

TEST REPORT

Report number: Z071C-11024

Issue Date: May 19, 2011

The device, as described herewith, was tested pursuant to applicable test procedure indicated below and complies with the requirements of;

FCC Part15 Subpart C / IC RSS-210
- Class II Permissive Change -

The test results are traceable to the international or national standards.

Applicant	: Topcon Corporation
Equipment under test (EUT)	: WLAN UNIT
Model Number	: WLAN528
FCC ID	: H5P-WLAN528
IC Certification Number	: 6050A-WLAN528

Test procedure	: ANSI C63.4-2003
Date of test	: May 10, 11, 2011
Test place	: ZACTA Technology Corporation Yonezawa Testing Center 4149-7 Hachimanpara 5-chome Yonezawa-si Yamagata 992-1128 Japan Phone: +81-238-28-2880 Fax: +81-238-28-2888
Test results	: Complied

Zacta Technology Corporation certifies that no party to the application is subject to a denial of federal benefits that include FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21U.S.C. 853(a).

The results in this report are applicable only to the samples tested.

This report shall not be re-produced except in full without the written approval of ZACTA Technology Corporation.

This test report must not be used by client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Tested by:



Taiki Watanabe

Authorized by:



Jun Shimanuki

General Manager of Technical Division



NVLAP LAB CODE 200306-0

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1. Summary of Test

1.1 Purpose of test

This test report is issued for the purpose of re-testing due to the change in Antenna for EUT. Spurious emission test (Radiated) and Restricted Bands of Operation test only were performed because the change in Antenna does not affect other test result.

1.2 Standards

CFR47 FCC Part 15 Subpart C, RSS-210

1.3 Summary of test results

Table-A presents the list of the measurement items for Digital modulation devices under FCC Part 15 Subpart C and Industry Canada RSS-210 Issue 8.

Table-A: List of the measurements

Test Items Section	Test Items	Condition	Result
	Transmit mode [Tx]:		
15.247(a)(2) RSS-210 A8.2(a)	Occupied Bandwidth (6dB Bandwidth)	Conducted	N/A
RSS-Gen 4.6.1	99% Occupied bandwidth	Conducted	N/A
15.247(b)(3) 15.31(e) RSS-210 A8.4(2)	Maximum Peak Output Power - Conducted -	Conducted	N/A
15.247(d) RSS-210 A8.5	Band Edge Compliance of RF Conducted Emissions	Conducted	N/A
15.247(d) RSS-210 A8.5 RSS-Gen 4.9, 4.10	Spurious Emissions	Conducted Radiated	N/A Pass
15.247(d) 15.205 15.209 RSS-210 2.2	Restricted Bands of Operation	Radiated	Pass
15.247(e) RSS-210 A8.2(b)	Transmitter power spectral density	Conducted	N/A
15.207 RSS-Gen 7.2.4	AC Power Line Conducted Emissions 150kHz – 30MHz	Conducted	N/A

Note: Since there is no change in EUT, only the Radiated test items were performed.

1.4 Deviation from the standard

None

1.5 Modification to the EUT by laboratory

None

2. Equipment description

2.1 General Description of equipment

EUT is 802.11b/g Wireless LAN Module.

2.2 EUT information

Applicant	: Topcon Corporation 75-1, Hasunuma-cho, Itabashi-ku, Tokyo 174-8580 Japan Phone: +81-3-3558-2634 Fax: +81-3-3966-0038
Equipment under test (EUT)	: WLAN UNIT
Trade name	: TOPCON
Model Number	: WLAN528
Serial Number	: N/A
EUT Condition	: Pre-Production
Max. frequency	: 16MHz
Power ratings	: DC 3.3V $\pm$ 5% 320mA
Size	: (W) 28 x (D) 13.5 x (H) 3.5 mm
Type of equipment	: Wireless Module
Environment	: Indoor / Outdoor use
Thermal limitation	: -15°C to 55°C
Operating mode	: Tx mode, Rx mode
[RF Specification]	
Protocol	: IEEE802.11b, IEEE802.11g
Type of Modulation	: DSSS, OFDM
Frequency Range	: 2412MHz - 2462MHz
Number of FR Channels	: 11 Channels
Symbol rate on channel	: 1, 2, 5.5, <u>11</u> Mbps (IEEE802.11b) : 6, 9, 12, 18, 24, 36, 48, <u>54</u> Mbps (IEEE802.11g) _: Tested rate
Channel Separation	: 5MHz
Output power	: 48.417mW (IEEE802.11b) : 52.481mW (IEEE802.11g)
Antenna (Tx and Rx)	: Dipole antenna
Antenna gain	: 2.0dBi
RF type	: Transceiver
Intended use	: Data transmission
RF emission type designator	: 13M6G1D (IEEE802.11b) : 16M7G1D (IEEE802.11g)

2.3 Operating channels and frequencies

Channel	Frequency[MHz]
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2453
10	2457
11	2462

2.4 Description of Test modes

The EUT had been tested under operating condition.
There are three channels have been tested as following:

Tested Channel	Frequency (MHz)
Low	2412
Middle	2437
High	2462

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

Tested Channel	Modulation Technology	Modulation Type	Data Rate
Low, Middle, High	DSSS (IEEE802.11b)	CCK	11Mbps
	DSSS, OFDM (IEEE802.11g)	64QAM	54Mbps

The field strength of spurious emission was measured at each position of all three axis X, Y and Z to compare the level, and the maximum noise.

The worst emission was found in X-axis and the worst case recorded.

2.5 Operating mode

【Tx mode】

- Test program set up
- ii) Select a test mode
 - Operating frequency: CH.1, 6, 11
 - Tx speed: 11Mbps (IEEE802.11b), 54Mbps (IEEE802.11g)
 - Power control: 10dBm
- iii) Start test mode

【Rx mode】

- Test program set up
- ii) Select a test mode
 - Write Receive only
 - Operating frequency: CH.1, 6, 11
- iii) Start test mode

3. Configuration information

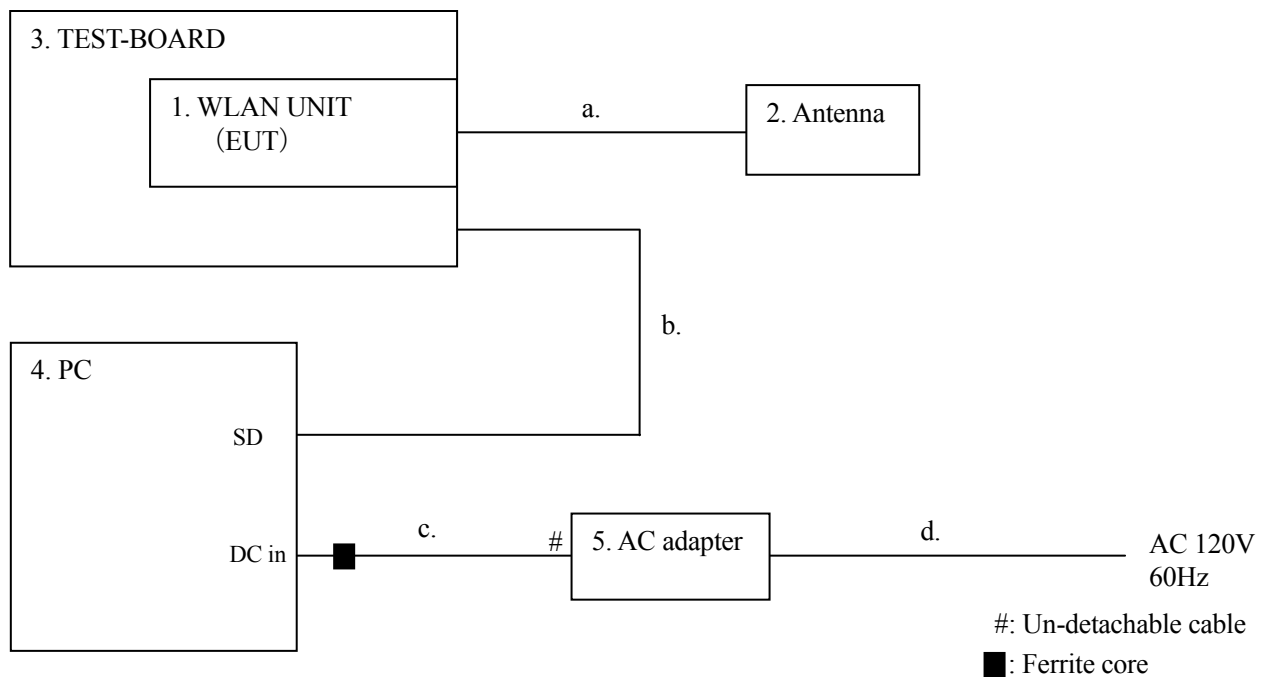
3.1 EUT and Peripheral(s) used

No.	Equipment	Company	Model No.	Serial No.	FCC ID/DoC	Comment
1	WLAN UNIT	Topcon Corporation	WLAN528	N/A	H5P-WLAN528 6050A-WLAN528	EUT
2	Antenna	SANSEI ELECTRIC	ANTB18-127A0	N/A	-	-
3	TEST-BOARD	Nagano JRC	N/A	003	-	-
4	Personal Computer	IBM	Type 1866	LV-F4035	DoC	-
5	AC adapter for PC	IBM	02K6810	N/A	-	-

3.2 Cable(s) information

No.	Cable	Length [m]	Shield	Connector	Comment
a	Coaxial cable	0.7	Yes	Metal	-
b	I/O cable	0.8	No	Plastic	-
c	DC cable for PC AC adapter	1.8	No	Metal	-
d	AC Power cord for PC AC adapter	0.9	No	Plastic	-

3.3 System configuration



Note1: Numbers assigned to equipment or cables on this diagram are corresponded to the list in “2.2 EUT information”, “3.1 Peripheral(s) used” and “3.2 Cable(s) information”.

Note2: DC cable (No.c) with a ferrite core is accessory for AC adapter (No.5).

4. Test Type and Results

4.1 Spurious Emissions - Radiated - (9kHz - 25GHz)

4.1.1 Test Procedure [FCC 15.205/209/247(d), IC RSS-210 A8.5, RSS-Gen 4.9&4.10]

Radiated emission measurements are performed at 3m distance with the broadband antenna (Loop antenna, TRILOG antenna, and double-ridged guide antenna). The antenna is positioned both the horizontal and vertical planes of polarization and height is varied 1 to 4 meters and stopped at height producing the maximum emission. As for the Loop antenna, it is positioned with its plane vertical, and the center of the Loop is 1.0meter above the ground plane. Frequency Range: 9kHz –1GHz is scanned and investigated with the test receiver, and above 1GHz, with the spectrum analyzer. The detector function of the test receiver is set to CISPR Quasi-peak mode and the bandwidth is set to 120kHz. Peak and average detectors are used for measurements above 1GHz. The bandwidth of the spectrum analyzer is set to 1MHz.

The EUT and support equipment are placed on a 1meter x 2meter surface, 0.8meter height FRP table. The turntable is rotated by 360 degrees and stopped at azimuth of producing the maximum emission.

Interconnecting cables, which hanging closer than 40cm to the horizontal metal ground plane are bundled its excess in center. The highest fundamental frequency generated in the EUT is 2402-2480MHz, therefore the frequency was investigated up to 25GHz, as specified in CFR section 15.33, and at least six highest emissions are reported. The test results represent the worst-case emission for each emission with manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation.

Sufficient time for the EUT, support equipment, and test equipment are allowed in order for them to warm up to their normal operating condition.

The spectrum analyzer is set to:

- Peak: RBW=1MHz, VBW=1MHz, Span=0Hz, Sweep=auto
- Average: RBW=1MHz, VBW=10Hz, Span=0Hz, Sweep=auto

The EUT was set to operate with following conditions.

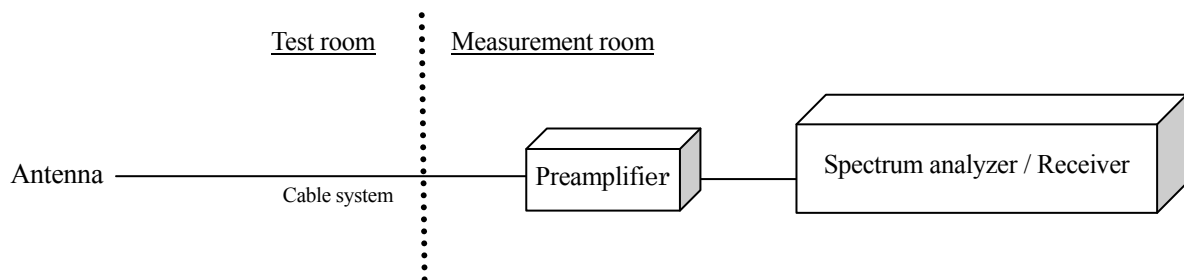
- Channel 1(Low), Channel 6(Mid), Channel 11(High)

The test mode of EUT is as follows.

- Tx mode
- Rx mode

4.1.2 Measurement Setup

Test configuration for Spurious emissions



4.1.3 Limit of Spurious Emission Measurement

Frequency [MHz]	Field Strength	
	[uV/m]	[dBuV/m]
0.009 – 0.490	2400 / F [kHz]	20logE [uV/m]
0.490 – 1.705	24000 / F [kHz]	20logE [uV/m]
1.705-30	30	29.5
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level [dBuV/m] = 20 log Emission [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.

4.1.4 Sample of field strength calculation

Spurious Emission $\text{dB}\mu\text{V/m} = 20\log_{10}(\mu\text{V/m})$

Limit @147.6MHz = 150μV/m = 43.5dBμV/m
Reading = 42.8dBμV
Ant. Factor + Cable Loss - Amp. Gain = 14.2 + 3.0 - 30.0 = -12.8dB
Total = 42.8 - 12.8 = 30.0dBμV/m
Margin = 43.5 - 30.0 = <u>13.5dB</u>

4.1.5 Measurement Results

Test Personnel:

Tested by: Taiki Watanabe

Date : May 10, 2011
Temperature : 21.7 [°C]
Humidity : 43.9 [%]
Test place : 3m Semi-anechoic chamber

Spurious Emissions – Radiated -
[IEEE802.11b] < below 1GHz >

Tx Channel 1: 2412.0MHz

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c. f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	149.374	H	33.9	-8.9	25.0	43.5	18.5	221.0	187.0
2	183.180	H	37.6	-9.3	28.3	43.5	15.2	157.0	189.0
3	191.996	H	37.4	-10.0	27.4	43.5	16.1	186.0	187.0
4	215.723	H	41.6	-10.3	31.3	43.5	12.2	113.0	212.0
5	248.896	H	38.7	-9.1	29.6	46.0	16.4	168.0	331.0
6	383.168	H	32.2	-5.4	26.8	46.0	19.2	100.0	333.0
7	400.002	H	38.5	-5.1	33.4	46.0	12.6	100.0	332.0
8	449.635	H	27.5	-3.8	23.7	46.0	22.3	100.0	64.0
9	500.130	H	21.5	-2.9	18.6	46.0	27.4	400.0	313.0
10	549.667	H	22.5	-1.9	20.6	46.0	25.4	161.0	70.0

Tx Channel 6: 2437.0MHz

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c. f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	183.216	H	37.9	-9.3	28.6	43.5	14.9	166.0	191.0
2	215.743	H	42.6	-10.3	32.3	43.5	11.2	147.0	179.0
3	249.849	H	38.3	-9.1	29.2	46.0	16.8	100.0	322.0
4	383.161	H	34.4	-5.4	29.0	46.0	17.0	100.0	2.0
5	400.008	H	38.2	-5.1	33.1	46.0	12.9	100.0	321.0
6	449.764	H	27.9	-3.8	24.1	46.0	21.9	199.0	333.0
7	633.080	H	25.9	-0.5	25.4	46.0	20.6	146.0	167.0

Tx Channel 11: 2462.0MHz

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c. f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	183.223	H	36.3	-9.3	27.0	43.5	16.5	165.0	225.0
2	215.740	H	42.6	-10.3	32.3	43.5	11.2	128.0	193.0
3	249.847	H	39.6	-9.1	30.5	46.0	15.5	114.0	333.0
4	383.151	H	35.5	-5.4	30.1	46.0	15.9	103.0	0.0
5	400.006	H	38.2	-5.1	33.1	46.0	12.9	100.0	328.0
6	449.779	H	27.9	-3.8	24.1	46.0	21.9	214.0	310.0
7	633.059	H	25.9	-0.5	25.4	46.0	20.6	149.0	326.0

Note:

1. Emission Level (Margin) = Limit – [Reading + Factor (Antenna + Cable - Amp)]
2. No emissions were detected in frequency range 9KHz to 30MHz at the 3 meters distance.

Spurious Emissions – Radiated -
[IEEE802.11g] < below 1GHz >

Tx Channel 1: 2412.0MHz

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c. f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	182.736	H	35.8	-9.3	26.5	43.5	17.0	200.0	3.0
2	215.720	H	42.5	-10.3	32.2	43.5	11.3	180.0	209.0
3	248.899	H	37.6	-9.1	28.5	46.0	17.5	182.0	325.0
4	383.154	H	35.8	-5.4	30.4	46.0	15.6	100.0	330.0
5	400.018	H	38.1	-5.1	33.0	46.0	13.0	100.0	327.0
6	448.061	H	29.0	-3.8	25.2	46.0	20.8	213.0	325.0

Tx Channel 6: 2437.0MHz

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c. f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	182.536	H	38.0	-9.4	28.6	43.5	14.9	235.0	0.0
2	215.744	H	43.1	-10.3	32.8	43.5	10.7	179.0	202.0
3	248.920	H	39.2	-9.1	30.1	46.0	15.9	100.0	2.0
4	383.147	H	34.6	-5.4	29.2	46.0	16.8	100.0	336.0
5	400.015	H	38.4	-5.1	33.3	46.0	12.7	100.0	324.0
6	449.793	H	30.0	-3.8	26.2	46.0	19.8	210.0	313.0

Tx Channel 11: 2462.0MHz

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c. f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	182.550	H	38.0	-9.4	28.6	43.5	14.9	226.0	10.0
2	215.760	H	42.6	-10.3	32.3	43.5	11.2	191.0	188.0
3	248.895	H	38.4	-9.1	29.3	46.0	16.7	100.0	11.0
4	384.010	H	29.1	-5.4	23.7	46.0	22.3	100.0	331.0
5	400.016	H	38.5	-5.1	33.4	46.0	12.6	100.0	326.0
6	449.730	H	28.0	-3.8	24.2	46.0	21.8	223.0	311.0

Note:

1. Emission Level (Margin) = Limit – [Reading + Factor (Antenna + Cable - Amp)]
2. No emissions were detected in frequency range 9KHz to 30MHz at the 3 meters distance.

Spurious Emissions – Radiated -

[IEEE802.11b] < above 1GHz >

Tx mode

No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c. f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]	Remark
1	4824.000	H	35.8	48.4	4.7	40.5	53.1	74.0	13.5	20.9	109.0	3.0	CH:Low
2	4824.000	H	35.8	48.4	4.7	40.5	53.1	74.0	13.5	20.9	109.0	3.0	
3	4874.000	H	35.9	49.0	5.4	41.3	54.4	74.0	12.7	19.6	119.0	3.0	CH:Mid
4	4874.000	H	35.9	49.0	5.4	41.3	54.4	74.0	12.7	19.6	119.0	3.0	
5	4924.000	H	35.8	49.5	5.5	41.3	55.0	74.0	12.7	19.0	116.0	348.0	CH:High
6	4924.000	H	35.8	49.5	5.5	41.3	55.0	74.0	12.7	19.0	116.0	348.0	

[IEEE802.11g] < above 1GHz >

Tx mode

No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c. f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]	Remark
1	4824.000	H	35.8	48.8	5.2	41.0	54.0	74.0	13.0	20.0	100.0	334.0	CH:Low
2	4824.000	H	35.8	48.8	5.2	41.0	54.0	74.0	13.0	20.0	100.0	334.0	
3	4874.000	H	35.8	48.7	5.4	41.2	54.1	74.0	12.8	19.9	111.0	53.0	CH:Mid
4	4874.000	H	35.8	48.7	5.4	41.2	54.1	74.0	12.8	19.9	111.0	53.0	
5	4924.000	H	35.7	48.3	5.5	41.2	53.8	74.0	12.8	20.2	111.0	115.0	CH:High
6	4924.000	H	35.7	48.3	5.5	41.2	53.8	74.0	12.8	20.2	111.0	115.0	

Note:

1. Emission Level (Margin) = Limit – [Reading + Factor (Antenna + Cable - Amp)]

Spurious Emissions – Radiated -

Rx Channel 1: 2412.0MHz

No.	Frequency [MHz]	(P)	Reading QP [dB(μ V)]	c. f [dB(1/m)]	Result QP [dB(μ V/m)]	Limit [dB(μ V/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	149.887	H	33.7	-8.9	24.8	43.5	18.7	173.0	7.0
2	182.550	H	38.0	-9.4	28.6	43.5	14.9	226.0	10.0
3	215.725	H	43.2	-10.3	32.9	43.5	10.6	159.0	206.0
4	248.900	H	40.3	-9.1	31.2	46.0	14.8	148.0	345.0
5	381.641	H	28.5	-5.5	23.0	46.0	23.0	260.0	323.0
6	400.010	H	38.1	-5.1	33.0	46.0	13.0	100.0	319.0
7	449.775	H	27.1	-3.8	23.3	46.0	22.7	215.0	313.0

Rx Channel 6: 2437.0MHz

No.	Frequency [MHz]	(P)	Reading QP [dB(μ V)]	c. f [dB(1/m)]	Result QP [dB(μ V/m)]	Limit [dB(μ V/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	149.887	H	33.5	-8.9	24.6	43.5	18.9	167.0	198.0
2	182.540	H	38.2	-9.4	28.8	43.5	14.7	210.0	0.0
3	215.741	H	43.4	-10.3	33.1	43.5	10.4	145.0	204.0
4	248.924	H	40.4	-9.1	31.3	46.0	14.7	125.0	344.0
5	383.140	H	31.3	-5.4	25.9	46.0	20.1	251.0	320.0
6	400.010	H	39.3	-5.1	34.2	46.0	11.8	100.0	324.0
7	448.962	H	25.2	-3.8	21.4	46.0	24.6	100.0	322.0

Rx Channel 11: 2462.0MHz

No.	Frequency [MHz]	(P)	Reading QP [dB(μ V)]	c. f [dB(1/m)]	Result QP [dB(μ V/m)]	Limit [dB(μ V/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	149.879	H	33.4	-8.9	24.5	43.5	19.0	161.0	211.0
2	182.550	H	37.6	-9.4	28.2	43.5	15.3	141.0	208.0
3	215.719	H	42.5	-10.3	32.2	43.5	11.3	137.0	189.0
4	248.920	H	40.5	-9.1	31.4	46.0	14.6	140.0	340.0
5	383.120	H	29.3	-5.4	23.9	46.0	22.1	250.0	350.0
6	400.005	H	38.4	-5.1	33.3	46.0	12.7	100.0	325.0
7	448.000	H	27.4	-3.8	23.6	46.0	22.4	100.0	319.0

Note:

1. Emission Level (Margin) = Limit – [Reading + Factor (Antenna + Cable - Amp)]
2. No emissions were detected in frequency range 9KHz to 30MHz at the 3 meters distance.

4.2 Restricted Bands of Operation

4.2.1 Test Procedure [FCC 15.205, 15.209, 15.247(d)]

The peak power is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to:

- Peak: RBW=1MHz, VBW=1MHz, Span=Arbitrary setting, Sweep=auto
- Average: RBW=1MHz, VBW=10Hz, Span=Arbitrary setting, Sweep=auto

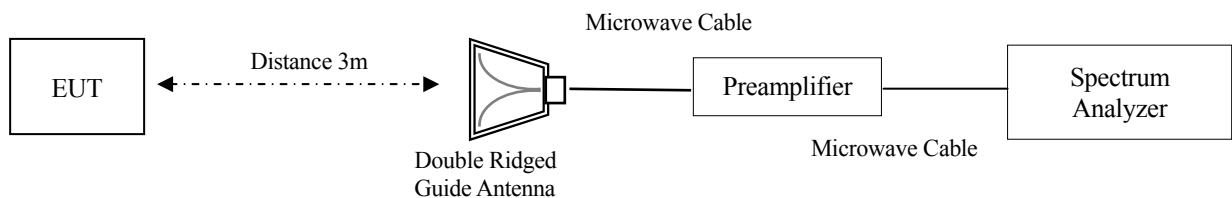
The EUT was set to operate with following conditions.

- Channel 1(Low): 2412MHz, Channel 11(High): 2462MHz

The test mode of EUT is as follows.

- Tx mode

4.2.2 Measurement Setup



4.2.3 Limit of Restricted Bands of Operation

Emission at the boundary of the restricted band provided by 15.205 shall be lower than 15.209 limit.

4.2.4 Measurement Result

Channel	Frequency[MHz]	Results Chart	Result
Low	2412.0	See the Trace Data	PASS
High	2462.0	See the Trace Data	PASS

4.2.5 Trace Data

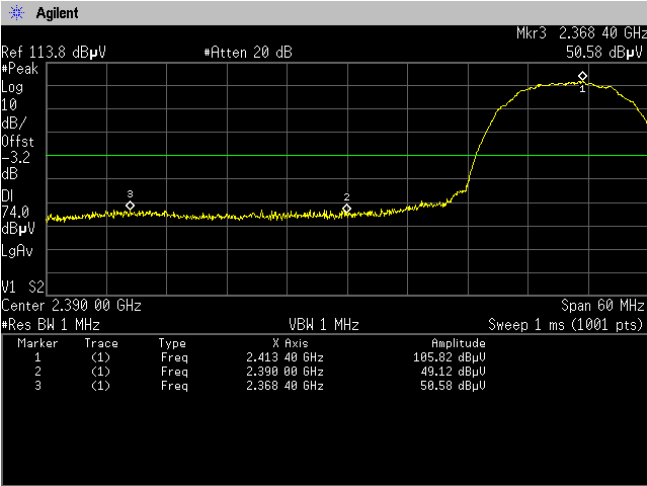
Test Personnel:

Tested by: Taiki Watanabe

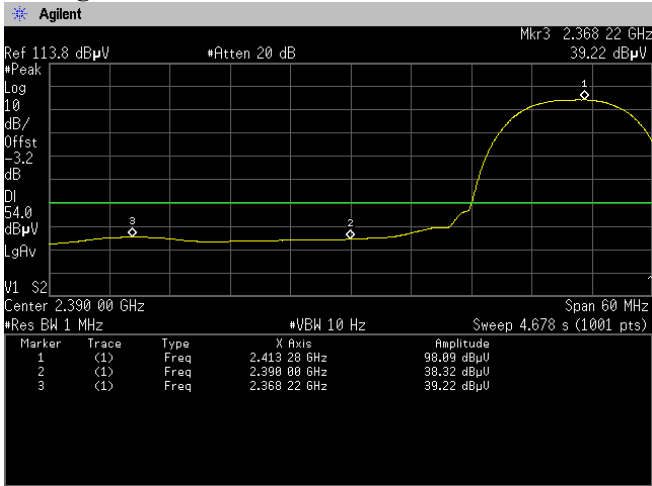
Date : May 11, 2011
 Temperature : 20.9 [°C]
 Humidity : 47.8 [%]
 Test place : 3m Semi-anechoic chamber

Restricted Bands of Operation
[IEEE802.11b]
Channel Low: 2412.0MHz

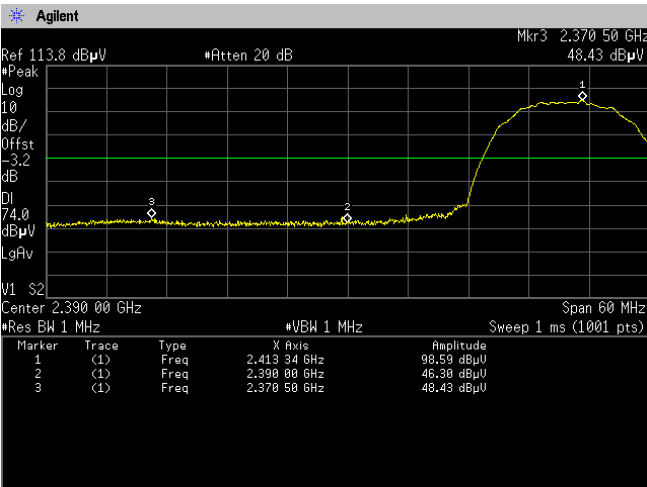
**-Horizontal-
Peak**



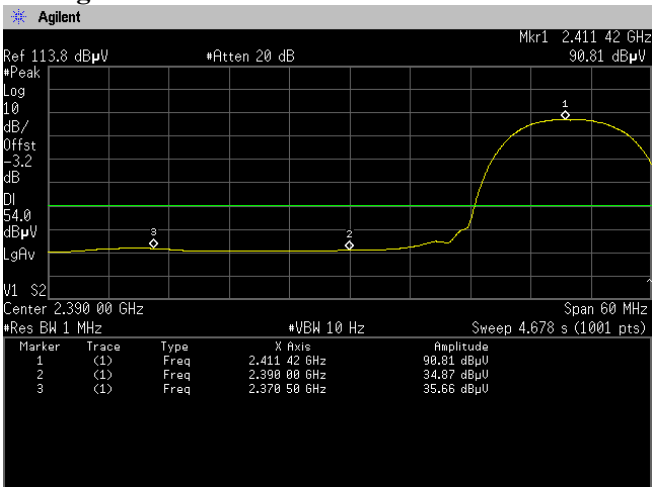
Average



**-Vertical-
Peak**

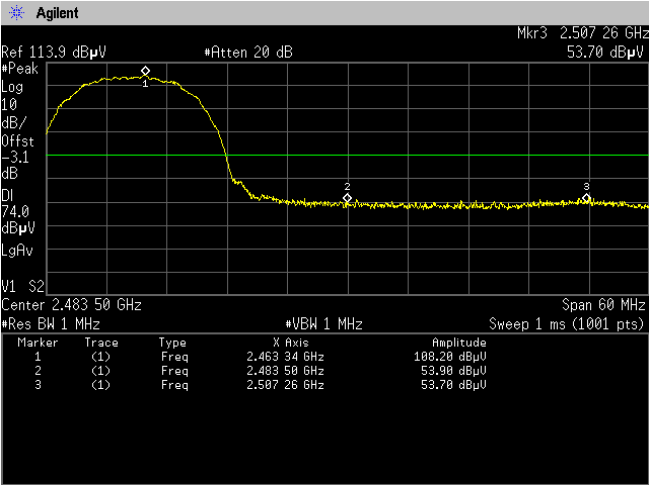


Average

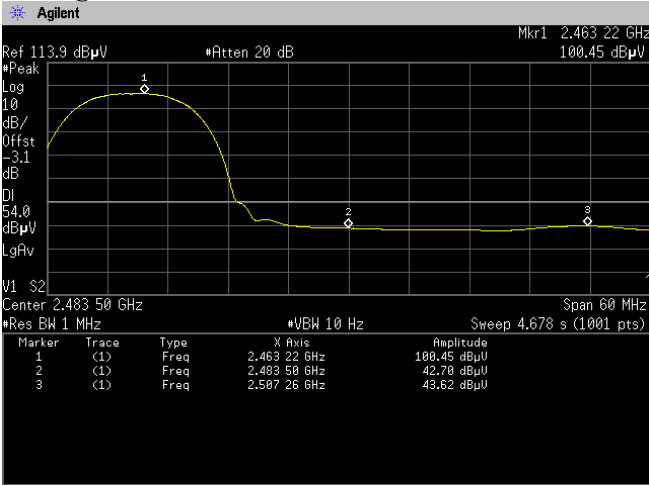


Restricted Bands of Operation
[IEEE802.11b]
Channel High: 2462.0MHz

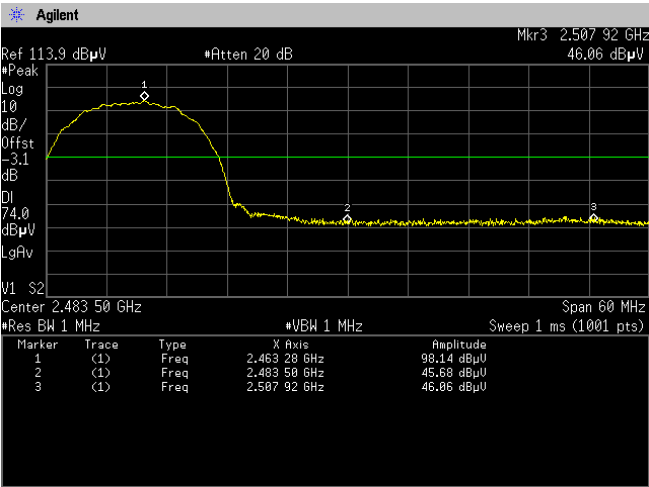
**-Horizontal-
Peak**



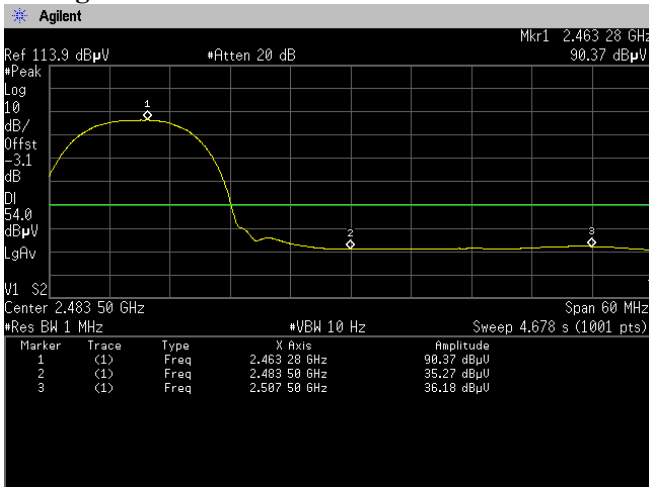
Average



**-Vertical-
Peak**

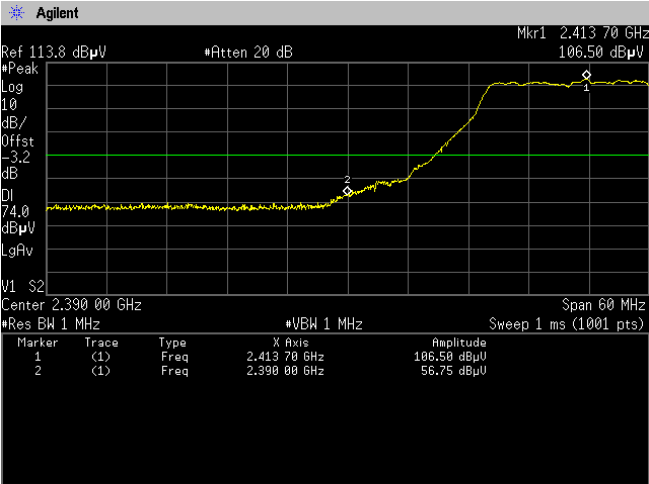


Average

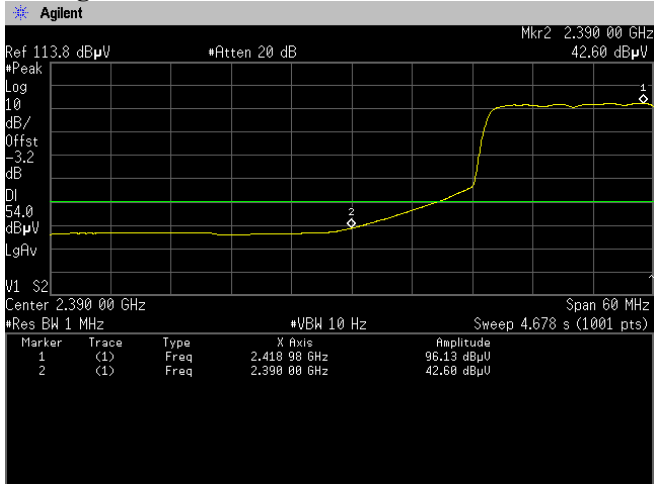


Restricted Bands of Operation
[IEEE802.11g]
Channel Low: 2412.0MHz

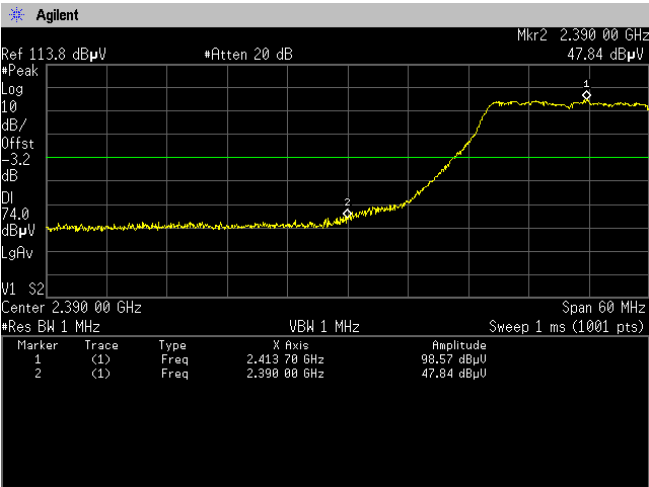
**-Horizontal-
Peak**



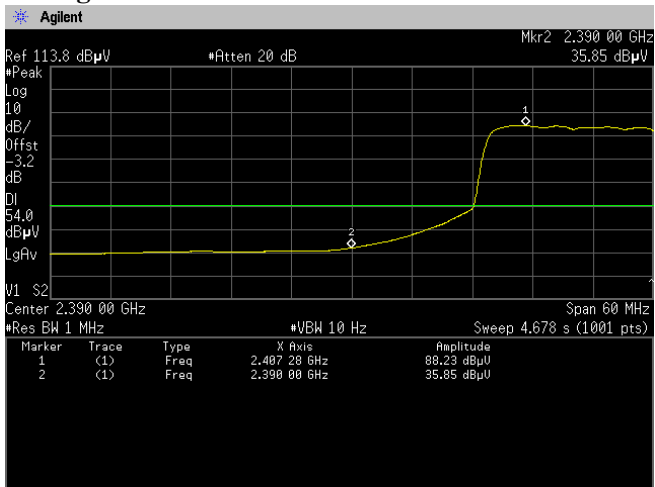
Average



**-Vertical-
Peak**

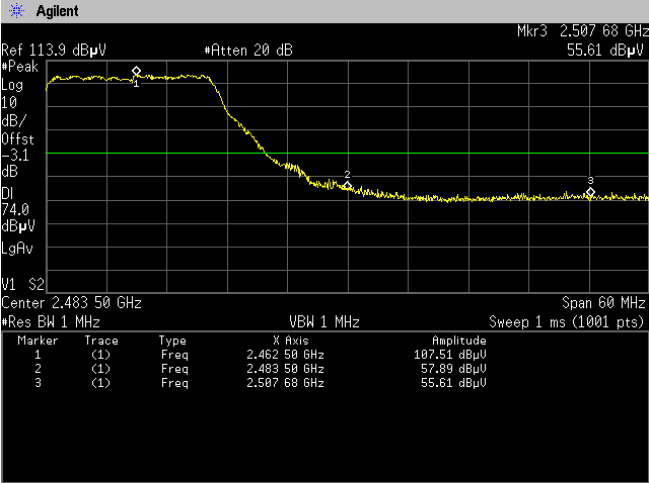


Average

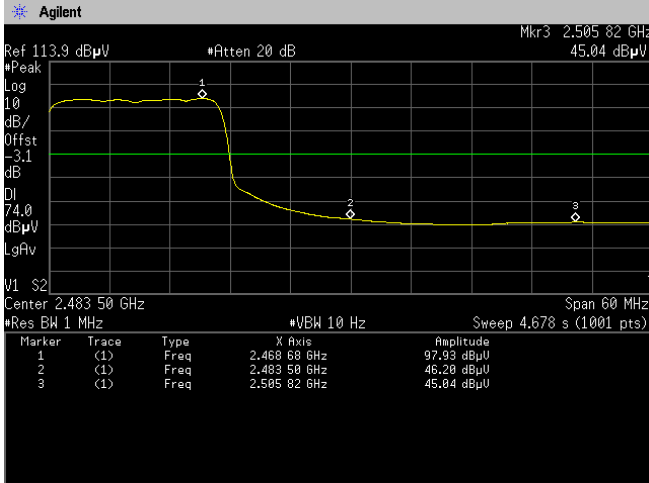


Restricted Bands of Operation
[IEEE802.11g]
Channel High: 2462.0MHz

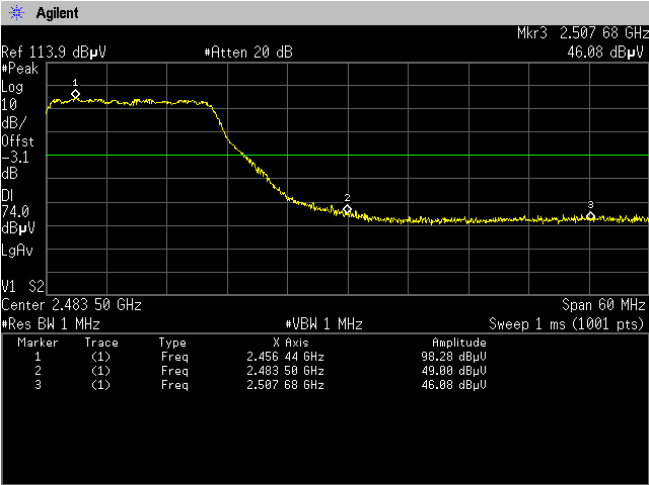
**-Horizontal-
Peak**



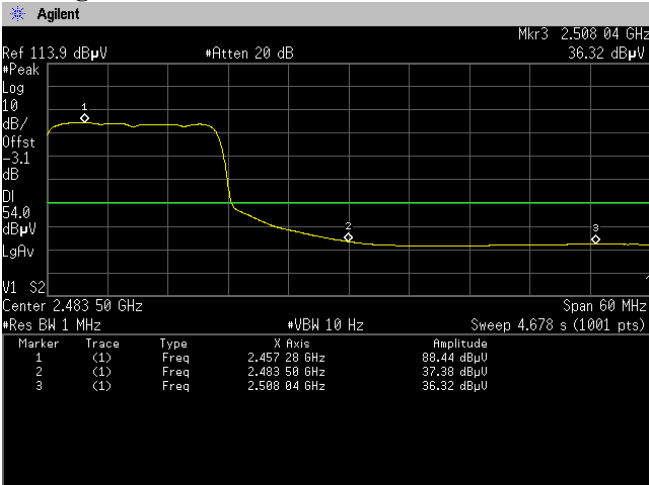
Average



**-Vertical-
Peak**



Average



4.3 Antenna requirement

According to FCC 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.

The EUT has an external antenna with U.FL Connector, which was installed by manufacture.

5. Uncertainty of measurement

Expanded uncertainties stated were calculated with a coverage Factor $k=2$.

Please note that these results are not taken into account when determining compliance or non-compliance with test result.

Test item	Measurement uncertainty
Conducted emission at mains port (150kHz - 30MHz)	$\pm 3.0\text{dB}$
Radiated emission (9kHz - 30MHz)	$\pm 4.4\text{dB}$
Radiated emission (30MHz – 1000MHz)	$\pm 4.5\text{dB}$
Radiated emission (1000MHz – 26GHz)	$\pm 3.9\text{dB}$

6. Laboratory description

6.1 Location: ZACTA Technology Corporation Yonezawa Testing Center
4149-7 Hachimanpara 5-chome Yonezawa-shi Yamagata 992-1128 Japan
Phone: +81-238-28-2880 Fax: +81-238-28-2888

6.2 Facility filing information:

1) NVLAP accreditation: NVLAP Lab. code: 200306-0

2) FCC filing:

Site name	Registration Number	Expiry Date
Site 2, Site3	91065	November 19, 2011
3m Semi-anechoic chamber 10m Semi-anechoic chamber	540072	February 16, 2013

3) Industry Canada Oats site filing:

Site name	Sites on file: Oats 3m/10m	Expiry Date
Site 2	4224A-2	February 16, 2012
Site 3	4224A-3	February 16, 2012
3m Semi-anechoic chamber	4224A-4	February 16, 2012
10m Semi-anechoic chamber	4224A-5	February 16, 2012

4) VCCI site filing:

Site name	Radiated emission	Conducted Emission for mains port	Expiry Date	Conducted emission for telecom port	Expiry Date
Site 2	R-137	C-133	Nov. 16, 2011	T-1477	Oct. 8, 2011
Site 3	R-138	C-134	Nov. 16, 2011	T-1478	Oct. 8, 2011
10m Semi-anechoic chamber	R-2480	C-2722	Jul. 3, 2011	T-1474	Oct. 8, 2011
3m Semi-anechoic chamber	R-2481	C-2723	Jul. 3, 2011	T-1475	Oct. 8, 2011
Shielded room No.1	R-137	C-2724	Jul. 3, 2011	T-1476	Oct. 8, 2011

5) ETL SEMKO authorization:

Authorized as an EMC test laboratory.

6) TUV Rheinland authorization:

Authorized as an EMC test laboratory.

7) BUREAU VERITAS certification:

Certified as an EMC test laboratory.

Appendix A: Test equipment

List of Measuring Instruments

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. date
Spectrum Analyzer (3Hz – 42.98GHz)	Agilent Technologies	E4447A	MY46180188	Feb. 2012	Feb. 23, 2011
Preamplifier (100kHz-1.2GHz)	ANRITSU	MH648A	M96057	Jun. 2011	Jun. 12, 2010
Preamplifier (1GHz-26.5GHz)	Agilent Technologies	8449B	3008A01008	Feb. 2012	Feb. 23, 2011
EMI Receiver	ROHDE&SCHWARZ	ESCI	100765	Jun. 2011	Jun. 9, 2010
Loop antenna	ROHDE&SCHWARZ	HFH2-Z2	891847/17	Feb. 2011	Feb. 25, 2010
TRILOG Antenna	Schwarzbeck	VULB9160	9160-3220	Apr. 2012	Apr. 5, 2011
Attenuator (6dB)	TME	CFA-01NPJ-6	N/A (S274)	Jun. 2011	Jun. 12, 2010
Double Ridged Guide Antenna	EMCO	3115	4328	Dec. 2011	Dec. 16, 2010
Broad-Band Horn antenna	Schwarzbeck	BBHA9170	BBHA9170189	Apr. 2013	Apr. 20, 2010
Preamplifier	TSJ	MLA-1840-B03-35	1240332	Apr. 2013	Apr. 20, 2010
Microwave cable	SUHNER	SUCOFLEX104/9m	322083/4	Oct. 2011	Oct. 6, 2010
Microwave cable	SUHNER	SUCOFLEX104/1m	322084/4	Oct. 2011	Oct. 6, 2010
Microwave cable	SUHNER	SUCOFLEX104/1.5m	317226/4	Oct. 2011	Oct. 6, 2010
Microwave cable	SUHNER	SUCOFLEX106/7m	41625/6	Oct. 2011	Oct. 6, 2010
Notch filter	Micro-Tronics	BRM50702	045	Oct. 2011	Oct. 6, 2010
PC	DELL	DIMENSION E521	85465BX	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V3.4	N/A	N/A
3m Semi an-echoic Chamber	TOKIN	N/A	N/A (9002-NSA)	May 2011	May 18, 2010

*The calibrations of the above equipment are traceable to NIST or equivalent standards of the reference organizations.