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TEST REPORT For FCC

Test Report No.	:	2011070024
Date of Issue	:	July 11, 2011
FCC ID	:	V2R-PS20BT
Model/Type No.	:	PS20BT
Kind of Product	:	Bluetooth Stereo Headset
Applicant	:	Cresyn Co., Ltd.
Applicant Address	:	8-22 Jamwon-dong, Seocho-gu, Seoul, Korea
Manufacturer	:	Cresyn Electronic Telecommunication (Heyuan) Co., Ltd.
Manufacturer Address	:	BLD.8 Emigration Obtain Employment Base, Hi-Tech Development Area, Heyuan, Guangdong, 51700 China
Contact Person	:	Hyeon Gil, Jang / Staff
Telephone	:	+82-2-2041-2843
Received Date	:	July 01 , 2011
Test period	:	Start : July 02, 2011 End : July 8, 2011

The test results presented in this report relate only to the object tested.

Tested by

Won-Jae, Hwang
Test Engineer
Date: July 11, 2011

Reviewed by

Young-Joon, Park
Technical Manager
Date: July 11, 2011

REPORT REVISION HISTORY

Date	Revision	Page No
July 11, 2011	Issued (2011070024)	All

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1.0   General Product Description

Equipment model name	: PS20BT
Serial number	: Prototype
EUT condition	: Pre-production, not damaged
Antenna type	: Chip antenna Gain 2.7 dBi
Frequency Range	: 2402 - 2480 MHz
RF power	: 5.899 dBm Peak Conducted (GFSK) : 4.154 dBm Peak Conducted (8-DPSK)
Type of Modulation	: Frequency Hopping Spread Spectrum
Number of channels	: 79
Channel Spacing	: 1MHz
Channel Access Protocol	: Frequency Hopping
Type of Modulation	: GFSK(1Mbps), DQPSK(2Mbps), 8-DPSK(3Mbps)
Power Source	: Internal Lithium ion Battery (DC 3.7V)

1.1   Tested Frequency

	LOW	MID	HIGH
Frequency (MHz)	2402	2441	2480

1.2   Tested Mode

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

- Following channel(s) was (were) selected for the final test as listed below.

Tested Ch	Modulation Technology	Modulation Type	Packet Type
Low, Mid, High	FHSS	GFSK	DH 5
Low, Mid, High	FHSS	8-DPSK	3DH 5

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1.3   Model Differences

Not applicable

1.4   Device Modifications
The following modifications were necessary for compliance:

Not applicable

1.5   Peripheral Devices

Device	Manufacturer	Model No.	Serial No.
Mouse (USB type)	INTECH ELECTRONICS CORP.,SHEN ZHEN ZHI	3D-510	-
Notebook Computer	TOSHIBA CORPORATION	PSL48K-00L00K	Z7037782R

1.6   Calibration Details of Equipment Used for Measurement
Test equipment and test accessories are calibrated on regular basis.   The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

1.7   Test Facility
The measurement facility is located at 386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea.

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1.8   Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	**FCC**	3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements.	FC 805871
JAPAN	**VCCI**	10 meter Open Area Test Site and one conducted site.	VCI R-948, C-986 T-1843
KOREA	**KCC**	EMI (10 meter Open Area Test Site and two conducted sites) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	No. 51, KR0025
International	**KOLAS**	EMC	KOLAS TESTING NO.119

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2.0   Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.247(a)	Carrier Frequency Separation	> 25 kHz	Conducted	C
15.247(a)	Number of Hopping Frequencies	> 15 hops		C
15.247(a)	20 dB Bandwidth	NA		C
15.247	Dwell Time	< 0.4 seconds		C
15.247(b)	Transmitter Output Power	< 0.125 Watts		C
15.247(d)	Conducted Spurious emission	> 20 dBc		C
15.247(d)	Band Edge	> 20 dBc		C
15.209	Field Strength of Harmonics	15.209(a)	Radiated	C
15.207	AC Conducted Emissions	15.207(a)	Line Conducted	NA

Note 1: C=Complies   NC=Not Complies   NT=Not Tested   NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

The sample was tested according to the following specification:
- FCC Part 15.247, ANSI C63.4-2003

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2.1 Transmitter Requirements

2.1.1 Carrier Frequency Separation

Test Location
RF Test Room

Test Procedures

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna terminal, while EUT has its hopping function enabled.
After the trace being stable, the reading value between the peaks of the adjacent channels using the marker-delta function was recorded as the measurement results.

The spectrum analyzer is set to:
Span = 3 MHz (wide enough to capture the peaks of two adjacent channels)
RBW = 30 kHz ($\geq$ 1% of the span)   Sweep = auto
VBW = 30 kHz ($\geq$ RBW)   Detector function = peak
Trace = max hold
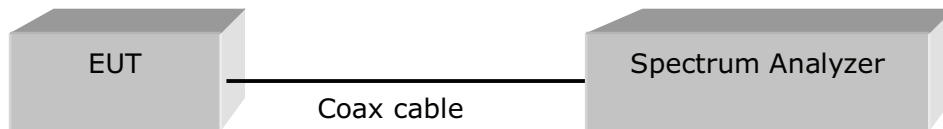

| EUT | Coax cable | Spectrum Analyzer |

Figure 1 : Measurement setup for the carrier frequency separation

Limit
§15.247(a)(1) Frequency hopping system operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-third of 20dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Test Results

Test mode : GFSK, CFG PKT Packet Type : 15 Packet Size : 339(DH5)

Channel	Adjacent Hopping Channel Separation (kHz)	Two-third of 20dB bandwidth (kHz)	Minimum Bandwidth (kHz)	Result
2441MHz	995	614	25	Complies

Test mode : 8-DPSK, CFG PKT Packet Type : 31 Packet Size : 1021(3DH5)

Channel	Adjacent Hopping Channel Separation (kHz)	Two-third of 20dB bandwidth (kHz)	Minimum Bandwidth (kHz)	Result
2441MHz	1030	837	25	Complies

See next pages for actual measured spectrum plots.

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Carrier Frequency Separation

Data Rate : GFSK

Data Rate : 8-DPSK

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2.1.2 Number of Hopping Frequencies

Test Location
RF Test Room

Test Procedures

The number of hopping frequencies was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

The spectrum analyzer is set to:

Frequency range   1: Start = 2389.5 MHz, Stop = 2439.5 MHz
                    2: Start = 2439.5 MHz, Stop = 2489.5 MHz

Span = 50 MHz
RBW = 300 kHz ($\geq$ 1% of the span)   Sweep = auto
VBW = 300 kHz ($\geq$ RBW)   Detector function = peak
Trace = max hold

```
┌──────────┐          ┌─────────────────────┐
│          │          │                     │
│   EUT    │──────────│  Spectrum Analyzer  │
│          │          │                     │
└──────────┘          └─────────────────────┘
```

Limit

§15.247(a)(1)(iii) For frequency hopping system operating in the 2400-2483.5 MHz band shall use at least 15 hopping frequencies.

Test Results

Test mode : GFSK, CFG PKT Packet Type : 15 Packet Size : 339(DH5)

Total number of Hopping Channels	Result
79	Complies

Test mode : 8-DPSK, CFG PKT Packet Type : 31 Packet Size : 1021(3DH5)

Total number of Hopping Channels	Result
79	Complies

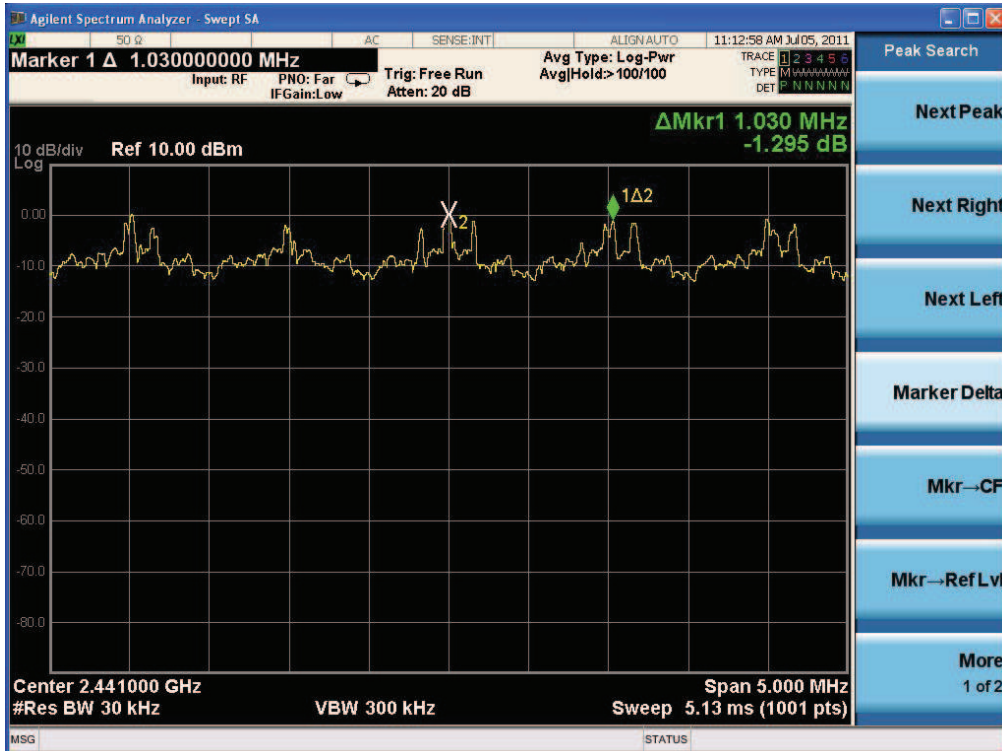See next pages for actual measured spectrum plots.

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Number of Hopping Frequencies(GFSK)

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Number of Hopping Frequencies(8-DPSK)

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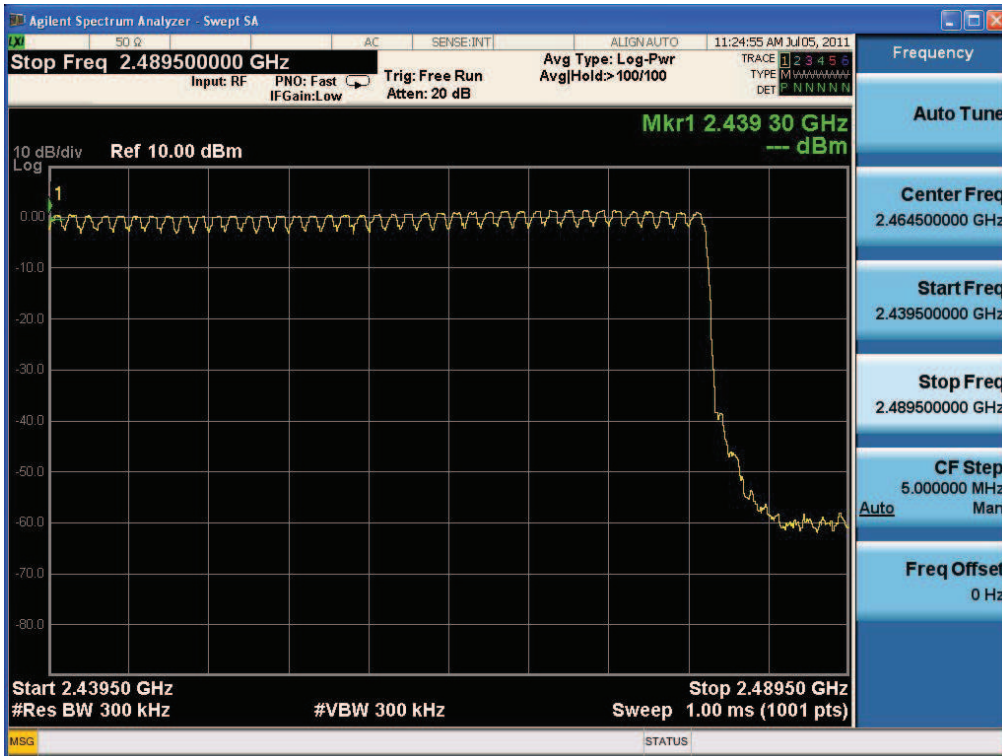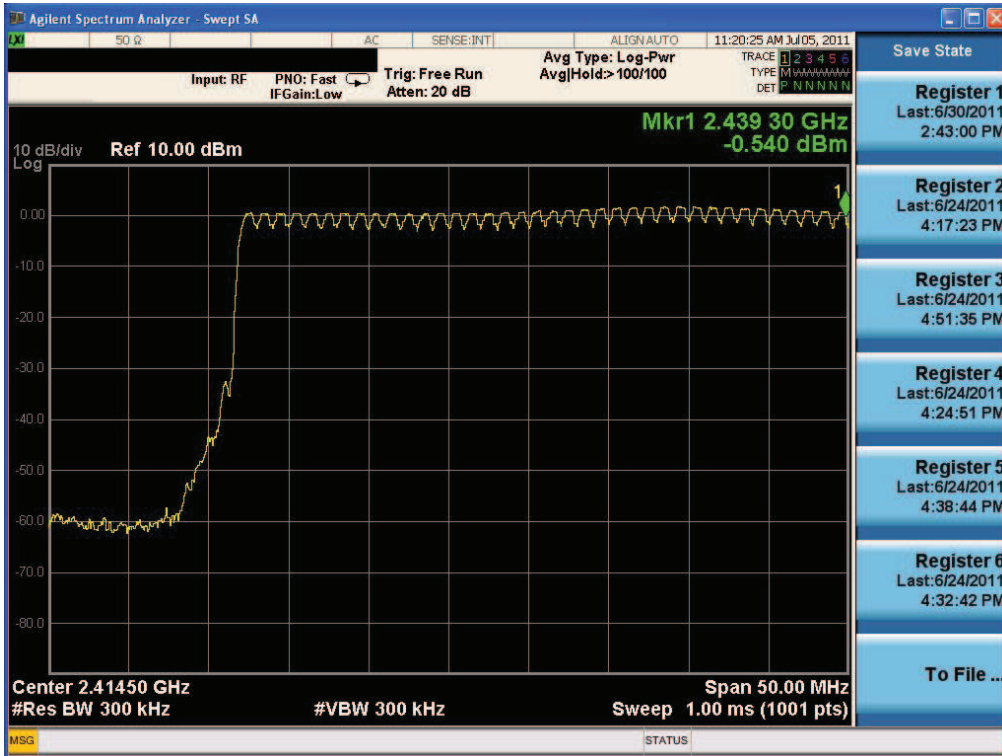
2.1.3 20 dB bandwidth

Test Location

RF Test Room

Test Procedures

The bandwidth at 20 dB below the highest inband spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels.
After the trace being stable, Use the marker-to peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

The spectrum analyzer is set to:
Center frequency = the highest, middle and the lowest channels
Span = 2 MHz (approximately 2 or 3 times of the 20 dB bandwidth)
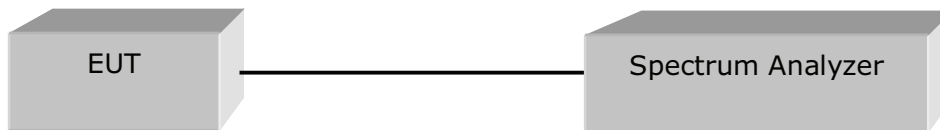RBW = 30 kHz ($\geq$ 1% of the span)   Sweep = auto
VBW = 30 kHz ($\geq$ RBW)   Detector function = peak
Trace = max hold

```
┌──────────┐                    ┌──────────────────┐
│   EUT    │────────────────────│ Spectrum Analyzer │
└──────────┘                    └──────────────────┘
```

Limit

Limit : N/A

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Test Results

Test mode : GFSK, CFG PKT Packet Type : 15 Packet Size : 339(DH5)

Frequency (MHz)	Channel Number.	Measured Bandwidth (MHz)	Result
2402	0	0.926	Complies
2441	39	0.921	Complies
2480	78	0.929	Complies

Test mode : 8-DPSK, CFG PKT Packet Type : 31 Packet Size : 1021(3DH5)

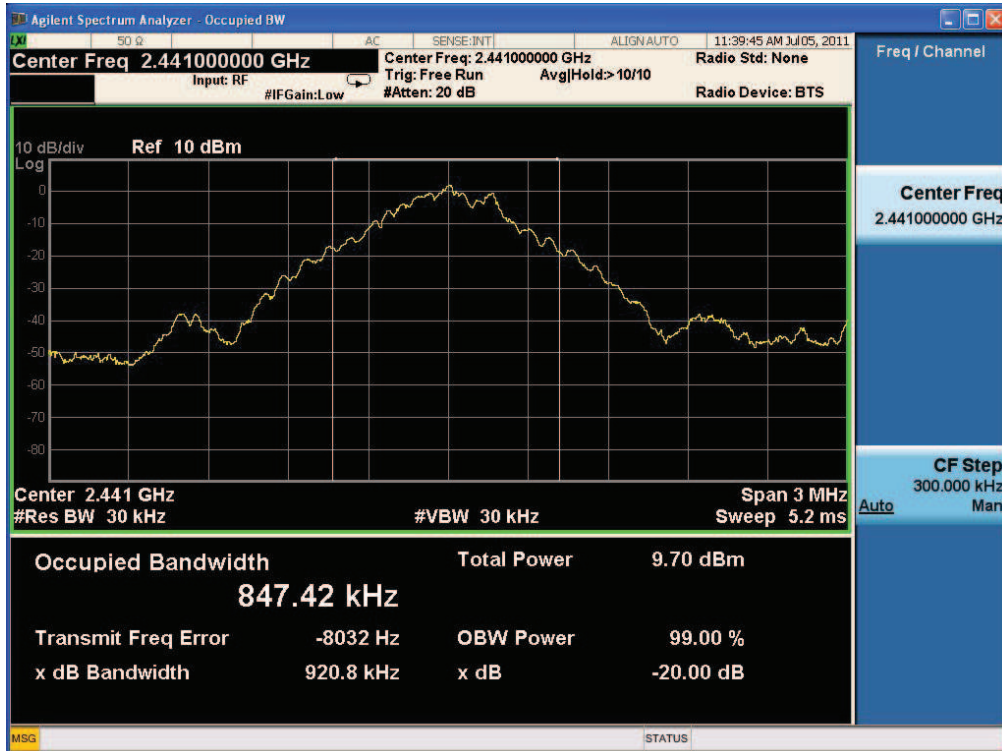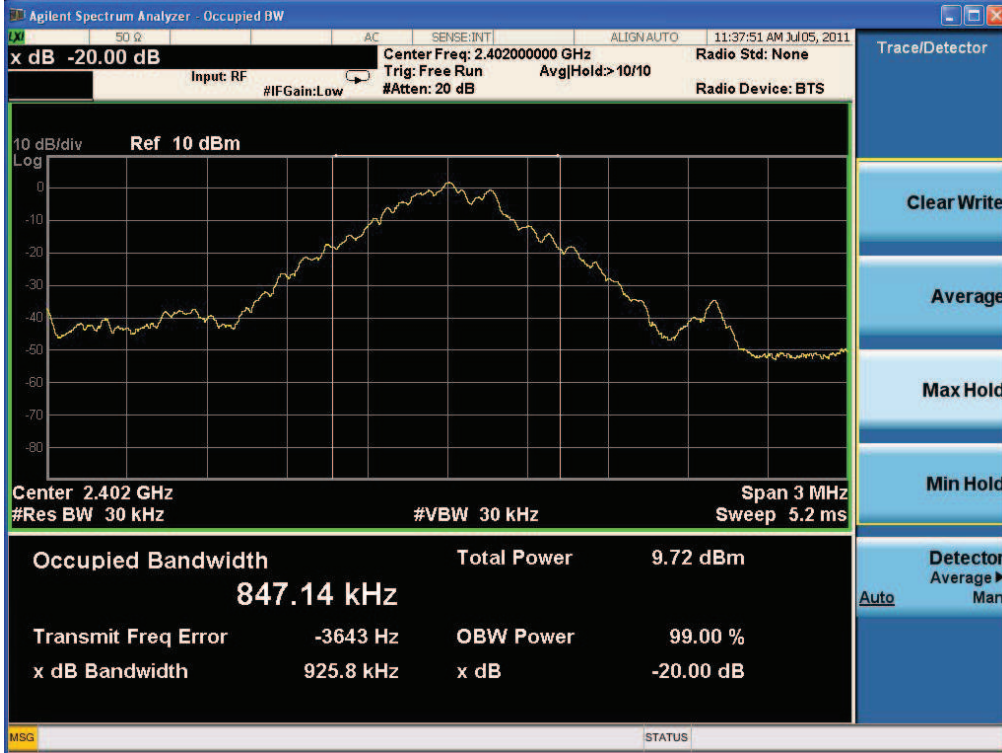| Frequency (MHz)	Channel Number.	Measured Bandwidth (MHz)	Result
2402	0	1.253	Complies
2441	39	1.255	Complies
2480	78	1.258	Complies

See next pages for actual measured spectrum plots.

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20 dB Bandwidth - GFSK

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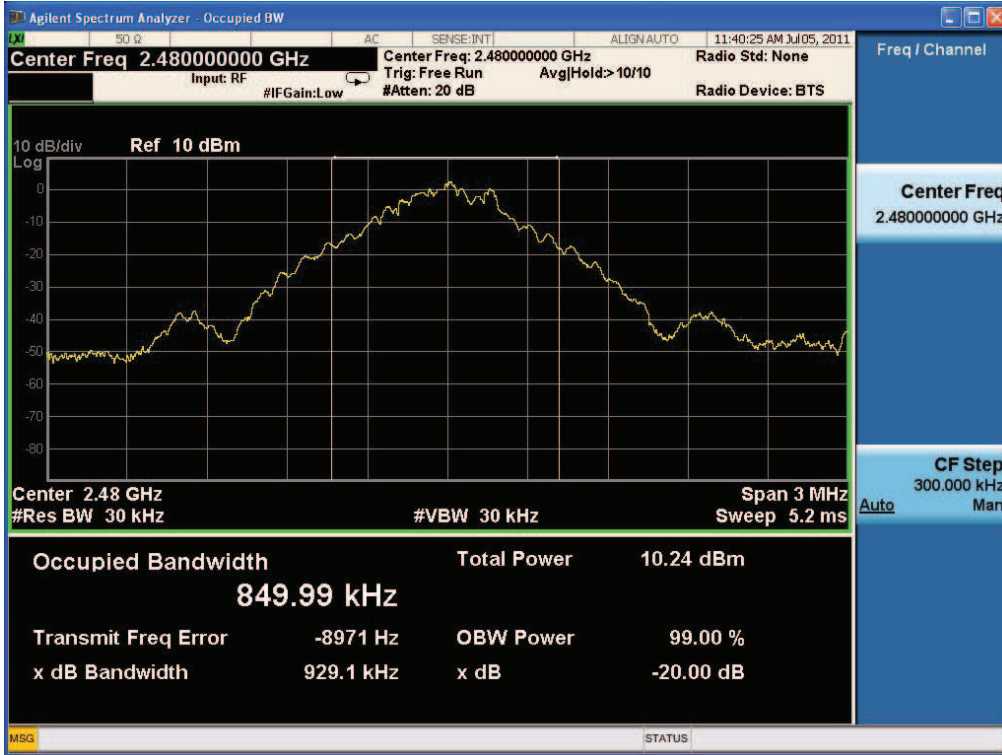Tel: +82-31-339-9970   Fax: +82-31-339-9855
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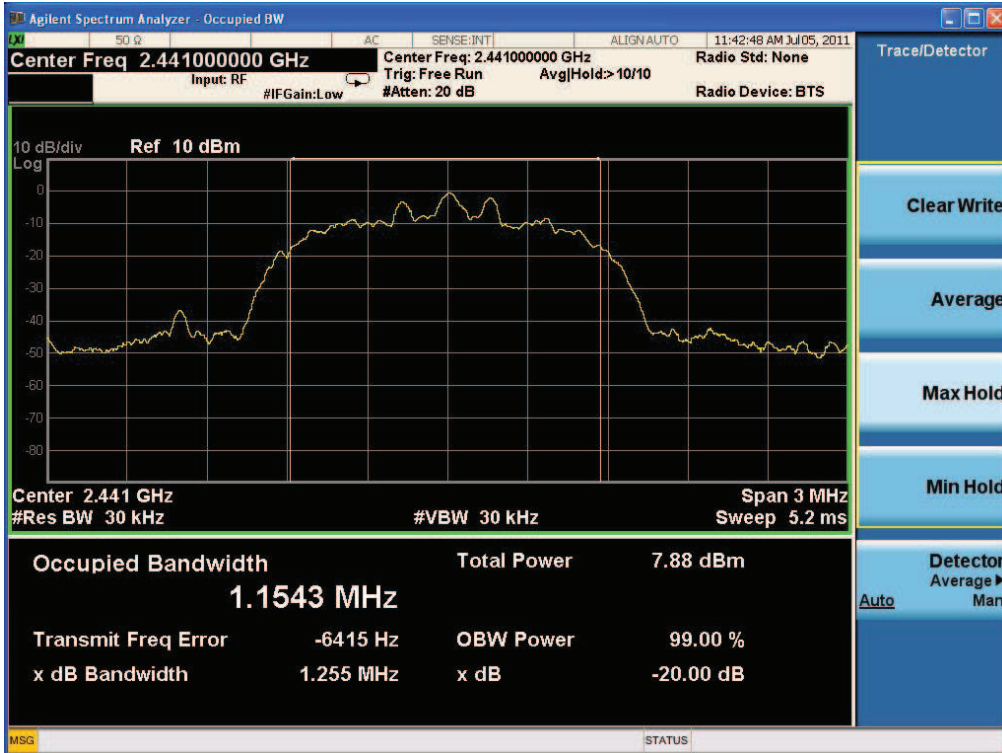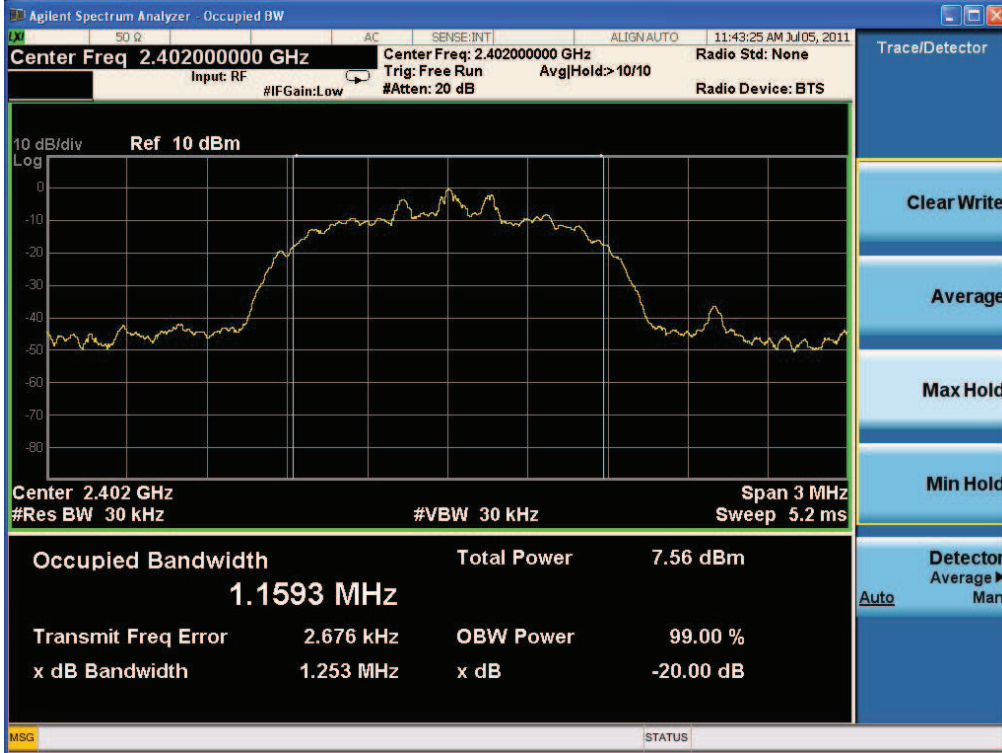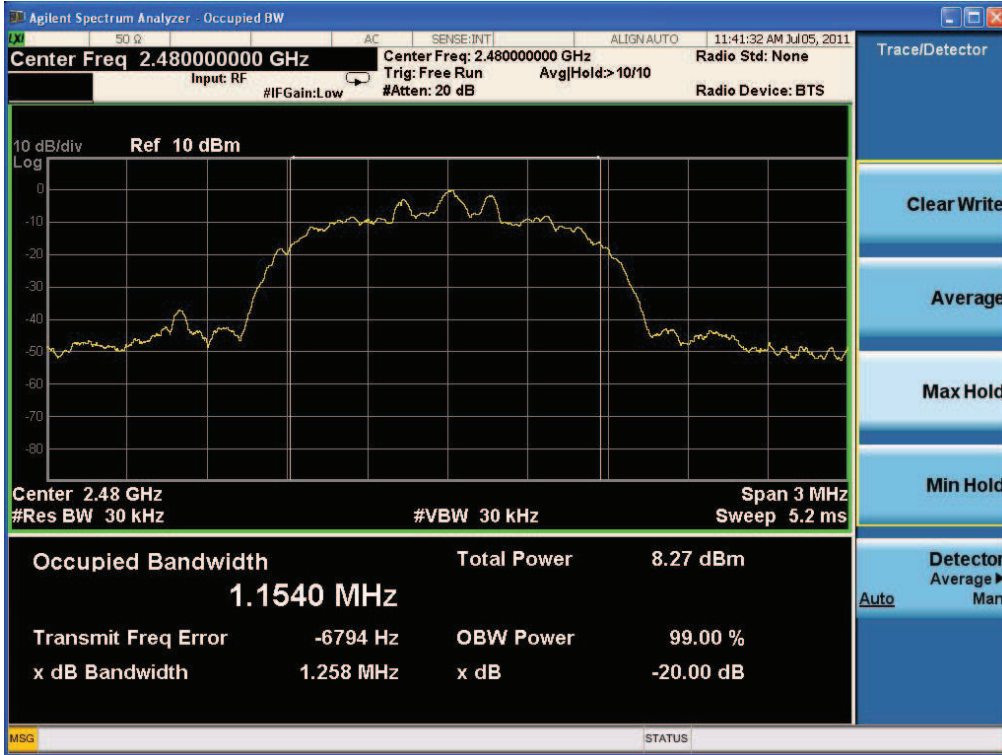**Tel: +82-31-339-9970   Fax: +82-31-339-9855**
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20 dB Bandwidth – 8-DPSK

Agilent Spectrum Analyzer - Occupied BW

LXI	50 Ω		AC	SENSE:INT	ALIGN AUTO	11:41:32 AM Jul 05, 2011

Center Freq 2.480000000 GHz
Input: RF
#IFGain:Low

Center Freq: 2.480000000 GHz   Radio Std: None
Trig: Free Run   Avg|Hold:> 10/10
#Atten: 20 dB   Radio Device: BTS

10 dB/div   Ref 10 dBm
Log

Center 2.48 GHz   Span 3 MHz
#Res BW 30 kHz   #VBW 30 kHz   Sweep 5.2 ms

Occupied Bandwidth	Total Power	8.27 dBm
1.1540 MHz		
Transmit Freq Error -6794 Hz	OBW Power	99.00 %
x dB Bandwidth 1.258 MHz	x dB	-20.00 dB

Trace/Detector

Clear Write

Average

Max Hold

Min Hold

Detector
Average ▶
Auto   Man

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2.1.4 Time of Occupancy (Dwell Time)

Test Location
RF Test Room

Test Procedures

The dwell time was measured with a spectrum analyzer connected to the antenna terminal, while EUT has its hopping function enabled.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in test setup without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of spectrum analyzer on any frequency be measured and set spectrum analyzer to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
5. Repeat above procedures until all frequencies measured were complete.
6. The H318B has 3 type of payload, DH1, DH3, DH5. The hopping rate is 1600 per second.

The spectrum analyzer is set to:
Center frequency = the highest, middle, and the lowest channels
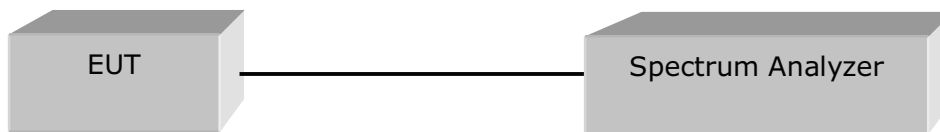Span = zero
RBW = 1 MHz   Trace = max hold
VBW = 1 MHz ($\geq$ RBW)   Detector function = peak
Sweep = as necessary to capture the entire dwell time per hopping channel

EUT	Spectrum Analyzer

Limit

§15.247(a)(1)(iii) For frequency hopping system operating in 2400-2483.5 MHz band, the average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.