FCC RF Test Report

APPLICANT	:	HUAWEI TECHNOLOGIES CO., LTD
EQUIPMENT	:	GSM mobile phone
BRAND NAME	:	HUAWEI
MODEL NAME	:	HUAWEI G7005
FCC ID	:	QISG7005
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	Digital Spread Spectrum (DSS)

The product was received on Jun. 14, 2011 and completely tested on Aug. 16, 2011. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:

Jones Tsai

Jones Tsai / Manager

Testing Laboratory 1190

SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR161402	Rev. 01	Initial issue of report	Aug. 18, 2011

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(1)	A8.4(2)	Number of Channels	≥ 15Chs	Pass	-
3.2	15.247(a)(1)	A8.1(a)	20dB Bandwidth	NA	Pass	-
3.3	15.247(a)(1)	A8.1(b)	Channel Separation	≥ 2/3 of 20dB BW	Pass	-
3.4	15.247(a)(1)	A8.1(d)	Dwell Time of Each Channel	≤ 0.4sec in 31.6sec period	Pass	-
3.5	15.247(b)(1)	A8.1(b)	Peak Output Power	≤ 125 mW	Pass	-
3.6	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass	-
3.7	15.247(d)	A8.5	Spurious Emission	< 20 dBc	Pass	-
3.8	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 4.17 dB at 2.21 MHz
3.9	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 6.51 dB at 37.29 MHz
3.10	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

HUAWEI TECHNOLOGIES CO., LTD
Administration Building, Huawei Base, Bantian, Longgang District, Shenzhen 518129

1.2 Manufacturer

HUAWEI TECHNOLOGIES CO., LTD
Administration Building, Huawei Base, Bantian, Longgang District, Shenzhen 518129

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	GSM mobile phone
Brand Name	HUAWEI
Model Name	HUAWEI G7005
FCC ID	QISG7005
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Number of Channels	79
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78
Channel Spacing	1 MHz
Maximum Output Power to Antenna	Bluetooth (1Mbps) : 8.42 dBm (0.0070 W) Bluetooth EDR (2Mbps) : 8.13 dBm (0.0065 W) Bluetooth EDR (3Mbps) : 8.43 dBm (0.0070 W)
Antenna Type	PIFA Antenna with gain -1 dBi
HW Version	P2
SW Version	HUAWEI_G7005_D_V100R001B101C00SP06
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : π/4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
EUT Stage	Identical Prototype

Remark:

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Digital Spread Spectrum (DSS).
3. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
4. It is only the SIM card different between HUAWEI G7005 single SIM card mobile and HUAWEI G7005 double SIM card mobile, the others are the same including circuit design, PCB board, structure and all components. It is special to declare. Only double SIM card mobile was performed for this test.

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.		
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958		
Test Site No.	Sporton Site No.		
	TH01-KS	CO01-KS	03CH01-KS

1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC Public Notice DA 00-705
- ANSI C63.4-2003
- IC RSS-210 Issue 8

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Base Station	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	Bluetooth Base Station	R&S	CBT	N/A	N/A	Unshielded, 1.8 m
3.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A

2 Test Configuration of Equipment Under Test

2.1 RF Output Power

Preliminary tests were performed in different data rate and recorded the RF output power in the following table:

Channel	Frequency	Bluetooth RF Output Power		
		Data Rate / Modulation		
		GFSK	π/4-DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
Ch00	2402MHz	8.42 dBm	8.13 dBm	**8.43** dBm
Ch39	2441MHz	7.27 dBm	6.99 dBm	7.25 dBm
Ch78	2480MHz	6.69 dBm	6.39 dBm	6.66 dBm

Remark:

1. The data rate was set in 3Mbps for all the test items due to the highest RF output power.
2. The EUT is programmed to transmit signals continuously for all testing.

2.2 Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations.

The following tables are showing the test modes as the worst cases and recorded in this report.

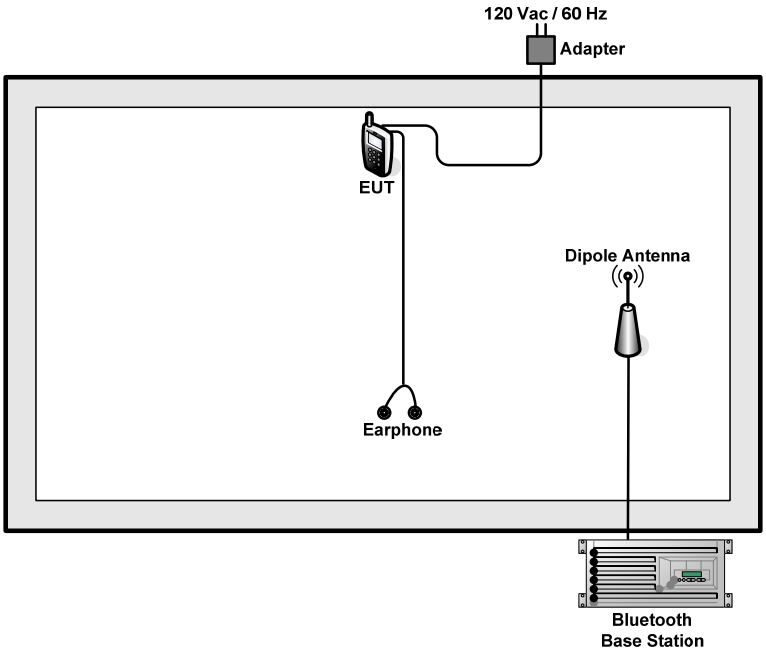
Test Cases			
Test Item	**Data Rate / Modulation**		
	Bluetooth 1Mbps GFSK	**Bluetooth EDR 2Mbps π/4-DQPSK**	**Bluetooth EDR 3Mbps 8-DPSK**
Conducted TCs	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz	Mode 4: CH00_2402 MHz Mode 5: CH39_2441 MHz Mode 6: CH78_2480 MHz	Mode 7: CH00_2402 MHz Mode 8: CH39_2441 MHz Mode 9: CH78_2480 MHz
Radiated TCs	N/A	N/A	Mode 1: CH00_2402 MHz Mode 2: CH39_2441 MHz Mode 3: CH78_2480 MHz
AC Conducted Emission	Mode 1 :GSM 850 Idle + Bluetooth Link + Adapter + Earphone + Camera		

Remark:

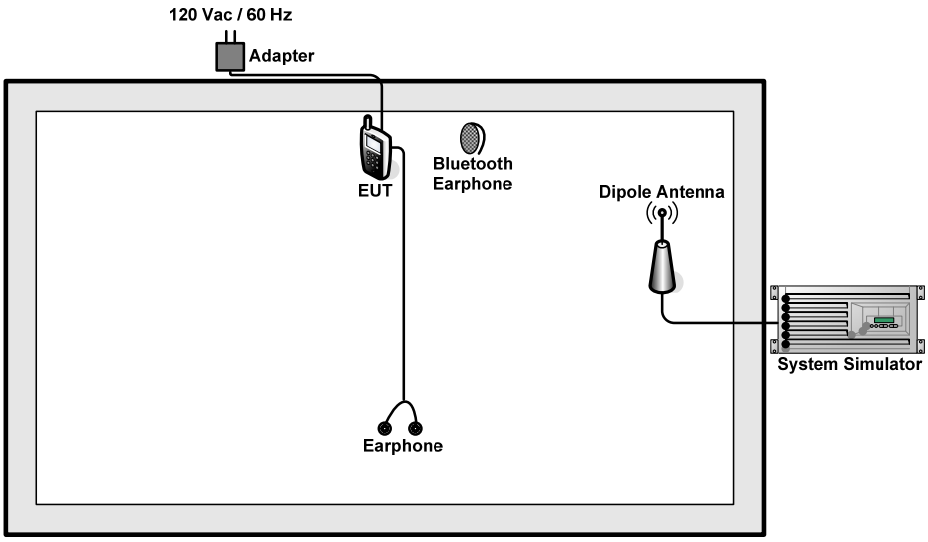
1. For radiated TCs, the data rate was set in 3Mbps due to the highest RF output power; only the data of these modes was reported.
2. For conducted emission, the worst case is mode 1; only the test data of this mode was reported.

2.3 Connection Diagram of Test System

<Bluetooth Tx Mode>



<AC Conducted Emission Mode>



2.4 RF Utility

For Bluetooth function, the RF utility, "＊＃162089＃" was installed in EUT which was programmed in order to make the EUT into the engineering modes to contact with Bluetooth base station for transmitting and receiving signals continuously.

3 Test Result

3.1 Number of Channel Measurement

3.1.1 Limits of Number of Hopping Frequency

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

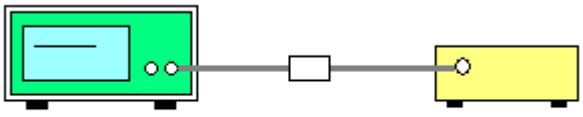
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The modulation types of EUT are irrelevant to number of hopping channels deviation.
4. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings: Span = the frequency band of operation; RBW ≥ 1% of the span; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
5. The number of hopping frequency used is defined as the device has the numbers of total channel.

3.1.4 Test Setup

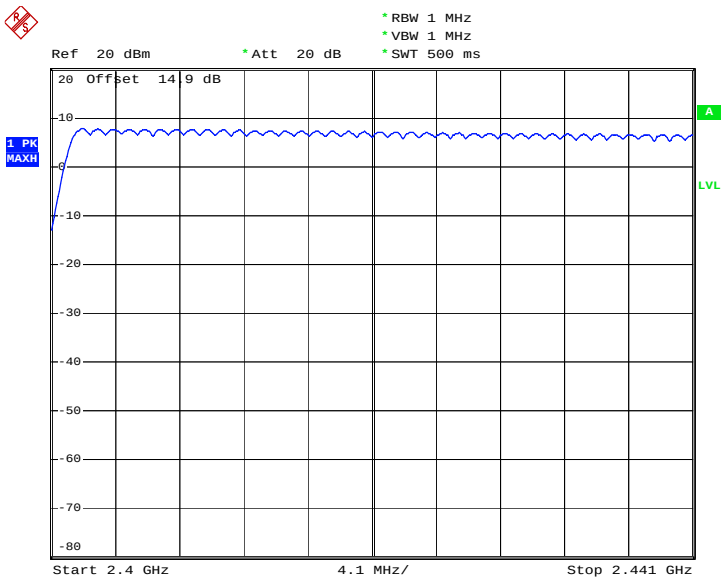


3.1.5 Test Result of Number of Hopping Frequency

Test Mode :	Mode 7~9	Temperature :	23~24℃
Test Engineer :	Jun Liu	Relative Humidity :	45~47%

Number of Hopping Channels (Channel)	Limits (Channel)	Pass/Fail
79	> 15	Pass

Number of Hopping Channel Plot on Channel 00 - 78



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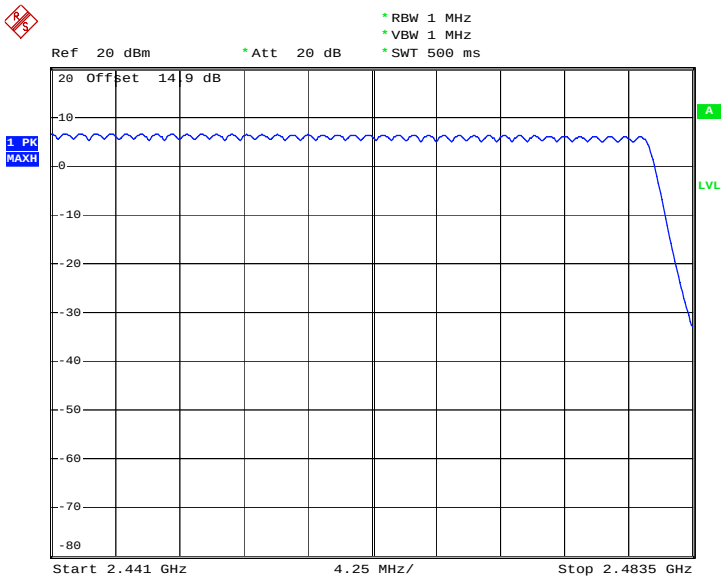

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3.2 20dB Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

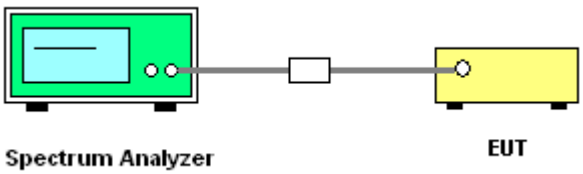
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Use the following spectrum analyzer settings:
   Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel;
   RBW ≥ 1% of the 20 dB bandwidth; VBW ≥ RBW; Sweep = auto; Detector function = peak;
   Trace = max hold.
5. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

3.2.4 Test Setup

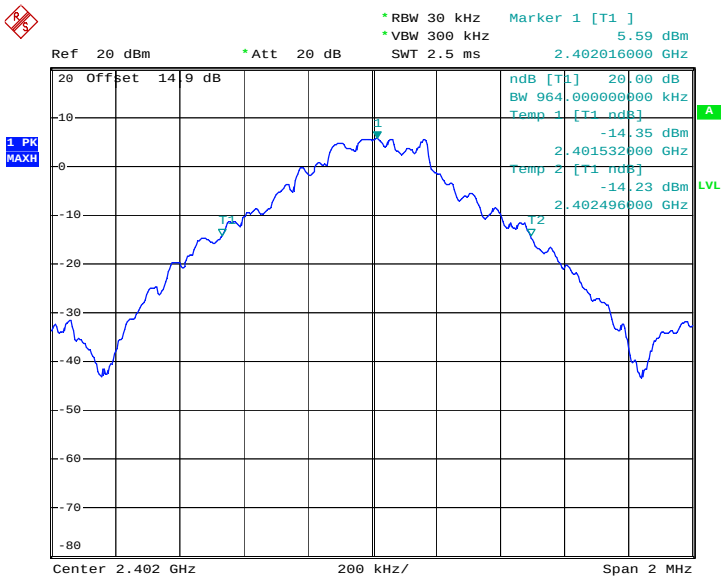


3.2.5 Test Result of 20dB Bandwidth

Test Mode :	Mode 1, 2, 3	Temperature :	23~24℃
Test Engineer :	Jun Liu	Relative Humidity :	45~47%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.964
39	2441	0.964
78	2480	0.964

20 dB Bandwidth Plot on Channel 00



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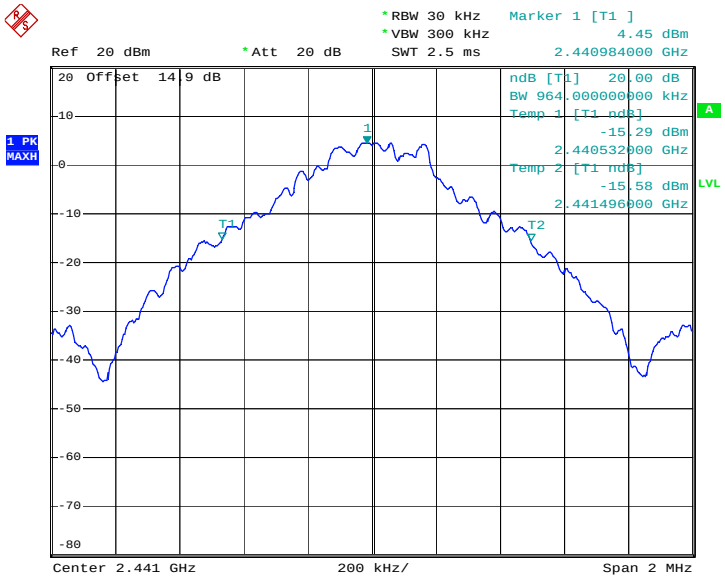
20 dB Bandwidth Plot on Channel 39



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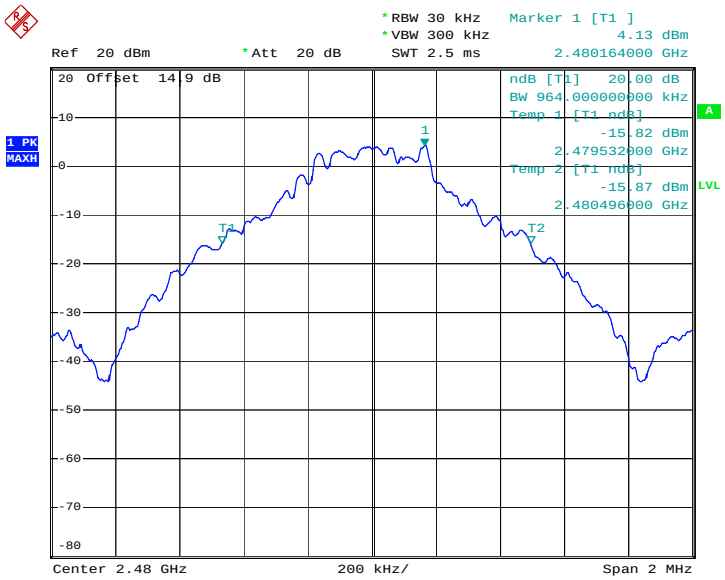
20 dB Bandwidth Plot on Channel 78



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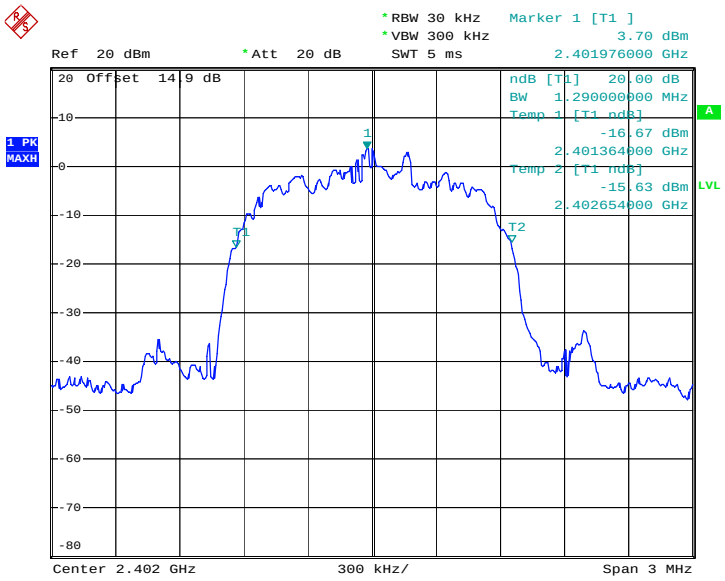
Test Mode :	Mode 4, 5, 6	Temperature :	23~24℃
Test Engineer :	Jun Liu	Relative Humidity :	45~47%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.290
39	2441	1.278
78	2480	1.272

20 dB Bandwidth Plot on Channel 00



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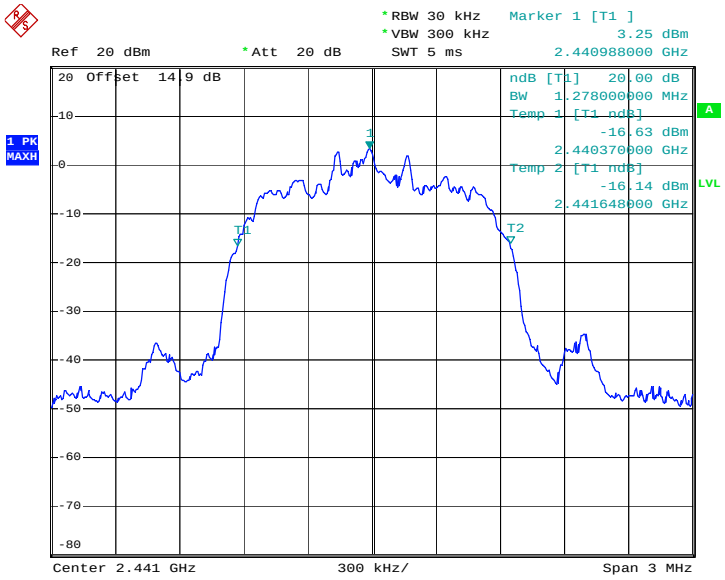
20 dB Bandwidth Plot on Channel 39



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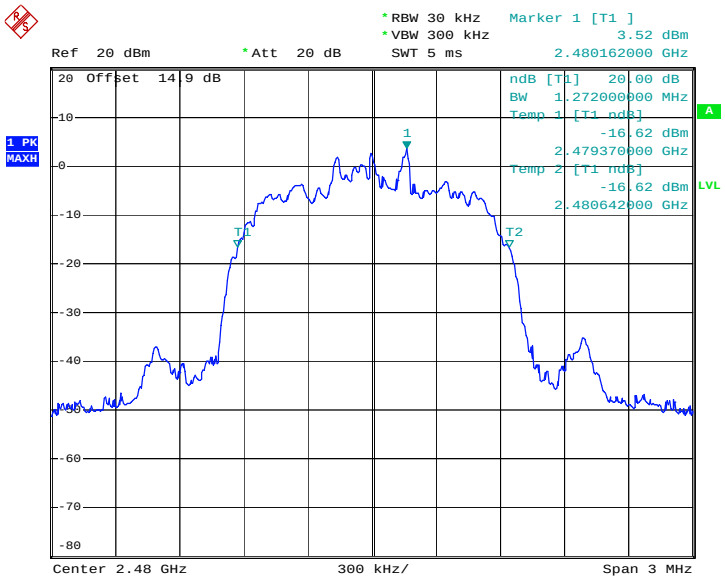
20 dB Bandwidth Plot on Channel 78

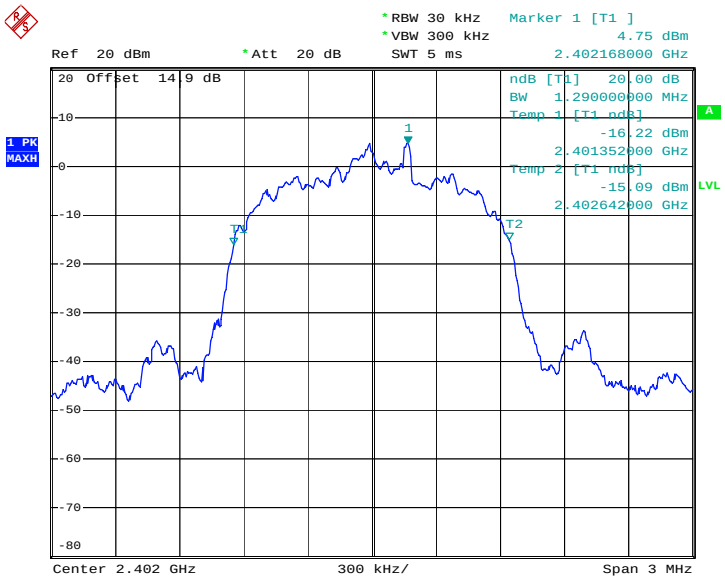


Date: 6.AUG.2011 14:06:09

Test Mode :	Mode 7, 8, 9	Temperature :	23~24℃
Test Engineer :	Jun Liu	Relative Humidity :	45~47%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.290
39	2441	1.290
78	2480	1.284

20 dB Bandwidth Plot on Channel 00



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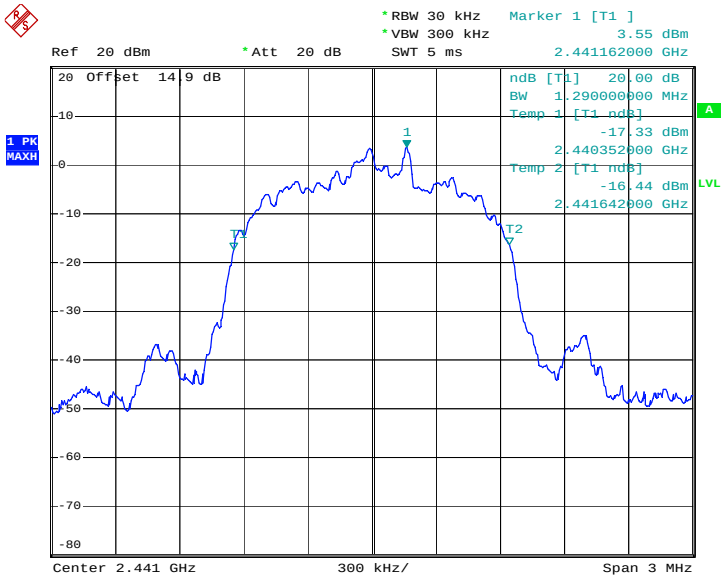
20 dB Bandwidth Plot on Channel 39



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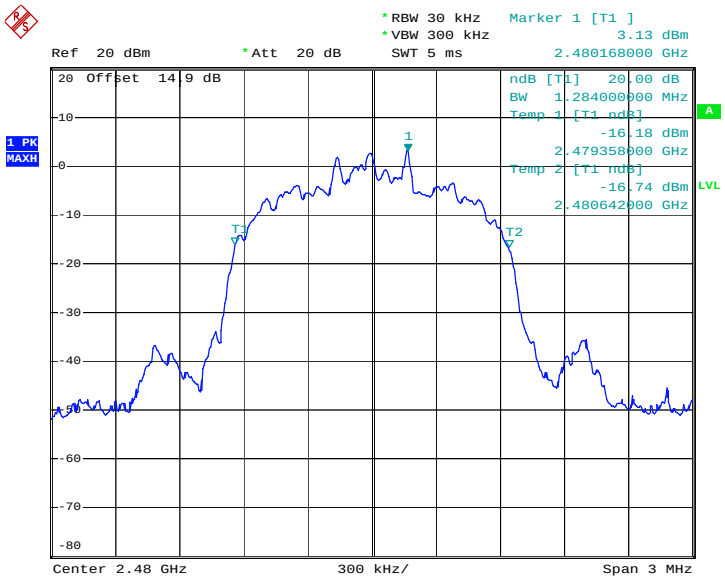
20 dB Bandwidth Plot on Channel 78



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3.3 Hopping Channel Separation Measurement

3.3.1 Limit of Hopping Channel Separation

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. Please refer FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels; RBW ≥ 1% of the span; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
5. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

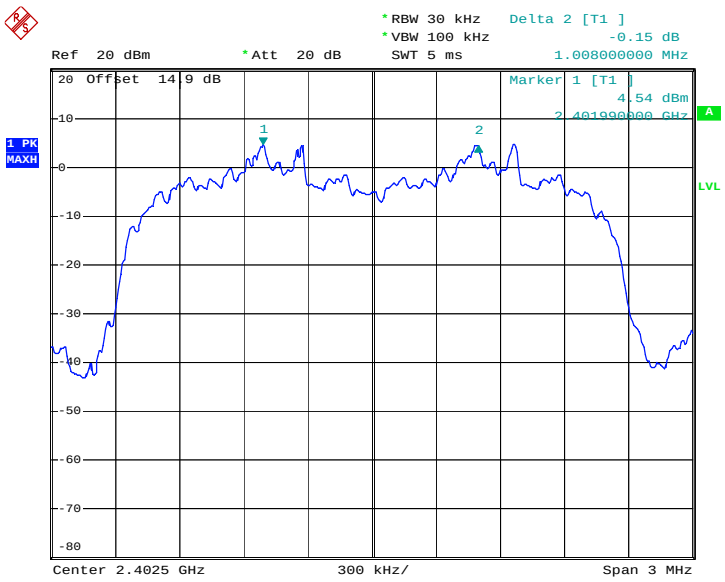
3.3.4 Test Setup

3.3.5 Test Result of Hopping Channel Separation

Test Mode :	Mode 7, 8, 9	Temperature :	23~24℃
Test Engineer :	Jun Liu	Relative Humidity :	45~47%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.008	0.860	Pass
39	2441	1.002	0.860	Pass
78	2480	1.002	0.856	Pass

Channel Separation Plot on Channel 00 - 01



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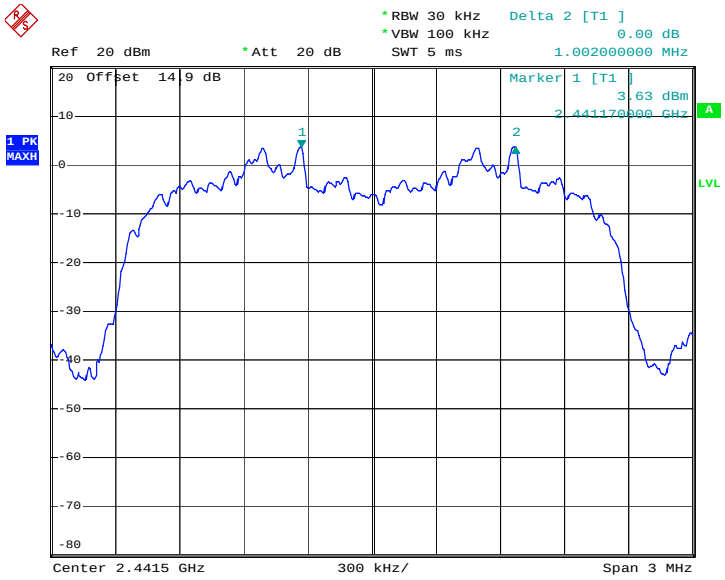
Channel Separation Plot on Channel 39 - 40



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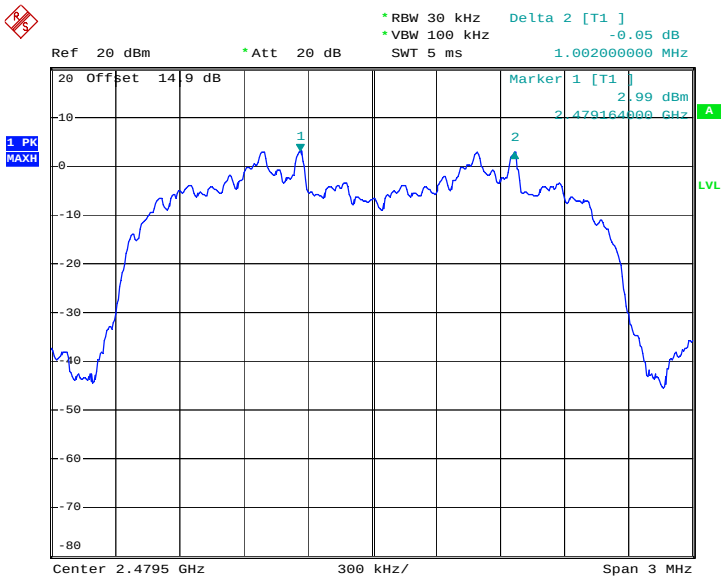
Channel Separation Plot on Channel 77 - 78



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3.4 Dwell Time Measurement

3.4.1 Limit of Dwell Time

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.

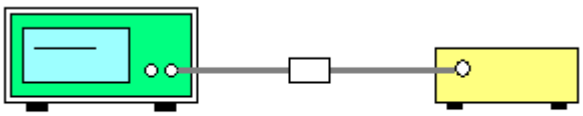
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
5. Use the marker-delta function to calculate the dwell time.

3.4.4 Test Setup



3.4.5 Test Result of Dwell Time

Test Mode :	Mode 8	Temperature :	23~24℃
Test Engineer :	Jun Liu	Relative Humidity :	45~47%

Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
3DH5	3.10	2940.00	0.29	0.4	Pass

Remark:

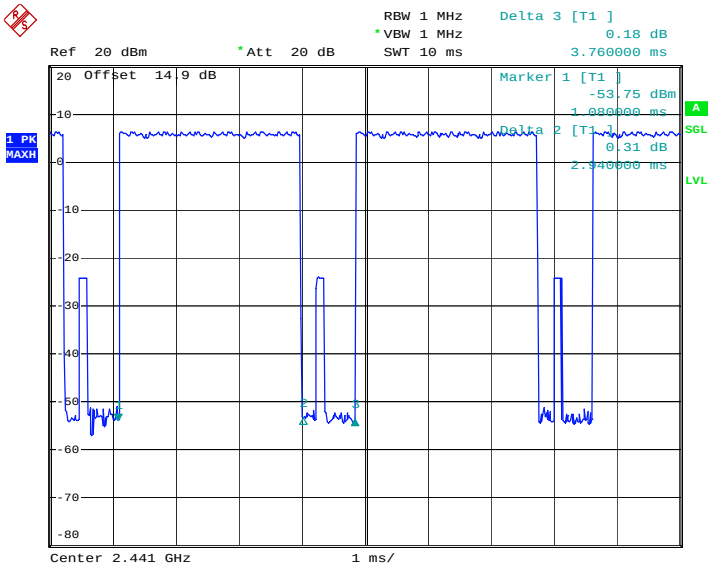
1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time

2. 79 channels come from the Hopping Channel number.

3. Average Hopping Channel = hops/sweep time

4. t: Package Transfer Time(us)

3DH5 Dwell Time (One Pulse) Plot on Channel 39



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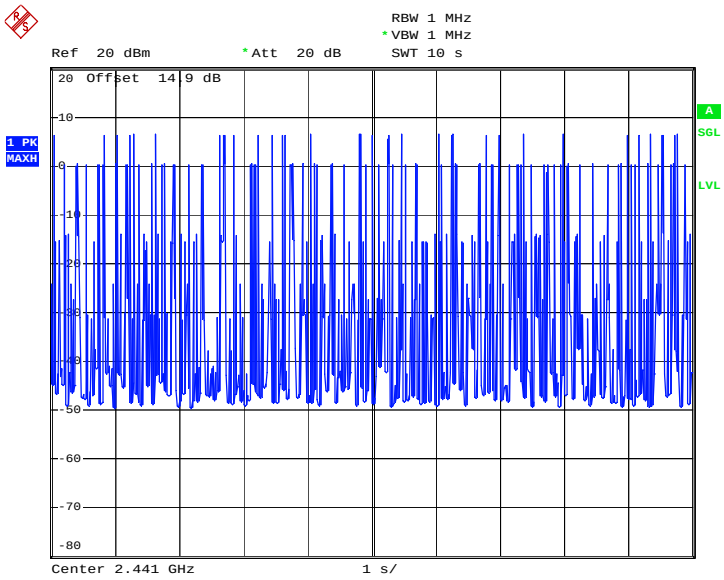
3DH5 Dwell Time (Count Pulses) Plot on Channel 39



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3.5 Peak Output Power Measurement

3.5.1 Limit of Peak Output Power

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW (20.97dBm).

3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.

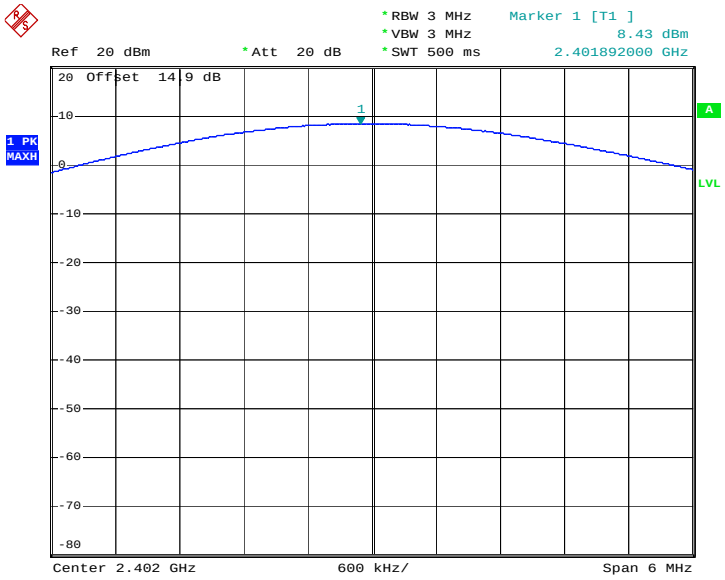
3.5.4 Test Setup

3.5.5 Test Result of Peak Output Power

Test Mode :	Mode 7, 8, 9	Temperature :	23~24℃
Test Engineer :	Jun Liu	Relative Humidity :	45~47%

Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits	Pass/Fail
		3 Mbps	(dBm)	
00	2402	8.43	20.97	Pass
39	2441	7.25	20.97	Pass
78	2480	6.66	20.97	Pass

Peak Output Power Plot on Channel 00



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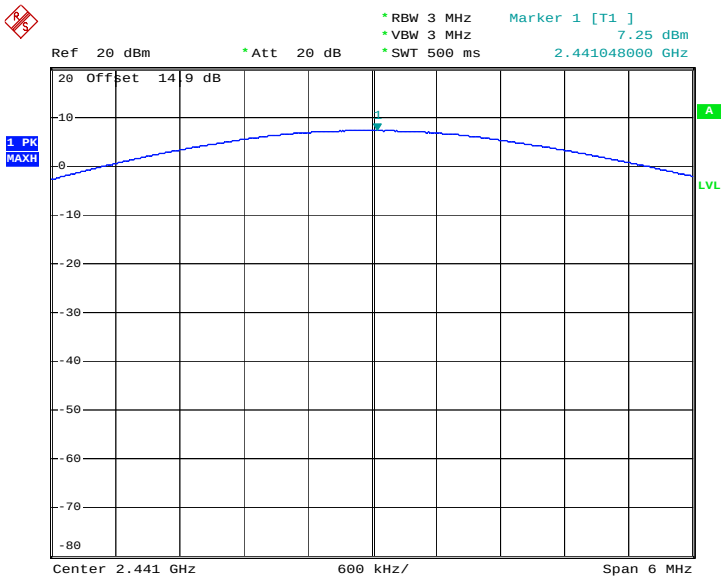
Peak Output Power Plot on Channel 39



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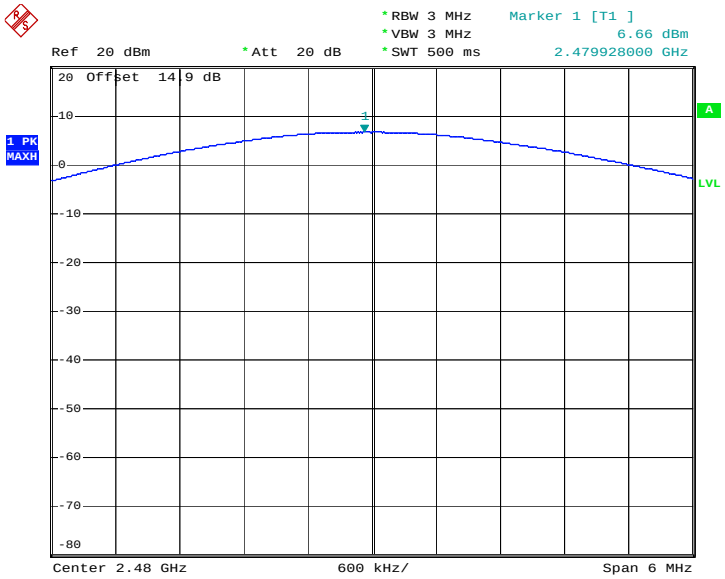
Peak Output Power Plot on Channel 78



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3.6 Band Edges Measurement

3.6.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

3.6.2 Measuring Instruments

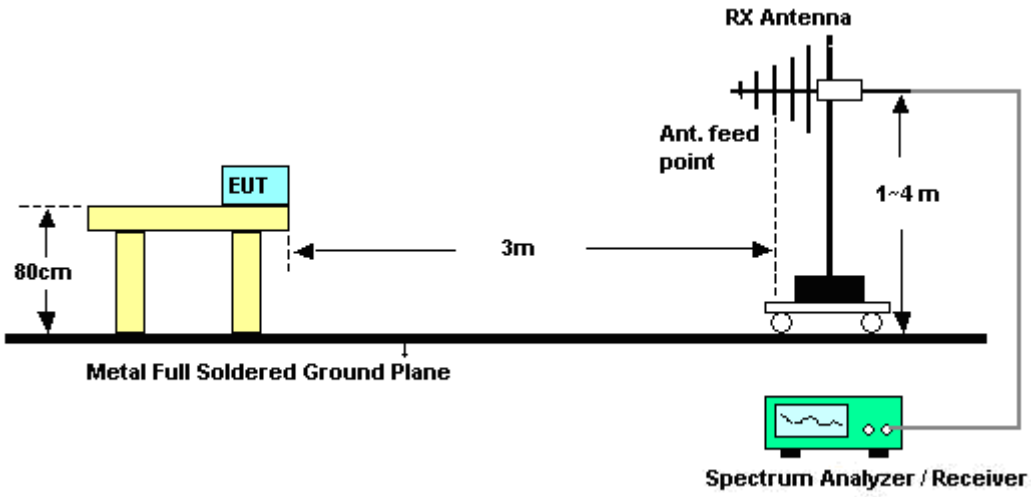
See list of measuring instruments of this test report.

3.6.3 Test Procedures

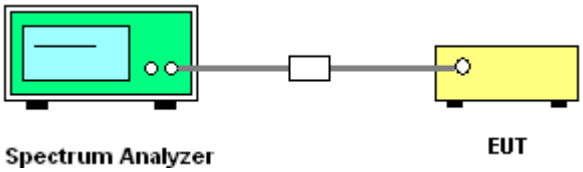
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW) ≥ RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 300k Hz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Applies to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 1MHz, Sweep: Auto for Peak; set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto for Average. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See FCC Section 15.35(b) and (c).
4. In case the emission is fail due to the used RBW / VBW is too wide, marker-delta method of FCC Public Notice DA 00-705 will be followed.

3.6.4 Test Setup

<Radiated Band Edges>



<Conducted Band Edges>



3.6.5 Test Result of Radiated Band Edges

Test Mode :	Mode 1	Temperature :	22~23°C
Test Channel :	00	Relative Humidity :	43~44%
		Test Engineer :	Chenmy Cheng

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2387.14	50.08	-23.92	74	47.8	32.86	3.47	34.05	100	0	Peak
2387.14	38.05	-15.95	54	35.77	32.86	3.47	34.05	100	0	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2336.98	49.95	-24.05	74	47.78	32.78	3.33	33.94	100	330	Peak
2336.98	37.32	-16.68	54	35.15	32.78	3.33	33.94	100	330	Average

Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	43~44%
		Test Engineer :	Chenmy Cheng

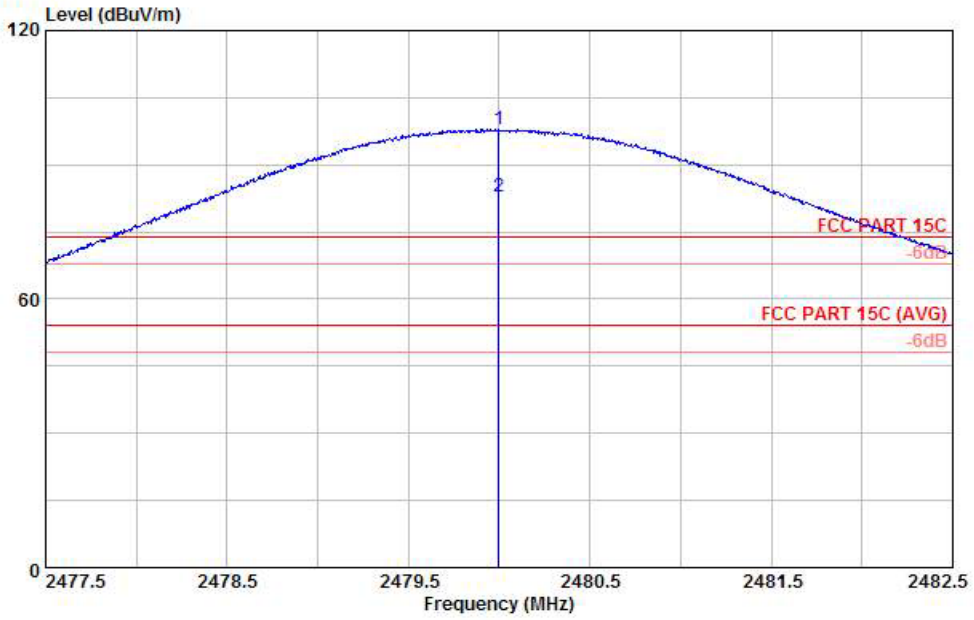
ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2485.12	45.06	-28.94	74	42.57	33.01	3.68	34.2	200	203	Peak
2485.12	33.83	-20.17	54	31.34	33.01	3.68	34.2	200	203	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBµV/m)	Delta Result (dB)	Average Result (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
Single Carrier Mode	82.94	51.68	31.26	54	-22.74	Pass
Hopping Mode	82.94	49.11	33.83	54	-20.17	Pass

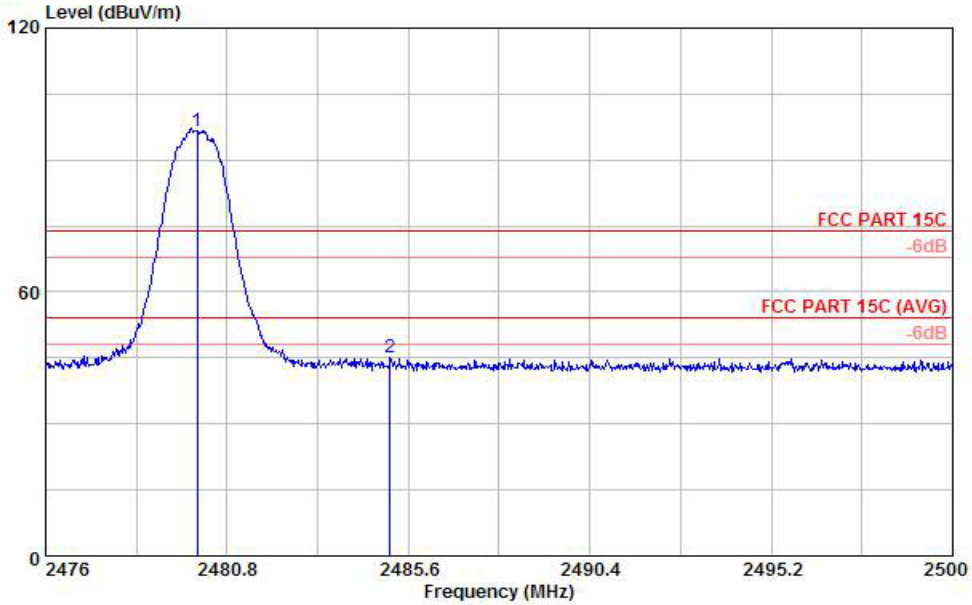
Note : Average result = Maximum field strength – Delta result

Test Plots:



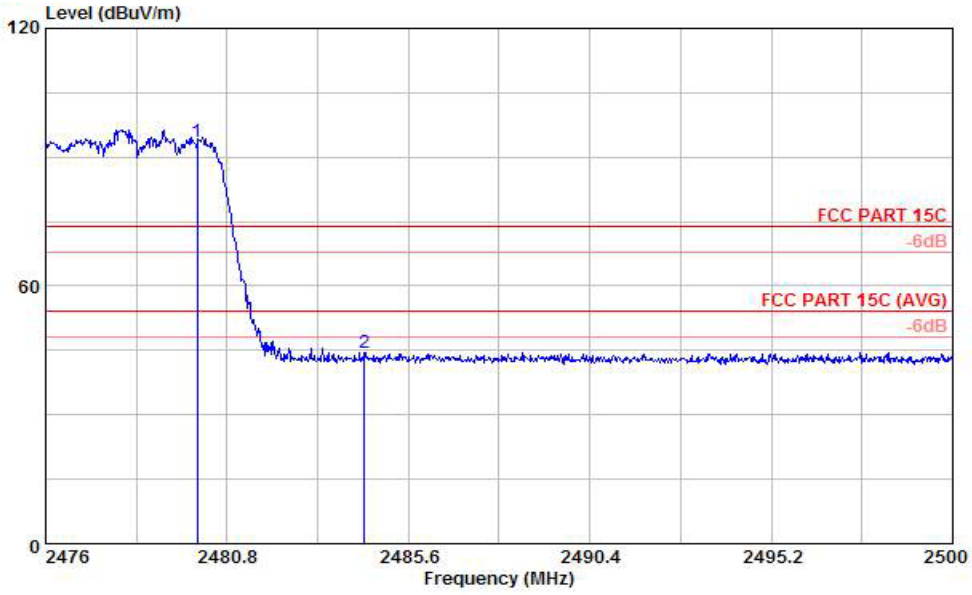

```
Site     : 03CH01-KS
Condition: FCC PART 15C 3m HF ANT-100803 HORIZONTAL
Project  : (FR) 161402
Mode     : mode 3
Plane    : H
```

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	97.81	23.81	74.00	95.32	33.01	3.68	34.20	100	189	Peak
2 X	2480.00	82.94	28.94	54.00	80.45	33.01	3.68	34.20	100	189	Average



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANT-100803 HORIZONTAL
Project : (FR) 161402
Mode : mode 3
Plane : H

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	96.74	22.74	74.00	94.25	33.01	3.68	34.20	100	136	Peak
2	2485.12	45.06	-28.94	74.00	42.57	33.01	3.68	34.20	120	122	Peak



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANT-100803 HORIZONTAL
Project : (FR) 161402
Mode : mode 3
Plane : H

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	93.62	19.62	74.00	91.13	33.01	3.68	34.20	116	129	Peak
2	2484.42	44.51	-29.49	74.00	42.02	33.01	3.68	34.20	200	203	Peak

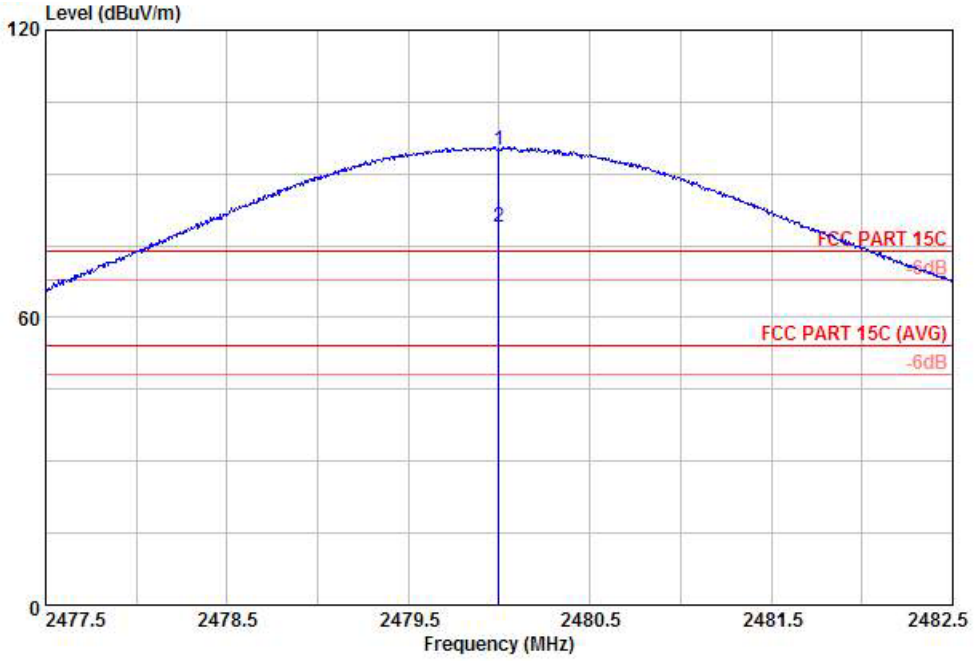
ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2492.368	45	-29	74	42.46	33.05	3.72	34.23	160	202	Peak
2492.368	33.01	-20.99	54	30.47	33.05	3.72	34.23	160	202	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBµV/m)	Delta Result (dB)	Average Result (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
Single Carrier Mode	79.04	49.12	29.92	54	-24.08	Pass
Hopping Mode	79.04	46.03	33.01	54	-20.99	Pass

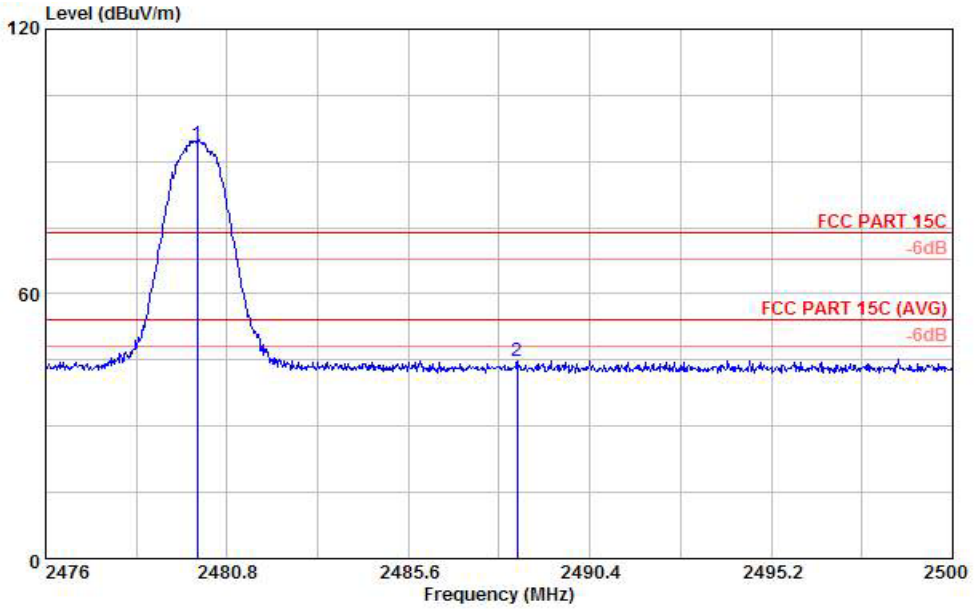
Note : Average result = Maximum field strength – Delta result

Test Plots:



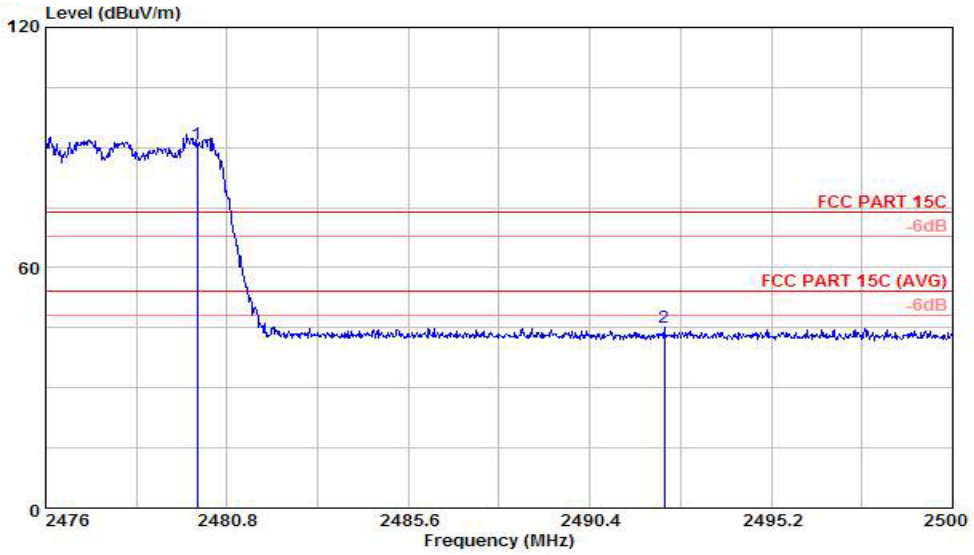

```
Site     : 03CH01-KS
Condition: FCC PART 15C 3m HF ANT-100803 VERTICAL
Project  : (FR) 161402
Mode     : mode 3
Plane    : H
```

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	94.84	20.84	74.00	92.35	33.01	3.68	34.20	100	291	Peak
2 X	2480.00	79.04	25.04	54.00	76.55	33.01	3.68	34.20	100	291	Average



Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANT-100803 VERTICAL
Project : (FR) 161402
Mode : mode 3
Plane : H

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	94.02	20.02	74.00	91.53	33.01	3.68	34.20	136	268	Peak
2	2488.48	44.90	-29.10	74.00	42.36	33.05	3.72	34.23	160	202	Peak



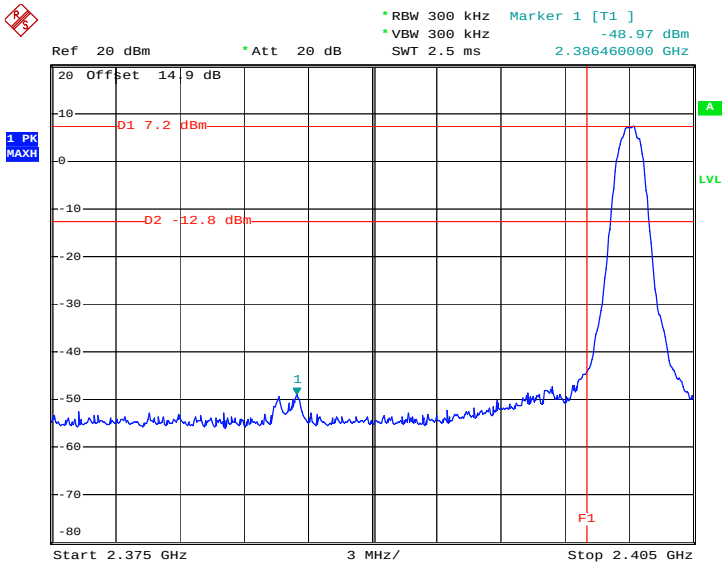
Site : 03CH01-KS
Condition: FCC PART 15C 3m HF ANT-100803 VERTICAL
Project : (FR) 161402
Mode : mode 3
Plane : H

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	91.03	17.03	74.00	88.54	33.01	3.68	34.20	116	208	Peak
2	2492.37	45.00	-29.00	74.00	42.46	33.05	3.72	34.23	116	208	Peak

3.6.6 Test Result of Conducted Band Edges

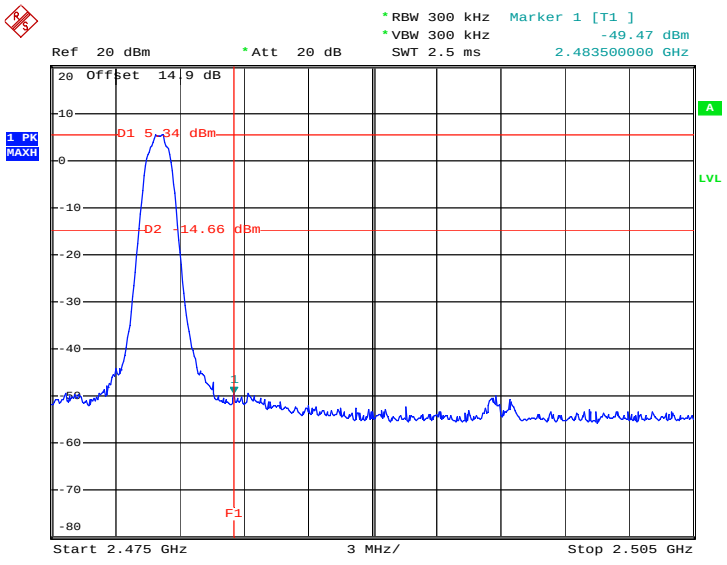
Test Mode :	Mode 7 and 9	Temperature :	23~24℃
Test Channel :	00 and 78	Relative Humidity :	45~47%
		Test Engineer :	Jun Liu

Low Band Edge Plot on Channel 00



Date: 6.AUG.2011 13:39:05

High Band Edge Plot on Channel 78



Date: 6.AUG.2011 13:54:55

3.7 Spurious Emission Measurement

3.7.1 Limit of Spurious Emission Measurement

All harmonics/spurious must be at least 20 dB down from the highest emission level within the authorized band.

3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

3.7.3 Test Procedure

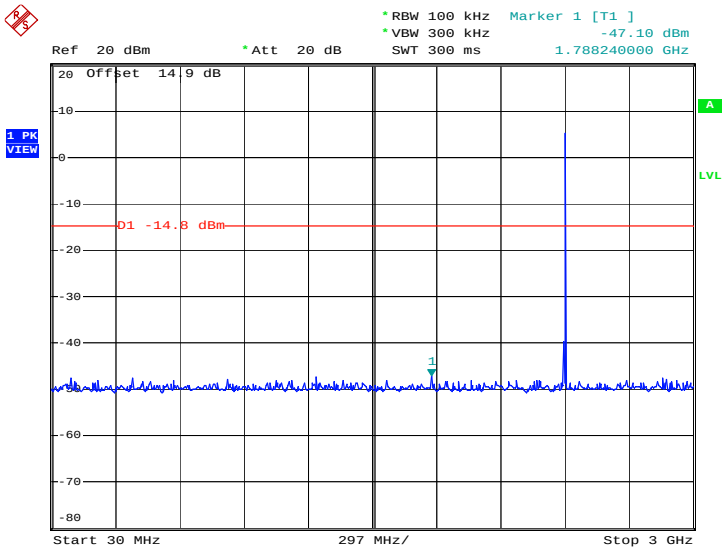
1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW = 100 kHz, Video bandwidth (VBW) ≥ RBW, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

3.7.4 Test Setup

3.7.5 Test Result

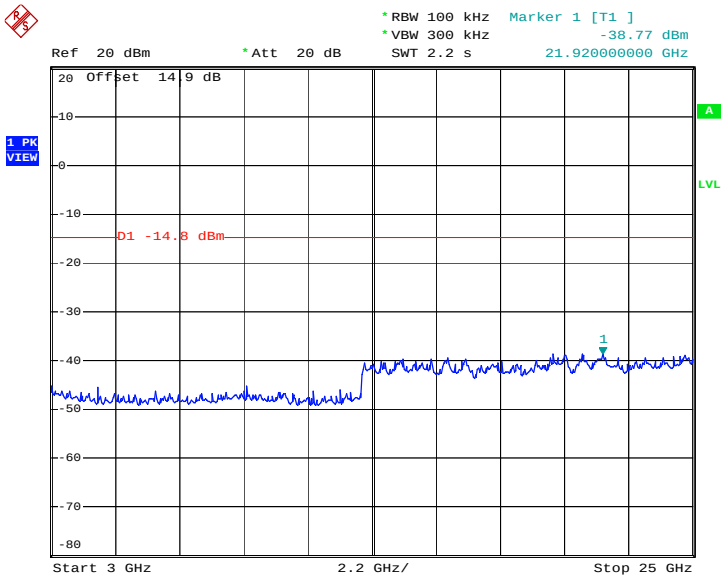
Test Mode :	Mode 7	Temperature :	23~24℃
Test Channel :	00	Relative Humidity :	45~47%
		Test Engineer :	Jun Liu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 6.AUG.2011 13:40:59

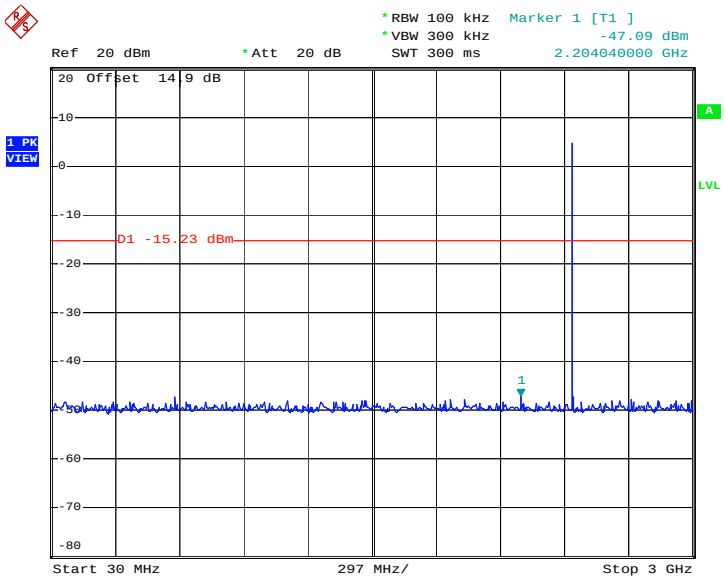
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 6.AUG.2011 13:41:21

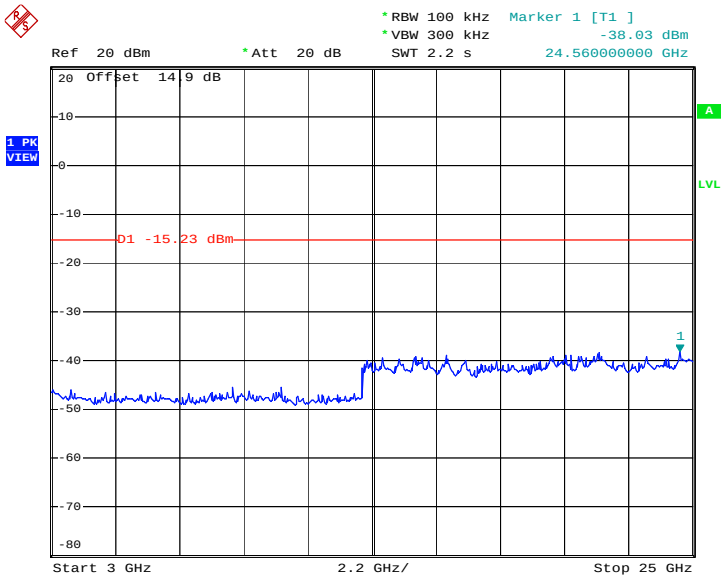
Test Mode :	Mode 8	Temperature :	23~24℃
Test Channel :	39	Relative Humidity :	45~47%
		Test Engineer :	Jun Liu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 6.AUG.2011 13:49:57

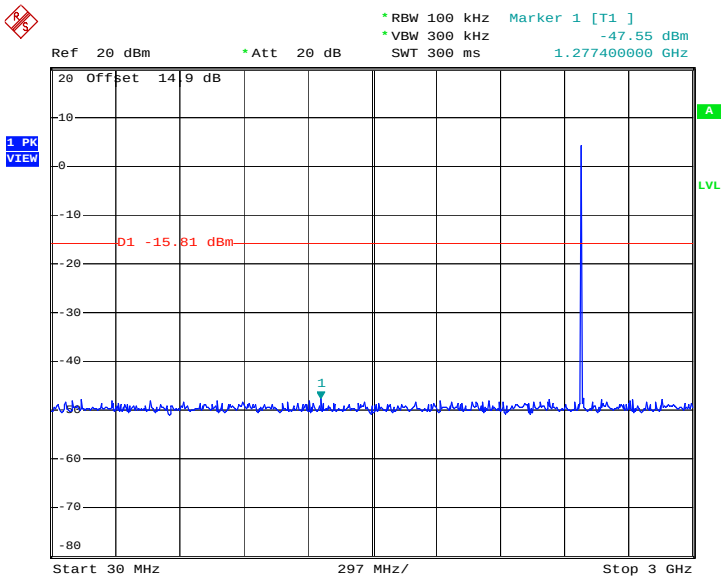
Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 6.AUG.2011 13:50:19

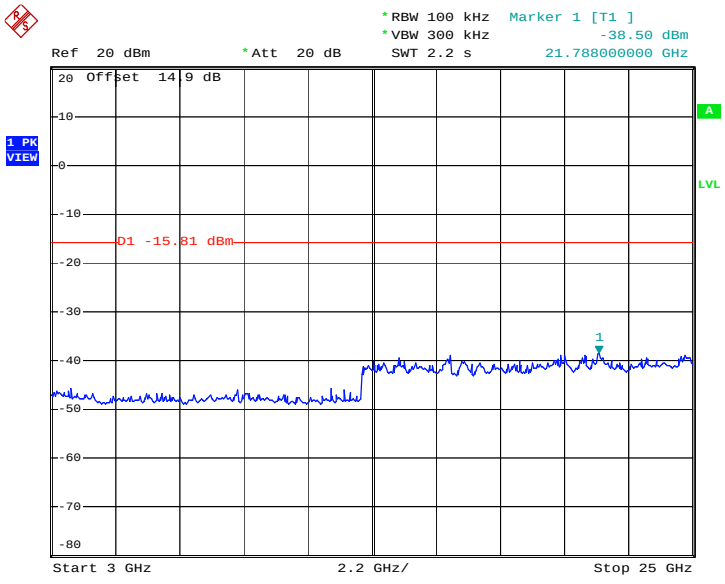
Test Mode :	Mode 9	Temperature :	23~24℃
Test Channel :	78	Relative Humidity :	45~47%
		Test Engineer :	Jun Liu

Conducted Spurious Emission Plot between 30MHz ~ 3 GHz



Date: 6.AUG.2011 13:58:11

Conducted Spurious Emission Plot between 3 GHz ~ 25 GHz



Date: 6.AUG.2011 13:58:33

3.8 AC Conducted Emission Measurement

3.8.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

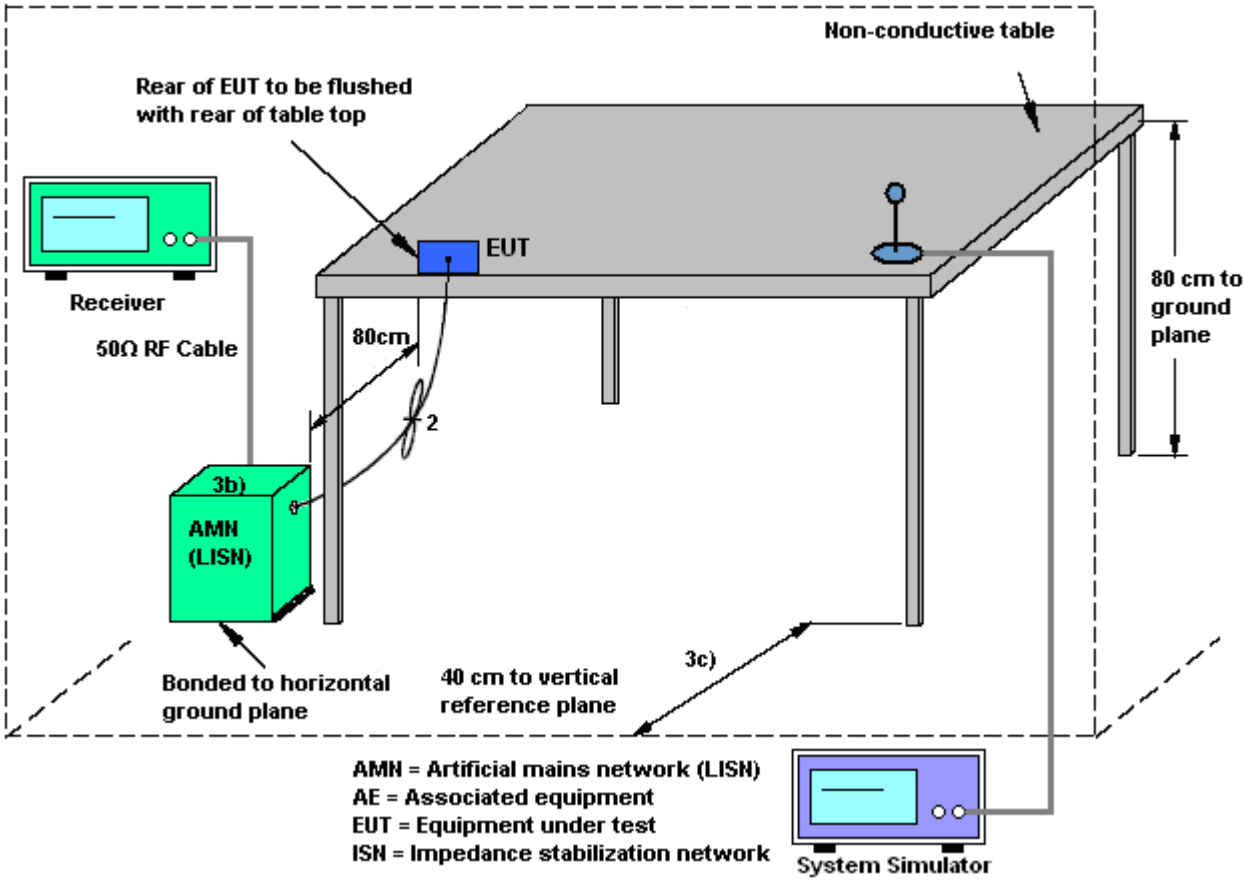
3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

3.8.3 Test Procedures

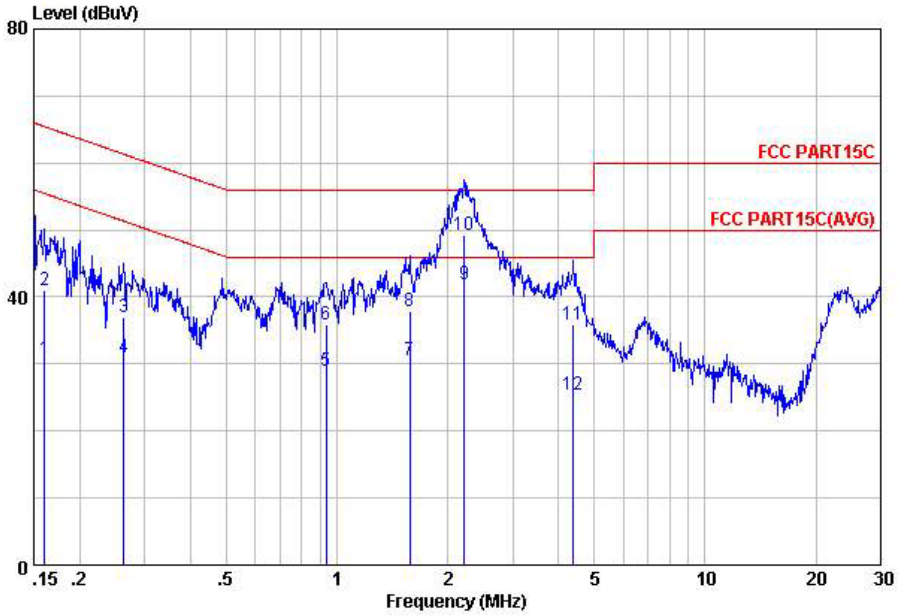
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.8.4 Test Setup



3.8.5 Test Result of AC Conducted Emission

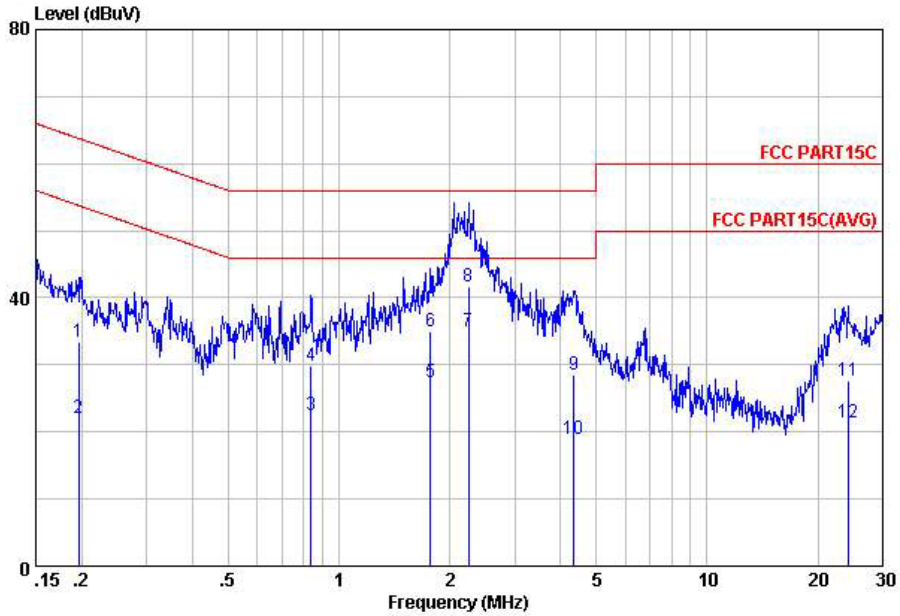
Test Mode :	Mode 1	Temperature :	22~23℃
Test Engineer :	Chenmy Cheng	Relative Humidity :	43~44%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM 850 Idle + Bluetooth Link + Adapter + Earphone + Camera		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-KS
Condition: FCC PART15C LISN-100807 LINE
Project : (FD) 161402
mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.16	30.70	-24.73	55.43	20.63	-0.07	10.14	Average
2	0.16	40.97	-24.46	65.43	30.90	-0.07	10.14	QP
3	0.26	36.99	-24.35	61.34	26.90	-0.07	10.16	QP
4	0.26	30.89	-20.45	51.34	20.80	-0.07	10.16	Average
5	0.93	29.06	-16.94	46.00	18.90	-0.10	10.26	Average
6	0.93	35.86	-20.14	56.00	25.70	-0.10	10.26	QP
7	1.58	30.60	-15.40	46.00	20.40	-0.11	10.31	Average
8	1.58	37.80	-18.20	56.00	27.60	-0.11	10.31	QP
9	2.21	41.83	-4.17	46.00	31.60	-0.11	10.34	Average
10	2.21	49.33	-6.67	56.00	39.10	-0.11	10.34	QP
11	4.38	35.86	-20.14	56.00	25.60	-0.13	10.39	QP
12	4.38	25.46	-20.54	46.00	15.20	-0.13	10.39	Average

Test Mode :	Mode 1	Temperature :	22~23℃
Test Engineer :	Chenmy Cheng	Relative Humidity :	43~44%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM 850 Idle + Bluetooth Link + Adapter + Earphone + Camera		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : C001-KS
Condition: FCC PART15C LISN-100807 NEUTRAL
Project : (FD) 161402
mode : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.20	33.38	-30.38	63.76	23.30	-0.07	10.15	QP
2	0.20	21.98	-31.78	53.76	11.90	-0.07	10.15	Average
3	0.84	22.56	-23.44	46.00	12.40	-0.09	10.25	Average
4	0.84	29.76	-26.24	56.00	19.60	-0.09	10.25	QP
5	1.77	27.41	-18.59	46.00	17.20	-0.11	10.32	Average
6	1.77	35.01	-20.99	56.00	24.80	-0.11	10.32	QP
7	2.25	35.03	-10.97	46.00	24.80	-0.11	10.34	Average
8	2.25	41.73	-14.27	56.00	31.50	-0.11	10.34	QP
9	4.34	28.46	-27.54	56.00	18.20	-0.13	10.39	QP
10	4.34	18.86	-27.14	46.00	8.60	-0.13	10.39	Average
11	24.14	27.54	-32.46	60.00	16.80	0.11	10.63	QP
12	24.14	21.34	-28.66	50.00	10.60	0.11	10.63	Average

3.9 Radiated Emission Measurement

3.9.1 Limit of Radiated Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (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

3.9.2 Measuring Instruments

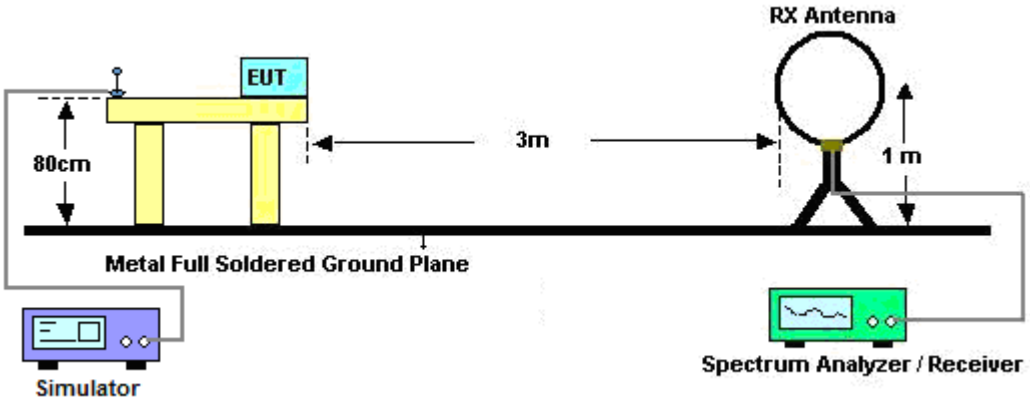
See list of measuring instruments of this test report.

3.9.3 Test Procedures

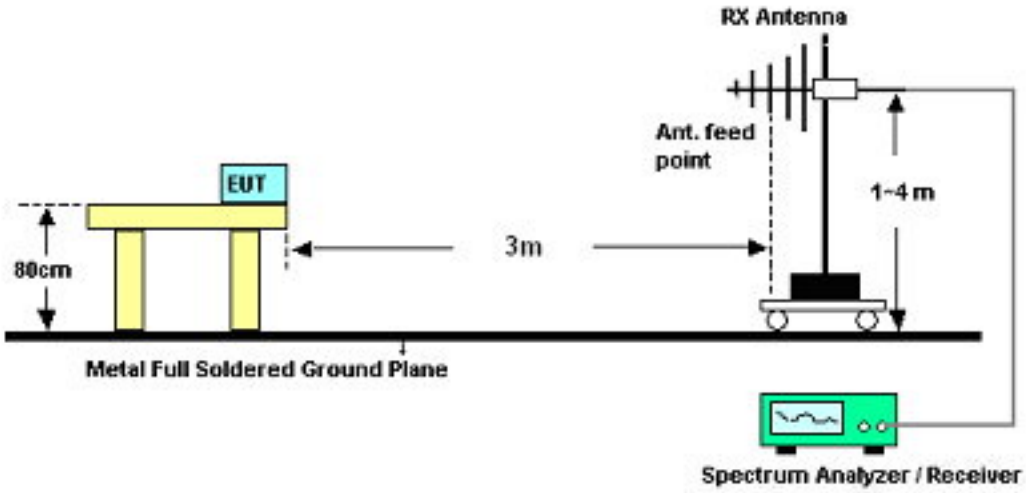
1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
   (1) Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
   (2) Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.
   Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB)
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.
4. Measured average value for the peak value is greater than 54 dBuv/m

3.9.4 Test Setup

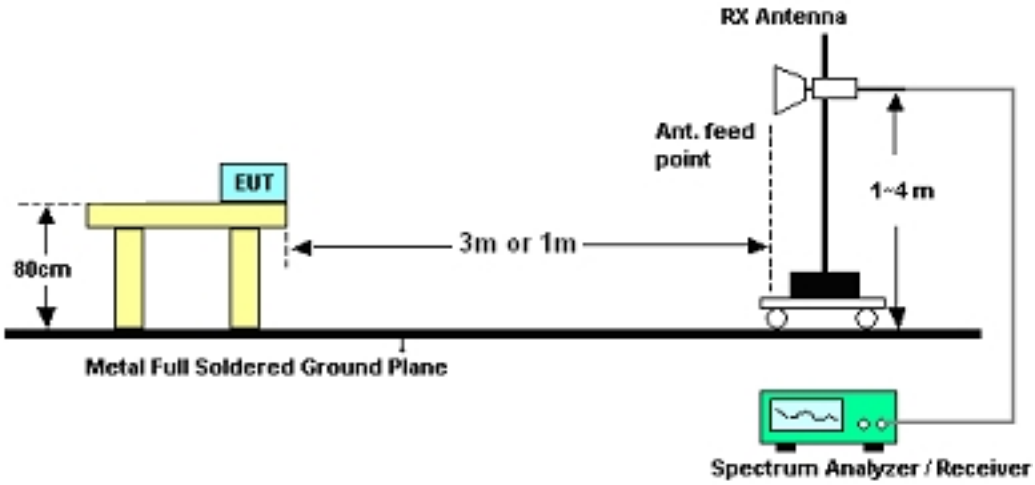
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.9.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

Test Engineer :	Chenmy Cheng	Temperature :	22~23°C
		Relative Humidity :	43~44%

Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

3.9.6 Test Result of Radiated Emission (30 MHz ~ 10th Harmonic)

Test Mode :	Mode 1	Temperature :	22~23°C
Test Channel :	00	Relative Humidity :	43~44%
Test Engineer :	Chenmy Cheng	Polarization :	Horizontal
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
31.08	20.62	-19.38	40	33.16	17.29	0.25	30.08	100	306	Peak
192	19.16	-24.34	43.5	39.95	8.59	0.58	29.96			Peak
206.04	19	-24.5	43.5	39.15	9.25	0.6	30			Peak
551.3	21.62	-24.38	46	31.8	18.5	1	29.68			Peak
871.2	25.99	-20.01	46	33.8	20.49	1.29	29.59			Peak
988.1	23.51	-30.49	54	30.6	21.03	1.4	29.52			Peak
2387.14	50.08	-23.92	74	47.8	32.86	3.47	34.05	100	0	Peak
2387.14	38.05	-15.95	54	35.77	32.86	3.47	34.05	100	0	Average
2402	101.28			99	32.86	3.47	34.05	140	360	Peak
2402	84.81			82.53	32.86	3.47	34.05	140	360	Average
2483.5	47.95	-26.05	74	45.46	33.01	3.68	34.2	100	0	Peak
2483.5	36.59	-17.41	54	34.1	33.01	3.68	34.2	100	0	Average

Test Mode :	Mode 1	Temperature :	22~23°C
Test Channel :	00	Relative Humidity :	43~44%
Test Engineer :	Chenmy Cheng	Polarization :	Vertical
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.97	31.03	-8.97	40	44.84	16.04	0.24	30.09			Peak
37.83	33.05	-6.95	40	49.17	13.7	0.24	30.06	126	266	Peak
81.3	21.94	-18.06	40	44.76	6.87	0.35	30.04			Peak
678	21.52	-24.48	46	30.98	19.13	1.11	29.7			Peak
831.3	22.98	-23.02	46	31.06	20.29	1.27	29.64			Peak
871.9	24.04	-21.96	46	31.85	20.49	1.29	29.59			Peak
2336.98	49.95	-24.05	74	47.78	32.78	3.33	33.94	100	330	Peak
2336.98	37.32	-16.68	54	35.15	32.78	3.33	33.94	100	330	Average
2402	94.43			92.15	32.86	3.47	34.05	100	337	Peak
2402	80.75			78.47	32.86	3.47	34.05	100	337	Average
2484.8	51.24	-22.76	74	48.75	33.01	3.68	34.2	100	306	Peak
2484.8	37.72	-16.28	54	35.23	33.01	3.68	34.2	100	306	Average

Test Mode :	Mode 2	Temperature :	22~23°C
Test Channel :	39	Relative Humidity :	43~44%
Test Engineer :	Chenmy Cheng	Polarization :	Horizontal
Remark :	2441 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.7	21.16	-18.84	40	34.97	16.04	0.24	30.09	100	189	Peak
192	19.1	-24.4	43.5	39.89	8.59	0.58	29.96			Peak
206.04	20.76	-22.74	43.5	40.91	9.25	0.6	30			Peak
551.3	22.52	-23.48	46	32.7	18.5	1	29.68			Peak
870.5	25.93	-20.07	46	33.74	20.49	1.29	29.59			Peak
911.8	23.61	-22.39	46	31.29	20.5	1.31	29.49			Peak
2332.42	49.58	-24.42	74	47.45	32.76	3.27	33.9	100	19	Peak
2332.42	37.26	-16.74	54	35.13	32.76	3.27	33.9	100	19	Average
2441	95.52			93.12	32.95	3.6	34.15	100	7	Peak
2441	80.82			78.42	32.95	3.6	34.15	100	7	Average
2483.85	49.54	-24.46	74	47.05	33.01	3.68	34.2	100	115	Peak
2483.85	37.34	-16.66	54	34.85	33.01	3.68	34.2	100	115	Average

Test Mode :	Mode 2	Temperature :	22~23°C
Test Channel :	39	Relative Humidity :	43~44%
Test Engineer :	Chenmy Cheng	Polarization :	Vertical
Remark :	2441 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.97	31.5	-8.5	40	45.31	16.04	0.24	30.09			Peak
38.1	31.53	-8.47	40	47.65	13.7	0.24	30.06	100	16	Peak
81.57	23.18	-16.82	40	46	6.87	0.35	30.04			Peak
551.3	22.99	-23.01	46	33.17	18.5	1	29.68			Peak
870.5	24.2	-21.8	46	32.01	20.49	1.29	29.59			Peak
979.7	24.37	-29.63	54	31.55	20.96	1.39	29.53			Peak
2348.76	50.69	-23.31	74	48.52	32.78	3.33	33.94	100	163	Peak
2348.76	37.19	-16.81	54	35.02	32.78	3.33	33.94	100	163	Average
2441	94.46			92.06	32.95	3.6	34.15	100	288	Peak
2441	78.85			76.45	32.95	3.6	34.15	100	288	Average
2485.94	49.53	-24.47	74	47.04	33.01	3.68	34.2	100	268	Peak
2485.94	37.35	-16.65	54	34.86	33.01	3.68	34.2	100	268	Average

Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	43~44%
Test Engineer :	Chenmy Cheng	Polarization :	Horizontal
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
33.24	21.46	-18.54	40	35.27	16.04	0.24	30.09	100	36	Peak
37.29	19.4	-20.6	40	35.52	13.7	0.24	30.06			Peak
192	20.61	-22.89	43.5	41.4	8.59	0.58	29.96			Peak
551.3	22.71	-23.29	46	32.89	18.5	1	29.68			Peak
750.8	22.36	-23.64	46	30.82	19.9	1.18	29.54			Peak
871.2	24.86	-21.14	46	32.67	20.49	1.29	29.59			Peak
2360	48.89	-25.11	74	46.68	32.81	3.38	33.98	100	176	Peak
2360	37.32	-16.68	54	35.11	32.81	3.38	33.98	100	176	Average
2480	97.81			95.32	33.01	3.68	34.2	100	189	Peak
2480	82.94			80.45	33.01	3.68	34.2	100	189	Average
2485.12	45.06	-28.94	74	42.57	33.01	3.68	34.2	200	203	Peak
2485.12	33.83	-20.17	54	31.34	33.01	3.68	34.2	200	203	Average

Test Mode :	Mode 3	Temperature :	22~23°C
Test Channel :	78	Relative Humidity :	43~44%
Test Engineer :	Chenmy Cheng	Polarization :	Vertical
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.97	31.36	-8.64	40	45.17	16.04	0.24	30.09			Peak
37.29	33.49	-6.51	40	49.61	13.7	0.24	30.06	100	32	Peak
81.03	22.57	-17.43	40	45.39	6.87	0.35	30.04			Peak
551.3	21.5	-24.5	46	31.68	18.5	1	29.68			Peak
749.4	22.13	-23.87	46	30.59	19.9	1.18	29.54			Peak
870.5	23.92	-22.08	46	31.73	20.49	1.29	29.59			Peak
2314	49.04	-24.96	74	46.95	32.73	3.22	33.86	100	122	Peak
2314	37.02	-16.98	54	34.93	32.73	3.22	33.86	100	122	Average
2480	94.84			92.35	33.01	3.68	34.2	100	291	Peak
2480	79.04			76.55	33.01	3.68	34.2	100	291	Average
2492.368	45	-29	74	42.46	33.05	3.72	34.23	160	202	Peak
2492.368	33.01	-20.99	54	30.47	33.05	3.72	34.23	160	202	Average

3.10 Antenna Requirements

3.10.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.10.2 Antenna Connected Construction

The antennas type used in this product is PIFA Antenna without connector and it is considered to meet antenna requirement.

3.10.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 07, 2011	Jan. 06, 2012	Conducted (TH01-KS)
Power Meter	Agilent	E4416A	MY45101555	N/A	Aug. 24, 2010	Aug. 23, 2011	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY44421198	N/A	Aug. 24, 2010	Aug. 23, 2011	Conducted (TH01-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	Jun. 02, 2011	Jun. 01, 2012	Conduction (CO01-KS)
LISN	MessTec	AN3016	60103	9kHz~30MHz	Jan. 07, 2011	Jan. 06, 2012	Conduction (CO01-KS)
LISN	MessTec	AN3016	60105	9kHz~30MHz	Jan. 07, 2011	Jan. 06, 2012	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	N/A	Nov. 10, 2010	Nov. 09, 2011	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 16, 2010	Nov. 15, 2011	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 07, 2010	Dec. 06, 2011	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Amplifier	Wireless	FPA-6592G	060004	30MHz~2GHz	Dec. 09, 2010	Dec. 08, 2011	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Jan. 07, 2011	Jan. 06, 2012	Radiation (03CH01-KS)
Actice hore antenna	com-power	AHA-118	701023	1G-18GHz	Nov. 09, 2010	Nov. 08, 2011	Radiation (03CH01-KS)
Signal Generator	R&S	SMR40	100455	10MHz~40GHz	Jan. 06, 2011	Jan. 05, 2012	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15-40GHz	Oct. 15, 2010	Oct.14, 2011	Radiation (03CH01-KS)
Bluetooth Base Station	ANRITSU	MT8852B	6K00004935	BT EDR	Sep. 17, 2010	Sep. 16, 2011	-
System Simulator	R&S	CMU200	837587/066	Full-Band	Jan. 07, 2011	Jan. 06, 2012	-

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.10	Normal (k=2)	0.05
Cable Loss	0.10	Normal (k=2)	0.05
AMN Insertion Loss	2.50	Rectangular	0.63
Receiver Specification	1.50	Rectangular	0.43
Site Imperfection	1.39	Rectangular	0.80
Mismatch	+0.34 / -0.35	U-Shape	0.24
Combined Standard Uncertainty Uc(y)	**1.13**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.26**		

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty Uc(y)	**1.27**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.54**		

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	±0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	±1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	±0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site Imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR Γ1 = 0.197 Antenna VSWR Γ2 = 0.194 Uncertainty = 20Log(1-Γ1*Γ2)	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty Uc(y)	**2.36**				
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**				

Appendix A. Photographs of EUT

Please refer to Sporton report number EP161402 as below.

Annex

Declaration for Bluetooth Device acc to Part 15.247

1 Output power and channel separation of a Bluetooth device in the different operating modes:

The different operating modes (data-mode, acquisition-mode) of a Bluetooth device has no influence on the output power and the channel spacing. There is only one transmitter which is driven by identical input parameters concerning these two parameters.
Only a different hopping sequence will be used. For this reason the check of these RF parameters in one op-mode is sufficient.

2 Frequency range of a Bluetooth device:

Hereby we declare that the maximum frequency of this device is: 2402 – 2480 MHz. This is according to the Bluetooth Core Specification (+ critical errata) for devices which will be operated in the USA.
This was checked during the Bluetooth Qualification tests (Test Case: TRM/CA/04-E). Other frequency ranges (e.g. for Spain, France, Japan) which are allowed according the Core Specification are not supported by this device.

3 Co-ordination of the hopping sequence in data mode to avoid simultaneous occupancy by multiple transmitters:

Bluetooth units which want to communicate with other units must be organised in a structure called piconet. This piconet consist of max. 8 Bluetooth units. One unit is the master the other seven are the slaves. The master co-ordinates frequency occupation in this piconet for all units. As the master hop sequence is derived from its BD address which is unique for each Bluetooth device, additional masters intending to establish new piconets will always use different hop sequences.

4 Example of a hopping sequence in data mode:

Example of a 79 hopping sequence in data mode:
40, 21, 44, 23, 42, 53, 46, 55, 48, 33, 52, 35, 50, 65, 54, 67,
56, 37, 60, 39, 58, 69, 62, 71, 64, 25, 68, 27, 66, 57, 70, 59,
72, 29, 76, 31, 74, 61, 78, 63, 01, 41, 05, 43, 03, 73, 07, 75,
09, 45, 13, 47, 11, 77, 15, 00, 64, 49, 66, 53, 68, 02, 70, 06,
01, 51, 03, 55, 05, 04

5 Equally average use of frequencies in data mode and behaviour for short transmissions:

The generation of the hopping sequence in connection mode depends essentially on two input values:
1. LAP/UAP of the master of the connection
2. Internal master clock

The LAP (lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP (upper address part) are the 24 MSB's of the 48 BD_ADDRESS.

The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For synchronisation with other units only offset are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5 µs. The clock has a cycle of about one day (23h30). In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire
LAP (24 bits), 4 LSB's (4 bits) (Input 1) and the 27 MSB's of the clock (Input 2) are used. With this input values different mathematical procedures (permutations, additions, XOR- operations) are performed to generate the sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following behaviour:
The first connection between the two devices is established, a hopping sequence was generated. For transmitting the wanted data the complete hopping sequence was not used. The connection ended.
The second connection will be established. A new hopping sequence is generated. Due to the fact that the Bluetooth clock has a different value, because the period between the two transmission is longer (and it cannot be shorter) than the minimum resolution of the clock (312.5 µs). The hopping sequence will always differ from the first one.

6 Receiver input bandwidth and behaviour for repeated single or multiple packets:

The input bandwidth of the receiver is 1 MHz. In every connection one Bluetooth device is the master and the other one is the slave. The master determines the hopping sequence (see chapter 5). The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master.
Additionally the type of connection (e.g. single or multislot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection will use these settings.
Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

7 Dwell time in data mode

The dwell time of 0.3797s within a 30 second period in data mode is independent from the packet type (packet length). The calculation for a 30 second period is a follows:

Dwell time = time slot length * hop rate / number of hopping channels *30s

Example for a DH1 packet (with a maximum length of one time slot) Dwell time = 625 µs * 1600 1/s / 79 * 30s = 0.3797s (in a 30s period)

For multislot packet the hopping is reduced according to the length of the packet. Example for a DH5 packet (with a maximum length of five time slots)
Dwell time = 5 * 625 µs * 1600 * 1/5 *1/s / 79 * 30s = 0.3797s (in a 30s period). This is according the Bluetooth Core Specification V 1.0B (+ critical errata) for all Bluetooth devices. Therefor all Bluetooth devices **comply** with the FCC dwell time requirement in data mode. This was checked during the Bluetooth Qualification tests. The Dwell time in hybrid mode is measured and stated in the test report.

8 Channel Separation in hybrid mode

The nominal channel spacing of the Bluetooth system is 1Mhz independent of the operating mode.
The maximum “initial carrier frequency tolerance” which is allowed for Bluetooth is fcenter = 75 kHz.
This was checked during the Bluetooth Qualification tests (Test Case: TRM/CA/07-E) for three frequencies (2402, 2441, 2480 MHz).
Additionally an example for the channel separation is given in the test report

9 Derivation and examples for a hopping sequence in hybrid mode

For the generation of the inquiry and page hop sequences the same procedures as described for the data mode are used (see chapter 5), but this time with different input vectors:

- For the inquiry hop sequence, a predefined fixed address is always used. This results in the same 32 frequencies used by all devices doing an inquiry but every time with a different start frequency and phase in this sequence.
- For the page hop sequence, the device address of the paged unit is used as input vector. This results in the use of a subset of 32 frequencies which is specific for that initial state of the connection establishment between the two units. A page to different devices would result in a different subset of 32 frequencies.

So it is ensured that also in hybrid mode the frequency use equally averaged.

Example of a hopping sequence in inquiry mode:
48, 50, 09, 13, 52, 54,41, 45, 56, 58, 11, 15, 60, 62, 43, 47, 00, 02, 64, 68, 04, 06, 17, 21, 08, 10, 66, 70, 12, 14, 19, 23

Example of a hopping sequence in paging mode:
08, 57, 68, 70, 51, 02, 42, 40, 04, 61, 44, 46, 63, 14, 50, 48, 16, 65, 52, 54, 67, 18, 58, 56, 20, 53, 60, 62, 55, 06, 66, 64

10 Receiver input bandwidth and synchronisation in hybrid mode:

The receiver input bandwidth is the same as in the data mode (1 MHz). When two Bluetooth devices establish contact for the first time, one device sends an inquiry access code, the other device is scanning for this inquiry access code. If two devices have been connected previously and want to start a new transmission, a similar procedure takes place. The only difference is, instead of the inquiry access code, an special access code, derived from the BD_ADDRESS of the paged device will be, will be sent by the master of this connection.
Due to the fact that both units have been connected before (in the inquiry procedure) the paging unit has timing and frequency information about the page scan of the paged unit. For this reason the time to establish the connection is reduced considerable.

11 Spread rate / data rate of the direct sequence signal

The Spread rate / Data rate in inquiry and paging mode can be defined via the access code. The access code is the only criterion for the system to check if there is a valid transmission or not. If you regard the presence of a valid access code as one bit of information, and compare it with the length of the access code of 68 bits, the Spread rate
/ Data rate will be 68/1.

12 Spurious emission in hybrid mode

The dwell time in hybrid mode is shorter than in data mode. For this reason the spurious emissions average level in data mode is worst case. The spurious emissions peak level is the same for both modes.

13 Peak power spectral density measurement

Since the transmitter is only active for some milliseconds on one channel you would get a result with many interruptions if using a sweep time of e.g. 1s as stated in the FCC rules. Therefore a fast sweep in maxhold function is used instead and the EUT is activated several times until the measurement curve has stabilized.