

HCT CO., LTD.

CERTIFICATE OF COMPLIANCE

FCC Certification

Applicant Name:

SAMSUNG Electronics Co., Ltd.

Address:

129, Samsung-ro, Yeongtong-gu Suwon-si, Gyeonggi-do, 443-742 Rep. of Korea

Date of Issue: March 07, 2014 Test Site/Location: HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majangmyeon, Icheon-si, Gyeonggi-do, Korea Report No.: HCT-R-1403-F012

HCT FRN: 0005866421

FCC ID

: A3LSHWM580D

: SAMSUNG Electronics Co., Ltd. APPLICANT

FCC Model(s):	SHW-M580D
Additional FCC Model(s):	SHW-M585D
EUT Type:	Mobile Phone
Max. RF Output Power:	9.33 dBm (8.57 mW)
Frequency Range:	2402 MHz - 2480 MHz (Bluetooth)
Modulation type	GFSK(Normal), π /4DQPSK and 8DPSK(EDR)
FCC Classification:	FCC Part 15 Spread Spectrum Transmitter
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 subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

Report prepared by : Kyoung Houn Seo **Test Engineer of RF Team**

Approved by : Chang Seok Choi Manager of RF Team

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<u>Version</u>

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1403-F012	March 07, 2014	- First Approval Report

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1. GENERAL INFORMATION

Applicant:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu Suwon-si, Gyeonggi-do, 443-742 Rep. of Korea
FCC ID:	A3LSHWM580D
EUT Type: Model name(s):	Mobile Phone SHW-M580D
Additional Model name(s):	SHW-M585D
Date(s) of Tests:	February 27, 2014 ~ March 04, 2014
Place of Tests:	HCT Co., Ltd. 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea (IC Recognition No. : 5944A-3)

2. EUT DESCRIPTION

EUT Type	Mobile Phone
FCC Model Name	SHW-M580D
Additional FCC Model Name	SHW-M585D
Power Supply	DC 3.8 V
Battery type	Li-ion Battery(Standard)
Frequency Range	2402 MHz - 2480 MHz (Bluetooth)
Transmit Power	9.33 dBm (8.57 mW)
BT Operating Mode	Normal, EDR, AFH
Modulation Type	GFSK(Normal), π/4DQPSK and 8DPSK(EDR)
Modulation Technique	FHSS
Number of Channels	79Channels, Minimum 20 Channels(AFH)
Antenna Specification	Manufacturer: Partron
	Antenna type: FPCB Antenna
	Peak Gain : -0.63 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 pseudo-randomly.

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 Testing Unlicensed Wireless Devices(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 **SAMSUNG Electronics Co., Ltd. Mobile Phone FCC ID: A3LSHWM580D**

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). To record the final measurements, the analyzer detector function was set to CISPR quasi-peak mode and the bandwidth of the spectrum analyzer was set to 120 kHz for frequencies below 1 GHz or 1 MHz for frequencies above 1 GHz. For average measurements above 1 GHz, the analyzer was set to peak detector with a reduced VBW setting(RBW = 1 MHz, VBW = 1/T Hz, where T = Pulse width).

Conducted Antenna Terminal

See Section from 8.1 to 8.6.1.(DA 00-705)

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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.

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 SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 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 June 21, 2011 (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."

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. SUMMARY OF TEST RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
20 dB Bandwidth	§15.247(a)(1)(ii) or (iii)	NA		PASS
Occupied Bandwidth	NA	NA		NA
Conducted Maximum Peak Output Power	§15.247(b)(1)	< 1 Watts for 1Mbps < 125 Milliwatts for 2, 3Mbps		PASS
Carrier Frequency Separation	§15.247(a)(1)	>25 kHz or >2/3 of the 20dB BW		PASS
Number of Hopping Frequencies	§15.247(a)(1)(iii)	>15	CONDUCTED	PASS
Time of Occupancy	§15.247(a)(1)(iii)	<400 ms		PASS
Conducted Spurious Emissions	§15.247(d)	> 20 dB for all out-of band emissions		PASS
Band Edge(Out of Band Emissions)	§15.247(d)	> 20 dB for all out-of band emissions		PASS
AC Power line Conducted Emissions	§15.207(a)	cf. Section 8.7		PASS
Radiated Spurious Emissions	§15.247(d), 15.205, 15.209	cf. Section 8.6.2	DADIATED	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 8.6.3	RADIATED	PASS

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8. FCC PART 15.247 REQUIREMENTS

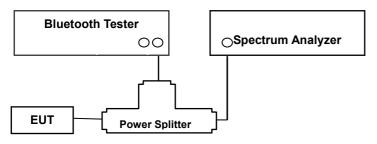
8.1 PEAK POWER

LIMIT

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

- 1. 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 W for hopping mode, 125 mW for AFH mode
- 2. The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 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. This test is performed with hopping off.

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

Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel RBW > the 20 dB bandwidth of the emission being measured VBW ≥ RBW Sweep = Auto Detector = Peak Trace = Max hold

SAMPLE CALCULATION

Output Power = Spectrum Reading Power + Power Splitter loss + Cable loss(2 ea)

= 10 dBm + 6 dB + 1.5 dB = 17.5 dBm

Note :

- 1. Spectrum reading values are not plot data. The power results in plot is already including the actual values of loss for the splitter and cable combination.
- 2. Spectrum offset = Power Splitter loss + Cable loss
- 3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. Actual value of

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loss for the splitter and cable combination is 7.18 dB at 2402 MHz and is 7.23 dB at 2480 MHz.

So, 7.2 dB is offset. And the offset gap in the 2.4 GHz range do not affect the conducted peak power final result

TEST RESULTS

No non-compliance noted

Test Data

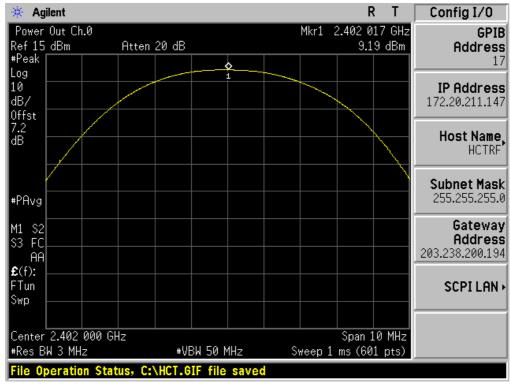
Channel	Frequency	Output Power (GFSK)		Limit	Result
	(MHz)	(dBm)	(mW)	(mW)	
Low	2402	9.19	8.30		PASS
Mid	2441	9.33	8.57	125	PASS
High	2480	8.75	7.50		PASS

Channel	Frequency	Output Power (8DPSK)		Output (π/4D0		Limit	Result
	(MHz)	(dBm)	(mW)	(dBm)	(mW)	(mW)	
Low	2402	8.42	6.95	8.04	6.37		PASS
Mid	2441	8.56	7.18	8.17	6.56	125	PASS
High	2480	7.99	6.30	7.55	5.69		PASS

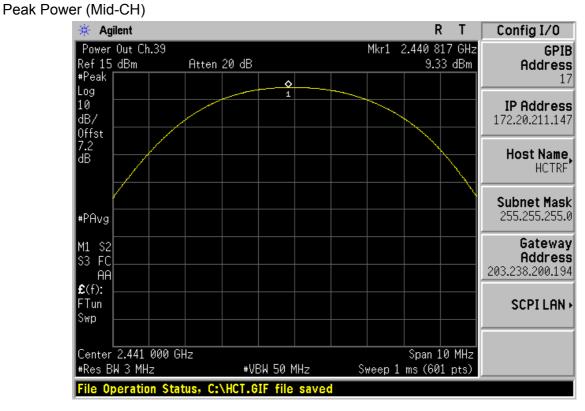
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Test Plots (GFSK) Peak Power (Low-CH)



Test Plots (GFSK)



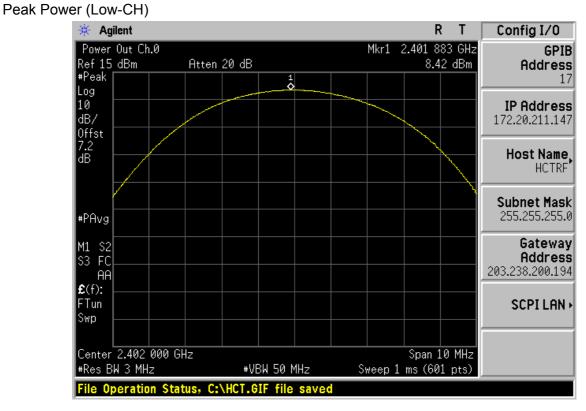
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Test Plots (GFSK) Peak Power (High-CH)



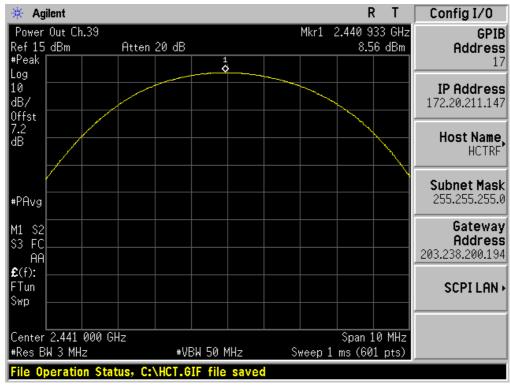
Test Plots (8DPSK)



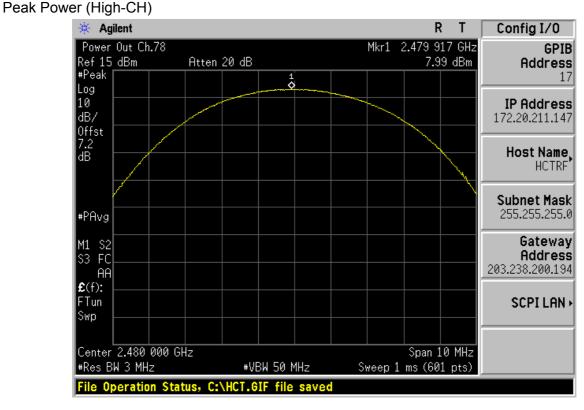
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Test Plots (8DPSK) Peak Power (Mid-CH)



Test Plots (8DPSK)

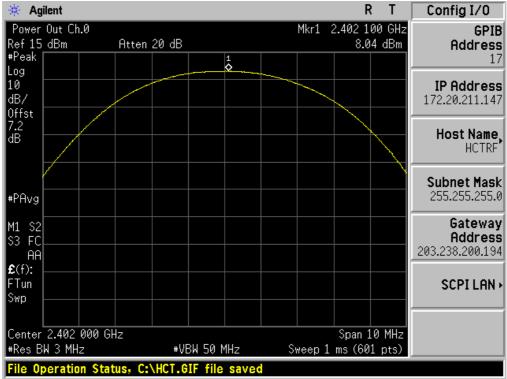


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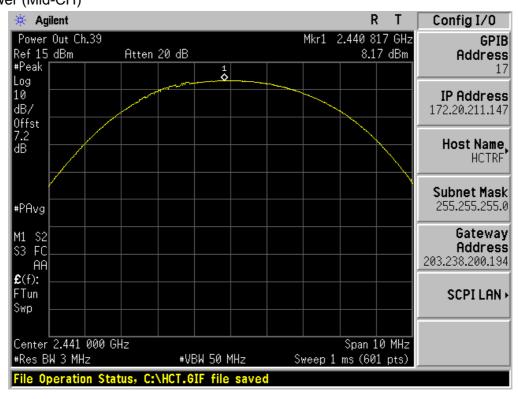


Test Plots (π/4DQPSK)

Peak Power (Low-CH)



Test Plots (π/4DQPSK) Peak Power (Mid-CH)



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Test Plots (π/4DQPSK) Peak Power (High-CH)

🔆 Agilent				RT	Config I/O
Power Out Ch.78				083 GHz	GPIB
Ref 15 dBm #Peak	Atten 20 dB		7	.55 dBm	Address
Log					17
10 dB/					IP Address 172.20.211.147
Offst 7.2 dB					Host Name, HCTRF
*PAvg					Subnet Mask 255.255.255.0
M1 S2 S3 FC AA					Gateway Address 203.238.200.194
£(f): FTun Swp					SCPI LAN 🕨
Center 2.480 000 GH				10 MHz	
#Res BW 3 MHz	⊭VBW 5	0 MHz	Sweep 1 ms (6		
	us, C:\HCT.GIF f				

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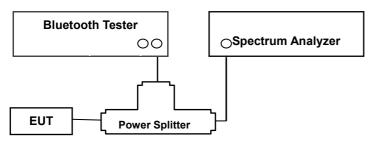


8.2 BAND EDGES

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

This test is performed with hopping off and hopping on.

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

Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation

RBW ≥ 1% of the span

VBW ≥ RBW

Sweep = Auto

Detector = Peak

Trace = Max hold

TEST RESULTS

See attached.

Note :

- 1. The results in plot is already including the actual values of loss for the splitter and cable combination.
- 2. Spectrum offset = Power Splitter loss + Cable loss
- 3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the splitter and cable combination is 7.18 dB at 2402 MHz and is 7.23 dB at 2480 MHz. So, 7.2 dB is offset. And the offset gap in the 2.4 GHz range do not affect the band edge measurement final result.

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Test Data

- Without hopping

Outside Frequency	GFSK	8DPSK	π/4DQPSK	Limit				
Band	(dB)	(dB)	(dB)	(dBc)	GFSK	8DPSK	π/4DQPSK	Result
Banu	(UB)	(UB)	(UB)	(UDC)	(dBc)	(dBc)	(dBc)	
Lower	60.40	58.05	57.33	20	40.40	38.05	37.33	PASS
Upper	65.19	63.80	62.26	20	45.19	43.80	42.26	PASS

- With hopping

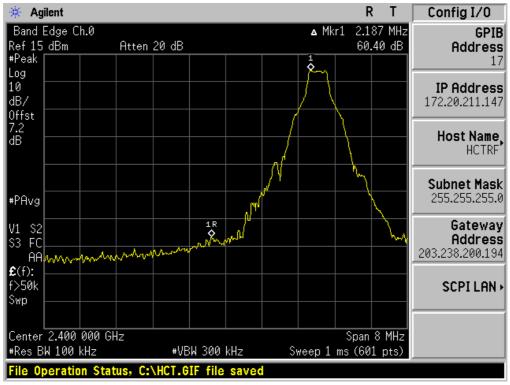
Outside Frequency	GFSK	8DPSK	π/4DQPSK	Limit		Margin		
Band	(dB)	(dB)	(dB)	(dBc)	GFSK	8DPSK	π/4DQPSK	Result
Ballu	(UB)	(06)	(UD)	(UDC)	(dBc)	(dBc)	(dBc)	
Lower	61.50	61.18	58.26	20	41.50	41.18	38.26	PASS
Upper	66.34	62.68	56.20	20	46.34	42.68	36.20	PASS

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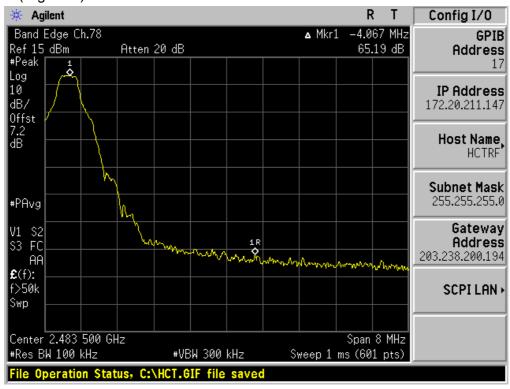


Test Plots without hopping (GFSK)

Band Edges (Low-CH)



Test Plots without hopping (GFSK) Band Edges (High-CH)

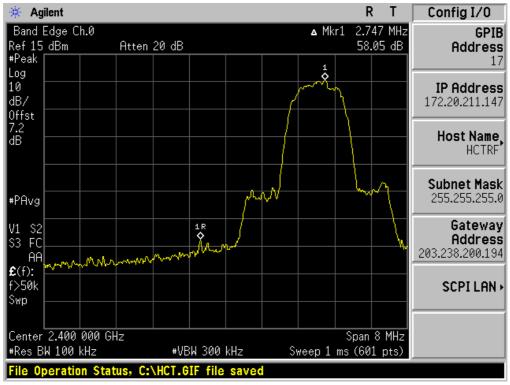


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Test Plots without hopping (8DPSK)

Band Edges (Low-CH)



Test Plots without hopping (8DPSK) Band Edges (High-CH)

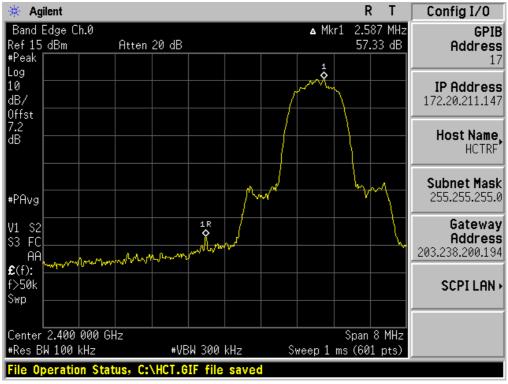


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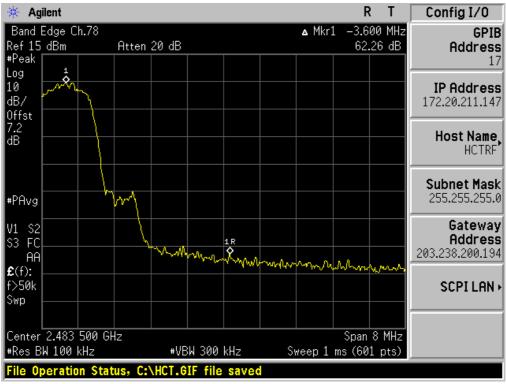


Test Plots without hopping (π /4DQPSK)

Band Edges (Low-CH)



Test Plots without hopping (π /4DQPSK) Band Edges (High-CH)

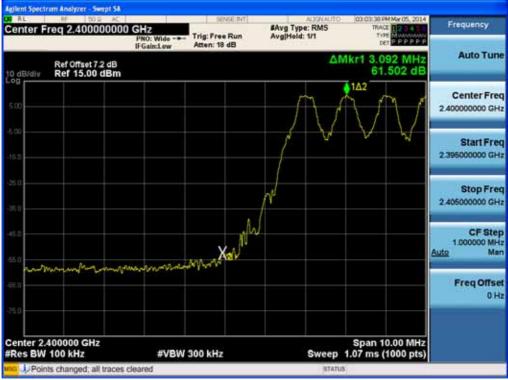


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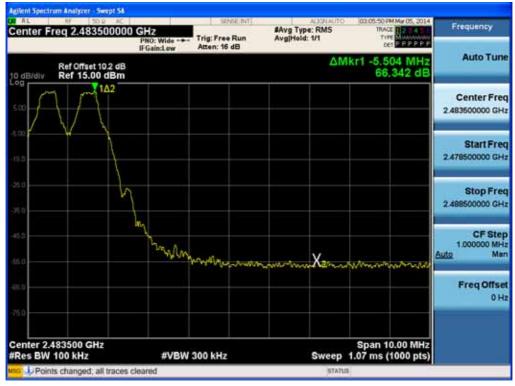


Test Plots with hopping (GFSK)

Band Edges (Low-CH)



Test Plots with hopping (GFSK) Band Edges (High-CH)



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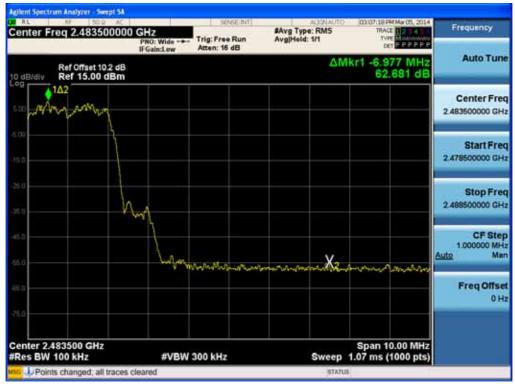


Test Plots with hopping (8DPSK)

Band Edges (Low-CH)



Test Plots with hopping (8DPSK) Band Edges (High-CH)



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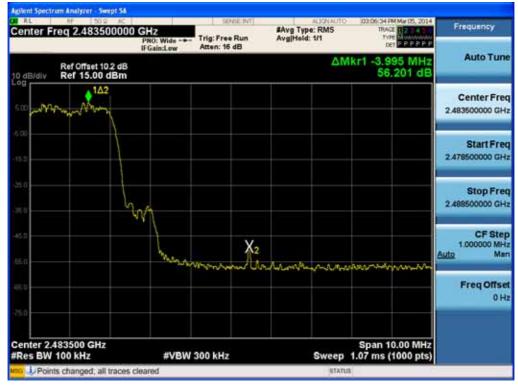


Test Plots with hopping (π /4DQPSK)

Band Edges (Low-CH)



Test Plots with hopping (π /4DQPSK) Band Edges (High-CH)



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		 EUT Type: Mobile Phone	

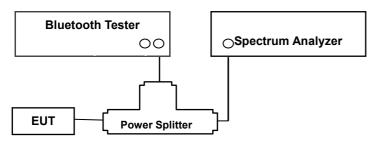


8.3 FREQUENCY SEPARATION / OCCUPIED BANDWIDTH (99% BW)

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 Channel Separation test is performed with hopping on. And the 20 dB Bandwidth test is performed with hopping off.

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

Span = wide enough to capture the peaks of two adjacent channels

RBW \geq 1% of the span

VBW ≥ RBW

Sweep = Auto

Detector = Peak

Trace = Max hold

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

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Test Data

Channel Separation (kHz)				20dB Bandwidth (kHz)				
GFSK	8DPSK	π/4DQPSK	Channel	GFSK	8DPSK	π/4DQPSK	(kHz)	
			Low CH	936.7	1307.0	1337.0	>25 or	
870	990	995	Middle CH	937.3	1306.0	1311.0	>2/3 of the	Pass
			High CH	936.9	1304.0	1336.0	20dB BW	

Occupied Bandwidth (99% BW)

99% BW (kHz)								
Channel	GFSK	8DPSK	π/4DQPSK					
Low CH	877.6	1193.4	1192.0					
Middle CH	877.8	1192.6	1192.0					
High CH	877.2	1192.4	1197.6					

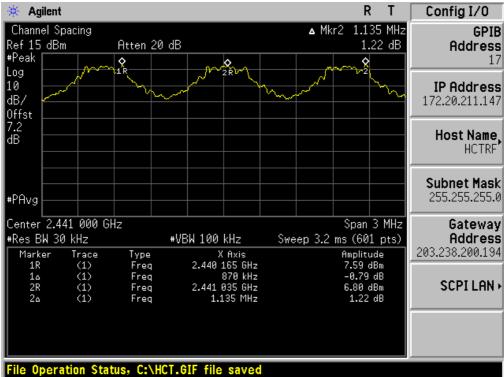
Note : We can not know what use channel in AFH mode. So, we can not test in AFH mode. Also, if the test performs some channel in AFH mode, the test result is not different with normal mode.

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr
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HCT-R-1403-F012	March 07, 2014		A3LSHWM580D

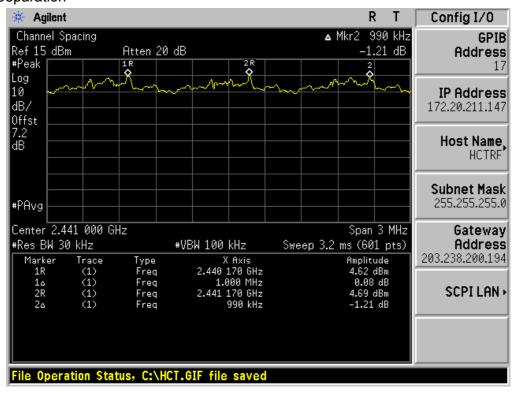


Test Plots (GFSK)

Channel Separation



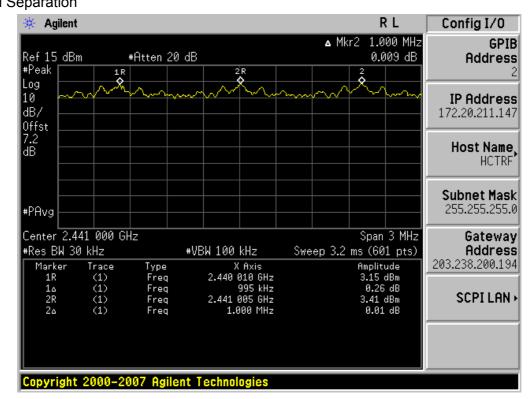
Test Plots (8DPSK) Channel Separation



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Test Plots (π/4DQPSK) Channel Separation

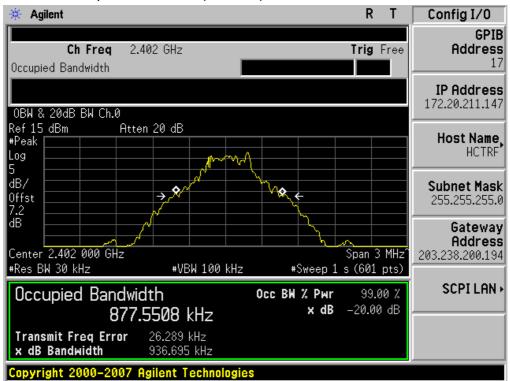


FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT	www.hct.co.kr		
Test Report No. HCT-R-1403-F012	Date of Issue: March 07, 2014	EUT Type: Mobile Phone	FCC ID: A3LSHWM580D		



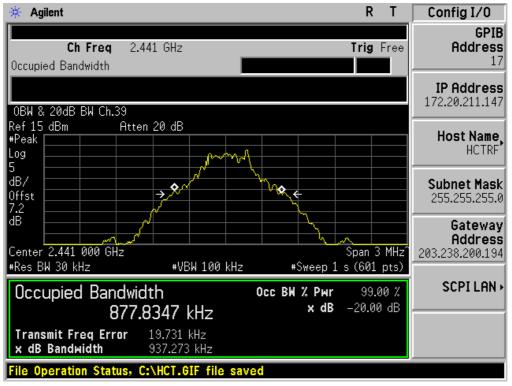
Test Plots (GFSK)

20 dB Bandwidth & Occupied Bandwidth (Low-CH)



Test Plots (GFSK)

20 dB Bandwidth & Occupied Bandwidth (Mid-CH)



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		B	



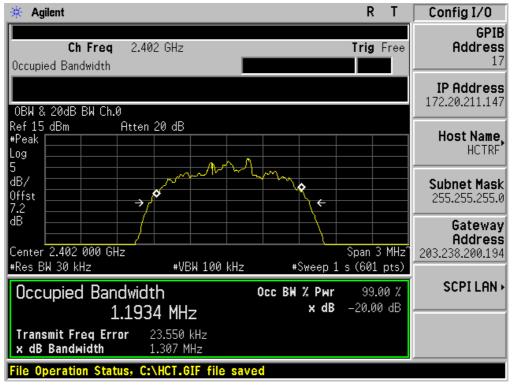
Test Plots (GFSK)

20 dB Bandwidth & Occupied Bandwidth (High-CH)



Test Plots (8DPSK)

20 dB Bandwidth & Occupied Bandwidth (Low-CH)

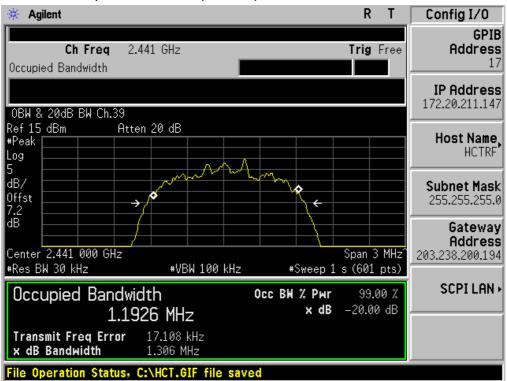


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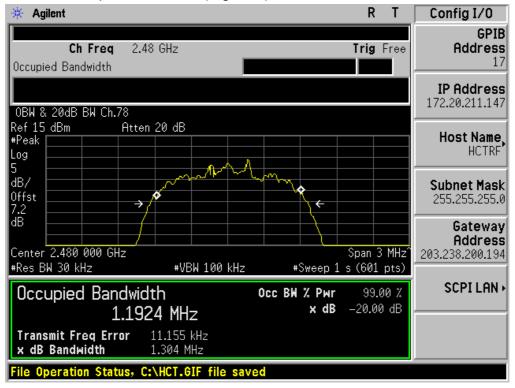
Test Plots (8DPSK)

20 dB Bandwidth & Occupied Bandwidth (Mid-CH)



Test Plots (8DPSK)

20 dB Bandwidth & Occupied Bandwidth (High-CH)

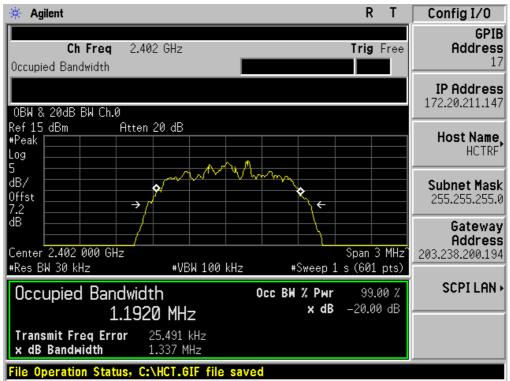


FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT	www.hct.co.kr
Test Report No. HCT-R-1403-F012	Date of Issue: March 07, 2014	EUT Type: Mobile Phone	FCC ID: A3LSHWM580D
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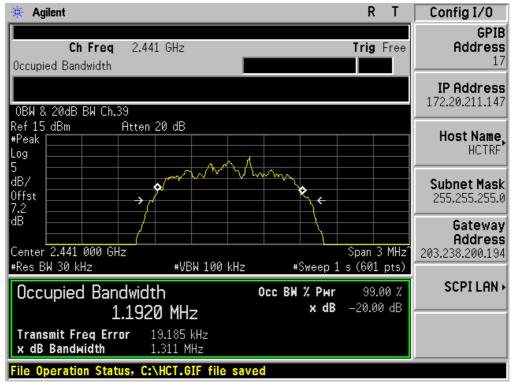
Test Plots (π/4DQPSK)

20 dB Bandwidth & Occupied Bandwidth (Low-CH)



Test Plots (π/4DQPSK)

20 dB Bandwidth & Occupied Bandwidth (Mid-CH)

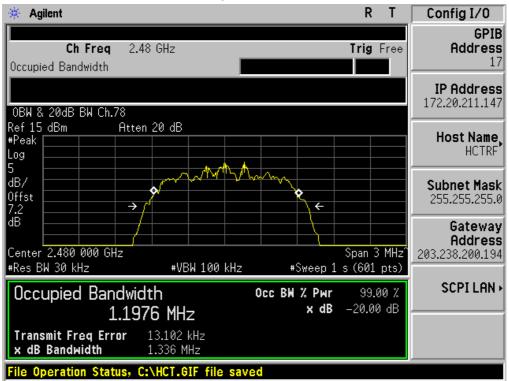


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		www.hct.co.kr		
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Test Plots (π/4DQPSK)

20 dB Bandwidth & Occupied Bandwidth (High-CH)



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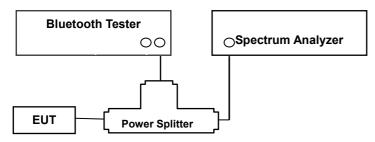


8.4 NUMBER OF HOPPING FREQUENCY

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 ≥ 1% of the span

VBW ≥ RBW

Sweep = Auto

Detector = Peak

Trace = Max hold

The trace was allowed to stabilize.

TEST RESULTS

No non-compliance noted

Test Data

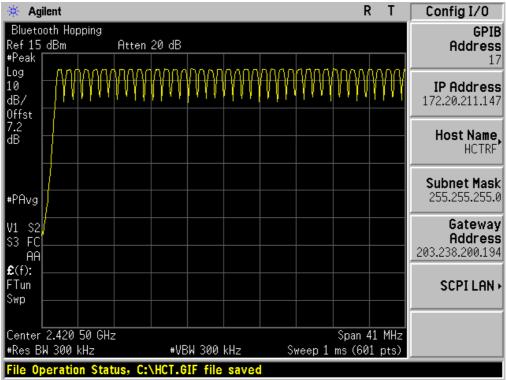
	Result (No. of CH)	Lingit	Decult	
GFSK	8DPSK	π/4DQPSK	Limit	Result
79	79	79	>15	Pass

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

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Test Report No.	Date of Issue:	EUT Type: Mobile Phone	FCC ID:
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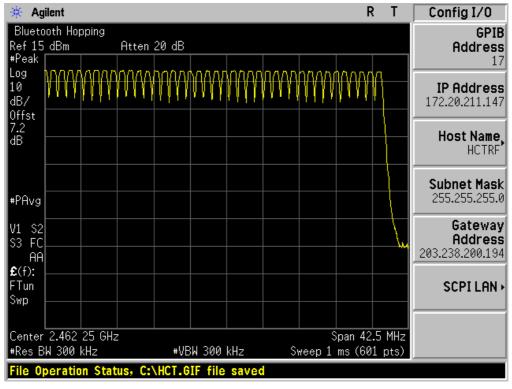


Test Plots (GFSK) Number of Channels (2.4 GHz - 2.441 GHz)



Test Plots (GFSK)

Number of Channels (2.441 GHz - 2.4835 GHz)

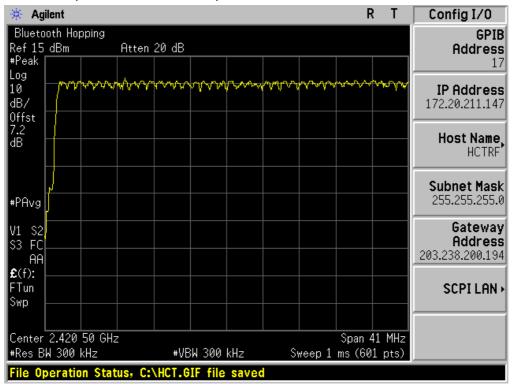


FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT	www.hct.co.kr
Test Report No. HCT-R-1403-F012	Date of Issue: March 07, 2014	EUT Type: Mobile Phone	FCC ID: A3LSHWM580D
		D 00 . (75	



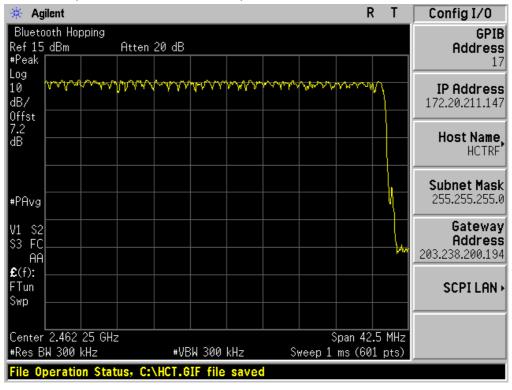
Test Plots (8DPSK)

Number of Channels (2.4 GHz - 2.441 GHz)



Test Plots (8DPSK)

Number of Channels (2.441 GHz - 2.4835 GHz)

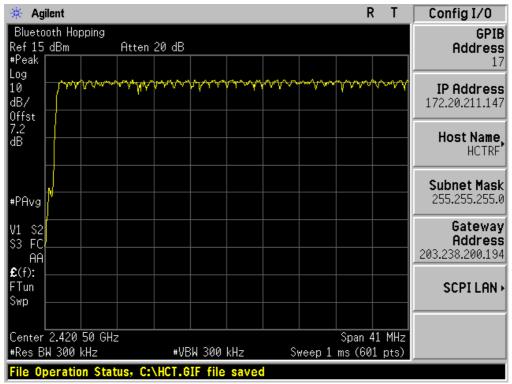


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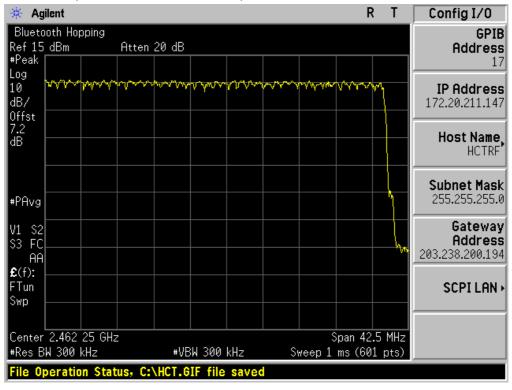
Test Plots (π/4DQPSK)

Number of Channels (2.4 GHz - 2.441 GHz)



Test Plots (π/4DQPSK)

Number of Channels (2.441 GHz - 2.4835 GHz)



FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT	www.hct.co.kr			
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Dage 25 of 75						

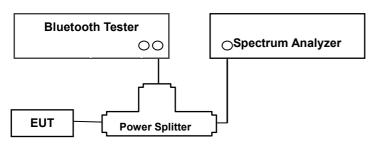


8.5 TIME OF OCCUPANCY (DWELL TIME)

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 : 2.883 * (1600/6)/79 * 31.6 = 307.52 (ms)**2-DH 5**(The longest packet type for $\pi/4DQPSK$) CH Mid : 2.883 * (1600/6)/79 * 31.6 = 307.52 (ms)**3-DH 5**(The longest packet type for 8DPSK) CH Mid : 2.883 * (1600/6)/79 * 31.6 = 307.52 (ms)

AFH Mode

DH 5(The longest packet type for GFSK) CH Mid : 2.883 * (800/6)/20 * 8.0 = 153.76 (ms)

2-DH 5(The longest packet type for π /4DQPSK)

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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 : 2.883 * (800/6)/20 * 8.0 = 153.76 (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.

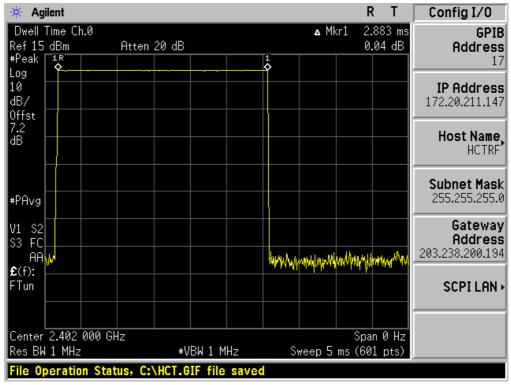
	Channel	GFSK	8DPSK	π/4DQPSK
Pulse	Low	2.883	2.892	2.892
Time	Mid	2.883	2.883	2.883
(ms)	High	2.892	2.892	2.892

	Channel	GFSK	8DPSK	π/4DQPSK	Period Time (s)	Limit (ms)	Result
Total of	Low	307.52	308.48	308.48	31.6		PASS
Dwell	Mid	307.52	307.52	307.52	31.6	400	PASS
(ms)	High	308.48	308.48	308.48	31.6		PASS

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



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

🔆 Agilent		F	₹ T	Config I/0
Dwell Time Ch.39 Ref 15 dBm Atten :	20 dB		.883 ms .06 dB	GPIB Address
#Peak 1R Log A				17
10 dB/				IP Address 172.20.211.147
dB				Host Name, HCTRF
#PAvg				Subnet Mask 255.255.255.0
V1 S2 S3 FC AAMAL of ALIAA ALIAA			L.M	Gateway Address 203.238.200.194
£(f): FTun		hand a start and a start	AI W^YT*V	SCPI LAN >
Center 2.441 000 GHz			n 0 Hz	
Res BW 1 MHz File Operation Status, C:\	#VBW 1 MHz HCT.GIF file saved	Sweep 5 ms (60	l pts)	

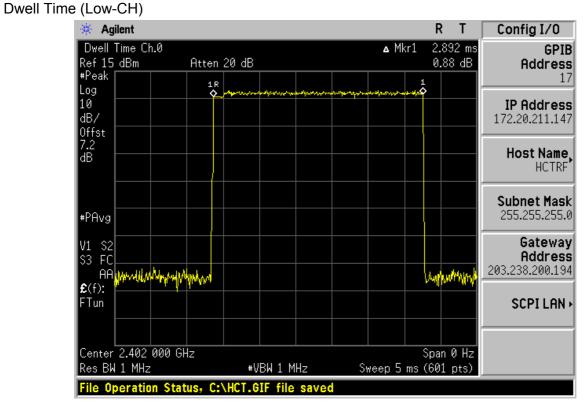
TEST REPORT		FCC CERTIFICATION REPORT	www.hct.co.kr
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Test Plots (GFSK) Dwell Time (High-CH)

🔆 Agilent			RT	Config I/O
Dwell Time Ch.78 Ref 15 dBm At #Peak	ten 20 dB	▲ Mkr1	2.892 ms 0.05 dB	GPIB Address
Log	Å			17
10 dB/ Offst				IP Address 172.20.211.147
dB				Host Name, HCTRF
#PAvg				Subnet Mask 255.255.255.0
V1 S2 S3 FC θθ	ha		เป็นไกร์ 1 แก้เป็นเล	Gateway Address 203.238.200.194
AA you way			Jullin Arturdiska	SCPI LAN 🕨
Center 2.480 000 GHz			Span 0 Hz	
Res BW 1 MHz	#VBW 1 MH:	z Sweep 5 ms		
File Operation Status,	C:\HCT.GIF file s	aved		

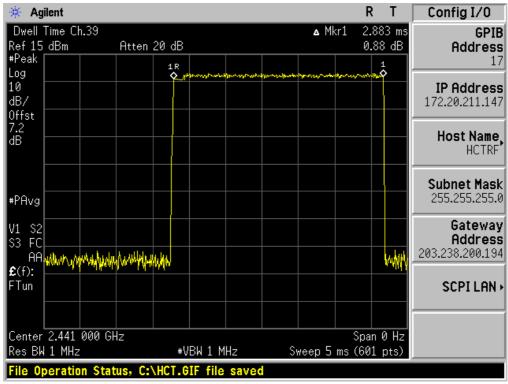
Test Plots (8DPSK)



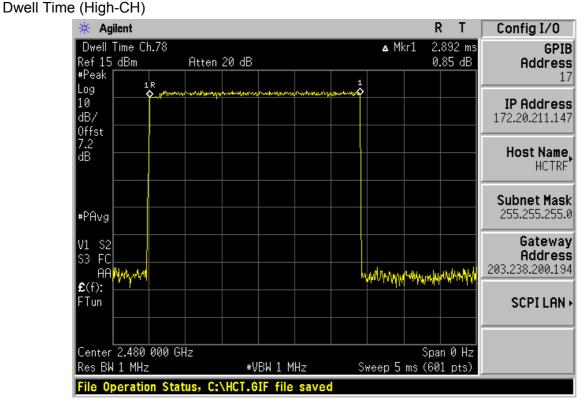
FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT				
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Test Plots (8DPSK) Dwell Time (Mid-CH)



Test Plots (8DPSK)

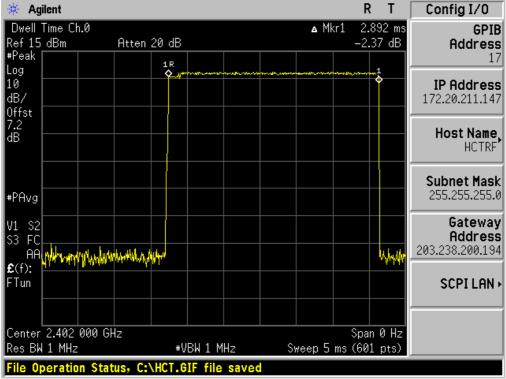


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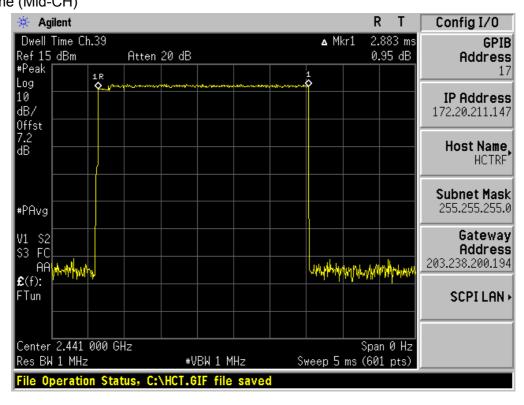


Test Plots (π/4DQPSK)

Dwell Time (Low-CH)



Test Plots (π/4DQPSK) Dwell Time (Mid-CH)



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Test Plots (π/4DQPSK) Dwell Time (High-CH)

🔆 Agilent				RT	Config I/0
Dwell Time Ch.78 Ref 15 dBm #Peak	Atten 20 dB		▲ Mkr1	. 2.892 ms 0.51 dB	Address
Log 1R 10 dB/ Offst	มูปข้างกร้างสำนักสุดมีการังการกำลัง _{การไป}	1			17 IP Address 172.20.211.147
dB					Host Name, HCTRF
#PAvg					Subnet Mask 255.255.255.0
V1 S2 S3 FC AA <mark>%</mark> £(f):			nuunuuhhunhuun	Warmanthana	Gateway Address 203.238.200.194
FTun					SCPI LAN >
Center 2.480 000 GH Res BW 1 MHz		l 1 MHz	Sweep 5 ms	Span 0 Hz s (601 pts)	
File Operation Stat	us, C:\HCT.GIF	file saved			

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8.6 SPURIOUS EMISSIONS

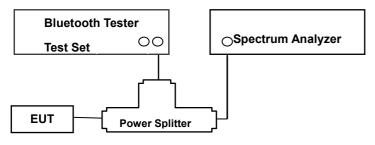
8.6.1 CONDUCTED SPURIOUS EMISSIONS

Test Requirements and limit, §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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. 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 § 15.205(c)).

Limit : 20 dBc

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 Spectrum Analyzer is set to (DA 00-705)

- 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.
- 2. RBW = 100 kHz
- 3. VBW ≥ 300 kHz
- 4. Sweep = auto
- 5. Sweep point ≥ 2*span/RBW
- 5. Detector function = peak

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6. Trace = max hold

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

This test is performed with hopping off.

TEST RESULTS

No non-compliance noted.

Note : In order to simplify the report, attached plots were only the worst case channel and data rate.

FACTORS F	FACTORS FOR FREQUENCY					
Freq(MHz)	Factor(dB)					
30	10.01					
100	10.02					
200	10.10					
300	10.09					
400	10.13					
500	10.21					
600	10.13					
700	10.31					
800	10.18					
900	10.30					
1000	10.17					
2000	8.53					
2400*	7.18					
2500*	7.18 7.21					
3000	8.59					
4000	10.02					
5000	9.88					
6000	5.70					
7000	10.21					
8000	6.13					
9000	8.79					
10000	12.46					
11000	8.11					
12000	9.52					
13000	8.98					
14000	8.13					
15000	11.82					
16000	6.92					
17000	13.23					
18000	10.25					
19000	10.28					
20000	9.10					
21000	10.94					
22000	11.54					
23000	8.81					
24000	11.71					
25000	9.37					
26000	9.34					

Note : 1. '*' is fundamental frequency range.

2. Factor = Cable loss + Splitter loss

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Test Plots (GFSK) - 30 MHz - 1 GHz Spurious Emission (Mid-CH)

Center Freq 515.00000		Trig: Free Run Atten: 24 dB	#Avg Type: RMS Avg Hold: 1/1	09:17:26 PMI TRACE TYPE DET		Frequency
Ref Offset 7.2 dB 0 dBidiy Ref 20.00 dBm	e .		M	kr1 828.55	9 MHz 3 dBm	Auto Tune
ia o						Center Fre 515.000000 MH
10.0					-11.11.0-1	Start Fre 30.000000 MH
90.0 90.0						Stop Fre 1.00000000 GH
40.0						CF Ste 97.000000 MH wto Ma
	- Little of Little of A					Freq Offse 0 H
Start 30.0 MHz Res BW 100 kHz		300 kHz	<u> </u>	Stop 1.00	00 GHz	

Test Plots (GFSK) - 1 GHz – 3 GHz Spurious Emission (Mid-CH)

Agilent Spectrum Analyzer - Swept OR RL: RP 500 Center Freq 2.0000000	AC.	56M(6(9V1)	ALION #Avg Type: RM		PM Mar 04, 2014	Frequency
Center Freq 2.00000	PNO: Fast ++++	Trig: Free Run Atten: 24 dB	Avg Hold: 1/1	T	ET P P P P P P	1500000000
Ref Offset 7.2 dl	B m			Mkr1 2.706 -55.3	25 GHz 57 dBm	Auto Tune
100						Center Freq 2.000000000 GHz
-10.0					11.21.6	Start Freq 1.000000000 GHz
-30.9						Stop Freq 3.00000000 GHz
40.0				1		CF Step 200.000000 MHz Auto Man
40.0	an a de familie	a transfirm				Freq Offset 0 Hz
-70.0						
Start 1.000 GHz #Res BW 100 kHz	#VBW 3	00 kHz	Swe	Stop 3 ep 192 ms (4	3.000 GHz 40001 pts)	
#Res BW 100 kHz		00 KHZ		ep 192 ms (4 status	(0001 pts)	-

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Test Plots (GFSK) - 3 GHz - 5 GHz Spurious Emission (Mid-CH)

Center Freq 4.000000000	GHz PN0: Fast ++-	Trig: Free Run Atten: 24 dB	#Avg Type: RMS AvgjHold: 1/1	DR 17-42 PM Mar D4, 2014 RRACE 2 2 4 9 TYPE DET P P P P P	Frequency
Ref Offset 7.2 dB 0 dB/div Ref 20.00 dBm			Mkr	1 4.881 75 GHz -42.358 dBm	Auto Tune
10.0					Center Fre 4.000000000 GH
10.0				11.21.40%	Start Free 3.000000000 GH
30.0					Stop Free 5.00000000 GH
40.0					CF Step 200.000000 MH Auto Mar
a designed the state of the state				antis and an	Freq Offse 0 Hi
Start 3.000 GHz Res BW 100 kHz	#VBW 3	100 kHz	Sweep	Stop 5.000 GHz 192 ms (40001 pts)	

Test Plots (GFSK) - 5 GHz - 7 GHz Spurious Emission (Mid-CH)

Agilent Spectrum Analyzer - Swept SA							
Center Freq 6.00000000	PNO: Fast +++ Trig: Fr	ree Run	#Avg Type Avg[Hold:			Mar 04, 2014	Frequency
Ref Offset 7.2 dB 10 dBidiy Ref 20.00 dBm	IFGain:Low Atten:	24 dB	120100	Mkr	6.694 5		Auto Tune
100							Center Freq 6.00000000 GHz
-10.0						11.11.45%	Start Freq 5.00000000 GHz
-30.0							Stop Freq 7.00000000 GHz
40.0							CF Step 200.000000 MHz Auto Man
452.0 ale eleveriter estadol la la del compositione de la composition de la compositione de la compositione de	n din ana din din din di katala Paragana na mjeri katala din din di	the state			1 A secolarity mestical		Freq Offset 0 Hz
Start 5.000 GHz #Res BW 100 kHz	#VBW 300 kH	Iz		Sweep 1	Stop 7.(92 ms (40	000 GHz 001 pts)	
uso 🜙 Points changed; all trace	s cleared			STATUS			

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Test Plots (GFSK) - 7 GHz - 9 GHz Spurious Emission (Mid-CH)

Center Freq 8.000000000	PNO: East ++++	Trig: Free Run Atten: 24 dB	#Avg Type: RMS Avg[Held: 1/1		Frequency
Ref Offset 7.2 dB 0 dBidiy Ref 20.00 dBm			N	/kr1 7.334 45 GH -57.336 dBn	Auto Tune
iao					Center Free 8.000000000 GH
io.0				11.21.40	Start Free 7.000000000 GH
xx x x x x x x x x x x x x x x x x x x					Stop Fre 9.000000000 GH
40.0					CF Ste 200.000000 MH <u>Auto</u> Ma
					Freq Offse 0 H
Start 7.000 GHz Res BW 100 kHz	#VBW 3			Stop 9.000 GHz p 192 ms (40001 pts	

Test Plots (GFSK) - 9 GHz - 11 GHz Spurious Emission (Mid-CH)

Agilent Spectrum Analyzer - Swept SA					
Center Freq 10.00000000	DO GHz PNO: Fast +++	Trig: Free Run Atten: 24 dB	#Avg Type: RMS Avg[Held: 1/1	09:10:30 PM Mar 04, 2014 TRACE 2014 TYPE LET P P P P P	Frequency
Ref Offset 7.2 dB			Mk	r1 9.098 20 GHz -57.938 dBm	Auto Tune
ia 0					Center Freq 10.000000000 GHz
-10.0				11.11.40%	Start Freq 9.00000000 GHz
30.9 					Stop Freq 11.00000000 GHz
-40.0					CF Step 200.000000 MHz Auto Man
	et dan belander wittigten der et der et			habahan Konstana pina Munimikan kangana ma	Freq Offset 0 Hz
Start 9.000 GHz #Res BW 100 kHz	#VBW 3	00 kHz	Sweep	Stop 11.000 GHz 192 ms (40001 pts)	
uso JPoints changed, all traces	cleared		STAT	18	

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Test Plots (GFSK) - 11 GHz - 13 GHz Spurious Emission (Mid-CH)

Center Freq 12.00000000	PNO: East ++++	Trig: Free Run Atten: 24 dB	#Avg Type: RMS Avg[Hold: 1/1	09:10:45 PM Mar 04, 2014 TRACE P 2:13 TYPE MULLION DET P P P P P	Frequency
Ref Offset 7.2 dB 0 dB/dly Ref 20.00 dBm			Mkr1	11.693 45 GHz -56.033 dBm	Auto Tune
iao					Center Free 12.000000000 GH
ic 0				11.21.60	Start Free 11.000000000 GH
30.0 30.0					Stop Free 13.000000000 GH
40.0					CF Ste 200.000000 MH Auto Ma
				n na delen delen sin da. Yn riened de Snjërnay en	Freq Offse 0 H
Start 11.000 GHz Res BW 100 kHz	#VBW 3	00 kHz	Sweep	Stop 13.000 GHz 92 ms (40001 pts)	

Test Plots (GFSK) - 13 GHz – 15 GHz

Spurious Emission (Mid-CH)

Agilent Spectrum Analyzer - Swept SA 02 RL RF SDB AC Center Freq 14.00000000	PNO: Fast +++ T	rig: Free Run	#Avg Type: RMS Avg[Hold: 1/1	09:19:02 PM Mar 04, 2014 TRACE 2014 TYPE TYPE P P P P P P	Frequency
Ref Offset 7.2 dB 10 dBidiv Ref 20.00 dBm	IFGain:Low P	itten: 24 dB	Mkr1	14.827 10 GHz -54.005 dBm	Auto Tune
ino					Center Freq 14.00000000 GHz
-10.0				11.11.40	Start Freq 13.00000000 GHz
-30.9					Stop Freq 15.00000000 GHz
-40.0				ti	CF Step 200.000000 MHz Auto Man
40.0 H. Statemedia (A.M. Artania) - 20.0		el fect a la facta de 12 périos y al provincio a	a bita a kasta da kasta a serifanan Alim mada pinanan manjari ya mi	energiani andalari energiani andalari	Freq Offset 0 Hz
Start 13.000 GHz #Res BW 100 kHz	#VBW 30	0 kHz	Sweep	Stop 15.000 GHz 192 ms (40001 pts)	

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Test Plots (GFSK) – 15 GHz - 17 GHz Spurious Emission (Mid-CH)

enter Freq 16.0000000	00 GHz	ee Run AvgHol		DR 19 18 PM Mar 04, 201 TRACE TYPE DET P P P P P	Frequency
Ref Offset 7.2 dB 0 dBidiy Ref 20.00 dBm			Mkr1	16.706 05 GH -52.870 dBn	z Auto Tune
(0.0)					Center Free 16.000000000 GH
E.0)				11.21.40	Start Free 15.00000000 GH:
90.0 90.0					Stop Free 17.00000000 GH
40.0				6 ¹	CF Step 200.000000 MH <u>Auto</u> Mar
			de de a dutina		Freq Offse 0 Hi
Start 15.000 GHz Res BW 100 kHz	#VBW 300 kH	17	Sweep 1	Stop 17.000 GH 92 ms (40001 pts	Z

Test Plots (GFSK) - 17 GHz - 19 GHz

Spurious Emission (Mid-CH)

Center Freq 18.0000000	PNO: Fast +++ Trig: Free Run	#Avg Type: RMS Avg Hold: 1/1	09:19:50 FM M# 04, 2014 TRACE 2 2 4 5 TYPE MUMMUM DET P FF P F F	Frequency
Ref Offset 7.2 dB	IFGain:Low Atten: 24 dB	Mkr1	18.973 95 GHz -53.948 dBm	Auto Tune
100				Center Freq 18.000000000 GHz
-10.0			11.21.45%	Start Freq 17.000000000 GHz
-30.0				Stop Freq 19.00000000 GHz
40.0			1	CF Step 200.000000 MHz Auto Man
an a <mark>the line on a line line of a deservation of the line of the </mark>		nitere biritik beterdet Telepiperiter	alarina da ang mining	Freq Offset 0 Hz
Start 17.000 GHz #Res BW 100 kHz	#VBW 300 kHz	Sweep	Stop 19.000 GHz 192 ms (40001 pts)	

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Test Plots (GFSK) - 19 GHz - 21 GHz Spurious Emission (Mid-CH)

RL 88 508 AC Center Freq 20.0000000	DO GHZ		Aug/Hold: 1/1	09:20:06 PM Mir 04, 2014 TRACE 2 2 1 2 TYPE MUMANNE DET 2 P P P P P	Frequency
Ref Offset 7.2 dB 0 dBidiv Ref 20.00 dBm			Mkr1	20.975 45 GHz -51.340 dBm	Auto Tune
10.0					Center Free 20.000000000 GH
10.0 10.0				11.31.654	Start Free 19.00000000 GH
90.0 90.0					Stop Fre 21.00000000 GH
40.0					CF Stej 200.000000 MH Auto Ma
					Freq Offse 0 H
Start 19.000 GHz Res BW 100 kHz	#VBW 300 k	Hz	Sweep	Stop 21.000 GHz 192 ms (40001 pts)	

Test Plots (GFSK) - 21 GHz - 23 GHz

Spurious Emission (Mid-CH)



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Test Plots (GFSK) - 23 GHz - 25 GHz Spurious Emission (Mid-CH)

Center Freq 24.00000000	PNO: Fast	Trig: Free Run Atten: 24 dB	#Avg Type: RMS Avg[Hold: 1/1	09:20:30 PM Mar 04, 2014 TRACE TYPE TYPE DEP P.P.P.	Frequency
Ref Offset 7.2 dB Ref 20.00 dBm	B Gain:Low	Autor, 14 db	Mkr1	24.956 65 GHz -48.425 dBm	Auto Tune
.cg					Center Free 24.000000000 GH
10.0				11.11.65	Start Fre 23.00000000 GH
30.0					Stop Fre 25.00000000 GH
40.0 60.0 11.03 - June - Minto, Roce Automatic		Line of the line o	defailed to deforme 1 and and		CF Stej 200.000000 MH Auto Ma
				and the second se	Freq Offse 0 H
Start 23.000 GHz Res BW 100 kHz	#VBW	300 kHz	Sweep	Stop 25.000 GHz 192 ms (40001 pts)	

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8.6.2 RADIATED SPURIOUS EMISSIONS

LIMIT : §15.247(d), §15.205, §15.209

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.

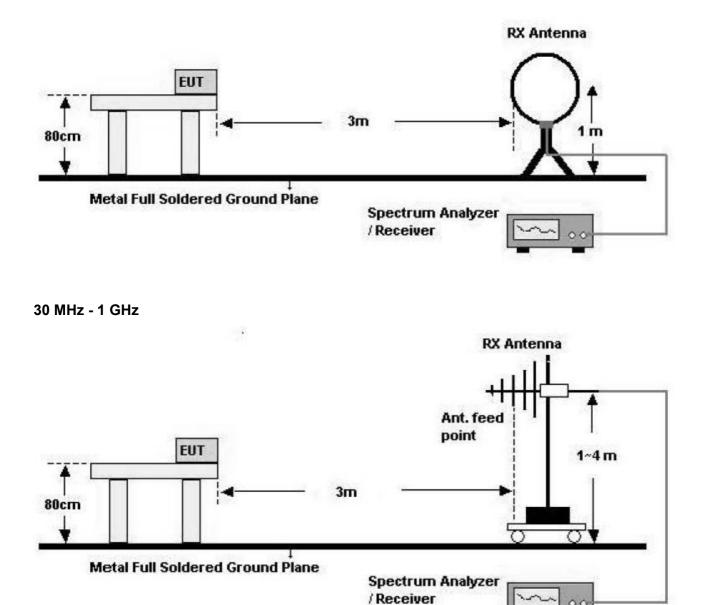
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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Test Configuration

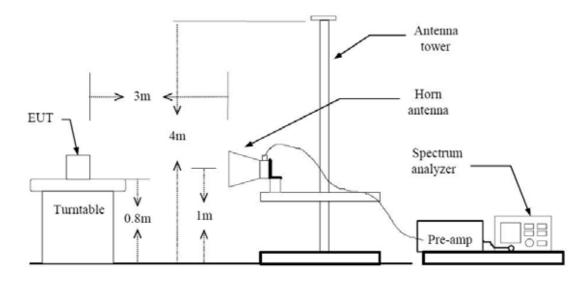
Below 30 MHz



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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.
- 7. 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 = 1 kHz \ge 1/T Hz, where T = pulse width in seconds.

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TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin			
MHz	dBµV	dB /m	dB	(H/V)	dBµV/m	dBµV/m	dB			
	No Critical peaks found									

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 (specific distance / test distance) (dB)
- 4. Limit line = specific Limits (dBuV) + Distance extrapolation factor
- 5. This test is performed with hopping off.
- 6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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TEST RESULTS

Below 1 GHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin			
MHz	dBµV	dB /m	dB	(H/V)	dBµV/m	dBµV/m	dB			
	No Critical peaks found									

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.
- 3. This test is performed with hopping off.
- 4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Above 1 GHz

Operation Mode: CH Low(GFSK)

Frequency	Reading	A.F+CL-AMP GAIN	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Detect
[MHz]	dBuV	[dB]	[H/V]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4804	61.33	-4.32	V	0	57.01	73.98	16.97	PK
4804	57.51	-4.32	V	-24.76	28.43	53.98	25.55	AV
7206	52.61	5.18	V	0	57.79	73.98	16.19	PK
7206	38.40	5.18	V	-24.76	18.83	53.98	35.15	AV
4804	60.98	-4.32	н	0	56.66	73.98	17.32	PK
4804	57.34	-4.32	Н	-24.76	28.26	53.98	25.72	AV
7206	52.61	5.18	Н	0	57.79	73.98	16.19	PK
7206	38.51	5.18	Н	-24.76	18.94	53.98	35.04	AV

Operation Mode: CH Low(8DPSK)

Frequency	Reading	A.F+CL-AMP GAIN	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Detect
[MHz]	dBuV	[dB]	[H/V]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4804	59.08	-4.32	V	0	54.76	73.98	19.22	PK
4804	50.60	-4.32	V	-24.76	21.52	53.98	32.46	AV
7206	52.63	5.18	V	0	57.81	73.98	16.17	PK
7206	38.44	5.18	V	-24.76	18.87	53.98	35.11	AV
4804	59.26	-4.32	Н	0	54.94	73.98	19.04	PK
4804	50.60	-4.32	Н	-24.76	21.52	53.98	32.46	AV
7206	51.79	5.18	Н	0	56.97	73.98	17.01	PK
7206	38.38	5.18	Н	-24.76	18.81	53.98	35.17	AV

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Frequency	Reading	A.F+CL-AMP GAIN	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Detect
[MHz]	dBuV	[dB]	[H/V]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4804	58.83	-4.32	V	0	54.51	73.98	19.47	PK
4804	50.50	-4.32	V	-24.76	21.42	53.98	32.56	AV
7206	52.54	5.18	V	0	57.72	73.98	16.26	PK
7206	38.38	5.18	V	-24.76	18.81	53.98	35.17	AV
4804	58.39	-4.32	Н	0	54.07	73.98	19.91	PK
4804	50.45	-4.32	Н	-24.76	21.37	53.98	32.61	AV
7206	52.21	5.18	Н	0	57.39	73.98	16.59	PK
7206	38.62	5.18	Н	-24.76	19.05	53.98	34.93	AV

Operation Mode: CH Low(π/4DQPSK)

A·F: ANTENNA FACTOR

C·L: CABLE LOSS

AMP GAIN: AMPLIFIER GAIN

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.
- 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. Total = Reading Value + Antenna Factor + Cable Loss Amp Gain + Duty Cycle Correction Factor
- 5. 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 = 1 kHz \ge 1/T Hz, where T = pulse width in seconds. We performed using a reduced video BW method was done with the analyzer in linear mode.
- 6. FYI : Duty Cycle Correction Factor (79 channel hopping)
 - a. Time to cycle through all channels= Δ t= τ [ms] x 79 channels = 228.468 ms, where τ = pulse width
 - b. 100 ms/ Δt [ms] = $H \rightarrow$ Round up to next highest integer, H' = 1
 - c. Worst Case Dwell Time = T [ms] x H ' = 2.892 ms
 - d. Duty Cycle Correction = 20log (Worst Case Dwell Time/ 100ms) dB = -30.776 dB
- 7. Duty Cycle Correction Factor(AFH mode minimum channel number case 20 channels)
 - a. Time to cycle through all channels= Δ t= τ [ms] x 20 channels = 57.84 ms, where τ = pulse width
 - b. 100 ms/ Δt [ms] = $H \rightarrow$ Round up to next highest integer, H' = 2
 - c. Worst Case Dwell Time = τ [ms] x H ' = 5.784 ms
 - d. Duty Cycle Correction(AFH) = 20log (Worst Case Dwell Time/ 100ms) dB = -24.7554 dB
 - e. We applied DCCF in the test result which hopping channel number is 20.

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- 8. We have done Normal Mode and EDR Mode test.
- 9. This test is performed with hopping off.
- 10. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Operation Mode: CH Mid(GFSK)

Frequency	Reading	A.F+CL-AMP GAIN	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Detect
[MHz]	dBuV	[dB]	[H/V]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4882	56.86	-3.95	V	0	52.91	73.98	21.07	PK
4882	51.69	-3.95	V	-24.78	22.96	53.98	31.02	AV
7323	52.28	5.46	V	0	57.74	73.98	16.25	PK
7323	38.55	5.46	V	-24.78	19.22	53.98	34.76	AV
4882	56.12	-3.95	н	0	52.17	73.98	21.81	PK
4882	50.03	-3.95	Н	-24.78	21.30	53.98	32.68	AV
7323	52.06	5.46	Н	0	57.52	73.98	16.47	PK
7323	38.54	5.46	Н	-24.78	19.21	53.98	34.77	AV

Operation Mode: CH Mid(8DPSK)

Frequency	Reading	A.F+CL-AMP GAIN	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Detect
[MHz]	dBuV	[dB]	[H/V]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4882	55.42	-3.95	V	0	51.47	73.98	22.51	PK
4882	45.98	-3.95	V	-24.78	17.25	53.98	36.73	AV
7323	52.33	5.46	V	0	57.79	73.98	16.20	PK
7323	38.37	5.46	V	-24.78	19.04	53.98	34.94	AV
4882	54.40	-3.95	Н	0	50.45	73.98	23.53	PK
4882	44.44	-3.95	н	-24.78	15.71	53.98	38.27	AV
7323	52.20	5.46	Н	0	57.66	73.98	16.33	PK
7323	38.38	5.46	Н	-24.78	19.05	53.98	34.93	AV

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Operation Mode: CH Mid(π/4DQPSK)

Frequency	Reading	A.F+CL-AMP GAIN	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Detect
[MHz]	dBuV	[dB]	[H/V]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4882	55.91	-3.95	V	0	51.96	73.98	22.02	PK
4882	45.80	-3.95	V	-24.78	17.07	53.98	36.91	AV
7323	52.24	5.46	V	0	57.70	73.98	16.29	PK
7323	38.31	5.46	V	-24.78	18.98	53.98	35.00	AV
4882	54.20	-3.95	Н	0	50.25	73.98	23.73	PK
4882	44.31	-3.95	Н	-24.78	15.58	53.98	38.40	AV
7323	51.82	5.46	н	0	57.28	73.98	16.71	PK
7323	38.41	5.46	Н	-24.78	19.08	53.98	34.90	AV

A·F: ANTENNA FACTOR C·L: CABLE LOSS

AMP GAIN: AMPLIFIER GAIN

Notes:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 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. Total = Reading Value + Antenna Factor + Cable Loss Amp Gain + Duty Cycle Correction Factor
- 5. 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 = 1 kHz \ge 1/T Hz, where T = pulse width in seconds. We performed using a reduced video BW method was done with the analyzer in linear mode.
- 6. FYI : Duty Cycle Correction Factor (79 channel hopping)
 - a. Time to cycle through all channels= Δ t= τ [ms] x 79 channels = 227.757 ms, where τ = pulse width
 - b. 100 ms/ Δt [ms] = $H \rightarrow$ Round up to next highest integer, H' = 1
 - c. Worst Case Dwell Time = T [ms] x H ' = 2.883 ms
 - d. Duty Cycle Correction = 20log (Worst Case Dwell Time/ 100ms) dB = -30.803 dB
- 7. Duty Cycle Correction Factor(AFH mode minimum channel number case 20 channels)
 - a. Time to cycle through all channels= Δ t= τ [ms] x 20 channels = 57.66 ms, where τ = pulse width
 - b. 100 ms/ Δt [ms] = $H \rightarrow$ Round up to next highest integer, H' = 2
 - c. Worst Case Dwell Time = T [ms] x H ' = 5.766 ms
 - d. Duty Cycle Correction(AFH) = 20log (Worst Case Dwell Time/ 100ms) dB = -24.7825 dB

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- e. We applied DCCF in the test result which hopping channel number is 20.
- 8. We have done Normal Mode and EDR Mode test.
- 9. This test is performed with hopping off.
- 10. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Operation Mode: CH High(GFSK)

Frequency	Reading	A.F+CL-AMP GAIN	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Detect
[MHz]	dBuV	[dB]	[H/V]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4960	54.25	-3.49	V	0	50.76	73.98	23.22	PK
4960	45.96	-3.49	V	-24.76	17.72	53.98	36.26	AV
7440	51.90	5.10	V	0	57.00	73.98	16.98	PK
7440	38.16	5.10	V	-24.76	18.50	53.98	35.48	AV
4960	54.72	-3.49	н	0	51.23	73.98	22.75	PK
4960	47.57	-3.49	Н	-24.76	19.33	53.98	34.65	AV
7440	52.22	5.10	Н	0	57.32	73.98	16.66	PK
7440	38.21	5.10	Н	-24.76	18.55	53.98	35.43	AV

Operation Mode: CH High(8DPSK)

Frequency	Reading	A.F+CL-AMP GAIN	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Detect
[MHz]	DBuV	[dB]	[H/V]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	Delect
4960	52.73	-3.49	V	0	49.24	73.98	24.74	PK
4960	41.35	-3.49	V	-24.76	13.11	53.98	40.87	AV
7440	51.43	5.10	V	0	56.53	73.98	17.45	PK
7440	38.20	5.10	V	-24.76	18.54	53.98	35.44	AV
4960	52.99	-3.49	н	0	49.50	73.98	24.48	PK
4960	42.20	-3.49	Н	-24.76	13.96	53.98	40.02	AV
7440	52.54	5.10	Н	0	57.64	73.98	16.34	PK
7440	38.30	5.10	Н	-24.76	18.64	53.98	35.34	AV

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Frequency	Reading	A.F+CL-AMP GAIN	ANT. POL	Duty Cycle Correction	Total	Limit	Margin	Detect
[MHz]	dBuV	[dB]	[H/V]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	Detect
4960	52.29	-3.49	V	0	48.80	73.98	25.18	PK
4960	41.23	-3.49	V	-24.76	12.99	53.98	40.99	AV
7440	51.68	5.10	V	0	56.78	73.98	17.20	PK
7440	38.29	5.10	V	-24.76	18.63	53.98	35.35	AV
4960	53.79	-3.49	н	0	50.30	73.98	23.68	PK
4960	42.30	-3.49	н	-24.76	14.06	53.98	39.92	AV
7440	51.93	5.10	Н	0	57.03	73.98	16.95	PK
7440	38.23	5.10	Н	-24.76	18.57	53.98	35.41	AV

Operation Mode: CH High (π/4DQPSK)

A·F: ANTENNA FACTOR C·L: CABLE LOSS AMP GAIN: AMPLIFIER GAIN

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. Total = Reading Value + Antenna Factor + Cable Loss Amp Gain + Duty Cycle Correction Factor
- 5. 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 = 1 kHz \ge 1/T Hz, where T = pulse width in seconds. We performed using a reduced video BW method was done with the analyzer in linear mode.
- 6. FYI : Duty Cycle Correction Factor (79 channel hopping)
 - a. Time to cycle through all channels= Δ t= τ [ms] x 79 channels = 228.468 ms, where τ = pulse width
 - b. 100 ms/ Δt [ms] = $H \rightarrow$ Round up to next highest integer, H '=1
 - c. Worst Case Dwell Time = T [ms] x H '= 2.892 ms
 - d. Duty Cycle Correction = 20log (Worst Case Dwell Time/ 100ms) dB = -30.776 dB
- 7. Duty Cycle Correction Factor(AFH mode minimum channel number case 20 channels)
 - a. Time to cycle through all channels= Δ t= τ [ms] x 20 channels = 57.84 ms, where τ = pulse width
 - b. 100 ms/ Δt [ms] = $H \rightarrow$ Round up to next highest integer, H' = 2
 - c. Worst Case Dwell Time = T [ms] x H ' = 5.784 ms
 - d. Duty Cycle Correction(AFH) = 20log (Worst Case Dwell Time/ 100ms) dB = -24.7554 dB

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- e. We applied DCCF in the test result which hopping channel number is 20.
- 8. We have done Normal Mode and EDR Mode test.
- 9. This test is performed with hopping off.
- 10. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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8.6.3 RADIATED RESTRICTED BAND EDGES

Test Requirements and limit, §15.247(d), §15.205, §15.209

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	Normal(GFSK)
Operating Frequency	2402 MHz
Channel No	CH 0

Frequency	Reading	A.F+CL	ANT. POL	Total	Limit	Margin	Detect
[MHz]	dBuV	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Detect
2390.0	25.07	33.90	н	58.97	73.98	15.01	PK
2390.0	11.92	33.90	н	45.82	53.98	8.16	AV
2390.0	25.12	33.90	V	59.02	73.98	14.96	PK
2390.0	11.91	33.90	V	45.81	53.98	8.17	AV

Operation Mode Operating Frequency Channel No EDR(8DPSK) 2402 MHz CH 0

Frequency [MHz]	Reading dBuV	A.F+CL [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2390.0	25.32	33.90	H	59.22	73.98	14.76	PK
2390.0	11.95	33.90	H	45.85	53.98	8.13	AV
2390.0	25.40	33.90	V	59.30	73.98	14.68	PK
2390.0	11.92	33.90	V	45.82	53.98	8.16	AV

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Operation Mode	EDR(π/4DQPSK)
Operating Frequency	2402 MHz
Channel No	CH 0

Frequency	Reading	A.F+CL	ANT. POL	Total	Limit	Margin	Detect
[MHz]	dBuV	[dB]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Detect
2390.0	25.09	33.90	Н	58.99	73.98	14.99	PK
2390.0	11.88	33.90	н	45.78	53.98	8.20	AV
2390.0	24.63	33.90	V	58.53	73.98	15.45	PK
2390.0	11.93	33.90	V	45.83	53.98	8.15	AV

A·F: ANTENNA FACTOR

C·L: CABLE LOSS

Notes:

- 1.. Frequency range of measurement = 2310 MHz ~ 2390 MHz
- 2. Total = Fundamental Reading Value + Antenna Factor + Cable Loss
- 3. 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 = 1 kHz \ge 1/ τ Hz, where τ = pulse width in seconds. We performed using a reduced video BW method was done with the analyzer in linear mode.
- 4. We have done Normal Mode and EDR Mode.
- 5. This test is performed with hopping off.
- 6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna

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Operation Mode	Normal(GFSK)
Operating Frequency	2480 MHz
Channel No	CH 78

Frequency	Reading	A.F.+CL	Ant. Pol.	Duty Cycle Correction	Total	Limit	Margin	Detect
[MHz]	dBuV	[dB]	[H/V]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	Deleci
2483.5	35.15	33.99	Н	0	69.14	73.98	4.84	PK
2483.5	32.70	33.99	Н	-24.76	41.93	53.98	12.05	AV
2483.5	32.38	33.99	V	0	66.37	73.98	7.61	PK
2483.5	28.92	33.99	V	-24.76	38.15	53.98	15.83	AV

Operation Mode Operating Frequency Channel No EDR(8DPSK) 2480 MHz

CH 78

Frequency [MHz]	Reading dBuV	A.F.+CL [dB]	Ant. Pol. [H/V]	Duty Cycle Correction [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2483.5	34.08	33.99	Н	0	68.07	73.98	5.91	PK
2483.5	30.09	33.99	Н	-24.76	39.32	53.98	14.66	AV
2483.5	31.29	33.99	V	0	65.28	73.98	8.70	PK
2483.5	26.26	33.99	V	-24.76	35.49	53.98	18.49	AV

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Operation Mode	EDR(π/4DQPSK)
Operating Frequency	2480 MHz
Channel No	СН 78

Frequency	Reading	A.F.+CL	Ant. Pol.	Duty Cycle Correction	Total	Limit	Margin	Detect
[MHz]	dBuV	[dB]	[H/V]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	Detect
2483.5	34.25	33.99	Н	0	68.24	73.98	5.74	PK
2483.5	29.91	33.99	Н	-24.76	39.14	53.98	14.84	AV
2483.5	31.40	33.99	V	0	65.39	73.98	8.59	PK
2483.5	26.21	33.99	V	-24.76	35.44	53.98	18.54	AV

A·F: ANTENNA FACTOR

C·L: CABLE LOSS

AMP GAIN: AMPLIFIER GAIN

Notes:

- 1. Frequency range of measurement = 2483.5 MHz ~ 2500 MHz
- 2. Total = Fundamental Reading Value + Antenna Factor + Cable Loss Delta Value + Duty Cycle Correction Factor
- 3. 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 = 1 kHz \ge 1/T Hz, where T = pulse width in seconds.

We performed using a reduced video BW method was done with the analyzer in linear mode.

- 4. FYI : Duty Cycle Correction Factor (79 channel hopping)
 - a. Time to cycle through all channels= Δ t= τ [ms] x 79 channels = 228.468 ms, where τ = pulse width
 - b. 100 ms/ Δt [ms] = $H \rightarrow$ Round up to next highest integer, H '=1
 - c. Worst Case Dwell Time = T [ms] x H ' = 2.892 ms
 - d. Duty Cycle Correction = 20log (Worst Case Dwell Time/ 100ms) dB = -30.776 dB
- 5. Duty Cycle Correction Factor(AFH mode minimum channel number case 20 channels)
 - a. Time to cycle through all channels= Δ t= τ [ms] x 20 channels = 57.84 ms, where τ = pulse width
 - b. 100 ms/ Δt [ms] = $H \rightarrow$ Round up to next highest integer, H' = 2
 - c. Worst Case Dwell Time = T [ms] x H ' = 5.784 ms
 - d. Duty Cycle Correction(AFH) = 20log (Worst Case Dwell Time/ 100ms) dB = -24.7554 dB
 - e. We applied DCCF in the test result which hopping channel number is 20.
- 6. We have done Normal Mode, EDR Mode.
- 7. This test is performed with hopping off.
- 8. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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8.7 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:

	Limits (dBµV)				
Frequency Range (MHz)	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.

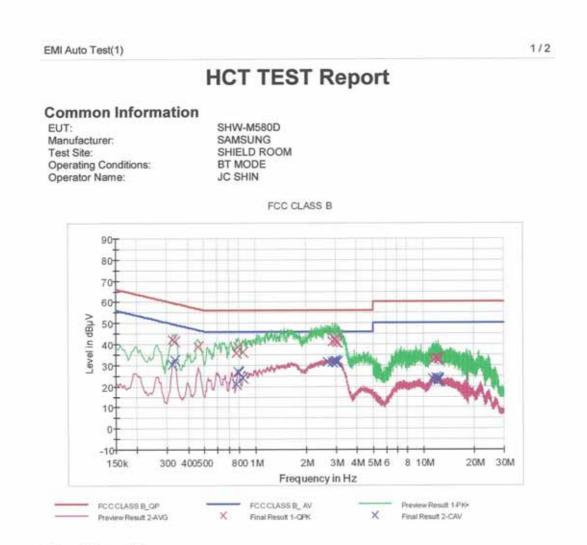
TEST PROCEDURE

- 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.
- 5. This test is performed with hopping off and 3 Mbps (3-DH5) data rate of No.78 channel.

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RESULT PLOTS Conducted Emissions (Line 1)



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.325500	41.9	9,000	Off	L1	9.7	17.7	59.6
0.334500	41.1	9.000	Off	L1	9.7	18.2	59.3
0.460500	38.9	9.000	Off	L1	9.7	17.8	56.7
0.774500	35.8	9.000	Off	L1	9.8	20.2	56.0
0.792500	38.5	9.000	Off	L1	9.8	17.5	56.0
0.846500	36.3	9.000	Off	L1	9.8	19.7	56.0
2.885000	41.4	9.000	Off	L1	10.0	14.6	56.0
2.966000	42.2	9.000	Off	L1	10.0	13.8	56.0
2.979500	42.7	9,000	Off	L1	10.0	13.3	56.0
3,015500	41.2	9.000	Off	L1	10.0	14.8	56.0
3.024500	41.2	9.000	Off	L1	10.0	14.8	56.0
3.083000	40.9	9.000	Off	L1	10.0	15.1	56.0
11.520500	32.8	9,000	Off	L1	10.5	27.2	60.0
11.894000	33.4	9.000	Off	L1	10.5	26.6	60.0
12.204500	33.2	9.000	Off	L1	10.5	26.8	60.0
12.281000	33.0	9,000	Off	L1	10.5	27.0	60.0

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EMI Auto Test(1)

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
12.294500	32.9	9.000	110	L1	10.5	27.1	60.0
12.312500	33.2	9,000	011	L1	10.5	26.8	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.325500	30.3	9.000	Off	L1	9.7	19.3	49.6
0.334500	32.6	9.000	110	L1	9.7	16.7	49.3
0.774500	21.0	9.000	ott	L1	9,8	25.0	46.0
0.792500	27.0	9.000	Off	L1	9,8	19.0	46.0
0.801500	26.7	9.000	Off	L1	9.8	19.3	46.0
0.846500	24.1	9.000	Off	L1	9.8	21.9	46.0
2,696000	31.6	9.000	Off	L1	9.9	14.4	46.0
2.885000	31.7	9.000	Off	L1	10.0	14.3	46.0
2.966000	32.1	9.000	Off	L1	10.0	13.9	46.0
3.015500	31.5	9.000	Off	L1	10.0	14.5	46.0
3.024500	31.7	9,000	Off	L1	10.0	14.3	46.0
3.083000	31.4	9,000	Off	L1	10.0	14.6	46.0
11,358500	23.4	9,000	Off	L1	10,5	26.6	50.0
11.894000	23.9	9,000	Off	L1	10.5	26.1	50.0
12,137000	23.7	9.000	Off	L1	10.5	26.3	50.0
12.204500	23.4	9,000	Off	L1	10.5	26.6	50.0
12.281000	22.9	9.000	Off	L1	10.5	27.1	50.0
12.312500	23.2	9.000	Off	L1	10.5	26.8	50.0

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Conducted Emissions (Line 2)

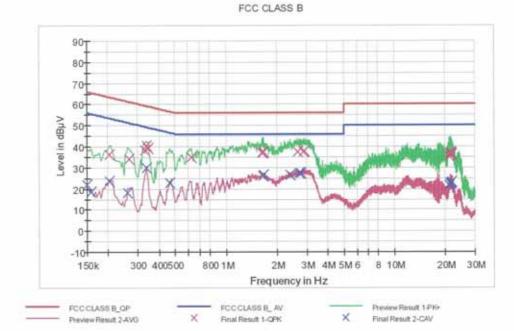
EMI Auto Test(1)

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HCT TEST Report

Common Information

EUT: Manufacturer: Test Site: Operating Conditions: Operator Name: SHW-M580D SAMSUNG SHIELD ROOM BT MODE JC SHIN



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBpV)
0.204000	36.2	9.000	Off	N	9.7	27.2	63.4
0.267000	34.3	9.000	Off	N	9.7	26.9	61.2
0.330000	38.4	9,000	Off	N	9.7	21.1	59.5
0.339000	40.3	9.000	Off	N	9.7	18.9	59.2
0.348000	39.1	9,000	Off	N	9.7	19.9	59.0
0.626000	35.0	9,000	Off	N	9.8	21.0	56.0
1.638500	37.2	9.000	110	N	9,9	18.8	56.0
1.661000	37.2	9.000	Off	N	9.9	18.8	56.0
1.670000	37.5	9.000	Off	N	9.9	18.5	56.0
2.655500	37.3	9.000	Off	N	9.9	18.7	56.0
2.889500	37.4	9.000	Off	N	10.0	18.6	56.0
2.925500	37.9	9,000	0ff	N	10.0	18.1	56.0
21.236000	35.6	9.000	Off	N	10.8	24.4	60.0
21.312500	36.1	9,000	Off	N	10.8	23.9	60.0
21.326000	37.0	9.000	Off	N	10.8	23.0	60.0
21.645500	36.8	9.000	Off	N	10.9	23.2	60.0

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EMI Auto Test(1)

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
21.668000	37.2	9.000	110	N	10.9	22.8	60.0
21.938000	36.4	9.000	Off	N	10.9	23.6	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	21.8	9,000	Off	N	9.7	34.2	56.0
0.159000	18.6	9.000	Off	N	9.7	36.9	55.5
0.204000	23.6	9.000	Off	N	9.7	29.8	53.4
0.262500	18.2	9.000	Off	N	9.7	33.2	51.4
0.339000	29,9	9.000	Off	N	9.7	19.3	49.2
0,465000	22.7	9.000	Off	N	9.8	23,9	46.6
1,652000	26.3	9.000	Off	N	9.9	19.7	46.0
1.661000	26.3	9.000	Off	N	9.9	19.7	46.0
1.670000	26.4	9,000	Off	N	9.9	19.6	46.0
2.394500	26.4	9.000	Off	N	9.9	19.6	46.0
2.714000	27.4	9.000	110	N	10.0	18.6	46.0
2.772500	27.4	9,000	Off	N	10.0	18.6	46.0
21.236000	21.7	9,000	Off	N	10.8	28.3	50.0
21.312500	22.3	9.000	Off	N	10,8	27.7	50.0
21.326000	22.5	9.000	Off	N	10.8	27.5	50.0
21.384500	22.6	9.000	Off	N	10.8	27.4	50.0
21.650000	22.8	9.000	110	N	10.9	27.2	50.0
21,857000	23.3	9.000	110	N	10.9	26.7	50.0

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9. LIST OF TEST EQUIPMENT

		Calibration	Calibration		
Manufacturer	Model / Equipment	Interval	Due	Serial No.	
Rohde & Schwarz	ENV216/ LISN	Annual	01/29/2015	100073	
Schwarzbeck	VULB 9160/ TRILOG Antenna	Biennial	12/17/2014	3150	
Rohde & Schwarz	ESCI / EMI TEST RECEIVER	Annual	01/24/2015	100584	
Agilent	E4440A/ Spectrum Analyzer	Annual	04/25/2014	US45303008	
Agilent	N9020A/ SIGNAL ANALYZER	Annual	05/14/2014	MY51110063	
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	SCU-18/ Signal Conditioning Unit	Annual	09/10/2014	10094	
CERNEX	CBL18265035 / POWER AMP	Annual	07/24/2014	22966	
CERNEX	CBL26405040 / POWER AMP	Annual	04/16/2014	19660	
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	07/05/2015	1151	
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	Biennial	10/30/2014	BBHA9170124	
Rohde & Schwarz	FSP / Spectrum Analyzer	Annual	01/24/2015	839117/011	
Agilent	N1911A/Power Meter	Annual	01/24/2015	MY45100523	
Agilent	N1921A /POWER SENSOR	Annual	07/11/2014	MY45241059	
Wainwright Instrument	WHF3.0/18G-10EF / High Pass Filter	Annual	02/03/2015	F6	
Wainwright Instrument	WHNX6.0/26.5G-6SS / High Pass Filter	Annual	04/16/2014	1	
Wainwright Instrument	WHNX7.0/18G-8SS / High Pass Filter	Annual	04/16/2014	29	
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	Annual	06/24/2014	1	
Hewlett Packard	11636B/Power Divider	Annual	10/22/2014	11377	
Agilent	87300B/Directional Coupler	Annual	12/18/2014	3116A03621	
Hewlett Packard	11667B / Power Splitter	Annual	05/29/2014	05001	
DIGITAL	EP-3010 /DC POWER SUPPLY	Annual	10/29/2014	3110117	
ITECH	IT6720 / DC POWER SUPPLY	Annual	11/05/2014	010002156287001199	
TESCOM	TC-3000C / BLUETOOTH TESTER	Annual	04/24/2014	3000C000276	
Rohde & Schwarz	CBT / BLUETOOTH TESTER	Annual	04/25/2014	100422	
Rohde & Schwarz	LOOP ANTENNA	Biennial	08/14/2014	100179	
Agilent	8493C / Attenuator(10 dB)	Annual	07/24/2014	76649	
WEINSCHEL	2-3 / Attenuator(3 dB)	Annual	10/28/2014	BR0617	
CERNEX	CBL06185030 / POWER AMP	Annual	07/24/2014	22965	
CERNEX	CBLU1183540 / POWER AMP	Annual	07/24/2014	22964	

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