



# FCC Part 15C Test Report

## FCC ID: GAO-STAR5

Product Name:	<b>Mobile Phone</b>
Trademark:	<b>SMOOTH</b>
Model Name :	<b>SMOOTH STAR 5</b>
Prepared For :	<b>Collage Investments LLC</b>
Address :	11437 NW 34 STREET, Doral, FL 33178, United States
Prepared By :	<b>Shenzhen BCTC Technology Co., Ltd.</b>
Address :	No.101, Yousong Road, Longhua New District, Shenzhen, China
Test Date:	<b>Apr. 4 - Apr. 14, 2016</b>
Date of Report :	<b>Apr. 15, 2016</b>
Report No.:	<b>BCTC-160303341-3E</b>



### VERIFICATION OF COMPLIANCE

**Applicant's name** ..... : **Collage Investments LLC**  
 Address ..... : 11437 NW 34 STREET, Doral, FL 33178, United States  
**Manufacture's Name**..... : **Collage Investments LLC**  
 Address ..... : 11437 NW 34 STREET, Doral, FL 33178, United States

**Product description**

Product name ..... : Mobile Phone  
 Trademark:                         SMOOTH  
 Model Name:                         SMOOTH STAR 5  
 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 Lee  
 (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

Product Name:	Mobile Phone
Model No.:	SMOOTH STAR 5
Trademark:	SMOOTH
Operation Frequency:	GSM 850MHz: Tx: 824.20 - 848.80MHz (at intervals of 200kHz); Rx: 869.20 - 893.80MHz (at intervals of 200kHz) GSM 1900MHz: Tx: 1850.20 - 1909.80MHz (at intervals of 200kHz); Rx: 1930.20 - 1989.80MHz (at intervals of 200kHz) WCDMA 850MHz Tx: 826.40 - 846.60MHz (at intervals of 200kHz); Rx: 871.40 - 891.60MHz (at intervals of 200kHz) BT:2402~2480MHz WIFI:2412~2462MHz
Modulation technology:	GSM/GPRS Mode with GMSK EGPRS Mode with 8PSK WCDMA Mode with QPSK BT:GFSK, PI/4 DPSK, 8DPSK WIFI: OFDM,DSSS
Antenna Type:	Integral Antenna
Antenna gain:	2.0dBi(GSM850/1900) 1.5dBi(BT&WIFI)
Power supply:	DC 5V from adapter Rechargeable lithium-ion battery 3.7V
GPRS Class:	12
EGPRS Class:	12
Adapter	Model: STAR 5 I/P:100-240V 50/60Hz 0.15A O/P: DC 5V/0.5A
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)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

**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



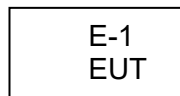
**2.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING**

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	Mobile Phone	SMOOTH	SMOOTH STAR 5	N/A	EUT
E-2	Adapter	N/A	STAR 5	N/A	

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

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	1166.5950K03-1 01165-ha	2015.06.06	2016.06.05
2	LISN	R&S	NSLK81 26	812646 6	2015.08.24	2016.08.23
3	LISN	R&S	NSLK81 26	812648 7	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	PLSMOOTH STAR 530/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

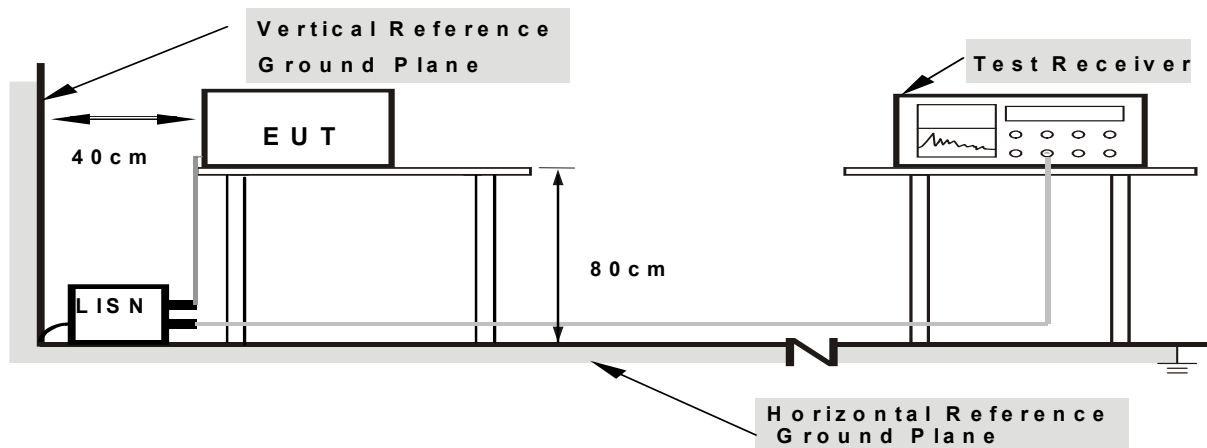
### 3.1.2 TEST PROCEDURE

- 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.



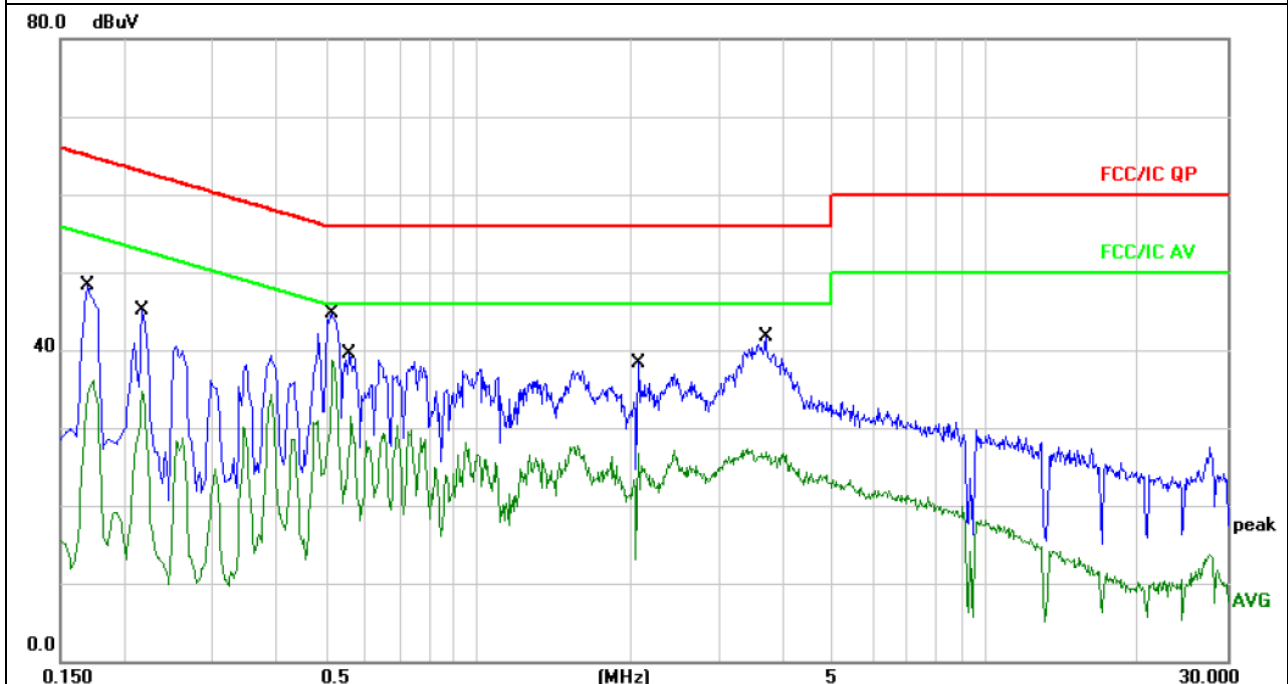
### 3.1.6 TEST RESULTS

EUT :	Mobile Phone	Model Name :	SMOOTH STAR 5
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. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV	Limit dBuV	Over dB	Detector	Comment
1	0.1700	38.21	10.06	48.27	64.96	-16.69	QP	
2	0.1700	25.95	10.06	36.01	54.96	-18.95	AVG	
3	0.2180	35.05	10.07	45.12	62.89	-17.77	QP	
4	0.2180	24.69	10.07	34.76	52.89	-18.13	AVG	
5	0.5140	34.65	10.12	44.77	56.00	-11.23	QP	
6 *	0.5140	28.51	10.12	38.63	46.00	-7.37	AVG	
7	0.5580	29.38	10.12	39.50	56.00	-16.50	QP	
8	0.5580	19.87	10.12	29.99	46.00	-16.01	AVG	
9	2.0700	28.11	10.18	38.29	56.00	-17.71	QP	
10	2.0700	16.54	10.18	26.72	46.00	-19.28	AVG	
11	3.6980	31.44	10.17	41.61	56.00	-14.39	QP	
12	3.6980	16.78	10.17	26.95	46.00	-19.05	AVG	

**Remark:**

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



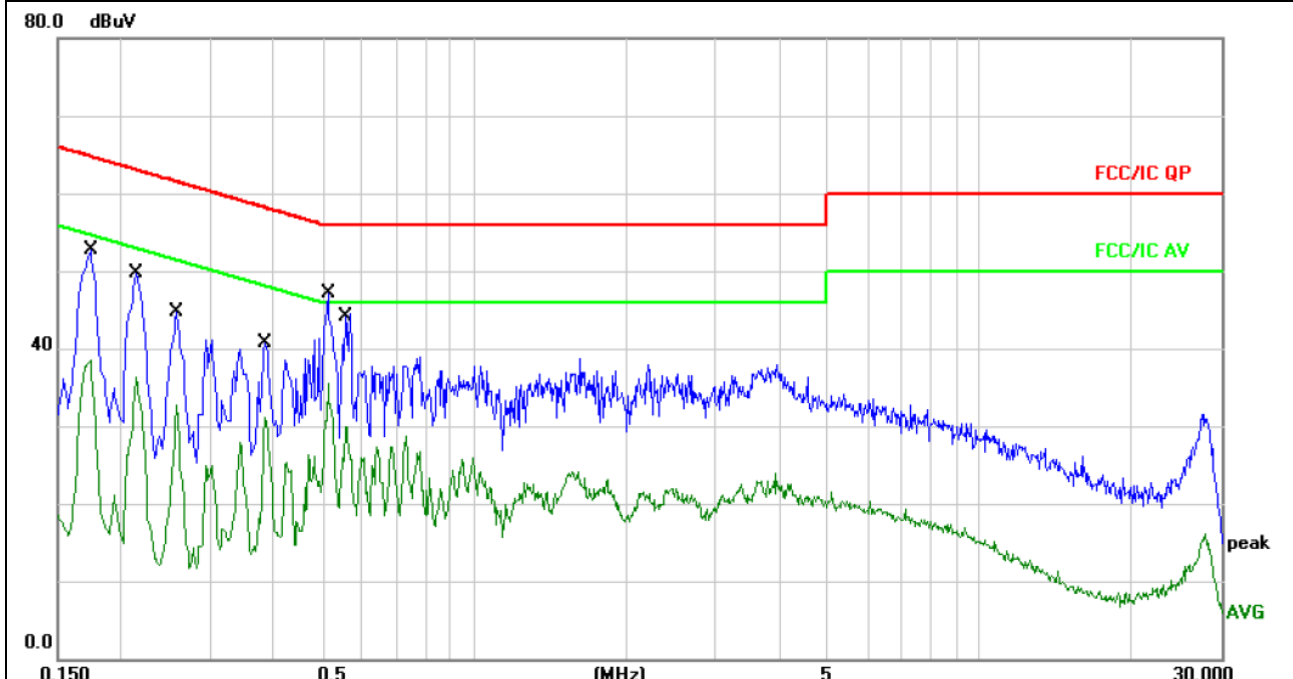


EUT :	Mobile Phone	Model Name :	SMOOTH STAR 5
Temperature :	25 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5V from PC	Test Mode :	Mode 4(Worst Mode)

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1740	42.58	10.06	52.64	64.76	-12.12	QP	
2		0.1740	28.46	10.06	38.52	54.76	-16.24	AVG	
3		0.2140	39.73	10.07	49.80	63.04	-13.24	QP	
4		0.2140	26.29	10.07	36.36	53.04	-16.68	AVG	
5		0.2580	34.61	10.08	44.69	61.49	-16.80	QP	
6		0.2580	22.69	10.08	32.77	51.49	-18.72	AVG	
7		0.3860	30.62	10.10	40.72	58.15	-17.43	QP	
8		0.3860	21.07	10.10	31.17	48.15	-16.98	AVG	
9	*	0.5140	36.95	10.12	47.07	56.00	-8.93	QP	
10		0.5140	25.47	10.12	35.59	46.00	-10.41	AVG	
11		0.5580	34.43	10.12	44.55	56.00	-11.45	QP	
12		0.5580	19.82	10.12	29.94	46.00	-16.06	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 <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

- 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. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.
- g. 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:

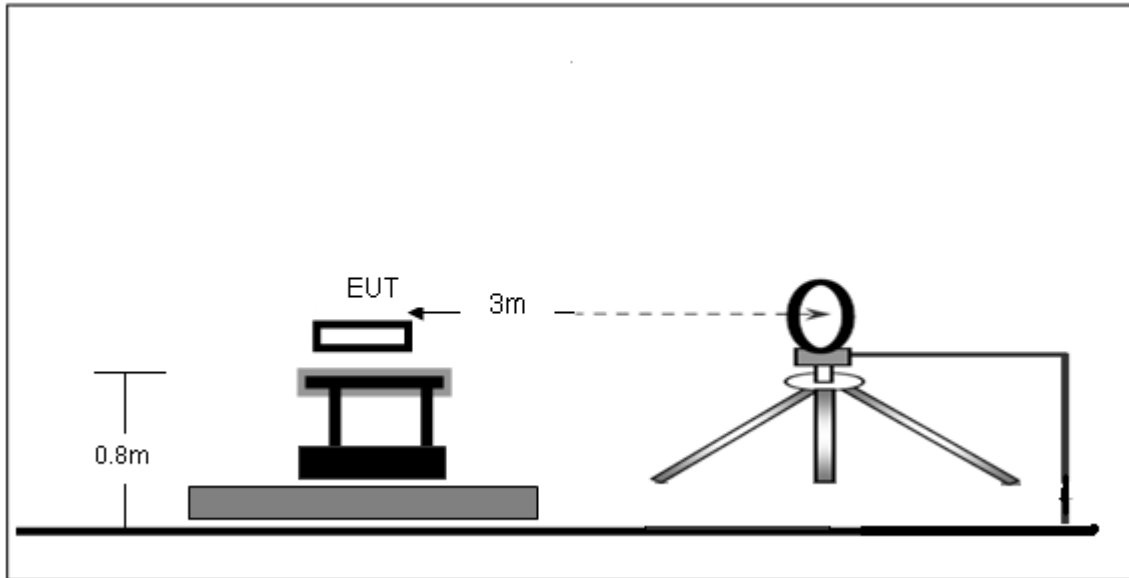
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

### 3.2.3 DEVIATION FROM TEST STANDARD

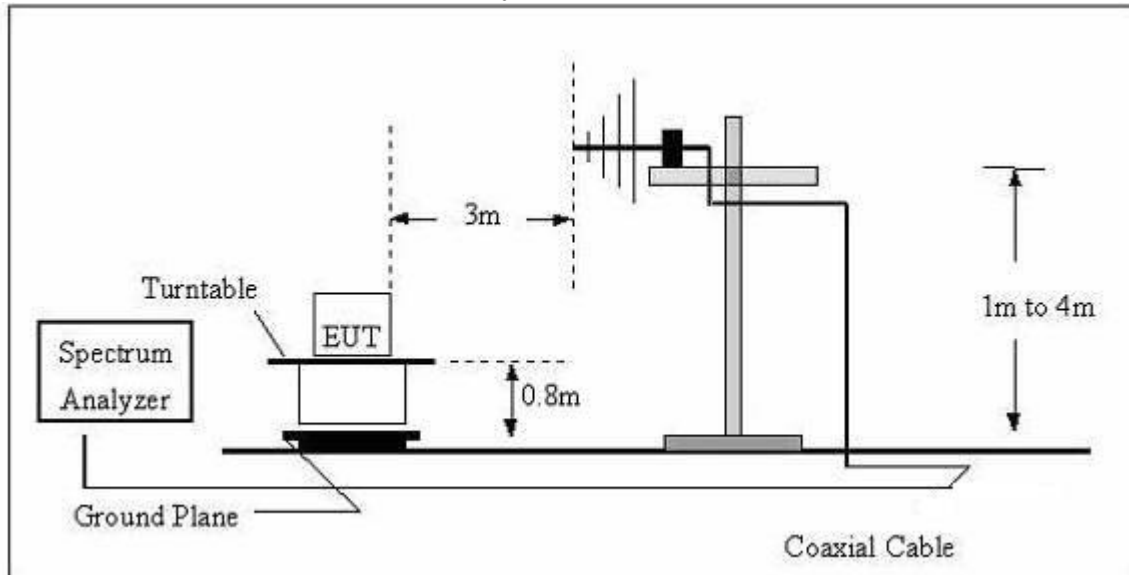
No deviation

### 3.2.4 TEST SETUP

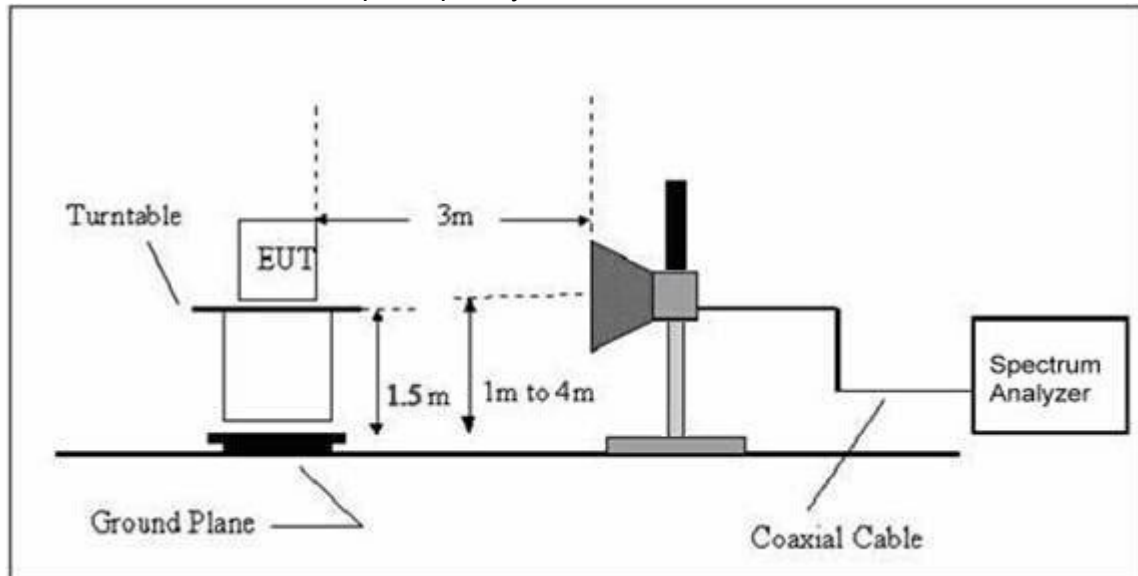
(A) Radiated Emission Test-Up Frequency Below 30MHz



(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 :	Mobile Phone	Model Name :	SMOOTH STAR 5
Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1010 hPa	Polarization :	---
Test Voltage :	DC 3.7V		
Test Mode :	TX		

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



Radiated Spurious Emission (Between 30MHz – 1GHz)

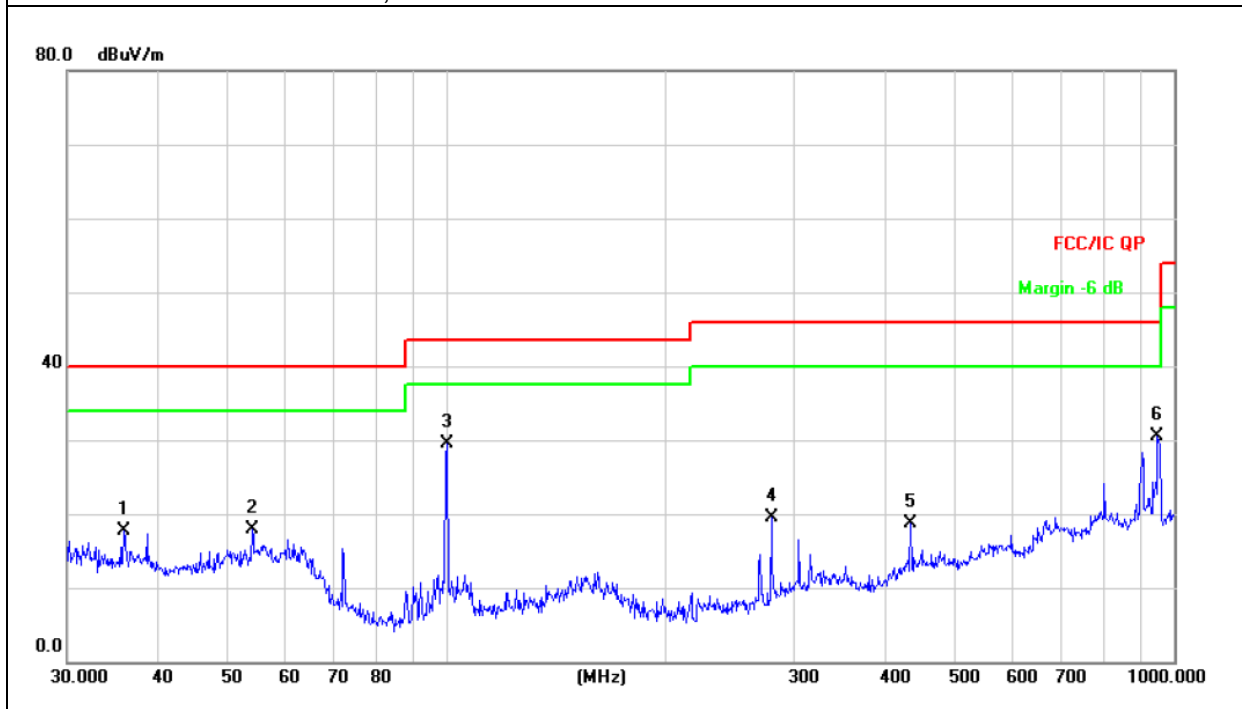
EUT :	Mobile Phone	Model Name :	SMOOTH STAR 5
Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 5V from dadapter		
Test Mode : (Worst)	Link mode		

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		35.8746	26.25	-8.58	17.67	40.00	-22.33	QP			
2		53.8818	28.88	-10.93	17.95	40.00	-22.05	QP			
3	*	99.8777	45.99	-16.49	29.50	43.50	-14.00	QP			
4		279.0436	32.64	-13.13	19.51	46.00	-26.49	QP			
5		434.0651	28.05	-9.36	18.69	46.00	-27.31	QP			
6		948.7610	30.91	-0.48	30.43	46.00	-15.57	QP			

Remark:

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

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

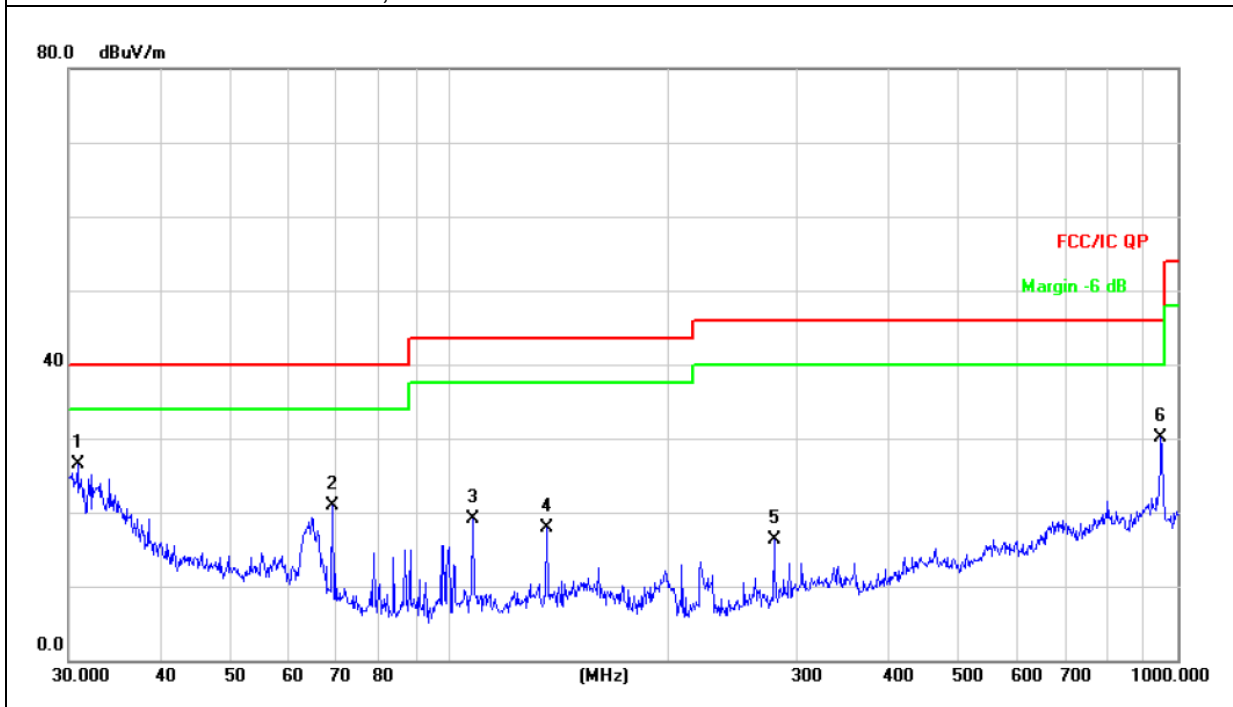




EUT :	Mobile Phone	Model Name :	SMOOTH STAR 5
Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 5V from adapter		
Test Mode : (Worst)	Link mode		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	30.8535	34.70	-8.14	26.56	40.00	-13.44	QP		
2		69.1141	35.15	-14.18	20.97	40.00	-19.03	QP		
3		107.5101	35.03	-15.87	19.16	43.50	-24.34	QP		
4		135.9822	31.49	-13.68	17.81	43.50	-25.69	QP		
5		279.0436	29.40	-13.13	16.27	46.00	-29.73	QP		
6		948.7610	30.60	-0.48	30.12	46.00	-15.88	QP		

Remark:  
 Factor = Antenna Factor + Cable Loss – Pre-amplifier.  
 All interfaces was connected, and BT TX mode was link.





Above 1GHz  
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	2402.00	102.98	PK	H	1.31	104.29	114	Pass
	2402.00	88.54	Ave	H	1.31	89.85	94	Pass
	4804.00	55.71	PK	H	-1.06	54.65	74	Pass
	4804.00	45.72	Ave	H	-1.06	44.66	54	Pass
	10635.00	50.36	PK	H	-4.62	45.74	74	Pass
	16864.00	49.68	PK	H	-5.64	44.04	74	Pass
	2402.00	102.69	PK	V	1.31	104.00	114	Pass
	2402.00	89.03	Ave	V	1.31	90.34	94	Pass
	4804.00	54.84	PK	V	-1.06	53.78	74	Pass
	4804.00	45.52	Ave	V	-1.06	44.46	54	Pass
	10436.29	51.26	PK	V	-4.58	46.68	74	Pass
	16786.95	50.33	PK	V	-5.59	44.74	74	Pass
	Middle Channel 2441MHz	2441	102.89	PK	H	0.85	103.74	114
2441		88.99	Ave	H	0.85	89.84	94	Pass
4882		57.54	PK	H	-0.62	56.92	74	Pass
4882		48.60	Ave	H	-0.62	47.98	54	Pass
10635.00		50.43	PK	H	-4.62	45.81	74	Pass
16864.00		49.28	PK	H	-5.64	43.64	74	Pass
2441		102.75	PK	V	0.85	103.60	114	Pass
2441		88.60	Ave	V	0.85	89.45	94	Pass
4882		57.61	PK	V	-0.62	56.99	74	Pass
4882		49.00	Ave	V	-0.62	48.38	54	Pass
10436.29		51.37	PK	V	-4.58	46.79	74	Pass
16786.95		50.73	PK	V	-5.59	45.14	74	Pass
Upper Channel 2480MHz	2480	103.94	PK	H	0.53	104.47	114	Pass
	2480	88.16	Ave	H	0.53	88.69	94	Pass
	4960	57.70	PK	H	-0.24	57.46	74	Pass
	4960	48.78	Ave	H	-0.24	48.54	54	Pass
	10635.00	50.29	PK	H	-4.62	45.67	74	Pass
	16864.00	49.38	PK	H	-5.64	43.74	74	Pass
	2480	103.56	PK	V	0.53	104.09	114	Pass
	2480	88.53	Ave	V	0.53	89.06	94	Pass
	4960	57.46	PK	V	-0.24	57.22	74	Pass
	4960	47.48	Ave	V	-0.24	47.24	54	Pass
	10436.29	51.41	PK	V	-4.58	46.83	74	Pass
	16786.95	50.33	PK	V	-5.59	44.74	74	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)	
<b>Lower Channel 2402MHz</b>	2402.00	103.23	PK	H	1.31	104.54	114	Pass
	2402.00	88.75	Ave	H	1.31	90.06	94	Pass
	4804.00	55.84	PK	H	-1.06	54.78	74	Pass
	4804.00	45.83	Ave	H	-1.06	44.77	54	Pass
	10635.00	50.61	PK	H	-4.62	45.99	74	Pass
	16864.00	49.91	PK	H	-5.64	44.27	74	Pass
	2402.00	102.93	PK	V	1.31	104.24	114	Pass
	2402.00	89.25	Ave	V	1.31	90.56	94	Pass
	4804.00	54.98	PK	V	-1.06	53.92	74	Pass
	4804.00	45.63	Ave	V	-1.06	44.57	54	Pass
	10436.29	51.05	PK	V	-4.58	46.47	74	Pass
	16786.95	49.86	PK	V	-5.59	44.27	74	Pass
<b>Middle Channel 2441MHz</b>	2441	103.13	PK	H	0.85	103.98	114	Pass
	2441	89.21	Ave	H	0.85	90.06	94	Pass
	4882	57.68	PK	H	-0.62	57.06	74	Pass
	4882	48.72	Ave	H	-0.62	48.10	54	Pass
	10635.00	50.09	PK	H	-4.62	45.47	74	Pass
	16864.00	49.42	PK	H	-5.64	43.78	74	Pass
	2441	102.99	PK	V	0.85	103.84	114	Pass
	2441	88.81	Ave	V	0.85	89.66	94	Pass
	4882	57.75	PK	V	-0.62	57.13	74	Pass
	4882	49.12	Ave	V	-0.62	48.50	54	Pass
	10436.29	51.12	PK	V	-4.58	46.54	74	Pass
	16786.95	50.74	PK	V	-5.59	45.15	74	Pass
<b>Upper Channel 2480MHz</b>	2480	104.19	PK	H	0.53	104.72	114	Pass
	2480	88.37	Ave	H	0.53	88.90	94	Pass
	4960	57.84	PK	H	-0.24	57.60	74	Pass
	4960	48.90	Ave	H	-0.24	48.66	54	Pass
	10635.00	50.28	PK	H	-4.62	45.66	74	Pass
	16864.00	49.43	PK	H	-5.64	43.79	74	Pass
	2480	103.82	PK	V	0.53	104.35	114	Pass
	2480	88.74	Ave	V	0.53	89.27	94	Pass
	4960	57.60	PK	V	-0.24	57.36	74	Pass
	4960	47.59	Ave	V	-0.24	47.35	54	Pass
	10436.29	51.22	PK	V	-4.58	46.64	74	Pass
	16786.95	50.41	PK	V	-5.59	44.82	74	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)		
<b>Lower Channel 2402MHz</b>	2402.00	104.11	PK	H	1.31	105.42	114	Pass	
	2402.00	89.28	Ave	H	1.31	90.59	94	Pass	
	4804.00	57.11	PK	H	-1.06	56.05	74	Pass	
	4804.00	49.19	Ave	H	-1.06	48.13	54	Pass	
	10635.00	50.51	PK	H	-4.62	45.89	74	Pass	
	16864.00	49.44	PK	H	-5.64	43.80	74	Pass	
	2402.00	104.27	PK	V	1.31	105.58	114	Pass	
	2402.00	89.62	Ave	V	1.31	90.93	94	Pass	
	4804.00	57.59	PK	V	-1.06	56.53	74	Pass	
	4804.00	48.70	Ave	V	-1.06	47.64	54	Pass	
	10436.29	51.51	PK	V	-4.58	46.93	74	Pass	
	16786.95	50.62	PK	V	-5.59	45.03	74	Pass	
	<b>Middle Channel 2441MHz</b>	2441.00	103.73	PK	H	0.85	104.58	114	Pass
		2441.00	89.15	Ave	H	0.85	90.00	94	Pass
4882.00		57.76	PK	H	-0.62	57.14	74	Pass	
4882.00		48.78	Ave	H	-0.62	48.16	54	Pass	
10635.00		50.66	PK	H	-4.62	46.04	74	Pass	
16864.00		49.79	PK	H	-5.64	44.15	74	Pass	
2441.00		104.18	PK	V	0.85	105.03	114	Pass	
2441.00		88.08	Ave	V	0.85	88.93	94	Pass	
4882.00		57.39	PK	V	-0.62	56.77	74	Pass	
4882.00		48.49	Ave	V	-0.62	47.87	54	Pass	
10436.29		51.51	PK	V	-4.58	46.93	74	Pass	
16786.95		50.76	PK	V	-5.59	45.17	74	Pass	
<b>Upper Channel 2480MHz</b>	2480.00	103.39	PK	H	0.53	103.92	114	Pass	
	2480.00	89.59	Ave	H	0.53	90.12	94	Pass	
	4960.00	57.76	PK	H	-0.24	57.52	74	Pass	
	4960.00	48.59	Ave	H	-0.24	48.35	54	Pass	
	10635.00	50.53	PK	H	-4.62	45.91	74	Pass	
	16864.00	49.76	PK	H	-5.64	44.12	74	Pass	
	2480.00	103.67	PK	V	0.53	104.20	114	Pass	
	2480.00	89.45	Ave	V	0.53	89.98	94	Pass	
	4960.00	58.26	PK	V	-0.24	58.02	74	Pass	
	4960.00	49.00	Ave	V	-0.24	48.76	54	Pass	
	10436.29	51.51	PK	V	-4.58	46.93	74	Pass	
	16786.95	50.62	PK	V	-5.59	45.03	74	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

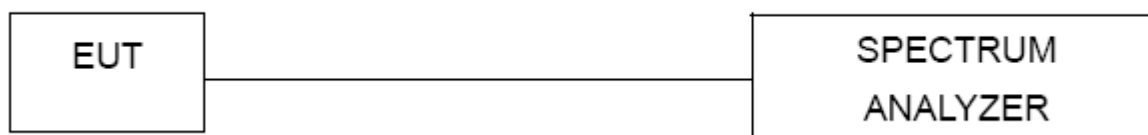
#### 4.1.1 TEST PROCEDURE

- 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.

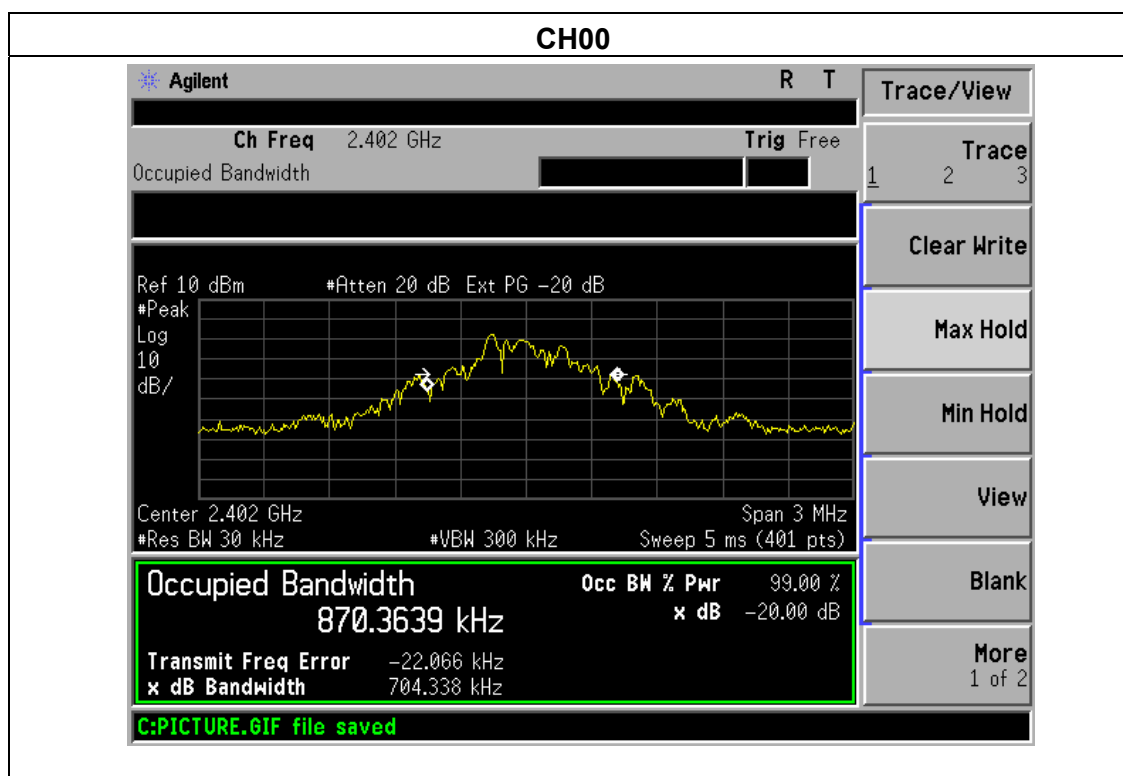


### 4.1.5 TEST RESULTS

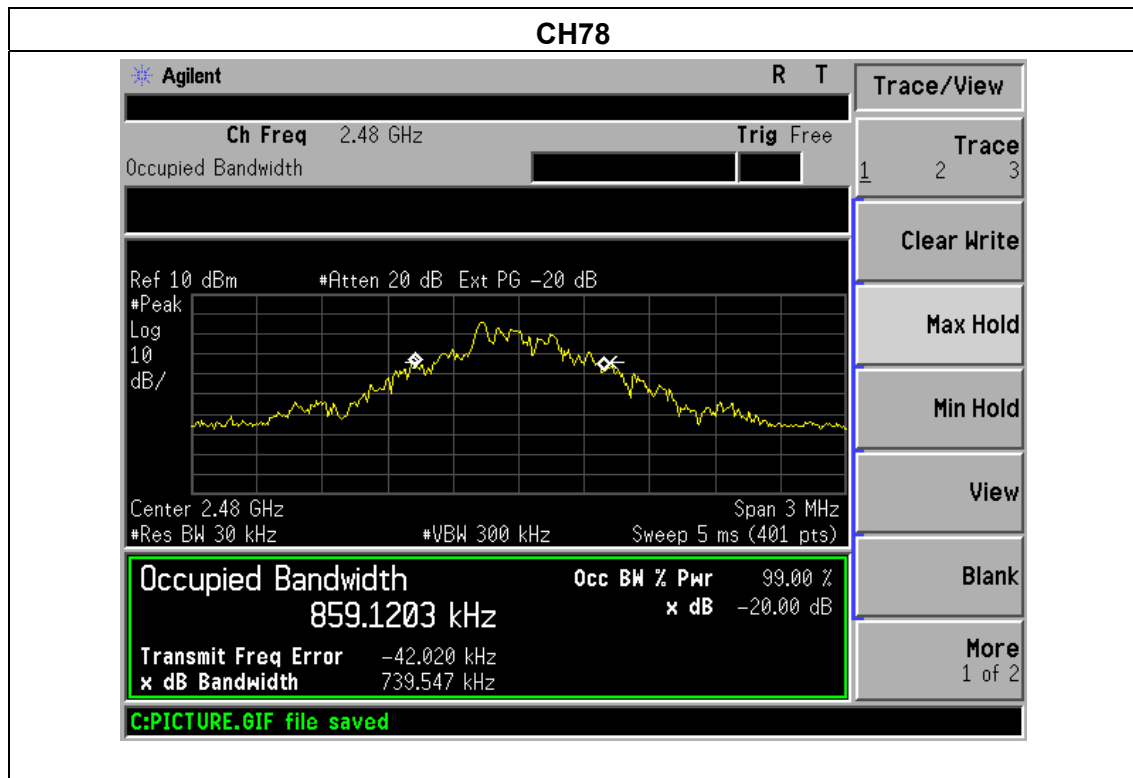
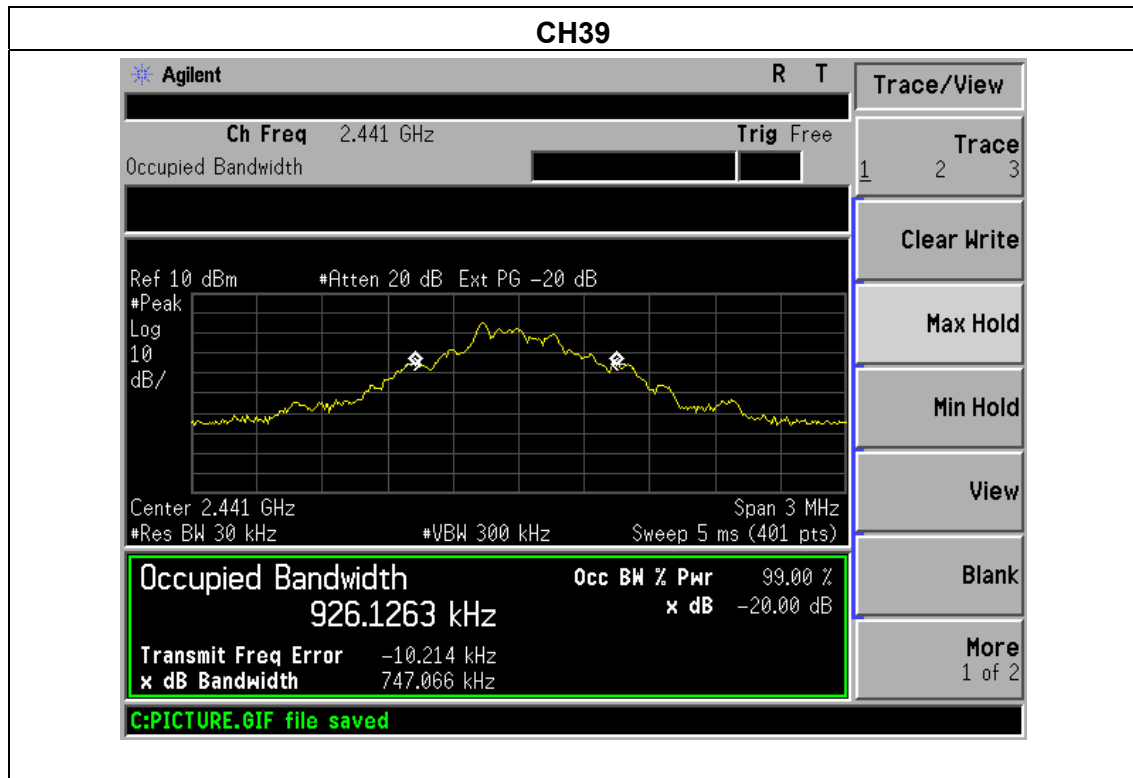
EUT :	Mobile Phone	Model Name :	SMOOTH STAR 5
Temperature :	25 °C	Relative Humidity :	55%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00/CH39/C78		

	Frequency	20dB Bandwidth (kHz)	Result
GFSK	2402 MHz	704.338	PASS
	2441 MHz	747.066	PASS
	2480 MHz	739.547	PASS
PI/4 DPSK	2402 MHz	1132	PASS
	2441 MHz	1141	PASS
	2480 MHz	1141	PASS
8DPSK	2402 MHz	1137	PASS
	2441 MHz	1138	PASS
	2480 MHz	1139	PASS

### GFSK

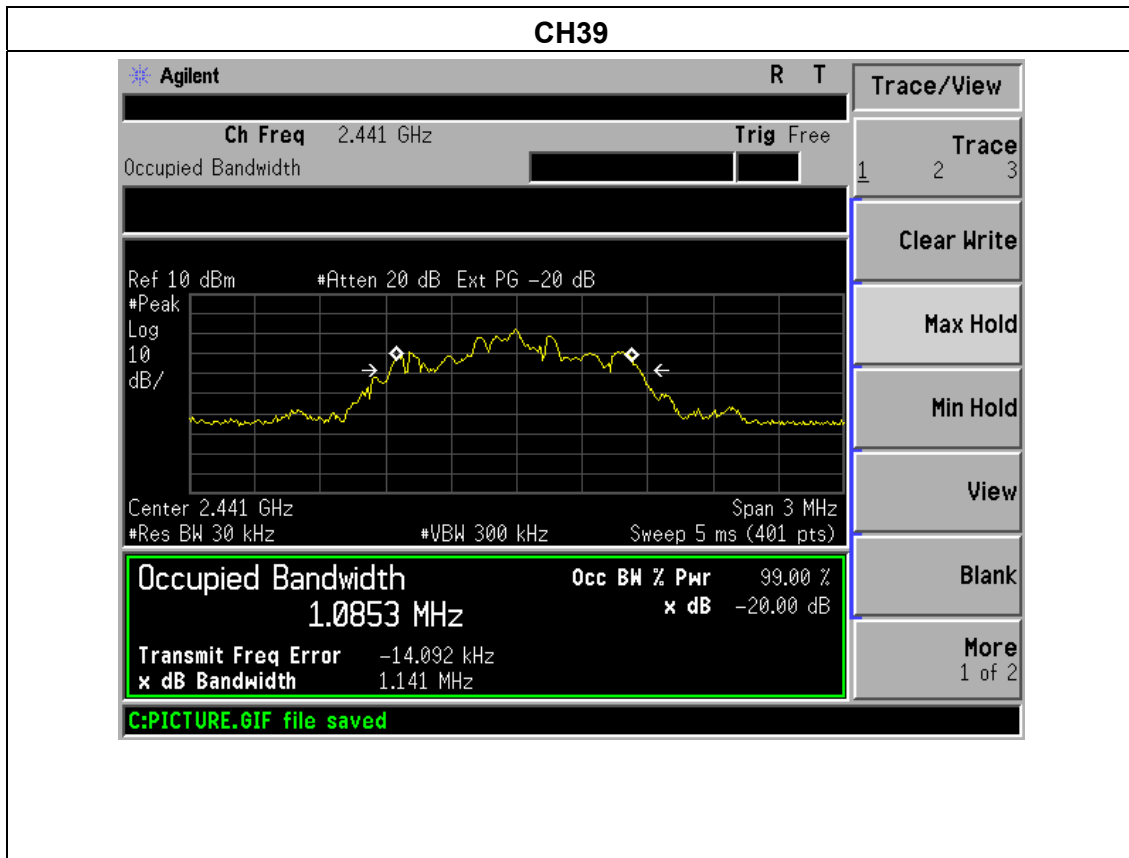
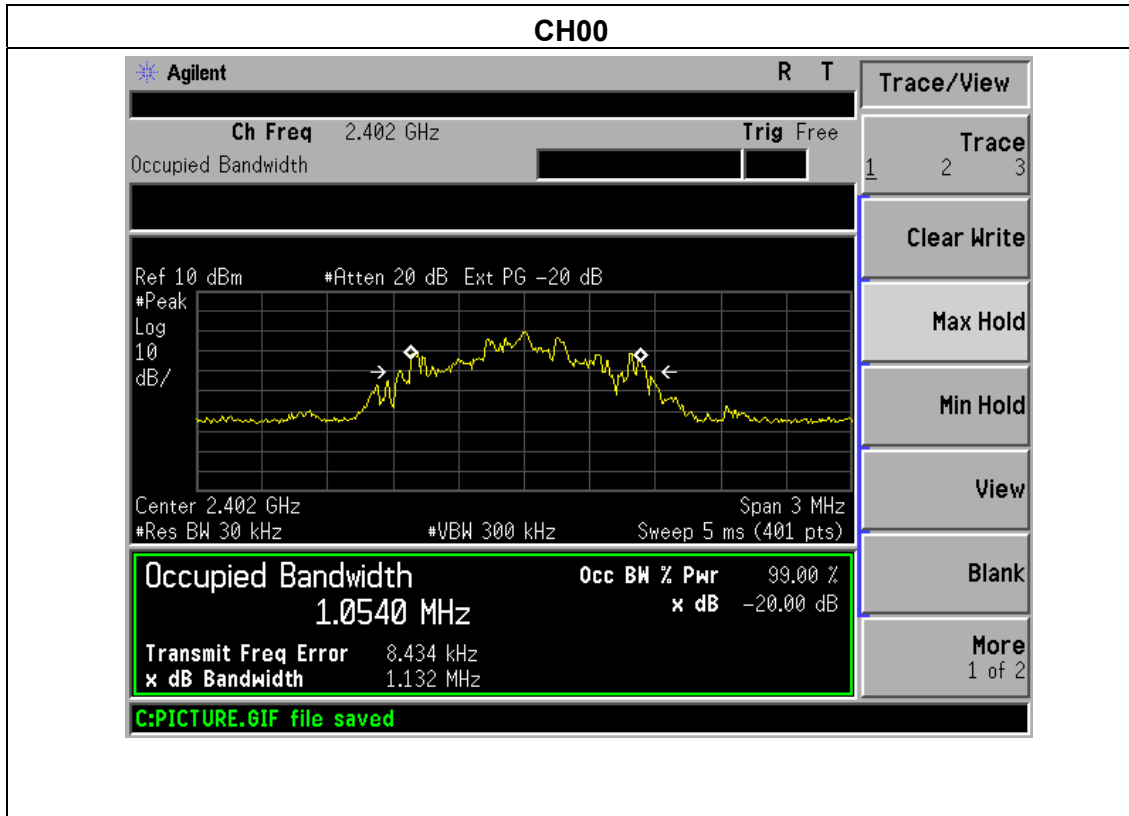


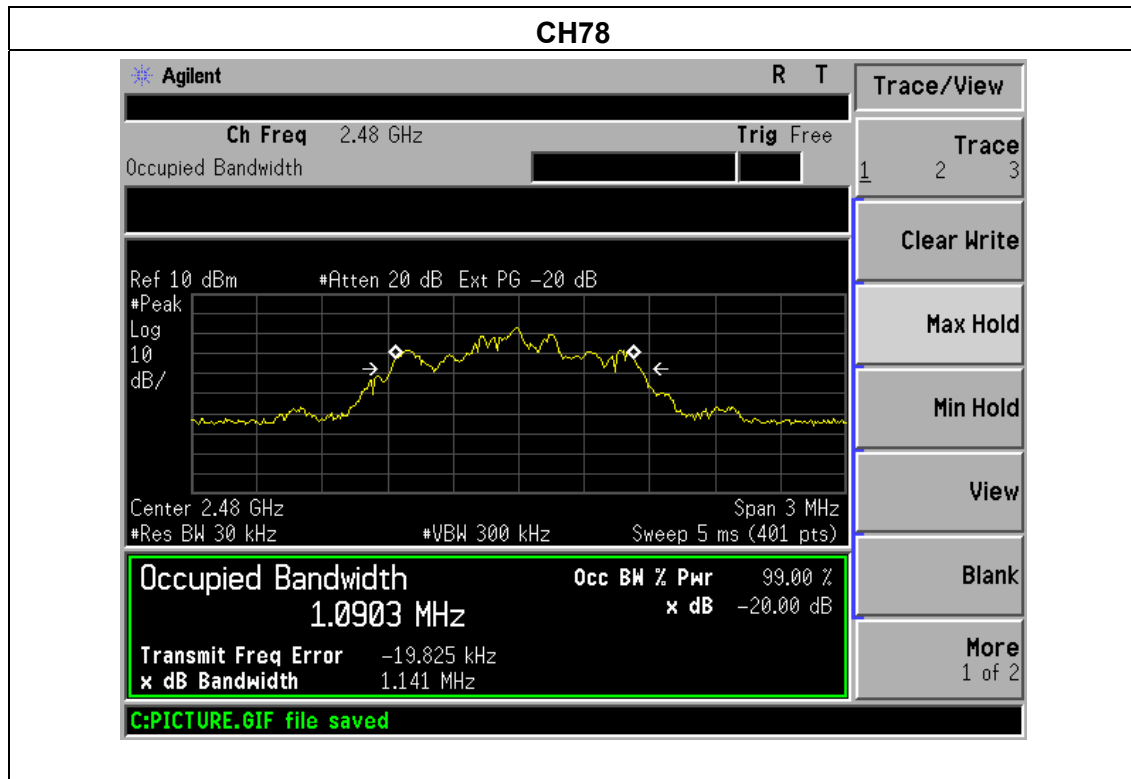




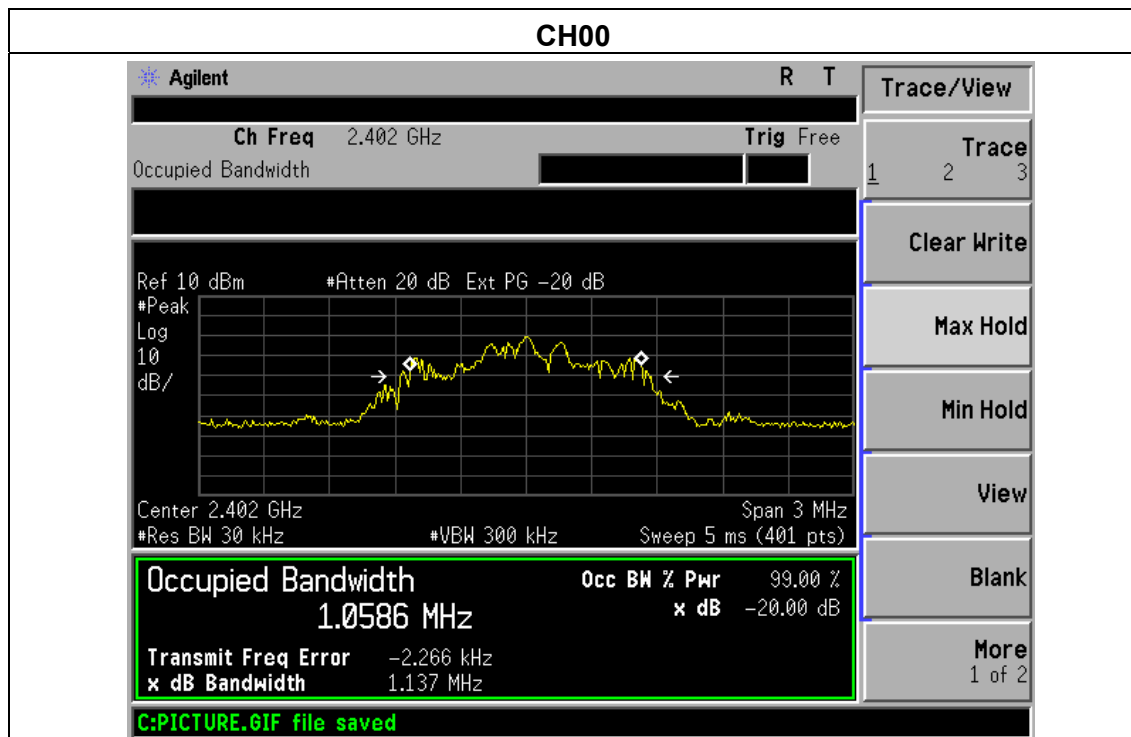


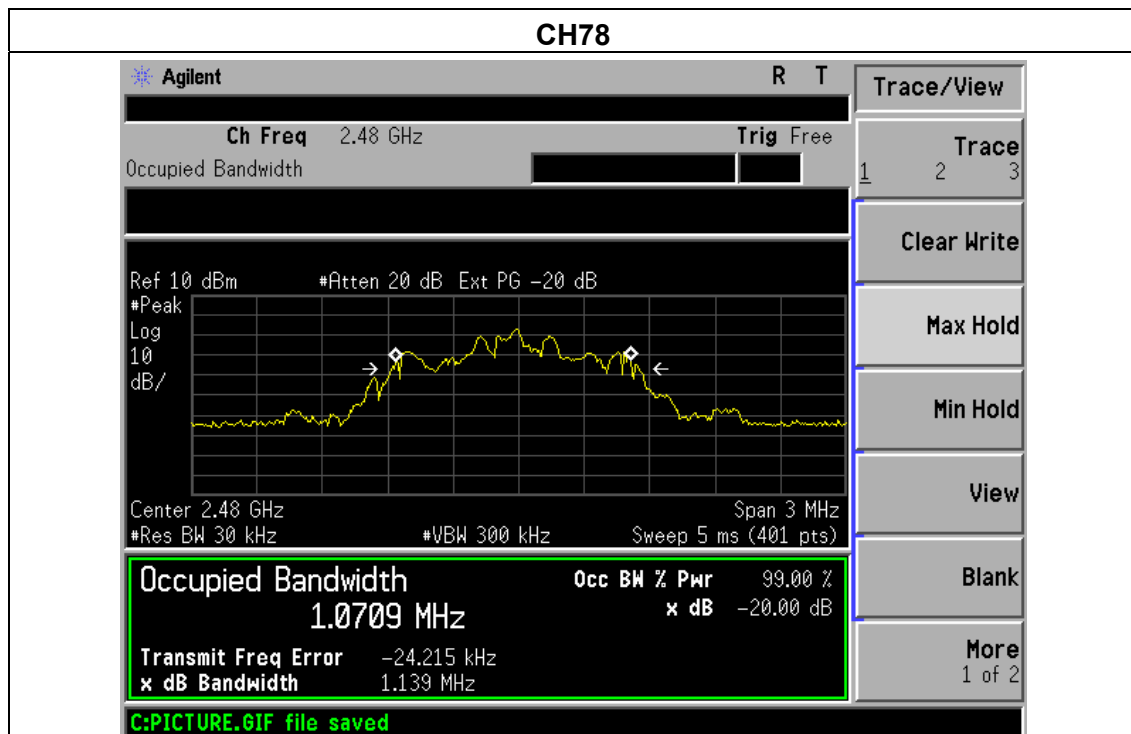
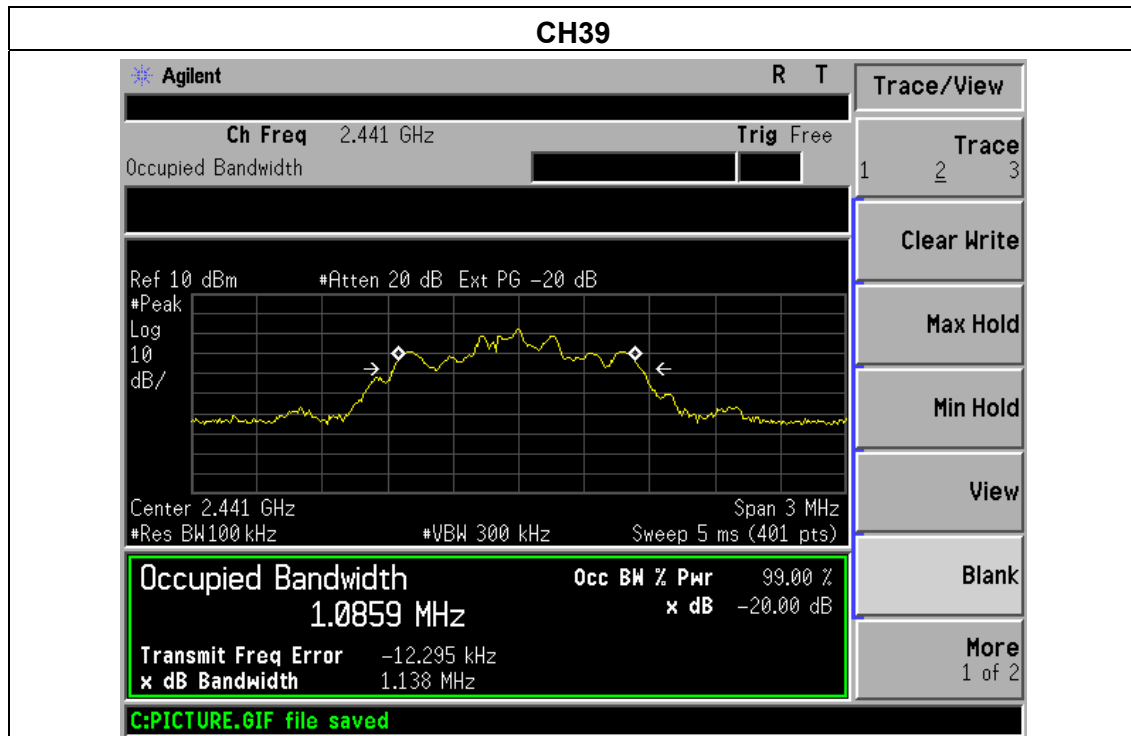
PI/4 DPSK





8DPSK







## 5. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE 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

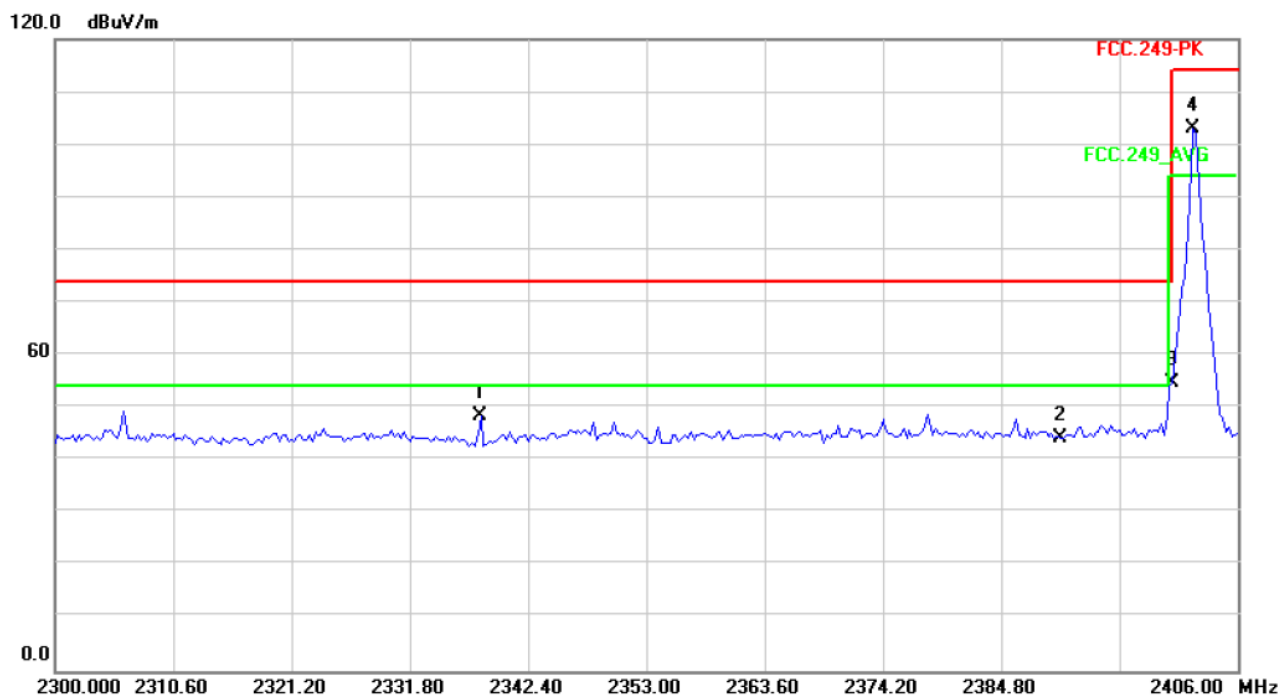
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

### 5.3 TEST RESULTS

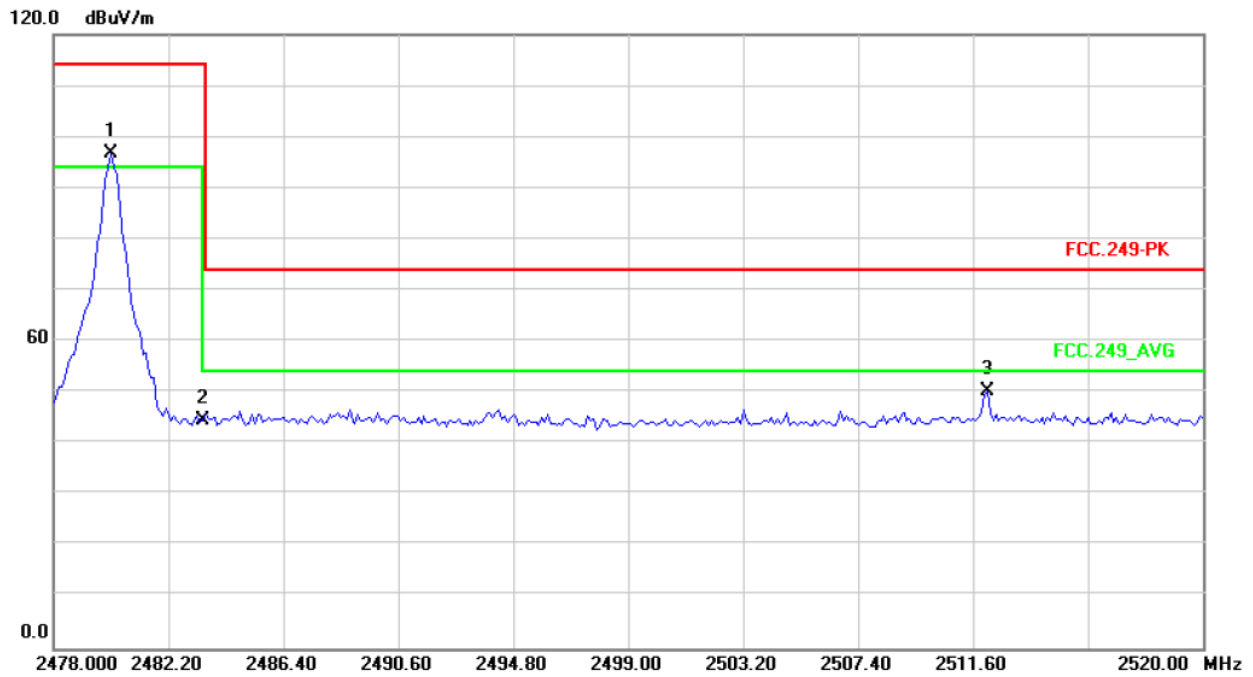
Note: we pretest all mode, the worst mode was vertical.



GFSK Unhopping



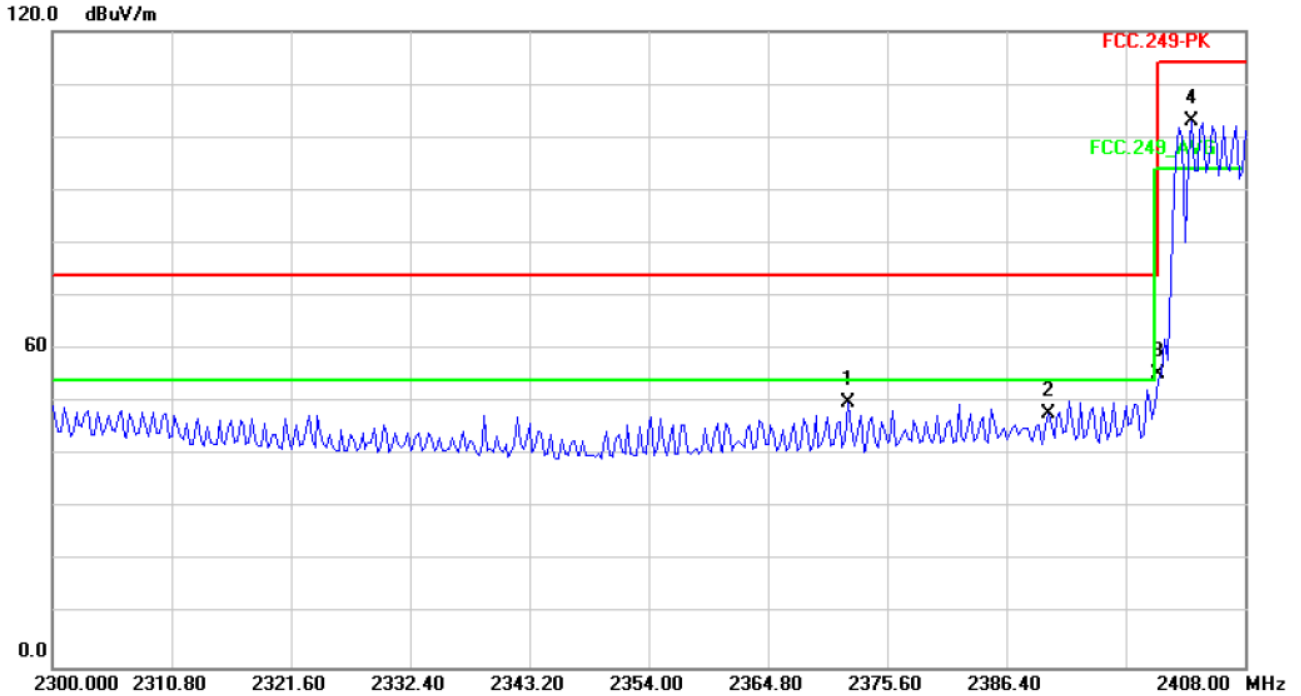
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		2338.160	34.71	13.73	48.44	74.00	-25.56	peak			
2		2390.100	30.41	13.83	44.24	74.00	-29.76	peak			
3		2400.170	40.84	13.85	54.69	114.00	-59.31	peak			
4	*	2402.025	89.10	13.85	102.95	114.00	-11.05	peak			



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2480.100	82.59	14.02	96.61	114.00	-17.39			peak
2		2483.460	30.48	14.02	44.50	114.00	-69.50			peak
3		2512.125	36.27	14.08	50.35	74.00	-23.65			peak

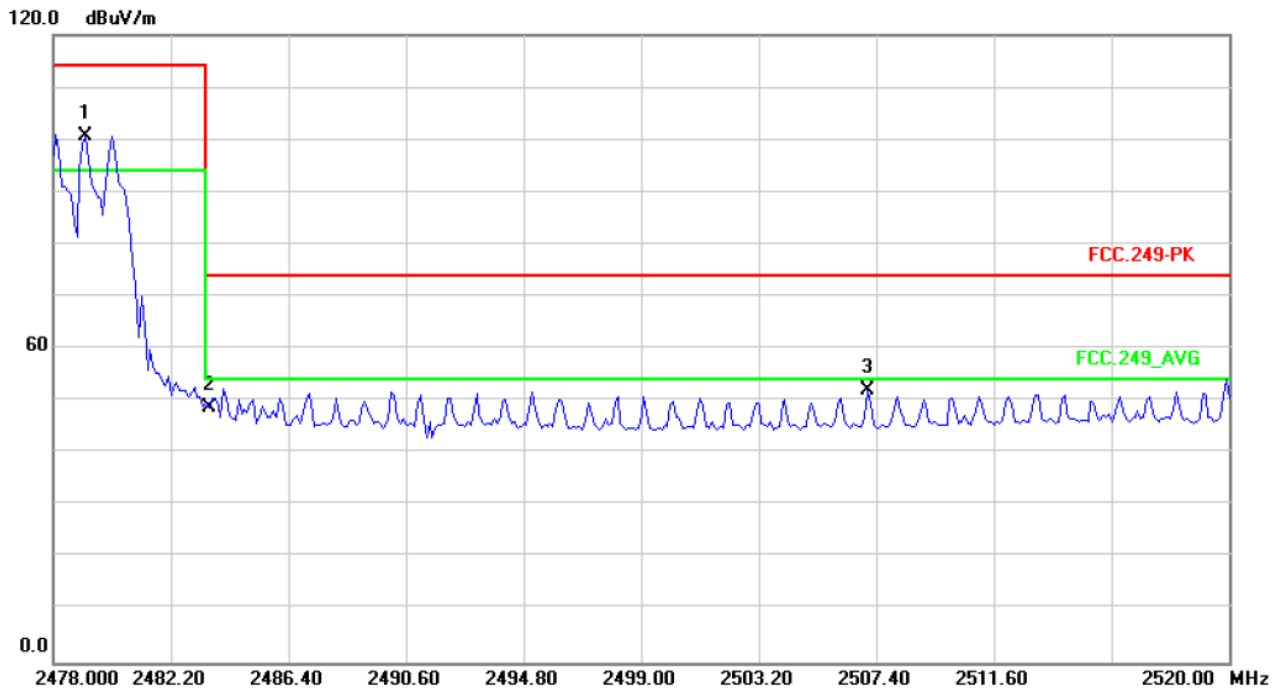


Hopping



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		2372.090	36.26	13.79	50.05	74.00	-23.95			peak
2		2390.180	33.91	13.83	47.74	74.00	-26.26			peak
3		2400.170	41.36	13.85	55.21	114.00	-58.79			peak
4	*	2403.140	89.28	13.87	103.15	114.00	-10.85			peak

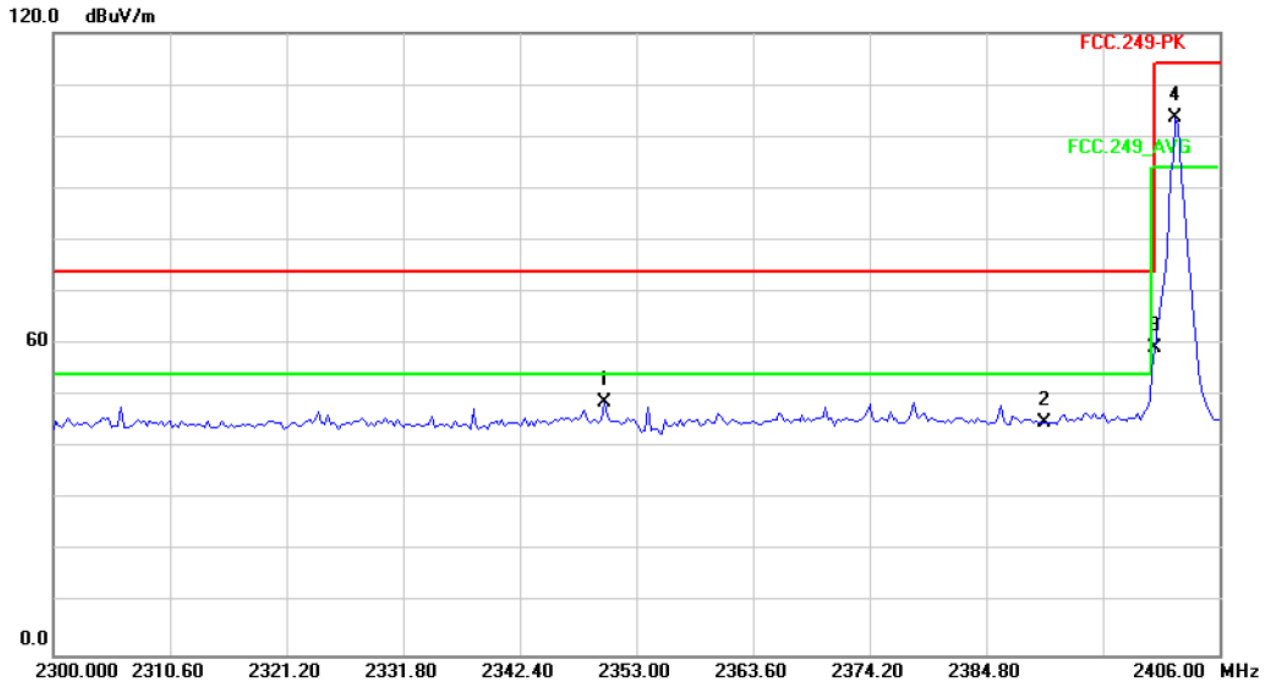




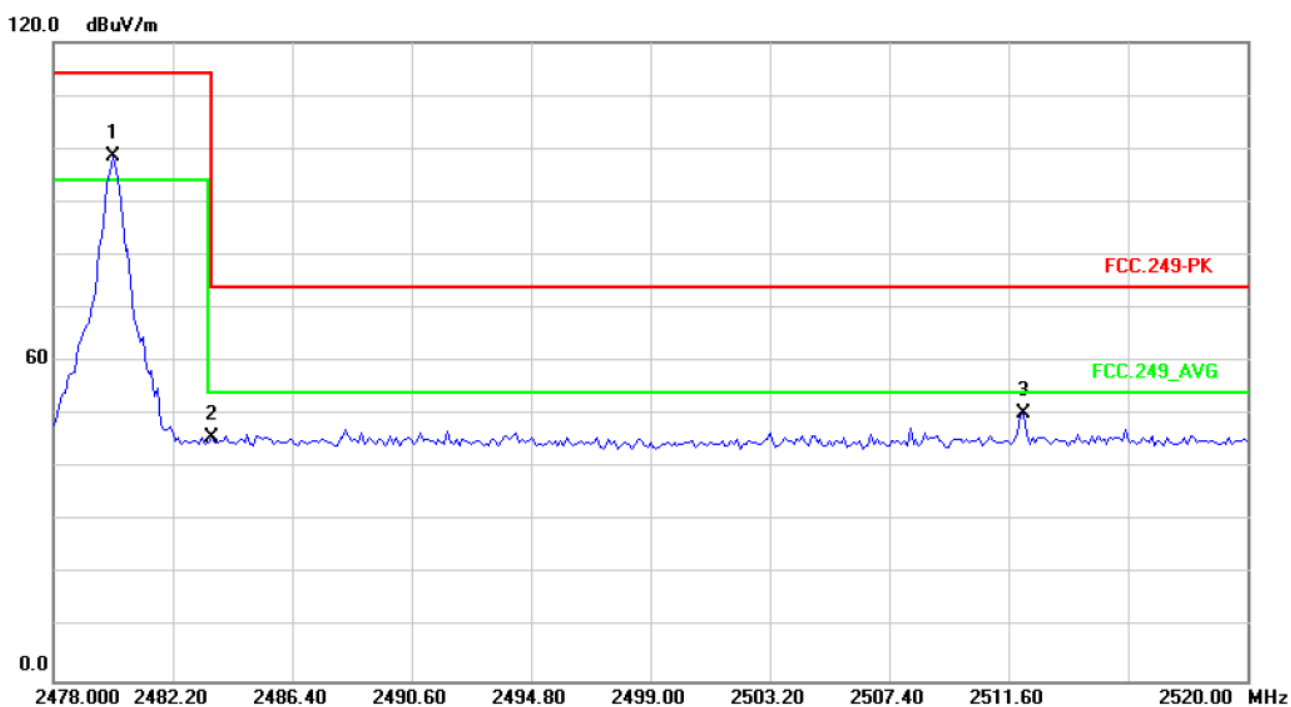
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1	*	2479.155	86.65	14.02	100.67	114.00	-13.33	peak		
2		2483.565	34.86	14.02	48.88	74.00	-25.12	peak		
3		2507.085	37.84	14.08	51.92	74.00	-22.08	peak		



8DPSK Unhopping



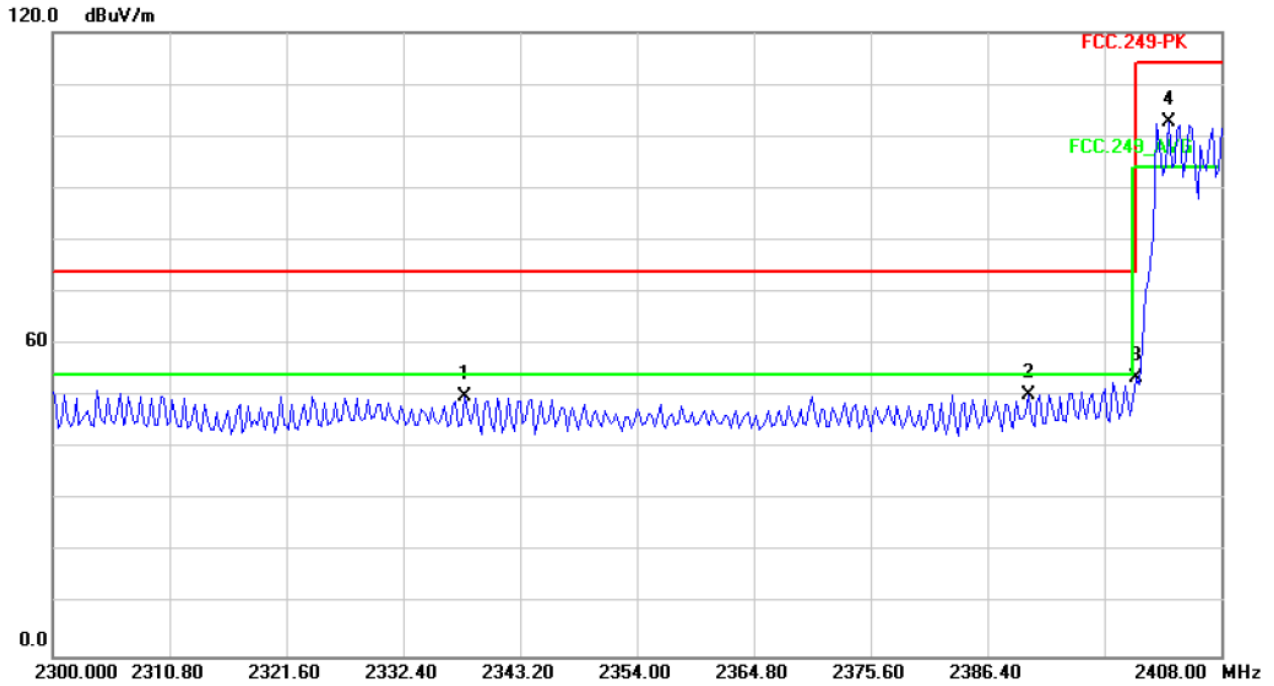
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		2350.085	34.94	13.75	48.69	74.00	-25.31			peak
2		2390.100	31.08	13.83	44.91	74.00	-29.09			peak
3		2400.170	45.53	13.85	59.38	114.00	-54.62			peak
4	*	2402.025	89.77	13.85	103.62	114.00	-10.38			peak



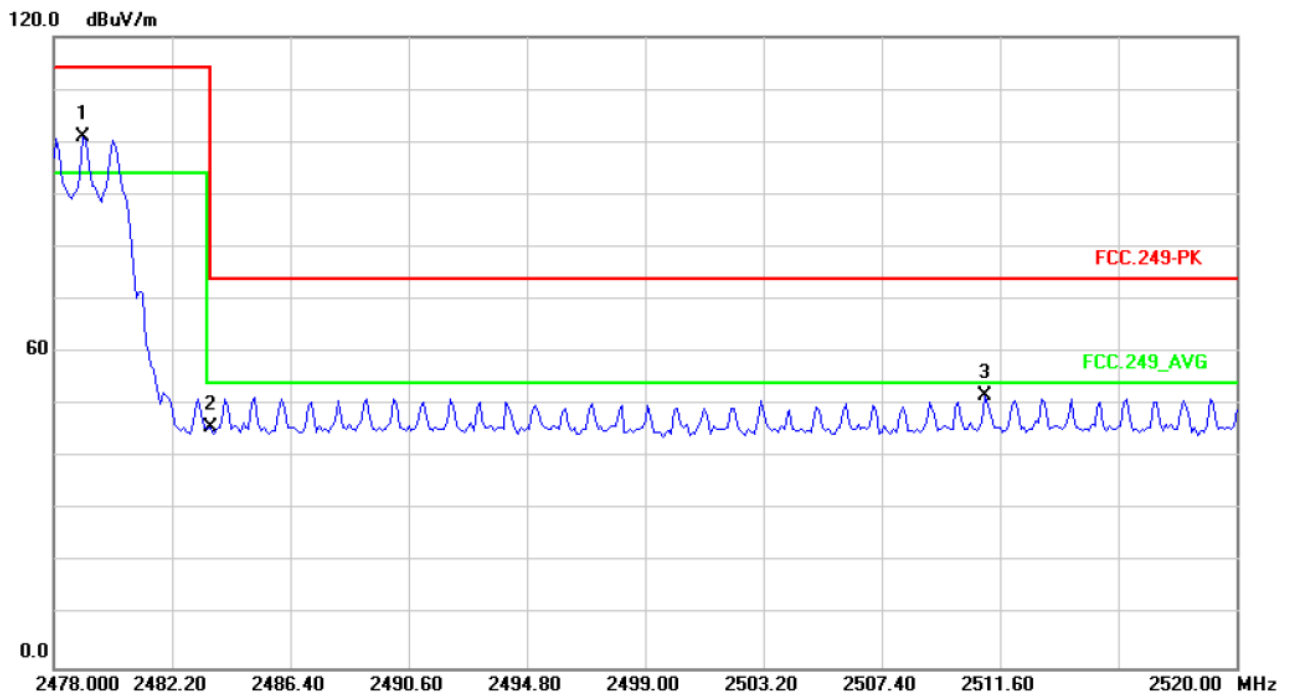
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2480.100	84.43	14.02	98.45	114.00	-15.55			peak
2		2483.565	31.65	14.02	45.67	74.00	-28.33			peak
3		2512.125	36.27	14.08	50.35	74.00	-23.65			peak



Hopping



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		2338.070	36.25	13.71	49.96	74.00	-24.04			peak
2		2390.180	36.46	13.83	50.29	74.00	-23.71			peak
3		2400.170	39.60	13.85	53.45	114.00	-60.55			peak
4	*	2403.140	88.78	13.87	102.65	114.00	-11.35			peak



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2479.050	86.92	14.02	100.94	114.00	-13.06			peak
2		2483.565	31.78	14.02	45.80	74.00	-28.20			peak
3		2511.075	37.78	14.08	51.86	74.00	-22.14			peak



## **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.

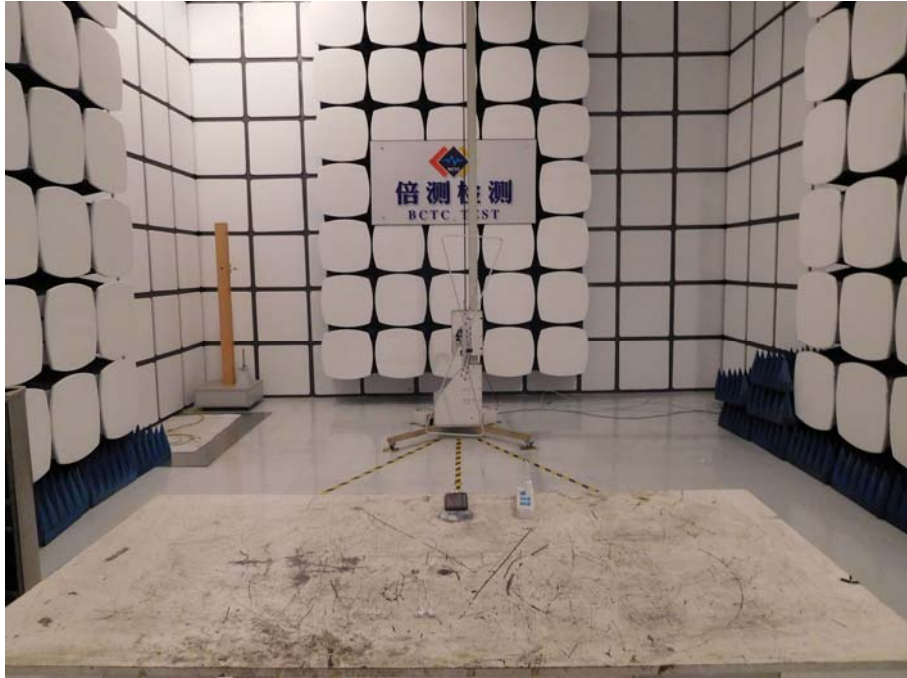
## 7. EUT TEST PHOTO

### conducted Emission





### Radiated Measurement Photos





## 8. EUT PHOTO







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