



FCC Part 15C Test Report

FCC ID: 2AHN7VS08

Product Name:	Smart Watch
Trademark:	N/A
Model Name :	VS08/GT08 A1, U8/VS07, U9/VS06, DZ09/VS09, VS19, VS20, VS20 plus, VS21, VS36, VS65
Prepared For :	Shenzhen Viota Technology Co., Ltd
Address :	Rm.308-311,3rd Floor,Blog 5,Internet Industrial Park,Xixiang Town,Baoyuan Road,Baoan District,Shenzhen,Guangdong,China
Prepared By :	Shenzhen BCTC Technology Co., Ltd.
Address :	No.101,Yousong Road,Longhua New District, Shenzhen,China
Test Date:	Mar. 9 – Mar. 22, 2016
Date of Report :	Mar. 23, 2016
Report No.:	BCTC-160302220-1E



VERIFICATION OF COMPLIANCE

Applicant's name : **Shenzhen Viota Technology Co., Ltd**
Address : Rm.308-311,3rd Floor,Blog 5,Internet Industrial Park,Xixiang
Town,Baoyuan Road,Baoan
District,Shenzhen,Guangdong,China

Manufacture's Name : **Shenzhen Viota Technology Co., Ltd**
Address : Rm.308-311,3rd Floor,Blog 5,Internet Industrial Park,Xixiang
Town,Baoyuan Road,Baoan
District,Shenzhen,Guangdong,China

Product description

Product name : Smart Watch

Trademark: **N/A**

VS08/GT08

Model Name: A1, U8/VS07, U9/VS06, DZ09/VS09, VS19, VS20, VS20 plus,
VS21, VS36, VS65

Test procedure FCC Part15.249

Standards 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

(Eric Yang)

Technical Manager :

Sophie Lu

(Sophia Lee)

Authorized Signatory :

Carson. Zhang



(Carson. Zhang)



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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	Smart Watch											
Trade Name	N/A											
Model Name	VS08/GT08											
Serial Model	A1, U8/VS07, U9/VS06, DZ09/VS09, VS19, VS20, VS20 plus, VS21, VS36, VS65											
Model Difference	The product is different for model number and outlook color.											
Product Description	<table><tr><td>Operation Frequency:</td><td>2402~2480 MHz</td></tr><tr><td>Modulation Type:</td><td>GFSK,PI/4 DPSK,8DPSK</td></tr><tr><td>Bit Rate of Transmitter</td><td>1M/2M/3Mbps</td></tr><tr><td>Number Of Channel</td><td>79 CH</td></tr><tr><td>Antenna Designation:</td><td>Please see Note 3.</td></tr></table>		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.
	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.											
Power	DC 5V from Adapter DC 3.7V											
Connecting I/O Port(s)	Please refer to the User's Manual											
hardware version	--											
Software version	--											
Serial number	--											
Adapter	Model:JK050050-502USD I/P:100-240V ~ 50/60Hz 0.3A O/P:DC 5V 500mA											

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)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
~	~	~	~	~	~
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

3.

Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	Internal Antenna	N/A	0.5	

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.

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 TEXT SOFTWARE SETTING

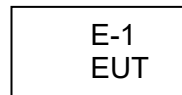
During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final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

Frequency	2402 MHz	2441 MHz	2480 MHz
Channel	Low	Middle	High

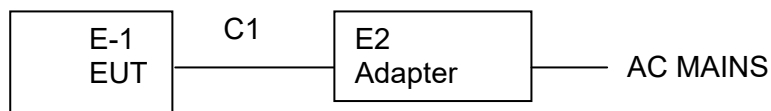


2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

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	Smart Watch	N/A	VS08/GT08	N/A	EUT
E-2	PC	ASUS	JK050050-502USD	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C1	NO	NO	0.8M	Unshielded, Micro USB Line

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
1	Test Receiver	R&S	ESCI	1166.5950K03-101165-ha	2015.06.06	2016.06.05
2	LISN	R&S	NSLK8126	8126466	2015.08.24	2016.08.23
3	LISN	R&S	NSLK8126	8126487	2015.08.24	2016.08.23
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2015.06.07	2016.06.06
5	RF cables	R&S	R204	R20X	2015.07.06	2016.07.05

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

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer	Agilent	E4407B	MY45109572	2015.08.25	2016.08.24
2	Test Receiver	R&S	ESPI	101396	2015.08.25	2016.08.24
3	Bilog Antenna	SCHWARZBECK	VULB9160	VULB9160-3369	2015.08.25	2016.08.24
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2015.07.06	2016.07.05
5	Spectrum Analyzer	Agilent	N9020A	MY5051041	2015.07.06	2016.07.05
6	Horn Antenna	SCHWARZBECK	9120D	9120D-1275	2015.08.25	2016.08.24
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2015.07.06	2016.07.05
8	Amplifier	SCHWARZBECK	BBV9718	9718-270	2015.08.25	2016.08.24
9	Amplifier	SCHWARZBECK	BBV9743	9743-119	2015.08.25	2016.08.24
10	Loop Antenna	ARA	PLVS08/GT0830/B	1029	2015.07.06	2016.07.05
11	Power Meter	R&S	NRVS	100696	2015.07.06	2016.07.05
12	Power Sensor	R&S	URV5-Z4	0395.1619.05	2015.07.06	2016.07.05
13	RF cables	R&S	N/A	N/A	2015.07.06	2016.07.05



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

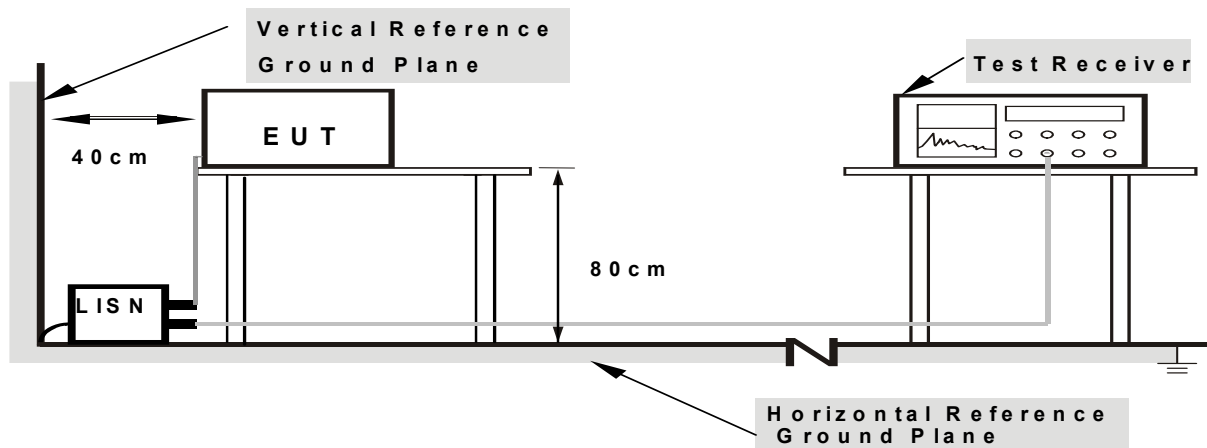
3.1.2 TEST PROCEDURE

- 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 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.

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



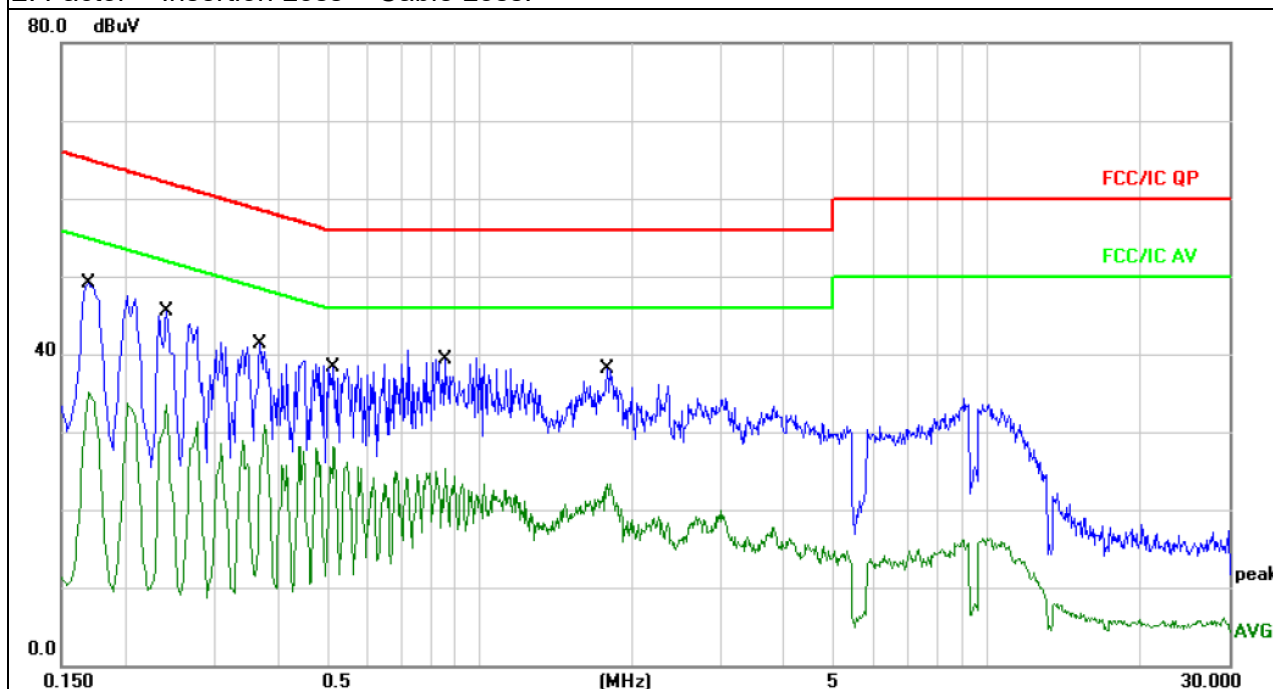
3.1.6 TEST RESULTS

EUT :	Smart Watch	Model Name :	VS08/GT08
Temperature :	25 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 5V from PC	Test Mode :	Mode 4(Worst Mode)

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1712	37.50	10.06	47.56	64.90	-17.34	QP	
2		0.1712	24.66	10.06	34.72	54.90	-20.18	AVG	
3		0.2420	33.76	10.08	43.84	62.02	-18.18	QP	
4		0.2420	23.45	10.08	33.53	52.02	-18.49	AVG	
5		0.3700	31.24	10.10	41.34	58.50	-17.16	QP	
6		0.3700	20.88	10.10	30.98	48.50	-17.52	AVG	
7		0.5180	28.64	10.12	38.76	56.00	-17.24	QP	
8		0.5180	17.95	10.12	28.07	46.00	-17.93	AVG	
9	*	0.8540	29.34	10.15	39.49	56.00	-16.51	QP	
10		0.8540	15.17	10.15	25.32	46.00	-20.68	AVG	
11		1.7900	27.90	10.18	38.08	56.00	-17.92	QP	
12		1.7900	13.22	10.18	23.40	46.00	-22.60	AVG	

Remark:

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



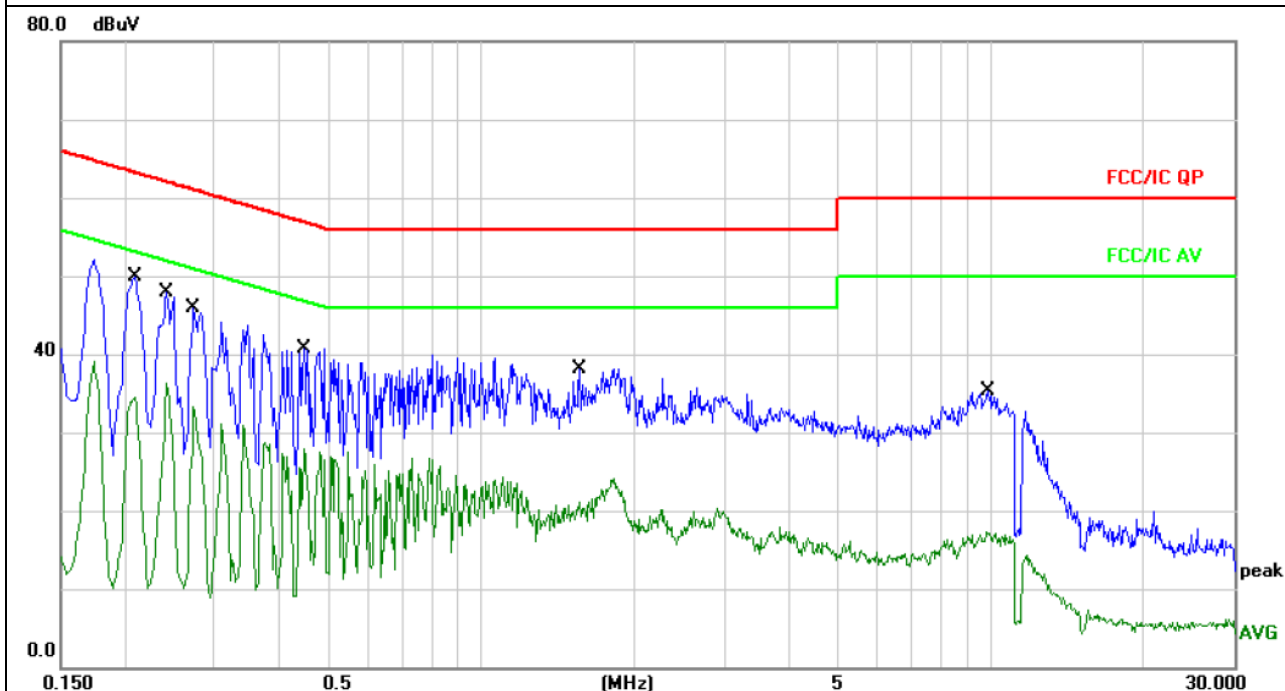


EUT :	Smart Watch	Model Name :	VS08/GT08
Temperature :	25 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5V from PC	Test Mode :	Mode 4(Worst Mode)

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.2100	39.92	10.07	49.99	63.20	-13.21	QP	
2		0.2100	24.52	10.07	34.59	53.20	-18.61	AVG	
3		0.2420	37.91	10.08	47.99	62.02	-14.03	QP	
4		0.2420	26.20	10.08	36.28	52.02	-15.74	AVG	
5		0.2740	33.93	10.09	44.02	60.99	-16.97	QP	
6		0.2740	23.14	10.09	33.23	50.99	-17.76	AVG	
7		0.4500	30.56	10.11	40.67	56.87	-16.20	QP	
8		0.4500	17.74	10.11	27.85	46.87	-19.02	AVG	
9		1.5620	27.84	10.18	38.02	56.00	-17.98	QP	
10		1.5620	11.24	10.18	21.42	46.00	-24.58	AVG	
11		9.8420	25.17	10.12	35.29	60.00	-24.71	QP	
12		9.8420	7.25	10.12	17.37	50.00	-32.63	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)

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	10 th 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 1.5 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.
- The height of the equipment or of the substitution antenna shall be 1.5 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.
- 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:

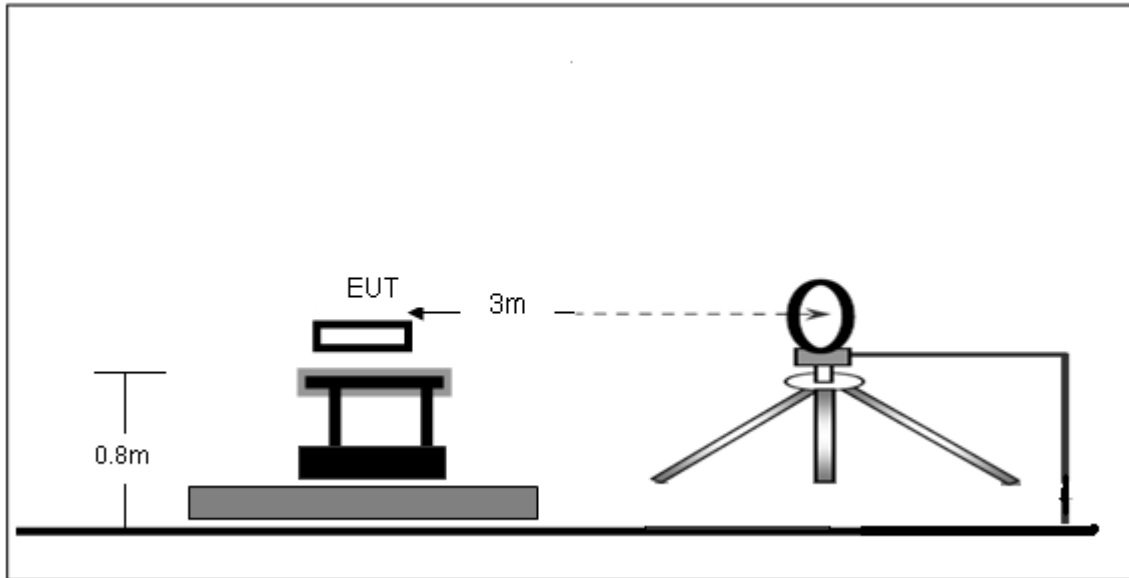
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

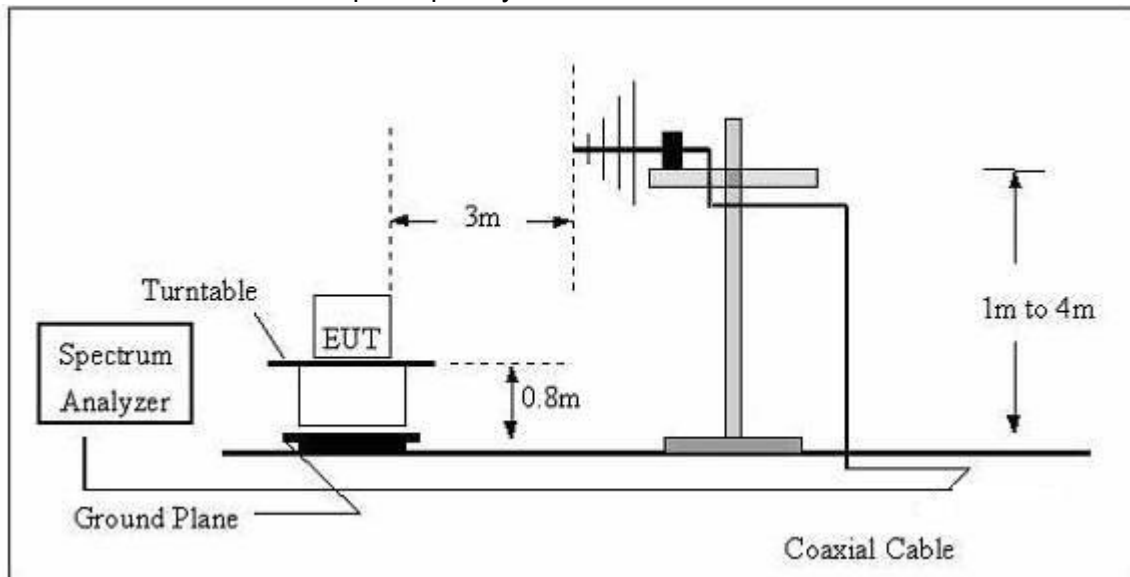
No deviation

3.2.4 TEST SETUP

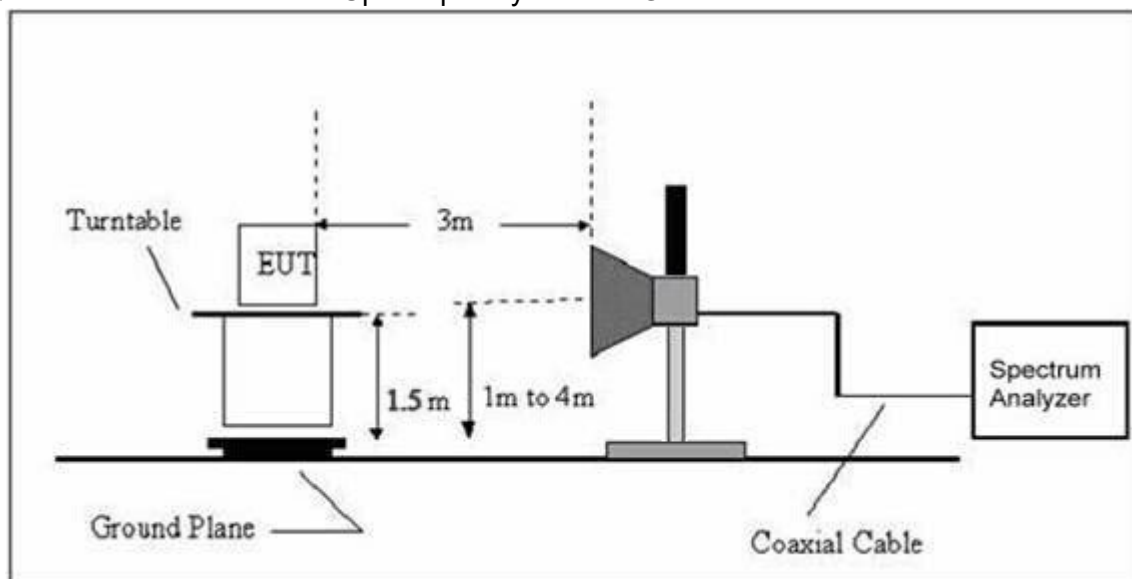
(A) Radiated Emission Test-Up Frequency Below 30MHz



(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)

EUT :	Smart Watch	Model Name :	VS08/GT08
Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1010 hPa	Polarization :	---
Test Voltage :	DC 3.7V		
Test Mode :	TX		

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)

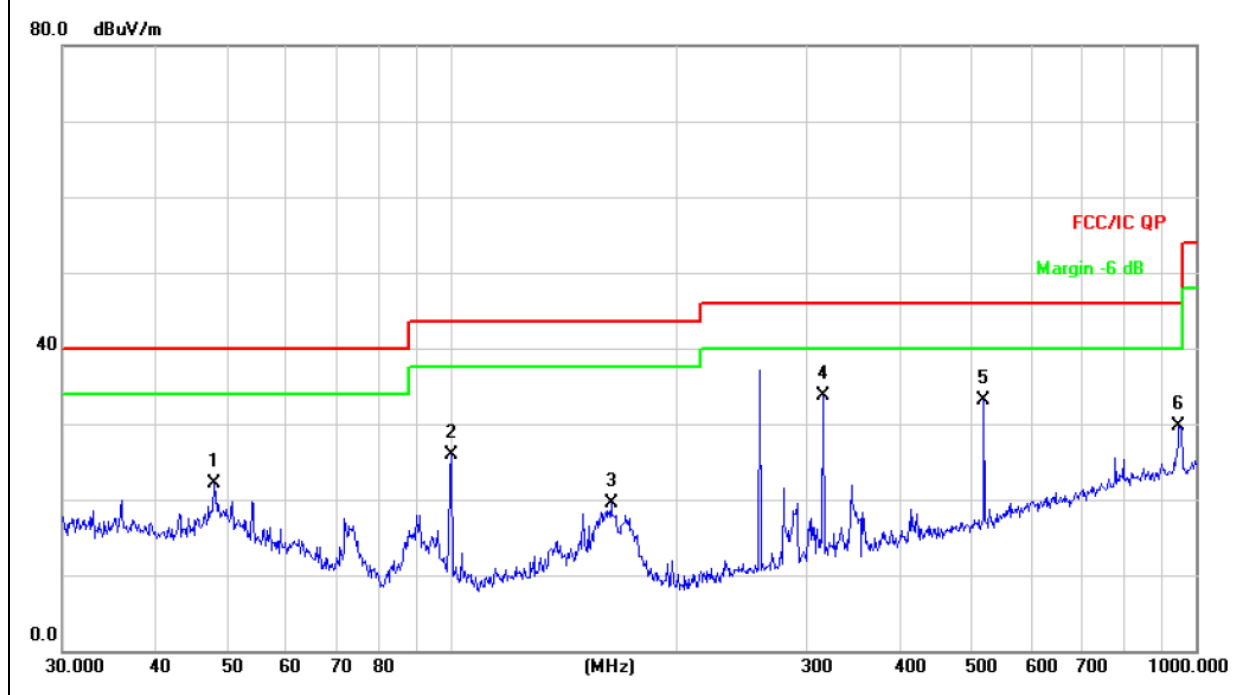
EUT :	Smart Watch	Model Name :	VS08/GT08
Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 3.7V		
Test Mode : (Worst)	Link mode		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		47.9940	32.08	-9.96	22.12	40.00	-17.88	QP		
2		99.8777	42.44	-16.49	25.95	43.50	-17.55	QP		
3		163.7550	32.66	-13.08	19.58	43.50	-23.92	QP		
4	*	315.4808	45.86	-12.18	33.68	46.00	-12.32	QP		
5		519.0649	41.02	-7.84	33.18	46.00	-12.82	QP		
6		948.7610	30.16	-0.48	29.68	46.00	-16.32	QP		

Remark:

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

All interfaces was connected, and BT TX mode was link.





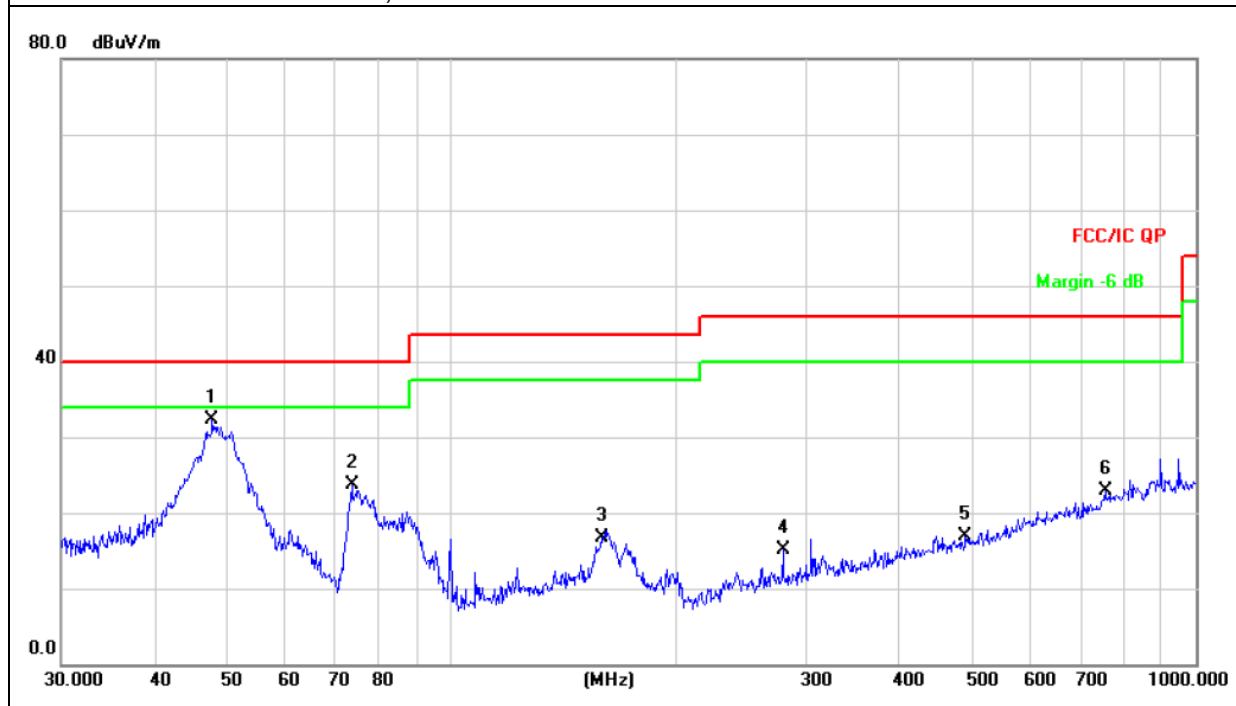
EUT :	Smart Watch	Model Name :	VS08/GT08
Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 3.7V		
Test Mode : (Worst)	Link mode		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	47.8260	42.17	-9.94	32.23	40.00	-7.77	QP		
2		73.6170	39.45	-15.83	23.62	40.00	-16.38	QP		
3		159.2250	29.61	-12.87	16.74	43.50	-26.76	QP		
4		279.0436	28.27	-13.13	15.14	46.00	-30.86	QP		
5		490.7447	25.31	-8.31	17.00	46.00	-29.00	QP		
6		755.3872	26.00	-3.01	22.99	46.00	-23.01	QP		

Remark:

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

All interfaces was connected, and BT TX mode was link.





Radiated Spurious Emission (1GHz to 10th harmonics)
GFSK

	Freq.	Receiver Reading	Detector	Polar	Corrected Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 2402MHz	2402	102.85	PK	H	1.31	104.16	114	Pass
	2402	88.97	Ave	H	1.31	90.28	94	Pass
	4804	55.98	PK	H	-1.06	54.92	74	Pass
	4804	45.94	Ave	H	-1.06	44.88	54	Pass
	2402	103.19	PK	V	1.31	104.50	114	Pass
	2402	89.46	Ave	V	1.31	90.77	94	Pass
	4804	55.10	PK	V	-1.06	54.04	74	Pass
	4804	45.74	Ave	V	-1.06	44.68	54	Pass
	2441	103.39	PK	H	0.85	104.24	114	Pass
	2441	89.42	Ave	H	0.85	90.27	94	Pass
Middle Channel 2441MHz	4882	57.82	PK	H	-0.62	57.20	74	Pass
	4882	48.83	Ave	H	-0.62	48.21	54	Pass
	2441	103.25	PK	V	0.85	104.10	114	Pass
	2441	89.03	Ave	V	0.85	89.88	94	Pass
	4882	57.89	PK	V	-0.62	57.27	74	Pass
	4882	49.23	Ave	V	-0.62	48.61	54	Pass
	2480	104.44	PK	H	0.53	104.97	114	Pass
	2480	88.59	Ave	H	0.53	89.12	94	Pass
Upper Channel 2480MHz	4960	57.98	PK	H	-0.24	57.74	74	Pass
	4960	49.01	Ave	H	-0.24	48.77	54	Pass
	2480	104.06	PK	V	0.53	104.59	114	Pass
	2480	88.96	Ave	V	0.53	89.49	94	Pass
	4960	57.74	PK	V	-0.24	57.50	74	Pass
	4960	47.71	Ave	V	-0.24	47.47	54	Pass

Remark:

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

Emission Level = Meter Reading + Factor

Margin = Emission Level - Limit

Other harmonics emissions are lower than 20dB below the allowable limit.



PI/4 DPSK

	Freq.	Receiver Reading	Detector	Polar	Corrected Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 2402MHz	2402	102.47	PK	H	1.31	103.78	114	Pass
	2402	88.64	Ave	H	1.31	89.95	94	Pass
	4804	55.77	PK	H	-1.06	54.71	74	Pass
	4804	45.77	Ave	H	-1.06	44.71	54	Pass
	2402	102.80	PK	V	1.31	104.11	114	Pass
	2402	89.13	Ave	V	1.31	90.44	94	Pass
	4804	54.90	PK	V	-1.06	53.84	74	Pass
	4804	45.57	Ave	V	-1.06	44.51	54	Pass
Middle Channel 2441MHz	2441	103.00	PK	H	0.85	103.85	114	Pass
	2441	89.09	Ave	H	0.85	89.94	94	Pass
	4882	57.61	PK	H	-0.62	56.99	74	Pass
	4882	48.65	Ave	H	-0.62	48.03	54	Pass
	2441	102.86	PK	V	0.85	103.71	114	Pass
	2441	88.70	Ave	V	0.85	89.55	94	Pass
	4882	57.68	PK	V	-0.62	57.06	74	Pass
	4882	49.05	Ave	V	-0.62	48.43	54	Pass
Upper Channel 2480MHz	2480	104.05	PK	H	0.53	104.58	114	Pass
	2480	88.26	Ave	H	0.53	88.79	94	Pass
	4960	57.77	PK	H	-0.24	57.53	74	Pass
	4960	48.83	Ave	H	-0.24	48.59	54	Pass
	2480	103.69	PK	V	0.53	104.22	114	Pass
	2480	88.63	Ave	V	0.53	89.16	94	Pass
	4960	57.53	PK	V	-0.24	57.29	74	Pass
	4960	47.53	Ave	V	-0.24	47.29	54	Pass

Remark:

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

Emission Level = Meter Reading + Factor

Margin = Emission Level - Limit

Other harmonics emissions are lower than 20dB below the allowable limit.



8DPSK

	Freq.	Receiver Reading	Detector	Polar	Corrected Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 2402MHz	2402.00	103.34	PK	H	1.31	104.65	114	Pass
	2402.00	89.16	Ave	H	1.31	90.47	94	Pass
	4804.00	57.03	PK	H	-1.06	55.97	74	Pass
	4804.00	49.12	Ave	H	-1.06	48.06	54	Pass
	2402.00	104.13	PK	V	1.31	105.44	114	Pass
	2402.00	89.50	Ave	V	1.31	90.81	94	Pass
	4804.00	57.52	PK	V	-1.06	56.46	74	Pass
	4804.00	48.63	Ave	V	-1.06	47.57	54	Pass
Middle Channel 2441MHz	2441.00	103.60	PK	H	0.85	104.45	114	Pass
	2441.00	89.04	Ave	H	0.85	89.89	94	Pass
	4882.00	57.69	PK	H	-0.62	57.07	74	Pass
	4882.00	48.71	Ave	H	-0.62	48.09	54	Pass
	2441.00	104.04	PK	V	0.85	104.89	114	Pass
	2441.00	87.96	Ave	V	0.85	88.81	94	Pass
	4882.00	57.32	PK	V	-0.62	56.70	74	Pass
	4882.00	48.42	Ave	V	-0.62	47.80	54	Pass
Upper Channel 2480MHz	2480.00	103.26	PK	H	0.53	103.79	114	Pass
	2480.00	89.47	Ave	H	0.53	90.00	94	Pass
	4960.00	57.69	PK	H	-0.24	57.45	74	Pass
	4960.00	48.52	Ave	H	-0.24	48.28	54	Pass
	2480.00	103.54	PK	V	0.53	104.07	114	Pass
	2480.00	89.33	Ave	V	0.53	89.86	94	Pass
	4960.00	58.18	PK	V	-0.24	57.94	74	Pass
	4960.00	48.93	Ave	V	-0.24	48.69	54	Pass

Remark:

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

Emission Level = Meter Reading + Factor

Margin = Emission Level - Limit

Other harmonics emissions are lower than 20dB below the allowable limit.



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



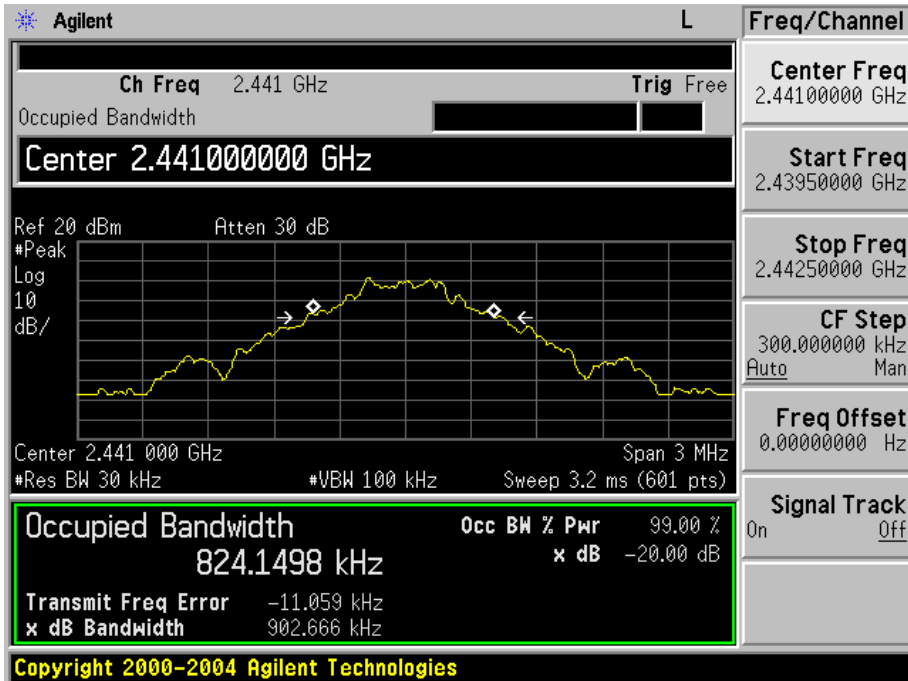
4.1.4 EUT OPERATION CONDITIONS

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.

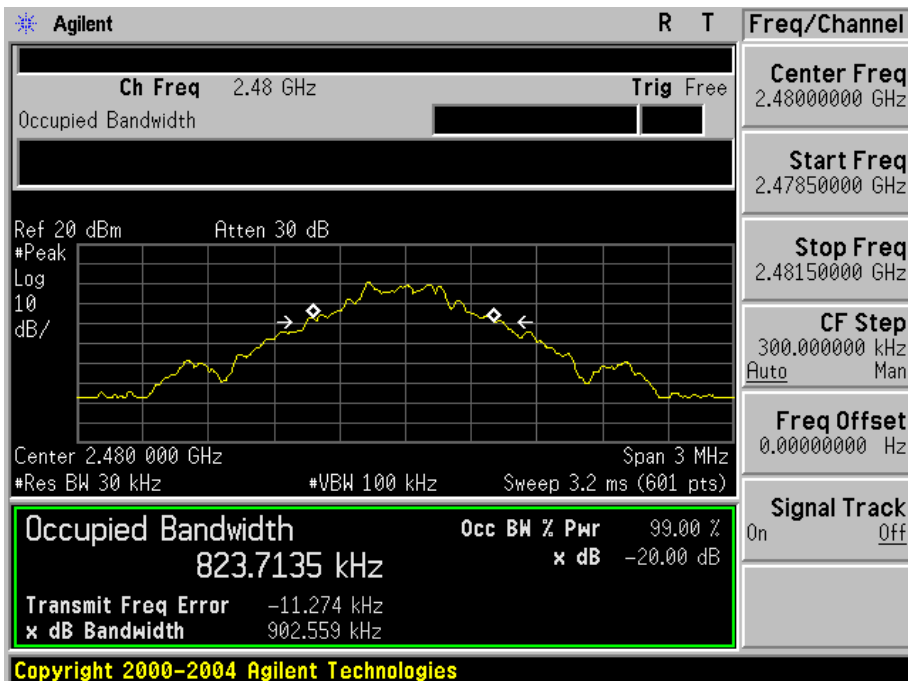
4.1.5 TEST RESULTS



CH39

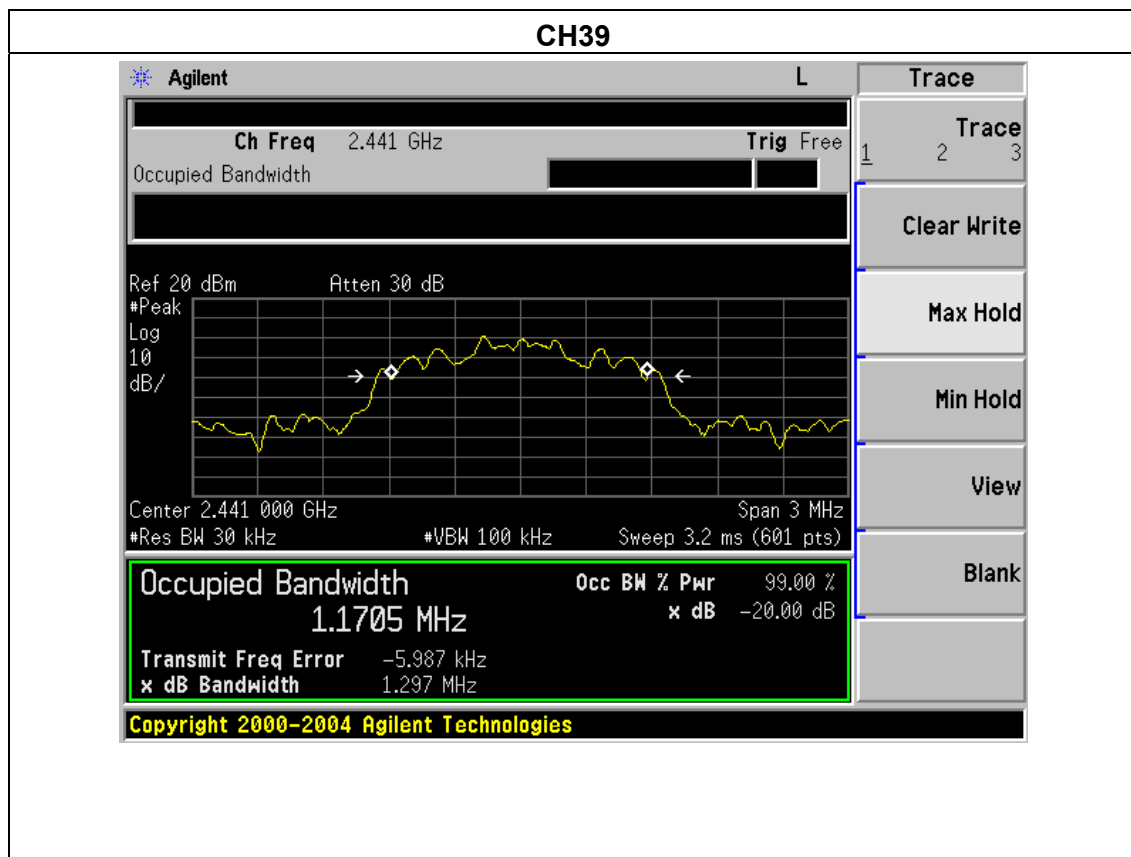
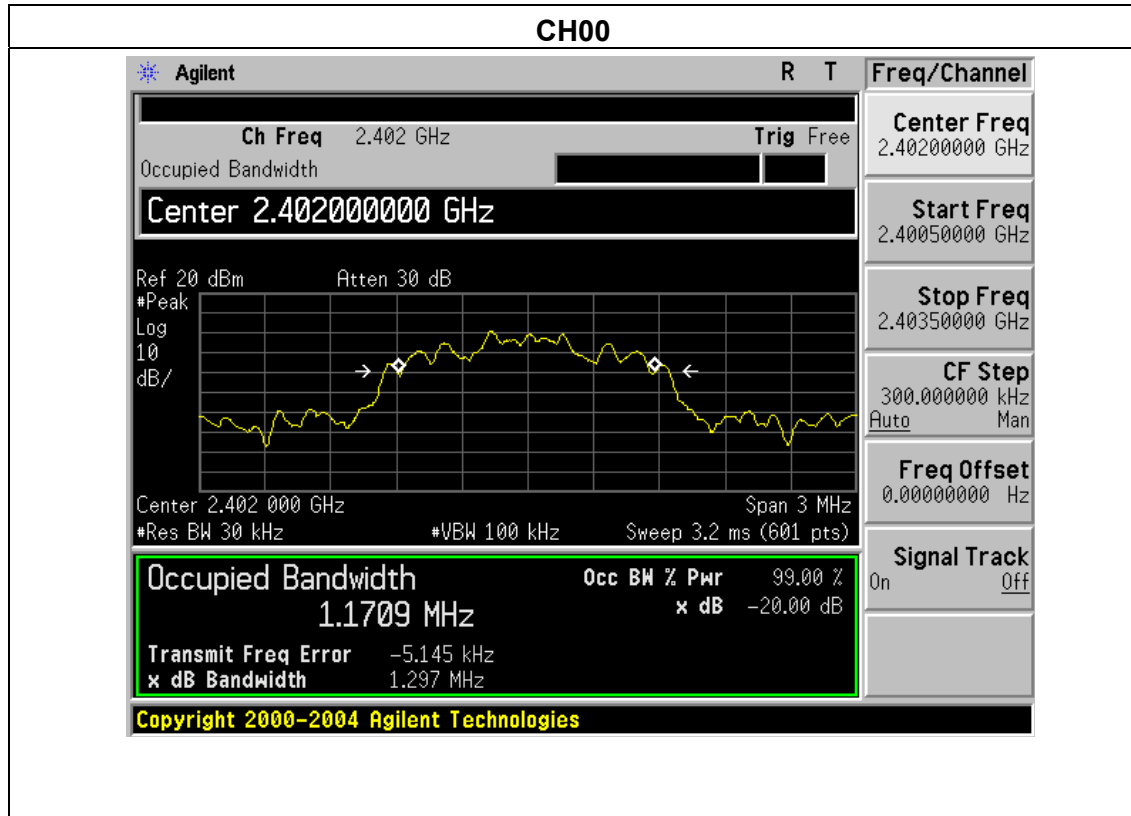


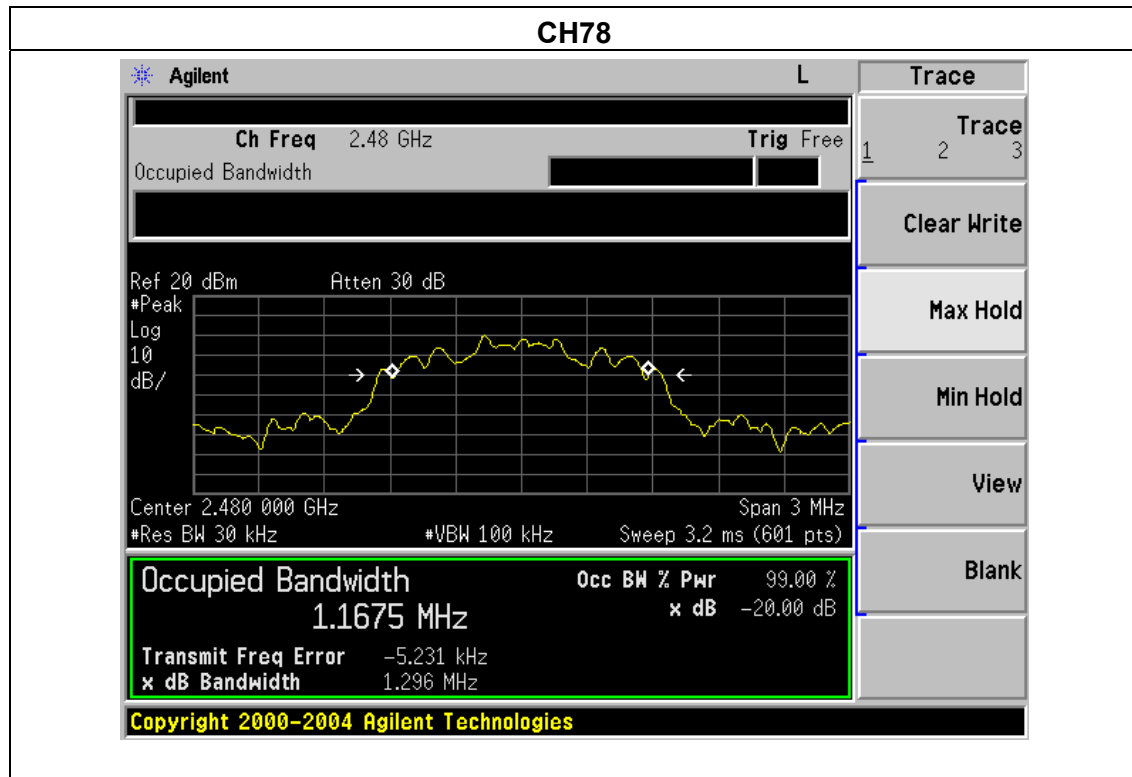
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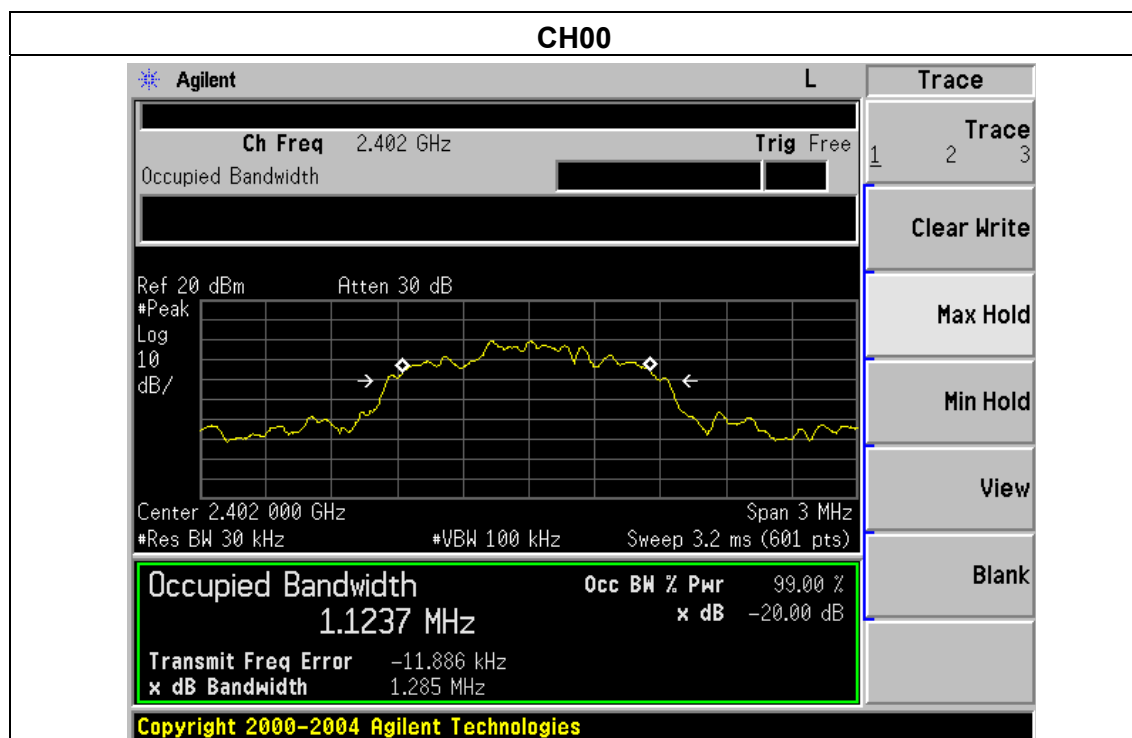


PI/4 DPSK



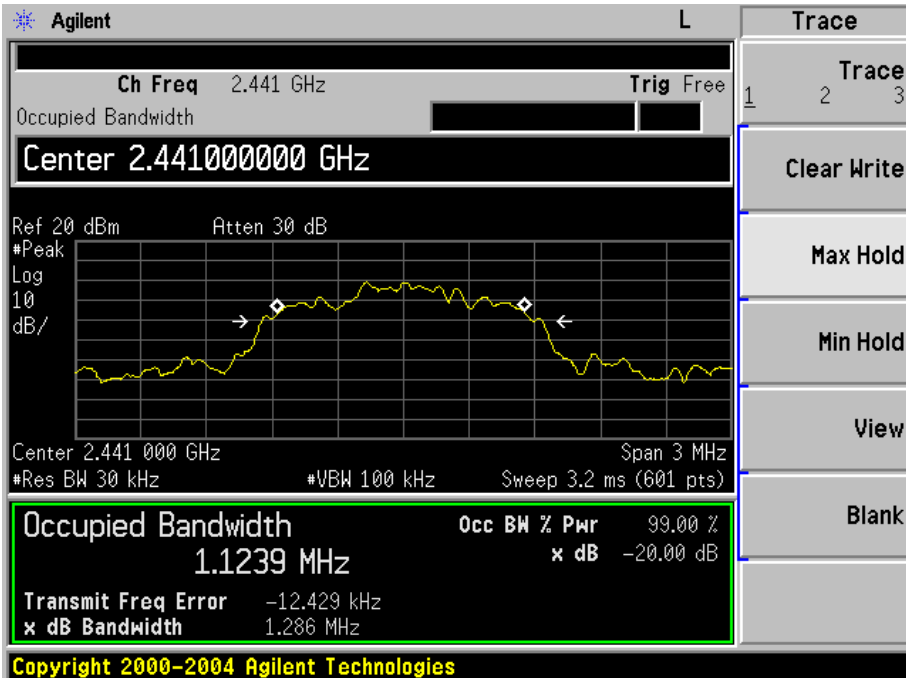


8DPSK

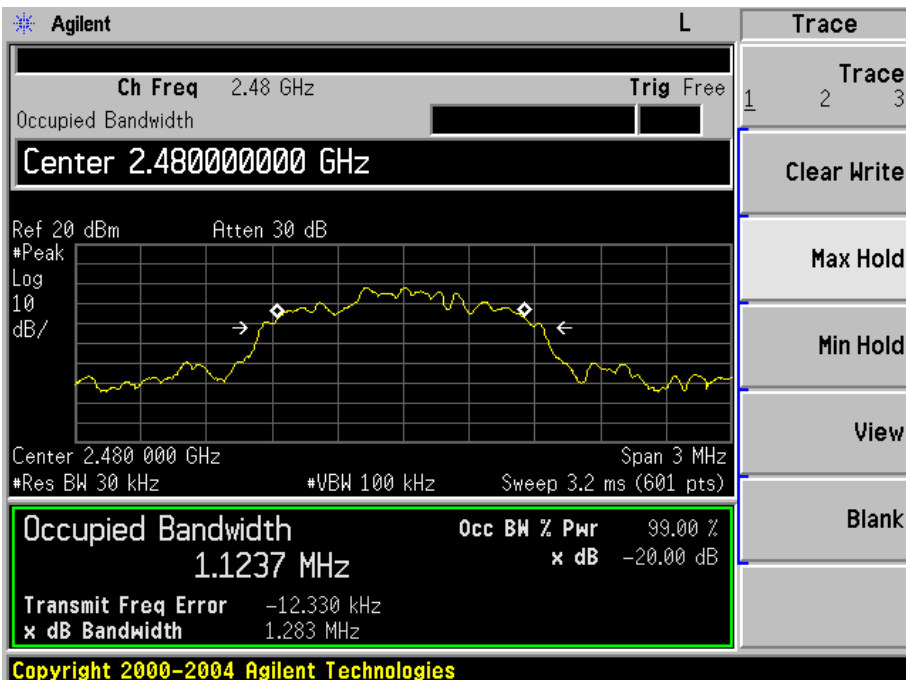




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5. BAND EDGE EMISSION

APPLICABLE STANDARD

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 §15.209, whichever is the lesser attenuation.

TEST PROCEDURE

- a. 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.
- b. The EUT was placed on the top of a rotating table 1.5 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 1.5 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. 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.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.
- f. 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.
- g Spectrum Setting : RBW= 1MHz, VBW=3MHz, Sweep time = Auto for peak
RBW= 1MHz, VBW=10Hz, Sweep time = Auto for average

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 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.



5.3 TEST RESULTS

		Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)	Band edge Limit (dBuV/m)		Result
				PK	PK	AV	
GFSK	Hopping	<2400	H	51.56	74.00	54.00	Pass
		<2400	V	51.12	74.00	54.00	Pass
		>2483.5	H	50.99	74.00	54.00	Pass
		>2483.5	V	51.56	74.00	54.00	Pass
	Unhopping	<2400	H	51.18	74.00	54.00	Pass
		<2400	V	50.92	74.00	54.00	Pass
		>2483.5	H	51.22	74.00	54.00	Pass
		>2483.5	V	51.66	74.00	54.00	Pass
GFSK	Hopping	<2400	H	51.71	74.00	54.00	Pass
		<2400	V	51.27	74.00	54.00	Pass
		>2483.5	H	51.14	74.00	54.00	Pass
		>2483.5	V	51.71	74.00	54.00	Pass
	Unhopping	<2400	H	51.33	74.00	54.00	Pass
		<2400	V	51.07	74.00	54.00	Pass
		>2483.5	H	51.37	74.00	54.00	Pass
		>2483.5	V	51.81	74.00	54.00	Pass
8DPSK	Hopping	<2400	H	51.40	74.00	54.00	Pass
		<2400	V	51.20	74.00	54.00	Pass
		>2483.5	H	51.07	74.00	54.00	Pass
		>2483.5	V	51.72	74.00	54.00	Pass
	Unhopping	<2400	H	50.96	74.00	54.00	Pass
		<2400	V	50.56	74.00	54.00	Pass
		>2483.5	H	50.46	74.00	54.00	Pass
		>2483.5	V	50.20	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 internal antenna. It complies with the standard requirement.



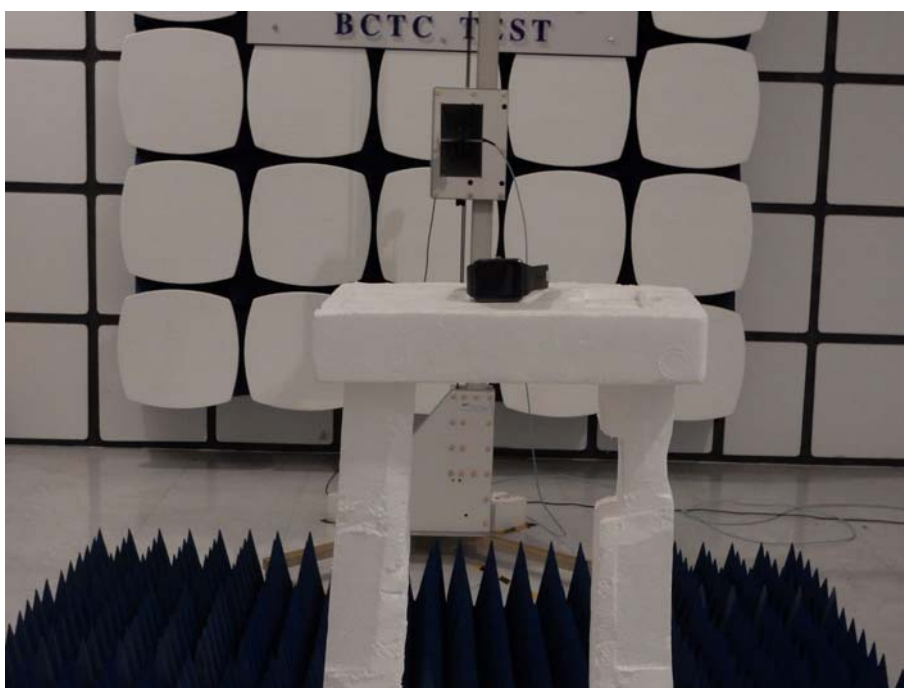
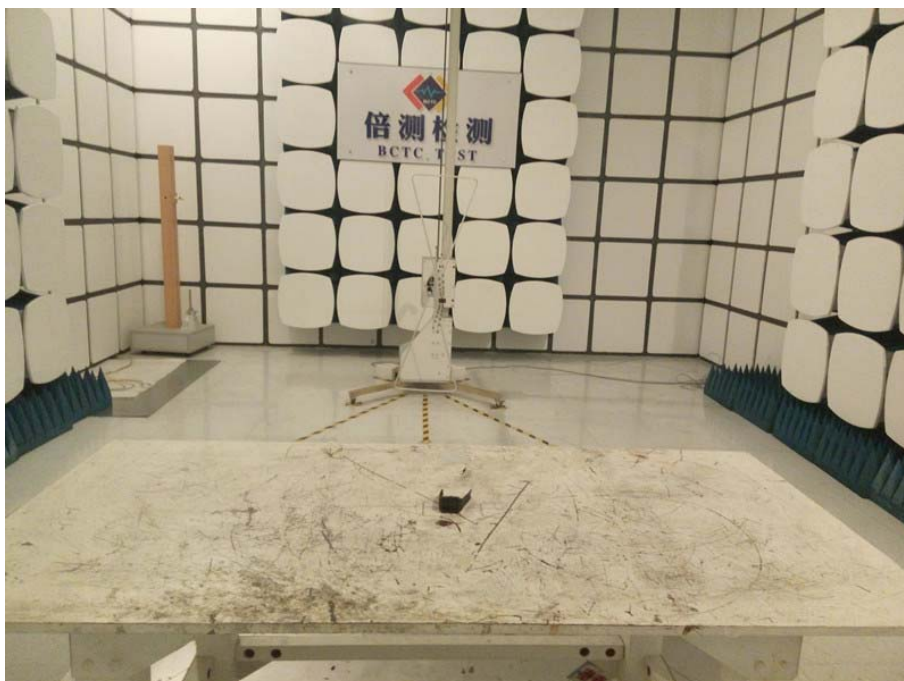
7. EUT TEST PHOTO

conducted Emission





Radiated Measurement Photos





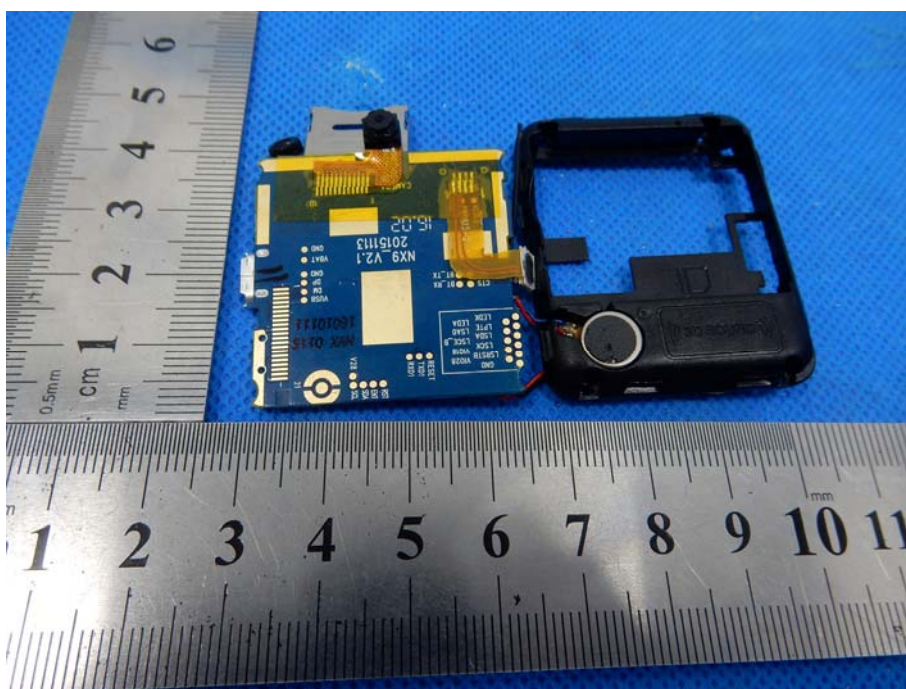
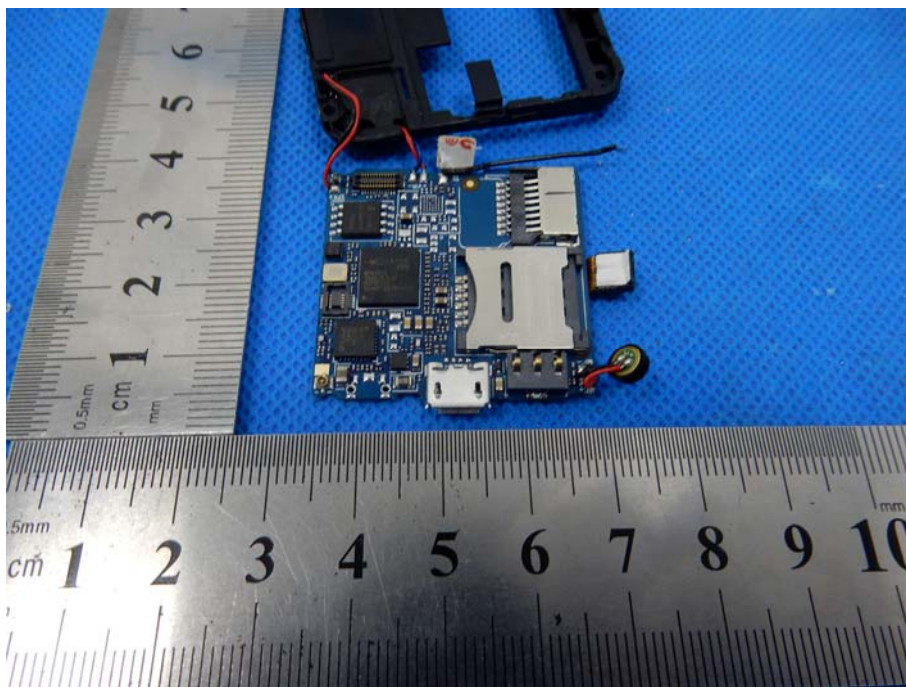
8. EUT PHOTO











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