

HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.



PRODUCT COMPLIANCE DIVISION
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CERTIFICATE OF COMPLIANCE

FCC PART 15.247 Certification

Applicant Name:
PANTECH&CURITEL COMMUNICATION, INC.
110-1, ONGJEONG-RI, TONGJIN-EUP,
GIMPO-SI, GYOUNGGI-DO, 415-865, KOREA

Date of Testing: July 2, 2007
Test Site/Location:
HCT, San 136-1 Ami-ri, Bubal-eup, Icheon-si,
Kyungki-do, Korea
Test Report No.: HCT-R07-025

FCC ID: PP4L1

APPLICANT: PANTECH&CURITEL COMMUNICATION, INC.

EUT Type: Dual- Band CDMA Phone with Bluetooth - Prototype
Frequency range: 2402 - 2480 MHz (Bluetooth)
Max. RF Output Power: 0.00075 W Bluetooth (- 1.24 dBm)
Trade Name/Model(s): PANTECH&CURITEL COMMUNICATION, INC. / L1
FCC Classification: FCC Part 15 Frequency Hopping Spread Spectrum Transceiver
Application Type: Class II Permissive Change
FCC Rule Part(s): Part 15 subpart C 15.247
Antenna Specifications: Manufacturer: AMOTECH Co., Ltd.
PART NUMBER: AMAN542012PC07 (Dielectric Chip Antenna)

Engineering Statement:

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch 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. 853(a)

Youn Seok Jung

Report prepared by

: Youn Seok Jung

Test engineer of RF Part

Sang Jun Lee

Approved by

: Sang Jun Lee

Manager of RF Part

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1. GENERAL INFORMATION

Company Name:	PANTECH&CURITEL COMMUNICATIONS, INC.
Address:	110-1, ONGJEONG-RI, TONGJIN-EUP, GIMPO-SI, GYOUNGGI-DO, 415-865, KOREA
Tel. / Fax :	+82-2-2030-1256 / +82-2-2030-2520

- **FCC ID:** PP4L1
- **EUT Type:** Dual- Band CDMA Phone with Bluetooth - Prototype
- **Trade Name:** PANTECH&CURITEL COMMUNICATIONS, INC.
- **Model(s):** L1
- **Frequency range:** 2402 – 2480 MHz (Bluetooth)
- **Application Type:** Class II Permissive Change
- **FCC Classification:** FCC Part 15 Frequency Hopping Spread Spectrum Transceiver
- **FCC Rule Part(s):** Part 15 subpart C 15.247
- **Modulation(s):** GFSK
- **Antenna Type:** Dielectric Chip Antenna
- **Place of Tests:** HCT
Icheon, Kyounki-Do, KOREA
- **Date(s) of Tests:** July 2, 2007
- **Report No.:** HCT-R07-025

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4. (Version :2003) Radiated testing was performed at an antenna to EUT distance 3 meters.

2.1 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.

2.2 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.

2.3 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)

2.4 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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3. 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.

4. FACILITIES AND ACCREDITATIONS

4.1 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)

4.2 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."

5. SETUP OF EQUIPMENT UNDER TEST

5.1 SETUP CONFIGURATION OF EUT

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

6. TEST RESULT

6.1 SUMMARY

Company Name: PANTECH&CURITEL COMMUNICATION, INC.

FCC ID: PP4L1

Method/System: Frequency Hopping Spread Spectrum (FHSS)

Number of Channels: 79

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (Tx)					
15.247(b)(1)	PEAK POWER	< 1 Watt if > 75 non-overlapping channels used	CONDUCTED	PASS	Section 6.2
15.247(d)	BAND EDGES MEASUREMENT	Conducted < 20dBc		PASS	Section 6.3
15.247(a)(1)	FREQUENCY SEPARATION / 20 dB BANDWIDTH	> 2/3 of 20 dB BW for systems with Output Power < 125mW		PASS	Section 6.4
15.247(a)(1)(iii)	NUMBER OF CHANNELS	> 15 Channels		PASS	Section 6.5
15.247(a)(1)(iii)	TIME OF OCCUPANCY	< 0.4 sec in 31.6 sec period		PASS	Section 6.6
15.247(d)	Conducted Spurious Emissions	Conducted < 20dBc		PASS	Section 6.7.1
15.205 15.209	Radiated Spurious Emissions	Radiated < 20dBc Emissions in restricted bands must meet the radiated limits detailed in 15.209 (RSS-210 table 3 limits)	RADIATED	PASS	Section 6.7.2
15.207	AC CONDUCTED EMISSIONS 150kHz – 30MHz	< FCC 15.207 limits or < RSS-Gen table 2 limits	LINE CONDUCTED	PASS	Section 6.8

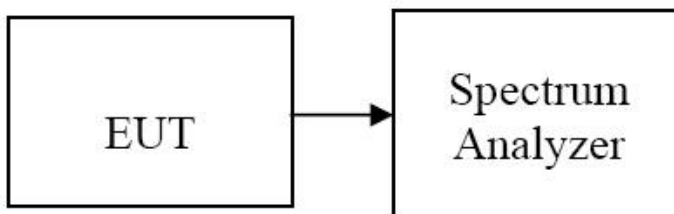
6.2 PEAK POWER

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. The RBW is set to 1MHz. The VBW is set to 3MHz.

TEST RESULTS

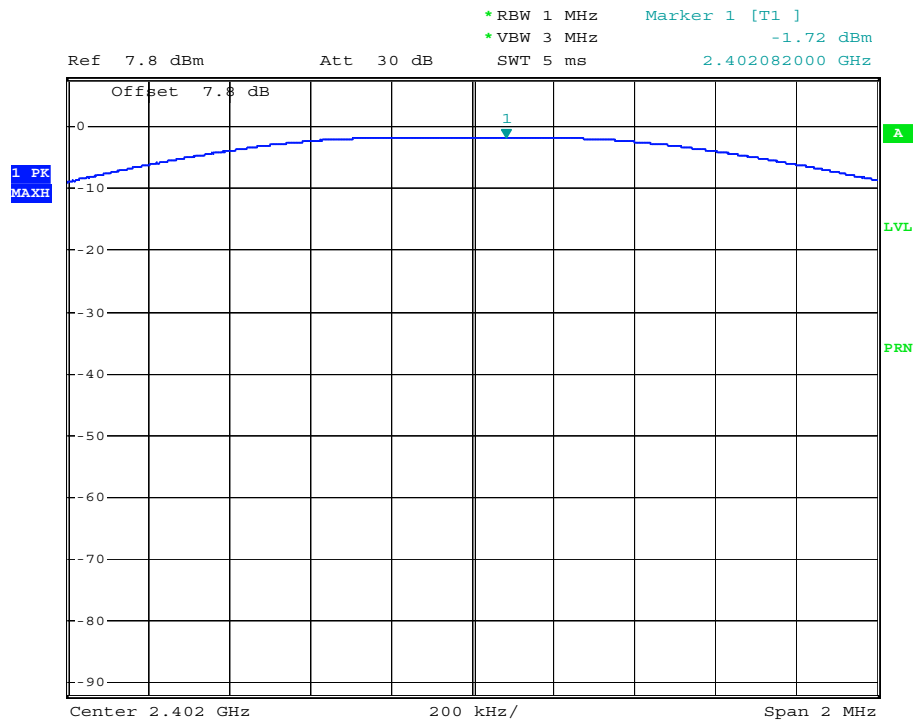
No non-compliance noted

Test Data

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2402	-1.72	0.00067	1	PASS
Mid	2440	-1.35	0.00073		PASS
High	2480	-1.24	0.00075		PASS

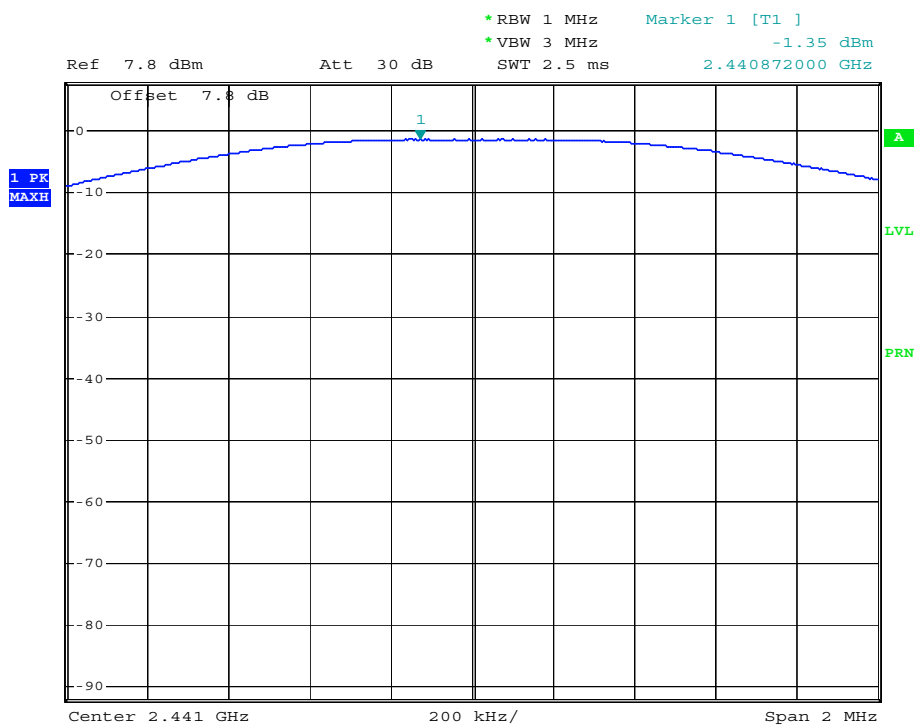
Test Plots

Peak Power (Low CH)



Date: 2.JUL.2007 16:10:31

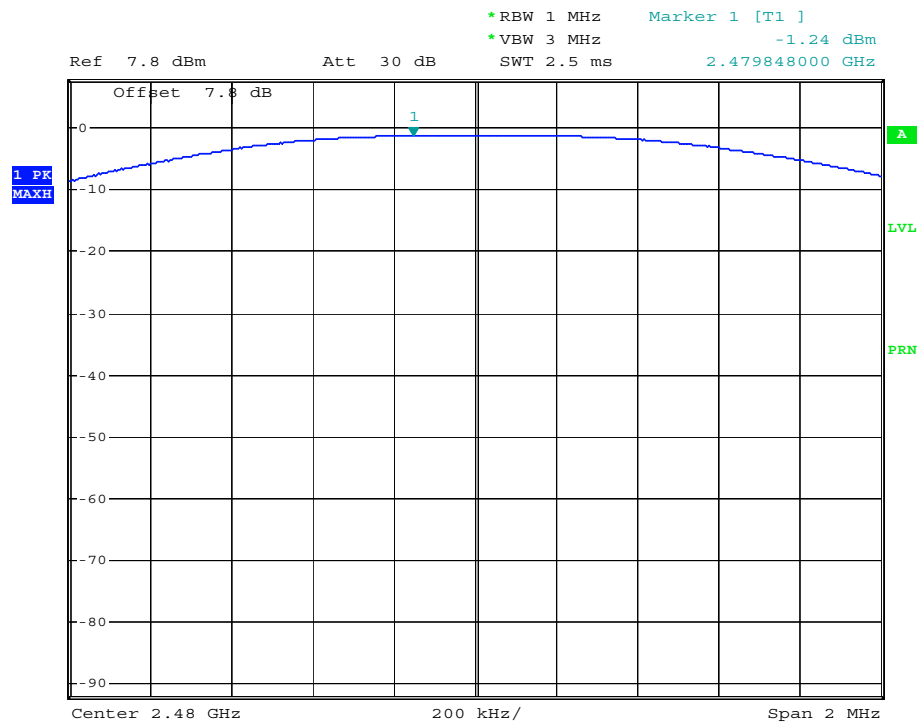
Peak Power (Mid CH)



Date: 2.JUL.2007 14:24:58

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Peak Power (High CH)



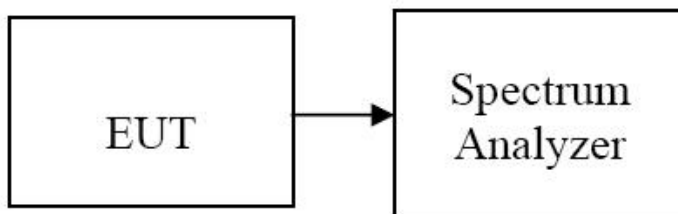
Date: 2.JUL.2007 14:26:49

6.3 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 :

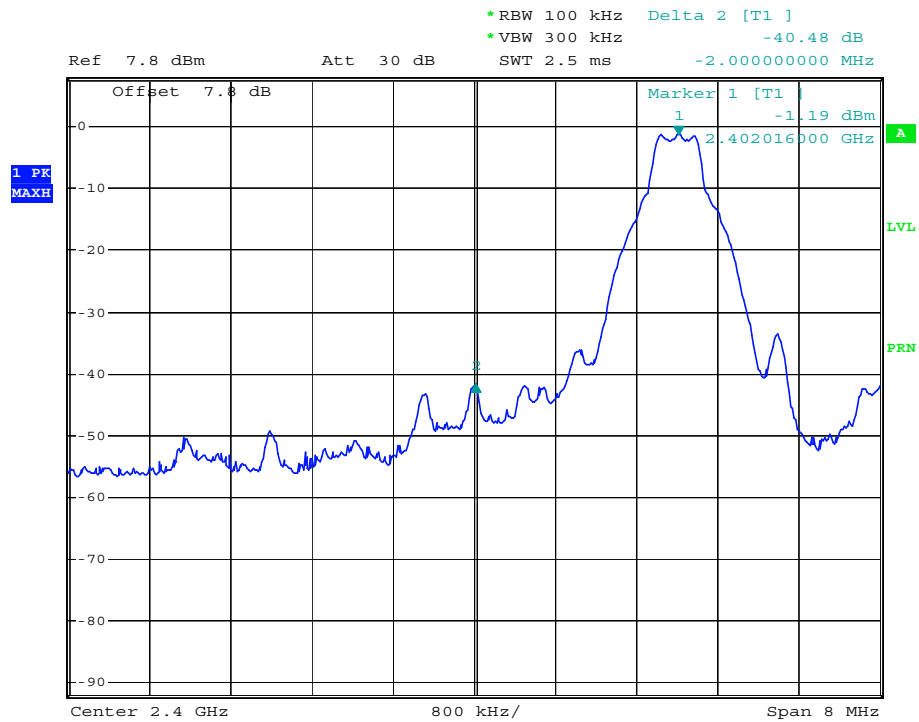
1. Span = 8 MHz
2. RBW = 100 KHz
3. VBW = 300 KHz
4. Sweep = auto

TEST RESULTS

See attached.

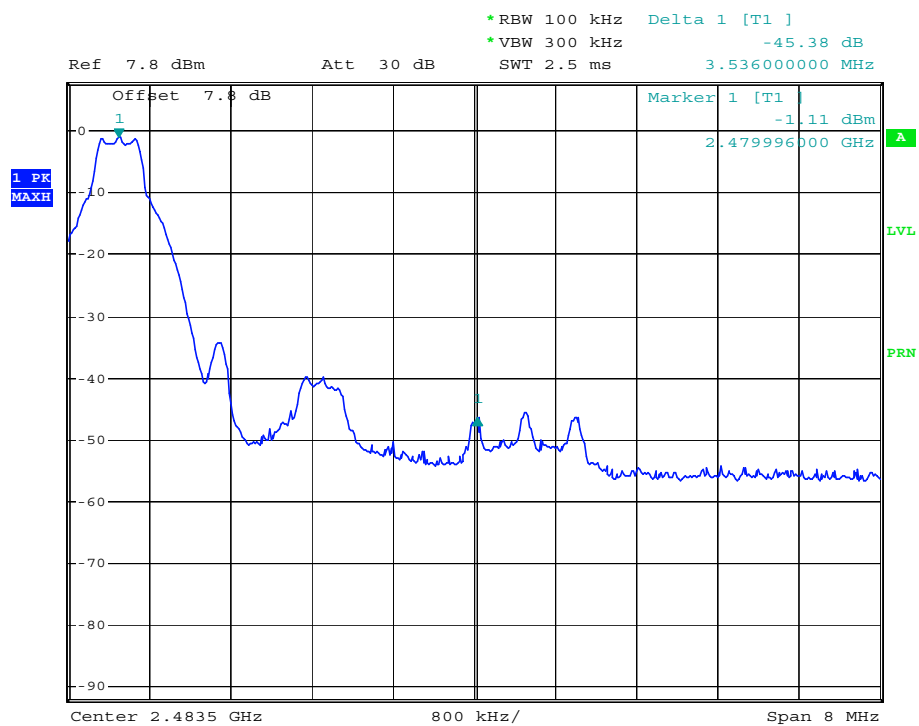
Test Plots

Band Edges (Low CH)



Date: 2.JUL.2007 14:29:52

Band Edges (High CH)



Date: 2.JUL.2007 14:32:27

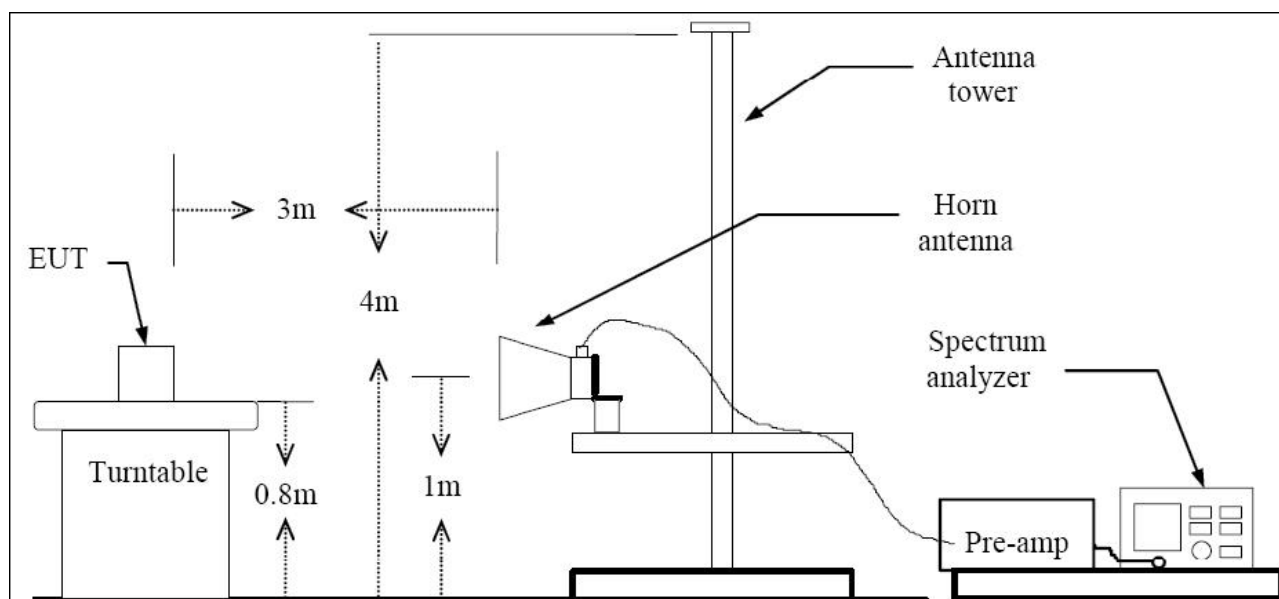
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6.3.1 BAND EDGES MEASUREMENT (Radiated)

LIMIT

According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum 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. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

Test Configuration



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW = VBW = 1 MHz / Sweep = AUTO
 - (b) AVERAGE: RBW = 1 MHz / VBW = 10 Hz / Sweep = AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

TEST RESULTS

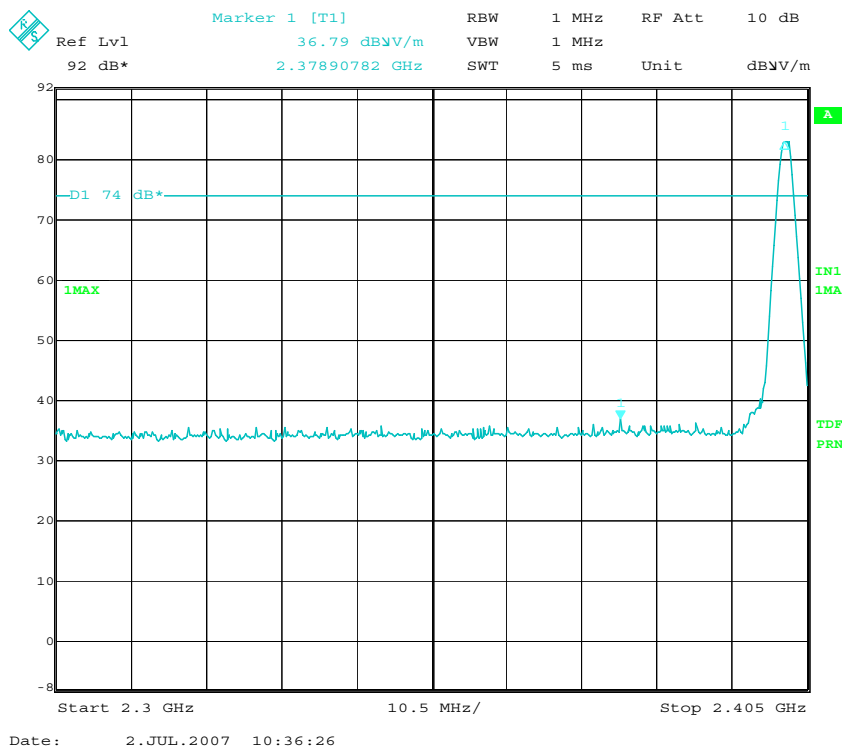
Refer to attach spectrum analyzer data plots.

Test Plots

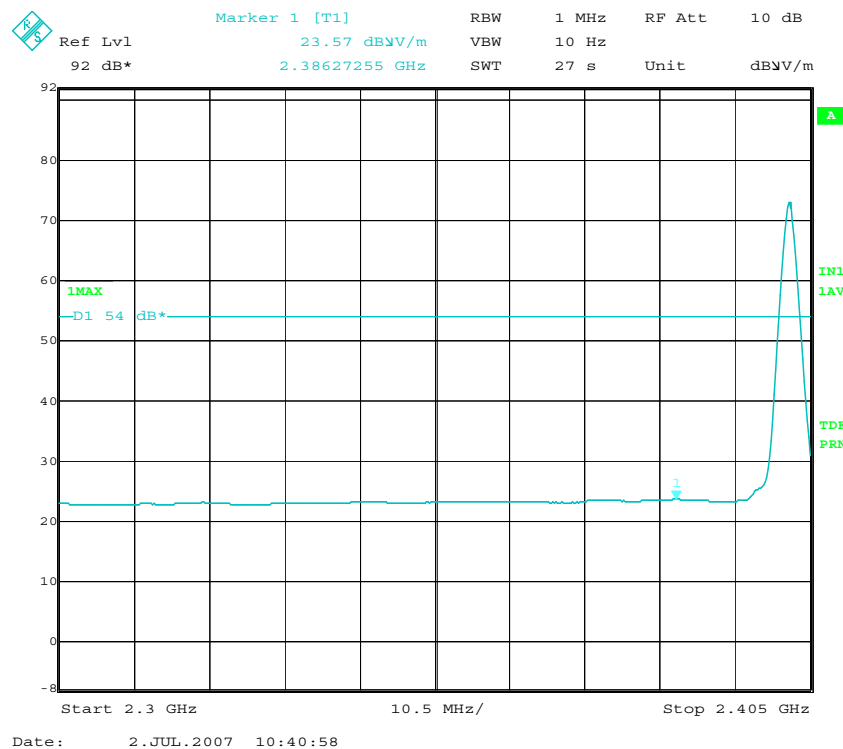
CH: Low

Polarity: Vertical

Detector Mode: Peak



Detector Mode: Average

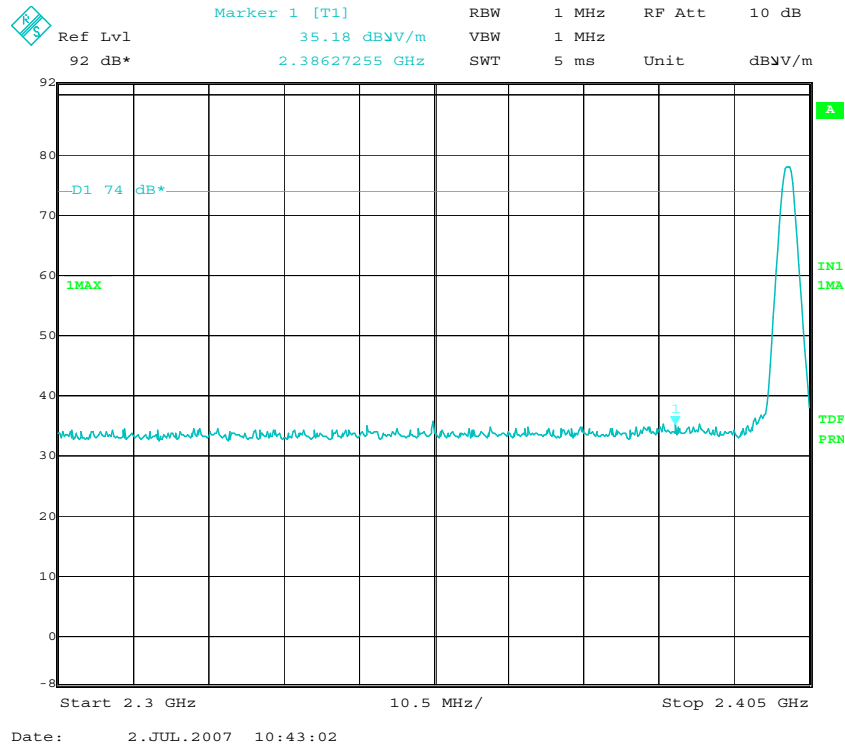


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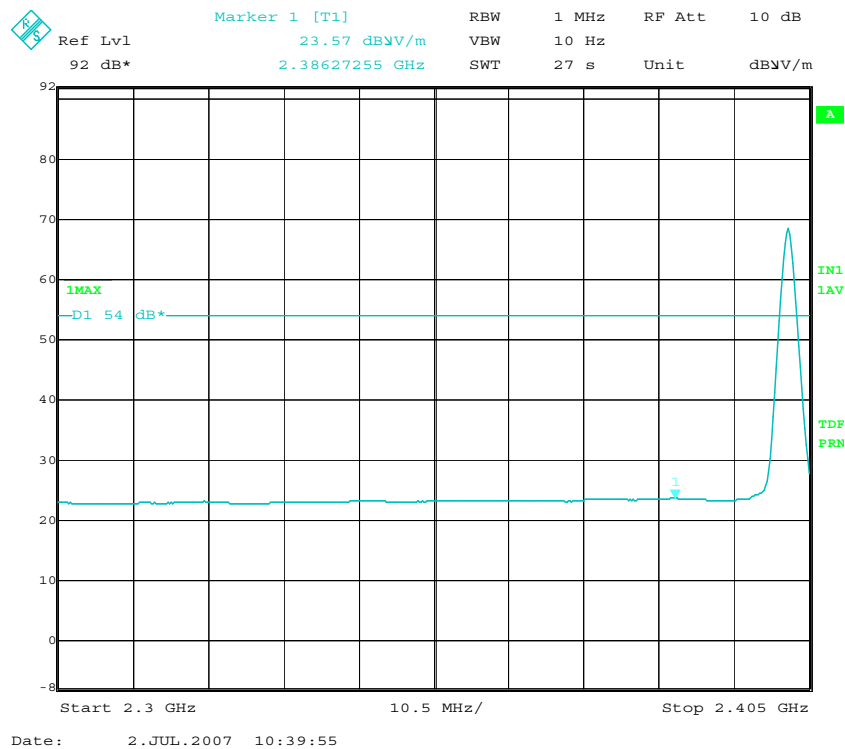
CH: Low

Polarity: Horizontal

Detector Mode: Peak



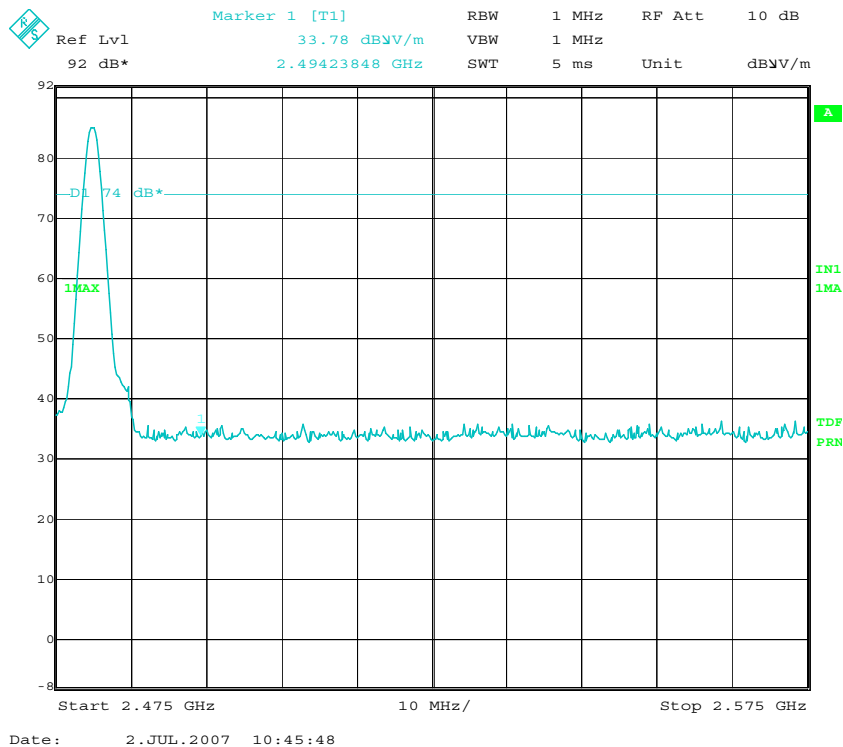
Detector Mode: Average



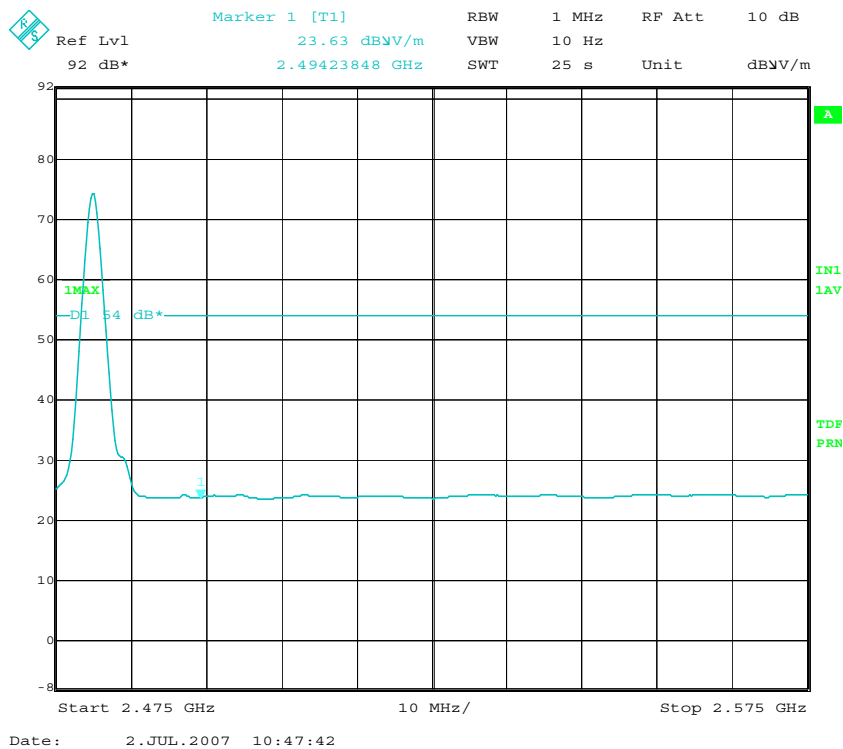
CH: High

Polarity: Vertical

Detector Mode: Peak



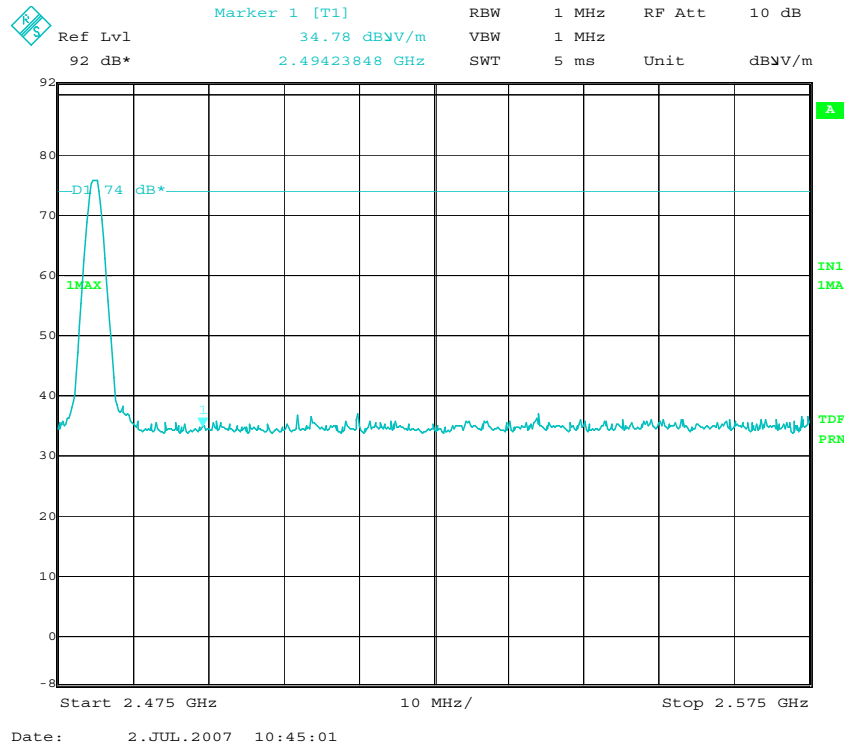
Detector Mode: Average



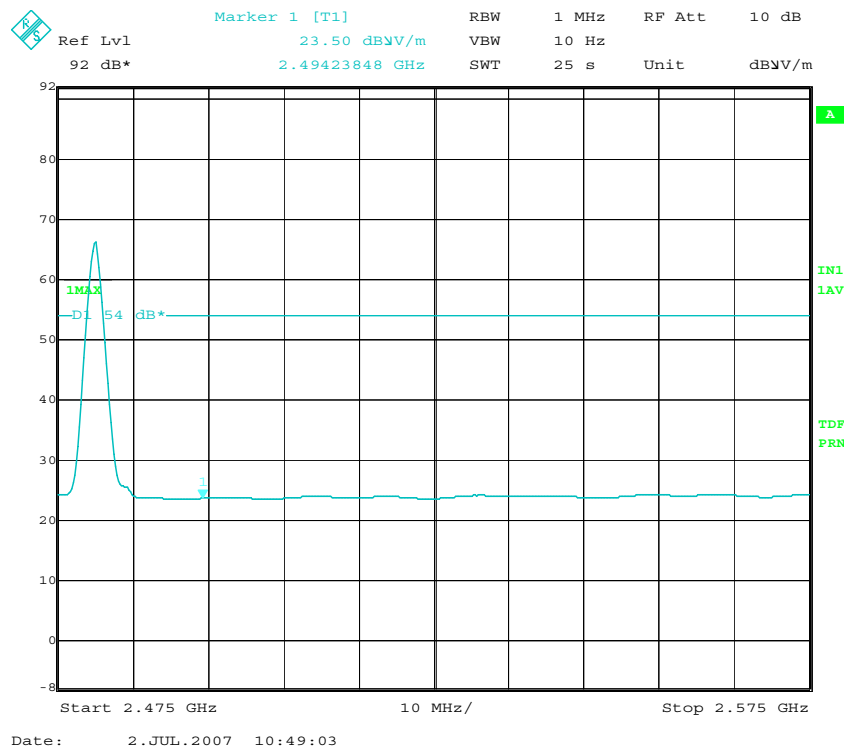
CH: High

Polarity: Horizontal

Detector Mode: Peak



Detector Mode: Average

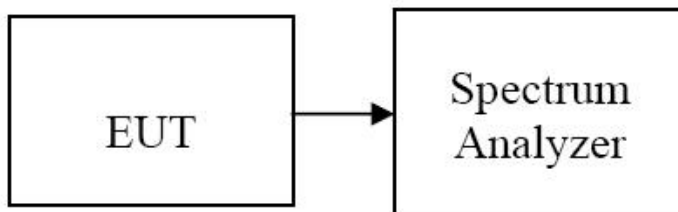


6.4 FREQUENCY SEPARATION

LIMIT

According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25 kHz or 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 = 100 KHz
3. VBW = 300 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.

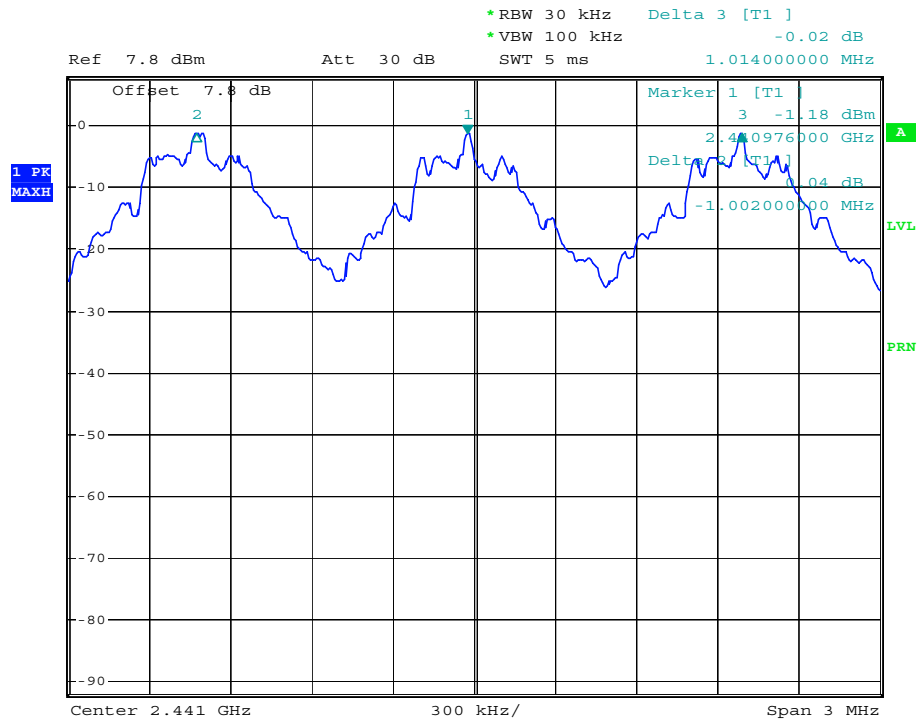
TEST RESULTS

No non-compliance noted

Test Data

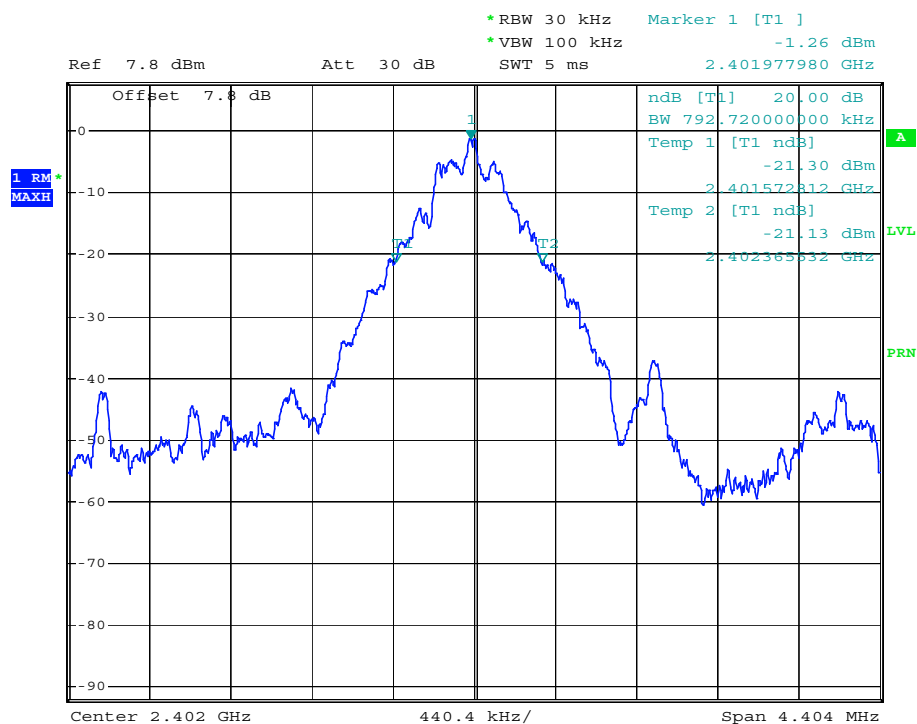
Channel Separation (KHz)	20dB Bandwidth (KHz)		Limit (KHz)	Result
1014	Low CH	792.72	>25	Pass
	Middle CH	792.72		
	High CH	792.72		

Test Plots Measurement of Channel Separation



Date: 2.JUL.2007 14:36:22

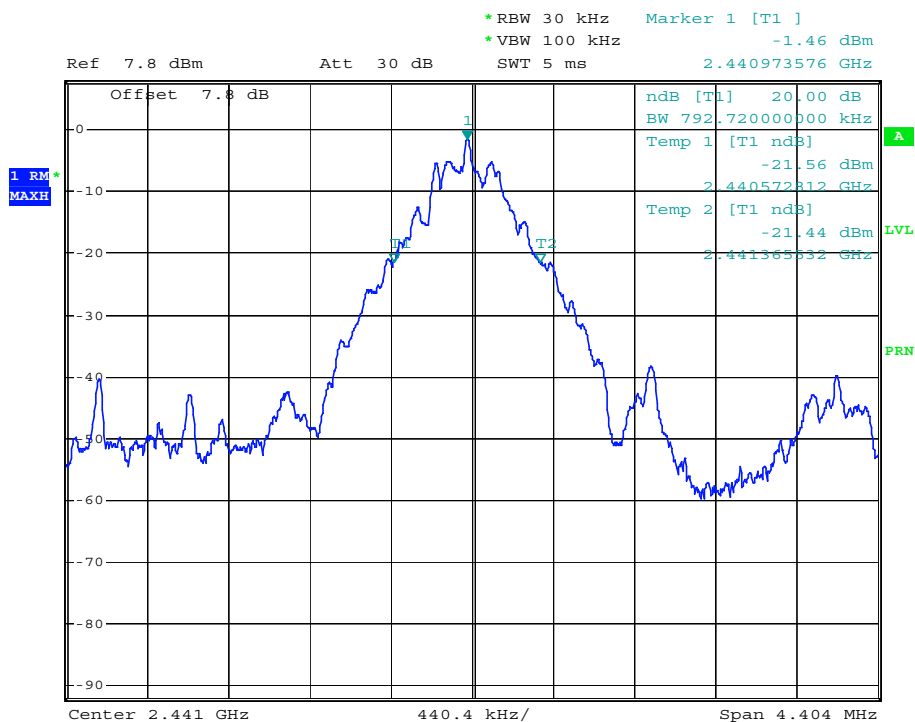
Test Plot 20 dB bandwidth (Low CH)



Date: 2.JUL.2007 15:59:42

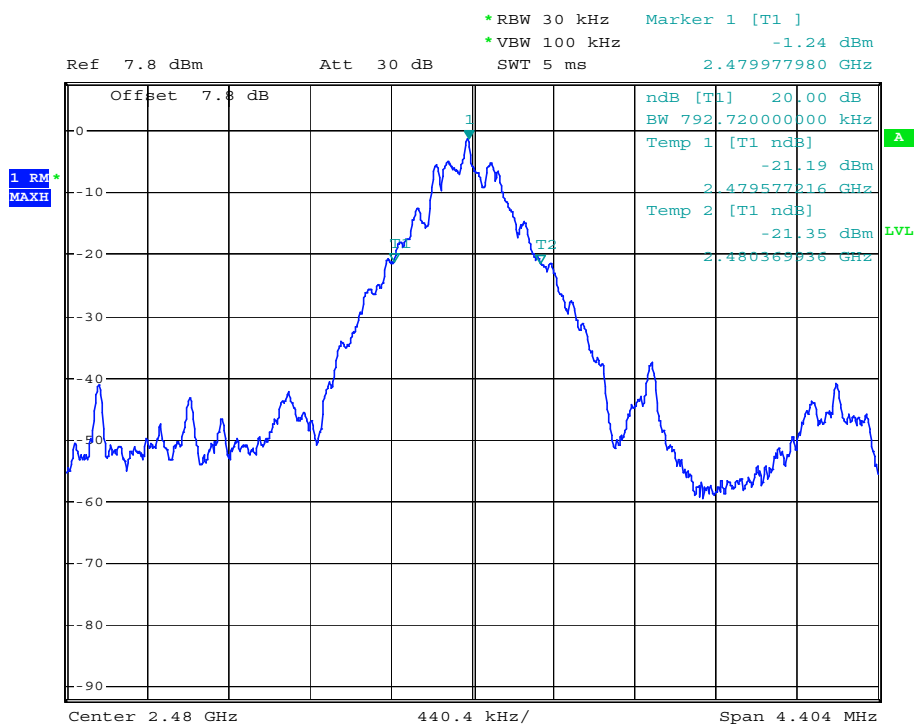
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(Mid CH)



Date: 2.JUL.2007 16:00:42

(High CH)



Date: 2.JUL.2007 16:01:46

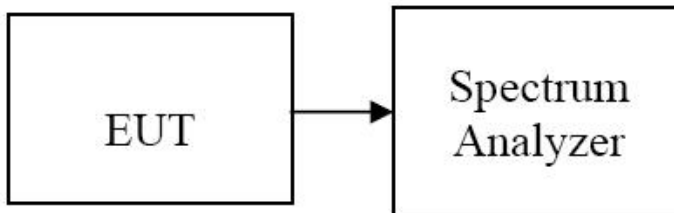
HCT PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT			www.hct.co.kr
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6.5 NUMBER OF HOPPING FREQUENCY

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 = 1 MHz
4. Sweep = auto

The trace was allowed to stabilize.

TEST RESULTS

No non-compliance noted

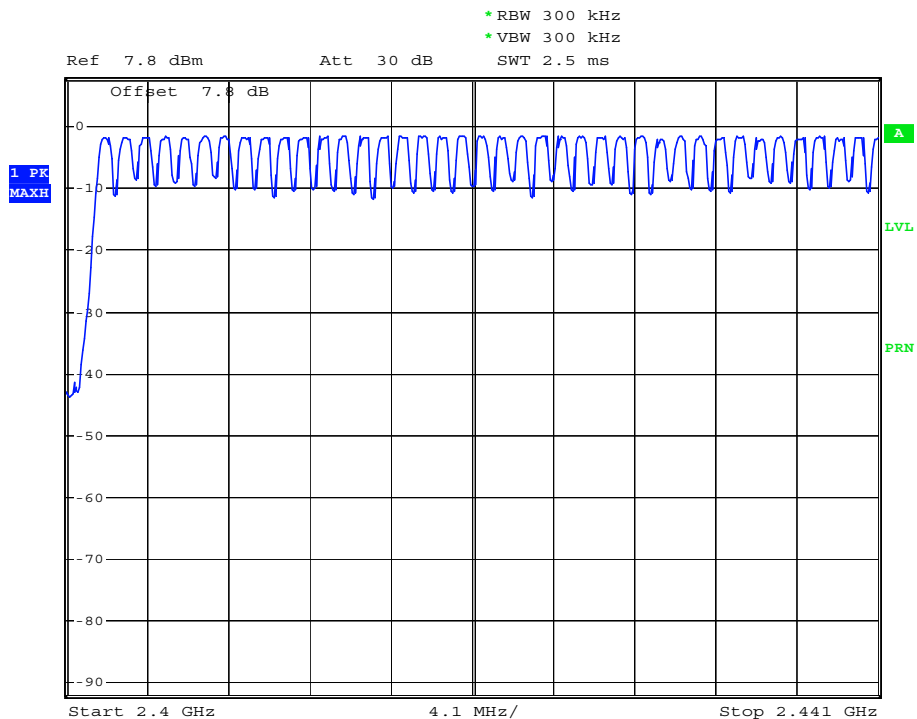
Test Data

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

Test Plot

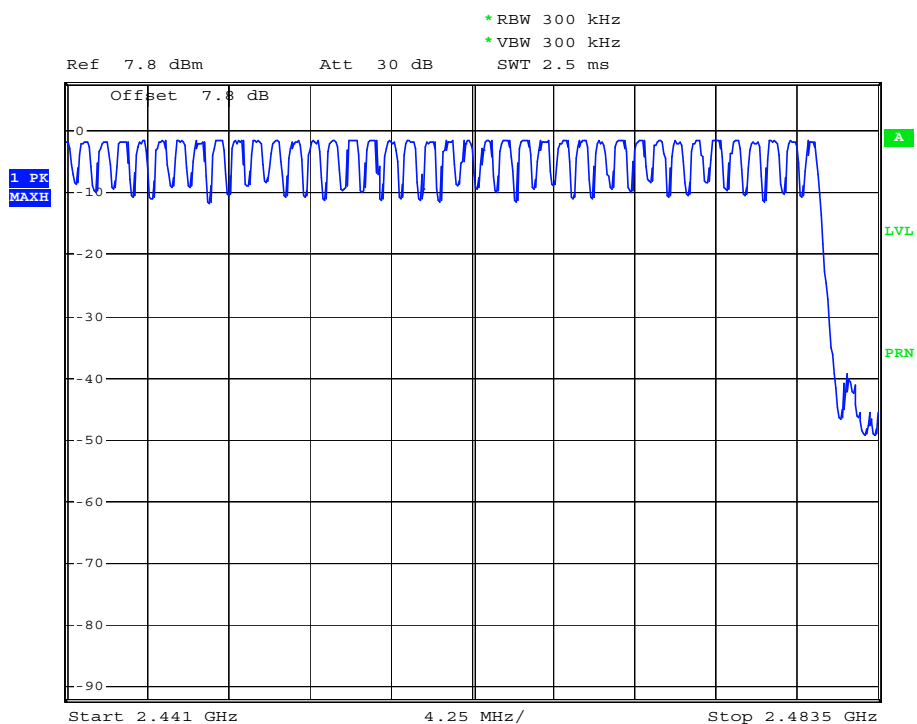
Channel Number

2.4 GHz – 2.441 GHz



Date: 2.JUL.2007 14:38:47

2.441 GHz – 2.483.5 GHz



Date: 2.JUL.2007 14:40:27

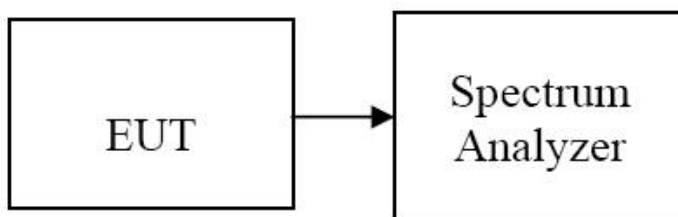
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6.6 TIME OF OCCUPANCY (DWELL TIME)

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 = 3 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

CH Low: $2.920 * (1600/6)/79 * 31.6 = ?$ (ms)

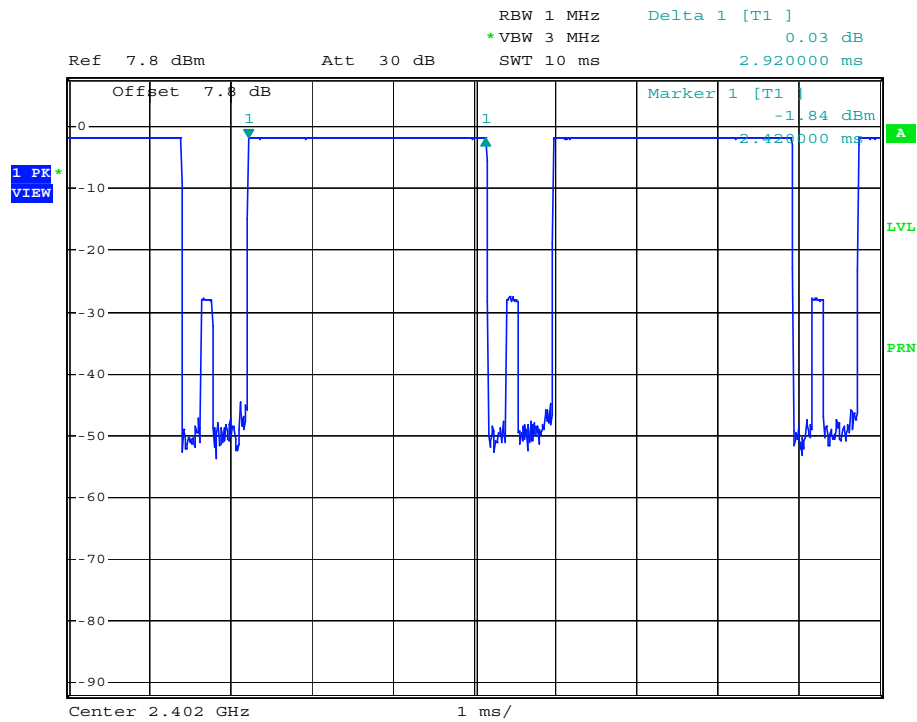
CH Mid: $2.920 * (1600/6)/79 * 31.6 = ?$ (ms)

CH High: $2.920 * (1600/6)/79 * 31.6 = ?$ (ms)

Channel	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
Low	2.920	311.4	31.6	400	PASS
Mid	2.920	311.4	31.6		PASS
High	2.920	311.4	31.6		PASS

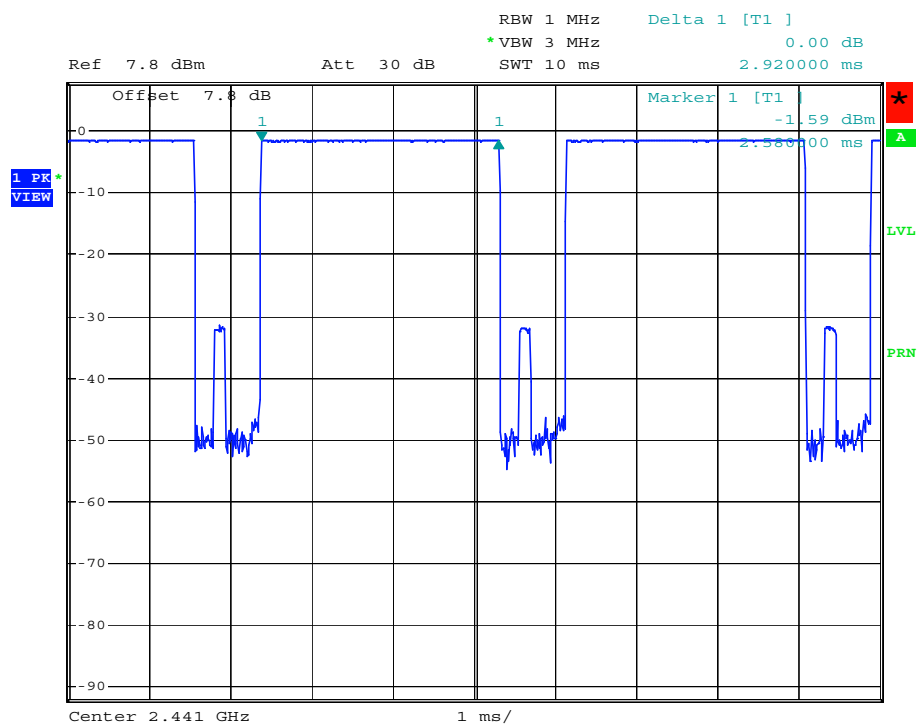
Test Plots

DH 5 (Low CH)



Date: 2.JUL.2007 16:16:10

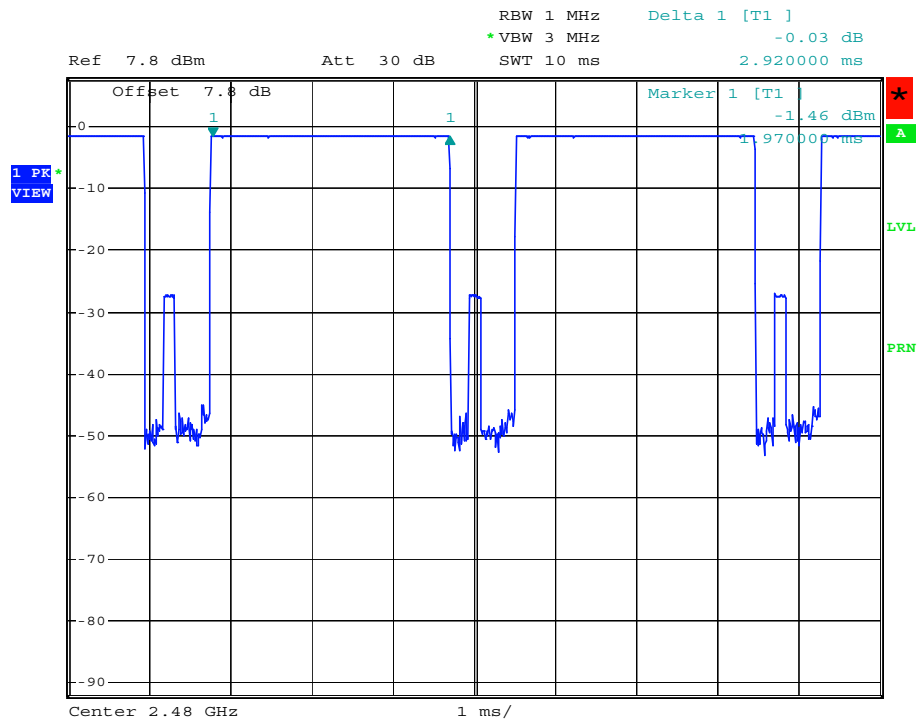
(Mid CH)



Date: 2.JUL.2007 16:23:53

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(CH High)



Date: 2.JUL.2007 16:25:10

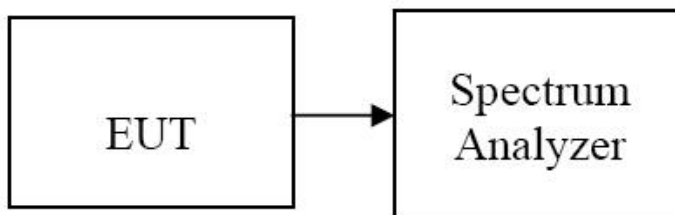
6.7 SPURIOUS EMISSIONS

6.7.1 Conducted Spurious Emissions

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.

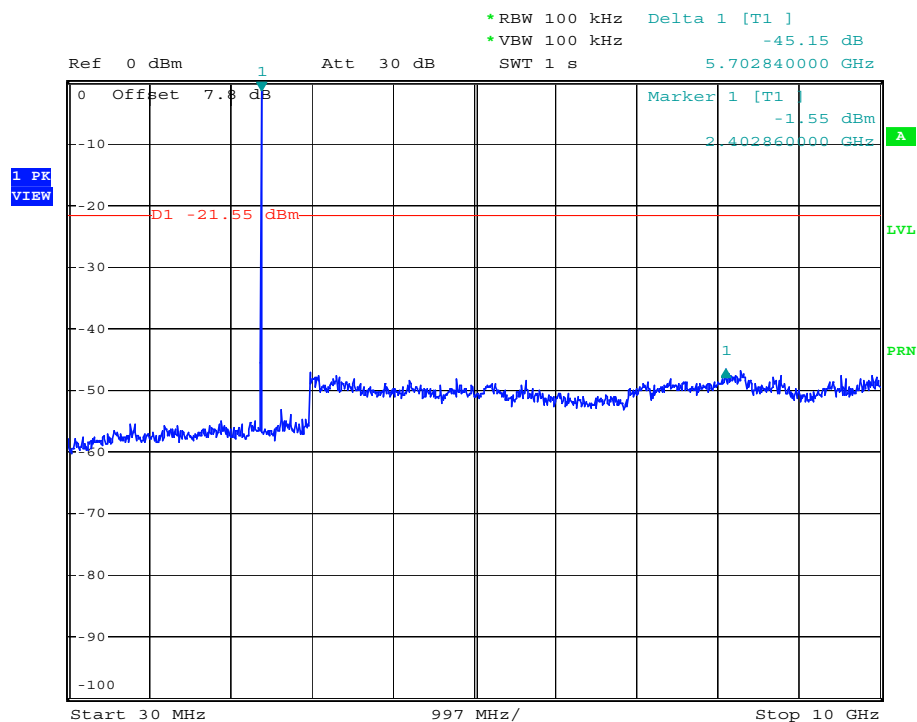
Measurements are made over the 30 MHz to 26 GHz range with the transmitter set to the lowest, middle, and highest channels.

TEST RESULTS

No non-compliance noted

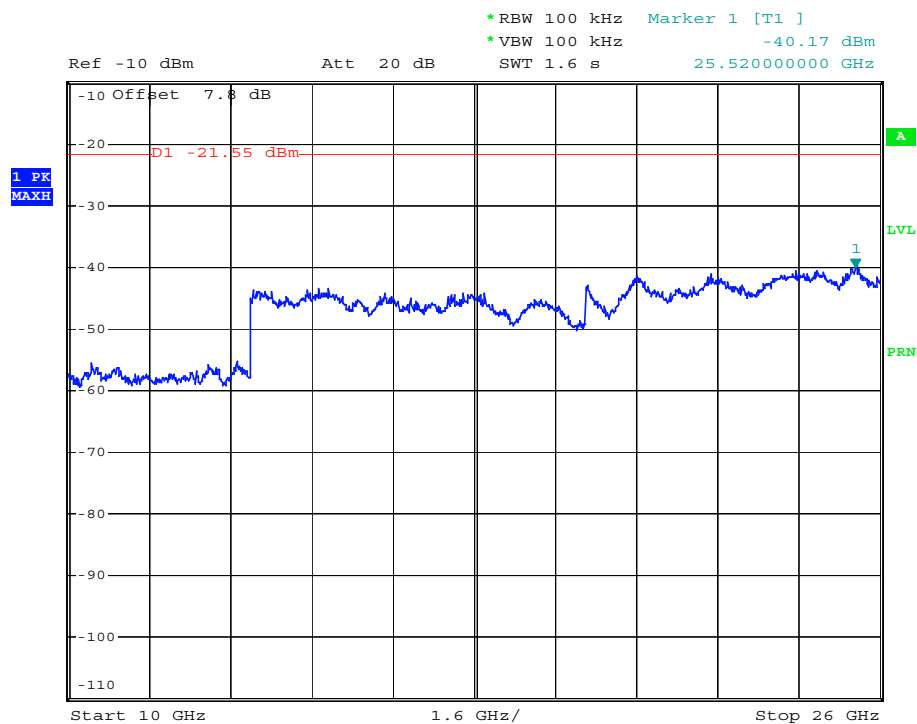
HCT PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT			www.hct.co.kr
Test Report No. HCT-R07-025	Test Dates: July 2, 2007	EUT Type: Dual-Band CDMA Phone with Bluetooth	FCC ID: PP4L1	Page 26 of 43

Test Plots (Low CH)



Date: 2.JUL.2007 16:48:29

(30MHz ~ 10GHz)

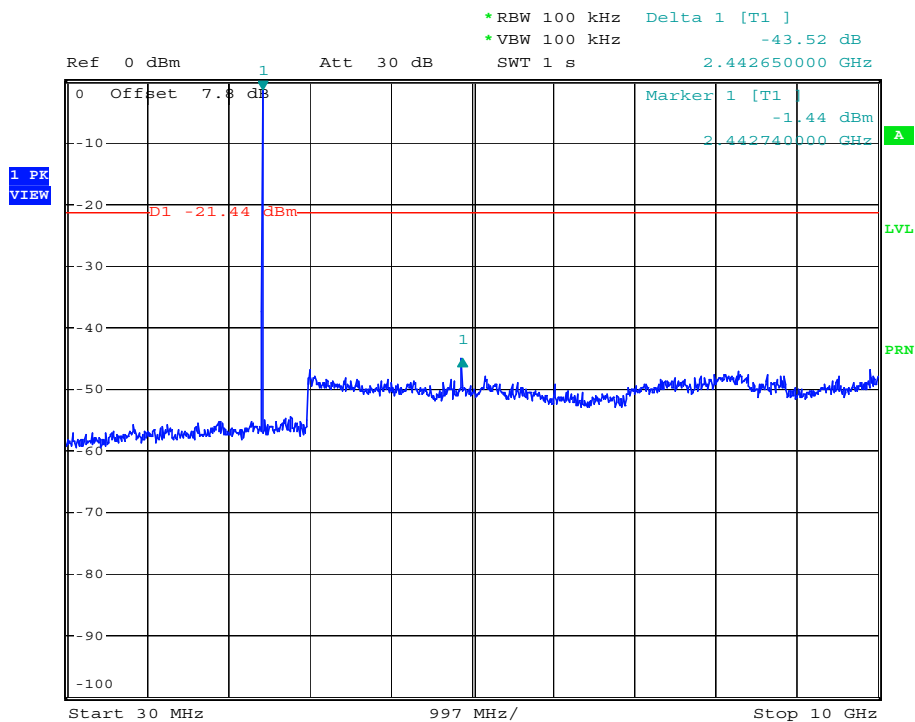


Date: 2.JUL.2007 17:08:27

(10GHz ~ 26GHz)

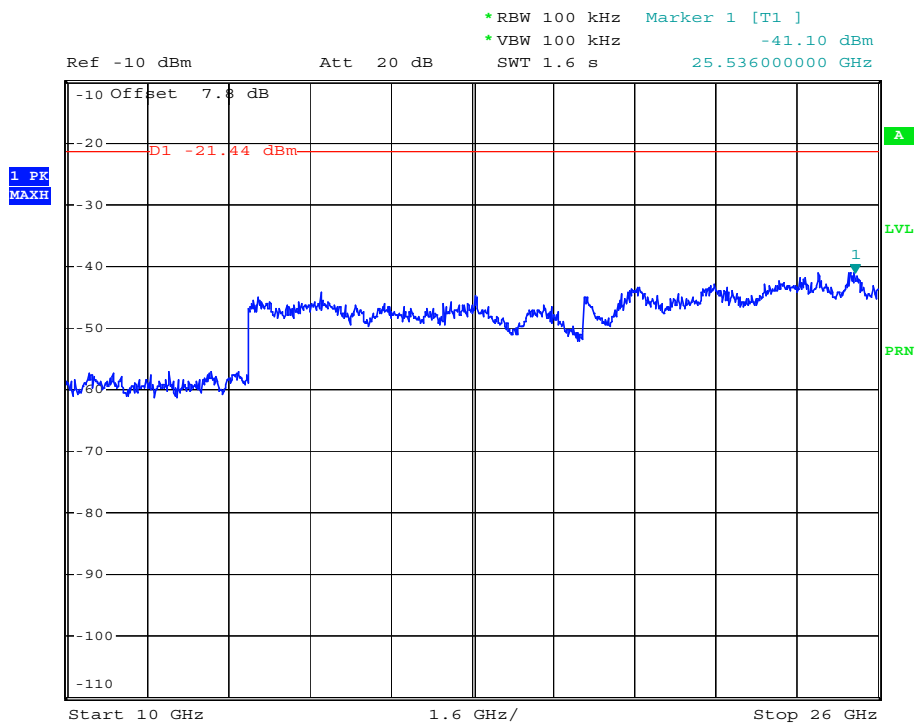
HCT PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT			www.hct.co.kr
Test Report No. HCT-R07-025	Test Dates: July 2, 2007	EUT Type: Dual-Band CDMA Phone with Bluetooth	FCC ID: PP4L1	Page 27 of 43

(Mid CH)



Date: 2.JUL.2007 17:10:33

(30MHz ~ 10GHz)

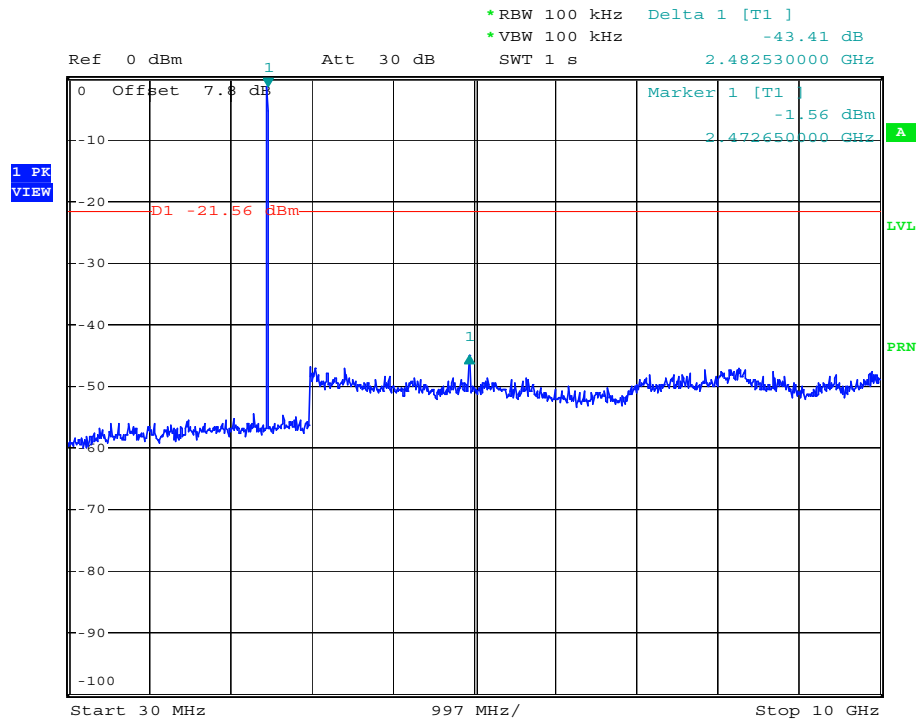


Date: 2.JUL.2007 17:11:53

(10GHz ~ 26GHz)

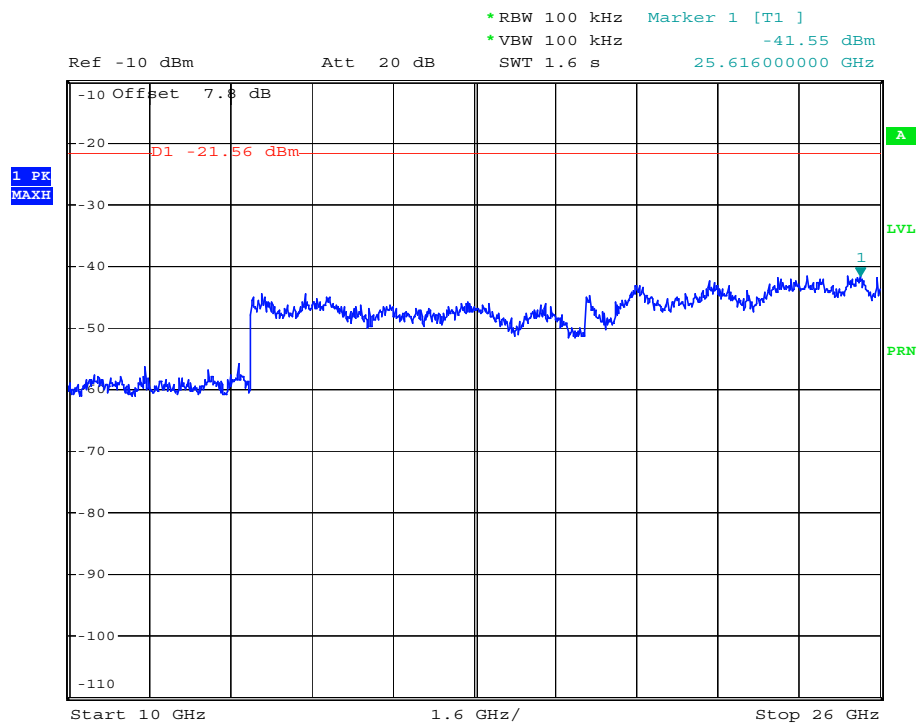
HCT PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT			www.hct.co.kr
Test Report No. HCT-R07-025	Test Dates: July 2, 2007	EUT Type: Dual-Band CDMA Phone with Bluetooth	FCC ID: PP4L1	Page 28 of 43

(High CH)



Date: 2.JUL.2007 16:41:01

(30MHz ~ 10GHz)



Date: 2.JUL.2007 16:42:30

(10GHz ~ 26GHz)

HCT PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT			www.hct.co.kr
Test Report No. HCT-R07-025	Test Dates: July 2, 2007	EUT Type: Dual-Band CDMA Phone with Bluetooth	FCC ID: PP4L1	Page 29 of 43

6.7.2 Radiated Spurious Emissions

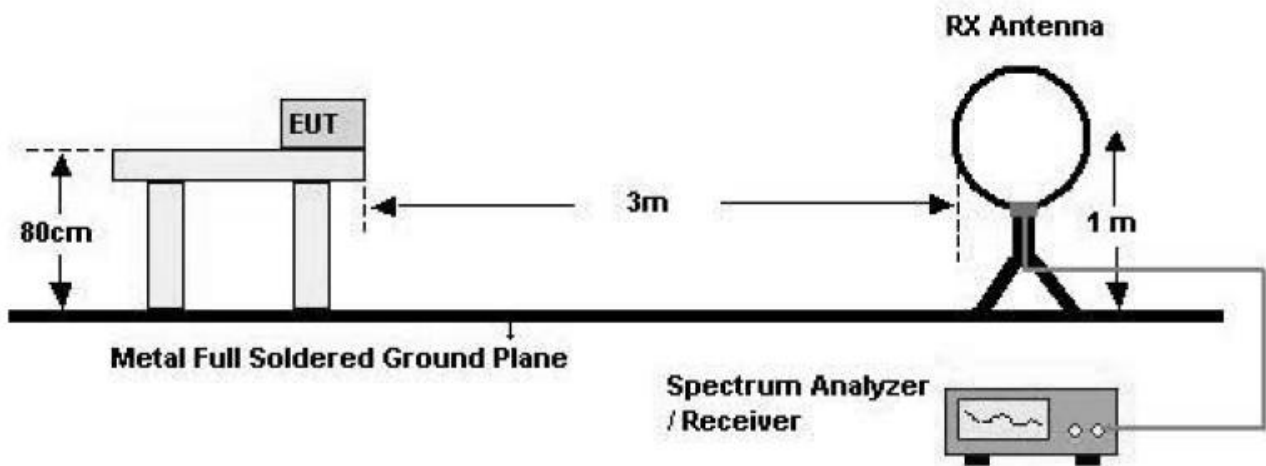
LIMIT

1. 20dBc in any 100kHz 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

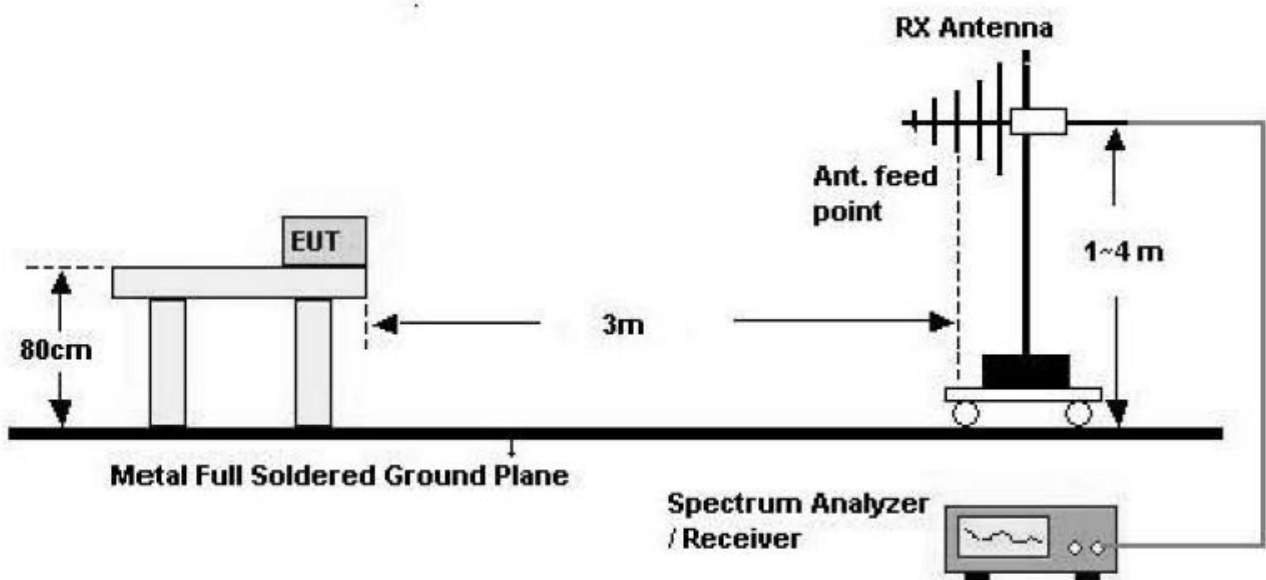
Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(KHz)	300
0.490 – 1.705	24000/F(KHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

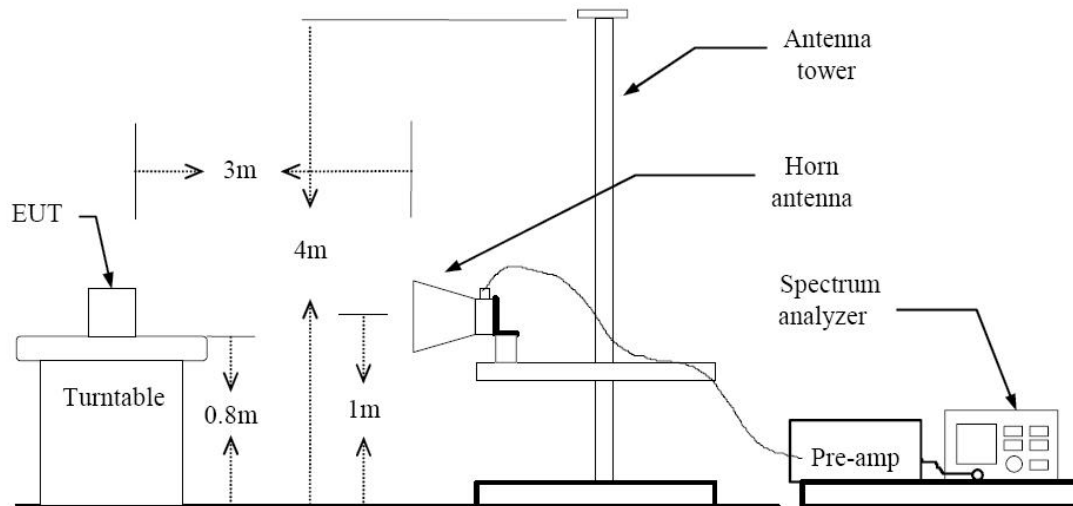
Below 30 MHz



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

TEST RESULTS

Below 1 GHz

Operation Mode: Normal Link

Frequency MHz	Reading dBuV	Ant. Factor dB	Cable Loss dB	ANT POL (H/V)	Field Strength dBuV/m	Limit dBuV/m	Margin dB
37.5	11.81	12.55	1.54	V	25.90	40	14.10
54.2	9.56	12.16	1.67	V	23.39	40	16.61
189.6	16.3	16.1	3.1	V	35.4	43.5	8.1
137.0	15.98	12.19	2.77	H	30.94	43.5	12.56

Notes:

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

Above 1 GHz

Operation Mode: CH Low

Frequency [MHz]	Level [dBuV]	AN. CL. [dB]	ANT. POL [H/V]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4804	-129.06	34.9	V	56.96	74	17.04	PK
4804	-118.71	34.9	V	46.61	54	7.39	AV
9608	-114.77	44.08	V	51.85	74	22.15	PK
9608	-104.19	44.08	V	41.27	54	12.73	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 4 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

Frequency [MHz]	Level [dBuV]	AN. CL. [dB]	ANT. POL [H/V]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4882	-130.40	35.1	V	58.50	74	15.50	PK
4882	-119.84	35.1	V	47.94	54	6.06	AV
9764	-114.10	44.49	V	51.59	74	22.41	PK
9764	-104.44	44.49	V	41.93	54	12.07	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 4 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

Frequency [MHz]	Level [dBuV]	AN. CL. [dB]	ANT. POL [H/V]	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4960	-130.00	35.3	V	58.30	74	15.70	PK
4960	-119.30	35.3	V	47.60	54	6.40	AV
9920	-113.36	44.89	V	51.25	74	22.75	PK
9920	-102.99	44.89	V	40.88	54	13.12	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 4 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 MHz
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.

6.8 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 microvolts (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 groundplane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detector Mode– Quasi Peak and Average Detector.

Test Plot

Conducted emissions (Line 1)

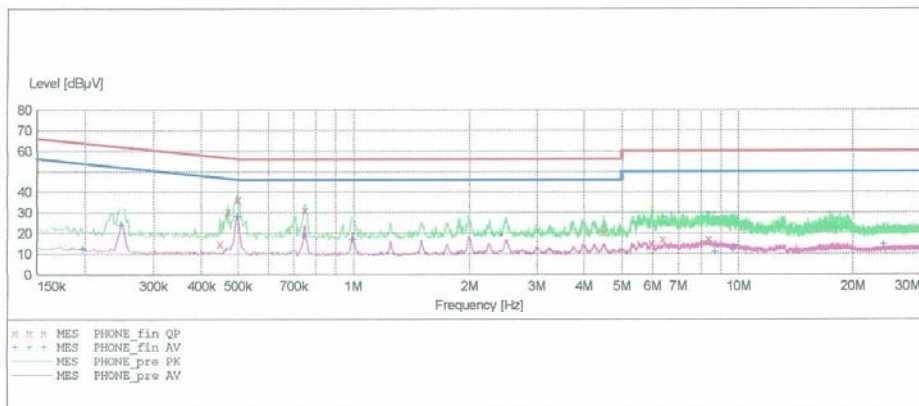
HCT

EMC TEST LAB.

EUT: L1
 Manufacturer: PANTECH
 Operating Condition: BLUETOOTH MODE
 Test Site: SHIELD ROOM
 Operator: DH.RYU
 Test Specification: CISPR 22 CLASS B
 Comment: N

SCAN TABLE: "CISPR 22 Voltage"

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



MEASUREMENT RESULT: "PHONE_fin_QP"

6/29/2007 12:01PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.447600	14.90	10.1	57	42.0	---	---
0.470100	30.70	10.1	57	25.9	---	---
0.497600	36.40	10.1	56	19.7	---	---
0.500000	36.30	10.1	56	19.7	---	---
0.750000	31.30	10.1	56	24.7	---	---
4.490000	20.60	10.6	56	35.4	---	---
5.970000	15.00	10.8	60	45.0	---	---
6.365000	17.10	10.8	60	42.9	---	---
8.335000	17.20	11.0	60	42.8	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

6/29/2007 12:01PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.197600	12.30	10.0	54	41.4	---	---
0.247600	24.20	10.0	52	27.6	---	---
0.497600	28.10	10.1	46	17.9	---	---
0.500000	27.90	10.1	46	18.1	---	---
0.745000	19.00	10.1	46	27.0	---	---
0.995000	17.00	10.1	46	29.0	---	---
8.690000	10.90	11.0	50	39.1	---	---
9.640000	12.10	11.1	50	37.9	---	---
24.015000	14.60	12.6	50	35.4	---	---

Conducted emissions (Line 2)

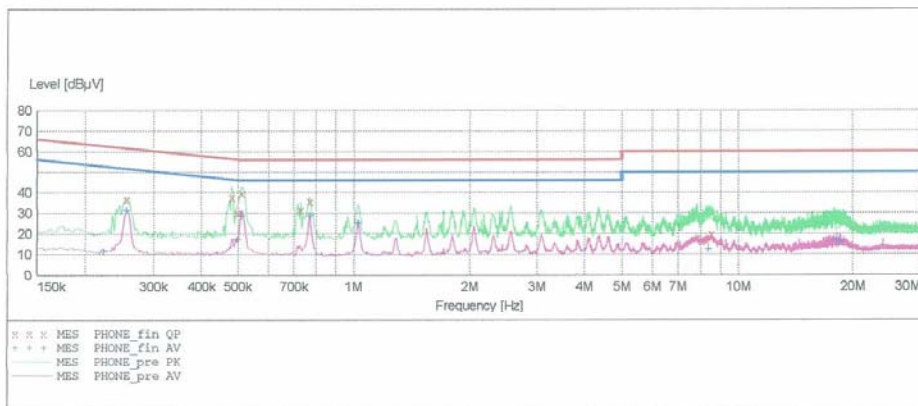
HCT

EMC TEST LAB.

EUT: L1
 Manufacturer: PANTECH
 Operating Condition: BLUETOOTH MODE
 Test Site: SHIELD ROOM
 Operator: DH.RYU
 Test Specification: CISPR 22 CLASS B
 Comment: H

SCAN TABLE: "CISPR 22 Voltage"

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



MEASUREMENT RESULT: "PHONE_fin QP"

6/29/2007 12:04PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.255100	36.70	10.0	62	24.9	---	---
0.480100	37.50	10.1	56	18.8	---	---
0.500000	30.00	10.1	56	26.0	---	---
0.510000	39.70	10.1	56	16.3	---	---
0.730000	31.60	10.1	56	24.4	---	---
0.770000	35.70	10.1	56	20.3	---	---
7.830000	18.00	11.0	60	42.0	---	---
8.245000	16.50	11.0	60	43.5	---	---
8.520000	19.80	11.0	60	40.2	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

6/29/2007 12:04PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.222600	11.50	10.0	53	41.2	---	---
0.255100	31.40	10.0	52	20.2	---	---
0.497600	17.30	10.1	46	28.8	---	---
0.510000	28.80	10.1	46	17.2	---	---
0.770000	28.90	10.1	46	17.1	---	---
1.025000	25.40	10.1	46	20.6	---	---
8.355000	12.50	11.0	50	37.5	---	---
18.175000	16.70	12.2	50	33.3	---	---
18.490000	16.10	12.2	50	33.9	---	---

7. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Calibration Date	Cal Interval	Calibration Due	Serial No.
Rohde & Schwarz	ESI40/ EMI Test Receiver	11/06/2006	Annual	11/06/2007	831564103
Rohde & Schwarz	ESC/ EMI Test Receiver	08/24/ 2006	Annual	08/24/ 2007	100033
Rohde & Schwarz	ESH2-Z5/ LISN	04/20/2007	Annual	04/20/2008	861741/013
Rohde & Schwarz	ESH3-Z6/ LISN	04/11/2007	Annual	03/16/2008	837950/023
Schwarzbeck	VULB 9160/ TRILOG Antenna	04/20/2007	Annual	04/20/2008	9160-3150
HD	MA240/ Antenna Position Tower	N/A	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	N/A	12
Rohde & Schwarz	ESH3-Z2/ PULSE LIMITER	03/16/2007	Annual	03/16/2008	375.8810.352
MITEQ	AMF-60-0010 1800-35-20P	01/24/2007	Annual	01/24/2008	1200937
MITEQ	AMF-6D-01180-35-20P	02/24/2007	Annual	02/24/2008	990893
Schwarzbeck	BBHA 9120D/ Horn Antenna	03/30/2007	Annual	03/30/2008	147
Schwarzbeck	BBHA9170/ SHF-EHF Horn Antenna	03/20/2007	Annual	03/20/2008	BBHA9170342
Rohde & Schwarz	HFH2-Z2/Loop Antenna	05/11/2007	Annual	01/10/2008	881056/070
ADVANTEST	R3273/Spectrum Analyzer	05/02/2007	Annual	05/02/2008	J004821
Agilent	E4416A /Power Meter	01/22/2007	Annual	01/22/2008	GB41291412
Agilent	E7405A	10/02/2006	Annual	10/02/2007	US40240209
Weinschel	2/Attenuator	01/24/2007	Annual	01/24/2008	BR0554
Wainwright Instrument	WHF3.3/18G-10EF / High Pass Filter	06/28/2006	Annual	06/28/2007	1
Rohde & Schwarz	Spectrum Analyzer	06/28/ 2006	Annual	06/28/ 2007	839117/011