FCC TEST REPORT

REPORT NO.:	RF120511C42E-1
MODEL NO.:	BHT-1261BWB-CE, BHT-1261QWB-CE
FCC ID:	PZWBHT1200
RECEIVED:	May 11, 2012
TESTED:	May 29 ~ May 31, 2012 (For model: BHT-1261BWB-CE)
	Sep. 26 ~ Sep. 27, 2012 (For model: BHT-1261QWB-CE)
ISSUED:	Oct. 08, 2012

APPLICANT:	DENSO WAVE INCORPORATED
ADDRESS:	1 Yoshiike Kusagi Agui-cho,Chita-gun Aichi 470-2297, Japan

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
LAB ADDRESS:	No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.
TEST LOCATION:	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF120511C42E-1	Original release	Oct. 08, 2012

1. CERTIFICATION

PRODUCT:	Barcode Handy Terminal
MODEL NO.:	BHT-1261BWB-CE, BHT-1261QWB-CE
BRAND:	DENSO
APPLICANT:	DENSO WAVE INCORPORATED
TESTED:	May 29 ~ May 31, 2012 (For model: BHT-1261BWB-CE) Sep. 26 ~ Sep. 27, 2012 (For model: BHT-1261QWB-CE)
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)** ANSI C63.10-2009

The above equipment (model: BHT-1261BWB-CE, BHT-1261QWB-CE) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch,** 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 : Ivy Lin / Specialist , DATE : Oct. 08, 2012

APPROVED BY : Ken Liu / Manager , DATE : Oct. 08, 2012

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -16.56dB at 0.15000MHz.
15.247(a)(1) (iii)	Number of Hopping Frequency Used	PASS	Meet the requirement of limit.
15.247(a)(1) (iii)	Dwell Time on Each Channel	PASS	Meet the requirement of limit.
15.247(a)(1)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power	PASS	Meet the requirement of limit.
15.247(d)	Transmitter Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -6.5dB at 2398.00MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

NOTE: If The Frequency Hopping System operating in 2400-2483.5MHz band and the output power less than 125mW. The hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of hopping channel whichever is greater.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.34 dB
	200MHz ~1000MHz	3.35 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Barcode Handy Terminal
MODEL NO.	BHT-1261BWB-CE, BHT-1261QWB-CE
POWER SUPPLY	3.7Vdc (Battery)
MODULATION TYPE	GFSK, π/4-DQPSK, 8DPSK
MODULATION TECHNOLOGY	FHSS
TRANSFER RATE	1/2/3Mbps
OPERATING FREQUENCY	2402 ~ 2480MHz
NUMBER OF CHANNEL	79
MAX. OUTPUT POWER	2.958mW
ANTENNA TYPE	Printed PCB antenna with 1.93dBi gain
ANTENNA CONNECTOR	NA
I/O PORTS	Refer to user's manual
DATA CABLE	NA
ACCESSORY DEVICES	Battery

NOTE:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report to the original BVADT report no. RF120511C42-1. The difference compared with original report is adding model for changing scanner module (2D), camera, flash light and MR sensor of battery case. Therefore, the test items of conducted emission and radiated emissions below 1GHz had been verified for additional model and the other original test results were kept in the report.
2. The following models are provided to the EUT. (New model is marked in boldface.)

Model No.	BHT-1261BWB-CE	**BHT-1261QWB-CE**
Module	1D Long	2D
Keyboard	Type D	Type D
Camera	5M/AF	5M/AF

3. The EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	1TX

4. The EUT consumes power from the following batteries:

2 Cell Battery	
MODEL	BT-110LA(BP06-00028C)
RATING	3.7Vdc Capacity, 2300mAh

3 Cell Battery	
MODEL	BT-110L(BP06-00029C)
RATING	3.7Vdc Capacity, 3450mAh

* After pre-testing, the EUT with 3 cell battery is the worst case of all tests except conducted emission test and the EUT with 2 cell battery is the worst case of conducted emission test.

5. The following devices are support units only.

Device	Brand Name	Model No.	Remark
Communication Unit (USB Cradle)	DENSO	CU-1233	-
Communication Unit (Ethernet Cradle)	DENSO	CU-1211	-
AC adapter	FSP	FSP050-DBAE1	AC I/P: 100-240Vac, 1.5A, 50-60Hz DC O/P: 12Vdc, 4.16A 1.8m non-shielded AC cable without core 1.2m shielded DC cable with 1 core

* After pre-testing, the EUT with Communication Unit (USB Cradle) is the worst case for final test.

6. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 DESCRIPTION OF TEST MODES

79 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		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	-	√	Model: BHT-1261BWB-CE with 3 cell battery
B	-	√	-	-	Model: BHT-1261BWB-CE with 3 cell battery and Communication Unit (USB Cradle)
C	-	-	√	-	Model: BHT-1261BWB-CE with 2 cell battery and Communication Unit (USB Cradle)
D	-	√	-	-	Model: BHT-1261QWB-CE with 3 cell battery
E	-	√	√	-	Model: BHT-1261QWB-CE with 2 cell battery and Communication Unit (USB Cradle)

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz

PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane.**

NOTE: "-"means no effect.

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture) and packet type.

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
A	0 to 78	0, 78	FHSS	GFSK	DH5
A	0 to 78	0, 78	FHSS	8DPSK	DH5

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture) and packet type.

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
A, B, D, E	0 to 78	78	FHSS	8DPSK	DH5

POWER LINE CONDUCTED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
C, E	0 to 78	78	FHSS	8DPSK	DH5

BANDEDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
A	0 to 78	0, 78	FHSS	GFSK	DH5
A	0 to 78	0, 78	FHSS	π/4-DQPSK	DH5
A	0 to 78	0, 78	FHSS	8DPSK	DH5

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE
A	0 to 78	0, 78	FHSS	GFSK	DH5
A	0 to 78	0, 78	FHSS	π/4-DQPSK	DH5
A	0 to 78	0, 78	FHSS	8DPSK	DH5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TEST MODE	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	A	Hura Yang
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	A, B	Hura Yang
	24deg. C, 69%RH	120Vac, 60Hz	D, E	Alan Wu
PLC	25deg. C, 64%RH	120Vac, 60Hz	C	Skys Huang
	24deg. C, 64%RH	120Vac, 60Hz	E	Match Tsui
APCM	25deg. C, 65%RH	120Vac, 60Hz	A	Hura Yang

3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

For radiated emissions test

TEST MODE A & D

The EUT has been tested as an independent unit.

TEST MODE B & E

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Communication Unit (USB Cradle)	DENSO	CU-1233	NA	NA
2	AC ADAPTER	FSP	FSP050-DBAE1	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA

NOTE:

1. All power cords of the above support units are non shielded (1.8m).
2. Item 1 & 2 are provided by the client.

For conducted emission test

TEST MODE C

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	D610	CRMTH1S	E2K5HCKT
2	24" LCD MONITOR	DELL	U2410	CN082WXD-72872-0CN-06RL	FCC DoC Approved
3	MOUSE	DELL	MO56U0	516056379	FCC DoC Approved
4	PRINTER	EPSON	LQ-300+	DCGY047271	FCC DoC Approved
5	WIRELESS AP	BUFFALO	WBR2-G54	34059544811631	FDI-04600142-0
6	BLUETOOTH SPEAKER	Ambeon	Ms-01B	AMB 08041000	NA
7	COMMUNICATION UNIT (USB CRADLE)	DENSO	CU-1233	NA	NA
8	AC ADAPTER	FSP	FSP050-DBAE1	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.8m D-Sub cable with 2 cores.
3	1.8m foil shielded wire, USB Connector, w/o core.
4	1.8m braid shielded wire, DB25 connector, w/o core.
5	NA
6	NA
7	1.8m USB cable, 1.8m RS-232 cable
8	NA

NOTE:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item 5 ~ 6 acted as communication partners to transfer data.
3. Item 7 & 8 are provided by the client.

TEST MODE E

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	PP18L	D1T5W1S 28407620224	QDS-BRCM1019
2	LCD MONITOR	DELL	2408WFPb	CN-0NN792-742 61-823-OKGS	FCC DoC Approved
3	PRINTER	EPSON	B241A	FAPY139300	FCC DoC Approved
4	MOUSE	Microsoft	ITE78CJ	N/A	FCC DoC Approved
5	WIRELESS AP	BUFFALO	WBR2-G54	3405954481163 1	FDI-04600142-0
6	BLUETOOTH SPEAKER	Ambeon	Ms-01B	AMB 08041000	NA
7	COMMUNICATIO N UNIT (USB CRADLE)	DENSO	CU-1233	NA	NA
8	AC ADAPTER	FSP	FSP050-DBAE1	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.8m D-Sub cable with 2 cores.
3	1.8 m shielded cable, terminated with USB connector, w/o core.
4	1.8m foil shielded wire, USB Connector, with core.
5	NA
6	NA
7	1.8m USB cable, 1.8m RS-232 cable
8	NA

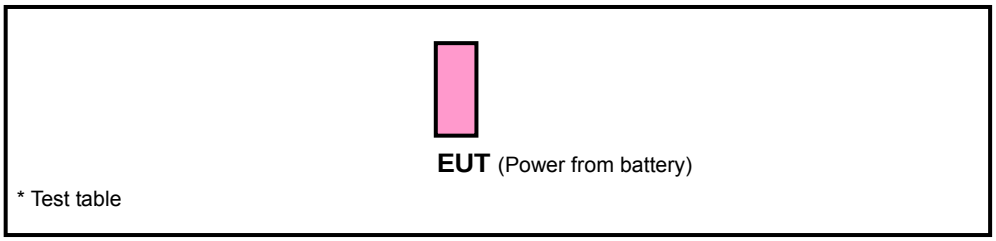
NOTE:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item 5 ~ 6 acted as communication partners to transfer data.
3. Item 7 & 8 are provided by the client.

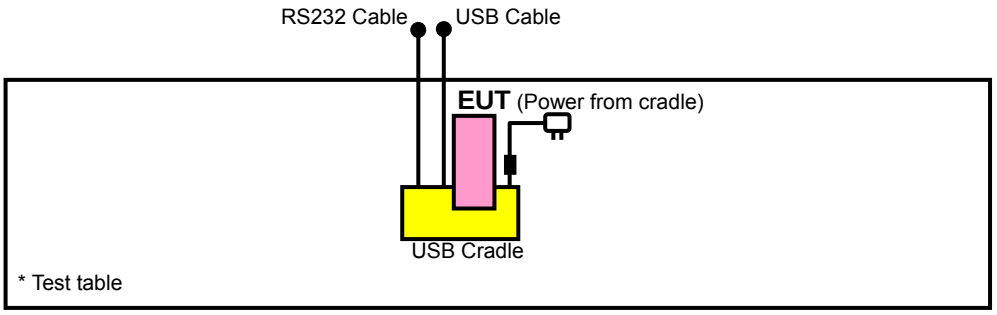
3.3.1 CONFIGURATION OF SYSTEM UNDER TEST

For radiated emissions test

TEST MODE A & D

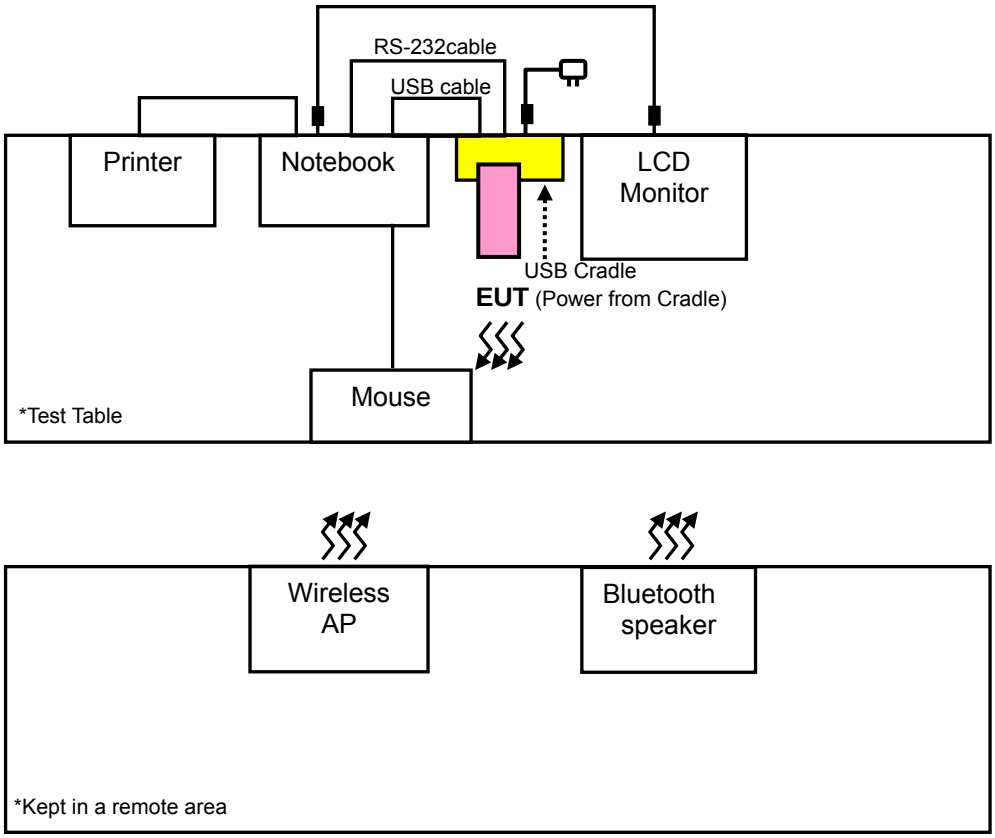


TEST MODE B & E



For conducted emission test

TEST MODE C & E



3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. 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 C63.10-2009

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.

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. 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.

4.1.2 TEST INSTRUMENTS

Test Date: May 28 ~ 29, 2012 (Model: BHT-1261BWB-CE)

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100212	Aug. 02, 2011	Aug. 01, 2012
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Jul. 21, 2011	Jul. 20, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Apr. 06, 2012	Apr. 05, 2013
HORN Antenna SCHWARZBECK	9120D	209	Aug. 25, 2011	Aug. 24, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 20, 2011	Jul. 19, 2012
Preamplifier Agilent	8447D	2944A10633	Oct. 29, 2011	Oct. 28, 2012
Preamplifier Agilent	8449B	3008A01964	Oct. 29, 2011	Oct. 28, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250723/4	Aug. 30, 2011	Aug. 29, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6+309224/4	Aug. 30, 2011	Aug. 29, 2012
Software ADT.	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100	TT93021703	NA	NA
Turn Table Controller ADT.	SC100	SC93021703	NA	NA
High Speed Peak Power Meter	ML2495A	0824011	Aug. 04, 2011	Aug. 03, 2012
Power Sensor	MA2411B	0738171	Aug. 04, 2011	Aug. 03, 2012

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 3.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 988962.
5. The IC Site Registration No. is IC 7450F-3.

Test Date: Sep. 27, 2012 (Model: BHT-1261QWB-CE)

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100212	Aug. 06, 2012	Aug. 05, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Feb. 03, 2012	Feb. 02, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Apr. 06, 2012	Apr. 05, 2013
HORN Antenna SCHWARZBECK	9120D	209	Sep. 03, 2012	Sep. 02, 2013
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 11, 2012	Jul. 10, 2013
Preamplifier Agilent	8447D	2944A10633	Oct. 29, 2011	Oct. 28, 2012
Preamplifier Agilent	8449B	3008A01964	Oct. 29, 2011	Oct. 28, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250723/4	Aug. 28, 2012	Aug. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6+309224/4	Aug. 28, 2012	Aug. 27, 2013
Software ADT.	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100	TT93021703	NA	NA
Turn Table Controller ADT.	SC100	SC93021703	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 3.

3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 988962.

4. The IC Site Registration No. is IC 7450F-3.

4.1.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 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 lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

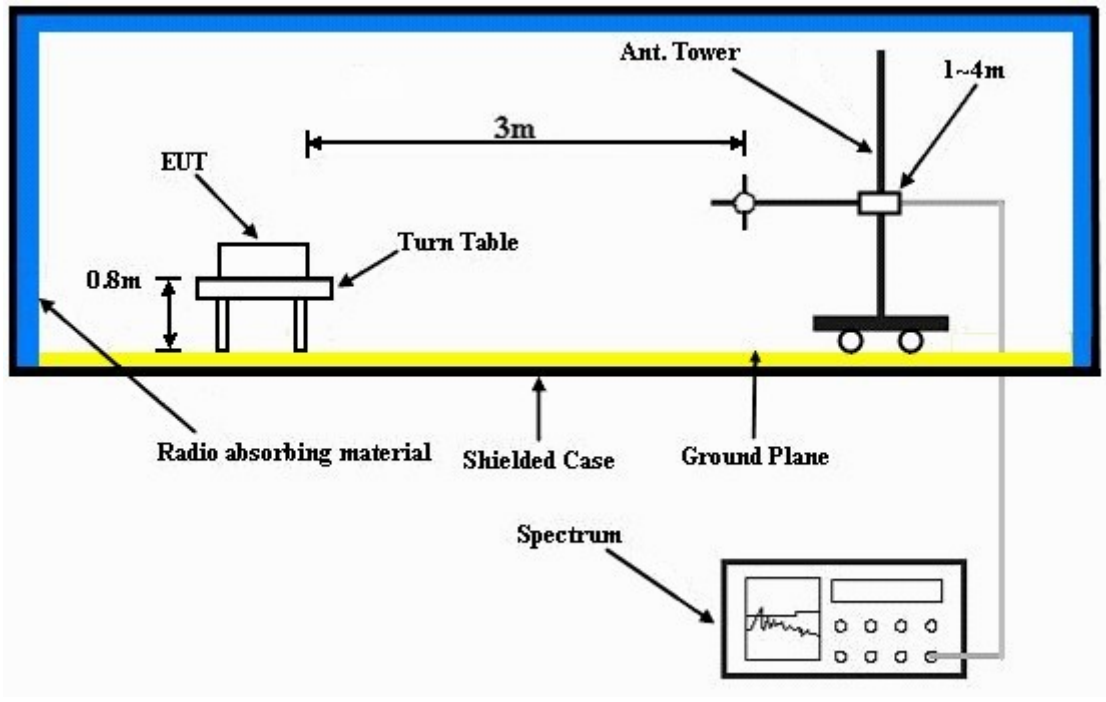
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT OPERATING CONDITIONS

TEST MDOE A & D

a. Placed the EUT on a testing table.
b. Set the EUT under transmission condition continuously at specific channel frequency.

TEST MDOE B & E

a. Placed the EUT with USB cradle on the testing table.
b. The EUT ran a test program (provided by manufacturer) to enable all functions under transmission condition continuously at specific channel frequency.
c. The necessary accessories enable the EUT in full functions.

4.1.7 TEST RESULTS

GFSK

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	**FREQUENCY RANGE**	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	**TESTED BY**	Haru Yang

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	2390.00	49.7 PK	74.0	-24.3	1.12 H	166	18.40	31.30
2	2390.00	37.1 AV	54.0	-16.9	1.12 H	166	5.80	31.30
3	#2398.00	49.2 PK	82.0	-32.8	1.12 H	166	17.90	31.30
4	#2398.00	37.1 AV	51.9	-14.8	1.12 H	166	5.80	31.30
5	#2400.00	65.3 PK	82.0	-16.7	1.12 H	166	34.00	31.30
6	#2400.00	35.2 AV	51.9	-16.7	1.12 H	166	3.90	31.30
7	*2402.00	102.0 PK			1.12 H	166	70.70	31.30
8	*2402.00	71.9 AV			1.12 H	166	40.60	31.30
9	4804.00	48.4 PK	74.0	-25.6	1.00 H	196	11.20	37.20
10	4804.00	18.3 AV	54.0	-35.7	1.00 H	196	-18.90	37.20

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.
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 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	2390.00	49.5 PK	74.0	-24.5	1.69 V	206	18.20	31.30
2	2390.00	37.1 AV	54.0	-16.9	1.69 V	206	5.80	31.30
3	#2398.00	49.4 PK	74.1	-24.7	1.69 V	206	18.10	31.30
4	#2398.00	36.6 AV	44.0	-7.4	1.69 V	206	5.30	31.30
5	#2400.00	58.3 PK	74.1	-15.8	1.69 V	206	27.00	31.30
6	#2400.00	28.2 AV	44.0	-15.8	1.69 V	206	-3.10	31.30
7	*2402.00	94.1 PK			1.69 V	206	62.80	31.30
8	*2402.00	64.0 AV			1.69 V	206	32.70	31.30
9	4804.00	47.2 PK	74.0	-26.8	1.39 V	276	10.00	37.20
10	4804.00	17.1 AV	54.0	-36.9	1.39 V	276	-20.10	37.20

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.
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 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).
8. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	102.9 PK			1.10 H	165	71.40	31.50
2	*2441.00	72.8 AV			1.10 H	165	41.30	31.50
3	4882.00	48.7 PK	74.0	-25.3	1.00 H	264	11.40	37.30
4	4882.00	18.6 AV	54.0	-35.4	1.00 H	264	-18.70	37.30
5	7323.00	51.8 PK	74.0	-22.2	1.00 H	207	8.20	43.60
6	7323.00	21.7 AV	54.0	-32.3	1.00 H	207	-21.90	43.60
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	95.1 PK			1.62 V	202	63.60	31.50
2	*2441.00	65.0 AV			1.62 V	202	33.50	31.50
3	4882.00	47.4 PK	74.0	-26.6	1.46 V	283	10.10	37.30
4	4882.00	17.3 AV	54.0	-36.7	1.46 V	283	-20.00	37.30
5	7323.00	51.6 PK	74.0	-22.4	1.00 V	122	8.00	43.60
6	7323.00	21.5 AV	54.0	-32.5	1.00 V	122	-22.10	43.60

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.
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 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	103.8 PK			1.08 H	168	72.20	31.60
2	*2480.00	73.7 AV			1.08 H	168	42.10	31.60
3	2483.50	57.7 PK	74.0	-16.3	1.08 H	168	26.10	31.60
4	2483.50	27.6 AV	54.0	-26.4	1.08 H	168	-4.00	31.60
5	2485.50	53.2 PK	74.0	-20.8	1.08 H	168	21.60	31.60
6	2485.50	37.1 AV	54.0	-16.9	1.08 H	168	5.50	31.60
7	4960.00	52.3 PK	74.0	-21.7	1.00 H	237	14.80	37.50
8	4960.00	22.2 AV	54.0	-31.8	1.00 H	237	-15.30	37.50
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	96.7 PK			1.61 V	204	65.10	31.60
2	*2480.00	66.6 AV			1.61 V	204	35.00	31.60
3	2483.50	53.9 PK	74.0	-20.1	1.61 V	204	22.30	31.60
4	2483.50	23.8 AV	54.0	-30.2	1.61 V	204	-7.80	31.60
5	2485.50	54.8 PK	74.0	-19.2	1.61 V	204	23.20	31.60
6	2485.50	36.8 AV	54.0	-17.2	1.61 V	204	5.20	31.60
7	4960.00	47.9 PK	74.0	-26.1	1.48 V	295	10.40	37.50
8	4960.00	17.8 AV	54.0	-36.2	1.48 V	295	-19.70	37.50

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.
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 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

8DPSK

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	2390.00	51.9 PK	74.0	-22.1	1.13 H	162	20.60	31.30
2	2390.00	38.1 AV	54.0	-15.9	1.13 H	162	6.80	31.30
3	#2398.00	52.5 PK	80.8	-28.3	1.13 H	162	21.20	31.30
4	#2398.00	39.5 AV	50.7	-11.2	1.13 H	162	8.20	31.30
5	#2400.00	67.8 PK	80.8	-13.0	1.13 H	162	36.50	31.30
6	#2400.00	37.7 AV	50.7	-13.0	1.13 H	162	6.40	31.30
7	*2402.00	100.8 PK			1.13 H	162	69.50	31.30
8	*2402.00	70.7 AV			1.13 H	162	39.40	31.30
9	4804.00	48.1 PK	74.0	-25.9	1.00 H	247	10.90	37.20
10	4804.00	18.0 AV	54.0	-36.0	1.00 H	247	-19.20	37.20

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.
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 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH 1000 hPa	TESTED BY	Haru Yang

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	2390.00	51.7 PK	74.0	-22.3	1.69 V	191	20.40	31.30
2	2390.00	37.3 AV	54.0	-16.7	1.69 V	191	6.00	31.30
3	#2398.00	50.6 PK	73.7	-23.1	1.69 V	191	19.30	31.30
4	**#2398.00**	**37.1 AV**	**43.6**	**-6.5**	**1.69 V**	**191**	**5.80**	**31.30**
5	#2400.00	61.5 PK	73.7	-12.2	1.69 V	191	30.20	31.30
6	#2400.00	31.4 AV	43.6	-12.2	1.69 V	191	0.10	31.30
7	*2402.00	93.7 PK			1.69 V	191	62.40	31.30
8	*2402.00	63.6 AV			1.69 V	191	32.30	31.30
9	4804.00	47.2 PK	74.0	-26.8	1.36 V	279	10.00	37.20
10	4804.00	17.1 AV	54.0	-36.9	1.36 V	279	-20.10	37.20

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.
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 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).
8. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	101.8 PK			1.09 H	169	70.30	31.50
2	*2441.00	71.7 AV			1.09 H	169	40.20	31.50
3	4882.00	48.5 PK	74.0	-25.5	1.00 H	238	11.20	37.30
4	4882.00	18.4 AV	54.0	-35.6	1.00 H	238	-18.90	37.30
5	7323.00	51.4 PK	74.0	-22.6	1.00 H	219	7.80	43.60
6	7323.00	21.3 AV	54.0	-32.7	1.00 H	219	-22.30	43.60
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	94.5 PK			1.67 V	204	63.00	31.50
2	*2441.00	64.4 AV			1.67 V	204	32.90	31.50
3	4882.00	47.6 PK	74.0	-26.4	1.44 V	291	10.30	37.30
4	4882.00	17.5 AV	54.0	-36.5	1.44 V	291	-19.80	37.30
5	7323.00	51.3 PK	74.0	-22.7	1.00 V	117	7.70	43.60
6	7323.00	21.2 AV	54.0	-32.8	1.00 V	117	-22.40	43.60

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.
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 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	102.5 PK			1.07 H	160	70.90	31.60
2	*2480.00	72.4 AV			1.07 H	160	40.80	31.60
3	2483.50	52.4 PK	74.0	-21.6	1.07 H	160	20.80	31.60
4	2483.50	22.3 AV	54.0	-31.7	1.07 H	160	-9.30	31.60
5	2485.50	54.0 PK	74.0	-20.0	1.07 H	160	22.40	31.60
6	2485.50	38.9 AV	54.0	-15.1	1.07 H	160	7.30	31.60
7	4960.00	51.8 PK	74.0	-22.2	1.00 H	224	14.30	37.50
8	4960.00	21.7 AV	54.0	-32.3	1.00 H	224	-15.80	37.50
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	96.0 PK			1.66 V	193	64.40	31.60
2	*2480.00	65.9 AV			1.66 V	193	34.30	31.60
3	2483.50	51.5 PK	74.0	-22.5	1.66 V	193	19.90	31.60
4	2483.50	21.4 AV	54.0	-32.6	1.66 V	193	-10.20	31.60
5	2485.50	51.5 PK	74.0	-22.5	1.66 V	193	19.90	31.60
6	2485.50	37.5 AV	54.0	-16.5	1.66 V	193	5.90	31.60
7	4960.00	48.2 PK	74.0	-25.8	1.39 V	283	10.70	37.50
8	4960.00	18.1 AV	54.0	-35.9	1.39 V	283	-19.40	37.50

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.
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 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

BELOW 1GHz WORST-CASE DATA：8DPSK

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang
TEST MODE	A		

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	37.68	19.6 QP	40.0	-20.4	1.74 H	300	6.30	13.30
2	218.50	22.7 QP	46.0	-23.3	1.25 H	334	11.00	11.70
3	407.09	21.7 QP	46.0	-24.3	1.25 H	17	4.00	17.70
4	626.80	24.1 QP	46.0	-21.9	1.25 H	98	1.70	22.40
5	836.78	26.3 QP	46.0	-19.7	1.50 H	345	0.20	26.10
6	953.44	27.7 QP	46.0	-18.3	1.50 H	144	0.40	27.30
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	35.73	22.2 QP	40.0	-17.8	1.25 V	106	9.20	13.00
2	70.73	19.0 QP	40.0	-21.0	1.00 V	218	6.90	12.10
3	226.27	16.6 QP	46.0	-29.4	1.74 V	5	4.50	12.10
4	652.07	22.8 QP	46.0	-23.2	1.50 V	349	0.20	22.60
5	830.95	25.8 QP	46.0	-20.2	1.50 V	19	-0.20	26.00
6	949.55	27.3 QP	46.0	-18.7	1.74 V	5	0.00	27.30

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang
TEST MODE	B		

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	37.68	19.3 QP	40.0	-20.7	2.00 H	92	6.00	13.30
2	160.17	19.9 QP	43.5	-23.6	1.25 H	82	5.80	14.10
3	234.05	21.3 QP	46.0	-24.7	1.25 H	74	8.90	12.40
4	286.55	23.8 QP	46.0	-22.2	1.00 H	93	9.40	14.40
5	311.82	23.7 QP	46.0	-22.3	1.00 H	243	8.40	15.30
6	467.36	22.1 QP	46.0	-23.9	2.00 H	214	2.90	19.20
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	35.73	28.5 QP	40.0	-11.5	1.00 V	23	15.50	13.00
2	284.60	24.2 QP	46.0	-21.8	1.00 V	147	9.80	14.40
3	311.82	25.7 QP	46.0	-20.3	1.99 V	188	10.40	15.30
4	337.10	23.4 QP	46.0	-22.6	1.24 V	181	7.50	15.90
5	467.36	23.3 QP	46.0	-22.7	1.00 V	87	4.10	19.20
6	519.86	22.9 QP	46.0	-23.1	1.00 V	6	2.50	20.40

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 69%RH	TESTED BY	Haru Yang
TEST MODE	D		

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	53.18	15.1 QP	40.0	-24.9	1.00 H	136	-11.90	27.00
2	97.81	18.0 QP	43.5	-25.5	1.74 H	213	-9.00	27.00
3	159.91	14.6 QP	43.5	-28.9	1.49 H	40	-12.40	27.00
4	487.83	19.9 QP	46.0	-26.1	1.74 H	220	-7.10	27.00
5	714.86	22.8 QP	46.0	-23.2	1.49 H	21	-4.20	27.00
6	759.49	24.0 QP	46.0	-22.0	1.00 H	168	-3.00	27.00
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	97.81	18.3 QP	43.5	-25.2	1.99 V	3	9.20	9.10
2	159.91	15.2 QP	43.5	-28.3	1.49 V	4	1.20	14.00
3	650.83	22.1 QP	46.0	-23.9	1.00 V	323	0.20	21.90
4	689.64	22.3 QP	46.0	-23.7	1.24 V	14	0.20	22.10
5	788.60	24.7 QP	46.0	-21.3	1.00 V	294	0.40	24.30
6	879.80	26.8 QP	46.0	-19.2	1.49 V	335	1.30	25.50

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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	24deg. C, 69%RH	TESTED BY	Haru Yang
TEST MODE	E		

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	97.81	24.0 QP	43.5	-19.5	1.99 H	259	14.87	9.13
2	233.64	25.1 QP	46.0	-20.9	1.24 H	104	12.88	12.21
3	311.26	25.3 QP	46.0	-20.7	1.00 H	111	10.28	15.02
4	338.42	25.7 QP	46.0	-20.3	1.00 H	121	10.02	15.68
5	363.65	23.1 QP	46.0	-22.9	1.00 H	130	6.82	16.28
6	788.60	24.8 QP	46.0	-21.2	1.24 H	302	0.48	24.32
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	51.24	24.4 QP	40.0	-15.6	1.00 V	170	-2.64	27.04
2	97.81	20.9 QP	43.5	-22.7	1.74 V	238	-6.19	27.04
3	311.26	27.7 QP	46.0	-18.3	1.49 V	178	0.70	27.04
4	363.65	25.0 QP	46.0	-21.0	1.49 V	191	-2.08	27.04
5	571.27	25.4 QP	46.0	-20.6	1.00 V	8	-1.64	27.04
6	780.83	26.3 QP	46.0	-19.8	1.24 V	142	-0.79	27.04

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.

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

Test Date: May 29, 2012 (Model: BHT-1261BWB-CE)

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 23, 2011	Nov. 22, 2012
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 29, 2011	Dec. 28, 2012
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 07, 2011	Jul. 06, 2012
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 07, 2012	Feb. 06, 2013
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

Test Date: Sep. 26, 2012(Model: BHT-1261QWB-CE)

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 23, 2011	Nov. 22, 2012
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 29, 2011	Dec. 28, 2012
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 02, 2012	Jul. 01, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 07, 2012	Feb. 06, 2013
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

4.2.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

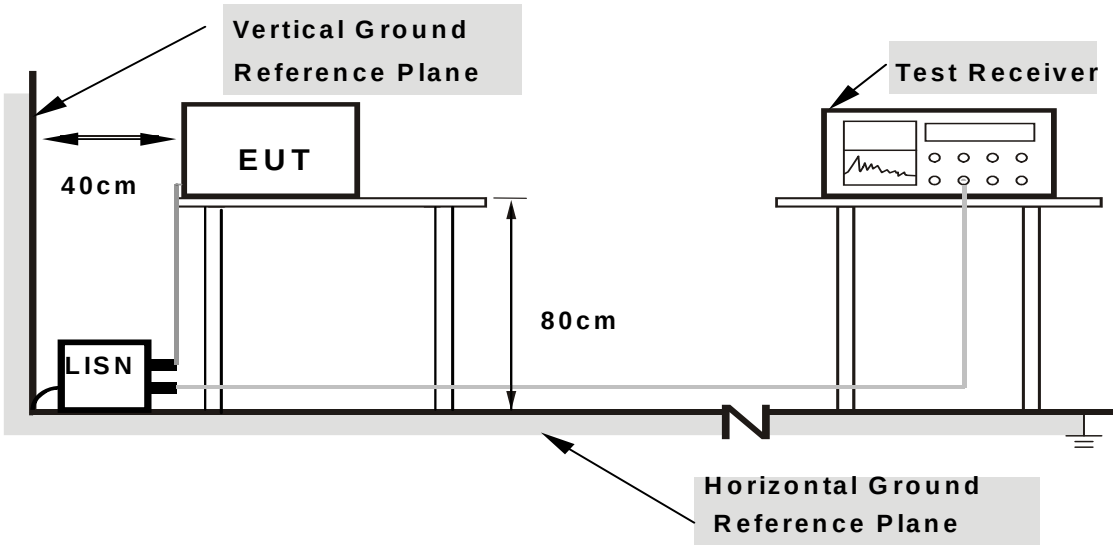
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT OPERATING CONDITIONS

a. Placed the EUT on the testing table.
b. The EUT run ”VCCITest” program (provided by manufacturer) to enable EUT under operating condition.
c. Prepared the Wireless AP and Bluetooth speaker placed them outside of testing area to act as communication partner for EUT.
d. The EUT run barcode scan function.
e. Step d ~ d were repeated

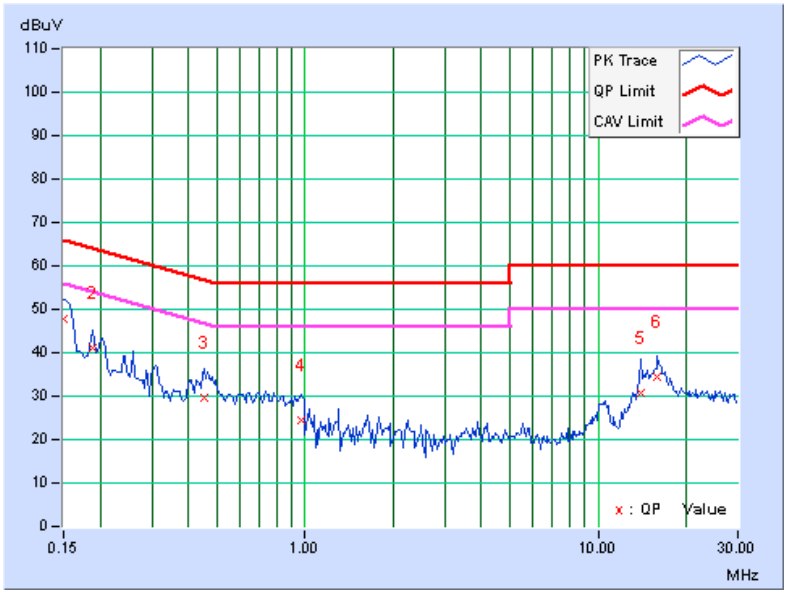
4.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA：8DPSK

PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	C		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.11	47.79	32.37	47.90	32.48	66.00	56.00	-18.10	-23.52
2	0.18906	0.13	41.13	25.38	41.26	25.51	64.08	54.08	-22.82	-28.57
3	0.45469	0.14	29.45	20.57	29.59	20.71	56.79	46.79	-27.20	-26.08
4	0.96641	0.19	24.19	15.71	24.38	15.90	56.00	46.00	-31.62	-30.10
5	13.94531	0.85	29.85	22.76	30.70	23.61	60.00	50.00	-29.30	-26.39
6	15.89844	0.95	33.38	26.61	34.33	27.56	60.00	50.00	-25.67	-22.44

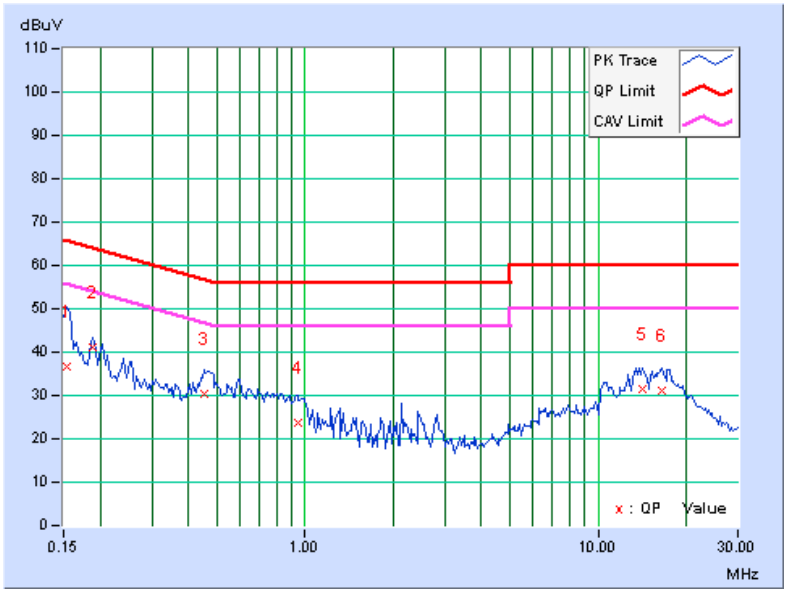
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	C		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.13	36.49	26.84	36.62	26.97	65.79	55.79	-29.17	-28.82
2	0.18906	0.14	40.83	29.83	40.97	29.97	64.08	54.08	-23.11	-24.11
3	0.45469	0.16	30.32	20.54	30.48	20.70	56.79	46.79	-26.31	-26.09
4	0.94297	0.20	23.59	14.44	23.79	14.64	56.00	46.00	-32.21	-31.36
5	14.16016	0.75	30.83	24.31	31.58	25.06	60.00	50.00	-28.42	-24.94
6	16.44531	0.83	30.33	24.69	31.16	25.52	60.00	50.00	-28.84	-24.48

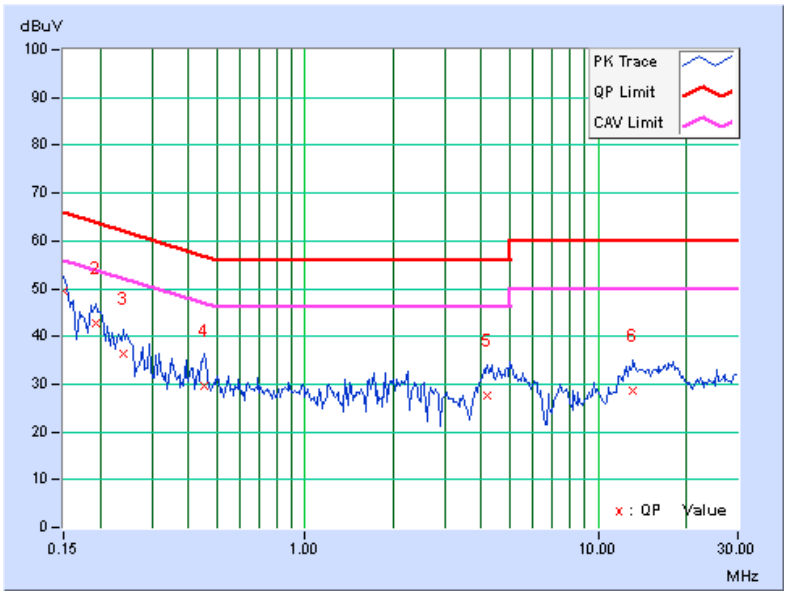
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



PHASE	Line 1	6dB BANDWIDTH	9kHz
TEST MODE	E		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15000**	**0.11**	**49.33**	**36.18**	**49.44**	**36.29**	**66.00**	**56.00**	**-16.56**	**-19.71**
2	0.19297	0.13	42.71	27.88	42.84	28.01	63.91	53.91	-21.07	-25.90
3	0.23984	0.13	36.22	21.10	36.35	21.23	62.10	52.10	-25.75	-30.87
4	0.45469	0.14	29.62	21.30	29.76	21.44	56.79	46.79	-27.03	-25.35
5	4.18359	0.35	27.35	15.15	27.70	15.50	56.00	46.00	-28.30	-30.50
6	13.21094	0.81	27.71	21.40	28.52	22.21	60.00	50.00	-31.48	-27.79

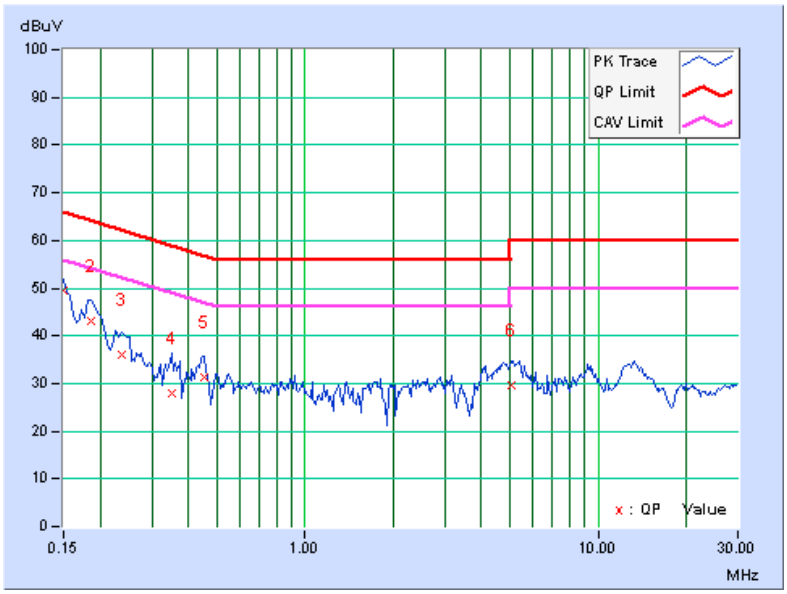
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



PHASE	Line 2	6dB BANDWIDTH	9kHz
TEST MODE	E		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15000**	**0.12**	**49.32**	**36.54**	**49.44**	**36.66**	**66.00**	**56.00**	**-16.56**	**-19.34**
2	0.18516	0.14	42.99	24.29	43.13	24.43	64.25	54.25	-21.13	-29.83
3	0.23594	0.14	35.81	19.10	35.95	19.24	62.24	52.24	-26.29	-33.00
4	0.34922	0.15	27.71	17.69	27.86	17.84	58.98	48.98	-31.12	-31.14
5	0.45078	0.16	31.21	24.07	31.37	24.23	56.86	46.86	-25.50	-22.64
6	5.05469	0.39	29.29	18.23	29.68	18.62	60.00	50.00	-30.32	-31.38

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

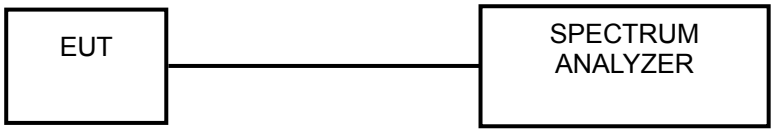


4.3 NUMBER OF HOPPING FREQUENCY USED

4.3.1 LIMIT OF HOPPING FREQUENCY USED

At least 15 channels frequencies, and should be equally spaced.

4.3.2 TEST SETUP



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.3.4 TEST PROCEDURES

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. 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.
c. 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.
d. Set the SA on View mode and then plot the result on SA screen.
e. Repeat above procedures until all frequencies measured were complete.

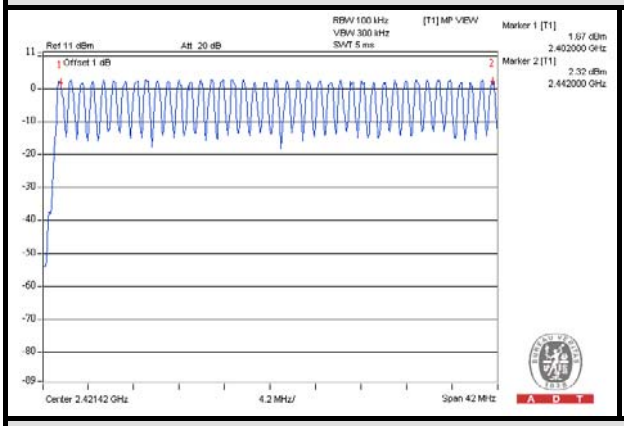
4.3.5 DEVIATION FROM TEST STANDARD

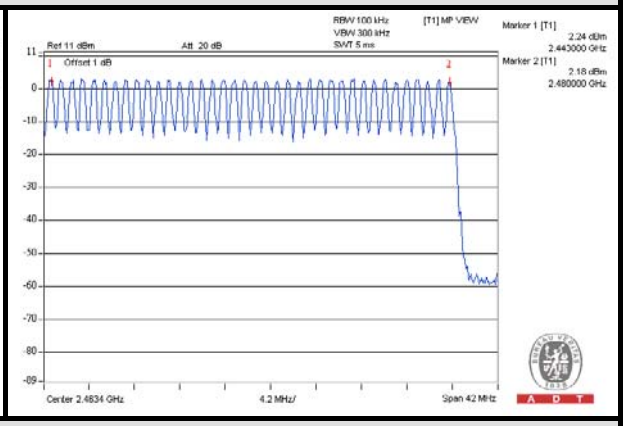
No deviation.

4.3.6 TEST RESULTS

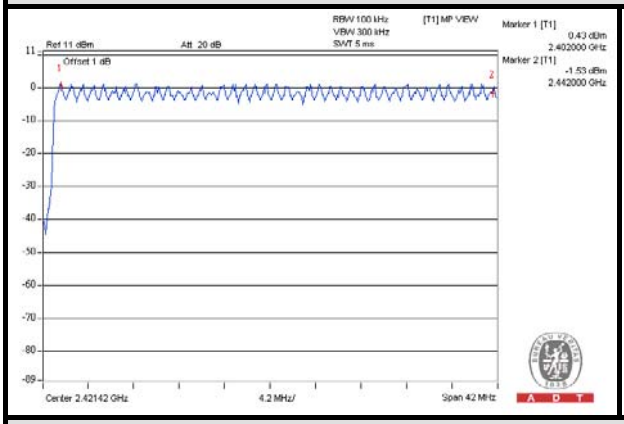
There are 79 hopping frequencies in the hopping mode. Please refer to next two pages for the test result. On the plots, it shows that the hopping frequencies are equally spaced.

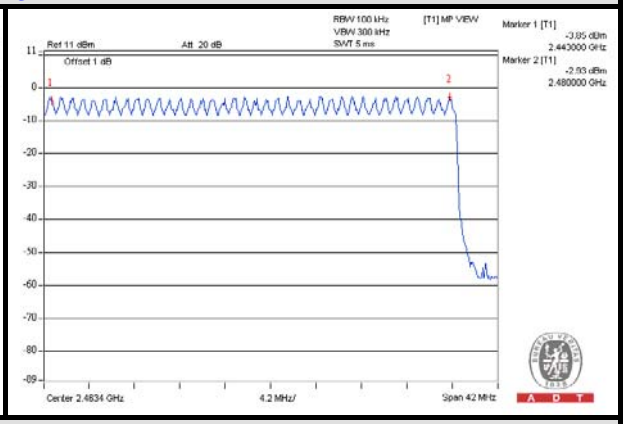
GFSK



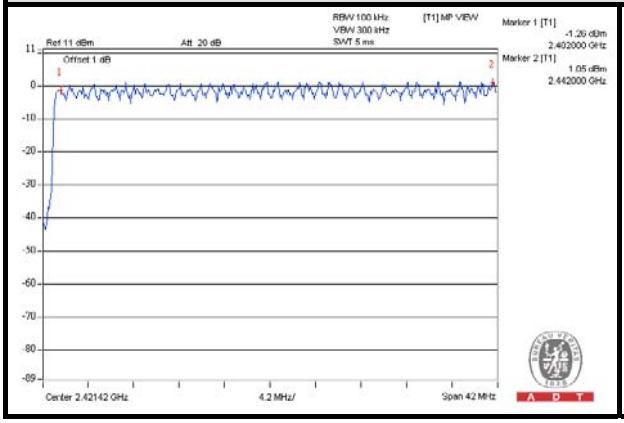


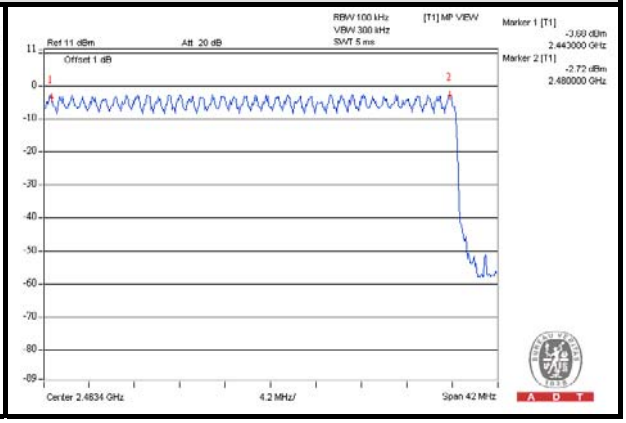
π/4-DQPSK





8DPSK



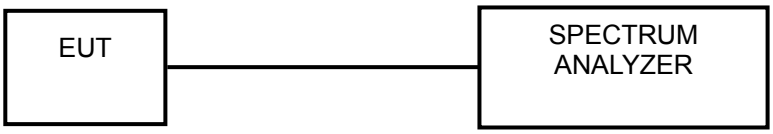


4.4 DWELL TIME ON EACH CHANNEL

4.4.1 LIMIT OF DWELL TIME USED

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.4.4 TEST PROCEDURES

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. 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.
c. 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.
d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
e. Repeat above procedures until all different time-slot modes have been completed.

4.4.5 DEVIATION FROM TEST STANDARD

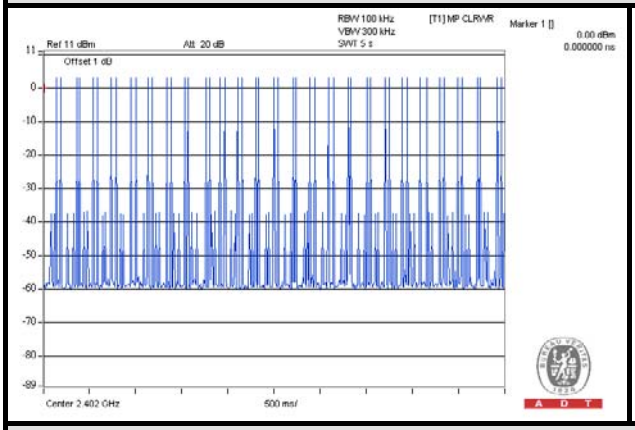
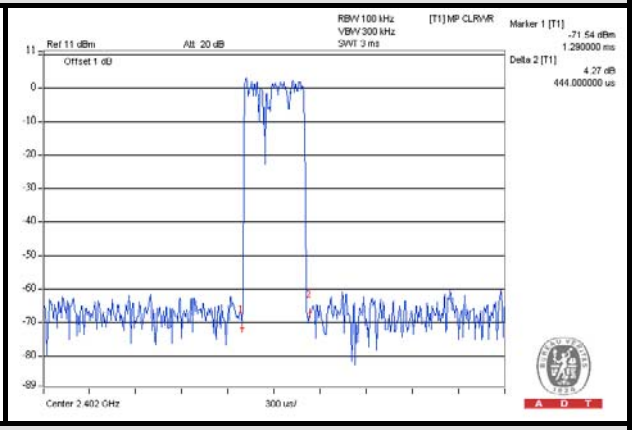
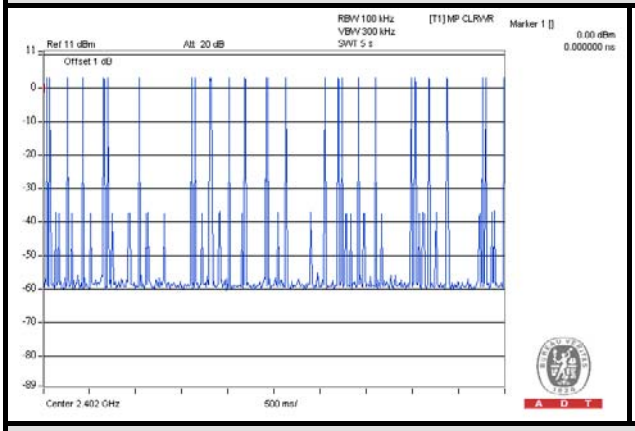
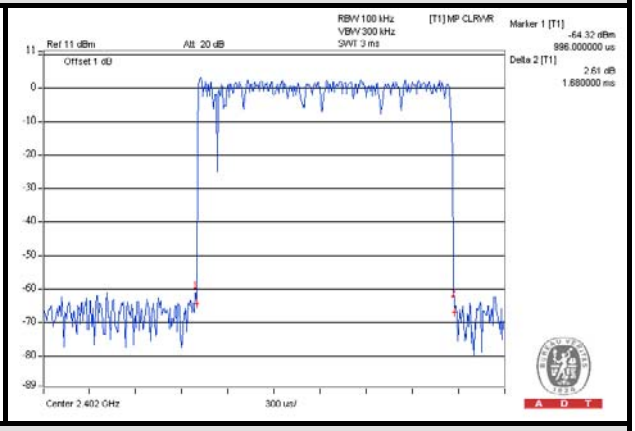
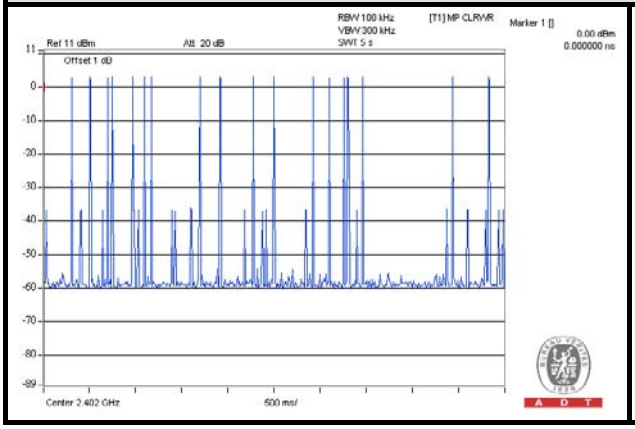
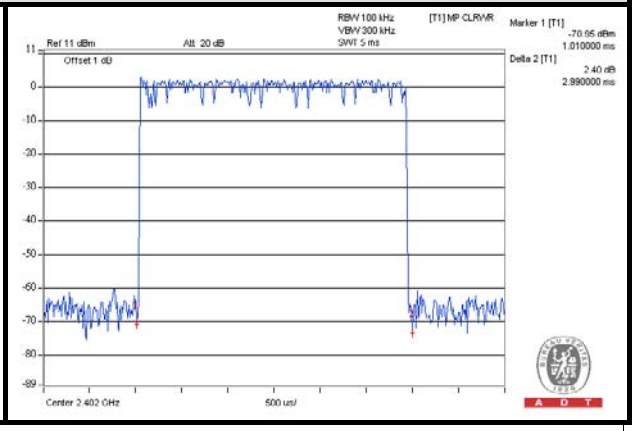
No deviation.

4.4.6 TEST RESULTS

GFSK

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 = 316.00times	0.444	140.304	400
DH3	27 (times / 5 sec) * 6.32 = 170.64 times	1.680	286.675	400
DH5	18 (times / 5 sec) * 6.32 = 113.76 times	2.990	340.142	400

NOTE: Test plots of the transmitting time slot are shown on next page.

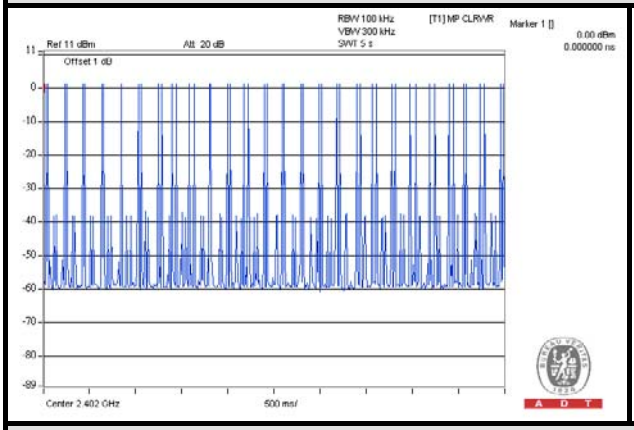
DH1	
	
DH3	
	
DH5	
	

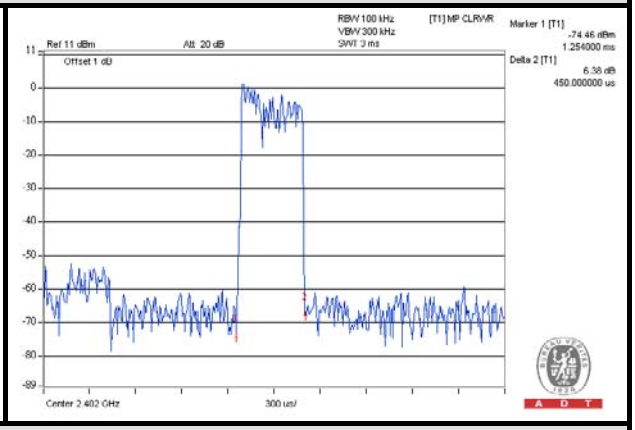
π/4-DQPSK

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 = 316.00times	0.450	142.200	400
DH3	25 (times / 5 sec) * 6.32 = 158.00 times	1.752	276.816	400
DH5	16 (times / 5 sec) * 6.32 = 101.12 times	3.030	306.394	400

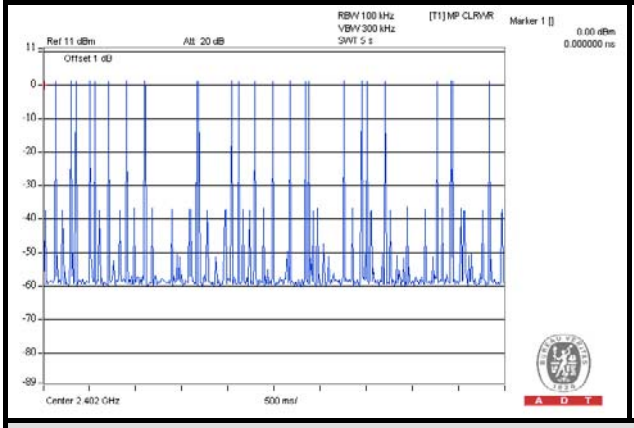
NOTE: Test plots of the transmitting time slot are shown on next page.

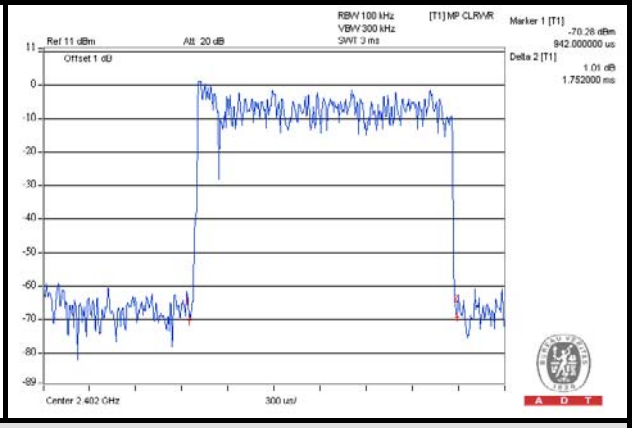
DH1


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
Marker 1 []
0.00 dBm
0.000000 ns
Ref 11 dBm
Att 20 dB
Offset 1 dB
Center 2.402 GHz
500 ms/

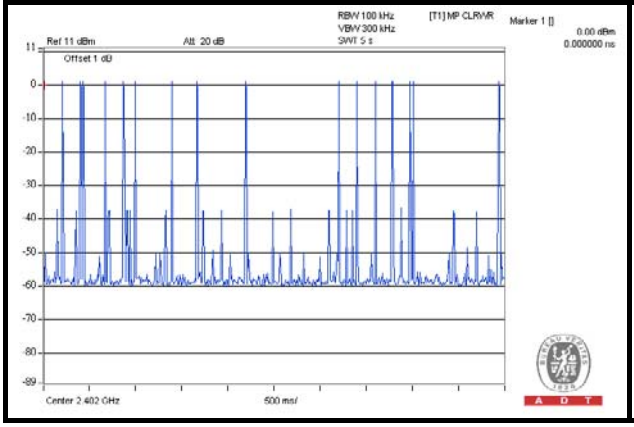

RBW 100 kHz
VBW 300 kHz
SWT 3 ms
[T1] MP CLRWR
Marker 1 [T1]
-74.46 dBm
1.254000 ms
Delta 2 [T1]
6.38 dB
450.000000 us
Ref 11 dBm
Att 20 dB
Offset 1 dB
Center 2.402 GHz
300 us/

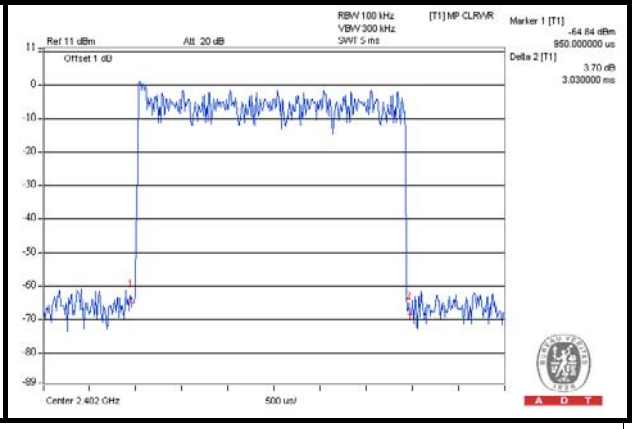
DH3


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
Marker 1 []
0.00 dBm
0.000000 ns
Ref 11 dBm
Att 20 dB
Offset 1 dB
Center 2.402 GHz
500 ms/


RBW 100 kHz
VBW 300 kHz
SWT 3 ms
[T1] MP CLRWR
Marker 1 [T1]
-70.26 dBm
842.000000 us
Delta 2 [T1]
1.01 dB
1.752000 ms
Ref 11 dBm
Att 20 dB
Offset 1 dB
Center 2.402 GHz
300 us/

DH5

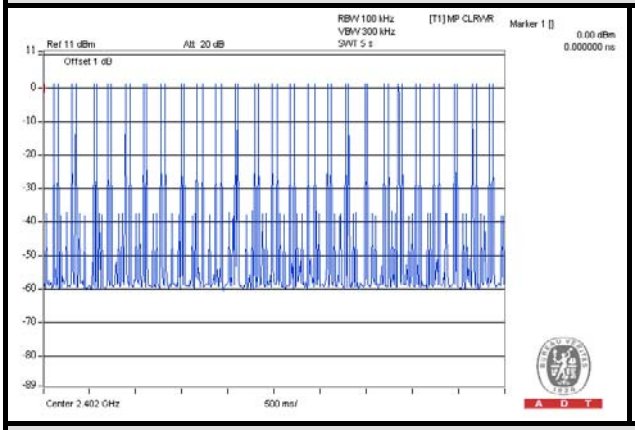
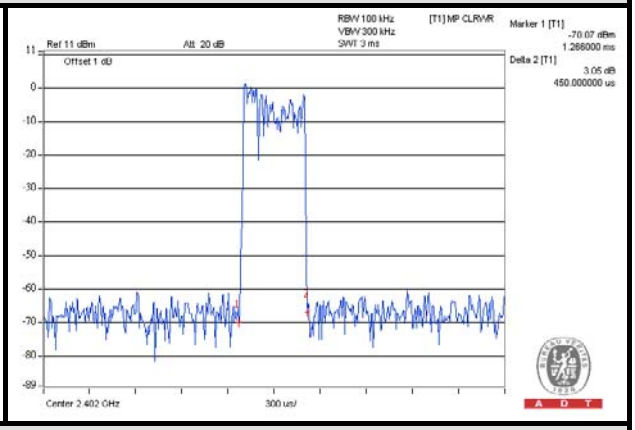
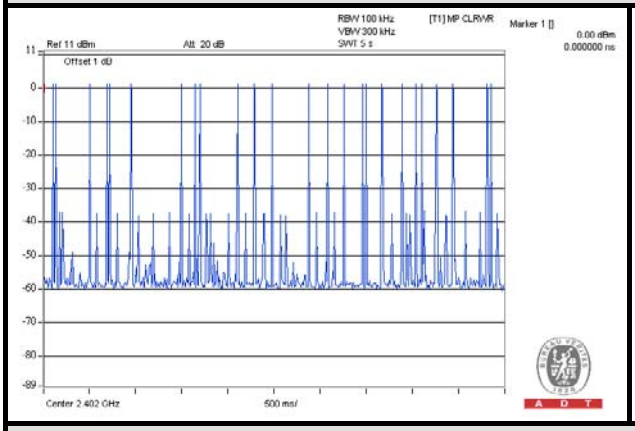
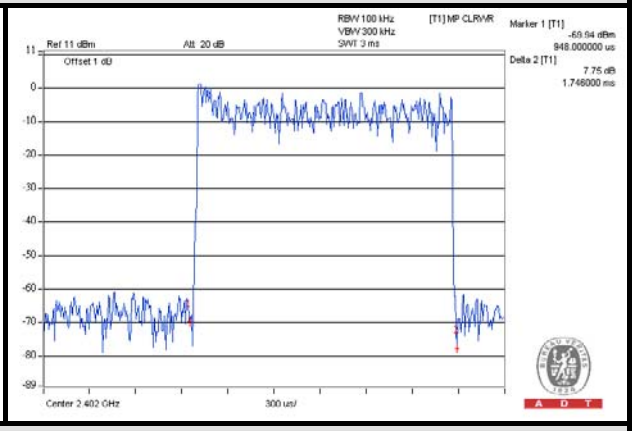
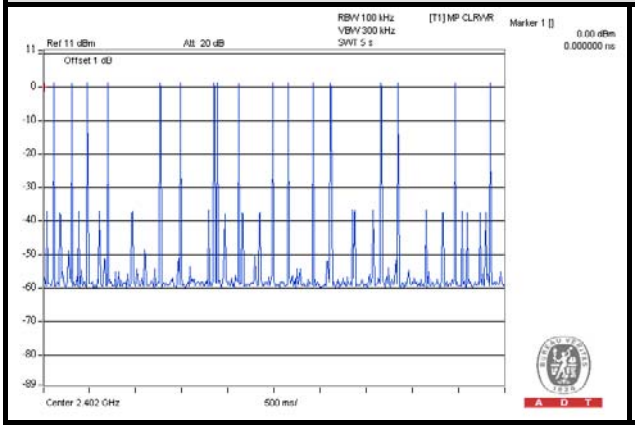
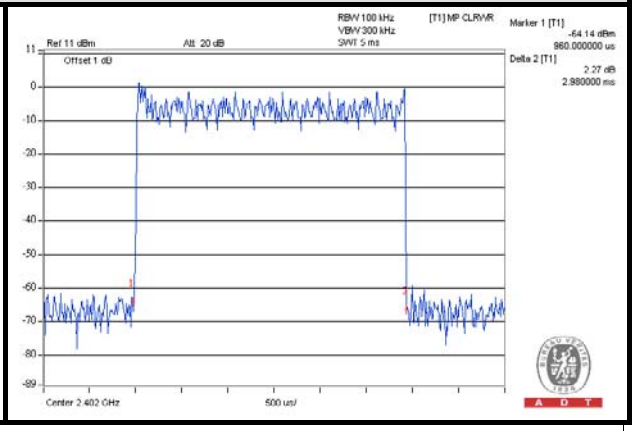

RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
Marker 1 []
0.00 dBm
0.000000 ns
Ref 11 dBm
Att 20 dB
Offset 1 dB
Center 2.402 GHz
500 ms/


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MP CLRWR
Marker 1 [T1]
-64.84 dBm
950.000000 us
Delta 2 [T1]
3.70 dB
3.030000 ms
Ref 11 dBm
Att 20 dB
Offset 1 dB
Center 2.402 GHz
500 us/

8DPSK

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 = 316.00times	0.450	142.200	400
DH3	25 (times / 5 sec) * 6.32 = 158.00 times	1.746	275.868	400
DH5	17 (times / 5 sec) * 6.32 = 107.44 times	2.980	320.171	400

NOTE: Test plots of the transmitting time slot are shown on next page.

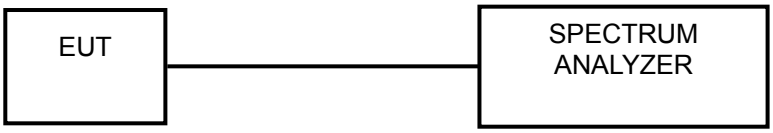
DH1	
	
DH3	
	
DH5	
	

4.5 CHANNEL BANDWIDTH

4.5.1 LIMITS OF CHANNEL BANDWIDTH

For frequency hopping system operating in the 2400-2483.5MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dBbandwidth of hopping channel shell be a minimum limit for the hopping channel separation.

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.5.4 TEST PROCEDURE

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

b. 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.

c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.

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

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

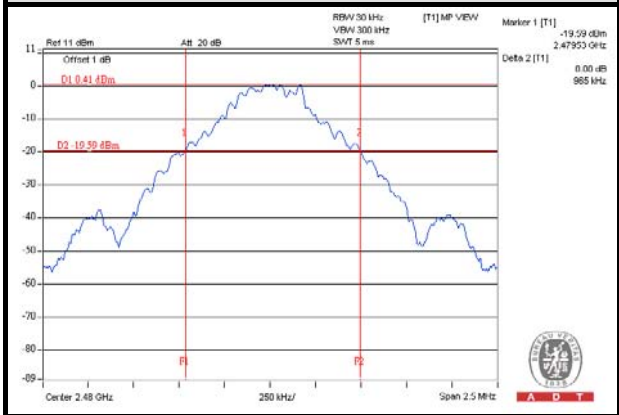
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.5.7 TEST RESULTS

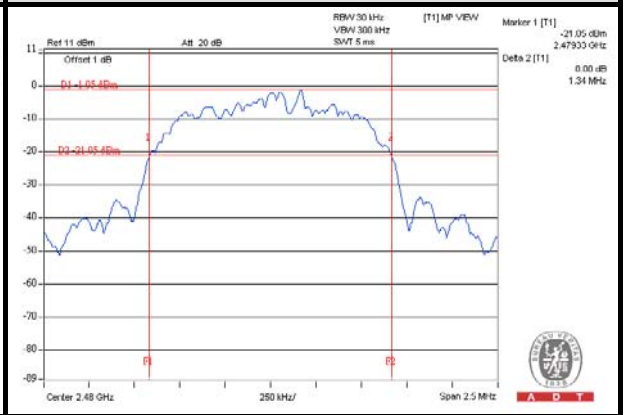
CHANNEL	FREQUENCY (MHz)	20dB BANDWIDTH (MHz)		
		GFSK	π/4-DQPSK	8DPSK
0	2402	0.965	1.340	1.330
39	2441	0.963	1.340	1.340
78	2480	0.965	1.340	1.340

SPECTRUM PLOT OF WORST VALUE

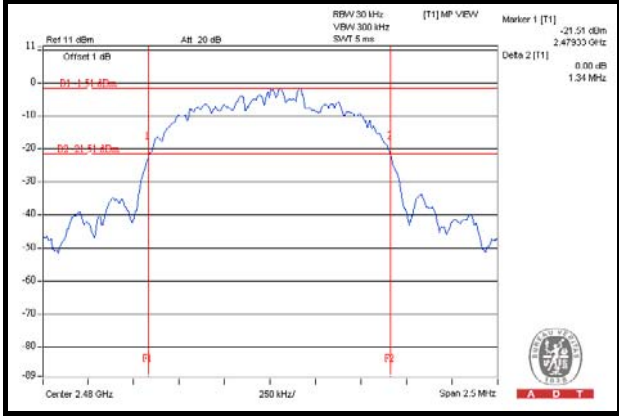
GFSK



π/4-DQPSK



8DPSK

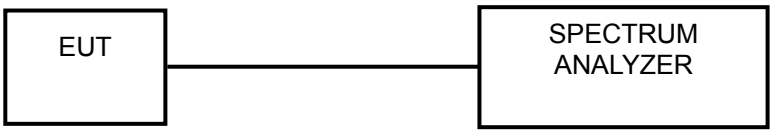


4.6 HOPPING CHANNEL SEPARATION

4.6.1 LIMIT OF HOPPING CHANNEL SEPARATION

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

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.6.4 TEST PROCEDURES

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.

c. By using the MaxHold function record the separation of two adjacent channels.

d. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.

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

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 TEST RESULTS

GFSK

CHANNEL	FREQUENCY (MHZ)	ADJACENT CHANNEL SEPARATION (MHz)	20dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	1.010	0.965	0.643	PASS
39	2441	1.010	0.963	0.642	PASS
78	2480	1.000	0.965	0.643	PASS

π/4-DQPSK

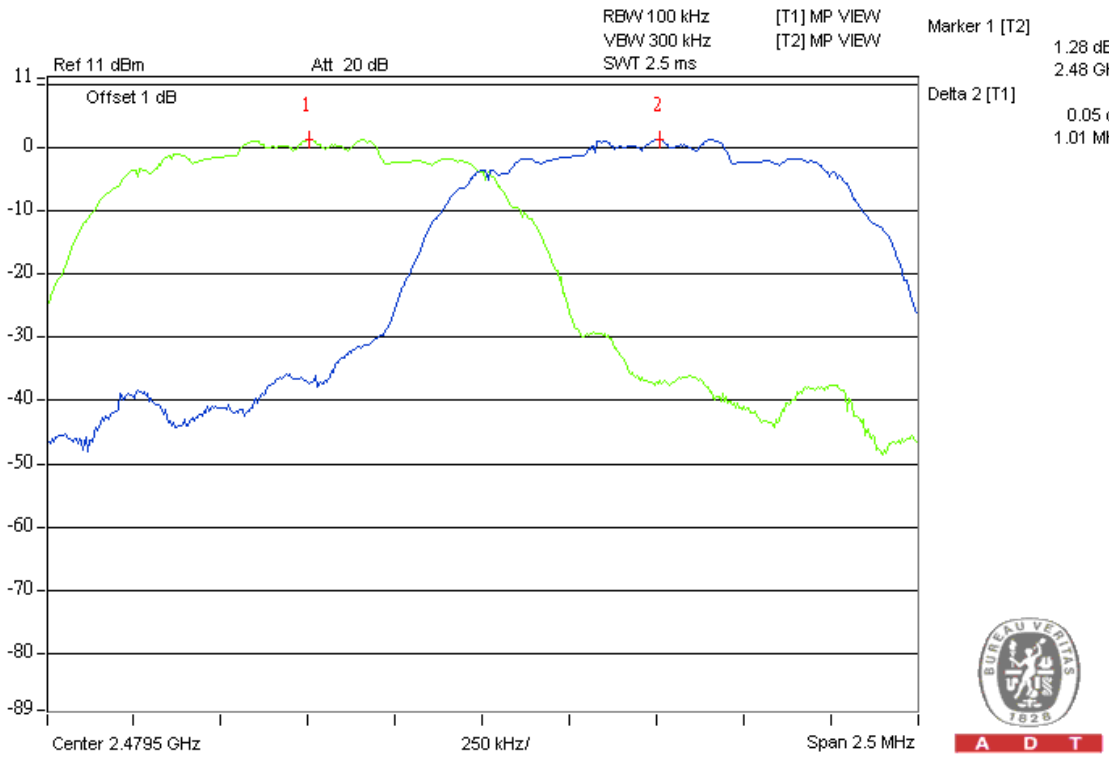
CHANNEL	FREQUENCY (MHZ)	ADJACENT CHANNEL SEPARATION (MHz)	20dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	1.010	1.340	0.893	PASS
39	2441	1.000	1.340	0.893	PASS
78	2480	1.000	1.340	0.893	PASS

8DPSK

CHANNEL	FREQUENCY (MHz)	ADJACENT CHANNEL SEPARATION (MHz)	20dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	1.010	1.330	0.887	PASS
39	2441	1.010	1.340	0.893	PASS
78	2480	1.010	1.340	0.893	PASS

NOTE: The minimum limit is two-third 20dB bandwidth.

SPECTRUM PLOT OF WORST VALUE

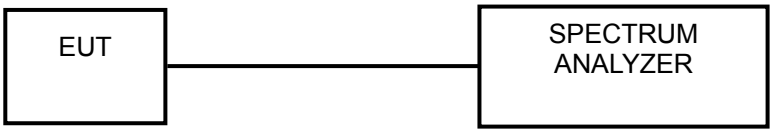


4.7 MAXIMUM OUTPUT POWER

4.7.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

The Maximum Output Power Measurement is 125mW.

4.7.2 TEST SETUP



4.7.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.7.4 TEST PROCEDURES

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

b. 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.

c. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3MHz RBW and 10 MHz VBW.

d. Measure the captured power within the band and recording the plot.

e. Repeat above procedures until all frequencies required were complete.

4.7.5 DEVIATION FROM TEST STANDARD

No deviation.

4.7.6 EUT OPERATING CONDITION

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

4.7.7 TEST RESULTS

GFSK

CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER (mW)	OUTPUT POWER (dBm)	POWER LIMIT (mW)	PASS/FAIL
0	2402	2.143	3.31	125	PASS
39	2441	2.158	3.34	125	PASS
78	2480	2.203	3.43	125	PASS

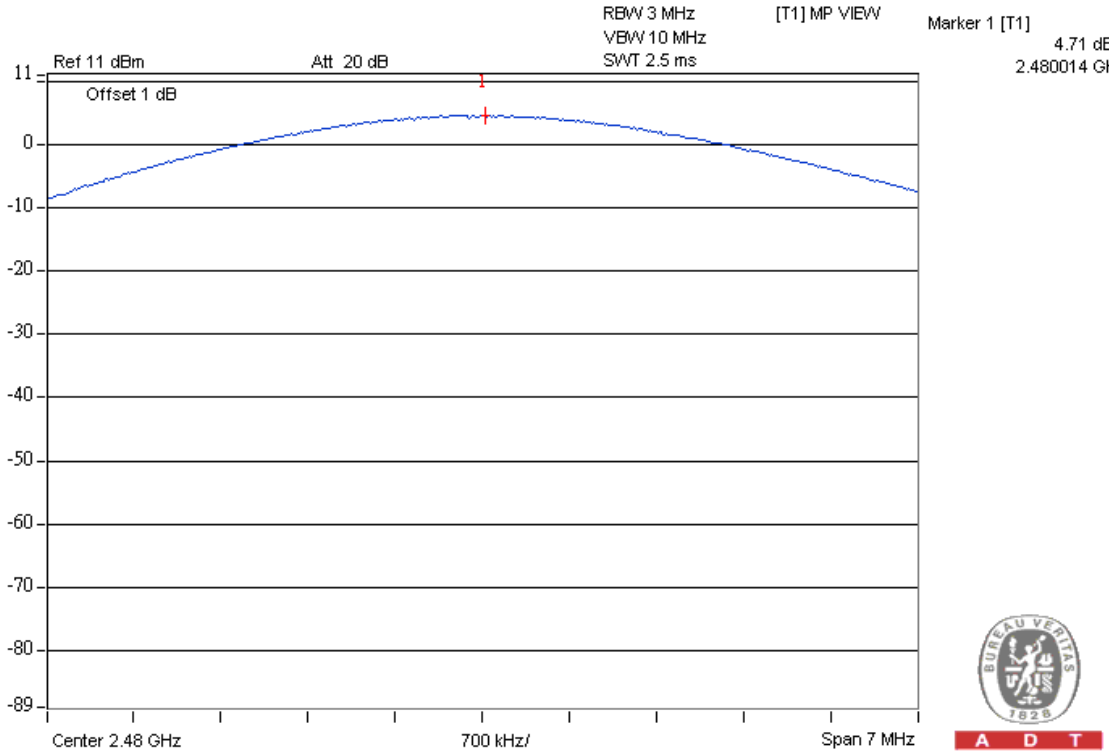
π/4-DQPSK

CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER (mW)	OUTPUT POWER (dBm)	POWER LIMIT (mW)	PASS/FAIL
0	2402	2.382	3.77	125	PASS
39	2441	2.382	3.77	125	PASS
78	2480	2.415	3.83	125	PASS

8DPSK

CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER (mW)	OUTPUT POWER (dBm)	POWER LIMIT (mW)	PASS/FAIL
0	2402	2.818	4.50	125	PASS
39	2441	2.877	4.59	125	PASS
78	2480	2.958	**4.71**	125	PASS

SPECTRUM PLOT OF WORST VALUE



4.8 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

4.8.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

4.8.2 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

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

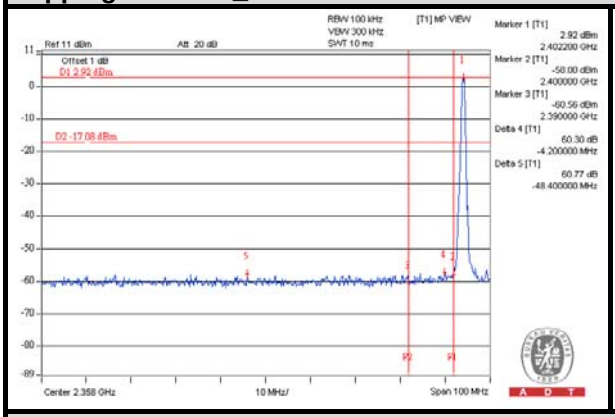
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

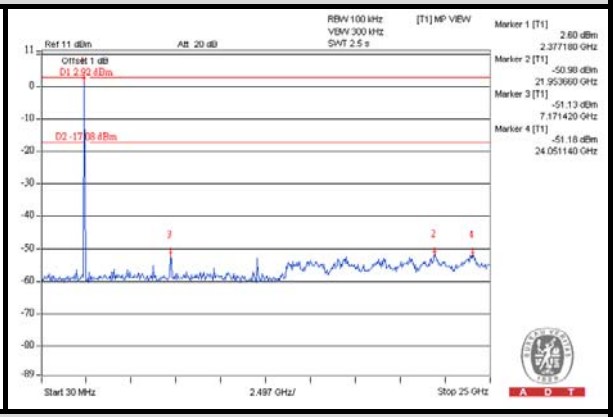
4.8.6 TEST RESULTS

The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

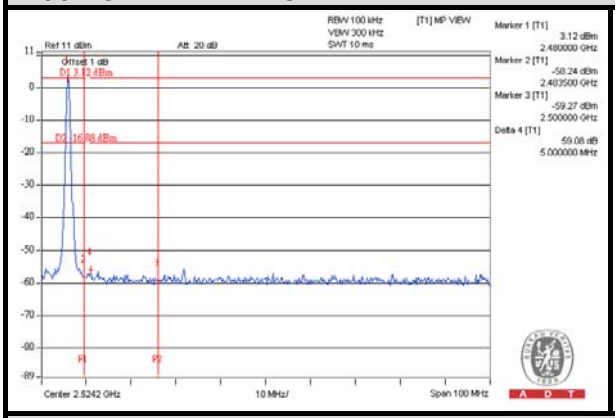
GFSK

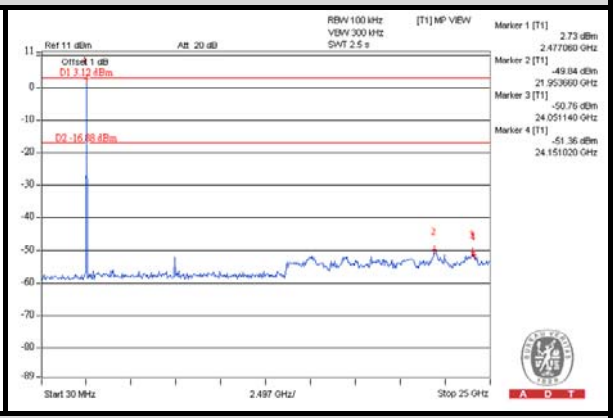
Hopping disabled_ Low Channel



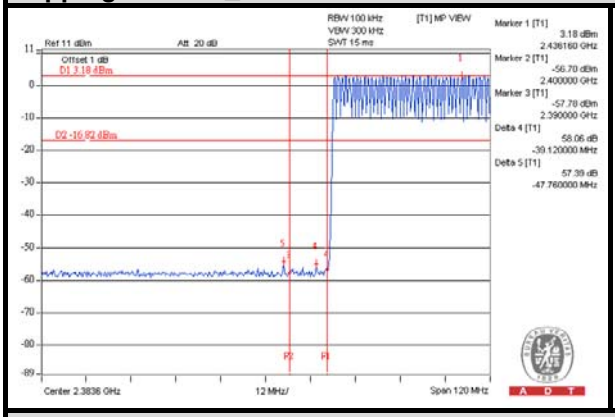


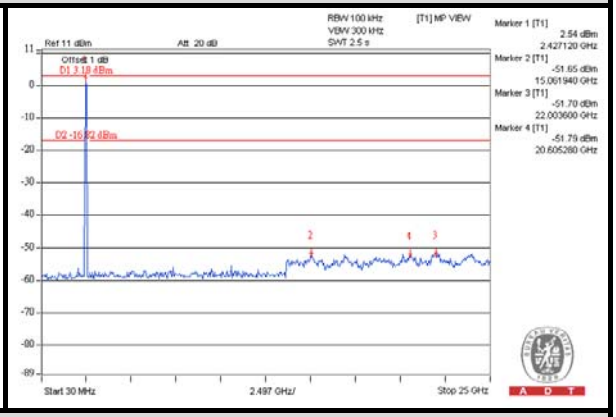
Hopping disabled_ High Channel



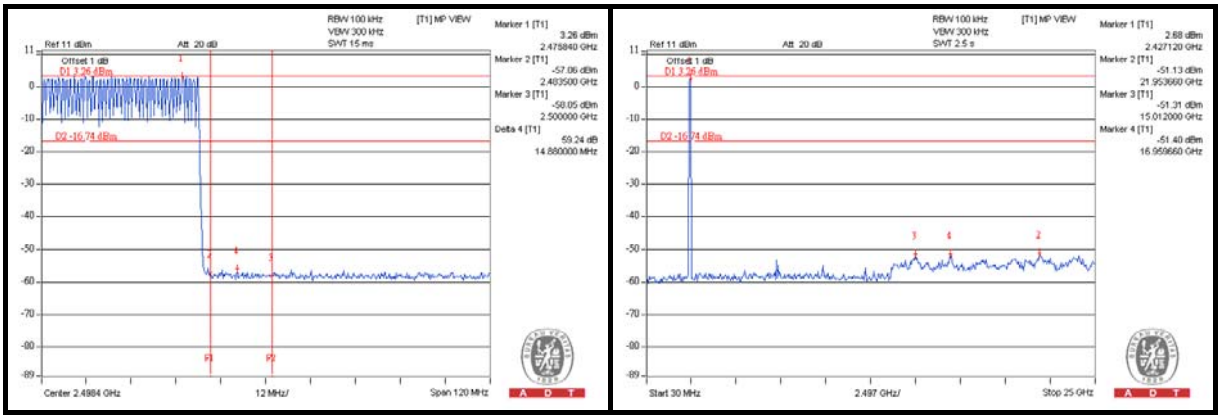


Hopping enabled_ Low Channel



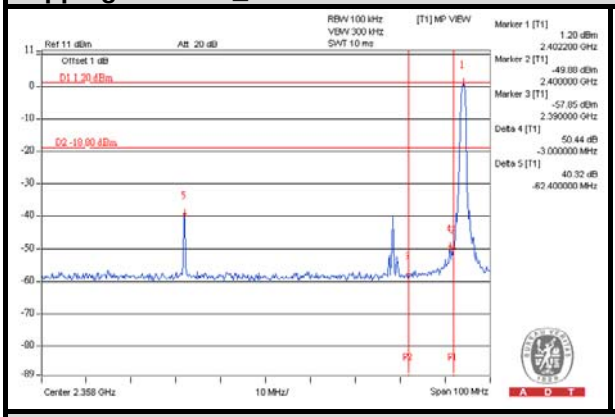


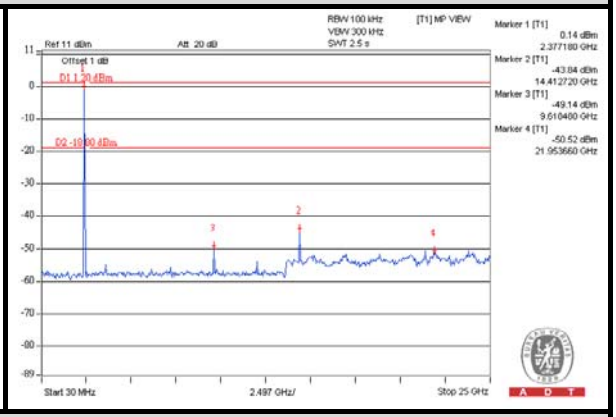
Hopping enabled_ High Channel


RBW 100 kHz
VBW 300 kHz
SWT 15 ms
[T1] MP VBW
Ref 11 dBm
Att 20 dB
Offset 1 dB
D1 3.26 dBm
D2 -16.74 dBm
Marker 1 [T1]
3.26 dBm
2.478840 GHz
Marker 2 [T1]
-57.06 dBm
2.483500 GHz
Marker 3 [T1]
-58.05 dBm
2.500000 GHz
Delta 4 [T1]
59.24 dB
14.880000 MHz
Center 2.4884 GHz
12 MHz/
Span 120 MHz
RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MP VBW
Ref 11 dBm
Att 20 dB
Offset 1 dB
D1 3.26 dBm
D2 -16.74 dBm
Marker 1 [T1]
2.68 dBm
2.427120 GHz
Marker 2 [T1]
-51.13 dBm
21.953660 GHz
Marker 3 [T1]
-51.31 dBm
15.012000 GHz
Marker 4 [T1]
-51.40 dBm
16.959660 GHz
Start 30 MHz
2.497 GHz/
Stop 25 GHz

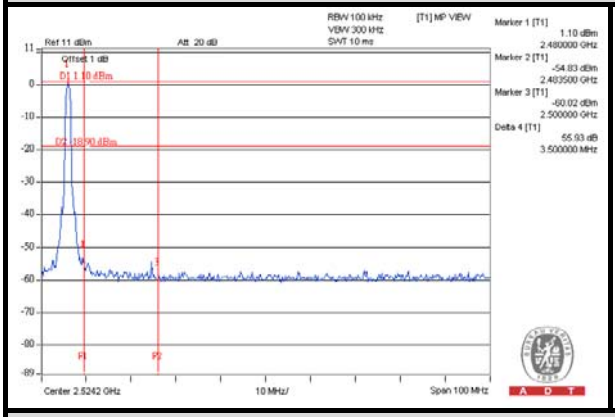
$\pi/4$-DQPSK

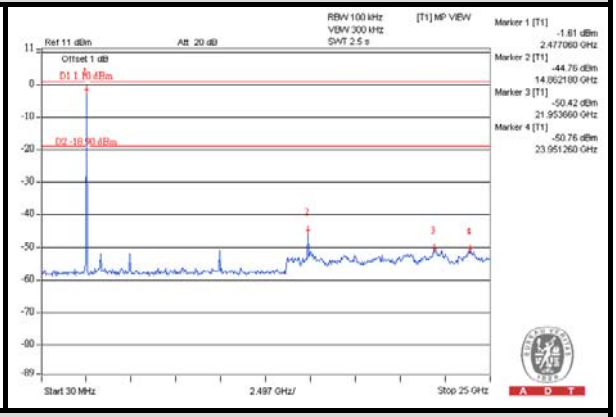
Hopping disabled_ Low Channel



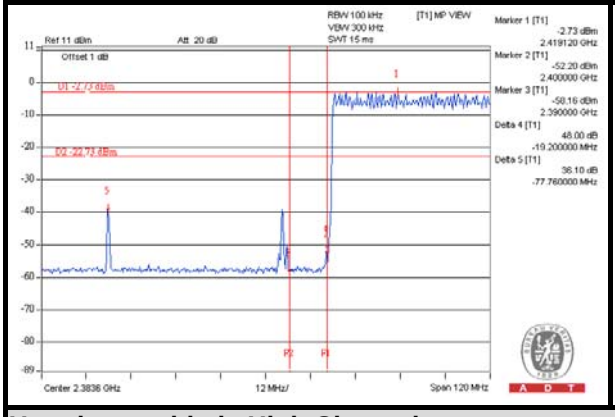


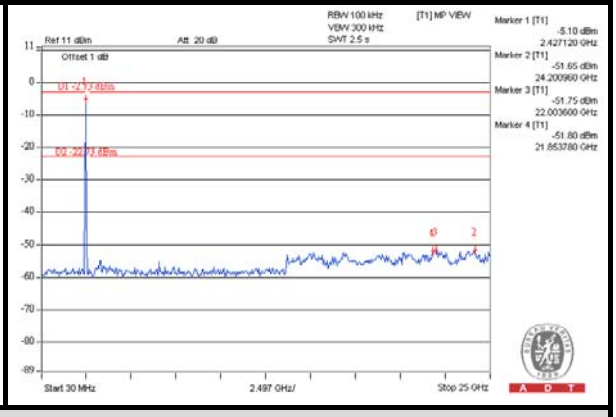
Hopping disabled_ High Channel



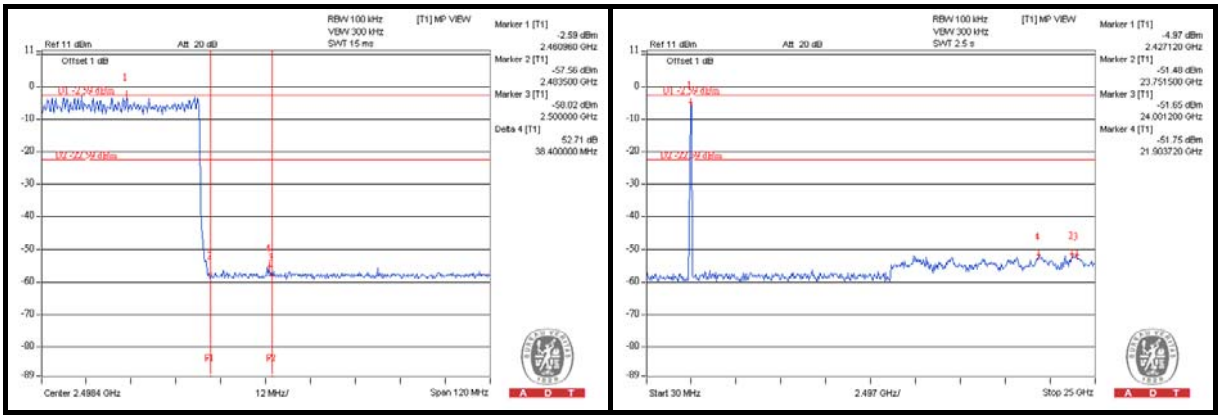


Hopping enabled_ Low Channel



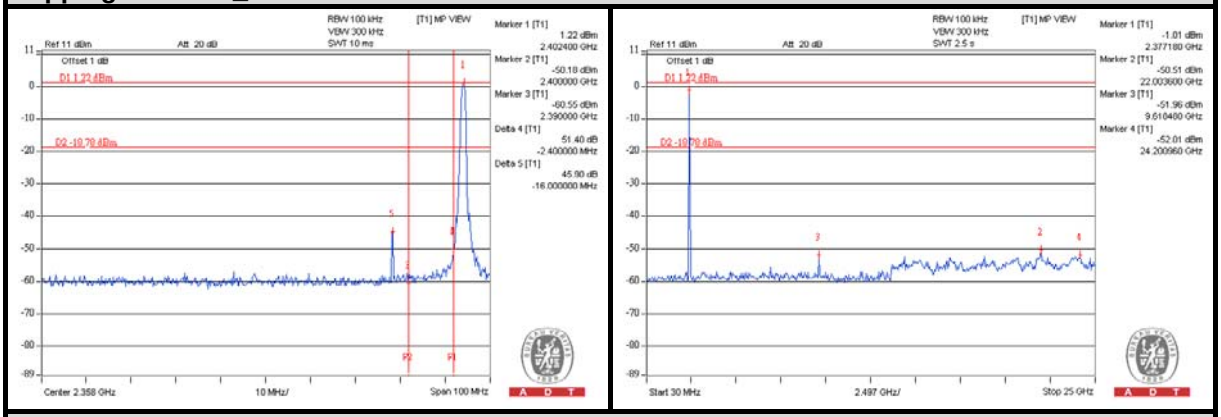


Hopping enabled_ High Channel

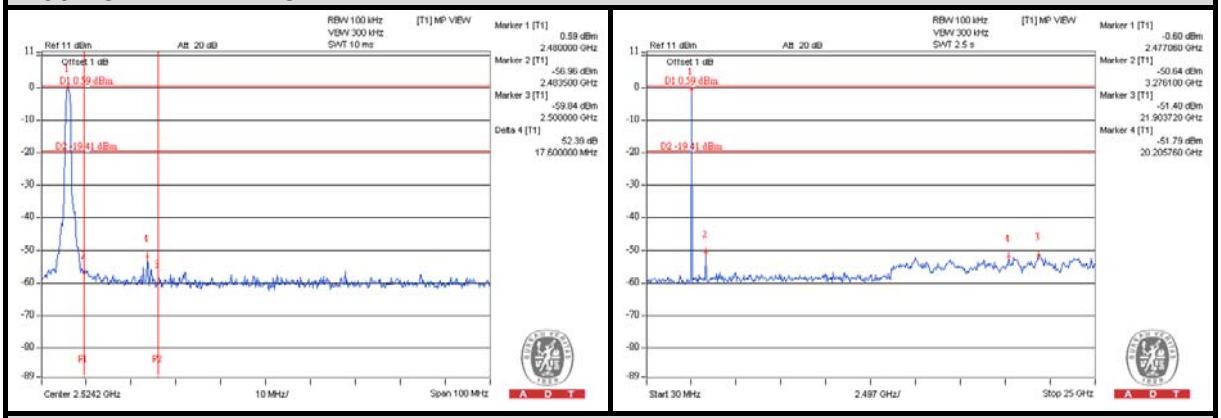


8DPSK

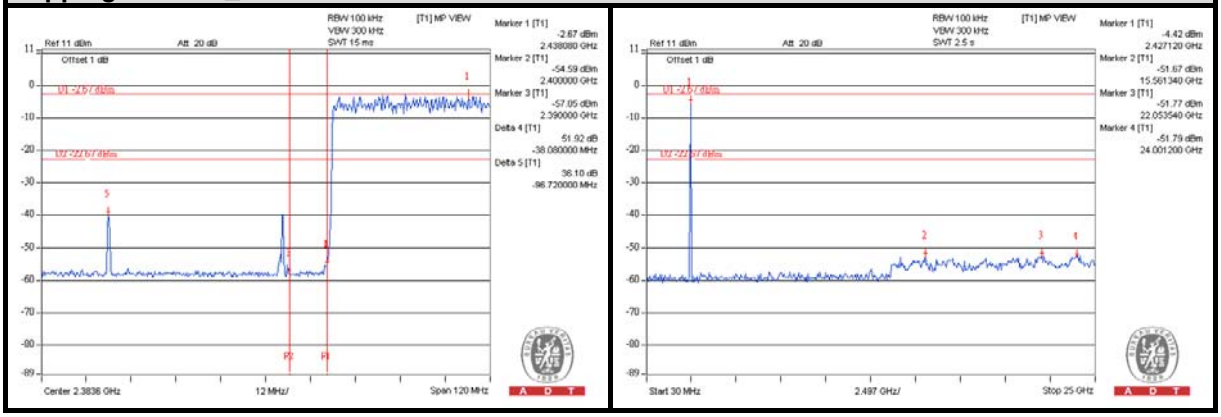
Hopping disabled_ Low Channel



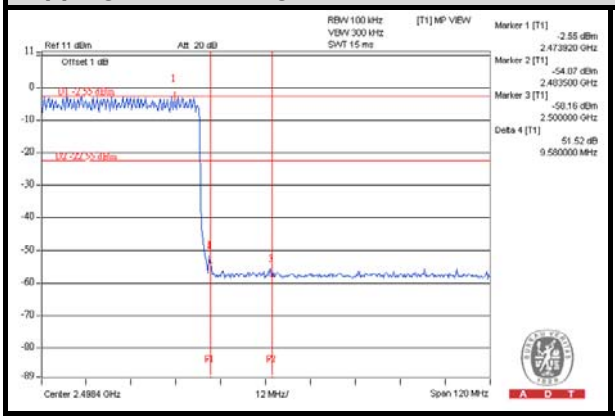
Hopping disabled_ High Channel

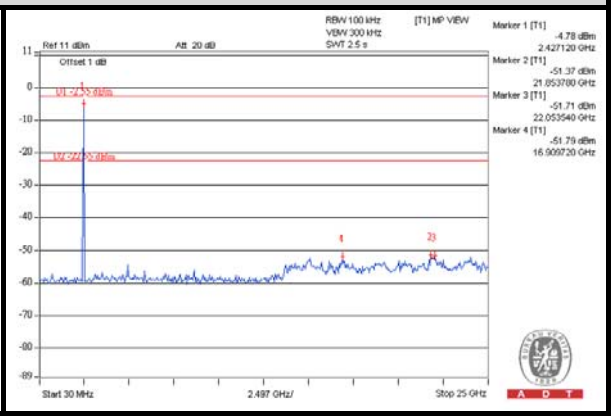


Hopping enabled_ Low Channel



Hopping enabled_ High Channel





5. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

6. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

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: 886-3-3270892

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

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

7. 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.

--- END ---