FCC Part 15B
Measurement and Test Report

For

Hyundai Corporation

25, Yulgok-ro 2-Gil, Jongno-gu, Seoul, South Korea

FCC ID: RQQHLT-E50FSL

Test Rule(s):	FCC Part 15 Subpart B
Product Description:	Smart Phone
Tested Model:	e501
Report No.:	STR17088079I-5
Tested Date:	2017-07-04 to 2017-07-10
Issued Date:	2017-09-01
Tested By:	Iven Guo / Engineer
Reviewed By:	Silin Chen / EMC Manager
Approved & Authorized By:	Jandy So / PSQ Manager

Prepared By:

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	Hyundai Corporation
Address of applicant:	25, Yulgok-ro 2-Gil, Jongno-gu, Seoul, South Korea
Manufacturer:	Shenzhen Fortuneship Technology Co., Ltd.
Address of manufacturer:	Room 701-716, 7th Floor, Kanghesheng Building, No.1 ChuangSheng Road, Nanshan District, Shenzhen, Guangdong, P. R. China

General Description of EUT:	
Product Name:	Smart Phone
Brand Name:	/
Model No.:	e501
Adding Model(s):	/
Hardware version:	WW816 V8.5
Software version:	Android 6.0
Rated Voltage:	DC 3.7V
Battery:	2200mAh
Device Category:	Portable Device
Note: The test data is gathered from a production sample provided by the manufacturer.	

Technical Characteristics of EUT	
Rated Voltage:	DC 3.7V
Rated Current:	/
Rated Power:	/
Power Adapter Model:	/
Lowest Internal Frequency:	32.768kHz
Highest Internal Frequency:	1.3GHz

1.2 Test Standards

The following report is prepared on behalf of the Hyundai Corporation 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 C63.4-2014, 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.

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	Charging + Playing	/
TM2	Downloading	/
TM3	Charging + Camera	/

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
USB Cable	1.0	Shielded	Without Ferrite
Earphone	1.2	Unshielded	Without Ferrite

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	E10	LR-63C8R

Special Cable List and Details

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

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
Conducted Emissions	Conducted	±2.88dB
Transmitter Spurious Emissions	Radiated	±5.1dB

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2017-06-12	2018-06-11
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2017-06-12	2018-06-11
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2017-06-12	2018-06-11
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2017-06-12	2018-06-11
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2017-06-12	2018-06-11
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2017-06-12	2018-06-11
SEMT-1042	Horn Antenna	ETS	3117	00086197	2017-06-12	2018-06-11
SEMT-1121	Horn Antenna	ETS	3116B	00088203	2017-06-12	2018-06-11
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2017-06-12	2018-06-11
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2017-06-12	2018-06-11
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2017-06-12	2018-06-11
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2017-06-12	2018-06-11

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

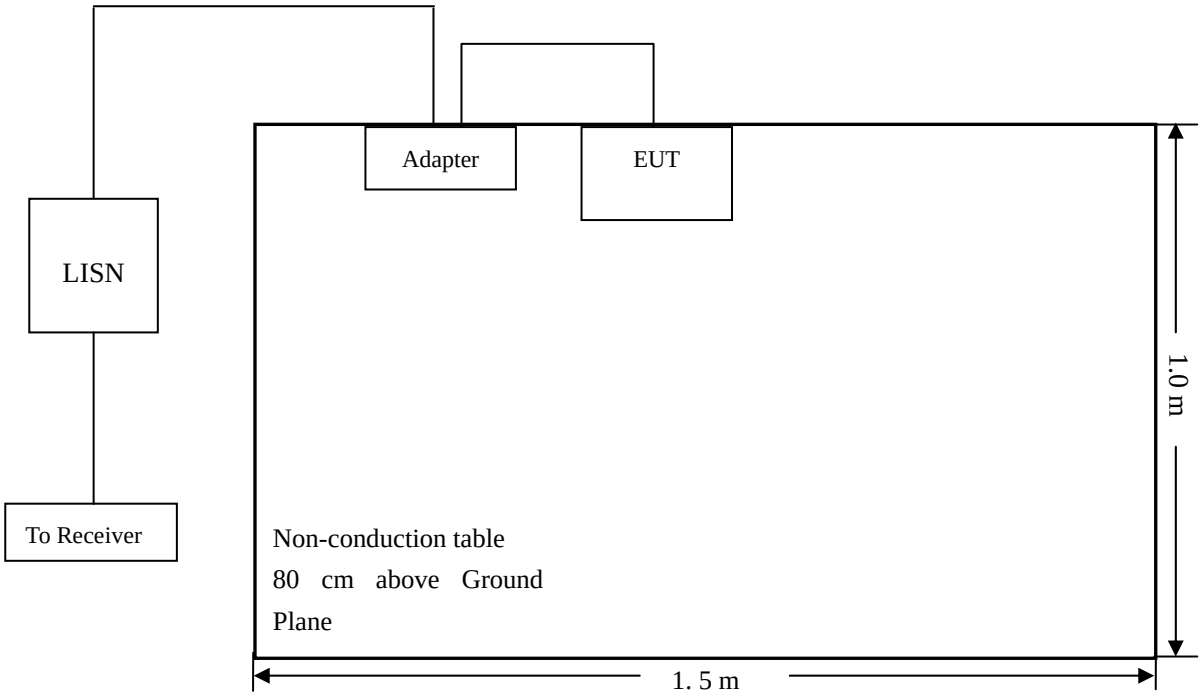
Note: The Conducted Emission test data was copied from the original report (the original report No.: STR16088242I-5, authorize by TIMCO) because the main board was all the same except the back Camera pixel and the finger print sensor (e501 without finger print sensor), Radiated Emissions was tested newly.

3. Conducted Emissions

3.1 Test Procedure

Test is conducting under the description of ANSI C63.4-2014, 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.

3.2 Basic Test Setup Block Diagram



3.3 Environmental Conditions

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

3.4 Summary of Test Results/Plots

According to the data in section 3.6, the EUT complied with the FCC Part 15.107(a) Conducted margin for a Class B device, with the *worst* margin reading of:

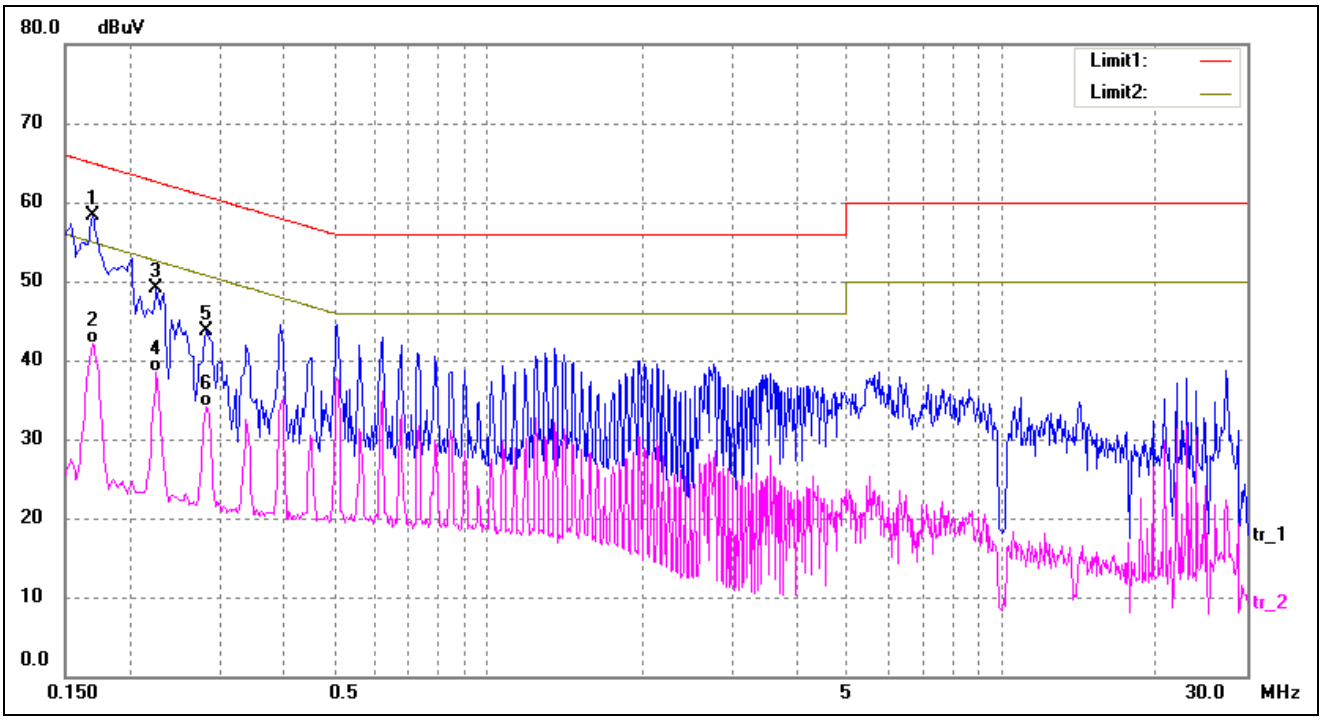
-1.75 dB at **0.5060 MHz** in the **Line**, **TM1** Mode, **Average** detector, 0.15-30MHz

3.5 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

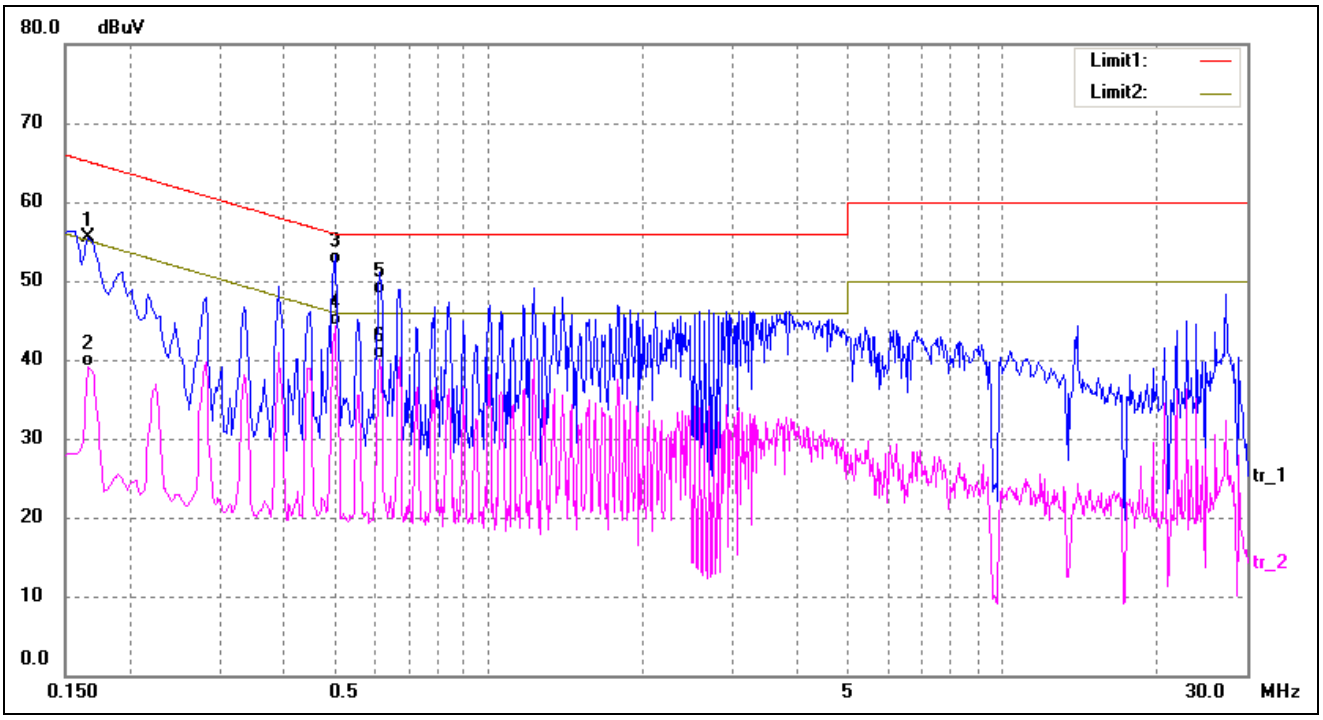
EUT: *Smart Phone*
Tested Model: *e501*
Operating Condition: *TM1*
Comment: *AC 120V/60Hz; Adapter DC 5V*

Test Specification: *Neutral*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1*	0.1700	48.88	9.50	58.38	64.96	-6.58	peak
2	0.1700	32.65	9.50	42.15	54.96	-12.81	AVG
3	0.2260	39.64	9.50	49.14	62.60	-13.46	peak
4	0.2260	29.07	9.50	38.57	52.60	-14.03	AVG
5	0.2820	34.25	9.50	43.75	60.76	-17.01	peak
6	0.2820	24.51	9.50	34.01	50.76	-16.75	AVG

Test Specification: *Line*

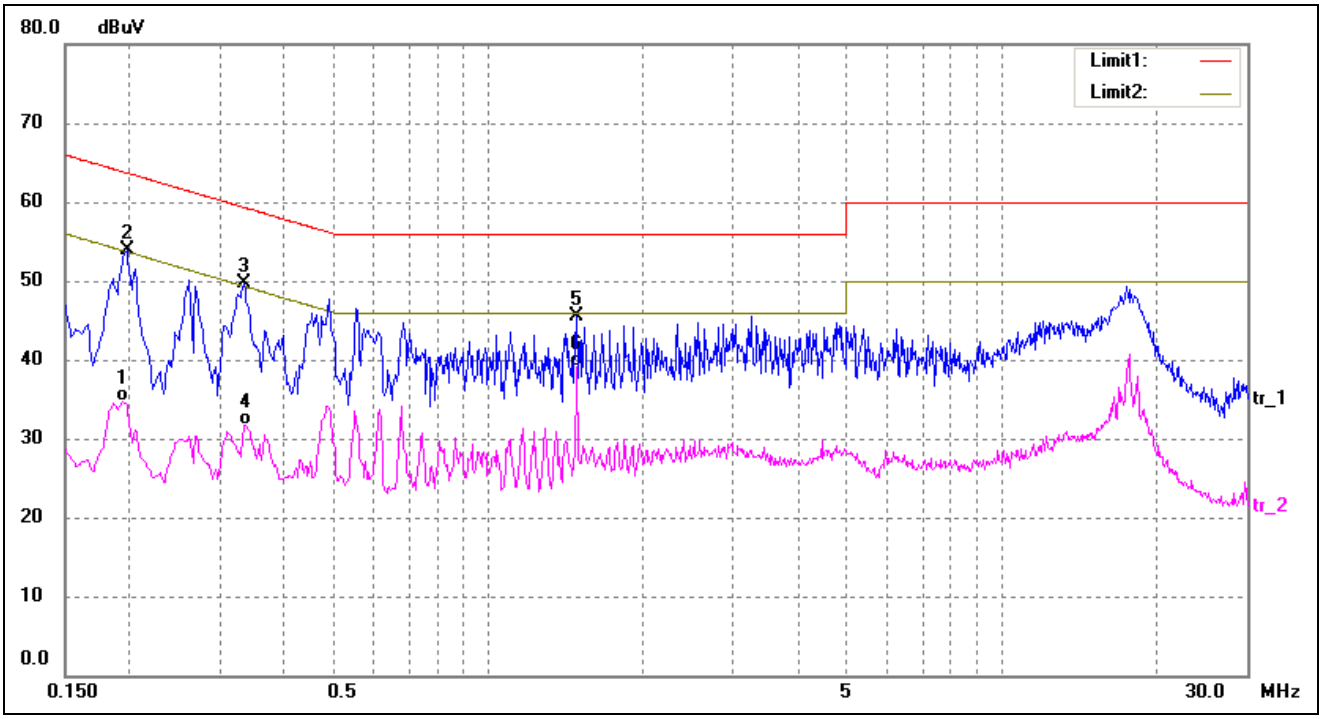


No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.1660	46.02	9.50	55.52	65.16	-9.64	peak
2	0.1660	29.63	9.50	39.13	55.16	-16.03	AVG
3	0.5020	42.63	9.56	52.19	56.00	-3.81	QP
4*	0.5060	34.69	9.56	44.25	46.00	-1.75	AVG
5	0.6140	38.70	9.59	48.29	56.00	-7.71	QP
6	0.6140	30.61	9.59	40.20	46.00	-5.80	AVG

Plot of Conducted Emissions Test Data

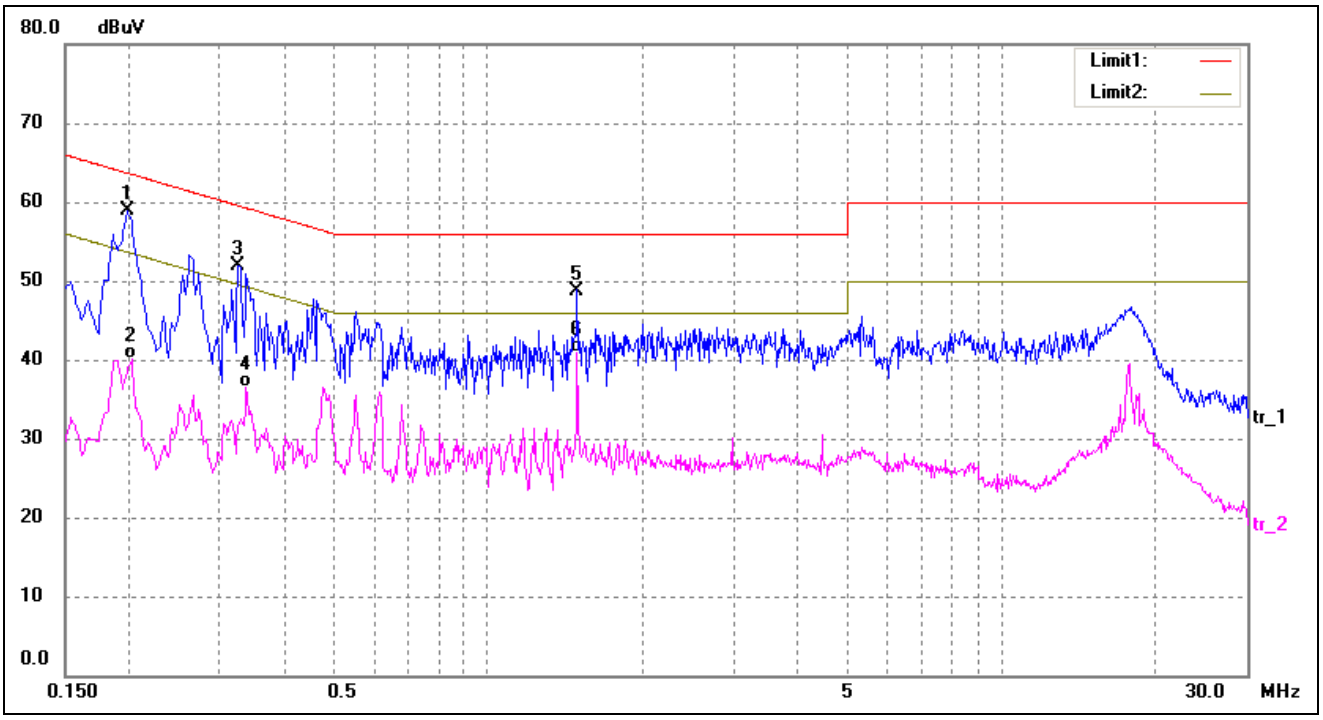
EUT: *Smart Phone*
Tested Model: *E500*
Operating Condition: *e501*
Comment: *AC 120V/60Hz, USB 5V*

Test Specification: *Neutral*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.1940	22.24	12.50	34.74	53.86	-19.12	AVG
2	0.1980	41.50	12.50	54.00	63.69	-9.69	peak
3	0.3340	37.25	12.50	49.75	59.35	-9.60	peak
4	0.3380	19.27	12.50	31.77	49.25	-17.48	AVG
5	1.4900	32.43	13.00	45.43	56.00	-10.57	peak
6*	1.4900	26.17	13.00	39.17	46.00	-6.83	AVG

Test Specification: *Line*

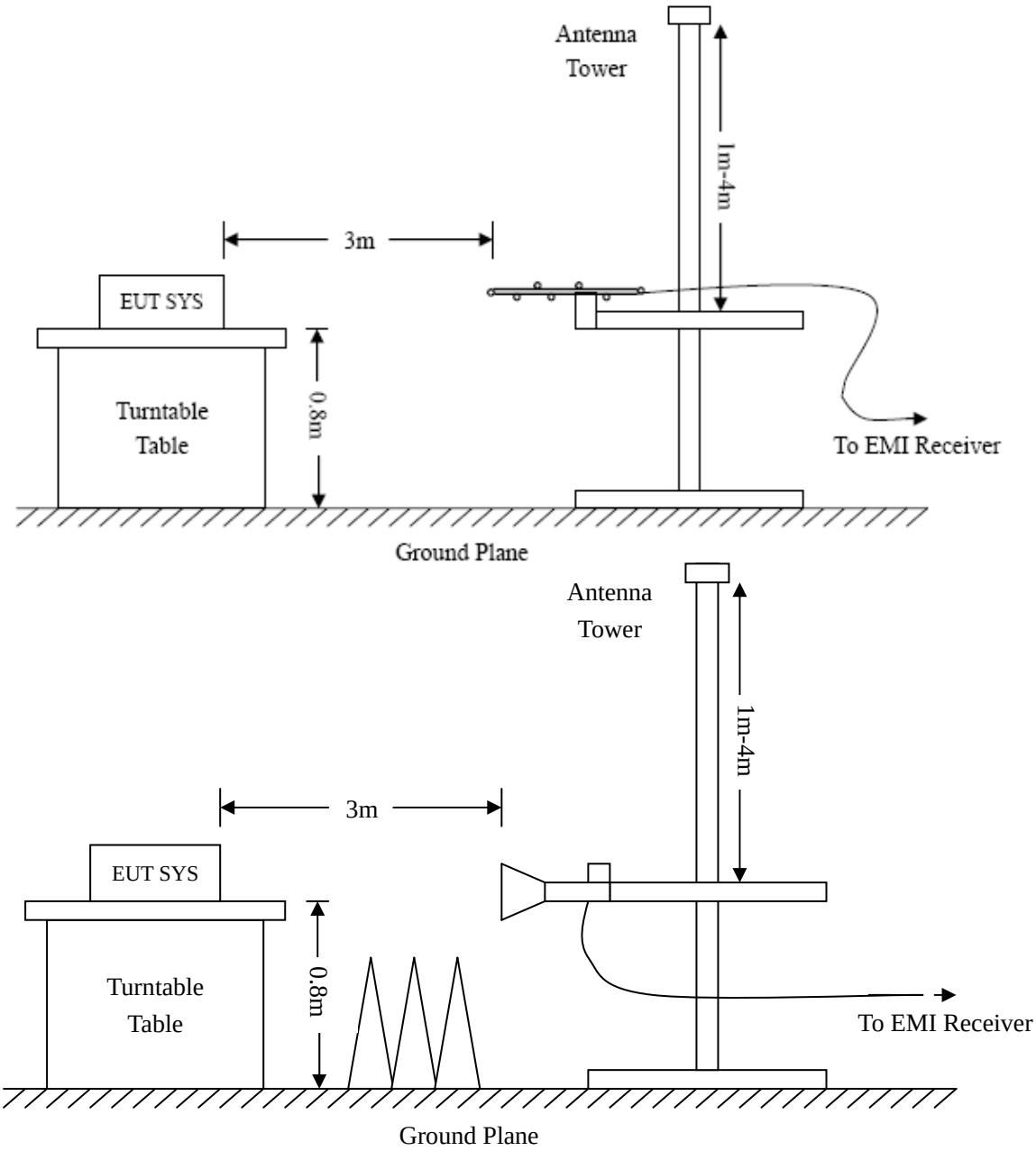


No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1*	0.1980	46.38	12.50	58.88	63.69	-4.81	peak
2	0.2020	27.51	12.50	40.01	53.53	-13.52	AVG
3	0.3260	39.36	12.50	51.86	59.55	-7.69	peak
4	0.3380	24.09	12.50	36.59	49.25	-12.66	AVG
5	1.4940	35.80	13.00	48.80	56.00	-7.20	peak
6	1.4940	27.88	13.00	40.88	46.00	-5.12	AVG

4. Radiated Emissions

4.1 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 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.



4.2 Test Receiver Setup

Frequency :9kHz-30MHz	Frequency :30MHz-1GHz	Frequency :Above 1GHz
RBW=10KHz,	RBW=120KHz,	RBW=1MHz,
VBW =30KHz	VBW=300KHz	VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto	Sweep time= Auto	Sweep time= Auto
Trace = max hold	Trace = max hold	Trace = max hold
Detector function = peak	Detector function = peak, QP	Detector function = peak, AV

4.3 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:

Corr. Ampl. = Indicated Reading – Corr. Factor

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

Margin = Corr. Ampl. – FCC Part 15.109(a) Limit

4.4 Environmental Conditions

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

4.5 Summary of Test Results/Plots

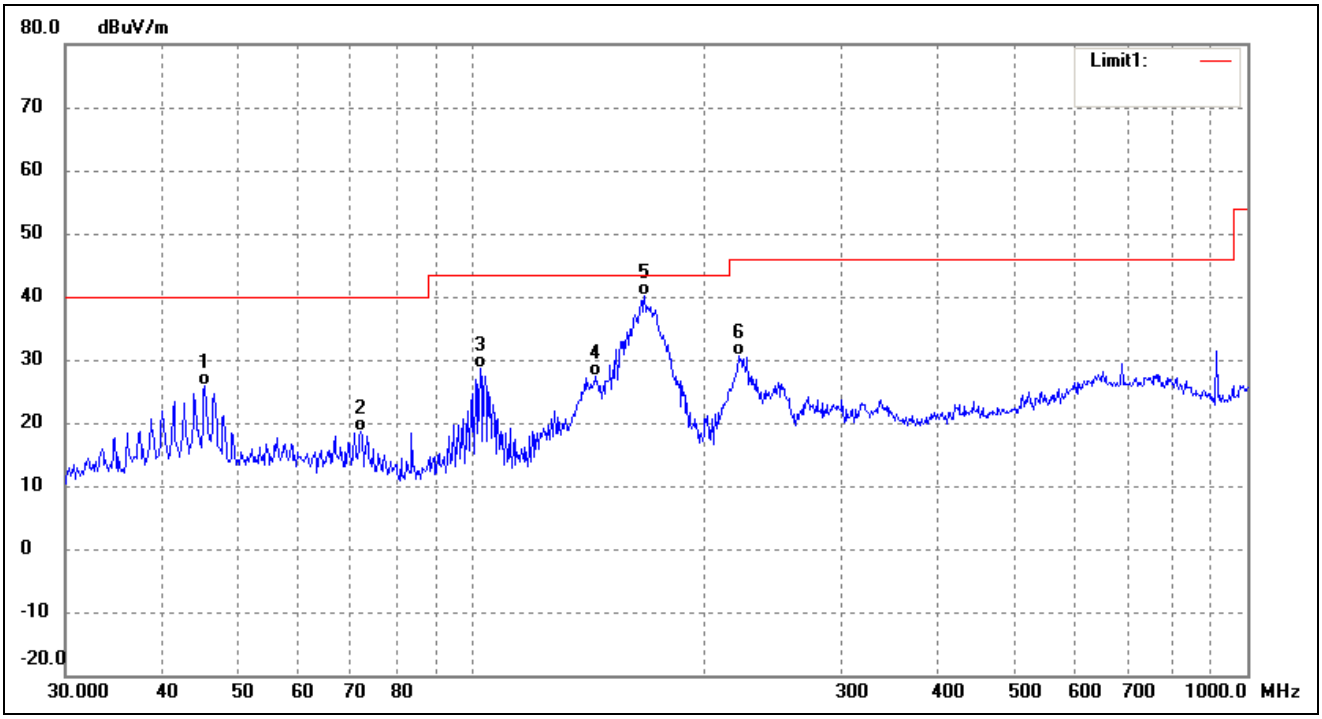
According to the data, the EUT complied with the FCC Part 15.109(a) rule, and had the worst margin of:

-1.11 dB at 172.5988 MHz in the Vertical polarization, **TM1** Mode, **30MHz** to **12.75GHz**, **3Meters**

Plot of Radiated Emissions Test Data

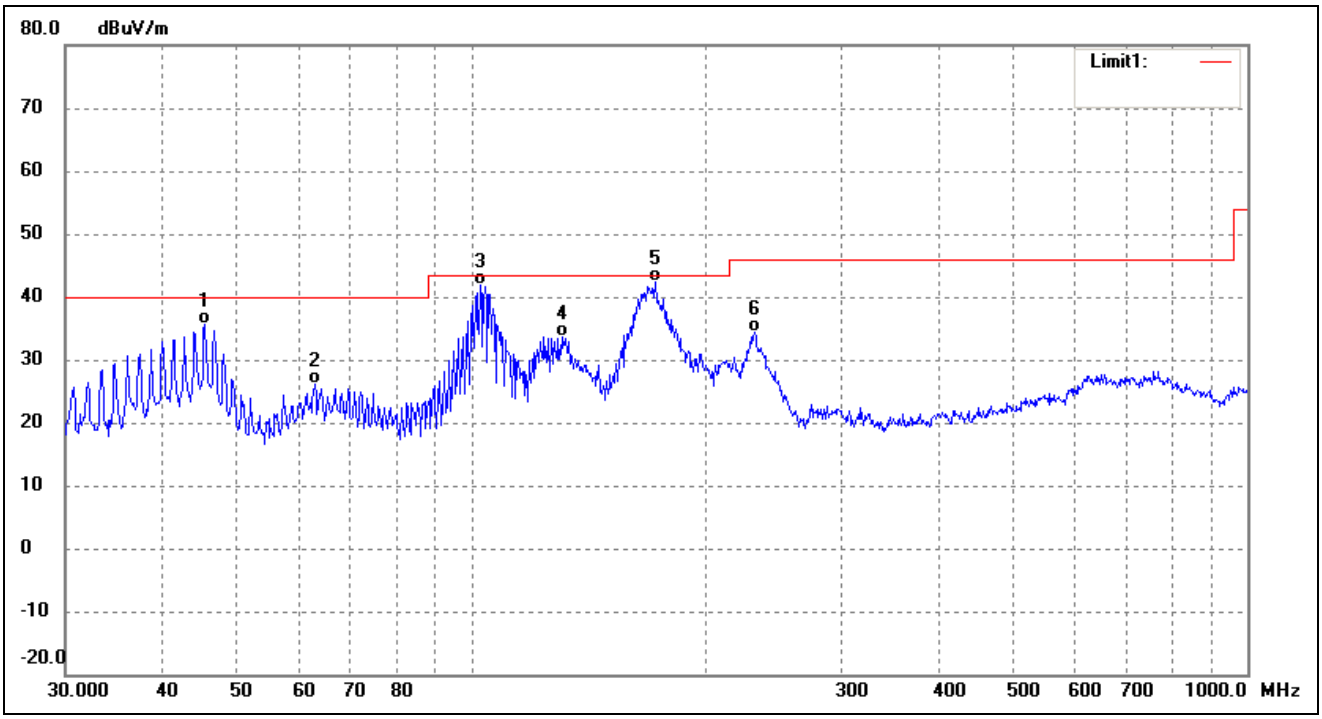
EUT: *Smart Phone*
Tested Model: *e501*
Operating Condition: *TM1*
Comment: *AC 120V/60Hz; Adapter DC 5V*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	45.3755	42.46	-16.49	25.97	40.00	-14.03	271	100	QP
2	72.0843	37.61	-18.97	18.64	40.00	-21.36	100	100	QP
3	102.7192	45.23	-16.59	28.64	43.50	-14.86	316	100	QP
4	144.3348	45.84	-18.50	27.34	43.50	-16.16	118	100	QP
5	167.2368	59.28	-19.05	40.23	43.50	-3.27	120	100	QP
6	221.3921	44.48	-13.76	30.72	46.00	-15.28	109	100	QP

Test Specification: *Vertical*

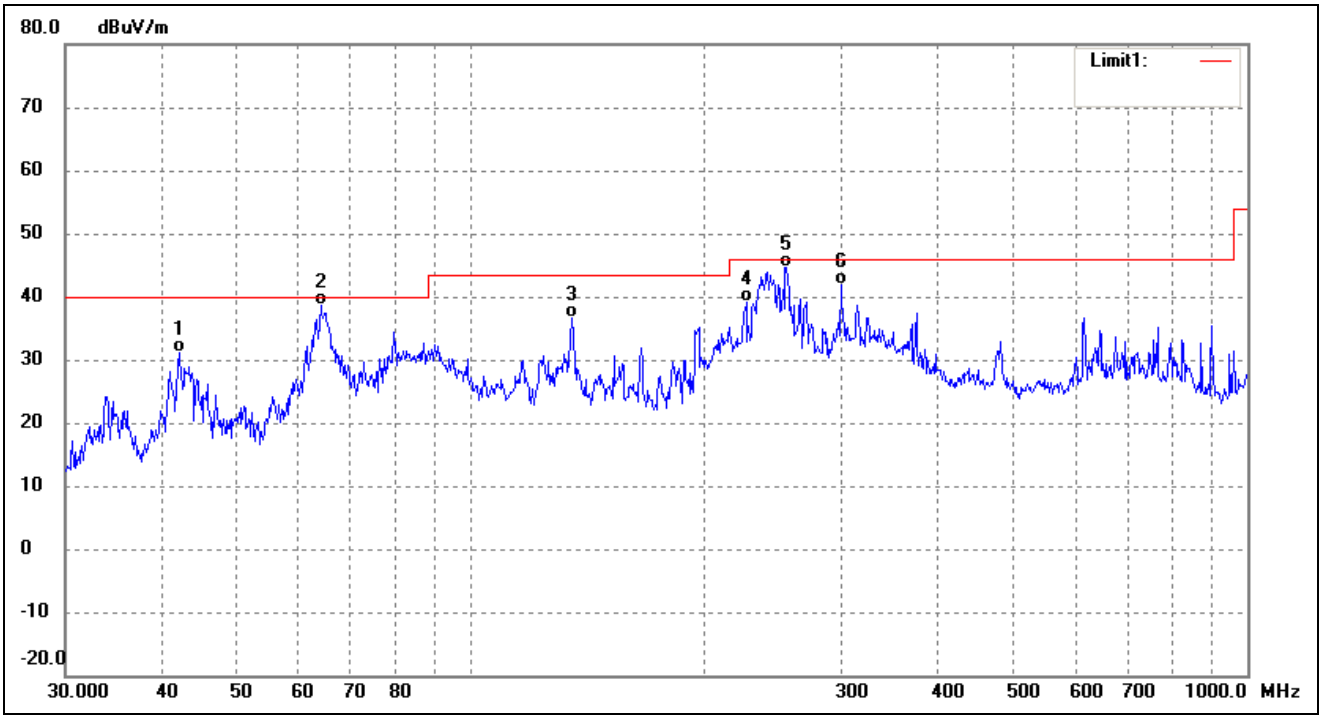


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	45.3755	52.02	-16.49	35.53	40.00	-4.47	231	100	QP
2	62.8708	43.20	-17.12	26.08	40.00	-13.92	90	100	QP
3	102.7192	58.55	-16.59	41.96	43.50	-1.54	85	100	QP
4	130.8369	51.18	-17.57	33.61	43.50	-9.89	97	100	QP
5	172.5988	61.45	-19.06	42.39	43.50	-1.11	203	100	QP
6	231.7179	47.42	-13.09	34.33	46.00	-11.67	313	100	QP

Plot of Radiated Emissions Test Data

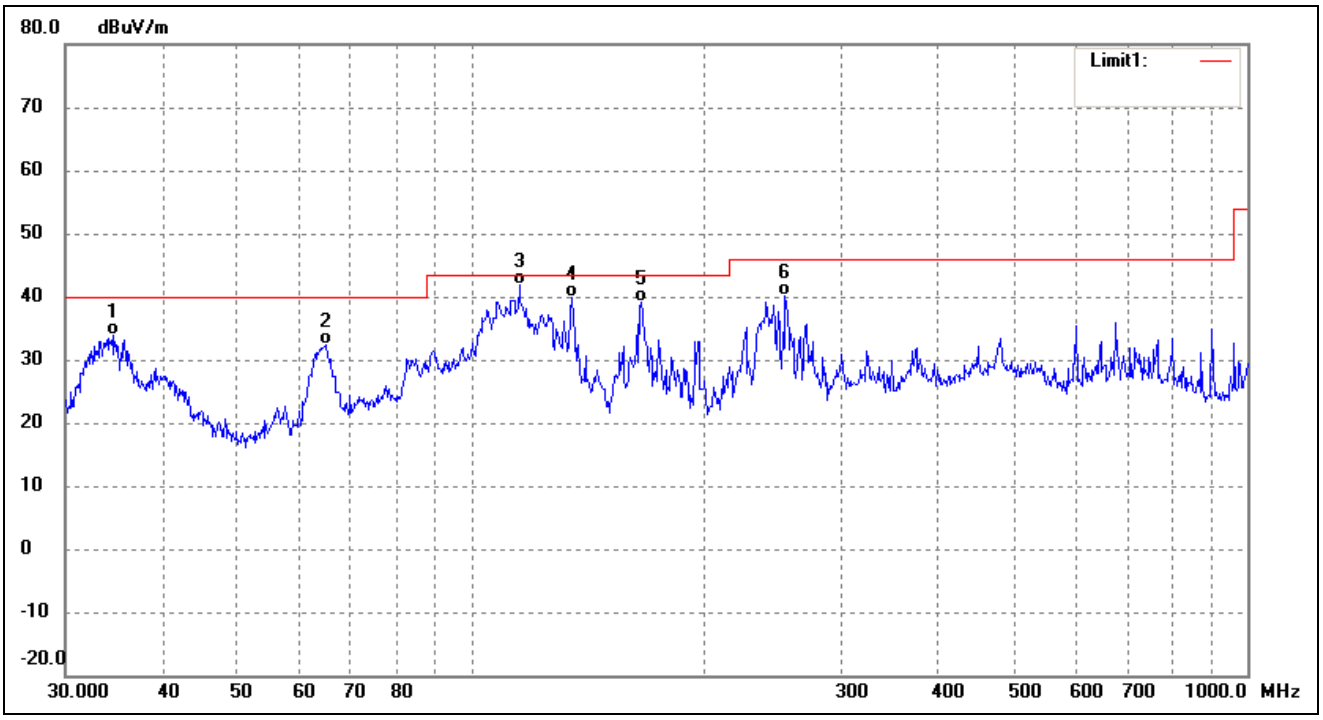
EUT: *Smart Phone*
Tested Model: *e501*
Operating Condition: *TM2*
Comment: *AC 120V/60Hz, USB 5V*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	42.0066	47.57	-16.51	31.06	40.00	-8.94	214	100	QP
2	63.9828	56.04	-17.35	38.69	40.00	-1.31	91	100	QP
3	134.5592	54.43	-17.89	36.54	43.50	-6.96	250	100	QP
4	226.0994	52.58	-13.45	39.13	46.00	-6.87	109	100	QP
5	254.7284	56.65	-11.97	44.68	46.00	-1.32	251	100	QP
6	299.3158	51.52	-9.62	41.90	46.00	-4.10	314	100	QP

Test Specification: *Vertical*

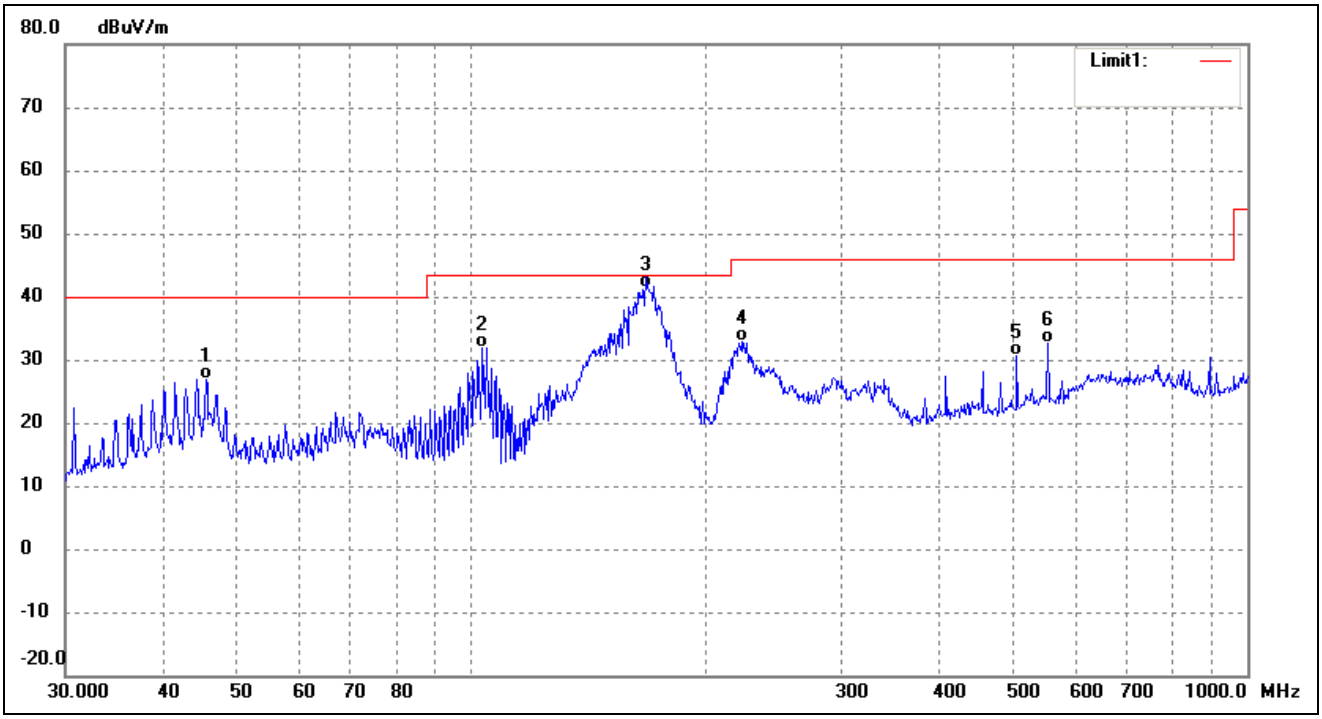


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	34.5173	51.20	-17.39	33.81	40.00	-6.19	219	100	QP
2	64.8865	50.04	-17.56	32.48	40.00	-7.52	113	100	QP
3	115.3205	58.59	-16.64	41.95	43.50	-1.55	67	100	QP
4	134.5592	57.78	-17.89	39.89	43.50	-3.61	129	100	QP
5	165.4866	58.18	-19.06	39.12	43.50	-4.38	157	100	QP
6	253.8367	52.18	-12.00	40.18	46.00	-5.82	307	100	QP

Plot of Radiated Emissions Test Data

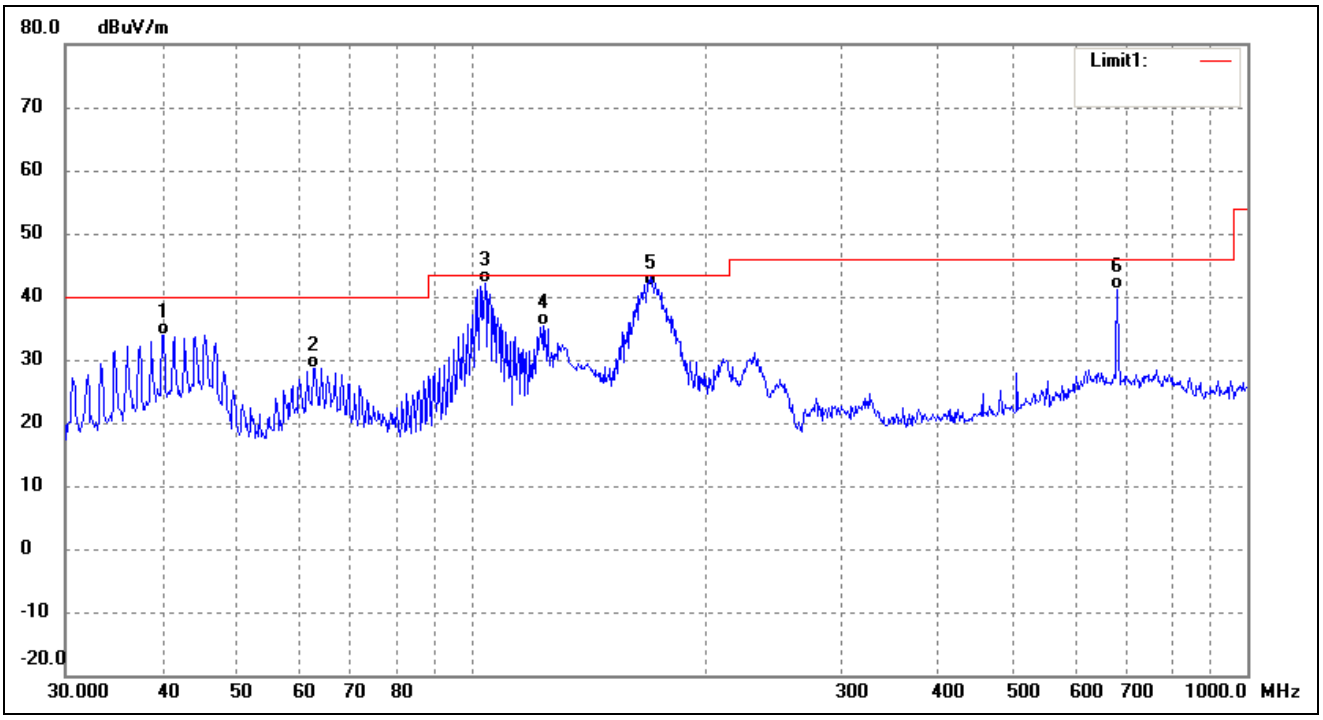
EUT: *Smart Phone*
Tested Model: *e501*
Operating Condition: *TM3*
Comment: *AC 120V/60Hz; Adapter DC 5V*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	45.5348	43.36	-16.49	26.87	40.00	-13.13	218	100	QP
2	103.4421	48.58	-16.59	31.99	43.50	-11.51	135	100	QP
3	167.8243	60.40	-19.05	41.35	43.50	-2.15	56	100	QP
4	222.9502	46.60	-13.66	32.94	46.00	-13.06	317	100	QP
5	504.7062	36.39	-5.67	30.72	46.00	-15.28	114	100	QP
6	552.8832	37.58	-5.04	32.54	46.00	-13.46	345	100	QP

Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	40.1347	50.48	-16.53	33.95	40.00	-6.05	141	100	QP
2	62.6507	45.73	-17.07	28.66	40.00	-11.34	172	100	QP
3	104.1701	58.74	-16.60	42.14	43.50	-1.36	110	100	QP
4	124.1330	52.27	-17.01	35.26	43.50	-8.24	145	100	QP
5	170.1948	60.60	-19.05	41.55	43.50	-1.95	158	100	QP
6	679.9600	41.54	-0.37	41.17	46.00	-4.83	238	100	QP

Note: Testing is carried out with frequency rang 30MHz to the 12.75GHz, which above 1GHz is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.

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