4.6 MAXIMUM PEAK OUTPUT POWER

4.6.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.6.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Nov. 23, 2005
Agilent SIGNAL GENERATOR	E8257C	MY43320668	Dec. 07, 2005
TEKTRONIX OSCILLOSCOPE	TDS 220	B027241	Jun. 18, 2005
NARDA DETECTOR	4503A	0306	NA

NOTE:
The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

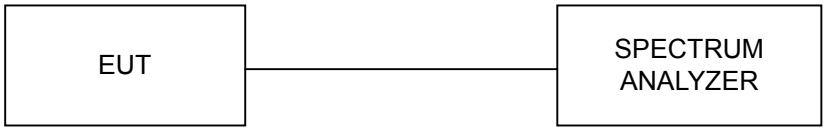
4.6.3 TEST PROCEDURES

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 1 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

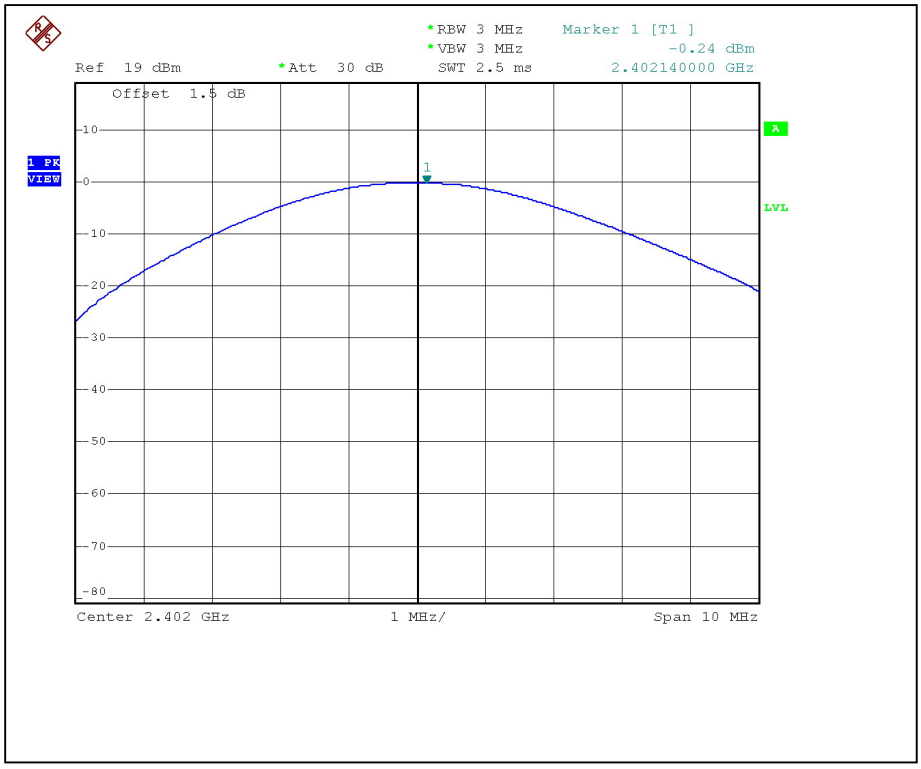
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.6.7 TEST RESULTS(MODE 1)

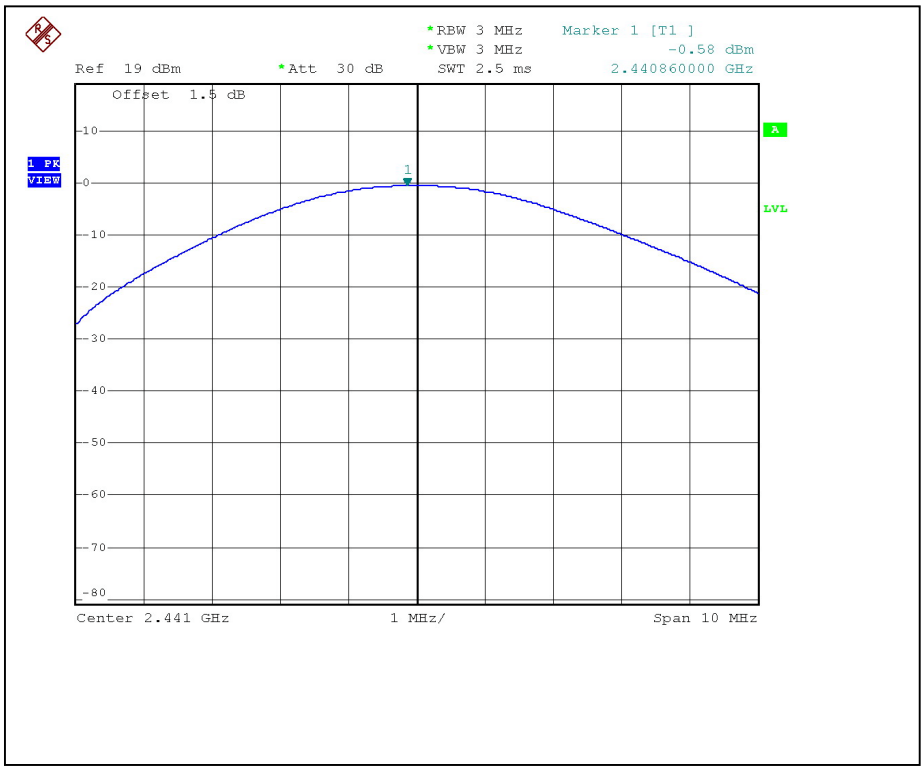
EUT	USB Bluetooth Module	MODEL	T60H928
ENVIRONMENTAL CONDITIONS	20 deg. C, 70%RH, 963 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	-0.24	30	PASS
39	2441	-0.58	30	PASS
78	2480	-1.14	30	PASS

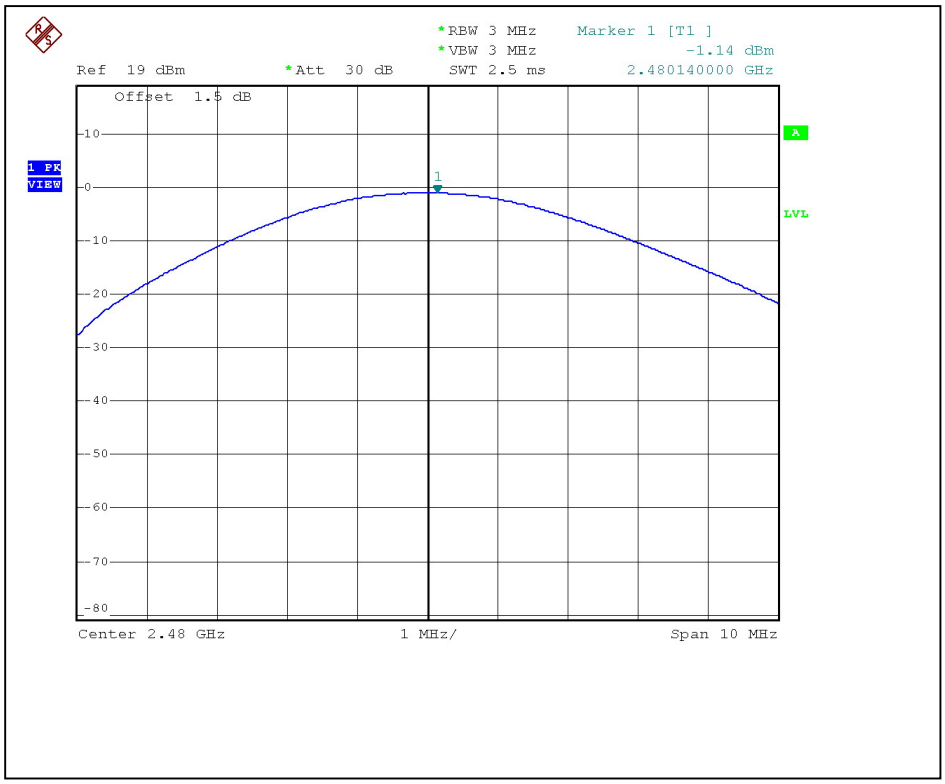
Channel 0



Channel 39



Channel 78

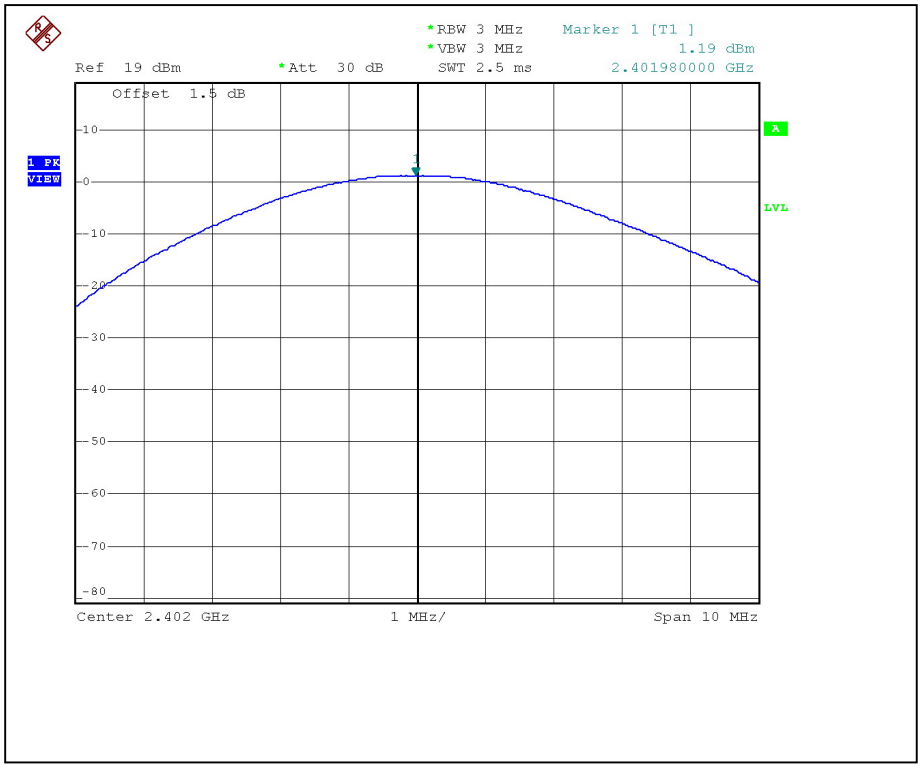

*RBW 3 MHz
*VBW 3 MHz
Marker 1 [T1]
-1.14 dBm
2.480140000 GHz
Ref 19 dBm
*Att 30 dB
SWT 2.5 ms
Offset 1.5 dB
1 PK VIEW
A
LVL
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
1 MHz/
Span 10 MHz

4.6.8 TEST RESULTS(MODE 2)

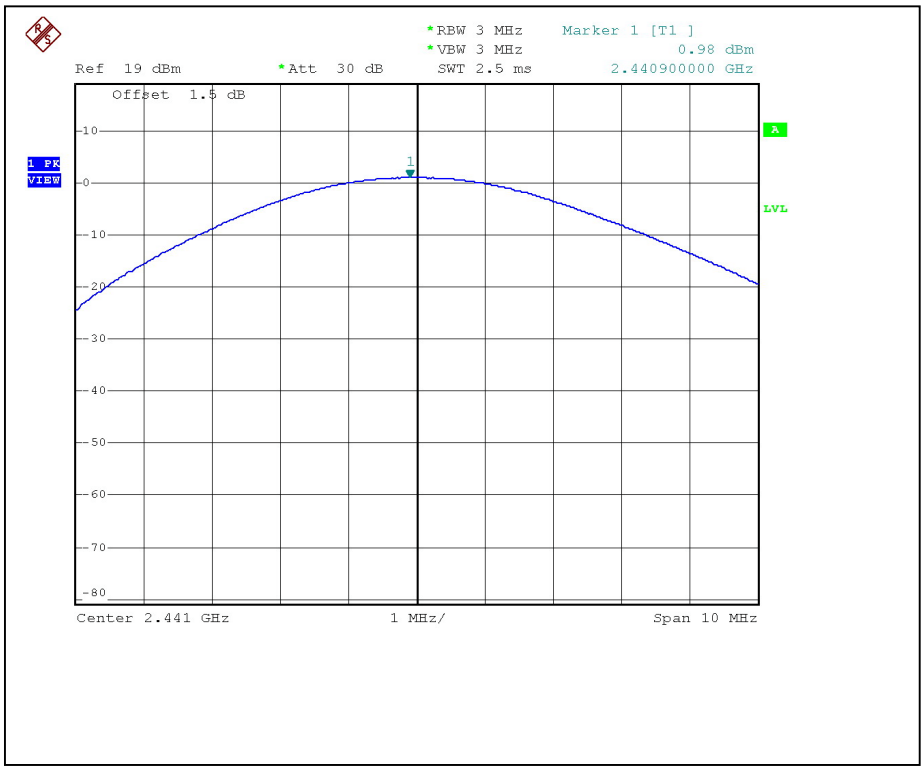
EUT	USB Bluetooth Module	**MODEL**	T60H928
ENVIRONMENTAL CONDITIONS	20 deg. C, 70%RH, 963 hPa	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	1.19	30	PASS
39	2441	0.98	30	PASS
78	2480	0. 52	30	PASS

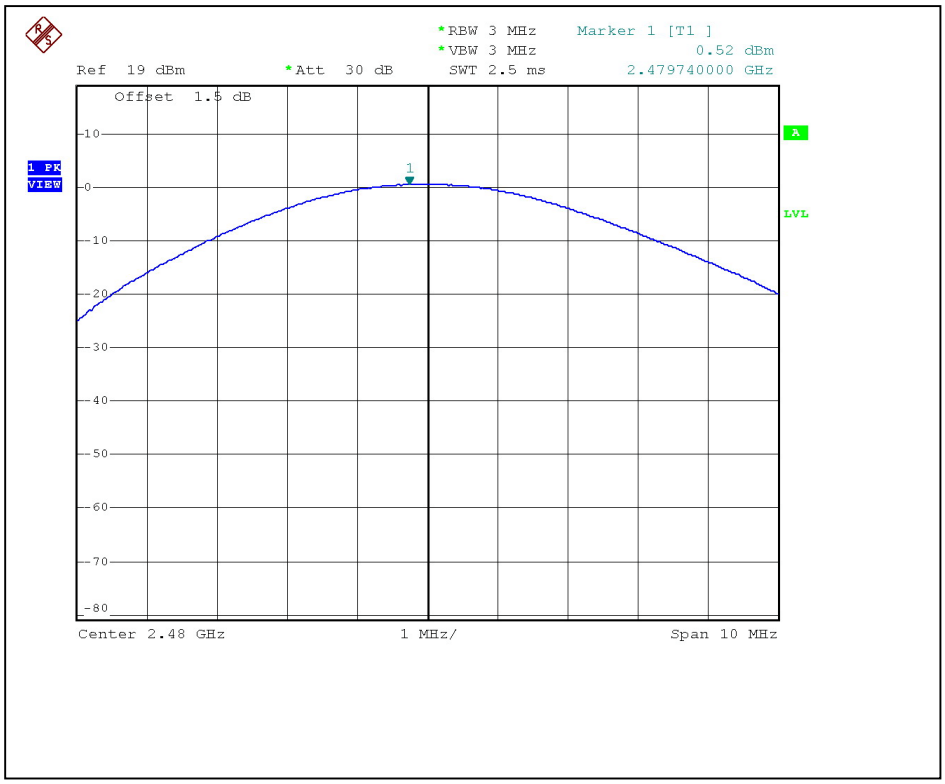
Channel 0



Channel 39



Channel 78

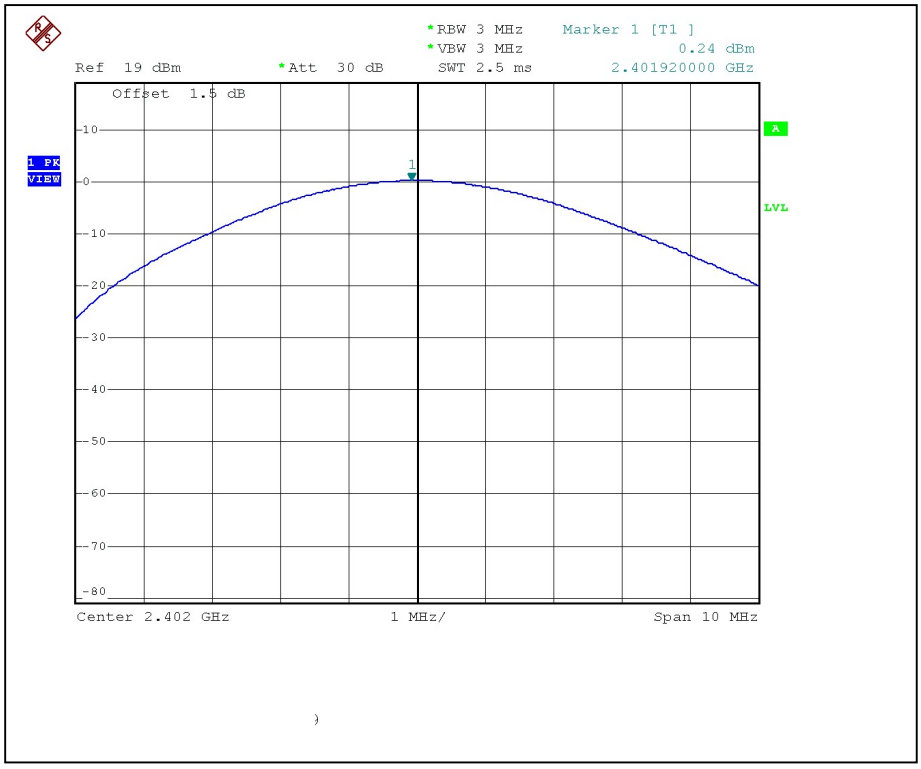

*RBW 3 MHz
*VBW 3 MHz
Marker 1 [T1]
0.52 dBm
2.479740000 GHz
Ref 19 dBm
*Att 30 dB
SWT 2.5 ms
Offset 1.5 dB
1 PK VIEW
A
LVL
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
1 MHz/
Span 10 MHz

4.6.9 TEST RESULTS(MODE 3)

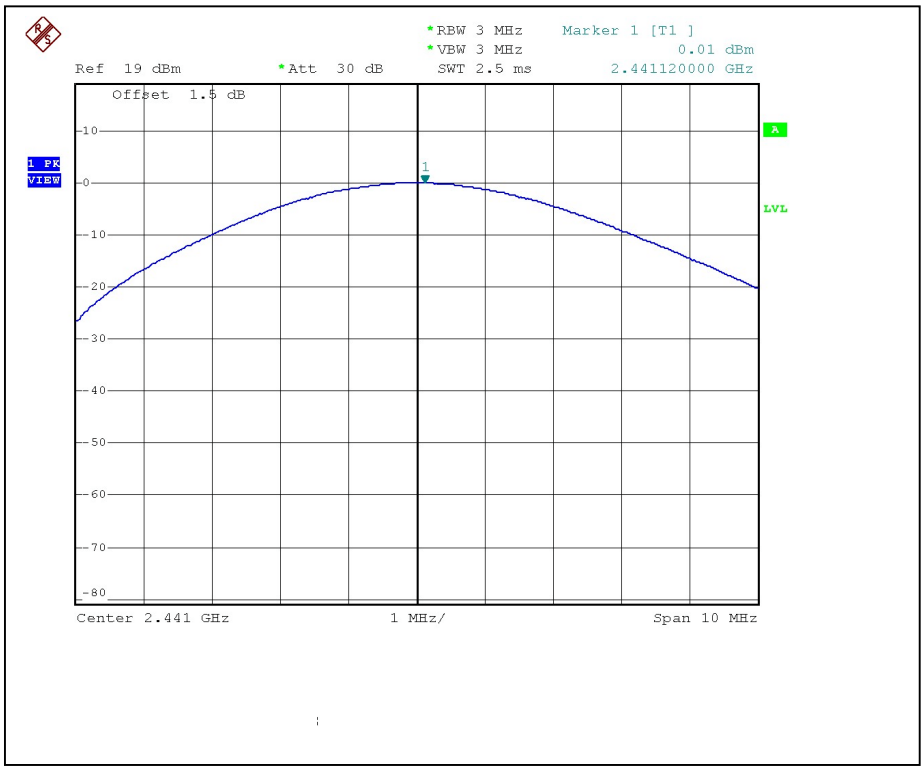
EUT	USB Bluetooth Module	**MODEL**	T60H928
ENVIRONMENTAL CONDITIONS	20 deg. C, 70%RH, 963 hPa	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	0.24	30	PASS
39	2441	0.01	30	PASS
78	2480	-0.36	30	PASS

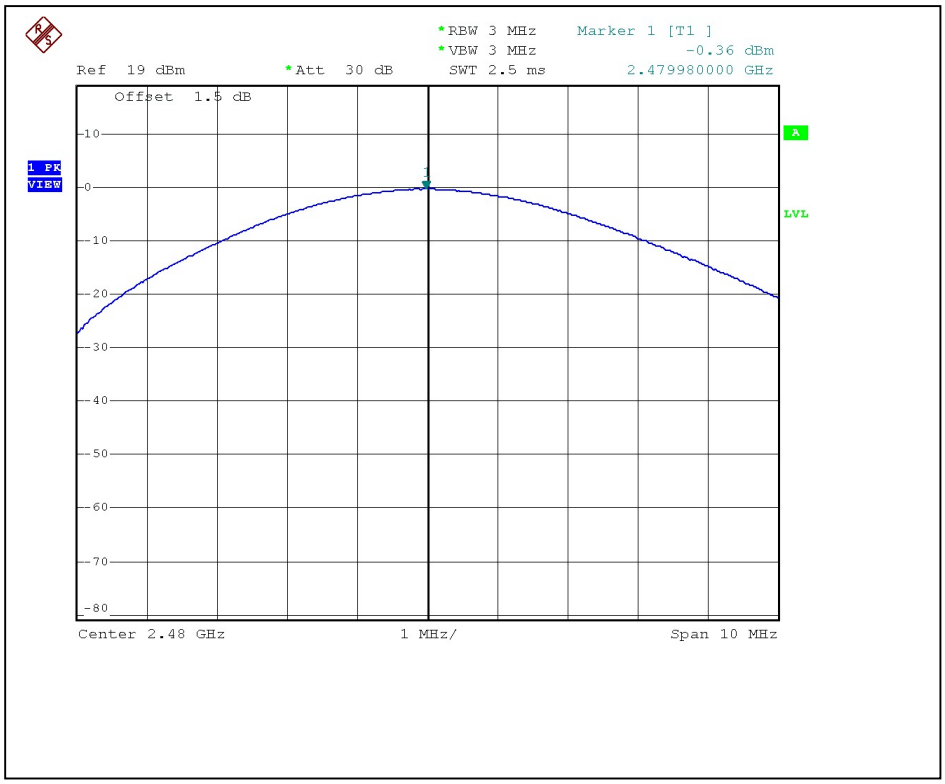
Channel 0



Channel 39



Channel 78


*RBW 3 MHz
*VBW 3 MHz
Marker 1 [T1]
-0.36 dBm
2.479980000 GHz
Ref 19 dBm
*Att 30 dB
SWT 2.5 ms
Offset 1.5 dB
1 PK
VIEW
A
LVL
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
1 MHz/
Span 10 MHz

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
HP Spectrum Analyzer	8594E	3710A04861	Sep. 23, 2005
ADVANTEST Spectrum Analyzer	R3271A	85060311	Jun. 29, 2005
CHASE RF Pre_Amplifier	CPA9232	1057	Aug. 06, 2005
HP Pre_Amplifier	8449B	3008A01922	Oct. 13, 2005
ROHDE & SCHWARZ Test Receiver	ESCS30	100287	Dec. 08, 2005
CHASE Broadband Antenna	VULB9168	138	Dec. 21, 2005
Schwarzbeck Horn_Antenna	BBHA9120	D124	Jun. 16, 2005
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 30, 2006
SCHWARZBECK Biconical Antenna	VHBA9123	459	Jun. 26, 2006
SCHWARZBECK Periodic Antenna	UPA6108	1148	Jun. 26, 2006
RF Switches (ARNITSU)	CS-201	1565157	Jul. 15, 2005
RF CABLE (Chaintek) 1GHz-20GHz	SF102	22054-2	Nov. 15. 2005
RF Cable(RICHTEC)	9913-30M	STCCAB-30M-1GHz-021	Jul. 15, 2005
Software	ADT_Radiated_V5.14	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 Periodic Antenna)and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) 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 4824-3.
7. The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4.

Measurement	Value
Radiated emissions (30MHz-1GHz)	2.98 dB
Radiated emissions (1GHz ~18GHz)	2.21 dB
Radiated emissions (18GHz ~20GHz)	1.88 dB

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.

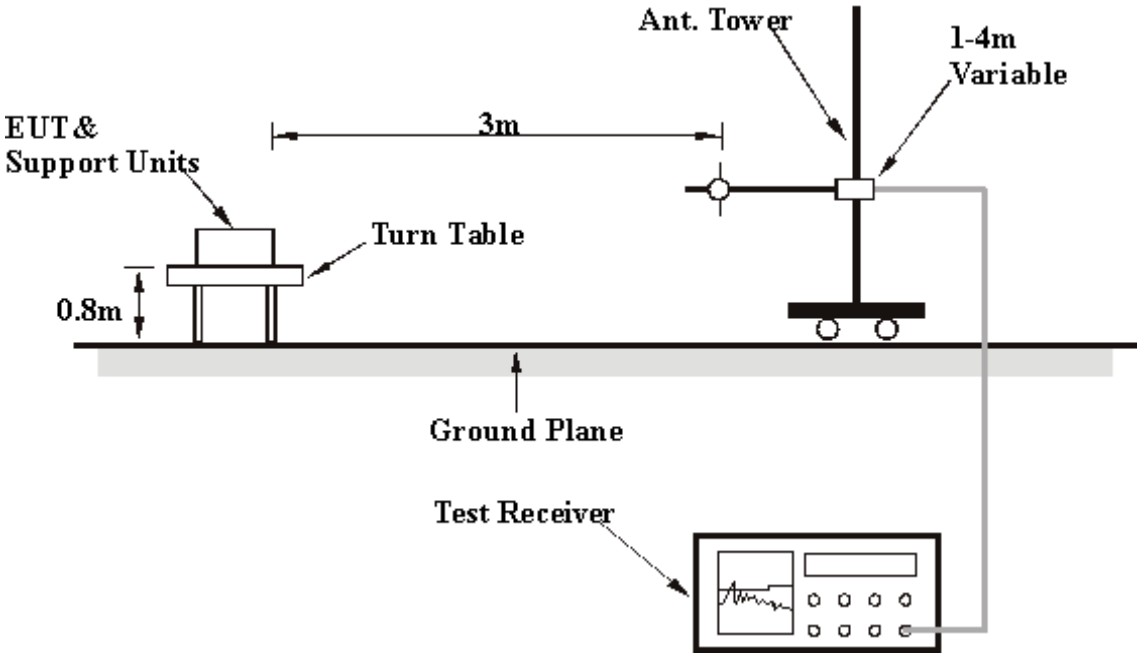
NOTE:

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 and video bandwidth of test receiver/spectrum analyzer is 1 MHz 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

EUT	USB Bluetooth Module	MODEL	T60H928
CHANNEL	78	FREQUENCY RANGE	Below 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	20 deg. C, 70%RH, 963 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	143.99	29.60 QP	43.50	-13.90	1.87 H	265	16.40	13.20
2	240.01	31.50 QP	46.00	-14.50	1.37 H	329	18.60	12.90
3	431.97	34.10 QP	46.00	-11.90	1.01 H	286	14.80	19.20
4	527.98	36.90 QP	46.00	-9.10	1.33 H	342	15.20	21.70
5	671.97	37.30 QP	46.00	-8.70	1.23 H	12	12.90	24.40
6	**719.97**	**42.10 QP**	**46.00**	**-3.90**	**1.13 H**	**16**	**16.60**	**25.50**
7	815.96	39.40 QP	46.00	-6.60	1.16 H	347	12.50	26.90
8	912.04	37.80 QP	46.00	-8.20	1.18 H	343	9.60	28.10

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	144.00	29.60 QP	43.50	-13.90	1.00 V	66	16.40	13.20
2	239.98	27.30 QP	46.00	-18.70	1.00 V	292	14.40	12.90
3	431.97	32.70 QP	46.00	-13.30	1.10 V	233	13.50	19.20
4	527.98	32.20 QP	46.00	-13.80	1.27 V	270	10.60	21.70
5	671.95	36.50 QP	46.00	-9.50	1.00 V	11	12.10	24.40
6	719.96	42.00 QP	46.00	-4.00	1.00 V	70	16.50	25.50
7	815.95	39.70 QP	46.00	-6.30	1.58 V	2	12.80	26.90
8	911.95	38.50 QP	46.00	-7.50	1.52 V	18	10.40	28.10

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.

4.7.7 TEST RESULTS (MODE 1)

EUT	USB Bluetooth Module	**MODEL**	T60H928
CHANNEL	Channel 0	**FREQUENCY RANGE**	1 ~25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24 deg. C, 65%RH, 963 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	1601.30	40.20 PK	74.00	-33.80	1.15 H	317	12.80	27.40
1	1601.30	10.20 AV	54.00	-43.80	1.15 H	317	-17.20	27.40
2	2390.00	44.50 PK	74.00	-29.50	1.00 H	300	10.80	33.70
2	2390.00	14.50 AV	54.00	-39.50	1.00 H	300	-19.20	33.70
3	*2402.00	94.70 PK			1.00 H	300	64.90	29.80
3	*2402.00	64.70 AV			1.00 H	300	34.90	29.80
4	3202.60	39.40 PK	74.00	-34.60	1.25 H	17	7.40	32.00
4	3202.60	9.40 AV	54.00	-44.60	1.25 H	17	-22.60	32.00
5	4804.00	41.60 PK	74.00	-32.40	1.46 H	353	6.60	35.00
5	4804.00	11.60 AV	54.00	-42.40	1.46 H	353	-23.40	35.00
6	7206.00	46.90 PK	74.00	-27.10	1.43 H	246	6.50	40.40
6	7206.00	16.90 AV	54.00	-37.10	1.43 H	246	-23.50	40.40

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	1601.30	39.90 PK	74.00	-34.10	1.23 V	265	12.50	27.40
1	1601.30	9.90 AV	54.00	-44.10	1.23 V	265	-17.50	27.40
2	2390.00	44.20 PK	74.00	-29.80	1.86 V	26	10.50	33.70
2	2390.00	14.20 AV	54.00	-39.80	1.86 V	26	-19.50	33.70
3	*2402.00	94.40 PK			1.86 V	26	64.60	29.80
3	*2402.00	64.40 AV			1.86 V	26	34.60	29.80
4	3202.60	39.80 PK	74.00	-34.20	1.47 V	278	7.80	32.00
4	3202.60	9.80 AV	54.00	-44.20	1.47 V	278	-22.20	32.00
5	4804.00	41.40 PK	74.00	-32.60	1.15 V	289	6.40	35.00
5	4804.00	11.40 AV	54.00	-42.60	1.15 V	289	-23.60	35.00
6	7206.00	46.10 PK	74.00	-27.90	1.11 V	314	5.70	40.40
6	7206.00	16.10 AV	54.00	-37.90	1.11 V	314	-24.30	40.40

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 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*5 per 247 ms per channel.Therefore, the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)

EUT	USB Bluetooth Module	MODEL	T60H928
CHANNEL	Channel 39	FREQUENCY RANGE	1 ~25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70%RH, 963 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M

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	1627.30	40.60 PK	74.00	-33.40	1.16 H	322	13.20	27.40
1	1627.30	10.60 AV	54.00	-43.40	1.16 H	322	-16.80	27.40
2	*2441.00	94.50 PK			1.00 H	302	64.60	29.90
2	*2441.00	64.50 AV			1.00 H	302	34.60	29.90
3	3254.60	41.80 PK	74.00	-32.20	1.29 H	26	9.70	32.10
3	3254.60	11.80 AV	54.00	-42.20	1.29 H	26	-20.30	32.10
4	4882.00	47.70 PK	74.00	-26.30	1.51 H	351	12.40	35.30
4	4882.00	17.70 AV	54.00	-36.30	1.51 H	351	-17.60	35.30
5	7323.00	47.70 PK	74.00	-26.30	1.44 H	258	7.00	40.70
5	7323.00	17.70 AV	54.00	-36.30	1.44 H	258	-23.00	40.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M

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	1627.30	40.40 PK	74.00	-33.60	1.26 V	264	13.00	27.40
1	1627.30	10.40 AV	54.00	-43.60	1.26 V	264	-17.00	27.40
2	*2441.00	94.50 PK			1.84 V	268	64.60	29.90
2	*2441.00	64.50 AV			1.84 V	268	34.60	29.90
3	3254.60	41.90 PK	74.00	-32.10	1.51 V	275	9.80	32.10
3	3254.60	11.90 AV	54.00	-42.10	1.51 V	275	-20.20	32.10
4	4882.00	47.30 PK	74.00	-26.70	1.18 V	288	12.00	35.30
4	4882.00	17.30 AV	54.00	-36.70	1.18 V	288	-18.00	35.30
5	7323.00	47.10 PK	74.00	-26.90	1.09 V	324	6.40	40.70
5	7323.00	17.10 AV	54.00	-36.90	1.09 V	324	-23.60	40.70

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 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*5 per 247 ms per channel.Therefore, the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)

EUT	USB Bluetooth Module	MODEL	T60H928
CHANNEL	Channel 78	FREQUENCY RANGE	1 ~25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70%RH, 963 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M

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	1653.30	42.10 PK	74.00	-31.90	1.18 H	321	14.70	27.50
1	1653.30	12.10 AV	54.00	-41.90	1.18 H	321	-15.30	27.50
2	*2480.00	94.40 PK			1.00 H	306	64.30	30.10
2	*2480.00	64.40 AV			1.00 H	306	34.30	30.10
3	2483.50	45.20 PK	74.00	-28.80	1.00 H	306	15.10	30.10
3	2483.50	15.20 AV	54.00	-38.80	1.00 H	306	-14.90	30.10
4	3306.60	46.00 PK	74.00	-28.00	1.34 H	336	13.70	32.20
4	3306.60	15.90 AV	54.00	-38.00	1.34 H	336	-16.30	32.20
5	4960.00	47.40 PK	74.00	-26.60	1.49 H	347	11.70	35.70
5	4960.00	17.40 AV	54.00	-36.60	1.49 H	347	-18.30	35.70
6	7440.00	47.00 PK	74.00	-27.00	1.47 H	253	6.00	40.90
6	7440.00	17.00 AV	54.00	-37.00	1.47 H	253	-24.00	40.90

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M

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	1653.30	41.80 PK	74.00	-32.20	1.25 V	267	14.40	27.50
1	1653.30	11.80 AV	54.00	-42.20	1.25 V	267	-15.60	27.50
2	*2480.00	94.20 PK			1.87 V	265	64.10	30.10
2	*2480.00	64.20 AV			1.87 V	265	34.10	30.10
3	2483.50	45.00 PK	74.00	-29.00	1.87 V	265	14.90	30.10
3	2483.50	15.00 AV	54.00	-39.00	1.87 V	265	-15.10	30.10
4	3306.60	46.30 PK	74.00	-27.70	1.54 V	281	14.00	32.20
4	3306.60	16.20 AV	54.00	-37.80	1.54 V	281	-16.00	32.20
5	4960.00	47.30 PK	74.00	-26.70	1.23 V	296	11.60	35.70
5	4960.00	17.20 AV	54.00	-36.80	1.23 V	296	-18.40	35.70
6	7440.00	46.50 PK	74.00	-27.50	1.12 V	318	5.50	40.90
6	7440.00	16.50 AV	54.00	-37.50	1.12 V	318	-24.50	40.90

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 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*5 per 247 ms per channel.Therefore, the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)

4.7.8 TEST RESULTS (MODE 2)

EUT	USB Bluetooth Module	MODEL	T60H928
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24 deg. C, 56%RH, 963 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	1601.30	40.00 PK	74.00	-34.00	1.12 H	319	12.60	27.40
1	1601.30	10.00 AV	54.00	-44.00	1.12 H	319	-17.40	27.40
2	2390.00	47.90 PK	74.00	-26.10	1.02 H	173	14.20	33.70
2	2390.00	17.90 AV	54.00	-36.10	1.02 H	173	-15.80	33.70
3	*2402.00	95.60 PK			1.02 H	173	65.80	29.80
3	*2402.00	65.60 AV			1.02 H	173	35.80	29.80
4	3202.60	39.50 PK	74.00	-34.50	1.00 H	314	7.50	32.00
4	3202.60	9.50 AV	54.00	-44.50	1.00 H	314	-22.50	32.00
5	4804.00	42.10 PK	74.00	-31.90	1.57 H	296	7.10	35.00
5	4804.00	12.10 AV	54.00	-41.90	1.57 H	296	-22.90	35.00
6	7206.00	47.40 PK	74.00	-26.60	1.38 H	164	7.00	40.40
6	7206.00	17.40 AV	54.00	-36.60	1.38 H	164	-23.00	40.40

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	1601.30	39.80 PK	74.00	-34.20	1.24 V	273	12.40	27.40
1	1601.30	9.80 AV	54.00	-44.20	1.24 V	273	-17.60	27.40
2	2390.00	47.40 PK	74.00	-26.60	1.85 V	31	13.70	33.70
2	2390.00	17.40 AV	54.00	-36.60	1.85 V	31	-16.30	33.70
3	*2402.00	95.10 PK			1.85 V	31	65.30	29.80
3	*2402.00	65.10 AV			1.85 V	31	35.30	29.80
4	3202.60	39.90 PK	74.00	-34.10	1.52 V	304	7.90	32.00
4	3202.60	9.90 AV	54.00	-44.10	1.52 V	304	-22.10	32.00
5	4804.00	41.60 PK	74.00	-32.40	1.23 V	276	6.60	35.00
5	4804.00	11.60 AV	54.00	-42.40	1.23 V	276	-23.40	35.00
6	7206.00	46.50 PK	74.00	-27.50	1.14 V	360	6.10	40.40
6	7206.00	16.50 AV	54.00	-37.50	1.14 V	360	-23.90	40.40

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 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*5 per 247 ms per channel.Therefore, the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)

EUT	USB Bluetooth Module	MODEL	T60H928
CHANNEL	Channel 39	FREQUENCY RANGE	1 ~25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24 deg. C, 56%RH, 963 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M

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	1627.30	40.70 PK	74.00	-33.30	1.21 H	319	13.30	27.40
1	1627.30	10.70 AV	54.00	-43.30	1.21 H	319	-16.70	27.40
2	*2441.00	95.00 PK			1.06 H	184	65.10	29.90
2	*2441.00	65.00 AV			1.06 H	184	35.10	29.90
3	3254.60	41.50 PK	74.00	-32.50	1.36 H	23	9.40	32.10
3	3254.60	11.50 AV	54.00	-42.50	1.36 H	23	-20.60	32.10
4	4882.00	47.60 PK	74.00	-26.40	1.69 H	13	12.30	35.30
4	4882.00	17.60 AV	54.00	-36.40	1.69 H	13	-17.70	35.30
5	7323.00	48.10 PK	74.00	-25.90	1.52 H	274	7.40	40.70
5	7323.00	18.10 AV	54.00	-35.90	1.52 H	274	-22.60	40.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M

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	1627.30	40.80 PK	74.00	-33.20	1.19 V	271	13.40	27.40
1	1627.30	10.80 AV	54.00	-43.20	1.19 V	271	-16.60	27.40
2	*2441.00	94.90 PK			1.83 V	274	65.00	29.90
2	*2441.00	64.90 AV			1.83 V	274	35.00	29.90
3	3254.60	42.10 PK	74.00	-31.90	1.64 V	312	10.00	32.10
3	3254.60	12.10 AV	54.00	-41.90	1.64 V	312	-20.00	32.10
4	4882.00	47.10 PK	74.00	-26.90	1.15 V	308	11.80	35.30
4	4882.00	17.10 AV	54.00	-36.90	1.15 V	308	-18.20	35.30
5	7323.00	47.40 PK	74.00	-26.60	1.13 V	279	6.70	40.70
5	7323.00	17.40 AV	54.00	-36.60	1.13 V	279	-23.30	40.70

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 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*5 per 247 ms per channel.Therefore, the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)

EUT	USB Bluetooth Module	MODEL	T60H928
CHANNEL	Channel 78	FREQUENCY RANGE	1 ~25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24 deg. C, 56%RH, 963 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M

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	1653.30	41.90 PK	74.00	-32.10	1.29 H	316	14.40	27.50
1	1653.30	11.90 AV	54.00	-42.10	1.29 H	316	-15.60	27.50
2	*2480.00	94.70 PK			1.85 H	243	64.60	30.10
2	*2480.00	64.70 AV			1.85 H	243	34.60	30.10
3	2483.50	47.30 PK	74.00	-26.70	1.85 H	243	17.20	30.10
3	2483.50	17.30 AV	54.00	-36.70	1.85 H	243	-12.80	30.10
4	3306.60	46.70 PK	74.00	-27.30	1.63 H	276	14.50	32.20
4	3306.60	16.70 AV	54.00	-37.30	1.63 H	276	-15.50	32.20
5	4960.00	47.60 PK	74.00	-26.40	1.34 H	303	11.90	35.70
5	4960.00	17.60 AV	54.00	-36.40	1.34 H	303	-18.10	35.70
6	7440.00	46.90 PK	74.00	-27.10	1.20 H	360	6.00	40.90
6	7440.00	16.90 AV	54.00	-37.10	1.20 H	360	-24.00	40.90

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M

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	1653.30	41.90 PK	74.00	-32.10	1.25 V	315	14.40	27.50
1	1653.30	11.90 AV	54.00	-42.10	1.25 V	315	-15.60	27.50
2	*2480.00	95.10 PK			1.06 V	184	65.00	30.10
2	*2480.00	65.10 AV			1.06 V	184	35.00	30.10
3	2483.50	47.70 PK	74.00	-26.30	1.06 V	184	17.60	30.10
3	2483.50	17.70 AV	54.00	-36.30	1.06 V	184	-12.40	30.10
4	3306.60	46.20 PK	74.00	-27.80	1.29 V	327	14.00	32.20
4	3306.60	16.20 AV	54.00	-37.80	1.29 V	327	-16.00	32.20
5	4960.00	47.80 PK	74.00	-26.20	1.53 V	348	12.10	35.70
5	4960.00	17.80 AV	54.00	-36.20	1.53 V	348	-17.90	35.70
6	7440.00	46.90 PK	74.00	-27.10	1.42 V	217	6.00	40.90
6	7440.00	16.90 AV	54.00	-37.10	1.42 V	217	-24.00	40.90

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 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*5 per 247 ms per channel.Therefore, the duty cycle be equal to: 20log(3.125/100)= -30dB
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	Nov. 23, 2005

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
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 (MODE 1)

The spectrum plots are attached on the following 2 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).

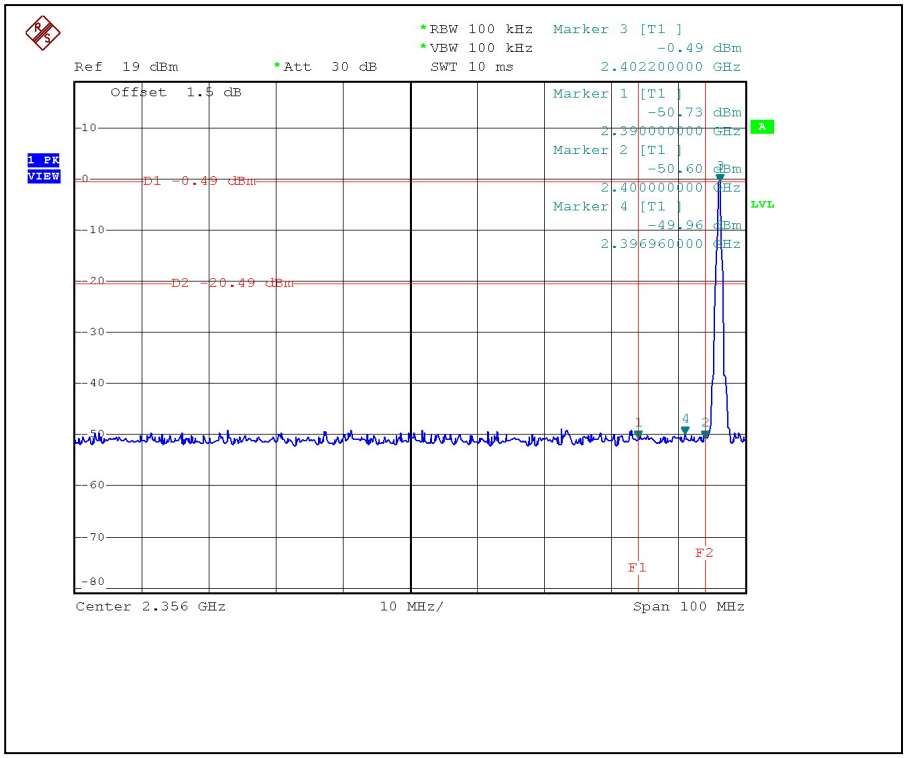
Note - The delta method is only used up to 2 MHz away from the restricted bandage, The radiated emissions which located in other restricted frequency band, the result, please refer to 4.2.

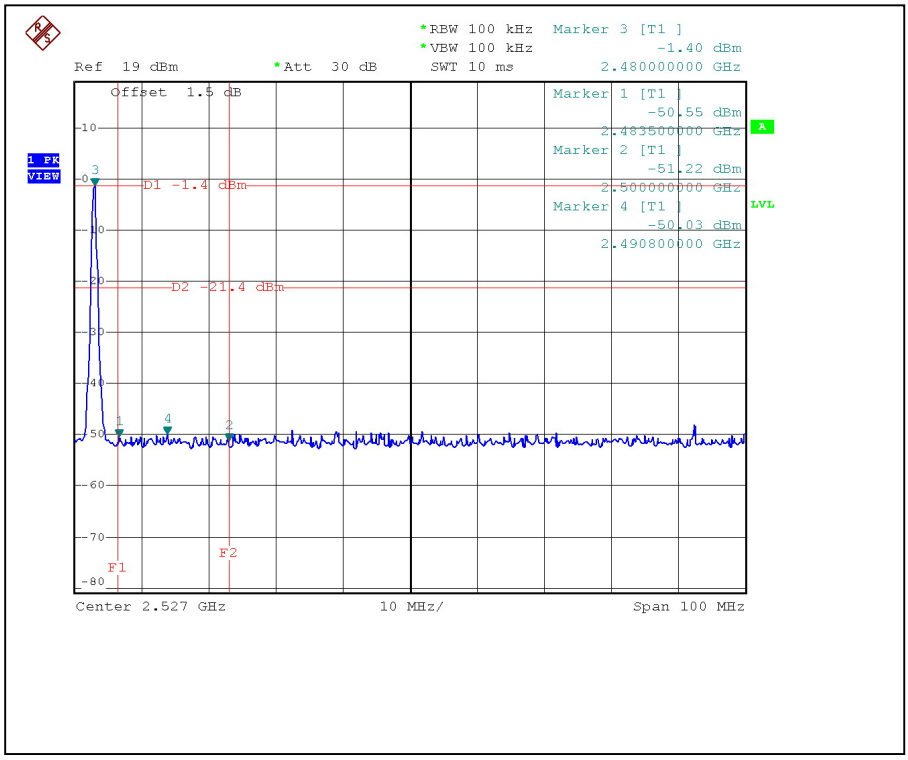
NOTE (Peak):
The band edge emission plot on the following first page show 50.24dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2 is 94.70dBuV/m, so the maximum field strength in restrict band is 94.70-50.24=44.46dBuV/m which is under 74 dBuV/m limit.

The band edge emission plot on the following first page shows 49.15dB 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 94.40dBuV/m, so the maximum field strength in restrict band is 94.40-49.15=45.25dBuV/m which is under 74 dBuV/m limit.

NOTE (Average):
The band edge emission plot on the following first page shows 50.24strict band (2.3900GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2 is 64.70dBuV/m, so the maximum field strength in restrict band is 64.70-50.24=14.46dBuV/m which is under 54 dBuV/m limit.

The band edge emission plot on the following first page shows 49.15dB 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 64.40dBuV/m, so the maximum field strength in restrict band is 64.40-49.15=15.25dBuV/m which is under 54 dBuV/m limit.


*RBW 100 kHz
*VBW 100 kHz
Ref 19 dBm
*Att 30 dB
SWT 10 ms
Marker 3 [T1]
-0.49 dBm
2.402200000 GHz
Offset 1.5 dB
Marker 1 [T1]
-50.73 dBm
2.390000000 GHz
Marker 2 [T1]
-50.60 dBm
2.400000000 GHz
Marker 4 [T1]
-49.96 dBm
2.396960000 GHz
1 PK
VIEW
D1 -0.49 dBm
D2 -20.49 dBm
LVL
F1
F2
Center 2.356 GHz
10 MHz/
Span 100 MHz


*RBW 100 kHz
*VBW 100 kHz
Ref 19 dBm
*Att 30 dB
SWT 10 ms
Marker 3 [T1]
-1.40 dBm
2.480000000 GHz
Offset 1.5 dB
Marker 1 [T1]
-50.55 dBm
2.483500000 GHz
Marker 2 [T1]
-51.22 dBm
2.500000000 GHz
Marker 4 [T1]
-50.03 dBm
2.490800000 GHz
1 PK
VIEW
D1 -1.4 dBm
D2 -21.4 dBm
LVL
F1
F2
Center 2.527 GHz
10 MHz/
Span 100 MHz

4.8.7 TEST RESULTS (MODE 2)

The spectrum plots are attached on the following 2 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).

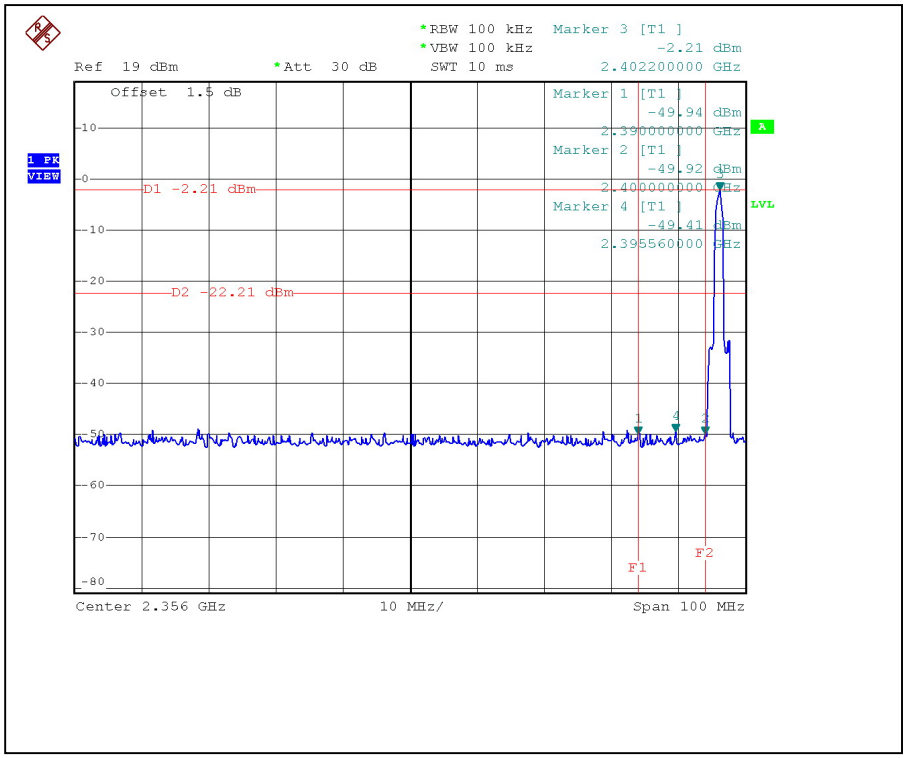
Note - The delta method is only used up to 2 MHz away from the restricted bandage, The radiated emissions which located in other restricted frequency band, the result, please refer to 4.2.

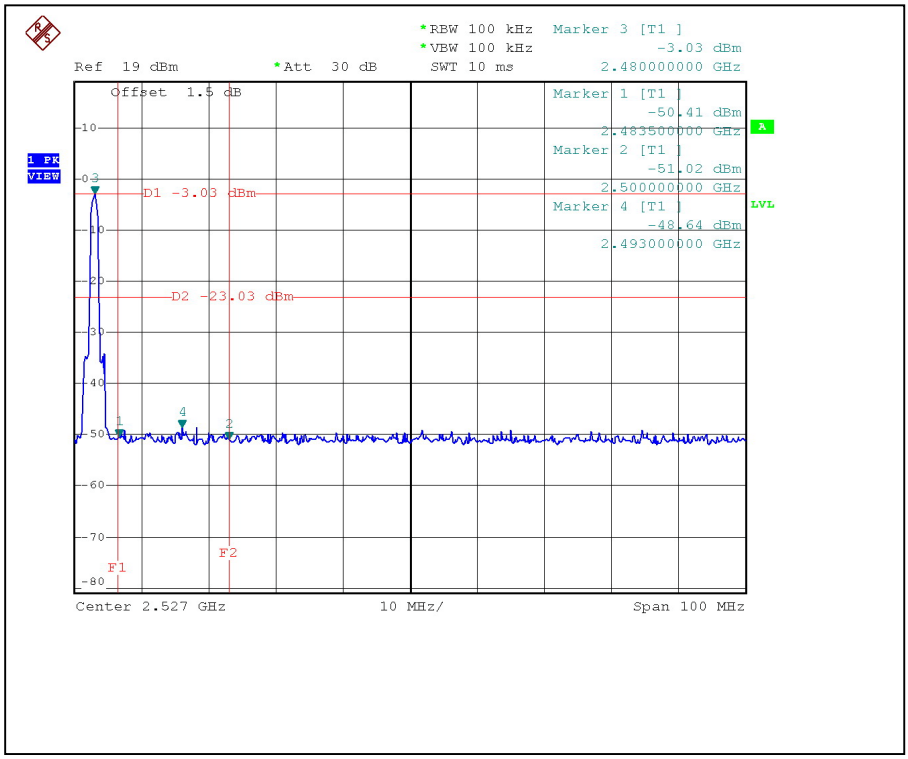
NOTE (Peak):
The band edge emission plot on the following first page show 47.73dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2 is 95.60dBuV/m, so the maximum field strength in restrict band is 95.60-47.73=47.87dBuV/m which is under 74 dBuV/m limit.

The band edge emission plot on the following first page shows 47.38dB 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 95.10dBuV/m, so the maximum field strength in restrict band is 95.10-47.38=47.72dBuV/m which is under 74 dBuV/m limit.

NOTE (Average):
The band edge emission plot on the following first page shows 47.73strict band (2.3900GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2 is 65.60dBuV/m, so the maximum field strength in restrict band is 65.60-47.73=17.87dBuV/m which is under 54 dBuV/m limit.

The band edge emission plot on the following first page shows 47.38dB 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 65.10dBuV/m, so the maximum field strength in restrict band is 65.10-47.38=17.72dBuV/m which is under 54 dBuV/m limit.


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 3 [T1]
-2.21 dBm
2.402200000 GHz
Ref 19 dBm
*Att 30 dB
Offset 1.5 dB
Marker 1 [T1]
-49.94 dBm
2.390000000 GHz
Marker 2 [T1]
-49.92 dBm
2.400000000 GHz
Marker 4 [T1]
-49.41 dBm
2.395560000 GHz
1 PK
VIEW
D1 -2.21 dBm
D2 -22.21 dBm
F1
F2
Center 2.356 GHz
10 MHz/
Span 100 MHz


*RBW 100 kHz
*VBW 100 kHz
SWT 10 ms
Marker 3 [T1]
-3.03 dBm
2.480000000 GHz
Ref 19 dBm
*Att 30 dB
Offset 1.5 dB
Marker 1 [T1]
-50.41 dBm
2.483500000 GHz
Marker 2 [T1]
-51.02 dBm
2.500000000 GHz
Marker 4 [T1]
-48.64 dBm
2.493000000 GHz
1 PK
VIEW
D1 -3.03 dBm
D2 -23.03 dBm
F1
F2
Center 2.527 GHz
10 MHz/
Span 100 MHz

4.9 ANTENNA REQUIREMENT

4.9.1 STANDARD APPLICABLE

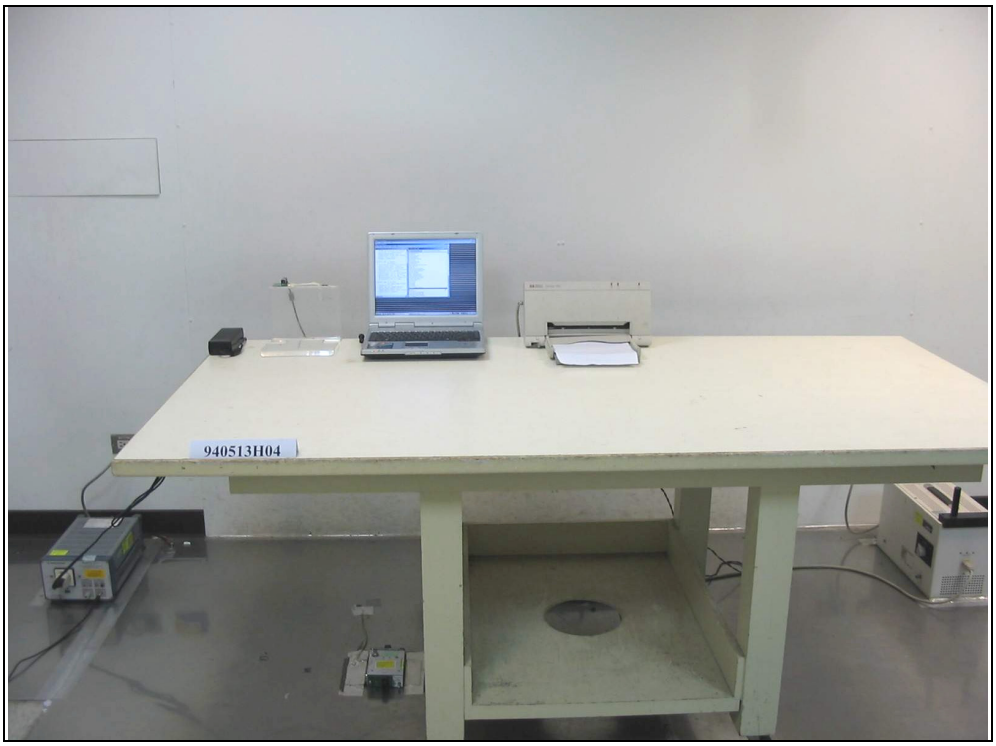
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional 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.

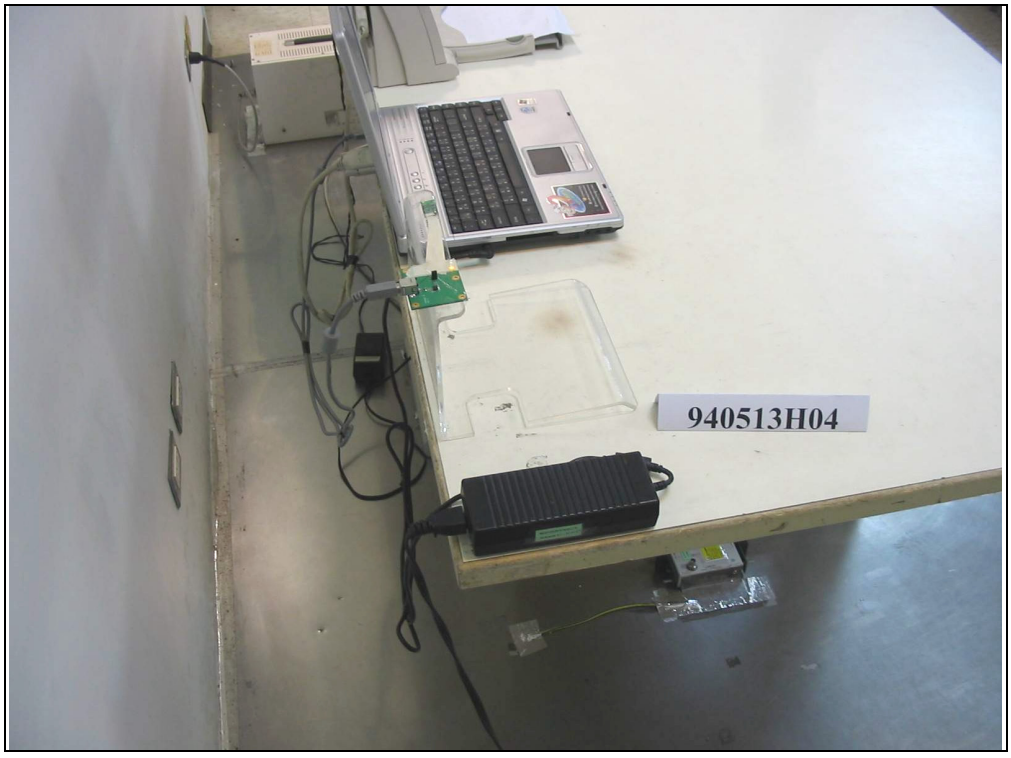
4.9.2 ANTENNA CONNECTED CONSTRUCTION

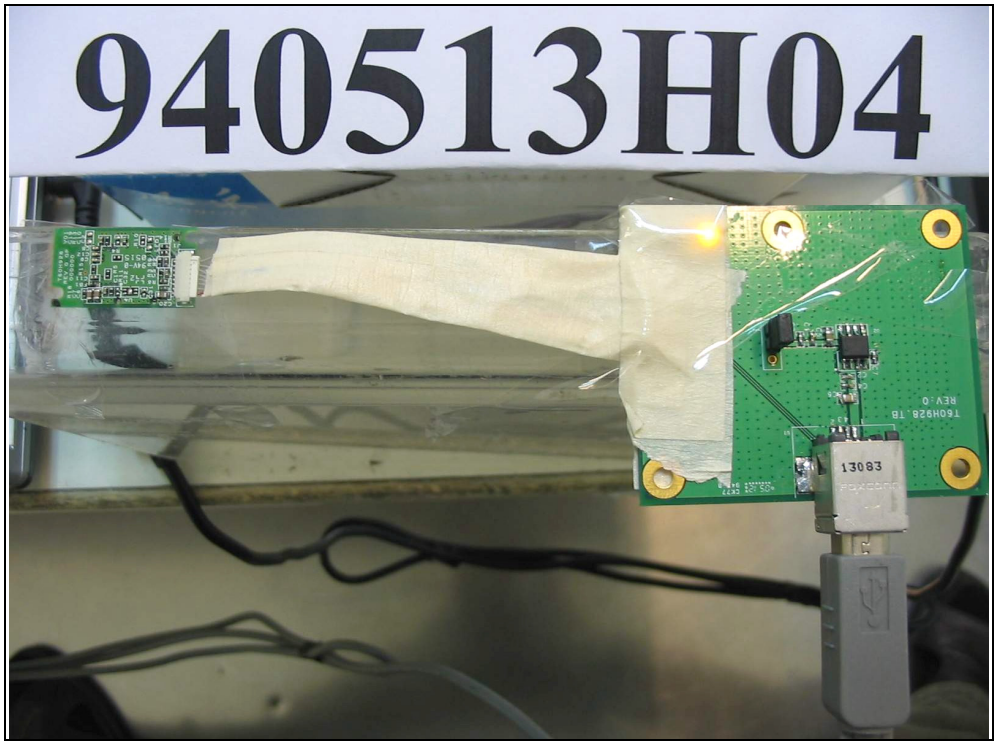
The antenna used in this product is Printed antenna without connector. The maximum Gain of the antenna is 1.97dBi.

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

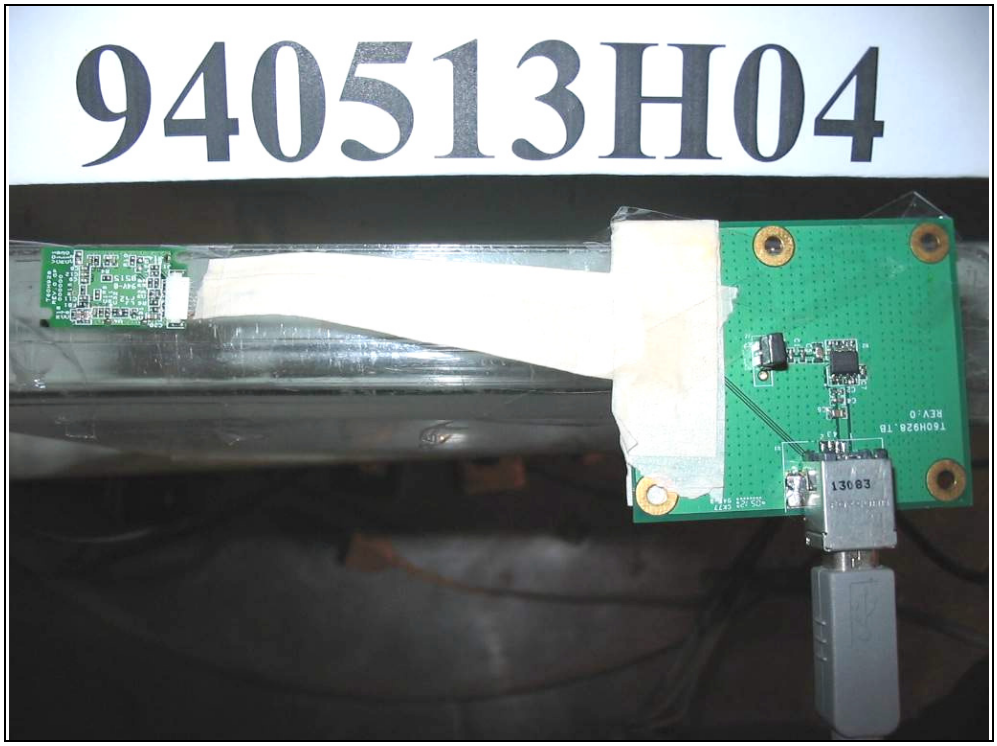
CONDUCTED EMISSION TEST






940513H04
13083

RADIATED EMISSION TEST


940513H04

6 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, NVLAP, UL, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA, CSA
R.O.C.	CNLA, BSMI, DGT
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
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The address and road map of all our labs can be found in our web site also.