


# FCC TEST REPORT

Report No: STS1704185F02

Issued for

Magene Technology Co., Ltd.

HaoQiGongChang No. 512, Xuzhou Road No. 79, Shinan  
District, Qingdao, Shandong, China

<b>Product Name:</b>	GRAVAT Smart Power Trainer
<b>Brand Name:</b>	 MAGENE
<b>Model Name:</b>	T11
<b>Series Model:</b>	T11A, T11B, T11C, T11D, T11E, T11F, T11G, T11H, T11J, T11K, T11L, T11M, T11N
<b>FCC ID:</b>	2ALZGT11
<b>Test Standard:</b>	FCC Part 15.249

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BZT Testing Technology Co., Ltd

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**TEST RESULT CERTIFICATION**

**Applicant's name :** Magene Technology Co., Ltd.

**Address :** HaoQiGongChang No. 512, Xuzhou Road No. 79, Shinan District, Qingdao, Shandong, China

**Manufacture's Name :** Magene Technology Co., Ltd.

**Address :** HaoQiGongChang No. 512, Xuzhou Road No. 79, Shinan District, Qingdao, Shandong, China

**Product description**

**Product name :** GRAVAT Smart Power Trainer

**Brand name :**



**Model and/or type reference :** T11

**Standards :** FCC Part15.249

**Test procedure :** ANSI C63.10-2013

This device described above has been tested by BZT, 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 of performance of tests :** 08 Jun. 2017 ~30 Jun. 2017

**Date of Issue :** 04 Jul. 2017

**Test Result :** **Pass**

**Testing Engineer :**

(Sean she)

**Technical Manager :**

(Hakim.hou)

**Authorized Signatory :**

(Vita Li)

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**Revision History**

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	04 Jul. 2017	1704185F02	ALL	Initial Issue

## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

<b>FCC Part 15.249 , Subpart C</b>			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	
15.203	Antenna Requirement	Pass	
15.249	Radiated Spurious Emission	Pass	
	conduction Spurious Emission	N/A	
15.205	Radiated Band Edge Emission	Pass	
	conduction Band Edge Emission	N/A	
15.249	20dB Bandwidth	Pass	

### NOTE:

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

(2) All tests are according to ANSI C63.10-2013

### 1.1 TEST FACTORY

BZT Testing Technology Co., Ltd.  
 Add. : Buliding 17, Xinghua Road Xingwei industrial Park Fuyong,  
 Baoan District, Shenzhen, Guangdong, China  
 FCC Registration No.: 701733


### 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 (9KHz-150KHz)	$\pm 2.88\text{Db}$
2	Conducted Emission (150KHz-30MHz)	$\pm 2.67\text{Db}$
3	RF power,conducted	$\pm 0.70\text{Db}$
4	Spurious emissions,conducted	$\pm 1.19\text{Db}$
5	All emissions,radiated(<1G) 30MHz-200MHz	$\pm 2.83\text{Db}$
6	All emissions,radiated(<1G) 200MHz-1000MHz	$\pm 2.94\text{Db}$
7	All emissions,radiated(>1G)	$\pm 3.03\text{Db}$
8	Temperature	$\pm 0.5^{\circ}\text{C}$
9	Humidity	$\pm 2\%$

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	GRAVAT Smart Power Trainer	
Trade Name	 MAGENE	
Model Name	T11	
Series Model	T11A, T11B, T11C, T11D, T11E, T11F, T11G, T11H, T11J, T11K, T11L, T11M, T11N	
Model Difference	Only different in model name.	
Product Description	The EUT is a GRAVAT Smart Power Trainer	
	Operation Frequency:	2402-2480MHz
	Modulation Type:	GFSK
	Antenna Designation:	PCB Antenna
	Antenna Gain(Peak):	-0.09 dBi
	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.	
Channel List	Please refer to the Note 2.	
Adapter	Power supply and ADP(rating): Input: AC 100V-240V~, 50/60Hz, 3.0A Output: DC 36V,4A	


Note:

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

2.

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2402	28	2429	55	2456
02	2403	29	2430	56	2457
03	2404	30	2431	57	2458
04	2405	31	2432	58	2459
05	2406	32	2433	59	2460
06	2407	33	2434	60	2461
07	2408	34	2435	61	2462
08	2409	35	2436	62	2463
09	2410	36	2437	63	2464
10	2411	37	2438	64	2465
11	2412	38	2439	65	2466
12	2413	39	2440	66	2467
13	2414	40	2441	67	2468
14	2415	41	2442	68	2469
15	2416	42	2443	69	2470
16	2417	43	2444	70	2471
17	2418	44	2445	71	2472
18	2419	45	2446	72	2473
19	2420	46	2447	73	2474
20	2421	47	2448	74	2475
21	2422	48	2449	75	2476
22	2423	49	2450	76	2477
23	2424	50	2451	77	2478
24	2425	51	2452	78	2479
25	2426	52	2453	79	2480
26	2427	53	2454		
27	2428	54	2455		

3. Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	 MAGENE	T11	PCB	NA	-0.09	Antenna

The EUT antenna is PCB Antenna. No antenna other than that furnished by the responsible party shall be used with the device.



## 2.2 DESCRIPTION OF TEST MODES

For conducted test items and radiated spurious emissions

Each of these EUT operation mode(s) or test configuration mode(s) mentioned below was evaluated respectively..

Pretest Mode	Description	Data/Modulation
Mode 1	TX CH01	1 MHz/GFSK
Mode 2	TX CH39	1 MHz/GFSK
Mode 3	TX CH79	1 MHz/GFSK

Note:

(1) All above mode have been measurement, only worst data was reported.

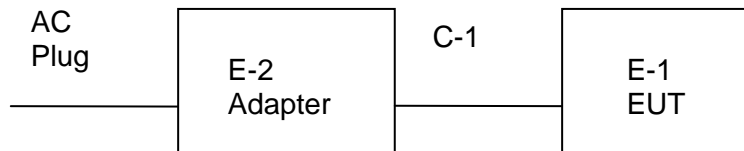
For AC Conducted Emission

Test Case	
AC Conducted Emission	Mode 4 : Keeping TX

### 2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

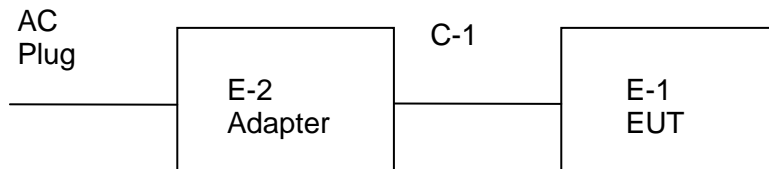
During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters

#### Radiated Spurious Emission Test




NOTE: New battery is used during all test

#### Conducted Emission Test



## 2.4 DESCRIPTION OF SUPPORT UNITS

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	Mfr/Brand	Model/Type No.	Serial No.	Note
E-1	GRAVAT Smart Power Trainer	 MAGENE	T11	N/A	EUT
E-2	Adapter	N/A	JK3604000	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note
C-1	USB Cable shielded line (Charging )	NO	100cm	N/A

### 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.

## 2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

## Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Spectrum Analyzer	Agilent	E4407B	MY50140340	2016.10.23	2017.10.22
Test Receiver	R&S	ESCI	101427	2016.10.23	2017.10.22
Bilog Antenna	TESEQ	CBL6111D	34678	2014.11.24	2017.11.23
Horn Antenna	Schwarzbeck	BBHA 9120D(1201)	9120D-1343	2015.03.05	2018.03.04
Loop Antenna	EMCO	6502	9003-2485	2016.03.06	2019.03.05
50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2016.10.23	2017.10.22
PreAmplifier	Agilent	8449B	60538	2016.10.23	2017.10.22
USB RF power sensor	DARE	RPR3006W	15I00041SNO03	2016.10.23	2017.10.22
Semi-anechoic chamber	Changling	966	N/A	2016.10.23	2017.10.22

## Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	102086	2016.10.23	2017.10.22
LISN	R&S	ENV216	101242	2016.10.23	2017.10.22
LISN	EMCO	3810/2NM	000-23625	2016.10.23	2017.10.22
Shielding Room	Changling	854	N/A	2016.10.23	2017.10.22

### 3. EMC EMISSION TEST

#### 3.1 CONDUCTED EMISSION MEASUREMENT

##### 3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 15.249 limit in the table below has to be followed.

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

0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	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.

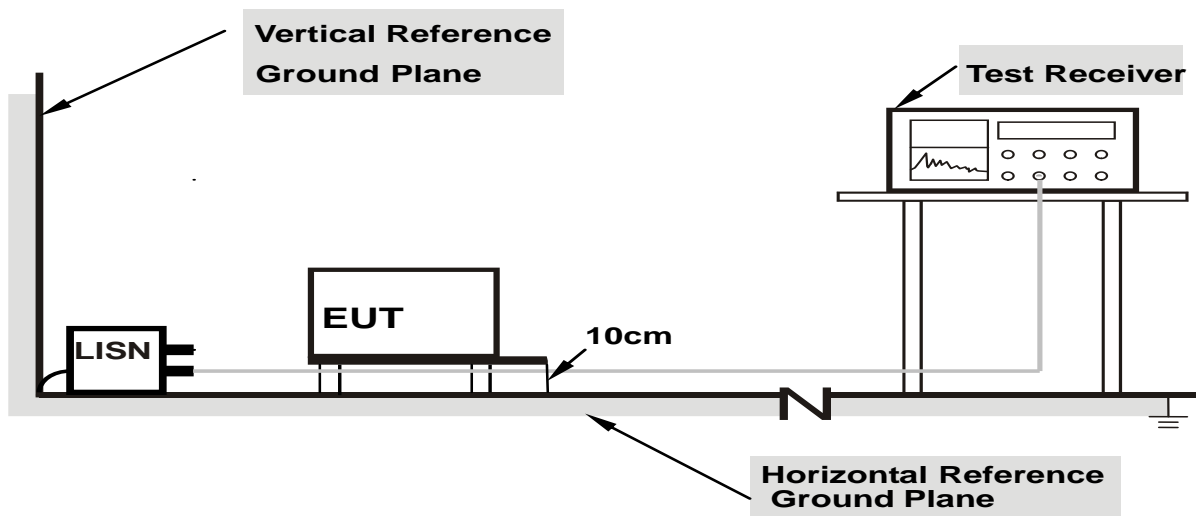
The following table is the setting of the receiver

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

### 3.1.2 TEST PROCEDURE

- The EUT was 0.1 meters from the horizontal ground plane and 0.4 meters from the vertical 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.
- 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.
- 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.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 3.1.3 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 from other units and other metal planes**

### 3.1.4 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.

## 3.1.5 TEST RESULTS

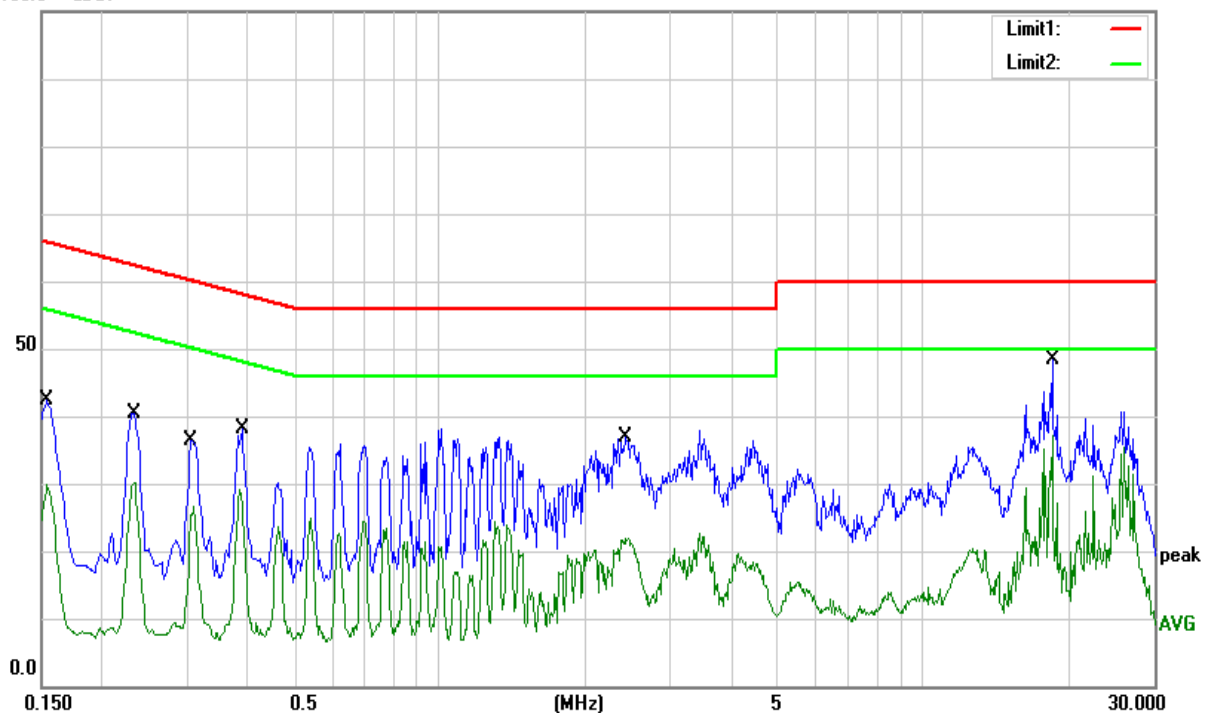
Temperature:	26 °C	Relative Humidity:	60%
Pressure:	1010hPa	Phase:	L
Test Voltage:	AC 120V/60Hz	Test Mode:	Mode 4

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.1540	29.75	10.72	40.47	65.78	-25.31	QP
0.1540	16.99	10.72	27.71	55.78	-28.07	AVG
0.2330	28.49	9.97	38.46	62.34	-23.88	QP
0.2330	19.51	9.97	29.48	52.34	-22.86	AVG
0.3080	23.23	9.92	33.15	60.02	-26.87	QP
0.3080	12.59	9.92	22.51	50.02	-27.51	AVG
0.3890	24.96	10.17	35.13	58.09	-22.96	QP
0.3890	18.70	10.17	28.87	48.09	-19.22	AVG
2.4600	21.03	10.00	31.03	56.00	-24.97	QP
2.4600	11.12	10.00	21.12	46.00	-24.88	AVG
18.4308	35.06	10.64	45.70	60.00	-14.30	QP
18.4308	26.75	10.64	37.39	50.00	-12.61	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) – Limit

100.0 dBuV



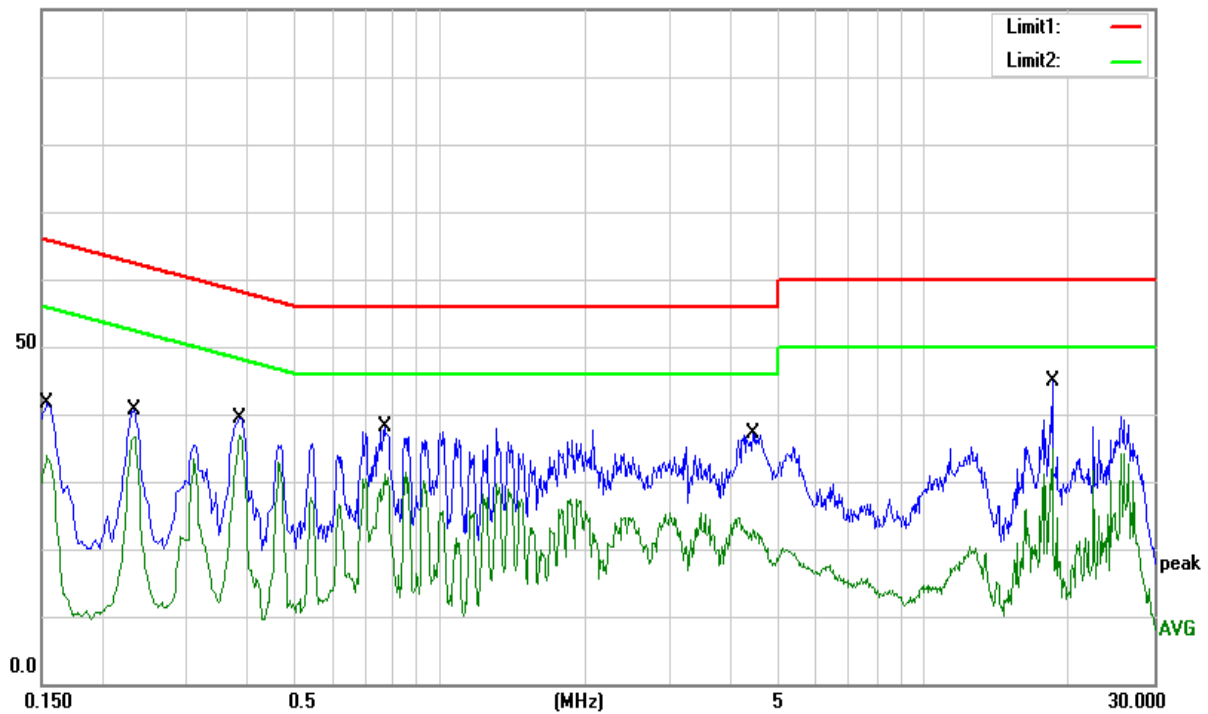
Temperature:	26 °C	Relative Humidity:	60%
Pressure:	1010hPa	Phase:	N
Test Voltage:	AC 120V/60Hz	Test Mode:	Mode 4

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.1540	29.46	10.72	40.18	65.78	-25.60	QP
0.1540	22.77	10.72	33.49	55.78	-22.29	AVG
0.2304	28.53	9.97	38.50	62.44	-23.94	QP
0.2304	19.97	9.97	29.94	52.44	-22.50	AVG
0.3840	27.56	9.98	37.54	58.19	-20.65	QP
0.3840	25.31	9.98	35.29	48.19	-12.90	AVG
0.7692	21.93	10.00	31.93	56.00	-24.07	QP
0.7692	16.25	10.00	26.25	46.00	-19.75	AVG
4.5204	20.77	10.20	30.97	56.00	-25.03	QP
4.5204	10.59	10.20	20.79	46.00	-25.21	AVG
18.4324	31.27	10.51	41.78	60.00	-18.22	QP
18.4324	25.50	10.51	36.01	50.00	-13.99	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor )–Limit

100.0 dBuV





### 3.2 RADIATED EMISSION MEASUREMENT

#### 3.2.1 RADIATED EMISSION LIMITS

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on Part 15.249 and the Part 15.209(a) limit in the table below has to be followed.

Standard FCC 15.209

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
960~1000	500	3
Above 1000	Other:74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	3

Standard FCC 15.249

Frequency of Emission (MHz)	Field Strength of fundamental (millivolts /meter)	Field Strength of Harmonics (microvolts/meter)
900~928	50	500
2400~2483.5	50	500
5725~5875	50	500
24000~242500	250	2500

Notes:

- (1) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Spectrum Parameter	Setting
Detector	Peak/AV
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB (emission in restricted band)	>20BW
VB (emission in restricted band)	=3xRB

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
	90kHz~110kHz / RB 200Hz for QP
	110kHz~490kHz / RB 200Hz for PK & AV
	490kHz~30MHz / RB 9kHz for QP
	30MHz~1000MHz / RB 120kHz for QP

### 3.2.2 TEST PROCEDURE

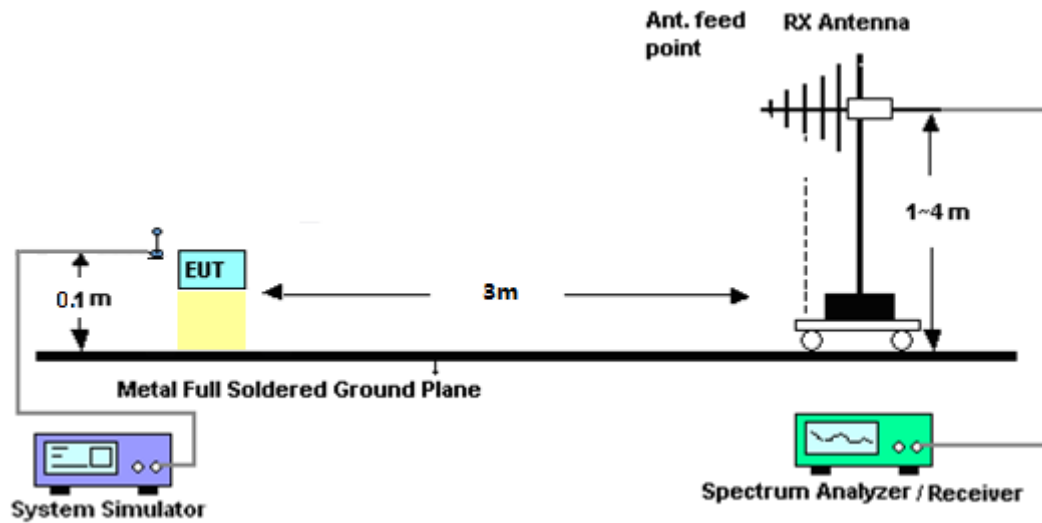
- a. The measuring distance of 3m shall be used for measurements. The EUT was placed on the top of a rotating table 0.1 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Below 1GHz)
- b. The measuring distance of 3m shall be used for measurements. The EUT was placed on the top of a rotating table 0.1 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Above 1GHz)
- c. The height of the test antenna shall vary between 1m to 4m.Both horizontal and vertical polarization Of the antenna are set to make the measurement.
- d. The initial step in collecting radiated emission data is a receive peak detector mode.  
Pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. All readings are peak unless otherwise stated QP in column of Note. Peak denoted that the Peak reading compliance with the QP limits and then QP Mode measurement didn't perform (Below 1GHz)
- f. All readings are Peak mode value unless otherwise stated AVG in column of Note. If the Peak mode measured value compliance with the Peak limits and lower than AVG Limits, the EUT shall be deemed to meet Peak & AVG limits and then only Peak mode was measured, but AVG mode didn't perform.(Above 1GHz)
9. For the actual test configuration, please refer to the related Item –EUT Test Photos.  
Note: Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

### 3.2.3 DEVIATION FROM TEST STANDARD

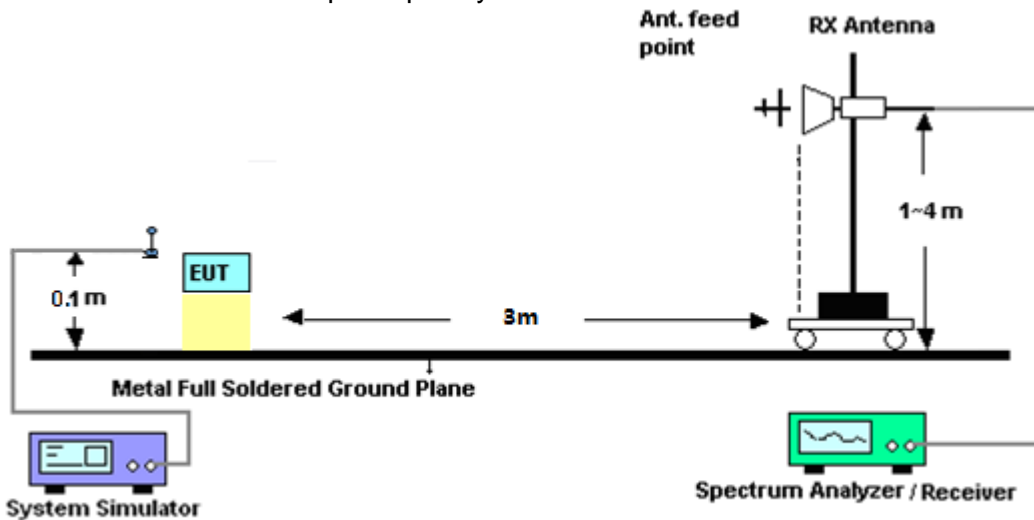
No deviation

### 3.2.4 TEST SETUP

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



#### (B) 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.

Below 30 MHz

Temperature:	26 °C	Relative Humidity:	60%
Pressure:	1010 hPa	Polarization:	---
Test Voltage:	DC 36V From Adapter AC 120		
Test Mode:	TX Mode		

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

**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.

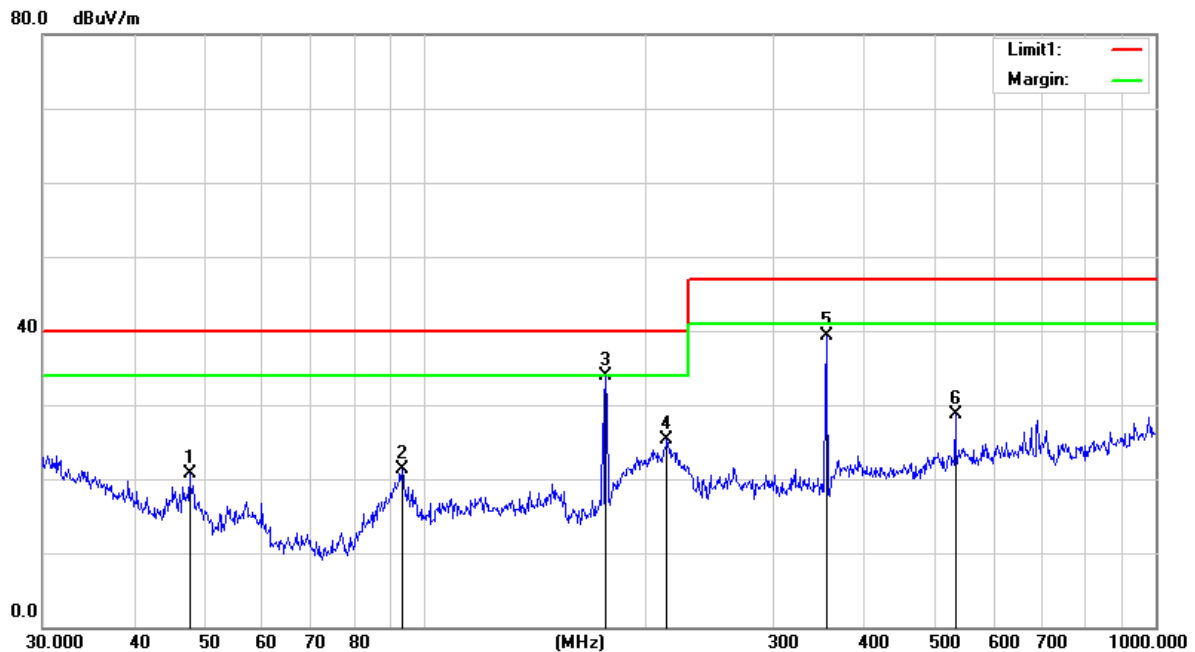
## Between 30MHz – 1000 MHz Radiation Spurious

Temperature:	26 °C	Relative Humidity:	60%
Pressure:	1010hPa	Phase:	Horizontal
Test Voltage:	DC 36V From Adapter AC 120	Test Mode:	Mode 1/2/3(Model 1 worst)

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
47.6584	44.91	-24.29	20.62	40.00	-19.38	QP
93.1132	44.97	-23.71	21.26	40.00	-18.74	QP
176.8874	56.83	-23.02	33.81	40.00	-6.19	QP
214.5141	48.50	-23.23	25.27	40.00	-14.73	QP
354.1831	56.58	-17.27	39.31	47.00	-7.69	QP
531.9633	42.95	-14.19	28.76	47.00	-18.24	QP

Remark:

1. All readings are Quasi-Peak .
2. Margin = Result (Result =Reading + Factor )–Limit



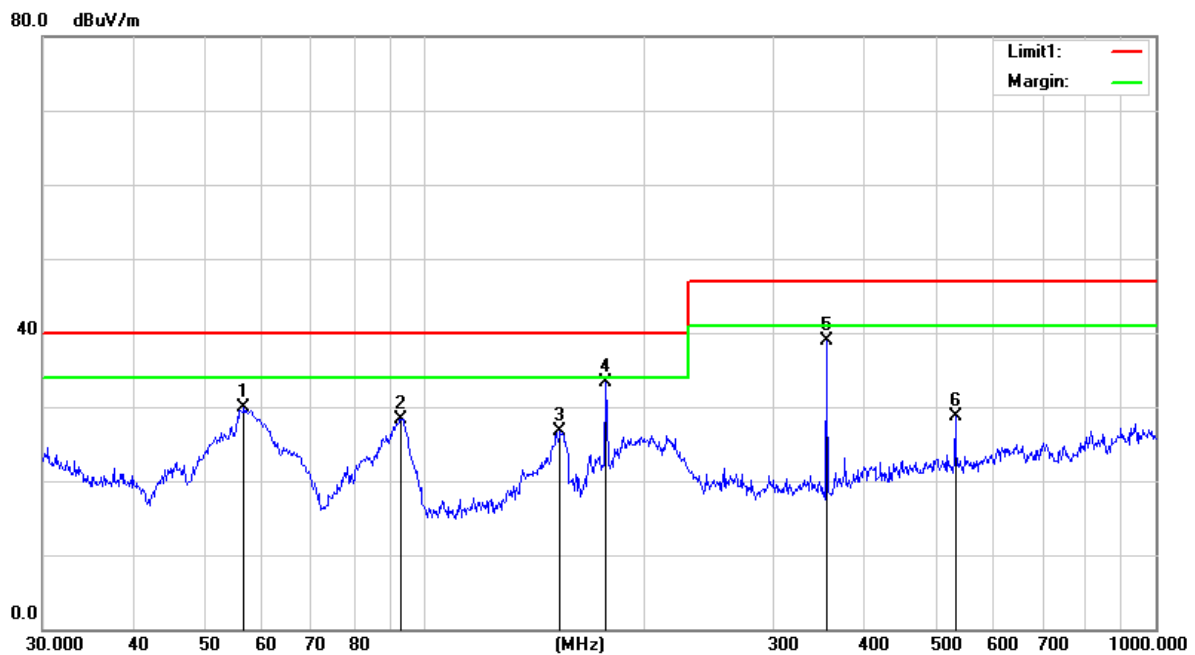
Temperature:	26 °C	Relative Humidity:	60%
Pressure:	1010hPa	Phase:	Vertical
Test Voltage:	DC 36V From Adapter AC 120	Test Mode:	Mode 1/2/3(Model 1 worst)

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
56.5930	57.13	-27.31	29.82	40.00	-10.18	QP
92.7870	52.13	-23.74	28.39	40.00	-11.61	QP
153.2004	48.88	-22.19	26.69	40.00	-13.31	QP
176.8875	56.25	-23.02	33.23	40.00	-6.77	QP
354.1831	56.24	-17.27	38.97	47.00	-8.03	QP
531.9633	43.33	-14.61	28.72	47.00	-18.28	QP

Remark:

1. All readings are Quasi-Peak.

2. Margin = Result (Result =Reading + Factor )–Limit



Fundamental frequency:

PK

Frequency (MHz)	Reading (dB $\mu$ V/m)	Amplifier	Loss	Antenna Factor	Factor(dB) Corr.	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin(dB)	Polarization
	PEAK	(dB)	(dB)	(dB/m)		PEAK	PEAK	PEAK	
2402	79.780	44.40	6.03	27.60	-10.77	69.01	114	-44.99	Vertical
2402	78.650	44.40	6.03	27.60	-10.77	67.88	114	-46.12	Horizontal
2440	77.920	44.40	6.04	27.63	-10.73	67.19	114	-46.81	Vertical
2440	78.210	44.40	6.04	27.63	-10.73	67.48	114	-46.52	Horizontal
2480	79.010	44.40	6.06	27.66	-10.68	68.33	114	-45.67	Vertical
2480	77.960	44.40	6.06	27.66	-10.68	67.28	114	-46.72	Horizontal

AV

Frequency (MHz)	Reading (dB $\mu$ V/m)	Amplifier	Loss	Antenna Factor	Factor(dB) Corr.	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin(dB)	Polarization
	AV	(dB)	(dB)	(dB/m)		AV	PEAK	PEAK	
2402	59.230	44.40	6.03	27.60	-10.77	48.46	94	-45.54	Vertical
2402	58.540	44.40	6.03	27.60	-10.77	47.77	94	-46.23	Horizontal
2440	57.750	44.40	6.04	27.63	-10.73	47.02	94	-46.98	Vertical
2440	58.970	44.40	6.04	27.63	-10.73	48.24	94	-45.76	Horizontal
2480	59.280	44.40	6.06	27.66	-10.68	48.60	94	-45.40	Vertical
2480	57.920	44.40	6.06	27.66	-10.68	47.24	94	-46.76	Horizontal

Note: RBW>20BW; VBW=3xRBW

## Above 1G Radiation Spurious

Frequency (MHz)	Reading (dBμV)	Amplifier (dB)	Loss (dB)	Antenna Factor (dB/m)	Corrected Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
Low Channel (2402 MHz)										
3264.73	47.87	44.70	6.70	28.20	-9.80	38.07	74.00	-35.93	PK	Vertical
3264.73	39.72	44.70	6.70	28.20	-9.80	29.92	54.00	-24.08	AV	Vertical
3264.58	48.08	44.70	6.70	28.20	-9.80	38.28	74.00	-35.72	PK	Horizontal
3264.58	37.95	44.70	6.70	28.20	-9.80	28.15	54.00	-25.85	AV	Horizontal
4804.29	58.18	44.20	9.04	31.60	-3.56	54.62	74.00	-19.38	PK	Vertical
4804.29	38.55	44.20	9.04	31.60	-3.56	34.99	54.00	-19.01	AV	Vertical
4804.51	59.48	44.20	9.04	31.60	-3.56	55.92	74.00	-18.08	PK	Horizontal
4804.51	38.65	44.20	9.04	31.60	-3.56	35.09	54.00	-18.91	AV	Horizontal
5359.68	46.02	44.20	9.86	32.00	-2.34	43.68	74.00	-30.32	PK	Vertical
5359.68	37.94	44.20	9.86	32.00	-2.34	35.60	54.00	-18.40	AV	Vertical
5359.75	46.35	44.20	9.86	32.00	-2.34	44.01	74.00	-29.99	PK	Horizontal
5359.75	37.94	44.20	9.86	32.00	-2.34	35.60	54.00	-18.40	AV	Horizontal
7205.70	51.09	43.50	11.40	35.50	3.40	54.49	74.00	-19.51	PK	Vertical
7205.70	33.82	43.50	11.40	35.50	3.40	37.22	54.00	-16.78	AV	Vertical
7205.71	51.34	43.50	11.40	35.50	3.40	54.74	74.00	-19.26	PK	Horizontal
7205.71	33.86	43.50	11.40	35.50	3.40	37.26	54.00	-16.74	AV	Horizontal
11035.84	40.99	43.60	14.30	39.50	10.20	51.19	74.00	-22.81	PK	Vertical
11035.84	29.78	43.60	14.30	39.50	10.20	39.98	54.00	-14.02	AV	Vertical
11035.97	41.02	43.60	14.30	39.50	10.20	51.22	74.00	-22.78	PK	Horizontal
11035.97	30.59	43.60	14.30	39.50	10.20	40.79	54.00	-13.21	AV	Horizontal
13299.13	40.26	42.60	15.90	38.90	12.20	52.46	74.00	-21.54	PK	Vertical
13299.13	28.54	42.60	15.90	38.90	12.20	40.74	54.00	-13.26	AV	Vertical
13299.40	40.41	42.60	15.90	38.90	12.20	52.61	74.00	-21.39	Pk	Horizontal
13299.40	29.63	42.60	15.90	38.90	12.20	41.83	54.00	-12.17	AV	Horizontal
15999.91	39.68	42.70	18.00	37.10	12.40	52.08	74.00	-21.92	PK	Vertical
15999.91	28.64	42.70	18.00	37.10	12.40	41.04	54.00	-12.96	AV	Vertical
15999.71	40.22	42.70	18.00	37.10	12.40	52.62	74.00	-21.38	PK	Horizontal
15999.71	29.86	42.70	18.00	37.10	12.40	42.26	54.00	-11.74	AV	Horizontal
17997.92	31.13	42.70	19.40	46.50	23.20	54.33	74.00	-19.67	PK	Vertical
17997.92	18.87	42.70	19.40	46.50	23.20	42.07	54.00	-11.93	AV	Vertical
17997.58	30.45	42.70	19.40	46.50	23.20	53.65	74.00	-20.35	PK	Horizontal
17997.58	17.88	42.70	19.40	46.50	23.20	41.08	54.00	-12.92	AV	Horizontal



Frequency	Reading	Amplifier	Loss	Antenna	Corrected	Emission	Limits	Margin	Detector	Comment
(MHz)	(dBμV)	(dB)	(dB)	Factor	Factor	Level	(dBμV/m)	(dB)	Type	
Middle Channel (2440 MHz)										
3264.77	48.78	44.70	6.70	28.20	-9.80	38.98	74.00	-35.02	PK	Vertical
3264.77	37.95	44.70	6.70	28.20	-9.80	28.15	54.00	-25.85	AV	Vertical
3264.57	48.18	44.70	6.70	28.20	-9.80	38.38	74.00	-35.62	PK	Horizontal
3264.57	38.10	44.70	6.70	28.20	-9.80	28.30	54.00	-25.70	AV	Horizontal
4880.46	59.33	44.20	9.04	31.60	-3.56	55.77	74.00	-18.23	PK	Vertical
4880.46	39.47	44.20	9.04	31.60	-3.56	35.91	54.00	-18.09	AV	Vertical
4880.39	58.57	44.20	9.04	31.60	-3.56	55.01	74.00	-18.99	PK	Horizontal
4880.39	39.22	44.20	9.04	31.60	-3.56	35.66	54.00	-18.34	AV	Horizontal
5359.81	46.41	44.20	9.86	32.00	-2.34	44.07	74.00	-29.93	PK	Vertical
5359.81	37.83	44.20	9.86	32.00	-2.34	35.49	54.00	-18.51	AV	Vertical
5359.64	45.17	44.20	9.86	32.00	-2.34	42.83	74.00	-31.17	PK	Horizontal
5359.64	37.63	44.20	9.86	32.00	-2.34	35.29	54.00	-18.71	AV	Horizontal
7310.90	51.75	43.50	11.40	35.50	3.40	55.15	74.00	-18.85	PK	Vertical
7310.90	33.06	43.50	11.40	35.50	3.40	36.46	54.00	-17.54	AV	Vertical
7310.69	51.07	43.50	11.40	35.50	3.40	54.47	74.00	-19.53	PK	Horizontal
7310.69	32.78	43.50	11.40	35.50	3.40	36.18	54.00	-17.82	AV	Horizontal
9607.86	41.11	43.60	14.30	39.50	10.20	51.31	74.00	-22.69	PK	Vertical
9607.86	29.90	43.60	14.30	39.50	10.20	40.10	54.00	-13.90	AV	Vertical
9607.99	40.70	43.60	14.30	39.50	10.20	50.90	74.00	-23.10	PK	Horizontal
9607.99	30.37	43.60	14.30	39.50	10.20	40.57	54.00	-13.43	AV	Horizontal
13299.29	40.09	42.60	15.90	38.90	12.20	52.29	74.00	-21.71	PK	Vertical
13299.29	28.54	42.60	15.90	38.90	12.20	40.74	54.00	-13.26	AV	Vertical
13299.51	40.39	42.60	15.90	38.90	12.20	52.59	74.00	-21.41	Pk	Horizontal
13299.51	29.63	42.60	15.90	38.90	12.20	41.83	54.00	-12.17	AV	Horizontal
15999.94	39.86	42.70	18.00	37.10	12.40	52.26	74.00	-21.74	PK	Vertical
15999.94	28.64	42.70	18.00	37.10	12.40	41.04	54.00	-12.96	AV	Vertical
15999.79	40.66	42.70	18.00	37.10	12.40	53.06	74.00	-20.94	PK	Horizontal
15999.79	30.10	42.70	18.00	37.10	12.40	42.50	54.00	-11.50	AV	Horizontal
17997.64	30.45	42.70	19.40	46.50	23.20	53.65	74.00	-20.35	PK	Vertical
17997.64	20.20	42.70	19.40	46.50	23.20	43.40	54.00	-10.60	AV	Vertical
17997.77	30.56	42.70	19.40	46.50	23.20	53.76	74.00	-20.24	PK	Horizontal
17997.77	18.17	42.70	19.40	46.50	23.20	41.37	54.00	-12.63	AV	Horizontal

Frequency	Reading	Amplifier	Loss	Antenna	Corrected	Emission	Limits	Margin	Detector	Comment
(MHz)	(dBμV)	(dB)	(dB)	Factor	Factor	Level	(dBμV/m)	(dB)	Type	
High Channel (2480 MHz)										
3264.71	48.53	44.70	6.70	28.20	-9.80	38.73	74.00	-35.27	PK	Vertical
3264.71	38.29	44.70	6.70	28.20	-9.80	28.49	54.00	-25.51	AV	Vertical
3264.57	49.19	44.70	6.70	28.20	-9.80	39.39	74.00	-34.61	PK	Horizontal
3264.57	39.07	44.70	6.70	28.20	-9.80	29.27	54.00	-24.73	AV	Horizontal
4960.56	58.60	44.20	9.04	31.60	-3.56	55.04	74.00	-18.96	PK	Vertical
4960.56	38.32	44.20	9.04	31.60	-3.56	34.76	54.00	-19.24	AV	Vertical
4960.45	58.85	44.20	9.04	31.60	-3.56	55.29	74.00	-18.71	PK	Horizontal
4960.45	38.67	44.20	9.04	31.60	-3.56	35.11	54.00	-18.89	AV	Horizontal
5359.64	45.93	44.20	9.86	32.00	-2.34	43.59	74.00	-30.41	PK	Vertical
5359.64	37.42	44.20	9.86	32.00	-2.34	35.08	54.00	-18.92	AV	Vertical
5359.64	45.99	44.20	9.86	32.00	-2.34	43.65	74.00	-30.35	PK	Horizontal
5359.64	37.33	44.20	9.86	32.00	-2.34	34.99	54.00	-19.01	AV	Horizontal
7439.78	51.04	43.50	11.40	35.50	3.40	54.44	74.00	-19.56	PK	Vertical
7439.78	33.40	43.50	11.40	35.50	3.40	36.80	54.00	-17.20	AV	Vertical
7439.95	50.91	43.50	11.40	35.50	3.40	54.31	74.00	-19.69	PK	Horizontal
7439.95	32.71	43.50	11.40	35.50	3.40	36.11	54.00	-17.89	AV	Horizontal
9919.91	41.14	43.60	14.30	39.50	10.20	51.34	74.00	-22.66	PK	Vertical
9919.91	30.75	43.60	14.30	39.50	10.20	40.95	54.00	-13.05	AV	Vertical
9920.08	40.12	43.60	14.30	39.50	10.20	50.32	74.00	-23.68	PK	Horizontal
9920.08	30.46	43.60	14.30	39.50	10.20	40.66	54.00	-13.34	AV	Horizontal
13299.32	39.64	42.70	18.00	37.10	12.40	52.04	74.00	-21.96	PK	Vertical
13299.32	28.54	42.70	18.00	37.10	12.40	40.94	54.00	-13.06	AV	Vertical
13299.34	40.66	42.70	18.00	37.10	12.40	53.06	74.00	-20.94	PK	Horizontal
13299.34	28.79	42.70	18.00	37.10	12.40	41.19	54.00	-12.81	AV	Horizontal
17997.71	30.03	42.70	19.40	46.50	23.20	53.23	74.00	-20.77	PK	Vertical
17997.71	20.13	42.70	19.40	46.50	23.20	43.33	54.00	-10.67	AV	Vertical
17997.61	29.79	42.70	19.40	46.50	23.20	52.99	74.00	-21.01	PK	Horizontal
17997.61	19.09	42.70	19.40	46.50	23.20	42.29	54.00	-11.71	AV	Horizontal

(Radiation Band edge)

Frequency	Reading	Amplifier	Loss	Antenna	Corrected	Emission	Limits	Margin	Detector	Comment
(MHz)	(dBμV)	(dB)	(dB)	Factor	Factor	Level	(dBμV/m)	(dB)	Type	
2400.00	71.23	43.80	4.91	25.90	-12.99	58.24	74.00	-15.76	PK	Vertical
2400.00	53.91	43.80	4.91	25.90	-12.99	40.92	54.00	-13.08	AV	Vertical
2400.00	70.03	43.80	4.91	25.90	-12.99	57.04	74.00	-16.96	PK	Horizontal
2400.00	54.56	43.80	4.91	25.90	-12.99	41.57	54.00	-12.43	AV	Horizontal
2483.50	70.01	43.80	5.12	25.90	-12.78	57.23	74.00	-16.77	PK	Vertical
2483.50	51.34	43.80	5.12	25.90	-12.78	38.56	54.00	-15.44	AV	Vertical
2483.50	68.33	43.80	5.12	25.90	-12.78	55.55	74.00	-18.45	PK	Horizontal
2483.50	53.12	43.80	5.12	25.90	-12.78	40.34	54.00	-13.66	AV	Horizontal

#### 4. CONDUCTED SPURIOUS & BAND EDGE EMISSION

##### 4.1 REQUIREMENT

According to FCC section 15.249, in any 100kHz 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 50dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

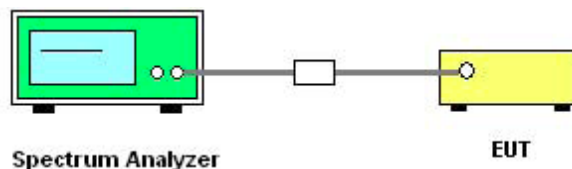
##### 4.2 TEST PROCEDURE

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

For Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 2310 – 2404 MHz Upper Band Edge: 2478 – 2500 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

##### 4.3 TEST SETUP



The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50 Ohm; the path loss as the factor is calibrated to correct the reading. Make the measurement with the spectrum analyzer's resolution bandwidth(RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

##### 4.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

## 4.5 TEST RESULTS

Temperature:	25 °C	Relative Humidity:	50%
Pressure:	1012 hPa	Test Voltage:	DC 36V From Adapter AC 120
Test Mode:	N/A		

Note: denotes test is not applicable in this test report.

## 5. BANDWIDTH TEST

### 5.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting : RBW= 30KHz, VBW $\geq$ RBW, Sweep time = Auto.

### 5.2 TEST SETUP



### 5.3 EUT OPERATION CONDITIONS

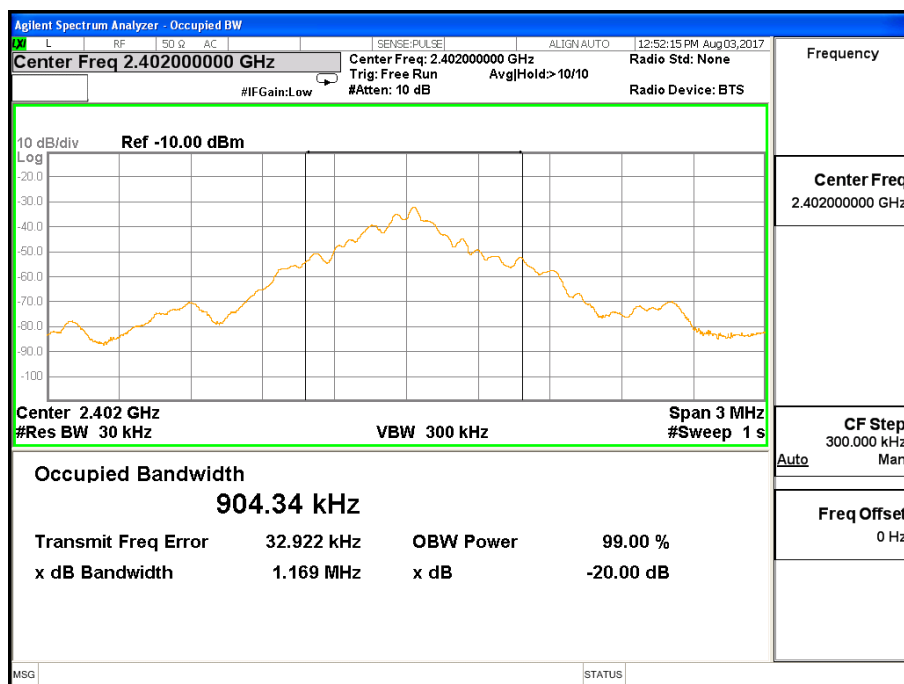
TX mode.

## 5.4 TEST RESULTS

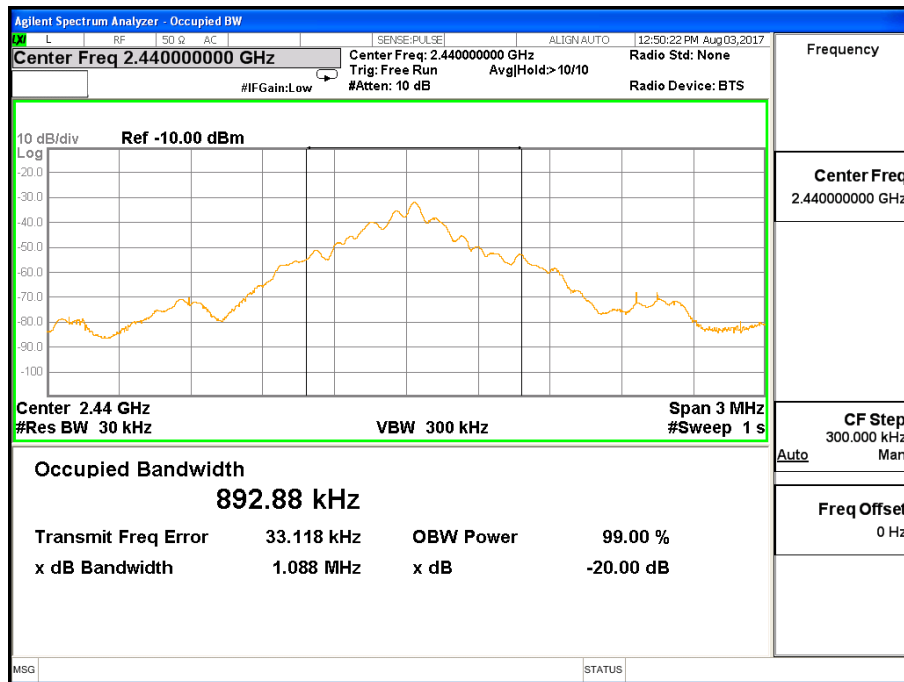
Temperature:	25 °C	Relative Humidity:	50%
Pressure:	1012 hPa	Test Voltage:	DC 36V From Adapter AC 120

Test Channel	Frequency (MHz)	20 dBc Bandwidth (MHz)	99% Bandwidth (MHz)
CH01	2402	1.169	0.904
CH39	2440	1.088	0.893
CH79	2480	1.064	0.888

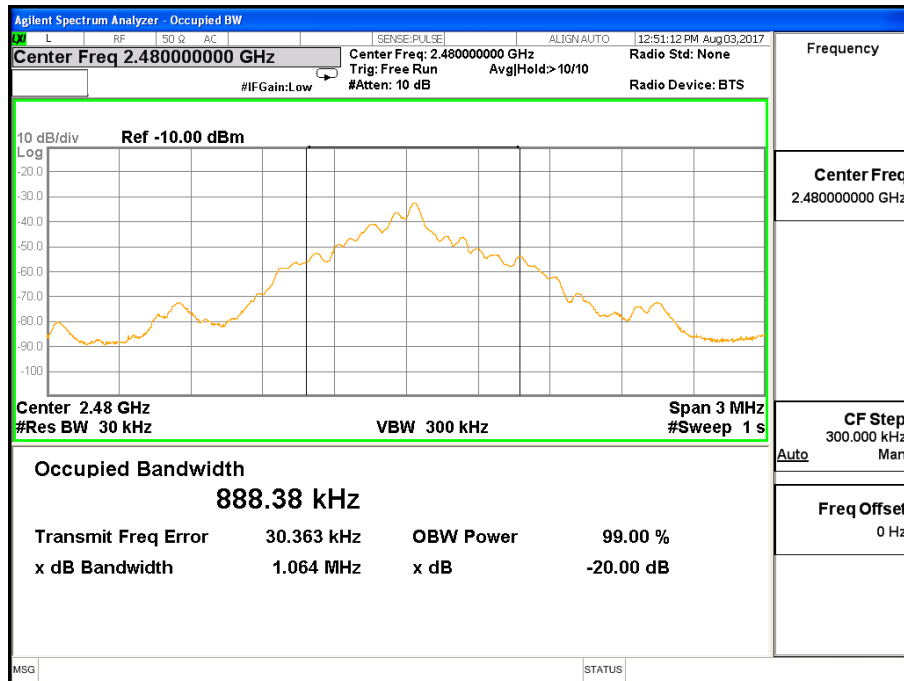
## The Lowest Channel:2402MHz



## The Middle Channel:2440MHz



## The High Channel: 2480MHz





## 6. ANTENNA REQUIREMENT

### 6.1 STANDARD REQUIREMENT

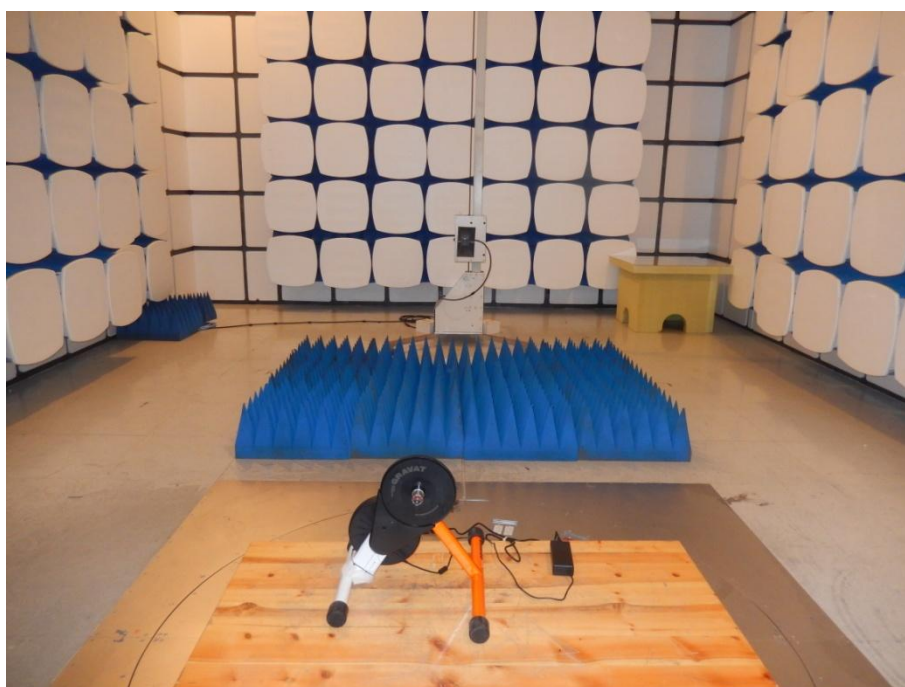
According to the FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

### 6.2 EUT ANTENNA

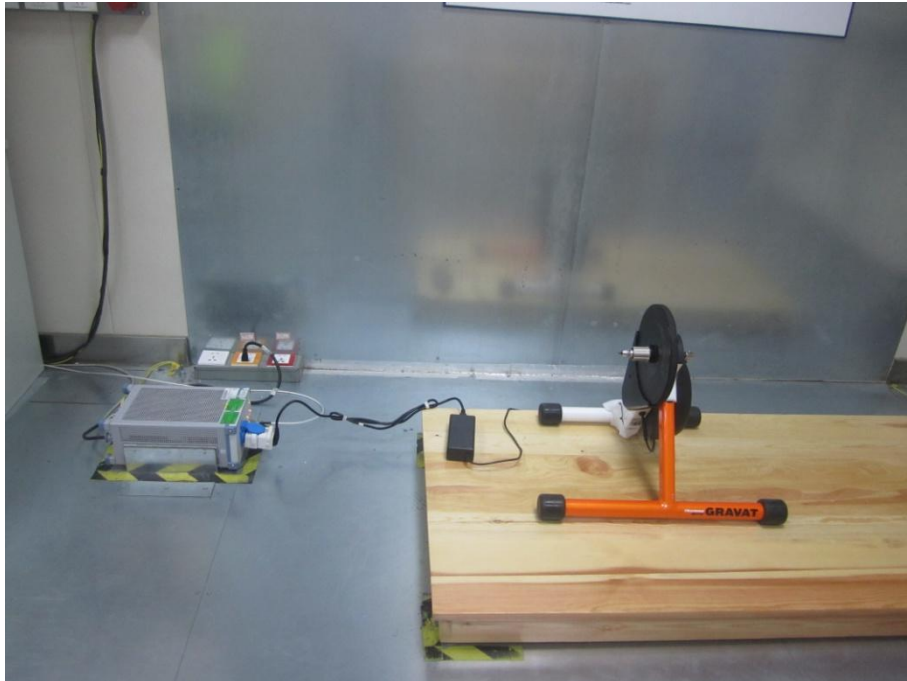
The EUT antenna is Internal PCB Antenna. It conforms to the standard requirements.

## APPENDIX- PHOTOS OF TEST SETUP

### Radiated Measurement Photos



### Conducted Measurement Photos



\*\*\*\*\*END OF THE REPORT\*\*\*\*\*