



# **FCC TEST REPORT**

Report No: STS1504046F02

Issued for

Piu Mobile Corp

6030 Nw 99 Av Unit 405 Miami Florida 33178

Product Name:	Mobile phone
Brand Name:	piu mobile
Model No.:	PICCOLO
Series Model:	N/A
FCC ID:	2ADOOPICCOLO
Test Standard:	FCC Part 15.247(2014)

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## **TEST RESULT CERTIFICATION**

Applicant's name ...... Piu Mobile Corp

Address...... 6030 Nw 99 Av Unit 405 Miami Florida 33178

Manufacture's Name ...... Piu Mobile Corp

Address...... 6030 Nw 99 Av Unit 405 Miami Florida 33178

**Product description** 

Product name ...... Mobile phone

Band name ..... piu mobile

Model and/or type reference ...... PICCOLO

Ratings...... DC 5V/500mA

**Standards** ...... FCC Part 15.247(2014)

Test procedure ...... DA00-705, ANSI C63.10-2009

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

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Date of Test .....

Date (s) of performance of tests..... 08 Apr. 2015 ~13 Apr. 2015

Date of Issue...... 14 Apr. 2015

Test Result......Pass

Testing Engineer :

(Jin Ming)

Report writing

0

(Sunny zheng)

Authorized

Signatory

Hand lag

(Bovey Yang)



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## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247), Subpart C				
Standard Section	I I I I I I I I I I I I I I I I I I I			
15.207	Conducted Emission	PASS		
15.247(a)(1)	Hopping Channel Separation	PASS		
15.247(b)(1)	15.247(b)(1) Peak Output Power			
15.247(c)	15.247(c) Radiated Spurious Emission			
15.247(d)	15.247(d) Conducted Spurious Emission			
15.247(a)(iii)	15.247(a)(iii) Number of Hopping Frequency			
15.247(a)(iii)	Dwell Time	PASS		
15.247(a)(1)	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 STS Test Services Co., Ltd.

Add.: 1/F, Building 2, Zhuoke Science Park, Chongqing Road, Fuyong, Baoan District,

Shenzhen, China.

FCC Registration No.: 842334; IC Registration No.: 12108A-1

#### 1.2 MEASUREMENT UNCERTAINTY

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

No.	Item	Uncertainty
1	Conducted Emission Test	±3.18dB
2	RF power,conducted	±0.16dB
3	Spurious emissions,conducted	±0.21dB
4	All emissions,radiated(<1G)	±4.68dB
5	All emissions,radiated(>1G)	±4.71dB
6	Temperature	±0.5°C
7	Humidity	±2%



## 2. GENERAL INFORMATION

## 2.1 GENERAL DESCRIPTION OF EUT

Equipment	Mobile phone	
Trade Name	piu mobile	
Model Name	PICCOLO	
Serial Model	N/A	
Model Difference	N/A	
Antenna Gain (dBi)	0 dbi	
Channel List	Please refer to the Note 2.	
Bluetooth	Frequency:2402 – 2480 MHz Modulation: GFSK(1Mbps), π/4-DQPSK(2Mbps), 8-DPSK(3Mbps)	
Adapter	Input:AC 100-240V,50/60Hz,200mA	
Adapter	Output:DC 5V,500mA	
	Rated Voltage: 3.7V	
Battery	Charge Limit: 4.2V	
	capacity :600mAh	
Hardware version number	F18_V1.0	
Software versioning number	f18_s31da_xinfangxiang_k770_g3_32m_rv1.01_rc01_	
Software versioning number	20141013	
Connecting I/O Port(s)	Please refer to the User's Manual	

## Note:

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



		Chann	el List		
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequenc (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
80	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		

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#### 3. Table for Filed Antenna

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

The EUT antenna isPIFA Antenna. no antenna other than that furnished by the responsible party shall be used with the device.



#### 2.1 DESCRIPTION OF TEST MODES

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

Pretest Mode	Description
Mode 1	CH00
Mode 2	CH39
Mode 3	CH78
Mode 4	Link Mode

For Conducted Emission			
Final Test Mode Description			
Mode 4 Link Mode			

For Radiated Emission				
Final Test Mode	Description			
Mode 1	CH00			
Mode 2	CH39			
Mode 3	CH78			
Mode 4	Link Mode			

#### Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

#### 2.2 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

Test software Version	Test program: N/A			
Frequency	2402 MHz 2441 MHz 2480 Mi			
Parameters(1Mbps)	DEF	DEF	DEF	
Parameters(2Mbps)	DEF	DEF	DEF	
Parameters(3Mbps)	DEF	DEF	DEF	



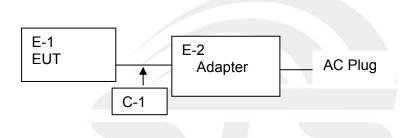
## 2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

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

Radiated Spurious Emission Test



#### Conducted Emission Test





#### 2.4 DESCRIPTION OF SUPPORT UNITS

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

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Mobile phone	piu mobile	PICCOLO	N/A	EUT
E-2	Adapter	piu mobile	PICCOLO	N/A	Accessories

Item	Shielded Type	Ferrite Core	Length	Note
C-1	No	No	1.5M	
		//		

#### 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 <code>"Length\_"</code> column.
- (3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".



## 2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Spectrum Analyzer	Agilent	E4407B	MY50140340	2014.10.25	2015.10.24
Test Receiver	R&S	ESCI	101427	2014.10.25	2015.10.24
Bilog Antenna	TESEQ	CBL6111D	34678	2014.10.27	2015.10.26
50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2014.06.06	2015.06.05
Horn Antenna	R&S	9120D	152265	2014.10.27	2015.10.26
Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2014.07.06	2015.07.05
Amplifier	EM	EM-30180	060538	2014.12.22	2015.12.21
Loop Antenna	ARA	PLA-1030/B	1029	2014.06.08	2015.06.07
Power Meter	Anritsu	ML2495A	1204003	2014.10.25	2015.10.24
Power Sensor	Anritsu	MA2411B	100309	2014.10.25	2015.10.24
Low frequency cable	MURATA	R-03	130627	2014.10.25	2015.10.24
High frequency cable	HARBOUR	R-02	FL0000175	2014.10.25	2015.10.24

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	102086	102086	2014.10.25	2015.10.24
LISN	R&S	ENV216	101242	2014.10.25	2015.10.24
LISN	EMCO	3810/2NM	000-23625	2014.10.25	2015.10.24
50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2014.06.06	2015.06.05
Passive Voltage Probe	R&S	ESH2-Z3	100196	2014.06.06	2015.06.05
Absorbing clamp	R&S	MDS-21	100668	2014.10.27	2015.10.26
Conduction Cable	EM	C01	N/A	2014.10.25	2015.10.24



#### 3. EMC EMISSION TEST

#### 3.1 CONDUCTED EMISSION MEASUREMENT

#### 3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 15.247&207(a) limit in the table below has to be followed.

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

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

#### Note:

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

#### The following table is the setting of the receiver

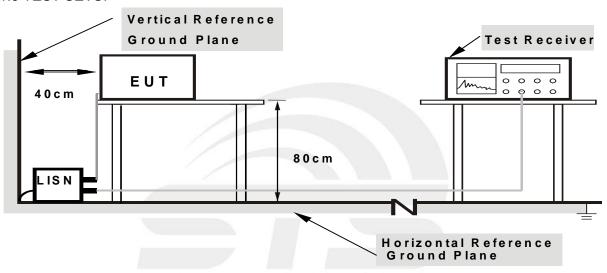
Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz



#### 3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.

#### 3.1.3 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

## 3.1.4 EUT OPERATING CONDITIONS

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

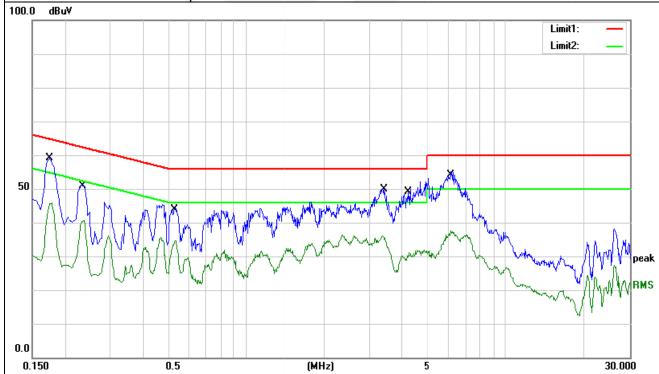


EUT:	Mobile phone	Model Name. :	PICCOLO
Temperature:	<b>23</b> ℃	Relative Humidity:	50%
Pressure:	1010hPa	Phase:	L
Test Voltage :	DC 5V from Adapter AC 120V/60Hz	Test Mode:	Link Mode

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	(cm)	(deg.)	
1	0.1740	49.12	10.00	59.12	64.77	-5.65			QP
2	0.1740	35.87	10.00	45.87	54.77	-8.90			AVG
3	0.2380	40.71	9.96	50.67	62.17	-11.50			QP
4	0.2380	30.63	9.96	40.59	52.17	-11.58			AVG
5	0.5260	32.83	9.91	42.74	56.00	-13.26			QP
6	0.5260	25.65	9.91	35.56	46.00	-10.44			AVG
7	3.4380	36.23	10.17	46.40	56.00	-9.60			QP
8	3.4380	25.66	10.17	35.83	46.00	-10.17			AVG
9	4.1260	36.86	10.19	47.05	56.00	-8.95			QP
10	4.1260	21.03	10.19	31.22	46.00	-14.78			AVG
11	6.1020	42.61	10.20	52.81	60.00	-7.19			QP
12	6.1020	27.49	10.20	37.69	50.00	-12.31			AVG

#### Remark:

- All readings are Quasi-Peak and Average values.
   Factor = Insertion Loss + Cable Loss.
- 3. N/A means All Data have pass Limit





EUT:	Mobile phone	Model Name. :	PICCOLO
Temperature:	23 ℃	Relative Humidity:	50%
Pressure:	1010hPa	Phase :	N
Test Voltage :	DC 5V from Adapter AC 120V/60Hz	Test Mode:	Link Mode

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	(cm)	(deg.)	
1	0.1820	45.40	10.00	55.40	64.39	-8.99			QP
2	0.1820	35.56	10.00	45.56	54.39	-8.83			AVG
3	0.2460	29.78	9.95	39.73	61.89	-22.16			QP
4	0.2460	30.03	9.95	39.98	51.89	-11.91			AVG
5	0.5380	34.89	9.92	44.81	56.00	-11.19			QP
6	0.5380	24.32	9.92	34.24	46.00	-11.76			AVG
7	3.2420	38.12	10.04	48.16	56.00	-7.84			QP
8	3.2420	27.35	10.04	37.39	46.00	-8.61			AVG
9	4.2660	38.75	10.19	48.94	56.00	-7.06			QP
10	4.2660	24.25	10.19	34.44	46.00	-11.56			AVG
11	5.8260	42.49	10.20	52.69	60.00	-7.31	100 100 100 100 100 100 100 100 100 100		QP
12	5.8260	29.83	10.20	40.03	50.00	-9.97			AVG

## Remark:

- 1. All readings are Quasi-Peak and Average values.
- 2. Factor = Insertion Loss + Cable Loss.
- 3. N/A means All Data have pass Limit





#### 3.2 RADIATED EMISSION MEASUREMENT

## 3.2.1 RADIATED EMISSION LIMITS

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on Part 15247&205(a), then the Part 15 247&209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (30MHz - 1000MHz)

Frequencies	Field Strength	Measurement Distance
(MHz)	(micorvolts/meter)	(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

Spectrum Parameter	Setting		
Attenuation	Auto		
Detector	Peak		
Start Frequency	1000 MHz(Peak/AV)		
Stop Frequency	10th carrier harmonic(Peak/AV)		
RB / VB (emission in restricted	1 MHz / 1 MHz A)/-1 MHz / 10Hz		
band)	1 MHz / 1 MHz, AV=1 MHz / 10Hz		

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



#### 3.2.2 TEST PROCEDURE

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

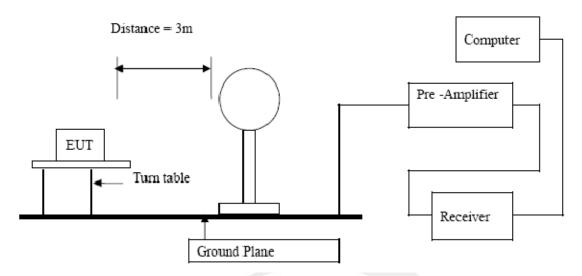
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD No deviation

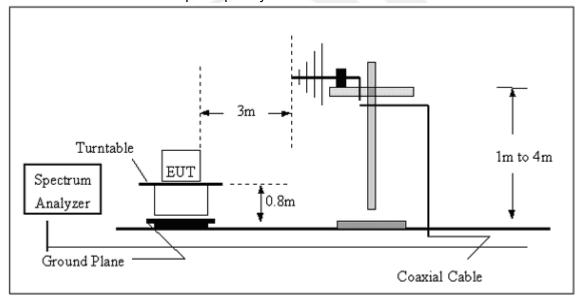


## 3.2.4 TEST SETUP

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

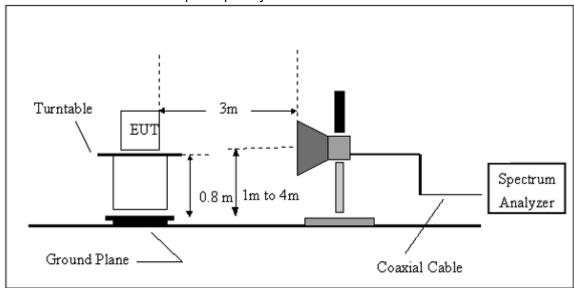


## (B) Radiated Emission Test-Up Frequency 30MHz~1GHz





## (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

## Below 30 MHz

EUT:	Mobile phone	Model Name. :	PICCOLO			
Temperature:	<b>23</b> ℃	Relative Humidity:	50%			
Pressure:	1010 hPa	Polarization :				
Test Voltage :	DC 3.7V from battery					
Test Mode :	TX Mode					

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

#### NOTE:

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

Distance extrapolation factor =40 log (specific distance/test distance)(dB);

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

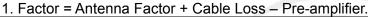


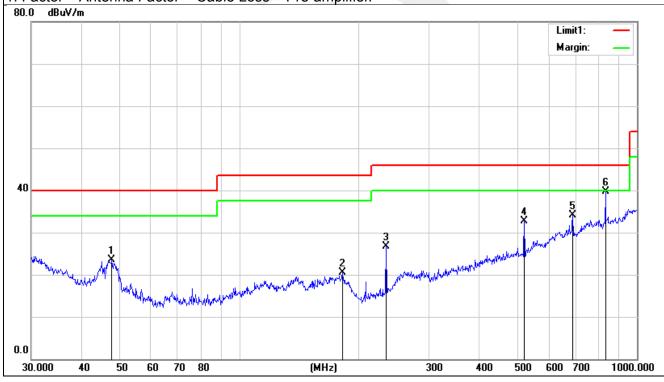
#### Between 30MHz - 1000 MHz

EUT:	Mobile phone	Model Name. :	PICCOLO		
Temperature :	23 ℃	Relative Humidity:	50%		
Pressure :	1010 hPa	Polarization :	Horizontal		
Test Voltage :	DC 3.7V from battery				
Test Mode:	TX Mode				

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	47.8260	14.01	9.55	23.56	40.00	-16.44			QP
2	181.9202	10.09	10.36	20.45	43.50	-23.05			QP
3	234.1684	15.32	11.48	26.80	46.00	-19.20			QP
4	520.8882	11.90	20.90	32.80	46.00	-13.20			QP
5	689.5644	10.08	23.95	34.03	46.00	-11.97			QP
6	833.3171	12.29	27.32	39.61	46.00	-6.39			QP

#### Remark:





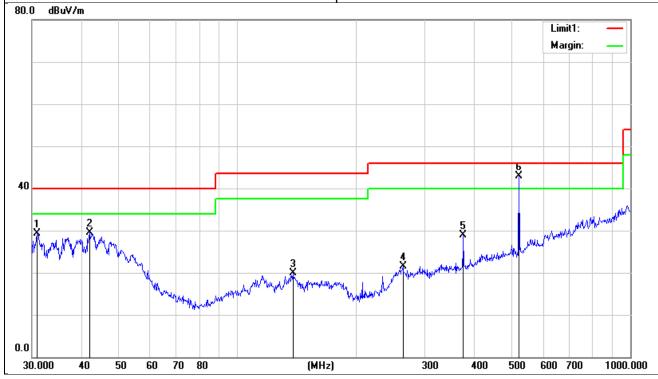


EUT:	Mobile phone	Model Name. :	PICCOLO		
Temperature:	23 ℃	Relative Humidity:	50%		
Pressure :	1010 hPa	Polarization :	Vertical		
Test Voltage:	DC 3.7V from battery				
Test Mode :	TX Mode				

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	30.8535	10.89	18.51	29.40	40.00	-10.60			QP
2	42.0066	16.81	12.67	29.48	40.00	-10.52			QP
3	138.3873	6.94	12.87	19.81	43.50	-23.69			QP
4	263.8190	6.19	15.39	21.58	46.00	-24.42			QP
5	375.9385	11.24	17.63	28.87	46.00	-17.13			QP
6	520.8882	21.95	20.90	42.85	46.00	-3.15			QP

#### Remark:

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





## Above 1000 MHz

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector	Comment	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре	Commone	
			ow Channel (2402	2 MHz)				
4804.264	66.58	-3.62	62.96	74	-11.04	Pk	Vertical	
4804.272	47.33	-3.62	43.71	54	-10.29	AV	Vertical	
7206.138	63.40	-0.9	62.50	74	-11.50	pk	Vertical	
7206.156	42.83	-0.9	41.93	54	-12.07	AV	Vertical	
4803.959	63.80	-3.64	60.16	74	-13.84	Pk	Horizontal	
4803.964	45.56	-3.64	41.92	54	-12.08	AV	Horizontal	
		1	Mid Channel (2441	1 MHz)				
4882.128	66.59	-3.65	62.94	74	-11.06	Pk	Vertical	
4882.094	51.81	-3.65	48.16	54	-5.84	AV	Vertical	
7323.228	62.26	-0.82	61.44	74	-12.56	Pk	Vertical	
7323.220	45.85	-0.82	45.03	54	-8.97	AV	Vertical	
4882.096	62.14	-3.68	58.56	74	-15.44	Pk	Horizontal	
4882.171	46.83	-3.68	43.15	54	-10.85	AV	Horizontal	
	High Channel (2480 MHz)							
4960.260	62.36	-3.59	58.77	74	-15.23	pk	Vertical	
4960.325	45.82	-3.59	42.23	54	-11.77	AV	Vertical	
4960.190	64.36	-3.59	60.77	74	-13.23	pk	Horizontal	
4960.157	46.65	-3.59	43.06	54	-10.94	AV	Horizontal	

#### Note:

- 1) 30MHz~25GHz:(Scan with GFSK, π/4-DQPSK,8DPSK, the worst casw is GFSK Mode)
- 2) Factor = Antenna Factor + Cable Loss Pre-amplifier.

Emission Level = Meter Reading + Factor

Margin = Limit - Emission Leve



Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Type	
			GF	SK			
2399.9	69.46	-12.99	56.47	74	-17.53	peak	Vertical
2399.9	55.31	-12.99	42.32	54	-11.68	AVG	Vertical
2399.9	70.39	-12.99	57.40	74	-16.60	peak	Horizontal
2399.9	54.35	-12.99	41.36	54	-12.64	AVG	Horizontal
2483.6	71.22	-12.78	58.44	74	-15.56	peak	Vertical
2483.6	54.29	-12.78	41.51	54	-12.49	AVG	Vertical
2483.6	71.43	-12.78	58.65	74	-15.35	peak	Horizontal
2483.6	54.42	-12.78	41.64	54	-12.36	AVG	Horizontal
			π/4-D	QPSK			
2399.9	71.48	-12.99	58.49	74	-15.51	peak	Vertical
2399.9	54.58	-12.99	41.59	54	-12.41	AVG	Vertical
2399.9	70.43	-12.99	57.44	74	-16.56	peak	Horizontal
2399.9	55.37	-12.99	42.38	54	-11.62	AVG	Horizontal
2483.6	71.61	-12.78	58.83	74	-15.17	peak	Vertical
2483.6	56.36	-12.78	43.58	54	-10.42	AVG	Vertical
2483.6	71.24	-12.78	58.46	74	-15.54	peak	Horizontal
2483.6	54.62	-12.78	41.84	54	-12.16	AVG	Horizontal
			8DF	PSK			
2399.9	71.56	-12.99	58.57	74	-15.43	peak	Vertical
2399.9	55.64	-12.99	42.65	54	-11.35	AVG	Vertical
2399.9	70.29	-12.99	57.30	74	-16.70	peak	Horizontal
2399.9	56.72	-12.99	43.73	54	-10.27	AVG	Horizontal
2483.6	71.45	-12.78	58.67	74	-15.33	peak	Vertical
2483.6	55.29	-12.78	42.51	54	-11.49	AVG	Vertical
2483.6	71.46	-12.78	58.68	74	-15.32	peak	Horizontal
2483.6	54.60	-12.78	41.82	54	-12.18	AVG	Horizontal



## Hopping

Frequency	Meter	Factor	Emission	Limits	Margin	Detector	Comment		
(MHz)	Reading (dBµV)	(dB)	Level (dBµV/m)	(dBµV/m)	(dB)	Туре	Comment		
(IVII IZ)	(MHZ) (dBμV) (dB) (dBμV/m) (dBμV/m) (dB) Type								
2390	69.46	-12.99	56.47	74	-17.53	peak	Vertical		
2390	55.63	-12.99	42.64	54	-11.36	AVG	Vertical		
2390	68.29	-12.99	55.30	74	-18.70	peak	Horizontal		
2390	54.72	-12.99	41.73	54	-12.27	AVG	Horizontal		
2483.5	67.46	-12.78	54.68	74	-19.32	peak	Vertical		
	55.27	-12.78				AVG	Vertical		
2483.5			42.49	54	-11.51				
2483.5	68.22	-12.78	55.44	74	-18.56	peak	Horizontal		
2483.5	55.63	-12.78	42.85	54	-11.15	AVG	Horizontal		
				QPSK		T	Ī		
2390	69.43	-12.99	56.44	74	-17.56	peak	Vertical		
2390	56.87	-12.99	43.88	54	-10.12	AVG	Vertical		
2390	68.61	-12.99	55.62	74	-18.38	peak	Horizontal		
2390	54.72	-12.99	41.73	54	-12.27	AVG	Horizontal		
2483.5	68.32	-12.78	55.54	74	-18.46	peak	Vertical		
2483.5	54.63	-12.78	41.85	54	-12.15	AVG	Vertical		
2483.5	69.11	-12.78	56.33	74	-17.67	peak	Horizontal		
2483.5	55.58	-12.78	42.80	54	-11.20	AVG	Horizontal		
			8DF	PSK					
2390	69.43	-12.99	56.44	74	-17.56	peak	Vertical		
2390	55.76	-12.99	42.77	54	-11.23	AVG	Vertical		
2390	68.44	-12.99	55.45	74	-18.55	peak	Horizontal		
2390	55.84	-12.99	42.85	54	-11.15	AVG	Horizontal		
2483.5	69.53	-12.78	56.75	74	-17.25	peak	Vertical		
2483.5	55.51	-12.78	42.73	54	-11.27	AVG	Vertical		
2483.5	68.58	-12.78	55.80	74	-18.20	peak	Horizontal		
2483.5	55.43	-12.78	42.65	54	-11.35	AVG	Horizontal		

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## 4. CONDUCTED SPURIOUS EMISSIONS

## 4.1 REQUIREMENT

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

#### 4.2 TEST PROCEDURE

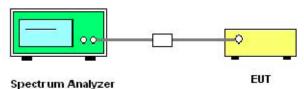
According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

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

## For Band edge

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

#### 4.3 TEST SETUP



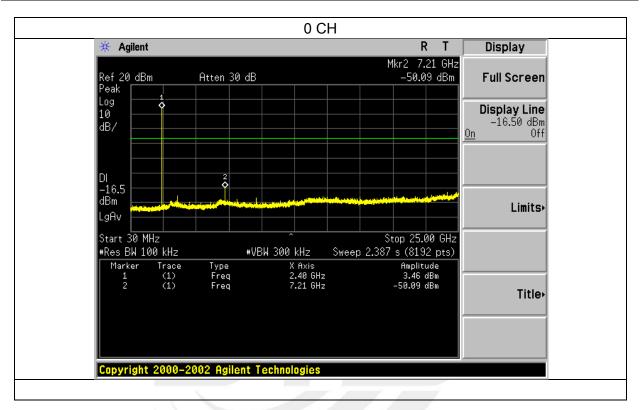
The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading. Make the measurement with the spectrum analyzer's resolution bandwidth(RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

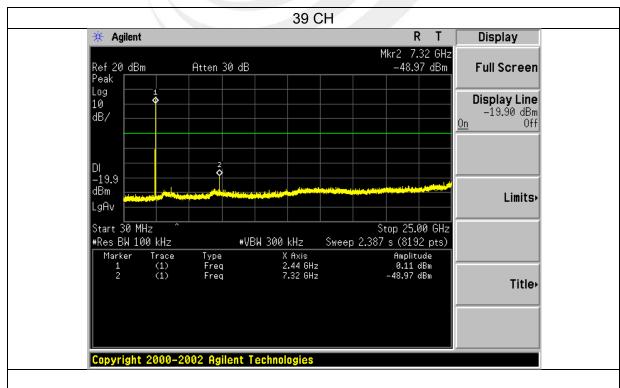
#### 4.4 EUT OPERATION CONDITIONS

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

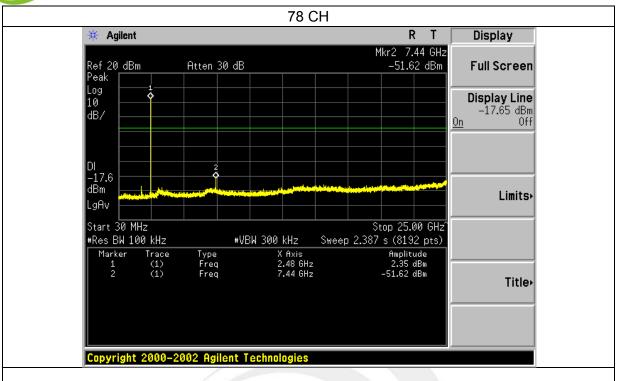


EUT:	Mobile phone	Model Name :	PICCOLO
Temperature :	<b>25</b> ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	GFSK(1Mbps)-00/39/78 CH		



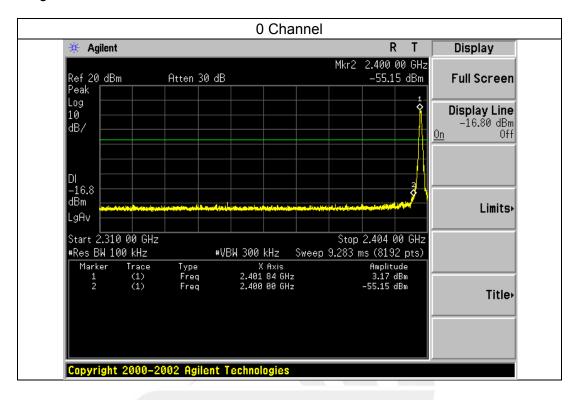


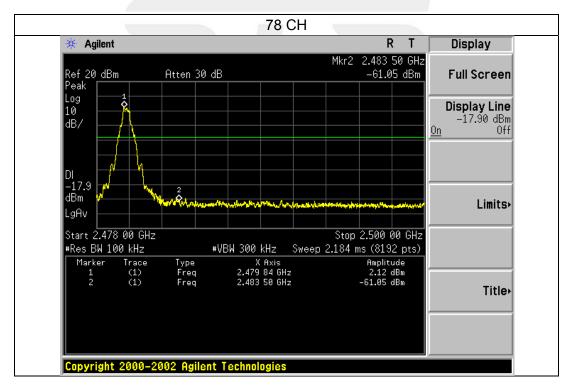






## For Band edge

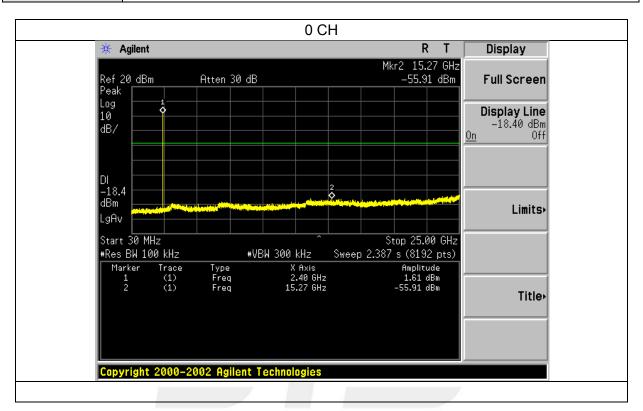


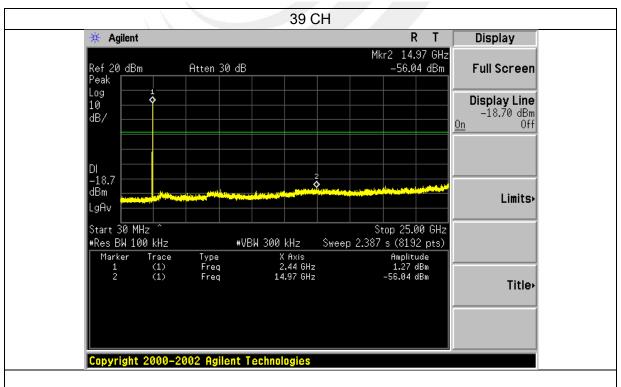


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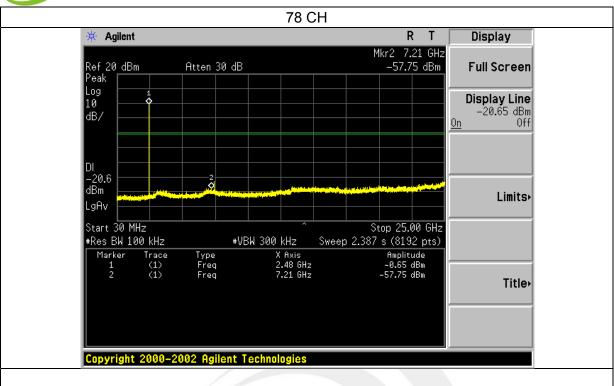


EUT:	Mobile phone	Model Name :	PICCOLO
Temperature:	<b>25</b> ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	π/4-DQPSK(2Mbps) –00/39/78 CH		



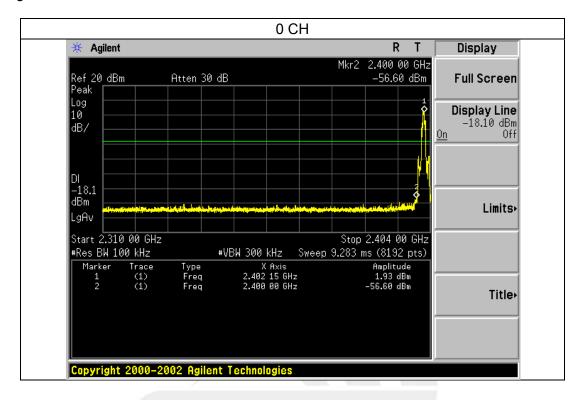


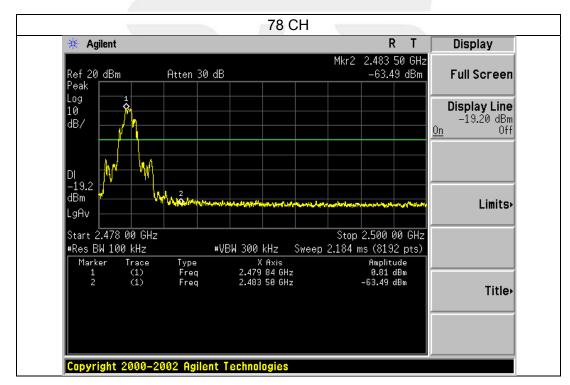






## Band edge



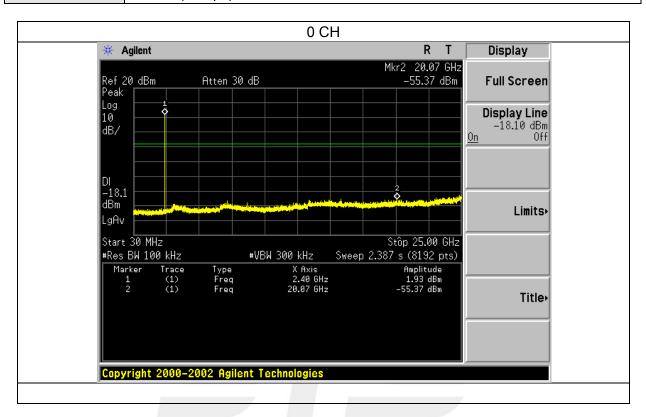


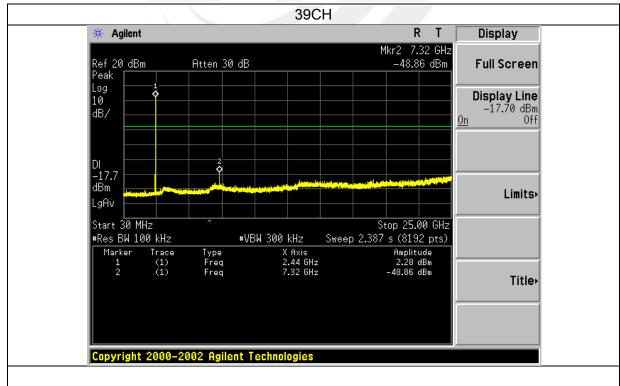


Report No.: STS1504046F02

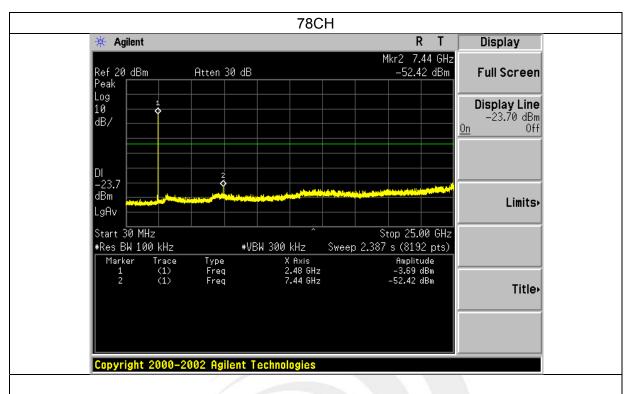


EUT:	Mobile phone	Model Name :	PICCOLO
Temperature :	<b>25</b> ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	8-DPSK(3Mbps) -00/39/78 CH		



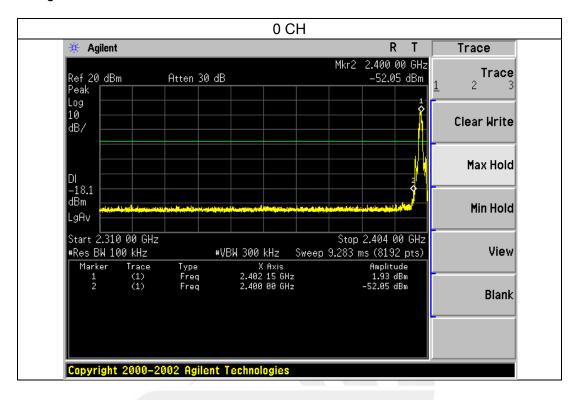


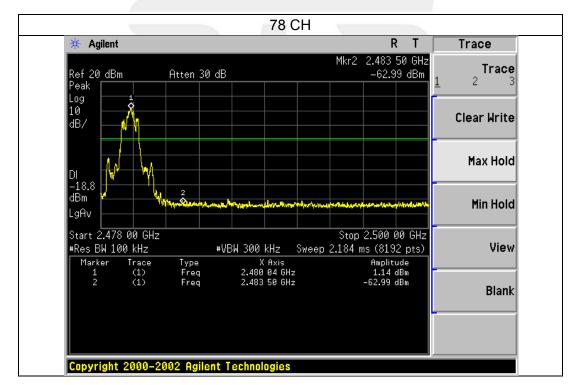






## For Band edge







## 5. NUMBER OF HOPPING CHANNEL

## 5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C					
Section Test Item Limit Frequency Range (MHz) Result				Result	
15.247 (a)(1)(iii)	Number of Hopping Channel	≥15	2400-2483.5	PASS	

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	100 KHz
VB	100 KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

## 5.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 100K, VBW=100K, Sweep time = Auto.

#### 5.3 TEST SETUP

EUT	SPECTRUM
	ANALYZER

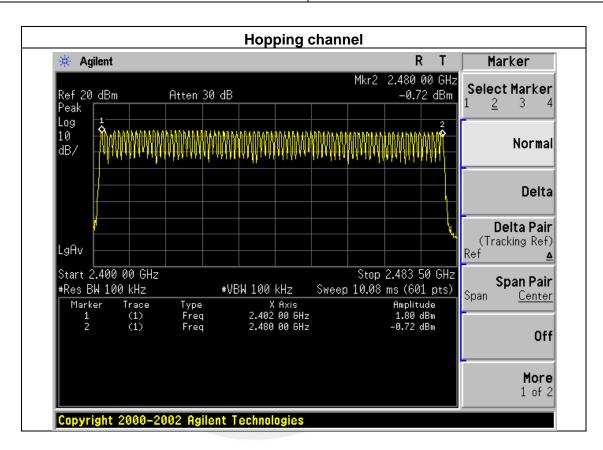
## 5.4 EUT OPERATION CONDITIONS





EUT:	Mobile phone	Model Name :	PICCOLO
Temperature :	<b>25</b> ℃	Relative Humidity:	60%
Pressure:	1015 hPa	Test Voltage :	DC 3.7V
Test Mode :	Hopping Mode		







## 6. AVERAGE TIME OF OCCUPANCY

### 6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C					
Section Test Item Limit Frequency Range (MHz) Result					
15.247 Average Time of Occupancy 0.4sec 2400-2483.5 PASS					

#### **6.2 TEST PROCEDURE**

- a. The transmitter output (antenna port) was connected to the spectrum analyzer
- b. Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz.
- c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- d. Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to e. zero span.
- f. Measure the maximum time duration of one single pulse.
- g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
- h. Measure the maximum time duration of one single pulse.
- i. DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 3.37 x 31.6 = 106.6 within 31.6 seconds.
- j. DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times  $5.06 \times 31.6 = 160$  within 31.6 seconds.
- k. DH1 Packet permit maximum 1600 / 79 /2 = 10.12 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 10.12 x 31.6 = 320 within 31.6 seconds.

#### 6.3 TEST SETUP

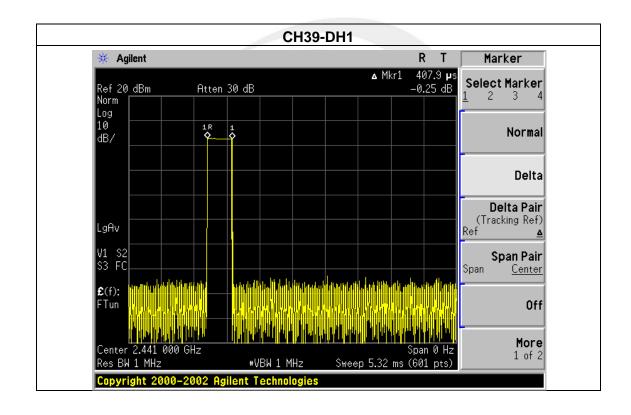
EUT	SPECTRUM
	ANALYZER

#### 6.4 EUT OPERATION CONDITIONS

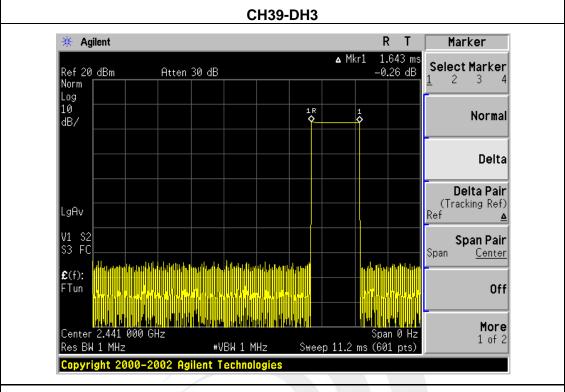


EUT:	Mobile phone	Model Name :	PICCOLO
Temperature :	<b>25</b> ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	GFSK(1Mbps)-DH1/DH3/DH5		

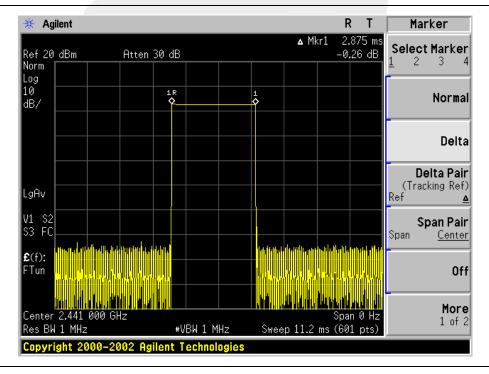
Data Packet	Frequen cy	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
DH1	2441 MHz	0.3947	0.13	0.4
DH3	2441 MHz	1.6580	0.27	0.4
DH5	2441 MHz	2.8800	0.31	0.4







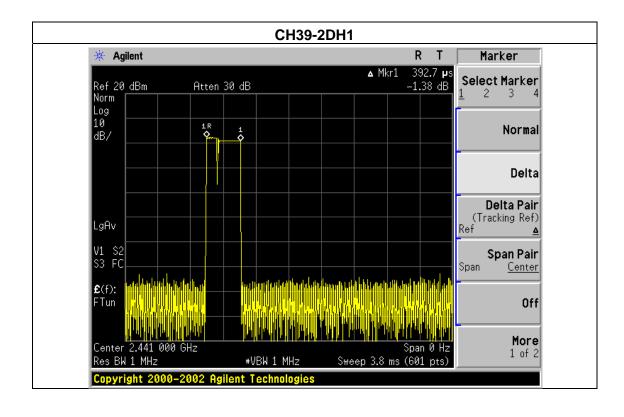




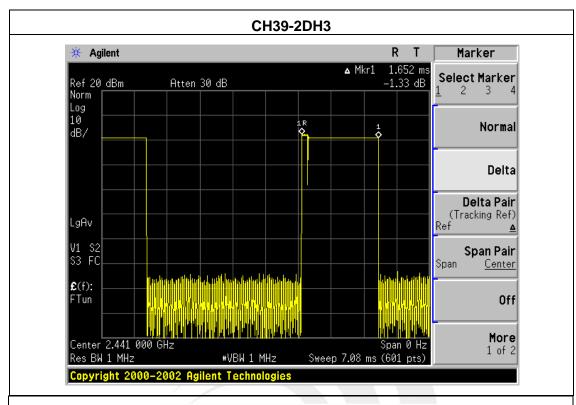


EUT:	Mobile phone	Model Name :	PICCOLO		
Temperature:	<b>25</b> ℃	Relative Humidity:	50%		
Pressure :	1012 hPa	Test Voltage :	DC 3.7V		
Test Mode :	π/4-DQPSK(2Mbps) –2DH1/2DH3/2DH5				

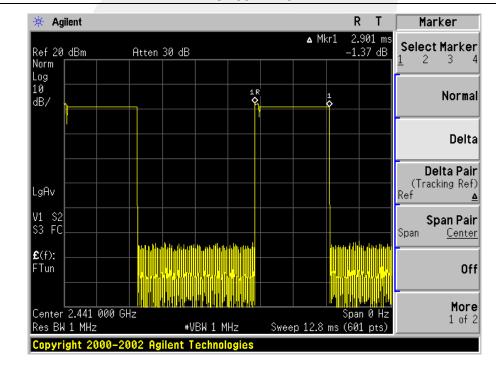
Data Packet	Frequen cy	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
2DH1	2441 MHz	0.3989	0.13	0.4
2DH3	2441 MHz	1.6320	0.26	0.4
2DH5	2441 MHz	2.9180	0.31	0.4









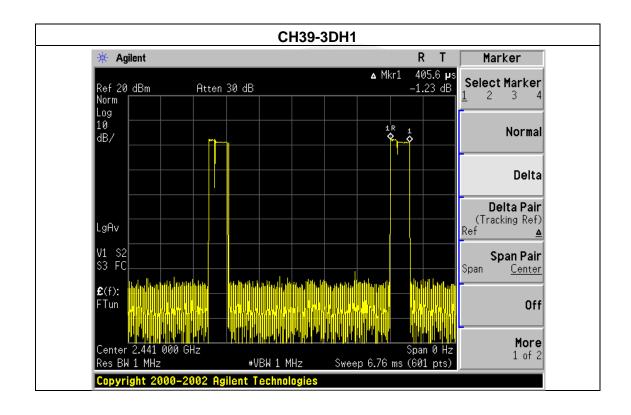




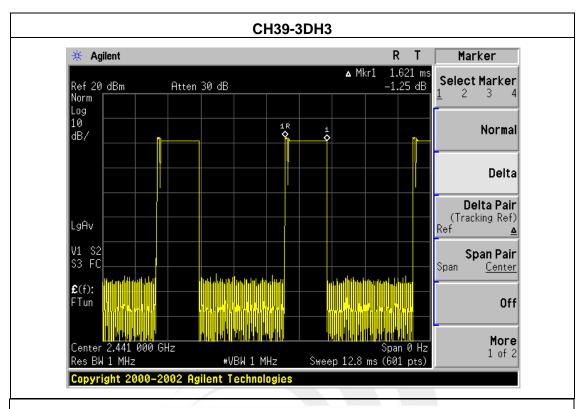
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EUT:	Mobile phone	Model Name :	PICCOLO		
Temperature :	25 ℃	Relative Humidity:	50%		
Pressure:	1012 hPa	Test Voltage :	DC 3.7V		
Test Mode :	8DPSK(3Mbps) –3DH1/3DH3/3DH5				

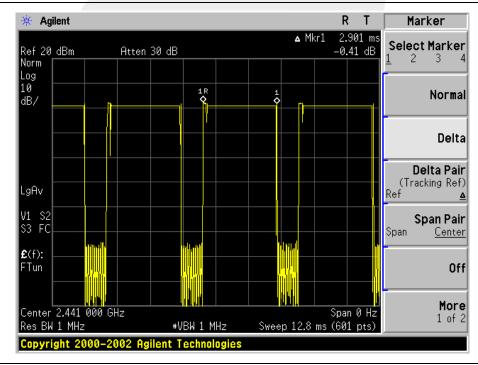
Data Packet	Frequen cy	Pulse Duration (ms)	Dwell Time (s)	Limits (s)
3DH1	2441 MHz	0.4051	0.13	0.4
3DH3	2441 MHz	1.6490	0.26	0.4
3DH5	2441 MHz	2.8550	0.30	0.4













#### 7. HOPPING CHANNEL SEPARATION MEASUREMEN

### 7.1 APPLIED PROCEDURES / LIMIT

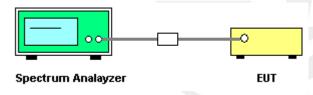
Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 20 dB bandwidth of the hopping channel, whichever is greater.

Spectrum Parameter	Setting	
Attenuation	Auto	
Span Frequency	> Measurement Bandwidth or Channel Separation	
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)	
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)	
Detector	Peak	
Trace	Max Hold	
Sweep Time	Auto	

#### 7.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- b. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
- c. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for channel separation measurement.

## 7.3 TEST SETUP



## 7.4 EUT OPERATION CONDITIONS

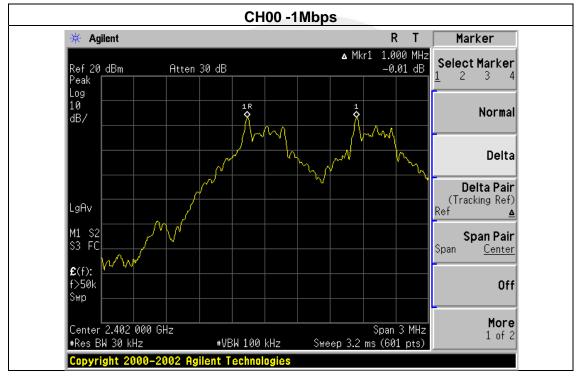
The EUT was programmed to be in continuously transmitting mode.



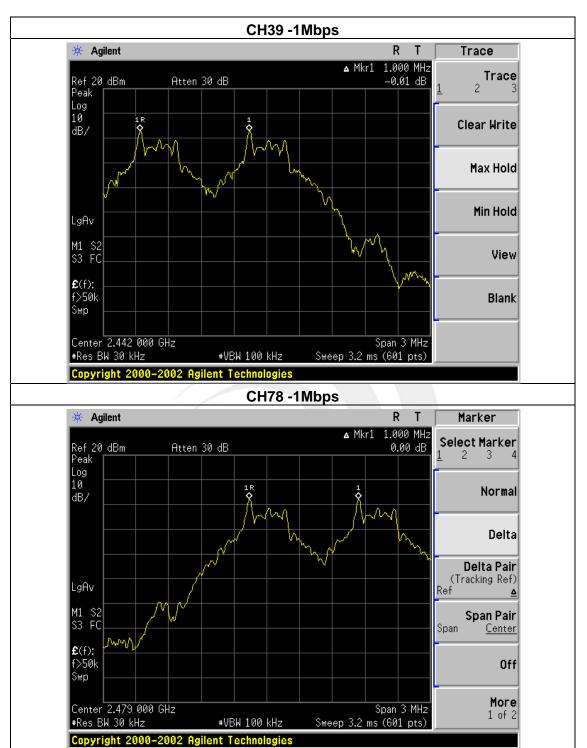
EUT:	Mobile phone	Model Name :	PICCOLO
Temperature:	<b>25</b> ℃	Relative Humidity:	50%
Pressure:	1012 hPa Test Voltage : DC 3.7V		DC 3.7V
Test Mode :	CH00 / CH39 /CH78 (GFSK(1Mbps) Mode)		

Frequency	Ch. Separation (MHz)	Result
2402 MHz	1.000	Complies
2441 MHz	1.000	Complies
2480 MHz	1.000	Complies

For GFSK: Ch. Separation Limits: >20dB bandwidth







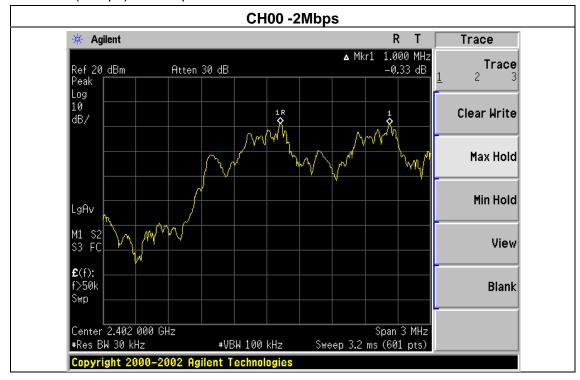
Report No.: STS1504046F02



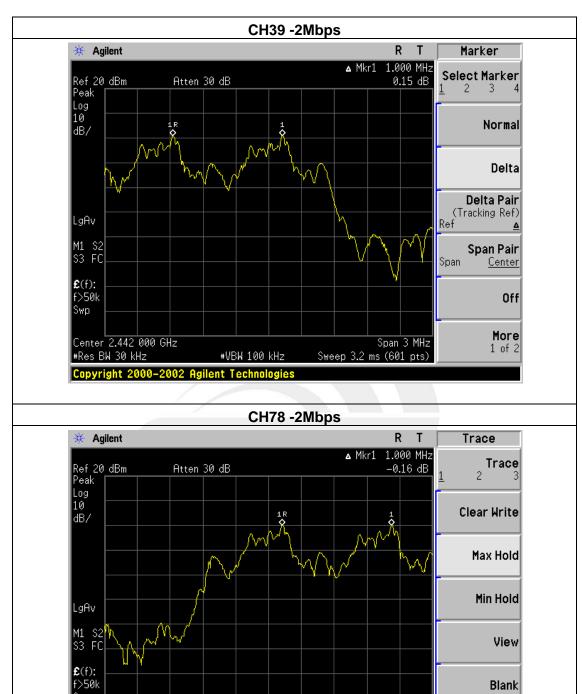
EUT:	Mobile phone	Model Name :	PICCOLO
Temperature :	<b>25</b> ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00 / CH39 /CH78 (π/4-DQPSK(2Mbps) Mode)		

Frequency	Ch. Separation (MHz)	Result
2402 MHz	1.000	Complies
2441 MHz	1.000	Complies
2480 MHz	1.000	Complies

For  $\pi/4$ -DQPSK(2Mbps): Ch. Separation Limits: > two-thirds 20dB bandwidth







#VBW 100 kHz

Span 3 MHz Sweep 3.2 ms (601 pts)

Center 2.479 000 GHz #Res BW 30 kHz

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EUT:	Mobile phone	Model Name :	PICCOLO
Temperature:	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode : CH00 / CH39 /CH78 (8-DPSK(3Mbps)Mode)		

Frequency	Ch. Separation (MHz)	Result
2402 MHz	1.000	Complies
2441 MHz	1.005	Complies
2480 MHz	1.000	Complies

For 8-DPSK(3Mbps):

## Ch. Separation Limits: > two-thirds 20dB bandwidth









### 8. BANDWIDTH TEST

### 8.1 APPLIED PROCEDURES / LIMIT

FCC Part15	(15.247) ,	Subpart C
------------	------------	-----------

Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)	Bandwidth	(20dB bandwidth)	2400-2483.5	PASS

Spectrum Parameter	Setting	
Attenuation	Auto	
Span Frequency	> Measurement Bandwidth or Channel Separation	
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)	
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)	
Detector	Peak	
Trace	Max Hold	
Sweep Time	Auto	

#### 8.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 30KHz, VBW=100KHz, Sweep time = Auto.

### 8.3 TEST SETUP

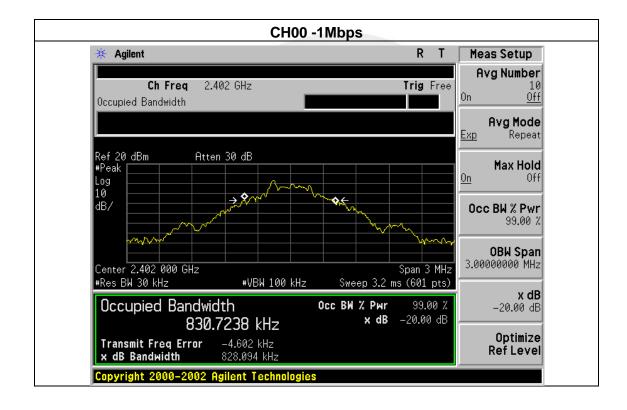
EUT	SPECTRUM
	ANALYZER

#### 8.4 EUT OPERATION CONDITIONS



EUT:	Mobile phone	Model Name :	PICCOLO
Temperature:	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa Test Voltage : DC 3.7V		DC 3.7V
Test Mode :	GFSK(1Mbps)CH00 / CH39 /C78		

Frequency	20dB Bandwidth (kHz)	Result
2402 MHz	828.094	PASS
2441 MHz	820.697	PASS
2480 MHz	827.399	PASS





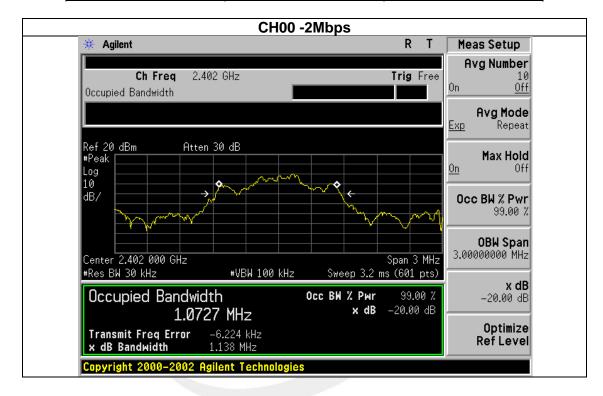


Report No.: STS1504046F02

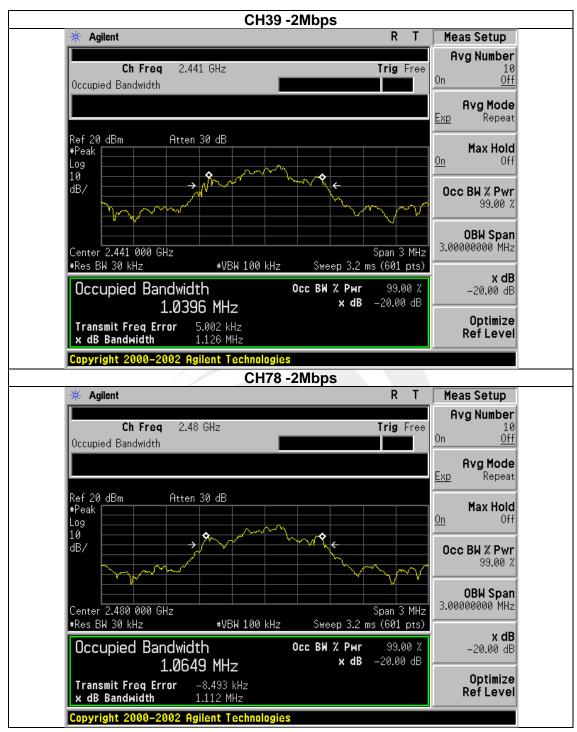


EUT:	Mobile phone	Model Name:	PICCOLO
Temperature:	25 ℃	Relative Humidity:	50%
Pressure:	1012 hPa	Test Voltage:	DC 3.7V
Test Mode: π/4-DQPSK(2Mbps)CH00 / CH39 /C78			

Frequency	20dB Bandwidth(MHz)	Result
2402 MHz	1.138	PASS
2441 MHz	1.126	PASS
2480 MHz	1.112	PASS



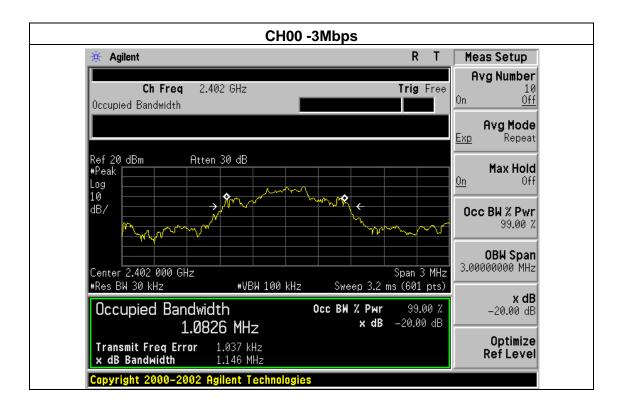




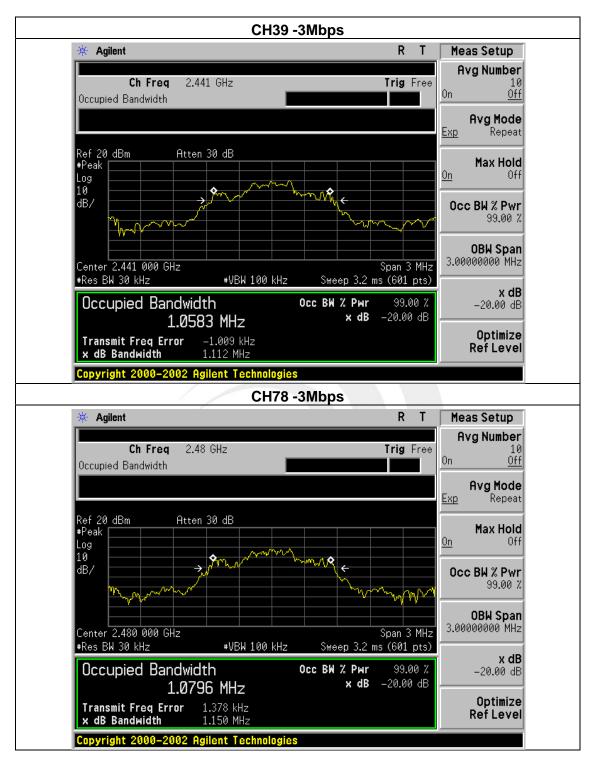


EUT:	Mobile phone	Model Name :	PICCOLO
Temperature:	<b>25</b> ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode : 8-DPSK(3Mbps)CH00 / CH39 /C78			

Frequency	20dB Bandwidth (MHz)	Result
2402 MHz	1.146	PASS
2441 MHz	1.112	PASS
2480 MHz	1.150	PASS









### 9. PEAK OUTPUT POWER TEST

## 9.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Peak	1 W or 0.125W		
(b)(i)	Output Power	Or if channel separation > 2/3 bandwidthprovided the systems operatewith an output power no greater than125 mW(20.96dBm)	2400-2483.5	PASS

#### 9.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: GFSK(1Mbps):RBW= 1MHz, VBW= 3MHz, Sweep time = Auto.
- c. Spectrum Setting :  $\pi/4$ -DQPSK(2Mbps):RBW= 3MHz, VBW= 3MHz, Sweep time = Auto.
- d. Spectrum Setting: 8-DPSK(3Mbps):RBW= 3MHz, VBW= 3MHz, Sweep time = Auto.

#### 9.3 TEST SETUP

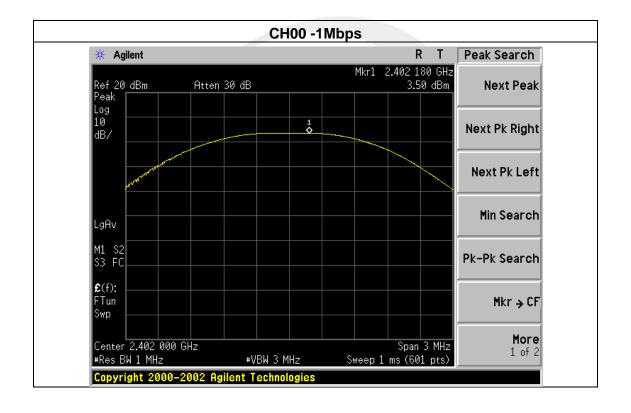
EUT	SPECTRUM
	ANALYZER

## 9.4 EUT OPERATION CONDITIONS

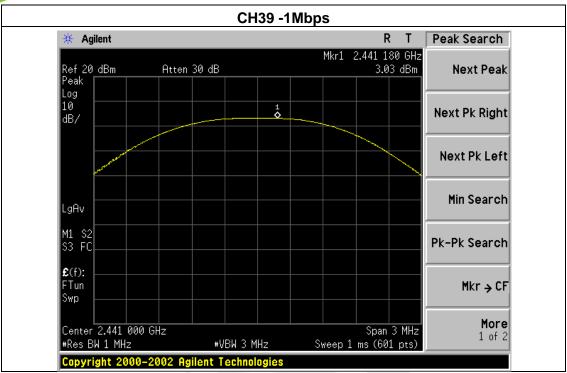


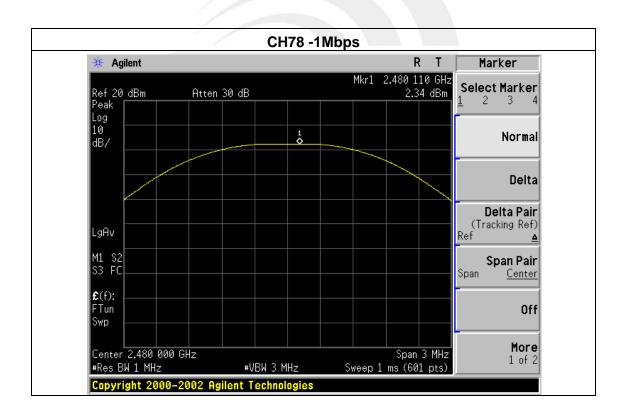
EUT:	Mobile phone	Model Name :	PICCOLO
Temperature :	<b>25</b> ℃	Relative Humidity:	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00/ CH39 /CH78 GFSK(1Mbps)		

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)
CH00	2402	3.50	30
CH39	2441	3.03	30
CH78	2480	2.34	30







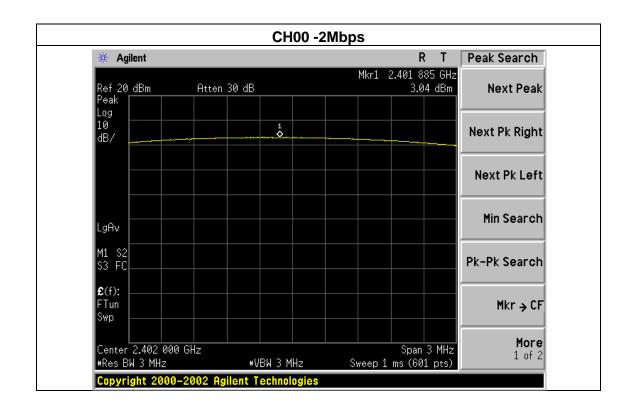




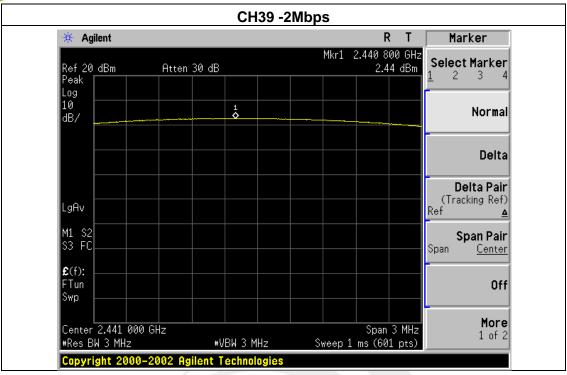
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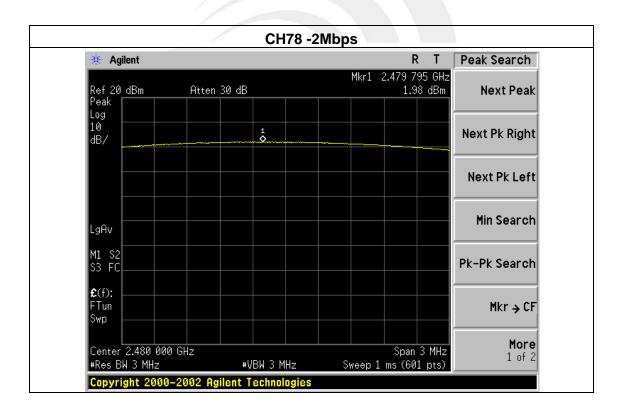
EUT:	Mobile phone	Model Name :	PICCOLO
Temperature :	25 ℃	Relative Humidity:	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode : CH00/ CH39 /CH78 π/4-DQPSK(2Mbps)			

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)
CH00	2402	3.04	20.96
CH39	2441	2.44	20.96
CH78	2480	1.98	20.96







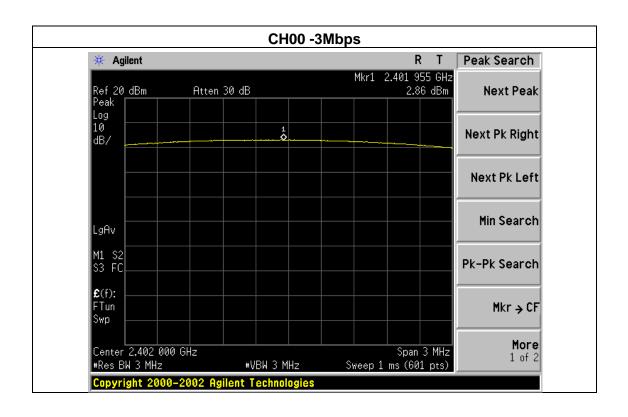




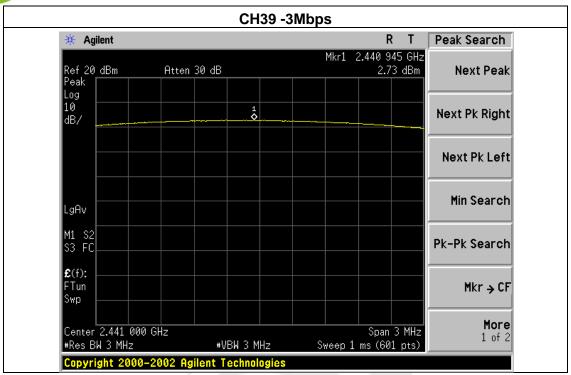


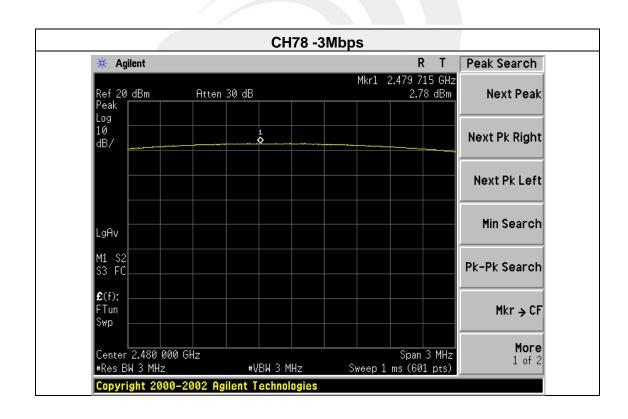
EUT:	Mobile phone	Model Name:	PICCOLO
Temperature:	<b>25</b> ℃	Relative Humidity:	60%
Pressure:	1012 hPa	Test Voltage:	DC 3.7V
Test Mode:	CH00/ CH39 /CH78 8-DPSK(3Mbps)		

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)
CH00	2402	2.86	20.96
CH39	2441	2.73	20.96
CH78	2480	2.78	20.96











## 10. ANTENNA REQUIREMENT

## 10.1 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.

## **10.2 EUT ANTENNA**

The EUT antenna is PIFA Antenna. It comply with the standard requirement.





## **APPENDIX- PHOTOS OF TEST SETUP**

## **Radiated Measurement Photos**







# **Conducted Measurement Photos**

