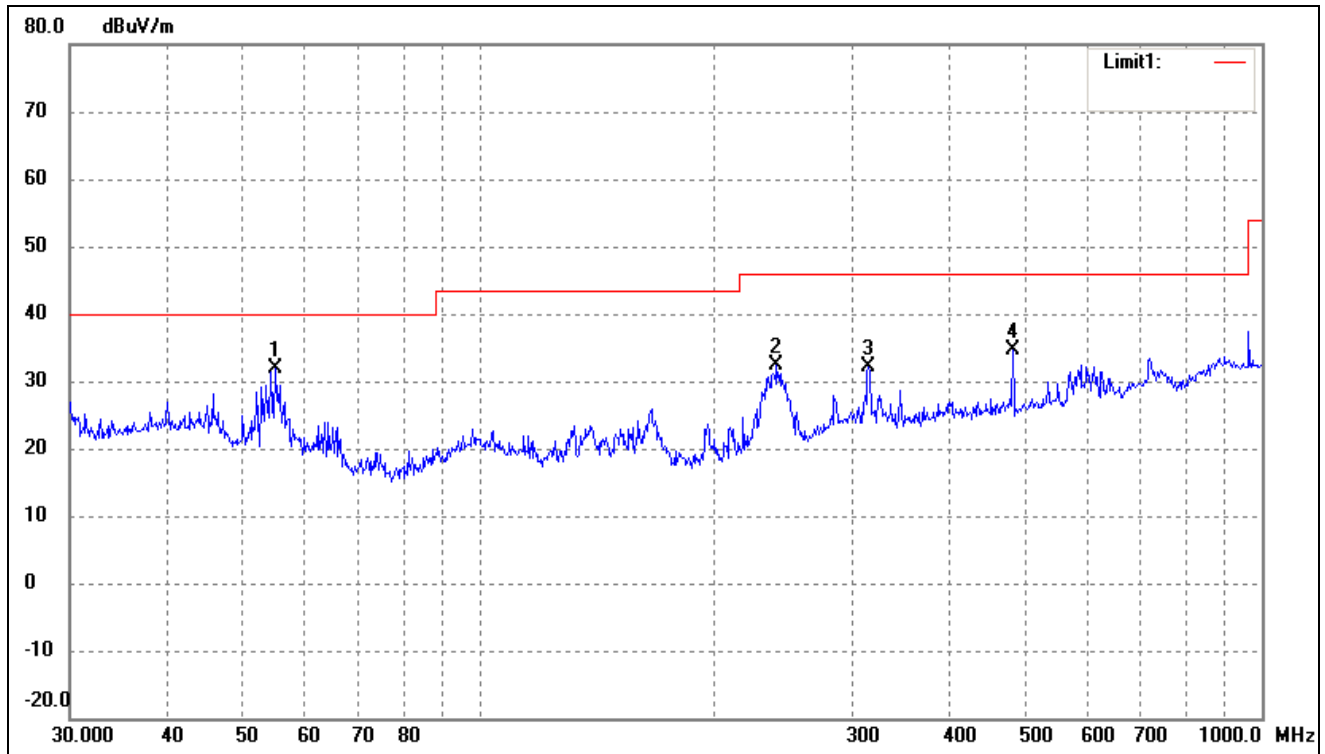
Plot of Radiated Emissions Test DataEUT: *Android TV Dongle*Tested Model: *MBR-1100*Operating Condition: *Playing:TF Card Input HDMI Output*Comment: *Adapter:DC5.35V*Test Specification: *Horizontal*

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Detector
1	185.7880	25.53	3.01	28.54	43.50	-14.96	21	100	peak
2	297.2241	21.49	9.06	30.55	46.00	-15.45	45	100	peak
3	372.0045	20.92	9.21	30.13	46.00	-15.87	125	100	peak
4*	609.9216	19.83	12.63	32.46	46.00	-13.54	201	100	peak

Test Specification: Vertical

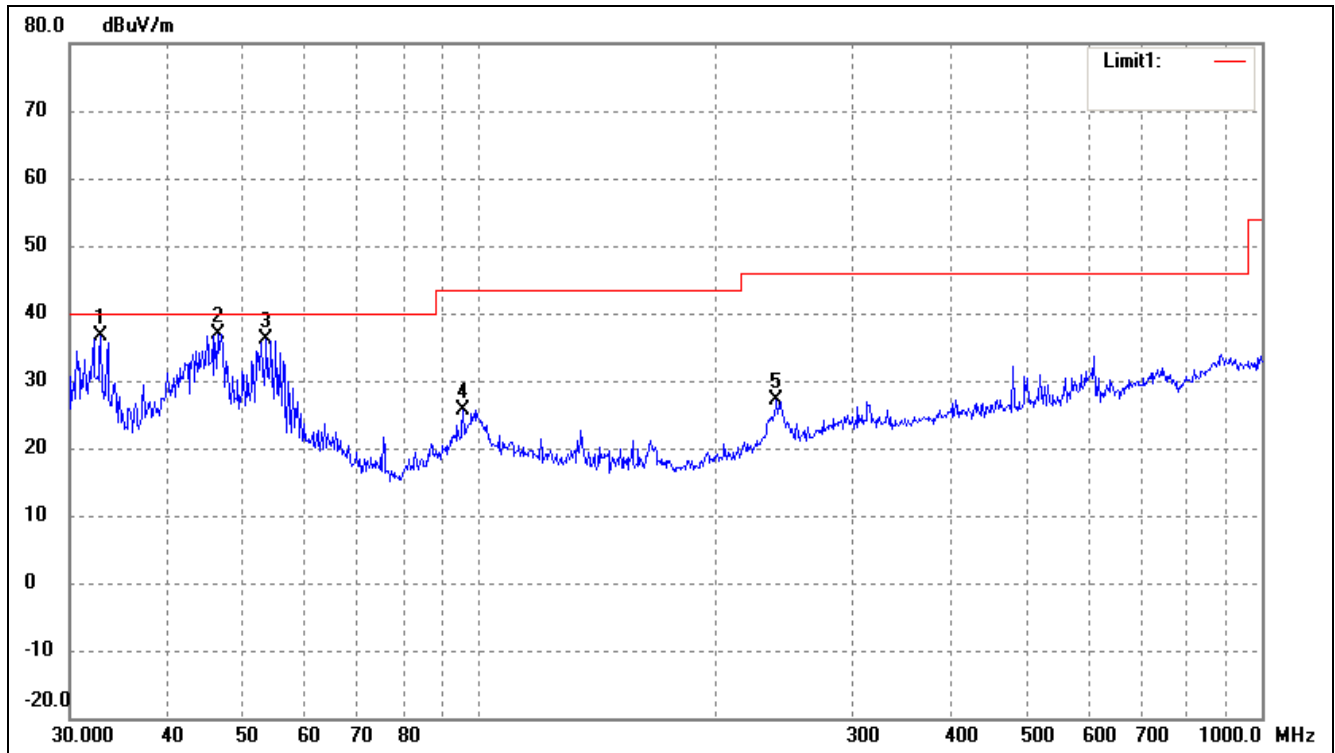


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	36.0007	20.00	8.56	28.56	40.00	-11.44	21	100	peak
2	88.0327	24.47	3.10	27.57	43.50	-15.93	155	100	peak
3	148.4410	29.15	2.49	31.64	43.50	-11.86	32	100	peak
4	185.7880	24.54	3.01	27.55	43.50	-15.95	123	200	peak

Plot of Radiated Emissions Test DataEUT: *Android TV Dongle*Tested Model: *MBR-1100*Operating Condition: *Downloading*Comment: *Adapter:DC5.35V*Test Specification: *Horizontal*

No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	55.0274	26.16	5.82	31.98	40.00	-8.02	12	100	peak
2	239.9874	25.94	6.33	32.27	46.00	-13.73	235	100	peak
3	314.3765	22.85	9.26	32.11	46.00	-13.89	89	100	peak
4	480.5276	24.49	10.12	34.61	46.00	-11.39	210	200	peak

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Detector
1	32.8637	31.25	5.36	36.61	40.00	-3.39	21	100	peak
2	46.3402	30.19	6.63	36.82	40.00	-3.18	125	100	peak
3	53.5052	30.23	5.95	36.18	40.00	-3.82	89	100	peak
4	95.4270	20.77	4.98	25.75	43.50	-17.75	321	200	peak
5	239.9874	20.86	6.33	27.19	46.00	-18.81	122	200	peak

The measurements greater than 20dB below the limit from 9kHz to 30MHz, 1 to 5GHz and test data are not provided.

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