



Shenzhen Asia Test Technology Co., Ltd.

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FCC RADIO TEST REPORT

FCC ID: 2AFMI036AL

Product : Power Bank

Trade Name :  運之易

Model Name : HZX-036AL

Serial Model : HZX-036BT, HZX-036, HZX-030BT, HZX-030
HZX-100, HZX-070

Prepared for

Shenzhen Saykey Technology Co.,Ltd

312, A BUILDING, HANGKONG ROAD, SANWEI, XIXIANG STREET, BAO'AN
DISTRICT, SHENZHEN, CHINA

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name Shenzhen Saykey Technology Co.,Ltd

Address 312, A BUILDING,HANGKONG ROAD,SANWEI,XIXIANG STREET, BAO'AN DISTRICT,SHENZHEN, CHINA

Manufacture's Name Shenzhen Saykey Technology Co.,Ltd

Address 312, A BUILDING,HANGKONG ROAD,SANWEI,XIXIANG STREET, BAO'AN DISTRICT,SHENZHEN, CHINA

Product description

Product name Power Bank

Model and/or type reference HZX-036AL

Serial Model HZX-036BT, HZX-036, HZX-030BT, HZX-030 HZX-100, HZX-070

Standards FCC Part15.247

Test procedure ANSI C63.4-2009

This device described above has been tested by ATT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test

Date (s) of performance of tests Jul. 26 2015- Aug. 07 2015

Date of Issue Aug. 07 2015

Test Result **Pass**

Tested by: Eric Wang
Eric Wang
Project Leader

Reviewed by: Jerry You
Jerry You
Laboratory Supervisor

Approved by: Jack Yu
Jack Yu
Technical Director



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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247 (a)(2)	6dB Bandwidth	PASS	
15.247 (b)	Peak Output Power	PASS	
15.247 (c)	Radiated Spurious Emission	PASS	
15.247 (d)	Power Spectral Density	PASS	
15.205	Band Edge Emission	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report



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1.1 TEST FACILITY

Asia Institute Technology (DongGuan) Limited

No. 22, JinQianLing Street 3, JiTiGang Village, Huang-Jiang Town, DongGuan, Guangdong, 523757 China

FCC Registration No.: 248337

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power, conducted	$\pm 0.16\text{dB}$
3	Spurious emissions, conducted	$\pm 0.21\text{dB}$
4	All emissions, radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$



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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Power Bank																
Model Name	HZX-036AL																
Serial Model	HZX-036BT, HZX-036, HZX-030BT, HZX-030 HZX-100, HZX-070																
Model Difference	All models are identical except model name.																
Product Description	<p>The EUT is a Power Bank with BT function.</p> <table border="1"><tr><td>Operation Frequency:</td><td>2402~2480MHz</td></tr><tr><td>Modulation Type:</td><td>GFSK</td></tr><tr><td>Bluetooth version:</td><td>BT 4.0 BLE mode</td></tr><tr><td>Bit Rate of Transmitter</td><td>1 Mbps</td></tr><tr><td>Number Of Channel</td><td>40CH</td></tr><tr><td>Antenna Designation:</td><td>Please see Note 3.</td></tr><tr><td>Output Power(Conducted):</td><td>2.55dBm(PK)</td></tr><tr><td>Antenna Gain (dBi)</td><td>0dbi</td></tr></table> <p>Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.</p>	Operation Frequency:	2402~2480MHz	Modulation Type:	GFSK	Bluetooth version:	BT 4.0 BLE mode	Bit Rate of Transmitter	1 Mbps	Number Of Channel	40CH	Antenna Designation:	Please see Note 3.	Output Power(Conducted):	2.55dBm(PK)	Antenna Gain (dBi)	0dbi
Operation Frequency:	2402~2480MHz																
Modulation Type:	GFSK																
Bluetooth version:	BT 4.0 BLE mode																
Bit Rate of Transmitter	1 Mbps																
Number Of Channel	40CH																
Antenna Designation:	Please see Note 3.																
Output Power(Conducted):	2.55dBm(PK)																
Antenna Gain (dBi)	0dbi																
Channel List	Please refer to the Note 2.																
Ratings	3.7Vdc from battery to 5.0Vdc from Micro-USB port																
Adapter	JINLI, M/N:JZ05001000A, Input:100-240V, 50/60Hz, 0.6A, output:DC 5V, 1A																
Battery	7.01Wh																
Connecting I/O Port(s)	Please refer to the User's Manual																
hardware version	A905_20150428_V1.0																
Software version	V1.1																

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Channel	Frequency (MHz)
00	2402
01	2404



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.....
38	2478
39	2480

3.

Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A	N/A	N/A	chip Antenna	N/A	0	BT Antenna

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode		Description
Mode 1		CH00
Mode 2		CH19
Mode 3		CH39
Mode 4		Link Mode

For Conducted Emission		
Final Test Mode		Description
Mode 4		Link Mode

For Radiated Emission		
Final Test Mode		Description
Mode 1		CH00
Mode 2		CH19
Mode 3		CH39
Mode 4		Link Mode

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) Measurements are performed according to the Public Notice-DA 00-705. The measurements are performed at all Bit Rate of Transmitter, the worst data was reported. The EUT was programmed to be in continuously transmitting mode.
- (3) The relevant RF Conducted Measurement is performed by a temporary antenna connector, please refer to the Equipment List for the detail

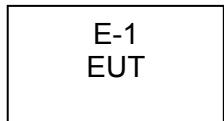


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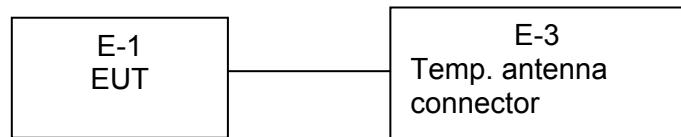
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2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

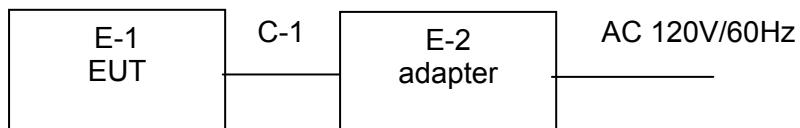
RE



RF conducted measurement



CE





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2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	Power Bank	 惠之尚	HZX-036AL	N/A	EUT
E-2	adapter	JINLI	JZ05001000A, Input:100-240V, 50/60Hz, 0.6A, output:DC 5V, 1A	N/A	N/A
E-3	Temp. antenna connector	DOKMA	KYS-0944	22550510	Impedance=50ohm cable loss=0.9db

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	60cm	USB Line(EUT)

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



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2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

For Conducted Test (In Shielded Room)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Receiver	R&S	ESCI	100124	2015.06.26	1Y
2	L.I.S.N.#1	Kyoritsu	KNW-242	8-837-4	2015.06.26	1Y
3	L.I.S.N.#2	Kyoritsu	KNW-407	8-1789-4	2015.06.26	1Y
4	Coaxial Switch	Anritsu	MP59B	6200264417	2015.06.26	6M
5	Cable 0.09-30MHz	N/A	AIT005	C001	2015.07.10	1Y

For Radiation Test and other conducted test (bandwidth,output power, power spectral density)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	ADVANTEST	R3182	150900201	2015.06.26	1Y
2	EMI Measuring Receiver	R&S	ESR	101160	2015.06.26	1Y
3	Preamplifier	Tsj	MLA-10K01-B01-27	1205323	2015.06.26	1Y
4	Preamplifier	Tsj	MLA-0120-A02-34	2648A04738	2014.12.02	1Y
5	Bilog Antenna	SCHWARZBECK	VULB9160	3206	2014.12.03	1Y
6	Horn Antenna	SCHWARZBECK	BBHA 9120D	452	2014.12.03	1Y
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2015.05.29	1Y
8	Loop Antenna	TESEQ	HLA6120	35779	2015.05.29	1Y
9	Coaxial Switch	Anritsu	MP59B	6200264416	2015.03.25	6M
10	Power Mete	Anritsu	ML2487B	110553	2015.07.10	1Y
11	Power Sensor	Anritsu	MA2411B	100345	2015.07.10	1Y
12	Cable below 30MHz	N/A	AIT005	R005	2015.07.10	1Y
13	RF Cabl 30-1000MHz	N/A	AIT001	R001	2015.07.10	1Y
14	RF Cabl 1-25GHz	N/A	AIT001	R001	2015.07.10	1Y



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3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz



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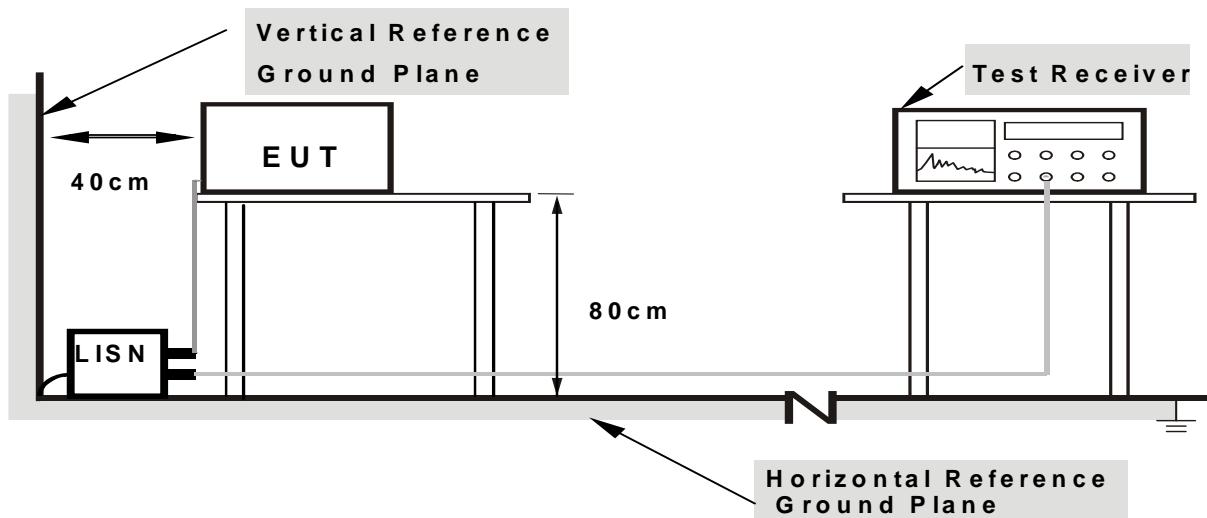
3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



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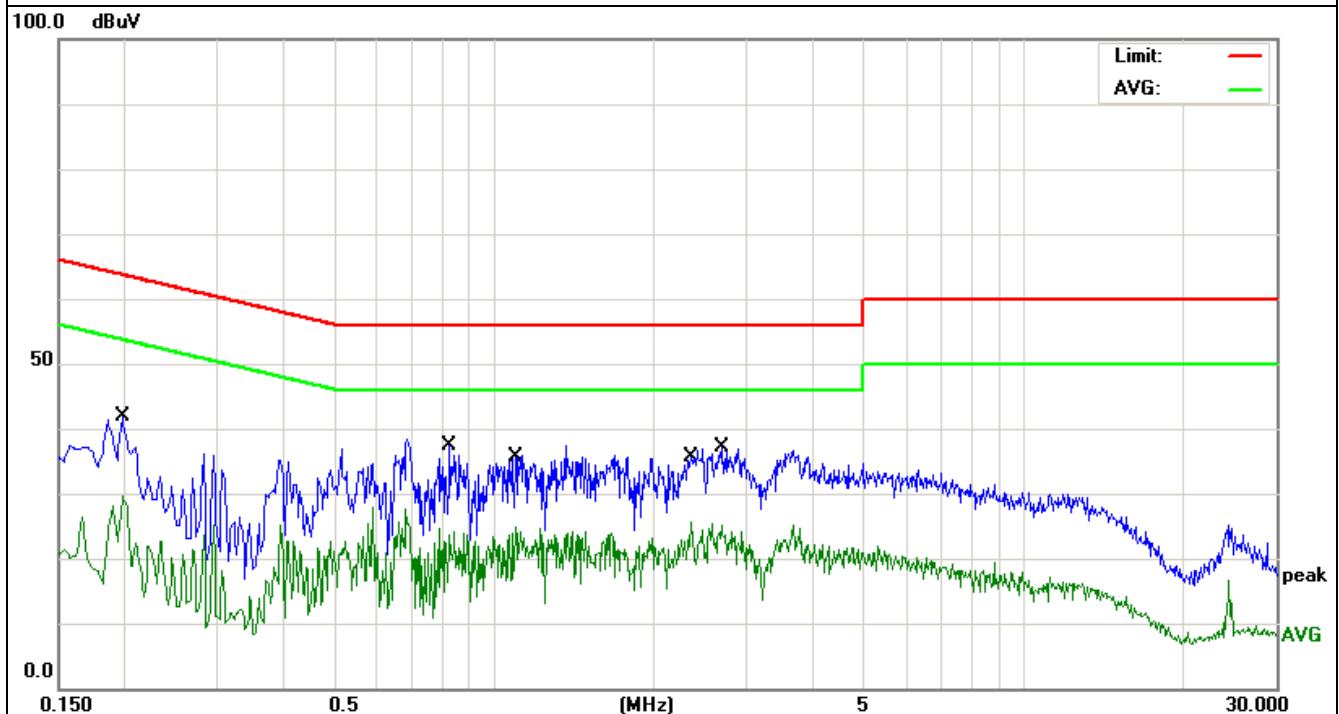
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3.1.6 TEST RESULTS

EUT :	Power Bank	Model Name :	HZX-036AL
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	Line
Test Voltage :	DC 5V from adapter, AC 120V/60Hz for adapter	Test Mode :	4

Frequency (MHz)	Meter Reading (dB μ V)	Factor(dB)	Emission Level (dB μ V)	Limits (dB μ V)	Margin (dB)	Detector
0.1980	39.79	2.12	41.91	63.69	-21.78	QP
0.1980	27.39	2.12	29.51	53.69	-24.18	Average
0.8220	27.39	9.95	37.34	56.00	-18.66	QP
1.0940	14.87	9.94	24.81	46.00	-21.19	Average
2.3540	15.68	10.00	25.68	46.00	-20.32	QP
2.7020	27.00	10.03	37.03	56.00	-18.97	Average

Remark: Factor = Absorbing clamp Factor + Cable Loss.





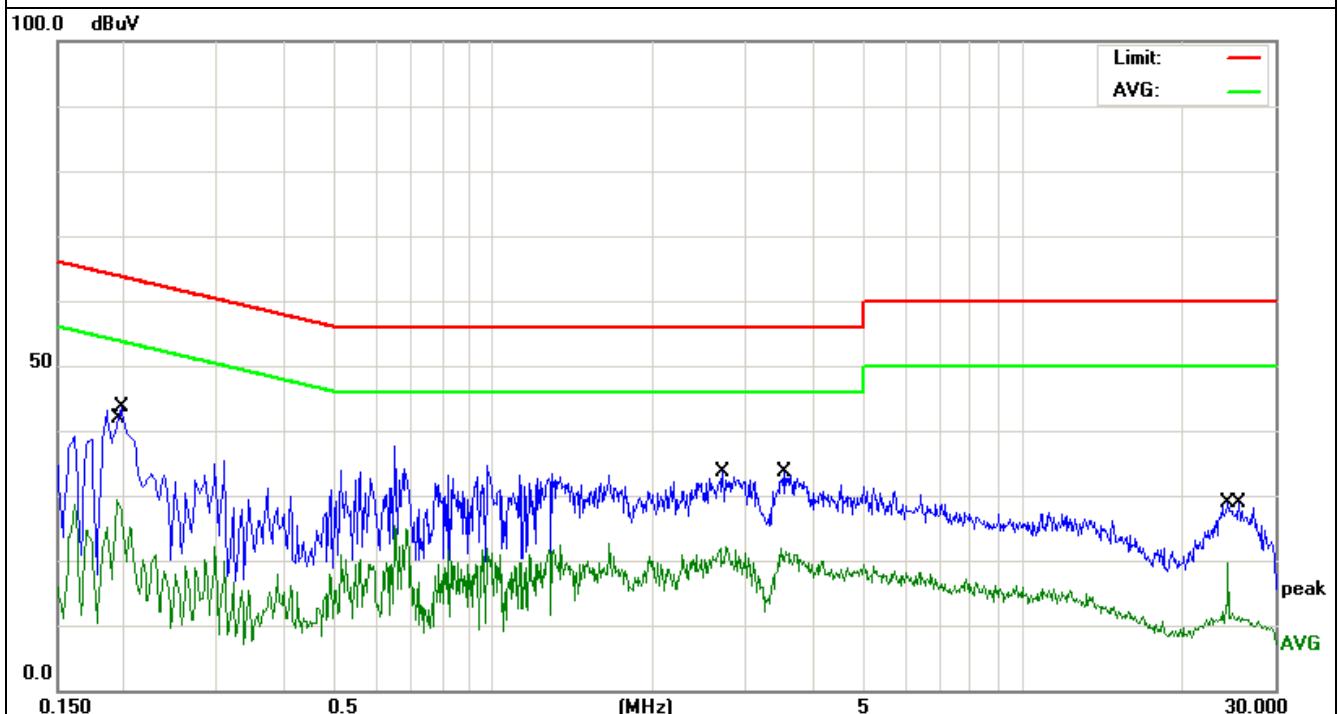
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EUT :	Power Bank	Model Name :	HZX-036AL
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	Neutral
Test Voltage :	DC 5V from adapter, AC 120V/60Hz for adapter	Test Mode :	4

Frequency (MHz)	Meter Reading (dB μ V)	Factor(dB)	Emission Level (dB μ V)	Limits (dB μ V)	Margin (dB)	Detector
0.1940	27.26	2.17	29.43	53.86	-24.43	Average
0.1980	41.41	2.12	43.53	63.69	-20.16	QP
2.7180	23.62	10.03	33.65	56.00	-22.35	QP
3.5060	11.76	10.04	21.80	46.00	-24.20	Average
24.4939	9.62	10.11	19.73	50.00	-30.27	Average
25.7179	18.83	10.14	28.97	60.00	-31.03	QP

Remark: Factor = Absorbing clamp Factor + Cable Loss.





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3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a)&A8.5, then the 15.209(a) limit in the table below has to be followed.

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (dBuV/m) (at 3M)		Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80	60	74	54

Notes:

(1) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average



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Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note: For radiated emission test above 1GHz:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

3.2.3 DEVIATION FROM TEST STANDARD

No deviation

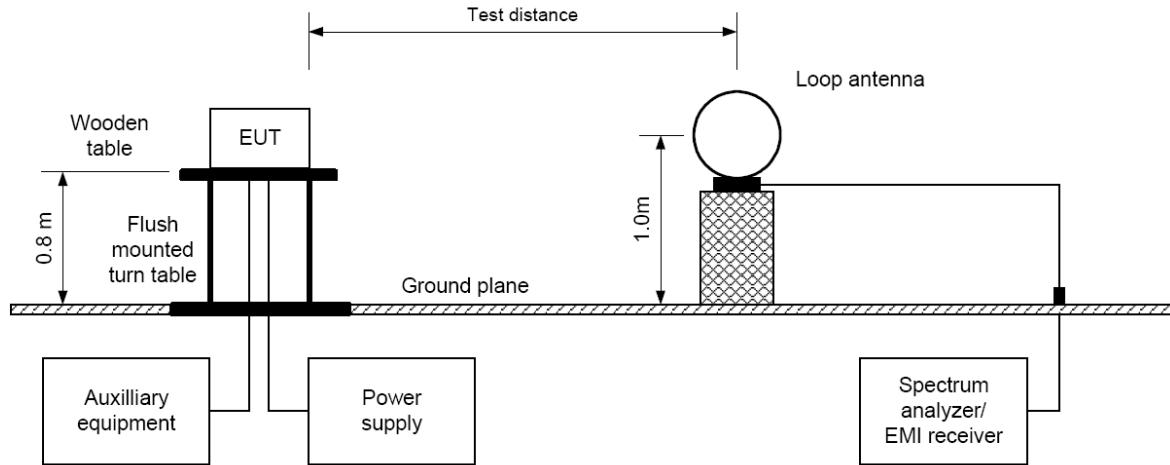


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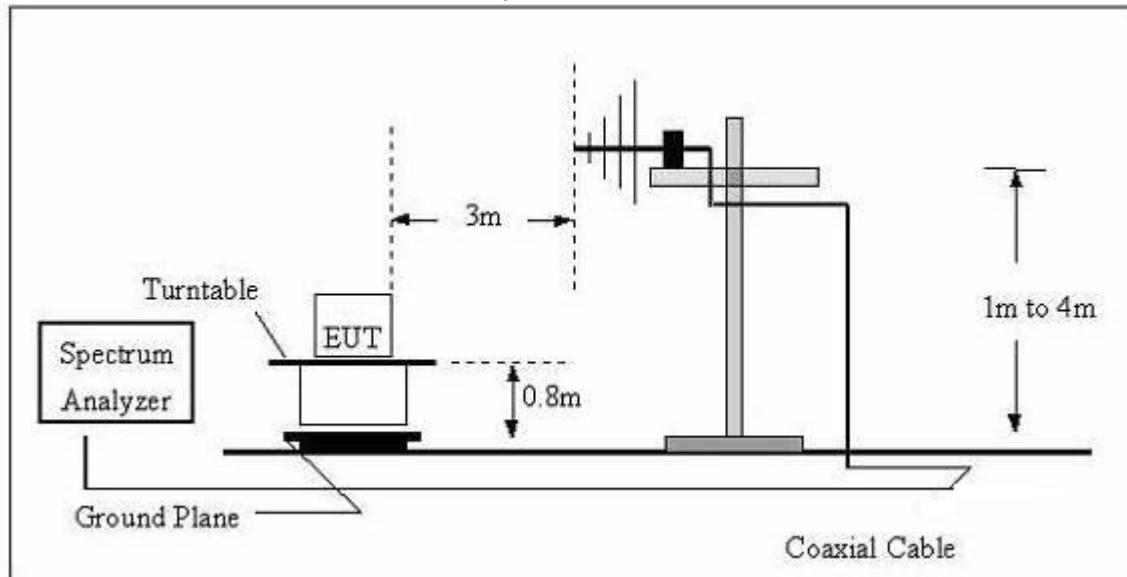
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3.2.4 TEST SETUP

(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz

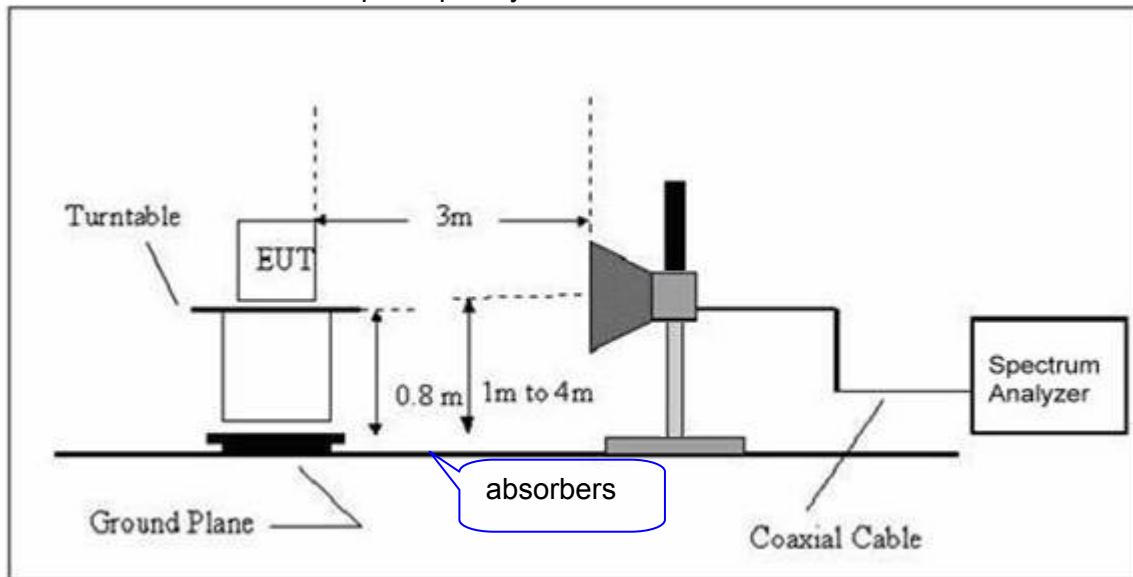




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(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



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3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

EUT:	Power Bank	Model Name. :	HZX-036AL
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.7V by battery
Test Mode :	TX	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	P
--	--	--	--	P

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (dB);
Limit line = specific limits(dBuV) + distance extrapolation factor.



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3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

EUT :	Power Bank	Model Name :	HZX-036AL
Temperature :	20 °C	Relative Humidity :	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.7V by battery
Test Mode :	TX 2402		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	37.0248	33.79	-16.72	17.07	40.00	-22.93	QP
V	114.9168	31.60	-14.15	17.45	43.50	-26.05	QP
V	159.7844	32.76	-15.01	17.75	43.50	-25.75	QP
V	283.9791	31.42	-10.15	21.27	46.00	-24.73	QP
V	672.8444	30.88	-0.83	30.05	46.00	-15.95	QP
V	801.7862	29.89	3.30	33.19	46.00	-12.81	QP
H	42.1542	30.02	-14.54	15.48	40.00	-24.52	QP
H	136.4598	30.80	-14.77	16.03	43.50	-27.47	QP
H	185.1379	31.21	-11.47	19.74	43.50	-23.76	QP
H	437.1197	29.65	-6.65	23.00	46.00	-23.00	QP
H	588.9048	30.37	-2.28	28.09	46.00	-17.91	QP
H	701.7607	30.32	0.32	30.64	46.00	-15.36	QP

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit

Note: test perform on all mode(low,mid,high), the worst case has been reported.



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3.2.8 TEST RESULTS (1GHZ~ 10TH HARMONIC)

Low Channel (2402 MHz)-Above 1G							
Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detect or Type	Polar (H/V)
4803.11	62.31	-3.16	59.15	74	-14.85	Pk	Vertical
4803.11	50.12	-3.16	46.96	54	-7.04	Av	Vertical
7206.21	57.43	-2.05	55.38	74	-18.62	Pk	Vertical
7206.21	51.06	-2.05	49.01	54	-4.99	Av	Vertical
4804.23	57.75	-3.43	54.32	74	-19.68	Pk	Horizontal
4804.23	45.68	-3.43	42.25	54	-11.75	Av	Horizontal
7206.13	55.91	-2.72	53.19	74	-20.81	Pk	Horizontal
7206.13	44.09	-2.72	41.37	54	-12.63	Av	Horizontal
Mid Channel (2440 MHz)-Above 1G							
4880.44	61.94	-3.16	58.78	74	-15.22	Pk	Vertical
4880.44	51.64	-3.16	48.48	54	-5.52	Av	Vertical
7324.16	58.29	-2.05	56.24	74	-17.76	Pk	Vertical
7324.16	50.73	-2.05	48.68	54	-5.32	Av	Vertical
4881.23	54.88	-3.43	51.45	74	-22.55	Pk	Horizontal
4881.23	45.41	-3.43	41.98	54	-12.02	Av	Horizontal
7324.06	52.52	-2.72	49.8	74	-24.2	Pk	Horizontal
7324.06	44.66	-2.72	41.94	54	-12.06	Av	Horizontal
High Channel (2480MHz)- Above 1G							
4960.11	62.82	-3.16	59.66	74	-14.34	Pk	Vertical
4960.11	50.64	-3.16	47.48	54	-6.52	Av	Vertical
7440.25	57.55	-2.05	55.5	74	-18.5	Pk	Vertical
7440.25	48.91	-2.05	46.86	54	-7.14	Av	Vertical
4960.71	47.59	-3.43	44.16	74	-29.84	Pk	Horizontal
4960.71	46.28	-3.43	42.85	54	-11.15	Av	Horizontal
7440.12	52.13	-2.72	49.41	74	-24.59	Pk	Horizontal
7440.12	44.67	-2.72	41.95	54	-12.05	Av	Horizontal

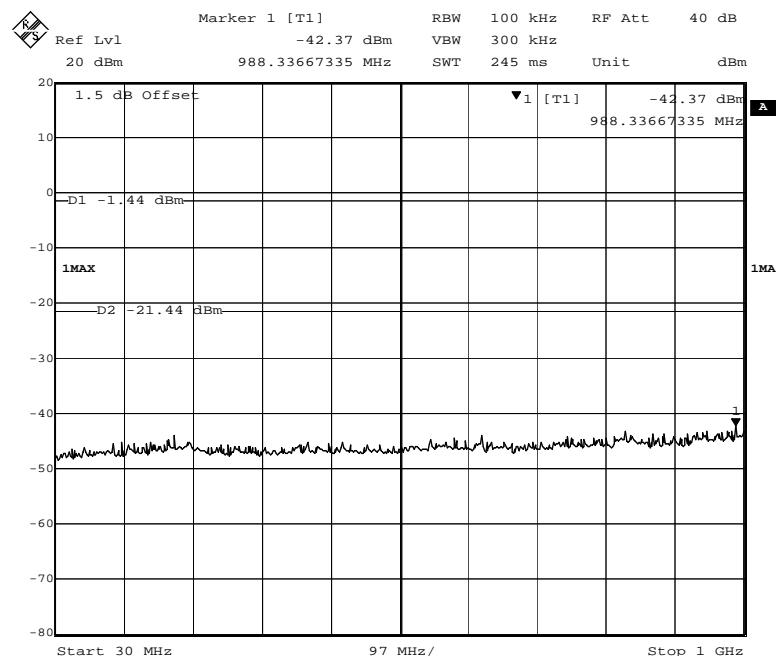
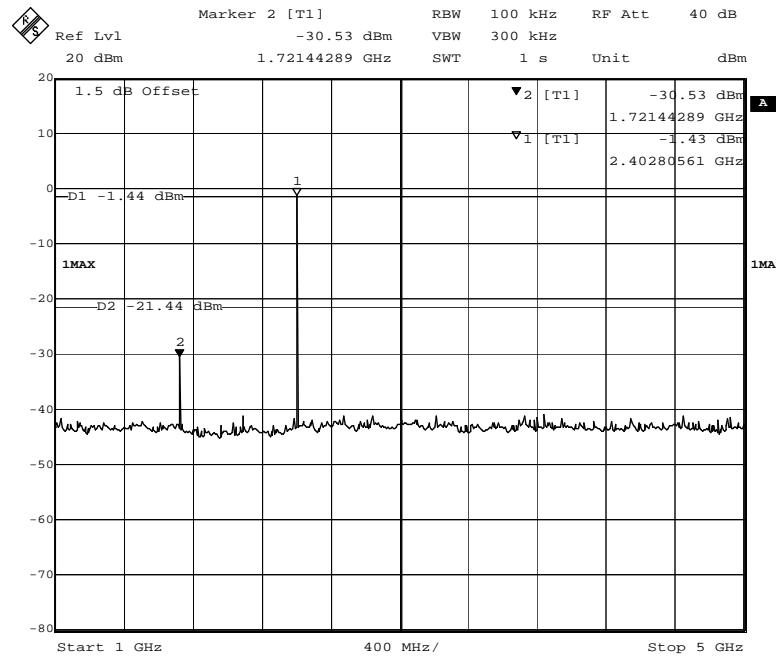


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Conducted Spurious Emissions at Antenna Port:
(there are 150001 points are used for each measurement plot)

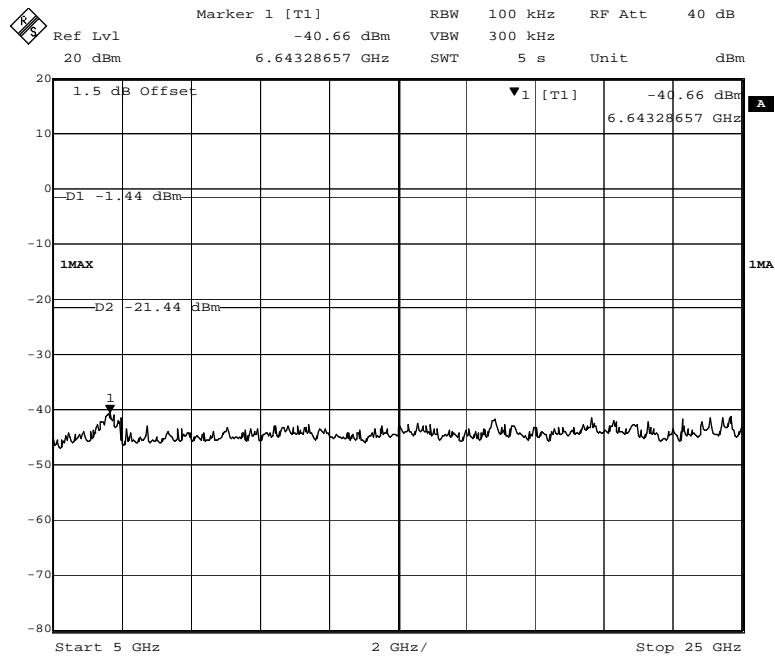
Low Channel





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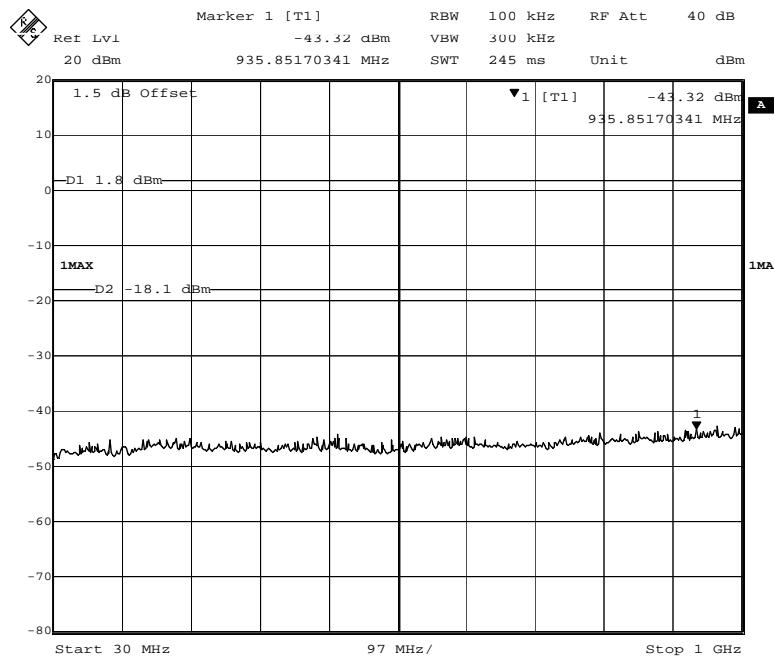
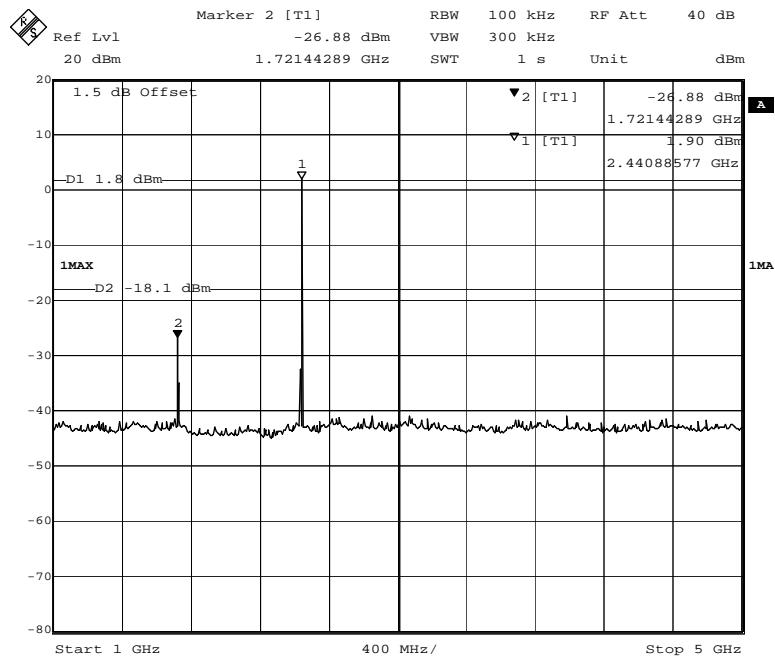




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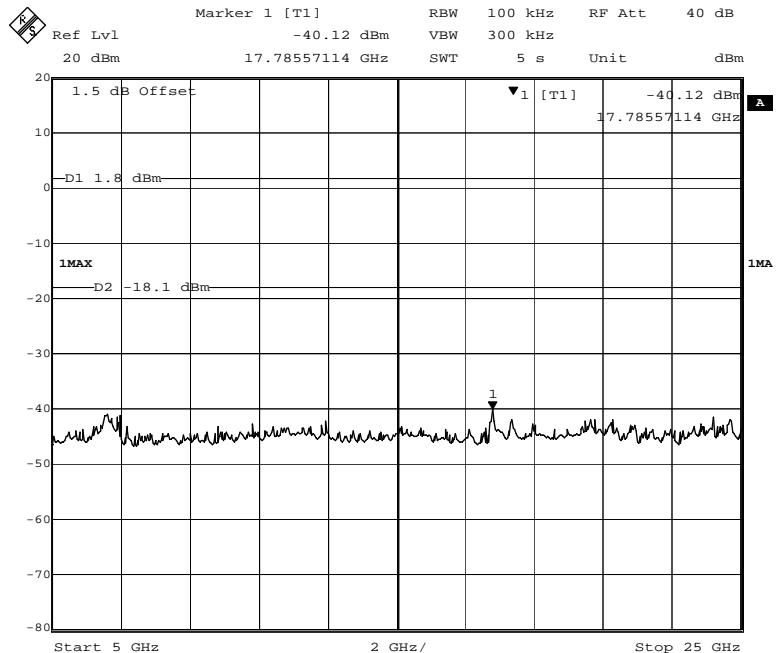
Middle Channel





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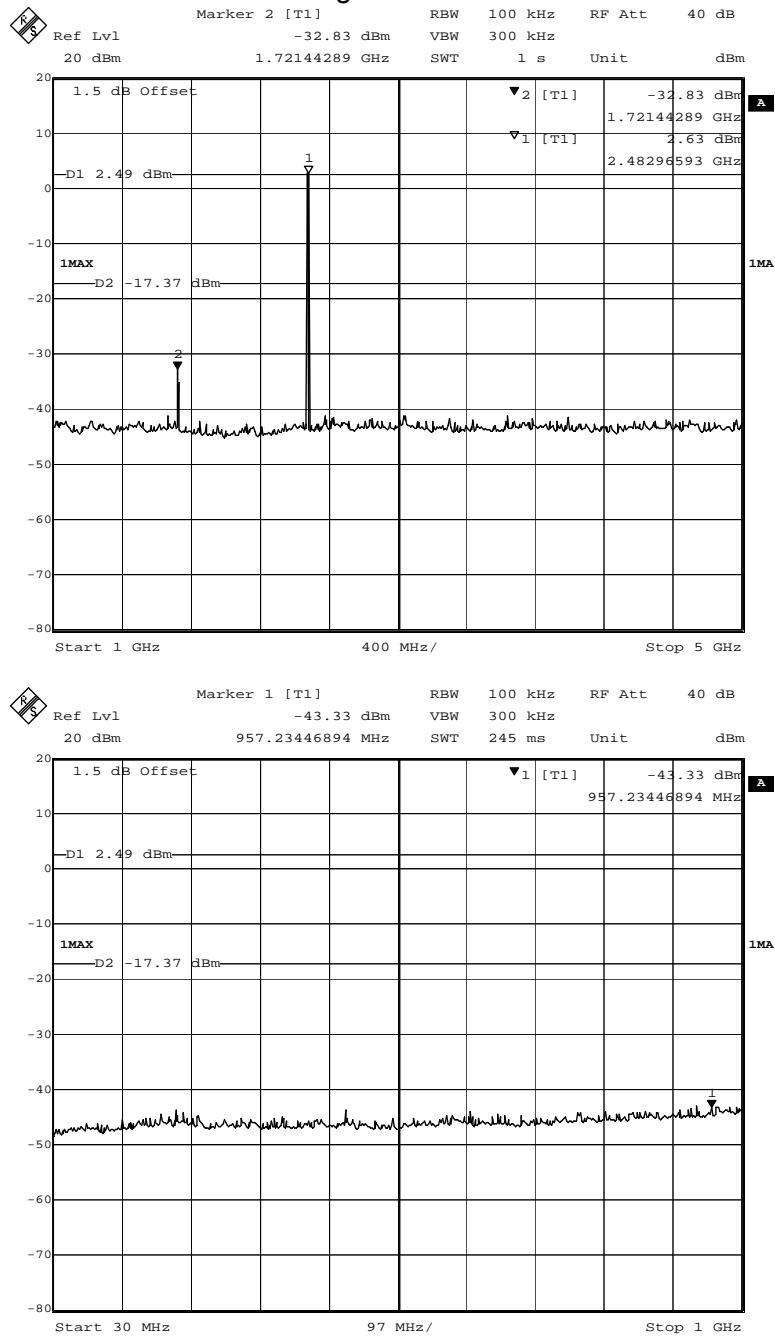




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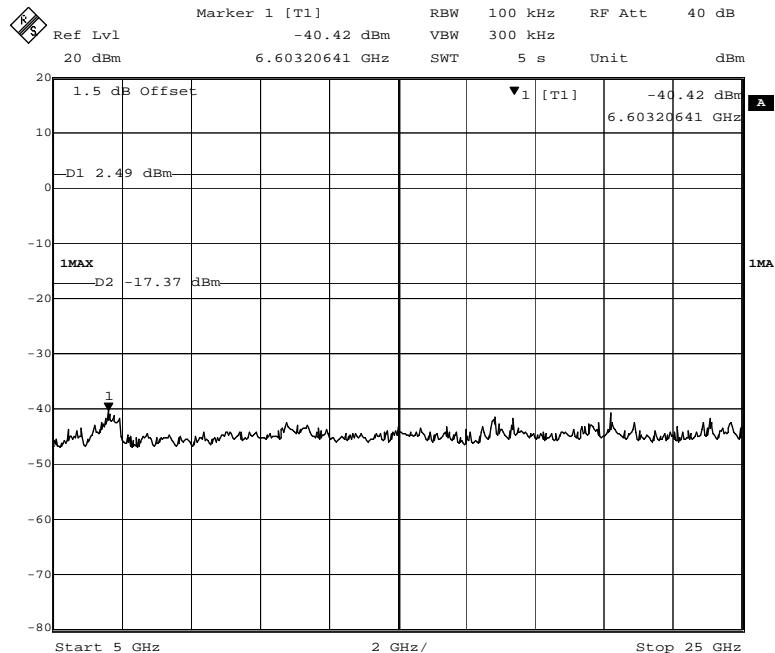
High Channel





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4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247&A8.2	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

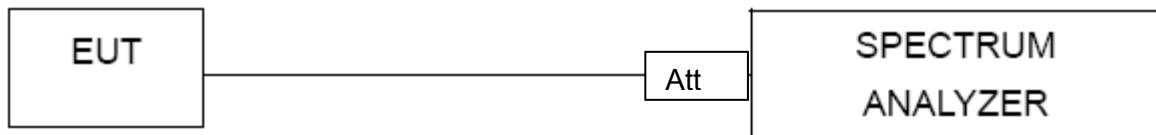
4.1.1 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW \geq 3 kHz.
4. Set the VBW \geq 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



4.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.



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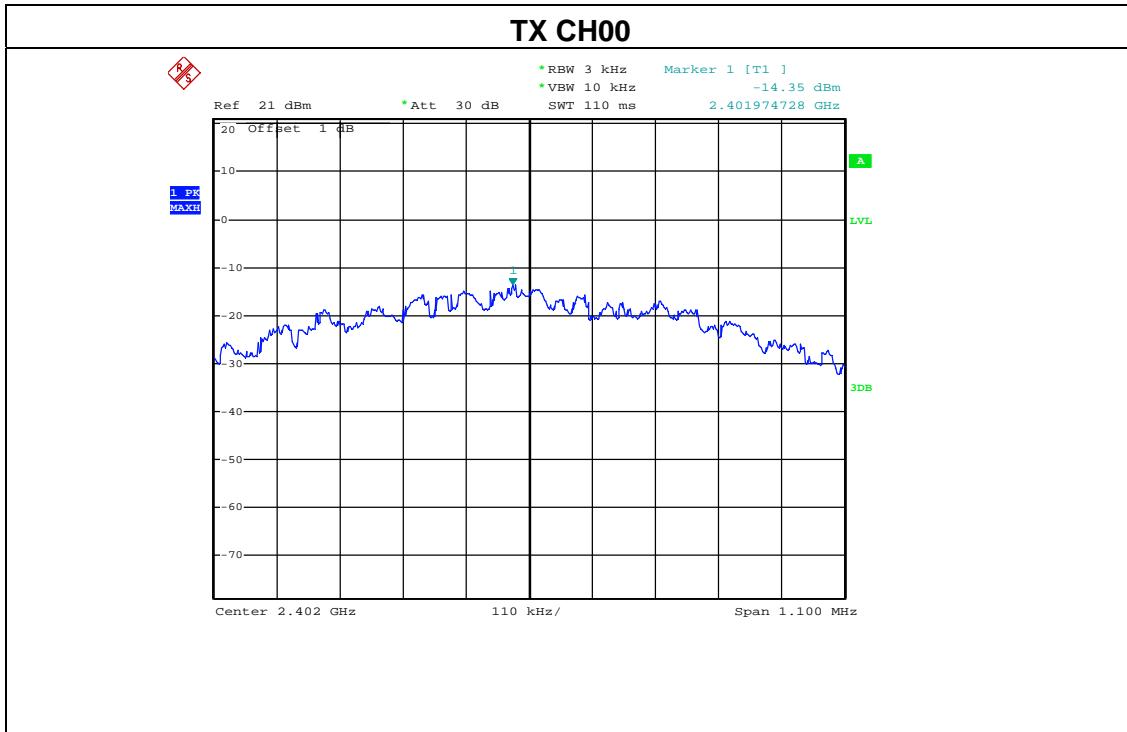
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4.1.5 TEST RESULTS

EUT :	Power Bank	Model Name :	HZX-036AL
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1015 hPa	Test Voltage :	DC 3.7V from battery
Test Mode :	TX Mode /CH00, CH19, CH39		

Note: The relevant measured result has the offset with cable loss already.

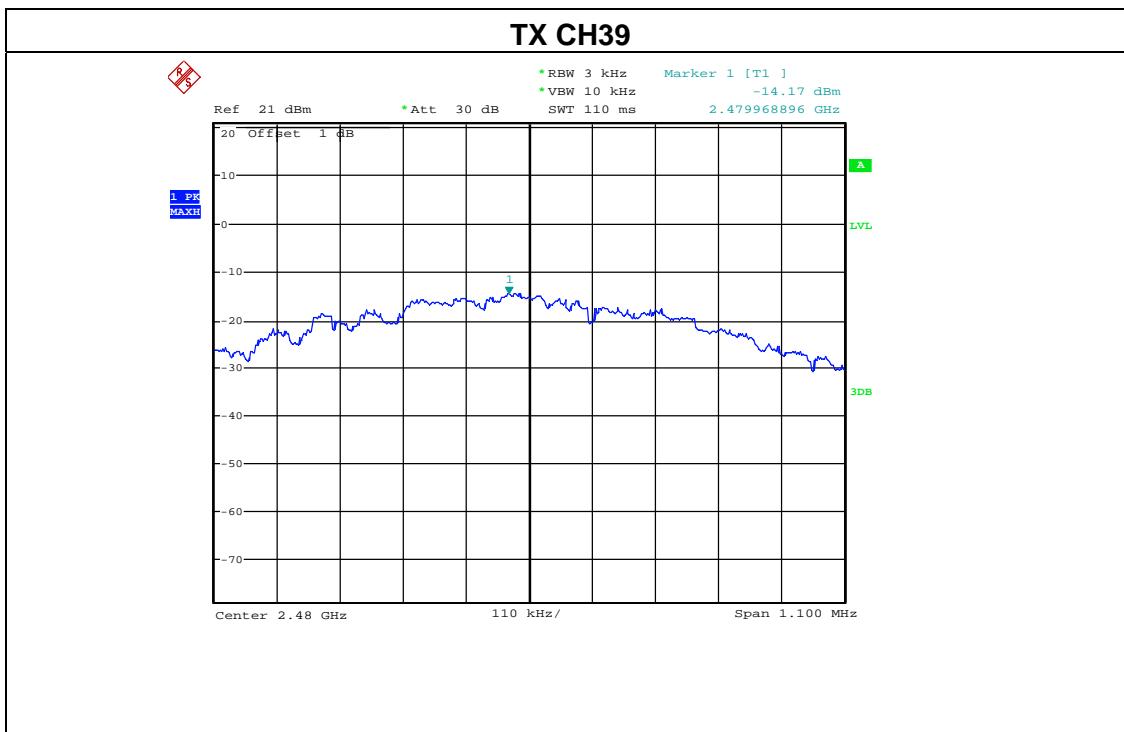
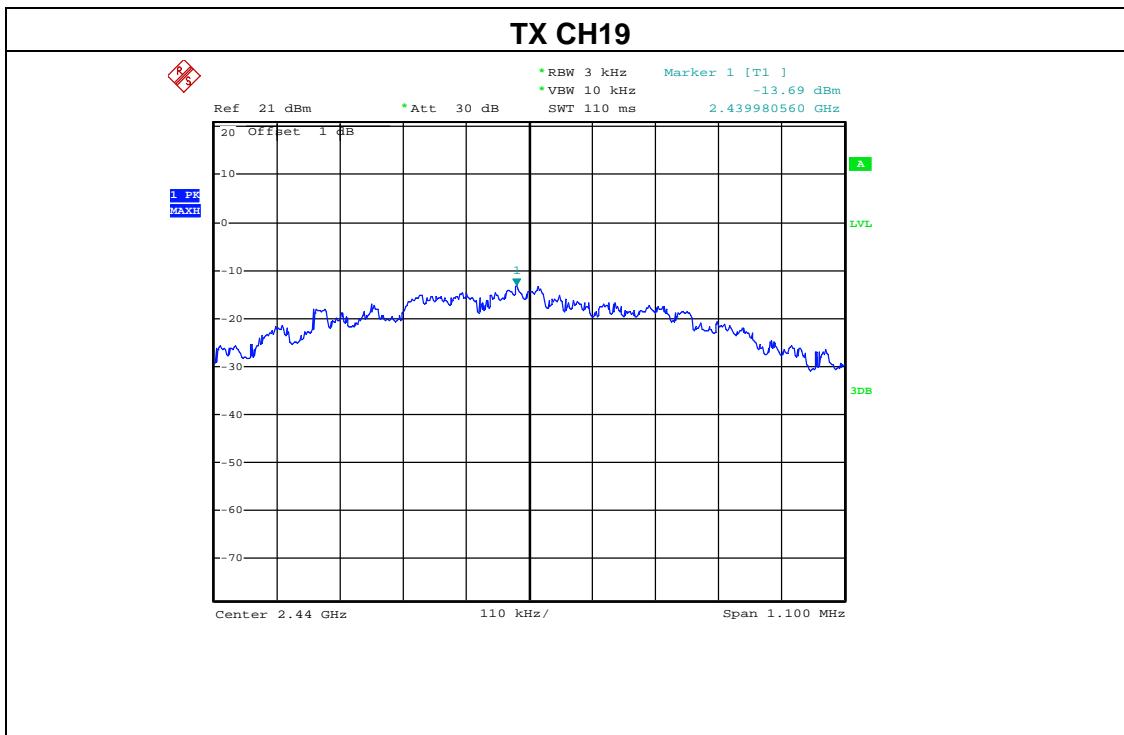
Frequency	Power Density dBm/3KHz	Limit dBm/3KHz	Result
2402 MHz	-14.35	8	PASS
2440 MHz	-13.69	8	PASS
2480 MHz	-14.17	8	PASS





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5. BANDWIDTH TEST

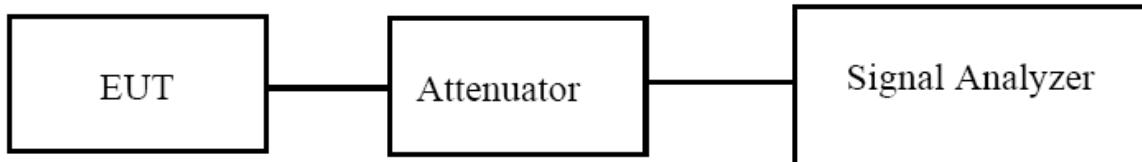
5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C&A8.2				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2) &A8.2	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS

5.1.1 TEST PROCEDURE

According to KDB 558074 D02 DTS Meas Guidance v03r03

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



5.1.2 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



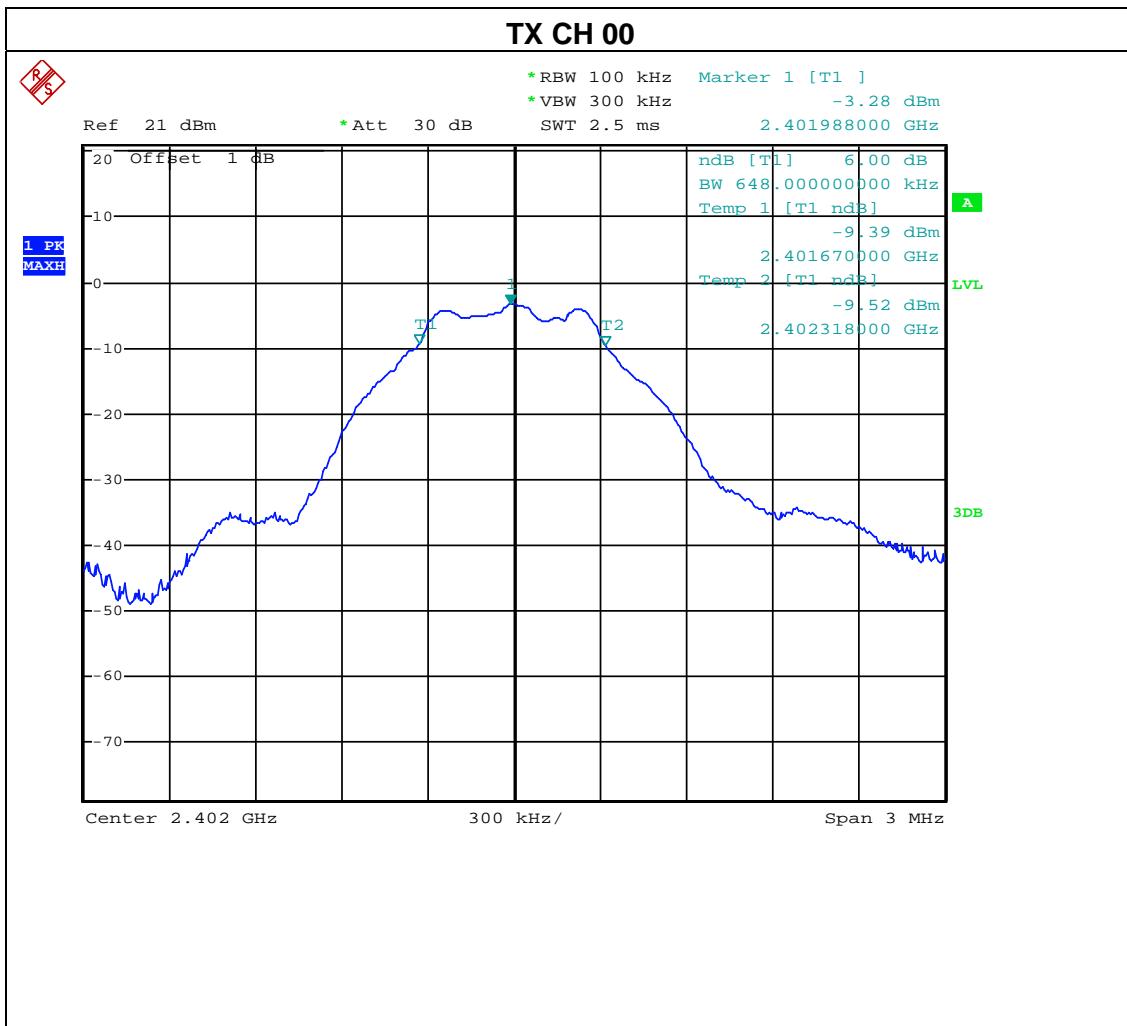
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5.1.3 TEST RESULTS

EUT :	Power Bank	Model Name :	HZX-036AL
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V from battery
Test Mode :	TX Mode /CH00, CH19, CH39		

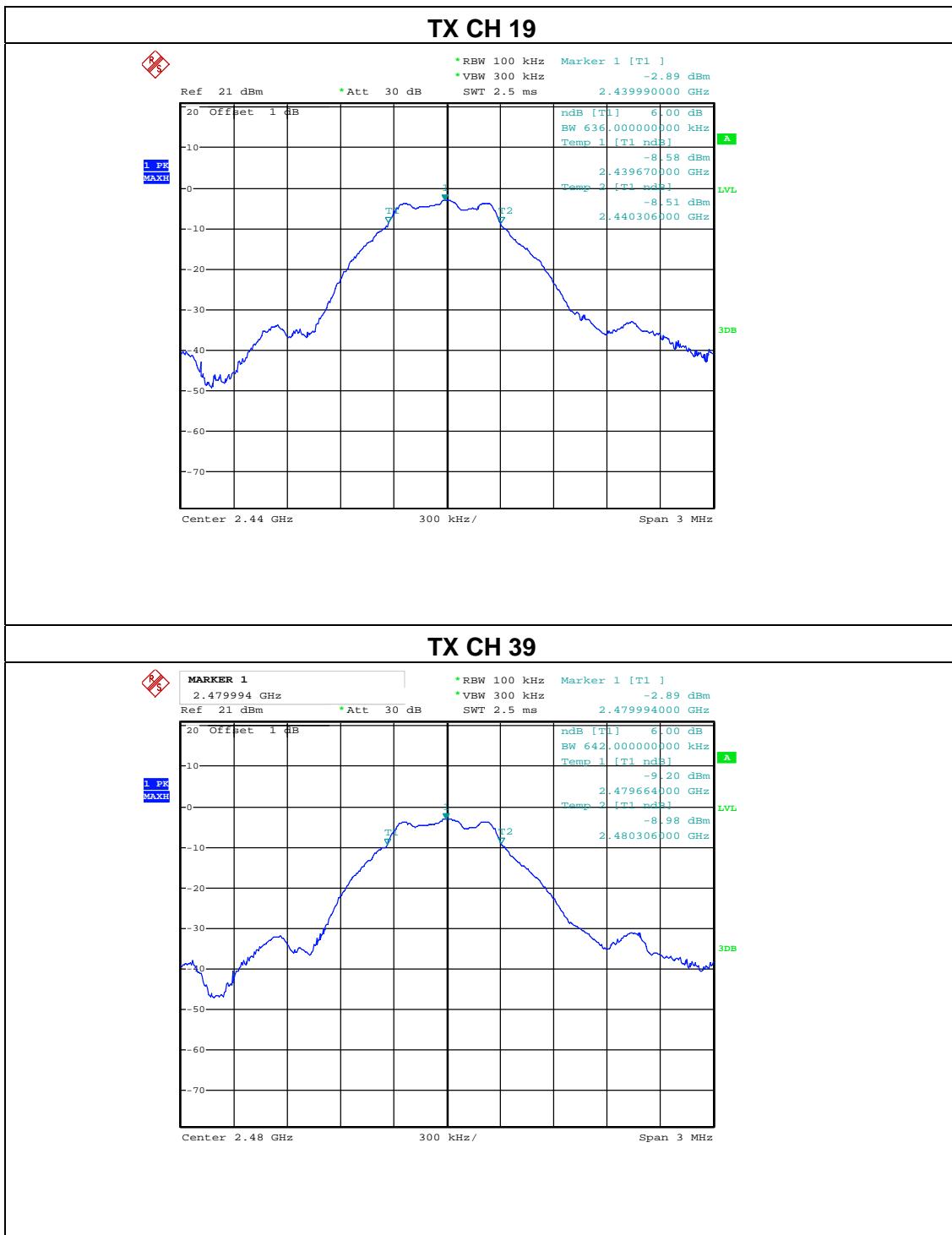
Channel	Frequency (MHz)	6dB bandwidth (kHz)	99% bandwidth (MHz)	Limit (kHz)	Result
Low	2402	648.00	/	>500	Pass
Middle	2440	636.00	/	>500	Pass
High	2480	642.00	/	>500	Pass





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6. PEAK OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

6.1.1 TEST PROCEDURE

- The EUT was directly connected to the Power meter

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



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6.1.5 TEST RESULTS

EUT :	Power Bank	Model Name :	HZX-036AL
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V from battery
Test Mode :	TX Mode		

Note: The relevant measured result has the offset with cable loss already.

TX Mode				
Test Channel	Frequency	Maximum	Conducted Output Power (PK)	LIMIT
	(MHz)		(dBm)	dBm
CH00	2402		2.53	30
CH19	2440		2.51	30
CH39	2480		2.55	30



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7. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

APPLICABLE STANDARD

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a)&A1.1 is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a)&A8.5, must also comply with the radiated emission limits specified in §15.209(a) &A1.1 (see §15.205(c)) &A8.5.

TEST PROCEDURE

- a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- c) Set RBW to 100kHz and VBW of spectrum analyzer to 300kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- e) Repeat above procedures until all measured frequencies were complete.

7.1 DEVIATION FROM STANDARD

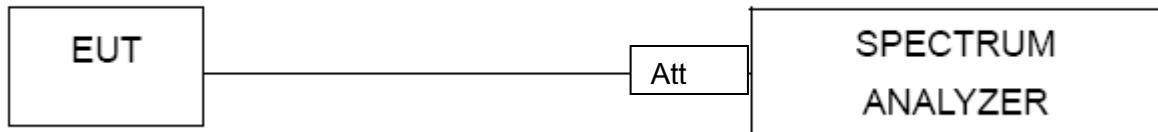
No deviation.



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7.2 TEST SETUP



7.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



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7.4 TEST RESULTS

EUT :	Power Bank	Model Name :	HZX-036AL
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V from battery

Frequency Band	Delta Peak to band emission (dBc)	> Limit (dBc)	Result
Left-band	49.71	20	Pass
Right-band	49.65	20	Pass

Frequency (MHz)	Meter Reading (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type	Comment
							1Mbps Non-hopping
2390	56.94	-13.06	43.88	74	-30.12	peak	Vertical
2390	59.61	-13.06	46.55	74	-27.45	peak	Horizontal
2483.5	56.49	-12.78	43.71	74	-30.29	peak	Vertical
2483.5	57.86	-12.78	45.08	74	-28.92	peak	Horizontal

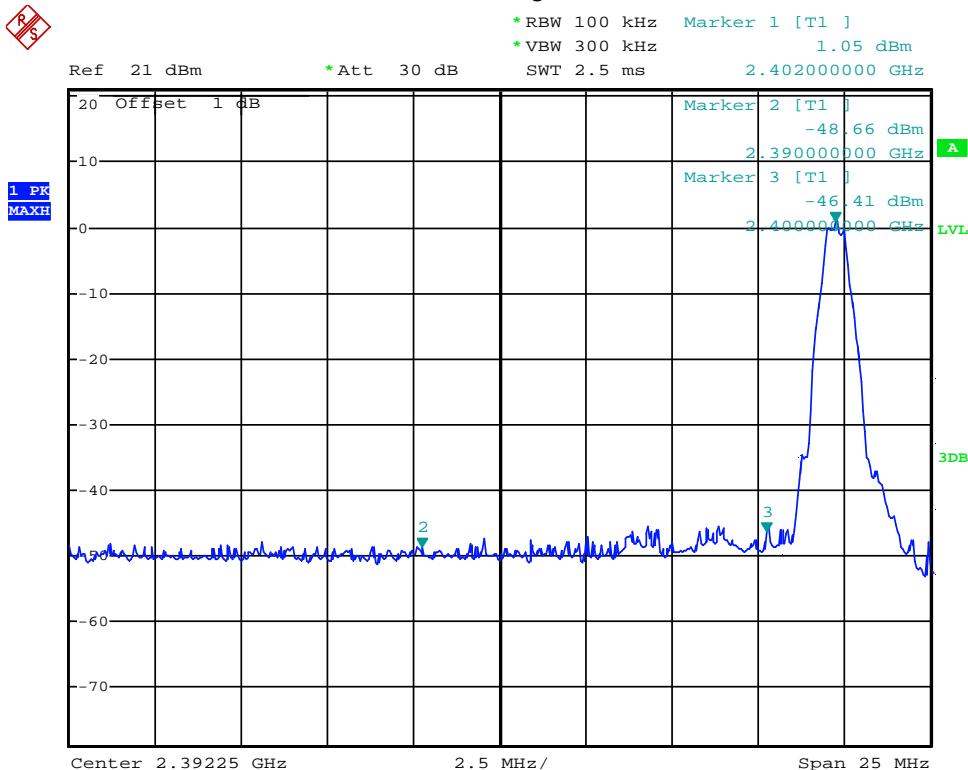
Note: Test method to see chapter 3.2 . When PK value is lower than the Average value limit, average didn't record.



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Band Edge, Left Side

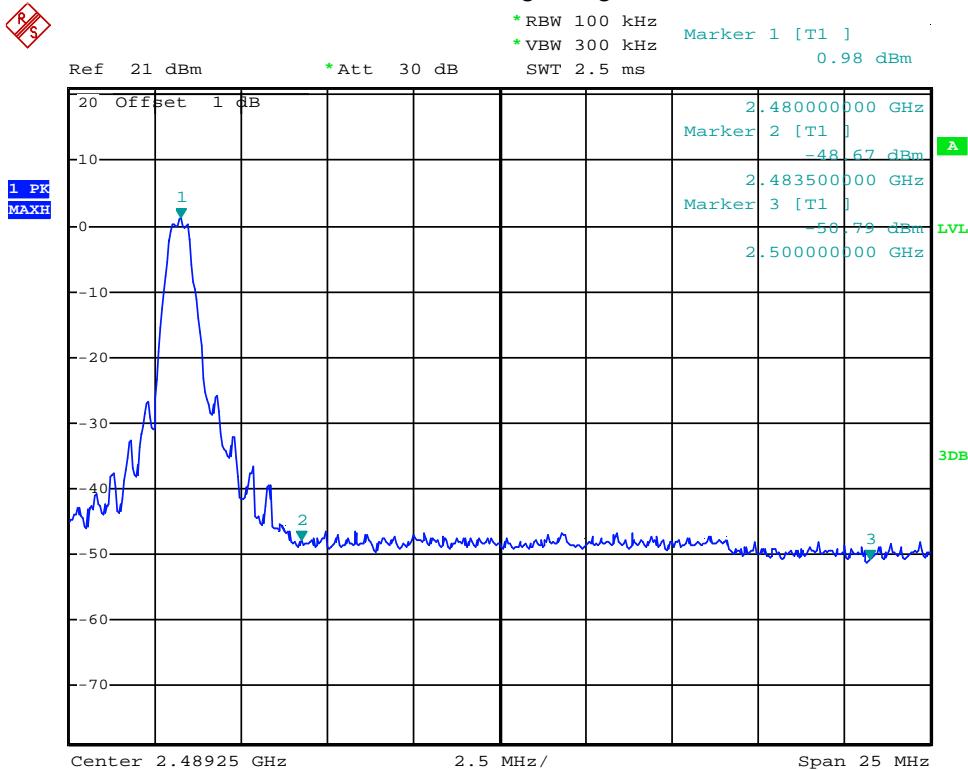




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Band Edge, Right Side





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8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

8.2 EUT ANTENNA

The EUT antenna is chip antenna. It comply with the standard requirement.

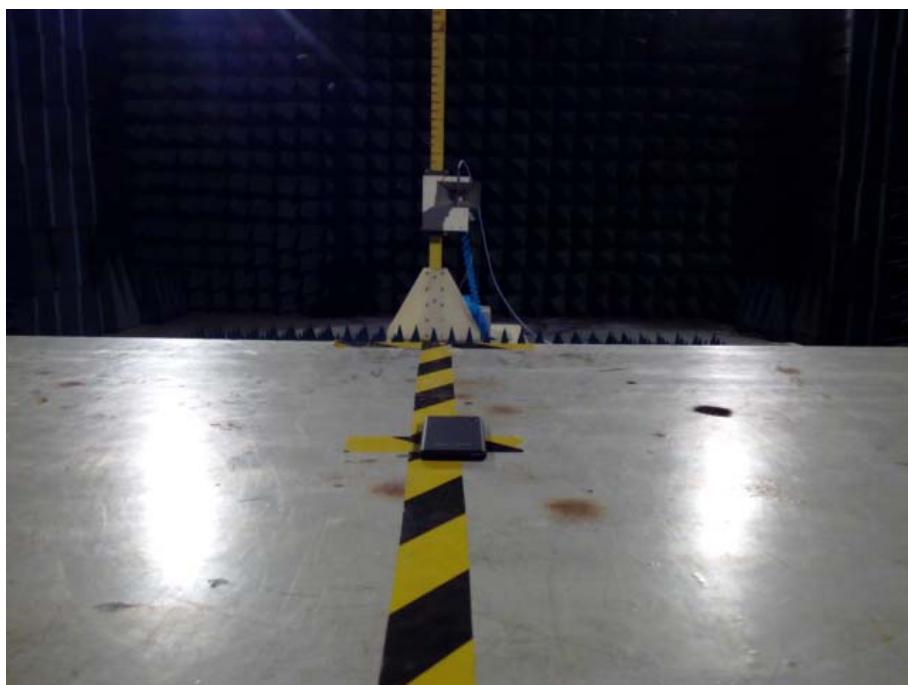
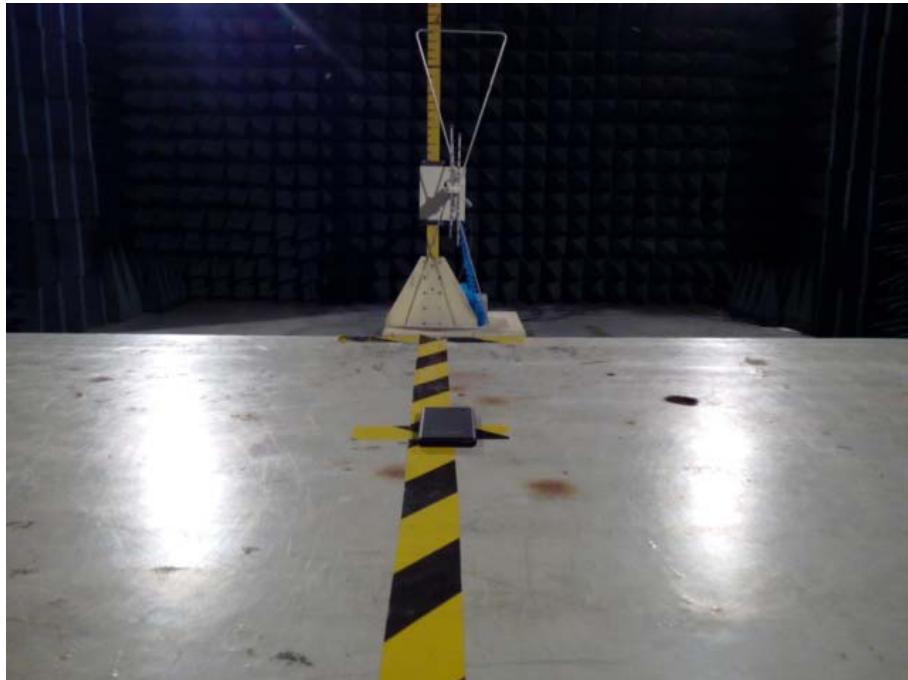


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9. EUT TEST PHOTO

Radiated Measurement Photos





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Conducted Measurement Photos

