



FCC TEST REPORT

According to

FCC Part 15, Subpart C (15.231) / ANSI C63.4: 2009

Applicant	: Excel Engineering (HK) Co Ltd
Address	: Unit 13, 11th/FL, Tower B, New Mandarin Plaza 14 Science Museum Road, Tsimshatsui , Kowloon , Hong Kong
Equipment	: Motion Detector
Model No.	: SP230
FCC ID.	: OWGSP2302011

- The test result refers exclusively to the test presented test model / sample.,
- Without written approval of **Cerpass Technology Corp.**, the test report shall not be reproduced except in full.



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History of this test report

■ ORIGINAL.

☐ Additional attachment as following record:

[illegible]



CERTIFICATE OF COMPLIANCE

According to

FCC Part 15, Subpart C (15.231) / ANSI C63.4: 2009

Applicant	: Excel Engineering (HK) Co Ltd
Address	: Unit 13, 11th/FL, Tower B, New Mandarin Plaza 14 Science Museum Road, Tsimshatsui , Kowloon , Hong Kong
Equipment	: Motion Detector
Model No.	: SP230
FCC ID.	: OWGSP2302011

I HEREBY CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4**. The equipment was **passed** the test performed according to **FCC Part 15, Subpart C (15.231) / ANSI C63.4: 2009**.

The test was carried out on Nov. 07, 2011 at Cerpass Technology Corp.

Signature

Hill Chen

EMC/RF B.U. Assistant Manager



1. Report of Measurements and Examinations

1.1 List of Measurements and Examinations

FCC Rule	Test Type	Result	Remark
15.203	Antenna Requirement	Pass	
15.207	Conducted Emission	Not Applicable	EUT is powered from DC
15.209 15.231	Radiated Emission	Pass	Minimum Passing margin is -8.70 at 833.40MHz
15.231	20dB Occupied Bandwidth Measurement	Pass	Meet the requirement of limit

Note: the information of measurement uncertainty is available upon the customer's request.



2. Test Configuration of Equipment under Test

2.1 Feature of Equipment under Test

Transmitter:

- Frequency: 433.92MHz
- Power: DC 9V
- Transmitting method: ASK

2.2 Test Mode and Test Software

- a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4.

2.3 Description of Test System

There is no supporting system during the test.



2.4 General Information of Test

Test Site :	CerpPASS Technology Corp. 2F-11, No. 3, Yuan Qu St., (Nankang Software Park), Taipei, Taiwan 115, R.O.C.
Test Site Location (OATS2-SD) :	No.68-1, Shihbachongsi, Shihding Township, Taipei City 223, Taiwan, R.O.C.
FCC Registration Number :	TW1049, TW1056, TW1061, 390316, 488071, 982971
IC Registration Number :	4934B-1, 4934D-1
VCCI Registration Number :	T-1173 for Telecommunication Test C-4139 for Conducted emission test R-3428 for Radiated emission test G-97 for Radiated emission test above 1GHz
Test in Compliance with:	FCC Part 15, Subpart C (15.231) / ANSI C63.4: 2009
Frequency Range Investigated:	Conducted Emission Test: from 150kHz to 30 MHz Radiated Emission Test: from 30 MHz to 4,500 MHz
Test Distance:	The test distance of radiated emission from antenna to EUT is 3 M.

2.5 Measurement Uncertainty

Measurement Item	Measurement Frequency	Polarization	Uncertainty
Conducted Emission	9 kHz ~ 30 MHz	LINE/NEUTRAL	4.44 dB
Radiated Emission	30 MHz ~ 1,000 MHz	Vertical / Horizontal	3.93 dB
	1,000 MHz ~ 18,000 MHz	Vertical / Horizontal	5.18 dB



3. Antenna Requirements

3.1 Standard Applicable

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

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

3.2 Antenna Construction and Directional Gain

Antenna Type: PCB Antenna



4. Test of Conducted Emission

4.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2009 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

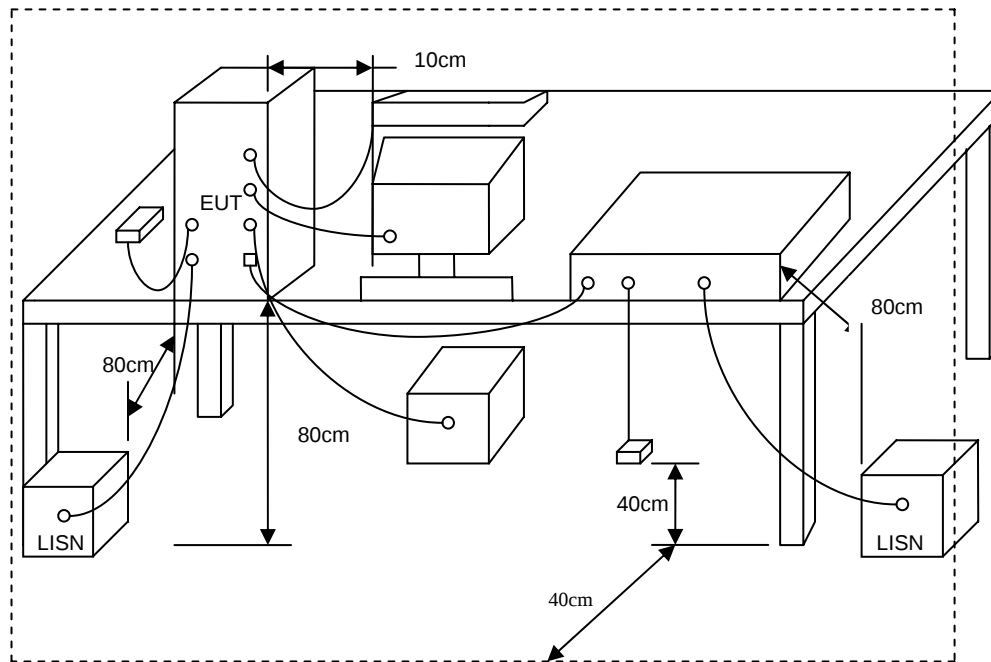
*Decreases with the logarithm of the frequency.

4.2 Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



4.3 Typical Test Setup

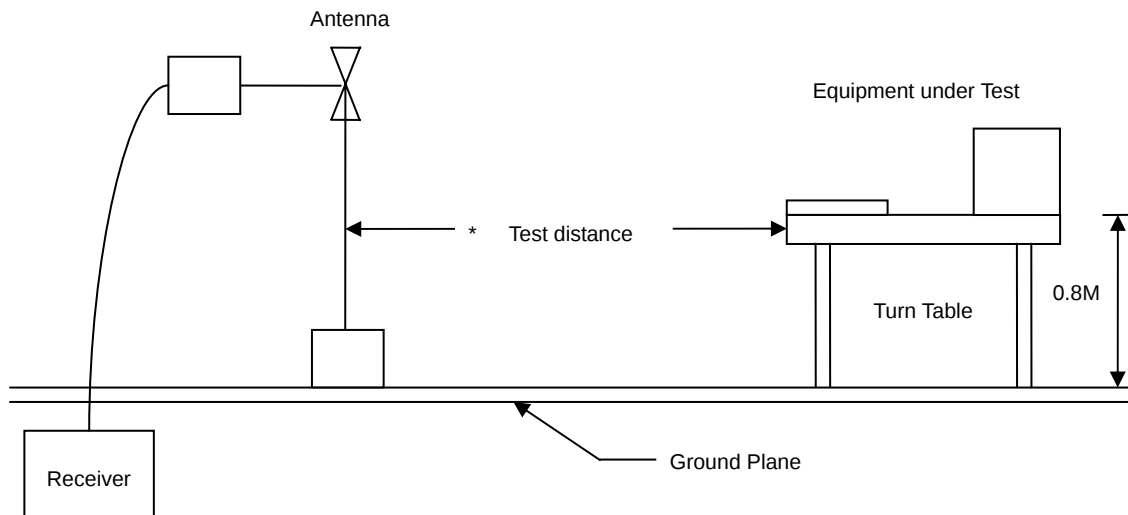


4.4 Test Result and Data

The test item is not applicable because the EUT is powered from DC.



4.5 Typical Test Setup



4.6 Measurement Equipment

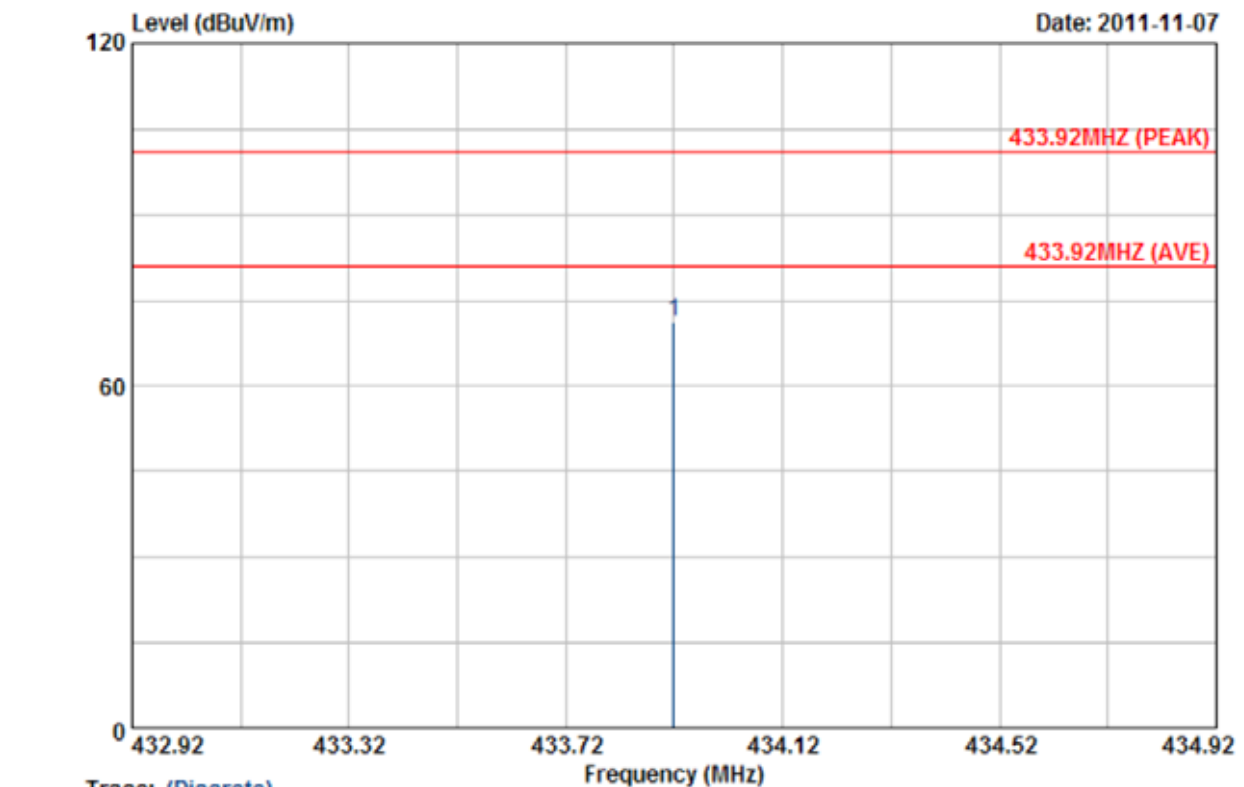
Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Amplifier	Agilent	8447D	2944A10531	2011/01/21	2012/01/20
Bilog Antenna	Schaffner	CBL6112D	22242	2011/02/09	2012/02/08
EMI Receiver	R&S	ESCI	101200	2011/07/26	2012/07/25
Spectrum Analyzer	R&S	FSP40	100047	2011/05/05	2012/05/04
HORN ANTENNA	EMCO	3115	31589	2011/05/02	2012/05/01
Preamplifier	Agilent	8449B	3008A01954	2011/03/02	2012/03/01



4.7 Test Result and Data

4.7.1 Test Result of Fundamental Emission

Power	: DC 9V	Pol/Phase	: VERTICAL
Test Mode	: Transmit	Temperature	: 25 °C
Memo	:	Humidity	: 68 %



Trace: (Discrete)

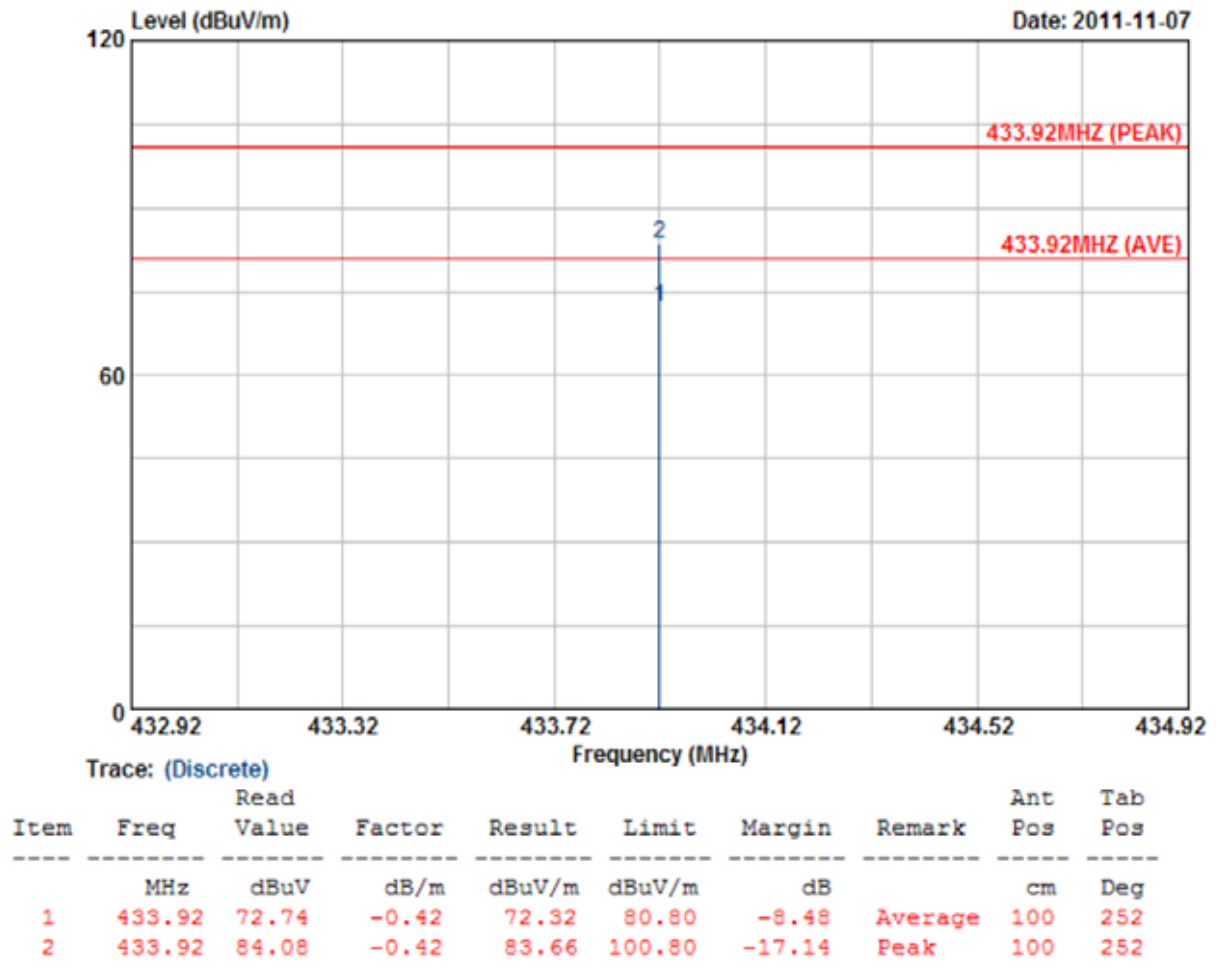
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	433.92	72.55	-1.29	71.26	100.80	-29.54	Peak	100	177

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The Average value = Peak value + 20log(Duty cycle)
6. The other emissions is too low to be measured.
7. The data is worse case.



Power	: DC 9V	Pol/Phase	: HORIZONTAL
Test Mode	: Transmit	Temperature	: 25 °C
Memo	:	Humidity	: 68 %



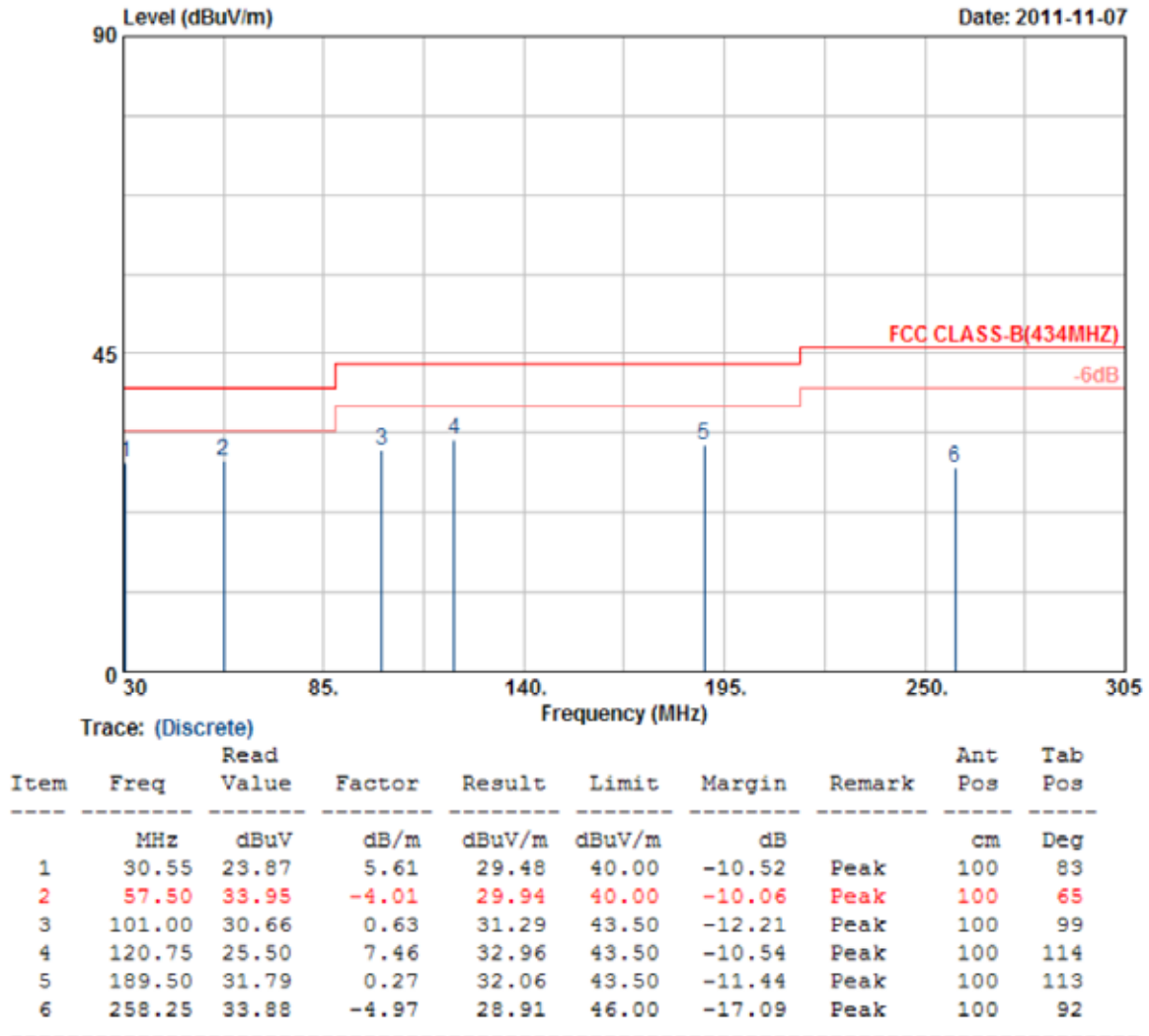
Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The Average value = Peak value + 20log(Duty cycle)
6. The other emissions is too low to be measured.
7. The data is worse case.



4.7.2 Test Result of Unwanted Spurious emission

Power	: DC 9V	Pol/Phase	: VERTICAL
Test Mode	: Transmit	Temperature	: 25 °C
Operation Axial	: Z	Humidity	: 68 %

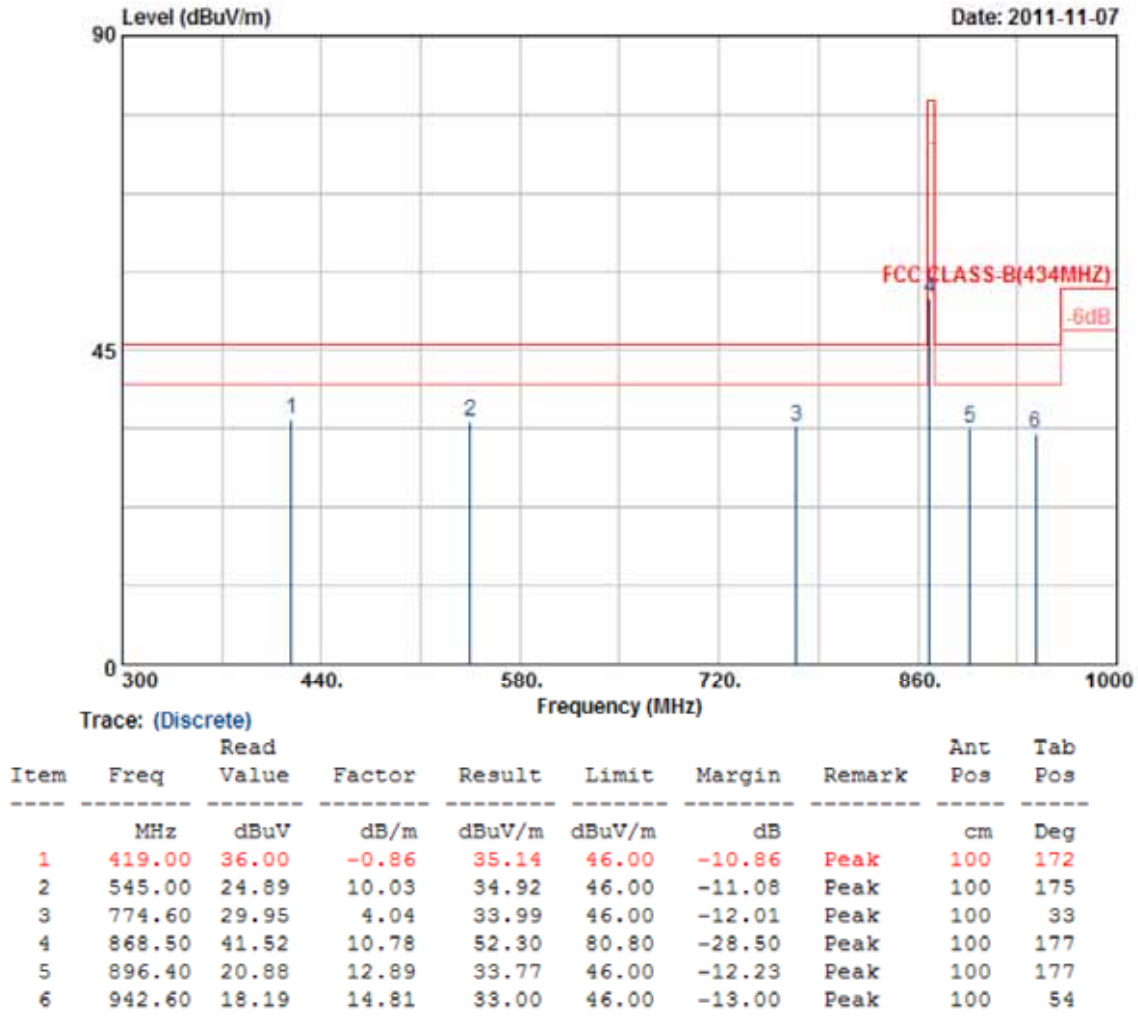


Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The Average value = Peak value + 20log(Duty cycle)
6. The other emissions is too low to be measured.
7. The data is worse case.



Power	: DC 9V	Pol/Phase	: VERTICAL
Test Mode	: Transmit	Temperature	: 25 °C
Operation Axial	: Z	Humidity	: 68 %

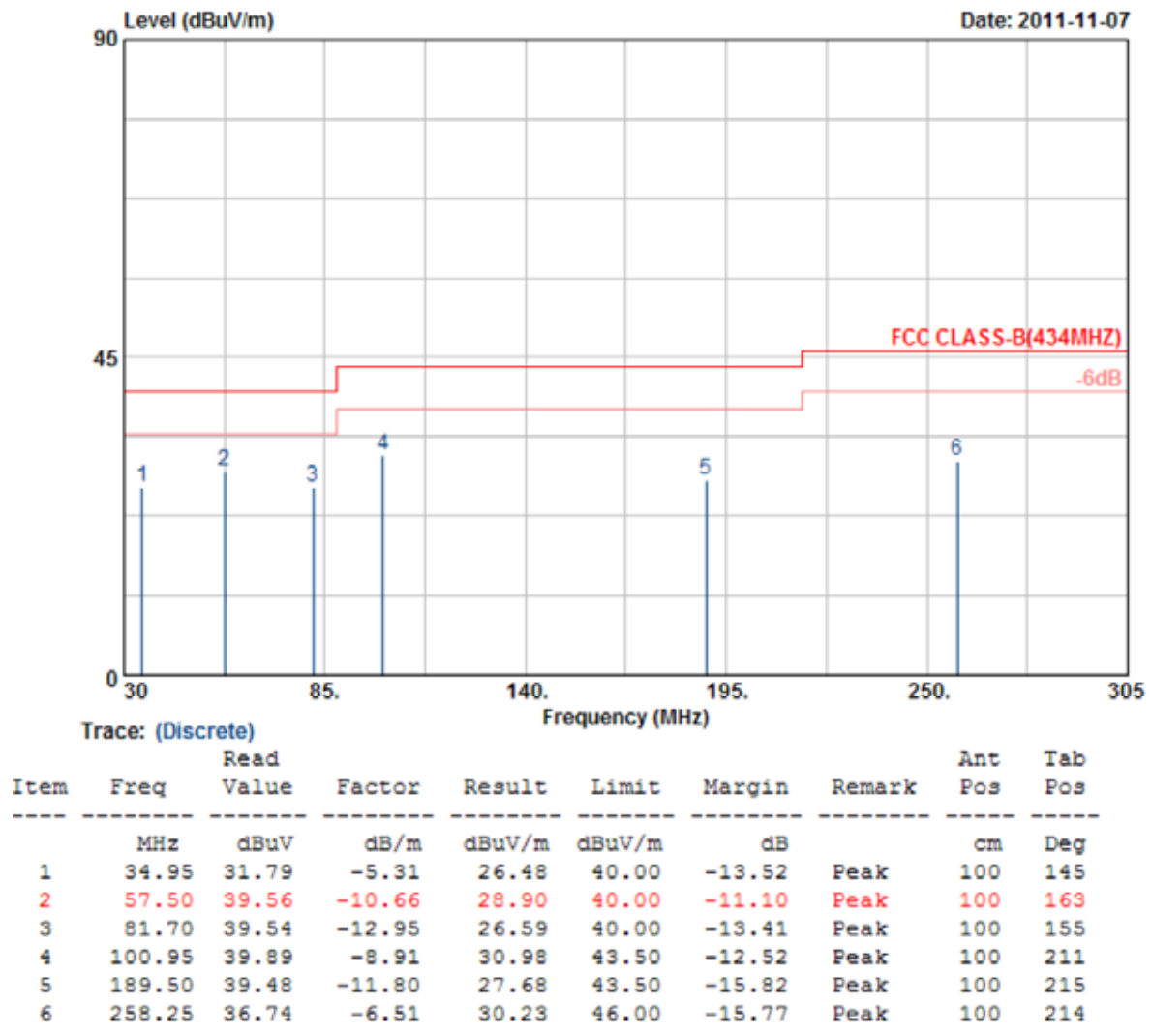


Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The Average value = Peak value + 20log(Duty cycle)
6. The other emissions is too low to be measured.
7. The data is worse case.



Power	: DC 9V	Pol/Phase	: HORIZONTAL
Test Mode	: Transmit	Temperature	: 25 °C
Operation Axial	: Z	Humidity	: 68 %

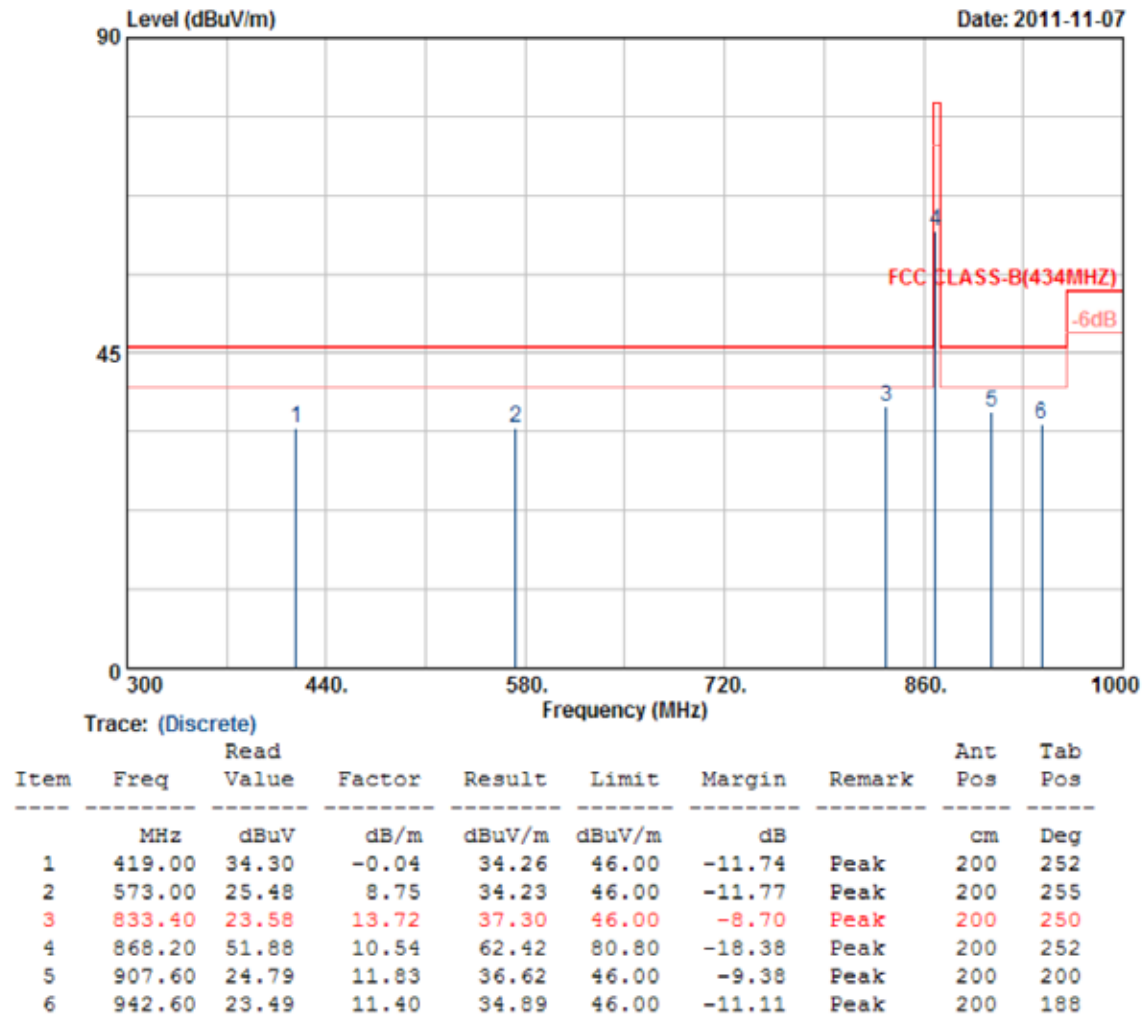


Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The Average value = Peak value + 20log(Duty cycle)
6. The other emissions is too low to be measured.
7. The data is worse case.



Power	: DC 9V	Pol/Phase	: HORIZONTAL
Test Mode	: Transmit	Temperature	: 25 °C
Operation Axial	: Z	Humidity	: 68 %

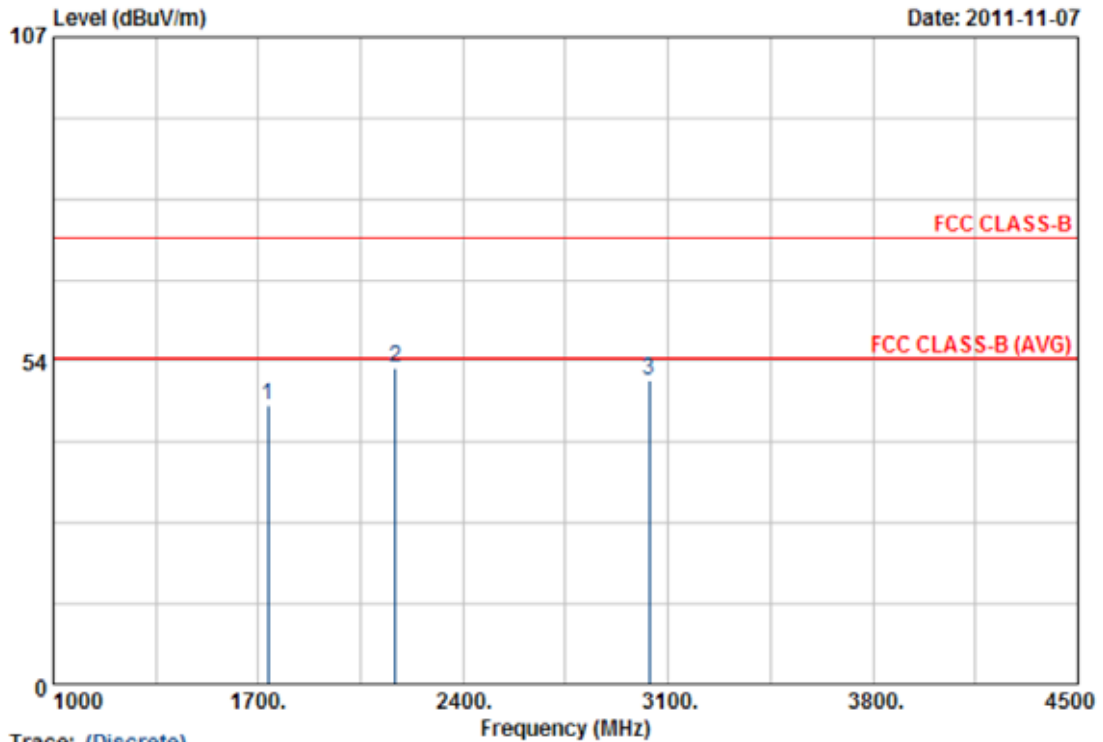


Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The Average value = Peak value + 20log(Duty cycle)
6. The other emissions is too low to be measured.
7. The data is worse case.



Power	: DC 9V	Pol/Phase	: VERTICAL
Test Mode	: Transmit	Temperature	: 25 °C
Operation Axial	: Z	Humidity	: 68 %



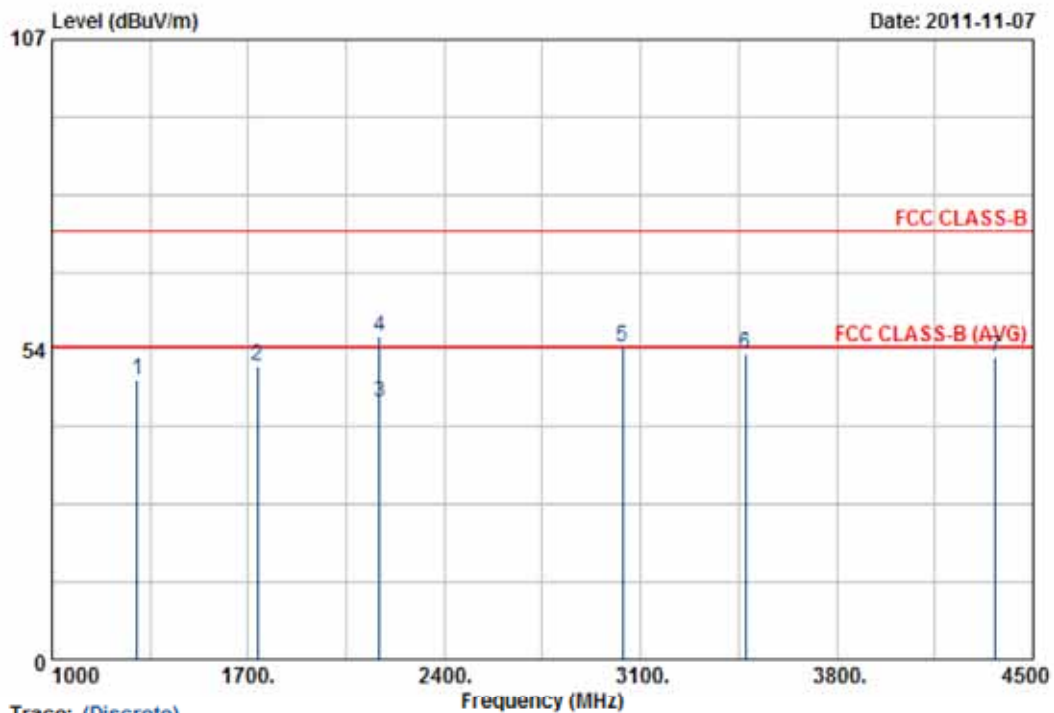
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	1731.50	36.12	9.97	46.09	74.00	-27.91	Peak	100	252
2	2169.00	41.16	11.23	52.39	74.00	-21.61	Peak	100	252
3	3037.00	40.05	10.37	50.42	74.00	-23.58	Peak	100	252

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The Average value = Peak value + 20log(Duty cycle)
6. The other emissions is too low to be measured.
7. The data is worse case.



Power	: DC 9V	Pol/Phase	: HORIZONTAL
Test Mode	: Transmit	Temperature	: 25 °C
Operation Axial	: Z	Humidity	: 68 %



Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	1304.50	39.99	8.38	48.37	74.00	-25.63	Peak	100	177
2	1731.50	36.84	13.92	50.76	74.00	-23.24	Peak	100	177
3	2169.00	31.79	12.67	44.46	54.00	-9.54	Average	100	177
4	2169.00	43.13	12.67	55.80	74.00	-18.20	Peak	100	177
5	3037.00	41.85	12.02	53.87	74.00	-20.13	Peak	100	177
6	3474.50	37.05	15.75	52.80	74.00	-21.20	Peak	100	177
7	4367.00	40.10	12.03	52.13	74.00	-21.87	Peak	100	177

Notes:

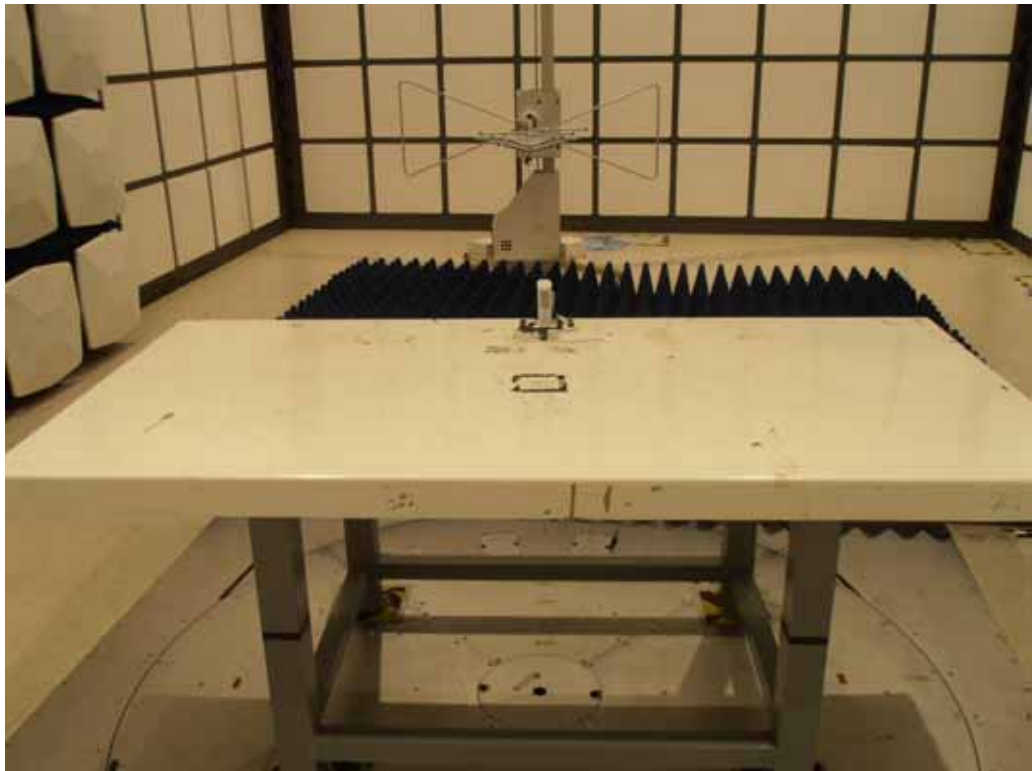
1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
5. The Average value = Peak value + 20log(Duty cycle)
6. The other emissions is too low to be measured.
7. The data is worse case.

Test engineer:

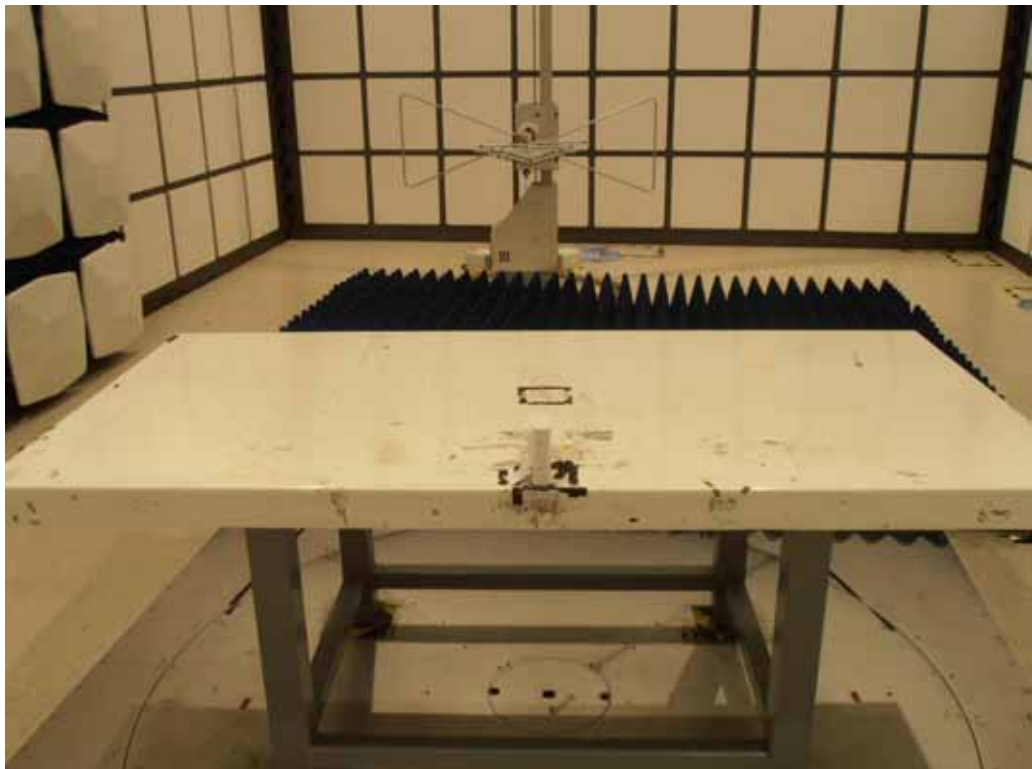


4.8 Test Photographs (30MHz~1GHz)

Front View



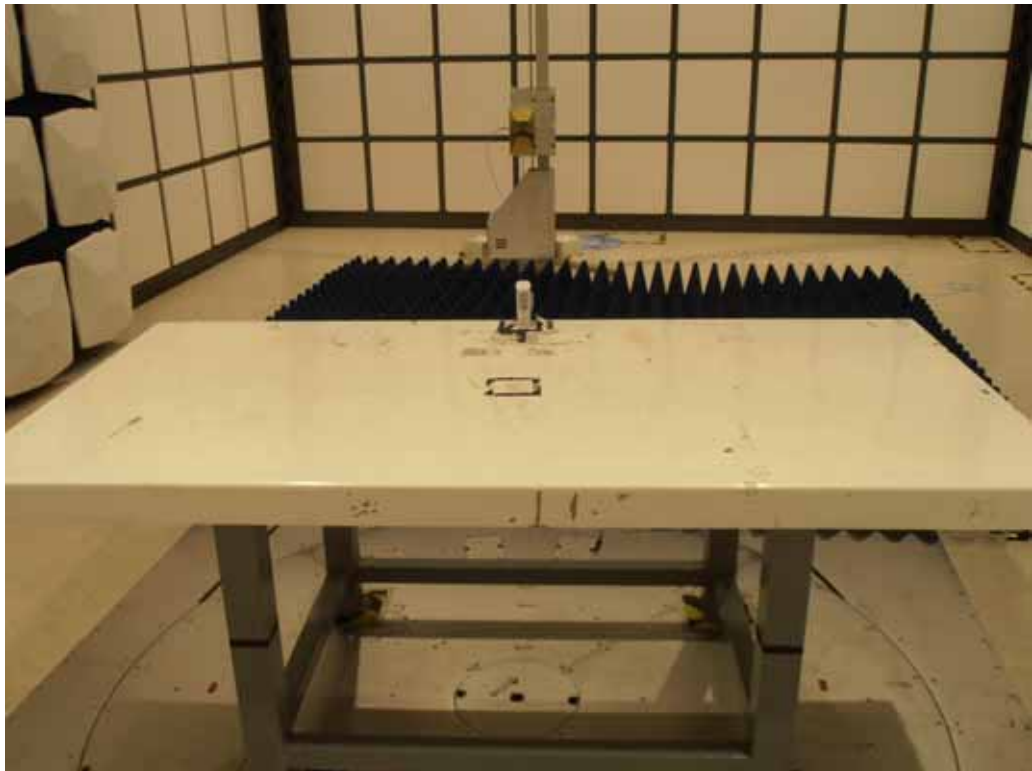
Rear View



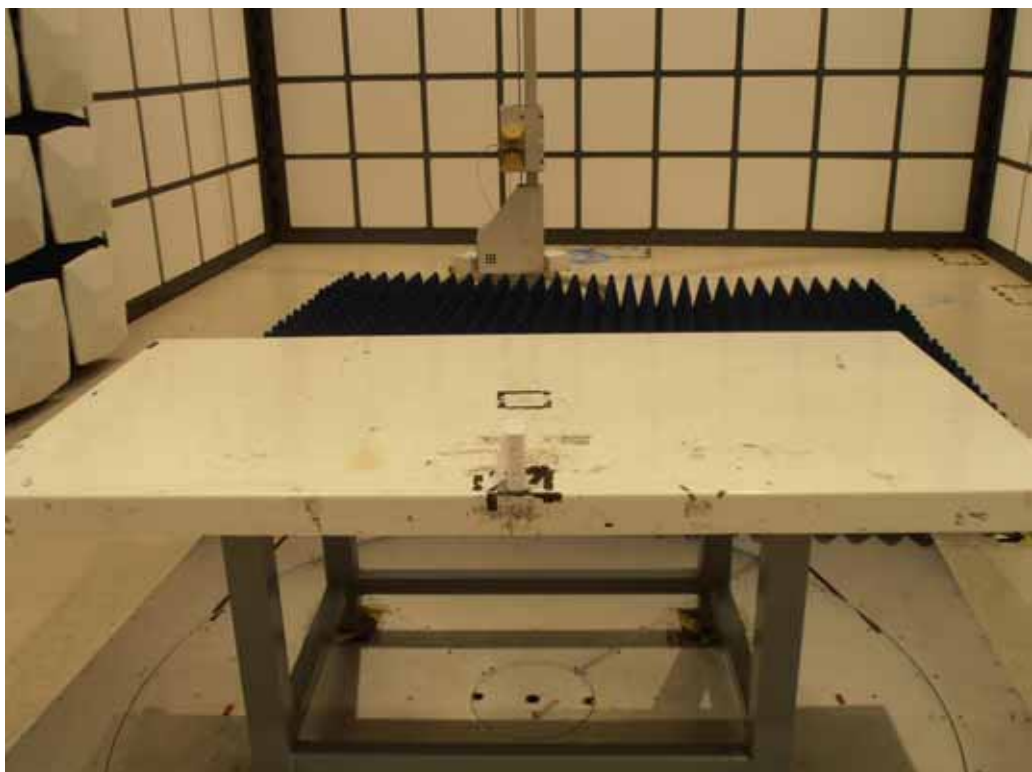


4.9 Test Photographs (Above 1GHz)

Front View



Rear View



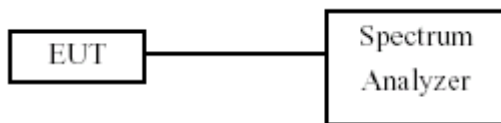


5. 20dB Occupied Bandwidth Measurement

5.1 Test Procedure

- The EUT placed on the turning table.
- The signal was coupled to the spectrum analyzer through an antenna.
- Set the resolution bandwidth to 100kHz and video bandwidth to 100kHz then select Peak function to scan the channel frequency.
- The 20dB bandwidth was measured and recorded.

5.2 Test Setup Layout



5.3 Limits of Band Edges Measurement

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for device operating above 70 MHz and above 900 MHz.

Frequency (MHz)	Limit of 20dB Bandwidth (MHz)
433.92	1.08

5.4 Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2011/05/05	2012/05/04

5.5 Test Result and Data

Test Date: Nov. 07, 2011

Temperature: 25

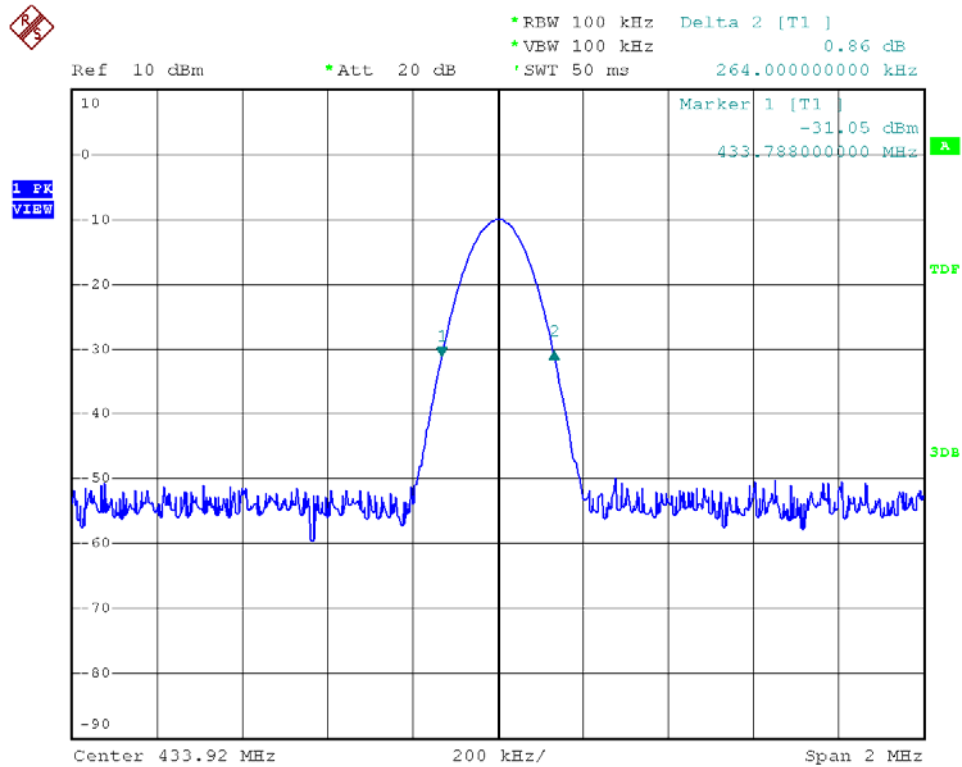
Atmospheric pressure: 1020 hPa

Humidity: 68%

Frequency (MHz)	20 dB bandwidth (MHz)	PASS / FAIL
433.92	0.264	PASS



Frequency: 433.92MHz, CH1



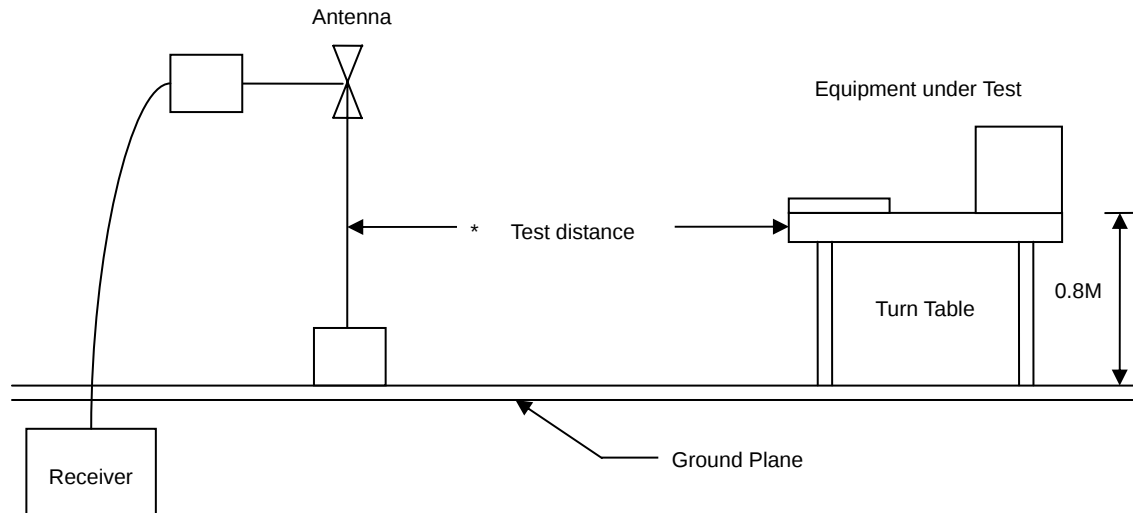


6. Transmission Time Control

6.1 Test Procedure

1. Set up the EUT in the state of Transmitter.
2. Set up the Spectrum, judge whether to accord with the regulation demand or not.

6.2 Test Setup Layout



6.3 Test Limit

Limits: A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

6.4 Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2011/05/05	2012/05/04

6.5 Test Result and Data

Test Date: Nov. 07, 2011

Temperature: 25

Atmospheric pressure: 1020 hPa

Humidity: 68%

Frequency (MHz)	Operation time(Sec.)	Limit(Sec.)	PASS / FAIL
433.92	0.36	5.00	PASS



Frequency: 433.92MHz, CH1

