

FCC Part 15B Measurement and Test Report

For

Huaheng Electronic Technology Co., Ltd

11F, Building A4, National Animation Industry Base, No. 800

Wangjiang West Road, Hefei, Anhui Province, China

FCC ID: REX-Z1

Test Rule(s): FCC Part 15 Subpart B

Product Description: Smart Watch

Tested Model: Z1

Report No.: STR13128296I-3

Tested Date: 2013-12-23 to 2014-01-02

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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: Huaheng Electronic Technology Co., Ltd
Address of applicant: 11F, Building A4, National Animation Industry Base, No. 800 Wangjiang West Road, Hefei, Anhui Province, China
Manufacturer: Huaheng Electronic Technology Co., Ltd
Address of manufacturer: 11F, Building A4, National Animation Industry Base, No. 800 Wangjiang West Road, Hefei, Anhui Province, China

General Description of EUT	
Product Name:	Smart Watch
Trade Name:	Smart Devices
Model No.:	Z1
Adding Model(s):	Z1 Lite
<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 Z1, but the circuit and the electronic construction do not change, declared by the manufacturer.</i>	

Technical Characteristics of EUT	
Rated Voltage:	Charging: DC 5V, Battery: 3.7V
Rated Current:	0.5A
Rated Power:	0.5W
Power Adapter Model:	/
Lowest Internal Frequency:	32.768kHz
Highest Internal Frequency:	37.4MHz
Classification of ITE:	Class B

1.2 Test Standards

The following report is prepared on behalf of the Huaheng Electronic Technology Co., Ltd 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	Charging & Playing	/
TM2	Downloading	Connected to Notebook

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
Headphone Jack to USB Cable	0.2	Shielded	Without Ferrite

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
/	/	/	/

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
Notebook	Lenovo	E23	EB12648265
Adaptor	KZ	KZ1036A	/

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.

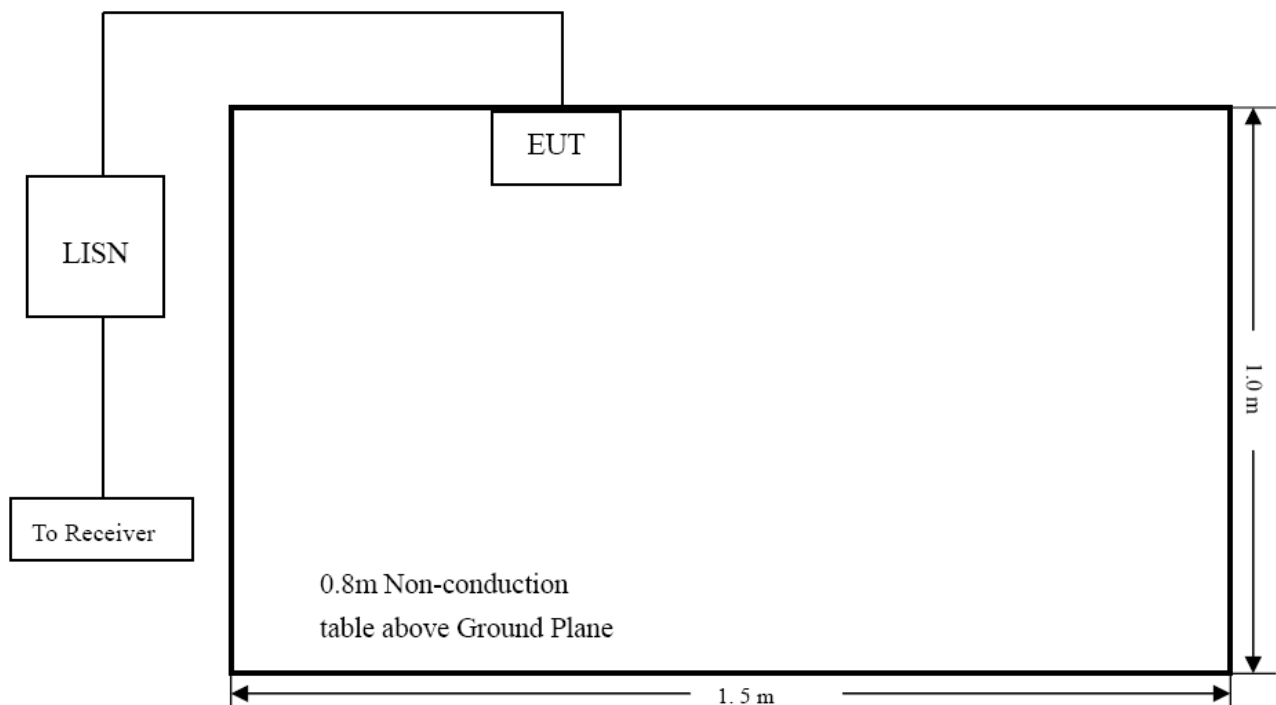
3.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2013-05-07	2014-05-06
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2013-05-07	2014-05-06
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2013-05-07	2014-05-06

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:

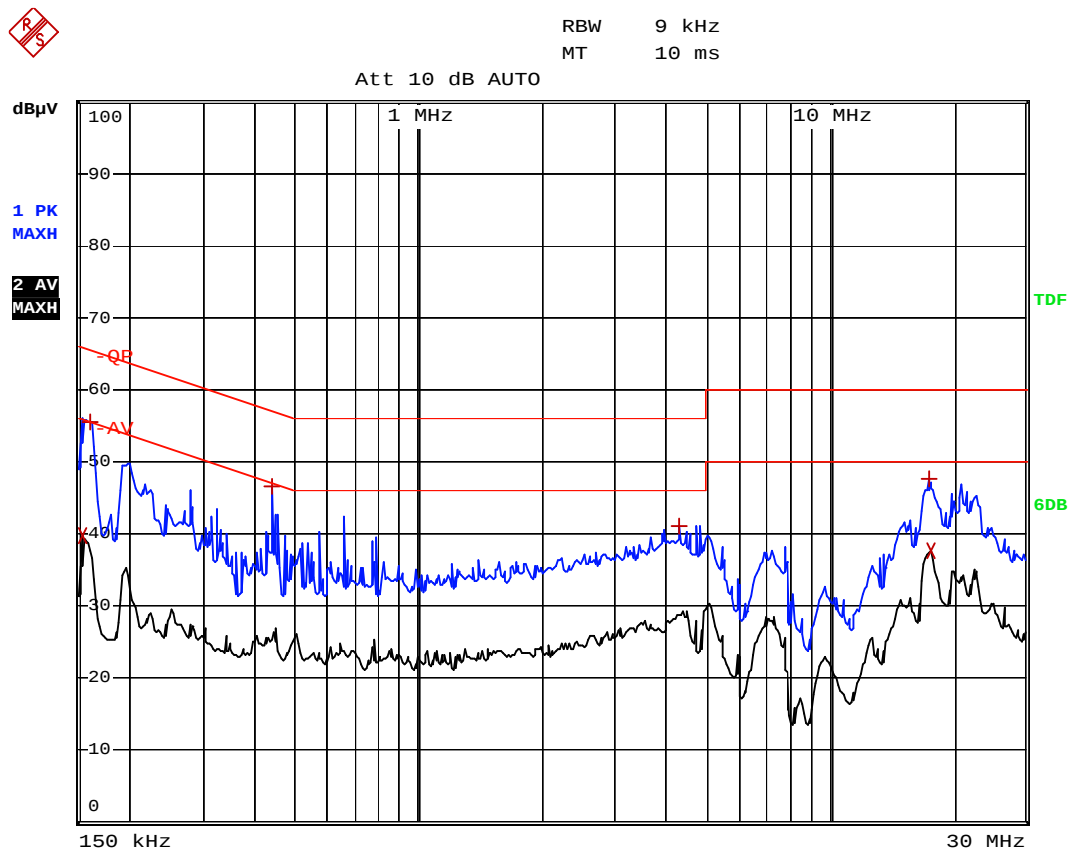
-8.50 dB at **0.158 MHz** in the **Line, Peak** detector, 0.15-30MHz

3.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

EUT: Smart Watch
Tested Model: Z1
Operating Condiation: TM1
Comment: Input AC 120V/60Hz, Output DC 5V

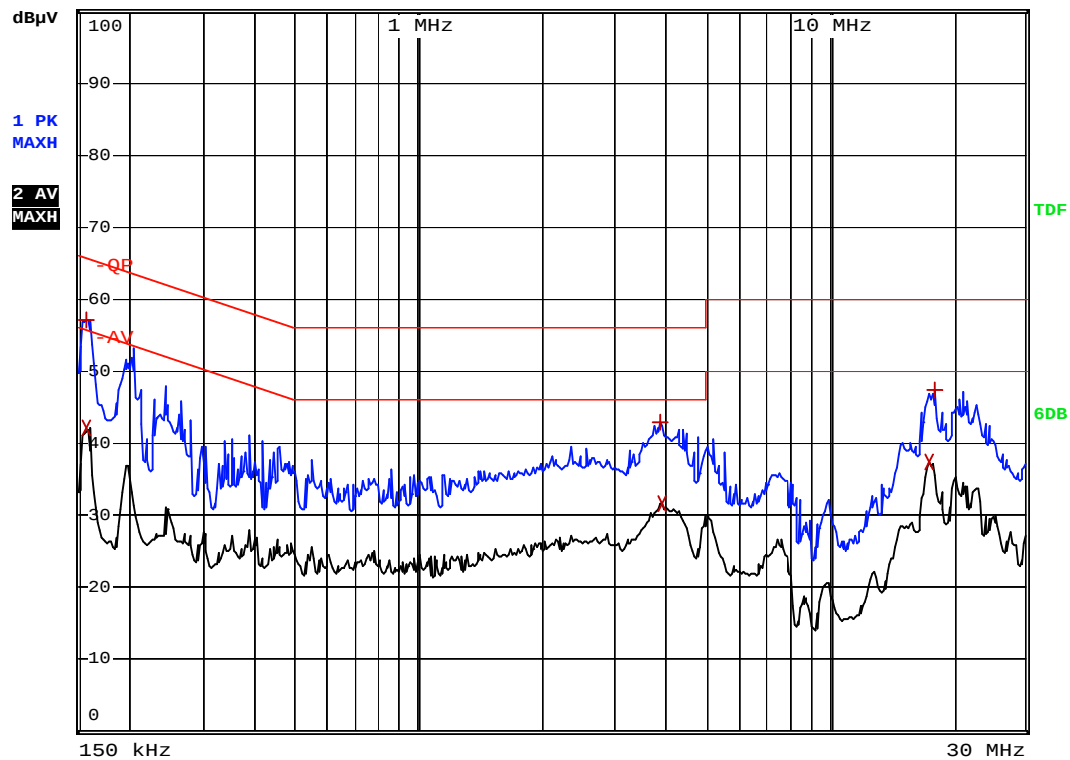
Test Specification: Neutral



EDIT PEAK LIST (Prescan Results)				
Trace1:		-QP		
Trace2:		-AV		
Trace3:		---		
TRACE		FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
2	Average	154 kHz	39.66	-16.12
1	Max Peak	162 kHz	55.62	-9.73
1	Max Peak	438 kHz	46.52	-10.57
1	Max Peak	4.33 MHz	41.18	-14.81
1	Max Peak	17.542 MHz	47.73	-12.26
2	Average	17.646 MHz	37.78	-12.21



Att 10 dB AUTO



EDIT PEAK LIST (Prescan Results)			
Trace1:		-QP	
Trace2:		-AV	
Trace3:		---	
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1 Max Peak	158 kHz	57.06	-8.50
2 Average	158 kHz	42.13	-13.43
1 Max Peak	3.858 MHz	42.91	-13.08
2 Average	3.91 MHz	31.59	-14.40
2 Average	17.546 MHz	37.43	-12.56
1 Max Peak	18.042 MHz	47.31	-12.69

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

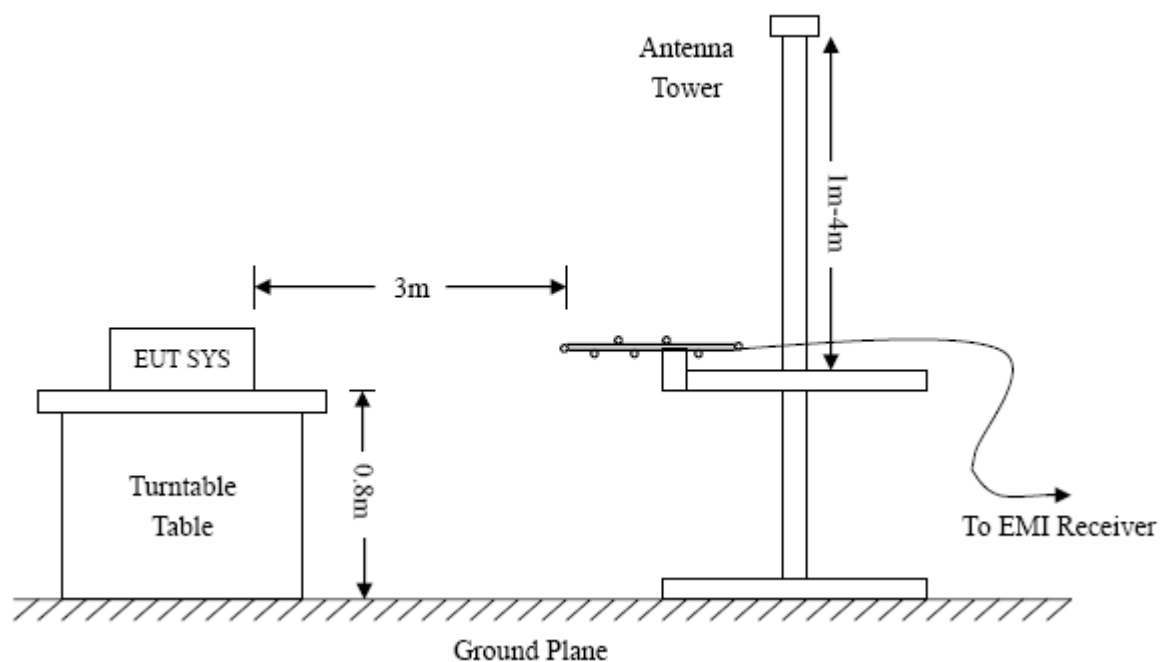
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2013-05-07	2014-05-06
EMI Test Receiver	R&S	ESVB	825471/005	2013-05-07	2014-05-06
Pre-amplifier	Agilent	8447F	3113A06717	2013-05-07	2014-05-06
Pre-amplifier	Compliance Direction	PAP-0118	24002	2013-05-07	2014-05-06
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2013-04-20	2014-04-19
Horn Antenna	ETS	3117	00086197	2013-04-20	2014-04-19
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2013-04-20	2014-04-19

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

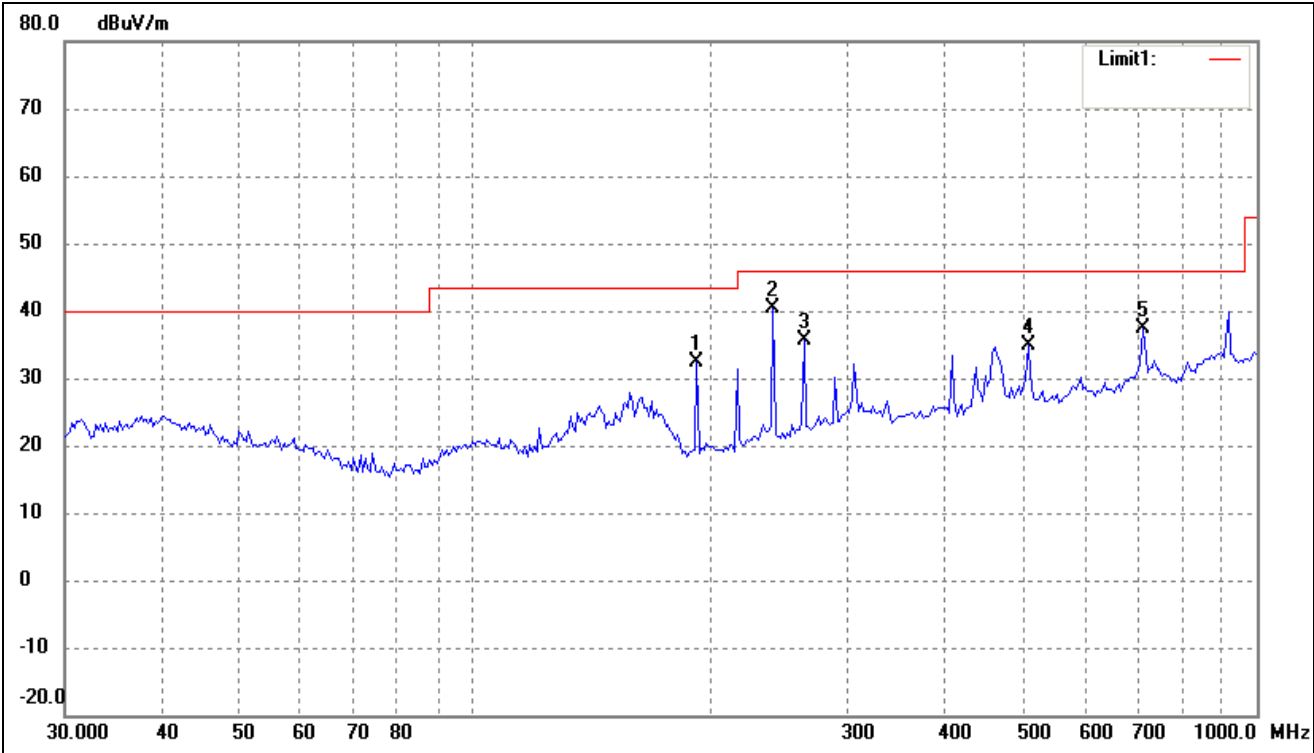
According to the data, the EUT complied with the FCC Part 15.109(a) rule, and had the worst margin of:

-1.59 dB at 237.4760 MHz in the Horizontal polarization, 9 kHz to 1 GHz, 3Meters

Plot of Radiated Emissions Test Data

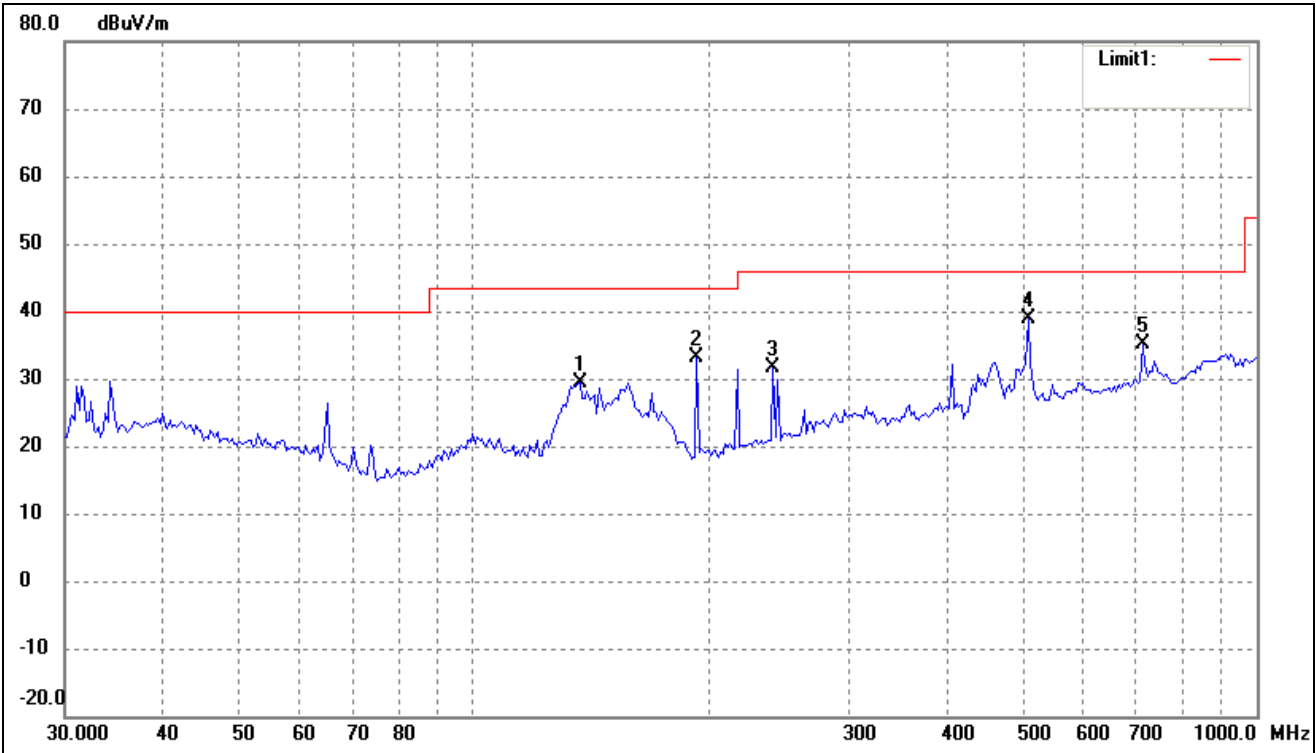
EUT: Smart Watch
Tested Model: Z1
Operating Condition: TM1
Comment: Input AC 120V/60Hz, Output DC 5V

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	192.4186	29.12	3.33	32.45	43.50	-11.05	58	150	peak
2	240.8304	34.09	6.36	40.45	46.00	-5.55	326	100	peak
3	263.8190	28.31	7.29	35.60	46.00	-10.40	29	120	peak
4	510.0436	23.70	11.11	34.81	46.00	-11.19	209	100	peak
5	714.1734	23.20	14.20	37.40	46.00	-8.60	359	200	peak

Test Specification: Vertical

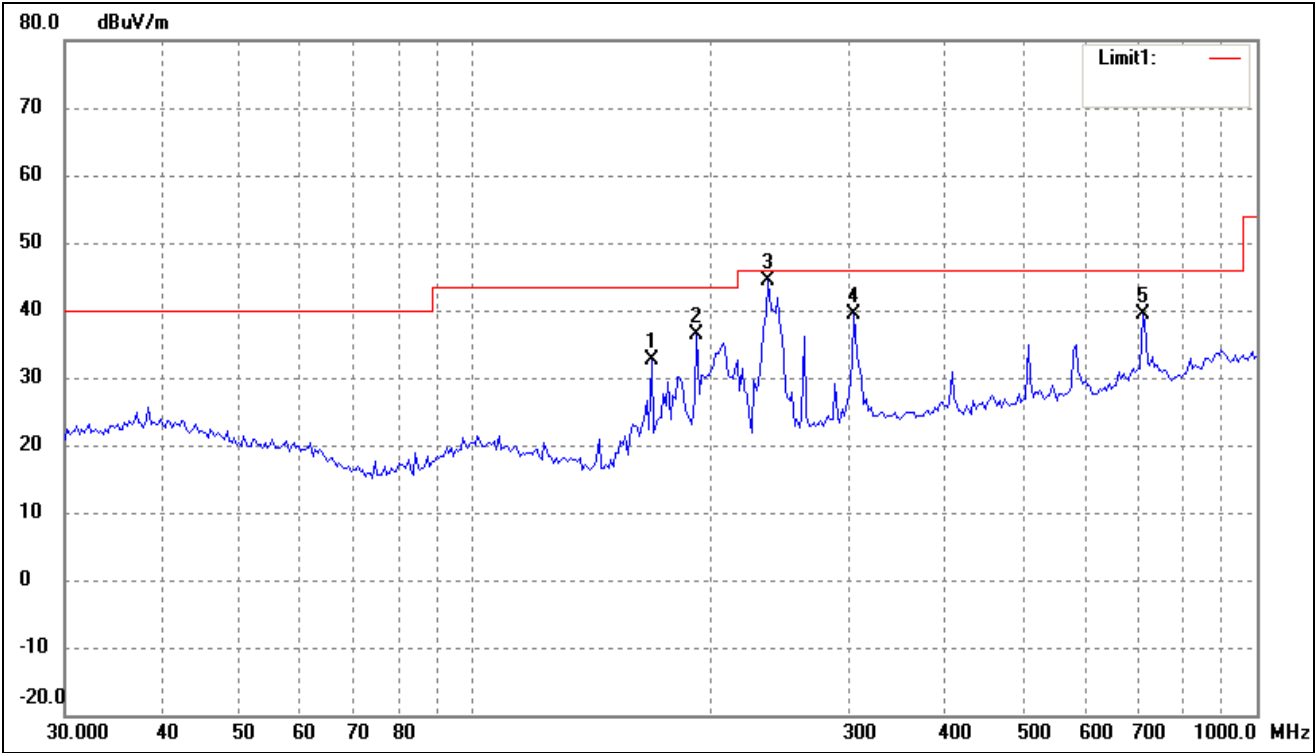


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	136.4598	26.67	2.69	29.36	43.50	-14.14	51	100	peak
2	192.4186	29.90	3.33	33.23	43.50	-10.27	308	100	peak
3	240.8304	25.25	6.36	31.61	46.00	-14.39	120	100	peak
4	510.0436	27.88	11.11	38.99	46.00	-7.01	359	100	peak
5	714.1734	21.05	14.20	35.25	46.00	-10.75	359	100	peak

Plot of Radiated Emissions Test Data

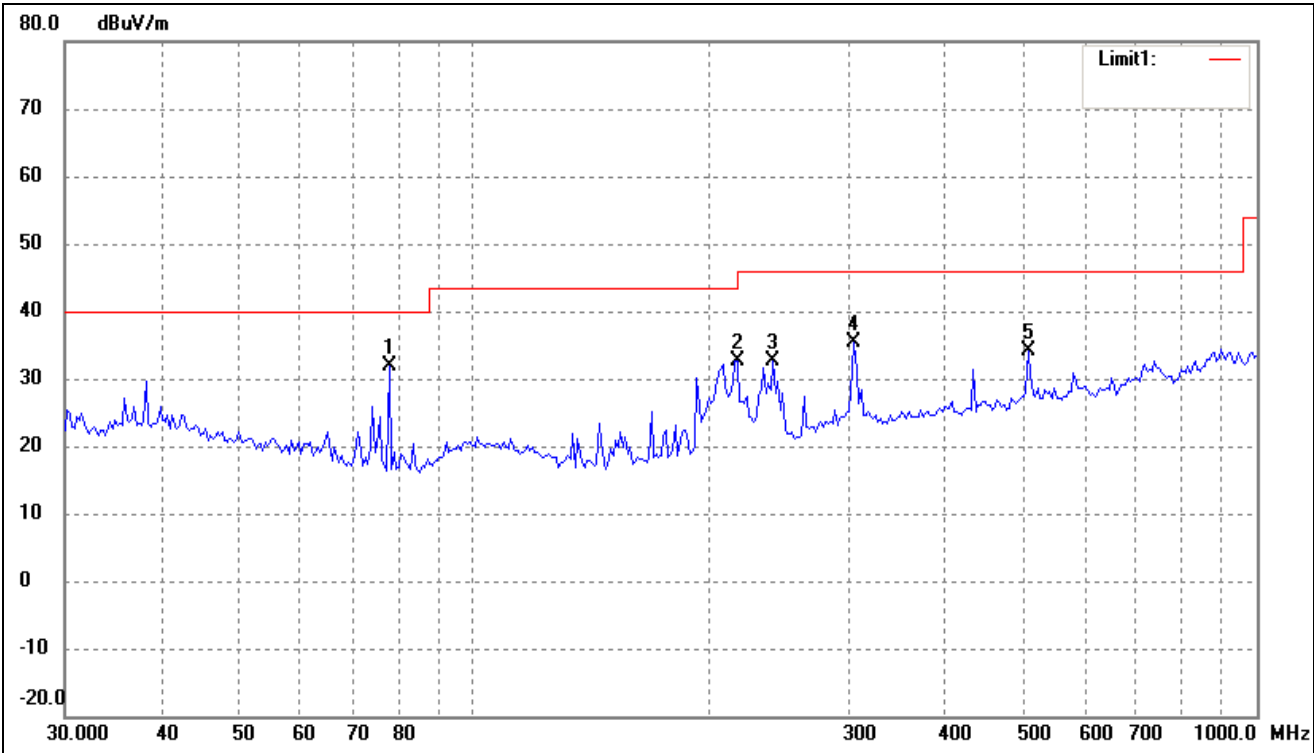
EUT: Smart Watch
Tested Model: Z1
Operating Condition: TM2
Comment: Input AC 120V/60Hz, Output DC 5V

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	168.4138	30.03	2.67	32.70	43.50	-10.80	58	150	peak
2	192.4186	33.00	3.33	36.33	43.50	-7.17	326	100	peak
3	237.4760	38.23	6.18	44.41	46.00	-1.59	29	120	peak
4	305.6800	30.07	9.21	39.28	46.00	-6.72	209	100	peak
5	714.1734	25.27	14.20	39.47	46.00	-6.53	359	200	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	77.8654	30.67	1.26	31.93	40.00	-8.07	51	100	peak
2	216.7828	27.84	4.88	32.72	46.00	-13.28	308	100	peak
3	240.8304	26.29	6.36	32.65	46.00	-13.35	120	100	peak
4	305.6800	26.23	9.21	35.44	46.00	-10.56	359	100	peak
5	510.0436	23.06	11.11	34.17	46.00	-11.83	359	100	peak

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

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