

商品電磁相容形式實驗報告

產品名稱 整合型IC卡與磁卡終端機

申請廠商 嘉利科技股份有限公司

製造廠商 PAX Computer Technology (Shenzhen)
Co.,Ltd.

銘牌標示及主要特性 Adapter(I/P: 100-240Vac~50/60Hz, 0.3A
O/P: 9.0Vdc, 1.0A)

商標或廠牌 PAX

型式(號) Q80

該產品樣品試驗依據之試驗標準 LP0002:2018

試驗結果 合格

受理日期：2018年12月05日

完成日期：2018年12月27日

蓋章：



NCC RADIO TEST REPORT

Report Reference No. : M80620J635

Compiled by (+ signature) Kevin Bothmann



Approved by (+ signature) Jay Gandhi



Date of issue..... : 2018-12-28

Applicant's name : 嘉利科技股份有限公司

Address : 臺北市中正區重慶南路2段51號13樓

Manufacture's Name : PAX Computer Technology (Shenzhen) Co., Ltd.

Test specification: FLAT 1506 · 15/F LUCKY CTR NO165-171 WAN CHAI RD
WAN CHAI HONG KONG

Standard : LP0002: 2018

Test procedure..... : EIA 603、ANSI、FCC/47 CFR/2.1046、2.1047、2.1049、2.1051、
2.1053 and 2.1055

Non-standard test method..... : N/A

Test item description

Product name : 整合型 IC 卡與磁卡終端機

Trademark : PAX

Model and/or type reference : Q80

Rating(s) : Adapter(I/P: 100-240Vac~50/60Hz, 0.3A
O/P: 9.0Vdc, 1.0A)

Testing Laboratory information:

Testing Laboratory Name : Electro Magnetic Test, Inc.

Address : 1547 Plymouth Street, Mountain View, CA 94043

CAB Identifier Number : US0036

Tel : (650) 965-4000

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E-mail..... : jgandhi@emtlabs.com

Testing :

Date of receipt of test item : 05 Dec. 2018

Date (s) of performance of tests : 05~27 Dec. 2018

Date of Issue..... : 28 Dec. 2018

Test Result..... : **Pass**

GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Electro Magnetic Test, Inc., which is an independent testing and consulting firm. The test report is based on testing performed Electro Magnetic Test, Inc. personnel according to the measurement procedure described in the test specification given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full.

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Federal Government.

Electro Magnetic Test, Inc. is recognized by the following agencies for performing EMI/EMC testing:

COUNTRY	AGENCY	IDENTIFYING #
USA	Federal Communications Commission (FCC) (EMT's test site is recognized by the FCC)	Registration Number: 90576
USA, Canada, Taiwan, Australia/New Zealand, European Community	National Voluntary Lab Accreditation Program (NVLAP) (EMT is accredited by NVLAP. A copy of the NVLAP Scope Of Accreditation is available upon request.)	Lab Code: 200147-0
Canada	Industry Canada	File No.: IC 2804
Japan	Voluntary Control Council For Interference (VCCI)	See Below
	Open Field Test Site "A"	R-589
	Mains Conducted Emissions Test Site "A"	C-604
	Telecom Conducted Emissions Test Site "A"	T-1655
	3 Meter Semi-Anechoic Chamber Site "E"	R-3227
	3 Meter Semi-Anechoic Chamber Site "E" (1GHz – 6GHz)	G-219
	Mains Conducted Emissions Test Site "E"	C-35793
	Telecom Conducted Emissions Test Site "E"	T-1715
Korea	Ministry of Information and Communication's Radio Research Laboratory (RRL) under the Asia Pacific Economic Cooperation (APEC) Mutual Recognition Arrangement (A copy of the Scope Of Accreditation is available upon request)	US0036
Taiwan	Bureau Of Standards, Metrology and Inspection (BSMI)	Reference Number: SL2-IN-E-1024
Australia / New Zealand	Australian Communications Authority (AUSTEL)	*

***THESE AGENCIES DO NOT ISSUE AN IDENTIFYING NUMBER TO TEST LABS.**

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

LP0002 : 2018 revised			
Standard Section	Test Item	Judgment	Remark
2.3	Conducted Emission	PASS	None
3.10.1(5)/2.8	Radiated Spurious Emission	PASS	None
3.10.1(2)	Peak Output Power	PASS	None
3.10.1(6.2.1)	6dB Occupied Bandwidth	PASS	None
3.10.1(6.2.2)	Power Density	PASS	None
3.10.1(5)/2.8	Restricted Bands	PASS	None
3.10.1(5)/2.8	ANTENNA CONDUCTED SPURIOUS EMISSION	PASS	None
3.10.1(3)	Antenna Requirement	PASS	None

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report

1.1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	Conducted Emission Test	1.38dB
2	Radiated Emission Test	3.17dB
3	RF power,conducted	0.16dB
4	Spurious emissions,conducted	0.21dB
5	All emissions,radiated(<1G)	4.68dB
6	All emissions,radiated(>1G)	4.89dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	整合型IC卡與磁卡終端機	
Trade Name	PAX	
Model Name	Q80	
OEM Brand/Model Name	N/A	
Product Description	The EUT is a 整合型IC卡與磁卡終端機	
	Operation Frequency:	2412~2462MHz@802.11b/g/n20
	Modulation Type:	CCK/QPSK/BPSK/OFDM
	Bit Rate of Transmitter	802.11b: CCK/QPSK/BPSK (11, 5.5, 2, 1 Mbps) 802.11g: OFDM (54, 48, 36, 24, 18, 12, 9, 6 Mbps) 802.11n20: OFDM (6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps)
	Number Of Channel	Please see Note 2.
	Antenna Designation:	PCB antenna
	Antenna Gain(Peak)	2.5dBi
	Output Power:	802.11b: 18.72dBm 802.11g: 18.95dBm 802.11n20: 19.11dBm
Channel List	Please refer to the Note 2.	
Power Rating	Adapter: HKA00909010-8F Input: 100-240Vac~50/60Hz, 0.3A Output: 9.0Vdc, 1.0A	
Connecting I/O Port(s)	Please refer to the User's Manual	
EUT Modification(s)	N/A	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Channel List							
802.11b/ g/ n(20M)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	05	2432	09	2452	/	/
02	2417	06	2437	10	2457	/	/
03	2422	07	2442	11	2462	/	/
04	2427	08	2447	/	/	/	/

3. Table for Filed Antenna

Ant	Manufacturer	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	SF-WIFI-IPEX	PCB antenna	N/A	2.5	Antenna

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
WiFi 2.4GHz	
Mode 1	802.11b: All Rate
Mode 2	802.11g: All Rate
Mode 3	802.11n20: All Rate

For Conducted Emission	
Final Test Mode	Description
Mode 4	WiFi Link mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11b: Rate 11Mbps (worst case)
Mode 2	802.11g: Rate 54Mbps (worst case)
Mode 3	802.11n20 : Rate 65Mbps (worst case)

Note:

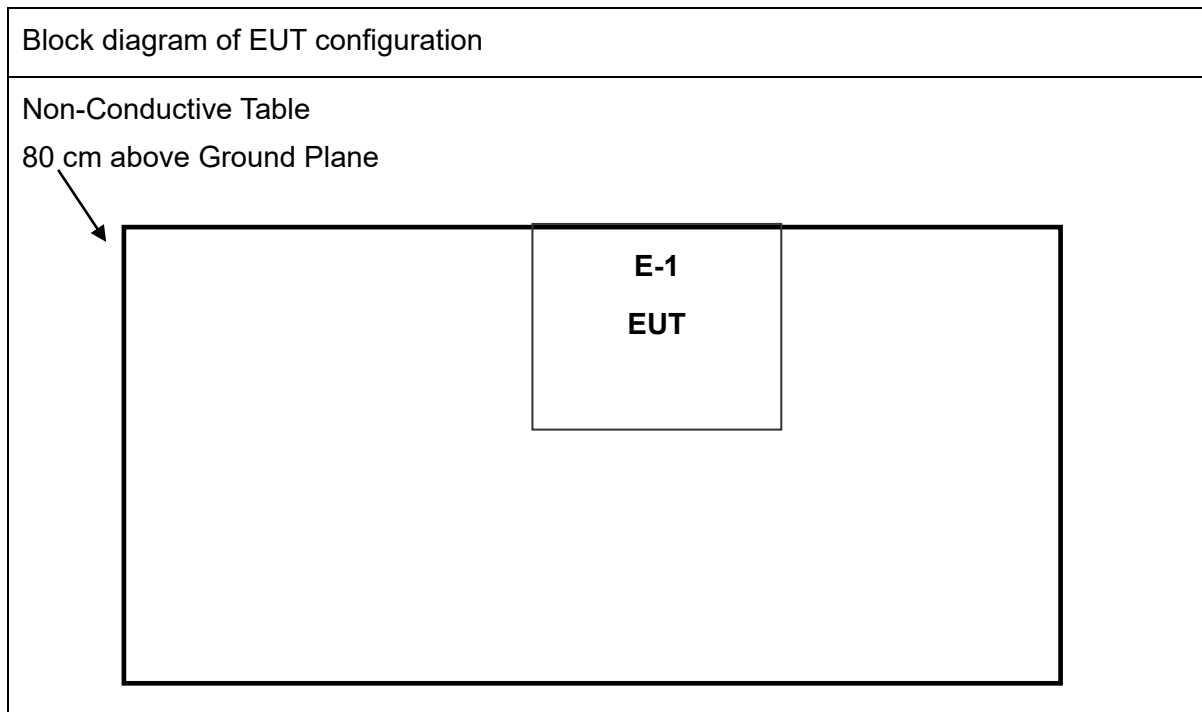
(1) The measurements are performed at the highest, middle, lowest available channels.

2.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters.

Test software Version	Test program: Wifi transmit		
Frequency	2412 MHz	2437 MHz	2462 MHz

2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.5 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

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.

Item	Equipment	Mfr/Brand	Model/Type No.	NCC ID	Series No.	Note
E-1	整合型 IC 卡 與磁卡終端機	PAX	Q80	N/A	N/A	EUT
E-2	Adapter	UNIFIVE	UN318-0530	N/A	N/A	Accessory equipment
E-3	Micro-SD	Apacer	N/A	N/A	N/A	
E-4	Micro-SD Adapter	Apacer	N/A	N/A	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
1#	NO	Yes	120 cm	USB cable
2#	NO	NO	140 cm	digital Camera cable
3#	NO	NO	120 cm	A/V cable
4#	NO	NO	100 cm	Camera cable

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” means “shielded” or “with ferrite core”; “NO” means “unshielded” or “without ferrite core”

2.5.1 EQUIPMENTS LIST FOR ALL TEST ITEMS

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
Spectrum Analyzer	Hewlett Packard	8566B	3013A07296	April 29, 2018	1 Year
RF Preselector	Hewlett Packard	85685A	3010A01157	April 29, 2018	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650	2521A00584	April 29, 2018	1 Year
Preamplifier	Com Power	PA-102	1482	April 29, 2018	1 Year
RF Attenuator	Mini-Circuits	CAT-10	Asset #1000	April 29, 2018	1 Year
LISN	Com Power	LI-200	12012	April 29, 2018	1 Year
LISN	Com Power	LI-200	12214	April 29, 2018	1 Year
LISN	Com Power	LI-200	1767	April 29, 2018	1 Year
LISN	Com Power	LI-200	1768	April 29, 2018	1 Year
Biconical Antenna	Com Power	AB-100	01557	April 29, 2018	1 Year
Log Periodic Antenna	Com Power	AL-100	16037	April 29, 2018	1 Year
Horn Antenna	Com Power	AHA-118	711054	April 29, 2018	1 Year
Antenna Mast	Com Power	AM-400	N/A	N/A	N/A
Turntable	Com Power	TT-100	N/A	N/A	N/A
Computer	Dell, Inc.	DHS	DNSV641	N/A	N/A
Printer	Hewlett Packard	C8124A	CN39B2234T	N/A	N/A
Plotter	Hewlett Packard	7470A	2308A96499	N/A	N/A

EMI Test Equipment (Continued)

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
EMI Receiver	Rohde & Schwarz	ESU40	100127	April 29, 2018	1 Year
BiConiLog Antenna	ETS-Lindgren	3142D	00102183	April 29, 2018	1 Year
Horn Antenna	ETS-Lindgren	3117	00109294	April 29, 2018	1 Year
Preamplifier	Rohde & Schwarz	TS-PR18	100056	April 29, 2018	1 Year
Antenna Mast	ETS-Lindgren	2175	00095727	N/A	N/A
Turntable	ETS-Lindgren	2187-3.0	00118231	N/A	N/A
Computer	Acer	Aspire 8930	85100050123	N/A	N/A
Multi-Function Controller	ETS-Lindgren	2090	00102270	N/A	N/A
Loop Antenna	ARA	PLA-1030/B	1029	April 29, 2018	1 Year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5			66 - 56 *	56 - 46 *	CISPR
0.50 -5.0			56.00	46.00	CISPR
5.0 -30.0			60.00	50.00	CISPR

0.15 -0.5			66 - 56 *	56 - 46 *	LP0002
0.50 -5.0			56.00	46.00	LP0002
5.0 -30.0			60.00	50.00	LP0002

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

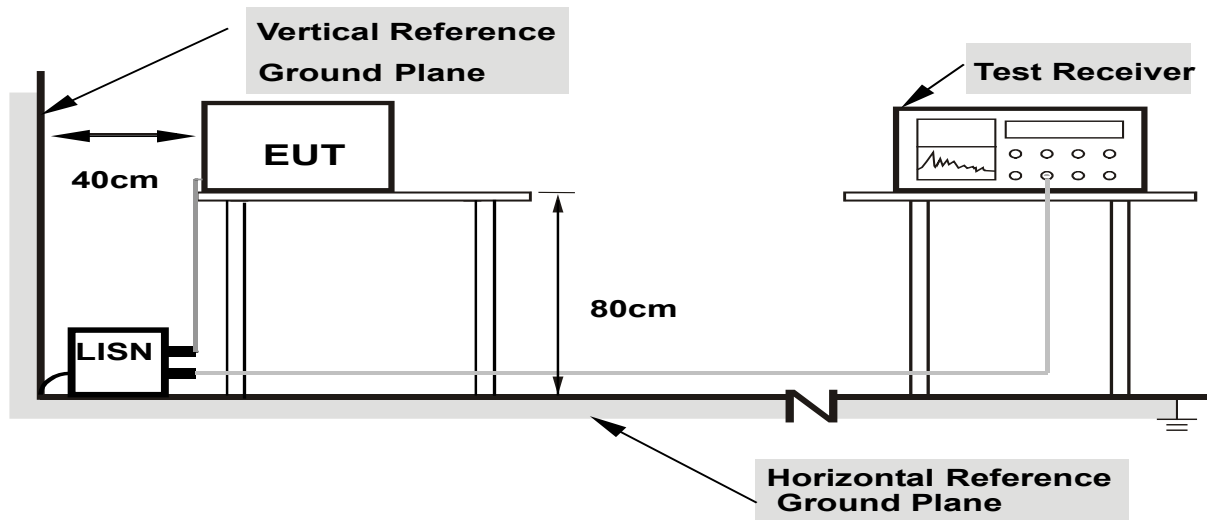
3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.

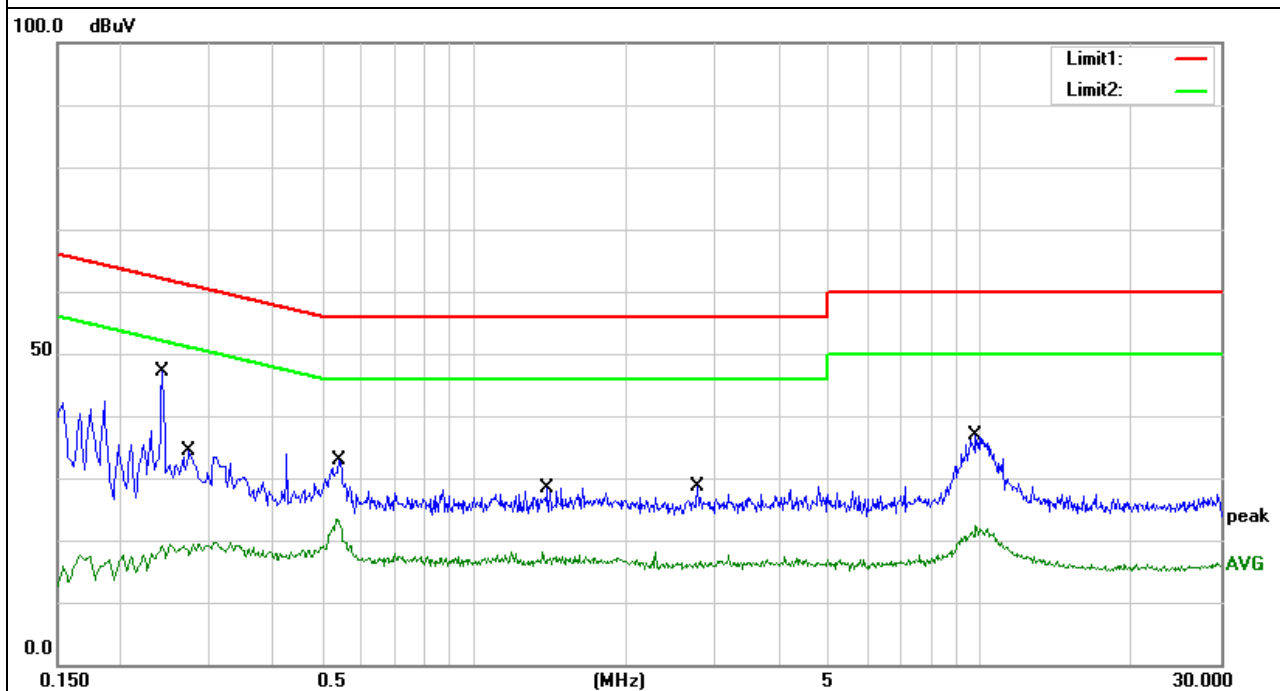
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 TEST RESULTS

EUT :	整合型 IC 卡與磁卡終端機	Model Name. :	Q80
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2018-12-20
Test Mode :	Mode 4	Polarization :	Horizontal
Test Power :	DC 9V from adapter		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
0.2420	26.72	20.44	47.16	62.03	-14.87	Quasi-Peak
0.2420	-1.01	20.44	19.43	52.03	-32.60	Average
0.2740	13.82	20.59	34.41	61.00	-26.59	Quasi-Peak
0.2740	-0.86	20.59	19.73	51.00	-31.27	Average
0.5420	12.48	20.43	32.91	56.00	-23.09	Quasi-Peak
0.5420	3.04	20.43	23.47	46.00	-22.53	Average
1.4020	8.36	20.12	28.48	56.00	-27.52	Quasi-Peak
1.4020	-2.67	20.12	17.45	46.00	-28.55	Average
2.7700	8.51	20.00	28.51	56.00	-27.49	Quasi-Peak
2.7700	-2.44	20.00	17.56	46.00	-28.44	Average
9.8220	16.73	20.12	36.85	60.00	-23.15	Quasi-Peak

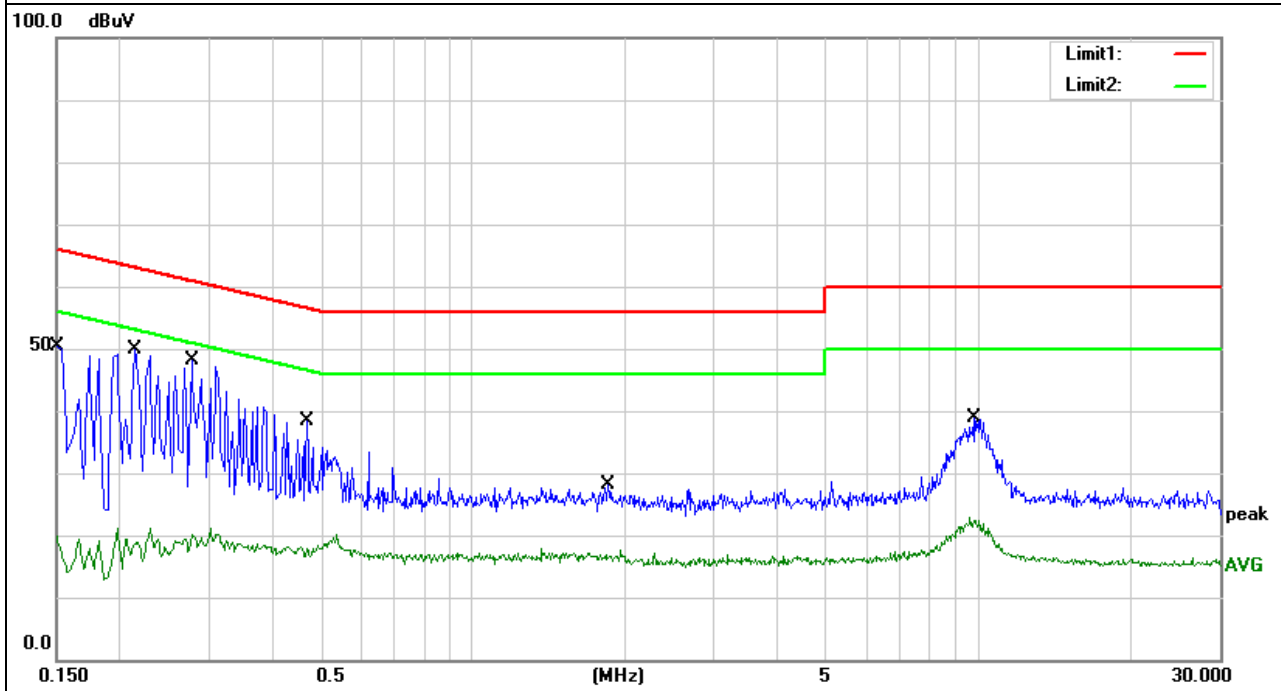
Remark: Factor = LISN factor + Cable Loss + Pulse limiter.



EUT :	整合型 IC 卡與磁卡終端機	Model Name. :	Q80
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2018-12-20
Test Mode :	Mode 4	Polarization :	Vertical
Test Power :	DC 9V from adapter		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
0.1500	30.19	20.23	50.42	66.00	-15.58	Quasi-Peak
0.1500	0.95	20.23	21.18	56.00	-34.82	Average
0.2140	29.55	20.30	49.85	63.05	-13.20	Quasi-Peak
0.2140	0.85	20.30	21.15	53.05	-31.90	Average
0.2780	27.46	20.61	48.07	60.88	-12.81	Quasi-Peak
0.2780	0.56	20.61	21.17	50.88	-29.71	Average
0.4700	17.92	20.48	38.40	56.51	-18.11	Quasi-Peak
0.4700	-0.29	20.48	20.19	46.51	-26.32	Average
1.8580	8.02	20.07	28.09	56.00	-27.91	Quasi-Peak
1.8580	-2.37	20.07	17.70	46.00	-28.30	Average
9.7820	18.69	20.12	38.81	60.00	-21.19	Quasi-Peak
9.7820	2.33	20.12	22.45	50.00	-27.55	Average

Remark: Factor = LISN factor + Cable Loss + Pulse limiter.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 2.7, then the 2.8 limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (dBuV/m) (at 3M)		Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80	60	74	54

Notes:

- (1) The limit for radiated test was performed according to LP0002.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

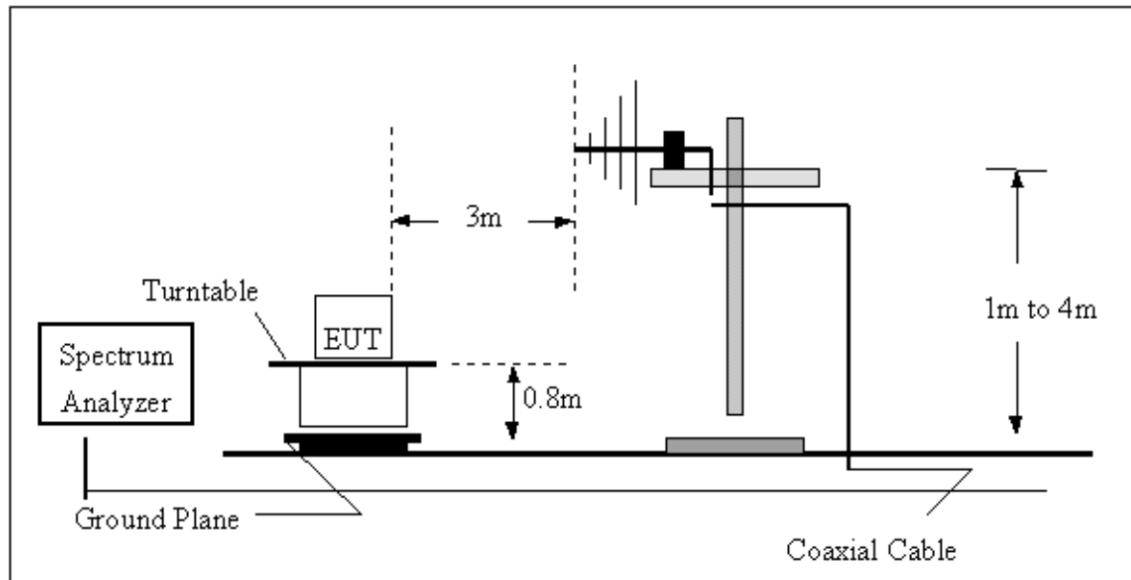
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

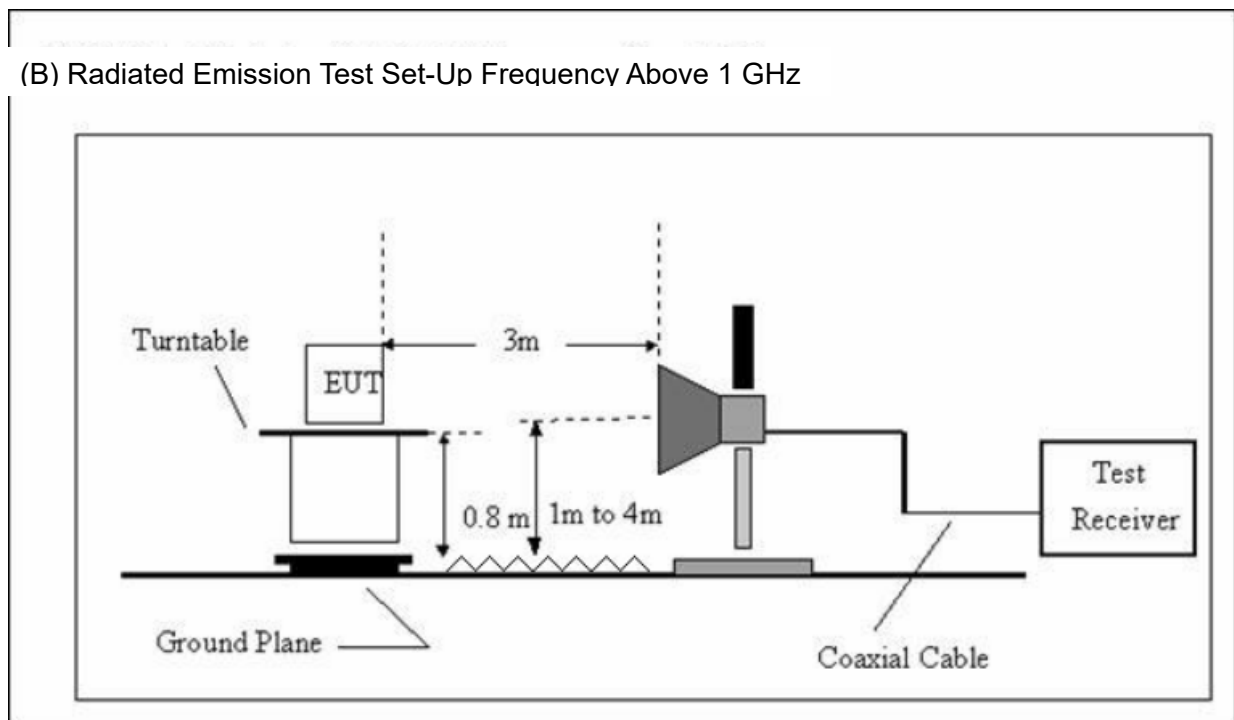
- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.3 TEST SETUP

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



3.2.4 EUT OPERATING CONDITIONS

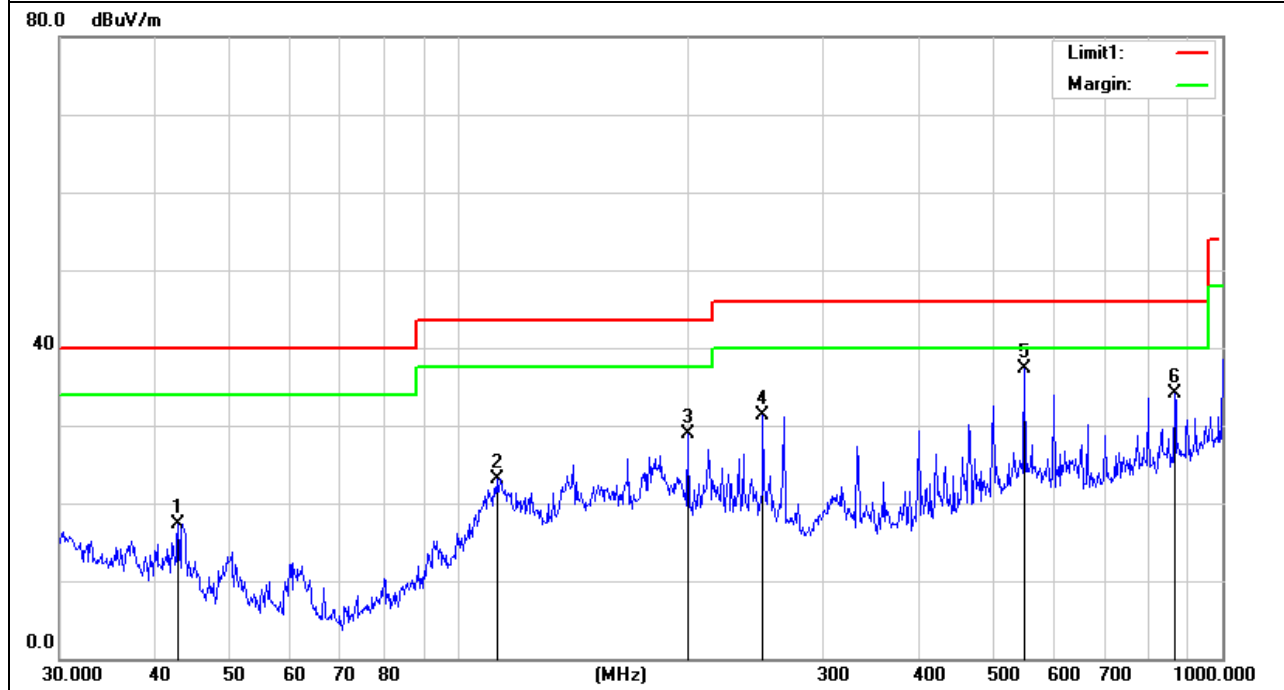
The EUT tested system was configured as the statements of 2..4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.5 TEST RESULTS (BETWEEN30 – 1000 MHZ)

EUT :	整合型 IC 卡與磁卡終端機	Model Name. :	Q80
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2018-12-20
Test Mode :	TX CH01 (802.11b :Rate 11Mbps)	Polarization :	Horizontal
Test Power :	DC 9V from Adapter		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
42.8998	35.08	-17.83	17.25	40.00	-22.75	Quasi-Peak
112.1305	41.30	-18.20	23.10	43.50	-20.40	Quasi-Peak
199.2855	49.14	-20.17	28.97	43.50	-14.53	Quasi-Peak
250.3012	47.65	-16.29	31.36	46.00	-14.64	Quasi-Peak
550.9480	44.14	-6.76	37.38	46.00	-8.62	Quasi-Peak
866.0880	36.65	-2.63	34.02	46.00	-11.98	Quasi-Peak

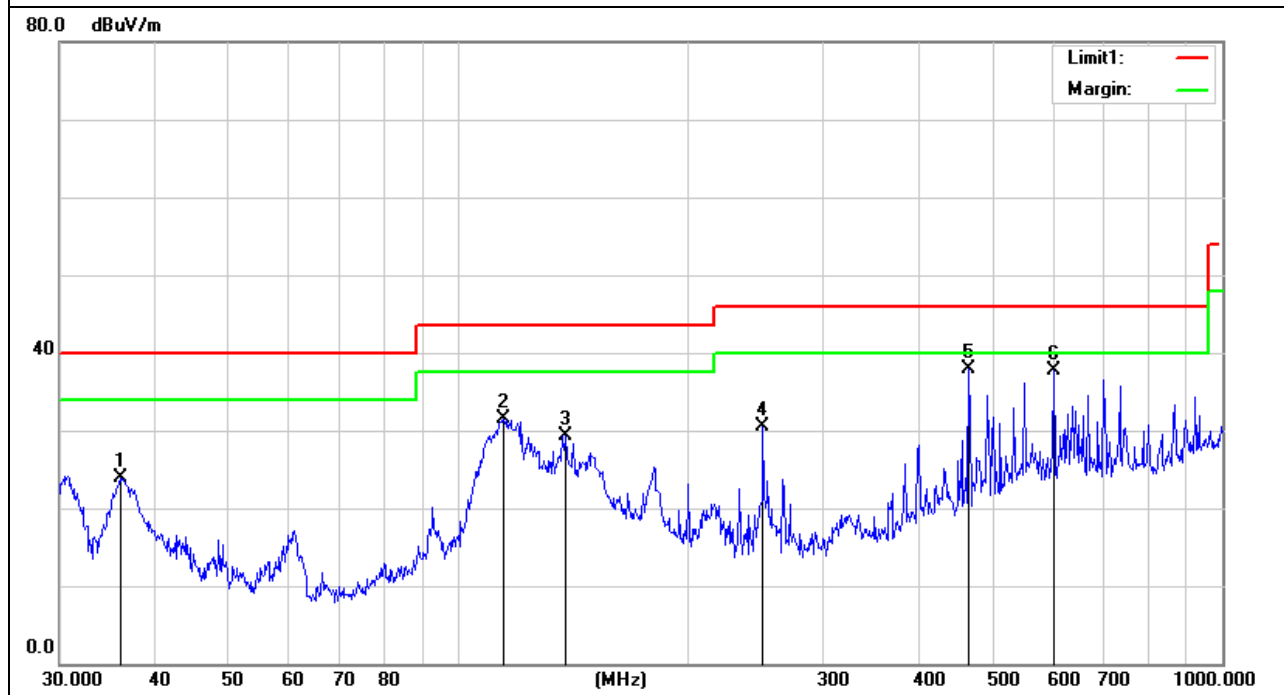
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT :	整合型 IC 卡與磁卡終端機	Model Name. :	Q80
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2018-12-20
Test Mode :	TX CH01 (802.11b :Rate 11Mbps)	Polarization :	Vertical
Test Power :	DC 9V from Adapter		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
36.0007	38.09	-14.27	23.82	40.00	-16.18	Quasi-Peak
114.5146	49.49	-18.05	31.44	43.50	-12.06	Quasi-Peak
137.9028	46.83	-17.52	29.31	43.50	-14.19	Quasi-Peak
250.3012	46.71	-16.29	30.42	46.00	-15.58	Quasi-Peak
465.5994	47.77	-9.93	37.84	46.00	-8.16	Quasi-Peak
601.4265	44.74	-7.12	37.62	46.00	-8.38	Quasi-Peak

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



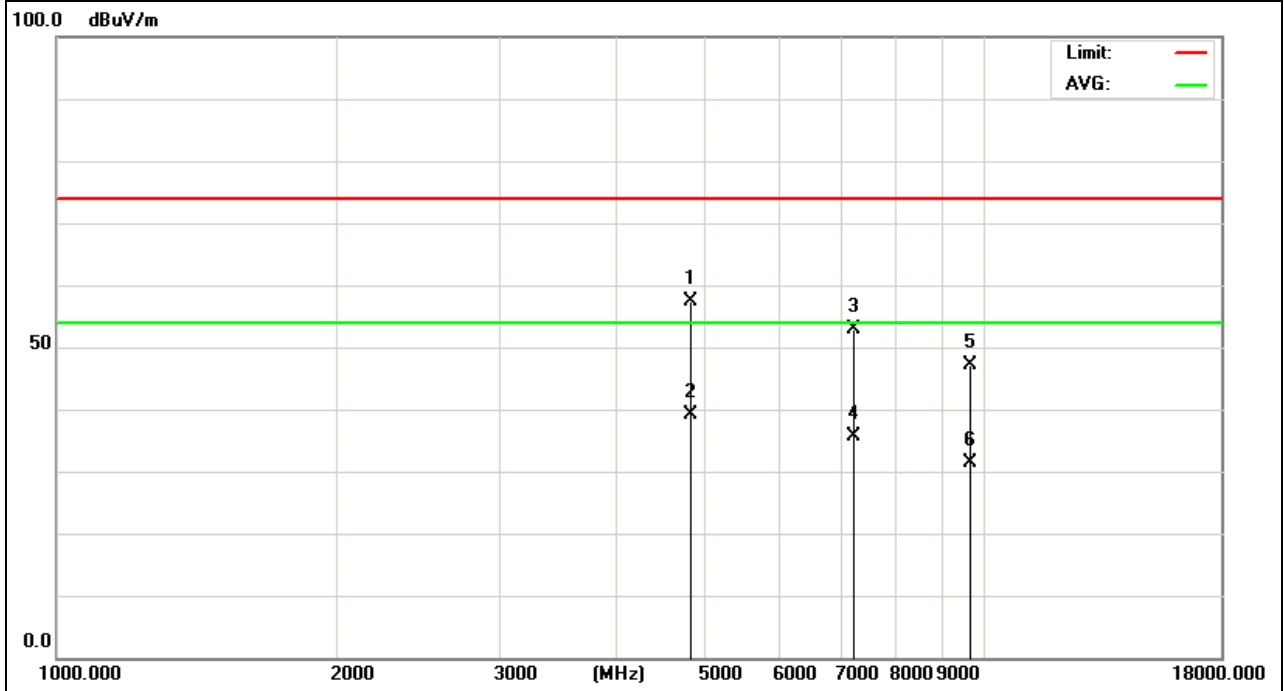
3.2.6 TEST RESULTS (ABOVE 1000 MHZ)

Power	:	DC 9V from Adapter	Pol/Phase	:	Horizontal / Vertical
Test Mode	:	CH 01(2412MHz)	Temperature	:	26°C
Modulation Type	:	802.11b :Rate 11Mbps	Humidity	:	58%

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4824.0000	52.21	5.08	57.29	74.00	-16.71	peak
4824.0000	34.28	5.08	39.36	54.00	-14.64	AVG
7236.0000	45.42	7.16	52.58	74.00	-21.42	peak
7236.0000	28.55	7.16	35.71	54.00	-18.29	AVG
9648.0000	36.26	10.82	47.08	74.00	-26.92	peak
9648.0000	20.46	10.82	31.28	54.00	-22.72	AVG

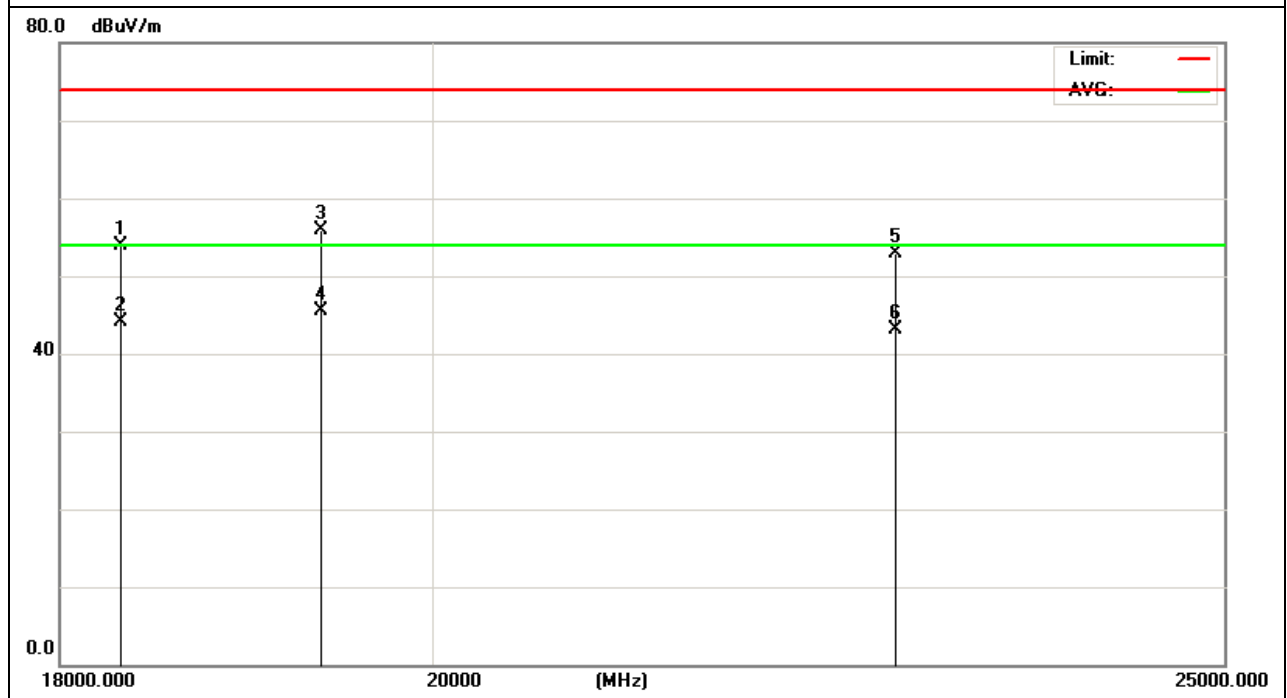
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
18322.000	38.27	15.71	53.98	74.00	-20.02	peak
18322.000	28.43	15.71	44.14	54.00	-9.86	AVG
19386.000	39.51	16.48	55.99	74.00	-18.01	peak
19386.000	28.95	16.48	45.43	54.00	-8.57	AVG
22795.000	35.84	17.15	52.99	74.00	-21.01	peak
22795.000	25.97	17.15	43.12	54.00	-10.88	AVG

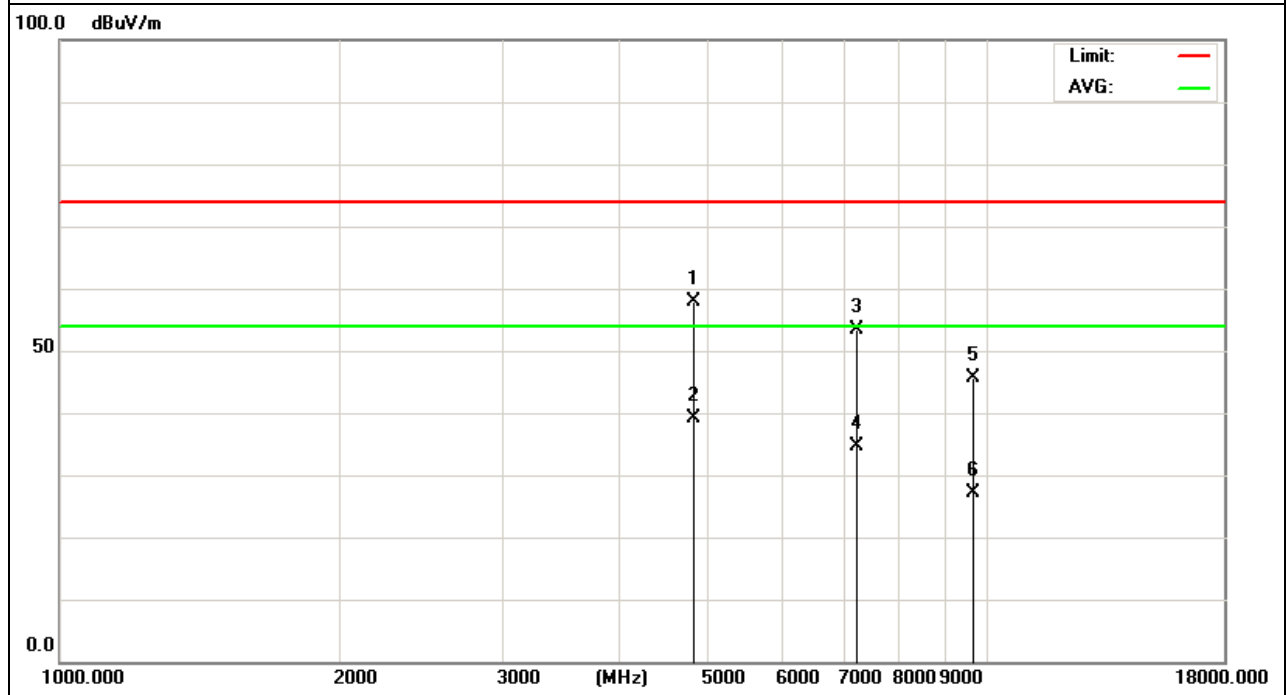
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4824.0000	52.85	5.08	57.93	74.00	-16.07	peak
4824.0000	33.94	5.08	39.02	54.00	-14.98	AVG
7236.0000	46.25	7.16	53.41	74.00	-20.59	peak
7236.0000	27.53	7.16	34.69	54.00	-19.31	AVG
9648.0000	34.74	10.82	45.56	74.00	-28.44	peak
9648.0000	16.38	10.82	27.20	54.00	-26.80	AVG

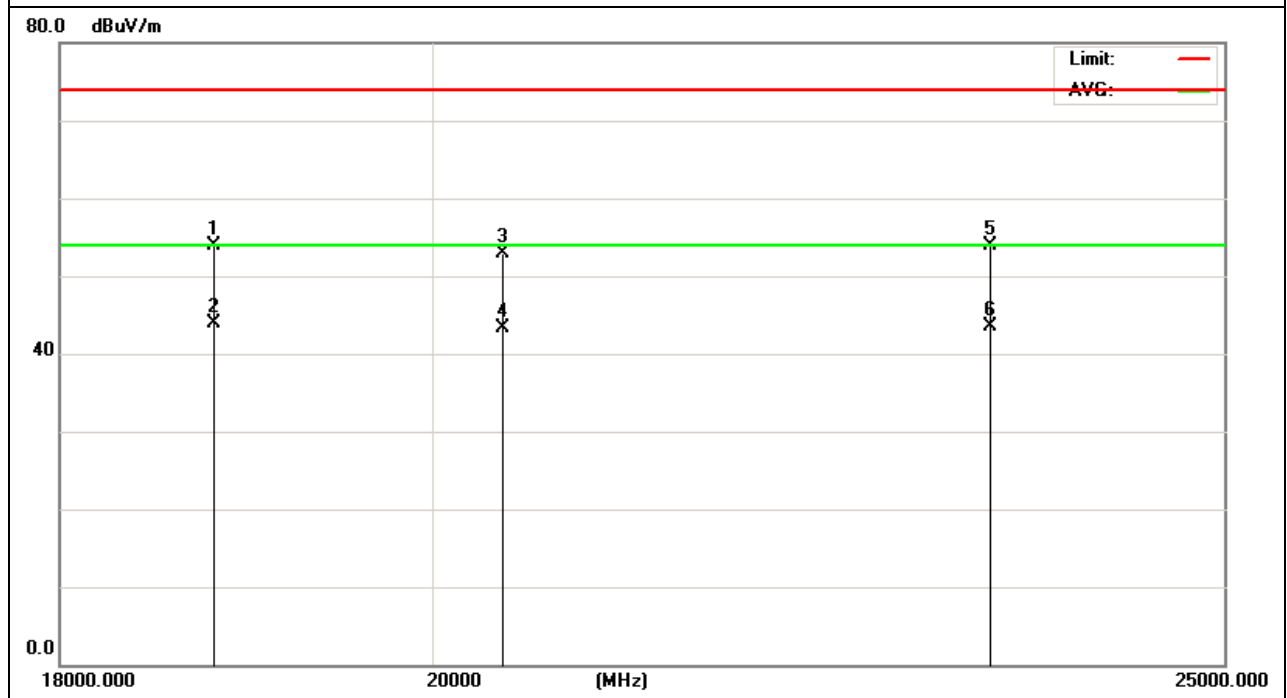
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
18791.522	37.86	16.20	54.06	74.00	-19.94	peak
18791.522	27.73	16.20	43.93	54.00	-10.07	AVG
20401.000	36.35	16.68	53.03	74.00	-20.97	peak
20401.000	26.65	16.68	43.33	54.00	-10.67	AVG
23404.000	36.73	17.27	54.00	74.00	-20.00	peak
23404.000	26.28	17.27	43.55	54.00	-10.45	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

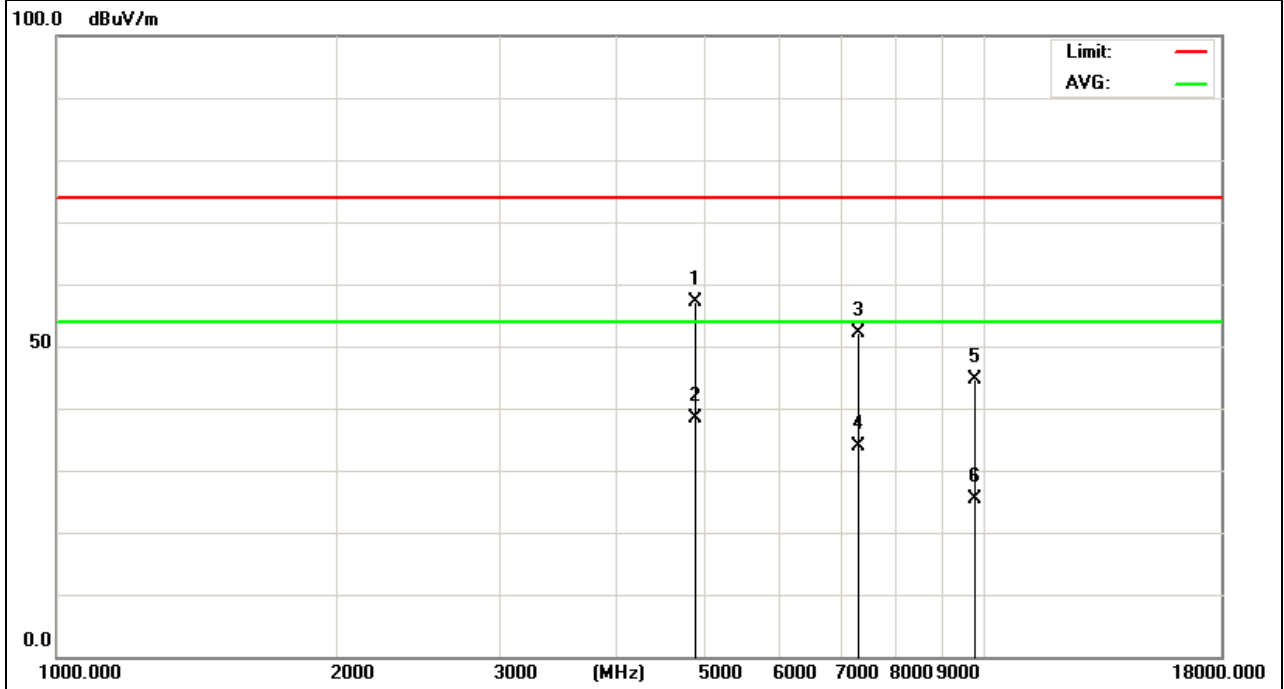


Power	: DC 9V from Adapter	Pol/Phase	: Horizontal / Vertical
Test Mode	: CH 06(2437MHz)	Temperature	: 26°C
Modulation Type	: 802.11b :Rate 11Mbps	Humidity	: 58%

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4874.0000	52.04	5.13	57.17	74.00	-16.83	peak
4874.0000	33.17	5.13	38.30	54.00	-15.70	AVG
7311.0000	44.52	7.49	52.01	74.00	-21.99	peak
7311.0000	26.26	7.49	33.75	54.00	-20.25	AVG
9748.0000	33.28	11.30	44.58	74.00	-29.42	peak
9748.0000	13.97	11.30	25.27	54.00	-28.73	AVG

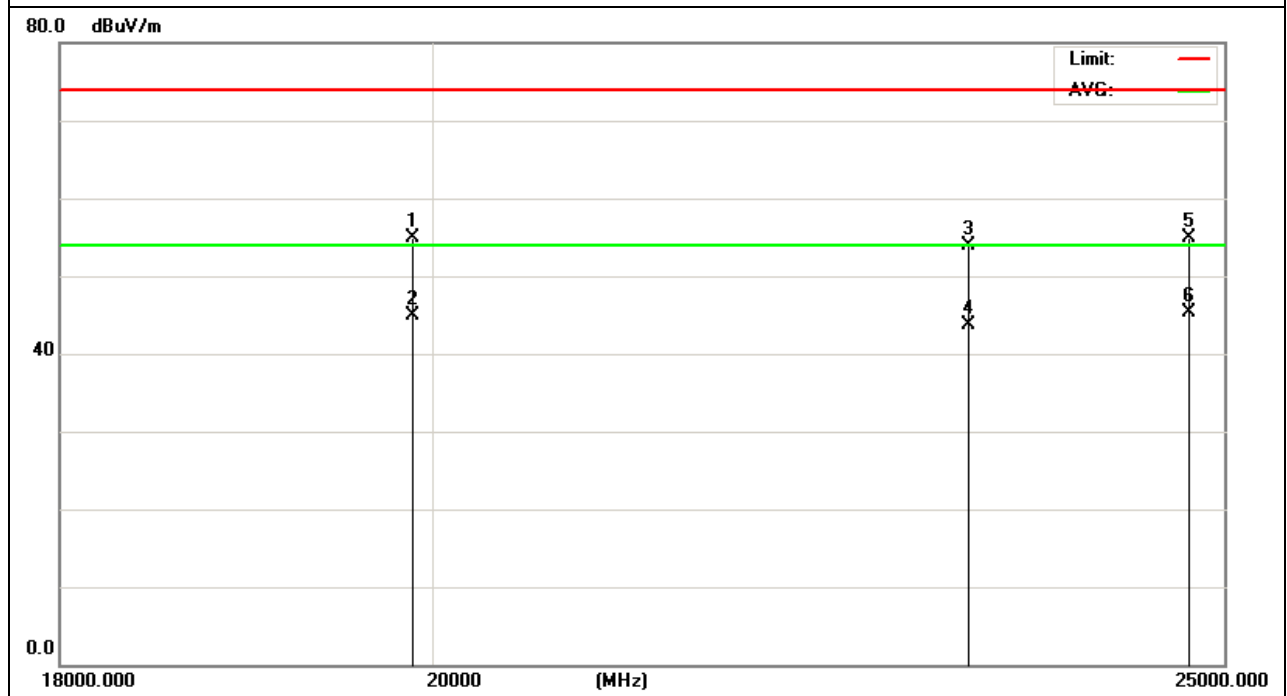
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
19890.000	38.42	16.58	55.00	74.00	-19.00	peak
19890.000	28.25	16.58	44.83	54.00	-9.17	AVG
23271.000	36.77	17.24	54.01	74.00	-19.99	peak
23271.000	26.45	17.24	43.69	54.00	-10.31	AVG
24755.000	37.43	17.53	54.96	74.00	-19.04	peak
24755.000	27.72	17.53	45.25	54.00	-8.75	AVG

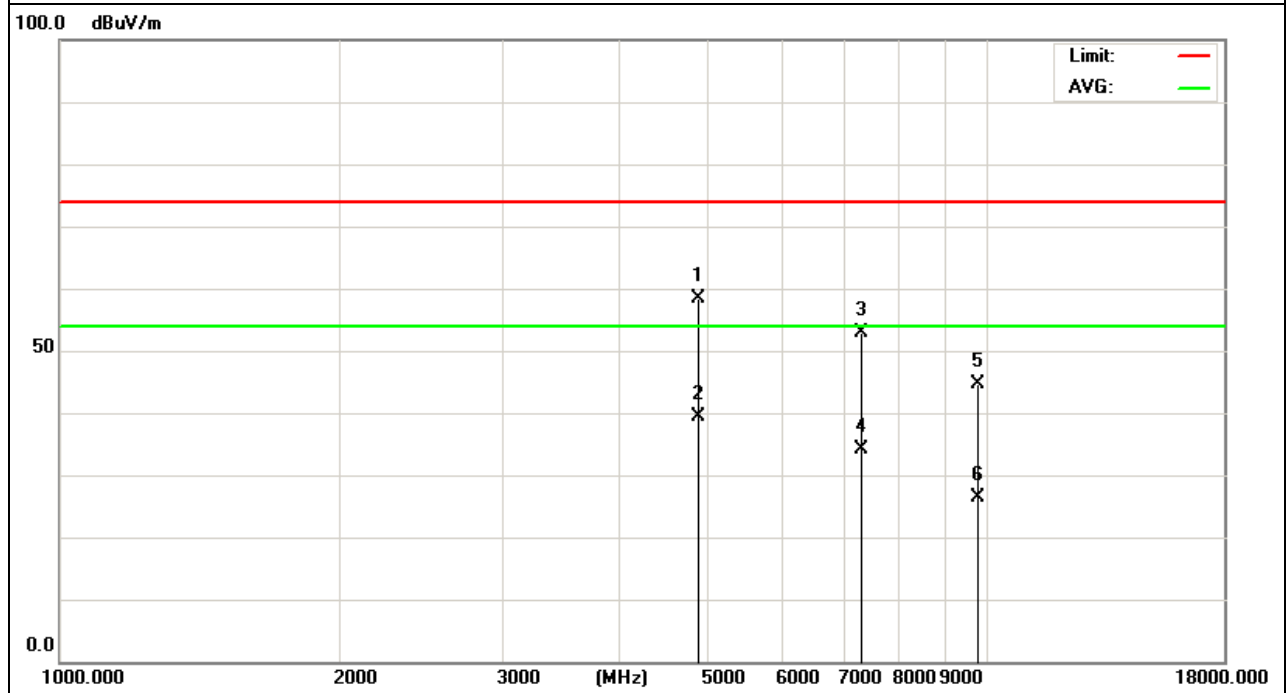
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4874.0000	53.13	5.13	58.26	74.00	-15.74	peak
4874.0000	34.26	5.13	39.39	54.00	-14.61	AVG
7311.0000	45.41	7.49	52.90	74.00	-21.10	peak
7311.0000	26.78	7.49	34.27	54.00	-19.73	AVG
9748.0000	33.23	11.30	44.53	74.00	-29.47	peak
9748.0000	15.06	11.30	26.36	54.00	-27.64	AVG

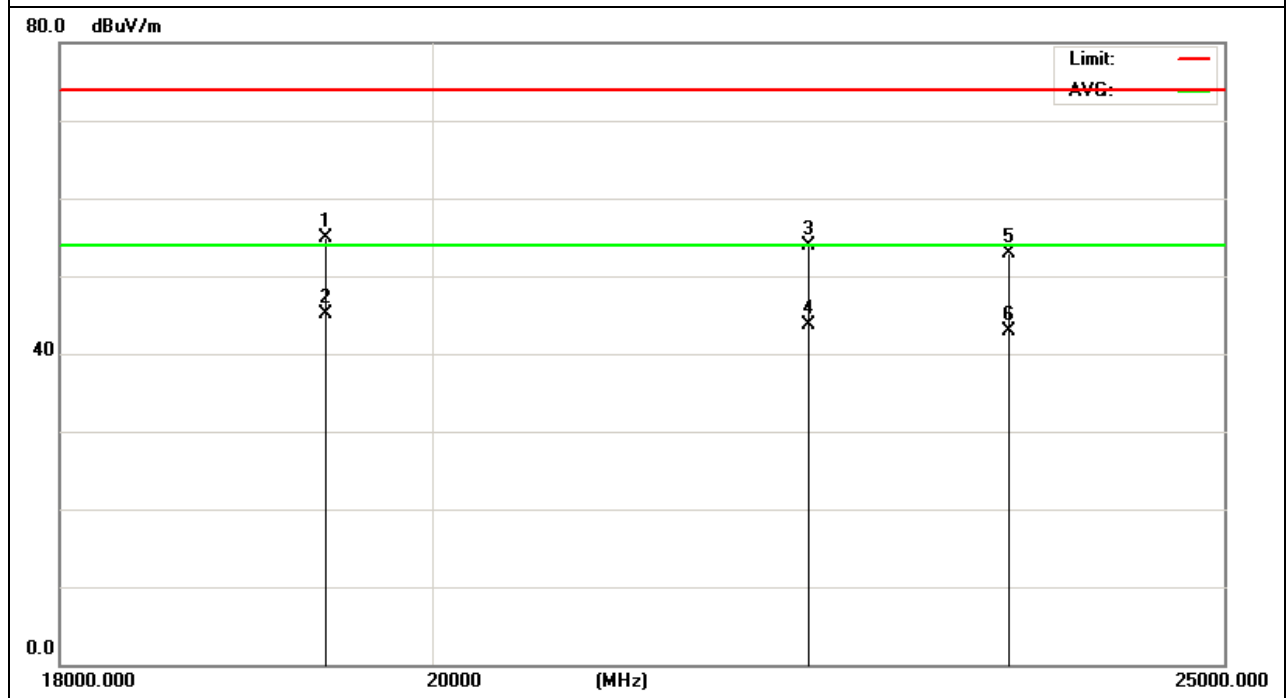
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
19393.582	38.52	16.49	55.01	74.00	-18.99	peak
19393.582	28.65	16.49	45.14	54.00	-8.86	AVG
22235.000	36.93	17.04	53.97	74.00	-20.03	peak
22235.000	26.67	17.04	43.71	54.00	-10.29	AVG
23530.000	35.72	17.29	53.01	74.00	-20.99	peak
23530.000	25.64	17.29	42.93	54.00	-11.07	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

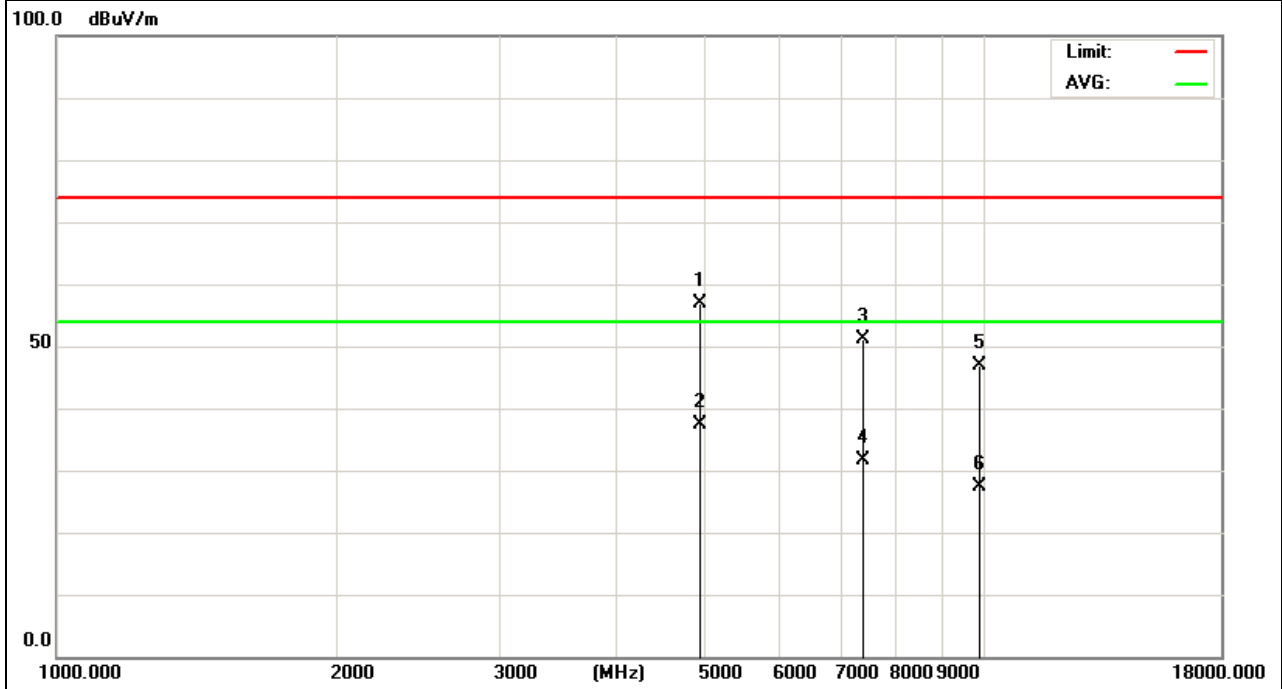


Power	: DC 9V from Adapter	Pol/Phase	: Horizontal / Vertical
Test Mode	: CH 11(2462MHz)	Temperature	: 26°C
Modulation Type	: 802.11b :Rate 11Mbps	Humidity	: 58%

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4924.0000	51.52	5.18	56.70	74.00	-17.30	peak
4924.0000	32.18	5.18	37.36	54.00	-16.64	AVG
7386.0000	43.16	7.82	50.98	74.00	-23.02	peak
7386.0000	23.72	7.82	31.54	54.00	-22.46	AVG
9848.0000	35.05	11.79	46.84	74.00	-27.16	peak
9848.0000	15.54	11.79	27.33	54.00	-26.67	AVG

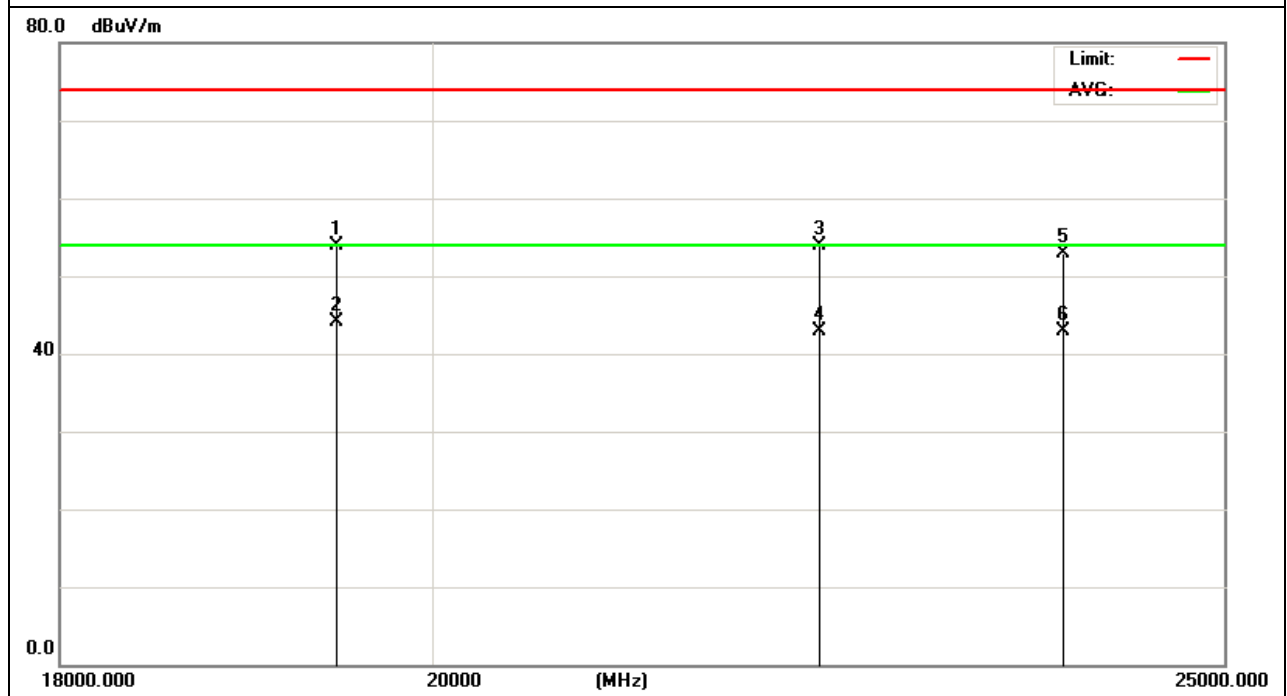
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
19470.000	37.58	16.50	54.08	74.00	-19.92	peak
19470.000	27.65	16.50	44.15	54.00	-9.85	AVG
22312.000	36.96	17.05	54.01	74.00	-19.99	peak
22312.000	25.85	17.05	42.90	54.00	-11.10	AVG
23894.000	35.63	17.36	52.99	74.00	-21.01	peak
23894.000	25.52	17.36	42.88	54.00	-11.12	AVG

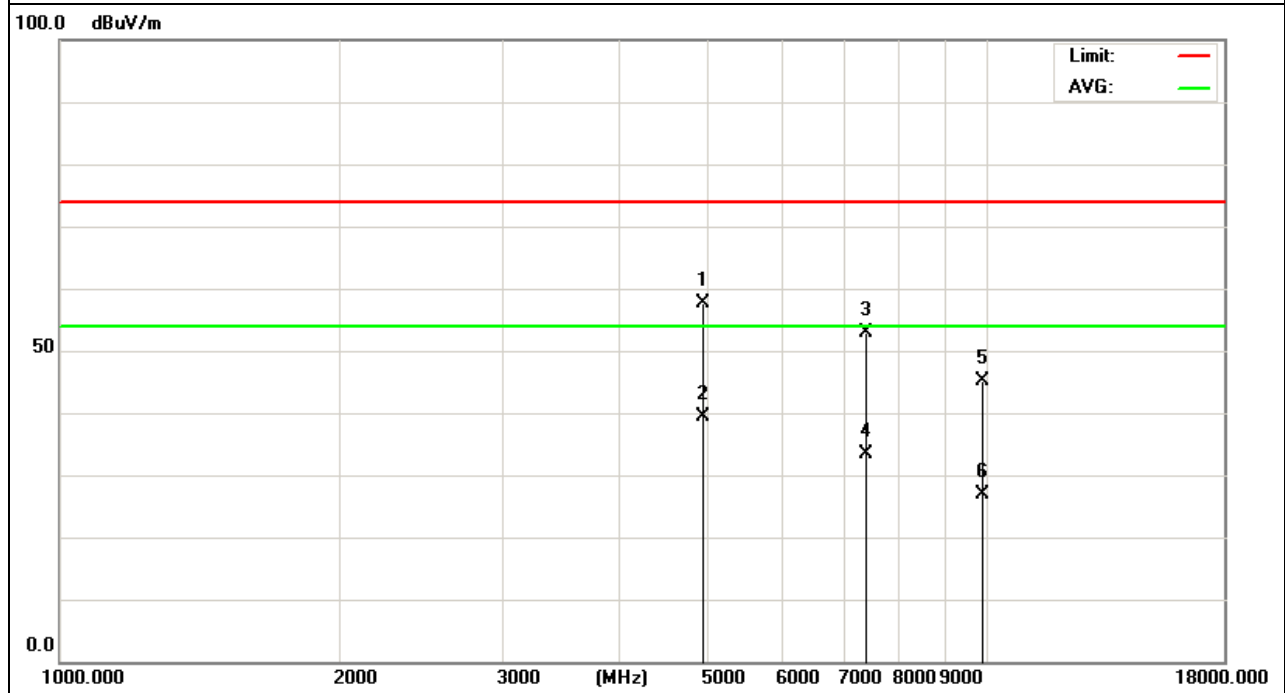
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4924.0000	52.32	5.18	57.50	74.00	-16.50	peak
4924.0000	34.15	5.18	39.33	54.00	-14.67	AVG
7386.0000	45.02	7.82	52.84	74.00	-21.16	peak
7386.0000	25.57	7.82	33.39	54.00	-20.61	AVG
9848.0000	33.21	11.79	45.00	74.00	-29.00	peak
9848.0000	15.13	11.79	26.92	54.00	-27.08	AVG

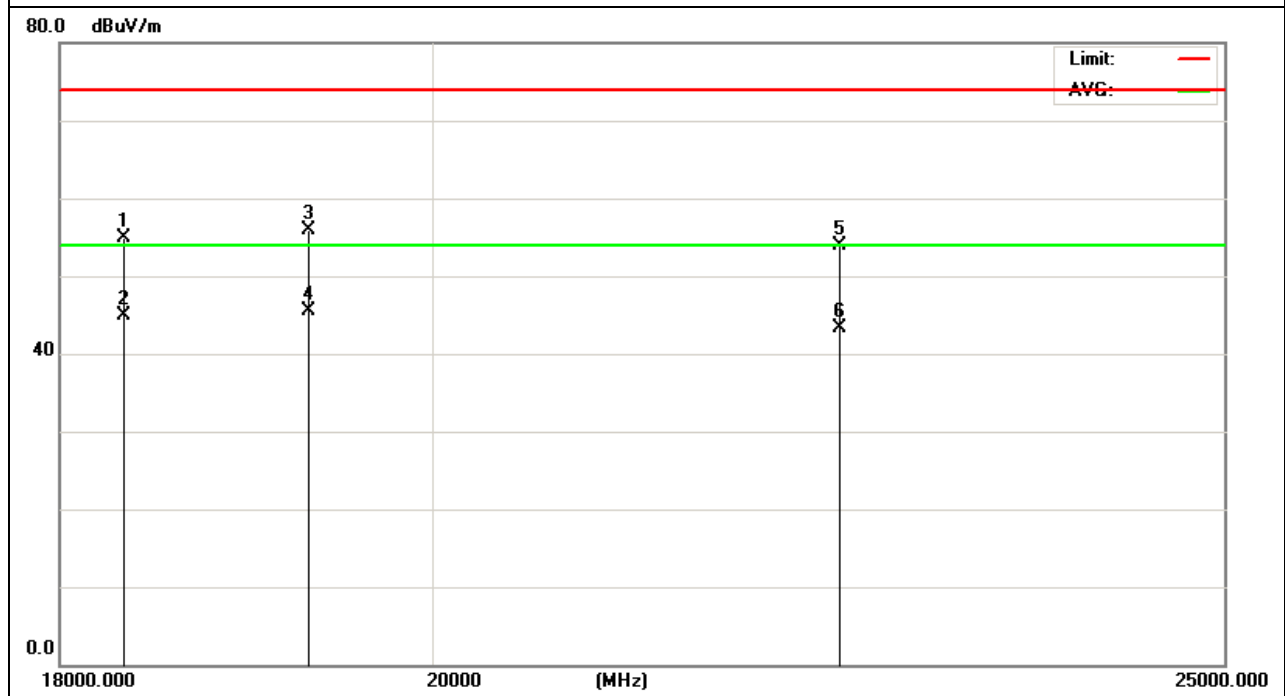
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
18322.155	39.21	15.71	54.92	74.00	-19.08	peak
18322.155	29.22	15.71	44.93	54.00	-9.07	AVG
19316.000	39.54	16.46	56.00	74.00	-18.00	peak
19316.000	29.06	16.46	45.52	54.00	-8.48	AVG
22438.000	36.95	17.08	54.03	74.00	-19.97	peak
22438.000	26.17	17.08	43.25	54.00	-10.75	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Note:

1. Only record the worst case 802.11b mode in this report.

3.2.7 TEST RESULTS (RESTRICTED BANDS REQUIREMENTS)

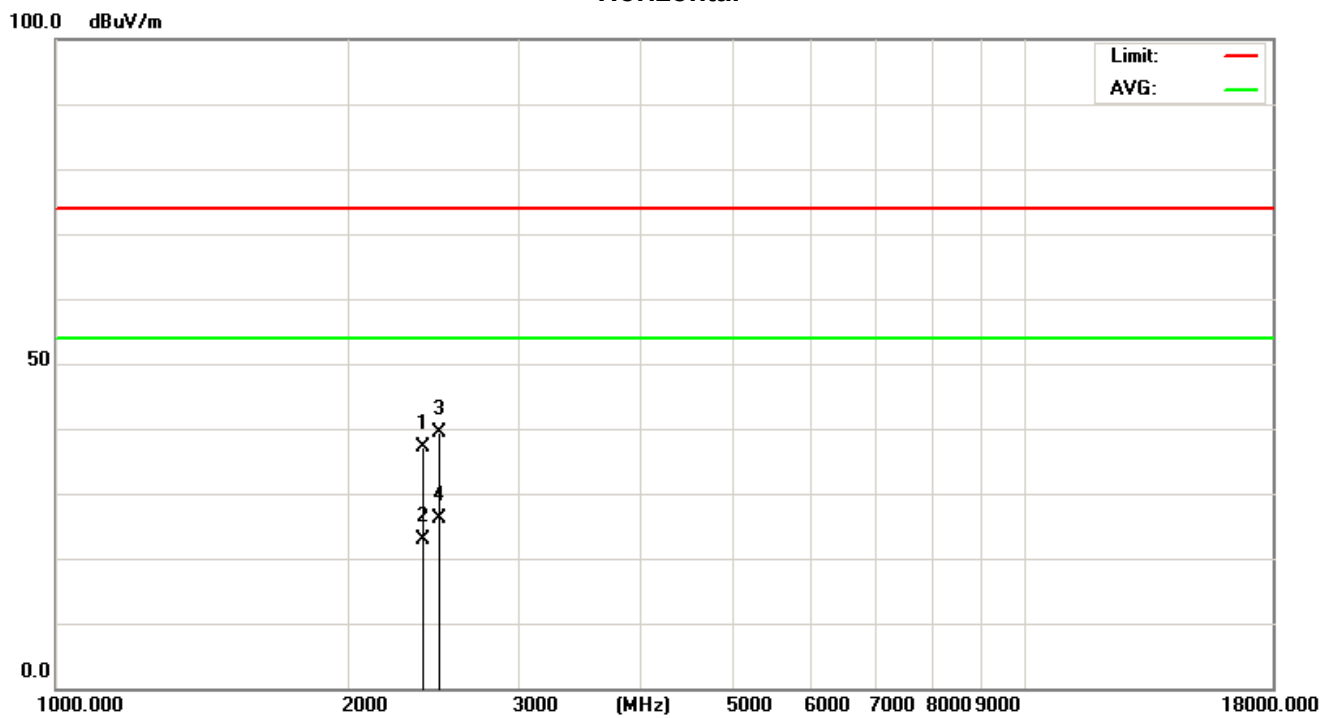
EUT :	整合型 IC 卡與磁卡終端機	Model Name :	Q80
Temperature :	26 °C	Relative Humidity :	51%
Pressure :	1010 hPa	Test Voltage :	DC 9V from Adapter
Test Mode :	802.11b Data rate 11Mbps		
Note :	1. The transmitter was setup to transmit at the lowest channel (CH01). Then the field strength was measured at 2310-2390 MHz. 2. The transmitter was setup to transmit at the highest channel (CH11). Then the field strength was measured at 2483.5-2500 MHz. 3. The data of 2390MHz and 2483.5MHz was the worst.		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant/CF CF(dB)	Act		Limit		Note
		Peak (dBuv)	AV (dBuv)		Peak (dBuv/m)	AV (dBuv/m)	Peak (dBuv/m)	AV (dBuv/m)	
2390.00	H	42.85	28.63	-5.79	37.06	22.84	74.00	54.00	CH01
2390.00	V	43.51	30.48	-5.79	37.72	24.69	74.00	54.00	CH01
2483.50	H	44.34	31.25	-4.98	39.36	26.27	74.00	54.00	CH11
2483.50	V	45.82	32.04	-4.98	40.84	27.06	74.00	54.00	CH11

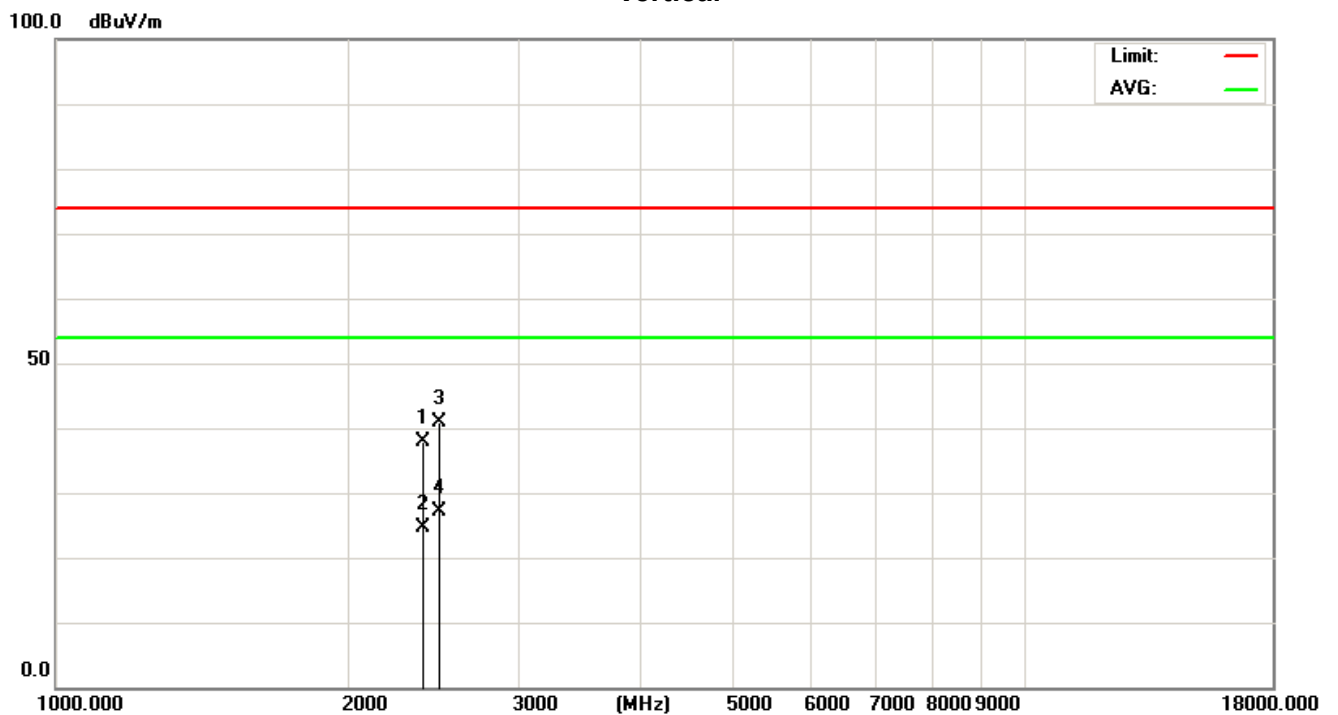
Remark :

- (1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode
- (2) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (3) Corr.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Horizontal



Vertical



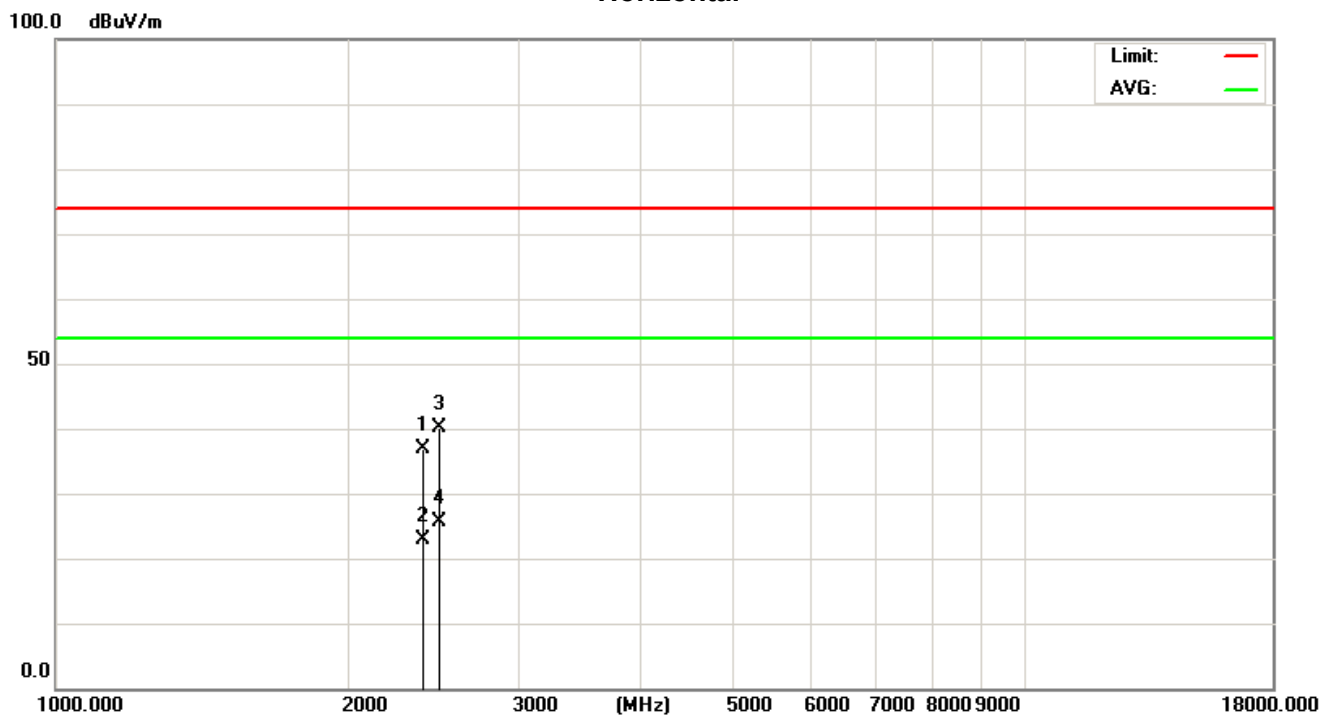
EUT :	整合型 IC 卡與磁卡終端機	Model Name :	Q80
Temperature :	26 °C	Relative Humidity :	51%
Pressure :	1010 hPa	Test Voltage :	DC 9V from Adapter
Test Mode :	802.11g Data rate 54Mbps		
Note :	1. The transmitter was setup to transmit at the lowest channel (CH01). Then the field strength was measured at 2310-2390 MHz. 2. The transmitter was setup to transmit at the highest channel (CH11). Then the field strength was measured at 2483.5-2500 MHz. 3. The data of 2390MHz and 2483.5MHz was the worst.		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant/CF CF(dB)	Act		Limit		Note
		Peak (dBuv)	AV (dBuv)		Peak (dBuv/m)	AV (dBuv/m)	Peak (dBuv/m)	AV (dBuv/m)	
2390.00	H	42.56	28.76	-5.79	36.77	22.97	74.00	54.00	CH01
2390.00	V	42.84	30.62	-5.79	37.05	24.83	74.00	54.00	CH01
2483.50	H	45.15	30.54	-4.98	40.17	25.56	74.00	54.00	CH11
2483.50	V	44.31	32.55	-4.98	39.33	27.57	74.00	54.00	CH11

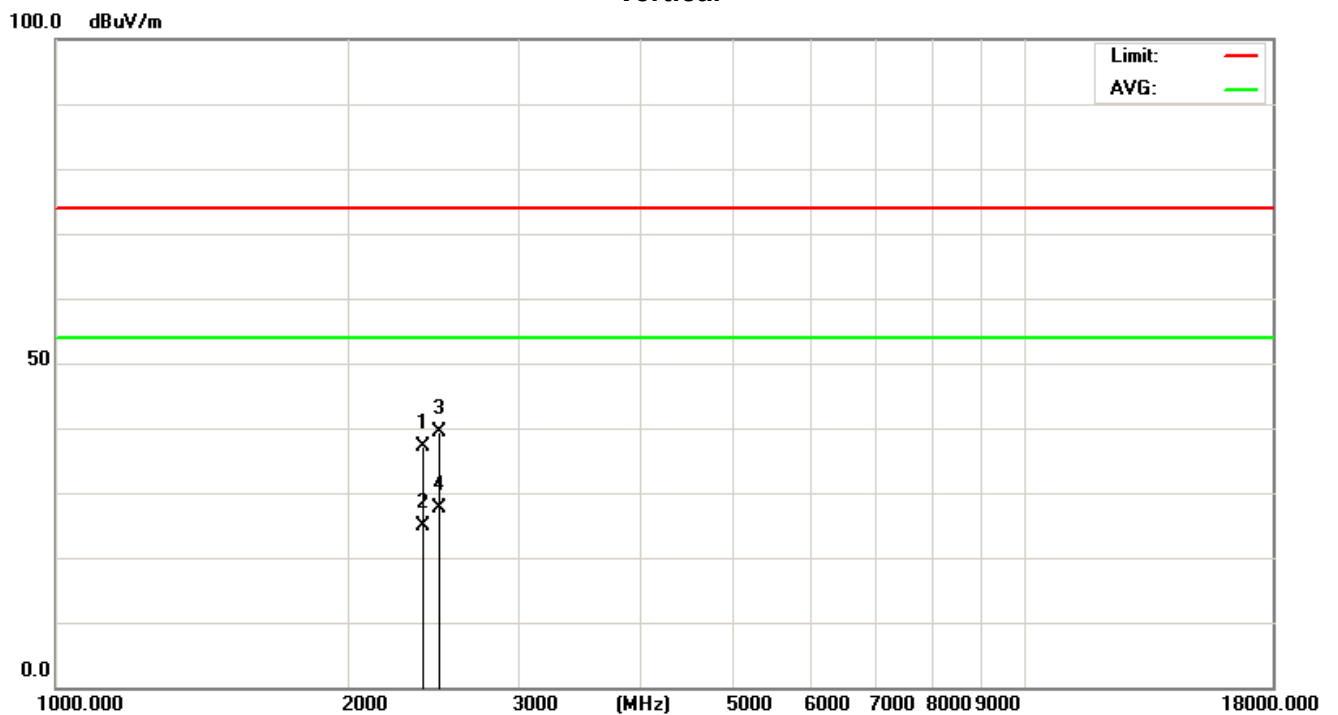
Remark :

- (1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode
- (2) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (3) Corr.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Horizontal



Vertical



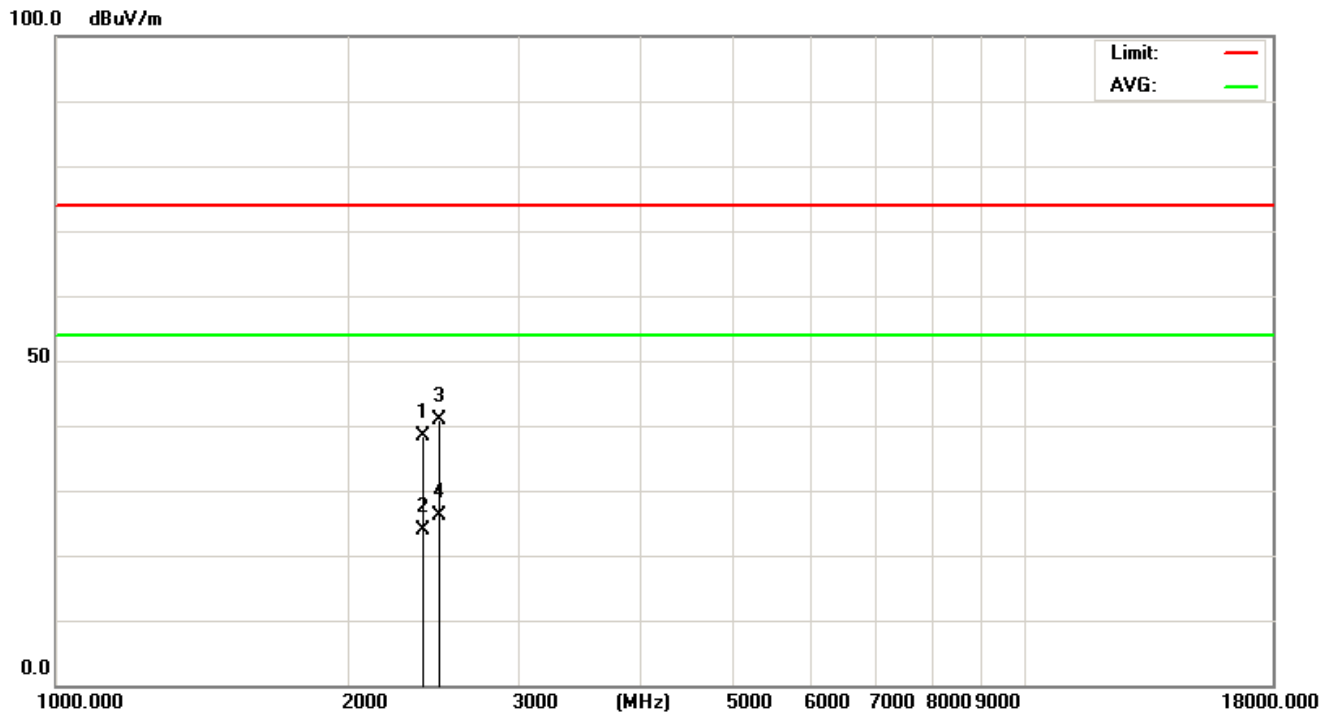
EUT :	整合型 IC 卡與磁卡終端機	Model Name :	Q80
Temperature :	26 °C	Relative Humidity :	51%
Pressure :	1010 hPa	Test Voltage :	DC 9V from Adapter
Test Mode :	802.11n20 Data rate 65Mbps		
Note :	1. The transmitter was setup to transmit at the lowest channel (CH01). Then the field strength was measured at 2310-2390 MHz. 2. The transmitter was setup to transmit at the highest channel (CH11). Then the field strength was measured at 2483.5-2500 MHz. 3. The data of 2390MHz and 2483.5MHz was the worst.		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant/CF CF(dB)	Act		Limit		Note
		Peak (dBuv)	AV (dBuv)		Peak (dBuv/m)	AV (dBuv/m)	Peak (dBuv/m)	AV (dBuv/m)	
2390.00	H	44.15	29.57	-5.79	38.36	23.78	74.00	54.00	CH01
2390.00	V	43.38	30.82	-5.79	37.59	25.03	74.00	54.00	CH01
2483.50	H	45.82	31.25	-4.98	40.84	26.27	74.00	54.00	CH11
2483.50	V	44.76	32.82	-4.98	39.78	27.84	74.00	54.00	CH11

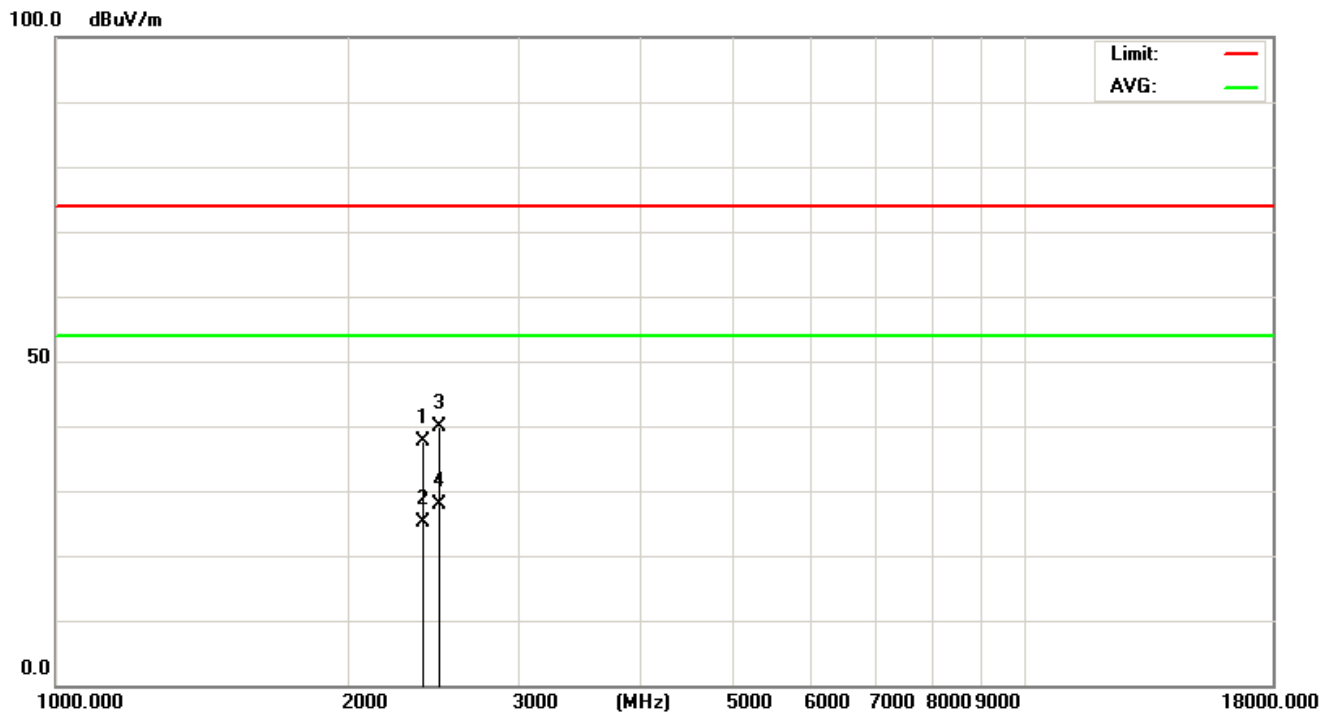
Remark :

- (1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode
- (2) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (3) Corr.Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Horizontal



Vertical



Test result: The unit does meet the NCC requirement.

4. OCCUPIED BANDWIDTH TEST (DTS)

4.1 APPLIED PROCEDURES / LIMIT

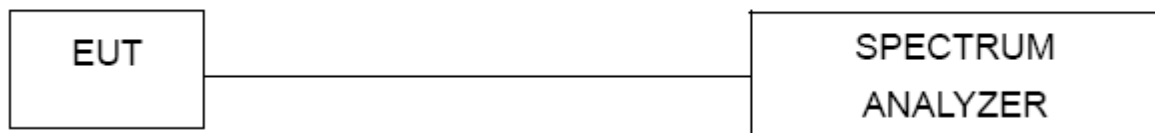
LP0002				
Section	Test Item	Limit	Frequency Range (MHz)	Result
3.10.1(6.2.1)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	100 kHz (6dB Bandwidth) / 100 kHz (Channel Separation)
VB	300 kHz (6dB Bandwidth) / 300 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=300KHz, Sweep time = Auto.

4.1.2 TEST SETUP



4.1.3 EUT OPERATION CONDITIONS

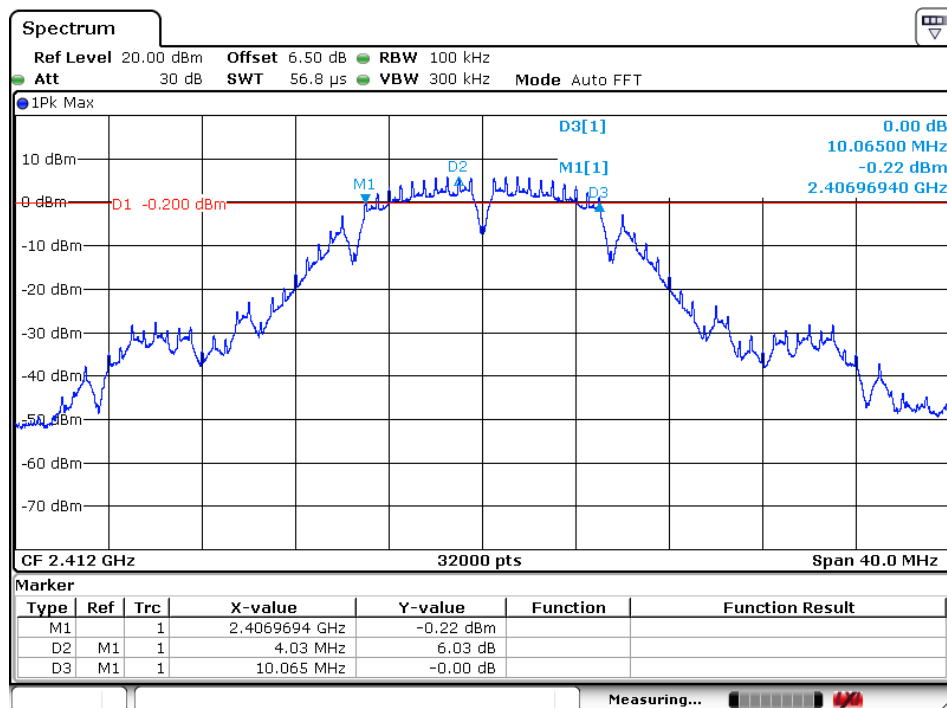
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.4 TEST RESULTS

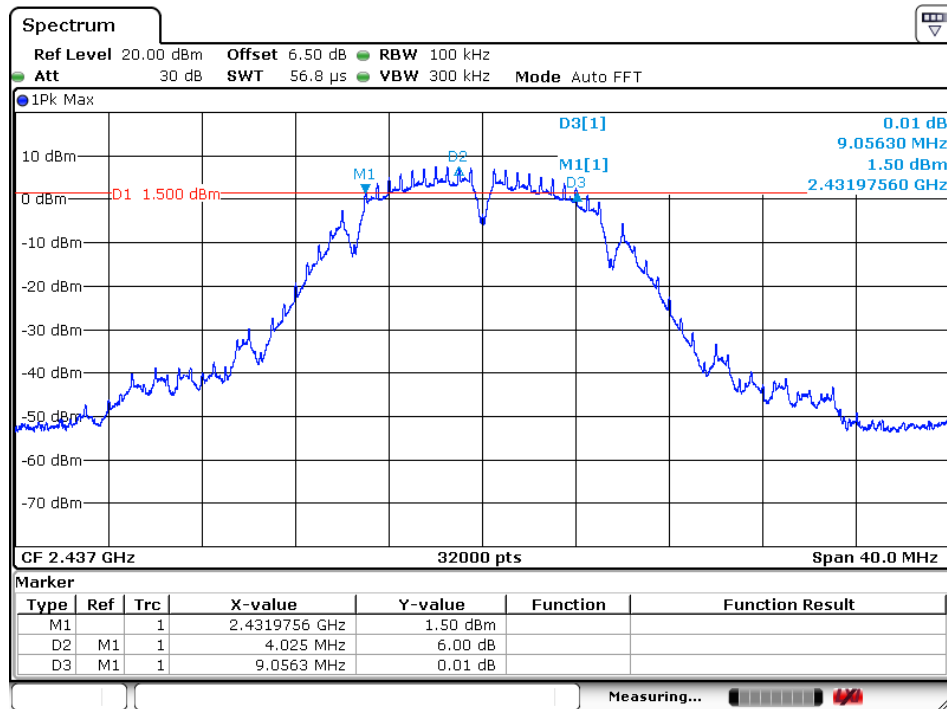
EUT :	整合型 IC 卡與磁卡終端機	Model Name :	Q80
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1010 hPa	Test Voltage :	DC 9V from Adapter
Test Mode :	CH01 / CH06 /CH11(802.11b Data rate 1Mbps)		

Frequency	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2412 MHz	10.0625	$\geq 500\text{KHz}$	Pass
2437 MHz	9.0563	$\geq 500\text{KHz}$	Pass
2462 MHz	9.55	$\geq 500\text{KHz}$	Pass

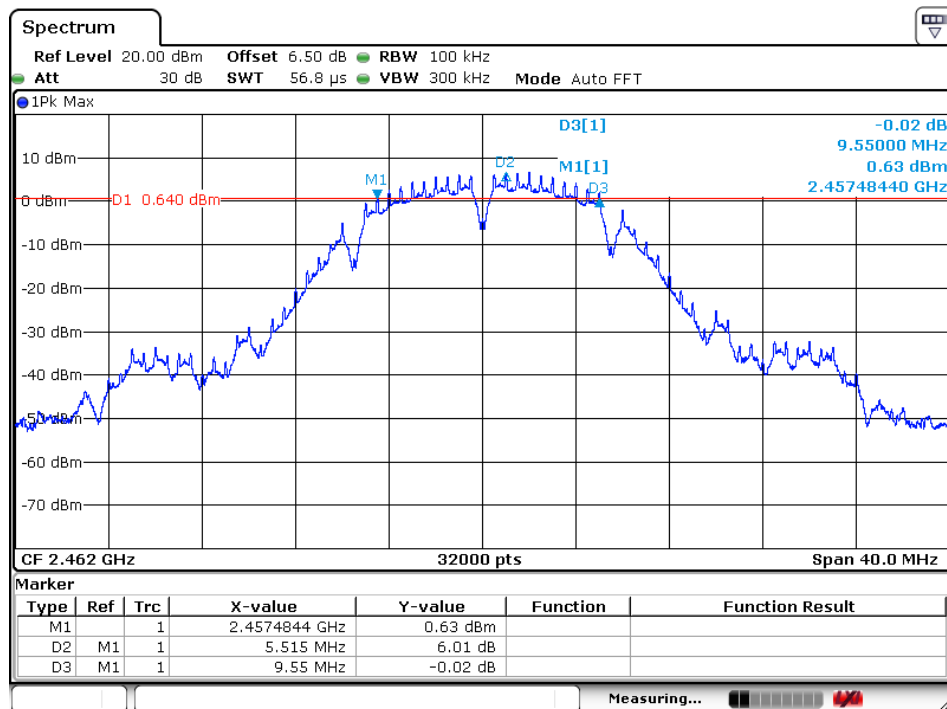
CH01



CH06



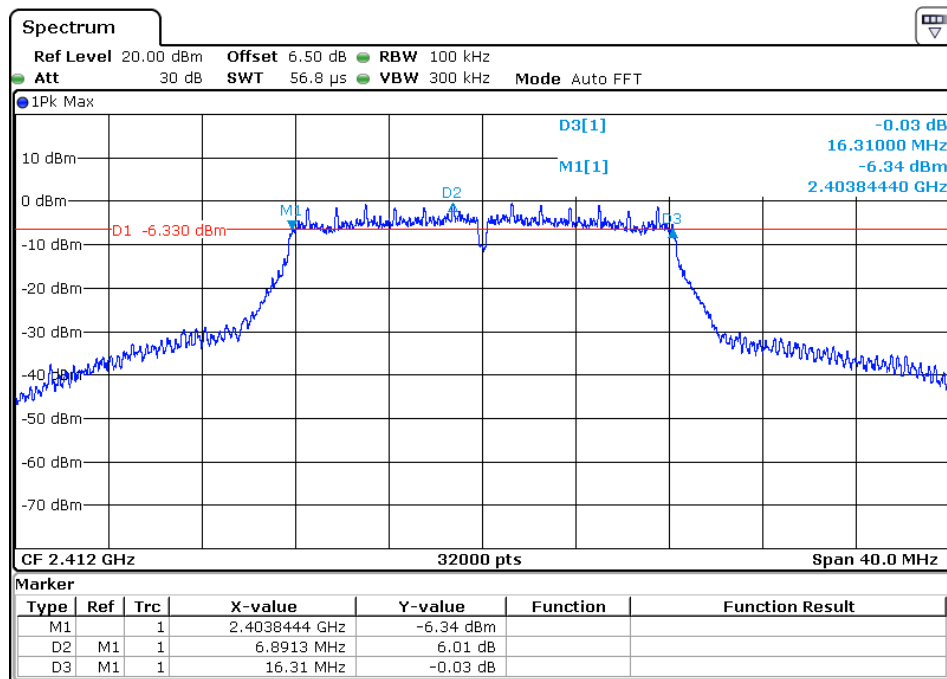
CH11



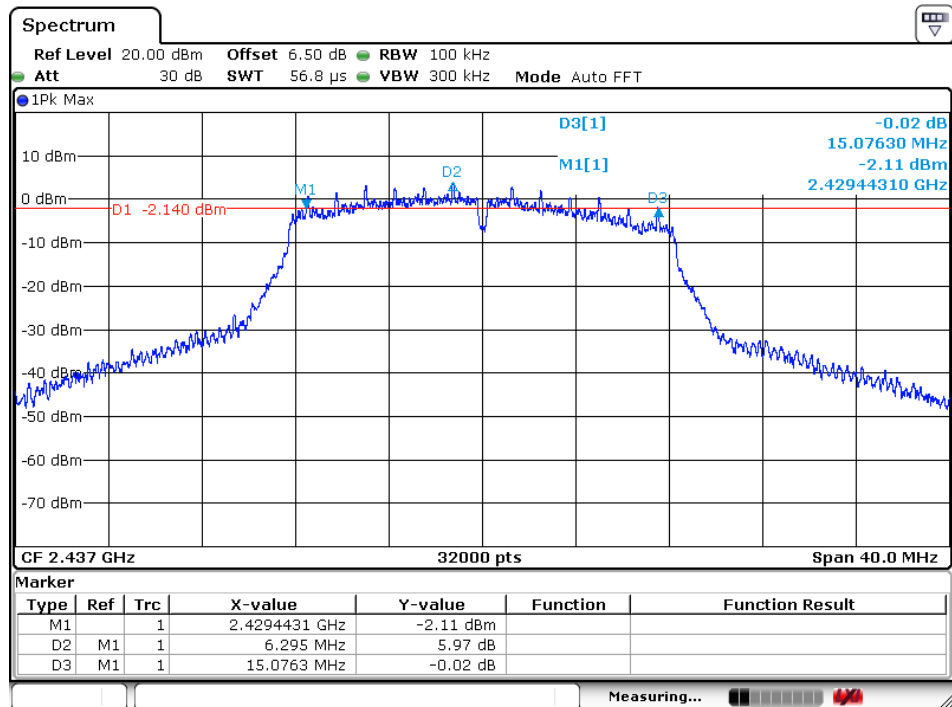
EUT :	整合型 IC 卡與磁卡終端機	Model Name :	Q80
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1010 hPa	Test Voltage :	DC 9V from Adapter
Test Mode :	CH01 / CH06 / CH11(802.11g Data rate 54Mbps)		

Frequency	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2412 MHz	16.31	>= 500KHz	Pass
2437 MHz	15.0763	>= 500KHz	Pass
2462 MHz	15.715	>= 500KHz	Pass

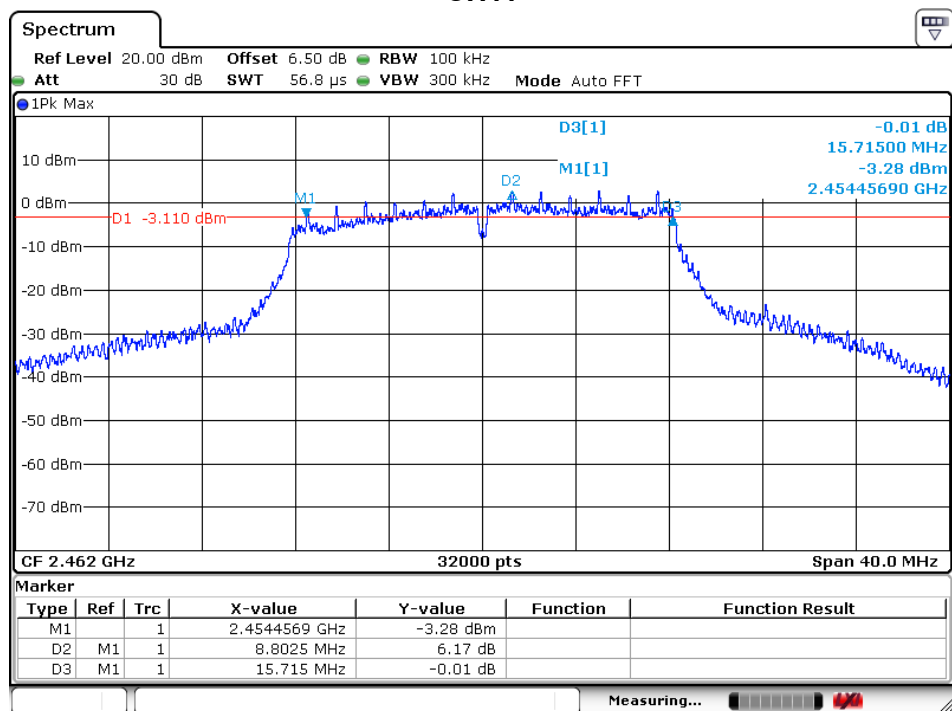
CH01



CH06



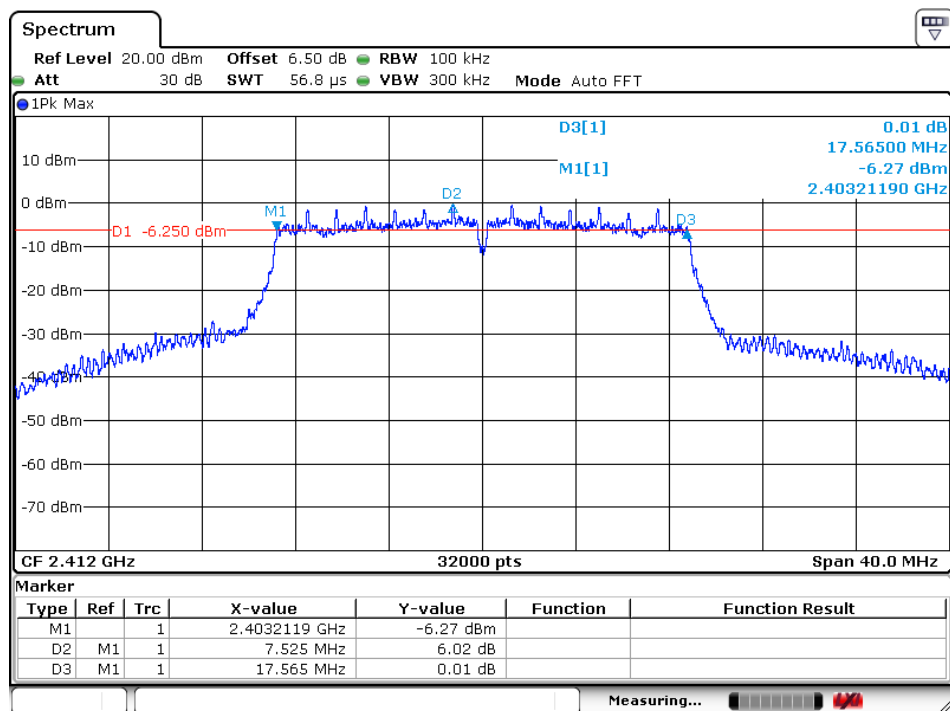
CH11



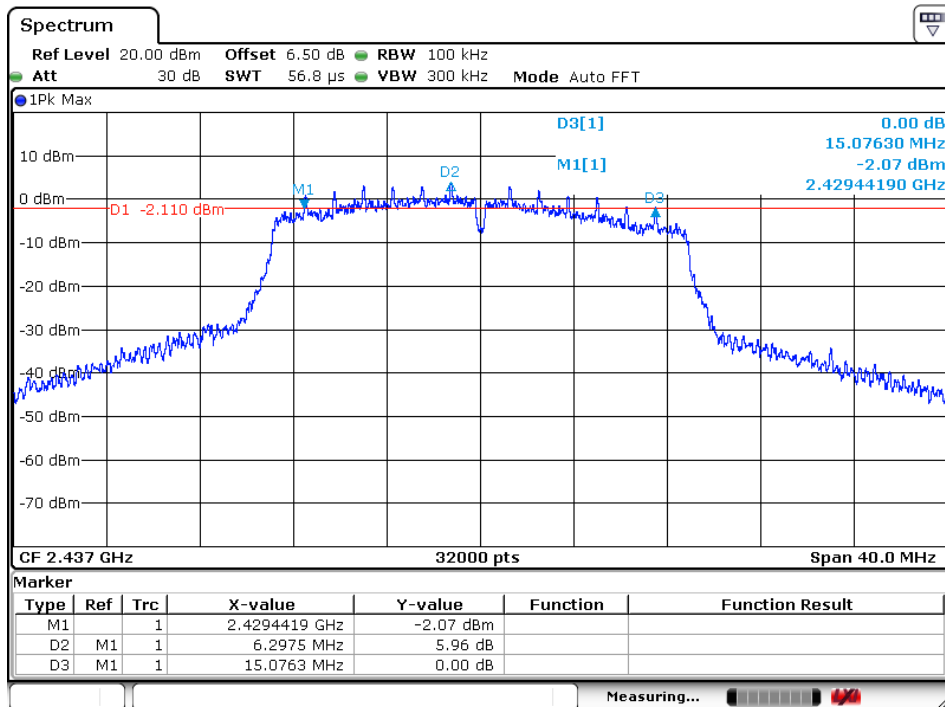
EUT :	整合型 IC 卡與磁卡終端機	Model Name :	Q80
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1010 hPa	Test Voltage :	DC 9V from Adapter
Test Mode :	CH01 / CH06/ CH11(802.11n20 Data rate 6.5Mbps)		

Frequency	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2412 MHz	17.565	>= 500KHz	Pass
2437 MHz	15.0763	>= 500KHz	Pass
2462 MHz	16.3338	>= 500KHz	Pass

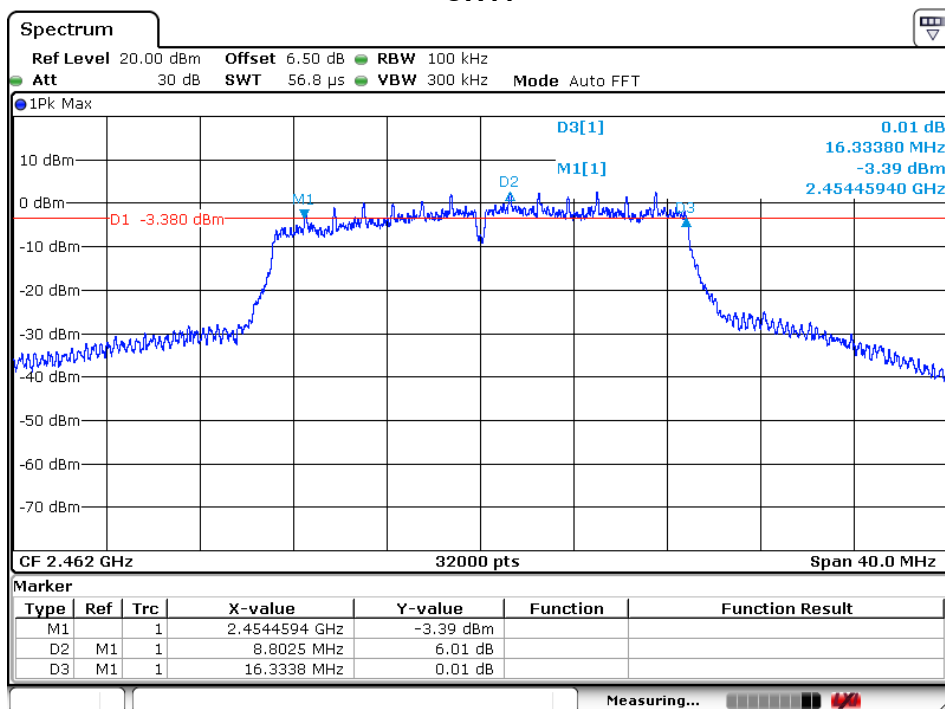
CH01



CH06



CH11



5. POWER DENSITY

5.1 APPLIED PROCEDURES / LIMIT

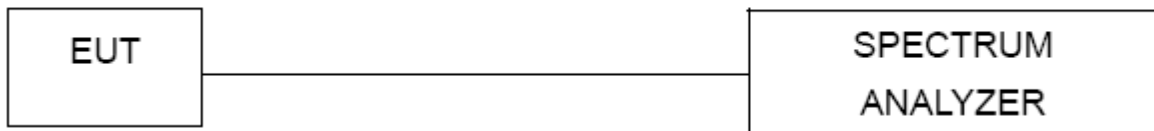
LP0002				
Section	Test Item	Limit	Frequency Range (MHz)	Result
3.10.1(6.2.2)	Power density	8dBm	2400-2483.5	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	3 kHz
VB	10 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 3KHz, VBW=10KHz, Sweep time = 100S, Span=300KHz.

5.1.2 TEST SETUP



5.1.3 EUT OPERATION CONDITIONS

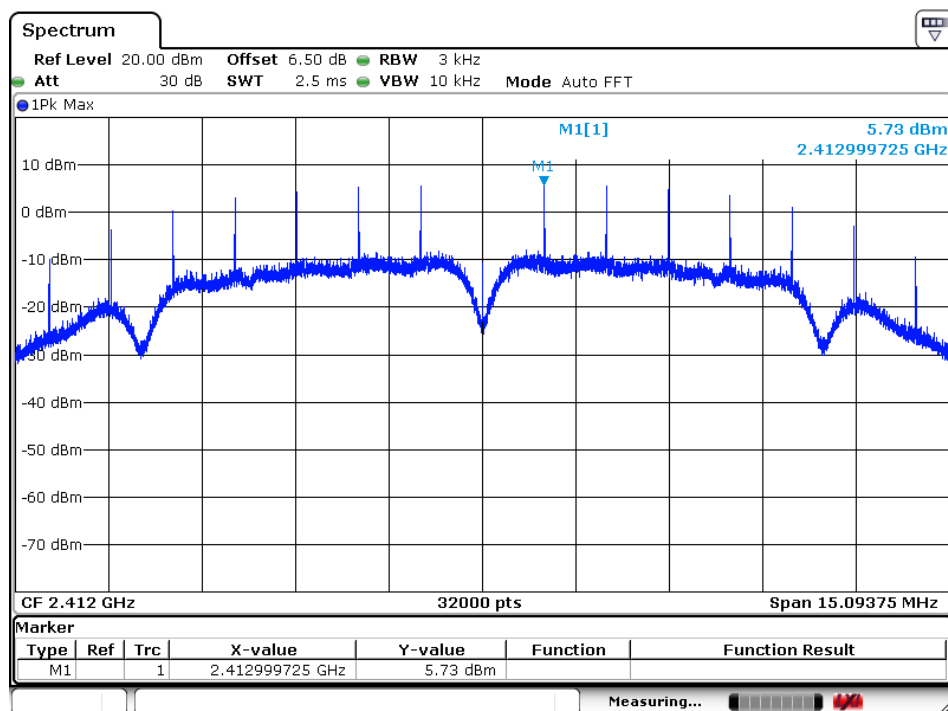
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.4 TEST RESULTS

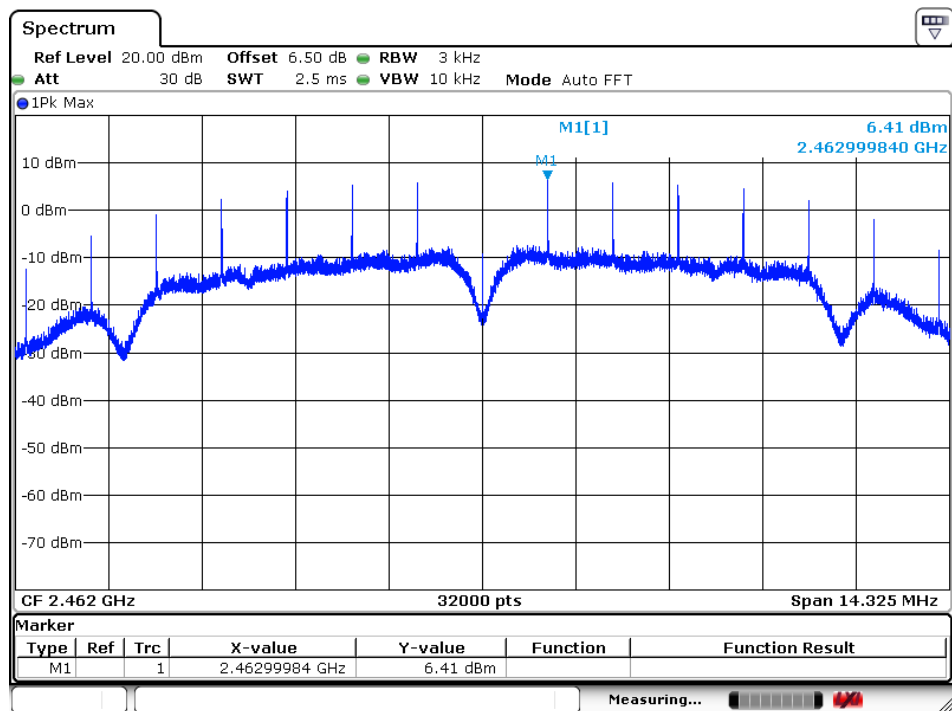
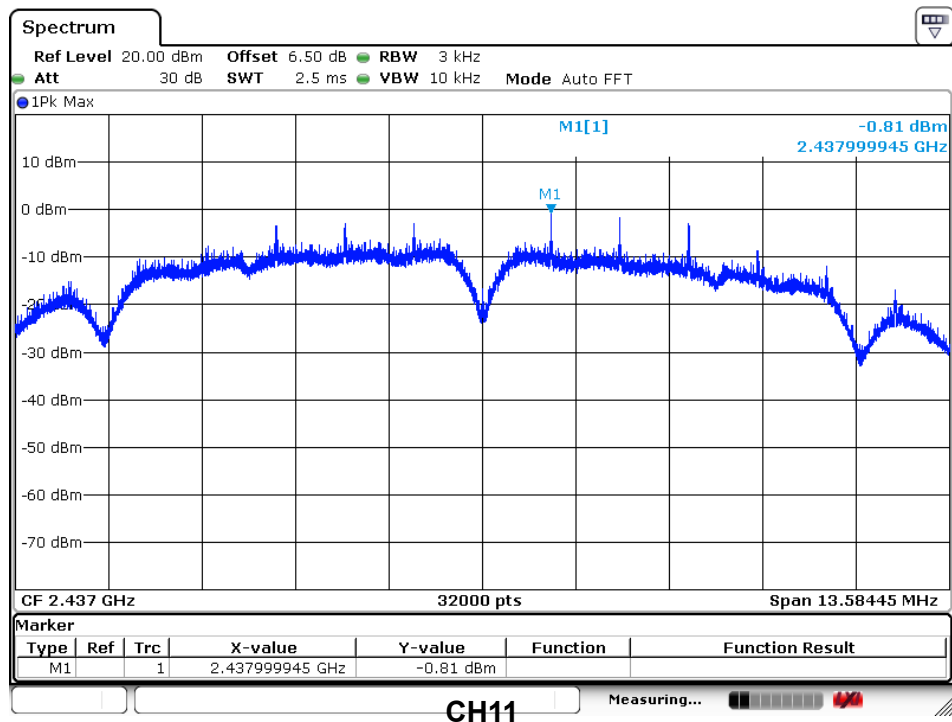
EUT :	整合型 IC 卡與磁卡終端機	Model Name :	Q80
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1010 hPa	Test Voltage :	DC 9V from Adapter
Test Mode :	CH01 /CH06 /CH11 (802.11b Data rate 1Mbps)		

Test Channel	Frequency (MHz)	Power Density (dBm)	LIMIT (dBm)	Result
CH01	2412 MHz	5.73	8	Pass
CH06	2437 MHz	-0.81	8	Pass
CH11	2462 MHz	6.41	8	Pass

CH01



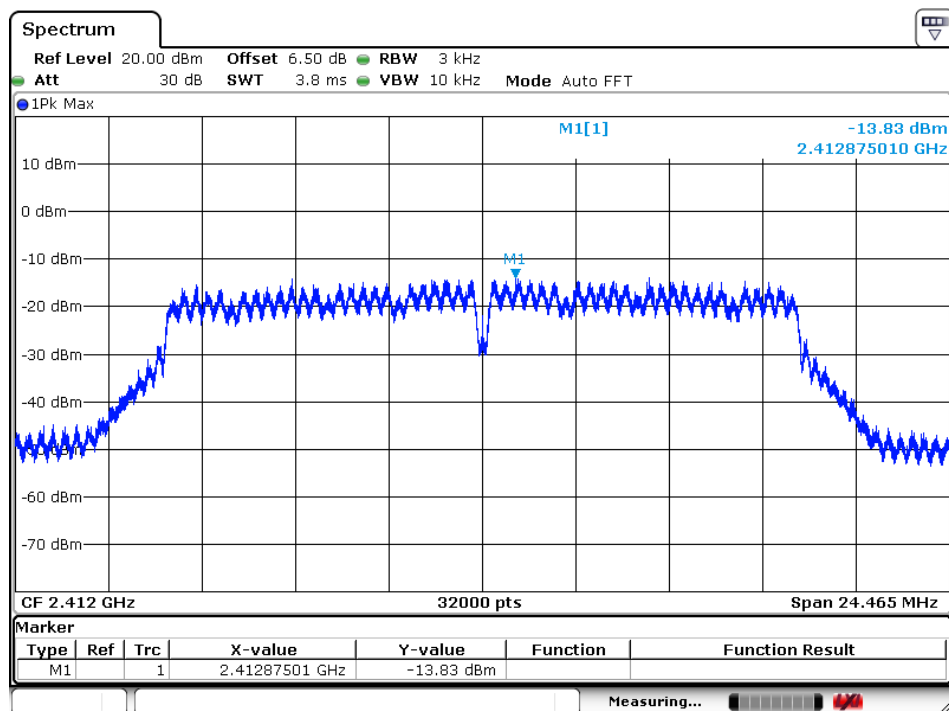
CH06



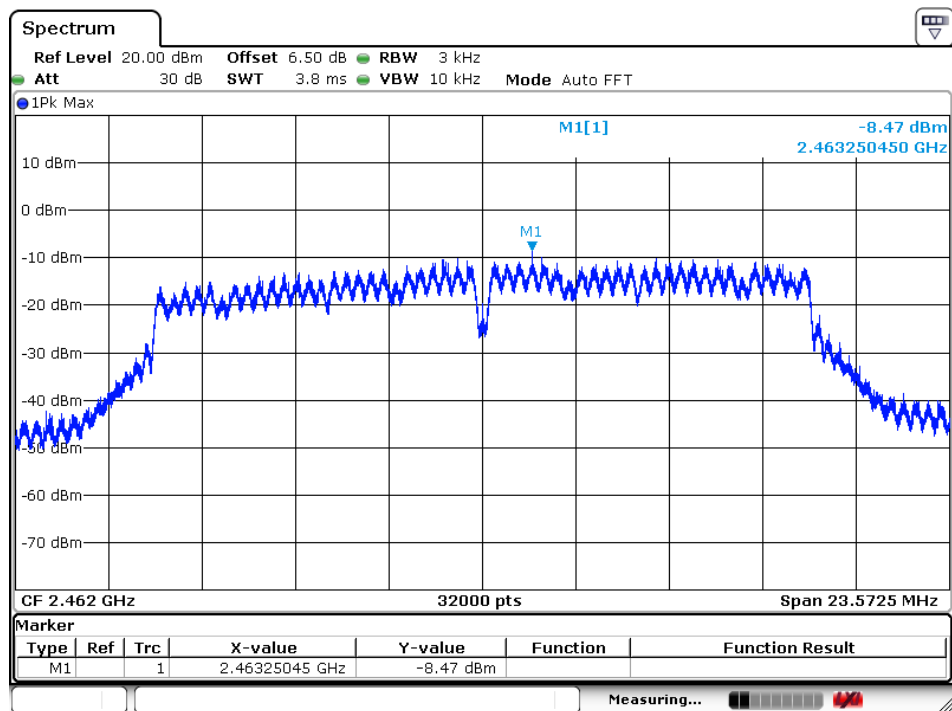
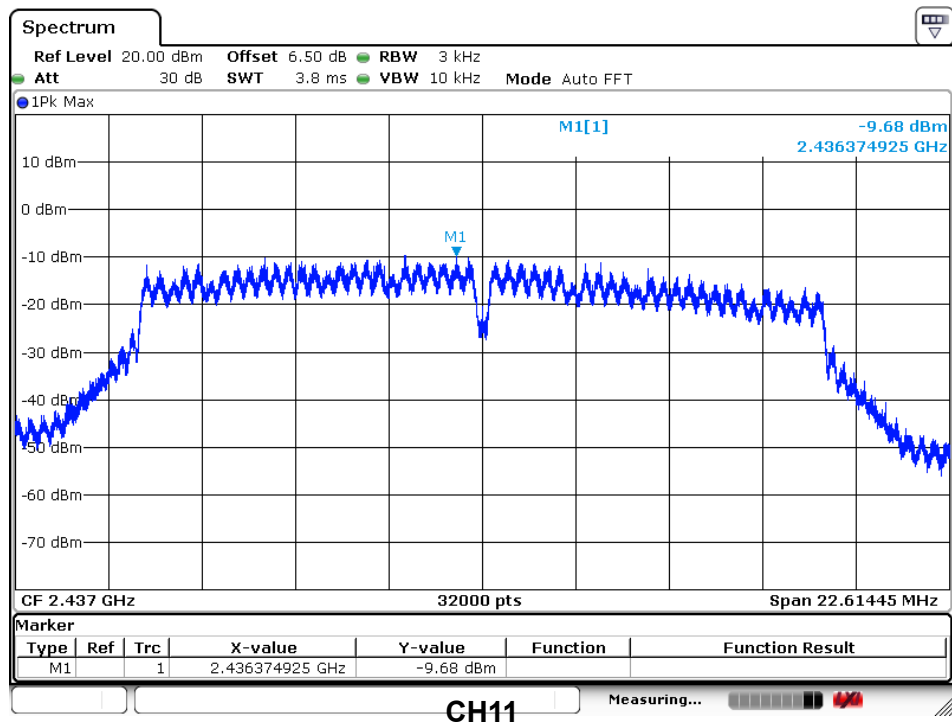
EUT :	整合型 IC 卡與磁卡終端機	Model Name :	Q80
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1010 hPa	Test Voltage :	DC 9V from Adapter
Test Mode :	CH01 / CH06/CH11 (802.11g Data rate 54Mbps)		

Test Channel	Frequency (MHz)	Power Density (dBm)	LIMIT (dBm)	Result
CH01	2412 MHz	-13.83	8	Pass
CH06	2437 MHz	-9.68	8	Pass
CH11	2462 MHz	-8.47	8	Pass

CH01



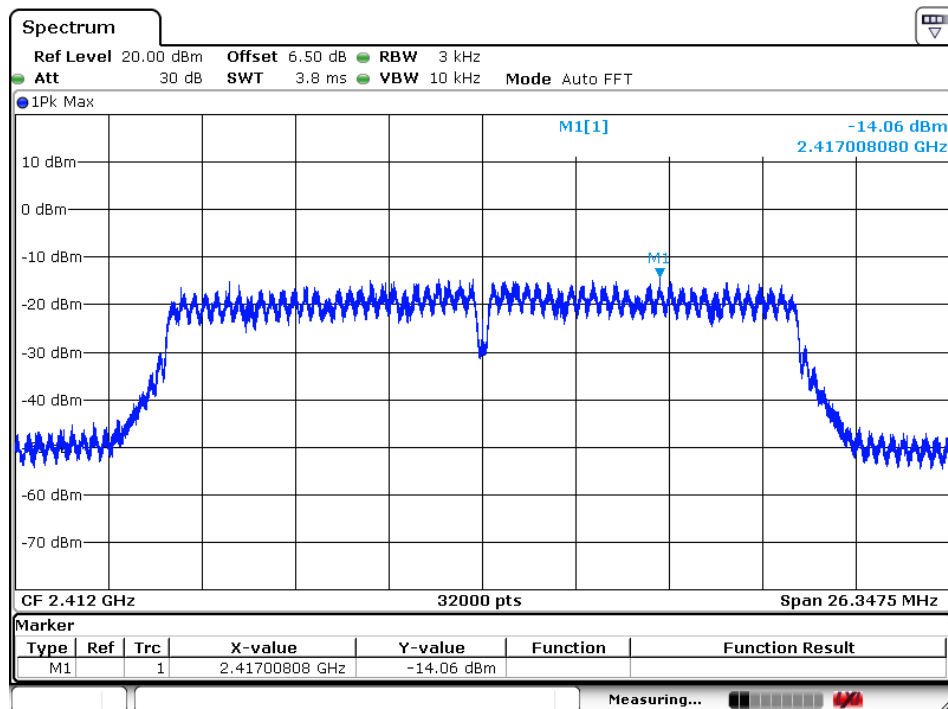
CH06



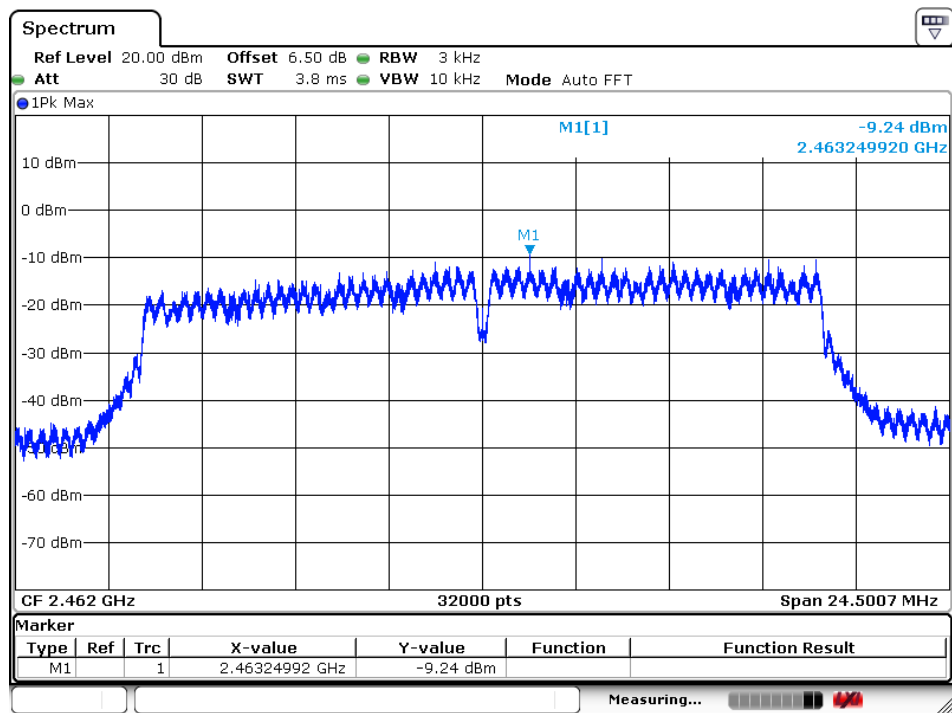
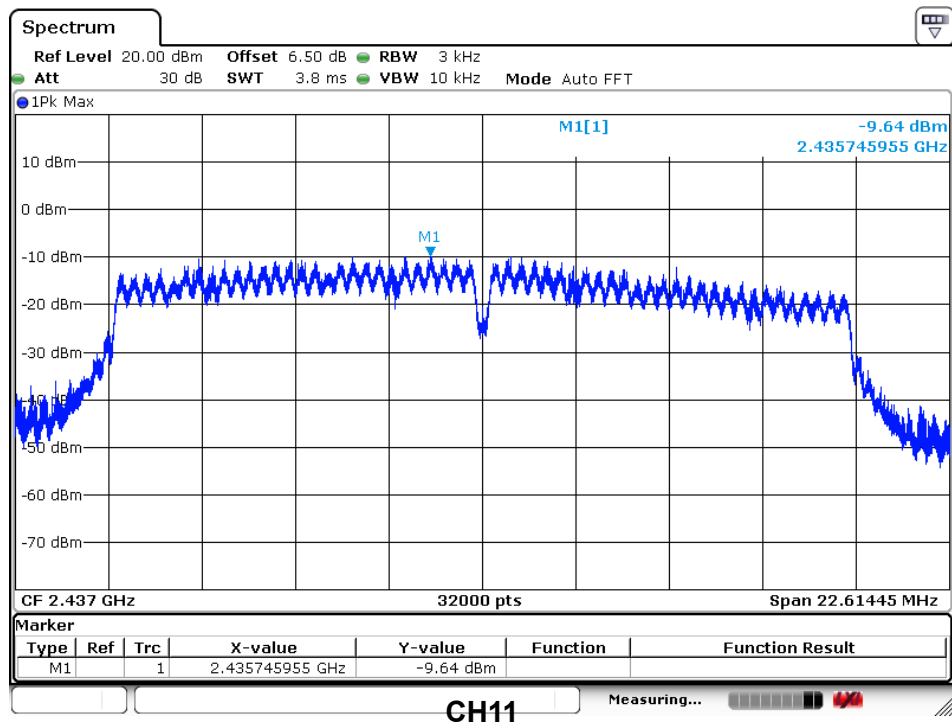
EUT :	整合型 IC 卡與磁卡終端機	Model Name :	Q80
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1010 hPa	Test Voltage :	DC 9V from Adapter
Test Mode :	CH01 / CH06/ CH11 (802.11n20 Data rate 6.5Mbps)		

Test Channel	Frequency (MHz)	Power Density (dBm)	LIMIT (dBm)	Result
CH01	2412 MHz	-14.60	8	Pass
CH06	2437 MHz	-9.64	8	Pass
CH11	2462 MHz	-9.24	8	Pass

CH01



CH06



6. PEAK OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

LP0002				
Section	Test Item	Limit	Frequency Range (MHz)	Result
3.10.1(2)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

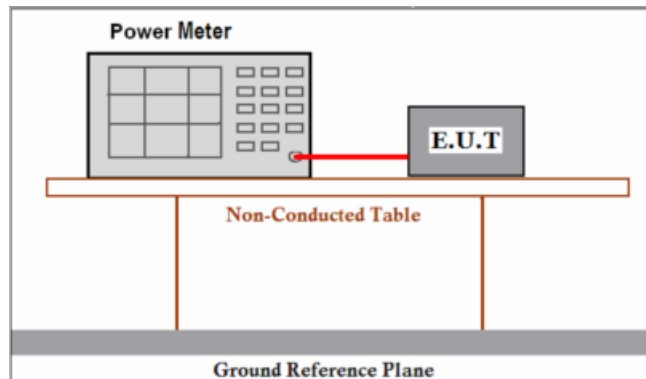
6.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 1MHz, VBW= 3MHz, Sweep time = Auto.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.5 TEST RESULTS

EUT :	整合型 IC 卡與磁卡終端機	Model Name :	Q80
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1010 hPa	Test Voltage :	DC 9V from Adapter
Test Mode :	CH01/ CH06 /CH11 (802.11b Data rate 1Mbps)		

802.11b

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)	LIMIT (W)	Result
CH01	2412 MHz	18.01	30	1	Pass
CH06	2437MHz	18.56	30	1	Pass
CH11	2462 MHz	18.72	30	1	Pass

802.11g

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)	LIMIT (W)	Result
CH01	2412 MHz	17.17	30	1	Pass
CH06	2437MHz	18.95	30	1	Pass
CH11	2462 MHz	18.87	30	1	Pass

802.11n20

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)	LIMIT (W)	Result
CH01	2412 MHz	17.23	30	1	Pass
CH06	2437MHz	19.05	30	1	Pass
CH11	2462 MHz	19.11	30	1	Pass

7. ANTENNA CONDUCTED SPURIOUS EMISSION

7.1 APPLIED PROCEDURES / LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in Section 2.8.

Frequencies (MHz)	Field Strength (micorvolts/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

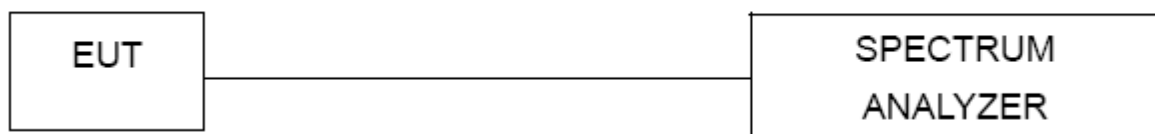
The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RB / VB (emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (other emission)	100 KHz /100 KHz for Peak

7.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

7.1.2 TEST SETUP



7.1.3 EUT OPERATION CONDITIONS

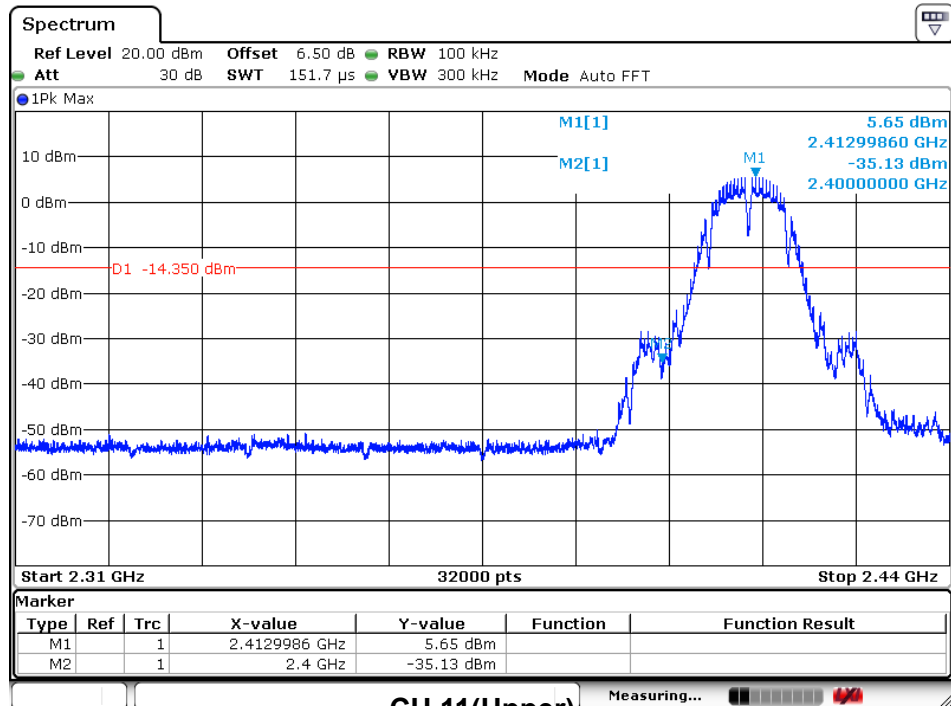
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.1.4 TEST RESULTS

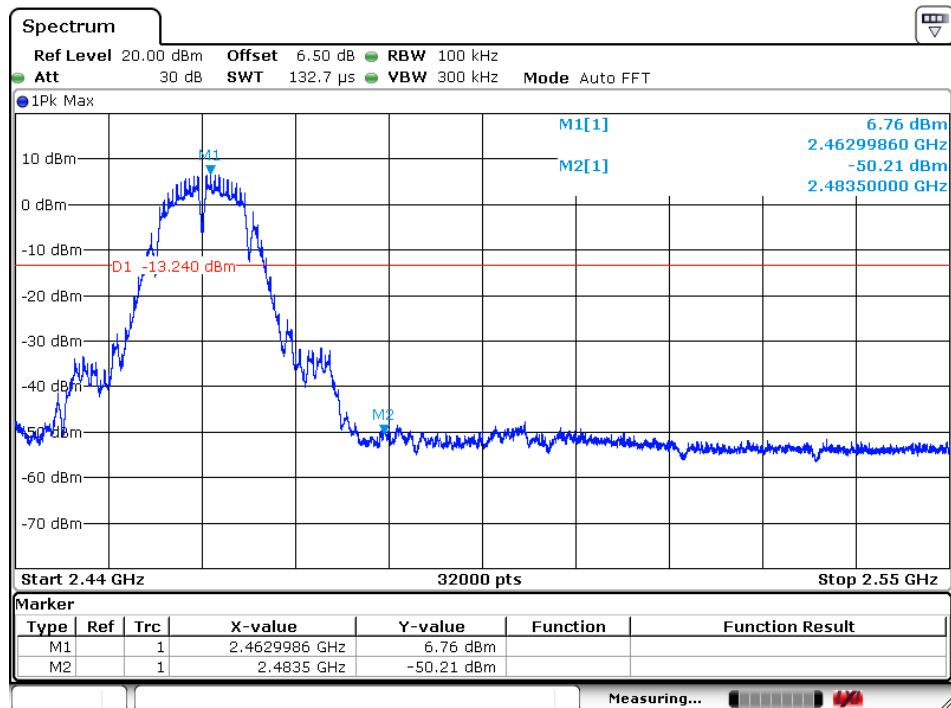
EUT :	整合型 IC 卡與磁卡終端機	Model Name :	Q80
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1010 hPa	Test Voltage :	DC 9V from Adapter
Test Mode :	CH01/ CH11 (802.11b Data rate 1Mbps)		

in any 100kHz bandwidth outside the low frequency band	in any 100 kHz bandwidth outside the high frequency band
Pass	Pass
Result	
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.	

CH01 (Lower)



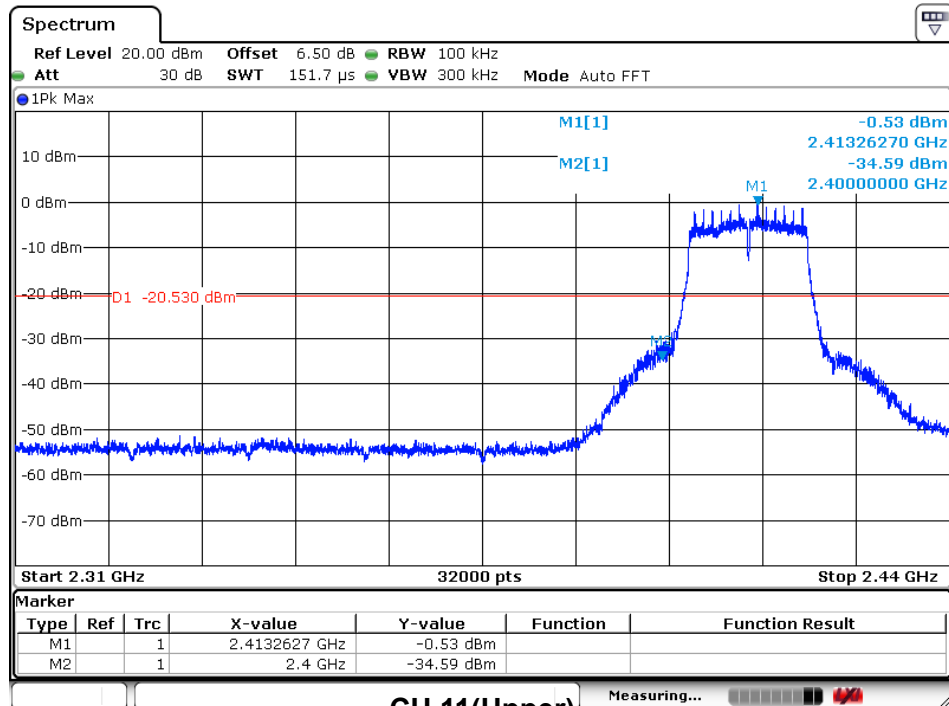
CH 11(Upper)



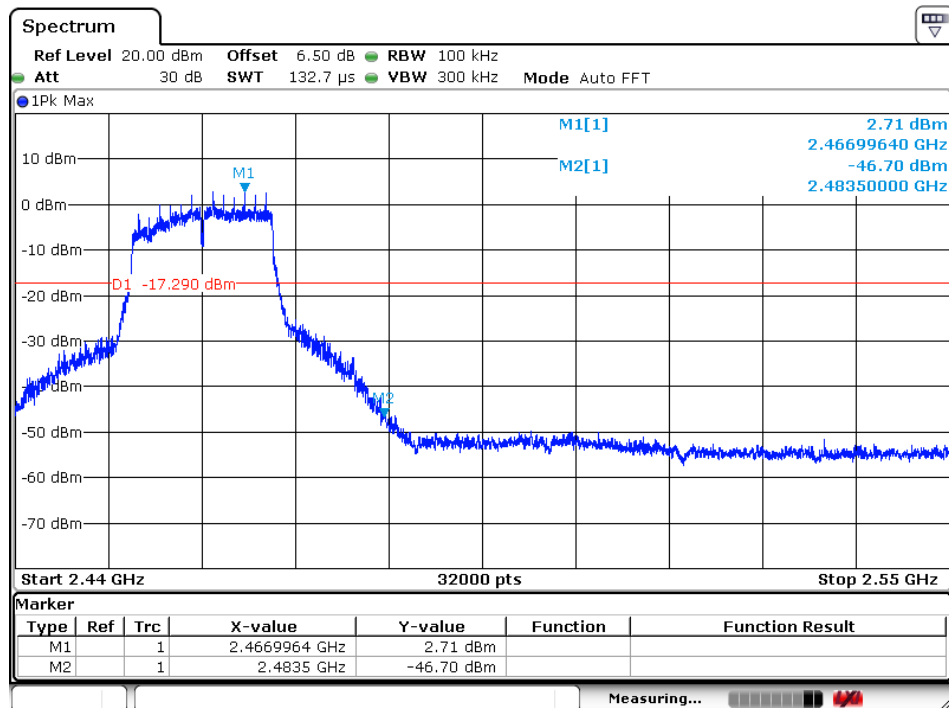
EUT :	整合型 IC 卡與磁卡終端機	Model Name :	Q80
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1010 hPa	Test Voltage :	DC 9V from Adapter
Test Mode :	CH01/ CH11 (802.11g Data rate 54Mbps)		

in any 100kHz bandwidth outside the low frequency band	in any 100 kHz bandwidth outside the high frequency band
Pass	Pass
Result	
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.	

CH01 (Lower)



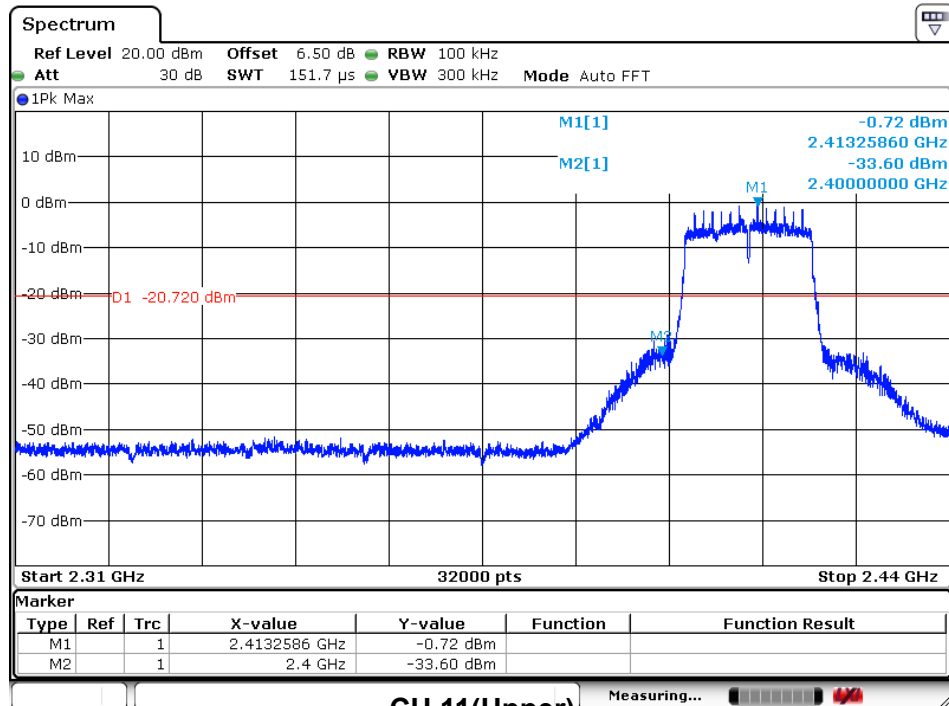
CH 11(Upper)



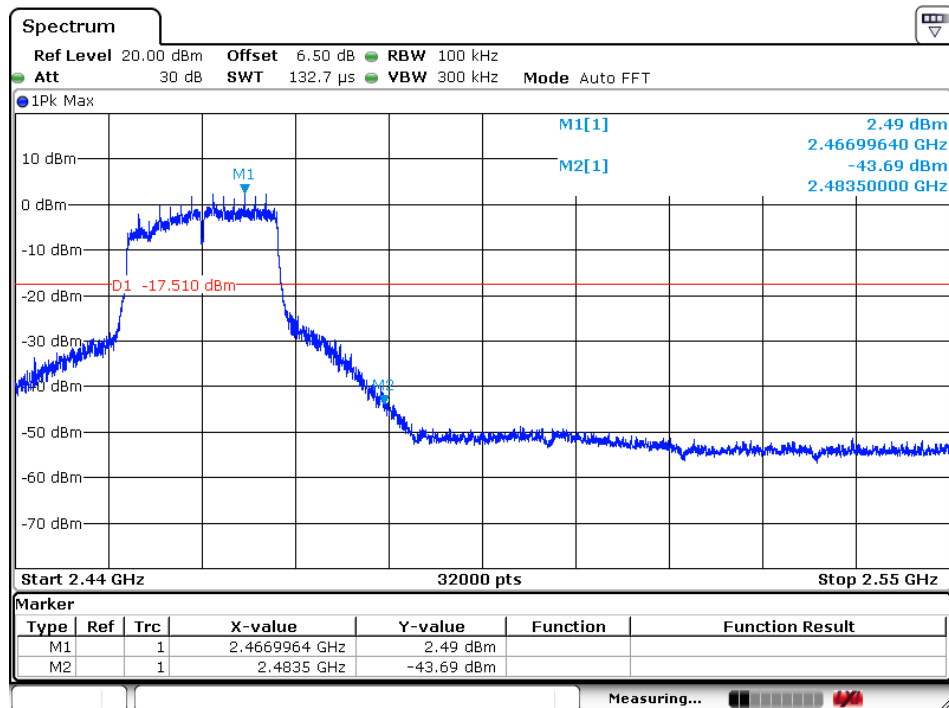
EUT :	整合型 IC 卡與磁卡終端機	Model Name :	Q80
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1010 hPa	Test Voltage :	DC 9V from Adapter
Test Mode :	CH01/ CH11 (802.11n20 Data rate 6.5Mbps)		

in any 100kHz bandwidth outside the low frequency band	in any 100 kHz bandwidth outside the high frequency band
Pass	Pass
Result	
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.	

CH01 (Lower)



CH 11(Upper)



8. RECEIVER EMISSION TEST

8.1 RADIATED EMISSION MEASUREMENT

8.1.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 2.7, then the 2.8 limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (dBuV/m) (at 3M)		Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80	60	74	54

Notes:

- (1) The limit for radiated test was performed according to LP0002.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

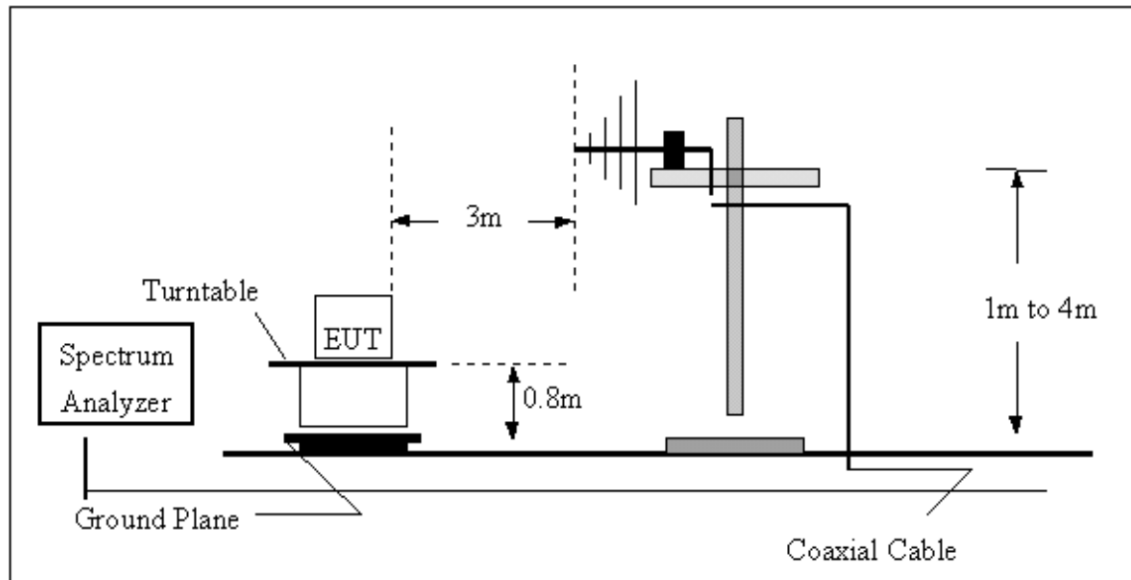
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

8.1.2 TEST PROCEDURE

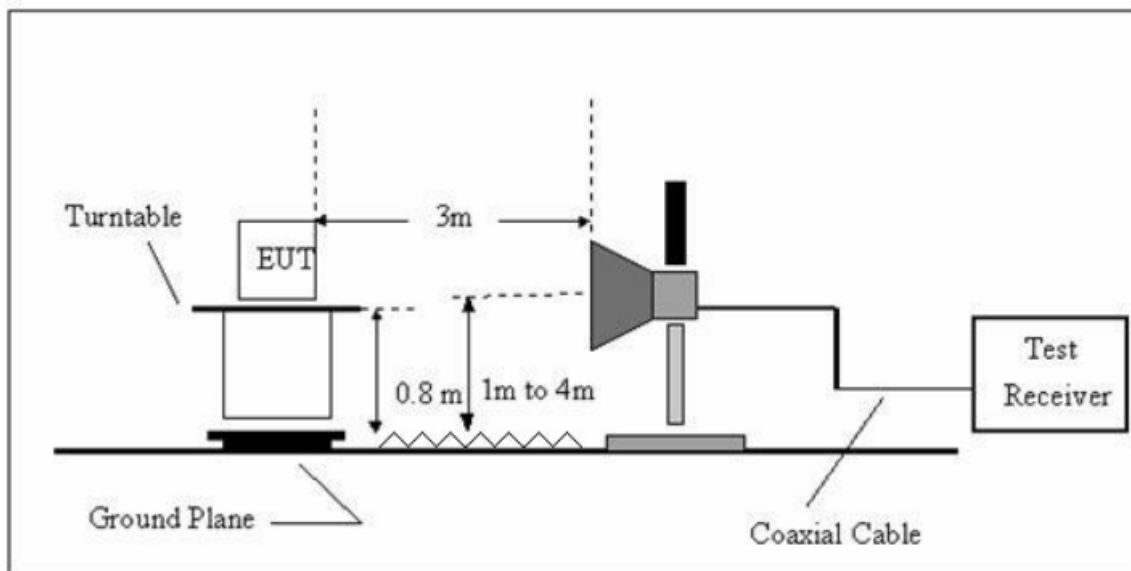
- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

8.1.3 TEST SETUP

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



8.1.4 EUT OPERATING CONDITIONS

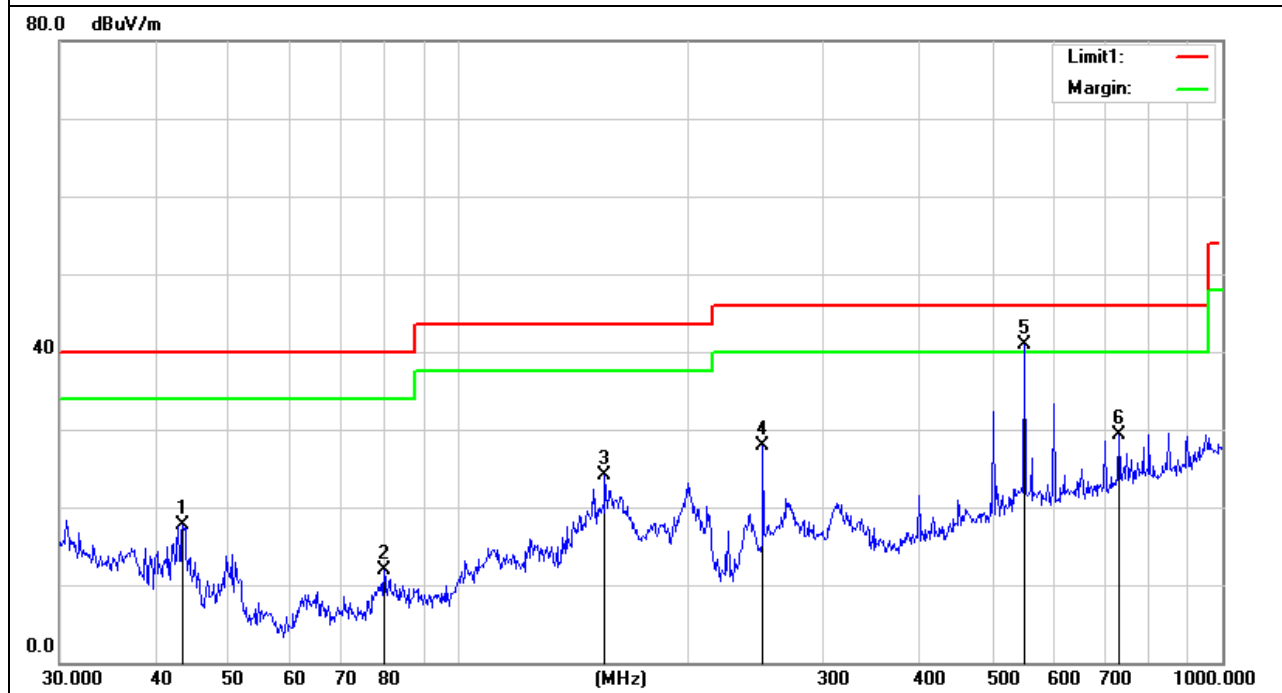
The EUT tested system was configured as the statements of 2..4 Unless otherwise a special operating condition is specified in the follows during the testing.

8.1.5 TEST RESULTS (BETWEEN 30 – 1000 MHZ)

EUT :	整合型 IC 卡與磁卡終端機	Model Name. :	Q80
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2018-12-20
Test Mode :	RX (worst case)	Polarization :	Horizontal
Test Power :	DC 9V from Adapter		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
43.5057	35.83	-18.13	17.70	40.00	-22.30	Quasi-Peak
79.8003	34.53	-22.72	11.81	40.00	-28.19	Quasi-Peak
155.3644	42.37	-18.25	24.12	43.50	-19.38	Quasi-Peak
250.3012	44.24	-16.29	27.95	46.00	-18.05	Quasi-Peak
550.9480	47.67	-6.76	40.91	46.00	-5.09	Quasi-Peak
731.9203	33.36	-3.97	29.39	46.00	-16.61	Quasi-Peak

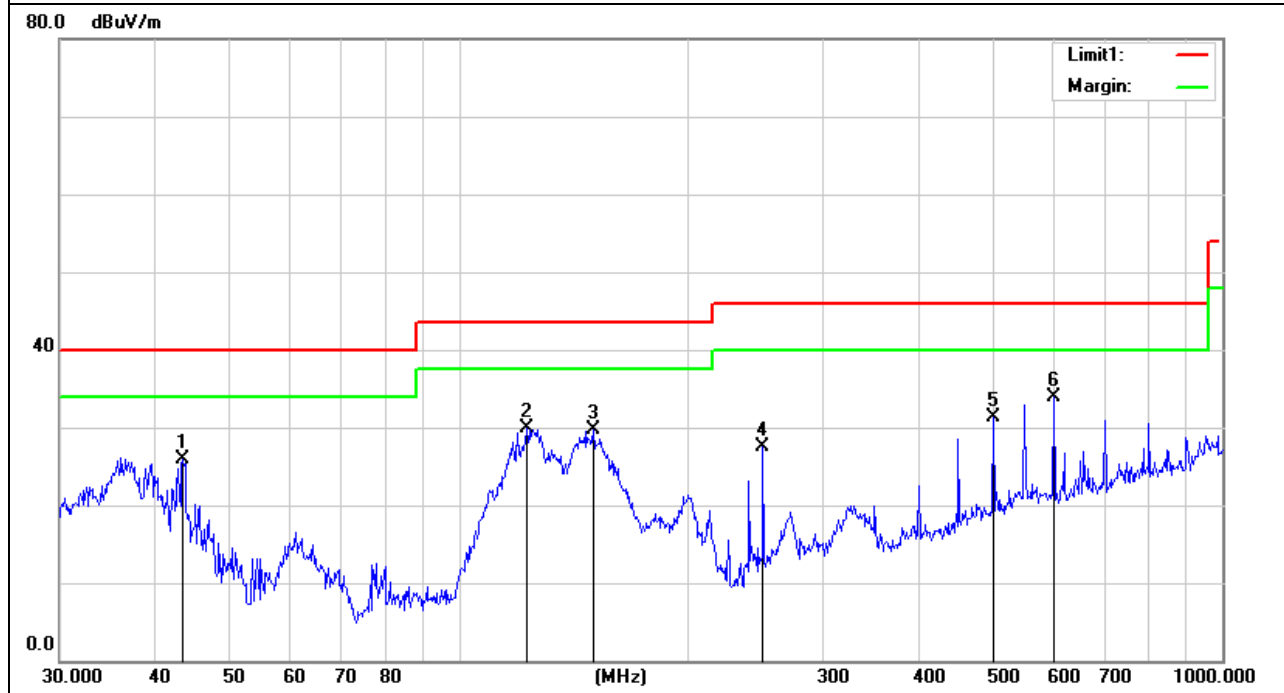
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT :	整合型 IC 卡與磁卡終端機	Model Name. :	Q80
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2018-12-20
Test Mode :	RX (worst case)	Polarization :	Vertical
Test Power :	DC 9V from Adapter		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
43.5057	43.99	-18.13	25.86	40.00	-14.14	Quasi-Peak
122.8340	47.52	-17.65	29.87	43.50	-13.63	Quasi-Peak
150.0108	47.60	-17.97	29.63	43.50	-13.87	Quasi-Peak
250.3012	43.83	-16.29	27.54	46.00	-18.46	Quasi-Peak
501.1790	40.11	-8.90	31.21	46.00	-14.79	Quasi-Peak
601.4265	41.03	-7.12	33.91	46.00	-12.09	Quasi-Peak

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

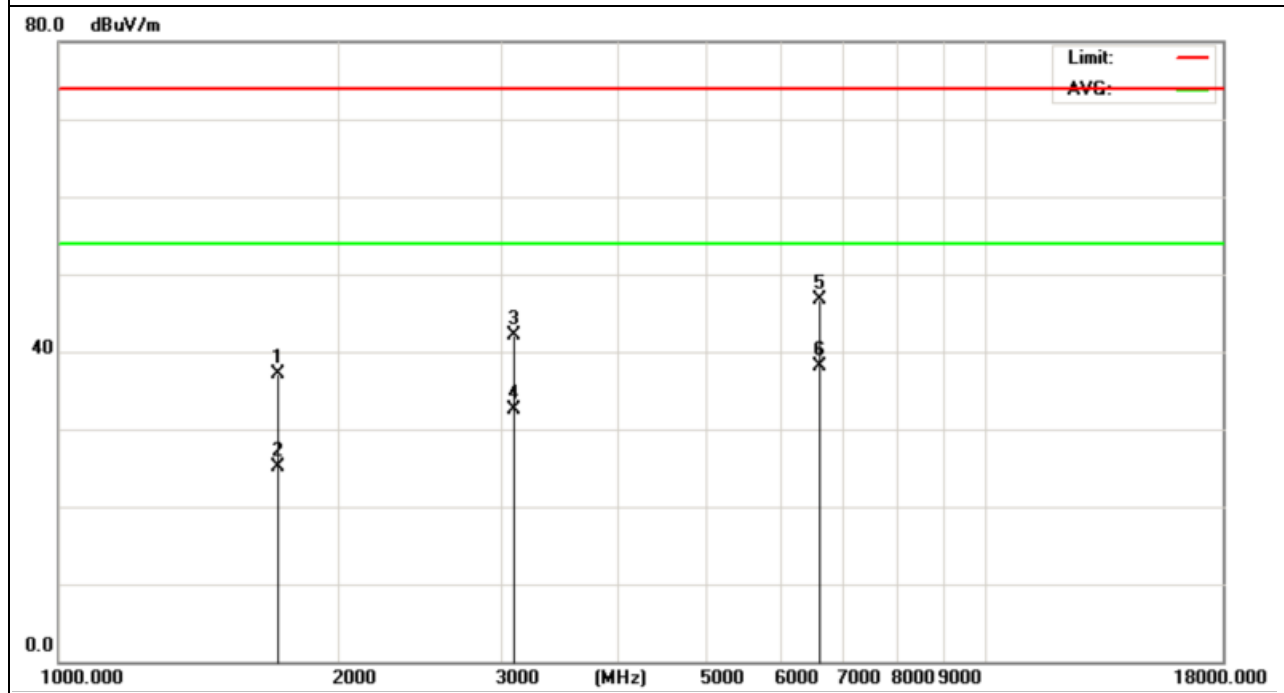


8.1.6 TEST RESULTS (ABOVE 1000 MHZ)

EUT :	整合型 IC 卡與磁卡終端機	Model Name :	Q80
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2018-12-20
Test Mode :	RX (worst case)	Polarization :	Horizontal
Test Power :	DC 9V from Adapter		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1721.834	46.70	-9.57	37.13	74.00	-36.87	peak
1721.834	34.68	-9.57	25.11	54.00	-28.89	AVG
3087.140	43.52	-1.47	42.05	74.00	-31.95	peak
3087.140	33.91	-1.47	32.44	54.00	-21.56	AVG
6602.265	40.74	5.91	46.65	74.00	-27.35	peak
6602.265	32.25	5.91	38.16	54.00	-15.84	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT :	整合型 IC 卡與磁卡終端機	Model Name :	Q80
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2018-12-20
Test Mode :	RX (worst case)	Polarization :	Vertical
Test Power :	DC 9V from Adapter		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2006.877	40.06	-9.02	31.04	74.00	-42.96	peak
2006.877	33.61	-9.02	24.59	54.00	-29.41	AVG
3069.345	42.75	-1.51	41.24	74.00	-32.76	peak
3069.345	32.84	-1.51	31.33	54.00	-22.67	AVG
7628.806	41.82	8.85	50.67	74.00	-23.33	peak
7628.806	31.77	8.85	40.62	54.00	-13.38	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



15. ANTENNA REQUIREMENT

15.1 STANDARD REQUIREMENT

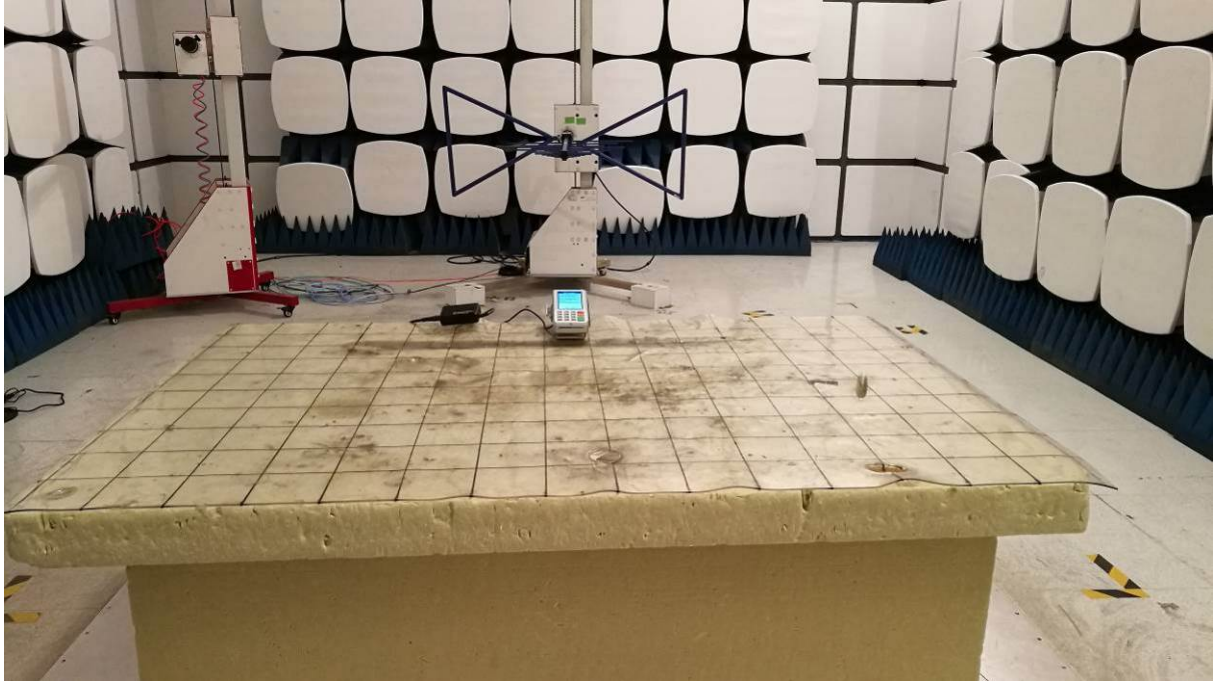
3.10.1 requirement: Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

15.2 EUT ANTENNA

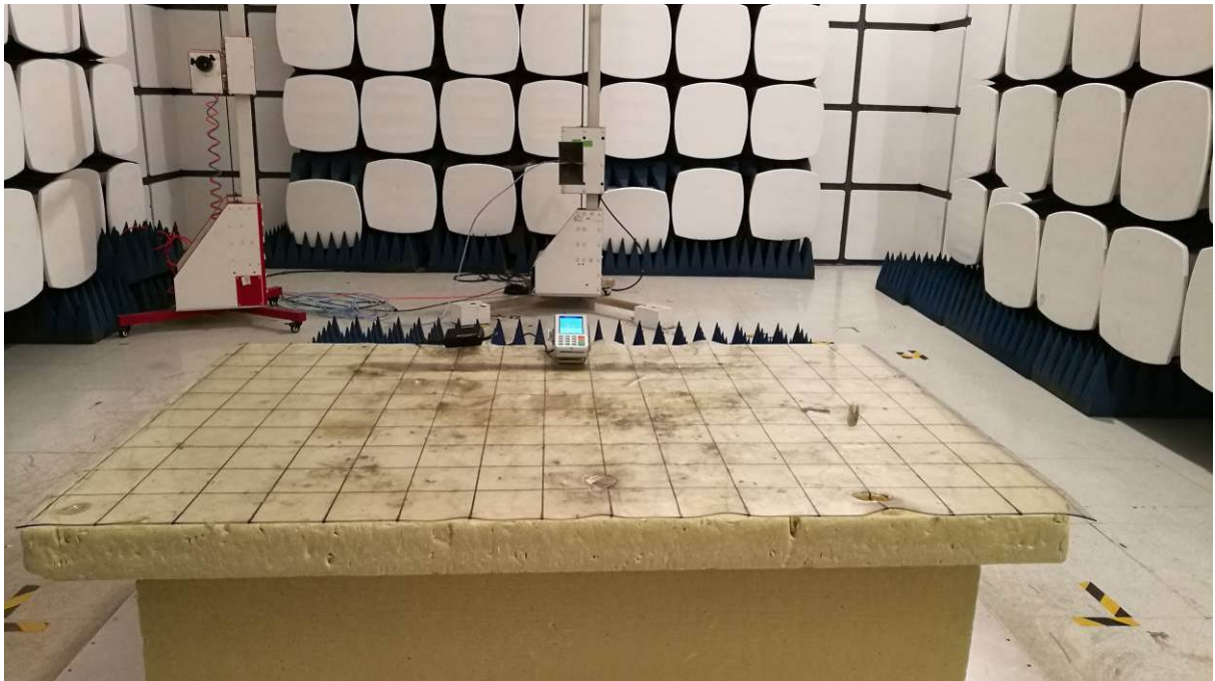
The antenna is PCB antenna and no consideration of replacement. Antenna max gain is 2.5dBi from 2400MHz to 2500MHz.

16. EUT TEST PHOTO

**Radiated Measurement Photos
30MHz-1GHz**



**Radiated Measurement Photos
1GHz-18GHz**



Conducted Measurement Photos

17. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

The modular use shall be at least 20cm distance away from human body.

MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 \cdot P \cdot G}}{d}$$

$$\text{Power Density} = P_d \text{ (mW/cm}^2\text{)} = E^2 / 3770$$

Combine these two formulas can be changed to

$$P_d = (30 \cdot P \cdot G) / (3770 \cdot d^2)$$

Note:

1. "E" means Electric field (V/m).
2. "P" means Peak RF output power (W).
3. "G" means EUT Antenna numeric gain (numeric).
4. "d" means the minimum mobile separation distance is 0.2m between radiator and human body.

TEST RESULT

Frequency (MHz)	Peak Output Power (dBm)	Power (mW)	Power Density (mW/cm ²)	Limit of Power Density (mW/cm ²)
2462	19.11	81.470	0.02882	1

$$G=2.5\text{dBi}=1.78\text{mW}$$