FCC TEST REPORT

REPORT NO.: RF950407H02

MODEL NO.: RU-801, RU-802, RU-803, RU-811, RU-812, RU-813

RECEIVED: April 07, 2006

TESTED: April 07 to April 14, 2006

ISSUED: April 21, 2006

APPLICANT: Microelectronics Technology Inc.

ADDRESS: 1, Innovation Road II,Hsinchu Science-based Industrial Park, Hsinchu, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

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

0536

No. 2177-01

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1 CERTIFICATION

PRODUCT :	UHF RFID Reader
BRAND NAME :	MTI (Microelectronics Technology Inc.)
MODEL NO. :	RU-801, RU-802, RU-803, RU-811, RU-812, RU-813
APPLICANT :	Microelectronics Technology Inc.
TESTED DATE:	April 07 to April 14, 2006
TEST ITEM :	ENGINEERING SAMPLE
STANDARDS :	47 CFR Part 15, Subpart C (Section 15.247), ANSI C63.4-2003

The above equipment (Model: RU-801) has been tested by **Advance Data Technology Corporation**, 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 : Amanda Chu , **DATE:** April 21, 2006
(Amanda Chu)

TECHNICAL ACCEPTANCE : Hank Chung , **DATE:** April 21, 2006
Responsible for RF
(Hank Chung)

APPROVED BY : , **DATE:** April 21, 2006
(May Chen, Deputy Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	**Test Type and Limit**	**Result**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is –14.28dB at 0.533 MHz
15.247(a)(1)(I)-(ii)	Number of Hopping Frequency Used Spec.: At least 75 channels	PASS	Meet the requirement of limit
15.247(a)(1)(ii)	Dwell Time on Each Channel Spec. : Max. 0.4 second	PASS	Meet the requirement of limit
15.247(a)(1)(I)-(ii)	Hopping Channel Separation Spec. : Min. 25 kHz or 20 dB bandwidth, which ever is greater	PASS	Meet the requirement of limit
15.247(a)(2)	Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System Spec.: Max. 1 MHz	PASS	Meet the requirement of limit
15.247(b)	Maximum Peak Output Power Spec.: max. 30dBm	PASS	Meet the requirement of limit
15.247(c)	Transmitter Radiated Emissions Spec.: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is –0.4dB at 1840.00MHz
15.247(c)	Band Edge Measurement	PASS	Meet the requirement of limit

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	UHF RFID Reader
MODEL NO.	RU-801, RU-802, RU-803, RU-811, RU-812, RU-813
FCC ID	MAD-RU-813
POWER SUPPLY	DC 12V from AC adapter
MODULATION TYPE	AM
MODULATION TECHNOLOGY	FHSS
FREQUENCY RANGE	910MHz ~ 920MHz
NUMBER OF CHANNEL	51
OUTPUT POWER	421.697mW
ANTENNA TYPE	Circular Antenna
DATA CABLE	NA
I/O PORTS	RJ45 Port x1
ASSOCIATED DEVICES	NA

NOTE:

1. Bluetooth technology is used for the EUT.
2. The EUT have six models which are identical to each other in all aspects except for the followings:

Model Number	Freq. Band	Protocol	Antenna
RU-801	US	ISO18000-6B	2 ea (1T1R)
RU-802	US	ISO18000-6B	4 ea (2T2R)
RU-803	US	ISO18000-6B	8 ea (4T4R)
RU-811	US	EPC C1 G2	2 ea (1T1R)
RU-812	US	EPC C1 G2	4 ea (2T2R)
RU-813	US	EPC C1 G2	8 ea (4T4R)
Explain:	RU-813 --> R: RFID U: UHF 8: for RFID business 1: EPC, 0 for ISO 3: 4T4R, 1 for 1T1R, 2 for 2T2R		

From the above models, model: **RU-801** was selected as representative model for the test and its data were recorded in this report.

3. The EUT must be supplied with a power adapter:

Brand:	CINCON
Model No.:	TR70A12
Input power :	AC90-264Vac, 3.5mA max, 47 to 63Hz
Output power :	DC12V, 5.5A

4. There is one antenna provided to this EUT:

Antenna Type	Gain (dBi)	Connector Type	Cable loss (dB)	Gain (dBi)
Circular Antenna	6 dBi	SMA Female	0.75	5.25 dBi

5. The EUT has 4Tx antenna port, and the 4Tx antenna port can't transmitter at the same time. We pretest each Tx antenna port, and found the worst case is Tx antenna port 1. So we choose this mode for final test.

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

3.2 DESCRIPTION OF TEST MODES

Fifty-one channels are provided to this EUT.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	910	21	914.2	42	918.4
1	910.2	22	914.4	43	918.6
2	910.4	23	914.6	44	918.8
3	910.6	24	914.8	45	919
4	910.8	25	915	46	919.2
5	911	26	915.2	47	919.4
6	911.2	27	915.4	48	919.6
7	911.4	28	915.6	49	919.8
8	911.6	29	915.8	50	920
9	911.8	30	916		
10	912	31	916.2		
11	912.2	32	916.4		
12	912.4	33	916.6		
13	912.6	34	916.8		
14	912.8	35	917		
15	913	36	917.2		
16	913.2	37	917.4		
17	913.4	38	917.6		
18	913.6	39	917.8		
19	913.8	40	918		
20	914	41	918.2		

3.3 TEST MODE APPLICABLITY AND TESTED CHANNEL DETAIL:

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

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

Power Line Conducted Emission:

☒ Pre-Scan to determine the worst-case mode from all possible combinations between available modulations and packet types.

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

Available Channel	Tested Channel	Modulation Technology	Modulation Type
0 to 50	50	FHSS	AM

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
0 to 50	0,25,50	FHSS	AM

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
0 to 50	0,25,50	FHSS	AM

Bandedge Measurement:

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

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

Available Channel	Tested Channel	Modulation Technology	Modulation Type
0 to 50	0, 50	FHSS	AM

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
0 to 50	0, 25, 50	FHSS	AM

3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a UHF RFID Reader. 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

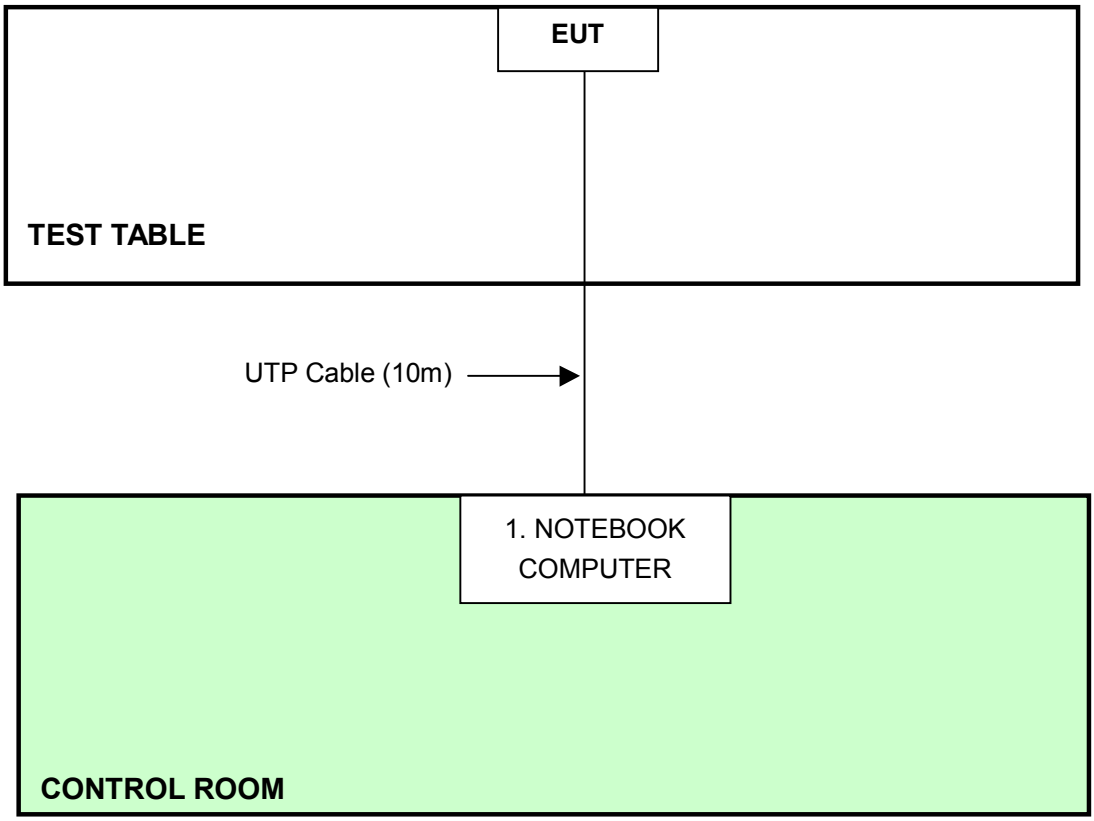
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP21L	CN-0GD366-70166-5B3-09ZX	QDS-BRCM1016

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

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

3.6 CONFIGURATION OF SYSTEM UNDER TEST



NOTE: 1. Support unit 1 was kept in the control room during the test.
2. Please refer to the photos of test configuration in Item 5 also.

4 TEST PROCEDURES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

Notes:

1. The lower limit shall apply at the transition frequencies.
2. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Sep. 19, 2006
Line-Impedance Stabilization Network(for EUT)	ENV-216	100071	Nov. 10, 2006
ROHDE & SCHWARZ LISN	KNW-407	8/1395/12	Jul. 19, 2006
RF Signal Cable	RG233/U	Cable_CA_02	Dec. 10, 2006
Terminator(for KYORITSU)	50	2	Oct. 08, 2006
Software	ADT_Cond_V7.3.2	NA	NA

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

4.1.3 TEST PROCEDURES

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

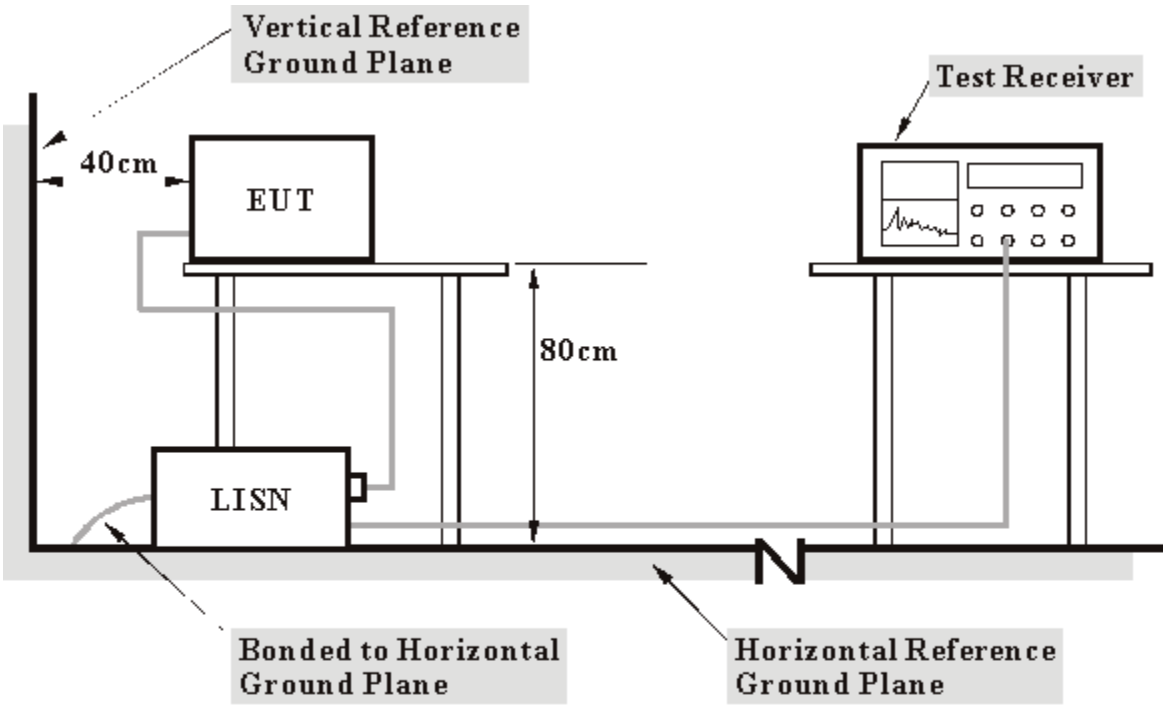
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

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

4.1.6 EUT OPERATING CONDITIONS

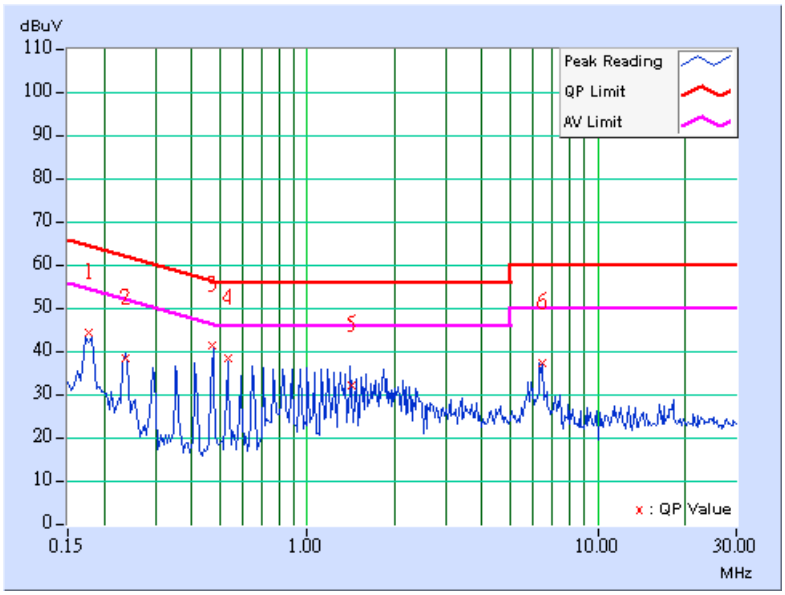
a. Placed the EUT on the testing table.
b. Prepared other computer systems to act as communication partners and placed them outside of testing area.
c. The communication partner run test program “RFID ATS FCC.vi” to enable EUT under transmission condition continuously at specific channel frequency.

4.1.7 TEST RESULTS

INPUT POWER (SYSTEM)	120Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	24 deg. C, 72%RH, 963 hPa	**PHASE**	Line (L)
TESTED BY	Eric Lee		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.177	9.60	34.80	-	44.40	-	64.60	54.60	-20.20	-
2	0.237	9.60	28.79	-	38.39	-	62.19	52.19	-23.80	-
3	0.473	9.60	31.58	-	41.18	-	56.46	46.46	-15.28	-
4	0.532	9.60	28.57	-	38.17	-	56.00	46.00	-17.83	-
5	1.417	9.64	22.33	-	31.97	-	56.00	46.00	-24.03	-
6	6.485	9.78	27.48	-	37.26	-	60.00	50.00	-22.74	-

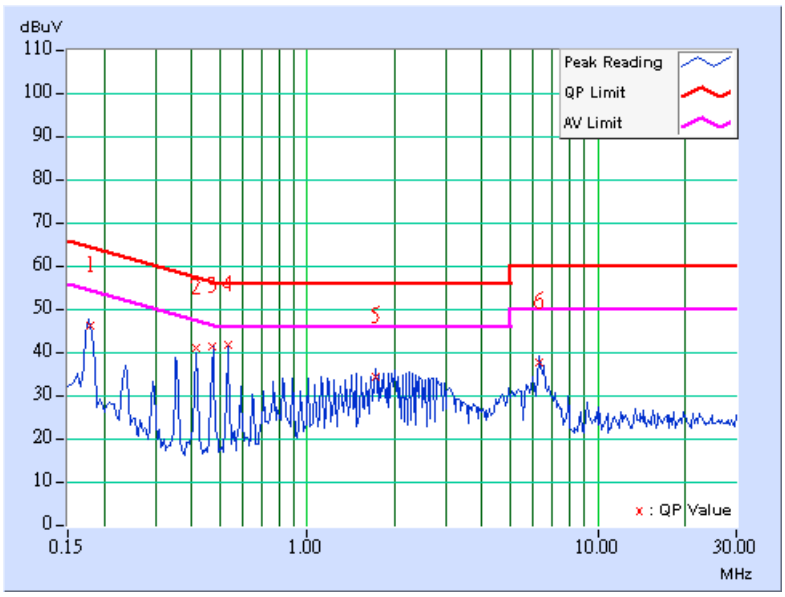
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



INPUT POWER (SYSTEM)	120Vac, 60 Hz	**6dB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	24 deg. C, 72%RH, 963 hPa	**PHASE**	Neutral (N)
TESTED BY	Eric Lee		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.179	9.60	36.54	-	46.14	-	64.55	54.55	-18.41	-
2	0.414	9.60	31.26	-	40.86	-	57.56	47.56	-16.70	-
3	0.473	9.60	31.56	-	41.16	-	56.46	46.46	-15.30	-
4	**0.533**	**9.60**	**32.12**	**-**	**41.72**	**-**	**56.00**	**46.00**	**-14.28**	**-**
5	1.715	9.67	24.57	-	34.24	-	56.00	46.00	-21.76	-
6	6.314	9.78	28.01	-	37.79	-	60.00	50.00	-22.21	-

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



4.2 NUMBER OF HOPPING FREQUENCY USED

4.2.1 LIMIT OF HOPPING FREQUENCY USED

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

4.2.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	May 26, 2006

Note:

1. The measurement uncertainty is 226Hz,which is calculated as per the document ETSI TR 100 028.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

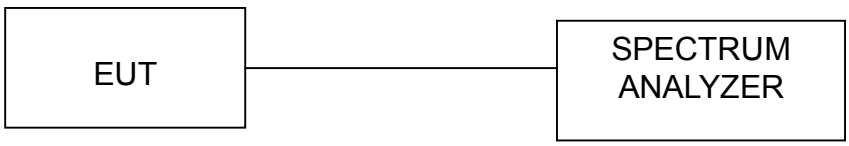
4.2.3 TEST PROCEDURES

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

4.2.4 DEVIATION FROM TEST STANDARD

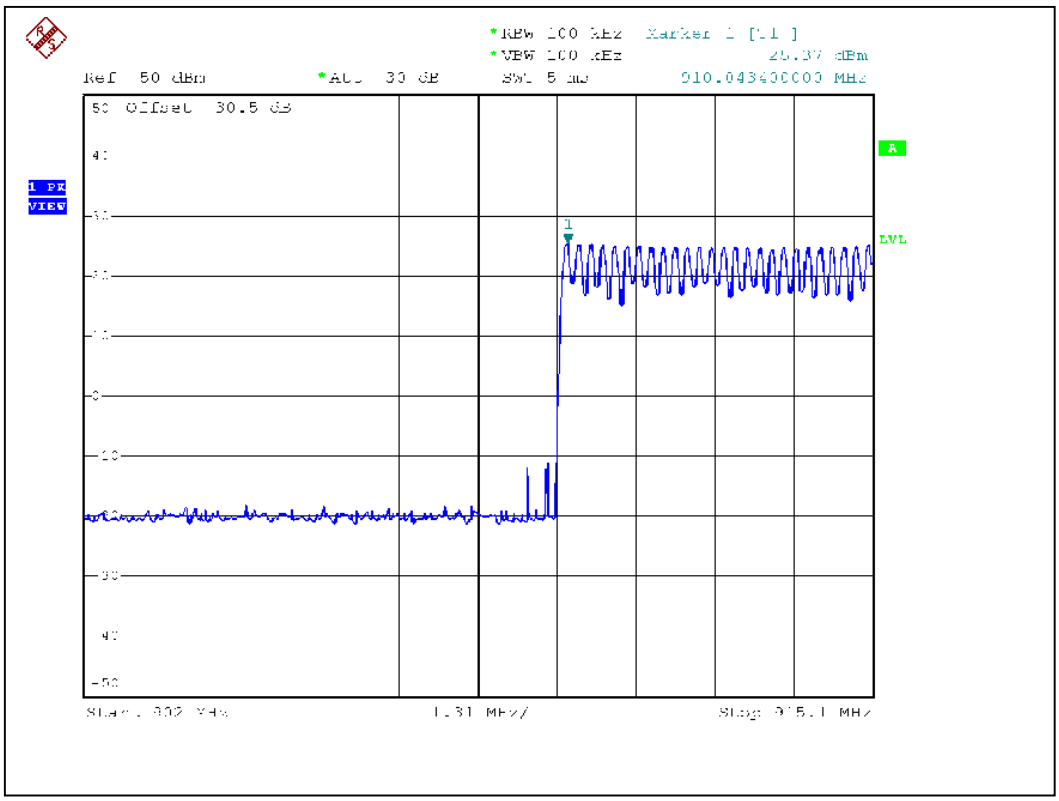
No deviation

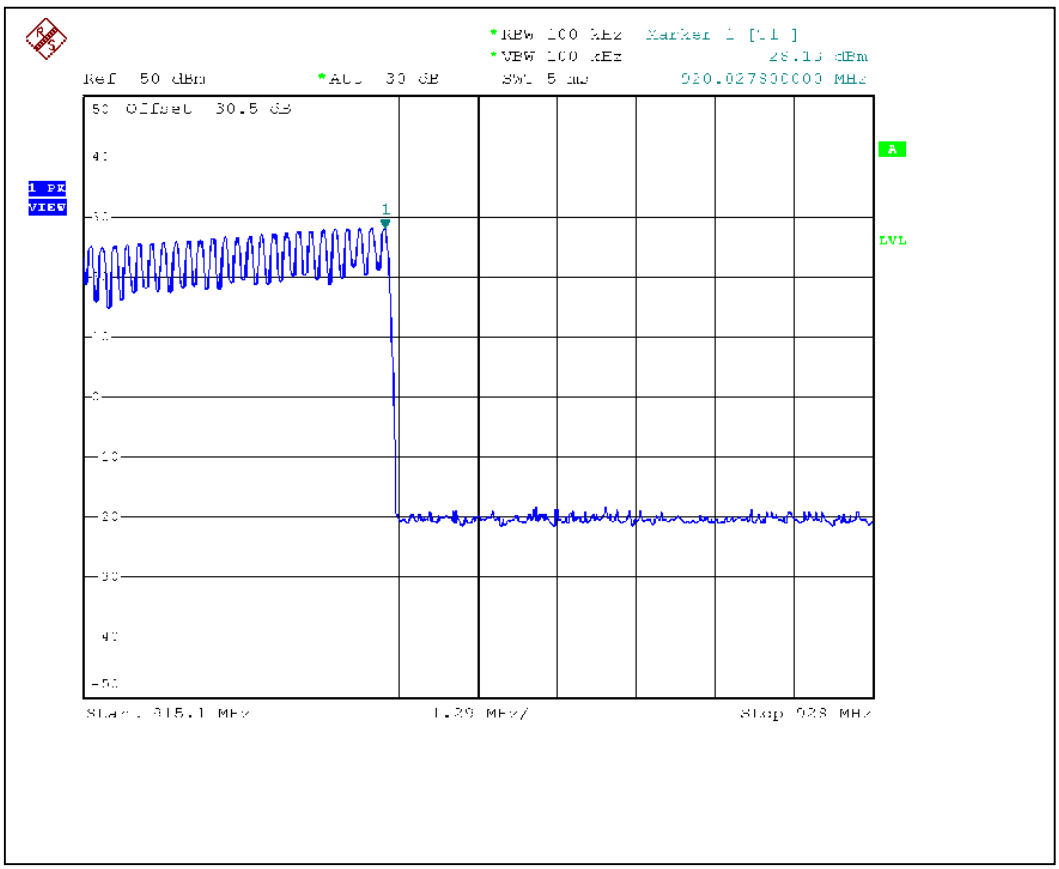
4.2.5 TEST SETUP



4.2.6 TEST RESULTS

There are 51 hopping frequencies in the hopping mode. Please refer to next two pages for the test result. On the plots, it shows that the hopping frequencies are equally spaced.


*RBW 100 kHz
*VBW 100 kHz
Ref 50 dBm
*Att 30 dB
SWT 5 ms
Offset 30.5 dB
1 PK
VIEW
A
LVL
1
Start 902 MHz
1.31 MHz/
Stop 915.1 MHz


*RBW 100 kHz
*VBW 100 kHz
Ref 50 dBm
*Att 30 dB
SWT 5 ms
Offset 30.5 dB
1 PK
VIEW
A
LVL
1
Start 915.1 MHz
1.29 MHz/
Stop 928 MHz

4.3 DWELL TIME ON EACH CHANNEL

4.3.1 LIMIT OF DWELL TIME USED

For FHSS, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20.4 second period. For hybrid systems, the average time of occupancy on any frequency should not exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 10, 2006

Note:

1. The measurement uncertainty is 226Hz,which is calculated as per the document ETSI TR 100 028.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

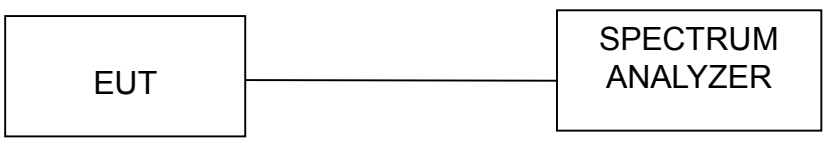
4.3.3 TEST PROCEDURES

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

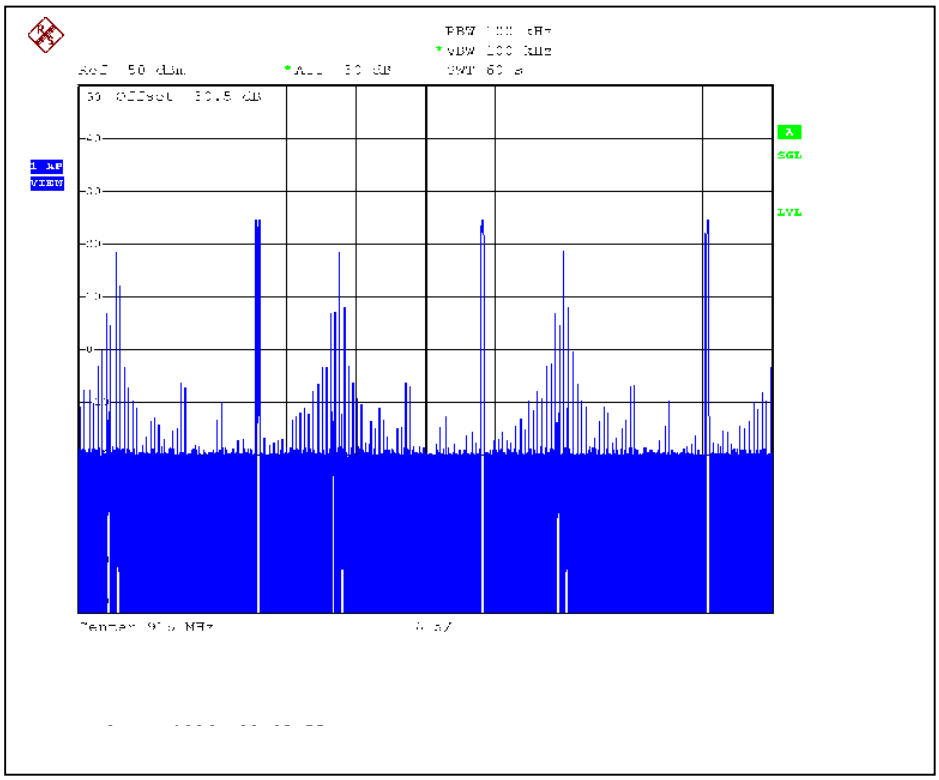
4.3.5 TEST SETUP

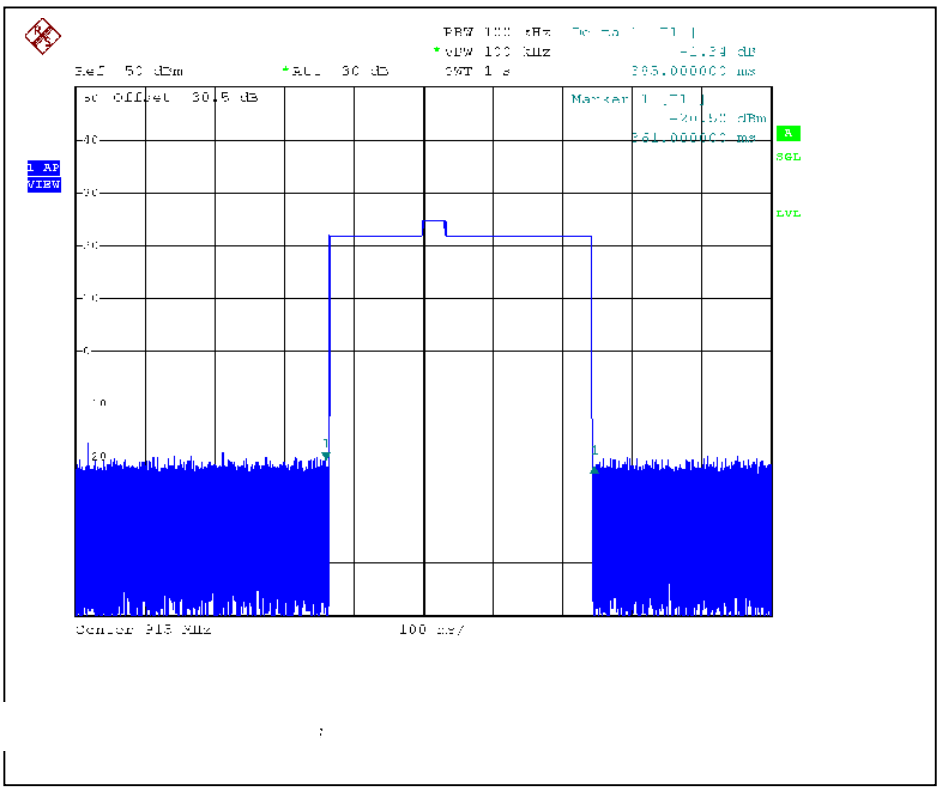


4.3.6 TEST RESULTS

Number of transmission in a 20.4 (51Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
3 (times / 60 sec) *0.34=1.02 times	0.385	0.3927	400

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





4.4 CHANNEL BANDWIDTH

4.4.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 10, 2006

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

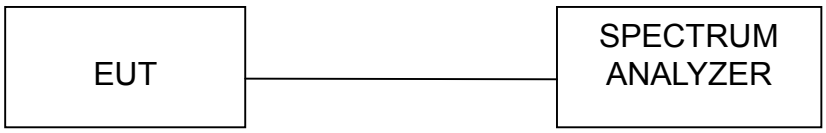
4.4.2 TEST PROCEDURE

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.

4.4.3 DEVIATION FROM TEST STANDARD

No deviation

4.4.4 TEST SETUP



4.4.5 EUT OPERATING CONDITION

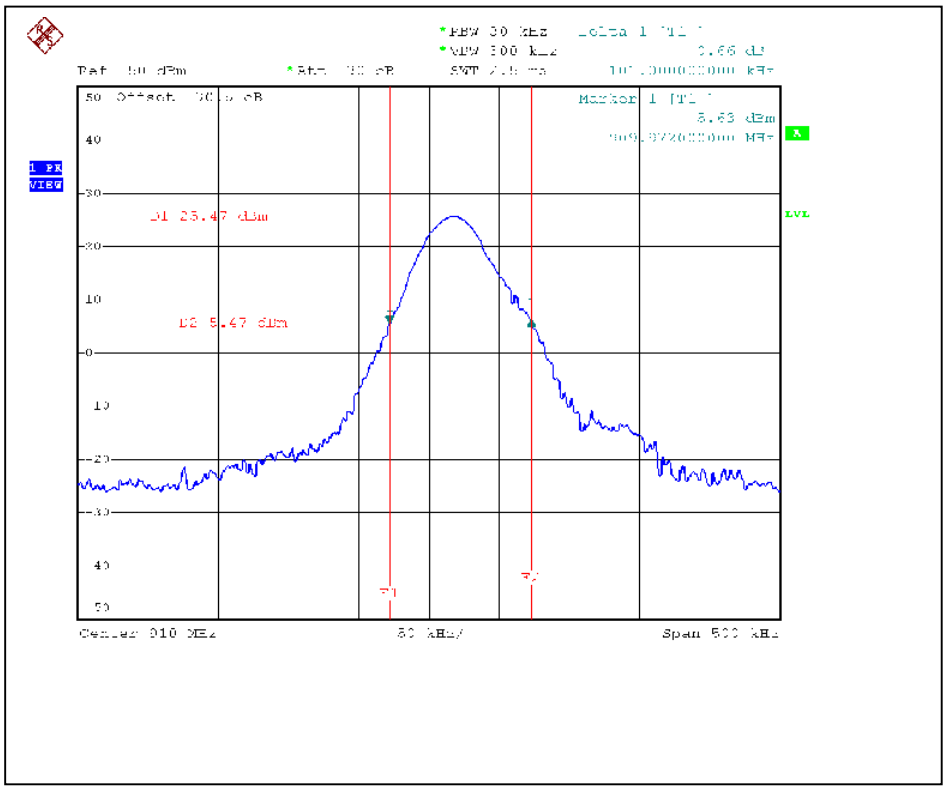
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.4.6 TEST RESULTS

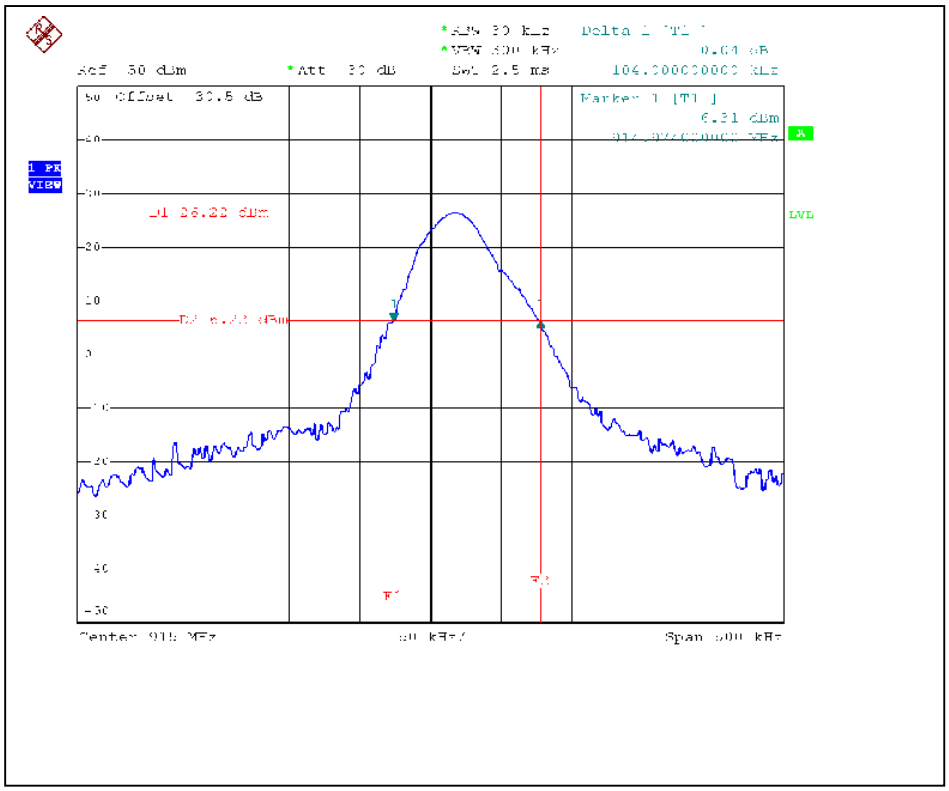
ENVIRONMENTAL CONDITIONS	24deg. C, 54%RH, 963 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (kHz)
0	910	101
25	915	104
50	920	147

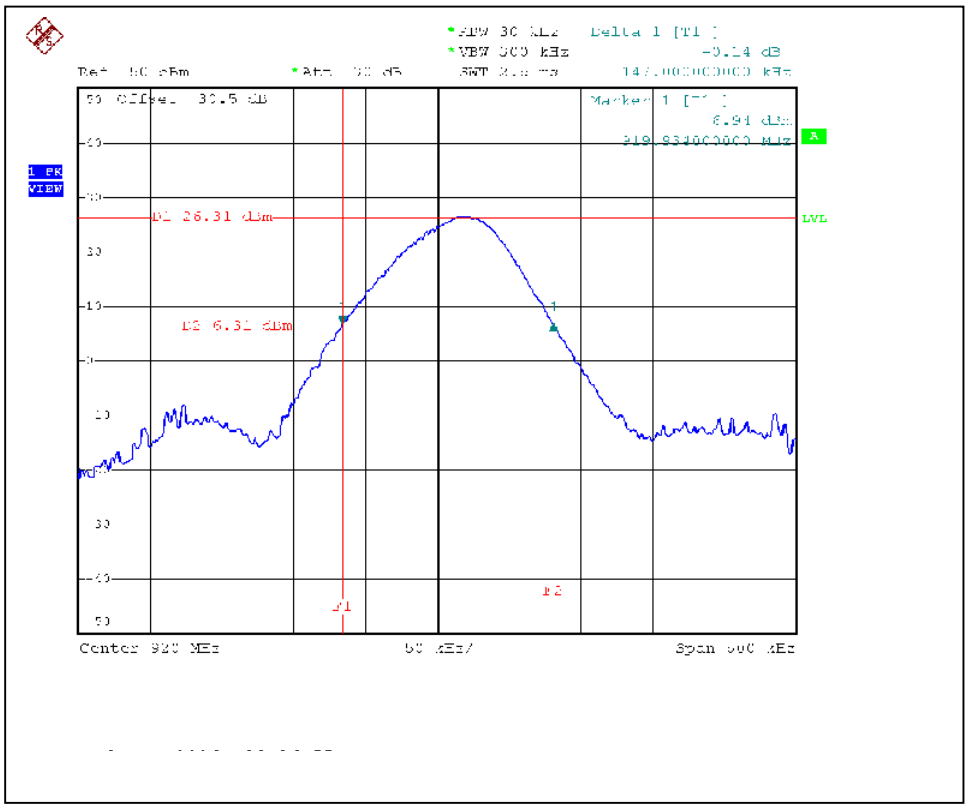
Channel 0



Channel 25



Channel 50



4.5 HOPPING CHANNEL SEPARATION

4.5.1 LIMIT OF HOPPING CHANNEL SEPARATION

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

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 10, 2006

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

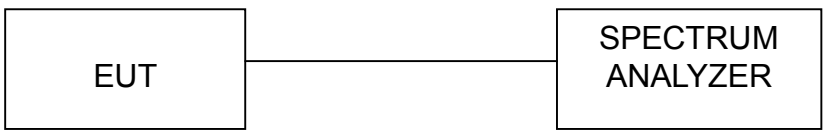
4.5.3 TEST PROCEDURES

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

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



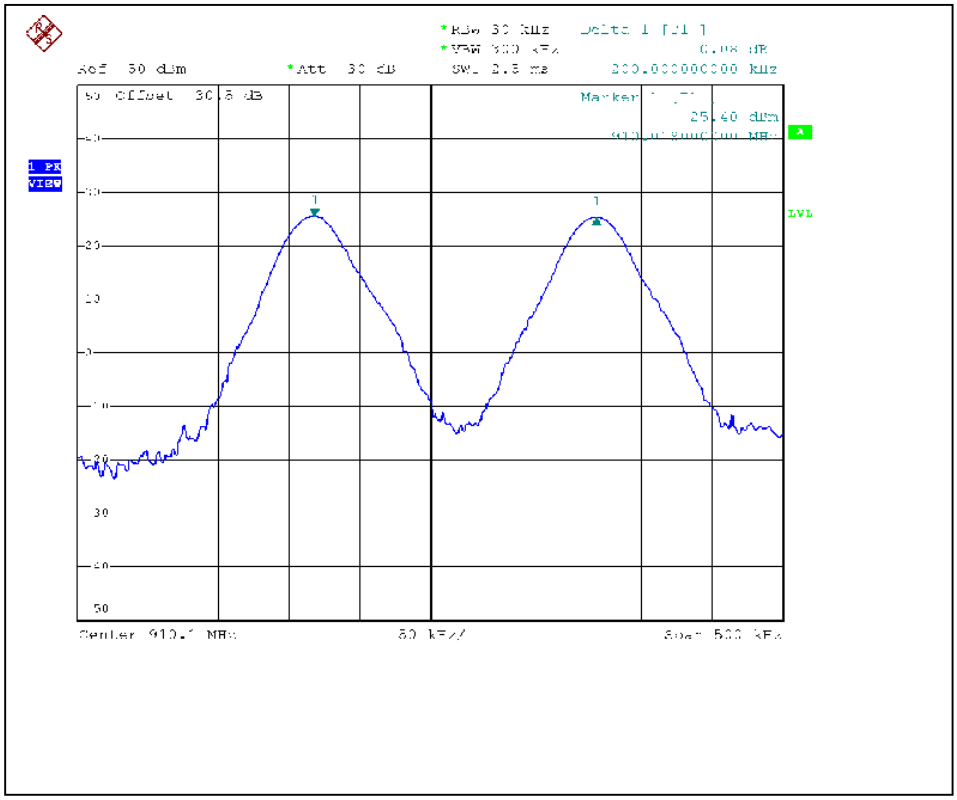
4.5.6 TEST RESULTS

ENVIRONMENTAL CONDITIONS	20 deg. C, 70%RH, 963 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Rex Huang		

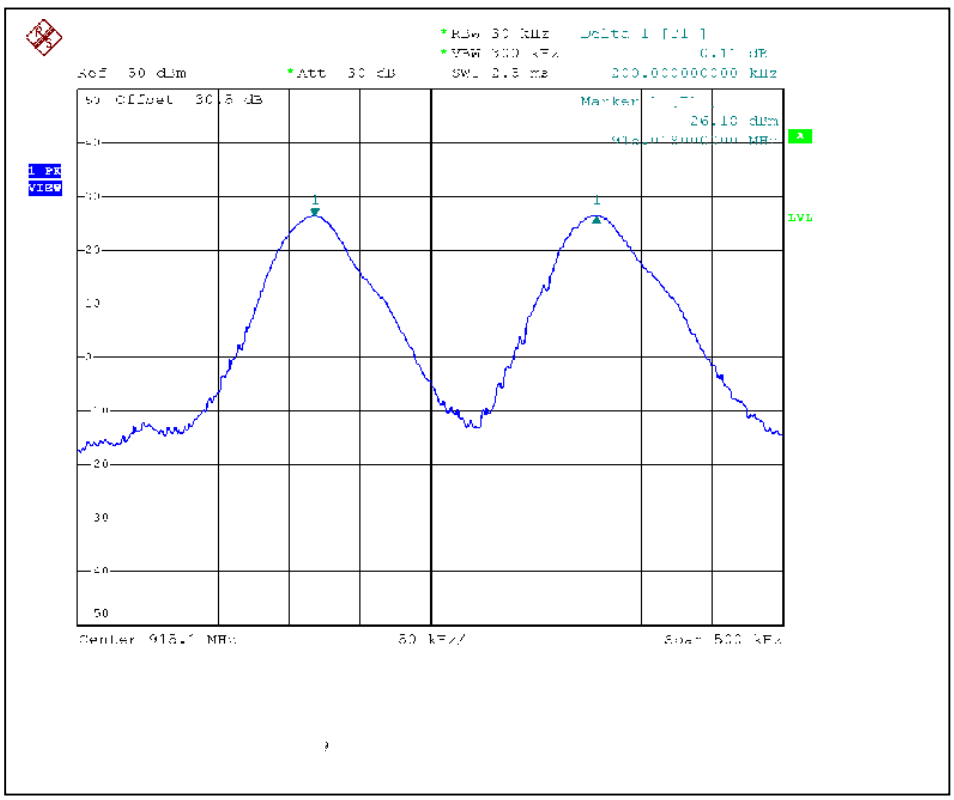
Channel	Frequency (MHz)	Adjacent Channel Separation	Minimum Limit (kHz)	Pass / Fail
0	910	200kHz	101	PASS
25	915	200kHz	104	PASS
50	920	200kHz	147	PASS

The minimum limit is 20dB bandwidth. Test results please refer to next three pages.

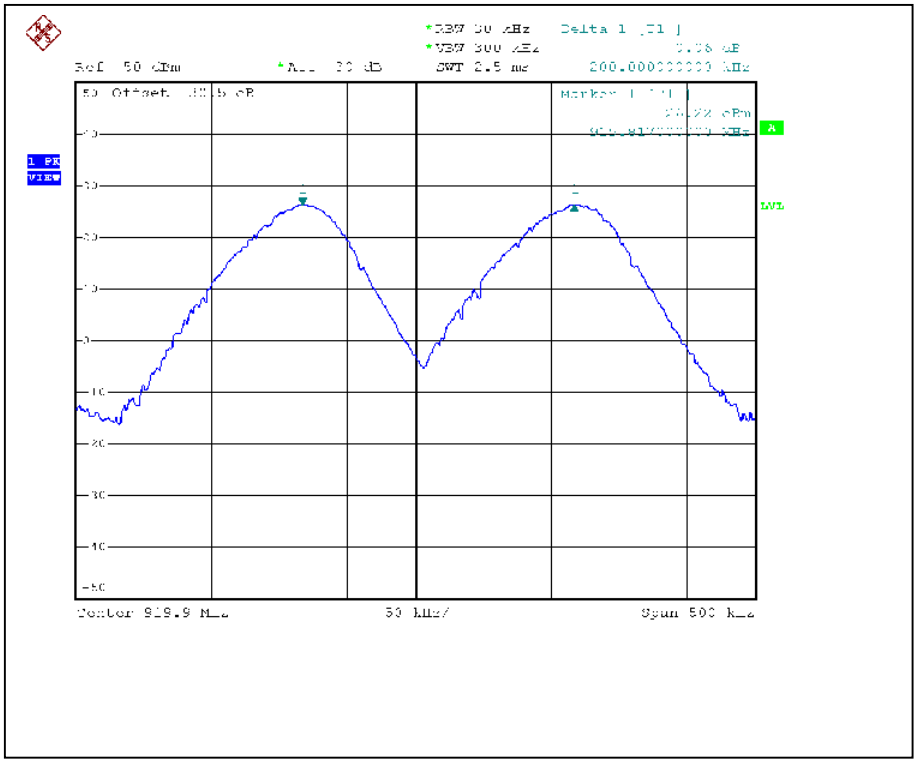
Channel 0



Channel 25



Channel 50



4.6 MAXIMUM PEAK OUTPUT POWER

4.6.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.6.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 10, 2006
Agilent SIGNAL GENERATOR	E8257C	MY43321031	Jun. 15, 2006
TEKTRONIX OSCILLOSCOPE	TDS 220	B027241	Aug. 02, 2006
NARDA DETECTOR	4503A	0306	NA

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

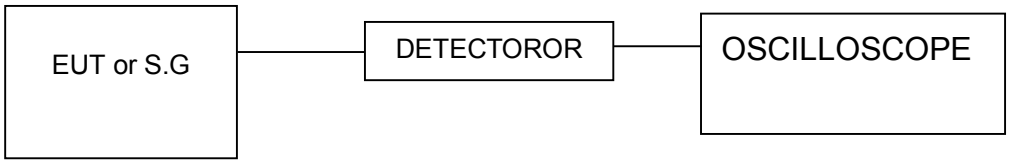
4.6.3 TEST PROCEDURES

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.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



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

4.6.6 EUT OPERATING CONDITION

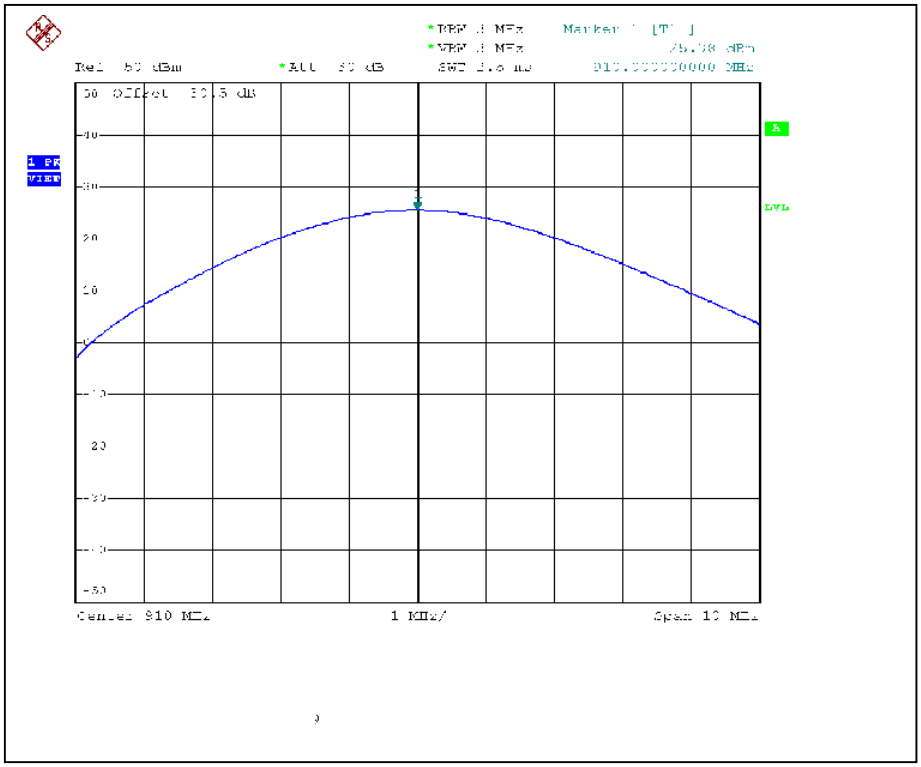
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.6.7 TEST RESULTS

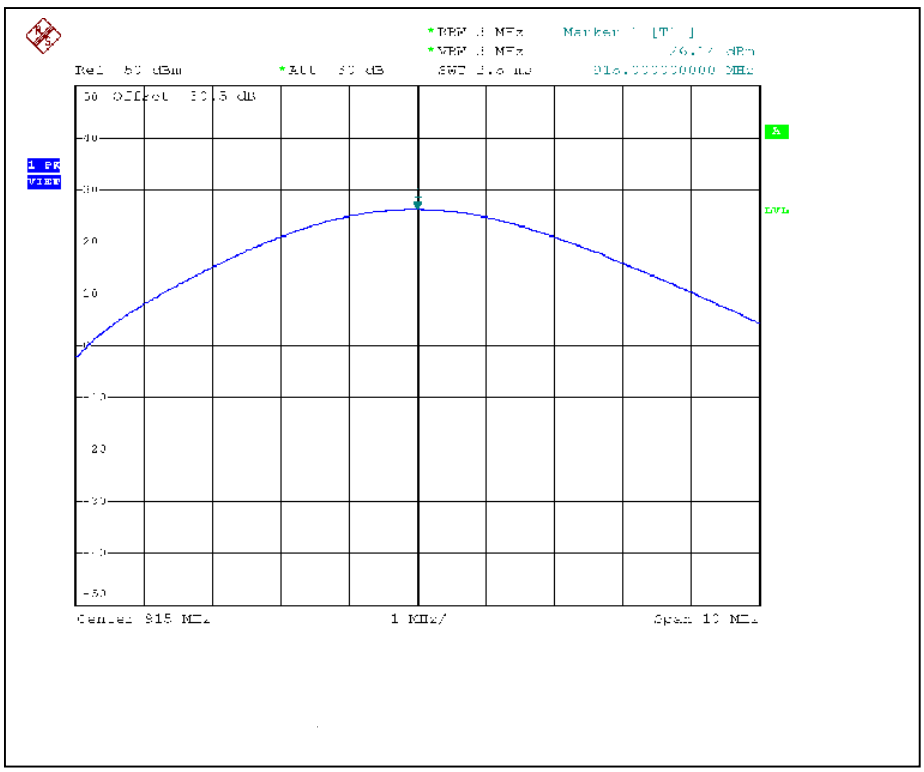
ENVIRONMENTAL CONDITIONS	24 deg. C, 54%RH, 963 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	910	345.144	25.38	30	PASS
25	915	411.434	26.14	30	PASS
50	920	421.697	26.25	30	PASS

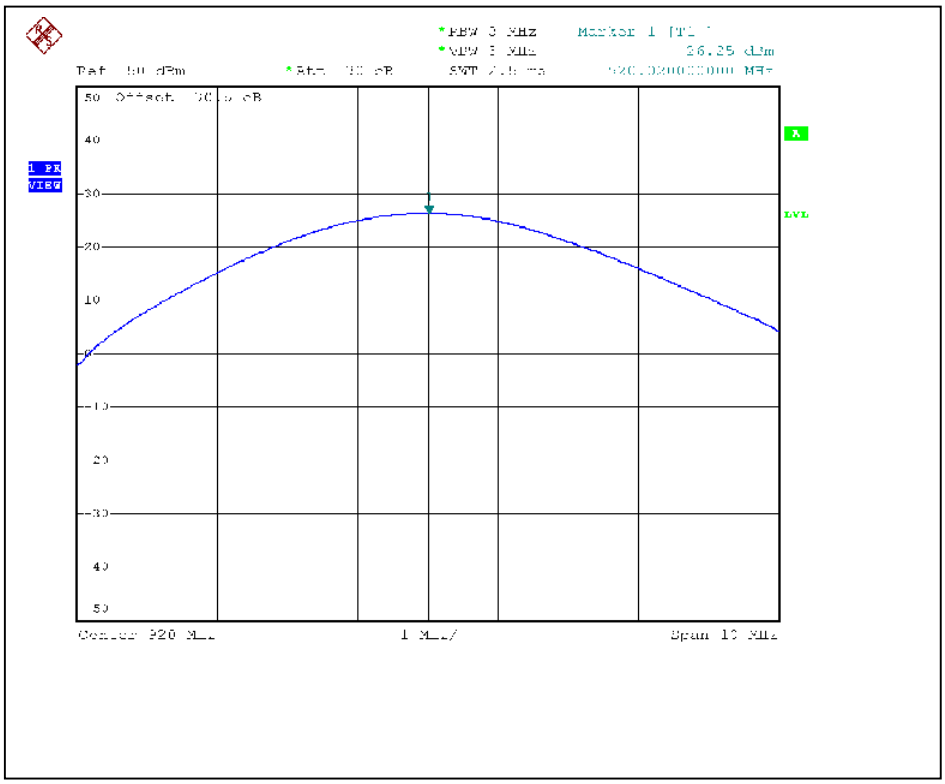
Channel 0



Channel 25



Channel 50


*RBW 3 MHz
*VBW 3 MHz
Marker 1 [T1]
26.25 dBm
Ref 50 dBm
*Att 30 dB
SWT 2.5 ms
50 Offset 30.0 dB
40
30
20
10
0
-10
-20
-30
40
50
1 PK
VIEW
A
LVL
Center 920 MHz
1 MHz/
Span 10 MHz

4.7 RADIATED EMISSION MEASUREMENT

4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

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

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

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 07, 2006
HP Pre_Amplifier	8449B	3008A01922	Oct. 02, 2006
ROHDE & SCHWARZ Test Receiver	ESCS30	100287	Dec. 08, 2006
CHASE Broadband Antenna	VULB9168	138	Dec. 21, 2006
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 11, 2006
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 05, 2007
SCHWARZBECK Biconical Antenna	VHBA9123	459	Jun. 26, 2006
SCHWARZBECK Periodic Antenna	UPA6108	1148	Jun. 26, 2006
R&S Loop Antenna	HFH2-Z2	881058/15	May 06, 2006
RF Switches (ARNITSU)	CS-201	1565157	NA
RF CABLE (Chaintek)	SF102	22054-2	Nov. 16. 2006
RF Cable(RICHTEC)	9913-30M	STCCAB-30M-1GHz-021	Jul. 16, 2006
Software	ADT_Radiated_V5.14	NA	NA
CHANCE MOST Antenna Tower	AT-100	0203	NA
CHANCE MOST Turn Table	TT-100	0203	NA

Note: 1. The calibration interval of the above test instruments is 12 months (36 months for Periodic Antenna)and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in ADT 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 4824-3.
7. The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4. 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)	2.98 dB
Radiated emissions (1GHz ~18GHz)	2.21 dB
Radiated emissions (18GHz ~40GHz)	1.88 dB

4.7.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

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

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

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

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

f. If the emission level of the EUT in peak mode was 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.

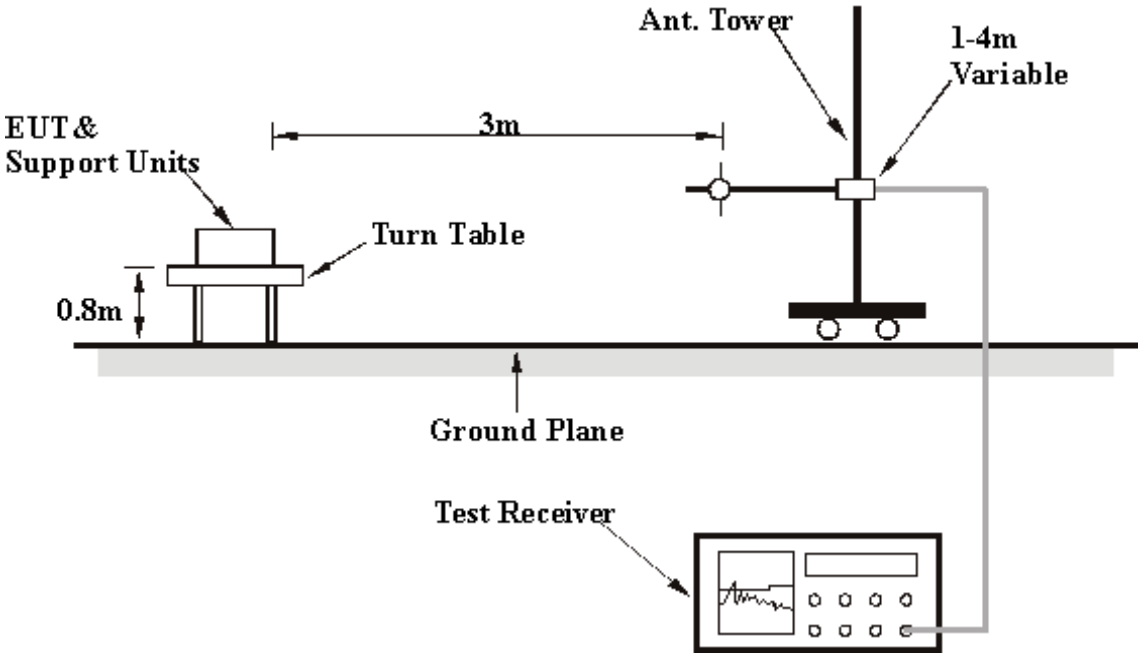
NOTE:

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 and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



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

4.7.6 TEST RESULTS

CHANNEL	0	FREQUENCY RANGE	Below 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 65%RH, 963 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	125.00	26.50 QP	43.50	-17.00	2.16 H	75	14.60	11.90
2	200.00	28.90 QP	43.50	-14.60	1.54 H	340	17.70	11.20
3	250.00	35.30 QP	46.00	-10.70	1.11 H	92	22.00	13.30
4	500.00	40.50 QP	46.00	-5.50	2.05 H	3	19.60	20.90
5	700.00	38.60 QP	46.00	-7.40	1.19 H	2	13.70	24.90
6	900.00	49.70 PK	108.70	-29.00	1.15 H	358	21.80	27.90
7	900.00	36.50 AV	73.80	-37.30	1.15 H	356	8.60	27.90
8	902.00	76.00 PK	108.70	-32.70	1.15 H	356	48.00	27.90
9	902.00	32.60 AV	73.80	-41.20	1.15 H	356	4.60	27.90
10	910.00	12.70 PK			1.15 H	356	100.60	28.10
11	910.00	93.80 AV			1.15 H	356	65.70	28.10

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	125.00	27.70 QP	43.50	-15.80	1.00 V	69	1.60	26.10
2	200.00	28.50 QP	43.50	-15.00	1.00 V	251	2.40	26.10
3	250.00	30.50 QP	46.00	-15.50	1.00 V	48	4.40	26.10
4	500.00	43.30 QP	46.00	-2.70	1.00 V	16	17.20	26.10
5	700.00	33.50 QP	46.00	-12.50	1.00 V	172	7.40	26.10
6	900.00	51.10 PK	109.20	-58.10	1.46 V	7	25.00	26.10
7	900.00	37.50 AV	74.30	-36.80	1.46 V	7	11.40	26.10
8	902.00	76.20 PK	109.20	-32.80	1.42 V	12	50.10	26.10
9	902.00	32.20 AV	74.30	-42.10	1.42 V	12	6.10	26.10
10	910.00	129.20 PK			1.42 V	12	103.10	26.10
11	910.00	94.30 AV			1.42 V	12	68.20	26.10

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.

CHANNEL	Channel 0	**FREQUENCY RANGE**	1 ~25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24 deg. C, 54%RH, 963 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	1820.00	60.50 PK	74.00	-13.50	1.34 H	107	32.70	27.80
1	1820.00	28.00 AV	54.00	-26.00	1.34 H	107	0.20	27.80
2	2730.00	56.60 PK	74.00	-17.40	1.34 H	238	25.60	31.00
2	2730.00	24.10 AV	54.00	-29.90	1.34 H	238	-6.90	31.00
3	3640.00	46.20 PK	74.00	-27.80	1.27 H	264	13.30	32.80
3	3640.00	13.70 AV	54.00	-40.30	1.27 H	264	-19.20	32.80
4	4550.00	44.90 PK	74.00	-29.10	1.35 H	343	10.90	34.00
4	4550.00	12.40 AV	54.00	-41.60	1.35 H	343	-21.60	34.00
5	5460.00	45.00 PK	74.00	-29.00	1.24 H	316	9.30	35.70
5	5460.00	12.50 AV	54.00	-41.50	1.24 H	316	-23.20	35.70
6	6370.00	45.30 PK	74.00	-28.70	1.34 H	47	7.80	37.50
6	6370.00	12.80 AV	54.00	-41.20	1.34 H	47	-24.70	37.50
7	7280.00	54.30 PK	74.00	-19.70	1.18 H	56	13.70	40.60
7	7280.00	21.80 AV	54.00	-32.20	1.18 H	56	-18.80	40.60
8	8190.00	52.90 PK	74.00	-21.10	1.12 H	31	9.80	43.10
8	8190.00	20.40 AV	54.00	-33.60	1.12 H	31	-22.70	43.10
9	9100.00	50.60 PK	74.00	-23.40	1.47 H	39	7.30	43.40
9	9100.00	18.10 AV	54.00	-35.90	1.47 H	39	-25.20	43.40

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	1820.00	66.60 PK	74.00	-7.40	1.05 V	135	38.80	27.80
1	1820.00	34.10 AV	54.00	-19.90	1.05 V	135	6.30	27.80
2	2730.00	60.20 PK	74.00	-13.80	1.00 V	149	29.20	31.00
2	2730.00	27.70 AV	54.00	-26.30	1.00 V	149	-3.30	31.00
3	3640.00	50.00 PK	74.00	-24.00	1.00 V	27	17.10	32.80
3	3640.00	17.50 AV	54.00	-36.50	1.00 V	27	-15.40	32.80
4	4550.00	46.20 PK	74.00	-27.80	1.23 V	354	12.20	34.00
4	4550.00	13.70 AV	54.00	-40.30	1.23 V	354	-20.30	34.00
5	5460.00	44.50 PK	74.00	-29.50	1.67 V	15	8.80	35.70
5	5460.00	12.00 AV	54.00	-42.00	1.67 V	15	-23.70	35.70
6	6370.00	45.70 PK	74.00	-28.30	1.07 V	339	8.20	37.50
6	6370.00	13.20 AV	54.00	-40.80	1.07 V	339	-24.30	37.50
7	7280.00	53.50 PK	74.00	-20.50	1.09 V	341	12.90	40.60
7	7280.00	21.00 AV	54.00	-33.00	1.09 V	341	-19.60	40.60
8	8190.00	52.80 PK	74.00	-21.20	1.43 V	342	9.70	43.10
8	8190.00	20.30 AV	54.00	-33.70	1.43 V	342	-22.80	43.10
9	9100.00	50.00 PK	74.00	-24.00	1.32 V	297	6.70	43.40
9	9100.00	17.50 AV	54.00	-36.50	1.32 V	297	-25.80	43.40

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 247 ms per channel.Therefore, the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)

CHANNEL	25	FREQUENCY RANGE	Below 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 65%RH, 963 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	125.00	25.80 QP	43.50	-17.70	2.11 H	24	13.60	12.20
2	200.00	27.20 QP	43.50	-16.30	1.24 H	320	15.60	11.60
3	250.00	36.10 QP	46.00	-9.90	1.47 H	147	22.30	13.80
4	500.00	41.10 QP	46.00	-4.90	1.23 H	240	19.30	21.80
5	700.00	37.20 QP	46.00	-8.80	1.24 H	54	11.40	25.80
6	900.00	50.10 PK	109.70	-59.60	1.12 H	321	21.20	28.90
7	900.00	74.60 AV	74.60	-37.50	1.12 H	321	8.20	28.90
8	915.00	129.70 PK			1.12 H	321	100.50	29.20
9	915.00	94.60 AV			1.12 H	321	65.40	29.20

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	125.00	27.10 QP	43.50	-16.40	1.01 V	321	14.90	12.20
2	200.00	28.10 QP	43.50	-15.40	1.03 V	210	16.50	11.60
3	250.00	31.40 QP	46.00	-14.60	1.07 V	258	17.60	13.80
4	500.00	43.70 QP	46.00	-2.30	1.04 V	56	21.90	21.80
5	700.00	34.10 QP	46.00	-11.90	1.24 V	241	8.30	25.80
6	900.00	52.40 PK	110.10	-57.70	1.07 V	85	23.50	28.90
7	900.00	38.40 AV	75.40	-37.70	1.07 V	85	9.50	28.90
8	915.00	130.10 PK			1.07 V	85	100.90	29.20
9	915.00	95.40 AV			1.07 V	85	66.20	29.20

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.

CHANNEL	Channel 25	**FREQUENCY RANGE**	1 ~25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24 deg. C, 54%RH, 963 hPa	**TESTED BY**	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M								
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	1830.00	61.40 PK	74.00	-12.60	1.24 H	320	33.50	27.90
1	1830.00	28.90 AV	54.00	-25.10	1.24 H	320	1.00	27.90
2	2745.00	57.10 PK	74.00	-16.90	1.25 H	360	26.20	30.90
2	2745.00	24.60 AV	54.00	-29.40	1.25 H	360	-6.30	30.90
3	3660.00	46.40 PK	74.00	-27.60	1.18 H	201	13.60	32.80
3	3660.00	13.90 AV	54.00	-40.10	1.18 H	201	-18.90	32.80
4	4575.00	44.90 PK	74.00	-29.10	1.22 H	236	10.80	34.10
4	4575.00	12.40 AV	54.00	-41.60	1.22 H	236	-21.70	34.10
5	5490.00	45.80 PK	74.00	-28.20	1.32 H	102	10.10	35.70
5	5490.00	13.30 AV	54.00	-40.70	1.32 H	102	-22.40	35.70
6	6405.00	45.80 PK	74.00	-28.20	1.20 H	223	8.20	37.60
6	6405.00	13.30 AV	54.00	-40.70	1.20 H	223	-24.30	37.60
7	7320.00	55.10 PK	74.00	-18.90	1.21 H	54	14.40	40.70
7	7320.00	22.60 AV	54.00	-31.40	1.21 H	54	-18.10	40.70
8	8235.00	53.40 PK	74.00	-20.60	1.14 H	59	10.20	43.20
8	8235.00	20.90 AV	54.00	-33.10	1.14 H	59	-22.30	43.20
9	9150.00	51.20 PK	74.00	-22.80	1.20 H	124	7.80	43.40
9	9150.00	18.70 AV	54.00	-35.30	1.20 H	124	-24.70	43.40

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M								
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	1830.00	67.50 PK	74.00	-6.50	1.20 V	241	39.60	27.90
1	1830.00	35.30 AV	54.00	-18.70	1.20 V	241	7.40	27.90
2	2745.00	61.30 PK	74.00	-12.70	1.07 V	231	30.40	30.90
2	2745.00	28.80 AV	54.00	-25.20	1.07 V	231	-2.10	30.90
3	3660.00	51.10 PK	74.00	-22.90	1.04 V	111	18.30	32.80
3	3660.00	18.60 AV	54.00	-35.40	1.04 V	111	-14.20	32.80
4	4575.00	46.80 PK	74.00	-27.20	1.05 V	236	12.70	34.10
4	4575.00	14.30 AV	54.00	-39.70	1.05 V	236	-19.80	34.10
5	5490.00	45.10 PK	74.00	-28.90	1.06 V	124	9.40	35.70
5	5490.00	12.60 AV	54.00	-41.40	1.06 V	124	-23.10	35.70
6	6405.00	46.30 PK	74.00	-27.70	1.10 V	211	8.70	37.60
6	6405.00	13.80 AV	54.00	-40.20	1.10 V	211	-23.80	37.60
7	7320.00	54.40 PK	74.00	-19.60	1.03 V	223	13.70	40.70
7	7320.00	21.90 AV	54.00	-32.10	1.03 V	223	-18.80	40.70
8	8235.00	53.20 PK	74.00	-20.80	1.07 V	123	10.00	43.20
8	8235.00	20.70 AV	54.00	-33.30	1.07 V	123	-22.50	43.20
9	9150.00	51.20 PK	74.00	-22.80	1.03 V	222	7.80	43.40
9	9150.00	18.70 AV	54.00	-35.30	1.03 V	222	-24.70	43.40

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 247 ms per channel.Therefore, the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)

CHANNEL	50	FREQUENCY RANGE	Below 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 65%RH, 963 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	125.00	26.20 QP	43.50	-17.30	2.15 H	77	14.40	11.90
2	200.00	28.80 QP	43.50	-14.70	1.53 H	21	17.60	11.20
3	250.00	35.50 QP	46.00	-10.50	1.08 H	91	22.20	13.30
4	500.00	41.10 QP	46.00	-4.90	1.73 H	13	20.20	20.90
5	700.00	48.50 PK	111.20	-62.70	1.59 H	27	23.60	24.90
5	700.00	37.10 AV	75.90	-38.80	1.57 H	22	12.20	24.90
6	900.00	47.50 PK	111.20	-63.70	1.13 H	358	19.60	27.90
6	900.00	34.10 AV	75.90	-41.80	1.13 H	358	6.20	27.90
7	920.00	131.20 PK			1.12 H	348	102.90	28.30
7	920.00	95.90 AV			1.12 H	348	67.60	28.30
8	928.00	80.20 PK	111.20	-31.00	1.12 H	348	51.80	28.40
8	928.00	31.40 AV	75.90	-44.50	1.12 H	347	3.00	28.40

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	125.00	29.00 QP	43.50	-14.50	1.00 V	161	17.10	11.90
2	250.00	33.50 QP	46.00	-12.50	1.00 V	220	20.20	13.30
3	500.00	43.00 QP	46.00	-3.00	1.00 V	23	22.10	20.90
4	700.00	34.20 AV	111.60	-77.40	1.20 V	23	9.30	24.90
4	700.00	45.80 PK	76.00	-30.20	1.20 V	9	20.90	24.90
5	900.00	49.60 AV	111.60	-62.00	1.43 V	9	21.70	27.90
5	900.00	36.80 PK	76.00	-39.20	4.43 V	9	8.90	27.90
6	920.00	131.6 AV			1.40 V	9	103.30	28.30
6	920.00	96.00 PK			1.40 V	9	67.70	28.30
7	928.00	79.80 AV	111.60	-31.80	1.40 V	9	51.40	28.40
7	928.00	31.40 PK	76.00	-44.60	1.40 V	9	3.00	28.40

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.

CHANNEL	Channel 50	**FREQUENCY RANGE**	1 ~25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	24 deg. C, 54%RH, 963 hPa	**TESTED BY**	Rex Huang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M								
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	1840.00	66.10 PK	74.00	-7.90	1.37 H	112	38.20	27.90
1	1840.00	33.60 AV	54.00	-20.40	1.37 H	112	5.70	27.90
2	2760.00	58.30 PK	74.00	-15.70	1.36 H	196	27.30	31.00
2	2760.00	25.80 AV	54.00	-28.20	1.36 H	196	-5.20	31.00
3	3860.00	48.60 PK	74.00	-25.40	1.27 H	263	15.60	33.10
3	3860.00	16.10 AV	54.00	-37.90	1.27 H	263	-16.90	33.10
4	4600.00	45.80 PK	74.00	-28.20	1.31 H	345	11.60	34.20
4	4600.00	13.30 AV	54.00	-40.70	1.31 H	345	-20.90	34.20
5	5520.00	44.80 PK	74.00	-29.20	1.28 H	43	9.00	35.80
5	5520.00	12.30 AV	54.00	-41.70	1.28 H	43	-23.50	35.80
6	6440.00	45.80 PK	74.00	-28.20	1.38 H	42	8.20	37.60
6	6440.00	13.30 AV	54.00	-40.70	1.38 H	42	-24.30	37.60
7	7360.00	54.00 PK	74.00	-20.00	1.22 H	358	13.30	40.80
7	7360.00	16.50 AV	54.00	-37.50	1.22 H	358	-24.20	40.80
8	8280.00	52.90 PK	74.00	-21.10	1.20 H	4	9.50	43.40
8	8280.00	19.40 AV	54.00	-34.60	1.20 H	4	-24.00	43.40
9	9200.00	51.00 PK	74.00	-23.00	1.53 H	56	7.40	43.50
9	9200.00	18.50 AV	54.00	-35.50	1.53 H	56	-25.10	43.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M								
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	**1840.00**	**73.60 PK**	**74.00**	**-0.40**	**1.07 V**	**137**	**45.70**	**27.90**
1	1840.00	41.10 AV	54.00	-12.90	1.07 V	137	13.20	27.90
2	2760.00	63.90 PK	74.00	-10.10	1.00 V	147	32.90	31.00
2	2760.00	31.40 AV	54.00	-22.60	1.00 V	147	0.40	31.00
3	3680.00	50.70 PK	74.00	-23.30	1.00 V	21	17.80	32.90
3	3680.00	18.20 AV	54.00	-35.80	1.00 V	21	-14.70	32.90
4	4600.00	46.10 PK	74.00	-27.90	1.42 V	171	11.90	34.20
4	4600.00	13.60 AV	54.00	-40.40	1.42 V	171	-20.60	34.20
5	5520.00	45.50 PK	74.00	-28.50	1.35 V	23	9.70	35.80
5	5520.00	13.00 AV	54.00	-41.00	1.35 V	23	-22.80	35.80
6	6440.00	46.40 PK	74.00	-27.60	1.08 V	7	8.80	37.60
6	6440.00	13.90 AV	54.00	-40.10	1.08 V	7	-23.70	37.60
7	7360.00	55.50 PK	74.00	-18.50	1.35 V	18	14.80	40.80
7	7360.00	23.00 AV	54.00	-31.00	1.35 V	18	-17.70	40.80
8	8280.00	57.10 PK	74.00	-16.90	1.20 V	17	13.70	43.40
8	8280.00	24.60 AV	54.00	-29.40	1.20 V	17	-18.80	43.40
9	9200.00	50.60 PK	74.00	-23.40	1.47 V	24	7.00	43.50
9	9200.00	18.10 AV	54.00	-35.90	1.47 V	24	-25.50	43.50

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 247 ms per channel.Therefore, the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)

4.8 BAND EDGES MEASUREMENT

4.8.1 LIMITS OF BAND EDGES 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 Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 10, 2006

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. 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

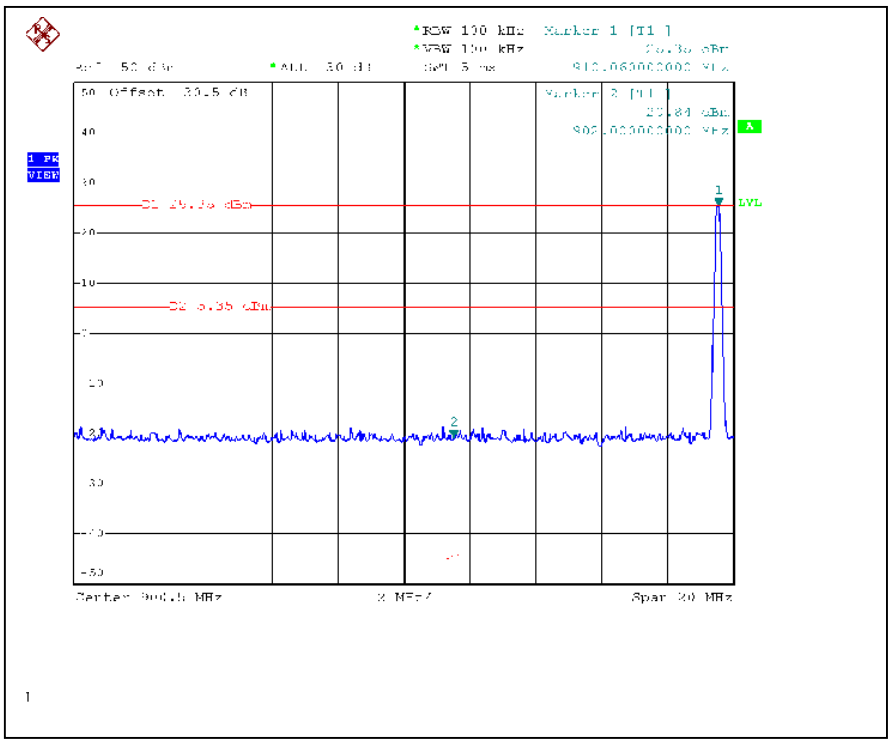
4.8.5 EUT OPERATING CONDITION

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

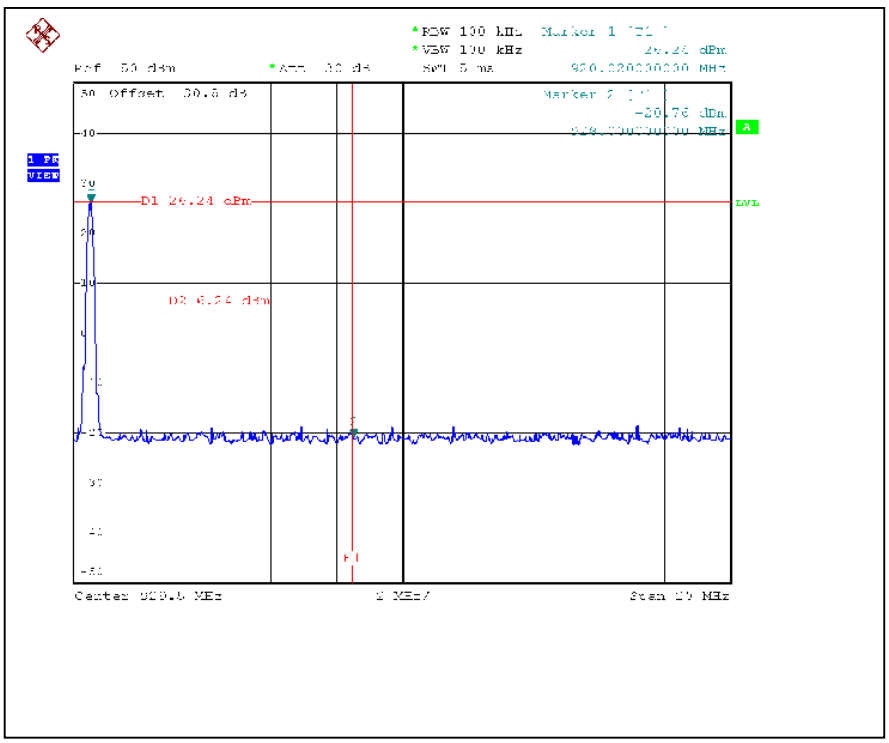
4.8.6 TEST RESULTS

The spectrum plots are attached on the following 2 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).

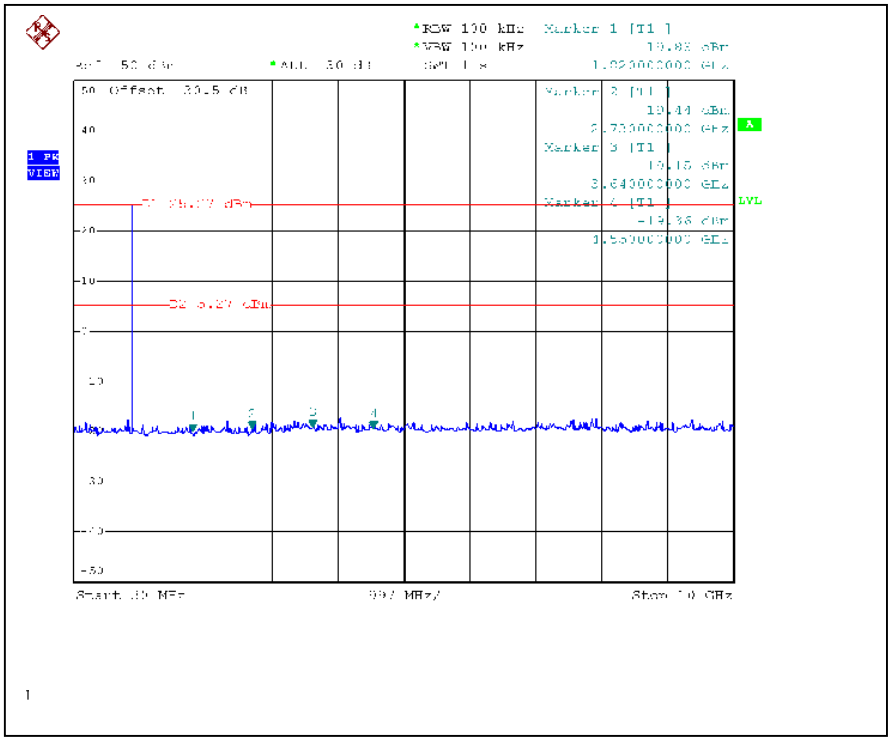
CH0


RBW 100 kHz
VBW 100 kHz
Marker 1 [T1]
Offset 30.5 dB
Marker 2 [T1]
20.84 dBm
1 PK
VIEW
D1 20.24 dBm
D2 0.35 dBm
LVL

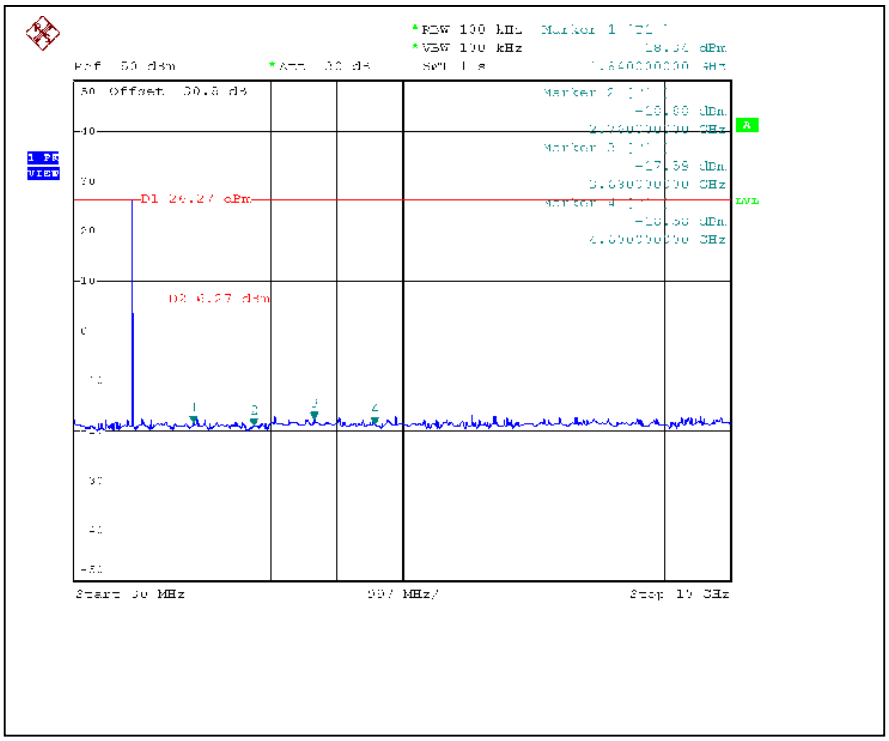
CH50


RBW 100 kHz
VBW 100 kHz
Ref 50 dBm
Offset 30.5 dB
Marker 2 [T1]
-20.76 dBm
1 PK
VIEW
D1 26.24 dBm
LVL

CH0


RBW 100 kHz
VBW 100 kHz
Offset 30.5 dB
1 PK
VIEW
D1 26.27 dBm
D2 6.27 dBm
LVL

CH50


RBW 100 kHz
VBW 100 kHz
Offset 30.5 dB
1 PK
VIEW
D1 26.27 dBm
D2 6.27 dBm
LVL

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 is one antenna provided to this EUT:

Antenna Type	Gain (dBi)	Connector Type	Cable loss (dB)	Gain (dBi)
Circular Antenna	6 dBi	SMA Female	0.75	5.25 dBi

5 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., 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, UL, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA, CSA
R.O.C.	CNLA, BSMI, DGT
Netherlands	Telefication
Singapore	PSB, 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:

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Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:
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Web Site: www.adt.com.tw

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