

FCC Part 15B Measurement and Test Report

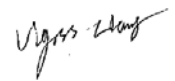
For

Michley Electronics Inc.

2433 De La Cruz Blvd. Santa Clara, CA 95050

FCC ID: 2AFWB-5400

Test Rule(s):	<u>FCC Part 15 Subpart B</u>
Product Description:	<u>4G Smart Phone</u>
Tested Model:	<u>Alba 5400</u>
Report No.:	<u>STR15088291I-6</u>
Tested Date:	<u>2015-08-27 to 2015-09-06</u>
Issued Date:	<u>2015-09-07</u>
Tested By:	<u>Vigoss Liang / Engineer</u>
Reviewed By:	<u>Lahm Peng / EMC Manager</u>
Approved & Authorized By:	<u>Jandy So / PSQ Manager</u>
Prepared By:	



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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: Michley Electronics Inc.
Address of applicant: 2433 De La Cruz Blvd. Santa Clara, CA 95050

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:	4G Smart Phone
Trade Name:	/
Model No.:	Alba 5400
Adapter Model:	JT-H050100
	INPUT:100-240V,50/60Hz,0.5A; OUTPUT:5V,1A
Hardware version:	A880-MB-V1.0
Software version:	A880_10H_HS005_QHD_ALBA_V001_20150908_1120
IMEI:	353222070171361/353222070171379
<i>The EUT Main board support GSM850/900/DCS1800/PCS1900, WCDMA Band 1/2/4/5, LTE Band 2/4/7/17 function. It is intended for speech, Multimedia Message Service (MMS) transmission and Alba 5400. It is equipped with GPRS/EDGE class 12 for GSM850/900/DCS1800/PCS1900, GPS, FM, Bluetooth and Wi-Fi functions. For more information see the following datasheet</i>	
<i>Note: The test data is gathered from a production sample provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Rated Voltage:	DC 3.8V
Battery Capacitor:	2200mAh
Rated Power:	/
Lowest Internal Frequency:	32.768kHz
Highest Internal Frequency:	1.3GHz
Classification of ITE:	Class B

1.2 Test Standards

The following report is prepared on behalf of the Michley Electronics 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 C63.4-2009, 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 & Playing	With Earphone
TM2	Downloading	Connected to PC
TM3	Camera on	Powered by battery
TM4	/	/

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
USB Cable	1.0	Unshielded	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 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Spectrum Analyzer	Agilent	E4407B	MY41440400	2015-06-17	2016-06-16
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2015-06-17	2016-06-16
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2015-06-17	2016-06-16
Amplifier	Agilent	8447F	3113A06717	2015-06-17	2016-06-16
Amplifier	C&D	PAP-1G18	2002	2015-06-17	2016-06-16
Broadband Antenna	Schwarz beck	VULB9163	9163-333	2015-06-17	2016-06-16
Horn Antenna	ETS	3117	00086197	2015-06-17	2016-06-16
Loop Antenna	Schwarz beck	FMZB 1516	9773	2015-06-17	2016-06-16
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2015-06-17	2016-06-16
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2015-06-17	2016-06-16
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2015-06-17	2016-06-16

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

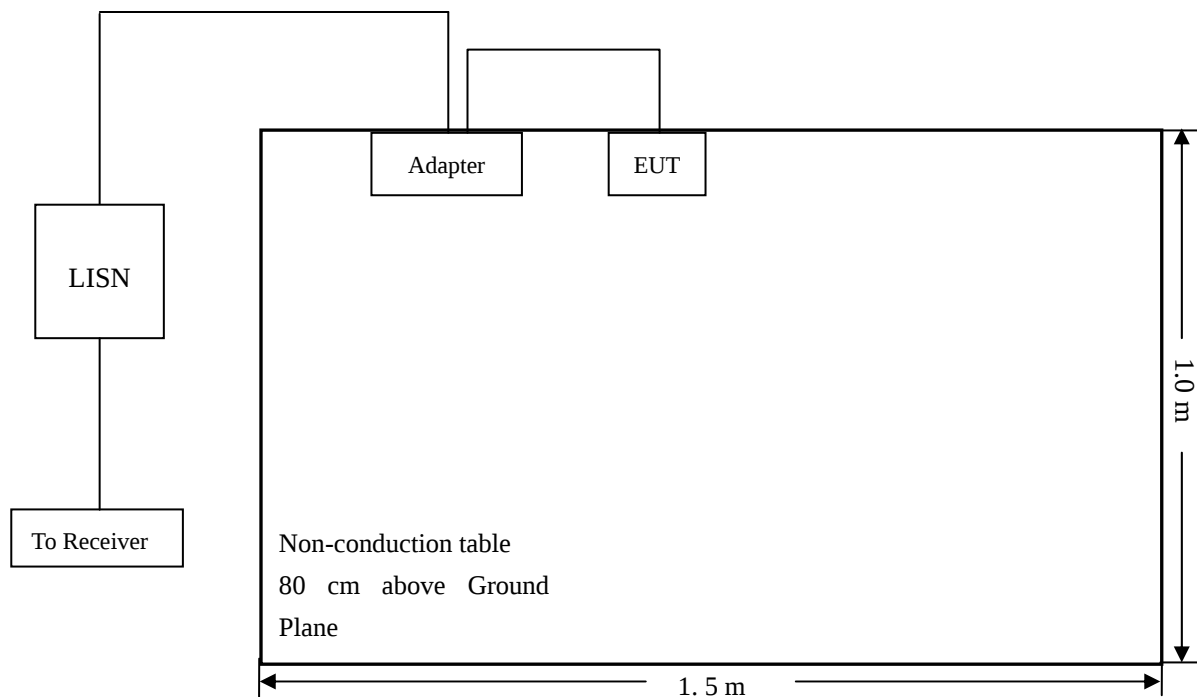
3.1 Measurement Uncertainty

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 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.

3.3 Basic Test Setup Block Diagram



3.4 Environmental Conditions

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

3.5 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:

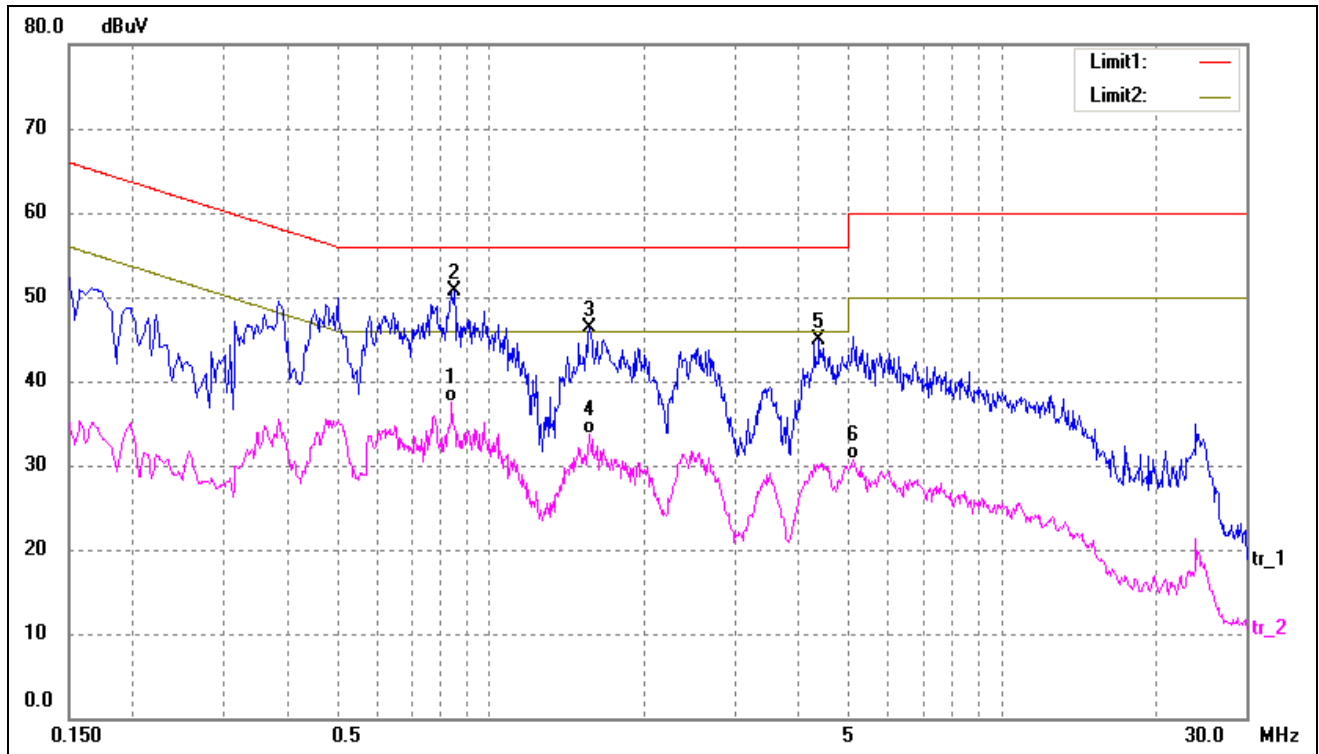
-5.26 dB at **0.8500 MHz** in the **Neutral, Peak** detector, TM1, 0.15-30MHz

3.6 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

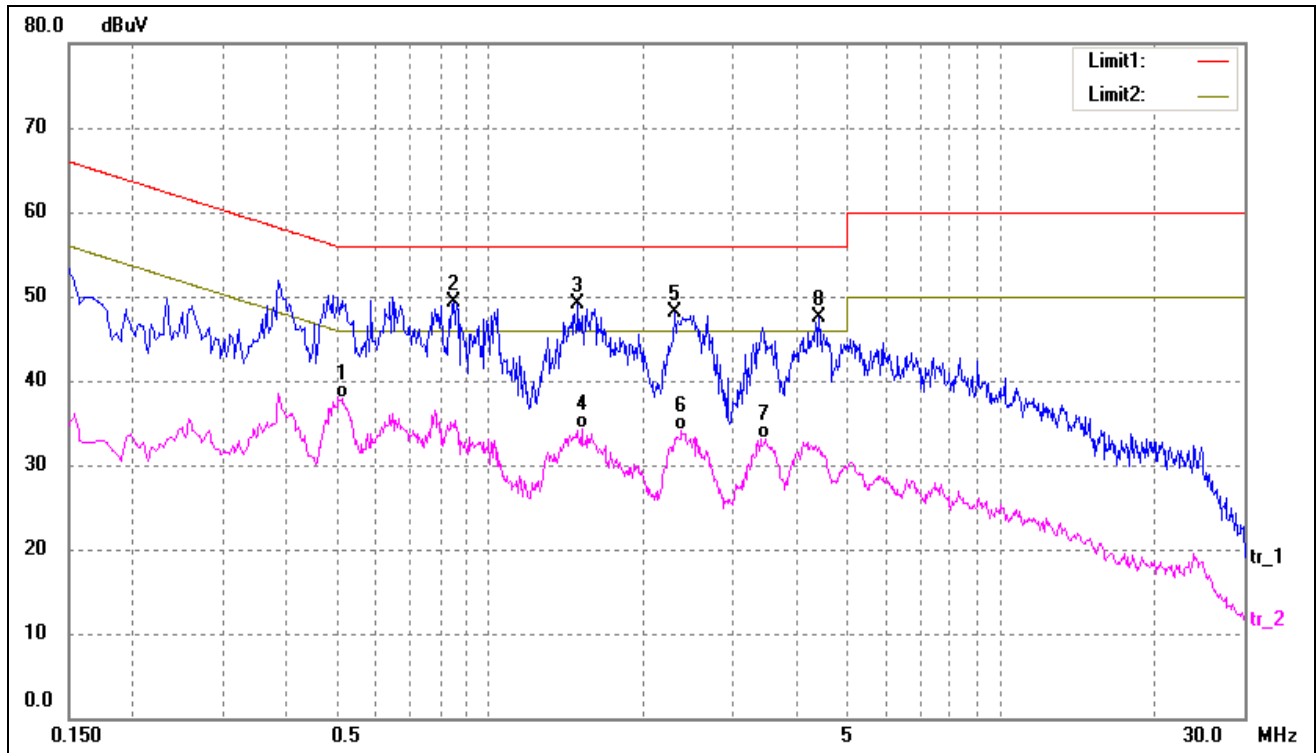
EUT: 4G Smart Phone
 Tested Model: Alba 5400
 Operating Condition: TM1
 Comment: AC 120V/60Hz; Adapter DC 5V

Test Specification: Neutral



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.8420	24.70	12.84	37.54	46.00	-8.46	AVG
2*	0.8500	37.89	12.85	50.74	56.00	-5.26	peak
3	1.5620	33.25	13.00	46.25	56.00	-9.75	peak
4	1.5620	20.74	13.00	33.74	46.00	-12.26	AVG
5	4.4020	31.99	13.00	44.99	56.00	-11.01	peak
6	5.1220	17.78	12.95	30.73	50.00	-19.27	AVG

Test Specification: Line

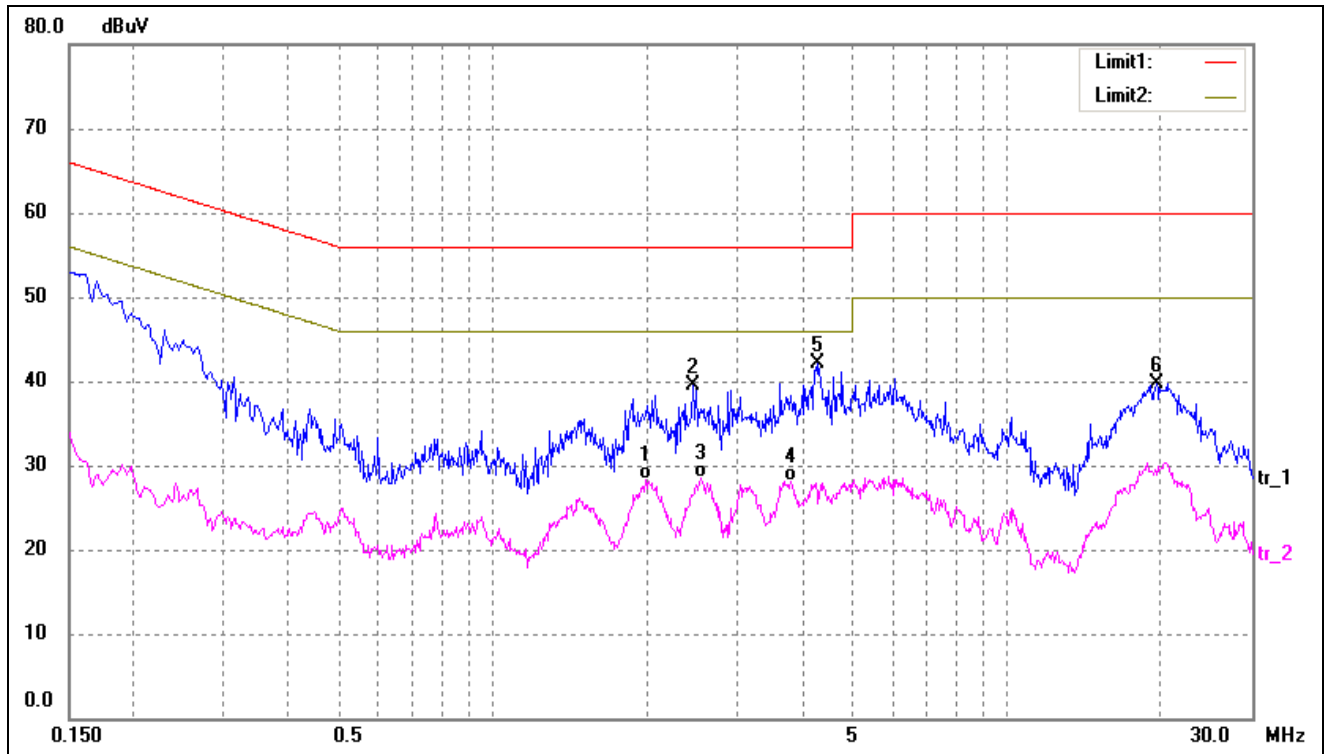


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.5140	25.34	12.51	37.85	46.00	-8.15	AVG
2*	0.8500	36.39	12.85	49.24	56.00	-6.76	peak
3	1.4940	36.16	13.00	49.16	56.00	-6.84	peak
4	1.5140	21.38	13.00	34.38	46.00	-11.62	AVG
5	2.3020	35.16	13.00	48.16	56.00	-7.84	peak
6	2.3780	21.10	13.00	34.10	46.00	-11.90	AVG
7	3.4580	20.10	13.00	33.10	46.00	-12.90	AVG
8	4.4180	34.58	13.00	47.58	56.00	-8.42	peak

Plot of Conducted Emissions Test Data

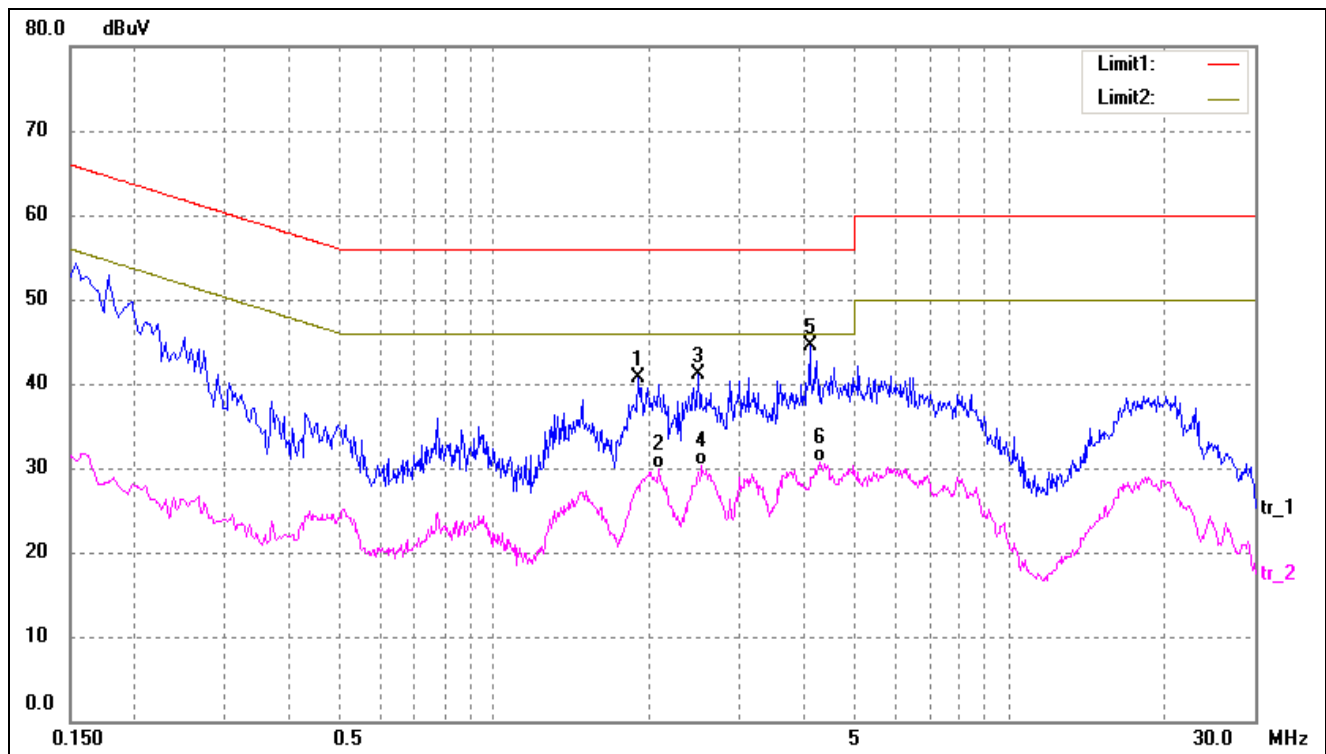
EUT: 4G Smart Phone
 Tested Model: Alba 5400
 Operating Condition: TM2
 Comment: AC 120V/60Hz; USB 5V

Test Specification: Neutral



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	1.9832	18.23	10.00	28.23	46.00	-17.77	AVG
2	2.4525	29.54	10.00	39.54	56.00	-16.46	peak
3	2.5575	18.51	10.00	28.51	46.00	-17.49	AVG
4	3.8068	18.12	10.00	28.12	46.00	-17.88	AVG
5*	4.2985	32.01	10.00	42.01	56.00	-13.99	peak
6	19.6264	27.80	11.93	39.73	60.00	-20.27	peak

Test Specification: Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	1.9007	30.71	10.00	40.71	56.00	-15.29	peak
2	2.0955	19.90	10.00	29.90	46.00	-16.10	AVG
3	2.4855	31.05	10.00	41.05	56.00	-14.95	peak
4	2.5312	20.34	10.00	30.34	46.00	-15.66	AVG
5*	4.0975	34.52	10.00	44.52	56.00	-11.48	peak
6	4.2765	20.66	10.00	30.66	46.00	-15.34	AVG

4. Radiated Emissions

4.1 Measurement Uncertainty

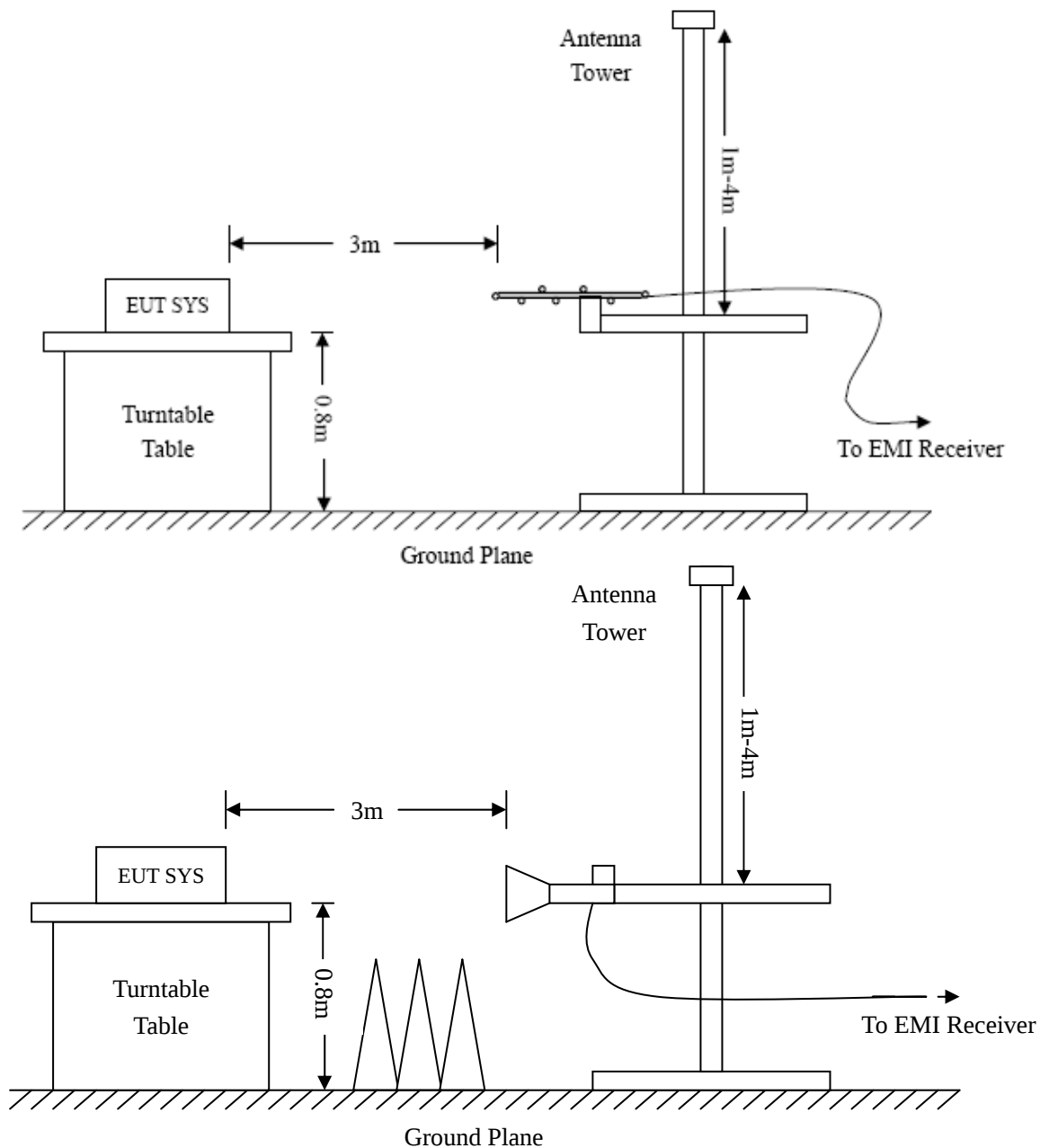
Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is ± 5.10 dB.

4.2 Test 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.



4.3 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

4.4 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:

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

4.5 Environmental Conditions

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

4.6 Summary of Test Results/Plots

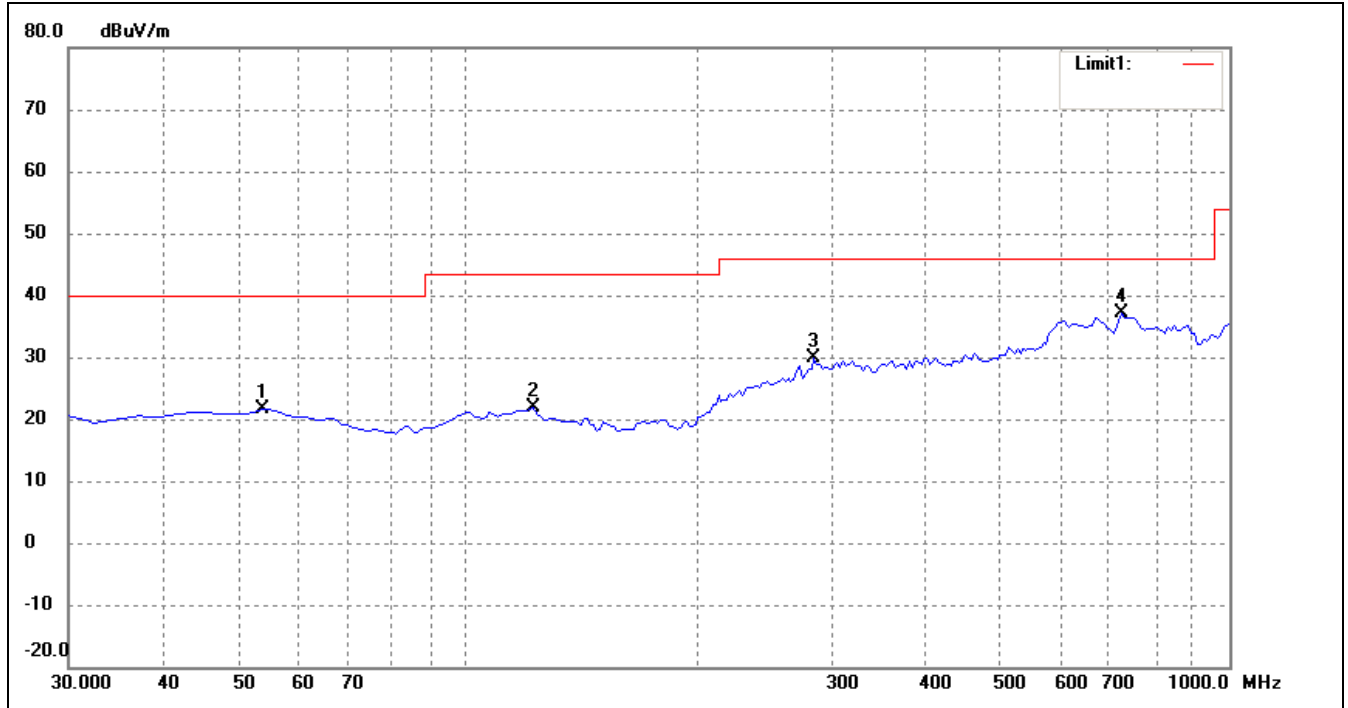
According to the data, the EUT complied with the FCC Part 15.109(a) rule, and had the worst margin of:

-1.69 dB at 165.8000 MHz in the Vertical polarization, TM2 Mode 9 kHz to 6.5 GHz, 3Meters

Plot of Radiated Emissions Test Data

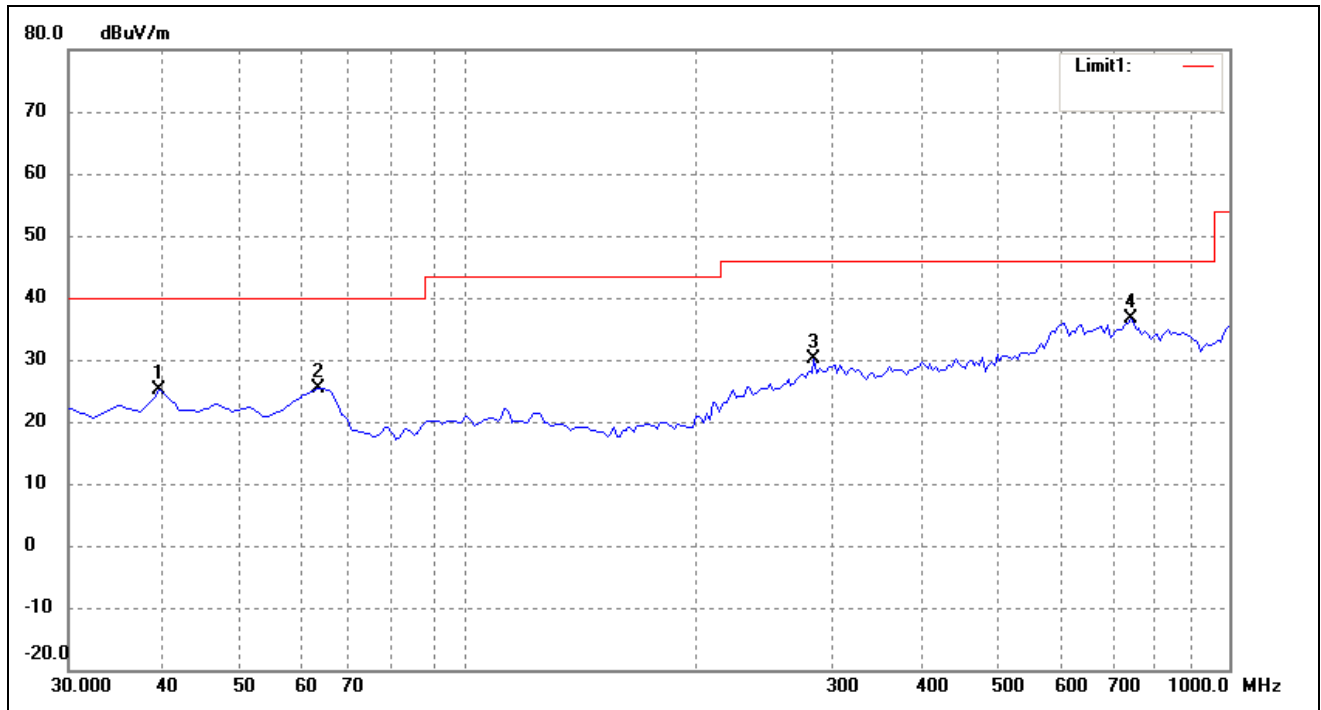
EUT: 4G Smart Phone
 Tested Model: Alba 5400
 Operating Condition: TM1
 Comment: AC 120V/60Hz; Adapter DC 5V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	54.2500	16.37	5.31	21.68	40.00	-18.32	42	100	QP
2	122.1500	17.08	4.84	21.92	43.50	-21.58	132	100	QP
3	287.0500	18.30	11.68	29.98	46.00	-16.02	168	100	QP
4	725.9750	18.30	18.72	37.02	46.00	-8.98	0	100	QP

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	39.7000	19.82	5.20	25.02	40.00	-14.98	59	100	QP
2	63.9500	20.95	4.51	25.46	40.00	-14.54	147	100	QP
3	287.0500	18.45	11.68	30.13	46.00	-15.87	236	100	QP
4	742.9500	17.10	19.42	36.52	46.00	-9.48	158	100	QP

Plot of Radiated Emissions Test Data

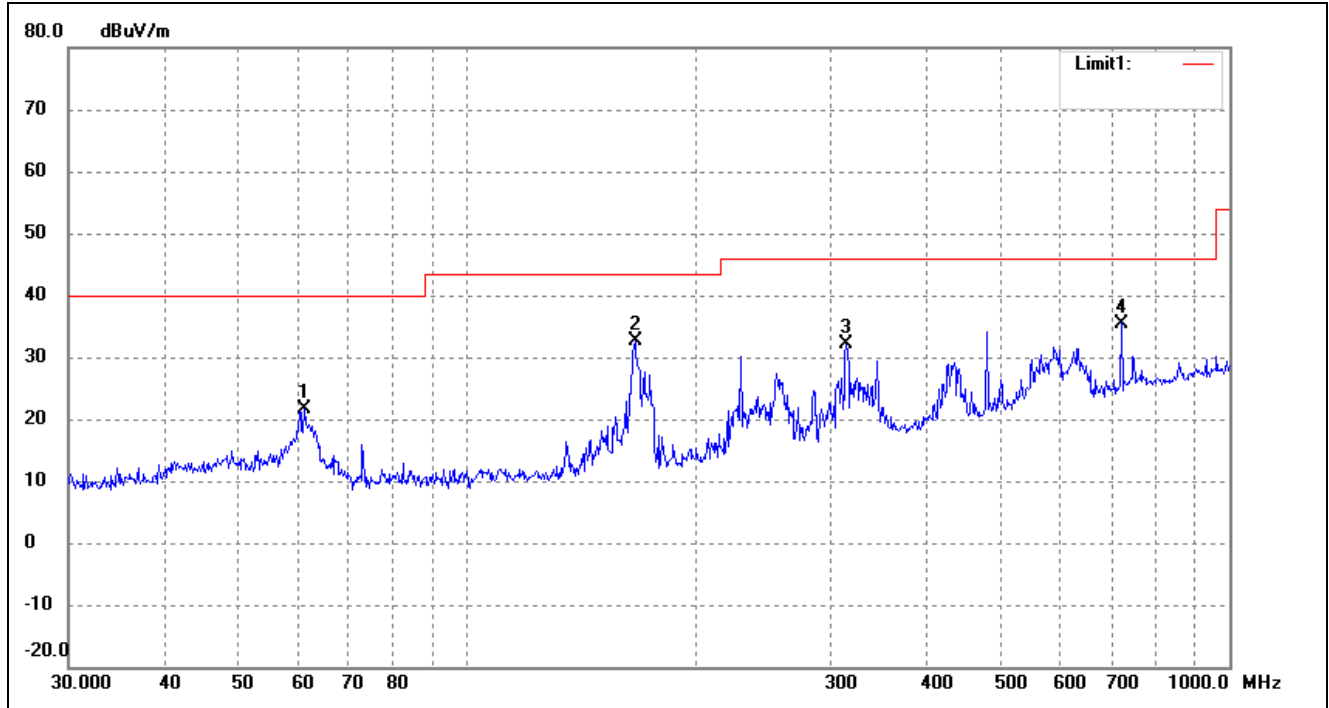
EUT: 4G Smart Phone

Tested Model: Alba 5400

Operating Condition: TM2

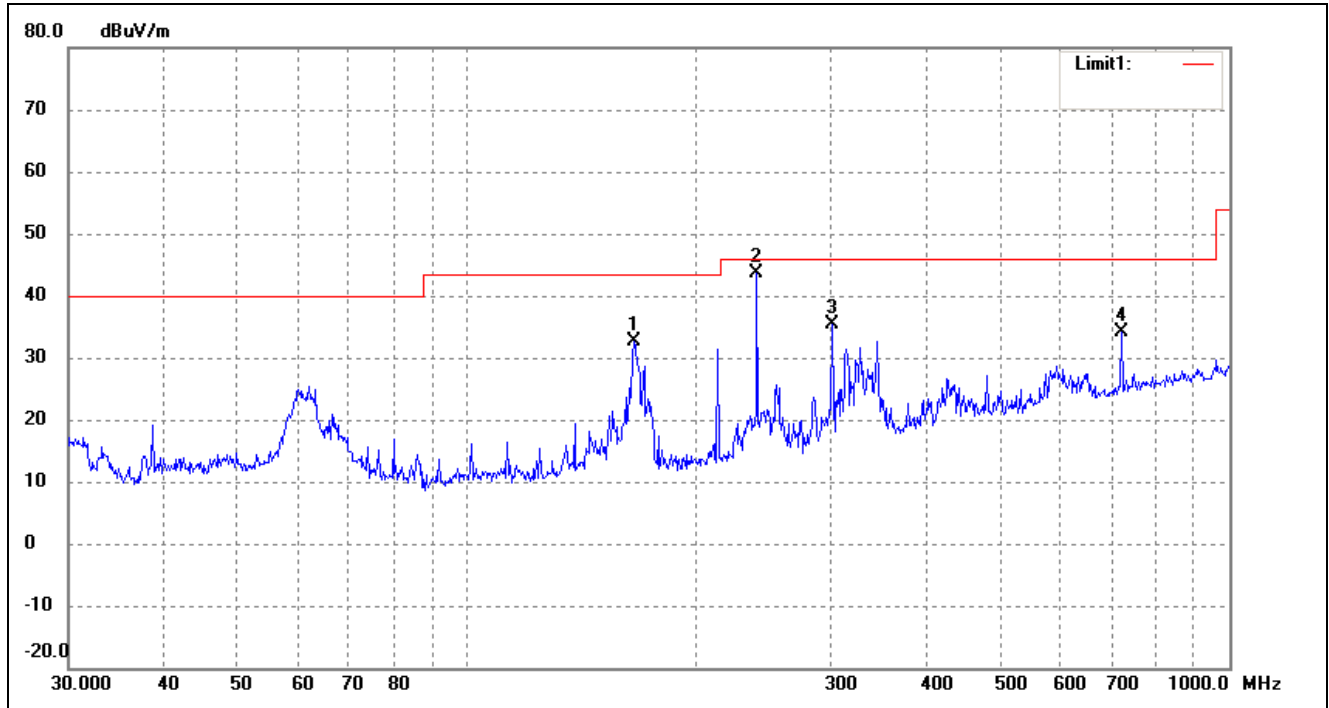
Comment: USB: DC5V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	61.1316	32.35	-10.68	21.67	40.00	-18.33	51	100	QP
2	166.0680	42.84	-10.26	32.58	43.50	-10.92	124	100	QP
3	314.3765	36.61	-4.60	32.01	46.00	-13.99	203	100	QP
4	721.7259	32.26	3.24	35.50	46.00	-10.50	86	100	QP

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	165.4867	42.92	-10.29	32.63	43.50	-10.87	22	100	QP
2	239.9874	50.01	-6.46	43.55	46.00	-2.45	146	100	QP
3	301.4224	40.34	-4.95	35.39	46.00	-10.61	197	100	QP
4	721.7259	30.88	3.24	34.12	46.00	-11.88	375	100	QP

Plot of Radiated Emissions Test Data

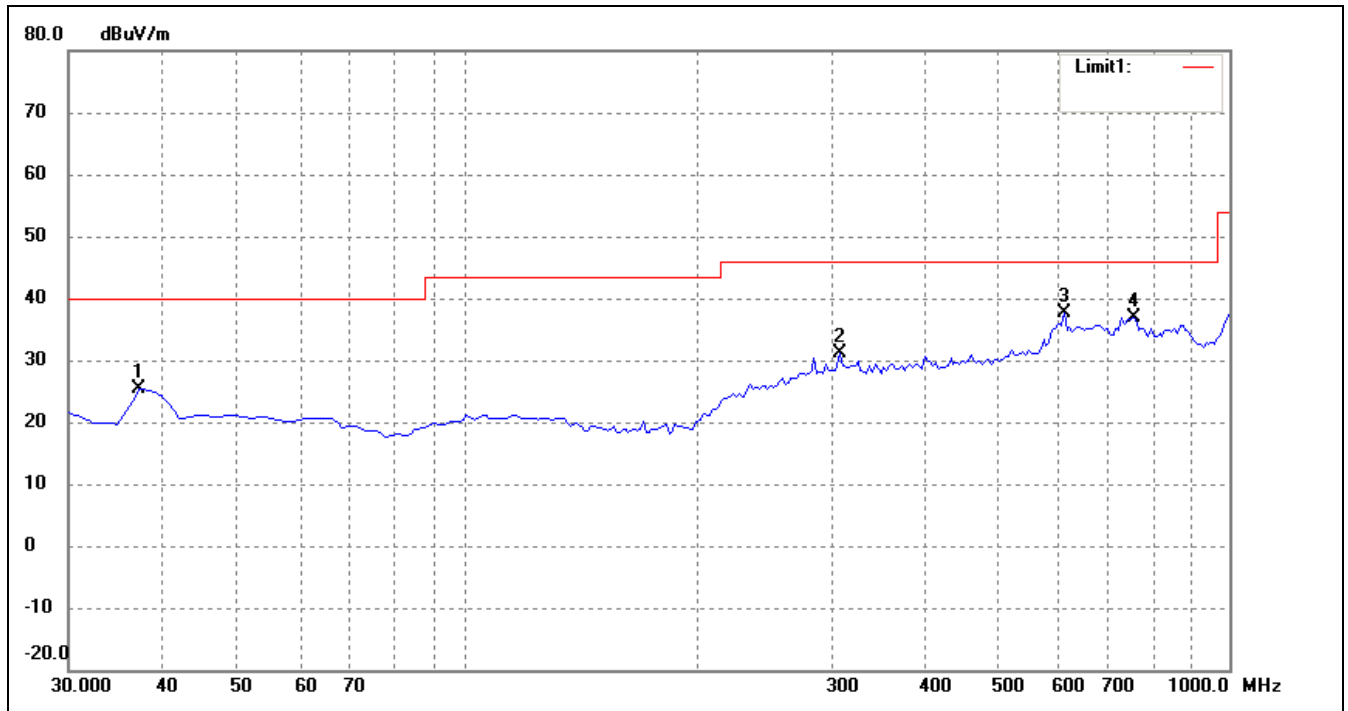
EUT: 4G Smart Phone

Tested Model: Alba 5400

Operating Condition: TM3

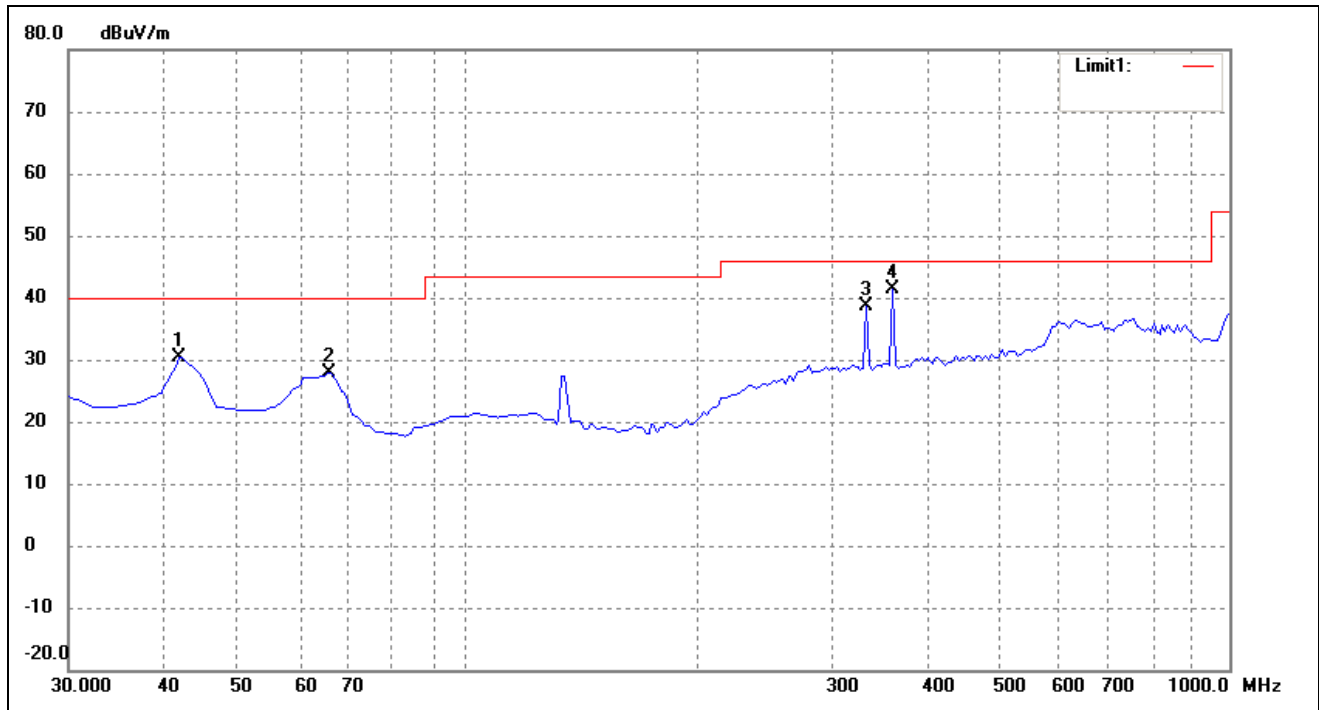
Comment: DC 3.8V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.2750	20.64	4.79	25.43	40.00	-14.57	158	100	QP
2	311.3000	18.99	12.24	31.23	46.00	-14.77	0	100	QP
3	612.0000	19.06	18.48	37.54	46.00	-8.46	147	100	QP
4	752.6500	17.95	18.98	36.93	46.00	-9.07	352	100	QP

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	42.1250	25.13	5.25	30.38	40.00	-9.62	76	100	QP
2	66.3750	23.94	3.99	27.93	40.00	-12.07	288	100	QP
3	335.5500	26.72	11.85	38.57	46.00	-7.43	10	100	QP
4	364.6500	29.05	12.23	41.28	46.00	-4.72	11	100	QP

Note: Testing is carried out with frequency rang 9kHz to the 6.5GHz, which above 1GHz is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.

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

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