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TEST REPORT For FCC

Test Report No.	:	2011040117
Date of Issue	:	April 22, 2011
FCC ID	:	U5MSPP-R200-F1
Model/Type No.	:	SPP-R200S
Kind of Product	:	Mobile Printer
Applicant	:	BIXOLON Co., Ltd.
Applicant Address	:	A-502~508, Digital Empire Bldg., 980-3, Yeongtong-dong, Yeongtong-gu, Suwon-shi, Gyeonggi-do 443-813, REPUBLIC OF KOREA
Manufacturer	:	BIXOLON Co., Ltd.
Manufacturer Address	:	A-502~508, Digital Empire Bldg., 980-3, Yeongtong-dong, Yeongtong-gu, Suwon-shi, Gyeonggi-do 443-813, REPUBLIC OF KOREA
Contact Person	:	Hyun-suk Son / Assistant Manager
Telephone	:	+82-31-218-5582
Received Date	:	April 12, 2011
Test period	:	Start : April 15, 2011 End : April 20, 2011

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

Tested by

Y. T. Lee

Lee Young-taek
Test Engineer
Date: April 22, 2011

Reviewed by

Y. J. Park

Young-Joon, Park
Technical Manager
Date: April 22, 2011

REPORT REVISION HISTORY

Date	Revision	Page No
April 22, 2011	Issued (2011040117)	All

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1.0 General Product Description

Equipment model name	: SPP-R200S
Serial number	: Prototype
EUT condition	: Pre-production, not damaged
Antenna type	: Chip antenna Gain 1.77 dBi
Frequency Range	: 2402 - 2480 MHz
RF power	: 4.672 dBm Peak Conducted (GFSK) : 0.809 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	: Lithium-ion Battery Pack(Rechargeable battery) 7.4 Vdc/1200 mAh

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

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.
Battery Charger (for EUT)	BridgePower Corp.	BL607080085600NK	1008000932
Personal Computer	Samsung Electronics Co,. Ltd.	DB-A150	ZMSI96BSB00124E
LCD Monitor	Lite-On Technology Corp.	VS17	CNN5130QMC
Keyboard (PS/2 type)	Samsung Electronics Co,. Ltd.	SEM-DT35	33008106
Mouse (USB type)	INTECH ELECTRONICS CORP.,SHEN ZHEN ZHI	3D-510	-
Bluetooth Dongle	ASUSTek Computer Inc.	WL-BTD201M	861060002425
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.

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.	805871
JAPAN	**VCCI**	10 meter Open Area Test Site and one conducted site.	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	

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
15.107	AC Conducted Emissions	15.107(a)	Line Conducted	C

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

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 (≥ 1% of the span) Sweep = auto
VBW = 30 kHz (≥ RBW) Detector function = peak
Trace = max hold

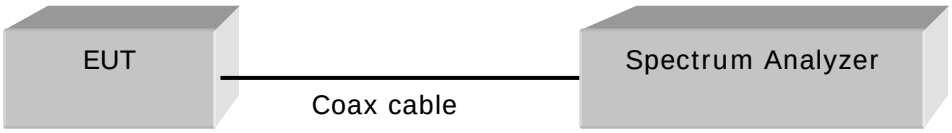


Figure 1 : Measurement setup for the carrier frequency separation

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	1000	621	25	Complies

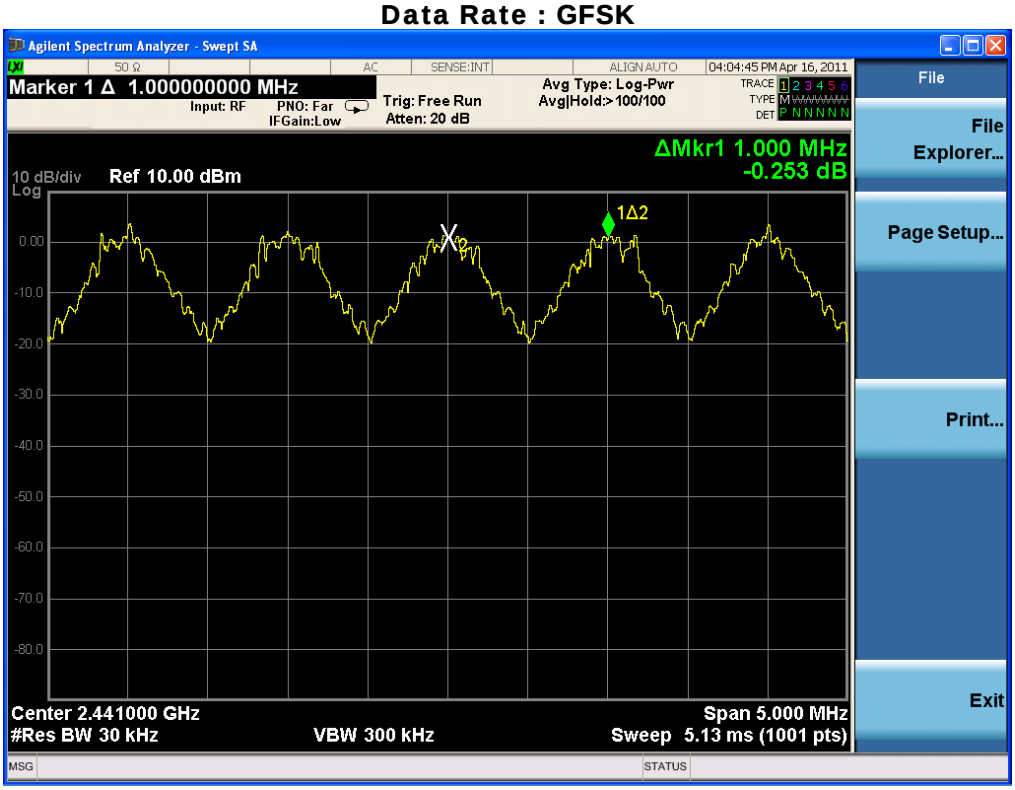
Test mode : 8-DPSK, CFG PKT Packet Type : 31 Packet Size : 1021(3DH5)

Channel	Adjacent Hopping Channel Separation (kHz)	Two-third of 20dB bandwidth (kHz)	Minimum Bandwidth (kHz)	Result
2441MHz	995	839	25	Complies

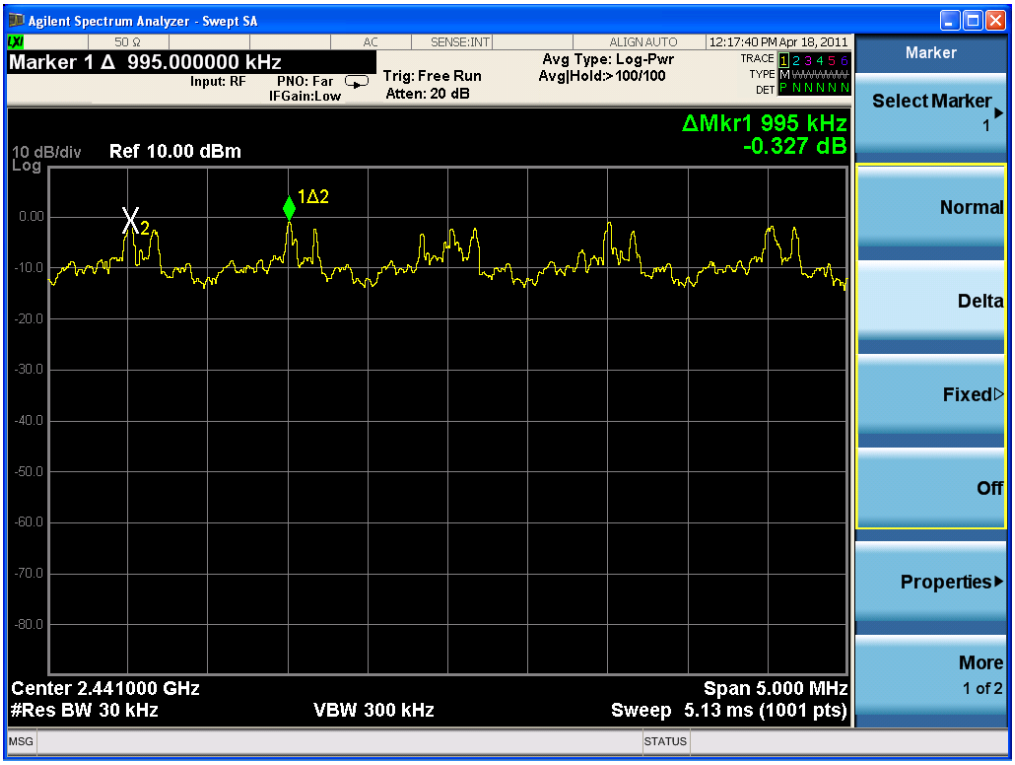
See next pages for actual measured spectrum plots.

Carrier Frequency Separation

Data Rate : GFSK



Data Rate : 8-DPSK



2.1.2 Number of Hopping Frequencies

Test Location

RF Test Room

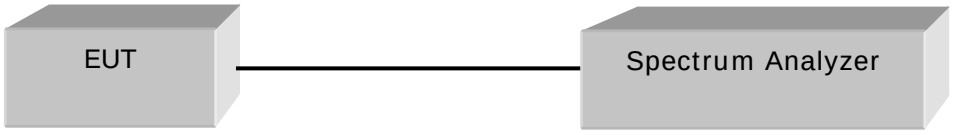
Test Procedures

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 (≥ 1% of the span) Sweep = auto
VBW = 300 kHz (≥ RBW) Detector function = peak
Trace = max hold



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)

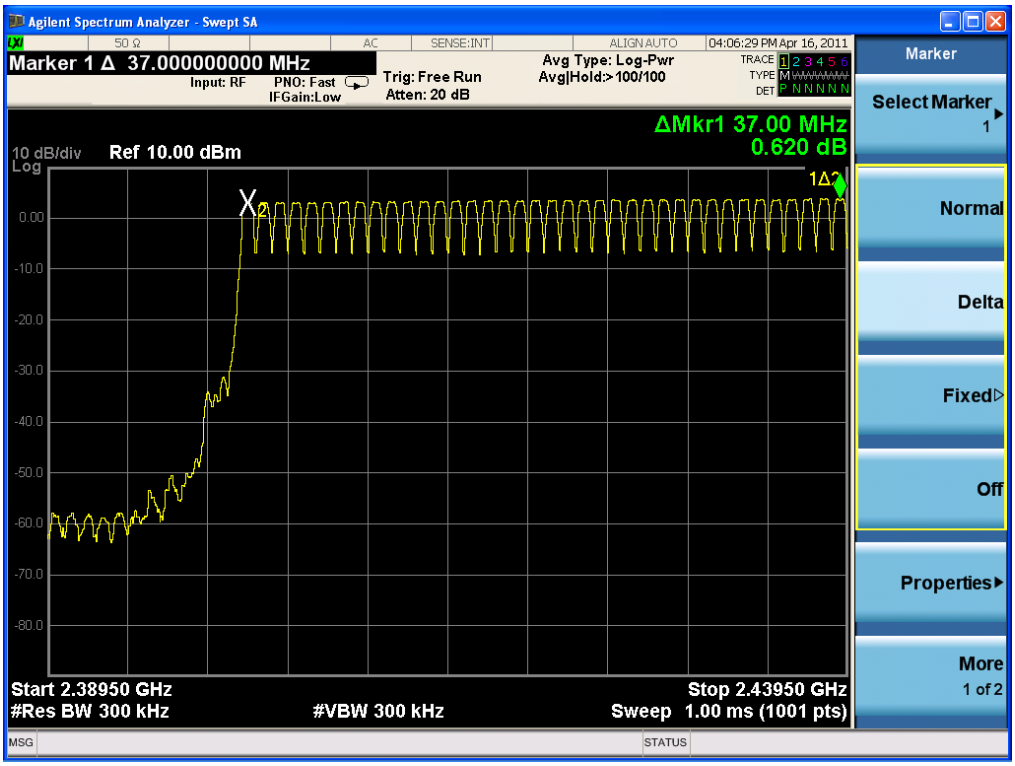
Total number of Hopping Channels	Result
79	Complies

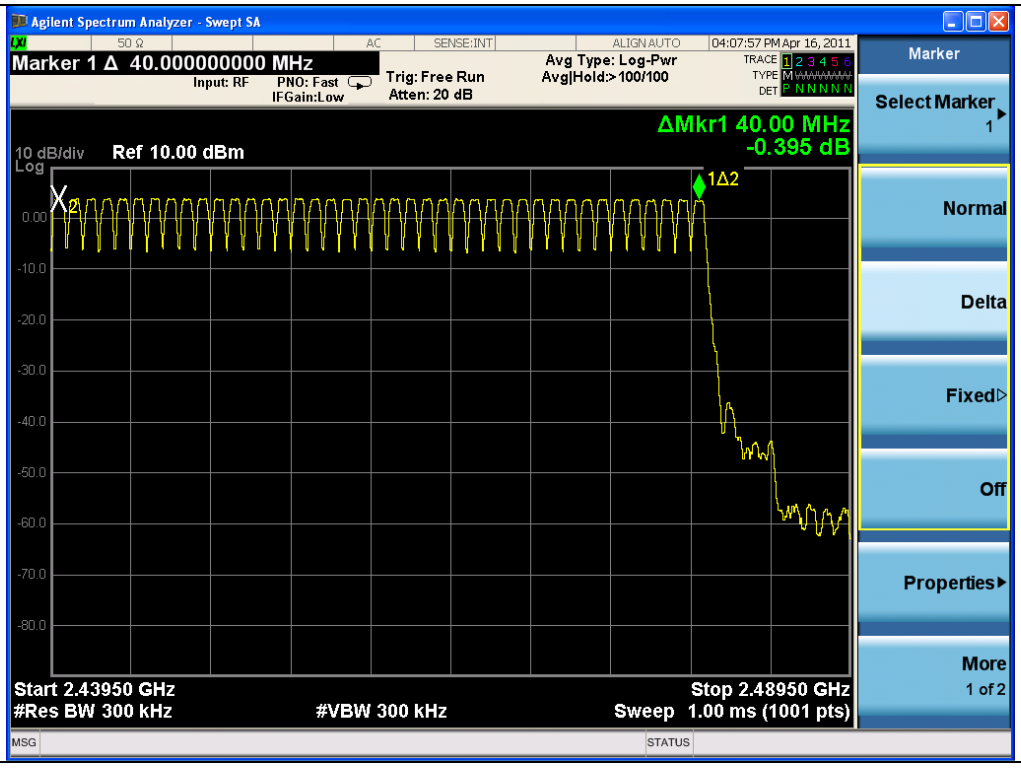
Test mode : 8-DPSK, CFG PKT Packet Type : 31 Packet Size : 1021(3DH5)

Total number of Hopping Channels	Result
79	Complies

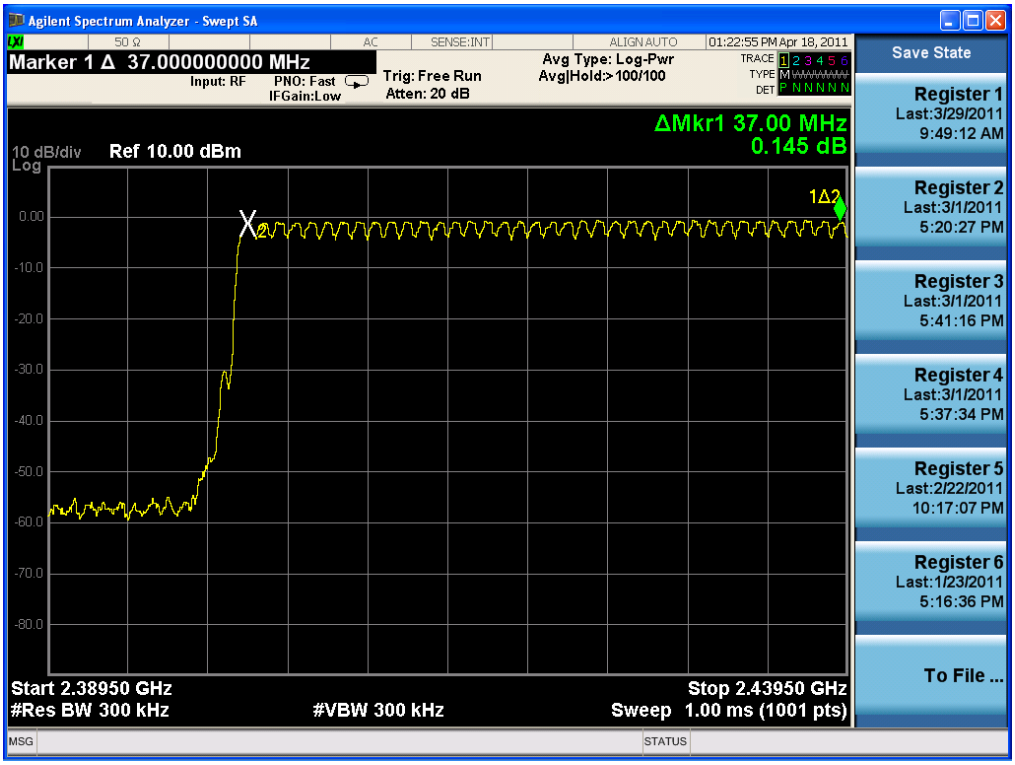
See next pages for actual measured spectrum plots.

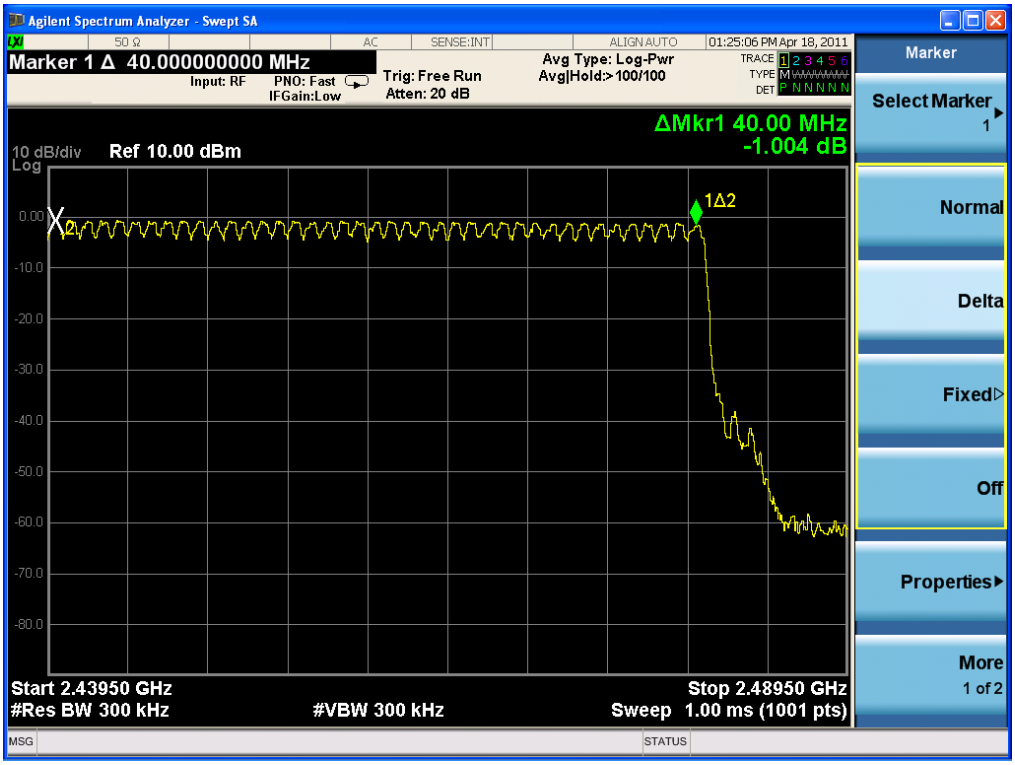
Number of Hopping Frequencies(GFSK)





Number of Hopping Frequencies(8-DPSK)





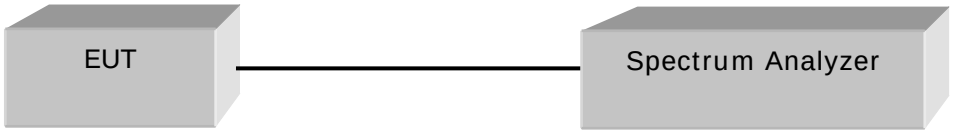
2.1.3 20 dB bandwidth

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 (≥ 1% of the span) Sweep = auto
VBW = 30 kHz (≥ RBW) Detector function = peak
Trace = max hold



Limit

Limit : N/A

Test Results

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

Frequency (MHz)	Channel Number.	Measured Bandwidth (MHz)	Result
2402	0	0.936	Complies
2441	39	0.932	Complies
2480	78	0.933	Complies

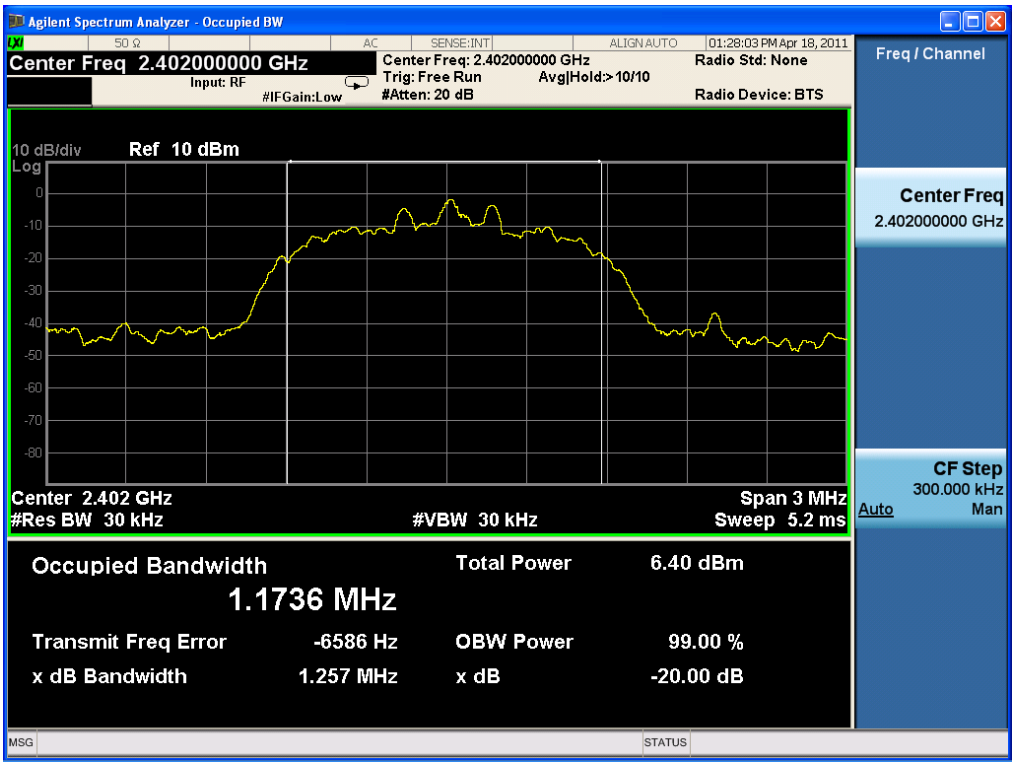
Test mode : 8-DPSK, CFG PKT Packet Type : 31 Packet Size : 1021(3DH5)

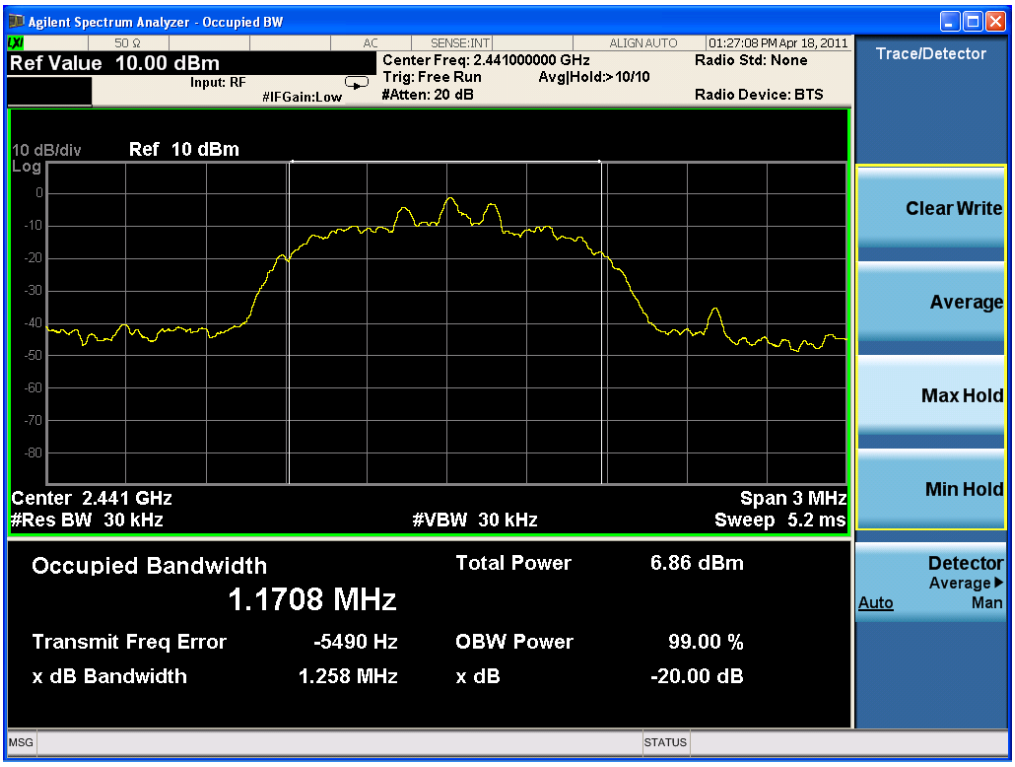
Frequency (MHz)	Channel Number.	Measured Bandwidth (MHz)	Result
2402	0	1.257	Complies
2441	39	1.258	Complies
2480	78	1.257	Complies

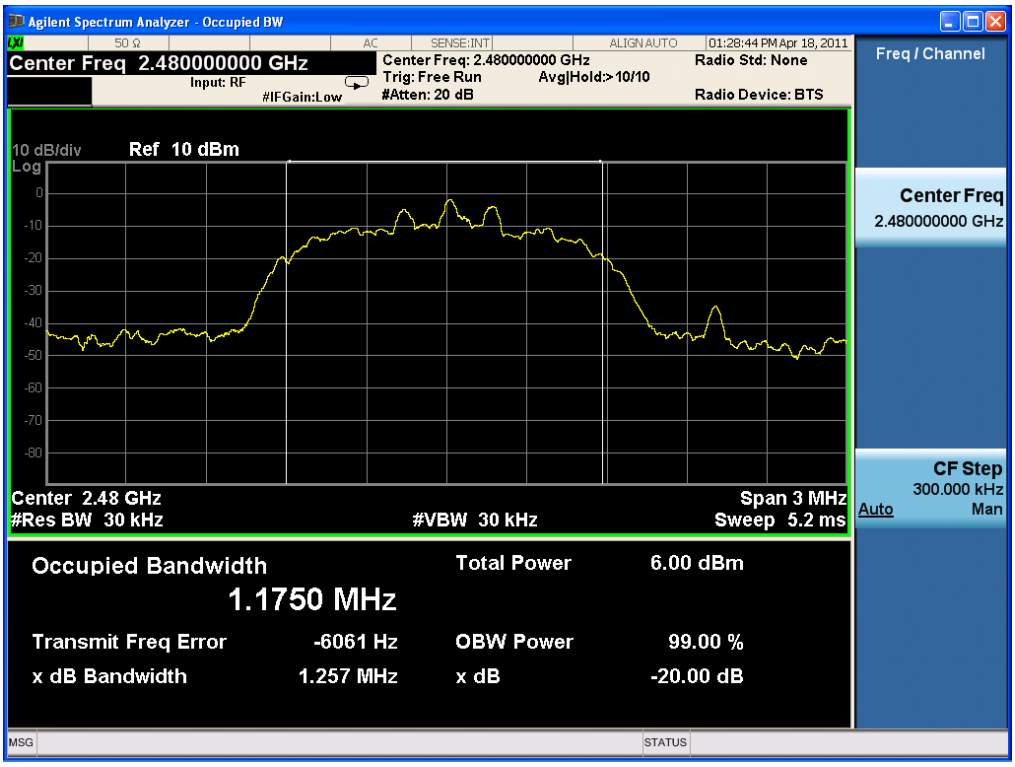
See next pages for actual measured spectrum plots.

20 dB Bandwidth - GFSK

20 dB Bandwidth – 8-DPSK







2.1.4 Time of Occupancy (Dwell Time)

Test Location

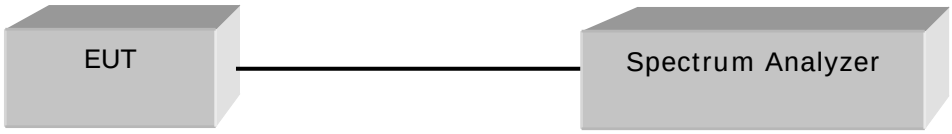
RF Test Room

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 (≥ RBW) Detector function = peak
Sweep = as necessary to capture the entire dwell time per hopping channel



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.

Test Results

Time of occupancy on the TX channel in 31.6 sec = time domain slot length × hop rate ÷ number of hop per channel × 31.6

Test mode : GFSK

Channel Frequency (MHz)	Packet Type	Dwell Time (ms)	Test Results	
			Time of occupancy on the TX channel in 31.6sec (ms)	Result
2441	DH 1	0.395	126.40	Complies
	DH 3	1.650	264.00	Complies
	DH 5	2.900	309.33	Complies

DH1 Dwell time = 0.395 ms × (1600÷2) ÷ 79 × 31.6 = 126.40 ms
DH3 Dwell time = 1.650 ms × (1600÷4) ÷ 79 × 31.6 = 264.00 ms
DH5 Dwell time = 2.900 ms × (1600÷6) ÷ 79 × 31.6 = 309.33 ms

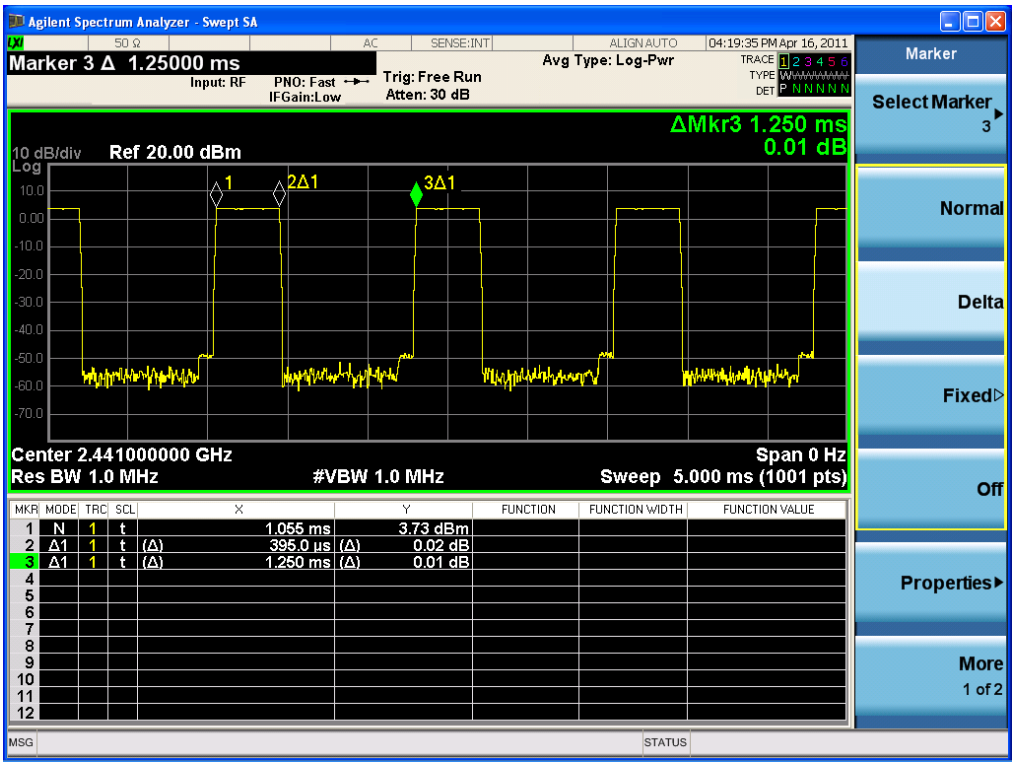
Test mode : 8-DPSK

Channel Frequency (MHz)	Packet Type	Dwell Time (ms)	Test Results	
			Time of occupancy on the TX channel in 31.6sec (ms)	Result
2441	3DH 1	0.405	129.60	Complies
	3DH 3	1.660	265.60	Complies
	3DH 5	2.900	309.33	Complies

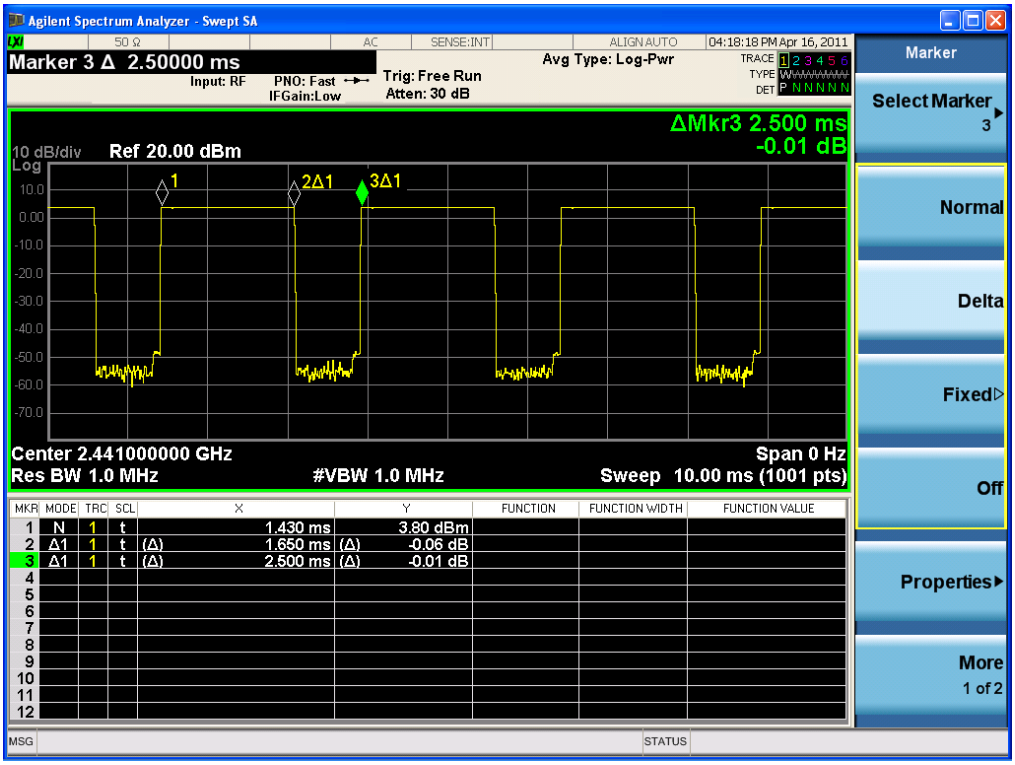
3DH1 Dwell time = 0.405 ms × (1600÷2) ÷ 79 × 31.6 = 129.60 ms
3DH3 Dwell time = 1.660 ms × (1600÷4) ÷ 79 × 31.6 = 265.60 ms
3DH5 Dwell time = 2.900 ms × (1600÷6) ÷ 79 × 31.6 = 309.33 ms

See next pages for actual measured spectrum plots.

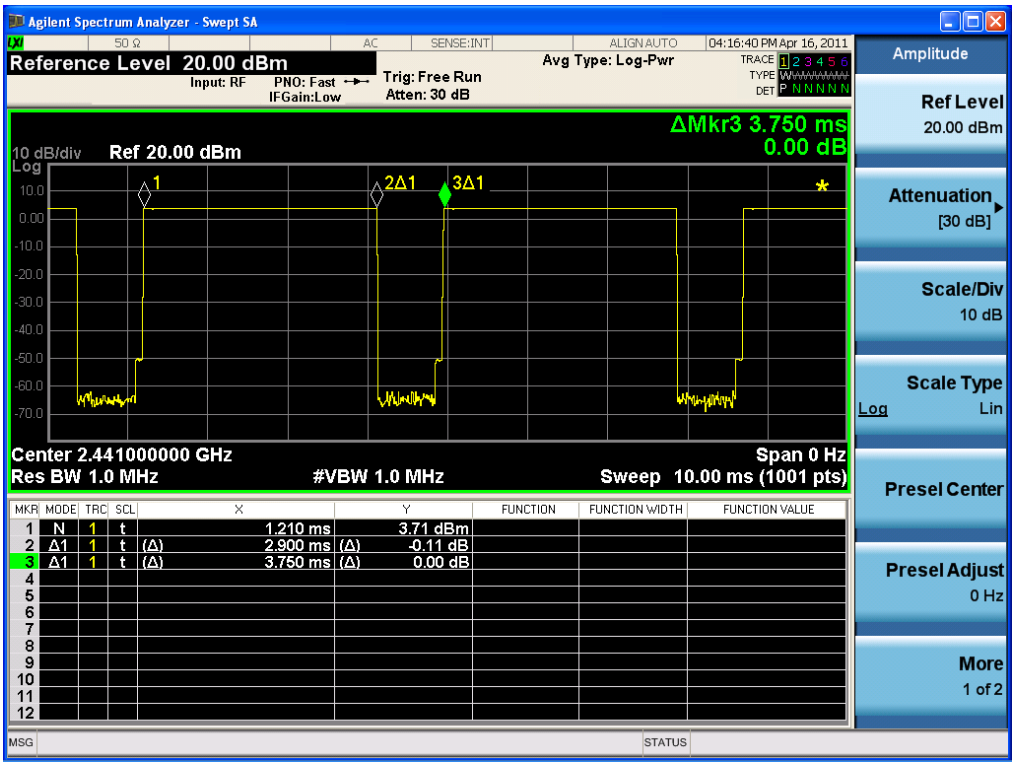
Time of Occupancy for PACKET Type DH1(GFSK)



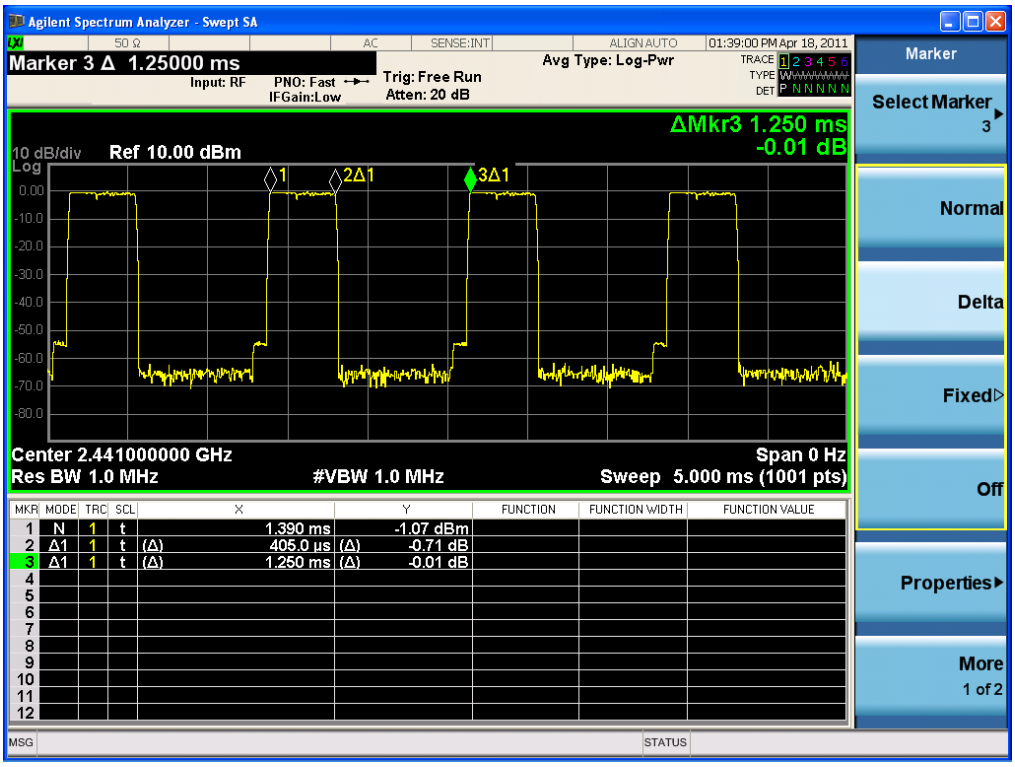
Time of Occupancy for PACKET Type DH3(GFSK)



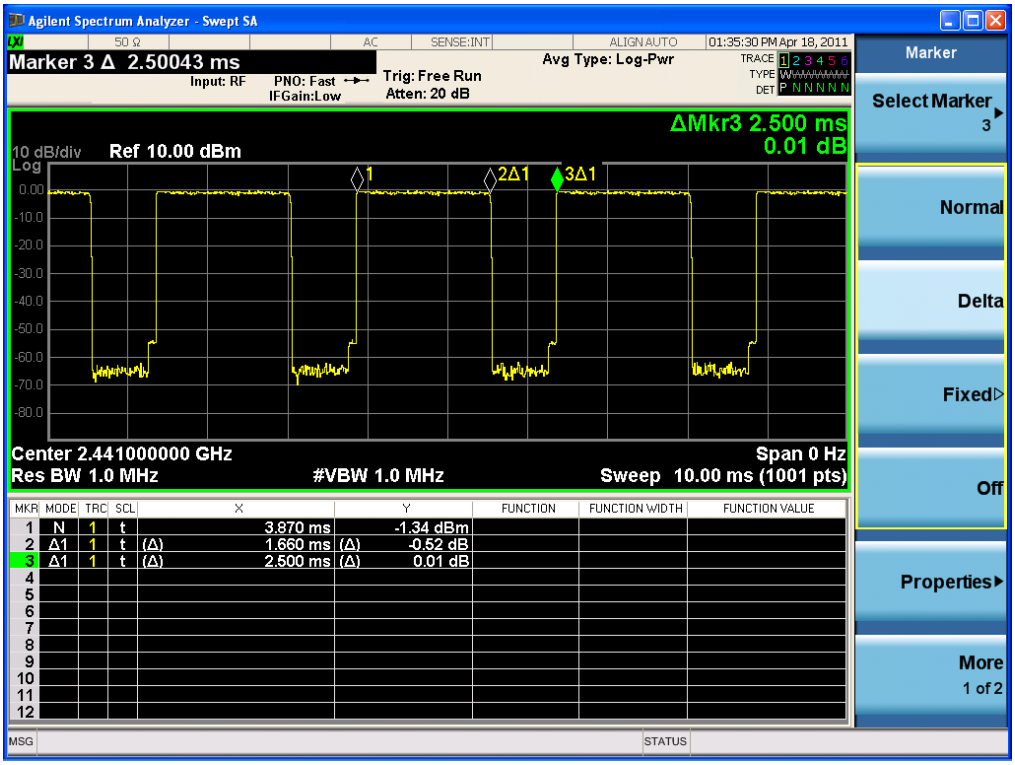
Time of Occupancy for PACKET Type DH5(GFSK)



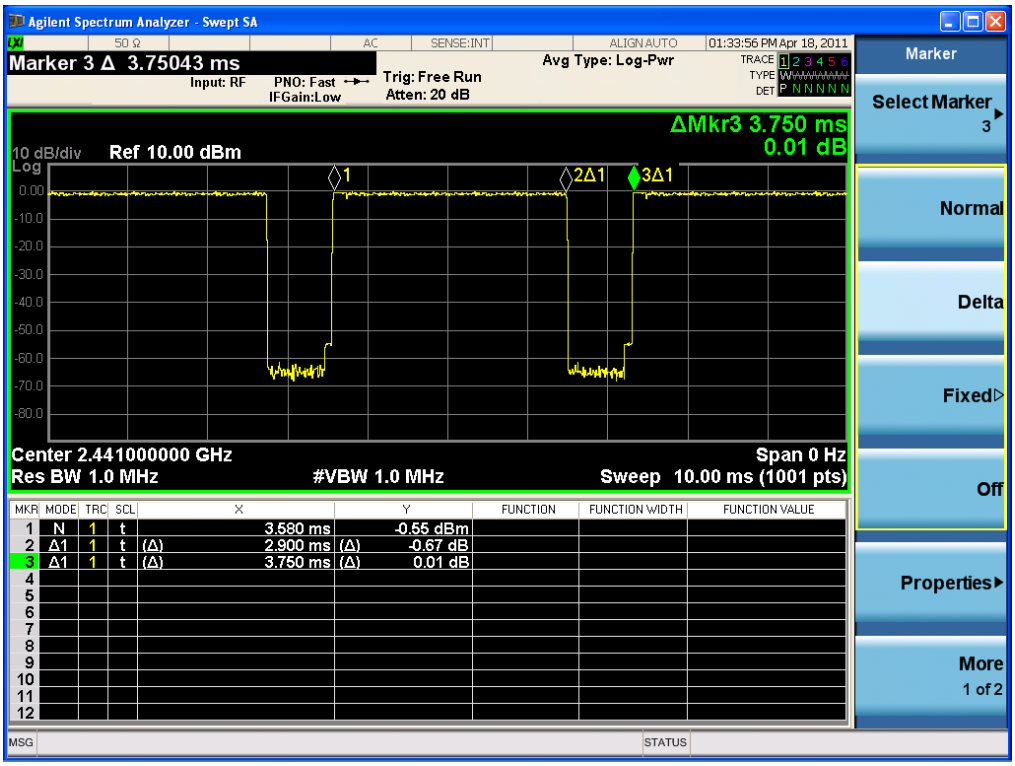
Time of Occupancy for PACKET Type 3DH1(8-DPSK)



Time of Occupancy for PACKET Type 3DH3(8-DPSK)



Time of Occupancy for PACKET Type 3DH5(8-DPSK)



2.1.5 Maximum peak Conducted Output Power

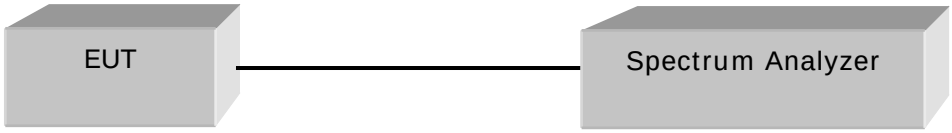
Test Location

RF Test Room

Test Procedures

The maximum peak conducted output power was measured with a spectrum analyzer connected to the antenna terminal, while EUT has its hopping function disabled at the highest, middle and the lowest available channels.

The spectrum analyzer is set to:
Center frequency = the highest, middle, and the lowest channels
Span = 5 MHz (approximately 5 times of the 20 dB bandwidth)
RBW = 1 MHz (greater than the 20 dB bandwidth of the emission being measured)
VBW = 1 MHz (≥ RBW) Detector function = peak
Trace = max hold Sweep = auto



Limit

§5.247(b)(1) The Maximum Peak Output Power Measurement is 0.125 Watts for frequency hopping system operating in 2400-2483.5 MHz employing at least 15 Hopping channels.

Test Results

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

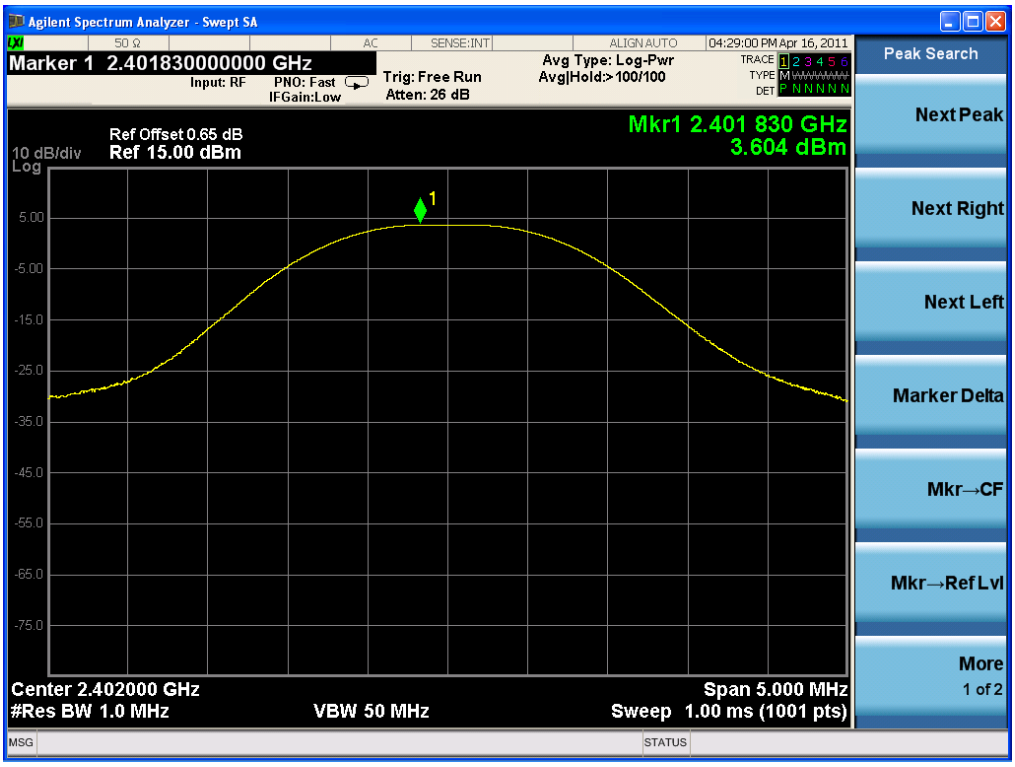
Frequency (MHz)	Channel No.	Peak output power(dBm)	Peak output power(mW)	Result
2402	0	3.604	2.293	Complies
2441	39	4.672	2.932	Complies
2480	78	4.421	2.768	Complies

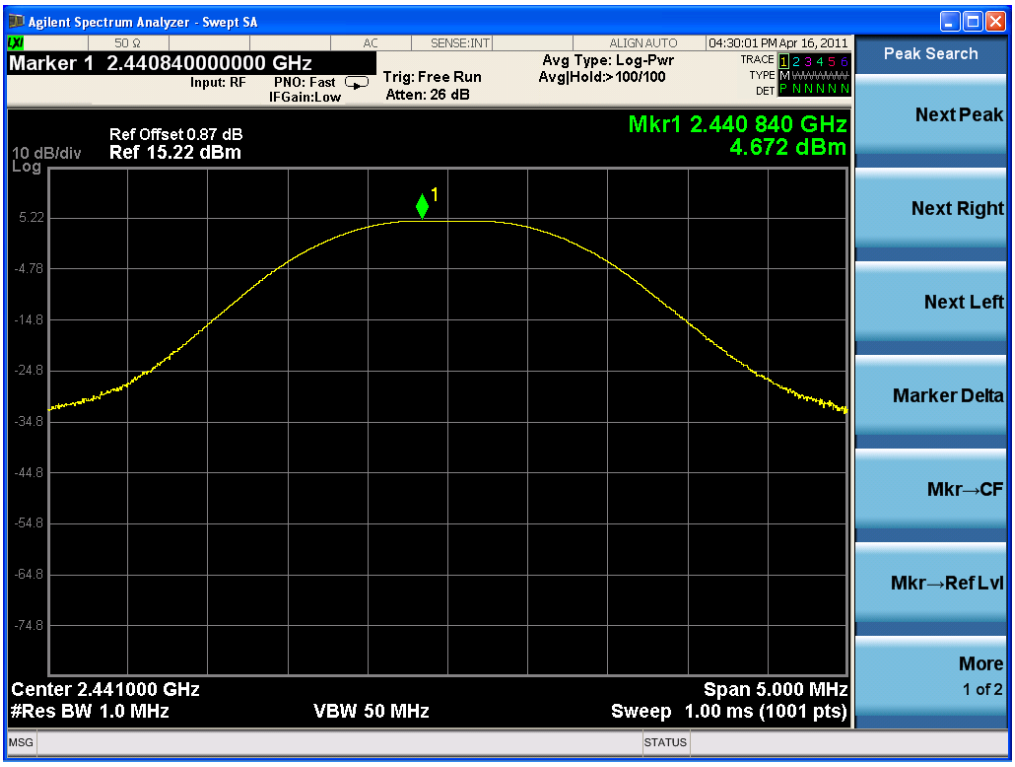
Test mode : 8-DPSK, CFG PKT Packet Type : 31 Packet Size : 1021(3DH5)

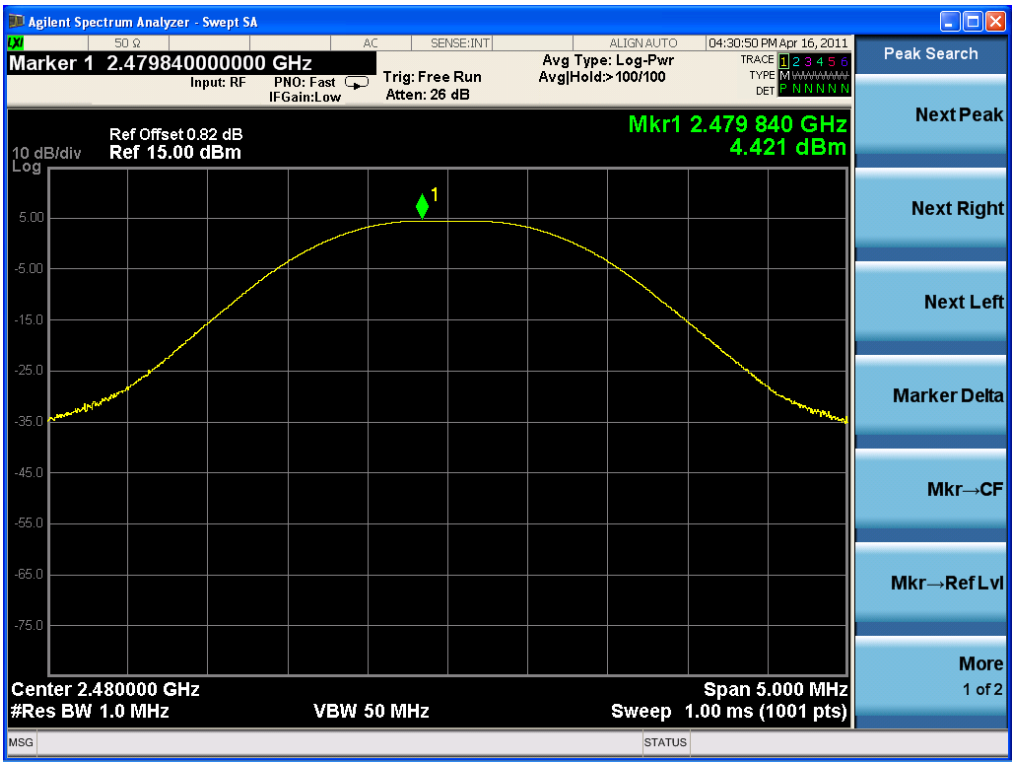
Frequency (MHz)	Channel No.	Peak output power(dBm)	Peak output power(mW)	Result
2402	0	0.203	1.048	Complies
2441	39	0.809	1.205	Complies
2480	78	0.149	1.035	Complies

See next pages for actual measured spectrum plots.

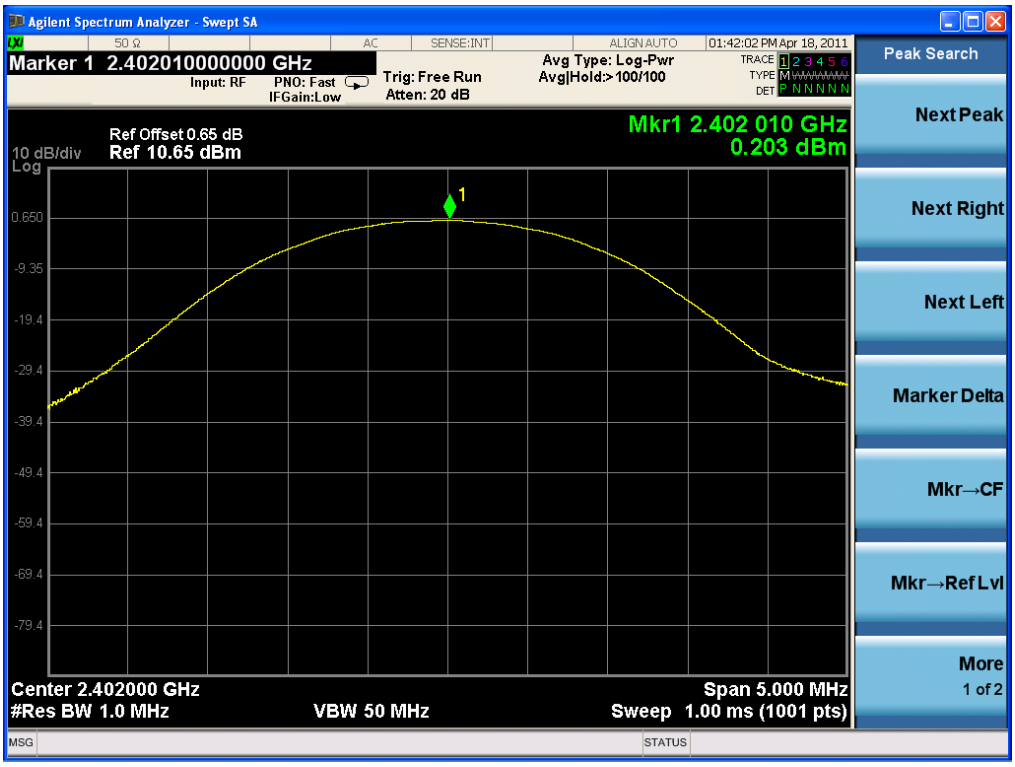
Maximum peak Conducted Output Power - GFSK

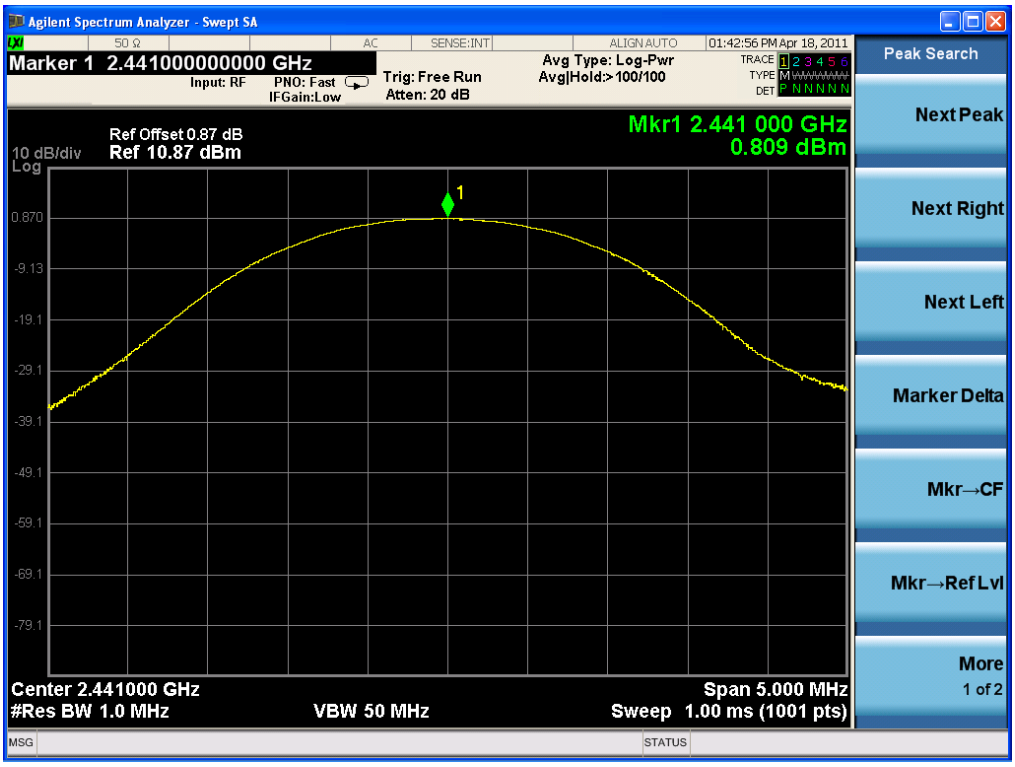


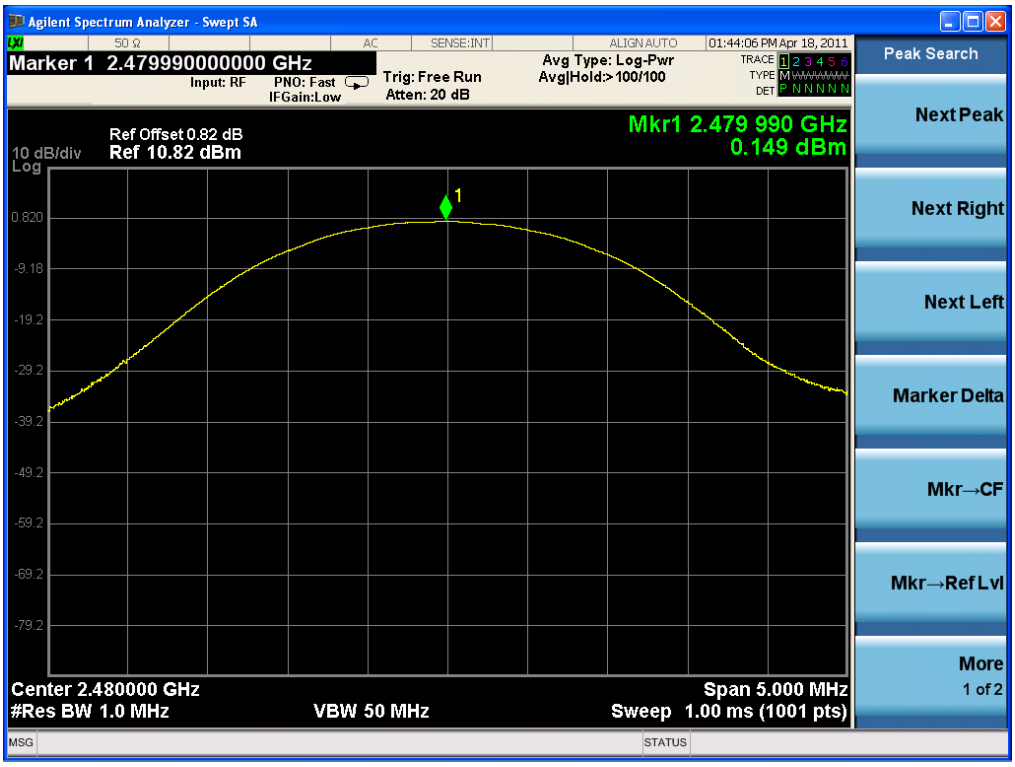




Maximum peak Conducted Output Power - 8-DPSK







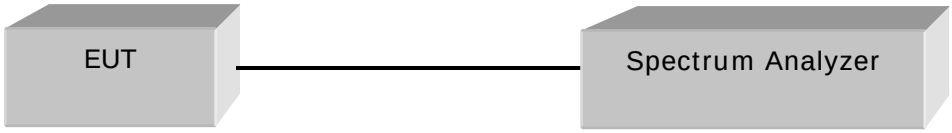
2.1.6 Band-edge

Test Location
RF Test Room

Test Procedures

The bandwidth at 20 dB down from the highest inband spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT has its hopping function disabled at the highest, middle and the lowest available channels.

The spectrum analyzer is set to:
Center frequency = the highest, middle, and the lowest channels
RBW = 100 kHz
VBW = 100 kHz (≥ RBW)
Span = 10 MHz
Trace = max hold
Detector function = peak
Sweep = auto



Limit

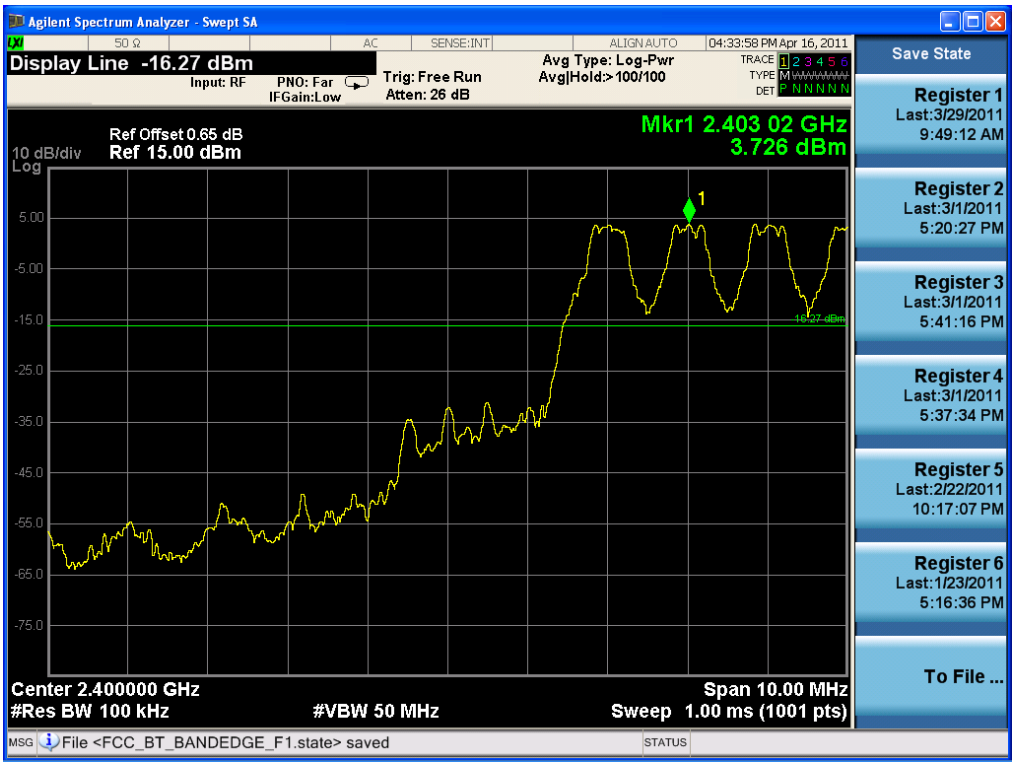
> 20 dBc

Test Results

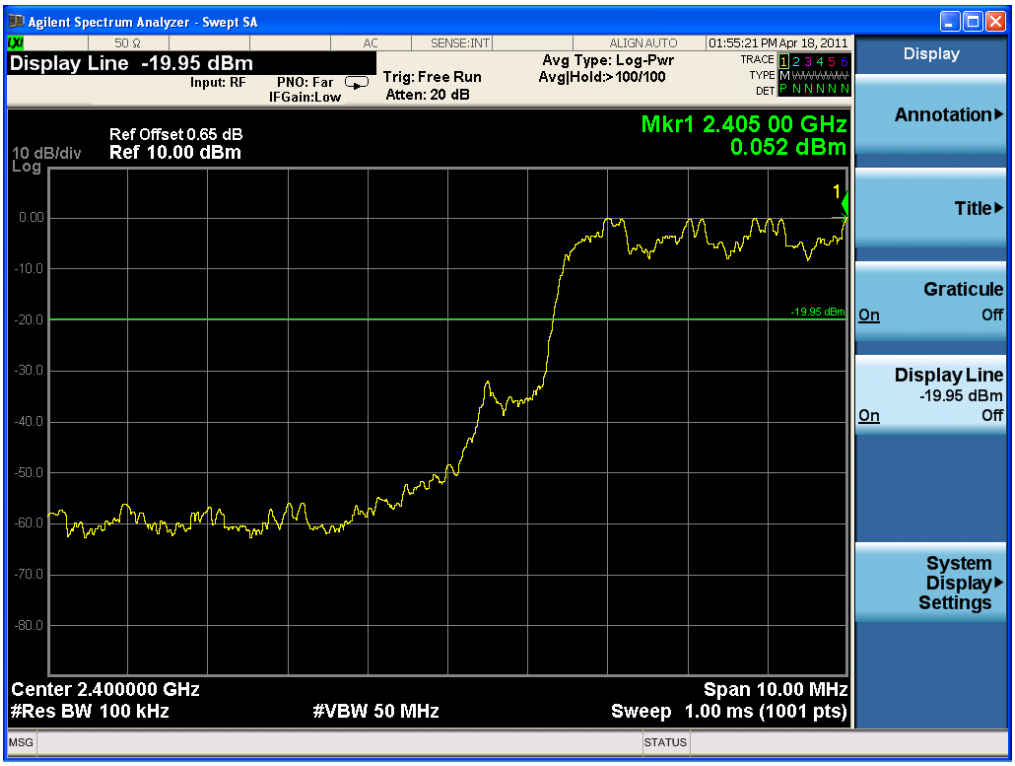
All conducted emission in any 100 kHz bandwidth outside of the spectrum band was at least 20 dB lower than the highest level of the inband spectral density.
Therefore the applying equipment meets the requirement.

See next pages for actual measured spectrum plots.

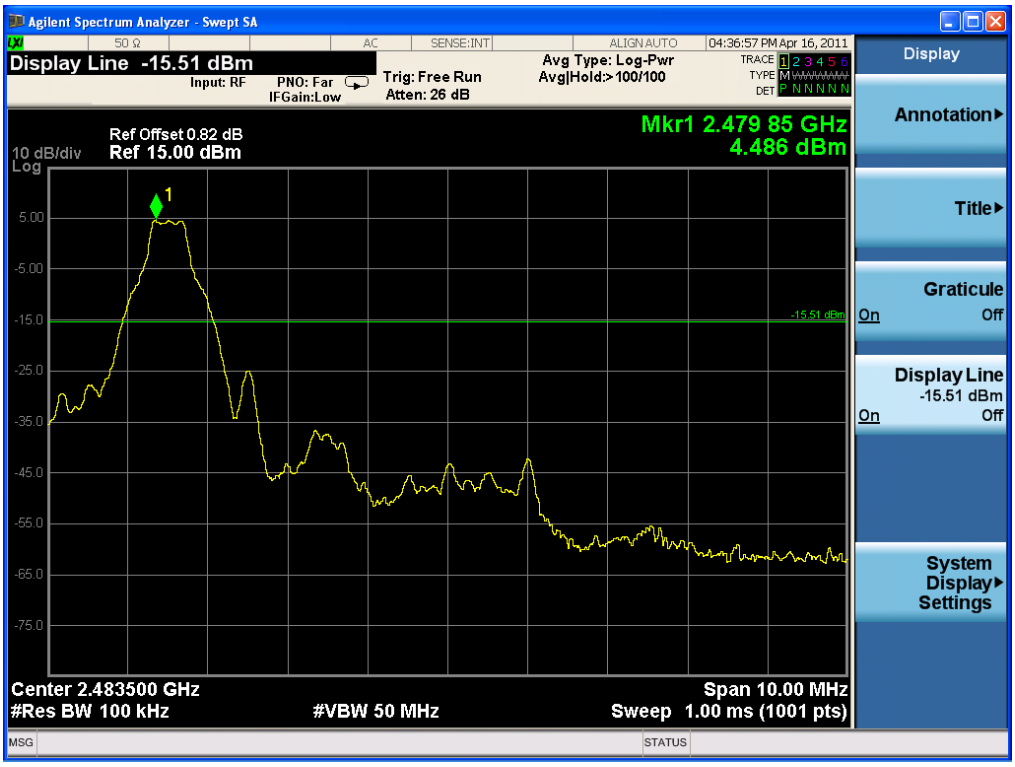
Band – edge (with Hopping) - GFSK



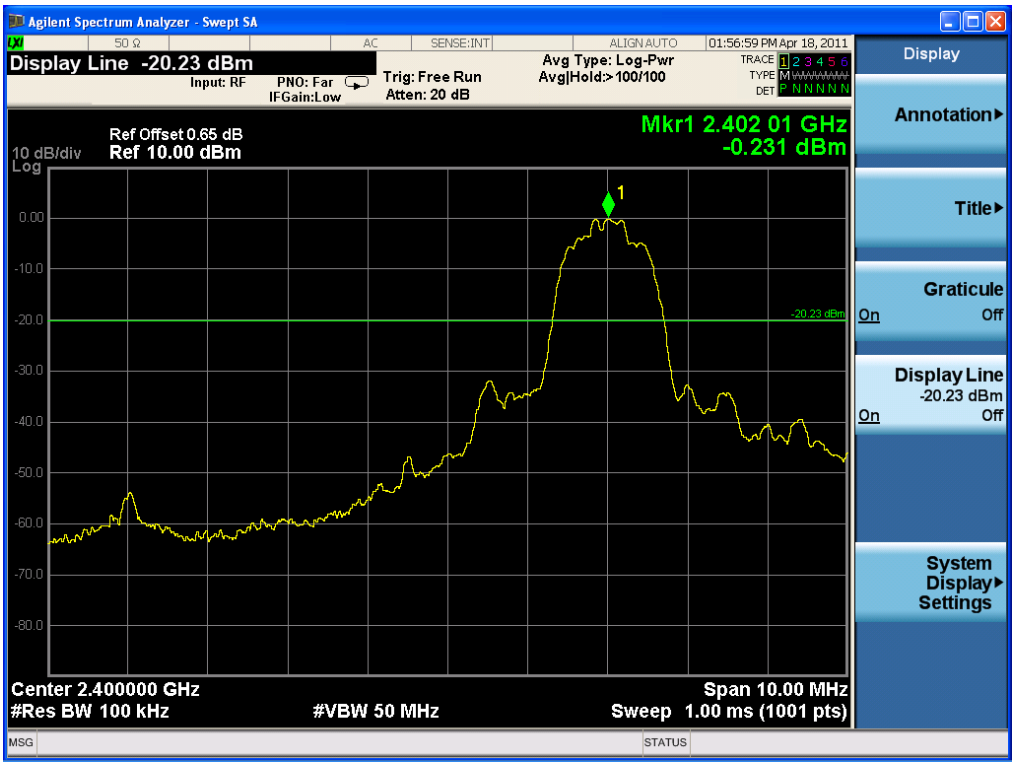
Band – edge (with Hopping) - 8-DPSK



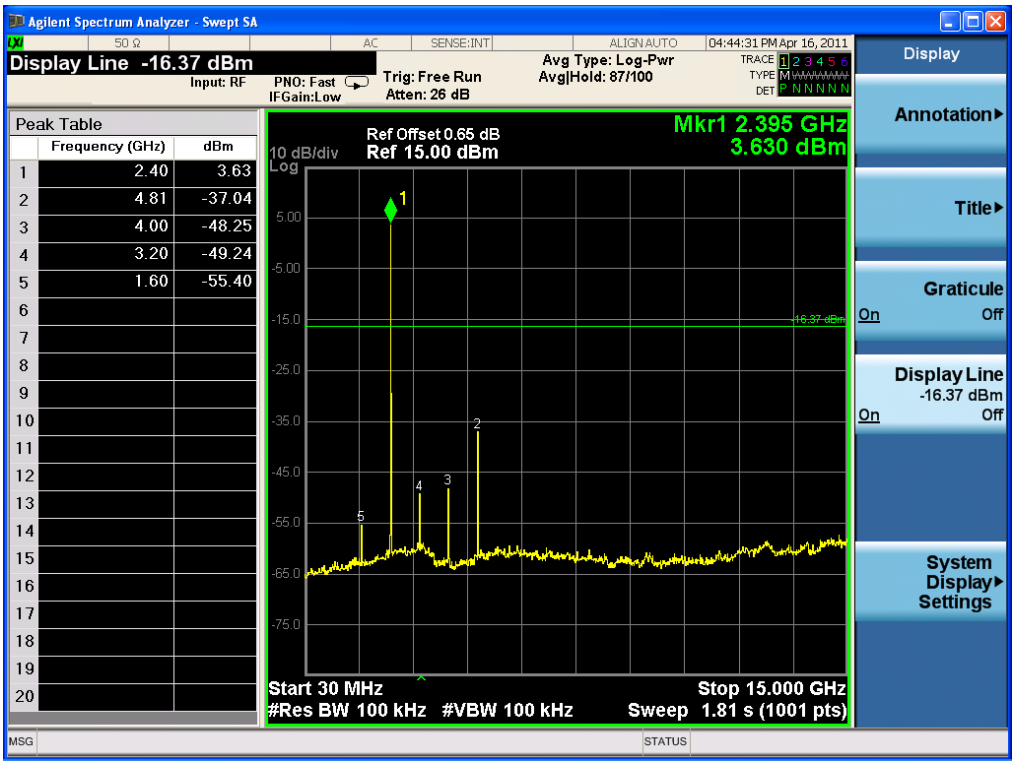
Band – edge (without Hopping) - GFSK

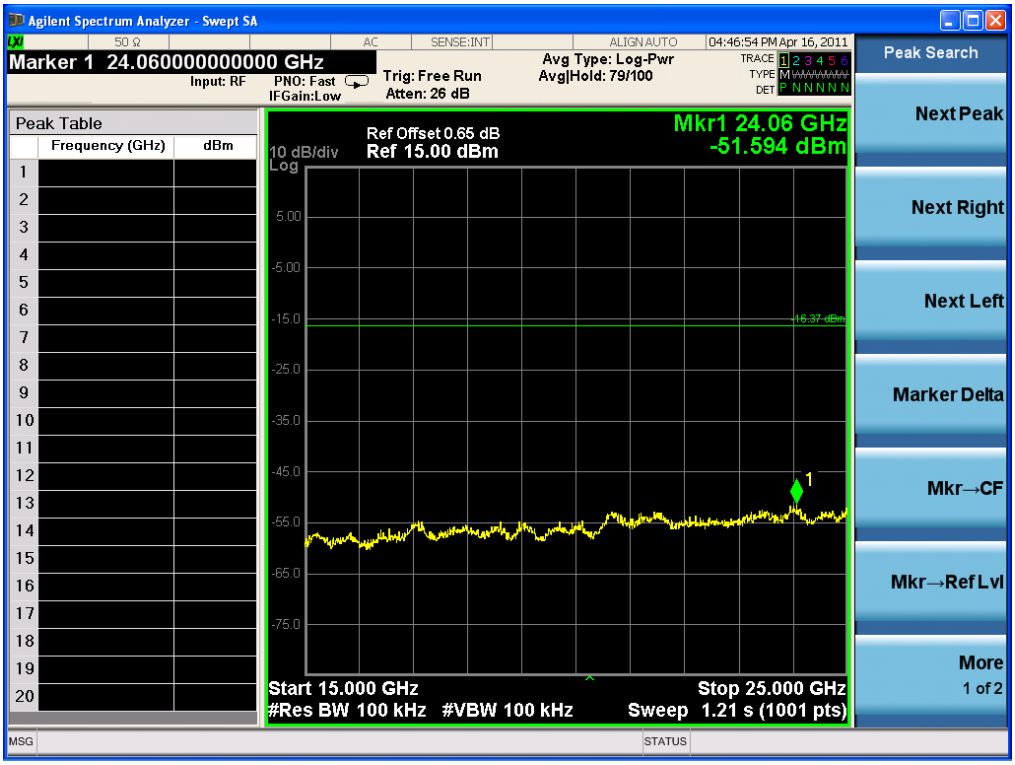


Band – edge (without Hopping) - 8-DPSK

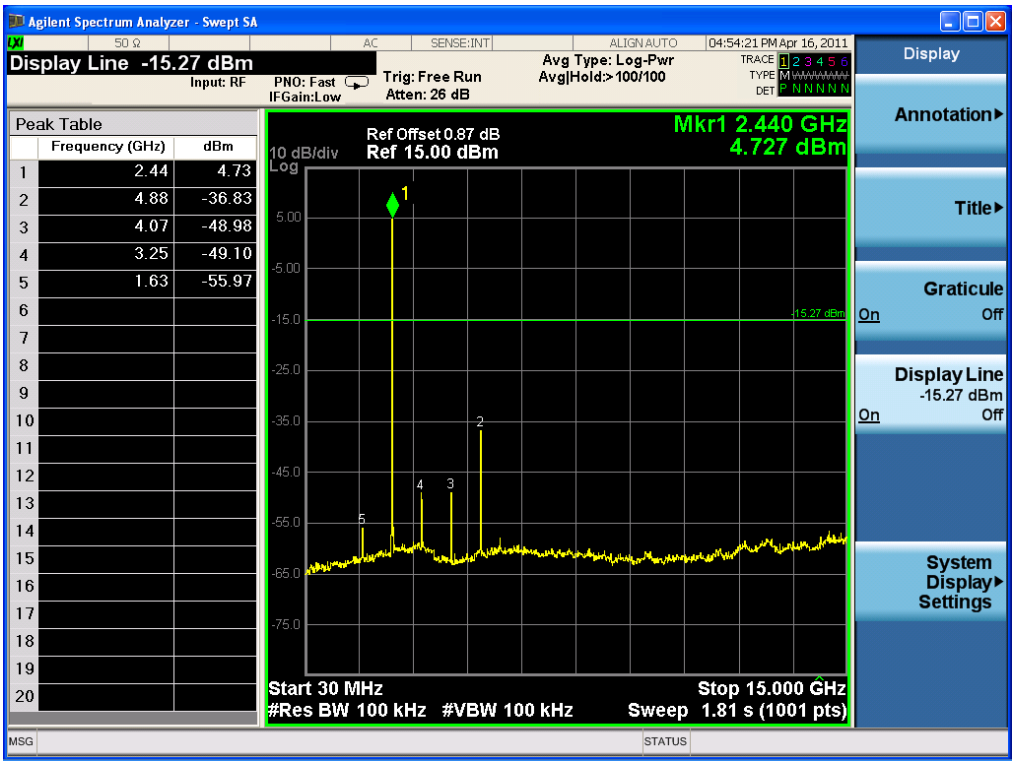


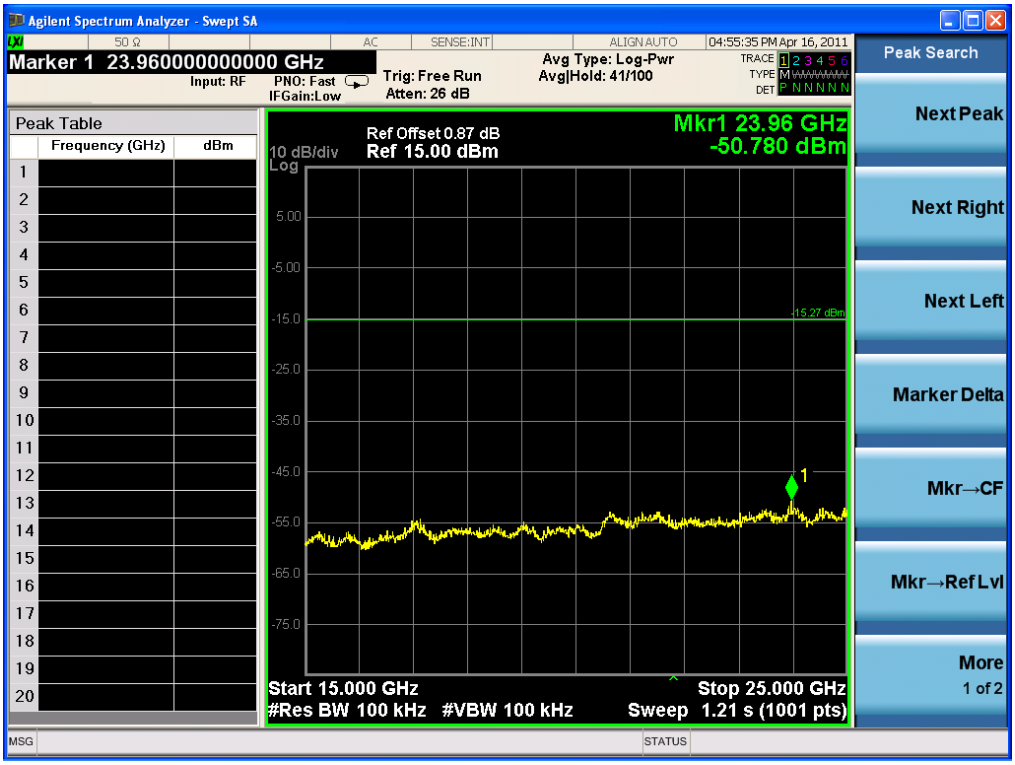
Band – edge (at 20 dB blow) – Low channel
Frequency Range = 30 MHz ~ 10th harmonic
(GFSK : Worst-Case)



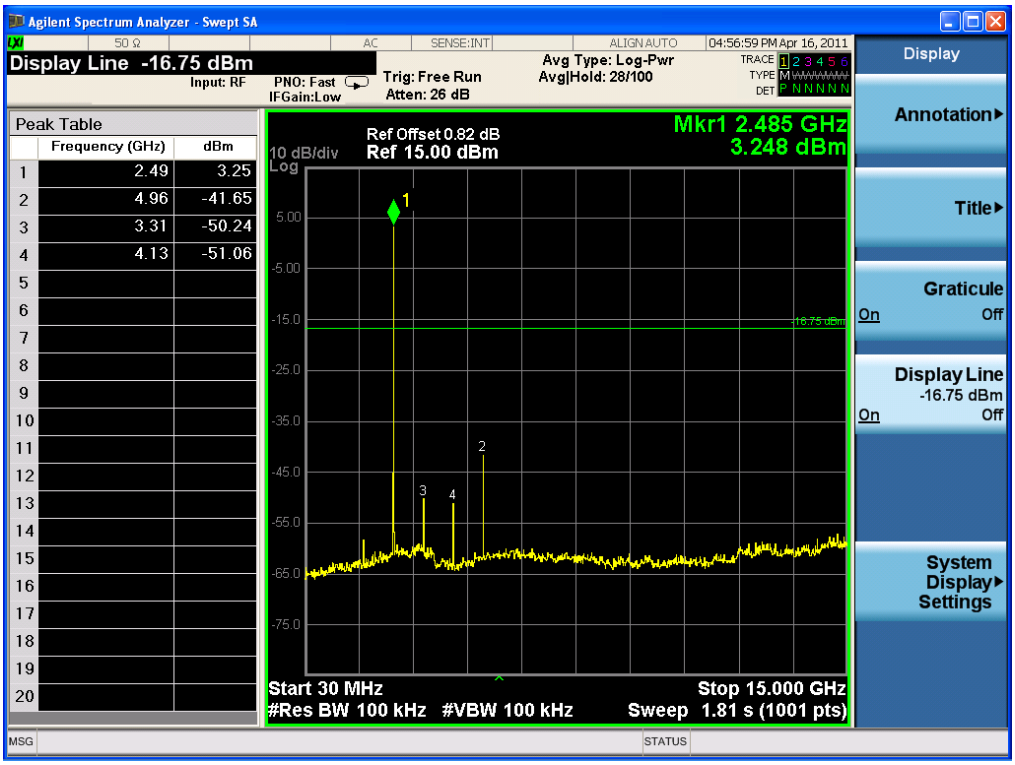


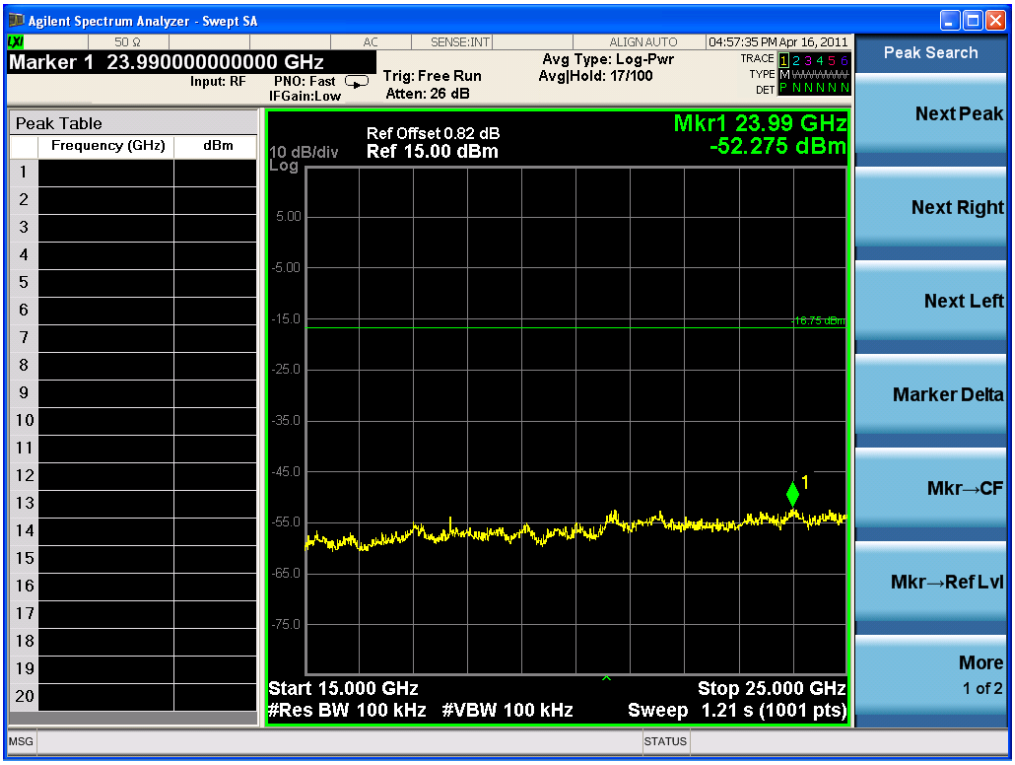
Band – edge (at 20 dB blow) – Mid channel
Frequency Range = 30 MHz ~ 10th harmonic
(GFSK : Worst-Case)





Band – edge (at 20 dB blow) – High channel
Frequency Range = 30 MHz ~ 10th harmonic
(GFSK : Worst-Case)





2.1.7 Field Strength of Emissions

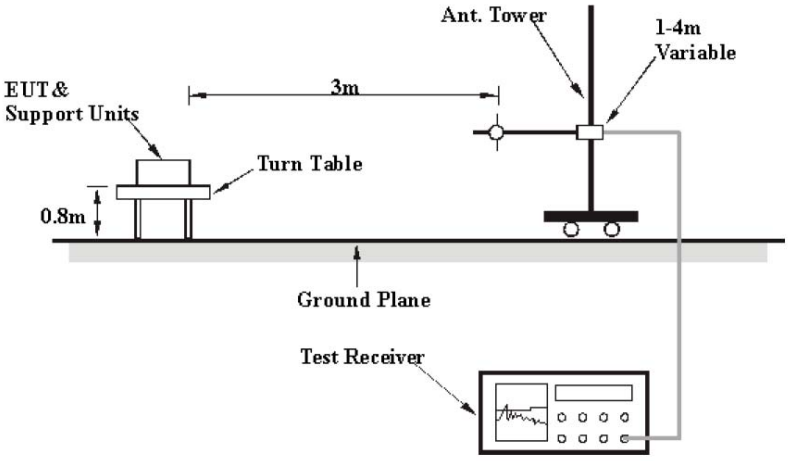
Test Location

☒ Testing was performed at a test distance of 3 meter Open Area Test Site

Test Procedures

The height of the measuring antenna was varied between 1 to 4 m and the table was rotated a full revolution in order to obtain maximum values of the electric field intensity. The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

The spectrum analyzer is set to:
Center frequency = the worst channel
Frequency Range =30 MHz ~ 10th harmonic
RBW = 120 kHz (30 MHz ~ 1 GHz) VBW ≥ RBW
= 1 MHz (1 GHz ~ 10th harmonic)
Span = 100 MHz Detector function = Quasi-peak
Trace = max hold



Limit

- **15.209(a)**

Frequency(MHz)	Field Strength uV/m@3m	Field Strength dBuV/m@3m
30-88	100**	40
88-216	150**	43.5
216-960	200**	46
Above 960	500	54

** Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231 and 15.241.

Test Results

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

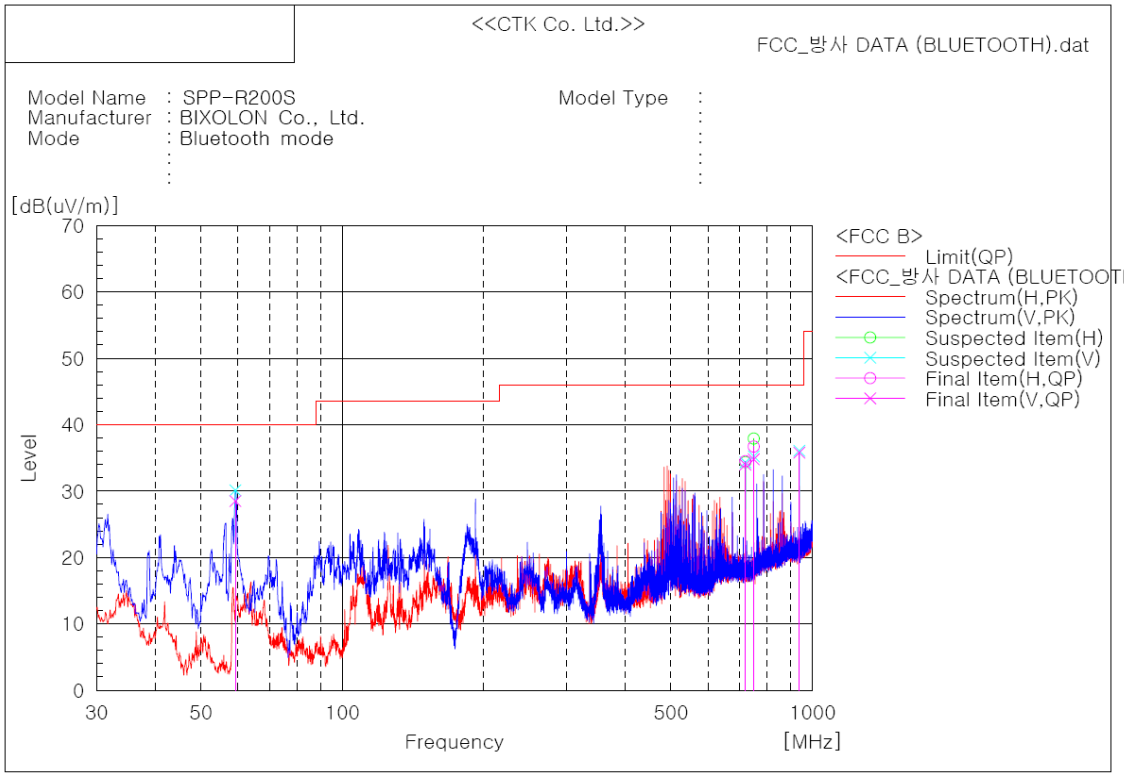
EUT	Mobile Printer	Measurement Detail	
Model	SPP-R200S	Frequency Range	Below 1000MHz
Test mode	GFSK (Worst case)	Detector function	Quasi-Peak

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
750.104	36.7	9.3	Quasi-peak

Test Data



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	59.221	V	52.3	-23.8	28.5	40.0	11.5	205.0	30.0	
2	720.155	H	39.6	-5.1	34.5	46.0	11.5	100.0	30.0	
3	720.155	V	39.1	-5.1	34.0	46.0	12.0	100.0	354.0	
4	750.104	H	41.3	-4.6	36.7	46.0	9.3	100.0	104.0	
5	750.104	V	39.4	-4.6	34.8	46.0	11.2	205.0	290.0	
6	937.677	V	36.4	-0.6	35.8	46.0	10.2	205.0	290.0	

Remark :
1. The field strength of spurious emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand-up position(Z axis) and the worst case was recorded.

Test Results

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

EUT	Mobile Printer	Measurement Detail	
Model	SPP-R200S	Frequency Range	1-25GHz
Channel	Channel 0	Detector function	Peak
Test Mode	GFSK (Worst case)		

Remarks

We have tested three mode (X, Y, Z). The worst mode (X axis) for final test.

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
4804.00	39.2 / 51.9	14.8 / 22.1	Average / Peak

Test Data

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
					Antenna	Amp. Gain	Cable						
4804.00	30.0	42.7	V	1.0	32.7	34.9	11.4	54.0	74.0	39.2	51.9	14.8	22.1

Restricted band edge test data

Measured frequency range : 2310-2390 MHz, 2483.5-2500 MHz

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
					Antenna	Amp. Gain	Cable						
2389.00	36.1	42.0	V	1.0	28.2	35.3	7.4	54.0	74.0	36.4	42.3	17.6	31.7

Test Results

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

EUT	Mobile Printer	Measurement Detail	
Model	SPP-R200S	Frequency Range	1-25GHz
Channel	Channel 39	Detector function	Peak
Test Mode	GFSK (Worst case)		

Remarks

We have tested three mode (X, Y, Z). The worst mode (X axis) for final test.

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
4882.00	38.9 / 54.3	15.1 / 19.7	Average / Peak

Test Data

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
					Antenna	Amp. Gain	Cable						
4882.00	29.7	45.1	V	1.0	32.7	34.9	11.4	54.0	74.0	38.9	54.3	15.1	19.7

Restricted band edge test data

Measured frequency range : 2310-2390 MHz, 2483.5-2500 MHz

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor			Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Amp. Gain	Cable			
No emissions were detected at a level greater than 20dB below limit.									

Test Results

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

EUT	Mobile Printer	Measurement Detail	
Model	SPP-R200S	Frequency Range	1-25GHz
Channel	Channel 78	Detector function	Peak
Test Mode	GFSK (Worst case)		

Remarks

We have tested three mode (X, Y, Z). The worst mode (X axis) for final test.

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
2483.5	43.8 / 56.8	10.2 / 17.2	Average / Peak

Test Data

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
					Antenna	Amp. Gain	Cable						
4960.00	34.6	47.6	H	1.1	32.7	34.9	11.4	54.0	74.0	43.8	56.8	10.2	17.2

Restricted band edge test data

Measured frequency range : 2310-2390 MHz, 2483.5-2500 MHz

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor			Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
					Antenna	Amp. Gain	Cable						
2483.50	36.0	45.0	H	1.1	28.2	35.3	7.4	54.0	74.0	36.3	45.3	17.7	28.7

2.1.8 AC Conducted Emissions

Test Location
Shielded Room

Frequency Range of Measurement
150 kHz to 30 MHz

Instrument Settings
IF Band Width: 9 kHz

Test Procedures

The EUT was placed on a non-metallic table 0.8m above the metallic, grounded floor and 0.4m from the reference ground plane wall. The distance to other metallic surfaces was at least 0.8m.
Amplitude measurements were performed with a quasi-peak detector and an average detector.

Limit

- **15.207(a)**

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56*	56 to 46*
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency.

Test Results
The requirements are:

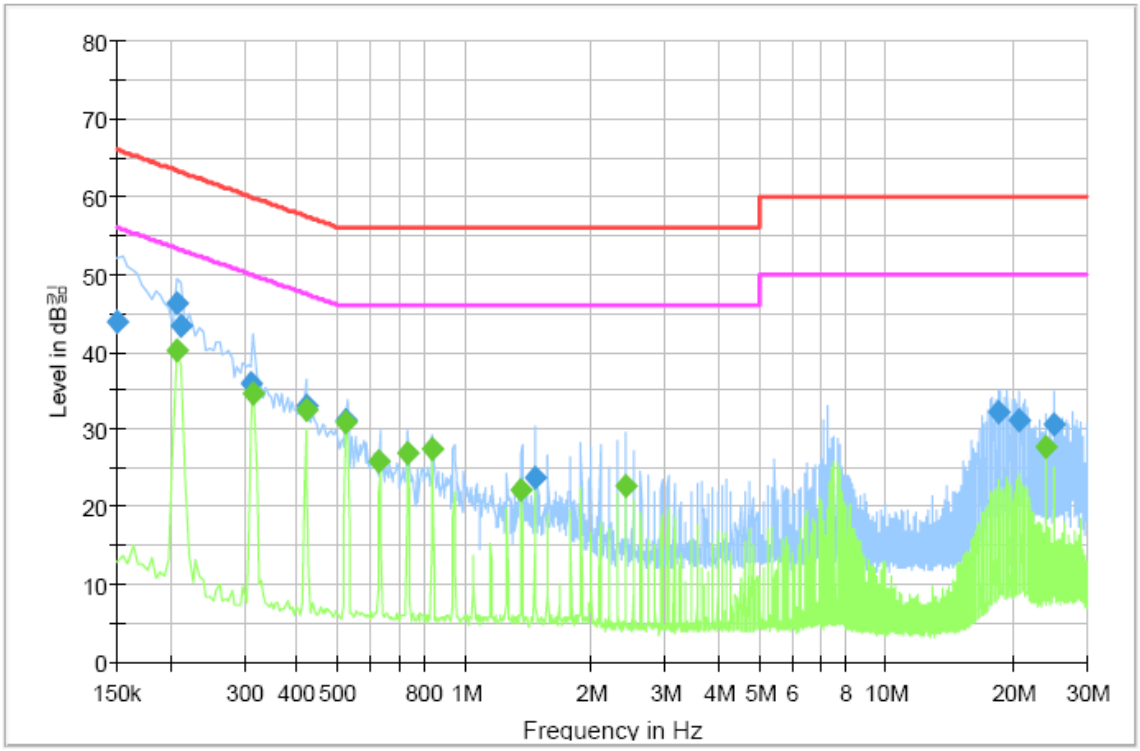
☒ Complies

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

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
0.2085	40.1	13.2	Average

Test Data

[HOT]



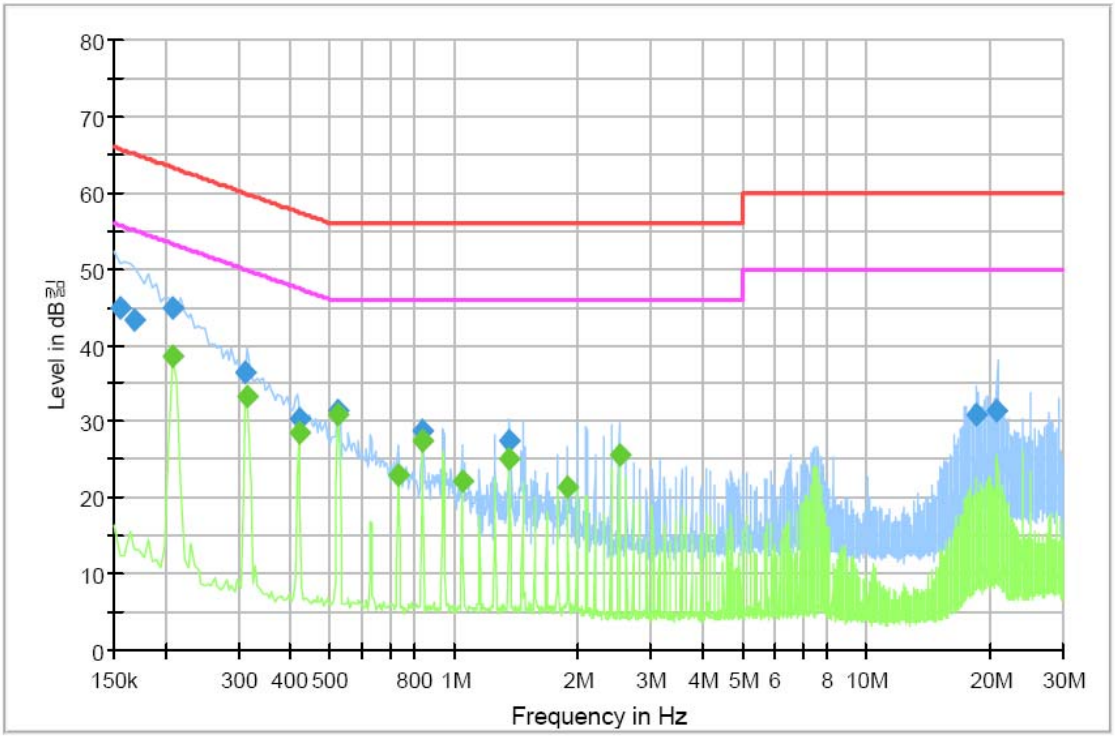
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	43.9	1000.0	9.000	On	L1	9.9	22.1	66.0
0.208500	46.2	1000.0	9.000	On	L1	10.0	17.1	63.3
0.213000	43.3	1000.0	9.000	On	L1	10.0	19.8	63.1
0.312000	36.0	1000.0	9.000	On	L1	10.1	23.9	59.9
0.420000	33.1	1000.0	9.000	On	L1	10.2	24.3	57.4
0.523500	31.1	1000.0	9.000	On	L1	10.2	24.9	56.0
1.468500	23.8	1000.0	9.000	On	L1	9.9	32.2	56.0
18.469500	32.2	1000.0	9.000	On	L1	10.0	27.8	60.0
20.769000	31.3	1000.0	9.000	On	L1	10.1	28.7	60.0
24.963000	30.5	1000.0	9.000	On	L1	10.1	29.5	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.208500	40.1	1000.0	9.000	On	L1	10.0	13.2	53.3
0.316500	34.5	1000.0	9.000	On	L1	10.1	15.3	49.8
0.420000	32.6	1000.0	9.000	On	L1	10.2	14.8	47.4
0.523500	30.9	1000.0	9.000	On	L1	10.2	15.1	46.0
0.627000	25.7	1000.0	9.000	On	L1	10.2	20.3	46.0
0.735000	26.8	1000.0	9.000	On	L1	10.1	19.2	46.0
0.838500	27.4	1000.0	9.000	On	L1	10.0	18.6	46.0
1.360500	22.1	1000.0	9.000	On	L1	9.9	23.9	46.0
2.409000	22.7	1000.0	9.000	On	L1	9.9	23.3	46.0
24.045000	27.7	1000.0	9.000	On	L1	10.1	22.3	50.0

[NEUTRAL]



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154500	45.0	1000.0	9.000	On	N	9.9	20.8	65.8
0.168000	43.2	1000.0	9.000	On	N	10.2	21.9	65.1
0.208500	44.9	1000.0	9.000	On	N	9.9	18.4	63.3
0.312000	36.3	1000.0	9.000	On	N	10.1	23.6	59.9
0.420000	30.5	1000.0	9.000	On	N	10.2	26.9	57.4
0.523500	31.5	1000.0	9.000	On	N	10.2	24.5	56.0
0.838500	28.8	1000.0	9.000	On	N	10.0	27.2	56.0
1.360500	27.5	1000.0	9.000	On	N	9.9	28.5	56.0
18.496500	30.8	1000.0	9.000	On	N	10.2	29.2	60.0
20.796000	31.5	1000.0	9.000	On	N	10.2	28.5	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.208500	38.4	1000.0	9.000	On	N	9.9	14.9	53.3
0.316500	33.3	1000.0	9.000	On	N	10.1	16.5	49.8
0.420000	28.5	1000.0	9.000	On	N	10.2	18.9	47.4
0.523500	30.8	1000.0	9.000	On	N	10.2	15.2	46.0
0.735000	22.9	1000.0	9.000	On	N	10.1	23.1	46.0
0.838500	27.4	1000.0	9.000	On	N	10.0	18.6	46.0
1.045500	22.1	1000.0	9.000	On	N	10.0	23.9	46.0
1.360500	25.2	1000.0	9.000	On	N	9.9	20.8	46.0
1.887000	21.3	1000.0	9.000	On	N	9.9	24.7	46.0
2.512500	25.6	1000.0	9.000	On	N	9.9	20.4	46.0

APPENDIX A – Test Equipment Used For Tests

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
1	Signal Analyzer	Agilent	N9020A	MY48011598	2011-11-12
2	Spectrum Analyzer	Rohde & Schwarz	FSP-30	100994	2011-11-12
3	EMI Test Receiver	Rohde & Schwarz	ESVS30	826638/008	2011-07-12
4	ULTRA Broadband Antenna	Rohde & Schwarz	HL562	361324/014	2011-11-18
5	LOOP ANTENNA	EMCO	6502	9107-2652	2012-10-29
6	Attenuator	HP	8498A	1801A06913	2011-11-15
7	EPM Series Power Meter	HP	E4418A	GB38272734	2011-11-12
8	Power Sensor	HP	8487A	3318A03524	2011-07-12
9	Audio Analyzer	HP	8903B	2747A03432	2011-11-12
10	ESG-D Series Signal Generator	Agilent	E4432B	US40054094	2011-11-12
11	SYNTHESIZED SWEEPER	HP	8341B	2819A01563	2011-11-12
12	Modulation Analyzer	HP	8901B	3438A05228	2011-11-16
13	Attenuator	HP	8494A	3308A33351	2011-11-15
14	Temp&Humi Chamber	Kunpoong	JT-TH-556-1	9QE5-002	2012-11-14
15	DC POWER SUPPLY	Agilent	E3632A	MY40011638	2011-11-12
16	EMC Analyzer	Agilent	E7405A	MY45110859	2012-02-11
17	Horn Antenna	ETS-Lindgren	3115	00078894	2012-12-18
18	Horn Antenna	ETS-Lindgren	3115	00078895	2012-12-18
19	Dipole Antenna	SCHWARZBECK	VHA 9103	VHA91032557	2011-09-18
20	Dipole Antenna	SCHWARZBECK	UHA 9105	UHA91052417	2011-09-18
21	OPT H64 AMPLIFIER	HP	8447F	3113A06814	2012-03-31
22	PREAMPLIFIER	Agilent	8449B	3008A02307	2011-11-16
23	Radio Communication Tester	Rohde & Schwarz	CMU200	106765	2012-02-09
24	LISN	Rohde & Schwarz	ESH3-Z5	100207	2011-11-15
25	LISN	Rohde & Schwarz	ENV216	101151	2012-03-09
26	DC POWER SUPPLY	Agilent	E3632A	MY40011638	2011-11-12
27	EMI Test Receiver	Rohde & Schwarz	ESCI3	100032	2012-02-09