FCC TEST REPORT

REPORT NO.: 061009FIA01

MODEL NO.: KCE-300BT

RECEIVED: Oct. 24, 2006

TESTED: Oct. 24 ~ Nov. 27, 2006

ISSUED: Nov. 27, 2006

APPLICANT: Motorola, Inc. Digital Media Services

ADDRESS: 2900 South Diablo Way, Tempe, AZ 85282 U.S.A.

ISSUED BY: ADT (Shanghai) Corporation

ADDRESS: 2F, Building C, No.1618, Yishan Rd., 201103, Shanghai, China

ADT (Shanghai) Corporation.

ACCREDITED
No.: 2343.01

V 1.0

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1. CERTIFICATION

PRODUCT:	Bluetooth Interface
BRAND NAME:	Motorola
MODEL NO.:	KCE-300BT
APPLICANT:	Motorola, Inc. Digital Media Services
TESTED:	Oct. 24 ~ Nov. 27, 2006
TEST ITEM:	Engineering Sample
STANDARDS:	FCC Part 15, Subpart C (Section 15.247), ANSI C63.4-2003

We, **ADT (Shanghai) Corporation**, declare that the equipment above has been tested in our facility and found compliance with the requirement limits of applicable standards. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate under the standards herein specified.

TECHNICAL ACCEPTANCE : Bright Tong , **DATE:** NOV. 27, 2006

Bright Tong
Engineering Supervisor

APPROVED BY : , **DATE:** NOV. 27, 2006

Wallace Pan
Director of Operations

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	N/A	Power supply is 12 Vdc from battery
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 two-thirds of 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. 125mW (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 –8.86 dB at 120.00MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.

Note: If the Frequency Hopping System operating in 2400-2483.5 MHz band and the output power less than 125mW. The hopping channel carrier frequencies separated by a minimum of 25 kHz 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:

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz ~ 30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.73 dB
	200MHz ~1000MHz	3.74 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Bluetooth Interface
MODEL NO.	KCE-300BT
POWER SUPPLY	12Vdc from Battery
MODULATION TYPE	GFSK
RADIO TECHNOLOGY	FHSS
FREQUENCY RANGE	2402~ 2480 MHz
NUMBER OF CHANNEL	79
OUTPUT POWER	2.5mW
ANTENNA TYPE	Soldered on PCB
ANTENNA GAIN	2dBi
DATA CABLE	N/A
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	N/A

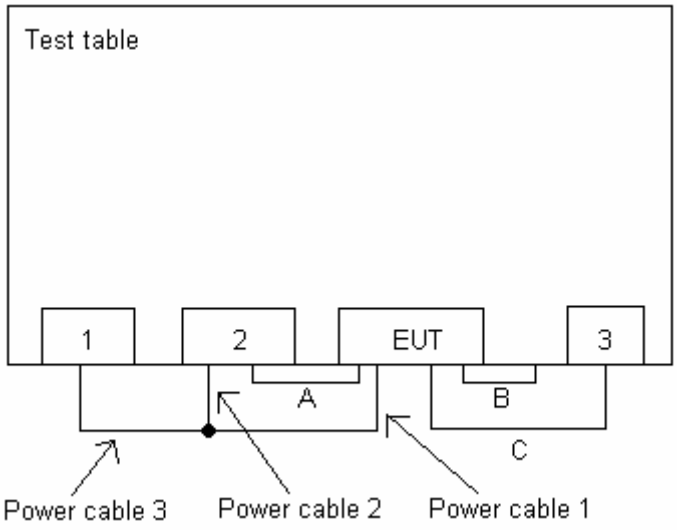
NOTE: The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

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



Note:

Power cable 1 (lines included: ACC, BATT, GND) -- 2.3m, non-shielded, detachable, supplied by manufacturer.

Power cable 2 (lines included: ACC, BATT, GND) -- 0.3m, non-shielded, detachable, supplied by manufacturer.

Power cable 3 (lines included : BATT, GND) -- 0.7m, non-shielded, detachable, supplied by lab.

3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	Applicable to							Description
	DT	CB	HCS	MPOP	BM	RE<1G	RE≥1G	
A	√	√	√	√	√	√	√	GFSK Modulation

Where **DT:** Dwell Time on Each Channel **CB:** CANNEL BANDWIDTH
HCS: Hopping Channel Separation **MPOP:** Maximum Peak Output Power
BM: Band edge Measurement
RE<1G: Radiated Emission below 1GHz **RE≥1G:** Radiated Emission above 1GHz

DWELL TIME ON EACH CHANNEL:

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

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
A	0 ~ 78	0, 39, 78	FHSS	GFSK

CHANNEL BANDWIDTH:

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

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
A	0 ~ 78	0, 39, 78	FHSS	GFSK

HOPPING CHANNEL SEPARATION

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

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
A	0 ~ 78	0, 39, 78	FHSS	GFSK

MAXIMUM PEAK OUTPUT POWER

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

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
A	0 ~ 78	0, 39, 78	FHSS	GFSK

BANDEDGE MEASUREMENT:

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

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
A	0 ~ 78	0, 78	FHSS	GFSK

RADIATED EMISSION TEST (BELOW 1 GHz):

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

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
A	0 ~ 78	39	FHSS	GFSK

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
A	0 ~ 78	0, 39, 78	FHSS	GFSK

3.2.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Bluetooth Interface. 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.

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	Battery	KOBA	NF78-550	N/A	N/A
2	Car Sound Box	ALPINE	MFAP613H	N/A	N/A
3	Microphone	N/A	N/A	N/A	N/A

Note: The microphone is supplied by the manufacturer.

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
A	1.9m shielded signal cable.
B	1.8m shielded signal cable.
C	3m non-shielded microphone connection line.

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 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

NOTES: (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 RESULTS

Since the EUT does not have AC port, the test item is not applicable.

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	ESCS30	E1R1001	Apr. 19, 2007
BILOG Antenna SCHWARZBECK	VULB9168	E1A1001	Sept. 26, 2007
Preamplifier Agilent	8447D	E1A2001	Jan. 27, 2007
Preamplifier Agilent	8449B	E1A2002	Jan. 27, 2007
Double Ridged Broadband Horn Antenna Schwarzbeck	BBHA 9120D	E1A1002	Feb. 15, 2007
Spectrum Analyzer Agilent	E4403B	E1S1001	Jan. 13, 2007
Spectrum Analyzer ROHDE & SCHWARZ	FSP30	E1S1002	May. 15, 2007
RF signal cable Woken	RG-402	E1CBH01	May. 30, 2007
RF signal cable Woken	RG-402	E1CBH16	May. 30, 2007
RF signal cable Woken	RG-402	E1CBH20	May. 30, 2007
RF signal cable Woken	RG-412	E1CBL02	May. 30, 2007
RF signal cable Woken	RG-412	E1CBL03	May. 30, 2007
RF signal cable Woken	RG-412	E1CBL04	May. 30, 2007
Software ADT	ADT_Radiated_V7.5	N/A	N/A

NOTE: 1. The calibration interval of the above test instruments is 12 months.
2. The horn antenna and Agilent preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The Spectrum Analyzer (model: FSP) and RF signal cable (SERIAL: E1CBH16&E1CBH20) are used only for the measurement of emission frequency above 1GHz if tested.

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.

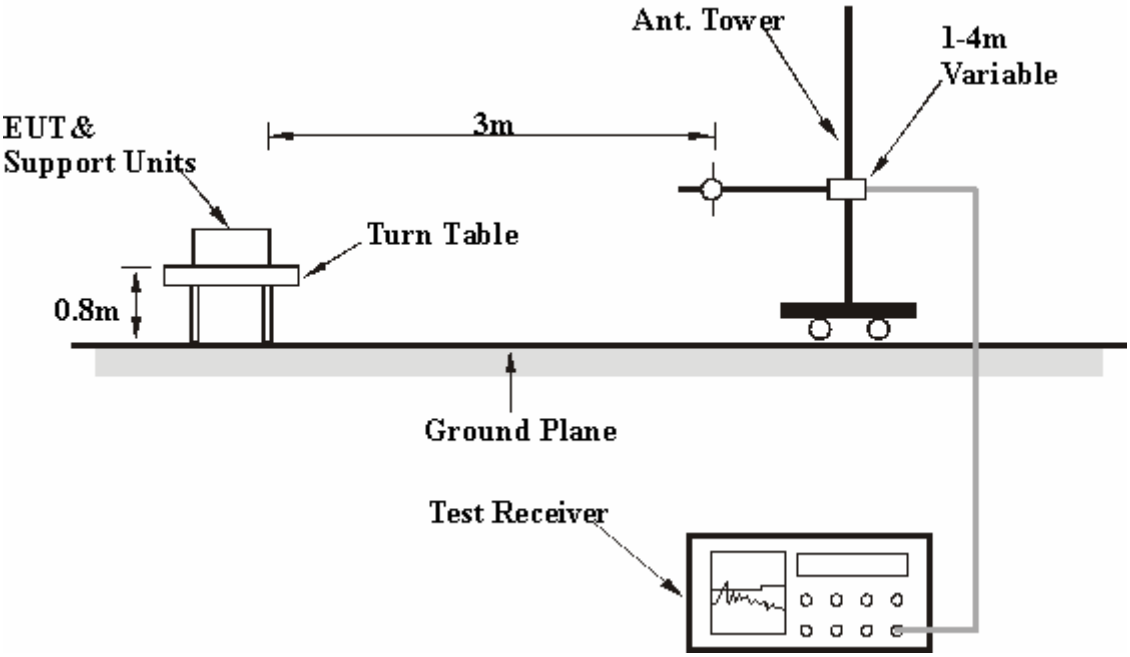
NOTE:

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

The software controlled the EUT to transmit at its maximum power on the specified channels.

4.2.7 TEST RESULTS

Below 1 GHz Worst Case

EUT	Bluetooth Interface	**MEASUREMENT DETAIL**	
MODEL	KCE-300BT	**FREQUENCY RANGE**	Below 1000MHz
CHANNEL	Channel 39	**DETECTOR FUNCTION**	Quasi-Peak
MODULATION TYPE	GFSK	**ENVIRONMENTAL CONDITIONS**	20deg. C, 60%RH, 1001hPa
TEST MODE	A	**INPUT POWER**	12Vdc from battery
TESTED BY	Bright Tong		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Frequency MHz	Factor dB	Reading dBuV/m	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower cm	Table deg
1	**120.00**	**14.77**	**19.87**	**34.64**	**43.50**	**-8.86**	**211.00**	**19.00**
2	145.00	16.59	14.73	31.32	43.50	-12.18	100.00	19.00
3	216.00	13.56	8.98	22.54	43.50	-20.96	329.00	29.00
4	323.43	17.10	12.30	29.40	46.00	-16.60	200.00	67.00
5	396.18	18.57	12.01	30.58	46.00	-15.42	164.00	19.00
6	531.98	21.58	-4.80	16.78	46.00	-29.22	100.00	226.00

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Frequency MHz	Factor dB	Reading dBuV/m	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower cm	Table deg
1	61.52	14.51	9.85	24.36	40.00	-15.64	100.00	65.00
2	119.72	14.74	11.60	26.34	43.50	-17.16	100.00	95.00
3	143.97	16.52	8.11	24.63	43.50	-18.87	100.00	115.00
4	277.35	15.74	7.55	23.29	46.00	-22.71	100.00	235.00
5	418.00	19.24	4.87	24.12	46.00	-21.88	100.00	44.00
6	529.55	21.52	8.00	29.52	46.00	-16.48	100.00	29.00

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.

Above 1 GHz

EUT	Bluetooth Interface	**MEASUREMENT DETAIL**	
MODEL	KCE-300BT	**FREQUENCY RANGE**	Above 1GHz
CHANNEL	Channel 0	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
MODULATION TYPE	GFSK	**ENVIRONMENTAL CONDITIONS**	20deg. C, 60%RH, 1001hPa
TEST MODE	A	**INPUT POWER**	12Vdc from battery
TESTED BY	Bright Tong		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Frequency MHz	Factor dB	Reading dBuV/m	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower cm	Table deg
1	4804.00 PK	37.74	12.48	50.22	74.00	-23.78	113.00	68.00
1	4804.00 AV	37.74	-7.52	30.22	54.00	-23.78	113.00	68.00
2	7206.00 PK	44.58	12.17	56.75	74.00	-17.25	128.00	95.00
2	7206.00 AV	44.58	-7.83	36.75	54.00	-17.25	128.00	95.00
3	9608.00 PK	47.12	10.88	58.01	74.00	-15.99	105.00	42.00
3	9608.00 AV	47.12	-9.11	38.01	54.00	-15.99	105.00	42.00
4	12010.00 PK	48.18	11.39	59.57	74.00	-14.43	109.00	86.00
4	12010.00 AV	48.18	-8.61	39.57	54.00	-14.43	109.00	86.00

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Frequency MHz	Factor dB	Reading dBuV/m	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower cm	Table deg
1	4804.00 PK	37.74	13.77	51.51	74.00	-22.49	163.00	48.00
1	4804.00 AV	37.74	-6.23	31.51	54.00	-22.49	163.00	48.00
2	7206.00 PK	44.58	11.58	56.16	74.00	-17.84	126.00	57.00
2	7206.00 AV	44.58	-8.42	36.16	54.00	-17.84	126.00	57.00
3	9608.00 PK	47.12	10.08	57.20	74.00	-16.80	108.00	59.00
3	9608.00 AV	47.12	-9.92	37.20	54.00	-16.80	108.00	59.00
4	12010.00 PK	48.18	10.05	58.22	74.00	-15.78	108.00	62.00
4	12010.00 AV	48.18	-9.96	38.22	54.00	-15.78	108.00	62.00

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. Based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle is equal to: 20log (3.125/100) = -30 dB.

6. Average value = peak reading –20dB

EUT	Bluetooth Interface	MEASUREMENT DETAIL	
MODEL	KCE-300BT	FREQUENCY RANGE	Above 1GHz
CHANNEL	Channel 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 1001hPa
TEST MODE	A	INPUT POWER	12Vdc from battery
TESTED BY	Bright Tong		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Frequency MHz	Factor dB	Reading dBuV/m	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower cm	Table deg
1	4882.00 PK	38.03	10.97	49.00	74.00	-25.00	223.00	147.00
1	4882.00 AV	38.03	-9.03	29.00	54.00	-25.00	223.00	147.00
2	7323.00 PK	44.65	10.53	55.19	74.00	-18.81	100.00	22.00
2	7323.00 AV	44.65	-9.46	35.19	54.00	-18.81	100.00	22.00
3	9764.00 PK	47.52	8.57	56.09	74.00	-17.91	153.00	98.00
3	9764.00 AV	47.52	-11.43	36.09	54.00	-17.91	153.00	98.00
4	12205.00 PK	48.28	10.06	58.34	74.00	-15.66	210.00	64.00
4	12205.00 AV	48.28	-9.94	38.34	54.00	-15.66	210.00	64.00

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Frequency MHz	Factor dB	Reading dBuV/m	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower cm	Table deg
1	4882.00 PK	38.03	12.61	50.64	74.00	-23.36	100.00	67.00
1	4882.00 AV	38.03	-7.39	30.64	54.00	-23.36	100.00	67.00
2	7323.00 PK	44.65	12.20	56.85	74.00	-17.15	100.00	86.00
2	7323.00 AV	44.65	-7.80	36.85	54.00	-17.15	100.00	86.00
3	9764.00 PK	47.52	9.04	56.56	74.00	-17.44	100.00	43.00
3	9764.00 AV	47.52	-10.96	36.56	54.00	-17.44	100.00	43.00
4	12205.00 PK	48.28	10.21	58.49	74.00	-15.51	100.00	73.00
4	12205.00 AV	48.28	-19.79	28.49	54.00	-15.51	100.00	73.00

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. Based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle is equal to: 20log (3.125/100) = -30 dB.
6. Average value = peak reading –20dB

EUT	Bluetooth Interface	MEASUREMENT DETAIL	
MODEL	KCE-300BT	FREQUENCY RANGE	Above 1GHz
CHANNEL	Channel 78	DETECTOR FUNCTION	Peak (PK) Average (AV)
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 1001hPa
TEST MODE	A	INPUT POWER	12 Vdc from battery
TESTED BY	Bright Tong		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Frequency MHz	Factor dB	Reading dBuV/m	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower cm	Table deg
1	4960.00 PK	38.32	11.90	50.21	74.00	-23.79	100.00	47.00
1	4960.00 AV	38.32	-8.11	30.21	54.00	-23.79	100.00	47.00
2	7440.00 PK	44.58	10.17	54.74	74.00	-19.26	100.00	22.00
2	7440.00 AV	44.58	-9.84	34.74	54.00	-19.26	100.00	22.00
3	9920.00 PK	47.73	9.14	56.87	74.00	-17.13	100.00	56.00
3	9920.00 AV	47.73	-10.86	36.87	54.00	-17.13	100.00	56.00
4	12400.00 PK	48.39	10.46	58.84	74.00	-15.16	100.00	231.00
4	12400.00 AV	48.39	-9.55	38.84	54.00	-15.16	100.00	231.00

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Frequency MHz	Factor dB	Reading dBuV/m	Emission dBuV/m	Limit dBuV/m	Margin dB	Tower cm	Table deg
1	4960.00 PK	38.32	12.16	50.48	74.00	-23.52	133.00	256.00
1	4960.00 AV	38.32	-7.84	30.48	54.00	-23.52	133.00	256.00
2	7440.00 PK	44.58	9.95	54.52	74.00	-19.48	123.00	19.00
2	7440.00 AV	44.58	-10.06	34.52	54.00	-19.48	123.00	19.00
3	9920.00 PK	47.73	10.15	57.87	74.00	-16.13	165.00	77.00
3	9920.00 AV	47.73	-9.86	37.87	54.00	-16.13	165.00	77.00
4	12400.00 PK	48.39	9.66	58.04	74.00	-15.96	247.00	46.00
4	12400.00 AV	48.39	-10.35	38.04	54.00	-15.96	247.00	46.00

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. Based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle is equal to: 20log (3.125/100) = -30 dB.
6. Average value = peak reading –20dB.

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 &	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Spectrum Analyzer ROHDE & SCHWARZ	FSP	E1S1002	May. 15, 2007

NOTE: The calibration interval of the above test instruments is 12 months.

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.

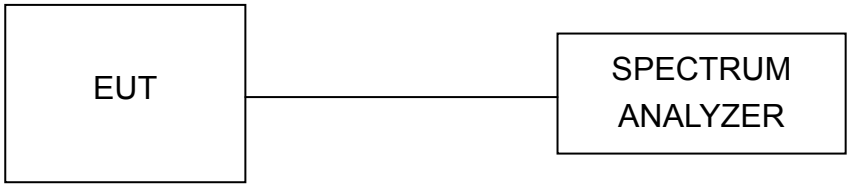
d. Set the SA on View mode and then plot the result on SA screen.

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

4.3.4 DEVIATION FROM TEST STANDARD

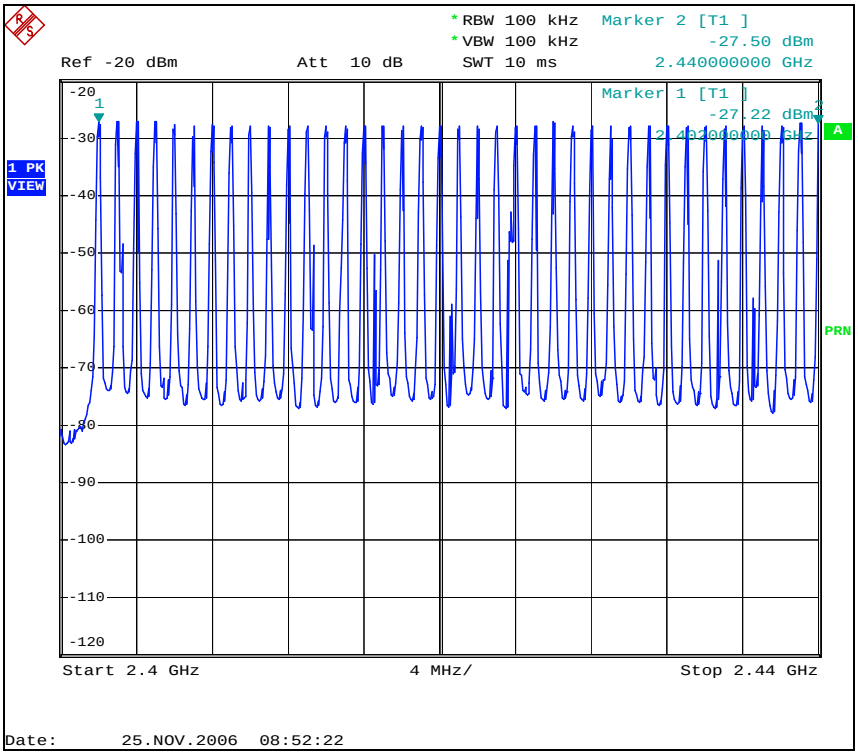
No deviation.

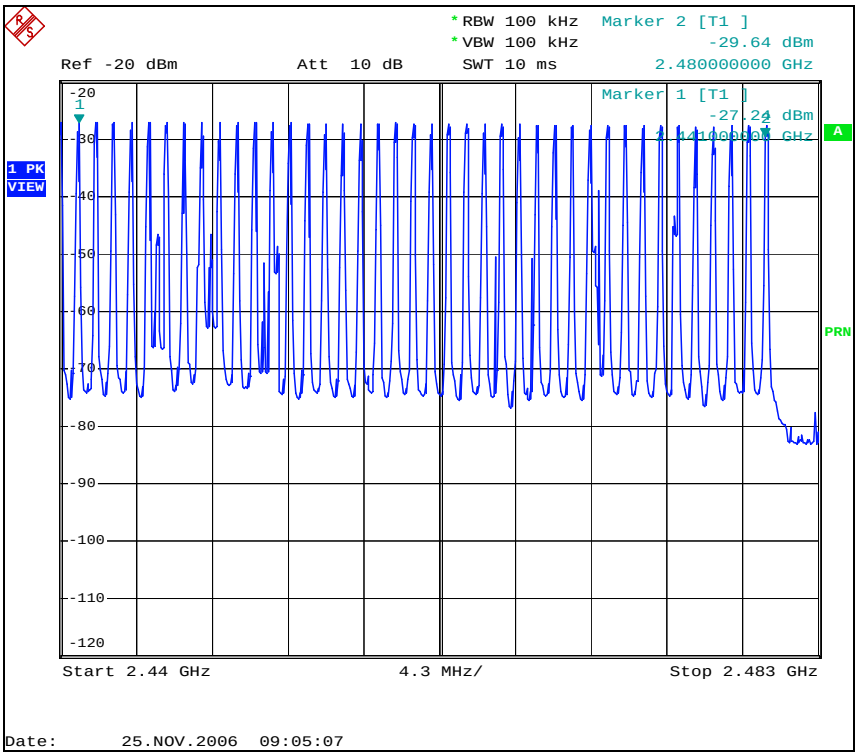
4.3.5 TEST SETUP



4.3.6 TEST RESULTS

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





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 ROHDE & SCHWARZ	FSP	E1S1002	May.15, 2007

NOTES: The calibration interval of the above test instruments is 12 months.

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

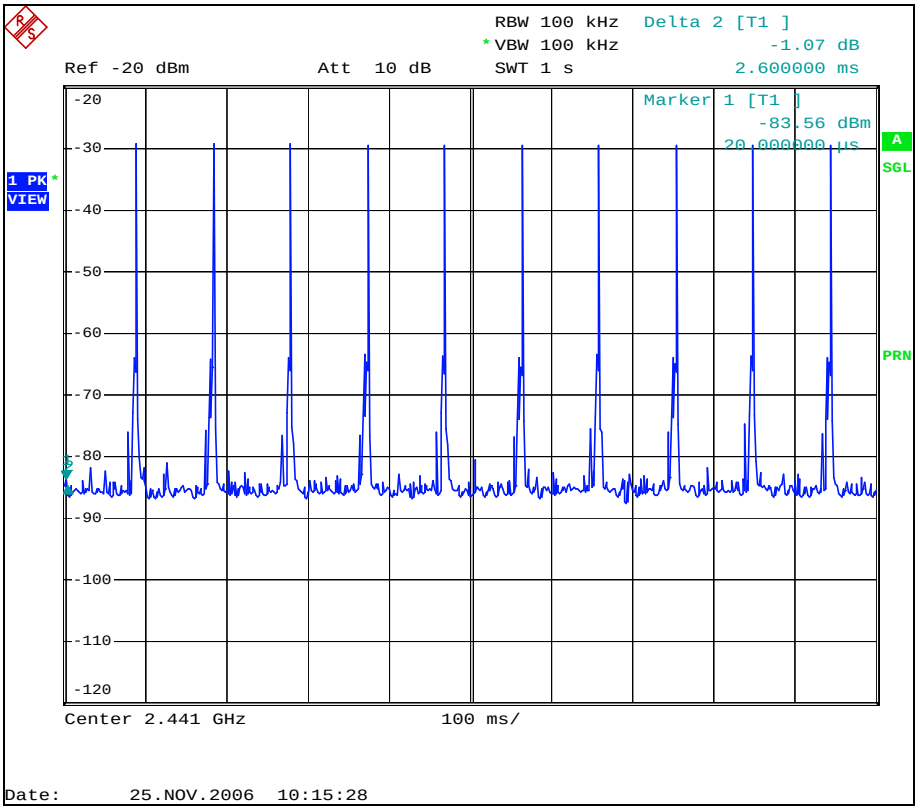
4.4.6 TEST RESULTS

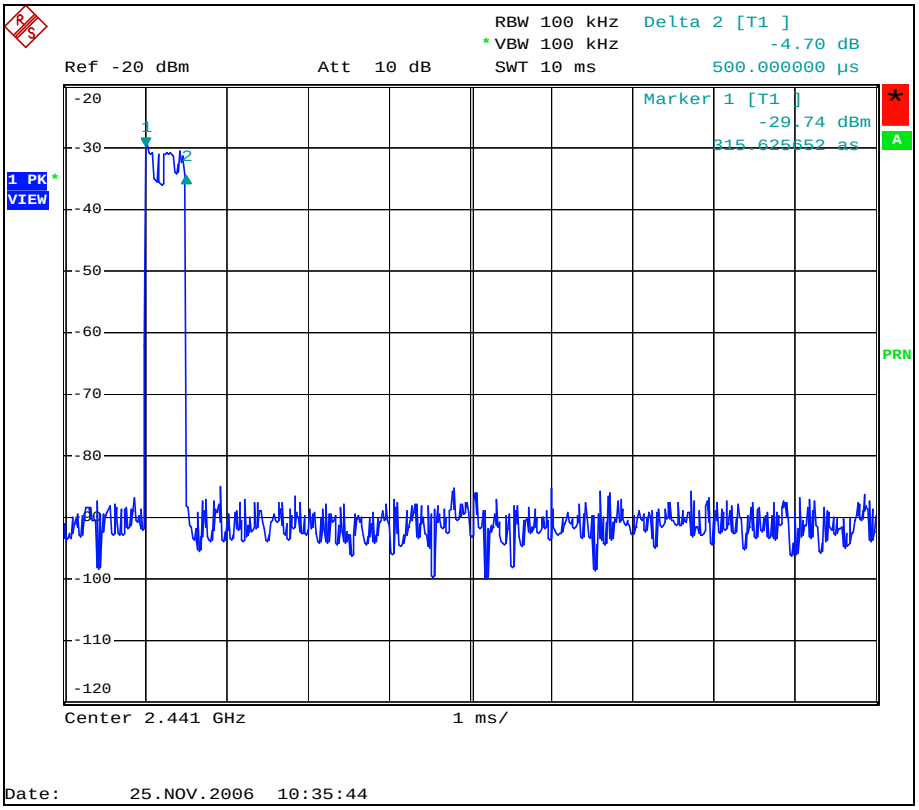
EUT	Bluetooth Interface	MODEL	KCE-300BT
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 1001Hpa
INPUT POWER	12Vdc from battery	TESTED BY	Bright Tong

MODE	NUMBER OF TRANSMISSION IN A 31.6 (79HOPPING * 0.4)	LENGTH OF TRANSMISSION TIME (msec)	RESULT (msec)	LIMIT (msec)
DH1	10(times/1sec)*31.6=316 times	0.50	158.00	400
DH3	5(times/1sec)*31.6=158 times	1.68	265.44	400
DH5	3(times/1sec)*31.6=94.8 times	2.92	276.82	400

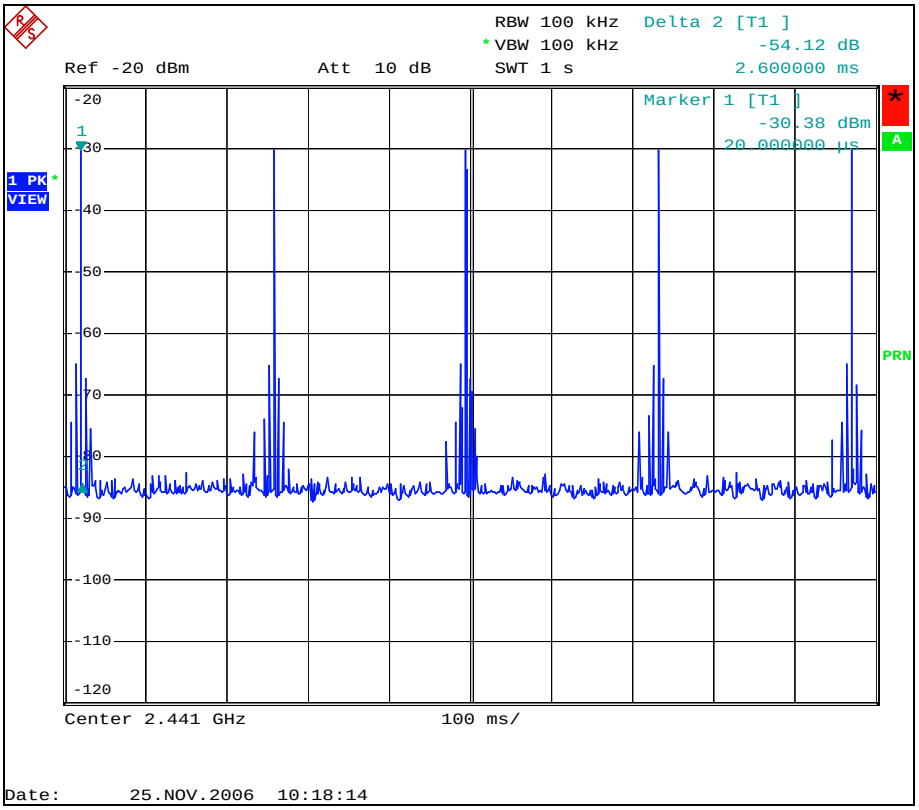
NOTE: Test plots of the transmitting time slot are shown on next 3 pages.

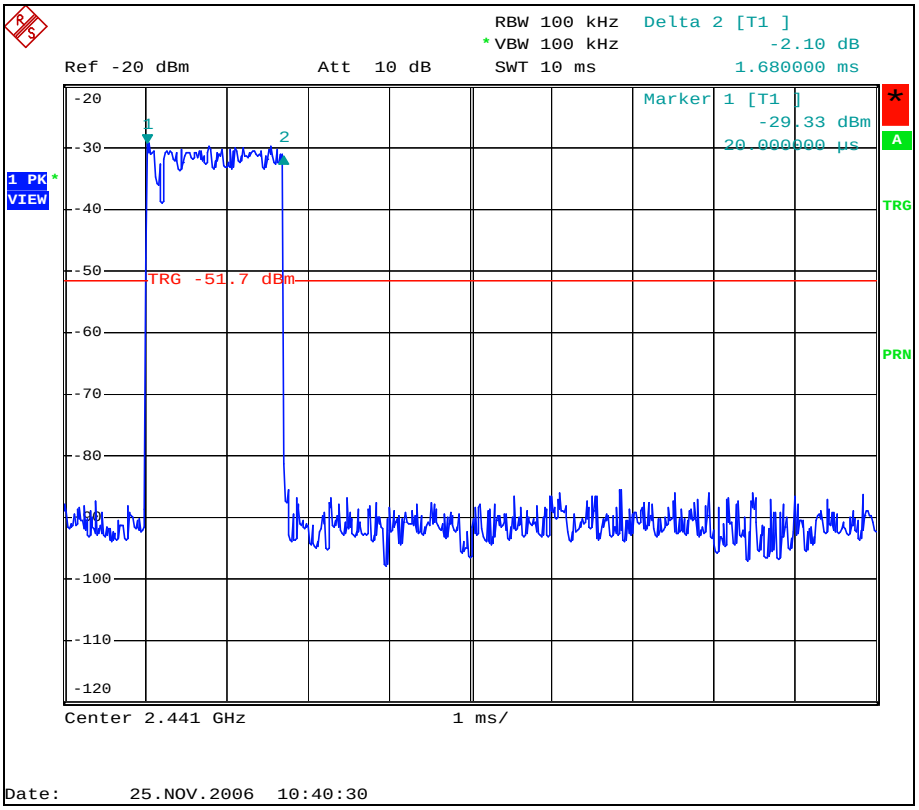
DH1


RBW 100 kHz
Delta 2 [T1]
*VBW 100 kHz
-1.07 dB
Ref -20 dBm
Att 10 dB
SWT 1 s
2.600000 ms
Marker 1 [T1]
-83.56 dBm
20.000000 µs
1 PK
VIEW
A
SGL
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Center 2.441 GHz
100 ms/
Date: 25.NOV.2006 10:15:28

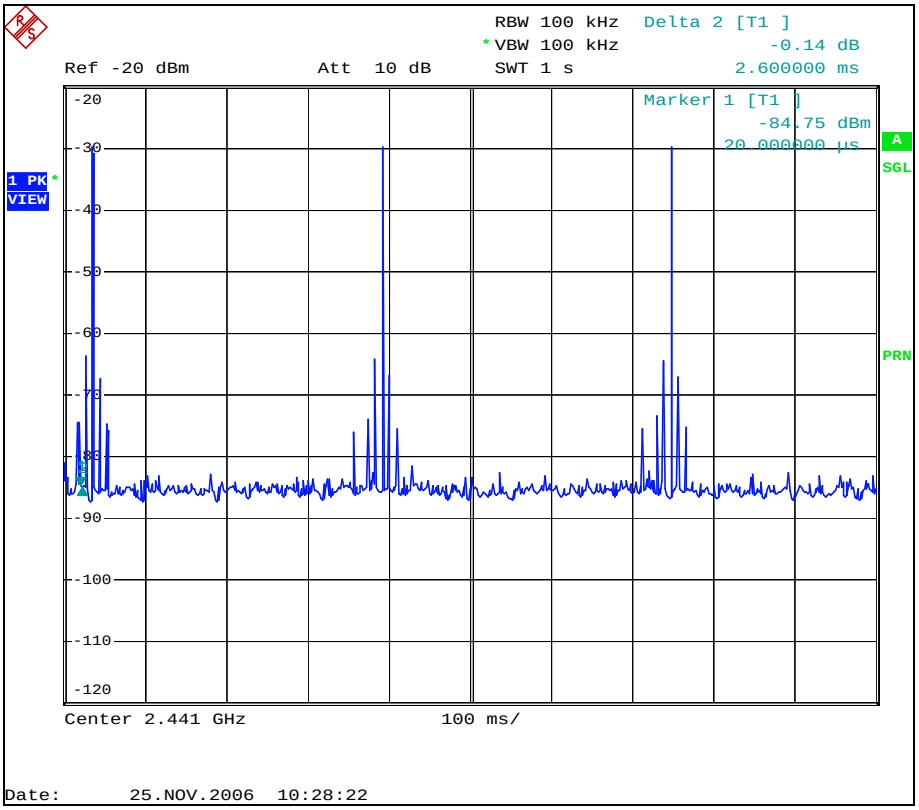

RBW 100 kHz
Delta 2 [T1]
*VBW 100 kHz
-4.70 dB
Ref -20 dBm
Att 10 dB
SWT 10 ms
500.000000 µs
Marker 1 [T1]
-29.74 dBm
315.625552 as
1 PK
VIEW
A
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Center 2.441 GHz
1 ms/
Date: 25.NOV.2006 10:35:44

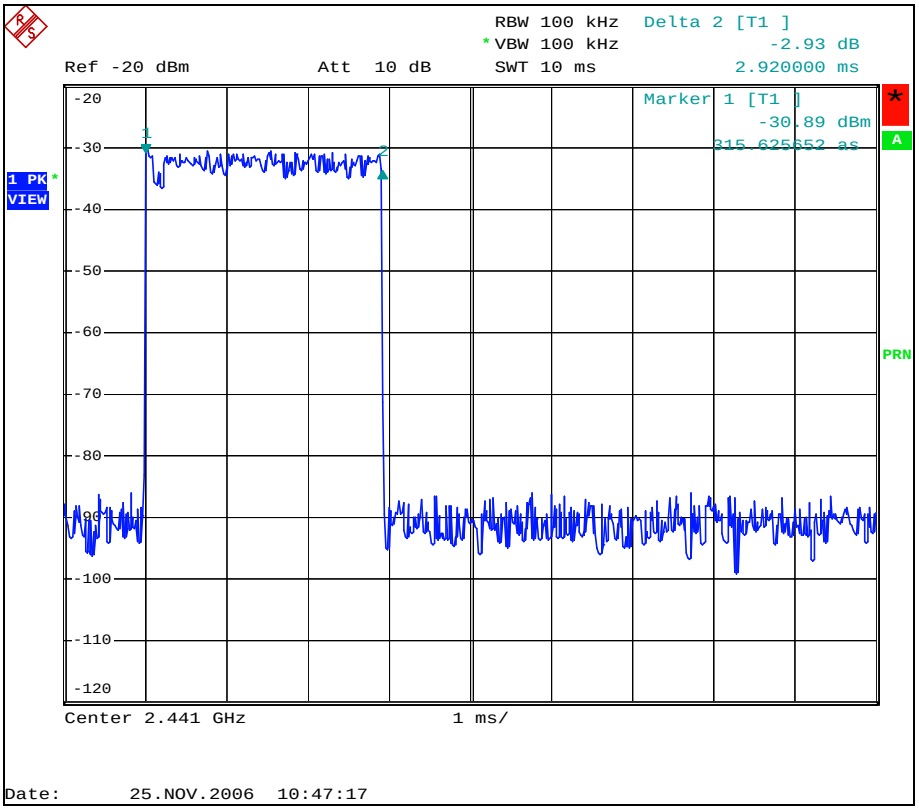
DH3


RBW 100 kHz
Delta 2 [T1]
*VBW 100 kHz
-54.12 dB
Ref -20 dBm
Att 10 dB
SWT 1 s
2.600000 ms
Marker 1 [T1]
-30.38 dBm
20.000000 µs
1 PK
VIEW
PRN
Center 2.441 GHz
100 ms/
Date: 25.NOV.2006 10:18:14


RBW 100 kHz
Delta 2 [T1]
*VBW 100 kHz
-2.10 dB
Ref -20 dBm
Att 10 dB
SWT 10 ms
1.680000 ms
Marker 1 [T1]
-29.33 dBm
20.000000 µs
1 PK
VIEW
TRG
PRN
TRG -51.7 dBm
Center 2.441 GHz
1 ms/
Date: 25.NOV.2006 10:40:30

DH5


RBW 100 kHz
Delta 2 [T1]
*VBW 100 kHz
-0.14 dB
Ref -20 dBm
Att 10 dB
SWT 1 s
2.600000 ms
Marker 1 [T1]
-84.75 dBm
20.000000 µs
1 PK
VIEW
A
SGL
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Center 2.441 GHz
100 ms/
Date: 25.NOV.2006 10:28:22


RBW 100 kHz
Delta 2 [T1]
*VBW 100 kHz
-2.93 dB
Ref -20 dBm
Att 10 dB
SWT 10 ms
2.920000 ms
Marker 1 [T1]
-30.89 dBm
315.625552 as
1 PK
VIEW
A
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Center 2.441 GHz
1 ms/
Date: 25.NOV.2006 10:47:17

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 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Spectrum Analyzer ROHDE & SCHWARZ	FSP	E1S1002	May. 15, 2007

NOTE: The calibration interval of the above test instruments is 12 months.

4.5.3 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.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

4.5.5 TEST SETUP

4.5.6 EUT OPERATING CONDITION

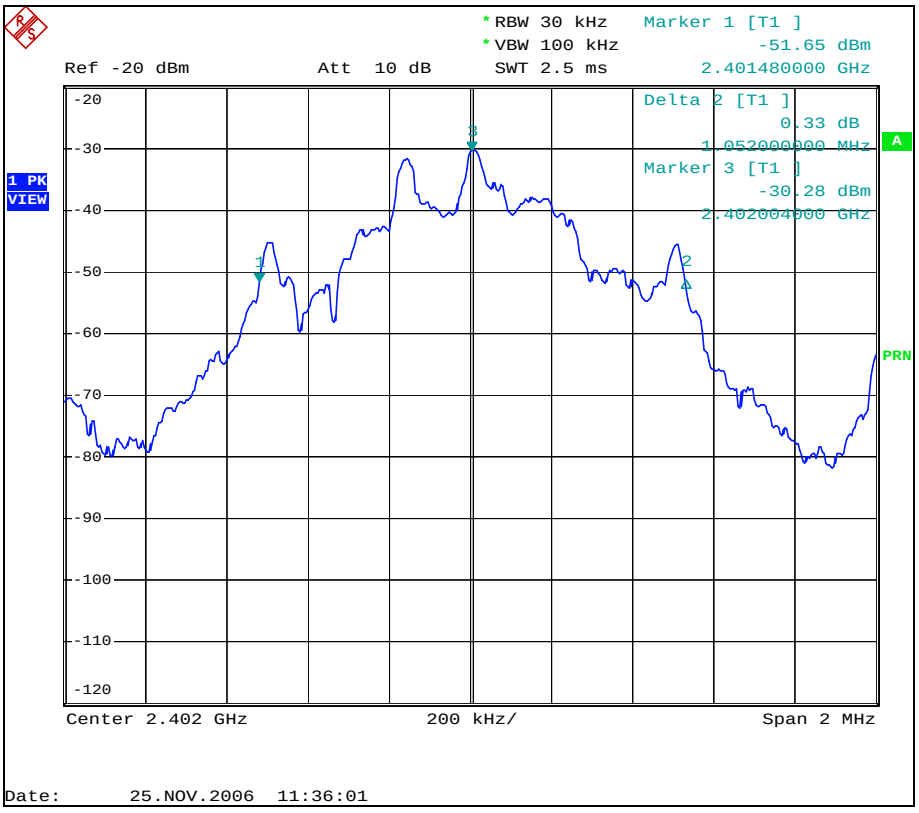
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.5.7 TEST RESULTS

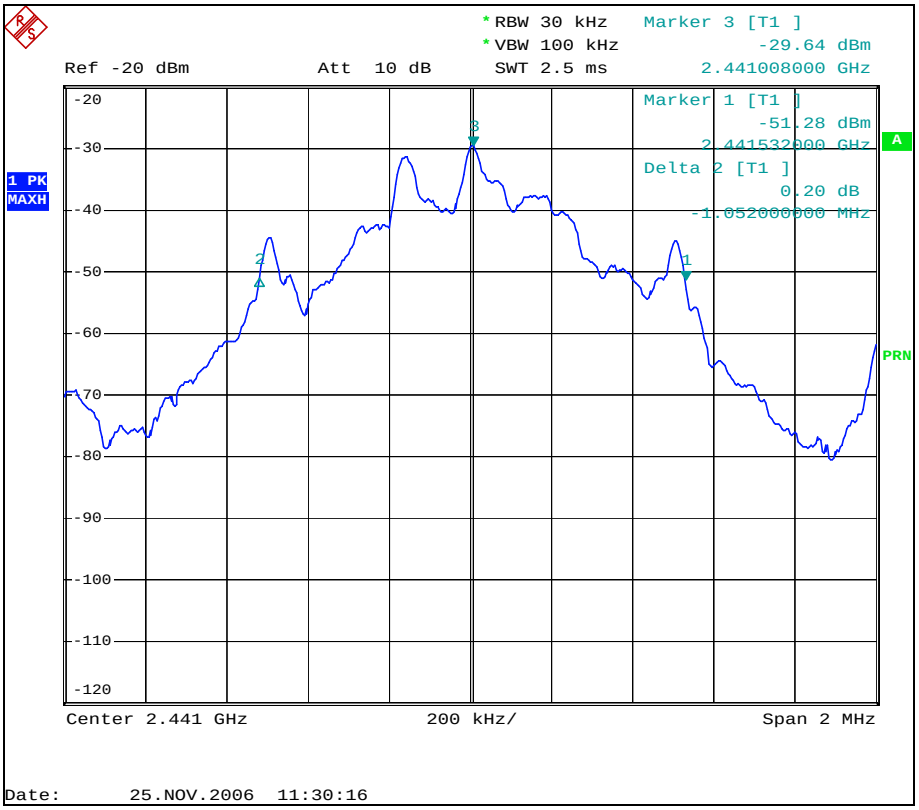
EUT	Bluetooth Interface	MODEL	KCE-300BT
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 1001Hpa
INPUT POWER	12Vdc from battery	TESTED BY	Bright Tong

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
0	2402	1.052
39	2441	1.052
78	2480	1.048

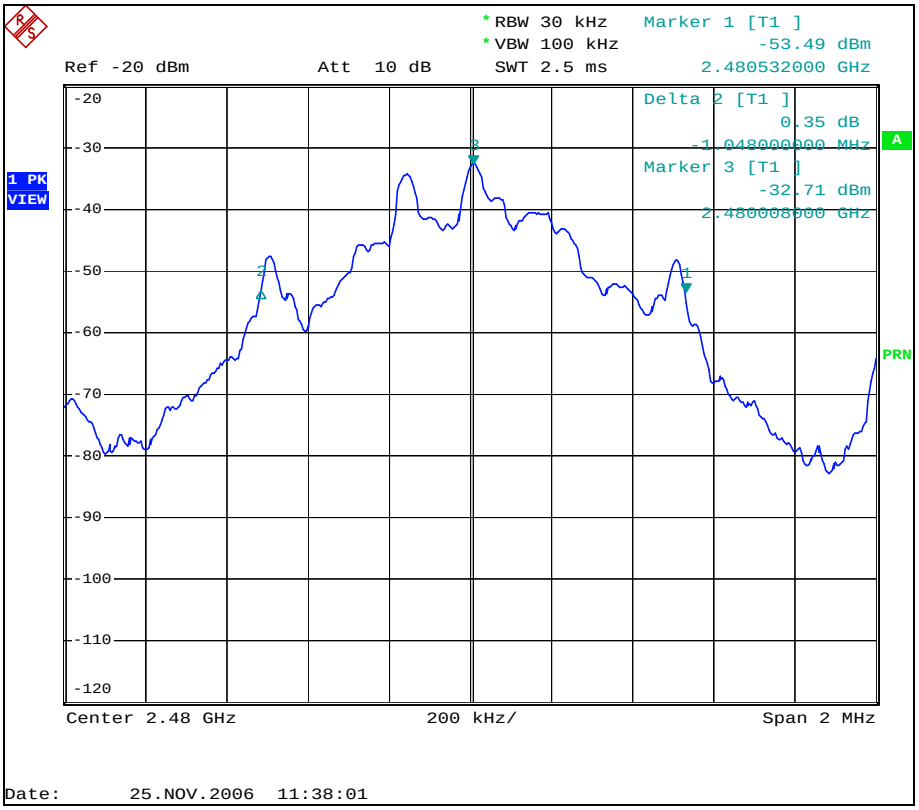
CH0



CH39


RBW 30 kHz
VBW 100 kHz
Ref -20 dBm
Att 10 dB
SWT 2.5 ms
Marker 3 [T1]
-29.64 dBm
2.441008000 GHz
Marker 1 [T1]
-51.28 dBm
2.441532000 GHz
Delta 2 [T1]
0.20 dB
-1.052000000 MHz
1 PK
MAXH
A
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Center 2.441 GHz
200 kHz/
Span 2 MHz
Date: 25.NOV.2006 11:30:16

CH78


RBW 30 kHz
VBW 100 kHz
Ref -20 dBm
Att 10 dB
SWT 2.5 ms
Marker 1 [T1]
-53.49 dBm
2.480532000 GHz
Delta 2 [T1]
0.35 dB
-1.048000000 MHz
Marker 3 [T1]
-32.71 dBm
2.480008000 GHz
1 PK
VIEW
A
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Center 2.48 GHz
200 kHz/
Span 2 MHz
Date: 25.NOV.2006 11:38:01

4.6 HOPPING CHANNEL SEPARATION

4.6.1 LIMIT OF HOPPING CHANNEL SEPARATION

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

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Spectrum Analyzer ROHDE & SCHWARZ	FSP30	E1S1002	May. 15, 2007

NOTES: The calibration interval of the above test instruments is 12 months.

4.6.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
3. By using the MaxHold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation.

4.6.5 TEST SETUP

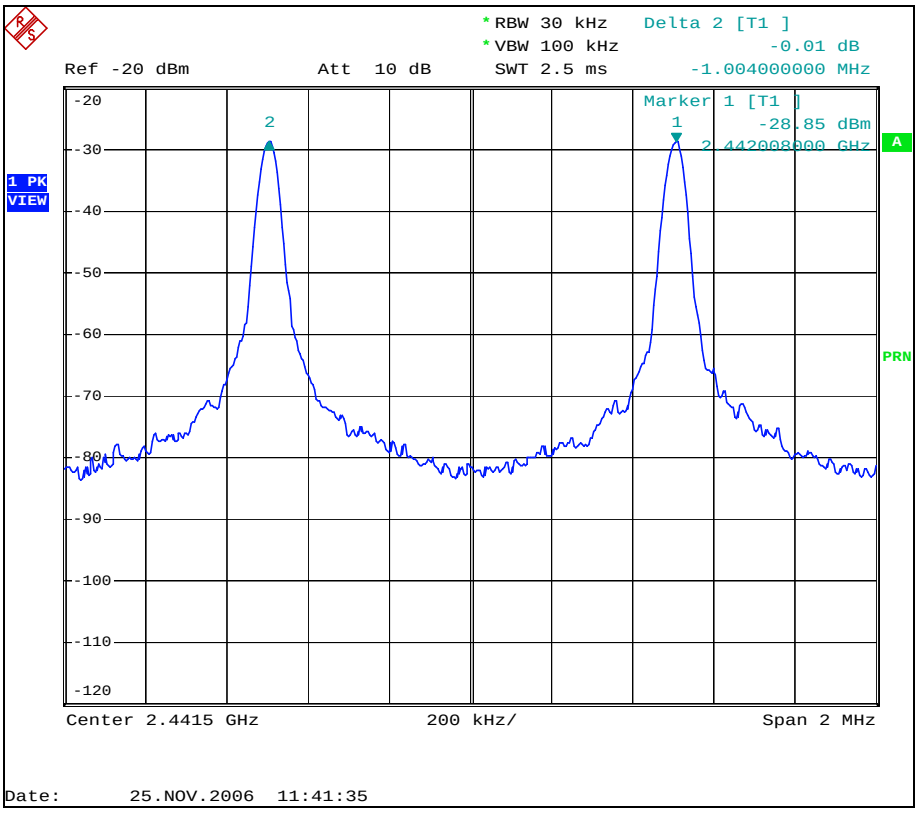
4.6.6 TEST RESULTS

EUT	Bluetooth Interface	MODEL	KCE-300BT
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 1001Hpa
INPUT POWER	12Vdc from battery	TESTED BY	Bright Tong

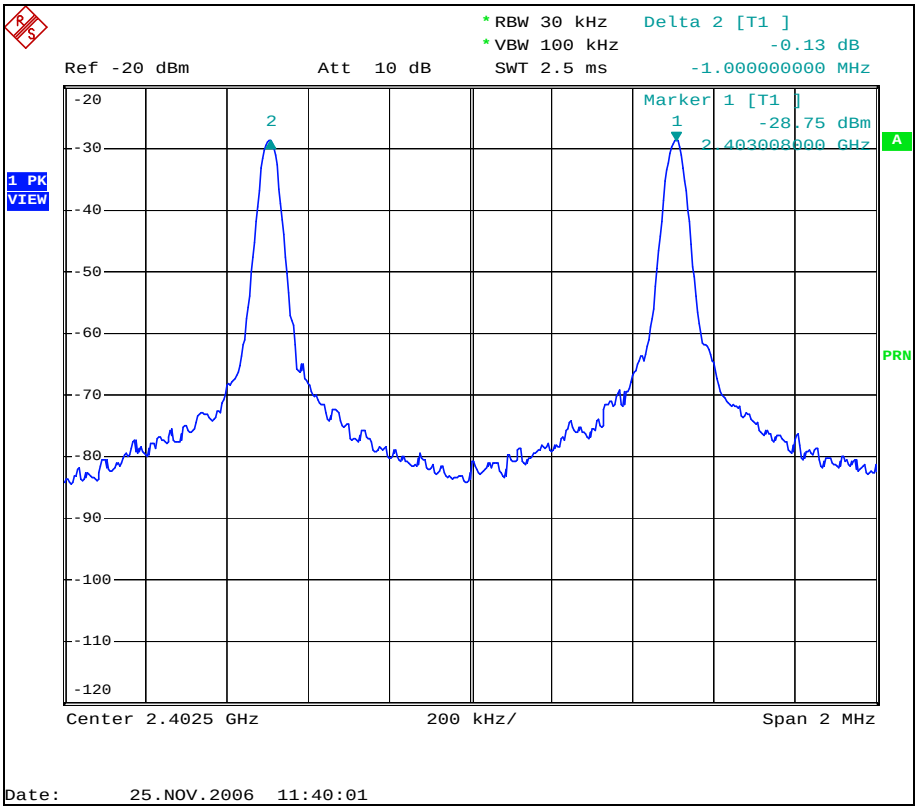
CHANNEL	FREQUENCY (MHz)	ADJACENT CHANNEL SEPARATION (MHz)	20dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	1.004	1.052	0.701	PASS
39	2441	1	1.052	0.701	PASS
78	2480	1	1.048	0.697	PASS

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

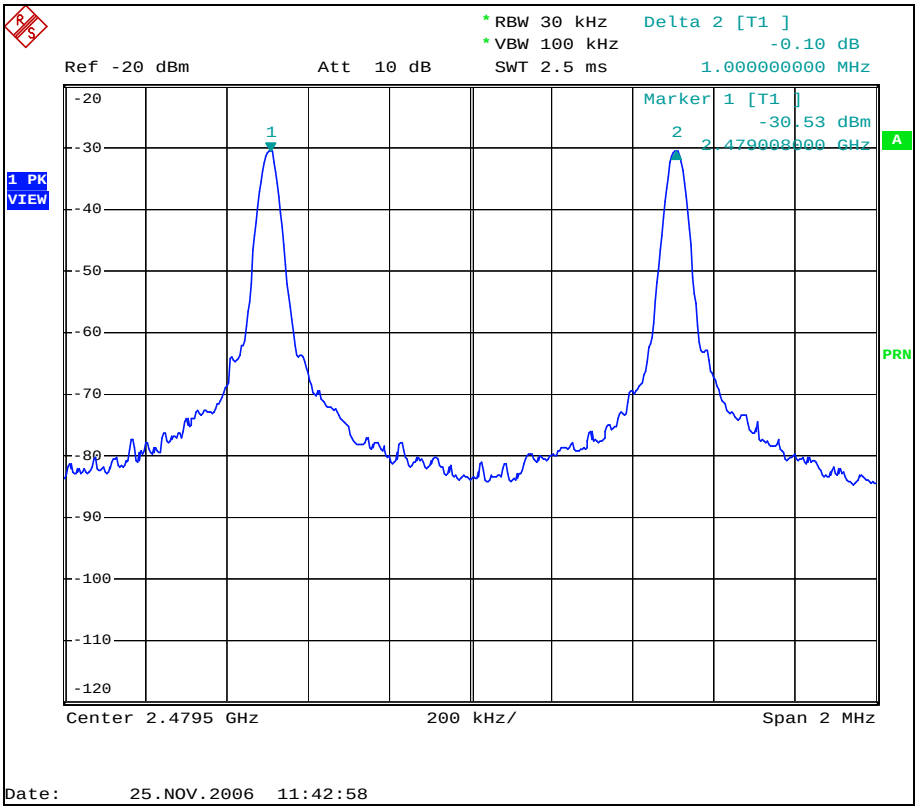
CH0



CH39


RBW 30 kHz
VBW 100 kHz
SWT 2.5 ms
Delta 2 [T1]
-0.13 dB
-1.000000000 MHz
Ref -20 dBm
Att 10 dB
Marker 1 [T1]
-28.75 dBm
2.403008000 GHz
1 PK
VIEW
A
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Center 2.4025 GHz
200 kHz/
Span 2 MHz
Date: 25.NOV.2006 11:40:01

CH78


RBW 30 kHz
VBW 100 kHz
SWT 2.5 ms
Delta 2 [T1]
-0.10 dB
1.000000000 MHz
Ref -20 dBm
Att 10 dB
Marker 1 [T1]
-30.53 dBm
2.479008000 GHz
1 PK
VIEW
A
PRN
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Center 2.4795 GHz
200 kHz/
Span 2 MHz
Date: 25.NOV.2006 11:42:58

4.7 MAXIMUM PEAK OUTPUT POWER

4.7.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 125mW.

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
*Spectrum Analyzer ROHDE & SCHWARZ	FSP30	E1S1002	May. 15, 2007

NOTE: The calibration interval of the above test instruments is 12 months.

4.7.3 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 1 MHz RBW and 3 MHz VBW.

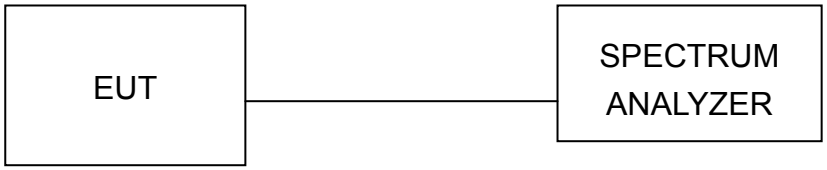
d. Measure the captured power within the band and recording the plot.

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

4.7.4 DEVIATION FROM TEST STANDARD

No deviation.

4.7.5 TEST SETUP



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

4.7.6 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

EUT	Bluetooth Interface	MODEL	KCE-300BT
MODULATION TYPE	GFSK	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 1001Hpa
INPUT POWER	12Vdc from battery	TESTED BY	Bright Tong

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (mW)	PASS/FAIL
0	2402	1.928	2.85	125	PASS
39	2441	1.603	2.05	125	PASS
78	2480	1.409	1.49	125	PASS

4.8 BAND EDGES MEASUREMENT

4.8.1 LIMITS OF BAND EDGES MEASUREMENT

Below –20dB of the highest emission level of operating band.

4.8.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Spectrum Analyzer ROHDE & SCHWARZ	FSP	E1S1002	May.15, 2007

NOTES: The calibration interval of the above test instruments is 12 months.

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 with suitable frequency span including bandwidth from band edge. The band edges was measured and recorded.

4.8.4 DEVIATION FROM TEST STANDARD

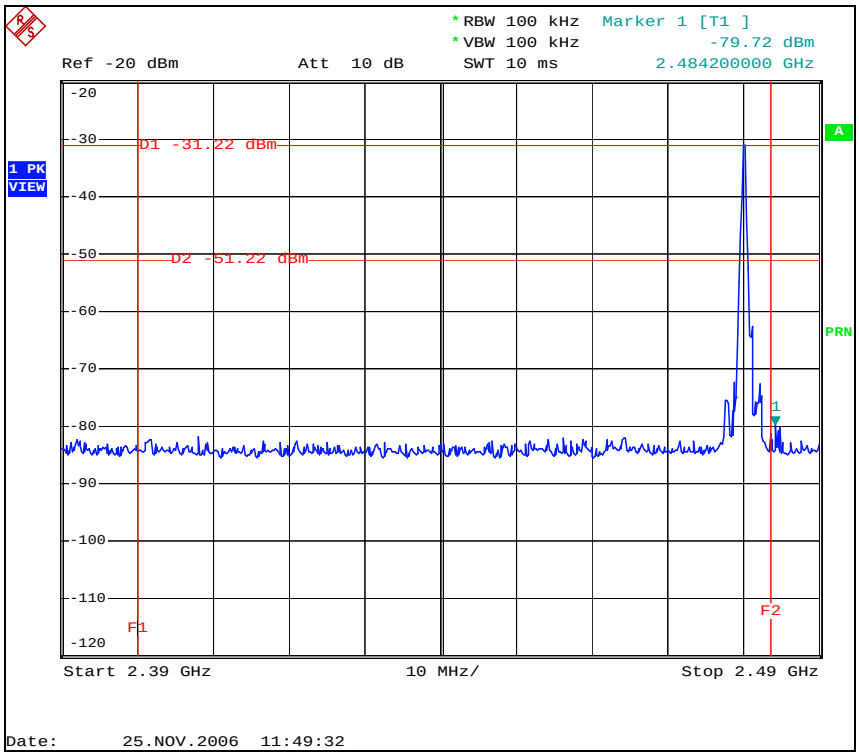
No deviation.

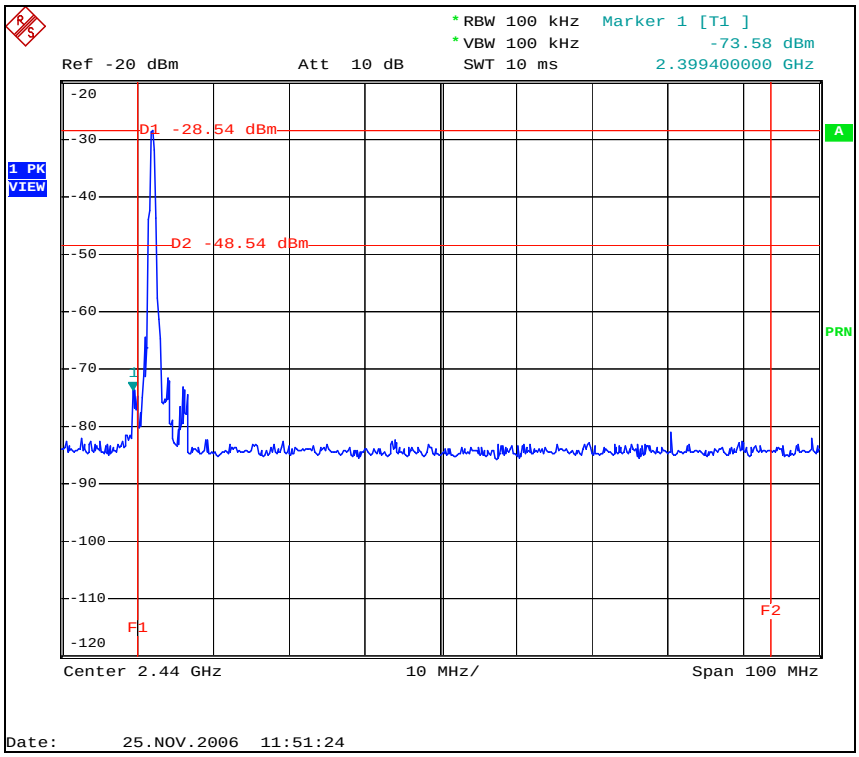
4.8.5 EUT OPERATING CONDITION

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 4 images. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).





4.9 ANTENNA REQUIREMENT

4.9.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.9.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is soldered on PCB without antenna connector. The maximum gain of this antenna is 2dBi.

5. INFORMATION ON THE TESTING LABORATORY

We, ADT (Shanghai) Corp., were founded in 2003 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025 (2005).

JAPAN	VCCI
USA	FCC, A2LA
Norway	DNV

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

ADT (Shanghai) Corporation
TEL :86-21-6465-9091
Fax : 86-21-6465-9092
Email: service@adt-sh.com
Web Site: www.cnadt.com

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.