



# FCC Part 15C Test Report

## FCC ID:XHWPBSKD12

Product Name:	<b>PBS KIDS Playtime Pad</b>
Trademark:	<b>E-matic</b>
Model Name :	<b>PBSKD12, DMPBSDM24.</b>
Prepared For :	<b>E-matic</b>
Address :	3435 Ocean Park Blvd # 107 PMB#444 Santa Monica CA 90405 Los Angeles, CA 90405.
Prepared By :	<b>Shenzhen BCTC Technology Co., Ltd.</b>
Address :	No.101,Yousong Road,Longhua New District, Shenzhen,China
Test Date:	<b>Aug. 23 - Aug. 30, 2016</b>
Date of Report :	<b>Aug. 30, 2016</b>
Report No.:	<b>BCTC-FY160801783E</b>



## VERIFICATION OF COMPLIANCE

**Applicant's name** ..... : E-matic

**Address** ..... : 3435 Ocean Park Blvd # 107 PMB#444 Santa Monica CA  
90405 Los Angeles, CA 90405.

**Manufacture's Name** ..... : Shaghal Ltd

**Address** ..... : 2231 Colby Ave. L.A., C.A., 90064 U.S.A

### Product description

**Product name** ..... : PBS KIDS Playtime Pad

**Trademark:** E-matic

**Model Name:** PBSKD12

**Test Standards:** FCC Part15.249  
ANSI C63.10-2013

This device described above has been tested by BCTC, 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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**Test Result**.....: **Pass**

**Testing Engineer** :

Eric Yang

**Reviewer  
(Supervisor)** :

Jade Yang

**Approved &  
Authorized  
Signer(Manager)** :





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## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.249) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.249	Fundamental & Radiated Spurious Emission Measurement	PASS	
15.249	Bandwidth	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

### 1.1 TEST FACILITY

Shenzhen BCTC Technology Co., Ltd.

Add.: No.101, Yousong Road, Longhua New District, Shenzhen, China

FCC Registration No.: 187086

### 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded 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	$\pm 2\%$



## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	PBS KIDS Playtime Pad	
Trade Name	E-matic	
Model Name	PBSKD12	
Serial Model	DMPBSDM24	
Model Difference	All the same, Only model name and outlook color is different.	
Product Description	Operation Frequency:	2402~2480 MHz
	Modulation Type:	GFSK,PI/4 DPSK,8DPSK
	Bit Rate of Transmitter	1M/2M/3Mbps
	Number Of Channel	79 CH
	Antenna Designation:	Please see Note 3.
	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.	
Battery	DC 3.7V	
Connecting I/O Port(s)	Please refer to the User's Manual	
hardware version	--	
Software version	--	
Serial number	--	

Note:

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

2.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2402	30	2429	59	2456
02	2403	31	2430	60	2457
03	2404	32	2431	61	2458
04	2405	33	2432	62	2459
05	2406	34	2433	63	2460
06	2407	35	2434	64	2461
07	2408	36	2435	65	2462
08	2409	37	2436	66	2463
09	2410	38	2437	67	2464
10	2411	39	2438	68	2465
11	2412	40	2439	69	2466
12	2413	41	2440	70	2467



13	2414	42	2441	71	2468
14	2415	43	2442	72	2469
15	2416	44	2443	73	2470
16	2417	45	2444	74	2471
17	2418	46	2445	75	2472
18	2419	47	2446	76	2473
19	2420	48	2447	77	2474
20	2421	49	2448	78	2475
21	2422	50	2449	79	2476
22	2423	51	2450	80	2477
23	2424	52	2451	81	2478
24	2425	53	2452	82	2479
25	2426	54	2453	83	2480
26	2427	55	2454		
27	2428	56	2455		
28		57			
29		58			

3.

Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Gain (dBi)	NOTE
1	N/A	N/A	FPCB Antenna	1	



## 2.2 DESCRIPTION OF TEST MODES

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

For All Mode	Description	Modulation Type
Mode 1	CH00	GFSK,PI/4 DPSK,8DPSK
Mode 2	CH39	
Mode 3	CH78	
Mode 4	Link mode(conducted emission and Radiated emission)	

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) Fully-charged battery is used during the test

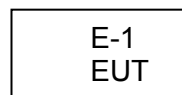
## 2.3 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

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 of FHSS

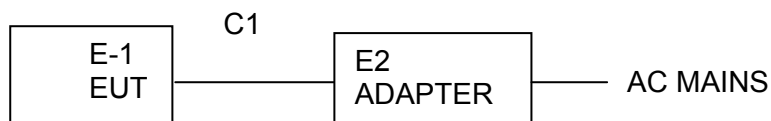
Frequency	2402 MHz	2441 MHz	2480 MHz
Channel	Low	Middle	High

## 2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted Emission Test







## 2.5 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	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	PBS KIDS Playtime Pad	<b>E-matic</b>	PBSKD12	N/A	EUT
E-2	Adapter	N/A	GDP06AV-0500500-3C	N/A	Input:100-240V~ 50/60Hz 0.25A Output: 5.0V---0.5A

Item	Shielded Type	Ferrite Core	Length	Note
C1	NO	NO	0.8M	USB cable unshielded

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.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.



## 2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

### Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	1166.5950K03-101165-ha	2016.06.06	2017.06.05	1 year
2	LISN	R&S	NSLK8126	8126466	2016.08.24	2017.08.23	1 year
3	LISN	R&S	NSLK8126	8126487	2016.08.24	2017.08.23	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2016.06.07	2017.06.06	1 year
5	RF cables	R&S	R204	R20X	2016.07.06	2017.07.05	1 year

### Radiation test, Band-edge test and 20db bandwidth test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2016.07.06	2017.07.05	1 year
2	Test Receiver	R&S	ESPI	101318	2016.06.07	2017.06.06	1 year
3	Bilog Antenna	R&S	VULB9168	VULB9168-438	2016.07.06	2017.07.05	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2016.06.07	2017.06.06	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2016.06.07	2017.06.06	1 year
6	Horn Antenna	R&S	HF906	10027	2016.07.06	2017.07.05	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2016.07.06	2017.07.05	1 year
8	Amplifier	R&S	BBV9743	9743-019	2016.08.25	2017.08.24	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2016.06.08	2017.06.07	1 year
10	RF cables	R&S	R203	R20X	2016.07.06	2017.07.05	1 year
11	Antenna connector	Florida RFLabs	Lab-Fle	RF 01#	2016.07.06	2017.07.05	1 year



### 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	Quas -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

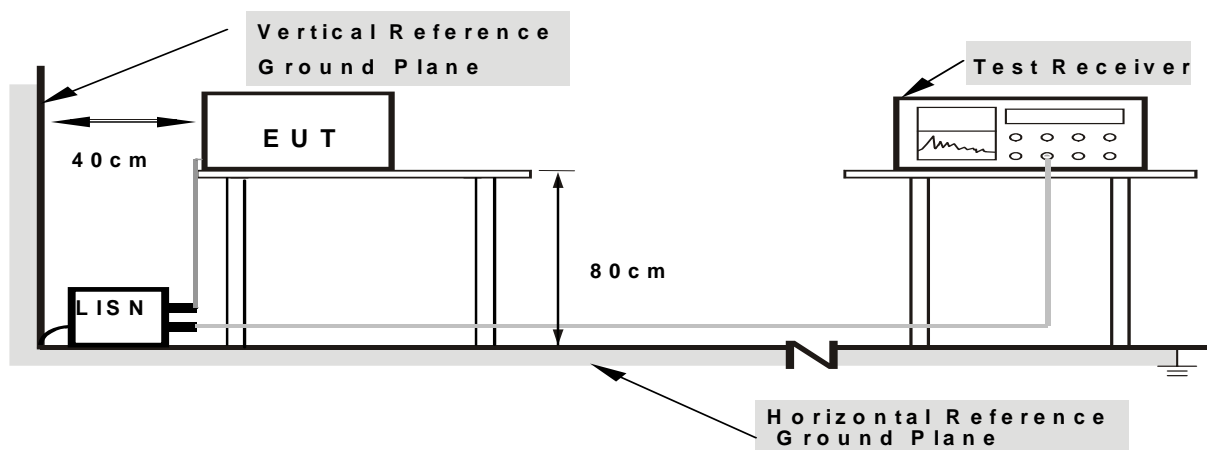
### 3.1.2 TEST PROCEDURE

- 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.
- 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 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 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.

We pretest AC 120V and AC 240V, the worst voltage was AC 120V and the data recording in the report.



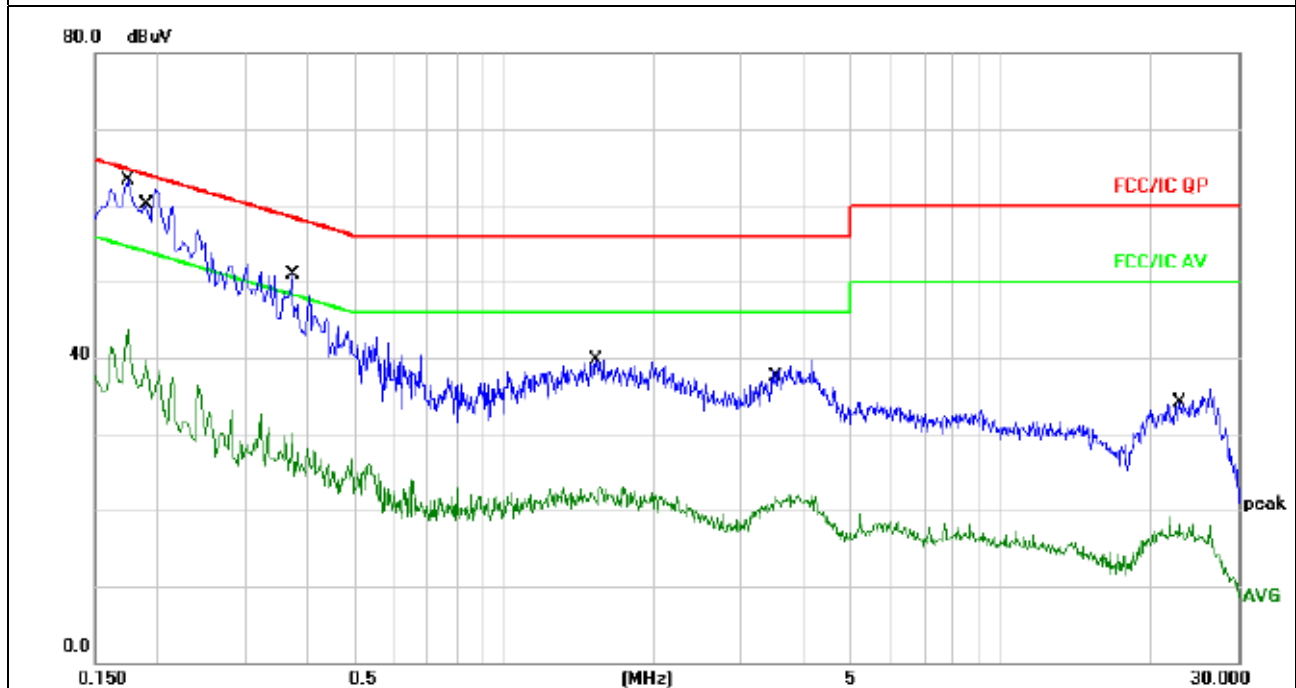
### 3.1.6 TEST RESULTS

Temperature :	25 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC5V from Adapter	Test Mode :	Mode 4

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Detector Type
0.1740	52.72	9.66	62.38	64.76	-2.38	QP
0.1740	34.02	9.66	43.68	54.76	-11.08	AVG
0.1900	52.10	9.65	61.75	64.03	-2.28	QP
0.1900	30.01	9.65	39.66	54.03	-14.37	AVG
0.3740	41.22	9.67	50.89	58.41	-7.52	QP
0.3740	20.34	9.67	30.01	48.41	-18.40	AVG
1.5300	30.07	9.70	39.77	56.00	-16.23	QP
1.5300	13.32	9.70	23.02	46.00	-22.98	AVG
3.5180	28.72	9.73	38.45	56.00	-17.55	QP
3.5180	11.89	9.73	21.62	46.00	-24.38	AVG
22.8460	26.01	9.85	35.86	60.00	-24.14	QP
22.8460	8.31	9.85	18.16	50.00	-31.84	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



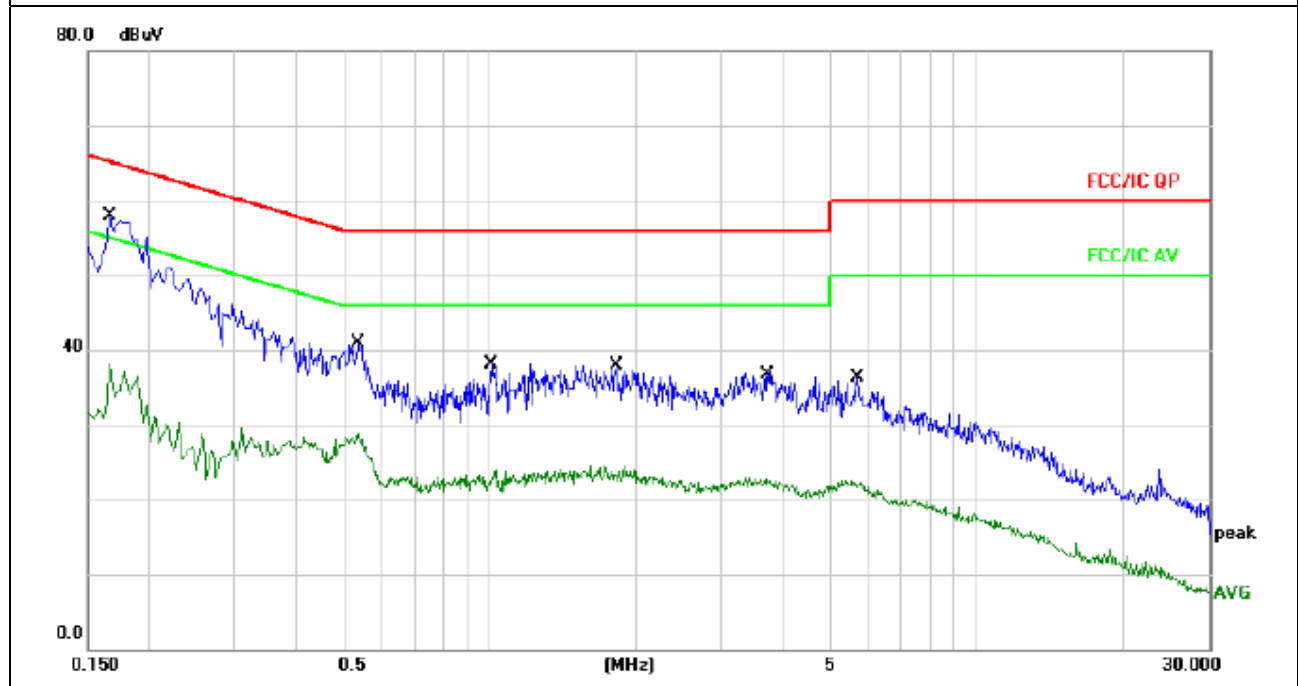


Temperature :	25 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC5V from Adapter	Test Mode :	Mode 4

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Detector Type
0.1660	47.69	9.66	57.35	65.16	-7.81	QP
0.1660	28.46	9.66	38.12	55.16	-17.04	AVG
0.5380	31.16	9.68	40.84	56.00	-15.16	QP
0.5380	19.20	9.68	28.88	46.00	-17.12	AVG
1.0140	28.48	9.69	38.17	56.00	-17.83	QP
1.0140	14.47	9.69	24.16	46.00	-21.84	AVG
1.8260	28.26	9.71	37.97	56.00	-18.03	QP
1.8260	14.72	9.71	24.43	46.00	-21.57	AVG
3.6980	27.34	9.73	37.07	56.00	-18.93	QP
3.6980	12.97	9.73	22.70	46.00	-23.30	AVG
5.6980	26.46	9.76	36.22	60.00	-23.78	QP
5.6980	11.97	9.76	21.73	50.00	-28.27	AVG

## Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.





### 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), then the 15.209(a) limit in the table below has to be followed.

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 B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

#### FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 <sup>th</sup> harmonic of the highest frequency or 40 GHz, whichever is lower

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

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

- The measuring distance of at 3 m shall be used for measurements at frequency up to 25GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 and 1.5 meters above the ground at a 3 meter semi-chamber test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; above 1GHz, the height was 1.5m, 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.
- 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.
- 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.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.
- For the radiated emission test above 1GHz:  
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.

Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

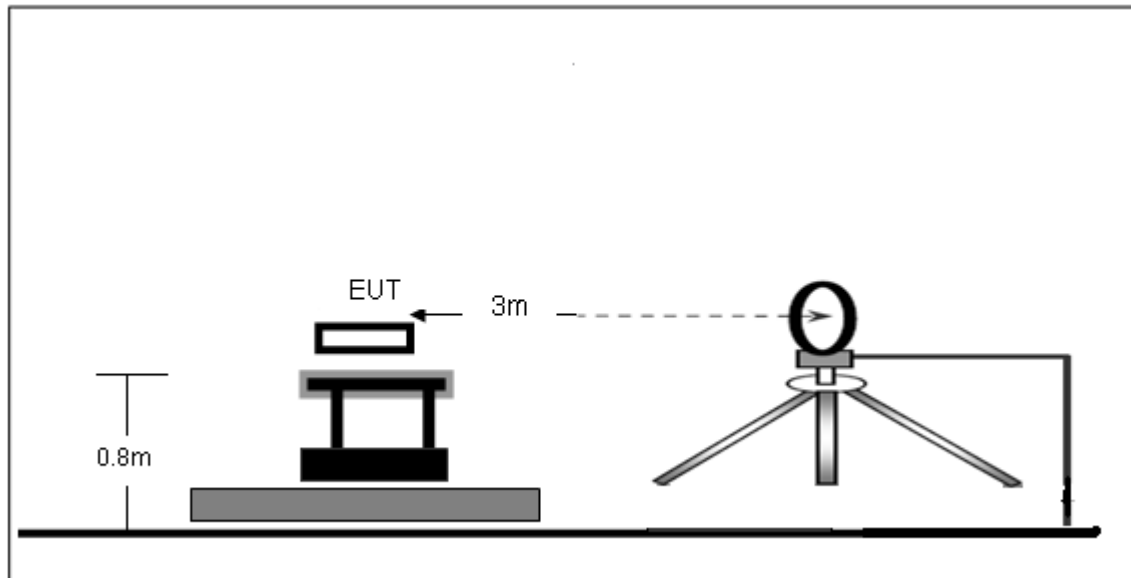
### 3.2.3 DEVIATION FROM TEST STANDARD

No deviation

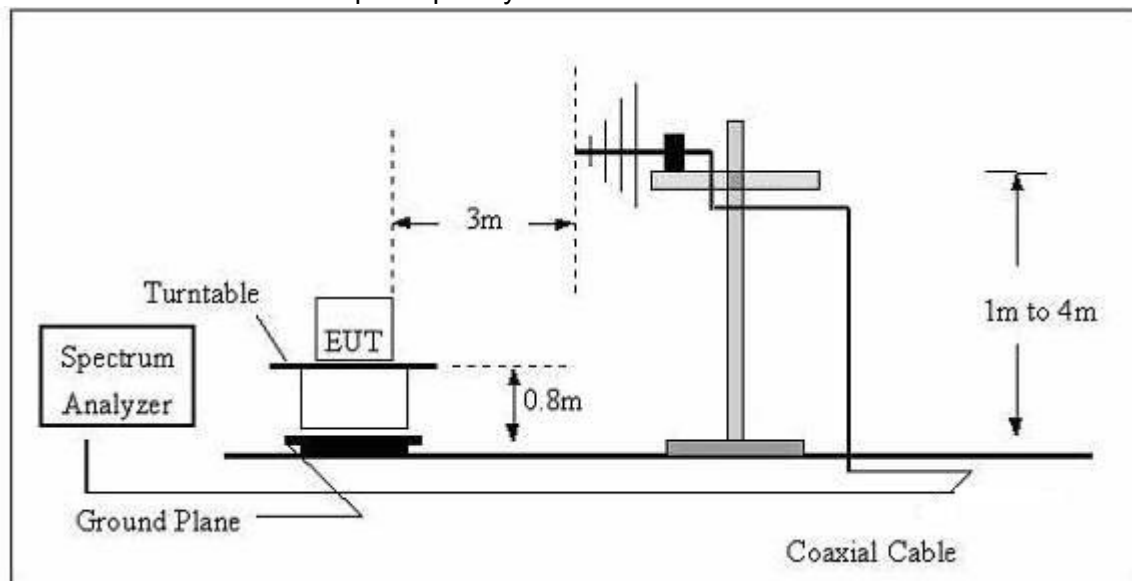


### 3.2.4 TEST SETUP

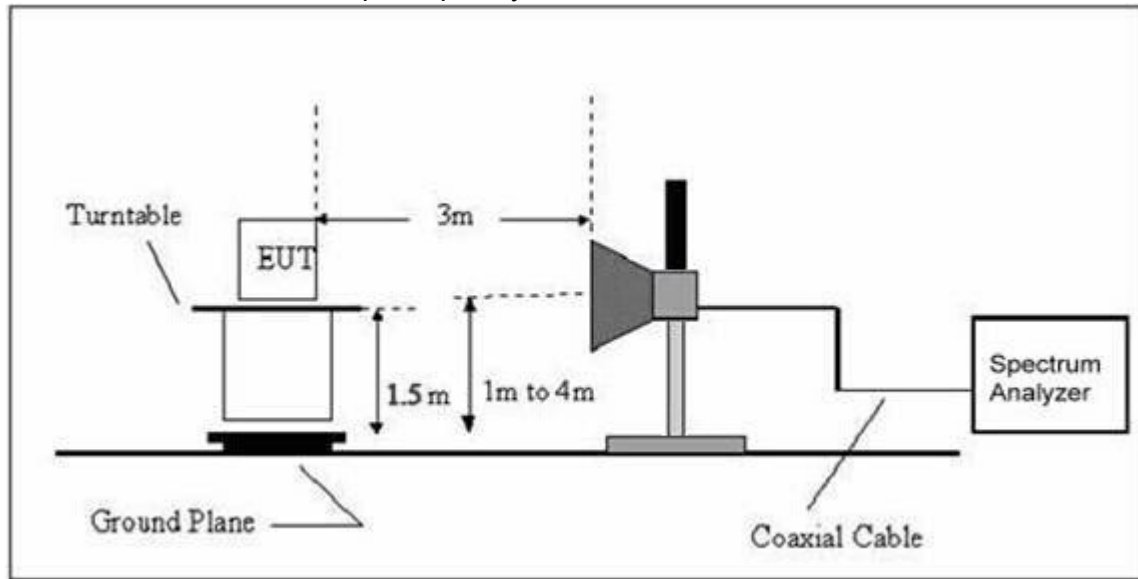
#### (A) Radiated Emission Test-Up Frequency Below 30MHz



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



## (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.



### 3.2.6 TEST RESULTS

#### Radiated Spurious Emission (Below 30MHz )

Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1010 hPa	Polarization :	---
Test Voltage :	DC 3.7V		
Test Mode :	Mode 4		

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 =  $40 \log (\text{specific distance/test distance})$ (dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.



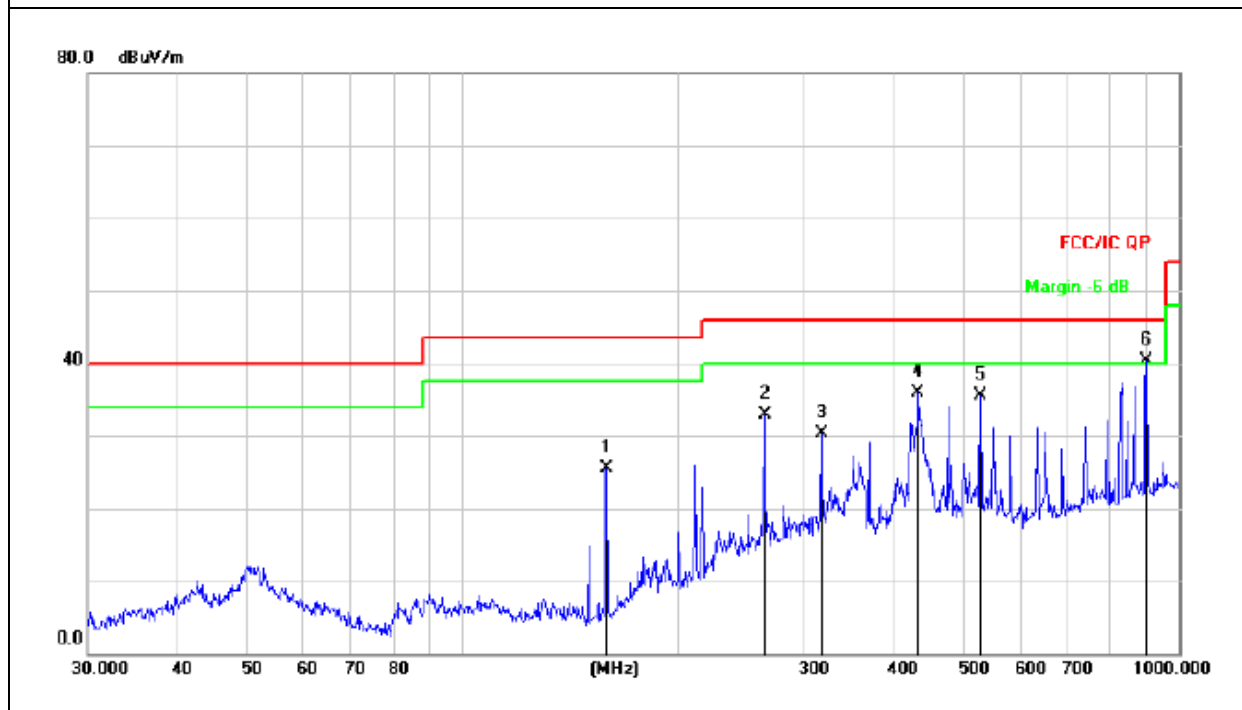
## Radiated Spurious Emission (Between 30MHz – 1GHz)

Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 3.7V		
Test Mode : (Worst)	Mode 4		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
158.6677	44.59	-19.10	25.49	43.50	-18.01	
263.8190	46.26	-13.28	32.98	46.00	-13.02	QP
316.5890	42.13	-11.73	30.40	46.00	-15.60	QP
432.5457	44.53	-8.62	35.91	46.00	-10.09	QP
528.2458	42.01	-6.52	35.49	46.00	-10.51	QP
900.1474	39.52	0.70	40.22	46.00	-5.78	QP

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



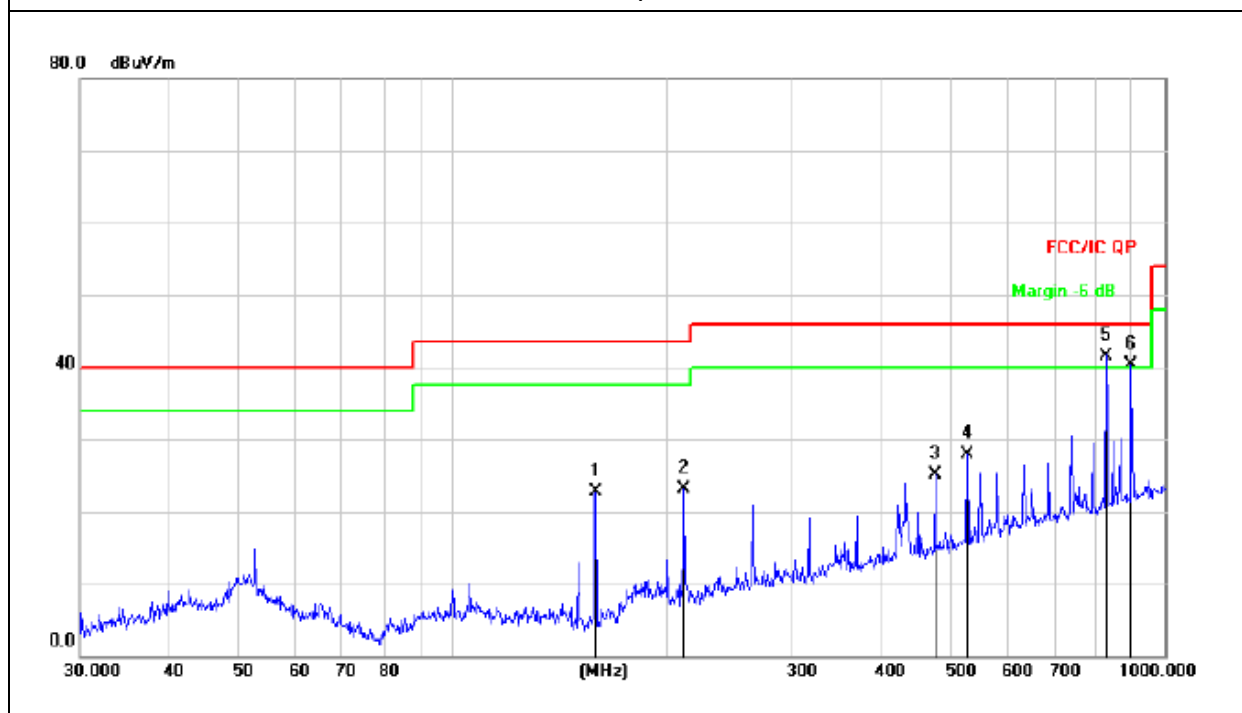


Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 3.7V		
Test Mode : (Worst)	Mode 4		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
158.6677	41.88	-19.10	22.78	43.50	-20.72	QP
211.5265	38.89	-15.82	23.07	43.50	-20.43	QP
475.4991	32.88	-7.83	25.05	46.00	-20.95	QP
528.2458	34.33	-6.52	27.81	46.00	-18.19	QP
827.4934	42.35	-0.75	41.60	46.00	-4.40	QP
896.9965	39.75	0.64	40.39	46.00	-5.61	QP

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.




Radiated Spurious Emission ( 1GHz to 10<sup>th</sup> harmonics)

GFSK									
Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Lower Channel:2402MHz									
V	2402.00	105.93	32.33	3.63	29.59	106.82	114	-7.18	PK
V	2402.00	88.76	32.33	3.63	29.59	89.65	94	-4.35	AV
V	4804.00	53.38	29.34	4.43	30.26	58.73	74	-15.27	PK
V	4804.00	34.77	29.34	4.43	30.26	40.12	54	-13.88	AV
V	17650.00	49.32	31.89	10.21	36.87	64.51	74	-9.49	PK
H	2402.00	104.97	32.33	3.63	29.59	105.86	114	-8.14	PK
H	2402.00	87.89	32.33	3.63	29.59	88.78	94	-5.22	AV
H	4804.00	51.35	29.34	4.43	30.26	56.70	74	-17.30	PK
H	4804.00	34.43	29.34	4.43	30.26	39.78	54	-14.22	AV
H	17650.00	47.84	31.89	10.21	36.87	63.03	74	-10.97	PK

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Middle Channel:2441MHz									
V	2441.00	104.97	32.64	3.66	29.82	105.81	114	-8.19	PK
V	2441.00	86.63	32.64	3.66	29.82	87.47	94	-6.53	AV
V	4882.00	54.55	29.42	4.74	30.48	60.35	74	-13.65	PK
V	4882.00	34.44	29.42	4.74	30.48	40.24	54	-13.76	AV
V	17650.00	46.67	31.89	10.21	36.87	61.86	74	-12.14	PK
H	2441.00	105.23	32.64	3.66	29.82	106.07	114	-7.93	PK
H	2441.00	86.85	32.64	3.66	29.82	87.69	94	-6.31	AV
H	4882.00	53.73	29.42	4.74	30.48	59.53	74	-14.47	PK
H	4882.00	35.47	29.42	4.74	30.48	41.27	54	-12.73	AV
H	17650.00	47.68	31.89	10.21	36.87	62.87	74	-11.13	PK

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Upper Channel:2480MHz									
V	2480.00	104.85	32.95	3.92	29.97	105.79	114	-8.21	PK
V	2480.00	87.69	32.95	3.92	29.97	88.63	94	-5.37	AV
V	4960.00	54.54	29.51	4.96	30.59	60.58	74	-13.42	PK
V	4960.00	34.76	29.51	4.96	30.59	40.80	54	-13.20	AV
V	17650.00	49.43	31.89	10.21	36.87	64.62	74	-9.38	PK
H	2480.00	104.85	32.95	3.92	29.97	105.79	114	-8.21	PK
H	2480.00	86.67	32.95	3.92	29.97	87.61	94	-6.39	AV
H	4960.00	53.63	29.51	4.96	30.59	59.67	74	-14.33	PK
H	4960.00	35.75	29.51	4.96	30.59	41.79	54	-12.21	AV
H	17650.00	48.66	31.89	10.21	36.87	63.85	74	-10.15	PK

## Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,  
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



8DPSK									
Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Lower Channel:2402MHz									
V	2402.00	105.45	32.33	3.63	29.59	106.34	114	-7.66	PK
V	2402.00	86.36	32.33	3.63	29.59	87.25	94	-6.75	AV
V	4804.00	55.38	29.34	4.43	30.26	60.73	74	-13.27	PK
V	4804.00	40.57	29.34	4.43	30.26	45.92	54	-8.08	AV
V	17650.00	49.18	31.89	10.21	36.87	64.37	74	-9.63	PK
H	2402.00	104.47	32.33	3.63	29.59	105.36	114	-8.64	PK
H	2402.00	86.68	32.33	3.63	29.59	87.57	94	-6.43	AV
H	4804.00	57.39	29.34	4.43	30.26	62.74	74	-11.26	PK
H	4804.00	43.49	29.34	4.43	30.26	48.84	54	-5.16	AV
H	17650.00	47.29	31.89	10.21	36.87	62.48	74	-11.52	PK

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Middle Channel:2441MHz									
V	2441.00	104.72	32.64	3.66	29.82	105.56	114	-8.44	PK
V	2441.00	85.96	32.64	3.66	29.82	86.80	94	-7.20	AV
V	4882.00	56.11	29.42	4.74	30.48	61.91	74	-12.09	PK
V	4882.00	40.45	29.42	4.74	30.48	46.25	54	-7.75	AV
V	17650.00	47.63	31.89	10.21	36.87	62.82	74	-11.18	PK
H	2441.00	104.15	32.64	3.66	29.82	104.99	114	-9.01	PK
H	2441.00	85.22	32.64	3.66	29.82	86.06	94	-7.94	AV
H	4882.00	57.21	29.42	4.74	30.48	63.01	74	-10.99	PK
H	4882.00	38.43	29.42	4.74	30.48	44.23	54	-9.77	AV
H	17650.00	46.78	31.89	10.21	36.87	61.97	74	-12.03	PK

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Upper Channel:2480MHz									
V	2480.00	105.46	32.95	3.92	29.97	106.40	114	-7.60	PK
V	2480.00	86.35	32.95	3.92	29.97	87.29	94	-6.71	AV
V	4960.00	55.82	29.51	4.96	30.59	61.86	74	-12.14	PK
V	4960.00	37.71	29.51	4.96	30.59	43.75	54	-10.25	AV
V	17650.00	48.28	31.89	10.21	36.87	63.47	74	-10.53	PK
H	2480.00	104.69	32.95	3.92	29.97	105.63	114	-8.37	PK
H	2480.00	86.06	32.95	3.92	29.97	87.00	94	-7.00	AV
H	4960.00	56.33	29.51	4.96	30.59	62.37	74	-11.63	PK
H	4960.00	38.42	29.51	4.96	30.59	44.46	54	-9.54	AV
H	17650.00	47.39	31.89	10.21	36.87	62.58	74	-11.42	PK

**Remark:**

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,  
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



## 4. BANDWIDTH TEST

### 4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.249) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.249	Bandwidth	(20dB bandwidth)	2400-2483.5	PASS

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30KHz
VB	$\geq$ RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

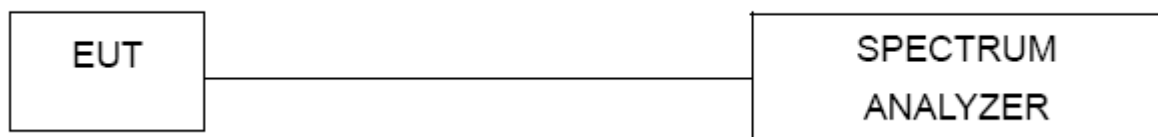
#### 4.1.1 TEST PROCEDURE

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

#### 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 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



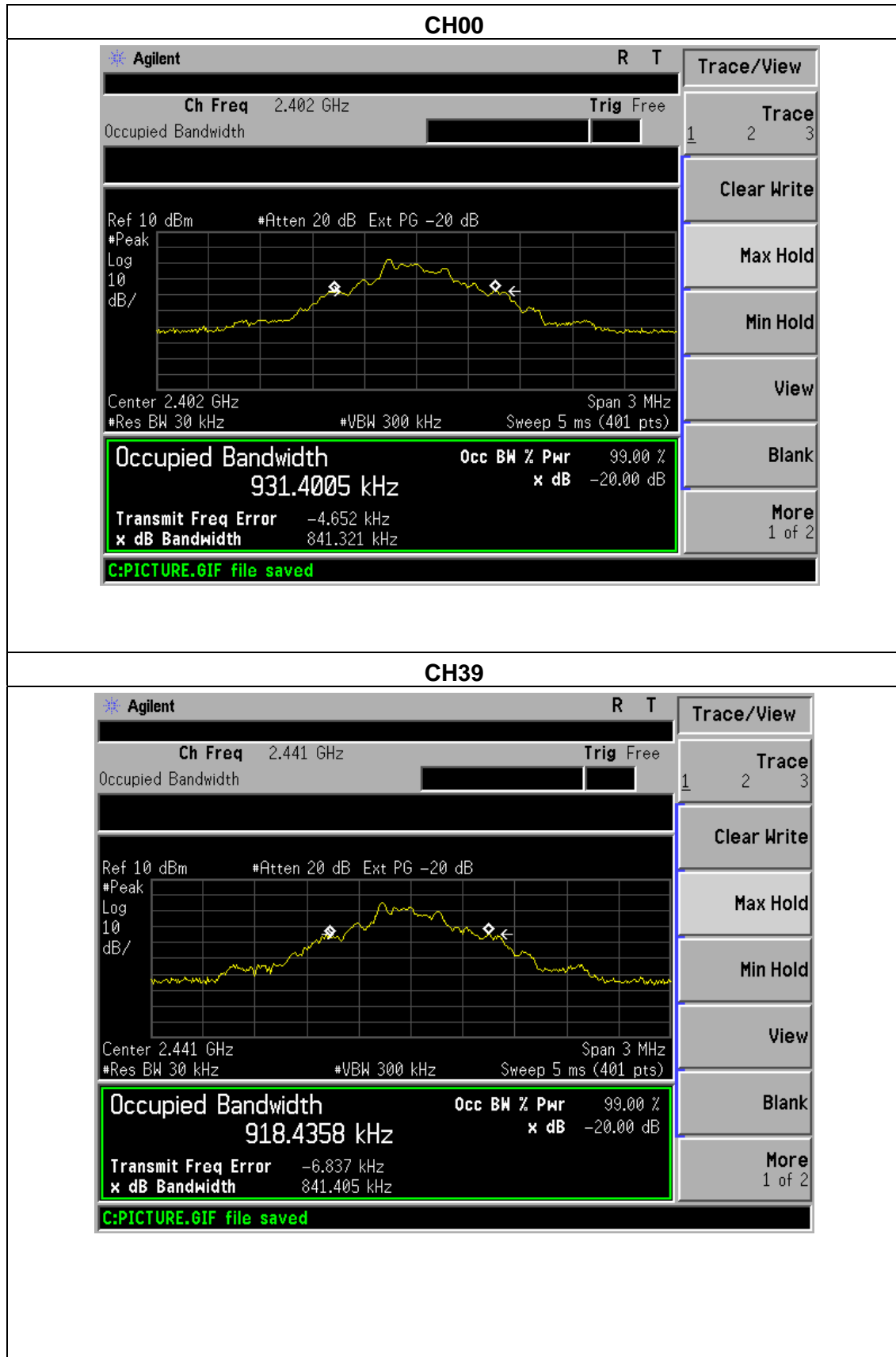
**4.1.5 TEST RESULTS**

EUT :	PBS KIDS Playtime Pad	Model Name :	PBSKD12
Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00 / CH39 /C78		

	Frequency	20dB Bandwidth (kHz)	Result
GFSK	2402 MHz	841.321	<b>PASS</b>
	2441 MHz	841.405	<b>PASS</b>
	2480 MHz	835.196	<b>PASS</b>
PI/4 DPSK	2402 MHz	1113	<b>PASS</b>
	2441 MHz	1129	<b>PASS</b>
	2480 MHz	1140	<b>PASS</b>
8DPSK	2402 MHz	1123	<b>PASS</b>
	2441 MHz	1125	<b>PASS</b>
	2480 MHz	1087	<b>PASS</b>

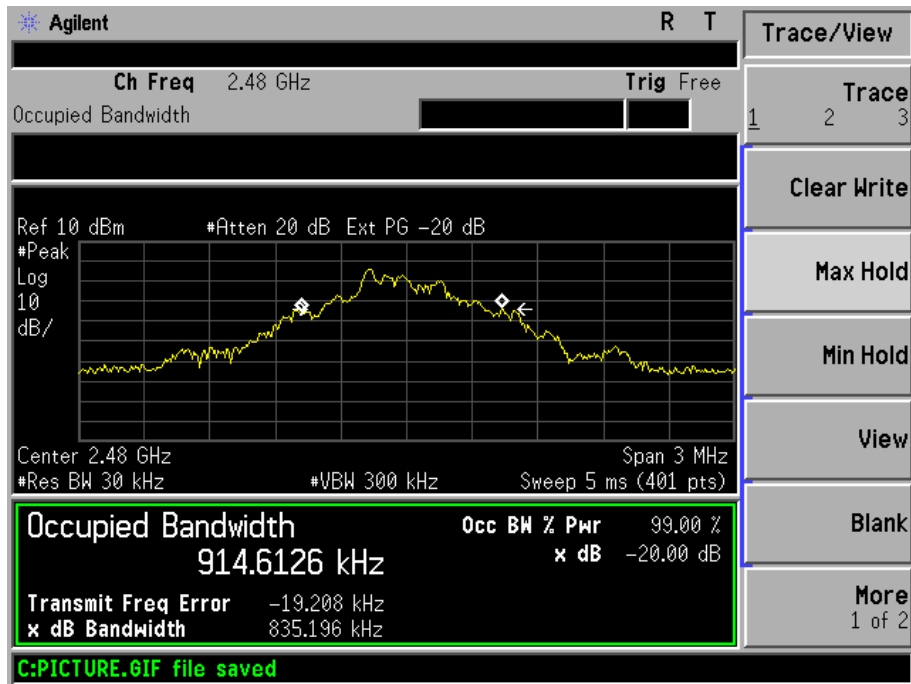


GFSK



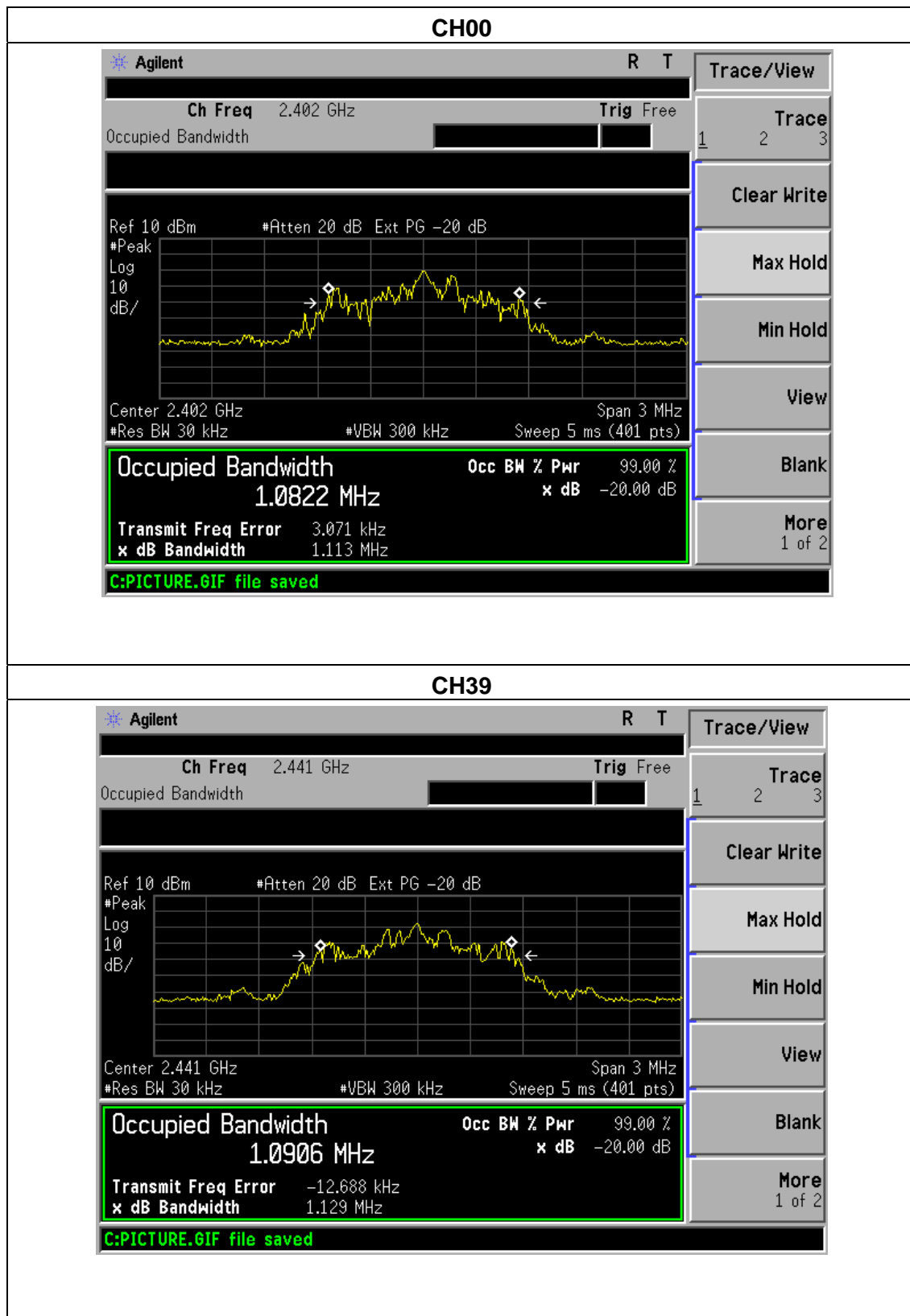


## CH78





PI/4 DPSK





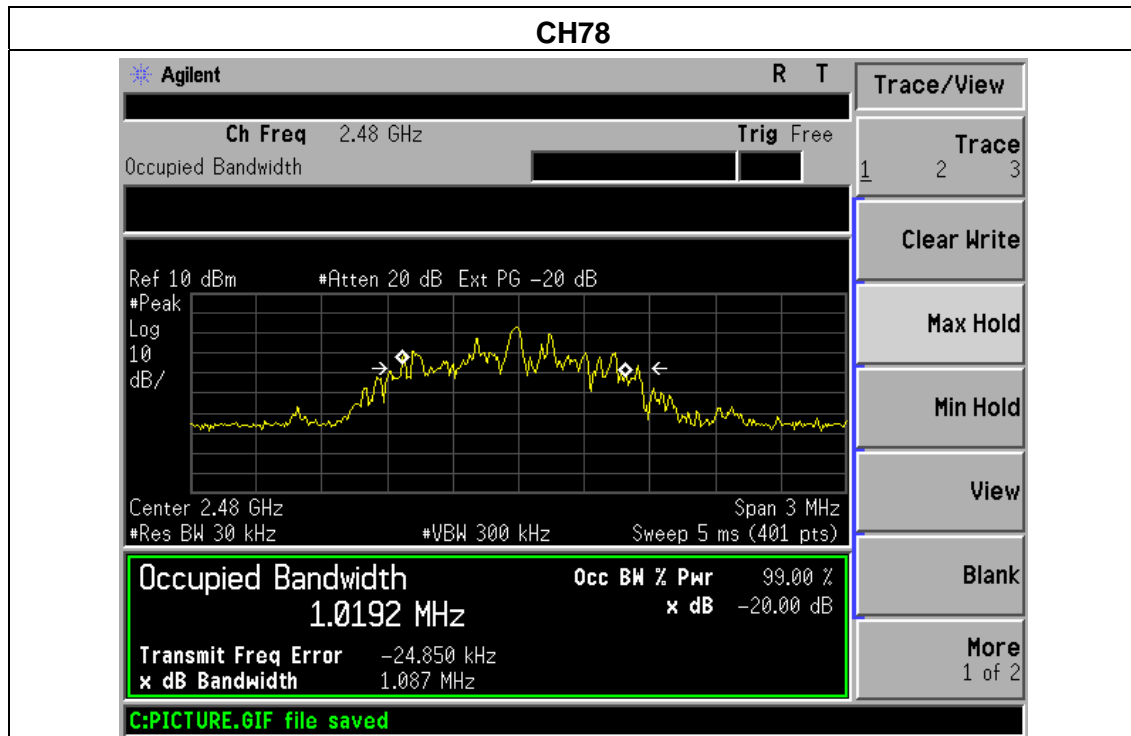
## CH78





8DPSK







## **5. 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) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### **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 100 kHz and VBW of spectrum analyzer to 300 kHz 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.

#### **Note:**

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported





## 5.1 DEVIATION FROM STANDARD

No deviation.

## 5.2 TEST SETUP

## 5.3 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.

## 5.4 TEST RESULTS

Temperature :	25 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00/ CH78		

	Frequency (MHz)	Antenna polarization (H/V)	Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission (dBuV/m)	Band edge Limit (dBuV/m)		Result
						PK	PK	AV	
GFSK	<2400	H	2390.00	34.35	13.83	48.18	74.00	54.00	Pass
	<2400	V	2390.00	33.92	13.83	47.75	74.00	54.00	Pass
	<2400	H	2400.00	34.44	13.85	48.29	74.00	54.00	Pass
	<2400	V	2400.00	33.83	13.85	47.68	74.00	54.00	Pass
	>2483.5	H	2483.50	34.47	14.02	48.49	74.00	54.00	Pass
	>2483.5	V	2483.50	33.74	14.02	47.76	74.00	54.00	Pass
	>2483.5	H	2485.50	33.97	14.04	48.01	74.00	54.00	Pass
PI/4 DPSK	<2400	H	2390.00	34.41	13.83	48.24	74.00	54.00	Pass
	<2400	V	2390.00	34.67	13.83	48.50	74.00	54.00	Pass
	<2400	H	2400.00	34.58	13.85	48.43	74.00	54.00	Pass
	<2400	V	2400.00	35.12	13.85	48.97	74.00	54.00	Pass
	>2483.5	H	2483.50	34.54	14.02	48.56	74.00	54.00	Pass
	>2483.5	V	2483.50	34.87	14.02	48.89	74.00	54.00	Pass
	>2483.5	H	2485.50	34.69	14.04	48.73	74.00	54.00	Pass
8DPSK K	<2400	V	2485.50	34.45	14.04	48.49	74.00	54.00	Pass
	<2400	H	2390.00	34.85	13.83	48.68	74.00	54.00	Pass
	<2400	V	2390.00	34.57	13.83	48.40	74.00	54.00	Pass
	<2400	H	2400.00	35.22	13.85	49.07	74.00	54.00	Pass
	<2400	V	2400.00	34.67	13.85	48.52	74.00	54.00	Pass
	>2483.5	H	2483.50	34.43	14.02	48.45	74.00	54.00	Pass
	>2483.5	V	2483.50	34.51	14.02	48.53	74.00	54.00	Pass
	>2483.5	H	2485.50	34.62	14.04	48.66	74.00	54.00	Pass
	>2483.5	V	2485.50	34.48	14.04	48.52	74.00	54.00	Pass

If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.



## **6. ANTENNA REQUIREMENT**

### **6.1 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.

### **6.2 EUT ANTENNA**

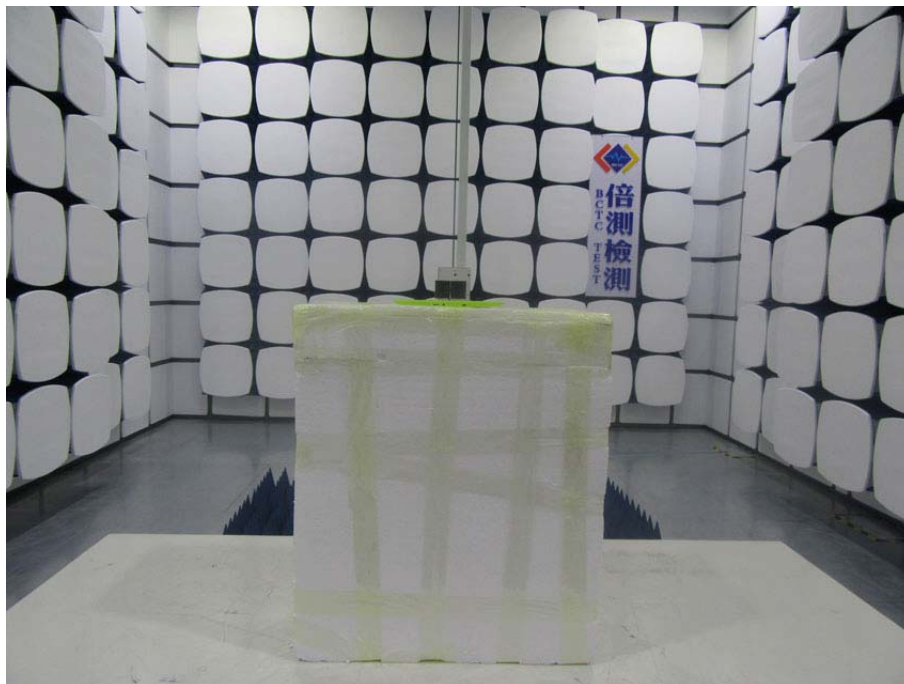
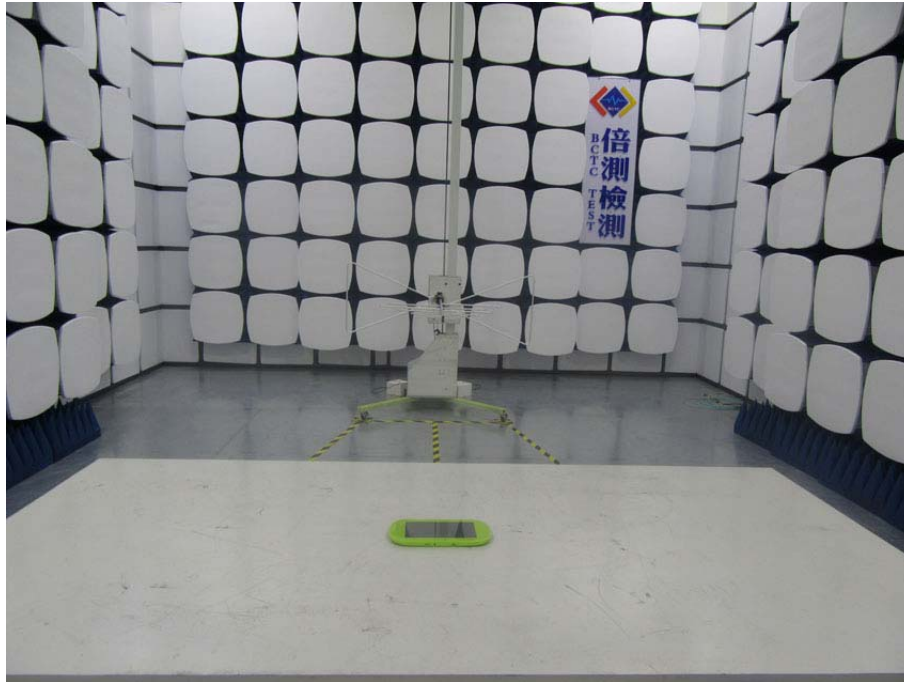
The EUT antenna is Integrated (FPCB) antenna. It complies with the standard requirement.

## 7. EUT TEST PHOTO

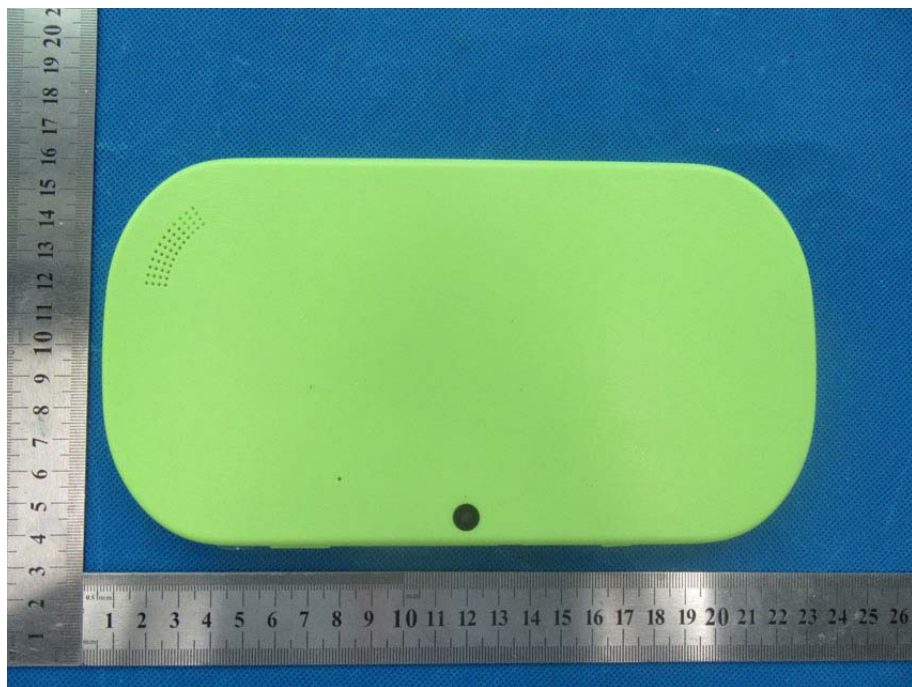
### conducted Emission



### Radiated Measurement Photos



## 8. EUT PHOTO



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