FCC Part15.247 Test Report

Product Name	:	HUAWEI Ascend G 302D; Ascend G 302D; TINO; Tino; HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth
Model No.	:	HUAWEI U8812D-5, U8812D-5, HUAWEI U8812D, U8812D
FCC ID	:	QISU8812D-5

Applicant	:	Huawei Technologies Co., Ltd.
Address	:	Bantian, Longgang District, Shenzhen, 518129 Guangdong, P. R. China

Date of Receipt	:	17/05/2012
Test Date	:	17/05/2012~26/06/2012
Issued Date	:	28/06/2012
Report No.	:	125S046R-RF-US-P06V01
Report Version	:	V 1.0

The test results relate only to the samples tested.
The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.
This report must not be used to claim product endorsement by TAF, CNAS or any agency of the Government.
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Test Report Certification

Issued Date : 28/06/2012
Report No. : 125S046R-RF-US-P06V01

QuieTek

Product Name	:	HUAWEI Ascend G 302D; Ascend G 302D; TINO; Tino; HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth
Applicant	:	Huawei Technologies Co., Ltd.
Address	:	Bantian, Longgang District, Shenzhen, 518129 Guangdong, P. R. China
Manufacturer	:	Huawei Technologies Co., Ltd.
Address	:	Bantian, Longgang District, Shenzhen, 518129 Guangdong, P. R. China
Model No.	:	HUAWEI U8812D-5, U8812D-5, HUAWEI U8812D, U8812D
FCC ID	:	QISU8812D-5
EUT Voltage	:	DC: 3.7V
Trade Name	:	HUAWEI
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart C: 2012 ANSI C63.4: 2009 ANSI C63.10: 2009
Test Result	:	Complied
Performed Location	:	Suzhou EMC Laboratory No.99 Hongye Rd., Suzhou Industrial Park Loufeng Hi-Tech Development Zone., Suzhou, China TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098 FCC Registration Number: 800392

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Laboratory Information

We, **QuieTek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scope:

Taiwan R.O.C.	**:**	**BSMI, NCC, TAF**
Germany	**:**	**TUV Rheinland**
Norway	**:**	**Nemko, DNV**
USA	**:**	**FCC, NVLAP**
Japan	**:**	**VCCI**
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The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site :http://www.quietek.com/tw/ctg/cts/accreditations.htm
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site : http://www.quietek.com/
If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

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TABLE OF CONTENTS

Description Page
1. General Information....7
1.1. EUT Description....7
1.2. Mode of Operation....11
1.3. Tested System Details....12
1.4. Configuration of Tested Systerm....13
1.5. EUT Exercise Software....14
2. Technical Test....15
2.1. Summary of Test Result....15
2.2. Test Environment....16
3. Conducted Emission....17
3.1. Test Equipment....17
3.2. Test Setup....17
3.3. Limit....18
3.4. Test Procedure....18
3.5. Uncertainty....18
3.6. Test Result....19
4. Radiated Emission....21
4.1. Test Equipment....21
4.2. Test Setup....22
4.3. Limit....23
4.4. Test Procedure....23
4.5. Uncertainty....23
4.6. Test Result....24
5. 20dB Bandwidth....27
5.1 Test Equipment....27
5.2 Test Setup....27
5.3 Limit....27
5.4 Test Procedure....28
5.5 Uncertainty....28
5.6 Test Result....29
6. Carrier Frequency Separation....35
6.1. Test Equipment....35
6.2. Test Setup....35
6.3. Limit....35
6.4. Test Procedure....36
6.5. Uncertainty....36
6.6. Test Result....37

7. Number of Hopping Frequencies 43
7.1. Test Equipment 43
7.2. Test Setup 43
7.3. Limit 43
7.4. Test Procedure 44
7.5. Uncertainty 44
7.6. Test Result 45
8. Time of Occupancy (Dwell Time) 54
8.1. Test Equipment 54
8.2. Test Setup 54
8.3. Limit 54
8.4. Test Procedure 55
8.5. Uncertainty 55
8.6. Test Result 56
9. Peak Output Power 62
9.1. Test Equipment 62
9.2. Test Setup 62
9.3. Limit 62
9.4. Test Procedure 63
9.5. Uncertainty 63
9.6. Test Result 64
10. Band-edge Compliance of RF Conducted Emissions 70
10.1. Test Equipment 70
10.2. Test Setup 70
10.3. Limit 70
10.4. Test Procedure 71
10.5. Uncertainty 71
10.6. Test Result 72
11. Spurious RF Conducted Emissions 76
11.1. Test Equipment 76
11.2. Test Setup 76
11.3. Limit 76
11.4. Test Procedure 77
11.5. Uncertainty 77
11.6. Test Result 78
12. Radiated Emission Band Edge 29
12.1. Test Equipment 84
12.2. Test Setup 85

12.3. Limit.....85
12.4. Test Procedure.....85
12.5. Uncertainty.....86
12.6. Test Result.....87

1. General Information

1.1. EUT Description

Product Name	HUAWEI Ascend G 302D; Ascend G 302D; TINO; Tino; HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth
Model No.	HUAWEI U8812D-5, U8812D-5, HUAWEI U8812D, U8812D
Hardware Version	A52_MB_V3.0
Software Version	U8812DV100R001C41B100SP04
Device Category	Portable
RF Exposure Environment	Uncontrolled
Antenna Type	Internal
GPS	
Operate Frequency	1575.42MHz
Type of modulation	BPSK
2G	
Support Band	GSM850/GSM900/DCS1800/PCS1900
GPRS Type	Class B
GPRS Class	Class 12
Uplink	GSM 850: 824~849MHz PCS 1900: 1850~1910MHz
Downlink	GSM 850: 869~894MHz PCS 1900: 1930~1990MHz
Release Version	Rel-6
Type of modulation	GMSK for GSM/GPRS; 8PSK for EDGE
Antenna Gain	GSM 850: -2.3dBi PCS1900: -0.5dBi
3G	
Support Band	WCDMA Band I/WCDMA Band II/WCDMA Band V/ WCDMA Band VIII
Uplink	WCDMA Band V: 824~849MHz WCDMA Band II: 1850~1910MHz
Downlink	WCDMA Band V: 869~894MHz WCDMA Band II: 1930~1990MHz
Release Version	UMTS FDD: Rel-6
Type of modulation	QPSK

Antenna Gain	WCDMA Band V: -2.3dBi WCDMA Band II: -0.5dBi
Bluetooth	
Bluetooth Frequency	2402~2480MHz
Bluetooth Version	V2.1 + EDR
Type of modulation	FHSS
Data Rate	1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps (8DPSK)
Antenna Gain	-4.0dBi
Wi-Fi	
Hotspots Function	YES
Wi-Fi Frequency	802.11b/g/n(20MHz): 2412 ~ 2462 MHz 802.11n(40MHz): 2422 ~ 2452 MHz
Type of modulation	802.11b: DSSS; 802.11g/n: OFDM
Data Rate	802.11b: 1/2/5.5/11 Mbps
	802.11g: 6/9/12/18/24/36/48/54 Mbps
	802.11n: up to 150 Mbps
Antenna Gain	-4.0dBi
Components	
Headset Model Number #1	HUAWEI/ 125G#+3261# 3.5MM-2
Headset Model Number #2	HUAWEI/ MEMD1532A761A00
Battery #1	Brand Name: HUAWEI M/N: HB5N1 Rated Voltage and Capacitance: 3.7V/1350mAh S/N: BAAC227F98000344
Battery #2	Brand Name: HUAWEI M/N: HB5N1H Rated Voltage and Capacitance: 3.7V/1500mAh S/N: BAAC424F13800165
Battery #3	Brand Name: HUAWEI M/N: HB5N1 Rated Voltage and Capacitance: 3.7V/1350mAh S/N: GAGC219Z98008748
Adapter #1	Brand Name: HUAWEI M/N: HW-050100U1W Input: 100-240V~50/60Hz 0.2A MAX Output: 5Vdc, 1A S/N: TPAB61442672

Adapter #2	Brand Name: HUAWEI M/N: HW-050100U1W Input: 100-240V~50/60Hz 0.2A MAX Output: 5Vdc, 1A S/N: HKAB51621440

Note 1: They are only for different marketing requirement.

Note 2: Headset #1 and #2 have the same circuit.

Bluetooth Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2403 MHz	02	2404 MHz	03	2405 MHz
04	2406 MHz	05	2407 MHz	06	2408 MHz	07	2409 MHz
08	2410 MHz	09	2411 MHz	10	2412 MHz	11	2413 MHz
12	2414 MHz	13	2415 MHz	14	2416 MHz	15	2417 MHz
16	2418 MHz	17	2419 MHz	18	2420 MHz	19	2421 MHz
20	2422 MHz	21	2423 MHz	22	2424 MHz	23	2425 MHz
24	2426 MHz	25	2427 MHz	26	2428 MHz	27	2429 MHz
28	2430 MHz	29	2431 MHz	30	2432 MHz	31	2433 MHz
32	2434 MHz	33	2435 MHz	34	2436 MHz	35	2437 MHz
36	2438 MHz	37	2439 MHz	38	2440 MHz	39	2441 MHz
40	2442 MHz	41	2443 MHz	42	2444 MHz	43	2445 MHz
44	2446 MHz	45	2447 MHz	46	2448 MHz	47	2449 MHz
48	2450 MHz	49	2451 MHz	50	2452 MHz	51	2453 MHz
52	2454 MHz	53	2455 MHz	54	2456 MHz	55	2457 MHz
56	2458 MHz	57	2459 MHz	58	2460 MHz	59	2461 MHz
60	2462 MHz	61	2463 MHz	62	2464 MHz	63	2465 MHz
64	2466 MHz	65	2467 MHz	66	2468 MHz	67	2469 MHz
68	2470 MHz	69	2471 MHz	70	2472 MHz	71	2473 MHz
72	2474 MHz	73	2475 MHz	74	2476 MHz	75	2477 MHz
76	2478 MHz	77	2479 MHz	78	2480 MHz	N/A	N/A

1.2. Mode of Operation

QuieTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Transmitter-1Mbps(GFSK_DH5)
Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)
Mode 3: Transmitter-3Mbps(8DPSK_DH5)

Note:

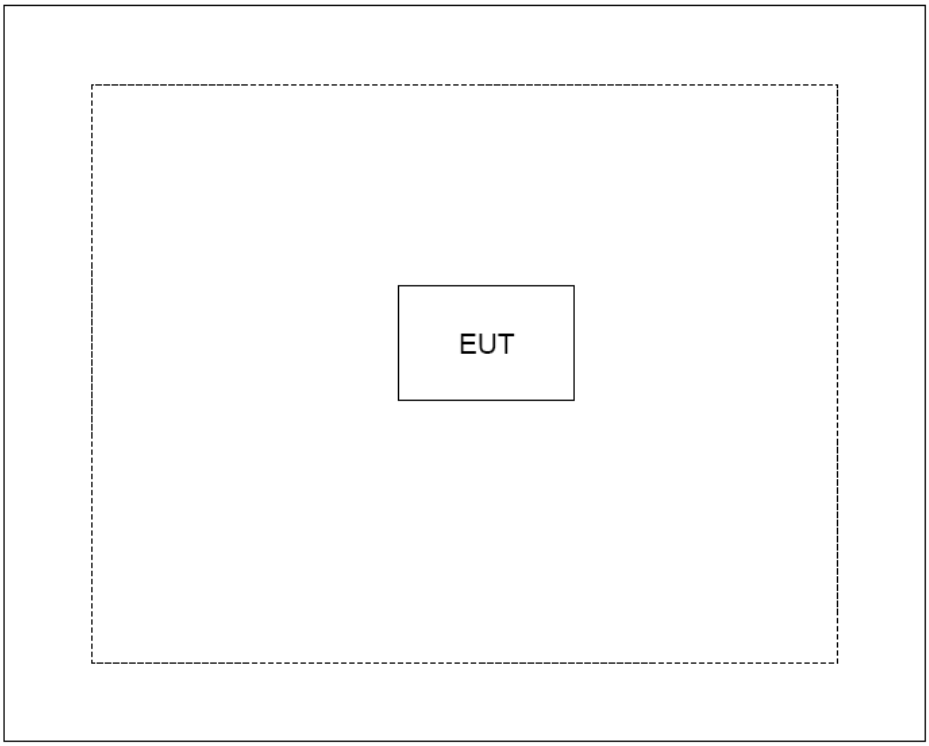
1. Regards to the frequency band operation: the lowest、middle and highest frequency of channel were selected to perform the test, then shown on this report.
2. For portable device, radiated spurious emission was verified over X, Y, Z axis, and shown the worst case on this report.
3. This device is a composite device in accordance with Part 15 Subpart B regulations. The report number is 125S046R-HP-US-P01V01.

1.3. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	N/A	N/A	N/A	N/A	N/A

1.4. Configuration of Tested System

Connection Diagram	
	
Signal Cable Type	Signal cable Description

1.5. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of equipment.
3	Execute the software provided by applicant on the phone.
4	Select test channel and test mode to test.

2. Technical Test

2.1. Summary of Test Result

☒ No deviations from the test standards

☐ Deviations from the test standards as below description:

Performed Test Item	Normative References	Test Performed	Deviation
Conducted Emission	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.207	Yes	No
Radiated Emission	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.209	Yes	No
20dB Bandwidth	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.247(a)(1)	Yes	No
Carrier Frequency Separation	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.247(a)(1)	Yes	No
Number of Hopping Frequencies	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.247(a)(1)(iii)	Yes	No
Time of Occupancy (Dwell Time)	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.247(a)(1)(iii)	Yes	No
Peak Output Power	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.247(b)(1)	Yes	No
Band-edge Compliance of RF Conducted Emissions	FCC CFR Title 47 Part 15 Subpart C: 2012 Section 15.215(c), 15.247(d)	Yes	No
Spurious RF Conducted Emissions	FCC CFR Title 47 Part 15 Subpart C: 2012 15.247(d)	Yes	No
Radiated Emission Band Edge	FCC CFR Title 47 Part 15 Subpart C: 2012 15.247(d)	Yes	No

2.2. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	50
Barometric pressure (mbar)	860-1060	950-1000

3. Conducted Emission

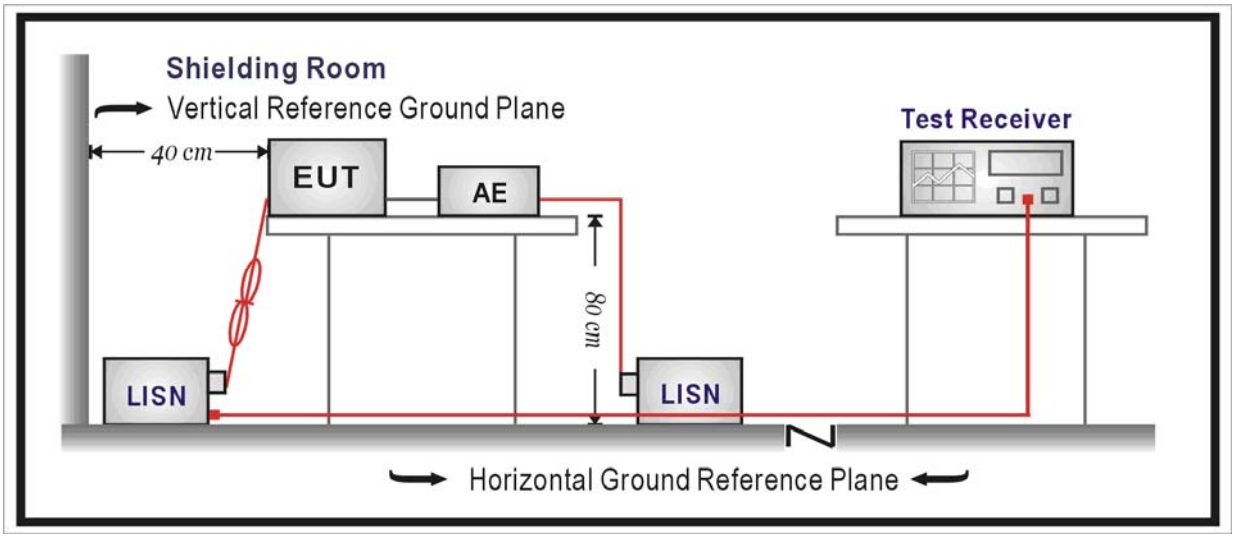
3.1. Test Equipment

Conducted Emission / TR-1

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100726	2013.04.18
Two-Line V-Network	R&S	ENV216	100043	2013.04.18
Two-Line V-Network	R&S	ENV216	100044	2012.09.07
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	2013.05.04
50ohm Termination	SHX	TF2	07081401	2012.09.22
Temperature/Humidity Meter	zhicheng	ZC1-2	TR1-TH	2013.01.10

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

3.2. Test Setup



3.3. Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

3.4. Test Procedure

According to FCC ANSI C63.4: 2009 & ANSI C63.10: 2009.

The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

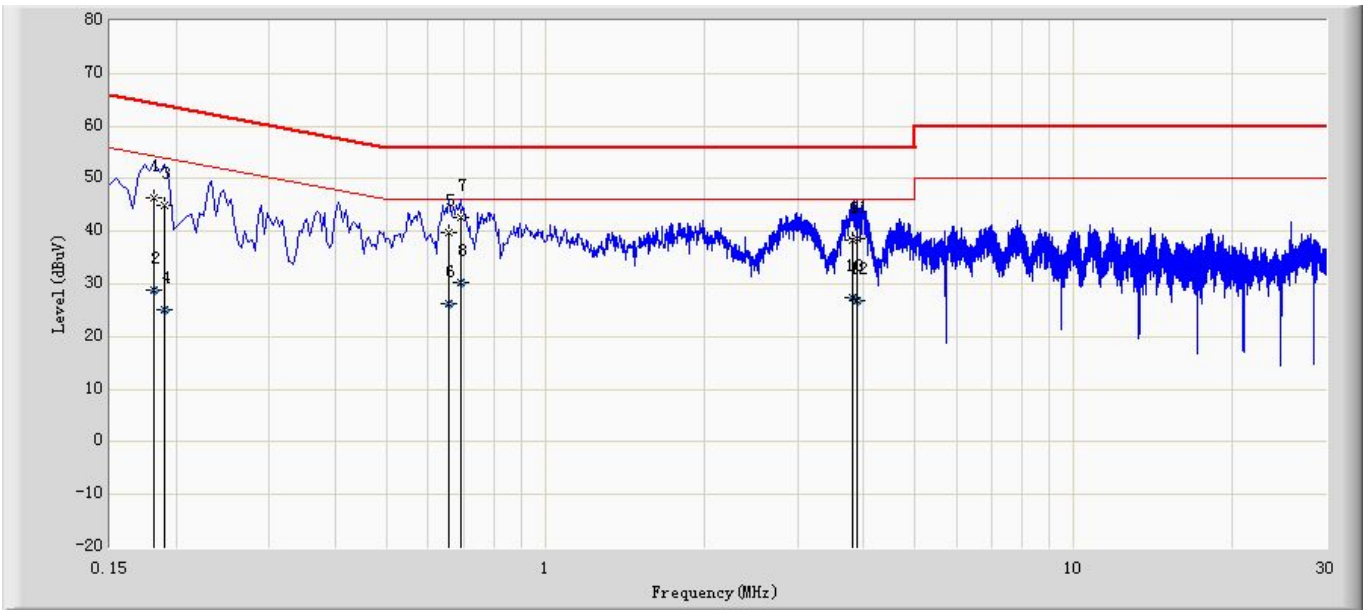
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

3.5. Uncertainty

The measurement uncertainty is defined as ± 2.02 dB

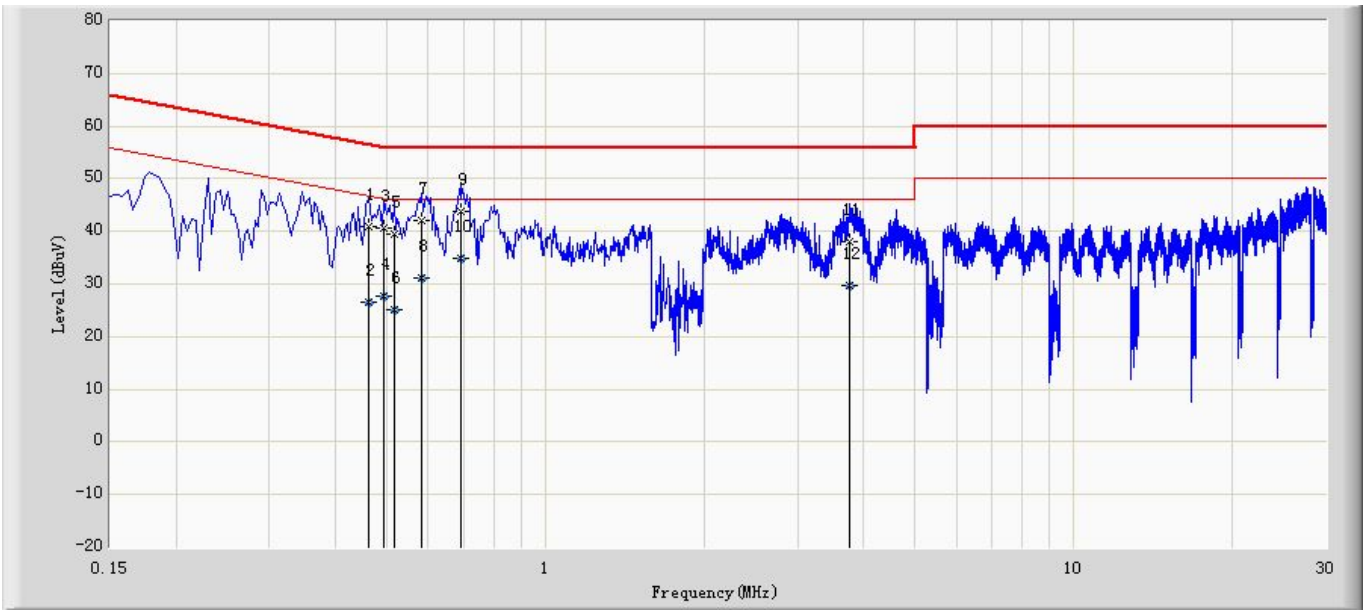
3.6. Test Result

Engineer: Jack	
Site: TR1	Time: 2012/06/20 - 12:35
Limit: FCC_Part15.207_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101044(0.009-30MHz)	Polarity: Line
EUT: Mobile Phone	Power: AC 120V/60Hz
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.182	46.477	36.621	-17.917	64.394	9.857	QP
2		0.182	28.913	19.057	-25.481	54.394	9.857	AV
3		0.190	44.936	35.078	-19.100	64.037	9.858	QP
4		0.190	25.241	15.382	-28.796	54.037	9.858	AV
5		0.658	39.730	29.876	-16.270	56.000	9.855	QP
6		0.658	26.123	16.268	-19.877	46.000	9.855	AV
7	*	0.690	42.685	32.842	-13.315	56.000	9.843	QP
8		0.690	30.401	20.558	-15.599	46.000	9.843	AV
9		3.810	38.289	28.453	-17.711	56.000	9.836	QP
10		3.810	27.322	17.486	-18.678	46.000	9.836	AV
11		3.886	38.717	28.881	-17.283	56.000	9.836	QP
12		3.886	26.916	17.080	-19.084	46.000	9.836	AV

Engineer: Jack	
Site: TR1	Time: 2012/06/20 - 12:39
Limit: FCC_Part15.207_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101044(0.009-30MHz)	Polarity: Neutral
EUT: Mobile Phone	Power: AC 120V/60Hz
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.462	40.838	30.797	-15.819	56.657	10.041	QP
2		0.462	26.671	16.631	-19.985	46.657	10.041	AV
3		0.494	40.763	30.711	-15.338	56.100	10.052	QP
4		0.494	27.593	17.541	-18.507	46.100	10.052	AV
5		0.518	39.604	29.560	-16.396	56.000	10.043	QP
6		0.518	25.050	15.007	-20.950	46.000	10.043	AV
7		0.582	42.140	32.154	-13.860	56.000	9.986	QP
8		0.582	31.125	21.139	-14.875	46.000	9.986	AV
9		0.690	43.768	33.879	-12.232	56.000	9.889	QP
10	*	0.690	34.922	25.033	-11.078	46.000	9.889	AV
11		3.766	38.022	27.978	-17.978	56.000	10.043	QP
12		3.766	29.820	19.776	-16.180	46.000	10.043	AV

4. Radiated Emission

4.1. Test Equipment

Radiated Emission / AC-2

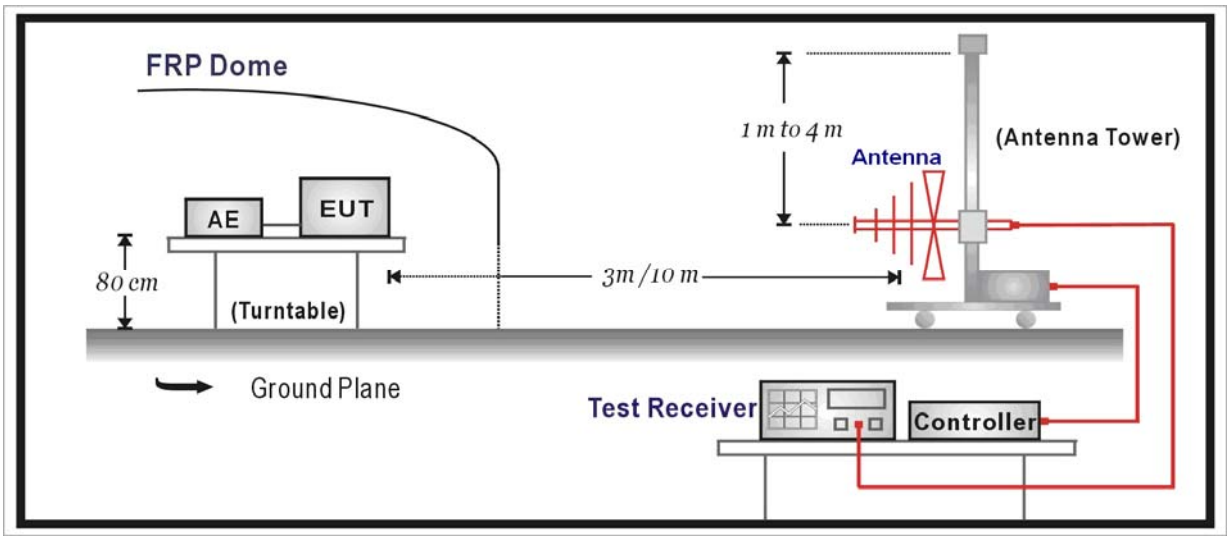
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
EMI Test Receiver	R&S	ESCI	100573	2013.04.18
Loop Antenna	R&S	HFH2-Z2	833799/003	2012.11.22
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2012.10.18
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2013.03.02
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC2-TH	2013.05.07

Radiated Emission / AC-5

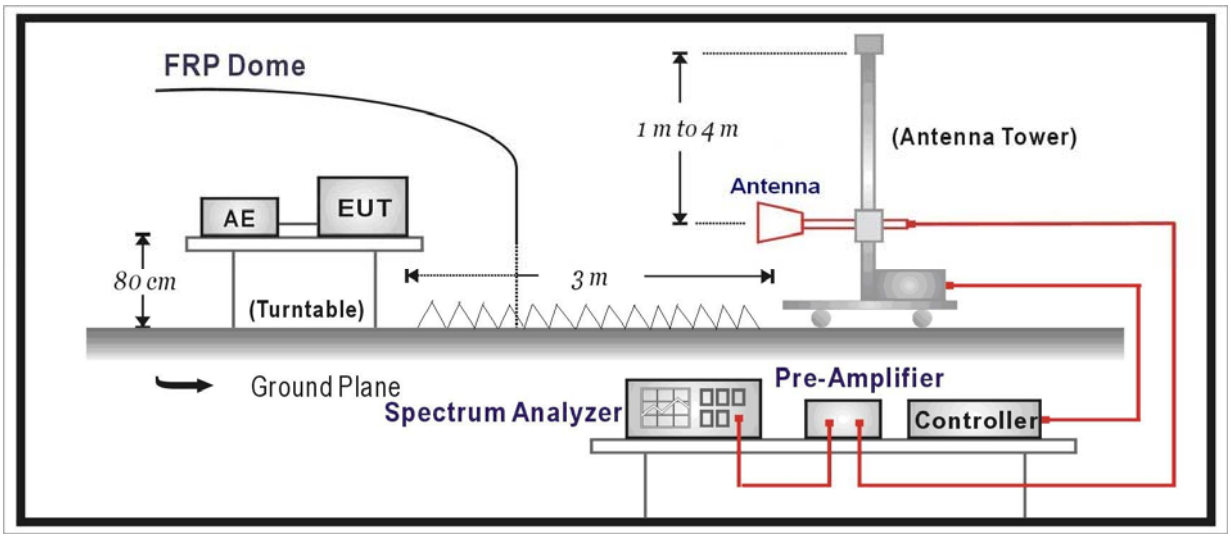
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2013.04.18
Preamplifier	Miteq	NSP1800-25	1364185	2013.05.04
Preamplifier	QuieTek	AP-040G	CHM-0906001	2013.05.04
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2012.10.18
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2014.06.08
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2013.11.24
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2013.03.02
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2013.03.02
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2013.03.02
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2013.01.10

4.2. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Limit

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Distance (m)	Level (dBuV/m)
30 - 88	3	40
88 - 216	3	43.5
216 - 960	3	46
Above 960	3	54

Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.4. Test Procedure

According to ANSI C63.10: 2009.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

The frequency range from 30MHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the “cone of radiation” of EUT. The 3dB beamwidth is 60~10 degrees for H-plane and 90~10 degrees for E-plane.

4.5. Uncertainty

The measurement uncertainty above 1G is defined as ± 3.9 dB

below 1G is defined as ± 3.8 dB

4.6. Test Result

All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:
Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;
Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.
Measure Level = Reading Level + Cable Loss + Antenna Factor – Preamplifier Gain

Mode 1: Transmitter-1Mbps(GFSK_DH5)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
0	H	2402.0	62.9	31.2	94.1	Fundamental	/	PK
	V	539.3	4.4	20.9	25.3	46	-20.7	QP
	V	780.3	0.3	22.6	22.9	46	-23.1	QP
	V	3216.5	52.5	-11.4	41.1	54(Note)	-12.9	PK
	V	4804.0	51.4	-9.4	42.0	54(Note)	-12.0	PK
	H	7206.0	48.3	-4.6	43.7	54(Note)	-10.3	PK
	H	24000.0	59.1	-8.9	50.2	54(Note)	-3.8	PK
39	H	2441.0	62.7	31.2	94.5	Fundamental	/	PK
	H	619.8	-1.1	21.2	20.1	46	-25.9	QP
	H	755.6	1.8	22.3	24.1	46	-21.9	QP
	H	3286.5	51.2	-11.2	40.0	54(Note)	-14.0	PK
	V	4882.0	51.3	-9.2	42.1	54(Note)	-11.9	PK
	H	7323.0	47.4	-4.1	43.3	54(Note)	-10.7	PK
	H	24000.0	59.1	-8.9	50.2	54(Note)	-3.8	PK
78	H	2480.0	64.1	31.2	95.3	Fundamental	/	PK
	V	539.3	3.9	20.9	24.8	46	-21.2	QP
	H	631.9	1.4	21.2	22.6	46	-23.4	QP
	H	3250.5	51.9	-11.2	40.7	54(Note)	-13.3	PK
	V	4944.0	57.2	-8.9	48.3	54(Note)	-5.7	PK
	V	7440.0	47.3	-3.7	43.6	54(Note)	-10.4	PK
	H	24000.0	59.1	-8.9	50.2	54(Note)	-3.8	PK

Note : This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode 2: Transmitter-2Mbps(Pi/4 DQPSK _DH5)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
0	H	2402.0	59.9	31.2	91.1	Fundamental	/	PK
	V	539.3	2.9	20.9	23.8	46	-22.2	QP
	V	567.4	0.9	21.3	22.2	46	-23.8	QP
	H	3216.5	51.2	-11.2	40.0	54(Note)	-14.0	PK
	V	4804.0	50.9	-9.4	41.5	54(Note)	-12.5	PK
	H	7206.0	48.1	-4.6	43.5	54(Note)	-10.5	PK
	H	24000.0	59.1	-8.9	50.2	54(Note)	-3.8	PK
39	H	2441.1	61.6	31.2	92.8	Fundamental	/	PK
	H	456.3	-0.5	18.9	18.4	46	-27.6	QP
	H	619.8	-1.1	21.2	20.1	46	-25.9	QP
	H	3250.5	51.1	-11.2	39.9	54(Note)	-14.1	PK
	H	4882.0	50.7	-9.2	41.5	54(Note)	-12.5	PK
	V	7323.0	47.6	-4.1	43.5	54(Note)	-10.5	PK
	H	24000.0	59.1	-8.9	50.2	54(Note)	-3.8	PK
78	H	2480.0	62.9	31.2	94.1	Fundamental	/	PK
	H	631.9	-0.2	21.2	21.0	46	-25.0	QP
	H	753.6	0.0	22.3	22.3	46	-23.7	QP
	V	3286.5	51.6	-11.4	40.2	54(Note)	-13.8	PK
	V	4944.0	57.9	-8.9	49.0	54(Note)	-5.0	PK
	V	7440.0	47.3	-3.7	43.6	54(Note)	-10.4	PK
	H	24000.0	59.1	-8.9	50.2	54(Note)	-3.8	PK

Note : This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode 3: Transmitter-3Mbps(8DPSK_DH5)

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
0	V	2402.0	59.6	31.2	90.8	Fundamental	/	PK
	H	619.8	-0.6	21.2	20.6	46	-25.4	QP
	H	780.3	1.7	22.6	24.3	46	-21.7	QP
	H	3220.0	51.5	-11.2	40.3	54(Note)	-13.7	PK
	V	4804.0	51.6	-9.4	42.2	54(Note)	-11.8	PK
	V	7206.0	48.2	-4.6	43.6	54(Note)	-10.4	PK
	H	24000.0	59.1	-8.9	50.2	54(Note)	-3.8	PK
39	H	2441.0	61.0	31.2	92.2	Fundamental	/	PK
	V	619.8	-0.4	21.2	20.8	46	-25.2	QP
	V	755.6	-1.4	22.3	20.9	46	-25.1	QP
	V	3250.5	51.1	-11.4	39.7	54(Note)	-14.3	PK
	H	4882.0	50.5	-9.2	41.3	54(Note)	-12.7	PK
	V	7323.0	47.8	-4.1	43.7	54(Note)	-10.3	PK
	H	24000.0	59.1	-8.9	50.2	54(Note)	-3.8	PK
78	H	2480.0	63.8	31.2	95.0	Fundamental	/	PK
	V	439.8	2.1	18.5	20.6	46	-25.4	QP
	V	753.6	0.8	22.3	23.1	46	-22.9	QP
	H	3286.5	51.6	-11.2	40.4	54(Note)	-13.6	PK
	V	4944.0	57.2	-8.9	48.3	54(Note)	-5.7	PK
	V	7440.0	46.9	-3.7	43.2	54(Note)	-10.8	PK
	H	24000.0	59.1	-8.9	50.2	54(Note)	-3.8	PK

Note : This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

5. 20dB Bandwidth

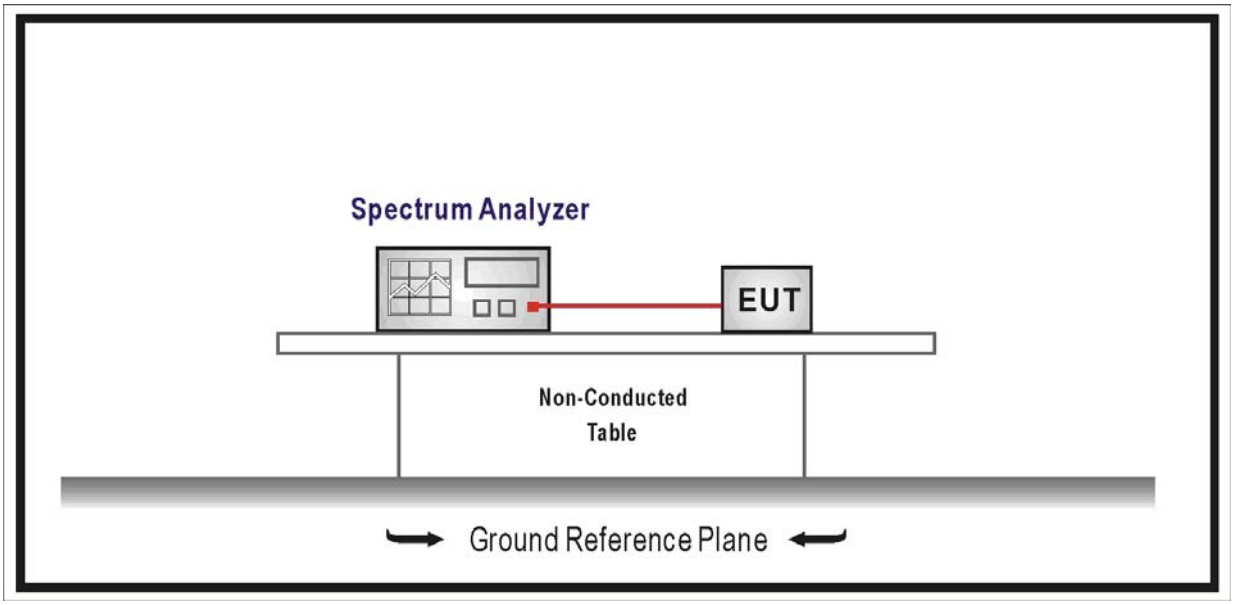
5.1 Test Equipment

20dB Bandwidth / TR8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

5.2 Test Setup



5.3 Limit

- For frequency hopping systems operating in 2400-2483.5 MHz band, no limitation.
- For frequency hopping systems operating in 902-928 MHz band, the maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
- For frequency hopping systems operating in 5725-5850 MHz band, the maximum 20 dB bandwidth of the hopping channel is 1 MHz.

5.4 Test Procedure

According to ANSI C63.10: 2009.
Use the following spectrum analyzer settings:
Span = approximately 2 to 3 times the 20dB bandwidth, centered on a hopping channel
RBW ≧ 1% of the 20dB bandwidth
VBW ≧ RBW
Sweep = auto
Detector function = peak
Trace = max hold
The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize.
Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

5.5 Uncertainty

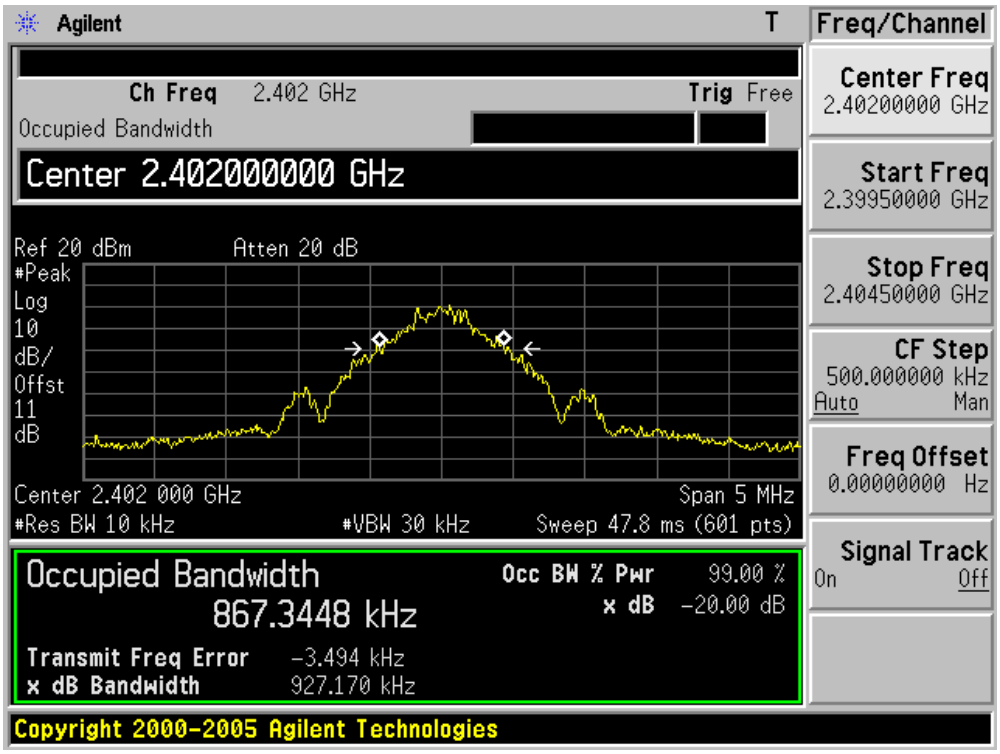
The measurement uncertainty is defined as ± 1 kHz

5.6 Test Result

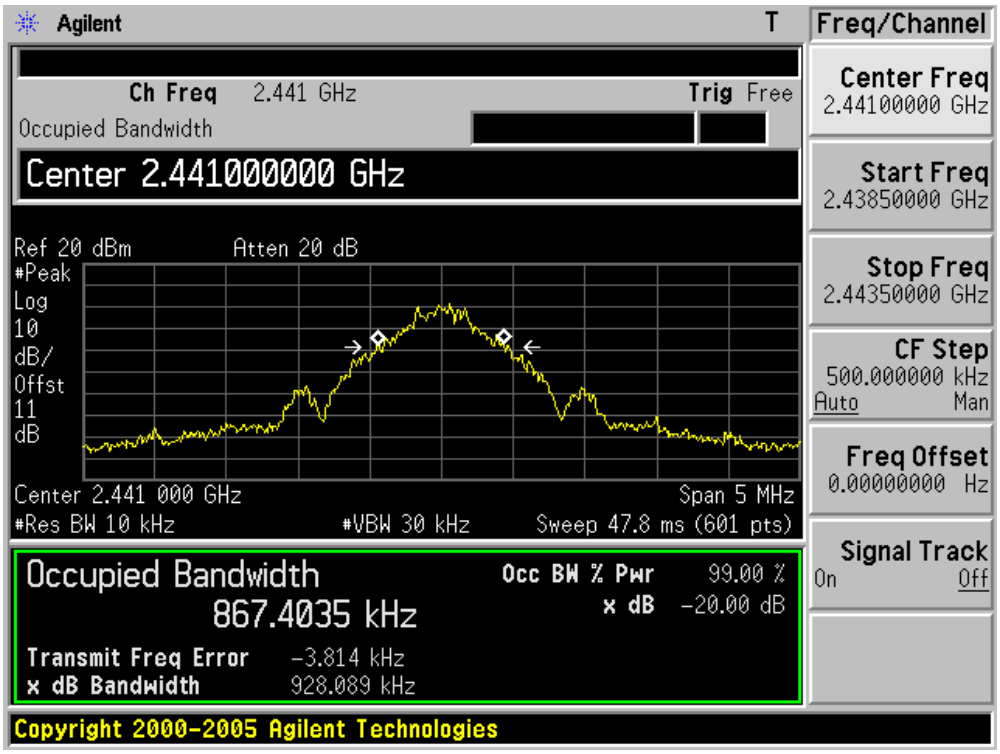
Product	:	Mobile Phone
Test Item	:	Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
00	2402	927.17	867.34
39	2441	928.09	867.40
78	2480	927.45	864.59

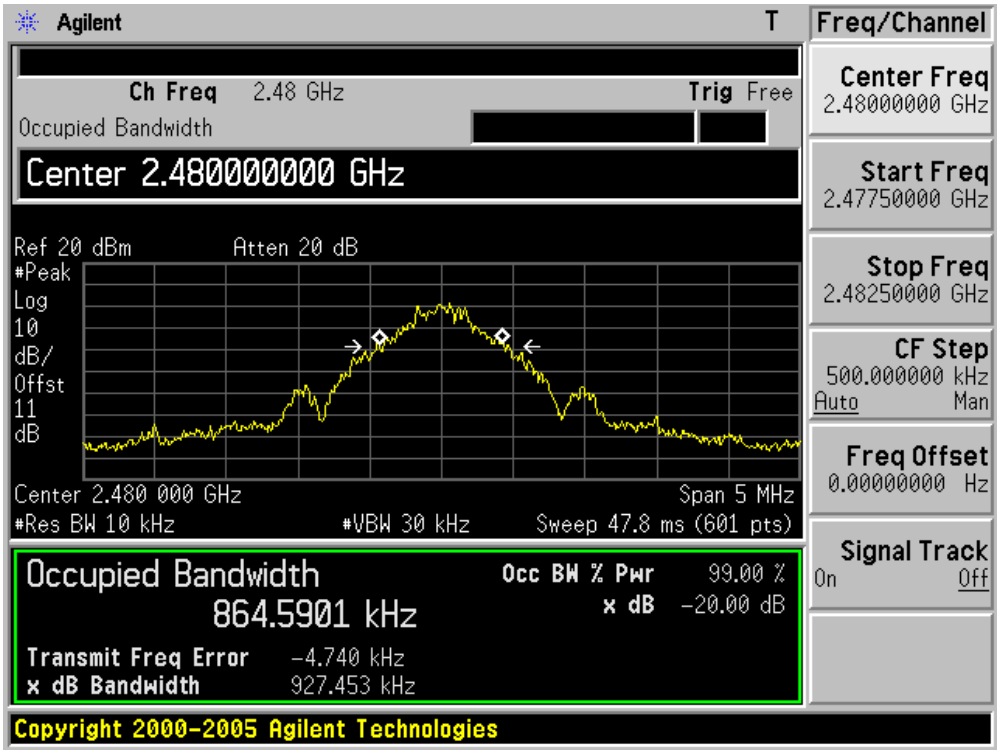
Channel 00 (2402MHz)



Channel 39 (2441MHz)



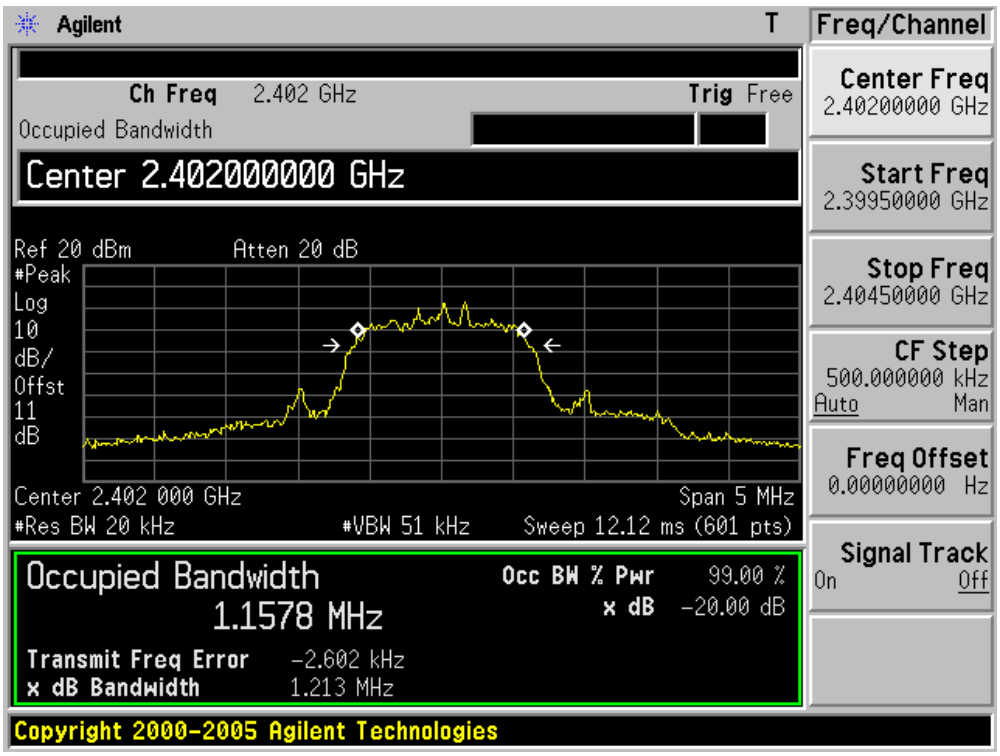
Channel 78 (2480MHz)



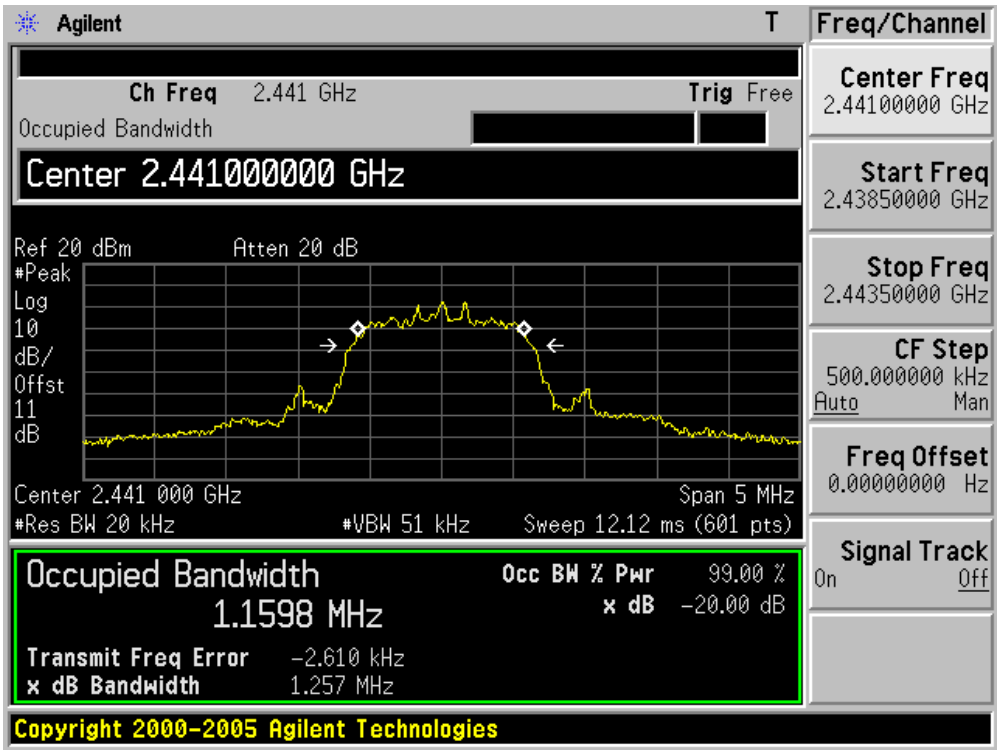
Product	:	Mobile Phone
Test Item	:	Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)

Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
00	2402	1213.0	1157.8
39	2441	1257.0	1159.8
78	2480	1235.0	1161.3

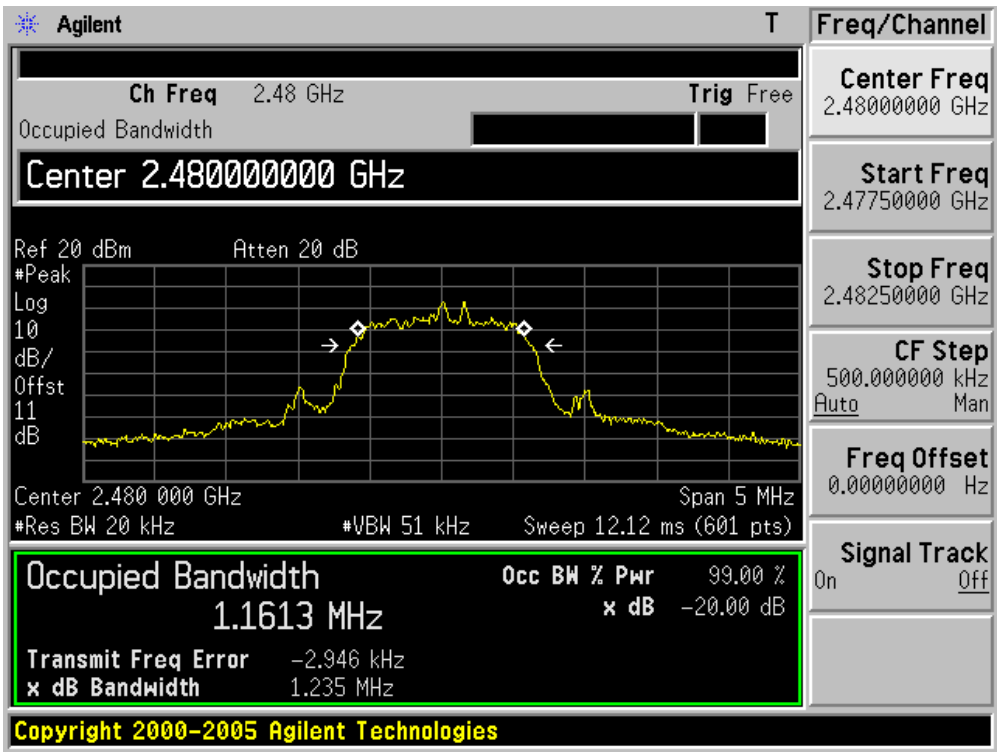
Channel 00 (2402MHz)



Channel 39 (2441MHz)



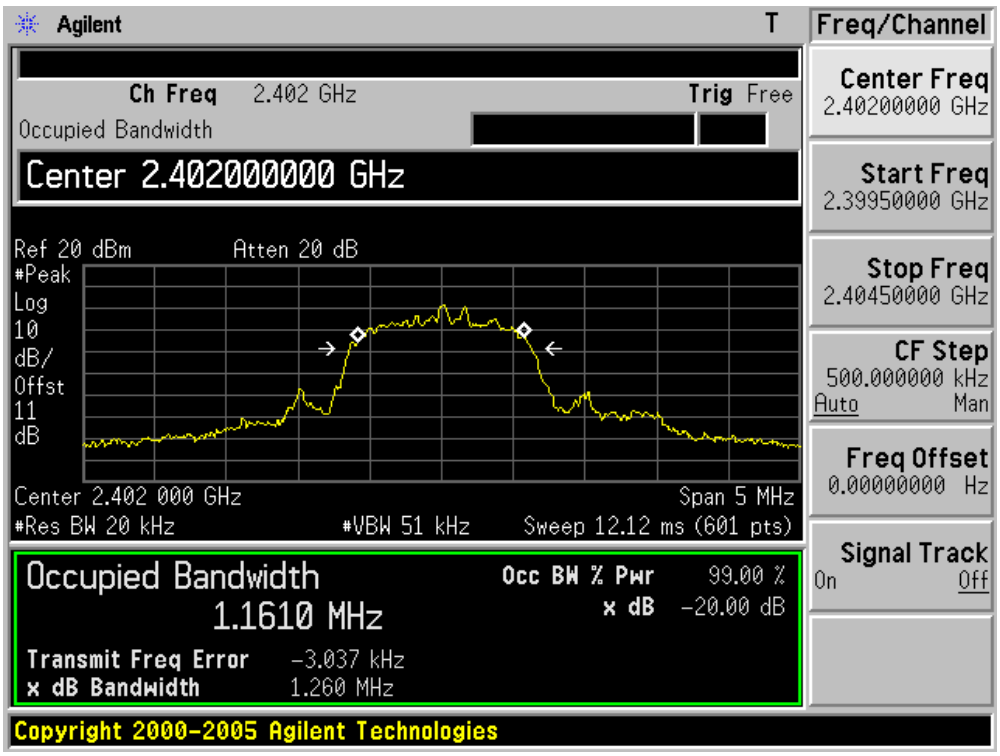
Channel 78 (2480MHz)



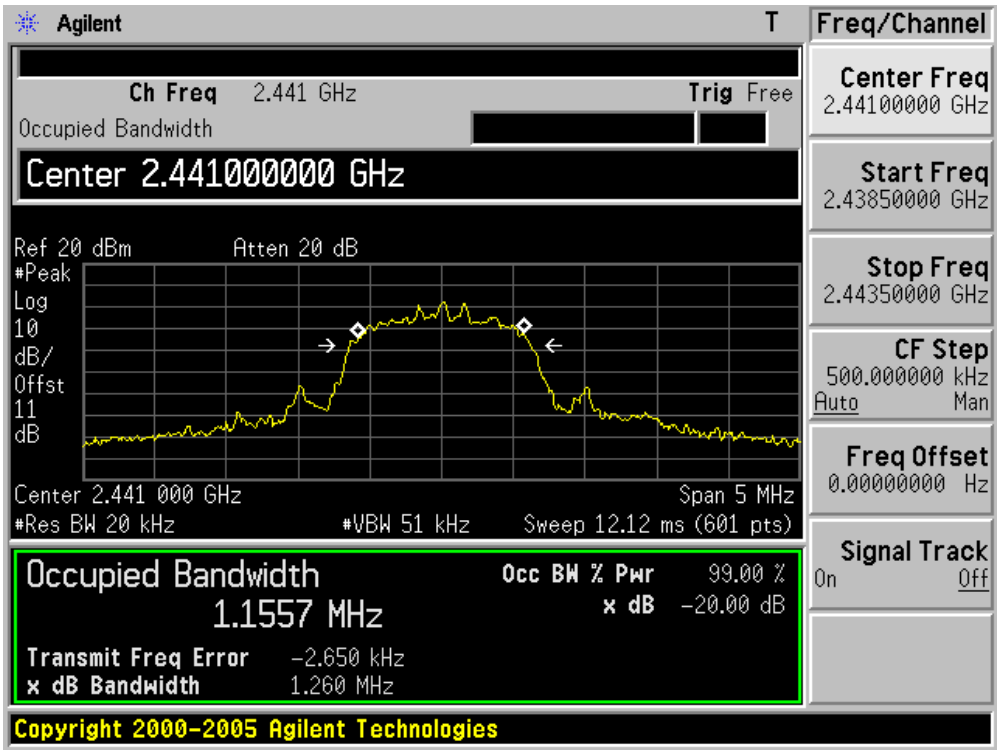
Product	:	Mobile Phone
Test Item	:	Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 3: Transmitter-3Mbps(8DPSK_DH5)

Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
00	2402	1260.0	1161.0
39	2441	1260.0	1155.7
78	2480	1260.0	1154.1

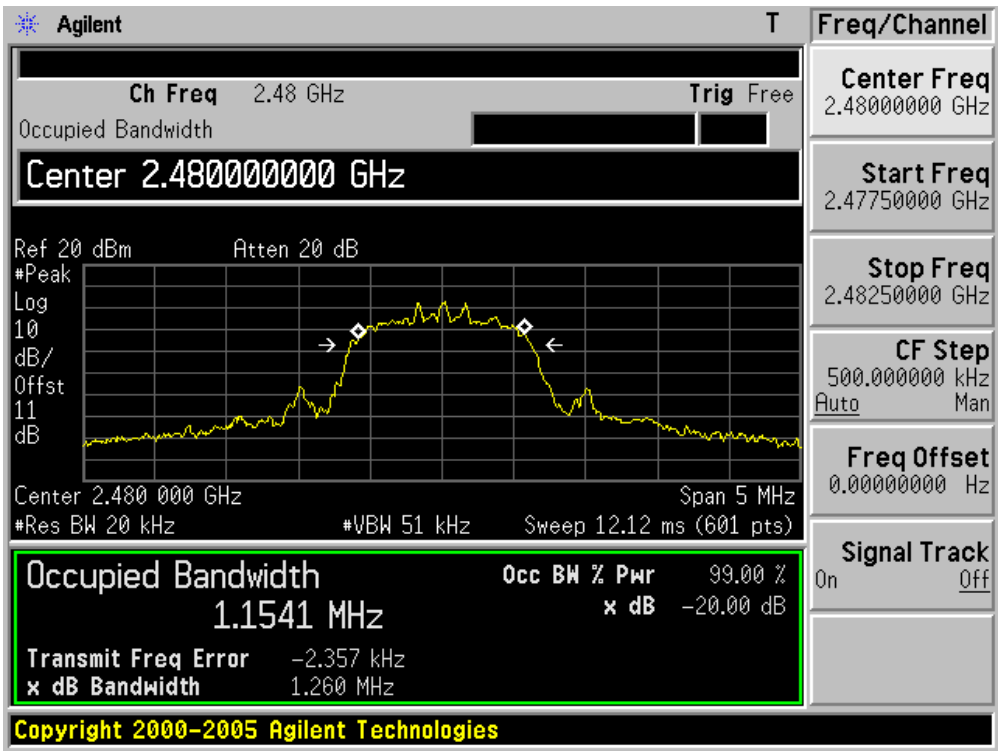
Channel 00 (2402MHz)



Channel 39 (2441MHz)



Channel 78 (2480MHz)



6. Carrier Frequency Separation

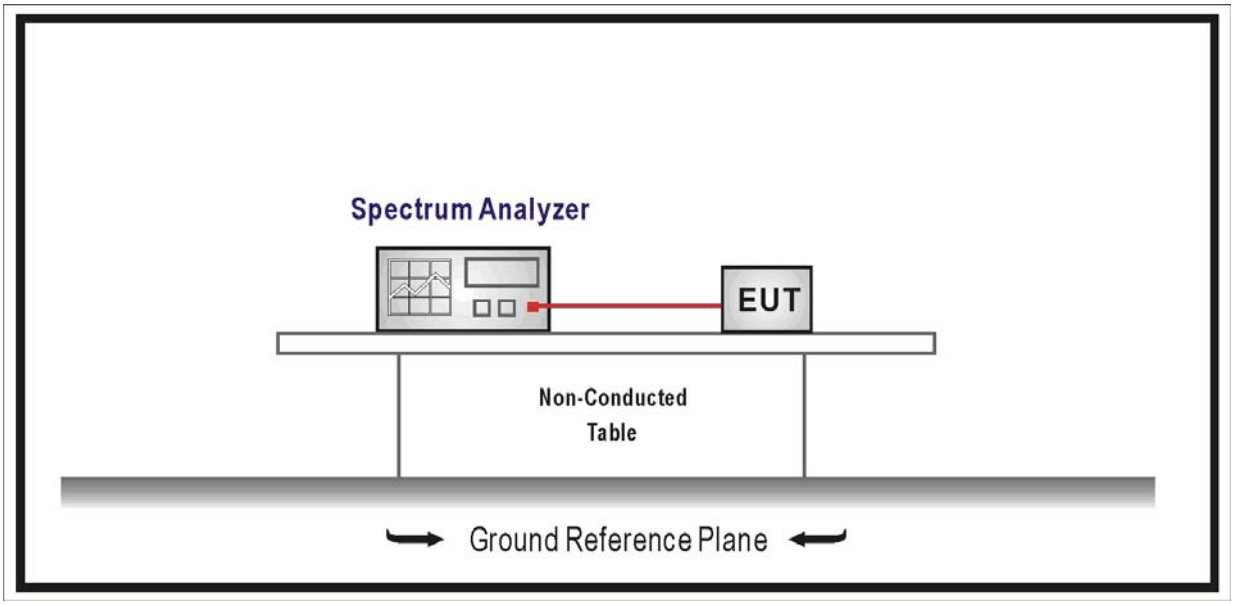
6.1. Test Equipment

Carrier Frequency Separation / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

6.2. Test Setup



6.3. Limit

- Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping

channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

- For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less then 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
- Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

6.4. Test Procedure

According to ANSI C63.10: 2009.
The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels
Resolution (or IF) Bandwidth (RBW) ≧ 1% of the span
Video (or Average) Bandwidth VBW ≧ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

6.5. Uncertainty

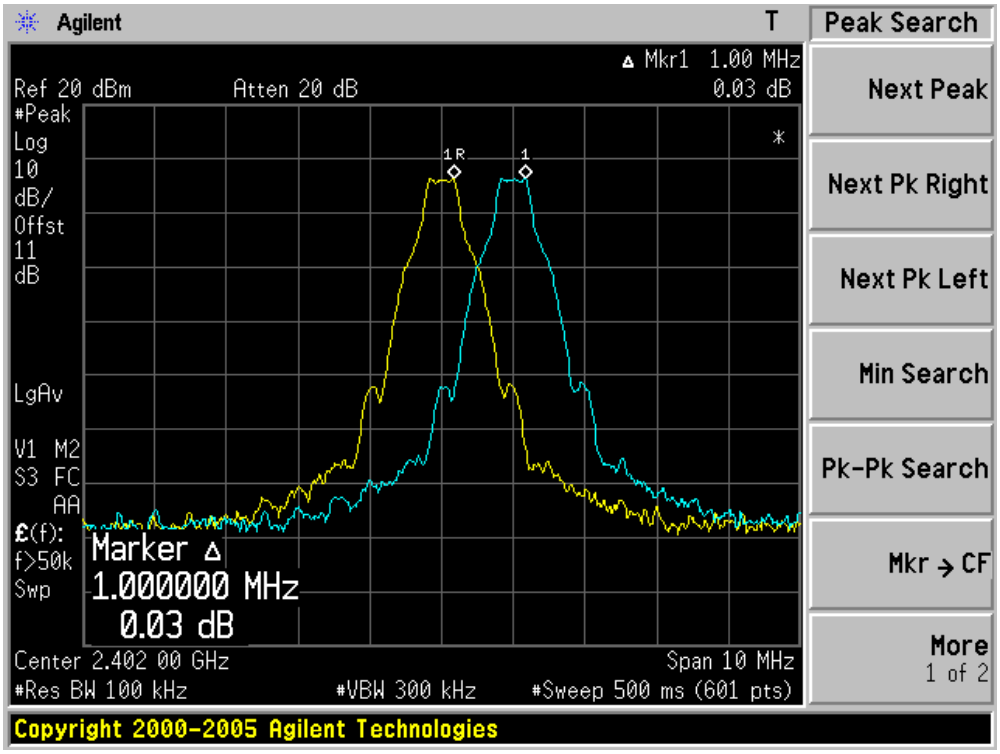
The measurement uncertainty is defined as ± 1 kHz

6.6. Test Result

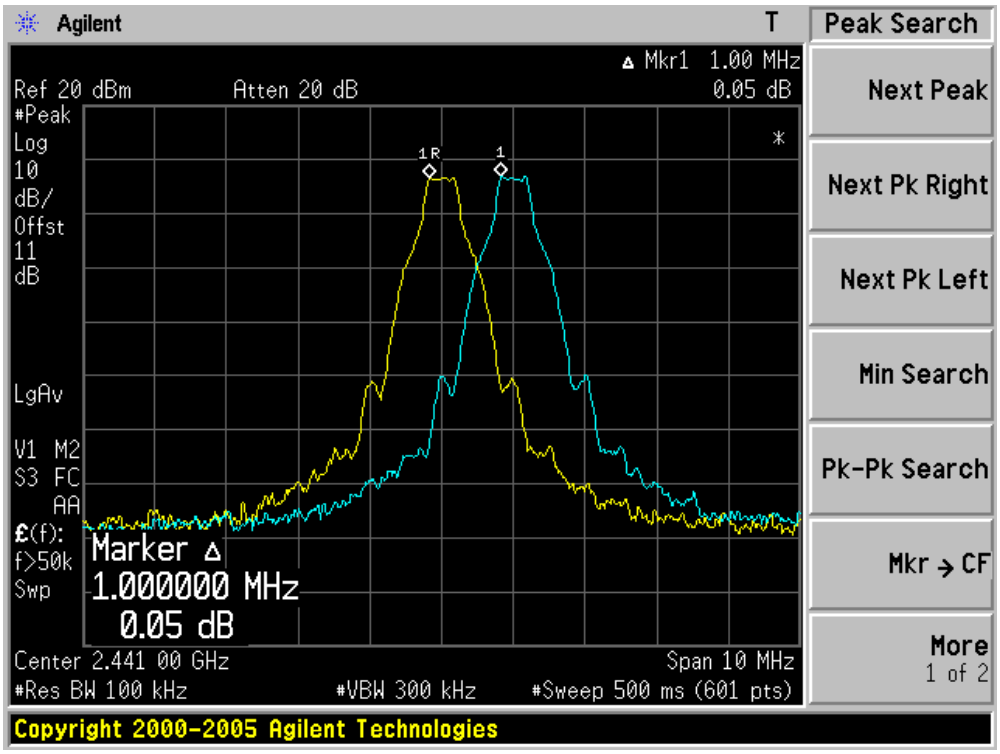
Product	:	Mobile Phone
Test Item	:	Carrier Frequency Separation
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

Channel No.	Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
00	2402	1000	>25 kHz or 2/3 of 20 dB BW	Pass
39	2441	1000	>25 kHz or 2/3 of 20 dB BW	Pass
78	2480	1000	>25 kHz or 2/3 of 20 dB BW	Pass

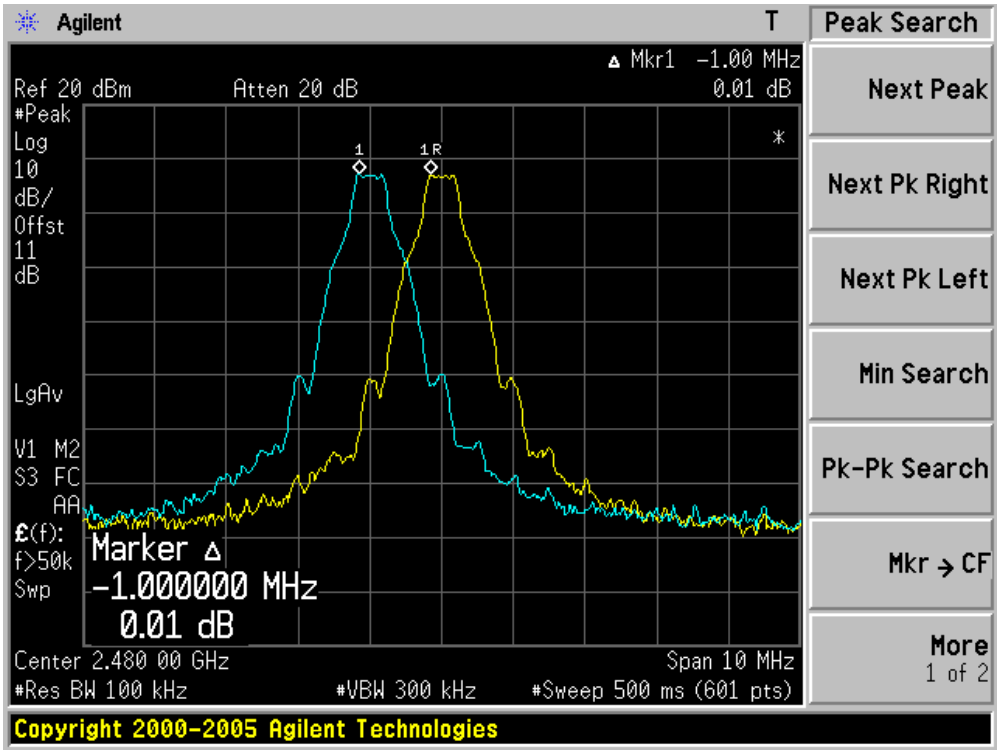
Channel 00 (2402MHz)



Channel 39 (2441MHz)



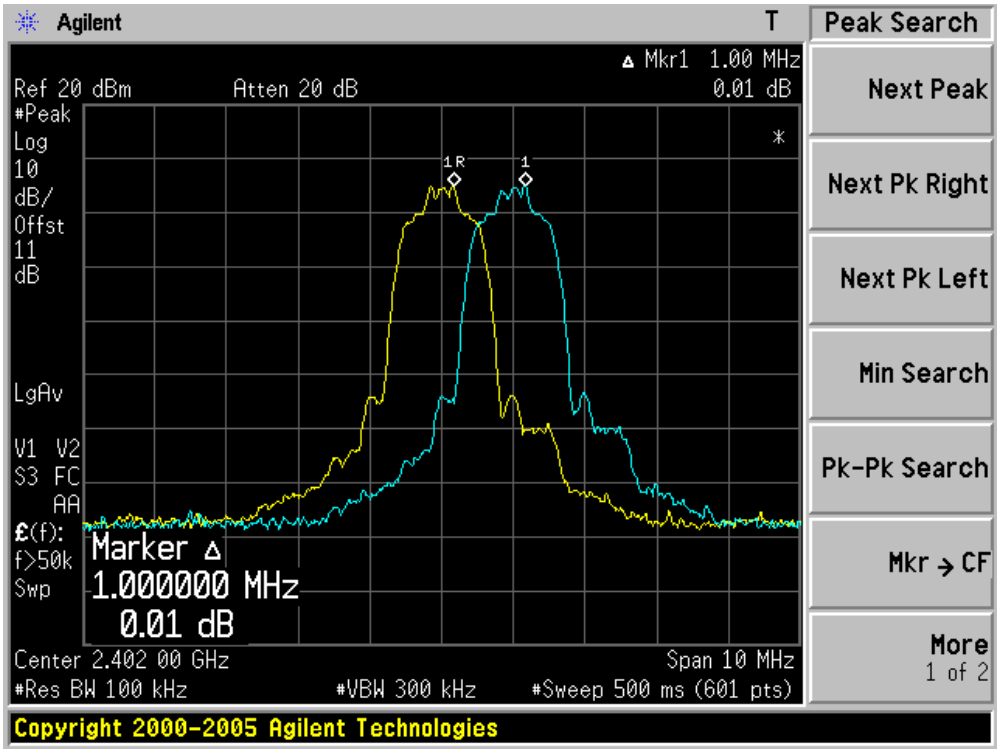
Channel 78 (2480MHz)



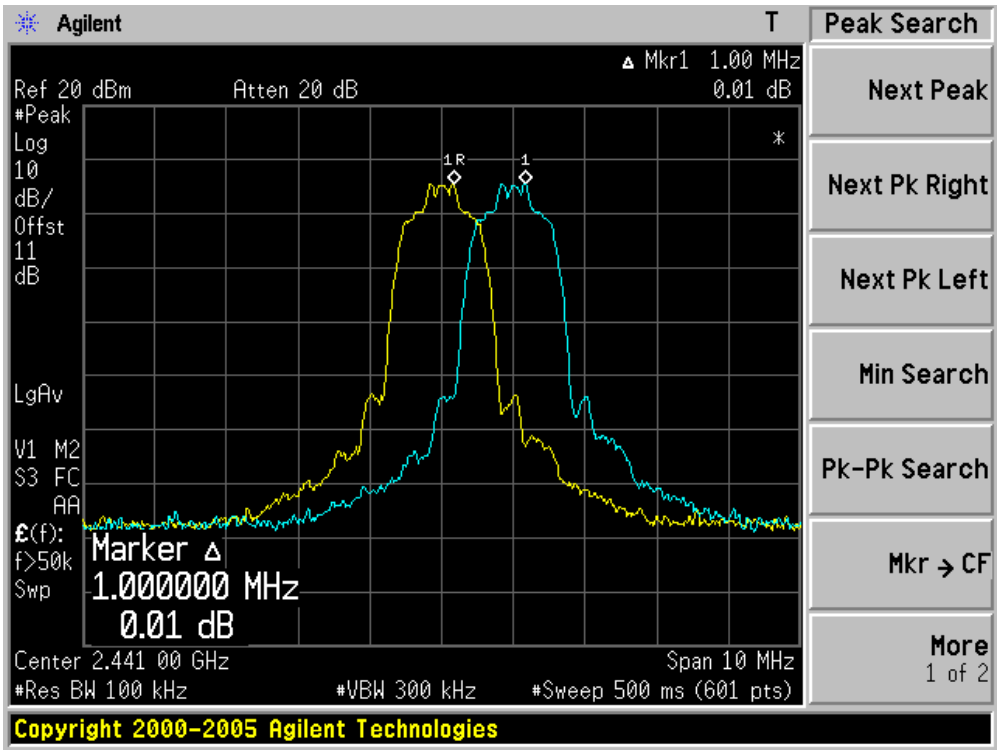
Product	:	Mobile Phone
Test Item	:	Carrier Frequency Separation
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)

Channel No.	Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
00	2402	1000	>25 kHz or 2/3 of 20 dB BW	Pass
39	2441	1000	>25 kHz or 2/3 of 20 dB BW	Pass
78	2480	1000	>25 kHz or 2/3 of 20 dB BW	Pass

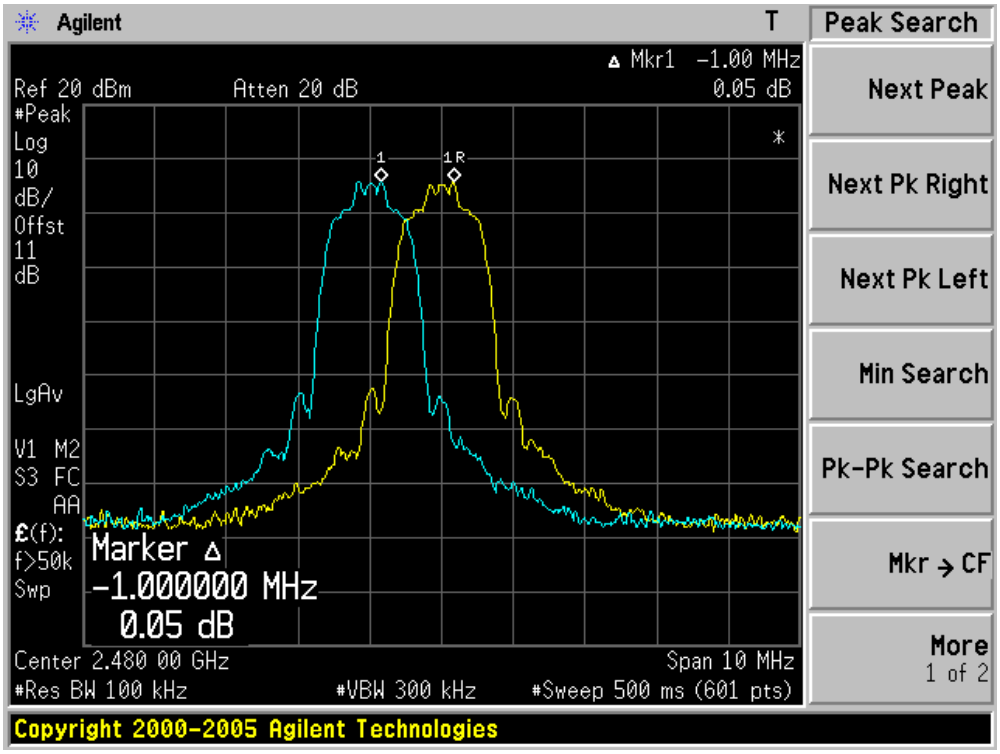
Channel 00 (2402MHz)



Channel 39 (2441MHz)



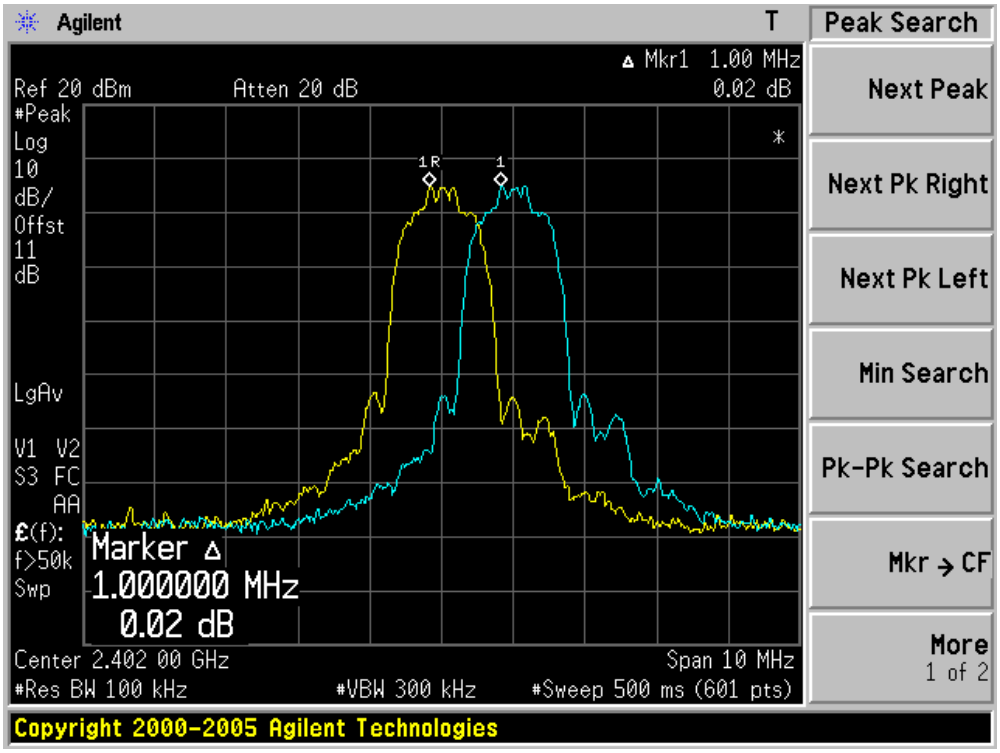
Channel 78 (2480MHz)



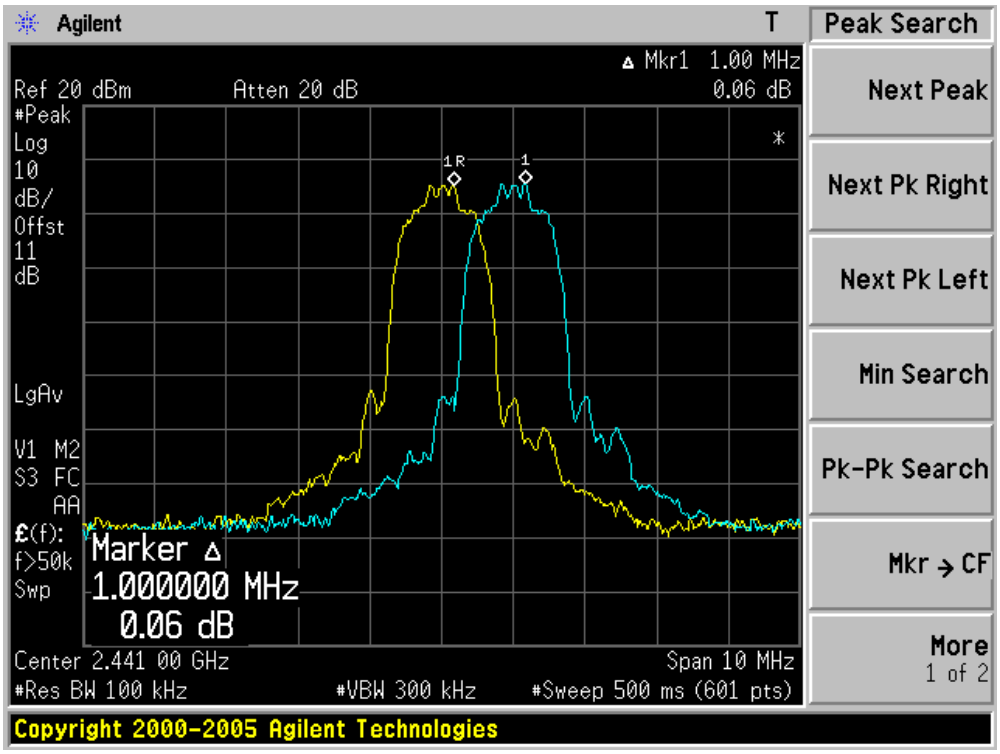
Product	:	Mobile Phone
Test Item	:	Carrier Frequency Separation
Test Site	:	TR-8
Test Mode	:	Mode 3: Transmitter-3Mbps(8DPSK_DH5)

Channel No.	Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
00	2402	1000	>25 kHz or 2/3 of 20 dB BW	Pass
39	2441	1000	>25 kHz or 2/3 of 20 dB BW	Pass
78	2480	1000	>25 kHz or 2/3 of 20 dB BW	Pass

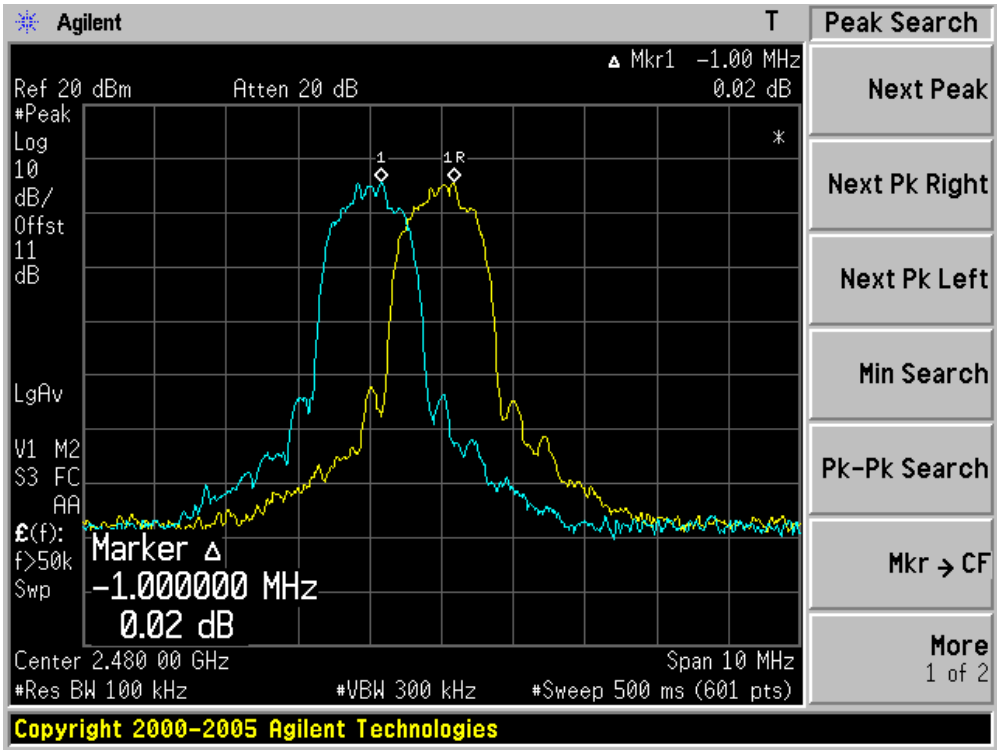
Channel 00 (2402MHz)



Channel 39 (2441MHz)



Channel 78 (2480MHz)



7. Number of Hopping Frequencies

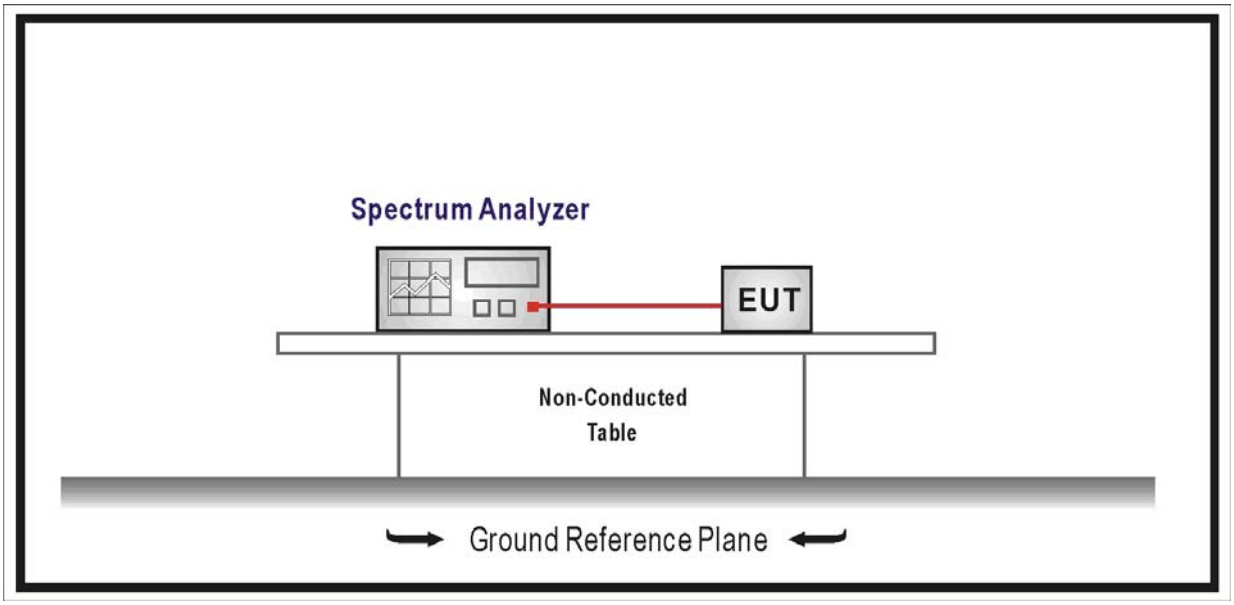
7.1. Test Equipment

Number of Hopping Frequencies / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

7.2. Test Setup



7.3. Limit

- For frequency hopping systems operating in the 2400-2483.5 MHz band shall use at least 15 hopping frequencies.
- For frequency hopping systems operating in 902-928 MHz band shall use at least 50 hopping frequencies.
- For frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies.

7.4. Test Procedure

According to ANSI C63.10: 2009.
The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
Span = the frequency band of operation
RBW ≧ 1% of the span
VBW ≧ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize. It may prove necessary to bread the span up to sections, in order to clearly show all of the hopping frequencies.

7.5. Uncertainty

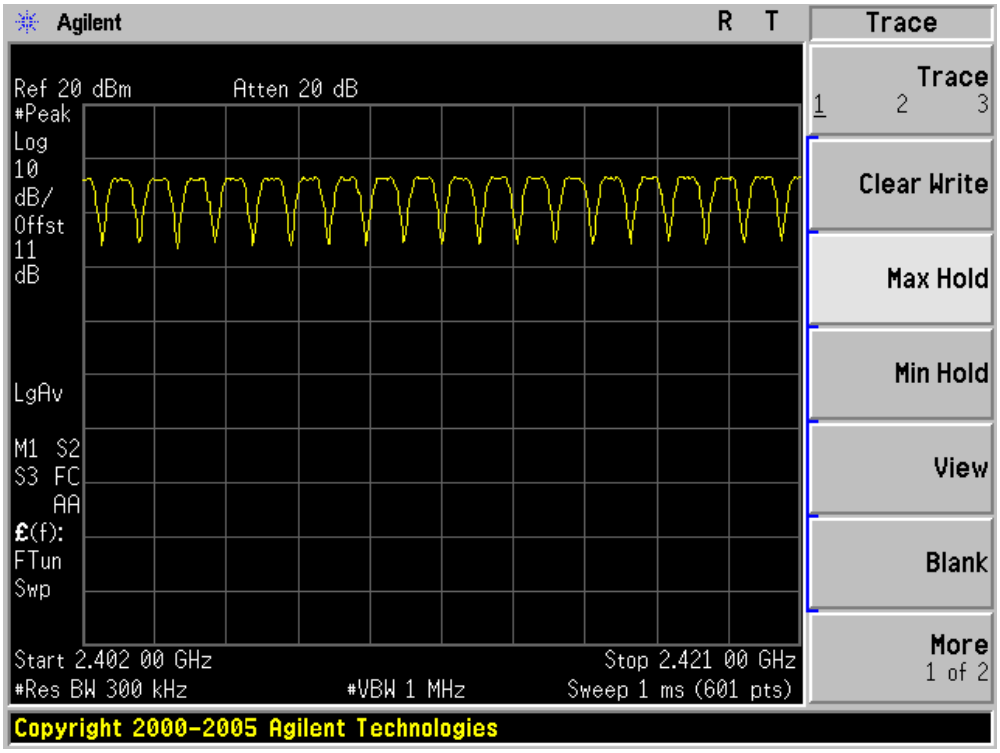
The measurement uncertainty is defined as ± 1 kHz

7.6. Test Result

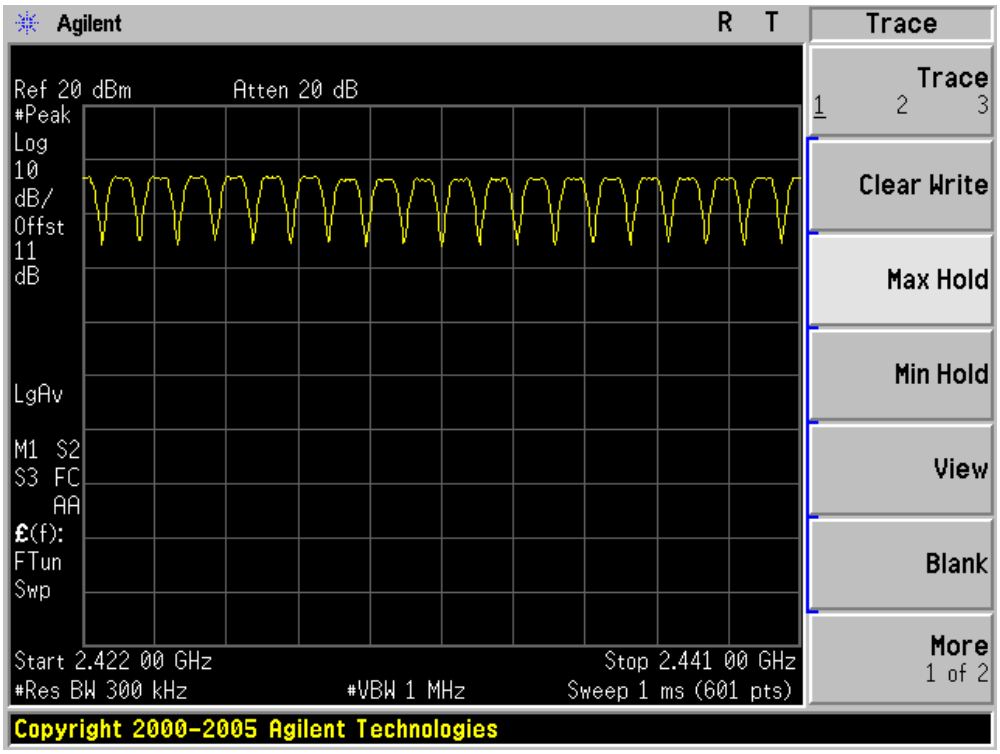
Product	:	Mobile Phone
Test Item	:	Number of Hopping Frequencies
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

Frequency Band (MHz)	Number of Hopping Frequencies	Limit	Result
2400 - 2483.5	79	>15	Pass

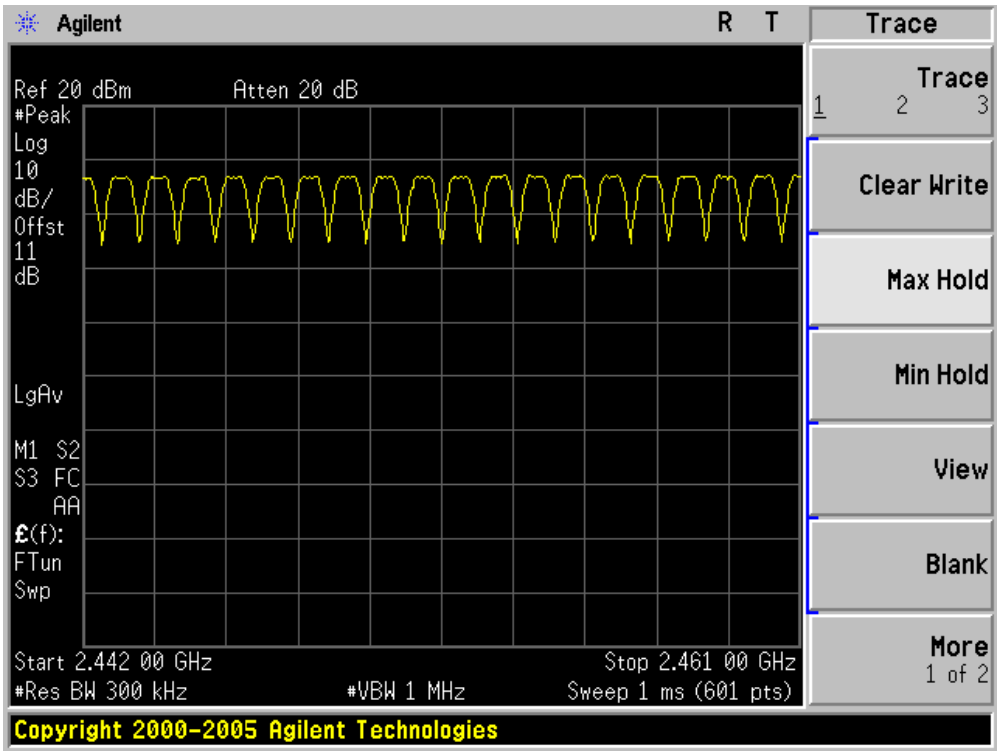
2402 - 2421 MHz



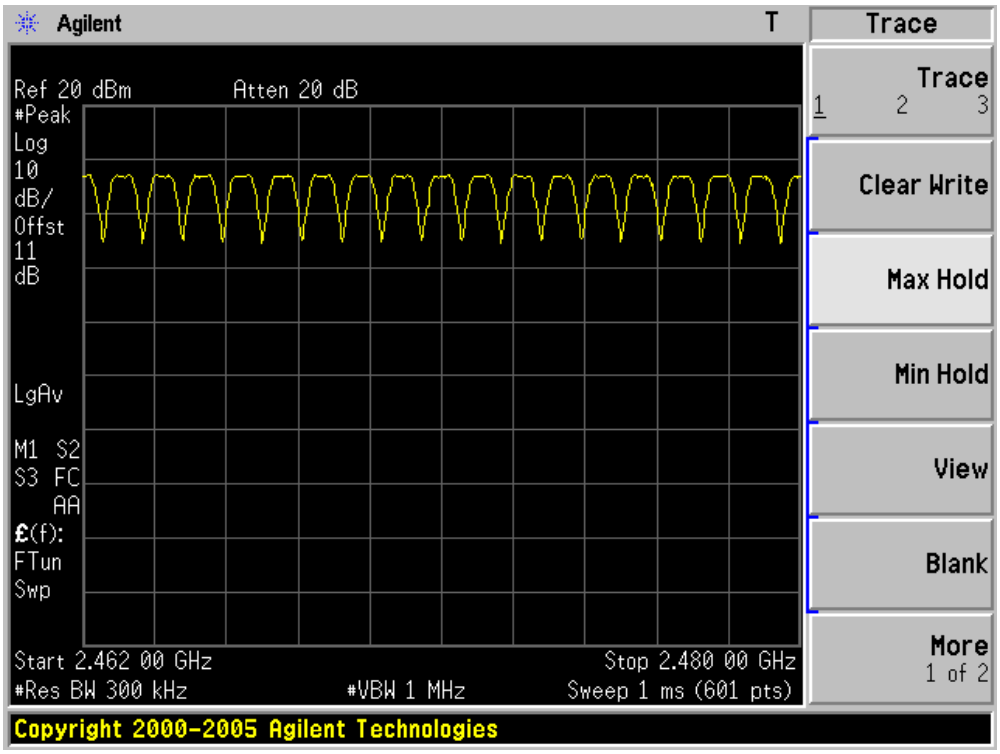
2422 - 2441 MHz



2442 - 2461 MHz



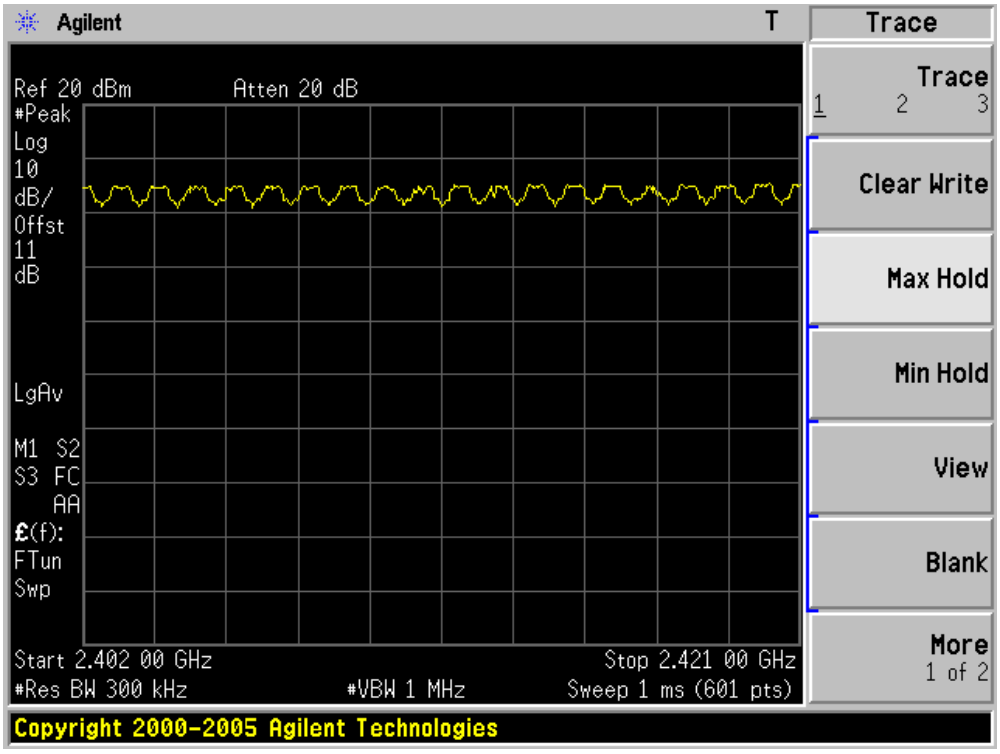
2462 - 2480 MHz



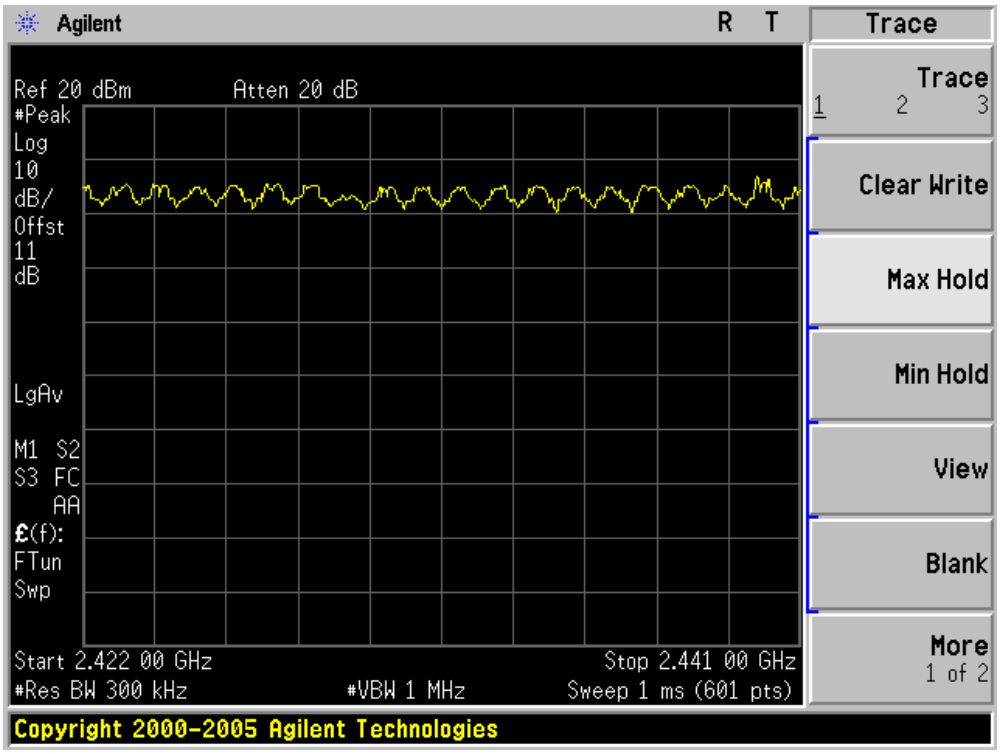
Product	:	Mobile Phone
Test Item	:	Number of Hopping Frequencies
Test Site	:	TR-8
Test Mode	:	Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)

Frequency Band (MHz)	Number of Hopping Frequencies	Limit	Result
2400 - 2483.5	79	>15	Pass

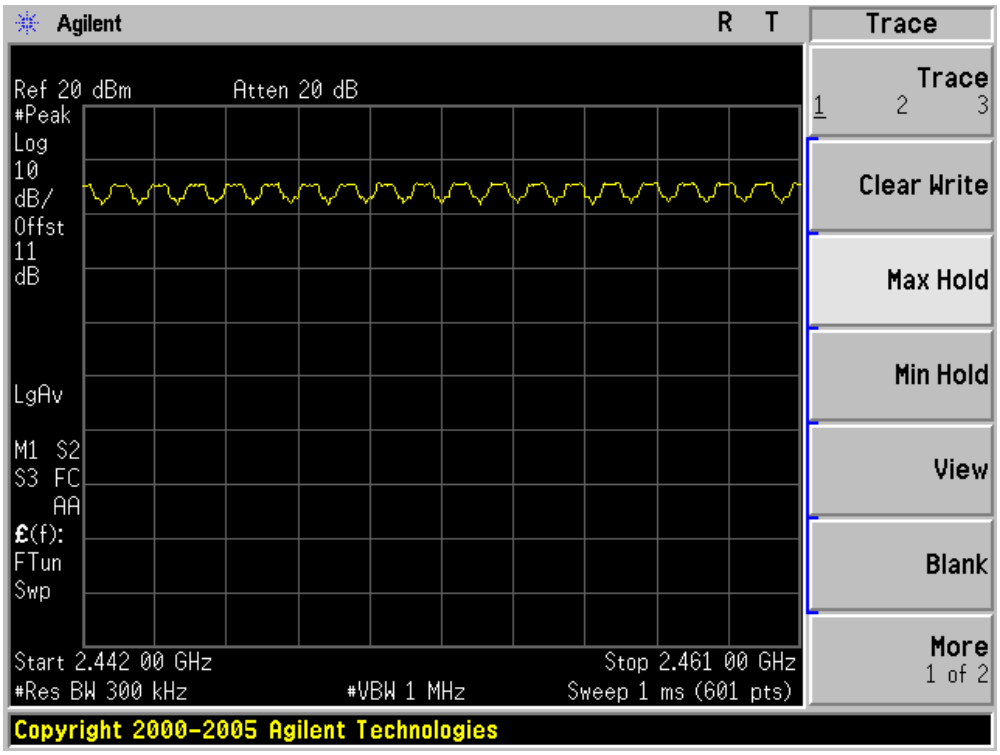
2402 - 2421 MHz



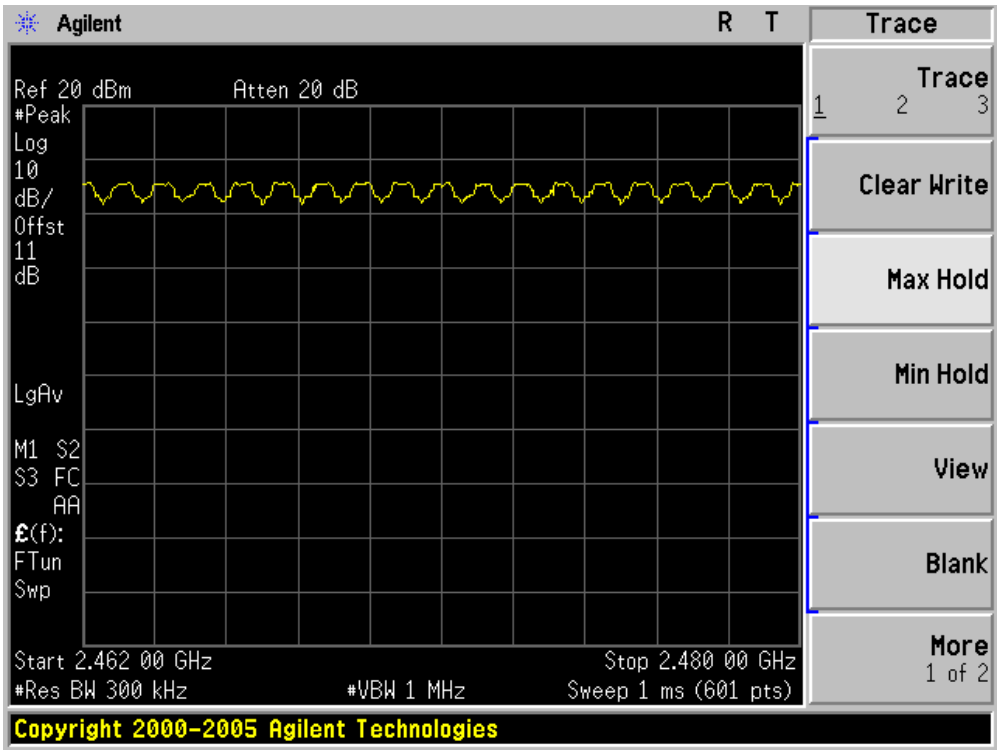
2422 - 2441 MHz



2442 - 2461 MHz



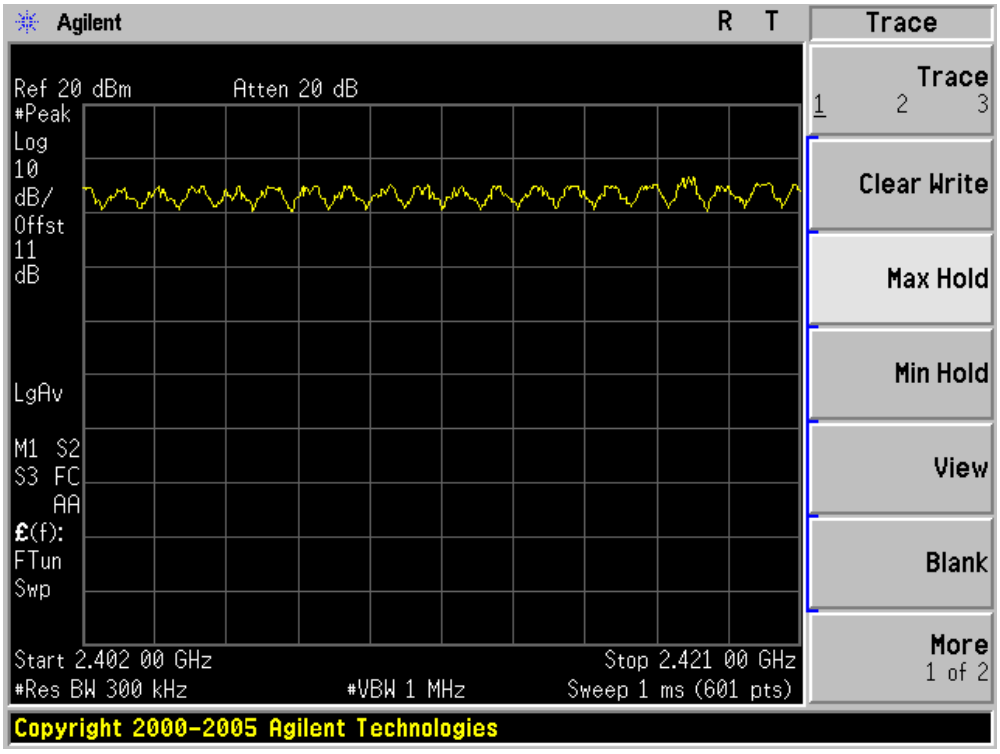
2462 - 2480 MHz



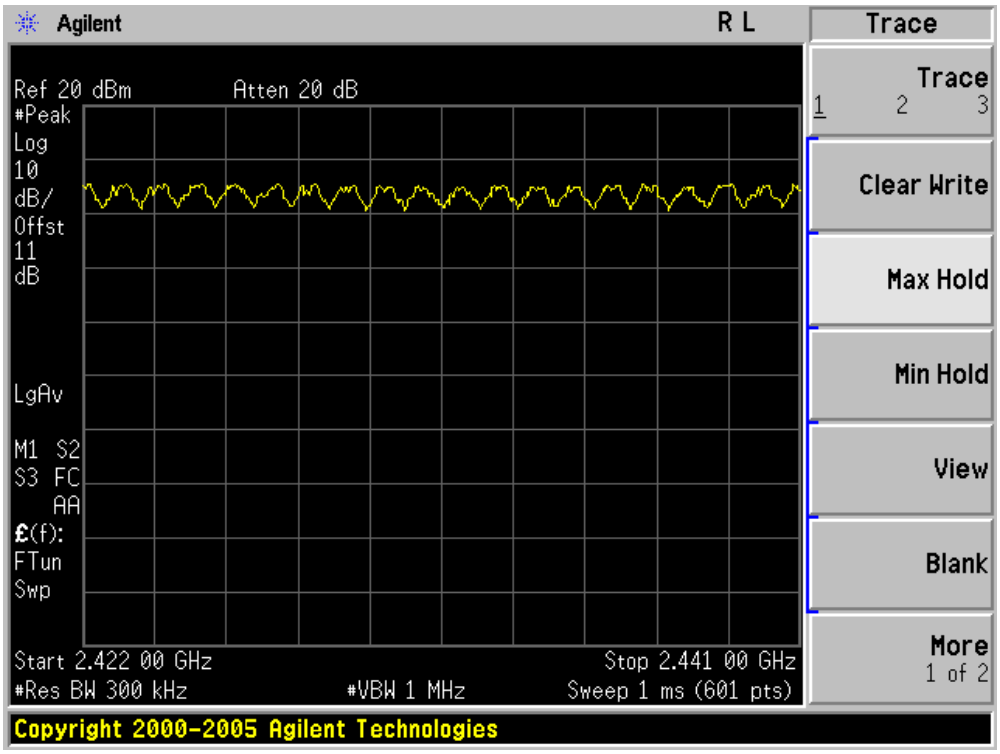
Product	:	Mobile Phone
Test Item	:	Number of Hopping Frequencies
Test Site	:	TR-8
Test Mode	:	Mode 3: Transmitter-3Mbps(8DPSK_DH5)

Frequency Band (MHz)	Number of Hopping Frequencies	Limit	Result
2400 - 2483.5	79	>15	Pass

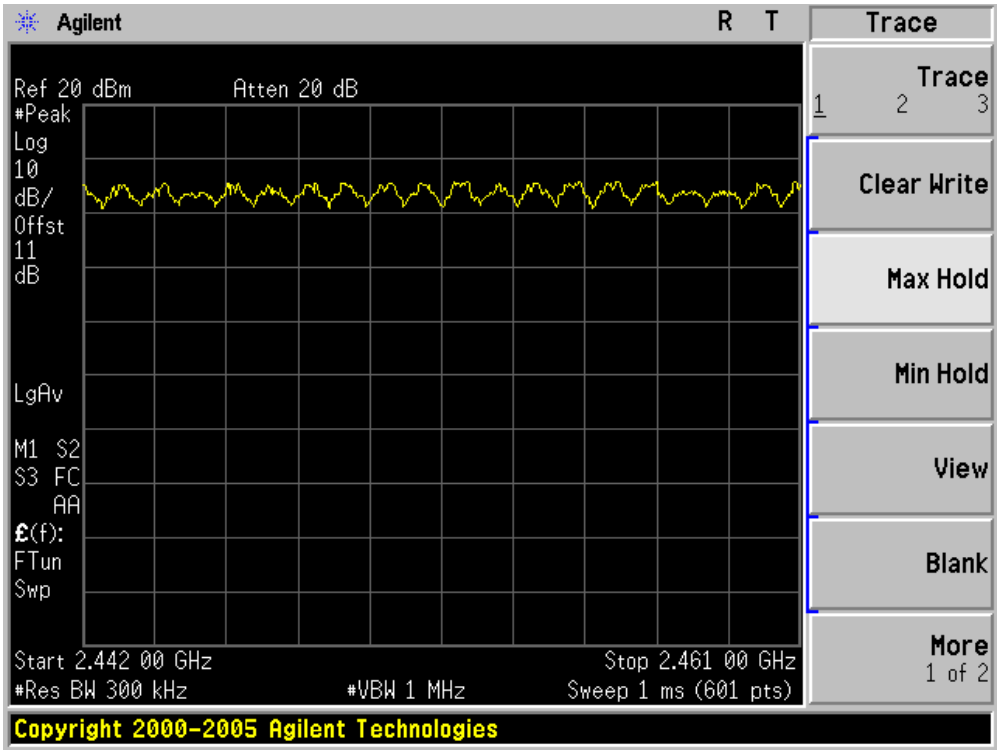
2402 - 2421 MHz



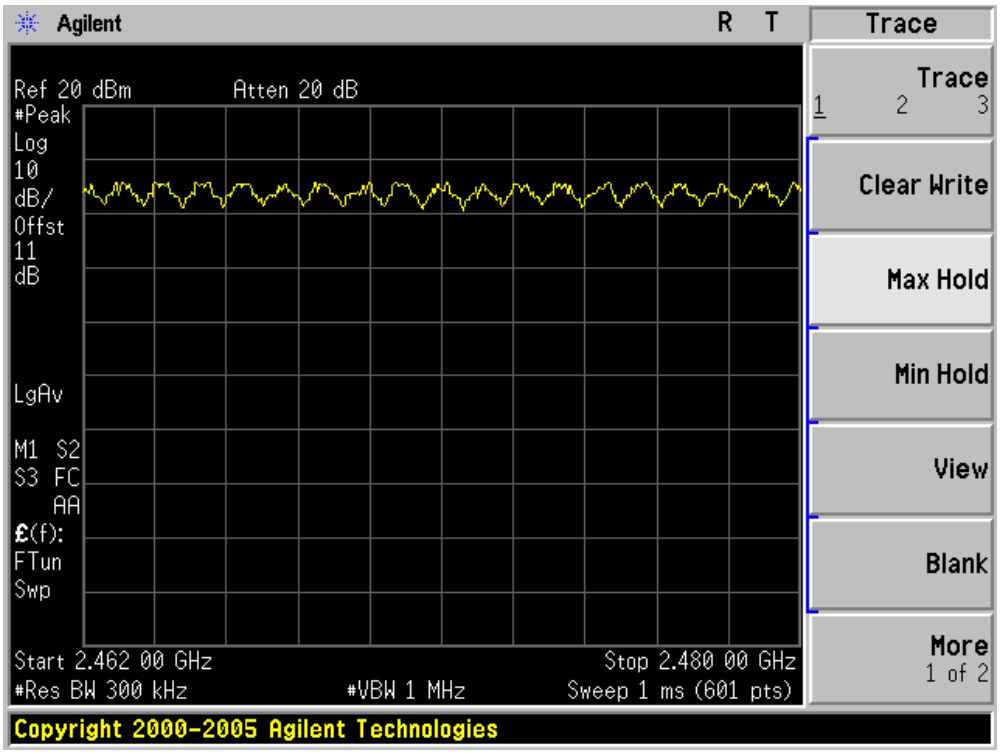
2422 - 2441 MHz



2442 - 2461 MHz



2462 - 2480 MHz



8. Time of Occupancy (Dwell Time)

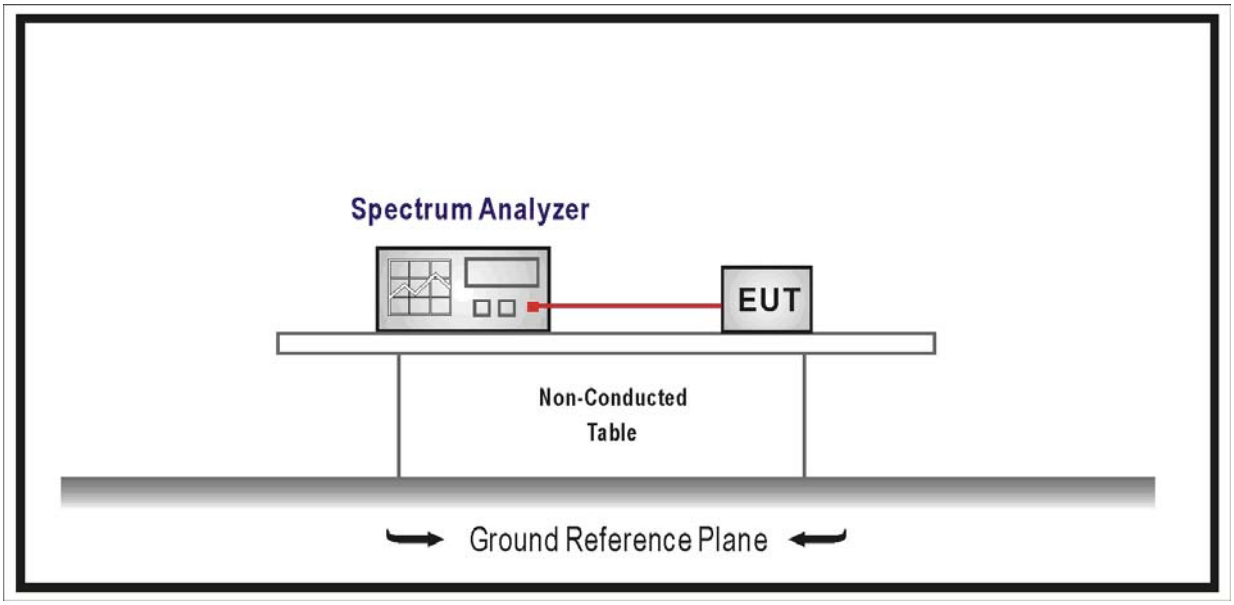
8.1. Test Equipment

Time of Occupancy (Dwell Time) / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

8.2. Test Setup



8.3. Limit

- For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
- Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75

hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

- Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

8.4. Test Procedure

According to ANSI C63.10: 2009.
The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
Span = zero span, centered on a hopping channel
RBW = 1MHz
VBW ≧ RBW
Sweep = as necessary to capture the entire dwell time per hopping channel
Detector function = peak
Trace = max hold
If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

8.5. Uncertainty

The measurement uncertainty is defined as ± 0.1 us

8.6. Test Result

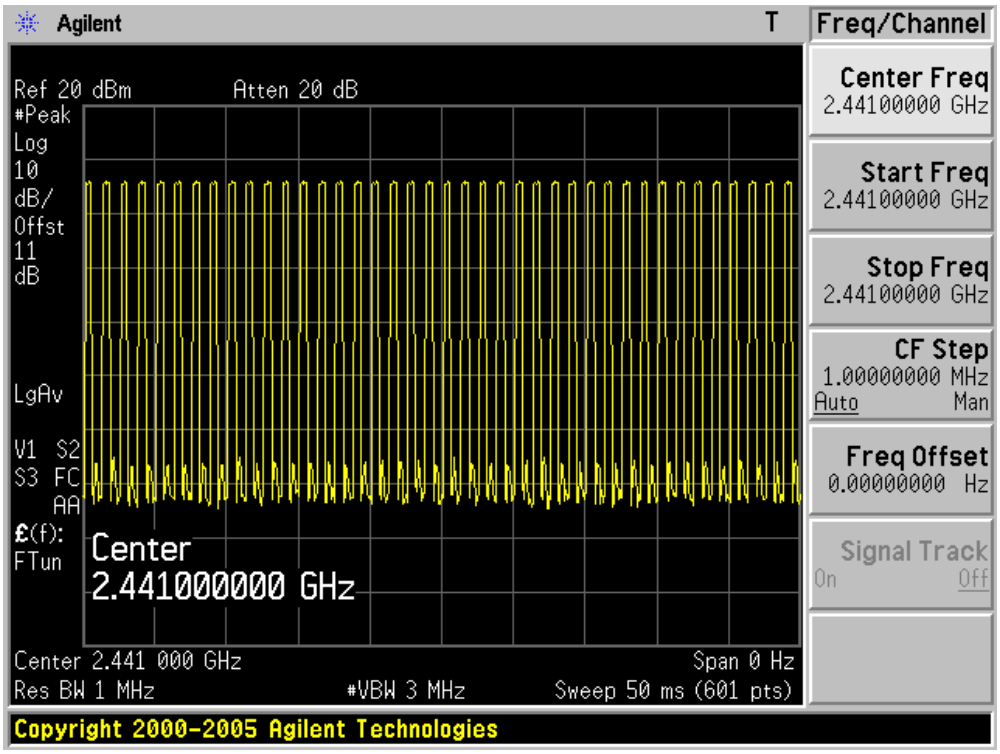
Product	:	Mobile Phone
Test Item	:	Time of Occupancy (Dwell Time)
Test Site	:	TR-8
Test Mode	:	Transmitter-3Mbps(8DPSK_DH1)

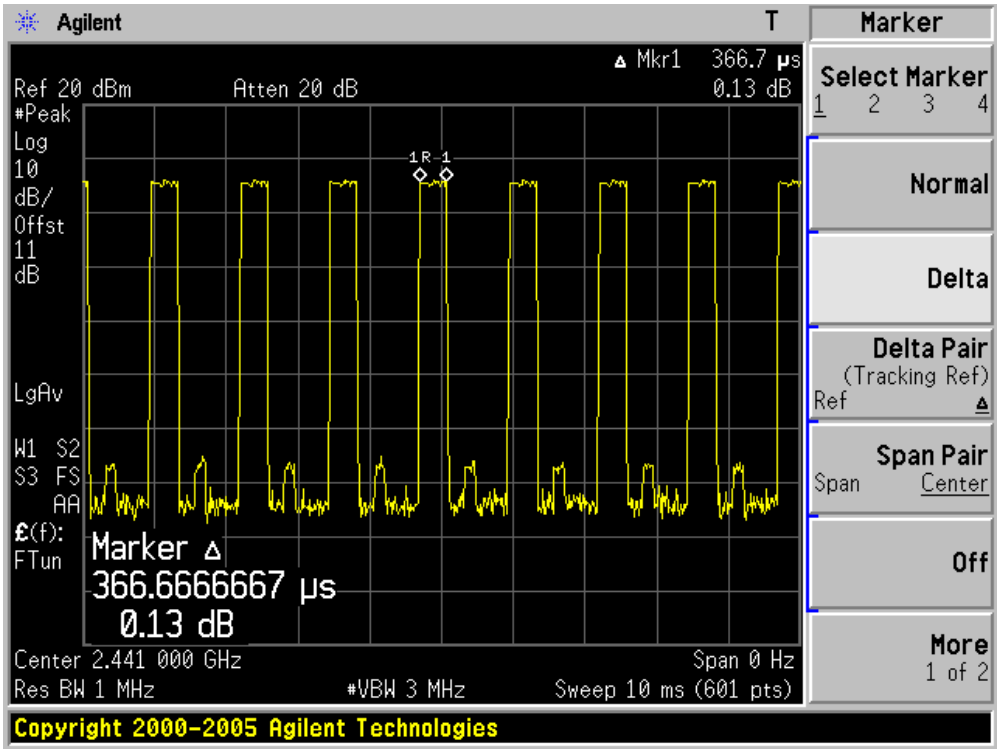
Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
39	2441	117.344	< 400	Pass

Test Time Period: 0.4*79=31.6sec, Hopping Times Within 1sec: 40/50msec=800 hops/sec.

- 2441MHz, The Maximum Occupancy Time Within 31.6sec: [(366.7μs*800)/79]*31.6 =117.344 msec

Channel 39 (2441MHz)-(3DH1)




Agilent
T
Marker
Mkr1 366.7 µs
0.13 dB
Ref 20 dBm
Atten 20 dB
#Peak
Log
10
dB/
Offst
11
dB
1R 1
LgAv
W1 S2
S3 FS
AA
£(f):
FTun
Marker Δ
366.6666667 µs
0.13 dB
Center 2.441 000 GHz
Span 0 Hz
Res BW 1 MHz
#VBW 3 MHz
Sweep 10 ms (601 pts)
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Δ
Span Pair
Span Center
Off
More
1 of 2
Copyright 2000-2005 Agilent Technologies

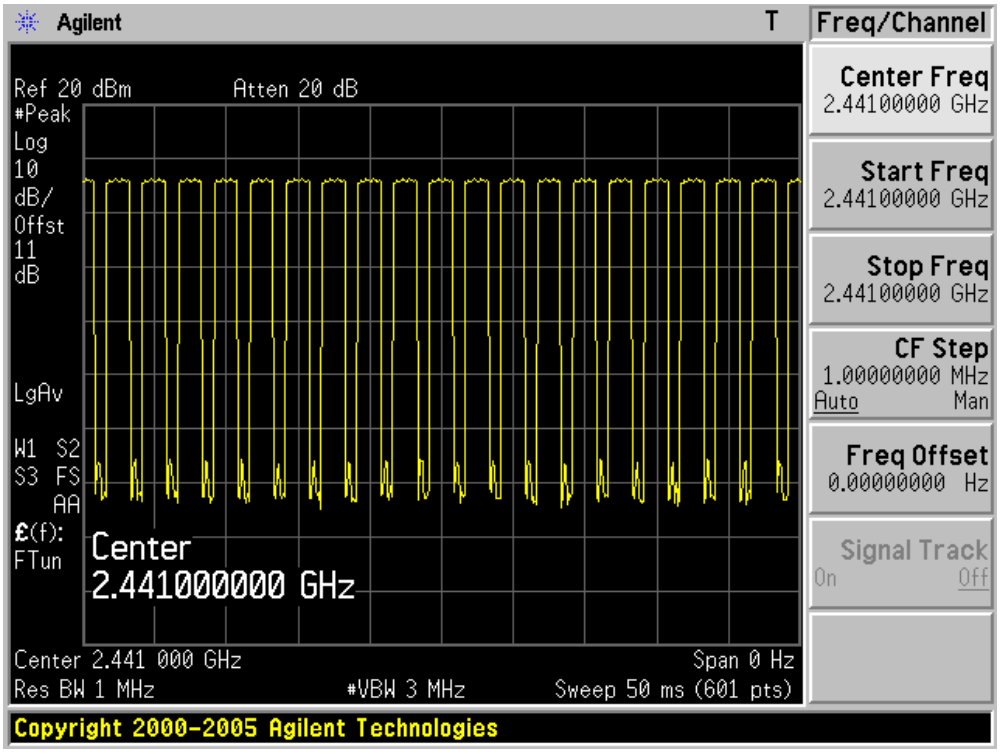
Product	:	Mobile Phone
Test Item	:	Time of Occupancy (Dwell Time)
Test Site	:	TR-8
Test Mode	:	Transmitter-3Mbps(8DPSK_DH3)

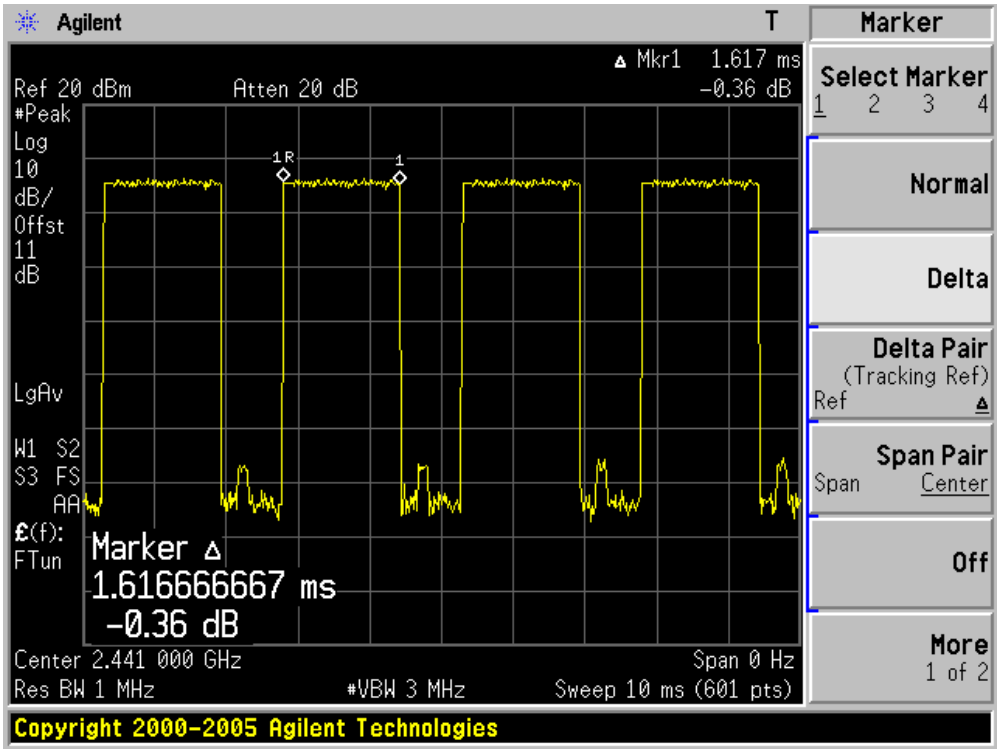
Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
39	2441	258.720	< 400	Pass

Test Time Period: 0.4*79=31.6sec, Hopping Times Within 1sec: 20/50msec=400hops/sec.

- 2441MHz, The Maximum Occupancy Time Within 31.6sec: [(1.617 ms*400)/79]*31.6=258.720 msec

Channel 39 (2441MHz) - (3DH3)




Agilent
T
Marker
Mkr1 1.617 ms
Ref 20 dBm
Atten 20 dB
-0.36 dB
#Peak
Log
10
dB/
Offst
11
dB
1R
1
LgAv
W1 S2
S3 FS
AA
£(f):
FTun
Marker Δ
1.616666667 ms
-0.36 dB
Center 2.441 000 GHz
Span 0 Hz
Res BW 1 MHz
#VBW 3 MHz
Sweep 10 ms (601 pts)
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Δ
Span Pair
Span Center
Off
More
1 of 2
Copyright 2000-2005 Agilent Technologies

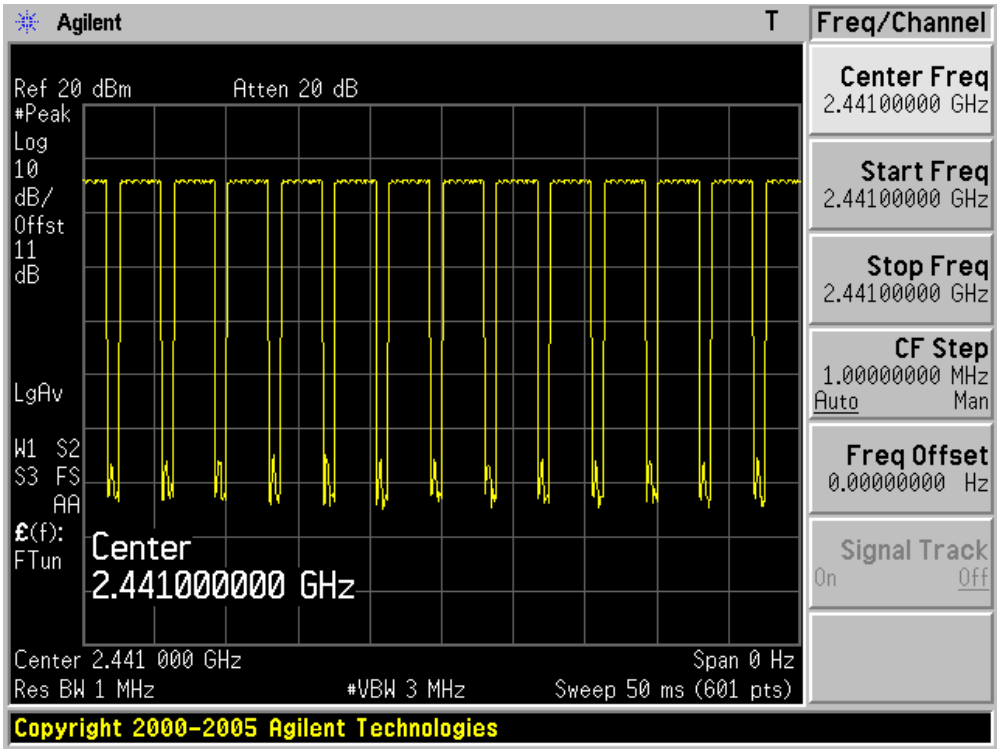
Product	:	Mobile Phone
Test Item	:	Time of Occupancy (Dwell Time)
Test Site	:	TR-8
Test Mode	:	Transmitter-3Mbps(8DPSK_DH5)

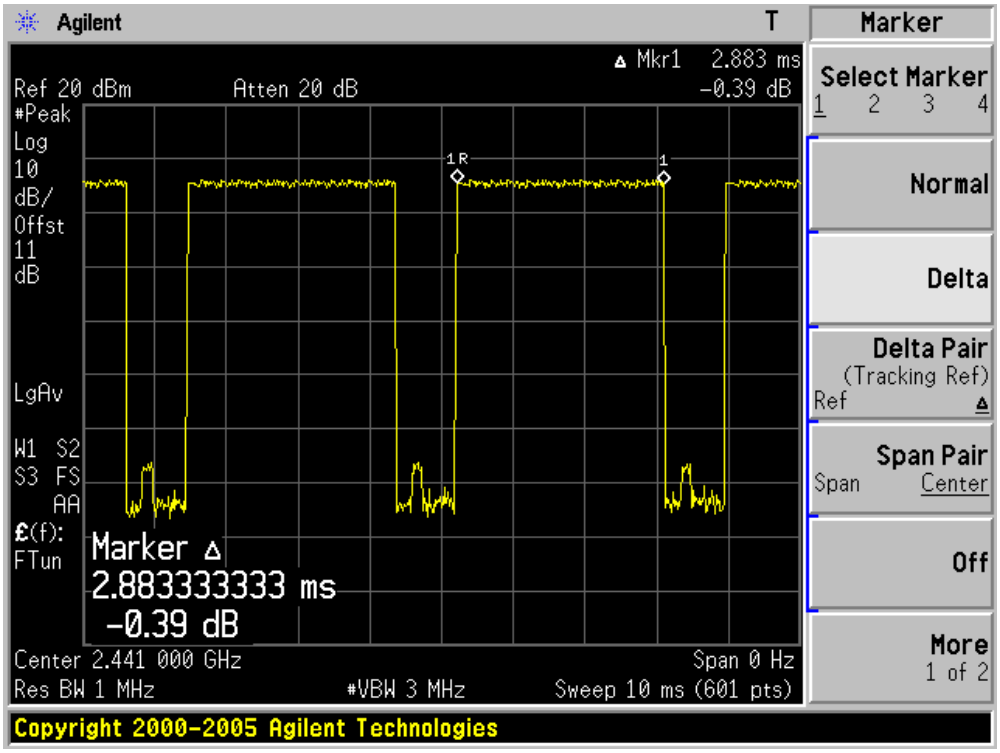
Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
39	2441	299.832	< 400	Pass

Test Time Period: 0.4*79=31.6sec, Hopping Times Within 1sec: 13/50msec=260 hops/sec.

- 2441MHz, The Maximum Occupancy Time Within 31.6sec: [(2.883 ms*260)/79]*31.6= 299.832 msec

Channel 39 (2441MHz) - (3DH5)




Agilent
T
Marker
Mkr1 2.883 ms
Ref 20 dBm
Atten 20 dB
-0.39 dB
#Peak
Log
10
dB/
Offst
11
dB
LgAv
W1 S2
S3 FS
AA
£(f):
FTun
Marker Δ
2.883333333 ms
-0.39 dB
Center 2.441 000 GHz
Span 0 Hz
Res BW 1 MHz
#VBW 3 MHz
Sweep 10 ms (601 pts)
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
Copyright 2000-2005 Agilent Technologies

9. Peak Output Power

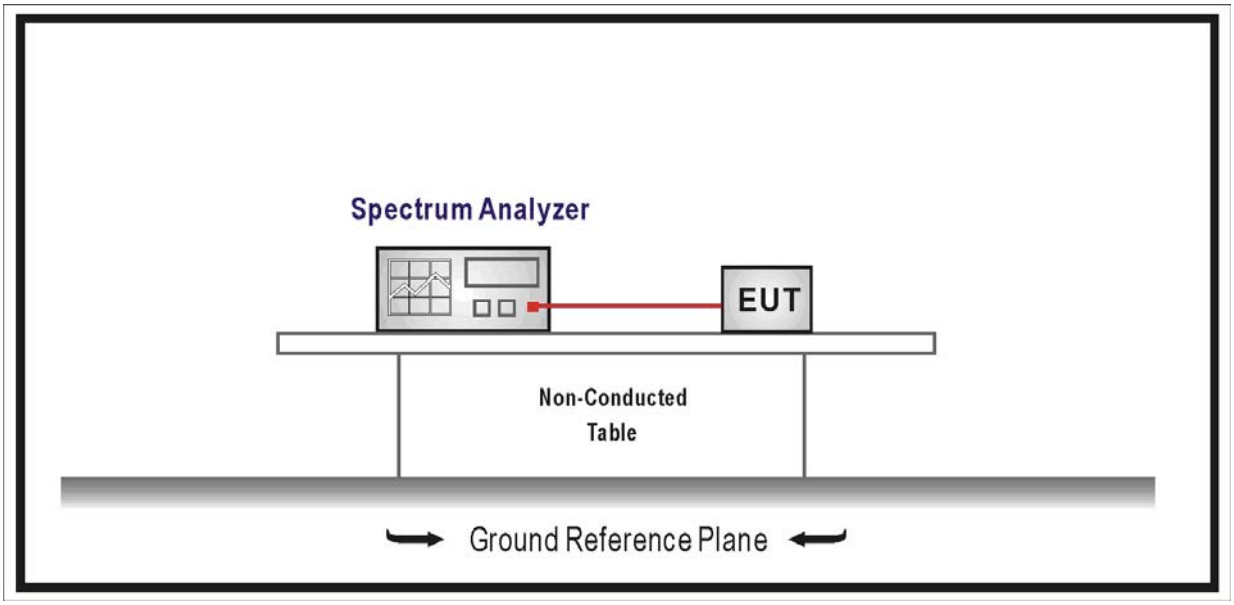
9.1. Test Equipment

Peak Output Power / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

9.2. Test Setup



9.3. Limit

- For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
- For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels.

Note: the conducted output power limit specified above is based on the use the antennas with

directional gains that do not exceed 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values above, as appropriate, by the amount in dB that the directional gain of antenna exceeds 6 dBi.

9.4. Test Procedure

According to ANSI C63.10: 2009.
Use the following spectrum analyzer settings:
Span = approximately 5 times the 20dB bandwidth, centered on a hopping channel
RBW ＞ the 20 dB bandwidth of the emission being measured.
VBW ≧ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power (don't forget added the external attenuation and cable loss).

9.5. Uncertainty

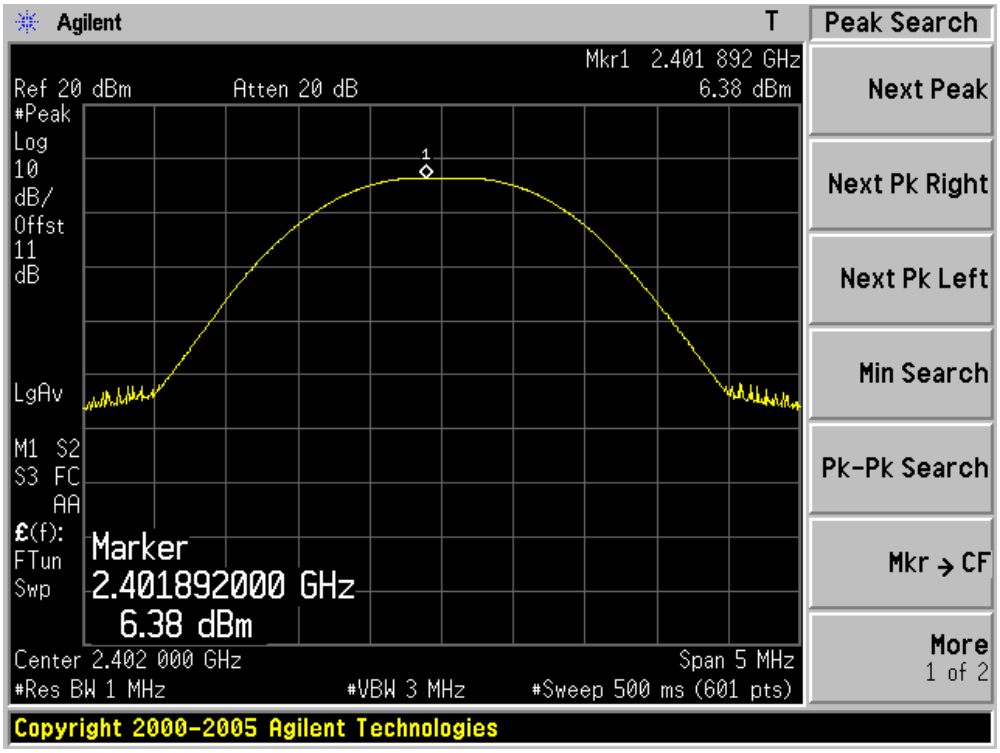
The measurement uncertainty is defined as ± 1.0 dB

9.6. Test Result

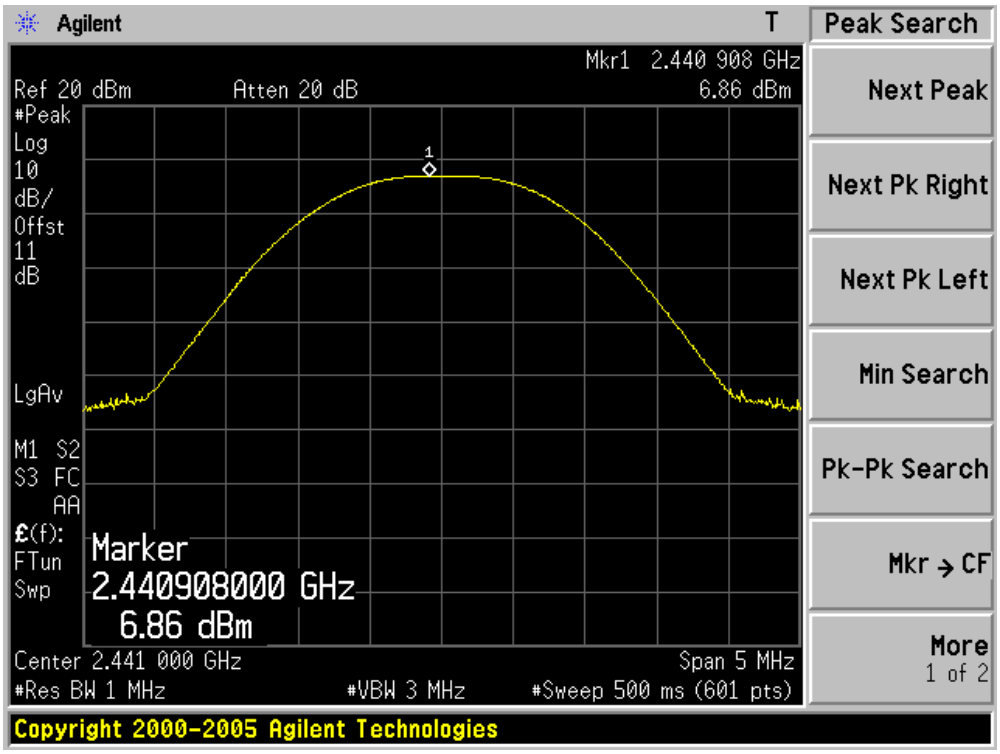
Product	:	Mobile Phone
Test Item	:	Power Output
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
0	2402	6.38	30.00	Pass
39	2441	6.86	30.00	Pass
78	2480	7.16	30.00	Pass

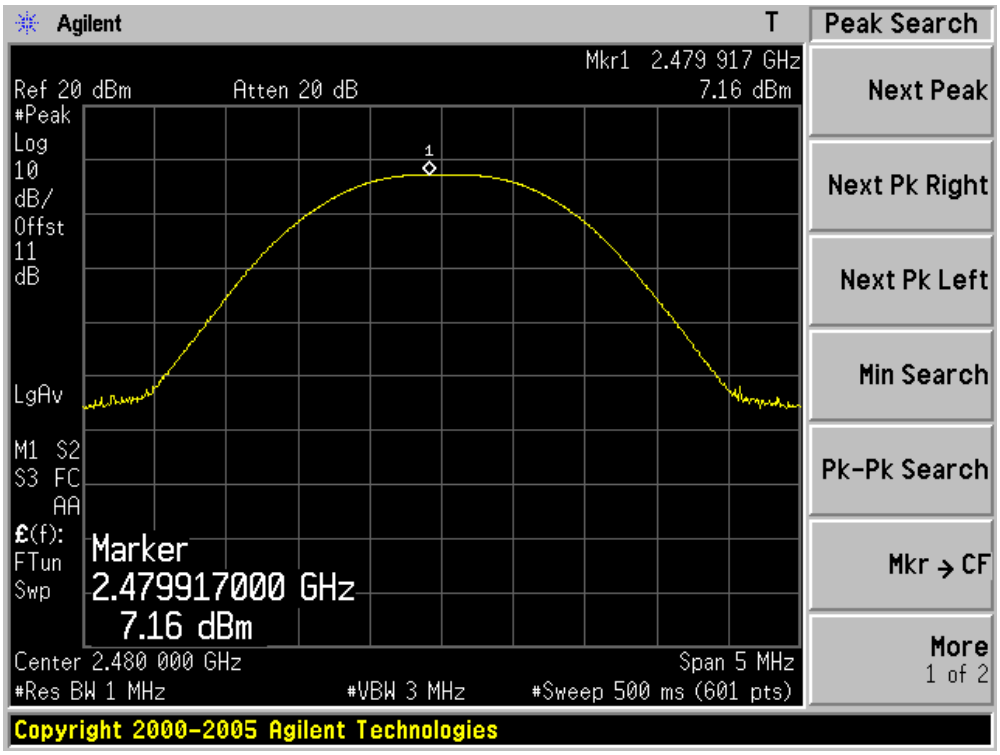
DH5 2402MHz



DH5 2441MHz



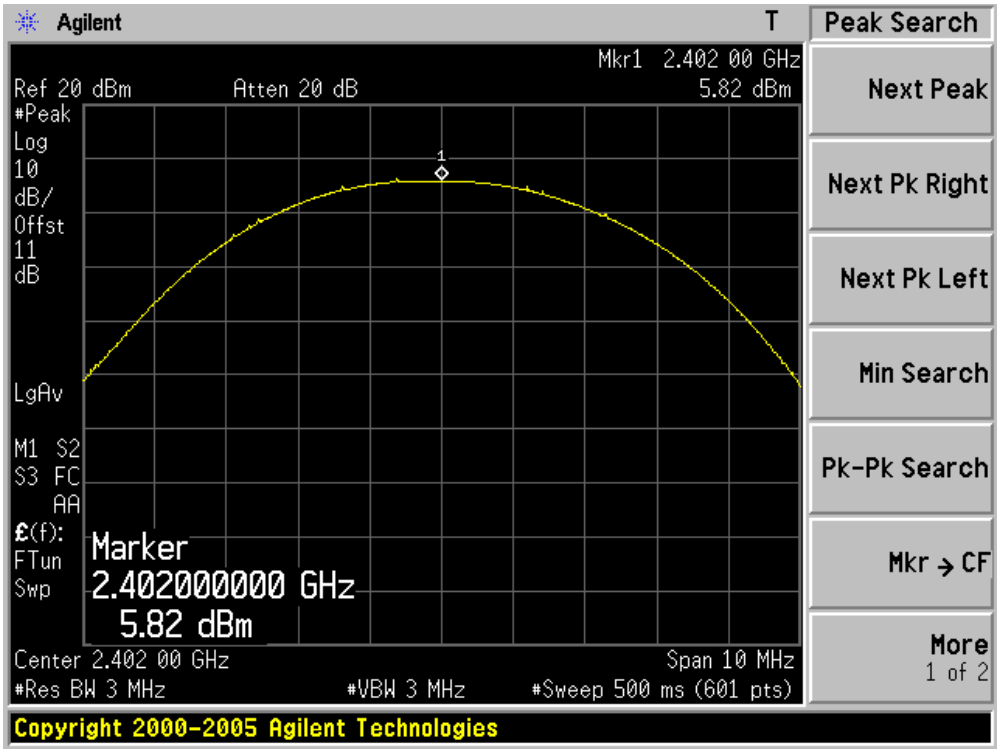
DH5 2480MHz



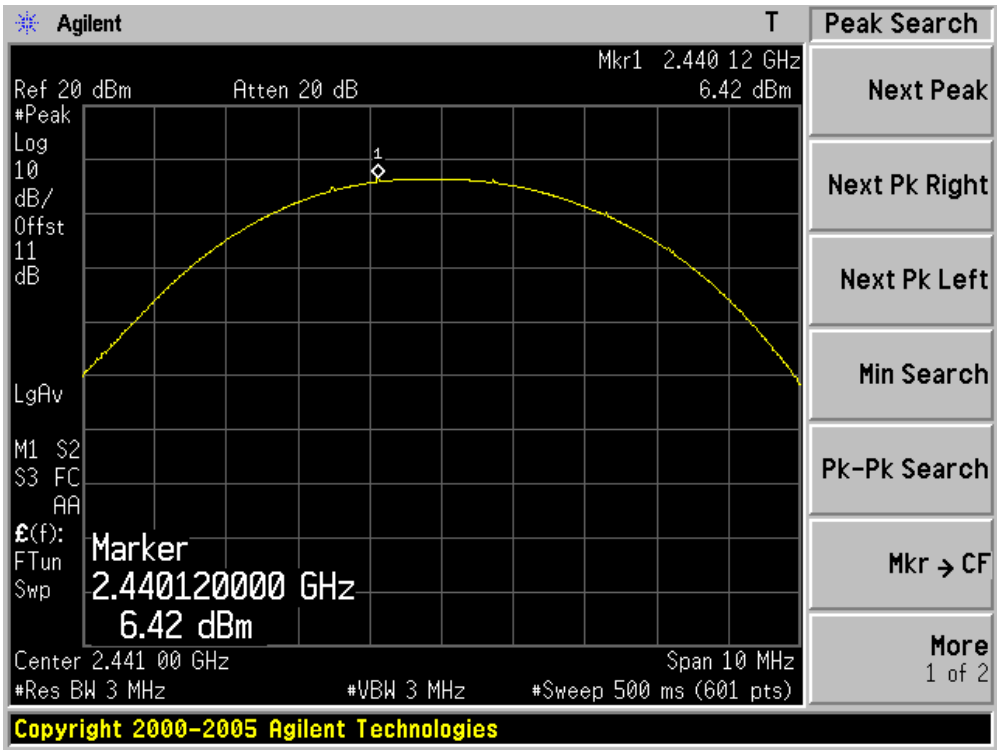
Product	:	Mobile Phone
Test Item	:	Power Output
Test Mode	:	Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
0	2402	5.82	30.00	Pass
39	2441	6.42	30.00	Pass
78	2480	6.66	30.00	Pass

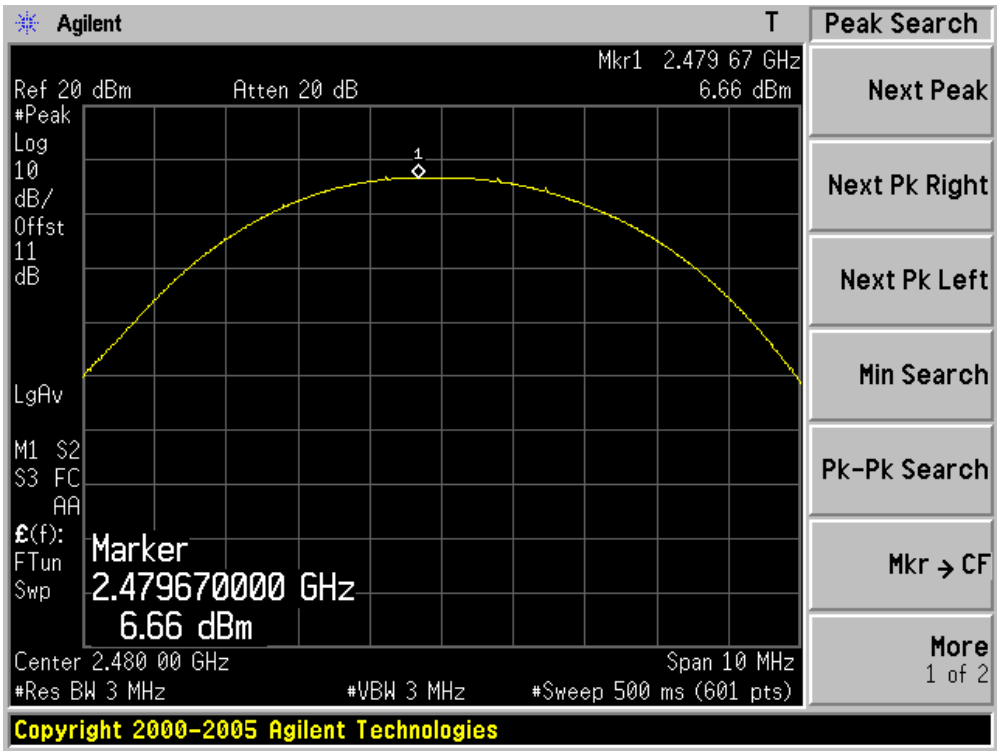
2DH5 2402MHz



2DH5 2441MHz



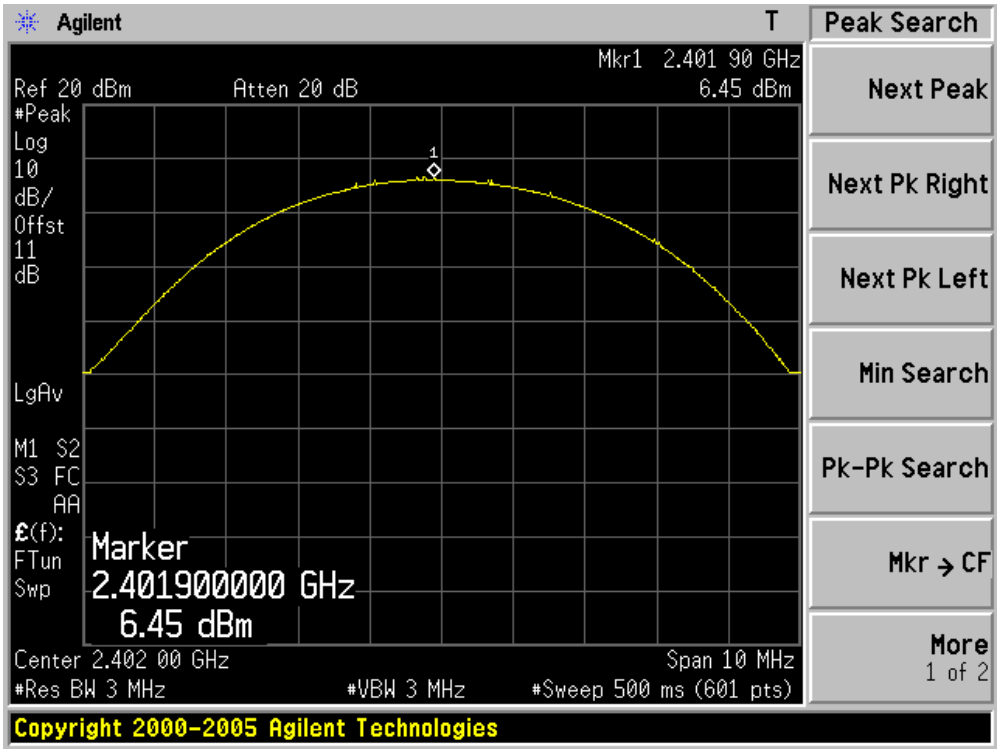
2DH5 2480MHz



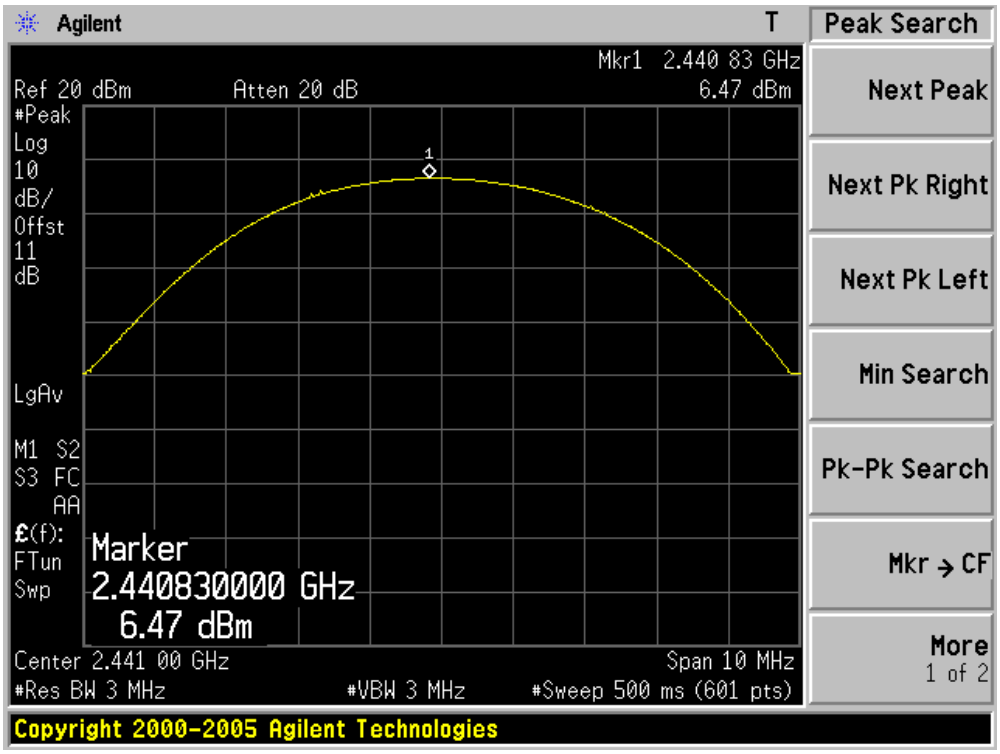
Product	:	Mobile Phone
Test Item	:	Power Output
Test Mode	:	Mode 3: Transmitter-3Mbps(8DPSK_DH5)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
0	2402	6.45	30.00	Pass
39	2441	6.47	30.00	Pass
78	2480	7.23	30.00	Pass

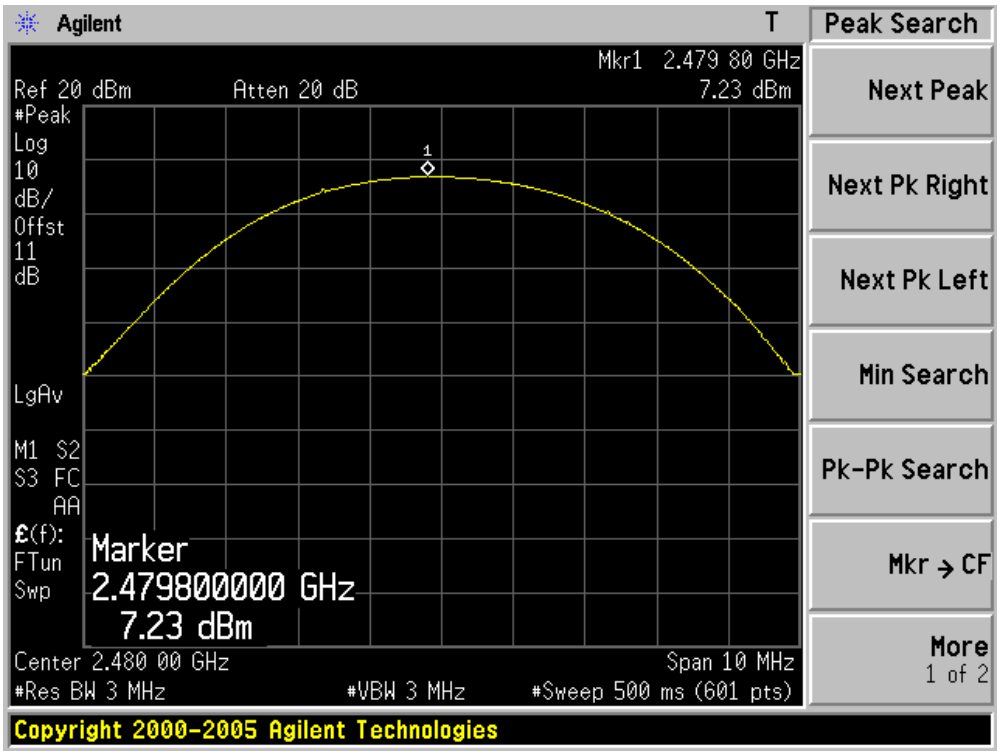
3DH5 2402MHz



3DH5 2441MHz



3DH5 2480MHz



10. Band-edge Compliance of RF Conducted Emissions

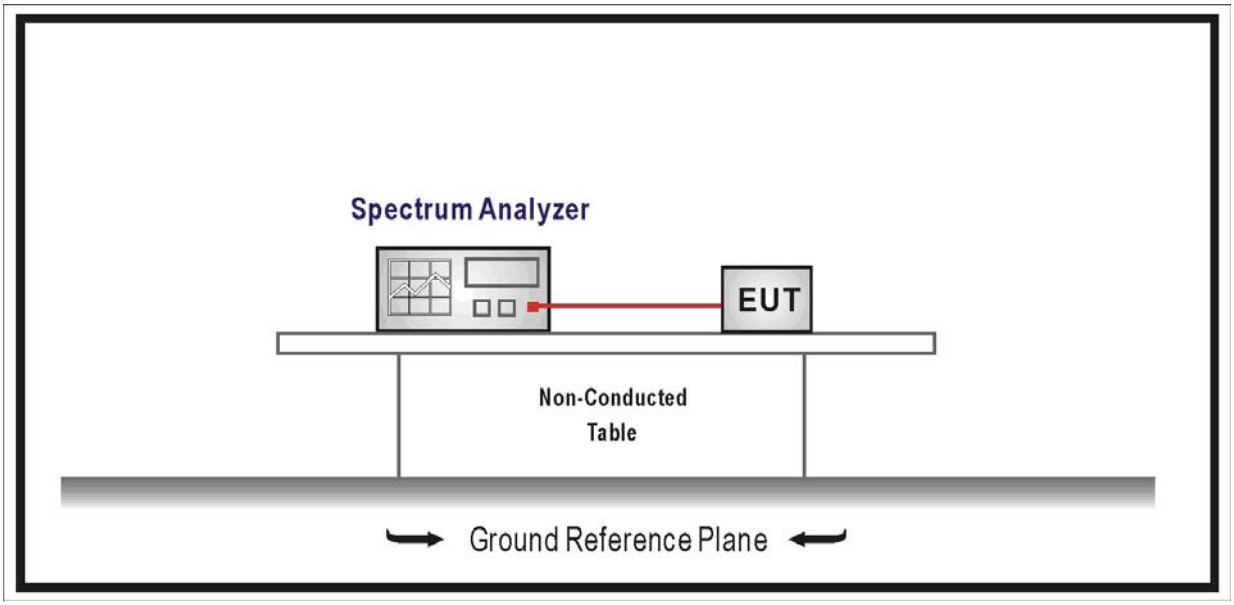
10.1. Test Equipment

Band-edge Compliance of RF Conducted Emissions / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

10.2. Test Setup



10.3. Limit

- Intentional radiators operating under the alternative provisions to the general emission limits as contained in 15.217 through 15.257 and in Subpart E of FCC part 15, must be designed to ensure that 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.
- In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz

bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) of FCC part 15 is not required.

10.4. Test Procedure

According to ANSI C63.10: 2009.
Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation.
RBW ≧ 1% of the span
VBW ≧ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation prouduct outside of the band, if this level is greater than that at the bandedge.
Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section.
Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit.

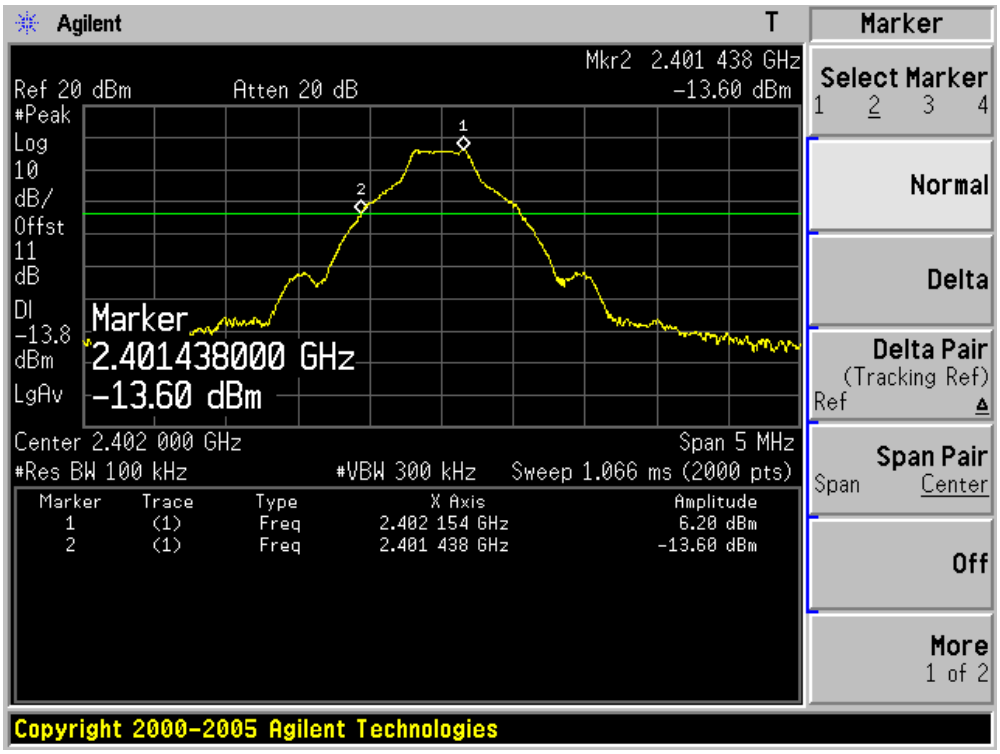
10.5. Uncertainty

The measurement uncertainty is defined as ± 1.0 dB

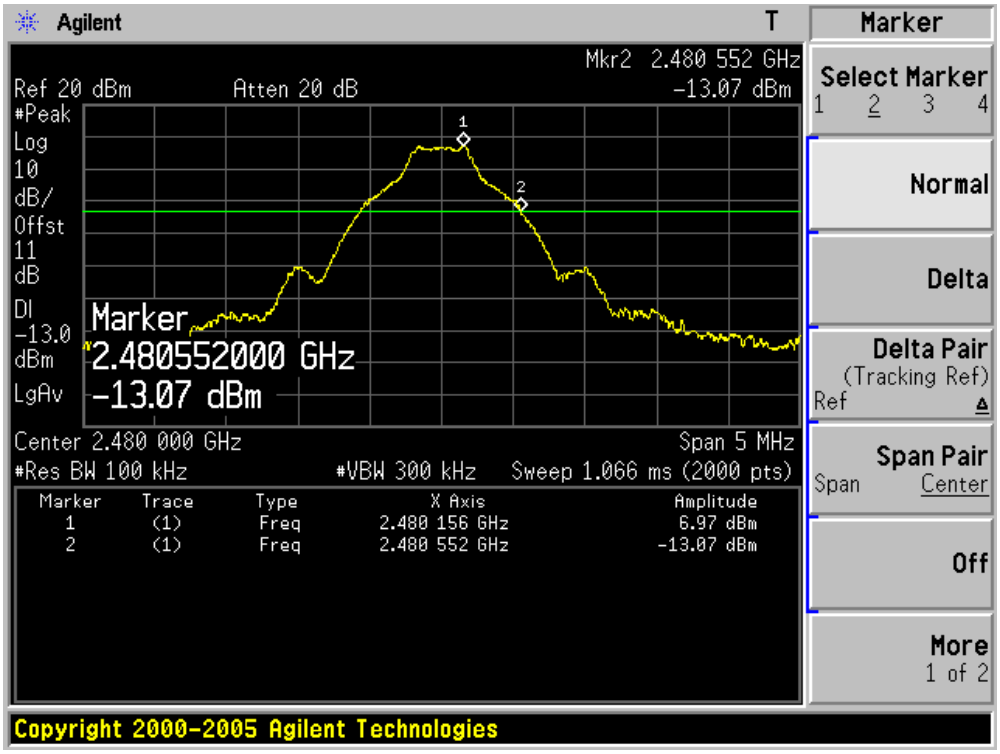
10.6. Test Result

Product	:	Mobile Phone
Test Item	:	Band-edge Compliance of RF Conducted Emissions
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

Channel 00 (2402MHz)

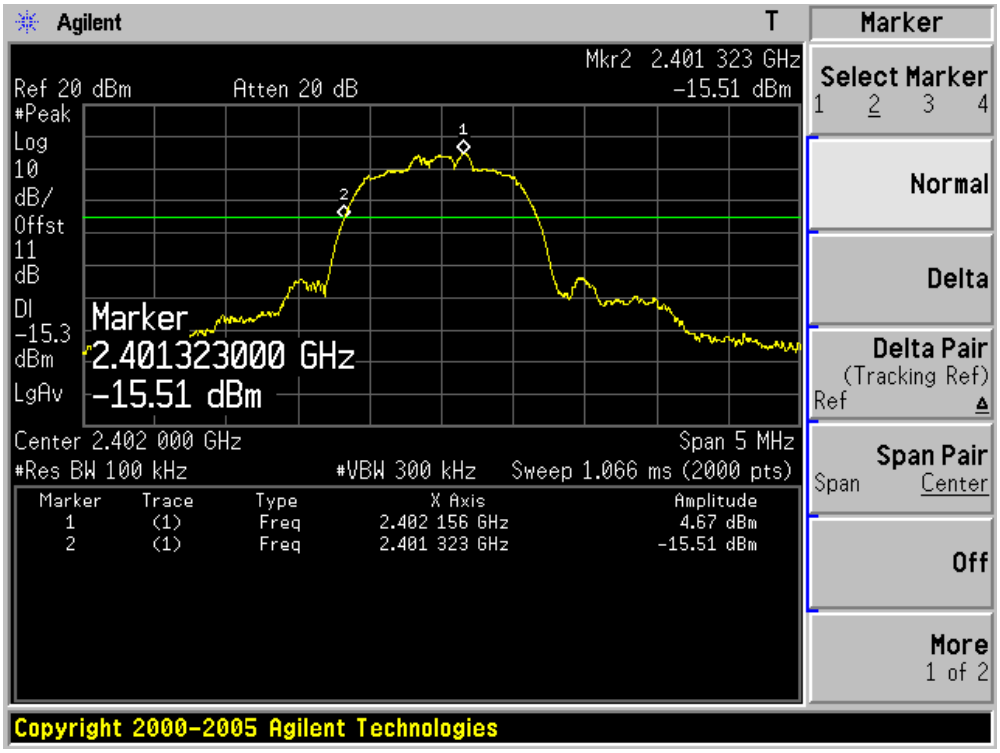


Channel 78 (2480MHz)

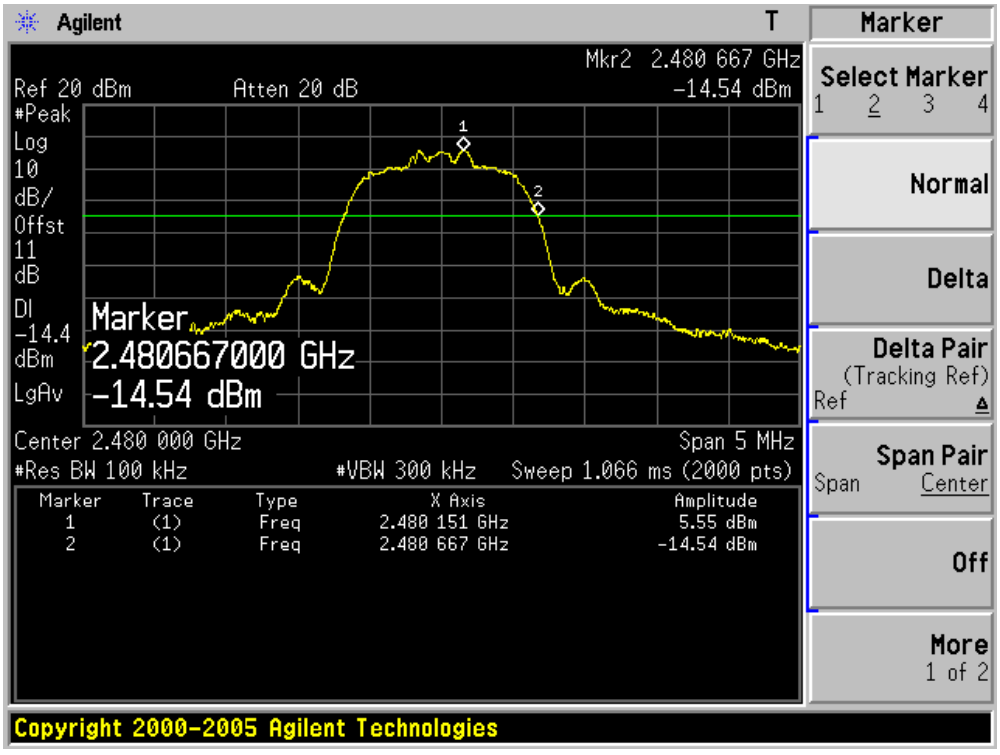


Product	:	Mobile Phone
Test Item	:	Band-edge Compliance of RF Conducted Emissions
Test Mode	:	Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)

Channel 00 (2402MHz)

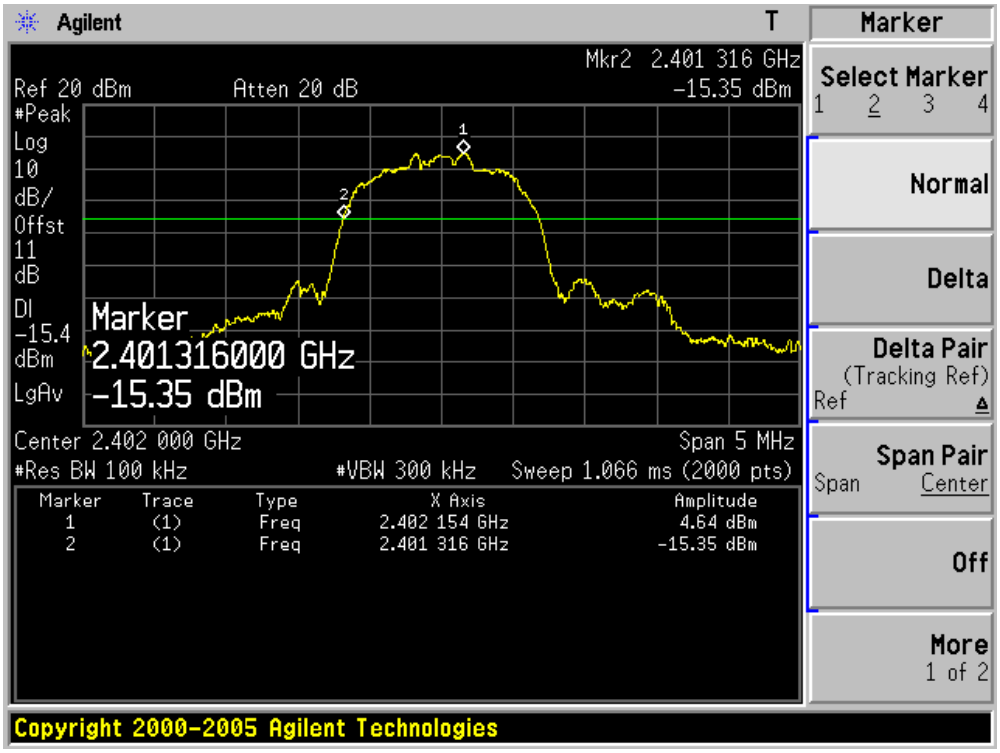


Channel 78 (2480MHz)

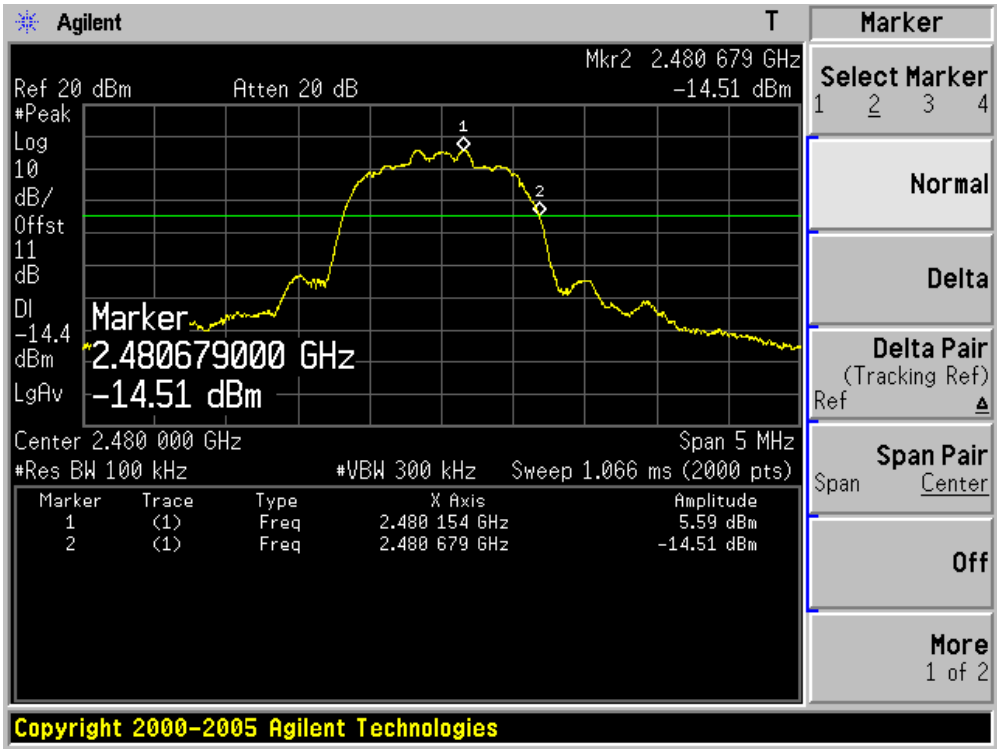


Product	:	Mobile Phone
Test Item	:	Band-edge Compliance of RF Conducted Emissions
Test Mode	:	Mode 3: Transmitter-3Mbps(8DPSK_DH5)

Channel 00 (2402MHz)

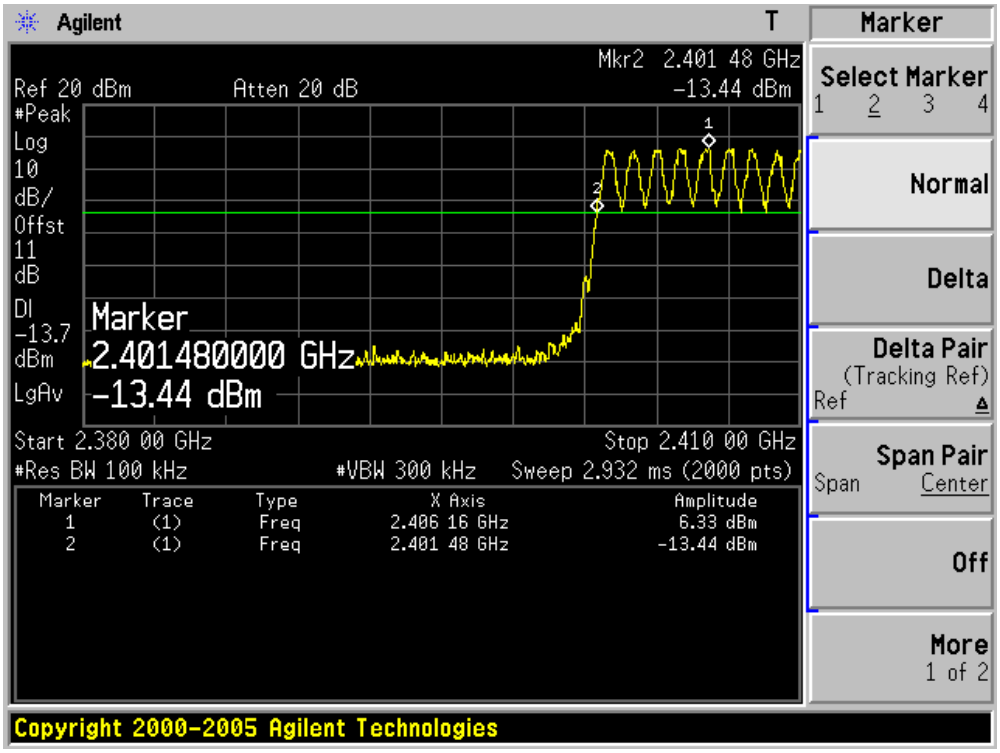


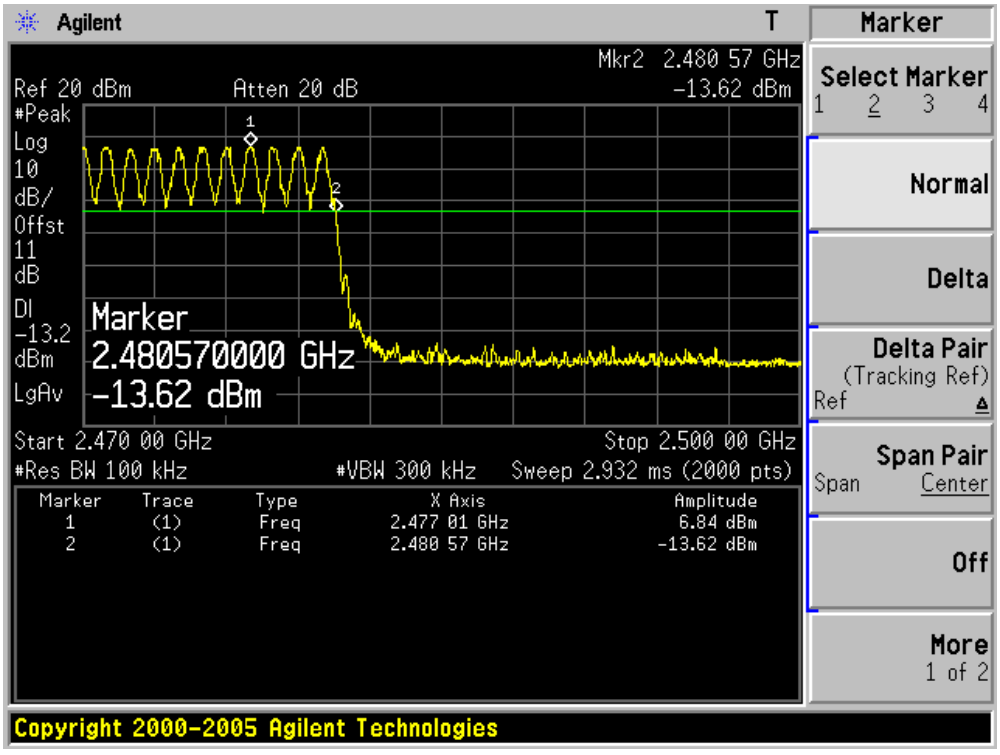
Channel 78 (2480MHz)



Product	:	Mobile Phone
Test Item	:	Band-edge Compliance of RF Conducted Emissions
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

Hopping Mode





11. Spurious RF Conducted Emissions

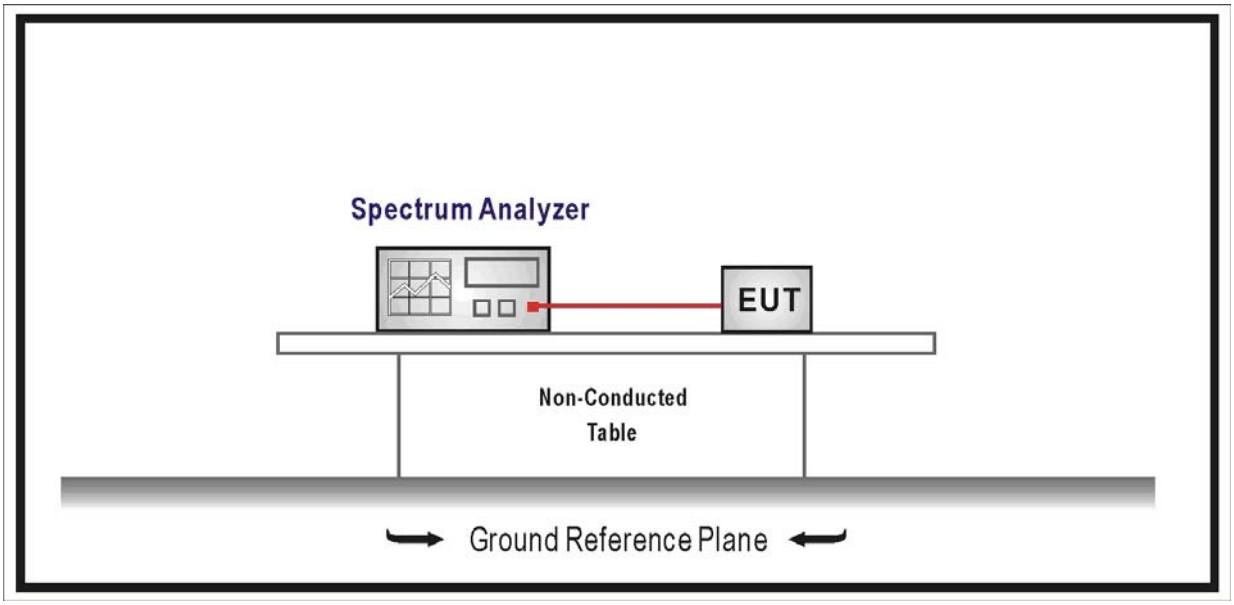
11.1. Test Equipment

Spurious RF Conducted Emissions / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2013.04.18
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2013.05.07

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

11.2. Test Setup



11.3. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in

Section 15.209(a) of FCC part 15 is not required.

11.4. Test Procedure

According to ANSI C63.10: 2009.
Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
RBW = 100 kHz
VBW ≧ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this section.

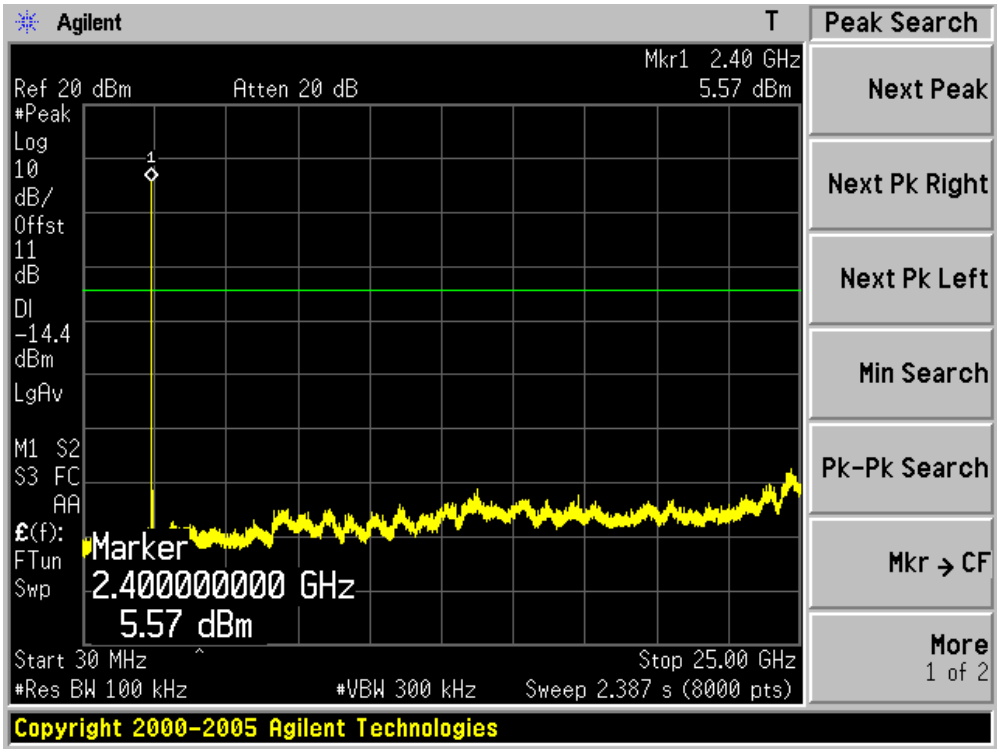
11.5. Uncertainty

The measurement uncertainty is defined as ± 1.0 dB

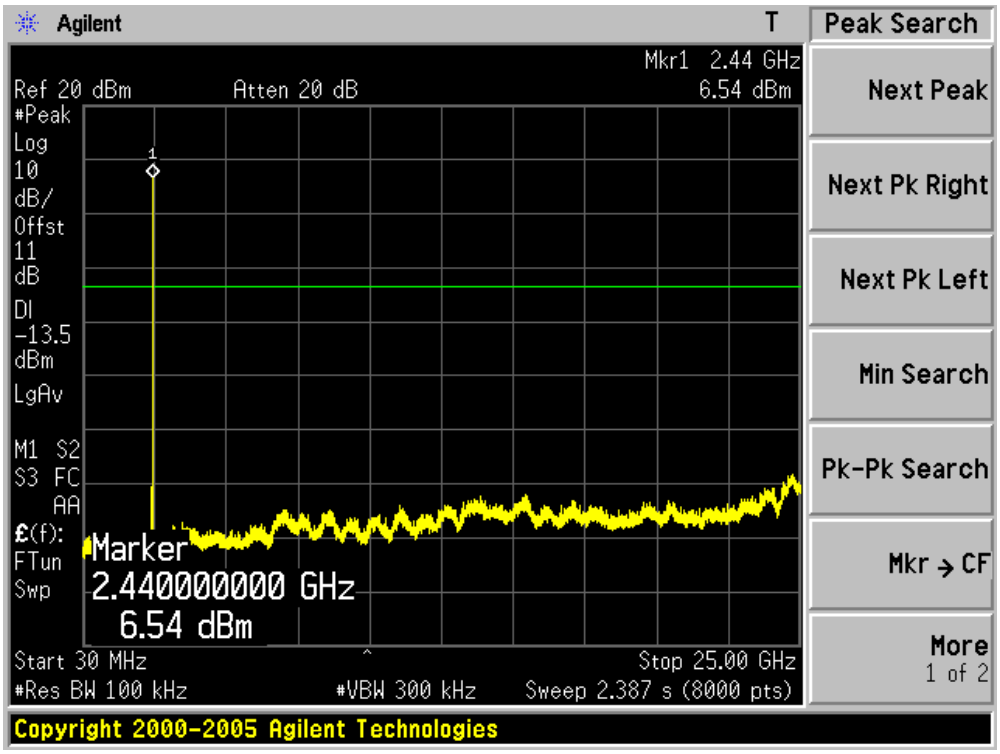
11.6. Test Result

Product	:	Mobile Phone
Test Item	:	Spurious RF Conducted Emissions
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

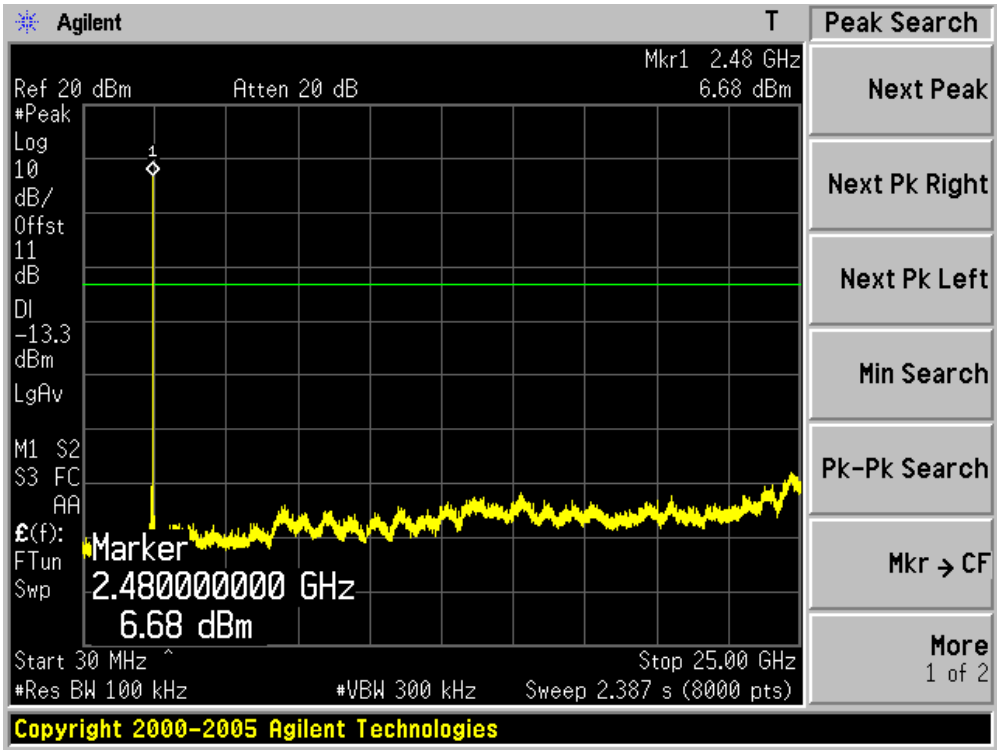
Channel 00 (2402MHz)



Channel 39 (2441MHz)

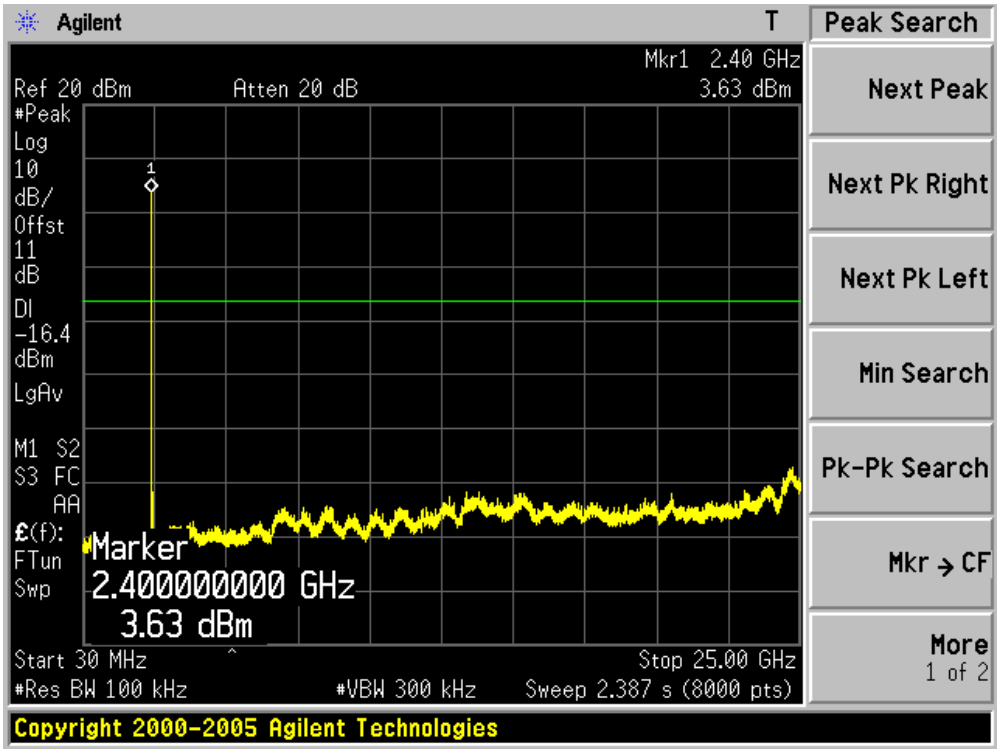


Channel 78 (2480MHz)

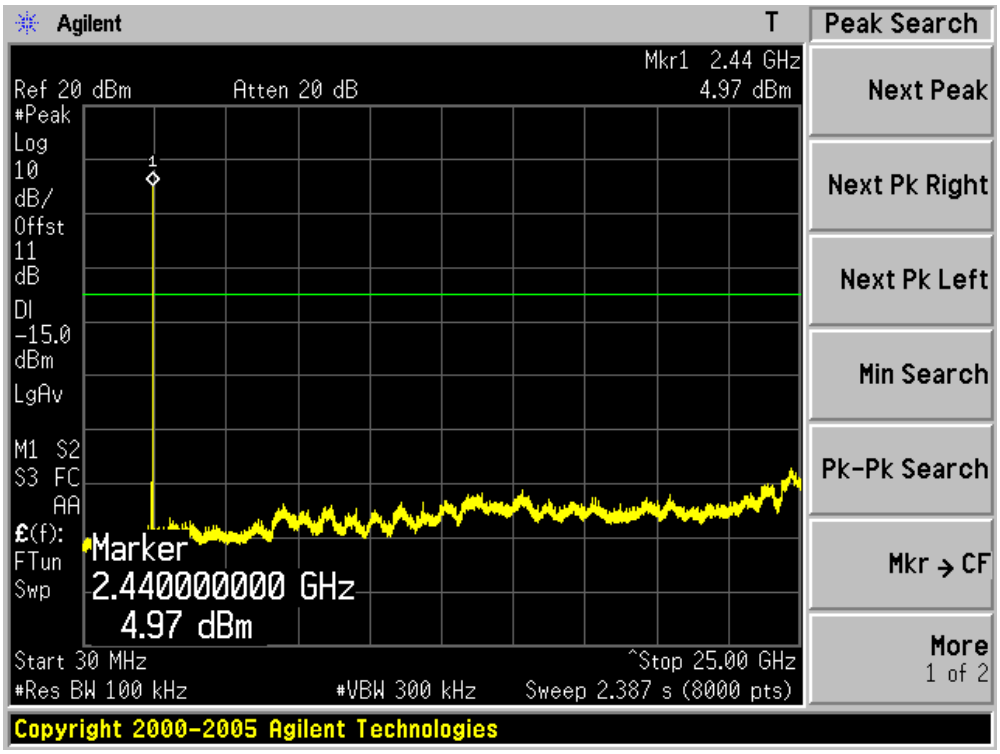


Product	:	Mobile Phone
Test Item	:	Spurious RF Conducted Emissions
Test Mode	:	Mode 2: Transmitter-2Mbps(Pi/4 DQPSK_DH5)

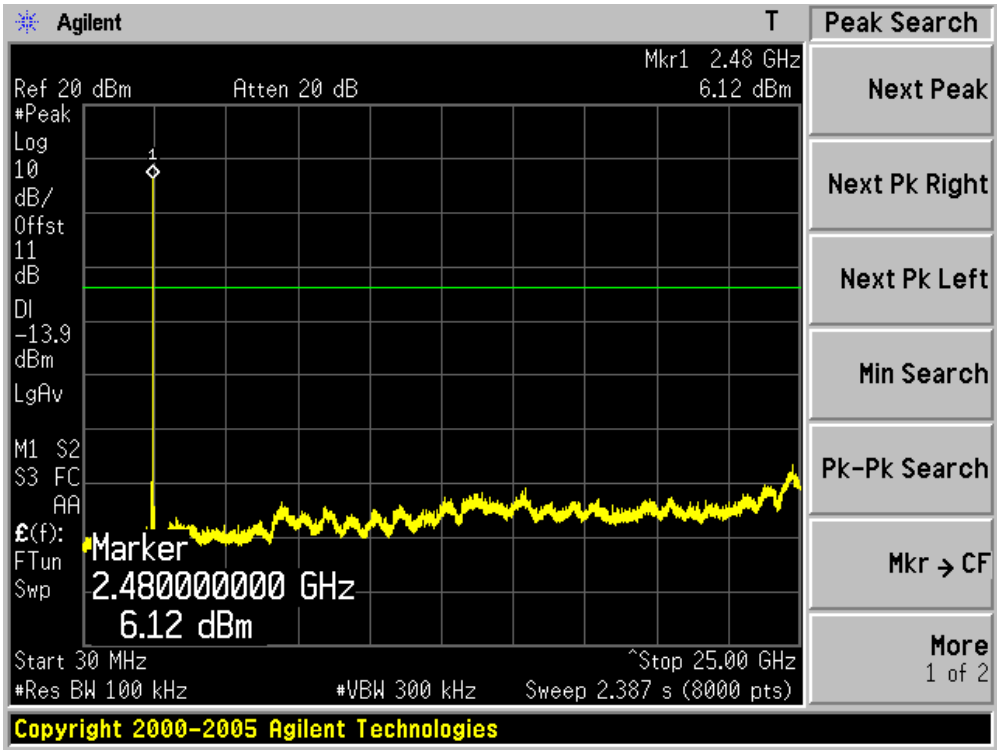
Channel 00 (2402MHz)



Channel 39 (2441MHz)

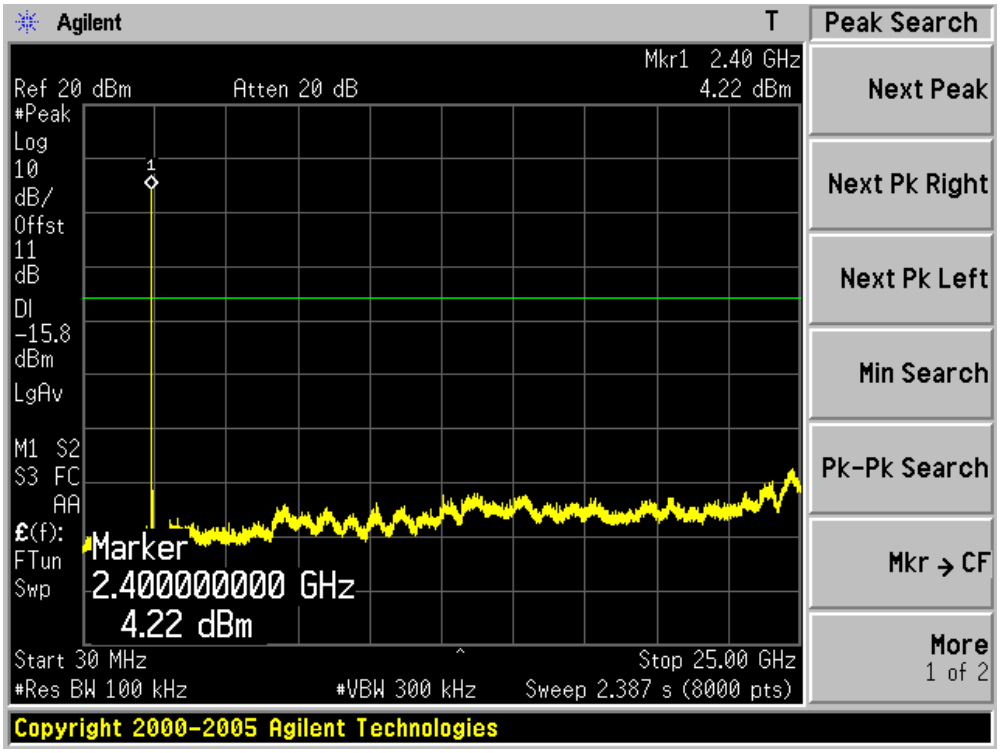


Channel 78 (2480MHz)

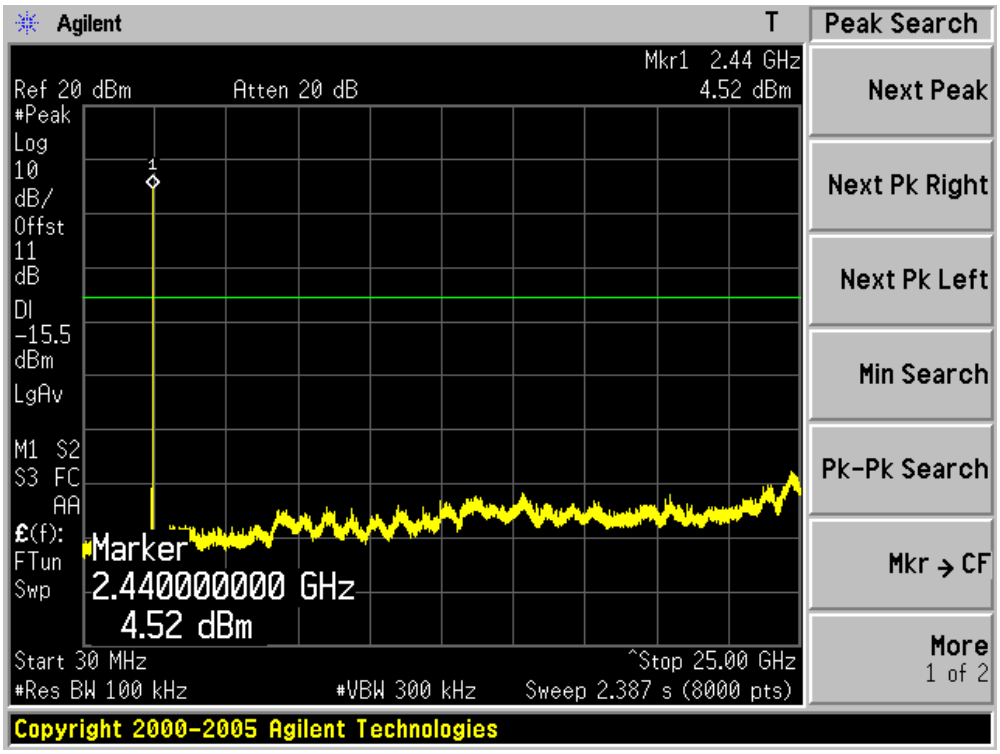


Product	:	Mobile Phone
Test Item	:	Spurious RF Conducted Emissions
Test Mode	:	Mode 3: Transmitter-3Mbps(8DPSK_DH5)

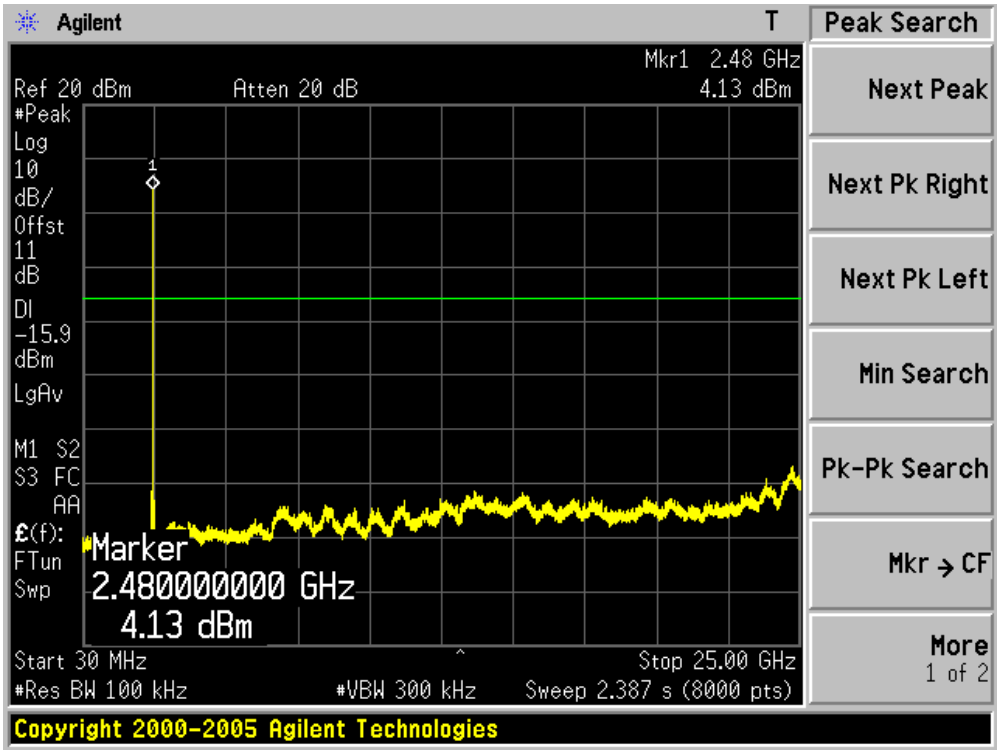
Channel 00 (2402MHz)



Channel 39 (2441MHz)



Channel 78 (2480MHz)



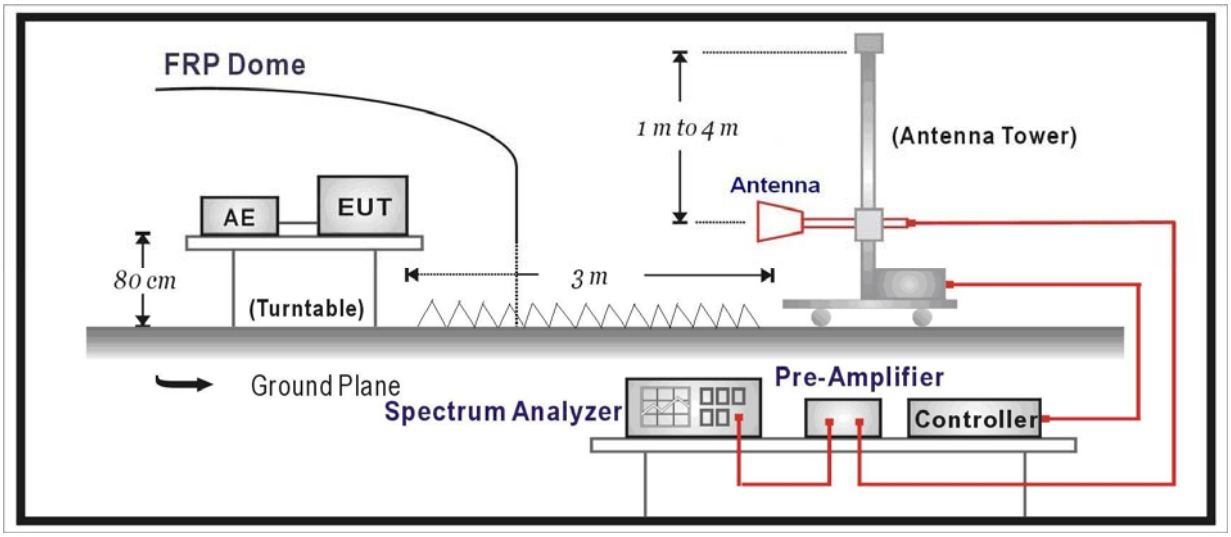
12. Radiated Emission Band Edge

12.1. Test Equipment

☒Radiated Emission Band Edge / AC-5

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2013.04.18
EMI Test Receiver	R&S	ESCI	100573	2013.04.18
Preamplifier	Miteq	NSP1800-25	1364185	2013.05.04
Preamplifier	QuieTek	AP-040G	CHM-0906001	2013.05.04
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2012.10.18
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2014.06.08
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	2013.03.02
Temperature/Humidity Meter	zhicheng	ZC1-2	AC5-TH	2013.01.10

12.2. Test Setup



12.3. Limit

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a) of FCC part 15.

12.4. Test Procedure

According to ANSI C63.10: 2009.
This test is required for any spurious emission or modulation product that falls in a Restricted Band, as defined in Section 15.205 of FCC part 15. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:
Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≧ 1 GHz, 100 kHz for f < 1GHz
VBW ≧ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Follow the guidelines in ANSI C63.4 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being

corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b) of FCC part 15.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209 of FCC Part 15. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log (dwell time/100 ms), in an effort to demonstrate compliance with the 15.209 limit of FCC part 15.

If the emission on which a radiated measurement must be made is located at the edge of the authorized band of operation, then the alternative “marker-delta” method may be employed.

12.5. Uncertainty

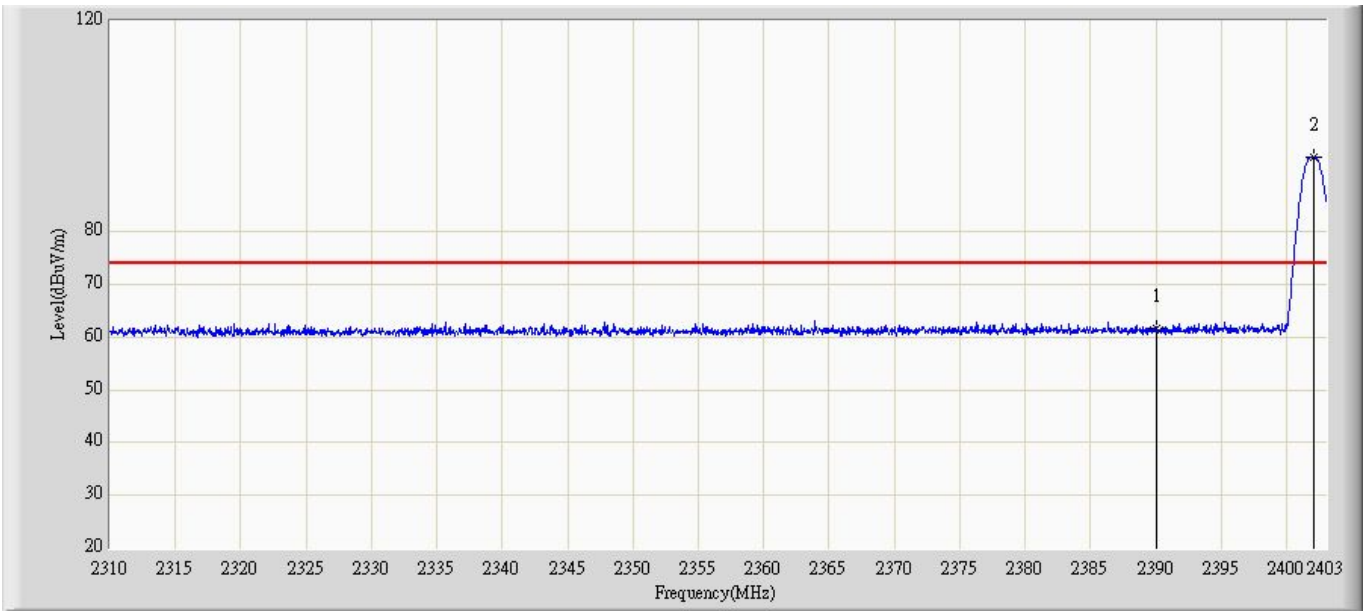
The measurement uncertainty above 1G is defined as ± 3.9 dB

below 1G is defined as ± 3.8 dB

12.6. Test Result

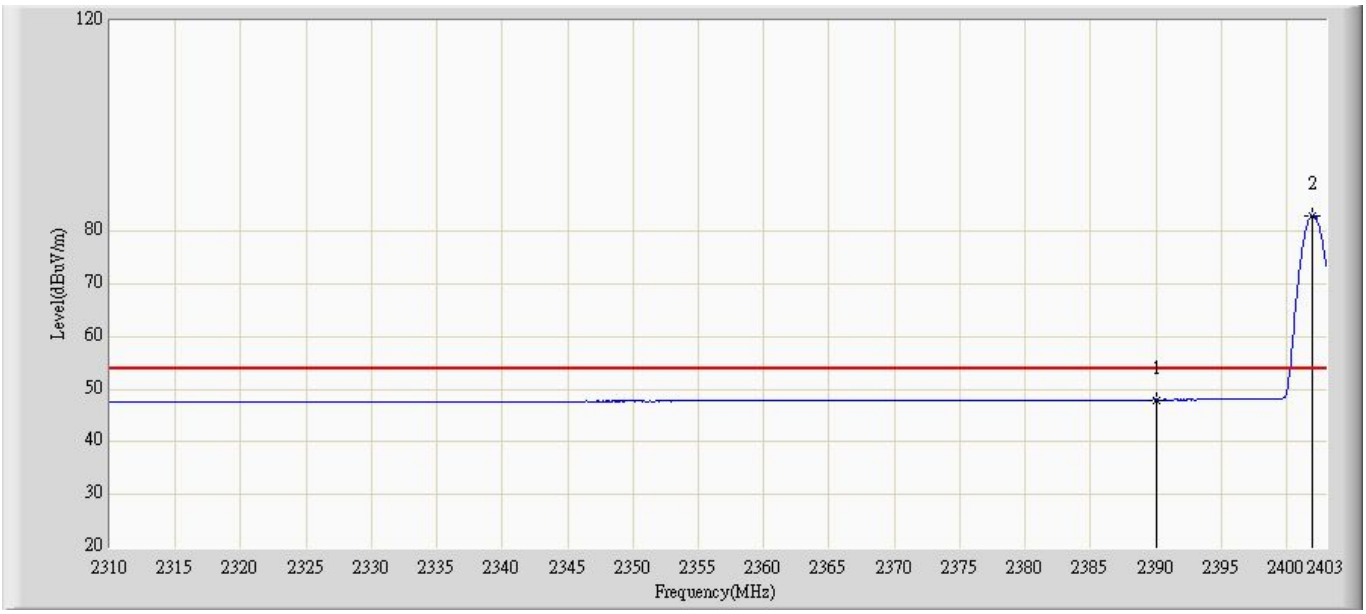
All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:
Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;
Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 14:09
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Mobile Phone	Power: By Battery
Note: Mode 1: Transmit at channel 2402MHz by DH5	



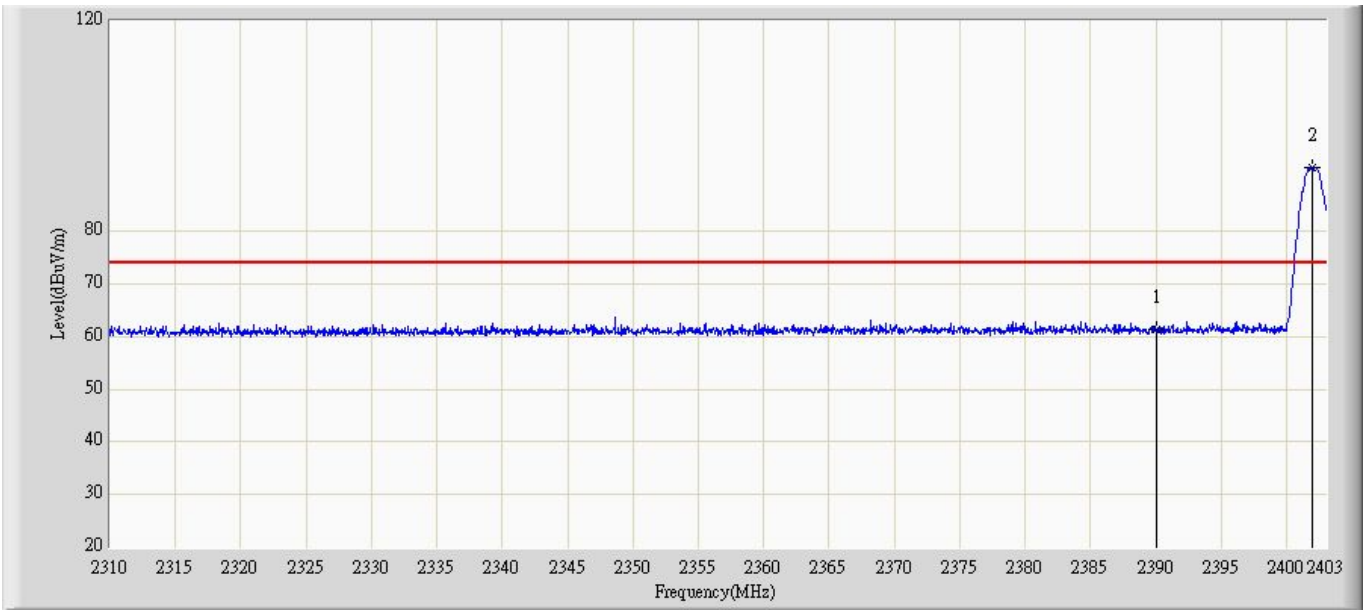
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	61.742	30.557	-12.258	74.000	31.185	PK
2		*	2402.070	94.115	62.935	N/A	N/A	31.179	PK

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 14:11
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Mobile Phone	Power: By Battery
Note: Mode 1: Transmit at channel 2402MHz by DH5	



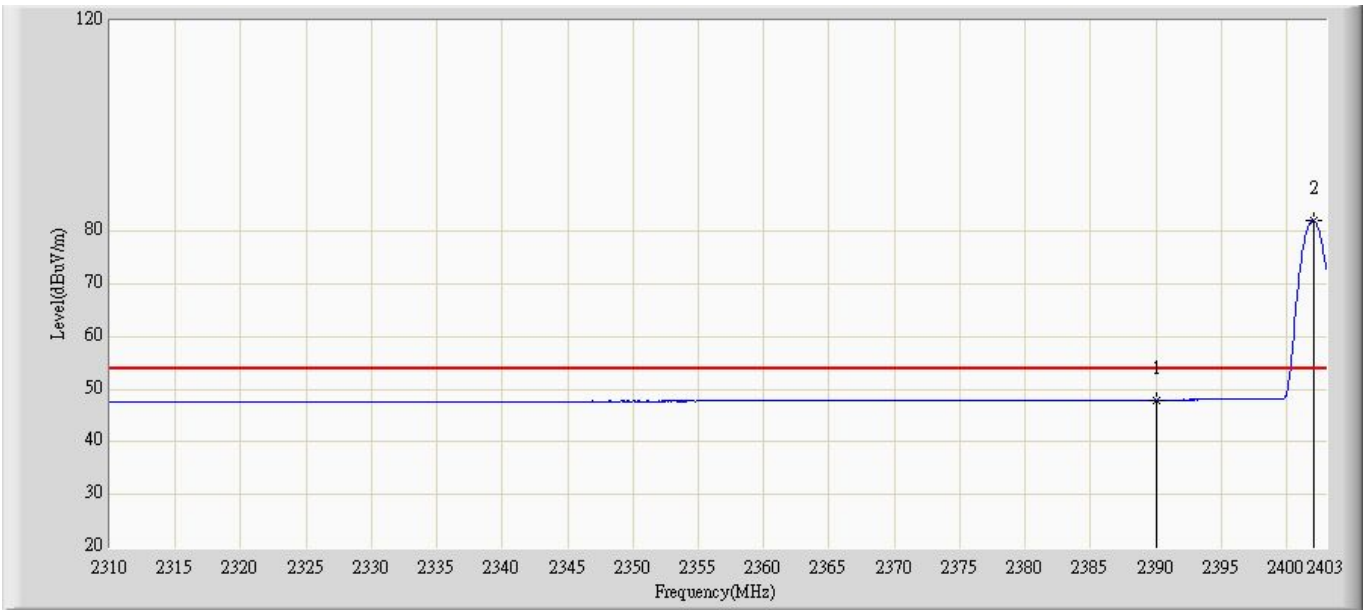
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	48.012	16.827	-5.988	54.000	31.185	AV
2		*	2401.930	83.018	51.838	N/A	N/A	31.179	AV

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 11:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Mobile Phone	Power: By Battery
Note: Mode 1: Transmit at channel 2402MHz by DH5	



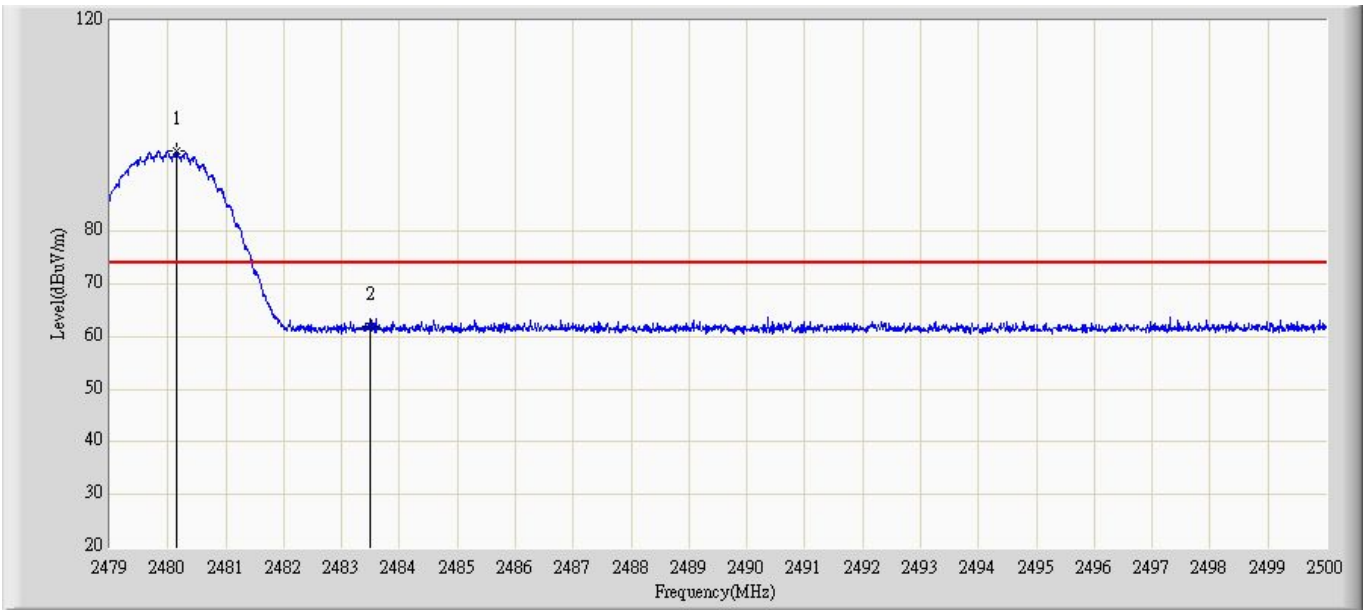
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	61.356	30.171	-12.644	74.000	31.185	PK
2		*	2401.930	92.096	60.916	N/A	N/A	31.179	PK

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 11:44
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Mobile Phone	Power: By Battery
Note: Mode 1: Transmit at channel 2402MHz by DH5	



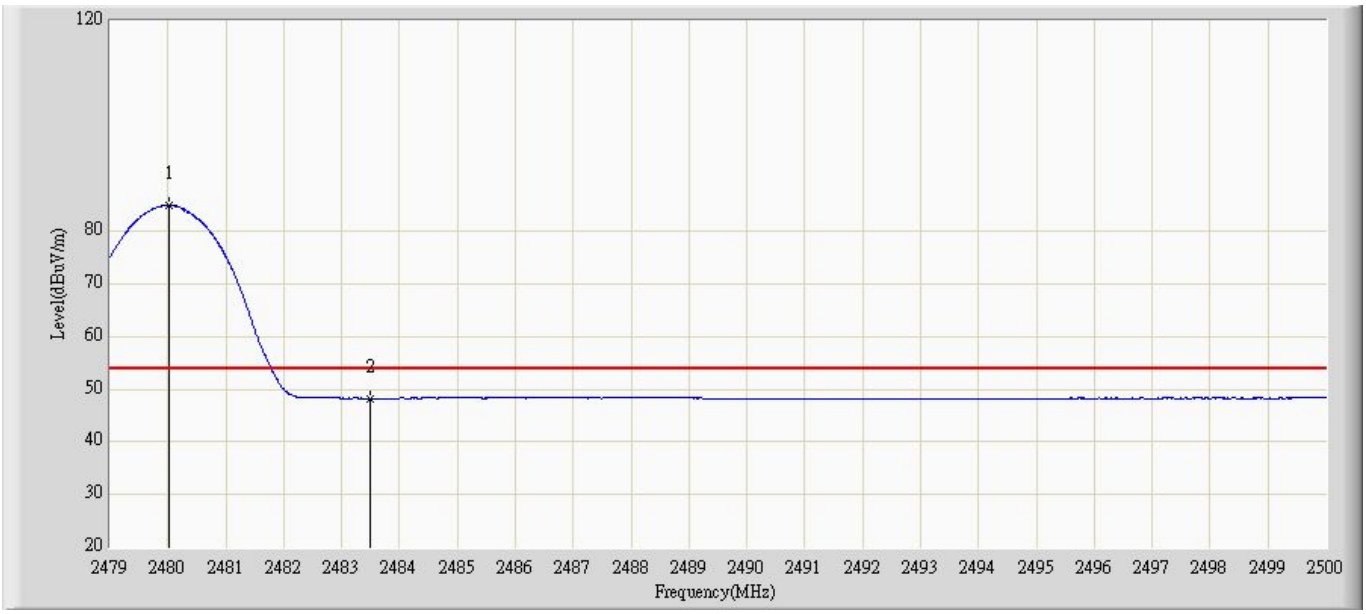
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	47.970	16.785	-6.030	54.000	31.185	AV
2		*	2402.070	82.081	50.901	N/A	N/A	31.179	AV

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 14:15
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Mobile Phone	Power: By Battery
Note: Mode 1: Transmit at channel 2480MHz by DH5	



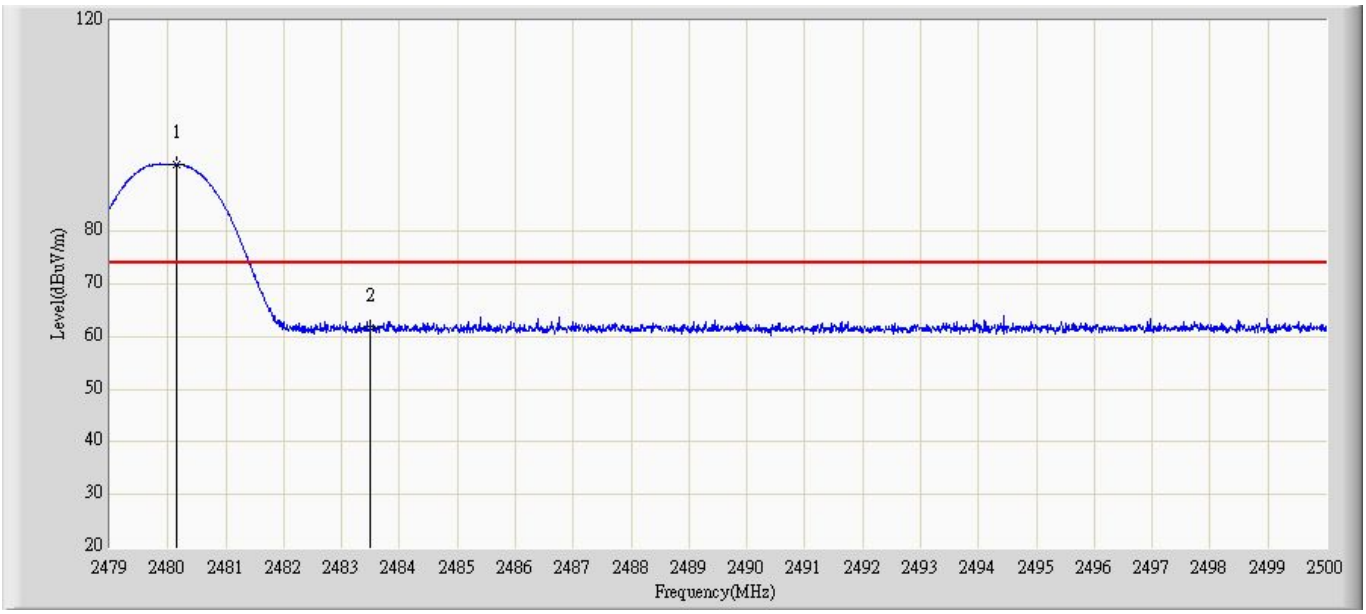
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2480.145	95.311	64.106	N/A	N/A	31.205	PK
2			2483.500	61.886	30.678	-12.114	74.000	31.208	PK

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 14:17
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Mobile Phone	Power: By Battery
Note: Mode 1: Transmit at channel 2480MHz by DH5	



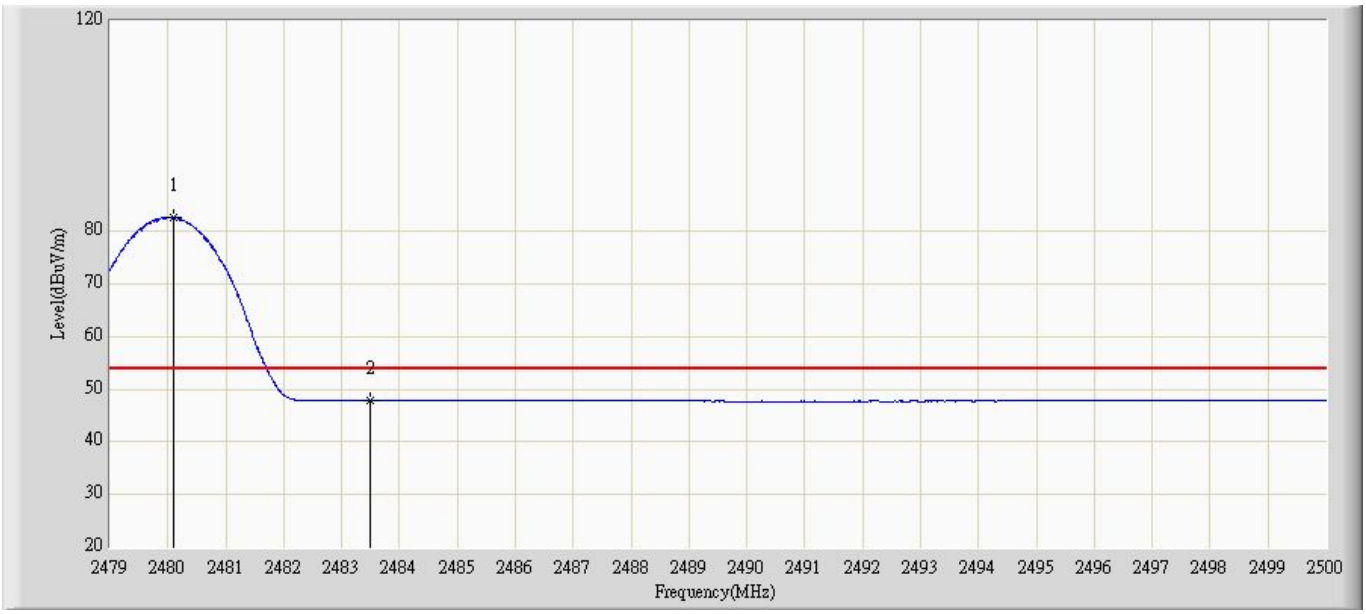
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2480.029	84.916	53.711	N/A	N/A	31.205	AV
2			2483.500	48.244	17.036	-5.756	54.000	31.208	AV

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 14:19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Mobile Phone	Power: By Battery
Note: Mode 1: Transmit at channel 2480MHz by DH5	



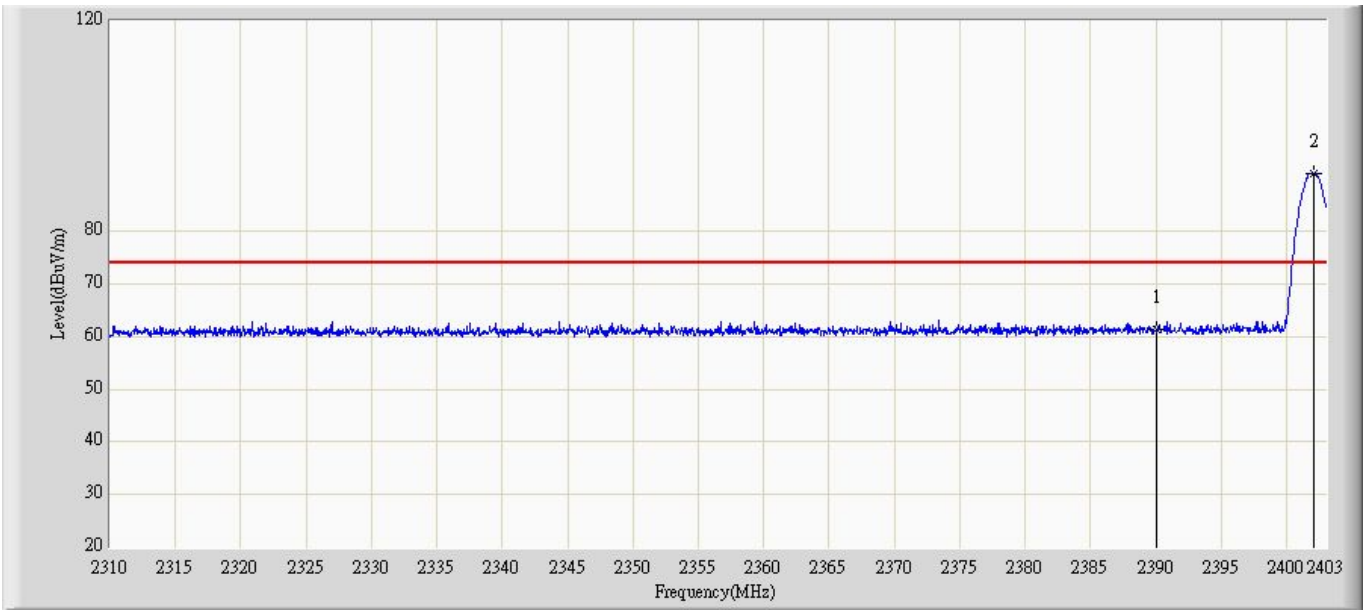
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2480.155	92.838	61.633	N/A	N/A	31.205	PK
2			2483.500	61.595	30.387	-12.405	74.000	31.208	PK

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 14:21
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Mobile Phone	Power: By Battery
Note: Mode 1: Transmit at channel 2480MHz by DH5	



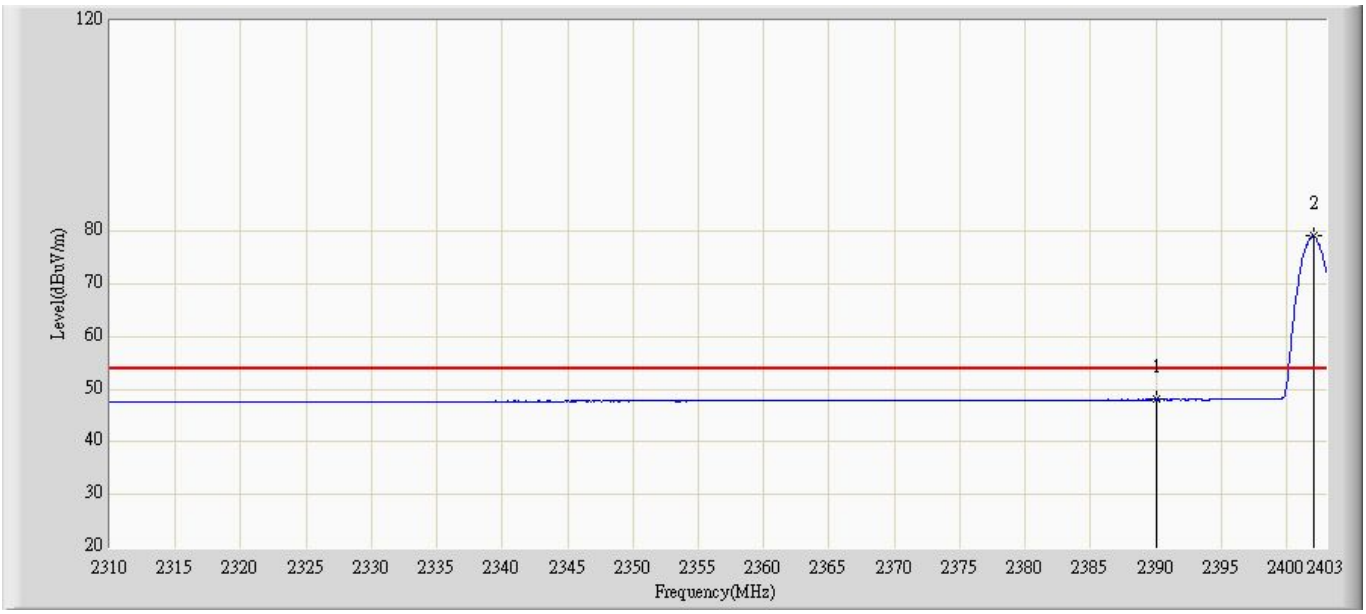
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2480.103	82.586	51.381	N/A	N/A	31.205	AV
2			2483.500	47.776	16.568	-6.224	54.000	31.208	AV

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 14:44
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Mobile Phone	Power: By Battery
Note: Mode 2: Transmit at channel 2402MHz by 2DH5	



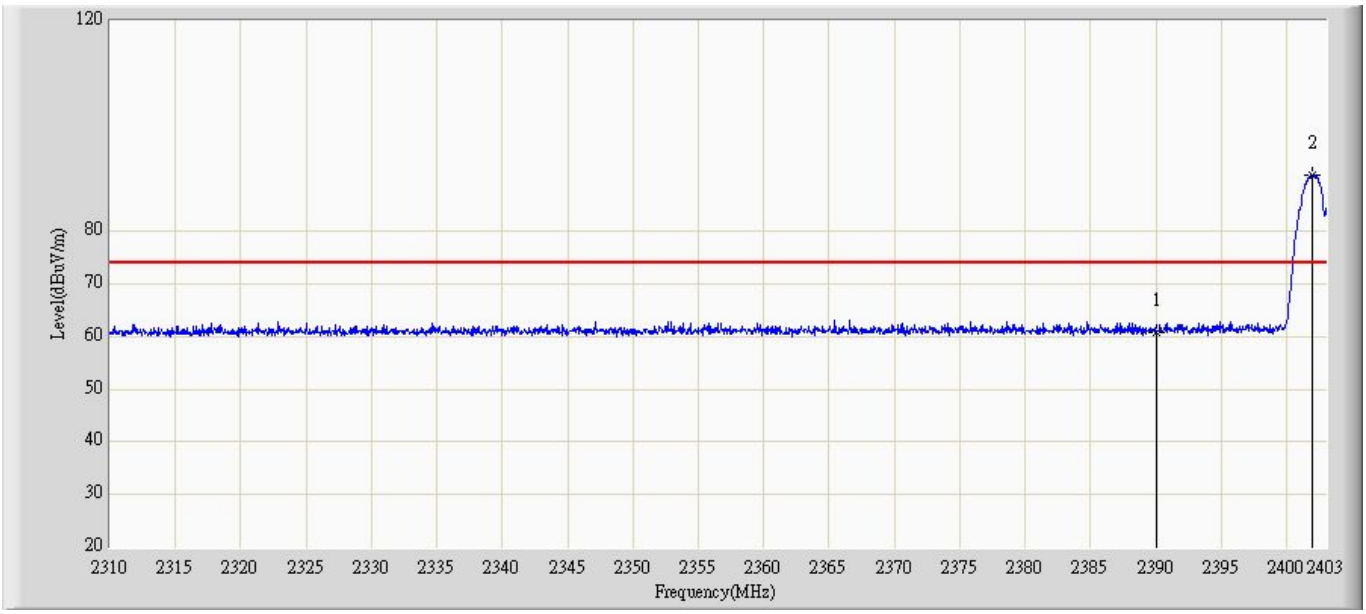
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	61.463	30.278	-12.537	74.000	31.185	PK
2		*	2402.070	91.053	59.873	N/A	N/A	31.179	PK

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 14:47
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Mobile Phone	Power: By Battery
Note: Mode 2: Transmit at channel 2402MHz by 2DH5	



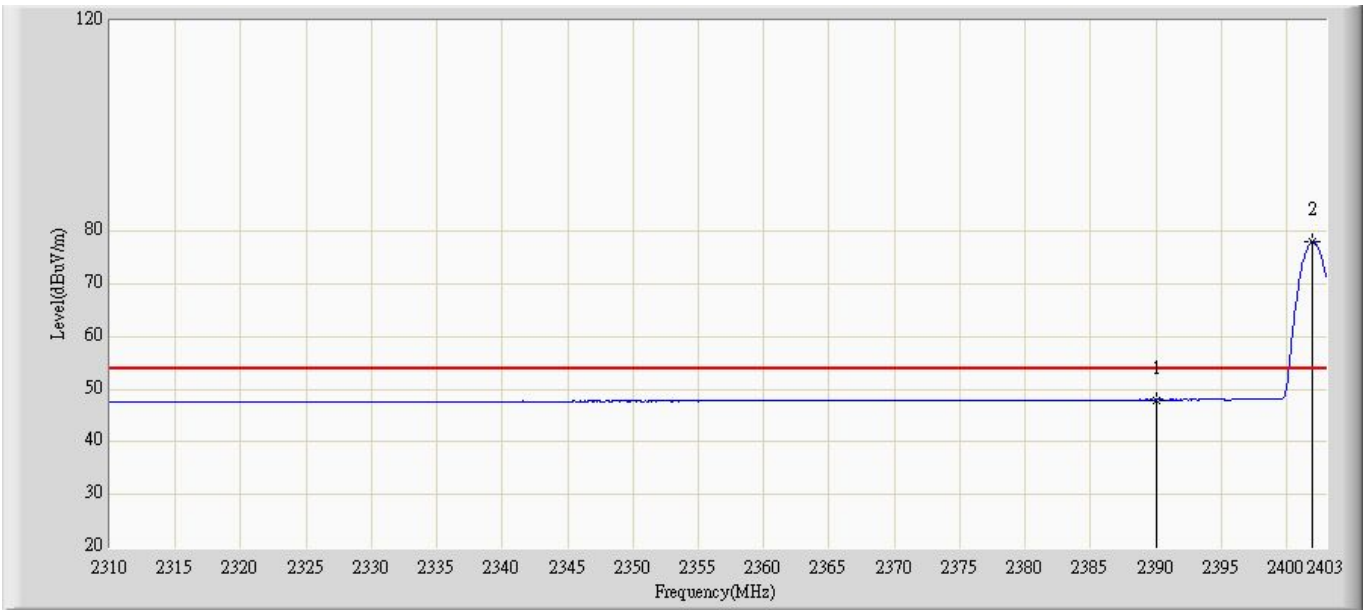
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	48.031	16.846	-5.969	54.000	31.185	AV
2		*	2402.070	79.088	47.908	N/A	N/A	31.179	AV

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 14:49
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Mobile Phone	Power: By Battery
Note: Mode 2: Transmit at channel 2402MHz by 2DH5	



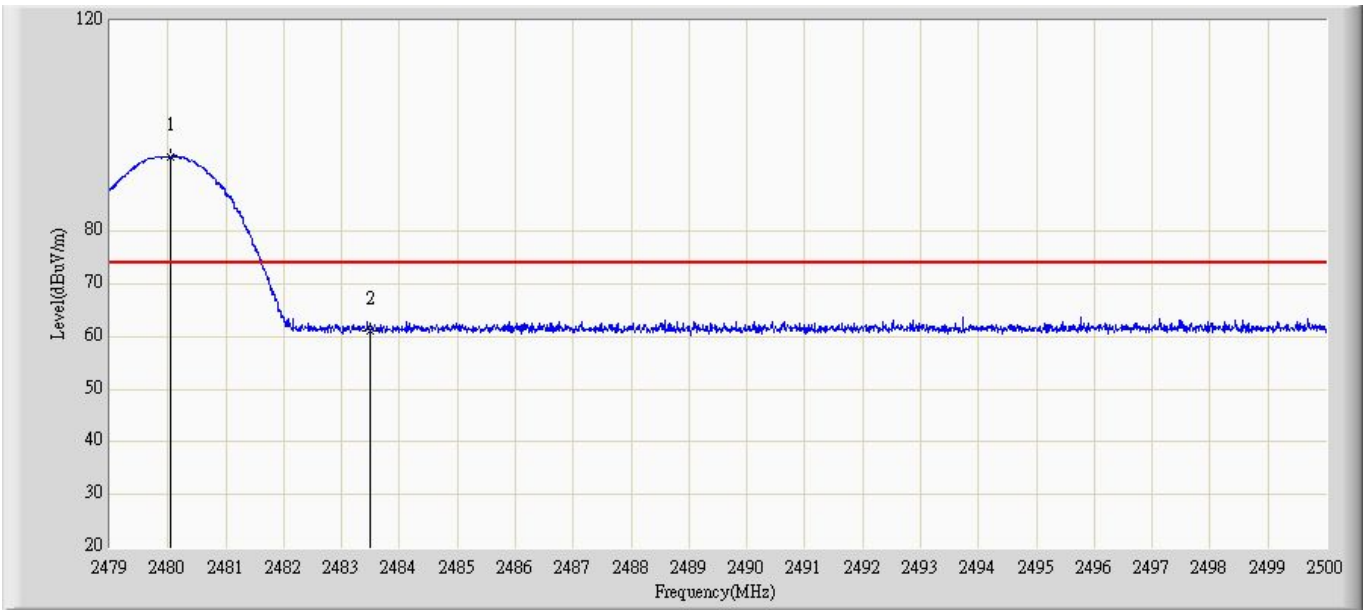
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	60.902	29.717	-13.098	74.000	31.185	PK
2		*	2401.930	90.714	59.534	N/A	N/A	31.179	PK

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 14:50
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Mobile Phone	Power: By Battery
Note: Mode 2: Transmit at channel 2402MHz by 2DH5	



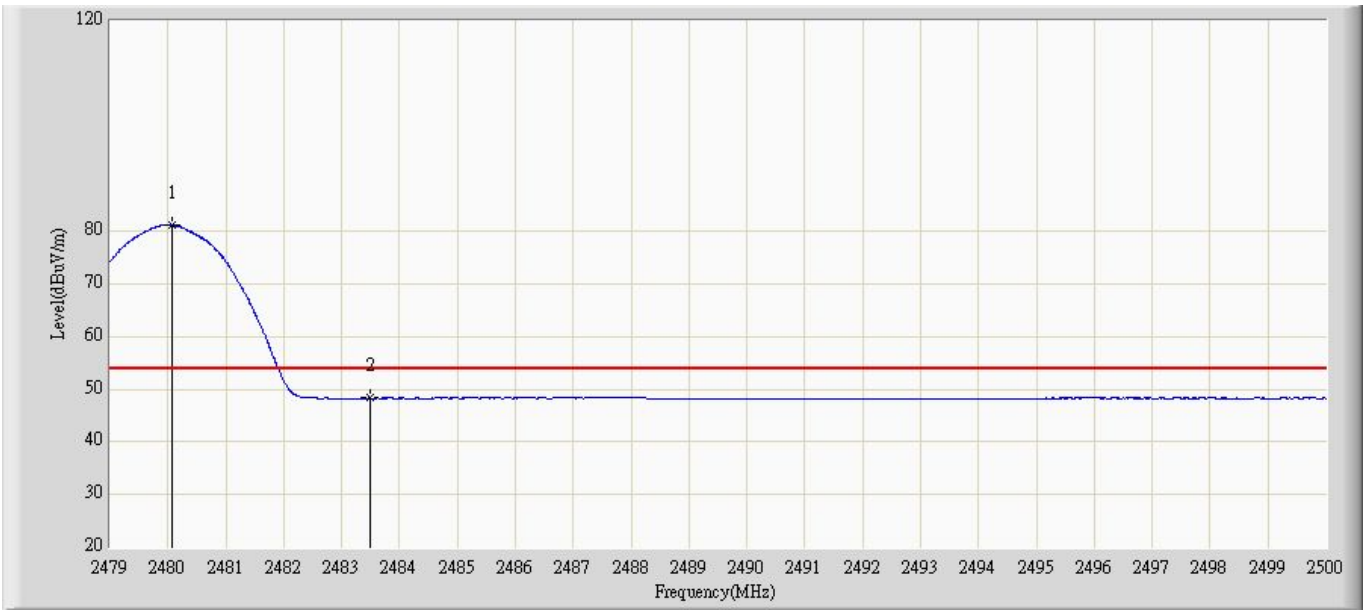
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	48.004	16.819	-5.996	54.000	31.185	AV
2		*	2401.930	78.084	46.904	N/A	N/A	31.179	AV

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 14:54
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Mobile Phone	Power: By Battery
Note: Mode 2: Transmit at channel 2480MHz by 2DH5	



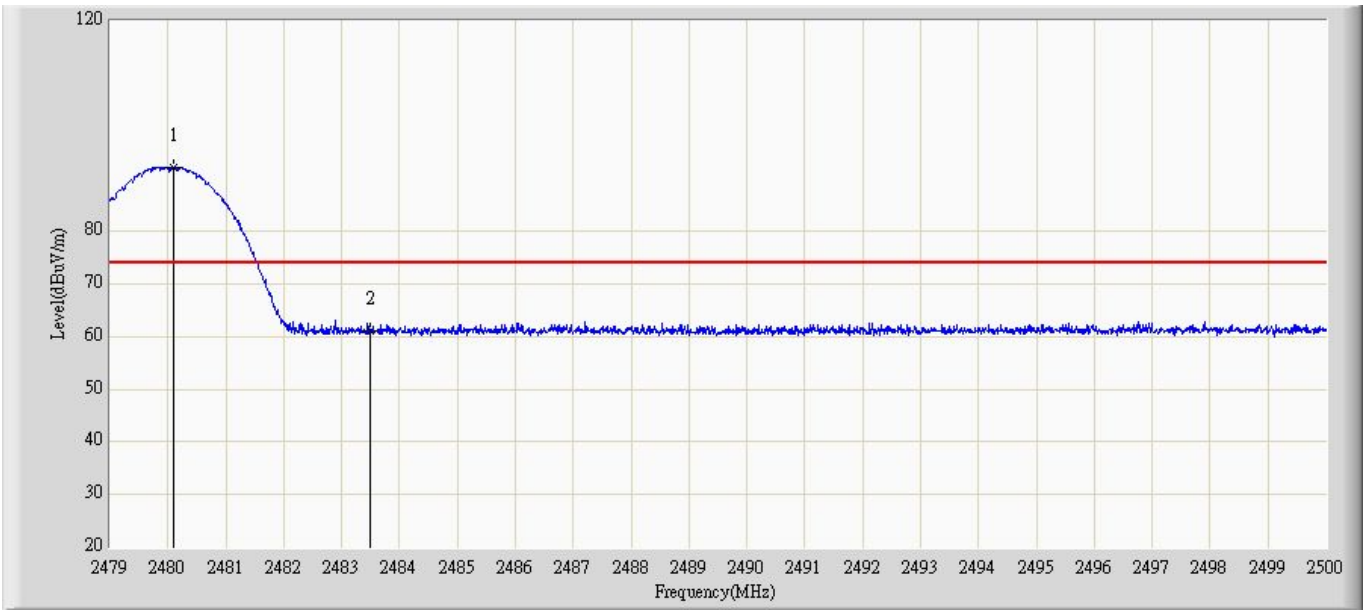
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2480.040	94.119	62.914	N/A	N/A	31.205	PK
2			2483.500	61.040	29.832	-12.960	74.000	31.208	PK

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 14:58
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Mobile Phone	Power: By Battery
Note: Mode 2: Transmit at channel 2480MHz by 2DH5	



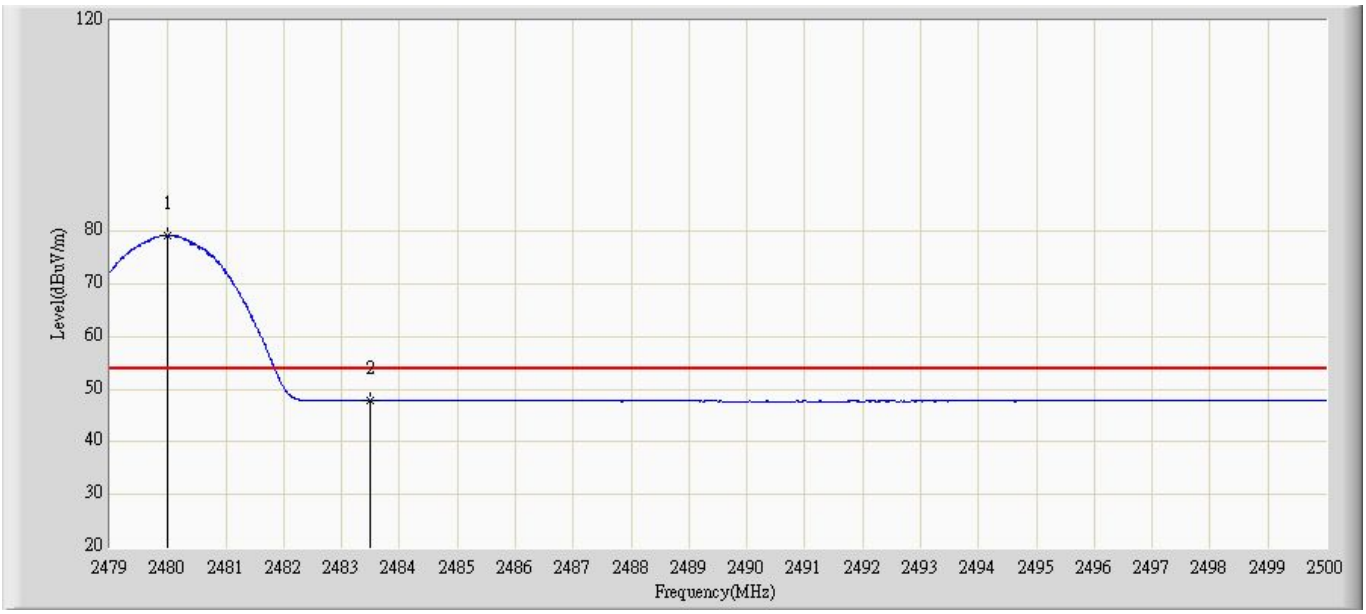
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2480.071	81.228	50.023	N/A	N/A	31.205	AV
2			2483.500	48.316	17.108	-5.684	54.000	31.208	AV

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 14:58
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Mobile Phone	Power: By Battery
Note: Mode 2: Transmit at channel 2480MHz by 2DH5	



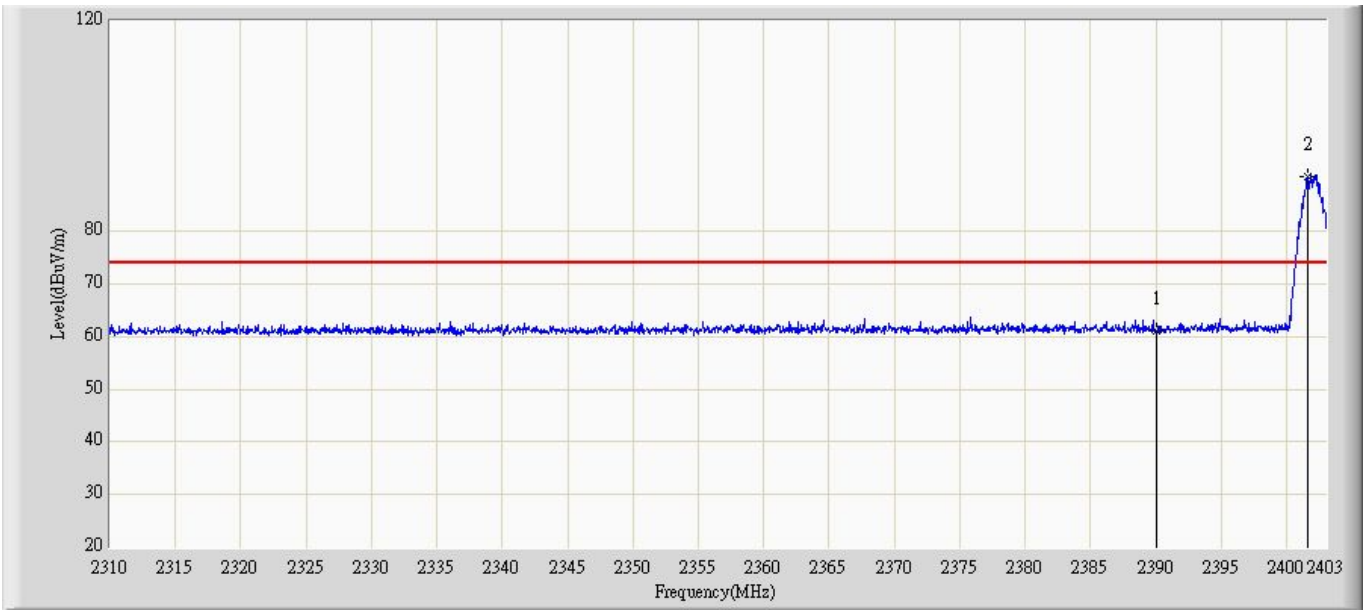
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2480.103	92.242	61.037	N/A	N/A	31.205	PK
2			2483.500	61.146	29.938	-12.854	74.000	31.208	PK

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 15:04
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Mobile Phone	Power: By Battery
Note: Mode 2: Transmit at channel 2480MHz by 2DH5	



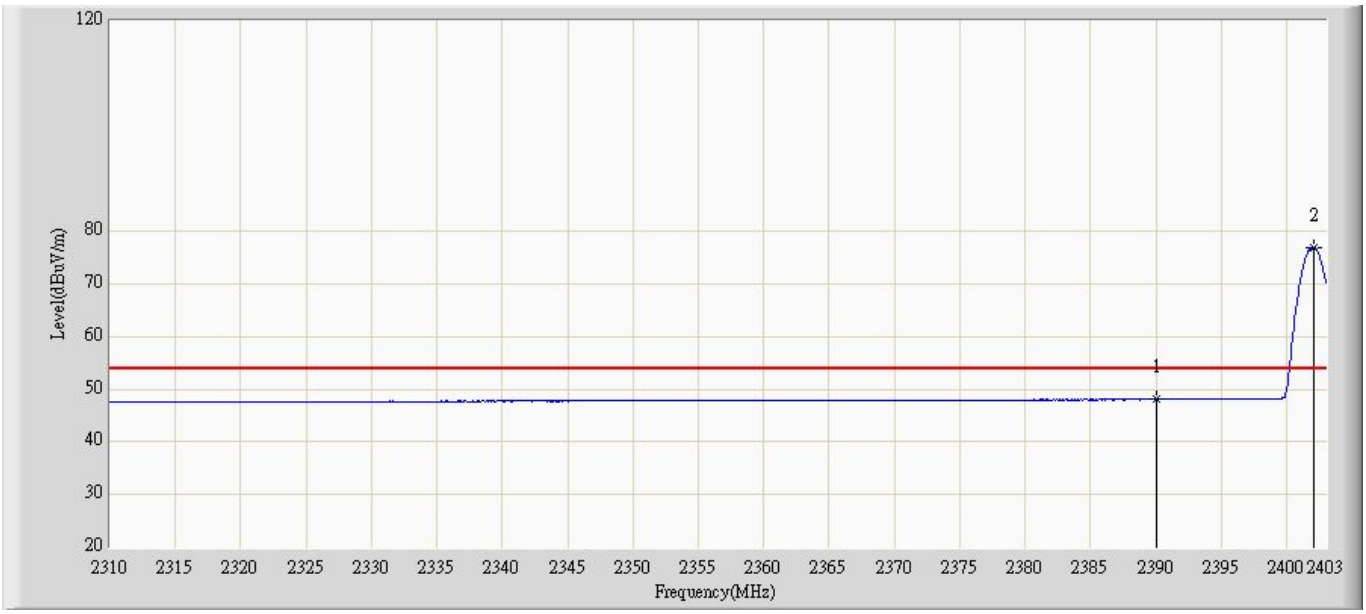
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2479.998	79.313	48.108	N/A	N/A	31.205	AV
2			2483.500	47.810	16.602	-6.190	54.000	31.208	AV

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 15:05
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Mobile Phone	Power: By Battery
Note: Mode 3: Transmit at channel 2402MHz by 3DH5	



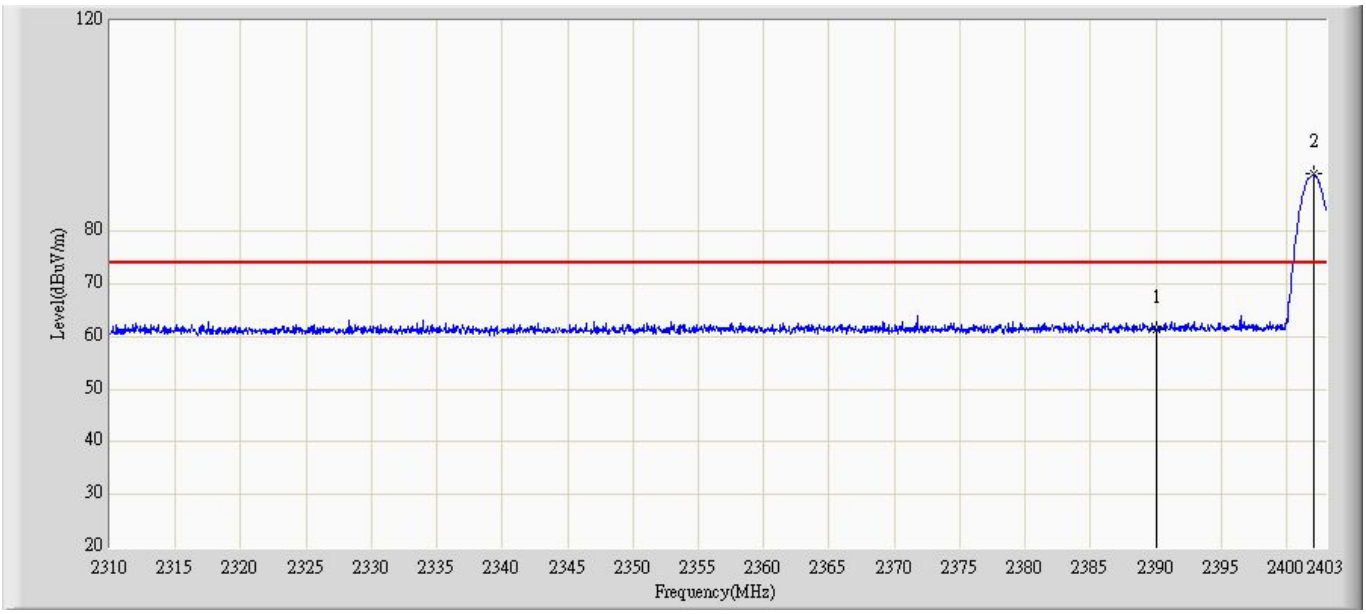
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	60.984	29.799	-13.016	74.000	31.185	PK
2		*	2401.652	90.533	59.353	N/A	N/A	31.180	PK

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 15:08
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Mobile Phone	Power: By Battery
Note: Mode 3: Transmit at channel 2402MHz by 3DH5	



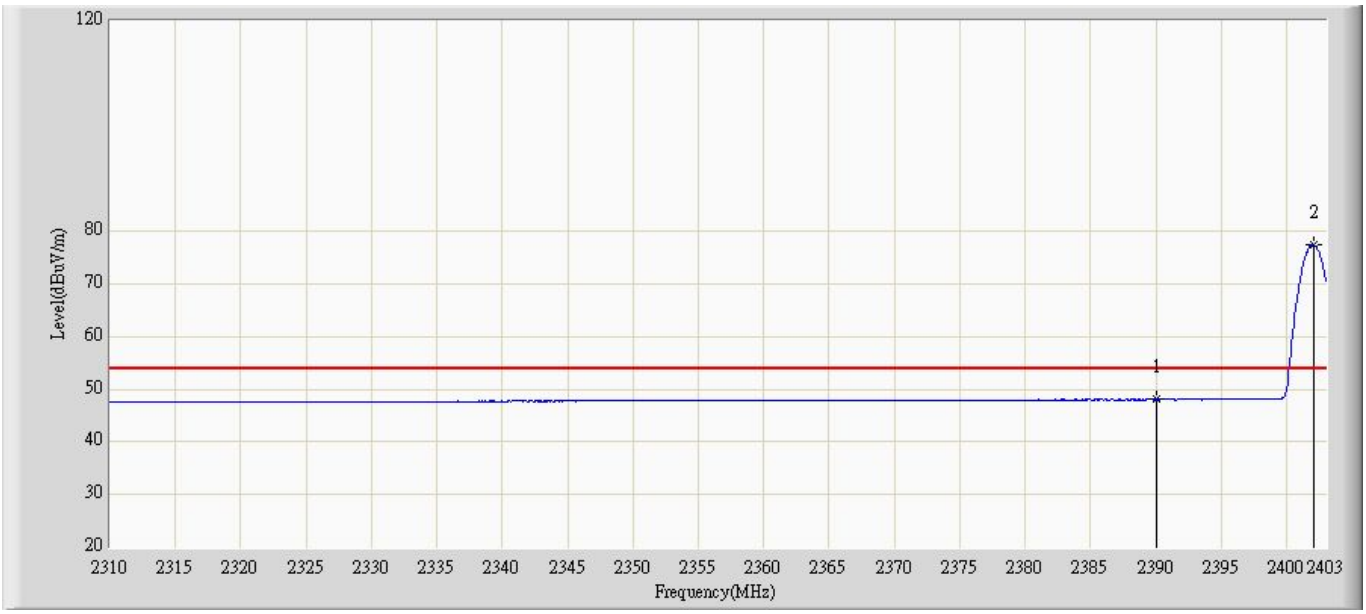
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	48.063	16.878	-5.937	54.000	31.185	AV
2		*	2402.070	76.895	45.715	N/A	N/A	31.179	AV

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 15:10
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Mobile Phone	Power: By Battery
Note: Mode 3: Transmit at channel 2402MHz by 3DH5	



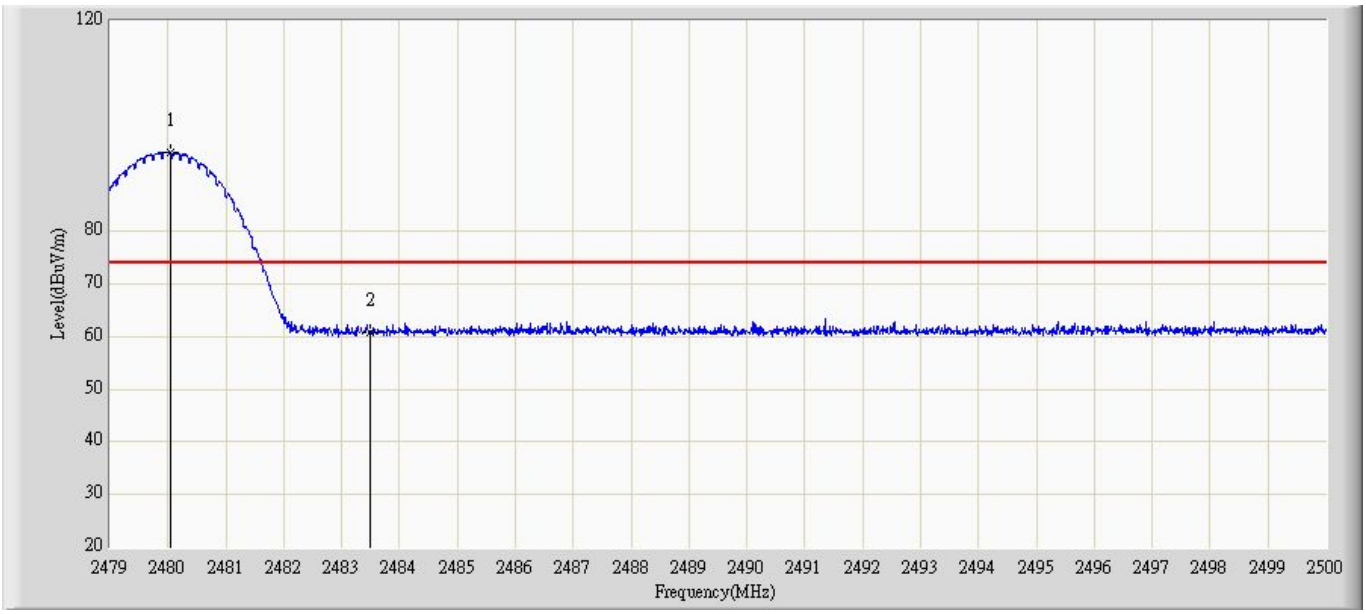
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	61.294	30.109	-12.706	74.000	31.185	PK
2		*	2402.070	90.835	59.655	N/A	N/A	31.179	PK

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 15:12
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Mobile Phone	Power: By Battery
Note: Mode 3: Transmit at channel 2402MHz by 3DH5	



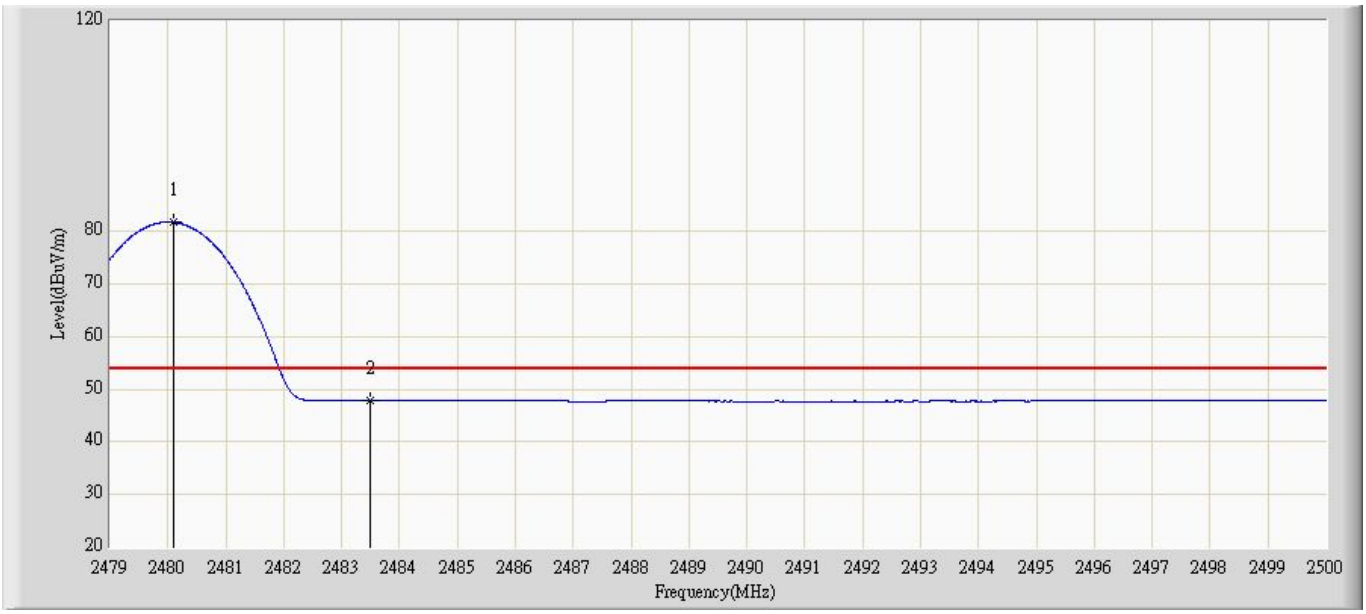
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	48.020	16.835	-5.980	54.000	31.185	AV
2		*	2402.070	77.404	46.224	N/A	N/A	31.179	AV

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 15:14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Mobile Phone	Power: By Battery
Note: Mode 3: Transmit at channel 2480MHz by 3DH5	



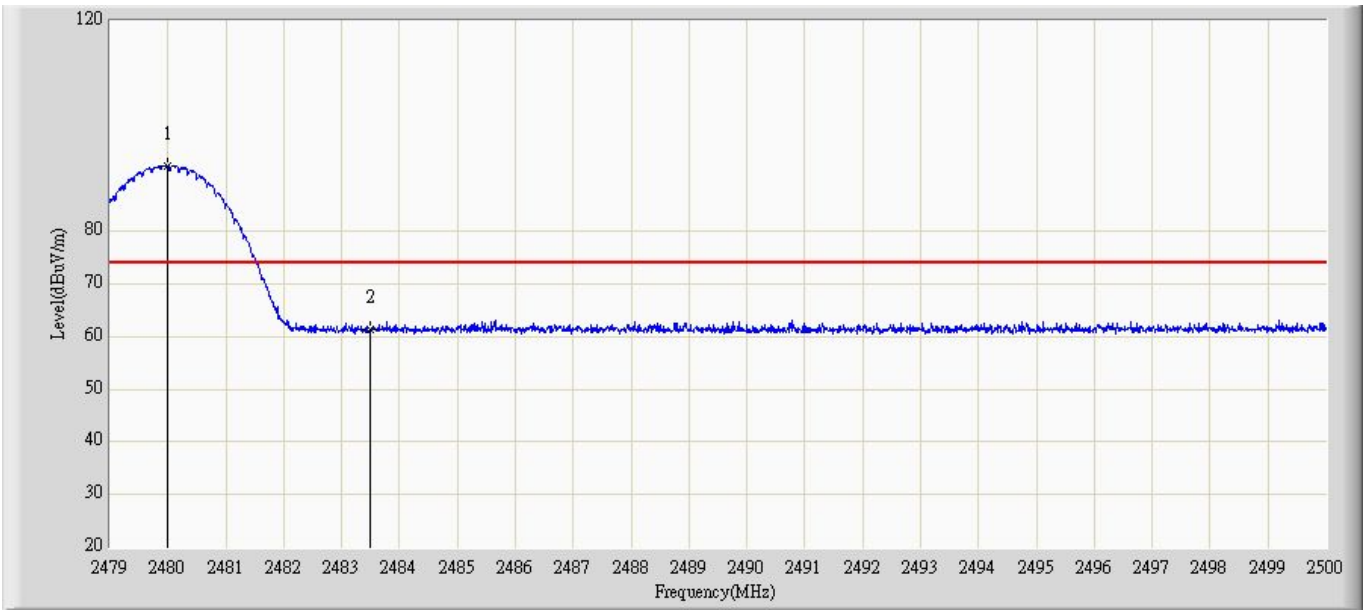
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2480.040	95.044	63.839	N/A	N/A	31.205	PK
2			2483.500	60.912	29.704	-13.088	74.000	31.208	PK

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 15:16
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Horizontal
EUT: Mobile Phone	Power: By Battery
Note: Mode 3: Transmit at channel 2480MHz by 3DH5	



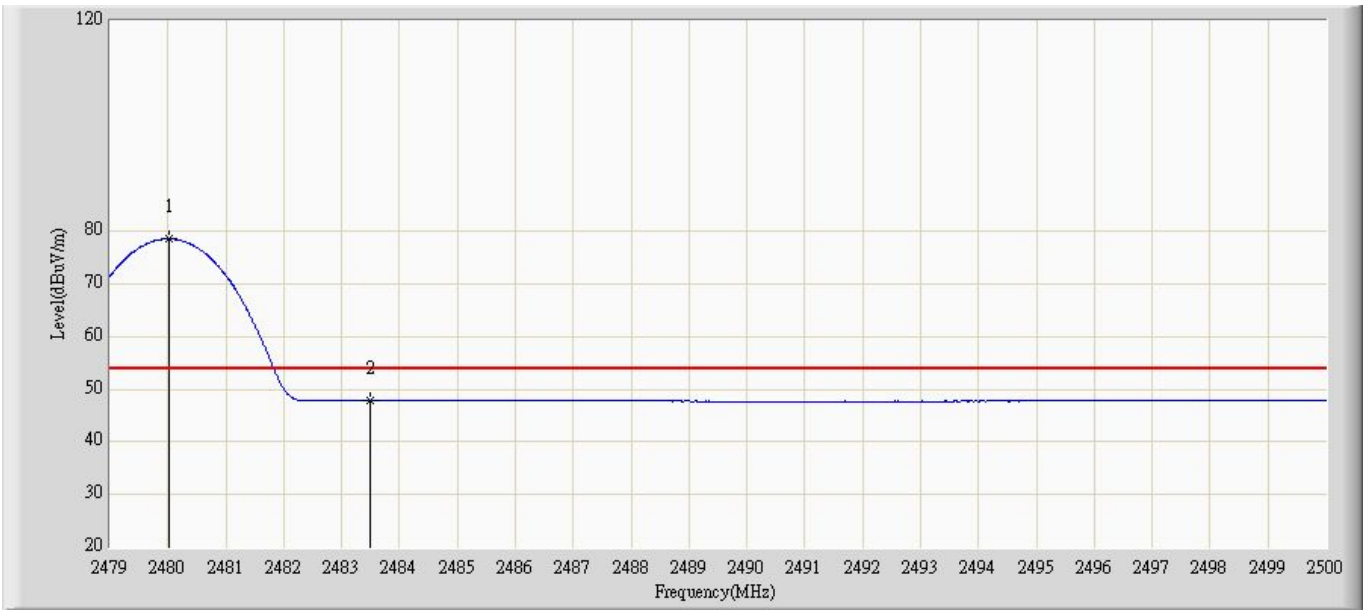
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2480.103	81.714	50.509	N/A	N/A	31.205	AV
2			2483.500	47.794	16.586	-6.206	54.000	31.208	AV

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 15:17
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Mobile Phone	Power: By Battery
Note: Mode 3: Transmit at channel 2480MHz by 3DH5	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2479.998	92.549	61.344	N/A	N/A	31.205	PK
2			2483.500	61.381	30.173	-12.619	74.000	31.208	PK

Engineer: Nancy	
Site: AC5	Time: 2012/06/11 - 15:22
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA 9120D_499(1-18GHz)	Polarity: Vertical
EUT: Mobile Phone	Power: By Battery
Note: Mode 3: Transmit at channel 2480MHz by 3DH5	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2480.029	78.548	47.343	N/A	N/A	31.205	AV
2			2483.500	47.754	16.546	-6.246	54.000	31.208	AV