FCC Part 15B
Measurement and Test Report

For

Hyundai Corporation

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

FCC ID: RQQHLT-E40FSS

Test Rule(s):	FCC Part 15 Subpart B
Product Description:	Smart Phone
Tested Model:	E435 Lite
Report No.:	STR16088241I-5
Tested Date:	2016-08-23 to 2016-09-09
Issued Date:	2016-09-12
Tested By:	Iven Guo / Engineer
Reviewed By:	Silin Chen / EMC Manager
Approved & Authorized By:	Jandy So / PSQ Manager

Prepared By:

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TABLE OF CONTENTS

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
Trade Name:	/
Model No.:	E435 Lite
Adding Model(s):	/
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 of EUT:	32.768kHz
Highest Internal Frequency of EUT:	1.3GHz
Classification of ITE:	Class B

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.

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	Charging & back Camera	With adapter
TM2	Charging & front Camera	With adapter
TM3	Charging & playing	With adapter
TM4	Downloading	Connect to PC

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	2016-06-04	2017-06-03
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2016-06-04	2017-06-03
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2016-06-04	2017-06-03
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2016-06-04	2017-06-03
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2016-06-04	2017-06-03
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2016-06-04	2017-06-03
SEMT-1042	Horn Antenna	ETS	3117	00086197	2016-06-04	2017-06-03
SEMT-1121	Horn Antenna	ETS	3116B	00088203	2016-06-04	2017-06-03
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2016-06-04	2017-06-03
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2016-06-04	2017-06-03
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2016-06-04	2017-06-03
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2016-06-04	2017-06-03

2. SUMMARY OF TEST RESULTS

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

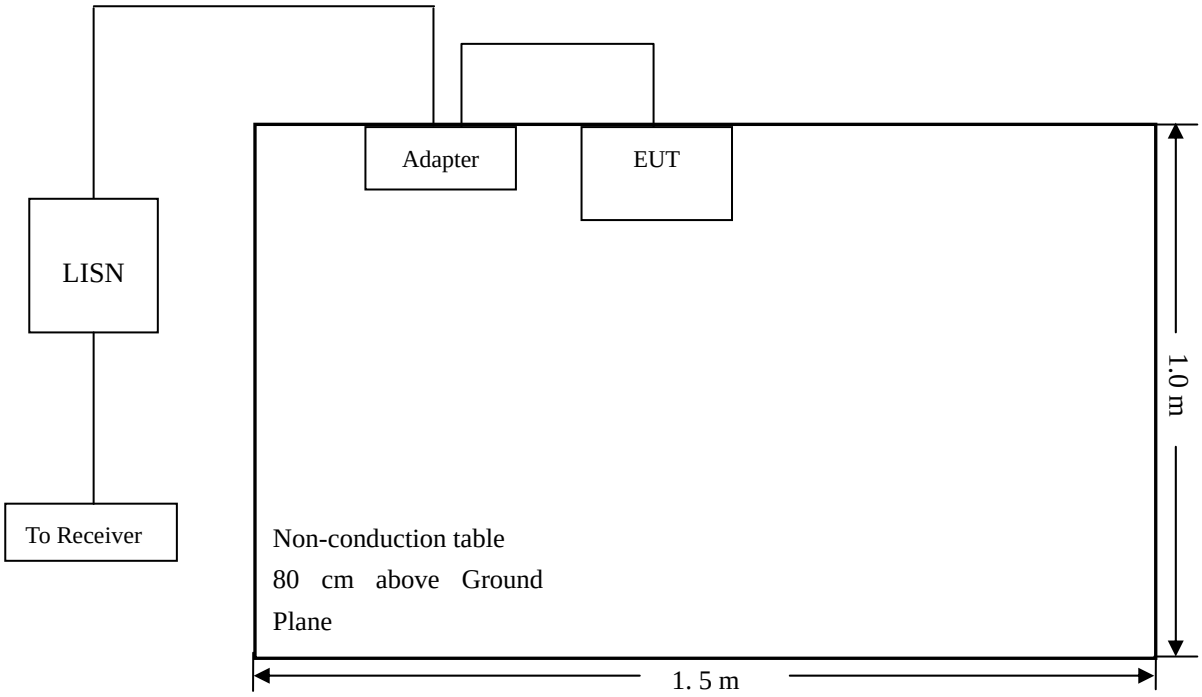
N/A: not applicable

3. Conducted Emissions

3.1 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:

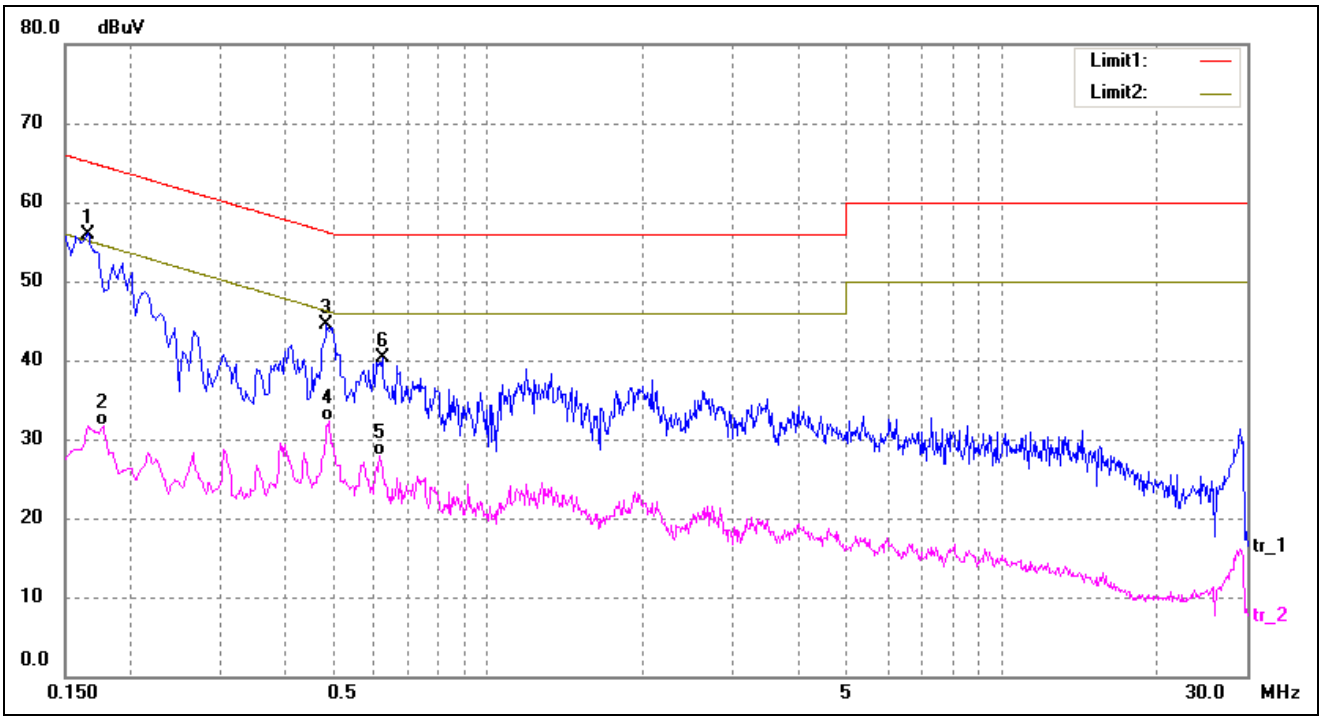
-3.64 dB at **0.4820 MHz** in the **Line**, **Peak** detector, 0.15-30MHz

3.5 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

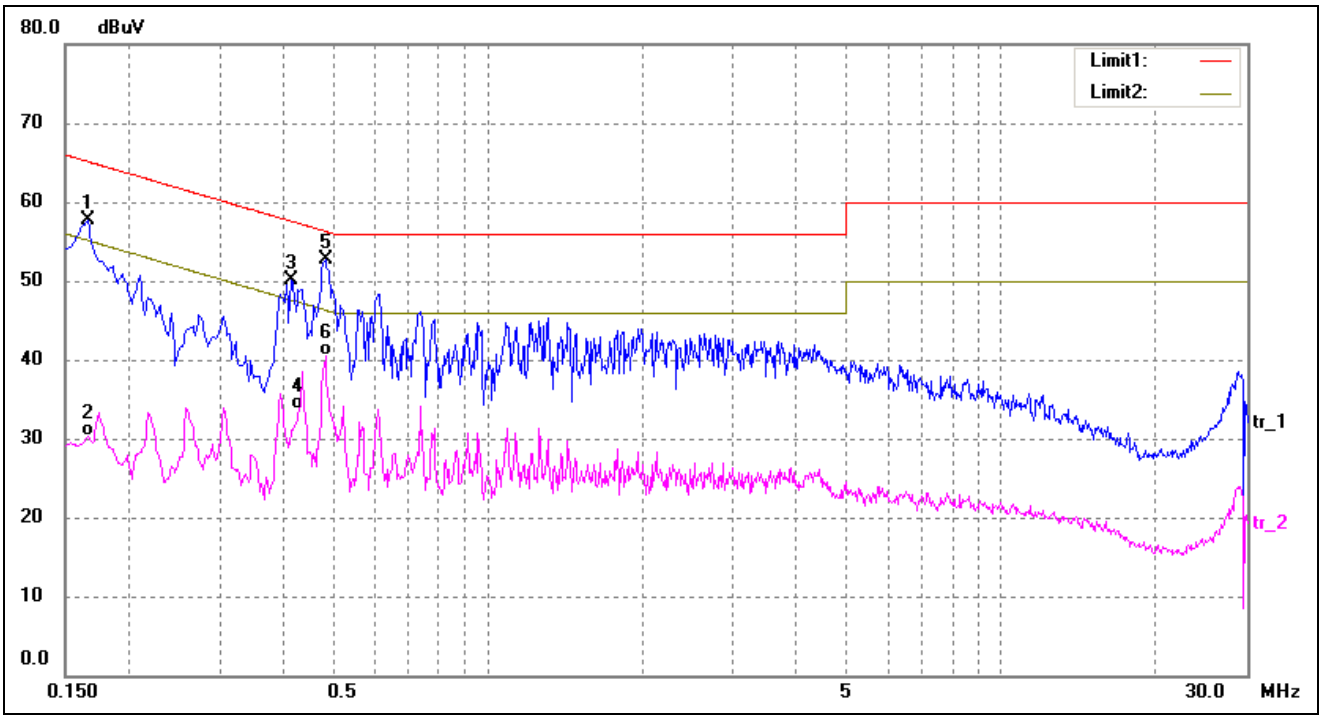
EUT: *Smart Phone*
Tested Model: *E435 Lite*
Operating Condition: *TM1*
Comment: *AC 120V/60Hz; Adapter DC 5V*

Test Specification: *Neutral*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1*	0.1660	46.50	9.50	56.00	65.16	-9.16	peak
2	0.1780	22.28	9.50	31.78	54.58	-22.80	AVG
3	0.4860	34.92	9.55	44.47	56.24	-11.77	peak
4	0.4900	22.82	9.55	32.37	46.17	-13.80	AVG
5	0.6140	18.34	9.59	27.93	46.00	-18.07	AVG
6	0.6220	30.64	9.59	40.23	56.00	-15.77	peak

Test Specification: *Line*

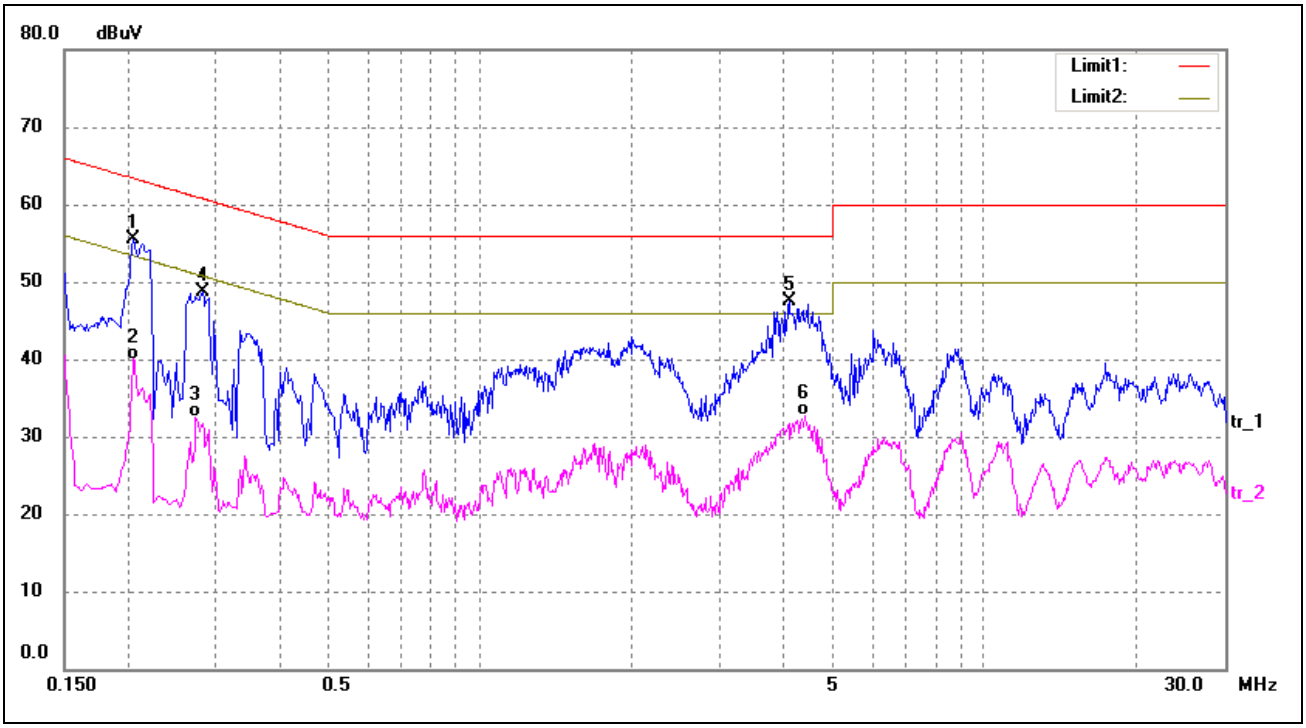


No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.1660	48.16	9.50	57.66	65.16	-7.50	peak
2	0.1660	20.73	9.50	30.23	55.16	-24.93	AVG
3	0.4140	40.69	9.51	50.20	57.57	-7.37	peak
4	0.4300	24.21	9.52	33.73	47.25	-13.52	AVG
5*	0.4820	43.11	9.55	52.66	56.30	-3.64	peak
6	0.4820	30.96	9.55	40.51	46.30	-5.79	AVG

Plot of Conducted Emissions Test Data

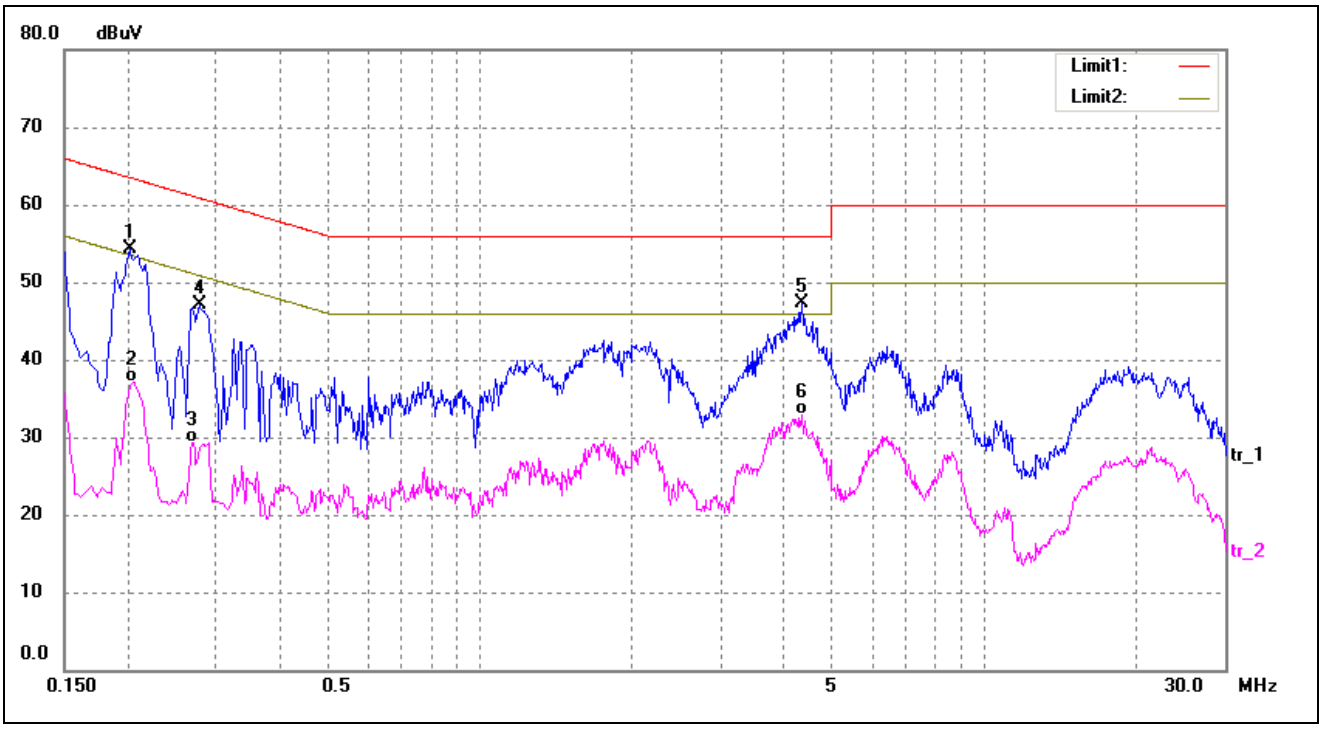
EUT: *Smart Phone*
Tested Model: *E435 Lite*
Operating Condition: *TM4*
Comment: *AC 120V/60Hz, USB 5V*

Test Specification: *Neutral*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1*	0.2060	46.08	9.50	55.58	63.36	-7.78	peak
2	0.2060	30.50	9.50	40.00	53.36	-13.36	AVG
3	0.2740	22.98	9.50	32.48	50.99	-18.51	AVG
4	0.2820	39.23	9.50	48.73	60.75	-12.02	peak
5	4.0979	37.50	10.00	47.50	56.00	-8.50	peak
6	4.4259	22.65	10.00	32.65	46.00	-13.35	AVG

Test Specification: *Line*

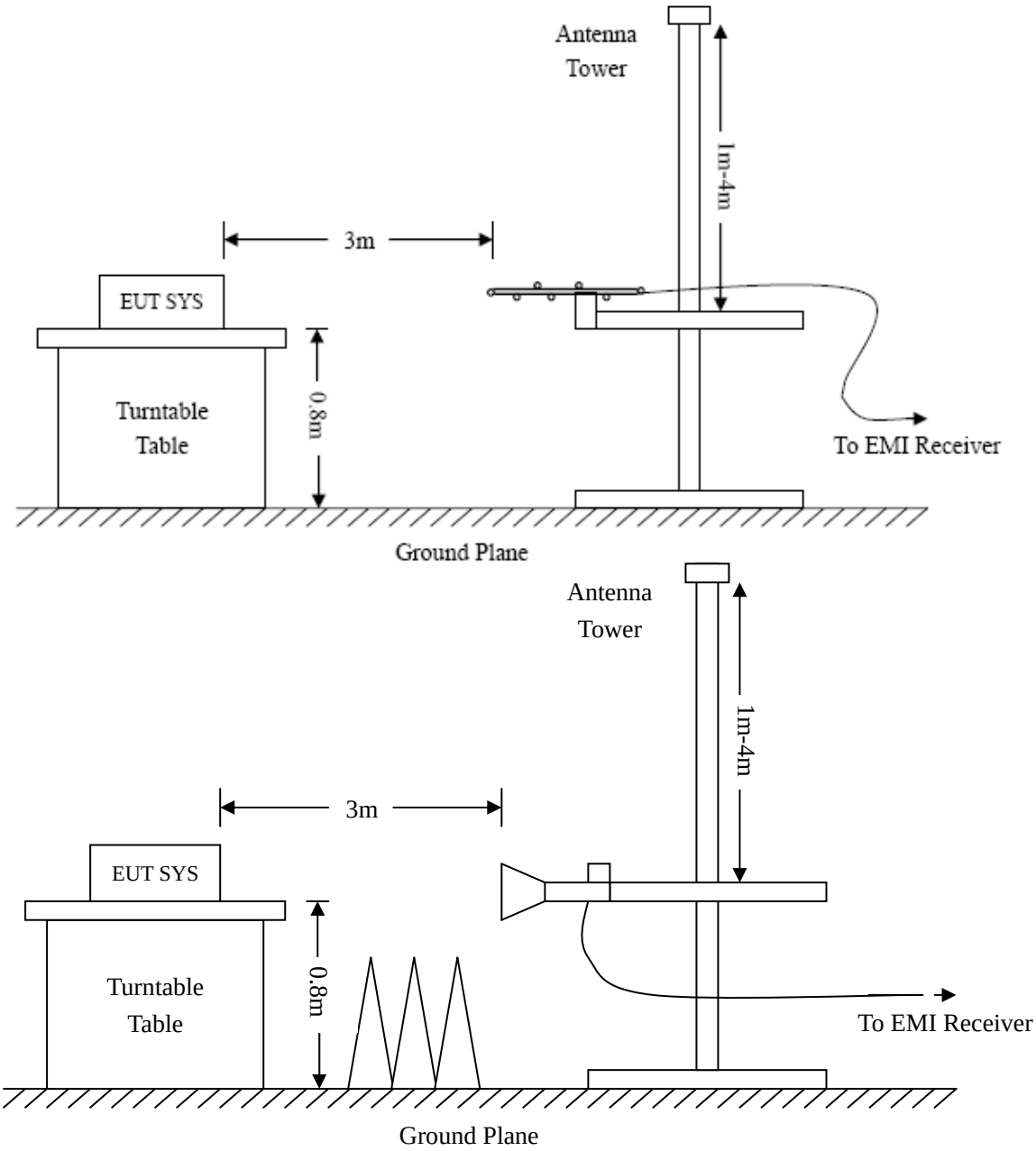


No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.2020	44.88	9.50	54.38	63.53	-9.15	peak
2	0.2060	27.57	9.50	37.07	53.37	-16.30	AVG
3	0.2700	19.85	9.50	29.35	51.12	-21.77	AVG
4	0.2780	37.51	9.50	47.01	60.88	-13.87	peak
5*	4.3420	37.38	10.00	47.38	56.00	-8.62	peak
6	4.3420	22.81	10.00	32.81	46.00	-13.19	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

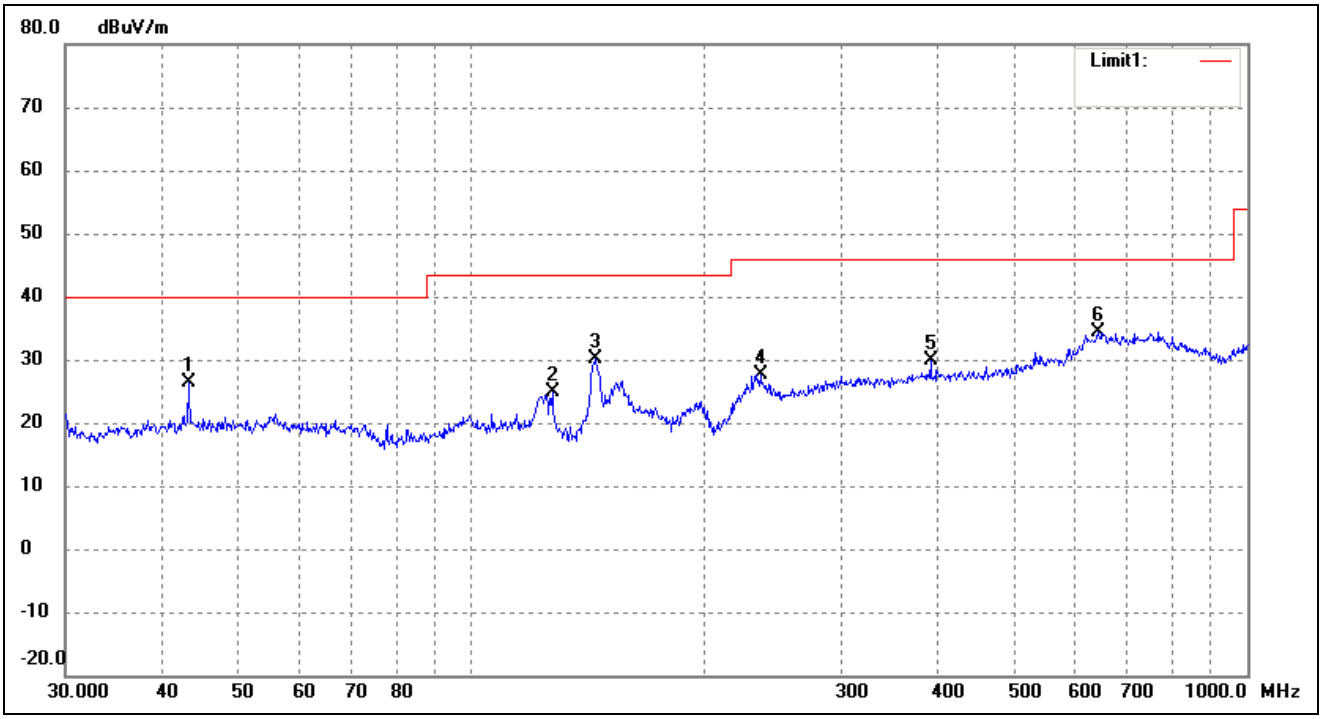
According to the data, the EUT complied with the FCC Part 15.109(a) rule, and had the worst margin of:

-1.67 dB at **239.9874 MHz** in the **Horizontal** polarization, **TM4** mode, **30MHz** to 6**.5 GHz**, **3Meters**

Plot of Radiated Emissions Test Data

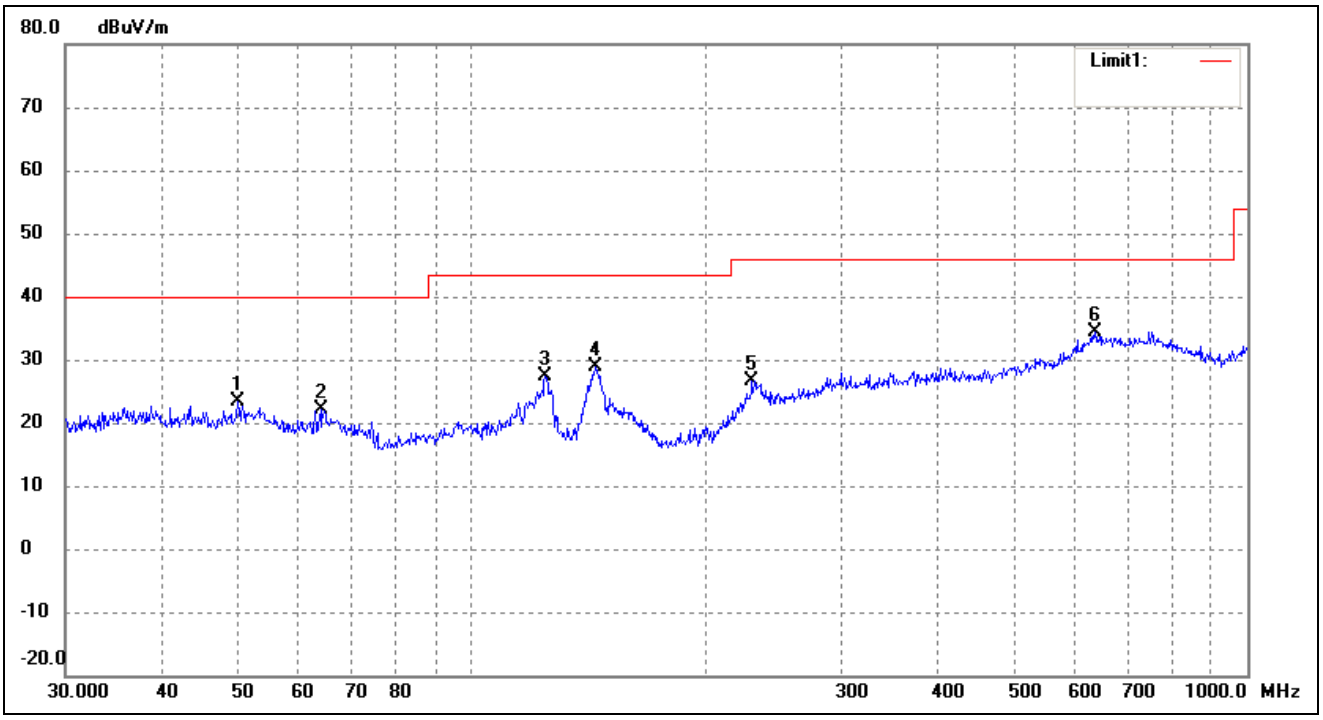
EUT: *Smart Phone*
Tested Model: *E435 Lite*
Operating Condition: *TM1*
Comment: *AC 120V/60Hz; Adapter DC 5V*

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	43.2017	21.32	4.94	26.26	40.00	-13.74	0	100	peak
2	127.2176	20.62	4.23	24.85	43.50	-18.65	0	100	peak
3	144.3348	27.08	2.98	30.06	43.50	-13.44	0	100	peak
4	235.8164	19.07	8.66	27.73	46.00	-18.27	0	100	peak
5	390.7226	17.68	12.27	29.95	46.00	-16.05	0	100	peak
6	642.8613	16.27	18.00	34.27	46.00	-11.73	0	100	peak

Test Specification: *Vertical*

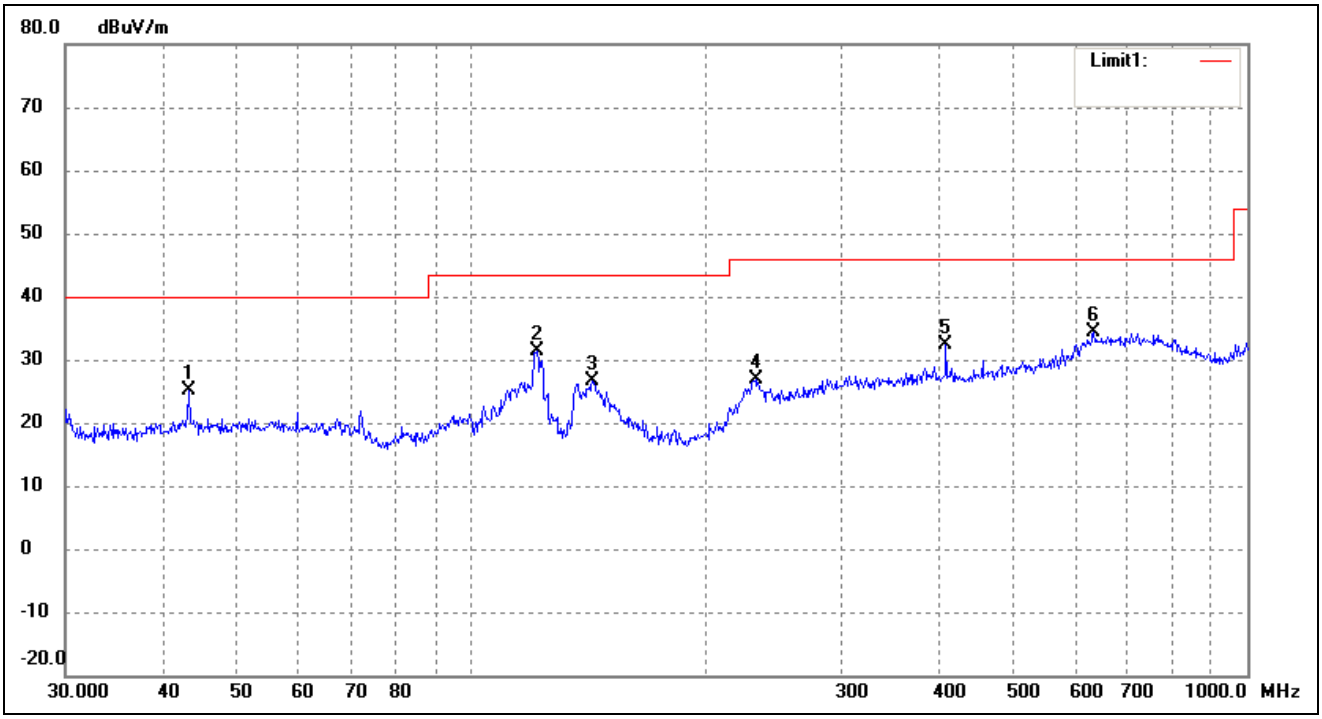


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	50.0566	18.29	4.98	23.27	40.00	-16.73	0	100	peak
2	64.2075	18.04	4.16	22.20	40.00	-17.80	0	100	peak
3	124.5690	23.04	4.44	27.48	43.50	-16.02	0	100	peak
4	144.3348	25.87	2.98	28.85	43.50	-14.65	0	100	peak
5	230.0985	18.29	8.31	26.60	46.00	-19.40	0	100	peak
6	636.1340	16.36	17.93	34.29	46.00	-11.71	0	100	peak

Plot of Radiated Emissions Test Data

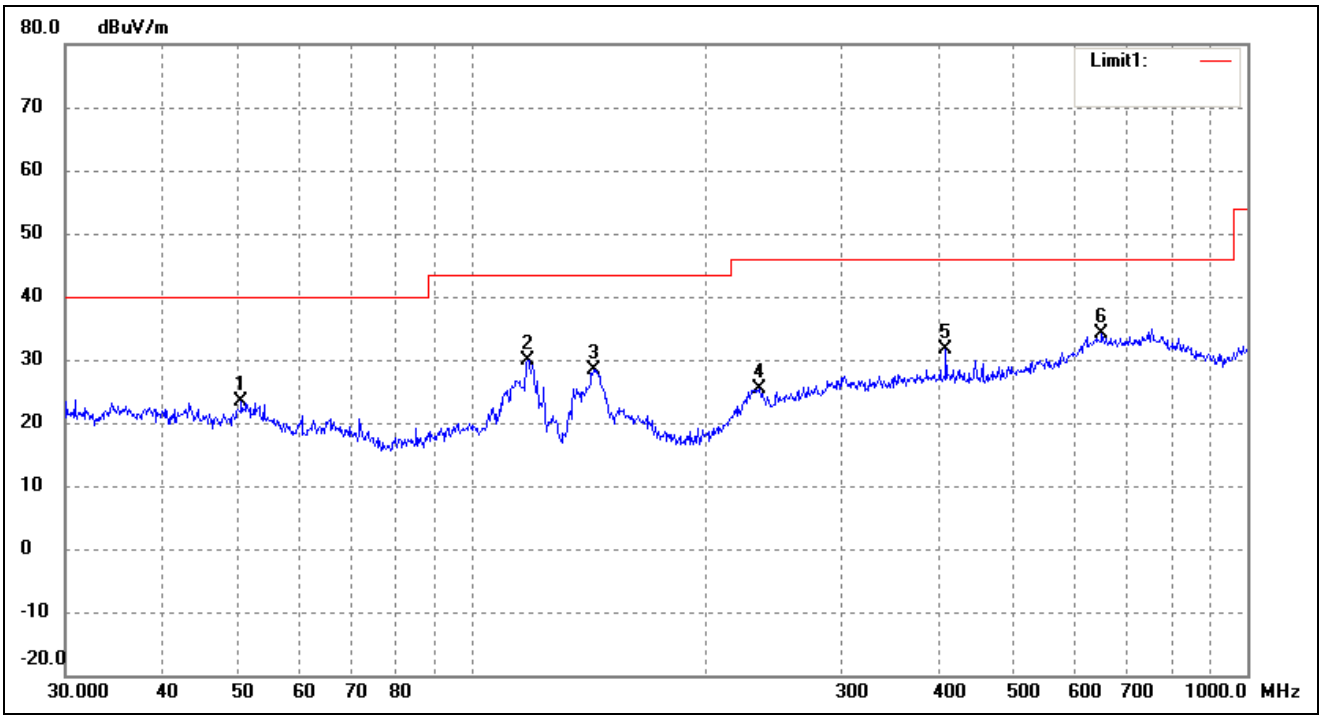
EUT: *Smart Phone*
Tested Model: *E435 Lite*
Operating Condition: *TM2*
Comment: *DC 3.7V*

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	43.3534	20.13	4.94	25.07	40.00	-14.93	0	100	peak
2	121.5486	26.69	4.69	31.38	43.50	-12.12	0	100	peak
3	143.3261	23.53	3.03	26.56	43.50	-16.94	0	100	peak
4	232.5318	18.37	8.45	26.82	46.00	-19.18	0	100	peak
5	408.9460	20.05	12.33	32.38	46.00	-13.62	0	100	peak
6	633.9073	16.56	17.86	34.42	46.00	-11.58	0	100	peak

Test Specification: *Vertical*

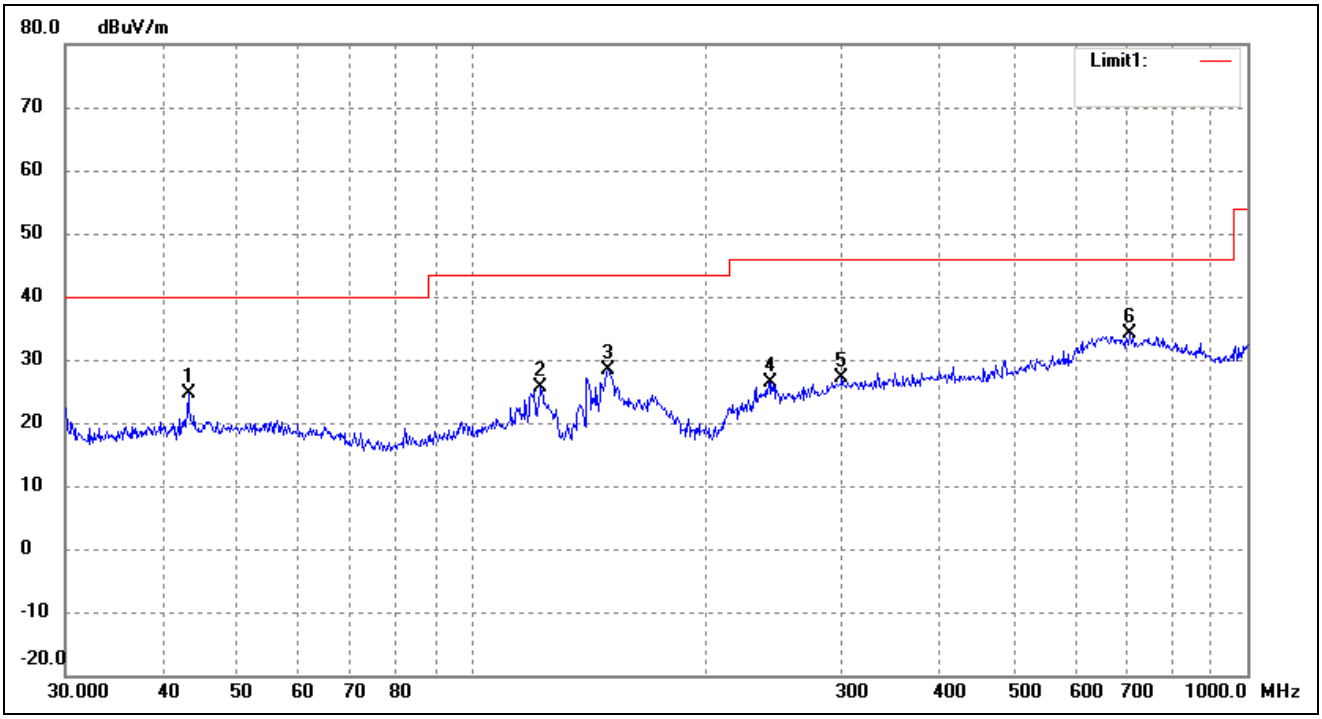


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	50.5860	18.36	5.00	23.36	40.00	-16.64	0	100	peak
2	118.1862	25.17	4.82	29.99	43.50	-13.51	0	100	peak
3	143.8295	25.35	3.01	28.36	43.50	-15.14	0	100	peak
4	234.9909	16.73	8.61	25.34	46.00	-20.66	0	100	peak
5	408.9460	19.26	12.33	31.59	46.00	-14.41	0	100	peak
6	649.6597	16.17	17.84	34.01	46.00	-11.99	0	100	peak

Plot of Radiated Emissions Test Data

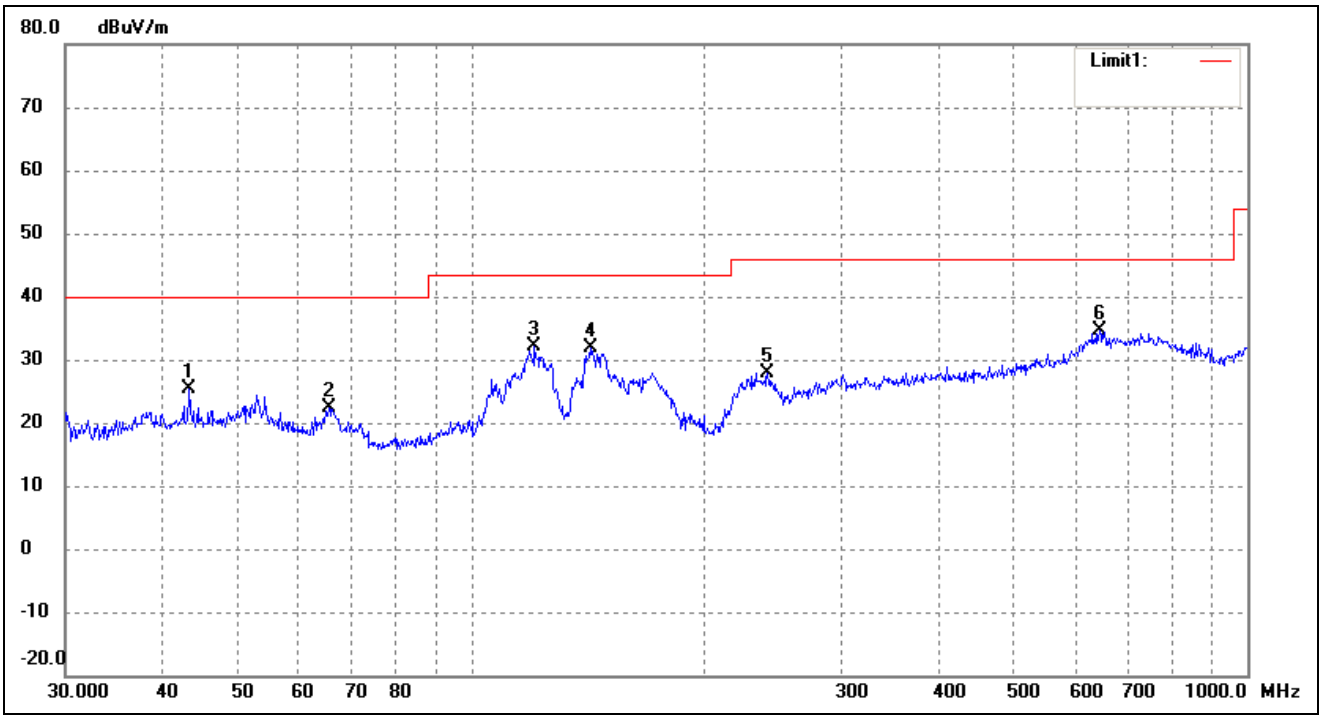
EUT: *Smart Phone*
Tested Model: *E435 Lite*
Operating Condition: *TM3*
Comment: *DC 3.7V*

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	43.2017	19.61	4.94	24.55	40.00	-15.45	0	100	peak
2	122.8340	20.97	4.59	25.56	43.50	-17.94	0	100	peak
3	150.0108	25.57	2.75	28.32	43.50	-15.18	0	100	peak
4	242.5253	17.36	9.03	26.39	46.00	-19.61	0	100	peak
5	300.3673	15.24	11.95	27.19	46.00	-18.81	0	100	peak
6	704.2261	16.90	17.32	34.22	46.00	-11.78	0	100	peak

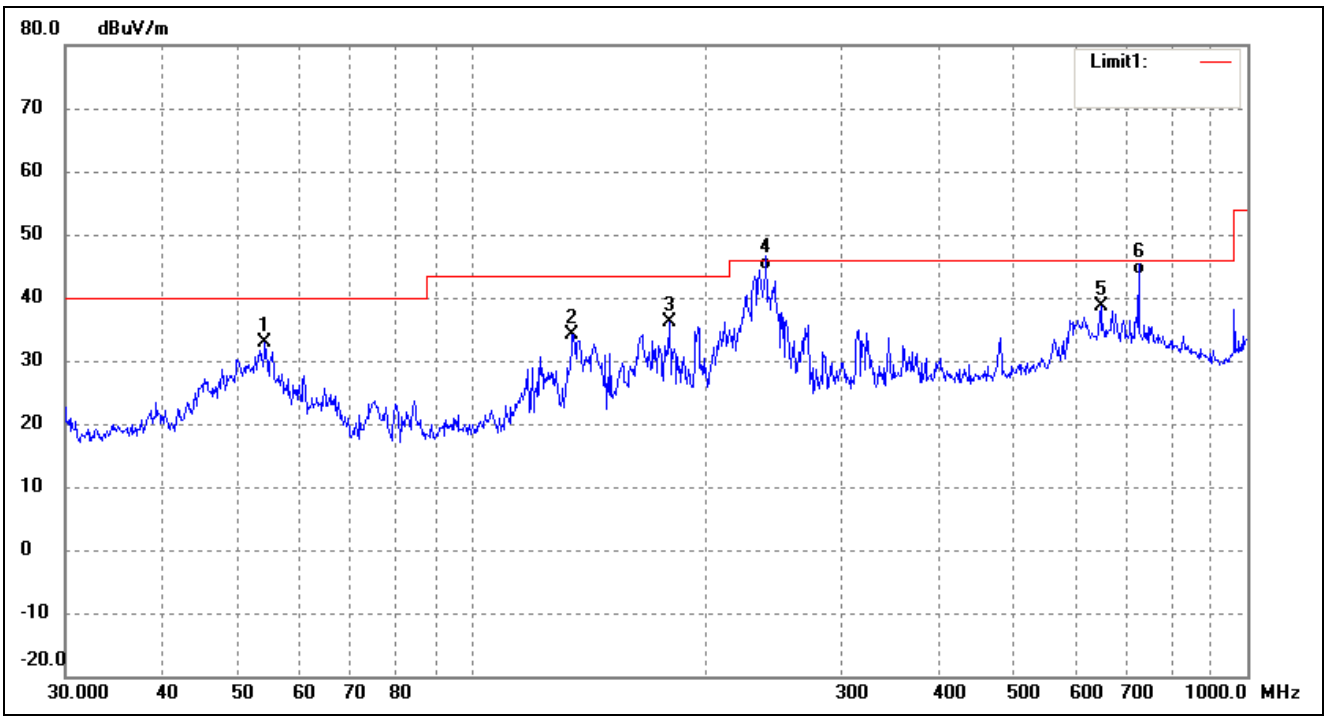
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	43.3534	20.56	4.94	25.50	40.00	-14.50	0	100	peak
2	65.5727	18.57	3.85	22.42	40.00	-17.58	0	100	peak
3	120.6991	27.35	4.76	32.11	43.50	-11.39	0	100	peak
4	142.3244	28.77	3.06	31.83	43.50	-11.67	0	100	peak
5	240.8304	19.01	8.96	27.97	46.00	-18.03	0	100	peak
6	645.1195	16.67	17.94	34.61	46.00	-11.39	0	100	peak

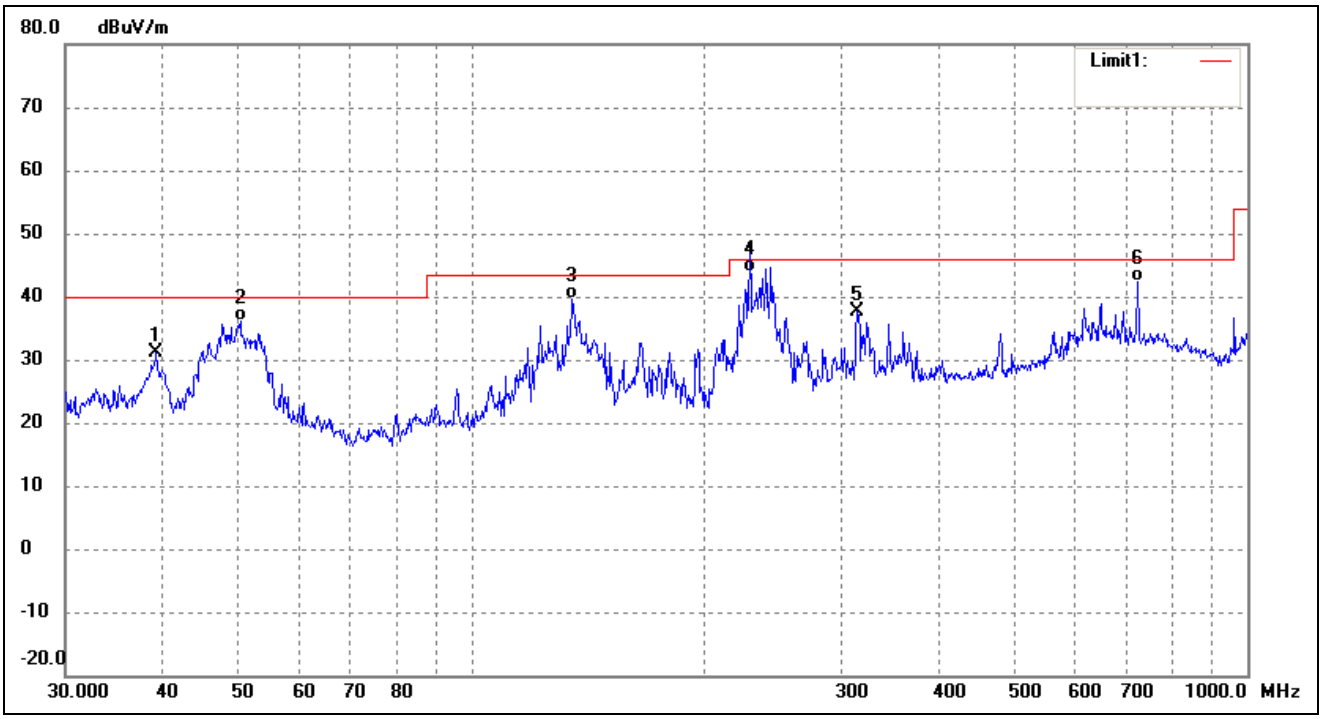
Plot of Radiated Emissions Test Data

EUT: *Smart Phone*
Tested Model: *E435 Lite*
Operating Condition: *TM4*
Comment: *AC 120V/60Hz, USB 5V*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	54.2610	27.93	5.04	32.97	40.00	-7.03	0	100	peak
2	135.0319	30.66	3.56	34.22	43.50	-9.28	0	100	peak
3	180.0165	33.75	2.46	36.21	43.50	-7.29	0	100	peak
4	239.9874	35.40	8.93	44.33	46.00	-1.67	0	100	QP
5	647.3856	20.72	17.90	38.62	46.00	-7.38	0	100	peak
6	724.2611	25.60	18.07	43.67	46.00	-2.33	0	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	39.2991	26.36	4.82	31.18	40.00	-8.82	0	100	peak
2	50.4089	31.03	4.99	36.02	40.00	-3.98	0	100	QP
3	135.0319	36.01	3.56	39.57	43.50	-3.93	0	100	QP
4	228.4904	35.60	8.20	43.80	46.00	-2.20	0	100	QP
5	314.3765	25.59	11.96	37.55	46.00	-8.45	0	100	peak
6	721.7259	24.38	17.91	42.29	46.00	-3.71	0	100	QP

Note: Testing is carried out with frequency rang 9kHz to the 6.5GHz, which below 30MHz and 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 *******