FCC TEST REPORT

REPORT NO.: RF960423H06
MODEL NO.: 1077
RECEIVED: April 23, 2007
TESTED: April 25 to May 29, 2007
ISSUED: June 15, 2007

APPLICANT: Microsoft® Corporation

ADDRESS: One Microsoft Way Redmond, WA 98052

ISSUED BY: Advance Data Technology Corporation

LAB LOCATION: No. 81-1, Lu Liao Keng, 9 Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien, Taiwan, R.O.C.

0536

No. 2177-01

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1 CERTIFICATION

PRODUCT :	Microsoft® Bluetooth® Notebook Mouse 5000
BRAND NAME :	Microsoft
MODEL NO. :	1077
APPLICANT :	Microsoft® Corporation
TESTED DATE:	April 25 to May 29, 2007
TEST ITEM :	ENGINEERING SAMPLE
STANDARDS :	47 CFR Part 15, Subpart C (Section 15.247), ANSI C63.4-2003

The above equipment (Model: 1077) has been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Claire Kuan , **DATE:** June 15, 2007
(Claire Kuan, Specialist)

TECHNICAL ACCEPTANCE : Hank Chung , **DATE:** June 15, 2007
Responsible for RF
(Hank Chung, Deputy Manager)

APPROVED BY : May Chen , **DATE:** June 15, 2007
(May Chen, Deputy Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	**Test Type and Limit**	**Result**	**REMARK**
15.207	AC Power Conducted Emission	NA	Power supply is 1.5 VDC from 2 AAA batteries in parallel
15.247(a)(1)(I)-(ii)	Number of Hopping Frequency Used Spec.: At least 75 channels	PASS	Meet the requirement of limit
15.247(a)(1)(ii)	Dwell Time on Each Channel Spec. : Max. 0.4 second within 31.6 second	PASS	Meet the requirement of limit
15.247(a)(1)(I)-(ii)	Hopping Channel Separation Spec. : Min. 25 kHz or 20 dB bandwidth, which ever is greater	PASS	Meet the requirement of limit
15.247(a)(2)	Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	PASS	Report reference
15.247(b)	Maximum Peak Output Power Spec.: max. 1W	PASS	Meet the requirement of limit
15.247(c)	Transmitter Radiated Emissions Spec.: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is –10.40dB at 2376.00MHz
15.247(c)	Band Edge Measurement	PASS	Meet the requirement of limit

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Radiated emissions (30MHz-1GHz)	3.36 dB
Radiated emissions (1GHz ~18GHz)	2.25 dB
Radiated emissions (18GHz ~20GHz)	1.88 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Microsoft® Bluetooth® Notebook Mouse 5000
MODEL NO.	1077
FCC ID	C3K1077
POWER SUPPLY	1.5 VDC from 2 AAA batteries in parallel.
PACKET TYPE	DH1
MODULATION TYPE	GFSK
MODULATION TECHNOLOGY	FHSS
FREQUENCY RANGE	2402MHz ~ 2480MHz
NUMBER OF CHANNEL	79
OUTPUT POWER	2.344 mW
ANTENNA TYPE	Inverted F antenna with 1.676dBi antenna gain
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT have two configs, which are identical to each other in all aspects except for the followings:

Configs	Difference
Configs 1	Balun: TDK
Configs 2	Balun: ACX

2. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

Seventy-nine channels are provided to this EUT.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

3.3 Test Mode Applicability and tested channel detail

EUT CONFIGURE MODE	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
-	x	√	√	√	NA

Where **PLC:** Power Line Conducted Emission **RE<1G:** Radiated Emission below 1GHz

RE≥1G: Radiated Emission above 1GHz **APCM:** Antenna Port Conducted Measurement

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
0 to 78	0	FHSS	GFSK	DH1

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
0 to 78	0, 39, 78	FHSS	GFSK	DH1

BANDEDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
0 to 78	0, 78	FHSS	GFSK	DH1

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
0 to 78	0, 39, 78	FHSS	GFSK	DH1

3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Microsoft® Bluetooth® Notebook Mouse 5000. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C. (15.247)
ANSI C63.4 : 2003

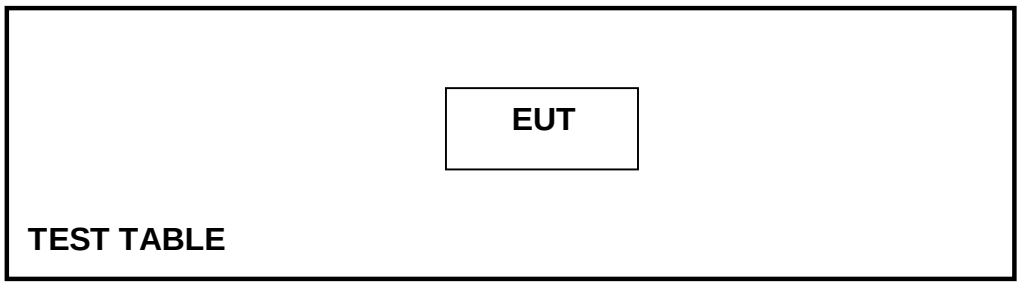
All test items have been performed and recorded as per the above standards.

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit.

3.6 CONFIGURATION OF SYSTEM UNDER TEST



4 TEST PROCEDURES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

NA

4.2 NUMBER OF HOPPING FREQUENCY USED

4.2.1 LIMIT OF HOPPING FREQUENCY USED

At least 75 hopping frequencies, and should be equally spaced.

4.2.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 21, 2007

Note:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

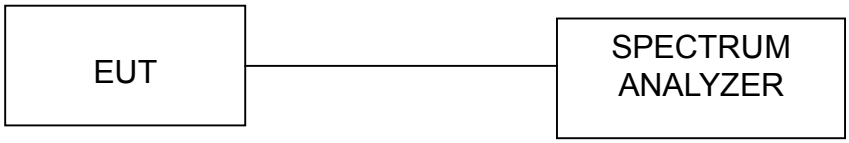
4.2.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect its antenna terminal to measurement 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 SA 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 SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

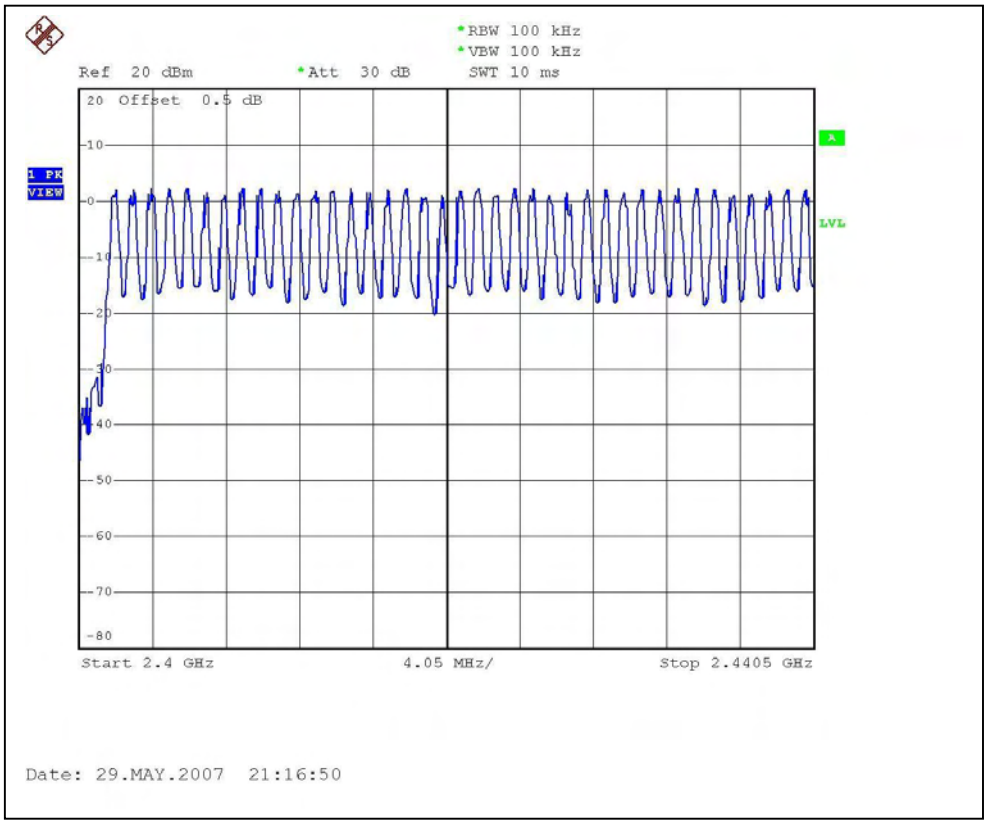
4.2.5 TEST SETUP

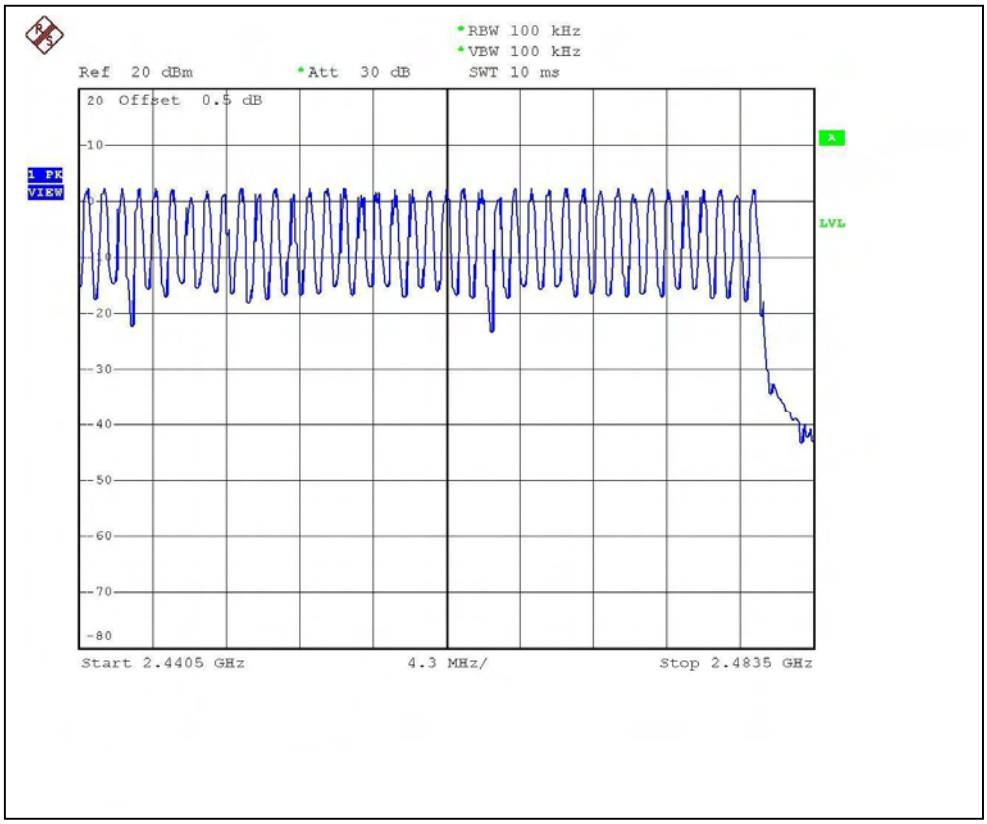


4.2.6 TEST RESULTS

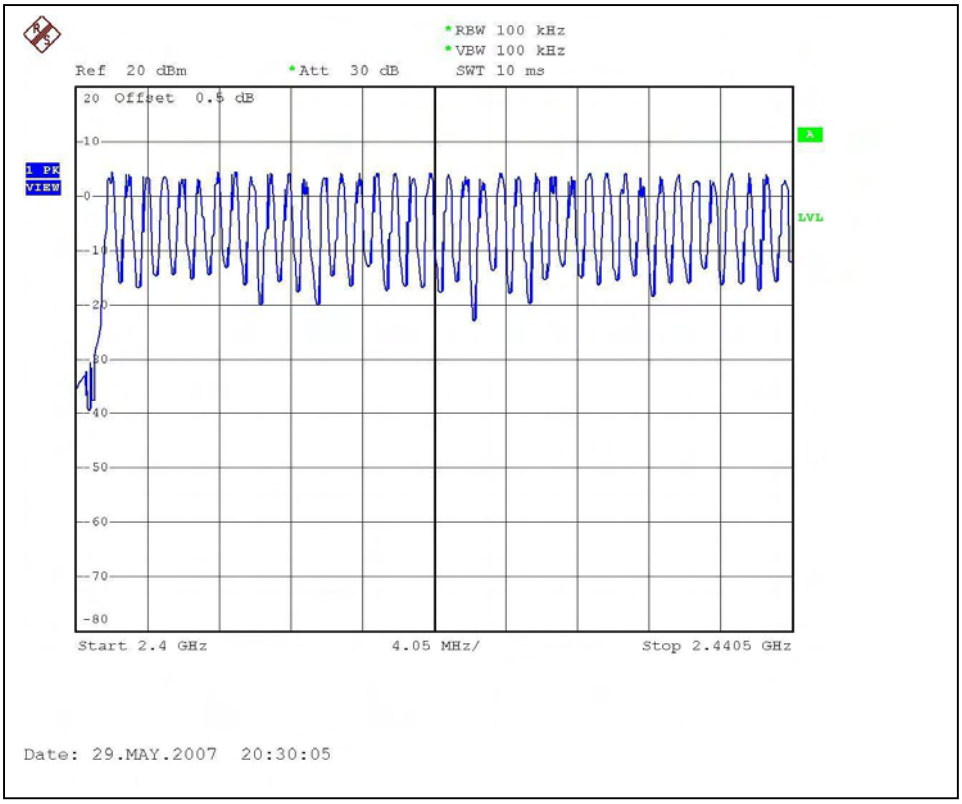
There are 79 hopping frequencies in the hopping mode. Please refer to next page for the test result. On the plots, it shows that the hopping frequencies are equally spaced.

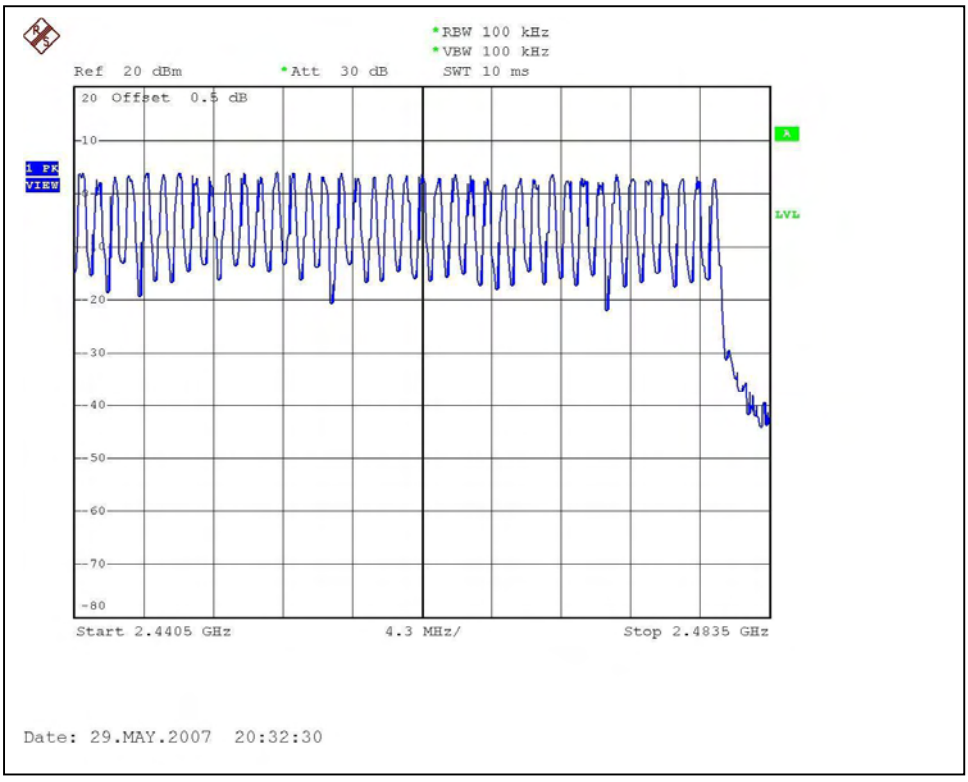
Configs 1


RBW 100 kHz
VBW 100 kHz
Ref 20 dBm
Att 30 dB
SWT 10 ms
20 Offset 0.5 dB
1 PK VIEW
LVL
Start 2.4 GHz
4.05 MHz/
Stop 2.4405 GHz
Date: 29.MAY.2007 21:16:50


RBW 100 kHz
VBW 100 kHz
Ref 20 dBm
Att 30 dB
SWT 10 ms
20 Offset 0.5 dB
1 PK VIEW
LVL
Start 2.4405 GHz
4.3 MHz/
Stop 2.4835 GHz

Configs 2


RBW 100 kHz
VBW 100 kHz
Ref 20 dBm
Att 30 dB
SWT 10 ms
20 Offset 0.5 dB
1 PK VIEW
A
LVL
Start 2.4 GHz
4.05 MHz/
Stop 2.4405 GHz
Date: 29.MAY.2007 20:30:05


RBW 100 kHz
VBW 100 kHz
Ref 20 dBm
Att 30 dB
SWT 10 ms
20 Offset 0.5 dB
1 PK VIEW
A
LVL
Start 2.4405 GHz
4.3 MHz/
Stop 2.4835 GHz
Date: 29.MAY.2007 20:32:30

4.3 DWELL TIME ON EACH CHANNEL

4.3.1 LIMIT OF DWELL TIME USED

For FHSS, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 31.6 second period. For hybrid systems, the average time of occupancy on any frequency should not exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 21, 2007

Note:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

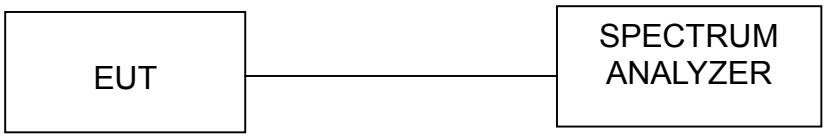
4.3.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect its antenna terminal to measurement 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 SA on any frequency be measured and set SA 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.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 TEST RESULTS

Configs 1

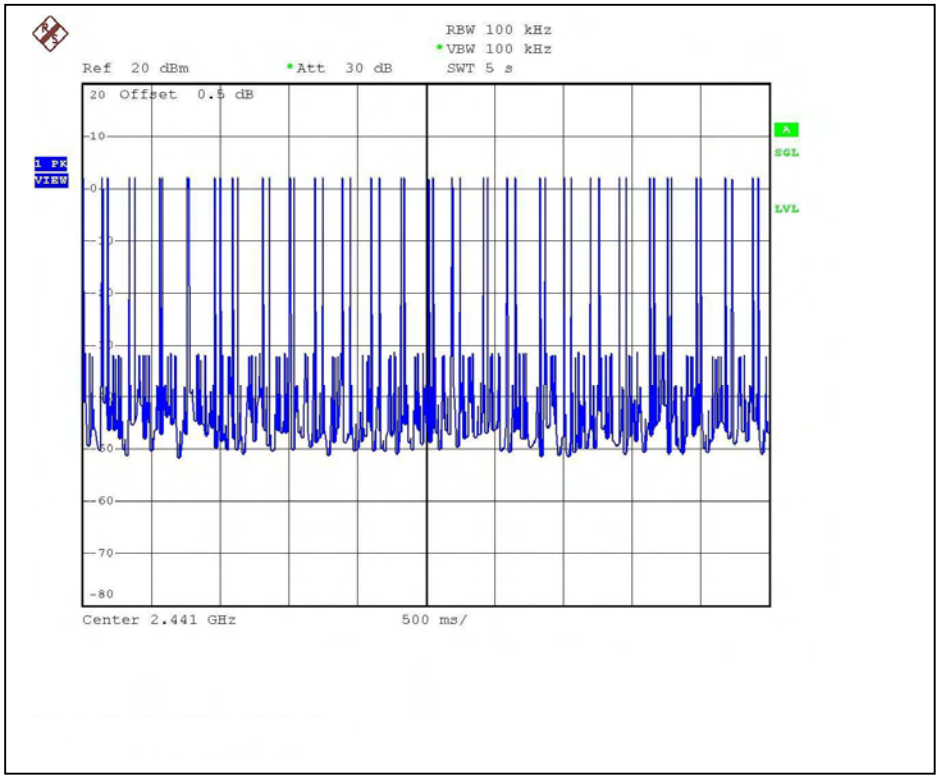
Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	51 (times / 5 sec) *6.32=322.32 times	0.188	60.6	400

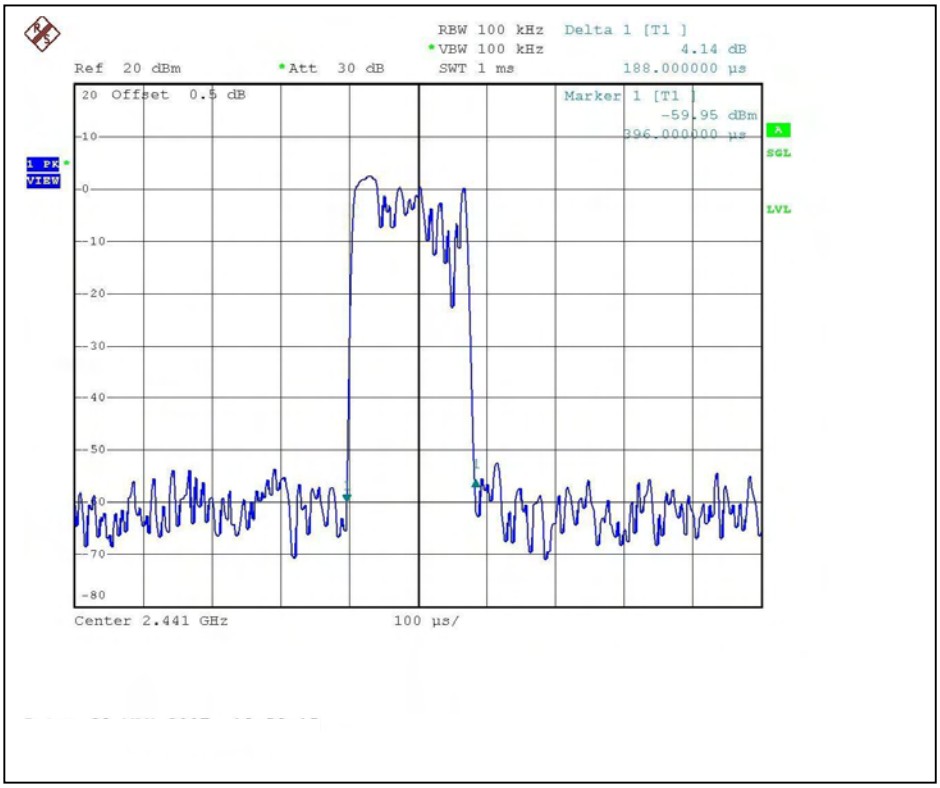
Configs 2

Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	50 (times / 5 sec) *6.32=316.00 times	0.188	59.4	400

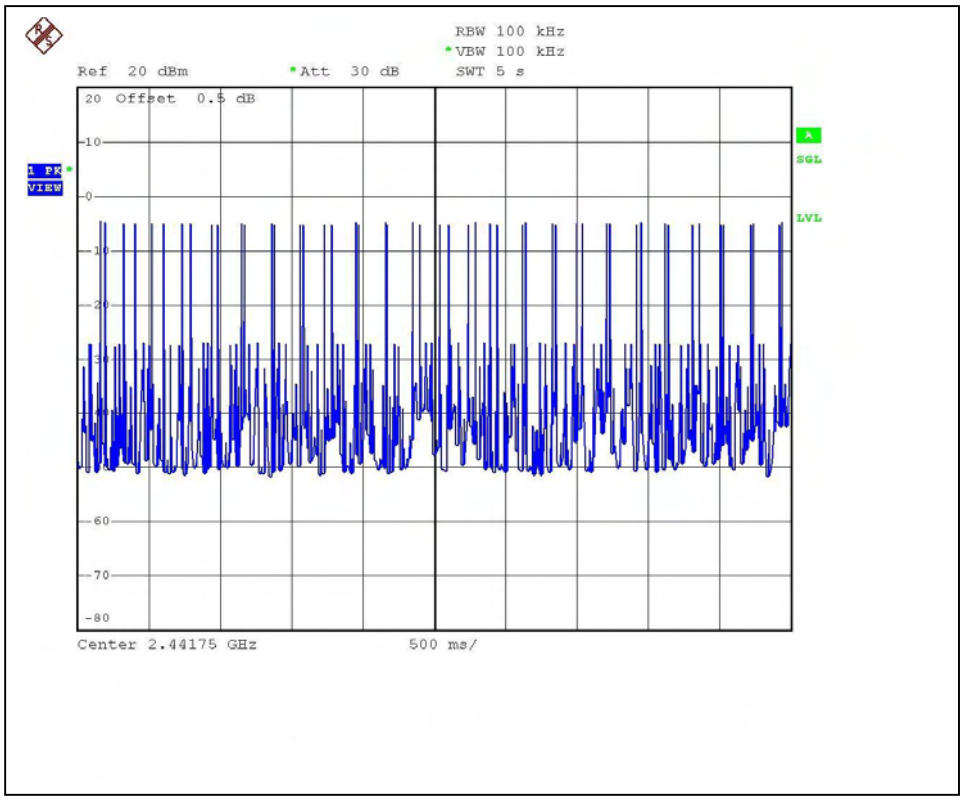
Test plots of the transmitting time slot are shown on following pages.

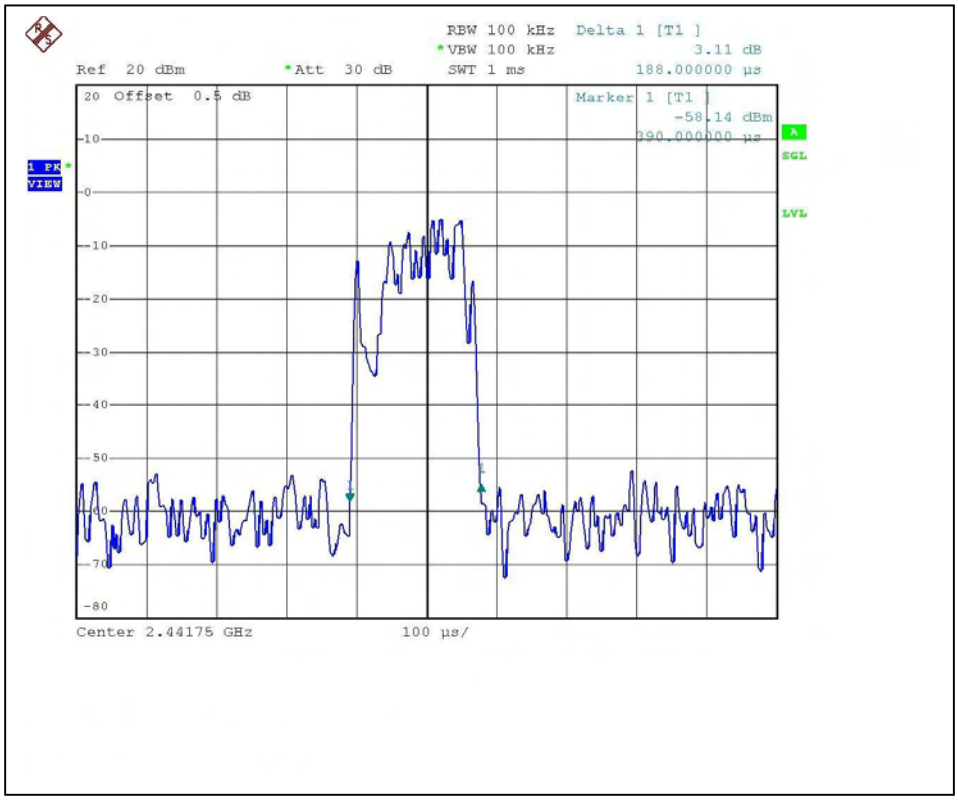
Configs 1
DH1





Configs 2
DH1





4.4 CHANNEL BANDWIDTH

4.4.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 21, 2007

Note:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.4.2 TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

4.4.3 DEVIATION FROM TEST STANDARD

No deviation

4.4.4 TEST SETUP

4.4.5 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.4.6 TEST RESULTS

ENVIRONMENTAL CONDITIONS	26deg. C, 55%RH, 960 hPa	INPUT POWER	DC 1.5V
TESTED BY	Rex Huang		

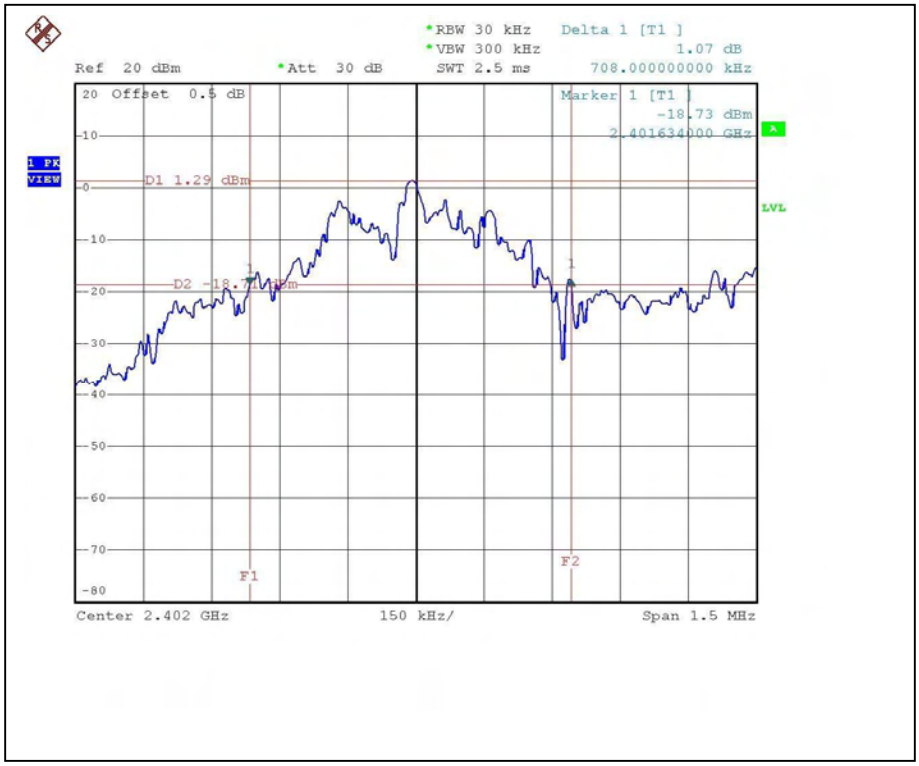
Configs 1

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (kHz)
0	2402	708
39	2441	702
78	2480	708

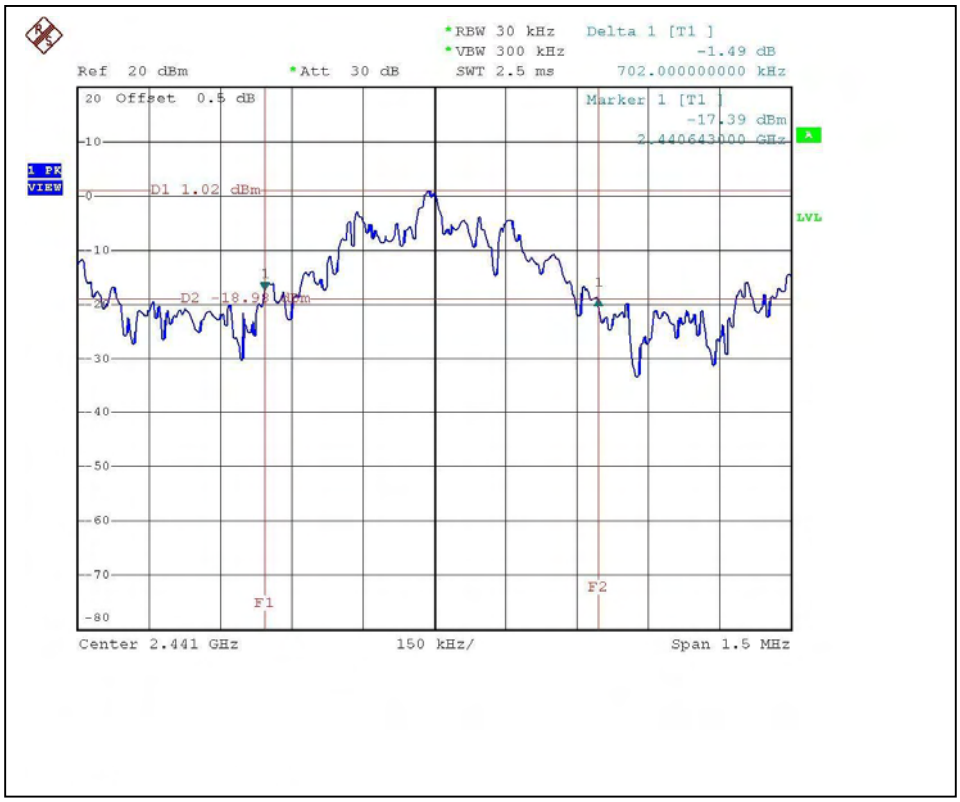
Configs 2

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (kHz)
0	2402	750
39	2441	780
78	2480	747

Configs 1
Channel 0



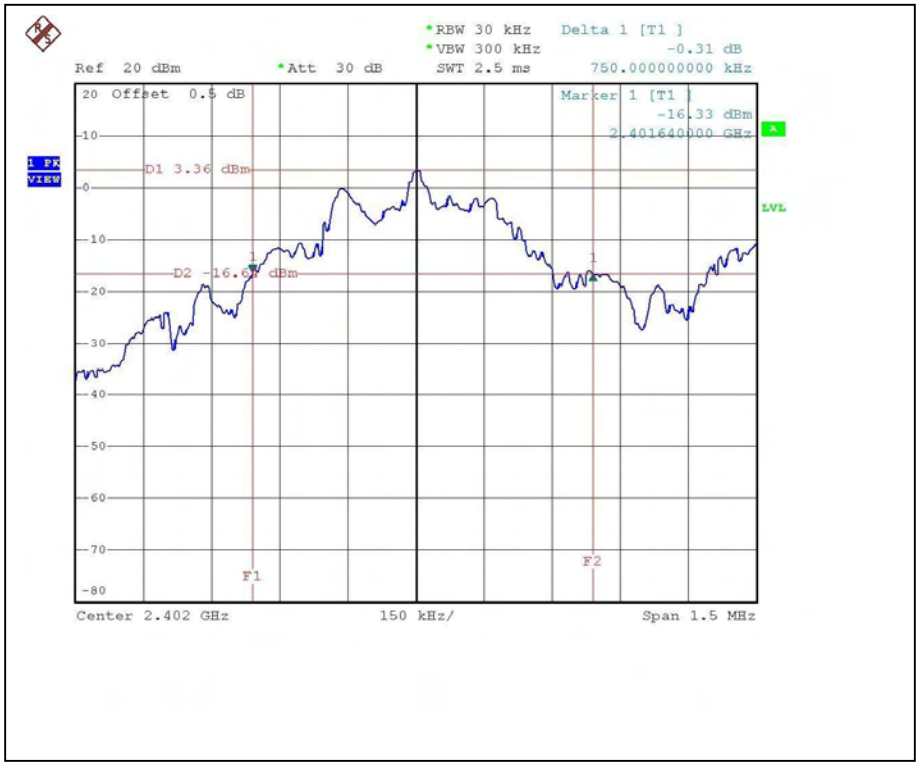
Channel 39



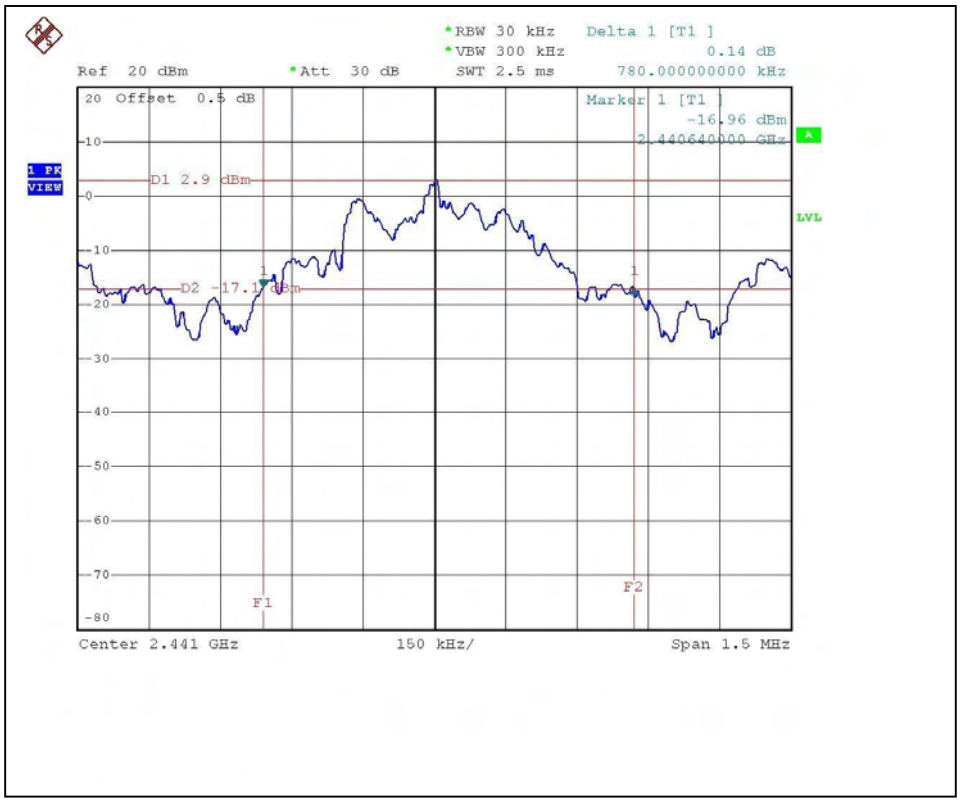
Channel 78


*RBW 30 kHz
Delta 1 [T1]
*VBW 300 kHz
-0.81 dB
Ref 20 dBm
*Att 30 dB
SWT 2.5 ms
708.000000000 kHz
20 Offset 0.5 dB
Marker 1 [T1]
-18.08 dBm
2.479640000 GHz
1 PK
VIEW
D1 1.04 dBm
LVL
D2 -18.96 dBm
F1
F2
Center 2.48 GHz
150 kHz/
Span 1.5 MHz
Date: 29.MAY.2007 21:31:55

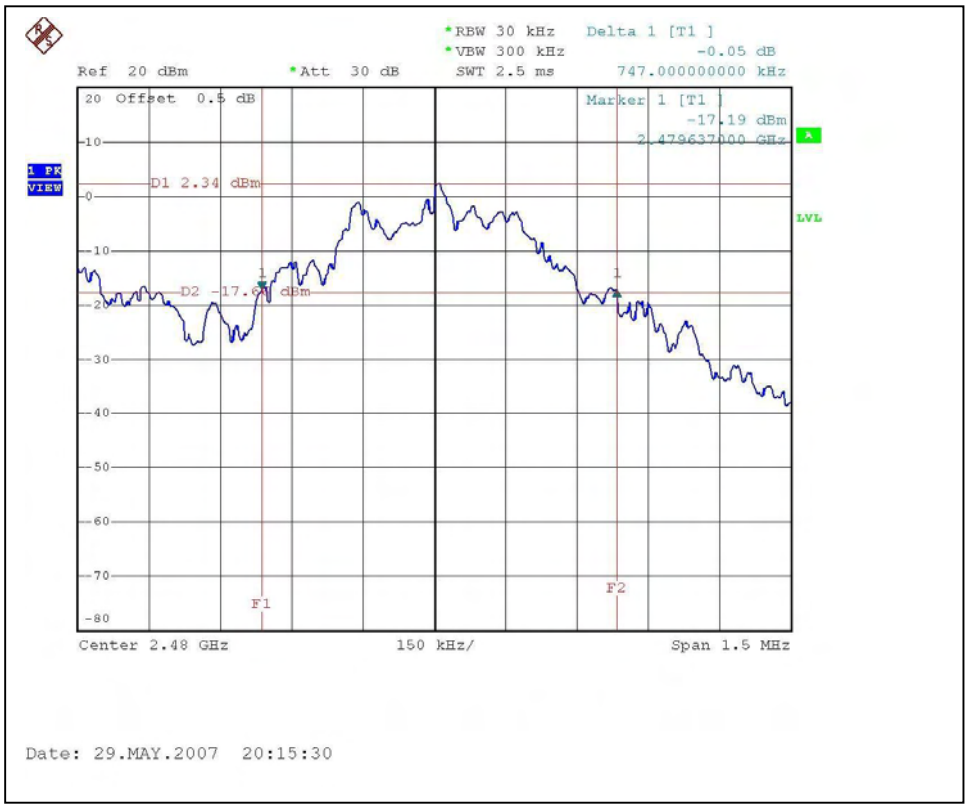
Configs 2
Channel 0



Channel 39



Channel 78


RBW 30 kHz
VBW 300 kHz
SWT 2.5 ms
Delta 1 [T1]
-0.05 dB
747.000000000 kHz
Ref 20 dBm
Att 30 dB
Offset 0.5 dB
Marker 1 [T1]
-17.19 dBm
2.479637000 GHz
1 PK VIEW
D1 2.34 dBm
D2 -17.60 dBm
LVL
F1
F2
Center 2.48 GHz
150 kHz/
Span 1.5 MHz
Date: 29.MAY.2007 20:15:30

4.5 HOPPING CHANNEL SEPARATION

4.5.1 LIMIT OF HOPPING CHANNEL SEPARATION

At least 25 kHz or 20dB hopping channel bandwidth (whichever is greater).

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 21, 2007

Note:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

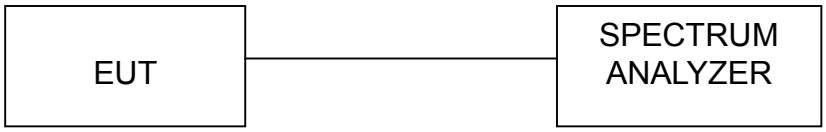
4.5.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. 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 two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 TEST RESULTS

ENVIRONMENTAL CONDITIONS	26deg. C, 55%RH, 960 hPa	INPUT POWER	DC 1.5V
TESTED BY	Rex Huang		

Configs 1

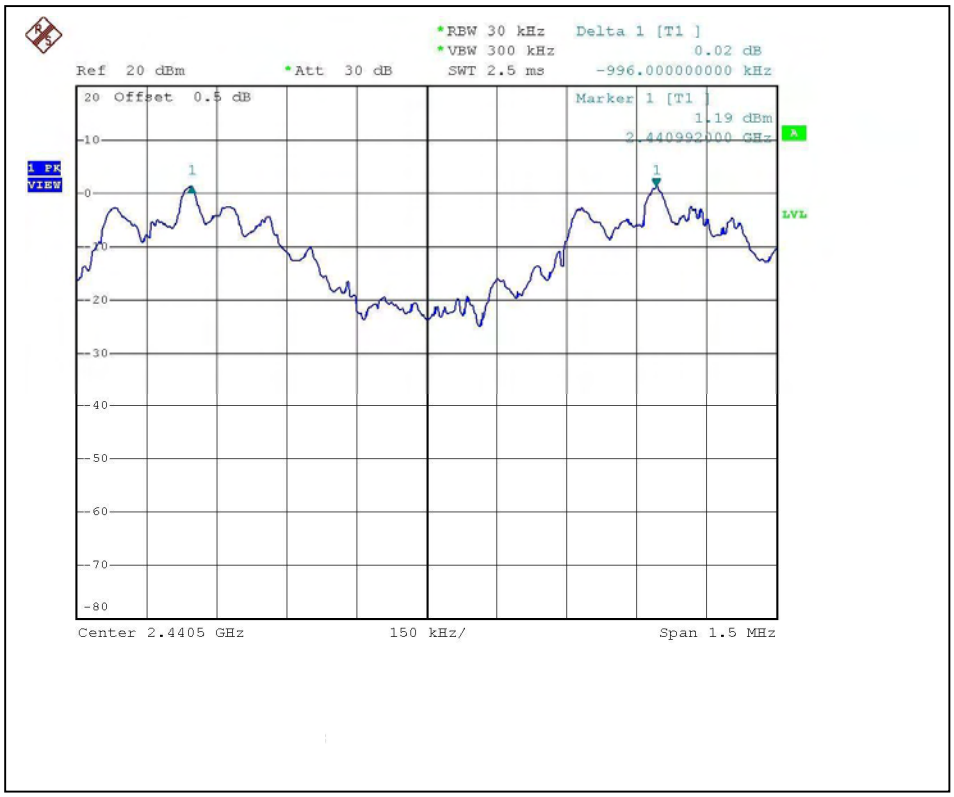
Channel	Frequency (MHz)	Adjacent Channel Separation	Minimum Limit (kHz)	Pass / Fail
0	2402	1.005MHz	708	PASS
39	2441	0.996MHz	702	PASS
78	2480	0.999MHz	708	PASS

Configs 2

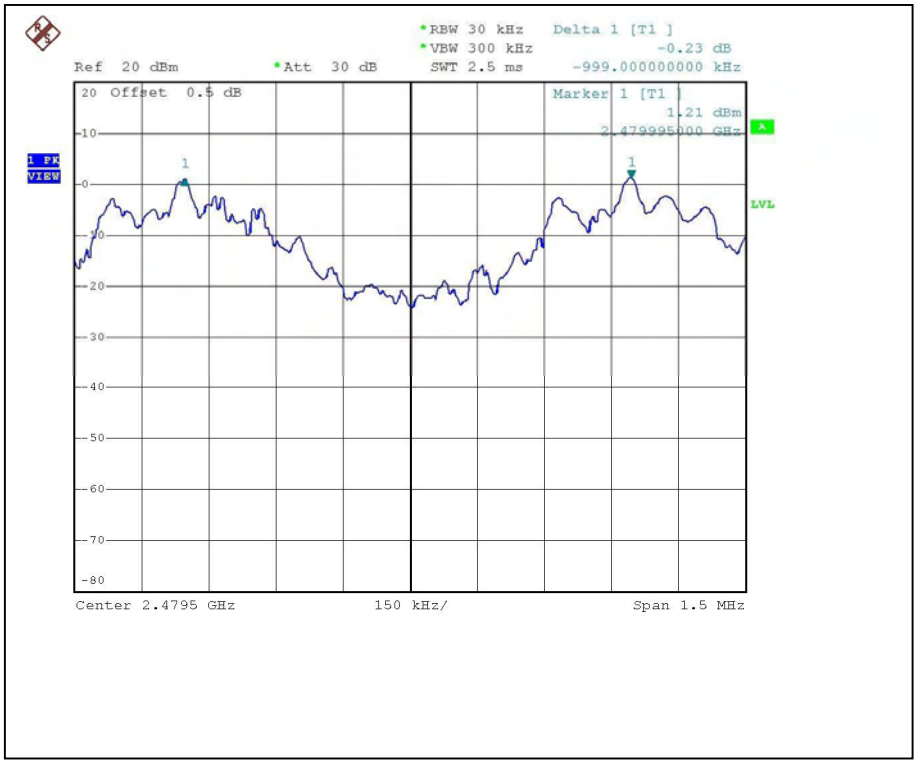
Channel	Frequency (MHz)	Adjacent Channel Separation	Minimum Limit (kHz)	Pass / Fail
0	2402	0.996MHz	750	PASS
39	2441	0.993MHz	780	PASS
78	2480	0.999MHz	747	PASS

Configs 1
Channel 0

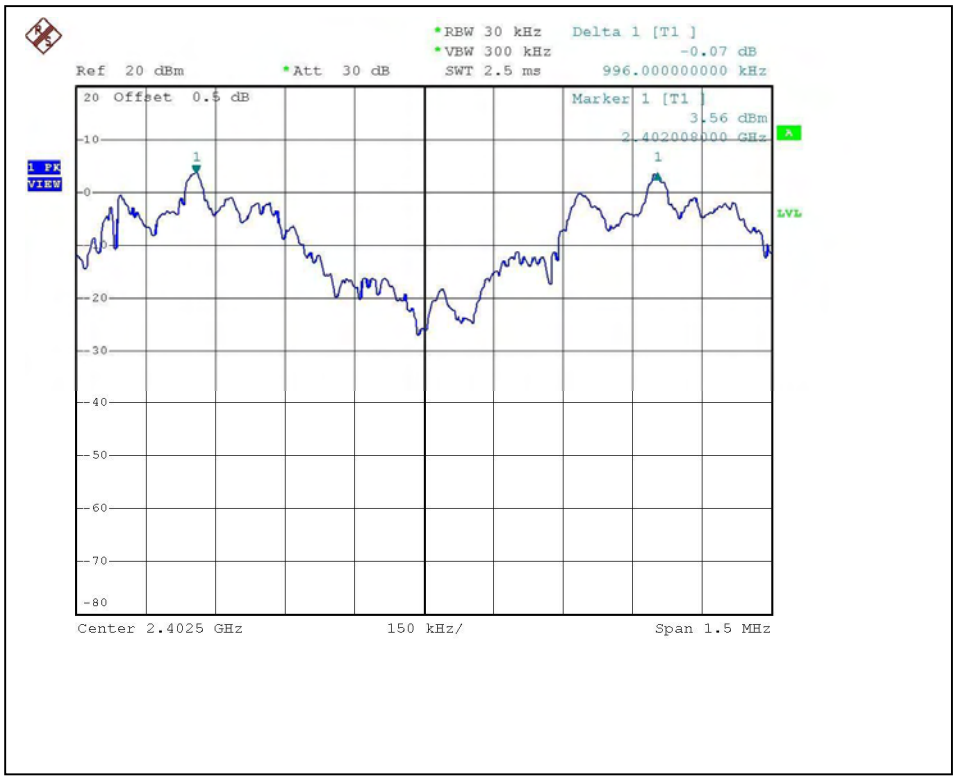
Channel 39



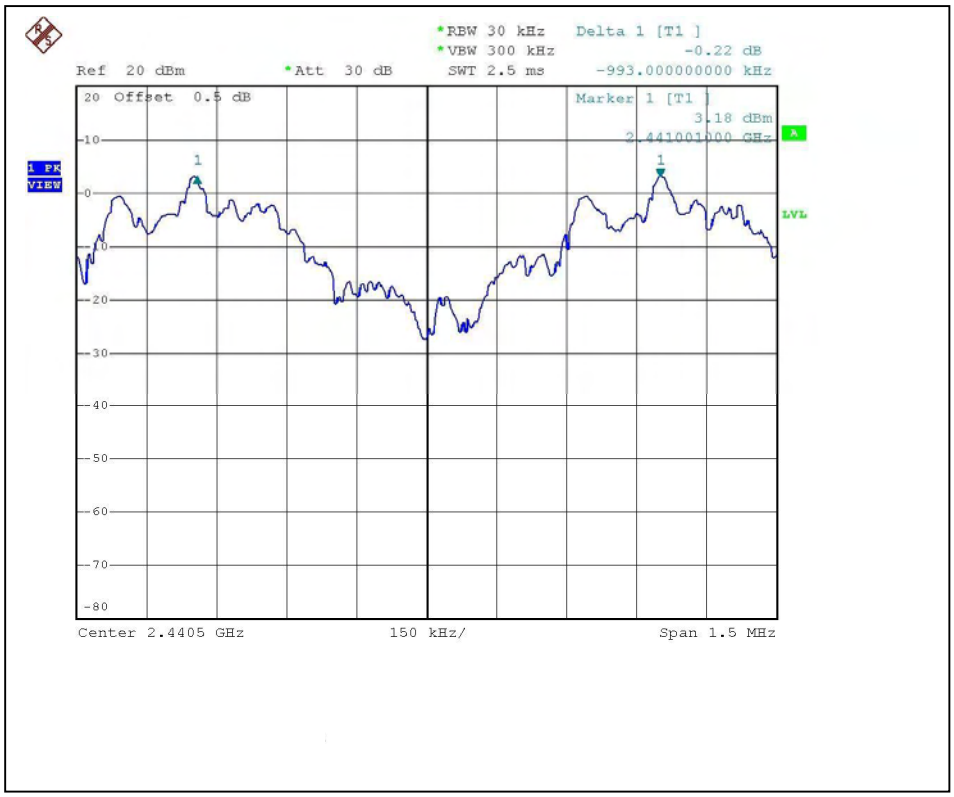
Channel 78


*RBW 30 kHz
Delta 1 [T1]
*VBW 300 kHz
-0.23 dB
Ref 20 dBm
*Att 30 dB
SWT 2.5 ms
-999.000000000 kHz
20 Offset 0.5 dB
Marker 1 [T1]
1.21 dBm
2.479995000 GHz
1 PK VIEW
LVL
Center 2.4795 GHz
150 kHz/
Span 1.5 MHz

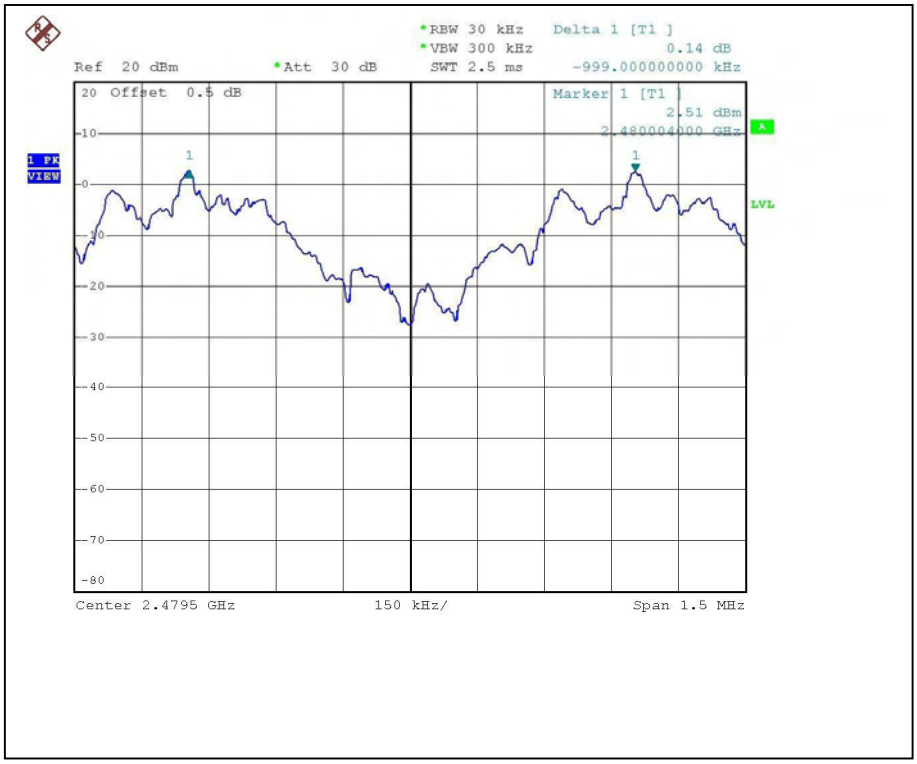
Configs 2
Channel 0



Channel 39



Channel 78


*RBW 30 kHz
Delta 1 [T1]
*VBW 300 kHz
0.14 dB
Ref 20 dBm
*Att 30 dB
SWT 2.5 ms
-999.000000000 kHz
20 Offset 0.5 dB
Marker 1 [T1]
2.51 dBm
2.480004000 GHz
1 PK VIEW
LVL
Center 2.4795 GHz
150 kHz/
Span 1.5 MHz

4.6 MAXIMUM PEAK OUTPUT POWER

4.6.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 1W.

4.6.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 21, 2007

Note:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

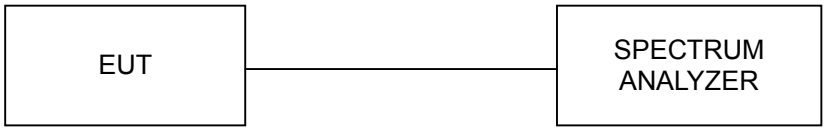
4.6.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3 MHz RBW and 3 MHz VBW.
4. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
5. Repeat above procedures until all frequencies measured were complete.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

4.6.6 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.6.7 TEST RESULTS

ENVIRONMENTAL CONDITIONS	26deg. C, 55%RH, 960 hPa	INPUT POWER	DC 1.5V
TESTED BY	Rex Huang		

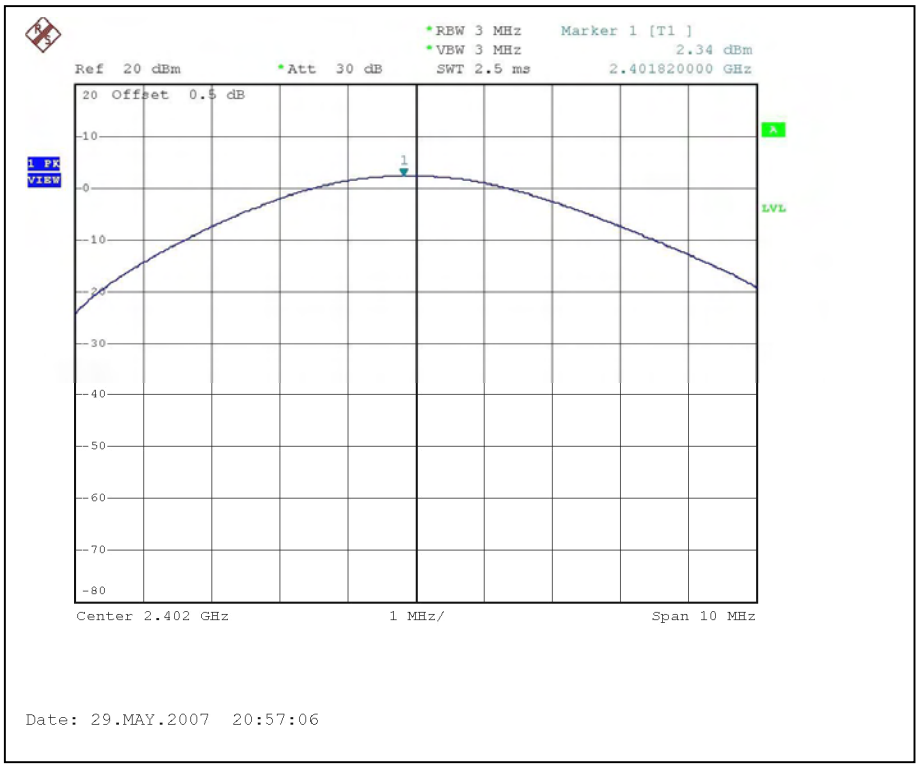
Configs 1

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	1.714	2.34	30	PASS
39	2441	1.706	2.32	30	PASS
78	2480	1.718	2.35	30	PASS

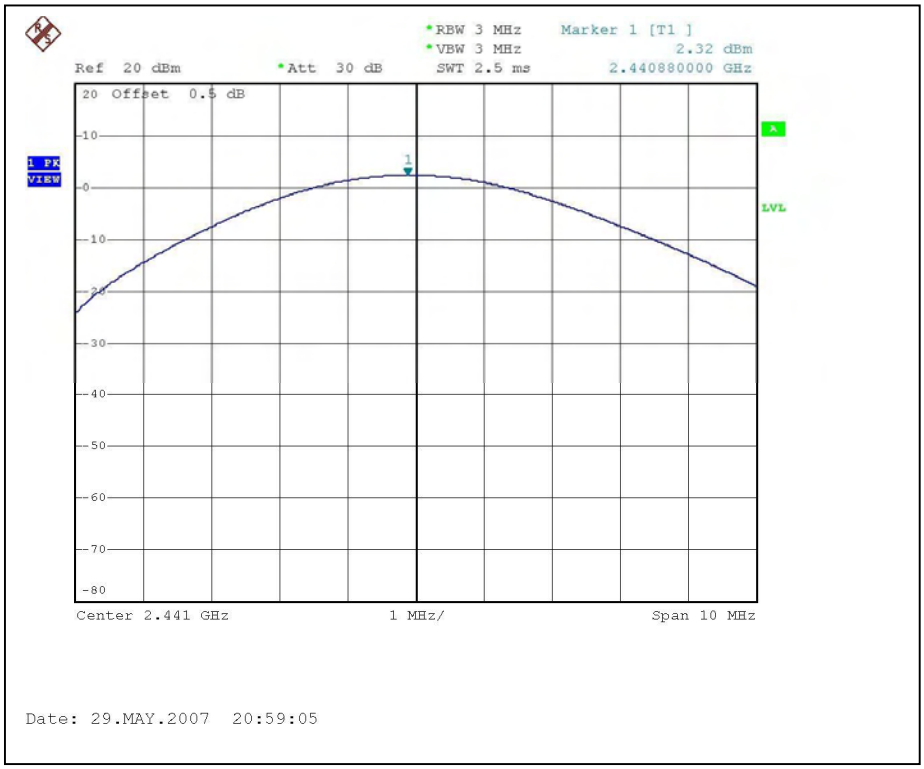
Configs 2

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	2.344	3.70	30	PASS
39	2441	2.323	3.66	30	PASS
78	2480	2.042	3.10	30	PASS

Configs 1
Channel 0



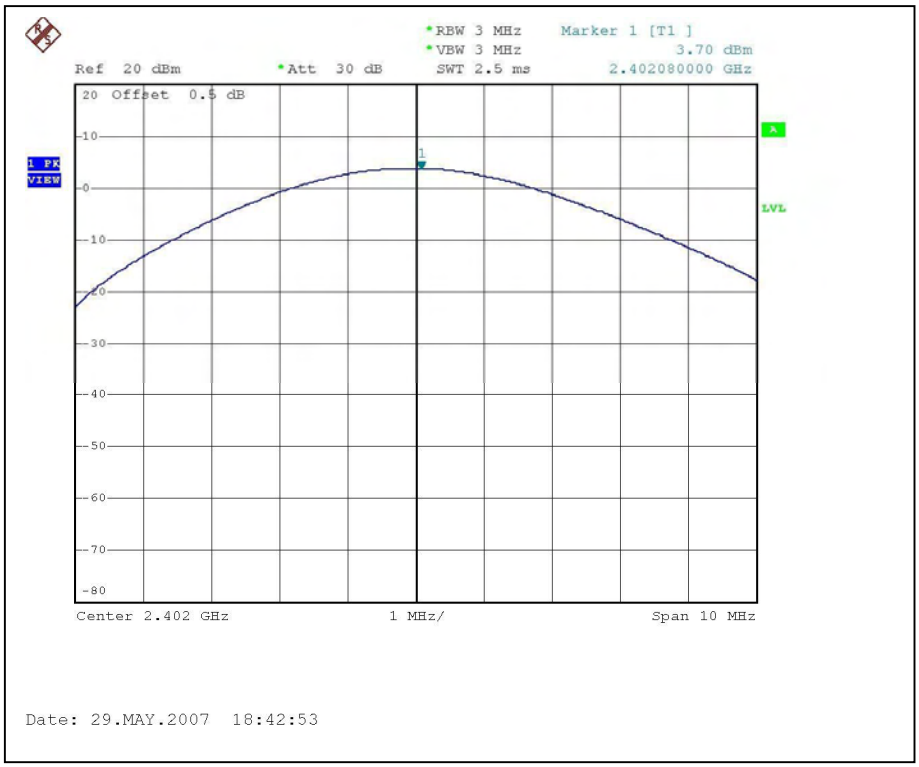
Channel 39



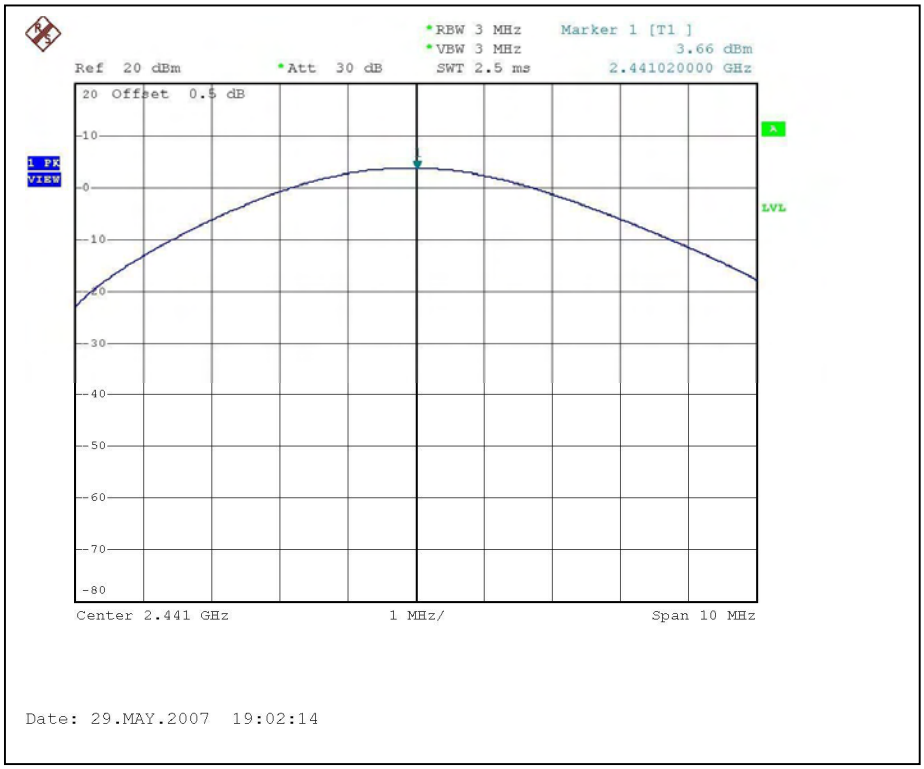
Channel 78


RBW 3 MHz
VBW 3 MHz
SWT 2.5 ms
Marker 1 [T1]
2.35 dBm
2.480000000 GHz
Ref 20 dBm
Att 30 dB
Offset 0.5 dB
1 PK VIEW
LVL
Center 2.48 GHz
1 MHz/
Span 10 MHz
Date: 29.MAY.2007 21:06:31

Configs 2
Channel 0



Channel 39



Channel 78


RBW 3 MHz
VBW 3 MHz
SWT 2.5 ms
Marker 1 [T1]
3.10 dBm
2.479860000 GHz
Ref 20 dBm
Att 30 dB
Offset 0.5 dB
1 PK VIEW
LVL
Center 2.48 GHz
1 MHz/
Span 10 MHz
Date: 29.MAY.2007 19:04:00

4.7 RADIATED EMISSION MEASUREMENT

4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 03, 2007
HP Pre_Amplifier	8449B	3008A01922	Sep. 18, 2007
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Sep. 20, 2007
CHASE Broadband Antenna	VULB 9168	138	July 17, 2007
Schwarzbeck Horn_Antenna	BBHA9120	D124	Jan. 01, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 05, 2008
SCHWARZBECK Biconical Antenna	VHBA9123	459	Jun. 08, 2009
SCHWARZBECK Periodic Antenna	UPA6108	1148	Jun. 08, 2009
R&S Loop Antenna	HFH2-Z2	881058/15	Nov. 29, 2007
RF Switches (ARNITSU)	CS-201	1565157	NA
RF CABLE (Chaintek)	SF102	22054-2	Nov. 14. 2007
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M-1 GHz	Jul. 15, 2007
Software	ADT_Radiated_V 7.6.15.7	NA	NA
CHANCE MOST Antenna Tower	AT-100	0203	NA
CHANCE MOST Turn Table	TT-100	0203	NA

Note: 1. The calibration interval of the above test instruments is 12 months (36 months for Biconical and Periodic Antenna)and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: R3271A) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in ADT Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 4824A-3.

4.7.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

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 polarizations 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 rotatable 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.

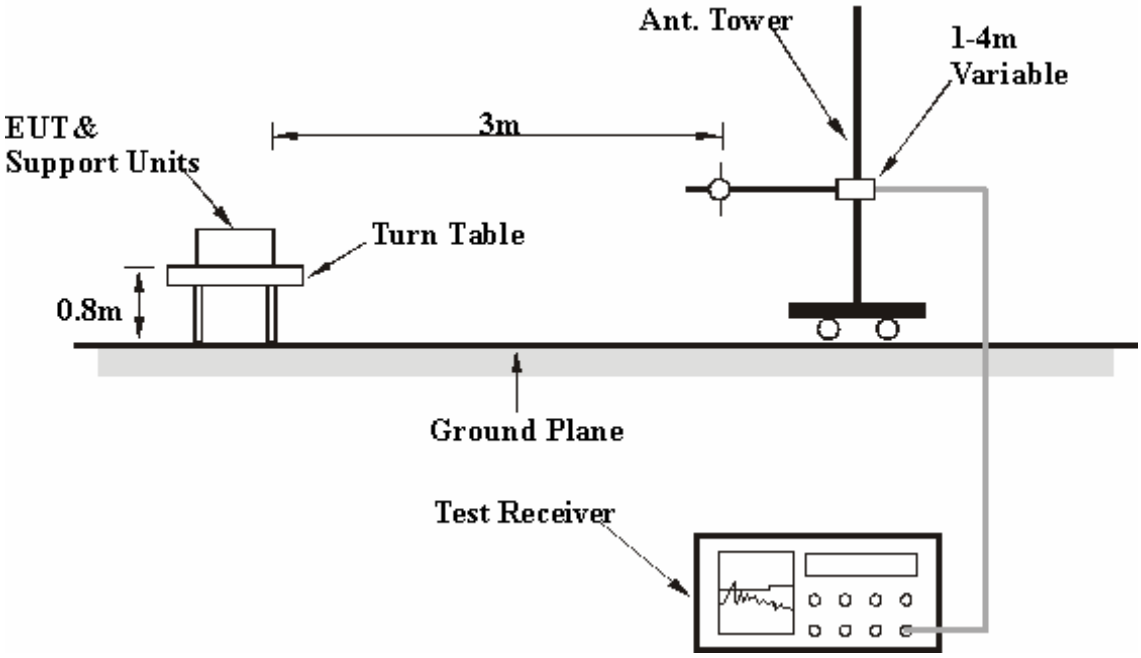
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at 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.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.7.6 TEST RESULTS

Configs 1

CHANNEL	0	**FREQUENCY RANGE**	Below 1GHz
INPUT POWER	DC 1.5V	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	26deg. C, 62%RH, 960 hPa	**TESTED BY**	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	156.00	23.62 QP	43.50	-19.88	1.41 H	264	9.62	14.00
2	260.00	24.71 QP	46.00	-21.29	1.34 H	245	10.79	13.92
3	364.00	31.52 QP	46.00	-14.48	1.00 H	162	13.68	17.84
4	520.00	29.06 QP	46.00	-16.94	1.00 H	284	6.71	22.35
5	624.00	30.96 QP	46.00	-15.04	1.46 H	330	6.22	24.74
6	780.00	31.94 QP	46.00	-14.06	1.19 H	283	4.46	27.48

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	156.00	24.66 QP	43.50	-18.84	1.00 V	82	10.66	14.00
2	260.00	24.29 QP	46.00	-21.71	1.00 V	139	10.37	13.92
3	364.00	30.86 QP	46.00	-15.14	1.00 V	285	13.02	17.84
4	520.00	29.46 QP	46.00	-16.54	1.00 V	126	7.11	22.35
5	624.00	30.89 QP	46.00	-15.11	1.68 V	294	6.15	24.74
6	780.00	32.46 QP	46.00	-13.54	1.29 V	308	4.98	27.48

REMARKS: 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

CHANNEL	Channel 0	FREQUENCY RANGE	1 ~25GHz
INPUT POWER	DC 1.5V	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 62%RH, 960 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2376.00	45.10 PK	74.00	-28.90	1.03 H	1	14.77	30.33
2	2376.00	34.70 AV	54.00	-19.30	1.03 H	1	4.37	30.33
3	2389.00	46.60 PK	74.00	-27.40	1.40 H	186	16.21	30.39
4	2389.00	10.10 AV	54.00	-43.90	1.40 H	186	-20.29	30.39
5	*2402.00	93.10 PK			1.40 H	186	62.65	30.45
6	*2402.00	49.10 AV			1.40 H	186	18.65	30.45
7	2698.00	46.30 PK	74.00	-27.70	1.23 H	165	14.97	31.33
8	2698.00	39.40 AV	54.00	-14.60	1.23 H	165	8.07	31.33
9	4804.00	50.10 PK	74.00	-23.90	1.55 H	80	14.45	35.65
10	4804.00	6.10 AV	54.00	-47.90	1.55 H	80	-29.55	35.65
11	7206.00	53.70 PK	74.00	-20.30	1.21 H	264	11.57	42.13
12	7206.00	23.70 AV	54.00	-30.30	1.21 H	264	-18.43	42.13

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2376.00	45.50 PK	74.00	-28.50	1.00 V	258	15.17	30.33
2	2376.00	37.90 AV	54.00	-16.10	1.00 V	258	7.57	30.33
3	2389.00	45.50 PK	74.00	-28.50	1.00 V	260	15.11	30.39
4	2389.00	9.00 AV	54.00	-45.00	1.00 V	260	-21.39	30.39
5	*2402.00	92.00 PK			1.00 V	260	61.55	30.45
6	*2402.00	48.00 AV			1.00 V	260	17.55	30.45
7	2968.00	44.90 PK	74.00	-29.10	1.00 V	252	12.96	31.94
8	2968.00	37.50 AV	54.00	-16.50	1.00 V	252	5.56	31.94
9	4804.00	49.20 PK	74.00	-24.80	1.25 V	279	13.55	35.65
10	4804.00	5.20 AV	54.00	-48.80	1.25 V	279	-30.45	35.65
11	7206.00	53.80 PK	74.00	-20.20	1.31 V	294	11.67	42.13
12	7206.00	9.80 AV	54.00	-44.20	1.31 V	294	-32.33	42.13

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH1 packet duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on 0.625*1 per 296.25 ms per channel.Therefore, the duty cycle be equal to: 20log(0.625/100)= -44dB
7. Average value = peak reading +20log(duty cycle)

CHANNEL	Channel 39	FREQUENCY RANGE	1 ~25GHz
INPUT POWER	DC 1.5V	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 62%RH, 960 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2441.00	92.30 PK			1.41 H	144	61.68	30.62
2	*2441.00	48.30 AV			1.41 H	144	17.68	30.62
3	2737.00	44.40 PK	74.00	-29.60	1.72 H	67	12.98	31.42
4	2737.00	37.30 AV	54.00	-16.70	1.72 H	67	5.88	31.42
5	4882.00	50.90 PK	74.00	-23.10	1.63 H	86	15.09	35.81
6	4882.00	6.90 AV	54.00	-47.10	1.63 H	86	-28.91	35.81
7	7323.00	54.30 PK	74.00	-19.70	1.27 H	279	11.74	42.56
8	7323.00	10.30 AV	54.00	-43.70	1.27 H	279	-32.26	42.56

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2441.00	92.90 PK			1.00 V	261	62.28	30.62
2	*2441.00	48.90 AV			1.00 V	261	18.28	30.62
3	2737.00	45.10 PK	74.00	-28.90	1.00 V	253	13.68	31.42
4	2737.00	38.00 AV	54.00	-16.00	1.00 V	253	6.58	31.42
5	4882.00	49.80 PK	74.00	-24.20	1.19 V	341	13.99	35.81
6	4882.00	5.80 AV	54.00	-48.20	1.19 V	341	-30.01	35.81
7	7323.00	54.60 PK	74.00	-19.40	1.27 V	247	12.04	42.56
8	7323.00	10.60 AV	54.00	-43.40	1.27 V	247	-31.96	42.56

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH1 packet duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on 0.625*1 per 296.25 ms per channel.Therefore, the duty cycle be equal to: 20log(0.625/100)= -44dB
7. Average value = peak reading +20log(duty cycle)

CHANNEL	Channel 78	**FREQUENCY RANGE**	1 ~25GHz
INPUT POWER	DC 1.5V	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 62%RH, 960 hPa	**TESTED BY**	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	91.80 PK			1.41 H	197	61.00	30.80
2	*2480.00	47.80 AV			1.41 H	197	17.00	30.80
3	2483.50	42.80 PK	74.00	-31.20	1.41 H	197	11.98	30.82
4	2483.50	18.50 AV	54.00	-35.50	1.41 H	197	-12.32	30.82
5	2493.00	46.10 PK	74.00	-27.90	1.41 H	197	15.24	30.86
6	2493.00	8.30 AV	54.00	-45.70	1.41 H	197	-22.56	30.86
7	2776.00	43.60 PK	74.00	-30.40	1.37 H	152	12.09	31.51
8	2776.00	35.40 AV	54.00	-18.60	1.37 H	152	3.89	31.51
9	4960.00	52.70 PK	74.00	-21.30	1.59 H	98	16.72	35.98
10	4960.00	8.70 AV	54.00	-45.30	1.59 H	98	-27.28	35.98
11	7440.00	54.50 PK	74.00	-19.50	1.24 H	313	11.50	43.00
12	7440.00	10.50 AV	54.00	-43.50	1.24 H	313	-32.50	43.00

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	91.60 PK			1.06 V	248	60.80	30.80
2	*2480.00	47.60 AV			1.06 V	248	16.80	30.80
3	2483.50	42.60 PK	74.00	-31.40	1.06 V	248	11.78	30.82
4	2483.50	18.30 AV	54.00	-35.70	1.06 V	248	-12.52	30.82
5	2493.00	45.90 PK	74.00	-28.10	1.06 V	248	15.04	30.86
6	2493.00	8.10 AV	54.00	-45.90	1.06 V	248	-22.76	30.86
7	2776.00	44.20 PK	74.00	-29.80	1.00 V	111	12.69	31.51
8	2776.00	36.70 AV	54.00	-17.30	1.00 V	111	5.19	31.51
9	4960.00	50.40 PK	74.00	-23.60	1.30 V	349	14.42	35.98
10	4960.00	6.40 AV	54.00	-47.60	1.30 V	349	-15.58	35.98
11	7440.00	54.60 PK	74.00	-19.40	1.22 V	215	11.60	43.00
12	7440.00	10.60 AV	54.00	-43.40	1.22 V	215	-32.40	43.00

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH1 packet duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on 0.625*1 per 296.25 ms per channel.Therefore, the duty cycle be equal to: 20log(0.625/100)= -44dB
7. Average value = peak reading +20log(duty cycle)

Configs 2

CHANNEL	0	FREQUENCY RANGE	Below 1GHz
INPUT POWER	DC 1.5V	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	26deg. C, 62%RH, 960 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	156.00	23.58 QP	43.50	-19.92	1.49 H	251	9.58	14.00
2	260.00	24.26 QP	46.00	-21.74	1.38 H	312	10.34	13.92
3	364.00	30.22 QP	46.00	-15.78	1.12 H	245	12.38	17.84
4	520.00	28.94 QP	46.00	-17.06	1.04 H	297	6.59	22.35
5	624.00	31.08 QP	46.00	-14.92	1.57 H	283	6.34	24.74
6	780.00	32.55 QP	46.00	-13.45	1.27 H	299	5.07	27.48

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	156.00	25.46 QP	43.50	-18.04	1.00 V	197	11.46	14.00
2	260.00	24.14 QP	46.00	-21.86	1.00 V	167	10.22	13.92
3	364.00	29.82 QP	46.00	-16.18	1.00 V	284	11.98	17.84
4	520.00	29.32 QP	46.00	-16.68	1.00 V	312	6.97	22.35
5	624.00	31.86 QP	46.00	-14.14	1.67 V	264	7.12	24.74
6	780.00	33.04 QP	46.00	-12.96	1.26 V	320	5.56	27.48

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

CHANNEL	Channel 0	FREQUENCY RANGE	1 ~25GHz
INPUT POWER	DC 1.5V	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 62%RH, 960 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2376.00	47.40 PK	74.00	-26.60	1.21 H	23	17.07	30.33
2	2376.00	40.00 AV	54.00	-14.00	1.21 H	23	9.67	30.33
3	2389.00	49.80 PK	74.00	-24.20	1.71 H	42	19.41	30.39
4	2389.00	13.70 AV	54.00	-40.30	1.71 H	42	-16.69	30.39
5	*2402.00	96.10 PK			1.71 H	42	65.65	30.45
6	*2402.00	52.10 AV			1.71 H	42	21.65	30.45
7	2687.50	46.60 PK	74.00	-27.40	1.48 H	17	15.29	31.31
8	2687.50	40.00 AV	54.00	-14.00	1.48 H	17	8.69	31.31
9	4804.00	49.60 PK	74.00	-24.40	1.95 H	11	13.95	35.65
10	4804.00	5.60 AV	54.00	-48.40	1.95 H	11	-30.05	35.65
11	7206.00	53.60 PK	74.00	-20.40	1.61 H	204	11.47	42.13
12	7206.00	9.60 AV	54.00	-44.40	1.61 H	204	-32.53	42.13

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2376.00	49.60 PK	74.00	-24.40	1.21 V	87	19.27	30.33
2	**2376.00**	**43.60 AV**	**54.00**	**-10.40**	**1.21 V**	**87**	**13.27**	**30.33**
3	2389.00	50.50 PK	74.00	-23.50	1.12 V	89	20.11	30.39
4	2389.00	14.40 AV	54.00	-39.60	1.12 V	89	-15.99	30.39
5	*2402.00	96.80 PK			1.12 V	89	66.35	30.45
6	*2402.00	52.80 AV			1.12 V	89	22.35	30.45
7	2687.50	45.80 PK	74.00	-28.20	1.66 V	96	14.49	31.31
8	2687.50	39.50 AV	54.00	-14.50	1.66 V	96	8.19	31.31
9	4804.00	49.10 PK	74.00	-24.90	1.52 V	168	13.45	35.65
10	4804.00	5.10 AV	54.00	-48.90	1.52 V	168	-30.55	35.65
11	7206.00	52.80 PK	74.00	-21.20	1.47 V	152	10.67	42.13
12	7206.00	8.80 AV	54.00	-45.20	1.47 V	152	-33.33	42.13

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH1 packet duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on 0.625*1 per 296.25 ms per channel.Therefore, the duty cycle be equal to: 20log(0.625/100)= -44dB
7. Average value = peak reading +20log(duty cycle)

CHANNEL	Channel 39	FREQUENCY RANGE	1 ~25GHz
INPUT POWER	DC 1.5V	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 62%RH, 960 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2441.00	95.70 PK			1.40 H	9	65.08	30.62
2	*2441.00	51.70 AV			1.40 H	9	21.08	30.62
3	2726.70	45.40 PK	74.00	-28.60	1.81 H	13	14.00	31.40
4	2726.70	39.40 AV	54.00	-14.60	1.81 H	13	8.00	31.40
5	4882.00	50.80 PK	74.00	-23.20	1.37 H	21	14.99	35.81
6	4882.00	6.80 AV	54.00	-47.20	1.37 H	21	-29.01	35.81
7	7323.00	53.50 PK	74.00	-20.50	1.51 H	13	10.94	42.56
8	7323.00	9.50 AV	54.00	-44.50	1.51 H	13	-33.06	42.56

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2441.00	97.10 PK			1.00 V	79	66.48	30.62
2	*2441.00	53.10 AV			1.00 V	79	22.48	30.62
3	2726.70	45.10 PK	74.00	-28.90	1.59 V	75	13.70	31.40
4	2726.70	38.40 AV	54.00	-15.60	1.59 V	75	7.00	31.40
5	4882.00	50.90 PK	74.00	-23.10	1.33 V	168	15.09	35.81
6	4882.00	6.90 AV	54.00	-47.10	1.33 V	168	-28.91	35.81
7	7323.00	53.10 PK	74.00	-20.90	1.27 V	112	10.54	42.56
8	7323.00	9.10 AV	54.00	-44.90	1.27 V	112	-33.46	42.56

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH1 packet duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on 0.625*1 per 296.25 ms per channel.Therefore, the duty cycle be equal to: 20log(0.625/100)= -44dB
7. Average value = peak reading +20log(duty cycle)

CHANNEL	Channel 78	**FREQUENCY RANGE**	1 ~25GHz
INPUT POWER	DC 1.5V	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 62%RH, 960 hPa	**TESTED BY**	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	94.70 PK			1.91 H	228	63.90	30.80
2	*2480.00	50.70 AV			1.91 H	228	19.90	30.80
3	2483.50	45.80 PK	74.00	-28.20	1.91 H	228	14.98	30.82
4	2483.50	21.60 AV	54.00	-32.40	1.91 H	228	-9.22	30.82
5	2493.00	48.30 PK	74.00	-25.70	1.91 H	228	17.44	30.86
6	2493.00	12.50 AV	54.00	-41.50	1.91 H	228	-18.36	30.86
7	2765.70	43.20 PK	74.00	-30.80	1.74 H	21	11.71	31.49
8	2765.70	36.40 AV	54.00	-17.60	1.74 H	21	4.91	31.49
9	4960.00	52.70 PK	74.00	-21.30	1.77 H	0	16.72	35.98
10	4960.00	8.70 AV	54.00	-45.30	1.77 H	0	-27.28	35.98
11	7440.00	53.70 PK	74.00	-20.30	1.47 H	17	10.70	43.00
12	7440.00	9.70 AV	54.00	-44.30	1.47 H	17	-33.30	43.00

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	93.60 PK			1.15 V	257	62.80	30.80
2	*2480.00	49.60 AV			1.15 V	257	18.80	30.80
3	2483.50	44.70 PK	74.00	-29.30	1.15 V	257	13.88	30.82
4	2483.50	20.50 AV	54.00	-33.50	1.15 V	257	-10.32	30.82
5	2493.00	47.20 PK	74.00	-26.80	1.15 V	257	16.34	30.86
6	2493.00	11.40 AV	54.00	-42.60	1.15 V	257	-19.46	30.86
7	2767.00	44.60 PK	74.00	-29.40	1.00 V	356	13.11	31.49
8	2767.00	38.50 AV	54.00	-15.50	1.00 V	356	7.01	31.49
9	4960.00	52.50 PK	74.00	-21.50	1.62 V	356	16.52	35.98
10	4960.00	8.50 AV	54.00	-45.50	1.62 V	356	-27.48	35.98
11	7440.00	53.40 PK	74.00	-20.60	1.52 V	271	10.40	43.00
12	7440.00	9.40 AV	54.00	-44.60	1.52 V	271	-33.60	43.00

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH1 packet duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on 0.625*1 per 296.25 ms per channel.Therefore, the duty cycle be equal to: 20log(0.625/100)= -44dB
7. Average value = peak reading +20log(duty cycle)

4.8 BAND EDGES MEASUREMENT

4.8.1 LIMITS OF BAND EDGES MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100KHz RBW).

4.8.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 21, 2007

Note:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.8.3 TEST PROCEDURE

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

4.8.4 DEVIATION FROM TEST STANDARD

No deviation

4.8.5 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.8.6 TEST RESULTS

The spectrum plots are attached on the following 1 pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

Note - The delta method is only used up to 2 MHz away from the restricted bandage, The radiated emissions which located in other restricted frequency band, the result, please refer to 4.2.

Configs 1

NOTE (Peak):

The band edge emission plot on the following page show 51.64dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2 is 93.10dBuV/m, so the maximum field strength in restrict band is 93.10-51.64=41.46dBuV/m which is under 74 dBuV/m limit.

The band edge emission plot on the following page shows 53.00dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.2 is 91.80dBuV/m, so the maximum field strength in restrict band is 91.80-53.00=38.8dBuV/m which is under 74 dBuV/m limit.

NOTE (Average):

Average value = 41.46-44.00= -2.54dBuV/m, which is under 54dBuV/m limit.
*The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on 0.625 * 1 per 296.25 ms per channel. Therefore, the duty cycle be equal to: 20log(3.125/100)= -30 dB. Average value = peak reading －44.00.

Average value = 38.8-44.00= -5.2dBuV/m, which is under 54dBuV/m limit.
*The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on 0.625 * 1 per 296.25 ms per channel. Therefore, the duty cycle be equal to: 20log(3.125/100)= -30 dB. Average value = peak reading －44.00.

Configs 2

NOTE (Peak):

The band edge emission plot on the following page show 54.51dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2 is 96.80dBuV/m, so the maximum field strength in restrict band is 96.80-54.51=42.29dBuV/m which is under 74 dBuV/m limit.

The band edge emission plot on the following page shows 53.42dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.2 is 94.70dBuV/m, so the maximum field strength in restrict band is 94.70-53.42=41.28dBuV/m which is under 74 dBuV/m limit.

NOTE (Average):

Average value = 42.29-44.00= -1.71dBuV/m, which is under 54dBuV/m limit.

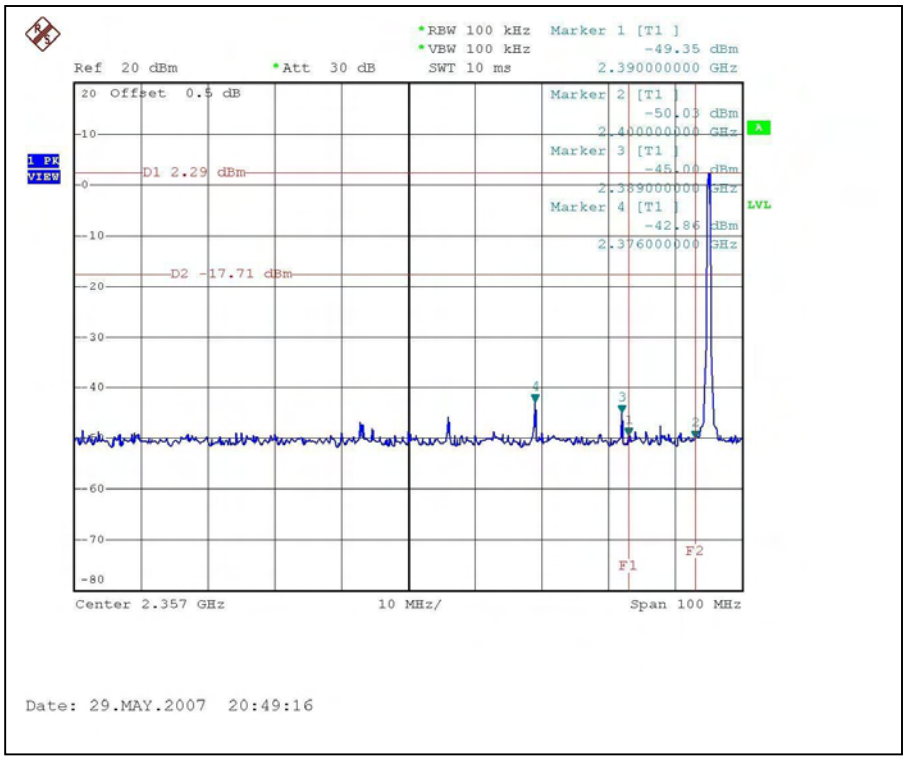
*The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on 0.625 * 1 per 296.25 ms per channel. Therefore, the duty cycle be equal to: 20log(3.125/100)= -30 dB. Average value = peak reading – 44.00.

Average value = 41.28-44.00= -2.72dBuV/m, which is under 54dBuV/m limit.

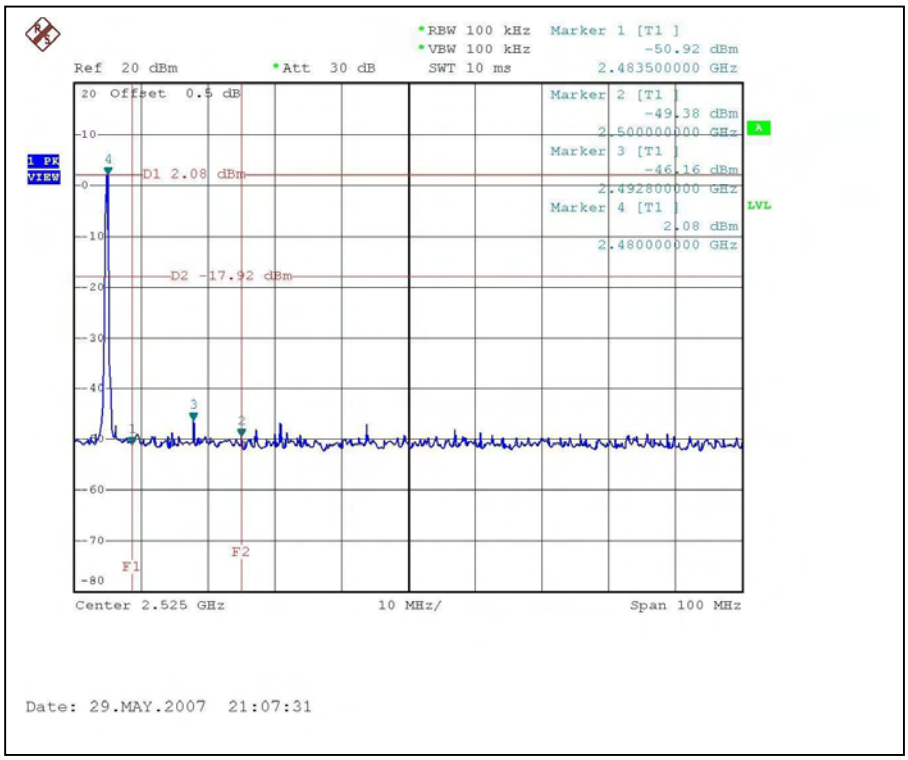
*The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon Bluetooth theory the transmitter is on 0.625 * 1 per 296.25 ms per channel. Therefore, the duty cycle be equal to: 20log(3.125/100)= -30 dB. Average value = peak reading – 44.00.

Configs 1

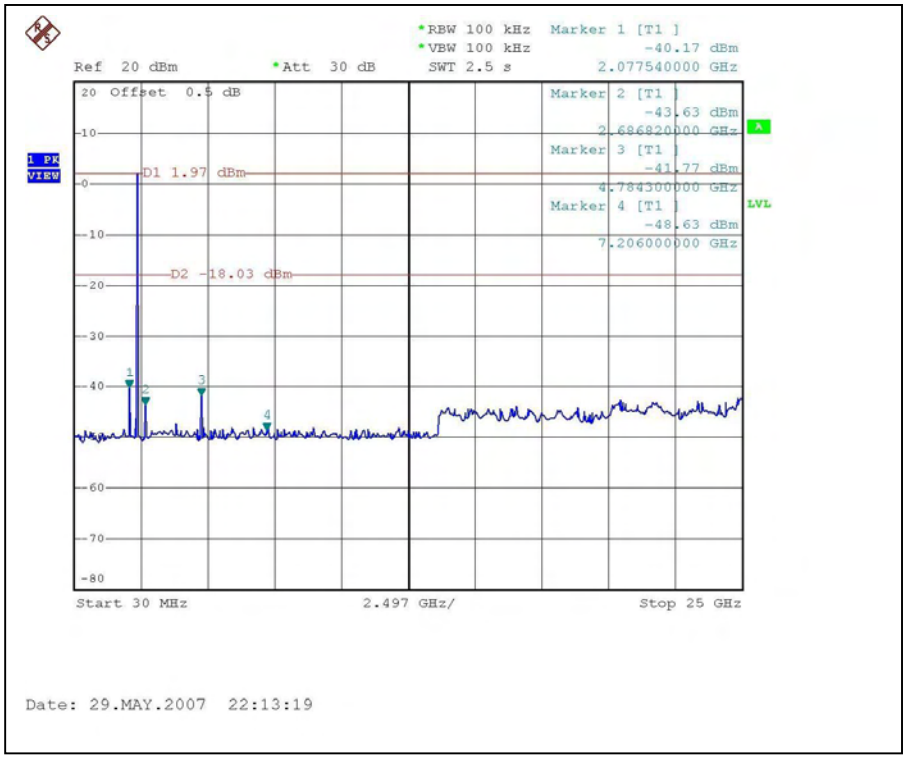
CH0



CH78



CH0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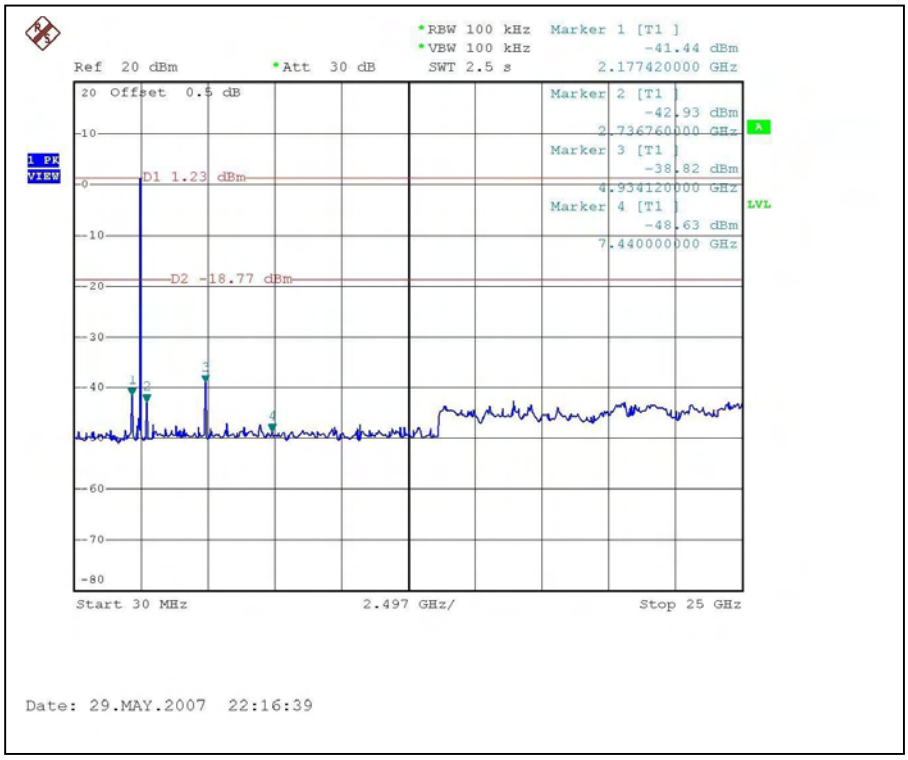
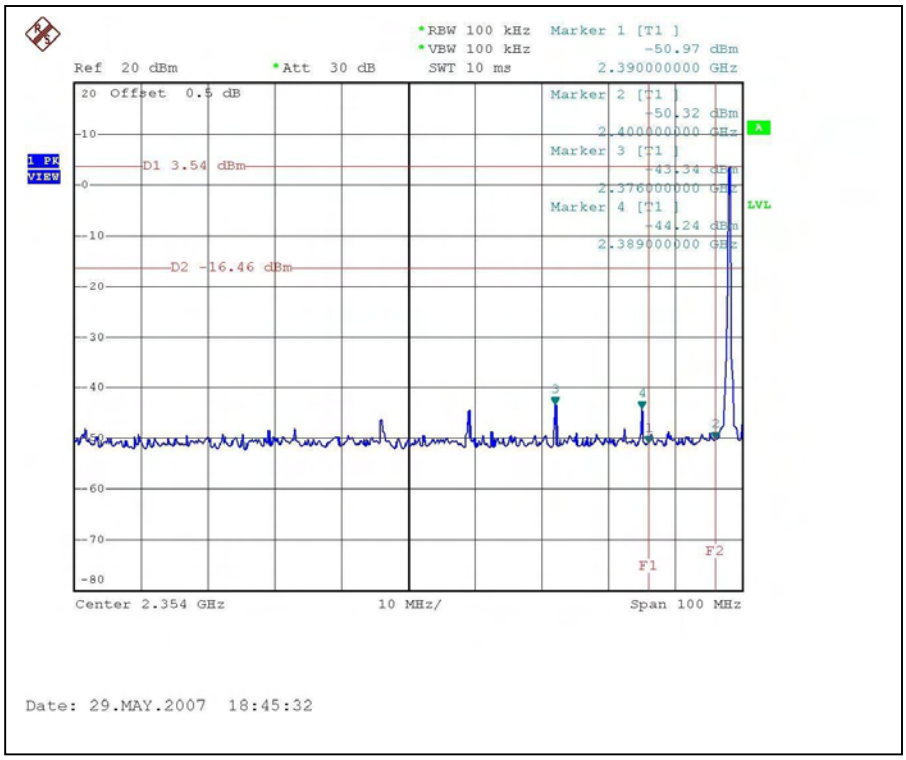
*VBW 100 kHz
SWT 2.5 s
Marker 1 [T1]
-40.17 dBm
2.077540000 GHz
Ref 20 dBm
*Att 30 dB
20 Offset 0.5 dB
Marker 2 [T1]
-43.63 dBm
2.686820000 GHz
Marker 3 [T1]
-41.77 dBm
4.784300000 GHz
Marker 4 [T1]
-48.63 dBm
7.206000000 GHz
1 PK VIEW
D1 1.97 dBm
D2 -18.03 dBm
LVL
Start 30 MHz
2.497 GHz/
Stop 25 GHz
Date: 29.MAY.2007 22:13:19

CH78

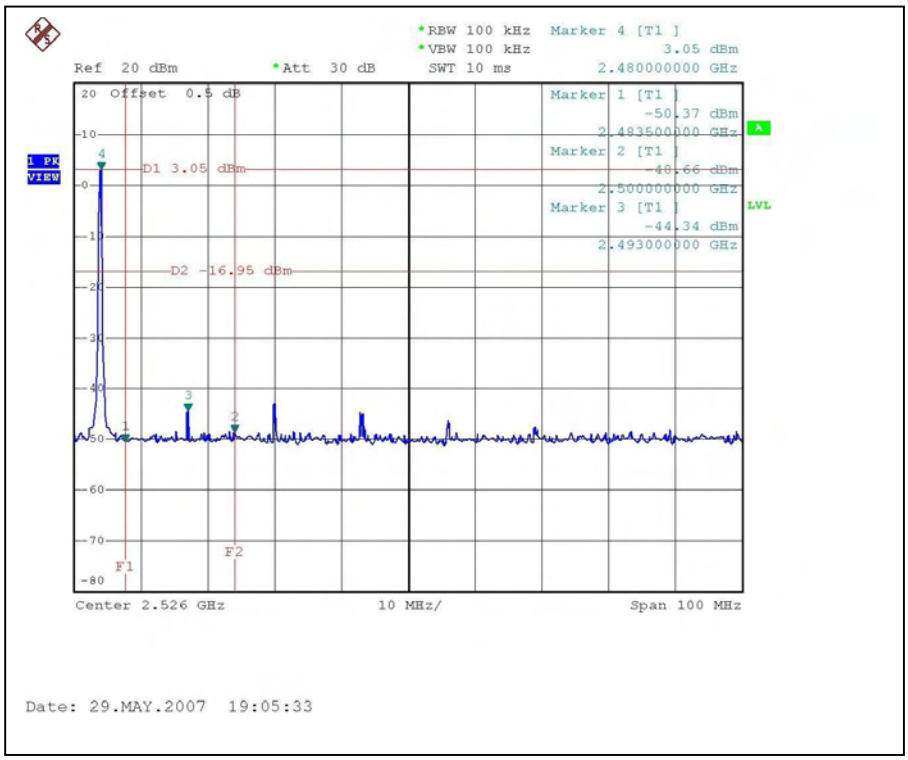

*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 s
Marker 1 [T1]
-41.44 dBm
2.177420000 GHz
Ref 20 dBm
*Att 30 dB
20 Offset 0.5 dB
Marker 2 [T1]
-42.93 dBm
2.736760000 GHz
Marker 3 [T1]
-38.82 dBm
4.934120000 GHz
Marker 4 [T1]
-48.63 dBm
7.440000000 GHz
1 PK VIEW
D1 1.23 dBm
D2 -18.77 dBm
LVL
Start 30 MHz
2.497 GHz/
Stop 25 GHz
Date: 29.MAY.2007 22:16:39

Configs 2

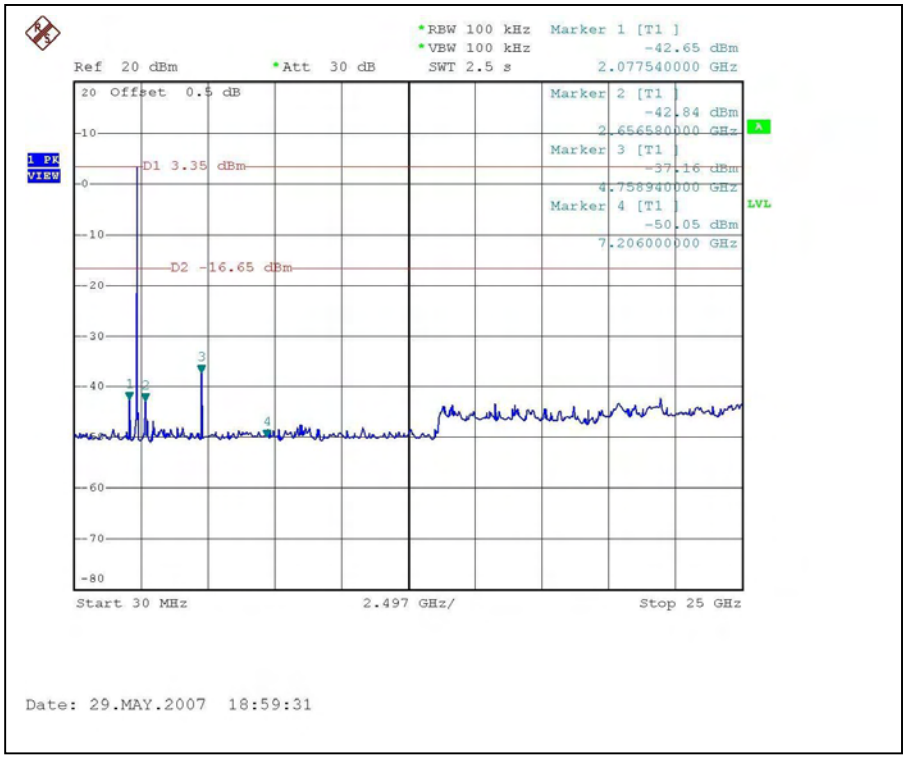
CH0



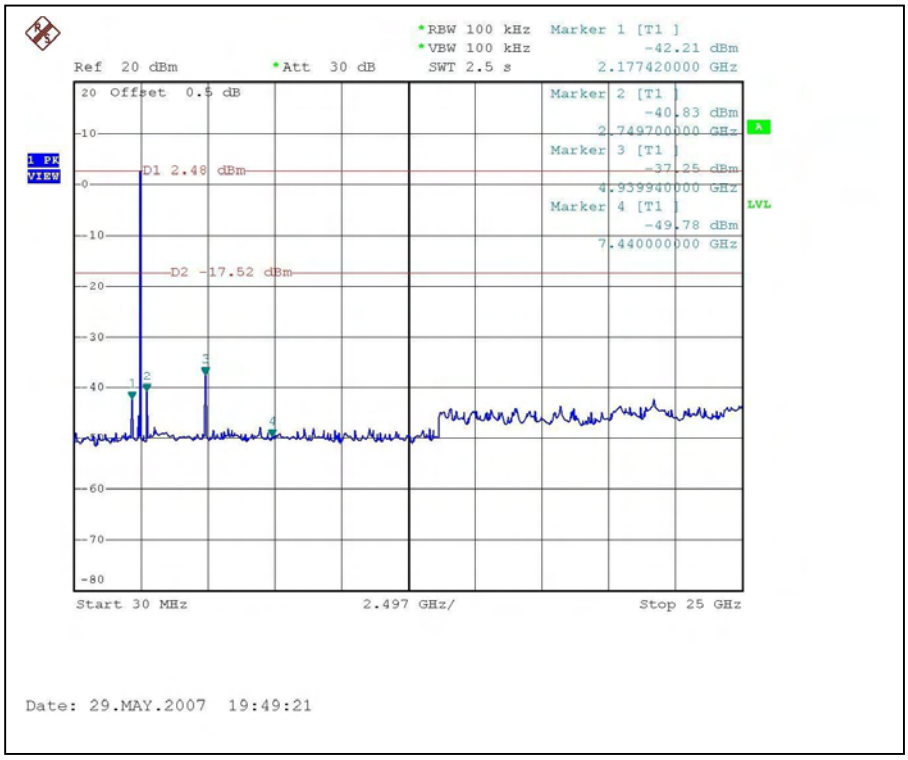
CH78



CH0


*RBW 100 kHz
*VBW 100 kHz
Ref 20 dBm
*Att 30 dB
SWT 2.5 s
Marker 1 [T1]
-42.65 dBm
2.077540000 GHz
20 Offset 0.5 dB
Marker 2 [T1]
-42.84 dBm
2.656580000 GHz
Marker 3 [T1]
-37.16 dBm
4.758940000 GHz
Marker 4 [T1]
-50.05 dBm
7.206000000 GHz
1 PK VIEW
D1 3.35 dBm
D2 -16.65 dBm
LVL
Start 30 MHz
2.497 GHz/
Stop 25 GHz
Date: 29.MAY.2007 18:59:31

CH78


*RBW 100 kHz
*VBW 100 kHz
Ref 20 dBm
*Att 30 dB
SWT 2.5 s
Marker 1 [T1]
-42.21 dBm
2.177420000 GHz
20 Offset 0.5 dB
Marker 2 [T1]
-40.83 dBm
2.749700000 GHz
Marker 3 [T1]
-37.25 dBm
4.939940000 GHz
Marker 4 [T1]
-49.78 dBm
7.440000000 GHz
1 PK VIEW
D1 2.48 dBm
D2 -17.52 dBm
LVL
Start 30 MHz
2.497 GHz/
Stop 25 GHz
Date: 29.MAY.2007 19:49:21

4.9 ANTENNA REQUIREMENT

4.9.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.9.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Inverted F antenna, without connector. The maximum Gain of the antenna is 1.676dBi

5 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025:

USA	FCC, UL, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA, CSA
R.O.C.	CNLA, BSMI, NCC
Netherlands	Telefication
Singapore	PSB, GOST-ASIA (MOU)
Russia	CERTIS (MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.
If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050

Email: service@adt.com.tw
Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also.

APPENDIX-A

MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.