FCC 47 CFR PART 15 SUBPART C AND ANSI C63.4 : 2003

TEST REPORT

For

BonSayON S102 Bone Conduction Bluetooth Sunglasses

Model : S102

Trade Name : BonSayOn

Issued for

NeoVictory Technology Co., Ltd.
2F, No.562, Dongning Rd., East Dist., Tainan City 70165,
Taiwan (R.O.C.)

Issued By

Compliance Certification Services Inc.
Tainan Laboratory
No. 8, Jiu Cheng Ling, Jiaokeng Village, Sinhua Township, Tainan Hsien 712, Taiwan R.O.C.
TEL: 886-6-580-2201
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Issued Date: February 24, 2010

Testing Laboratory 1109

REVISION HISTORY

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		February 24, 2010		Initial Issue	ALL	Selena.Chong

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1. TEST REPORT CERTIFICATION

Product:	BonSayON S102 Bone Conduction Bluetooth Sunglasses
Model:	S102
Brand Name:	BonSayOn
Applicant:	NeoVictory Technology Co., Ltd.
	2F, No.562, Dongning Rd., East Dist., Tainan City 70165, Taiwan (R.O.C.)
Manufacturer:	NeoVictory Technology Co., Ltd.
	2F, No.562, Dongning Rd., East Dist., Tainan City 70165, Taiwan (R.O.C.)
Tested:	December 11, 2009 ~ February 24, 2010

APPLICABLE STANDARD	
STANDARD	**TEST RESULT**
FCC Part 15 Subpart C AND ANSI C63.4 : 2003	PASS

Approved by:

Jeter Wu
Section Manager

Reviewed by:

Eric Yang
Senior Engineer

2. EUT DESCRIPTION

2.1 DESCRIPTION OF EUT & POWER

Product	BonSayON S102 Bone Conduction Bluetooth Sunglasses
Model Number	S102
Brand Name	BonSayOn
Frequency Range	2402 ~ 2480 MHz
Power Source	5Vdc (From Adapter)
Transmit Peak Power	-0.69dBm
Transmit Data Rate	GFSK (1Mbps), π/4-DQPSK(2Mbps), 8-DPSK(3Mbps)
Modulation Technique	Frequency Hopping Spread Spectrum
Number of Channels	79 Channels Channels Low : 2402 MHz Channels Mid : 2441 MHz Channels High : 2480 MHz
Channel Spacing	1 MHz
Antenna Specification	Gain : 1.3 dBi
Antenna Designation	Chip Antenna
Temperature Range	-10 ~ +50°C

Remark:
1. Client consigns only one model sample to test (Model Number: S102). Therefore, the testing Lab. just guarantees the unit, which has been tested.
2. For more details, please refer to the User's manual of the EUT.

Power Adapter :

No.	Manufacturer	Model No.	Power Input	Power Output
1	NeoVictory	FRA05-S05-1	100-240V, 50/60Hz, 0.3A	5V, 1A

3. DESCRIPTION OF TEST MODES

The EUT had been tested under operating condition.

There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	2402
Middle	2441
High	2480

Radiated Emission Test (Below 1 GHz):

☒ 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.

Charge Linking

Radiated Emission Test (Above 1 GHz):

☒ 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 Channel	Modulation Technology	Modulation Type	Packet Type
Low, Mid, High	FHSS	GFSK	DH5
Low, Mid, High	FHSS	8-DPSK	3-DH5

Bandedge Measurement :

☒ 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 Channel	Modulation Technology	Modulation Type	Packet Type
Low, High	FHSS	GFSK	DH5
Low, High	FHSS	8-DPSK	3-DH5

Antenna Port Conducted Measurement :

☒ 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 Channel	Modulation Technology	Modulation Type	Packet Type
Low, Mid, High	FHSS	GFSK	DH5
Low, Mid, High	FHSS	8-DPSK	3-DH5

Note：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.

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 : 2003 and FCC CFR 47 15.207, 15.209 and 15.247.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No. 8, Jiu Cheng Ling, Jiaokeng Village, Sinhua Township, Tainan Hsien 712, Taiwan R.O.C.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 : 2003 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.
Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.
Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3 LABORATORY ACCREDITATIONS LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by Taiwan Accreditation Foundation for the specific scope of accreditation under Lab Code: 1109 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by TAF or any agency of the Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: TW-1037).

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	TW-1037
Japan	VCCI	3/10 meter Open Area Test Sites and conducted test sites to perform radiated/conducted measurements	C-2882 R-2635
Taiwan	TAF	CISPR 11, FCC METHOD-47 CFR Part 18, EN 55011, EN 60601-1-2, CISPR 22, CNS 13438, EN 55022, EN 55024, AS/NZS CISPR 22 CISPR 14, EN 55014-1, EN 55014-2, CNS 13783-1, CISPR 22, CNS 13439, EN 55013, FCC Method-47 CFR Part 15 Subpart B, IC ICES-003, VCCI V-3 & V-4 FCC Method-47 CFR Part 15 Subpart C and ANSI C63.4, LP 0002 EN / IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8 / -11 EN 61000-3-2, EN 61000-3-3 EN 61000-6-3, EN 61000-6-1, AS/NZS 4251.1, EN 61000-6-4, EN 61000-6-2, AS/NZS 4251.2, EN 61204-3, EN 50130-4, EN 62040-2, EN 50371, EN 50385, AS/NZS 4268, ETSI EN 300 386 ETSI EN 300 328, ETSI EN 301 489-1/-3/-9/-17 ETSI EN 301 893, ETSI EN 300 220-2/-1 ETSI EN 300 440-2/-1 ETSI EN 301 357-2/-1 RSS-310, RSS-210 Issue 7, RSS-Gen Issue 2	Testing Laboratory 1109
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS13439	SL2-IN-E-0039 SL2-R1/R2-0039 SL2-A1-E-0039
Canada	Industry Canada	RSS210, Issue 7	IC 2324H-1

* No part of this report may be used to claim or imply product endorsement by TAF or any agency of the US Government..

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Certify No.	Signal cable
1	N/A	------	------	------	------

No.	Signal cable description	
A	DC Power Cable	Unshielded, 1.5m, 1pcs

SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

EUT OPERATING CONDITION

RF :

1. Setup all computers like the setup diagram.
2. Run Blue Test3.exe
3. TX mode : TXDATA1
   Hopping_Mode : TXDATA2
   Frequency : 2402, 2441, 2480
   CFG PKT : DH5/3-DH5
   Tx_Power_Level : 50
4. All of the functions are under run.
5. Start test.

For Normal operating :

1. Setup all computers like the setup diagram.
2. (1) Build up a connection between EUT and Notebook (play music).
   (2) Charge mode.
3. All of the functions are under run.
4. Start test.

7. APPLICABLE LIMITS AND TEST RESULTS

7.1 20dB BANDWIDTH FOR HOPPING

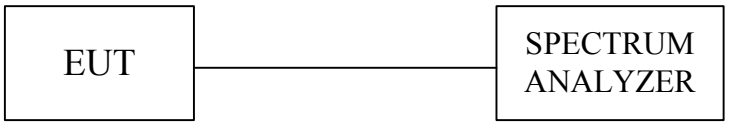
LIMIT

None; for reporting purposes only.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
SPECTRUM ANALYZER	R&S	FSEK 30	835253/002	JAN. 03, 2011

TEST SETUP



TEST PROCEDURE

The 20dB band width was measured with a spectrum analyzer connected to RF antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency, using the analyzer. Display Line and Marker Delta functions, the 20dB band width of the emission was determined.

TEST RESULTS

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

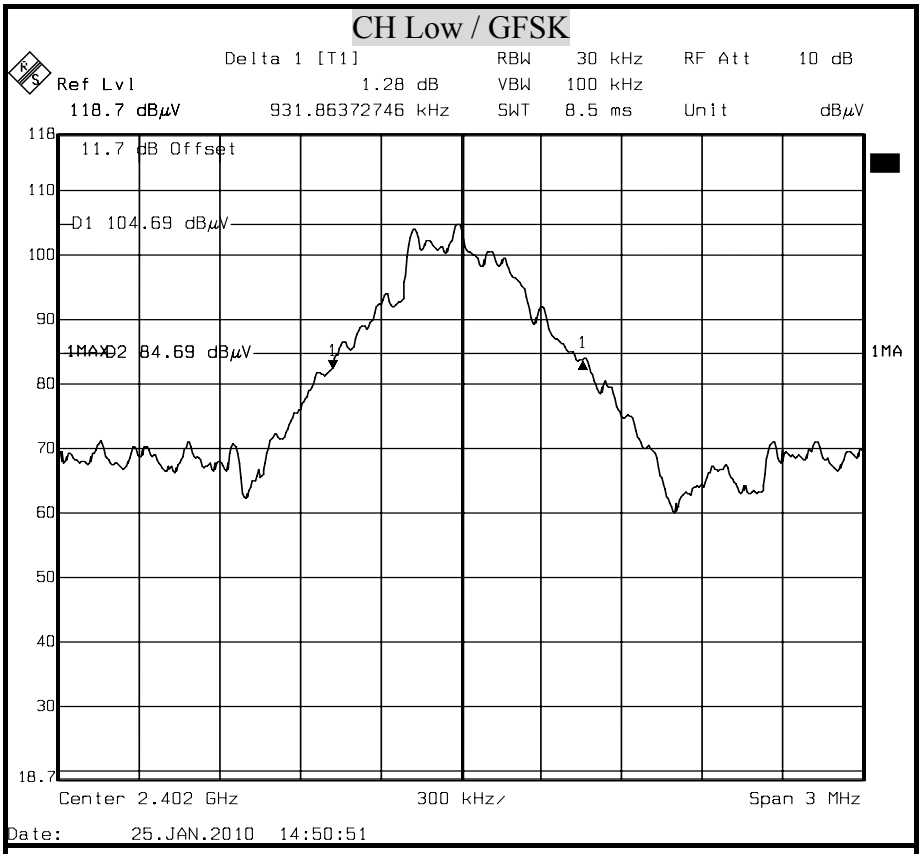
Channel	Channel Frequency (MHz)	20dB Bandwidth (MHz)	Pass / Fail
Low	2402	931.86	N/A
Middle	2441	937.87	N/A
High	2480	925.85	N/A

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

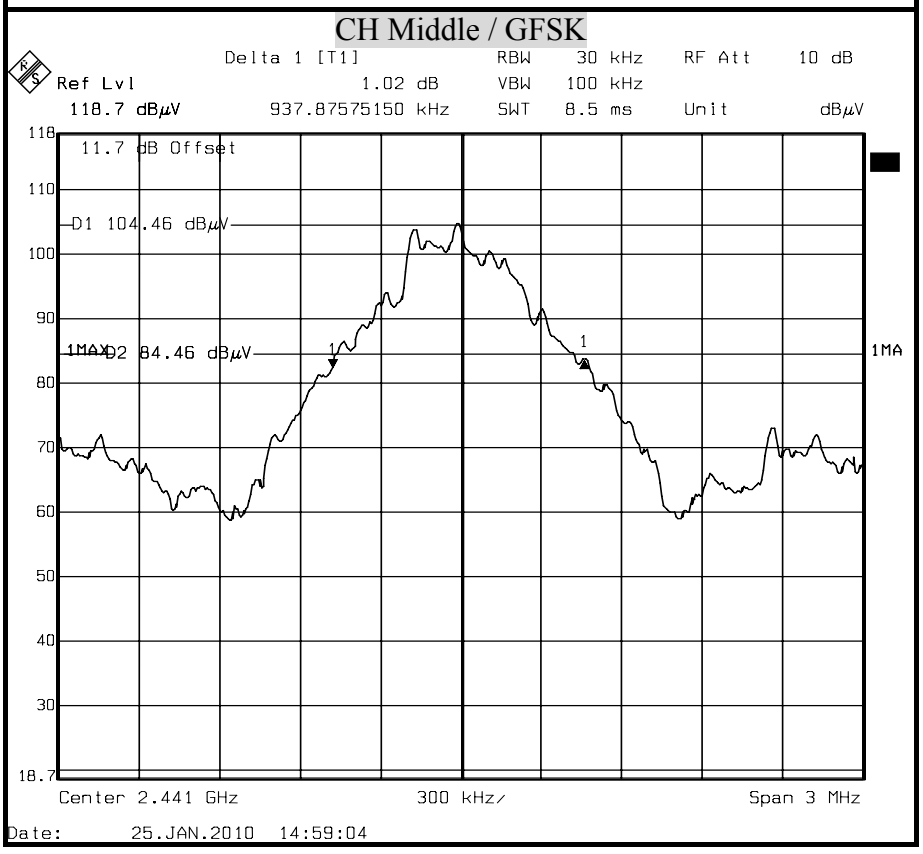
Channel	Channel Frequency (MHz)	20dB Bandwidth (MHz)	Pass / Fail
Low	2402	1.26	N/A
Middle	2441	1.24	N/A
High	2480	1.23	N/A

20dB BANDWIDTH

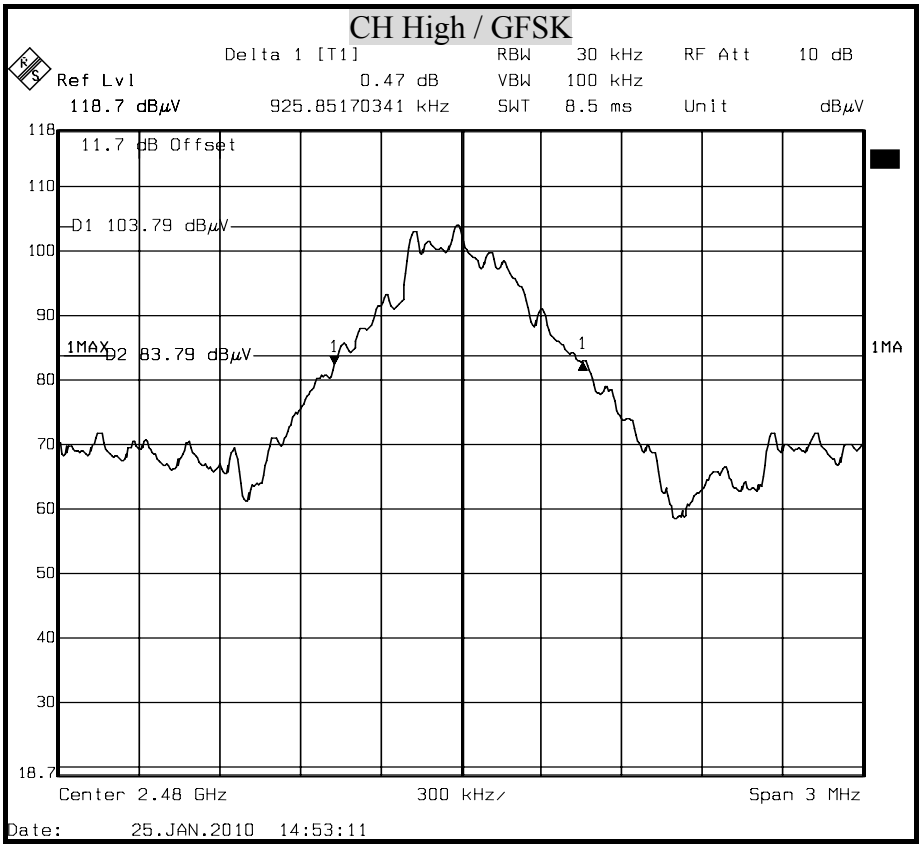
CH Low / GFSK



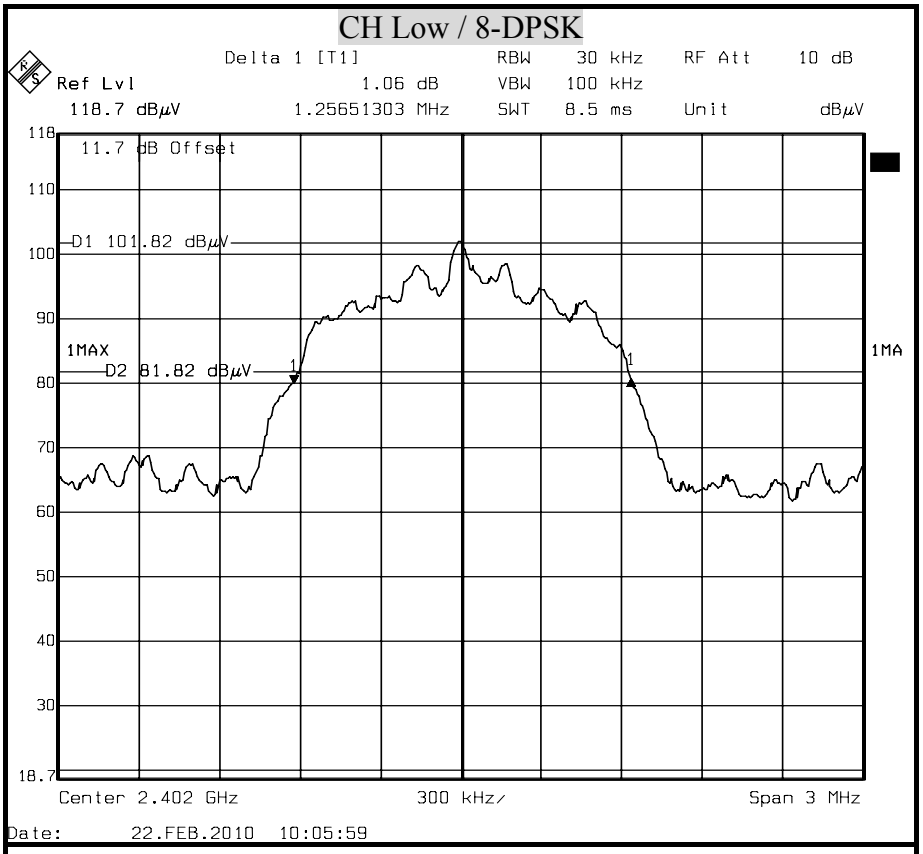
CH Middle / GFSK



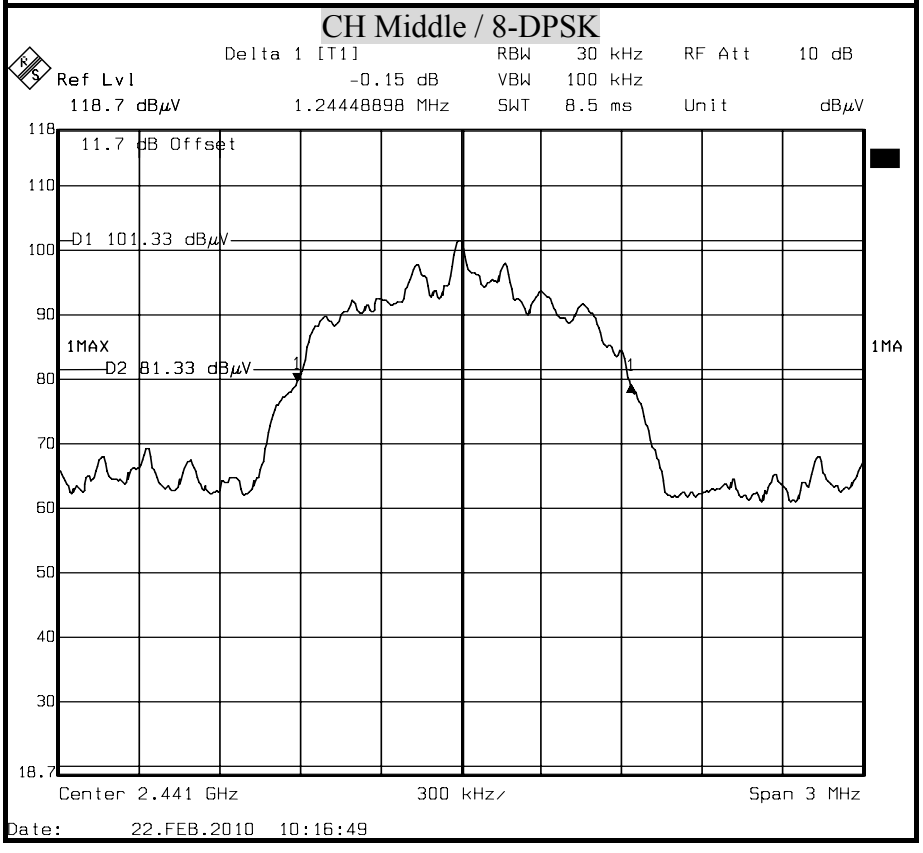
CH High / GFSK


Delta 1 [T1]
RBW 30 kHz
RF Att 10 dB
Ref Lvl
0.47 dB
VBW 100 kHz
118.7 dBµV
925.85170341 kHz
SWT 8.5 ms
Unit dBµV
11.7 dB Offset
D1 103.79 dBµV
1MAX D2 83.79 dBµV
1MA
118
110
100
90
80
70
60
50
40
30
18.7
Center 2.48 GHz
300 kHz/
Span 3 MHz
Date: 25.JAN.2010 14:53:11

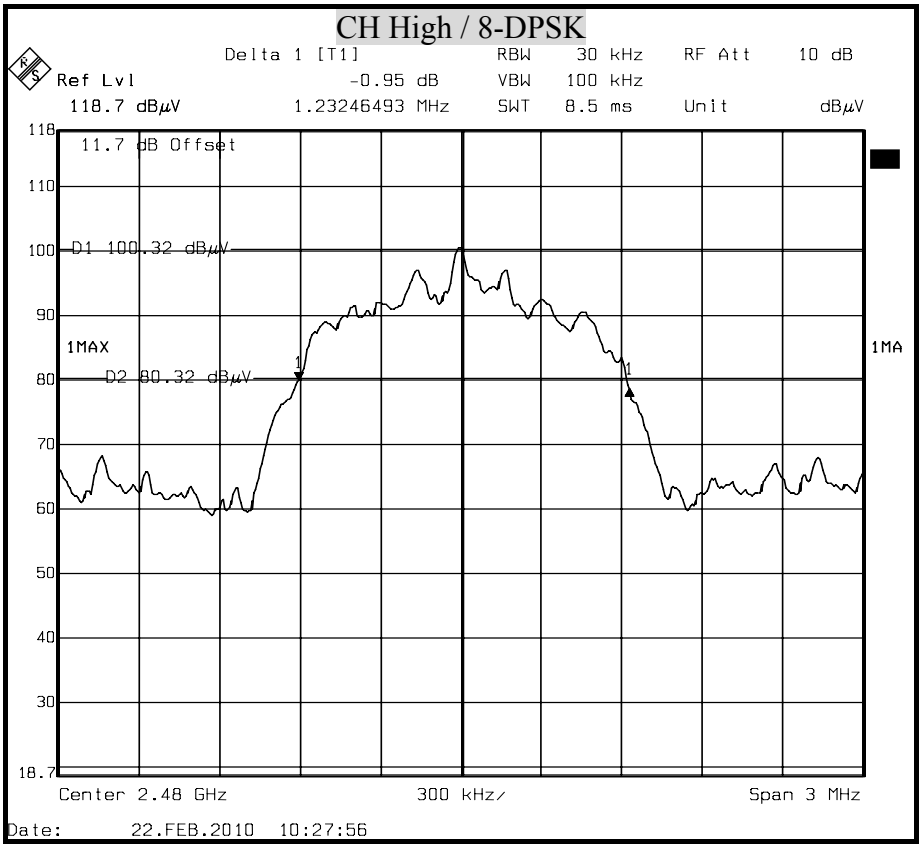
CH Low / 8-DPSK



CH Middle / 8-DPSK



CH High / 8-DPSK



7.2 MAXIMUM PEAK OUTPUT POWER

LIMIT

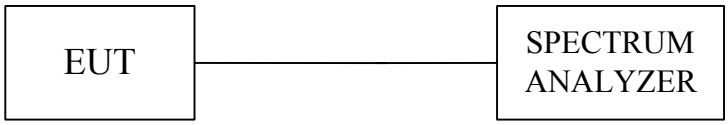
§15.247(b)(1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
SPECTRUM ANALYZER	R&S	FSEK 30	835253/002	JAN. 03, 2011

.

TEST SETUP



TEST PROCEDURE

The RF power output was measured with a power meter connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency, A power meter was used to record the shape of the transmit signal.

Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
RBW > the 20 dB bandwidth of the emission being measured
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

TEST RESULTS

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

Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	2402	-1.64	30	PASS
Middle	2441	-0.69	30	PASS
High	2480	-1.41	30	PASS

Remark: *The cable assembly insertion loss of 11.7dB (including 10dB pad and 1.7dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

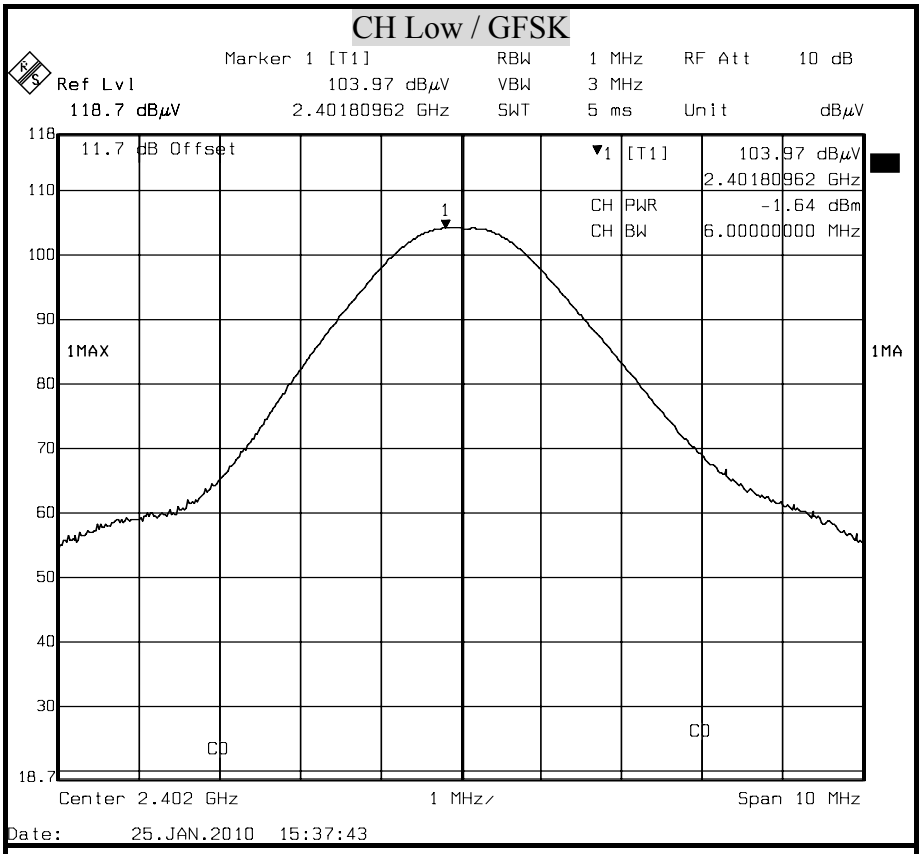
Modulation Type: 8-DPSK, CFG PKT Packet Type: 31 Packet Size: 1021 (3-DH5)

Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	2402	-3.01	30	PASS
Middle	2441	-3.64	30	PASS
High	2480	-4.73	30	PASS

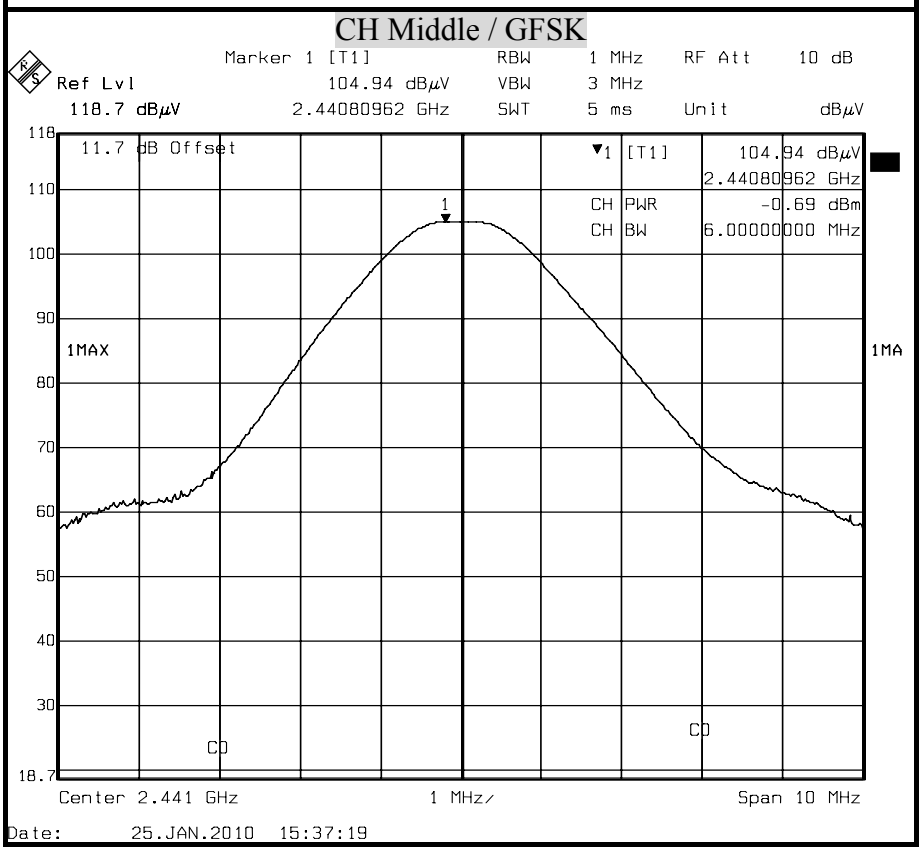
Remark: *The cable assembly insertion loss of 11.7dB (including 10dB pad and 1.7dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

MAXIMUM PEAK OUTPUT POWER

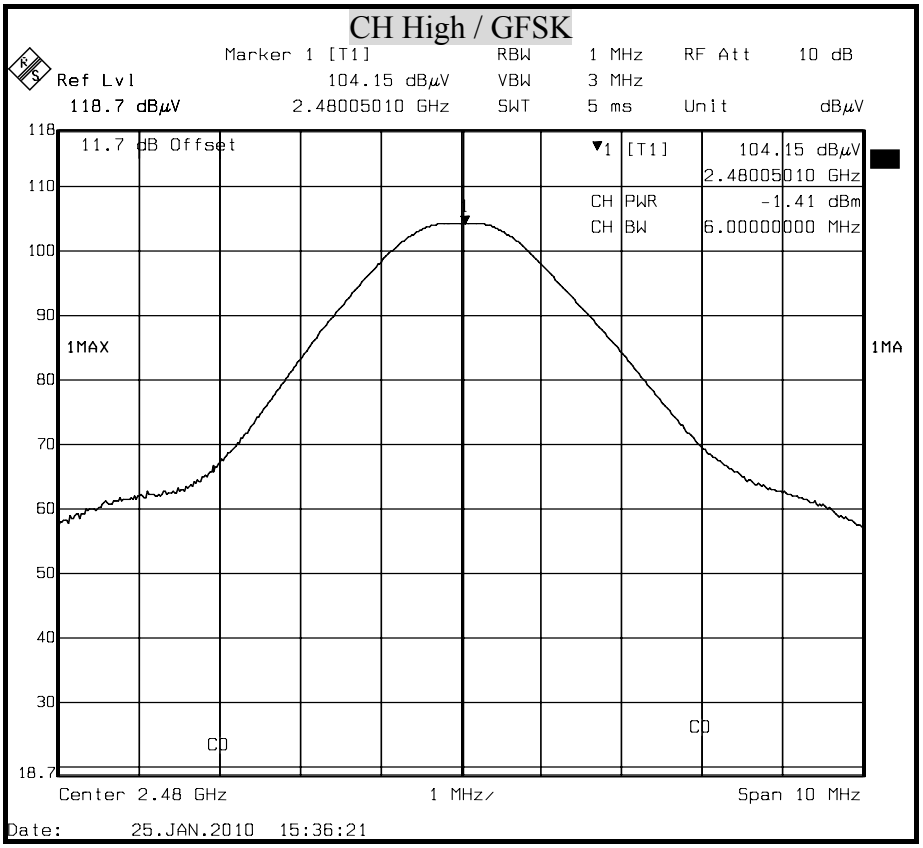
CH Low / GFSK



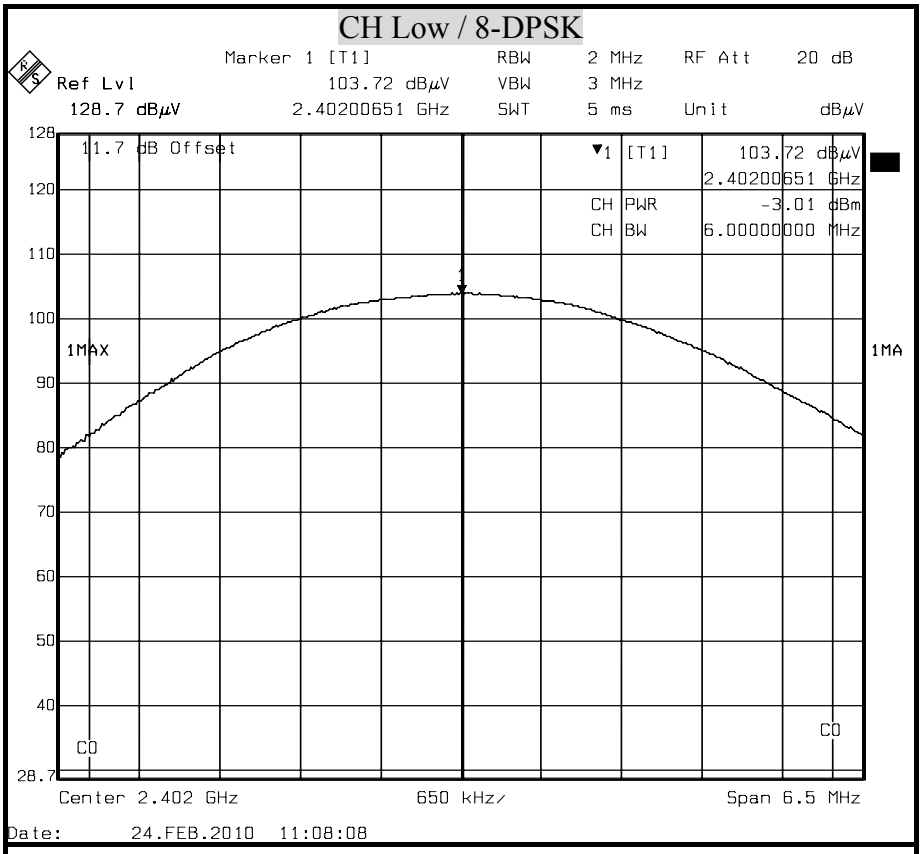
CH Middle / GFSK



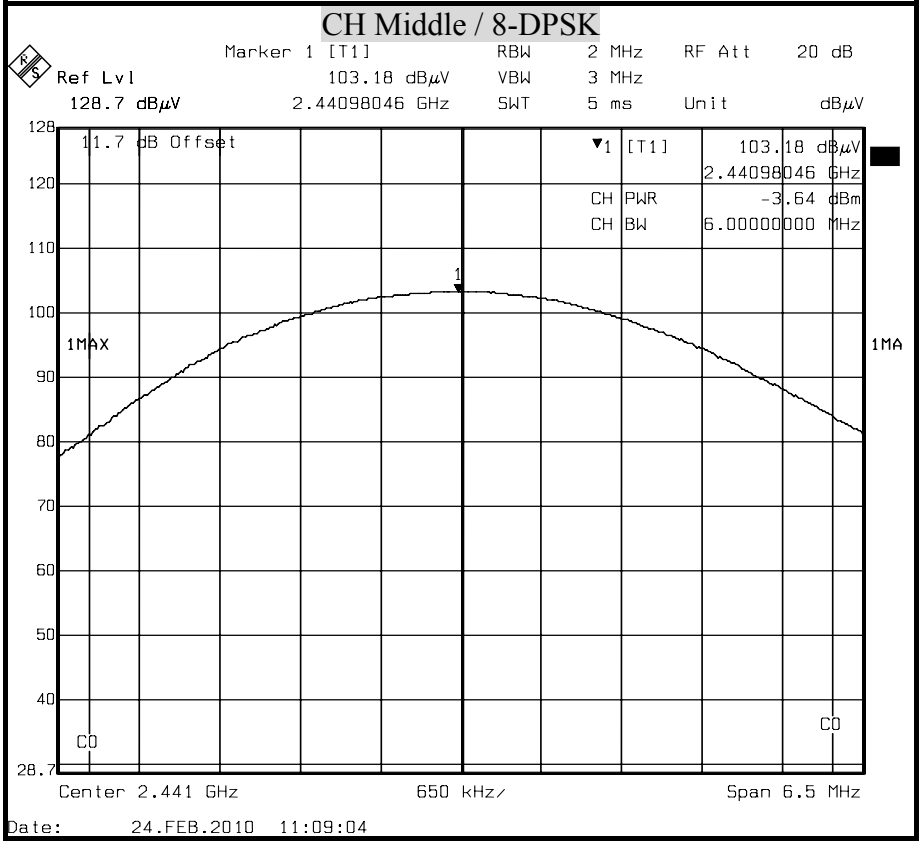
CH High / GFSK


Marker 1 [T1]
RBW 1 MHz
RF Att 10 dB
Ref Lvl
104.15 dBµV
VBW 3 MHz
118.7 dBµV
2.48005010 GHz
SWT 5 ms
Unit dBµV
11.7 dB Offset
▼1 [T1]
104.15 dBµV
2.48005010 GHz
CH PWR
-1.41 dBm
CH BW
6.00000000 MHz
1MAX
1MA
118
110
100
90
80
70
60
50
40
30
18.7
CO
CO
Center 2.48 GHz
1 MHz/
Span 10 MHz
Date: 25.JAN.2010 15:36:21

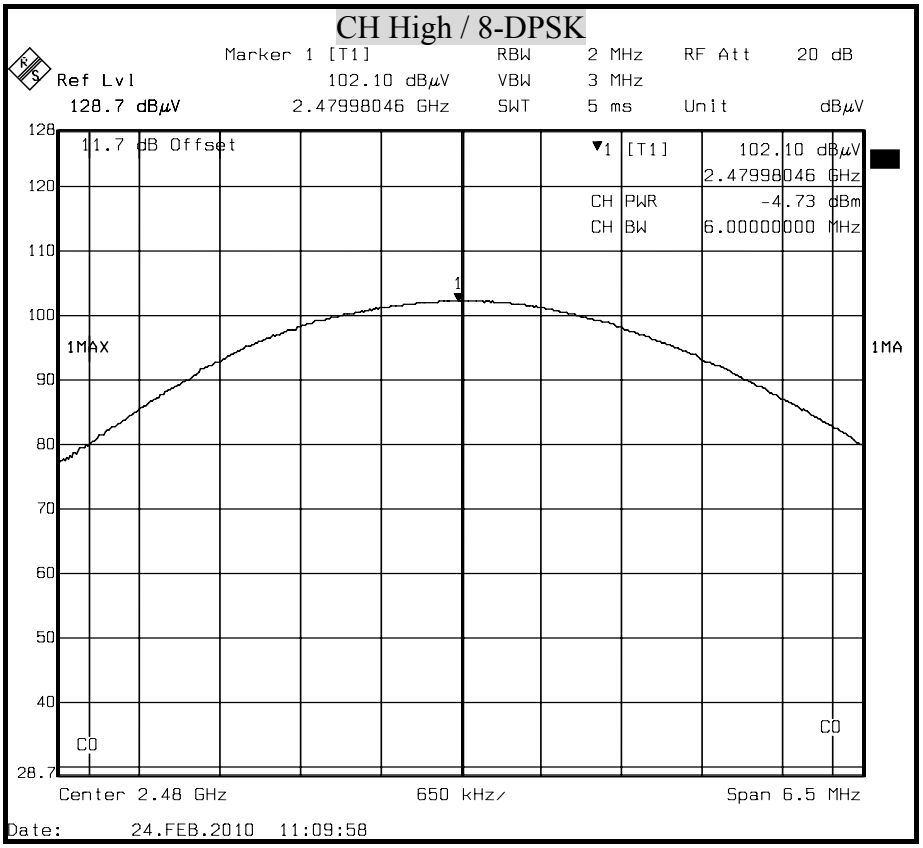
CH Low / 8-DPSK



CH Middle / 8-DPSK



CH High / 8-DPSK



7.3 HOPPING CHANNEL SEPARATION

LIMIT

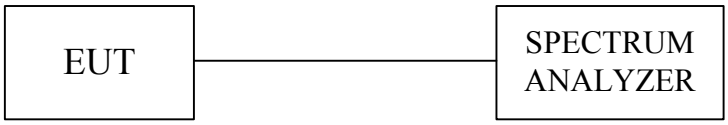
§15.247(a)(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier 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. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
SPECTRUM ANALYZER	R&S	FSEK 30	835253/002	JAN. 03, 2011

.

TEST SETUP



TEST PROCEDURE

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 it to measurement instrument. Then set it to any one convenient frequency within its operating range.
3. By using the MaxHold function record the separation of adjacent channels.
4. Measure the frequency difference of these two adjacent channels by spectrum analyzer MARK function. And then plot the result on spectrum analyzer screen.
5. Repeat above procedures until all frequencies measured were complete.

TEST RESULTS

Refer to section 8.1, 20dB bandwidth measurement, the measured channel separation should be greater than two-third of 20dB bandwidth or Minimum bandwidth.

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

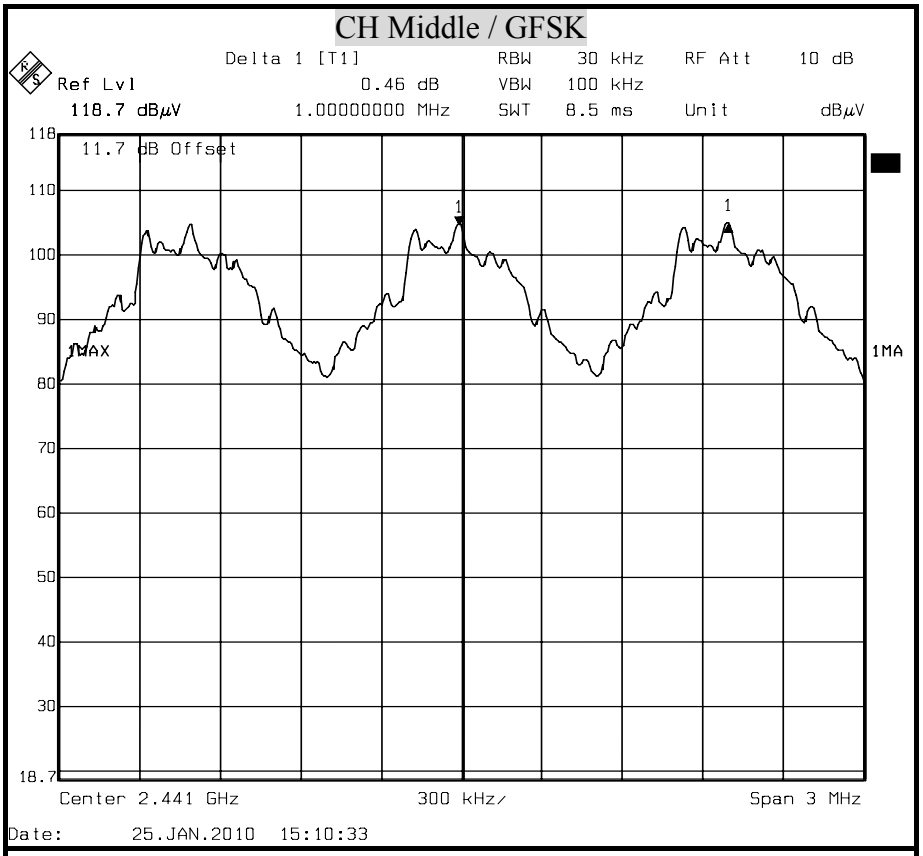
Channel	Adjacent Hopping Channel Separation (kHz)	Two –third of 20dB bandwidth (kHz)	Minimum Bandwidth (kHz)	Result
2441MHz (Mid)	1000	625.25	25	PASS

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

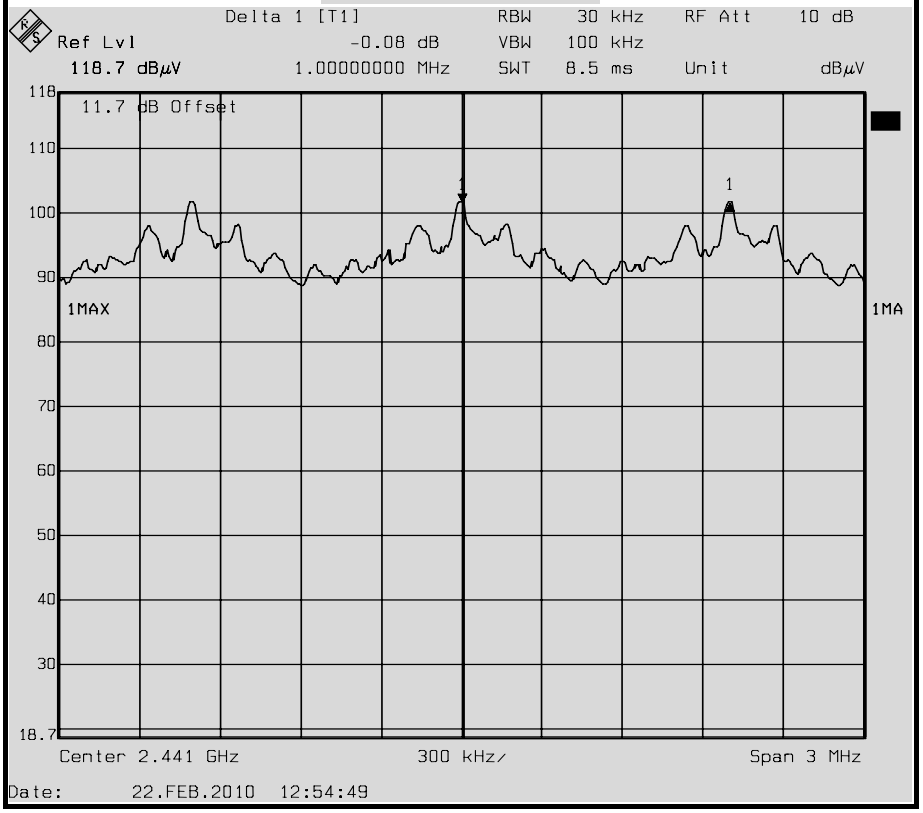
Channel	Adjacent Hopping Channel Separation (kHz)	Two –third of 20dB bandwidth (kHz)	Minimum Bandwidth (kHz)	Result
2441MHz (Mid)	1000	826.67	25	PASS

HOPPING CHANNEL SEPARATION

CH Middle / GFSK



CH Middle / 8-DPSK



7.4 NUMBER OF HOPPING FREQUENCY USED

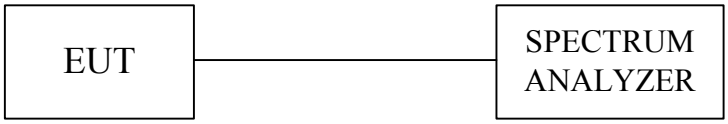
LIMIT

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

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
SPECTRUM ANALYZER	R&S	FSEK 30	835253/002	JAN. 03, 2011

TEST SETUP



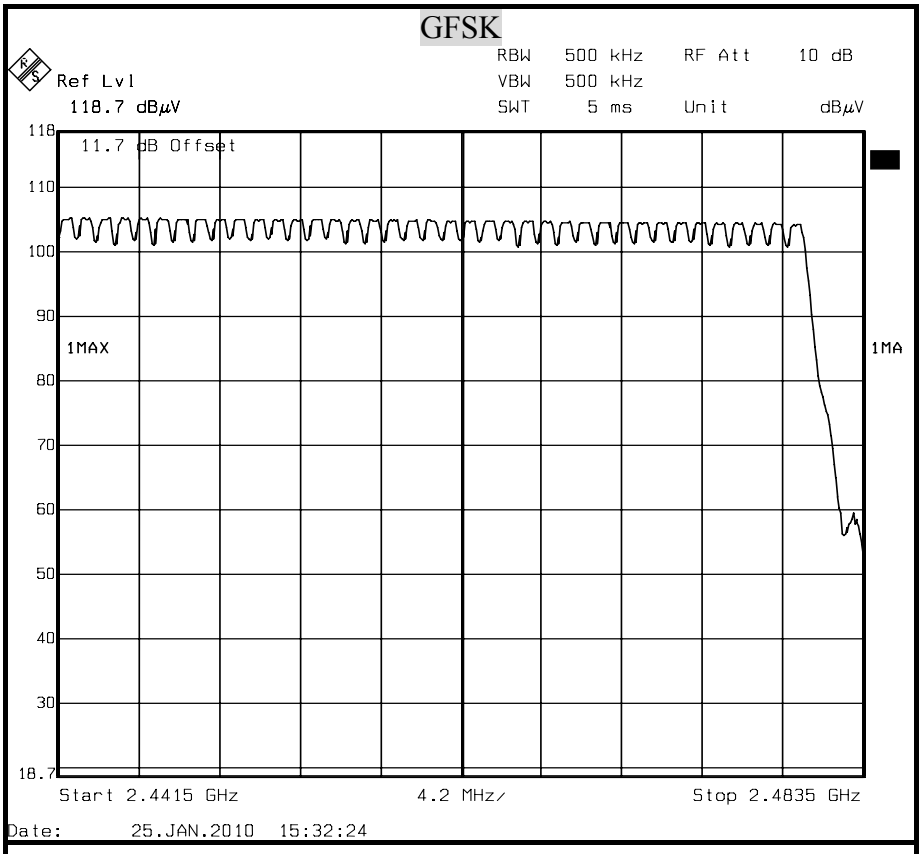
TEST PROCEDURE

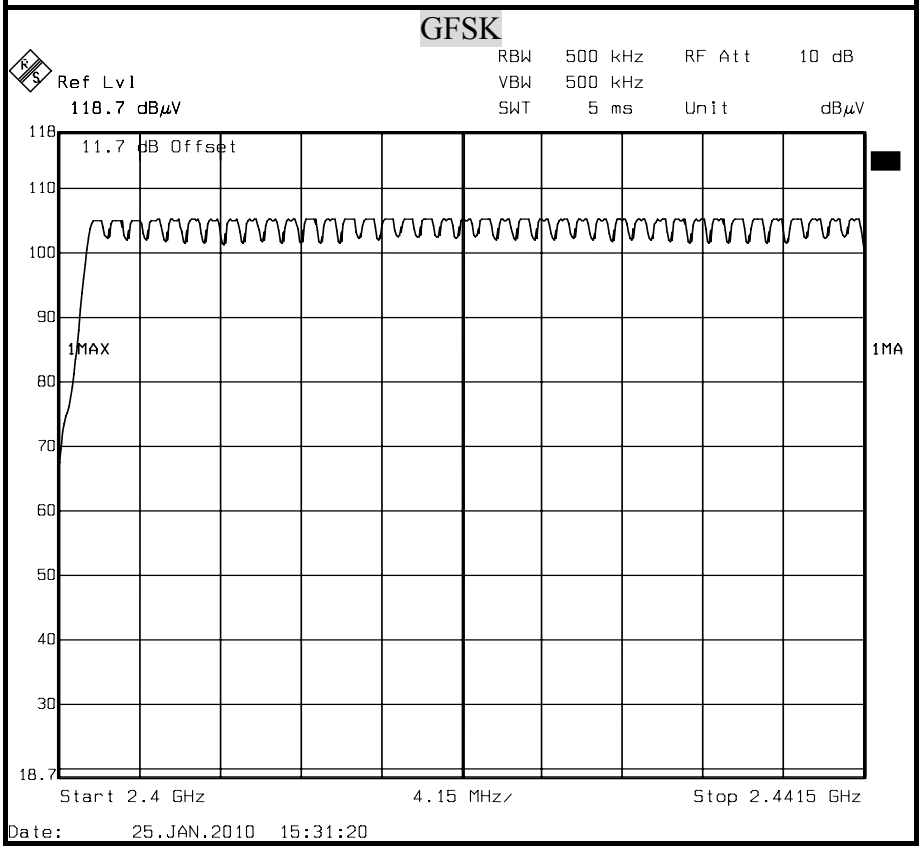
1 Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
2 Position the EUT as shown in test setup without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement 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 Set the spectrum analyzer on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
4 Set the spectrum analyzer on View mode and then plot the result on spectrum analyzer screen.
5 Repeat above procedures until all frequencies measured were complete.

TEST RESULTS

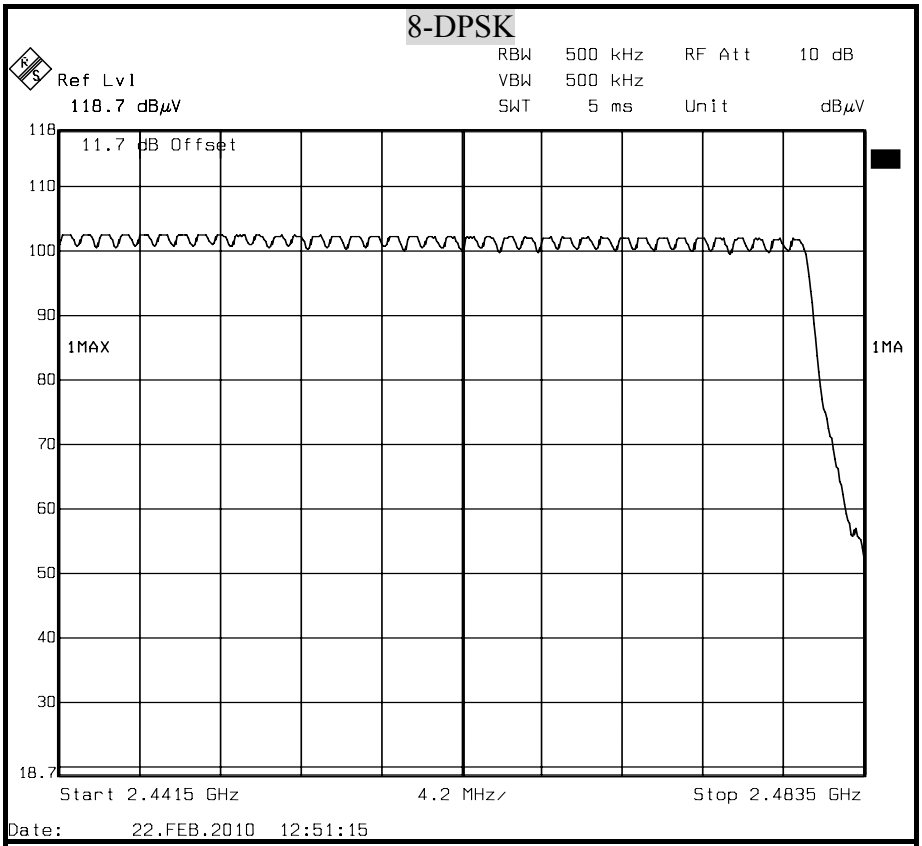
Result(No.of CH)	Limit(No.of CH)	Result
79	>75	PASS

NUMBER OF HOPPING FREQUENCY USED

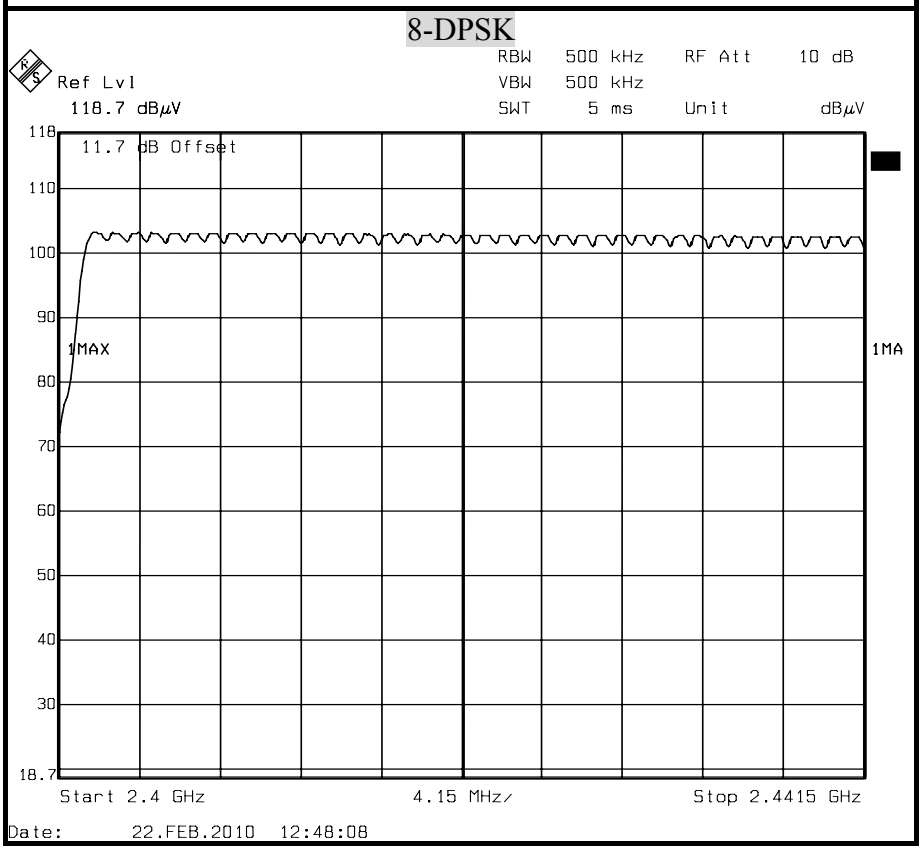




8-DPSK


RBW 500 kHz
RF Att 10 dB
VBW 500 kHz
Ref Lvl
118.7 dBµV
SWT 5 ms
Unit dBµV
11.7 dB Offset
1MAX
1MA
Start 2.4415 GHz
4.2 MHz/
Stop 2.4835 GHz
Date: 22.FEB.2010 12:51:15

8-DPSK


RBW 500 kHz
RF Att 10 dB
VBW 500 kHz
Ref Lvl
118.7 dBµV
SWT 5 ms
Unit dBµV
11.7 dB Offset
1MAX
1MA
Start 2.4 GHz
4.15 MHz/
Stop 2.4415 GHz
Date: 22.FEB.2010 12:48:08

7.5 DWELL TIME ON EACH CHANNEL

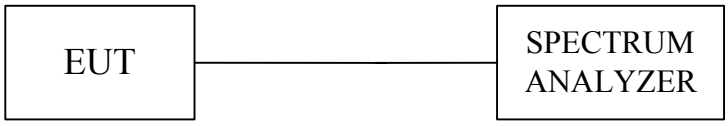
LIMIT

§15.247(a)(1)(iii) For frequency hopping system operating in the 2400-2483.5MHz band, the average time of occupancy on any frequency shall not be greater than 0.4 second within a 31.6 second period.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
SPECTRUM ANALYZER	R&S	FSEK 30	835253/002	JAN. 03, 2011

TEST SETUP



TEST PROCEDURE

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 Bluetooth Headset has 3 type of payload, DH1, DH3, DH5. The hopping rate is 1600 per second.

   The longer the payload is, the slower the hopping rate is.

TEST RESULTS

Time of occupancy on the TX channel in 31.6sec = time domain slot length × hop rate ÷ number of hop per channel × 31.6
Refer to the attached graph.
The hopping rates of Bluetooth devices change with different types of payload. The longer the payload is, the slower the hopping rate. The hopping rate scenario is defined in Bluetooth core specification.

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

Transmitting Frequency	Packet type	Dwell time (ms)	Time of occupancy on the TX channel in 31.6sec (ms)	Limit for Time of occupancy on the TX channel in 31.6sec (ms)	Results
2441MHz	DH1	0.400	128.00	400.00	PASS
2441MHz	DH3	1.653	264.48	400.00	PASS
2441MHz	DH5	2.905	309.87	400.00	PASS

CH1 Dwell tine=0.40 ms×(1600÷2)÷79×31.6=128.00(ms)
CH3 Dwell tine=1.65 ms×(1600÷4)÷79×31.6=264.48(ms)
CH5 Dwell tine=2.91 ms×(1600÷6)÷79×31.6=309.87(ms)

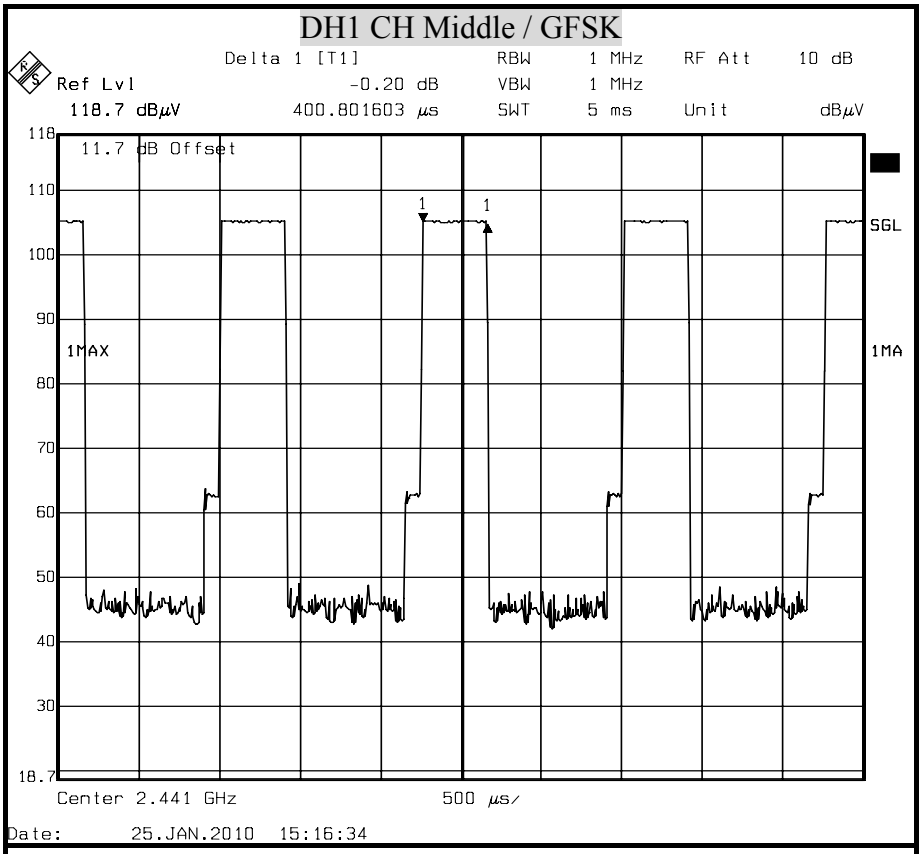
Modulation Type: 8-DPSK, CFG PKT Packet Type: 31 Packet Size: 1021 (3-DH5)

Transmitting Frequency	Packet type	Dwell time (ms)	Time of occupancy on the TX channel in 31.6sec (ms)	Limit for Time of occupancy on the TX channel in 31.6sec (ms)	Results
2441MHz	DH1	0.400	128.00	400.00	PASS
2441MHz	DH3	1.653	264.48	400.00	PASS
2441MHz	DH5	2.905	309.87	400.00	PASS

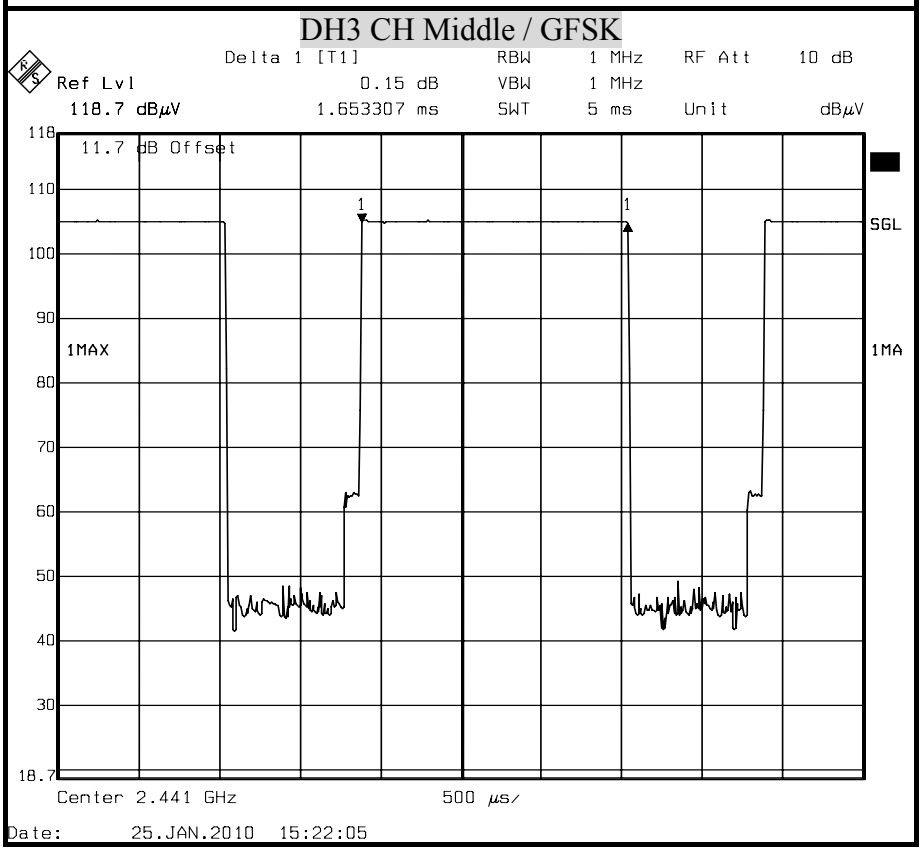
CH1 Dwell tine=0.40 ms×(1600÷2)÷79×31.6=128.00(ms)
CH3 Dwell tine=1.65 ms×(1600÷4)÷79×31.6=264.48(ms)
CH5 Dwell tine=2.91 ms×(1600÷6)÷79×31.6=309.87(ms)

DWELL TIME ON EACH PAYLOAD

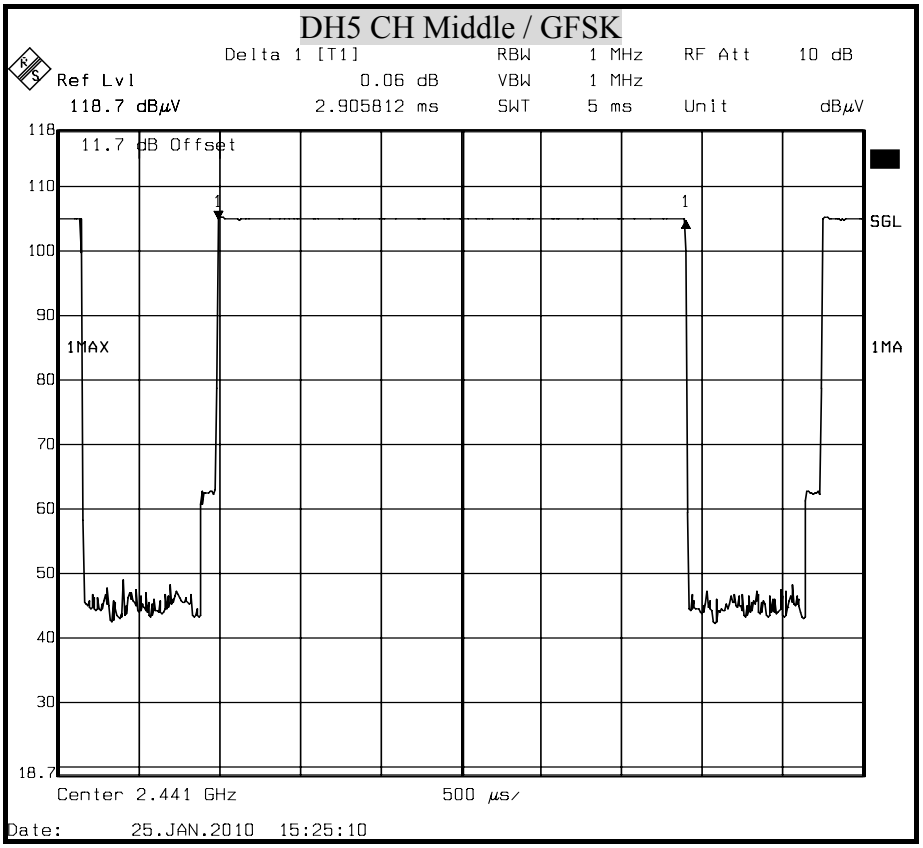
DH1 CH Middle / GFSK



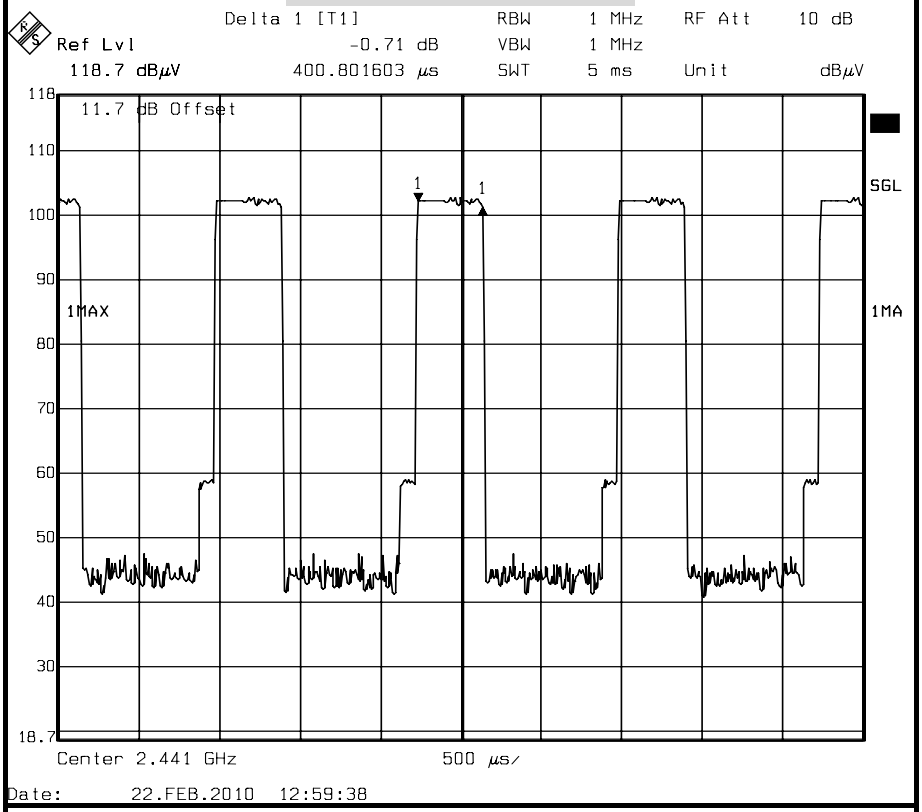
DH3 CH Middle / GFSK



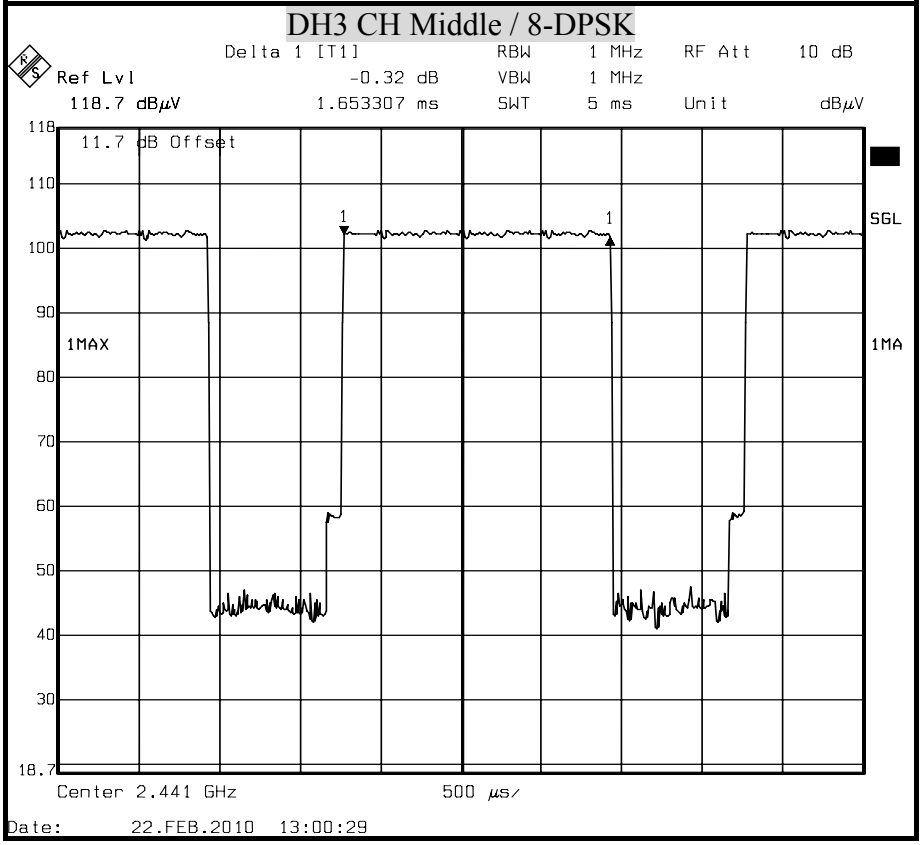
DH5 CH Middle / GFSK



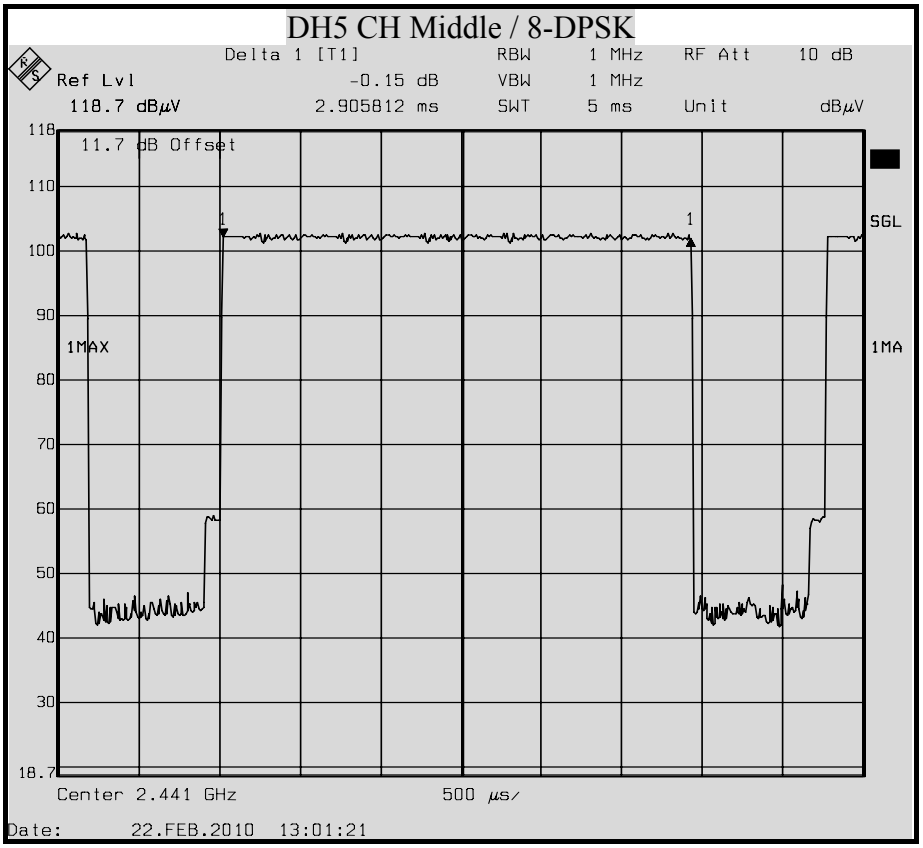
DH1 CH Middle / 8-DPSK



DH3 CH Middle / 8-DPSK



DH5 CH Middle / 8-DPSK



7.6 CONDUCTED SPURIOUS EMISSION

LIMITS

§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the and that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

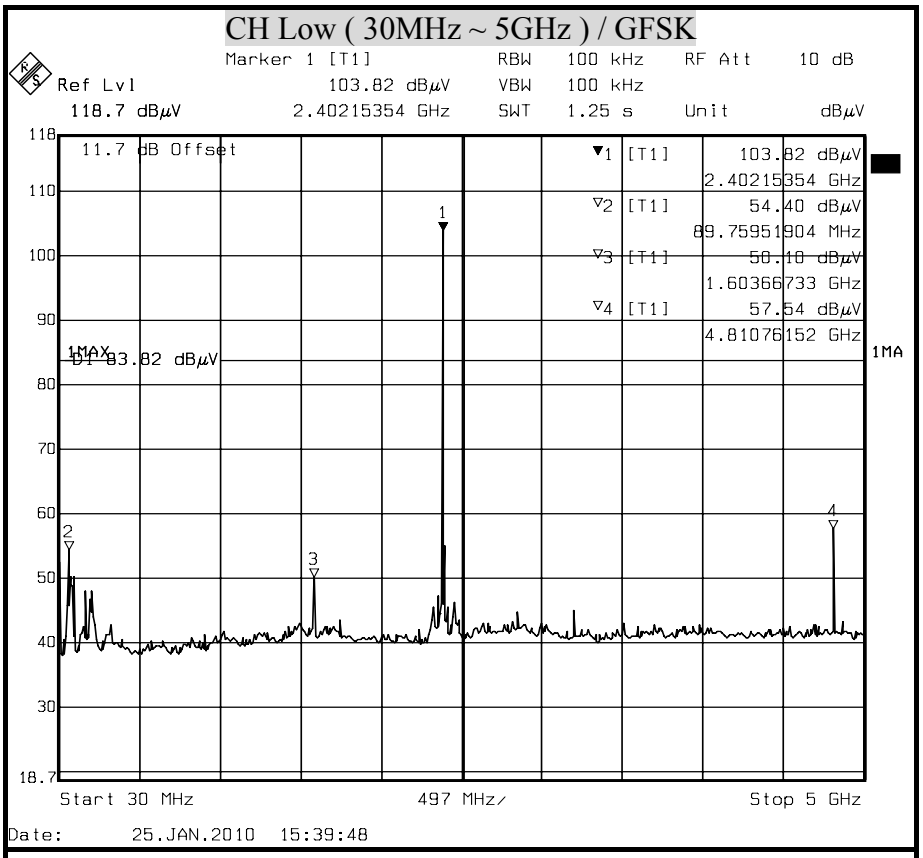
The spectrum from 30 MHz to 26.5 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

TEST RESULTS

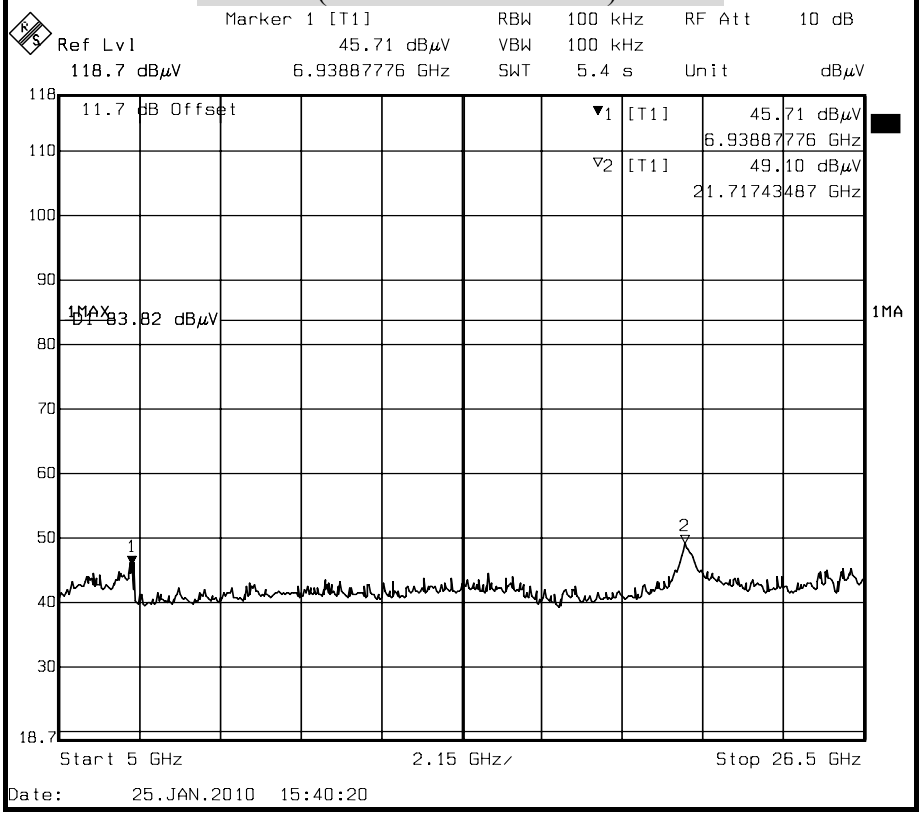
BAND EDGE COMPLIANCE OF RF CONDUCTED EMISSIONS

OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

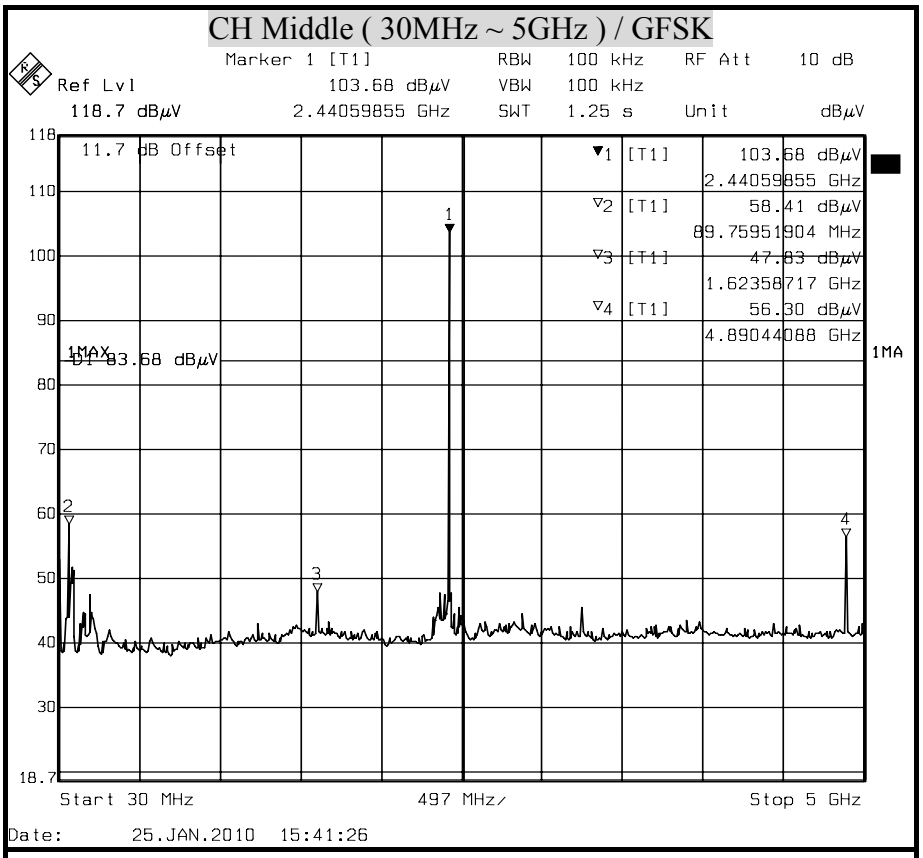
CH Low (30MHz ~ 5GHz) / GFSK



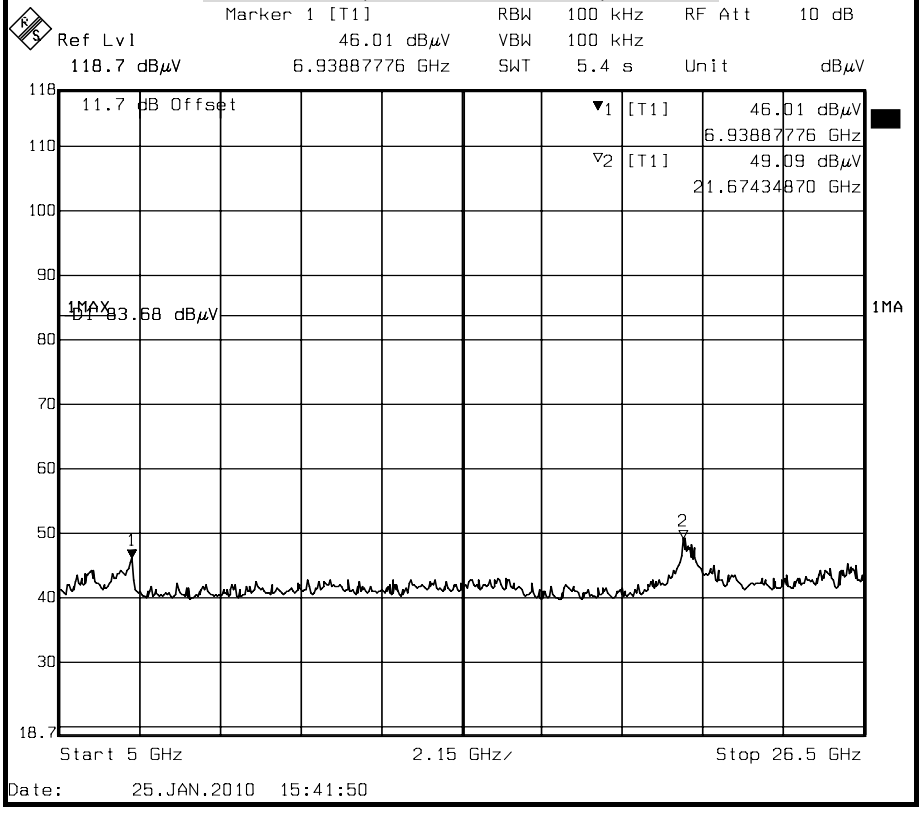
CH Low (5GHzHz ~ 26.5GHz) / GFSK



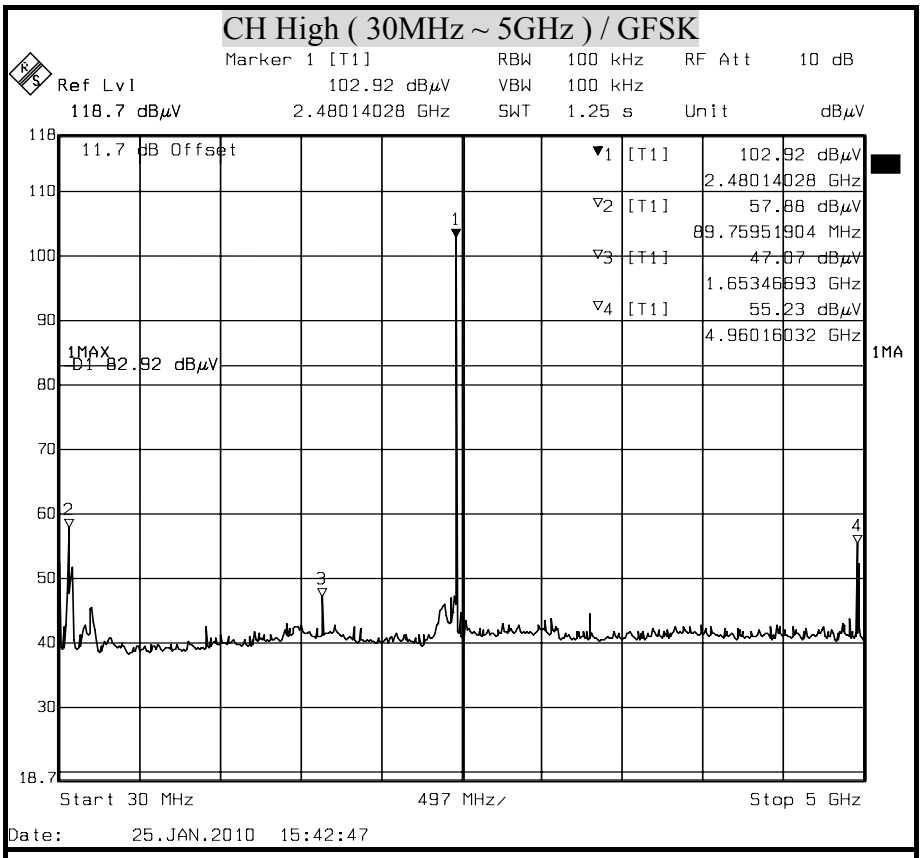
CH Middle (30MHz ~ 5GHz) / GFSK



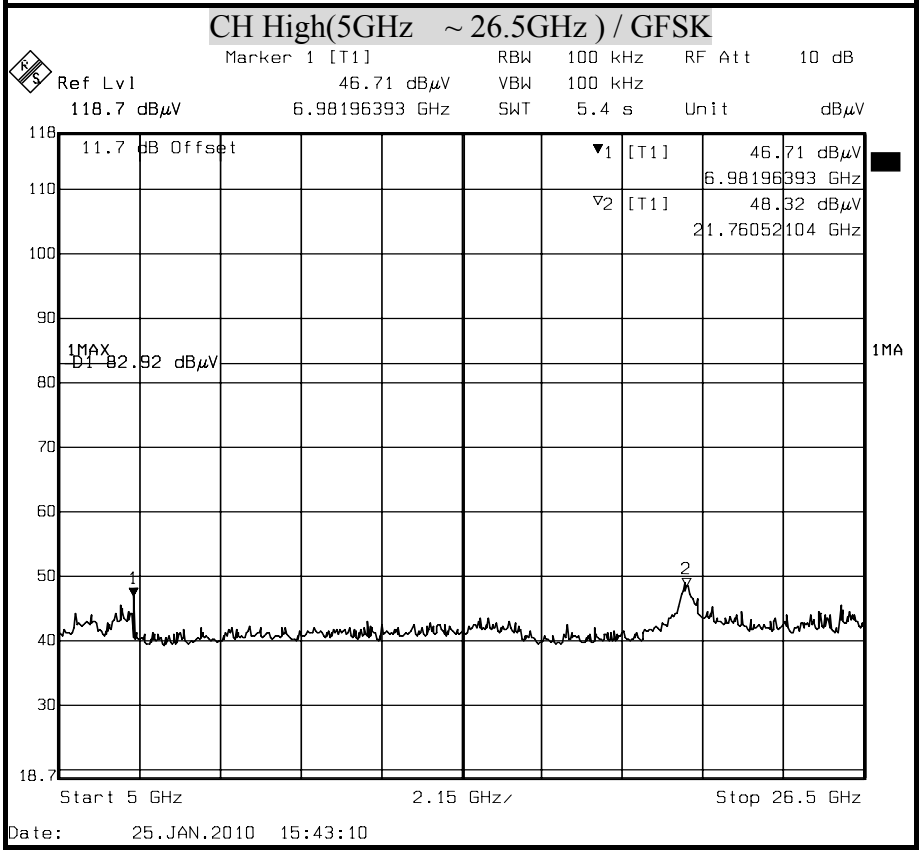
CH Middle (5GHz ~ 26.5GHz) / GFSK



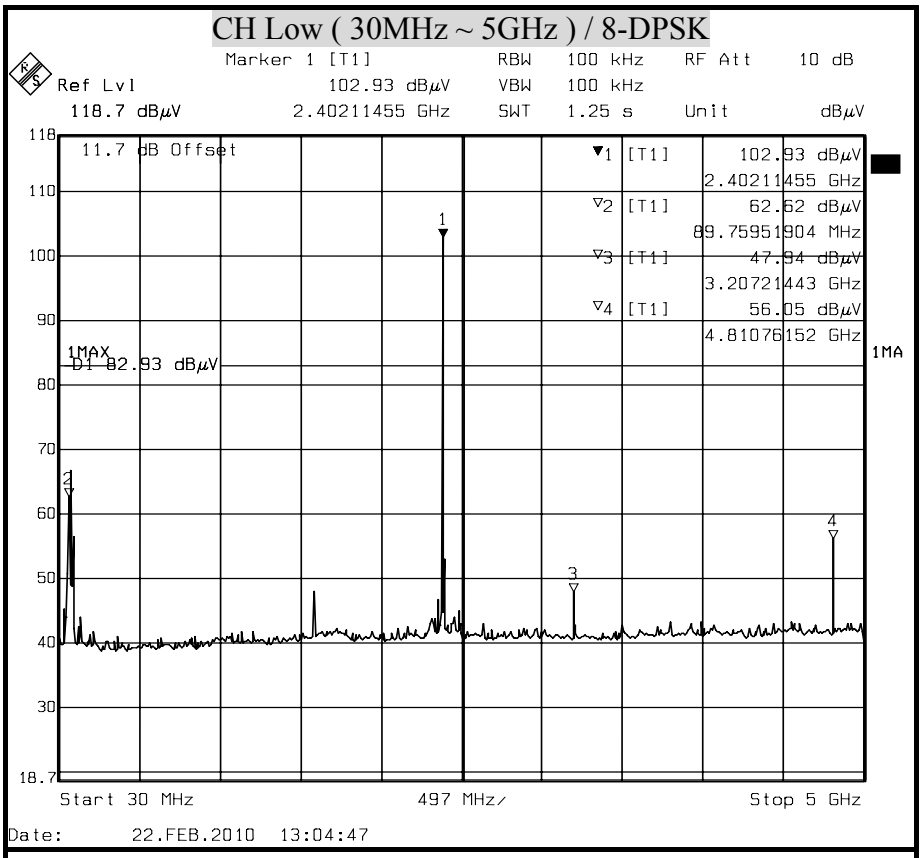
CH High (30MHz ~ 5GHz) / GFSK



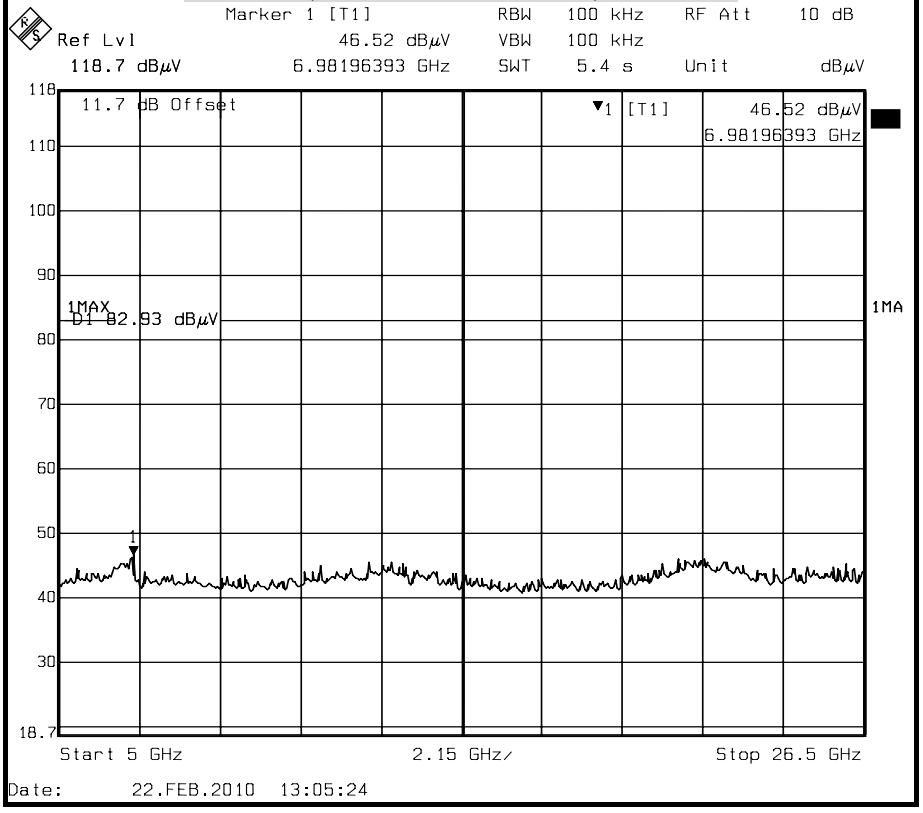
CH High(5GHz ~ 26.5GHz) / GFSK



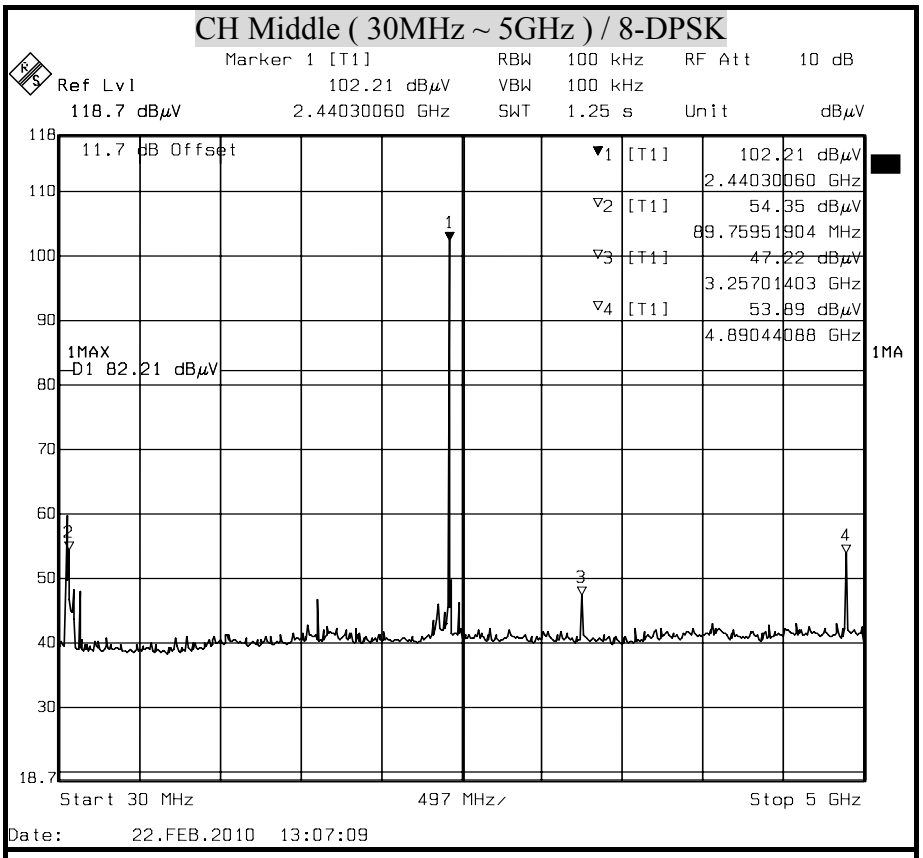
CH Low (30MHz ~ 5GHz) / 8-DPSK



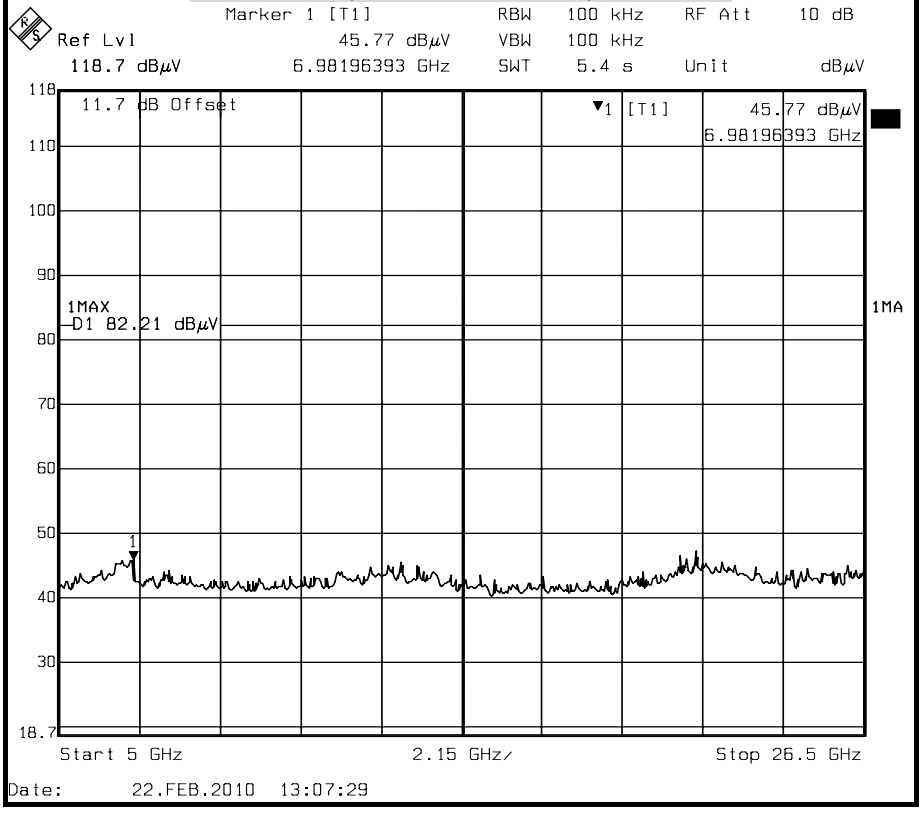
CH Low (5GHzHz ~ 26.5GHz) / 8-DPSK



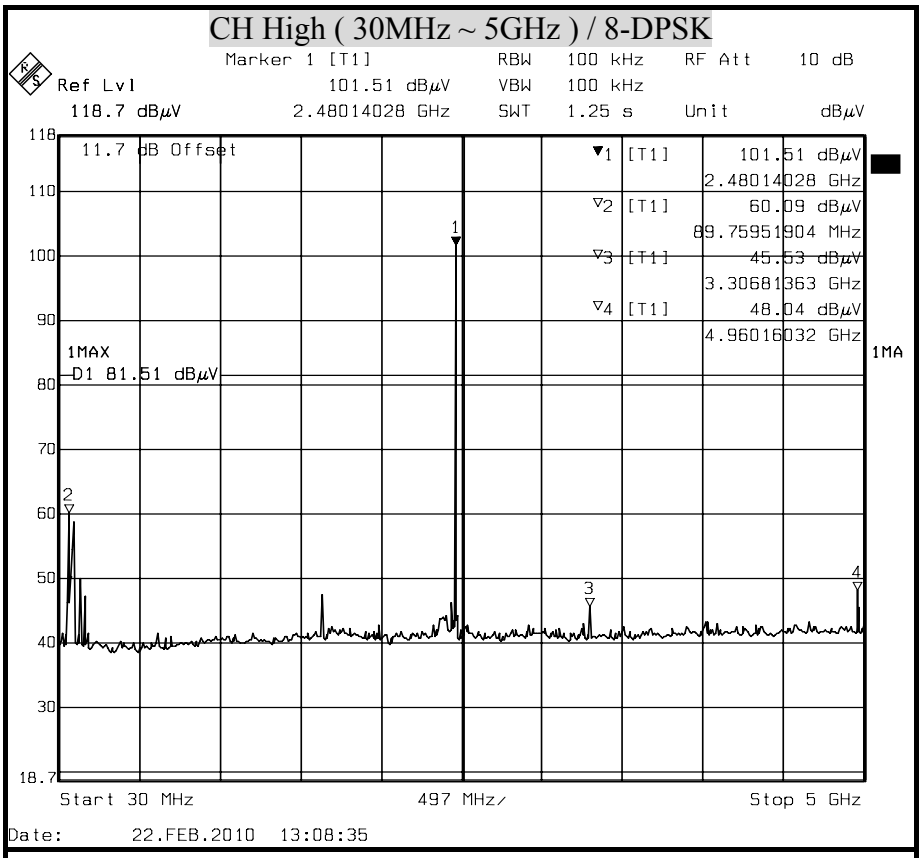
CH Middle (30MHz ~ 5GHz) / 8-DPSK



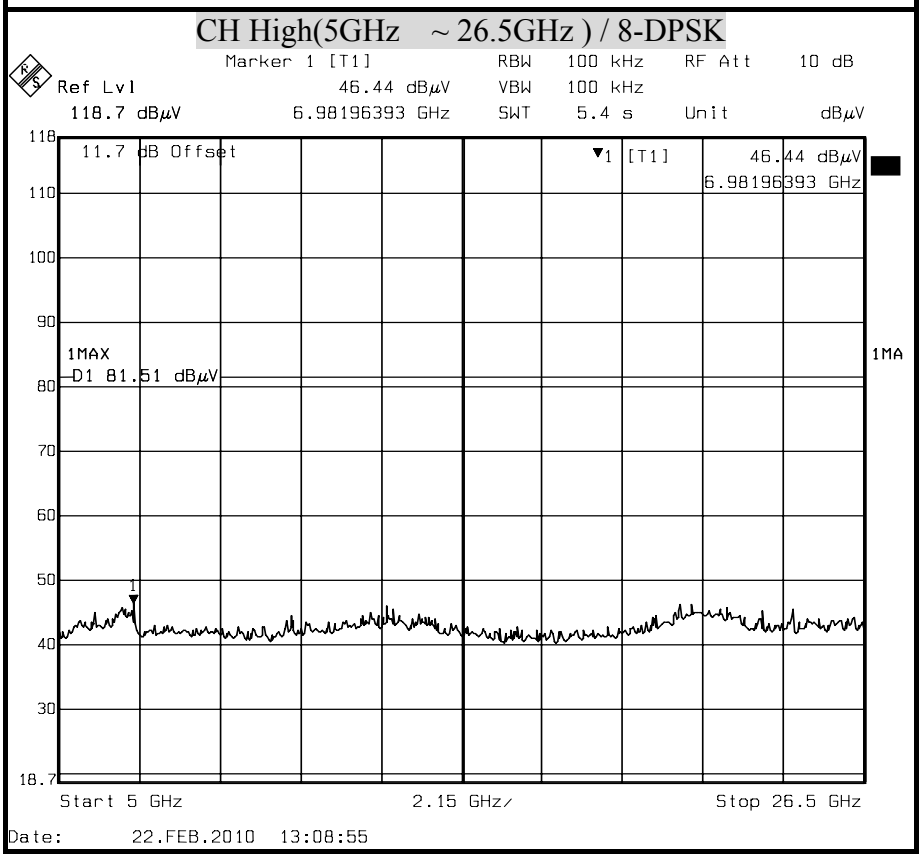
CH Middle (5GHz ~ 26.5GHz) / 8-DPSK



CH High (30MHz ~ 5GHz) / 8-DPSK



CH High(5GHz ~ 26.5GHz) / 8-DPSK



7.7 RADIATED EMISSIONS

7.7.1 TRANSMITTER RADIATED SUPURIOUS EMSSIONS

LIMITS

§ 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 -1710	10.6 -12.7
6.26775 - 6.26825	108 -121.94	1718.8 - 1722.2	13.25 -13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 – 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 -16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 -335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

§ 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown is Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§ 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

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

§ 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST EQUIPMENT

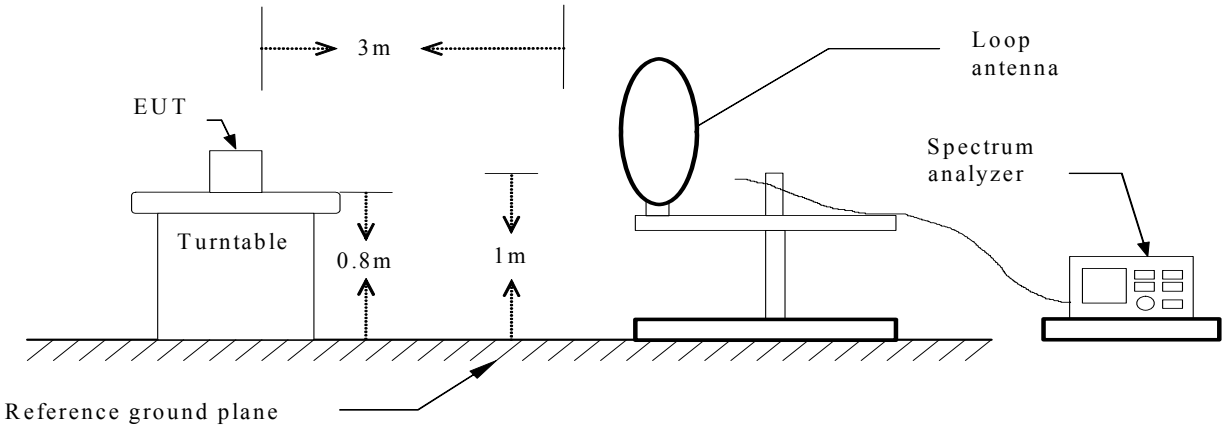
Open Area Test Site # 6				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
TYPE N COAXIAL CABLE	SUHNER	CHA9513	6	AUG. 31, 2010
BI-LOG Antenna	Sunol	JB1	A070506-2	NOV. 12, 2010
Pre-Amplifier	HP	8447F	2944A03817	AUG. 31, 2010
EMI Receiver	R&S	ESVS10	833206/012	APR. 28, 2010
RF Cable	SUHNER	SUCOFLEX104PEA	20520/4PEA	NOV. 10, 2010
Horn Antenna	Com-Power	AH-118	071032	DEC. 29, 2010
Spectrum Analyzer	R&S	FSEK 30	835253/002	JAN. 03, 2011
Pre-Amplifier	MITEQ	AFS44-00108650-42-10P -44	1205908	NOV. 10, 2010
Turn Table	Yo Chen	001	----------	N.C.R.
Antenna Tower	AR	TP1000A	309874	N.C.R.
Controller	CT	SC101	----------	N.C.R.
RF Swicth	E-INSTRUMENT TELH LTD	ERS-180A	EC1204141	N.C.R
LOOP ANTENNA	EMCO	6502	2356	05/28/2010
Test S/W	e-3 (5.04303e)			

Remark: 1. Each piece of equipment is scheduled for calibration once a year.
2. N.C.R = No Calibration Request.

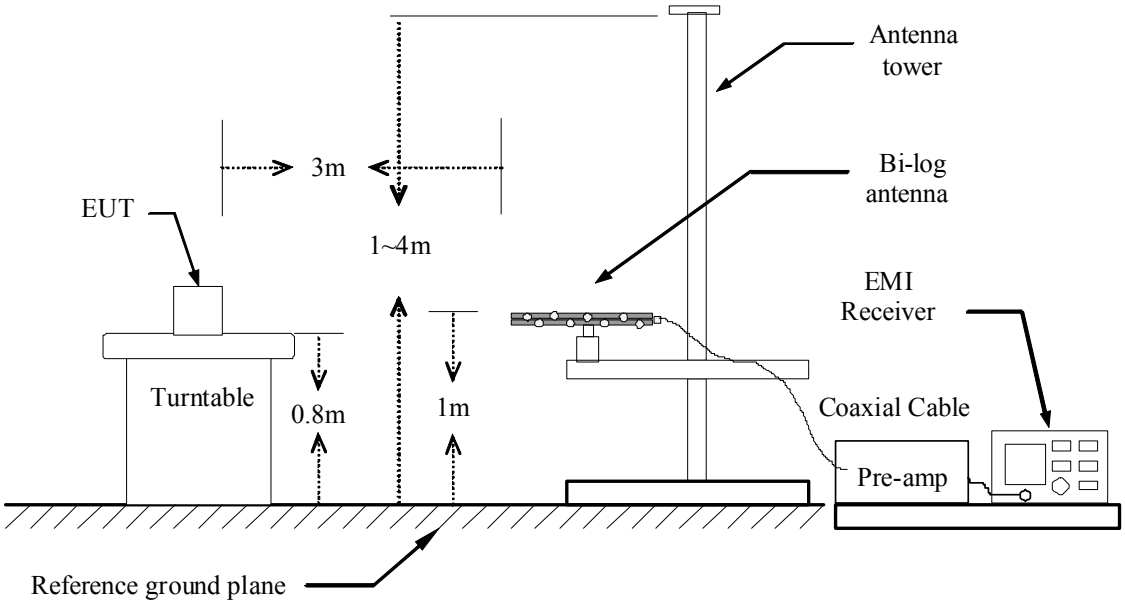
TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from below 1GHz.

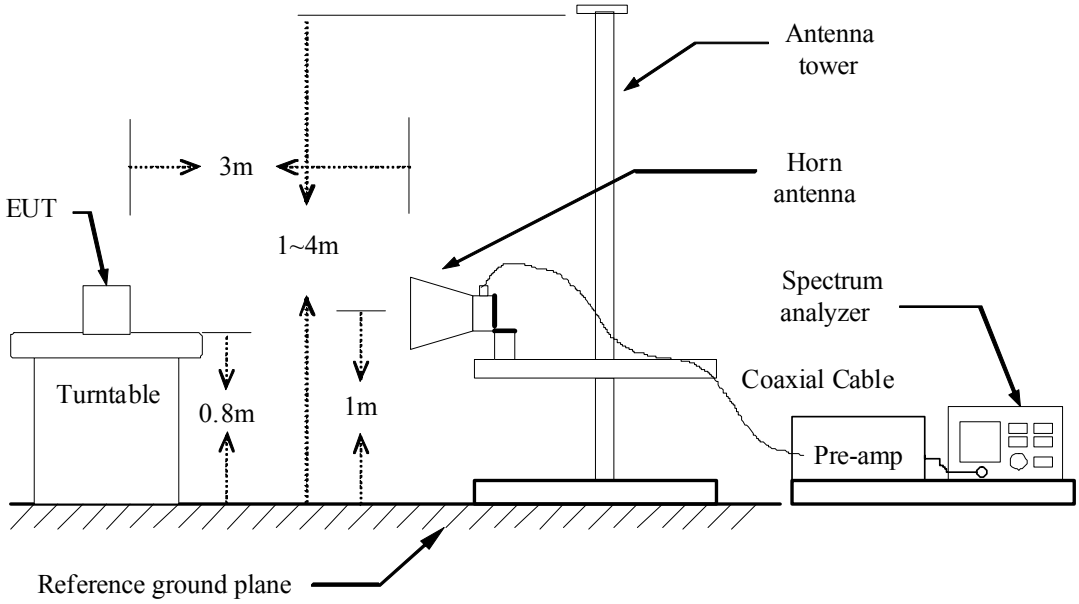
9kHz ~ 30MHz



30MHz ~ 1GHz



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



TEST PROCEDURE

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
b. White measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. White measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna
c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Note：
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

7.7.2 WORST-CASE RADIATED EMISSION BELOW 1 GHz

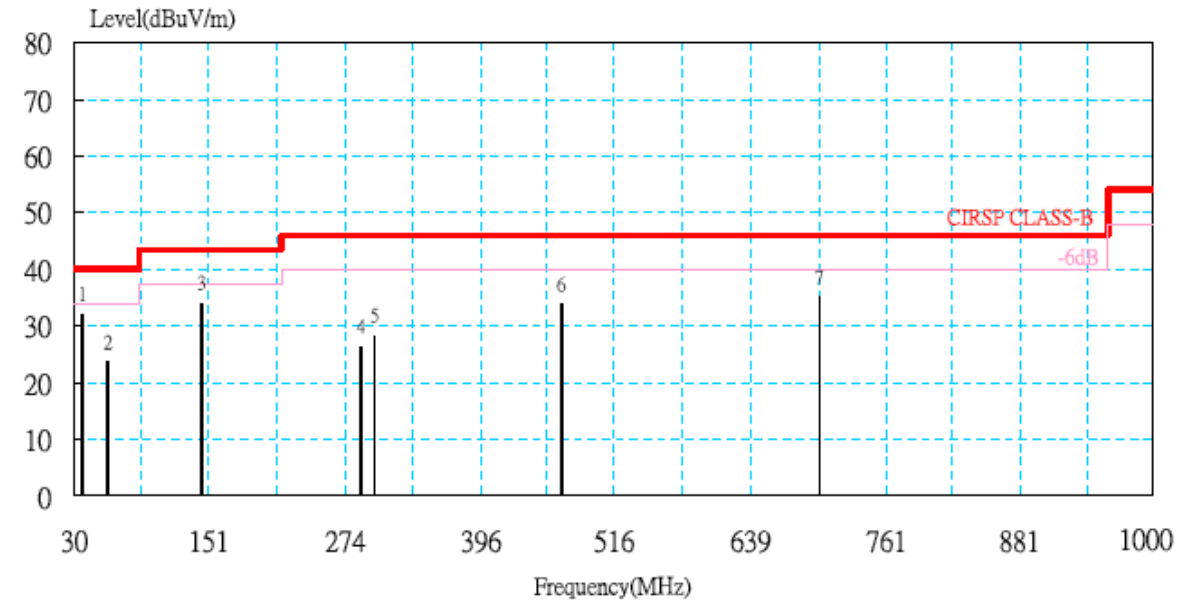
BELOW 1 GHz (9kHz ~ 30MHz)

No emission found between lowest internal used/generated frequency to 30MHz.

BELOW 1 GHz (30MHz ~ 1GHz)

Product Name	BonSayON S102 Bone Conduction Bluetooth Sunglasses	Test Date	January 25, 2010
Model Name	S102	Test By	Vision Chang
Test Mode	Normal Operation (worst case)	Temp & Humidity	28°C, 60%

Vertical



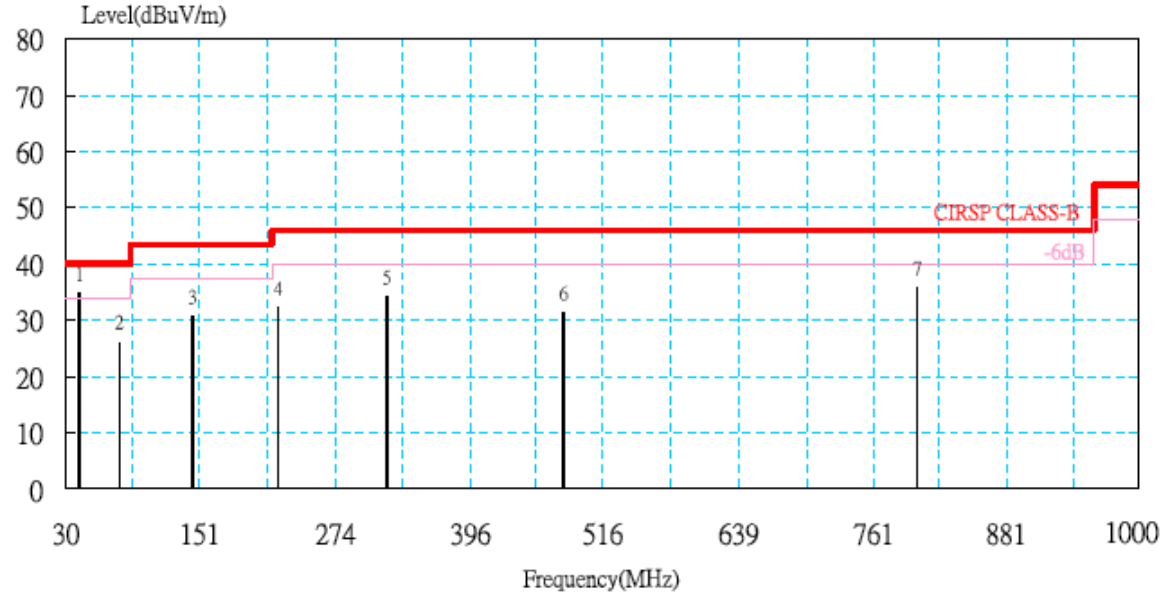
No.	Freq-Uency (MHz)	Meter Reading at 3 m Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission at 3 m Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector Mode PK/QP
1	37.15	14.80	16.47	0.83	32.09	40.00	-7.91	QP
2	60.98	14.90	7.76	0.99	23.65	40.00	-16.35	QP
3	144.05	19.20	13.18	1.50	33.88	43.50	-9.62	QP
4	288.46	10.40	13.58	2.37	26.35	46.00	-19.65	QP
5	300.50	11.80	14.01	2.48	28.29	46.00	-17.71	QP
6	468.52	13.10	17.43	3.26	33.79	46.00	-12.21	QP
7	700.00	10.70	20.60	3.77	35.07	46.00	-10.93	QP

Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
2. Radiated emissions measured were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).

Product Name	BonSayON S102 Bone Conduction Bluetooth Sunglasses	Test Date	January 25, 2010
Model Name	S102	Test By	Vision Chang
Test Mode	Normal Operation (worst case)	Temp & Humidity	28°C, 60%

Horizontal



No.	Freq-Uency (MHz)	Meter Reading at 3 m Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission at 3 m Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Mode PK/QP
1	42.86	21.54	12.30	0.89	34.73	40.00	-5.27	QP
2	78.55	16.70	8.13	1.16	25.99	40.00	-14.01	QP
3	144.00	15.90	13.18	1.50	30.58	43.50	-12.92	QP
4	222.19	17.40	12.92	1.89	32.22	46.00	-13.78	QP
5	320.00	16.90	14.44	2.72	34.06	46.00	-11.94	QP
6	480.00	10.50	17.64	3.18	31.32	46.00	-14.68	QP
7	800.00	9.80	21.80	4.14	35.74	46.00	-10.26	QP

Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
2. Radiated emissions measured were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).

7.7.3 TRANSMITTER RADIATED EMISSION ABOVE 1 GHz

Product Name	BonSayON S102 Bone Conduction Bluetooth Sunglasses	Test Date	January 25, 2010
Model Name	S102	Test By	Eric. Yang
Test Mode	CH Low TX / GFSK	Temp & Humidity	28.6°C, 43%

Horizontal

	TX mode / CH Low				Measurement Distance at 3m Horizontal polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	2402.08	98.10	30.06	2.34	39.80	0.00	90.70	Fundamental Frequency		P
	2402.08	97.86	30.06	2.34	39.80	0.00	90.46			A
*	1601.67	64.28	27.27	2.11	39.86	0.84	54.64	74.00	-19.36	P
*	1601.67	62.35	27.27	2.11	39.86	0.84	52.71	54.00	-1.29	A
*	4803.87	74.68	32.77	3.69	41.31	0.69	70.52	74.00	-3.48	P
*	4803.87	48.67	32.77	3.69	41.31	0.69	44.51	54.00	-9.49	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

Remark:
1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	BonSayON S102 Bone Conduction Bluetooth Sunglasses	Test Date	January 25, 2010
Model Name	S102	Test By	Eric. Yang
Test Mode	CH Low TX / GFSK	Temp & Humidity	28.6°C, 43%

Vertical

	TX mode / CH Low				Measurement Distance at 3m		Horizontal polarity			
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	2402.12	102.07	30.06	2.34	39.80	0.00	94.67	Fundamental Frequency		P
	2402.12	101.78	30.06	2.34	39.80	0.00	94.38			A
*	1601.67	60.37	27.27	2.11	39.86	0.84	50.73	74.00	-23.27	P
*	1601.67	56.88	27.27	2.11	39.86	0.84	47.24	54.00	-6.76	A
*	4803.66	74.95	32.77	3.69	41.31	0.69	70.79	74.00	-3.21	P
*	4803.66	48.68	32.77	3.69	41.31	0.69	44.52	54.00	-9.48	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

Remark:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	BonSayON S102 Bone Conduction Bluetooth Sunglasses	Test Date	January 25, 2010
Model Name	S102	Test By	Eric. Yang
Test Mode	CH Mid TX / GFSK	Temp & Humidity	28.6°C, 43%

Horizontal

	TX mode / CH Mid				Measurement Distance at 3m		Horizontal polarity			
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	2440.85	86.35	30.04	2.34	39.77	0.00	78.96	Fundamental Frequency		P
	2440.85	75.92	30.04	2.34	39.77	0.00	68.53			A
	1627.00	61.24	27.47	2.12	39.87	0.85	51.81	74.00	-22.19	P
	1627.00	59.19	27.47	2.12	39.87	0.85	49.76	54.00	-4.24	A
*	4882.02	71.12	32.94	3.74	41.42	0.72	67.09	74.00	-6.91	P
*	4882.02	46.90	32.94	3.74	41.42	0.72	42.87	54.00	-11.13	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

Remark:
1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	BonSayON S102 Bone Conduction Bluetooth Sunglasses	Test Date	January 25, 2010
Model Name	S102	Test By	Eric. Yang
Test Mode	CH Mid TX / GFSK	Temp & Humidity	28.6°C, 43%

Vertical

	TX mode / CH Mid				Measurement Distance at 3m		Horizontal polarity			
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	2440.86	92.55	30.04	2.34	39.77	0.00	85.16	Fundamental Frequency		P
	2440.86	81.50	30.04	2.34	39.77	0.00	74.11			A
	1626.95	60.96	27.46	2.12	39.87	0.85	51.53	74.00	-22.47	P
	1626.95	58.50	27.46	2.12	39.87	0.85	49.07	54.11	-5.04	A
*	4882.07	73.50	32.94	3.74	41.42	0.72	69.47	74.00	-4.53	P
*	4882.07	47.78	32.94	3.74	41.42	0.72	43.75	54.00	-10.25	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

Remark:
1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	BonSayON S102 Bone Conduction Bluetooth Sunglasses	Test Date	January 25, 2010
Model Name	S102	Test By	Eric. Yang
Test Mode	CH High TX / GFSK	Temp & Humidity	28.6°C, 43%

Horizontal

	TX mode / CH High				Measurement Distance at 3m Horizontal polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	2479.85	97.19	30.01	2.34	39.74	0.00	89.81	Fundamental Frequency		P
	2479.85	59.13	30.01	2.34	39.74	0.00	51.75			A
	1653.65	64.40	27.67	2.14	39.89	0.87	55.18	74.00	-18.82	P
	1653.65	62.22	27.67	2.14	39.89	0.87	53.00	54.00	-1.00	A
*	4960.03	68.03	33.11	3.78	41.54	0.74	64.13	74.00	-9.87	P
*	4960.03	44.91	33.11	3.78	41.54	0.74	41.01	54.00	-12.99	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

Remark:
1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	BonSayON S102 Bone Conduction Bluetooth Sunglasses	Test Date	January 25, 2010
Model Name	S102	Test By	Eric. Yang
Test Mode	CH High TX / GFSK	Temp & Humidity	28.6°C, 43%

Vertical

	TX mode / CH High				Measurement Distance at 3m Horizontal polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	2479.88	89.25	30.01	2.34	39.74	0.00	81.87	Fundamental Frequency		P
	2479.88	78.28	30.01	2.34	39.74	0.00	70.90			A
	1653.37	61.77	27.67	2.14	39.89	0.87	52.55	74.00	-21.45	P
	1653.37	59.87	27.67	2.14	39.89	0.87	50.65	54.00	-3.35	A
*	4960.05	72.85	33.11	3.78	41.54	0.74	68.95	74.00	-5.05	P
*	4960.05	46.55	33.11	3.78	41.54	0.74	42.65	54.00	-11.35	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

Remark:
1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	BonSayON S102 Bone Conduction Bluetooth Sunglasses	Test Date	February 23, 2010
Model Name	S102	Test By	Eric. Yang
Test Mode	CH Low TX / 8-DPSK	Temp & Humidity	27.5°C, 46%

Horizontal

	TX mode / CH Low				Measurement Distance at 3m Horizontal polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	2402.08	103.52	30.06	2.34	39.80	0.00	96.12	Fundamental Frequency		P
	2402.08	88.72	30.06	2.34	39.80	0.00	81.32			A
*	1601.62	64.18	27.27	2.11	39.86	0.84	54.54	74.00	-19.46	P
*	1601.62	62.34	27.27	2.11	39.86	0.84	52.70	54.00	-1.30	A
*	4803.95	65.75	32.77	3.69	41.31	0.69	61.59	74.00	-12.41	P
*	4803.95	48.39	32.77	3.69	41.31	0.69	44.23	54.00	-9.77	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

Remark:
1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	BonSayON S102 Bone Conduction Bluetooth Sunglasses	Test Date	February 23, 2010
Model Name	S102	Test By	Eric. Yang
Test Mode	CH Low TX / 8-DPSK	Temp & Humidity	27.5°C, 46%

Vertical

	TX mode / CH Low				Measurement Distance at 3m		Horizontal polarity			
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	2402.11	102.85	30.06	2.34	39.80	0.00	95.45	Fundamental Frequency		P
	2402.11	87.99	30.06	2.34	39.80	0.00	80.59			A
*	1601.68	62.11	27.27	2.11	39.86	0.84	52.47	74.00	-21.53	P
*	1601.68	60.52	27.27	2.11	39.86	0.84	50.88	54.00	-3.12	A
*	4803.98	63.54	32.77	3.69	41.31	0.69	59.38	74.00	-14.62	P
*	4803.98	46.87	32.77	3.69	41.31	0.69	42.71	54.00	-11.29	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

Remark:
1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	BonSayON S102 Bone Conduction Bluetooth Sunglasses	Test Date	February 23, 2010
Model Name	S102	Test By	Eric. Yang
Test Mode	CH Mid TX / 8-DPSK	Temp & Humidity	27.5°C, 46%

Horizontal

	TX mode / CH Mid				Measurement Distance at 3m		Horizontal polarity			
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	2440.91	102.86	30.04	2.34	39.77	0.00	95.47	Fundamental Frequency		P
	2440.91	87.95	30.04	2.34	39.77	0.00	80.56			A
	1627.02	63.87	27.47	2.12	39.87	0.85	54.44	75.47	-21.03	P
	1627.02	62.18	27.47	2.12	39.87	0.85	52.75	60.56	-7.81	A
*	4882.05	66.15	32.94	3.74	41.42	0.72	62.12	74.00	-11.88	P
*	4882.05	48.97	32.94	3.74	41.42	0.72	44.94	54.00	-9.06	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

Remark:
1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	BonSayON S102 Bone Conduction Bluetooth Sunglasses	Test Date	February 23, 2010
Model Name	S102	Test By	Eric. Yang
Test Mode	CH Mid TX / 8-DPSK	Temp & Humidity	27.5°C, 46%

Vertical

	TX mode / CH Mid				Measurement Distance at 3m		Horizontal polarity			
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	2440.89	102.73	30.04	2.34	39.77	0.00	95.34	Fundamental Frequency		P
	2440.89	87.54	30.04	2.34	39.77	0.00	80.15			A
	1626.99	61.89	27.47	2.12	39.87	0.85	52.46	75.34	-22.88	P
	1626.99	59.73	27.47	2.12	39.87	0.85	50.30	60.15	-9.85	A
*	4882.06	63.22	32.94	3.74	41.42	0.72	59.19	74.00	-14.81	P
*	4882.06	46.35	32.94	3.74	41.42	0.72	42.32	54.00	-11.68	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

Remark:
1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	BonSayON S102 Bone Conduction Bluetooth Sunglasses	Test Date	February 23, 2010
Model Name	S102	Test By	Eric. Yang
Test Mode	CH High TX / 8-DPSK	Temp & Humidity	27.5°C, 46%

Horizontal

	TX mode / CH High				Measurement Distance at 3m Horizontal polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	2479.89	102.65	30.01	2.34	39.74	0.00	95.27	Fundamental Frequency		P
	2479.89	87.33	30.01	2.34	39.74	0.00	79.95			A
	1653.65	64.35	27.67	2.14	39.89	0.87	55.13	75.27	-20.14	P
	1653.65	62.27	27.67	2.14	39.89	0.87	53.05	59.95	-6.90	A
*	4960.05	67.84	33.11	3.78	41.54	0.74	63.94	74.00	-10.06	P
*	4960.05	49.35	33.11	3.78	41.54	0.74	45.45	54.00	-8.55	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

Remark:
1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	BonSayON S102 Bone Conduction Bluetooth Sunglasses	Test Date	February 23, 2010
Model Name	S102	Test By	Eric. Yang
Test Mode	CH High TX / 8-DPSK	Temp & Humidity	27.5°C, 46%

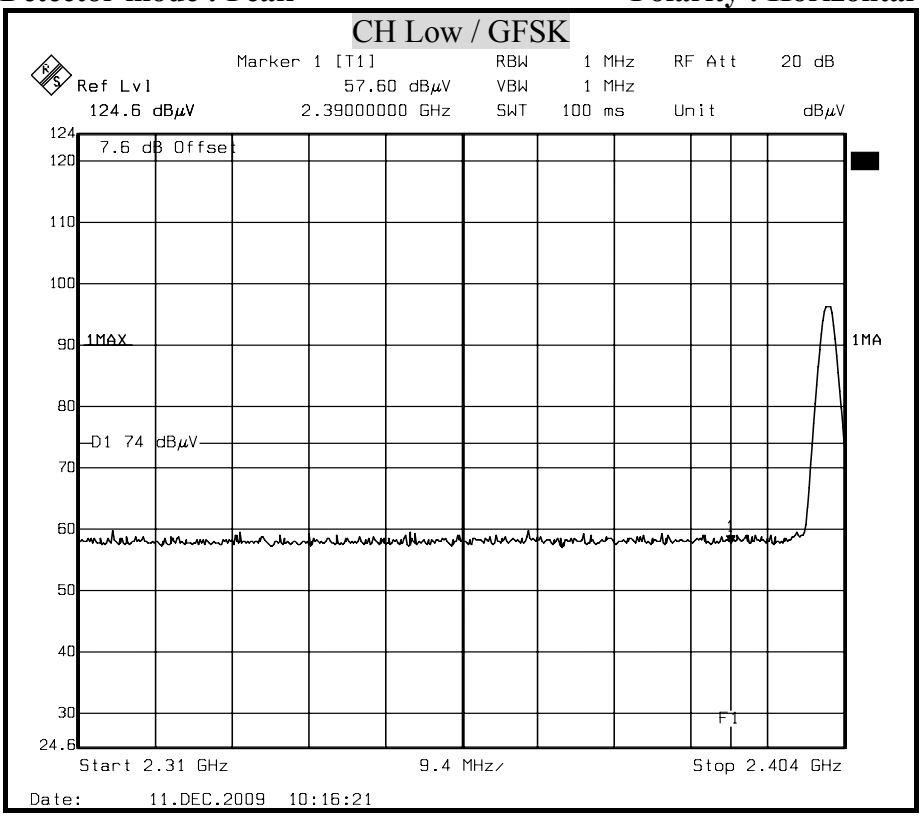
Vertical

	TX mode / CH High				Measurement Distance at 3m Horizontal polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	2479.83	102.72	30.01	2.34	39.74	0.00	95.34	Fundamental Frequency		P
	2479.83	86.97	30.01	2.34	39.74	0.00	79.59			A
	1653.41	61.85	27.67	2.14	39.89	0.87	52.63	75.34	-22.71	P
	1653.41	58.72	27.67	2.14	39.89	0.87	49.50	59.59	-10.09	A
*	4960.11	63.11	33.11	3.78	41.54	0.74	59.21	74.00	-14.79	P
*	4960.11	46.25	33.11	3.78	41.54	0.74	42.35	54.00	-11.65	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

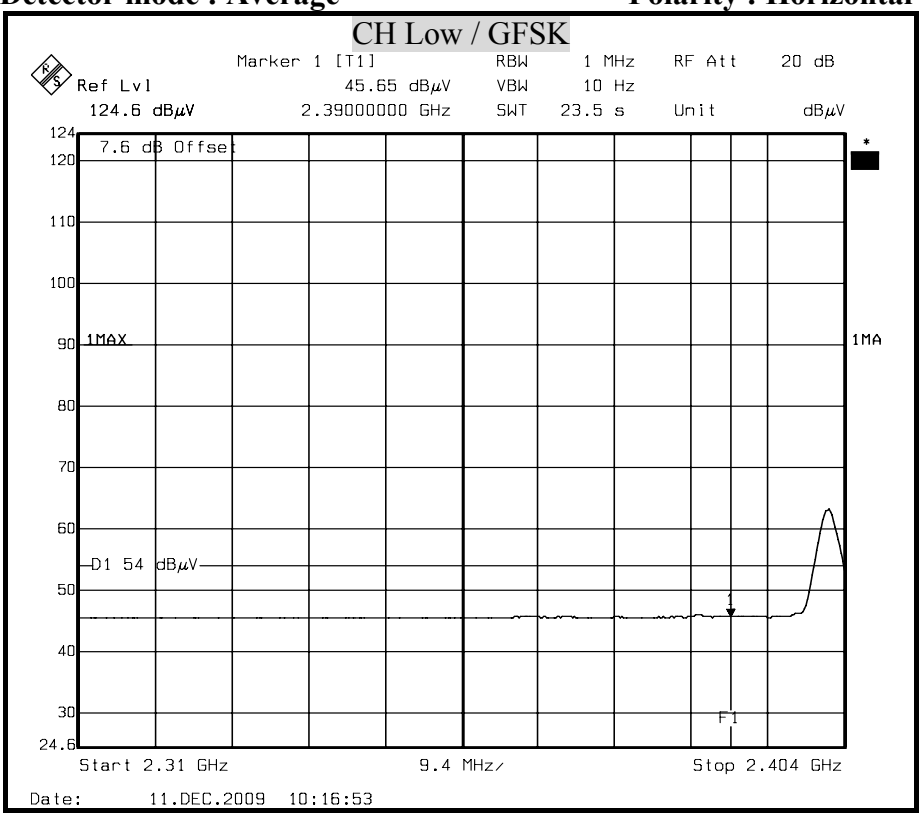
Remark:
1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

7.7.4 RESTRICTED BAND EDGES

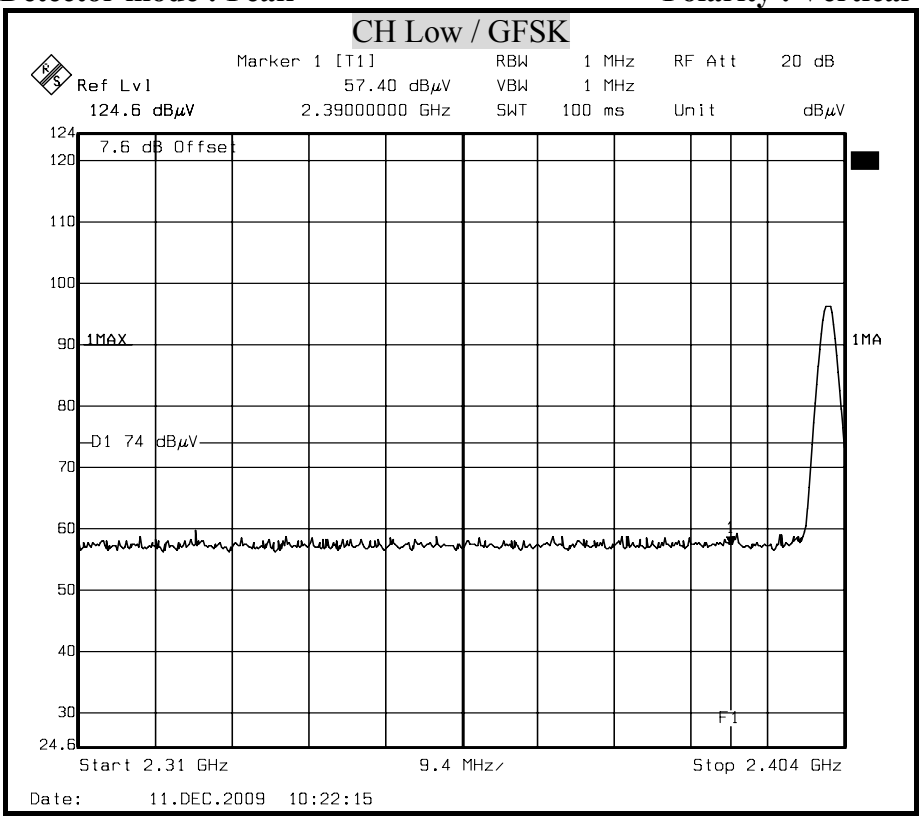
Detector mode : Peak **Polarity : Horizontal**



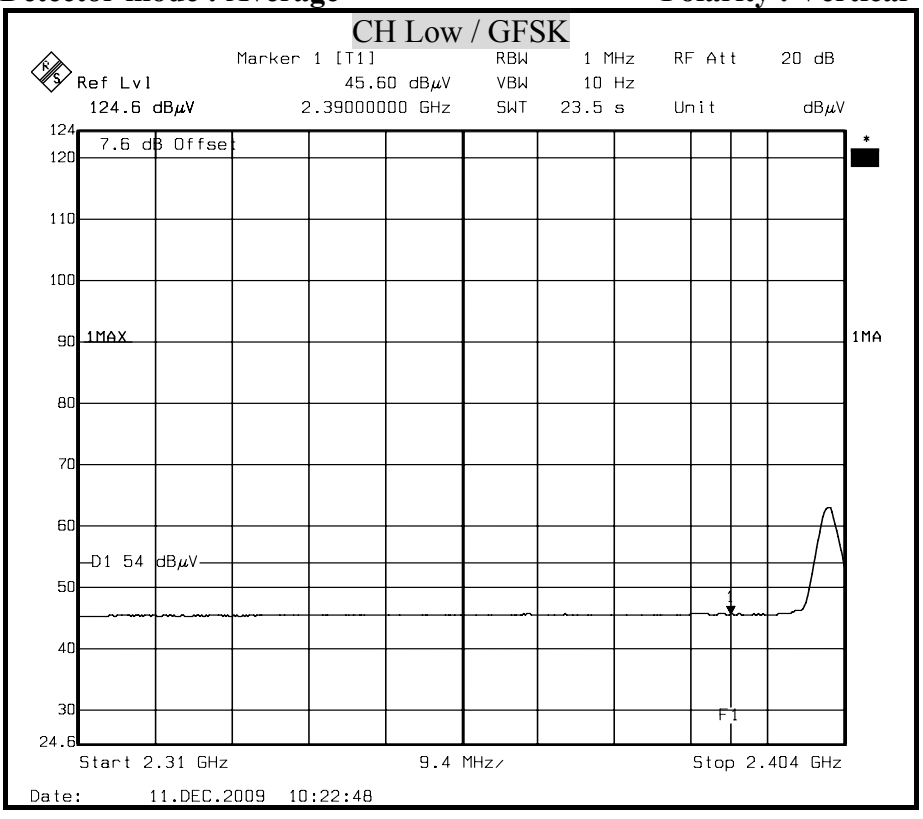
Detector mode : Average **Polarity : Horizontal**



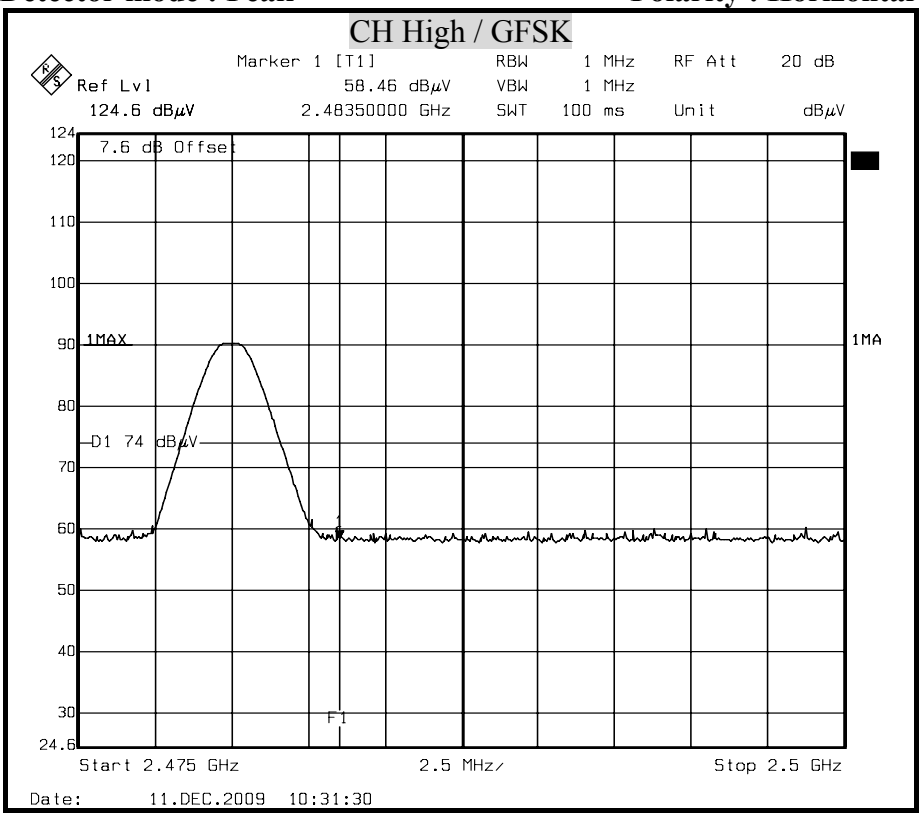
Detector mode : Peak **Polarity : Vertical**



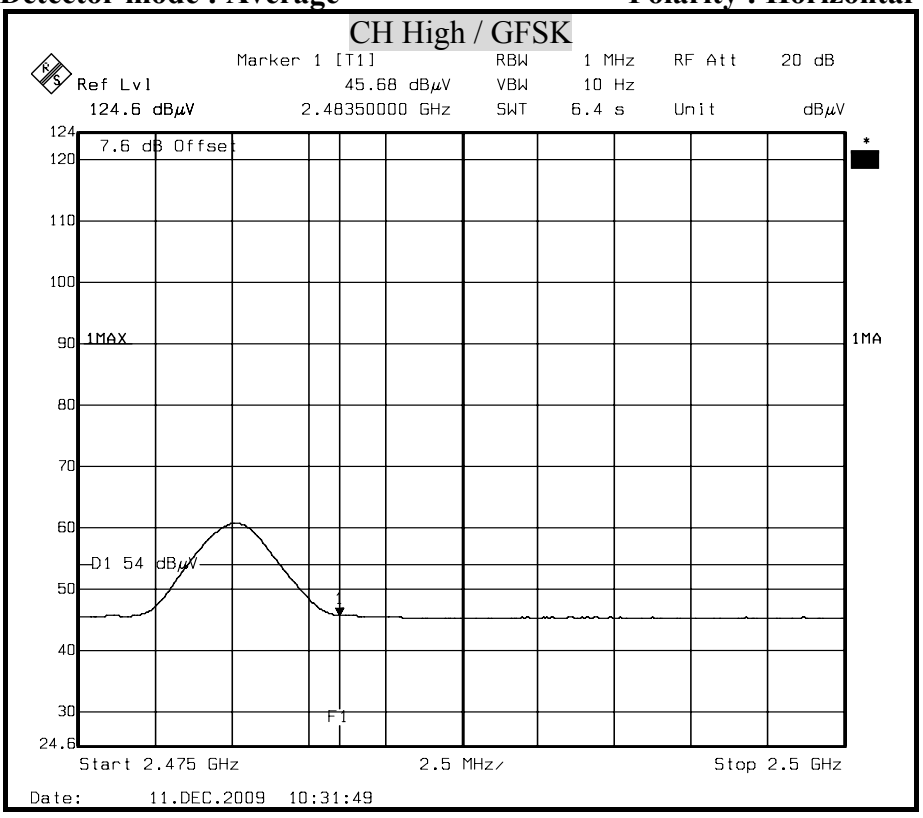
Detector mode : Average **Polarity : Vertical**



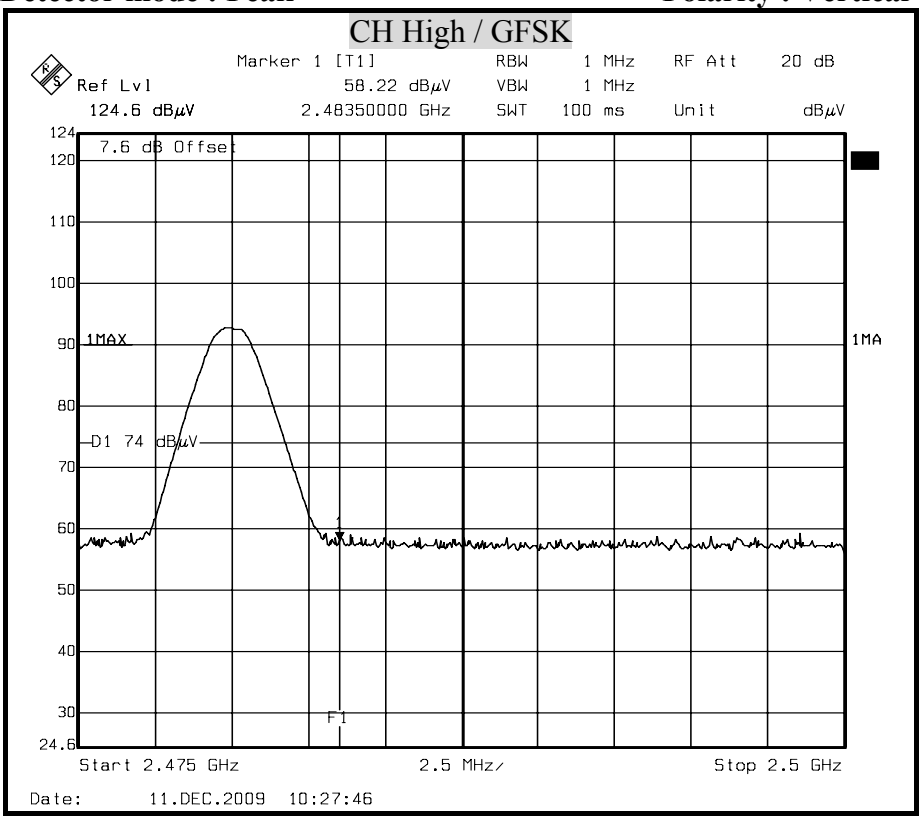
Detector mode : Peak **Polarity : Horizontal**



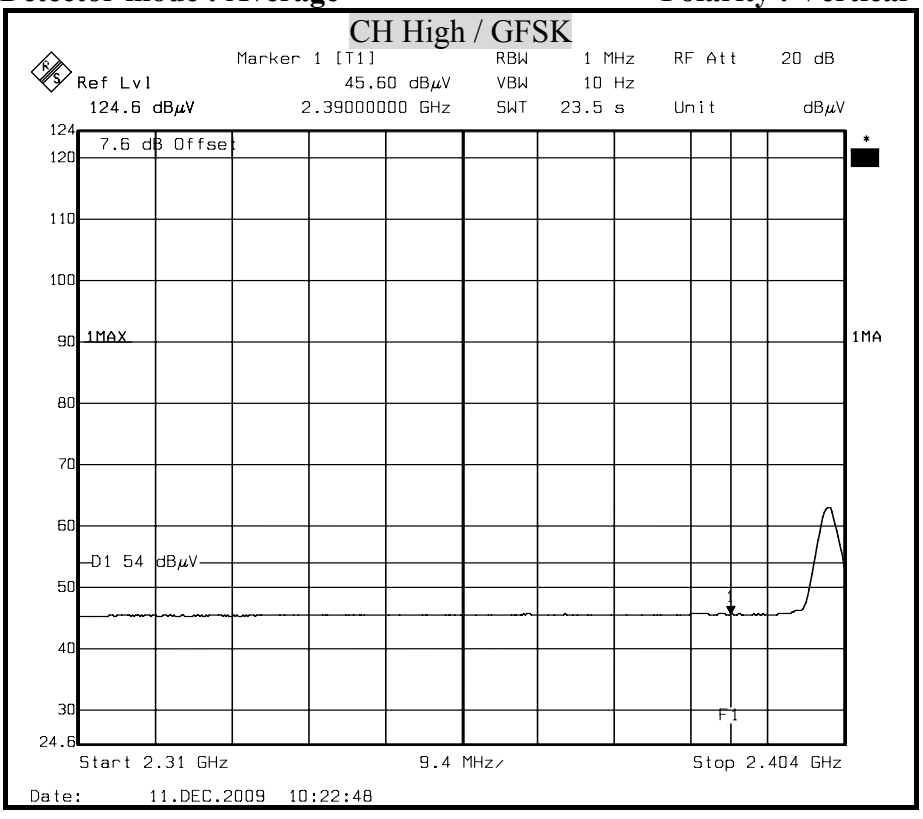
Detector mode : Average **Polarity : Horizontal**



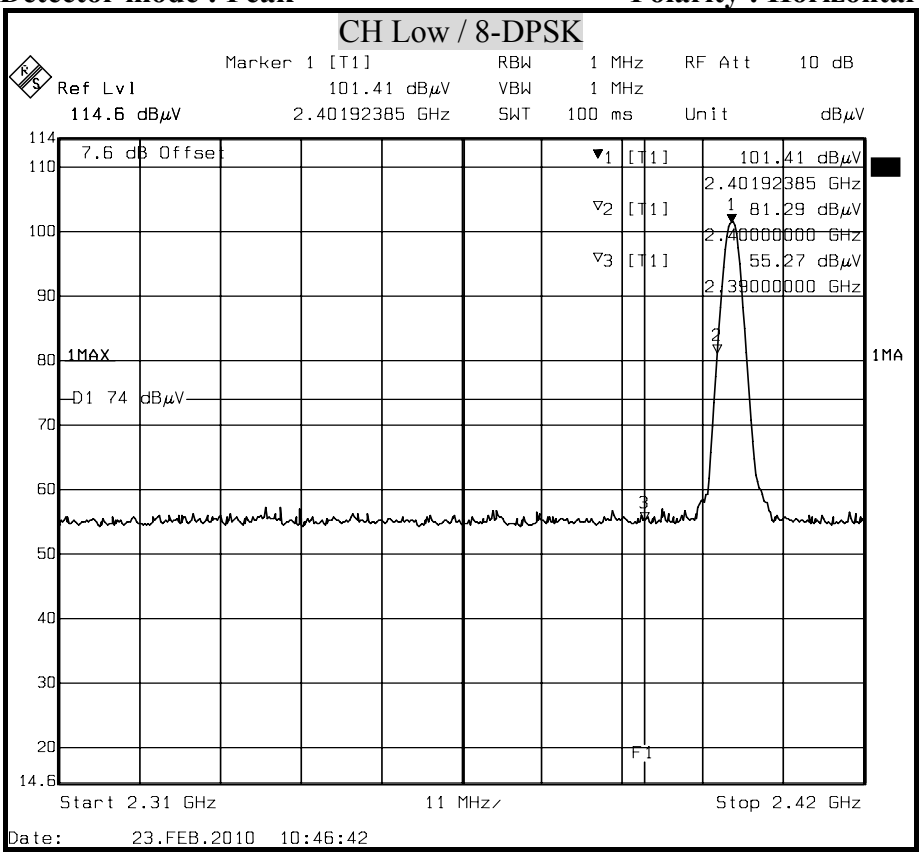
Detector mode : Peak **Polarity : Vertical**



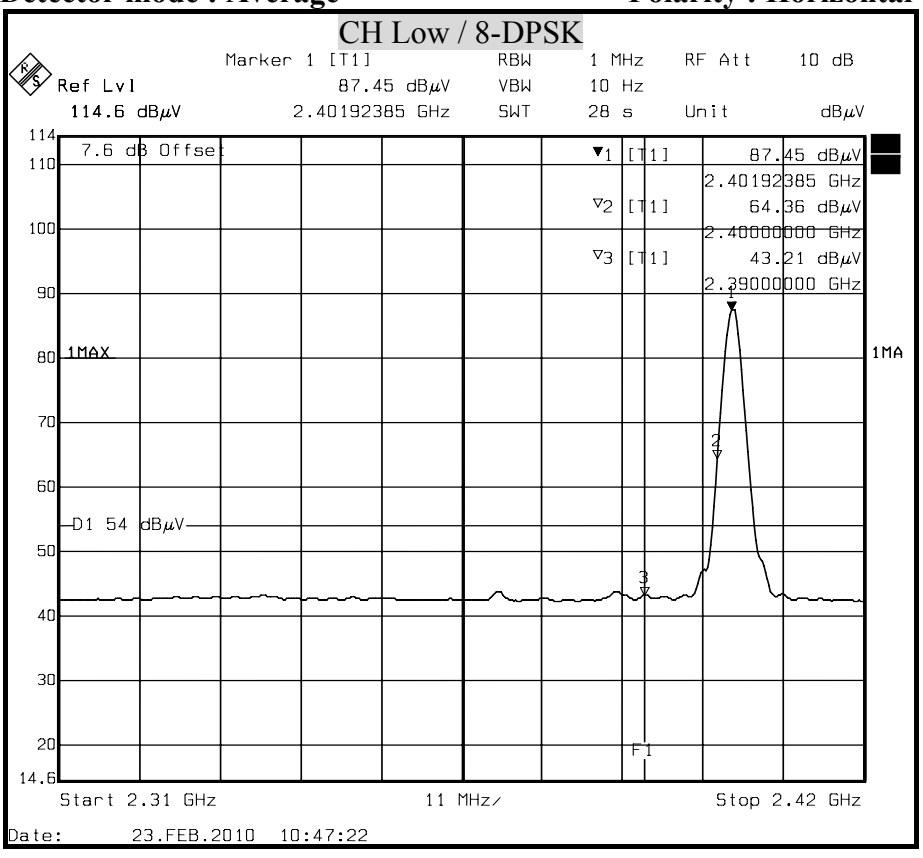
Detector mode : Average **Polarity : Vertical**



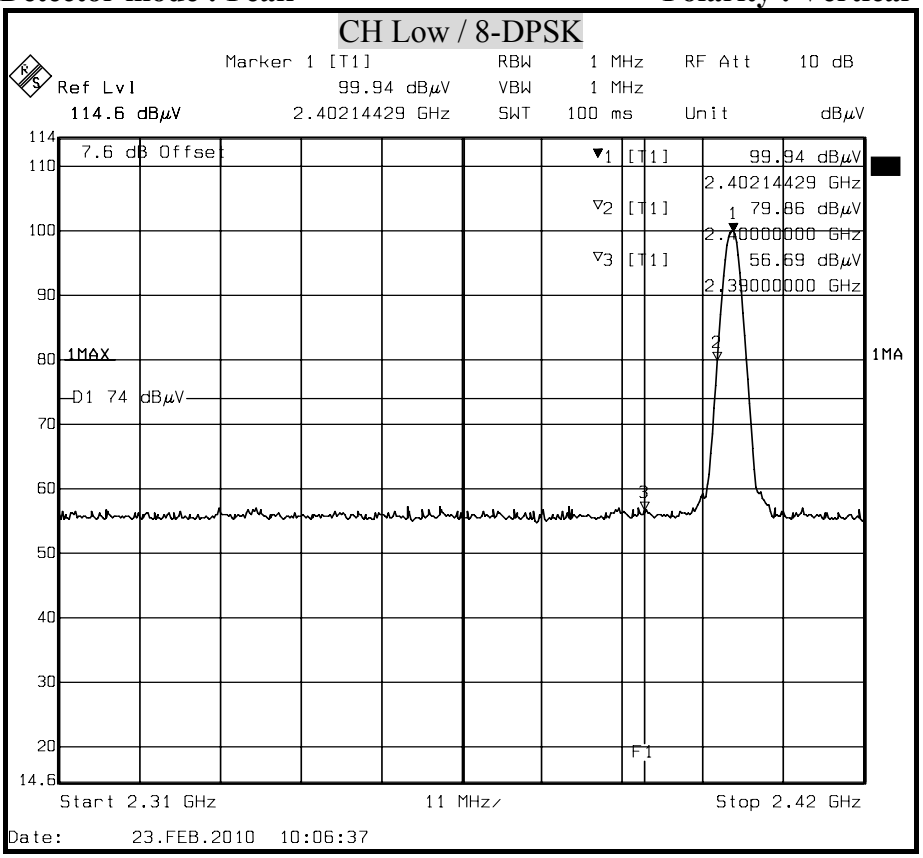
Detector mode : Peak **Polarity : Horizontal**



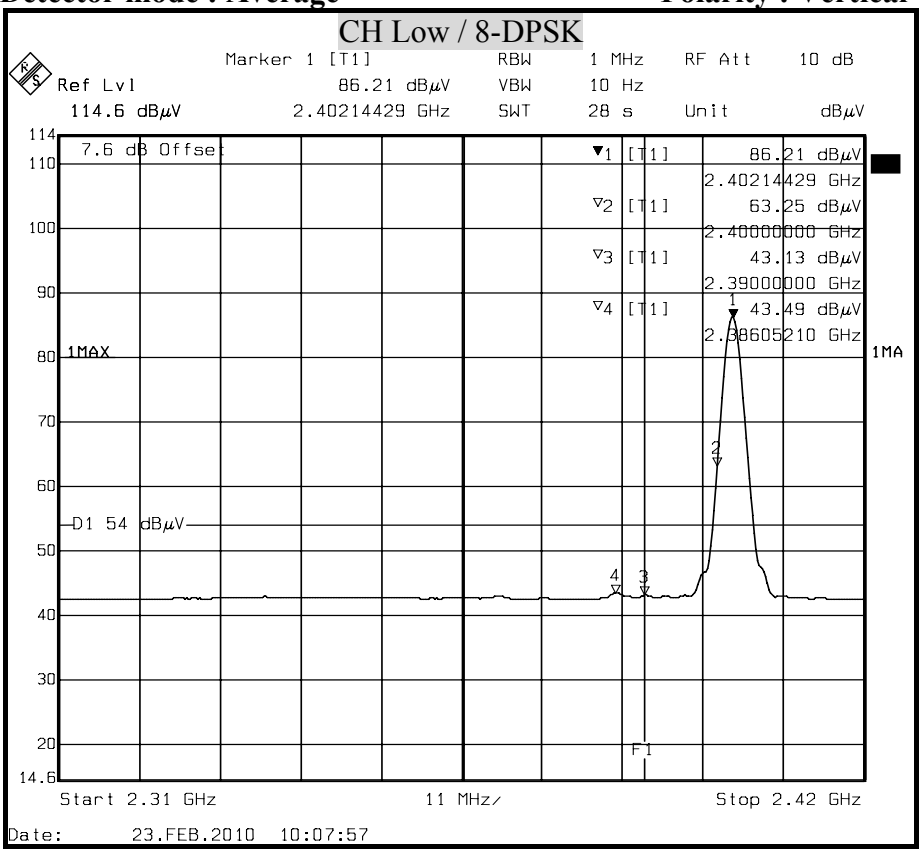
Detector mode : Average **Polarity : Horizontal**



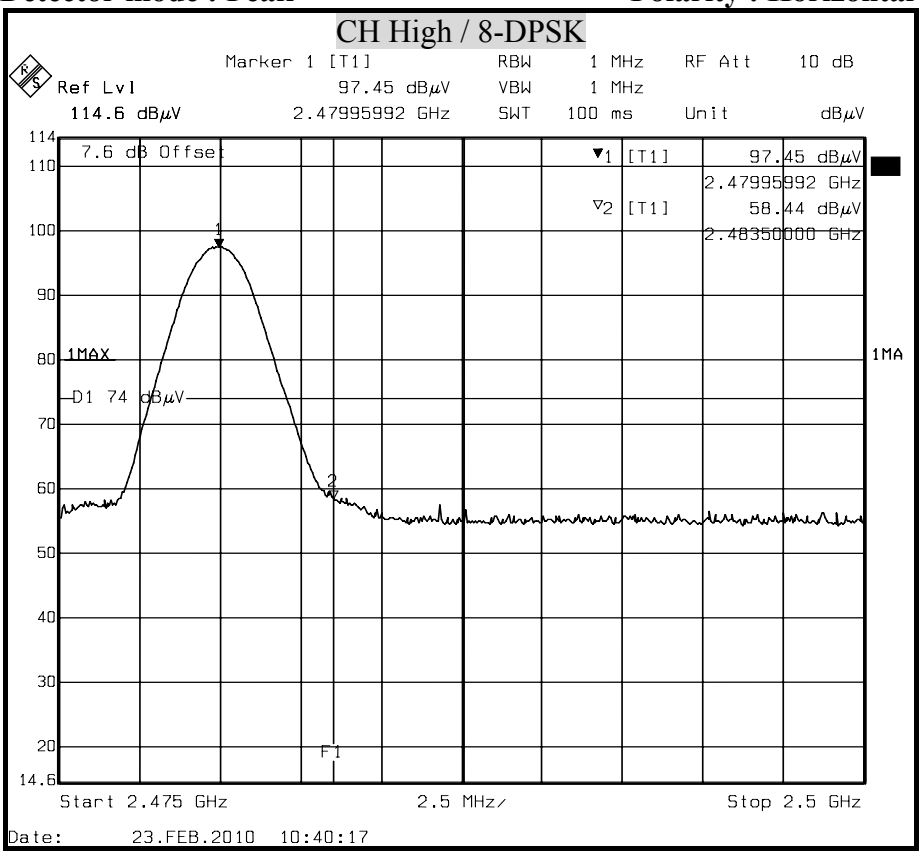
Detector mode : Peak **Polarity : Vertical**



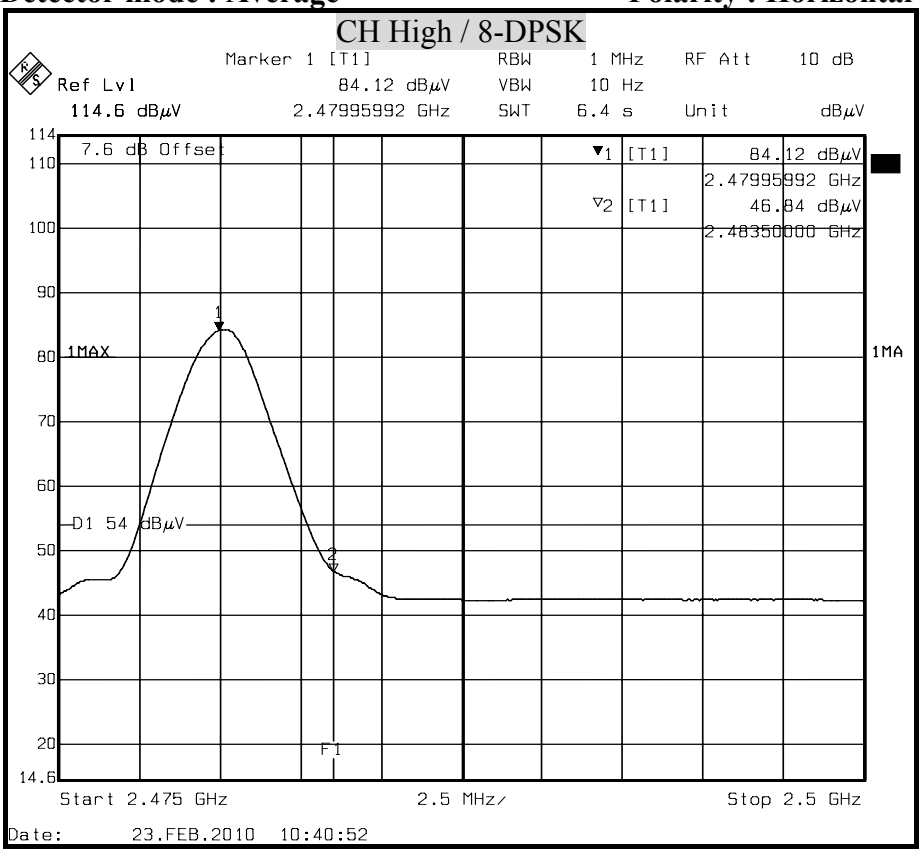
Detector mode : Average **Polarity : Vertical**



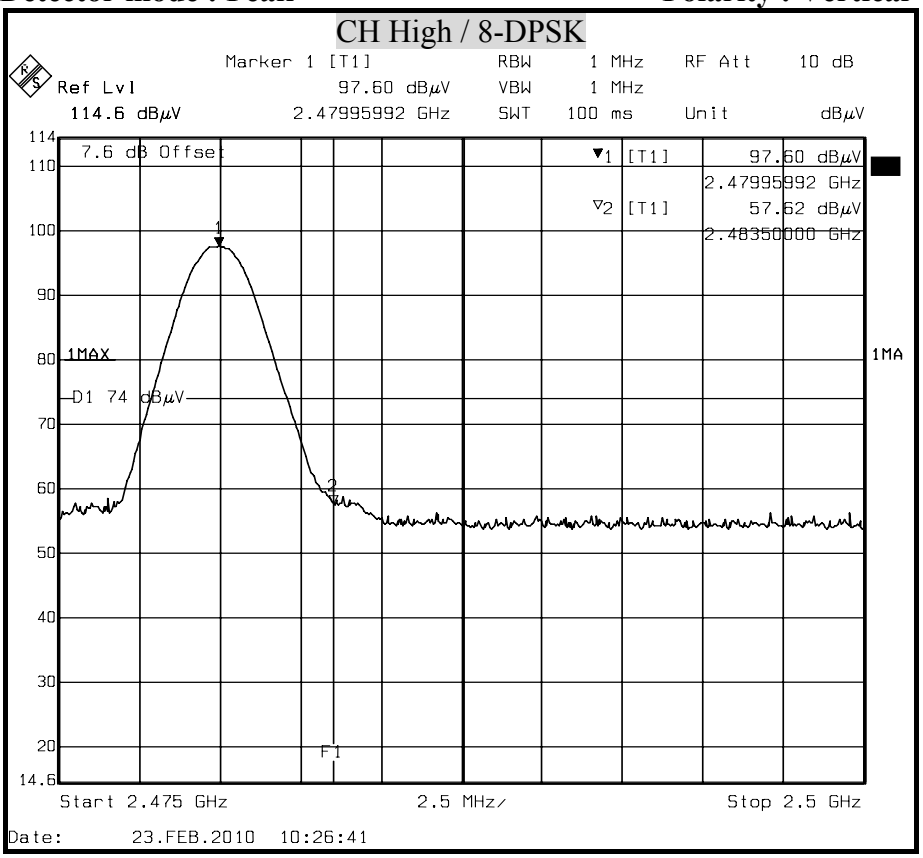
Detector mode : Peak **Polarity : Horizontal**



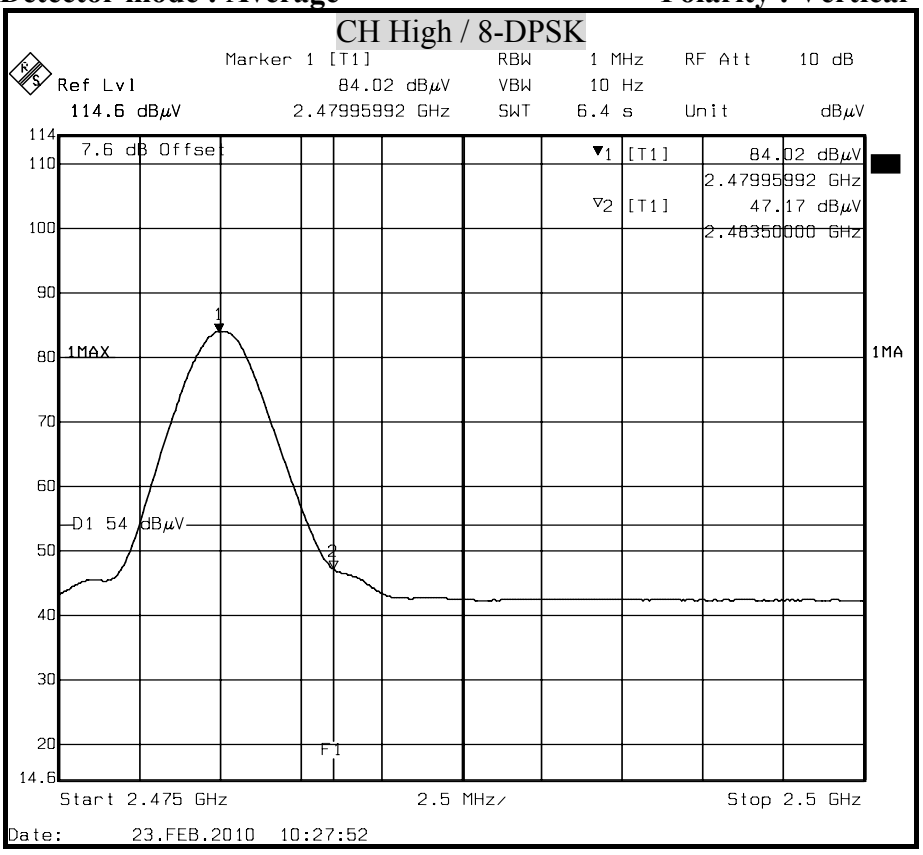
Detector mode : Average **Polarity : Horizontal**



Detector mode : Peak **Polarity : Vertical**



Detector mode : Average **Polarity : Vertical**



7.8 POWERLINE CONDUCTED EMISSIONS

LIMITS

§ 15.207 (a) Except as shown in paragraph (b) and (c) this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

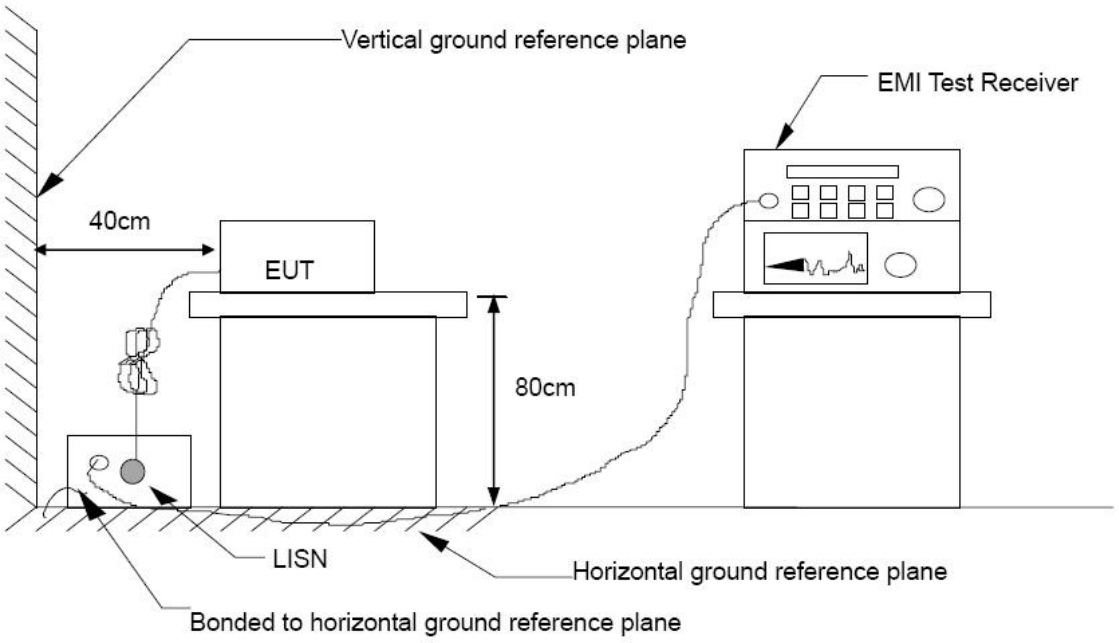
Frequency of Emission (MHz)	Conducted limit (dBμv)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.5 - 5	56	46
5 - 30	60	50

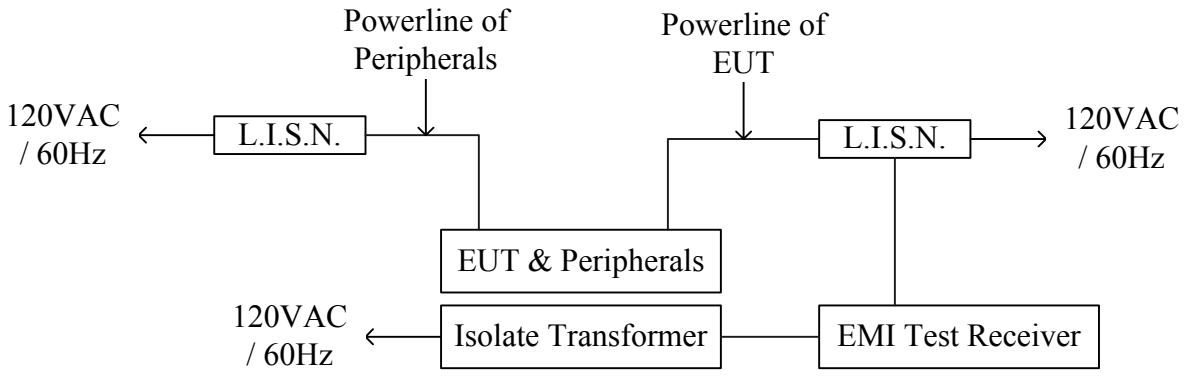
TEST EQUIPMENT

Conducted Emission room #1				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
L.I.S.N.	SCHWARZBECK	NNLK 8121	8121-446	NOV. 19, 2010 For Insertion loss
	Rohde & Schwarz	ESH 3-Z5	840062/021	NOV. 29, 2010
TEST RECEIVER	Rohde & Schwarz	ESCS 30	100348	JUL. 16, 2010
BNC COAXIAL CABLE	CCS	BNC50	11	AUG. 26, 2010
Test S/W	e-3 (5.04211c) R&S (2.27)			

Remark: Each piece of equipment is scheduled for calibration once a year.

TEST SETUP





TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80cm above the horizontal ground plane. The EUT IS CONFIGURED IN ACCORDANCE WITH ANSI C63.4 : 2003.

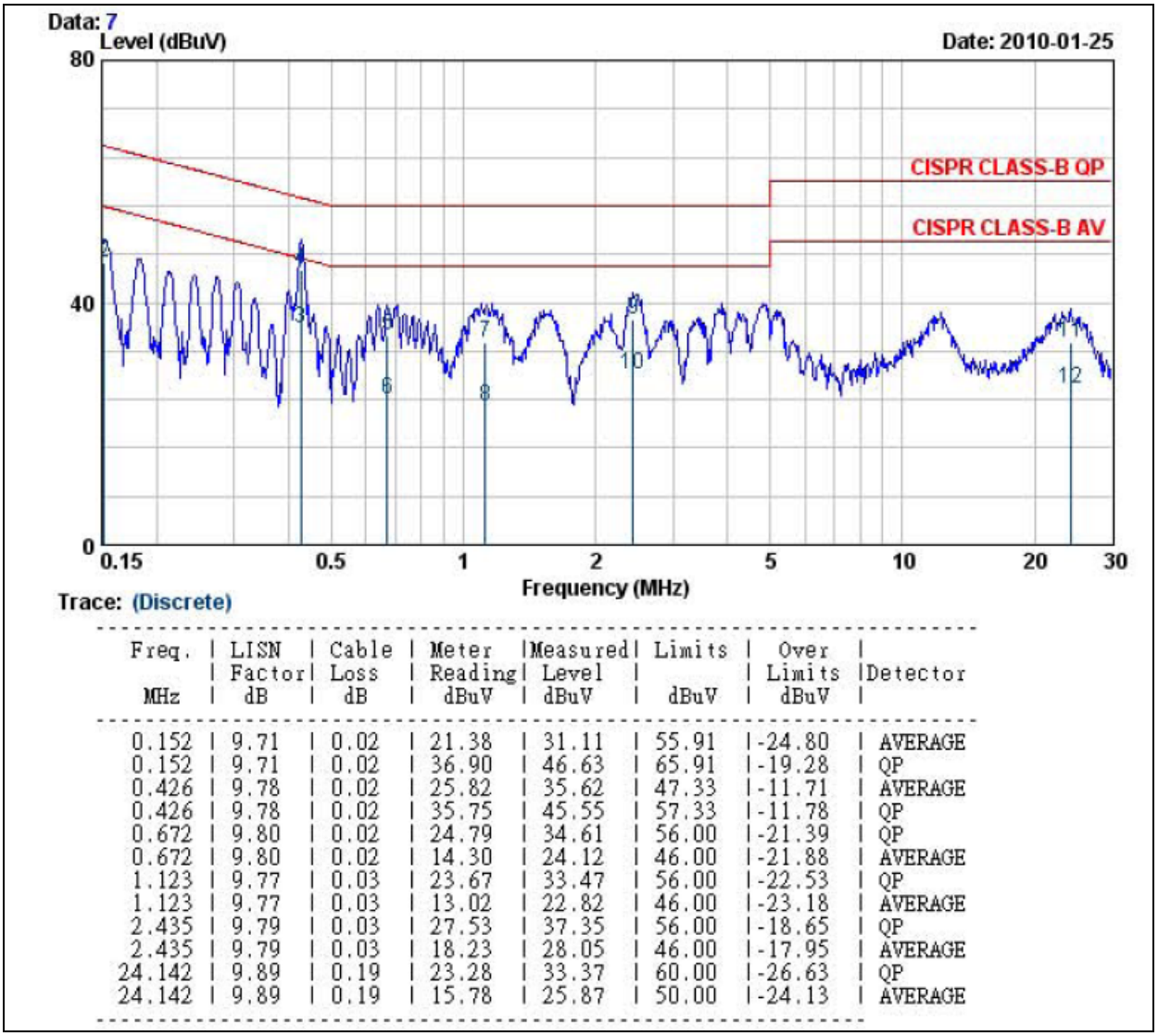
The resolution bandwidth is set to 9 kHz for both quasi-peak detection and average detection measurements.

Line conducted data is recorded for both NEUTRAL and LINE.

TEST RESULTS

Product Name	BonSayON S102 Bone Conduction Bluetooth Sunglasses	Test Date	January 25, 2010
Model Name	S102	Test By	Mick. Sue
Test Mode	Normal Operation	Temp & Humidity	24.4°C, 59%

LINE



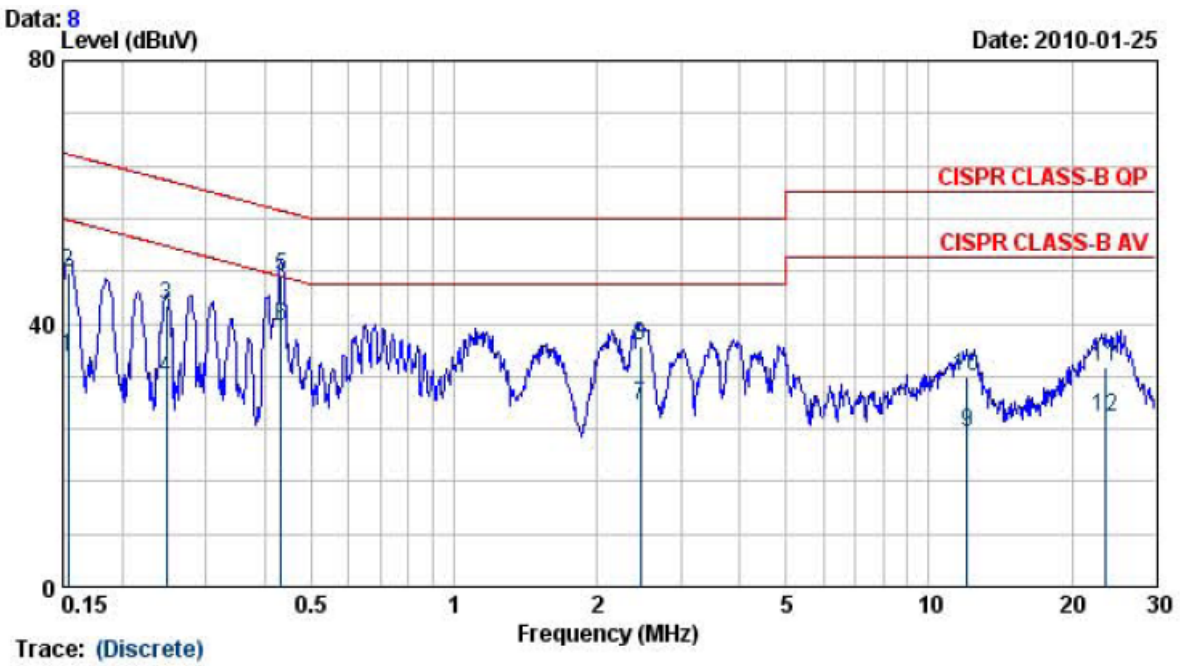
Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.152	9.71	0.02	21.38	31.11	55.91	-24.80	AVERAGE
0.152	9.71	0.02	36.90	46.63	65.91	-19.28	QP
0.426	9.78	0.02	25.82	35.62	47.33	-11.71	AVERAGE
0.426	9.78	0.02	35.75	45.55	57.33	-11.78	QP
0.672	9.80	0.02	24.79	34.61	56.00	-21.39	QP
0.672	9.80	0.02	14.30	24.12	46.00	-21.88	AVERAGE
1.123	9.77	0.03	23.67	33.47	56.00	-22.53	QP
1.123	9.77	0.03	13.02	22.82	46.00	-23.18	AVERAGE
2.435	9.79	0.03	27.53	37.35	56.00	-18.65	QP
2.435	9.79	0.03	18.23	28.05	46.00	-17.95	AVERAGE
24.142	9.89	0.19	23.28	33.37	60.00	-26.63	QP
24.142	9.89	0.19	15.78	25.87	50.00	-24.13	AVERAGE

Remark:

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value

Product Name	BonSayON S102 Bone Conduction Bluetooth Sunglasses	Test Date	January 25, 2010
Model Name	S102	Test By	Mick. Sue
Test Mode	Normal Operation	Temp & Humidity	24.4°C, 59%

NEUTRAL



Trace: (Discrete)

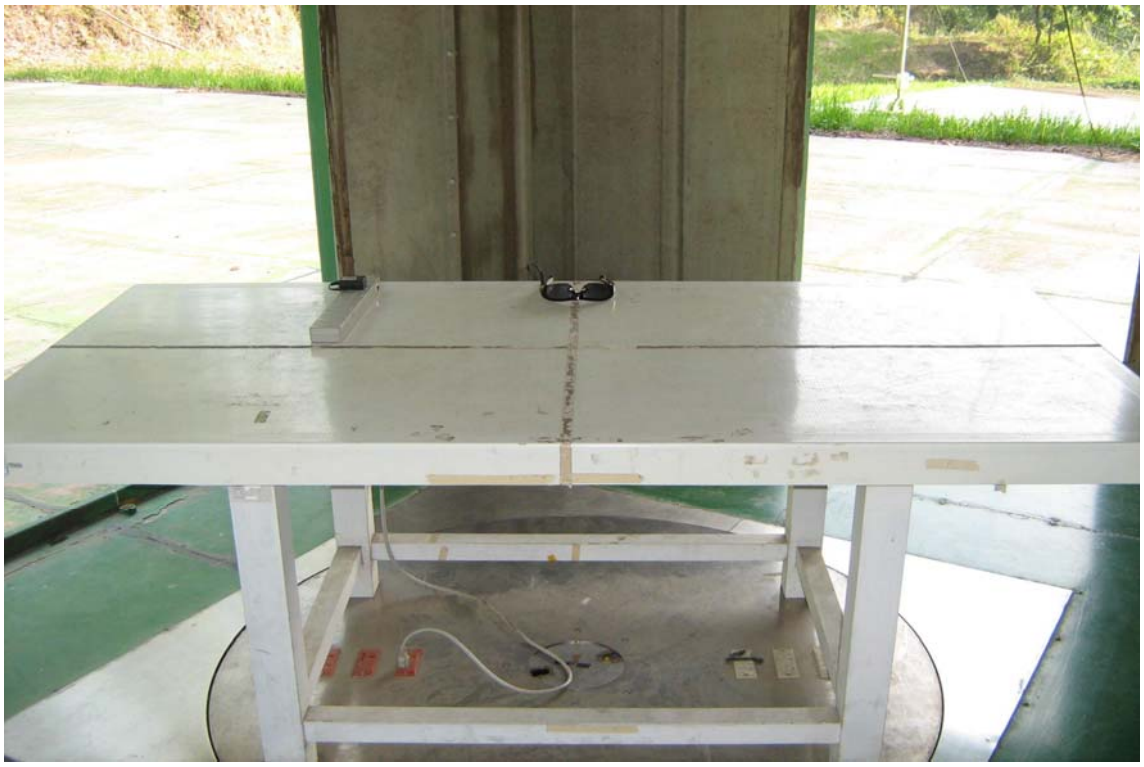
Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.154	9.71	0.02	25.04	34.77	55.78	-21.01	AVERAGE
0.154	9.71	0.02	38.08	47.81	65.78	-17.97	QP
0.248	9.77	0.02	33.12	42.91	61.82	-18.91	QP
0.248	9.77	0.02	21.77	31.56	51.82	-20.26	AVERAGE
0.433	9.78	0.02	37.35	47.15	57.20	-10.05	QP
0.433	9.78	0.02	29.90	39.70	47.20	-7.50	AVERAGE
2.474	9.80	0.03	17.78	27.61	46.00	-18.39	AVERAGE
2.474	9.80	0.03	26.66	36.49	56.00	-19.51	QP
12.060	9.83	0.13	13.34	23.30	50.00	-26.70	AVERAGE
12.060	9.83	0.13	21.86	31.82	60.00	-28.18	QP
23.511	9.89	0.19	23.34	33.42	60.00	-26.58	QP
23.511	9.89	0.19	15.76	25.84	50.00	-24.16	AVERAGE

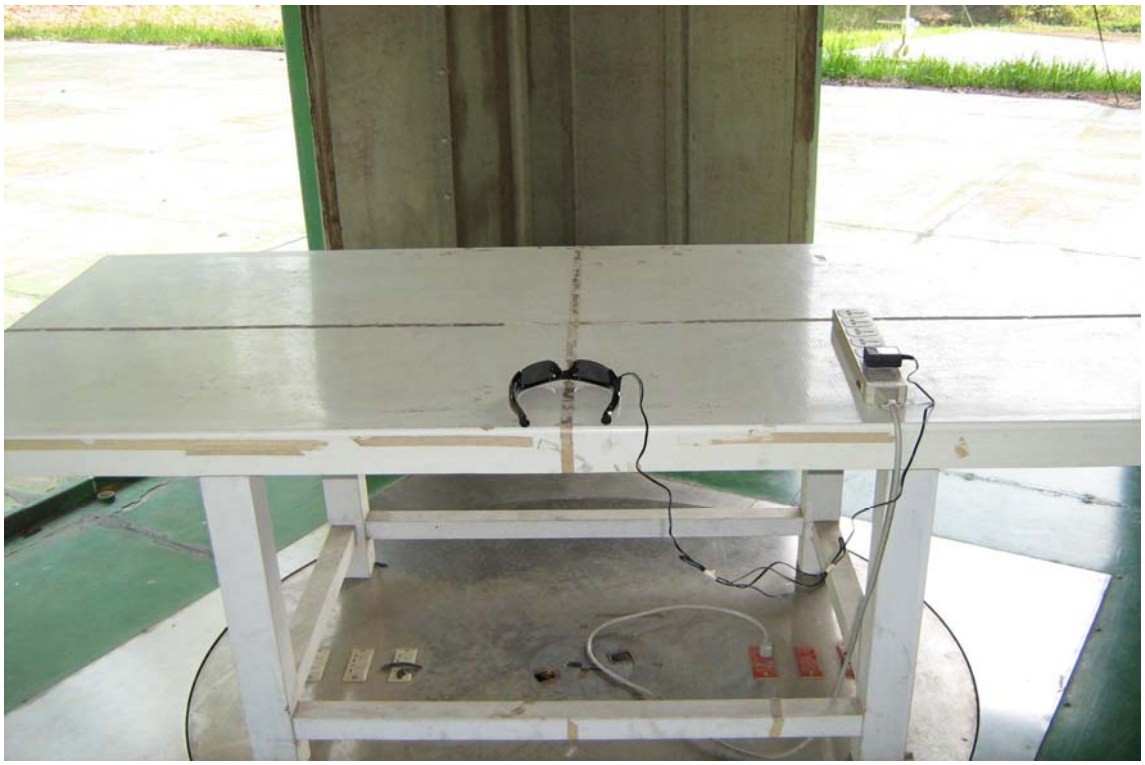
Remark:

1. *Correction Factor = Insertion loss + cable loss*
2. *Margin value = Emission level – Limit value*

8. APPENDIX SETUP PHOTOS

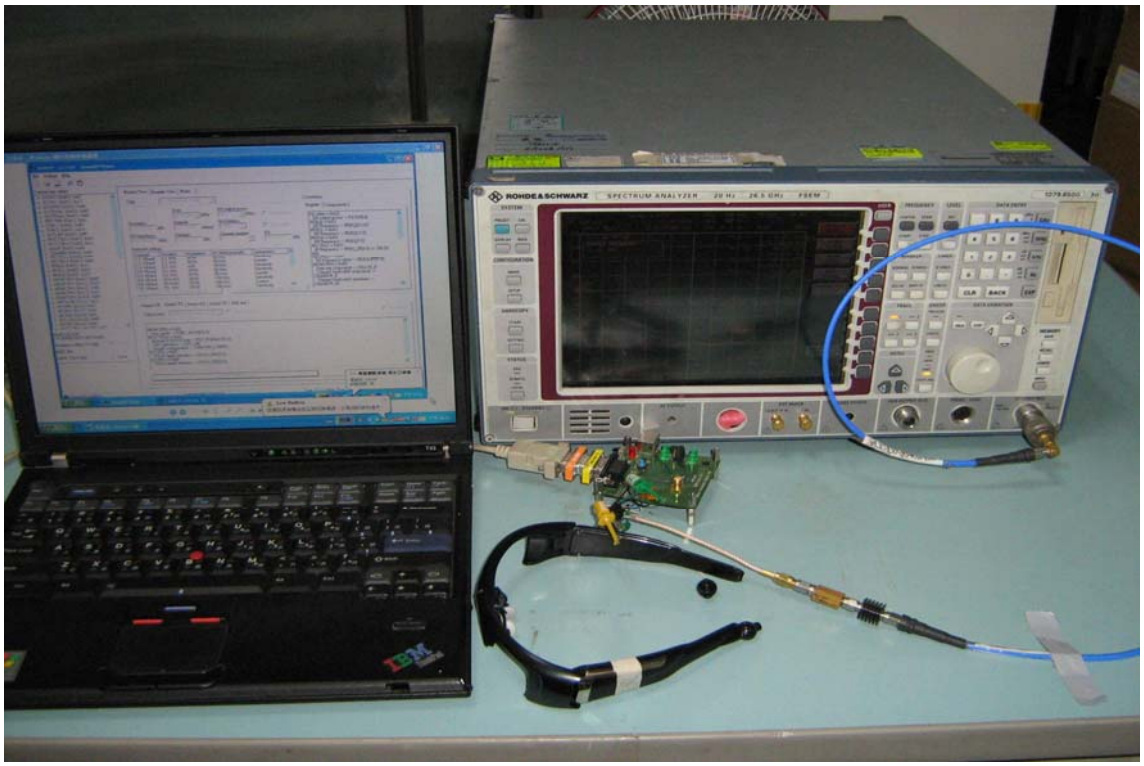
RADIATED MEASUREMENT SETUP





RADIATED RF MEASUREMENT SETUP

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

END OF REPORT