



FCC Part15.247 Test Report

Product Name : CDMA 1X Mobile Phone
Model No. : HUAWEI M636
FCC ID : QISM636

Applicant : HUAWEI TECHNOLOGIES CO., LTD.
Address : Bantian, Longgang District, Shenzhen, 518129
Guangdong, P. R. China

Date of Receipt : 22/03/2012
Test Date : 23/03/2012~28/03/2012
Issued Date : 06/04/2012
Report No. : 123S066R-RF-US-P06V01
Report Version : V 1.1

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.

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Test Report Certification

Issued Date : 06/04/2012

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Product Name : CDMA 1X Mobile Phone

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 M636

FCC ID : QISM636

EUT Voltage : DC: 3.7V

Trade Name : HUAWEI

Applicable Standard : FCC CFR Title 47 Part 15 Subpart C: 2010
ANSI C63.4: 2009
ANSI C63.10: 2009

Test Result : Complied

Performed Location : Suzhou EMC Laboratory
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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

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/>
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1. General Information

1.1. EUT Description

Product Name	CDMA 1X Mobile Phone
Model No.	HUAWEI M636
Hardware Version	VER.B
Software Version	M636C45B109
Device Category	Portable
CDMA	
Support Band	CDMA2000 1X 850/1700/1900
Uplink	824~849MHz 1710~1755MHz 1850~1910MHz
Downlink	869~894MHz 2110~2155MHz 1930~1990MHz
Antenna Type	Internal
Type of Modulation	QPSK
Peak Antenna Gain	BC0: 2.3dBi BC1: 3.7dBi BC15: 3.2dBi
GPS	
Operate Frequency	1575.42MHz
Type of modulation	BPSK
Antenna Gain	-3.5dBi
Bluetooth	
Bluetooth Frequency	2402~2480MHz
Bluetooth Version	V2.0
Type of modulation	FHSS
Data Rate	1Mbps(GFSK)
Antenna Gain	-5.18dBi
Components	
Battery #1	Manufacturer: Harbin Coslight Power Co., Ltd. M/N: HB4A1H Rated Voltage and Capacitance: 3.7V/900mAh
Battery #2	Manufacturer: BYD

	M/N: HB4A1H Rated Voltage and Capacitance: 3.7V/900mAh
Adapter #1	Manufacturer: HKA M/N: HS-050040U5 Input: 100-240V~50/60Hz 0.2A Output: 5Vdc, 400mA
Adapter #2	Manufacturer: BYD M/N: HS-050040U5 Input: 100-240V~50/60Hz 0.2A Output: 5Vdc, 400mA

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)

Note:

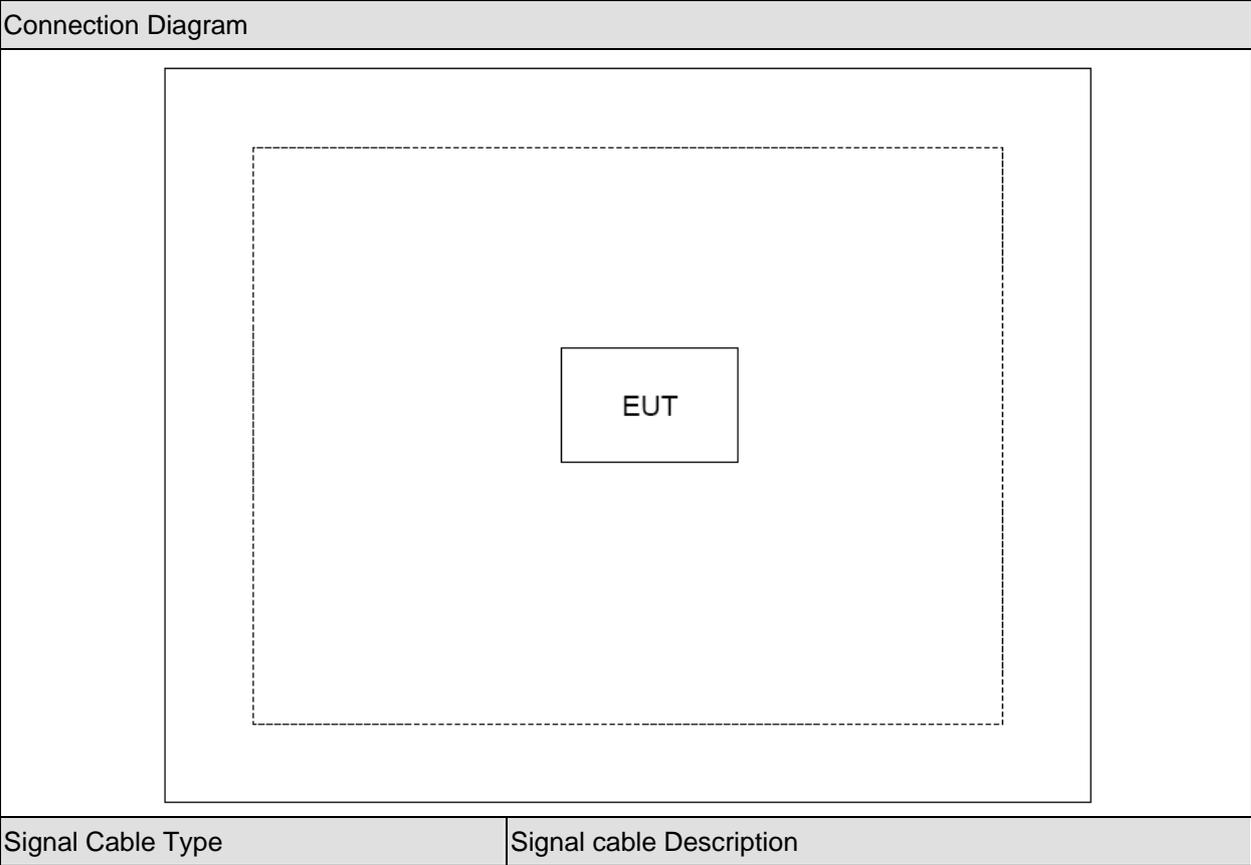
1. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.
2. For portable device, radiated spurious emission was verified over X, Y, Z axis, and shown the worst case on this report.
3. This device is a composite device in accordance with Part 15 Subpart B regulations. The report number is 123S066R-HP-US-P01V02.

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



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: 2010 Section 15.207	Yes	No
Radiated Emission	FCC CFR Title 47 Part 15 Subpart C: 2010 Section 15.209	Yes	No
20dB Bandwidth	FCC CFR Title 47 Part 15 Subpart C: 2010 Section 15.247(a)(1)	Yes	No
Carrier Frequency Separation	FCC CFR Title 47 Part 15 Subpart C: 2010 Section 15.247(a)(1)	Yes	No
Number of Hopping Frequencies	FCC CFR Title 47 Part 15 Subpart C: 2010 Section 15.247(a)(1)(iii)	Yes	No
Time of Occupancy (Dwell Time)	FCC CFR Title 47 Part 15 Subpart C: 2010 Section 15.247(a)(1)(iii)	Yes	No
Peak Output Power	FCC CFR Title 47 Part 15 Subpart C: 2010 Section 15.247(b)(1)	Yes	No
Band-edge Compliance of RF Conducted Emissions	FCC CFR Title 47 Part 15 Subpart C: 2010 Section 15.215(c), 15.247(d)	Yes	No
Spurious RF Conducted Emissions	FCC CFR Title 47 Part 15 Subpart C: 2010 15.247(d)	Yes	No
Radiated Emission Band Edge	FCC CFR Title 47 Part 15 Subpart C: 2010 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

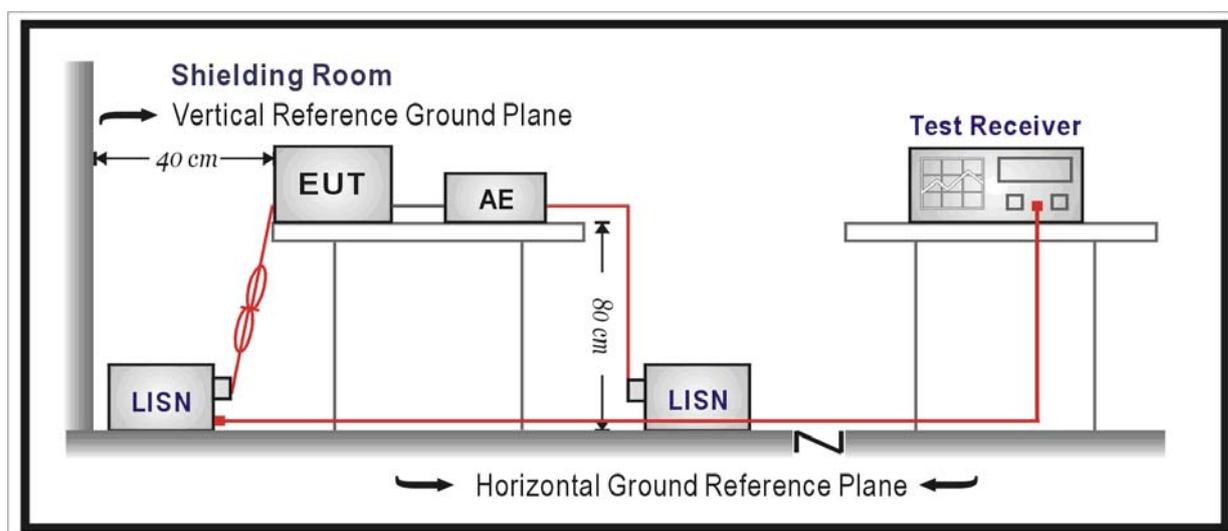
3.1. Test Equipment

Conducted Emission / TR-1

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100726	2012.04.23
Two-Line V-Network	R&S	ENV216	100043	2012.04.29
Two-Line V-Network	R&S	ENV216	100044	2012.09.07
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	2013.03.02
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.

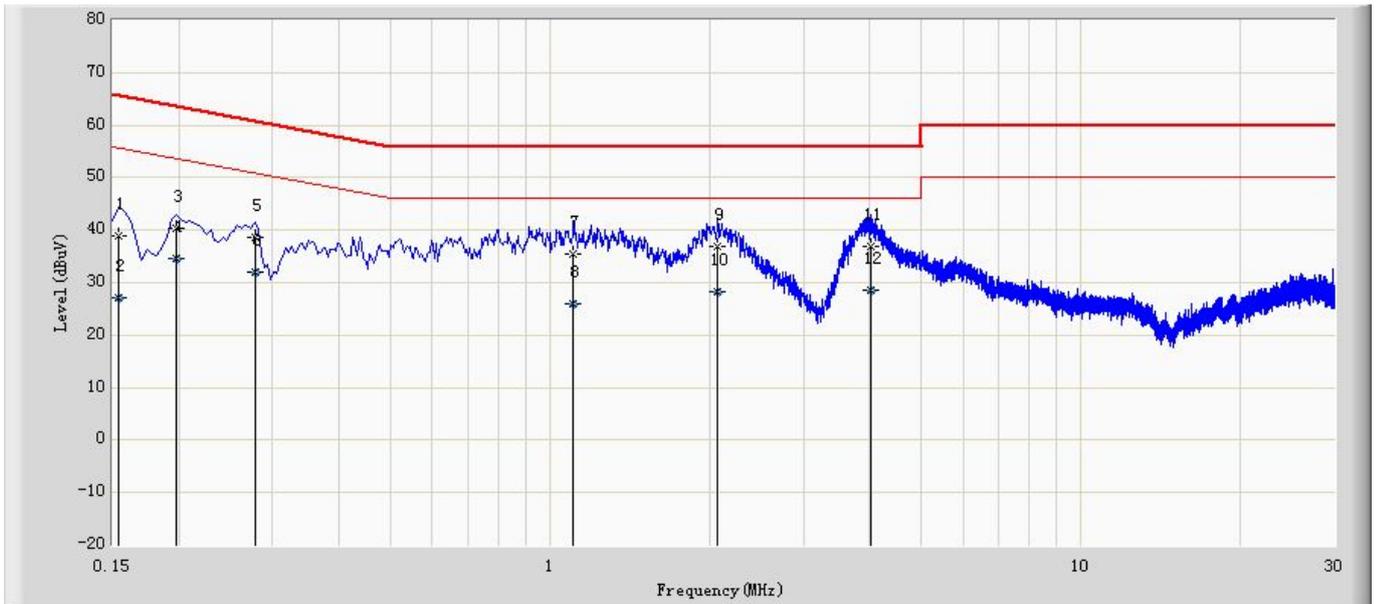
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

3.5. Uncertainty

The measurement uncertainty is defined as ± 2.02 dB

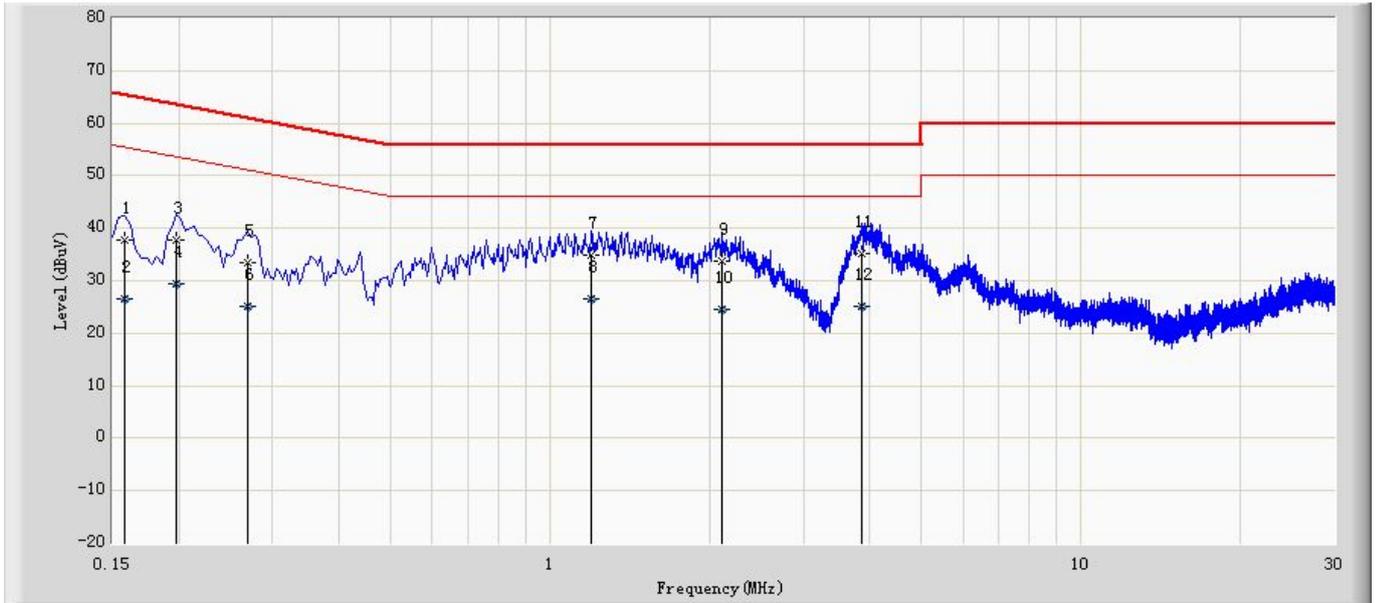
3.6. Test Result

Engineer: Jack	
Site: TR1	Time: 2012/03/28 - 18:35
Limit: FCC_Part15.207_CE_AC Power_ClassB	Margin: 0
Probe:ENV216_101043(0.009-30MHz)	Polarity: Line
EUT: CDMA 1X 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		0.154	38.820	28.965	-26.962	65.781	9.855	QP
2		0.154	27.143	17.288	-28.639	55.781	9.855	AV
3		0.198	40.381	30.521	-23.313	63.694	9.860	QP
4		0.198	34.469	24.609	-19.225	53.694	9.860	AV
5		0.278	38.522	28.652	-22.353	60.875	9.871	QP
6		0.278	32.101	22.230	-18.774	50.875	9.871	AV
7		1.106	35.322	25.517	-20.678	56.000	9.805	QP
8		1.106	25.888	16.083	-20.112	46.000	9.805	AV
9		2.066	36.789	26.999	-19.211	56.000	9.790	QP
10		2.066	28.135	18.345	-17.865	46.000	9.790	AV
11		4.022	37.030	27.193	-18.970	56.000	9.837	QP
12	*	4.022	28.669	18.832	-17.331	46.000	9.837	AV

Engineer: Jack	
Site: TR1	Time: 2012/03/28 - 18:39
Limit: FCC_Part15.207_CE_AC Power_ClassB	Margin: 0
Probe:ENV216_101043(0.009-30MHz)	Polarity: Neutral
EUT: CDMA 1X 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		0.158	37.723	27.725	-27.846	65.568	9.998	QP
2		0.158	26.678	16.680	-28.891	55.568	9.998	AV
3		0.198	37.682	27.761	-26.012	63.694	9.922	QP
4		0.198	29.535	19.613	-24.159	53.694	9.922	AV
5		0.270	33.389	23.455	-27.729	61.118	9.935	QP
6		0.270	25.096	15.162	-26.022	51.118	9.935	AV
7		1.198	34.991	24.973	-21.009	56.000	10.018	QP
8	*	1.198	26.629	16.611	-19.371	46.000	10.018	AV
9		2.110	33.737	23.784	-22.263	56.000	9.953	QP
10		2.110	24.673	14.720	-21.327	46.000	9.953	AV
11		3.874	35.166	25.120	-20.834	56.000	10.046	QP
12		3.874	25.193	15.147	-20.807	46.000	10.046	AV

4. Radiated Emission

4.1. Test Equipment

Radiated Emission / AC-2

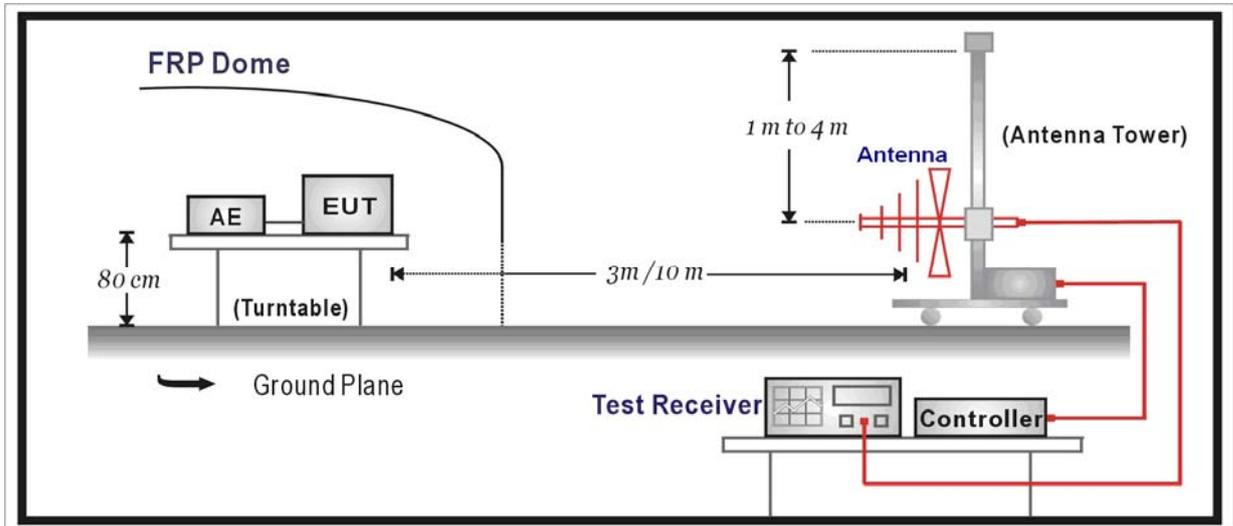
Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100573	2012.04.23
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2012.10.18
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2013.03.02
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC2-TH	2013.01.10

Radiated Emission / AC-5

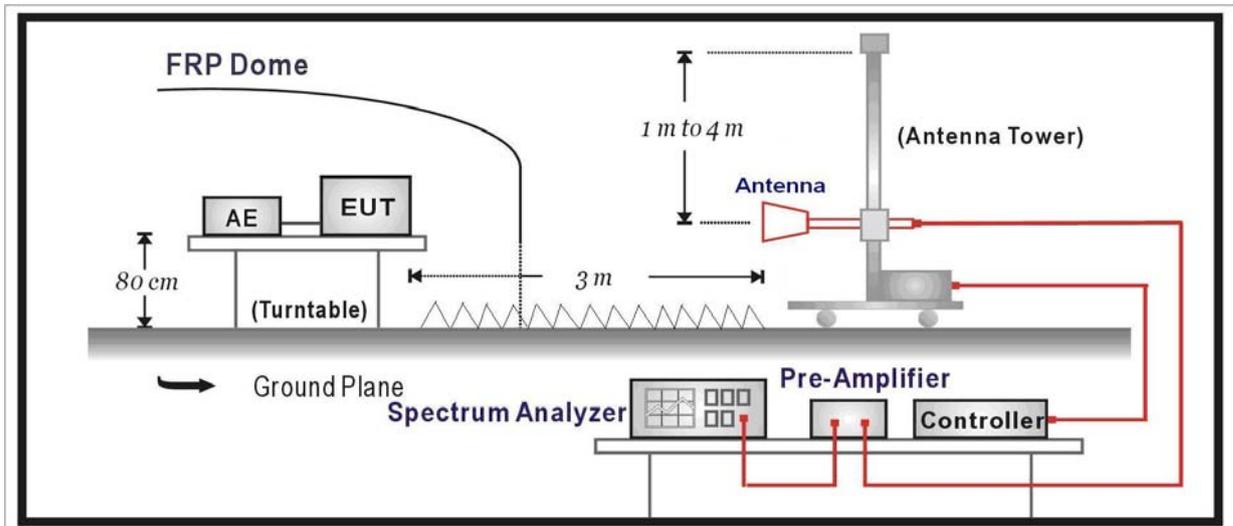
Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2012.04.23
EMI Test Receiver	R&S	ESCI	100573	2012.04.23
Preamplifier	Quietek	AP-025C	CHM-0511006	2012.05.05
Preamplifier	Quietek	AP-180C	CHM-0602013	2012.05.05
Bilog Type Antenna	Schaffner	CBL6112B	2932	2012.10.18
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2012.06.11
High-Pass Filter	Wainwright	WHKX2.8/18G-12SS	SN1	2013.03.03
Band Reject Filter	Wainwright	WRCG2400/2485-2375 /2510-60/11SS	SN9	2013.03.03
High-Pass Filter	Wainwright	WHKX7.0/18G-8SS	SN16	2013.03.03
Low-Pass Filter	Wainwright	WLKS4500-9SS	SN2	2013.03.03
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	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 – Preampifier 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	104.2	-7.7	96.5	Fundamental	/	PK
	H	141.5	5.5	17.6	23.1	46	-22.9	QP
	H	286.5	6.1	20.0	26.1	46	-19.9	QP
	V	3500.0	48.5	-14.4	34.1	54(Note)	-19.9	PK
	V	4808.0	53.7	-11.1	42.6	54(Note)	-11.4	PK
	V	7205.0	56.8	-2.6	54.2	74	-19.8	PK
	V	7205.0	51.1	-2.6	48.5	54	-5.5	AV
	H	24000.0	59.1	-8.9	50.2	54(Note)	-3.8	PK
39	H	2441.0	104.3	-7.5	96.8	Fundamental	/	PK
	H	161.9	5.7	16.4	22.1	46	-23.9	QP
	V	300.5	5.2	20.5	25.7	46	-20.3	QP
	H	3500.0	49.5	-14.4	35.1	54(Note)	-18.9	PK
	V	4884.5	55.2	-10.8	44.4	54(Note)	-9.6	PK
	V	7324.0	59.5	-2.8	56.7	74	-17.3	PK
	V	7324.0	53.2	-2.8	50.4	54	-3.6	AV
	H	24000.0	59.1	-8.9	50.2	54(Note)	-3.8	PK
78	H	2480.0	104.4	-7.3	97.1	Fundamental	/	PK
	V	151.2	5.2	16.8	22.0	46	-24.0	QP
	V	359.3	6.5	22.3	28.8	46	-17.2	QP
	V	3500.0	49.7	-14.4	35.3	54(Note)	-18.7	PK
	H	4944.0	57.3	-10.8	46.5	54(Note)	-7.5	PK
	V	7443.0	59.3	-3.1	56.2	74	-17.8	PK
	V	7443.0	53.7	-3.1	50.6	54	-3.4	AV
	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

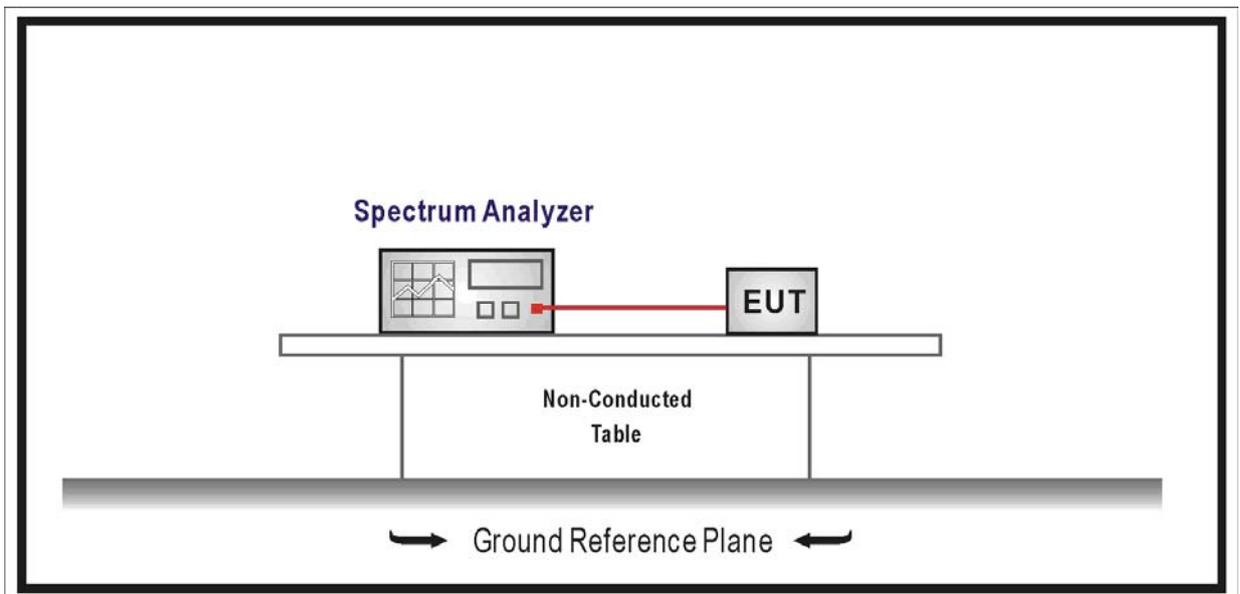
5.1 Test Equipment

20dB Bandwidth / TR8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2012.04.30
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2012.05.03

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 \cong 1% of the 20dB bandwidth

VBW \cong 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

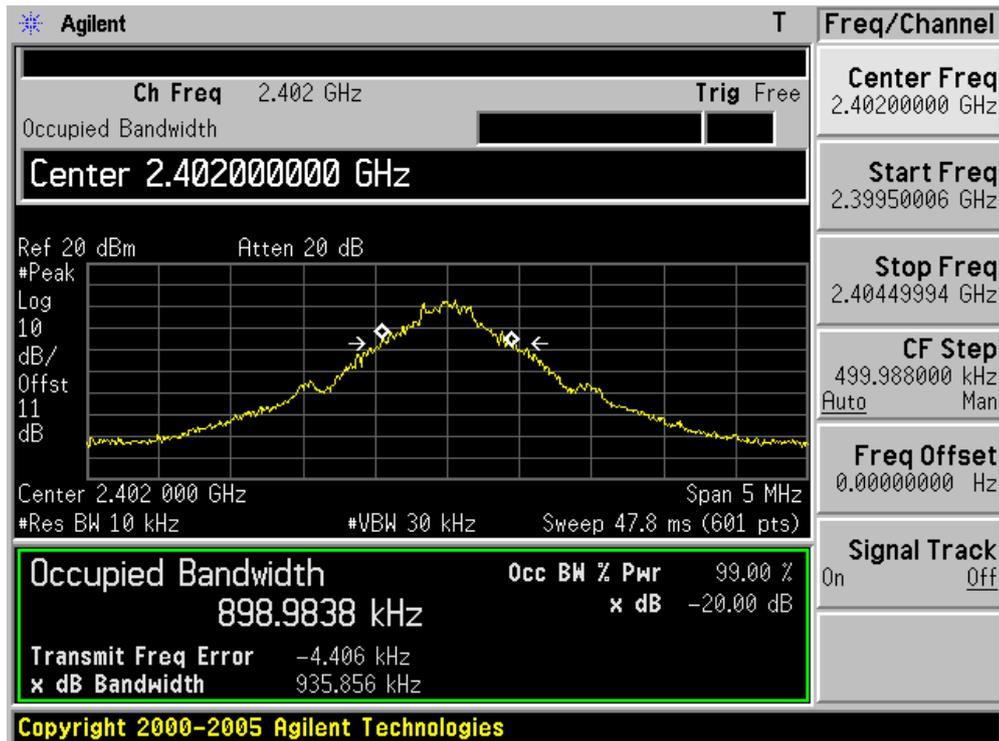
The measurement uncertainty is defined as ± 1 kHz

5.6 Test Result

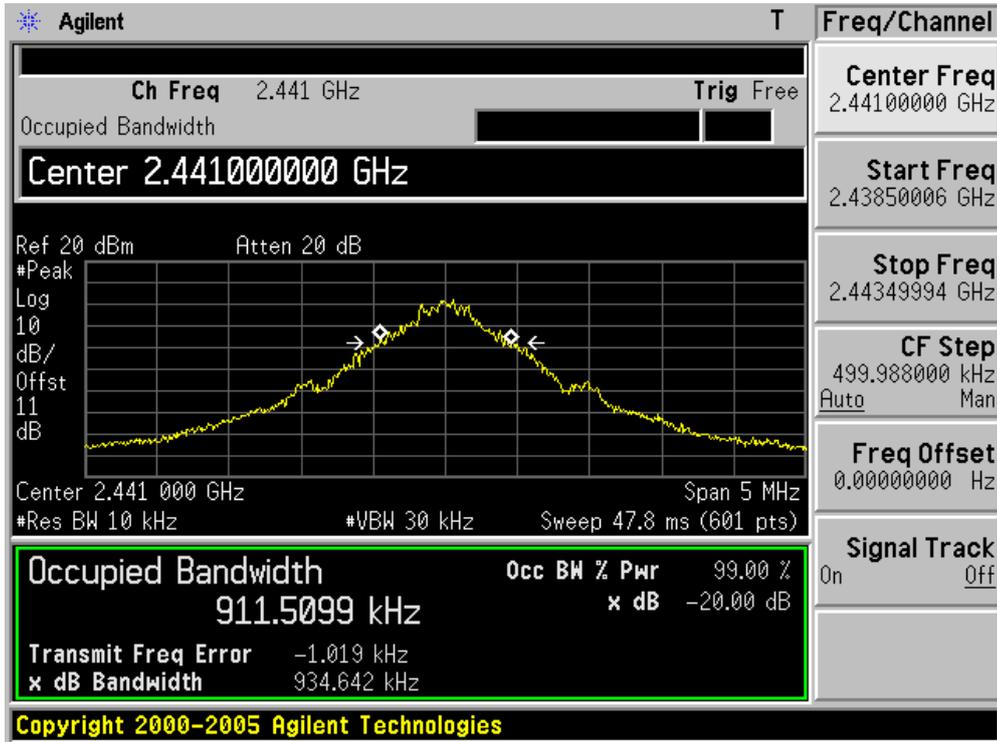
Product	:	CDMA 1X Mobile Phone
Test Item	:	Occupied Bandwidth
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
00	2402	935.86	898.98
39	2441	934.64	911.51
78	2480	996.07	924.67

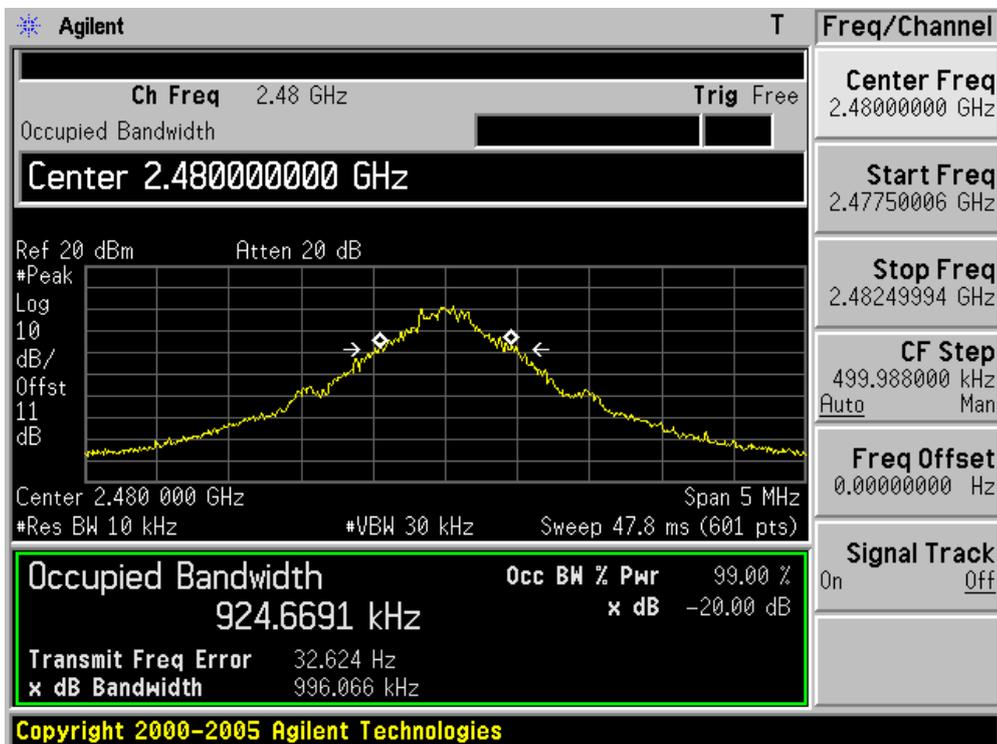
Channel 00 (2402MHz)



Channel 39 (2441MHz)



Channel 78 (2480MHz)



6. Carrier Frequency Separation

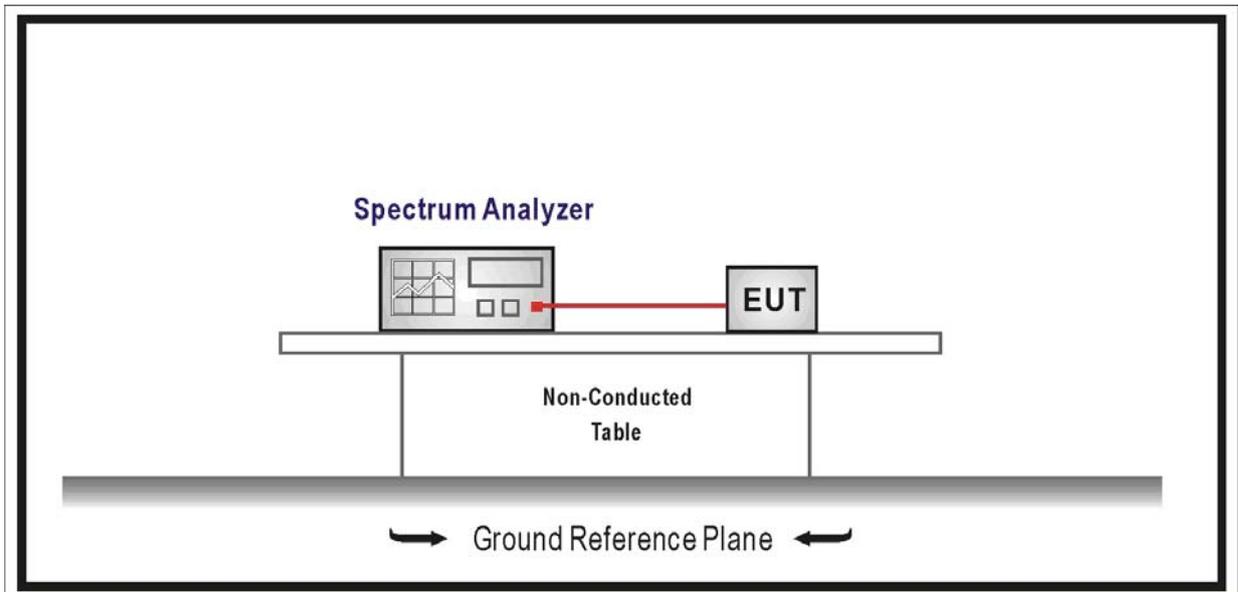
6.1. Test Equipment

Carrier Frequency Separation / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2012.04.30
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2012.05.03

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 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.

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) \cong 1% of the span

Video (or Average) Bandwidth VBW \cong 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

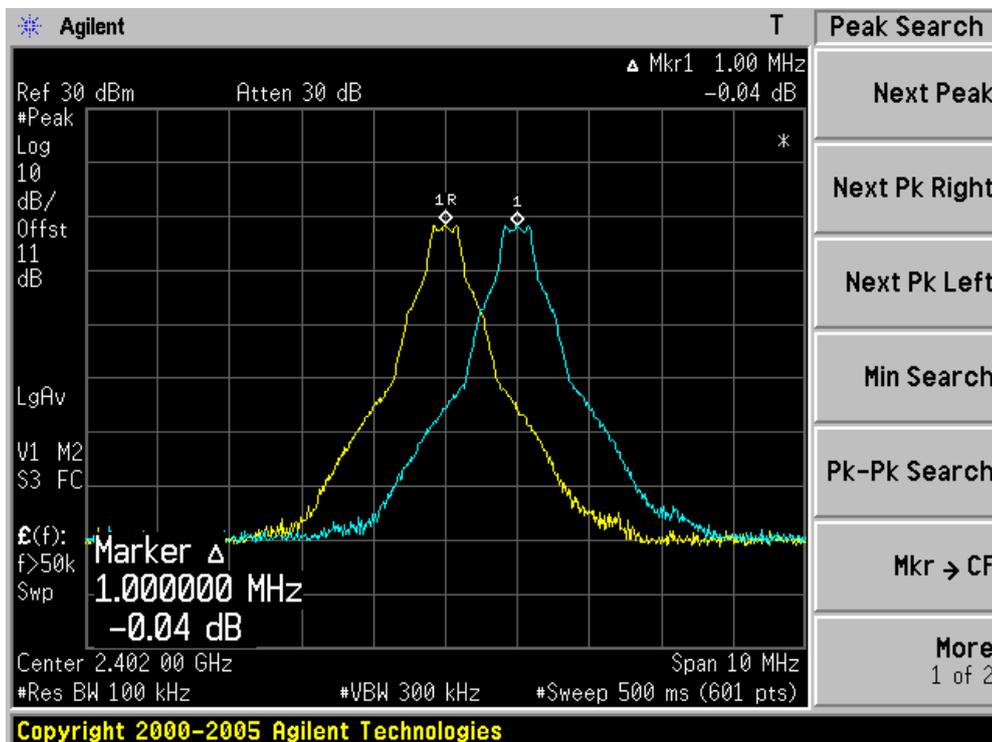
The measurement uncertainty is defined as \pm 1 kHz

6.6. Test Result

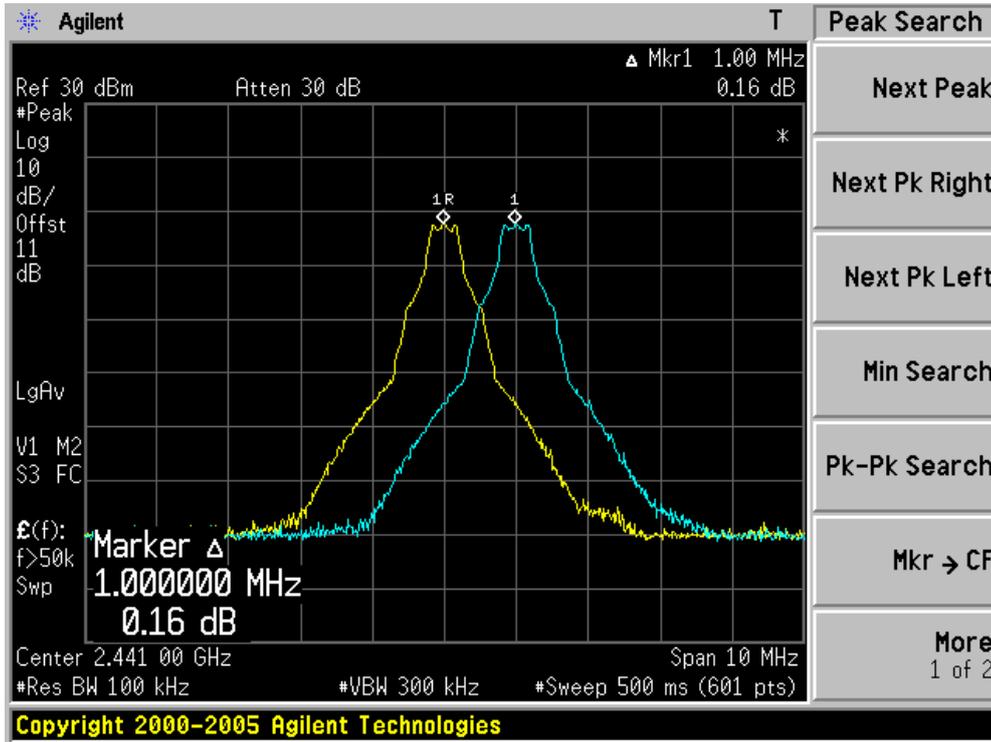
Product	:	CDMA 1X Mobile Phone
Test Item	:	Carrier Frequency Separation
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

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

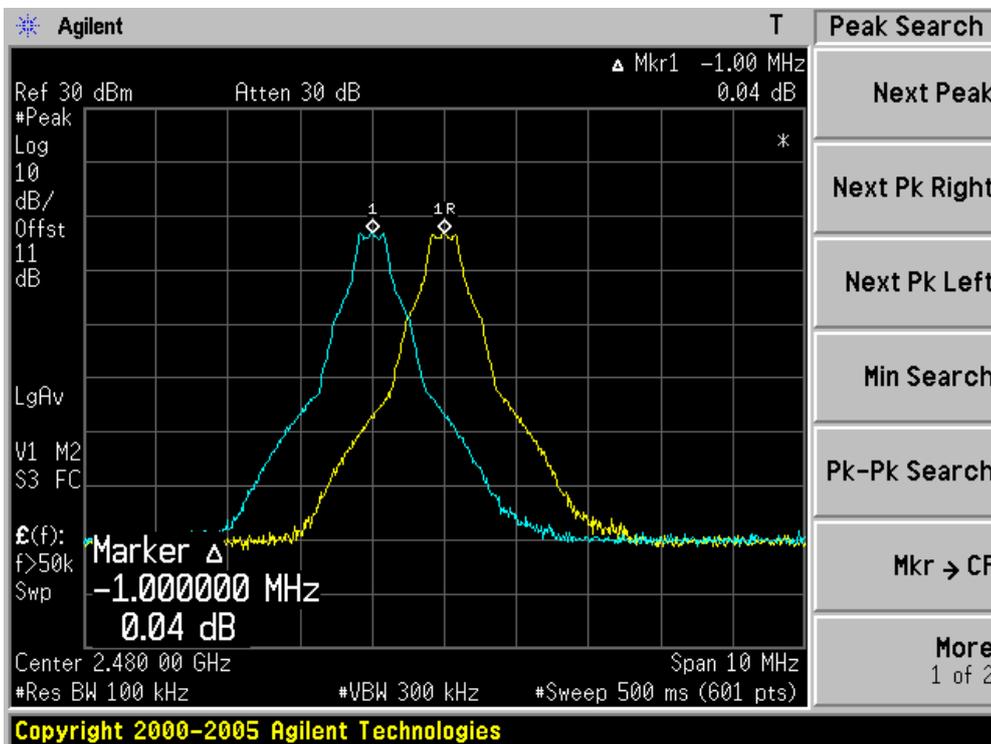
Channel 00 (2402MHz)



Channel 39 (2441MHz)



Channel 78 (2480MHz)



7. Number of Hopping Frequencies

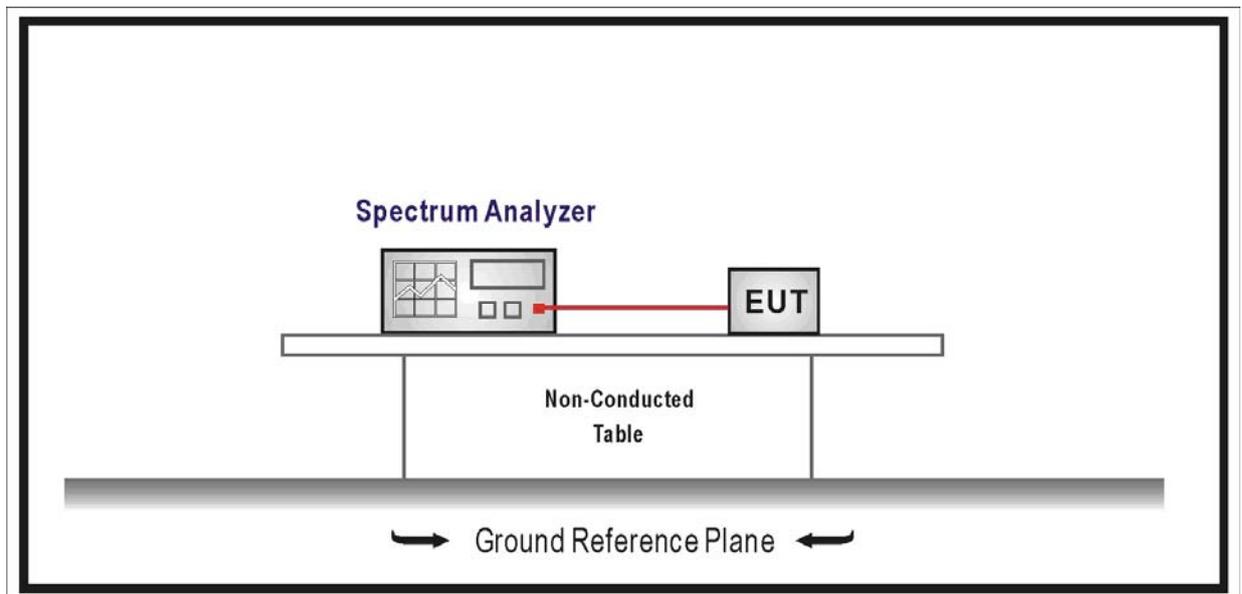
7.1. Test Equipment

Number of Hopping Frequencies / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2012.04.30
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2012.05.03

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 \cong 1% of the span

VBW \cong 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

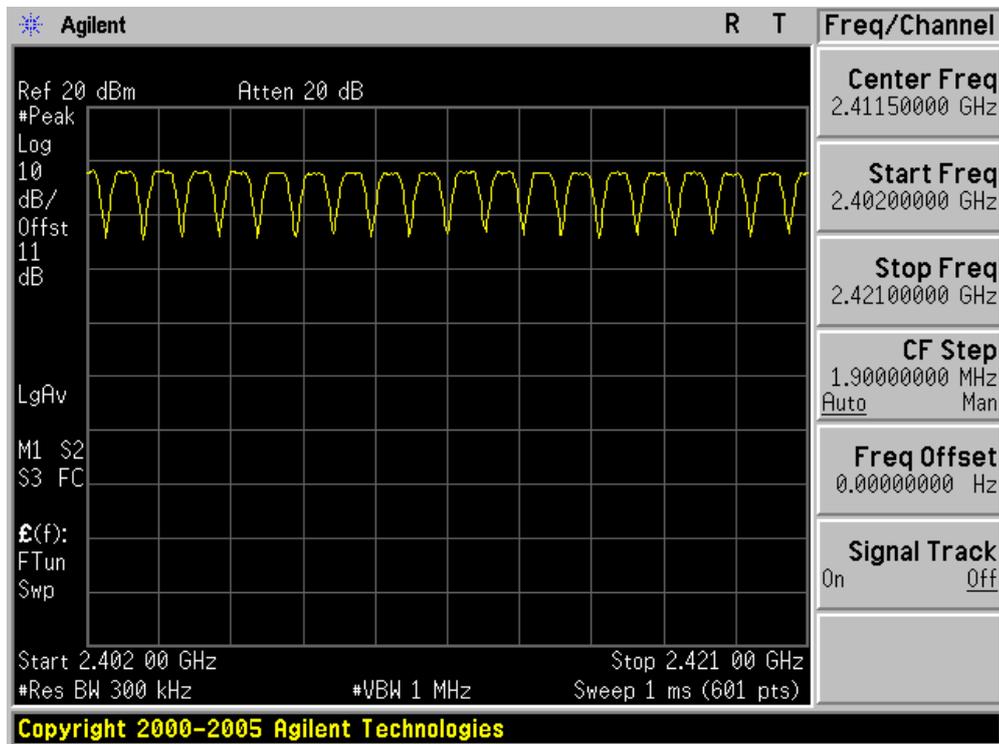
The measurement uncertainty is defined as ± 1 kHz

7.6. Test Result

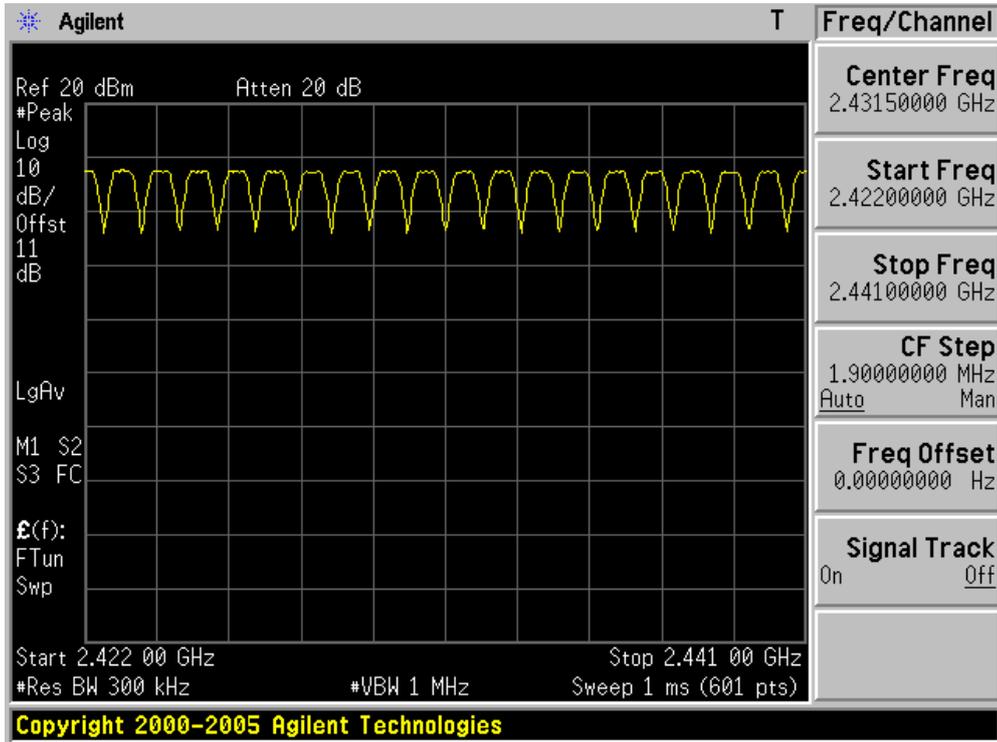
Product	:	CDMA 1X Mobile Phone
Test Item	:	Number of Hopping Frequencies
Test Site	:	TR-8
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

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

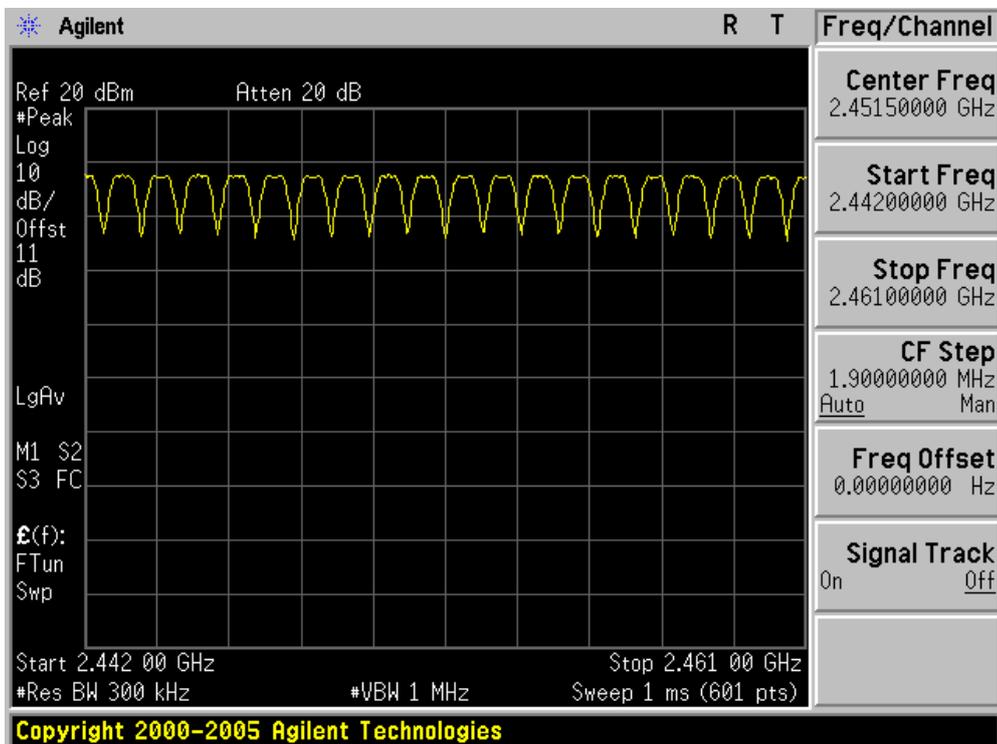
2402 - 2421 MHz



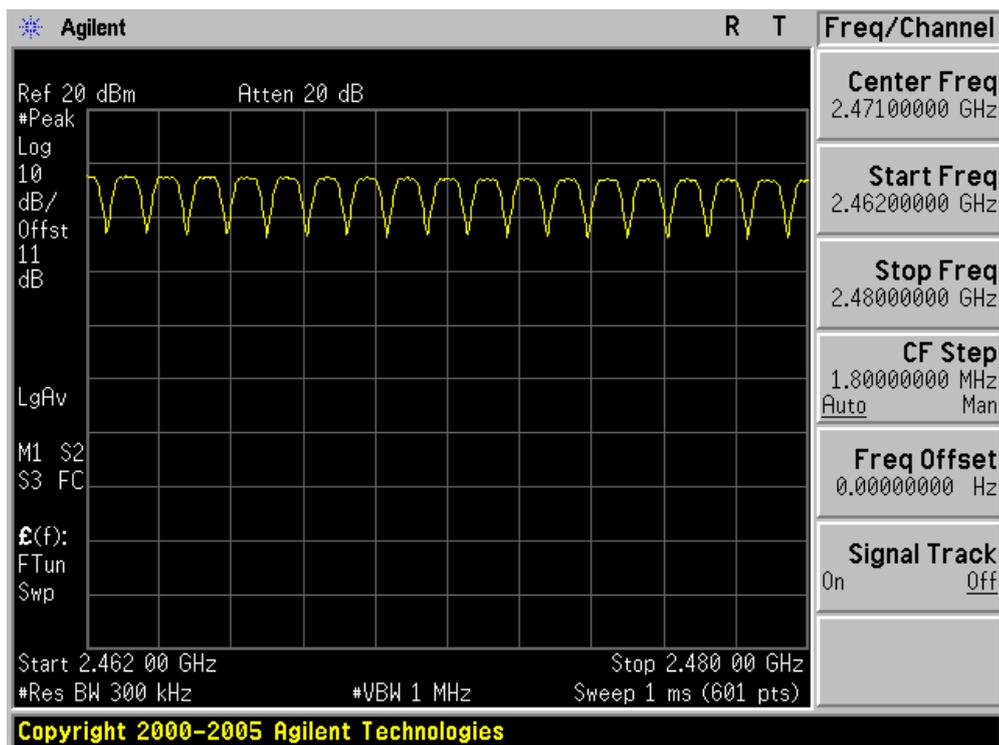
2422 - 2441 MHz



2442 - 2461 MHz



2462 - 2480 MHz



8. Time of Occupancy (Dwell Time)

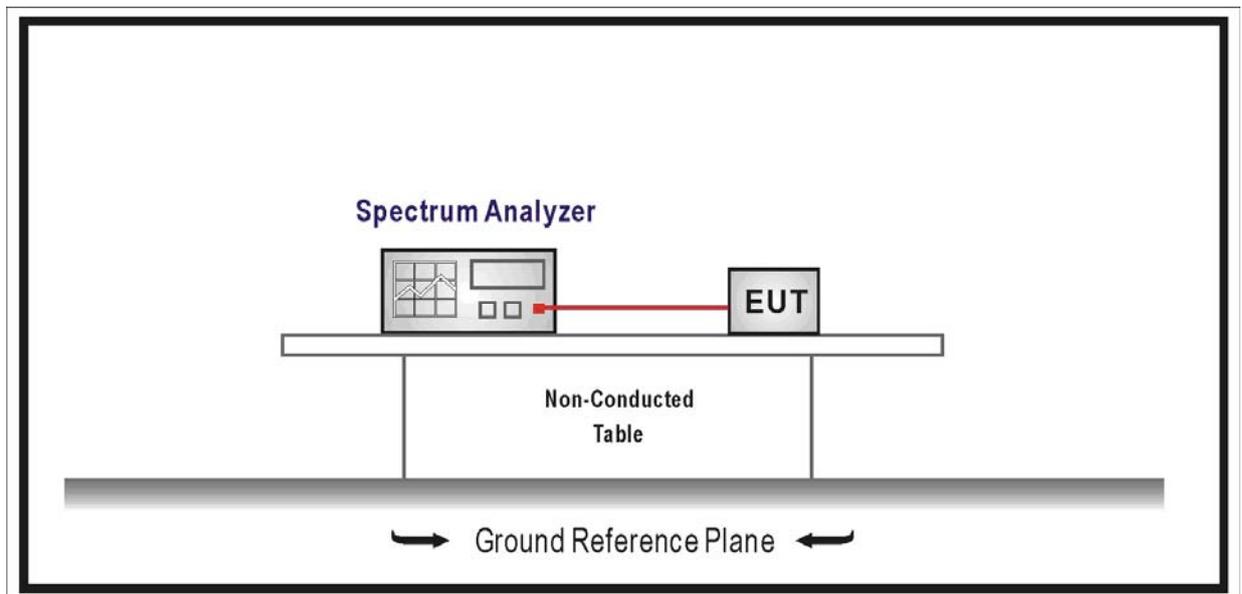
8.1. Test Equipment

Time of Occupancy (Dwell Time) / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2012.04.30
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2012.05.03

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 \cong 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

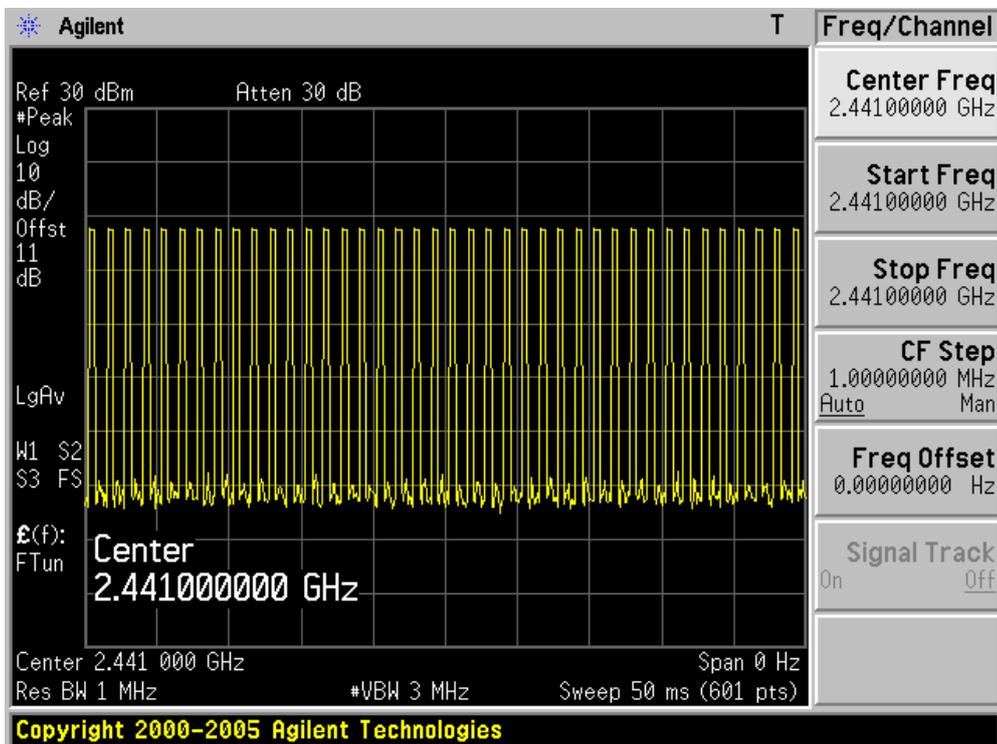
Product	:	CDMA 1X Mobile Phone
Test Item	:	Time of Occupancy (Dwell Time)
Test Site	:	TR-8
Test Mode	:	Transmitter-1Mbps(GFSK_DH1)

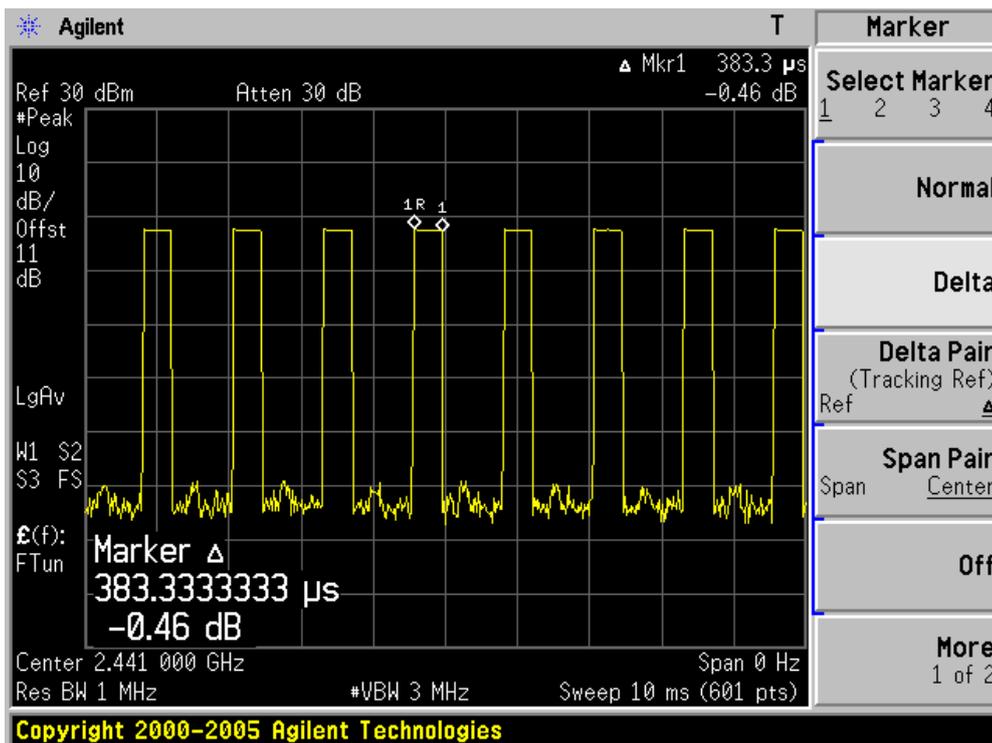
Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
39	2441	122.7	< 400	Pass

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

- 2441MHz, The Maximum Occupancy Time Within 31.6sec: $[(383.3 \mu s * 800) / 79] * 31.6 = 122.7$ msec

Channel 39 (2441MHz)-(DH1)





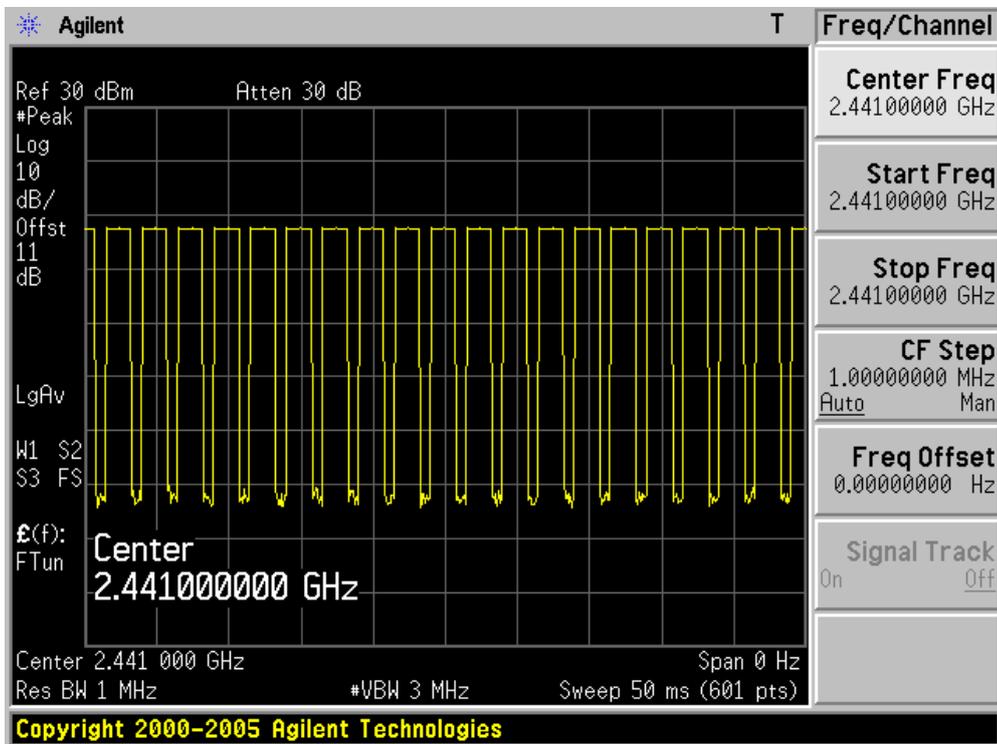
Product	:	CDMA 1X Mobile Phone
Test Item	:	Time of Occupancy (Dwell Time)
Test Site	:	TR-8
Test Mode	:	Transmitter-1Mbps(GFSK_DH3)

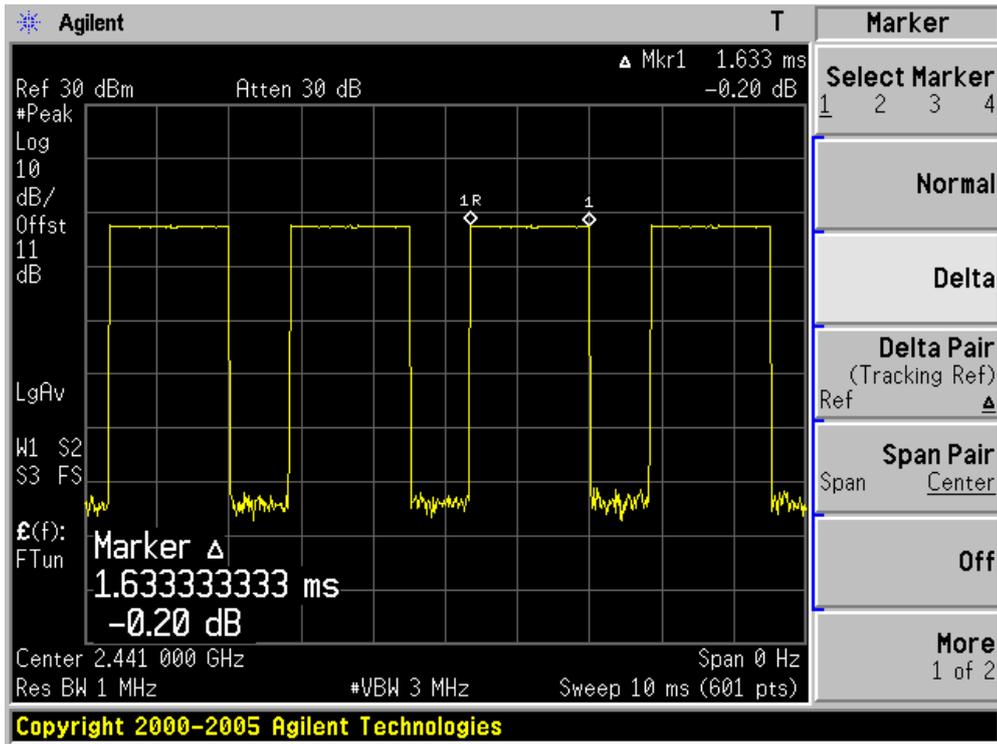
Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
39	2441	260.8	< 400	Pass

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

- 2441MHz, The Maximum Occupancy Time Within 31.6sec: $[(1.63 \text{ ms} * 400) / 79] * 31.6 = 260.8$ msec

Channel 39 (2441MHz) - (DH3)





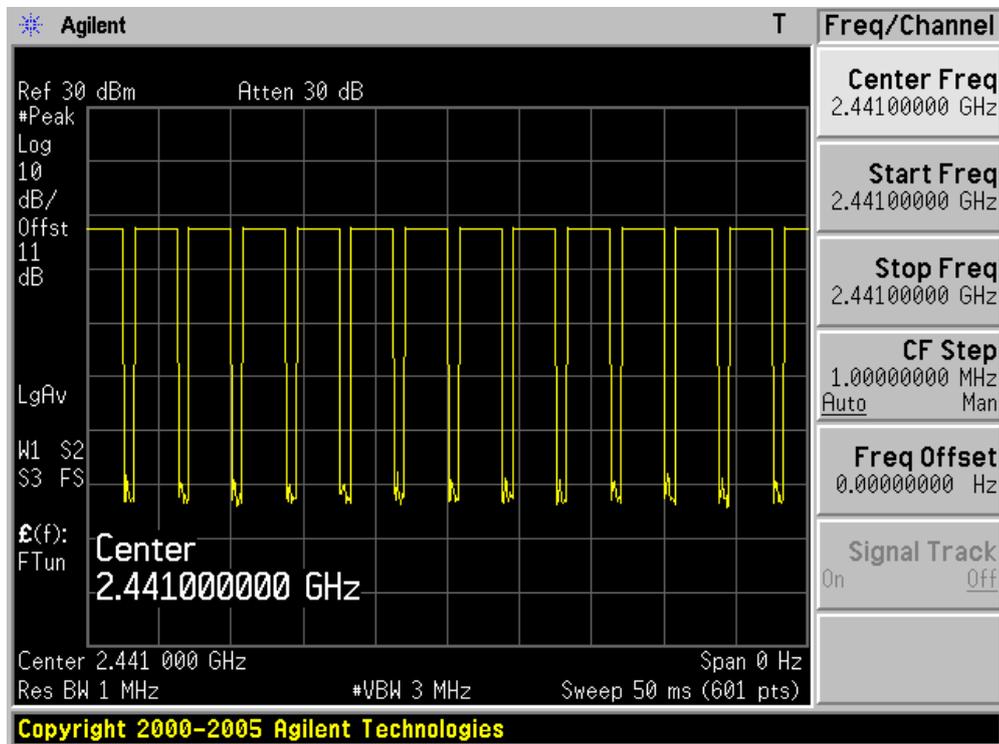
Product	:	CDMA 1X Mobile Phone
Test Item	:	Time of Occupancy (Dwell Time)
Test Site	:	TR-8
Test Mode	:	Transmitter-1Mbps(GFSK_DH5)

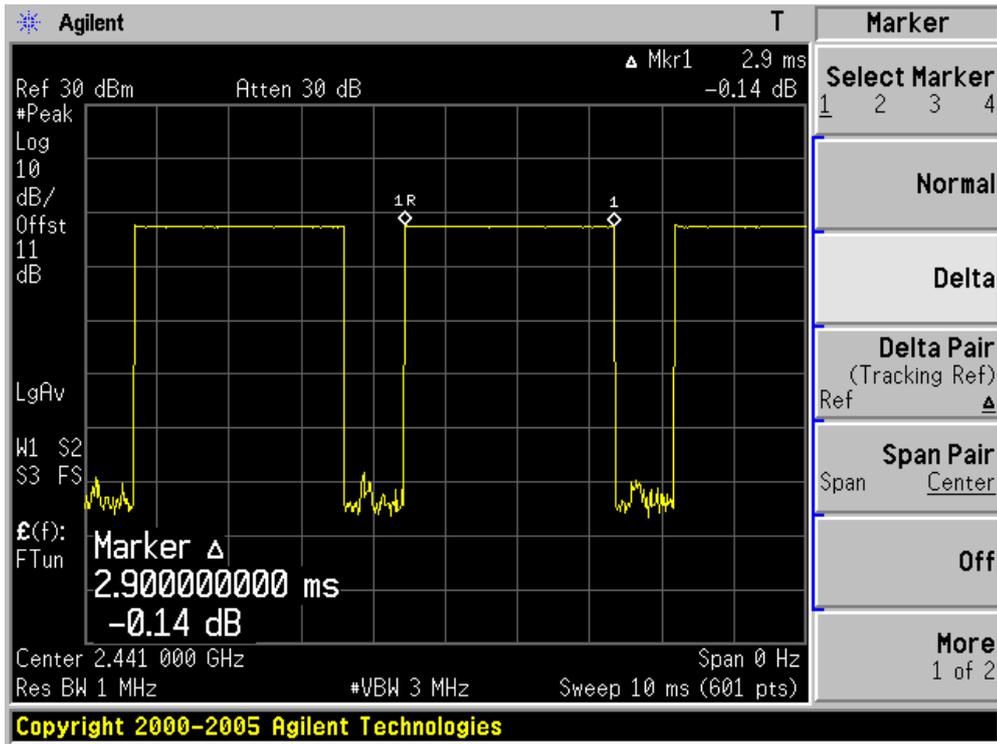
Channel No.	Frequency (MHz)	Time of Occupancy (ms)	Limit (ms)	Result
39	2441	324.8	< 400	Pass

Test Time Period: $0.4 * 79 = 31.6 \text{sec}$, Hopping Times Within 1sec: $14/50 \text{msec} = 280 \text{hops/sec}$.

- 2441MHz, The Maximum Occupancy Time Within 31.6sec: $[(2.9 \text{ ms} * 280) / 79] * 31.6 = 324.8 \text{ msec}$

Channel 39 (2441MHz) - (DH5)





9. Peak Output Power

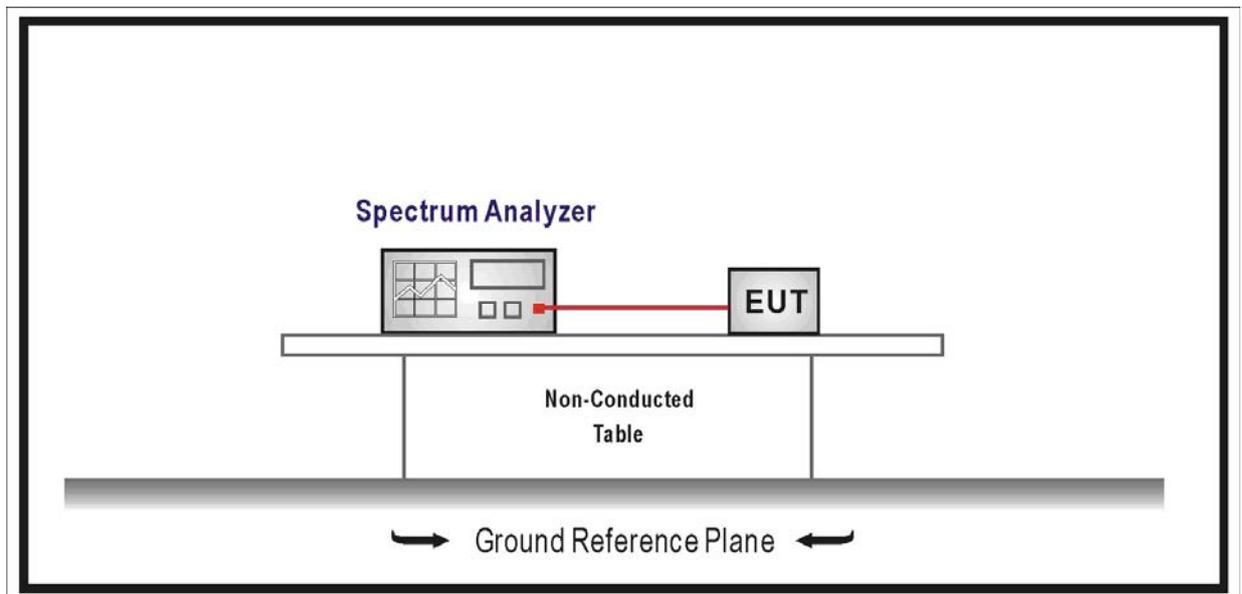
9.1. Test Equipment

Peak Output Power / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2012.04.30
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2012.05.03

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 \cong 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

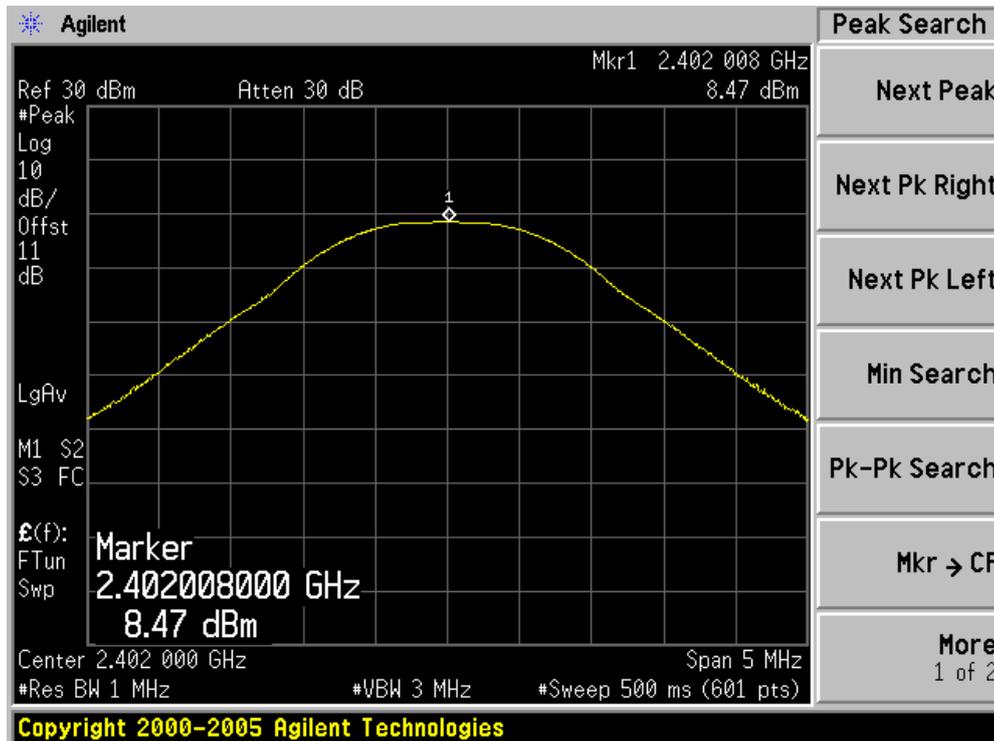
The measurement uncertainty is defined as ± 1.0 dB

9.6. Test Result

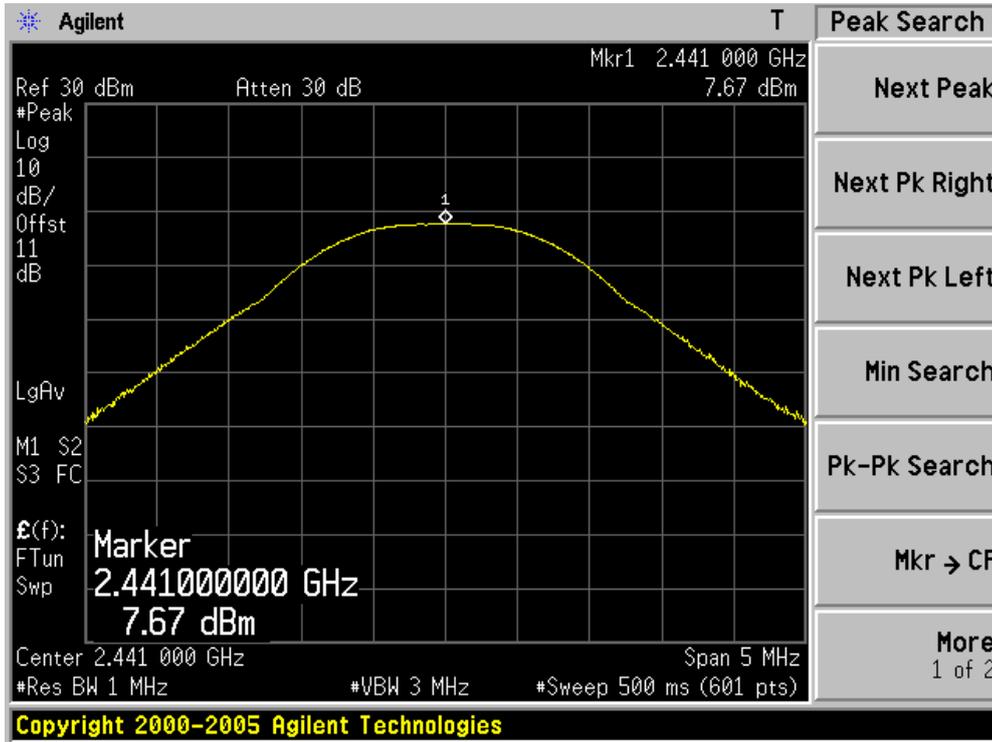
Product	:	CDMA 1X Mobile Phone
Test Item	:	Power Output
Test Mode	:	Mode 1: Transmitter-1Mbps(GFSK_DH5)

Channel No.	Frequency (MHz)	Measurement Power Output (dBm)	Limit (dBm)	Result
0	2402	8.47	30.00	Pass
39	2441	7.67	30.00	Pass
78	2480	6.95	30.00	Pass

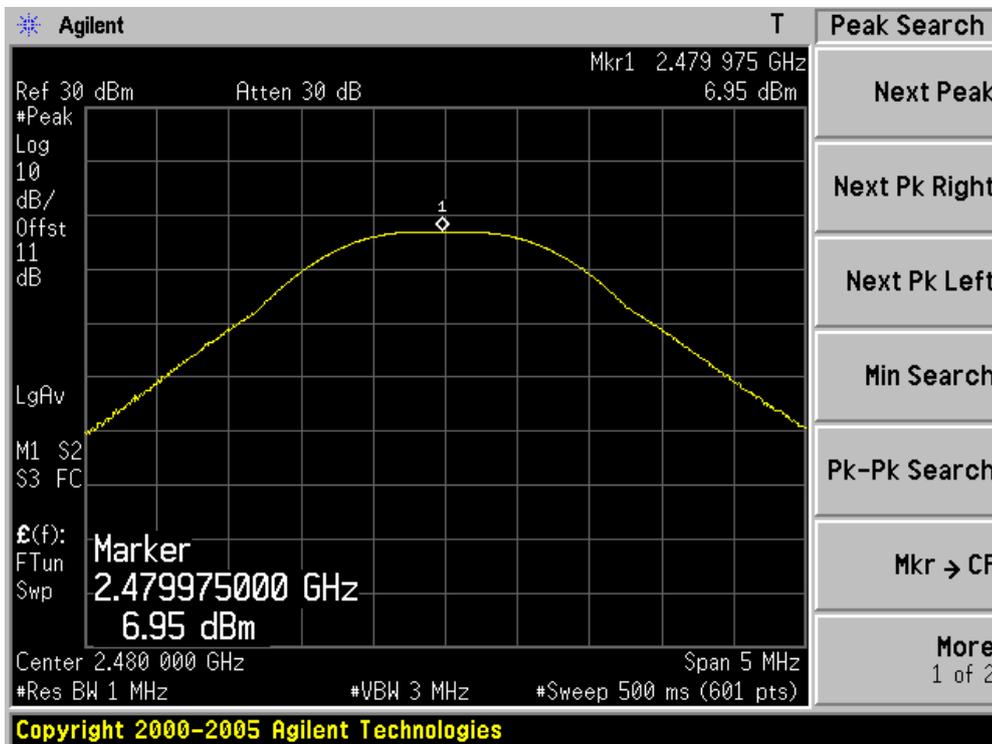
DH5 2402MHz



DH5 2441MHz



DH5 2480MHz



10. Band-edge Compliance of RF Conducted Emissions

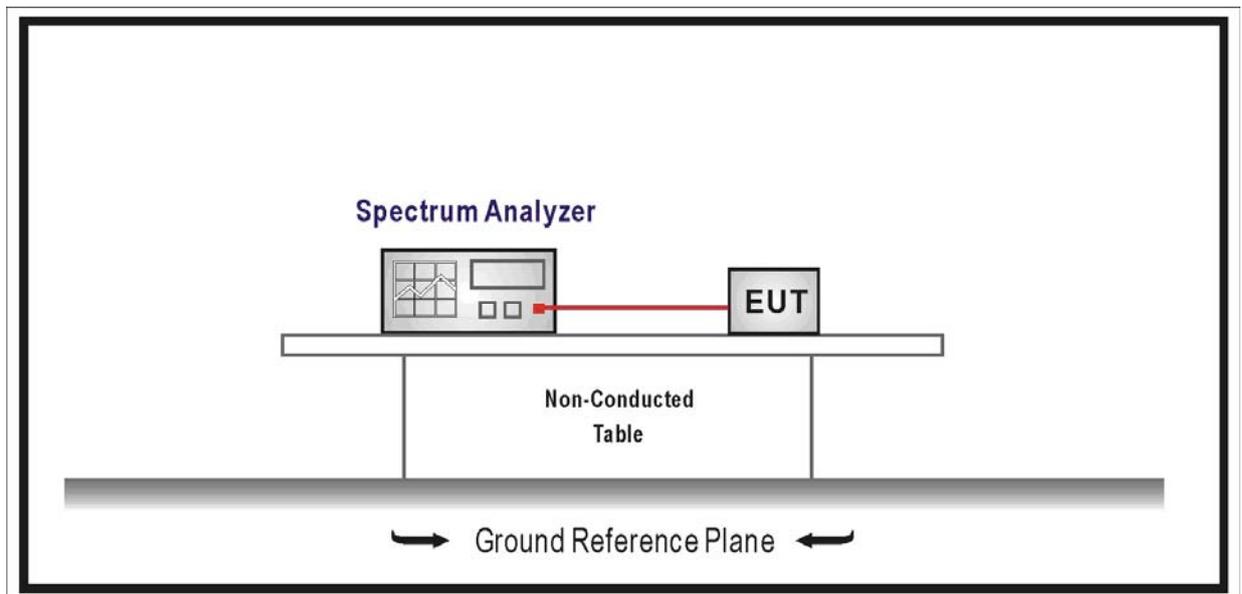
10.1. Test Equipment

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

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2012.04.30
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2012.05.03

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 \cong 1% of the span

VBW \cong 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 product 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.

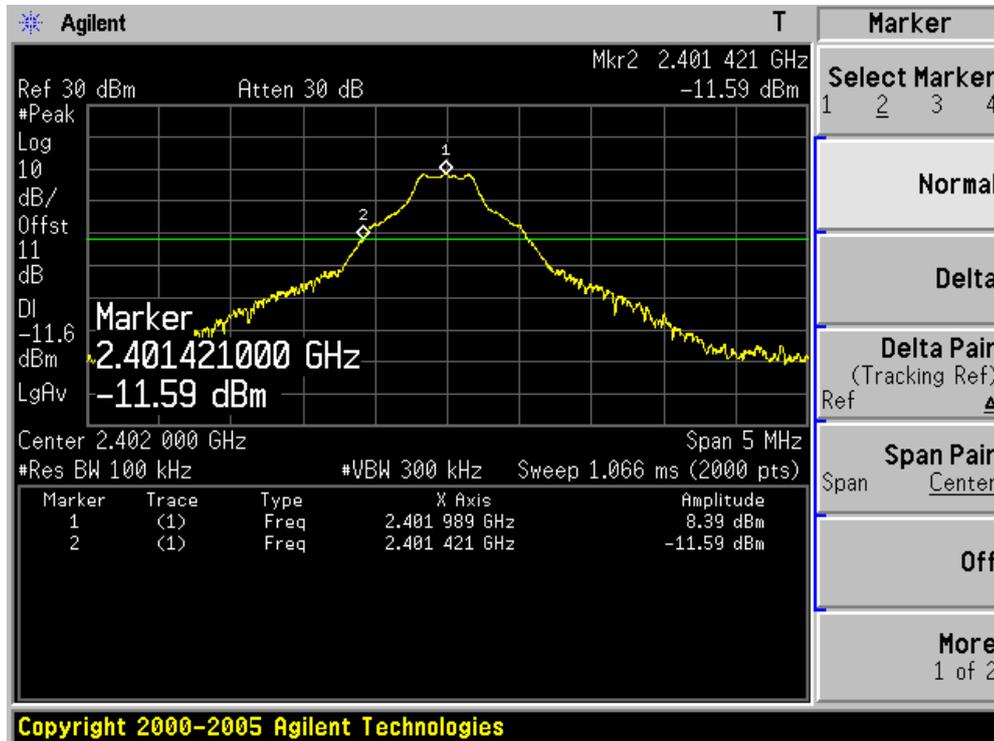
10.5. Uncertainty

The measurement uncertainty is defined as ± 1.0 dB

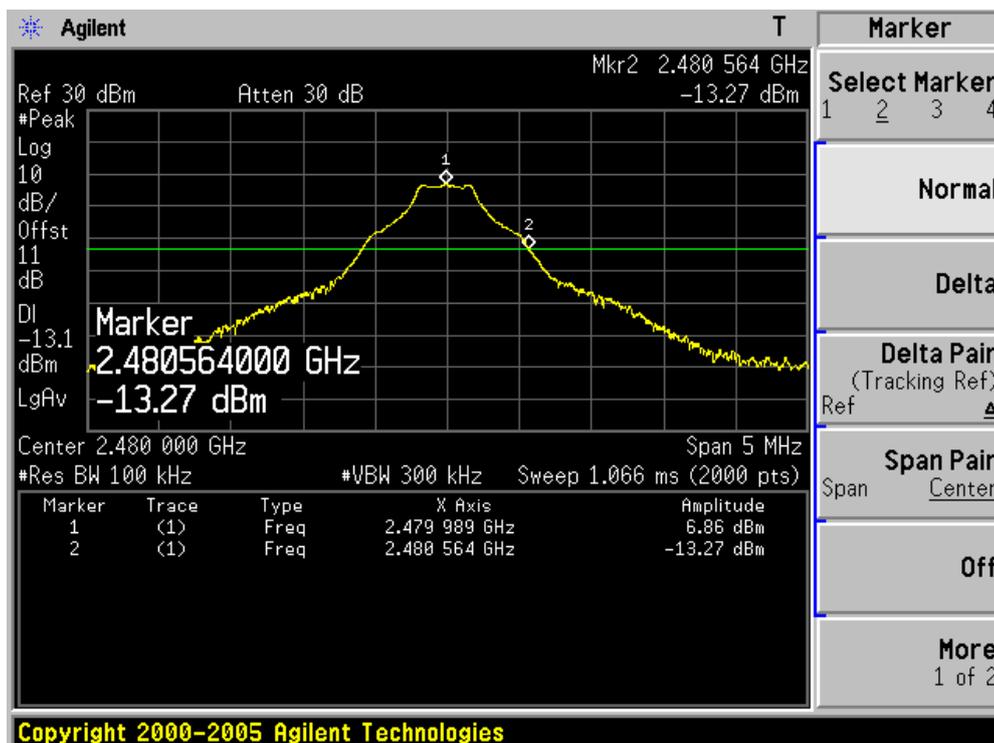
10.6. Test Result

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

Channel 00 (2402MHz)

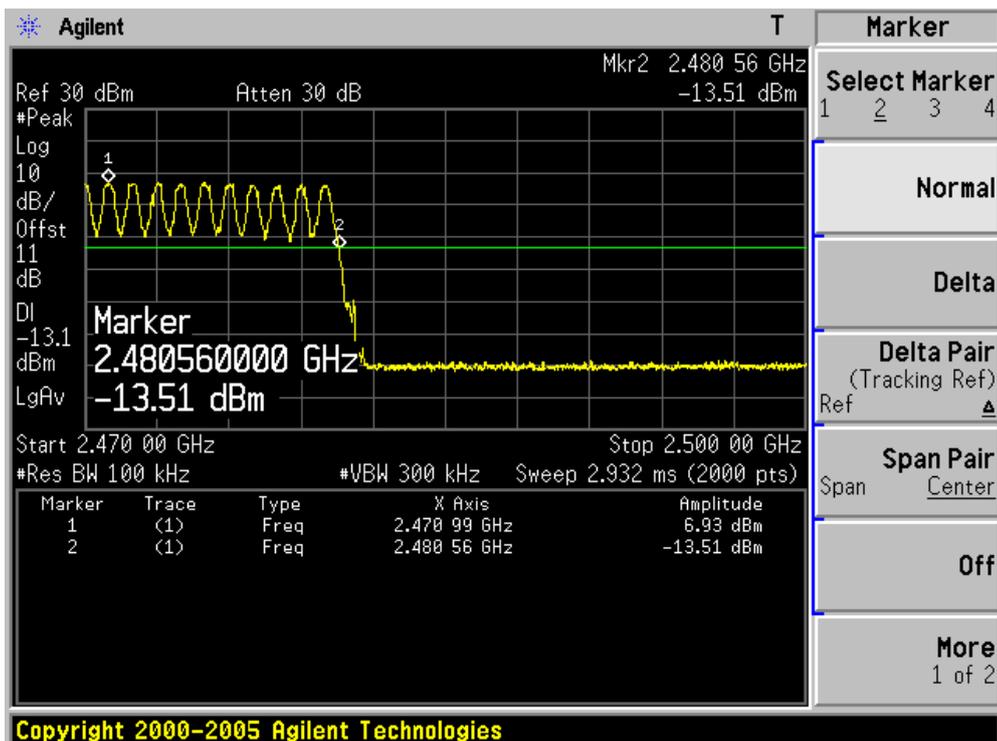
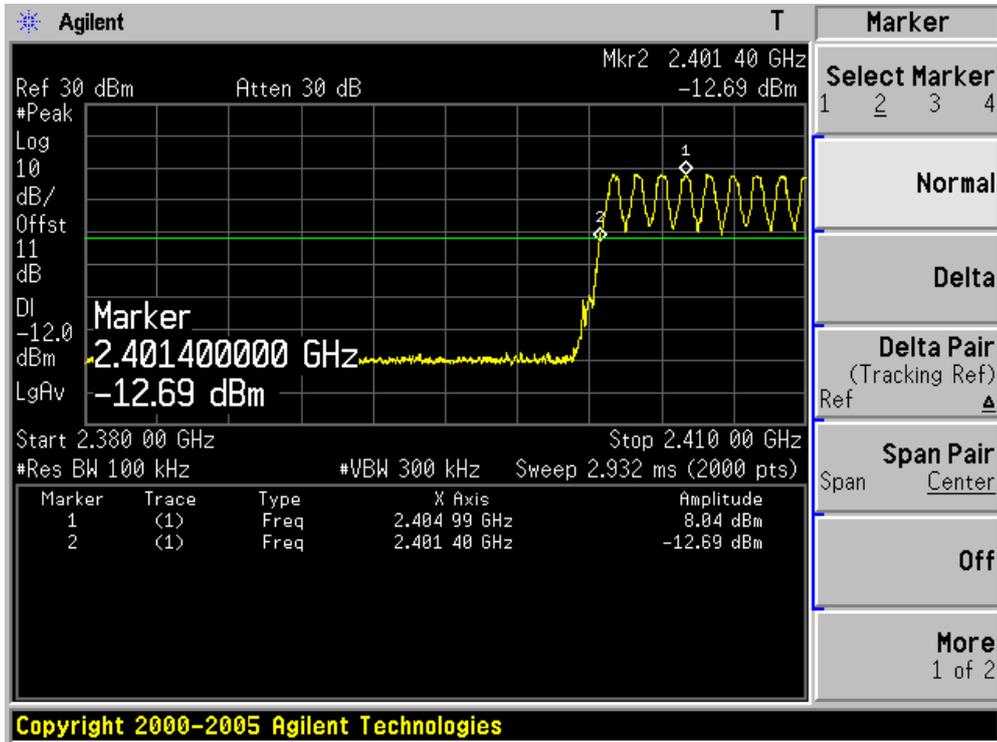


Channel 78 (2480MHz)



Product	: CDMA 1X 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

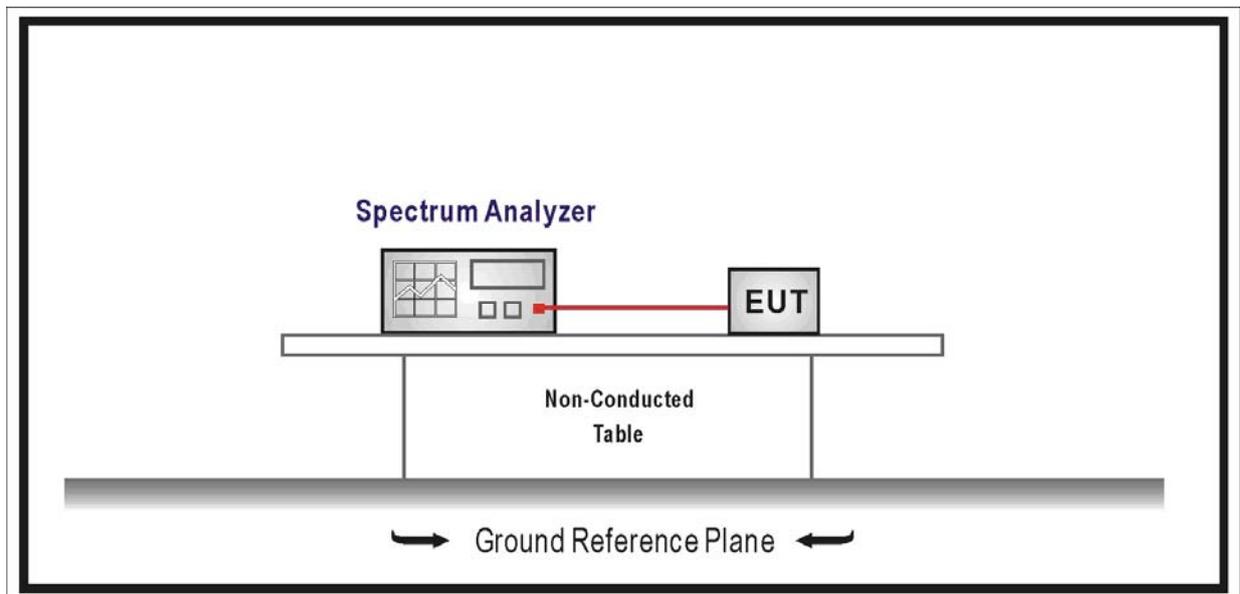
11.1. Test Equipment

Spurious RF Conducted Emissions / TR-8

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2012.04.30
Temperature/Humidity Meter	Zhicheng	ZC1-2	TR8-TH	2012.05.03

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 \cong 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.

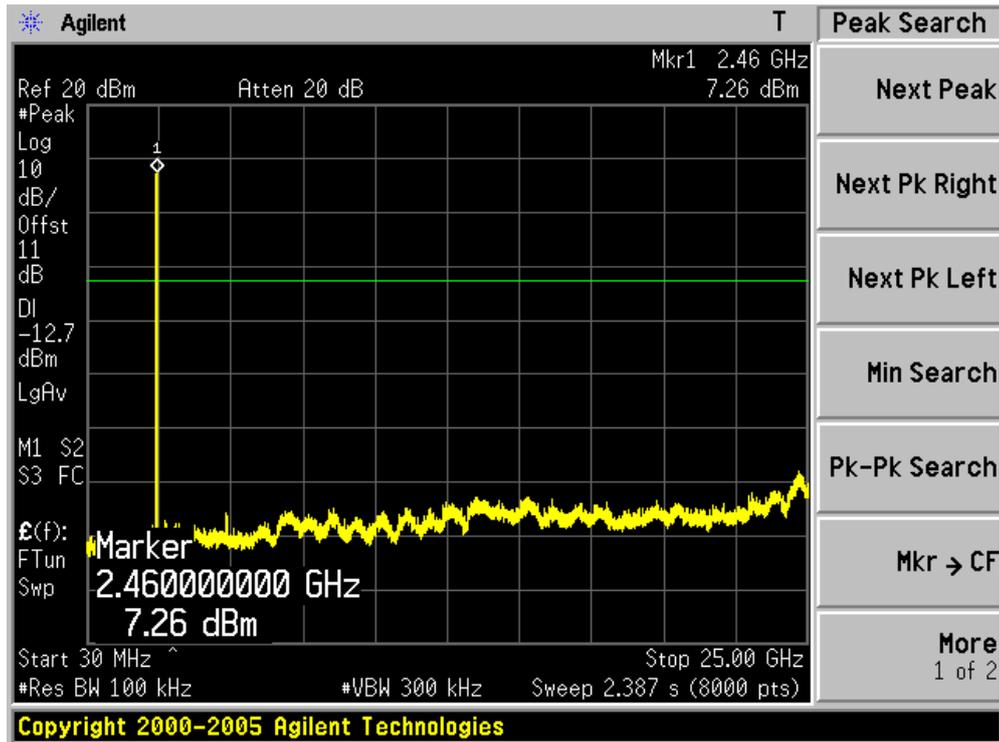
11.5. Uncertainty

The measurement uncertainty is defined as ± 1.0 dB

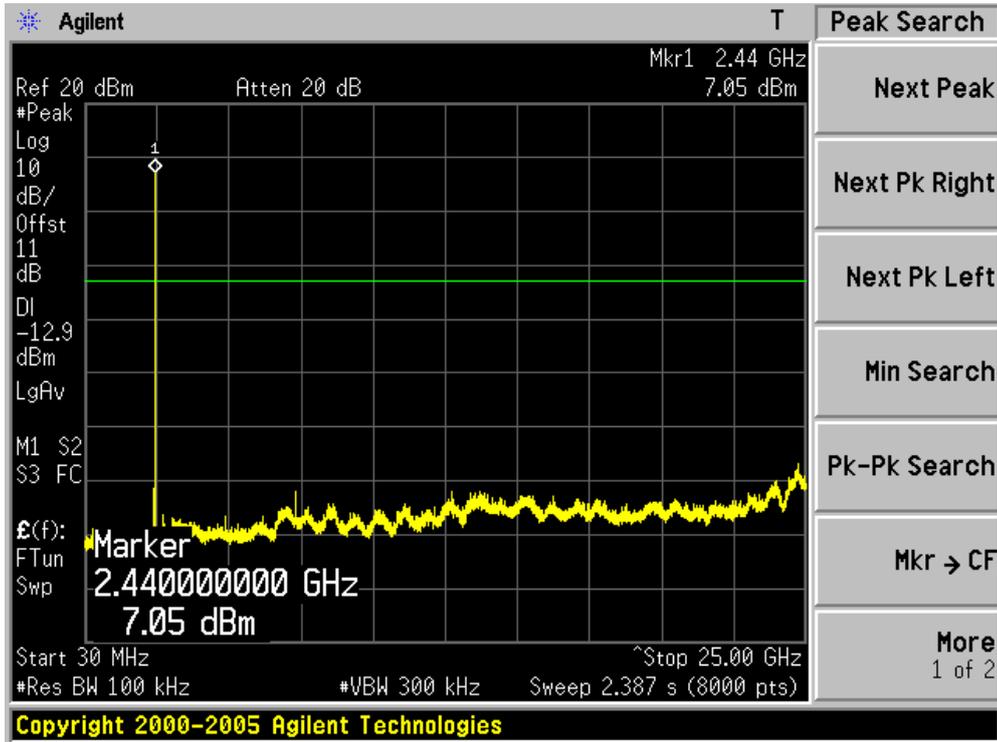
11.6. Test Result

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

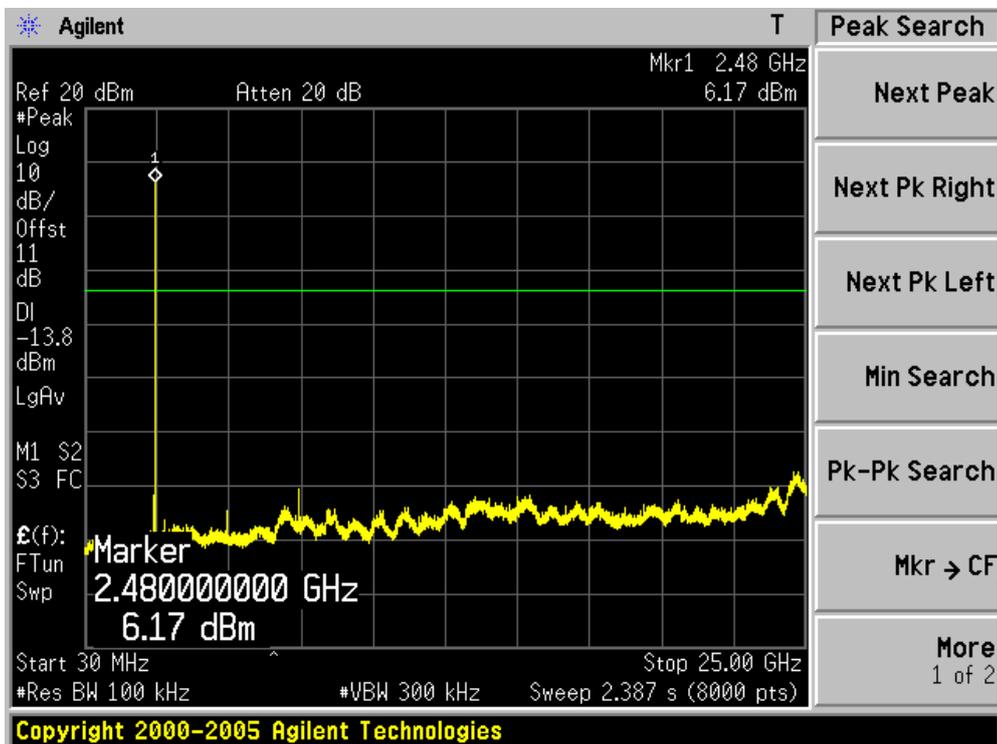
Channel 00 (2402MHz)



Channel 39 (2441MHz)



Channel 78 (2480MHz)



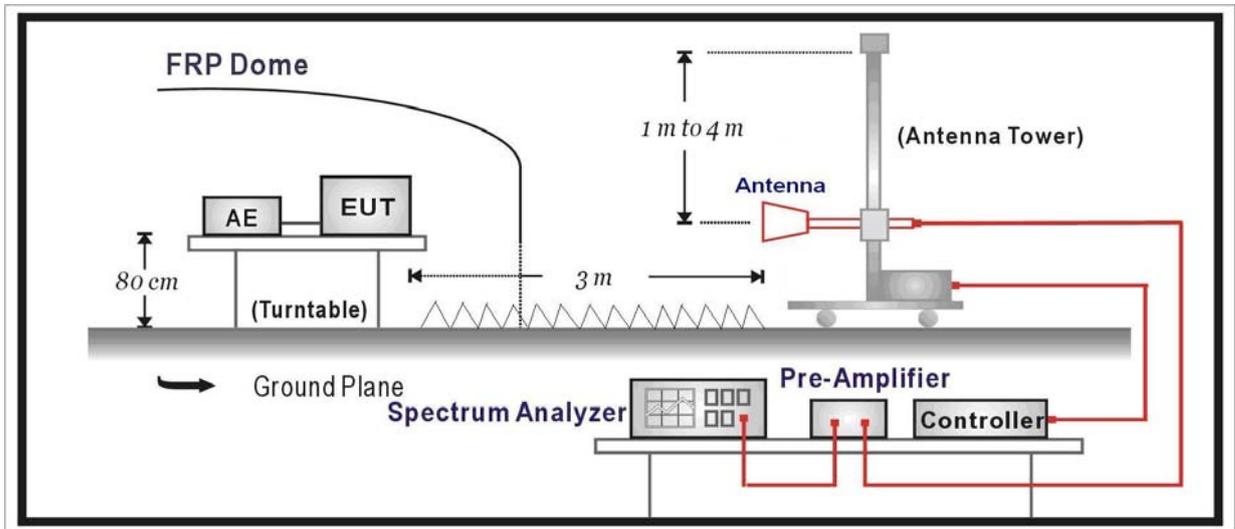
12. Radiated Emission Band Edge

12.1. Test Equipment

Radiated Emission Band Edge / AC-5

Instrument	Manufacturer	Type No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2012.04.23
EMI Test Receiver	R&S	ESCI	100573	2012.04.23
Preamplifier	Quietek	AP-025C	CHM-0511006	2012.05.05
Preamplifier	Quietek	AP-180C	CHM-0602013	2012.05.05
Bilog Type Antenna	Schaffner	CBL6112B	2932	2012.10.18
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2012.06.11
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 $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW \geq 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 $20\log(\text{dwell time}/100 \text{ ms})$, 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 $\pm 3.9 \text{ dB}$

below 1G is defined as $\pm 3.8 \text{ dB}$

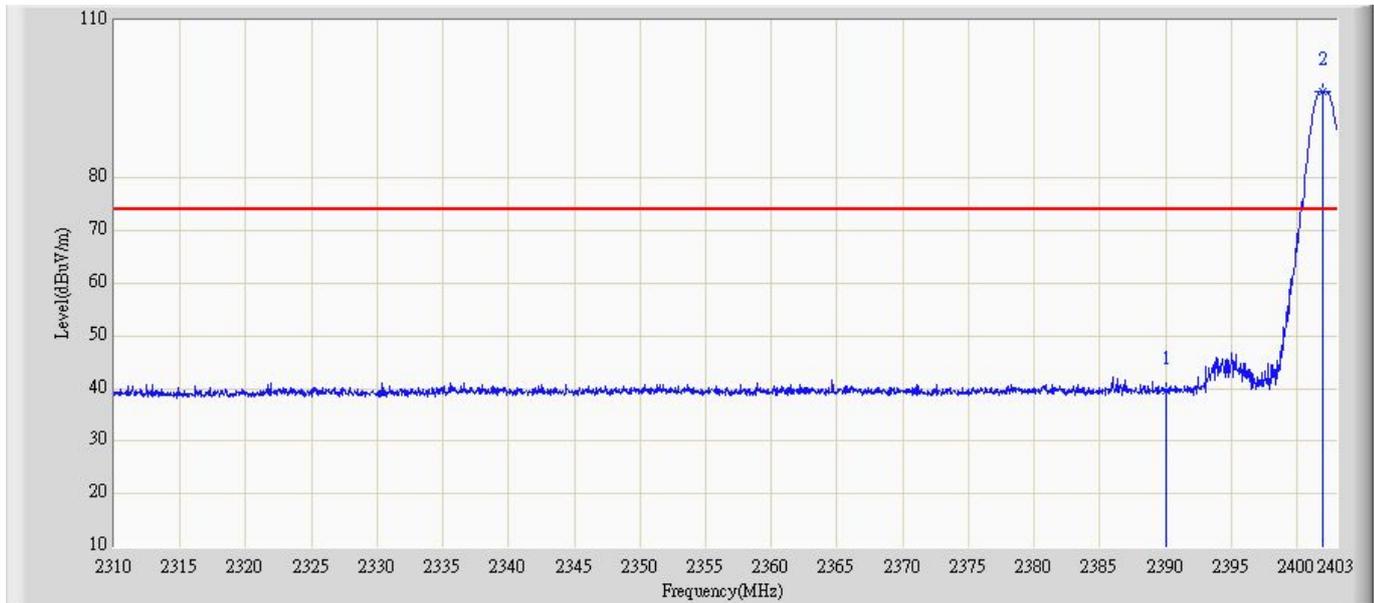
12.6. Test Result

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;

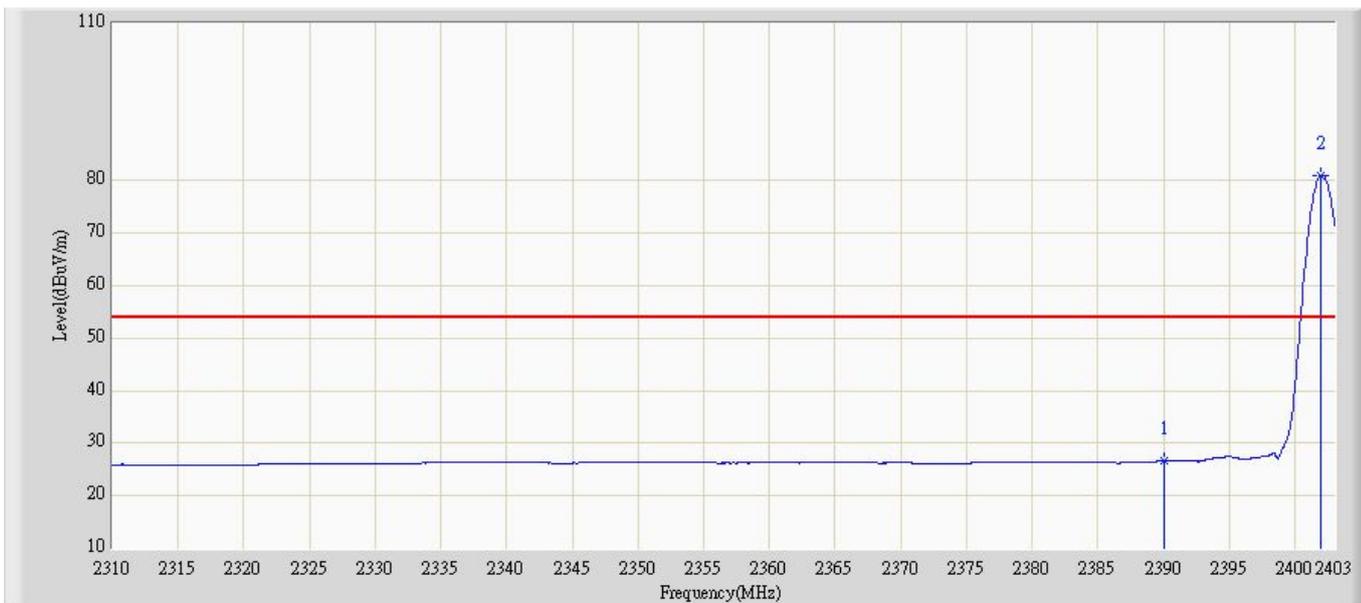
Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.

Engineer: Nancy	
Site: AC5	Time: 2012/03/23 - 14:04
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D-499_(1-18GHz)	Polarity: Horizontal
EUT: CDMA 1X Mobile Phone	Power: By Battery
Note: Mode 1: Transmit at channel 2402MHz By DH5	



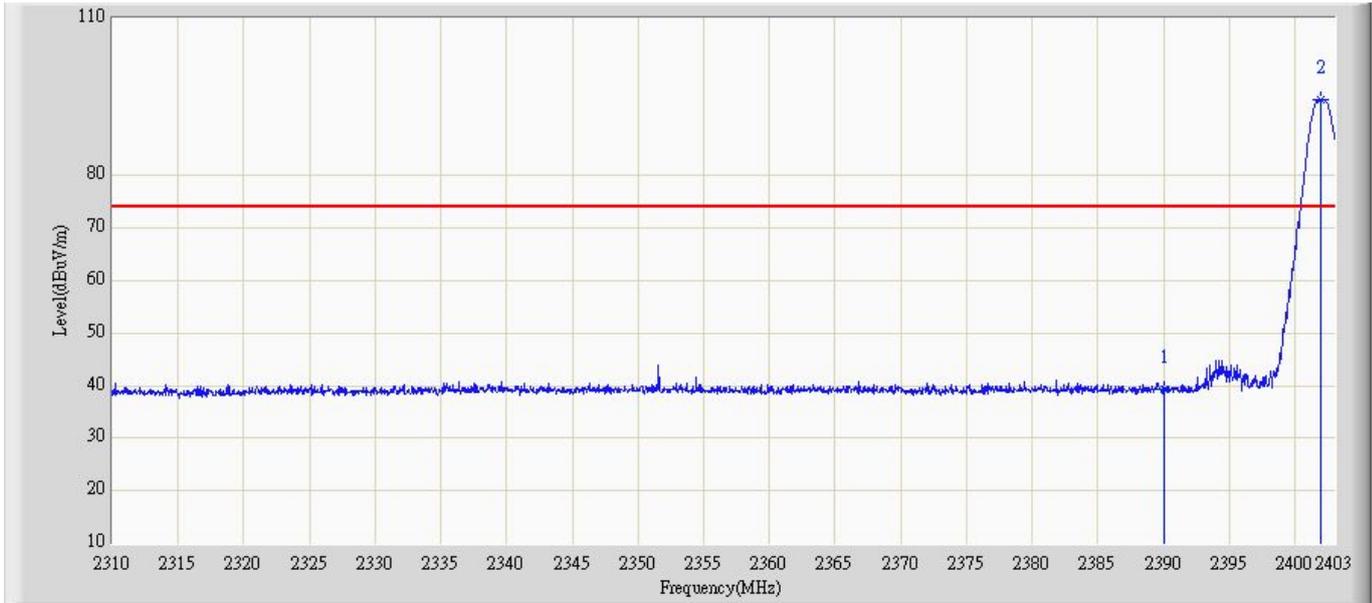
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	39.479	47.187	-34.521	74.000	-7.708	PK
2	*	2402.000	96.492	104.157	N/A	N/A	-7.664	PK

Engineer: Nancy	
Site: AC5	Time: 2012/03/23 - 14:49
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D-499_(1-18GHz)	Polarity: Horizontal
EUT: CDMA 1X Mobile Phone	Power: By Battery
Note: Mode 1: Transmit at channel 2402MHz By DH5	



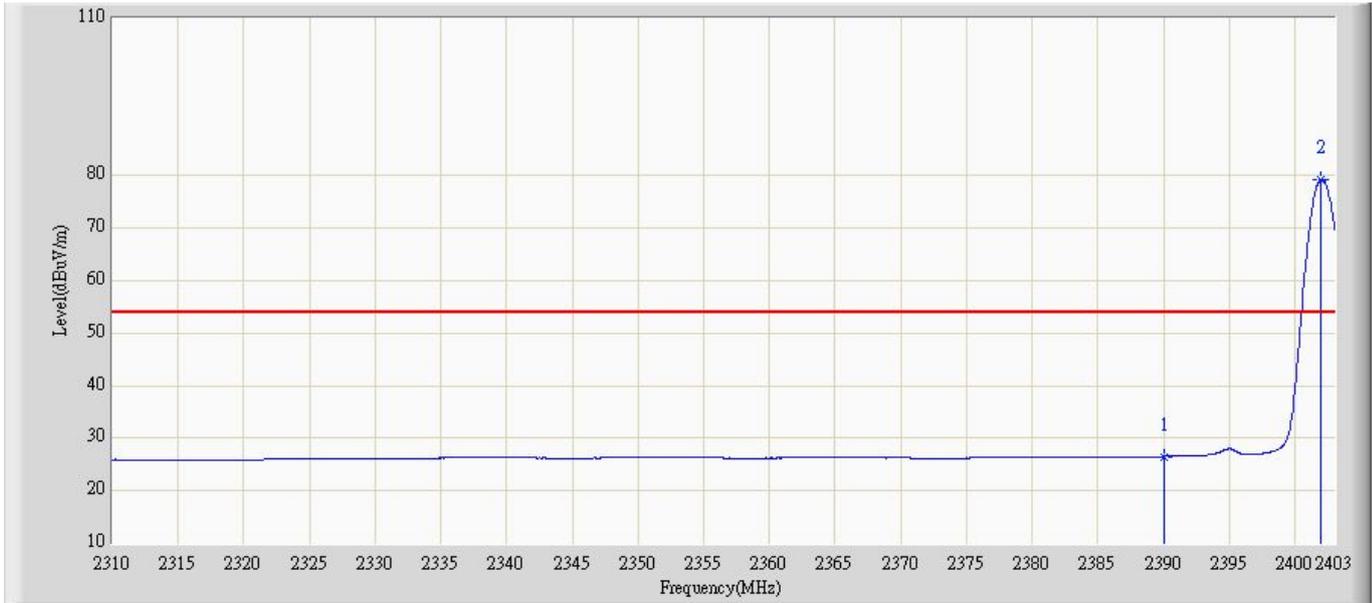
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	26.572	34.280	-27.428	54.000	-7.708	AV
2	*	2402.000	81.077	88.742	N/A	N/A	-7.664	AV

Engineer: Nancy	
Site: AC5	Time: 2012/03/23 - 14:55
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D-499_(1-18GHz)	Polarity: Vertical
EUT: CDMA 1X Mobile Phone	Power: By Battery
Note: Mode 1: Transmit at channel 2402MHz By DH5	



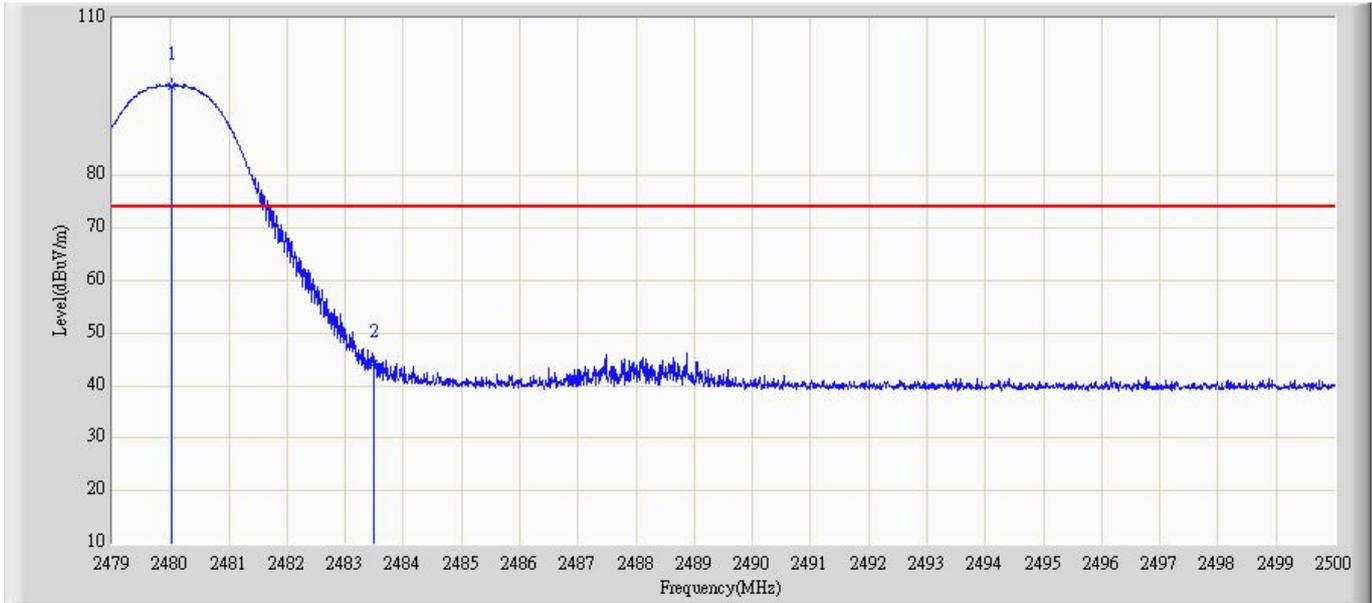
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	39.251	46.959	-34.749	74.000	-7.708	PK
2	*	2402.000	94.408	102.073	N/A	N/A	-7.664	PK

Engineer: Nancy	
Site: AC5	Time: 2012/03/23 - 14:57
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D-499_(1-18GHz)	Polarity: Vertical
EUT: CDMA 1X Mobile Phone	Power: By Battery
Note: Mode 1: Transmit at channel 2402MHz By DH5	



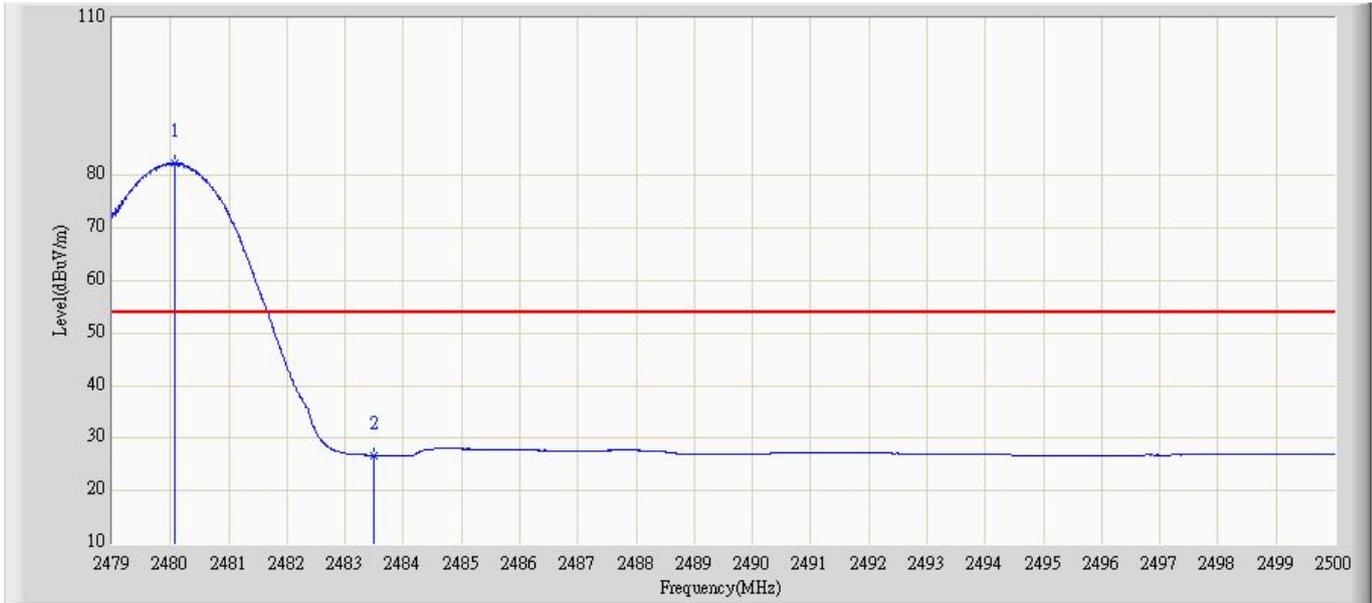
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	26.515	34.223	-27.485	54.000	-7.708	AV
2	*	2402.000	79.357	87.022	N/A	N/A	-7.664	AV

Engineer: Nancy	
Site: AC5	Time: 2012/03/23 - 15:00
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D-499_(1-18GHz)	Polarity: Horizontal
EUT: CDMA 1X Mobile Phone	Power: By Battery
Note: Mode 1: Transmit at channel 2480MHz By DH5	



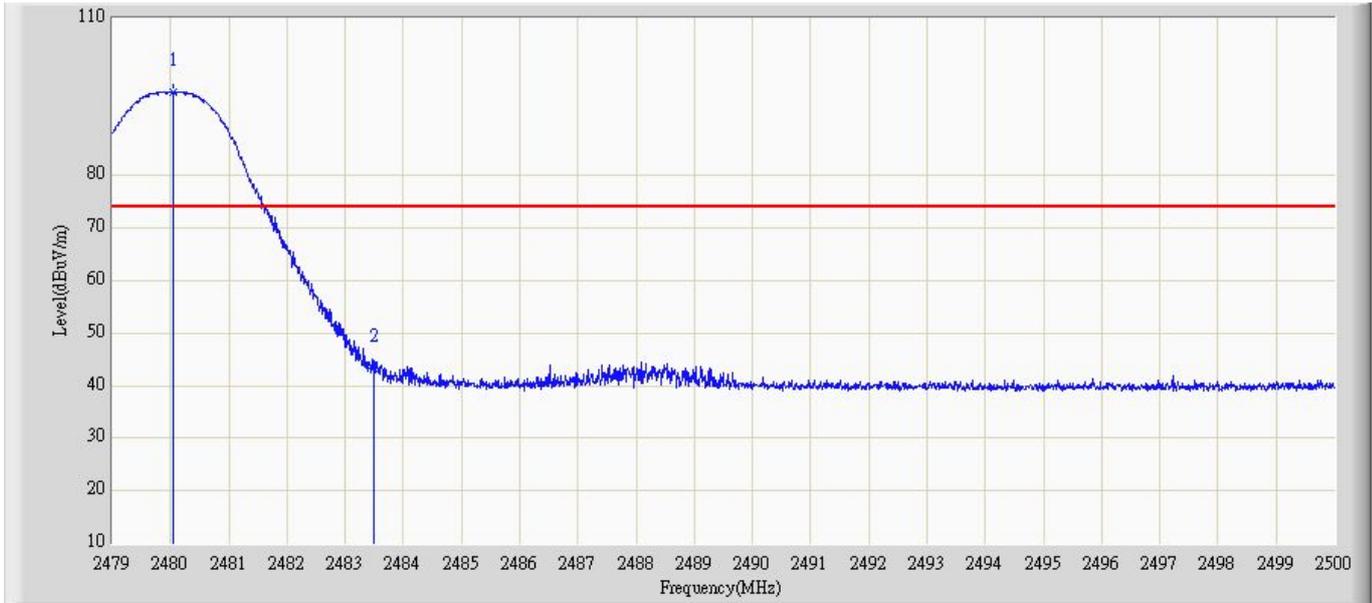
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.008	97.116	104.380	N/A	N/A	-7.264	PK
2		2483.500	44.183	51.432	-29.817	74.000	-7.249	PK

Engineer: Nancy	
Site: AC5	Time: 2012/03/23 - 15:05
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D-499_(1-18GHz)	Polarity: Horizontal
EUT: CDMA 1X Mobile Phone	Power: By Battery
Note: Mode 1: Transmit at channel 2480MHz By DH5	



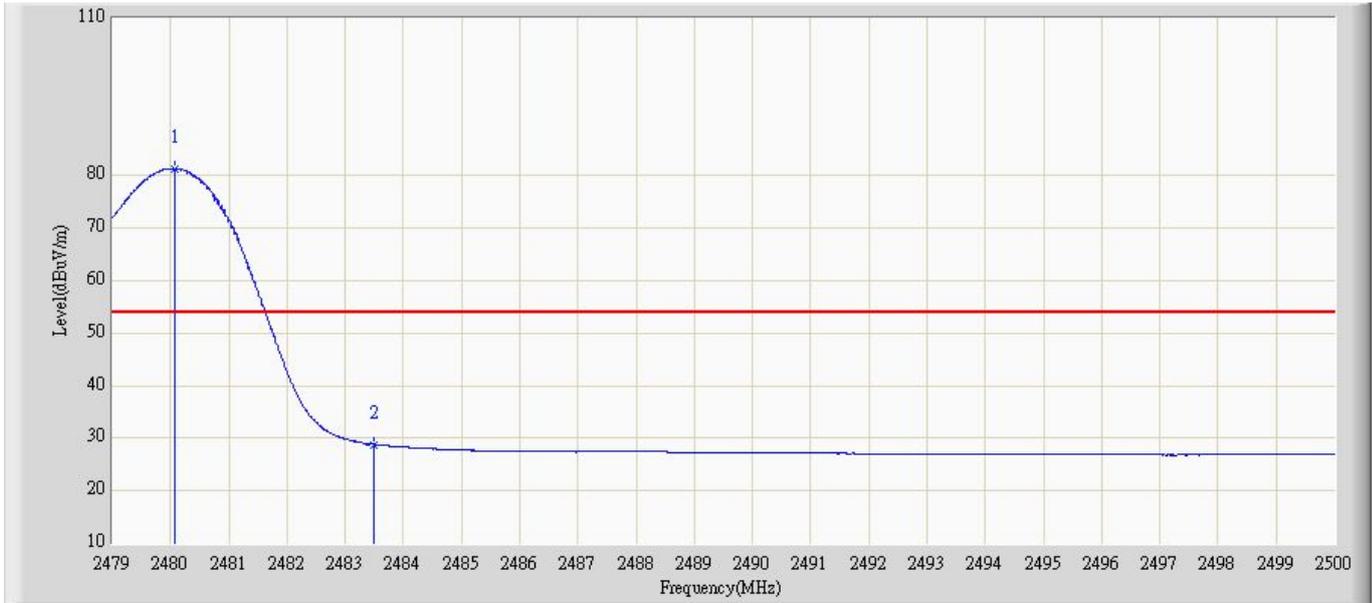
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.071	82.356	89.620	N/A	N/A	-7.264	AV
2		2483.500	26.790	34.039	-27.210	54.000	-7.249	AV

Engineer: Nancy	
Site: AC5	Time: 2012/03/23 - 15:08
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D-499_(1-18GHz)	Polarity: Vertical
EUT: CDMA 1X Mobile Phone	Power: By Battery
Note: Mode 1: Transmit at channel 2480MHz By DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.040	95.934	103.198	N/A	N/A	-7.264	PK
2		2483.500	43.211	50.460	-30.789	74.000	-7.249	PK

Engineer: Nancy	
Site: AC5	Time: 2012/03/23 - 15:11
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D-499_(1-18GHz)	Polarity: Vertical
EUT: CDMA 1X Mobile Phone	Power: By Battery
Note: Mode 1: Transmit at channel 2480MHz By DH5	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.071	81.391	88.655	N/A	N/A	-7.264	AV
2		2483.500	28.813	36.062	-25.187	54.000	-7.249	AV