



FCC TEST REPORT (BLUETOOTH EDR)

REPORT NO.: RF120405C14-5

MODEL NO.: FJI13

FCC ID: YUW-FJI13

RECEIVED: Apr. 05, 2012

TESTED: May 08 ~ May 15, 2012

ISSUED: Jun. 01, 2012

APPLICANT: Fujitsu Mobile Communications Ltd.

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Kawasaki 211-8588, Japan

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

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist., New
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TEST LOCATION: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei
Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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Table of Contents

RELEASE CONTROL RECORD	4
1. CERTIFICATION.....	5
2. SUMMARY OF TEST RESULTS.....	6
2.1 MEASUREMENT UNCERTAINTY	6
3. GENERAL INFORMATION	7
3.1 GENERAL DESCRIPTION OF EUT.....	7
3.2 DESCRIPTION OF TEST MODES.....	8
3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL.....	9
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS	11
3.4 DESCRIPTION OF SUPPORT UNITS.....	11
3.4.1 CONFIGURATION OF SYSTEM UNDER TEST	11
4. TEST TYPES AND RESULTS.....	12
4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT	12
4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT	12
4.1.2 TEST INSTRUMENTS	13
4.1.3 TEST PROCEDURES	14
4.1.4 DEVIATION FROM TEST STANDARD	14
4.1.5 TEST SETUP.....	15
4.1.6 EUT OPERATING CONDITIONS.....	15
4.1.7 TEST RESULTS	16
4.2 CONDUCTED EMISSION MEASUREMENT	24
4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	24
4.2.2 TEST INSTRUMENTS	24
4.2.3 TEST PROCEDURES	25
4.2.4 DEVIATION FROM TEST STANDARD	25
4.2.5 TEST SETUP.....	26
4.2.6 EUT OPERATING CONDITIONS.....	26
4.2.7 TEST RESULTS	27
4.3 NUMBER OF HOPPING FREQUENCY USED	29
4.3.1 LIMIT OF HOPPING FREQUENCY USED	29
4.3.2 TEST SETUP.....	29
4.3.3 TEST INSTRUMENTS	29
4.3.4 TEST PROCEDURES	29
4.3.5 DEVIATION FROM TEST STANDARD	29
4.3.6 TEST RESULTS	29
4.4 DWELL TIME ON EACH CHANNEL	31
4.4.1 LIMIT OF DWELL TIME USED	31
4.4.2 TEST SETUP.....	31
4.4.3 TEST INSTRUMENTS	31



A D T

4.4.4 TEST PROCEDURES	31
4.4.5 DEVIATION FROM TEST STANDARD	31
4.4.6 TEST RESULTS	32
4.5 CHANNEL BANDWIDTH	38
4.5.1 LIMITS OF CHANNEL BANDWIDTH.....	38
4.5.2 TEST SETUP.....	38
4.5.3 TEST INSTRUMENTS.....	38
4.5.4 TEST PROCEDURE.....	38
4.5.5 DEVIATION FROM TEST STANDARD	38
4.5.6 EUT OPERATING CONDITION	38
4.5.7 TEST RESULTS	39
4.6 HOPPING CHANNEL SEPARATION	42
4.6.1 LIMIT OF HOPPING CHANNEL SEPARATION	42
4.6.2 TEST SETUP.....	42
4.6.3 TEST INSTRUMENTS.....	42
4.6.4 TEST PROCEDURES	42
4.6.5 DEVIATION FROM TEST STANDARD	42
4.6.6 TEST RESULTS	43
4.7 MAXIMUM OUTPUT POWER	45
4.7.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT	45
4.7.2 TEST SETUP.....	45
4.7.3 TEST INSTRUMENTS.....	45
4.7.4 TEST PROCEDURES	45
4.7.5 DEVIATION FROM TEST STANDARD	45
4.7.6 EUT OPERATING CONDITION	45
4.7.7 TEST RESULTS	46
4.8 CONDUCTED OUT OF BAND EMISSION MEASUREMENT	48
4.8.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT	48
4.8.2 TEST INSTRUMENTS	48
4.8.3 TEST PROCEDURE.....	48
4.8.4 DEVIATION FROM TEST STANDARD	48
4.8.5 EUT OPERATING CONDITION	48
4.8.6 TEST RESULTS	48
5. PHOTOGRAPHS OF THE TEST CONFIGURATION.....	52
6. INFORMATION ON THE TESTING LABORATORIES	53
7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	54



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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF120405C14-5	Original release	Jun. 01, 2012



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1. CERTIFICATION

PRODUCT: CDMA FJI13

MODEL: FJI13

BRAND: Fujitsu Mobile Communications Ltd.

APPLICANT: Fujitsu Mobile Communications Ltd.

TESTED: May 08 ~ May 15, 2012

TEST SAMPLE: Production Unit

STANDARDS: FCC Part 15, Subpart C (Section 15.247)

ANSI C63.10-2009

The above equipment (Model: FJI13) 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 : Ivonne Wu , **DATE** : Jun. 01, 2012
Ivonne Wu / Senior Specialist

APPROVED BY : Gary Chang , **DATE** : Jun. 01, 2012
Gary Chang / Technical Manager



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2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C (Bluetooth EDR)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -13.15dB at 1.43359MHz.
15.247(a)(1) (iii)	Number of Hopping Frequency Used	PASS	Meet the requirement of limit.
15.247(a)(1) (iii)	Dwell Time on Each Channel	PASS	Meet the requirement of limit.
15.247(a)(1)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power	PASS	Meet the requirement of limit.
15.247(d)	Transmitter Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -5.57dB at 240.87MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

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

2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	CDMA FJI13	
MODEL NO.	FJI13	
POWER SUPPLY	5.0Vdc (adapter) 3.7Vdc (Li-ion battery)	
MODULATION TYPE	Bluetooth EDR	GFSK, $\pi/4$ -DQPSK, 8DPSK
TRANSFER RATE	Bluetooth EDR	1/2/3Mbps
OPERATING FREQUENCY	2402 ~ 2480MHz	
NUMBER OF CHANNEL	Bluetooth EDR	79
CHANNEL SPACING	Bluetooth EDR	1MHz
OUTPUT POWER	Bluetooth EDR	0.0067W
ANTENNA TYPE	Dipole antenna with -3.2dBi gain	
ANTENNA CONNECTOR	NA	
DATA CABLE	NA	
I/O PORTS	Refer to user's manual	
ACCESSORY DEVICES	Refer to Note as below	

NOTE:

1. The EUT contains following accessory and components.

ITEM	BRAND	MODEL	SPECIFICATION
Battery	Panasonic	FJI13UAA	Rating: 3.7Vdc, 1800mAh Type: Li-ion
LCD Panel	TMD	LT046MDY0000	--
Camera 1	SONY	IU091F-Z	--
Camera 2	SAMSUNG	S5K6AAFX13	--
WLAN/BT Module	TI	WL1283	--
WiMAX Module	Broadcom	BCSM350	--

2. The following accessory is for support unit only.

ITEM	BRAND	MODEL	SPECIFICATION
Adapter	HOSHIDEN	0204PTA	Input: 100-240Vac, 220mA Output: 5Vdc, 600mA

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



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3.2 DESCRIPTION OF TEST MODES

For Bluetooth EDR:

79 channels are provided to this EUT:

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

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

For Bluetooth EDR:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	✓	✓	✓	✓	-

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

PLC: Power Line Conducted Emission

RE<1G: Radiated Emission below 1GHz

APCM: Antenna Port Conducted Measurement

NOTE: 1. For Radiated emission test, pre-tested GFSK, $\pi/4$ -DQPSK, 8DPSK modulation type and found 8DPSK was the worse, therefore chosen for the final test and presented in the test report.

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

3. “-”means no effect.

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	PACKET TYPE
-	0 to 78	0, 39, 78	8DPSK	DH5

RADIATED EMISSION TEST (BELOW 1 GHz):

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

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	PACKET TYPE
-	0 to 78	39	8DPSK	DH5

POWER LINE CONDUCTED EMISSION TEST:

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

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

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	PACKET TYPE
-	0 to 78	39	8DPSK	DH5



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ANTENNA PORT CONDUCTED MEASUREMENT:

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	PACKET TYPE
-	0 to 78	0, 39, 78	GFSK	DH5
-	0 to 78	0, 39, 78	$\pi/4$ -DQPSK	DH5
-	0 to 78	0, 39, 78	8DPSK	DH5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE \geq 1G	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu
PLC	22deg. C, 56%RH	120Vac, 60Hz	Skys Huang
APCM	25deg. C, 65%RH	120Vac, 60Hz	Phoenix Chen

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (15.247)

ANSI C63.10-2009

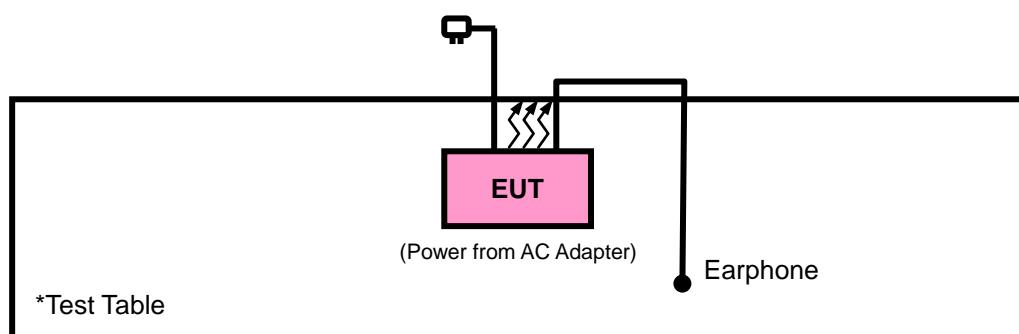
558074 D01 DTS Meas Guidance v01

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

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST





4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

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

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dB_{UV}/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



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4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver Agilent	N9038A	MY51210203	Dec. 22, 2011	Dec. 21, 2012
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 21, 2011	Dec. 20, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Dec. 20, 2011	Dec. 19, 2012
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Dec. 20, 2011	Dec. 19, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 20, 2011	Dec. 19, 2012
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier EMCI	EMC 012645	980115	Dec. 30, 2011	Dec. 29, 2012
Preamplifier EMCI	EMC 330H	980112	Dec. 30, 2011	Dec. 29, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4	Oct. 21, 2011	Oct. 20, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Jan. 02, 2012	Jan. 01, 2013
RF signal cable Worken	RG-213	NA	Jan. 02, 2012	Jan. 01, 2013
Software	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Mini-Circuits Power Splitter	ZN2PD-9G	NA	May 25, 2011	May 24, 2012
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA

NOTE:

1. The calibration interval of the above test instruments except loop antenna is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The calibration interval of loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in HwaYa Chamber 9.
4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
5. The FCC Site Registration No. is 460141.
6. The IC Site Registration No. is IC 7450F-4.



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4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

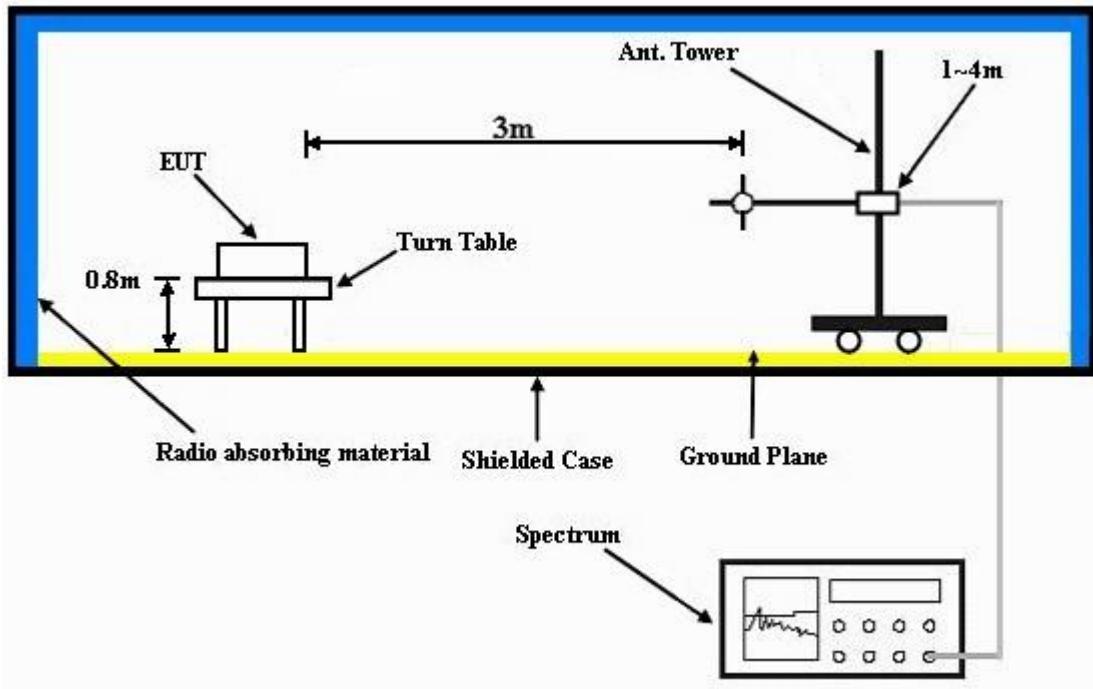
NOTE:

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



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

4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on a testing table.
- b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.



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4.1.7 TEST RESULTS

TEST MODE A

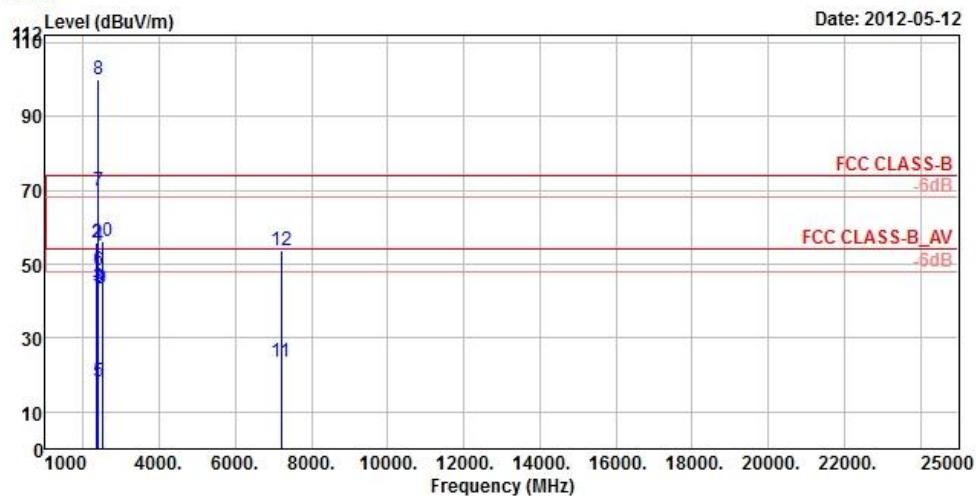
ABOVE 1GHz WORST-CASE DATA : 8DPSK



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Data: 19



Site : 966 Chamber 5
Condition : FCC CLASS-B 3m ANT_18G~40G_HF HORIZONTAL
Brand/Model: FJI13
Remark : BT TX CH00(8PSK)
Tested by : Kay Wu
Temperature : 25°C
Humidity : 65%
Plane : X

Freq	Level	Read	Limit	Over	Antenna	Cable	Preamp	A/Pos	T/Pos	Remark
		Level	Line	Limit	Factor	Loss	Factor	cm	deg	
MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2348.00	42.75	48.31	54.00	-11.25	27.11	4.82	37.49	130	62 Average
2	2348.00	55.66	61.22	74.00	-18.34	27.11	4.82	37.49	130	62 Peak
3	2398.00	43.71	49.10	54.00	-10.29	27.26	4.87	37.52	130	62 Average
4	2398.00	54.96	60.35	74.00	-19.04	27.26	4.87	37.52	130	62 Peak
5	2400.00	18.15	23.54	54.00	-35.85	27.26	4.87	37.52	130	62 Average
6	2400.00	48.25	53.64	74.00	-25.75	27.26	4.87	37.52	130	62 Peak
7 av	2402.00	69.97	75.36		27.26	4.87	37.52	130	62 Average	
8 pp	2402.00	100.07	105.46		27.26	4.87	37.52	130	62 Peak	
9	2488.00	43.50	48.35	54.00	-10.50	27.55	4.92	37.32	130	62 Average
10	2488.00	56.26	61.11	74.00	-17.74	27.55	4.92	37.32	130	62 Peak
11	7206.00	23.55	30.18	54.00	-30.45	35.97	9.57	52.17	100	225 Average
12	7206.00	53.65	60.28	74.00	-20.35	35.97	9.57	52.17	100	225 Peak



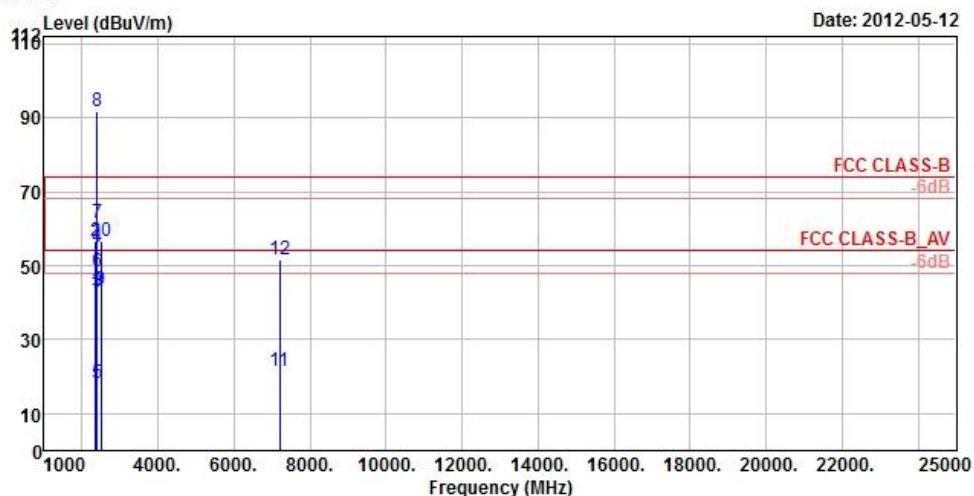
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Data: 20



Site : 966 Chamber 5

Condition : FCC CLASS-B 3m ANT_18G~40G_HF VERTICAL

Brand/Model: FJI13

Remark : BT TX CH00(8PSK)

Tested by : Kay Wu

Temprature : 25°C

Humidity : 65%

Plane : X

Freq	Level	Read	Limit	Over	Antenna	Cable	Preamp	A/Pos	T/Pos	Remark
		Level	Line	Limit	Factor	Cable	Preamp	A/Pos	T/Pos	
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg
1	2358.00	42.76	48.27	54.00	-11.24	27.16	4.82	37.49	100	210 Average
2	2358.00	56.57	62.08	74.00	-17.43	27.16	4.82	37.49	100	210 Peak
3	2398.00	42.90	48.29	54.00	-11.10	27.26	4.87	37.52	100	210 Average
4	2398.00	54.87	60.26	74.00	-19.13	27.26	4.87	37.52	100	210 Peak
5	2400.00	18.14	23.53	54.00	-35.86	27.26	4.87	37.52	100	210 Average
6	2400.00	48.24	53.63	74.00	-25.76	27.26	4.87	37.52	100	210 Peak
7 av	2402.00	61.76	67.15		27.26	4.87	37.52	100	210 Average	
8 pp	2402.00	91.86	97.25		27.26	4.87	37.52	100	210 Peak	
9	2500.00	43.52	48.28	54.00	-10.48	27.55	4.94	37.25	100	210 Average
10	2500.00	56.42	61.18	74.00	-17.58	27.55	4.94	37.25	100	210 Peak
11	7206.00	21.64	28.27	54.00	-32.36	35.97	9.57	52.17	100	98 Average
12	7206.00	51.74	58.37	74.00	-22.26	35.97	9.57	52.17	100	98 Peak



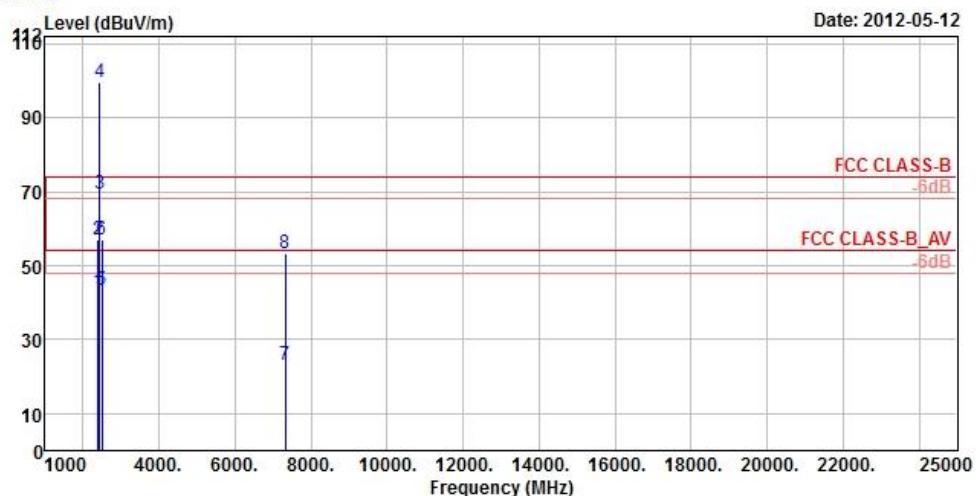
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Data: 19



Site : 966 Chamber 5
Condition : FCC CLASS-B 3m ANT_18G~40G_HF HORIZONTAL
Brand/Model: FJI13
Remark : BT TX CH39(8PSK)
Tested by : Kay Wu
Temprature : 25°C
Humidity : 65%
Plane : X

Freq	Level	Read	Limit	Over	Antenna	Cable	Preamp	A/Pos	T/Pos	Remark
		MHz	dBuV/m	dBuV	dBuV/m	Line	Limit Factor	dB/m	dB	
1	2386.00	42.89	48.28	54.00	-11.11	27.26	4.85	37.50	123	60 Average
2	2386.00	57.11	62.50	74.00	-16.89	27.26	4.85	37.50	123	60 Peak
3 av	2441.00	69.47	74.55			27.40	4.91	37.39	123	60 Average
4 pp	2441.00	99.57	104.65			27.40	4.91	37.39	123	60 Peak
5	2496.00	43.54	48.30	54.00	-10.46	27.55	4.94	37.25	123	60 Average
6	2496.00	56.93	61.69	74.00	-17.07	27.55	4.94	37.25	123	60 Peak
7	7323.00	23.24	29.12	54.00	-30.76	36.26	9.63	51.77	100	124 Average
8	7323.00	53.34	59.22	74.00	-20.66	36.26	9.63	51.77	100	124 Peak



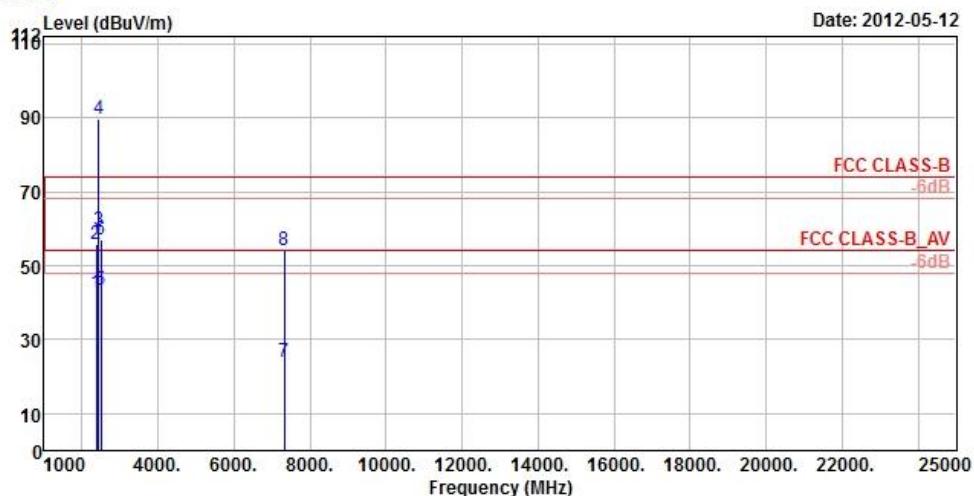
A D T



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 20



Site : 966 Chamber 5

Condition : FCC CLASS-B 3m ANT_18G~40G_HF VERTICAL

Brand/Model: FJI13

Remark : BT TX CH39(8PSK)

Tested by : Kay Wu

Temprature : 25°C

Humidity : 65%

Plane : X

Freq	Level	Read	Limit	OverAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
		MHz	dBuV/m	dBuV	dBuV/m	Line	Limit Factor	Loss Factor	
1	2364.00	42.75	48.26	54.00	-11.25	27.16	4.82	37.49	100 9 Average
2	2364.00	55.81	61.32	74.00	-18.19	27.16	4.82	37.49	100 9 Peak
3 av	2441.00	59.67	64.75			27.40	4.91	37.39	100 9 Average
4 pp	2441.00	89.77	94.85			27.40	4.91	37.39	100 9 Peak
5	2496.00	43.55	48.31	54.00	-10.45	27.55	4.94	37.25	100 9 Average
6	2496.00	56.99	61.75	74.00	-17.01	27.55	4.94	37.25	100 9 Peak
7	7323.00	24.04	29.92	54.00	-29.96	36.26	9.63	51.77	100 195 Average
8	7323.00	54.14	60.02	74.00	-19.86	36.26	9.63	51.77	100 195 Peak



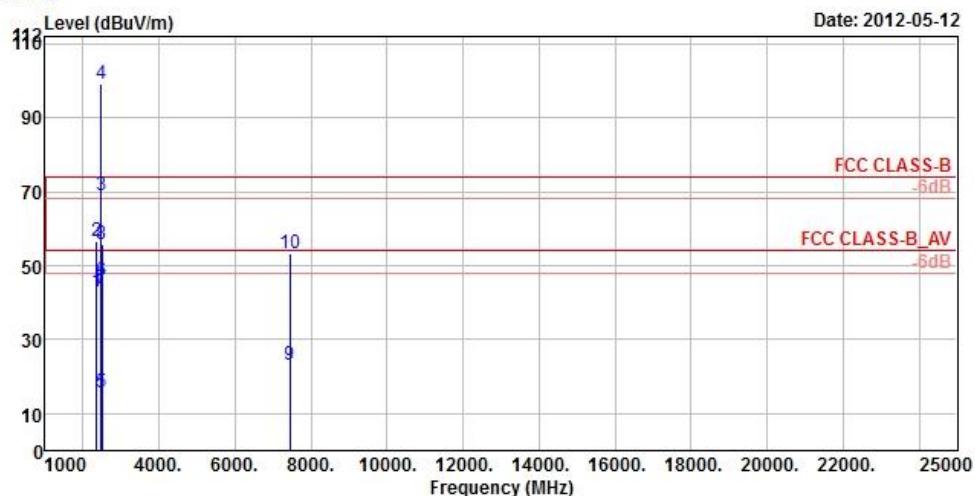
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 19



Site : 966 Chamber 5
Condition : FCC CLASS-B 3m ANT_18G~40G_HF HORIZONTAL
Brand/Model: FJI13
Remark : BT TX CH78(8PSK)
Tested by : Kay Wu
Temprature : 25°C
Humidity : 65%
Plane : X

Freq	Level	Read	Limit	OverAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
		MHz	dBuV/m	dBuV	dBuV/m	Line	Limit Factor	Loss	
1	2360.00	42.78	48.29	54.00	-11.22	27.16	4.82	37.49	125 58 Average
2	2360.00	56.78	62.29	74.00	-17.22	27.16	4.82	37.49	125 58 Peak
3 av	2480.00	69.07	73.97			27.50	4.92	37.32	125 58 Average
4 pp	2480.00	99.17	104.07			27.50	4.92	37.32	125 58 Peak
5	2483.50	15.91	20.81	54.00	-38.09	27.50	4.92	37.32	125 58 Average
6	2483.50	46.01	50.91	74.00	-27.99	27.50	4.92	37.32	125 58 Peak
7	2485.50	43.71	48.61	54.00	-10.29	27.50	4.92	37.32	125 58 Average
8	2485.50	55.67	60.57	74.00	-18.33	27.50	4.92	37.32	125 58 Peak
9	7440.00	23.31	28.43	54.00	-30.69	36.55	9.71	51.38	100 157 Average
10	7440.00	53.41	58.53	74.00	-20.59	36.55	9.71	51.38	100 157 Peak



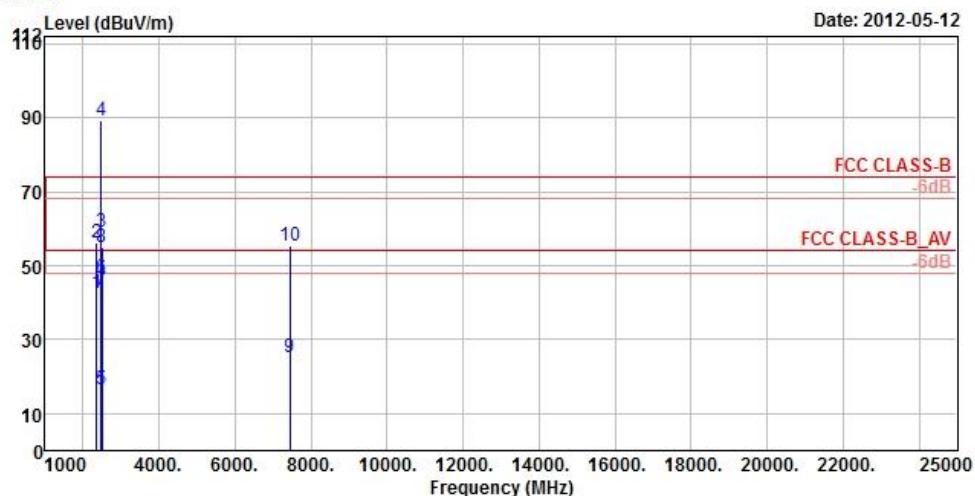
A D T



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 20



Site : 966 Chamber 5

Condition : FCC CLASS-B 3m ANT_18G~40G_HF VERTICAL

Brand/Model: FJI13

Remark : BT TX CH78(8PSK)

Tested by : Kay Wu

Temprature : 25°C

Humidity : 65%

Plane : X

Freq	Level	Read	Limit	OverAntenna	Cable	Preamp	A/Pos	T/Pos	Remark	
		Level	Line	Limit Factor	Loss	Factor	cm	deg		
MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2348.00	42.64	48.20	54.00	-11.36	27.11	4.82	37.49	100	10 Average
2	2348.00	56.30	61.86	74.00	-17.70	27.11	4.82	37.49	100	10 Peak
3 av	2480.00	59.28	64.18			27.50	4.92	37.32	100	10 Average
4 pp	2480.00	89.38	94.28			27.50	4.92	37.32	100	10 Peak
5	2483.50	16.73	21.63	54.00	-37.27	27.50	4.92	37.32	100	10 Average
6	2483.50	46.83	51.73	74.00	-27.17	27.50	4.92	37.32	100	10 Peak
7	2485.50	43.38	48.28	54.00	-10.62	27.50	4.92	37.32	100	10 Average
8	2485.50	55.14	60.04	74.00	-18.86	27.50	4.92	37.32	100	10 Peak
9	7440.00	25.10	30.22	54.00	-28.90	36.55	9.71	51.38	100	121 Average
10	7440.00	55.20	60.32	74.00	-18.80	36.55	9.71	51.38	100	121 Peak



A D T

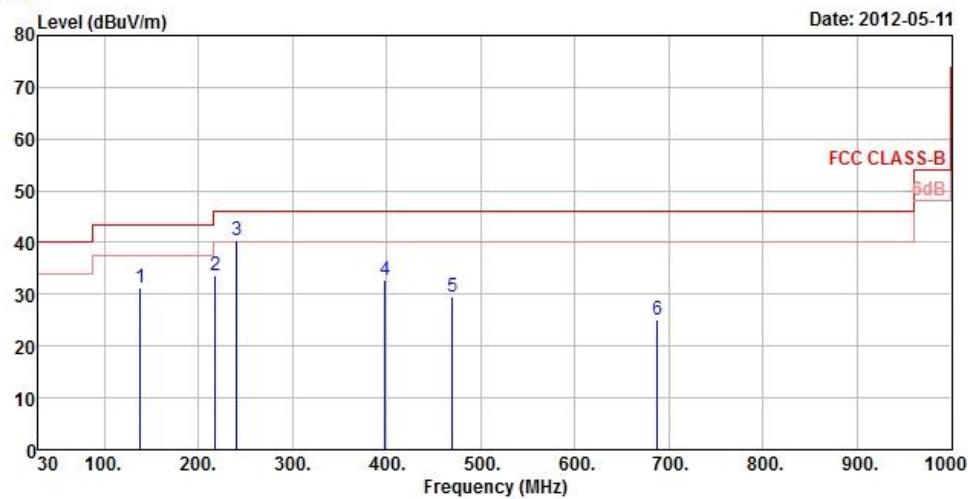
BELOW 1GHz WORST-CASE DATA :



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 Chamber 5
Condition : FCC CLASS-B 3m ANT_30M~1G_LF HORIZONTAL
Brand/Model: FJI13
Remark : BT TX LF
Tested by : Kay Wu
Temprature : 25°C
Humidity : 65%
Plane : X

Freq	Level	Read	Limit	Over	Antenna	Cable	Preamp	A/Pos	T/Pos	Remark
		Level	Line	Limit	Factor	Loss	Factor	cm	deg	
MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	138.00	31.42	49.62	43.50	-12.08	12.21	1.28	31.69	100	174 Peak
2	217.92	33.79	53.67	46.00	-12.21	10.13	1.68	31.69	100	210 Peak
3 pp	240.87	40.43	59.36	46.00	-5.57	11.07	1.79	31.79	125	274 Peak
4	398.00	32.64	47.05	46.00	-13.36	15.28	2.42	32.11	105	254 Peak
5	470.10	29.54	42.02	46.00	-16.46	16.73	2.68	31.89	133	214 Peak
6	687.80	25.13	32.92	46.00	-20.87	20.67	3.38	31.84	199	67 Peak



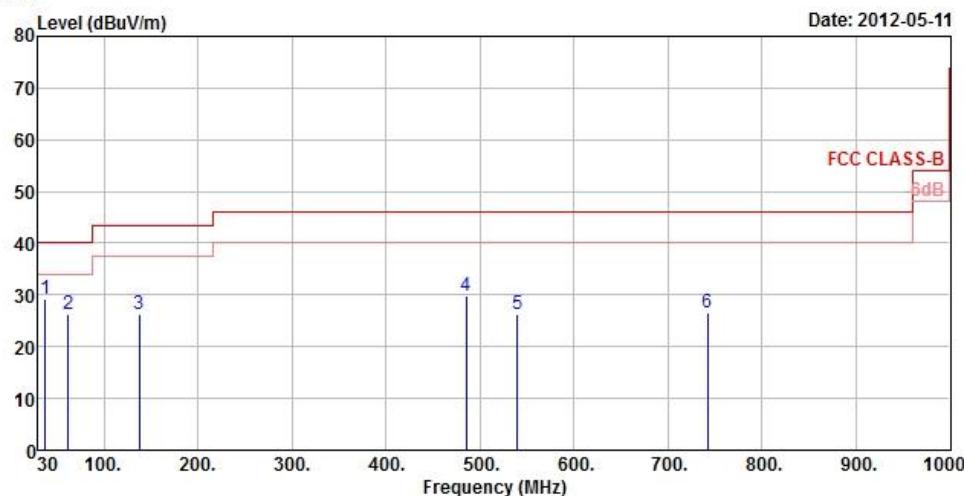
A D T



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6



Site : 966 Chamber 5

Condition : FCC CLASS-B 3m ANT_30M~1G_LF VERTICAL

Brand/Model: FJI13

Remark : BT TX LF

Tested by : Kay Wu

Temprature : 25°C

Humidity : 65%

Plane : X

Freq	Level	Read	Limit	Over	Antenna	Cable	Preamp	A/Pos	T/Pos	Remark
		Level	Line	Limit	Factor	Cable	Preamp	A/Pos	T/Pos	
MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1 pp	37.29	29.33	46.48	40.00	-10.67	13.24	0.63	31.02	132	284 Peak
2	61.59	26.25	45.15	40.00	-13.75	11.71	0.84	31.45	110	252 Peak
3	137.46	26.18	44.38	43.50	-17.32	12.21	1.28	31.69	132	274 Peak
4	485.50	29.95	41.98	46.00	-16.05	17.04	2.73	31.80	100	155 Peak
5	539.40	26.34	36.94	46.00	-19.66	18.22	2.91	31.73	177	41 Peak
6	742.40	26.70	33.18	46.00	-19.30	21.41	3.55	31.44	133	28 Peak



A D T

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	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.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Nov. 19, 2011	Nov. 18, 2012
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 22, 2011	Dec. 21, 2012
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 30, 2011	Dec. 29, 2012
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 07, 2011	Jul. 06, 2012
Software ADT	BV ADT_Cond_V7.3.7.3	NA	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 2.
3. The VCCI Site Registration No. is C-2047.



A D T

4.2.3 TEST PROCEDURES

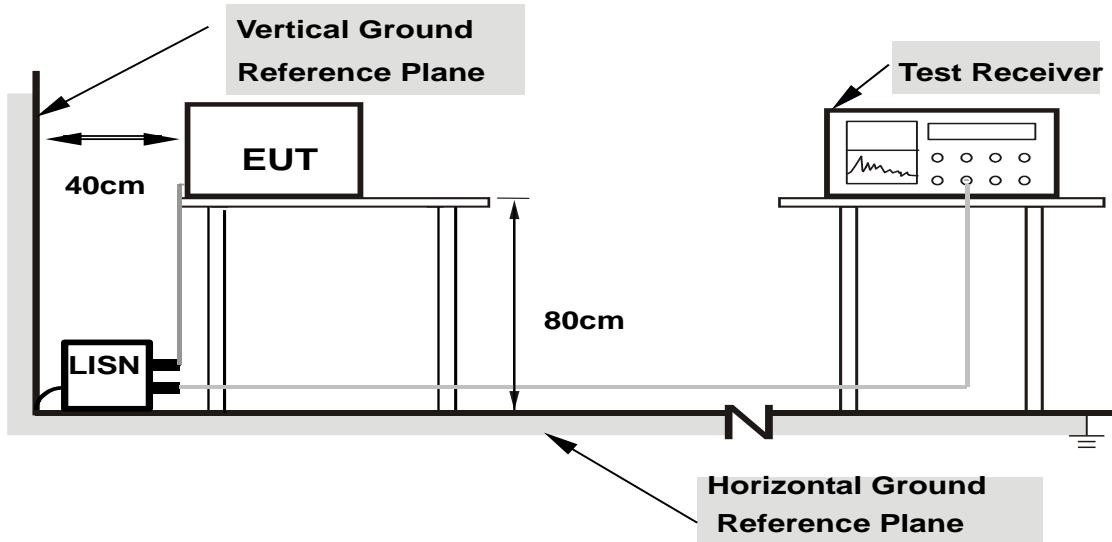
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



Note:

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

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

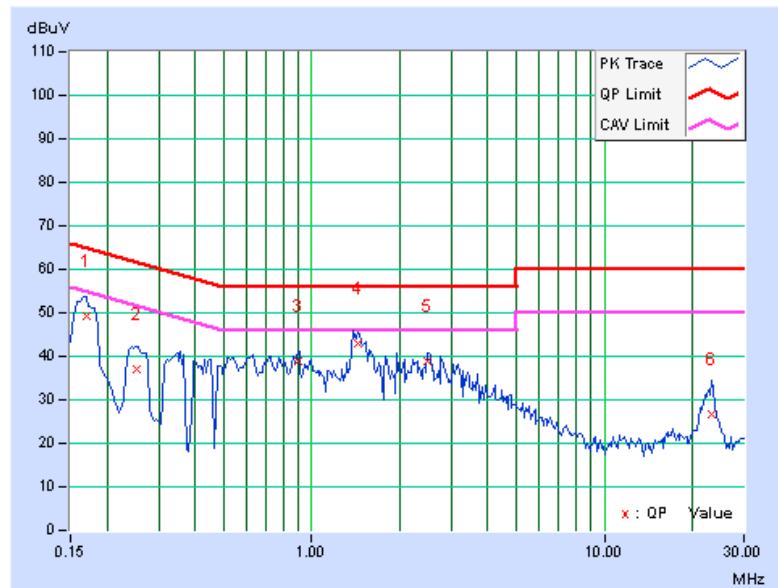
CONDUCTED WORST CASE DATA: 8DPSK

PHASE	Line 1		6dB BANDWIDTH		9kHz	
-------	--------	--	---------------	--	------	--

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	0.27	49.07	32.57	49.34	32.84	64.98	54.98	-15.64	-22.14
2	0.25156	0.28	36.84	25.58	37.12	25.86	61.71	51.71	-24.59	-25.85
3	0.89609	0.31	38.67	25.62	38.98	25.93	56.00	46.00	-17.02	-20.07
4	1.43359	0.34	42.51	25.88	42.85	26.22	56.00	46.00	-13.15	-19.78
5	2.49609	0.39	38.55	22.46	38.94	22.85	56.00	46.00	-17.06	-23.15
6	23.17578	0.69	25.84	11.63	26.53	12.32	60.00	50.00	-33.47	-37.68

REMARKS:

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

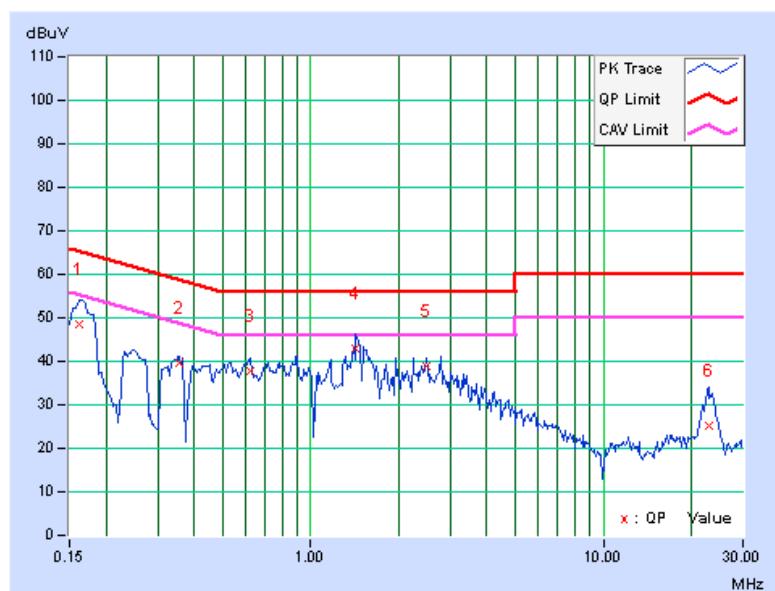


PHASE	Line 2	6dB BANDWIDTH	9kHz
-------	--------	---------------	------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.16172	0.29	48.20	27.83	48.49	28.12	65.38	55.38	-16.89
2	0.35703	0.30	39.49	27.53	39.79	27.83	58.80	48.80	-19.01	-20.97
3	0.62266	0.31	37.60	24.36	37.91	24.67	56.00	46.00	-18.09	-21.33
4	1.42969	0.35	42.61	26.23	42.96	26.58	56.00	46.00	-13.04	-19.42
5	2.49609	0.41	38.63	22.93	39.04	23.34	56.00	46.00	-16.96	-22.66
6	22.89844	0.84	24.29	11.42	25.13	12.26	60.00	50.00	-34.87	-37.74

REMARKS:

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

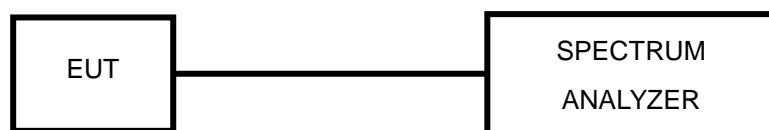


4.3 NUMBER OF HOPPING FREQUENCY USED

4.3.1 LIMIT OF HOPPING FREQUENCY USED

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

4.3.2 TEST SETUP



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.3.4 TEST PROCEDURES

- a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- c. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
- d. Set the SA on View mode and then plot the result on SA screen.
- e. Repeat above procedures until all frequencies measured were complete.

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

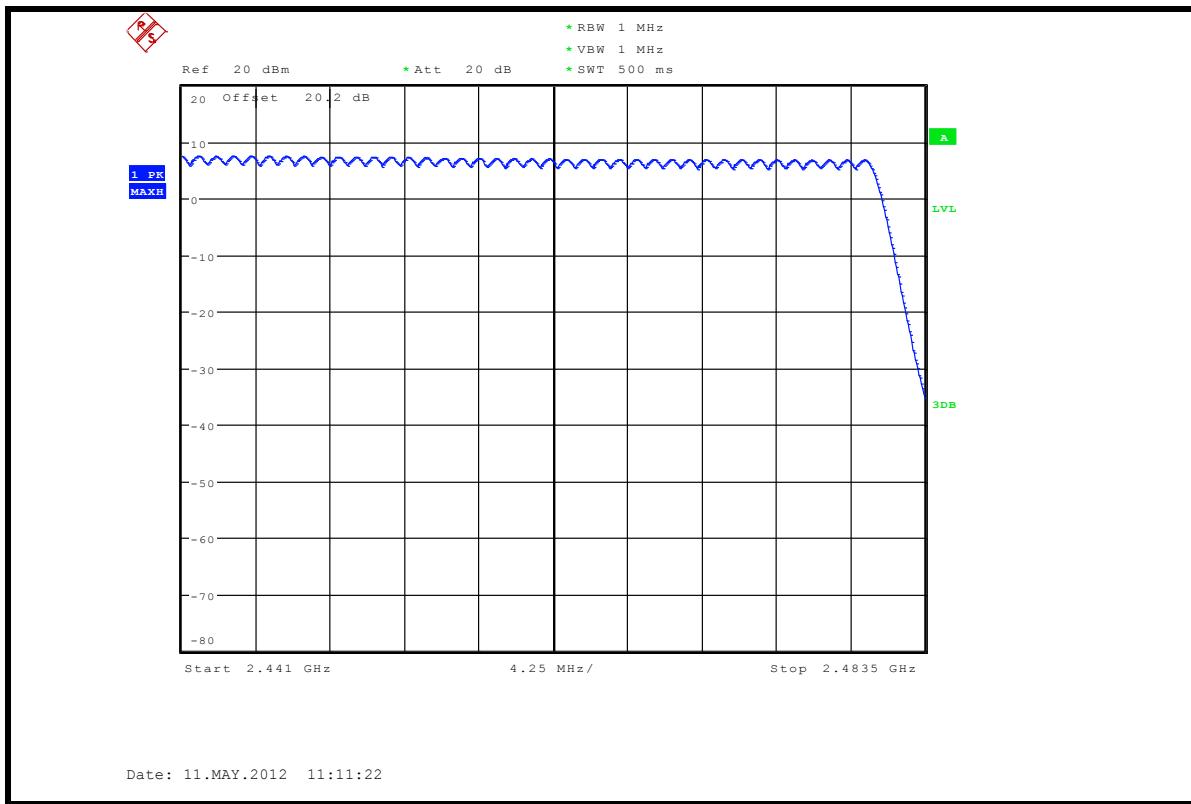
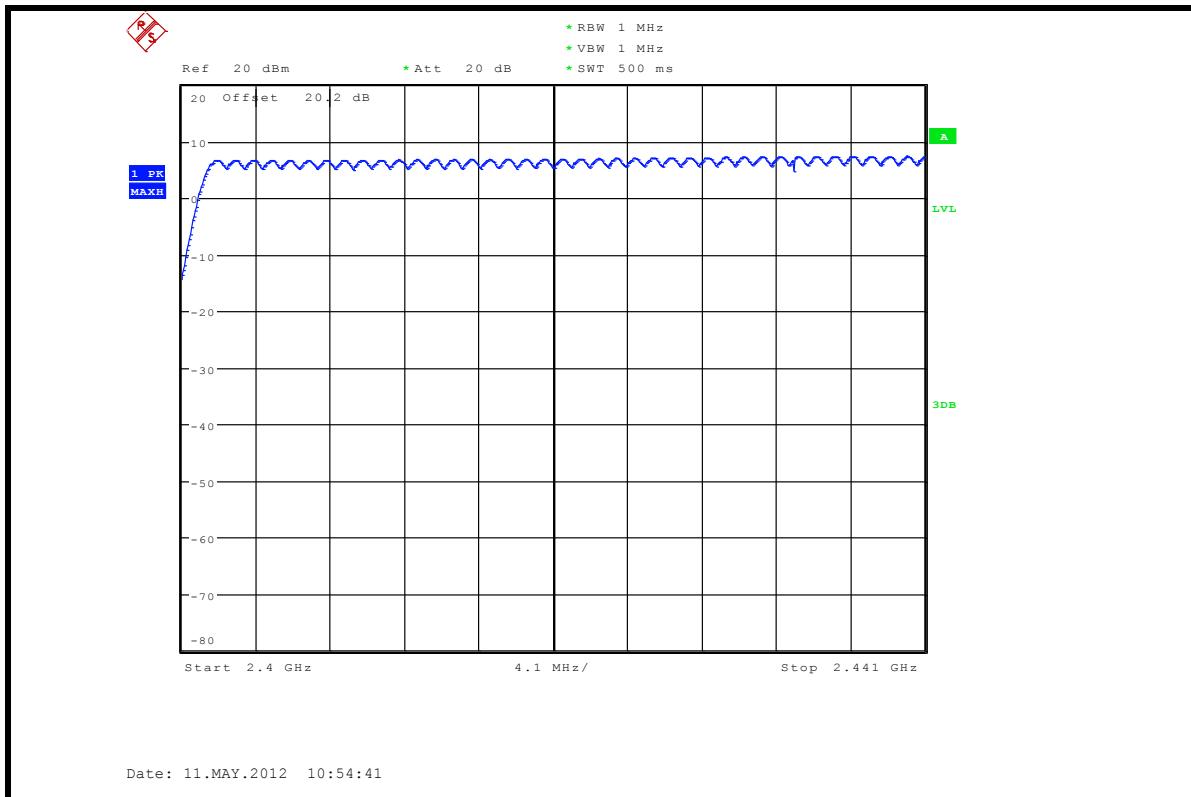
4.3.6 TEST RESULTS

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



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8DPSK

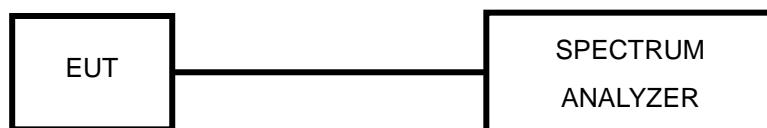


4.4 DWELL TIME ON EACH CHANNEL

4.4.1 LIMIT OF DWELL TIME USED

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

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.4.4 TEST PROCEDURES

- a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- c. Adjust the center frequency of SA on any frequency to be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
- d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
- e. Repeat above procedures until all different time-slot modes have been completed.

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.



A D T

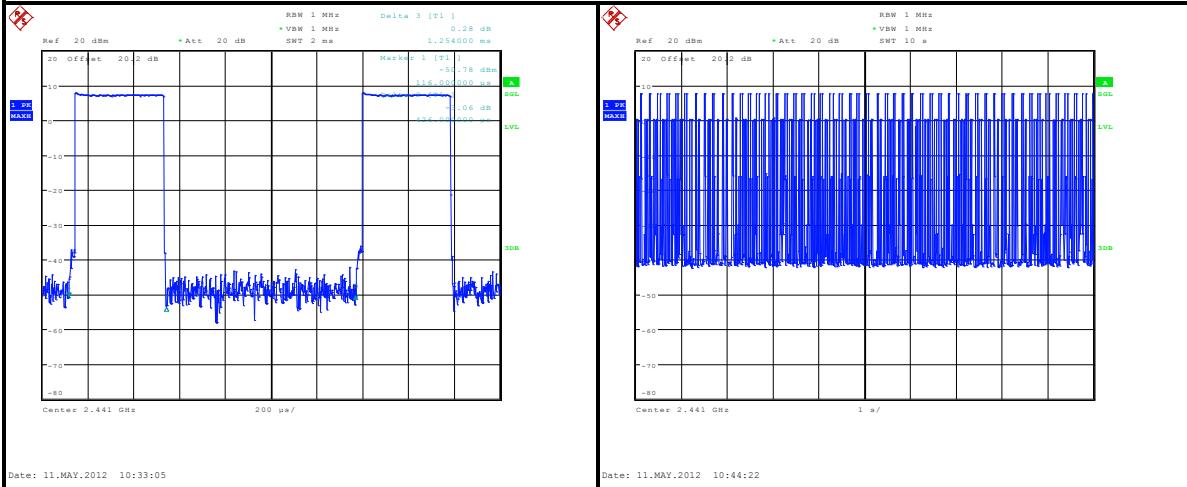
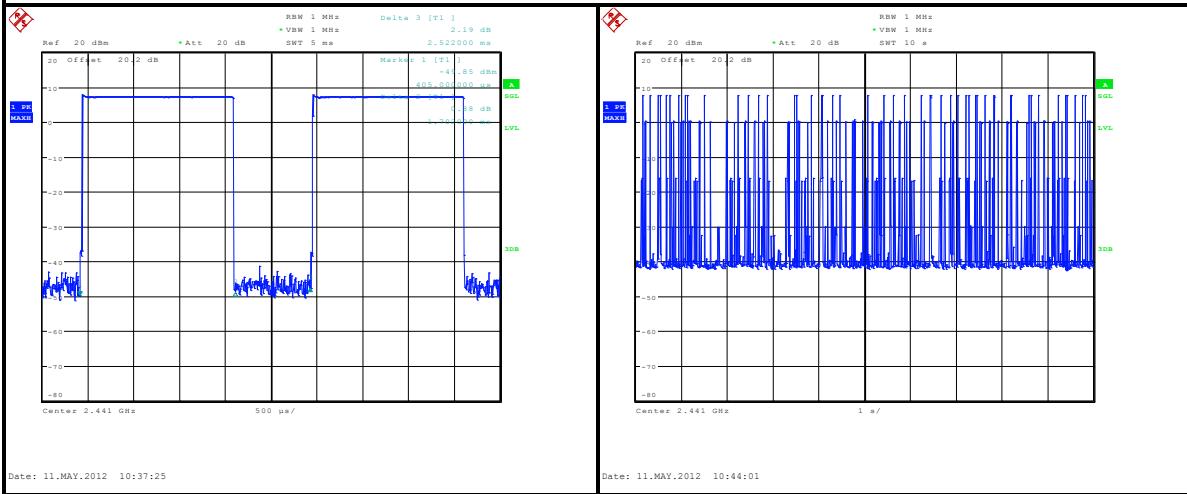
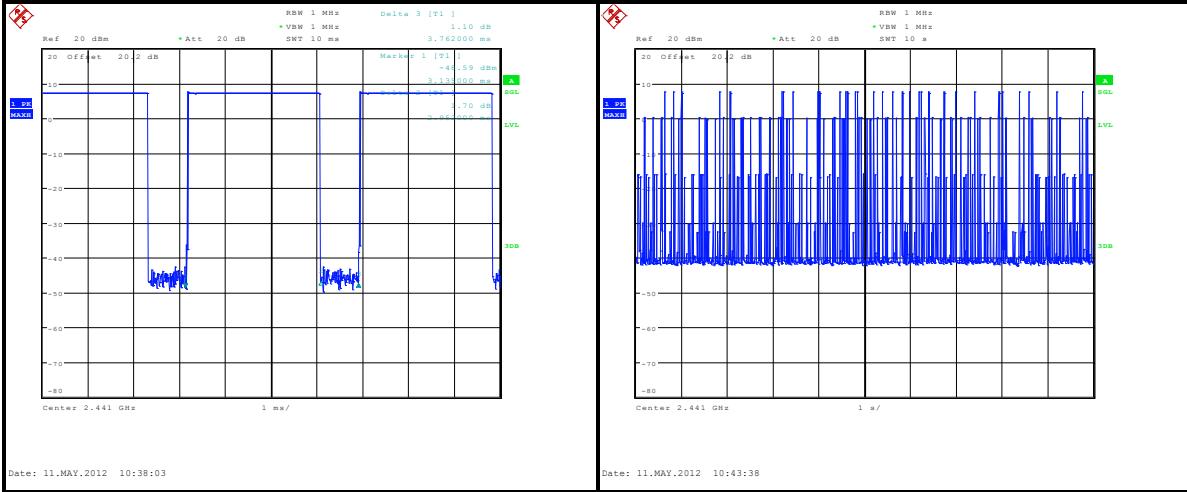
4.4.6 TEST RESULTS

GFSK

Mode	Average Hopping Channel	Package Transfer Time (usec)	Result (sec)	Limit (sec)
DH1	9.30	426.00	0.13	0.4
DH3	4.50	1702.00	0.24	0.4
DH5	3.40	2952.00	0.32	0.4

NOTE:

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)
5. Test plots of the transmitting time slot are shown on next page.

DH1

DH3

DH5




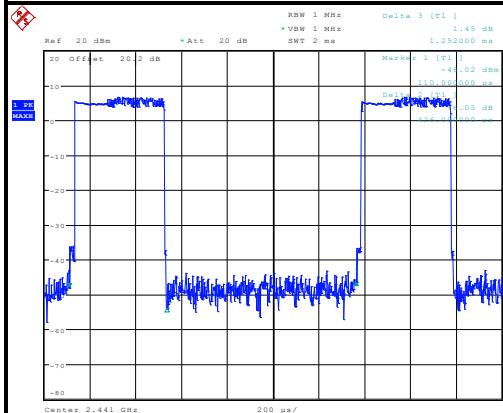
A D T

π/4-DQPSK

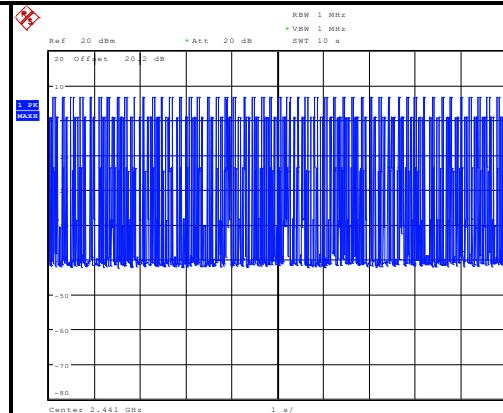
Mode	Average Hopping Channel	Package Transfer Time (usec)	Result (sec)	Limit (sec)
DH1	9.20	426.00	0.12	0.4
DH3	4.70	1702.00	0.25	0.4
DH5	3.50	2942.00	0.33	0.4

NOTE:

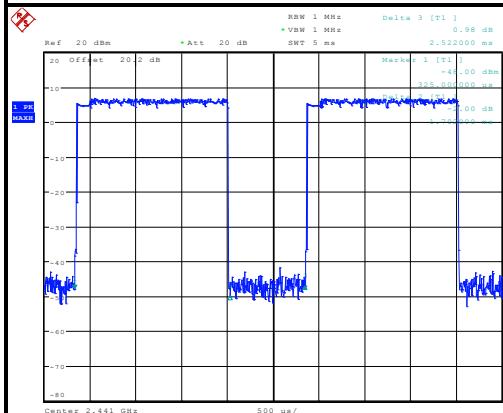
1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79 channels come from the Hopping Channel number
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)
5. Test plots of the transmitting time slot are shown on next page.

DH1


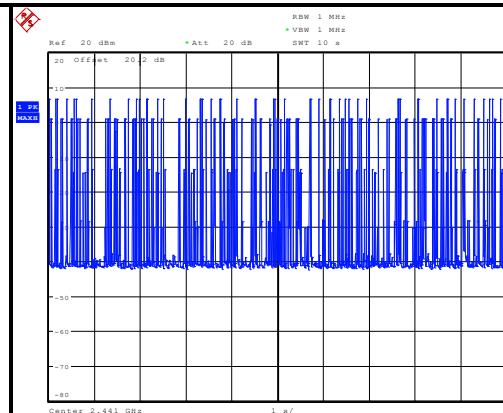
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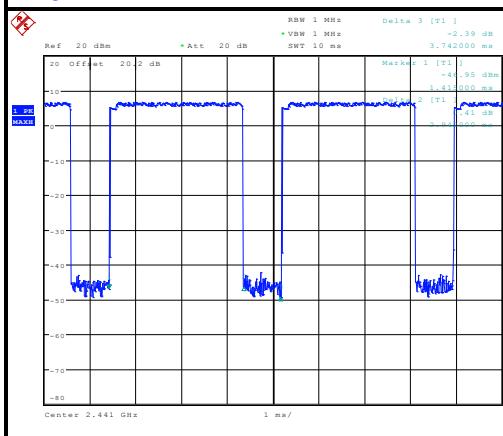
Date: 11.MAY.2012 10:43:10

DH3


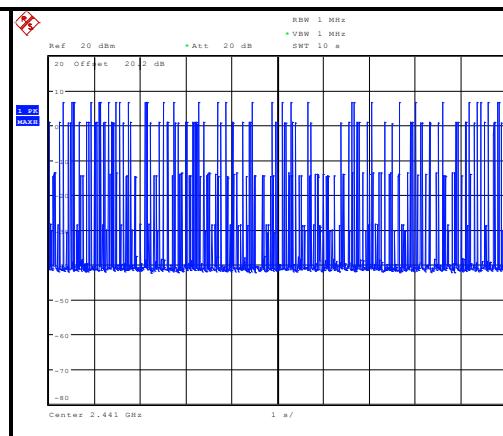
Date: 11.MAY.2012 10:36:57



Date: 11.MAY.2012 10:42:49

DH5


Date: 11.MAY.2012 10:38:35



Date: 11.MAY.2012 10:42:27



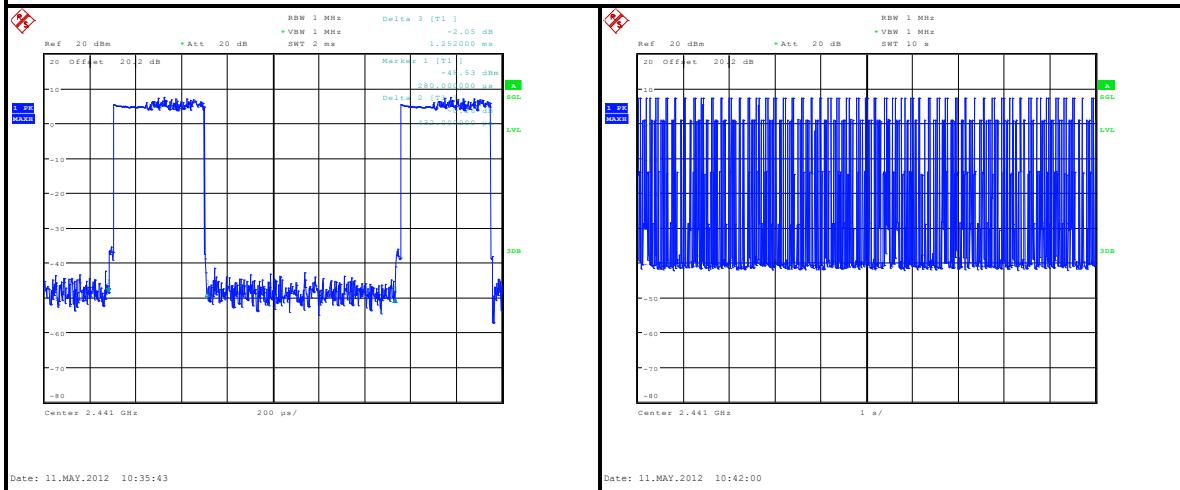
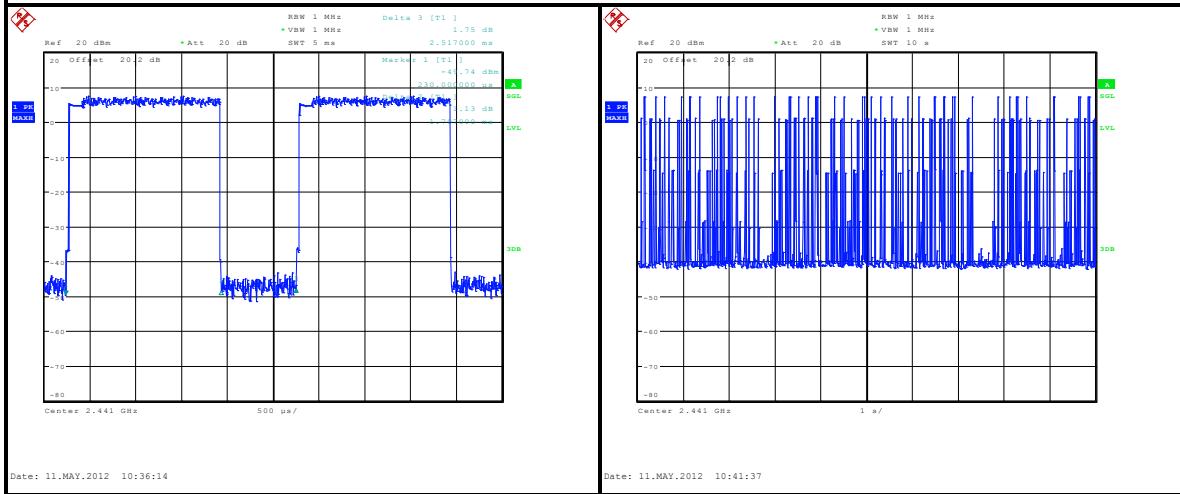
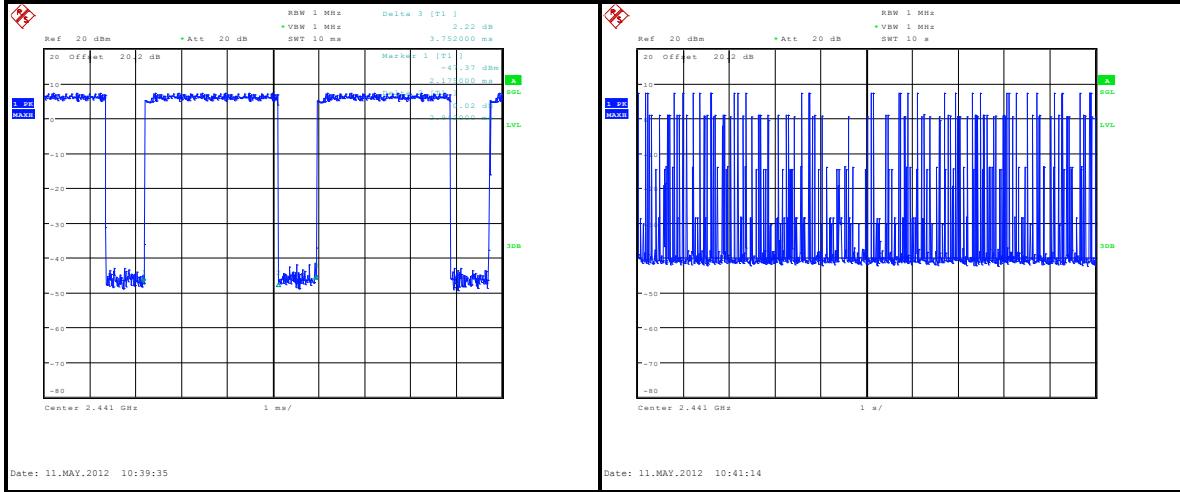
A D T

8DPSK

Mode	Average Hopping Channel	Package Transfer Time (usec)	Result (sec)	Limit (sec)
DH1	9.80	432.00	0.13	0.4
DH3	4.40	1707.00	0.24	0.4
DH5	3.40	2942.00	0.32	0.4

NOTE:

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)
5. Test plots of the transmitting time slot are shown on next page.

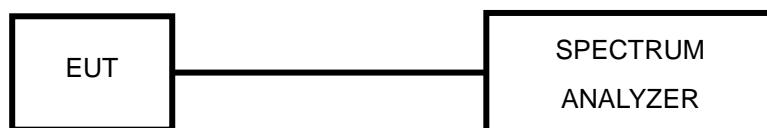
DH1

DH3

DH5


4.5 CHANNEL BANDWIDTH

4.5.1 LIMITS OF CHANNEL BANDWIDTH

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

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.5.4 TEST PROCEDURE

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

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

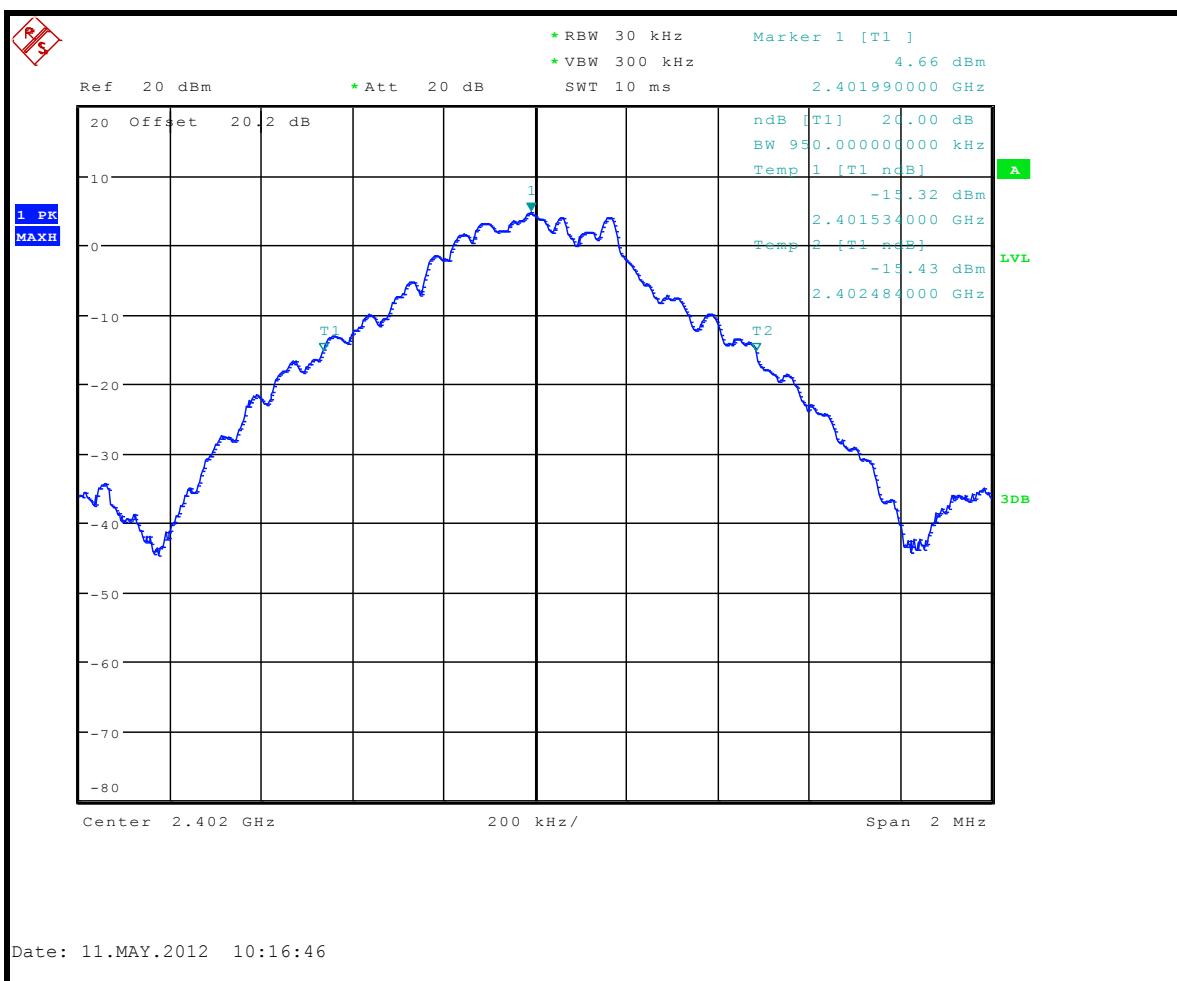
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.5.7 TEST RESULTS

GFSK

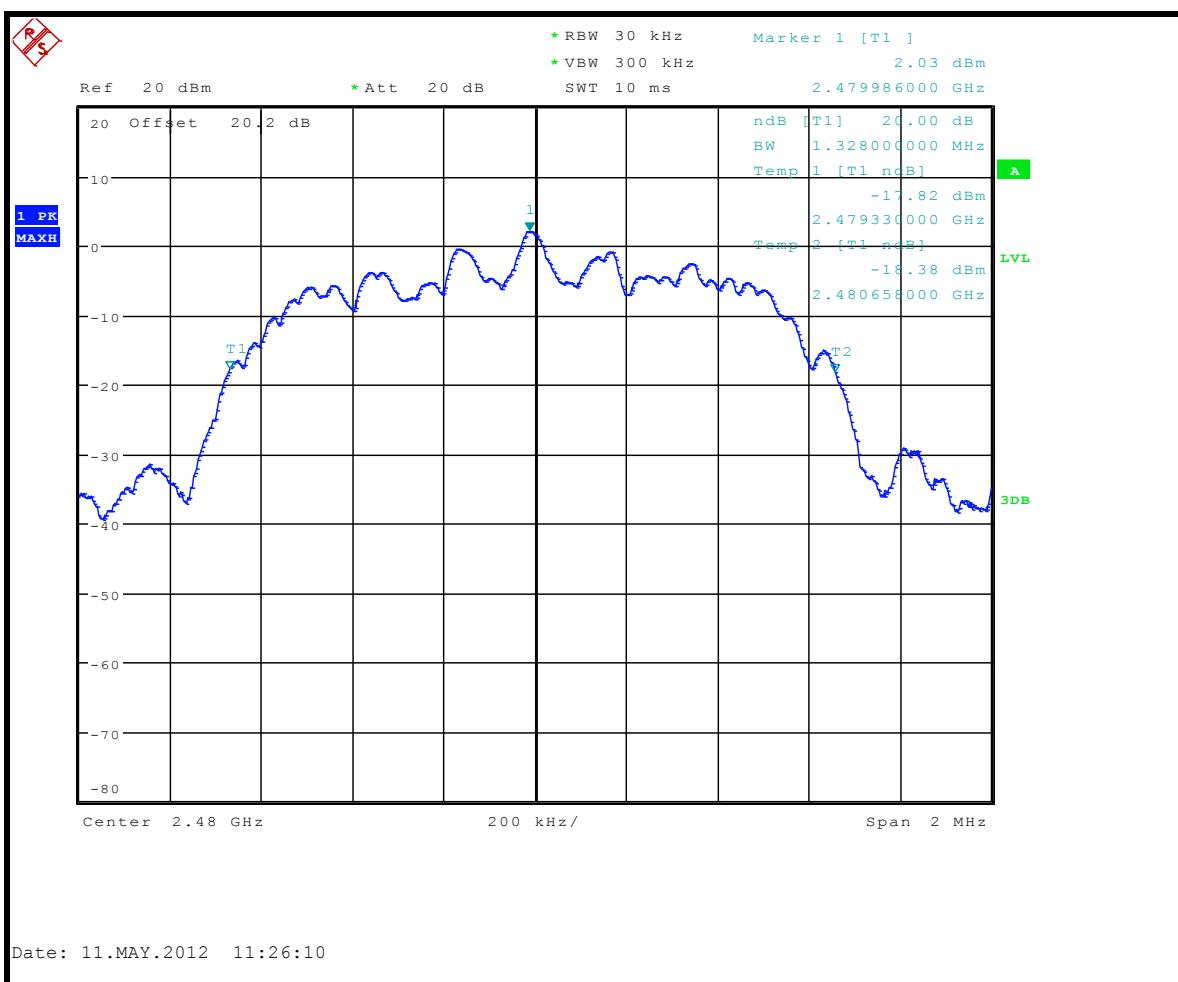
CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
0	2402	0.950
39	2441	0.950
78	2480	0.948

CH 0



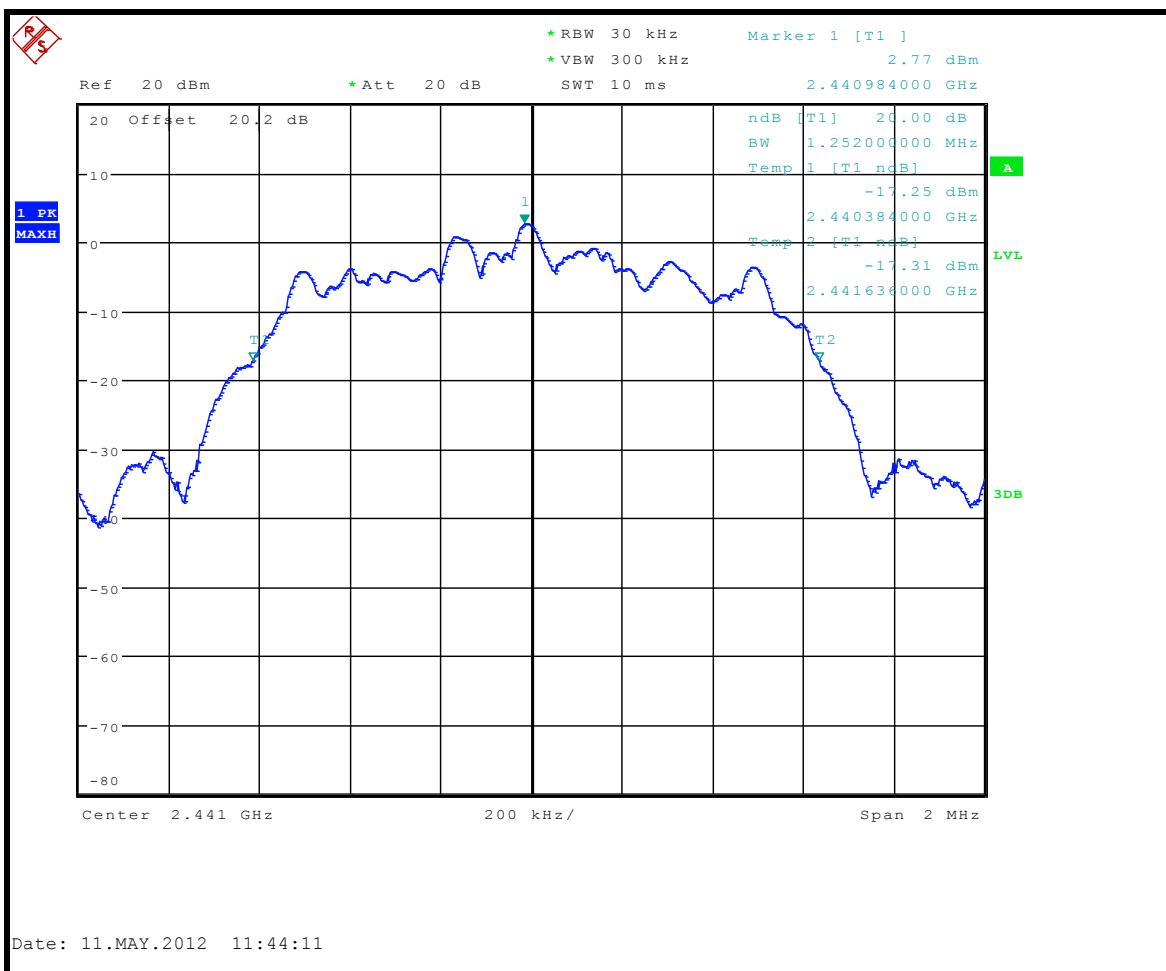
$\pi/4$ -DQPSK

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
0	2402	1.320
39	2441	1.322
78	2480	1.328

CH 78


8DPSK

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)
0	2402	1.248
39	2441	1.252
78	2480	1.250

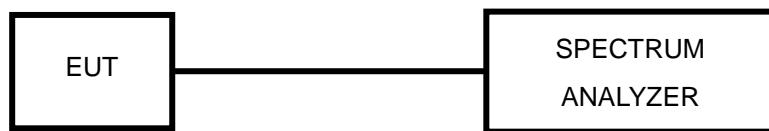
CH 39


4.6 HOPPING CHANNEL SEPARATION

4.6.1 LIMIT OF HOPPING CHANNEL SEPARATION

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

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.6.4 TEST PROCEDURES

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

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 TEST RESULTS

GFSK

CHANNEL	FREQUENCY (MHz)	ADJACENT CHANNEL SEPARATION (MHz)	20dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	1.002	0.950	0.633	PASS
39	2441	1.002	0.950	0.633	PASS
78	2480	1.002	0.948	0.632	PASS

$\pi/4$ -DQPSK

CHANNEL	FREQUENCY (MHz)	ADJACENT CHANNEL SEPARATION (MHz)	20dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	1.002	1.320	0.880	PASS
39	2441	1.002	1.322	0.881	PASS
78	2480	1.002	1.328	0.885	PASS

8DPSK

CHANNEL	FREQUENCY (MHz)	ADJACENT CHANNEL SEPARATION (MHz)	20dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2402	1.002	1.248	0.832	PASS
39	2441	1.002	1.252	0.835	PASS
78	2480	1.002	1.250	0.833	PASS

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

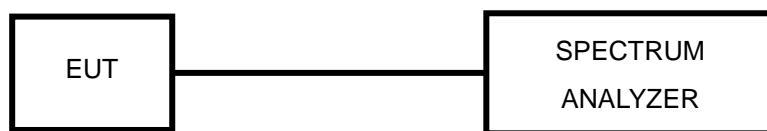


4.7 MAXIMUM OUTPUT POWER

4.7.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

The Maximum Output Power Measurement is 125mW.

4.7.2 TEST SETUP



4.7.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.7.4 TEST PROCEDURES

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3MHz RBW and 10 MHz VBW.
- d. Measure the captured power within the band and recording the plot.
- e. Repeat above procedures until all frequencies required were complete.

4.7.5 DEVIATION FROM TEST STANDARD

No deviation.

4.7.6 EUT OPERATING CONDITION

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



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4.7.7 TEST RESULTS

GFSK

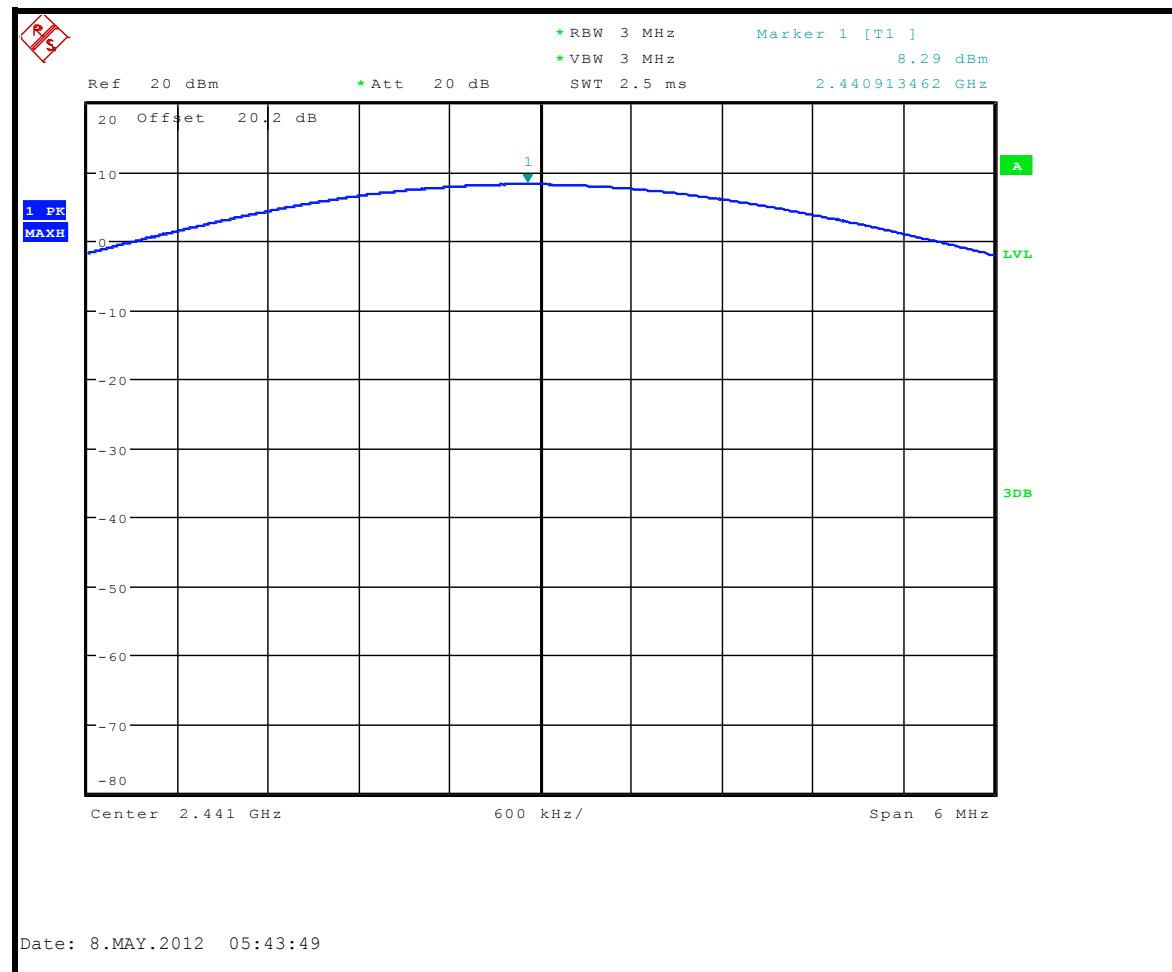
CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER (W)	OUTPUT POWER (dBm)	POWER LIMIT (mW)	PASS/FAIL
0	2402	0.0058	7.61	125	PASS
39	2441	0.0062	7.90	125	PASS
78	2480	0.0055	7.40	125	PASS

$\pi/4$ -DQPSK

CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER (W)	OUTPUT POWER (dBm)	POWER LIMIT (mW)	PASS/FAIL
0	2402	0.0052	7.20	125	PASS
39	2441	0.0056	7.48	125	PASS
78	2480	0.0050	6.97	125	PASS

8DPSK

CHANNEL	CHANNEL FREQUENCY (MHz)	OUTPUT POWER (W)	OUTPUT POWER (dBm)	POWER LIMIT (mW)	PASS/FAIL
0	2402	0.0061	7.86	125	PASS
39	2441	0.0067	8.29	125	PASS
78	2480	0.0059	7.70	125	PASS

8DPSK
CH 39



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4.8 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

4.8.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

4.8.2 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.8.3 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set VBW =300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

4.8.4 DEVIATION FROM TEST STANDARD

No deviation.

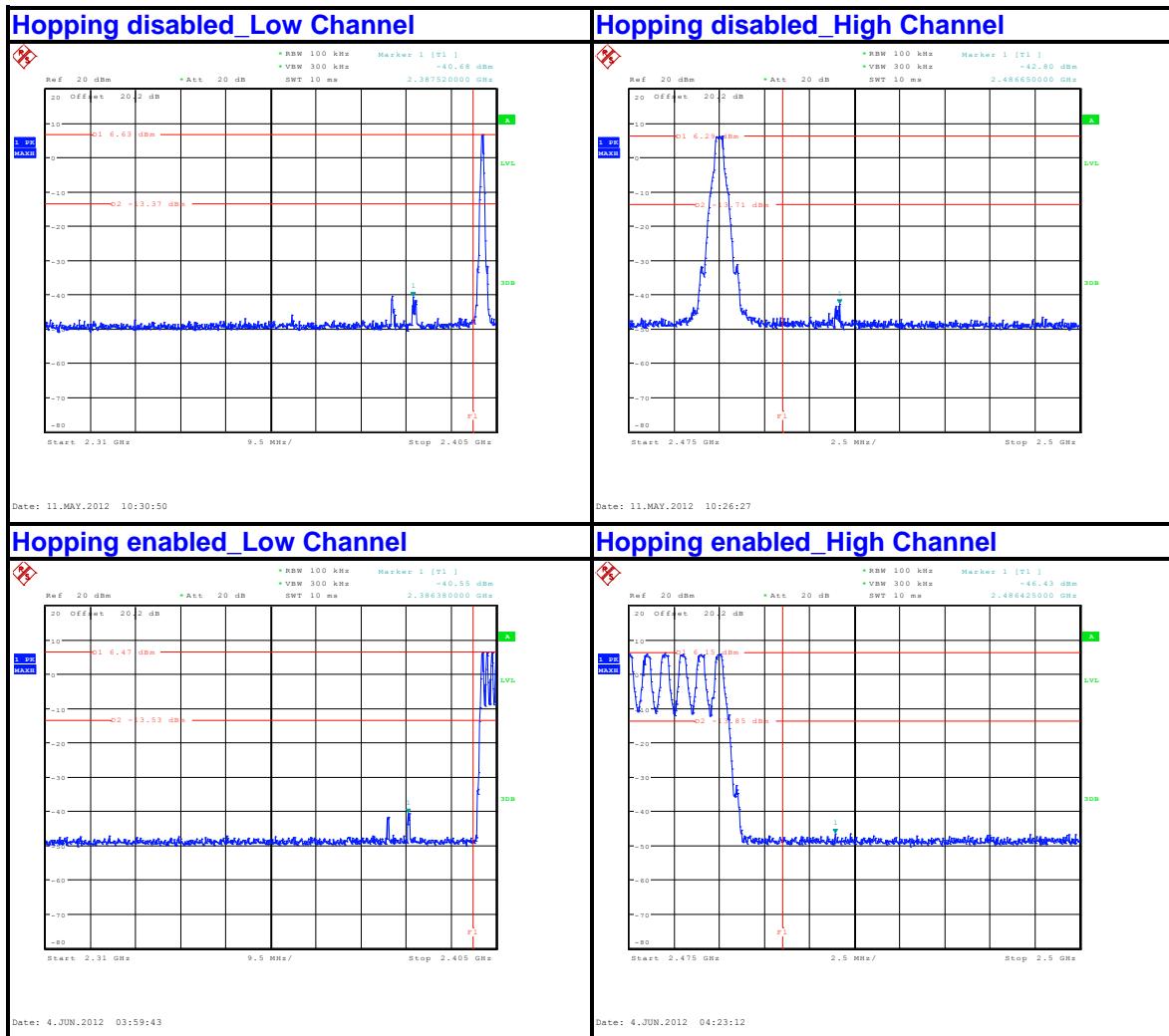
4.8.5 EUT OPERATING CONDITION

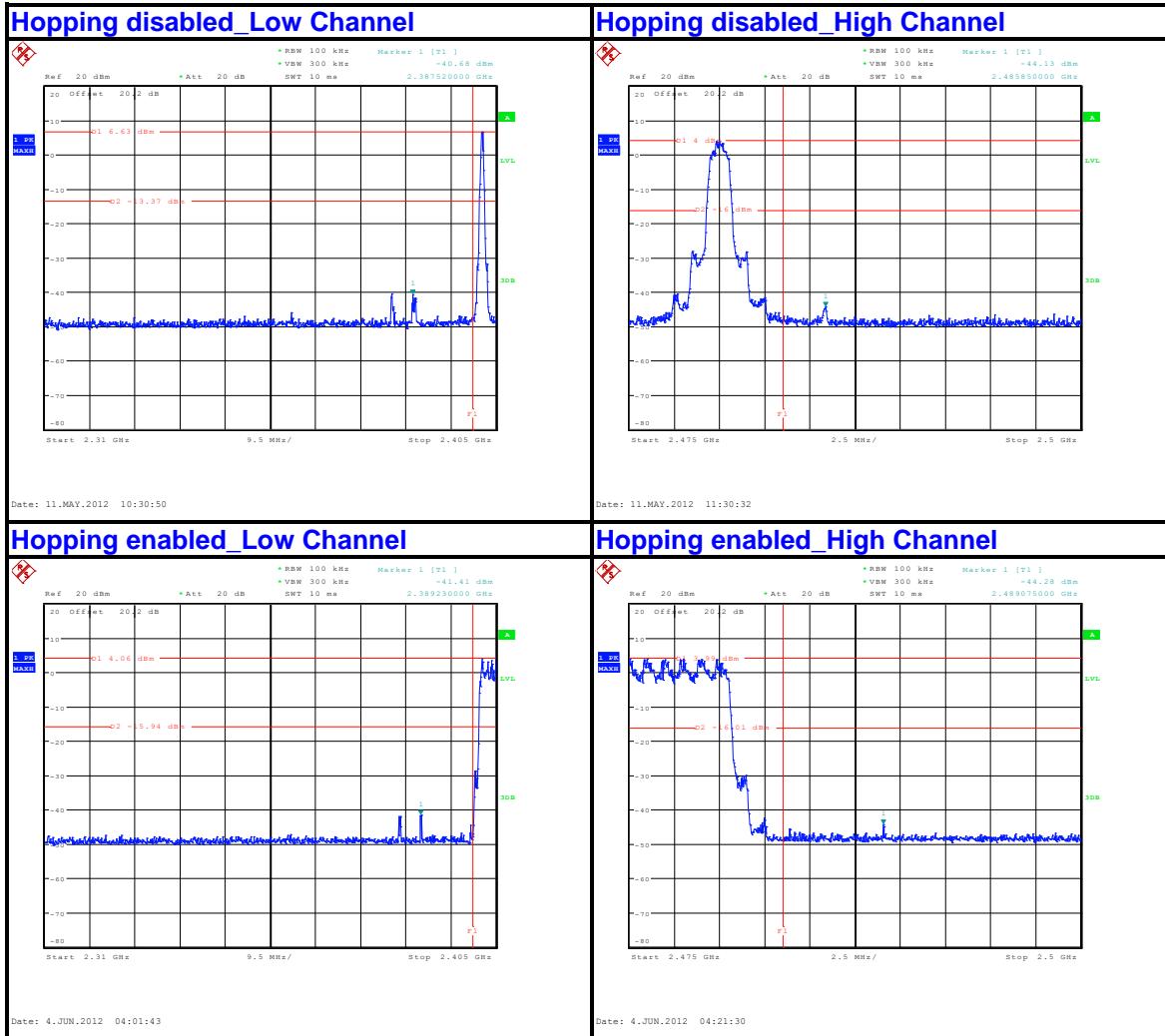
The software provided by client enabled the EUT to transmit continuously.

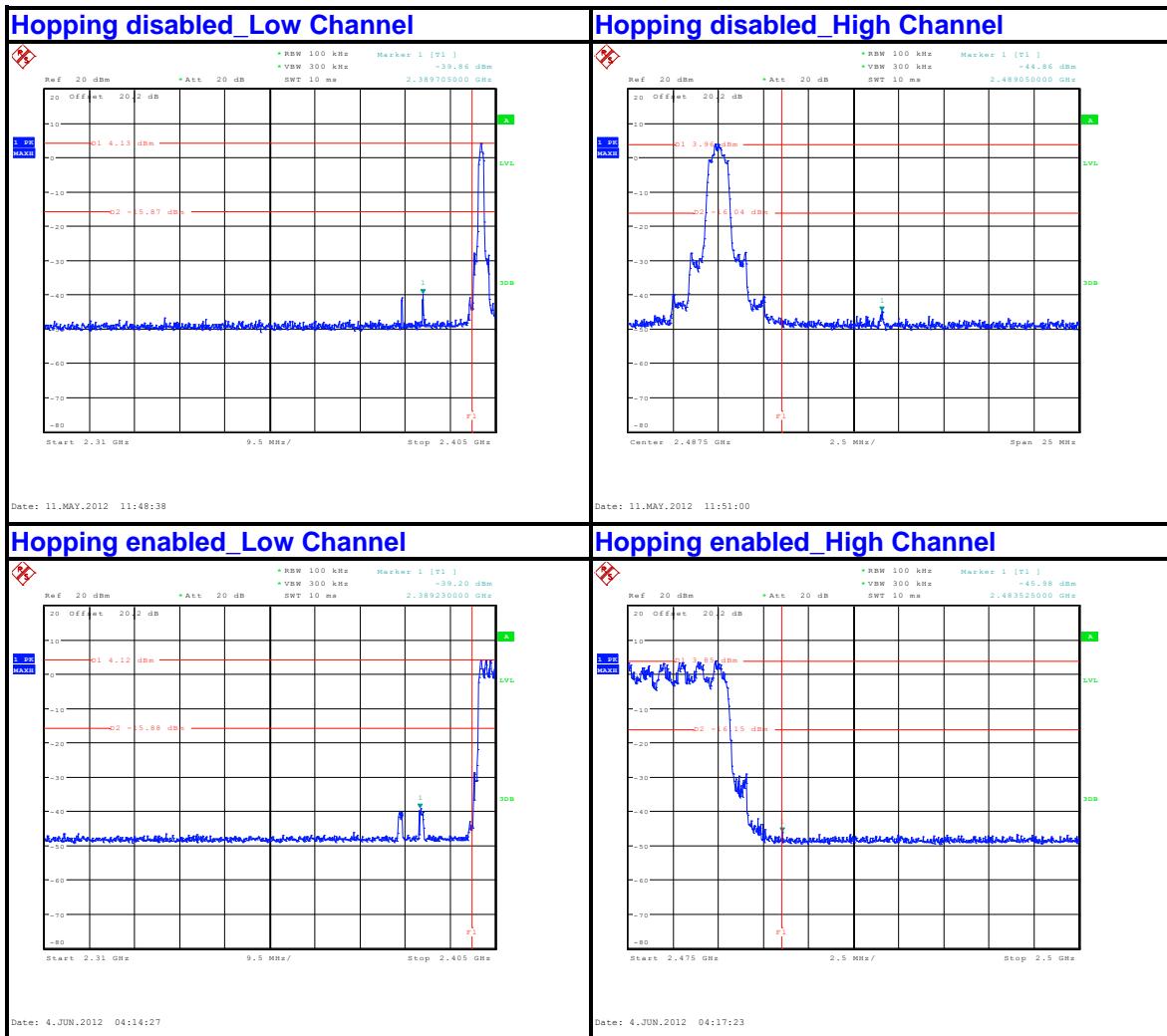
4.8.6 TEST RESULTS

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

GFSK



$\pi/4$ -DQPSK


8DPSK




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5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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6. INFORMATION ON THE TESTING LABORATORIES

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

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

Linko EMC/RF Lab:

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Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:

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Email: service.adt@tw.bureauveritas.com

Web Site: www.adt.com.tw

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



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

No modifications were made to the EUT by the lab during the test.

--- END ---