FCC TEST REPORT (Bluetooth)

REPORT NO.: RF981102H02-1

MODEL NO.: T77H134

RECEIVED: Nov. 02, 2009

TESTED: Nov. 16, 2009 to Jan. 08, 2010

ISSUED: Jan. 13, 2010

APPLICANT: Hon Hai PRECISION IND.CO.,LTD

ADDRESS: 5F-1,5 Hsin-An Road Hsinchu, Science-Based Industrial Park Taiwan, R.O.C.

ISSUED BY: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory

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1. CERTIFICATION

PRODUCT :	WLAN and Bluetooth combo module
BRAND :	Foxconn
MODEL NO.:	T77H134
APPLICANT :	Hon Hai PRECISION IND.CO.,LTD
TESTED :	Nov. 16, 2009 to Jan. 08, 2010
TEST SAMPLE :	ENGINEERING SAMPLE
STANDARDS :	FCC Part 15, Subpart C (Section 15.247), ANSI C63.4-2003

The above equipment (Model: T77H134) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : _____ , **DATE:** Jan. 13, 2010
(Claire Kaun, Specialist)

TECHNICAL ACCEPTANCE : _____ , **DATE:** Jan. 13, 2010
(Hank Chung, Deputy Manager)

APPROVED BY : _____ , **DATE:** Jan. 13, 2010
(May Chen, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	**Test Type and Limit**	**Result**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -27.98dB at 0.248MHz.
15.247(a)(1)(I)-(ii)	Number of Hopping Frequency Used Spec.: At least 15 channels	PASS	Meet the requirement of limit
15.247(a)(1)(ii)	Dwell Time on Each Channel Spec.: Max. 0.4 second within 31.6 second	PASS	Meet the requirement of limit
15.247(a)(1)(I)-(ii)	Hopping Channel Separation Spec. : Min. 25 kHz or two-thirds of 20 dB bandwidth, which ever is greater	PASS	Meet the requirement of limit
15.247(a)(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	PASS	Meet the requirement of limit
15.247(c)	Transmitter Radiated Emissions Spec.: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -7.16dB at 71.25MHz.
15.247(c)	Conducted Out-Band Emissions Measurement	PASS	Meet the requirement of limit
15.203	Antenna Requirement	PASS	Antenna connector is U.FL-R-SMT not a standard connector.

2.1 MEASUREMENT UNCERTAINTY

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

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

Measurement	Value
Conducted emissions	2.45 dB
Radiated emissions (30MHz-1GHz)	3.94 dB
Radiated emissions (1GHz -18GHz)	2.49 dB
Radiated emissions (18GHz -40GHz)	2.70 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	WLAN and Bluetooth combo module
MODEL NO.	T77H134
FCC ID	MCLT77H134
POWER SUPPLY	3.3VDC
MODULATION TYPE	For WLAN : CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
	For Bluetooth : GFSK, π/4-DQPSK, 8DPSK
MODULATION TECHNOLOGY	For WLAN : DSSS, OFDM
	For Bluetooth : FHSS
TRANSFER RATE	For WLAN : 802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps
	For Bluetooth : 3/2/1 Mbits/s
FREQUENCY RANGE	For WLAN : 2412MHz ~ 2462MHz
	For Bluetooth :2402MHz ~ 2480MHz
NUMBER OF CHANNEL	For WLAN : 11
	For Bluetooth :79
MAXIMUM OUTPUT POWER (FOR WLAN)	802.11b: 162.2mW 802.11g: 323.6mW
MAXIMUM OUTPUT POWER (FOR Bluetooth)	GFSK: 0.4 mW π/4-DQPSK: 0.2mW 8DPSK: 0.2mW
ANTENNA TYPE	Please see note 1
ANTENNA CONNECTOR	NA
DATA CABLE	NA
I/O PORT	NA
ASSOCIATED DEVICES	NA

NOTE:

1. There are two sets of antennas (four antennas) provided to this EUT, please refer to the following table:

Set	No.	Antenna Type	Net Gain (dBi) include cable loss	Cable Loss (dBi)	Cable Length	Antenna Connector	Note
A	1	PCB Printed	3.37	NA	NA	NA	For WLAN use
	2		3.37	NA	NA		For BT use
B	3	PIFA	4.51	1.083	380mm		For WLAN use
	4		3.51	1.112	390mm		For BT use

2. The EUT was pre-tested in chamber under the following modes:

Pre-test Mode	Description
Mode A	**X-Y plane**
Mode B	Y-Z plane
Mode C	Z-X plane

From the above modes, the worst case was found in **Mode A**. Therefore only the test data of the modes were recorded in this report.

3. The EUT complies with IEEE 802.11g standards, and backwards compatible with IEEE 802.11b products.

4. There are Bluetooth technology and WLAN technology used for the EUT. <the WLAN test data please refer "RF981102H02", and Dual Xmit test data please refer "RF981102H02-2">

5. 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

Operated in 2400 ~ 2483.5MHz band:
For Bluetooth normal mode: Seventy-nine channels are provided to this EUT.

CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE < 1G	RE ³ 1G	APCM	
A	√	√	√	√	PCB Printed antenna
B	-	√	√	√	PIFA antenna

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

RE ³ 1G: Radiated Emission above 1GHz **APCM:** Antenna Port Conducted Measurement

POWER LINE CONDUCTED EMISSION TEST:

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

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

CONFIGURE MODE	MODE
A	Ping mode

RADIATED EMISSION TEST (BELOW 1 GHZ):

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

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

CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
A	0 to 78	0	FHSS	GFSK
B	0 to 78	0	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, data rates and antenna ports (if EUT with antenna diversity architecture).

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

CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
A	0 to 78	0, 39, 78	FHSS	GFSK
B	0 to 78	0, 39, 78	FHSS	GFSK
A	0 to 78	0, 39, 78	FHSS	8DPSK
B	0 to 78	0, 39, 78	FHSS	8DPSK

BANDEDGE MEASUREMENT:

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

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

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

ANTENNA PORT CONDUCTED MEASUREMENT:

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

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

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

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

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	29deg. C, 64%RH, 1016 hPa	120Vac, 60Hz	Frank Liu / Phoenix Huang
RE<1G	29deg. C, 67%RH, 1016 hPa	120Vac, 60Hz	Kent Liu / Wen Yu
PLC	26deg. C, 60%RH, 1016 hPa	120Vac, 60Hz	Kent Liu
APCM	25deg. C, 60%RH, 1016 hPa	120Vac, 60Hz	Eric Lee

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is an RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C. (15.247)

ANSI C63.4-2003

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

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

3.4 DESCRIPTION OF SUPPORT UNITS

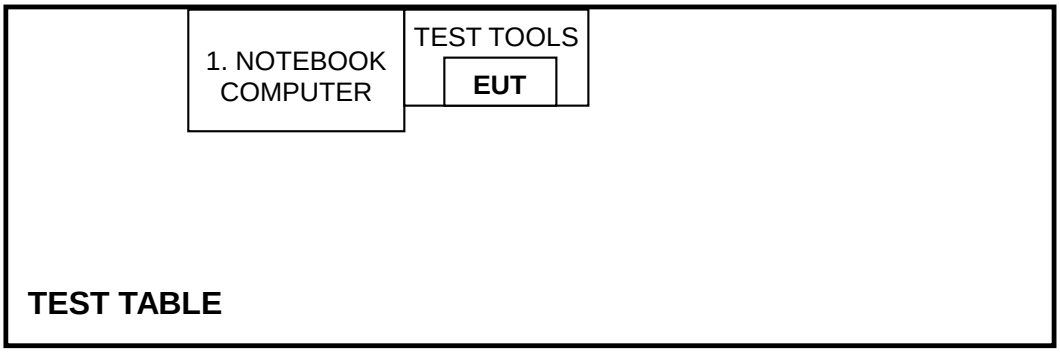
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	IBM	X40	00045-506-217-9	FCC DoC

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

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

3.5 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

NOTE: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Mar. 23, 2009	Mar. 22, 2010
Line-Impedance Stabilization Network (for Peripheral)	ENV-216	100071	Nov. 25, 2009	Nov. 24, 2010
Line-Impedance Stabilization Network (for EUT)	ESH3-Z5	848773/004	Nov. 04, 2009	Nov. 03, 2010
RF Cable (JYEBAO)	5DFB	COBCAB-001	Aug. 14, 2009	Aug. 13, 2010
50 ohms Terminator	50	3	Nov. 04, 2009	Nov. 03, 2010
Software	BV ADT_Cond_V7.3.7	NA	NA	NA

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. B.
3 The VCCI Con B Registration No. is C-2193.

4.1.3 TEST PROCEDURES

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

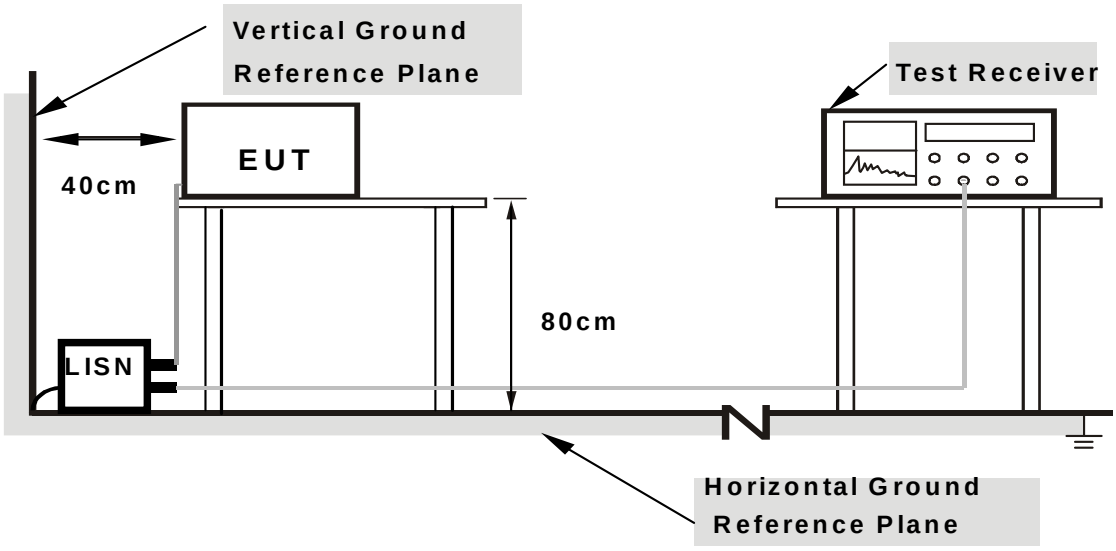
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

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

4.1.6 EUT OPERATING CONDITIONS

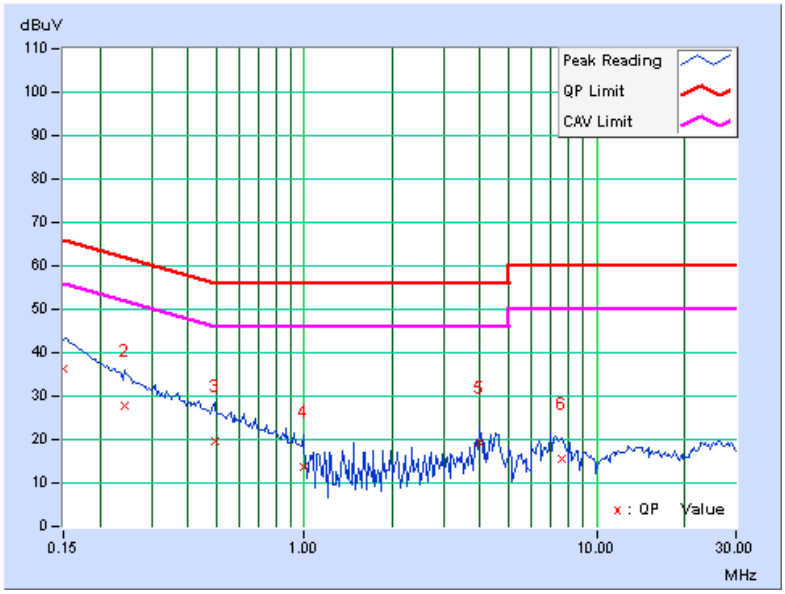
1. Connect the EUT with the support unit 1 (Notebook Computer) which placed on a testing table.
2. The communication partner run test program “DutApiSD868x” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.1.7 TEST RESULTS

PHASE	Line (L)	6dB BANDWIDTH	9 kHz
TEST MODE	Normal made		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.17	36.13	8.47	36.30	8.64	66.00	56.00	-29.70	-47.36
2	0.244	0.18	27.74	17.52	27.92	17.70	61.97	51.97	-34.05	-34.27
3	0.494	0.23	19.41	14.13	19.64	14.36	56.10	46.10	-36.47	-31.75
4	0.994	0.44	13.26	3.20	13.70	3.64	56.00	46.00	-42.30	-42.36
5	3.996	0.62	18.46	9.71	19.08	10.33	56.00	46.00	-36.92	-35.67
6	7.613	0.85	14.78	0.08	15.63	0.93	60.00	50.00	-44.37	-49.07

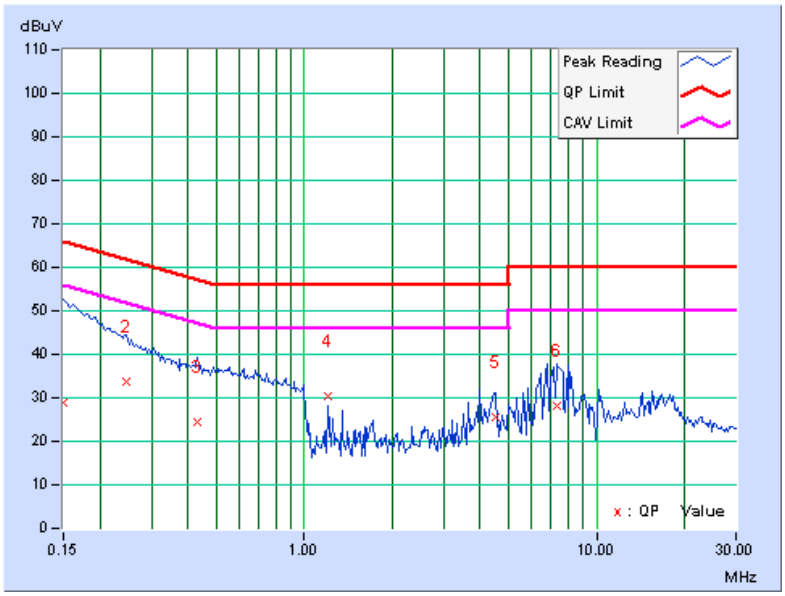
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz
TEST MODE	Normal made		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	9.68	19.28	-	28.96	-	66.00	56.00	-37.04	-
2	**0.248**	**9.69**	**24.16**	**-**	**33.85**	**-**	**61.84**	**51.84**	**-27.98**	**-**
3	0.431	9.71	14.76	-	24.47	-	57.23	47.23	-32.76	-
4	1.211	9.86	20.35	-	30.21	-	56.00	46.00	-25.79	-
5	4.504	9.87	15.62	-	25.49	-	56.00	46.00	-30.51	-
6	7.324	10.06	18.17	-	28.23	-	60.00	50.00	-31.77	-

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



4.2 NUMBER OF HOPPING FREQUENCY USED

4.2.1 LIMIT OF HOPPING FREQUENCY USED

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

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 09, 2009	Aug. 08, 2010

NOTE:

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

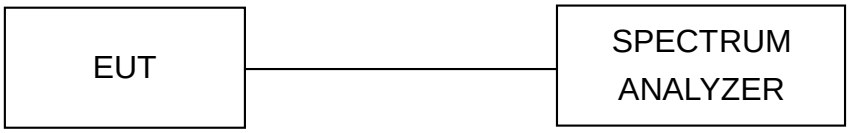
4.2.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. 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.
3. 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.
4. Set the SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

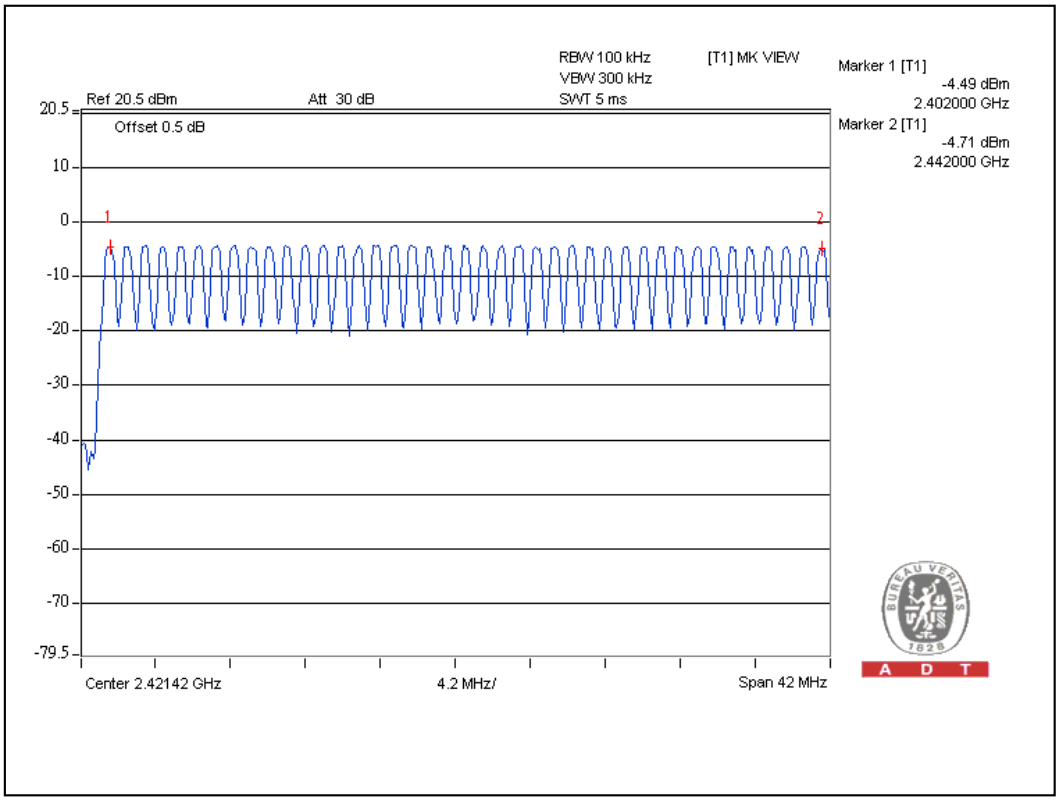
4.2.5 TEST SETUP

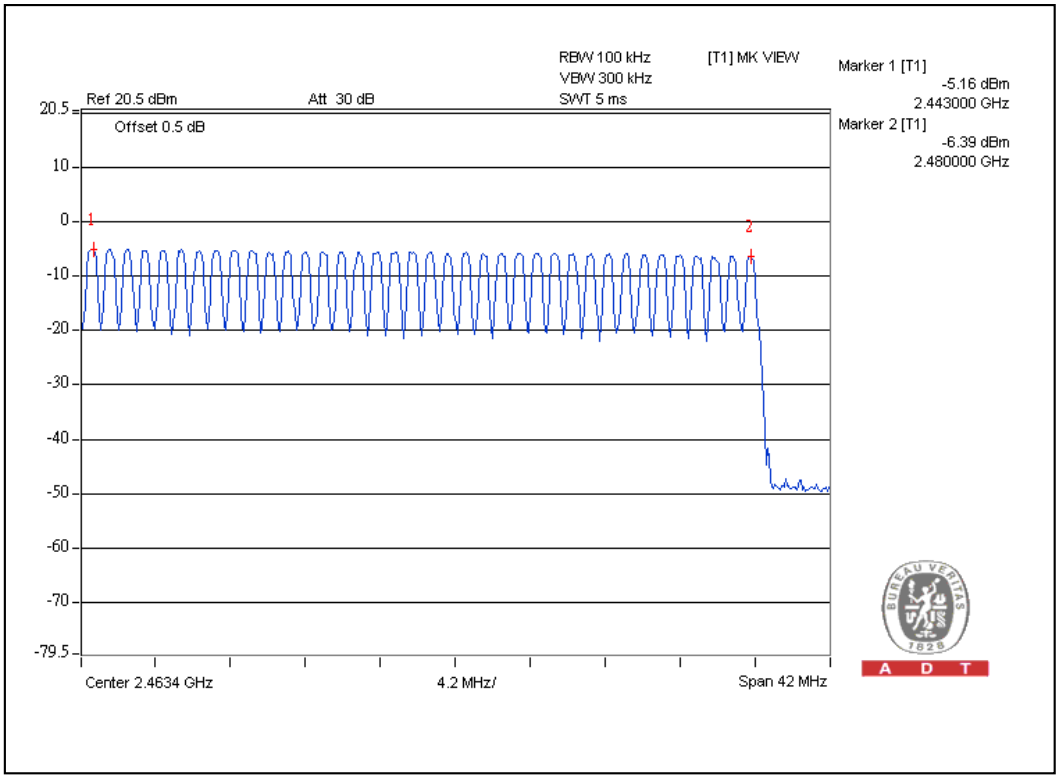


4.2.6 TEST RESULTS

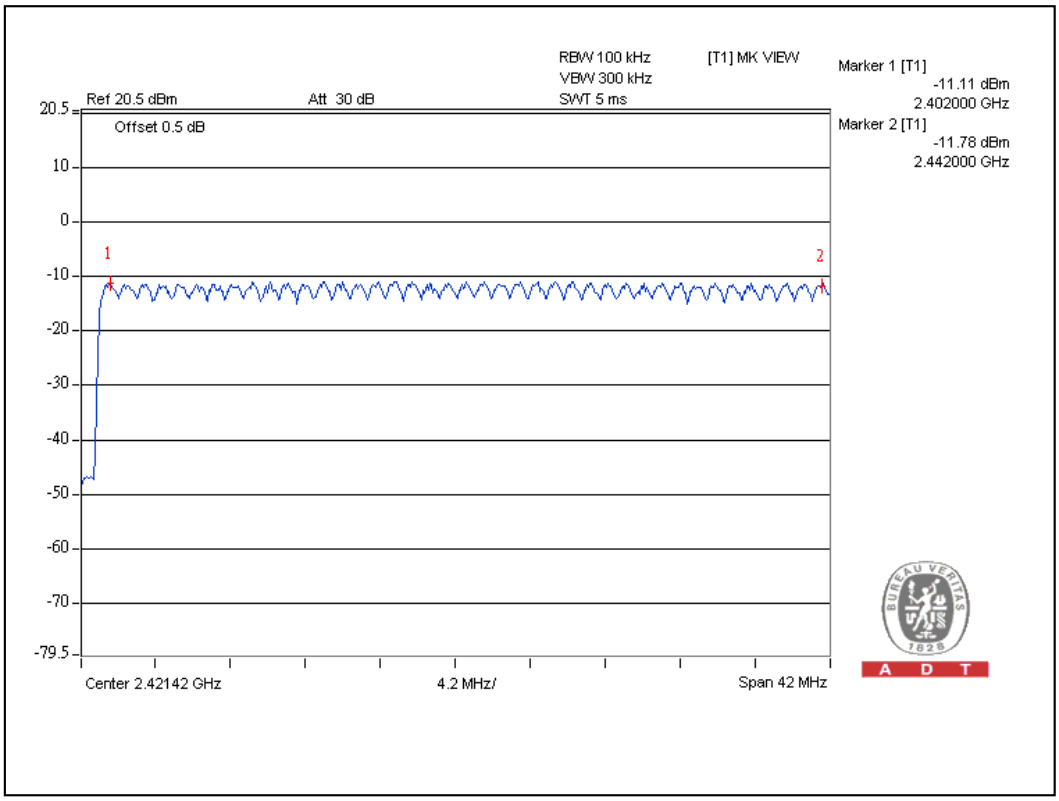
There are 79 hopping frequencies in the hopping mode. Please refer to next pages for the test result. On the plots, it shows that the hopping frequencies are equally spaced.

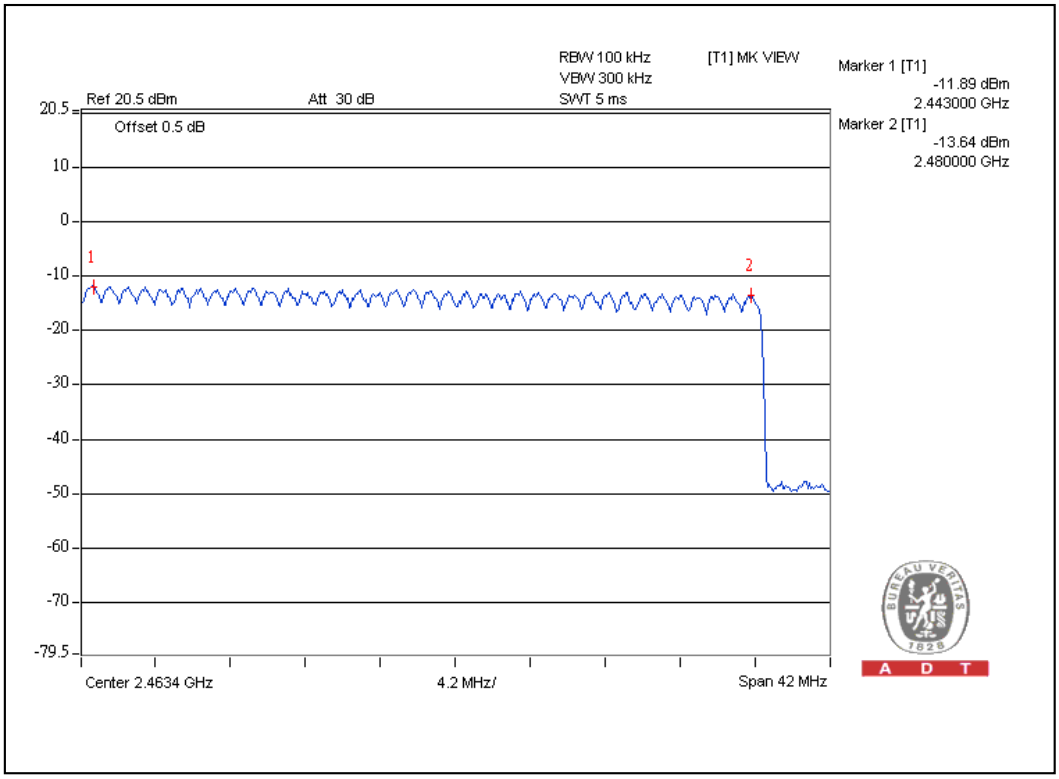
For GFSK :


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-4.49 dBm
2.402000 GHz
Marker 2 [T1]
-4.71 dBm
2.442000 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.42142 GHz
4.2 MHz/
Span 42 MHz

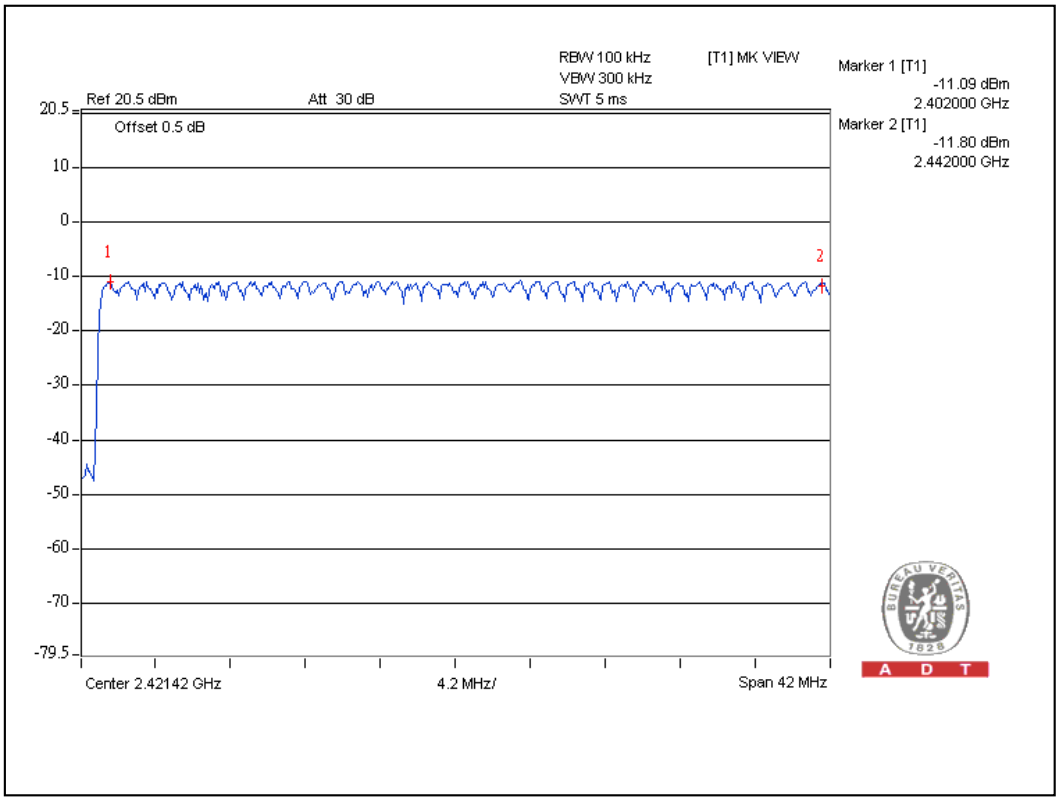

RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-5.16 dBm
2.443000 GHz
Marker 2 [T1]
-6.39 dBm
2.480000 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.4634 GHz
4.2 MHz/
Span 42 MHz

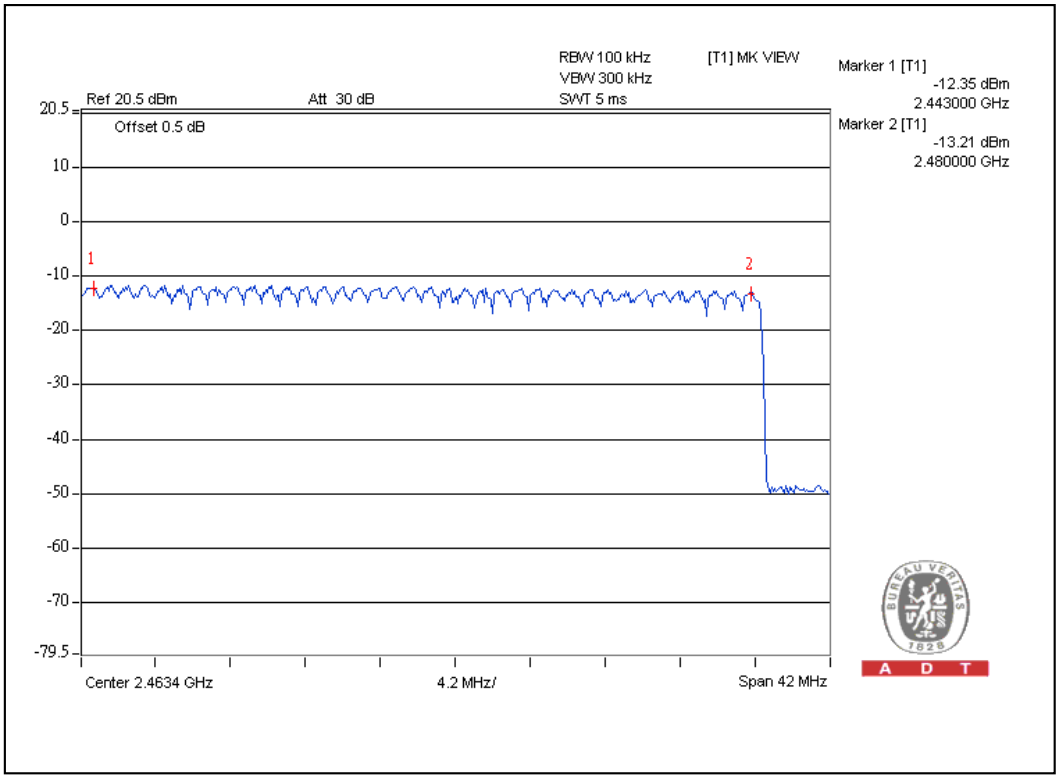
For π/4-DQPSK :





For 8DPSK :


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-11.09 dBm
2.402000 GHz
Marker 2 [T1]
-11.80 dBm
2.442000 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.42142 GHz
4.2 MHz/
Span 42 MHz


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MK VIEW
Marker 1 [T1]
-12.35 dBm
2.443000 GHz
Marker 2 [T1]
-13.21 dBm
2.480000 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Center 2.4634 GHz
4.2 MHz/
Span 42 MHz

4.3 DWELL TIME ON EACH CHANNEL

4.3.1 LIMIT OF DWELL TIME USED

For FHSS, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 31.6 second period. For hybrid systems, the average time of occupancy on any frequency should not exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 09, 2009	Aug. 08, 2010

NOTE:

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

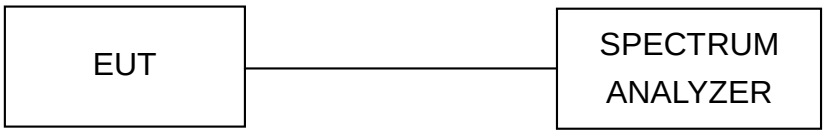
4.3.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. 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.
3. 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.
4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
5. 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

For GFSK :

Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	48 (times / 5 sec) *6.32=303.36 times	0.448	135.91	400
DH3	23 (times / 5 sec) *6.32=145.36 times	1.7	247.1	400
DH5	12 (times / 5 sec) *6.32=75.84 times	3.01	228.3	400

For π/4-DQPSK :

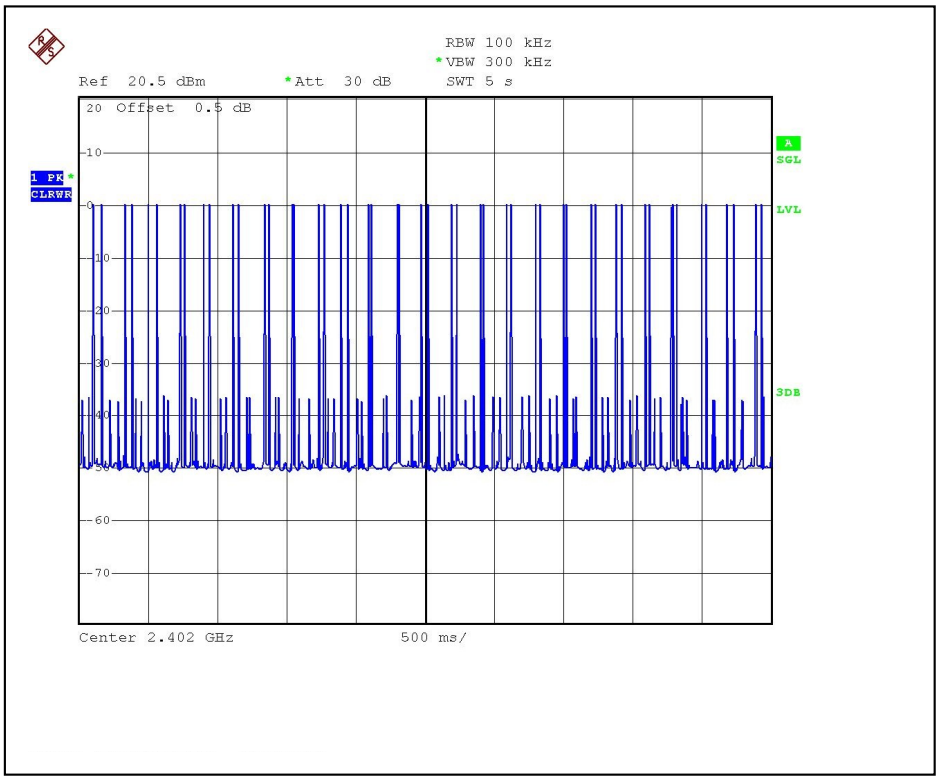
Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	48 (times / 5 sec) *6.32=303.36 times	0.51	154.7	400
DH3	26 (times / 5 sec) *6.32=164.32 times	1.7	279.3	400
DH5	16 (times / 5 sec) *6.32=101.12 times	3.0	303.4	400

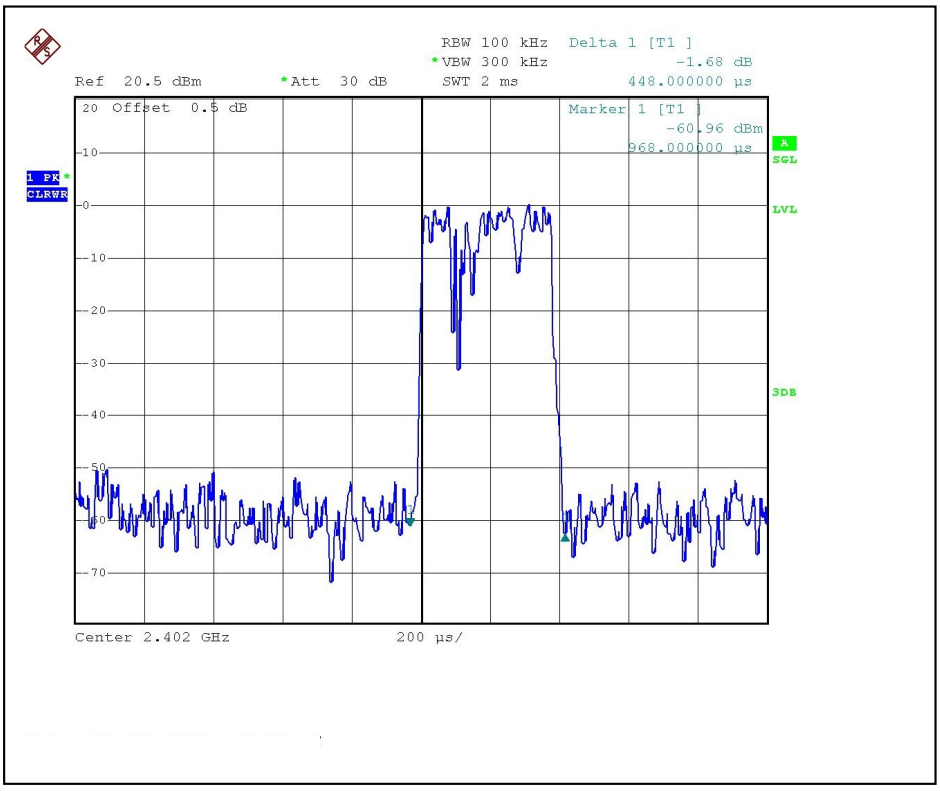
For 8DPSK :

Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	50 (times / 5 sec) *6.32=316 times	0.47	148.5	400
DH3	22 (times / 5 sec) *6.32=139.04 times	1.72	239.1	400
DH5	15 (times / 5 sec) *6.32=94.8 times	3.01	285.3	400

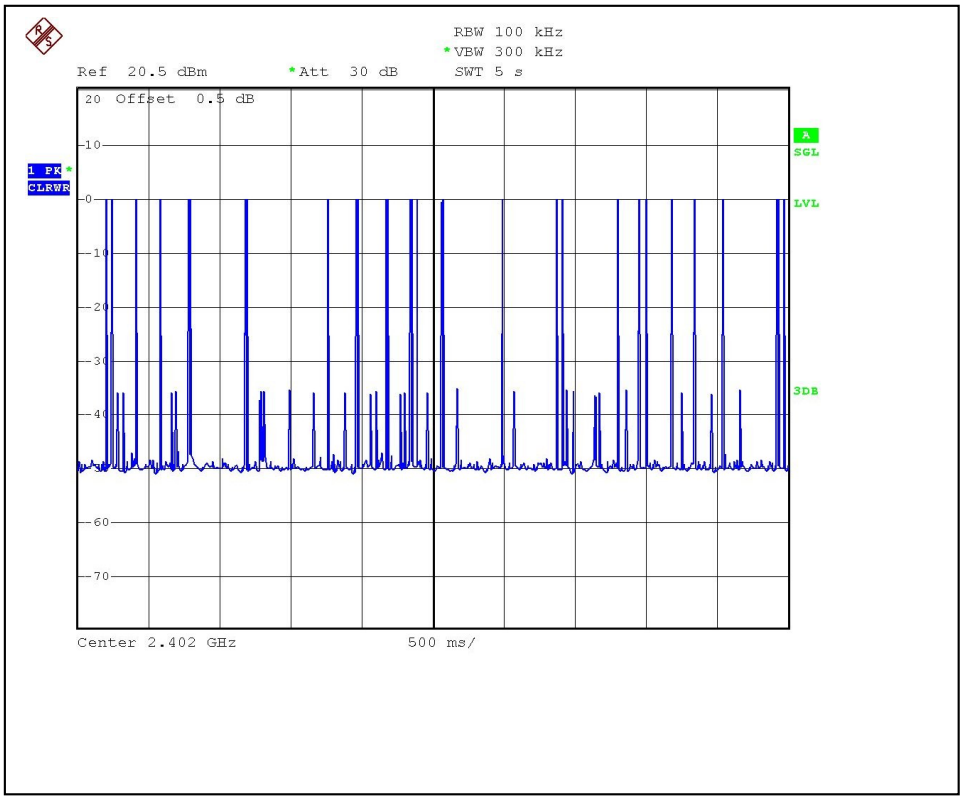
Test plots of the transmitting time slot are shown on next nine pages.

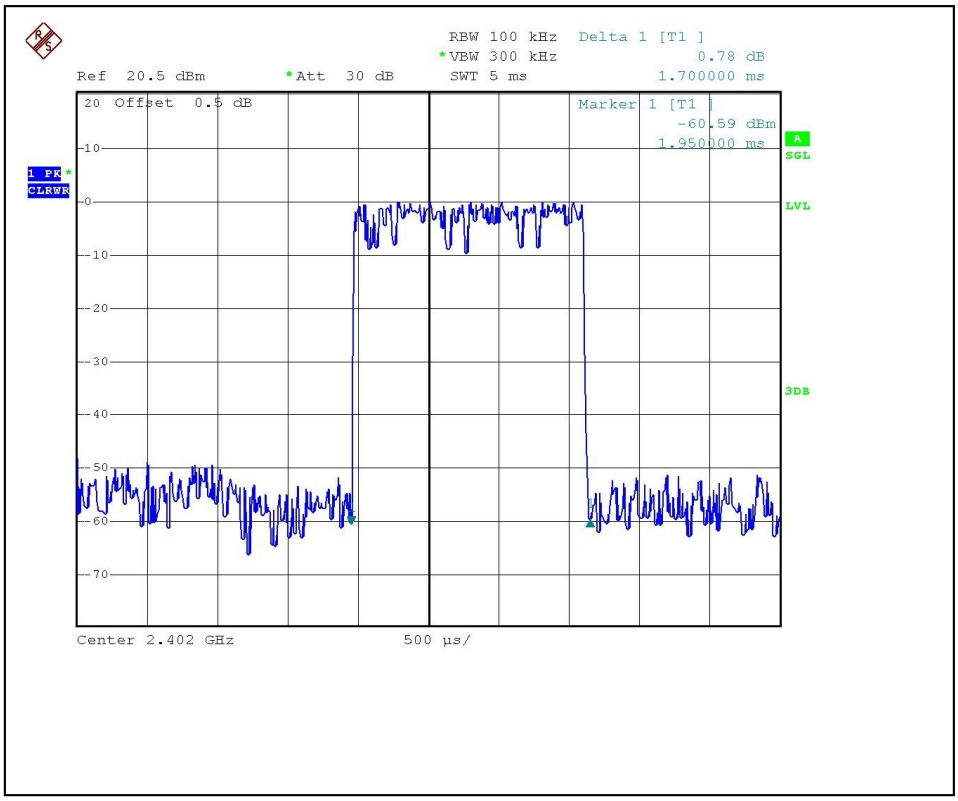
For GFSK :
DH1


RBW 100 kHz
*VBW 300 kHz
Ref 20.5 dBm
*Att 30 dB
SWT 5 s
20 Offset 0.5 dB
1 PK
CLRWR
A
SGL
LVL
3DB
Center 2.402 GHz
500 ms/

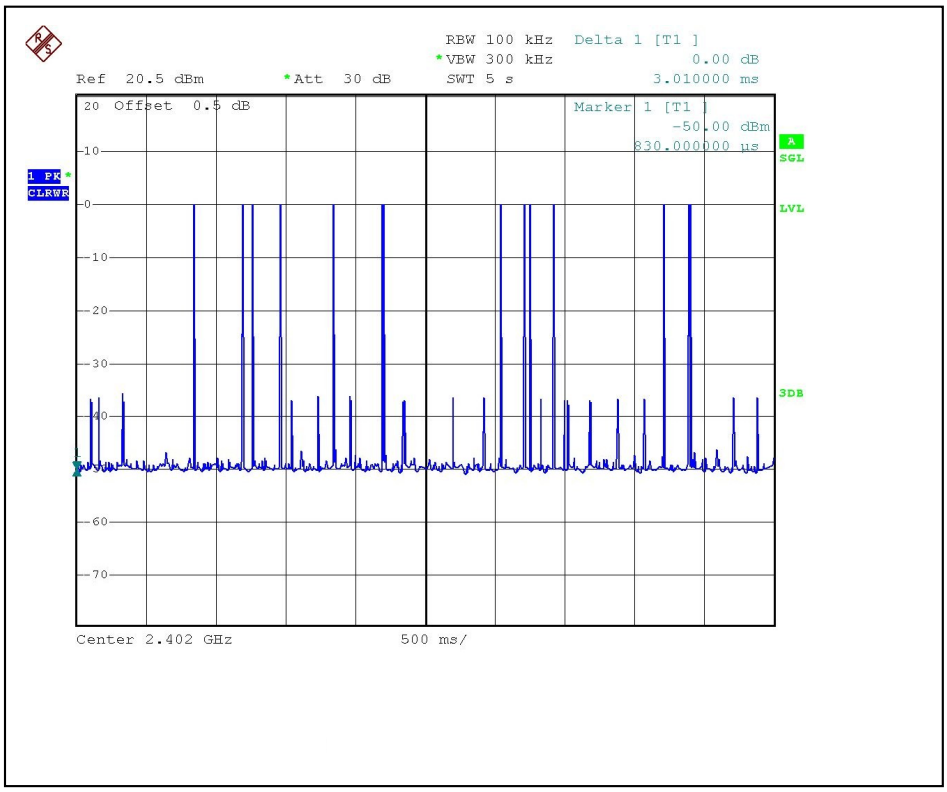

RBW 100 kHz
Delta 1 [T1]
*VBW 300 kHz
-1.68 dB
Ref 20.5 dBm
*Att 30 dB
SWT 2 ms
448.000000 µs
20 Offset 0.5 dB
Marker 1 [T1]
-60.96 dBm
968.000000 µs
1 PK
CLRWR
A
SGL
LVL
3DB
Center 2.402 GHz
200 µs/

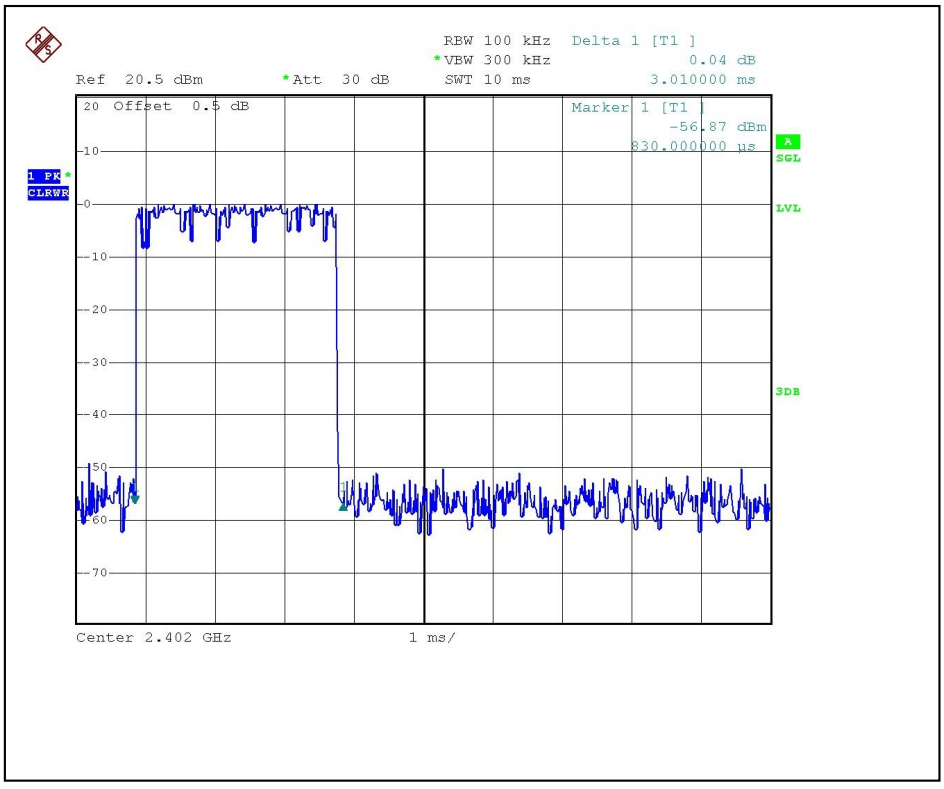
DH3


RBW 100 kHz
*VBW 300 kHz
Ref 20.5 dBm
*Att 30 dB
SWT 5 s
20 Offset 0.5 dB
1 PK *
CLRWR
A
SGL
LVL
3DB
Center 2.402 GHz
500 ms/

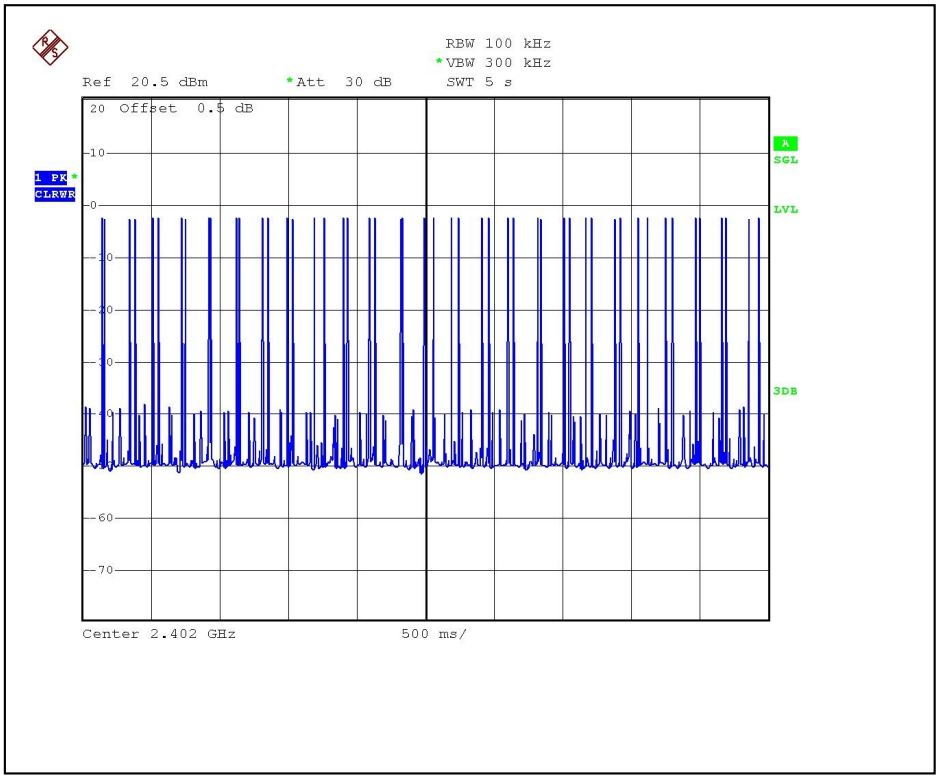

RBW 100 kHz
Delta 1 [T1]
*VBW 300 kHz
0.78 dB
Ref 20.5 dBm
*Att 30 dB
SWT 5 ms
1.700000 ms
20 Offset 0.5 dB
Marker 1 [T1]
-60.59 dBm
1.950000 ms
1 PK *
CLRWR
A
SGL
LVL
3DB
Center 2.402 GHz
500 µs/

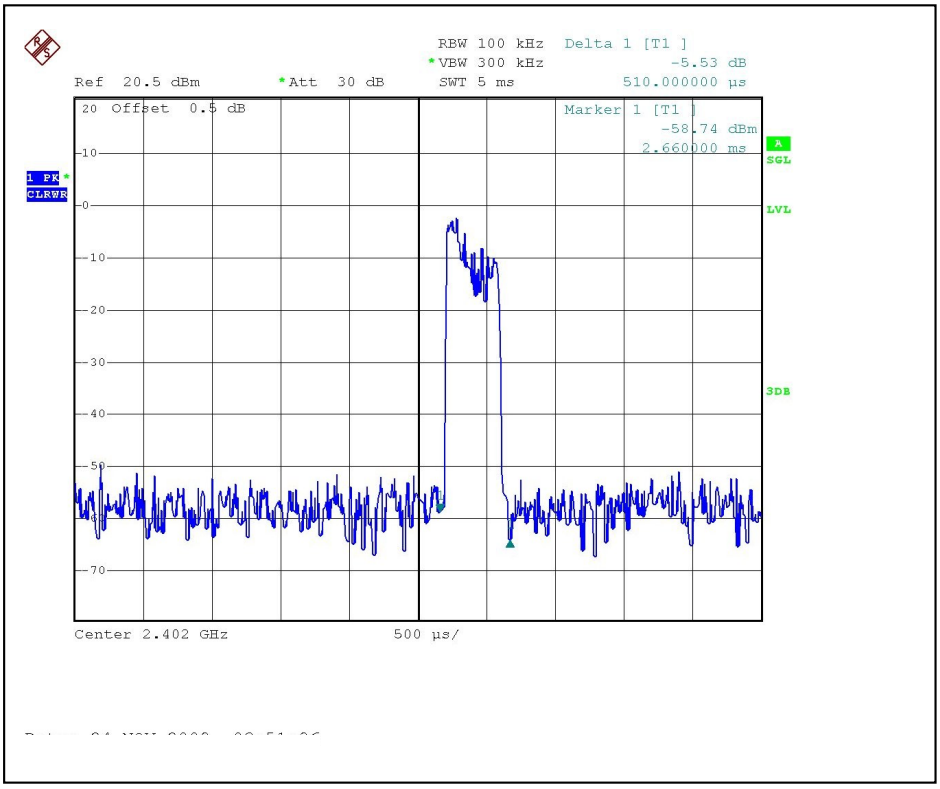
DH5


RBW 100 kHz
*VBW 300 kHz
SWT 5 s
Delta 1 [T1]
0.00 dB
3.010000 ms
Ref 20.5 dBm
*Att 30 dB
20 Offset 0.5 dB
Marker 1 [T1]
-50.00 dBm
830.000000 µs
1 PK*
CLRWR
A
SGL
LVL
3DB
Center 2.402 GHz
500 ms/

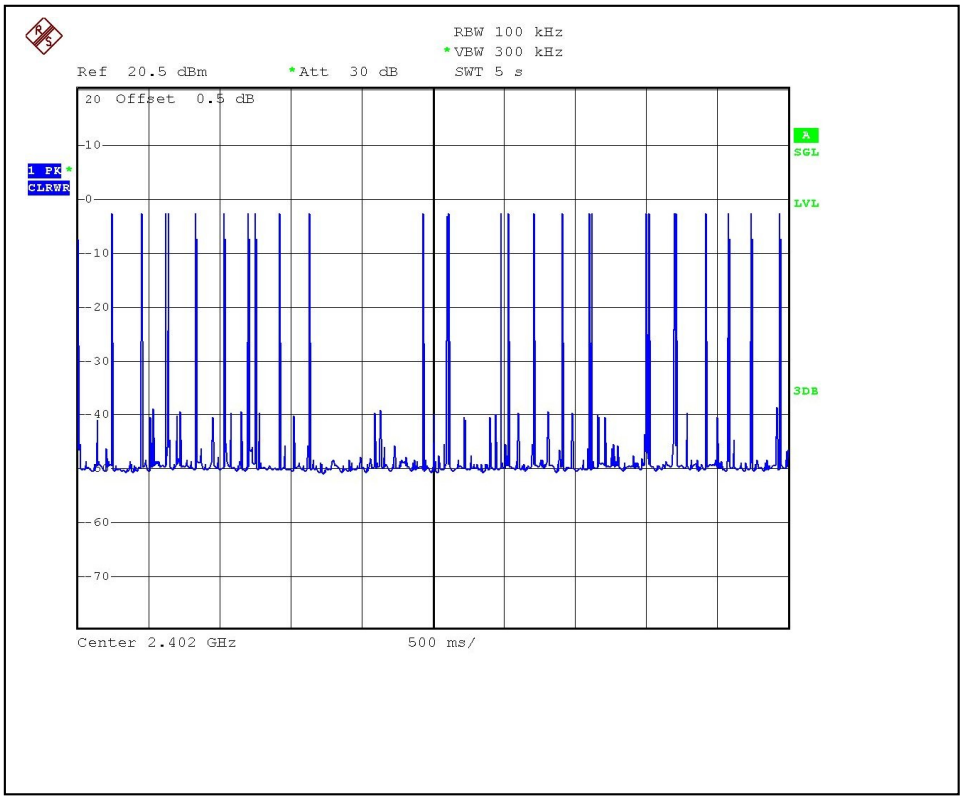

RBW 100 kHz
*VBW 300 kHz
SWT 10 ms
Delta 1 [T1]
0.04 dB
3.010000 ms
Ref 20.5 dBm
*Att 30 dB
20 Offset 0.5 dB
Marker 1 [T1]
-56.87 dBm
830.000000 µs
1 PK*
CLRWR
A
SGL
LVL
3DB
Center 2.402 GHz
1 ms/

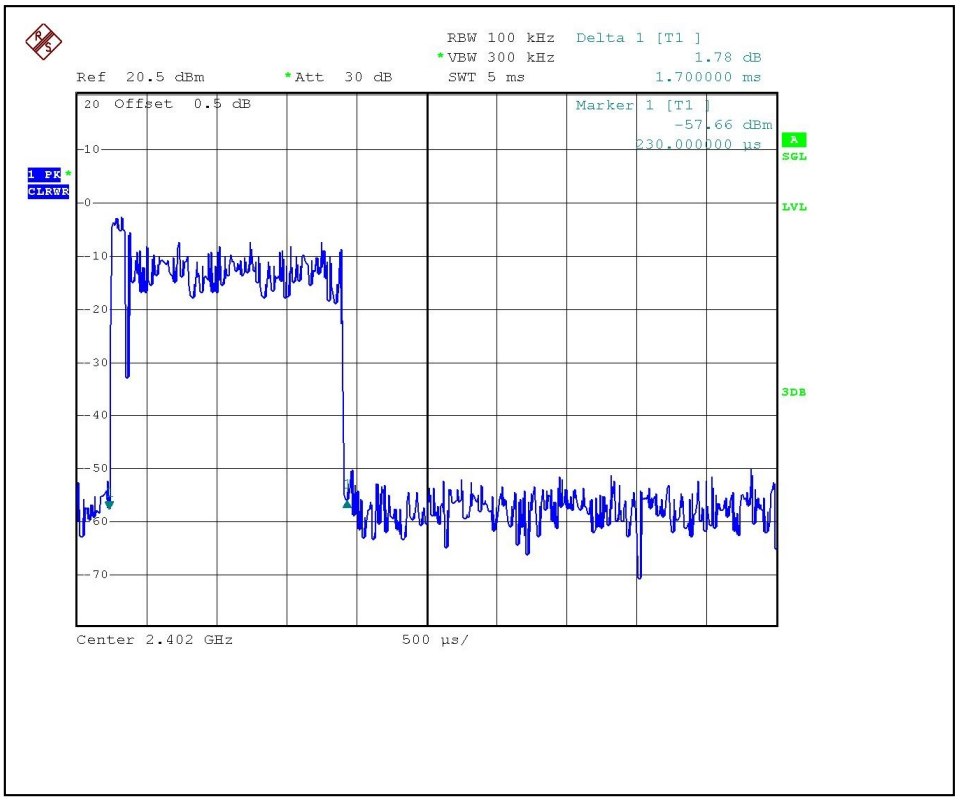
For π/4-DQPSK :
DH1



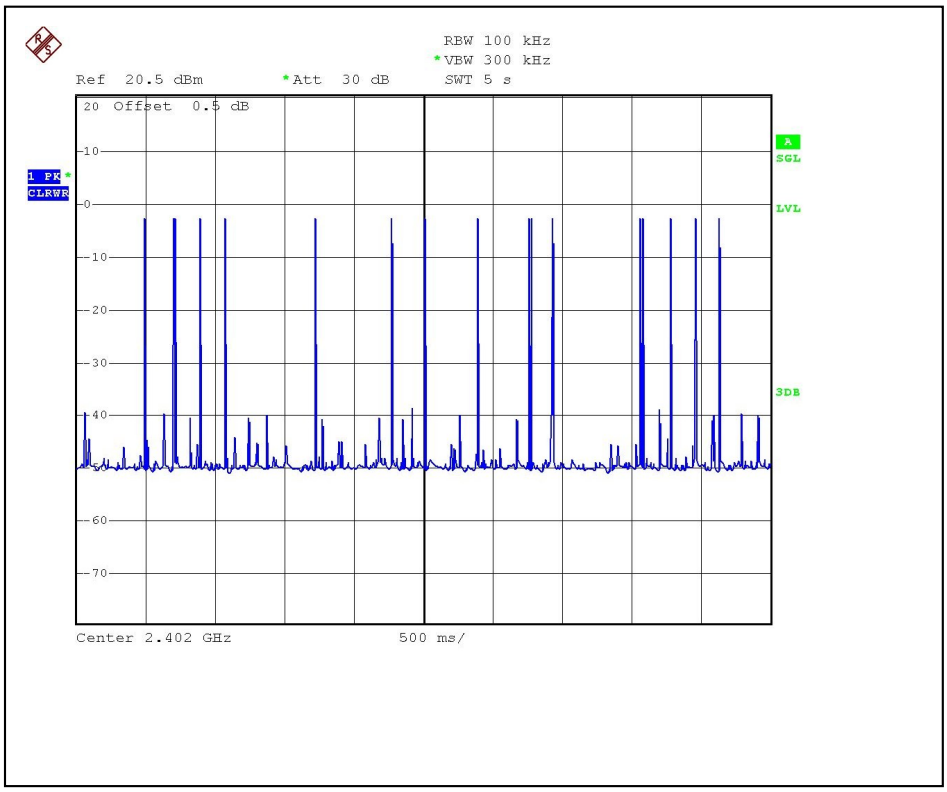


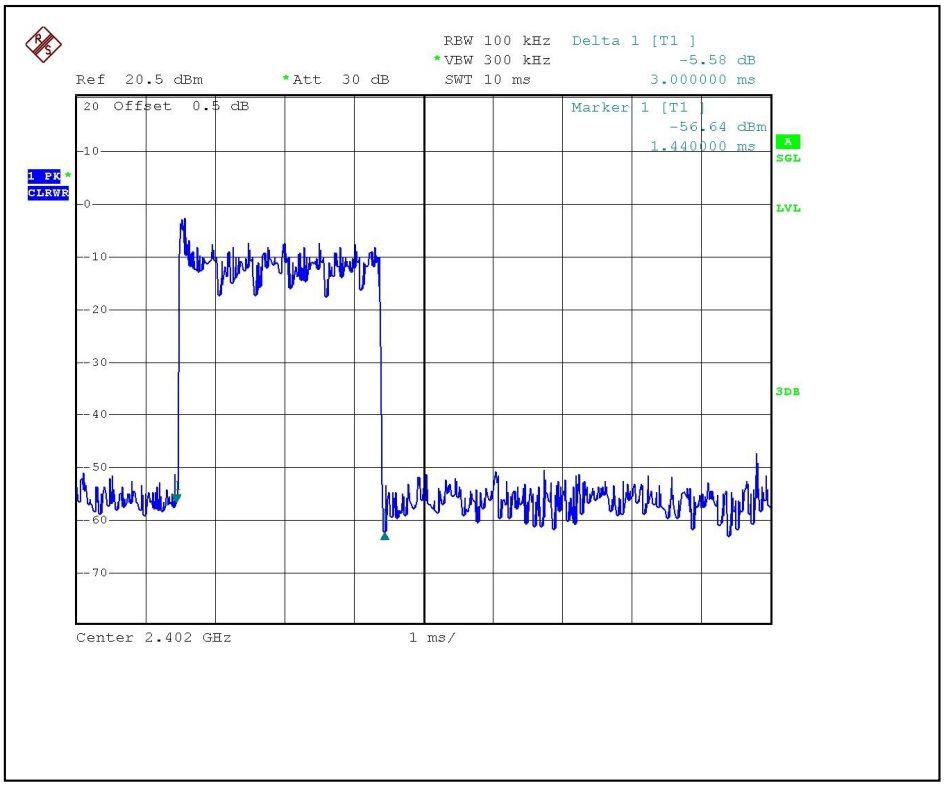
DH3


RBW 100 kHz
VBW 300 kHz
Ref 20.5 dBm
Att 30 dB
SWT 5 s
20 Offset 0.5 dB
1 PK
CLRWR
SGL
LVL
3DB
Center 2.402 GHz
500 ms/

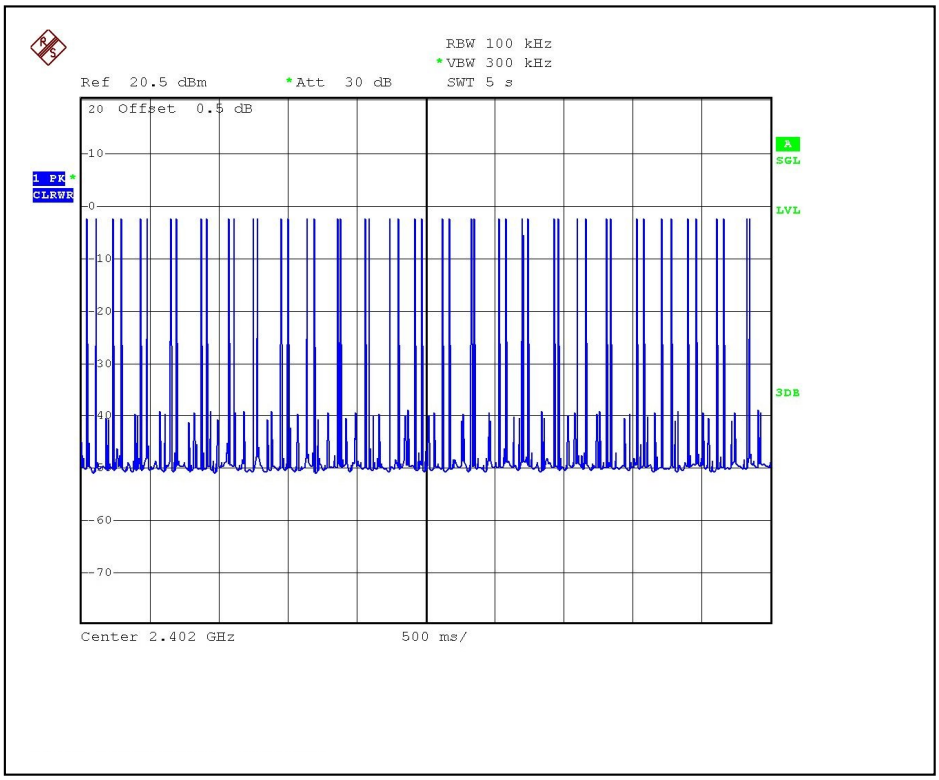

RBW 100 kHz
VBW 300 kHz
Ref 20.5 dBm
Att 30 dB
SWT 5 ms
Delta 1 [T1]
1.78 dB
1.700000 ms
Marker 1 [T1]
-57.66 dBm
230.000000 µs
20 Offset 0.5 dB
1 PK
CLRWR
SGL
LVL
3DB
Center 2.402 GHz
500 µs/

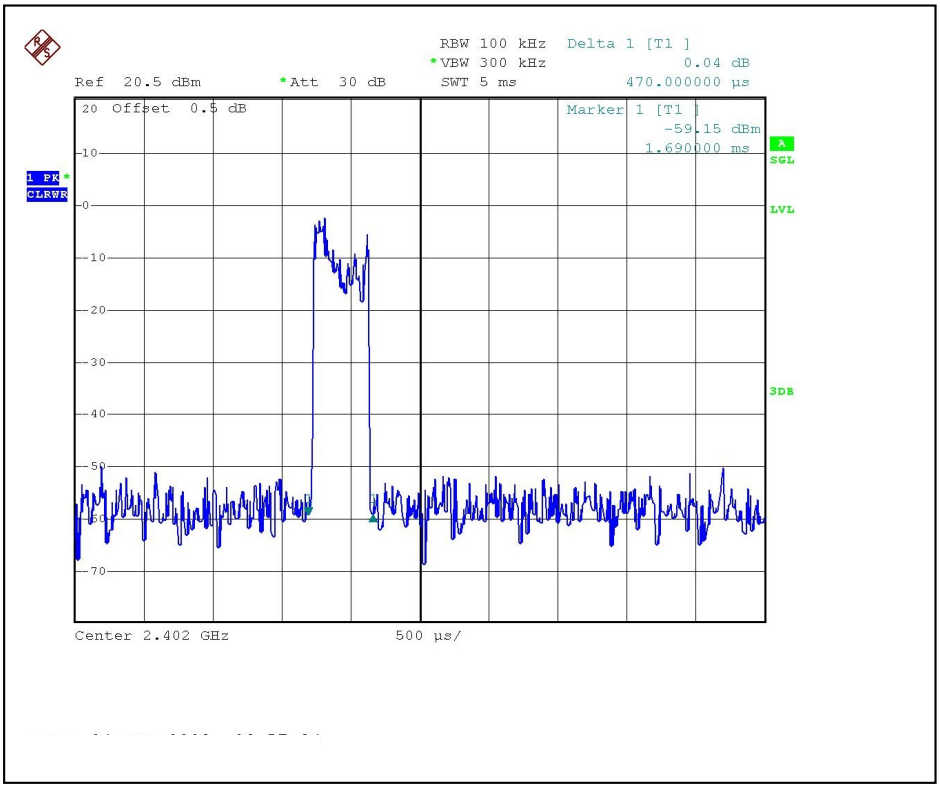
DH5


RBW 100 kHz
*VBW 300 kHz
Ref 20.5 dBm
*Att 30 dB
SWT 5 s
20 Offset 0.5 dB
1 PK*
CLRWR
A
SGL
LVL
3DB
Center 2.402 GHz
500 ms/

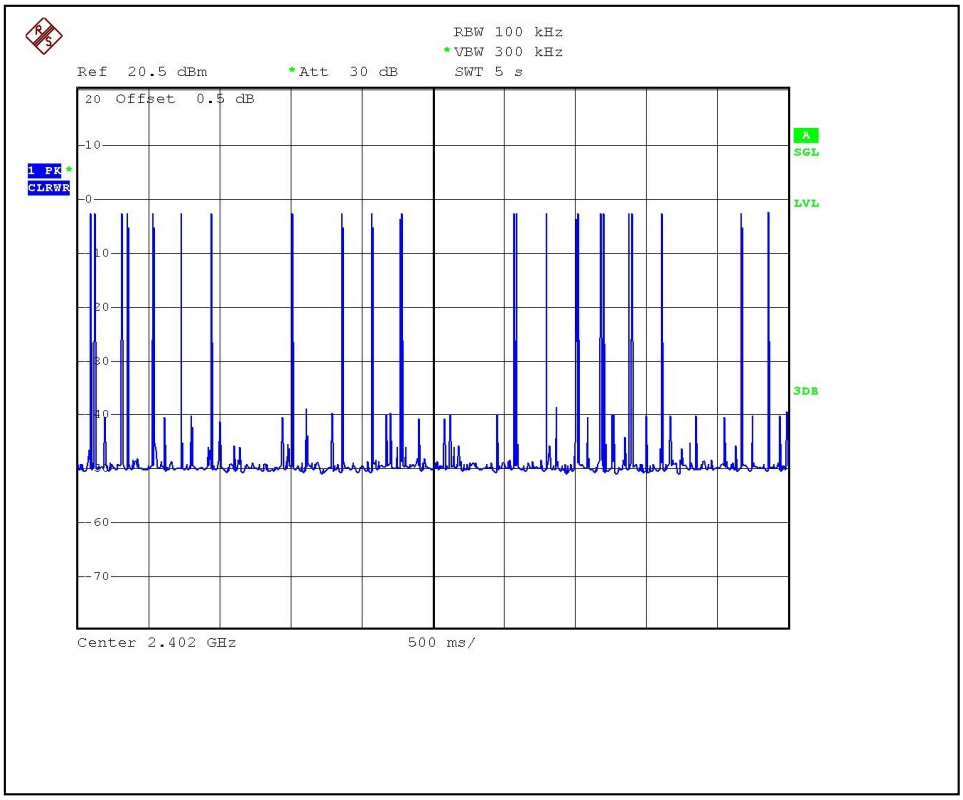

RBW 100 kHz
Delta 1 [T1]
*VBW 300 kHz
-5.58 dB
Ref 20.5 dBm
*Att 30 dB
SWT 10 ms
3.000000 ms
20 Offset 0.5 dB
Marker 1 [T1]
-56.64 dBm
1.440000 ms
1 PK*
CLRWR
A
SGL
LVL
3DB
Center 2.402 GHz
1 ms/

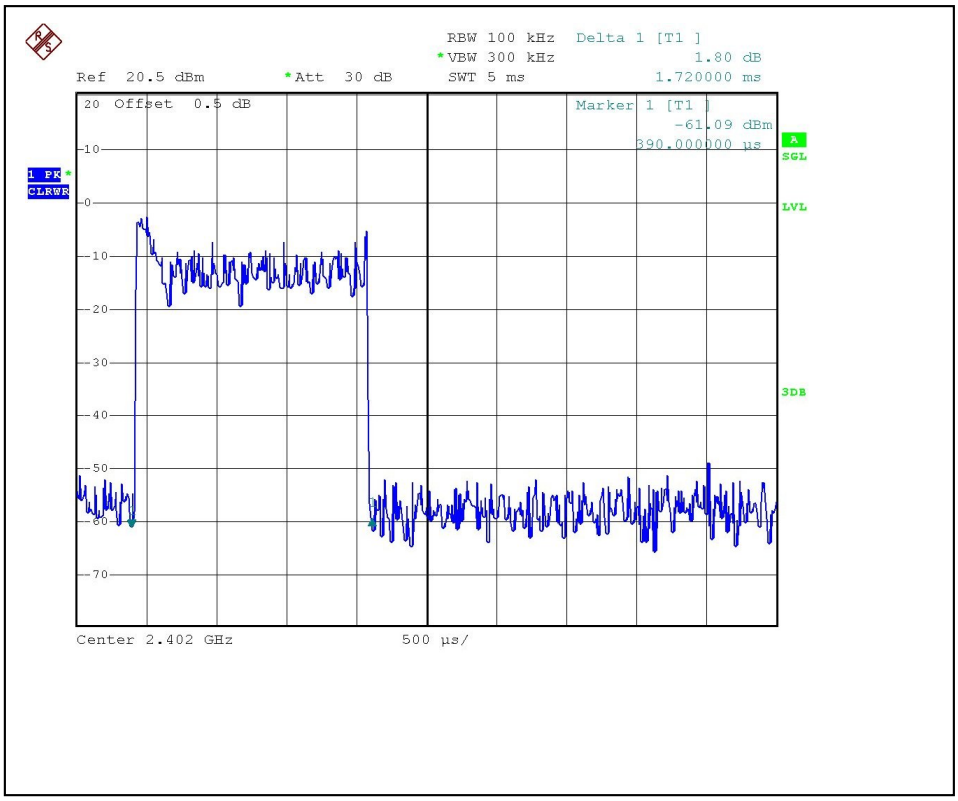
For 8DPSK :
DH1



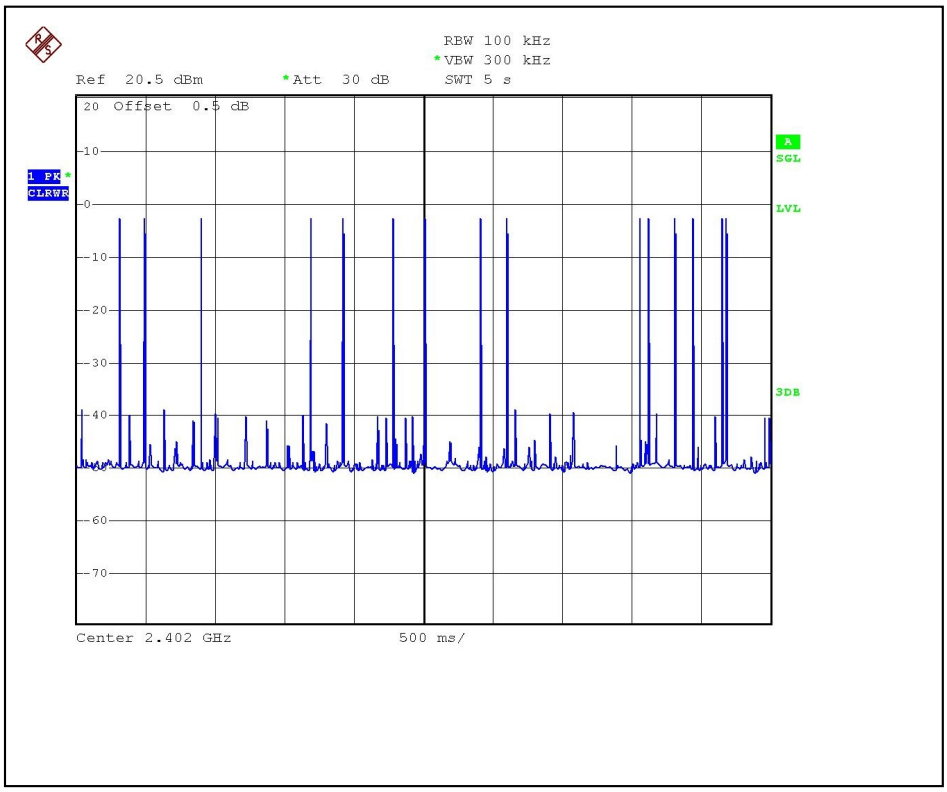


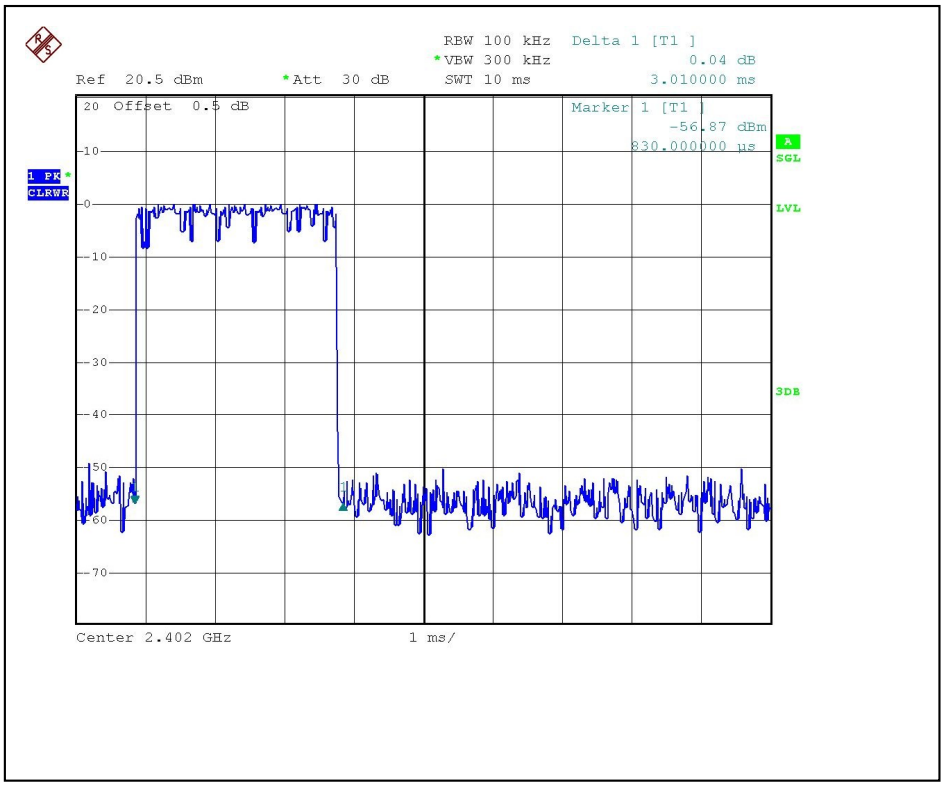
DH3


RBW 100 kHz
*VBW 300 kHz
Ref 20.5 dBm
*Att 30 dB
SWT 5 s
20 Offset 0.5 dB
1 PK
CLRWR
SGL
LVL
3DB
Center 2.402 GHz
500 ms/


RBW 100 kHz
Delta 1 [T1]
*VBW 300 kHz
1.80 dB
Ref 20.5 dBm
*Att 30 dB
SWT 5 ms
1.720000 ms
20 Offset 0.5 dB
Marker 1 [T1]
-61.09 dBm
390.000000 µs
1 PK
CLRWR
SGL
LVL
3DB
Center 2.402 GHz
500 µs/

DH5


RBW 100 kHz
*VBW 300 kHz
Ref 20.5 dBm
*Att 30 dB
SWT 5 s
20 Offset 0.5 dB
1 PK*
CLRWR
A
SGL
LVL
3DB
Center 2.402 GHz
500 ms/


RBW 100 kHz
Delta 1 [T1]
*VBW 300 kHz
0.04 dB
Ref 20.5 dBm
*Att 30 dB
SWT 10 ms
3.010000 ms
20 Offset 0.5 dB
Marker 1 [T1]
-56.87 dBm
830.000000 µs
1 PK*
CLRWR
A
SGL
LVL
3DB
Center 2.402 GHz
1 ms/

4.4 CHANNEL BANDWIDTH

4.4.1 LIMITS OF CHANNEL BANDWIDTH

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

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 09, 2009	Aug. 08, 2010

NOTE:

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

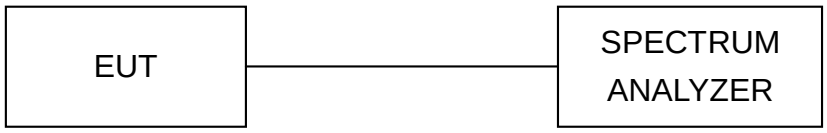
4.4.3 TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITION

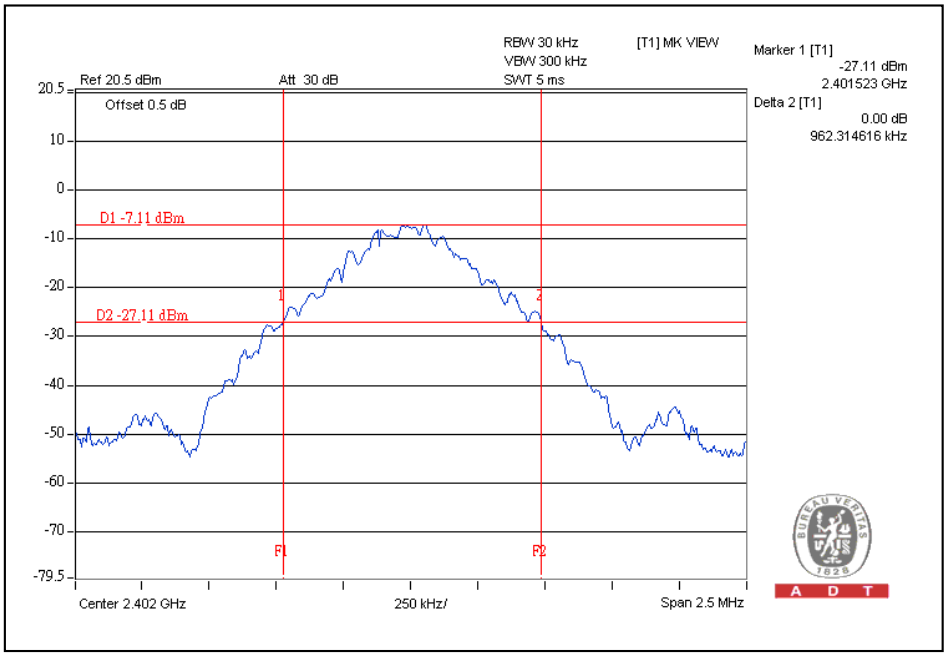
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.4.7 TEST RESULTS

For GFSK :

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (kHz)
0	2402	962
39	2441	961
78	2480	960

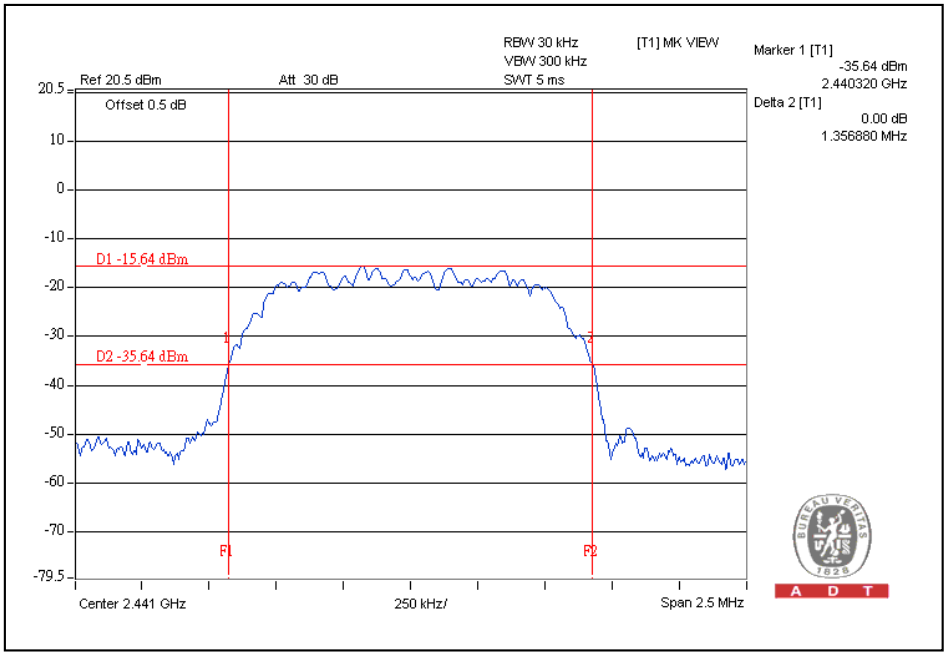
Channel 0



For π/4-DQPSK :

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (kHz)
0	2402	1354
39	2441	1357
78	2480	1357

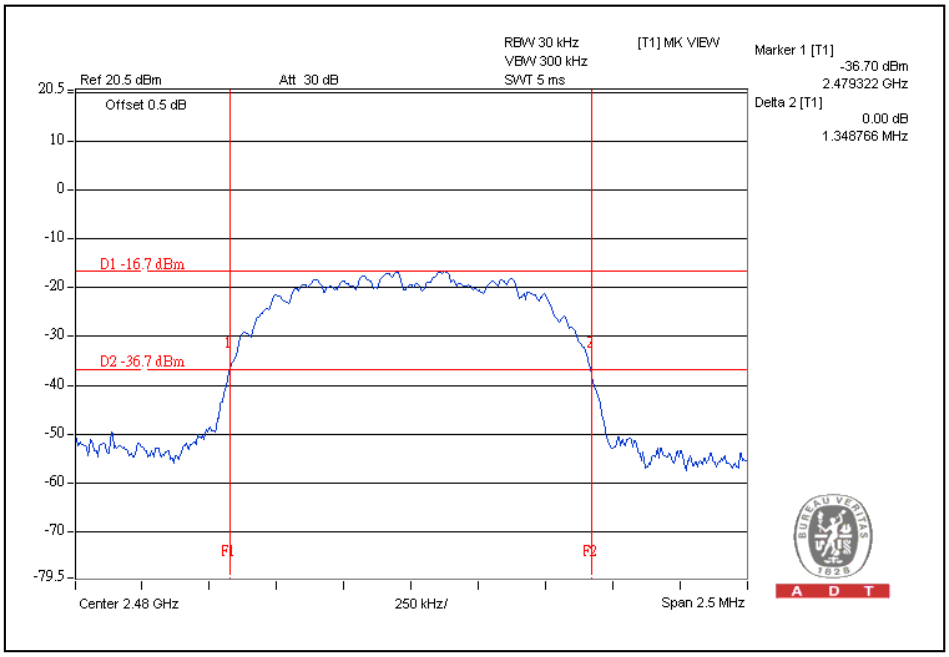
Channel 39



For 8DPSK :

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (kHz)
0	2402	1346
39	2441	1346
78	2480	1349

Channel 78



4.5 HOPPING CHANNEL SEPARATION

4.5.1 LIMIT OF HOPPING CHANNEL SEPARATION

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

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 09, 2009	Aug. 08, 2010

NOTE:

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

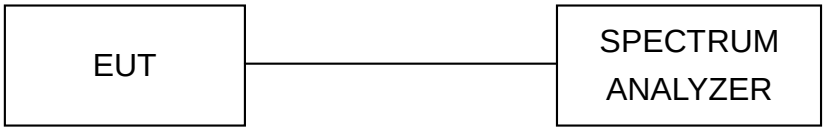
4.5.3 TEST PROCEDURES

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.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



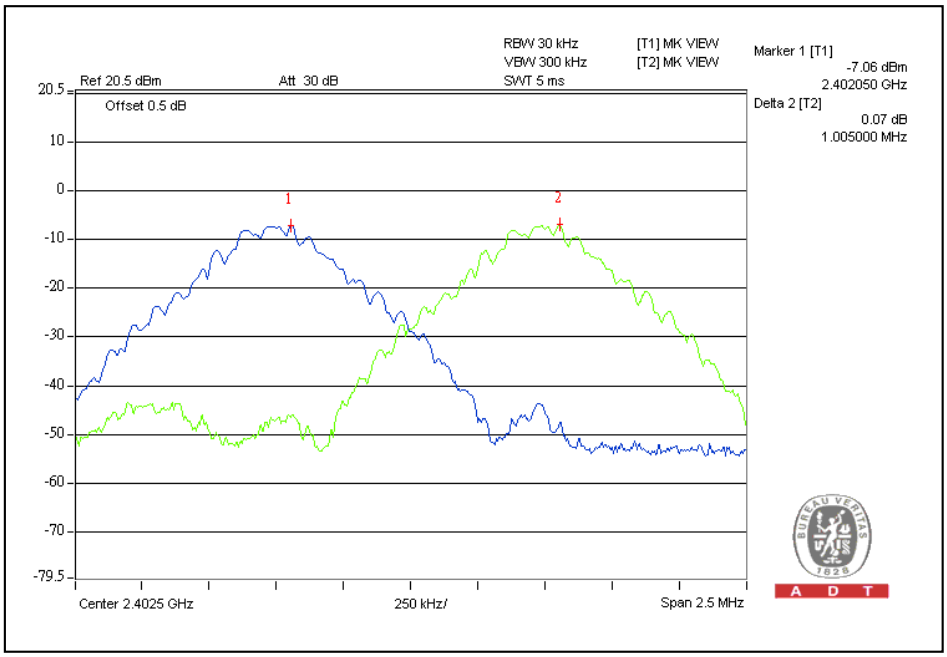
4.5.6 TEST RESULTS

For GFSK :

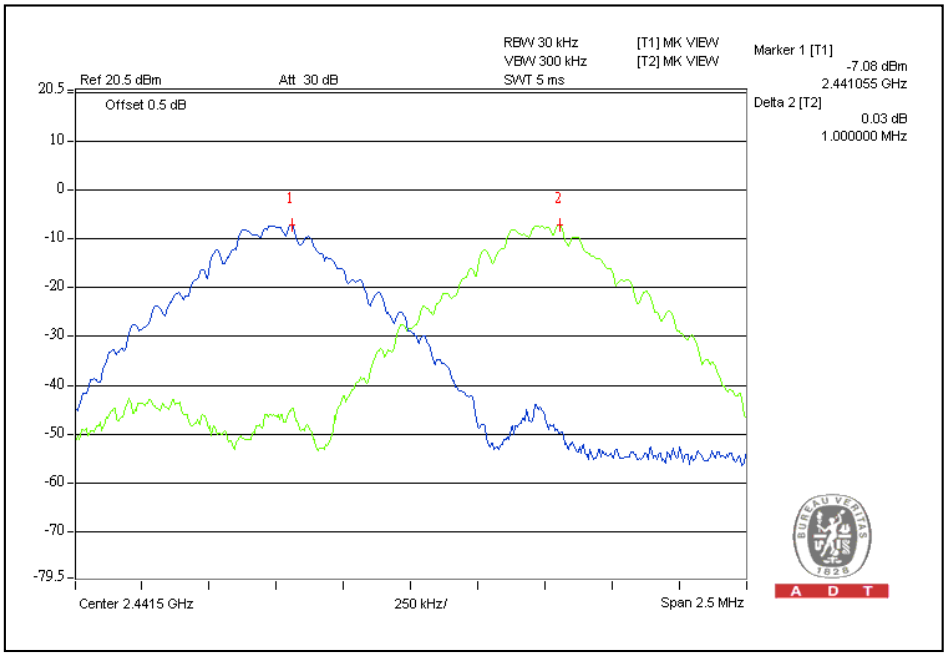
Channel	Frequency (MHz)	Adjacent Channel Separation (kHz)	Minimum Limit (kHz)	Pass / Fail
0	2402	1005	641	PASS
39	2441	1000	641	PASS
78	2480	1000	640	PASS

The minimum limit is two-thirds of 20dB bandwidth. Test results please refer to below and next page.

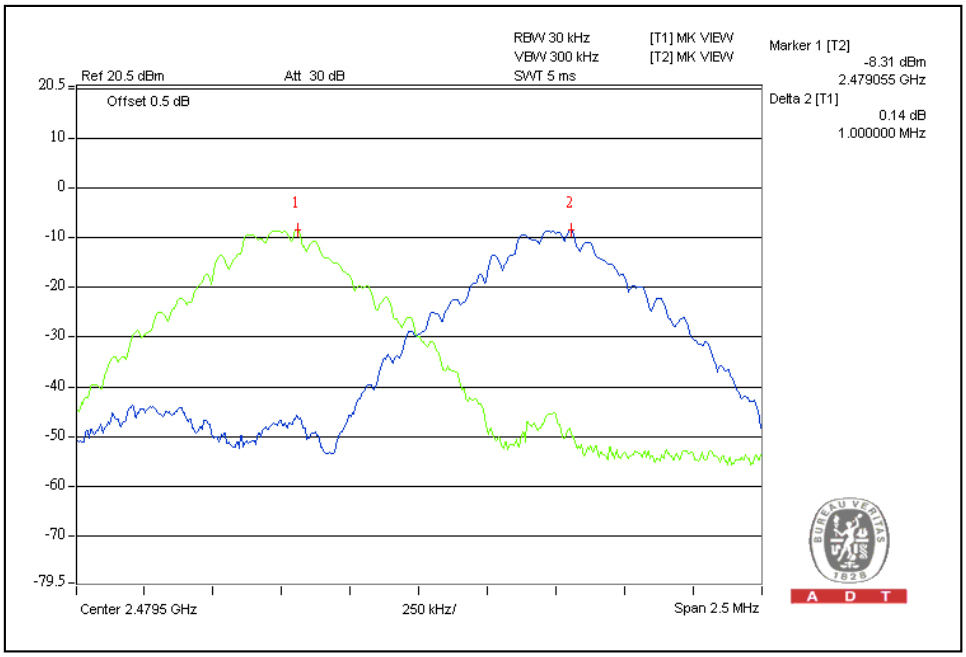
Channel 0



Channel 39



Channel 78

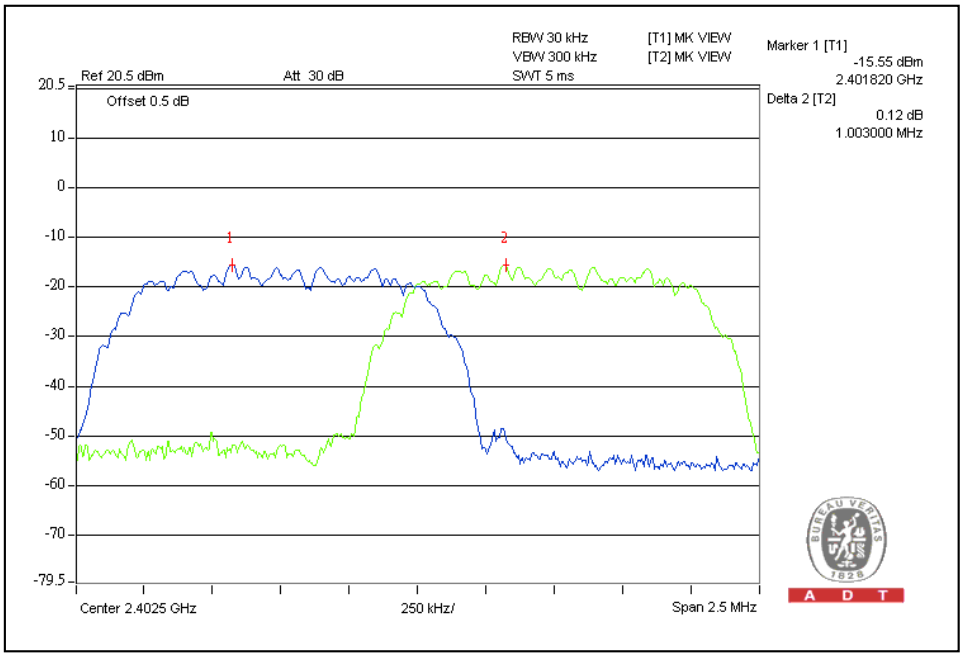


For π/4-DQPSK :

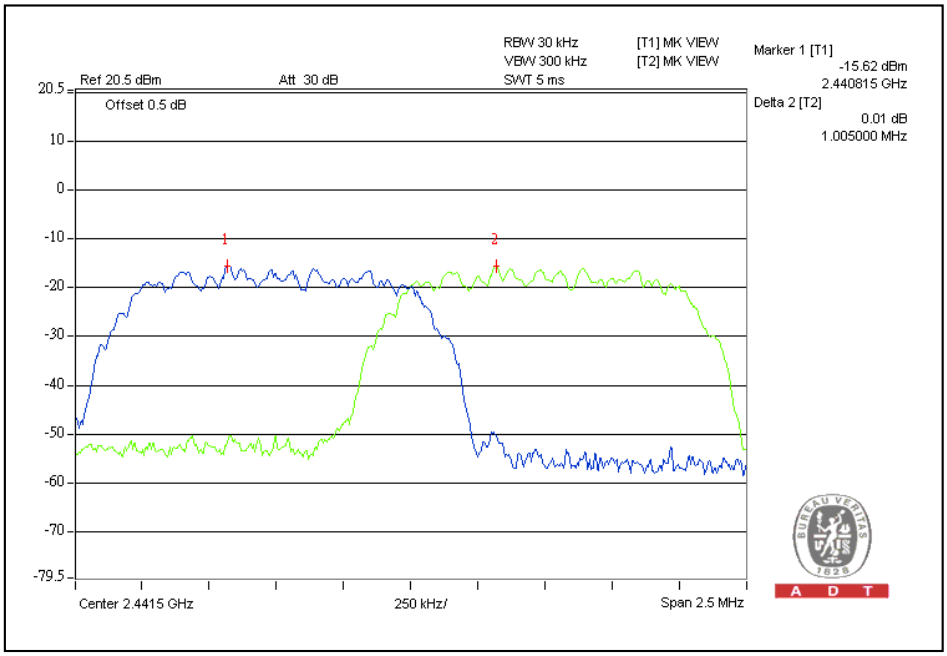
Channel	Frequency (MHz)	Adjacent Channel Separation (kHz)	Minimum Limit (kHz)	Pass / Fail
0	2402	1003	903	PASS
39	2441	1005	905	PASS
78	2480	1000	905	PASS

The minimum limit is two-thirds of 20dB bandwidth. Test results please refer to below and next page.

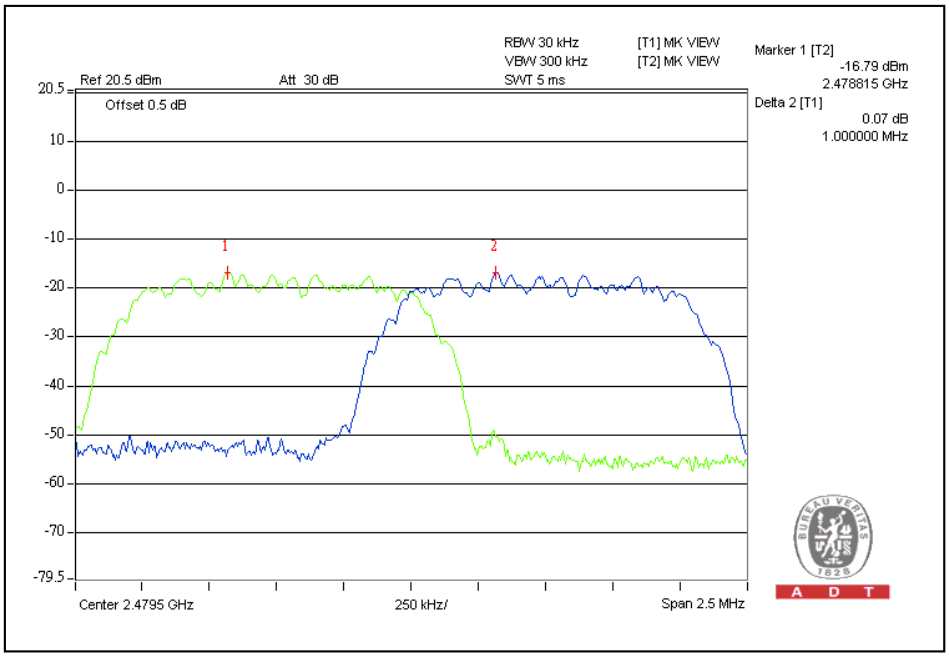
Channel 0



Channel 39



Channel 78

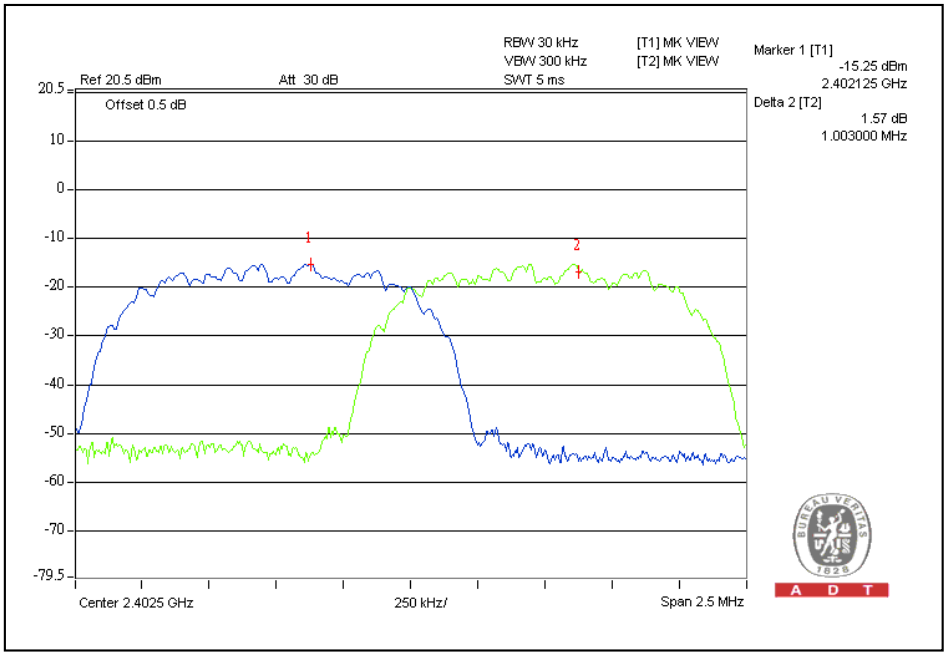


For 8DPSK :

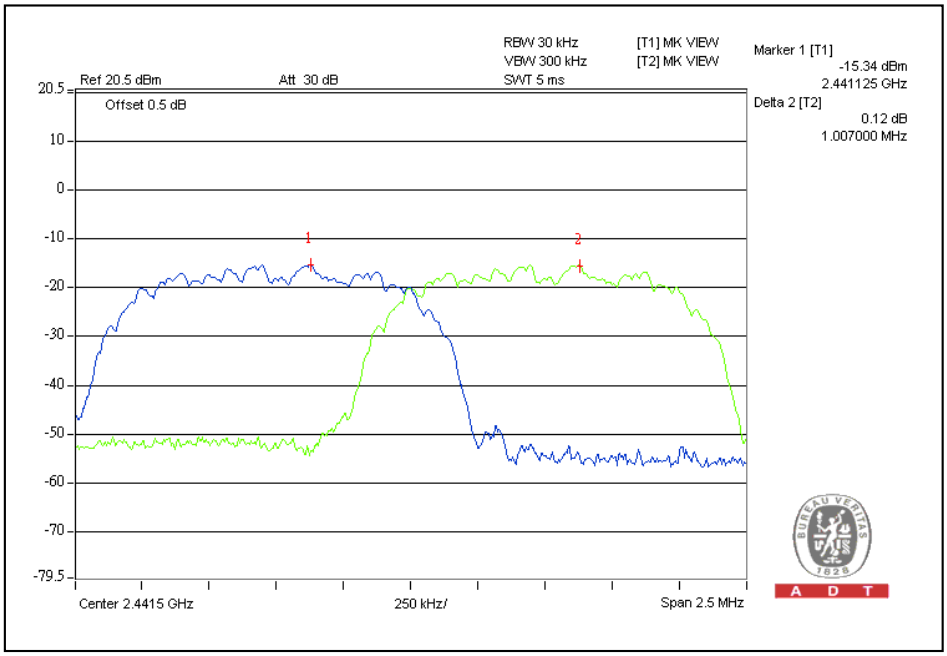
Channel	Frequency (MHz)	Adjacent Channel Separation (kHz)	Minimum Limit (kHz)	Pass / Fail
0	2402	1003	897	PASS
39	2441	1007	897	PASS
78	2480	1006	899	PASS

The minimum limit is two-thirds of 20dB bandwidth. Test results please refer to below and next page.

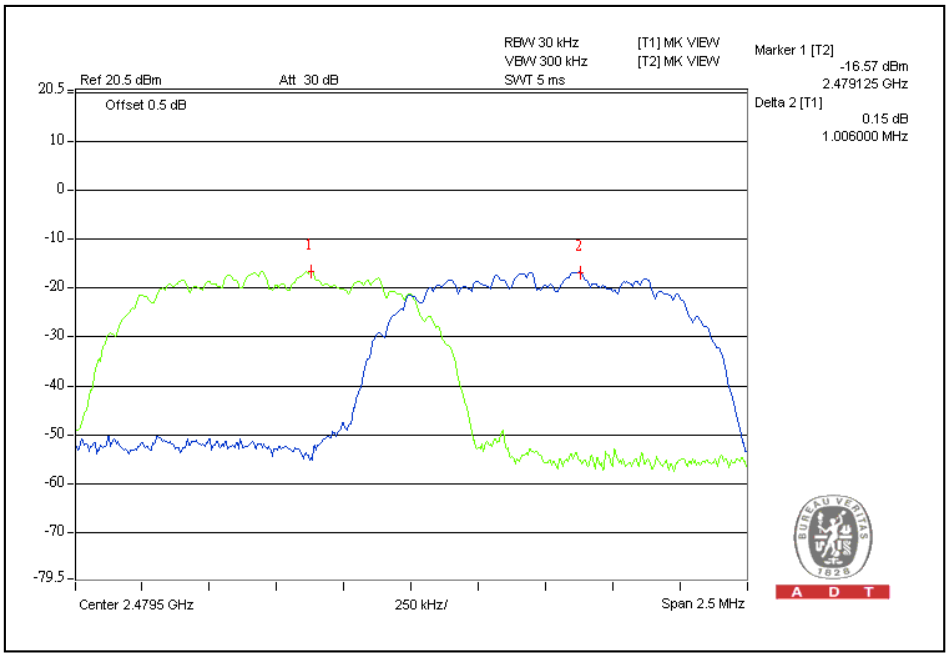
Channel 0



Channel 39



Channel 78



4.6 MAXIMUM PEAK OUTPUT POWER

4.6.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Limit is 125mW.

4.6.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 09, 2009	Aug. 08, 2010

NOTE:

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

4.6.3 TEST PROCEDURES

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 3 MHz RBW and 3 MHz VBW.

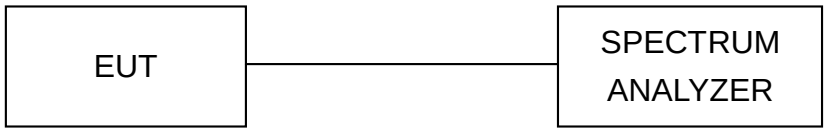
d. Measure the captured power within the band and recording the plot.

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

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



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

4.6.6 EUT OPERATING CONDITION

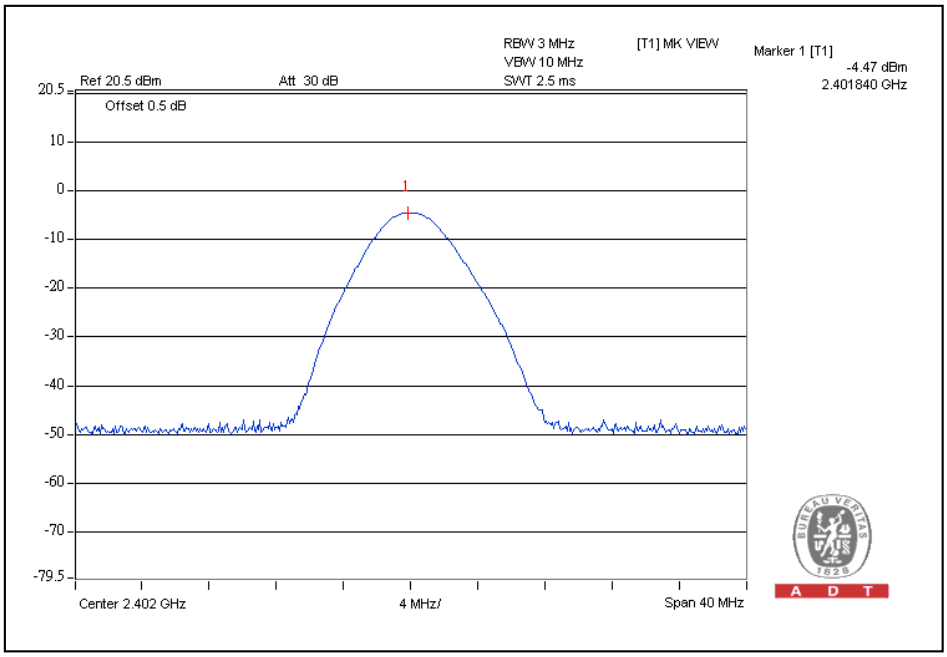
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.6.7 TEST RESULTS

For GFSK : PCB Printed antenna

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (mW)	PASS/FAIL
0	2402	0.4	-4.5	125	PASS
39	2441	0.4	-4.5	125	PASS
78	2480	0.3	-5.7	125	PASS

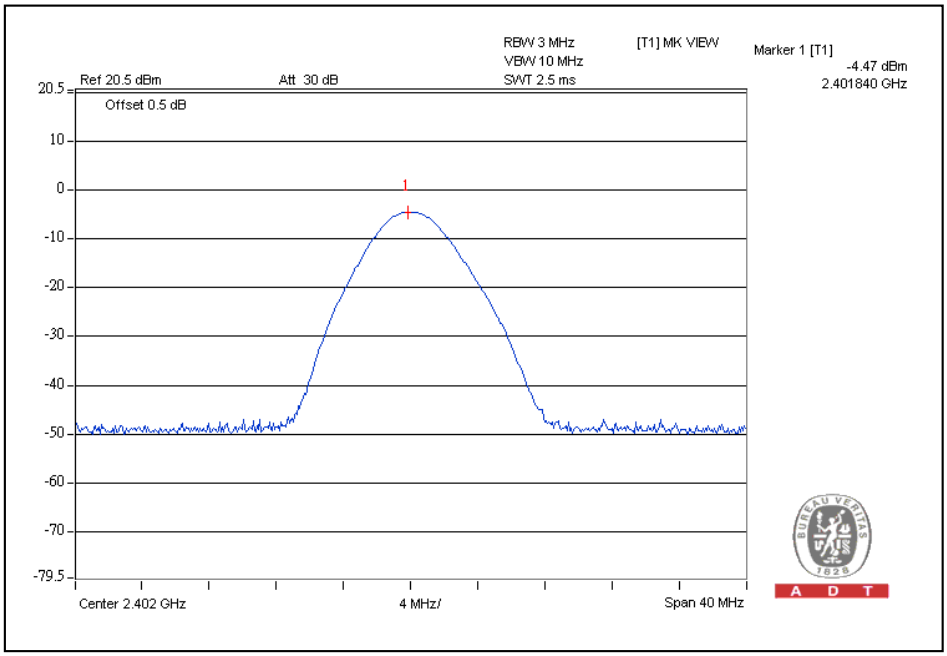
Channel 0



For GFSK : PIFA antenna

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (mW)	PASS/FAIL
0	2402	0.4	-4.5	125	PASS
39	2441	0.4	-4.5	125	PASS
78	2480	0.3	-5.7	125	PASS

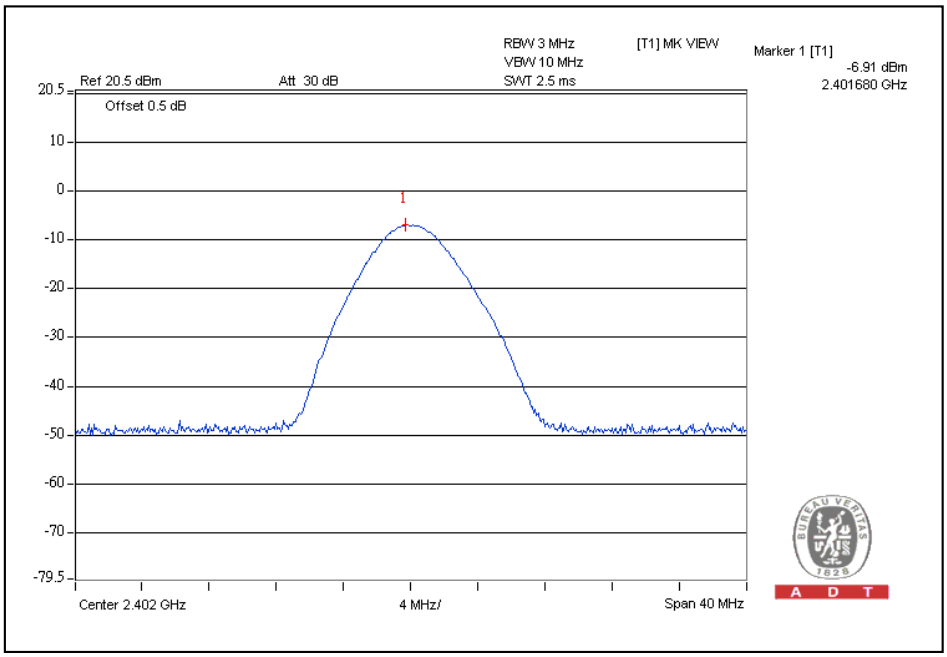
Channel 0



For π/4-DQPSK : PCB Printed antenna

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (mW)	PASS/FAIL
0	2402	0.2	-6.9	125	PASS
39	2441	0.2	-7.0	125	PASS
78	2480	0.2	-8.2	125	PASS

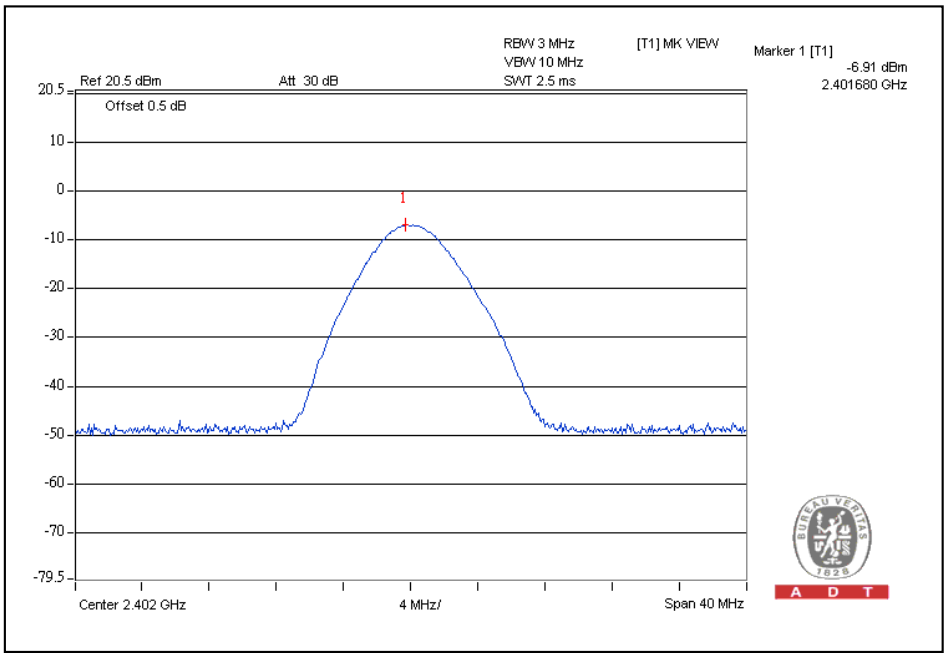
Channel 0



For π/4-DQPSK : PIFA antenna

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (mW)	PASS/FAIL
0	2402	0.2	-6.9	125	PASS
39	2441	0.2	-7.0	125	PASS
78	2480	0.2	-8.2	125	PASS

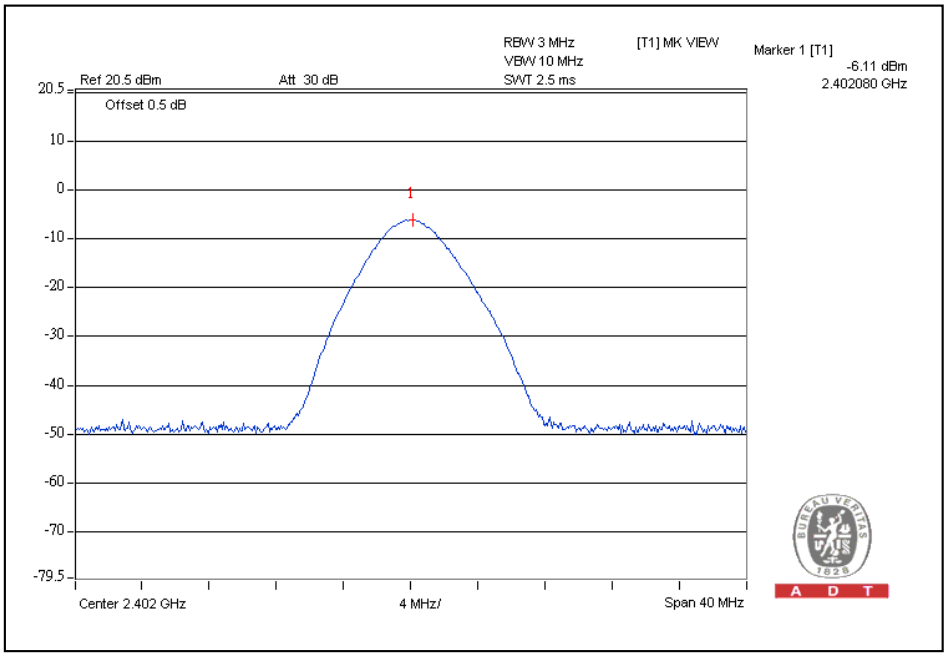
Channel 0



For 8DPSK : PCB Printed antenna

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (mW)	PASS/FAIL
0	2402	0.2	-6.1	125	PASS
39	2441	0.2	-6.3	125	PASS
78	2480	0.2	-7.7	125	PASS

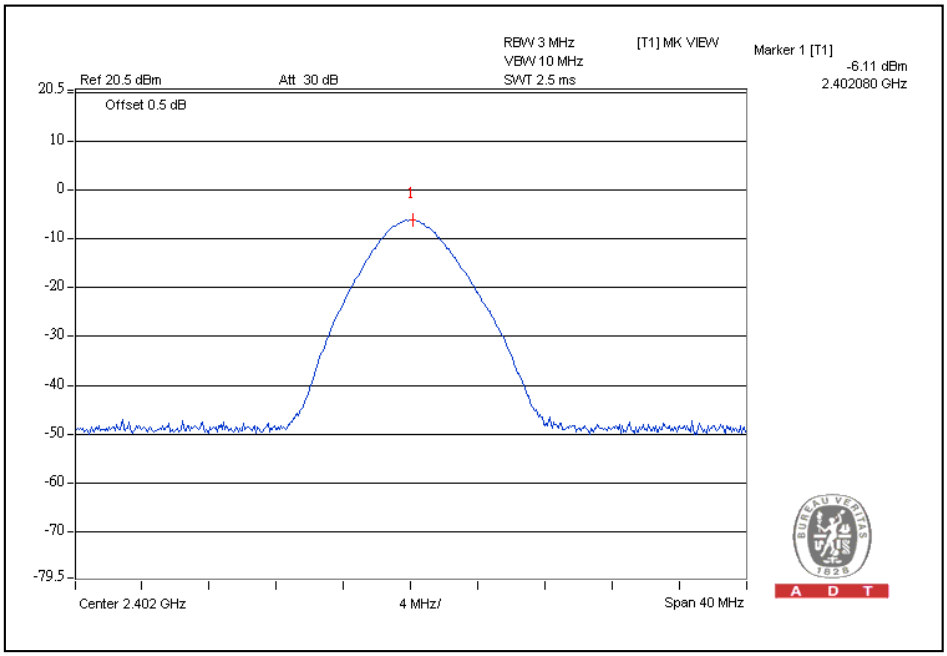
Channel 0



For 8DPSK : PIFA antenna

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (mW)	PASS/FAIL
0	2402	0.2	-6.1	125	PASS
39	2441	0.2	-6.3	125	PASS
78	2480	0.2	-7.7	125	PASS

Channel 0



4.7 RADIATED EMISSION MEASUREMENT

4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400 / F(kHz)	300
0.490 ~ 1.705	24000 / F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

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.

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100036	Dec. 18, 2009	Dec. 17, 2010
Agilent PSA Spectrum Analyzer	E4446A	MY46180622	Apr. 24 , 2009	Apr. 23 , 2010
HP Pre_Amplifier	8449B	300801923	Nov. 02, 2009	Nov. 01, 2010
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Aug. 28, 2009	Aug. 27, 2010
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	April 29, 2009	April 28, 2010
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 18, 2009	Dec. 17, 2010
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 22, 2009	Jan. 21, 2010
R&S Loop Antenna	HFH2-Z2	100070	Jan. 14, 2008	Jan. 13, 2010
RF Switches	EMH-011	1001	NA	NA
RF CABLE (Chaintek)	Sucoflex 106	28077	Aug. 14, 2009	Aug. 13, 2010
RF Cable	8DFB	STCCAB-30M-1GHz	NA	NA
Software	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: FSP40) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 7450G-3.

4.7.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

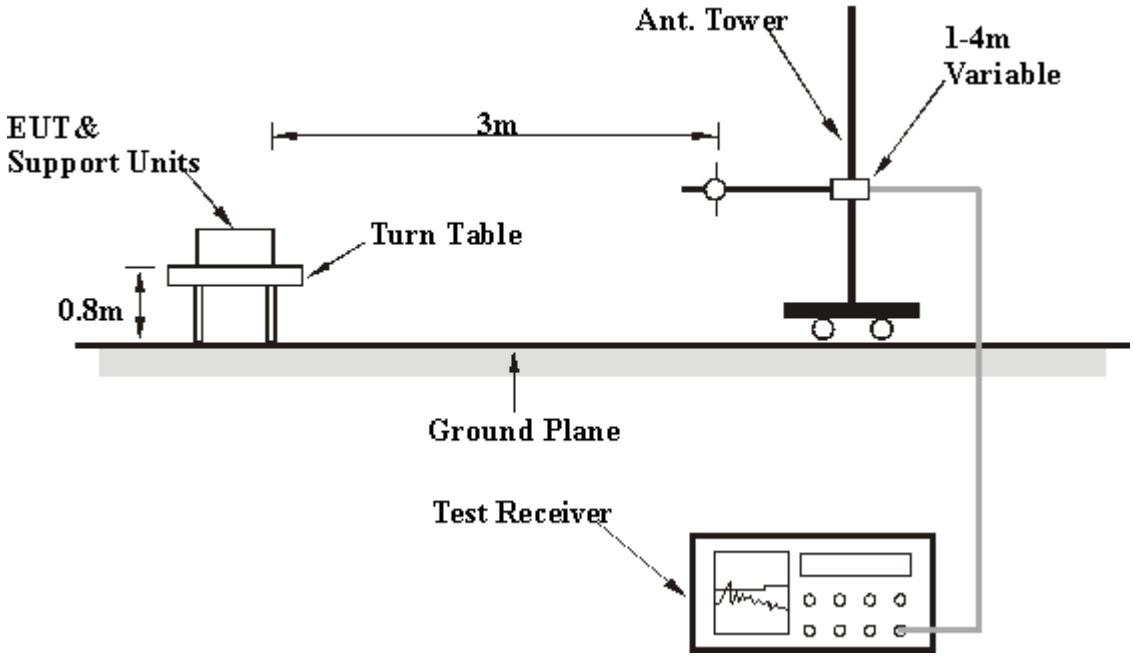
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



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

4.7.6 EUT OPERATING CONDITIONS

3. Connect the EUT with the support unit 1 (Notebook Computer) which placed on a testing table.
4. The communication partner run test program “DutApiSD868x” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

Below 1GHz Test Data

4.7.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA：GFSK MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
	29deg. C, 64%RH 1019 hPa	TESTED BY	Kent Liu
TEST MODE	PCB Printed antenna		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	240.04	21.3 QP	46.00	-24.7	1.11 H	130	7.93	13.33
2	498.00	36.3 QP	46.00	-9.7	1.38 H	6	15.02	21.25
3	639.23	33.0 QP	46.00	-13.1	1.34 H	124	8.69	24.26
4	719.24	29.9 QP	46.00	-16.1	1.23 H	351	4.68	25.21
5	809.14	33.6 QP	46.00	-12.4	1.13 H	244	6.87	26.76
6	899.06	35.0 QP	46.00	-11.0	1.32 H	157	6.85	28.17
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	71.25	31.7 QP	40.00	-8.3	1.21 V	113	19.11	12.55
2	120.00	22.3 QP	43.50	-21.3	1.33 V	247	10.30	11.95
3	498.90	29.2 QP	46.00	-16.8	1.00 V	247	7.96	21.28
4	599.00	30.0 QP	46.00	-16.1	1.32 V	66	6.11	23.84
5	720.00	29.5 QP	46.00	-16.5	1.44 V	11	4.32	25.22
6	899.00	31.8 QP	46.00	-14.2	1.24 V	110	3.65	28.17

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.

BELOW 1GHz WORST-CASE DATA：GFSK MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	29deg. C, 64%RH 1019 hPa	TESTED BY	Kent Liu
TEST MODE	PIFA antenna		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	240.04	22.56 QP	46.00	-23.44	1.10 H	132	9.21	13.35
2	498.00	36.65 QP	46.00	-9.35	1.40 H	22	14.94	21.71
3	639.23	32.99 QP	46.00	-13.01	1.33 H	126	8.08	24.91
4	719.24	30.25 QP	46.00	-15.75	1.20 H	355	3.85	26.40
5	809.14	33.69 QP	46.00	-12.31	1.11 H	254	5.98	27.71
6	899.06	35.34 QP	46.00	-10.66	1.33 H	152	6.50	28.84
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	**71.25**	**32.84 QP**	**40.00**	**-7.16**	**1.20 V**	**115**	**20.57**	**12.27**
2	120.00	22.56 QP	43.50	-20.94	1.40 V	250	10.74	11.82
3	498.90	29.87 QP	46.00	-16.13	1.00 V	255	8.14	21.73
4	599.00	30.26 QP	46.00	-15.74	1.33 V	70	5.80	24.46
5	720.00	30.25 QP	46.00	-15.75	1.45 V	12	3.83	26.42
6	899.00	31.89 QP	46.00	-14.11	1.22 V	115	3.05	28.84

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 1GHz Test Data

4.7.8 TEST RESULTS

GFSK MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 65%RH 1019 hPa	TESTED BY	Frank Liu
TEST MODE	PCB Printed antenna		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	54.8 PK	74.00	-19.3	1.64 H	187	24.47	30.28
2	2390.00	24.8 AV	54.00	-29.3	1.64 H	187	-5.53	30.28
3	*2402.00	93.8 PK			1.61 H	180	63.47	30.33
4	*2402.00	63.8 AV			1.61 H	180	33.47	30.33
5	4808.00	50.9 PK	74.00	-23.1	1.23 H	274	14.15	36.75
6	4808.00	20.9 AV	54.00	-33.1	1.23 H	274	-15.85	36.75
7	#7206.00	53.8 PK	73.80	-20.0	1.04 H	123	10.66	43.14
8	#7206.00	23.8 AV	43.80	-20.0	1.04 H	123	-19.34	43.14
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	54.5 PK	74.00	-19.5	1.00 V	23	24.22	30.28
2	2390.00	24.5 AV	54.00	-29.5	1.00 V	23	-5.78	30.28
3	*2402.00	87.9 PK			1.00 V	16	57.57	30.33
4	*2402.00	57.9 AV			1.00 V	16	27.57	30.33
5	4804.00	47.8 PK	74.00	-26.2	1.22 V	241	11.07	36.73
6	4804.00	17.8 AV	54.00	-36.2	1.22 V	241	-18.93	36.73
7	#7206.00	52.6 PK	67.90	-15.3	1.09 V	128	9.46	43.14
8	#7206.00	22.6 AV	37.90	-15.3	1.09 V	128	-20.54	43.14

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).
8. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 65%RH 1019 hPa	TESTED BY	Frank Liu
TEST MODE	PCB Printed antenna		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2441.00	90.3 PK			1.62 H	184	59.83	30.47
2	*2441.00	60.3 AV			1.62 H	184	29.83	30.47
3	4882.00	50.3 PK	74.00	-23.7	1.24 H	279	13.36	36.94
4	4882.00	20.3 AV	54.00	-33.7	1.24 H	279	-16.64	36.94
5	7323.00	53.4 PK	74.00	-20.6	1.05 H	127	10.27	43.13
6	7323.00	23.4 AV	54.00	-30.6	1.05 H	127	-19.73	43.13
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2441.00	85.4 PK			1.00 V	121	54.93	30.47
2	*2441.00	55.4 AV			1.00 V	121	24.93	30.47
3	4882.00	47.4 PK	74.00	-26.6	1.24 V	254	10.46	36.94
4	4882.00	17.4 AV	54.00	-36.6	1.24 V	254	-19.54	36.94
5	7323.00	51.8 PK	74.00	-22.2	1.06 V	126	8.67	43.13
6	7323.00	21.8 AV	54.00	-32.2	1.06 V	126	-21.33	43.13

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 65%RH 1019 hPa	TESTED BY	Frank Liu
TEST MODE	PCB Printed antenna		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	87.6 PK			1.49 H	194	56.98	30.62
2	*2480.00	57.6 AV			1.49 H	194	26.98	30.62
3	2483.50	54.3 PK	74.00	-19.7	1.47 H	183	23.65	30.63
4	2483.50	24.3 AV	54.00	-29.7	1.47 H	183	-6.35	30.63
5	4960.00	49.2 PK	74.00	-24.8	1.28 H	275	12.05	37.15
6	4960.00	19.2 AV	54.00	-34.8	1.28 H	275	-17.95	37.15
7	7440.00	53.2 PK	74.00	-20.8	1.03 H	122	10.08	43.12
8	7440.00	23.2 AV	54.00	-30.8	1.03 H	122	-19.92	43.12
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	83.7 PK			1.22 V	16	53.08	30.62
2	*2480.00	53.7 AV			1.22 V	16	23.08	30.62
3	2483.50	55.7 PK	74.00	-18.3	1.23 V	18	25.04	30.63
4	2483.50	25.7 AV	54.00	-28.3	1.23 V	18	-4.96	30.63
5	4960.00	46.9 PK	74.00	-27.1	1.27 V	241	9.75	37.15
6	4960.00	16.9 AV	54.00	-37.1	1.27 V	241	-20.25	37.15
7	7440.00	51.6 PK	74.00	-22.4	1.03 V	124	8.48	43.12
8	7440.00	21.6 AV	54.00	-32.4	1.03 V	124	-21.52	43.12

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

8DPSK MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 65%RH 1019 hPa	TESTED BY	Frank Liu
TEST MODE	PCB Printed antenna		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	52.4 PK	74.00	-21.6	1.34 H	78	22.15	30.28
2	2390.00	22.4 AV	54.00	-31.6	1.34 H	78	-7.85	30.28
3	*2402.00	87.2 PK			1.37 H	75	56.87	30.33
4	*2402.00	57.2 AV			1.37 H	75	26.87	30.33
5	4804.00	44.6 PK	74.00	-29.4	1.24 H	24	7.91	36.73
6	4804.00	14.6 AV	54.00	-39.4	1.24 H	24	-22.09	36.73
7	#7206.00	51.9 PK	67.20	-15.3	1.01 H	336	8.79	43.14
8	#7206.00	21.9 AV	37.20	-15.3	1.01 H	336	-21.21	43.14
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	54.0 PK	74.00	-20.0	1.19 V	78	23.76	30.28
2	2390.00	24.0 AV	54.00	-30.0	1.19 V	78	-6.24	30.28
3	*2402.00	85.4 PK			1.18 V	72	55.06	30.33
4	*2402.00	55.4 AV			1.18 V	72	25.06	30.33
5	4804.00	46.7 PK	74.00	-27.3	1.22 V	247	10.00	36.73
6	4804.00	16.7 AV	54.00	-37.3	1.22 V	247	-20.00	36.73
7	#7206.00	51.1 PK	65.39	-14.3	1.10 V	307	7.94	43.14
8	#7206.00	21.1 AV	35.39	-14.3	1.10 V	307	-22.06	43.14

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).
8. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 65%RH 1019 hPa	TESTED BY	Frank Liu
TEST MODE	PCB Printed antenna		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2441.00	83.5 PK			1.37 H	77	53.03	30.47
2	*2441.00	53.5 AV			1.37 H	77	23.03	30.47
3	4882.00	44.2 PK	74.00	-29.8	1.22 H	31	7.23	36.94
4	4882.00	14.2 AV	54.00	-39.8	1.22 H	31	-22.77	36.94
5	7323.00	52.0 PK	74.00	-22.0	1.09 H	241	8.91	43.13
6	7323.00	22.0 AV	54.00	-32.0	1.09 H	241	-21.09	43.13
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2411.00	82.4 PK			1.40 V	17	52.04	30.36
2	*2411.00	52.4 AV			1.40 V	17	22.04	30.36
3	4882.00	46.4 PK	74.00	-27.6	1.40 V	231	9.45	36.94
4	4882.00	16.4 AV	54.00	-37.6	1.40 V	231	-20.55	36.94
5	7323.00	51.4 PK	74.00	-22.6	1.41 V	64	8.27	43.13
6	7323.00	21.4 AV	54.00	-32.6	1.41 V	64	-21.73	43.13

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).
8. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 65%RH 1019 hPa	TESTED BY	Frank Liu
TEST MODE	PCB Printed antenna		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	81.9 PK			1.38 H	79	51.31	30.62
2	*2480.00	51.9 AV			1.38 H	79	21.31	30.62
3	2483.50	52.3 PK	74.00	-21.7	1.38 H	77	21.68	30.63
4	2483.50	22.3 AV	54.00	-31.7	1.38 H	77	-8.32	30.63
5	4960.00	43.7 PK	74.00	-30.3	1.09 H	24	6.57	37.15
6	4960.00	13.7 AV	54.00	-40.3	1.09 H	24	-23.43	37.15
7	7440.00	50.4 PK	74.00	-23.6	1.36 H	236	7.27	43.12
8	7440.00	20.4 AV	54.00	-33.6	1.36 H	236	-22.73	43.12
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	80.2 PK			1.41 V	14	49.53	30.62
2	*2480.00	50.2 AV			1.41 V	14	19.53	30.62
3	2483.50	52.5 PK	74.00	-21.5	1.41 V	15	21.87	30.63
4	2483.50	20.7 AV	54.00	-33.3	1.41 V	15	-9.93	30.63
5	4960.00	45.5 PK	74.00	-28.5	1.47 V	312	8.38	37.15
6	4960.00	15.5 AV	54.00	-38.5	1.47 V	312	-21.62	37.15
7	7440.00	50.7 PK	74.00	-23.3	1.33 V	261	7.58	43.12
8	7440.00	20.7 AV	54.00	-33.3	1.33 V	261	-22.42	43.12

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

GFSK MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	19deg. C, 69%RH 1019 hPa	TESTED BY	Phoenix Huang
TEST MODE	PIFA antenna		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	53.4 PK	74.00	-20.6	1.81 H	226	23.36	30.03
2	2390.00	23.4 AV	54.00	-30.6	1.81 H	226	-6.64	30.03
3	*2402.00	98.2 PK			1.81 H	226	68.09	30.08
4	*2402.00	68.2 AV			1.81 H	226	38.09	30.08
5	4804.00	50.6 PK	74.00	-23.4	1.00 H	353	15.17	35.43
6	4804.00	20.6 AV	54.00	-33.4	1.00 H	353	-14.83	35.43
7	#7206.00	51.7 PK	78.17	-26.5	1.22 H	69	10.71	40.99
8	#7206.00	21.7 AV	48.17	-26.5	1.22 H	69	-19.29	40.99
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.1 PK	74.00	-18.9	1.10 V	88	25.08	30.03
2	2390.00	25.1 AV	54.00	-28.9	1.10 V	88	-4.92	30.03
3	*2402.00	96.6 PK			1.10 V	88	66.52	30.08
4	*2402.00	66.6 AV			1.10 V	88	36.52	30.08
5	4804.00	49.5 PK	74.00	-24.5	1.06 V	259	14.07	35.43
6	4804.00	19.5 AV	54.00	-34.5	1.06 V	259	-15.93	35.43
7	#7206.00	52.6 PK	76.60	-24.0	1.22 V	258	11.61	40.99
8	#7206.00	22.6 AV	46.60	-24.0	1.22 V	258	-18.39	40.99

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).
8. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	19deg. C, 69%RH 1019 hPa	TESTED BY	Phoenix Huang
TEST MODE	PIFA antenna		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2441.00	97.2 PK			1.56 H	338	66.94	30.23
2	*2441.00	67.2 AV			1.56 H	338	36.94	30.23
3	4882.00	48.5 PK	74.00	-25.5	1.13 H	304	12.86	35.64
4	4882.00	18.5 AV	54.00	-35.5	1.13 H	304	-17.14	35.64
5	7323.00	51.8 PK	74.00	-22.2	1.25 H	73	10.51	41.29
6	7323.00	21.8 AV	54.00	-32.2	1.25 H	73	-19.49	41.29
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2441.00	96.5 PK			1.07 V	88	66.27	30.23
2	*2441.00	66.5 AV			1.07 V	88	36.27	30.23
3	4882.00	47.6 PK	74.00	-26.4	1.19 V	286	11.97	35.64
4	4882.00	17.6 AV	54.00	-36.4	1.19 V	286	-18.03	35.64
5	7323.00	52.7 PK	74.00	-21.3	1.31 V	268	11.41	41.29
6	7323.00	22.7 AV	54.00	-31.3	1.31 V	268	-18.59	41.29

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	19deg. C, 69%RH 1019 hPa	TESTED BY	Phoenix Huang
TEST MODE	PIFA antenna		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	97.3 PK			1.46 H	311	66.92	30.38
2	*2480.00	67.3 AV			1.46 H	311	36.92	30.38
3	2483.50	54.7 PK	74.00	-19.3	1.46 H	311	24.26	30.40
4	2483.50	24.7 AV	54.00	-29.3	1.46 H	311	-5.74	30.40
5	4960.00	49.3 PK	74.00	-24.7	1.13 H	308	13.47	35.83
6	4960.00	19.3 AV	54.00	-34.7	1.13 H	308	-16.53	35.83
7	7440.00	51.9 PK	74.00	-22.1	1.22 H	68	10.31	41.59
8	7440.00	21.9 AV	54.00	-32.1	1.22 H	68	-19.69	41.59
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	96.3 PK			1.06 V	88	65.92	30.38
2	*2480.00	66.3 AV			1.06 V	88	35.92	30.38
3	2483.50	54.4 PK	74.00	-19.6	1.06 V	88	23.96	30.40
4	2483.50	24.4 AV	54.00	-29.6	1.06 V	88	-6.04	30.40
5	4960.00	49.3 PK	74.00	-24.7	1.40 V	96	13.50	35.83
6	4960.00	19.3 AV	54.00	-34.7	1.40 V	96	-16.50	35.83
7	7440.00	52.9 PK	74.00	-21.1	1.35 V	271	11.31	41.59
8	7440.00	22.9 AV	54.00	-31.1	1.35 V	271	-18.69	41.59

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

8DPSK MODULATION

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	19deg. C, 69%RH 1019 hPa	TESTED BY	Phoenix Huang
TEST MODE	PIFA antenna		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	54.7 PK	74.00	-19.3	1.22 H	335	24.64	30.03
2	2390.00	24.7 AV	54.00	-29.3	1.22 H	335	-5.36	30.03
3	*2402.00	95.2 PK			1.22 H	335	65.12	30.08
4	*2402.00	65.2 AV			1.22 H	335	35.12	30.08
5	4804.00	46.7 PK	74.00	-27.3	1.18 H	302	11.27	35.43
6	4804.00	16.7 AV	54.00	-37.3	1.18 H	302	-18.73	35.43
7	#7206.00	52.1 PK	75.20	-23.1	1.26 H	85	11.11	40.99
8	#7206.00	22.1 AV	45.20	-23.1	1.26 H	85	-18.89	40.99
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.3 PK	74.00	-18.7	1.06 V	89	25.27	30.03
2	2390.00	25.3 AV	54.00	-28.7	1.06 V	89	-4.73	30.03
3	*2402.00	94.4 PK			1.06 V	89	64.32	30.08
4	*2402.00	64.4 AV			1.06 V	89	34.32	30.08
5	4804.00	44.9 PK	74.00	-29.1	1.65 V	259	9.47	35.43
6	4804.00	14.9 AV	54.00	-39.1	1.65 V	259	-20.53	35.43
7	#7206.00	53.2 PK	74.40	-21.2	1.30 V	279	12.21	40.99
8	#7206.00	23.2 AV	44.40	-21.2	1.30 V	279	-17.79	40.99

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).
8. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	**FREQUENCY RANGE**	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	19deg. C, 69%RH 1019 hPa	**TESTED BY**	Phoenix Huang
TEST MODE	PIFA antenna		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	*2441.00	95.5 PK			1.18 H	335	65.27	30.23
2	*2441.00	65.5 AV			1.18 H	335	35.27	30.23
3	4882.00	46.1 PK	74.00	-27.9	1.13 H	304	10.46	35.64
4	4882.00	16.1 AV	54.00	-37.9	1.13 H	304	-19.54	35.64
5	7323.00	52.2 PK	74.00	-21.8	1.22 H	74	10.91	41.29
6	7323.00	22.2 AV	54.00	-31.8	1.22 H	74	-19.09	41.29
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	*2441.00	93.8 PK			1.07 V	98	63.52	30.23
2	*2441.00	63.8 AV			1.07 V	98	33.52	30.23
3	4882.00	43.7 PK	74.00	-30.3	1.04 V	253	8.06	35.64
4	4882.00	13.7 AV	54.00	-40.3	1.04 V	253	-21.94	35.64
5	7323.00	53.5 PK	74.00	-20.5	1.33 V	268	12.21	41.29
6	7323.00	23.5 AV	54.00	-30.5	1.33 V	268	-17.79	41.29

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	19deg. C, 69%RH 1019 hPa	TESTED BY	Phoenix Huang
TEST MODE	PIFA antenna		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	94.8 PK			1.17 H	335	64.42	30.38
2	*2480.00	64.8 AV			1.17 H	335	34.42	30.38
3	2483.50	53.8 PK	74.00	-20.2	1.17 H	335	23.37	30.40
4	2483.50	23.8 AV	54.00	-30.2	1.17 H	335	-6.63	30.40
5	4960.00	46.0 PK	74.00	-28.0	1.14 H	306	10.17	35.83
6	4960.00	16.0 AV	54.00	-38.0	1.14 H	306	-19.83	35.83
7	7440.00	52.4 PK	74.00	-21.6	1.26 H	86	10.81	41.59
8	7440.00	22.4 AV	54.00	-31.6	1.26 H	86	-19.19	41.59
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	93.0 PK			1.07 V	90	62.62	30.38
2	*2480.00	63.0 AV			1.07 V	90	32.62	30.38
3	2483.50	53.3 PK	74.00	-20.7	1.07 V	90	22.94	30.40
4	2483.50	23.3 AV	54.00	-30.7	1.07 V	90	-7.06	30.40
5	4960.00	44.2 PK	74.00	-29.8	1.27 V	254	8.37	35.83
6	4960.00	14.2 AV	54.00	-39.8	1.27 V	254	-21.63	35.83
7	7440.00	53.4 PK	74.00	-20.6	1.38 V	275	11.81	41.59
8	7440.00	23.4 AV	54.00	-30.6	1.38 V	275	-18.19	41.59

REMARKS: 1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB.
7. Average value = peak reading + 20log(duty cycle).

4.8 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.8.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

4.8.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 09, 2009	Aug. 08, 2010

NOTE:

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

4.8.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set RBW a of spectrum analyzer to 100 kHz and VBW of spectrum analyzer to 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

4.8.4 DEVIATION FROM TEST STANDARD

No deviation

4.8.5 EUT OPERATING CONDITION

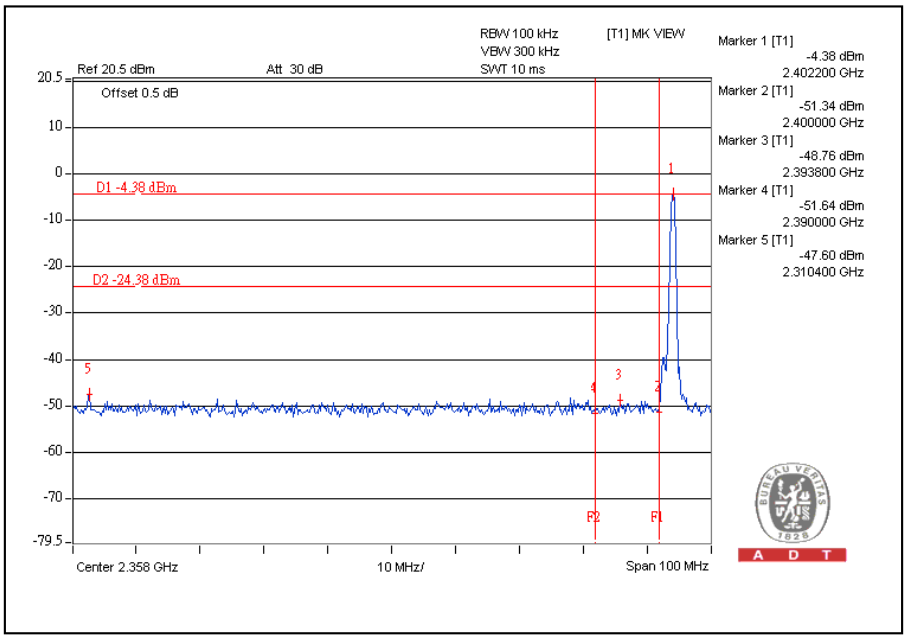
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.8.6 TEST RESULTS

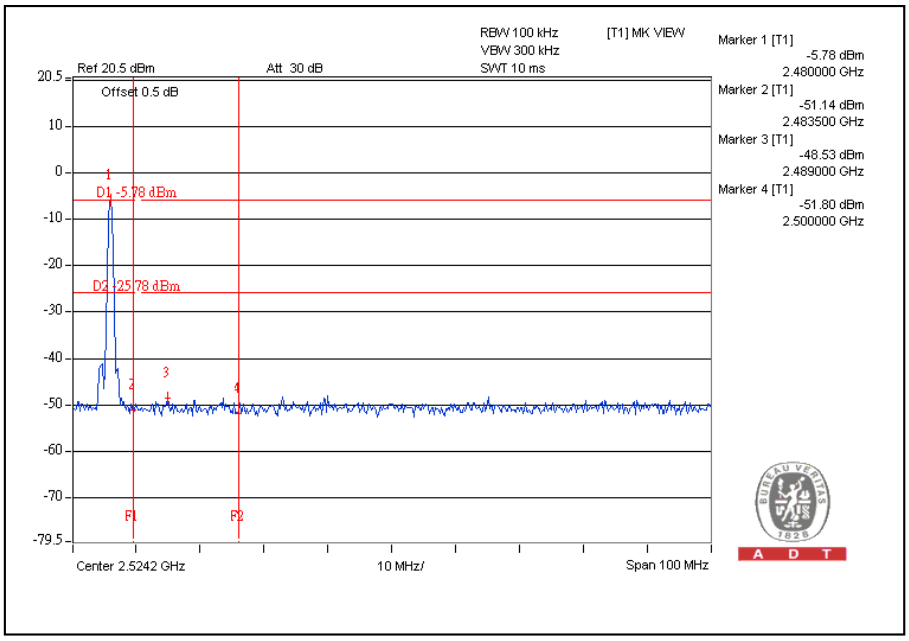
Emissions radiated outside of the specified frequency bands, please refer pages from 61 to 66 for met the requirement of the general radiated emission limits in § 15.209.

For GFSK MODULATION TYPE:

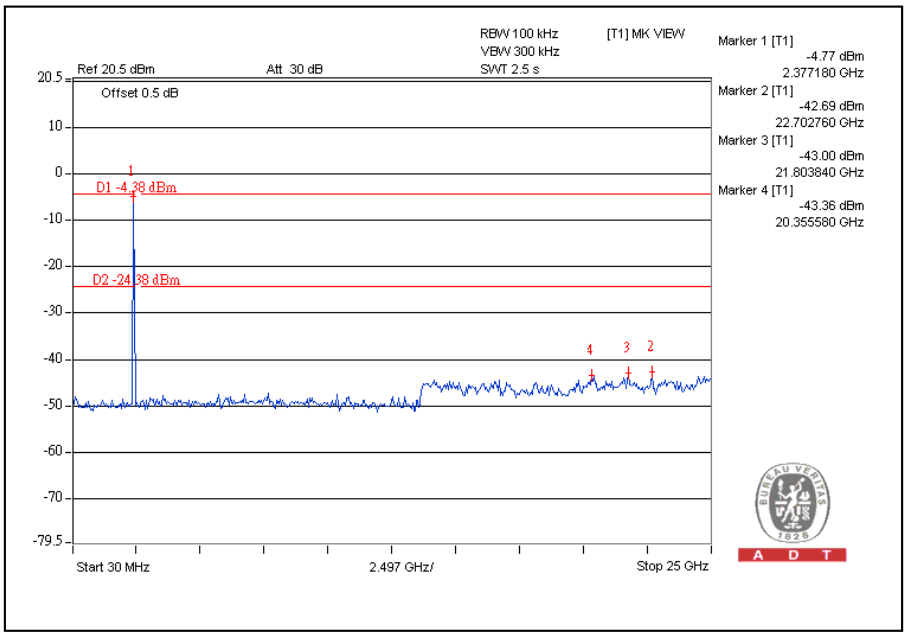
CH0



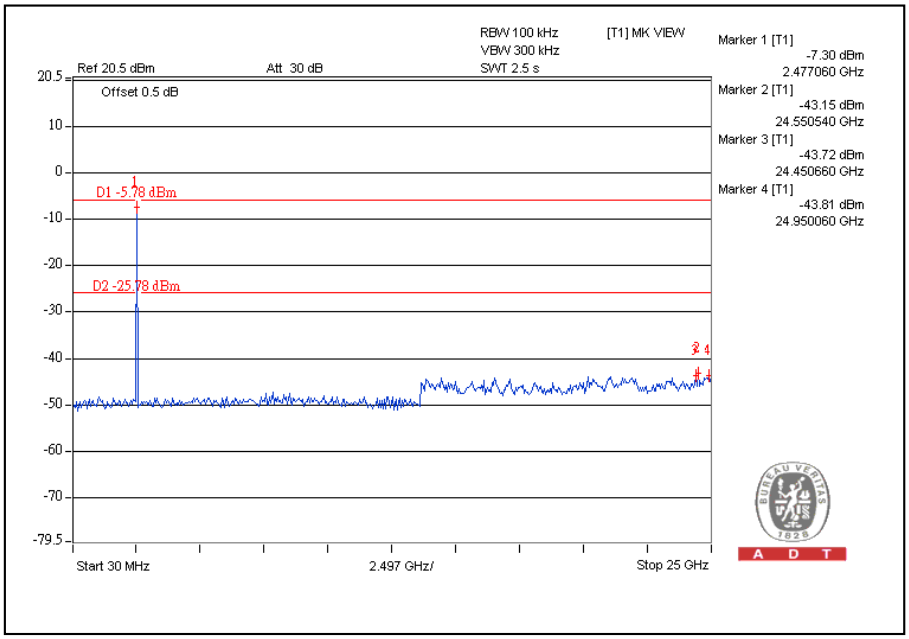
CH78



CH0

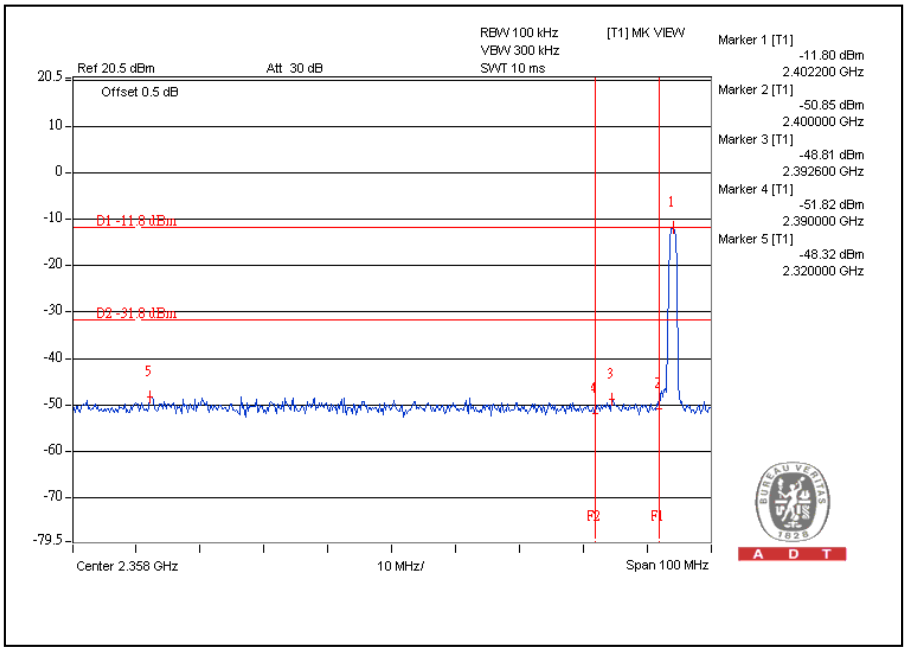

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 -4.38 dBm
D2 -24.38 dBm
Marker 1 [T1]
-4.77 dBm
2.377180 GHz
Marker 2 [T1]
-42.69 dBm
22.702760 GHz
Marker 3 [T1]
-43.00 dBm
21.803840 GHz
Marker 4 [T1]
-43.36 dBm
20.355580 GHz
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH78

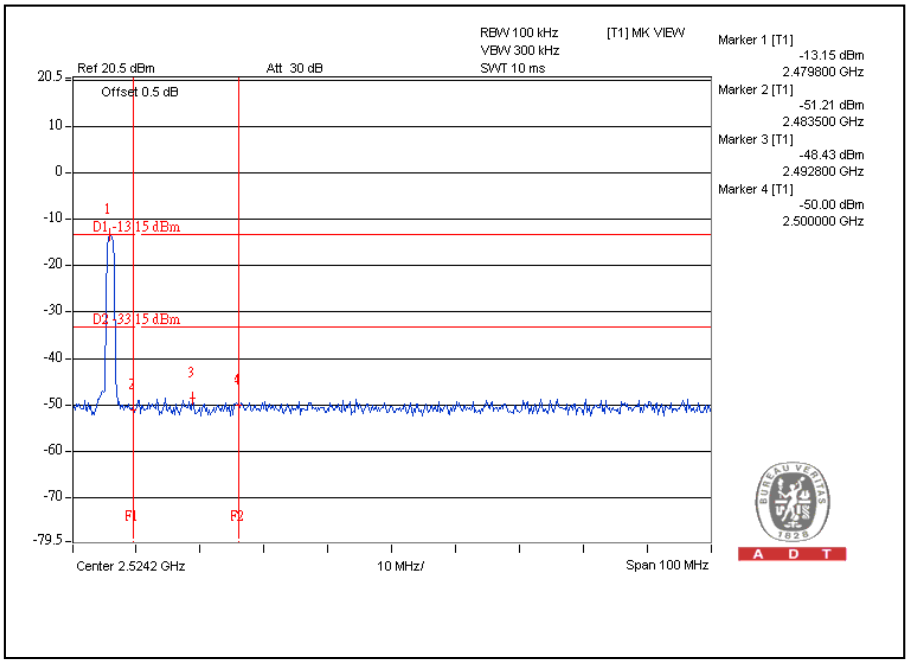

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 -5.78 dBm
D2 -25.78 dBm
Marker 1 [T1]
-7.30 dBm
2.477060 GHz
Marker 2 [T1]
-43.15 dBm
24.550540 GHz
Marker 3 [T1]
-43.72 dBm
24.450660 GHz
Marker 4 [T1]
-43.81 dBm
24.950060 GHz
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

FOR π/4-DQPSK MODULATION TYPE:

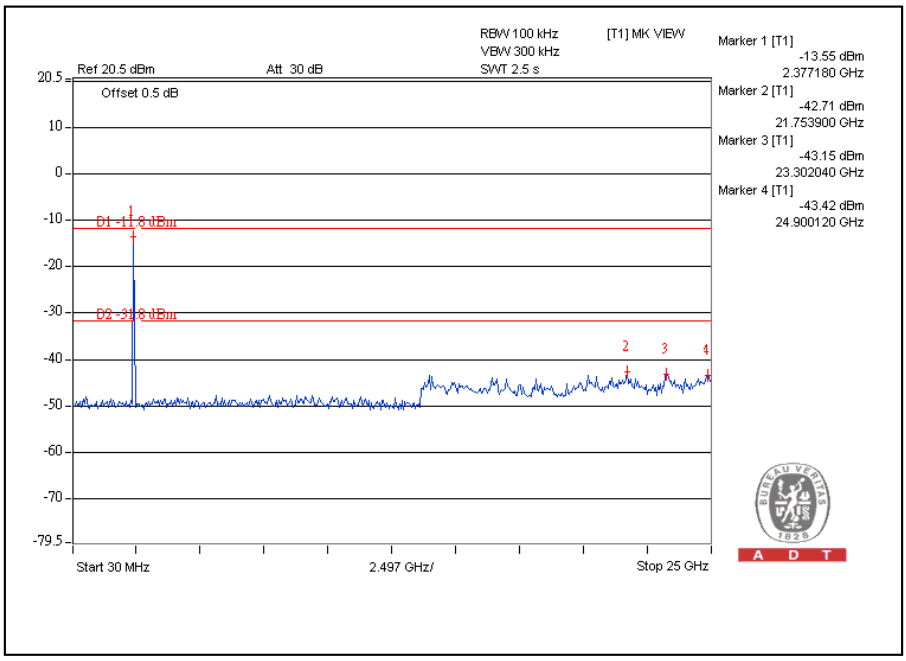
CH0



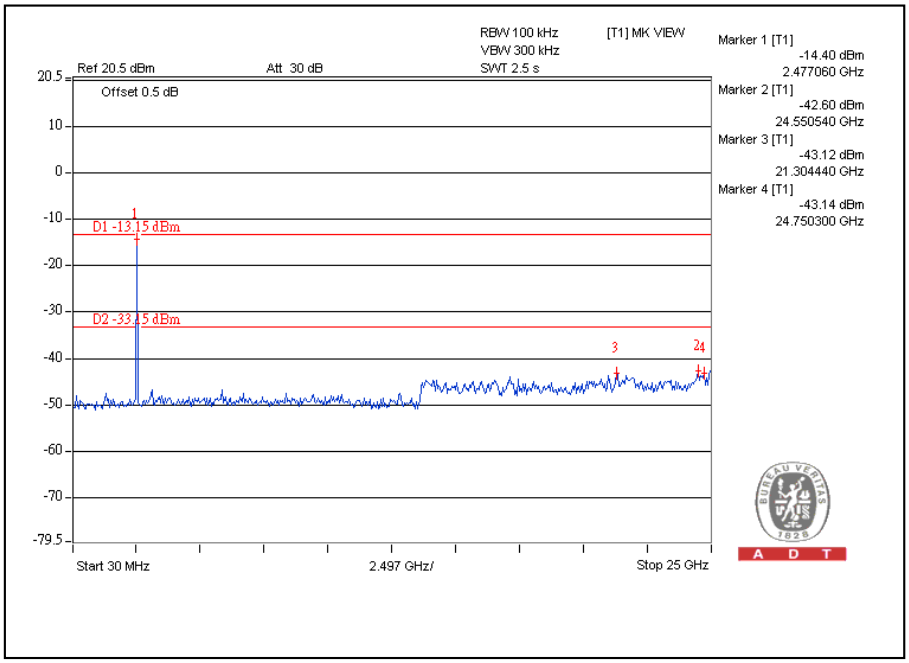
CH78



CH0

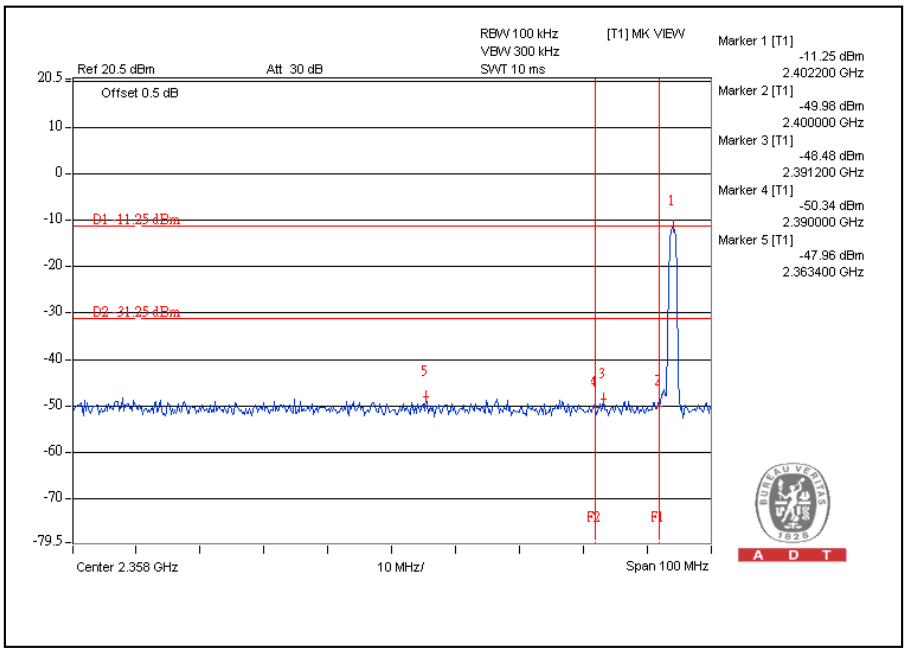

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
Marker 1 [T1]
-13.55 dBm
2.377180 GHz
Marker 2 [T1]
-42.71 dBm
21.753900 GHz
Marker 3 [T1]
-43.15 dBm
23.302040 GHz
Marker 4 [T1]
-43.42 dBm
24.900120 GHz
D1 -11.8 dBm
D2 -31.8 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH78

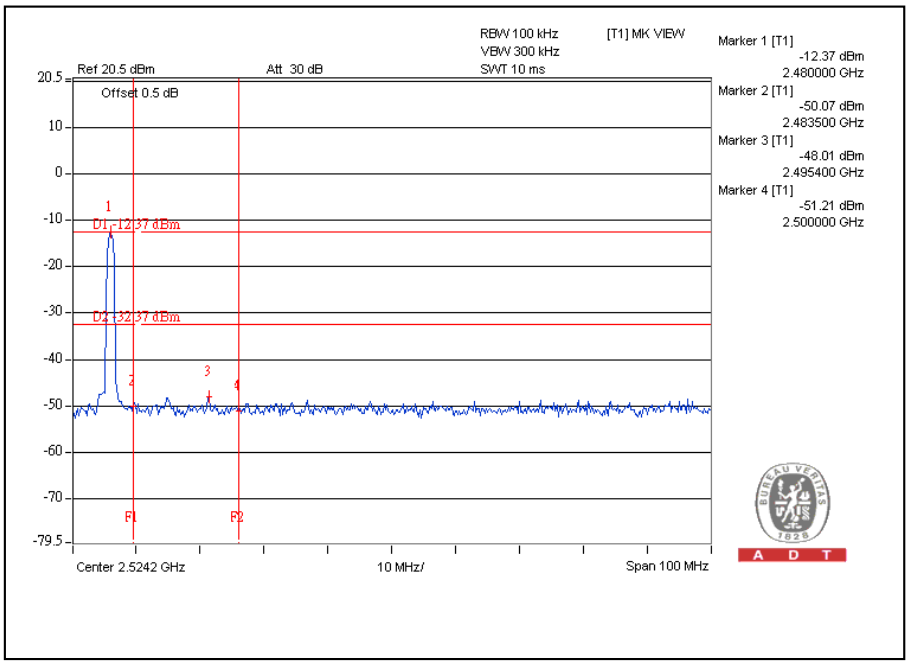

RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
Marker 1 [T1]
-14.40 dBm
2.477060 GHz
Marker 2 [T1]
-42.60 dBm
24.550540 GHz
Marker 3 [T1]
-43.12 dBm
21.304440 GHz
Marker 4 [T1]
-43.14 dBm
24.750300 GHz
D1 -13.15 dBm
D2 -33.15 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

FOR 8DPSK MODULATION TYPE:

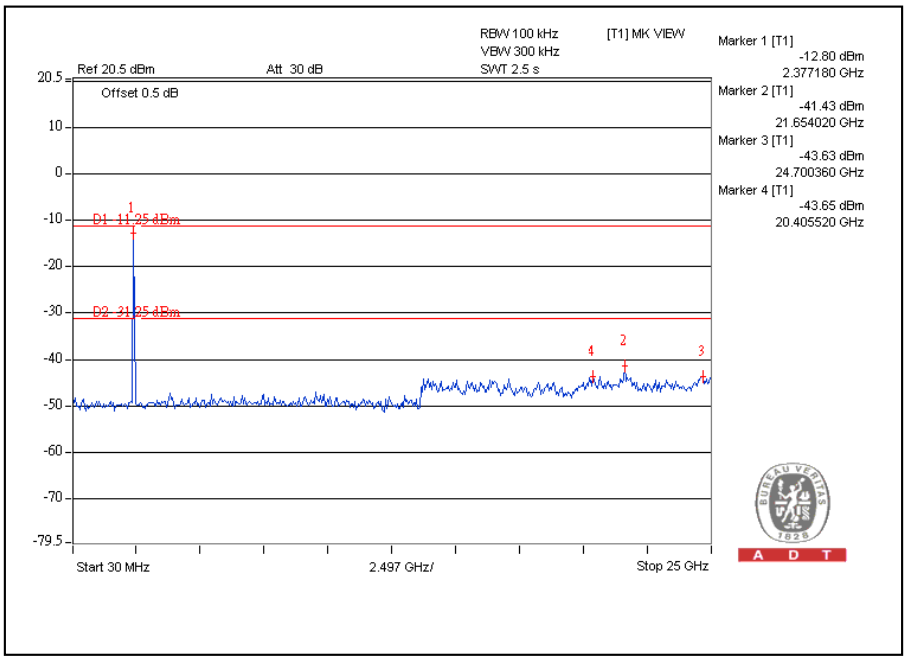
CH0



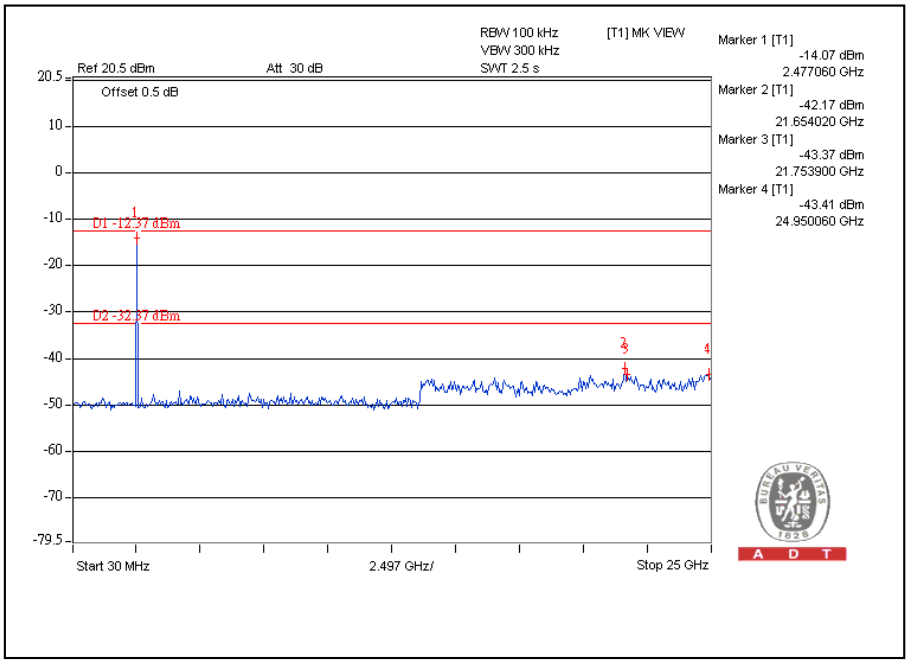
CH78



CH0


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Marker 1 [T1]
-12.80 dBm
2.377180 GHz
Marker 2 [T1]
-41.43 dBm
21.654020 GHz
Marker 3 [T1]
-43.63 dBm
24.700360 GHz
Marker 4 [T1]
-43.65 dBm
20.405520 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 11.25 dBm
D2 -1.25 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

CH78


RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
[T1] MK VIEW
Marker 1 [T1]
-14.07 dBm
2.477060 GHz
Marker 2 [T1]
-42.17 dBm
21.654020 GHz
Marker 3 [T1]
-43.37 dBm
21.753900 GHz
Marker 4 [T1]
-43.41 dBm
24.950060 GHz
Ref 20.5 dBm
Att 30 dB
Offset 0.5 dB
D1 -12.37 dBm
D2 -32.37 dBm
20.5
10
0
-10
-20
-30
-40
-50
-60
-70
-79.5
Start 30 MHz
2.497 GHz/
Stop 25 GHz

5. INFORMATION ON THE TESTING LABORATORIES

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

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.
If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050

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

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

6. APPENDIX - A MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

--- END ---