



FCC TEST REPORT

according to

FCC Rules and Regulations Part 15 Subpart C

Applicant	: Sony Corporation
Address	: 1-7-1 Konan, Minato-ku, Tokyo, 108-0075 Japan
Equipment	: DIGITAL AUDIO NUSERY MONITOR
Model No.	: NTM-DA1T
FCC ID	: AK8NTMDA1T

- The test result refers exclusively to the test presented test model / sample.,
- Without written approval of **Cerpass Technology Corp.** the test report shall not be reproduced except in full.
- The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



Contents

1. Report of Measurements and Examinations.....	6
1.1 List of Measurements and Examinations.....	6
2. Test Configuration of Equipment under Test.....	7
2.1 Feature of Equipment under Test.....	7
2.2 Carrier Frequency of Channels.....	7
2.3 Test Mode & Test Software	8
2.4 Description of Test System.....	8
2.5 General Information of Test.....	9
2.6 Measurement Uncertainty	9
3. Antenna Requirements.....	10
3.1 Standard Applicable	10
3.2 Antenna Construction and Directional Gain.....	10
4. Test of Conducted Emission.....	11
4.1 Test Limit	11
4.2 Test Procedures	11
4.3 Typical Test Setup	12
4.4 Measurement equipment	12
4.5 Test Result and Data.....	13
5. Test of Radiated Emission	15
5.1 Test Limit	15
5.2 Test Procedures.....	15
5.3 Typical Test Setup	16
5.4 Measurement equipment	16
5.5 Test Result and Data.....	17
6. 20dB Bandwidth Measurement Data.....	21
6.1 Test Limit	21
6.2 Test Procedures	21
6.3 Test Setup Layout	21
6.4 Measurement equipment	21
6.5 Test Result and Data.....	21
7. Frequencies Separation	24
7.1 Test Limit	24
7.2 Test Procedures	24
7.3 Test Setup Layout	24
7.4 Measurement equipment	24
7.5 Test Result and Data.....	24
8. Dwell Time	27
8.1 Test Limit	27
8.2 Test Procedures	27
8.3 Test Setup Layout	27
8.4 Measurement equipment	27
8.5 Test Result and Data.....	28
9. Number of Hopping Channels	30



9.1	Test Limit	30
9.2	Test Procedures	30
9.3	Test Setup Layout	30
9.4	Measurement equipment	30
9.5	Test Result and Data	30
10.	Maximum Peak Output Power	32
10.1	Test Limit	32
10.2	Test Procedures	32
10.3	Test Setup Layout	32
10.4	Measurement equipment	32
10.5	Test Result and Data	32
11.	Band Edges Measurement	35
11.1	Test Limit	35
11.2	Test Procedure	35
11.3	Test Setup Layout	35
11.4	List of Measuring Equipment Used	35
11.5	Test Result and Data	35
11.6	Restrict band emission Measurement Data	38
12.	Restricted Bands of Operation	39
12.1	Labeling Requirement	39



■ ORIGINAL.

☐ Additional attachment as following record:

[illegible]



CERTIFICATE OF COMPLIANCE

according to

FCC Rules and Regulations Part 15 Subpart C

Applicant	: Sony Corporation
Address	: 1-7-1 Konan, Minato-ku, Tokyo, 108-0075 Japan
Equipment	: DIGITAL AUDIO NUSERY MONITOR
Model No.	: NTM-DA1T
FCC ID	: AK8NTMDA1T

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4**. The equipment was **passed** the test performed according to **FCC Rules and Regulations Part 15 Subpart C (2010)**.

The test was carried out on Jan 16, 2013 at **CerpPASS Technology Corp.**

Signature

Miro Chueh/ Technical director



1. Report of Measurements and Examinations

1.1 List of Measurements and Examinations

FCC Rule	. Description of Test	Result
15.203	. Antenna Requirement	Pass
15.207	. Conducted Emission	Pass
15.209	. Radiated Emission	Pass
15.247(a)(1)	. Channel Carrier Frequencies Separation	Pass
15.247(a)(1)	. 20dB Bandwidth Measurement	Pass
15.247(a)(1)	. Dwell Time	Pass
15.247(b)	. Number of Hopping Channels	Pass
15.247(b)	. Peak Output Power Measurement Data	Pass
15.247(d)	. Band Edges Measurement Data	Pass



2. Test Configuration of Equipment under Test

2.1 Feature of Equipment under Test

Frequency	2414 MHz~2467MHz
Number of Channel	46 channel
Operating Voltage	5.0 V
Operating Current	0.4 mA
Operating Temperature	-25℃~85℃
Transmit Power	14.05dBm

2.2 Carrier Frequency of Channels

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2414	20	2438	40	2461
01	2415	21	2439	41	2462
02	2417	22	2441	42	2463
03	2418	23	2442	43	2465
04	2419	24	2443	44	2466
05	2421	25	2444	45	2467
06	2422	26	2445		
07	2423	27	2446		
08	2424	28	2447		
09	2425	29	2449		
10	2426	30	2451		
11	2427	31	2452		
12	2428	32	2453		
13	2429	33	2454		
14	2431	34	2455		
15	2433	35	2456		
16	2434	36	2457		
17	2435	37	2458		
18	2436	38	2459		
19	2437	39	2460		



2.3 Test Mode & Test Software

- a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4
- b. The complete test system included EUT for RF test.
- c. The EUT was executed to keep transmitting .
- d. The following test mode was performed for conduction and radiation test:
 - GFSK: CH low : 2414MHz, CH Mid: 2441MHz, CH High: 2467MHz.

2.4 Description of Test System

There is no supporting system during the test.



2.5 General Information of Test

Test Site:	Cerpass Technology Corp.
Performand Location :	No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China
NVLAP LAB Code :	200814-0
FCC Registration Number :	916572, 331395
IC Registration Number :	7290A-1, 7290A-2
VCCI Registration Number :	T-343 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test below 1GHz G-227 for Radiated emission test above 1GHz

Laboratory accreditation



2.6 Measurement Uncertainty

Measurement Item	Measurement Frequency	Polarization	Uncertainty
Conducted Emission	9 kHz ~ 30 MHz	LINE/NEUTRAL	±2.71 dB
Radiated Emission	30 MHz ~ 25GHz	Vertical	±4.11 dB
		Horizontal	±4.10 dB
Occupied Bandwidth	---	---	±7500 Hz
Maximum Peak Output Power	---	---	±1.4 dB
Band Edges	---	---	±2.2 dB
Power Spectral Density	---	---	±2.2 dB



3. Antenna Requirements

3.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

3.2 Antenna Construction and Directional Gain

Antenna type: PIFA Antenna

Antenna Gain: 2.5 dBi



4. Test of Conducted Emission

4.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2009 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

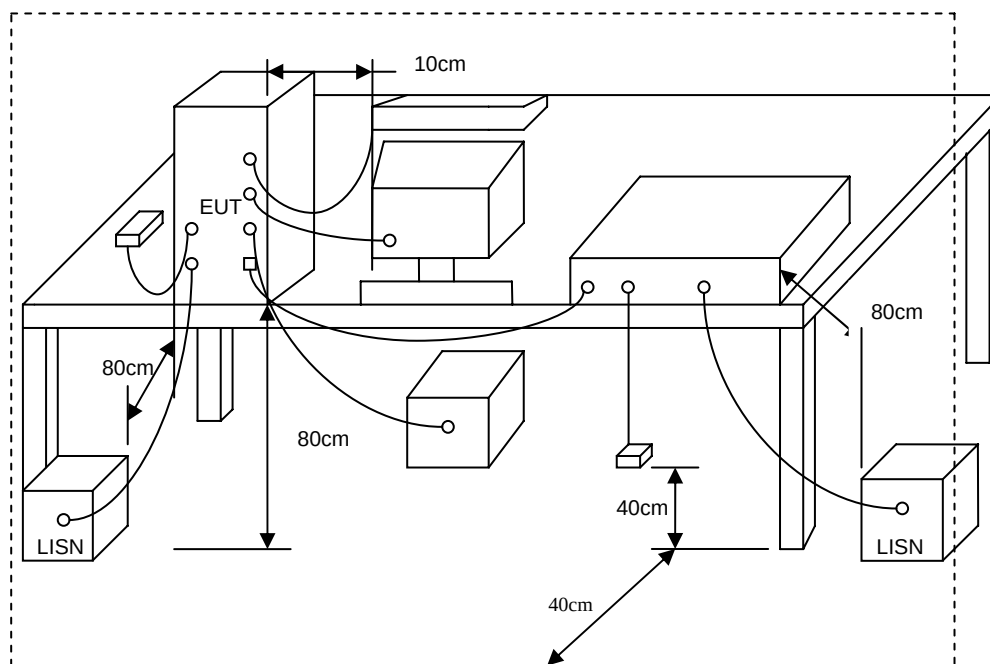
*Decreases with the logarithm of the frequency.

4.2 Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



4.3 Typical Test Setup



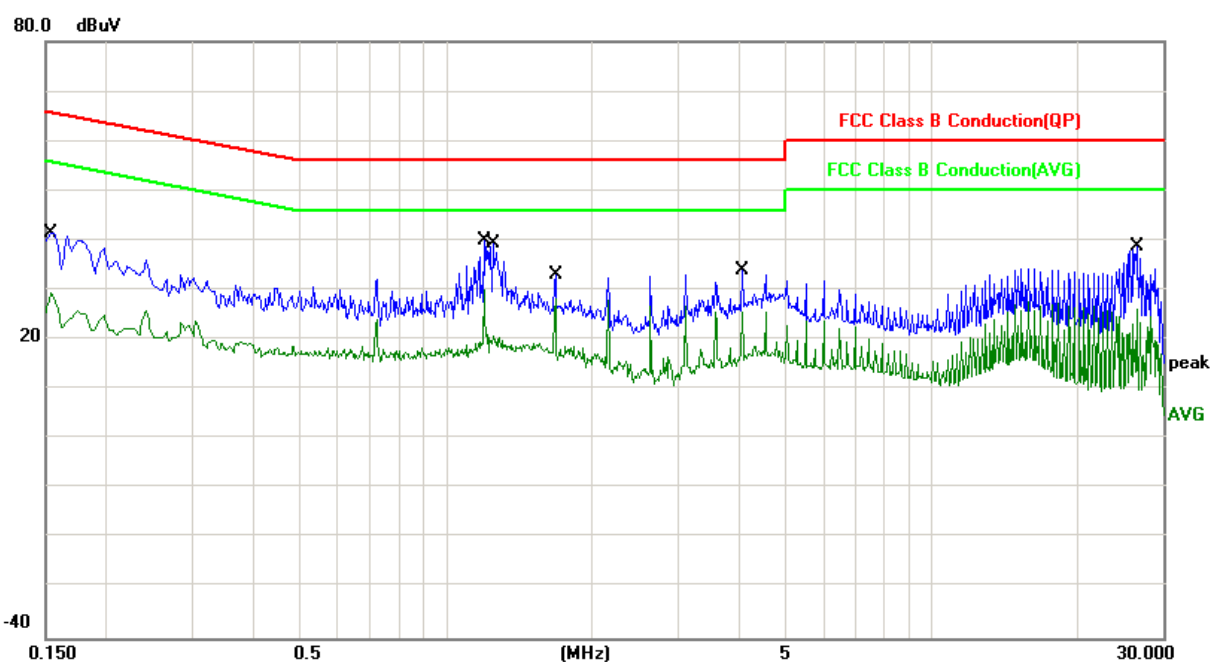
4.4 Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Test Receiver	R&S	ESCI	100565	2013.01.15	2014.01.14
ISN	FCC	FCC-TLISN-T2-02	20379	2012.03.14	2013.03.13
ISN	FCC	FCC-TLISN-T4-02	20380	2012.03.14	2013.03.13
ISN	FCC	FCC-TLISN-T8-02	20381	2012.03.14	2013.03.13



4.5 Test Result and Data

Power	: DC 5V	Pol/Phase	: LINE
Test Mode	: GFSK	Temperature	: 25 °C
Memo	:	Humidity	: 60 %

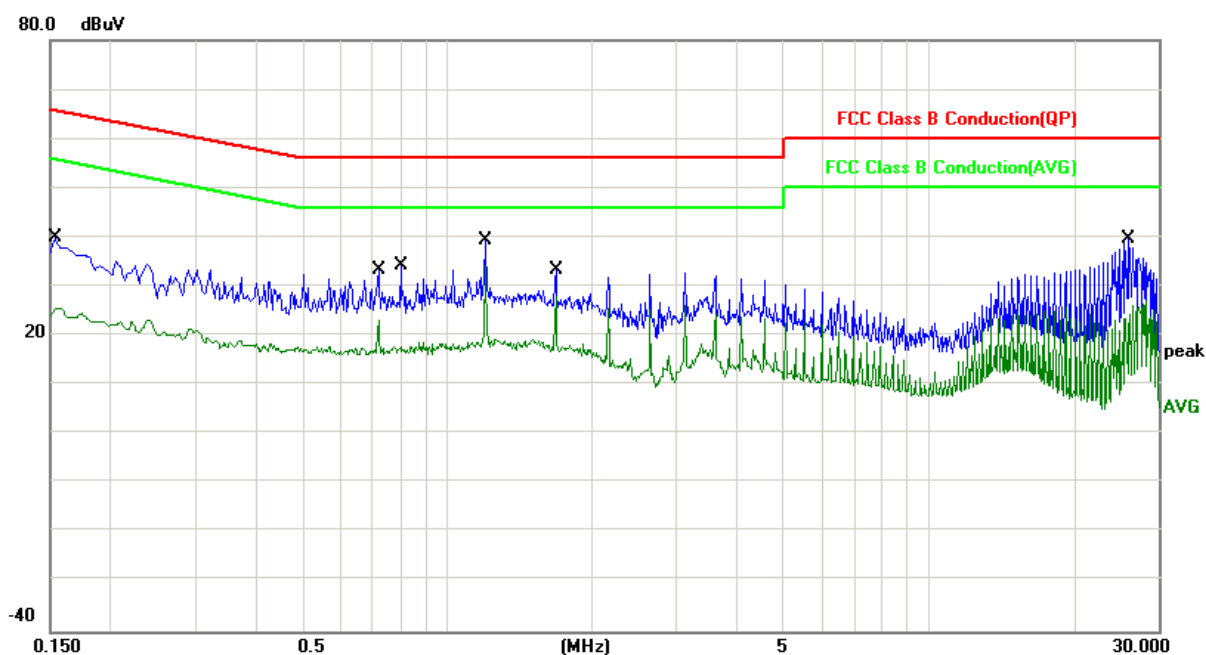


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Remark
1	0.1539	0.04	39.53	39.57	65.78	-26.21	QP	
2	0.1539	0.04	27.75	27.79	55.78	-27.99	AVG	
3	1.2020	0.11	33.99	34.10	56.00	-21.90	QP	
4	1.2020	0.11	30.41	30.52	46.00	-15.48	AVG	
5	1.2540	0.11	28.48	28.59	56.00	-27.41	QP	
6	1.2540	0.11	18.73	18.84	46.00	-27.16	AVG	
7	1.6820	0.12	31.22	31.34	56.00	-24.66	QP	
8	1.6820	0.12	28.68	28.80	46.00	-17.20	AVG	
9	4.0820	0.19	27.19	27.38	56.00	-28.62	QP	
10	4.0820	0.19	21.65	21.84	46.00	-24.16	AVG	
11	26.4220	0.47	34.30	34.77	60.00	-25.23	QP	
12	26.4220	0.47	19.54	20.01	50.00	-29.99	AVG	

Note: Measurement Level = Reading Level + Correct Factor



Power	: DC 5V	Pol/Phase	: NEUTRAL
Test Mode	: GFSK	Temperature	: 25 °C
Memo	:	Humidity	: 60 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Remark
1	0.1539	0.09	35.56	35.65	65.78	-30.13	QP	
2	0.1539	0.09	24.59	24.68	55.78	-31.10	AVG	
3	0.7220	0.14	30.46	30.60	56.00	-25.40	QP	
4	0.7220	0.14	22.02	22.16	46.00	-23.84	AVG	
5	0.8020	0.14	22.51	22.65	56.00	-33.35	QP	
6	0.8020	0.14	17.00	17.14	46.00	-28.86	AVG	
7	1.2020	0.15	39.52	39.67	56.00	-16.33	QP	
8	1.2020	0.15	34.80	34.95	46.00	-11.05	AVG	
9	1.6820	0.17	31.08	31.25	56.00	-24.75	QP	
10	1.6820	0.17	28.09	28.26	46.00	-17.74	AVG	
11	25.9619	0.48	35.65	36.13	60.00	-23.87	QP	
12	25.9619	0.48	23.55	24.03	50.00	-25.97	AVG	

Note: Measurement Level = Reading Level + Correct Factor



5. Test of Radiated Emission

5.1 Test Limit

Radiated emissions from 30 MHz to 25 GHz were measured according to the methods defines in ANSI C63.4-2009. The EUT was placed, 0.8 meter above the ground plane, as shown in section 5.6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions. For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance Meters	Radiated (μ V / M)	Radiated (dB μ V / M)
30-88	3	100	40.0
88-216	3	150	43.5
216-960	3	200	46.0
Above 960	3	500	54.0

For unintentional device, according to CISPR PUB.22, for Class B digital devices, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 10 meters shall not exceed the above table.

Frequency (MHz)	Distance Meters	Radiated (dB μ V / M)
30-230	10	30
230-1000	10	37

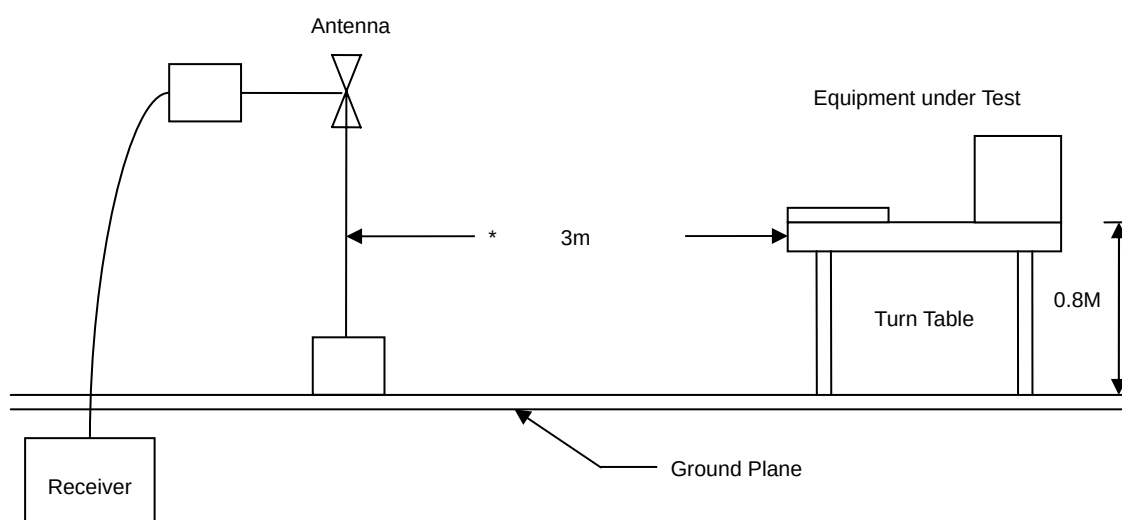
5.2 Test Procedures

- The EUT was placed on a rotatable table top 0.8 meter above ground.
- The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

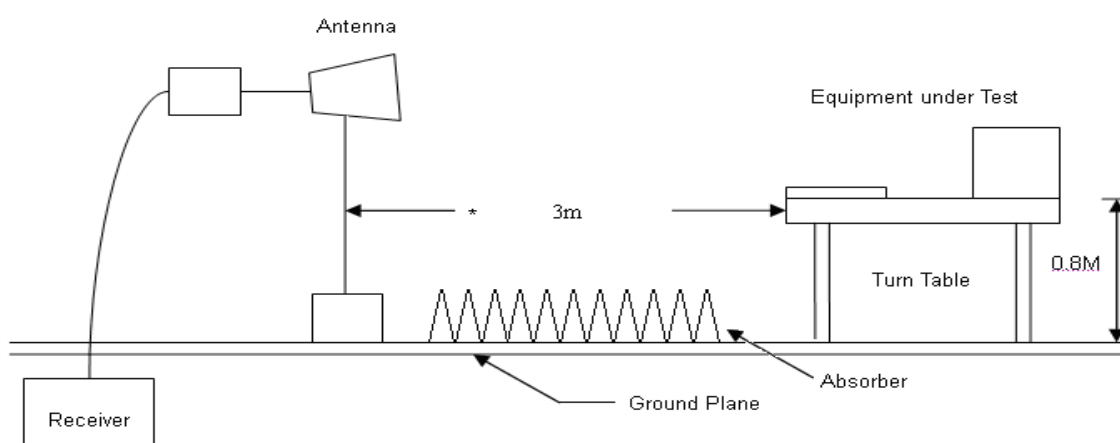


5.3 Typical Test Setup

Below 1GHz Test Setup



Above 1GHz Test Setup



5.4 Measurement equipment

Instrument	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
EMI Test Receiver	ESCI	R&S	101183	2012.05.11	2013.05.10
H64 Amplifier	8447F	HP	3113A05582	2012.08.14	2013.08.13
Preamplifier	8449B	Agilent	3008A02342	2012.02.10	2013.02.09
Ultra Broadband Antenna	HL562	R&S	100363	2012.05.07	2013.05.06
Broad-Band Horn Antenna	BBHA9120D	Schwarzbeck	9120D-619	2012.05.07	2013.05.06
Spectrum Analyzer	FSP40	R&S	100324	2012.08.14	2013.08.13
Temperature/ Humidity Meter	ZC1-11	Zhicheng	CEP-TH-002	2012.08.17	2013.08.16



5.5 Test Result and Data

The 9kHz-30MHz spurious emission is under limit 20dB more.

5.5.1 Test Result and Data of Transmitter

Under 1G

Site : EMC Lab AC 102	Time : 2013-1-16
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Test mode: normal link	Probe : VERTICAL/ HORIZONTAL
Power : AC 120V/60Hz	

Freq. (MHz)	Ant.Pol. H/V	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)	Detector Mode (PK/QP)
35.24	V	44.51	-15.02	29.49	40.00	-10.51	Peak
145.86	V	45.09	-16.87	28.22	43.50	-15.28	Peak
237.82	V	46.51	-16.43	30.08	46.00	-15.92	Peak
505.72	V	45.91	-8.91	37	46.00	-9	Peak
587.51	V	39.56	-5.26	34.3	46.00	-11.7	Peak
630.15	V	39.88	-5.98	33.9	46.00	-12.1	Peak
34.82	H	46.82	-14.64	32.18	40.00	-7.82	Peak
96.25	H	44.51	-17.13	27.38	43.50	-16.12	Peak
145.96	H	44.25	-15.01	29.24	43.50	-14.26	Peak
194.86	H	49.72	-19.22	30.5	43.50	-13	Peak
236.45	H	48.56	-17.21	31.35	46.00	-14.65	Peak
643.66	H	37.82	-5.82	32	46.00	-14	Peak

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



Above 1G

Site : EMC Lab AC 102	Time : 2013-1-16
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Test mode: Transmit by GFSK 2414MHz	Probe : VERTICAL/ HORIZONTAL
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
4828.55	V	42.95	23.95	18.10	61.05	42.05	74	54	-11.95	average
7241.61	V	40.51	16.24	24.95	65.46	41.19	74	54	-12.81	average
4828.01	H	40.26	23.62	18.35	58.61	41.97	74	54	-12.03	average
7242.56	H	41.89	14.86	26.32	68.21	41.18	74	54	-12.82	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



Site : EMC Lab AC 102	Time : 2013-1-16
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Test mode: Transmit by GFSK 2441MHz	Probe : VERTICAL/ HORIZONTAL
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m) \\	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
4882.45	V	32.56	24.85	19.12	51.68	43.97	74	54	-10.03	average
7325.85	V	31.95	17.67	25.34	57.29	43.01	74	54	-10.99	average
4882.56	H	33.85	23.47	19.23	53.08	42.7	74	54	-11.3	average
7326.67	H	32.45	15.98	26.05	58.5	42.03	74	54	-11.97	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



Site : EMC Lab AC 102	Time : 2013-1-16
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Test mode: Transmit by GFSK 2467MHz	Probe : VERTICAL/ HORIZONTAL
Power : AC 120V/60Hz	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
4934.33	V	33.85	20.67	22.34	56.19	43.01	74	54	-10.99	average
7400.67	V	31.92	15.96	26.11	58.03	42.07	74	54	-11.93	average
4935.01	H	33.51	21.95	20.45	53.96	42.4	74	54	-11.6	average
7402.76	H	30.56	14.86	26.56	57.12	41.42	74	54	-12.58	average

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



6. 20dB Bandwidth Measurement Data

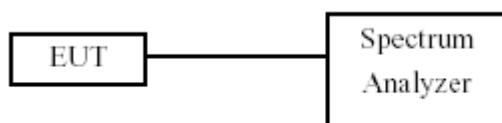
6.1 Test Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, 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, provided the systems operate with an output power no greater than 125 mW.

6.2 Test Procedures

- The transmitter output was connected to the spectrum analyzer.
- Set RBW of spectrum analyzer to 100 KHz and VBW to 300 KHz.
- The 20 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20 dB.

6.3 Test Setup Layout



6.4 Measurement equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	FSP40	R&S	100324	2012.08.14	2013.08.13

6.5 Test Result and Data

Modulation Standard: GFSK

Test Date: January 16, 2013

Temperature: 25°C

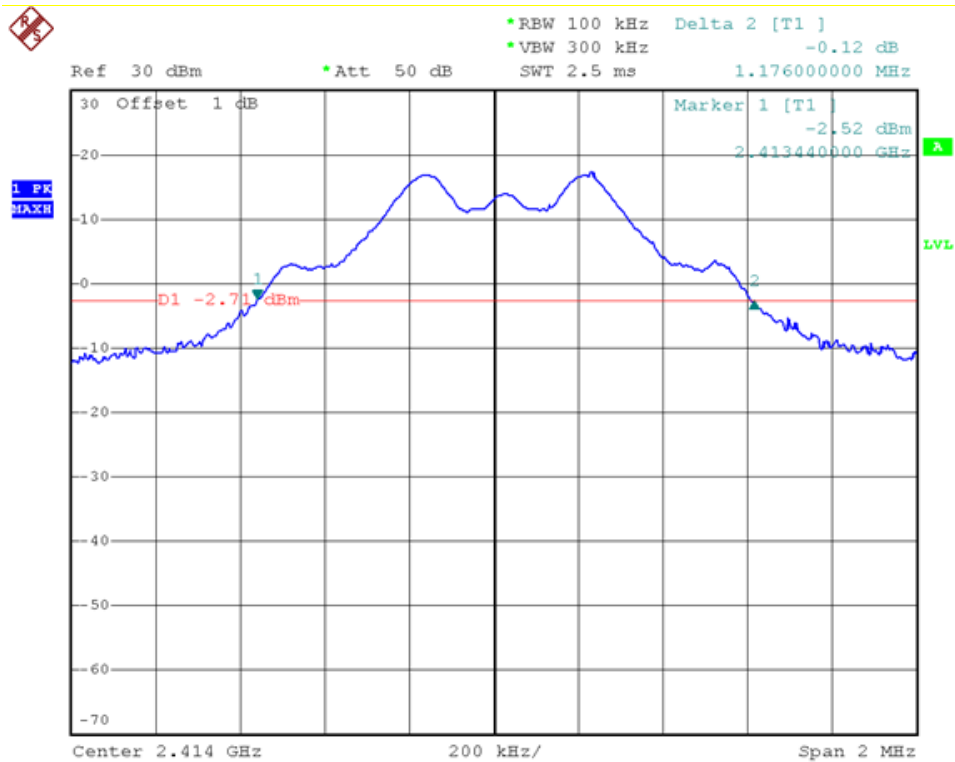
Atmospheric pressure: 1020 hPa

Humidity: 55%

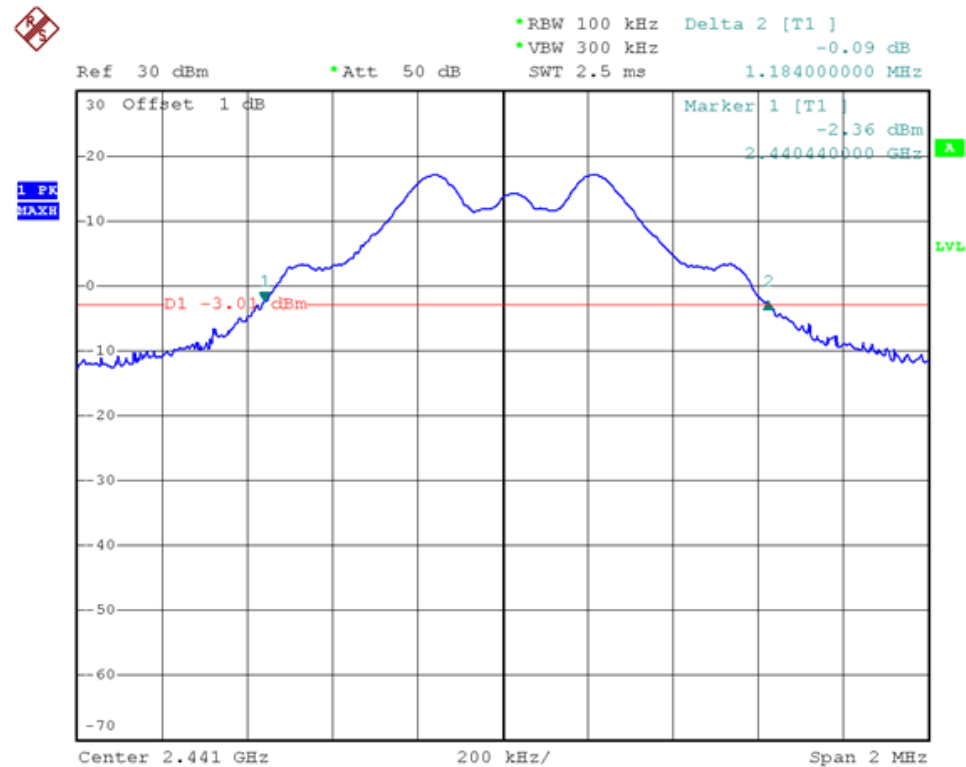
Channel	Frequency (MHz)	20dB Bandwidth (KHz)
Low	2414	1176.00
Mid	2441	1184.00
High	2467	1176.00



Modulation Standard: GFSK
Channel: Low



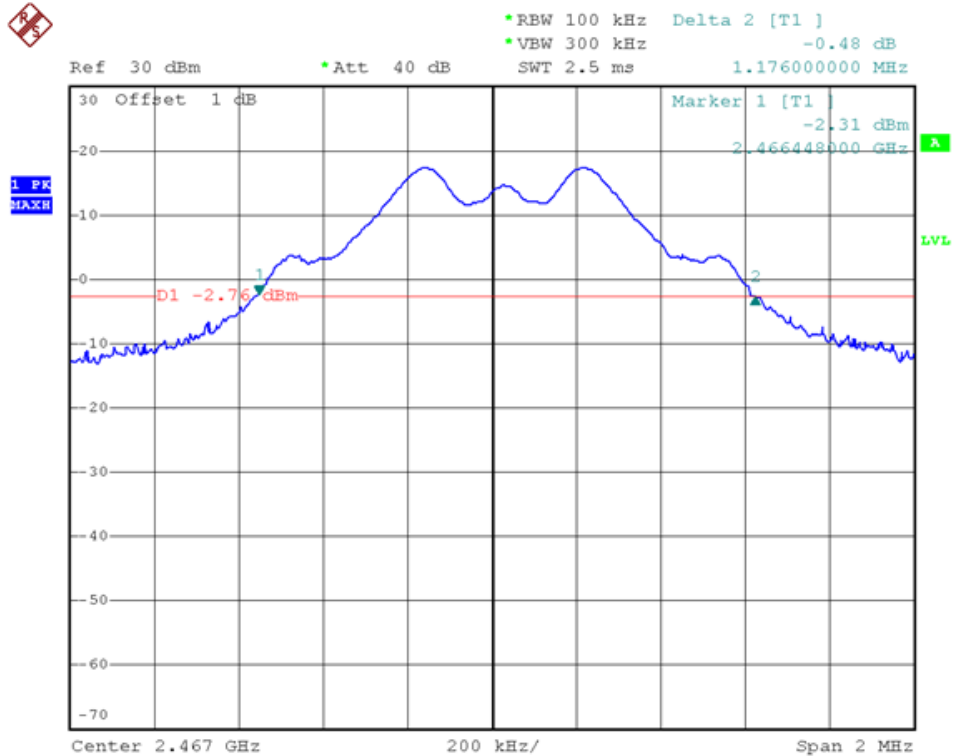
Modulation Standard: GFSK
Channel: Mid





Modulation Standard: GFSK

Channel: High





7. Frequencies Separation

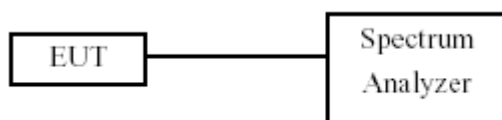
7.1 Test Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

7.2 Test Procedures

- The transmitter output was connected to the spectrum analyzer.
- Set RBW of spectrum analyzer to 30 KHz and VBW to 100 KHz.
- By using the MaxHold function record the separation of two adjacent channels.
- Measure the frequency difference of these two adjacent channels.

7.3 Test Setup Layout



7.4 Measurement equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	FSP40	R&S	100324	2012.08.14	2013.08.13

7.5 Test Result and Data

Modulation Standard: GFSK

Test Date: January 16, 2013

Temperature: 25°C

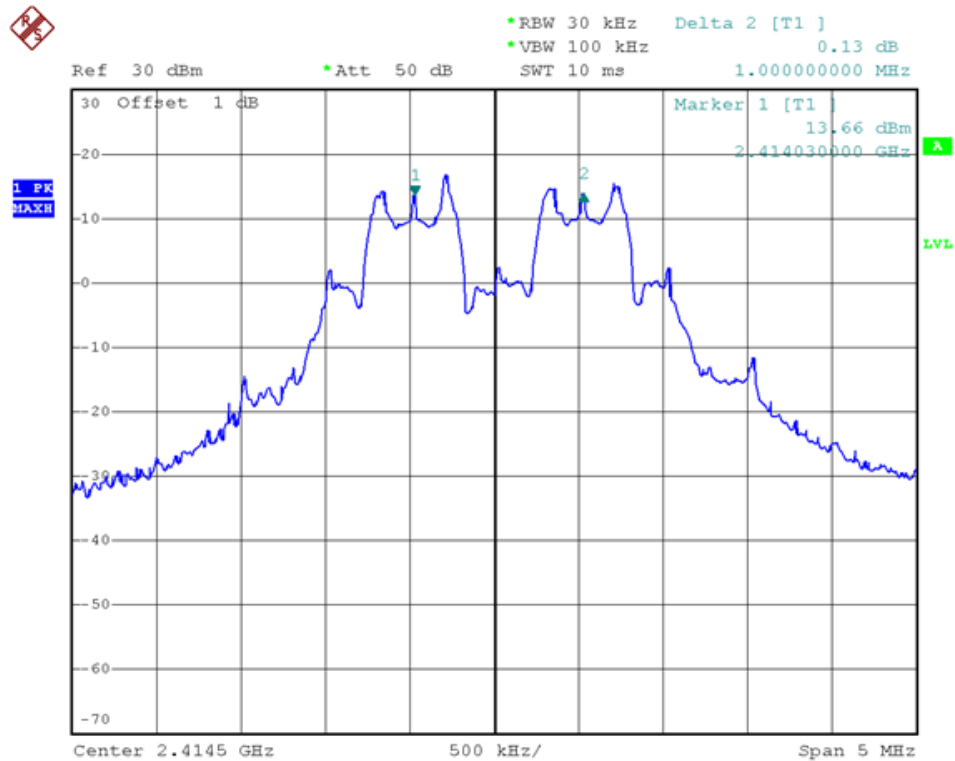
Atmospheric pressure: 1020 hPa

Humidity: 55%

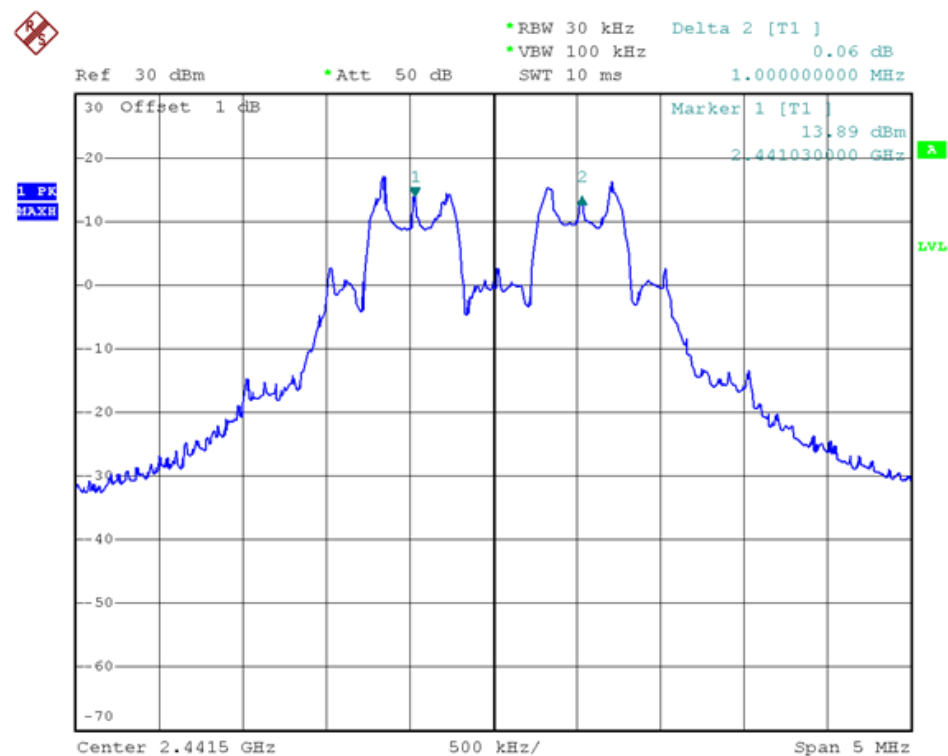
Channel	Frequency (MHz)	Channel Separation (MHz)
Low	2414	1.000
Mid	2441	1.000
High	2467	1.000



Modulation Standard: GFSK
Channel: Low

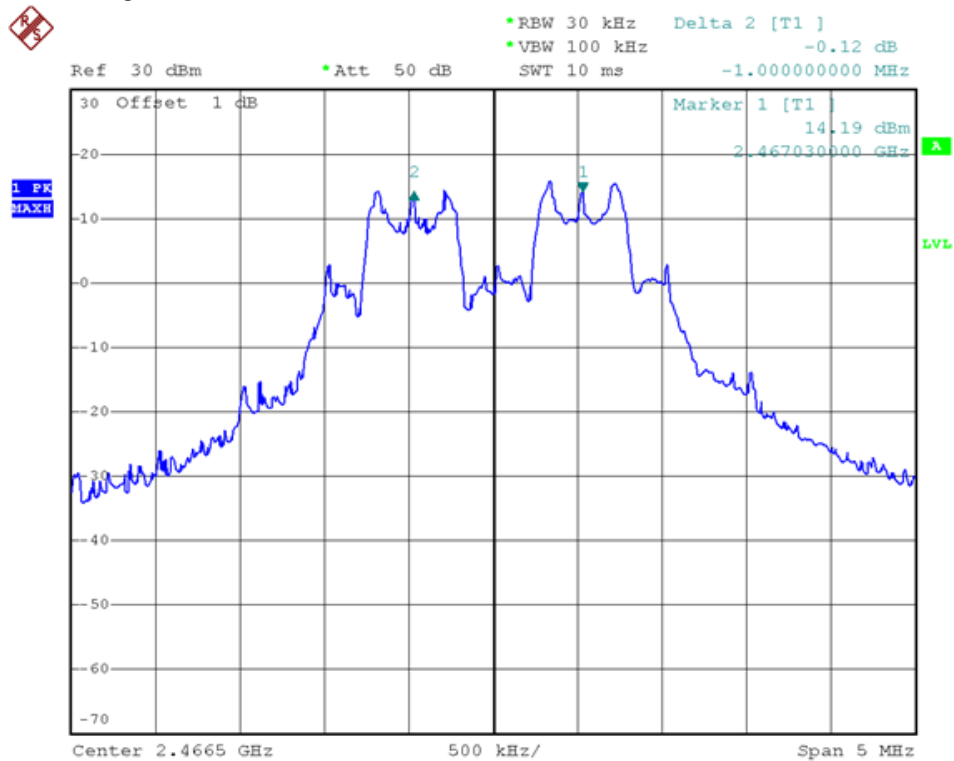


Modulation Standard: GFSK
Channel: Mid





Modulation Standard: GFSK
Channel: High





8. Dwell Time

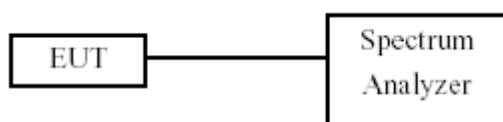
8.1 Test Limit

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.

8.2 Test Procedures

1. The transmitter output was connected to the spectrum analyzer.
2. Adjust the center frequency to measure frequency, then set zero span mode.
2. Set RBW of spectrum analyzer to 100 KHz and VBW to 100 KHz.
4. Measure the time duration of one transmission on the measured frequency.

8.3 Test Setup Layout



8.4 Measurement equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	FSP40	R&S	100324	2012.08.14	2013.08.13



8.5 Test Result and Data

Modulation Standard: GFSK

Test Date: January 16, 2013

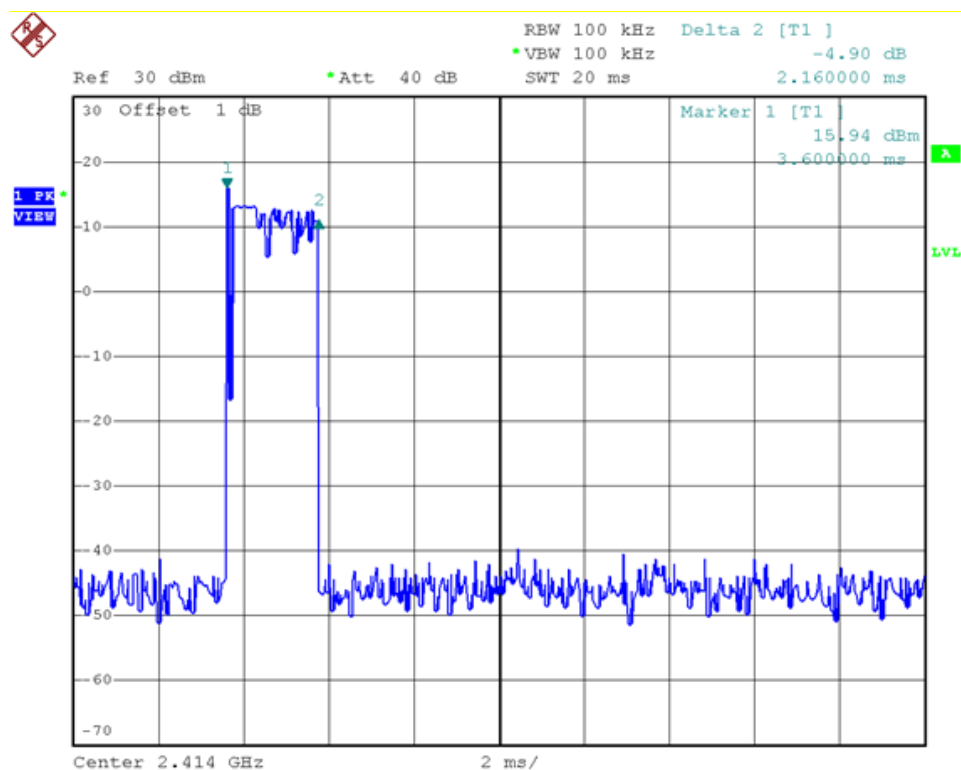
Temperature: 25°C

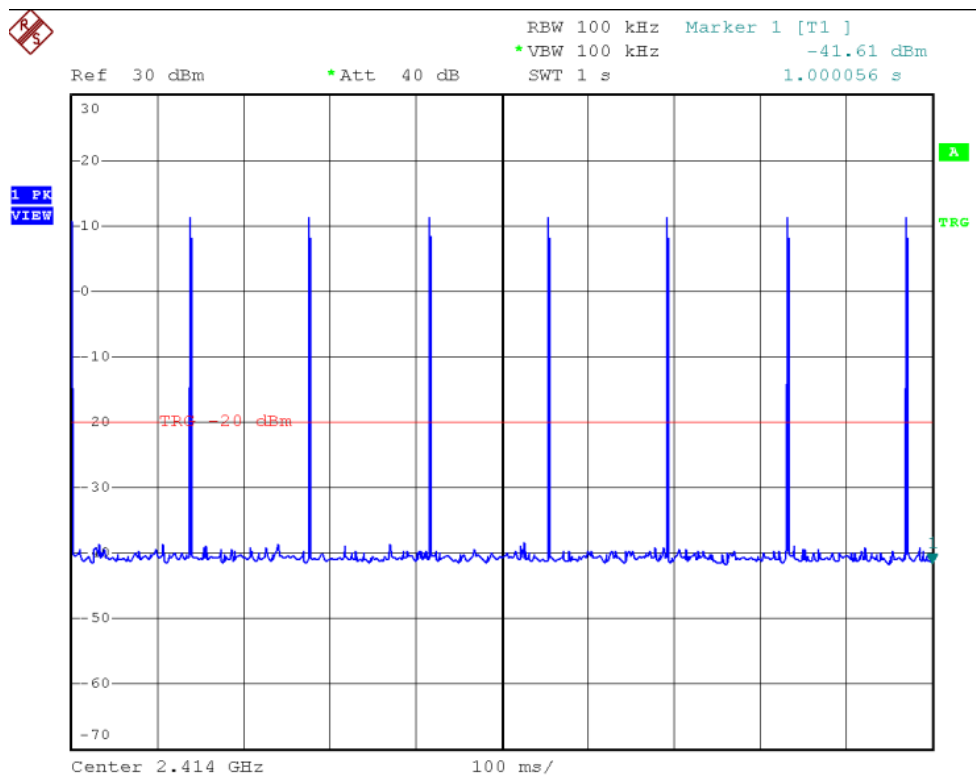
Atmospheric pressure: 1020 hPa

Humidity: 55%

Mode	Dwell time	Limit	Conclusion
GFSK	$8\text{hops}/1\text{s} \times 0.4 \times 46\text{channels} \times 2.16\text{ms} = 317.96\text{ms}$	<400ms	Pass

Modulation Standard: GFSK







9. Number of Hopping Channels

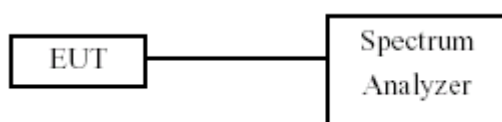
9.1 Test Limit

Frequency hopping systems in the 2400 ~ 2483.5 MHz band shall use at least 15 channels.

9.2 Test Procedures

- a. The transmitter output was connected to the spectrum analyzer.
- b. 2. Set RBW of spectrum analyzer to 100 KHz and VBW to 300 KHz.
- c. 3. Set the MaxHold function, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been record.

9.3 Test Setup Layout



9.4 Measurement equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	FSP40	R&S	100324	2012.08.14	2013.08.13

9.5 Test Result and Data

Modulation Standard: GFSK

Test Date: January 16, 2013

Temperature: 25°C

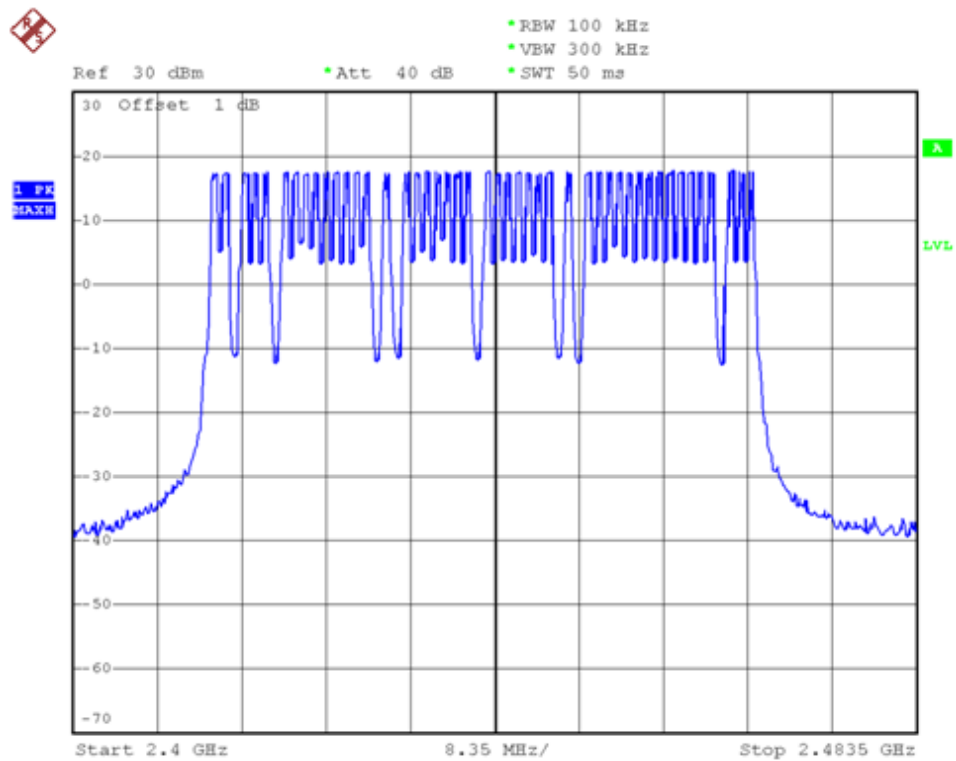
Atmospheric pressure: 1020 hPa

Humidity: 55%

Number of hopping channels:	46	Channels
-----------------------------	----	----------



Modulation Standard: GFSK





10. Maximum Peak Output Power

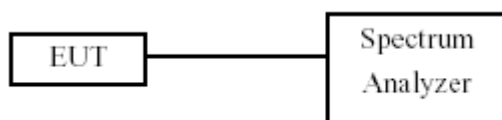
10.1 Test Limit

The Maximum Peak Output Power Measurement is 125mW.

10.2 Test Procedures

The antenna port(RF output)of the EUT was connected to the input(RF input)of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

10.3 Test Setup Layout



10.4 Measurement equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	FSP40	R&S	100324	2012.08.14	2013.08.13

10.5 Test Result and Data

Modulation Standard: GFSK

Test Date: January 16, 2013

Temperature: 25°C

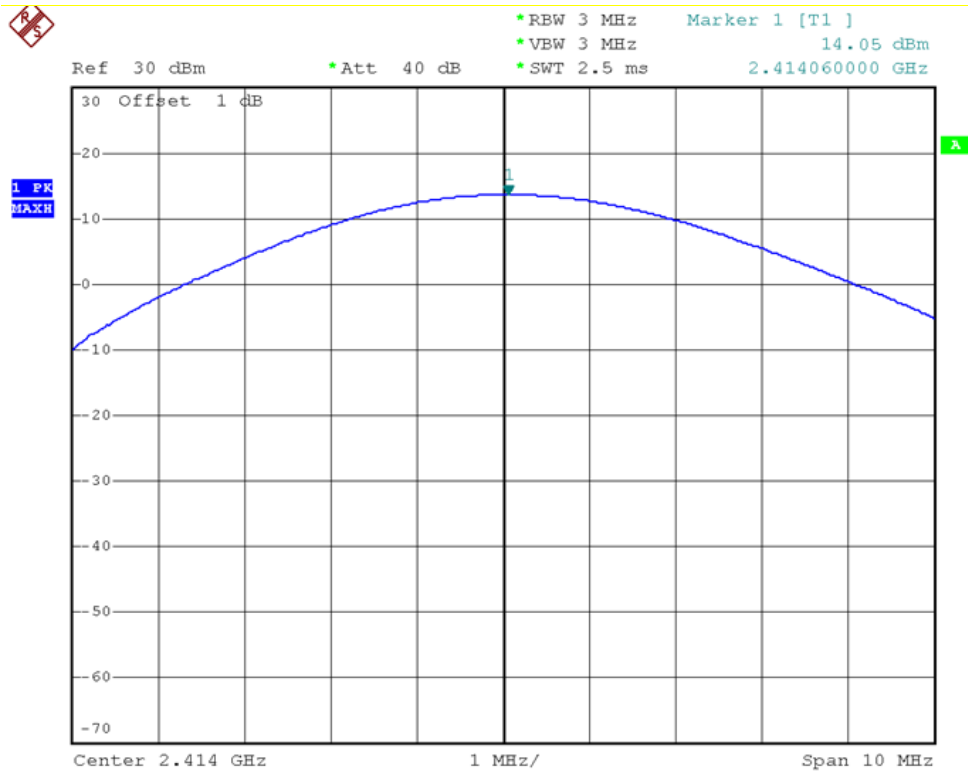
Atmospheric pressure: 1020 hPa

Humidity: 55%

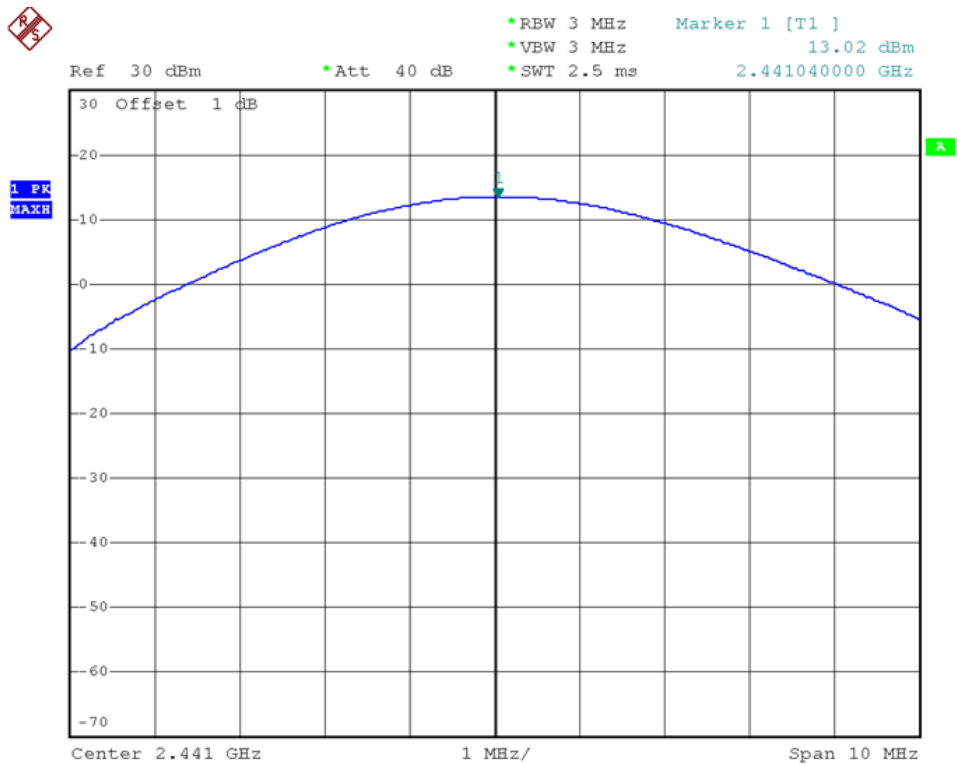
Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Output (mW)
Low	2414	14.05	25.41
Mid	2441	13.02	20.04
High	2467	12.93	19.63



Modulation Standard: GFSK
Channel: Low

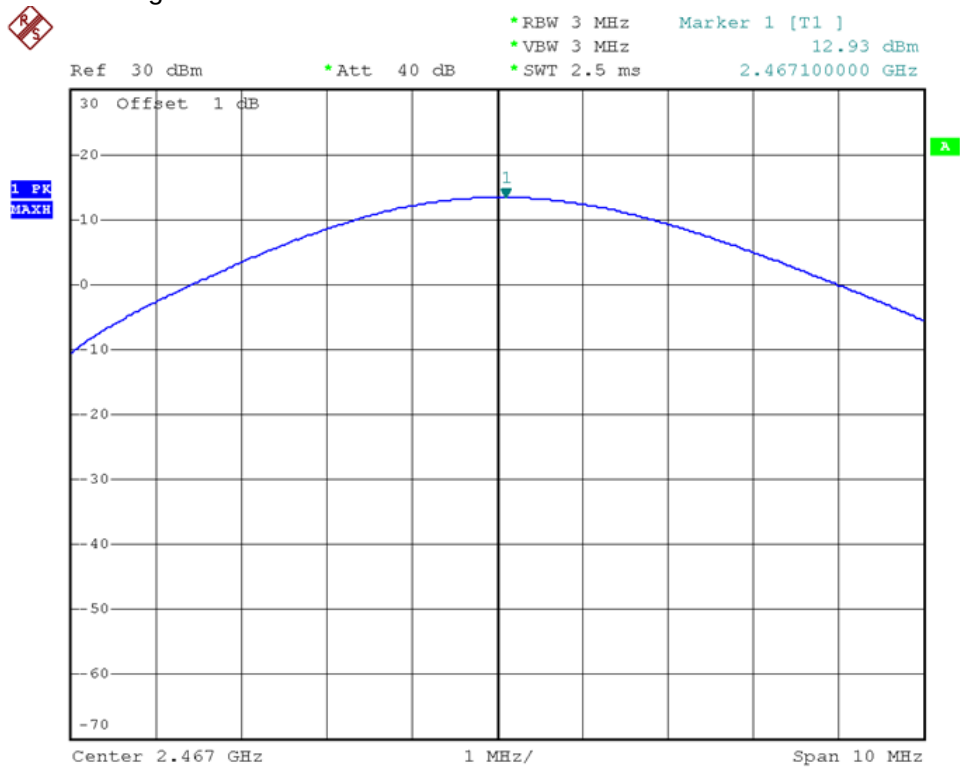


Modulation Standard: GFSK
Channel: Mid





Modulation Standard: GFSK
Channel: High





11. Band Edges Measurement

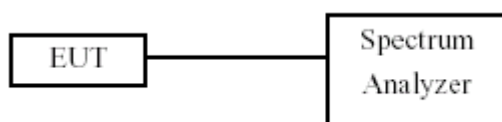
11.1 Test Limit

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

11.2 Test Procedure

- The transmitter output was connected to the spectrum analyzer via a low lose cable.
- Set both RBW and VBW of spectrum analyzer to 100 KHz with convenient frequency span including 100 KHz bandwidth from band edge.
- The band edges was measured and recorded.

11.3 Test Setup Layout



11.4 List of Measuring Equipment Used

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	FSP40	R&S	100324	2012.08.14	2013.08.13

11.5 Test Result and Data

Modulation Standard: GFSK

Test Date: January 16,2013

Temperature: 25°C

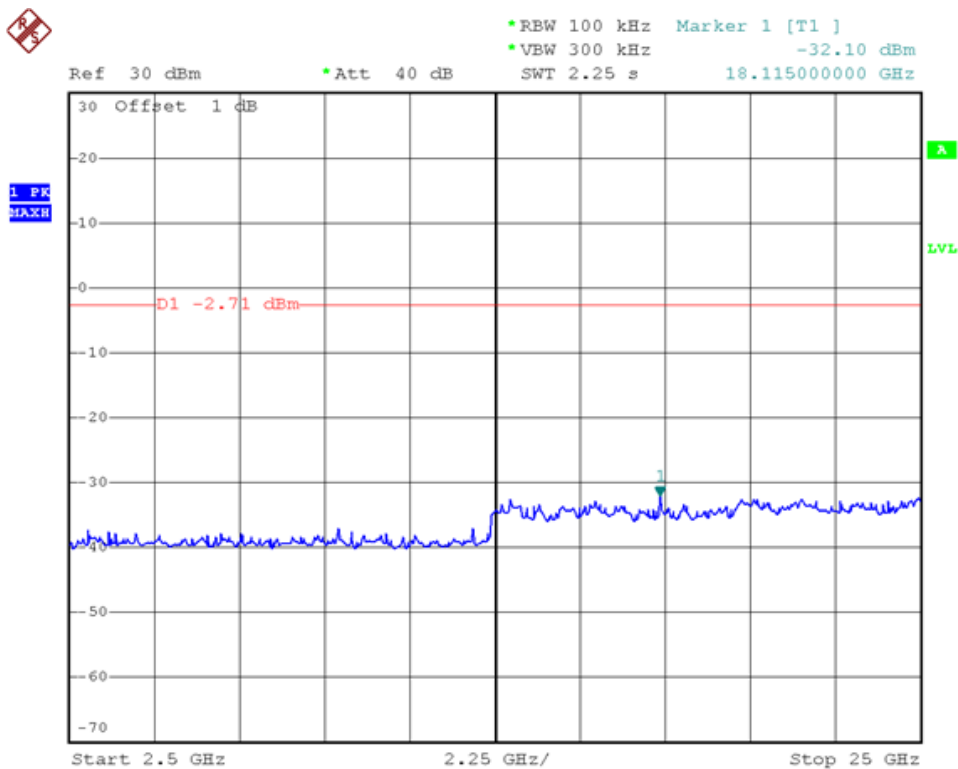
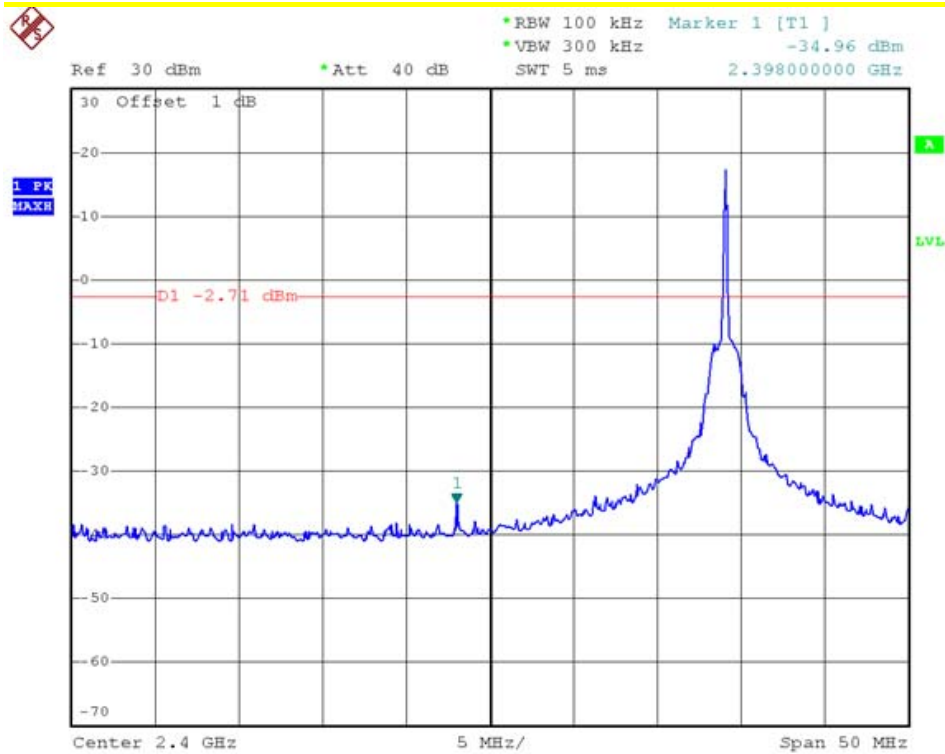
Atmospheric pressure: 1020 hPa

Humidity: 55%

Channel	Frequency	maximum value in frequency (MHz)	maximum value is (dBm)
Low	2414	2398.00	-34.96
High	2467	2483.50	-39.75

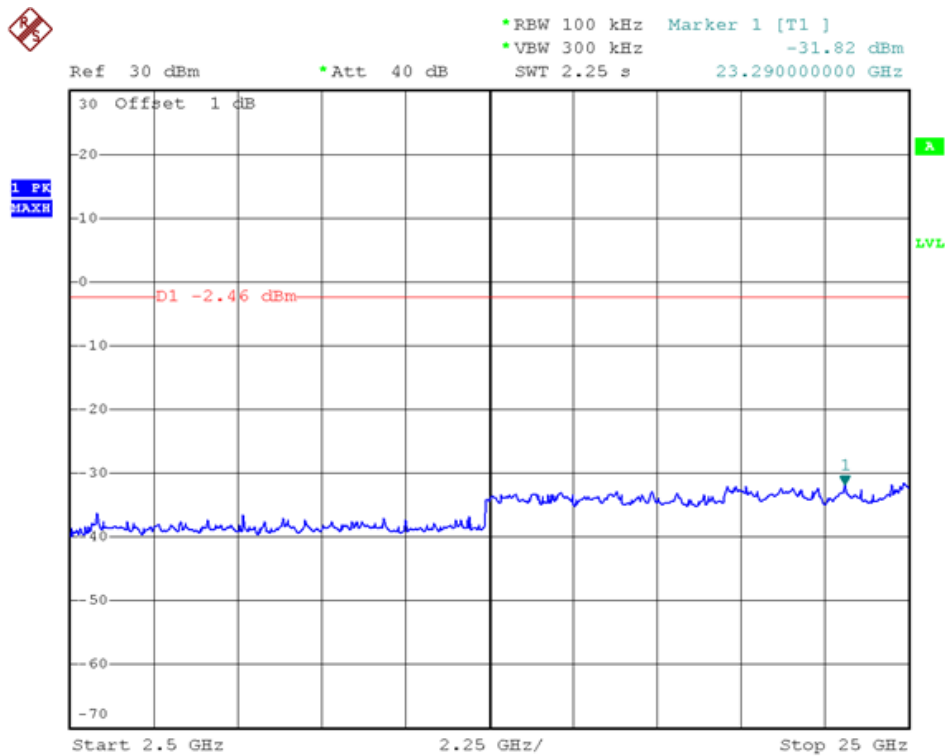
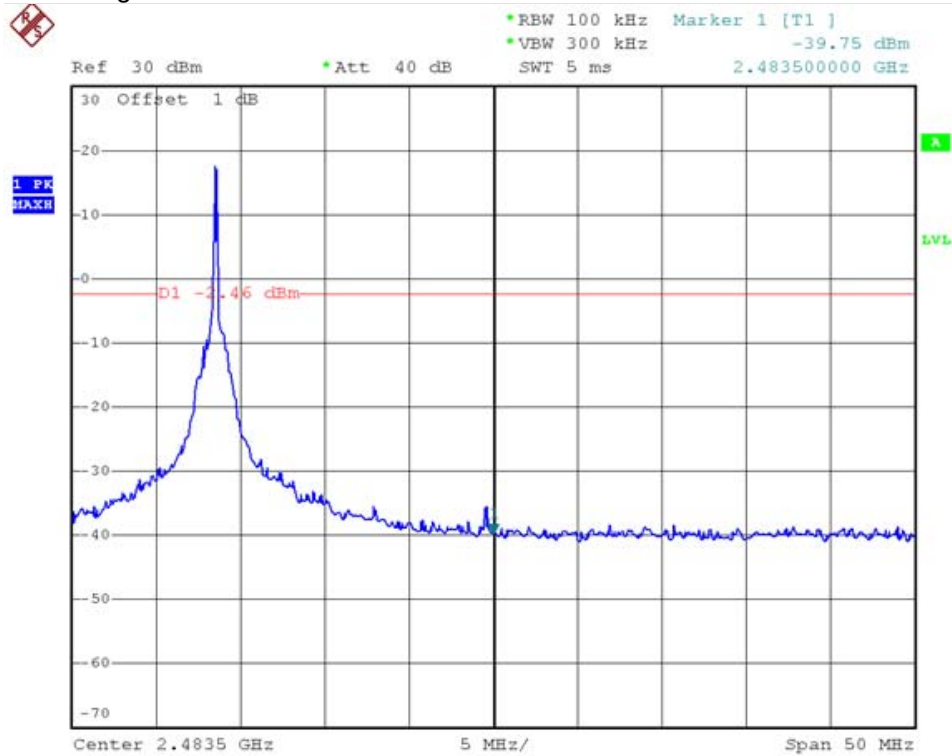


Modulation Standard: GFSK
Channel: Low





Modulation Standard: GFSK
Channel: High



**11.6 Restrict band emission Measurement Data**

Test Date : January 16, 2013
Temperature : 23°C
Humidity : 65%
Atmospheric Pressure : 1020 hPa
Modulation Standard : GFSK

Channel Low						Fundamental Frequency: 2414 MHz				
Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
2382.04	H	59.51	-1.42	58.09	Peak	74	54	-15.91	241	1.0
2382.00	H	50.44	-1.42	49.02	Ave	74	54	-4.98	241	1.0
2382.18	V	57.67	-1.42	56.25	Peak	74	54	-17.75	325	1.0
2382.00	V	46.90	-1.42	45.48	Ave	74	54	-8.52	302	1.0
Channel High						Fundamental Frequency: 2467 MHz				
2483.50	H	61.48	-1.08	60.40	Peak	74	54	-13.60	186	1.0
2483.50	H	50.88	-1.08	49.80	Ave	74	54	-4.20	186	1.0
2483.50	V	65.61	-1.08	64.53	Peak	74	54	-9.47	33	1.0
2483.50	V	51.93	-1.08	50.85	Ave	74	54	-3.25	33	1.0

Notes:

1. Result = Meter Reading + Factor
2. Factor = Antenna Factor + Cable Loss – Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz



12. Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.09000 – 0.11000	16.42000 – 16.42300	399.9 – 410.0	4.500 – 5.250
0.49500 – 0.505**	16.69475 – 16.69525	608.0 – 614.0	5.350 – 5.460
2.17350 – 2.19050	16.80425 – 16.80475	960.0 – 1240.0	7.250 – 7.750
4.12500 – 4.12800	25.50000 – 25.67000	1300.0 – 1427.0	8.025 – 8.500
4.17725 – 4.17775	37.50000 – 38.25000	1435.0 – 1626.5	9.000 – 9.200
4.20725 – 4.20775	73.00000 – 74.60000	1645.5 – 1646.5	9.300 – 9.500
6.21500 – 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 – 12.700
6.26775 – 6.26825	108.00000 – 121.94000	1718.8 – 1722.2	13.250 – 13.400
6.31175 – 6.31225	123.00000 – 138.00000	2200.0 – 2300.0	14.470 – 14.500
8.29100 – 8.29400	149.90000 – 150.05000	2310.0 – 2390.0	15.350 – 16.200
8.36200 – 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400
8.37625 – 8.38675	156.70000 – 156.90000	2655.0 – 2900.0	22.010 – 23.120
8.41425 – 8.41475	162.01250 – 167.17000	3260.0 – 3267.0	23.600 – 24.000
12.29000 – 12.29300	167.72000 – 173.20000	3332.0 – 3339.0	31.200 – 31.800
12.51975 – 12.52025	240.00000 – 285.00000	3345.8 – 3358.0	36.430 – 36.500
12.57675 – 12.57725	322.00000 – 335.40000	3600.0 – 4400.0	Above 38.6
13.36000 – 13.41000			

** : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

12.1 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.