FCC Test Report

Report No.: AGC04Z110401-3F1

FCC ID	:	ZGL-Q65
PRODUCT DESIGNATION	:	Bluetooth headset
BRAND NAME	:	GERRY, GBLUE
TEST MODEL	:	Q65
CLIENT	:	G-BLUE Technology Limited
DATE OF ISSUE	:	Apr.15, 2011
STANDARD(S)	:	FCC Part 15 Rules

Attestation of ***G***lobal ***C***ompliance Co., Ltd.

VERIFICATION OF COMPLIANCE

Applicant:	G-BLUE Technology Limited
Address	8/F, Cnt Comm Blog 302 Queen's RD Central HongKong
Manufacturer Name:	G-BLUE Technology Limited
Address:	8/F, Cnt Comm Blog 302 Queen's RD Central HongKong
Product Description:	Bluetooth headset
Brand Name:	GERRY, GBLUE
Model Name:	Q65
FCC ID	ZGL-Q65
Report Number:	AGC04Z110401-3F1
Date of Test:	Apr. 08, 2011 to Apr.14, 2011

WE HEREBY CERTIFY THAT:

The above equipment was tested by Attestation of Global Compliance Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.247.

Checked By: Jekey Zhang

Jekey Zhang Apr.14, 2011

Authorized By Randy He

Randy He Apr.14, 2011

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

The EUT is a **Bluetooth headset**; It is short range, lower power. And it is designed by way of utilizing the FHSS technology to achieve the system operation.

A major technical description of EUT is described as following:

Operation Frequency	2.402 GHz to 2.480GHz
Output Power	BT(1Mbps): 2.40dBm BT EDR(2Mbps): 1.10dBm BT EDR(3Mbps): 0.88dBm
Modulation	BT(1Mbps): GFSK BT EDR(2Mbps): Π/4-DQPSK BT EDR(3Mbps): 8-DPSK
Number of channels	79
Antenna Designation	Integrated Antenna
Antenna Gain	0.82dBi
Hardware Version	IS1632_213-V1.0/1632-Q1
Software Version	IS1632_213UI-V1.0
Power Supply	Internal Lion Composite Battery DC 3.7V by battery

1.2 TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
2400~2483.5MHZ	0	2402MHZ
	1	2403MHZ
	:	:
	38	2440 MHZ
	39	2441 MHZ
	40	2442 MHZ
	:	:
	77	2479 MHZ
	78	2480 MHZ

1.3 RECEIVER INPUT BANDWIDTH AND BEHAVIOUR FOR REPEATED SINGLE OR MULTIPLE PACKETS

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

1.4 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for FCC ID: ZGL-Q65 filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

1.5 TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.6 TEST FACILITY

All measurement facilities used to collect the measurement data are located at
Attestation of Global Compliance Co., Ltd.

1F, No.2 Building, Huafeng No.1 Technical,Industrial Park, Sanwei, Xixiang, Baoan District,,

Shenzhen, China
The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003.
FCC register No.: 259865

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

1.7 SPECIAL ACCESSORIES

Not available for this EUT intended for grant.

1.8 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

1.9 EXAMPLE OF A HOPPING SEQUENCY IN DATA MODE

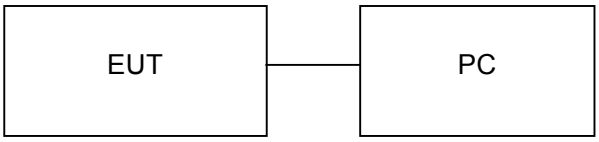
Example of a 79 hopping sequence in data mode:
40,21,44,23,42,53,46,55,48,33,52,35,50,65,54,67
56,37,60,39,58,69,62,71,64,25,68,27,66,57,70,59
72,29,76,31,74,61,78,63,01,41,05,43,03,73,07,75
09,45,13,47,11,77,15,00,64,49,66,53,68,02,70,06
01,51,03,55,05,04

1.10 EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR

The generation of the hopping sequence in connection mode depends essentially on two input values:
1 LAP/UAP of the master of the connection
2 Internal master clock
The LAP(lower address part) are the 24 LSB's of the 48 BD_ADDRESS.
The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP (upper address part) are the 24MSB's of the 48BD_ADDRESS The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and Is never turned off. For synchronisation with other units only offset are used. It has no relation to the tim Of the day.Its resolution is at least half the RX/TX slot length of 312.5us.The clock has a cycle of about
One day(23h30).In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire.LAP(24 bits),4LSB's(4bits)(Input 1) and the 27MSB's of the clock(Input 2) are used. With this input values different mathematical procedures (permutations, additions, XOR-operations)are performed to generate the Sequence. This will be done at the beginning of every new transmission.
Regarding short transmissions the Bluetooth system has the following behaviour:
The first connection between the two devices is established, a hopping sequence was generated. For Transmitting the wanted data the complete hopping sequence was not used. The connection ended.
The second connection will be established. A new hopping sequence is generated. Due to the fact the Bluetooth clock has a different value, because the period between the two transmission is longer(and it Cannot be shorter)than the minimum resolution of the clock(312.5us).The hopping sequence will always Differ from the first one.

2. SYSTEM TEST CONFIGURATION

2.1 CONFIGURATION OF TESTED SYSTEM



2.2 EQUIPMENT USED IN TESTED SYSTEM

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID
1	Bluetooth Headset	GERRY, GBLUE	Q65	ZGL-Q65
2	PC(Notebook)	HEDY	--	--

NOTE: Bluetooth transmitter is controlled through PC. Select the relevant frequency is tested through PC.

2.3 RF OUTPUT POWER

Channel	Frequency (MHZ)	GFSK (1Mbps)	Π/4-DQPSK (2Mbps)	8-DPSK (3Mbps)
0	2402	**2.40dBm**	**1.10dBm**	**0.88dBm**
39	2441	2.03dBm	0.89dBm	0.62dBm
78	2480	1.33dBm	0.24dBm	0.45dBm

Remark:

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

2.4 LIST OF TEST EQUIPMENTS

Description	Manufacturer	Model No.	Calibration Date	Calibration Due.
Test Receiver	ROHDE&SCHWARZ	ESCS30	05/29/2010	05/29/2011
Wideband Ant	Sunol Sciences Corp.	JB3	05/29/2010	05/29/2011
H&T Chamber	EXPERY	TN-400	05/29/2010	05/29/2011
Antenna	R&S	VULB9163	05/29/2010	05/29/2011
Regulated DC Power Supply	LONGWEI	50V30A	05/29/2010	05/29/2011
Universal Radio Communication Tester	R&S	CMU200	05/29/2010	05/29/2011
Horn Antenna	ETS	3117	05/29/2010	05/29/2011
Loop Antenna	R&S	HM525	05/29/2010	05/29/2011
SPECTRUM ANALYZER	AGILENT	E4443A	05/29/2010	05/29/2011
LISN	Rohde & Schwarz	ESH2-Z5	05/29/2010	05/29/2011
LISN	Rohde & Schwarz	ESH2-Z5	05/29/2010	05/29/2011
50 Ω Coaxial Switch	Anritsu	MP59B	05/29/2010	05/29/2011

3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.207	Conduction Emission	N/A
§15.209	Radiated Emission	Compliant
§15.247	Maximum Output Power	Compliant
§15.247	20 dB Bandwidth	Compliant
§15.247	Band Edges	Compliant
§15.247	Spurious Emission	Compliant
§15.247	Frequency Separation	Compliant
§15.247	Number of Hopping Frequency	Compliant
§15.247	Time of Occupancy	Compliant

4. DESCRIPTION OF TEST MODES

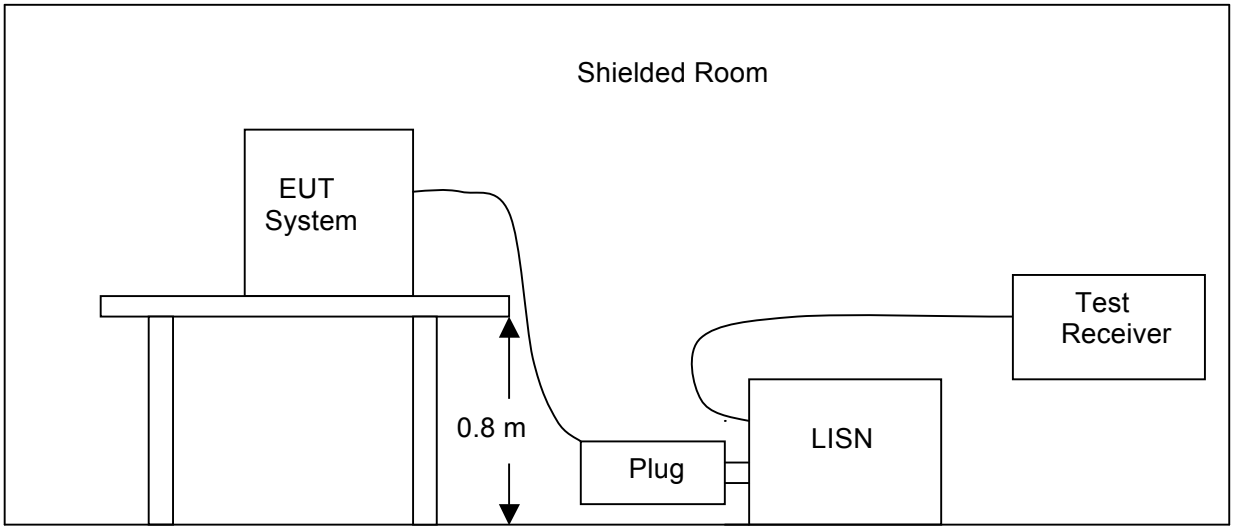
1. The EUT has been set to operate continuously on the lowest, the middle and the highest operation frequency individually.
2. The EUT stays in continuous transmitting mode on the operation frequency being set.

5. CONDUCTION EMISSIONS

5.1 MEASUREMENT PROCEDURE:

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4.
2. Support equipment, if needed, was placed as per ANSI C63.4.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4. The EUT received DC3.7V through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

5.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



5.3 LIMITS AND MEASUREMENT RESULT:

LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note: 1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

MEASURING INSTRUMENT AND SETTING

The following table is the setting of receiver.

Receiver Parameter	Setting
Attenuation	10dB
Start Frequency	0.15MHz
Stop Frequency	30MHz
6dB bandwidth	9KHz for QP
IF bandwidth	9KHz for AV

TEST RESULT:

N/A

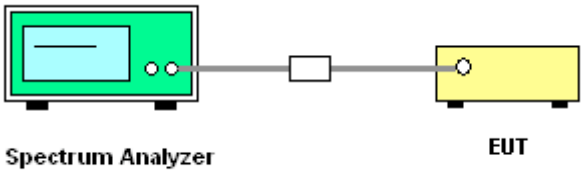
6. MAXIMUM OUTPUT POWER

6.1 MEASUREMENT PROCEDURE:

CONDUCTED METHOD
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Set Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
   RBW > the 20 dB bandwidth of the emission being measured
   VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

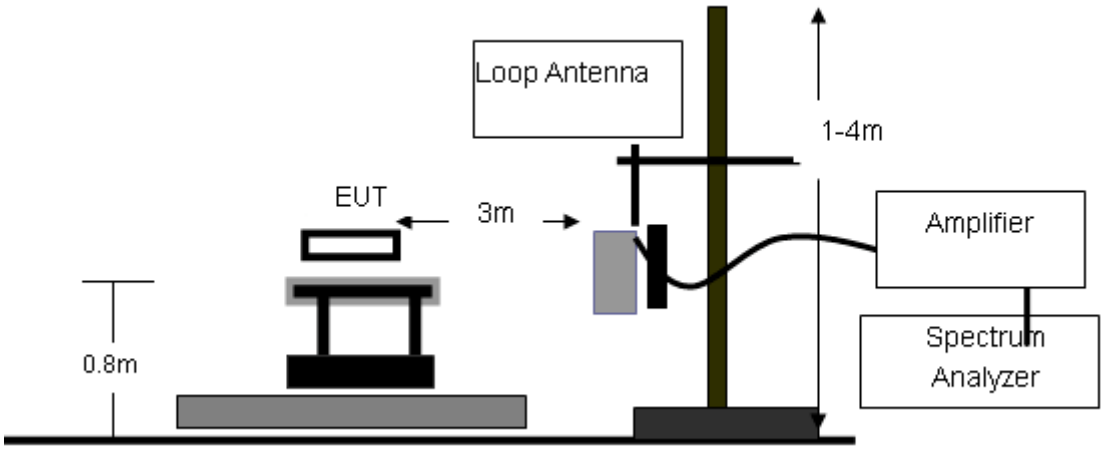
6.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

CONDUCTED METHOD

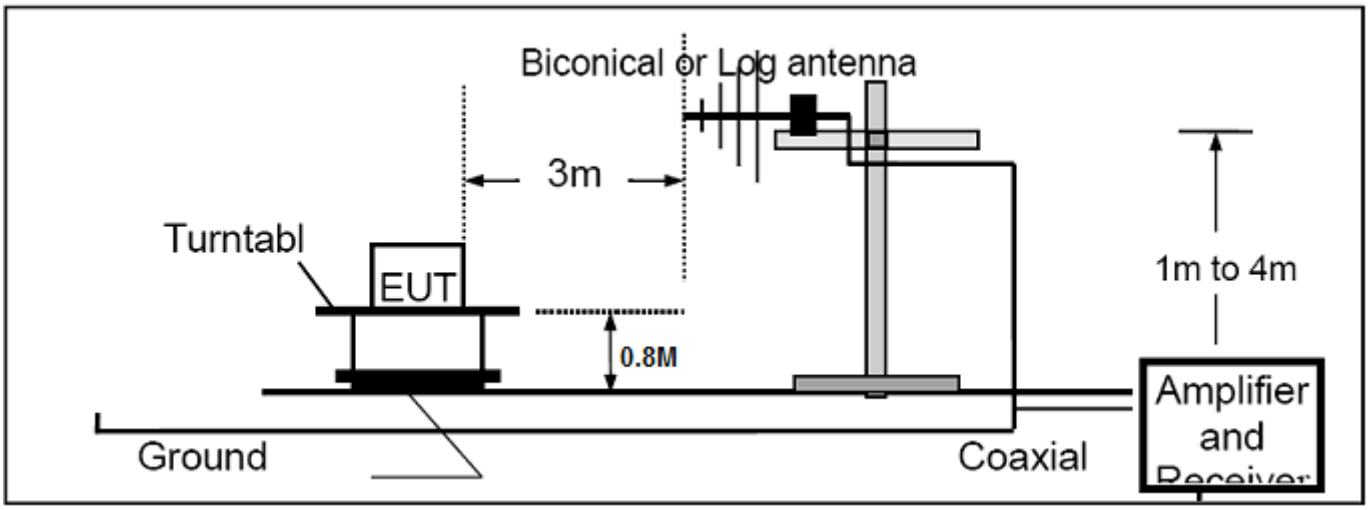


RADIATED EMISSION TEST SETUP

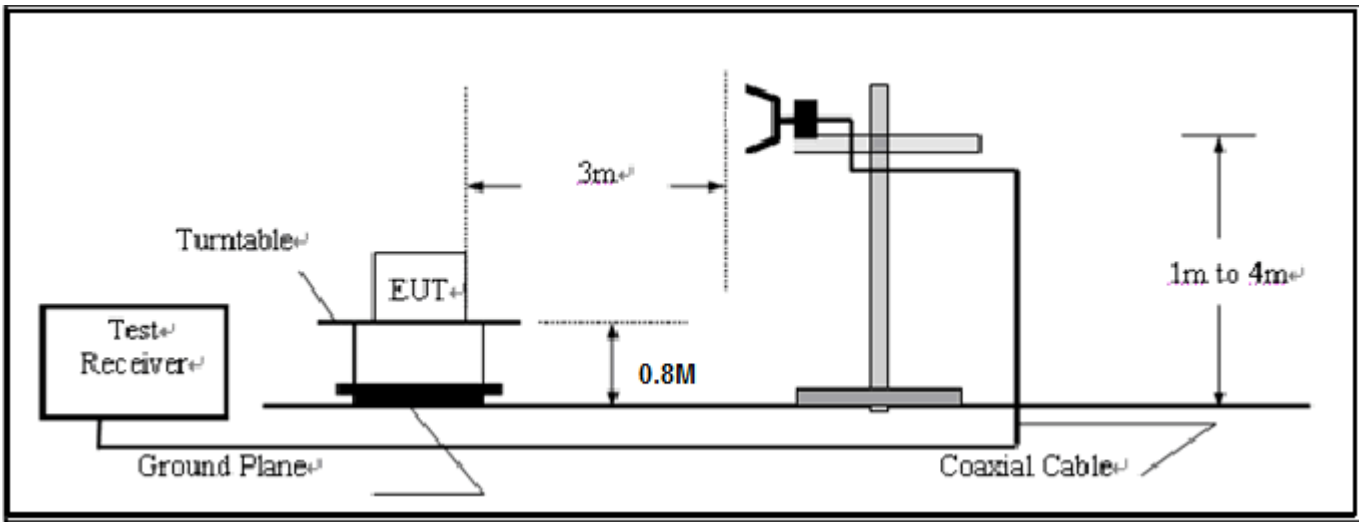
RADIATED MISSION TEST SETUP BELOW 30MHz



RADIATED MISSION TEST SETUP 30MHz-1000MHz



RADIATED MISSION TEST SETUP ABOVE 1000MHz

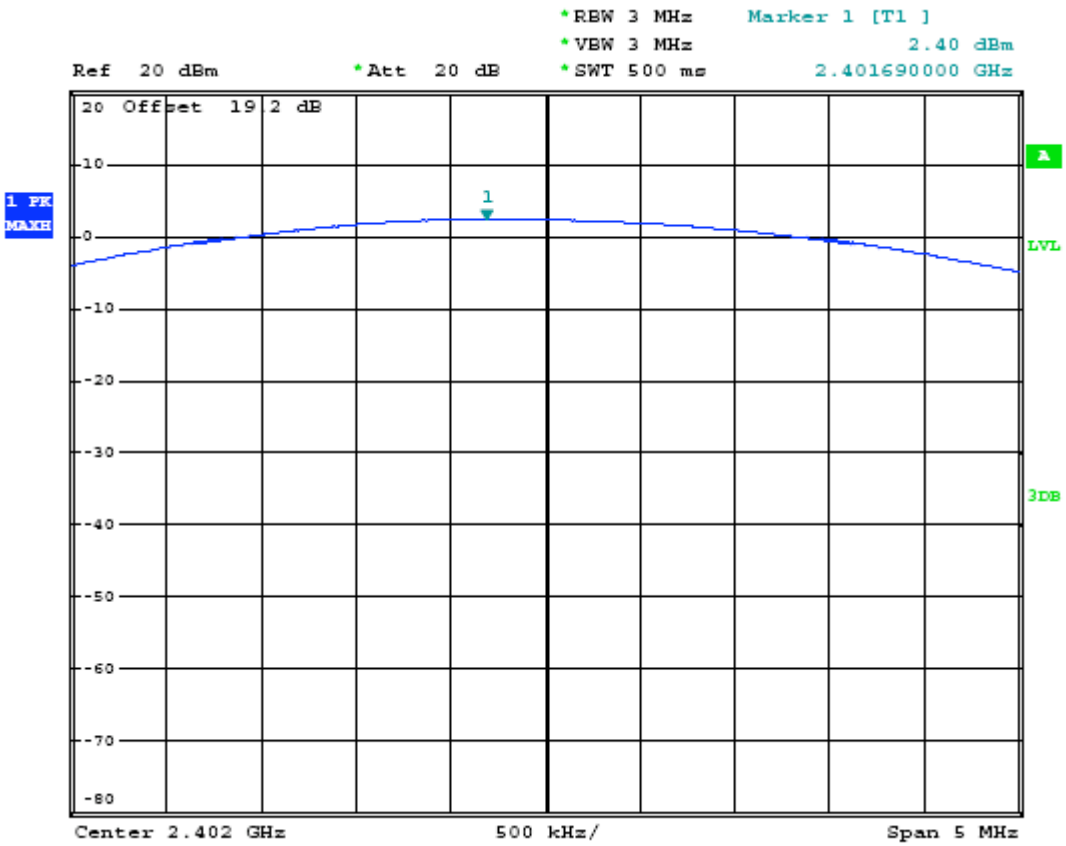


6.3 LIMITS AND MEASUREMENT RESULT:

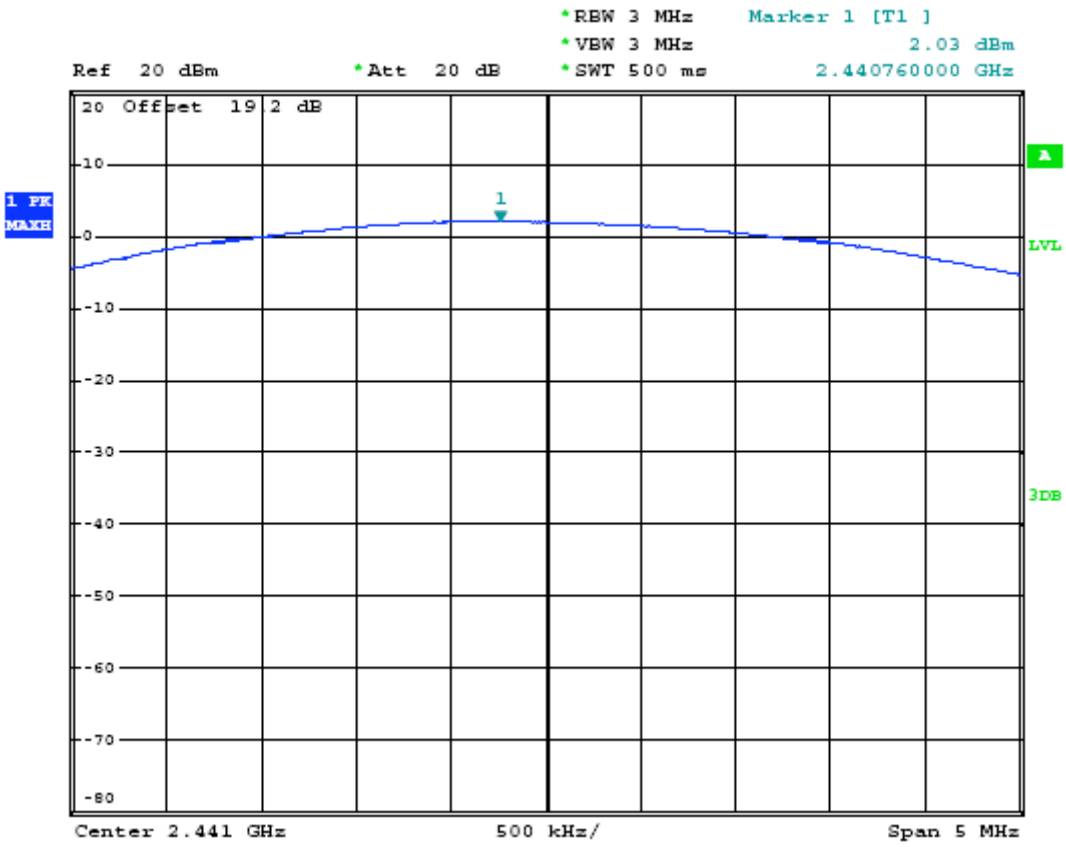
Operation Mode:	RF MODE（CONDUCTED）	Test Date:	Apr.14, 2011
Temperature:	25°C	Tested by:	Jekey Zhang
Humidity:	55 % RH		

Channel	Frequency (MHZ)	GFSK 1Mbps	Limit (dBm)	Result
0	2402	2.40	30	Pass
39	2441	2.03	30	Pass
78	2480	1.33	30	Pass

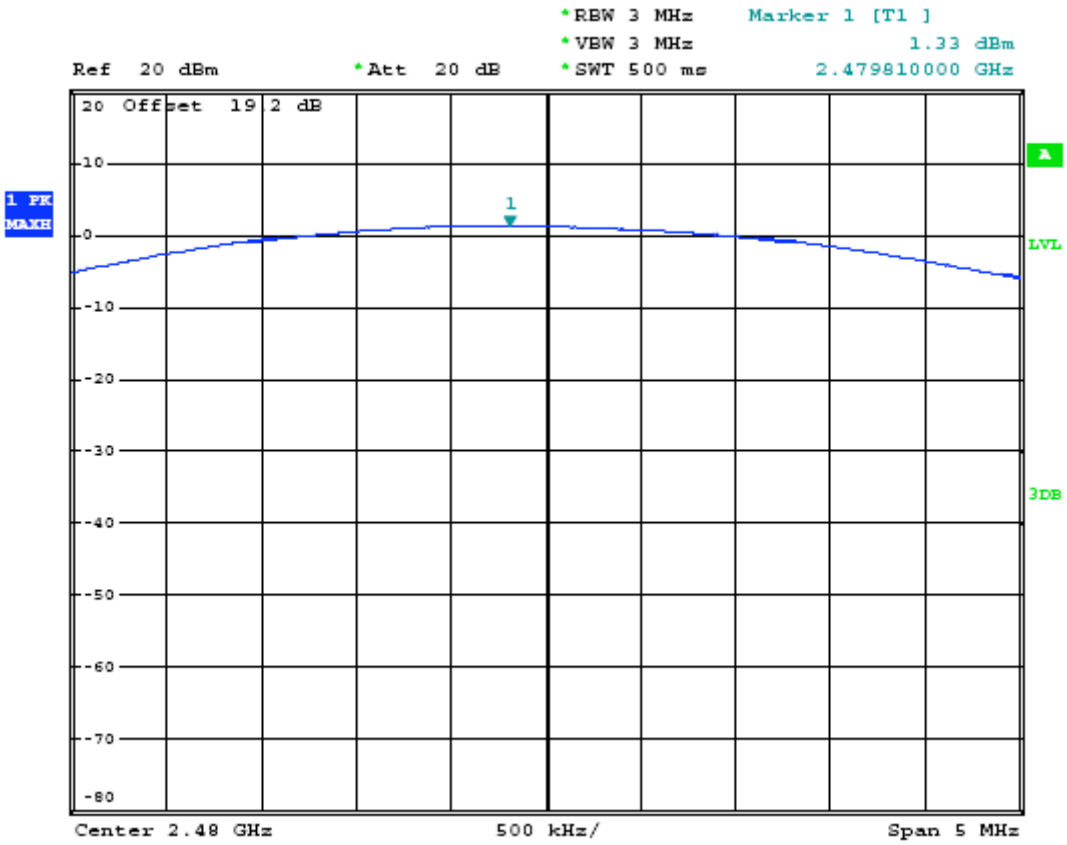
CH0



CH39


*RBW 3 MHz
Marker 1 [T1]
*VBW 3 MHz
2.03 dBm
Ref 20 dBm
*Att 20 dB
*SWT 500 ms
2.440760000 GHz
Offset 19.2 dB
1 PK MAXH
A
LVL
3DB
Center 2.441 GHz
500 kHz/
Span 5 MHz

CH78


*RBW 3 MHz
*VBW 3 MHz
*SWT 500 ms
Marker 1 [T1]
1.33 dBm
2.479810000 GHz
Ref 20 dBm
*Att 20 dB
20 Offset 19.2 dB
1 PK MAXH
A
LVL
3DB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
500 kHz/
Span 5 MHz

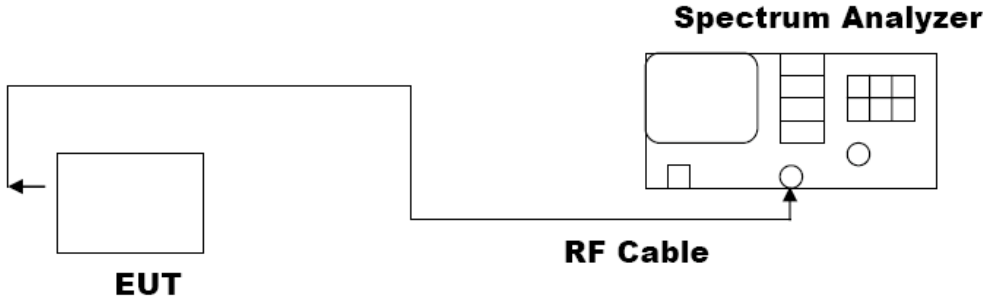
7. 20 DB BANDWIDTH

7.1 MEASUREMENT PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Set Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW ≥ 1% of the 20 dB bandwidth
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

7.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

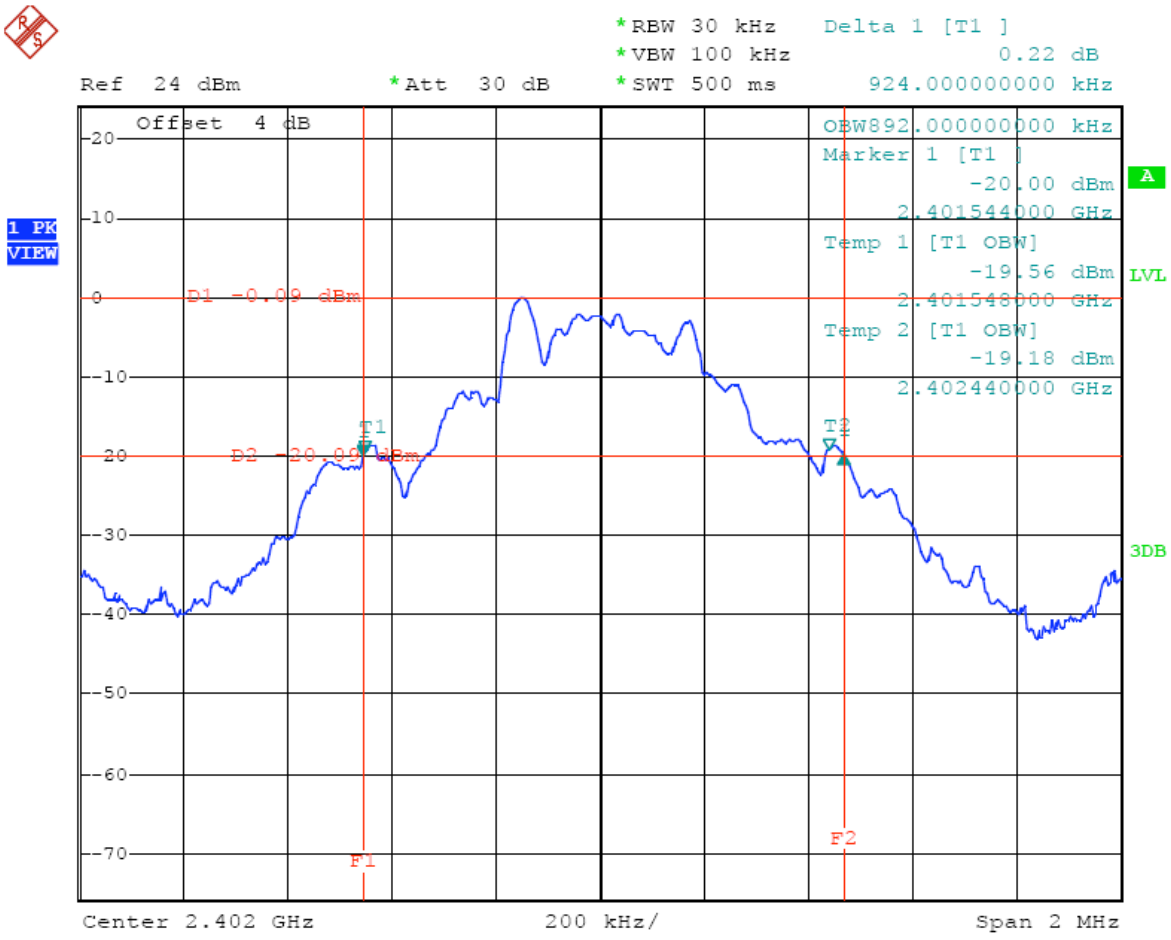


7.3 LIMITS AND MEASUREMENT RESULTS:

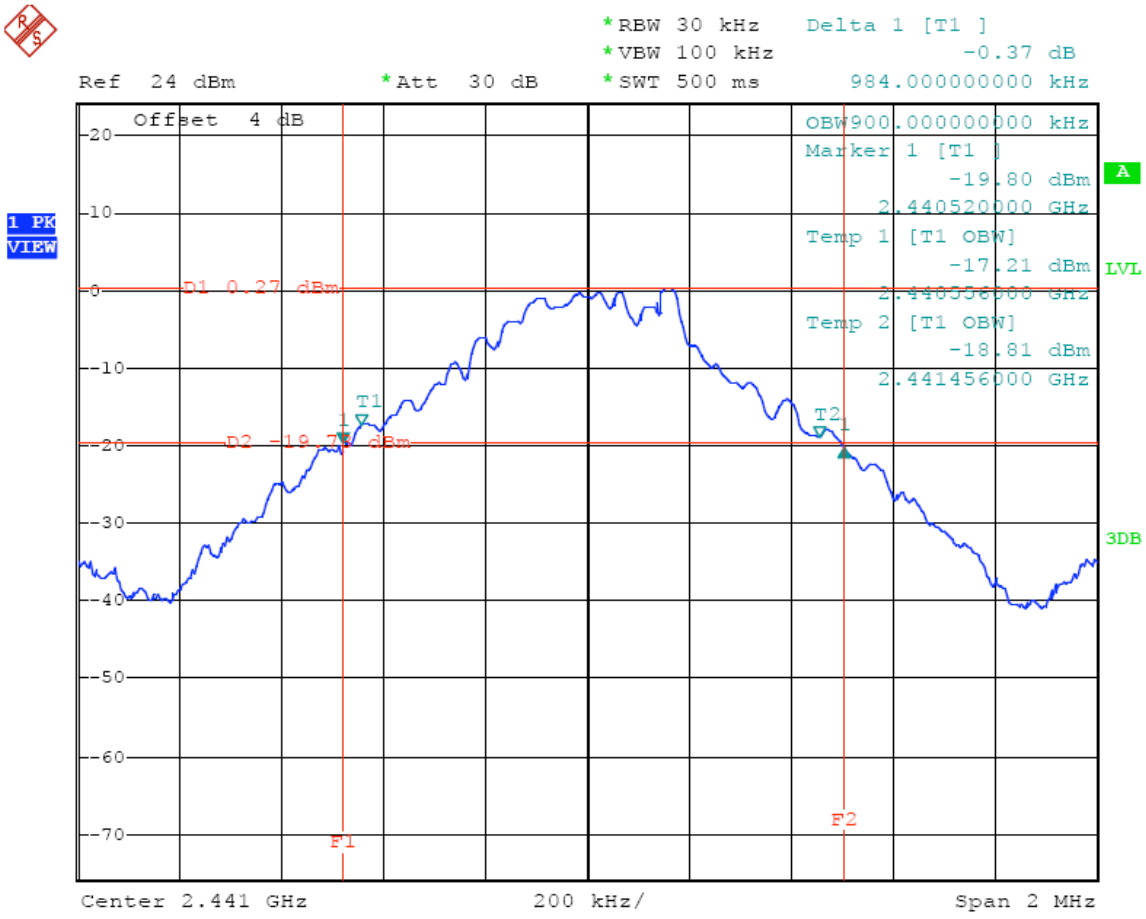
Operation Mode:	RF MODE	Test Date:	Apr.14, 2011
Temperature:	25°C	Tested by:	Jekey Zhang
Humidity:	55 % RH		

Channel	Frequency (MHZ)	20 dB BANDWIDTH		
		GFSK (1Mbps)	Π/4-DQPSK (2Mbps)	8-DPSK (3Mbps)
0	2402	0.924MHz	1.368MHz	1.362MHz
39	2441	0.984MHz	1.368MHz	1.368MHz
78	2480	0.932MHz	1.368MHz	1.362MHz

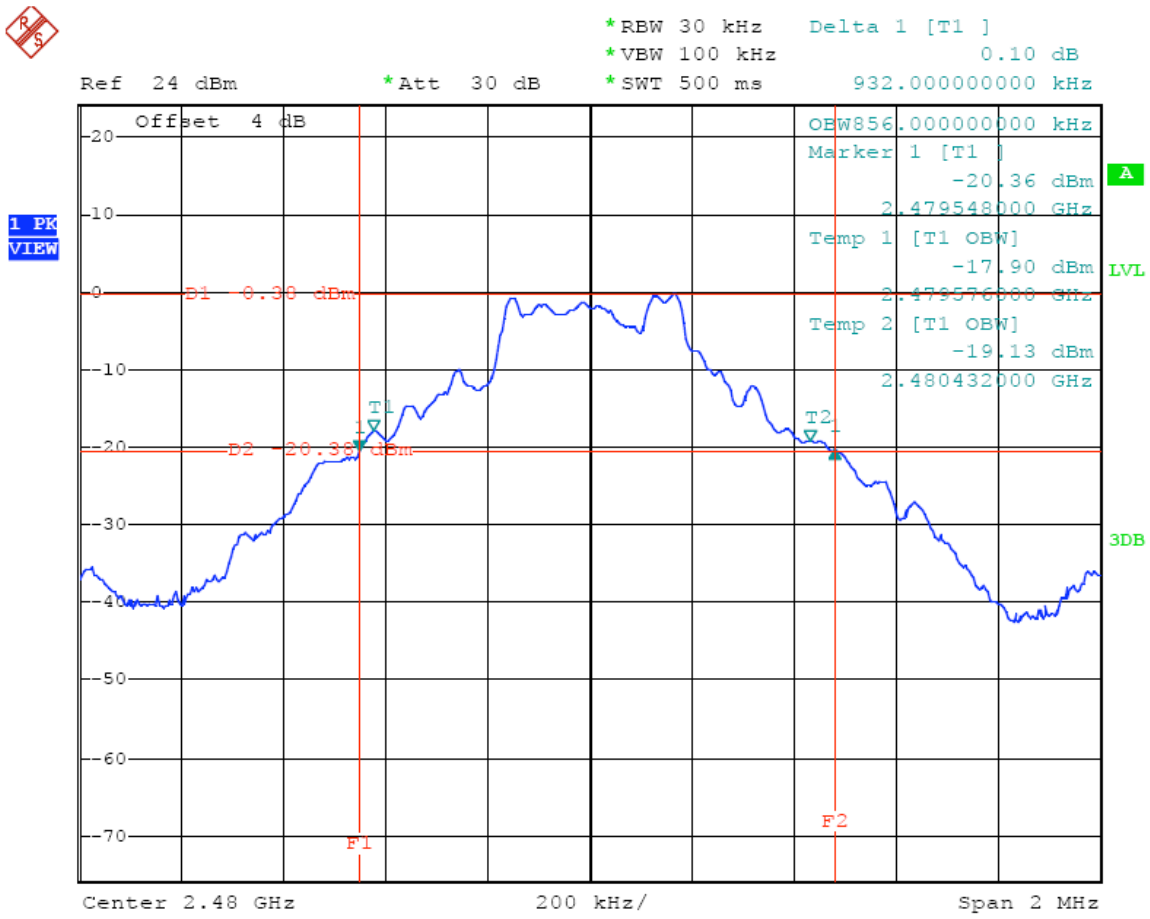
TEST PLOT OF BANDWIDTH FOR BOTTOM CHANNEL (1Mpbs)



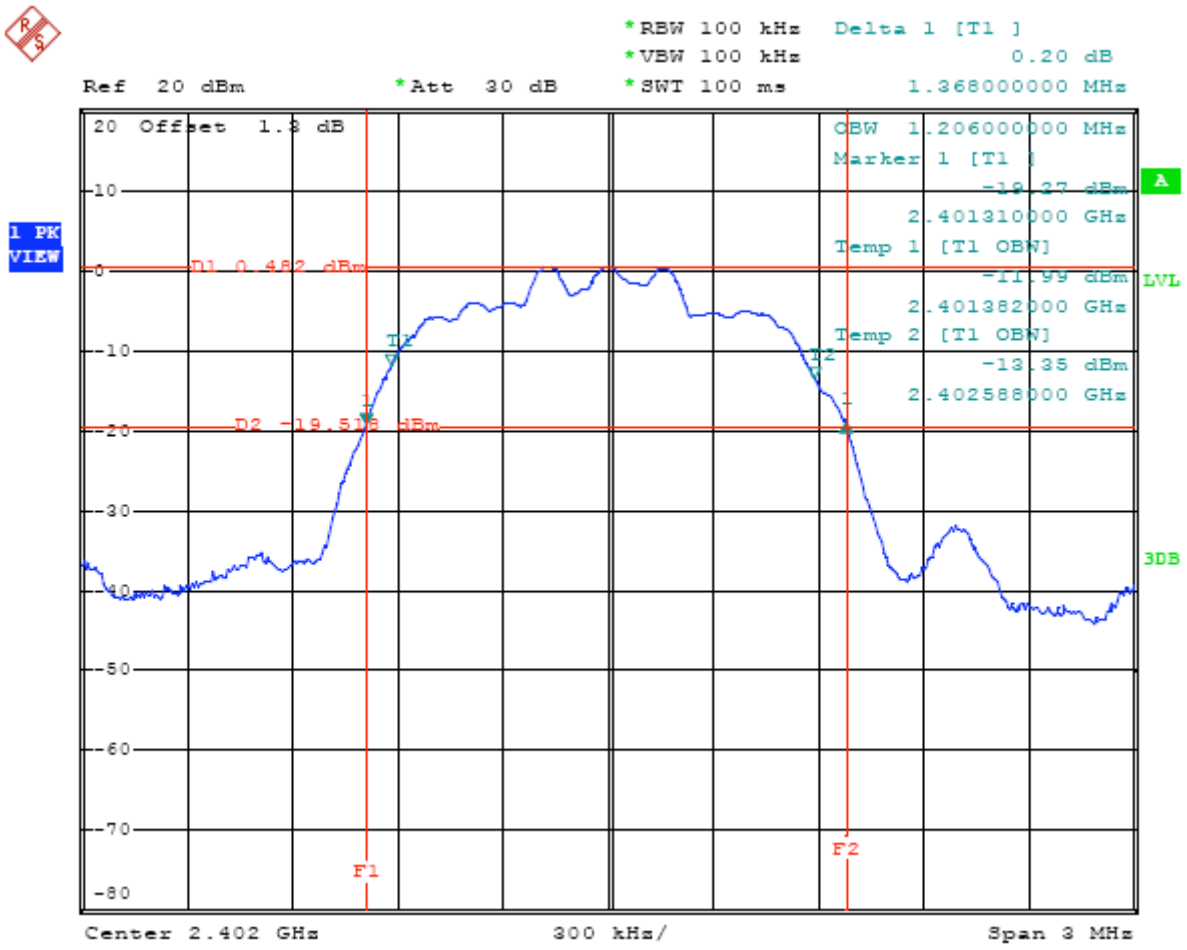
TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL (1Mpbs)



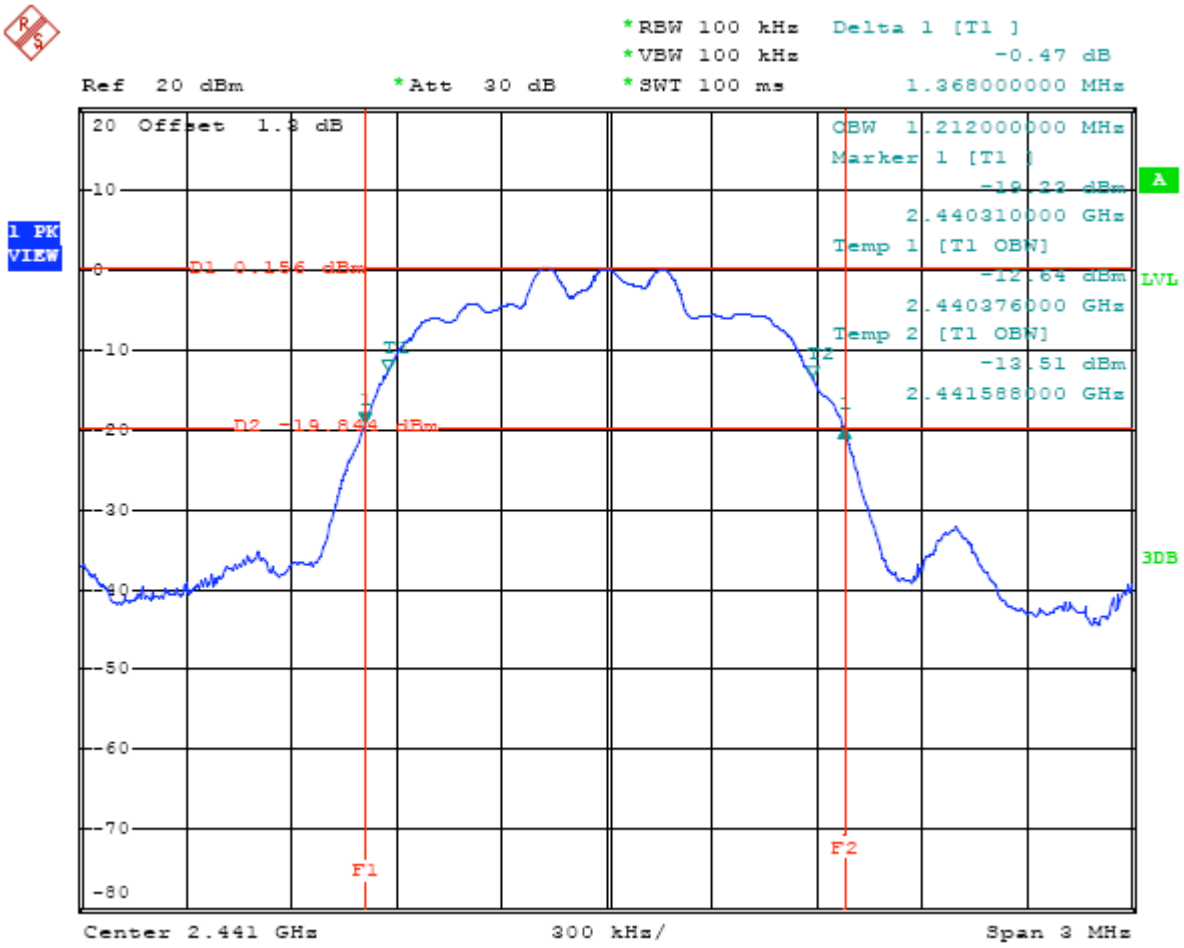
TEST PLOT OF BANDWIDTH FOR TOP CHANNEL (1Mpbs)



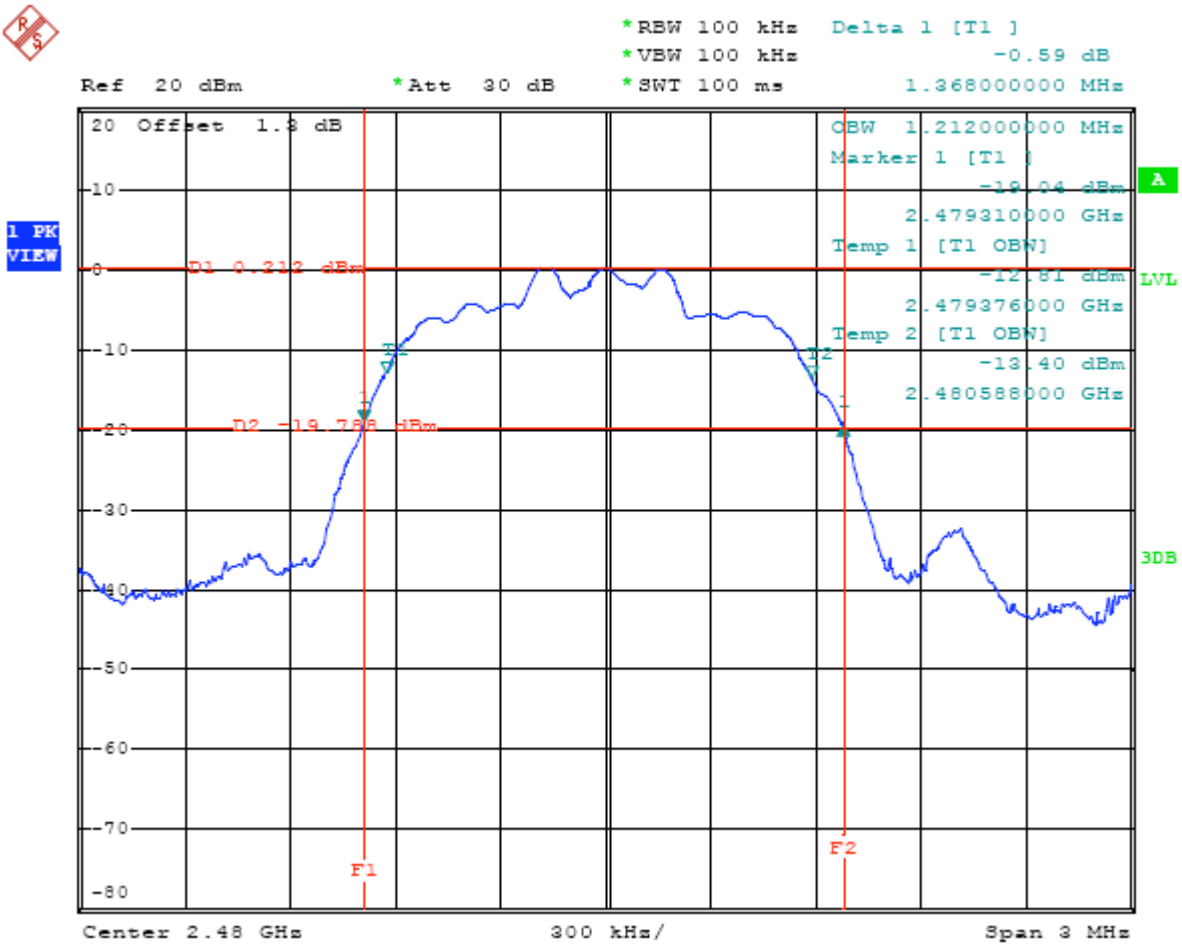
TEST PLOT OF BANDWIDTH FOR BOTTOM CHANNEL (2Mpbs)



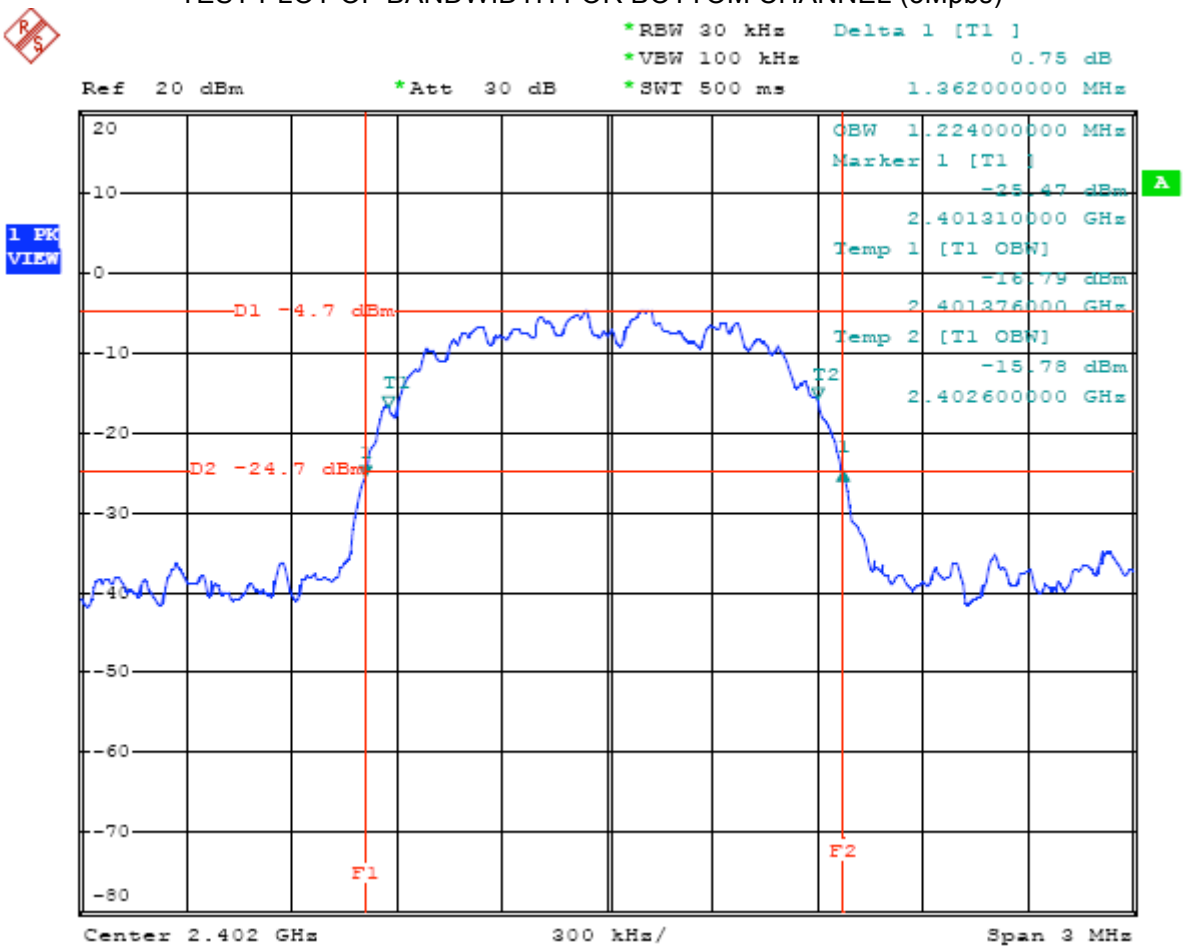
TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL (2Mpbs)



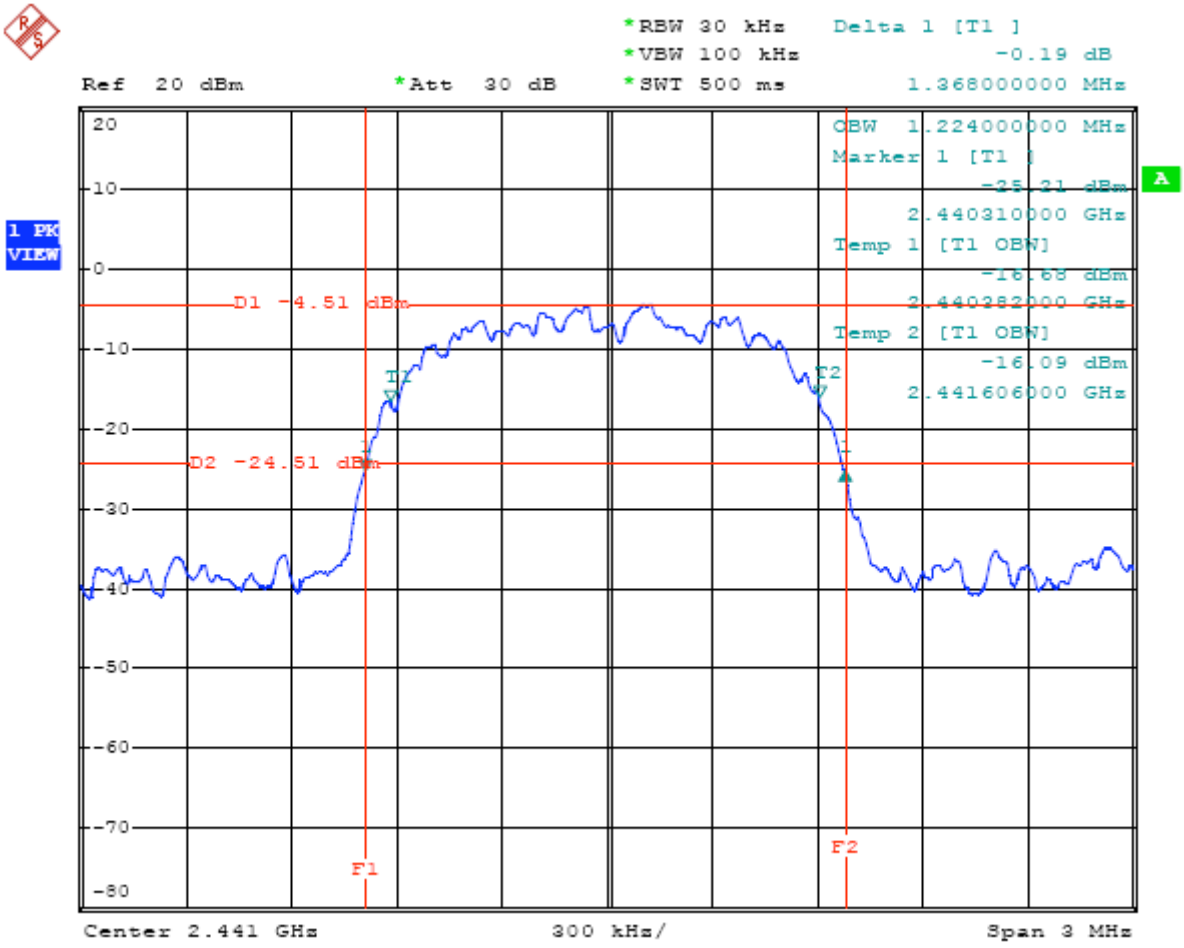
TEST PLOT OF BANDWIDTH FOR TOP CHANNEL (2Mpbs)



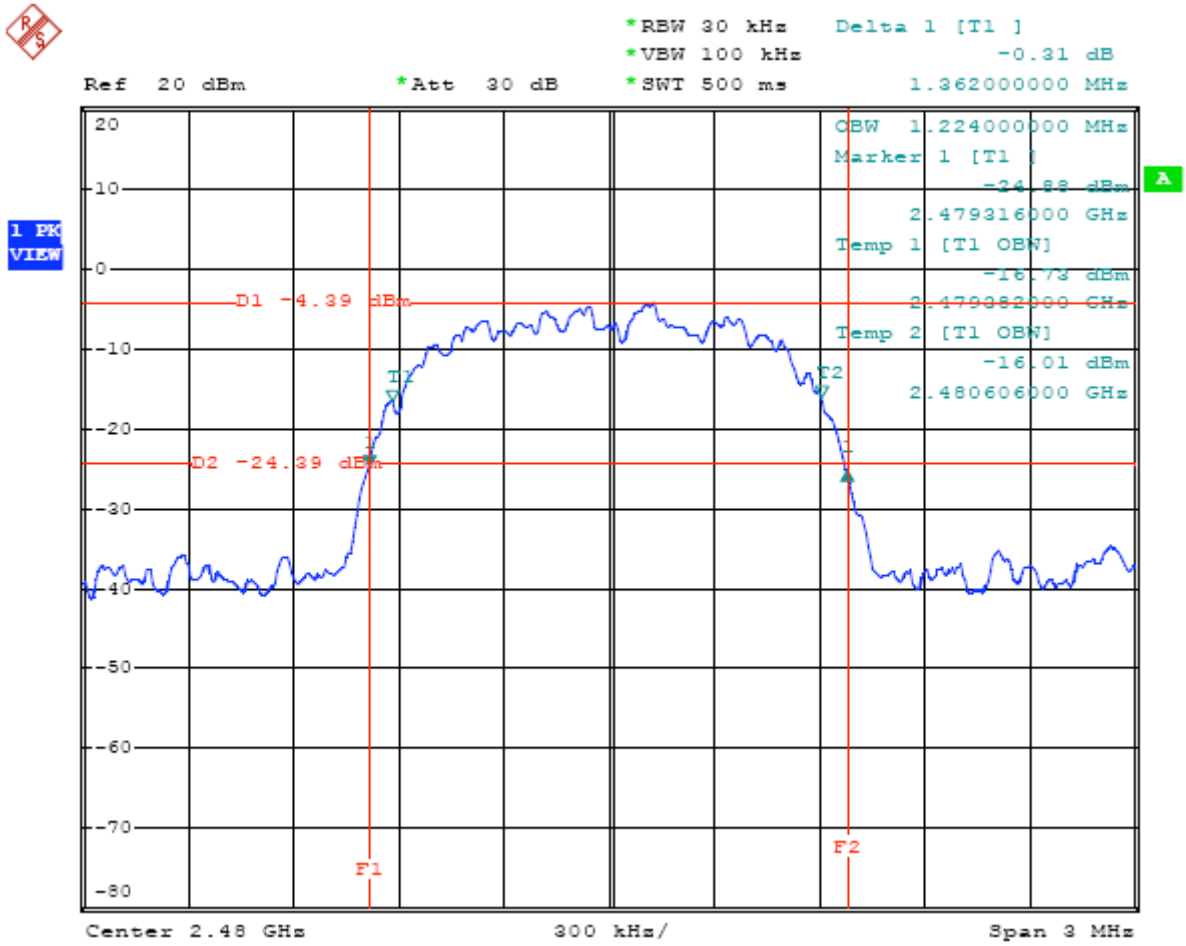
TEST PLOT OF BANDWIDTH FOR BOTTOM CHANNEL (3Mpbs)



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL (3Mpbs)



TEST PLOT OF BANDWIDTH FOR TOP CHANNEL (3Mpbs)

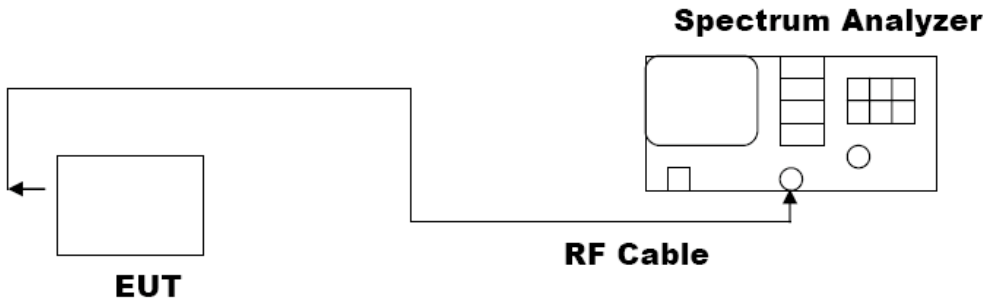


8. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY (N/A)

8.1 MEASUREMENT PROCEDURE:

(1). The EUT was placed on a turn table which is 0.8m above ground plane.
(2). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
(3), Set the EUT Work on the top, the middle and the bottom operation frequency individually.
(4). Set SPA Centre Frequency = Operation Frequency, RBW= 3 KHz,
VBW= 10 KHz, Sweep time= Auto
(5). Set SPA Trace 1 Max hold, then View.

8.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



8.3 LIMITS AND MEASUREMENT RESULT:

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Measurement Result		
	Test Data (dBm/3KHz)		Criteria
8 dBm / 3KHz	Bottom Channel	--	--
	Middle Channel	--	--
	Top Channel	--	--

9. OUT OF BAND EMISSION

9.1 MEASUREMENT PROCEDURE:

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Set SPA Centre Frequency = Operation Frequency, RBW ≥ 1% of the span
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

9.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The Same as described in section 6.2
1. Conducted test setup
2. Radiated Emission test Setup

9.3 MEASUREMENT EQUIPMENT USED:

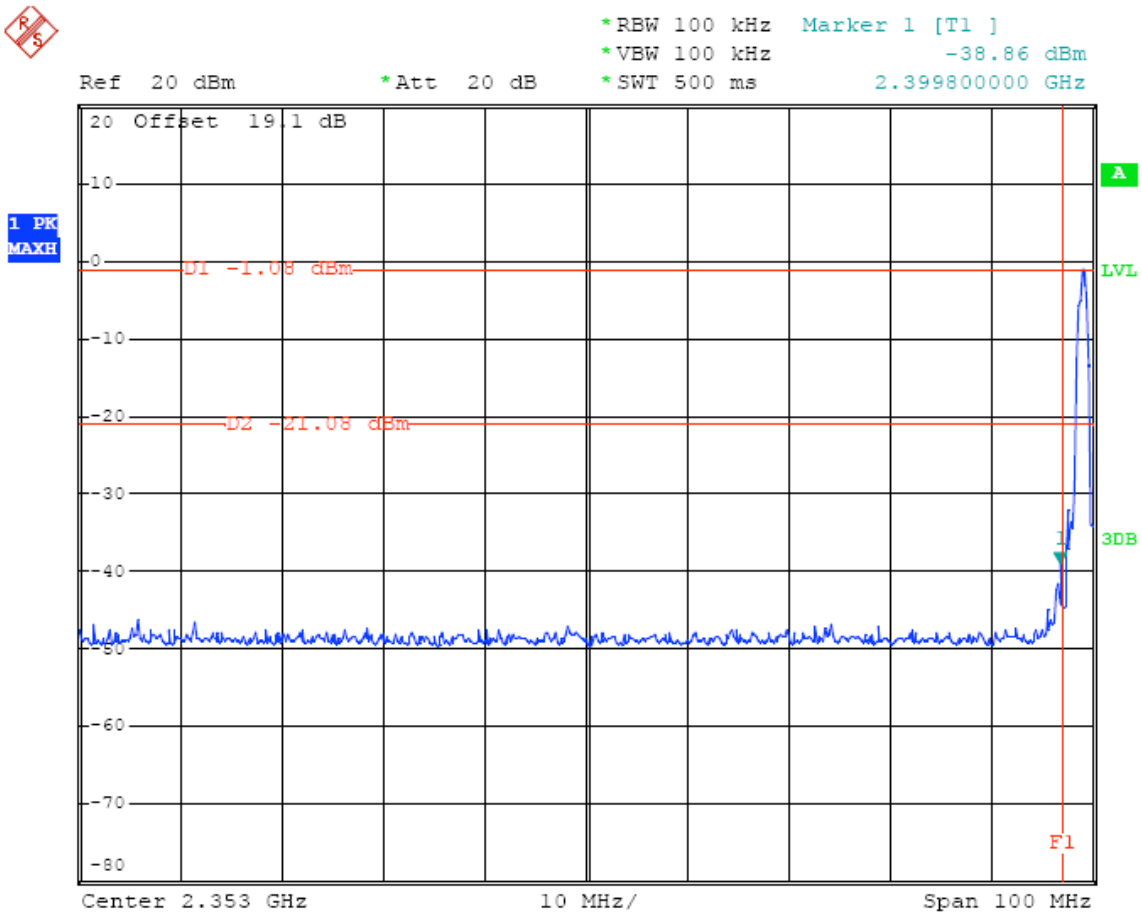
The Same as described in section 2.4

9.4 LIMITS AND MEASUREMENT RESULT:

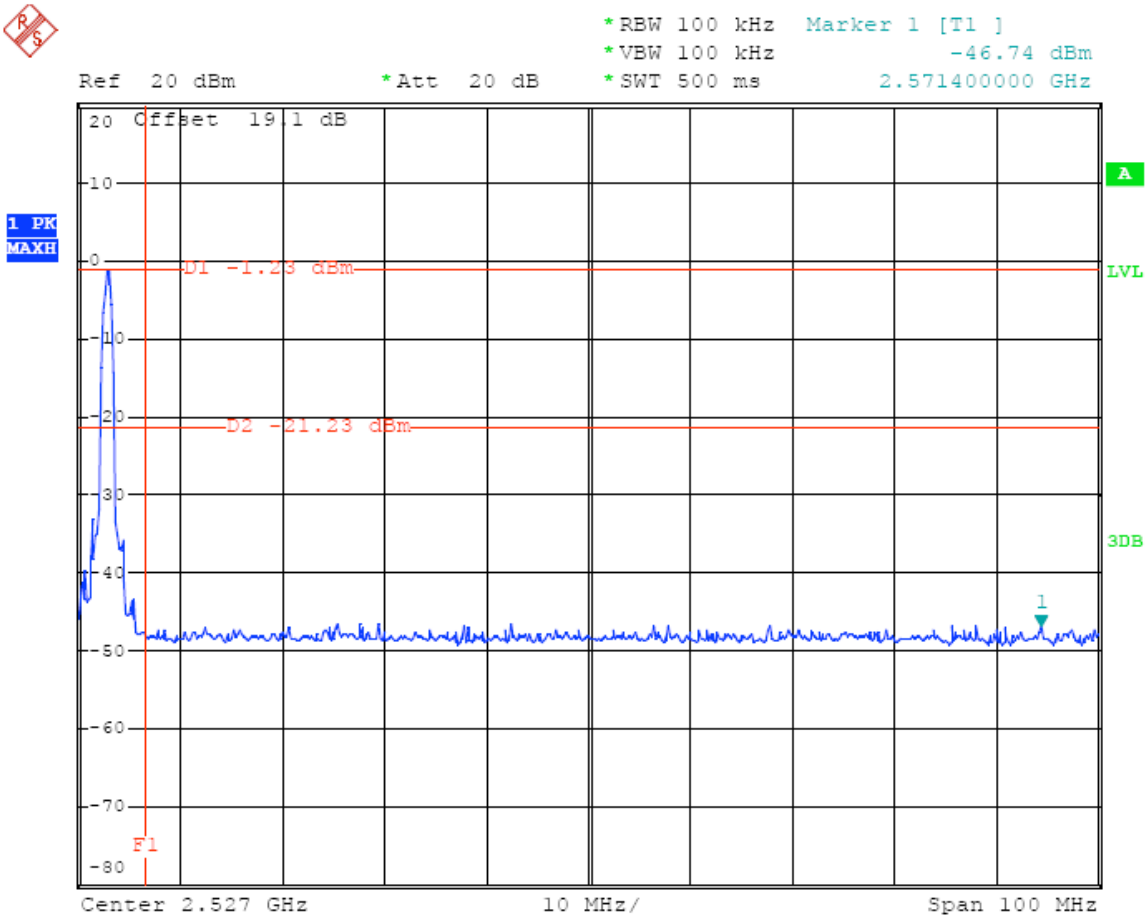
LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test Data	Criteria
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power.	At least -20dBc than the limit Specified on the BOTTOM Channel	PASS
In addition, radiation emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in§15.209(a))	At least -20dBc than the limit Specified on the TOP Channel	PASS

Humidity:	55 % RH	Test Date:	Apr.14, 2011
Temperature:	25°C	Tested by:	Mary Liu
Test Method	GFSK(Conducted)		

TEST PLOT OF BAND ELDG FOR BOTTOM CHANNEL (2.402GHz)



TEST PLOT OF BAND ELDG FOR TOP CHANNEL (2.480GHz)



NOTE:

All (1Mbps, 2Mbps, 3Mbps) Modes was tested about band-edge, and the worst test data of the EUT was rate1Mbps, and its test data was showed.

Humidity:	55 % RH	Test Date:	Apr.14, 2011
Temperature:	25°C	Tested by:	Mary Liu
Test Method	GFSK(Radiated)-CH0		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2386.38	44.98	-29.02	74	45.36	31.98	3.92	36.28	100	354	Peak
2386.38	31.09	-22.91	54	31.47	31.98	3.92	36.28	100	354	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2353.13	44.17	-29.83	74	44.65	31.93	3.86	36.27	151	334	Peak
2353.13	30.23	-23.77	54	30.71	31.93	3.86	36.27	151	334	Average

Humidity:	55 % RH	Test Date:	Apr.14, 2011
Temperature:	25°C	Tested by:	Mary Liu
Test Method	GFSK(Radiated)-CH78		

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	61.17	-12.83	74	61.33	32.08	4.05	36.29	102	339	Peak
2483.5	48.23	-5.77	54	48.39	32.08	4.05	36.29	102	339	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	59.91	-14.09	74	60.07	32.08	4.05	36.29	180	323	Peak
2483.5	47.59	-6.41	54	47.75	32.08	4.05	36.29	180	323	Average

RADIATED EMISSSION

MEASUREMENT PROCEDURE

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

The following table is the setting of spectrum analyzer and receiver.'

Spectrum Parameter	Setting
Start Frequency	1GHz
Stop Frequency	26.5GHz
RB/VB(Emission in restricted band)	1MHz/1MHz for Peark, 1MHz/10Hz for Average
RB/VB(Emission in non-restricted band)	1MHz/1MHz for Peak

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

TEST SET-UP

The Same as described in section 6.2

TEST RESULT OF RADIATED EMISSION TEST (9KHz ~30MHz)

Humidity:	55 % RH	Test Date:	Apr.14, 2011
Temperature:	25°C	Tested by:	Mary Liu
Test Method	GFSK		

Operation Mode: RF Mode

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

Note:

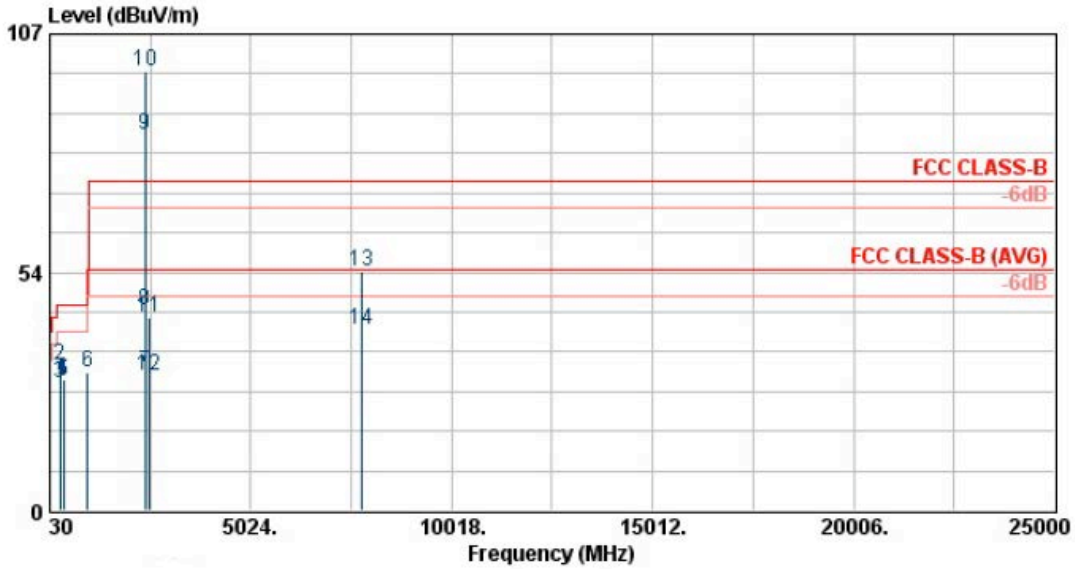
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = 20 log (specific distance / test distance) (dB);

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

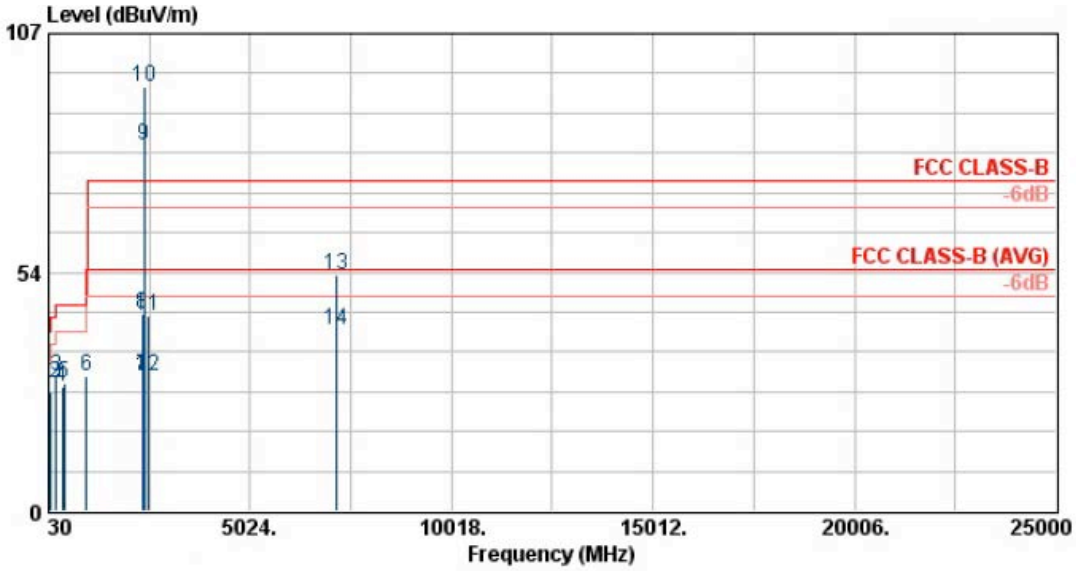
TEST RESULT OF RADIATED EMISSION TEST (30MHZ-10TH Harmonic)

Operation Mode:	RF	Test Date:	Apr.14, 2011
Temperature:	25°C	Tested by:	Mary Liu
Humidity:	55 % RH	Polarization :	Horizontal
Remark	2402 MHz is Fundamental Signals which can be ignored.		



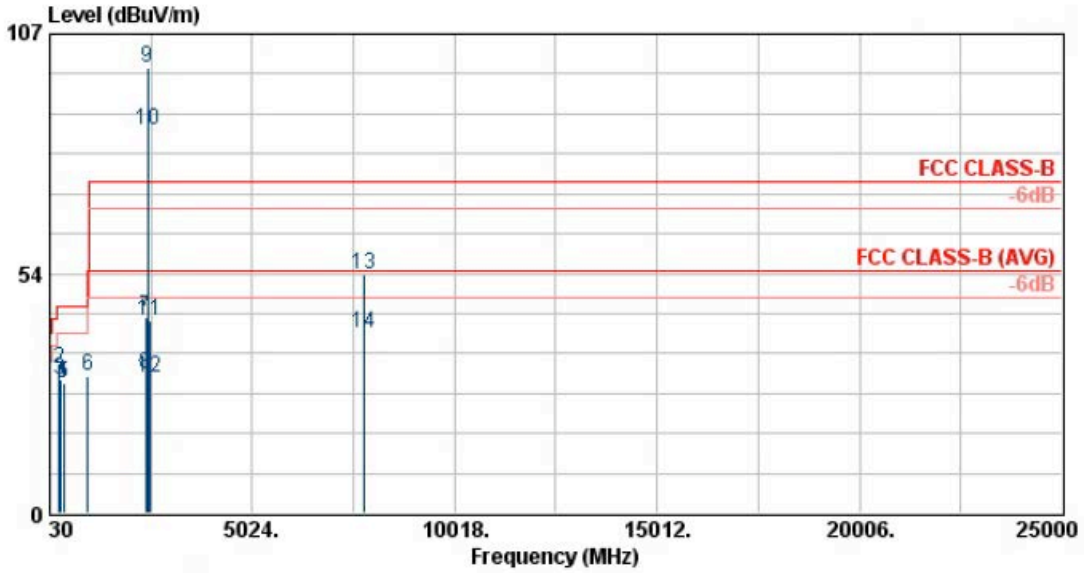
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	33.24	25.77	-14.23	40.00	39.09	18.10	0.30	31.72	---	---	Peak
2	273.54	32.63	-13.37	46.00	50.39	13.50	0.70	31.96	100	335	Peak
3	287.58	28.70	-17.30	46.00	46.40	13.66	0.70	32.07	---	---	Peak
4	372.80	29.43	-16.57	46.00	44.55	15.84	0.82	31.78	---	---	Peak
5	381.90	29.19	-16.81	46.00	44.05	16.08	0.88	31.82	---	---	Peak
6	959.40	31.09	-14.91	46.00	38.98	22.12	1.29	31.30	---	---	Peak
7	2386.38	31.09	-22.91	54.00	31.47	31.98	3.92	36.28	100	354	Average
8	2386.38	44.98	-29.02	74.00	45.36	31.98	3.92	36.28	100	354	Peak
9 @	2402.00	84.39			84.77	31.98	3.92	36.28	100	354	Average
10 X	2402.00	98.53			98.89	32.00	3.92	36.28	100	354	Peak
11	2486.00	43.50	-30.50	74.00	43.66	32.08	4.05	36.30	100	354	Peak
12	2486.00	30.22	-23.78	54.00	30.39	32.08	4.05	36.30	100	354	Average
13	7776.00	53.56	-20.44	74.00	47.20	35.61	7.40	36.66	100	177	Peak
14	7776.00	40.55	-13.45	54.00	34.19	35.61	7.40	36.66	100	177	Average

Operation Mode:	RF	Test Date:	Apr.14, 2011
Temperature:	25°C	Tested by:	Mary Liu
Humidity:	55 % RH	Polarization :	Vertical
Remark	2402 MHz is Fundamental Signals which can be ignored.		



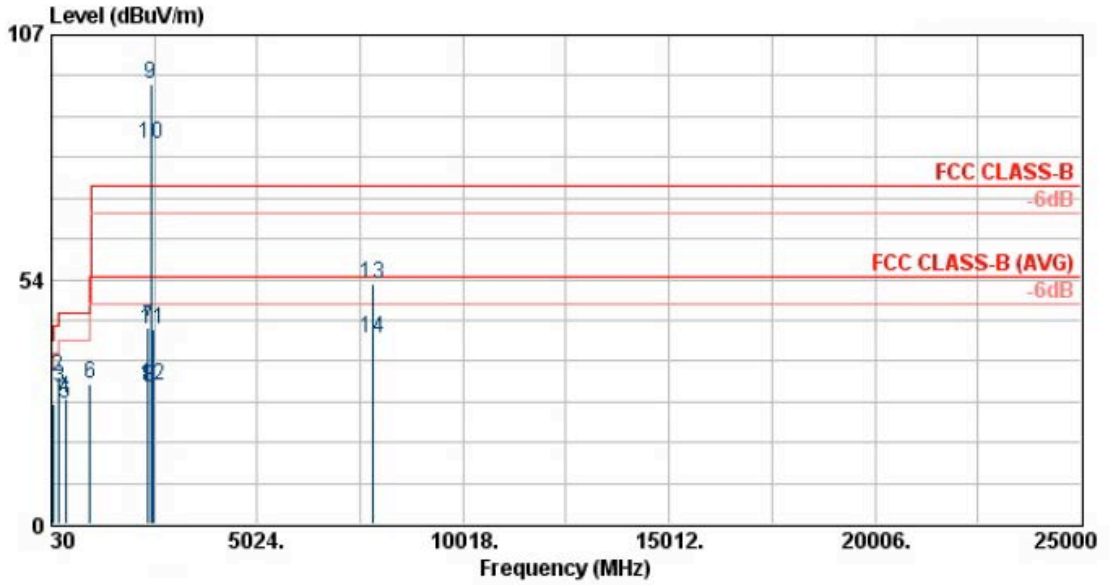
		Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1		54.03	26.49	-13.51	40.00	49.95	8.08	0.38	31.92	---	---	Peak
2		191.19	28.72	-14.78	43.50	50.48	9.67	0.60	32.03	---	---	Peak
3		214.68	30.32	-13.18	43.50	51.15	10.62	0.64	32.09	100	356	Peak
4		372.80	27.76	-18.24	46.00	42.88	15.84	0.82	31.78	---	---	Peak
5		411.30	28.50	-17.50	46.00	42.87	16.66	0.89	31.92	---	---	Peak
6		959.40	30.15	-15.85	46.00	38.04	22.12	1.29	31.30	---	---	Peak
7		2353.13	30.23	-23.77	54.00	30.71	31.93	3.86	36.27	151	334	Average
8		2353.13	44.17	-29.83	74.00	44.65	31.93	3.86	36.27	151	334	Peak
9	X	2402.00	81.94			82.32	31.98	3.92	36.28	151	334	Average
10	X	2402.00	95.24			95.60	32.00	3.92	36.28	151	334	Peak
11		2484.00	43.77	-30.23	74.00	43.93	32.08	4.05	36.30	151	334	Peak
12		2484.00	30.32	-23.68	54.00	30.49	32.08	4.05	36.30	151	334	Average
13		7182.00	52.72	-21.28	74.00	46.41	35.62	7.16	36.47	100	301	Peak
14		7182.00	40.53	-13.47	54.00	34.22	35.62	7.16	36.47	100	301	Average

Operation Mode:	RF	Test Date:	Apr.14, 2011
Temperature:	25°C	Tested by:	Mary Liu
Humidity:	55 % RH	Polarization :	Horizontal
Remark	2441 MHz is Fundamental Signals which can be ignored.		



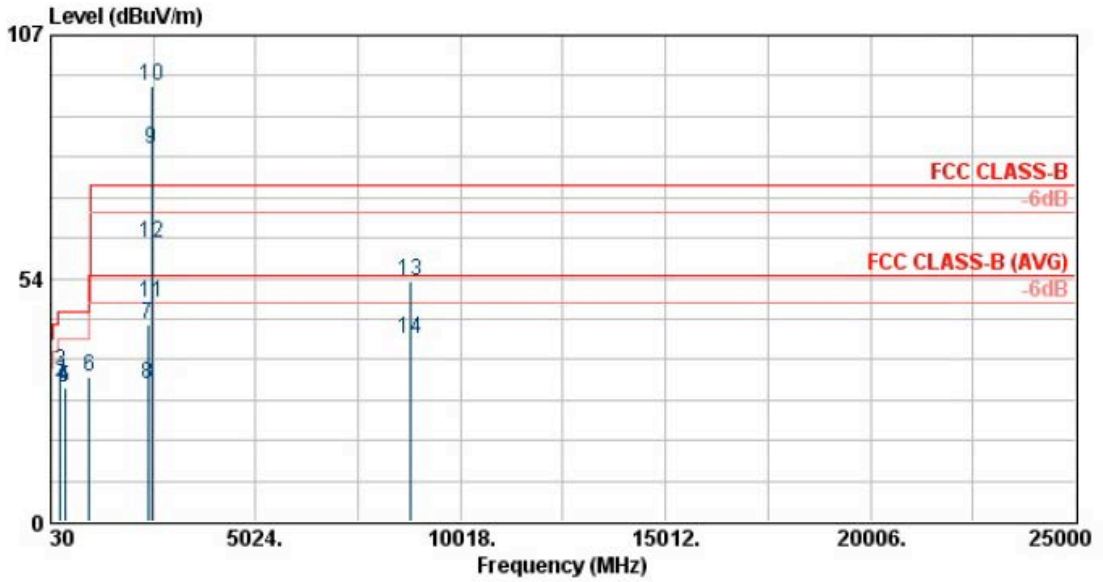
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.54	25.37	-14.63	40.00	37.39	19.30	0.30	31.61	---	---	Peak
2	272.19	32.29	-13.71	46.00	50.04	13.50	0.70	31.95	100	330	Peak
3	286.23	29.83	-16.17	46.00	47.57	13.62	0.70	32.05	---	---	Peak
4	371.40	29.01	-16.99	46.00	44.16	15.82	0.81	31.78	---	---	Peak
5	381.90	28.93	-17.07	46.00	43.79	16.08	0.88	31.82	---	---	Peak
6	959.40	30.46	-15.54	46.00	38.35	22.12	1.29	31.30	---	---	Peak
7	2390.00	43.73	-30.27	74.00	44.11	31.98	3.92	36.28	100	351	Peak
8	2390.00	31.17	-22.83	54.00	31.55	31.98	3.92	36.28	100	351	Average
9 X	2441.00	99.50			99.77	32.04	3.99	36.29	100	351	Peak
10 @	2441.00	85.51			85.78	32.04	3.99	36.29	100	351	Average
11	2486.00	42.99	-31.01	74.00	43.15	32.08	4.05	36.30	100	351	Peak
12	2486.00	30.31	-23.69	54.00	30.48	32.08	4.05	36.30	100	351	Average
13	7782.00	53.26	-20.74	74.00	46.88	35.61	7.41	36.66	100	123	Peak
14	7782.00	40.17	-13.83	54.00	33.80	35.61	7.41	36.66	100	123	Average

Operation Mode:	RF	Test Date:	Apr.14, 2011
Temperature:	25°C	Tested by:	Mary Liu
Humidity:	55 % RH	Polarization :	Vertical
Remark	2441 MHz is Fundamental Signals which can be ignored.		



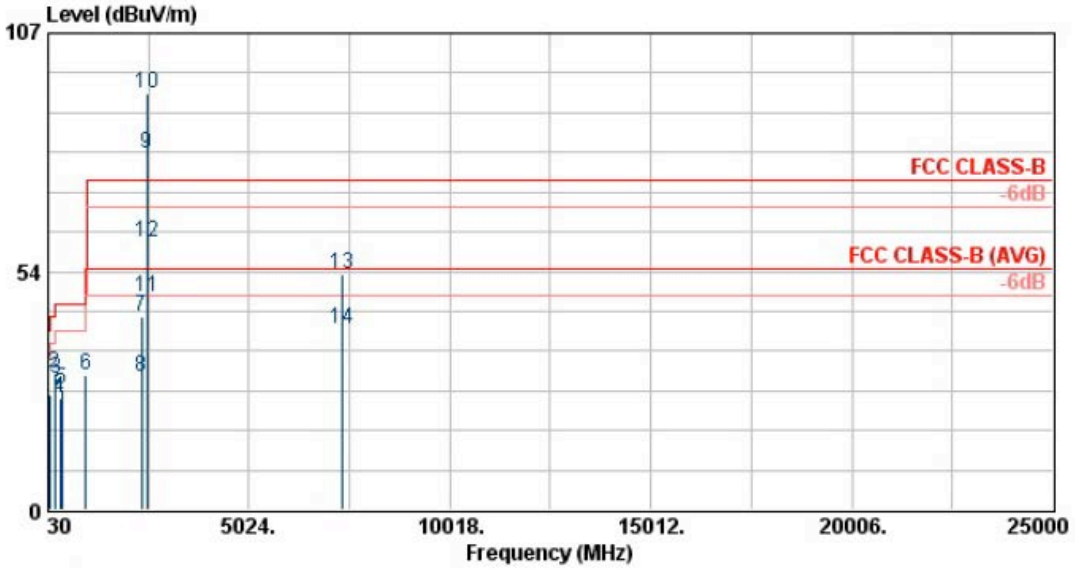
		Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1		54.84	26.13	-13.87	40.00	49.78	7.85	0.40	31.90	---	---	Peak
2		190.38	32.12	-11.38	43.50	53.94	9.60	0.60	32.02	100	236	Peak
3		214.68	29.71	-13.79	43.50	50.54	10.62	0.64	32.09	---	---	Peak
4		371.40	27.52	-18.48	46.00	42.67	15.82	0.81	31.78	---	---	Peak
5		381.90	26.10	-19.90	46.00	40.97	16.08	0.88	31.82	---	---	Peak
6		959.40	30.67	-15.33	46.00	38.55	22.12	1.29	31.30	---	---	Peak
7		2366.00	42.79	-31.21	74.00	43.24	31.93	3.89	36.28	189	309	Peak
8		2366.00	29.88	-24.12	54.00	30.33	31.93	3.89	36.28	189	309	Average
9	X	2441.00	96.40			96.67	32.04	3.99	36.29	189	309	Peak
10	@	2441.00	83.02			83.29	32.04	3.99	36.29	189	309	Average
11		2484.00	42.75	-31.25	74.00	42.91	32.08	4.05	36.30	189	309	Peak
12		2484.00	30.28	-23.72	54.00	30.45	32.08	4.05	36.30	189	309	Average
13		7827.00	52.59	-21.41	74.00	46.20	35.63	7.42	36.67	100	241	Peak
14		7827.00	40.38	-13.62	54.00	33.99	35.63	7.42	36.67	100	241	Average

Operation Mode:	RF	Test Date:	Apr.14, 2011
Temperature:	25°C	Tested by:	Mary Liu
Humidity:	55 % RH	Polarization :	Horizontal
Remark	2480 MHz is Fundamental Signals which can be ignored.		



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.27	25.15	-14.85	40.00	36.51	19.90	0.30	31.56	---	---	Peak
2	264.09	30.78	-15.22	46.00	48.29	13.68	0.70	31.89	---	---	Peak
3	272.19	33.02	-12.98	46.00	50.78	13.50	0.70	31.95	100	350	Peak
4	372.80	29.28	-16.72	46.00	44.40	15.84	0.82	31.78	---	---	Peak
5	381.90	29.41	-16.59	46.00	44.28	16.08	0.88	31.82	---	---	Peak
6	959.40	31.73	-14.27	46.00	39.62	22.12	1.29	31.30	---	---	Peak
7	2388.00	43.26	-30.74	74.00	43.64	31.98	3.92	36.28	102	339	Peak
8	2388.00	30.31	-23.69	54.00	30.69	31.98	3.92	36.28	102	339	Average
9 @	2480.00	81.95			82.12	32.08	4.05	36.30	102	339	Average
10 X	2480.00	95.85			96.02	32.08	4.05	36.30	102	339	Peak
11 !	2483.50	48.23	-5.77	54.00	48.40	32.08	4.05	36.30	102	339	Average
12	2483.50	61.17	-12.83	74.00	61.34	32.08	4.05	36.30	102	339	Peak
13	8772.00	53.10	-20.90	74.00	46.41	35.97	7.53	36.81	100	130	Peak
14	8772.00	40.03	-13.97	54.00	33.34	35.97	7.53	36.81	100	130	Average

Operation Mode:	RF	Test Date:	Apr.14, 2011
Temperature:	25°C	Tested by:	Mary Liu
Humidity:	55 % RH	Polarization :	Vertical
Remark	2480 MHz is Fundamental Signals which can be ignored.		



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	54.84	26.04	-13.96	40.00	49.69	7.85	0.40	31.90	---	---	Peak
2	190.38	30.63	-12.87	43.50	52.45	9.60	0.60	32.02	100	335	Peak
3	220.08	29.30	-16.70	46.00	49.99	10.50	0.70	31.89	---	---	Peak
4	323.80	25.26	-20.74	46.00	41.81	14.57	0.80	31.93	---	---	Peak
5	372.80	27.10	-18.90	46.00	42.22	15.84	0.82	31.78	---	---	Peak
6	959.40	30.04	-15.96	46.00	37.93	22.12	1.29	31.30	---	---	Peak
7	2356.00	43.41	-30.59	74.00	43.89	31.93	3.86	36.27	180	323	Peak
8	2356.00	30.01	-23.99	54.00	30.49	31.93	3.86	36.27	180	323	Average
9 @	2480.00	79.84			80.01	32.08	4.05	36.30	180	323	Average
10 X	2480.00	93.43			93.60	32.08	4.05	36.30	180	323	Peak
11	2483.50	47.59	-6.41	54.00	47.76	32.08	4.05	36.30	180	323	Average
12	2483.50	59.91	-14.09	74.00	60.08	32.08	4.05	36.30	180	323	Peak
13	7362.00	53.00	-21.00	74.00	46.76	35.56	7.22	36.54	100	219	Peak
14	7362.00	40.72	-13.28	54.00	34.49	35.56	7.22	36.54	100	219	Average

10. NUMBER OF HOPPING FREQUENCY

10.1 MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.
3. Set Span = the frequency band of operation
   RBW ≥ 1% of the span
   VBW ≥ RBW
   Sweep = auto
   Detector function = peak
   Trace = max hold

10.2 TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 6.2
1. Conducted Method.

10.3 MEASUREMENT EQUIPMENT USED

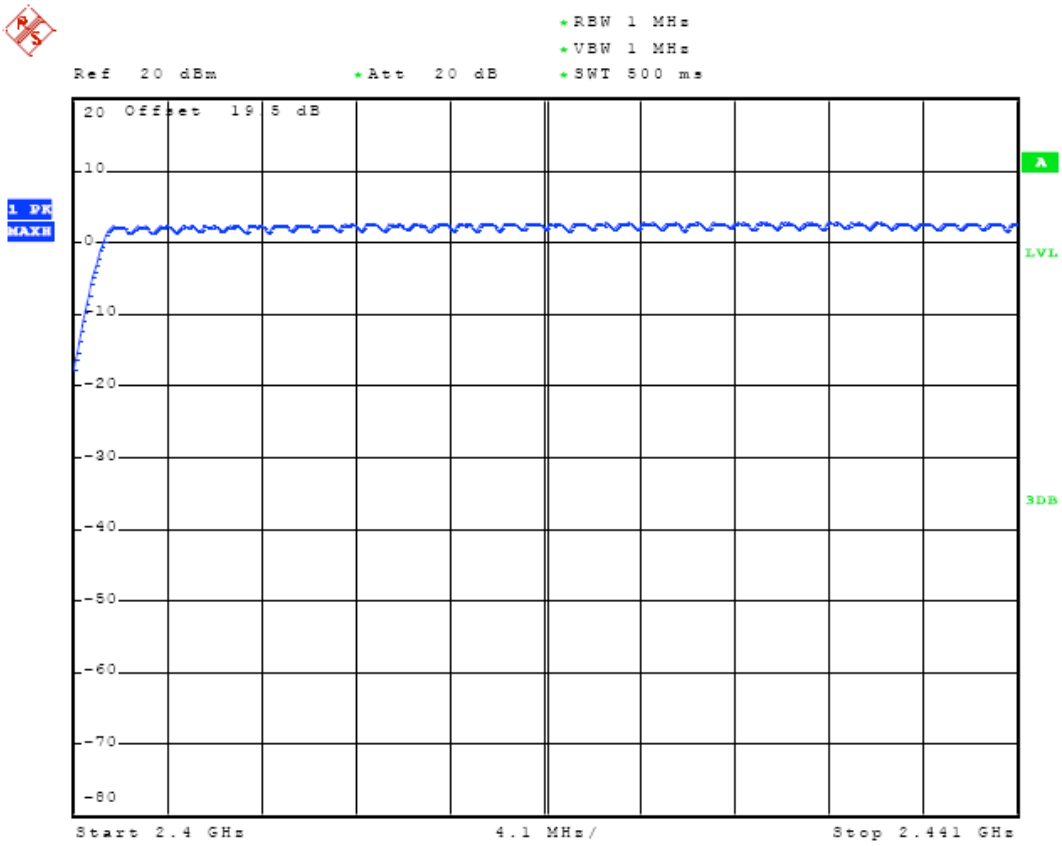
The Same as described in section 6.3

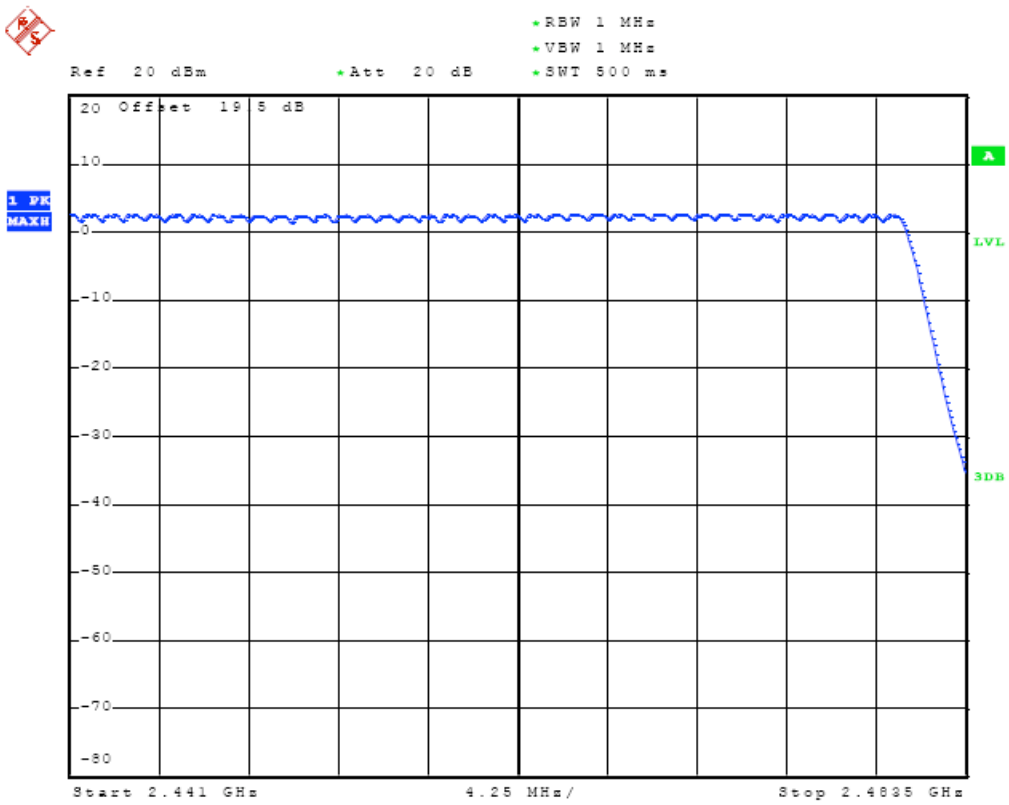
10.4 LIMITS AND MEASUREMENT RESULT:

TOTAL NO. OF HOPPING CHANNEL	LIMIT (NO. OF CH)	MEASUREMENT (NO. OF CH)	RESULT
	>=15	79	PASS

Humidity:	55 % RH	Test Date:	Apr.14, 2011
Temperature:	25°C	Tested by:	Jekey Zhang

NUMBER OF HOPPING CHANNEL PLOT ON CHANNEL 0~78




RBW 1 MHz
VBW 1 MHz
Ref 20 dBm
Att 20 dB
SWT 500 ms
Offset 19.5 dB
1 PK
MAXH
A
LVL
3DB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 2.441 GHz
4.25 MHz/
Stop 2.4835 GHz

11. TIME OF OCCUPANCY (DWELL TIME)

11.1 MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
3. Set center frequency of spectrum analyzer = Operating frequency
4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0 Hz,

11.2 TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 6.2
Conducted Method

11.3 MEASUREMENT EQUIPMENT USED

The same as described in section 2.4

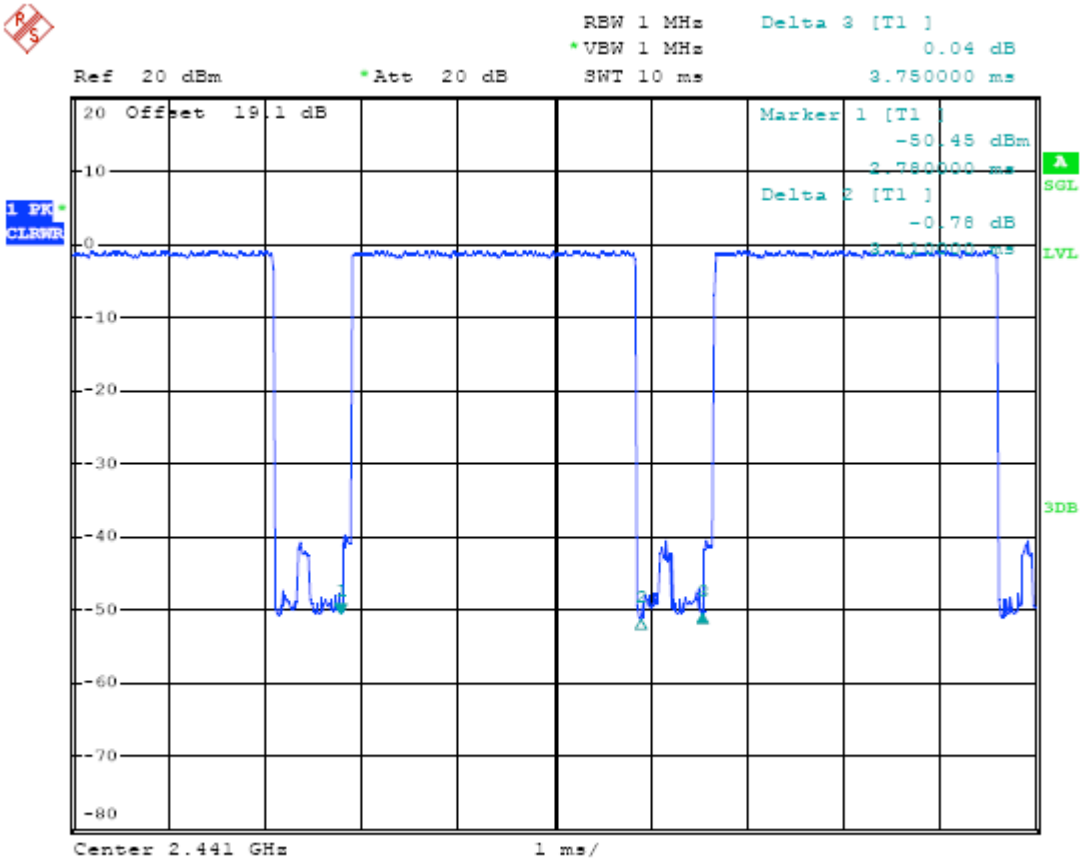
11.4 LIMITS AND MEASUREMENT RESULT

Mode	Spectrum Reading	Test Result	Limit	Pass / Fail
	(uS)	(mS)	(mS)	
DH5	3110	300	400	Pass

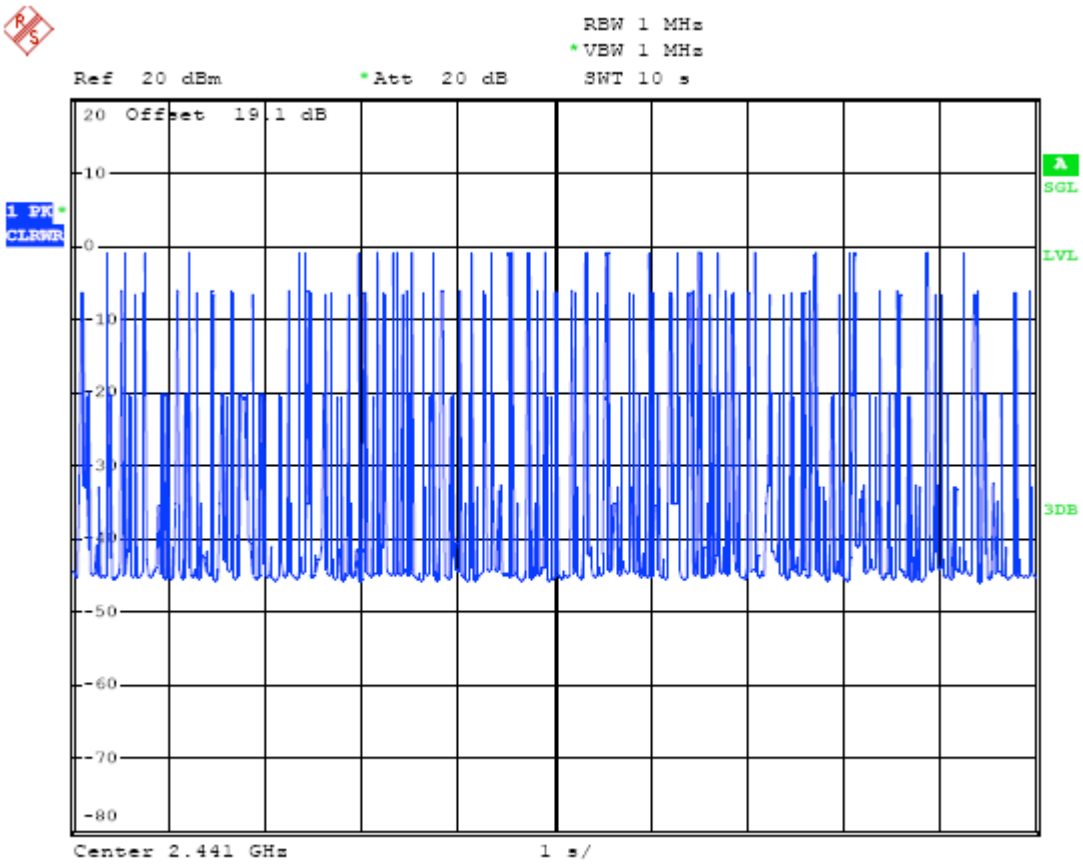
Remark:
A Period Time = 79*0.4=31.6 S
DH1 Time Slot: Reading * (1600/2)*31.6/79
DH3 Time Slot: Reading * (1600/4)*31.6/79
DH5 Time Slot: Reading * (1600/6)*31.6/79
The dwell time is showed the maximum data of all data (DH1, DH3, DH5), DH5 of mode have the maximum dwell time.

Humidity:	55 % RH	Test Date:	Apr.14, 2011
Temperature:	25°C	Tested by:	Jekey Zhang
Configurations	DH5		

DH5 Dwell Time (One Pulse) Plot on Channel 39



DH5 Dwell Time (Count Pulses) Plot on Channel 39



12. FREQUENCY SEPARATION

12.1 MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
3. Set Span = wide enough to capture the peaks of two adjacent channels
   Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span
   Video (or Average) Bandwidth (VBW) ≥ RBW
   Sweep = auto
   Detector function = peak
   Trace = max hold

12.2 TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 6.2

12.3 MEASUREMENT EQUIPMENT USED

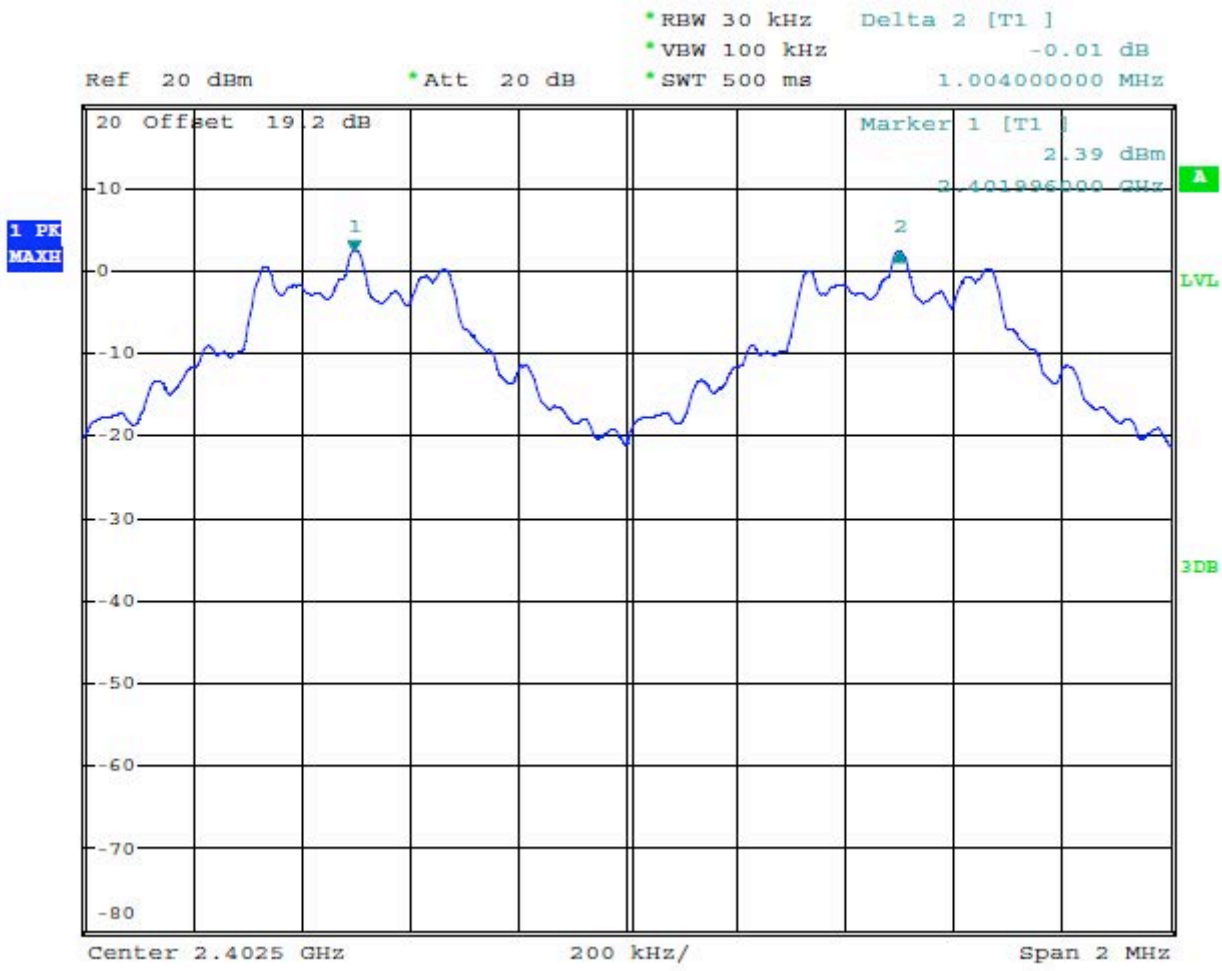
The same as described in section 2.4

12.4 LIMITS AND MEASUREMENT RESULT

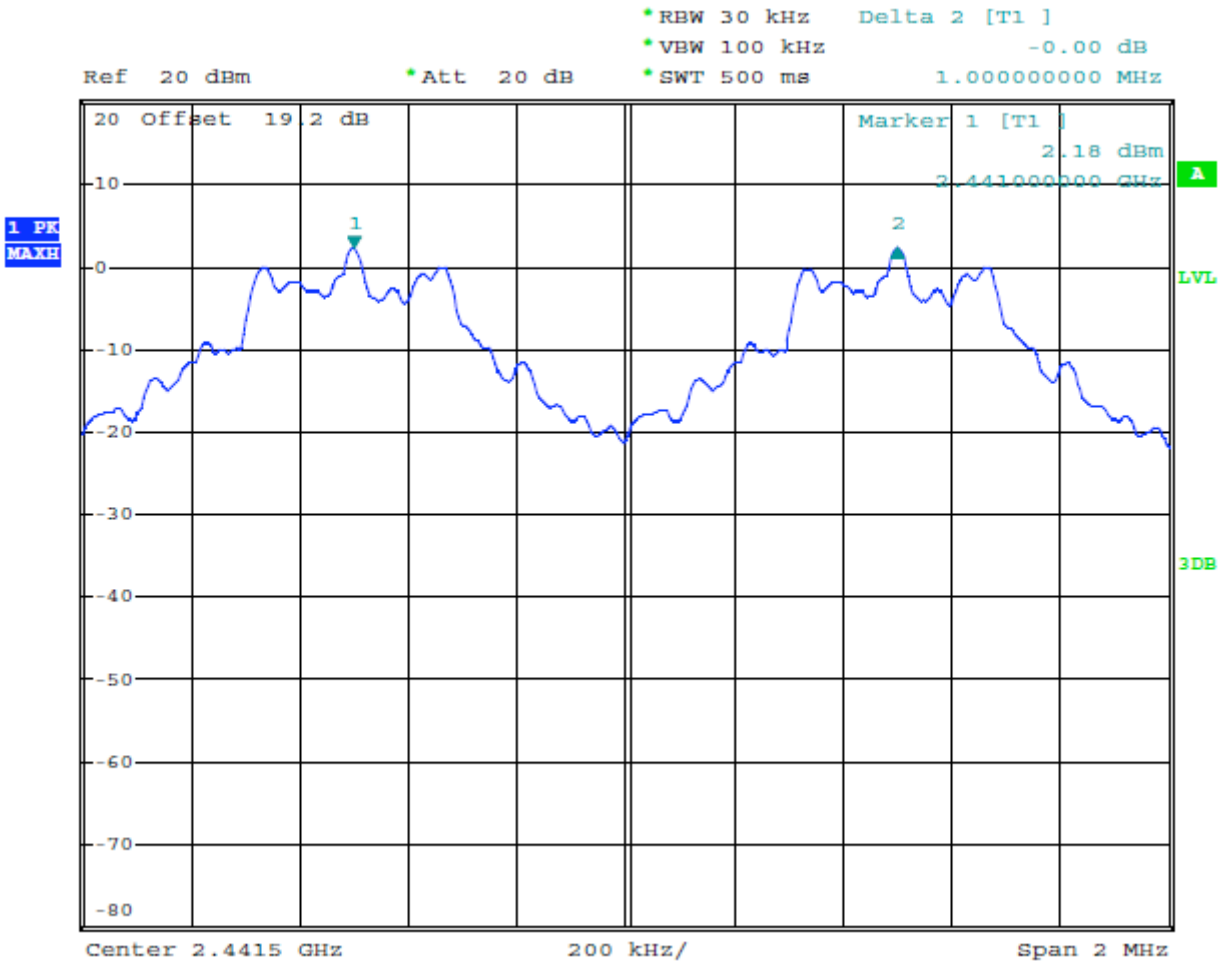
CHANNEL	Channel separation (1Mbps)	Channel separation (2Mbps)	Channel separation (3Mbps)
CH00-CH01	1004KHz	1008KHz	1000KHz
CH39-CH40	1000KHz	1008KHz	1000KHz
CH77-CH78	1000KHz	1008KHz	1000KHz
LIMIT	>=25 KHz or 2/3 20 dB BW		
RESULT	Pass		

Humidity:	55 % RH	Test Date:	Apr.14, 2011
Temperature:	25°C	Tested by:	Jekey Zhang
Configurations	Channel 0-1, channel39-40, channel78-79		

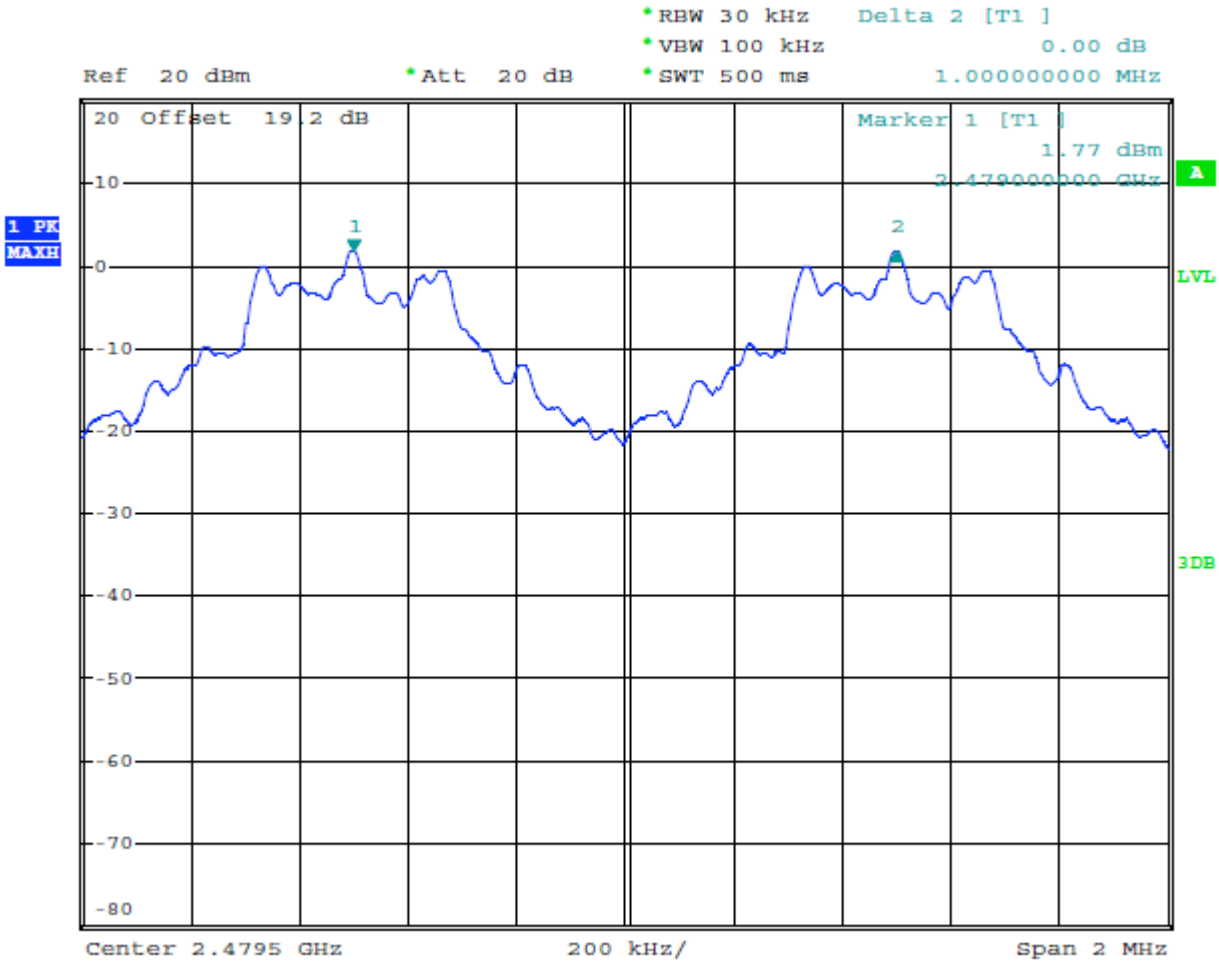
TEST PLOT FOR FREQUENCY SEPARATION –CHANNEL0-1(1Mbps)



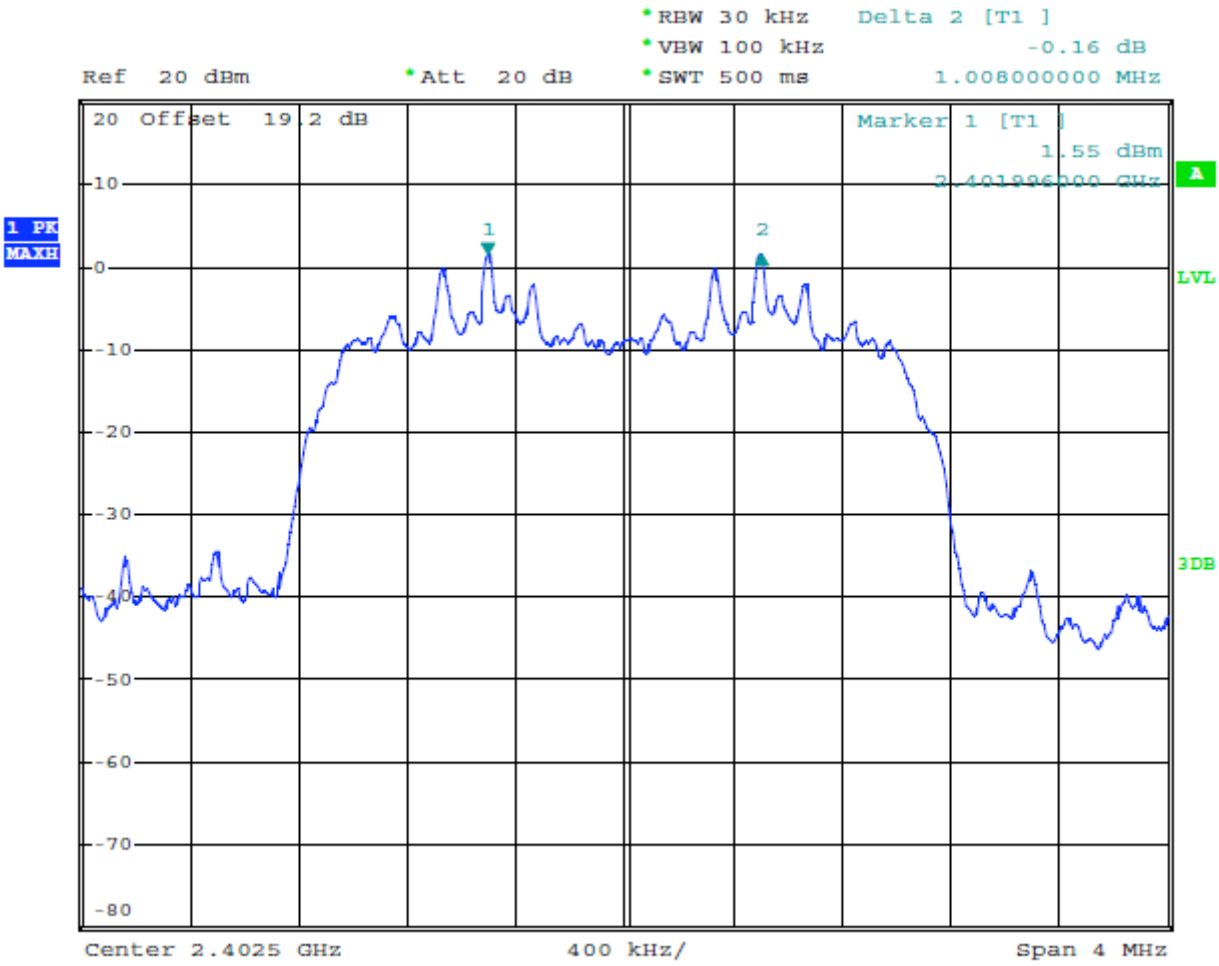
TEST PLOT FOR FREQUENCY SEPARATION –CHANNEL39-40(1Mbps)



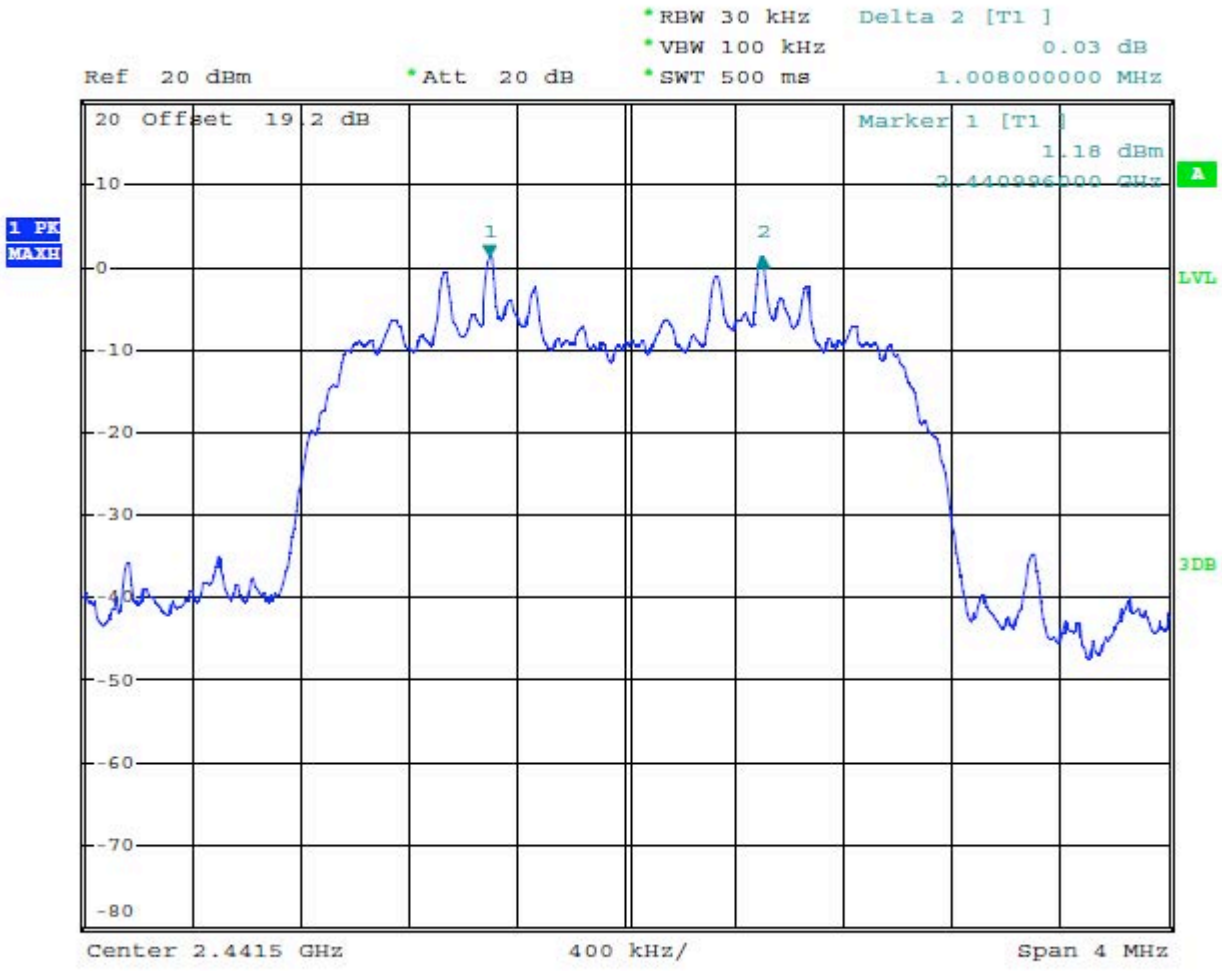
TEST PLOT FOR FREQUENCY SEPARATION -CHANNEL77-78(1Mbps)



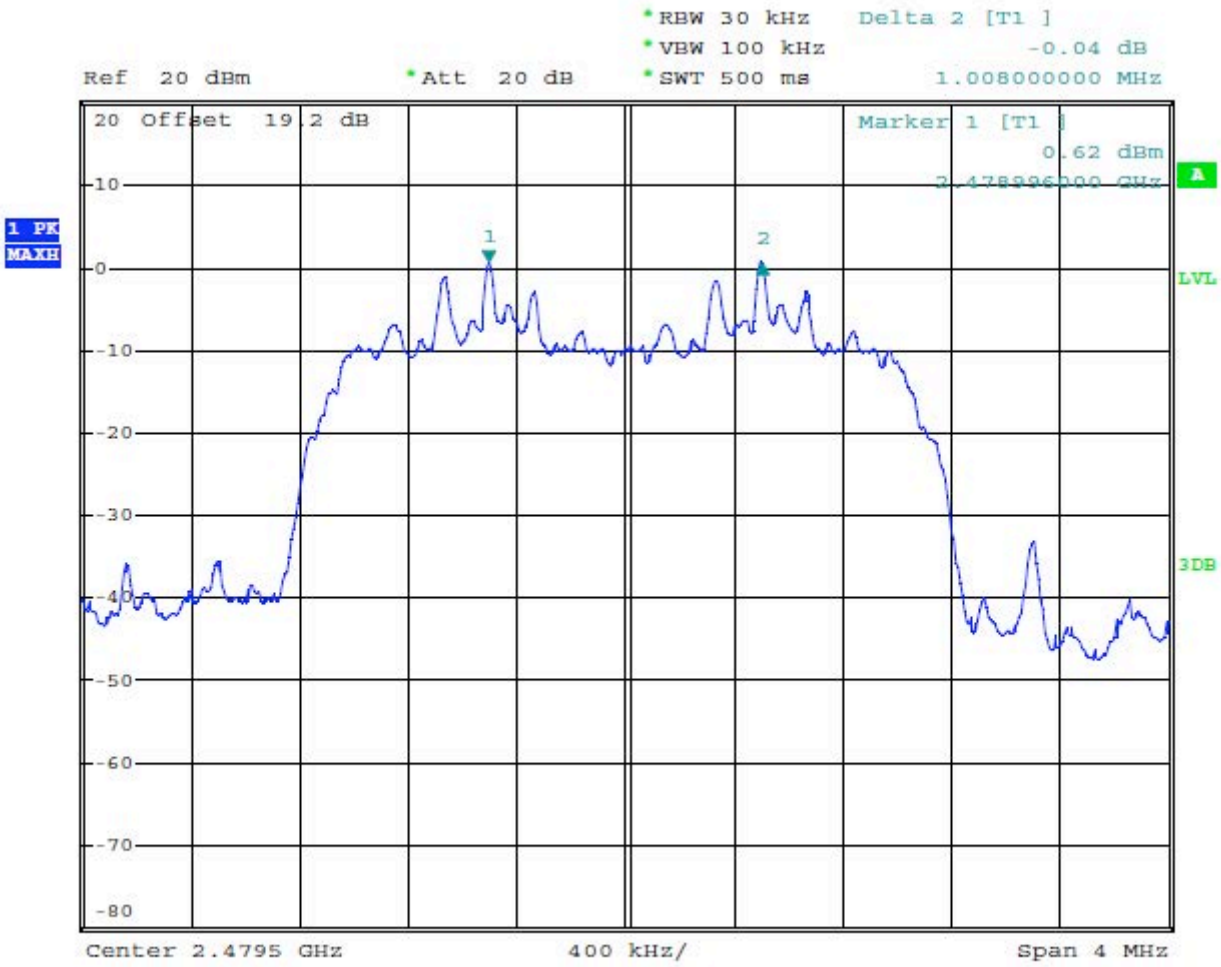
TEST PLOT FOR FREQUENCY SEPARATION –CHANNEL0-1(2Mbps)



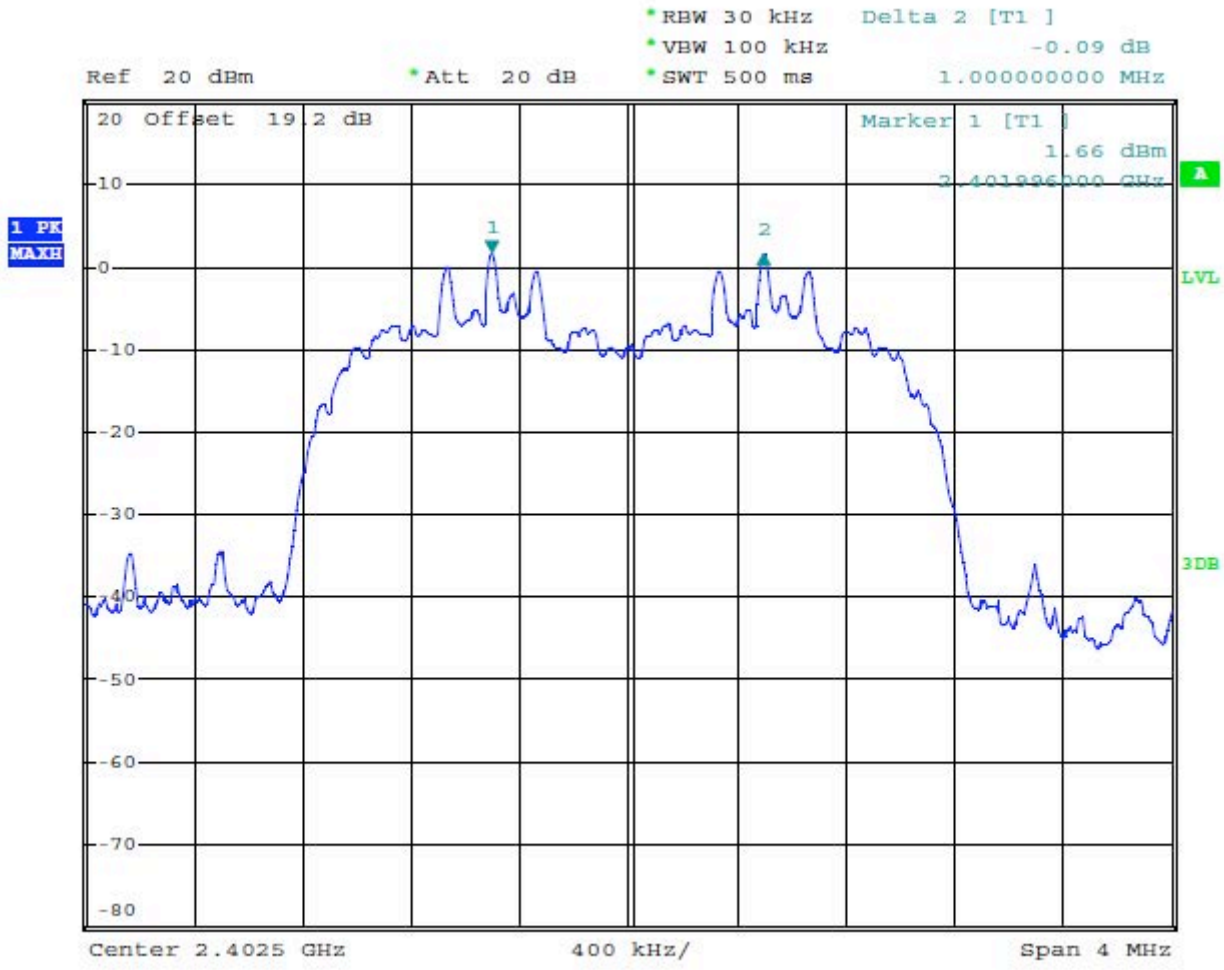
TEST PLOT FOR FREQUENCY SEPARATION –CHANNEL39-40(2Mbps)



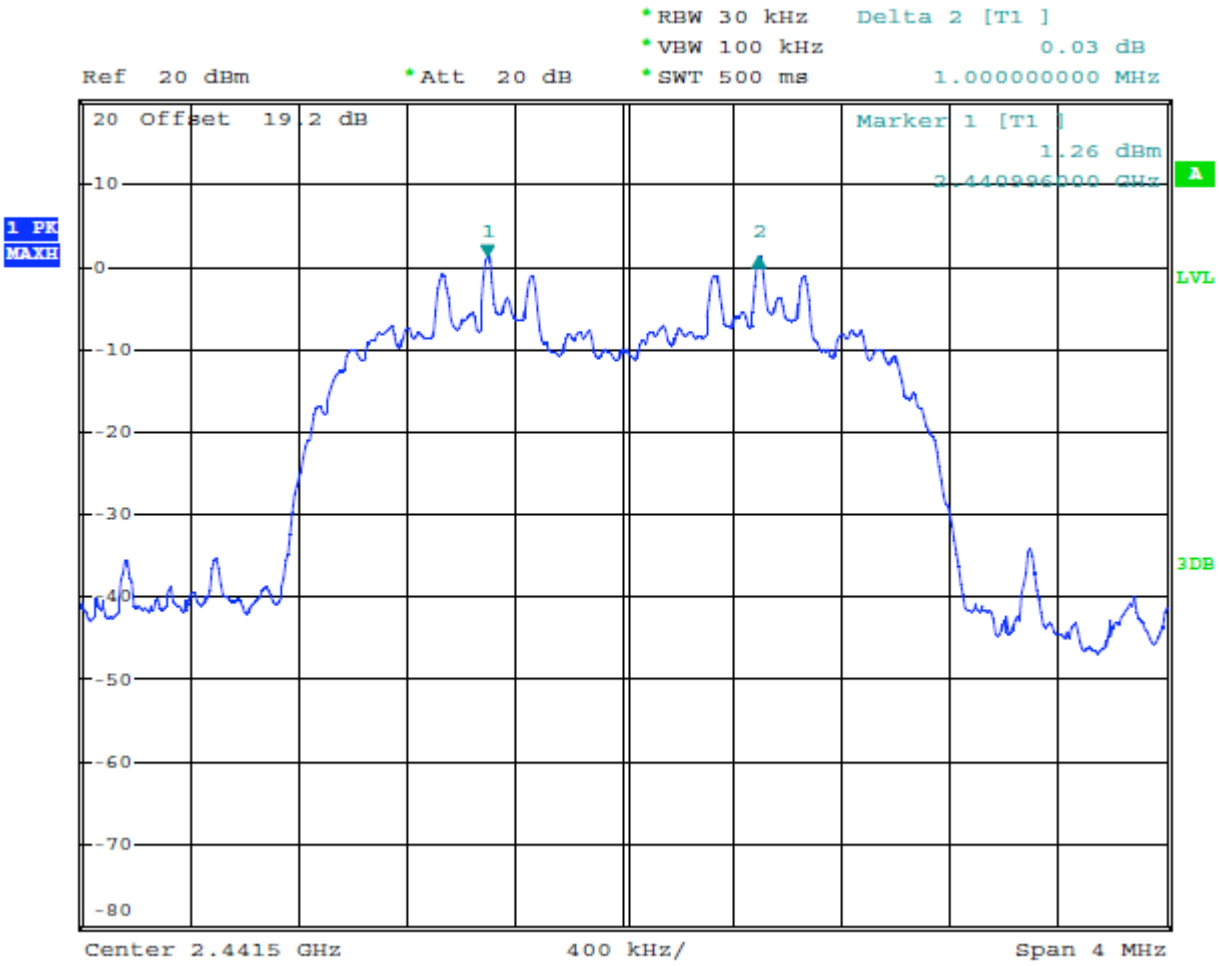
TEST PLOT FOR FREQUENCY SEPARATION -CHANNEL77-78(2Mbps)



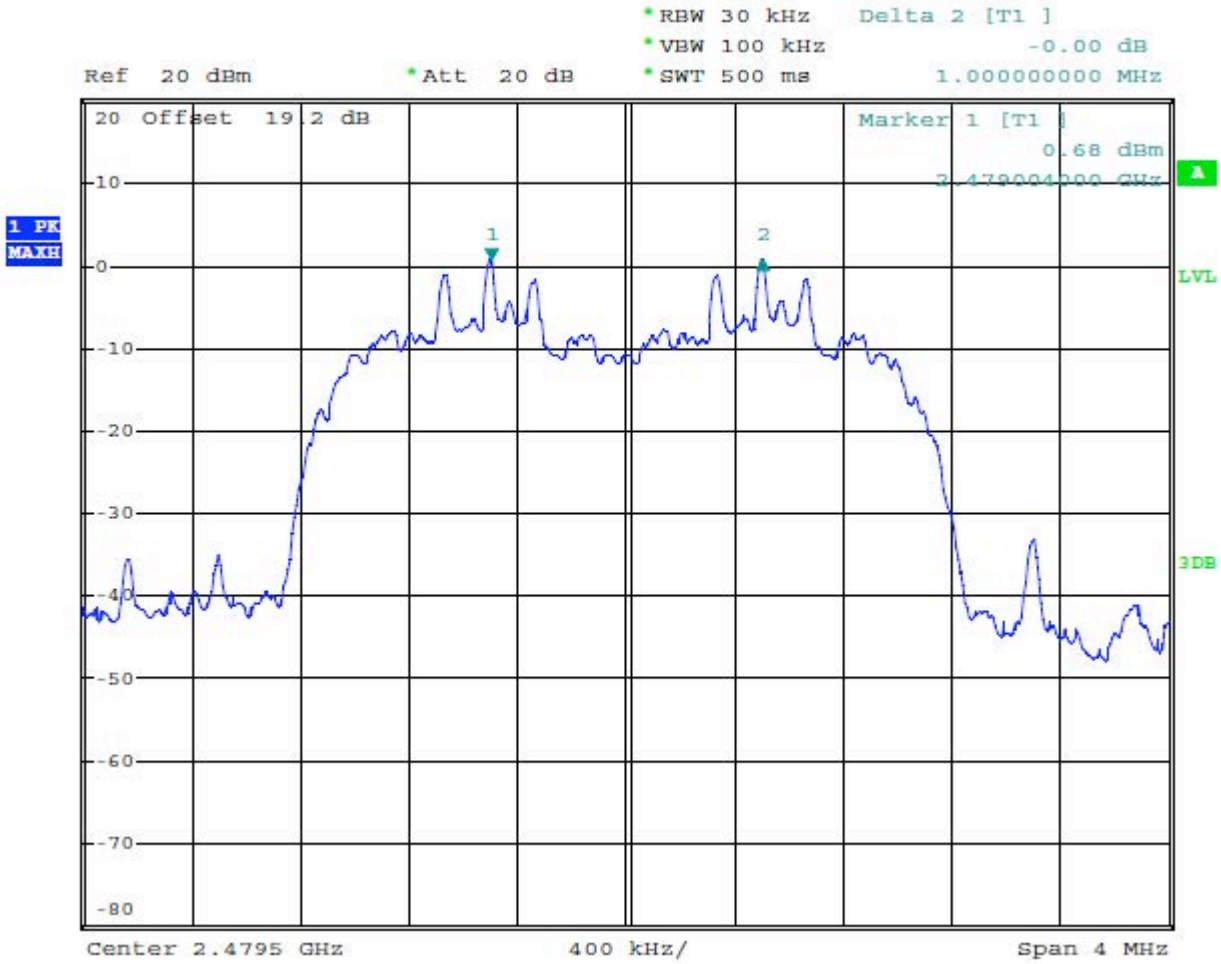
TEST PLOT FOR FREQUENCY SEPARATION –CHANNEL0-1(3Mbps)



TEST PLOT FOR FREQUENCY SEPARATION –CHANNEL39-40(3Mbps)



TEST PLOT FOR FREQUENCY SEPARATION –CHANNEL77-78(3Mbps)



APPENDIX I
PHOTOGRAPHS OF THE EUT

TOP VIEW OF SAMPLE-Q2

BACK VIEW OF SAMPLE-Q2

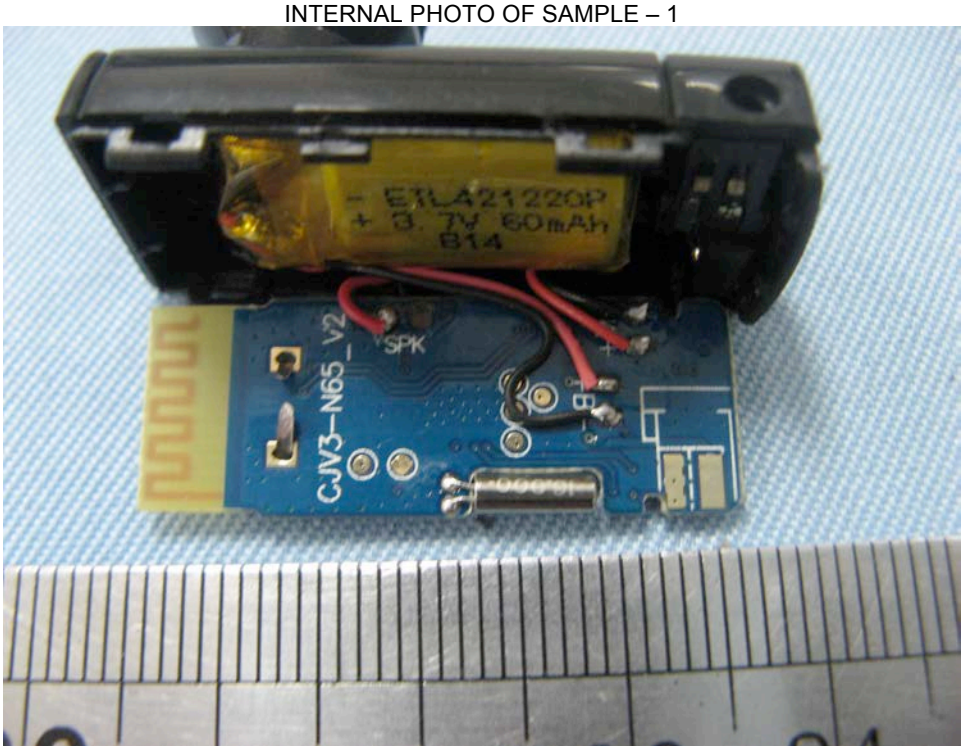
LEFT VIEW OF SAMPLE

RIGHT VIEW OF SAMPLE

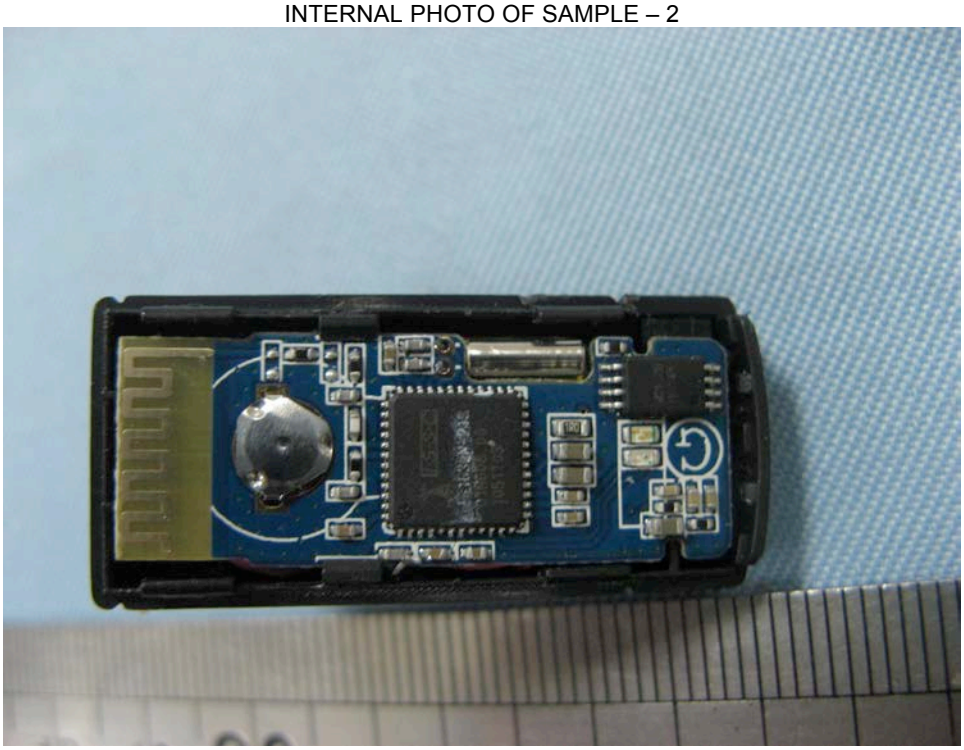
FRONT VIEW OF SAMPLE

BACK VIEW OF SAMPLE

INTERNAL PHOTO OF SAMPLE – 1



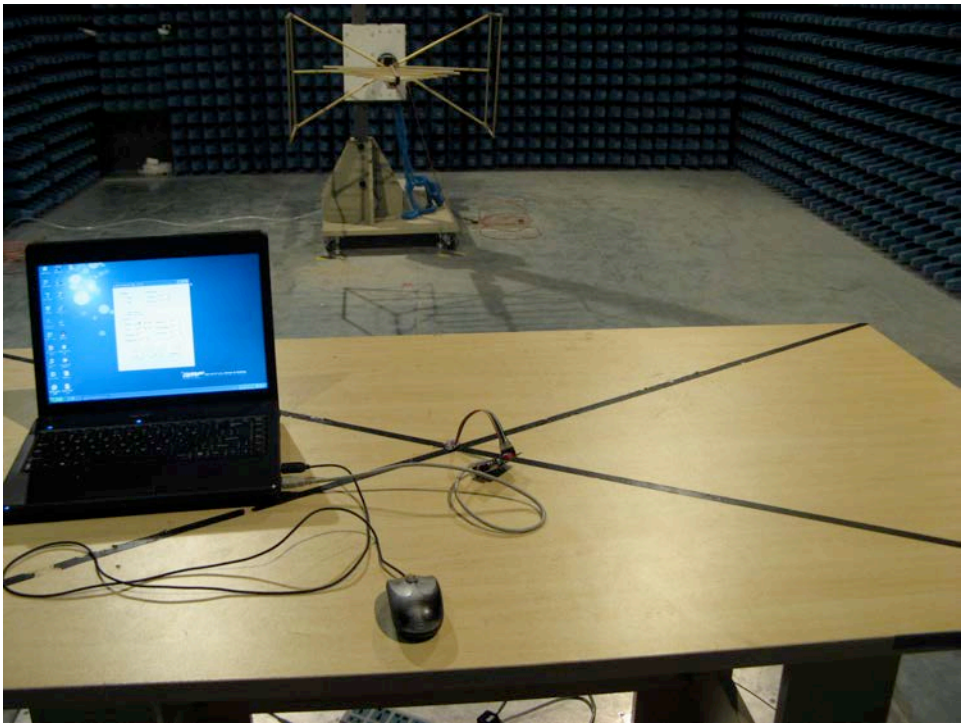
INTERNAL PHOTO OF SAMPLE – 2



PPENDIX II

PHOTOGRAPHS OF THE TEST SETUP

RADIATED EMISSION TEST SETUP



---- END OF REPORT ----