



HCT CO., LTD.

Product Compliance Division

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CERTIFICATE OF COMPLIANCE FCC PART 15.247 Certification

Applicant Name:

Pantech Co., Ltd.

PANTECH Building, I-2, DMC, Sangam-dong,
Mapo-gu, Seoul, 121-792, Korea

Date of Issue:

March 25, 2009

Test Site/Location:

HCT.CO., LTD., San 136-1 Ami-ri, Bubal-eup, Icheon-si,
Kyungki-do, Korea

Test Report No.: HCT-RF09-0317

HCT FRN: 0005866421

FCC ID: JYCC790

APPLICANT: Pantech Co., Ltd.

Model(s):

C790

EUT Type:

Dual-Band Dual-Mode GSM/ WCDMA/ Phone with Bluetooth

Max. RF Output Power:

0.90 dBm(1.23 mW)

Frequency Range:

2402 - 2480 MHz (Bluetooth)

Modulation type

GFSK, PSK

FCC Classification:

FCC Part 15 Frequency Hopping Spread Spectrum Transceiver

FCC Rule Part(s):

Part 15 subpart C 15.247

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT.CO., LTD. Certifies that no party to this application has been denied FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998, 21 U.S. C. 862

Report prepared by

: Hyo Sun Kwak

Test engineer of RF Part

Approved by

: Sang Jun Lee

Manager of RF Part

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1. GENERAL INFORMATION

Applicant: Pantech Co., Ltd.
Address: PANTECH Building, I-2, DMC, Sangam-dong,
Mapo-gu, Seoul, 121-792, Korea
FCC ID: JYCC790
EUT: Dual-Band Dual-Mode GSM/ WCDMA/ Phone with Bluetooth
Model: C790
Date of Test: March 18, 2009 ~ March 22, 2009
Contact person: Name: HYUN JIN, KWON
Phone #: + 82 - 2 - 2030 - 1363
Fax #: + 82 - 2 - 2030 - 2519

2. EUT DESCRIPTION

Product	Dual-Band Dual-Mode GSM/ WCDMA/ Phone with Bluetooth
Model Name	C790
Power Supply	DC 3.7 V
Battery type	Standard
Frequency Range	2402 ~ 2480 MHz
Transmit Power	0.90 dBm(1.23 mW)
Modulation Type	GFSK(Normal), PSK(EDR)
Modulation Technique	FHSS
Number of Channels	79 Channels
Antenna Specification	Manufacturer: ace antenna. Antenna type: Internal Antenna Peak Gain : -4.71 dBi

15.247 Requirements for Bluetooth transmitter.

- This Bluetooth module has been tested by a Bluetooth Qualification Lab, and we confirm the following:
 - 1) This system is hopping pseudorandomly.
 - 2) Each frequency is used equally on the average by each transmitter.
 - 3) The receiver input bandwidths that match the hopping channel bandwidths of their corresponding transmitters
 - 4) The receiver shifts frequencies in synchronization with the transmitted signals.
- 15.247(g): The system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this Section 15.247 should the transmitter be presented with a continuous data (or information) stream.
- 15.247(h): The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

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3. TEST METHODOLOGY

The measurement procedure described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz(ANSI C63.4-2003) and FCC Public Notice DA 00-705 dated March 30, 2000 entitled “Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems” were used in the measurement of the **Pantech Co., Ltd.**

Dual-Band Dual-Mode GSM/ WCDMA/ Phone with Bluetooth FCC ID: JYCC790

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version :2003) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version: 2003)

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

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4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1, Maekok-Ri, Hobup-Myun, Ichon-Si, Kyoungki-Do, 467-701, KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 6, 2006(Registration Number: 90661)

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

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6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

* The antennas of this E.U.T are permanently attached.

*The E.U.T Complies with the requirement of §15.203

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7. FCC PART 15.247 REQUIREMENTS

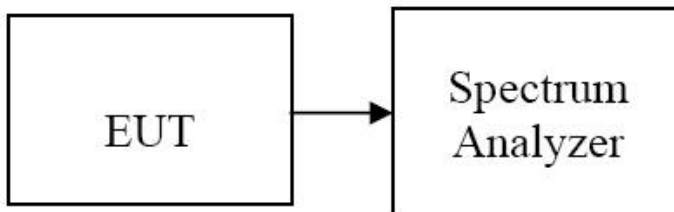
7.1 PEAK POWER

LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

1. For systems using digital modulation in the bands of 902 ~ 928 MHz, 2400 ~ 2483.5 MHz, and 5725 ~ 5850 MHz: 1 watt.
2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. The Spectrum Analyzer is set to the peak detector mode.

1. Span = 2 MHz (GFSK) / 5 MHz (8DPSK)
2. RBW = 1 MHz (GFSK) / 3 MHz (8DPSK)
3. VBW = 1 MHz (GFSK) / 3 MHz (8DPSK)
4. Sweep = auto
5. Packet type= DH5 (GFSK) / 3-DH5 (8DPSK)

TEST RESULTS

No non-compliance noted

Test Data

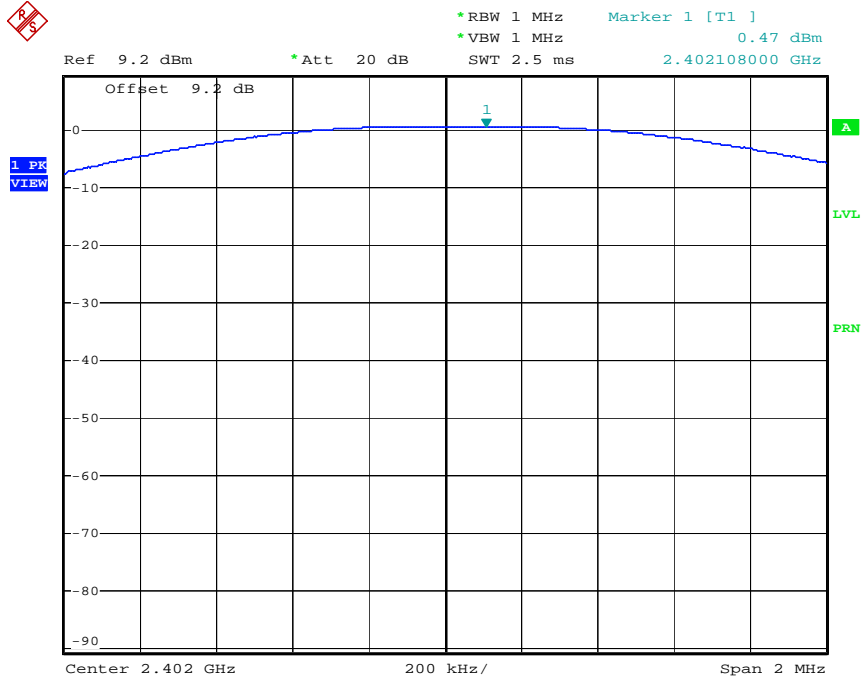
Channel	Frequency (MHz)	Output Power(GFSK)		Output Power(8DPSK)		Limit (W)	Result
		(dBm)	(mW)	(dBm)	(mW)		
Low	2402	0.47	1.11	0.90	1.23	1	PASS
Mid	2441	-0.09	0.98	0.31	1.07		PASS
High	2480	-0.34	0.92	-0.15	0.97		PASS



Test Plots

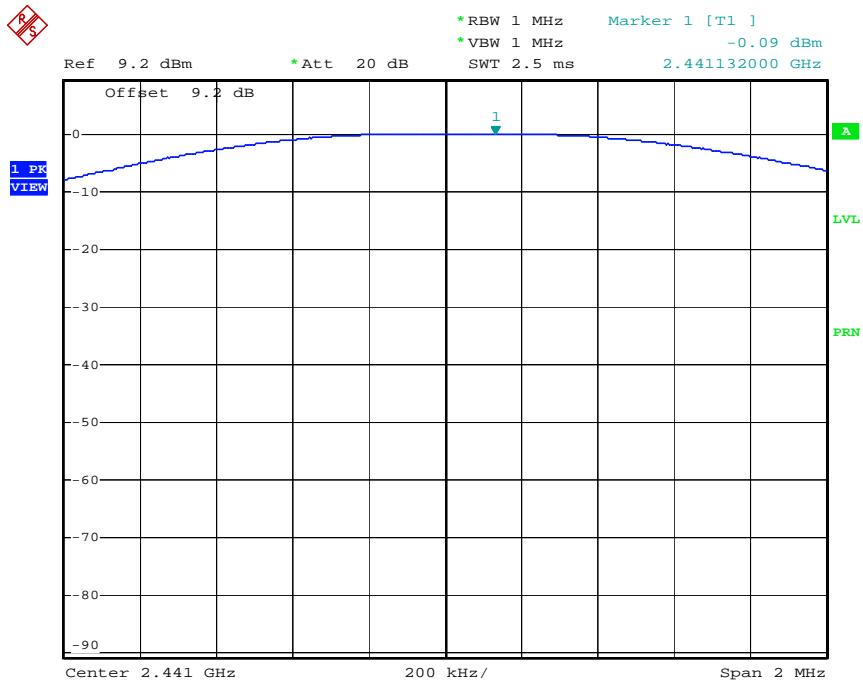
(GFSK)

Peak Power (Low CH)



Date: 22.MAR.2009 09:40:46

Peak Power (Mid CH)

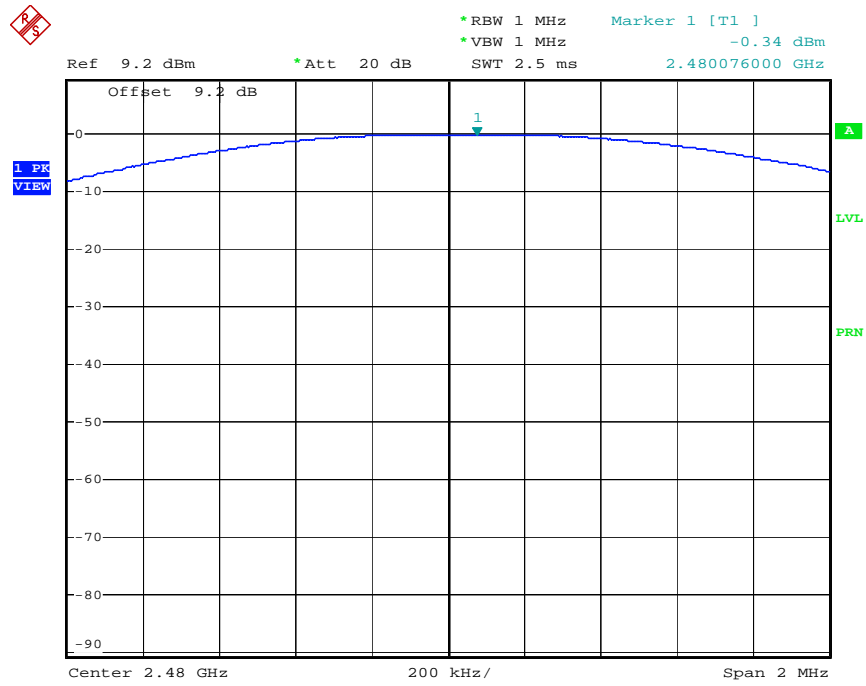


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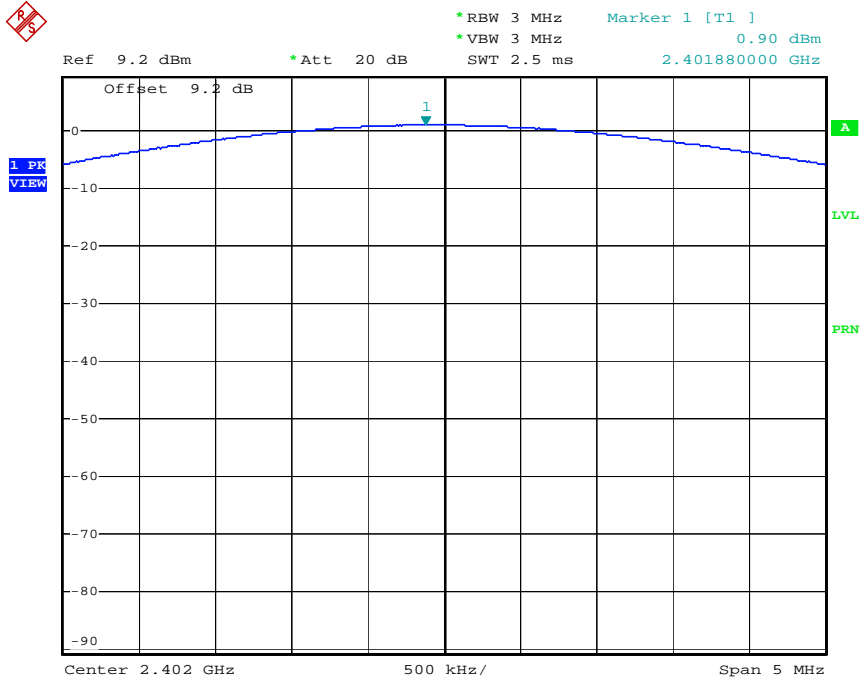
Peak Power (High CH)



Date: 22.MAR.2009 09:42:50

(8DPSK)

Peak Power (Low CH)

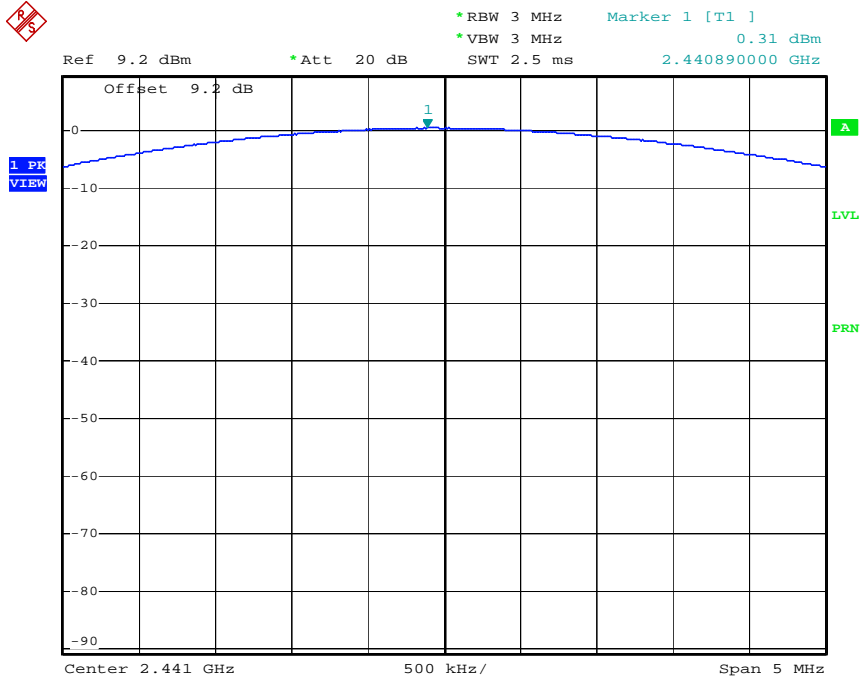


Date: 22.MAR.2009 09:59:45

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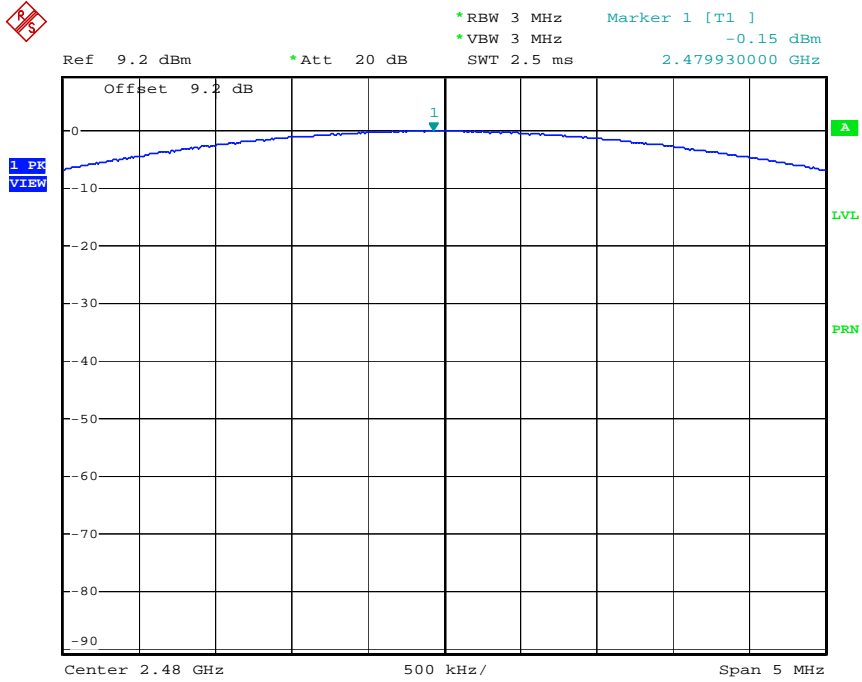


Peak Power (Mid CH)



Date: 22.MAR.2009 10:15:44

Peak Power (High CH)



Date: 22.MAR.2009 10:16:22

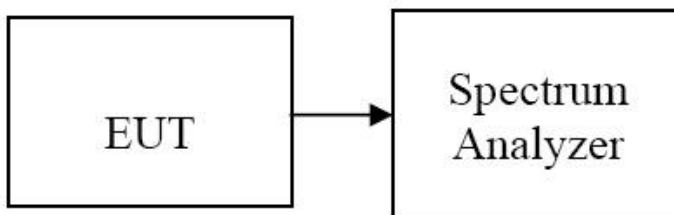
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7.2 BAND EDGES MEASUREMENT

LIMIT

According to §15.247(d), 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 power limits.

Test Configuration



TEST PROCEDURE

The spectrum analyzer is set to :

1. Span = 8 MHz
2. RBW = 100 kHz
3. VBW = 300 kHz
4. Sweep = auto
5. Detector Mode = Peak

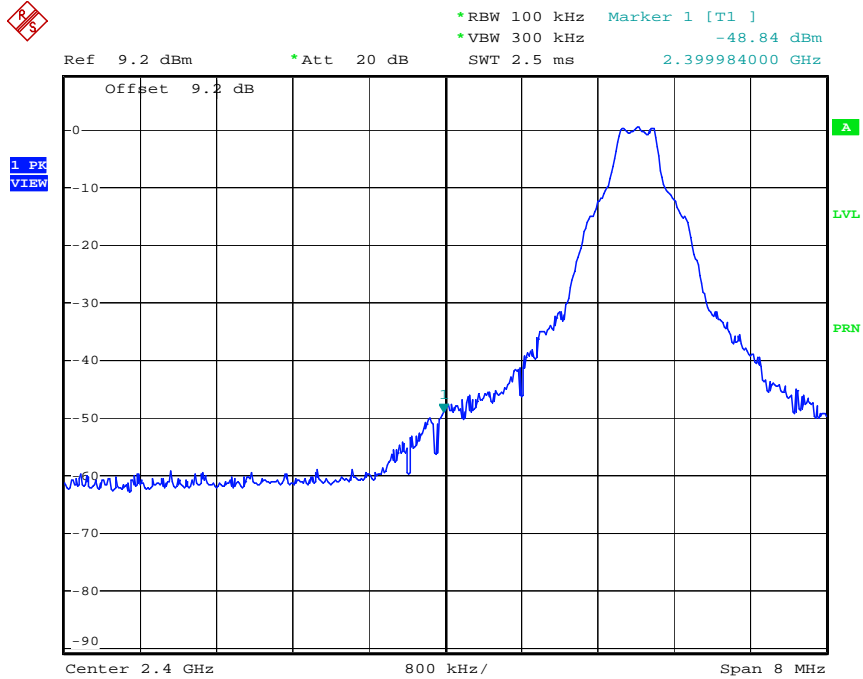
TEST RESULTS

See attached.



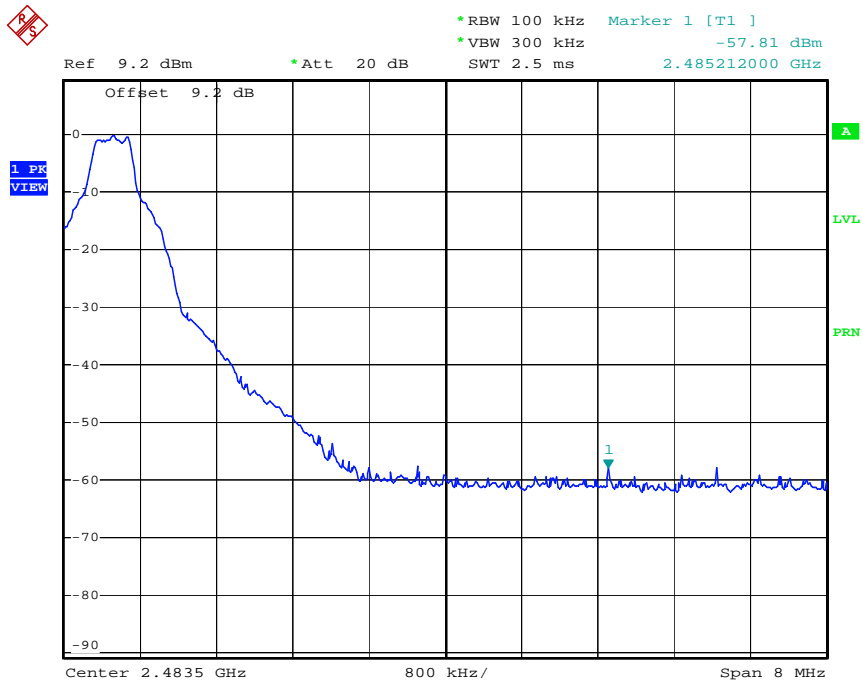
Test Data (GFSK)

Band Edges (Low- CH)



Date: 22.MAR.2009 10:18:03

Band Edges (High-CH)



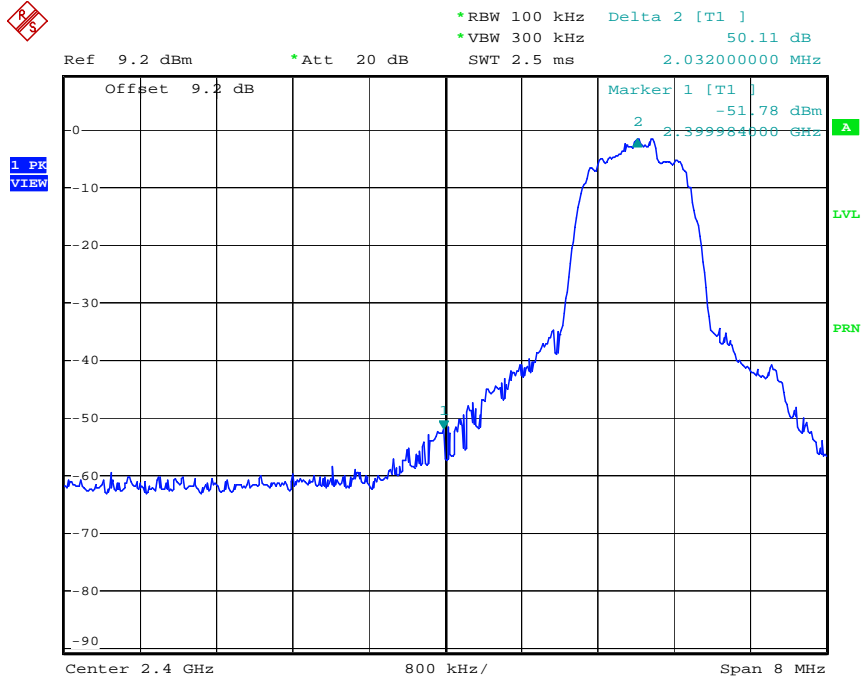
Date: 22.MAR.2009 10:19:51

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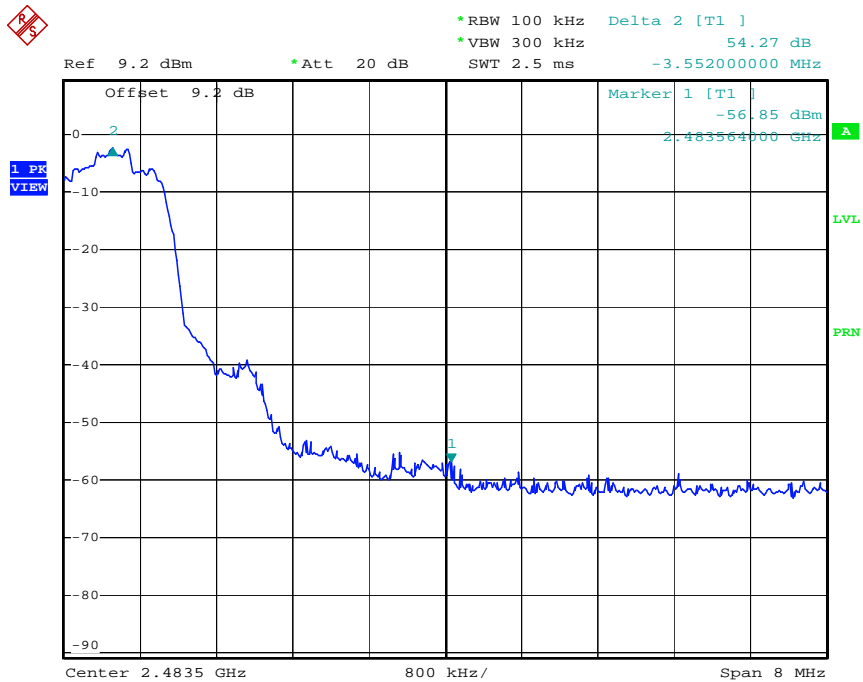
Test Data (8DPSK)

Band Edges (Low- CH)



Date: 22.MAR.2009 10:21:24

Band Edges (High-CH)



Date: 22.MAR.2009 10:22:31

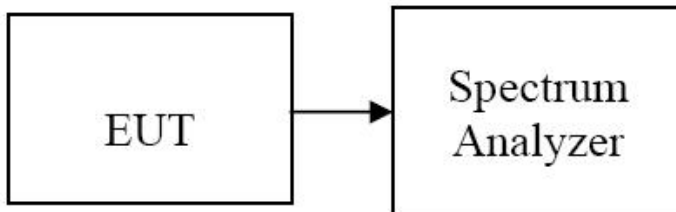
HCT PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
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7.3 FREQUENCY SEPARATION

LIMIT

According to §15.247(a)(1), 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.

Test Configuration



TEST PROCEDURE

The spectrum analyzer is set to :

1. Span = 3 MHz
2. RBW = 30 kHz
3. VBW = 100 kHz
4. Sweep = auto

The trace was allowed to stabilize. The marker-delta function was used to determine the separation between the peaks of the adjacent channels.

TEST RESULTS

No non-compliance noted

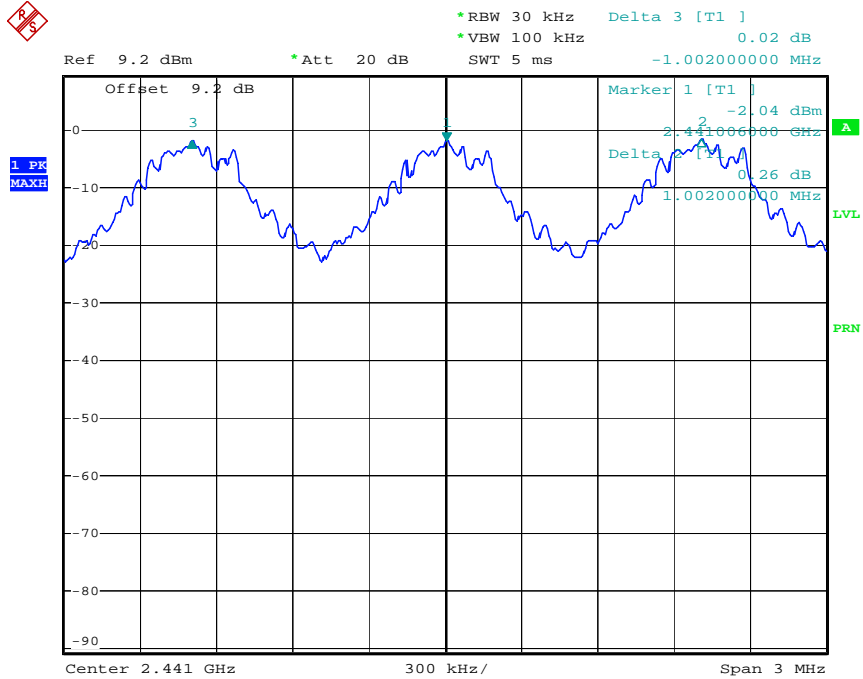
Test Data

Channel Separation (kHz)		20dB Bandwidth (kHz)			Limit (kHz)	Result
GFSK	8DPSK	Channel	GFSK	8DPSK		
1002	1002	Low CH	948	1296	>25	Pass
		Middle CH	960	1302		
		High CH	972	1296		



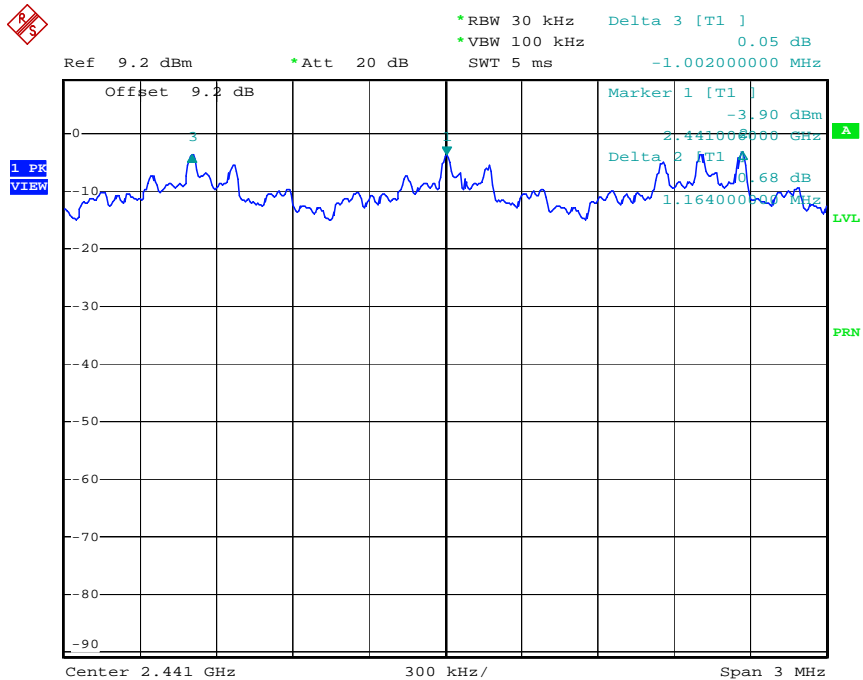
Test Plot

Measurement of Channel Separation



Date: 22.MAR.2009 10:27:20

Measurement of Channel Separation(8DPSK)

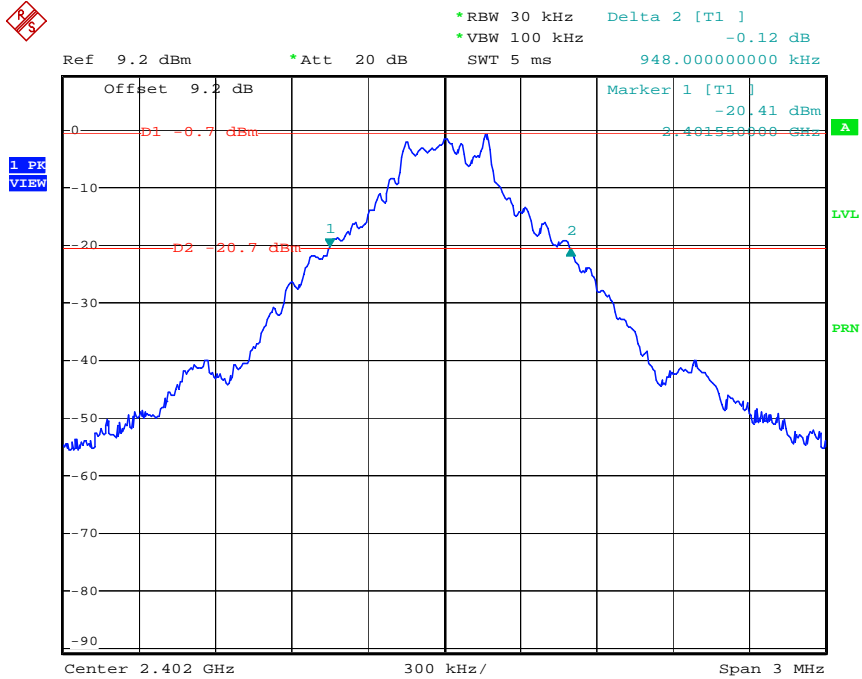


Date: 22.MAR.2009 10:28:59

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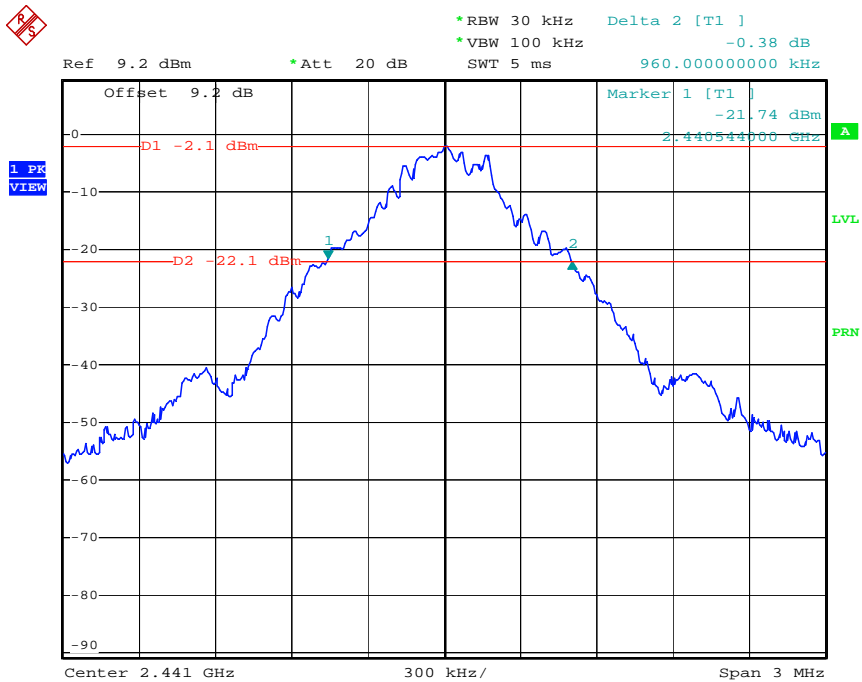


Test Plot (GFSK)
20 dB bandwidth
(Low CH)



Date: 22.MAR.2009 09:21:41

(Mid CH)

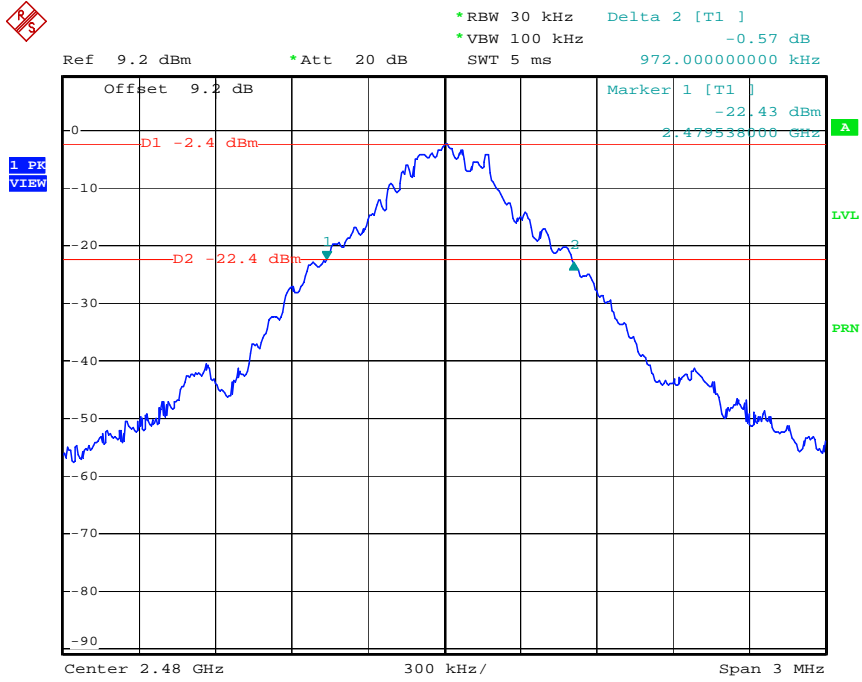


Date: 22.MAR.2009 09:29:01

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(High CH)

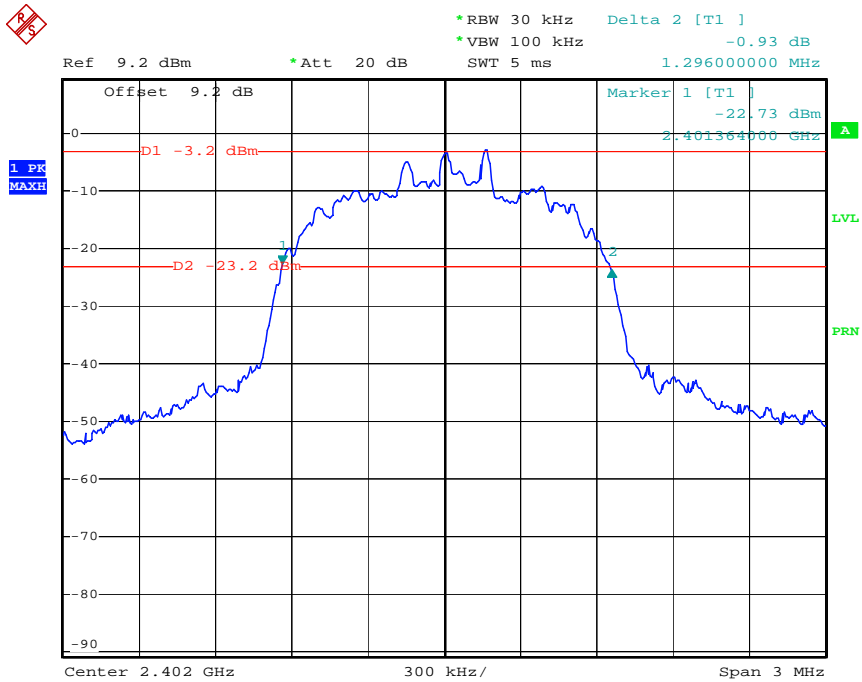


Date: 22.MAR.2009 09:27:36

Test Plot (8DPSK)

20 dB bandwidth

(Low CH)

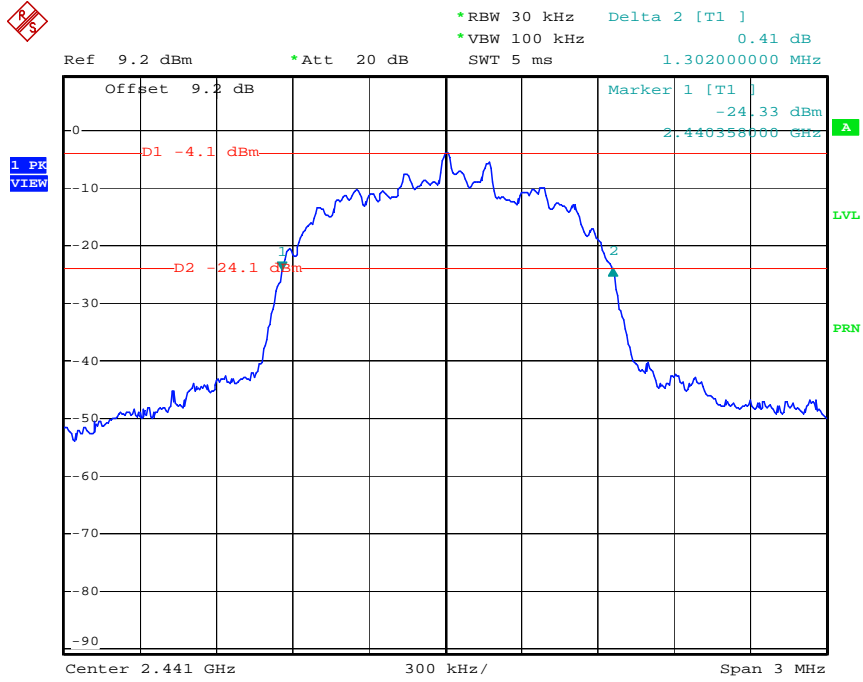


Date: 22.MAR.2009 09:30:33

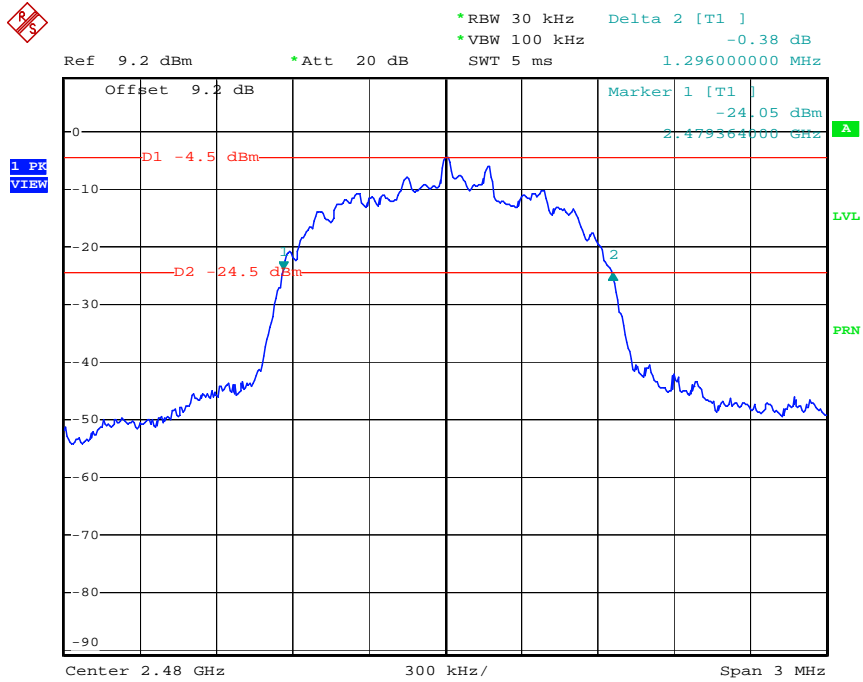
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(Mid CH)



(High CH)



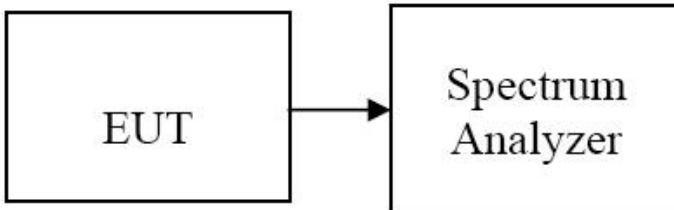
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7.4 NUMBER OF HOPPING FREQUENCY

LIMIT

According to §15.247(a)(1)(ii), Frequency hopping systems operating in the 2400 MHz ~ 2483.5 MHz bands shall use at least 15 hopping frequencies.

Test Configuration



TEST PROCEDURE

The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer was set to :

1. Span = the frequency band of operation (Start = 2400 MHz, Stop = 2483.5 MHz)
2. RBW = 300 kHz
3. VBW = 300 kHz
4. Sweep = auto

The trace was allowed to stabilize.

TEST RESULTS

No non-compliance noted

Test Data

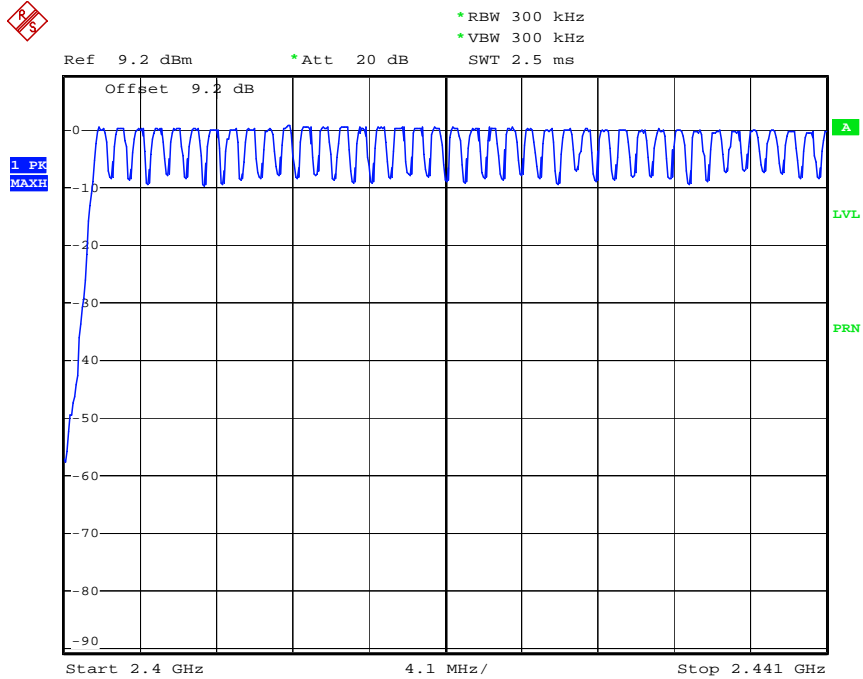
Result (No. of CH)	Limit (No. of CH)	Result
79	>75	Pass



Test Plot

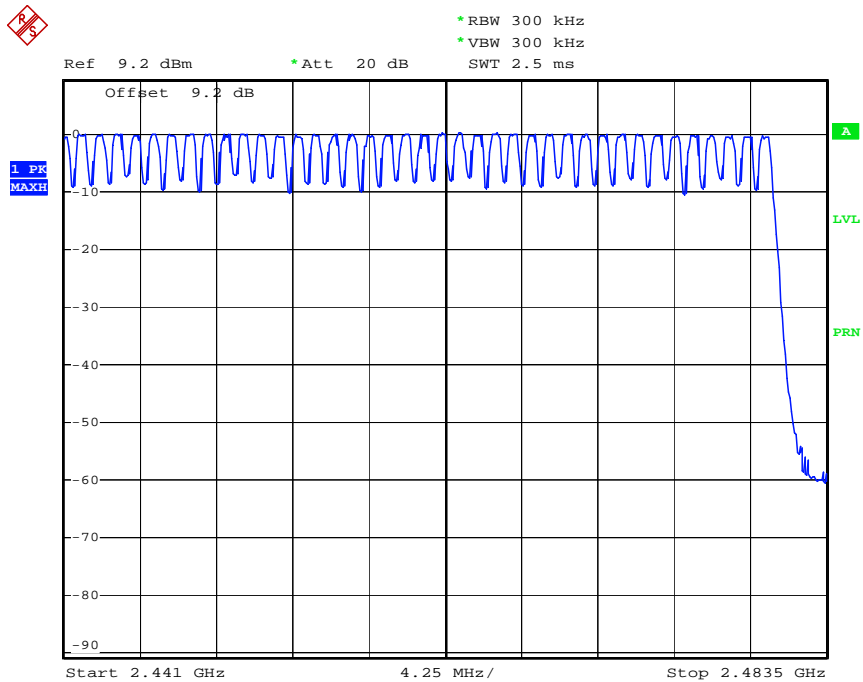
Number of Channels (GFSK)

2.4 GHz – 2.441 GHz



Date: 22.MAR.2009 10:30:34

2.441 GHz – 2.4835 GHz



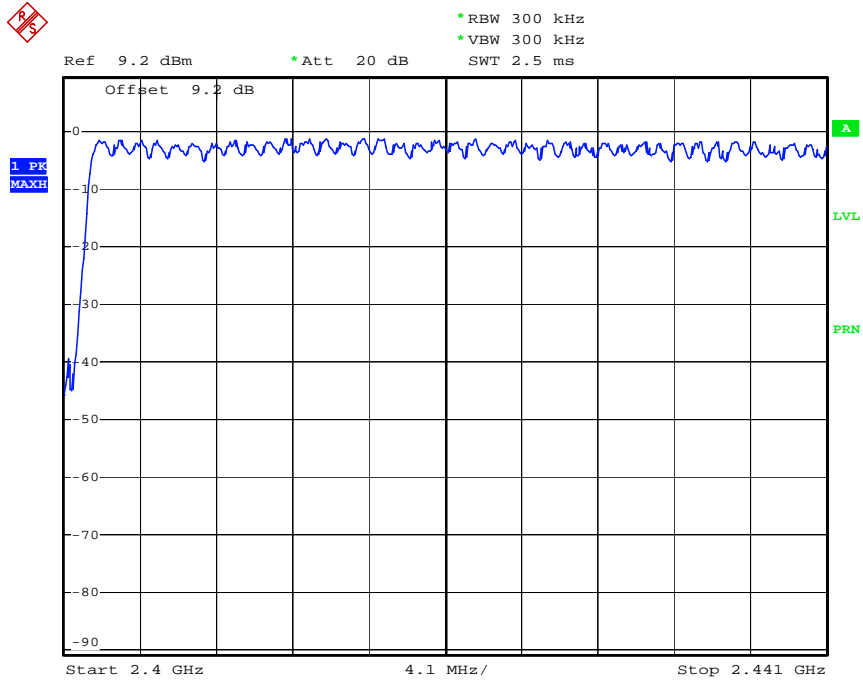
Date: 22.MAR.2009 10:31:25

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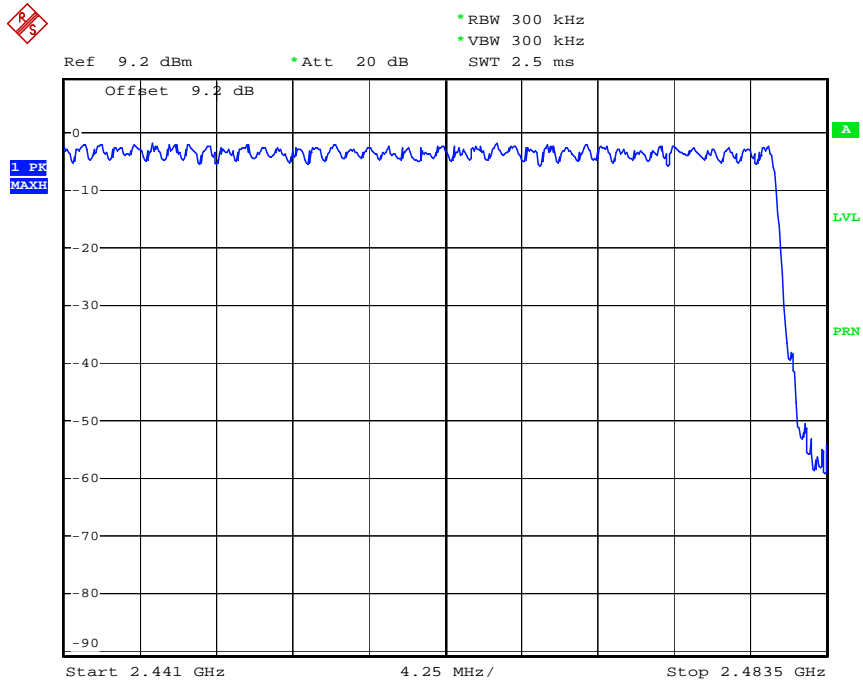
Number of Channels (8DPSK)

2.4 GHz – 2.441 GHz



Date: 22.MAR.2009 10:34:06

2.441 GHz – 2.4835 GHz



Date: 22.MAR.2009 10:35:26

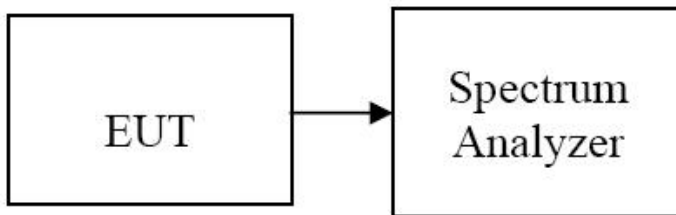
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7.5 TIME OF OCCUPANCY (DWELL TIME)

LIMIT

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400 MHz ~ 2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

Test Configuration



TEST PROCEDURE

EUT was set to transmit the longest packet type (DH5)

1. Span = zero span
2. RBW = 1 MHz
3. VBW = 1 MHz
4. Sweep = as necessary to capture the entire dwell time per channel

The marker-delta function was used to determine the dwell time.

TEST RESULTS

See the table.

DH 5(The longest packet type for GFSK)

CH Mid : $2.90 * (1600/6)/79 * 31.6 = 309.33$ (ms)

3-DH 5(The longest packet type for 8DPSK)

CH Mid : $2.90 * (1600/6)/79 * 31.6 = 309.33$ (ms)

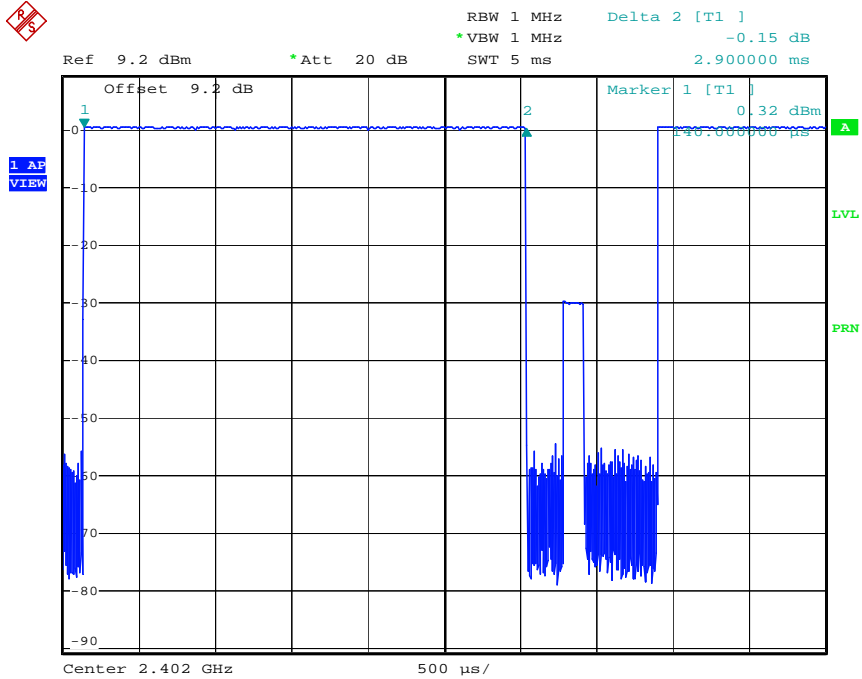
Channel	Pulse Time (ms)		Total of Dwell (ms)		Period Time (s)	Limit (ms)	Result
	GFSK	8DPSK	GFSK	8DPSK			
Low	2.90	2.91	309.33	310.40	31.6	400	PASS
Mid	2.90	2.90	309.33	309.33	31.6		PASS
High	2.91	2.91	310.40	310.40	31.6		PASS



Test Plots (GFSK)

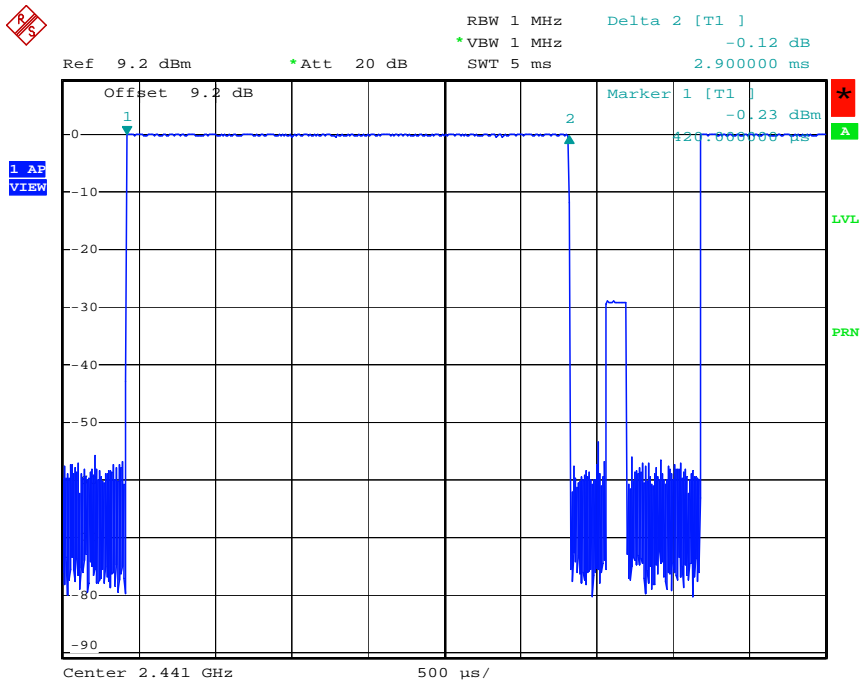
DH 5

(Low CH)



Date: 22.MAR.2009 10:37:36

(Mid CH)

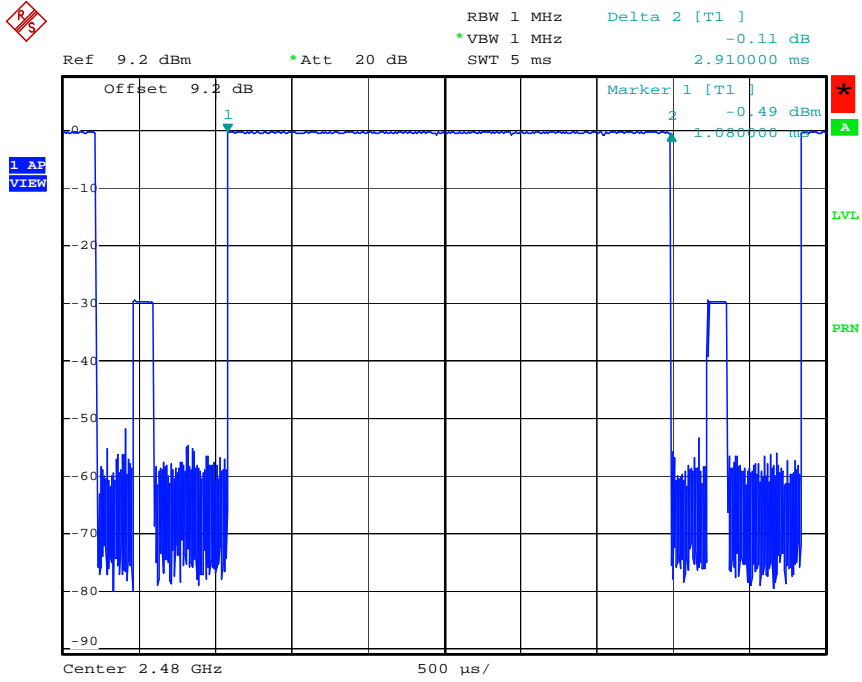


Date: 22.MAR.2009 10:38:26

HCT PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-RF09-0317	Date of Issue: March 25, 2009	EUT Type: Dual-Band Dual-Mode GSM/ WCDMA/ Phone with Bluetooth	FCC ID: JYCC790	Page 2 3 of 47



(CH High)

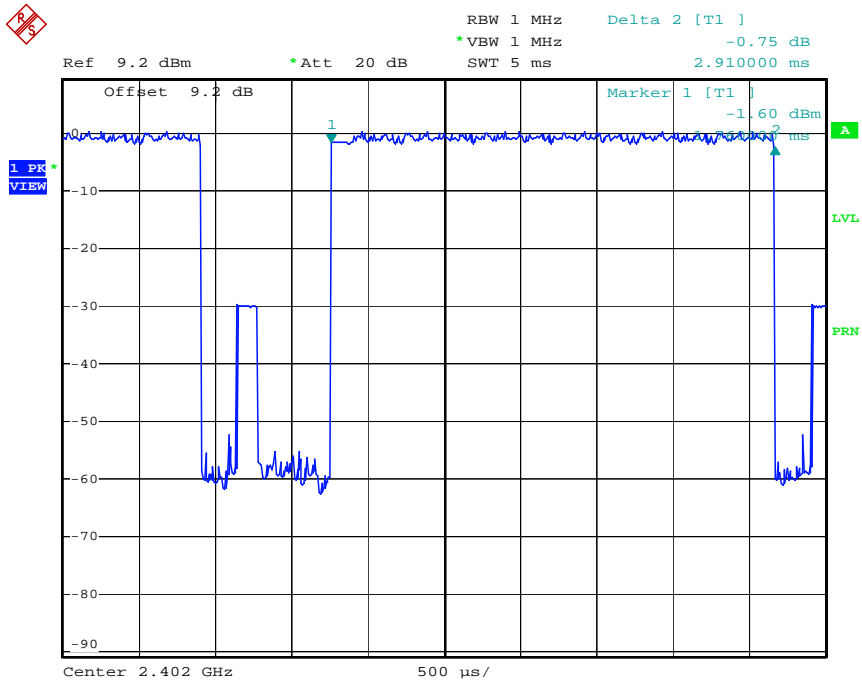


Date: 22.MAR.2009 10:39:04

Test Plots (8DPSK)

3-DH 5

(Low CH)

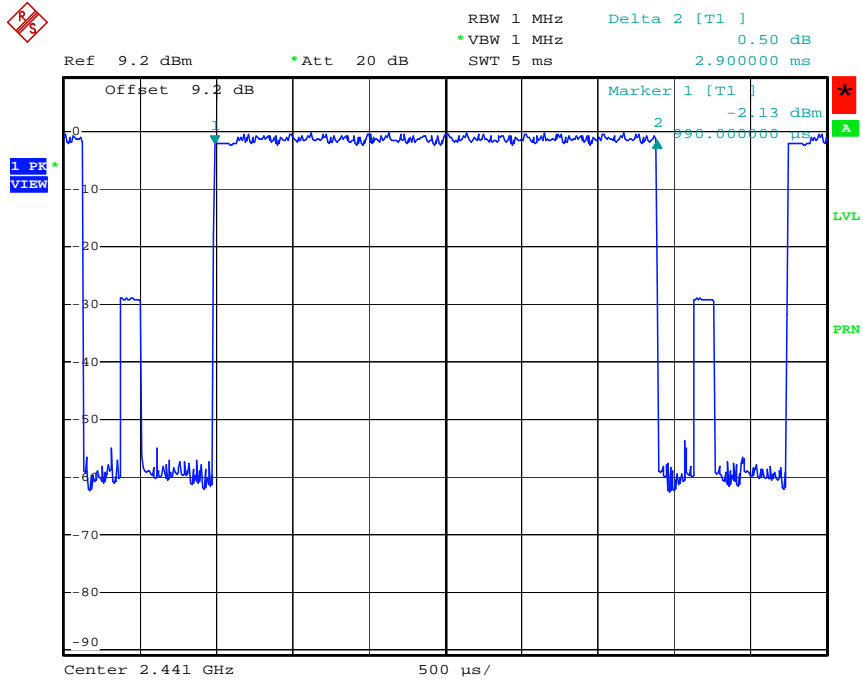


Date: 22.MAR.2009 10:40:06

HCT PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCT-RF09-0317	Date of Issue: March 25, 2009	EUT Type: Dual-Band Dual-Mode GSM/ WCDMA/ Phone with Bluetooth	FCC ID: JYCC790	Page 2 4 of 47

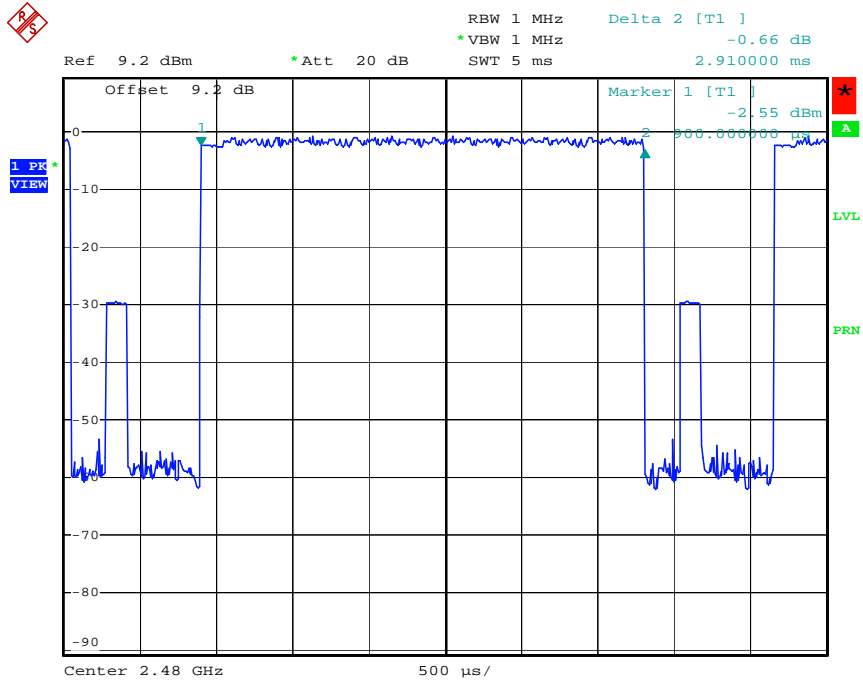


(Mid CH)



Date: 22.MAR.2009 10:41:03

(CH High)



Date: 22.MAR.2009 10:41:39

HCT PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCT-RF09-0317	Date of Issue: March 25, 2009	EUT Type: Dual-Band Dual-Mode GSM/ WCDMA/ Phone with Bluetooth	FCC ID: JYCC790	Page 2 5 of 47

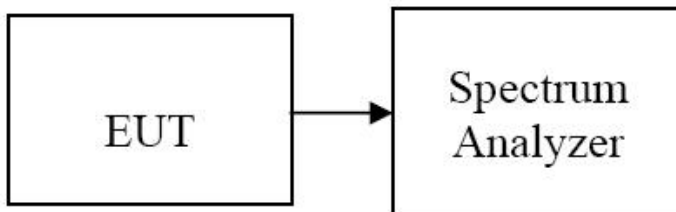
7.6 SPURIOUS EMISSIONS

7.6.1 Conducted Spurious Measurement

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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Test Configuration



TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

Detector Mode is set to a peak detector Mode.

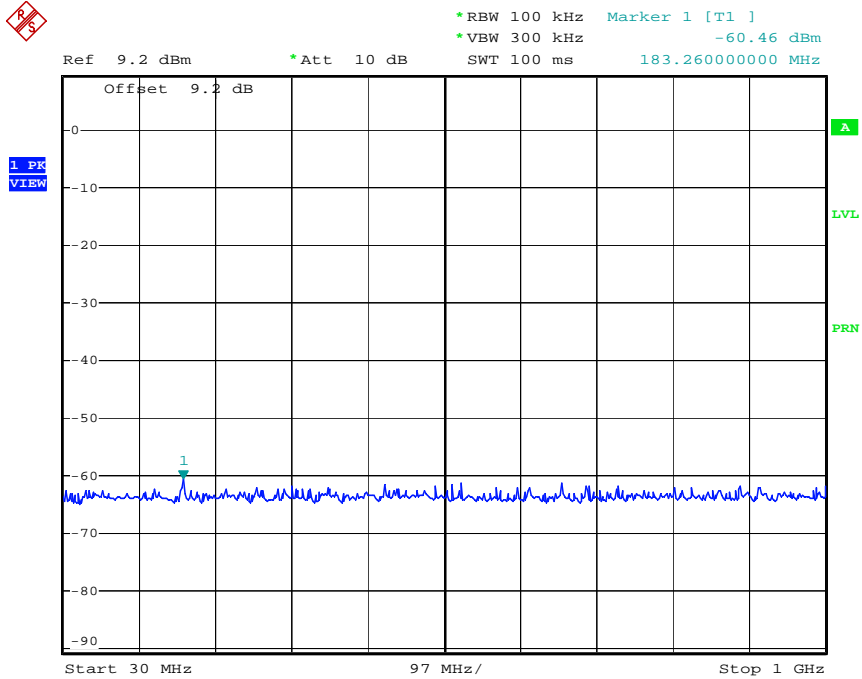
Measurements are made over the 30 MHz to 26 GHz range with the transmitter set to the lowest, middle, and highest channels.

TEST RESULTS

No non-compliance noted

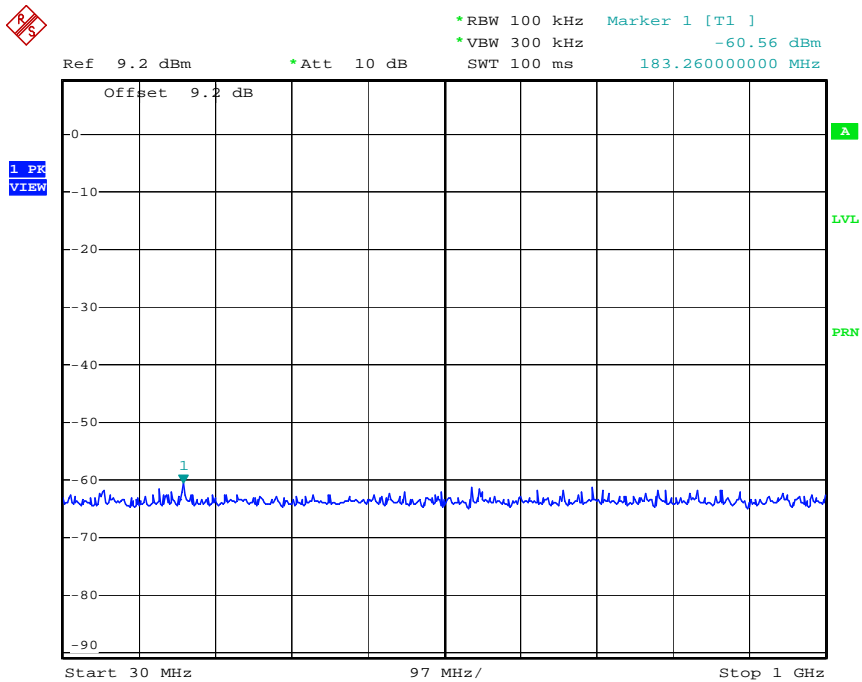


Test Plots (GFSK) – 30 MHz ~ 1 GHz(RBW:100 KHz, VBW: 300 KHz)
(Low CH)



Date: 22.MAR.2009 10:54:19

(Mid CH)

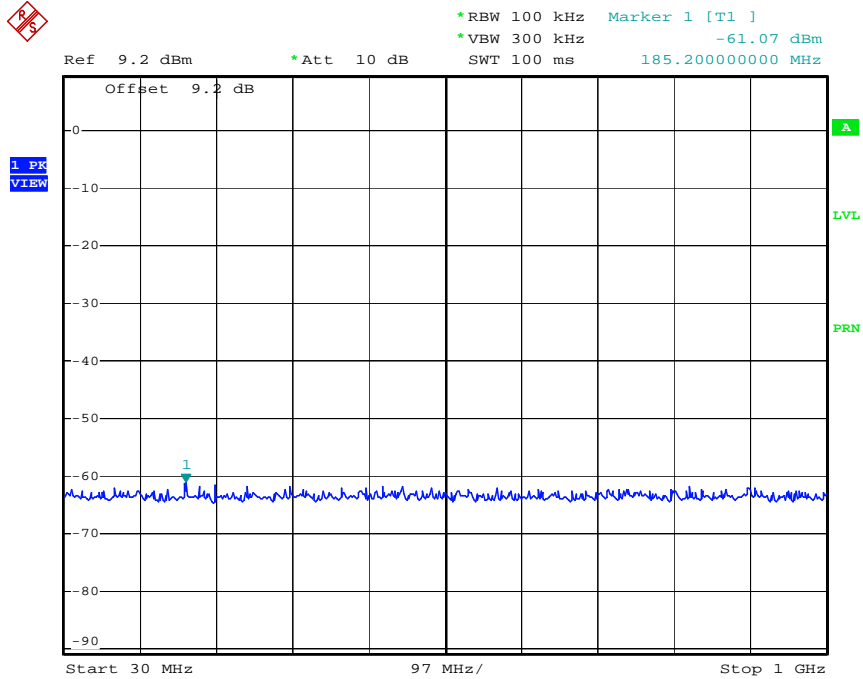


Date: 22.MAR.2009 10:55:06

HCT PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-RF09-0317	Date of Issue: March 25, 2009	EUT Type: Dual-Band Dual-Mode GSM/ WCDMA/ Phone with Bluetooth	FCC ID: JYCC790	Page 27 of 47



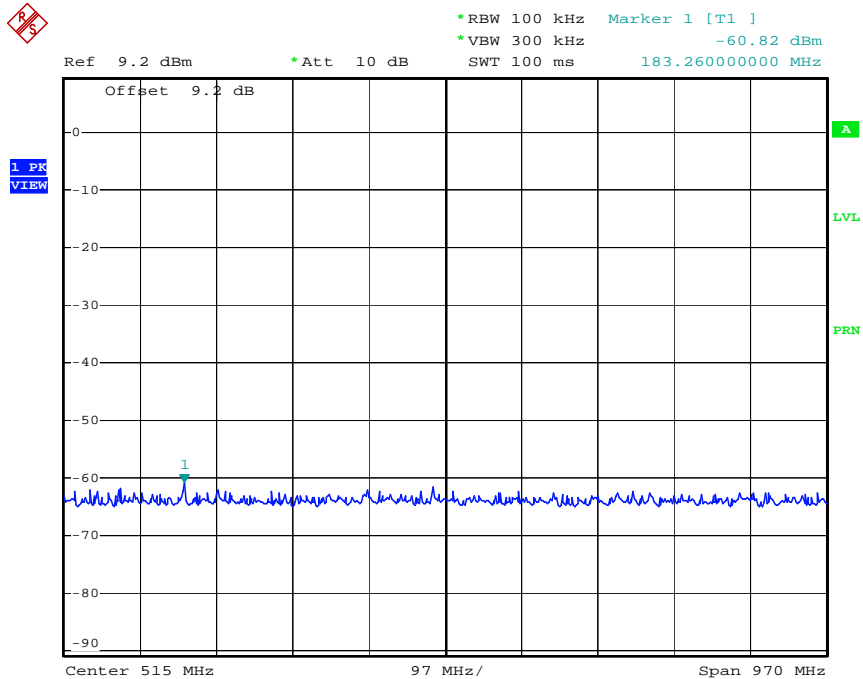
(High CH)



Date: 22.MAR.2009 10:56:05

Test Plots (8DPSK)

(Low CH)

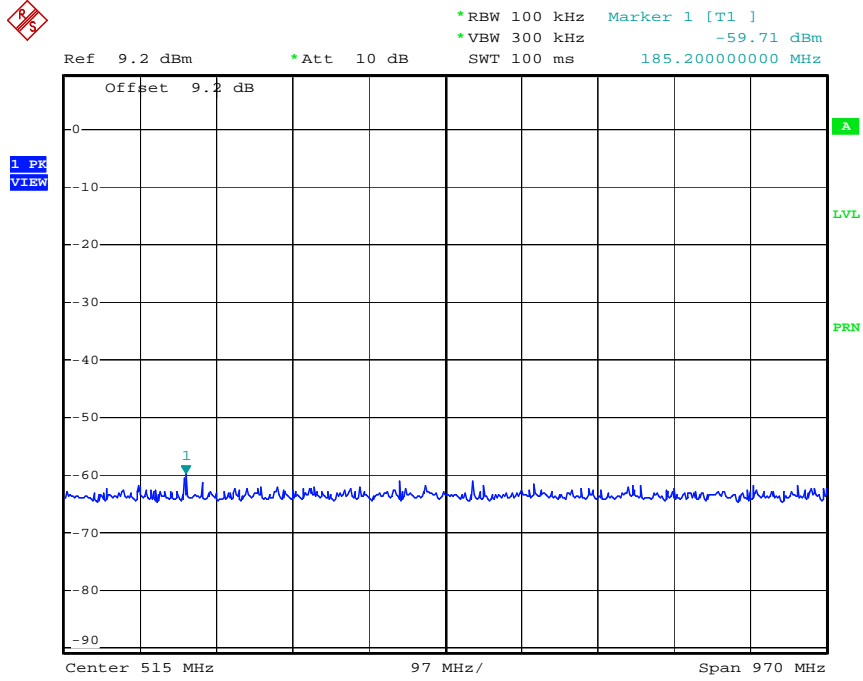


Date: 22.MAR.2009 10:56:48

HCT PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-RF09-0317	Date of Issue: March 25, 2009	EUT Type: Dual-Band Dual-Mode GSM/ WCDMA/ Phone with Bluetooth	FCC ID: JYCC790	Page 2 8 of 47

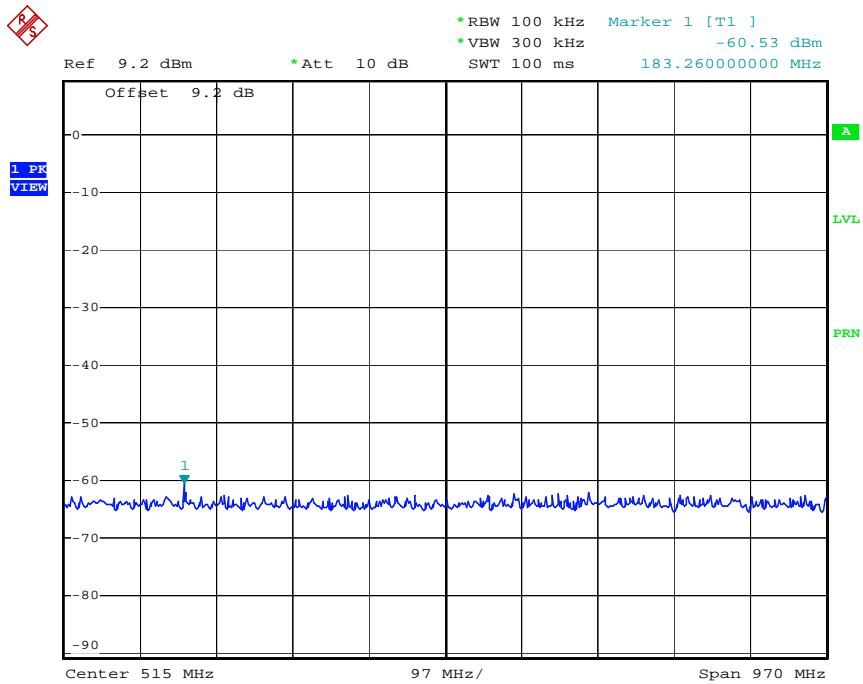


(Mid CH)



Date: 22.MAR.2009 10:57:35

(High CH)

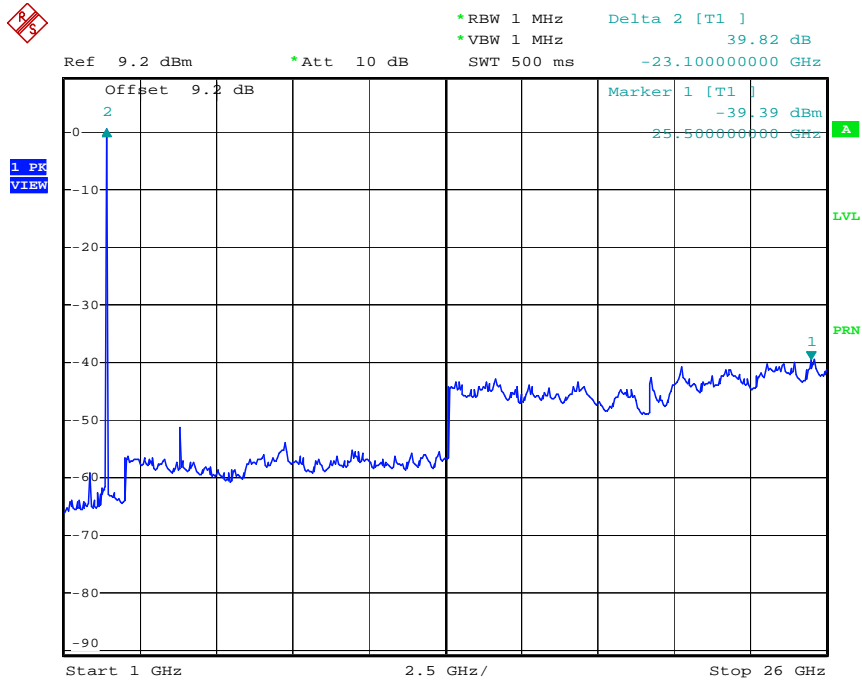


Date: 22.MAR.2009 10:58:12

HCT PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCT-RF09-0317	Date of Issue: March 25, 2009	EUT Type: Dual-Band Dual-Mode GSM/ WCDMA/ Phone with Bluetooth	FCC ID: JYCC790	Page 29 of 47

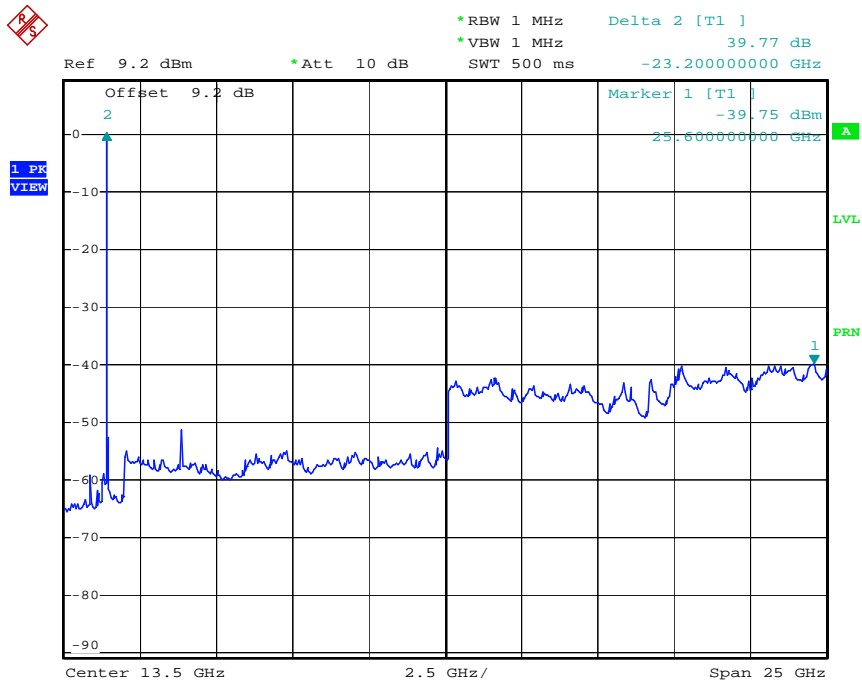


Test Plots (GFSK) –1 GHz ~ 26 GHz (RBW: 1 MHz, VBW: 1 MHz)
(Low CH)



Date: 22.MAR.2009 11:00:34

(Mid CH)

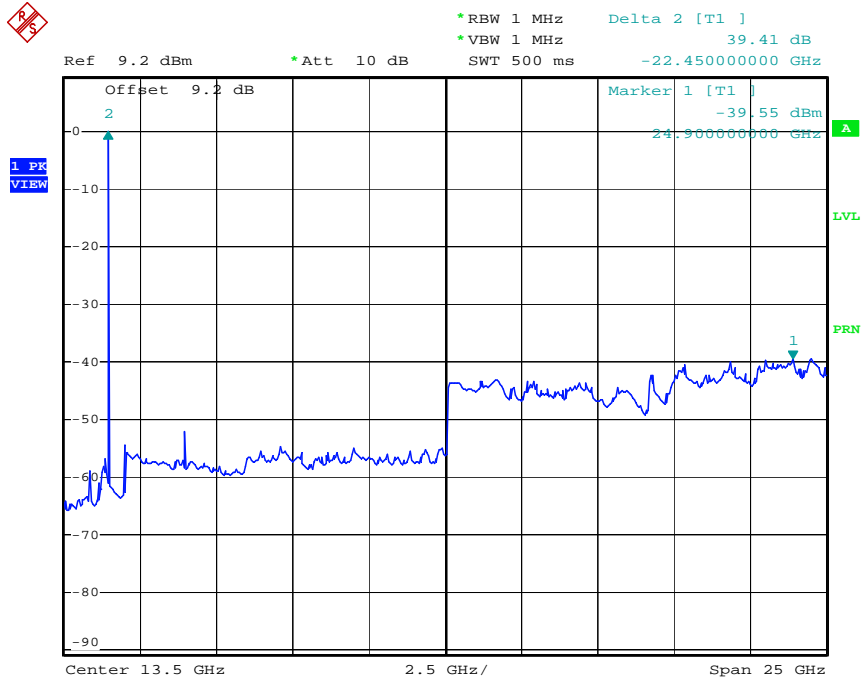


Date: 22.MAR.2009 11:01:40

HCT PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCT-RF09-0317	Date of Issue: March 25, 2009	EUT Type: Dual-Band Dual-Mode GSM/ WCDMA/ Phone with Bluetooth	FCC ID: JYCC790	Page 3 0 of 47



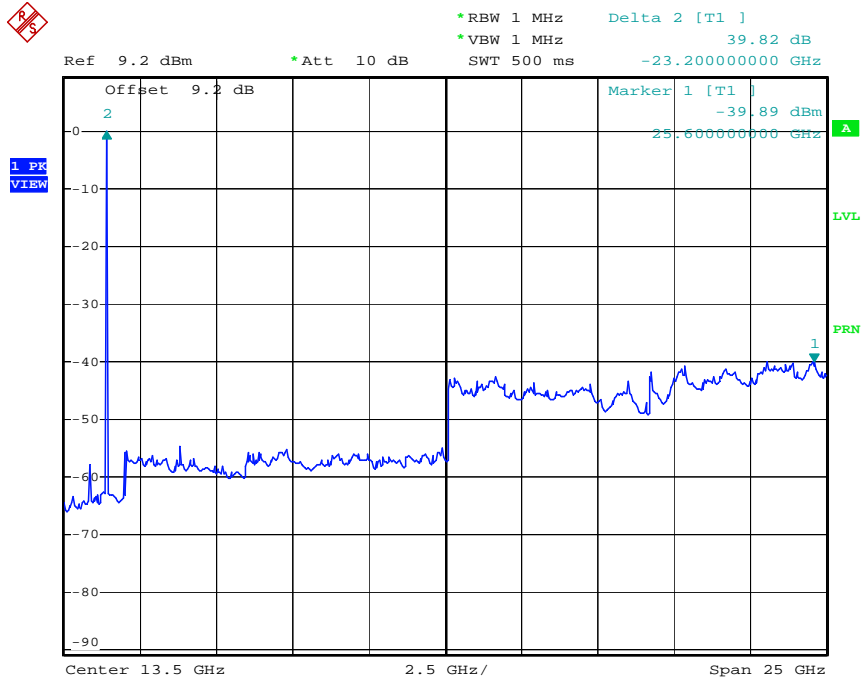
(High CH)



Date: 22.MAR.2009 12:14:52

Test Plots (8DPSK)

(Low CH)

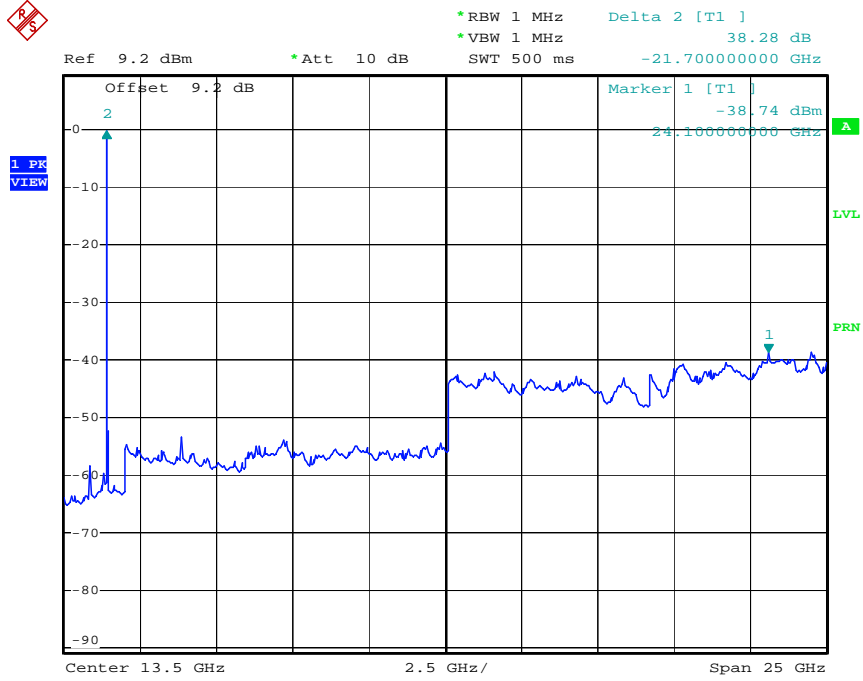


Date: 22.MAR.2009 12:15:38

HCT PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCT-RF09-0317	Date of Issue: March 25, 2009	EUT Type: Dual-Band Dual-Mode GSM/ WCDMA/ Phone with Bluetooth	FCC ID: JYCC790	Page 3 1 of 47

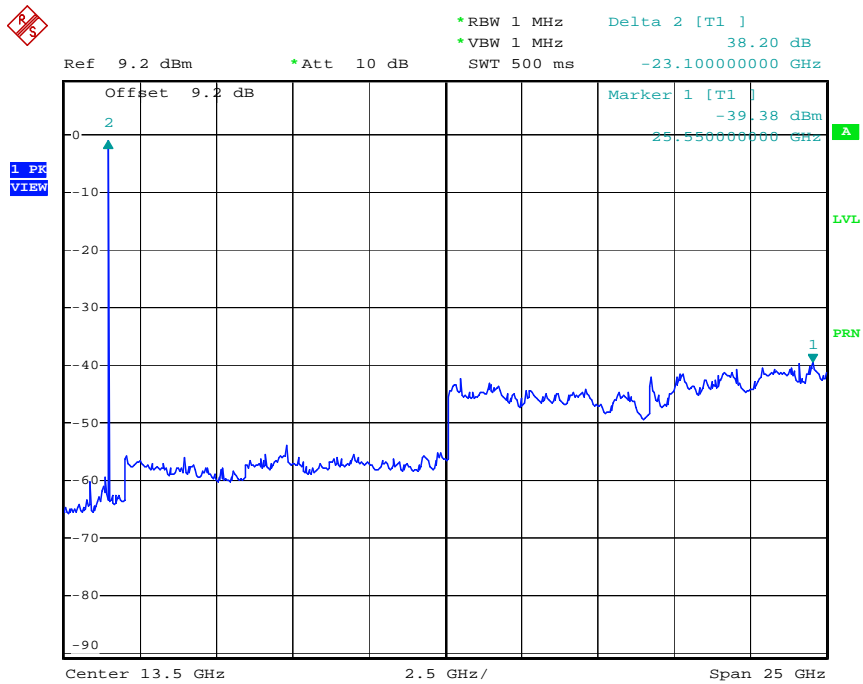


(Mid CH)



Date: 22.MAR.2009 12:20:15

(High CH)



Date: 22.MAR.2009 12:21:00

HCT PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-RF09-0317	Date of Issue: March 25, 2009	EUT Type: Dual-Band Dual-Mode GSM/ WCDMA/ Phone with Bluetooth	FCC ID: JYCC790	Page 3 2 of 47



7.6.2 Radiated Spurious Emissions

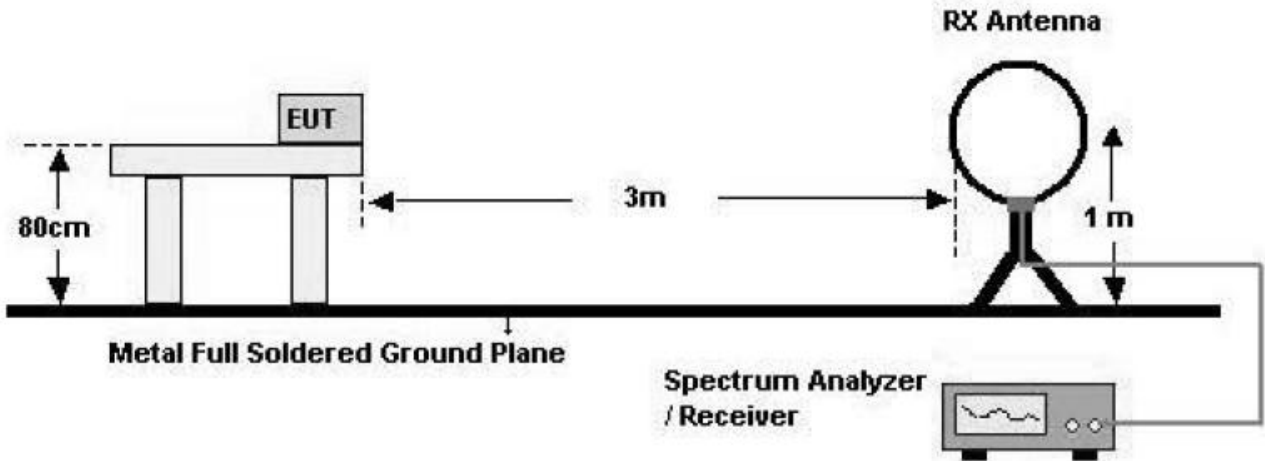
LIMIT

1. 20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed

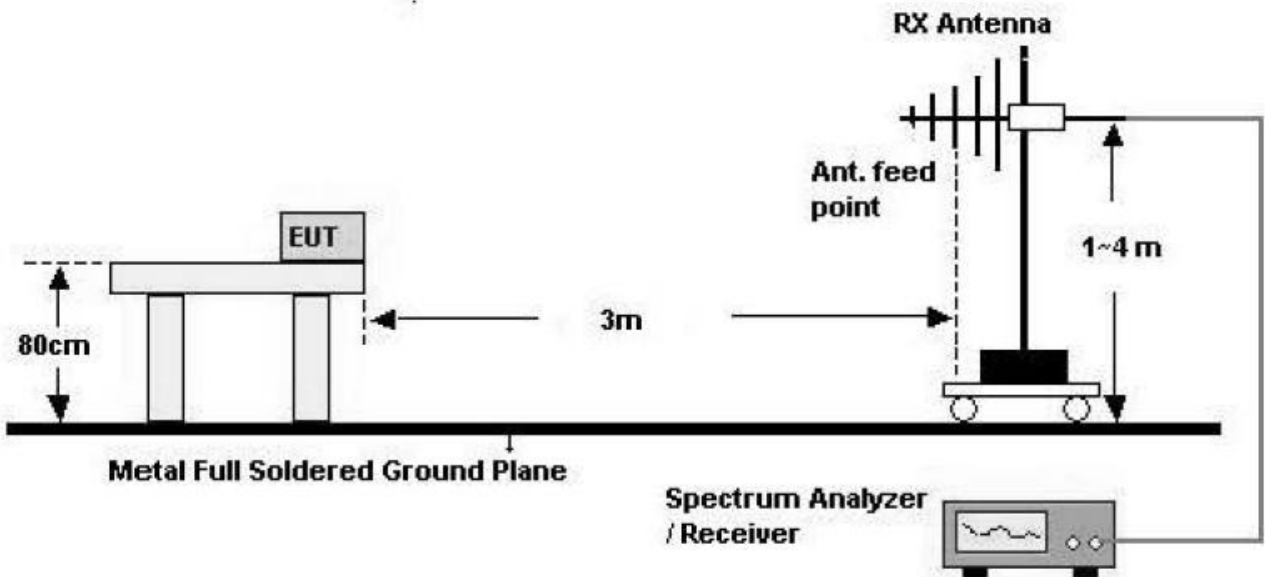
Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

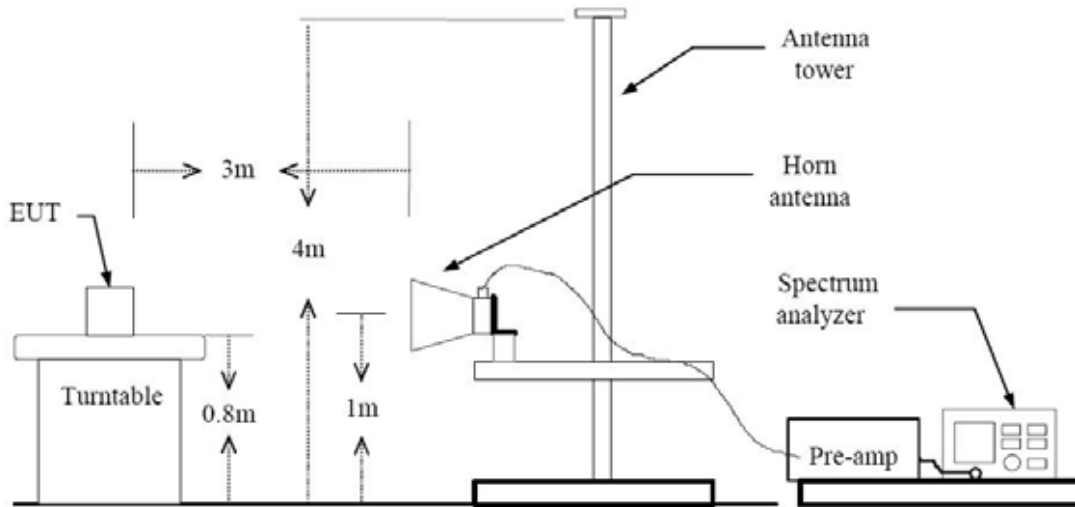
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.



TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Link

Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB)
4. Limit line = specific Limits (dBuV) + Distance extrapolation factor

HCT PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT			www.hct.co.kr
Test Report No. HCT-RF09-0317	Date of Issue: March 25, 2009	EUT Type: Dual-Band Dual-Mode GSM/ WCDMA/ Phone with Bluetooth	FCC ID: JYCC790	Page 3 6 of 47



TEST RESULTS

Below 1 GHz

Operation Mode: Normal Link

Frequency	Reading	Ant. Factor	Cable Loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
184.2	13.6	11.2	3.2	V	28.0	43.5	15.5
326.3	23.3	13.6	4.3	H	41.2	46.0	4.8
441.6	18.0	16.4	4.9	H	39.3	46.0	6.7
480.0	12.7	17.0	5.2	V	34.9	46.0	11.1
480.0	15.0	17.0	5.2	H	37.2	46.0	8.8

Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.



Above 1 GHz

Operation Mode: CH Low (Normal)

Frequency [MHz]	Reading dBuV	AN.+CL-AMP GAIN. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4804	47.15	-4.79	V	42.36	74	31.64	PK
4804	34.88	-4.79	V	30.09	54	23.91	AV
7206	48.82	1.21	V	50.03	74	23.97	PK
7206	35.65	1.21	V	36.86	54	17.14	AV
4804	46.96	-4.79	H	42.17	74	31.83	PK
4804	33.78	-4.79	H	28.99	54	25.01	AV
7206	49.02	1.21	H	50.23	74	23.77	PK
7206	36.23	1.21	H	37.44	54	16.56	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.



Operation Mode: CH Mid (Normal)

Frequency [MHz]	Reading dBuV	AN.+CL-AMP GAIN. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4882	48.64	-4.61	V	44.03	74	29.97	PK
4882	36.07	-4.61	V	31.46	54	22.54	AV
7323	49.97	1.62	V	51.59	74	22.41	PK
7323	37.13	1.62	V	38.75	54	15.25	AV
4882	47.48	-4.61	H	42.87	74	31.13	PK
4882	34.40	-4.61	H	29.79	54	24.21	AV
7323	50.39	1.62	H	52.01	74	21.99	PK
7323	37.04	1.62	H	38.66	54	15.34	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.



Operation Mode: CH High (Normal)

Frequency [MHz]	Reading dBuV	AN.+CL-AMP GAIN. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4960	48.81	-4.42	V	44.39	74	29.61	PK
4960	36.38	-4.42	V	31.96	54	22.04	AV
7440	49.83	2.04	V	51.87	74	22.13	PK
7440	37.13	2.04	V	39.17	54	14.83	AV
4960	47.40	-4.42	H	42.98	74	31.02	PK
4960	34.56	-4.42	H	30.14	54	23.86	AV
7440	50.02	2.04	H	52.06	74	21.94	PK
7440	37.12	2.04	H	39.16	54	14.84	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MH.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.



7.6.3 Radiated Restricted Band Edge Measurements

Test Requirements and limit, §15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a) (See section 15.205(c)).

Operation Mode:	8DPSK
Operating Frequency	2402, 2480 MHz
Channel No.	0, 78 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2319.92	47.77	-10.46	H	37.31	74	36.69	PK
2319.92	34.97	-10.46	H	24.51	54	29.49	AV
2328.56	48.13	-10.42	V	37.71	74	36.29	PK
2328.56	34.76	-10.42	V	24.34	54	29.66	AV
2495.35	47.13	-9.71	H	37.42	74	36.58	PK
2495.35	34.79	-9.71	H	25.08	54	28.92	AV
2495.45	47.45	-9.71	V	37.74	74	36.26	PK
2495.45	34.76	-9.71	V	25.05	54	28.95	AV

Notes:

1. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.



7.7 POWERLINE CONDUCTED EMISSIONS

LIMIT

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolt (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.



Test Plot

Conducted emissions (Line 1 / Mid CH)

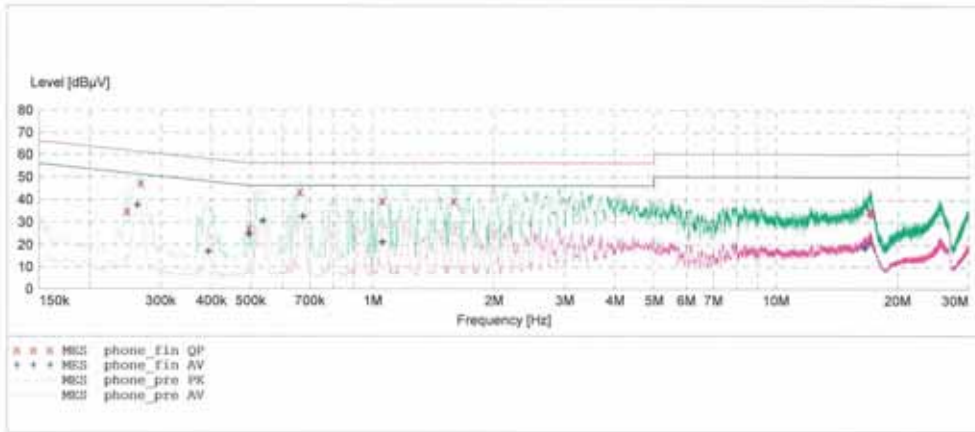
HCT

EMC TEST LAB.

EUT: C790
 Manufacturer: Pantech
 Operating Condition: Bluetooth Mode
 Test Site: SHIELD ROOM
 Operator: YH, LEE
 Test Specification: CISPR 22 CLASS B
 Comment: H

SCAN TABLE: "CISPR 22 Voltage"

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.1 kHz	500.0 kHz	2.5 kHz	MaxPeak	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	4.0 kHz	Average	10.0 ms	9 kHz	None
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "phone_fin QP"

3/18/2009 4:43PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.247600	34.90	10.1	62	27.0	---	---
0.267600	47.30	10.1	61	13.9	---	---
0.495100	27.20	10.2	56	28.9	---	---
0.660000	43.30	10.2	56	12.7	---	---
1.056000	39.50	10.2	56	16.5	---	---
1.588000	39.50	10.3	56	16.5	---	---
17.012000	35.00	12.2	60	25.0	---	---
17.168000	34.90	12.2	60	25.1	---	---
17.268000	33.70	12.2	60	26.3	---	---

MEASUREMENT RESULT: "phone_fin AV"

3/18/2009 4:43PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.262600	37.70	10.1	51	13.6	---	---
0.392600	17.00	10.1	48	31.0	---	---
0.495100	24.70	10.2	46	21.3	---	---

MEASUREMENT RESULT: "phone_fin AV"

(continued)

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.536000	30.70	10.2	46	15.3	---	---
0.672000	32.70	10.2	46	13.3	---	---
1.056000	21.20	10.2	46	24.8	---	---
16.508000	19.00	12.1	50	31.0	---	---
16.588000	18.80	12.1	50	31.2	---	---
17.044000	20.90	12.2	50	29.1	---	---



Conducted emissions (Line 2 / Mid CH)

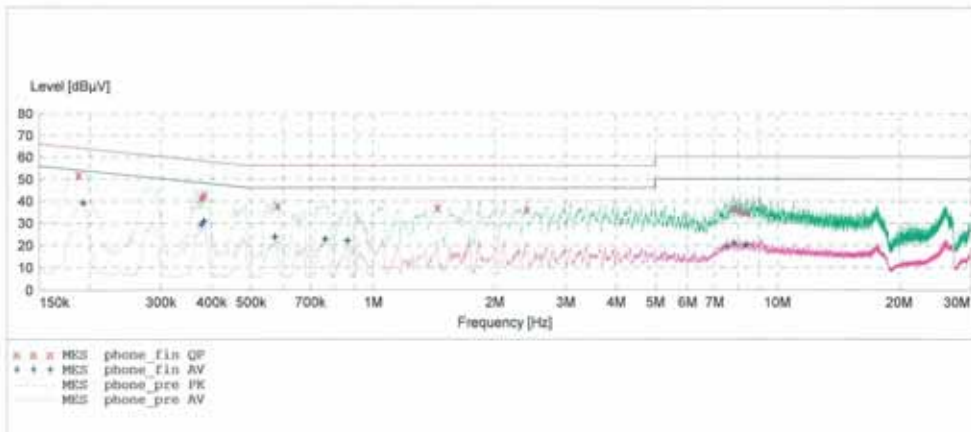
HCT

EMC TEST LAB.

EUT: C790
 Manufacturer: Pantech
 Operating Condition: Bluetooth Mode
 Test Site: SHIELD ROOM
 Operator: YH, LEE
 Test Specification: CISPR 22 CLASS B
 Comment: N

SCAN TABLE: "CISPR 22 Voltage"

Short Description:		CISPR 22 Voltage					Transducer
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.		
150.1 kHz	500.0 kHz	2.5 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None	
			Average				
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None	



MEASUREMENT RESULT: "phone_fin QP"

3/18/2009 9:34AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.187600	51.80	10.1	64	12.4	---	---
0.377600	41.70	10.1	58	16.7	---	---
0.382600	42.80	10.1	58	15.5	---	---
0.580000	37.90	10.2	56	18.1	---	---
1.444000	37.20	10.3	56	18.8	---	---
2.404000	36.40	10.4	56	19.6	---	---
7.796000	36.80	11.0	60	23.2	---	---
8.088000	35.60	11.0	60	24.4	---	---
8.372000	35.00	11.1	60	25.0	---	---

MEASUREMENT RESULT: "phone_fin AV"

3/18/2009 9:34AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.192600	39.10	10.1	54	14.8	---	---
0.377600	29.50	10.1	48	18.8	---	---
0.382600	30.90	10.1	48	17.4	---	---

MEASUREMENT RESULT: "phone_fin AV"

(continued)

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.572000	23.80	10.2	46	22.2	---	---
0.760000	22.80	10.2	46	23.2	---	---
0.864000	22.00	10.2	46	24.0	---	---
7.516000	19.60	11.0	50	30.4	---	---
7.800000	21.10	11.0	50	28.9	---	---
8.372000	20.50	11.1	50	29.5	---	---



8. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Cal Interval	Calibration Due	Serial No.
Rohde & Schwarz	ESH2-Z5/ LISN	Annual	04/20/2009	861741/013
Rohde & Schwarz	ESH3-Z6/ LISN	Annual	06/13/2009	100329
Schwarzbeck	VULB 9160/ TRILOG Antenna	Biennial	12/18/2010	9160-3150
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12
Rohde & Schwarz	ESH3-Z2/ PULSE LIMITER	Annual	10/30/2009	375.8810.352
MITEQ	AMF-60-0010 1800-35-20P	Annual	05/20/2009	1200937
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	03/26/2010	147
Rohde & Schwarz	6502/Loop Antenna	Biennial	12/26/2009	9009-2536
Rohde & Schwarz	FSP30/Spectrum Analyzer	Annual	07/31/2009	839117/011
Agilent	E4416A /Power Meter	Annual	01/21/2010	GB41291412
Wainwright Instrument	WHF3.3/18G-10EF / High Pass Filter	Annual	06/28/2009	1
Hewlett Packard	11636B/Power Divider	Annual	12/24/2009	11377
DIGITAL	EP-3010 /DC POWER SUPPLY	Annual	01/07/2010	3110117