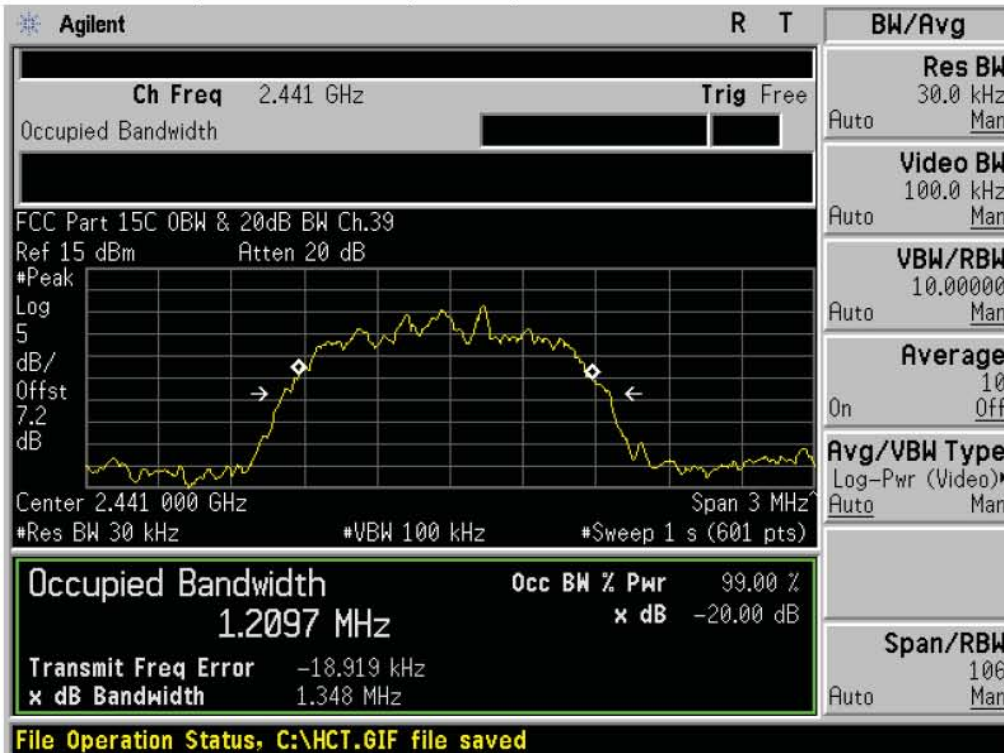


Test Plots ($\pi/4$ DQPSK)
20 dB Bandwidth & Occupied Bandwidth (Low-CH)

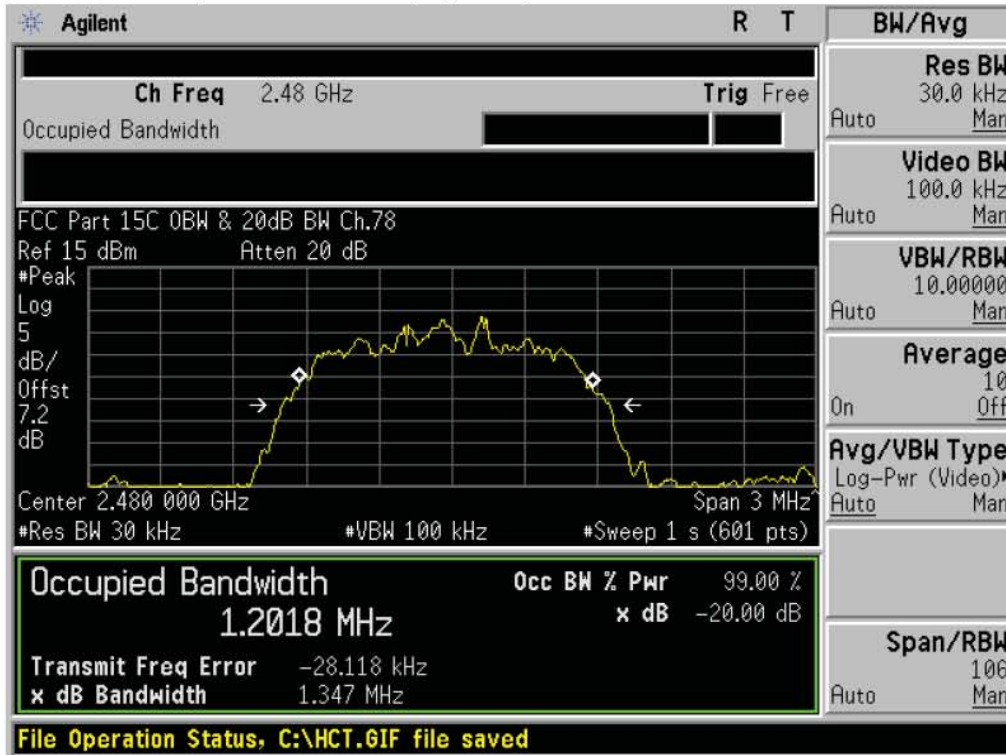


Test Plots ($\pi/4$ DQPSK)
20 dB Bandwidth & Occupied Bandwidth (Mid-CH)



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Test Plots ($\pi/4$ DQPSK)
20 dB Bandwidth & Occupied Bandwidth (High-CH)

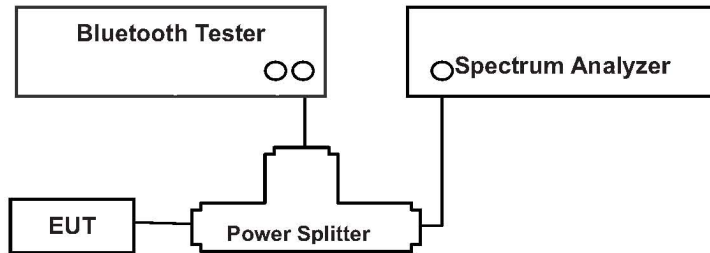


8.4 NUMBER OF HOPPING FREQUENCY

LIMIT

According to §15.247(a)(1)(iii), 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 is set to (DA 00-705)

Span = the frequency band of operation

RBW \geq 1% of the span

VBW \geq RBW

Sweep = Auto

Detector = Peak

Trace = Max hold

The trace was allowed to stabilize.

TEST RESULTS

No non-compliance noted

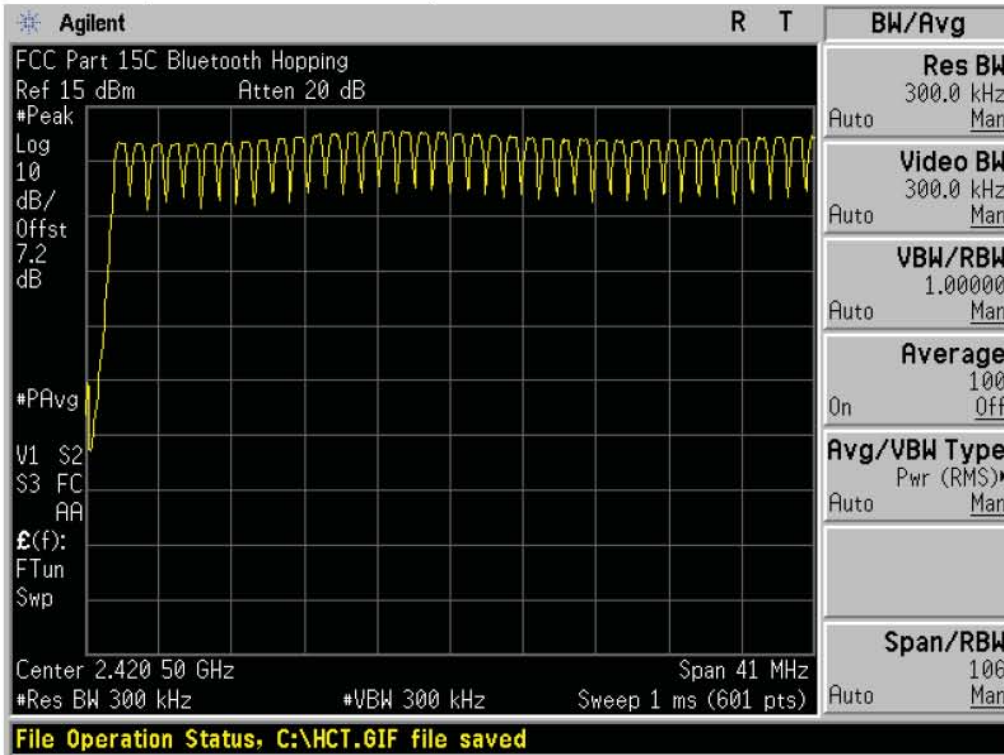
Test Data

Result (No. of CH)			Limit	Result
GFSK	8DPSK	$\pi/4$ DQPSK		
79	79	79	>15	Pass

Note : In case of AFH mode, minimum number of hopping channels is 20.

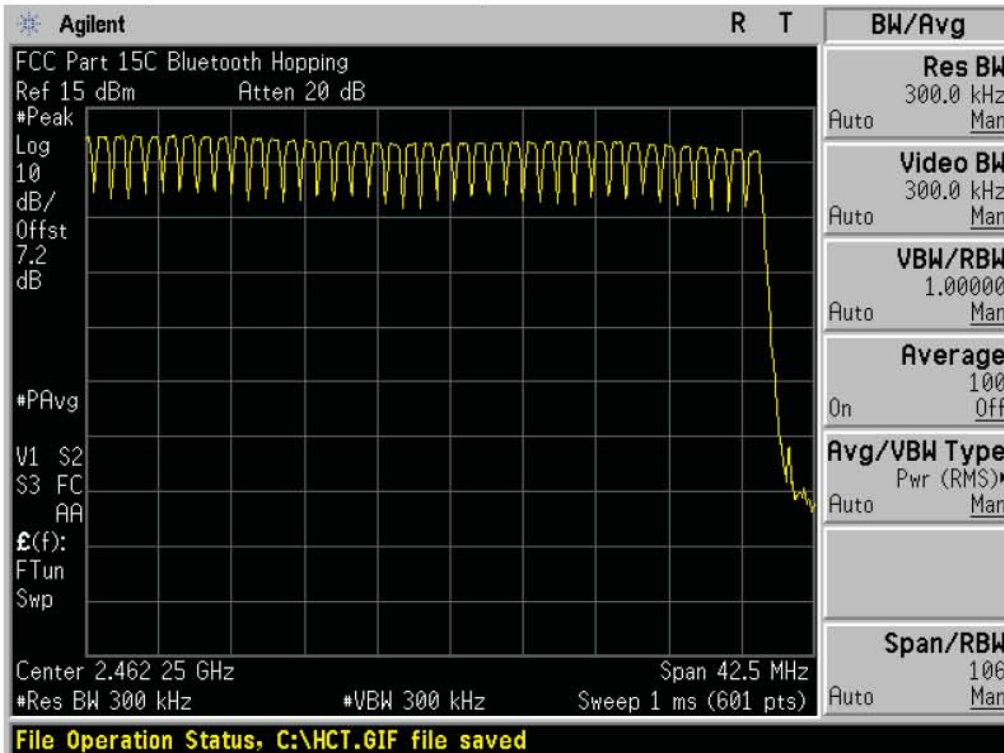
Test Plots (GFSK)

Number of Channels (2.4 GHz - 2.441 GHz)



Test Plots (GFSK)

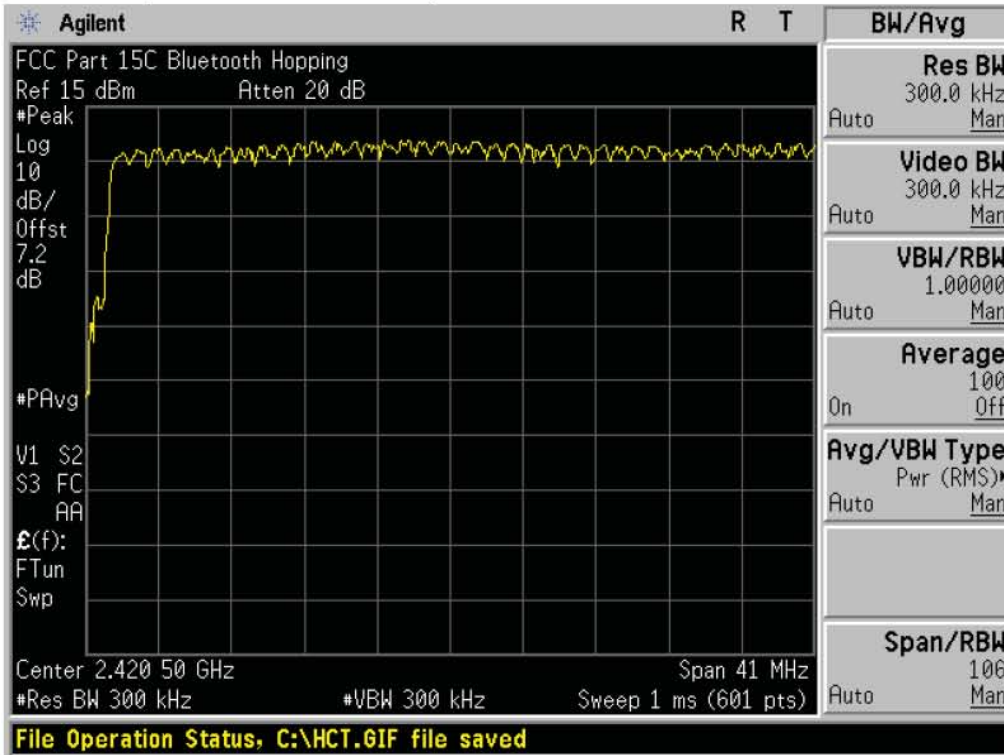
Number of Channels (2.441 GHz - 2.4835 GHz)



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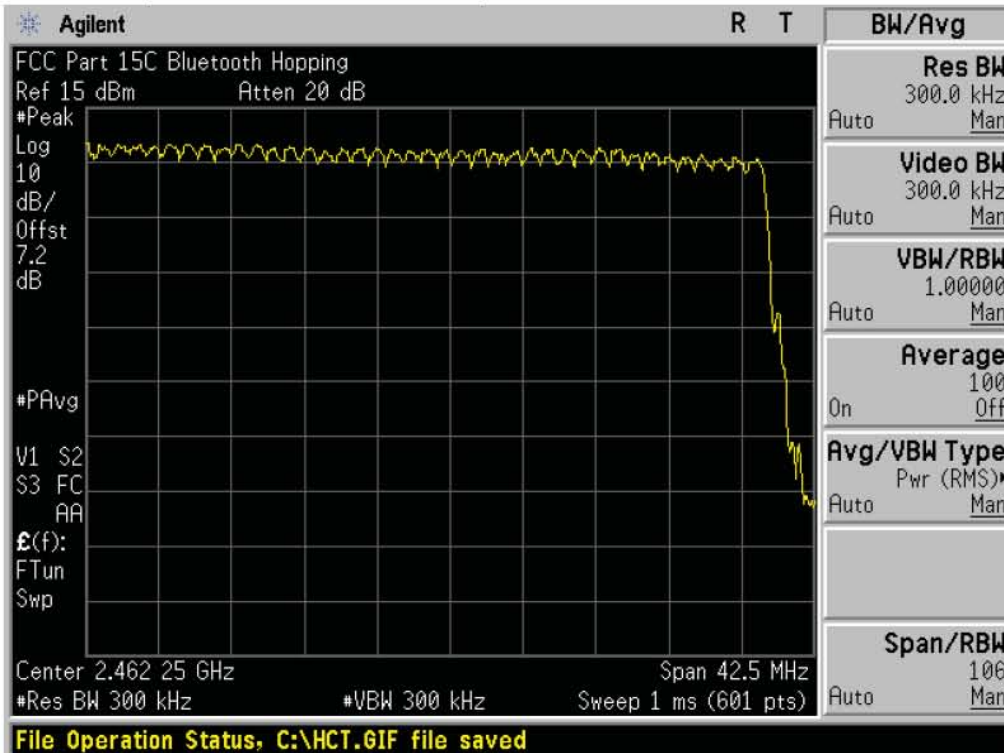
Test Plots (8DPSK)

Number of Channels (2.4 GHz - 2.441 GHz)



Test Plots (8DPSK)

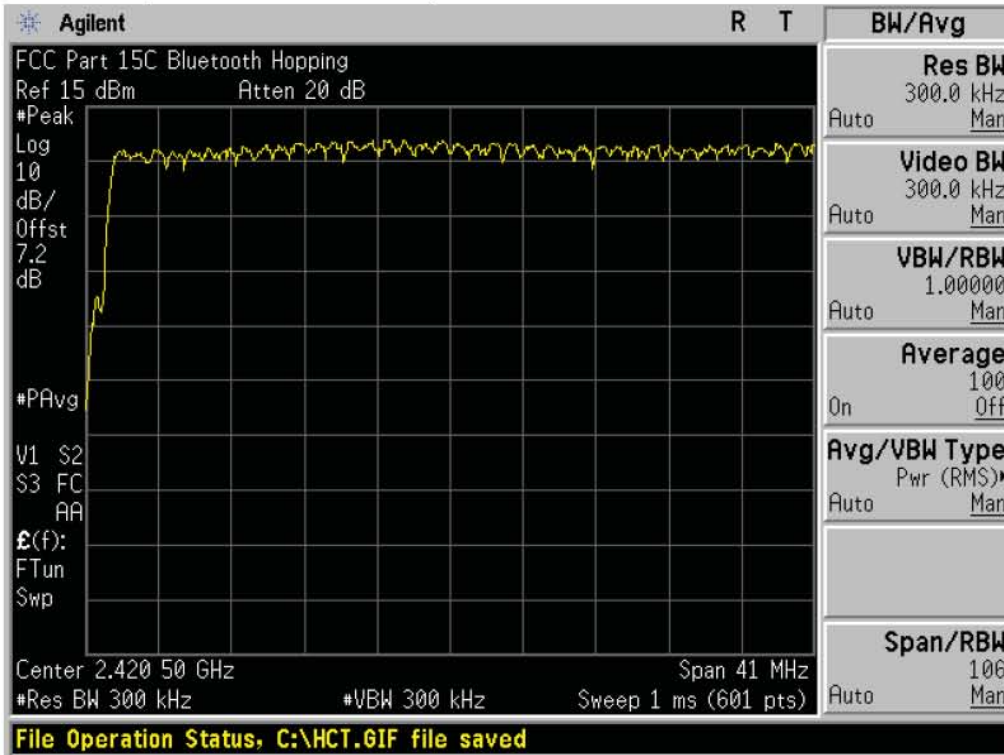
Number of Channels (2.441 GHz - 2.4835 GHz)



FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1306FR02	Date of Issue: June 05, 2013	EUT Type: GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 a/b/g/n(2.4/5GHz)/NFC	FCC ID: ZNFE989

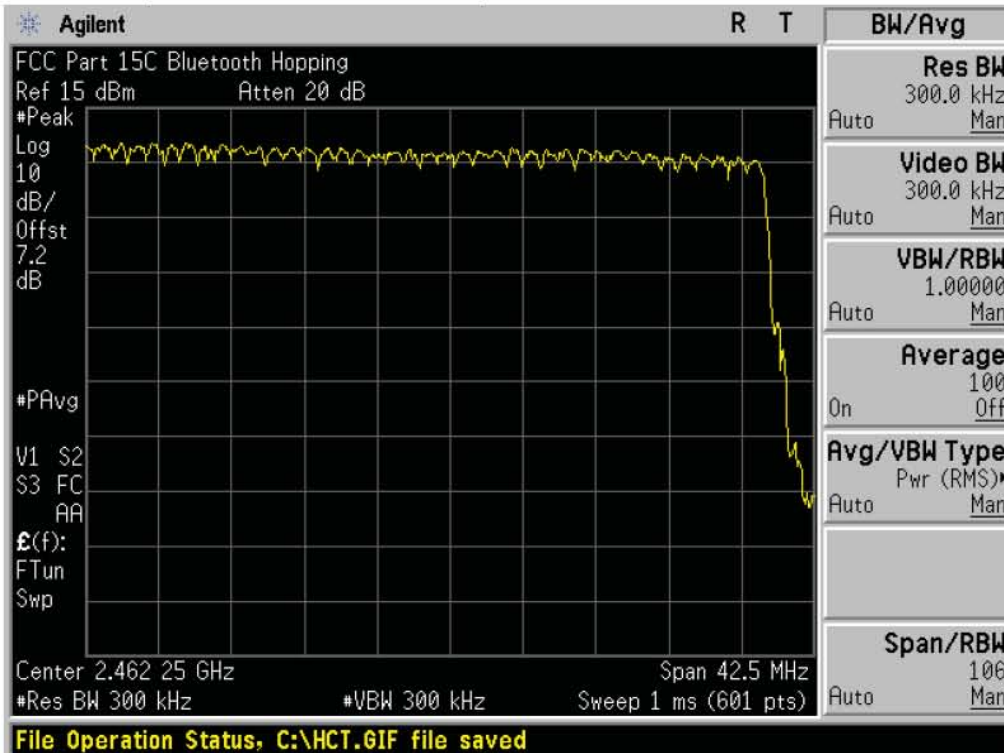
Test Plots ($\pi/4$ DQPSK)

Number of Channels (2.4 GHz - 2.441 GHz)



Test Plots ($\pi/4$ DQPSK)

Number of Channels (2.441 GHz - 2.4835 GHz)



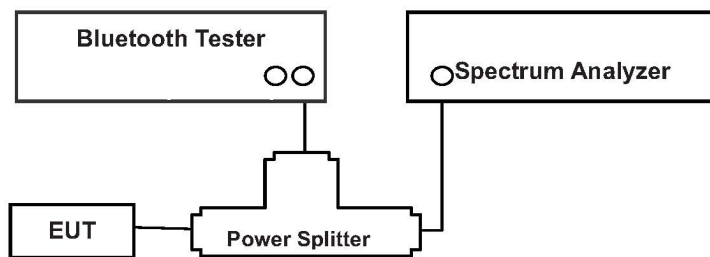
FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1306FR02	Date of Issue: June 05, 2013	EUT Type: GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 a/b/g/n(2.4/5GHz)/NFC	FCC ID: ZNFE989

8.5 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

This test is performed with hopping off.

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

The Spectrum Analyzer is set to (DA 00-705)

Span = Zero span, Centered on a hopping channel

RBW = 1 MHz

VBW ≥ RBW

Sweep = as necessary to capture the entire dwell time per hopping channel

Detector = Peak

Trace = Max hold

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

Normal Mode / EDR Mode

DH 5(The longest packet type for GFSK)

CH Mid : $2.892 * (1600/6)/79 * 31.6 = 308.48$ (ms)

2-DH 5(The longest packet type for $\pi/4$ DQPSK)

CH Mid : $2.883 * (1600/6)/79 * 31.6 = 307.52$ (ms)

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

CH Mid : $2.892 * (1600/6)/79 * 31.6 = 308.48$ (ms)

AFH Mode

DH 5(The longest packet type for GFSK)

CH Mid : $2.892 * (800/6)/20 * 8.0 = 154.24$ (ms)

2-DH 5(The longest packet type for $\pi/4$ DQPSK)

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CH Mid : $2.883 * (800/6)/20 * 8.0 = 153.76$ (ms)

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

CH Mid : $2.892 * (800/6)/20 * 8.0 = 154.24$ (ms)

Note :

A DH5 Packet need 5 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 1600/6 hops per second with 79 channels. So the system have each channel 3.3755 times per second and so for 31.6 seconds the system have 106.7 times of appearance.

Each tx-time per appearance of DH5 is 2.883 ms.

Dwell time = Tx-time * 106.7

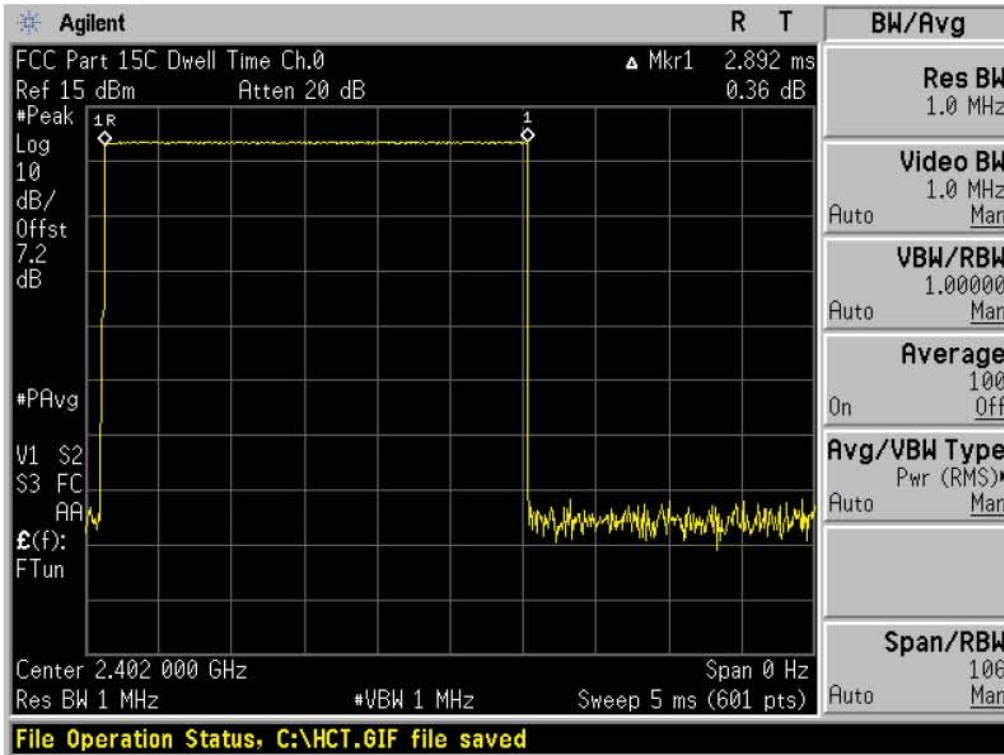
TEST RESULTS

See the table.

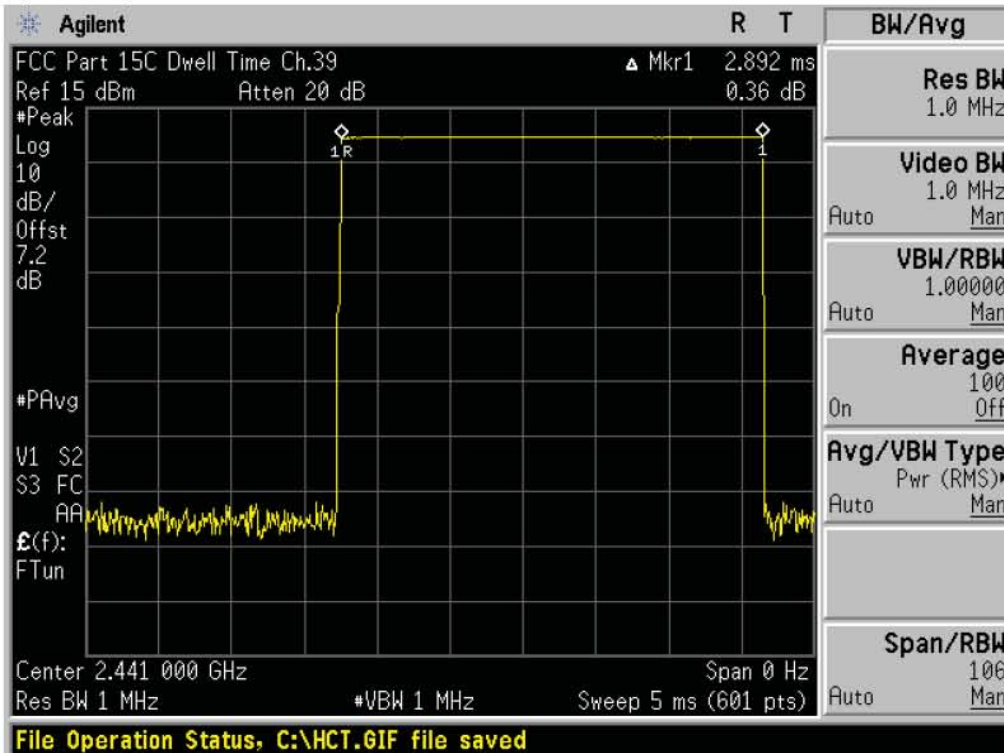
Channel	Pulse Time (ms)		Total of Dwell (ms)		Period Time (s)	Limit (ms)	Result
	GFSK	8DPSK	GFSK	8DPSK			
Low	2.892	2.892	308.48	308.48	31.6	400	PASS
Mid	2.892	2.892	308.48	308.48	31.6		PASS
High	2.883	2.892	307.52	308.48	31.6		PASS

Channel	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
	$\pi/4$ DQPSK				
Low	2.892	308.48	31.6	400	PASS
Mid	2.883	307.52	31.6		PASS
High	2.892	308.48	31.6		PASS

Test Plots (GFSK)
Dwell Time (Low-CH)

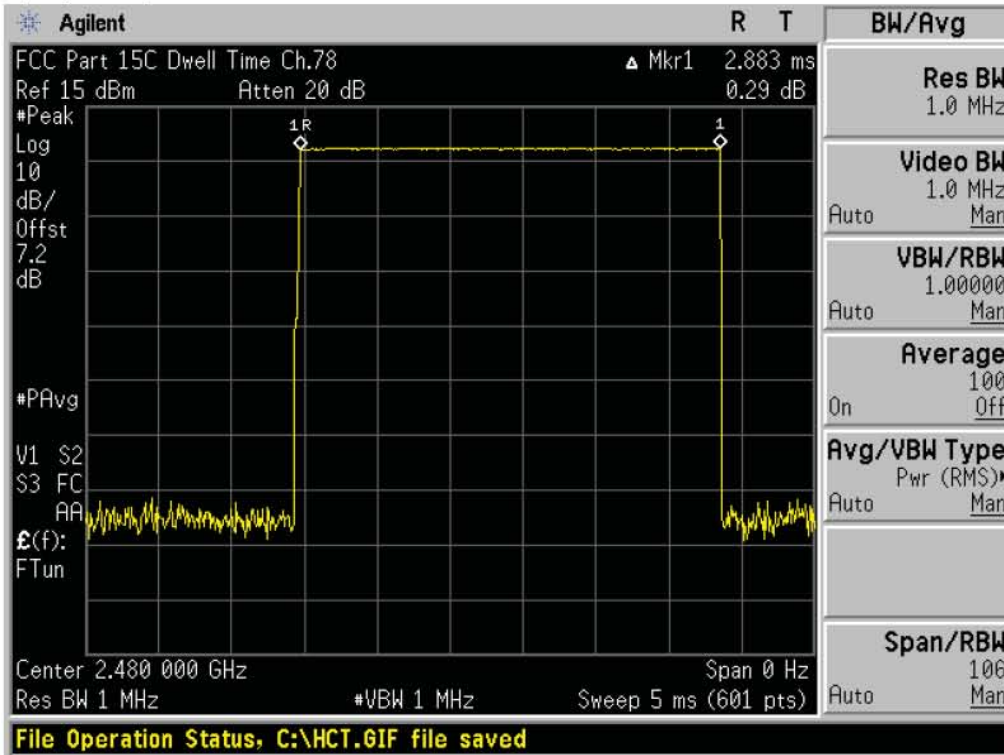


Test Plots (GFSK)
Dwell Time (Mid-CH)

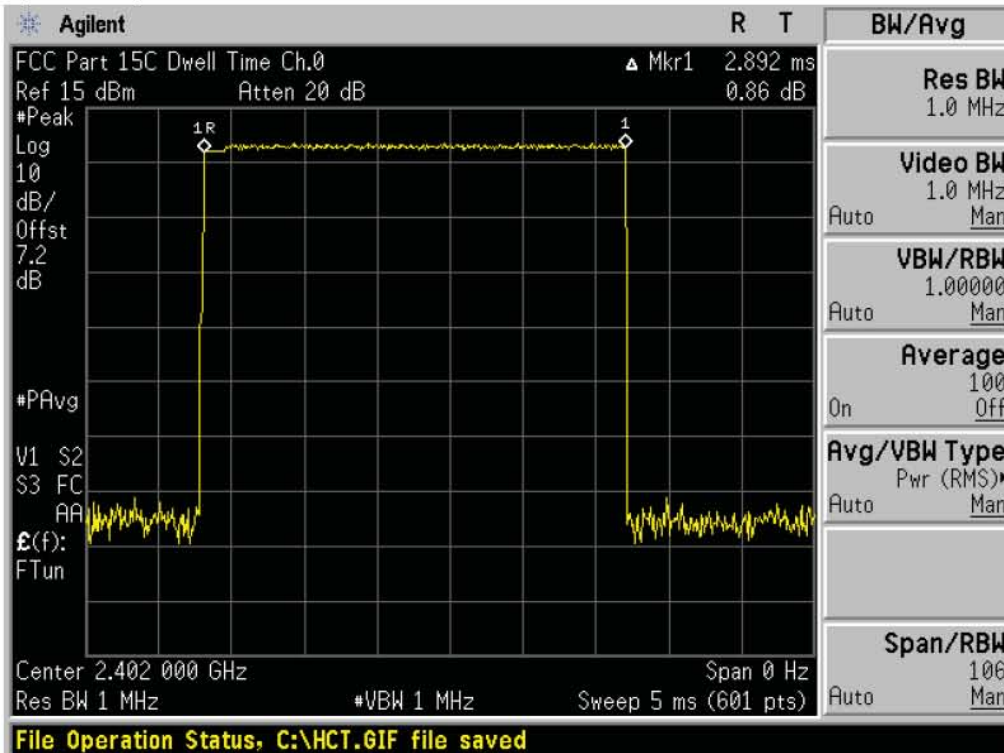


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
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Test Plots (GFSK)
Dwell Time (High-CH)

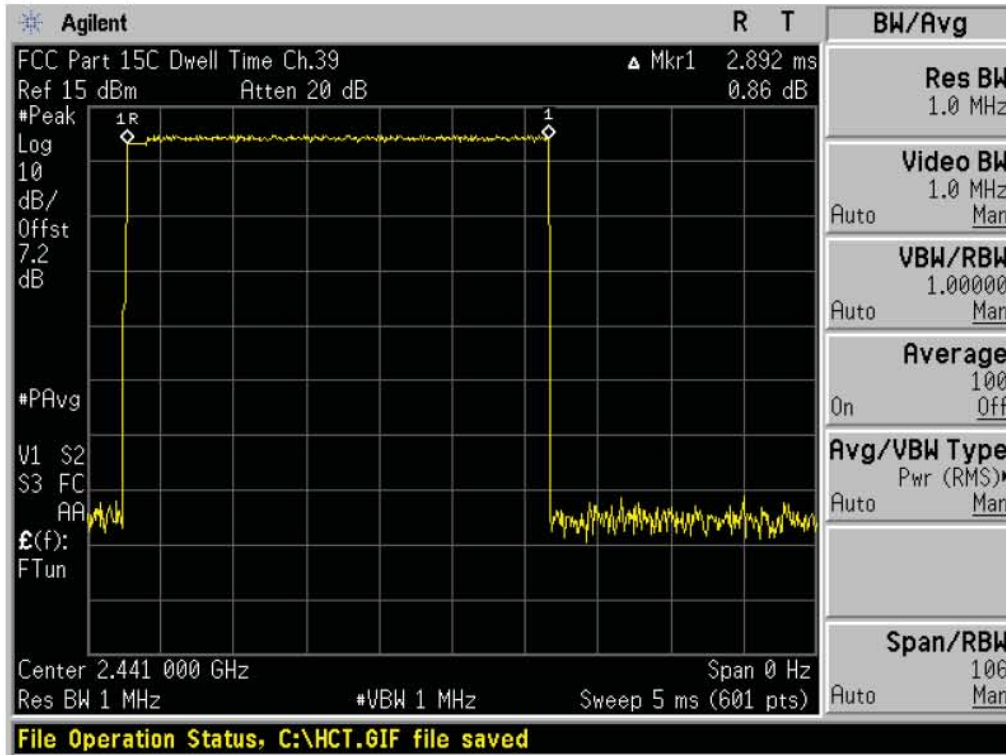


Test Plots (8DPSK)
Dwell Time (Low-CH)

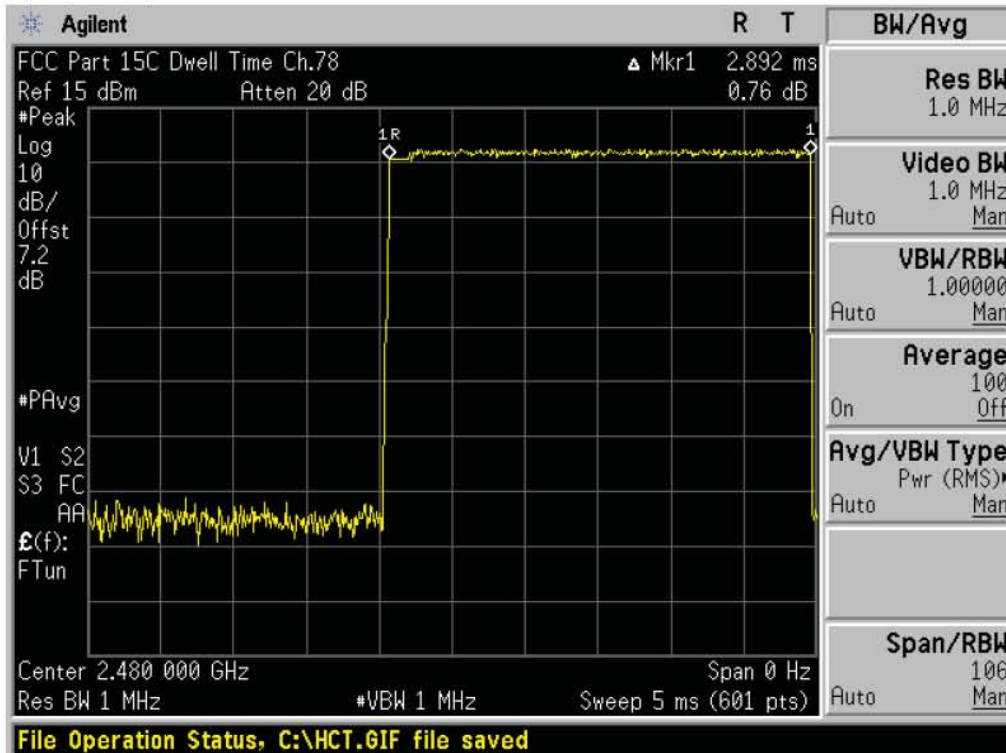


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
Test Report No. HCTR1306FR02	Date of Issue: June 05, 2013	EUT Type: GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 a/b/g/n(2.4/5GHz)/NFC	FCC ID: ZNFE989

Test Plots (8DPSK)
Dwell Time (Mid-CH)

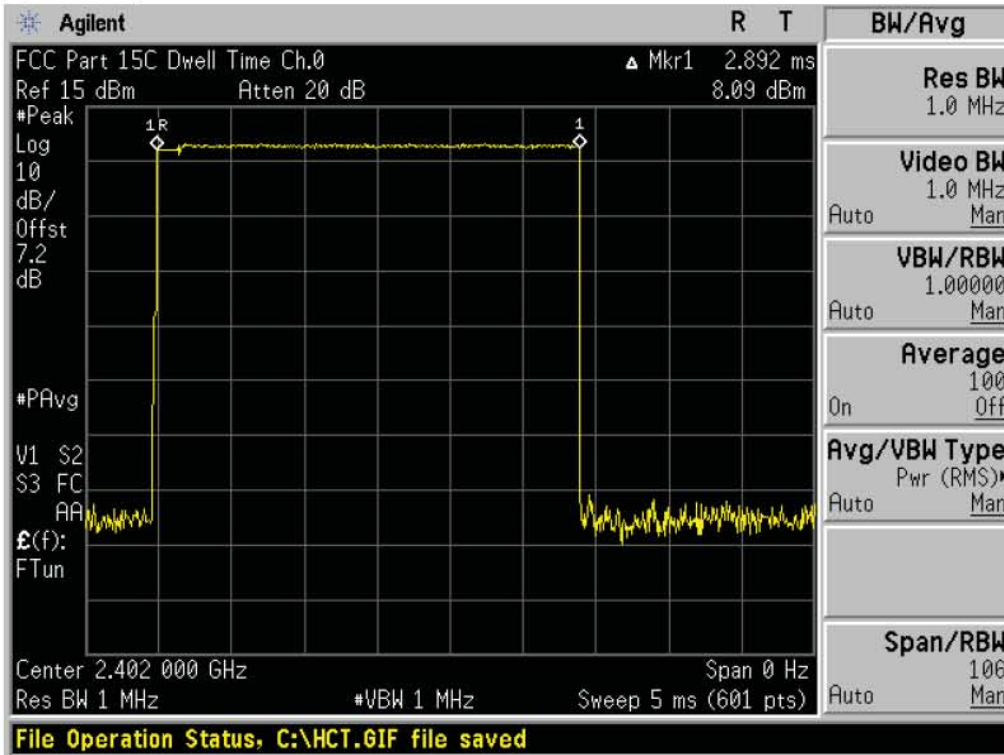


Test Plots (8DPSK)
Dwell Time (High-CH)

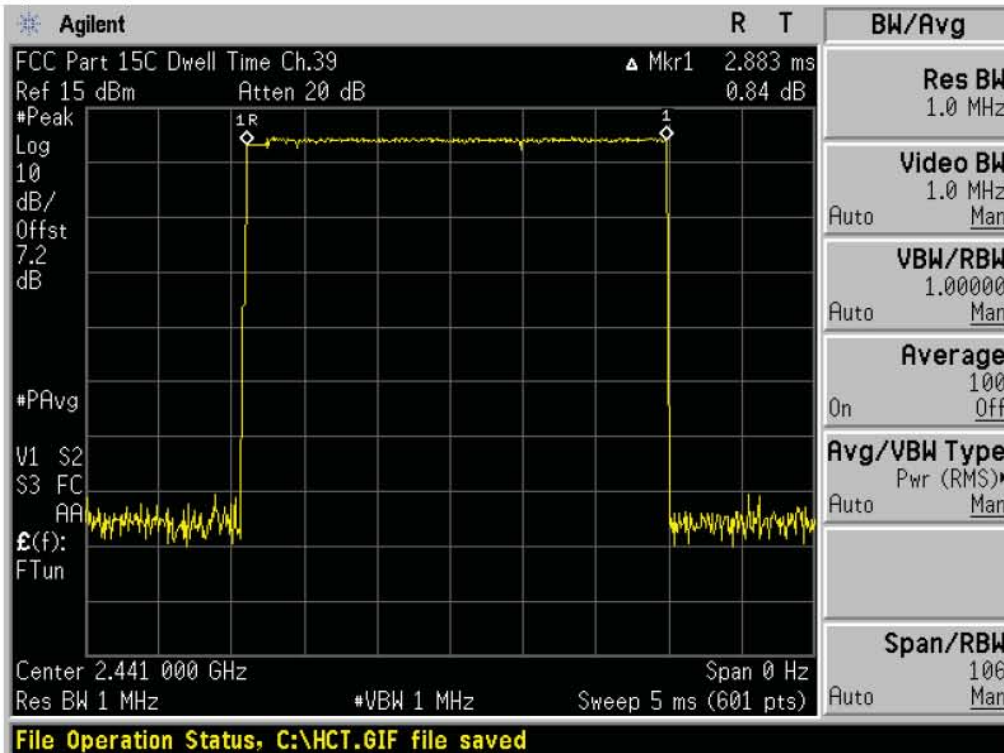


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Test Report No. HCTR1306FR02	Date of Issue: June 05, 2013	EUT Type: GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 a/b/g/n(2.4/5GHz)/NFC	FCC ID: ZNFE989

Test Plots ($\pi/4$ DQPSK)
Dwell Time (Low-CH)

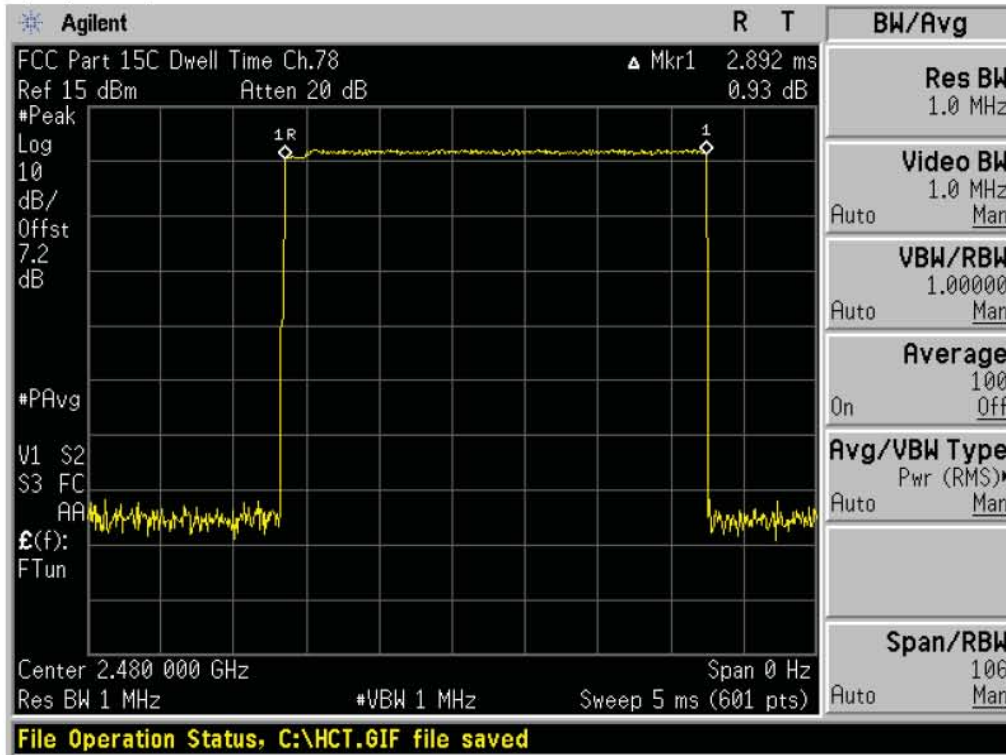


Test Plots ($\pi/4$ DQPSK)
Dwell Time (Mid-CH)



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Test Plots ($\pi/4$ DQPSK)
Dwell Time (High-CH)



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