FCC TEST REPORT

REPORT NO.: RF950626L06

MODEL NO.: UBT4KH

RECEIVED: Jun. 27, 2006

TESTED: Oct. 23, 2006

ISSUED: Oct. 24, 2006

APPLICANT: AboCom Systems, Inc.

ADDRESS: 1F, No. 21, Yanfa 2nd Rd., SBIP, Hsinchu City 300, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang 244, Taipei Hsien, 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.

NO. 2177-01

0528

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1. CERTIFICATION

PRODUCT:	Bluetooth USB Dongle
MODEL NO.:	UBT4KH
BRAND NAME:	AboCom
APPLICANT:	AboCom Systems, Inc.
TESTED:	Oct. 23, 2006
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	FCC Part 15, Subpart C (Section 15.247), ANSI C63.4-2003

The above equipment (Model: UBT4KH) have been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Jessie Wang , **DATE:** Oct. 24, 2006

TECHNICAL ACCEPTANCE : Long Chen , **DATE:** Oct. 24, 2006
Responsible for RF

APPROVED BY : Gary Chang / Supervisor , **DATE:** Oct. 24, 2006

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 –16.19dB at 0.195MHz.
15.247(a)(1)(iii)	Number of Hopping Frequency Used Spec.: At least 15 channels	PASS	Meet the requirement of limit.
15.247(a)(1)(iii)	Dwell Time on Each Channel Spec. : Max. 0.4 second within 31.6 second	PASS	Meet the requirement of limit.
15.247(a)(1)	1. Hopping Channel Separation Spec. : Min. 25 kHz or 20 dB bandwidth, whichever is greater (see Note 1) 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Spec.: max. 30dBm (see Note 1)	PASS	Meet the requirement of limit.
15.247(d)	Transmitter Radiated Emissions Spec.: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is –1.19dB at 9920.00MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.

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:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz ~ 30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.71 dB
	200MHz ~1000MHz	3.73 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

PRODUCT	Bluetooth USB Dongle
MODEL NO.	UBT4KH
FCC ID	MQ4UBT4KH
POWER SUPPLY	5Vdc from host equipment
MODULATION TYPE	GFSK, π /4-DQPSK, 8DPSK
RADIO TECHNOLOGY	FHSS
TRANSFER RATE	1/2/3Mbps
FREQUENCY RANGE	2400 ~ 2483.5 MHz
NUMBER OF CHANNEL	79
OUTPUT POWER	17.742mW
ANTENNA TYPE	Printed antenna with 0.2dBi gain
DATA CABLE	NA
I/O PORTS	USB

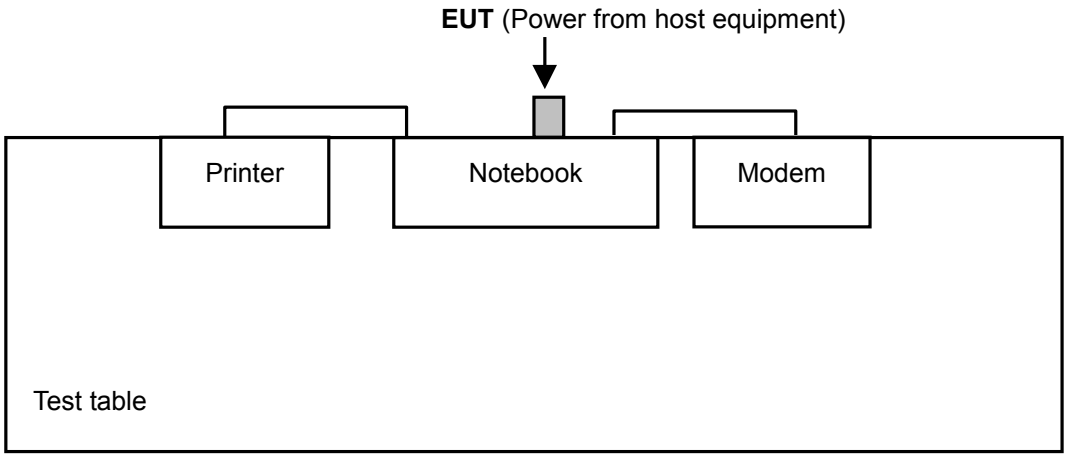
NOTE: The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

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	2431	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 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
A	√	√	√	√	GFSK Modulation
B	-	√	√	√	8DPSK Modulation

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

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

NOTE: "-" means no effect

POWER LINE CONDUCTED EMISSION TEST:

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

☒ 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	DATE RATE
A	0 to 78	0, 39, 78	FHSS	GFSK	DH5	1

RADIATED EMISSION TEST (BELOW 1 GHz):

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

☒ 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	DATE RATE
A	0 to 78	78	FHSS	GFSK	DH5	1

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

☒ 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	DATE RATE
A	0 to 78	0, 39, 78	FHSS	GFSK	DH5	1
B	0 to 78	0, 39, 78	FHSS	8DPSK	DH5	3

BANDEDGE MEASUREMENT:

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

☒ 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	DATE RATE
A	0 to 78	0, 78	FHSS	GFSK	DH5	1
B	0 to 78	0, 78	FHSS	8DPSK	DH5	3

ANTENNA PORT CONDUCTED MEASUREMENT:

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

☒ 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	DATE RATE
A	0 to 78	0, 39, 78	FHSS	GFSK	DH5	1
B	0 to 78	0, 39, 78	FHSS	8DPSK	DH5	3

3.2.3 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 C63.4- 2003

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

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

3.2.4 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.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP05L	9954115984	E2K24CLNS
2	MODEM	ACEEX	1414V/3	0401008248	IFAXDM1414
3	PRINTER	EPSON	LQ-300+	DCGY047265	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.2 m shielded cable without core
3	1.2 m shielded cable without core

NOTE: All power cords of the above support units are non shielded (1.8m).

4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 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 0.50 MHz.

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.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Nov. 02, 2006
RF signal cable Woken	5D-FB	Cable-HYCO3-01	Jan. 06, 2007
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 09, 2007
LISN ROHDE & SCHWARZ	ESH3-Z5	100311	Jan. 22, 2007
Software ADT	ADT_Cond_V3	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 2.

3. The VCCI Site Registration No. is C-2047.

4.1.3 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.

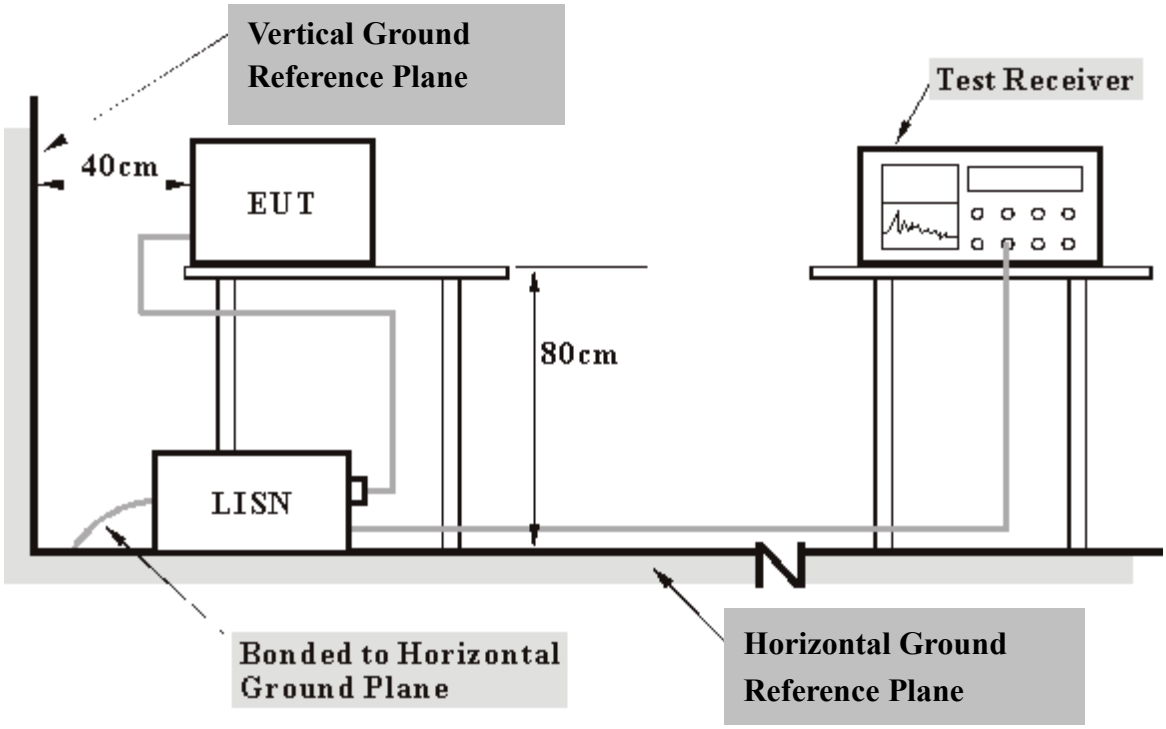
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

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

4.1.6 EUT OPERATING CONDITIONS

a. Plugged EUT into notebook system and placed on a testing table.

b. The notebook system ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.

c. The notebook system sent "H" messages to its screen.

d. The notebook system sent “H” messages to modem.

e. The notebook system sent "H" messages to printer, and the printer printed them on paper.

f. Steps c ~ e were repeated.

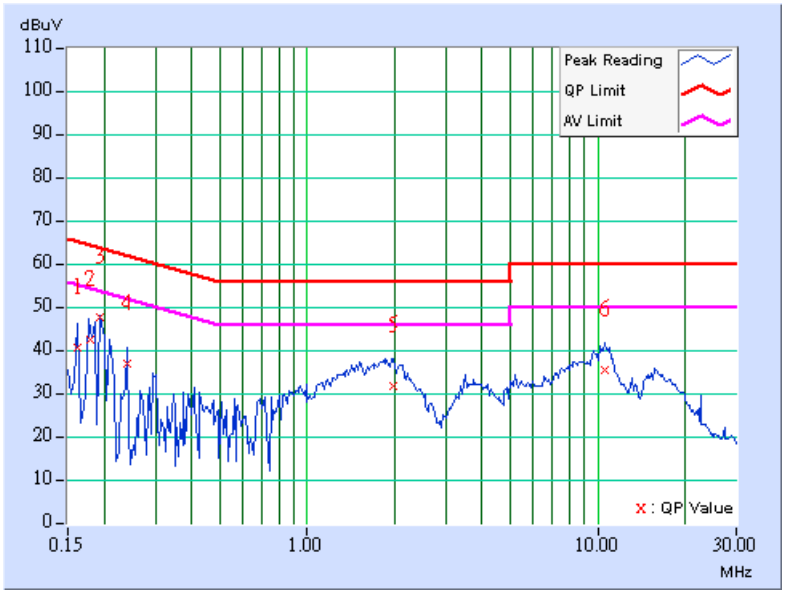
4.1.7 TEST RESULTS

CONDUCTED WORST CASE DATA: MODE A FOR GFSK

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	PHASE	Line 1
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TEST MODE	A	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.162	0.10	40.27	-	40.37	-	65.34	55.34	-24.97	-
2	0.178	0.10	42.10	-	42.20	-	64.56	54.56	-22.36	-
3	0.193	0.10	47.55	-	47.65	-	63.90	53.90	-16.25	-
4	0.240	0.10	36.58	-	36.68	-	62.10	52.10	-25.42	-
5	1.990	0.20	31.62	-	31.82	-	56.00	46.00	-24.18	-
6	10.554	0.39	35.10	-	35.49	-	60.00	50.00	-24.51	-

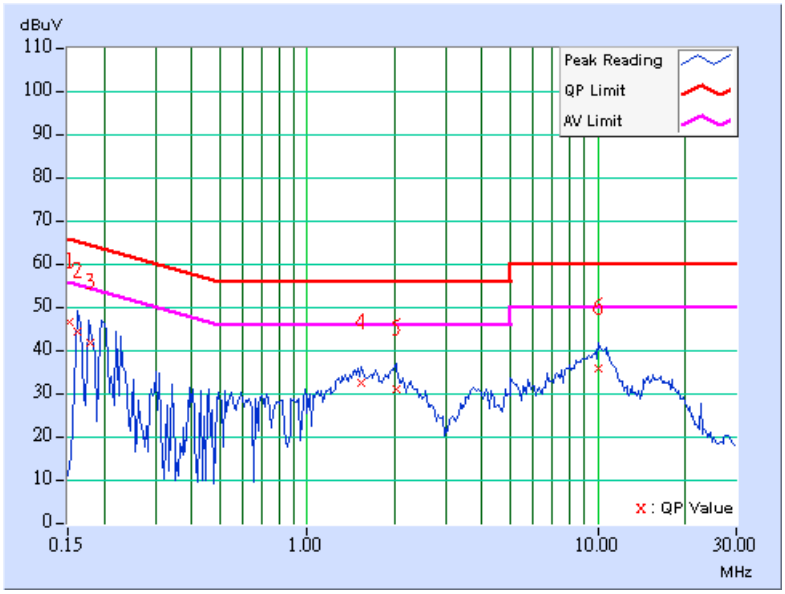
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	PHASE	Line 2
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TEST MODE	A	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.152	0.10	46.08	-	46.18	-	65.88	55.88	-19.70	-
2	0.162	0.10	43.87	-	43.97	-	65.34	55.34	-21.37	-
3	0.179	0.10	41.21	-	41.31	-	64.55	54.55	-23.24	-
4	1.537	0.20	32.03	-	32.23	-	56.00	46.00	-23.77	-
5	2.025	0.20	30.65	-	30.85	-	56.00	46.00	-25.15	-
6	10.084	0.46	35.40	-	35.86	-	60.00	50.00	-24.14	-

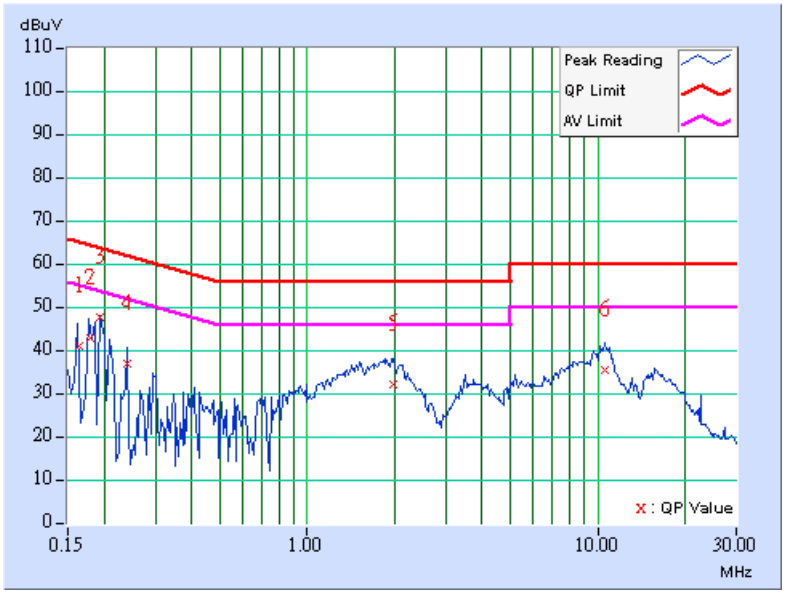
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	PHASE	Line 1
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TEST MODE	A	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.163	0.10	40.74	-	40.84	-	65.30	55.30	-24.46	-
2	0.179	0.10	42.42	-	42.52	-	64.55	54.55	-22.03	-
3	**0.195**	**0.10**	**47.55**	**-**	**47.65**	**-**	**63.84**	**53.84**	**-16.19**	**-**
4	0.241	0.10	36.68	-	36.78	-	62.07	52.07	-25.29	-
5	1.990	0.20	31.89	-	32.09	-	56.00	46.00	-23.91	-
6	10.555	0.39	35.17	-	35.56	-	60.00	50.00	-24.44	-

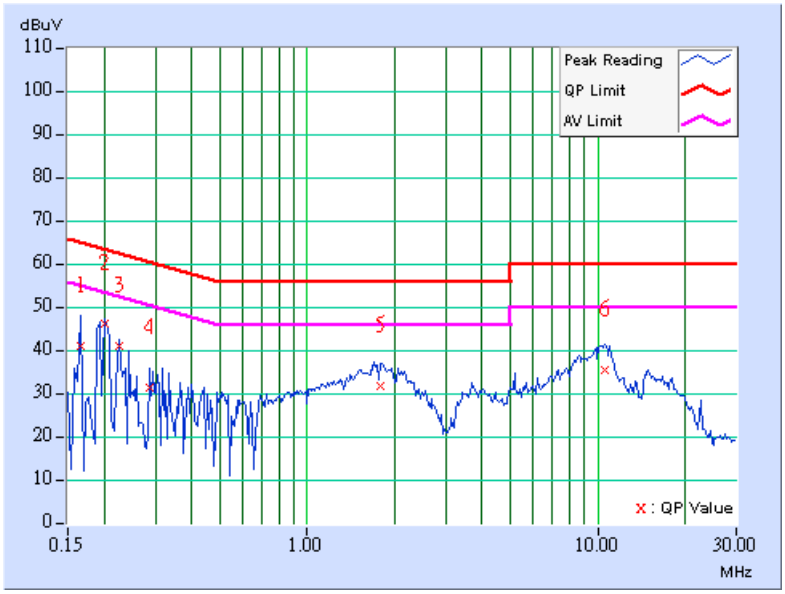
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	PHASE	Line 2
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TEST MODE	A	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.166	0.10	40.47	-	40.57	-	65.17	55.17	-24.60	-
2	0.201	0.10	45.85	-	45.95	-	63.57	53.57	-17.62	-
3	0.224	0.10	40.74	-	40.84	-	62.66	52.66	-21.82	-
4	0.288	0.10	31.05	-	31.15	-	60.59	50.59	-29.44	-
5	1.790	0.20	31.24	-	31.44	-	56.00	46.00	-24.56	-
6	10.619	0.48	35.14	-	35.62	-	60.00	50.00	-24.38	-

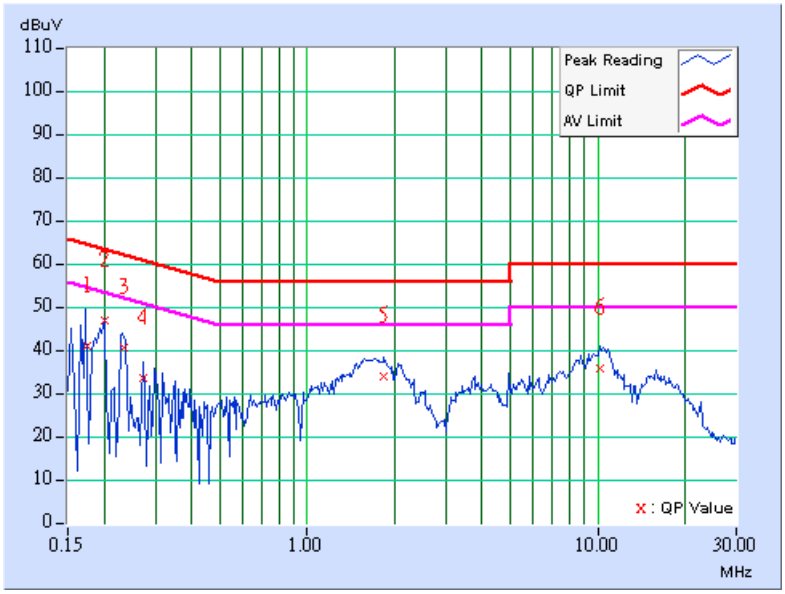
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	PHASE	Line 1
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TEST MODE	A	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.175	0.10	40.89	-	40.99	-	64.74	54.74	-23.75	-
2	0.202	0.10	46.65	-	46.75	-	63.55	53.55	-16.80	-
3	0.233	0.10	40.23	-	40.33	-	62.33	52.33	-22.00	-
4	0.272	0.10	33.25	-	33.35	-	61.05	51.05	-27.70	-
5	1.840	0.18	33.63	-	33.81	-	56.00	46.00	-22.19	-
6	10.216	0.37	35.57	-	35.94	-	60.00	50.00	-24.06	-

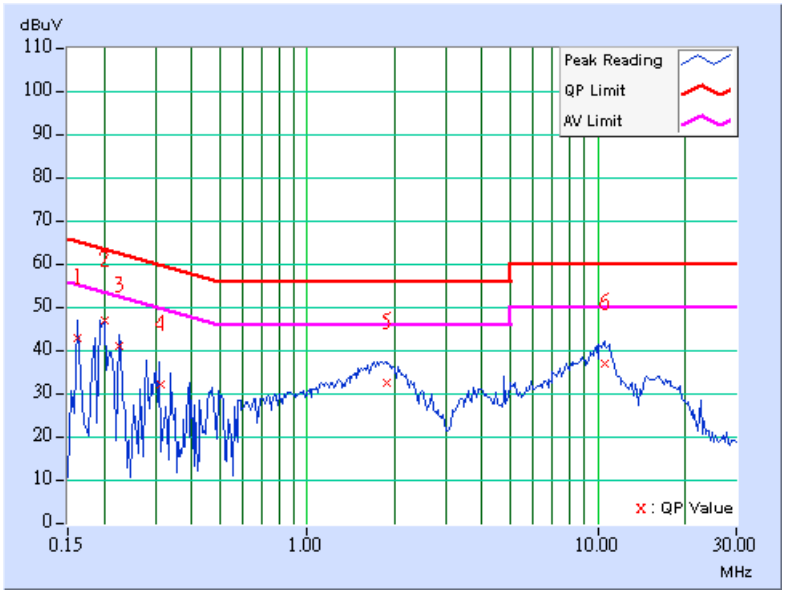
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	PHASE	Line 2
MODULATION TYPE	GFSK	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TEST MODE	A	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.162	0.10	42.50	-	42.60	-	65.35	55.35	-22.75	-
2	0.201	0.10	46.47	-	46.57	-	63.57	53.57	-17.00	-
3	0.225	0.10	40.72	-	40.82	-	62.62	52.62	-21.80	-
4	0.312	0.10	31.74	-	31.84	-	59.93	49.93	-28.09	-
5	1.879	0.20	31.96	-	32.16	-	56.00	46.00	-23.84	-
6	10.533	0.48	36.57	-	37.05	-	60.00	50.00	-22.95	-

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



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 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

NOTE:

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

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESI7	100033	May. 22, 2007
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100025	Dec. 05, 2006
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	May 31, 2007
HORN Antenna SCHWARZBECK	9120D	9120D-408	Jan. 08, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Jan. 19, 2007
Preamplifier Agilent	8447D	2944A10633	Nov. 04, 2006
Preamplifier Agilent	8449B	3008A01964	Oct. 30, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	214377/4	Dec. 13, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219272/4	Dec. 13, 2006
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA
Turn Table ADT.	TT100.	TT93021703	NA
Turn Table Controller ADT.	SC100.	SC93021703	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 VCCI Site Registration No. is R-237.
5. The IC Site Registration No. is IC4924-3.

4.2.3 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.

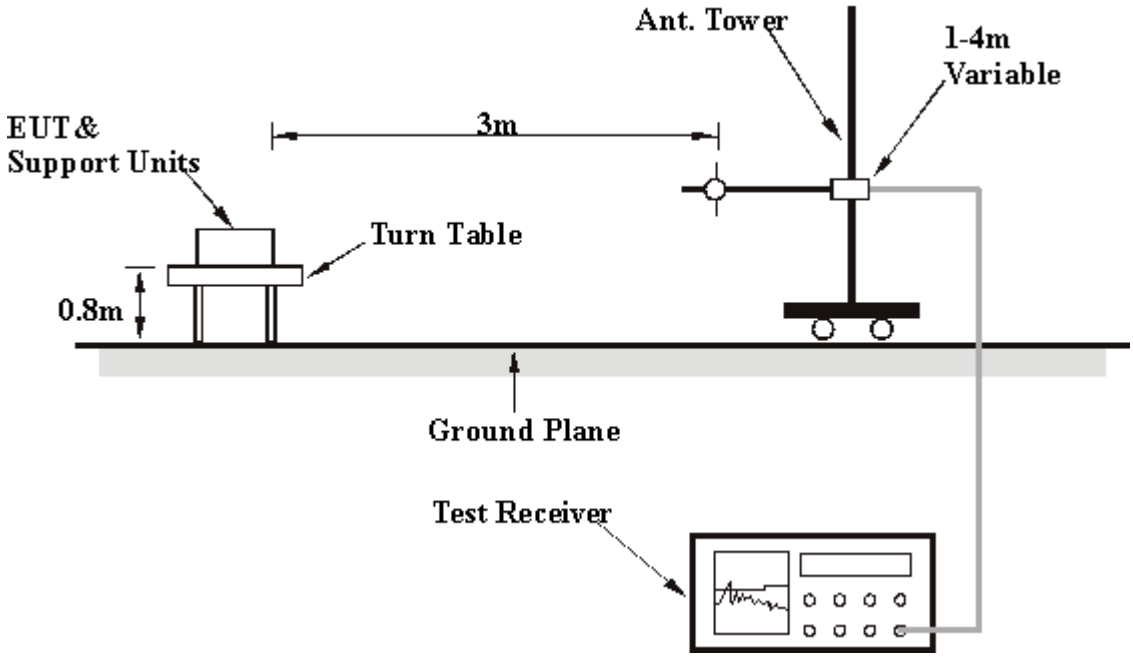
NOTE:

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.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

RADIATED WORST CASE DATA: BELOW 1GHz

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	**FREQUENCY RANGE**	Below 1000MHz
MODULATION TYPE	GFSK	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 67%RH, 991hPa	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TEST MODE	**A**	**TESTED BY**	Morgan Chen

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	129.11	28.08 QP	43.50	-15.42	1.00 H	38	14.93	13.15
2	232.18	25.82 QP	46.00	-20.18	1.25 H	100	13.12	12.70
3	449.88	30.51 QP	46.00	-15.49	1.00 H	352	11.11	19.40
4	663.71	28.82 QP	46.00	-17.18	1.00 H	71	5.24	23.58
5	731.74	34.93 QP	46.00	-11.07	1.00 H	205	9.99	24.94
6	801.72	41.96 QP	46.00	-4.04	1.25 H	22	16.23	25.73

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	84.43	25.11 QP	40.00	-14.89	1.50 V	58	15.28	9.83
2	125.15	28.08 QP	43.50	-15.42	1.00 V	58	15.15	12.93
3	397.39	31.88 QP	46.00	-14.12	1.50 V	58	14.30	17.58
4	449.88	30.78 QP	46.00	-15.22	1.00 V	349	11.38	19.40
5	733.69	34.13 QP	46.00	-11.87	1.50 V	258	9.14	24.99
6	801.72	42.70 QP	46.00	-3.30	1.00 V	89	16.97	25.73

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.

RADIATED WORST CASE DATA: ABOVE 1GHz

MODE A FOR GFSK

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	GFSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25 deg. C, 67%RH, 991hPa
TEST MODE	**A**	**TESTED BY**	Morgan Chen

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	1602.00	61.73 PK	74.00	-12.27	1.00 H	232	32.48	29.25
2	1602.00	51.81 AV	54.00	-2.19	1.00 H	232	22.56	29.25
3	2390.00	58.81 PK	74.00	-15.19	1.05 H	318	27.32	31.49
4	2390.00	50.29 AV	54.00	-3.71	1.05 H	318	18.80	31.49
5	*2402.00	105.47 PK			1.00 H	334	73.93	31.54
6	*2402.00	75.47 AV			1.00 H	334	43.93	31.54
7	4804.00	65.81 PK	74.00	-8.19	1.08 H	25	28.33	37.48
8	4804.00	35.81 AV	54.00	-18.19	1.08 H	25	-1.67	37.48
9	7206.00	61.55 PK	85.47	-23.92	1.05 H	305	17.81	43.74
10	7206.00	31.55 AV	55.47	-23.92	1.05 H	305	-12.19	43.74
11	9608.00	77.58 PK	85.47	-7.89	1.39 H	25	29.55	48.03
12	9608.00	47.58 AV	55.47	-7.89	1.39 H	25	-0.45	48.03
13	12010.00	61.22 PK	74.00	-12.78	1.58 H	15	12.06	49.16
14	12010.00	31.22 AV	54.00	-22.78	1.58 H	15	-17.94	49.16
15	14412.00	60.05 PK	85.47	-25.42	1.37 H	36	7.44	52.61
16	14412.00	30.05 AV	55.47	-25.42	1.37 H	36	-22.56	52.61

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. 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 be equal to: 20log(3.125/100)= -30 dB.
6. Average value = peak reading –20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	GFSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25 deg. C, 67%RH, 991hPa
TEST MODE	**A**	**TESTED BY**	Morgan Chen

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	1602.00	60.75 PK	74.00	-13.25	1.35 V	305	31.50	29.25
2	1602.00	50.86 AV	54.00	-3.14	1.35 V	305	21.61	29.25
3	2390.00	55.18 PK	74.00	-18.82	1.05 V	338	23.69	31.49
4	2390.00	47.09 AV	54.00	-6.91	1.05 V	338	15.60	31.49
5	*2402.00	102.36 PK			1.08 V	335	70.82	31.54
6	*2402.00	72.36 AV			1.08 V	335	41.82	31.54
7	4804.00	72.11 PK	74.00	-1.89	1.50 V	265	34.63	37.48
8	4804.00	42.11 AV	54.00	-11.89	1.50 V	265	4.63	37.48
9	7206.00	60.78 PK	82.36	-21.58	1.07 V	328	17.04	43.74
10	7206.00	30.78 AV	52.36	-21.58	1.07 V	328	-12.96	43.74
11	9608.00	81.03 PK	82.36	-1.33	1.36 V	13	33.00	48.03
12	9608.00	51.03 AV	52.36	-1.33	1.36 V	13	3.00	48.03
13	12010.00	59.58 PK	74.00	-14.42	1.03 V	303	10.42	49.16
14	12010.00	29.58 AV	54.00	-24.42	1.03 V	303	-19.58	49.16
15	14412.00	61.32 PK	82.36	-21.04	1.58 V	26	8.71	52.61
16	14412.00	31.32 AV	52.36	-21.04	1.58 V	26	-21.29	52.61

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. 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 be equal to: 20log(3.125/100)= -30 dB.
6. Average value = peak reading –20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	GFSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25 deg. C, 67%RH, 991hPa
TEST MODE	**A**	**TESTED BY**	Morgan Chen

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	1627.00	61.98 PK	85.54	-23.56	1.03 H	246	32.70	29.28
2	1627.00	52.03 AV	55.54	-3.51	1.03 H	246	22.75	29.28
3	*2441.00	105.54 PK			1.03 H	312	73.82	31.72
4	*2441.00	75.54 AV			1.03 H	312	43.82	31.72
5	4882.00	65.35 PK	74.00	-8.65	1.06 H	19	27.68	37.67
6	4882.00	35.35 AV	54.00	-18.65	1.06 H	19	-2.32	37.67
7	7323.00	61.03 PK	74.00	-12.97	1.05 H	18	16.92	44.11
8	7323.00	31.03 AV	54.00	-22.97	1.05 H	18	-13.08	44.11
9	9764.00	76.89 PK	85.54	-8.65	1.52 H	28	28.44	48.45
10	9764.00	46.89 AV	55.54	-8.65	1.52 H	28	-1.56	48.45
11	12205.00	60.85 PK	74.00	-13.15	1.47 H	10	11.55	49.30
12	12205.00	30.85 AV	54.00	-23.15	1.47 H	10	-18.45	49.30
13	14646.00	59.89 PK	85.54	-25.65	1.34 H	27	7.28	52.61
14	14646.00	29.89 AV	55.54	-25.65	1.34 H	27	-22.72	52.61

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. 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 be equal to: 20log(3.125/100)= -30 dB.
6. Average value = peak reading –20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	GFSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25 deg. C, 67%RH, 991hPa
TEST MODE	**A**	**TESTED BY**	Morgan Chen

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	1627.00	60.81 PK	82.14	-21.33	1.18 V	312	31.53	29.28
2	1627.00	50.90 AV	52.14	-1.24	1.18 V	312	21.62	29.28
3	*2441.00	102.14 PK			1.05 V	306	70.42	31.72
4	*2441.00	72.14 AV			1.05 V	306	40.42	31.72
5	4882.00	72.16 PK	74.00	-1.84	1.05 V	345	34.49	37.67
6	4882.00	42.16 AV	54.00	-11.84	1.05 V	345	4.49	37.67
7	7323.00	59.89 PK	74.00	-14.11	1.06 V	339	15.78	44.11
8	7323.00	29.89 AV	54.00	-24.11	1.06 V	339	-14.22	44.11
9	9764.00	80.93 PK	82.14	-1.21	1.35 V	11	32.48	48.45
10	9764.00	50.93 AV	52.14	-1.21	1.35 V	11	2.48	48.45
11	12205.00	59.32 PK	74.00	-14.68	1.09 V	298	10.02	49.30
12	12205.00	29.32 AV	54.00	-24.68	1.09 V	298	-19.98	49.30
13	14646.00	61.03 PK	82.14	-21.11	1.55 V	18	8.42	52.61
14	14646.00	31.03 AV	52.14	-21.11	1.55 V	18	-21.58	52.61

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. 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 be equal to: 20log(3.125/100)= -30 dB.
6. Average value = peak reading –20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	GFSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25 deg. C, 67%RH, 991hPa
TEST MODE	**A**	**TESTED BY**	Morgan Chen

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	1654.00	60.35 PK	85.32	-24.97	1.08 H	315	31.04	29.31
2	1654.00	50.42 AV	55.32	-4.90	1.08 H	315	21.11	29.31
3	*2480.00	105.32 PK			1.18 H	8	73.42	31.90
4	*2480.00	75.32 AV			1.18 H	8	43.42	31.90
5	2483.50	57.82 PK	74.00	-16.18	1.05 H	305	25.91	31.91
6	2483.50	49.03 AV	54.00	-4.97	1.05 H	305	17.12	31.91
7	4960.00	65.01 PK	74.00	-8.99	1.06 H	315	27.18	37.83
8	4960.00	35.01 AV	54.00	-18.99	1.06 H	315	-2.82	37.83
9	7440.00	60.36 PK	74.00	-13.64	1.03 H	308	16.08	44.28
10	7440.00	30.36 AV	54.00	-23.64	1.03 H	308	-13.92	44.28
11	9920.00	78.12 PK	85.32	-7.20	1.58 H	32	29.34	48.78
12	9920.00	48.12 AV	55.32	-7.20	1.58 H	32	-0.66	48.78
13	12400.00	62.12 PK	74.00	-11.88	1.05 H	26	12.96	49.16
14	12400.00	32.12 AV	54.00	-21.88	1.05 H	26	-17.04	49.16
15	14880.00	60.85 PK	85.32	-24.47	1.05 H	315	8.48	52.37
16	14880.00	30.85 AV	55.32	-24.47	1.05 H	315	-21.52	52.37

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. 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 be equal to: 20log(3.125/100)= -30 dB.
6. Average value = peak reading –20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	GFSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25 deg. C, 67%RH, 991hPa
TEST MODE	**A**	**TESTED BY**	Morgan Chen

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	1654.00	57.81 PK	82.41	-24.60	1.08 V	346	28.50	29.31
2	1654.00	49.93 AV	52.41	-2.48	1.08 V	346	20.62	29.31
3	*2480.00	102.41 PK			1.15 V	25	70.51	31.90
4	*2480.00	72.41 AV			1.15 V	25	40.51	31.90
5	2483.50	55.10 PK	74.00	-18.90	1.07 V	116	23.19	31.91
6	2483.50	47.28 AV	54.00	-6.72	1.07 V	116	15.37	31.91
7	4960.00	71.89 PK	74.00	-2.11	1.06 V	345	34.06	37.83
8	4960.00	41.89 AV	54.00	-12.11	1.06 V	345	4.06	37.83
9	7440.00	61.22 PK	74.00	-12.78	1.05 V	51	16.94	44.28
10	7440.00	31.22 AV	54.00	-22.78	1.05 V	51	-13.06	44.28
11	9920.00	80.93 PK	82.41	-1.48	1.78 V	18	32.15	48.78
12	9920.00	50.93 AV	52.41	-1.48	1.78 V	18	2.15	48.78
13	12400.00	60.11 PK	74.00	-13.89	1.07 V	325	10.95	49.16
14	12400.00	30.11 AV	54.00	-23.89	1.07 V	325	-19.05	49.16
15	14412.00	61.11 PK	82.41	-21.30	1.38 V	10	8.50	52.61
16	14412.00	31.11 AV	52.41	-21.30	1.38 V	10	-21.50	52.61

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. 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 be equal to: 20log(3.125/100)= -30 dB.
6. Average value = peak reading –20log(duty cycle).

MODE B FOR 8DPSK

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	8DPSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25 deg. C, 67%RH, 991hPa
TEST MODE	**B**	**TESTED BY**	Morgan Chen

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	1602.00	61.71 PK	74.00	-12.29	1.05 H	213	32.46	29.25
2	1602.00	51.89 AV	54.00	-2.11	1.05 H	213	22.64	29.25
3	2390.00	56.88 PK	74.00	-17.12	1.04 H	289	25.39	31.49
4	2390.00	48.76 AV	54.00	-5.24	1.04 H	289	17.27	31.49
5	*2402.00	104.38 PK			1.15 H	32	72.84	31.54
6	*2402.00	74.38 AV			1.15 H	32	42.84	31.54
7	4804.00	62.33 PK	74.00	-11.67	1.08 H	318	24.85	37.48
8	4804.00	32.33 AV	54.00	-21.67	1.08 H	318	-5.15	37.48
9	7206.00	66.12 PK	84.38	-18.26	1.10 H	332	22.38	43.74
10	7206.00	37.12 AV	54.38	-17.26	1.10 H	332	-6.62	43.74
11	9608.00	75.15 PK	84.38	-9.23	1.03 H	345	27.12	48.03
12	9608.00	45.15 AV	54.38	-9.23	1.03 H	345	-2.88	48.03
13	12010.00	61.08 PK	74.00	-12.92	1.48 H	22	11.92	49.16
14	12010.00	31.08 AV	54.00	-22.92	1.48 H	22	-18.08	49.16

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. 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 be equal to: 20log(3.125/100)= -30 dB.
6. Average value = peak reading –20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	8DPSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25 deg. C, 67%RH, 991hPa
TEST MODE	**B**	**TESTED BY**	Morgan Chen

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	1602.00	60.88 PK	74.00	-13.12	1.03 V	215	31.63	29.25
2	1602.00	50.97 AV	54.00	-3.03	1.03 V	215	21.72	29.25
3	2390.00	54.35 PK	74.00	-19.65	1.10 V	25	22.86	31.49
4	2390.00	45.35 AV	54.00	-8.65	1.10 V	25	13.86	31.49
5	*2402.00	101.51 PK			1.05 V	38	69.97	31.54
6	*2402.00	71.51 AV			1.05 V	38	39.97	31.54
7	4804.00	70.89 PK	74.00	-3.11	1.05 V	34	33.41	37.48
8	4804.00	40.89 AV	54.00	-13.11	1.05 V	34	3.41	37.48
9	7206.00	64.22 PK	81.51	-17.29	1.06 V	305	20.48	43.74
10	7206.00	34.22 AV	51.51	-17.29	1.06 V	305	-9.52	43.74
11	9608.00	76.85 PK	81.51	-4.66	1.49 V	7	28.82	48.03
12	9608.00	46.85 AV	51.51	-4.66	1.49 V	7	-1.18	48.03
13	12010.00	60.02 PK	74.00	-13.98	1.46 V	16	10.86	49.16
14	12010.00	30.02 AV	54.00	-23.98	1.46 V	16	-19.14	49.16

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. 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 be equal to: 20log(3.125/100)= -30 dB.
6. Average value = peak reading –20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	8DPSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25 deg. C, 67%RH, 991hPa
TEST MODE	**B**	**TESTED BY**	Morgan Chen

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	1627.00	61.88 PK	84.11	-22.23	1.08 H	25	32.60	29.28
2	1627.00	51.93 AV	54.11	-2.18	1.08 H	25	22.65	29.28
3	*2441.00	104.11 PK			1.03 H	321	72.39	31.72
4	*2441.00	74.11 AV			1.03 H	321	42.39	31.72
5	4882.00	61.98 PK	74.00	-12.02	1.07 H	315	24.31	37.67
6	4882.00	31.98 AV	54.00	-22.02	1.07 H	315	-5.69	37.67
7	7323.00	66.08 PK	74.00	-7.92	1.14 H	345	21.97	44.11
8	7323.00	36.08 AV	54.00	-17.92	1.14 H	345	-8.03	44.11
9	9764.00	76.35 PK	84.11	-7.76	1.08 H	340	27.90	48.45
10	9764.00	46.35 AV	54.11	-7.76	1.08 H	340	-2.10	48.45
11	12205.00	62.32 PK	74.00	-11.68	1.50 H	26	13.02	49.30
12	12205.00	32.32 AV	54.00	-21.68	1.50 H	26	-16.98	49.30

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.
5. 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 be equal to: 20log(3.125/100)= -30 dB.
6. Average value = peak reading –20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	8DPSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25 deg. C, 67%RH, 991hPa
TEST MODE	**B**	**TESTED BY**	Morgan Chen

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	1627.00	60.01 PK	81.24	-21.23	1.15 V	312	30.73	29.28
2	1627.00	49.95 AV	51.24	-1.29	1.15 V	312	20.67	29.28
3	*2441.00	101.24 PK			1.04 V	305	69.52	31.72
4	*2441.00	71.24 AV			1.04 V	305	39.52	31.72
5	4882.00	71.38 PK	74.00	-2.62	1.08 V	26	33.71	37.67
6	4882.00	41.38 AV	54.00	-12.62	1.08 V	26	3.71	37.67
7	7323.00	64.08 PK	74.00	-9.92	1.05 V	345	19.97	44.11
8	7323.00	34.08 AV	54.00	-19.92	1.05 V	345	-10.03	44.11
9	9764.00	79.79 PK	81.24	-1.45	1.08 V	352	31.34	48.45
10	9764.00	49.79 AV	51.24	-1.45	1.08 V	352	1.34	48.45
11	12205.00	60.23 PK	74.00	-13.77	1.35 V	24	10.93	49.30
12	12205.00	30.23 AV	54.00	-23.77	1.35 V	24	-19.07	49.30

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.
5. 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 be equal to: 20log(3.125/100)= -30 dB.
6. Average value = peak reading –20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	8DPSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25 deg. C, 67%RH, 991hPa
TEST MODE	**B**	**TESTED BY**	Morgan Chen

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	1654.00	60.55 PK	84.06	-23.51	1.07 H	312	31.24	29.31
2	1654.00	50.31 AV	54.06	-3.75	1.07 H	312	21.00	29.31
3	*2480.00	104.06 PK			1.13 H	8	72.16	31.90
4	*2480.00	74.06 AV			1.13 H	8	42.16	31.90
5	2483.50	56.89 PK	74.00	-17.11	1.08 H	305	24.98	31.91
6	2483.50	49.46 AV	54.00	-4.54	1.08 H	305	17.55	31.91
7	4960.00	62.32 PK	74.00	-11.68	1.09 H	198	24.49	37.83
8	4960.00	32.32 AV	54.00	-21.68	1.09 H	198	-5.51	37.83
9	7440.00	64.55 PK	74.00	-9.45	1.06 H	325	20.27	44.28
10	7440.00	34.55 AV	54.00	-19.45	1.06 H	325	-9.73	44.28
11	9920.00	77.52 PK	84.06	-6.54	1.11 H	312	28.74	48.78
12	9920.00	47.52 AV	54.06	-6.54	1.11 H	312	-1.26	48.78
13	12400.00	61.89 PK	74.00	-12.11	1.07 H	315	12.73	49.16
14	12400.00	31.89 AV	54.00	-22.11	1.07 H	315	-17.27	49.16

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. 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 be equal to: 20log(3.125/100)= -30 dB.
6. Average value = peak reading –20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	8DPSK	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25 deg. C, 67%RH, 991hPa
TEST MODE	**B**	**TESTED BY**	Morgan Chen

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	1654.00	59.85 PK	81.17	-21.32	1.08 V	25	30.54	29.31
2	1654.00	49.39 AV	51.17	-1.78	1.08 V	25	20.08	29.31
3	*2480.00	101.17 PK			1.08 V	345	69.27	31.90
4	*2480.00	71.17 AV			1.08 V	345	39.27	31.90
5	2483.50	53.85 PK	74.00	-20.15	1.05 V	305	21.94	31.91
6	2483.50	45.98 AV	54.00	-8.02	1.05 V	305	14.07	31.91
7	4960.00	70.85 PK	74.00	-3.15	1.02 V	318	33.02	37.83
8	4960.00	40.85 AV	54.00	-13.15	1.02 V	318	3.02	37.83
9	7440.00	62.88 PK	74.00	-11.12	1.15 V	330	18.60	44.28
10	7440.00	32.88 AV	54.00	-21.12	1.15 V	330	-11.40	44.28
11	**9920.00**	**79.98 PK**	**81.17**	**-1.19**	**1.58 V**	**308**	**31.20**	**48.78**
12	**9920.00**	**49.98 AV**	**51.17**	**-1.19**	**1.58 V**	**308**	**1.20**	**48.78**
13	12400.00	60.98 PK	74.00	-13.02	1.28 V	16	11.82	49.16
14	12400.00	30.98 AV	54.00	-23.02	1.28 V	16	-18.18	49.16

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. 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 be equal to: 20log(3.125/100)= -30 dB.
6. Average value = peak reading –20log(duty cycle).

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 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
SPECTRUM ANALYZER	FSP40	100040	Jun. 07, 2007

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

4.3.3 TEST PROCEDURES

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.

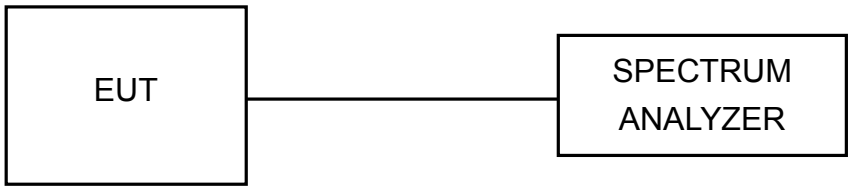
d. Set the SA on View mode and then plot the result on SA screen.

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

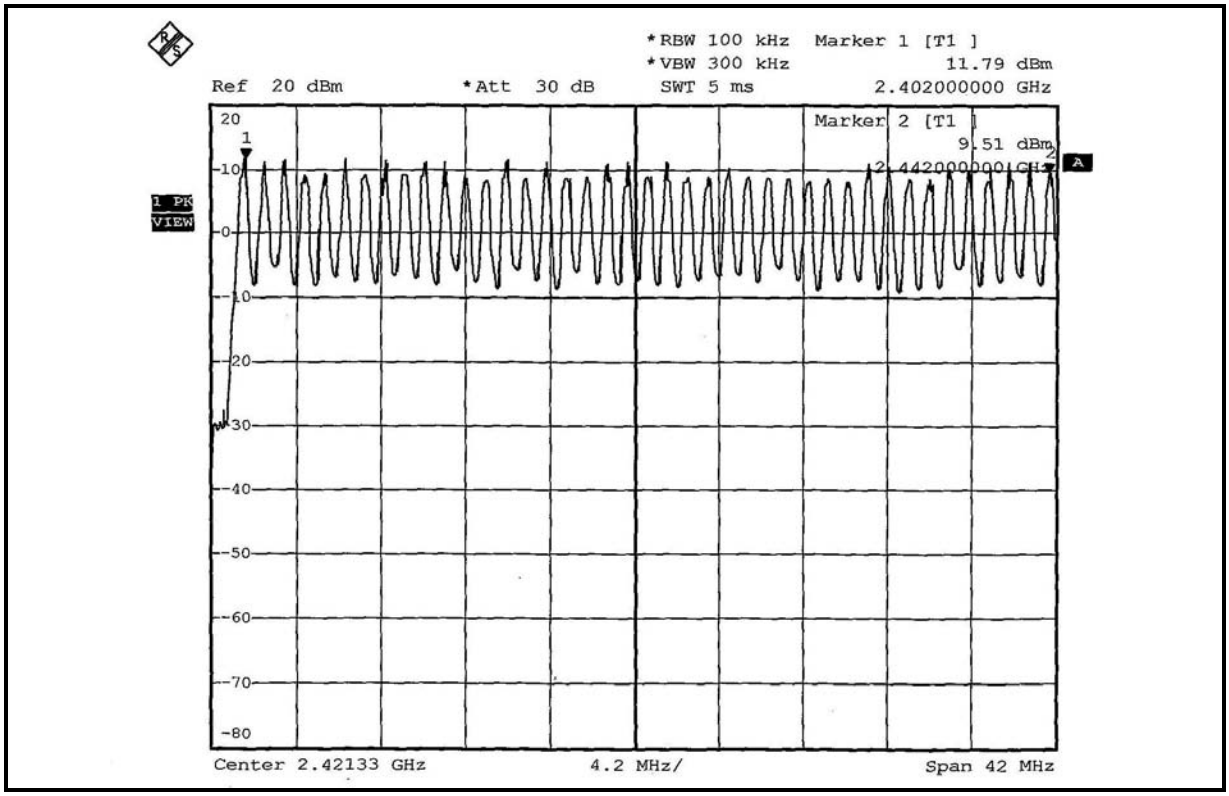
4.3.5 TEST SETUP

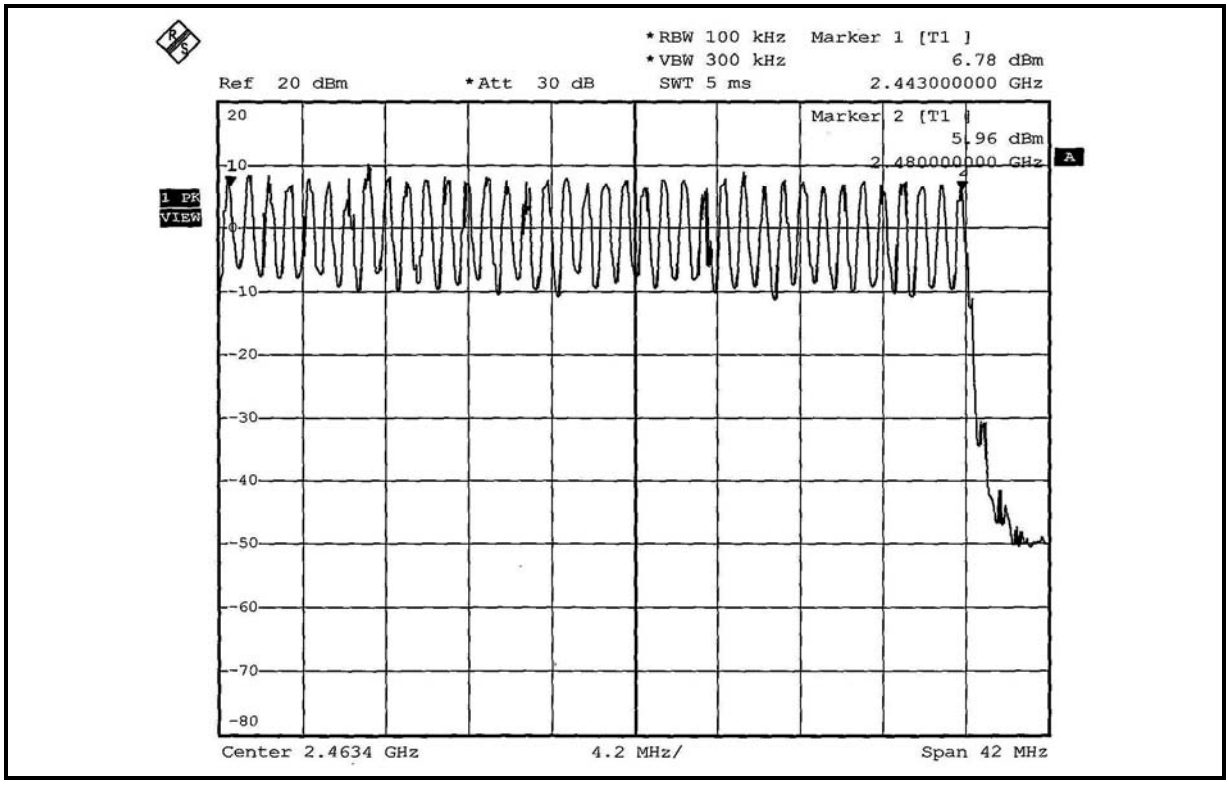


4.3.6 TEST RESULTS

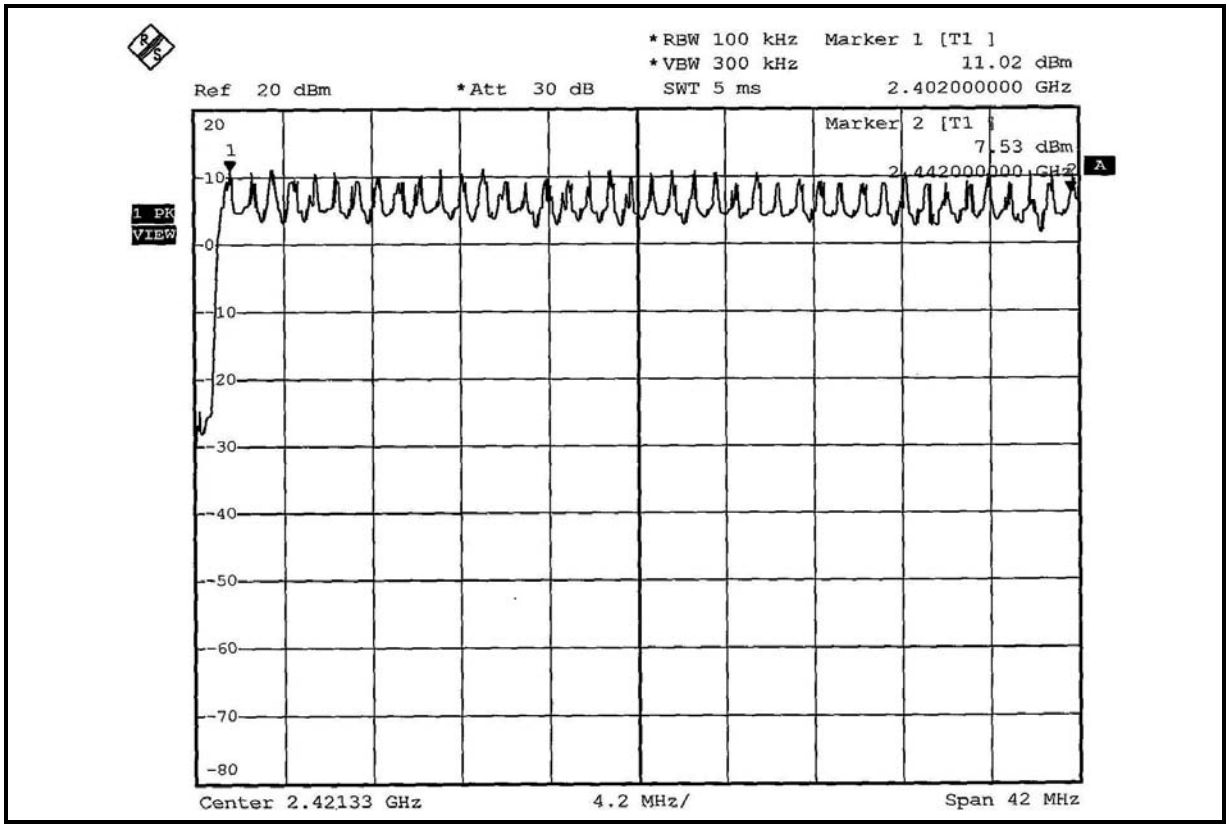
There are 79 hopping frequencies in the hopping mode. Please refer to next two pages for the test result. On the plots, it shows that the hopping frequencies are equally spaced.

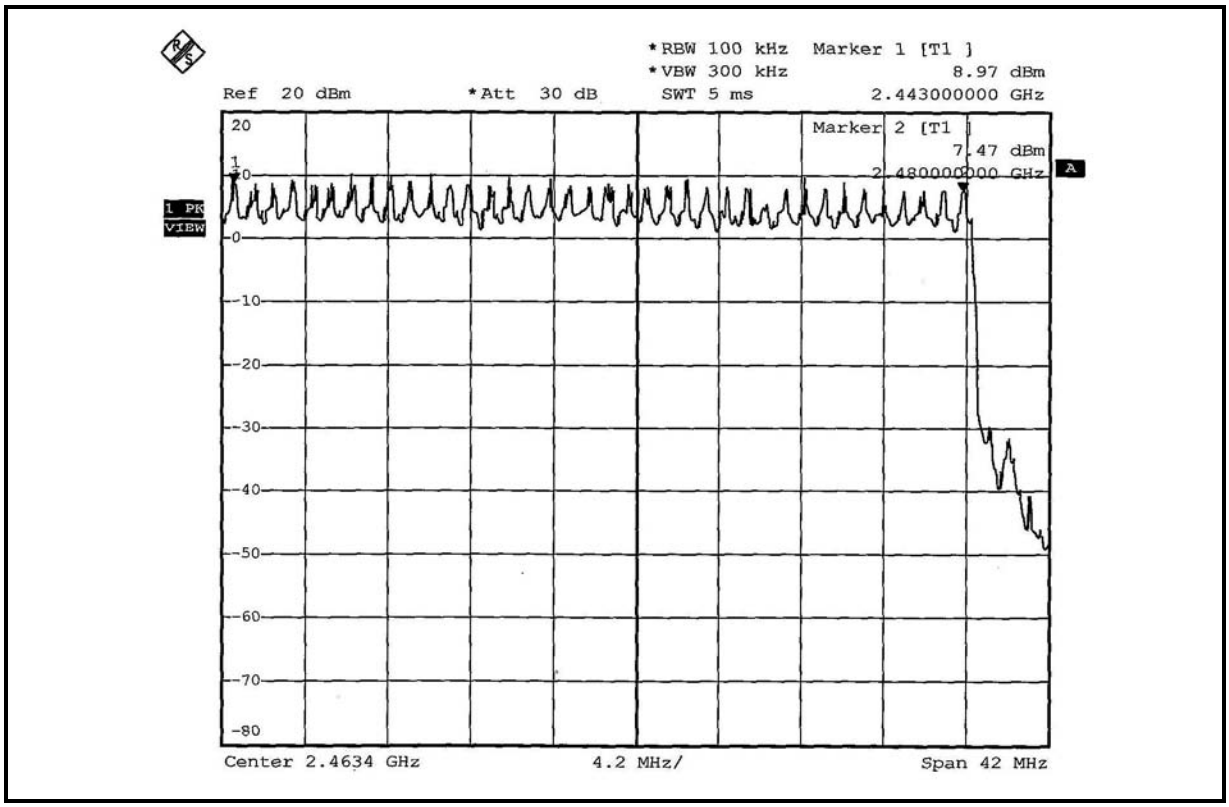
FOR GFSK


*RBW 100 kHz
*VBW 300 kHz
SWT 5 ms
Marker 1 [T1]
11.79 dBm
2.402000000 GHz
Ref 20 dBm
*Att 30 dB
Marker 2 [T1]
9.51 dBm
2.442000000 GHz
1 PK VIEW
A
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.42133 GHz
4.2 MHz/
Span 42 MHz


*RBW 100 kHz
*VBW 300 kHz
SWT 5 ms
Marker 1 [T1]
6.78 dBm
2.443000000 GHz
Ref 20 dBm
*Att 30 dB
Marker 2 [T1]
5.96 dBm
2.480000000 GHz
1 PK VIEW
A
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.4634 GHz
4.2 MHz/
Span 42 MHz

FOR 8DPSK


*RBW 100 kHz
*VBW 300 kHz
Marker 1 [T1]
11.02 dBm
Ref 20 dBm
*Att 30 dB
SWT 5 ms
2.402000000 GHz
Marker 2 [T1]
7.53 dBm
1 PK VIEW
Center 2.42133 GHz
4.2 MHz/
Span 42 MHz


*RBW 100 kHz
*VBW 300 kHz
Marker 1 [T1]
8.97 dBm
Ref 20 dBm
*Att 30 dB
SWT 5 ms
2.443000000 GHz
Marker 2 [T1]
7.47 dBm
1 PK VIEW
Center 2.4634 GHz
4.2 MHz/
Span 42 MHz

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 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
SPECTRUM ANALYZER	FSP40	100040	Jun. 07, 2007

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

4.4.3 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.

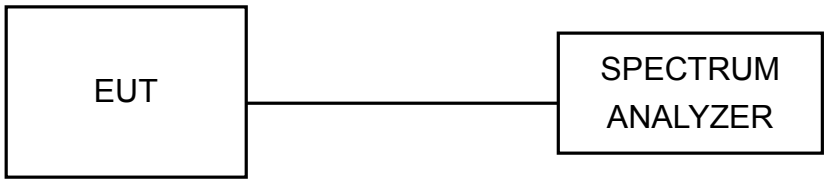
d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.

e. Repeat above procedures until all different time-slot modes have been completed.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



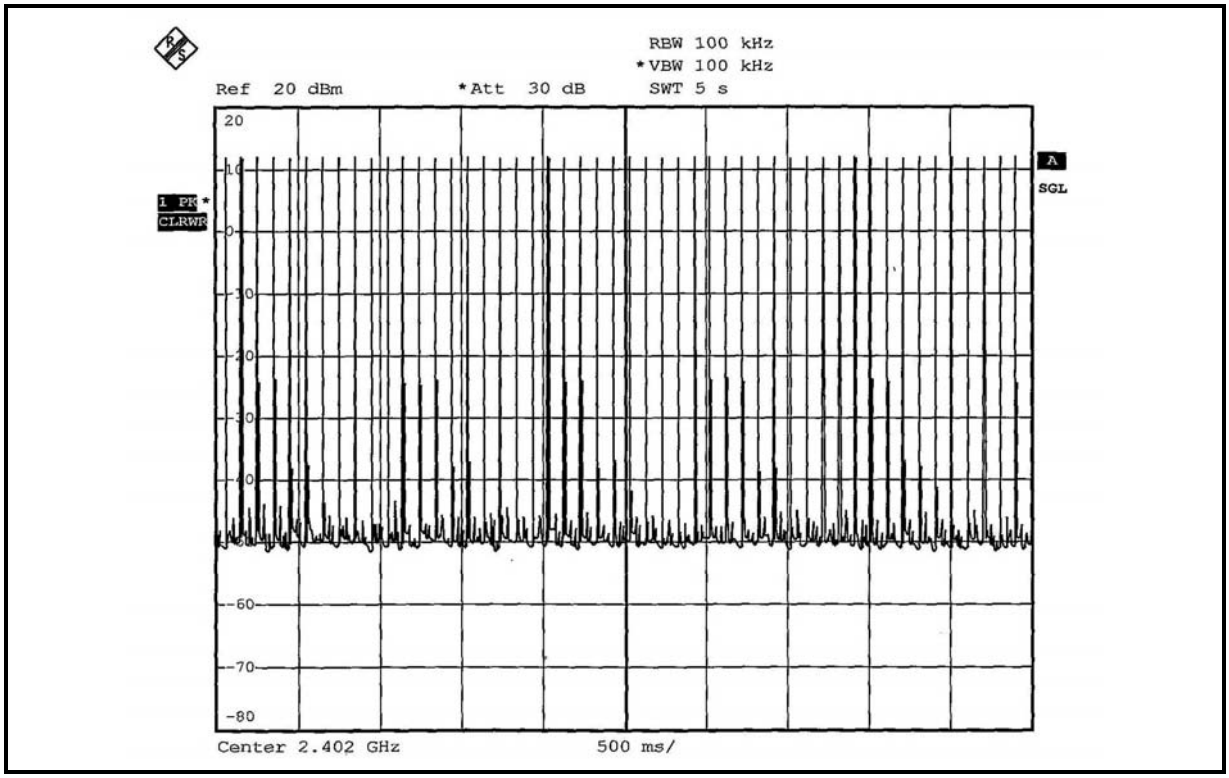
4.4.6 TEST RESULTS

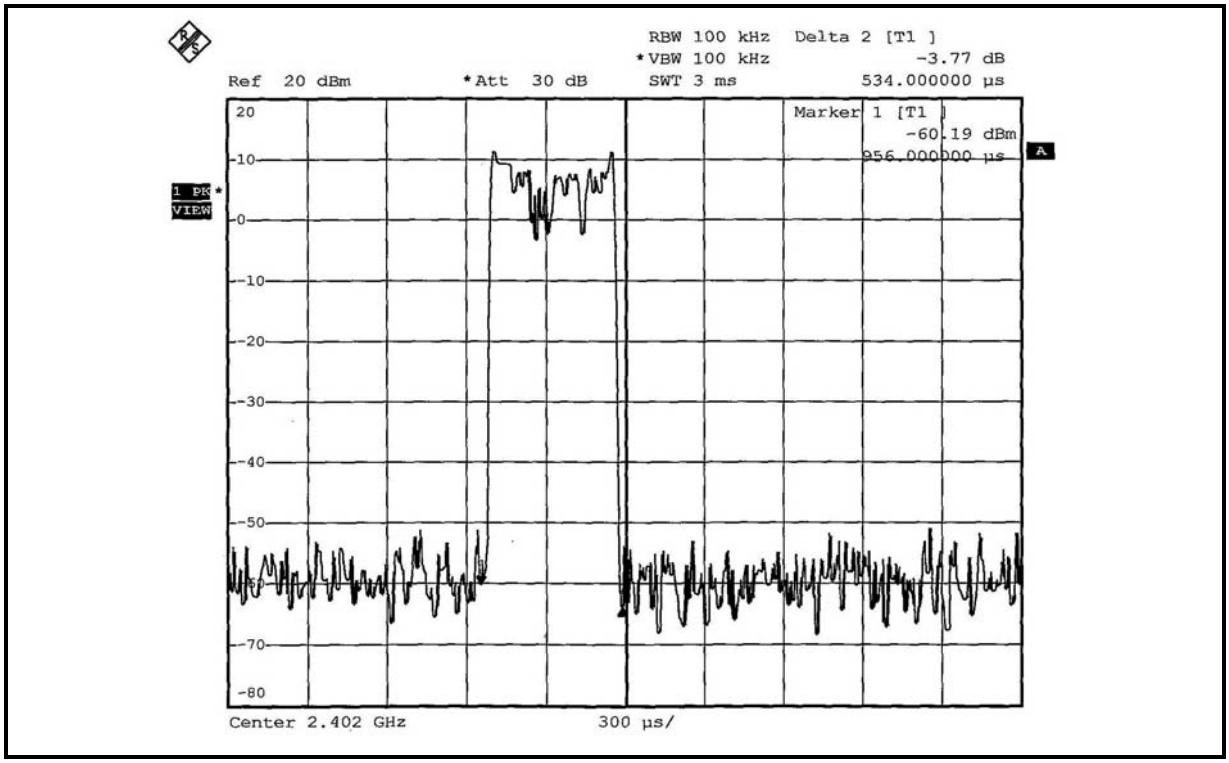
FOR GFSK

Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	51 (times / 5 sec) *6.32=322.32 times	0.534	172.119	400
DH3	26 (times / 5 sec) *6.32=164.32 times	1.806	296.762	400
DH5	17 (times / 5 sec) *6.32=107.44 times	3.090	331.990	400

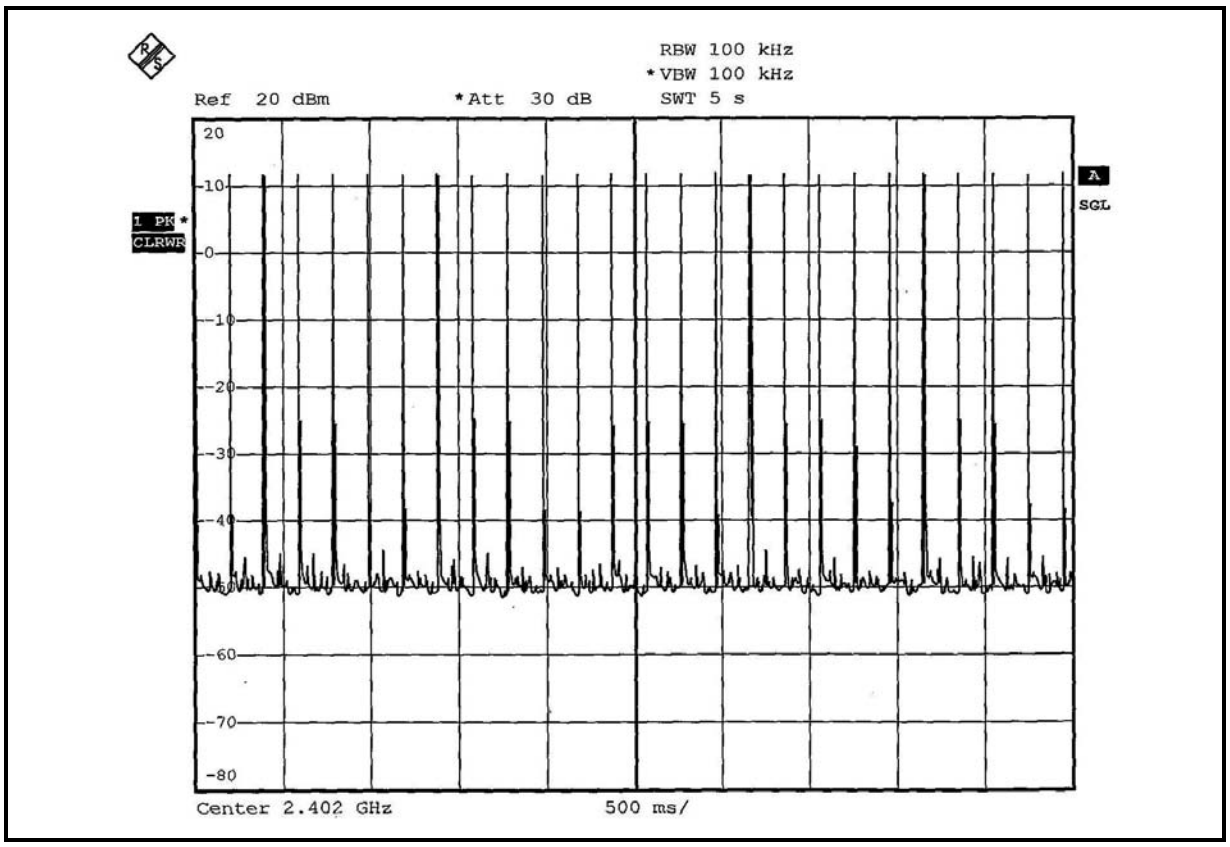
NOTE: Test plots of the transmitting time slot are shown on next 3 pages.

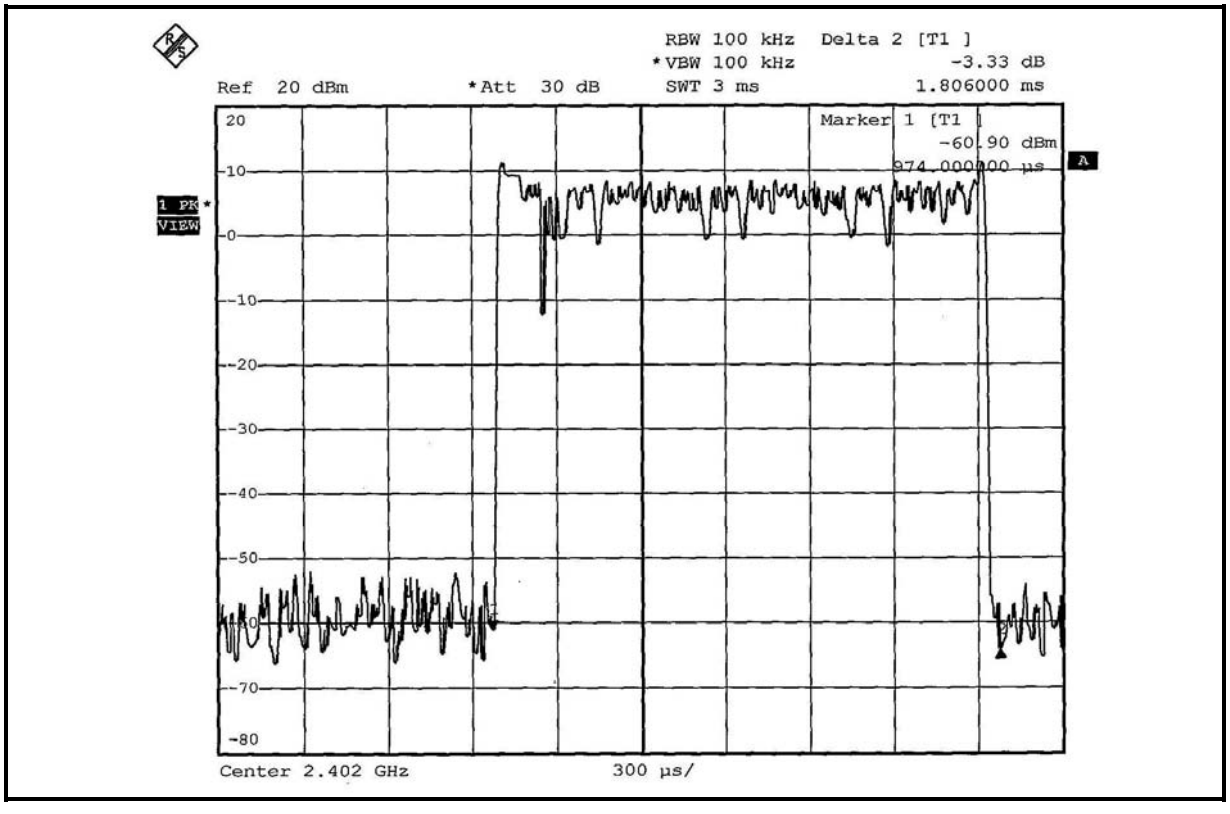
DH1


RBW 100 kHz
*VBW 100 kHz
Ref 20 dBm
*Att 30 dB
SWT 5 s
1 PK*
CLRWR
A
SGL
20
10
0
-10
-20
-30
-40
-60
-70
-80
Center 2.402 GHz
500 ms/

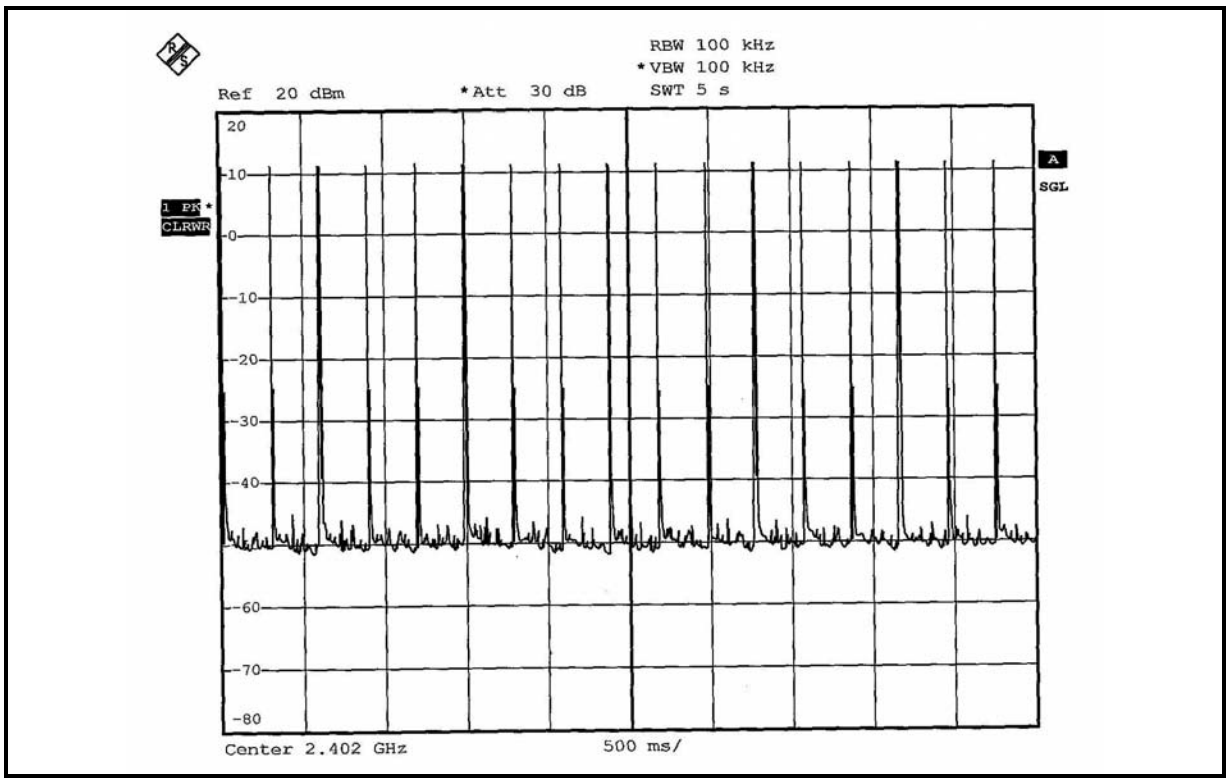

RBW 100 kHz
*VBW 100 kHz
SWT 3 ms
Delta 2 [T1]
-3.77 dB
534.000000 µs
Marker 1 [T1]
-60.19 dBm
956.000000 µs
Ref 20 dBm
*Att 30 dB
1 PK*
VIEW
A
20
10
0
-10
-20
-30
-40
-50
-70
-80
Center 2.402 GHz
300 µs/

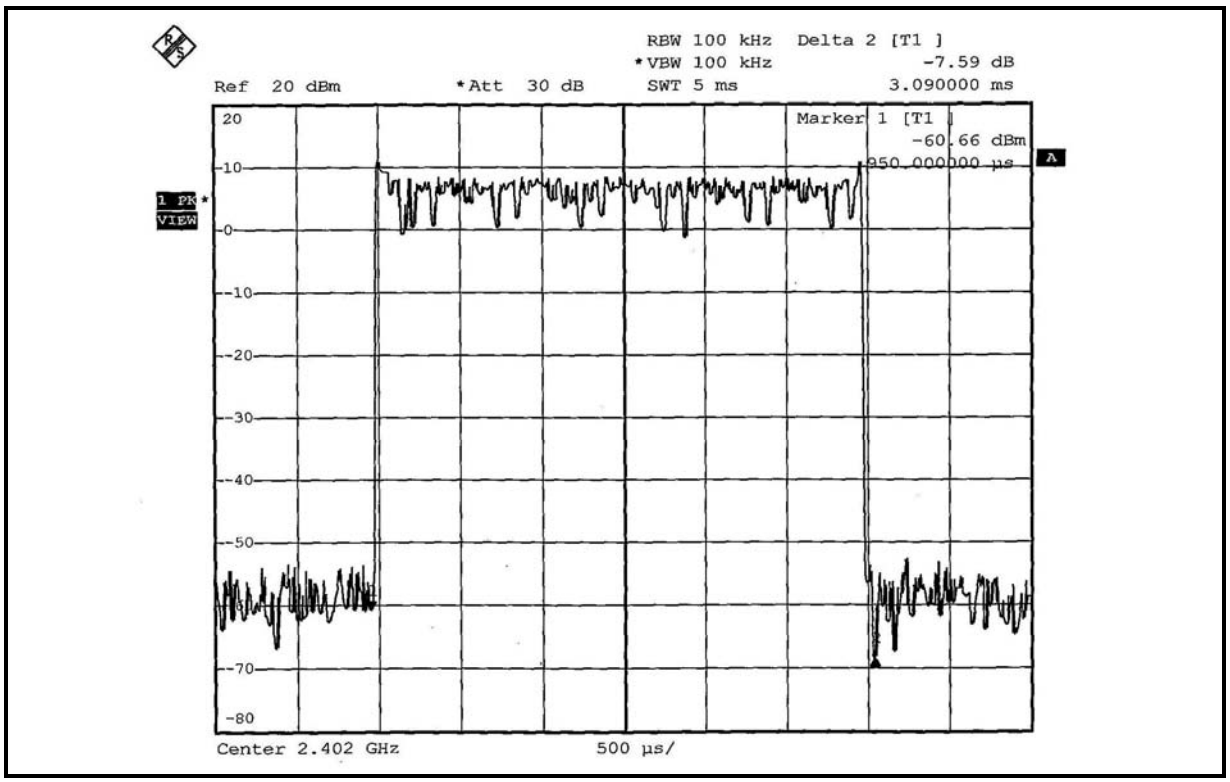
DH3


RBW 100 kHz
*VBW 100 kHz
Ref 20 dBm
*Att 30 dB
SWT 5 s
1 PK*
CLRWR
A
SGL
20
-10
0
-10
-20
-30
-40
-60
-70
-80
Center 2.402 GHz
500 ms/


RBW 100 kHz
Delta 2 [T1]
*VBW 100 kHz
-3.33 dB
Ref 20 dBm
*Att 30 dB
SWT 3 ms
1.806000 ms
Marker 1 [T1]
-60.90 dBm
974.000000 µs
1 PK*
VIEW
A
20
-10
0
-10
-20
-30
-40
-50
-70
-80
Center 2.402 GHz
300 µs/

DH5


RBW 100 kHz
*VBW 100 kHz
Ref 20 dBm
*Att 30 dB
SWT 5 s
1 PK*
CLRWR
A
SGL
20
-10
0
-10
-20
-30
-40
-60
-70
-80
Center 2.402 GHz
500 ms/

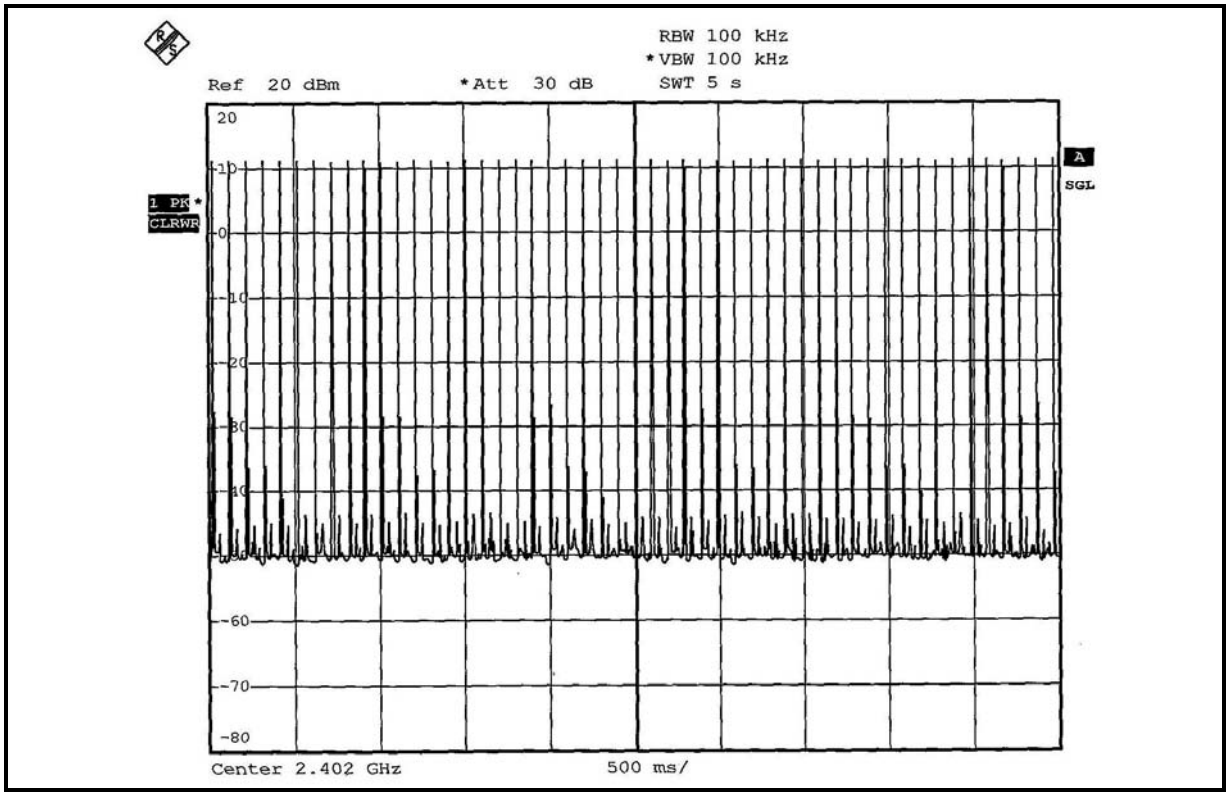

RBW 100 kHz
Delta 2 [T1]
*VBW 100 kHz
-7.59 dB
Ref 20 dBm
*Att 30 dB
SWT 5 ms
3.090000 ms
Marker 1 [T1]
-60.66 dBm
850.000000 µs
1 PK*
VIEW
A
20
-10
0
-10
-20
-30
-40
-50
-70
-80
Center 2.402 GHz
500 µs/

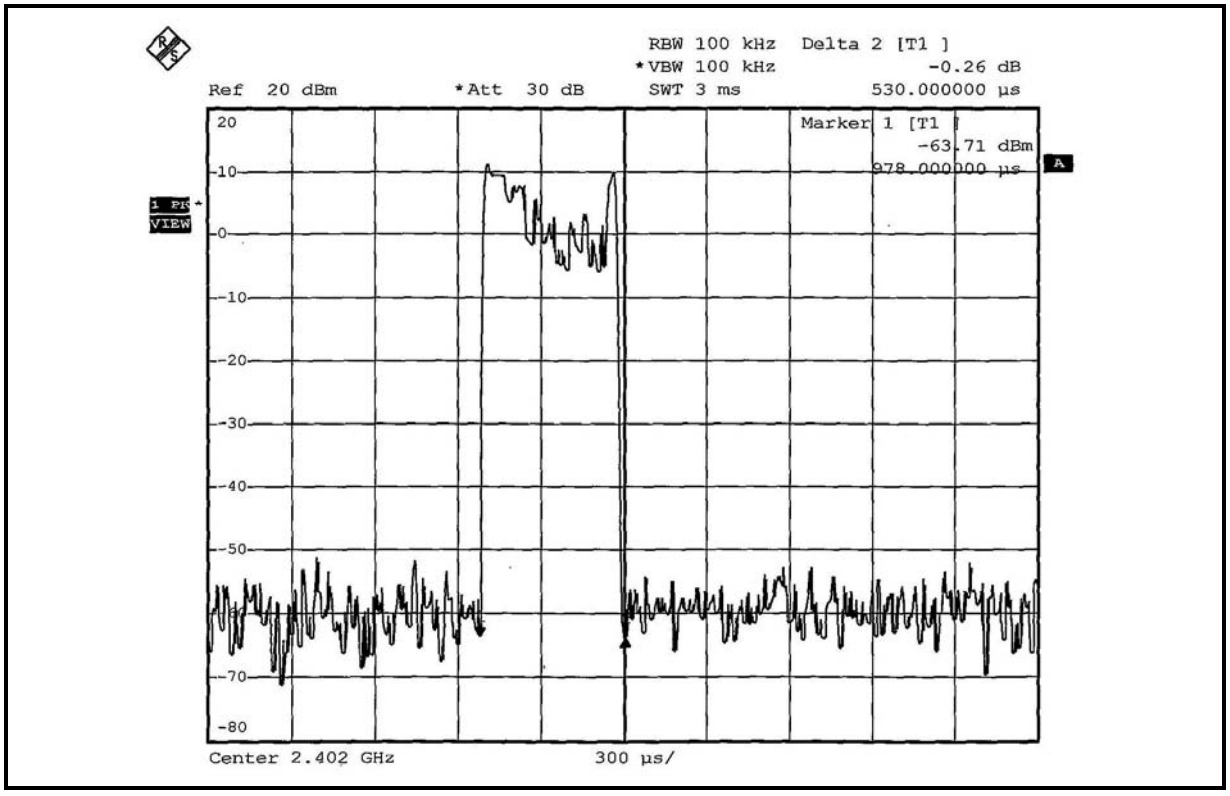
FOR 8DPSK

Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	51 (times / 5 sec) *6.32=322.32 times	0.530	170.830	400
DH3	26 (times / 5 sec) *6.32=164.32 times	1.836	301.692	400
DH5	17 (times / 5 sec) *6.32=107.44 times	3.070	329.841	400

NOTE: Test plots of the transmitting time slot are shown on next 3 pages.

DH1


RBW 100 kHz
*VBW 100 kHz
Ref 20 dBm
*Att 30 dB
SWT 5 s
1 PK*
CLRWR
A
SGL
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.402 GHz
500 ms/


RBW 100 kHz
Delta 2 [T1]
*VBW 100 kHz
-0.26 dB
Ref 20 dBm
*Att 30 dB
SWT 3 ms
530.000000 µs
Marker 1 [T1]
-63.71 dBm
978.000000 µs
1 PK*
VIEW
A
20
10
0
-10
-20
-30
-40
-50
-70
-80
Center 2.402 GHz
300 µs/