



FCC TEST REPORT (RFID)

REPORT NO.: RF981015H02-3

MODEL NO.: MC3090Z

RECEIVED: Oct. 15, 2009

TESTED: Oct. 22 to 31, 2009

ISSUED: Nov. 23, 2009

APPLICANT: Motorola Inc.

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

LAB LOCATION: No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen,
Chiung Lin Hsiang, Hsin Chu Hsien 307,
Taiwan

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TABLE OF CONTENTS

1	CERTIFICATION.....	4
2	SUMMARY OF TEST RESULTS.....	5
2.1	MEASUREMENT UNCERTAINTY	6
3	GENERAL INFORMATION.....	7
3.1	GENERAL DESCRIPTION OF EUT.....	7
3.2	DESCRIPTION OF TEST MODES.....	11
3.3	TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:	12
3.4	GENERAL DESCRIPTION OF APPLIED STANDARDS.....	13
3.5	DESCRIPTION OF SUPPORT UNITS	14
3.6	CONFIGURATION OF SYSTEM UNDER TEST	14
4	TEST PROCEDURES AND RESULTS.....	15
4.1	NUMBER OF HOPPING FREQUENCY USED.....	15
4.1.1	LIMIT OF HOPPING FREQUENCY USED.....	15
4.1.2	TEST INSTRUMENTS	15
4.1.3	TEST PROCEDURES.....	15
4.1.4	DEVIATION FROM TEST STANDARD	15
4.1.5	TEST SETUP	16
4.1.6	TEST RESULTS	16
4.2	DWELL TIME ON EACH CHANNEL	20
4.2.1	LIMIT OF DWELL TIME USED	20
4.2.2	TEST INSTRUMENTS	20
4.2.3	TEST PROCEDURES.....	20
4.2.4	DEVIATION FROM TEST STANDARD	21
4.2.5	TEST SETUP	21
4.2.6	TEST RESULTS	21
4.3	CHANNEL BANDWIDTH.....	25
4.3.1	TEST INSTRUMENTS	25
4.3.2	TEST PROCEDURE	26
4.3.3	DEVIATION FROM TEST STANDARD	26
4.3.4	TEST SETUP	26
4.3.5	EUT OPERATING CONDITION.....	26
4.3.6	TEST RESULTS	27
4.4	HOPPING CHANNEL SEPARATION	33
4.4.1	LIMIT OF HOPPING CHANNEL SEPARATION.....	33
4.4.2	TEST INSTRUMENTS	33
4.4.3	TEST PROCEDURES.....	33



4.4.4	DEVIATION FROM TEST STANDARD	33
4.4.5	TEST SETUP	33
4.4.6	TEST RESULTS	34
4.5	MAXIMUM PEAK OUTPUT POWER	40
4.5.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT	40
4.5.2	INSTRUMENTS.....	40
4.5.3	TEST PROCEDURES.....	40
4.5.4	DEVIATION FROM TEST STANDARD	40
4.5.5	TEST SETUP	41
4.5.6	EUT OPERATING CONDITION.....	41
4.5.7	TEST RESULTS	42
4.6	RADIATED EMISSION MEASUREMENT.....	48
4.6.1	LIMITS OF RADIATED EMISSION MEASUREMENT	48
4.6.2	TEST INSTRUMENTS	49
4.6.3	TEST PROCEDURES.....	51
4.6.4	DEVIATION FROM TEST STANDARD	51
4.6.5	TEST SETUP	52
4.6.6	TEST RESULTS	53
4.7	CONDUCTED OUT-BAND EMISSION MEASUREMENT	65
4.8.1	LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT.....	65
4.8.2	TEST INSTRUMENTS	65
4.8.3	TEST PROCEDURE	65
4.8.4	DEVIATION FROM TEST STANDARD	65
4.8.5	EUT OPERATING CONDITION.....	65
4.8.6	TEST RESULTS	66
4.9	ANTENNA REQUIREMENT	73
4.9.1	STANDARD APPLICABLE	73
4.9.2	ANTENNA CONNECTED CONSTRUCTION.....	73
5	INFORMATION ON THE TESTING LABORATORIES	74
6	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	75



1 CERTIFICATION

PRODUCT : Mobile Computing Terminal
BRAND NAME : MOTOROLA
MODEL NO. : MC3090Z
APPLICANT : Motorola Inc.
TESTED DATE: Oct. 22 to 31, 2009
TEST SAMPLE : ENGINEERING SAMPLE
STANDARDS : 47 CFR Part 15, Subpart C (Section 15.247),
ANSI C63.4-2003

The above equipment 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 : Carol Liao , **DATE:** Nov. 23, 2009
(Carol Liao, Specialist)

TECHNICAL ACCEPTANCE : Hank Chung , **DATE:** Nov. 23, 2009
(Hank Chung, Deputy Manager)

APPROVED BY : May Chen , **DATE:** Nov. 23, 2009
(May Chen, Deputy Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	Test Type and Limit	Result	REMARK
15.207	AC Power Conducted Emission	NA	Power supply is DC 3.7V from battery
15.247(a)(1)(l)	Number of Hopping Frequency Used Spec.:	PASS	Meet the requirement of limit
15.247(a)(1)(i)	Dwell Time on Each Channel Spec. : Max. 0.4 second	PASS	Meet the requirement of limit
15.247(a)(1)	Hopping Channel Separation Spec. : Min. 25 kHz or 20 dB bandwidth, which ever is greater	PASS	Meet the requirement of limit
15.247(a)(1)(i)	Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System Spec.: Max. 0.5 MHz	PASS	Meet the requirement of limit
15.247(b)(2)	Maximum Peak Output Power Spec.: max. 30dBm	PASS	Meet the requirement of limit
15.247(d)	Transmitter Radiated Emissions Spec.: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -3.02dB at 3709.00MHz
15.247(d)	Conducted Out-Band Emission Measurement	PASS	Meet the requirement of limit

NOTE:

1. There are Bluetooth technology, RFID technology and WLAN technology used for the EUT.
2. This report was recorded the RFID technology.
3. For WLAN technology, the test data please refer "RF981015H02" and "RF981015H02-1".
4. For Bluetooth technology, the test data please refer " RF981015H02-2".

2.1 MEASUREMENT UNCERTAINTY

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

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

Measurement	Value
Radiated emissions (30MHz-1GHz)	3.98 dB
Radiated emissions (1GHz ~18GHz)	2.49 dB
Radiated emissions (18GHz ~40GHz)	2.70 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Mobile Computing Terminal
MODEL NO.	MC3090Z
FCC ID	UZ7MC3090Z
POWER SUPPLY	DC 12V to cradle, DC 5.4V from power adapter or DC 3.7V from battery
MODULATION TYPE	For WLAN : CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
	For Bluetooth : GFSK
	For RFID : PR-ASK(DRM) , DSB-ASK(MRM), PR-ASK(XRM)
MODULATION TECHNOLOGY	For WLAN : DSSS, OFDM
	For Bluetooth : FHSS
	For RFID : FHSS
TRANSFER RATE	For WLAN : 802.11b: 11 / 5.5 / 2 / 1Mbps 802.11g: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps 802.11a: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps
	For Bluetooth : DH 1, DH 3, DH 5
FREQUENCY RANGE	For WLAN : For 15.407 802.11a: 5.18 ~ 5.32GHz, 5.50 ~ 5.70GHz For 15.247(2.4GHz) 802.11b & 802.11g: 2412 ~ 2462MHz For 15.247(5GHz) 802.11a: 5.745 ~ 5.825GHz
	For Bluetooth :2402MHz ~ 2480MHz
	For RFID : 902.75MHz ~ 927.25MHz



NUMBER OF CHANNEL	For WLAN : For 15.407 19 for 802.11a For 15.247(2.4GHz) 11 for 802.11b, 802.11g For 15.247(5GHz) 5 for 802.11a
	For Bluetooth : 79
	For RFID : 50
MAXIMUM OUTPUT POWER	For WLAN : For 15.407 802.11a: 40.7mW For 15.247(2.4GHz) 802.11b: 83.2mW 802.11g: 93.3mW For 15.247(5GHz) 802.11a: 77.6mW
	For Bluetooth : 1.3 mW
	For RFID : PR-ASK(DRM): 660.7mW DSB-ASK(MRM): 977.2mW PR-ASK(XRM): 977.2mW
ANTENNA TYPE	Please see note 3
DATA CABLE	USB Cable x 1 (Part No.: 25-67868-03R) (only for test, not for sale together)
I/O PORTS	USB port x 1, Audio port x 1
ASSOCIATED DEVICES	Battery x 1

NOTE:

1. There are Bluetooth technology, RFID technology and WLAN technology used for the EUT. < the WLAN test data please refer " RF981015H02" and "RF981015H02-1", the Bluetooth test data please refer "RF981015H02-2">
2. The EUT was pre-tested under the following modes:

Test Mode	Description
Mode A	X-Y plane
Mode B	Z-X plane
Mode C	Z-Y plane

From the above modes, the worst emission level was found in **Mode A**. Therefore only the test data of the mode was recorded in this report individually.



3. There are four antennas provided to this EUT, please refer to the following table:

For WLAN (RX has diversity function)					
No.	Model	Antenna Type	Gain (dBi)	Connector Type	Frequency range (MHz)
1	OZONE WLAN 1	PCB(TX,RX)	2.96 (2.4G) 4.16 (5G)	N/A	2400~2850 4920~5850
2	OZONE WLAN 2	PIFA(RX only)	3.45 (2.4G) 3.32 (5G)	N/A	2400~2850 4920~5850
For Bluetooth					
No.	Model	Antenna Type	Gain (dBi)	Connector Type	Frequency range (MHz)
1	Mica 2.4GHz	SMD	-0.45	N/A	2400~2500
For RFID					
No.	Model	Antenna Type	Gain (dBi)	Connector Type	Frequency range (MHz)
1	OZONE RFID	Hor- dipole, outside antenna, Ver- slot, inside antenna	1.7483(Max)	N/A	902~928

4. The EUT could be supplied with the a charger, power adapter and Li-ion battery as below table:

Cradle (only for test, not for sale together)	
Brand:	SYMBOL
Part No.:	CRD3000-1001RR
Input power :	+12V-----3.3A
I/O Ports:	USB Port x 1 RJ-45(console) Port x 1
Associated devices:	USB cable x 1 (Part No.: 25-68596-01R) (1.6m, Unshielded without core) RJ-45(console) cable x 1 (Part No.: 25-63852-01R) (1.8m, Unshielded without core) Adapter x 1 (Part No.: 50-14000-148R)
Adapter (only for Cradle use, not for sale together)	
Brand:	HIPRO
Model No.:	HP-O2040D43
Part No.:	50-14000-148R
Input power :	100-240V, 50-60Hz, 1.5A
Output power :	+12V-----3.33A DC output cable (1.8m, Unshielded)

Adapter (only for test, not for sale together)	
Brand:	MOTOROLA
Model No.:	EADP-16BB A
Part No.:	50-14000-249R
Input power :	100-240V, 50-60Hz, 0.4A
Output power :	+5.4V-----3.0A DC output cable (1.8m, Unshielded)
Li-ion Battery 1	
Brand:	MOTOROLA/ Palladium Energy Inc
Model No.:	82-127909-01
RATING:	3.7V, 4800mAh
Li-ion Battery 2	
Brand:	Symbol/ Sole Energy Tech Corp.
Model No.:	55-060112-05
RATING:	3.7V, 4400mAh

5. The EUT operates in both the 5GHz and 2.4GHz Bands and compatibility with 802.11a, 802.11b, 802.11g, RFID technology and Bluetooth technology.
6. RFID and scanner have no function while the EUT is under charger condition.
7. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

Fifty channels are provided to this EUT.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	902.75	21	913.25	42	923.75
1	903.25	22	913.75	43	924.25
2	903.75	23	914.25	44	924.75
3	904.25	24	914.75	45	925.25
4	904.75	25	915.25	46	925.75
5	905.25	26	915.75	47	926.25
6	905.75	27	916.25	48	926.75
7	906.25	28	916.75	49	927.25
8	906.75	29	917.25		
9	907.25	30	917.75		
10	907.75	31	918.25		
11	908.25	32	918.75		
12	908.75	33	919.25		
13	909.25	34	919.75		
14	909.75	35	920.25		
15	910.25	36	920.75		
16	910.75	37	921.25		
17	911.25	38	921.75		
18	911.75	39	922.25		
19	912.25	40	922.75		
20	912.75	41	923.25		

3.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

The device has and different accessory, therefore the worst case base on investigation by different combination for each test item and its data was recorded in this report.

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
A	NA	√	√	√	Scanner Stand-alone

Where PLC: Power Line Conducted Emission RE<1G RE: Radiated Emission below 1GHz
 RE≥1G: Radiated Emission above 1GHz APCM: Antenna Port Conducted Measurement

Radiated Emission Test (Below 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Technology	Modulation Type	EUT configure mode
0 to 49	0, 24, 49	FHSS	DSB-ASK(MRM)	A
0 to 49	0, 24, 49	FHSS	PR-ASK(XRM)	A

Radiated Emission Test (Above 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Technology	Modulation Type	EUT configure mode
0 to 49	0, 24, 49	FHSS	DSB-ASK(MRM)	A
0 to 49	0, 24, 49	FHSS	PR-ASK(XRM)	A

Conducted Out-Band Emission Measurement:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Technology	Modulation Type	EUT configure mode
0 to 49	0, 49	FHSS	DSB-ASK(MRM)	A
0 to 49	0, 49	FHSS	PR-ASK(XRM)	A

Antenna Port Conducted Measurement:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Technology	Modulation Type	EUT configure mode
0 to 49	0, 24, 49	FHSS	DSB-ASK(MRM)	A
0 to 49	0, 24, 49	FHSS	PR-ASK(XRM)	A

3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

47 CFR Part 15, Subpart C. (15.247)
ANSI C63.4 : 2003

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

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

3.5 DESCRIPTION OF SUPPORT UNITS

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

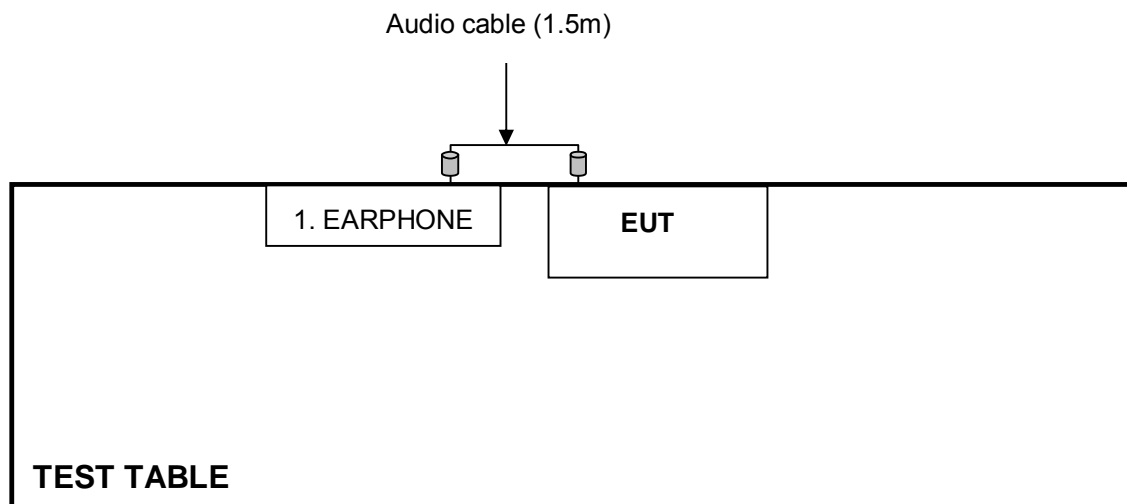
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	EARPHONE	VXI	A380800253	50-11300-050R	NA

No.	Signal cable description
1	Audio Cable, 1.5m with two cores.

Note: 1. All power cords of the above support units are unshielded (1.8m).

3.6 CONFIGURATION OF SYSTEM UNDER TEST

For Scanner Stand-alone Mode:





4 TEST PROCEDURES AND RESULTS

4.1 NUMBER OF HOPPING FREQUENCY USED

4.1.1 LIMIT OF HOPPING FREQUENCY USED

At least 50 hopping frequencies, and should be equally spaced.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 03, 2009	Aug. 02, 2010

NOTE:

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

4.1.3 TEST PROCEDURES

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



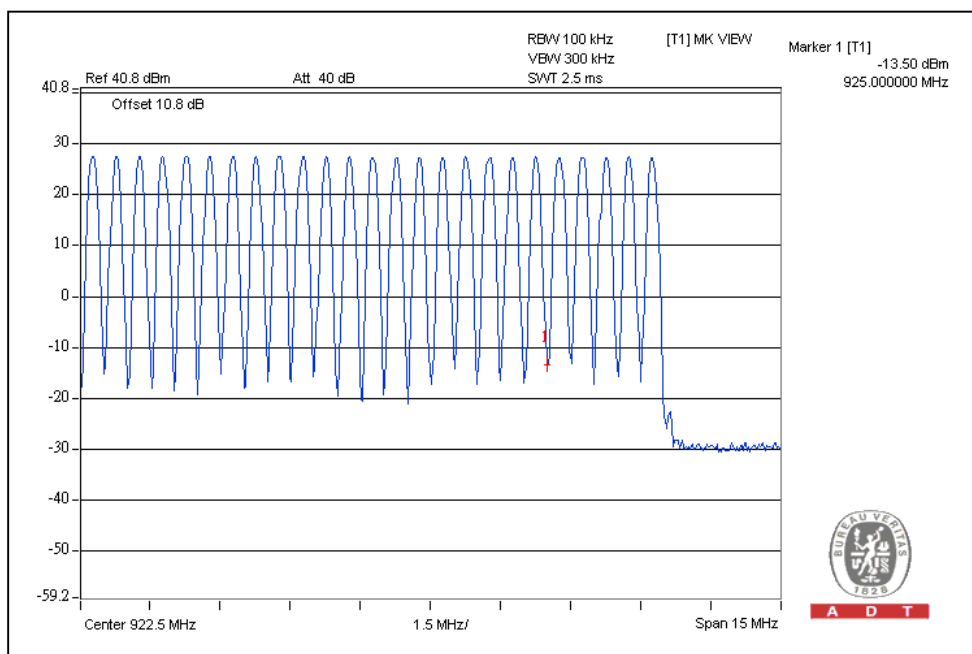
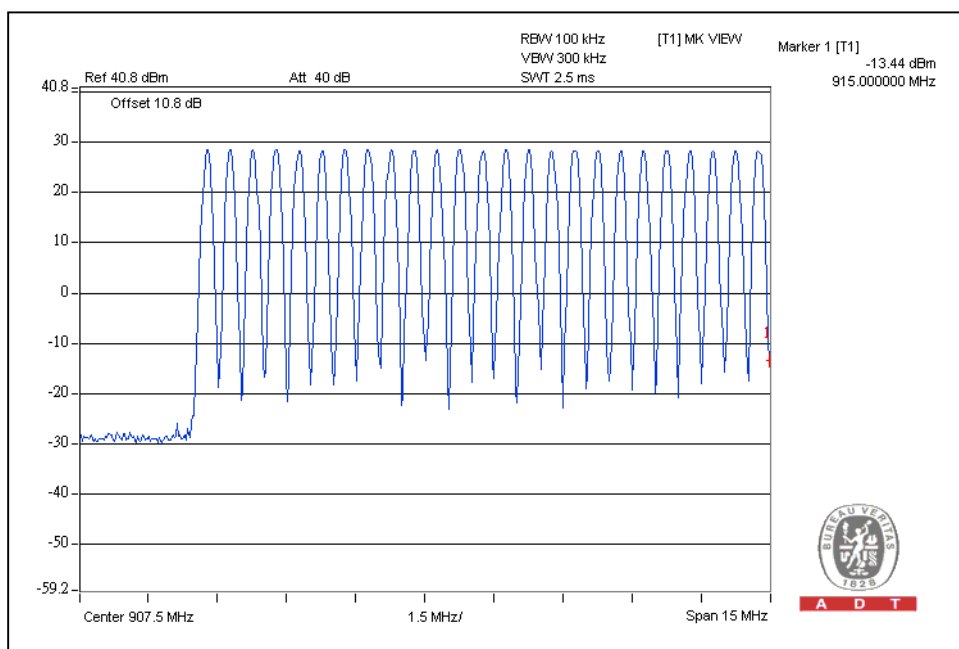
4.1.6 TEST RESULTS

There are 50 hopping frequencies in the hopping mode. Please refer to following pages for the test result. On the plots, it shows that the hopping frequencies are equally spaced.



A D T

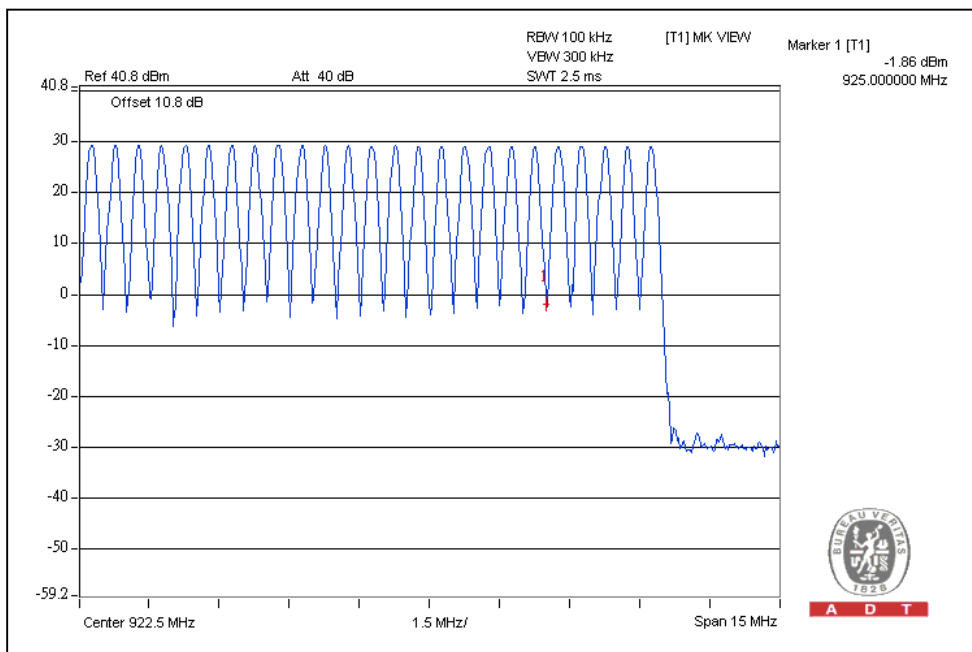
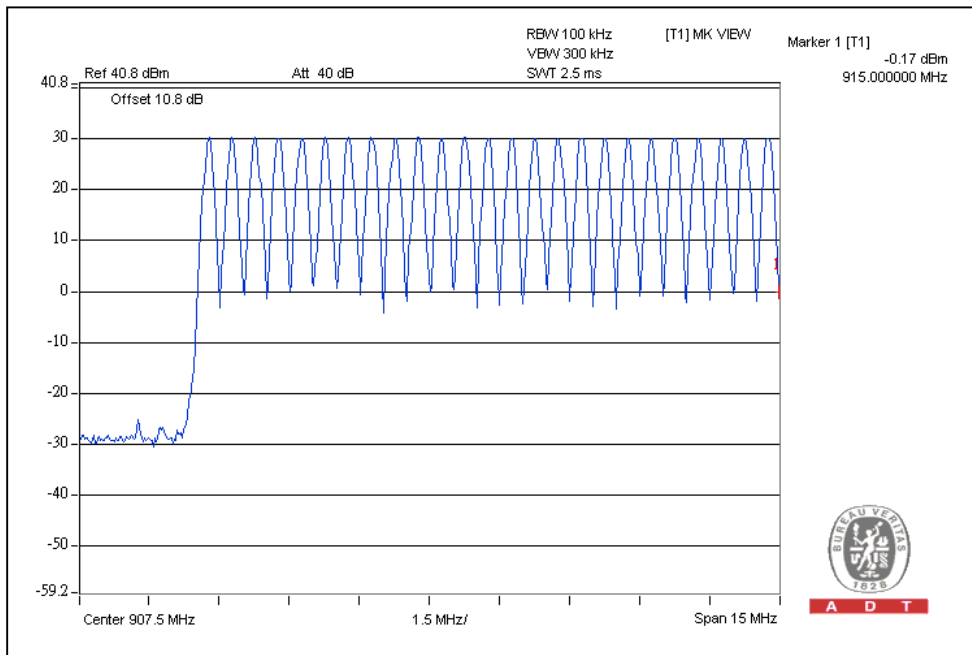
For PR-ASK(DRM):





A D T

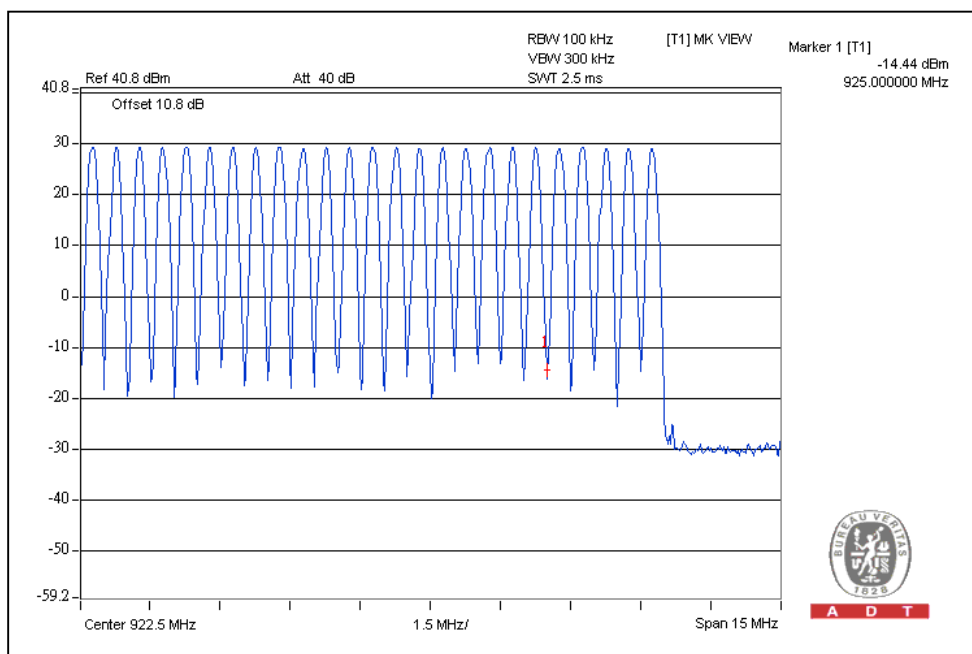
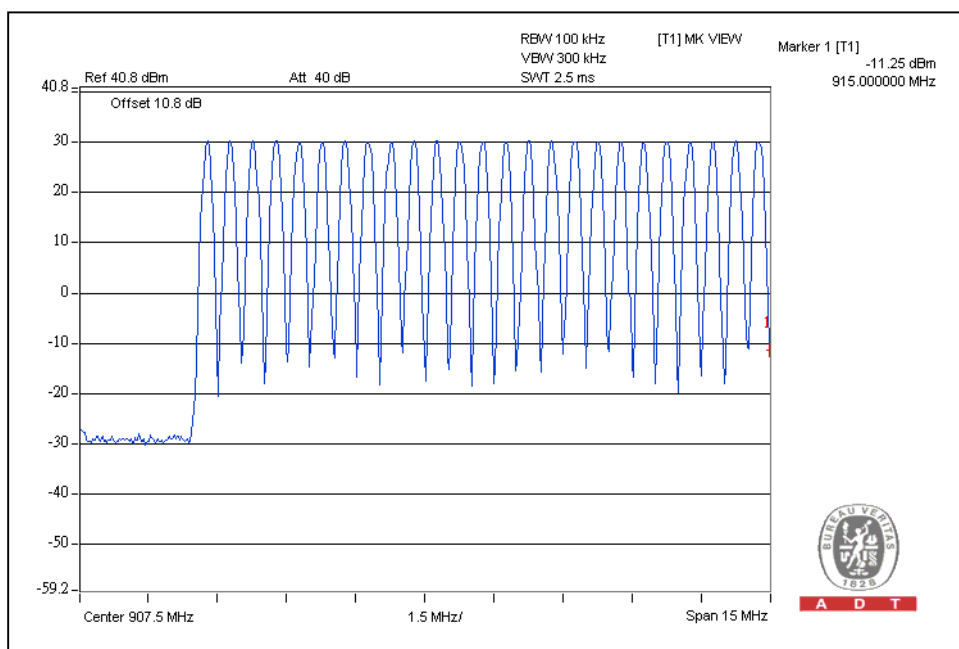
For DSB-ASK(MRM):





A D T

For PR-ASK(XRM):



4.2 DWELL TIME ON EACH CHANNEL

4.2.1 LIMIT OF DWELL TIME USED

For FHSS, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period. For hybrid systems, the average time of occupancy on any frequency should not exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 03, 2009	Aug. 02, 2010

NOTE:

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

4.2.3 TEST PROCEDURES

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



4.2.6 TEST RESULTS

For PR-ASK(DRM):

Number of transmission in a 20 s	Length of transmission time (msec)	Result (msec)	Limit (msec)
1.8 times	124	223	400

For DSB-ASK(MRM):

Number of transmission in a 20 s	Length of transmission time (msec)	Result (msec)	Limit (msec)
2.2 times	100	220	400

For PR-ASK(XRM):

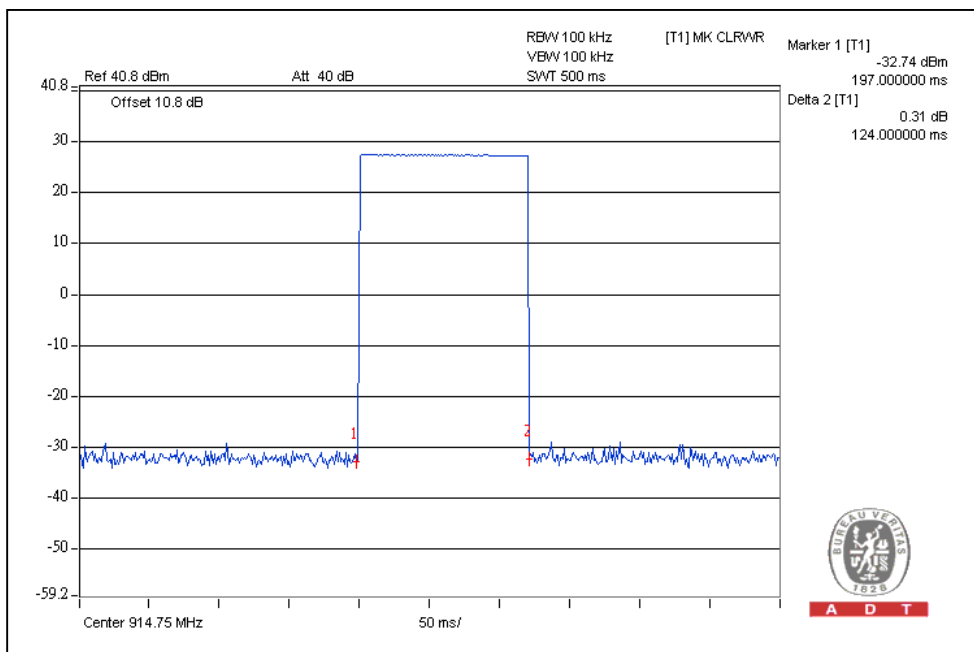
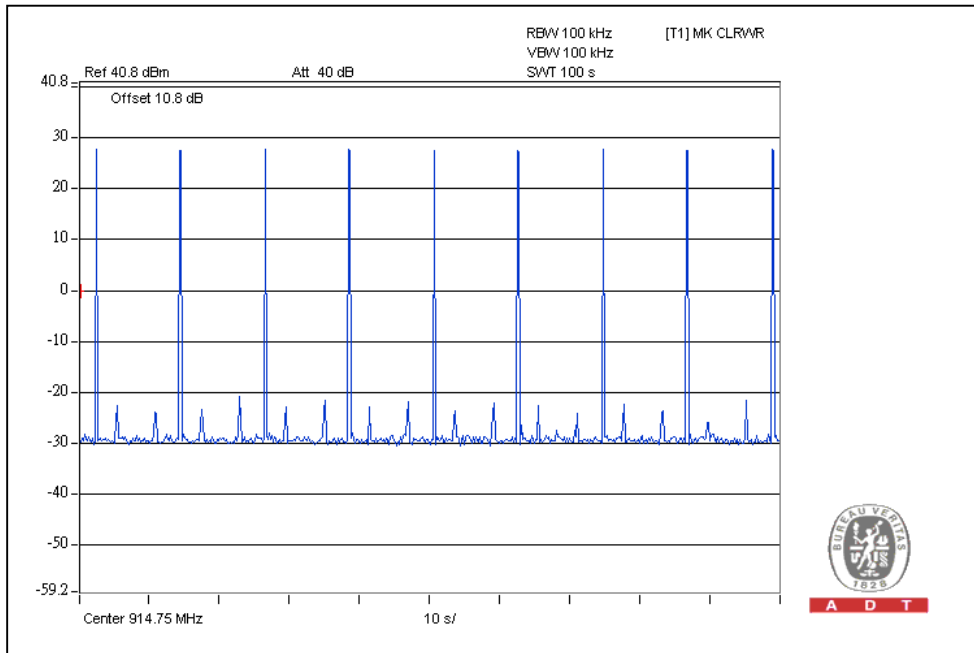
Number of transmission in a 20 s	Length of transmission time (msec)	Result (msec)	Limit (msec)
1.8 times	124	223	400

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



A D T

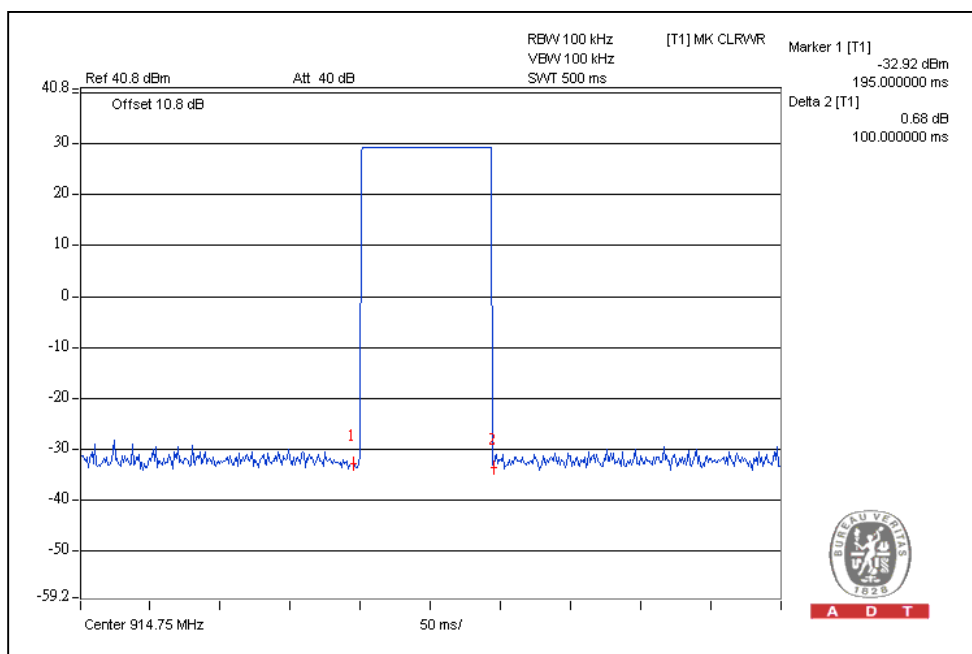
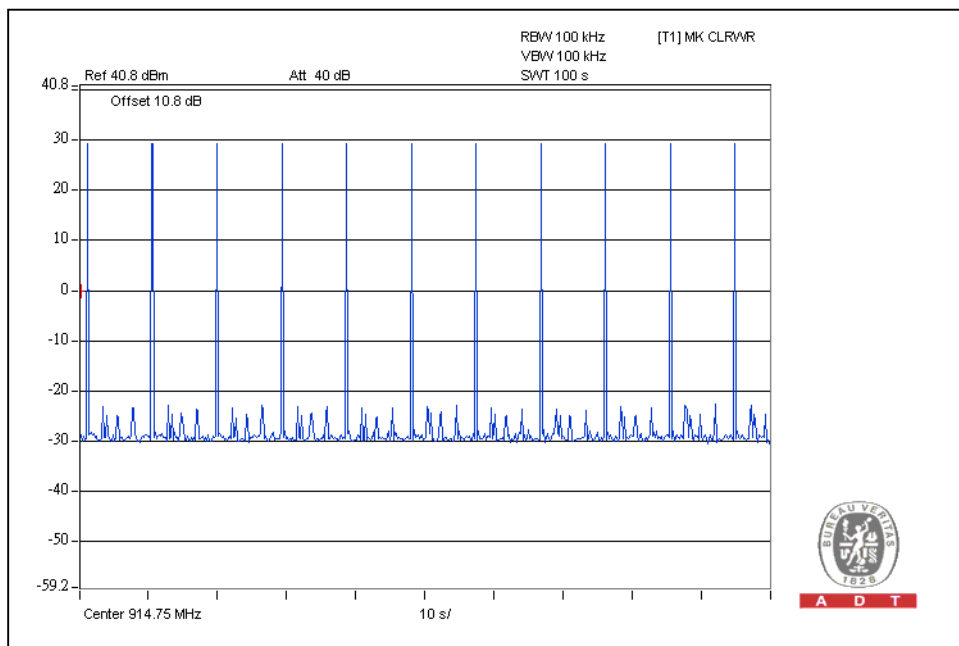
For PR-ASK(DRM):





A D T

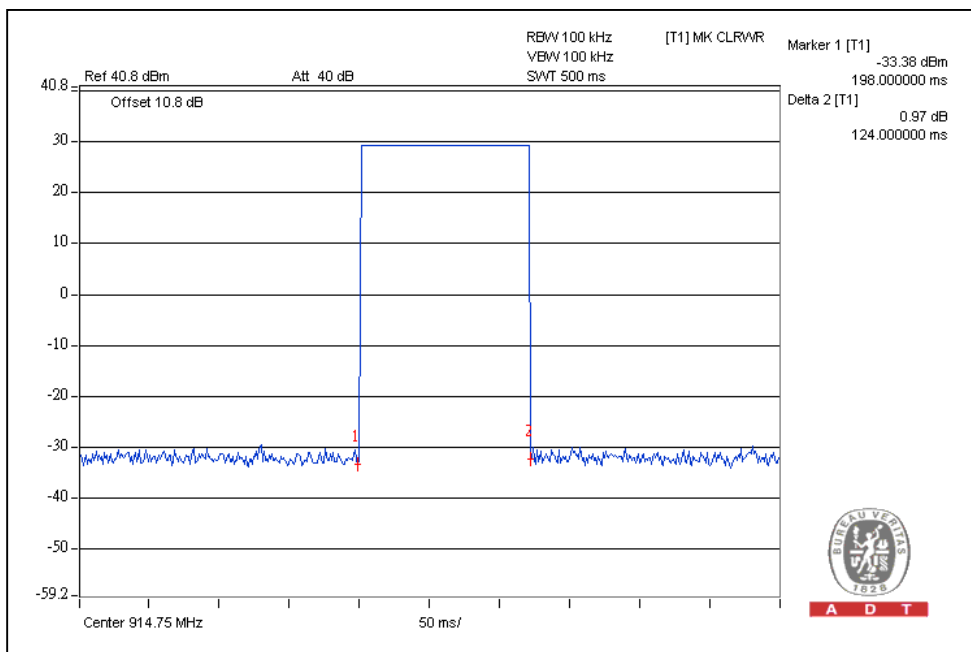
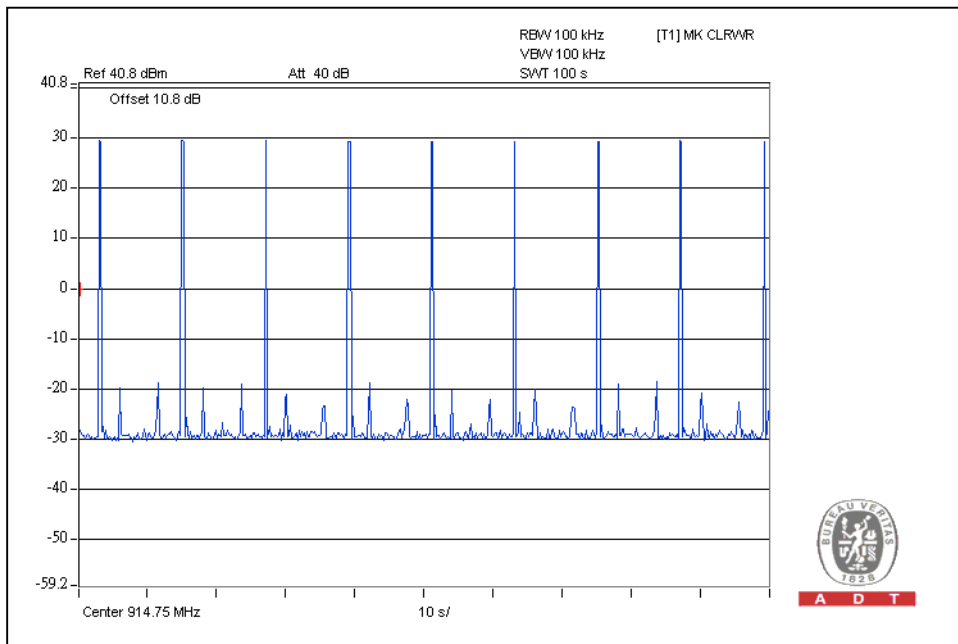
For DSB-ASK(MRM):





A D T

For PR-ASK(XRM):





4.3 CHANNEL BANDWIDTH

For frequency hopping system operating in the 902-928MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz and less than 500kHz, 20dB bandwidth of hopping channel shall be a minimum limit for the hopping channel separation

4.3.1 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 03, 2009	Aug. 02, 2010

NOTE:

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

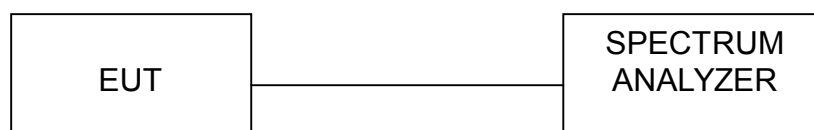
4.3.2 TEST PROCEDURE

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

4.3.3 DEVIATION FROM TEST STANDARD

No deviation

4.3.4 TEST SETUP



4.3.5 EUT OPERATING CONDITION

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



A D T

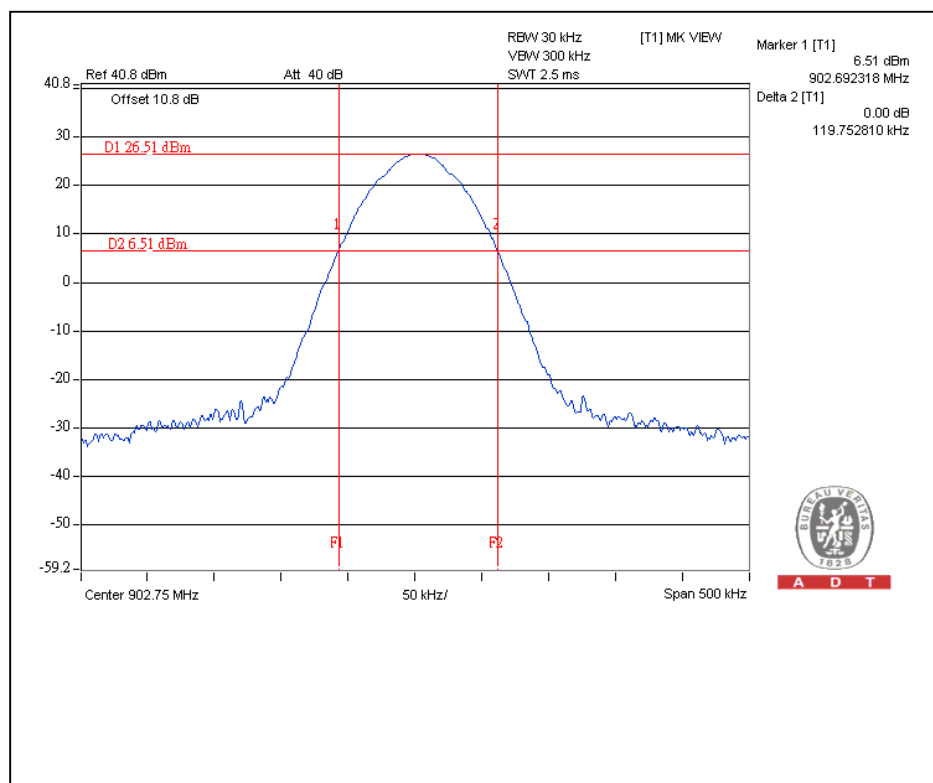
4.3.6 TEST RESULTS

For PR-ASK(DRM):

ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	INPUT POWER	DC 3.7V from battery
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (kHz)
0	902.75	119.8
24	914.75	120.0
49	927.25	119.1

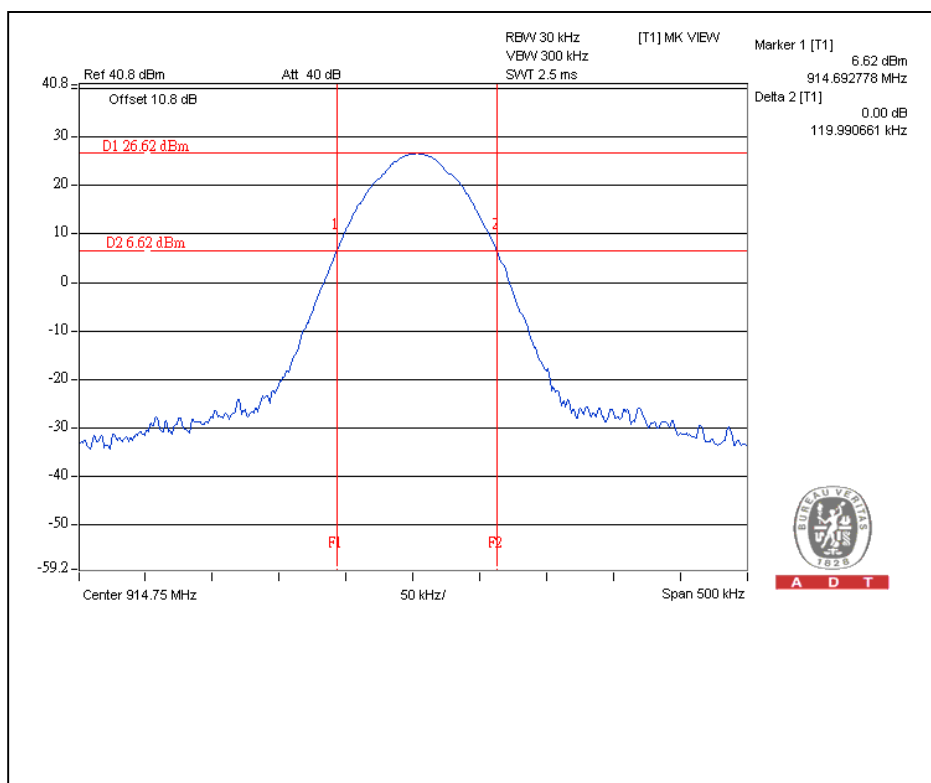
Channel 0



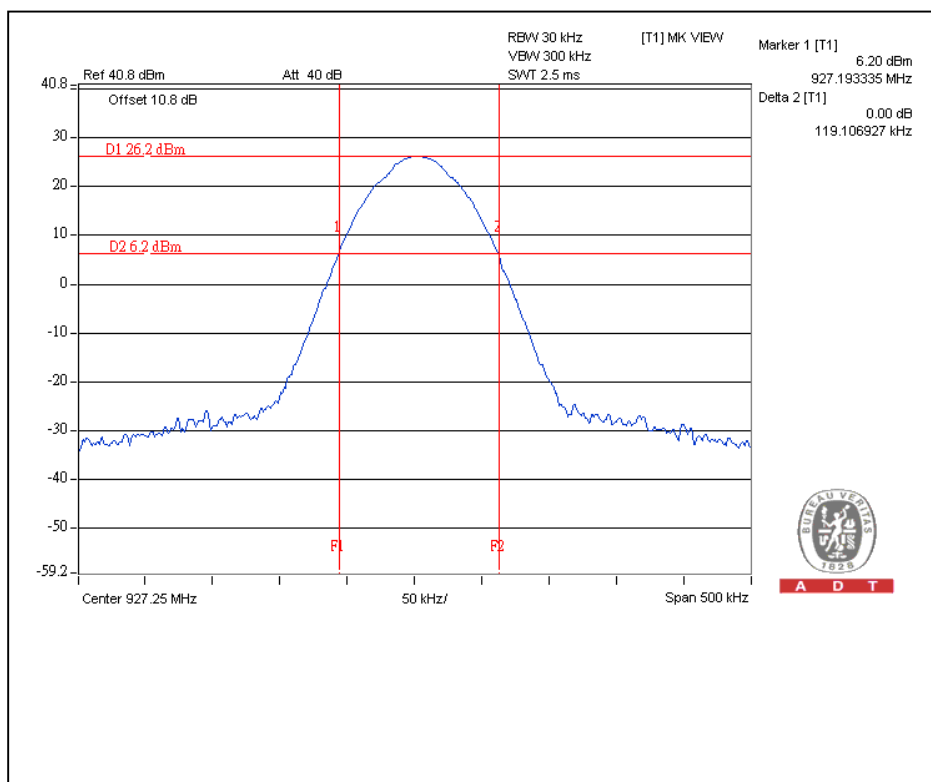


A D T

Channel 24



Channel 49





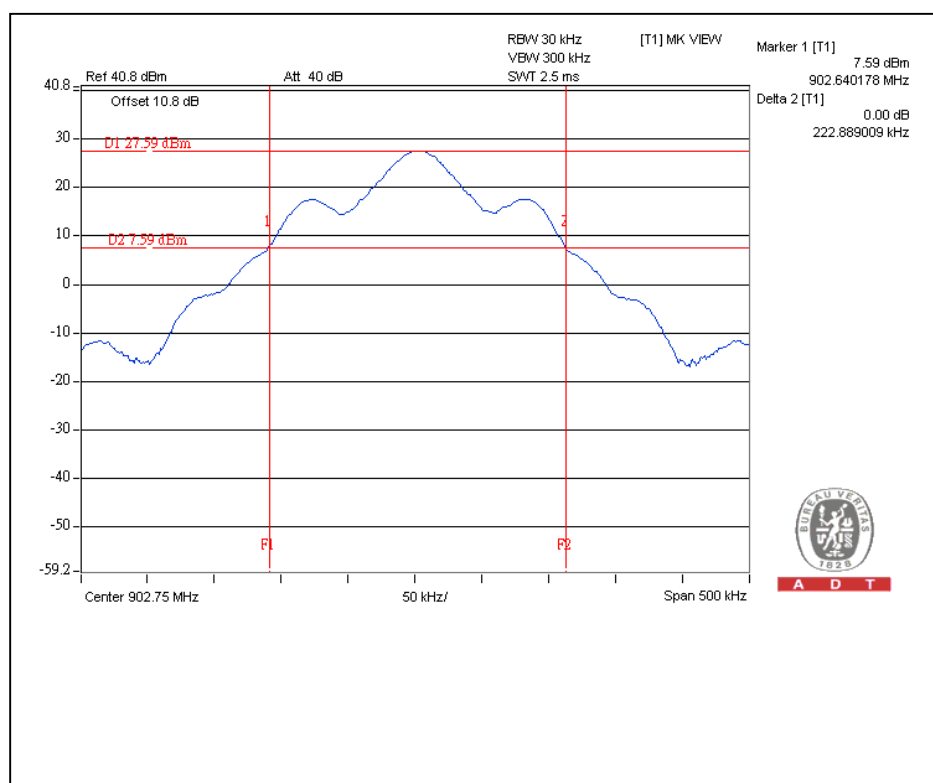
A D T

For DSB-ASK(MRM):

ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	INPUT POWER	DC 3.7V from battery
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (kHz)
0	902.75	222.9
24	914.75	223.2
49	927.25	222.1

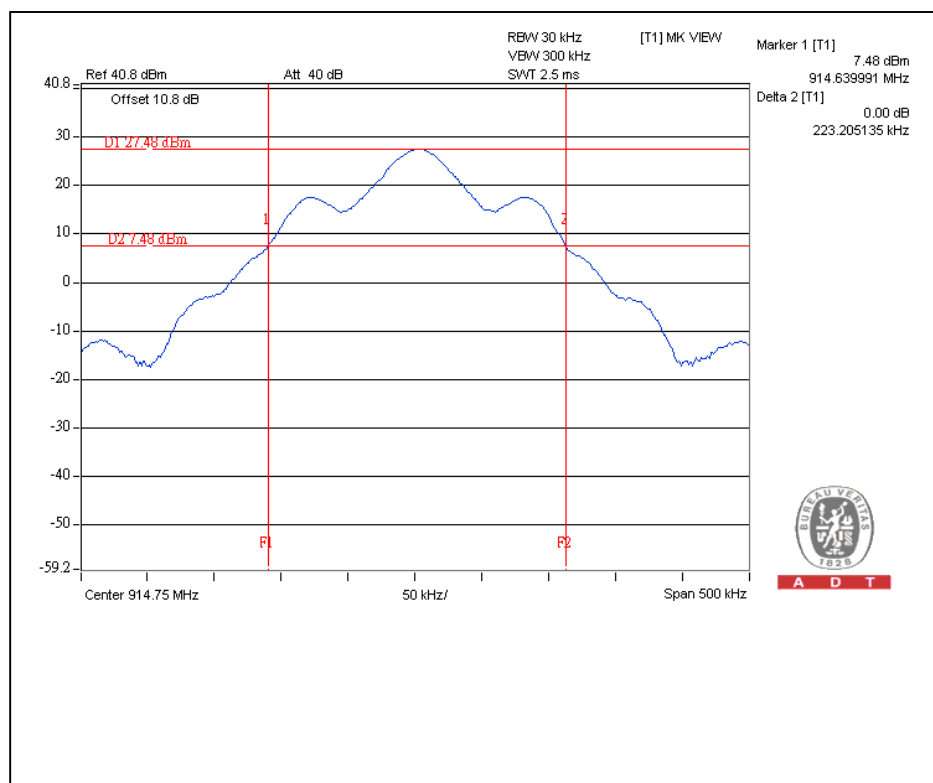
Channel 0



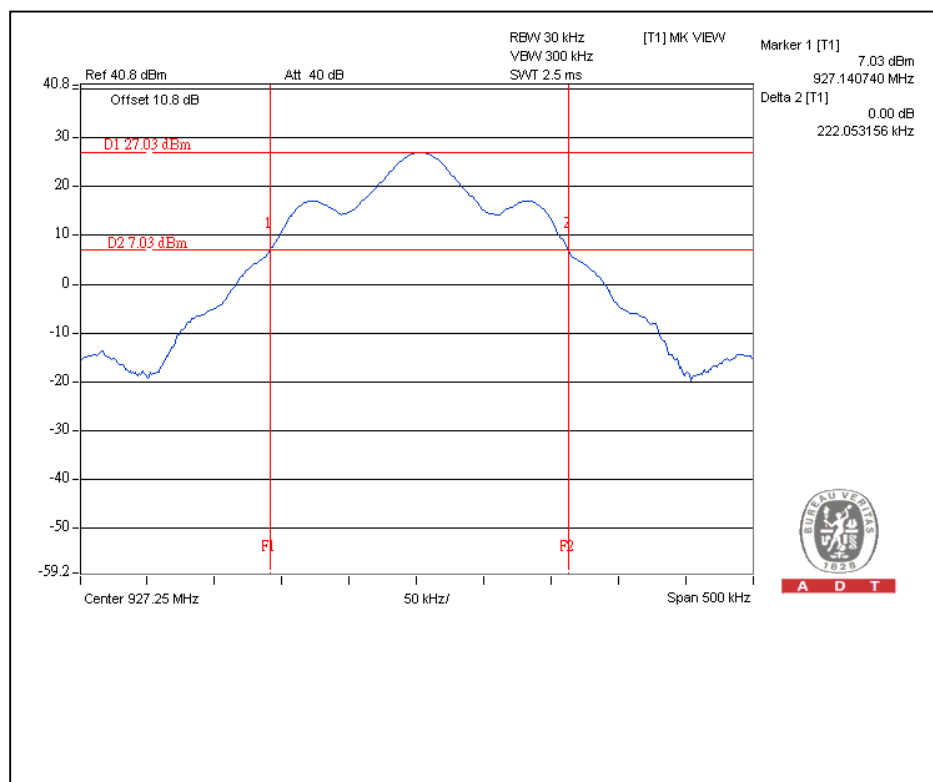


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Channel 24



Channel 49





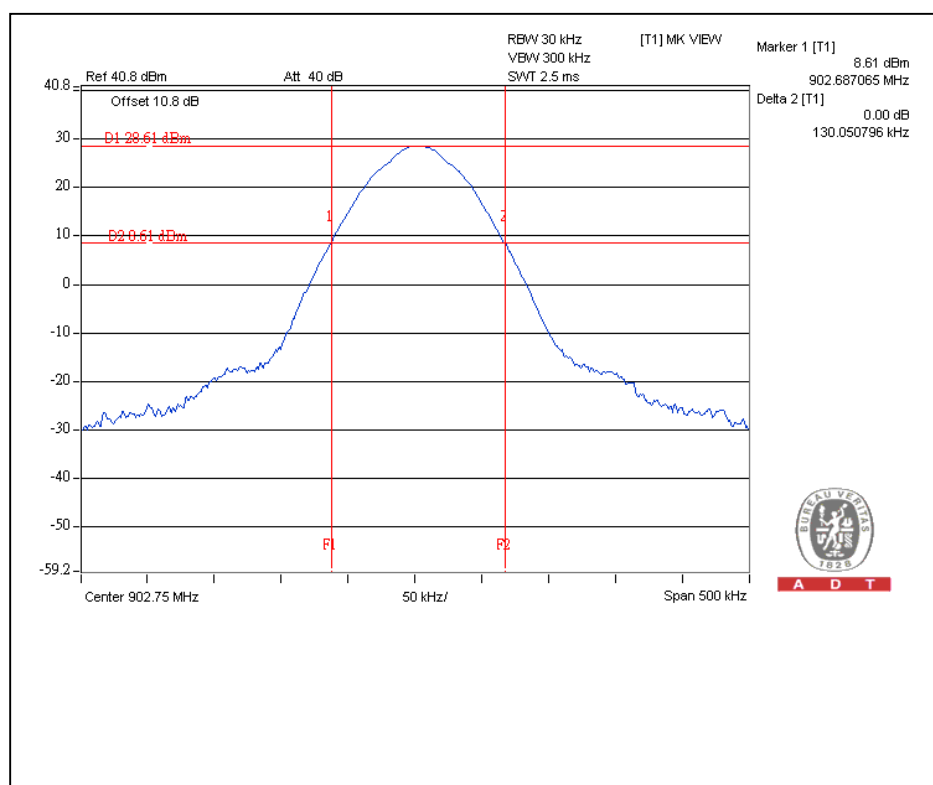
A D T

For PR-ASK(XRM):

ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	INPUT POWER	DC 3.7V from battery
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (kHz)
0	902.75	130.1
24	914.75	127.2
49	927.25	124.3

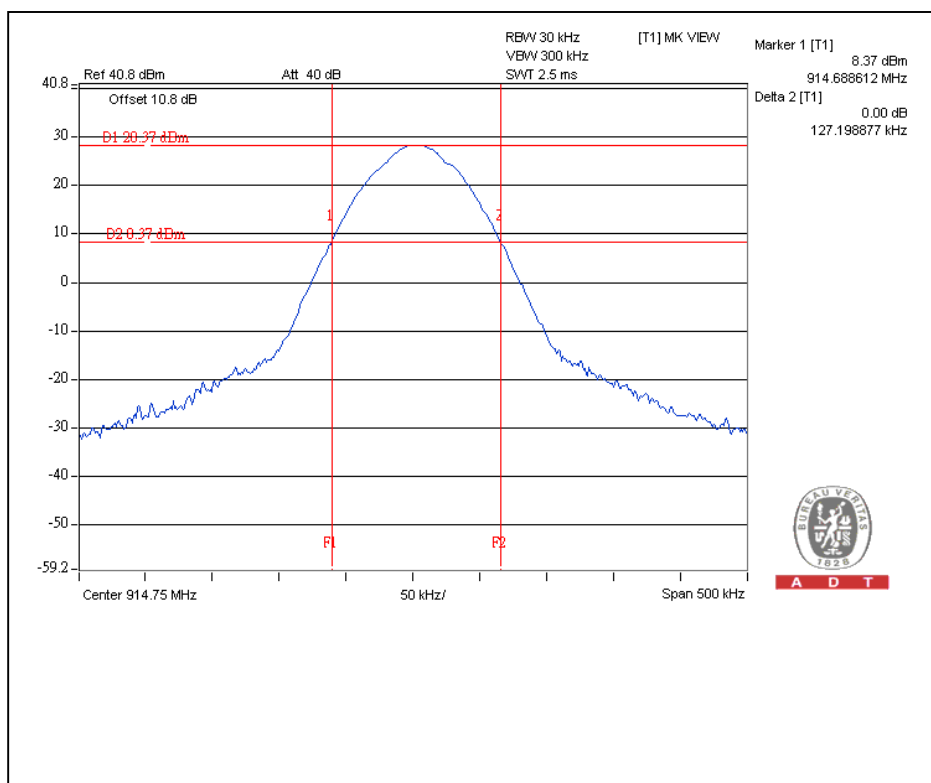
Channel 0



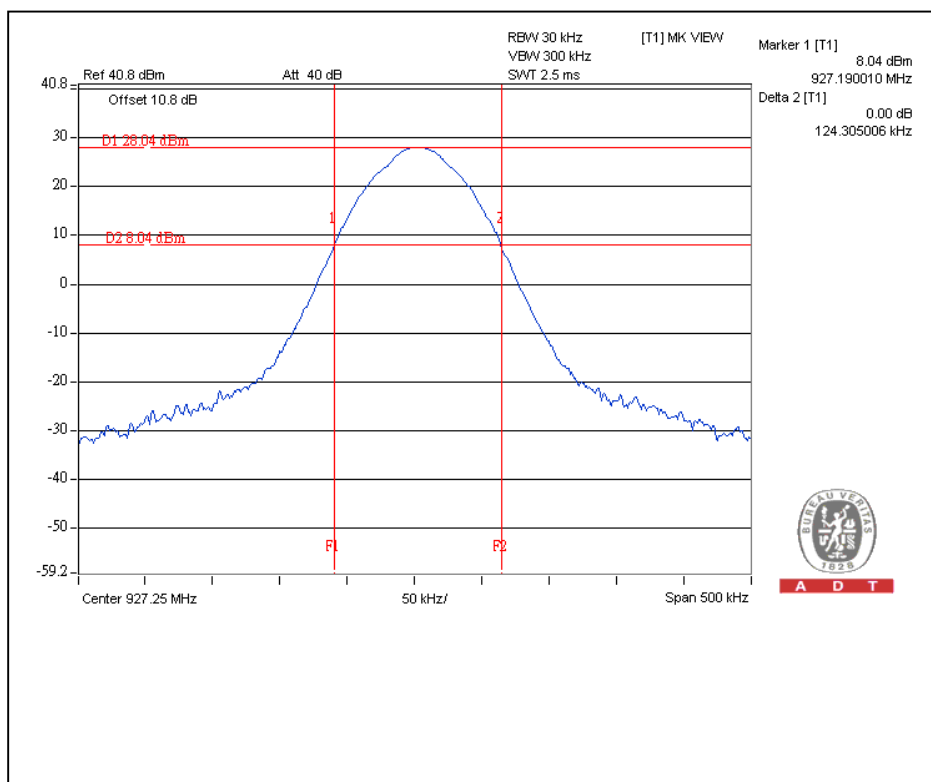


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Channel 24



Channel 49



4.4 HOPPING CHANNEL SEPARATION

4.4.1 LIMIT OF HOPPING CHANNEL SEPARATION

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

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 03, 2009	Aug. 02, 2010

NOTE:

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

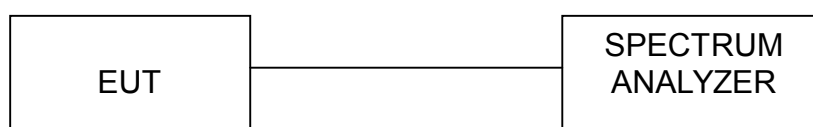
4.4.3 TEST PROCEDURES

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.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 TEST RESULTS

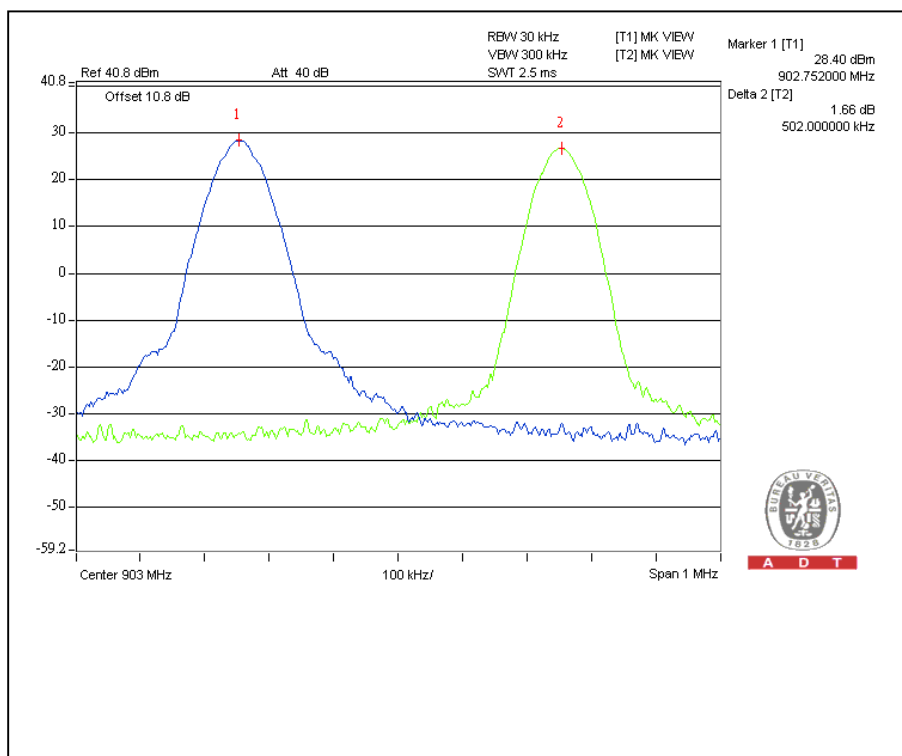
For PR-ASK(DRM):

ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	INPUT POWER	DC 3.7V from battery
TESTED BY	Rex Huang		

Channel	Frequency (MHz)	Adjacent Channel Separation	Minimum Limit (kHz)	Pass / Fail
0	902.75	502kHz	119.8	PASS
24	914.75	508kHz	120.0	PASS
49	927.25	502kHz	119.1	PASS

The minimum limit is 20dB bandwidth. Test results please refer to below.

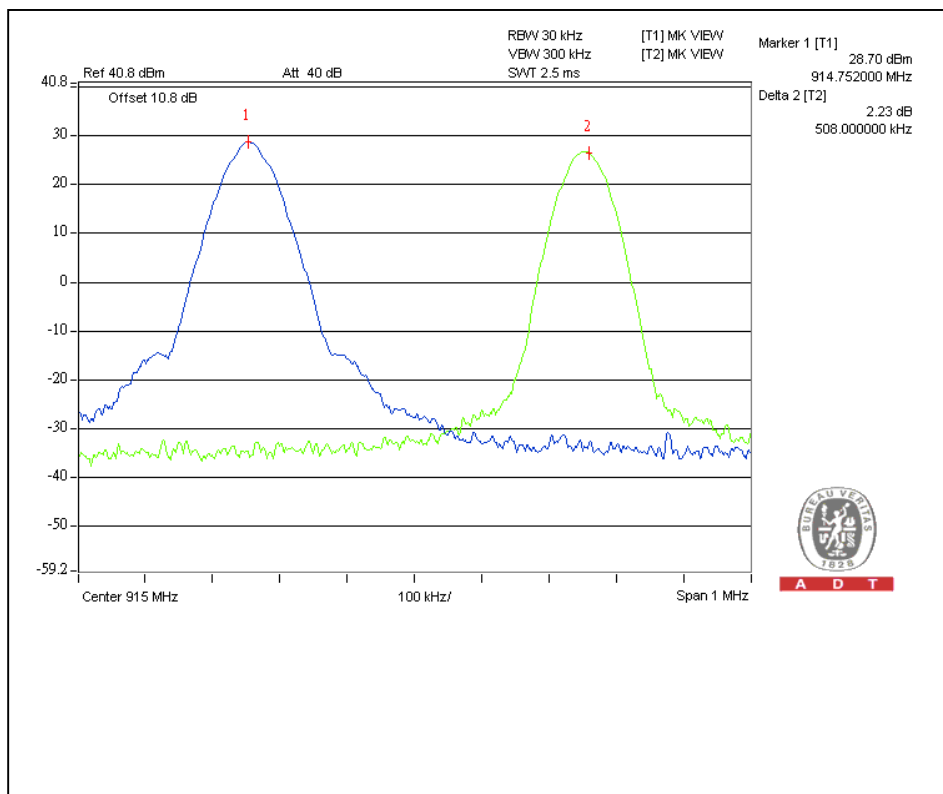
Channel 0



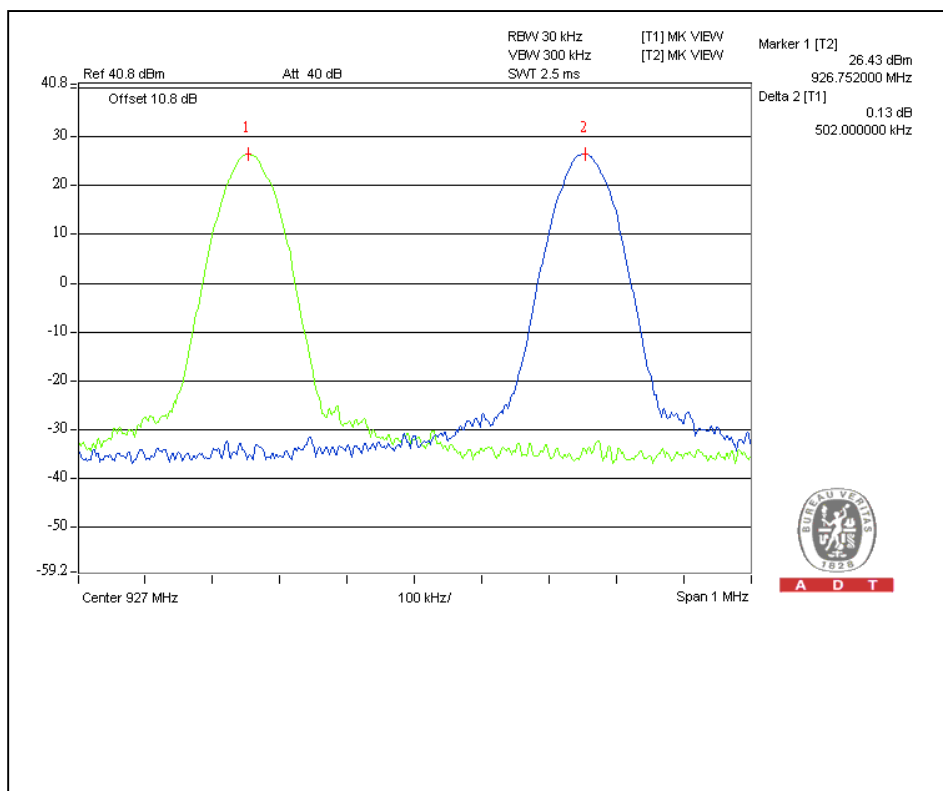


A D T

Channel 24



Channel 49



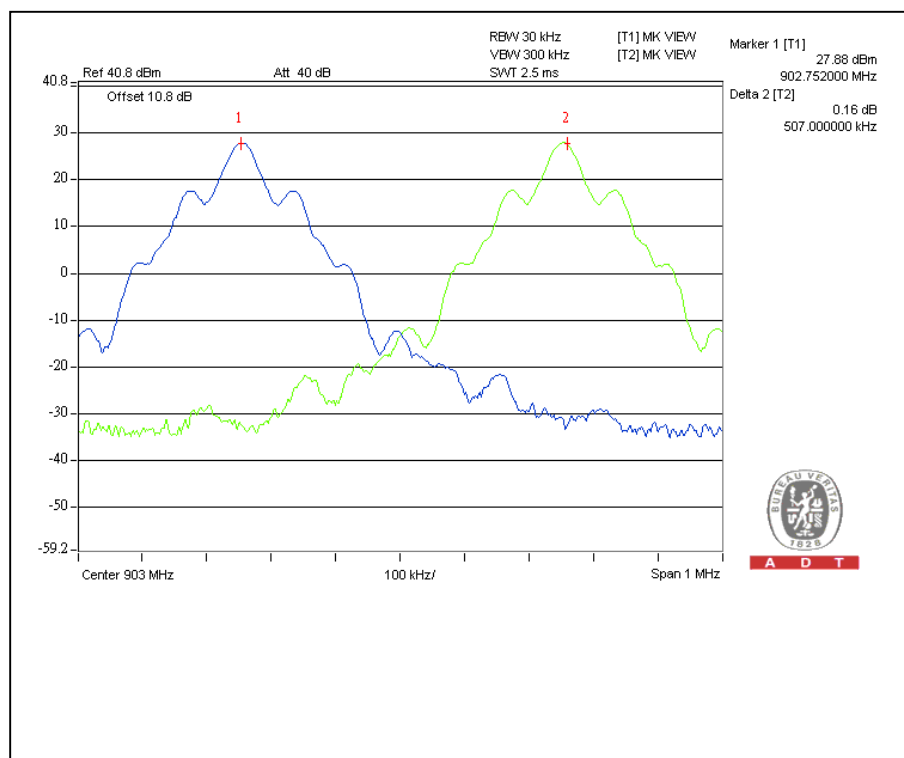
For DSB-ASK(MRM):

ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	INPUT POWER	DC 3.7V from battery
TESTED BY	Rex Huang		

Channel	Frequency (MHz)	Adjacent Channel Separation	Minimum Limit (kHz)	Pass / Fail
0	902.75	507kHz	222.9	PASS
24	914.75	501kHz	223.2	PASS
49	927.25	507kHz	222.1	PASS

The minimum limit is 20dB bandwidth. Test results please refer to below.

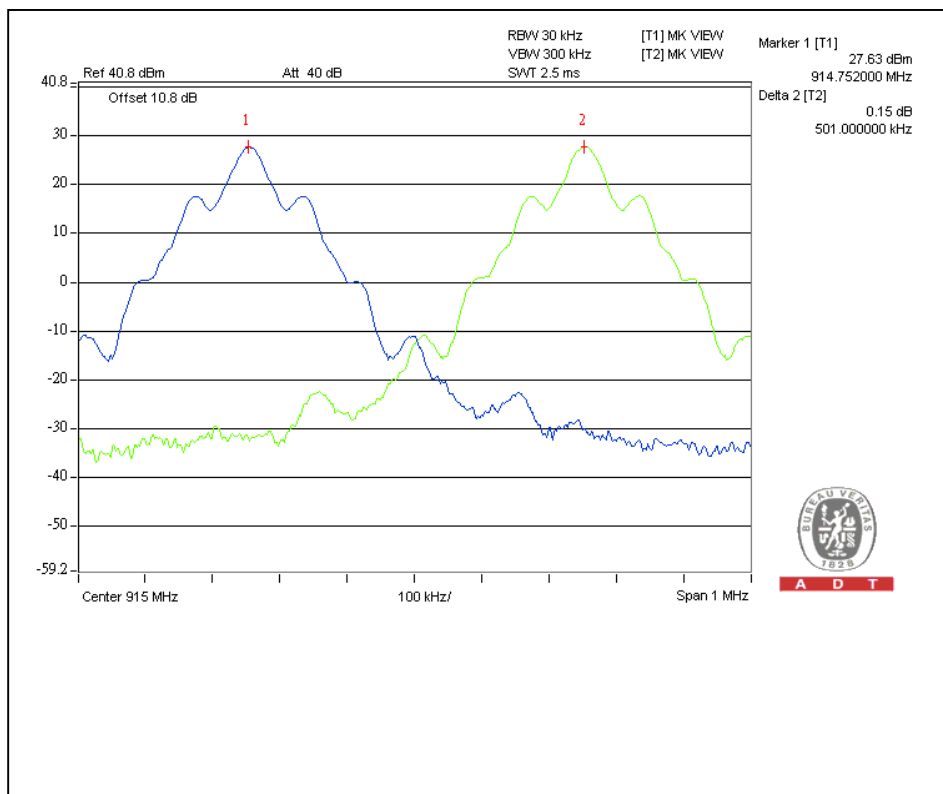
Channel 0



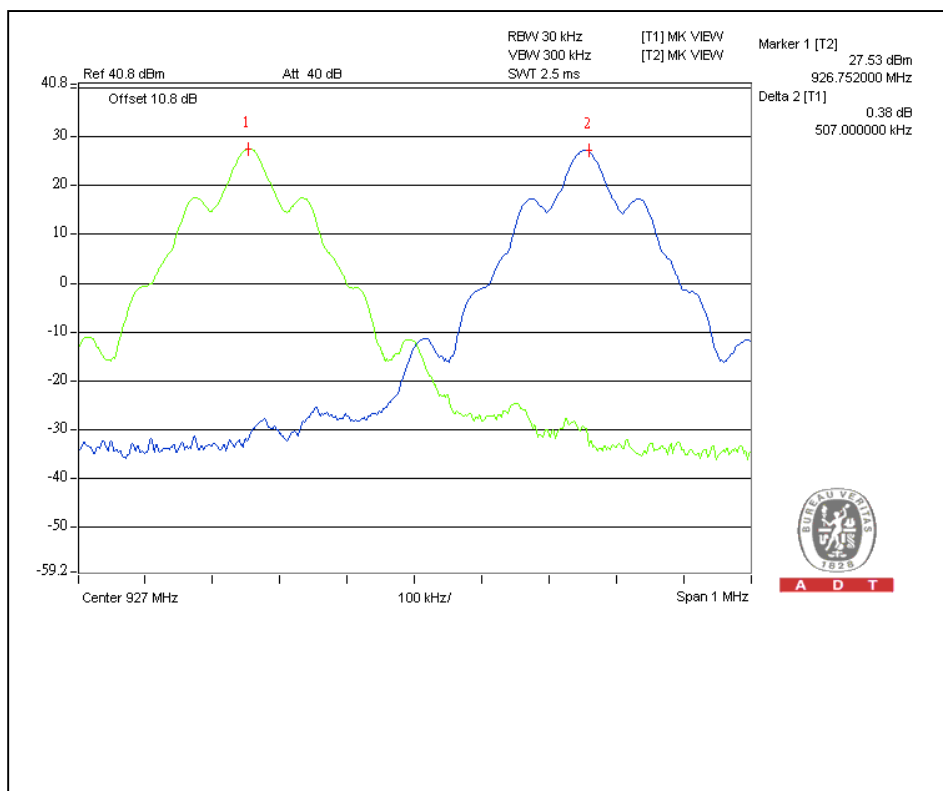


A D T

Channel 24



Channel 49



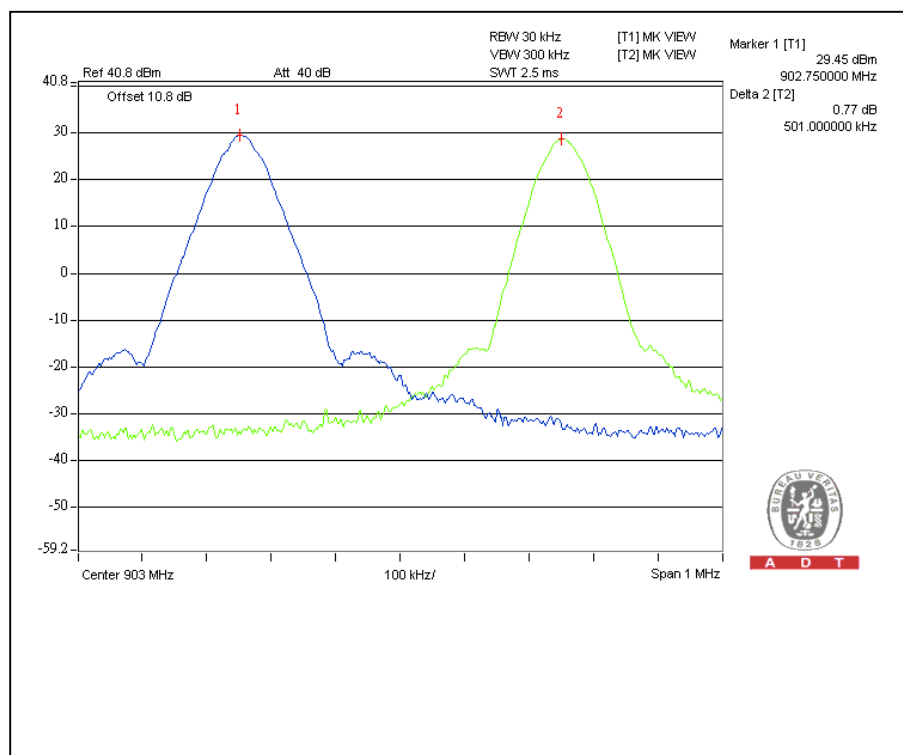
For PR-ASK(XRM):

ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	INPUT POWER	DC 3.7V from battery
TESTED BY	Rex Huang		

Channel	Frequency (MHz)	Adjacent Channel Separation	Minimum Limit (kHz)	Pass / Fail
0	902.75	501kHz	130.1	PASS
24	914.75	503kHz	127.2	PASS
49	927.25	500kHz	124.3	PASS

The minimum limit is 20dB bandwidth. Test results please refer to below.

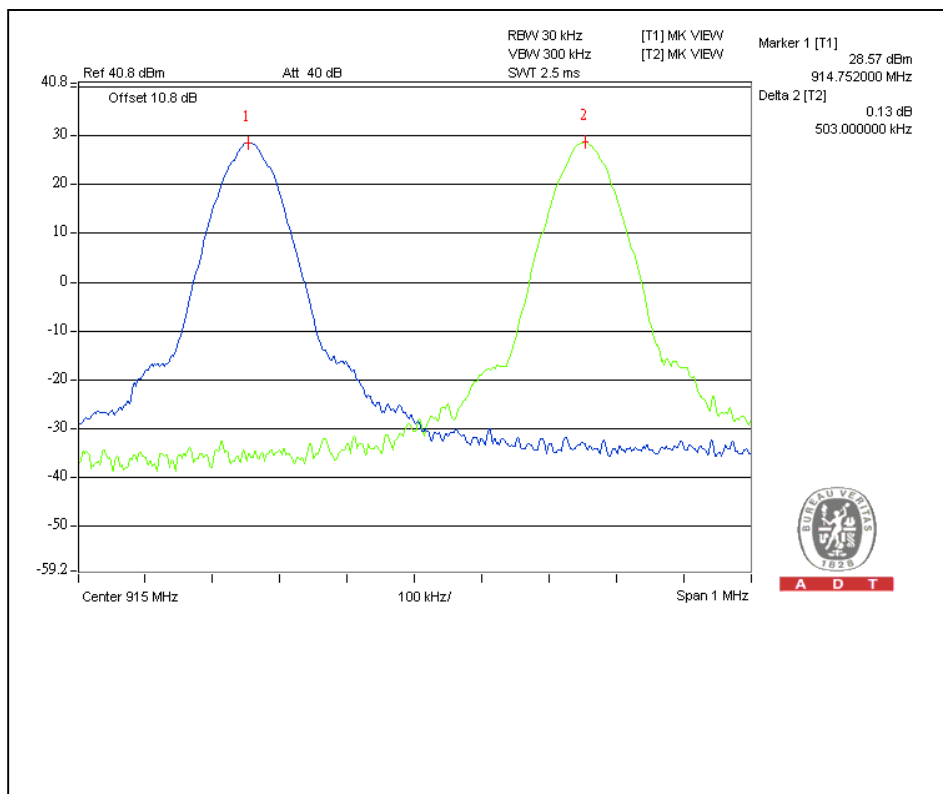
Channel 0



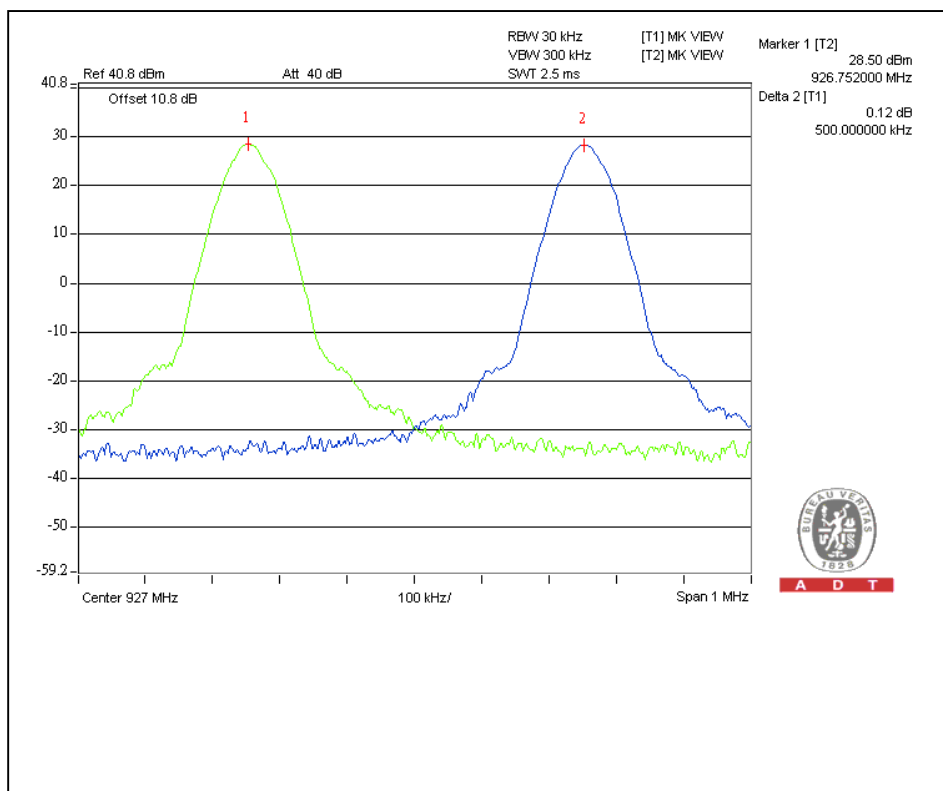


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Channel 24



Channel 49





4.5 MAXIMUM PEAK OUTPUT POWER

4.5.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.5.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 03, 2009	Aug. 02, 2010

NOTE:

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

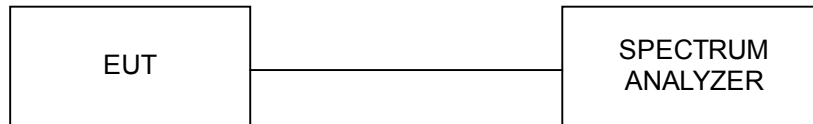
4.5.3 TEST PROCEDURES

1. A detector was used on the output port of the EUT. An oscilloscope was used to read the response of the detector.
2. Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same reading on oscilloscope. Record the power level.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



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

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.

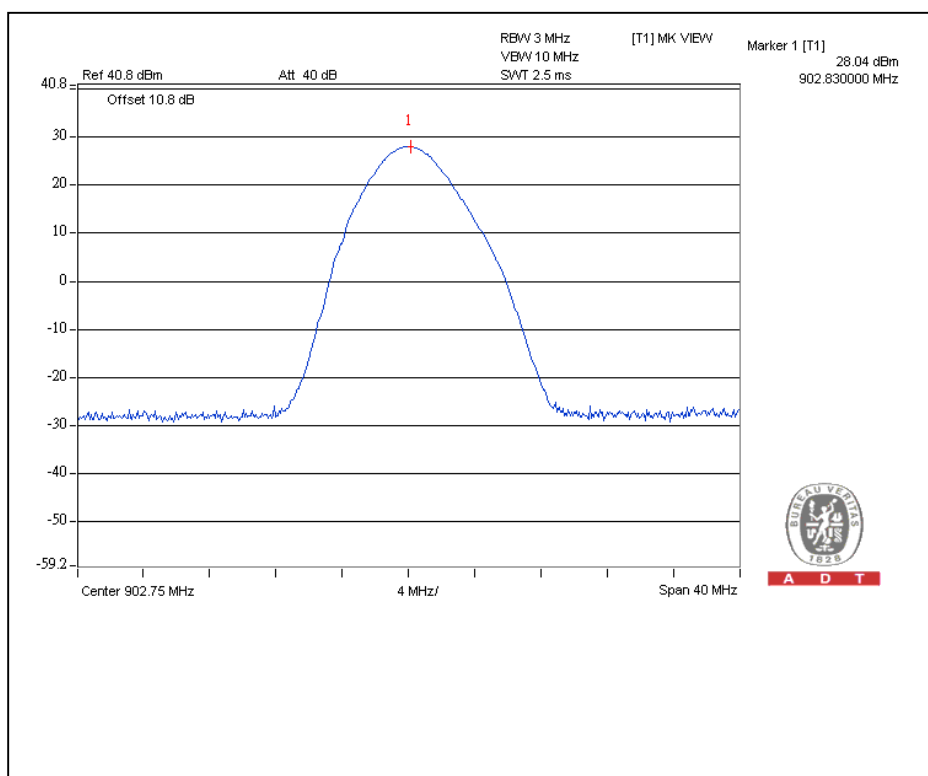
4.5.7 TEST RESULTS

For PR-ASK(DRM):

ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	INPUT POWER	DC 3.7V from battery
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	902.75	631.0	28.0	30	PASS
24	914.75	660.7	28.2	30	PASS
49	927.25	602.6	27.8	30	PASS

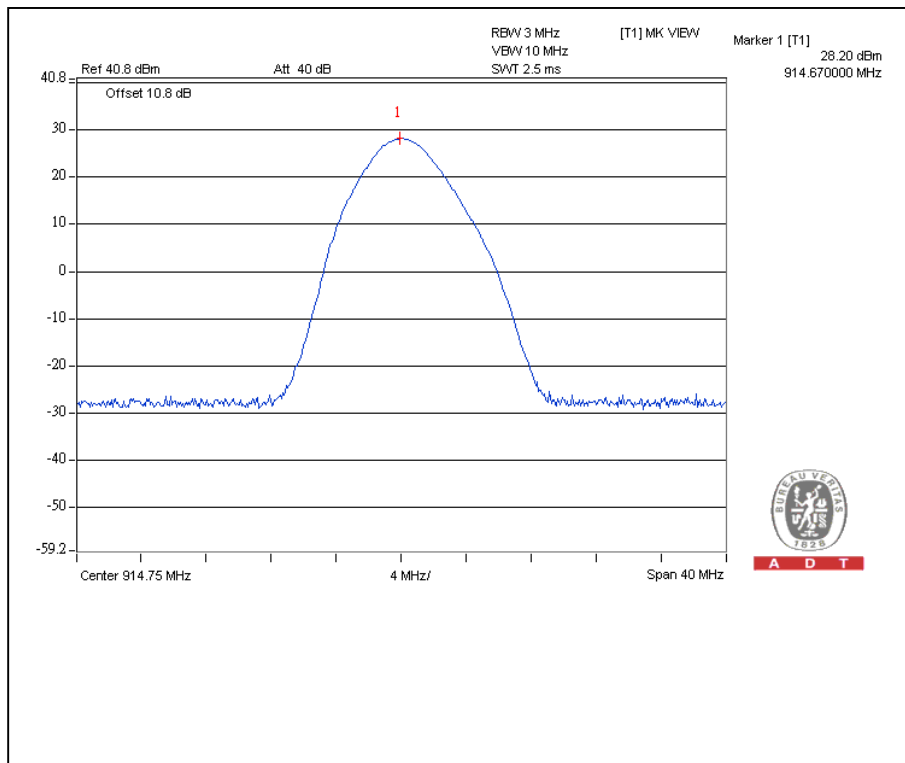
Channel 0



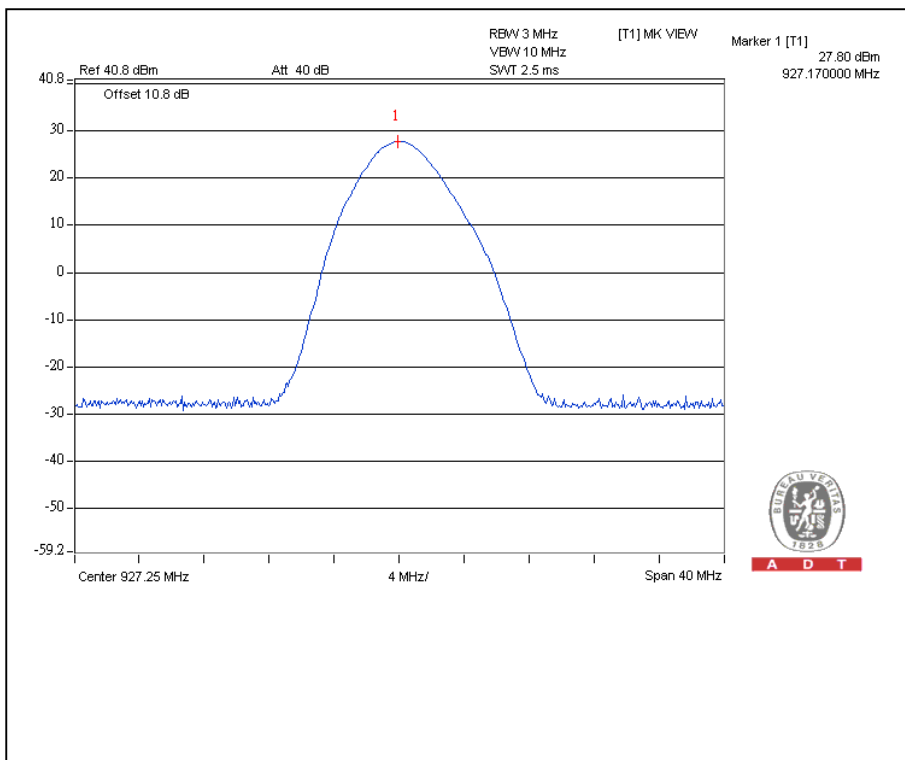


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Channel 24



Channel 49





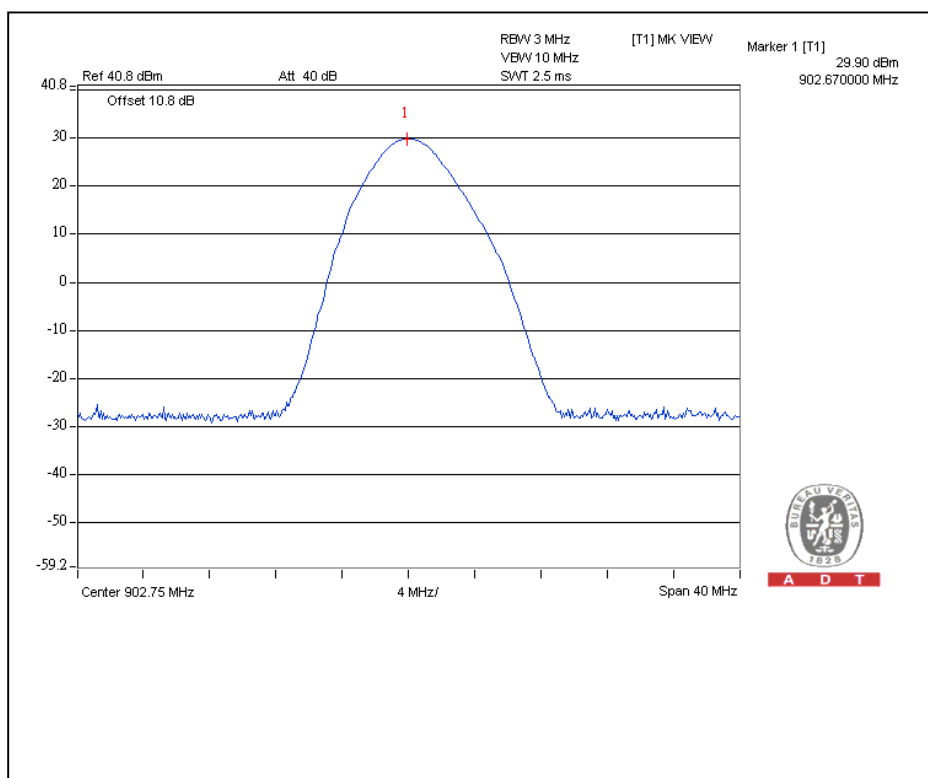
A D T

For DSB-ASK(MRM):

ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	INPUT POWER	DC 3.7V from battery
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	902.75	977.2	29.9	30	PASS
24	914.75	955.0	29.8	30	PASS
49	927.25	933.3	29.7	30	PASS

Channel 0

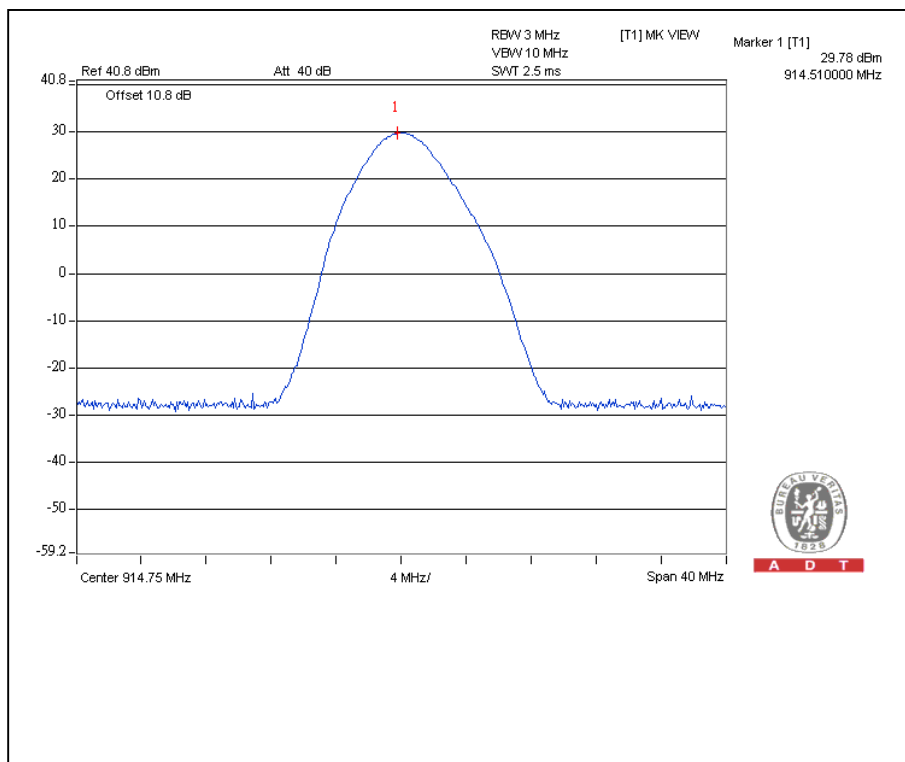


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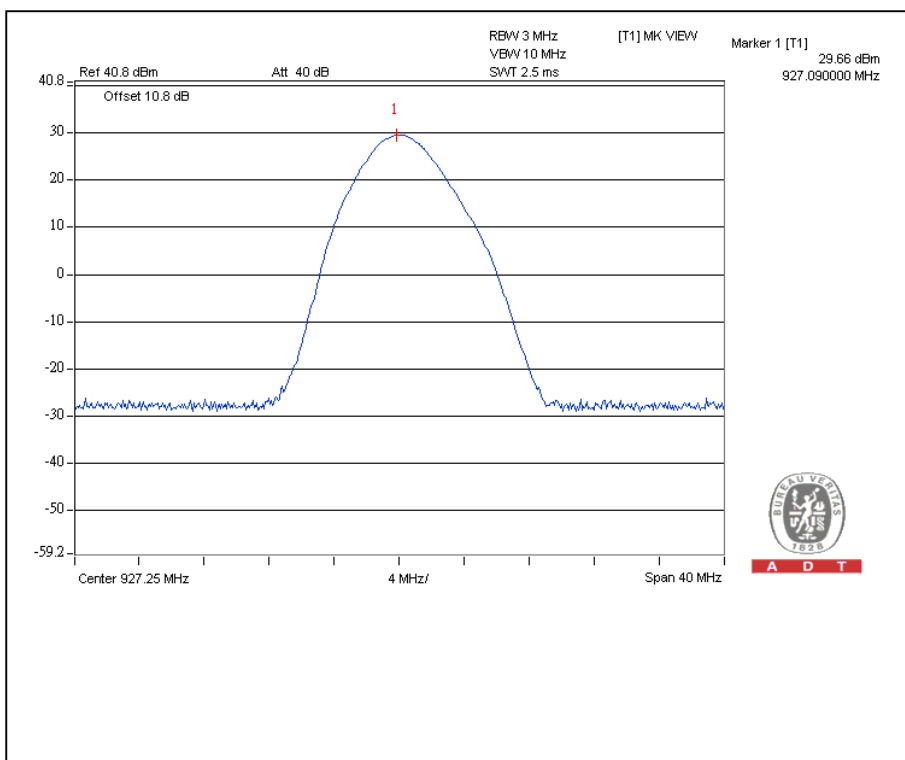


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Channel 24



Channel 49





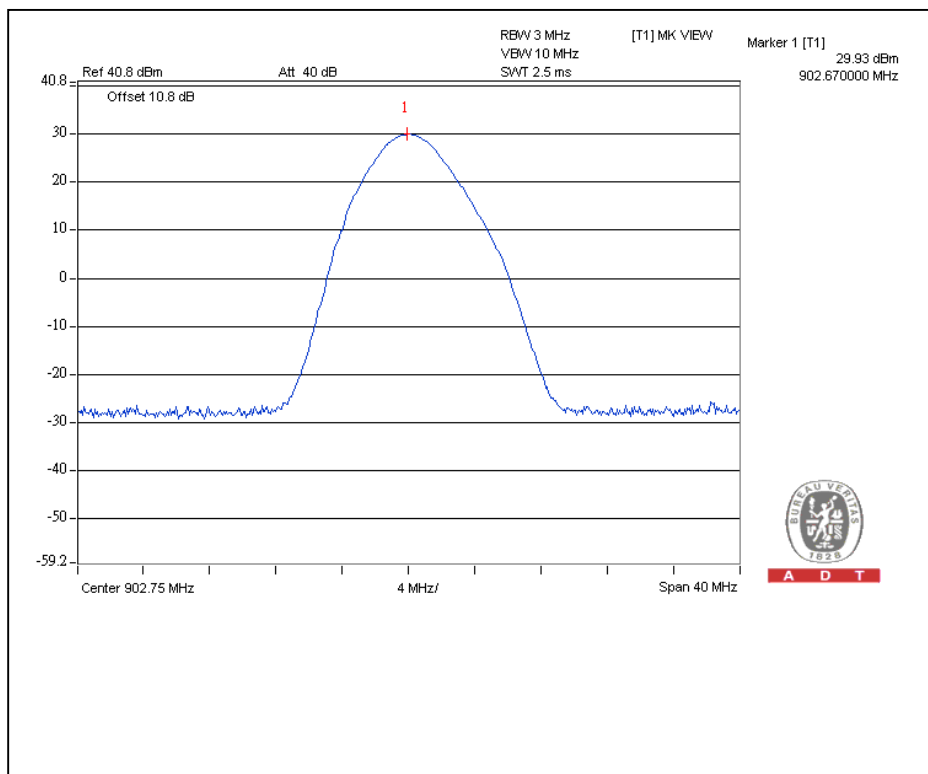
A D T

For PR-ASK(XRM):

ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	INPUT POWER	DC 3.7V from battery
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	902.75	977.2	29.90	30	PASS
24	914.75	977.2	29.90	30	PASS
49	927.25	912.0	29.60	30	PASS

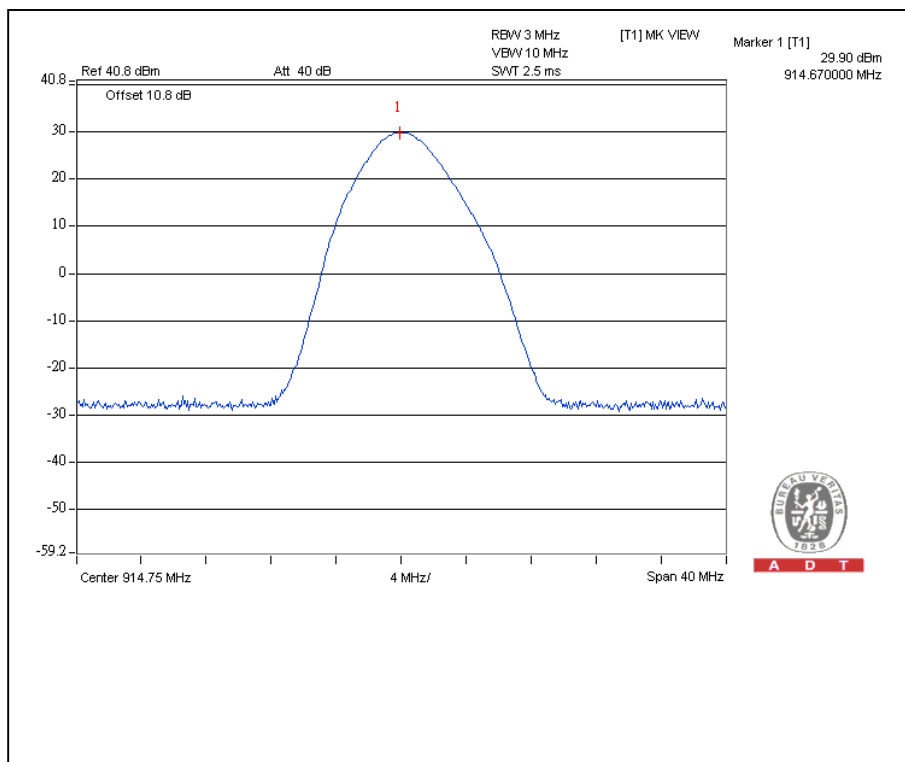
Channel 0



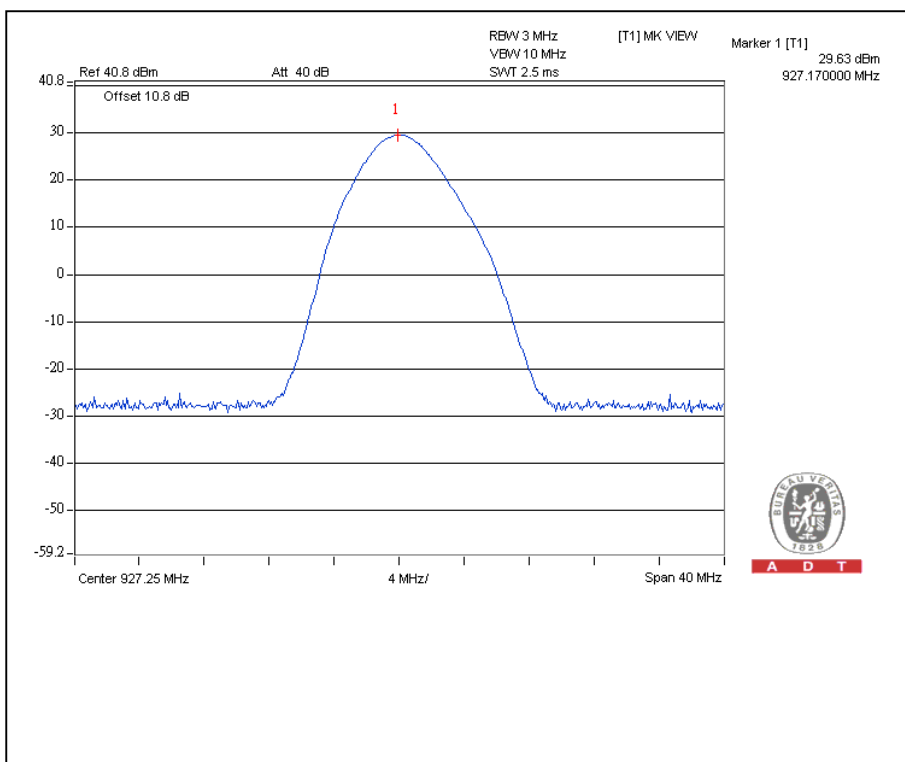


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Channel 24



Channel 49



4.6 RADIATED EMISSION MEASUREMENT

4.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.6.2 TEST INSTRUMENTS

For radiated emission test (Below 1 GHz):

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	U3751	170100022	Nov. 17, 2008	Nov. 16, 2009
ADVANTEST Spectrum Analyzer	U3772	160100280	July 26, 2009	July 25, 2010
HP Pre_Amplifier	8449B	3008A01922	Sep. 25, 2009	Sep. 24, 2010
ROHDE & SCHWARZ Test Receiver	ESCS 30	100027	May 05, 2009	May 04, 2010
SCHWARZBECK Broadband Antenna	VULB-9168	263	April 29, 2009	April 28, 2010
Schwarzbeck Horn_Antenna	BBHA9120	D123	Sep. 21, 2009	Sep. 20, 2010
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 23, 2009	Jan. 22, 2010
RF Switches	EM-H-01-1	1009	Aug. 10, 2009	Aug. 09, 2010
RF Cable	8DFB	STACAB-30M-1GHz-091	Feb. 19, 2009	Feb. 18, 2010
Software	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
CT Antenna Tower & Turn Table	TT100	ADT01	NA	NA
CORCOM AC Filter	MRI2030	107/108	NA	NA

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: U3772) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Open Site No. A.
4. The VCCI Site Registration No. is R-782.
5. The FCC Site Registration No. is 91097.
6. The CANADA Site Registration No. is IC 7450G-1.



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For radiated emission test (Above 1 GHz):

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ Spectrum Analyzer	FSP40	100036	Dec. 09, 2008	Dec. 08, 2009
Agilent PSA Spectrum Analyzer	E4446A	MY46180622	Apr. 24 , 2009	Apr. 23 , 2010
HP Pre_Amplifier	8449B	3008A01923	Nov. 10, 2008	Nov. 09, 2009
ROHDE & SCHWARZ Test Receiver	ESCS30	847124/029	Aug. 28, 2009	Aug. 28, 2010
SCHWARZBECK TRILOG Broadband Antenna	VULB 9168	138	Apr. 29, 2009	Apr. 28, 2010
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 09, 2008	Dec. 08, 2009
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 22, 2009	Jan. 21, 2010
RF Switches	EMH-011	08009	Sep. 26, 2009	Sep. 25, 2010
RF CABLE (Chaintek)	Sucoflex 106	28077	Aug. 14, 2009	Aug. 13, 2010
RF Cable	8D	STCCAB-001	Sep. 26, 2009	Sep. 25, 2010
Software	ADT_Radiated_V7.6.15.9.2	NA	NA	NA
CT Antenna Tower & Turn Table	NA	NA	NA	NA

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

4.6.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

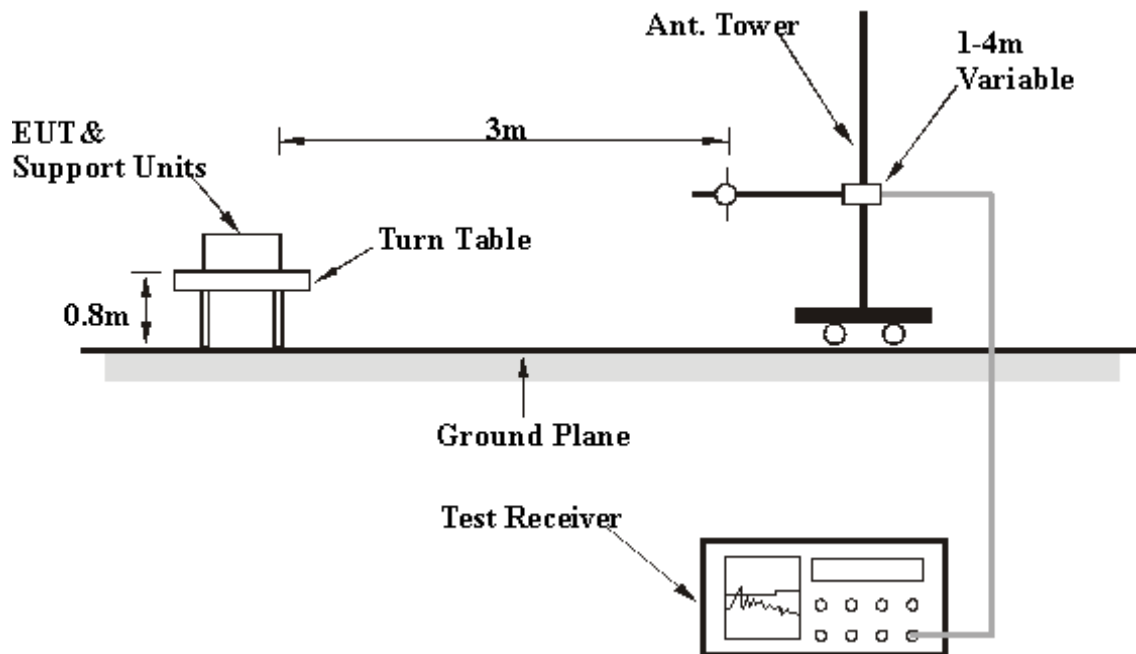
NOTE:

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

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



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



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4.6.6 TEST RESULTS

For DSB-ASK(MRM):

CHANNEL	0	FREQUENCY RANGE	Below 1GHz
INPUT POWER	DC 3.7V from battery	DETECTOR FUNCTION	Quasi-Peak Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH, 965 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	115.50	36.47 QP	43.50	-7.03	1.75 H	234	24.74	11.73
2	128.33	36.23 QP	43.50	-7.27	1.96 H	254	23.13	13.10
3	150.00	36.35 QP	43.50	-7.15	1.54 H	268	20.90	15.46
4	180.00	32.89 QP	43.50	-10.61	1.62 H	273	19.69	13.20
5	208.10	37.26 QP	43.50	-6.24	1.62 H	84	25.35	11.91
6	500.00	35.24 QP	46.00	-10.76	1.54 H	257	14.18	21.06
7	902.00	27.10 PK	70.30	-43.20	1.00 H	231	-1.11	28.21
8	902.00	18.60 AV	67.90	-49.30	1.00 H	231	-9.61	28.21
9	*902.75	90.30 PK			1.00 H	231	62.09	28.21
10	*902.75	87.90 AV			1.00 H	231	59.69	28.21

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	113.75	34.32 QP	43.50	-9.18	1.00 V	259	22.78	11.54
2	120.00	33.42 QP	43.50	-10.08	1.00 V	117	21.22	12.20
3	134.00	31.23 QP	43.50	-12.27	1.00 V	279	17.53	13.70
4	143.50	32.64 QP	43.50	-10.86	1.00 V	262	17.90	14.74
5	212.70	33.73 QP	43.50	-9.77	1.00 V	286	21.64	12.09
6	500.00	37.69 QP	46.00	-8.31	1.00 V	176	16.63	21.06
7	921.25	37.83 QP	46.00	-8.17	1.64 V	157	9.71	28.12
8	902.00	37.50 PK	83.50	-46.00	1.00 V	314	9.29	28.21
9	902.00	25.90 AV	80.24	-54.34	1.00 V	314	-2.31	28.21
10	*902.75	103.50 PK			1.00 V	314	75.29	28.21
11	*902.75	100.24 AV			1.00 V	314	72.03	28.21

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.



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CHANNEL	24	FREQUENCY RANGE	Below 1GHz
INPUT POWER	DC 3.7V from battery	DETECTOR FUNCTION	Quasi-Peak Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH, 965 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	115.50	36.84 QP	43.50	-6.66	1.84 H	248	25.11	11.73
2	128.33	36.56 QP	43.50	-6.94	2.13 H	284	23.46	13.10
3	150.00	36.25 QP	43.50	-7.25	1.82 H	313	20.80	15.46
4	180.00	33.24 QP	43.50	-10.26	1.75 H	163	20.04	13.20
5	208.10	36.28 QP	43.50	-7.22	1.63 H	85	24.37	11.91
6	500.00	35.67 QP	46.00	-10.33	1.53 H	312	14.61	21.06
7	*914.75	87.70 PK			1.00 H	219	59.39	28.31
8	*914.75	84.80 AV			1.00 H	219	56.49	28.31

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	113.75	33.92 QP	43.50	-9.58	1.00 V	264	22.38	11.54
2	120.00	32.52 QP	43.50	-10.98	1.00 V	127	20.32	12.20
3	134.00	30.54 QP	43.50	-12.96	1.00 V	283	16.84	13.70
4	143.50	33.25 QP	43.50	-10.25	1.00 V	218	18.51	14.74
5	212.70	33.43 QP	43.50	-10.07	1.00 V	315	21.34	12.09
6	500.00	37.05 QP	46.00	-8.95	1.00 V	184	15.99	21.06
7	*914.75	101.60 PK			1.00 V	327	73.29	28.31
8	*914.75	99.30 AV			1.00 V	327	70.99	28.31
9	921.25	37.59 QP	46.00	-8.41	1.58 V	176	9.47	28.12

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.



A D T

CHANNEL	49	FREQUENCY RANGE	Below 1GHz
INPUT POWER	DC 3.7V from battery	DETECTOR FUNCTION	Quasi-Peak Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24deg. C, 68%RH, 965 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	115.50	36.52 QP	43.50	-6.98	1.77 H	251	24.79	11.73
2	128.33	37.21 QP	43.50	-6.29	2.03 H	257	24.11	13.10
3	150.00	36.77 QP	43.50	-6.73	1.73 H	259	21.32	15.46
4	180.00	33.12 QP	43.50	-10.38	1.73 H	182	19.92	13.20
5	208.10	36.93 QP	43.50	-6.57	1.58 H	71	25.02	11.91
6	500.00	35.21 QP	46.00	-10.79	1.61 H	287	14.15	21.06
7	*927.25	87.30 PK			1.48 H	210	58.89	28.41
8	*927.25	84.50 AV			1.48 H	210	56.09	28.41
9	928.00	29.70 PK	67.30	-37.60	1.48 H	210	1.29	28.41
10	928.00	19.60 AV	64.50	-44.90	1.48 H	210	-8.81	28.41

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	113.75	34.53 QP	43.50	-8.97	1.00 V	251	22.99	11.54
2	120.00	33.28 QP	43.50	-10.22	1.00 V	94	21.08	12.20
3	134.00	30.26 QP	43.50	-13.24	1.00 V	193	16.56	13.70
4	143.50	32.62 QP	43.50	-10.88	1.00 V	186	17.88	14.74
5	212.70	33.08 QP	43.50	-10.42	1.00 V	273	20.99	12.09
6	500.00	36.85 QP	46.00	-9.15	1.00 V	231	15.79	21.06
7	921.25	37.54 QP	46.00	-8.46	1.65 V	183	9.42	28.12
8	*927.25	100.10 PK			1.00 V	339	71.69	28.41
9	*927.25	97.60 AV			1.00 V	339	69.19	28.41
10	928.00	40.80 PK	80.10	-39.30	1.00 V	339	12.39	28.41
11	928.00	31.90 AV	77.60	-45.70	1.00 V	339	3.49	28.41

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.



A D T

CHANNEL	Channel 0	FREQUENCY RANGE	1 ~10GHz
INPUT POWER	DC 3.7V from battery	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2708.25	50.20 PK	74.00	-23.80	1.29 H	175	18.79	31.41
2	2708.25	39.87 AV	54.00	-14.13	1.29 H	175	8.46	31.41
3	3611.00	56.17 PK	74.00	-17.83	1.34 H	41	22.92	33.25
4	3611.00	45.02 AV	54.00	-8.98	1.34 H	41	11.77	33.25
5	4513.75	47.08 PK	74.00	-26.92	1.22 H	107	11.12	35.96
6	4513.75	35.56 AV	54.00	-18.44	1.22 H	107	-0.40	35.96

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2708.25	48.76 PK	74.00	-25.24	1.38 V	239	17.35	31.41
2	2708.25	38.08 AV	54.00	-15.92	1.38 V	239	6.67	31.41
3	3611.00	57.48 PK	74.00	-16.52	1.07 V	19	24.23	33.25
4	3611.00	46.25 AV	54.00	-7.75	1.07 V	19	13.00	33.25
5	4513.75	46.55 PK	74.00	-27.45	1.24 V	178	10.59	35.96
6	4513.75	35.50 AV	54.00	-18.50	1.24 V	178	-0.46	35.96

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



A D T

CHANNEL	Channel 24	FREQUENCY RANGE	1 ~10GHz
INPUT POWER	DC 3.7V from battery	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2744.25	47.50 PK	74.00	-26.50	1.49 H	347	15.97	31.53
2	2744.25	36.81 AV	54.00	-17.19	1.49 H	347	5.28	31.53
3	3659.00	58.88 PK	74.00	-15.12	1.21 H	283	25.49	33.39
4	3659.00	47.71 AV	54.00	-6.29	1.21 H	283	14.32	33.39
5	4573.75	45.59 PK	74.00	-28.41	1.21 H	264	9.47	36.12
6	4573.75	34.06 AV	54.00	-19.94	1.21 H	264	-2.06	36.12

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2744.25	49.26 PK	74.00	-24.74	1.49 V	160	17.73	31.53
2	2744.25	39.81 AV	54.00	-14.19	1.49 V	160	8.28	31.53
3	3659.00	59.64 PK	74.00	-14.36	1.25 V	100	26.25	33.39
4	3659.00	48.89 AV	54.00	-5.11	1.25 V	100	15.50	33.39
5	4573.75	46.95 PK	74.00	-27.05	1.22 V	256	10.83	36.12
6	4573.75	35.80 AV	54.00	-18.20	1.22 V	256	-0.32	36.12

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



A D T

CHANNEL	Channel 49	FREQUENCY RANGE	1 ~10GHz
INPUT POWER	DC 3.7V from battery	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2781.75	50.87 PK	74.00	-23.13	1.23 H	22	19.21	31.66
2	2781.75	40.89 AV	54.00	-13.11	1.23 H	22	9.23	31.66
3	3709.00	61.53 PK	74.00	-12.47	1.40 H	282	27.99	33.54
4	3709.00	50.98 AV	54.00	-3.02	1.40 H	282	17.44	33.54
5	4636.25	45.12 PK	74.00	-28.88	1.25 H	42	8.83	36.29
6	4636.25	33.71 AV	54.00	-20.29	1.25 H	42	-2.58	36.29

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2781.75	51.38 PK	74.00	-22.62	1.42 V	147	19.72	31.66
2	2781.75	42.30 AV	54.00	-11.70	1.42 V	147	10.64	31.66
3	3709.00	60.46 PK	74.00	-13.54	1.21 V	94	26.92	33.54
4	3709.00	50.32 AV	54.00	-3.68	1.21 V	94	16.78	33.54
5	4636.25	46.18 PK	74.00	-27.82	1.21 V	189	9.89	36.29
6	4636.25	35.34 AV	54.00	-18.66	1.21 V	189	-0.95	36.29

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



A D T

For PR-ASK(XRM):

CHANNEL	0	FREQUENCY RANGE	Below 1GHz
INPUT POWER	DC 3.7V from battery	DETECTOR FUNCTION	Quasi-Peak Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	115.53	37.01 QP	43.50	-6.49	2.14 H	289	25.28	11.73
2	128.33	36.71 QP	43.50	-6.79	2.54 H	273	23.61	13.10
3	150.00	36.49 QP	43.50	-7.01	1.94 H	334	21.04	15.46
4	180.04	33.41 QP	43.50	-10.09	2.07 H	151	20.21	13.20
5	208.12	37.02 QP	43.50	-6.48	1.88 H	59	25.11	11.91
6	500.00	35.50 QP	46.00	-10.50	1.68 H	306	14.44	21.06
7	902.00	27.90 PK	73.90	-46.00	1.28 H	126	-0.31	28.21
8	902.00	14.50 AV	70.40	-55.90	1.28 H	126	-13.71	28.21
9	*902.75	93.90 PK			1.28 H	126	65.69	28.21
10	*902.75	90.40 AV			1.28 H	126	62.19	28.21

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	113.74	34.72 QP	43.50	-8.78	1.00 V	271	23.18	11.54
2	120.00	33.12 QP	43.50	-10.38	1.00 V	108	20.92	12.20
3	134.02	30.75 QP	43.50	-12.75	1.00 V	284	17.04	13.71
4	143.55	32.84 QP	43.50	-10.66	1.11 V	203	18.10	14.74
5	212.68	33.58 QP	43.50	-9.92	1.00 V	311	21.49	12.09
6	500.00	37.61 QP	46.00	-8.39	1.00 V	192	16.55	21.06
7	902.00	37.30 PK	82.40	-45.10	1.00 V	161	9.09	28.21
8	902.00	23.10 AV	79.70	-56.60	1.00 V	161	-5.11	28.21
9	*902.75	102.40 PK			1.00 V	161	74.19	28.21
10	*902.75	99.70 AV			1.00 V	161	71.49	28.21
11	921.25	38.04 QP	46.00	-7.96	1.76 V	161	9.92	28.12

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.



A D T

CHANNEL	24	FREQUENCY RANGE	Below 1GHz
INPUT POWER	DC 3.7V from battery	DETECTOR FUNCTION	Quasi-Peak Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	115.50	36.43 QP	43.50	-7.07	1.56 H	253	24.70	11.73
2	128.33	36.42 QP	43.50	-7.08	2.16 H	247	23.32	13.10
3	150.00	36.58 QP	43.50	-6.92	1.56 H	325	21.12	15.46
4	180.04	33.72 QP	43.50	-9.78	1.67 H	286	20.52	13.20
5	208.10	36.54 QP	43.50	-6.96	1.45 H	63	24.63	11.91
6	500.00	35.46 QP	46.00	-10.54	1.57 H	281	14.40	21.06
7	*914.75	92.60 PK			1.00 H	134	64.29	28.31
8	*914.75	89.00 AV			1.00 H	134	60.69	28.31

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	113.73	34.51 QP	43.50	-8.99	1.00 V	256	22.97	11.54
2	120.00	32.64 QP	43.50	-10.86	1.00 V	125	20.44	12.20
3	134.06	31.16 QP	43.50	-12.34	1.00 V	273	17.45	13.71
4	143.52	32.18 QP	43.50	-11.32	1.03 V	246	17.44	14.74
5	212.74	33.91 QP	43.50	-9.59	1.00 V	294	21.82	12.09
6	500.00	37.05 QP	46.00	-8.95	1.00 V	187	15.99	21.06
7	*914.75	101.20 PK			1.00 V	182	72.89	28.31
8	*914.75	98.40 AV			1.00 V	182	70.09	28.31
9	921.16	37.62 QP	46.00	-8.38	1.68 V	241	9.50	28.12

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.



A D T

CHANNEL	49	FREQUENCY RANGE	Below 1GHz
INPUT POWER	DC 3.7V from battery	DETECTOR FUNCTION	Quasi-Peak Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	115.50	35.96 QP	43.50	-7.54	1.59 H	247	24.23	11.73
2	128.33	35.84 QP	43.50	-7.66	1.97 H	246	22.74	13.10
3	150.00	36.24 QP	43.50	-7.26	1.64 H	283	20.79	15.46
4	180.00	33.21 QP	43.50	-10.29	1.58 H	256	20.01	13.20
5	208.10	36.59 QP	43.50	-6.91	1.54 H	58	24.68	11.91
6	500.00	35.34 QP	46.00	-10.66	1.48 H	235	14.28	21.06
7	*927.25	91.30 PK			1.22 H	129	62.89	28.41
8	*927.25	88.20 AV			1.22 H	129	59.79	28.41
9	928.00	28.60 PK	71.30	-42.70	1.22 H	129	0.19	28.41
10	928.00	18.70 AV	68.20	-49.50	1.22 H	129	-9.71	28.41

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	113.75	33.69 QP	43.50	-9.81	1.00 V	243	22.15	11.54
2	120.00	32.81 QP	43.50	-10.69	1.00 V	137	20.61	12.20
3	134.03	30.92 QP	43.50	-12.58	1.00 V	257	17.21	13.71
4	143.50	32.51 QP	43.50	-10.99	1.00 V	251	17.77	14.74
5	212.70	32.87 QP	43.50	-10.63	1.00 V	306	20.78	12.09
6	500.00	37.24 QP	46.00	-8.76	1.00 V	194	16.18	21.06
7	921.25	37.48 QP	46.00	-8.52	1.57 V	143	9.36	28.12
8	*927.25	100.40 PK			1.00 V	176	71.99	28.41
9	*927.25	97.50 AV			1.00 V	176	69.09	28.41
10	928.00	37.80 PK	80.40	-42.60	1.00 V	176	9.39	28.41
11	928.00	25.40 AV	77.50	-52.10	1.00 V	176	-3.01	28.41

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “: Fundamental frequency.



A D T

CHANNEL	Channel 0	FREQUENCY RANGE	1 ~10GHz
INPUT POWER	DC 3.7V from battery	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2708.25	46.62 PK	74.00	-27.38	1.34 H	182	15.21	31.41
2	2708.25	36.71 AV	54.00	-17.29	1.34 H	182	5.30	31.41
3	3611.00	56.58 PK	74.00	-17.42	1.27 H	43	23.33	33.25
4	3611.00	45.43 AV	54.00	-8.57	1.27 H	43	12.18	33.25
5	4513.75	46.04 PK	74.00	-27.96	1.21 H	149	10.08	35.96
6	4513.75	34.32 AV	54.00	-19.68	1.21 H	149	-1.64	35.96

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2708.25	49.07 PK	74.00	-24.93	1.41 V	184	17.66	31.41
2	2708.25	39.14 AV	54.00	-14.86	1.41 V	184	7.73	31.41
3	3611.00	58.12 PK	74.00	-15.88	1.14 V	23	24.87	33.25
4	3611.00	47.64 AV	54.00	-6.36	1.14 V	23	14.39	33.25
5	4513.75	45.96 PK	74.00	-28.04	1.27 V	191	10.00	35.96
6	4513.75	34.47 AV	54.00	-19.53	1.27 V	191	-1.49	35.96

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



A D T

CHANNEL	Channel 24	FREQUENCY RANGE	1 ~10GHz
INPUT POWER	DC 3.7V from battery	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2744.25	47.94 PK	74.00	-26.06	1.31 H	184	16.41	31.53
2	2744.25	37.35 AV	54.00	-16.65	1.31 H	184	5.82	31.53
3	3659.00	57.87 PK	74.00	-16.13	1.23 H	62	24.48	33.39
4	3659.00	45.72 AV	54.00	-8.28	1.23 H	62	12.33	33.39
5	4573.75	46.31 PK	74.00	-27.69	1.17 H	158	10.19	36.12
6	4573.75	34.67 AV	54.00	-19.33	1.17 H	158	-1.45	36.12

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2744.25	49.42 PK	74.00	-24.58	1.44 V	187	17.89	31.53
2	2744.25	39.73 AV	54.00	-14.27	1.44 V	187	8.20	31.53
3	3659.00	59.04 PK	74.00	-14.96	1.17 V	14	25.65	33.39
4	3659.00	48.43 AV	54.00	-5.57	1.17 V	14	15.04	33.39
5	4573.75	46.57 PK	74.00	-27.43	1.29 V	189	10.45	36.12
6	4573.75	34.92 AV	54.00	-19.08	1.29 V	189	-1.20	36.12

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



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CHANNEL	Channel 49	FREQUENCY RANGE	1 ~10GHz
INPUT POWER	DC 3.7V from battery	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 965 hPa	TESTED BY	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2781.75	49.13 PK	74.00	-24.87	1.33 H	178	17.47	31.66
2	2781.75	39.02 AV	54.00	-14.98	1.33 H	178	7.36	31.66
3	3709.00	59.56 PK	74.00	-14.44	1.29 H	45	26.02	33.54
4	3709.00	49.31 AV	54.00	-4.69	1.29 H	45	15.77	33.54
5	4636.25	46.57 PK	74.00	-27.43	1.18 H	171	10.28	36.29
6	4636.25	35.25 AV	54.00	-18.75	1.18 H	171	-1.04	36.29

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2781.75	50.57 PK	74.00	-23.43	1.43 V	173	18.91	31.66
2	2781.75	41.48 AV	54.00	-12.52	1.43 V	173	9.82	31.66
3	3709.00	59.73 PK	74.00	-14.27	1.18 V	17	26.19	33.54
4	3709.00	49.41 AV	54.00	-4.59	1.18 V	17	15.87	33.54
5	4636.25	46.82 PK	74.00	-27.18	1.34 V	202	10.53	36.29
6	4636.25	35.73 AV	54.00	-18.27	1.34 V	202	-0.56	36.29

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.

4.7 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.8.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

4.8.2 TEST INSTRUMENTS

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

NOTE:

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

4.8.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz with suitable frequency span including 20 MHz bandwidth from band edge. The band edges was measured and recorded.

4.8.4 DEVIATION FROM TEST STANDARD

No deviation

4.8.5 EUT OPERATING CONDITION

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

4.8.6 TEST RESULTS

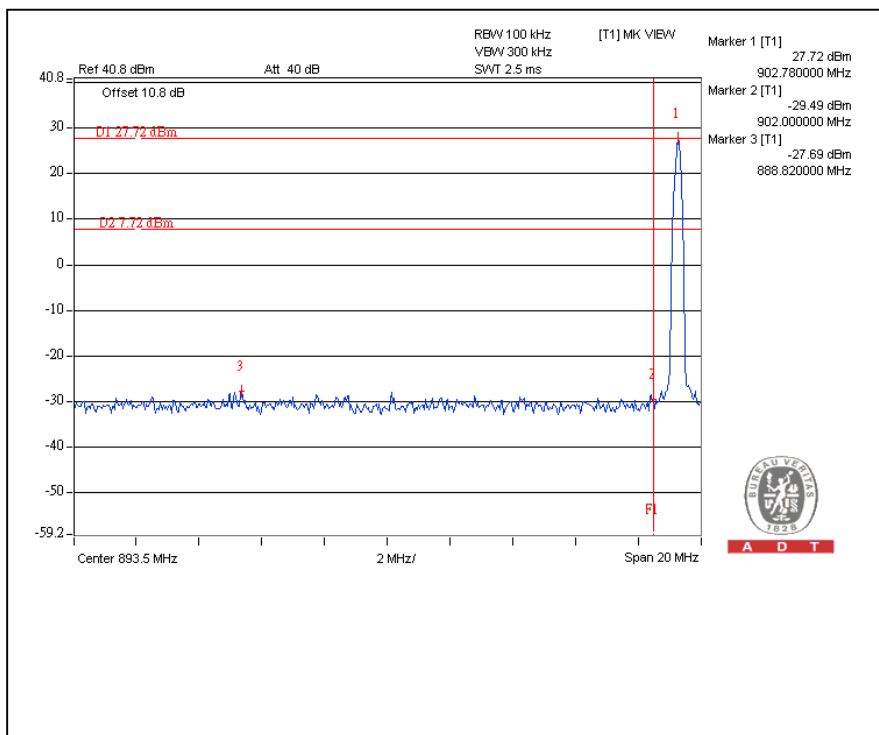
The spectrum plots are attached on the following pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).



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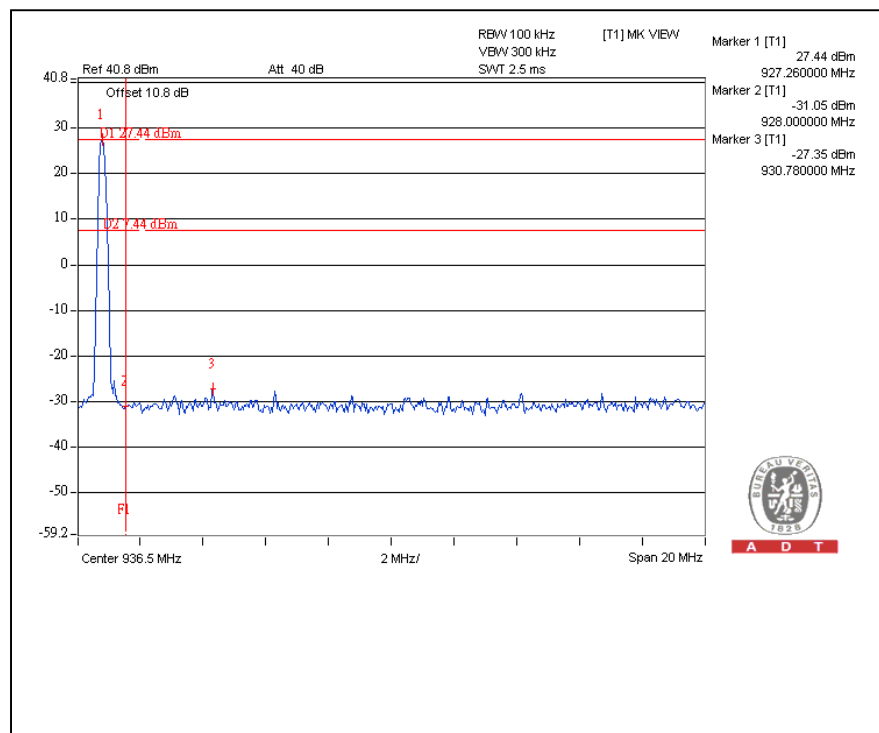
For PR-ASK(DRM):

CH0



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CH49

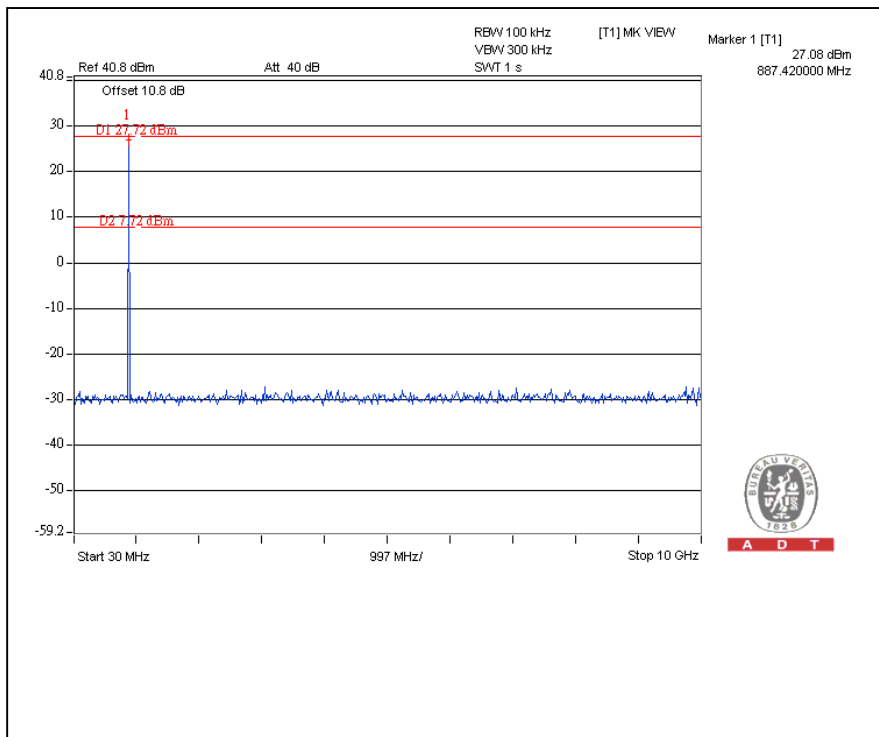


A D T

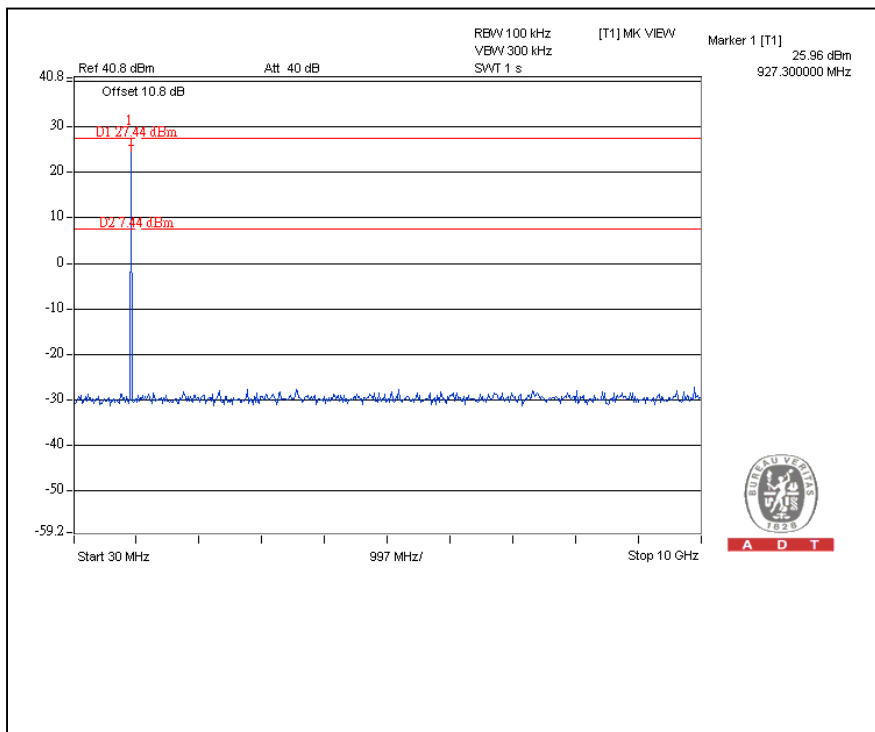


A D T

CH0



CH49

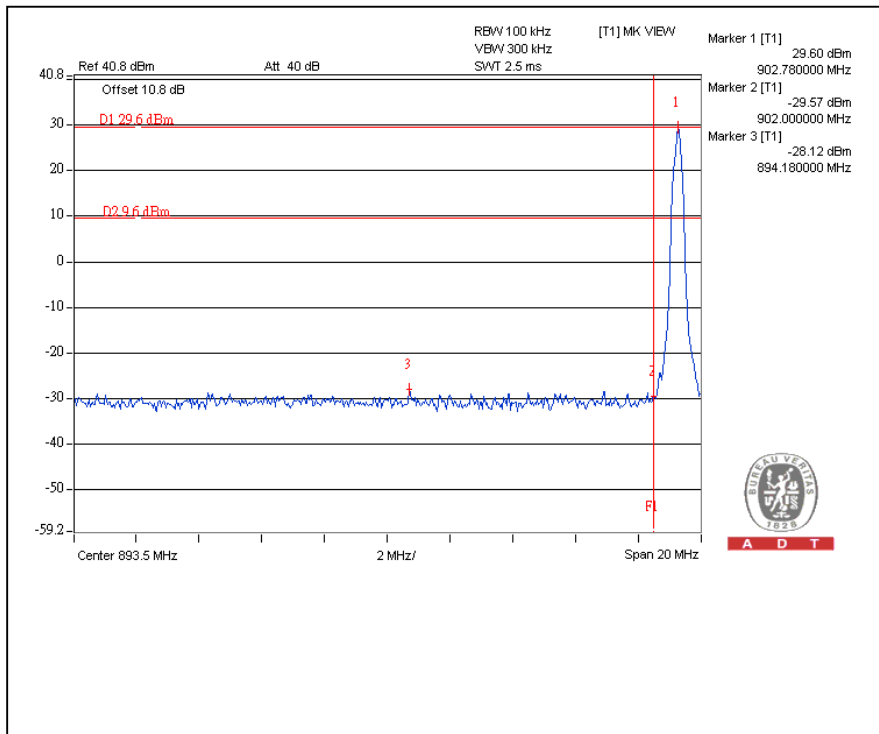




A D T

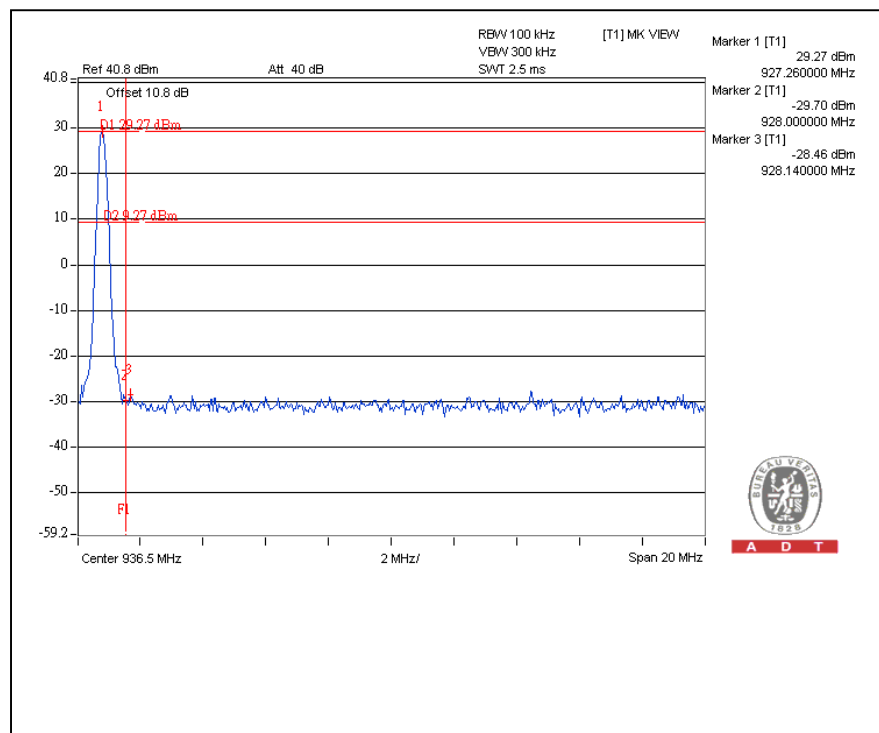
For DSB-ASK(MRM):

CH0



A D T

CH49

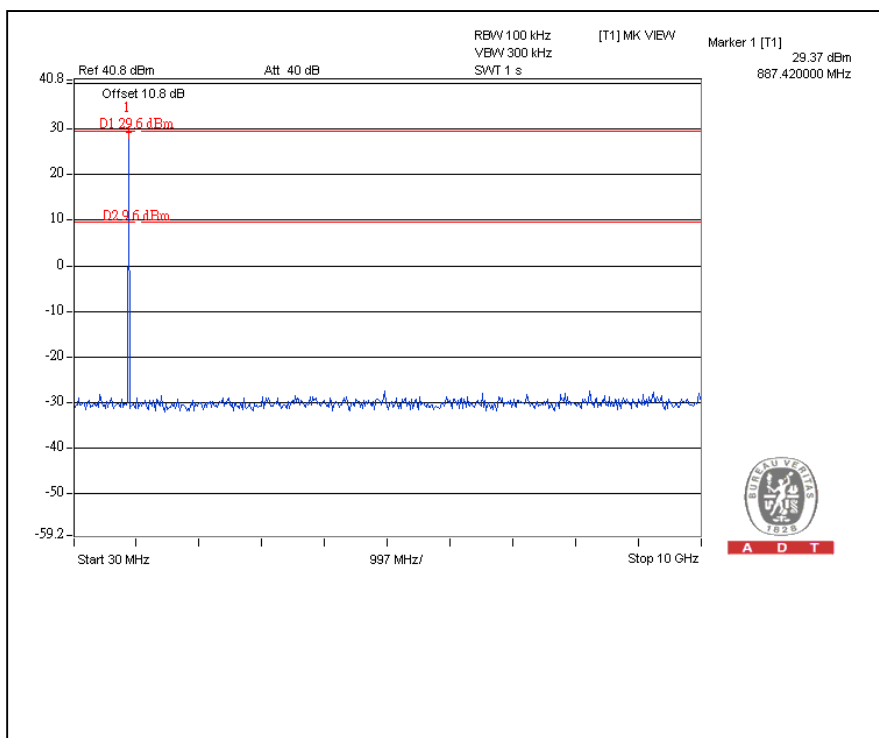


A D T

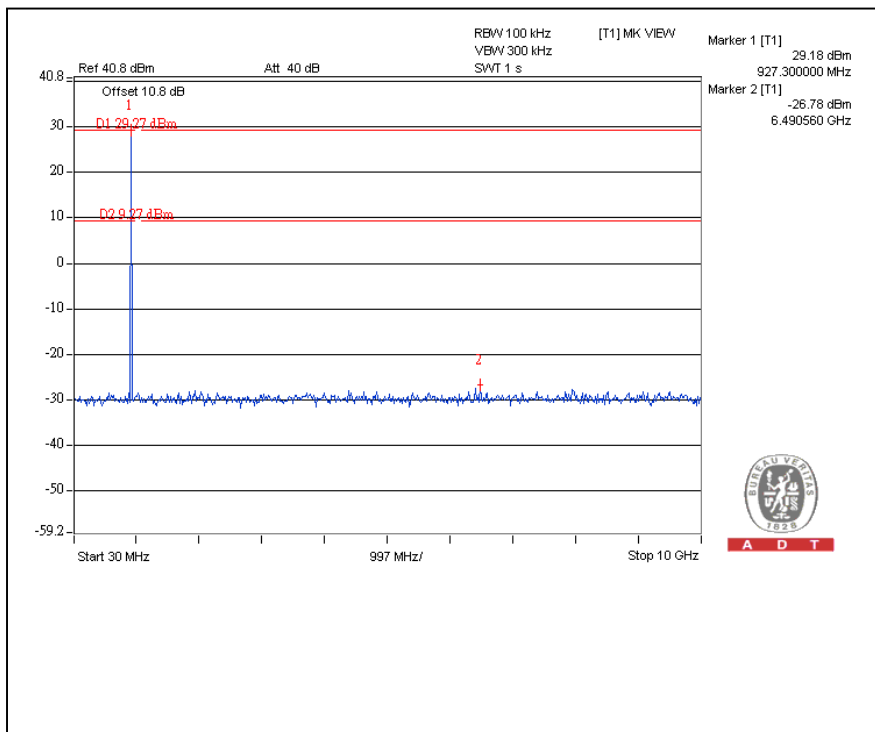


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CH0



CH49

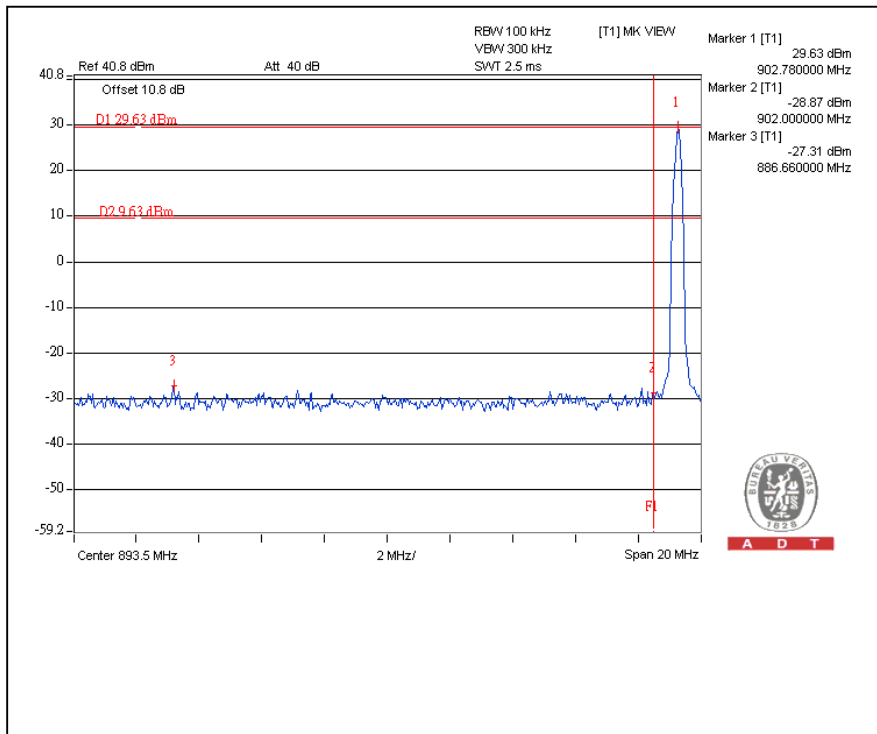




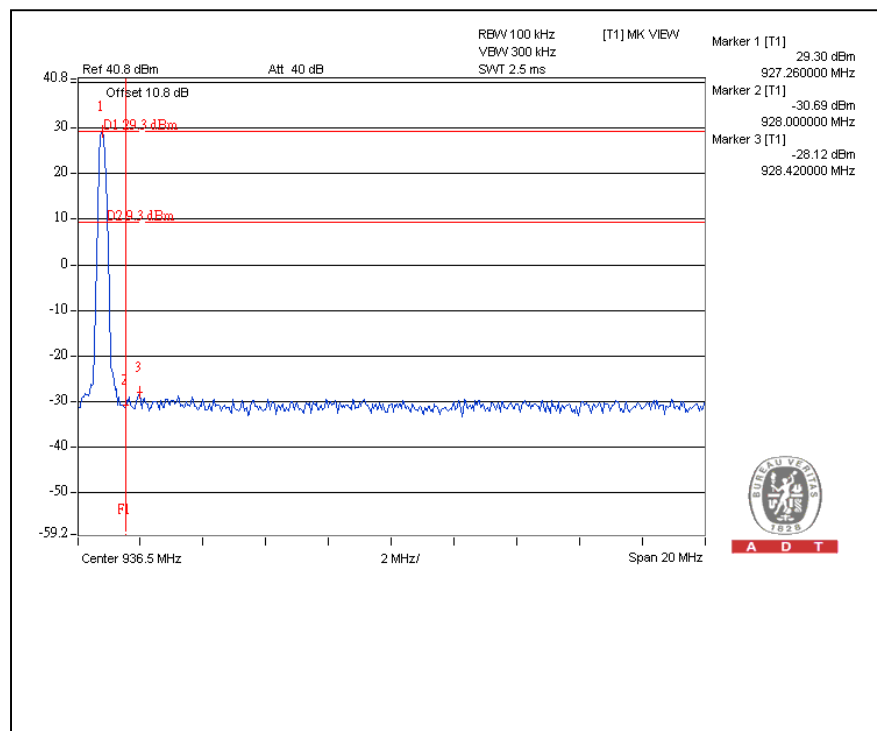
A D T

For PR-ASK(XRM):

CH0



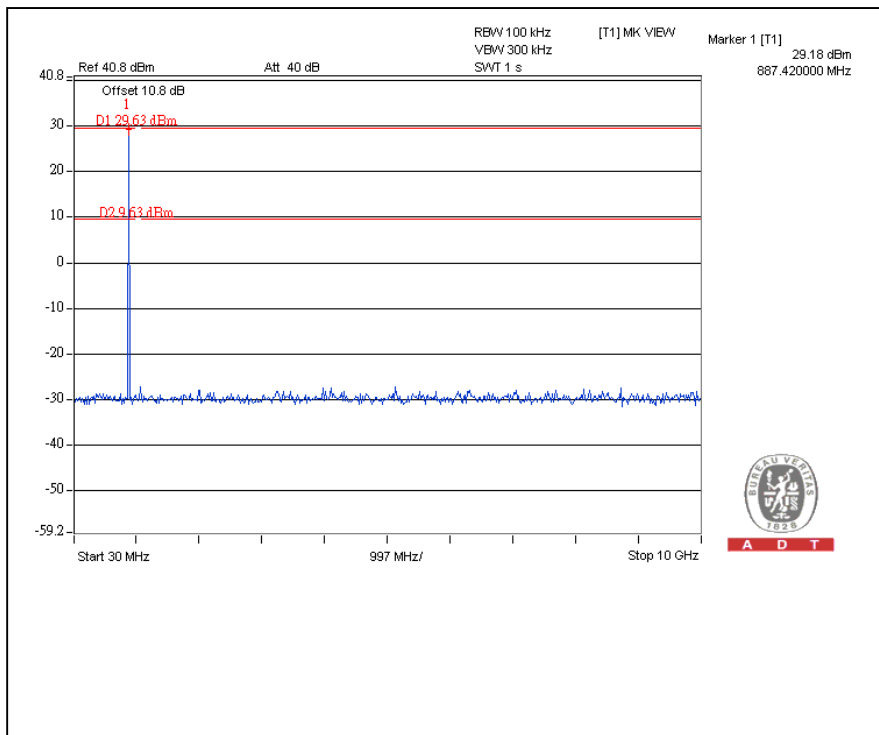
CH49



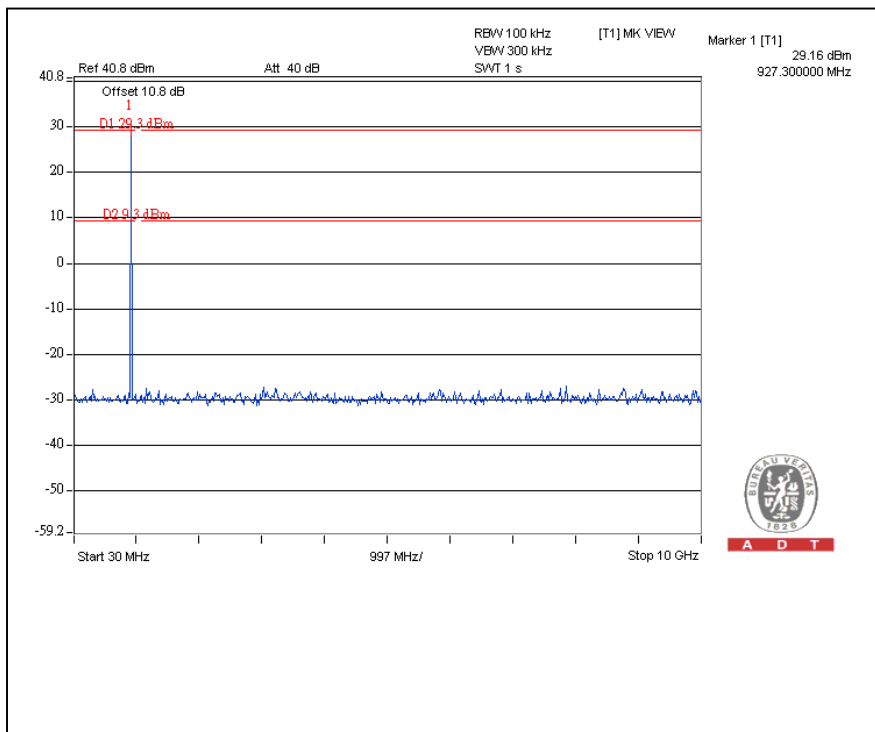


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CH0



CH49



4.9 ANTENNA REQUIREMENT

4.9.1 STANDARD APPLICABLE

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

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

4.9.2 ANTENNA CONNECTED CONSTRUCTION

There are four antennas provided to this EUT, please refer to the following table:

For WLAN (RX has diversity function)					
No.	Model	Antenna Type	Gain (dBi)	Connector Type	Frequency range (MHz)
1	OZONE WLAN 1	PCB(TX,RX)	2.96 (2.4G) 4.16 (5G)	N/A	2400~2850 4920~5850
2	OZONE WLAN 2	PIFA(RX only)	3.45 (2.4G) 3.32 (5G)	N/A	2400~2850 4920~5850
For Bluetooth					
No.	Model	Antenna Type	Gain (dBi)	Connector Type	Frequency range (MHz)
1	Mica 2.4GHz	SMD	-0.45	N/A	2400~2500
For RFID					
No.	Model	Antenna Type	Gain (dBi)	Connector Type	Frequency range (MHz)
1	OZONE RFID	Hor- dipole, outside antenna, Ver- slot, inside antenna	1.7483(Max)	N/A	902~928



5 INFORMATION ON THE TESTING LABORATORIES

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

USA	FCC, NVLAP
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA, CSA
R.O.C.	TAF, BSMI, NCC
Netherlands	Telefication
Singapore	GOST-ASIA (MOU)
Russia	CERTIS (MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.

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

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

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Hwa Ya EMC/RF/Safety/Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3185050

Email: service@adt.com.tw

Web Site: www.adt.com.tw

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

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

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

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