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FCC TEST REPORT(Bluetooth)

REPORT NO.: RF130223E01-2

MODEL NO.: QCNFA222

FCC ID: PPD-QCNFA222

IC: 4104A-QCNFA222

RECEIVED: Feb. 23, 2013

TESTED: Feb. 26 to June 10, 2013

ISSUED: July 08, 2013

APPLICANT: Qualcomm Atheros, Inc.

ADDRESS: 1700 Technology Drive, San Jose, CA 95110

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

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Testing Laboratory
2022

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130223E01-2	Original release	July 08, 2013



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1 CERTIFICATION

PRODUCT : PCIE 802.11a/b/g/n 2.4GHz/5GHz + USB BT 4.0 card

BRAND NAME : Qualcomm Atheros

MODEL NO. : QCNFA222

TEST SAMPLE : ENGINEERING SAMPLE

APPLICANT : Qualcomm Atheros, Inc.

TESTED : Feb. 26 to June 10, 2013

STANDARDS : FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10-2009
Canada RSS-210 Issue 8 (2010-12)
Canada RSS-Gen Issue 3 (2010-12)

The above equipment (Model: QCNFA222) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and was in 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 : C. Kuan, **DATE:** July 08, 2013
(Claire Kuan, Specialist)

APPROVED BY : M. Chen, **DATE:** July 08, 2013
(May Chen, Manager)



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2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C; RSS-210; RSS-Gen				
STANDARD SECTION		TEST TYPE AND LIMIT	RESULT	REMARK
FCC Part 15	RSS-Gen RSS-210			
15.207	RSS-Gen 7.2.4	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -3.60dB at 16.46484MHz.
15.247(a)(1) (iii)	RSS-210 A8.1(b)	Number of Hopping Frequency Used	PASS	Meet the requirement of limit.
15.247(a)(1) (iii)	RSS-210 A8.1(d)	Dwell Time on Each Channel	PASS	Meet the requirement of limit.
15.247(a)(1)	RSS-210 A8.1(d)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	PASS	Meet the requirement of limit.
15.247(b)	RSS-210 A8.4(2)	Maximum Peak Output Power	PASS	Meet the requirement of limit.
15.247(d)	RSS-210 A8.5	Transmitter Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.3dB at 2361.06MHz.
15.247(d)	RSS-210 A8.5	Conducted Out-Band Emission Measurement	PASS	Meet the requirement of limit.
-	RSS-Gen 4.6	Occupied Bandwidth Measurement	-	Meet the requirement.
15.203	-	Antenna Requirement	PASS	Antenna connector is IPEX not a standard connector.

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



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2.1 MEASUREMENT UNCERTAINTY

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

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

Measurement	Value
Conducted emissions	2.98 dB
Radiated emissions (30MHz-1GHz)	5.63 dB
Radiated emissions (1GHz -6GHz)	3.54 dB
Radiated emissions (6GHz -18GHz)	4.08 dB
Radiated emissions (18GHz -40GHz)	4.11 dB



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3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT(BLUETOOTH)

PRODUCT	PCIE 802.11a/b/g/n 2.4GHz/5GHz + USB BT 4.0 card
MODEL NO.	QCNFA222
POWER SUPPLY	DC 3.3V from host equipment
MODULATION TYPE	GFSK, $\pi/4$ -DQPSK, 8DPSK
MODULATION TECHNOLOGY	FHSS
OPRTAING FREQUENCY	2402MHz ~ 2480MHz
NUMBER OF CHANNEL	Bluetooth 2.1+ EDR: 79
MAXIMUM OUTPUT POWER	GFSK: 3.855 mW 8DPSK: 6.950 mW
ANTENNA TYPE	See item 3.2
ANTENNA CONNECTOR	See item 3.2
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. The Bluetooth supports version 4.0.
2. Spurious Emission (radiated emission) of the simultaneous operation (WiFi & Bluetooth) have been evaluated and no non-compliance found. The detail combinations of transmitters / frequencies / modes as below table

Mode	Available Channel	Tested Channel	Modulation Technology
2.4 GHz (802.11g) + Bluetooth	1 to 11	6	OFDM
	0 to 78	78	FHSS
5 GHz (802.11a) + Bluetooth	149 to 165	149	OFDM
	0 to 78	0	FHSS

3. This device support the power back off for WLAN/BT coexist mode. The WiFi output power will reduce to 10.5dBm from Maximum power in 802.11n HT20 (2TX) mode of 2.4GHz when WLAN and BT simultaneously transmission.
4. 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.



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3.2 DESCRIPTION OF ANTENNA

The antenna provided to the EUT, please refer to the following table:

Brand	Model	Antenna Type	2.4G Gain with cable loss (dBi)	5G Gain with cable loss (dBi)	2.4G Cable Loss (dBi)	5G Cable Loss (dBi)	Connector Type	Cable Length (mm)
WNC	81.EBJ15.005	PIFA	3.62	Band 1&2: 3.08 Band 3: 4.76 Band 4: 4.76	1.15	Band1&2: 1.70 Band 3: 1.74 Band 4: 1.79	IPEX	300

Note: 1. Above antenna gains of antenna are Total (H+V).
2. All of antenna can be application for WLAN and Bluetooth.



3.3 DESCRIPTION OF TEST MODES

Seventy-nine channels are provided to this EUT.

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



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3.4 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

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

Where **PLC**: Power Line Conducted Emission**RE < 1G**: Radiated Emission below 1GHz**RE ≥ 1G**: Radiated Emission above 1GHz**APCM**: Antenna Port Conducted Measurement**OB**: Conducted Out-Band Emission Measurement**NOTE:** The EUT's antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

Power Line Conducted Emission Test:

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

Available Channel	Tested Channel	Modulation Type	Packet Type
0 to 78	78	8DPSK	DH5

Radiated Emission Test (Below 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, 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 Type	Packet Type
0 to 78	78	8DPSK	DH5

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 Type	Packet Type
0 to 78	0, 39, 78	GFSK	DH5
0 to 78	0, 39, 78	8DPSK	DH5



Conducted Out-Band 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 Type	Packet Type
0 to 78	0, 39, 78	GFSK	DH5
0 to 78	0, 39, 78	8DPSK	DH5

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 Type	Packet Type
0 to 78	0, 39, 78	GFSK	DH5
0 to 78	0, 39, 78	8DPSK	DH5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
PLC	20deg. C, 70%RH	120Vac, 60Hz	Mike Hsieh
RE \geq 1G	22deg. C, 70%RH	120Vac, 60Hz	Tim Ho
RE<1G	25deg. C, 69%RH	120Vac, 60Hz	Tim Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	James Chen
OB	25deg. C, 60%RH	120Vac, 60Hz	James Chen



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3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (Section 15.247)

ANSI C63.10-2009

Canada RSS-210 Issue 8 (2010-12)

Canada RSS-Gen Issue 3 (2010-12)

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



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3.6 DESCRIPTION OF SUPPORT UNITS

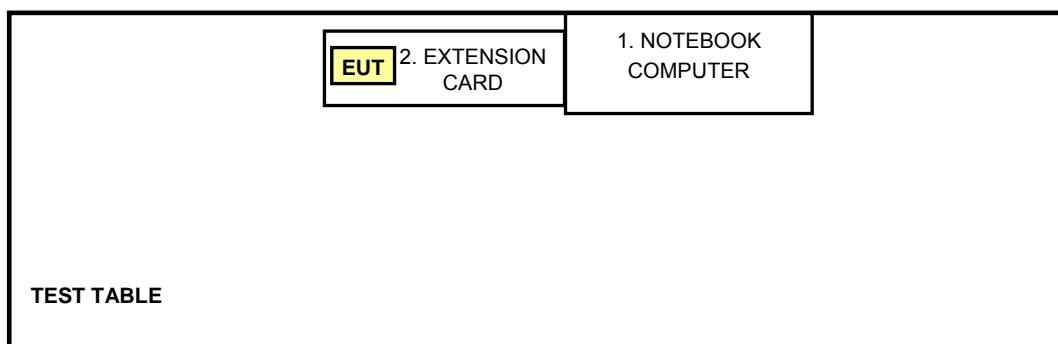
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP19L	CN-OHC416-70166-5 CA-0448	PIW6325005166 10
2	EXTENSION CARD	Qualcomm Atheros	NA	NA	NA

No.	Signal cable description
1	NA
2	NA

Note: The power cords of the above support units were unshielded (1.8m).

3.7 CONFIGURATION OF SYSTEM UNDER TEST





4 TEST PROCEDURES AND RESULTS

4.1 MAXIMUM PEAK OUTPUT POWER

4.1.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Limit is 125mW.

4.1.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	May 17, 2013	May 16, 2014

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. Tested date : June 10, 2013

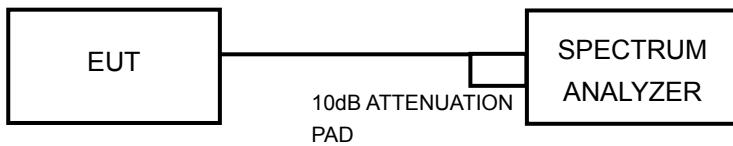
4.1.3 TEST PROCEDURES

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

4.1.6 EUT OPERATING CONDITION

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

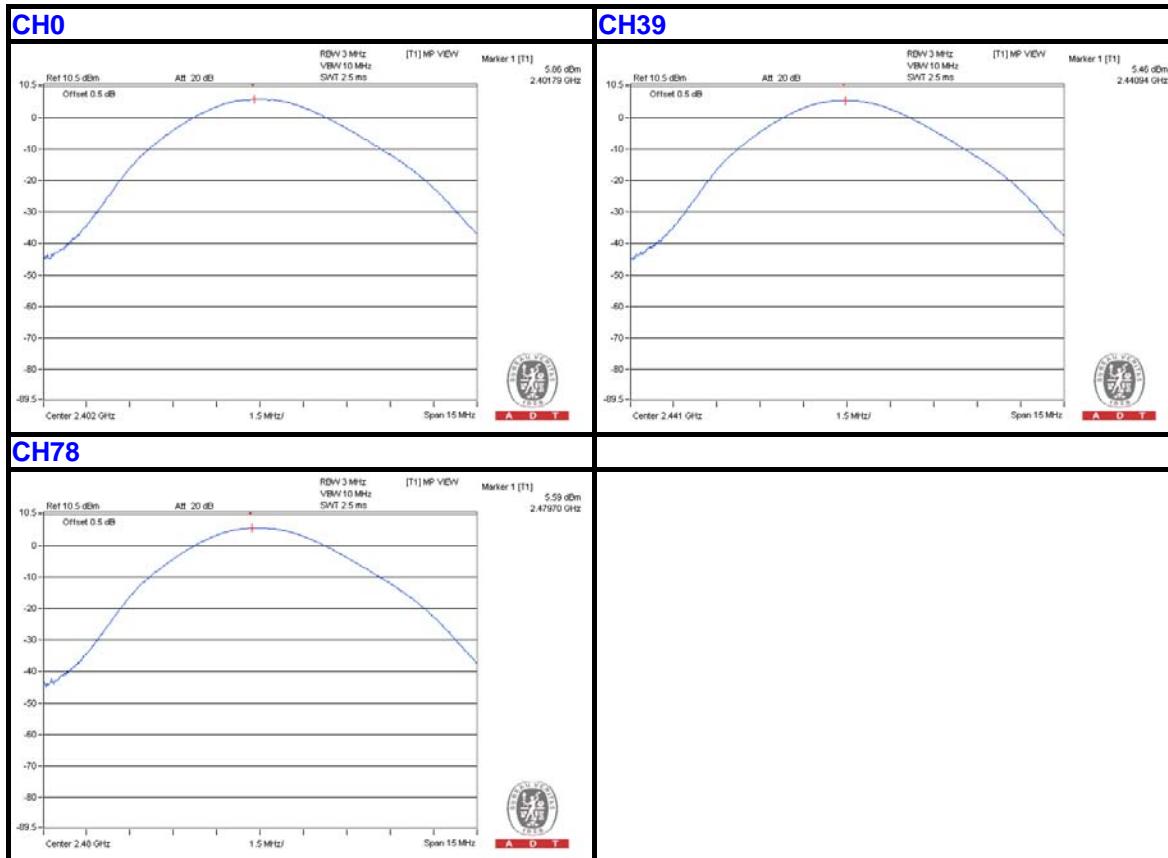


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4.1.7 TEST RESULTS

CHANNEL	FREQUENCY (MHz)	OUTPUT POWER (mW)		OUTPUT POWER (dBm)		POWER LIMIT (mW)	PASS / FAIL
		GFSK	8DPSK	GFSK	8DPSK		
0	2402	3.855	6.486	5.86	8.12	125	PASS
39	2441	3.516	6.808	5.46	8.33	125	PASS
78	2480	3.622	6.950	5.59	8.42	125	PASS

For GFSK

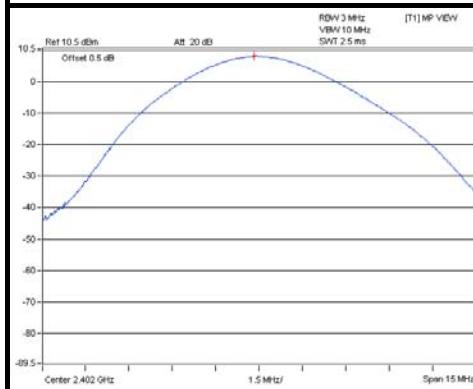




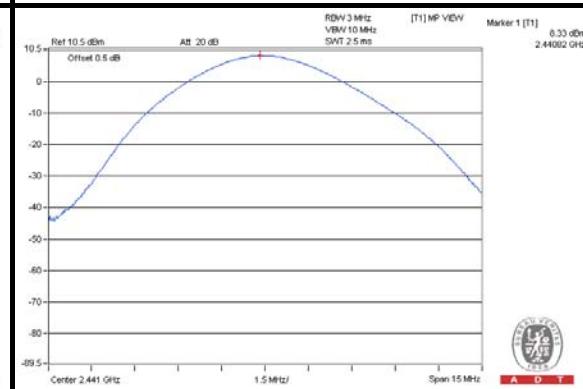
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For 8DPSK

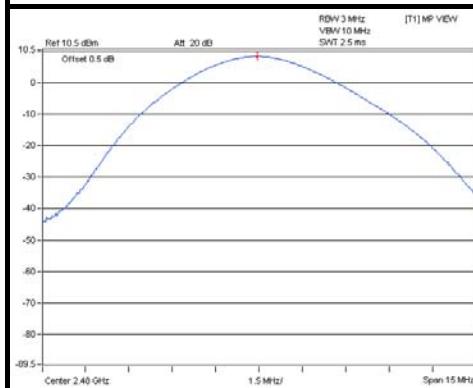
CH0



CH39



CH78





4.2 AVERAGE OUTPUT POWER

4.2.1 FOR REFERENCE.

4.2.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	0824006	May 20, 2013	May 19, 2014
Peak Power Sensor	MA2411B	0738172	May 20, 2013	May 19, 2014

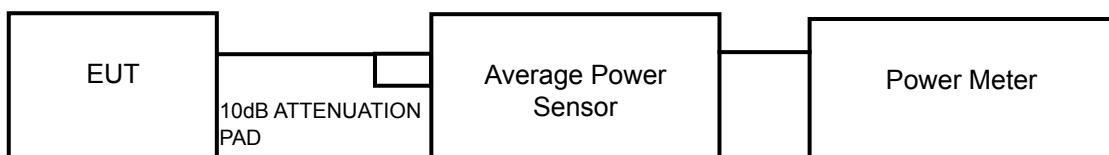
Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : June 10, 2013

4.2.3 TEST PROCEDURES

1. The transmitter output was connected to the power meter through an attenuator, the bandwidth of the fundamental frequency was measured with the power meter.
2. Record the average power level.

4.2.4 TEST SETUP



4.2.5 EUT OPERATING CONDITION

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



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4.2.6 TEST RESULTS

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER OUTPUT (mW)	
		GFSK	8DPSK
0	2402	5.69	5.33
39	2441	5.37	5.51
78	2480	5.43	5.81



4.3 CHANNEL BANDWIDTH

4.3.1 LIMITS OF CHANNEL BANDWIDTH

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

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	Jan. 21, 2013	Jan. 20, 2014

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. Tested date : June 10, 2013

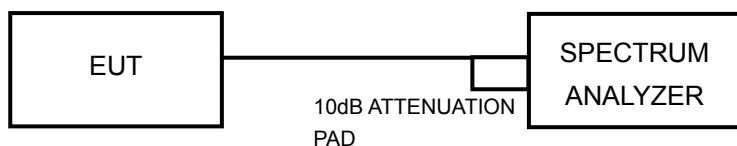
4.3.3 TEST PROCEDURE

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



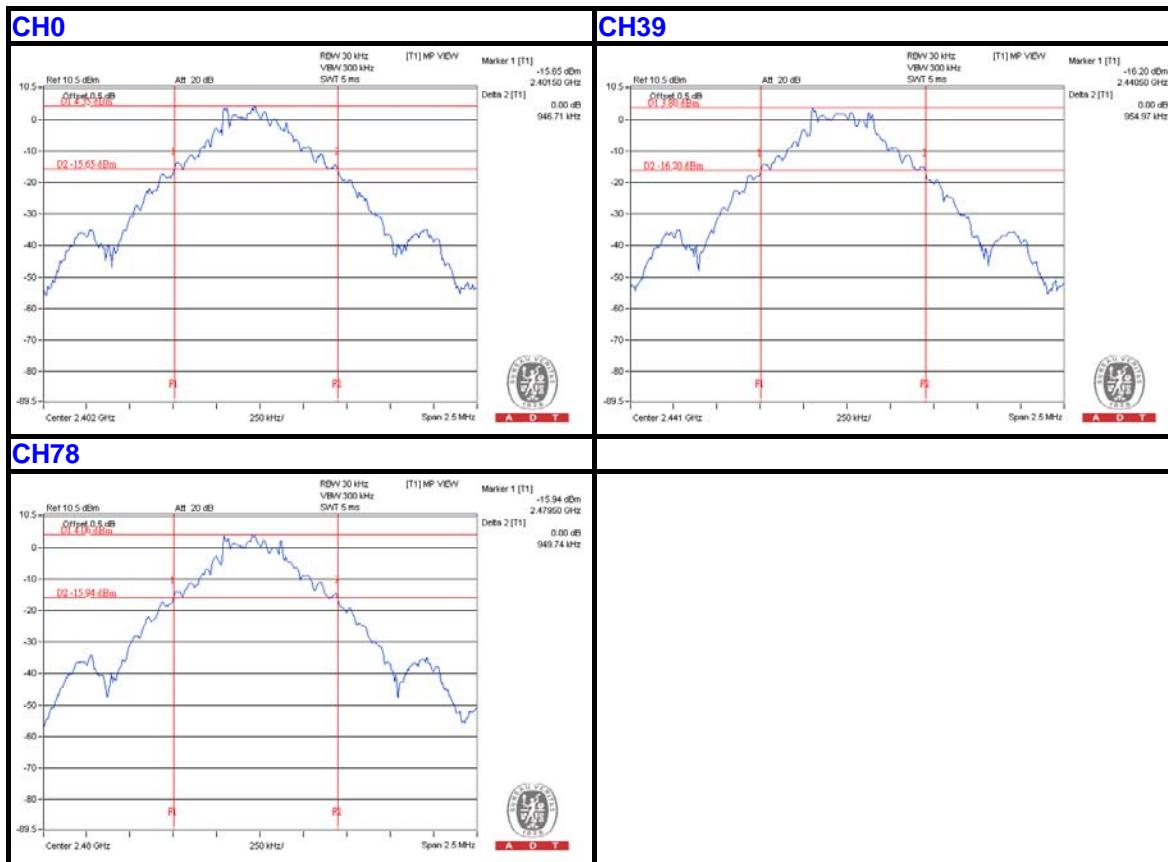
4.3.6 EUT OPERATING CONDITION

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

4.3.7 TEST RESULTS

CHANNEL	FREQUENCY (MHz)	20dB BANDWIDTH (MHz)	
		GFSK	8DPSK
0	2402	0.94	1.29
39	2441	0.95	1.29
78	2480	0.94	1.30

For GFSK





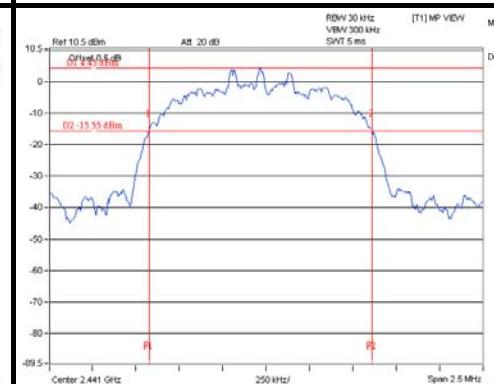
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For 8DPSK

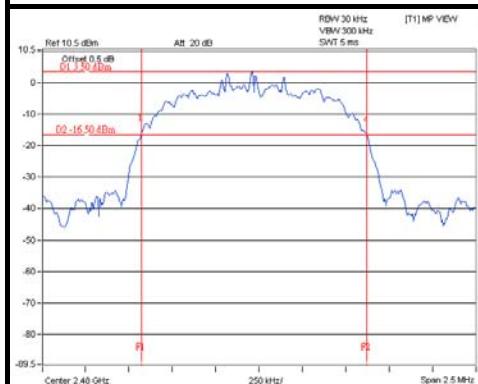
CH0



CH39



CH78





4.4 OCCUPIED BANDWIDTH MEASUREMENT

4.4.1 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	Jan. 21, 2013	Jan. 20, 2014

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. Tested date : June 10, 2013

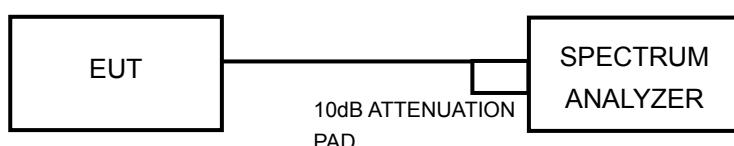
4.4.2 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 kHz RBW and 300 kHz VBW. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.4.3 DEVIATION FROM TEST STANDARD

No deviation

4.4.4 TEST SETUP



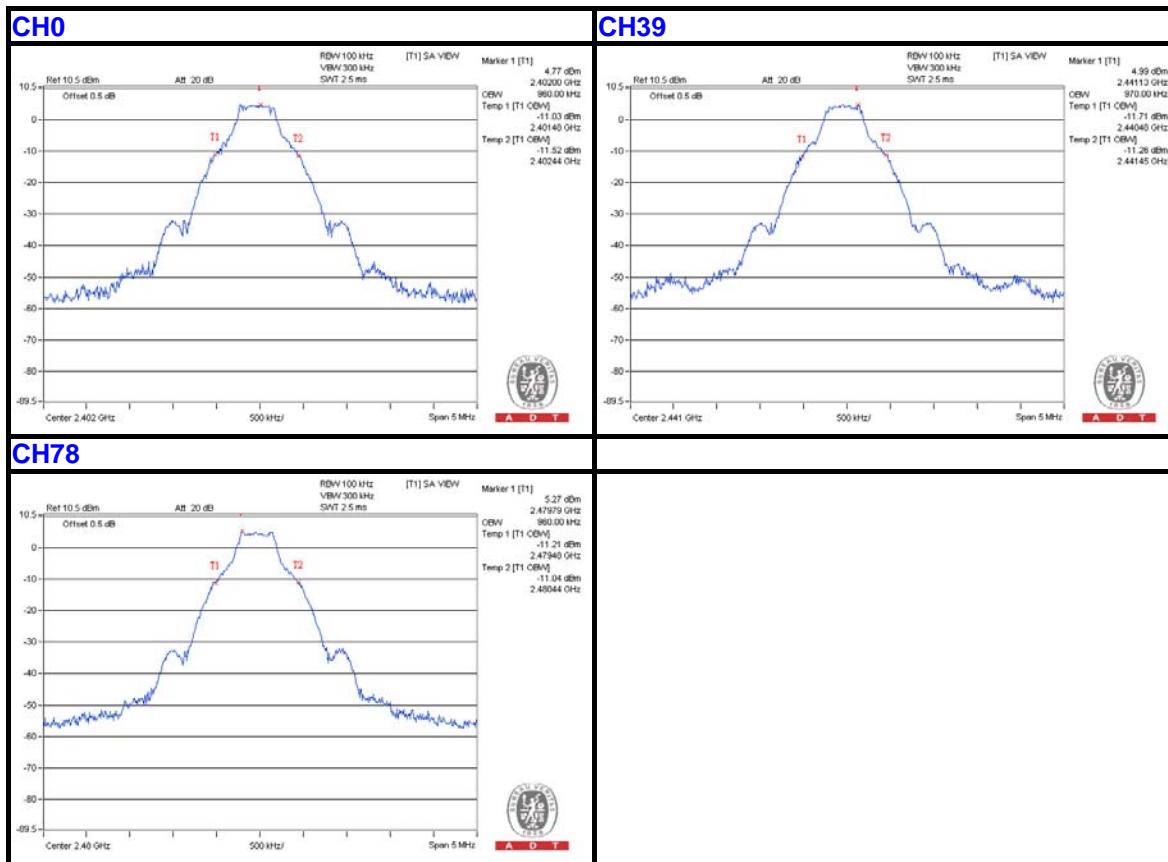
4.4.5 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.4.6 TEST RESULTS

CHANNEL	FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)	
		GFSK	8DPSK
0	2402	0.96	1.23
39	2441	0.97	1.22
78	2480	0.96	1.22

For GFSK

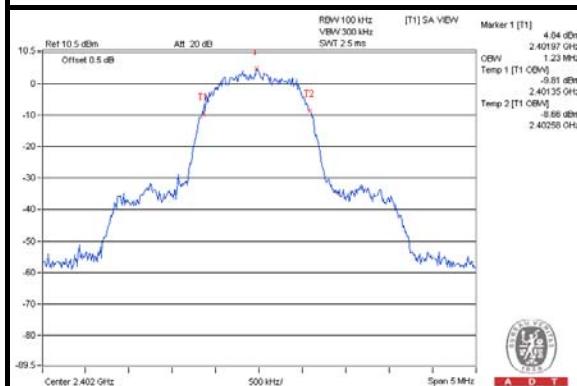




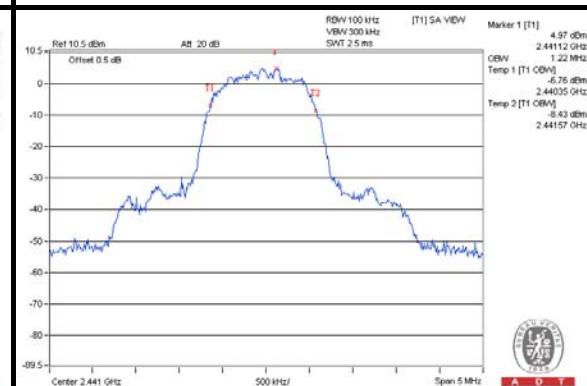
A D T

For 8DPSK

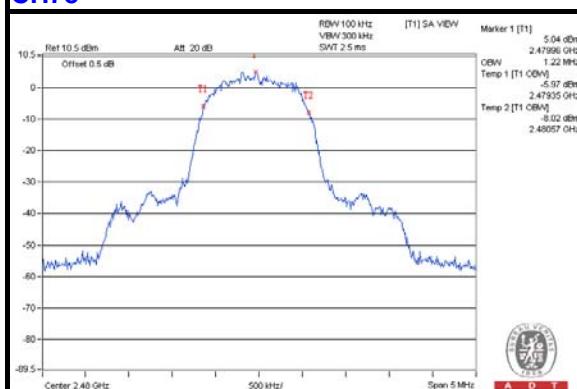
CH0



CH39



CH78





4.5 HOPPING CHANNEL SEPARATION

4.5.1 LIMIT OF HOPPING CHANNEL SEPARATION

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

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	1000036	Jan. 21, 2013	Jan. 20, 2014

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. Tested date : June 10, 2013

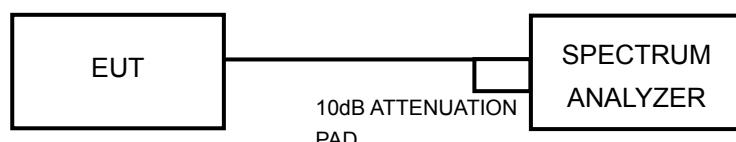
4.5.3 TEST PROCEDURES

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

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP

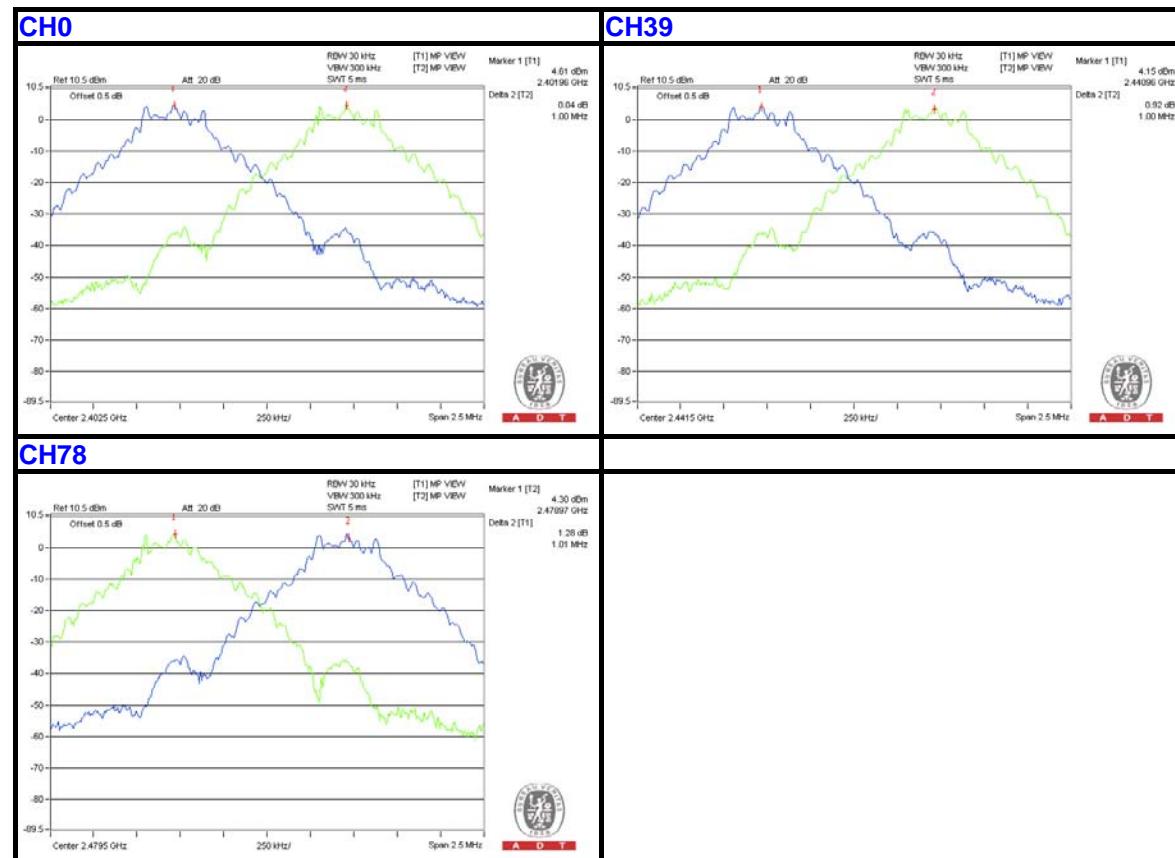


4.5.6 TEST RESULTS

CHANNEL	FREQUENCY (MHz)	ADJACENT CHANNEL SEPARATION (MHz)		20dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)		PASS / FAIL
		GFSK	8DPSK	GFSK	8DPSK	GFSK	8DPSK	
0	2402	1.00	1.00	0.94	1.29	0.63	0.86	PASS
39	2441	1.00	1.01	0.95	1.29	0.64	0.86	PASS
78	2480	1.01	1.00	0.94	1.30	0.63	0.87	PASS

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

For GFSK

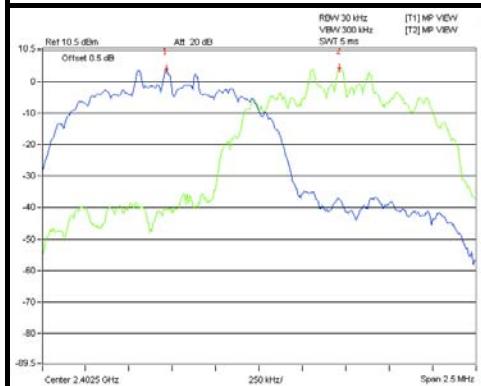




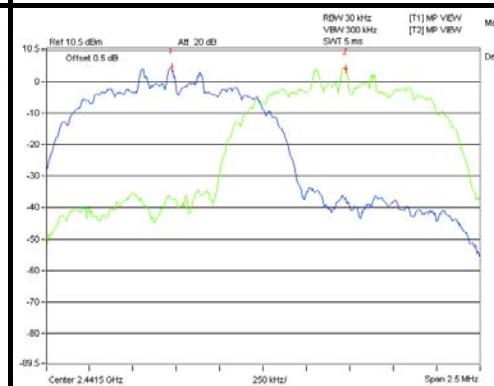
A D T

For 8DPSK

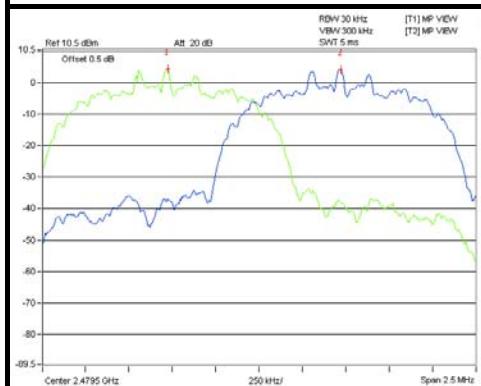
CH0



CH39



CH78





A D T

4.6 NUMBER OF HOPPING FREQUENCY USED

4.6.1 LIMIT OF HOPPING FREQUENCY USED

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

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	Jan. 21, 2013	Jan. 20, 2014

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. Tested date : June 10, 2013

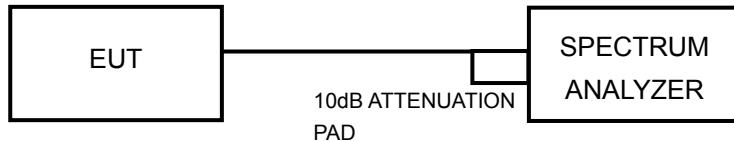
4.6.3 TEST PROCEDURES

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

4.6.4 DEVIATION FROM TEST STANDARD

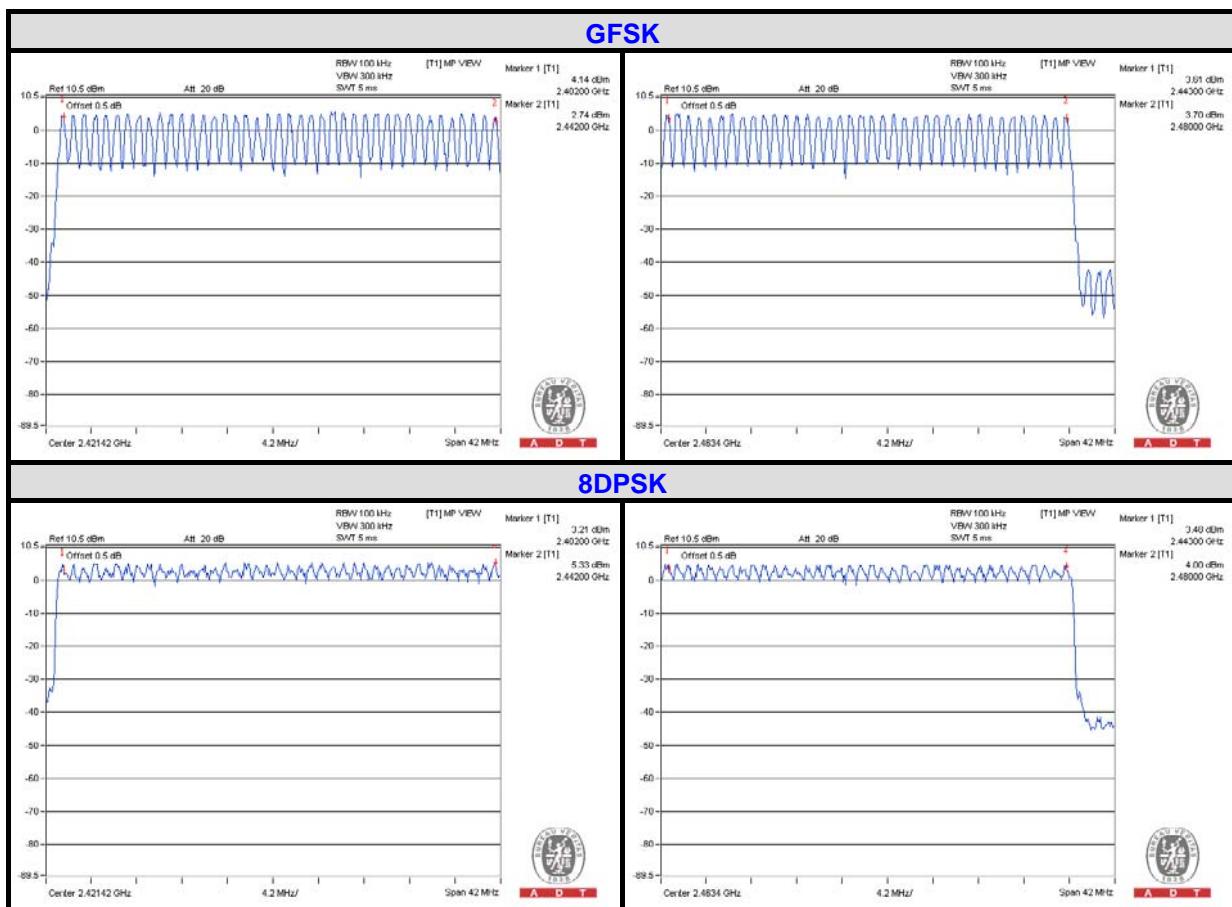
No deviation

4.6.5 TEST SETUP



4.6.6 TEST RESULTS

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





4.7 DWELL TIME ON EACH CHANNEL

4.7.1 LIMIT OF DWELL TIME USED

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

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	Jan. 21, 2013	Jan. 20, 2014

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. Tested date : June 10, 2013

4.7.3 TEST PROCEDURES

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

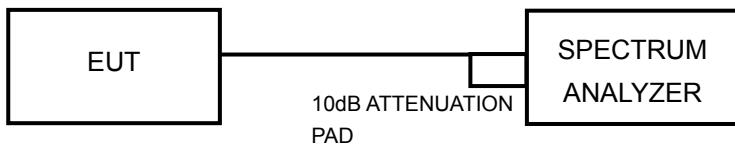
4.7.4 DEVIATION FROM TEST STANDARD

No deviation



A D T

4.7.5 TEST SETUP





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4.7.6 TEST RESULTS

For GFSK:

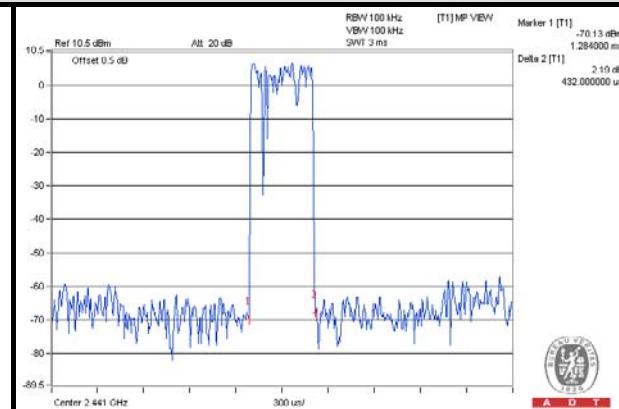
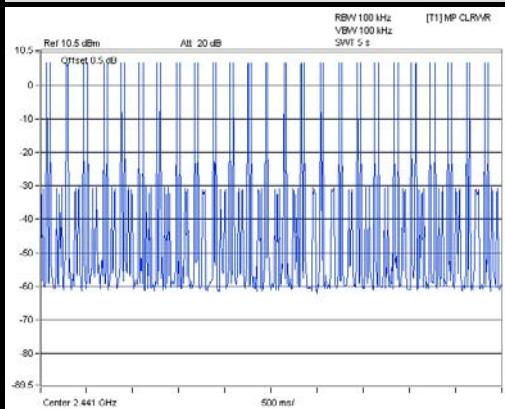
Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	50 (times / 5 sec) *6.32=316 times	0.432	136.51	400
DH3	25 (times / 5 sec) *6.32=158 times	1.73	273.34	400
DH5	16 (times / 5 sec) *6.32=101.12 times	2.95	298.3	400

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

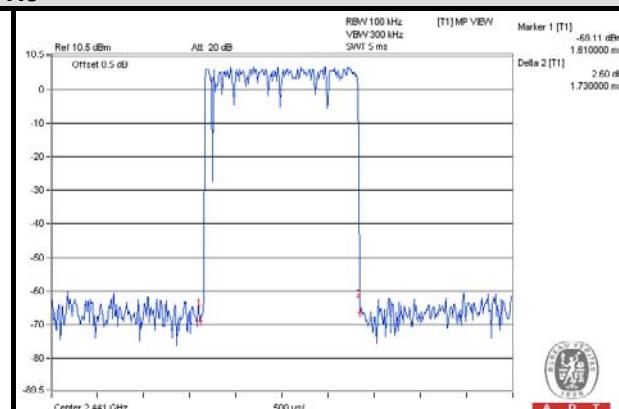
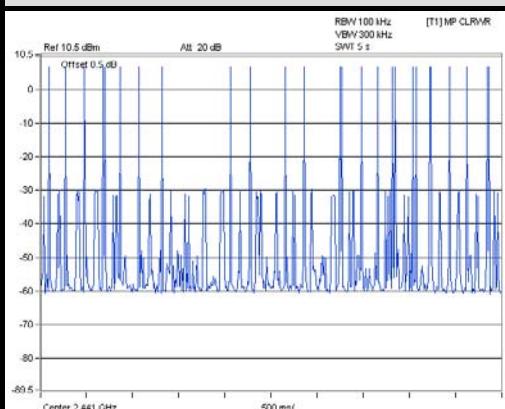


A D T

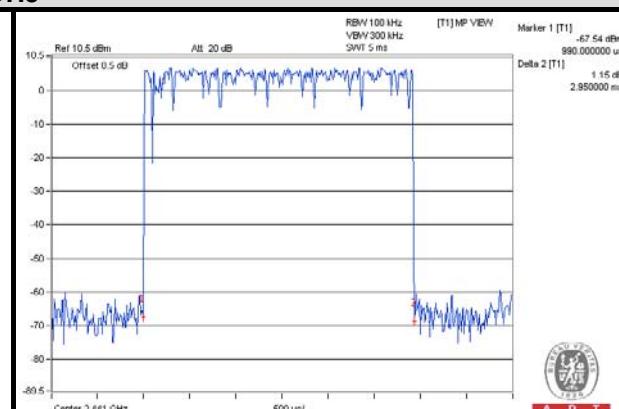
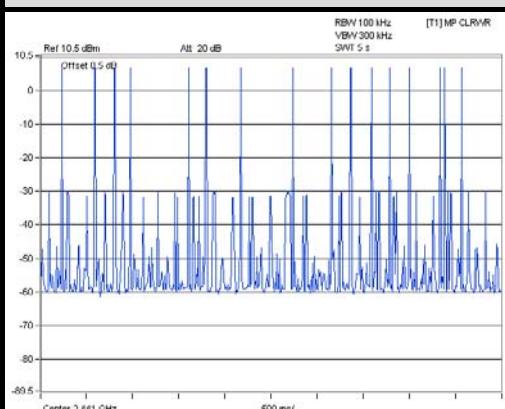
DH1



DH3



DH5





A D T

For GFSK(AFH):

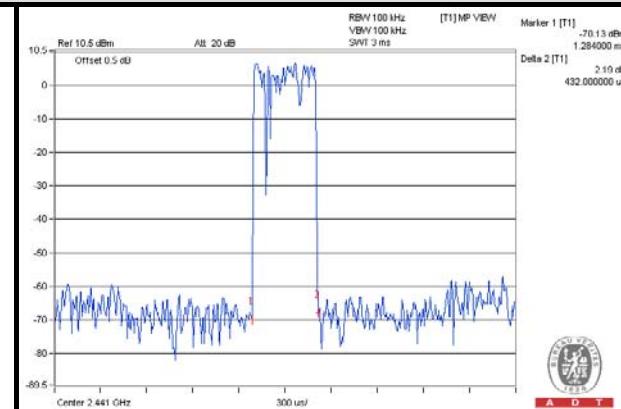
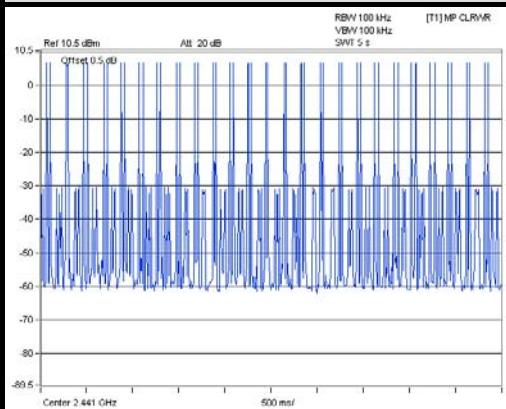
Mode	Number of transmission in a 8 (20Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	50 (times / 5 sec) *1.6=80 times	0.432	34.56	400
DH3	25 (times / 5 sec) *1.6=40 times	1.73	69.2	400
DH5	16 (times / 5 sec) *1.6=25.6 times	2.95	75.52	400

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

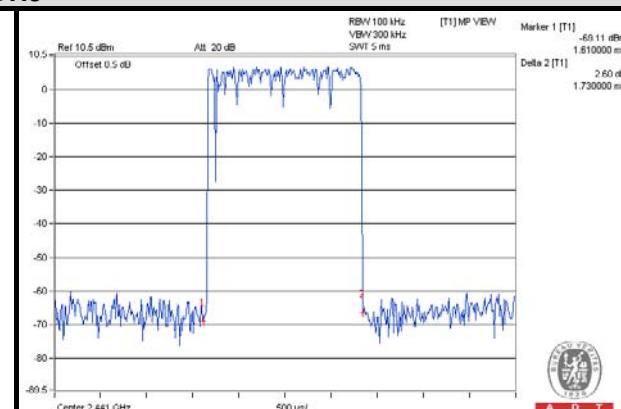
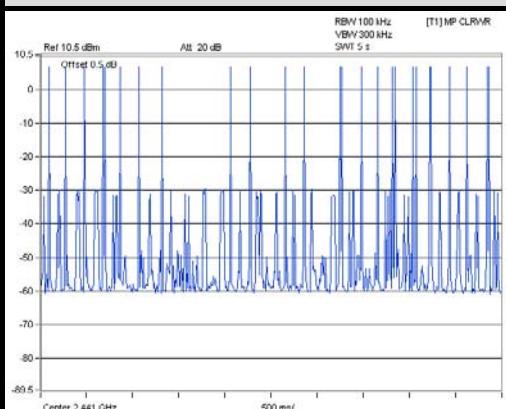


A D T

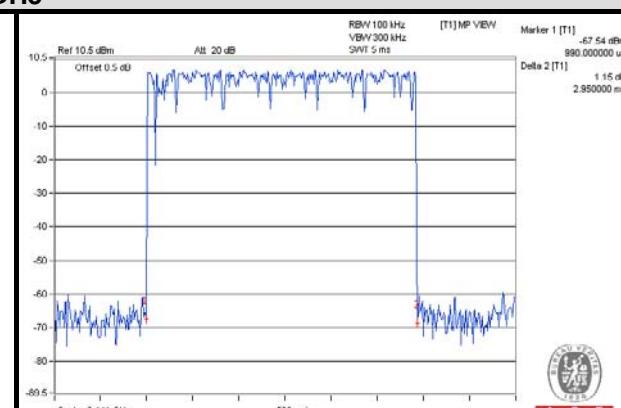
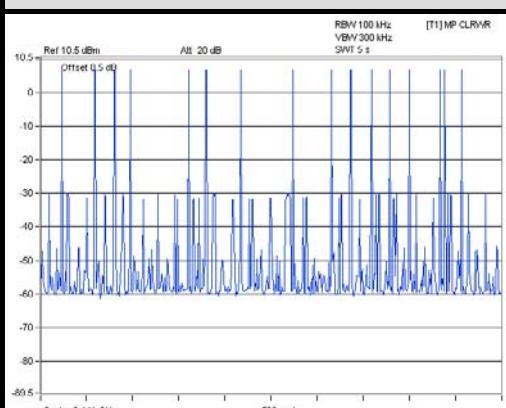
DH1



DH3



DH5





For 8DPSK:

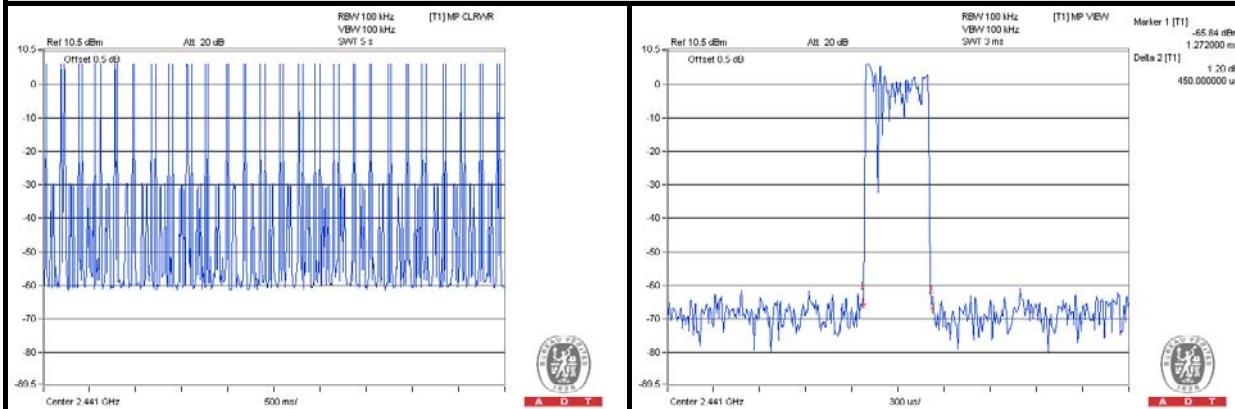
Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	51 (times / 5 sec) *6.32=322.32 times	0.45	145.04	400
DH3	25 (times / 5 sec) *6.32=158 times	1.71	270.18	400
DH5	17 (times / 5 sec) *6.32=107.44 times	2.98	320.17	400

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

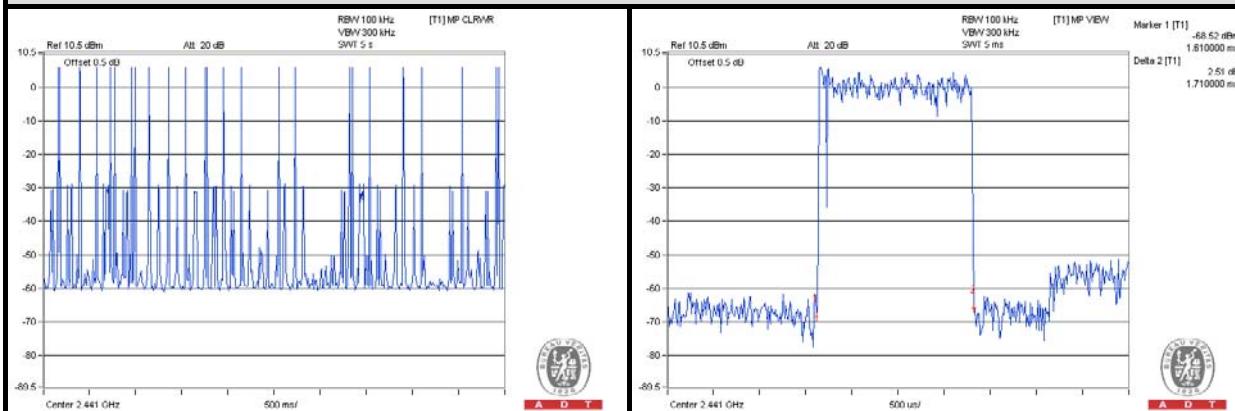


A D T

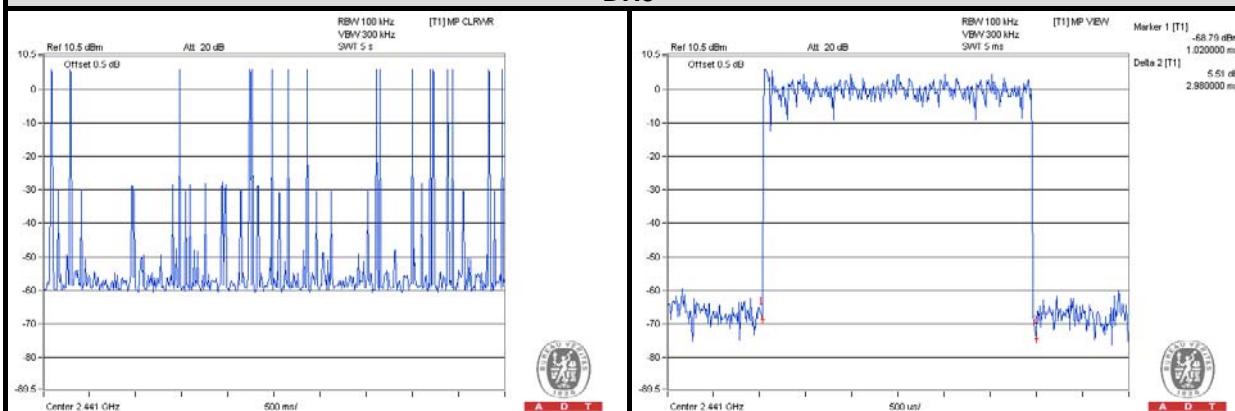
DH1



DH3



DH5





A D T

For 8DPSK(AFH):

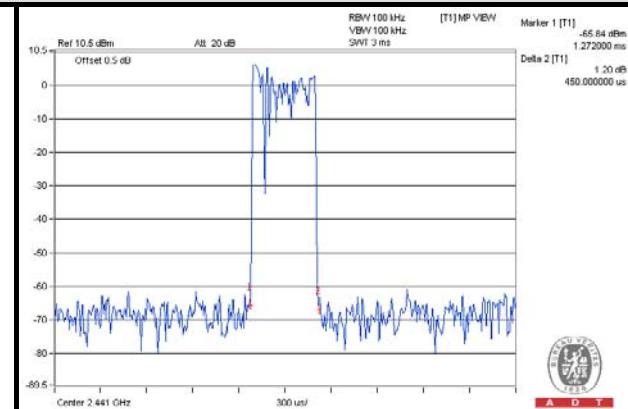
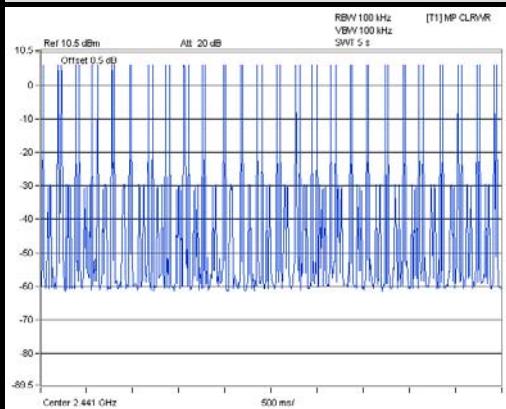
Mode	Number of transmission in a 8 (20Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	51 (times / 5 sec) *1.6=81.6 times	0.45	36.72	400
DH3	25 (times / 5 sec) *1.6=40 times	1.71	68.4	400
DH5	17 (times / 5 sec) *1.6=27.2 times	2.98	81.056	400

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

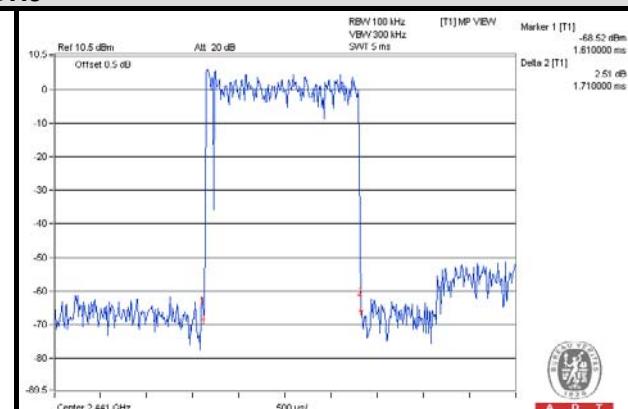
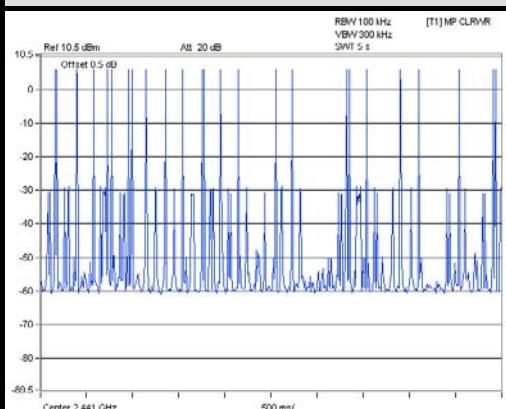


A D T

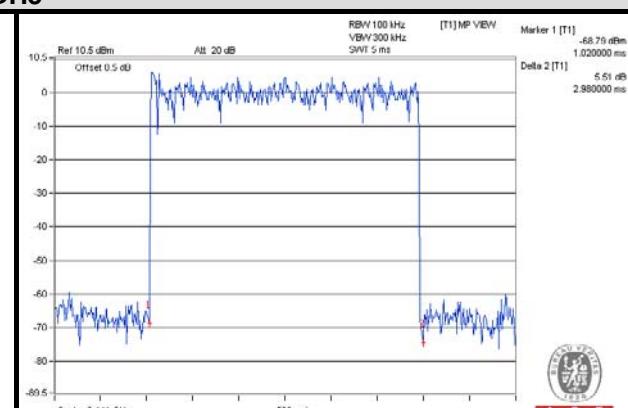
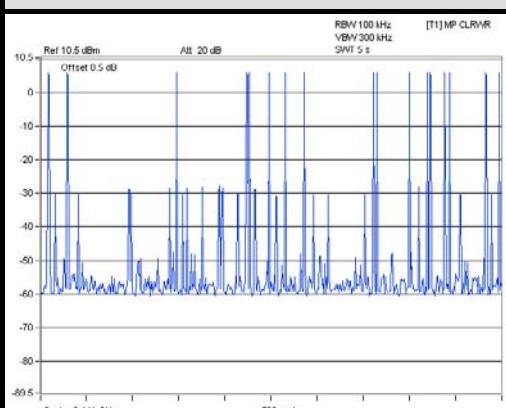
DH1



DH3



DH5





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4.8 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.8.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

4.8.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	Jan. 21, 2013	Jan. 20, 2014

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. Tested date : June 10, 2013

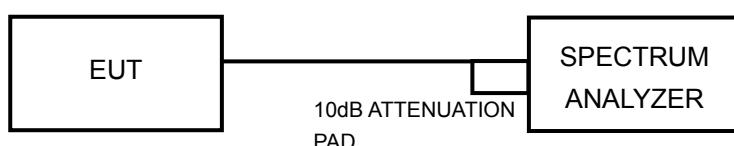
4.8.3 TEST PROCEDURE

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

4.8.4 DEVIATION FROM TEST STANDARD

No deviation

4.8.1 TEST SETUP



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.



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4.8.6 TEST RESULTS

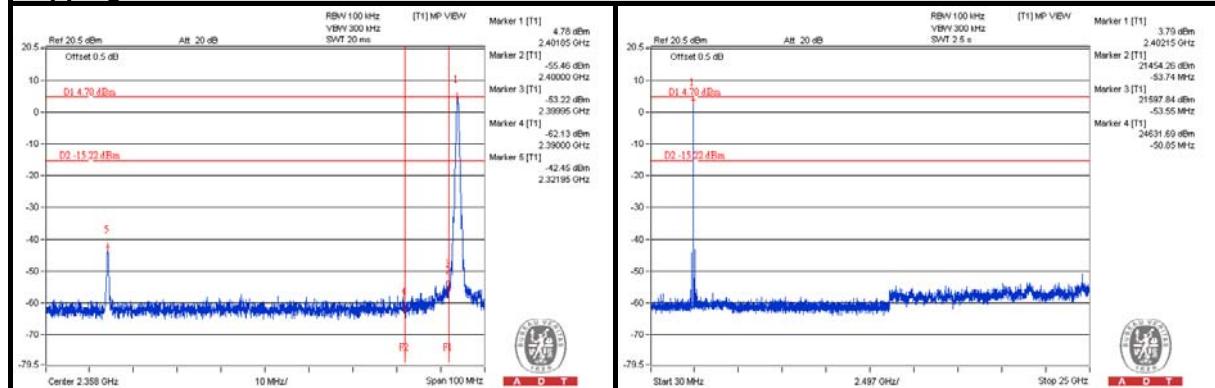
The spectrum plots are attached on the following images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



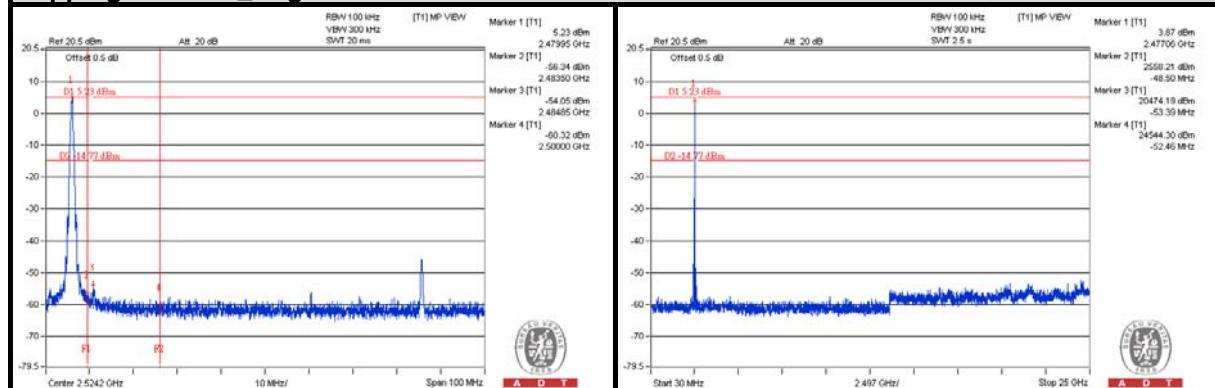
A D T

For GFSK

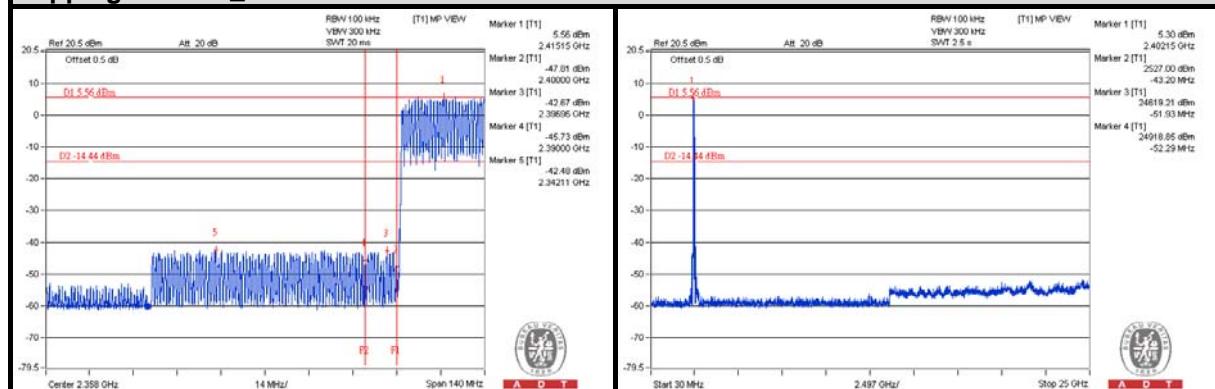
Hopping disabled_ Low Channel



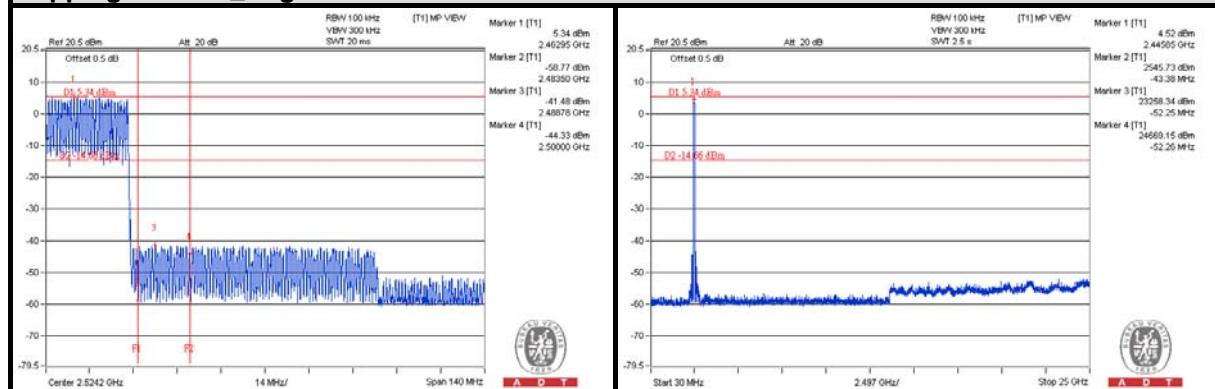
Hopping disabled_ High Channel



Hopping enabled_ Low Channel



Hopping enabled_ High Channel

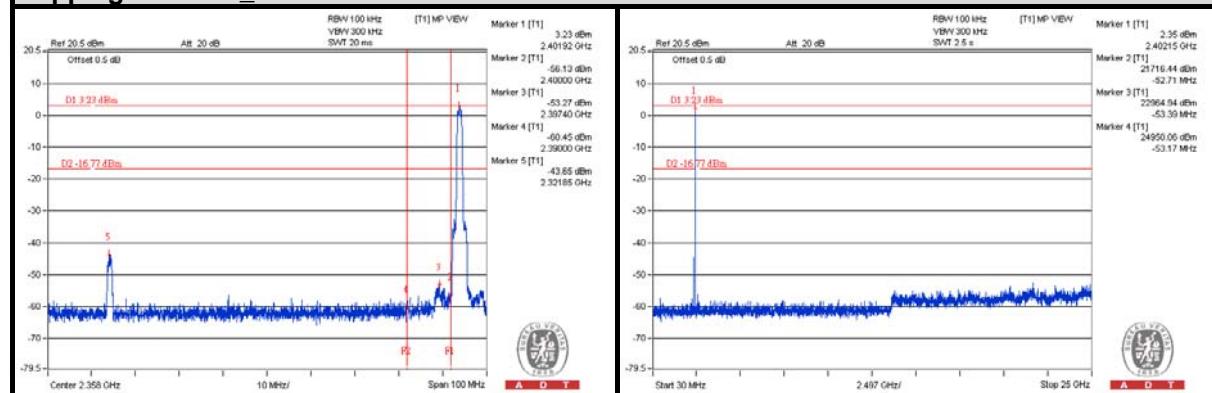




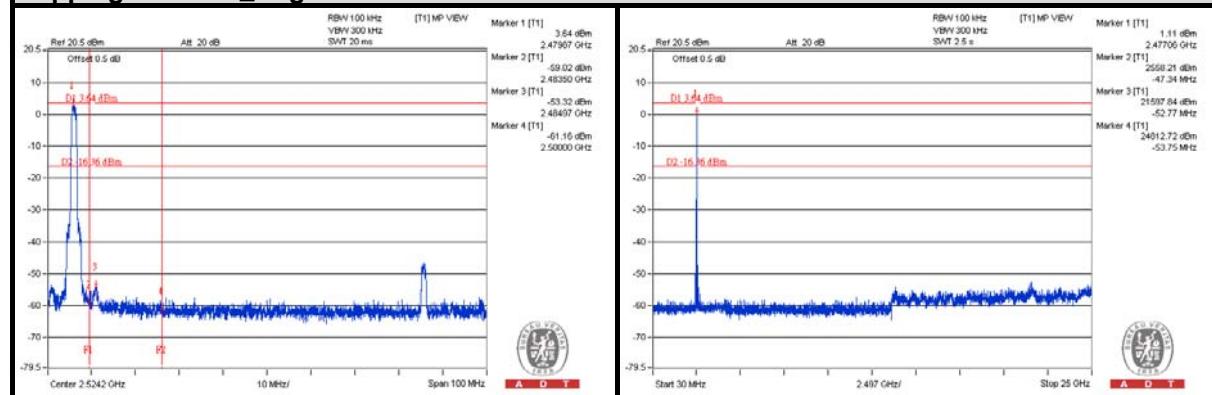
A D T

For 8DPSK

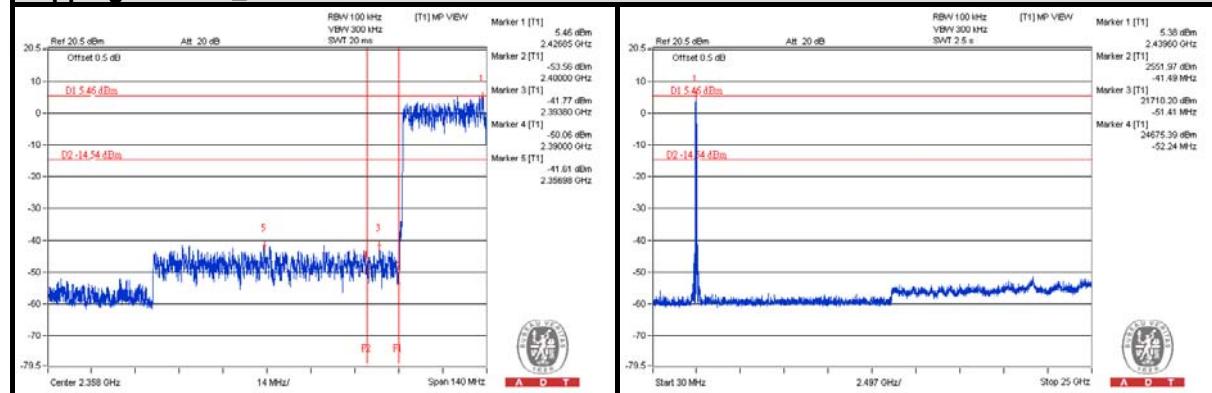
Hopping disabled_ Low Channel



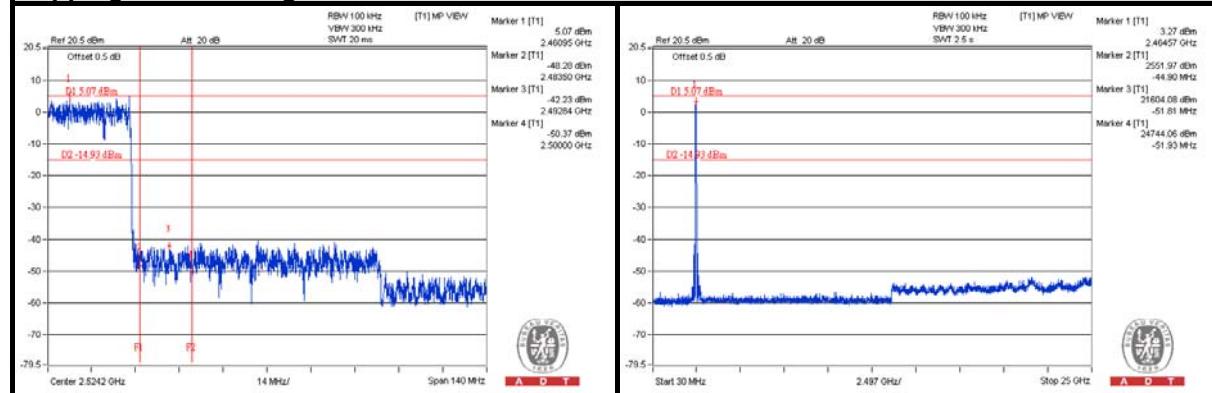
Hopping disabled_ High Channel



Hopping enabled_ Low Channel



Hopping enabled_ High Channel





4.9 RADIATED EMISSION MEASUREMENT

4.9.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dB_BV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



4.9.2 TEST INSTRUMENTS

Below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 29, 2013	Jan. 28, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 26, 2012	June 25, 2013
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Apr. 09, 2012	Apr. 08, 2013
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 19, 2012	Nov. 18, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 25, 2012	Dec. 24, 2013
RF Cable	NA	CHGCAB_001	Oct. 06, 2012	Oct. 05, 2013
Software	ADT_Radiated _V8.7.05	NA	NA	NA
Antenna Tower & Turn Table CT	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, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: Feb. 26, 2013



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Above 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
MXE EMI Receiver Agilent	N9038A	MY50010156	Jan. 16, 2013	Jan. 15, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 30, 2012	Oct. 29, 2013
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Mar. 25, 2013	Mar. 24, 2014
Horn_Antenna AISI	AIH.8018	0000220091110	Nov. 27, 2012	Nov. 26, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 26, 2012	Dec. 25, 2013
RF Cable	NA	CHHCAB_001	Oct. 07, 2012	Oct. 06, 2013
Software	ADT_Radiated _V8.7.05	NA	NA	NA
Antenna Tower & Turn Table CT	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, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5. The CANADA Site Registration No. is IC 7450H-3.
6. Tested Date: June 06, 2013



A D T

4.9.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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 height of antenna 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

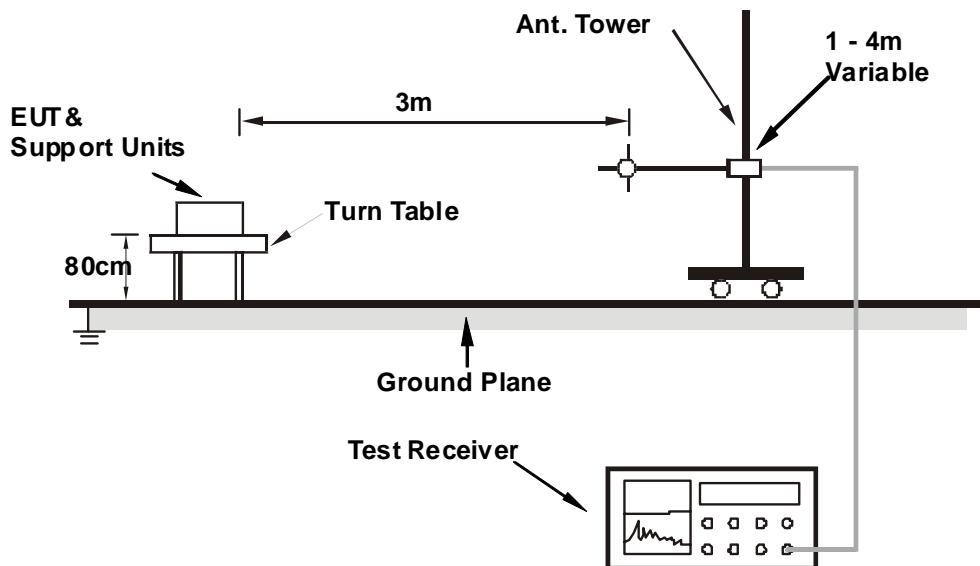
NOTE:

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

4.9.4 DEVIATION FROM TEST STANDARD

No deviation

4.9.5 TEST SETUP



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

4.9.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit 1 (Notebook Computer) which is placed on a testing table.
2. The communication partner run test program “BtTest Jupiter.exe Version: V1 0 B20” to enable EUT under transmission/receiving condition continuously at specific channel frequency.



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4.9.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

BT_8DPSK

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	Below 1GHz		

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	300.00	40.6 QP	46.0	-5.4	1.00 H	34	25.28	15.29
2	366.56	43.4 QP	46.0	-2.7	2.00 H	268	26.35	17.00
3	398.06	42.5 QP	46.0	-3.5	2.00 H	261	24.71	17.81
4	497.65	41.6 QP	46.0	-4.4	2.00 H	360	21.28	20.33
5	600.33	43.7 QP	46.0	-2.3	1.00 H	268	21.05	22.66
6	796.08	43.1 QP	46.0	-2.9	1.50 H	266	17.26	25.84

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	99.99	33.6 QP	43.5	-9.9	2.00 V	301	23.76	9.88
2	299.89	38.7 QP	46.0	-7.4	1.50 V	264	23.36	15.29
3	366.56	39.4 QP	46.0	-6.6	2.00 V	294	22.41	17.00
4	398.06	38.6 QP	46.0	-7.4	2.00 V	294	20.83	17.81
5	600.32	44.2 QP	46.0	-1.8	1.00 V	220	21.58	22.66
6	799.98	42.4 QP	46.0	-3.7	1.00 V	299	16.43	25.92

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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ABOVE 1GHz DATA**BT_GFSK**

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	2313.95	59.2 PK	74.0	-14.8	1.45 H	118	62.94	-3.74
2	2313.95	47.6 AV	54.0	-6.4	1.45 H	118	51.34	-3.74
3	2322.00	61.1 PK	74.0	-12.9	1.45 H	118	64.82	-3.72
4	2322.00	52.4 AV	54.0	-1.6	1.45 H	118	56.12	-3.72
5	*2402.00	105.8 PK			1.40 H	127	109.22	-3.42
6	*2402.00	103.3 AV			1.40 H	127	106.72	-3.42
7	4804.00	46.9 PK	74.0	-27.1	1.11 H	127	40.42	6.48
8	4804.00	36.9 AV	54.0	-17.1	1.11 H	127	30.42	6.48

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	2313.95	56.9 PK	74.0	-17.1	1.00 V	60	60.64	-3.74
2	2313.95	48.1 AV	54.0	-5.9	1.00 V	60	51.84	-3.74
3	2321.99	57.9 PK	74.0	-16.1	1.22 V	300	61.62	-3.72
4	2321.99	46.1 AV	54.0	-7.9	1.22 V	300	49.82	-3.72
5	*2402.00	102.2 PK			1.00 V	295	105.62	-3.42
6	*2402.00	99.4 AV			1.00 V	295	102.82	-3.42
7	4804.00	46.5 PK	74.0	-27.5	1.11 V	159	40.02	6.48
8	4804.00	36.0 AV	54.0	-18.0	1.11 V	159	29.52	6.48

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	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	2361.06	60.8 PK	74.0	-13.2	1.40 H	127	64.37	-3.57
2	2361.06	52.7 AV	54.0	-1.3	1.40 H	127	56.27	-3.57
3	*2441.00	102.4 PK			1.40 H	127	105.70	-3.30
4	*2441.00	99.7 AV			1.40 H	127	103.00	-3.30
5	2483.50	58.4 PK	74.0	-15.6	1.40 H	127	61.56	-3.16
6	2483.50	46.7 AV	54.0	-7.3	1.40 H	127	49.86	-3.16
7	4882.00	47.4 PK	74.0	-26.6	1.22 H	193	40.87	6.53
8	4882.00	36.3 AV	54.0	-17.7	1.22 H	193	29.77	6.53
9	7323.00	56.4 PK	74.0	-17.6	1.17 H	331	45.25	11.15
10	7323.00	44.2 AV	54.0	-9.8	1.17 H	331	33.05	11.15

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	2361.06	56.1 PK	74.0	-17.9	1.00 V	65	59.67	-3.57
2	2361.06	47.3 AV	54.0	-6.7	1.00 V	65	50.87	-3.57
3	*2441.00	100.1 PK			1.21 V	285	103.40	-3.30
4	*2441.00	95.5 AV			1.21 V	285	98.80	-3.30
5	2483.50	57.4 PK	74.0	-16.6	1.18 V	295	60.56	-3.16
6	2483.50	45.6 AV	54.0	-8.4	1.18 V	295	48.76	-3.16
7	4882.00	46.7 PK	74.0	-27.3	1.19 V	165	40.17	6.53
8	4882.00	36.0 AV	54.0	-18.0	1.19 V	165	29.47	6.53
9	7323.00	56.5 PK	74.0	-17.5	1.22 V	358	45.35	11.15
10	7323.00	44.0 AV	54.0	-10.0	1.22 V	358	32.85	11.15

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	TX Channel 78	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	105.6 PK			1.39 H	128	108.77	-3.17
2	*2480.00	103.0 AV			1.39 H	128	106.17	-3.17
3	2483.50	59.2 PK	74.0	-14.8	1.39 H	128	62.36	-3.16
4	2483.50	46.8 AV	54.0	-7.2	1.39 H	128	49.96	-3.16
5	4960.00	47.6 PK	74.0	-26.4	1.16 H	184	41.06	6.54
6	4960.00	36.6 AV	54.0	-17.4	1.16 H	184	30.06	6.54
7	7440.00	56.2 PK	74.0	-17.8	1.20 H	299	44.69	11.51
8	7440.00	44.0 AV	54.0	-10.0	1.20 H	299	32.49	11.51

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	101.9 PK			1.11 V	303	105.07	-3.17
2	*2480.00	99.0 AV			1.11 V	303	102.17	-3.17
3	2483.50	58.5 PK	74.0	-15.5	1.11 V	303	61.66	-3.16
4	2483.50	45.8 AV	54.0	-8.2	1.11 V	303	48.96	-3.16
5	4960.00	47.7 PK	74.0	-26.3	1.24 V	166	41.16	6.54
6	4960.00	36.9 AV	54.0	-17.1	1.24 V	166	30.36	6.54
7	7440.00	56.1 PK	74.0	-17.9	1.26 V	339	44.59	11.51
8	7440.00	44.3 AV	54.0	-9.7	1.26 V	339	32.79	11.51

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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BT_8DPSK

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	2322.00	59.4 PK	74.0	-14.6	1.40 H	125	63.12	-3.72
2	2322.00	50.3 AV	54.0	-3.7	1.40 H	125	54.02	-3.72
3	*2402.00	107.4 PK			1.40 H	125	110.82	-3.42
4	*2402.00	102.0 AV			1.40 H	125	105.42	-3.42
5	4804.00	45.6 PK	74.0	-28.4	1.13 H	138	39.12	6.48
6	4804.00	36.1 AV	54.0	-17.9	1.13 H	138	29.62	6.48

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	2322.00	57.5 PK	74.0	-16.5	1.34 V	161	61.22	-3.72
2	2322.00	48.9 AV	54.0	-5.1	1.34 V	161	52.62	-3.72
3	*2402.00	103.2 PK			1.34 V	161	106.62	-3.42
4	*2402.00	97.7 AV			1.34 V	161	101.12	-3.42
5	4804.00	46.7 PK	74.0	-27.3	1.12 V	144	40.22	6.48
6	4804.00	36.7 AV	54.0	-17.3	1.12 V	144	30.22	6.48

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	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.1 PK	74.0	-15.9	1.40 H	127	61.55	-3.45
2	2390.00	45.9 AV	54.0	-8.1	1.40 H	127	49.35	-3.45
3	*2441.00	107.6 PK			1.40 H	127	110.90	-3.30
4	*2441.00	102.3 AV			1.40 H	127	105.60	-3.30
5	2483.50	58.8 PK	74.0	-15.2	1.40 H	127	61.96	-3.16
6	2483.50	46.1 AV	54.0	-7.9	1.40 H	127	49.26	-3.16
7	4882.00	47.1 PK	74.0	-26.9	1.23 H	188	40.57	6.53
8	4882.00	36.0 AV	54.0	-18.0	1.23 H	188	29.47	6.53
9	7323.00	55.8 PK	74.0	-18.2	1.16 H	335	44.65	11.15
10	7323.00	43.9 AV	54.0	-10.1	1.16 H	335	32.75	11.15

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.6 PK	74.0	-16.4	1.44 V	142	61.05	-3.45
2	2390.00	45.6 AV	54.0	-8.4	1.44 V	142	49.05	-3.45
3	*2441.00	103.0 PK			1.32 V	160	106.30	-3.30
4	*2441.00	97.5 AV			1.32 V	160	100.80	-3.30
5	2483.50	58.9 PK	74.0	-15.1	1.39 V	137	62.06	-3.16
6	2483.50	46.1 AV	54.0	-7.9	1.39 V	137	49.26	-3.16
7	4882.00	47.3 PK	74.0	-26.7	1.23 V	152	40.77	6.53
8	4882.00	36.1 AV	54.0	-17.9	1.23 V	152	29.57	6.53
9	7323.00	56.1 PK	74.0	-17.9	1.26 V	354	44.95	11.15
10	7323.00	43.7 AV	54.0	-10.3	1.26 V	354	32.55	11.15

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	TX Channel 78	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	107.3 PK			1.38 H	128	110.47	-3.17
2	*2480.00	101.8 AV			1.38 H	128	104.97	-3.17
3	2483.50	58.0 PK	74.0	-16.0	1.22 H	355	61.16	-3.16
4	2483.50	46.3 AV	54.0	-7.7	1.22 H	355	49.46	-3.16
5	4960.00	46.7 PK	74.0	-27.3	1.29 H	189	40.16	6.54
6	4960.00	36.4 AV	54.0	-17.6	1.29 H	189	29.86	6.54
7	7440.00	55.0 PK	74.0	-19.0	1.12 H	334	43.49	11.51
8	7440.00	43.5 AV	54.0	-10.5	1.12 H	334	31.99	11.51

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	102.7 PK			1.37 V	148	105.87	-3.17
2	*2480.00	97.0 AV			1.37 V	148	100.17	-3.17
3	2483.50	57.6 PK	74.0	-16.4	1.22 V	333	60.76	-3.16
4	2483.50	45.7 AV	54.0	-8.3	1.22 V	333	48.86	-3.16
5	4960.00	45.7 PK	74.0	-28.3	1.28 V	165	39.16	6.54
6	4960.00	36.5 AV	54.0	-17.5	1.28 V	165	29.96	6.54
7	7440.00	56.4 PK	74.0	-17.6	1.22 V	342	44.89	11.51
8	7440.00	43.8 AV	54.0	-10.2	1.22 V	342	32.29	11.51

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.



4.10 CONDUCTED EMISSION MEASUREMENT

4.10.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

NOTE:

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

4.10.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Mar. 08, 2013	Mar. 07, 2014
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 06, 2012	Sep. 05, 2013
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 08, 2012	June 07, 2013
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 11, 2013	Mar. 10, 2014
50 ohms Terminator	50	EMC-3	Sep. 25, 2012	Sep. 24, 2013
Software ADT	BV ADT_Cond_V7.3.7.3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Mar. 14, 2013

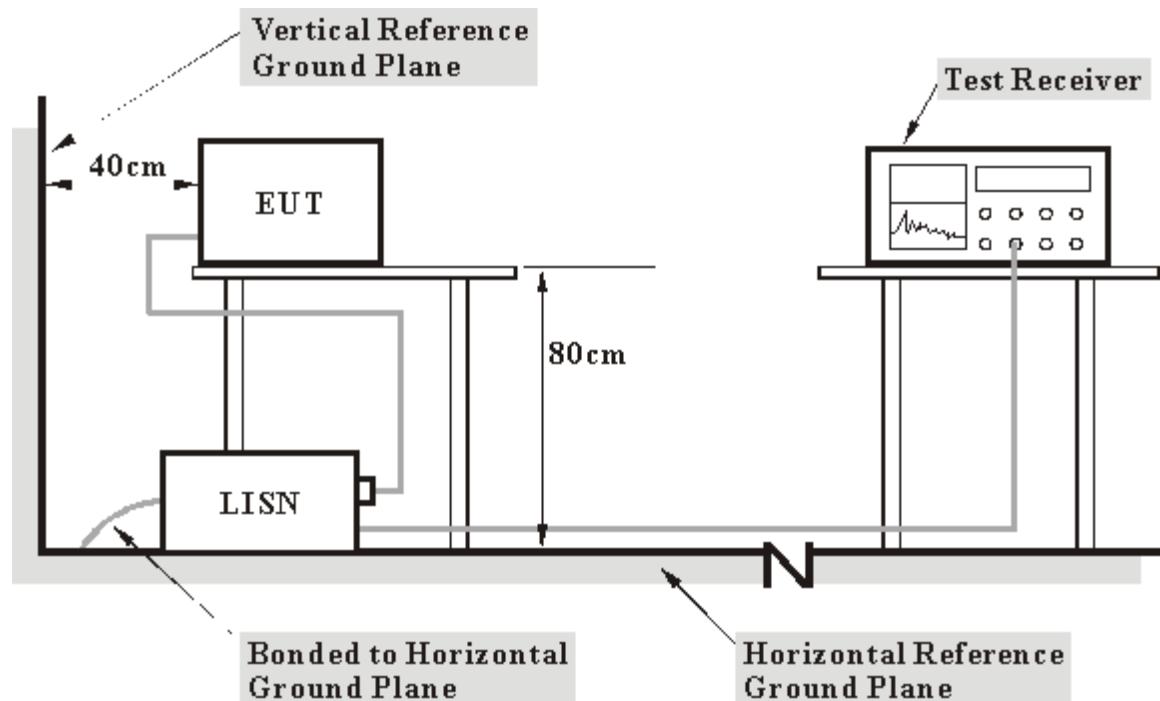
4.10.3 TEST PROCEDURES

- a. The EUT/HOST was placed 0.4 meters from the conducting wall of the shielded room with EUT/HOST 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/HOST were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

4.10.4 DEVIATION FROM TEST STANDARD

No deviation

4.10.5 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.



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4.10.6 EUT OPERATING CONDITIONS

Same as Item 4.8.6

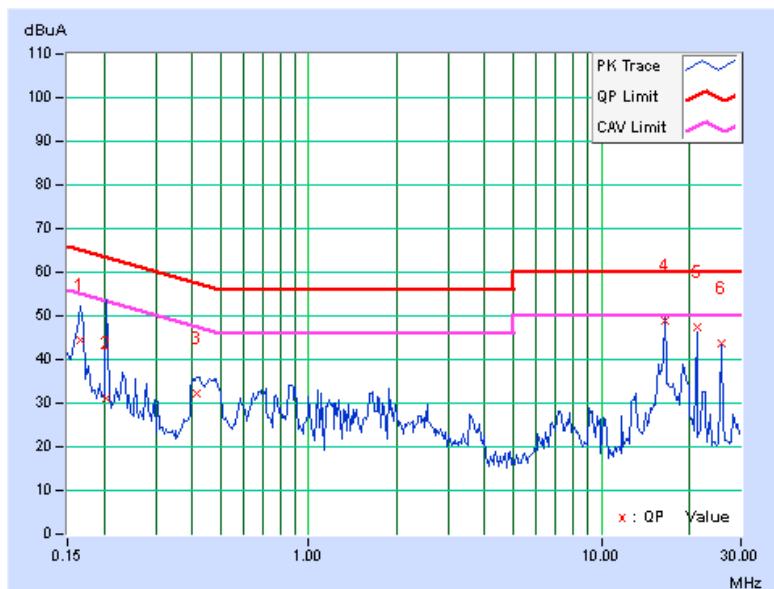
4.10.7 TEST RESULTS

PHASE	Line (L)		6dB BANDWIDTH		9 kHz	
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	0.11	44.19	20.08	44.30	20.19	65.18	55.18	-20.88	-34.99
2	0.20469	0.12	30.94	19.55	31.06	19.67	63.42	53.42	-32.36	-33.75
3	0.41563	0.16	32.00	16.84	32.16	17.00	57.54	47.54	-25.37	-30.53
4	16.46484	0.79	48.16	45.61	48.95	46.40	60.00	50.00	-11.05	-3.60
5	21.16797	0.95	46.62	45.26	47.57	46.21	60.00	50.00	-12.43	-3.79
6	25.87500	1.09	42.58	41.26	43.67	42.35	60.00	50.00	-16.33	-7.65

REMARKS:

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

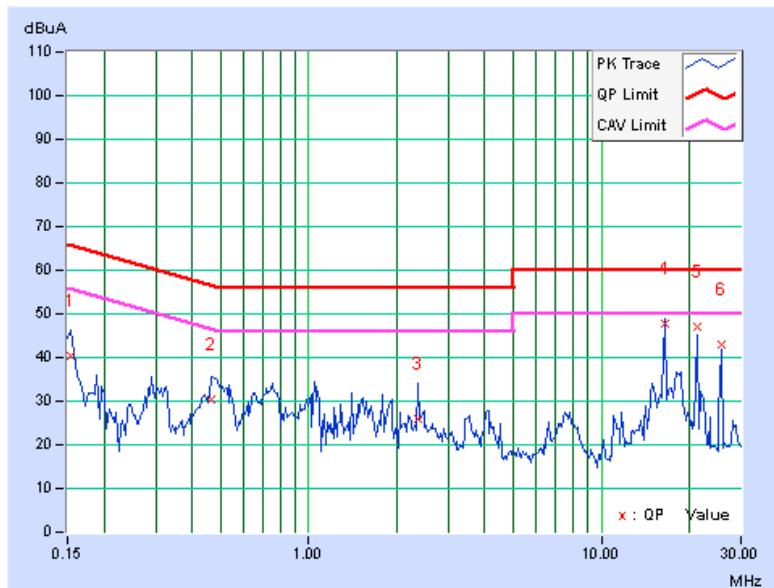


PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz
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No	Freq. [MHz]	Corr. (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.09	40.11	28.97	40.20	29.06	65.79	55.79	-25.59	-26.73
2	0.46641	0.15	30.37	21.31	30.52	21.46	56.58	46.58	-26.06	-25.12
3	2.36719	0.22	25.72	17.02	25.94	17.24	56.00	46.00	-30.06	-28.76
4	16.46484	0.54	47.24	45.71	47.78	46.25	60.00	50.00	-12.22	-3.75
5	21.16797	0.63	46.39	45.03	47.02	45.66	60.00	50.00	-12.98	-4.34
6	25.87500	0.74	42.18	40.84	42.92	41.58	60.00	50.00	-17.08	-8.42

REMARKS:

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





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5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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6 INFORMATION ON THE TESTING LABORATORIES

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

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

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



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

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

--- END ---