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TEST REPORT For FCC

Test Report No.	:	CTK-2013-00181
Date of Issue	:	February 07, 2013
FCC ID	:	U5MSRP-350IIOBE
Model/Type No.	:	SRP-35*IIOBEz
Kind of Product	:	THERMAL RECEIPT PRINTER
Applicant	:	BIXOLON Co., Ltd.
Applicant Address	:	7th~8th FL, Miraeasset Venture Tower, 685, Sampyeong-dong, Bundang-gu Seongnam-si, Gyeonggi-do, Korea
Manufacturer	:	BIXOLON Co., Ltd.
Manufacturer Address	:	7th~8th FL, Miraeasset Venture Tower, 685, Sampyeong-dong, Bundang-gu Seongnam-si, Gyeonggi-do, Korea
Contact Person	:	Hyun-suk Son / Assistant Manager
Telephone	:	+82-31-218-5582
Received Date	:	January 04, 2013
Test period	:	Start : January 14, 2013 End : January 31, 2013

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

Tested by

Y. T. Lee

Young-taek Lee
Test Engineer
Date: February 07, 2013

Reviewed by

Y. J. Park

Young-Joon, Park
Technical Manager
Date: February 07, 2013

REPORT REVISION HISTORY

Date	Revision	Page No
February 07, 2013	Issued (CTK-2013-00181)	All

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1.0 General Product Description

Equipment model name	SRP-35*IIOBEz
Serial number	Prototype
EUT condition	Pre-production, not damaged
Antenna type	Chip antenna Gain 0.55 dBi
Frequency Range	2402 MHz - 2480 MHz
RF power	12.318 dBm Peak Conducted (GFSK) 11.966 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	AC/DC ADAPTER INPUT : 100-240V~, 1.5A OUTPUT : 24 VDC/2.5A

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

Model(SRP-35*IIOBEz) is identical to each other only except for below chart.

'*' means a resolution and may be 0 or 2. 'z' means a buyer or optional function and may be blank or any alphanumeric.

1.4 Device Modifications

The following modifications were necessary for compliance:

Not applicable

1.5 Peripheral Devices

Device	Model No.	Serial No.	Manufacturer
Notebook Computer	SP20	G86791BW400177	Samsung Electronics Co., Ltd.
AC/DC ADAPTER	BPA-06024G	CA1208211813	BIXOLON ELECTRONICS(DONGGUAN) CO., LTD.
Personal Computer	DB-A150	ZMSI96BSB00125F	Samsung Electronics Co., Ltd.
LCD Monitor	VS17	CNN5130QMC	Lite-On Technology Corp.
Melodist	RMB-100G	ISKD10100213	BIXOLON Co., LTD.
Keyboard(PS/2)	SK-2880	B943C0ACPS74OM	YET FOUNDATE
Mouse(USB)	3D-510	510080601808	LG Electronics Inc.

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 m & 10 m SAC and Conducted Test Site to perform FCC Part 15/18 measurements	805871
JAPAN	**VCCI**	3 m & 10 m SAC and Conducted Test Site	R-948, C-986 T-1843
KOREA	**KCC**	EMI (3 m & 10 m SAC and Conducted Test Site) 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
15.207	AC Conducted Emissions	15.207(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

The tests were performed according to the method of measurements prescribed in DA 00-705.

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

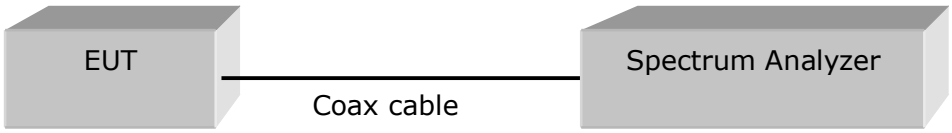


Figure 1 : Measurement setup for the carrier frequency separation

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	995	625.2	25	Complies

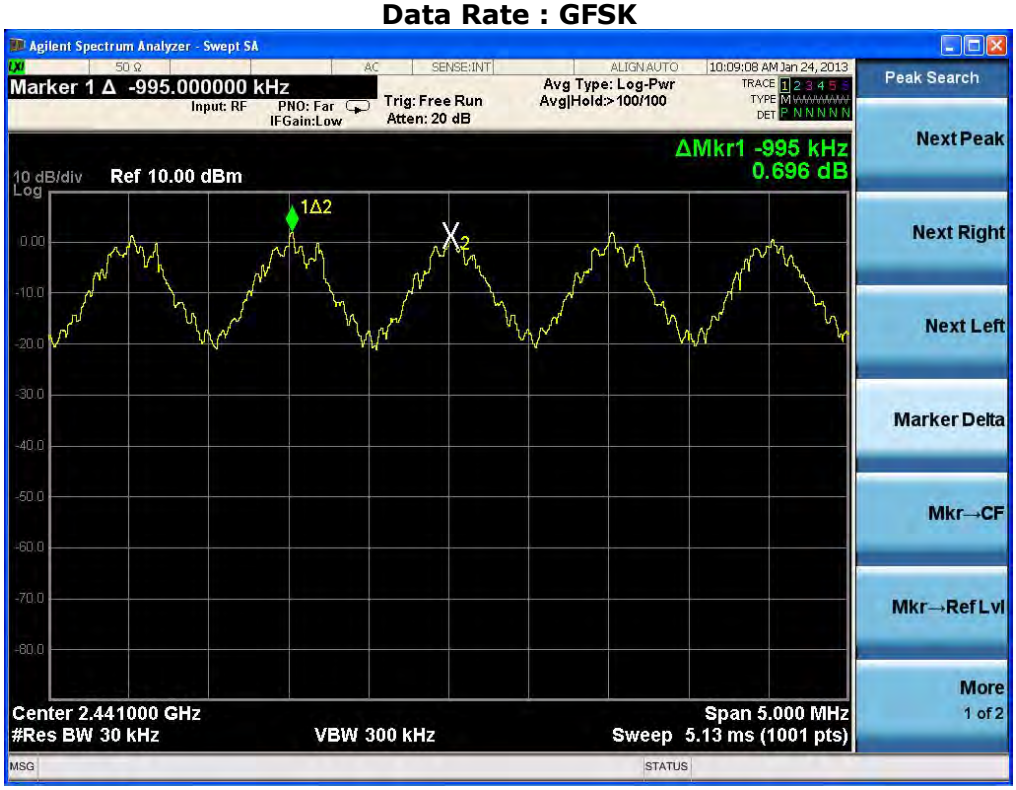
Test mode : 8-DPSK, CFG PKT Packet Type : 31 Packet Size : 1021(3DH5)

Channel	Adjacent Hopping Channel Separation (kHz)	Two-third of 20dB bandwidth (kHz)	Minimum Bandwidth (kHz)	Result
2441MHz	995	830.0	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

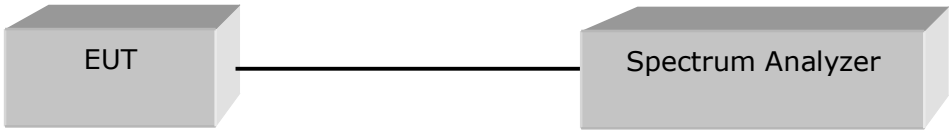
Test Procedures

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)
VBW = 300 kHz (≥ RBW)
Trace = max hold
Sweep = auto
Detector function = peak



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)

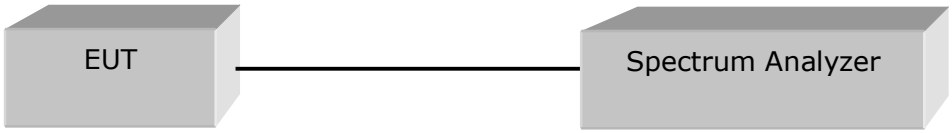
2.1.3 20 dB bandwidth

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)

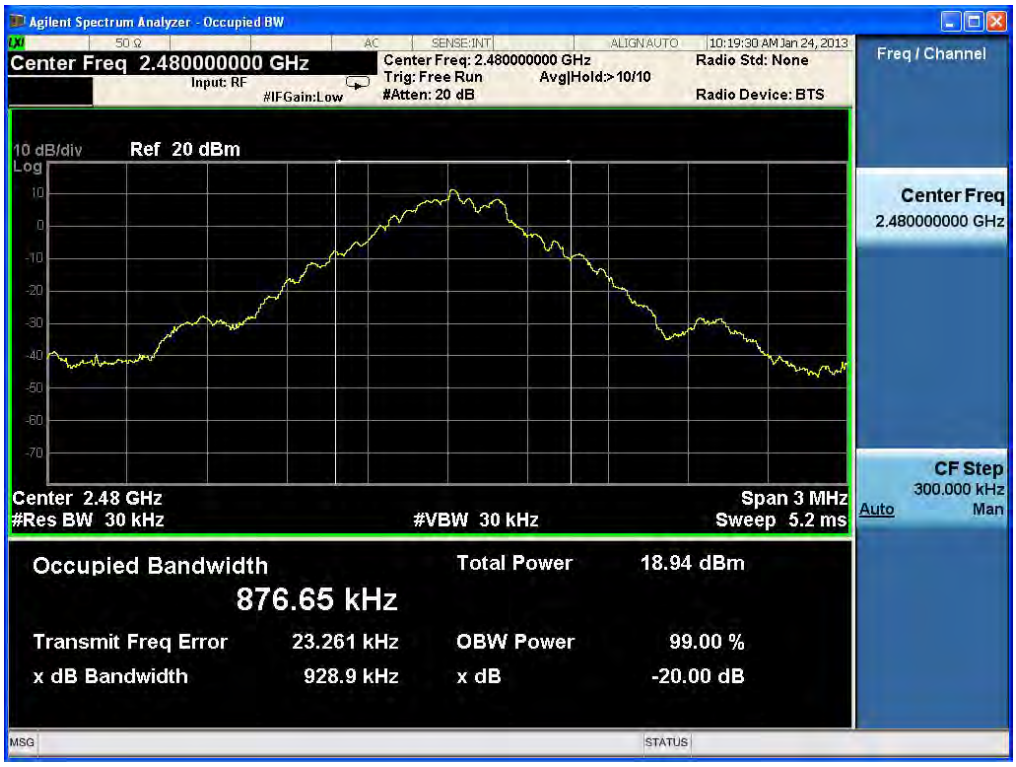
Frequency (MHz)	Channel Number.	Measured Bandwidth (MHz)	Result
2402	0	0.9250	Complies
2441	39	0.9378	Complies
2480	78	0.9289	Complies

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

Frequency (MHz)	Channel Number.	Measured Bandwidth (MHz)	Result
2402	0	1.246	Complies
2441	39	1.245	Complies
2480	78	1.246	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)

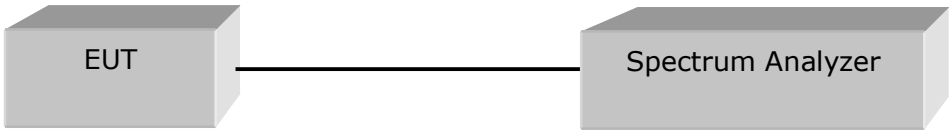
Test Location
RF Test Room

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 SRP-35*IIOBEz 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	0.420	134.40	Complies
	DH 3	1.670	267.20	Complies
	DH 5	2.920	311.47	Complies

DH1 Dwell time = 0.420 ms × (1600÷2) ÷ 79 × 31.6 = 134.40 ms
DH3 Dwell time = 1.670 ms × (1600÷4) ÷ 79 × 31.6 = 267.20 ms
DH5 Dwell time = 2.920 ms × (1600÷6) ÷ 79 × 31.6 = 311.47 ms

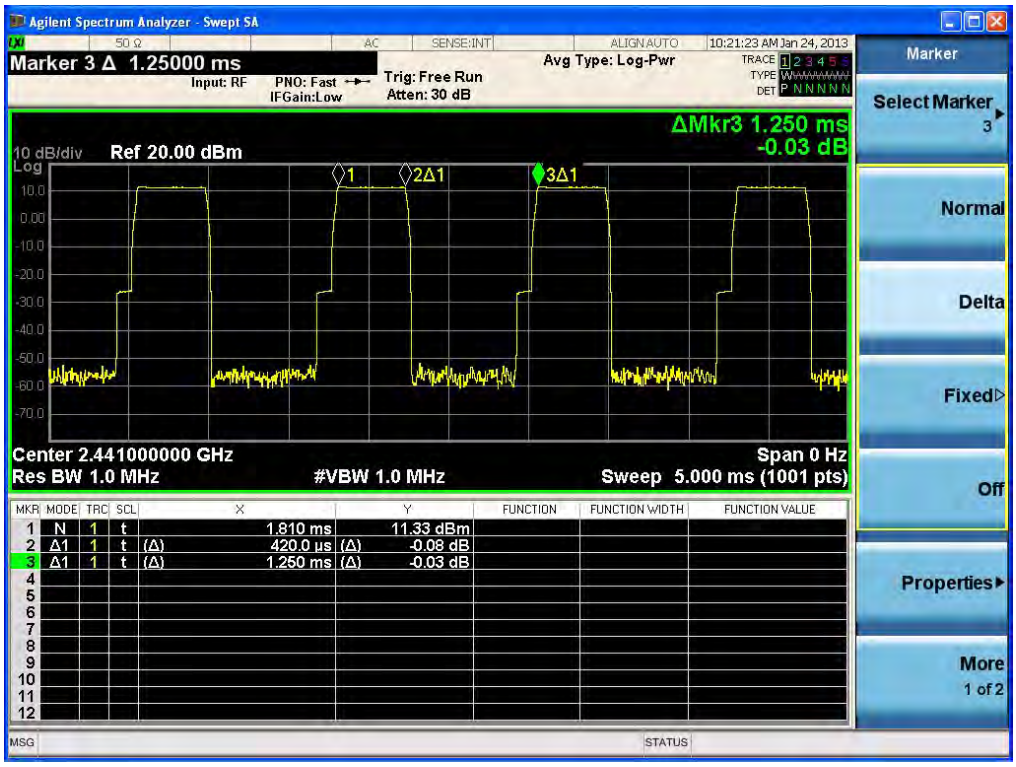
Test mode : 8-DPSK

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	0.430	137.60	Complies
	3DH 3	1.680	268.80	Complies
	3DH 5	2.930	312.52	Complies

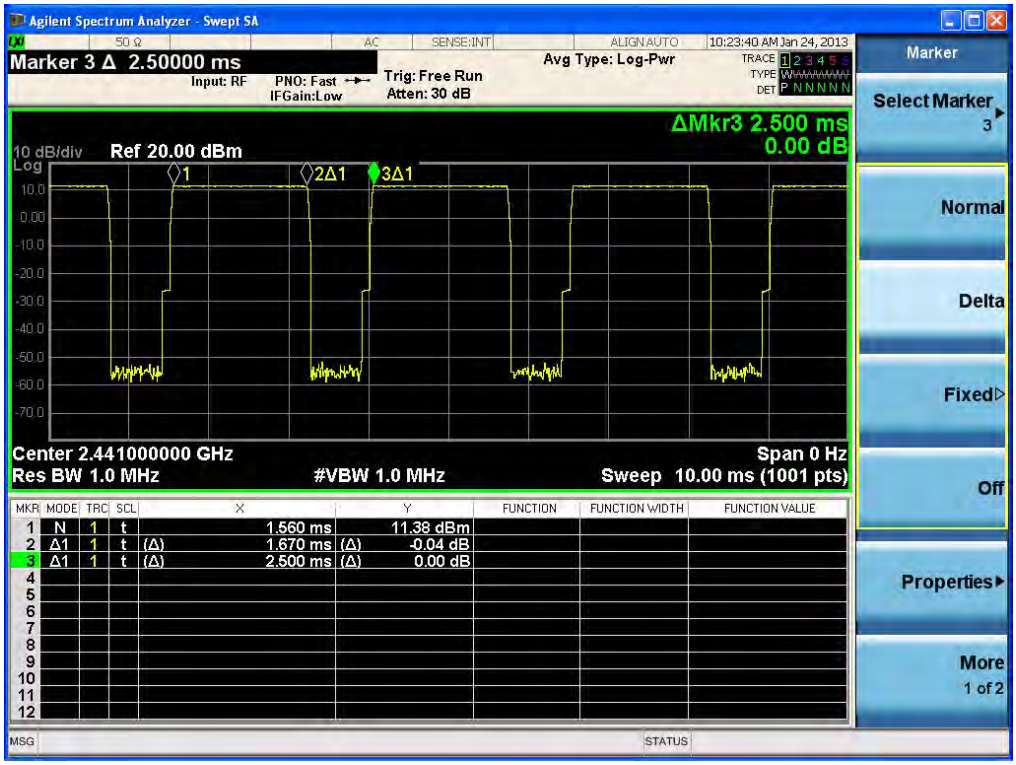
3DH1 Dwell time = 0.430 ms × (1600÷2) ÷ 79 × 31.6 = 137.60 ms
3DH3 Dwell time = 1.680 ms × (1600÷4) ÷ 79 × 31.6 = 268.80 ms
3DH5 Dwell time = 2.930 ms × (1600÷6) ÷ 79 × 31.6 = 312.52 ms

See next pages for actual measured spectrum plots.

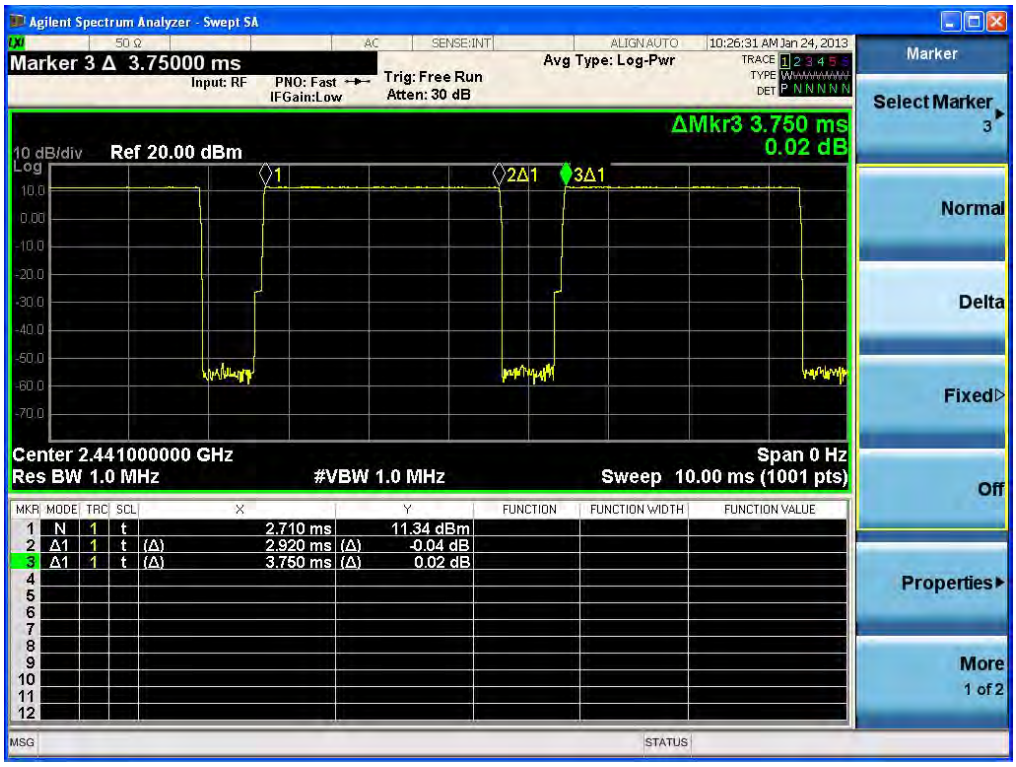
Time of Occupancy for PACKET Type DH1(GFSK)



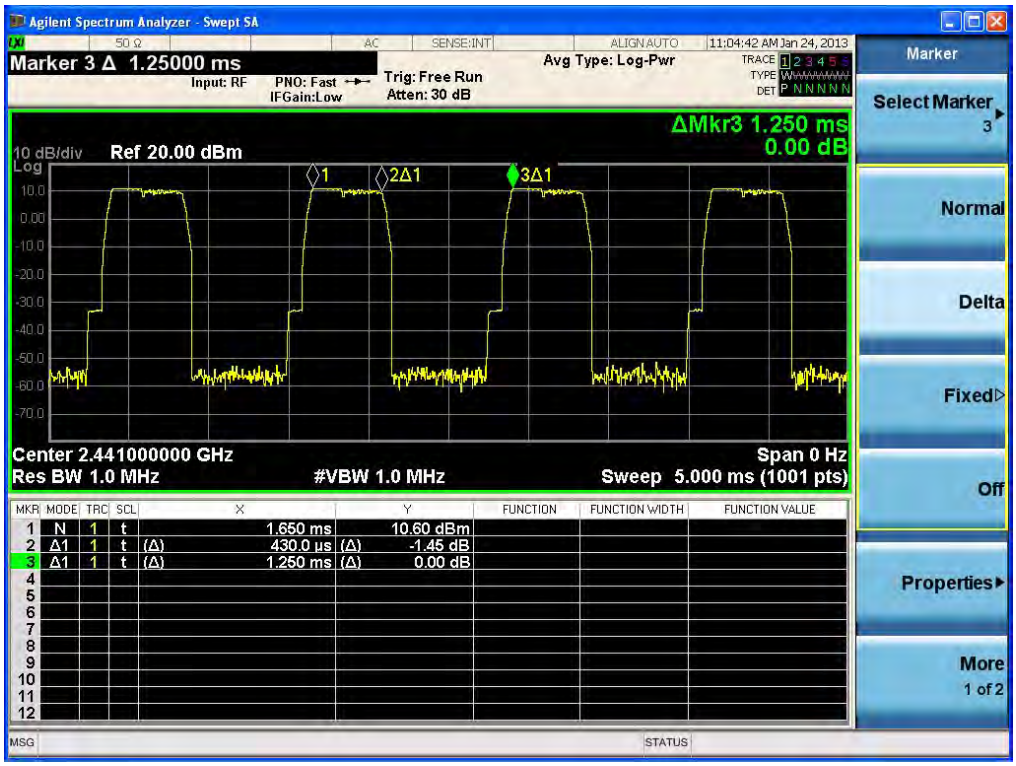
Time of Occupancy for PACKET Type DH3(GFSK)



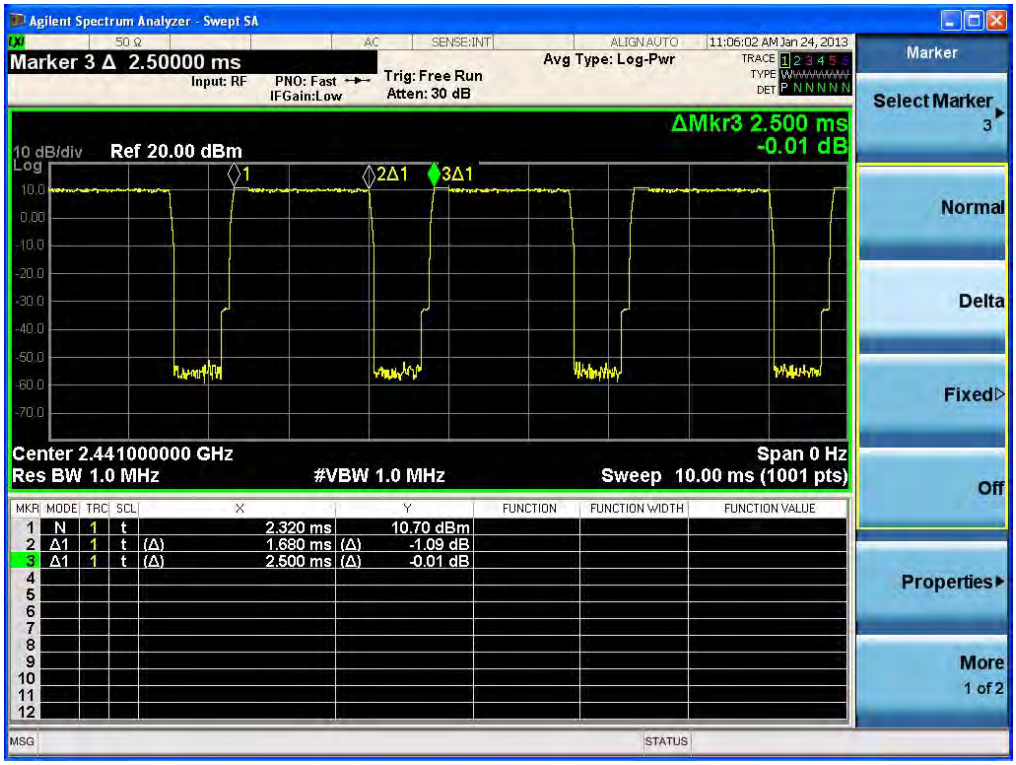
Time of Occupancy for PACKET Type DH5(GFSK)



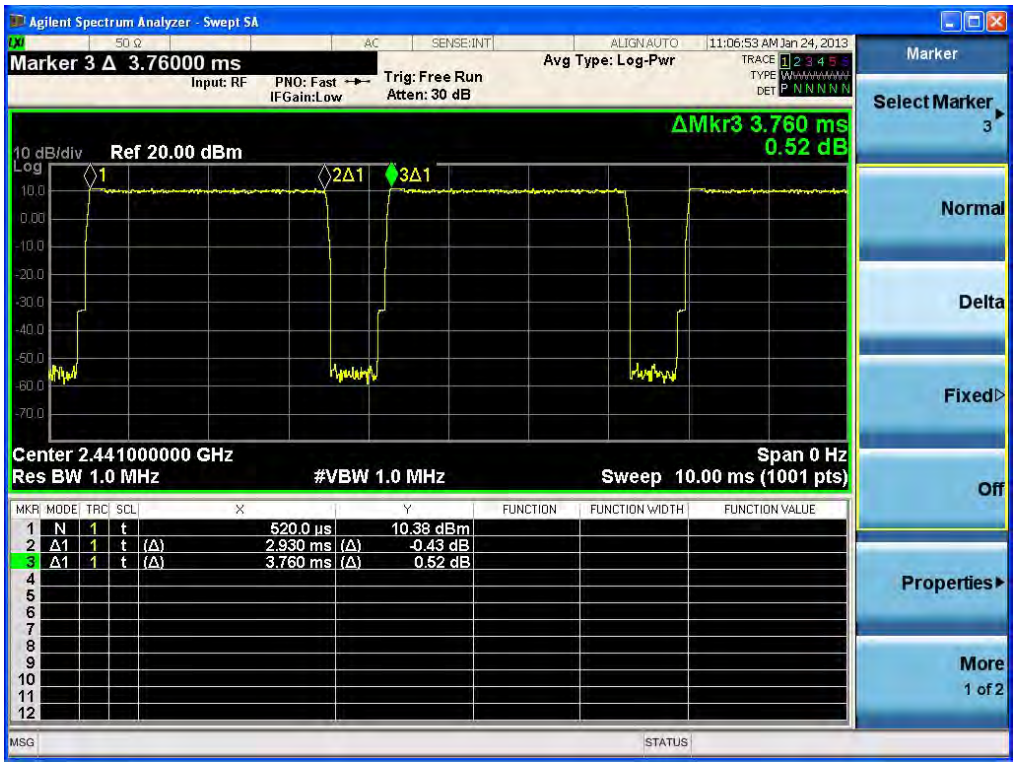
Time of Occupancy for PACKET Type 3DH1(8-DPSK)



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



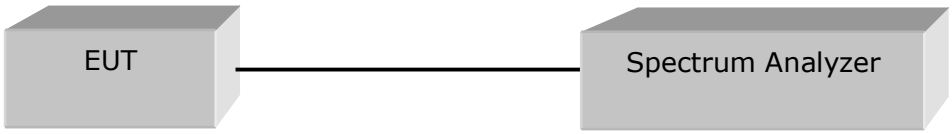
Time of Occupancy for PACKET Type 3DH5(8-DPSK)



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



Note:
The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
The RF output of EUT was connected to the spectrum analyzer by low loss cable.

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	11.849	15.307	Complies
2441	39	12.318	17.053	Complies
2480	78	12.101	16.222	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	11.966	15.725	Complies
2441	39	11.849	15.307	Complies
2480	78	11.138	12.996	Complies

See next pages for actual measured spectrum plots.

Maximum peak Conducted Output Power - GFSK

Maximum peak Conducted Output Power - 8-DPSK

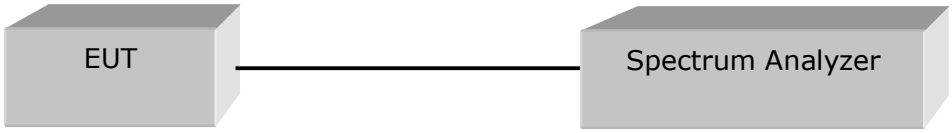
2.1.6 Band-edge

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

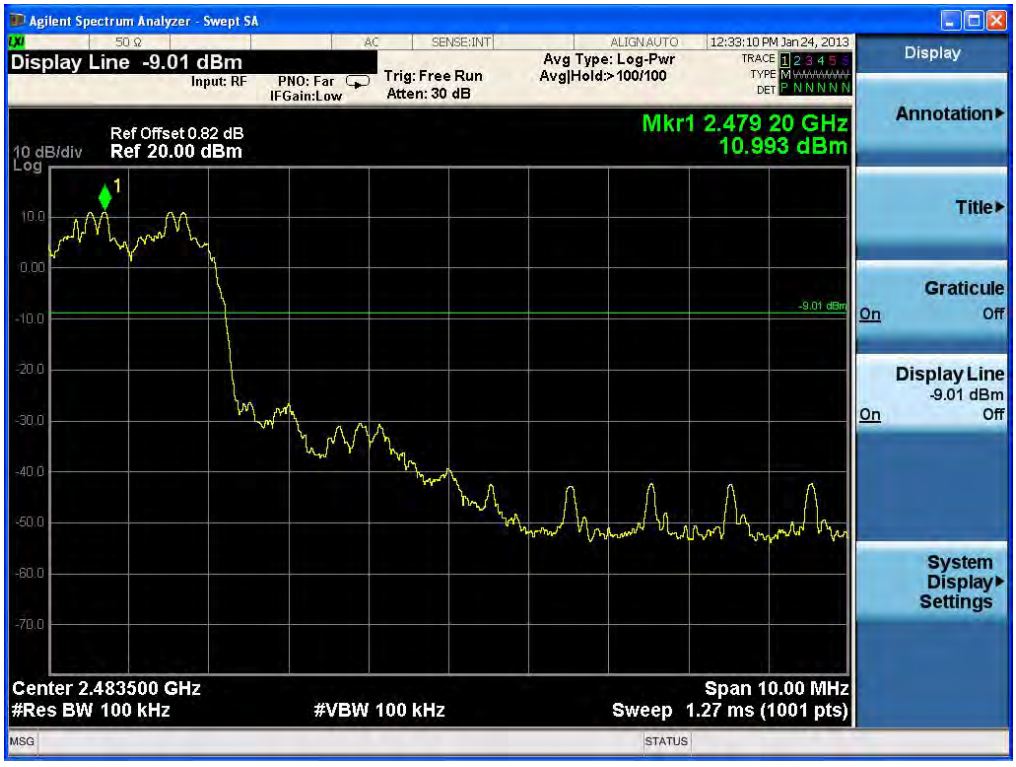
Test Results

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
(Test mode : GFSK)

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

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

Band – edge (at 20 dB blow) – Low channel
Frequency Range = 30 MHz ~ 10th harmonic
(Test mode : 8-DPSK)

Band – edge (at 20 dB blow) – Mid channel
Frequency Range = 30 MHz ~ 10th harmonic
(Test mode : 8-DPSK)

Band – edge (at 20 dB blow) – High channel
Frequency Range = 30 MHz ~ 10th harmonic
(Test mode : 8-DPSK)

2.1.7 Field Strength of Emissions

Test Location

☒ 10 m SAC (test distance : ☐ 10 m, ☒ 3 m)
☒ 3 m SAC (test distance : 3 m)

Test Procedures

1) In the frequency range of 9 kHz to 30 MHz, magnetic field is measured with Loop Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
2) In the frequency rage above 30 MHz, Bi-Log Test Antenna(30 MHz to 1 GHz) and Horn Test Antenna(above 1 GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is carried from 1m to 4m above the ground to determine the maximum value of the field strength. The emissions levels at both horizontal and vertical polarizations should be tested.

The spectrum analyzer is set to:

Frequency Range = 9 kHz ~ 25 GHz (2.4 GHz 10^{th} harmonic)
RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz, 9 kHz for f < 30 MHz
VBW ≥ RBW
Sweep = auto

Limit

- **15.209(a)**

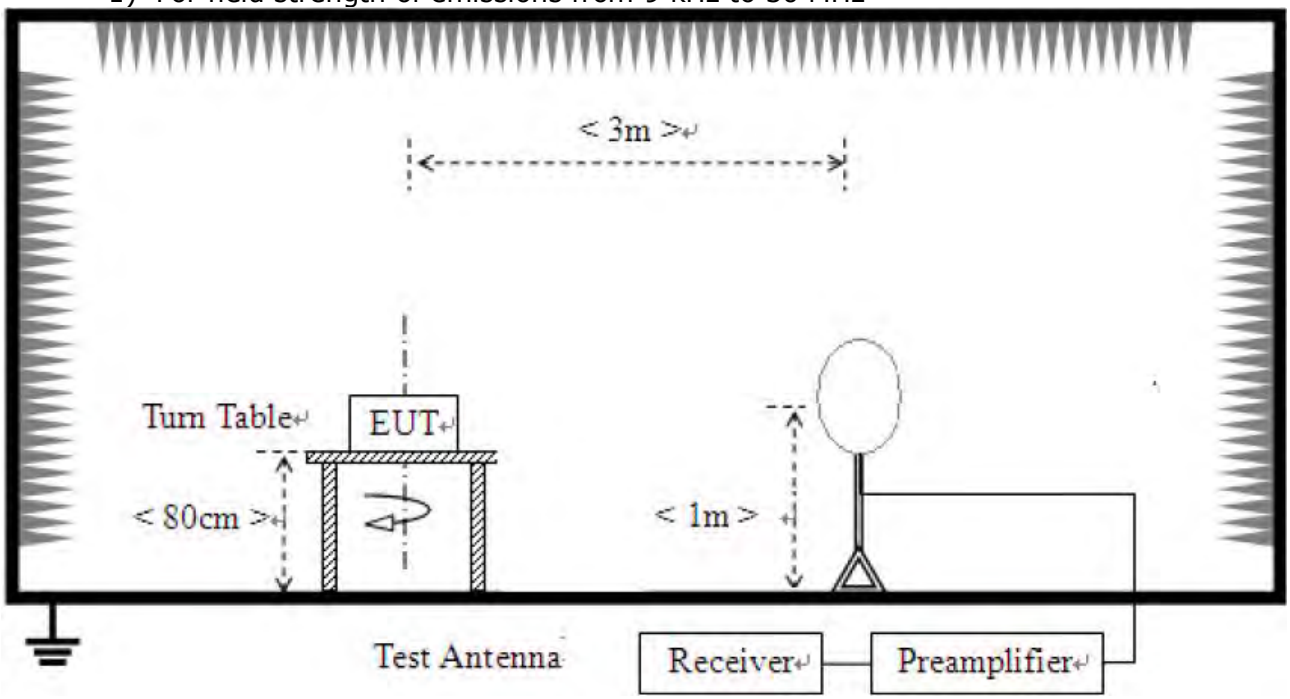
Frequency(MHz)	Field Strength uV/m@3m	Field Strength dBuV/m@3m	Deasurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705-30	30	-	30
30-88	100**	40	3
88-216	150**	43.5	3
216-960	200**	46	3
Above 960	500	54	3

** 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.

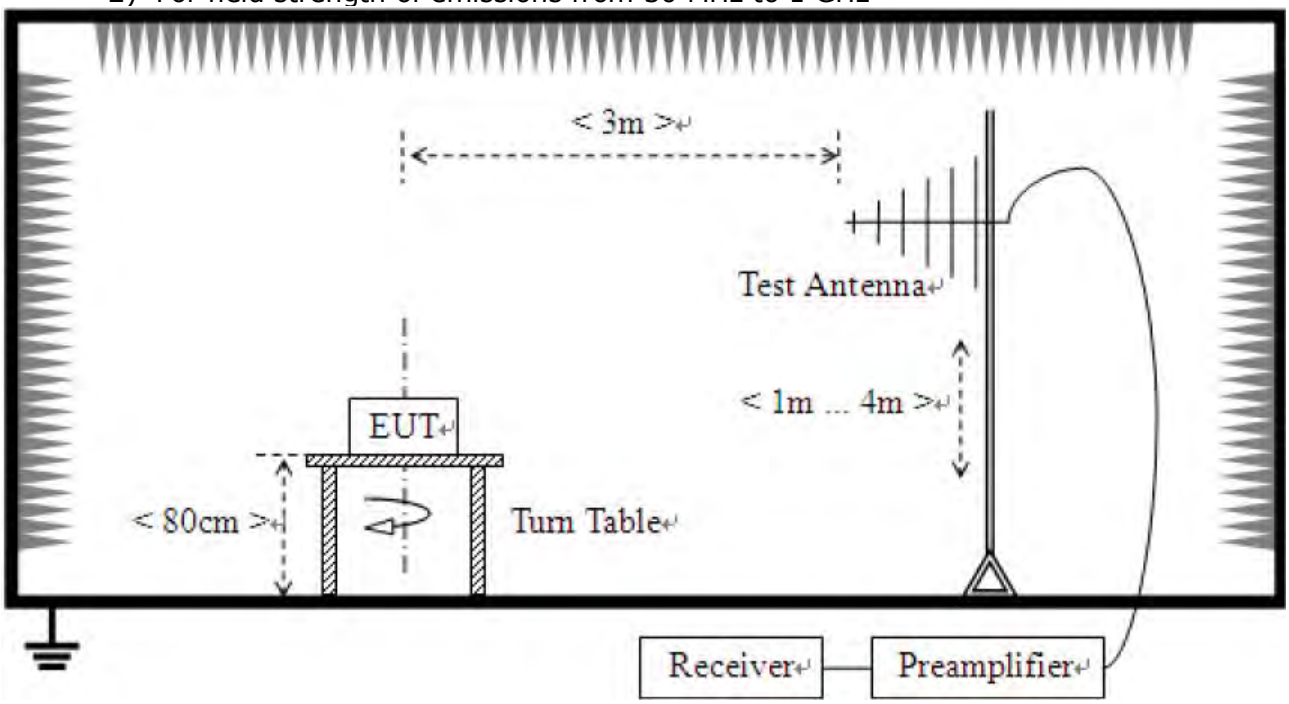
Note :
1) For above 1 GHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.
2) For above 1 GHz, limit field strength of harmonics : 54 dBuV/m@3m (AV) and 74 dBuV/m@3m (PK)

Test Setup:

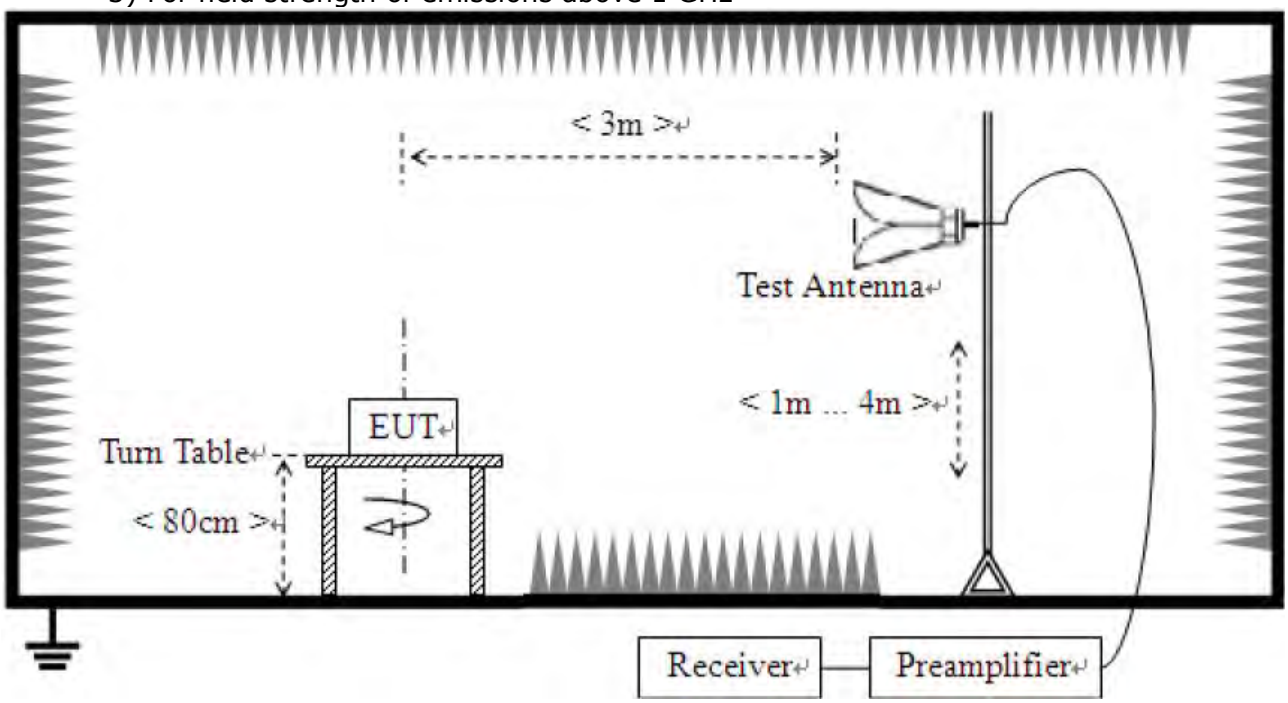
1) For field strength of emissions from 9 kHz to 30 MHz



2) For field strength of emissions from 30 MHz to 1 GHz



3) For field strength of emissions above 1 GHz



Test Results
1) 9 kHz to 30 MHz

EUT	THERMAL RECEIPT PRINTER	Measurement Detail	
Model	SRP-35*IIOBEz	Frequency Range	9 kHz – 30 MHz
Test mode	GFSK (Worst case)	Detector function	Quasi-Peak

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
-	-	-	See note

Note :
The amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.
Distance extrapolation factor = 40 log (specific distance / test distance) (dB)

2) 30 MHz to 1 GHz

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

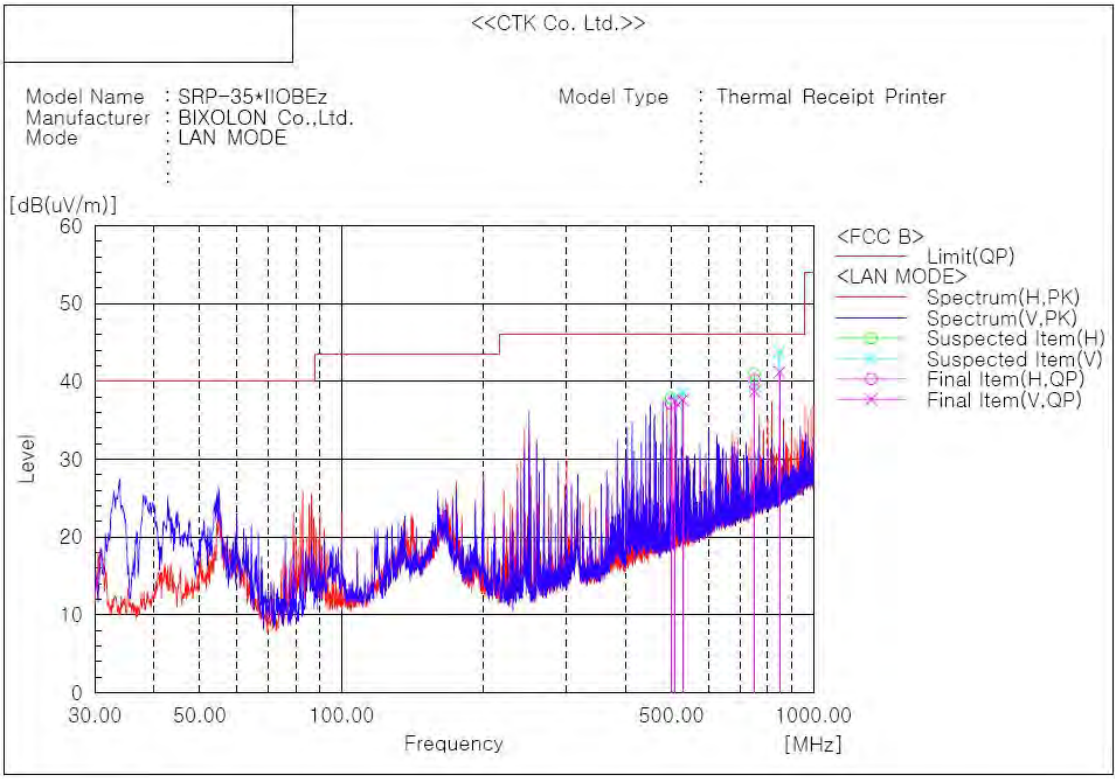
EUT	THERMAL RECEIPT PRINTER	Measurement Detail	
Model	SRP-35*IIOBEz	Frequency Range	Below 1000MHz
Test mode	GFSK (Worst case)	Detector function	Quasi-Peak

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
848.44	41.2	4.8	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]
1	499.237	H	41.9	-4.8	37.1	46.0	8.9	205.0	104.0
2	508.816	V	42.0	-4.6	37.4	46.0	8.6	100.0	178.0
3	528.095	V	41.6	-4.0	37.6	46.0	8.4	100.0	178.0
4	750.104	H	39.4	0.8	40.2	46.0	5.8	205.0	67.0
5	750.104	V	37.9	0.8	38.7	46.0	7.3	100.0	290.0
6	848.438	V	38.7	2.5	41.2	46.0	4.8	100.0	252.0

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.

3) above 1 GHz

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

EUT	THERMAL RECEIPT PRINTER	Measurement Detail	
Model	SRP-35*IIOBEz	Frequency Range	1-25GHz
Channel	Channel 0	Detector function	Peak
Test Mode	GFSK		

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	52.2 / 59.1	1.8 / 14.9	Average / Peak

Test Data

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor Antenna	Correction Factor Amp. Gain + Cabel	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
1602.00	48.8	51.8	V	1.0	26.5	24.1	54.0	74.0	51.2	54.2	2.8	19.8
4804.00	37.8	44.7	V	1.0	32.8	18.4	54.0	74.0	52.2	59.1	1.8	14.9

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 Antenna	Correction Factor Amp. Gain + Cabel	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
2386.16	36.5	46.6	V	1.0	28.7	22.4	54.0	74.0	42.8	52.9	11.2	21.1

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

EUT	THERMAL RECEIPT PRINTER	Measurement Detail	
Model	SRP-35*IIOBEz	Frequency Range	1-25GHz
Channel	Channel 39	Detector function	Peak
Test Mode	GFSK		

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	49.1 / 56.9	4.9 / 17.1	Average / Peak

Test Data

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor Antenna	Correction Factor Amp. Gain + Cabel	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
1627.00	28.5	40.3	V	1.0	26.6	24.0	54.0	74.0	31.1	42.9	22.9	31.1
4882.00	35.1	42.9	V	1.0	33.0	19.0	54.0	74.0	49.1	56.9	4.9	17.1

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

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

EUT	THERMAL RECEIPT PRINTER	Measurement Detail	
Model	SRP-35*IIOBEz	Frequency Range	1-25GHz
Channel	Channel 78	Detector function	Peak
Test Mode	GFSK		

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
4960	51.8 / 57.4	2.2 / 16.6	Average / Peak

Test Data

Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Height [m]	Correction Factor Antenna	Correction Factor Amp. Gain + Cabel	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
1654.00	30.5	39.7	V	1.0	26.7	23.8	54.0	74.0	33.4	42.6	20.6	31.4
4960.00	37.7	43.3	V	1.0	33.1	19.0	54.0	74.0	51.8	57.4	2.2	16.6

Restricted band edge test data

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

Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Height [m]	Correction Factor Antenna	Correction Factor Amp. Gain + Cabel	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
2483.50	37.0	51.2	V	1.0	28.8	22.1	54.0	74.0	43.7	57.9	10.3	16.1

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

EUT	THERMAL RECEIPT PRINTER	Measurement Detail	
Model	SRP-35*IIOBEz	Frequency Range	1-25GHz
Channel	Channel 0	Detector function	Peak
Test Mode	8-DPSK		

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	52.5 / 62.8	1.5 / 11.2	Average / Peak

Test Data

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
					Antenna	Amp. Gain + Cabel	AV	Peak	AV	Peak	AV	Peak
1602.00	48.8	50.8	V	1.0	26.5	24.1	54.0	74.0	51.2	53.2	2.8	20.8
4804.00	38.1	48.4	V	1.0	32.8	18.4	54.0	74.0	52.5	62.8	1.5	11.2

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]		Result [dBuV/m]		Margin [dB]	
					Antenna	Amp. Gain + Cabel	AV	Peak	AV	Peak	AV	Peak
2386.00	42.2	52.7	V	1.0	28.7	22.4	54.0	74.0	48.5	59.0	5.5	15.0

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

EUT	THERMAL RECEIPT PRINTER	Measurement Detail	
Model	SRP-35*IIOBEz	Frequency Range	1-25GHz
Channel	Channel 39	Detector function	Peak
Test Mode	8-DPSK		

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	48.4 / 59.0	5.6 / 15.0	Average / Peak

Test Data

Frequency [MHz]	Reading [dBuV/m] AV / Peak		Pol.	Height [m]	Correction Factor Antenna	Correction Factor Amp. Gain + Cabel	Limits [dBuV/m] AV / Peak		Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
1627.00	28.5	40.1	V	1.0	26.6	24.0	54.0	74.0	31.1	42.7	22.9	31.3
4882.00	34.4	45.0	V	1.0	33.0	19.0	54.0	74.0	48.4	59.0	5.6	15.0

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

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

EUT	THERMAL RECEIPT PRINTER	Measurement Detail	
Model	SRP-35*IIOBEz	Frequency Range	1-25GHz
Channel	Channel 78	Detector function	Peak
Test Mode	8-DPSK		

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	52.5 / 67.1	1.5 / 6.9	Average / Peak

Test Data

Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Height [m]	Correction Factor Antenna	Correction Factor Amp. Gain + Cabel	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
1654.00	33.0	41.2	V	1.0	26.7	23.8	54.0	74.0	35.9	44.1	18.1	29.9
4960.00	34.6	44.4	V	1.0	33.1	19.0	54.0	74.0	48.7	58.5	5.3	15.5

Restricted band edge test data

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

Frequency [MHz]	Reading [dBuV/m] AV	Reading [dBuV/m] Peak	Pol.	Height [m]	Correction Factor Antenna	Correction Factor Amp. Gain + Cabel	Limits [dBuV/m] AV	Limits [dBuV/m] Peak	Result [dBuV/m] AV	Result [dBuV/m] Peak	Margin [dB] AV	Margin [dB] Peak
2483.50	45.8	60.4	V	1.0	28.8	22.1	54.0	74.0	52.5	67.1	1.5	6.9

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:

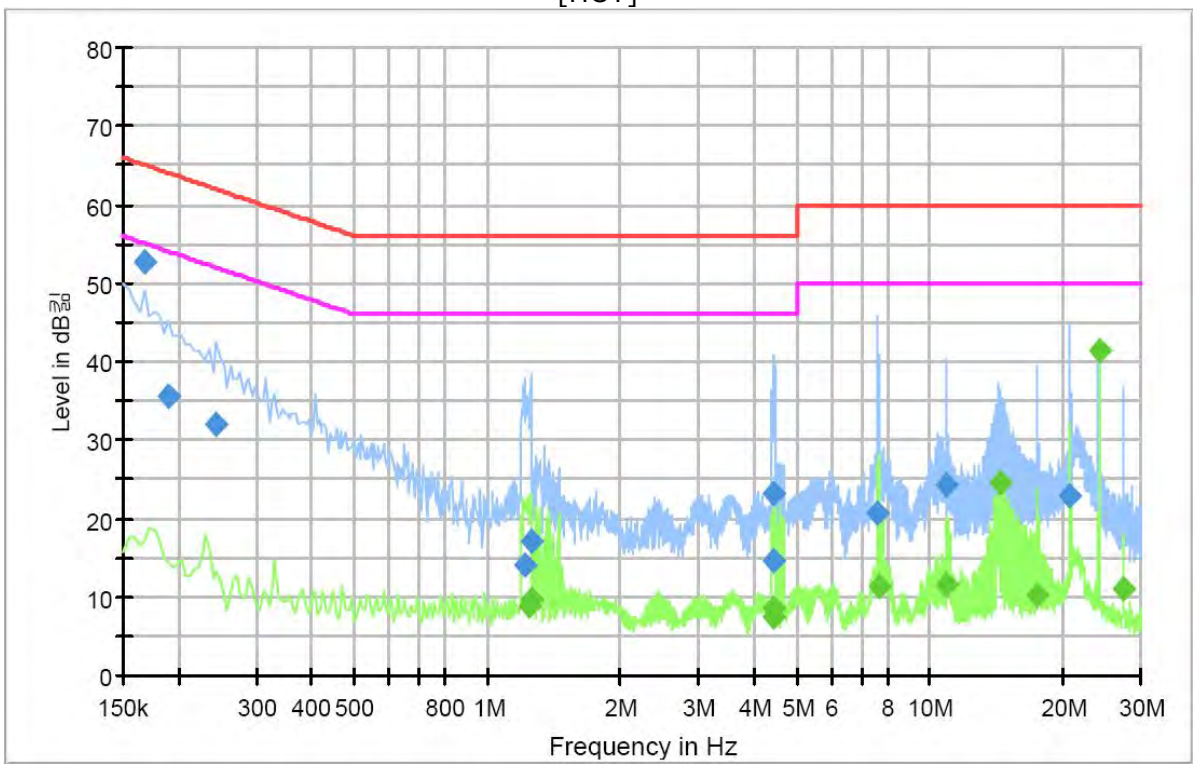
☒ Complies

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

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
24.144	41.9	8.1	Average

Test Data

[HOT]



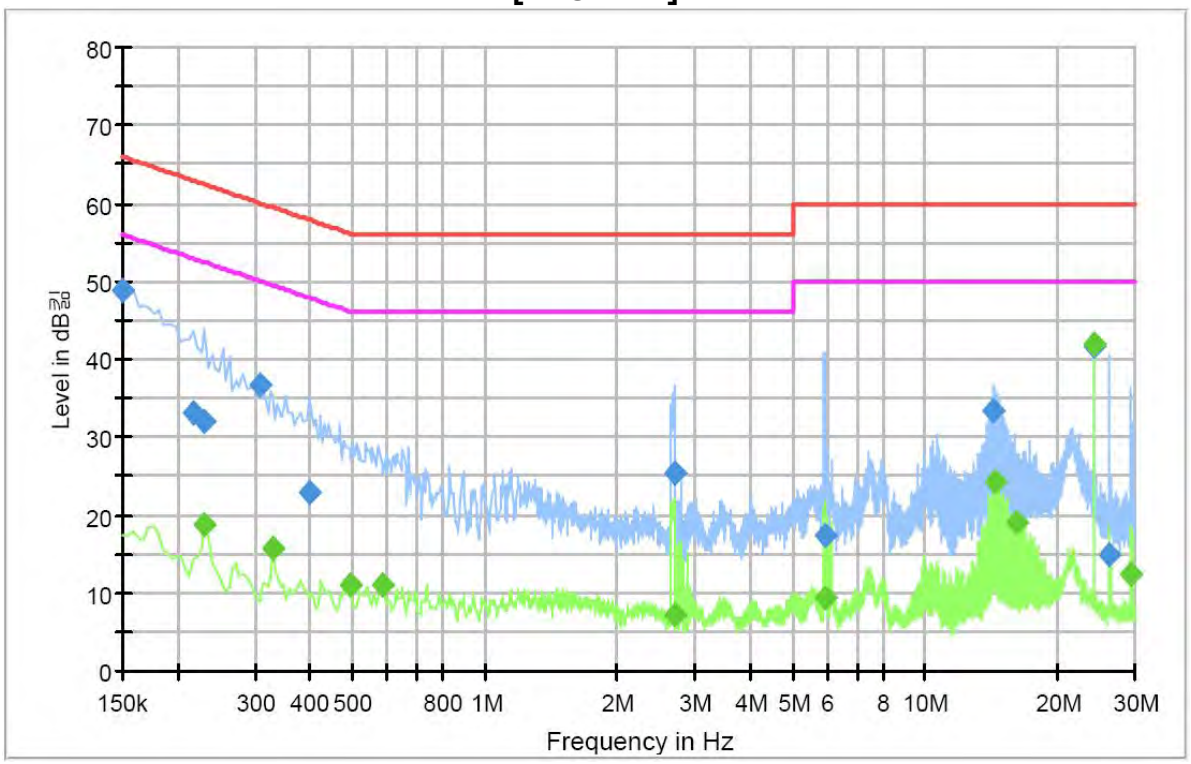
Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.168000	52.8	1000.0	9.000	On	L1	10.1	12.2	65.1
0.190500	35.6	1000.0	9.000	On	L1	10.0	28.4	64.0
0.244500	32.1	1000.0	9.000	On	L1	10.0	29.8	61.9
1.216500	14.0	1000.0	9.000	On	L1	9.9	42.0	56.0
1.252500	17.1	1000.0	9.000	On	L1	9.9	38.9	56.0
4.416000	14.6	1000.0	9.000	On	L1	9.7	41.4	56.0
4.456500	23.2	1000.0	9.000	On	L1	9.7	32.8	56.0
7.638000	20.8	1000.0	9.000	On	L1	9.7	39.2	60.0
10.950000	24.2	1000.0	9.000	On	L1	9.8	35.8	60.0
20.764500	23.0	1000.0	9.000	On	L1	9.9	37.0	60.0

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
1.239000	8.7	1000.0	9.000	On	L1	9.9	37.3	46.0
1.252500	9.6	1000.0	9.000	On	L1	9.9	36.4	46.0
4.438500	7.4	1000.0	9.000	On	L1	9.7	38.6	46.0
4.456500	8.4	1000.0	9.000	On	L1	9.7	37.6	46.0
7.669500	11.4	1000.0	9.000	On	L1	9.7	38.6	50.0
10.914000	11.5	1000.0	9.000	On	L1	9.8	38.5	50.0
14.406000	24.6	1000.0	9.000	On	L1	9.8	25.4	50.0
17.502000	10.2	1000.0	9.000	On	L1	9.8	39.8	50.0
24.144000	41.3	1000.0	9.000	On	L1	10.0	8.7	50.0
27.343500	11.2	1000.0	9.000	On	L1	10.0	38.8	50.0

[NEUTRAL]



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	48.8	1000.0	9.000	On	N	9.8	17.2	66.0
0.217500	33.1	1000.0	9.000	On	N	9.9	29.8	62.9
0.231000	32.0	1000.0	9.000	On	N	9.9	30.4	62.4
0.307500	36.6	1000.0	9.000	On	N	10.0	23.4	60.0
0.397500	23.0	1000.0	9.000	On	N	10.1	34.9	57.9
2.688000	25.4	1000.0	9.000	On	N	9.8	30.6	56.0
5.923500	17.5	1000.0	9.000	On	N	9.7	42.5	60.0
14.356500	33.5	1000.0	9.000	On	N	9.8	26.5	60.0
24.144000	41.8	1000.0	9.000	On	N	10.2	18.2	60.0
26.169000	15.0	1000.0	9.000	On	N	10.2	45.0	60.0

Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.231000	18.9	1000.0	9.000	On	N	9.9	33.5	52.4
0.330000	15.7	1000.0	9.000	On	N	10.0	33.8	49.5
0.492000	11.0	1000.0	9.000	On	N	10.1	35.1	46.1
0.582000	11.0	1000.0	9.000	On	N	10.1	35.0	46.0
2.692500	7.2	1000.0	9.000	On	N	9.8	38.8	46.0
5.923500	9.3	1000.0	9.000	On	N	9.7	40.7	50.0
14.406000	24.2	1000.0	9.000	On	N	9.8	25.8	50.0
16.098000	19.1	1000.0	9.000	On	N	9.9	30.9	50.0
24.144000	41.9	1000.0	9.000	On	N	10.2	8.1	50.0
29.494500	12.4	1000.0	9.000	On	N	10.2	37.6	50.0

APPENDIX A – Test Equipment Used For Tests

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
1	Signal Analyzer	Agilent	N9020A	MY48011598	2013-11-08
2	Spectrum Analyzer	Rohde & Schwarz	FSP-30	100994	2013-11-18
3	EMI Test Receiver	Rohde & Schwarz	ESCI7	100814	2013-12-15
4	EMI Test Receiver	Rohde & Schwarz	ESCI3	100032	2013-02-09
5	EMI Test Receiver	Rohde & Schwarz	ESU40	100336	2013-06-29
6	Trilog Broadband Antenna	SCHWARZBECK	VULB 9161 SE	100203	2014-06-11
7	Active Loop Antenna	SCHWARZBECK	FMZB 1513	1513-125	2014-06-06
8	Horn Antenna	ETS-Lindgren	3115	00078894	2013-03-22
9	Horn Antenna	ETS-Lindgren	3115	00078895	2013-03-22
10	EPM Series Power Meter	HP	E4418A	GB38272734	2013-11-08
11	Power Sensor	HP	8487A	3318A03524	2013-07-10
12	SYNTHESIZED SWEEPER	HP	8341B	2819A01563	2013-11-08
13	ESG-D Series Signal Generator	Agilent	E4432B	US40054094	2013-11-08
14	6dB Attenuator	Rohde & Schwarz	DNF	272.4110.50	2013-11-09
15	Attenuator	HP	8494A	3308A33351	2013-11-09
16	Attenuator	BIRD	1000-WA-MFN-30	236	2013-11-09
17	OPT H64 AMPLIFIER	HP	8447F	3113A06814	2013-03-27
18	PREAMPLIFIER	Agilent	8449B	3008A02307	2013-11-09
19	AMPLIFIER	Sonoma Instrument Co.	310	291721	2013-03-27
20	LISN	Rohde & Schwarz	ENV216	101235	2013-08-18
21	LISN	Rohde & Schwarz	ENV216	101236	2013-08-06
22	Temp&Humi Chamber	Kunpoong	JT-TH-556-1	9QE5-002	2014-01-16
23	DC POWER SUPPLY	Agilent	E3632A	MY40011638	2013-11-09
24	Band Reject Filter	Wainwright Instruments GmbH	WRCGV 2400/2483-2375/2505-50/10EE	2	2013-09-11