SGS-CSTC Standards Technical Services Ltd.

No. 1 Workshop, M-10, Middle Section, Science & Technology Park,
District Shenzhen, China 518057

Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: sgs_internet_operations@sgs.com

TEST REPORT

Application No:	SZEMO090301032RF
Applicant/ Manufacturer/ Factory:	SKYPINE ELECTRONICS (SHEN ZHEN) CO., LTD.
FCC ID:	V8VSN6805AC
Operation Frequency :	2.402GHz to 2.480GHz
Equipment Under Test (EUT):	
Name:	Car Multimedia System
Model:	Please refer to section 2 of this report which indicates all items and amplifies which item was actually tested and which were electrically identical.♣
Standards:	FCC PART 15 Subpart C ANSI C63.4 2003
Date of Receipt:	17 March 2009
Date of Test:	17 to 31 March 2009
Date of Issue:	01 April 2009

Test Result :	**PASS ***

* In the configuration tested, the EUT detailed in this report complied with the standards specified above. Please refer to section 2 of this report for further detail.

Authorized Signature:

Jack Zhang
Technical Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

2 Test Summary

Test	Test Requirement	Standard Paragraph	Result
Antenna Requirement	FCC PART 15	Section 15.247 (c)	PASS
AC power line conducted emissions	FCC PART 15	Section 15.207	NA
Occupied Bandwidth	FCC PART 15	Section 15.247 (a1)	PASS
Carrier Frequencies Separated	FCC PART 15	Section 15.247(a)(1)	PASS
Hopping Channel Number	FCC PART 15	Section 15.247(a)(1)(iii)	PASS
Dwell Time	FCC PART 15	Section 15.247(a)(1)(iii)	PASS
Pseudorandom Frequency Hopping Sequence	FCC PART 15	Section 15.247(a)(1)	PASS
Maximum Peak Output Power	FCC PART 15	Section 15.247(b)(1)	PASS
RF Exposure Compliance Requirement	FCC PART 15	15.247(b)(4)& TCB Exclusion List (7 July 2002)	PASS
Radiated Emission	FCC PART 15	Section 15.209，15.247(d)&15.205	PASS

Remark:

1. Item No.: SN-6805-AC (Advent: TOCLS-OE100), SN-6803-AC (Advent: TOCMR-OE100), SN-6805-AJ-AC (Advent: TOCLJ-OE100), SN-6104-ACM, SN-6211-ACM SB-6600-BS, CNE-8217, SN-6805M, SN-6803M, SN-6603M, SN-6900M, SN-6605-AC, SN-6102, SN-6103, SN-6105, SN-6210, SN-6212, SN-6300, SN-6601, SN-6800, SN-6910

Only the Item SN-6805-AC (Advent: TOCLS-OE100) was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above items.

2. NA: The EUT power supply is DC 12V, AC power line conducted emissions don't comply.

3 Contents

4 General Information

4.1 Client Information

Applicant:	SKYPINE ELECTRONICS (SHEN ZHEN) CO., LTD.
Address of Applicant:	A1 Building, No.6 Xinxing Industrial Park, Xinhe Villige, Fuyong Town, Baoan District, Shenzhen City, Guangdong, P.R.China

4.2 General Description of the E.U.T

Product Name:	Car Multimedia System
Model:	SN-6805-AC (Advent: TOCLS-OE100), SN-6803-AC (Advent: TOCMR-OE100), SN-6805-AJ-AC (Advent: TOCLJ-OE100), SN-6104-ACM, SN-6211-ACM SB-6600-BS, CNE-8217, SN-6805M, SN-6803M, SN-6603M, SN-6900M, SN-6605-AC, SN-6102, SN-6103, SN-6105, SN-6210, SN-6212, SN-6300, SN-6601, SN-6800, SN-6910
Operation Frequency:	2402MHz~2480MHz
Number of Channels	79 Channels
Channel Separation	1 MHz
Operation mode:	FHSS (Frequency Hopping Spread Spectrum); Adaptive Frequency Hopping (AFH) is used.
Type of Modulation	GFSK, Pi/4QPSK, 8DPSK
Dwell time	Per channel is less than 0.4s.
Antenna Type	Integral
Antenna Gain	0dBi
Power Supply:	DC 12V

4.3 Description of Support Units

The EUT was tested independently

4.4 Standards Applicable for Testing

The customer requested FCC tests for the EUT.

The standard used was FCC PART 15 Subpart C: 2008. ANSI C63.4:2003.and DA 00-705.

4.5 Test Location

All tests were performed at:

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, District Shenzhen, China 518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.6 Other Information Requested by the Customer

None.

4.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP – Lab Code: 200611-0**

  SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

- **FCC – Registration No.: 282399**

  SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399. May 31. 2002. With the above and NVLAP's accreditation. SGS-CSTC is an authorized test laboratory for the DoC process.

5 Equipments Used during Test

RE in Chamber						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (dd-mm-yy)**	**Cal.Due date (dd-mm-yy)**
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	16-06-2007	15-06-2009
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	12-12-2008	11-12-2009
3	EMI Test software	AUDIX	E3	SEL0050	N/A	N/A
4	Coaxial cable	SGS	N/A	SEL0028	18-06-2008	17-06-2009
5	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0014	12-08-2008	11-08-2009
6	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	18-06-2008	17-06-2009
7	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0005	12-08-2008	11-08-2009
8	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	12-08-2008	11-08-2009
9	Pre-amplifier (1-18GHz)	Rohde & Schwarz	AFS42-00101 800-25-S-42	SEL0081	18-06-2008	17-06-2009
10	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002650-30-8P-44	SEL0080	18-06-2008	17-06-2009
11	Band filter	Amindeon	82346	SEL0094	18-06-2008	17-06-2009
12	Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	15-06-2008	14-06-2009

6 Test Results

6.1 E.U.T. test conditions

Operating Environment:

Temperature: 24.0 °C

Humidity: 50 % RH

Atmospheric Pressure: 1010 mbar

Test frequencies: According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and. if required. reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top. 1 near middle and 1 near bottom

Test frequency is the lowest channel: 0 channel(2402MHz), middle channel: 38 channel(2441MHz) and highest channel: 78 channel(2480MHz)

6.2 Antenna Requirement

6.2.1 Standard requirement

15.203 requirement:
For intentional device, according to 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.
15.247(c) (1)(i) requirement:
(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

6.2.2 EUT Antenna

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.

Test result: The unit does meet the FCC requirements.

6.3 Occupied Bandwidth

Test Requirement: FCC 15.247(a)

Test Method: ANSI C63.4 2003& DA 00-705

Test Status: Test in fixing operating frequency at lowest, Middle, highest channel.

Test Procedure:

The Transmitter output of EUT was connected to the spectrum analyzer. The 20 dB bandwidth of the fundamental frequency was measured. The setting of spectrum analyzer is as follows;

Equipment Mode	Spectrum Analyzer
Detector Function	Peak Mode
RBW	30KHz
VBW	100KHz

Test result:

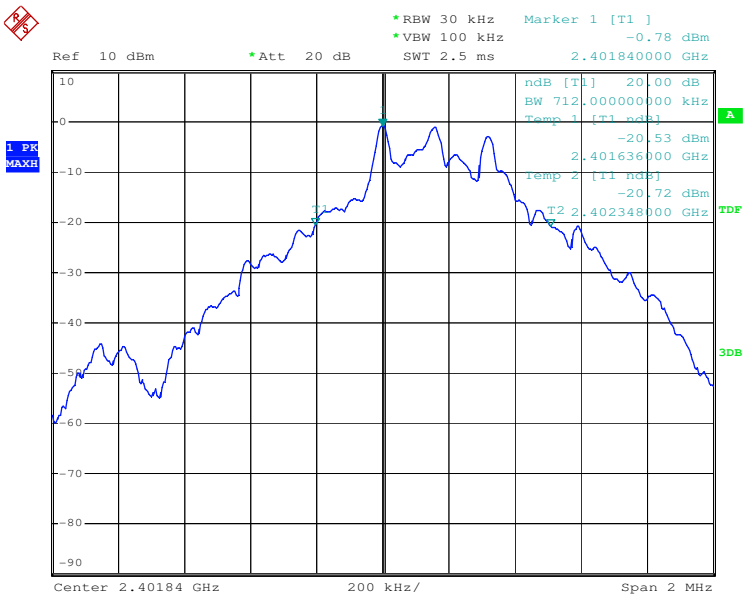
20dB Bandwidth:

GFSK mode		
Lowest Frequency 2.402GHz	**Middle Frequency** 2.441GHz	**Highest Frequency** 2.480GHz
712 KHz	708 KHz	720 KHz
PI/4QPSK mode		
Lowest Frequency 2.402GHz	**Middle Frequency** 2.441GHz	**Highest Frequency** 2.480GHz
1148 KHz	1144 KHz	1148 KHz
8DPSK mode		
Lowest Frequency 2.402GHz	**Middle Frequency** 2.441GHz	**Highest Frequency** 2.480GHz
1116 KHz	1112 KHz	1132KHz

Result plot as follows:

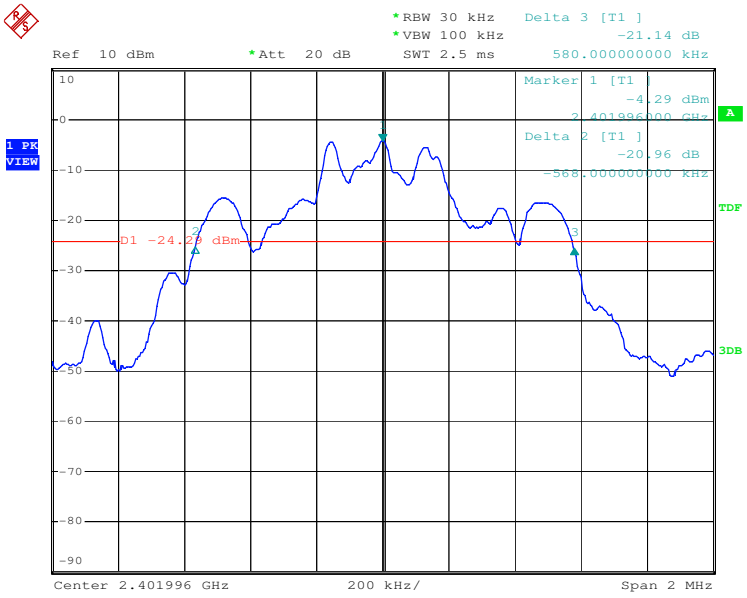
1. Lowest Channel:

GFSK mode:



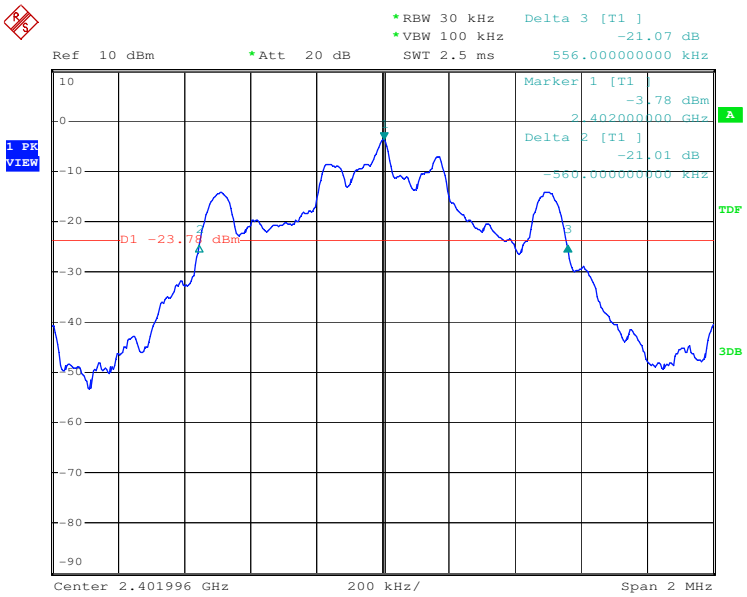
Date: 26.MAR.2009 13:01:00

PI/4QPSK mode:



Date: 26.MAR.2009 14:38:05

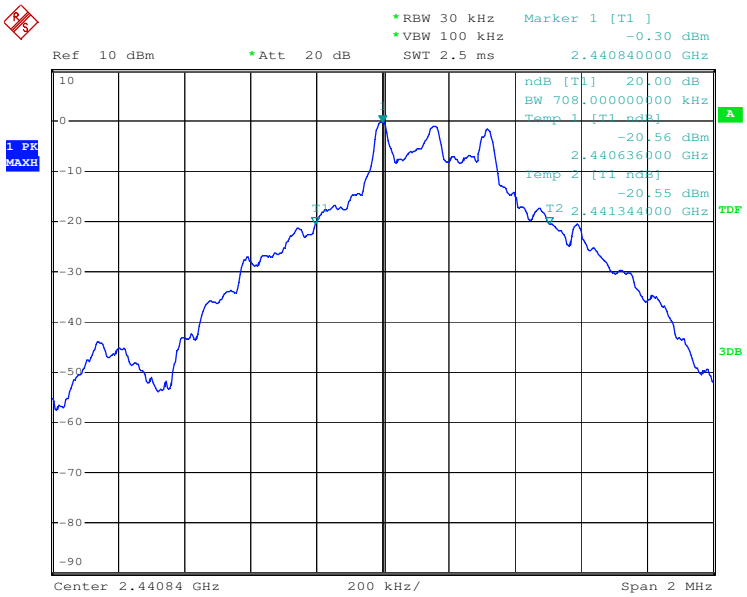
8DPSK mode:



Date: 27.MAR.2009 11:22:53

2. Middle Channel:

GFSK mode:



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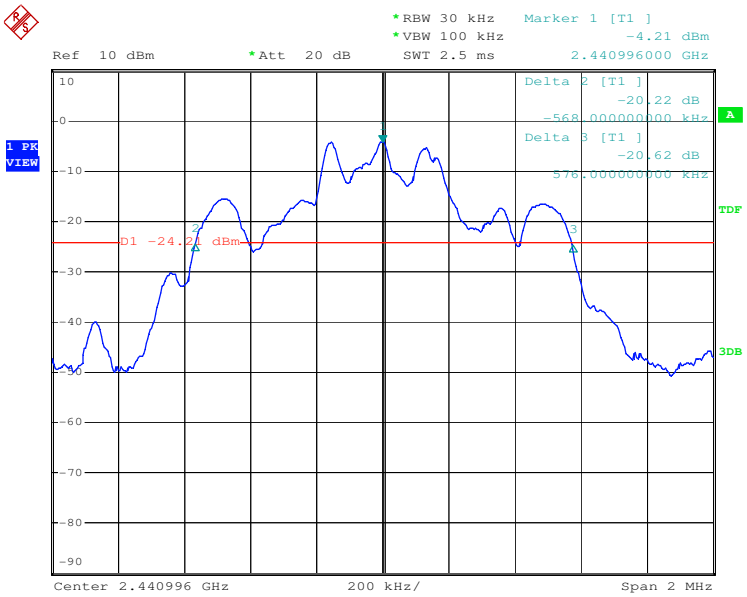
PI/4QPSK mode:



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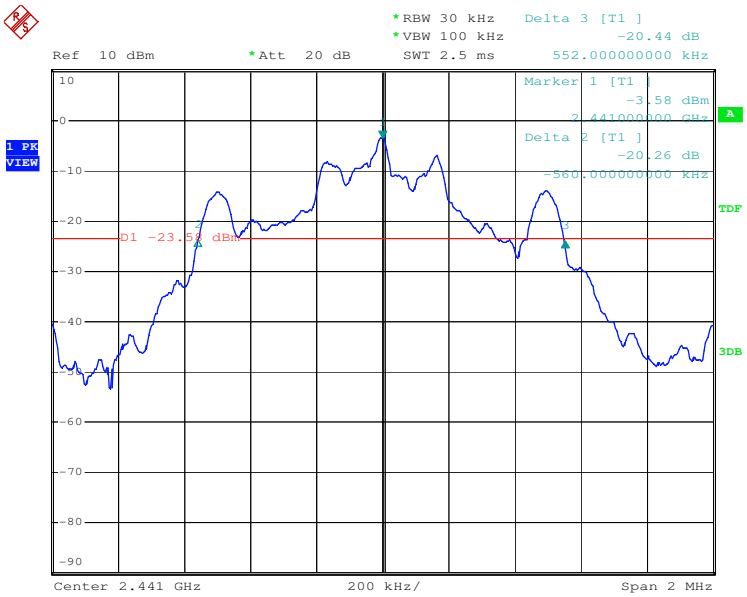
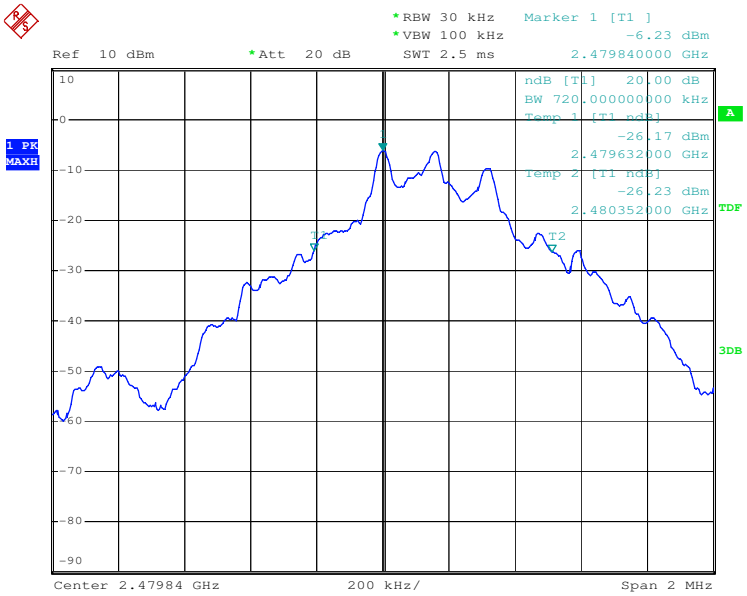
8DPSK mode:



Date: 27.MAR.2009 12:47:43

3. Highest Channel：

GFSK mode:



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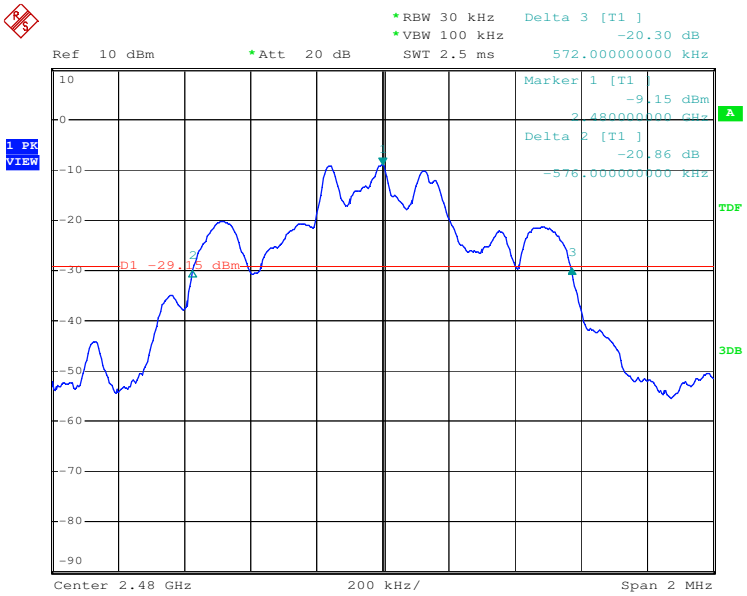
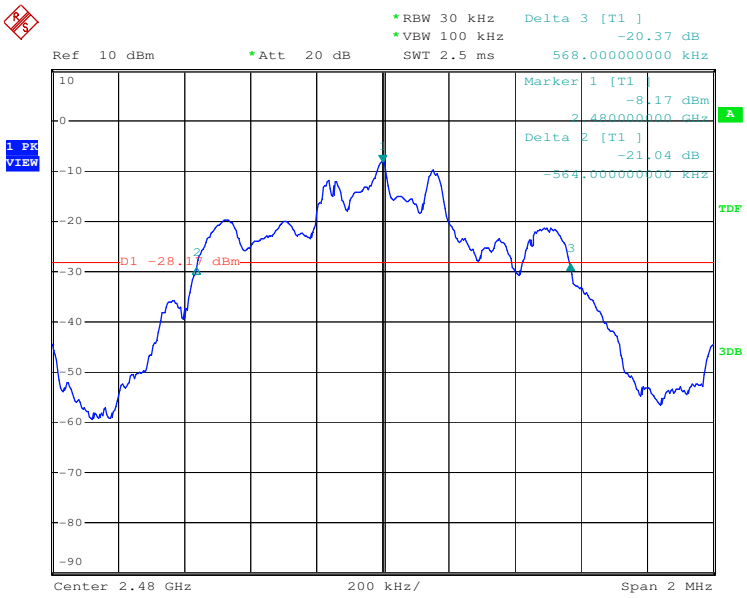
PI/4QPSK mode:



Date: 26.MAR.2009 14:14:50

8DPSK mode:



Date: 27.MAR.2009 13:09:39

Test result: The unit does meet the FCC requirements.

6.4 Carrier Frequencies Separated

Test Requirement: FCC 15.247(a)

Test Method: ANSI C63.4 2003& DA 00-705

Test requirements: Regulation 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.

Test Status: Test in hopping transmitting operating mode.

Test Procedure:

1 Connect EUT antenna terminal to the spectrum analyzer with a low loss cable.

Equipment mode: Spectrum analyzer

Equipment Mode	Spectrum Analyzer
Detector Function	Peak Mode
RBW	100KHz
VBW	300KHz

2. By using the Max-Hold function record the separation of two adjacent channels.

3. Measure the frequency difference of these two adjacent channels by spectrum analyzer Marker function.

4. Repeat above procedures until all frequencies measured were complete.

Test result:

Lowest channel: (2.402 GHz)

	Test mode		
	GFSK	**PI/4QPSK**	**8DPSK**
Carrier Frequencies separated	1.008MHz	1.002MHz	1.002MHz

Middle channel: (2.441GHz)

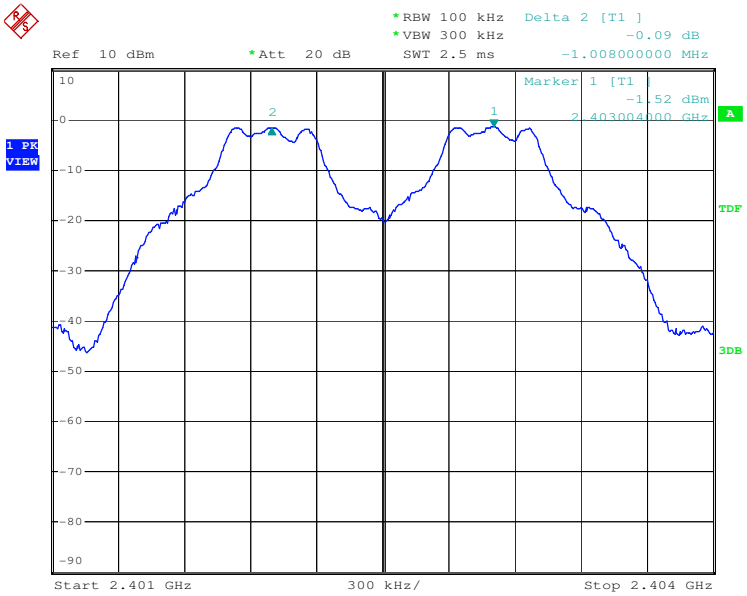
	Test mode		
	GFSK	**PI/4QPSK**	**8DPSK**
Carrier Frequencies separated	1.008MHz	1.002MHz	1.002MHz

Highest channel: (2.480GHz)

	Test mode		
	GFSK	**PI/4QPSK**	**8DPSK**
Carrier Frequencies separated	1.002MHz	1.002MHz	1.002MHz

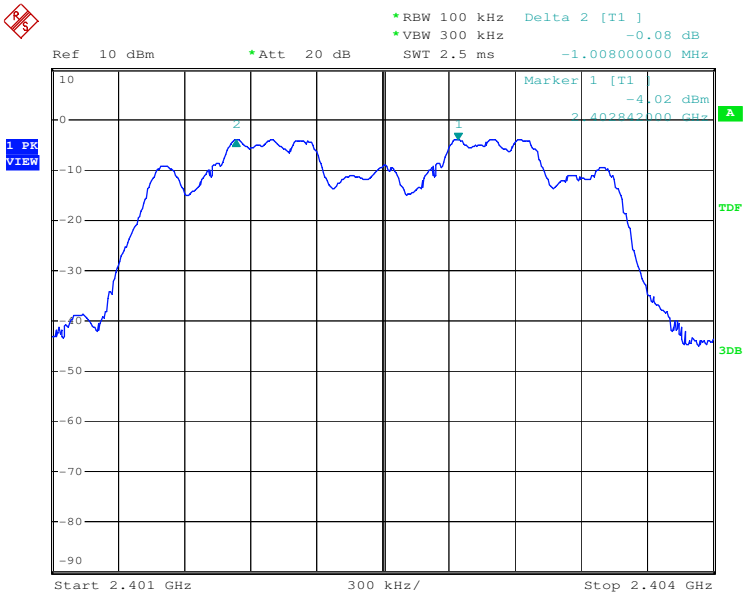
1. Lowest Channel:

GFSK mode:



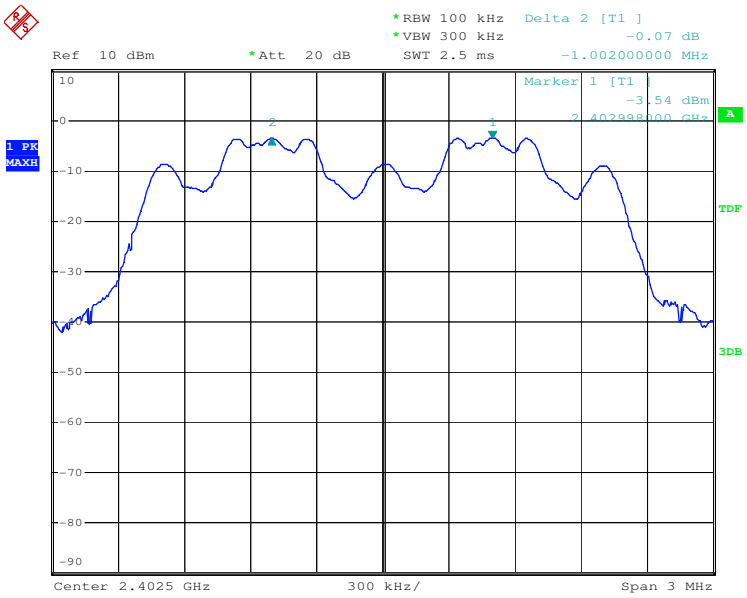
Date: 27.MAR.2009 14:03:34

PI/4QPSK mode:



Date: 27.MAR.2009 14:09:56

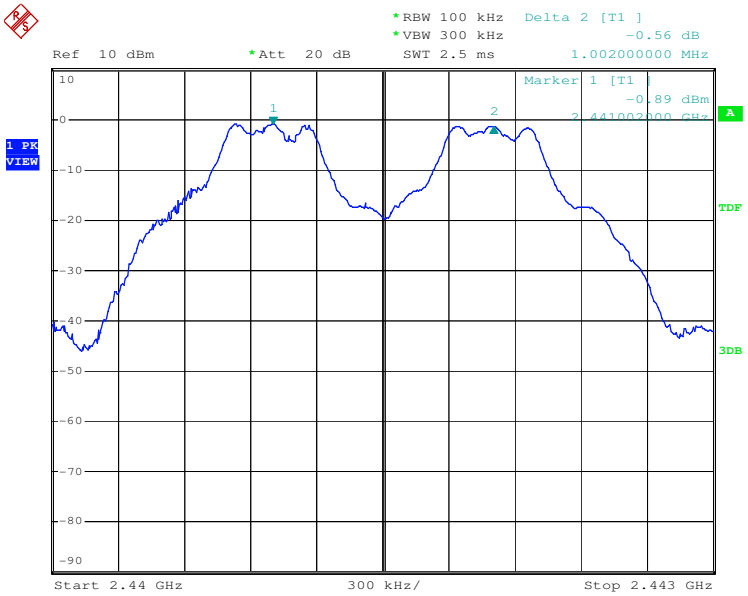
8DPSK mode:



Date: 27.MAR.2009 14:11:05

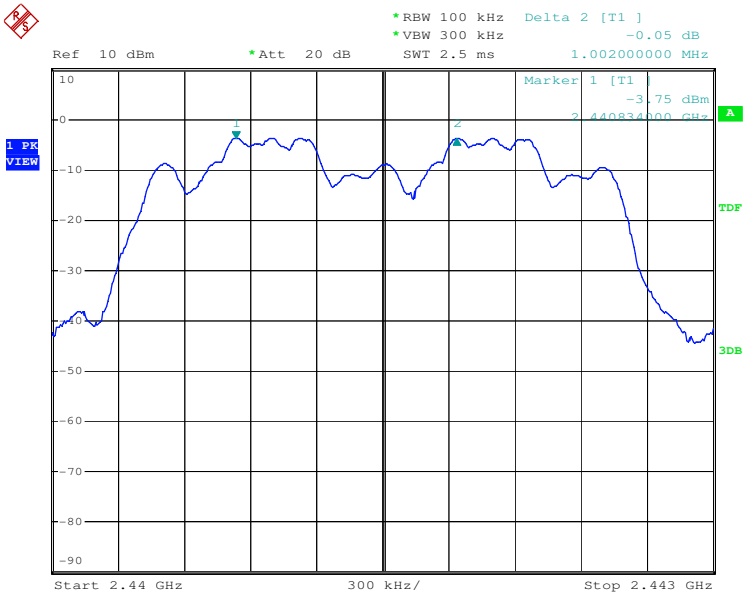
2. Middle Channel:

GFSK mode:



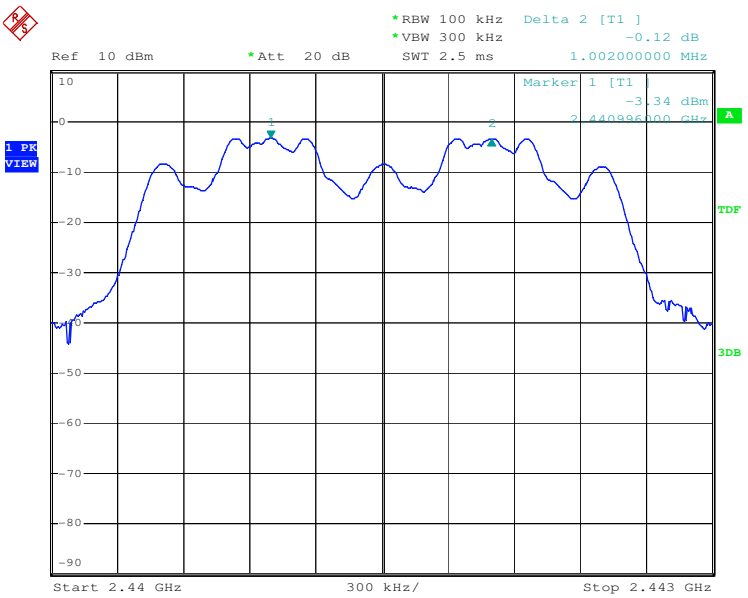
Date: 27.MAR.2009 14:04:52

PI/4QPSK mode:



Date: 27.MAR.2009 14:08:42

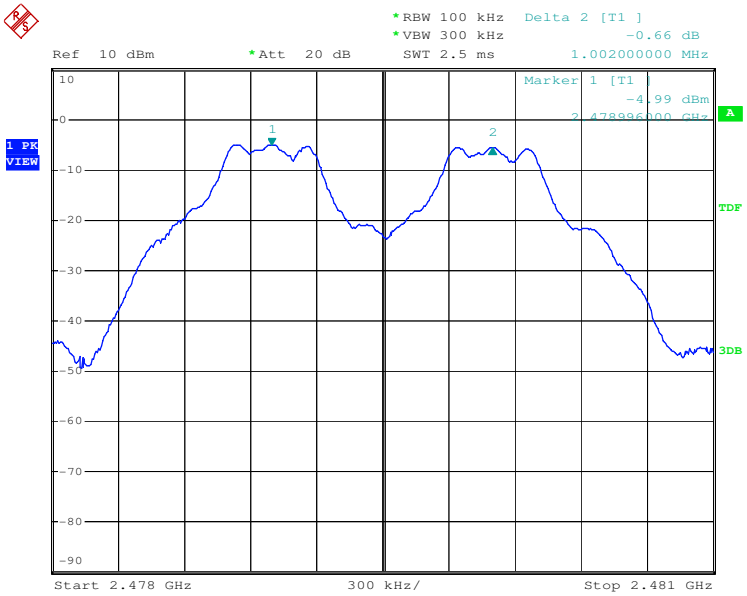
8DPSK mode:



Date: 27.MAR.2009 14:12:31

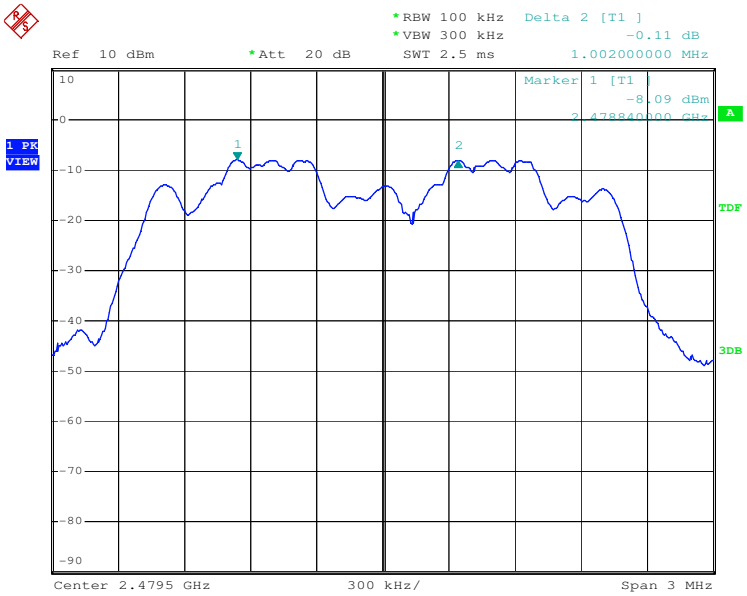
3. Highest Channel:

GFSK mode:



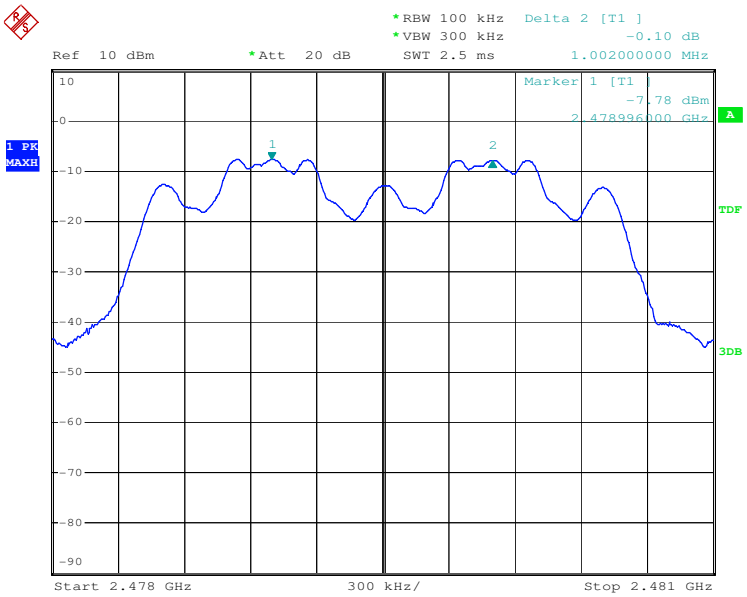
Date: 27.MAR.2009 14:06:14

PI/4QPSK mode:



Date: 27.MAR.2009 14:07:30

8DPSK mode:



Date: 27.MAR.2009 14:16:17

Test result: The unit does meet the FCC requirements.

6.5 Hopping Channel Number

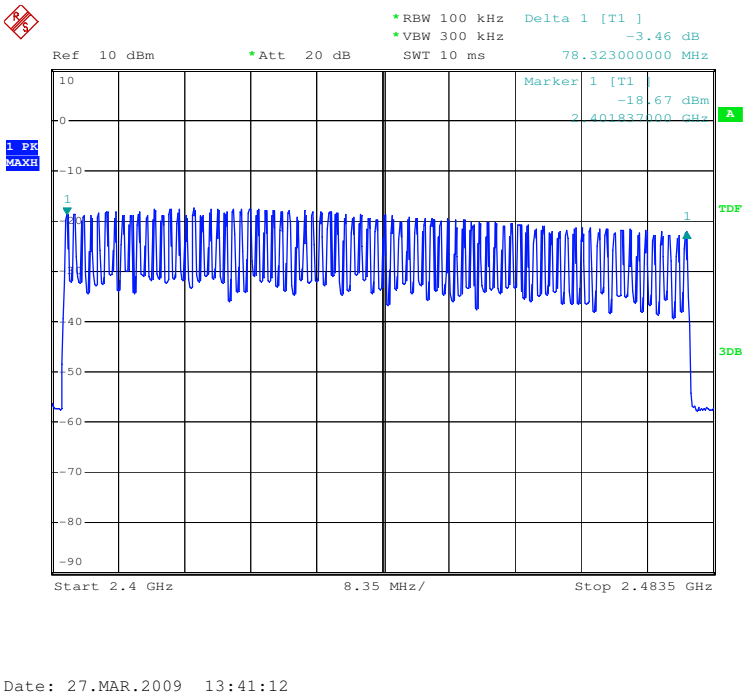
Test Requirement:	FCC 15.247(a)
Test Method:	ANSI C63.4:2003, 15.247 & DA 00-705
Requirements:	Regulation 15.247 (a) (1) (iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.
Test Status:	Test in hopping transmitting operating mode.

Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100 kHz. VBW = 300 kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. In order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.
4. Set the spectrum analyzer: start frequency = 2400MHz. stop frequency = 2483.5MHz. Submit the test result graph.

Test result: Total channels are 79 channels.

Hopping channel numbers



Date: 27.MAR.2009 13:41:12

Test result: The unit does meet the FCC requirements.

6.6 Dwell Time

Test Standards:	FCC 15.247(a)
Test Method:	ANSI C63.4 2003& DA 00-705
Test Requirements:	Regulation 15.247(a) (1) (iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Test Status:	Test in hopping transmitting operating mode.

Test Procedure:

1. Connect EUT antenna terminal to the spectrum analyzer with a low loss cable.
   Equipment mode: spectrum analyzer, detector function: Peak
   RBW=1MHz, VBW=1MHz, Span=zero.
2. Adjust the center frequency of spectrum analyzer on any frequency be measured.
3. Measure the Dwell Time by spectrum analyzer Marker function.
4. Repeat above procedures until all frequencies measured were complete.

Test Result:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

The lowest channel (2402MHz), middle channel (2441MHz), highest channel (2480MHz) as blow

GFSK Mode

Low channel:

DH1 time slot=0.230(ms)*(1600/ (2*79))*31.6=73.6 ms

DH3 time slot=0.250(ms)*(1600/ (4*79))*31.6=40 ms

DH5 time slot=2.97(ms)*(1600/ (6*79))*31.6=316.79ms

Middle channel:

DH1 time slot=0.228(ms)*(1600/ (2*79))*31.6=72.96 ms

DH3 time slot=0.250(ms)*(1600/ (4*79))*31.6=40 ms

DH5 time slot=2.948(ms)*(1600/ (6*79))*31.6=314.45ms

High channel:

DH1 time slot=0.228(ms)*(1600/ (2*79))*31.6=72.96ms

DH3 time slot=0.248(ms)*(1600/ (4*79))*31.6=39.68ms

DH5 time slot=2.948(ms)*(1600/ (6*79))*31.6=314.45ms

(Pi/4)QPSK mode:

Low channel:

DH1 time slot=0.225(ms)*(1600/ (2*79))*31.6=72 ms

DH3 time slot=1.69(ms)*(1600/ (4*79))*31.6=270.4 ms

DH5 time slot=2.96(ms)*(1600/ (6*79))*31.6=315.73ms

Middle channel:

DH1 time slot=0.225(ms)*(1600/ (2*79))*31.6=72 ms

DH3 time slot=1.69(ms)*(1600/ (4*79))*31.6=270.4 ms

DH5 time slot=2.96(ms)*(1600/ (6*79))*31.6=315.73ms

High channel:

DH1 time slot=0.225(ms)*(1600/ (2*79))*31.6=72 ms

DH3 time slot=1.685(ms)*(1600/ (4*79))*31.6=269.6 ms

DH5 time slot=2.965(ms)*(1600/ (6*79))*31.6=316.26ms

8DPSK mode:

Low channel:

DH1 time slot=0.425(ms)*(1600/ (2*79))*31.6=136 ms

DH3 time slot=1.69(ms)*(1600/ (4*79))*31.6=270.4 ms

DH5 time slot=2.96(ms)*(1600/ (6*79))*31.6=315.73ms

Middle channel:

DH1 time slot=0.425(ms)*(1600/ (2*79))*31.6=136 ms

DH3 time slot=1.685(ms)*(1600/ (4*79))*31.6=269.6 ms

DH5 time slot=2.96(ms)*(1600/ (6*79))*31.6=315.73ms

High channel:

DH1 time slot=0.425(ms)*(1600/ (2*79))*31.6=136 ms

DH3 time slot=1.69(ms)*(1600/ (4*79))*31.6=270.4 ms

DH5 time slot=2.98(ms)*(1600/ (6*79))*31.6=317.86ms

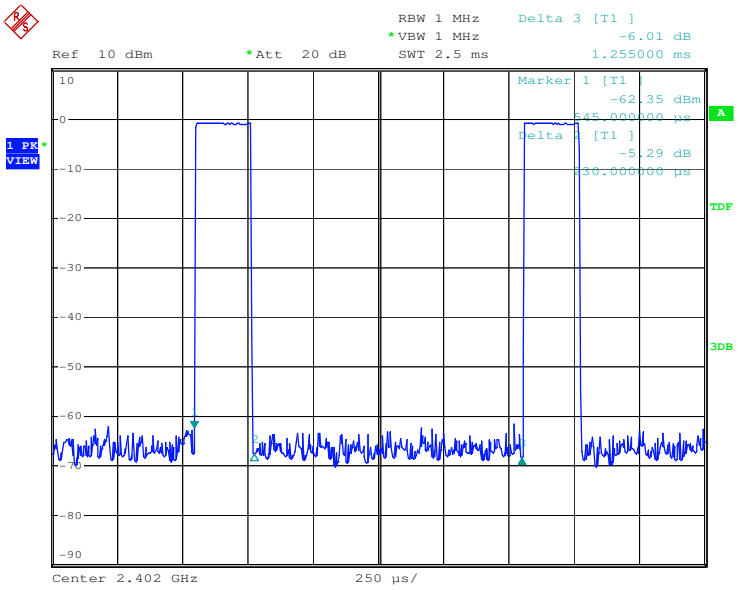
The unit does meet the FCC requirements.

Please refer the graph as below:

GFSK mode:

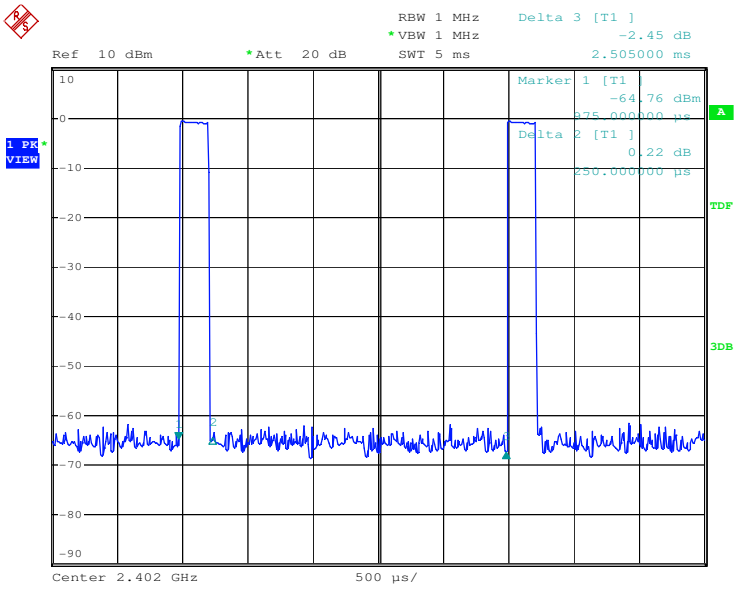
Lowest Channel

DH1



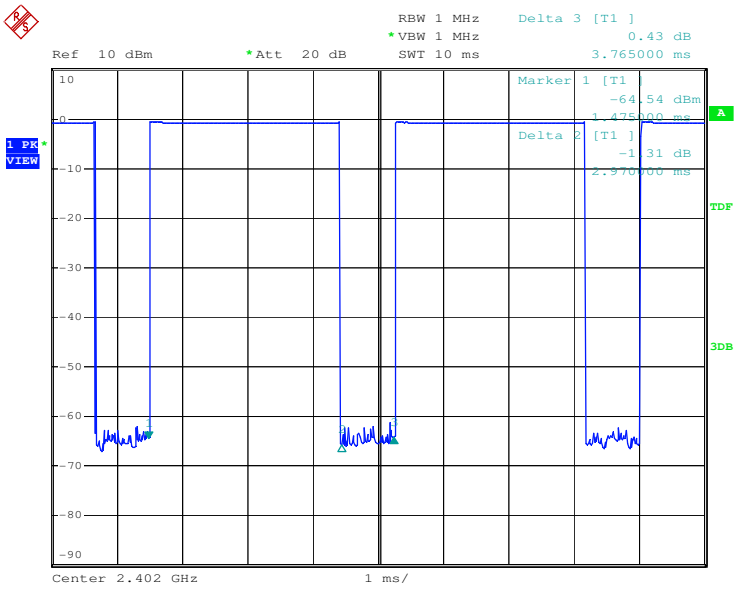
Date: 26.MAR.2009 08:13:37

DH3



Date: 26.MAR.2009 08:14:43

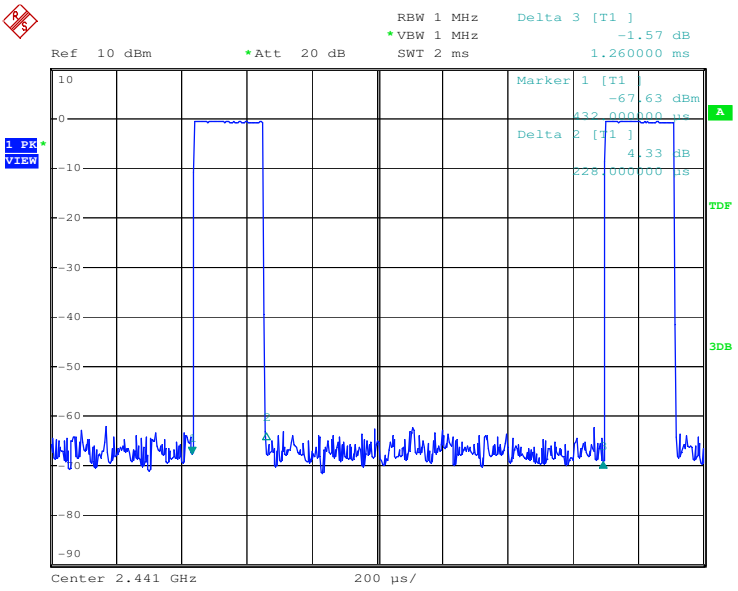
DH5



Date: 26.MAR.2009 08:16:08

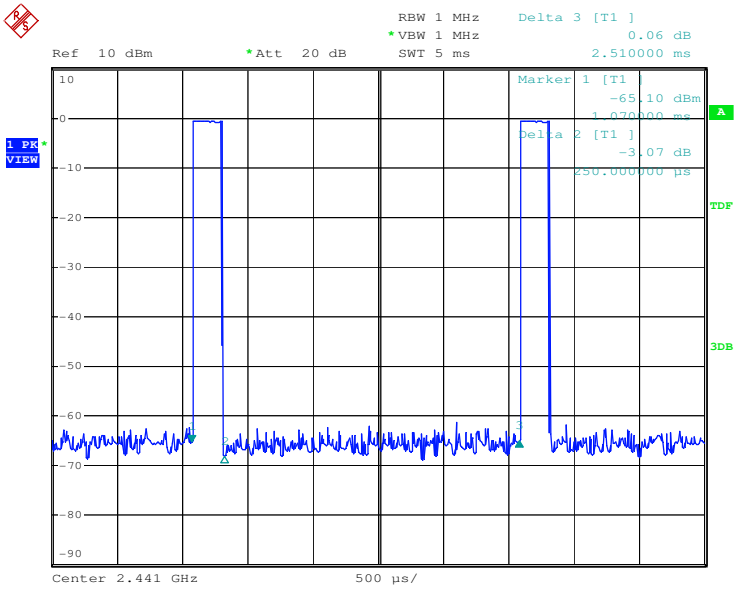
Middle Channel

DH1



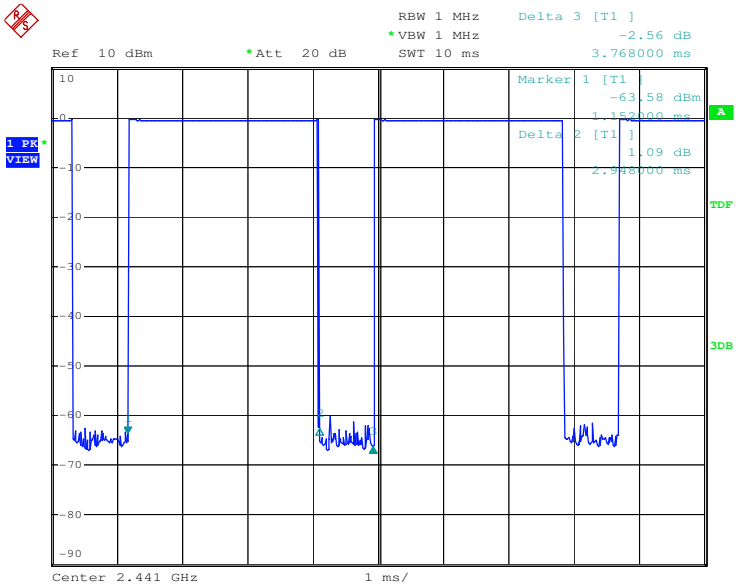
Date: 26.MAR.2009 13:18:12

DH3



Date: 26.MAR.2009 13:26:21

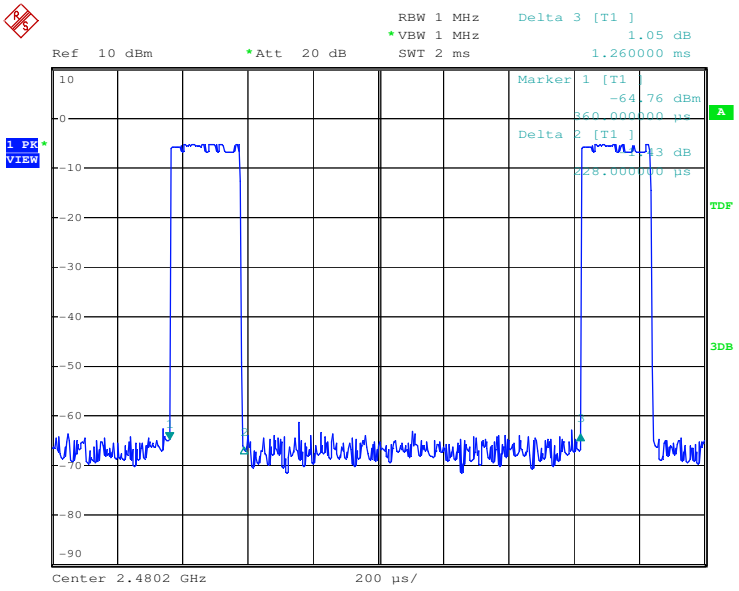
DH5



Date: 26.MAR.2009 13:20:30

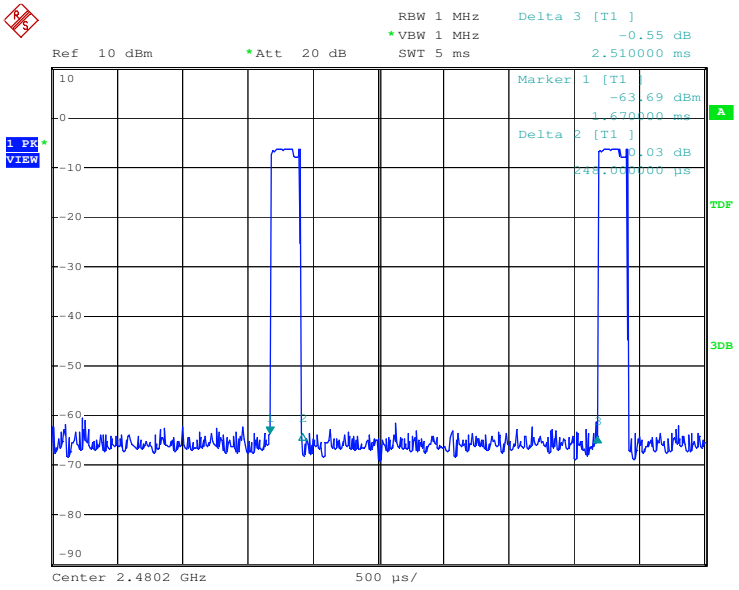
Highest Channel

DH1



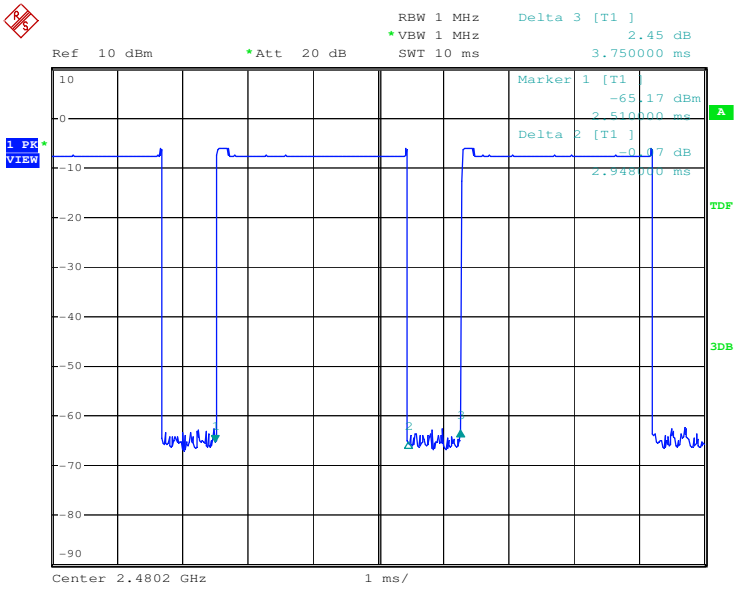
Date: 26.MAR.2009 13:34:22

DH3



Date: 26.MAR.2009 13:35:15

DH5

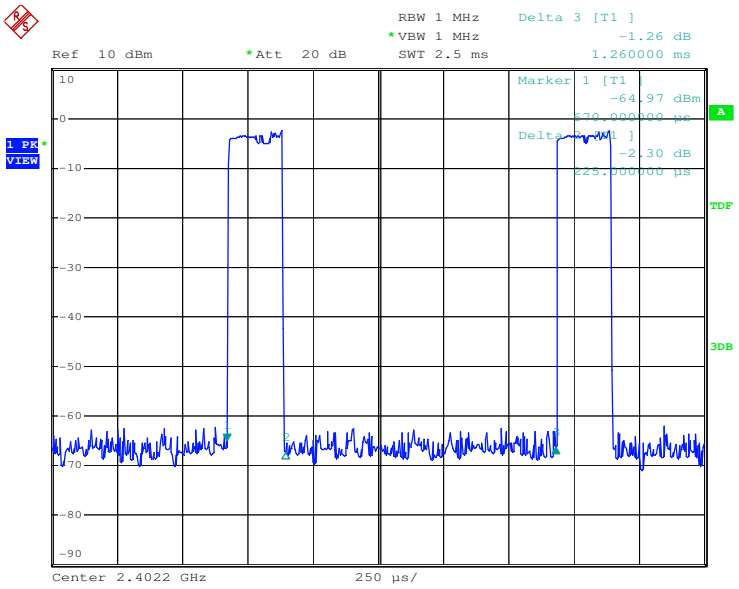


Date: 26.MAR.2009 13:36:04

(Pi/4)QPSK mode:

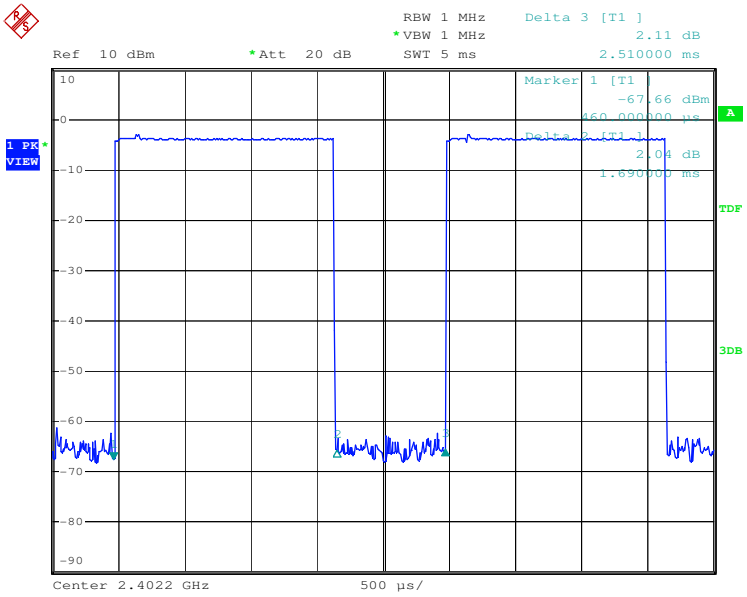
Lowest Channel

DH1



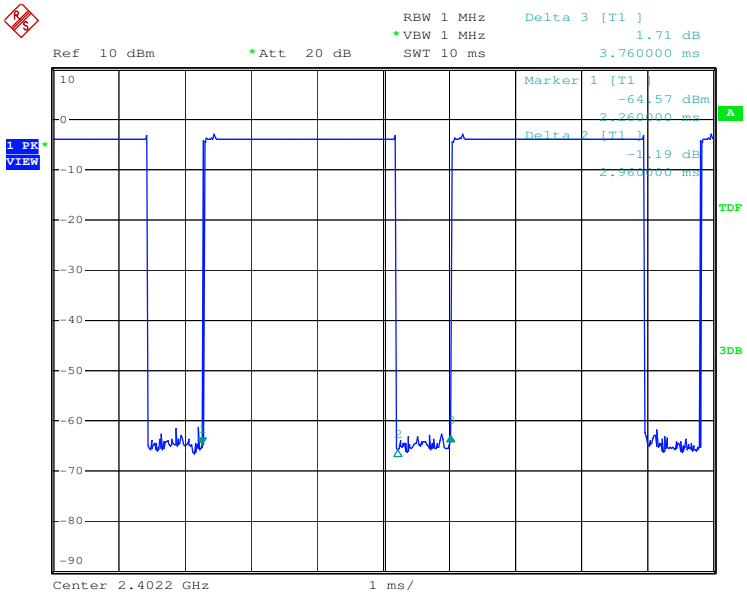
Date: 26.MAR.2009 14:31:15

DH3



Date: 26.MAR.2009 14:32:06

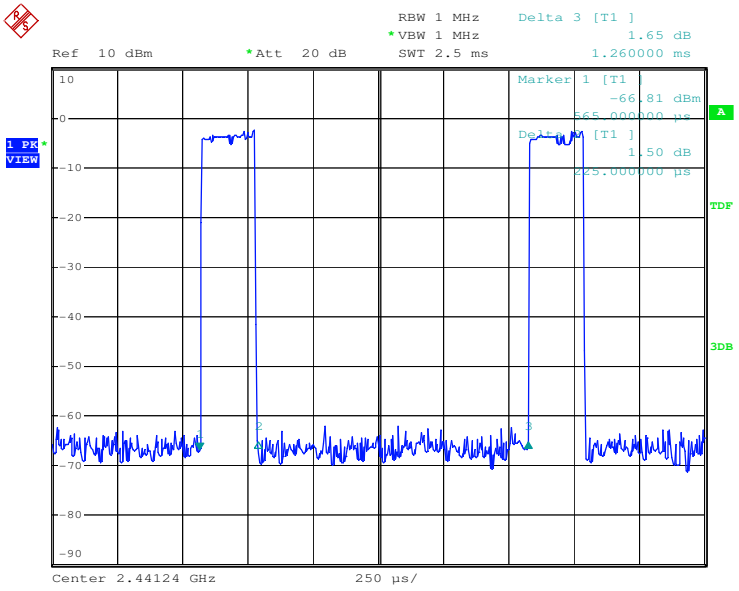
DH5



Date: 26.MAR.2009 14:34:02

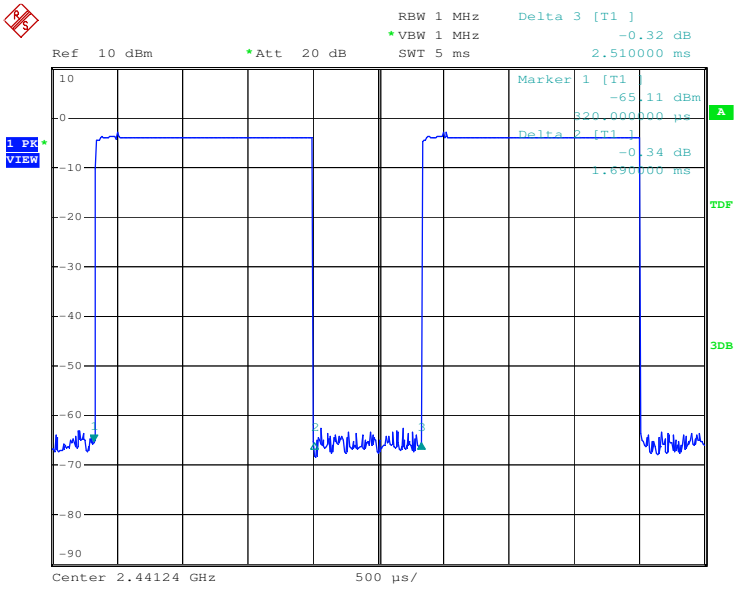
Middle Channel

DH1



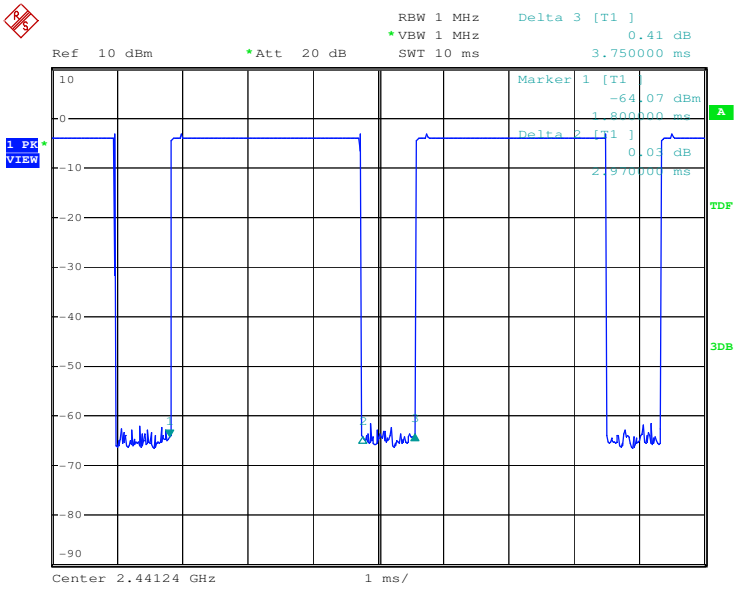
Date: 26.MAR.2009 14:22:31

DH3



Date: 26.MAR.2009 14:23:42

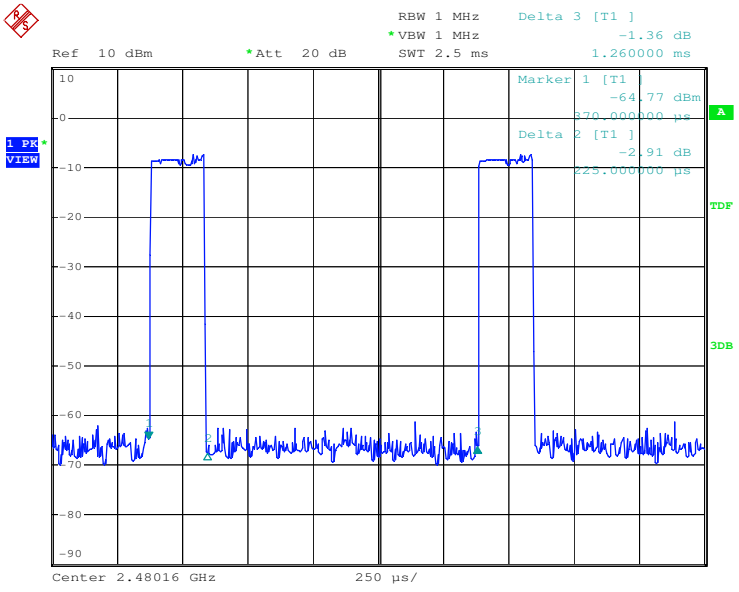
DH5



Date: 26.MAR.2009 14:24:29

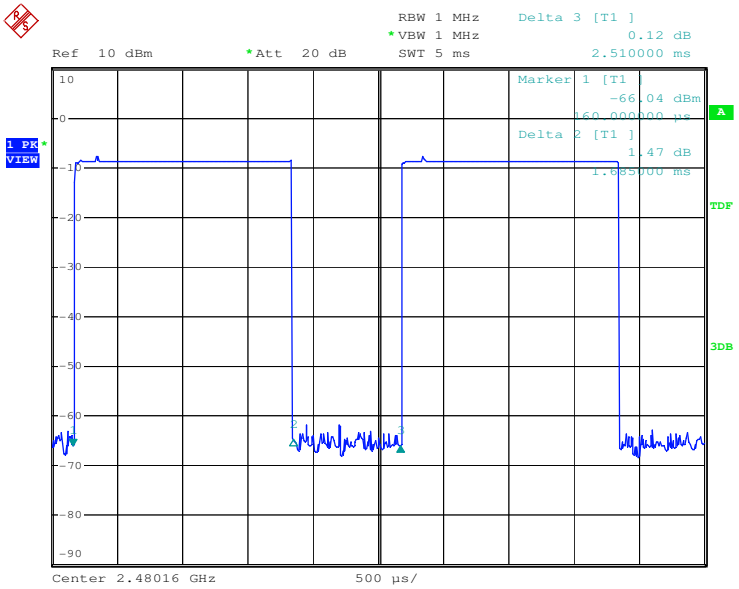
Highest Channel

DH1



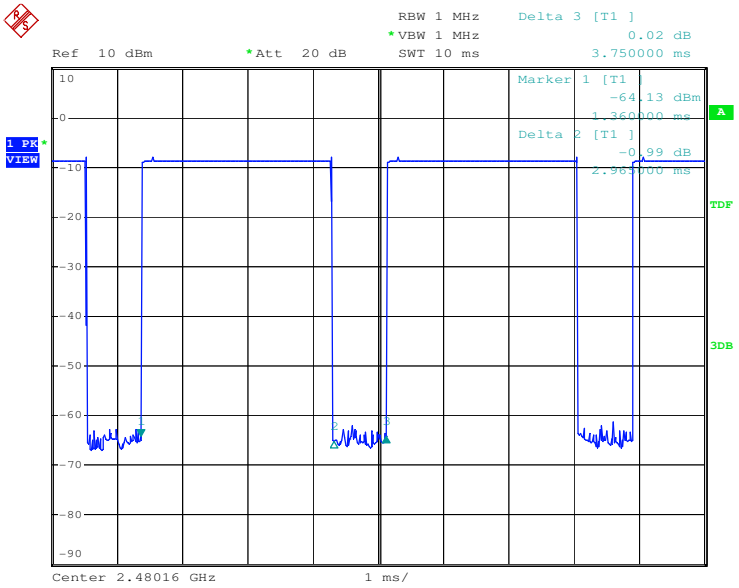
Date: 26.MAR.2009 14:04:57

DH3



Date: 26.MAR.2009 14:05:58

DH5

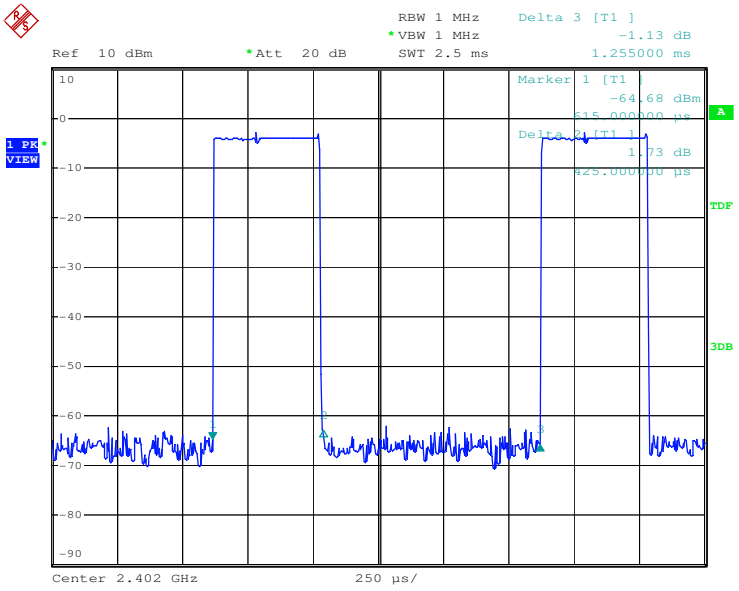


Date: 26.MAR.2009 14:07:05

8DPSK mode:

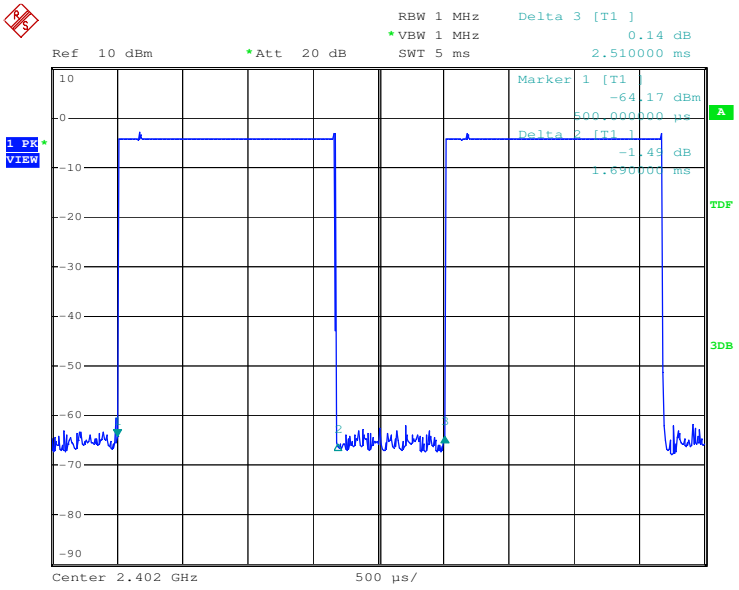
Lowest Channel

DH1



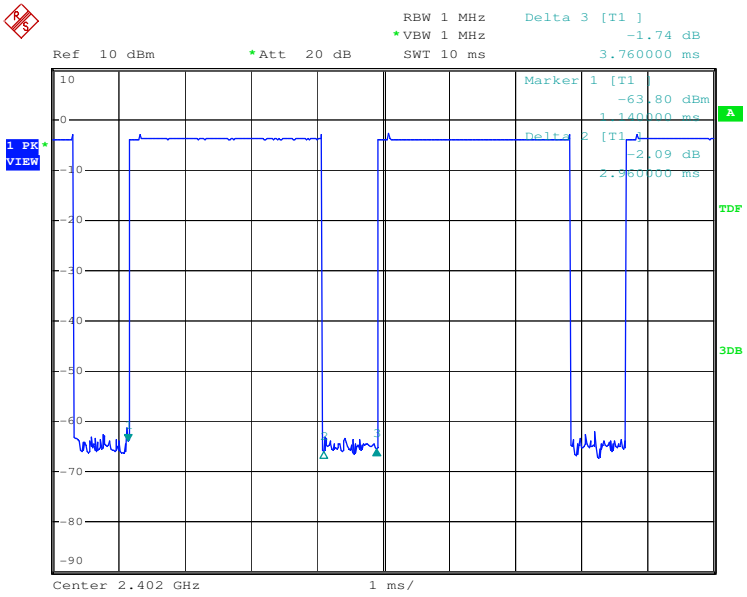
Date: 27.MAR.2009 11:18:24

DH3



Date: 27.MAR.2009 11:19:30

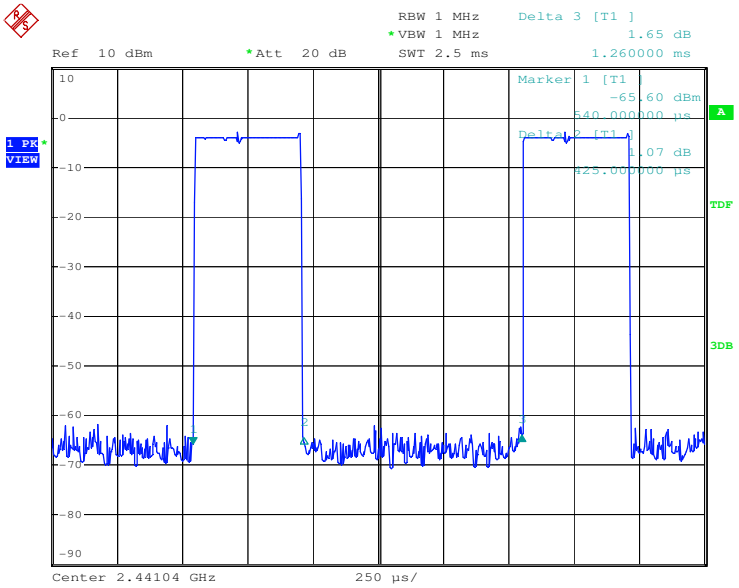
DH5



Date: 27.MAR.2009 11:21:04

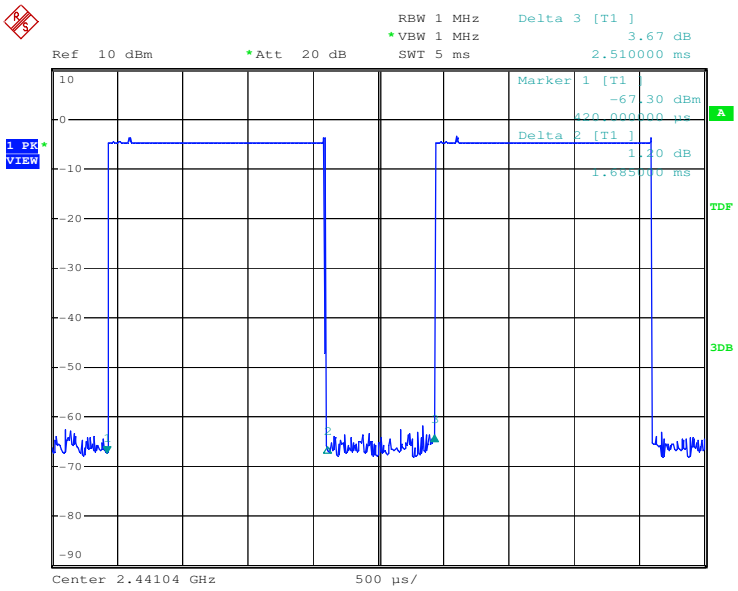
Middle Channel

DH1



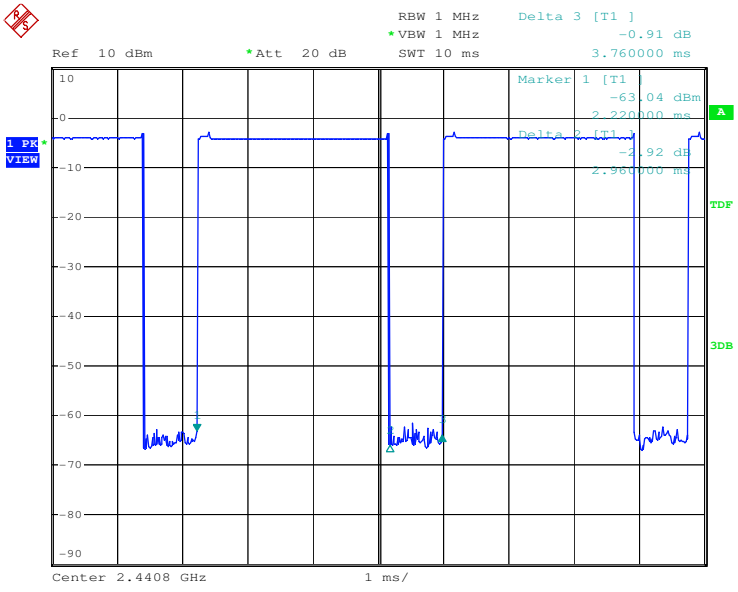
Date: 27.MAR.2009 12:42:59

DH3



Date: 27.MAR.2009 12:44:03

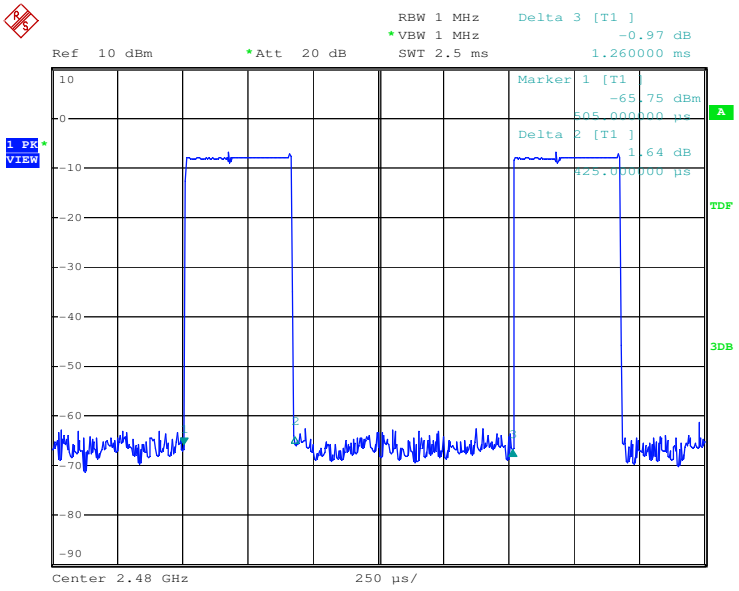
DH5



Date: 27.MAR.2009 13:20:10

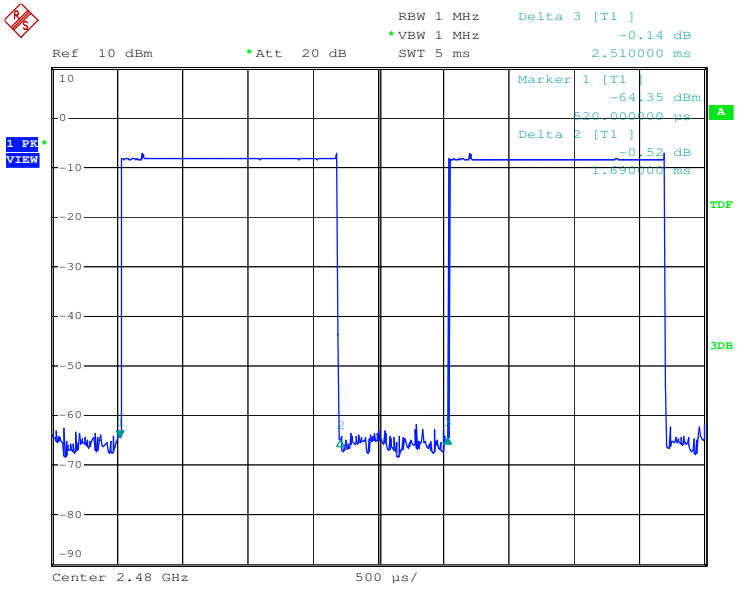
Highest Channel

DH1



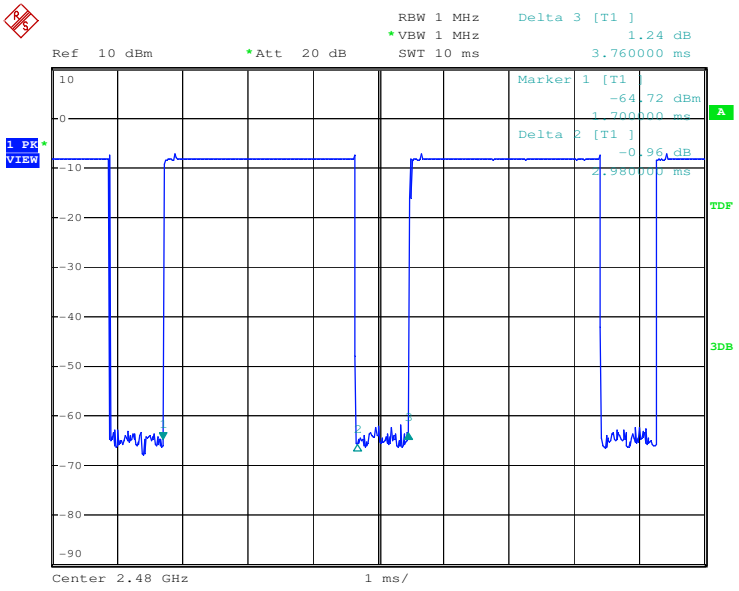
Date: 27.MAR.2009 13:06:24

DH3



Date: 27.MAR.2009 13:07:19

DH5



Date: 27.MAR.2009 13:08:10

6.7 Pseudorandom Frequency Hopping Sequence

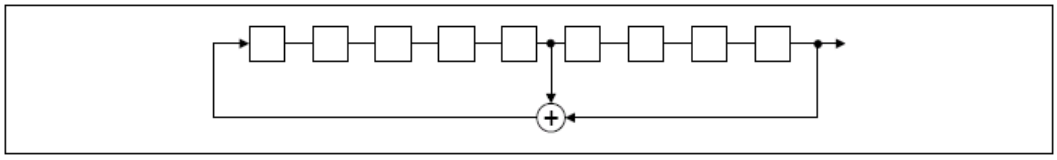
6.7.1 Standard requirement

15.247(a)(1) requirement:
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 Pseudorandom 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.

6.7.2 EUT Pseudorandom Frequency Hopping Sequence

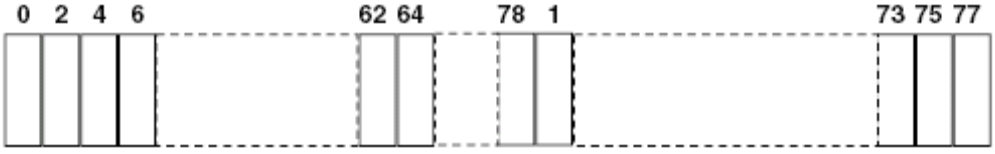
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence: 2^9 -1 = 511 bits
- Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



Each frequency used equally on the average by each transmitter.

The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

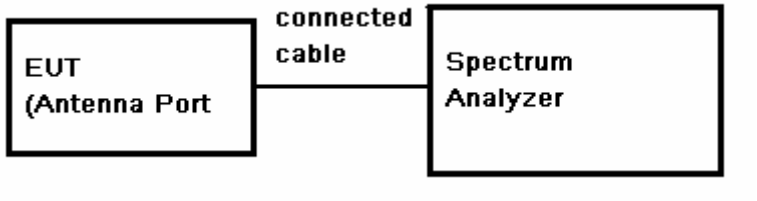
6.8 Maximum Peak Output Power

Test Requirement: FCC Part 15.247 & DA 00-705

Test Method: ANSI C63.4 & DA 00-705

Test Limit: Regulation 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.
Refer to the result "Hopping channel number" of this document. The 1 watt (30.0dBm) limit applies.

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3 MHz. VBW = 10 MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

Test Result:

Lowest channel: (2.402GHz)

Test Mode	Reading Power (dBm)	Cable Loss (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
GFSK mode	-1.32	1.2	-0.12	30.00	30.12
PI/4QPSK mode	-2.11	1.2	-0.91	30.00	30.91
8DPSK mode	-2.14	1.2	-0.94	30.00	30.94

Middle channel; (2.441GHz)

Test Mode	Reading Power (dBm)	Cable Loss (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
GFSK mode	-1.01	1.2	0.19	30.00	29.81
PI/4QPSK mode	-1.75	1.2	-0.55	30.00	30.55
8DPSK mode	-1.72	1.2	-0.50	30.00	30.50

Highest channel: (2.480GHz)

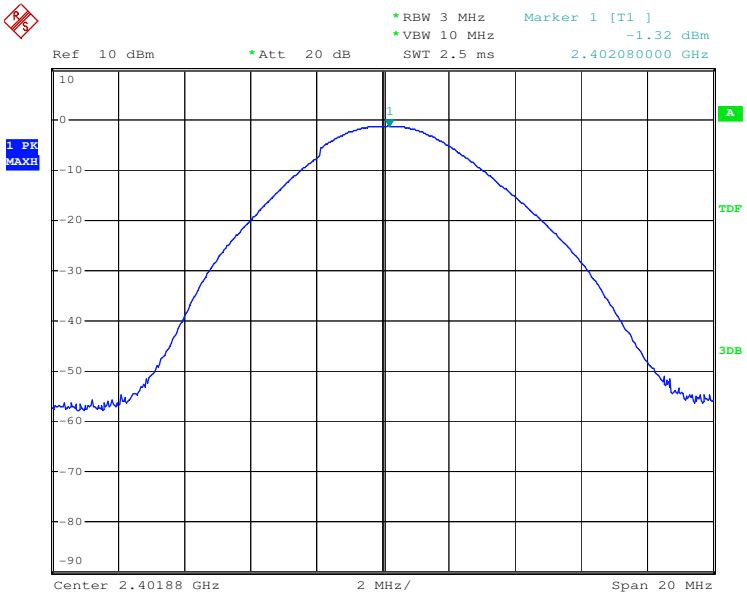
Test Mode	Reading Power (dBm)	Cable Loss (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
GFSK mode	-5.87	1.2	-4.67	30.00	34.67
PI/4QPSK mode	-6.78	1.2	-5.58	30.00	35.58
8DPSK mode	-6.26	1.2	-5.06	30.00	35.06

Test result: The unit does meet the FCC requirements.

Test result plot as follows:

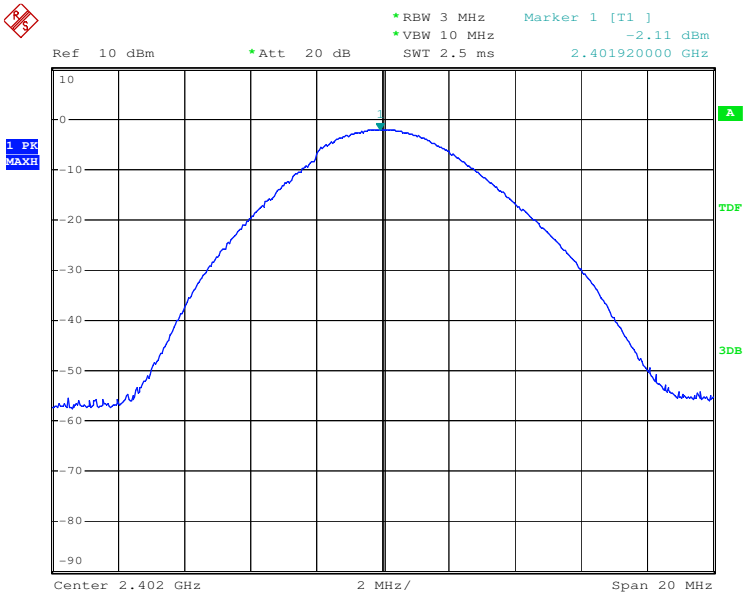
1. Lowest Channel: (2.402GHz)

GFSK mode:



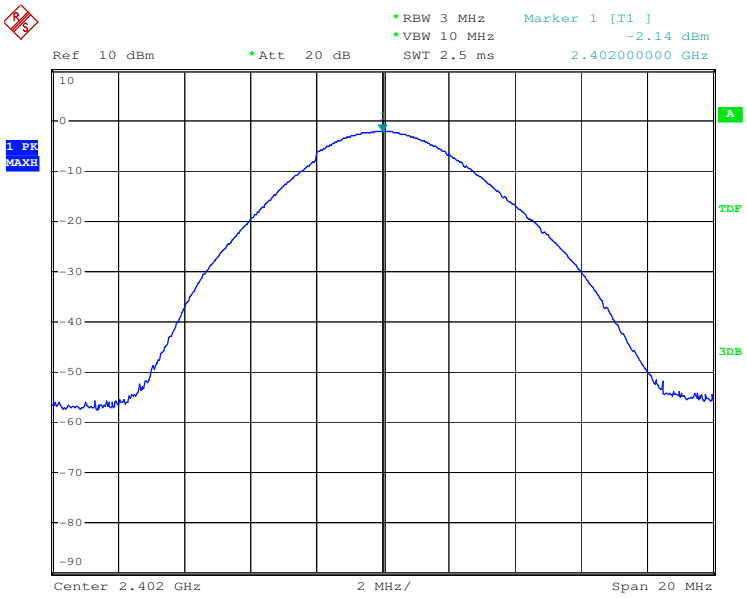
Date: 30.MAR.2009 09:11:30

PI/4QPSK mode:



Date: 30.MAR.2009 09:16:52

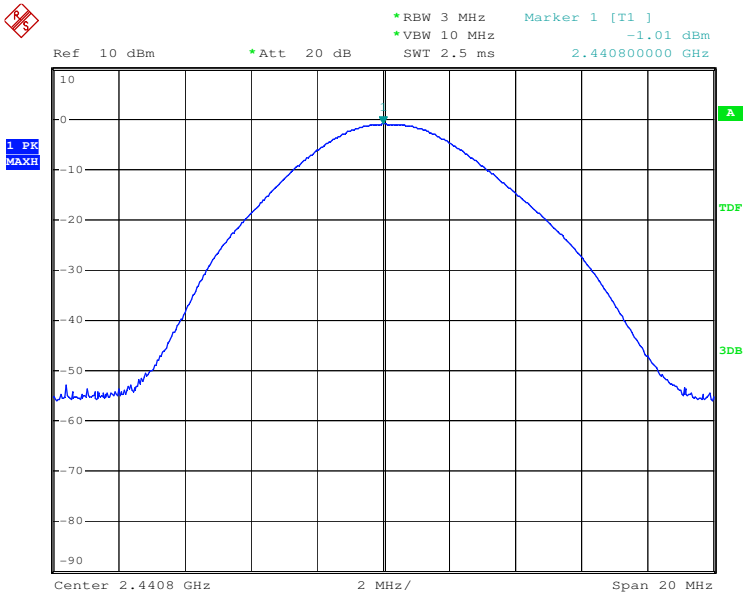
8DPSK mode:



Date: 30.MAR.2009 09:17:31

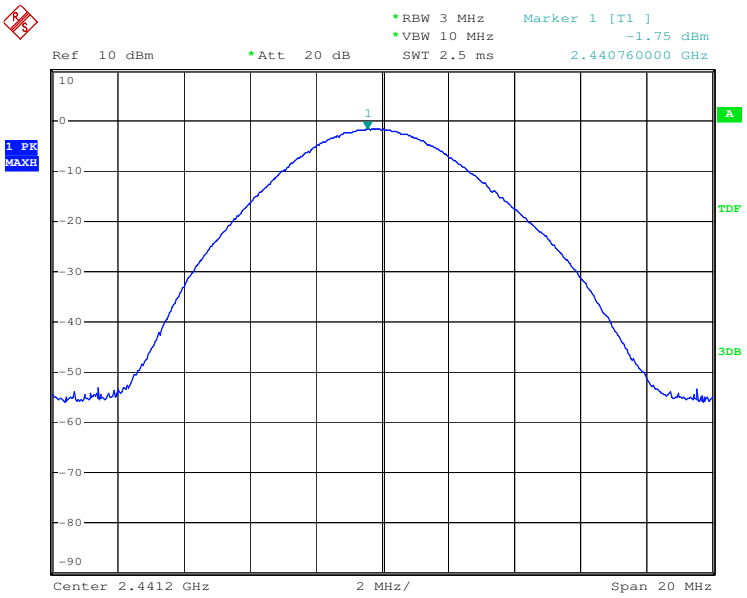
2. Middle Channel: (2.441GHz)

GFSK mode:



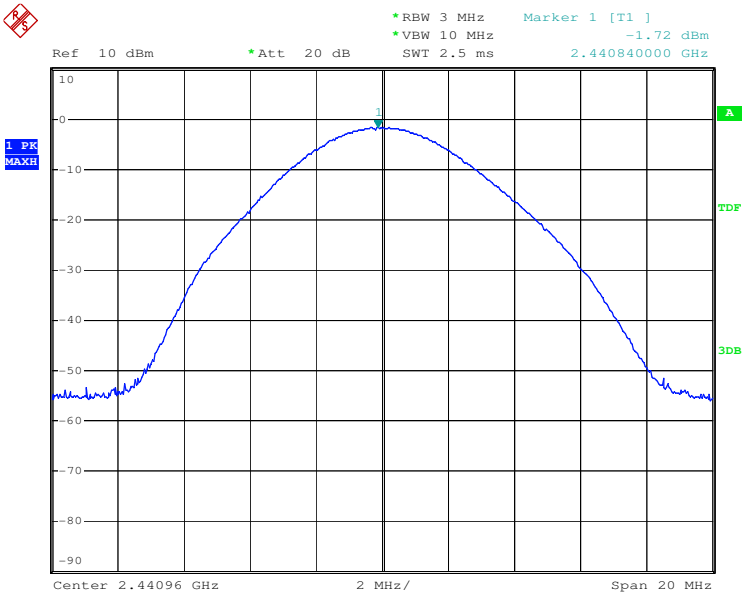
Date: 30.MAR.2009 09:12:15

PI/4QPSK mode:



Date: 30.MAR.2009 09:15:52

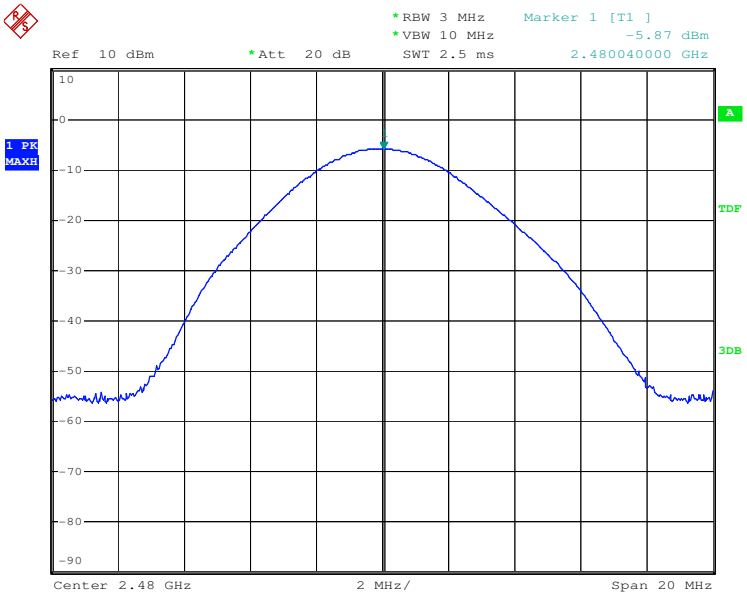
8DPSK mode:



Date: 30.MAR.2009 09:19:02

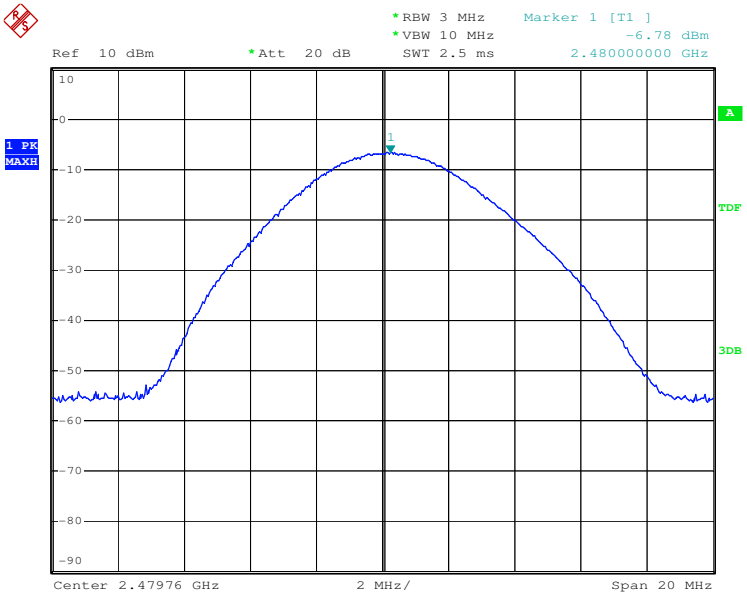
3. Highest Channel: (2.480GHz)

GFSK mode:



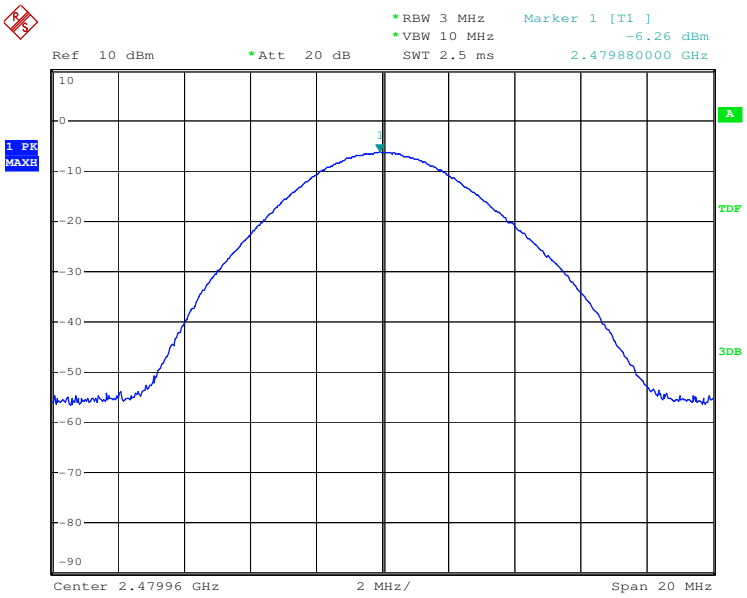
Date: 30.MAR.2009 09:13:09

PI/4QPSK mode:



Date: 30.MAR.2009 09:14:15

8DPSK mode:



Date: 30.MAR.2009 09:20:30

6.9 Antenna Requirement

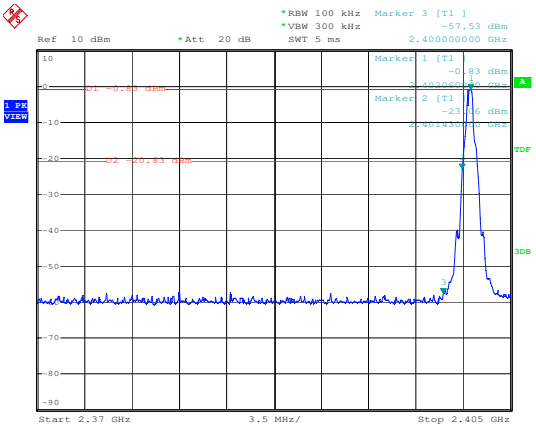
15.247(b)(4) requirement:
(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section. if transmitting antennas of directional gain greater than 6 dBi are used. the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1). (b)(2). and (b)(3) of this section. as appropriate. by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

6.10 Band edge

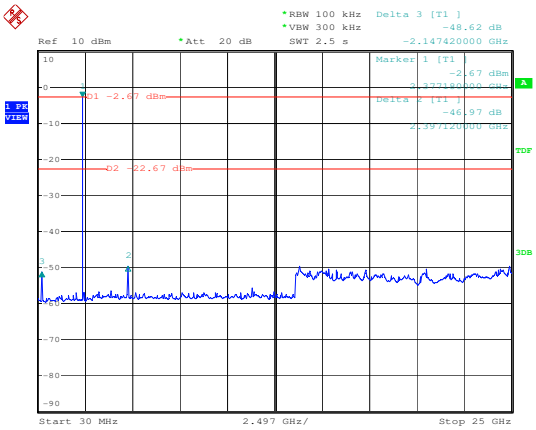
Test Requirement:	FCC 15.247(d)
Test Method:	ANSI C63.4:2003 & DA 00-705
Test Status:	Test lowest channel, highest channel.
Test site:	The transmitter output is connected to spectrum analyzer. The resolution bandwidth is set to 100KHz. The video bandwidth is set to 300KHz.
Limit:	15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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 band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

Out-OFF-band spurious emissions-conducted measurement:
GFSK mode:

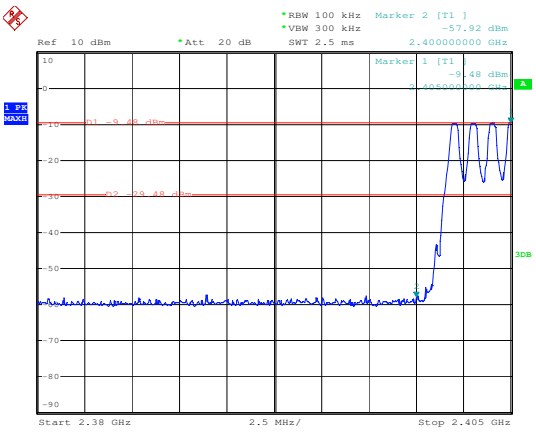
Low channel:



Date: 26.MAR.2009 13:06:05

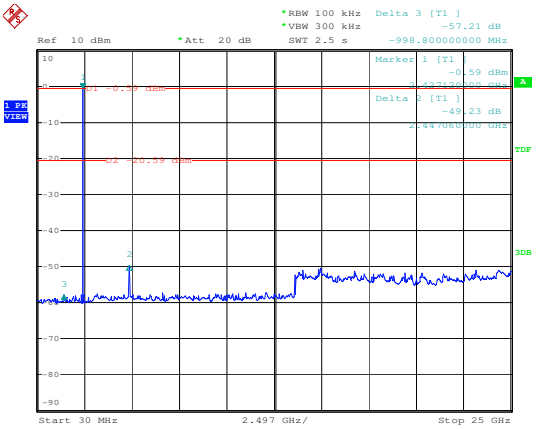


Date: 26.MAR.2009 13:10:24



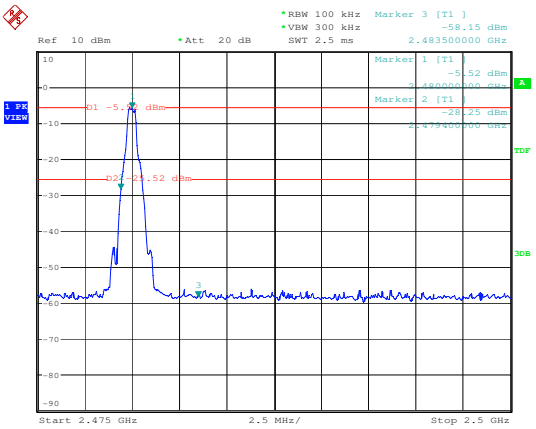
Date: 27.MAR.2009 04:58:30

Middle channel：

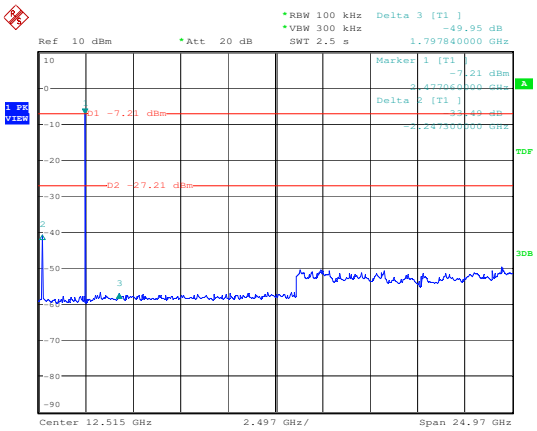


Date: 26.MAR.2009 13:24:00

High channel：



Date: 26.MAR.2009 13:42:48



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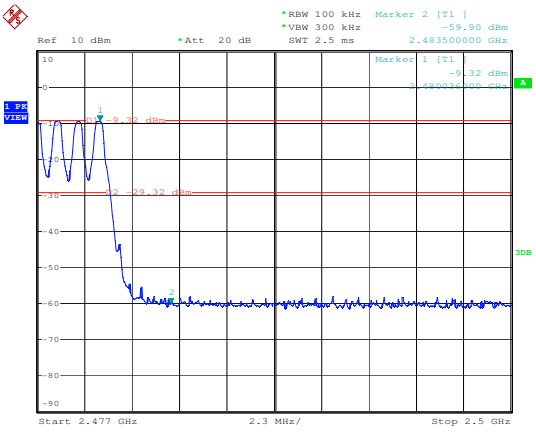
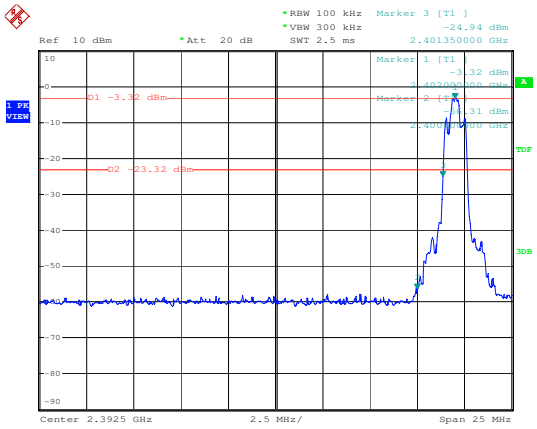


Date: 27.MAR.2009 09:57:34

PI/4QPSK mode:

Low channel:



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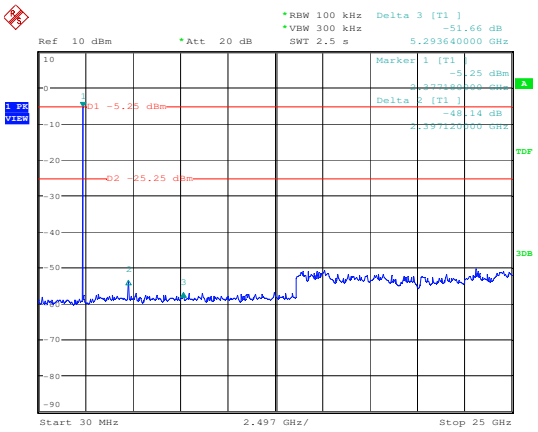

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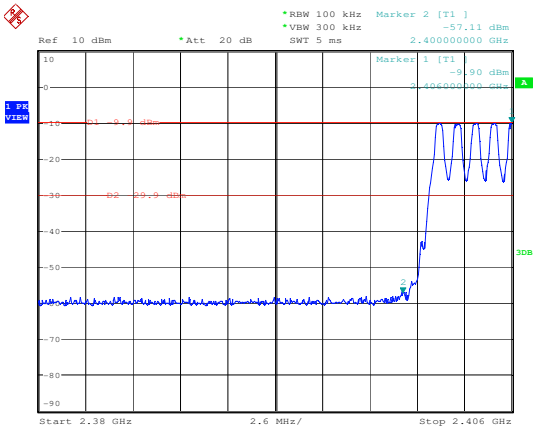

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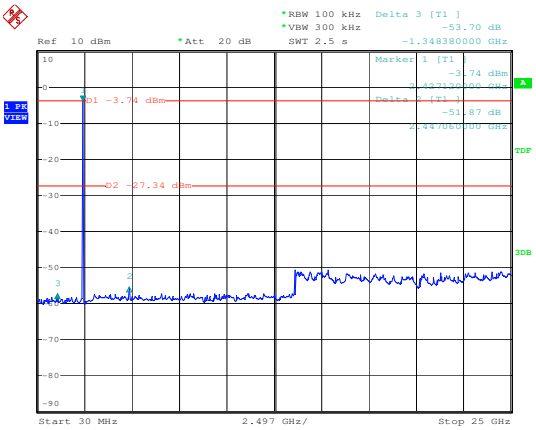
Middle channel:



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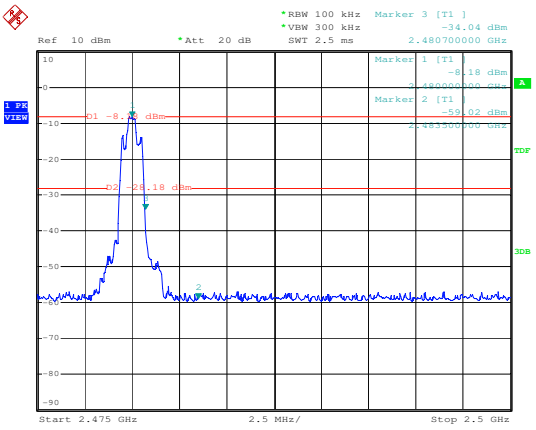
High channel:



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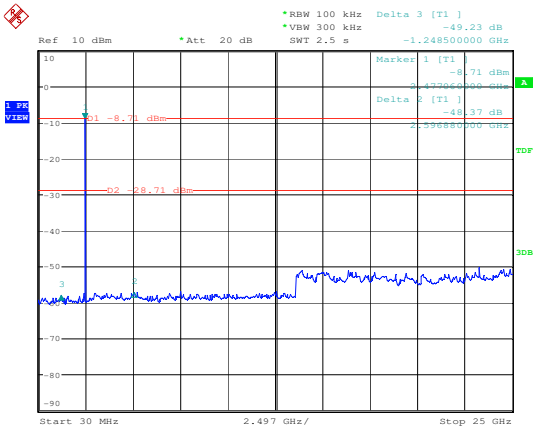

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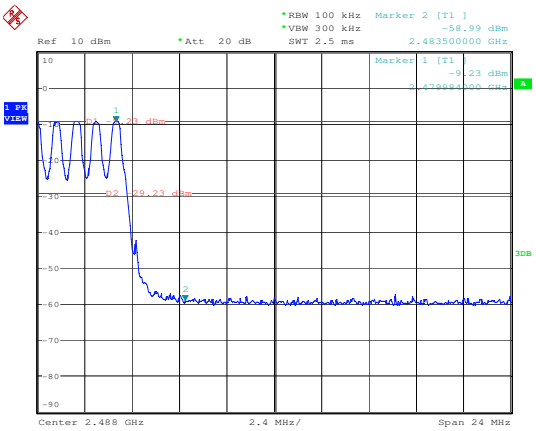

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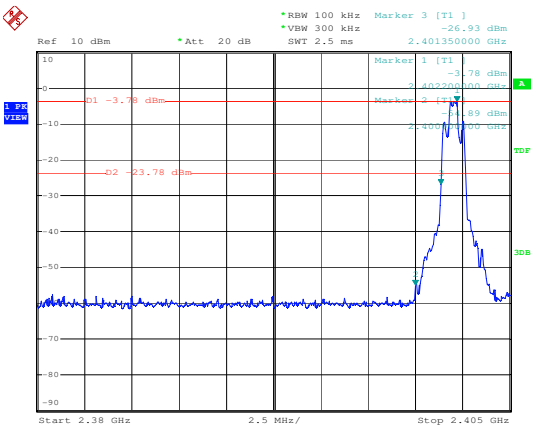
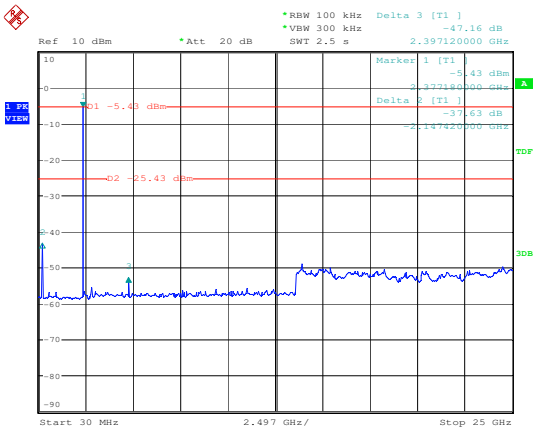
8DPSK mode:

Low channel:



Date: 27.MAR.2009 11:25:22



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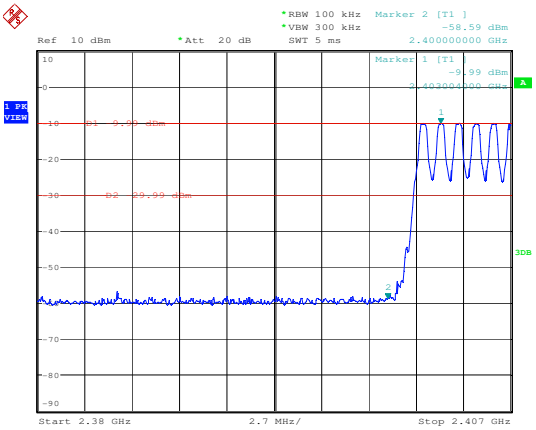

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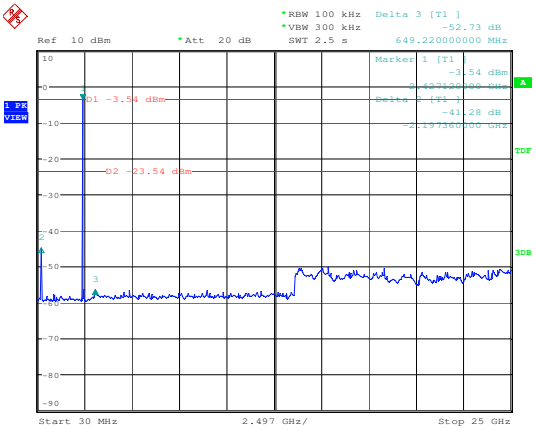
Middle channel:



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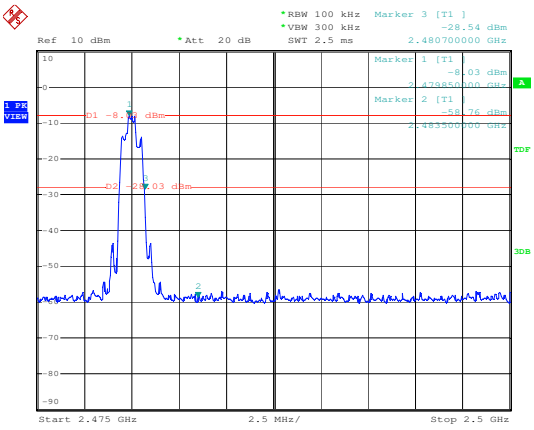
High channel:



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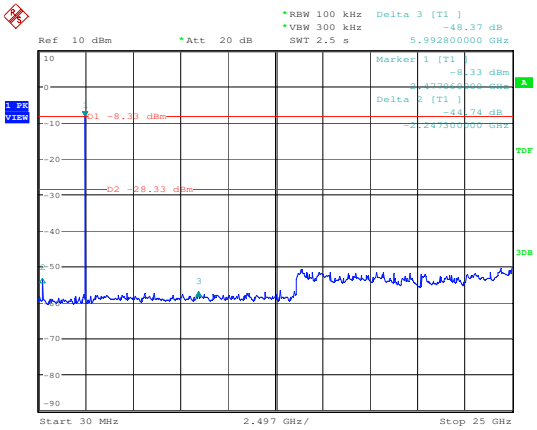

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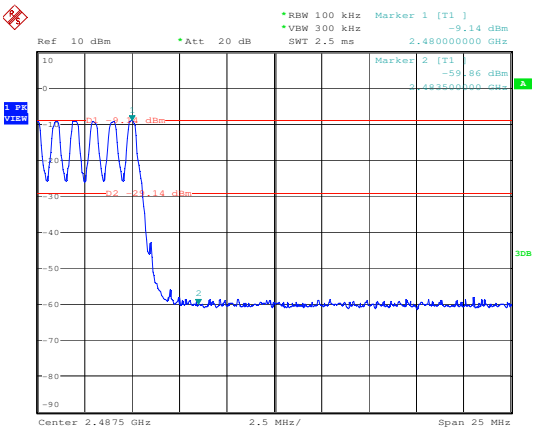

Date: 27.MAR.2009 09:43:56

6.11 Radiated Emissions

Test Requirement:	15.247(d),15.209 & 15.205
Test Method:	ANSI C63.4:2003 & DA 00-705
Test Status:	Test lowest channel, Middle, highest channel.
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Test Range	30MHz to 25GHz
	30MHz-1000MHz: RBW=100KHz, VBW=300KHz
	Above 1GHz: PK RBW=1MHz, VBW=3MHz
	Average RBW=1MHz, VBW=10Hz
15.209 Limit:	40.0 dBμV/m between 30MHz & 88MHz
	43.5 dBμV/m between 88MHz & 216MHz
	46.0 dBμV/m between 216MHz & 960MHz
	above 960MHz: Average value Limit 54.0 dBμV/m
	Peak value Limit 74.0 dBμV/m.

Test Configuration:

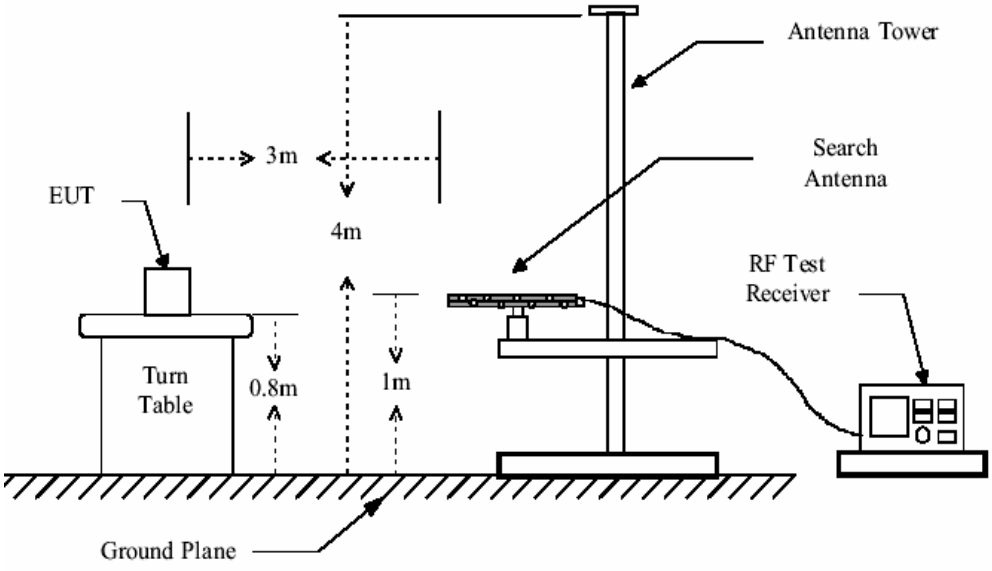

Figure1: 30MHz to 1GHz radiated emissions test configuration

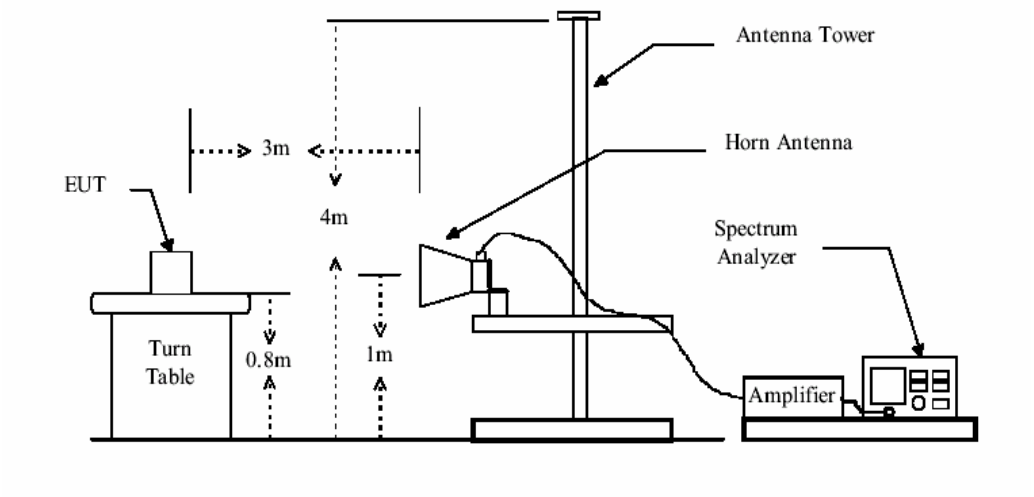

Figure 2: Above 1GHz radiated emissions test configuration

Test Procedure: The procedure used was ANSI Standard C63.4-2003. The receiver was scanned from 30MHz to 25GHz.When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

6.11.1 Radiated emission below 1GHz

Bluetooth mode.

Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
145.430	1.31	8.57	27.49	43.28	25.67	43.50	-17.83
179.380	1.37	9.87	27.26	49.56	33.54	43.50	-9.96
234.670	1.60	11.81	26.98	47.24	33.67	46.00	-12.33
257.950	1.71	12.47	26.88	43.89	31.19	46.00	-14.81
322.940	1.98	14.76	26.90	39.14	28.98	46.00	-17.02
540.220	2.64	18.75	27.67	44.68	38.40	46.00	-7.60

Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
179.380	1.37	9.87	27.26	52.84	36.82	43.50	-6.68
191.020	1.39	10.11	27.20	52.94	37.24	43.50	-6.26
214.300	1.49	10.93	27.08	51.60	36.94	43.50	-6.56
234.670	1.60	11.81	26.98	52.01	38.44	46.00	-7.56
322.940	1.98	14.76	26.90	44.31	34.15	46.00	-11.85
537.310	2.64	18.72	27.67	37.70	31.39	46.00	-14.61

GPS mode

Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
133.790	1.29	7.86	27.57	41.02	22.60	43.50	-20.90
179.380	1.37	9.87	27.26	48.69	32.67	43.50	-10.83
191.020	1.39	10.11	27.20	48.03	32.33	43.50	-11.17
234.670	1.60	11.81	26.98	45.29	31.72	46.00	-14.28
466.500	2.48	17.48	27.62	38.50	30.84	46.00	-15.16
540.220	2.64	18.75	27.67	43.13	36.85	46.00	-9.15

Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
179.380	1.37	9.87	27.26	49.70	33.68	43.50	-9.82
191.020	1.39	10.11	27.20	53.92	38.22	43.50	-5.28
234.670	1.60	11.81	26.98	51.53	37.96	46.00	-8.04
257.950	1.71	12.47	26.88	48.34	35.64	46.00	-10.36
322.940	1.98	14.76	26.90	44.66	34.50	46.00	-11.50
466.500	2.48	17.48	27.62	40.78	33.12	46.00	-12.88

CD/DVD mode

Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
133.790	1.29	7.86	27.57	40.66	22.24	43.50	-21.26
179.380	1.37	9.87	27.26	46.26	30.24	43.50	-13.26
234.670	1.60	11.81	26.98	44.51	30.94	46.00	-15.06
338.460	2.02	15.13	27.01	39.75	29.89	46.00	-16.11
404.420	2.22	16.32	27.43	39.55	30.66	46.00	-15.34
540.220	2.64	18.75	27.67	41.61	35.33	46.00	-10.67

Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
133.790	1.29	7.86	27.57	43.91	25.49	43.50	-18.01
191.020	1.39	10.11	27.20	52.53	36.83	43.50	-6.67
234.670	1.60	11.81	26.98	53.01	39.44	46.00	-6.56
257.950	1.71	12.47	26.88	49.07	36.37	46.00	-9.63
322.940	1.98	14.76	26.90	47.54	37.38	46.00	-8.62
471.350	2.49	17.67	27.63	42.23	34.76	46.00	-11.24

FM mode

Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
133.790	1.29	7.86	27.57	40.76	22.34	43.50	-21.16
179.380	1.37	9.87	27.26	46.95	30.93	43.50	-12.57
234.670	1.60	11.81	26.98	43.96	30.39	46.00	-15.61
404.420	2.22	16.32	27.43	37.79	28.90	46.00	-17.10
537.310	2.64	18.72	27.67	43.92	37.61	46.00	-8.39
673.110	2.85	21.40	27.37	33.99	30.87	46.00	-15.13

Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
133.790	1.29	7.86	27.57	45.01	26.59	43.50	-16.91
179.380	1.37	9.87	27.26	52.23	36.21	43.50	-7.29
191.020	1.39	10.11	27.20	53.66	37.96	43.50	-5.54
234.670	1.60	11.81	26.98	50.22	36.65	46.00	-9.35
322.940	1.98	14.76	26.90	44.71	34.55	46.00	-11.45
537.310	2.64	18.72	27.67	40.69	34.38	46.00	-11.62

U-Disk mode

Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
133.790	1.29	7.86	27.57	41.09	22.67	43.50	-20.83
179.380	1.37	9.87	27.26	47.85	31.83	43.50	-11.67
191.020	1.39	10.11	27.20	47.25	31.55	43.50	-11.95
234.670	1.60	11.81	26.98	46.07	32.50	46.00	-13.50
405.390	2.22	16.32	27.43	40.44	31.55	46.00	-14.45
537.310	2.64	18.72	27.67	44.94	38.63	46.00	-7.37

Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
191.020	1.39	10.11	27.20	54.70	39.00	43.50	-4.50
214.300	1.49	10.93	27.08	51.47	36.81	43.50	-6.69
234.670	1.60	11.81	26.98	51.37	37.80	46.00	-8.20
257.950	1.71	12.47	26.88	46.86	34.16	46.00	-11.84
322.940	1.98	14.76	26.90	40.82	30.66	46.00	-15.34
537.310	2.64	18.72	27.67	39.96	33.65	46.00	-12.35

6.11.2 Transmitter emission above 1GHz

The lowest channel (2.402GHz)

Peak Measurement

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1035.25	3.08	27.43	37.96	59.55	52.10	74.00	-21.90	Vertical
2398.25	4.97	32.25	37.97	53.55	52.80	74.00	-21.20	Vertical
2400.00	4.97	32.25	37.97	58.41	57.66	74.00	-16.34	Vertical
3902.25	5.98	33.36	38.47	53.47	54.34	74.00	-19.66	Vertical
5735.25	7.11	34.98	39.11	53.88	56.86	74.00	-17.14	Vertical
1035.25	3.08	27.43	37.96	55.78	48.33	74.00	-25.67	Horizontal
1446.50	3.67	27.77	38.20	56.89	50.13	74.00	-23.87	Horizontal
2398.25	4.97	32.25	37.97	52.92	52.17	74.00	-21.83	Horizontal
2400.00	4.97	32.25	37.97	58.42	57.67	74.00	-16.33	Horizontal
6757.50	7.55	36.36	37.87	47.86	53.90	74.00	-20.10	Horizontal

Average Measurement

Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over limit	Polarization
1928.25	4.37	31.45	38.23	36.98	34.57	54.00	-19.43	Vertical
2398.25	4.97	32.25	37.97	35.76	35.01	54.00	-18.99	Vertical
2400.00	4.97	32.25	37.97	41.73	40.98	54.00	-13.02	Vertical
4431.00	6.42	34.01	37.96	34.19	36.66	54.00	-17.34	Vertical
6992.50	7.73	36.70	37.79	33.53	40.17	54.00	-13.83	Vertical
1998.75	4.47	32.00	38.74	35.90	33.63	54.00	-20.37	Horizontal
2398.25	4.97	32.25	37.97	35.78	35.03	54.00	-18.97	Horizontal
2400.00	4.97	32.25	37.97	40.74	39.99	54.00	-14.01	Horizontal
4431.00	6.42	34.01	37.96	33.23	35.70	54.00	-18.30	Horizontal
6992.50	7.73	36.70	37.79	33.59	40.23	54.00	-13.77	Horizontal

The middle channel (2.441GHz)

Peak Measurement

Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over limit	Polarization
2400.00	4.97	32.25	37.97	55.33	54.58	74.00	-19.42	Vertical
2483.50	5.08	32.29	38.24	57.14	56.27	74.00	-17.73	Vertical
4882.00	6.64	34.02	38.88	53.24	55.02	74.00	-18.98	Vertical
7323.00	7.58	36.10	37.66	52.15	58.17	74.00	-15.83	Vertical
9764.00	8.65	37.10	33.45	46.54	58.84	74.00	-15.16	Vertical
2400.00	4.97	32.25	37.97	56.06	55.31	74.00	-18.69	Horizontal
2483.50	5.08	32.29	38.24	56.43	55.56	74.00	-18.44	Horizontal
4882.00	6.64	34.02	38.88	52.15	53.93	74.00	-20.07	Horizontal
7323.00	7.58	36.10	37.66	49.12	55.14	74.00	-18.86	Horizontal
9764.00	8.65	37.10	33.45	46.47	58.77	74.00	-15.23	Horizontal

Average Measurement

Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over limit	Polarization
2400.00	4.97	32.25	37.97	37.71	36.96	54.00	-17.04	Vertical
2483.50	5.08	32.29	38.24	38.29	37.42	54.00	-16.58	Vertical
4882.00	6.64	34.02	38.88	35.75	37.53	54.00	-16.47	Vertical
7305.00	7.59	36.14	37.68	34.00	40.05	54.00	-13.95	Vertical
9812.50	8.68	37.14	33.40	28.35	40.77	54.00	-13.23	Vertical
2400.00	4.97	32.25	37.97	36.60	35.85	54.00	-18.15	Horizontal
2483.50	5.08	32.29	38.24	37.29	36.42	54.00	-17.58	Horizontal
4489.75	6.47	34.10	38.13	38.11	40.55	54.00	-13.45	Horizontal
5418.00	6.95	34.59	38.67	34.29	37.16	54.00	-16.84	Horizontal
6992.50	7.73	36.70	37.79	33.47	40.11	54.00	-13.89	Horizontal

The highest channel (2.480GHz)

Peak Measurement

Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over limit	Polarization
1035.25	3.08	27.43	37.96	61.14	53.69	74.00	-20.31	Vertical
2483.50	5.08	32.29	38.24	59.90	59.03	74.00	-14.97	Vertical
2500.00	5.10	32.30	38.28	58.44	57.56	74.00	-16.44	Vertical
4960.00	6.68	34.01	38.84	51.81	53.66	74.00	-20.34	Vertical
9920.00	8.77	37.23	33.47	45.02	57.55	74.00	-16.45	Vertical
1035.25	3.08	27.43	37.96	58.68	51.23	74.00	-22.77	Horizontal
1240.00	3.37	27.61	37.26	66.61	60.33	74.00	-13.67	Horizontal
2483.50	5.08	32.29	38.24	57.64	56.77	74.00	-17.23	Horizontal
2500.00	5.10	32.30	38.28	54.43	53.55	74.00	-20.45	Horizontal
4960.00	6.68	34.01	38.84	52.29	54.14	74.00	-19.86	Horizontal

Average Measurement

Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over limit	Polarization
1223.25	3.35	27.60	37.48	39.96	33.43	54.00	-20.57	Vertical
1857.75	4.25	30.91	37.94	40.69	37.91	54.00	-16.09	Vertical
2483.50	5.08	32.29	38.24	35.42	34.55	54.00	-19.45	Vertical
2492.25	5.10	32.30	38.26	35.38	34.52	54.00	-19.48	Vertical
4960.00	6.68	34.01	38.84	35.51	37.36	54.00	-16.64	Vertical
1258.50	3.40	27.63	37.27	37.94	31.70	54.00	-22.30	Horizontal
2483.50	5.08	32.29	38.24	38.36	37.49	54.00	-16.51	Horizontal
2492.25	5.10	32.30	38.26	35.31	34.45	54.00	-19.55	Horizontal
4454.50	6.44	34.05	38.05	32.90	35.34	54.00	-18.66	Horizontal
7440.00	7.52	35.91	37.55	33.92	39.80	54.00	-14.20	Horizontal

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor –Preamplifier Factor.

Remark: No any other emissions level which are attenuated less than 20dB below the limit.

According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.

Hence there no other emissions have been reported.

Remark:

1). As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

2). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.

3) Pre-test the Bluetooth normal mode

4）For this intentional radiator operates below 25 GHz. The spectrum shall be investigated to the tenth harmonic of the highest fundamental frequency. And above the third harmonic of this intentional radiator, the disturbance is very low. So the test result only displays to 5^{th} harmonic.

Section 15.205 Restricted bands of operation.

(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 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	
13.36 - 13.41	322 - 335.4		

The result: The unit does meet the FCC requirements